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SAR EVALUATION REPORT

Applicant Name:
Apple Inc.
One Apple Park Way
Cupertino, CA 95014 USA

Date of Testing:
05/20/2019-06/05/2019
Test Site/Location:
PCTEST Lab, Morgan Hill, CA, USA
Document Serial No.:
1C1901280004-01-R2.BCG

FCC ID:	**BCGA2198**
APPLICANT:	**APPLE, INC.**

DUT Type:	Tablet Device
Application Type:	Certification
FCC Rule Part(s):	CFR §2.1093
Model:	A2198, A2199

Equipment Class	Band & Mode	Tx Frequency	SAR 1g Body (W/kg)
PCB	GPRS/EDGE 850	824.20 - 848.80 MHz	1.18
PCB	GPRS/EDGE 1900	1850.20 - 1909.80 MHz	1.12
PCB	UMTS 850	826.40 - 846.60 MHz	1.13
PCB	UMTS 1750	1712.4 - 1752.6 MHz	1.00
PCB	UMTS 1900	1852.4 - 1907.6 MHz	1.18
PCB	LTE Band 12	699.7 - 715.3 MHz	1.13
PCB	LTE Band 17	706.5 - 713.5 MHz	N/A
PCB	LTE Band 13	779.5 - 784.5 MHz	1.01
PCB	LTE Band 14	790.5 - 795.5 MHz	0.95
PCB	LTE Band 5 (Cell)	824.7 - 848.3 MHz	1.16
PCB	LTE Band 26 (Cell)	814.7 - 848.3 MHz	1.18
PCB	LTE Band 66 (AWS)	1710.7 - 1779.3 MHz	1.16
PCB	LTE Band 4 (AWS)	1710.7 - 1754.3 MHz	N/A
PCB	LTE Band 25 (PCS)	1850.7 - 1914.3 MHz	1.17
PCB	LTE Band 2 (PCS)	1850.7 - 1909.3 MHz	N/A
PCB	LTE Band 30	2307.5 - 2312.5 MHz	0.93
PCB	LTE Band 7	2502.5 - 2567.5 MHz	1.04
PCB	LTE Band 41	2498.5 - 2687.5 MHz	1.18
DTS	2.4 GHz WLAN	2412 - 2472 MHz	0.98
NII	U-NII-1	5180 - 5240 MHz	N/A
NII	U-NII-2A	5260 - 5320 MHz	0.92
NII	U-NII-2C	5500 - 5720 MHz	0.99
NII	U-NII-3	5745 - 5825 MHz	0.83
DSS/DTS	Bluetooth	2402 - 2480 MHz	1.08
Simultaneous SAR per KDB 690783 D01v01r03:			**1.37**

Note: This revised Test Report (S/N: 1C1901280004-01-R2.BCG) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

This wireless portable device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in ANSI/IEEE C95.1-1992 and has been tested in accordance with the measurement procedures specified in Section 1.7 of this report; for North American frequency bands only.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them. Test results reported herein relate only to the item(s) tested.

Randy Ortanez
President

The SAR Tick is an initiative of the Mobile & Wireless Forum (MWF). While a product may be considered eligible, use of the SAR Tick logo requires an agreement with the MWF. Further details can be obtained by emailing: sartick@mwfai.info.

REV 21.3 M
02/15/2019

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1 DEVICE UNDER TEST

1.1 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GPRS/EDGE 850	Data	824.20 - 848.80 MHz
GPRS/EDGE 1900	Data	1850.20 - 1909.80 MHz
UMTS 850	Data	826.40 - 846.60 MHz
UMTS 1750	Data	1712.4 - 1752.6 MHz
UMTS 1900	Data	1852.4 - 1907.6 MHz
LTE Band 12	Data	699.7 - 715.3 MHz
LTE Band 17	Data	706.5 - 713.5 MHz
LTE Band 13	Data	779.5 - 784.5 MHz
LTE Band 14	Data	790.5 - 795.5 MHz
LTE Band 5 (Cell)	Data	824.7 - 848.3 MHz
LTE Band 26 (Cell)	Data	814.7 - 848.3 MHz
LTE Band 66 (AWS)	Data	1710.7 - 1779.3 MHz
LTE Band 4 (AWS)	Data	1710.7 - 1754.3 MHz
LTE Band 25 (PCS)	Data	1850.7 - 1914.3 MHz
LTE Band 2 (PCS)	Data	1850.7 - 1909.3 MHz
LTE Band 30	Data	2307.5 - 2312.5 MHz
LTE Band 7	Data	2502.5 - 2567.5 MHz
LTE Band 41	Data	2498.5 - 2687.5 MHz
2.4 GHz WLAN	Voice/Data	2412 - 2472 MHz
U-NII-1	Voice/Data	5180 - 5240 MHz
U-NII-2A	Voice/Data	5260 - 5320 MHz
U-NII-2C	Voice/Data	5500 - 5720 MHz
U-NII-3	Voice/Data	5745 - 5825 MHz
Bluetooth	Data	2402 - 2480 MHz

1.2 Power Reduction for SAR

This device uses the manufacturer's proprietary motion detect mode to determine proximity to the user's body and set the licensed power level accordingly for SAR compliance. When being used in the hand or the body, the output power for licensed transmitters will always be reduced. Per FCC KDB Guidance, SAR testing was performed only using reduced output powers following the test positions in KDB Publication 616217.

This device additionally utilizes a power reduction mechanism for Bluetooth operations. When Bluetooth is operating simultaneously with 5 GHz WLAN, the output power is permanently reduced. SAR evaluations were additionally performed at the maximum allowed output power for these scenarios to evaluate simultaneous transmission compliance.

Detailed descriptions of the power reduction mechanisms are included in the operational description. The power reduction mechanisms were confirmed during the SAR Evaluation. Section 8.5 and Appendix G contains a summary of the verification results.

1.3 Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v06.

1.3.1 2G/3G/4G Output Power for Portable Use Conditions

A. Antenna C

Mode / Band		Burst Average GMSK (dBm)		Burst Average 8-PSK (dBm)	
		1 TX Slots	*2 TX Slots*	*1 TX Slots*	*2 TX Slots*
GPRS/EDGE 850	Maximum	**27.75**	**24.75**	**24.75**	**23.75**
	Nominal	**27.00**	**24.00**	**24.00**	**23.00**
GPRS/EDGE 1900	Maximum	**21.95**	**18.95**	**21.95**	**18.95**
	Nominal	**21.20**	**18.20**	**21.20**	**18.20**

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*	*3GPP DC-HSDPA*
UMTS Band 5 (850 MHz)	Maximum	**17.70**	**17.70**	**17.70**	**17.70**
	Nominal	**17.20**	**17.20**	**17.20**	**17.20**
UMTS Band 4 (1750 MHz)	Maximum	**13.30**	**13.30**	**13.30**	**13.30**
	Nominal	**12.80**	**12.80**	**12.80**	**12.80**
UMTS Band 2 (1900 MHz)	Maximum	**13.10**	**13.10**	**13.10**	**13.10**
	Nominal	**12.60**	**12.60**	**12.60**	**12.60**

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	**17.50**
	Nominal	**17.00**
LTE Band 17	Maximum	**17.50**
	Nominal	**17.00**
LTE Band 13	Maximum	**18.10**
	Nominal	**17.60**
LTE Band 14	Maximum	**18.10**
	Nominal	**17.60**
LTE Band 5 (Cell)	Maximum	**17.70**
	Nominal	**17.20**
LTE Band 26 (Cell)	Maximum	**19.00**
	Nominal	**18.50**
LTE Band 66 (AWS)	Maximum	**13.30**
	Nominal	**12.80**
LTE Band 4 (AWS)	Maximum	**13.30**
	Nominal	**12.80**
LTE Band 25 (PCS)	Maximum	**13.10**
	Nominal	**12.60**
LTE Band 2 (PCS)	Maximum	**13.10**
	Nominal	**12.60**
LTE Band 30	Maximum	**13.20**
	Nominal	**12.70**
LTE Band 7 ULCA	Maximum	**12.40**
	Nominal	**11.40**
LTE Band 7	Maximum	**12.40**
	Nominal	**11.90**
LTE Band 41 (PC3) ULCA	Maximum	**15.40**
	Nominal	**14.40**
LTE Band 41 (PC3)	Maximum	**15.40**
	Nominal	**14.90**
LTE Band 41 (PC2)	Maximum	**15.40**
	Nominal	**14.90**

B. Antenna D

Mode / Band		Burst Average GMSK (dBm)		Burst Average 8-PSK (dBm)	
		1 TX Slots	*2 TX Slots*	*1 TX Slots*	*2 TX Slots*
GPRS/EDGE 850	Maximum	**28.25**	**25.50**	**22.75**	**21.75**
	Nominal	**27.50**	**24.75**	**22.00**	**21.00**
GPRS/EDGE 1900	Maximum	**21.25**	**18.25**	**21.25**	**18.25**
	Nominal	**20.50**	**17.50**	**20.50**	**17.50**

Mode / Band		Modulated Average (dBm)			
		3GPP WCDMA	*3GPP HSDPA*	*3GPP HSUPA*	*3GPP DC-HSDPA*
UMTS Band 5 (850 MHz)	Maximum	**19.20**	**19.20**	**19.20**	**19.20**
	Nominal	**18.70**	**18.70**	**18.70**	**18.70**
UMTS Band 4 (1750 MHz)	Maximum	**13.20**	**13.20**	**13.20**	**13.20**
	Nominal	**12.70**	**12.70**	**12.70**	**12.70**
UMTS Band 2 (1900 MHz)	Maximum	**12.00**	**12.00**	**12.00**	**12.00**
	Nominal	**11.50**	**11.50**	**11.50**	**11.50**

Mode / Band		Modulated Average (dBm)
LTE Band 12	Maximum	**17.20**
	Nominal	**16.70**
LTE Band 17	Maximum	**17.20**
	Nominal	**16.70**
LTE Band 13	Maximum	**18.30**
	Nominal	**17.80**
LTE Band 14	Maximum	**18.30**
	Nominal	**17.80**
LTE Band 5 (Cell)	Maximum	**19.20**
	Nominal	**18.70**
LTE Band 26 (Cell)	Maximum	**18.20**
	Nominal	**17.70**
LTE Band 66 (AWS)	Maximum	**13.20**
	Nominal	**12.70**
LTE Band 4 (AWS)	Maximum	**13.20**
	Nominal	**12.70**
LTE Band 25 (PCS)	Maximum	**12.00**
	Nominal	**11.50**
LTE Band 2 (PCS)	Maximum	**12.00**
	Nominal	**11.50**
LTE Band 30	Maximum	**12.80**
	Nominal	**12.30**
LTE Band 7 ULCA	Maximum	**12.40**
	Nominal	**11.40**
LTE Band 7	Maximum	**12.40**
	Nominal	**11.90**
LTE Band 41 (PC3) ULCA	Maximum	**15.40**
	Nominal	**14.40**
LTE Band 41 (PC3)	Maximum	**15.40**
	Nominal	**14.90**
LTE Band 41 (PC2)	Maximum	**15.40**
	Nominal	**14.90**

1.3.1 Unlicensed Maximum Output Power

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Antenna A				
Channel		1	2 - 10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum	**16.00**				**14.50**
	Nominal	**14.50**				**13.00**
IEEE 802.11g (2.4 GHz)	Maximum	**15.00**	**16.00**	**14.00**	**12.00**	**2.00**
	Nominal	**13.50**	**14.50**	**12.50**	**10.50**	**0.50**
IEEE 802.11n (2.4 GHz)	Maximum	**15.00**	**16.00**	**14.00**	**12.00**	**2.00**
	Nominal	**13.50**	**14.50**	**12.50**	**10.50**	**0.50**

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Antenna B				
Channel		1	2 - 10	11	12	13
IEEE 802.11b (2.4 GHz)	Maximum	**16.00**				**14.50**
	Nominal	**14.50**				**13.00**
IEEE 802.11g (2.4 GHz)	Maximum	**15.00**	**16.00**	**14.00**	**12.00**	**2.00**
	Nominal	**13.50**	**14.50**	**12.50**	**10.50**	**0.50**
IEEE 802.11n (2.4 GHz)	Maximum	**15.00**	**16.00**	**14.00**	**12.00**	**2.00**
	Nominal	**13.50**	**14.50**	**12.50**	**10.50**	**0.50**

Mode / Band			Modulated Average - MIMO (dBm)				
			20 MHz Bandwidth				
Channel			1	2 - 10	11	12	13
IEEE 802.11g/n (2.4 GHz)	Antenna: A	Maximum	**13.50**	**16.00**	**13.00**	**10.50**	**0.50**
		Nominal	**12.00**	**14.50**	**11.50**	**9.00**	**-1.00**
	Antenna: B	Maximum	**13.50**	**16.00**	**13.00**	**10.50**	**0.50**
		Nominal	**12.00**	**14.50**	**11.50**	**9.00**	**-1.00**

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Antenna A
Bluetooth BDR/LE	Maximum	**17.00**
	Nominal	**15.50**
Bluetooth EDR	Maximum	**12.50**
	Nominal	**11.00**

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Antenna A																								
		20 MHz Bandwidth									40 MHz Bandwidth									80 MHz Bandwidth				
Channel		36	40-48	52-60	64	100	104-136	140	144	149-165	38	46	54	62	102	110-126	134	142	151-159	42-58	106	122	138	155
IEEE 802.11a (5 GHz)	Maximum	**16.00**	**16.50**	**17.00**	**16.00**	**15.00**	**17.50**	**15.00**	**17.50**	**16.25**														
	Nominal	**14.50**	**15.00**	**15.50**	**14.50**	**13.50**	**16.00**	**13.50**	**16.00**	**14.75**														
IEEE 802.11n (5 GHz)	Maximum	**16.00**	**16.50**	**17.00**	**16.00**	**15.00**	**17.50**	**15.00**	**17.50**	**16.25**	**14.00**	**16.50**	**17.00**	**14.50**	**14.00**	**17.50**	**15.50**	**17.50**	**16.25**					
	Nominal	**14.50**	**15.00**	**15.50**	**14.50**	**13.50**	**16.00**	**13.50**	**16.00**	**14.75**	**12.50**	**15.00**	**15.50**	**13.00**	**12.50**	**16.00**	**14.00**	**16.00**	**14.75**					
IEEE 802.11ac (5 GHz)	Maximum	**16.00**	**16.50**	**17.00**	**16.00**	**15.00**	**17.50**	**15.00**	**17.50**	**16.25**	**14.00**	**16.50**	**17.00**	**14.50**	**14.00**	**17.50**	**15.50**	**17.50**	**16.25**	**13.00**	**14.00**	**17.00**	**17.50**	**16.25**
	Nominal	**14.50**	**15.00**	**15.50**	**14.50**	**13.50**	**16.00**	**13.50**	**16.00**	**14.75**	**12.50**	**15.00**	**15.50**	**13.00**	**12.50**	**16.00**	**14.00**	**16.00**	**14.75**	**11.50**	**12.50**	**15.50**	**16.00**	**14.75**

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Antenna B																						
		20 MHz Bandwidth									40 MHz Bandwidth									80 MHz Bandwidth				
	Channel	36	40-48	52-60	64	100	104-136	140	144	149-165	38	46	54	62	102	110-126	134	142	151-159	42-58	106	122	138	155
IEEE 802.11a (5 GHz)	Maximum	**16.00**	**16.25**	**16.75**	**16.00**	**15.00**	**17.25**	**15.00**	**17.25**	**16.50**														
	Nominal	**14.50**	**14.75**	**15.25**	**14.50**	**13.50**	**15.75**	**13.50**	**15.75**	**15.00**														
IEEE 802.11n (5 GHz)	Maximum	**16.00**	**16.25**	**16.75**	**16.00**	**15.00**	**17.25**	**15.00**	**17.25**	**16.50**	**14.00**	**16.25**	**16.75**	**14.50**	**14.00**	**17.25**	**15.50**	**17.25**	**16.50**					
	Nominal	**14.50**	**14.75**	**15.25**	**14.50**	**13.50**	**15.75**	**13.50**	**15.75**	**15.00**	**12.50**	**14.75**	**15.25**	**13.00**	**12.50**	**15.75**	**14.00**	**15.75**	**15.00**					
IEEE 802.11ac (5 GHz)	Maximum	**16.00**	**16.25**	**16.75**	**16.00**	**15.00**	**17.25**	**15.00**	**17.25**	**16.50**	**14.00**	**16.25**	**16.75**	**14.50**	**14.00**	**17.25**	**15.50**	**17.25**	**16.50**	**13.00**	**14.00**	**17.00**	**17.25**	**16.50**
	Nominal	**14.50**	**14.75**	**15.25**	**14.50**	**13.50**	**15.75**	**13.50**	**15.75**	**15.00**	**12.50**	**14.75**	**15.25**	**13.00**	**12.50**	**15.75**	**14.00**	**15.75**	**15.00**	**11.50**	**12.50**	**15.50**	**15.75**	**15.00**

Mode / Band			Modulated Average - MIMO (dBm) 2Tx CDD																							
			20 MHz Bandwidth									40 MHz Bandwidth									80 MHz Bandwidth					
Channel			36	40-48	52-60	64-100	104-136	140	144	149-165	38	46	54	62	102	110-126	134	142	151-159	42	58	106	122	138	155
IEEE 802.11a (5 GHz)	Antenna: A	Maximum	**15.00**	**16.50**	**16.50**	**14.50**	**15.50**	**13.50**	**15.50**	**16.25**																
		Nominal	**13.50**	**15.00**	**15.00**	**13.00**	**14.00**	**12.00**	**14.00**	**14.75**																
	Antenna: B	Maximum	**15.00**	**16.25**	**16.50**	**14.50**	**15.50**	**13.50**	**15.50**	**16.50**																
		Nominal	**13.50**	**14.75**	**15.00**	**13.00**	**14.00**	**12.00**	**14.00**	**15.00**																
IEEE 802.11n (5 GHz)	Antenna: A	Maximum	**15.00**	**16.50**	**16.50**	**14.50**	**15.50**	**13.50**	**15.50**	**16.25**	**12.50**	**16.50**	**17.00**	**13.50**	**13.00**	**17.50**	**14.00**	**17.50**	**16.25**							
		Nominal	**13.50**	**15.00**	**15.00**	**13.00**	**14.00**	**12.00**	**14.00**	**14.75**	**11.00**	**15.00**	**15.50**	**12.00**	**11.50**	**16.00**	**12.50**	**16.00**	**14.75**							
	Antenna: B	Maximum	**15.00**	**16.25**	**16.50**	**14.50**	**15.50**	**13.50**	**15.50**	**16.50**	**12.50**	**16.25**	**16.75**	**13.50**	**13.00**	**17.25**	**14.00**	**17.25**	**16.50**							
		Nominal	**13.50**	**14.75**	**15.00**	**13.00**	**14.00**	**12.00**	**14.00**	**15.00**	**11.00**	**14.75**	**15.25**	**12.00**	**11.50**	**15.75**	**12.50**	**15.75**	**15.00**							
IEEE 802.11ac (5 GHz)	Antenna: A	Maximum	**15.00**	**16.50**	**16.50**	**14.50**	**15.50**	**13.50**	**15.50**	**16.25**	**12.50**	**16.50**	**17.00**	**13.50**	**13.00**	**17.50**	**14.00**	**17.50**	**16.25**	**11.50**	**12.00**	**13.00**	**17.00**	**17.50**	**16.00**	
		Nominal	**13.50**	**15.00**	**15.00**	**13.00**	**14.00**	**12.00**	**14.00**	**14.75**	**11.00**	**15.00**	**15.50**	**12.00**	**11.50**	**16.00**	**12.50**	**16.00**	**14.75**	**10.00**	**10.50**	**11.50**	**15.50**	**16.00**	**14.50**	
	Antenna: B	Maximum	**15.00**	**16.25**	**16.50**	**14.50**	**15.50**	**13.50**	**15.50**	**16.50**	**12.50**	**16.25**	**16.75**	**13.50**	**13.00**	**17.25**	**14.00**	**17.25**	**16.50**	**11.50**	**12.00**	**13.00**	**17.00**	**17.25**	**16.00**	
		Nominal	**13.50**	**14.75**	**15.00**	**13.00**	**14.00**	**12.00**	**14.00**	**15.00**	**11.00**	**14.75**	**15.25**	**12.00**	**11.50**	**15.75**	**12.50**	**15.75**	**15.00**	**10.00**	**10.50**	**11.50**	**15.50**	**15.75**	**14.50**	

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above.

Mode / Band			Modulated Average - MIMO (dBm) 2Tx SDM																							
			20 MHz Bandwidth									40 MHz Bandwidth									80 MHz Bandwidth					
Channel			36	40-48	52-60	64-100	104-136	140	144	149-165	38	46	54	62	102	110-126	134	142	151-159	42	58	106	122	138	155
IEEE 802.11n (5 GHz)	Antenna: A	Maximum	**15.00**	**16.50**	**17.00**	**14.50**	**17.50**	**13.50**	**17.50**	**16.25**	**12.50**	**16.50**	**17.00**	**13.50**	**13.00**	**17.50**	**14.00**	**17.50**	**16.25**							
		Nominal	**13.50**	**15.00**	**15.50**	**13.00**	**16.00**	**12.00**	**16.00**	**14.75**	**11.00**	**15.00**	**15.50**	**12.00**	**11.50**	**16.00**	**12.50**	**16.00**	**14.75**							
	Antenna: B	Maximum	**15.00**	**16.25**	**16.75**	**14.50**	**17.25**	**13.50**	**17.25**	**16.50**	**12.50**	**16.25**	**16.75**	**13.50**	**13.00**	**17.25**	**14.00**	**17.25**	**16.50**							
		Nominal	**13.50**	**14.75**	**15.25**	**13.00**	**15.75**	**12.00**	**15.75**	**15.00**	**11.00**	**14.75**	**15.25**	**12.00**	**11.50**	**15.75**	**12.50**	**15.75**	**15.00**							
IEEE 802.11ac (5 GHz)	Antenna: A	Maximum	**15.00**	**16.50**	**17.00**	**14.50**	**17.50**	**13.50**	**17.50**	**16.25**	**12.50**	**16.50**	**17.00**	**13.50**	**13.00**	**17.50**	**14.00**	**17.50**	**16.25**	**11.50**	**12.00**	**13.00**	**17.00**	**17.50**	**16.00**	
		Nominal	**13.50**	**15.00**	**15.50**	**13.00**	**16.00**	**12.00**	**16.00**	**14.75**	**11.00**	**15.00**	**15.50**	**12.00**	**11.50**	**16.00**	**12.50**	**16.00**	**14.75**	**10.00**	**10.50**	**11.50**	**15.50**	**16.00**	**14.50**	
	Antenna: B	Maximum	**15.00**	**16.25**	**16.75**	**14.50**	**17.25**	**13.50**	**17.25**	**16.50**	**12.50**	**16.25**	**16.75**	**13.50**	**13.00**	**17.25**	**14.00**	**17.25**	**16.50**	**11.50**	**12.00**	**13.00**	**17.00**	**17.25**	**16.00**	
		Nominal	**13.50**	**14.75**	**15.25**	**13.00**	**15.75**	**12.00**	**15.75**	**15.00**	**11.00**	**14.75**	**15.25**	**12.00**	**11.50**	**15.75**	**12.50**	**15.75**	**15.00**	**10.00**	**10.50**	**11.50**	**15.50**	**15.75**	**14.50**	

Note: In MIMO operations, each antenna transmits at maximum allowed powers as indicated above.

1.3.2 Unlicensed Reduced Output Power

Mode / Band		Modulated Average - Single Tx Chain (dBm) - Antenna A
Bluetooth BDR/EDR/LE	Maximum	**10.00**
	Nominal	**8.50**

Note: Bluetooth operations on Antenna A are reduced in output power when it is operating simultaneously with 5 GHz WLAN. Detailed description of the power reduction mechanism is included in the operational description.

1.4 DUT Antenna Locations

The overall dimensions of this device is > 200 mm. A diagram showing the location of the device antennas can be found in Appendix F. Exact antenna dimensions and separation distances are shown in the Technical Descriptions in the FCC filings.

Table 1-1
Device Edges/Sides for SAR Testing

Mode	Back	Front	Top	Bottom	Right	Left
GPRS 850 Antenna C	Yes	No	Yes	No	Yes	No
GPRS 1900 Antenna C	Yes	No	Yes	No	Yes	No
UMTS 850 Antenna C	Yes	No	Yes	No	Yes	No
UMTS 1750 Antenna C	Yes	No	Yes	No	Yes	No
UMTS 1900 Antenna C	Yes	No	Yes	No	Yes	No
LTE Band 12 Antenna C	Yes	No	Yes	No	Yes	No
LTE Band 13 Antenna C	Yes	No	Yes	No	Yes	No
LTE Band 14 Antenna C	Yes	No	Yes	No	Yes	No
LTE Band 5 (Cell) Antenna C	Yes	No	Yes	No	Yes	No
LTE Band 26 (Cell) Antenna C	Yes	No	Yes	No	Yes	No
LTE Band 66 (AWS) Antenna C	Yes	No	Yes	No	Yes	No
LTE Band 25 (PCS) Antenna C	Yes	No	Yes	No	Yes	No
LTE Band 30 Antenna C	Yes	No	Yes	No	Yes	No
LTE Band 7 Antenna C	Yes	No	Yes	No	Yes	No
LTE Band 41 Antenna C	Yes	No	Yes	No	Yes	No
GPRS 850 Antenna D	Yes	No	Yes	No	No	Yes
GPRS 1900 Antenna D	Yes	No	Yes	No	No	Yes
UMTS 850 Antenna D	Yes	No	Yes	No	No	Yes
UMTS 1750 Antenna D	Yes	No	Yes	No	No	Yes
UMTS 1900 Antenna D	Yes	No	Yes	No	No	Yes
LTE Band 12 Antenna D	Yes	No	Yes	No	No	Yes
LTE Band 13 Antenna D	Yes	No	Yes	No	No	Yes
LTE Band 14 Antenna D	Yes	No	Yes	No	No	Yes
LTE Band 5 (Cell) Antenna D	Yes	No	Yes	No	No	Yes
LTE Band 26 (Cell) Antenna D	Yes	No	Yes	No	No	Yes
LTE Band 66 (AWS) Antenna D	Yes	No	Yes	No	No	Yes
LTE Band 25 (PCS) Antenna D	Yes	No	Yes	No	No	Yes
LTE Band 30 Antenna D	Yes	No	Yes	No	No	Yes
LTE Band 7 Antenna D	Yes	No	Yes	No	No	Yes
LTE Band 41 Antenna D	Yes	No	Yes	No	No	Yes
2.4 GHz WLAN Antenna A	Yes	No	No	Yes	No	Yes
2.4 GHz WLAN Antenna B	Yes	No	No	Yes	Yes	No
5 GHz WLAN Antenna A	Yes	No	No	Yes	No	Yes
5 GHz WLAN Antenna B	Yes	No	No	Yes	Yes	No
Bluetooth Antenna A	Yes	No	No	Yes	No	Yes

Note: Per FCC KDB Publication 616217 D04v01r01, particular edges were not required to be evaluated for SAR based on the SAR exclusion threshold in KDB 447498 D01V06. Additional edges may have been evaluated for simultaneous transmission analysis.

1.5 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be operating simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds.

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v06 4.3.2 procedures.

Table 1-2
Simultaneous Transmission Scenarios

No.	Capable Transmit Configuration	Body
1	Cellular Band + 2.4 GHz WI-FI	Yes
2	Cellular Band + 5 GHz WI-FI	Yes
3	Cellular Band + 2.4 GHz Bluetooth	Yes
4	Cellular Band+ 2.4 GHz WI-FI MIMO	Yes
5	Cellular Band + 5 GHz WI-FI MIMO	Yes
6	Cellular Band + 2.4 GHz Bluetooth + 5 GHz WI-FI	Yes
7	Cellular Band + 2.4 GHz Bluetooth + 5 GHz WI-FI MIMO	Yes
8	2.4 GHz Bluetooth + 5 GHz WI-FI	Yes
9	2.4 GHz Bluetooth + 5 GHz WI-FI MIMO	Yes

1. There are no limitations in the above listed simultaneous transmission scenarios between cellular antennas and BT/WI-FI antennas.
2. 2.4 GHz WLAN and 2.4 GHz Bluetooth cannot transmit simultaneously.
3. 2.4 GHz WLAN and 5 GHz WLAN cannot transmit simultaneously.
4. All licensed modes share the same antenna path and cannot transmit simultaneously.
5. This device supports 2x2 MIMO Tx for WLAN. 802.11a/g/n/ac supports CDD/STBC and 802.11n/ac additionally supports SDM. Each WLAN antenna can transmit independently or together when operating with MIMO.
6. This device support VoWIFI.

1.6 Miscellaneous SAR Test Considerations

(A) WIFI/BT

Since U-NII-2A band have a higher or same specified maximum output power than U-NII-1 for both antennas A and B, U-NII-2A was evaluated for both antennas A and B SAR. Additional testing for U-NII-1 Antenna A and Antenna B was not required since all reported SAR for U-NII-2A was less than 1.2 W/kg per FCC KDB Publication 248227 D01v02r02.

The WLAN/Bluetooth chipset in this device is produced by two different suppliers. The electrically identical modules are manufactured with the identical mechanical structure to meet the same specifications and functions. Two device variants are referenced as Variant 1 and Variant 2 in this report.

WLAN/Bluetooth SAR worst case configuration was evaluated for Variant 1 and Variant 2. The Variant with the highest reported SAR value was evaluated for the remaining WLAN/Bluetooth configurations.

This device supports channel 1-13 for 2.4 GHz WLAN. However, because channel 12/13 targets are not higher than that of channels 1-11, channels 1, 6 and 11 were considered for SAR testing per FCC KDB 248227 D01V02r02.

This device supports IEEE 802.11ac with the following features:

a) Up to 80 MHz Bandwidth only
b) No aggregate channel configurations
c) 2 Tx antenna output
d) 256 QAM is supported
e) TDWR and Band gap channels are supported

(B) Licensed Transmitter(s)

This device is only capable of QPSK HSUPA in the uplink. Therefore, no additional SAR tests are required beyond that described for devices with HSUPA in KDB 941225 D01v03r01.

LTE SAR for the higher modulations and lower bandwidths were not tested since the maximum average output power of all required channels and configurations was not more than 0.5 dB higher than the highest bandwidth; and the reported LTE SAR for the highest bandwidth was less than 1.45 W/kg for all configurations according to FCC KDB 941225 D05v02r04.

This device supports LTE Carrier Aggregation (CA) in the downlink. All uplink communications are identical to Release 8 specifications. Per FCC KDB Publication 941225 D05A v01r02, SAR for LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive. The downlink carrier aggregation exclusion analysis can be found in Appendix H.

This device supports LTE capabilities with overlapping transmission frequency ranges. When the supported frequency range of an LTE Band falls completely within an LTE band with a larger transmission frequency range, both LTE bands have the same target power (or the band with the larger transmission frequency range has a higher target power), and both LTE bands share the same transmission path and signal characteristics, SAR was only assessed for the band with the larger transmission frequency range.

This device supports 64QAM on the uplink and 256QAM on the downlink for LTE Operations. Conducted powers for 64QAM uplink configurations were measured per Section 5.1 of FCC KDB Publication 941225 D05v02r05. SAR was not required for 64QAM since the highest maximum output power for 64 QAM is ≤ ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg, per Section 5.2.4 of FCC KDB Publication 941225 D05v02r05.

This device supports both Power Class 2 (PC2) and Power Class 3 (PC3) for LTE Band 41. Per May 2017 TCB Workshop Notes, SAR tests were performed with Power Class 3 (given the specific UL/DL limitations for Power Class 2). Additionally, SAR testing for the power class condition was evaluated for the highest configuration in Power Class 3 for each test configuration to confirm the results were scalable linearly (See Section 13).

This device supports LTE Carrier Aggregation (CA) for LTE Band 7 and LTE Band 41 with two component carriers in the uplink. LTE Band 41 ULCA only supported in PC3. SAR Measurements and conducted powers were evaluated per 2017 Fall TCB Workshop Notes.

1.7 Guidance Applied

- FCC KDB Publication 941225 D01v03r01, D05v02r04, D05Av01r02 (2G/3G/4G)
- FCC KDB Publication 248227 D01v02r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v06 (General SAR Guidance)
- FCC KDB Publication 865664 D01v01r04, D02v01r02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 616217 D04v01r02 (Tablet)
- October 2013 TCB Workshop Notes (GPRS Testing Considerations)
- May 2017 TCB Workshop Notes (LTE Band 41 Power Class 2/3)
- April 2018 TCB Workshop Notes (LTE Carrier Aggregation)

1.8 Device Serial Numbers

Several samples with identical hardware were used to support SAR testing. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units. The serial numbers used for each test are indicated alongside the results in Section 10.

2 LTE INFORMATION

LTE Information					
Form Factor	Tablet Device				
Frequency Range of each LTE transmission band	LTE Band 12 (699.7 - 715.3 MHz)				
	LTE Band 17 (706.5 - 713.5 MHz)				
	LTE Band 13 (779.5 - 784.5 MHz)				
	LTE Band 14 (790.5 - 795.5 MHz)				
	LTE Band 5 (Cell) (824.7 - 848.3 MHz)				
	LTE Band 26 (Cell) (814.7 - 848.3 MHz)				
	LTE Band 66 (AWS) (1710.7 - 1779.3 MHz)				
	LTE Band 4 (AWS) (1710.7 - 1754.3 MHz)				
	LTE Band 25 (PCS) (1850.7 - 1914.3 MHz)				
	LTE Band 2 (PCS) (1850.7 - 1909.3 MHz)				
	LTE Band 30 (2307.5 - 2312.5 MHz)				
	LTE Band 7 (2502.5 - 2567.5 MHz)				
	LTE Band 41 (2498.5 - 2687.5 MHz)				
Channel Bandwidths	LTE Band 12: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 17: 5 MHz, 10 MHz				
	LTE Band 13: 5 MHz, 10 MHz				
	LTE Band 14: 5 MHz, 10 MHz				
	LTE Band 5 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 26 (Cell): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz				
	LTE Band 66 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 4 (AWS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 25 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 2 (PCS): 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 30: 5 MHz, 10 MHz				
	LTE Band 7: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
	LTE Band 41: 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Numbers and Frequencies (MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 12: 1.4 MHz	699.7 (23017)		707.5 (23095)	715.3 (23173)	
LTE Band 12: 3 MHz	700.5 (23025)		707.5 (23095)	714.5 (23165)	
LTE Band 12: 5 MHz	701.5 (23035)		707.5 (23095)	713.5 (23155)	
LTE Band 12: 10 MHz	704 (23060)		707.5 (23095)	711 (23130)	
LTE Band 17: 5 MHz	706.5 (23755)		710 (23790)	713.5 (23825)	
LTE Band 17: 10 MHz	709 (23780)		710 (23790)	711 (23800)	
LTE Band 13: 5 MHz	779.5 (23205)		782 (23230)	784.5 (23255)	
LTE Band 13: 10 MHz	N/A		782 (23230)	N/A	
LTE Band 14: 5 MHz	790.5 (23305)		793 (23330)	795.5 (23355)	
LTE Band 14: 10 MHz	N/A		793 (23330)	N/A	
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)		836.5 (20525)	848.3 (20643)	
LTE Band 5 (Cell): 3 MHz	825.5 (20415)		836.5 (20525)	847.5 (20635)	
LTE Band 5 (Cell): 5 MHz	826.5 (20425)		836.5 (20525)	846.5 (20625)	
LTE Band 5 (Cell): 10 MHz	829 (20450)		836.5 (20525)	844 (20600)	
LTE Band 26 (Cell): 1.4 MHz	814.7 (26697)		831.5 (26865)	848.3 (27033)	
LTE Band 26 (Cell): 3 MHz	815.5 (26705)		831.5 (26865)	847.5 (27025)	
LTE Band 26 (Cell): 5 MHz	816.5 (26715)		831.5 (26865)	846.5 (27015)	
LTE Band 26 (Cell): 10 MHz	819 (26740)		831.5 (26865)	844 (26990)	
LTE Band 66 (AWS): 1.4 MHz	1710.7 (131979)		1745 (132322)	1779.3 (132665)	
LTE Band 66 (AWS): 3 MHz	1711.5 (131987)		1745 (132322)	1778.5 (132657)	
LTE Band 66 (AWS): 5 MHz	1712.5 (131997)		1745 (132322)	1777.5 (132647)	
LTE Band 66 (AWS): 10 MHz	1715 (132022)		1745 (132322)	1775 (132622)	
LTE Band 66 (AWS): 15 MHz	1717.5 (132047)		1745 (132322)	1772.5 (132597)	
LTE Band 66 (AWS): 20 MHz	1720 (132072)		1745 (132322)	1770 (132572)	
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)		1732.5 (20175)	1754.3 (20393)	
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)		1732.5 (20175)	1753.5 (20385)	
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)		1732.5 (20175)	1752.5 (20375)	
LTE Band 4 (AWS): 10 MHz	1715 (20000)		1732.5 (20175)	1750 (20350)	
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)		1732.5 (20175)	1747.5 (20325)	
LTE Band 4 (AWS): 20 MHz	1720 (20050)		1732.5 (20175)	1745 (20300)	
LTE Band 25 (PCS): 1.4 MHz	1850.7 (26047)		1882.5 (26365)	1914.3 (26683)	
LTE Band 25 (PCS): 3 MHz	1851.5 (26055)		1882.5 (26365)	1913.5 (26675)	
LTE Band 25 (PCS): 5 MHz	1852.5 (26065)		1882.5 (26365)	1912.5 (26665)	
LTE Band 25 (PCS): 10 MHz	1855 (26090)		1882.5 (26365)	1910 (26640)	
LTE Band 25 (PCS): 15 MHz	1857.5 (26115)		1882.5 (26365)	1907.5 (26615)	
LTE Band 25 (PCS): 20 MHz	1860 (26140)		1882.5 (26365)	1905 (26590)	
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)		1880 (18900)	1909.3 (19193)	
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)		1880 (18900)	1908.5 (19185)	
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)		1880 (18900)	1907.5 (19175)	
LTE Band 2 (PCS): 10 MHz	1855 (18650)		1880 (18900)	1905 (19150)	
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)		1880 (18900)	1902.5 (19125)	
LTE Band 2 (PCS): 20 MHz	1860 (18700)		1880 (18900)	1900 (19100)	
LTE Band 30: 5 MHz	2307.5 (27685)		2310 (27710)	2312.5 (27735)	
LTE Band 30: 10 MHz	N/A		2310 (27710)	N/A	
LTE Band 7: 5 MHz	2502.5 (20775)		2535 (21100)	2567.5 (21425)	
LTE Band 7: 10 MHz	2505 (20800)		2535 (21100)	2565 (21400)	
LTE Band 7: 15 MHz	2507.5 (20825)		2535 (21100)	2562.5 (21375)	
LTE Band 7: 20 MHz	2510 (20850)		2535 (21100)	2560 (21350)	
LTE Band 41: 5 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 10 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 15 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
LTE Band 41: 20 MHz	2506 (39750)	2549.5 (40185)	2593 (40620)	2636.5 (41055)	2680 (41490)
UE Category	DL UE Cat16 (QPSK, 16QAM, 64QAM, 256QAM), UL UE Cat13 (QPSK, 16QAM, 64QAM)				
Modulations Supported in UL	QPSK, 16QAM, 64QAM				
LTE MPR Permanently implemented per 3GPP TS 36.101 section 6.2.3~6.2.5? (manufacturer attestation to be provided)	YES				
A-MPR (Additional MPR) disabled for SAR Testing?	YES				
LTE Carrier Aggregation Possible Combinations	The technical description includes all the possible carrier aggregation combinations				
LTE Additional Information	This device does not support full CA features on 3GPP Release 13. It supports carrier aggregation features as shown in Section 8 and Appendix H. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. The following LTE Release 13 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, WIFI Offloading, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

3 INTRODUCTION

The FCC and Innovation, Science, and Economic Development Canada have adopted the guidelines for evaluating the environmental effects of radio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. [1]

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz [3] and Health Canada RF Exposure Guidelines Safety Code 6 [22]. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave [4] is used for guidance in measuring the Specific Absorption Rate (SAR) due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the International Committee for Non-Ionizing Radiation Protection (ICNIRP) in Biological Effects and Exposure Criteria for Radiofrequency Electromagnetic Fields," Report No. Vol 74. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

3.1 SAR Definition

Specific Absorption Rate is defined as the time derivative (rate) of the incremental energy (dU) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Equation 3-1).

Equation 3-1
SAR Mathematical Equation

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{\rho dv}\right)$$

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \frac{\sigma \cdot E^2}{\rho}$$

where:

σ = conductivity of the tissue-simulating material (S/m)
ρ = mass density of the tissue-simulating material (kg/m^3)
E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relation to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.[6]

4 DOSIMETRIC ASSESSMENT

4.1 Measurement Procedure

The evaluation was performed using the following procedure compliant to FCC KDB Publication 865664 D01v01r04 and IEEE 1528-2013:

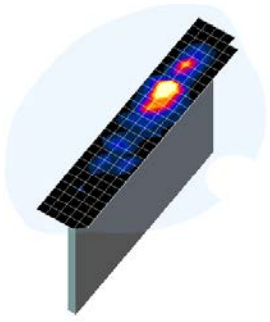

Figure 4-1
Sample SAR Area Scan

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013.
2. The point SAR measurement was taken at the maximum SAR region determined from Step 1 to enable the monitoring of SAR fluctuations/drifts during the 1g/10g cube evaluation. SAR at this fixed point was measured and used as a reference value.
3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r04 (See Table 4-1) and IEEE 1528-2013. On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (see references or the DASY manual online for more details):

   a. SAR values at the inner surface of the phantom are extrapolated from the measured values along the line away from the surface with spacing no greater than that in Table 4-1. The extrapolation was based on a least-squares algorithm. A polynomial of the fourth order was calculated through the points in the z-axis (normal to the phantom shell).

   b. After the maximum interpolated values were calculated between the points in the cube, the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.

   c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift measurements were repeated.

Table 4-1
Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

Frequency	Maximum Area Scan Resolution (mm) (Δx_{area}, Δy_{area})	Maximum Zoom Scan Resolution (mm) (Δx_{zoom}, Δy_{zoom})	Maximum Zoom Scan Spatial Resolution (mm)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
			$\Delta z_{zoom}(n)$	$\Delta z_{zoom}(1)$*	$\Delta z_{zoom}(n>1)$*	
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 22

*Also compliant to IEEE 1528-2013 Table 6

5 TEST CONFIGURATION POSITIONS

5.1 Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02.

5.2 SAR Testing for Tablet per KDB Publication 616217 D04v01r02

Per FCC KDB Publication 616217 D04v01r02, the back surface and edges of the tablet should be tested for SAR compliance with the tablet touching the phantom. The SAR Exclusion Threshold in KDB 447498 D01v06 can be applied to determine SAR test exclusion for adjacent edge configurations. The closest distance from the antenna to an adjacent tablet edge is used to determine if SAR testing is required for the adjacent edges, with the adjacent edge positioned against the phantom and the edge containing the antenna positioned perpendicular to the phantom.

6 RF EXPOSURE LIMITS

6.1 Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

6.2 Controlled Environment

CONTROLLED ENVIRONMENTS are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table 6-1
SAR Human Exposure Specified in ANSI/IEEE C95.1-1992 and Health Canada Safety Code 6

HUMAN EXPOSURE LIMITS		
	UNCONTROLLED ENVIRONMENT *General Population* (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT *Occupational* (W/kg) or (mW/g)
Peak Spatial Average SAR Head	1.6	8.0
Whole Body SAR	0.08	0.4
Peak Spatial Average SAR Hands, Feet, Ankle, Wrists, etc.	4.0	20

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

7 FCC MEASUREMENT PROCEDURES

Power measurements for licensed transmitters are performed using a base station simulator under digital average power.

7.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v06, when SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured at or scaled to the maximum tune-up tolerance limit, the results are referred to as *reported* SAR. The highest *reported* SAR results are identified on the grant of equipment authorization according to procedures in KDB 690783 D01v01r03.

7.2 3G SAR Test Reduction Procedure

In FCC KDB Publication 941225 D01v03r01, certain transmission modes within a frequency band and wireless mode evaluated for SAR are defined as primary modes. The equivalent modes considered for SAR test reduction are denoted as secondary modes. When the maximum output power including tune-up tolerance specified for production units in a secondary mode is ≤ 0.25 dB higher than the primary mode or when the highest reported SAR of the primary mode, scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode, is ≤ 1.2 W/kg, SAR measurements are not required for the secondary mode. These criteria are referred to as the 3G SAR test reduction procedure. When the 3G SAR test reduction procedure is not satisfied, SAR measurements are additionally required for the secondary mode.

7.3 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01v03r01 “3G SAR Measurement Procedures.”

The device is placed into a simulated call using a base station simulator in a RF shielded chamber. Establishing connections in this manner ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. Devices under test are evaluated prior to testing, with a fully charged battery and were configured to operate at maximum output power. In order to verify that the device is tested throughout the SAR test at maximum output power, the SAR measurement system measures a “point SAR” at an arbitrary reference point at the start and end of the 1 gram SAR evaluation, to assess for any power drifts during the evaluation. If the power drift deviates by more than 5%, the SAR test and drift measurements are repeated.

7.4 SAR Measurement Conditions for UMTS

7.4.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC with TPC (transmit power control) set to all “1s” or applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

7.4.2 Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all “1s”. The 3G SAR test reduction procedure is applied to other spreading codes and multiple $DPDCH_n$ configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreading code or $DPDCH_n$, for the highest reported SAR configuration in 12.2 kbps RMC.

7.4.3 SAR Measurements with Rel 5 HSDPA

The 3G SAR test reduction procedure is applied to HSDPA body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, for the highest reported SAR configuration in 12.2 kbps RMC without HSDPA. Handsets with both HSDPA and HSUPA are tested according to Release 6 HSPA test procedures.

7.4.4 SAR Measurements with Rel 6 HSUPA

The 3G SAR test reduction procedure is applied to HSPA (HSUPA/HSDPA with RMC) body configurations with 12.2 kbps RMC as the primary mode. Otherwise, Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 and power control algorithm 2, according to the highest reported body SAR configuration in 12.2 kbps RMC without HSPA.

When VOIP applies to head exposure, the 3G SAR test reduction procedure is applied with 12.2 kbps RMC as the primary mode; otherwise, the same HSPA configuration used for body SAR measurements are applied to head exposure testing.

7.4.5 SAR Measurement Conditions for DC-HSDPA

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable.

7.5 SAR Measurement Conditions for LTE

LTE modes are tested according to FCC KDB 941225 D05v02r04 publication. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR [4]. The R&S CMW500 or Anritsu MT8820C simulators are used for LTE output power measurements and SAR testing. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

7.5.1 Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

7.5.2 MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

7.5.3 A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

7.5.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r04:

a. Per Section 5.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
    i. The required channel and offset combination with the highest maximum output power is required for SAR.
    ii. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
    iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.
c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
d. Per Section 5.2.4 and 5.3, SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sections 5.2.1 through 5.2.3 is less than or equal to ½ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is <1.45 W/kg.

7.5.5 TDD

LTE TDD testing is performed using the SAR test guidance provided in FCC KDB 941225 D05v02r04. TDD is tested at the highest duty factor using UL-DL configuration 0 with special subframe configuration 6 and applying the FDD LTE procedures in KDB 941225 D05v02r04. SAR testing is performed using the extended cyclic prefix listed in 3GPP TS 36.211 Section 4.

7.5.6 Downlink Only Carrier Aggregation

Conducted power measurements with LTE Carrier Aggregation (CA) (downlink only) active are made in accordance to KDB Publication 941225 D05Av01r02. The RRC connection is only handled by one cell, the primary component carrier (PCC) for downlink and uplink communications. After making a data connection to the PCC, the UE device adds secondary component carrier(s) (SCC) on the downlink only. All uplink communications and acknowledgements remain identical to specifications when downlink carrier aggregation is inactive on the PCC. Additional conducted output powers are measured with the downlink carrier aggregation active for the configuration with highest measured maximum conducted power with downlink carrier aggregation inactive measured among the channel bandwidth, modulation, and RB combinations in each frequency band. Per FCC KDB Publication 941225 D05Av01r02, no SAR measurements are required for downlink only carrier aggregation configurations when the average output

power with downlink only carrier aggregation active is not more than 0.25 dB higher than the average output power with downlink only carrier aggregation inactive.

7.6 SAR Testing with 802.11 Transmitters

The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v02r02 for more details.

7.6.1 General Device Setup

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 - 96% is typically achievable in most test mode configurations. A minimum transmission duty factor of 85% is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

7.6.2 U-NII-1 and U-NII-2A

For devices that operate in both U-NII-1 and U-NII-2A bands, when the same maximum output power is specified for both bands, SAR measurement using OFDM SAR test procedures is not required for U-NII-1 unless the highest reported SAR for U-NII-2A is > 1.2 W/kg. When different maximum output powers are specified for the bands, SAR measurement for the U-NII band with the lower maximum output power is not required unless the highest reported SAR for the U-NII band with the higher maximum output power, adjusted by the ratio of lower to higher specified maximum output power for the two bands, is > 1.2 W/kg.

7.6.3 U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. When Terminal Doppler Weather Radar (TDWR) restriction applies, the channels at 5.60 – 5.65 GHz in U-NII-2C band must be disabled with acceptable mechanisms and documented in the equipment certification. Unless band gap channels are permanently disabled, SAR must be considered for these channels. Each band is tested independently according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

7.6.4 2.4 GHz SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.

2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed.

7.6.5 OFDM Transmission Mode and SAR Test Channel Selection

When the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11ac or 802.11g and 802.11n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11a, then 802.11n and 802.11ac or 802.11g then 802.11n, is used for SAR measurement. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

7.6.6 Initial Test Configuration Procedure

For OFDM, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, lowest data rate and lowest order IEEE 802.11 mode. The channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is ≤ 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements (See Section 7.6.5).

7.6.7 Subsequent Test Configuration Procedures

For OFDM configurations in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure. When the highest reported SAR (for the initial test configuration), adjusted by the ratio of the specified maximum output power of the subsequent test configuration to initial test configuration, is ≤ 1.2 W/kg, no additional SAR tests for the subsequent test configurations are required.

7.6.8 MIMO SAR considerations

Per KDB Publication 248227 D01v02r02, the simultaneous SAR provisions in KDB Publication 447498 D01v06 should be applied to determine simultaneous transmission SAR test exclusion for WIFI MIMO. If the sum of 1g single transmission chain SAR measurements is <1.6 W/kg, no additional SAR measurements for MIMO are required. Alternatively, SAR for MIMO can be measured with all antennas transmitting simultaneously at the specified maximum output power of MIMO operation.

8 RF CONDUCTED POWERS

8.1 GSM Conducted Powers

Table 8-1
Conducted Power Antenna C

Maximum Burst-Averaged Output Power					
		GPRS/EDGE Data (GMSK)		*EDGE Data (8-PSK)*	
Band	**Channel**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 850	128	26.81	23.81	24.71	23.71
	190	26.87	23.90	24.75	23.74
	251	26.86	23.81	24.70	23.68
GSM 1900	512	21.64	18.69	21.66	18.64
	661	21.43	18.44	21.54	18.45
	810	21.62	18.59	21.64	18.60
Calculated Maximum Frame-Averaged Output Power					
		GPRS/EDGE Data (GMSK)		*EDGE Data (8-PSK)*	
Band	**Channel**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 850	128	17.78	17.79	15.68	17.69
	190	17.84	17.88	15.72	17.72
	251	17.83	17.79	15.67	17.66
GSM 1900	512	12.61	12.67	12.63	12.62
	661	12.40	12.42	12.51	12.43
	810	12.59	12.57	12.61	12.58
GSM 850	**Frame Avg.Targets:**	17.97	17.98	14.97	16.98
GSM 1900		12.17	12.18	12.17	12.18

Table 8-2
Conducted Power Antenna D

Maximum Burst-Averaged Output Power					
		GPRS/EDGE Data (GMSK)		*EDGE Data (8-PSK)*	
Band	**Channel**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 850	128	28.18	25.43	22.69	21.70
	190	28.19	25.19	22.67	21.68
	251	28.16	25.18	22.68	21.69
GSM 1900	512	20.94	17.99	20.93	17.95
	661	20.81	17.87	20.85	17.84
	810	20.79	17.84	20.85	17.82
Calculated Maximum Frame-Averaged Output Power					
		GPRS/EDGE Data (GMSK)		*EDGE Data (8-PSK)*	
Band	**Channel**	**GPRS [dBm] 1 Tx Slot**	**GPRS [dBm] 2 Tx Slot**	**EDGE [dBm] 1 Tx Slot**	**EDGE [dBm] 2 Tx Slot**
GSM 850	128	19.15	19.41	13.66	15.68
	190	19.16	19.17	13.64	15.66
	251	19.13	19.16	13.65	15.67
GSM 1900	512	11.91	11.97	11.90	11.93
	661	11.78	11.85	11.82	11.82
	810	11.76	11.82	11.82	11.80
GSM 850	**Frame Avg.Targets:**	18.47	18.73	12.97	14.98
GSM 1900		11.47	11.48	11.47	11.48

Note:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. GPRS/EDGE (GMSK) output powers were measured with coding scheme setting of 1 (CS1) on the base station simulator. CS1 was configured to measure GPRS output power measurements and SAR to ensure GMSK modulation in the signal. Our Investigation has shown that CS1 - CS4 settings do not have any impact on the output levels or modulation in the GPRS modes.
3. EDGE (8-PSK) output powers were measured with MCS7 on the base station simulator. MCS7 coding scheme was used to measure the output powers for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation. It has been shown that MCS levels that produce 8PSK modulation do not have an impact on output power.

GSM Class: C
GPRS Multislot class: 10 (Max 2 Tx uplink slots)
EDGE Multislot class: 10 (Max 2 Tx uplink slots)
DTM Multislot Class: N/A

Figure 8-1
Power Measurement Setup

8.2 UMTS Conducted Powers

Table 8-3
Conducted Power Antenna C

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			AWS Band [dBm]			PCS Band [dBm]			3GPP MPR [dB]
			4132	4183	4233	1312	1412	1513	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	17.70	17.66	17.65	13.29	13.13	13.12	13.10	13.06	13.09	-
6	HSDPA	Subtest 1	17.68	17.60	17.57	13.24	13.18	13.11	13.10	12.99	13.06	0
6		Subtest 2	17.66	17.61	17.48	13.26	13.25	13.03	13.05	12.89	12.95	0
6		Subtest 3	17.70	17.66	17.52	13.30	13.26	13.12	13.09	12.94	13.03	0.5
6		Subtest 4	17.70	17.65	17.49	13.28	13.23	13.09	13.10	12.97	13.08	0.5
6	HSUPA	Subtest 1	17.67	17.64	17.48	13.30	13.29	13.14	13.10	12.97	13.05	0
6		Subtest 2	17.45	17.37	17.21	13.29	13.24	13.14	13.09	12.96	13.07	2
6		Subtest 3	17.66	17.58	17.45	13.30	13.27	13.12	13.10	12.99	13.02	1
6		Subtest 4	17.69	17.63	17.41	13.30	13.28	13.09	13.10	12.95	13.04	2
6		Subtest 5	17.64	17.56	17.43	13.26	13.23	13.05	13.08	12.93	12.99	0
8	DC-HSDPA	Subtest 1	17.69	17.58	17.50	13.30	13.07	13.06	12.80	12.90	13.09	0
8		Subtest 2	17.69	17.63	17.50	13.30	13.02	13.03	12.75	12.91	13.06	0
8		Subtest 3	17.70	17.65	17.52	13.29	13.00	13.01	12.79	12.91	13.08	0.5
8		Subtest 4	17.70	17.63	17.51	13.28	13.01	13.01	12.78	12.88	13.07	0.5

Table 8-4
Conducted Power Antenna D

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]			AWS Band [dBm]			PCS Band [dBm]		
			4132	4183	4233	1312	1412	1513	9262	9400	9538
99	WCDMA	12.2 kbps RMC	19.17	19.14	19.20	13.17	13.15	13.20	12.00	11.75	11.86
6	HSDPA	Subtest 1	19.15	19.12	19.01	13.15	13.18	13.08	11.99	11.81	11.83
6		Subtest 2	19.09	19.15	19.05	13.07	13.15	13.06	11.93	11.83	11.78
6		Subtest 3	19.13	19.20	19.07	13.04	13.16	13.05	11.97	11.84	11.76
6		Subtest 4	19.10	19.19	19.03	13.03	13.14	13.02	11.92	11.82	11.74
6	HSUPA	Subtest 1	19.05	19.17	19.02	13.07	13.13	13.04	11.93	11.78	11.73
6		Subtest 2	19.08	19.16	18.97	13.09	13.19	13.12	11.94	11.74	11.47
6		Subtest 3	19.12	19.14	19.01	13.07	13.20	13.11	11.88	11.73	11.69
6		Subtest 4	19.11	19.17	19.04	12.92	13.16	13.11	11.89	11.72	11.67
6		Subtest 5	19.07	19.13	19.04	13.09	13.19	13.12	11.98	11.84	11.74
8	DC-HSDPA	Subtest 1	19.04	19.13	19.06	13.11	13.19	12.97	11.80	11.94	11.78
8		Subtest 2	19.09	19.15	19.14	13.10	13.20	13.01	11.78	11.88	11.81
8		Subtest 3	19.08	19.15	19.07	13.07	13.16	13.03	11.81	11.96	11.83
8		Subtest 4	19.06	19.14	19.10	13.13	13.20	13.01	11.79	11.88	11.79

DC-HSDPA considerations

- 3GPP Specification 34.121-1 Release 8 Ver 8.10.0 was used for DC-HSDPA guidance
- H-Set 12 (QPSK) was confirmed to be used during DC-HSDPA measurements
- The DUT supports UE category 24 for HSDPA

Figure 8-2
Power Measurement Setup

8.3 LTE Conducted Powers

8.3.1 LTE Band 12

Table 8-5
LTE Band 12 Conducted Powers Antenna C – 10 MHz Bandwidth

LTE Band 12 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23095 (707.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	17.47	0	0
	1	25	17.43		0
	1	49	**17.48**		0
	25	0	**17.46**	0-1	0
	25	12	17.40		0
	25	25	17.43		0
	50	0	17.44		0
16QAM	1	0	17.37	0-1	0
	1	25	17.47		0
	1	49	17.49		0
	25	0	17.27	0-2	0
	25	12	17.19		0
	25	25	17.22		0
	50	0	17.16		0
64QAM	1	0	17.42	0-2	0
	1	25	17.47		0
	1	49	17.46		0
	25	0	17.25	0-3	0
	25	12	17.18		0
	25	25	17.20		0
	50	0	17.15		0

Note: LTE Band 12 at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 8-6
LTE Band 12 Conducted Powers Antenna C – 5 MHz Bandwidth

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23035 (701.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23155 (713.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	17.45	17.37	17.26	0	0
	1	12	17.42	17.32	17.14		0
	1	24	17.41	17.31	17.18		0
	12	0	17.37	17.30	17.32	0-1	0
	12	6	17.35	17.31	17.26		0
	12	13	17.32	17.29	17.24		0
	25	0	17.36	17.30	17.27		0
16QAM	1	0	17.50	17.48	17.44	0-1	0
	1	12	17.46	17.41	17.33		0
	1	24	17.43	17.44	17.40		0
	12	0	17.26	17.20	17.16	0-2	0
	12	6	17.25	17.22	17.12		0
	12	13	17.19	17.18	17.13		0
	25	0	17.24	17.19	17.10		0
64QAM	1	0	17.49	17.43	17.37	0-2	0
	1	12	17.46	17.38	17.22		0
	1	24	17.48	17.30	17.24		0
	12	0	17.21	17.16	17.09	0-3	0
	12	6	17.25	17.15	17.06		0
	12	13	17.18	17.11	17.05		0
	25	0	17.23	17.13	17.06		0

Table 8-7
LTE Band 12 Conducted Powers Antenna C – 3 MHz Bandwidth

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23025 (700.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23165 (714.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	17.37	17.36	17.21	0	0
	1	7	17.43	17.38	17.27		0
	1	14	17.41	17.34	17.24		0
	8	0	17.44	17.45	17.32	0-1	0
	8	4	17.45	17.41	17.33		0
	8	7	17.45	17.41	17.39		0
	15	0	17.44	17.43	17.37		0
16QAM	1	0	17.49	17.38	17.32	0-1	0
	1	7	17.47	17.41	17.36		0
	1	14	17.49	17.36	17.37		0
	8	0	17.29	17.22	17.11	0-2	0
	8	4	17.24	17.23	17.12		0
	8	7	17.30	17.20	17.17		0
	15	0	17.22	17.19	17.13		0
64QAM	1	0	17.50	17.41	17.36	0-2	0
	1	7	17.49	17.45	17.31		0
	1	14	17.48	17.39	17.29		0
	8	0	17.27	17.23	17.07	0-3	0
	8	4	17.24	17.19	17.10		0
	8	7	17.28	17.21	17.14		0
	15	0	17.25	17.20	17.17		0

Table 8-8
LTE Band 12 Conducted Powers Antenna C – 1.4 MHz Bandwidth

LTE Band 12 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23017 (699.7 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23173 (715.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	17.47	17.44	17.46	0	0
	1	2	17.45	17.42	17.48		0
	1	5	17.48	17.41	17.49		0
	3	0	17.49	17.47	17.41		0
	3	2	17.48	17.48	17.40		0
	3	3	17.49	17.44	17.40		0
	6	0	17.48	17.44	17.41	0-1	0
16QAM	1	0	17.49	17.44	17.40	0-1	0
	1	2	17.47	17.44	17.37		0
	1	5	17.50	17.35	17.37		0
	3	0	17.39	17.32	17.30		0
	3	2	17.36	17.27	17.27		0
	3	3	17.34	17.26	17.26		0
	6	0	17.26	17.22	17.22	0-2	0
64QAM	1	0	17.49	17.49	17.39	0-2	0
	1	2	17.39	17.48	17.33		0
	1	5	17.44	17.46	17.45		0
	3	0	17.28	17.50	17.23		0
	3	2	17.33	17.46	17.24		0
	3	3	17.31	17.44	17.20		0
	6	0	17.24	17.34	17.14	0-3	0

Table 8-9
LTE Band 12 Conducted Powers Antenna D – 10 MHz Bandwidth

LTE Band 12 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23095 (707.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**17.19**	0	0
	1	25	17.08		0
	1	49	17.11		0
	25	0	**17.20**	0-1	0
	25	12	17.13		0
	25	25	17.12		0
	50	0	17.16		0
16QAM	1	0	17.20	0-1	0
	1	25	17.18		0
	1	49	17.15		0
	25	0	16.93	0-2	0
	25	12	16.89		0
	25	25	16.84		0
	50	0	16.89		0
64QAM	1	0	17.19	0-2	0
	1	25	17.13		0
	1	49	17.10		0
	25	0	16.99	0-3	0
	25	12	16.92		0
	25	25	16.89		0
	50	0	16.90		0

Note: LTE Band 12 at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 8-10
LTE Band 12 Conducted Powers Antenna D – 5 MHz Bandwidth

LTE Band 12 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23035 (701.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23155 (713.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	17.05	17.03	17.06	0	0
	1	12	17.05	16.96	17.02		0
	1	24	17.02	16.94	17.11		0
	12	0	17.16	17.08	17.02	0-1	0
	12	6	17.16	17.06	16.98		0
	12	13	17.15	17.08	17.00		0
	25	0	17.18	17.07	16.98		0
16QAM	1	0	17.11	17.17	17.10	0-1	0
	1	12	17.04	17.02	17.01		0
	1	24	17.05	17.03	17.02		0
	12	0	16.91	16.81	16.78	0-2	0
	12	6	16.93	16.78	16.72		0
	12	13	16.95	16.80	16.74		0
	25	0	16.94	16.79	16.74		0
64QAM	1	0	17.12	17.18	17.04	0-2	0
	1	12	17.08	17.04	16.95		0
	1	24	17.02	17.07	16.99		0
	12	0	16.94	16.83	16.79	0-3	0
	12	6	16.92	16.77	16.73		0
	12	13	16.88	16.79	16.76		0
	25	0	16.91	16.75	16.71		0

Table 8-11
LTE Band 12 Conducted Powers Antenna D – 3 MHz Bandwidth

LTE Band 12 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23025 (700.5 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23165 (714.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	17.12	17.04	17.08	0	0
	1	7	17.19	17.05	17.13		0
	1	14	17.18	17.06	17.12		0
	8	0	17.18	17.11	17.14	0-1	0
	8	4	17.19	17.10	17.15		0
	8	7	17.20	17.18	17.12		0
	15	0	17.19	17.13	17.15		0
16QAM	1	0	17.17	17.11	17.12	0-1	0
	1	7	17.13	17.14	17.08		0
	1	14	17.16	17.12	17.16		0
	8	0	17.02	16.98	16.90	0-2	0
	8	4	17.04	16.95	16.94		0
	8	7	17.05	16.99	17.01		0
	15	0	17.02	16.89	16.92		0
64QAM	1	0	17.13	17.07	17.02	0-2	0
	1	7	17.08	17.12	17.00		0
	1	14	17.19	17.05	17.05		0
	8	0	17.06	17.00	16.87	0-3	0
	8	4	17.05	16.99	16.90		0
	8	7	17.09	17.00	16.98		0
	15	0	17.02	16.95	16.87		0

Table 8-12
LTE Band 12 Conducted Powers Antenna D – 1.4 MHz Bandwidth

LTE Band 12 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 23017 (699.7 MHz)	Mid Channel 23095 (707.5 MHz)	High Channel 23173 (715.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	17.05	17.16	16.88	0	0
	1	2	17.03	17.13	16.93		0
	1	5	17.09	17.15	16.94		0
	3	0	17.12	17.08	16.99		0
	3	2	17.10	17.09	16.99		0
	3	3	17.17	17.07	16.96		0
	6	0	17.15	17.06	16.95	0-1	0
16QAM	1	0	17.16	17.14	17.03	0-1	0
	1	2	17.18	17.03	17.07		0
	1	5	17.15	17.01	17.17		0
	3	0	17.05	16.89	16.97		0
	3	2	17.03	16.87	16.98		0
	3	3	17.08	16.84	16.97		0
	6	0	17.00	16.82	16.91	0-2	0
64QAM	1	0	17.15	17.11	17.07	0-2	0
	1	2	17.03	17.05	17.08		0
	1	5	17.03	17.04	17.03		0
	3	0	17.01	17.02	16.95		0
	3	2	16.98	17.03	16.97		0
	3	3	17.00	17.05	16.99		0
	6	0	16.96	16.86	16.98	0-3	0

8.3.2 LTE Band 13

Table 8-13
LTE Band 13 Conducted Powers Antenna C – 10 MHz Bandwidth

LTE Band 13 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**18.09**	0	0
	1	25	17.65		0
	1	49	17.66		0
	25	0	**17.85**	0-1	0
	25	12	17.77		0
	25	25	17.67		0
	50	0	17.79		0
16QAM	1	0	18.08	0-1	0
	1	25	17.68		0
	1	49	17.64		0
	25	0	17.51	0-2	0
	25	12	17.44		0
	25	25	17.34		0
	50	0	17.41		0
64QAM	1	0	18.09	0-2	0
	1	25	17.71		0
	1	49	17.61		0
	25	0	17.46	0-3	0
	25	12	17.38		0
	25	25	17.32		0
	50	0	17.38		0

Table 8-14
LTE Band 13 Conducted Powers Antenna C – 5 MHz Bandwidth

LTE Band 13 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	18.03	0	0
	1	12	17.92		0
	1	24	17.93		0
	12	0	18.04	0-1	0
	12	6	18.05		0
	12	13	18.00		0
	25	0	17.99		0
16QAM	1	0	18.08	0-1	0
	1	12	17.93		0
	1	24	17.98		0
	12	0	17.74	0-2	0
	12	6	17.71		0
	12	13	17.67		0
	25	0	17.66		0
64QAM	1	0	18.07	0-2	0
	1	12	17.90		0
	1	24	17.89		0
	12	0	17.73	0-3	0
	12	6	17.71		0
	12	13	17.65		0
	25	0	17.64		0

Note: LTE Band 13 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 8-15
LTE Band 13 Conducted Powers Antenna D – 10 MHz Bandwidth

LTE Band 13 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**18.00**	0	0
	1	25	17.52		0
	1	49	17.51		0
	25	0	**17.71**	0-1	0
	25	12	17.66		0
	25	25	17.59		0
	50	0	17.66		0
16QAM	1	0	17.99	0-1	0
	1	25	17.60		0
	1	49	17.65		0
	25	0	17.55	0-2	0
	25	12	17.46		0
	25	25	17.45		0
	50	0	17.44		0
64QAM	1	0	17.98	0-2	0
	1	25	17.71		0
	1	49	17.65		0
	25	0	17.55	0-3	0
	25	12	17.49		0
	25	25	17.44		0
	50	0	17.50		0

Table 8-16
LTE Band 13 Conducted Powers Antenna D – 5 MHz Bandwidth

LTE Band 13 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23230 (782.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	18.00	0	0
	1	12	17.81		0
	1	24	17.79		0
	12	0	17.92	0-1	0
	12	6	17.93		0
	12	13	17.87		0
	25	0	17.86		0
16QAM	1	0	17.97	0-1	0
	1	12	17.83		0
	1	24	17.89		0
	12	0	17.65	0-2	0
	12	6	17.68		0
	12	13	17.65		0
	25	0	17.61		0
64QAM	1	0	17.98	0-2	0
	1	12	17.97		0
	1	24	17.88		0
	12	0	17.63	0-3	0
	12	6	17.71		0
	12	13	17.61		0
	25	0	17.63		0

Note: LTE Band 13 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

8.3.3 LTE Band 14

Table 8-17
LTE Band 14 Conducted Powers Antenna C – 10 MHz Bandwidth

LTE Band 14 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23330 (793.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	18.05	0	0
	1	25	18.04		0
	1	49	**18.10**		0
	25	0	18.07	0-1	0
	25	12	18.05		0
	25	25	**18.09**		0
	50	0	18.07		0
16QAM	1	0	18.08	0-1	0
	1	25	18.06		0
	1	49	18.05		0
	25	0	17.75	0-2	0
	25	12	17.78		0
	25	25	17.82		0
	50	0	17.76		0
64QAM	1	0	18.05	0-2	0
	1	25	18.08		0
	1	49	18.08		0
	25	0	17.82	0-3	0
	25	12	17.79		0
	25	25	17.85		0
	50	0	17.79		0

Table 8-18
LTE Band 14 Conducted Powers Antenna C – 5 MHz Bandwidth

LTE Band 14 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23330 (793.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	18.06	0	0
	1	12	17.99		0
	1	24	18.02		0
	12	0	17.98	0-1	0
	12	6	17.97		0
	12	13	17.95		0
	25	0	17.97		0
16QAM	1	0	18.09	0-1	0
	1	12	18.01		0
	1	24	18.02		0
	12	0	17.67	0-2	0
	12	6	17.64		0
	12	13	17.64		0
	25	0	17.62		0
64QAM	1	0	18.03	0-2	0
	1	12	17.94		0
	1	24	17.93		0
	12	0	17.75	0-3	0
	12	6	17.74		0
	12	13	17.71		0
	25	0	17.70		0

Note: LTE Band 14 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 8-19
LTE Band 14 Conducted Powers Antenna D – 10 MHz Bandwidth

LTE Band 14 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23330 (793.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	17.86	0	0
	1	25	17.88		0
	1	49	**17.97**		0
	25	0	17.93	0-1	0
	25	12	17.92		0
	25	25	**18.00**		0
	50	0	17.94		0
16QAM	1	0	17.95	0-1	0
	1	25	17.93		0
	1	49	17.99		0
	25	0	17.69	0-2	0
	25	12	17.65		0
	25	25	17.66		0
	50	0	17.68		0
64QAM	1	0	17.99	0-2	0
	1	25	17.98		0
	1	49	17.95		0
	25	0	17.85	0-3	0
	25	12	17.82		0
	25	25	17.85		0
	50	0	17.81		0

Table 8-20
LTE Band 14 Conducted Powers Antenna D – 5 MHz Bandwidth

LTE Band 14 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 23330 (793.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	17.91	0	0
	1	12	17.92		0
	1	24	17.94		0
	12	0	17.98	0-1	0
	12	6	17.96		0
	12	13	17.99		0
	25	0	17.98		0
16QAM	1	0	17.99	0-1	0
	1	12	17.98		0
	1	24	17.96		0
	12	0	17.85	0-2	0
	12	6	17.78		0
	12	13	17.83		0
	25	0	17.81		0
64QAM	1	0	17.99	0-2	0
	1	12	17.96		0
	1	24	17.95		0
	12	0	17.80	0-3	0
	12	6	17.81		0
	12	13	17.84		0
	25	0	17.82		0

Note: LTE Band 14 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

8.3.4 LTE Band 5

Table 8-21
LTE Band 5 Conducted Powers Antenna C – 10 MHz Bandwidth

LTE Band 5 (Cell) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20525 (836.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	17.59	0	0
	1	25	17.65		0
	1	49	**17.69**		0
	25	0	**17.67**	0-1	0
	25	12	17.66		0
	25	25	17.64		0
	50	0	17.66		0
16QAM	1	0	17.61	0-1	0
	1	25	17.62		0
	1	49	17.68		0
	25	0	17.46	0-2	0
	25	12	17.45		0
	25	25	17.41		0
	50	0	17.43		0
64QAM	1	0	17.68	0-2	0
	1	25	17.61		0
	1	49	17.69		0
	25	0	17.46	0-3	0
	25	12	17.45		0
	25	25	17.45		0
	50	0	17.44		0

Note: LTE Band 5 (Cell) at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 8-22
LTE Band 5 Conducted Powers Antenna C – 5 MHz Bandwidth

LTE Band 5 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20425 (826.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20625 (846.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	17.66	17.63	17.53	0	0
	1	12	17.53	17.61	17.52		0
	1	24	17.59	17.62	17.64		0
	12	0	17.63	17.66	17.60	0-1	0
	12	6	17.60	17.67	17.58		0
	12	13	17.58	17.65	17.64		0
	25	0	17.60	17.67	17.60		0
16QAM	1	0	17.67	17.68	17.57	0-1	0
	1	12	17.59	17.66	17.53		0
	1	24	17.61	17.65	17.64		0
	12	0	17.32	17.39	17.37	0-2	0
	12	6	17.35	17.45	17.34		0
	12	13	17.32	17.42	17.41		0
	25	0	17.40	17.41	17.34		0
64QAM	1	0	17.69	17.68	17.63	0-2	0
	1	12	17.56	17.62	17.61		0
	1	24	17.62	17.67	17.64		0
	12	0	17.47	17.45	17.41	0-3	0
	12	6	17.41	17.47	17.38		0
	12	13	17.42	17.41	17.45		0
	25	0	17.38	17.42	17.31		0

Table 8-23
LTE Band 5 Conducted Powers Antenna C – 3 MHz Bandwidth

LTE Band 5 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20415 (825.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20635 (847.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	17.57	17.56	17.52	0	0
	1	7	17.54	17.60	17.62		0
	1	14	17.47	17.54	17.58		0
	8	0	17.70	17.67	17.60	0-1	0
	8	4	17.62	17.66	17.66		0
	8	7	17.62	17.65	17.67		0
	15	0	17.62	17.67	17.66		0
16QAM	1	0	17.64	17.67	17.56	0-1	0
	1	7	17.52	17.66	17.65		0
	1	14	17.58	17.61	17.62		0
	8	0	17.50	17.46	17.39	0-2	0
	8	4	17.42	17.45	17.50		0
	8	7	17.40	17.42	17.52		0
	15	0	17.40	17.46	17.45		0
64QAM	1	0	17.66	17.69	17.52	0-2	0
	1	7	17.68	17.58	17.68		0
	1	14	17.62	17.51	17.61		0
	8	0	17.52	17.53	17.41	0-3	0
	8	4	17.44	17.48	17.43		0
	8	7	17.45	17.48	17.45		0
	15	0	17.41	17.45	17.42		0

Table 8-24
LTE Band 5 Conducted Powers Antenna C – 1.4 MHz Bandwidth

LTE Band 5 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20407 (824.7 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20643 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	17.70	17.63	17.61	0	0
	1	2	17.68	17.61	17.59		0
	1	5	17.61	17.62	17.62		0
	3	0	17.56	17.50	17.50		0
	3	2	17.54	17.48	17.49		0
	3	3	17.55	17.50	17.51		0
	6	0	17.54	17.49	17.48	0-1	0
16QAM	1	0	17.68	17.68	17.65	0-1	0
	1	2	17.66	17.67	17.62		0
	1	5	17.56	17.60	17.63		0
	3	0	17.55	17.62	17.53		0
	3	2	17.54	17.44	17.51		0
	3	3	17.55	17.55	17.52		0
	6	0	17.51	17.41	17.49	0-2	0
64QAM	1	0	17.67	17.69	17.61	0-2	0
	1	2	17.55	17.70	17.65		0
	1	5	17.55	17.67	17.69		0
	3	0	17.68	17.55	17.50		0
	3	2	17.69	17.50	17.55		0
	3	3	17.68	17.52	17.61		0
	6	0	17.50	17.48	17.52	0-3	0

Table 8-25
LTE Band 5 Conducted Powers Antenna D – 10 MHz Bandwidth

LTE Band 5 (Cell) 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20525 (836.5 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	19.02	0	0
	1	25	19.06		0
	1	49	**19.13**		0
	25	0	**19.17**	0-1	0
	25	12	19.15		0
	25	25	19.12		0
	50	0	19.12		0
16QAM	1	0	19.19	0-1	0
	1	25	19.15		0
	1	49	19.11		0
	25	0	18.92	0-2	0
	25	12	18.90		0
	25	25	18.87		0
	50	0	18.88		0
64QAM	1	0	19.18	0-2	0
	1	25	19.06		0
	1	49	19.17		0
	25	0	18.88	0-3	0
	25	12	18.92		0
	25	25	18.87		0
	50	0	18.90		0

Note: LTE Band 5 (Cell) at 10 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 8-26
LTE Band 5 Conducted Powers Antenna D – 5 MHz Bandwidth

LTE Band 5 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20425 (826.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20625 (846.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.04	19.00	19.01	0	0
	1	12	19.03	18.90	18.99		0
	1	24	19.06	18.89	19.04		0
	12	0	18.98	19.02	19.01	0-1	0
	12	6	18.93	19.01	18.99		0
	12	13	18.97	18.99	19.03		0
	25	0	18.96	19.00	18.99		0
16QAM	1	0	19.04	19.11	19.18	0-1	0
	1	12	19.01	19.07	19.14		0
	1	24	19.07	19.01	19.15		0
	12	0	18.87	18.88	18.89	0-2	0
	12	6	18.84	18.87	18.88		0
	12	13	18.87	18.88	18.92		0
	25	0	18.82	18.87	18.85		0
64QAM	1	0	19.14	19.19	19.17	0-2	0
	1	12	19.11	19.16	19.18		0
	1	24	19.17	19.05	19.15		0
	12	0	18.86	18.91	18.88	0-3	0
	12	6	18.83	18.89	18.91		0
	12	13	18.88	18.82	18.90		0
	25	0	18.84	18.80	18.83		0

Table 8-27
LTE Band 5 Conducted Powers Antenna D – 3 MHz Bandwidth

LTE Band 5 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20415 (825.5 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20635 (847.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.97	19.05	19.06	0	0
	1	7	19.01	19.06	19.15		0
	1	14	18.97	18.98	19.07		0
	8	0	19.08	19.12	19.15	0-1	0
	8	4	19.07	19.11	19.18		0
	8	7	19.06	19.11	19.16		0
	15	0	19.08	19.12	19.17		0
16QAM	1	0	19.13	19.04	19.14	0-1	0
	1	7	19.05	19.06	19.18		0
	1	14	19.06	19.06	19.17		0
	8	0	18.92	19.00	18.98	0-2	0
	8	4	18.91	18.99	19.01		0
	8	7	18.90	18.95	19.00		0
	15	0	18.89	18.91	18.98		0
64QAM	1	0	19.07	19.17	19.16	0-2	0
	1	7	19.04	19.15	19.19		0
	1	14	19.03	19.07	19.14		0
	8	0	18.96	19.02	19.02	0-3	0
	8	4	18.88	19.01	19.01		0
	8	7	18.94	19.01	19.00		0
	15	0	18.86	18.92	18.98		0

Table 8-28
LTE Band 5 Conducted Powers Antenna D – 1.4 MHz Bandwidth

LTE Band 5 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20407 (824.7 MHz)	Mid Channel 20525 (836.5 MHz)	High Channel 20643 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.20	19.07	19.12	0	0
	1	2	19.16	19.04	19.09		0
	1	5	19.19	19.06	19.12		0
	3	0	19.10	19.10	19.20		0
	3	2	19.08	19.09	19.20		0
	3	3	19.09	19.11	19.19		0
	6	0	19.08	19.11	19.18	0-1	0
16QAM	1	0	19.17	19.18	19.19	0-1	0
	1	2	19.14	19.06	19.16		0
	1	5	19.14	19.05	19.15		0
	3	0	19.05	18.97	19.12		0
	3	2	19.05	19.02	19.11		0
	3	3	19.07	19.00	19.09		0
	6	0	18.97	18.97	19.02	0-2	0
64QAM	1	0	19.14	19.16	19.15	0-2	0
	1	2	19.13	19.12	19.18		0
	1	5	19.08	19.08	19.18		0
	3	0	19.15	19.06	19.09		0
	3	2	19.15	19.05	19.07		0
	3	3	19.18	19.01	19.08		0
	6	0	19.00	18.97	19.00	0-3	0

8.3.5 LTE Band 26

Table 8-29
LTE Band 26 Conducted Powers Antenna C – 10 MHz Bandwidth

LTE Band 26 (Cell) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26740 (819.0 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 26990 (844.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	**18.98**	18.88	18.83	0	0
	1	25	18.87	18.84	18.90		0
	1	49	18.82	18.91	18.88		0
	25	0	18.89	18.94	18.94	0-1	0
	25	12	18.86	18.87	**19.00**		0
	25	25	18.91	18.87	18.89		0
	50	0	18.90	18.88	18.97		0
16QAM	1	0	18.97	18.92	18.96	0-1	0
	1	25	18.92	18.85	18.95		0
	1	49	18.97	18.94	18.93		0
	25	0	18.59	18.60	18.60	0-2	0
	25	12	18.56	18.56	18.64		0
	25	25	18.60	18.56	18.57		0
	50	0	18.59	18.55	18.67		0
64QAM	1	0	18.97	18.95	18.64	0-2	0
	1	25	18.95	18.85	18.78		0
	1	49	18.89	18.88	18.69		0
	25	0	18.56	18.63	18.60	0-3	0
	25	12	18.54	18.58	18.62		0
	25	25	18.61	18.57	18.54		0
	50	0	18.60	18.56	18.67		0

Table 8-30
LTE Band 26 Conducted Powers Antenna C – 5 MHz Bandwidth

LTE Band 26 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26715 (816.5 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27015 (846.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	19.00	18.76	18.71	0	0
	1	12	18.88	18.71	18.67		0
	1	24	18.84	18.72	18.80		0
	12	0	18.85	18.72	18.71	0-1	0
	12	6	18.83	18.71	18.69		0
	12	13	18.84	18.71	18.77		0
	25	0	18.82	18.70	18.69		0
16QAM	1	0	18.97	18.81	18.73	0-1	0
	1	12	18.86	18.74	18.63		0
	1	24	18.96	18.72	18.75		0
	12	0	18.54	18.32	18.31	0-2	0
	12	6	18.49	18.34	18.33		0
	12	13	18.51	18.33	18.36		0
	25	0	18.45	18.32	18.30		0
64QAM	1	0	18.94	18.85	18.76	0-2	0
	1	12	18.77	18.82	18.75		0
	1	24	18.96	18.80	18.84		0
	12	0	18.67	18.55	18.51	0-3	0
	12	6	18.64	18.54	18.48		0
	12	13	18.67	18.52	18.53		0
	25	0	18.63	18.51	18.50		0

Table 8-31
LTE Band 26 Conducted Powers Antenna C – 3 MHz Bandwidth

LTE Band 26 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26705 (815.5 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27025 (847.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.93	18.70	18.75	0	0
	1	7	18.90	18.78	18.84		0
	1	14	18.77	18.71	18.76		0
	8	0	18.92	18.79	18.79	0-1	0
	8	4	18.93	18.78	18.84		0
	8	7	18.85	18.77	18.85		0
	15	0	18.90	18.77	18.82		0
16QAM	1	0	18.98	18.62	18.77	0-1	0
	1	7	18.95	18.52	18.94		0
	1	14	18.93	18.63	18.89		0
	8	0	18.56	18.43	18.42	0-2	0
	8	4	18.58	18.47	18.49		0
	8	7	18.54	18.45	18.48		0
	15	0	18.56	18.41	18.47		0
64QAM	1	0	18.94	18.51	18.56	0-2	0
	1	7	18.90	18.50	18.69		0
	1	14	18.92	18.47	18.63		0
	8	0	18.55	18.45	18.43	0-3	0
	8	4	18.54	18.44	18.48		0
	8	7	18.54	18.42	18.51		0
	15	0	18.51	18.41	18.44		0

Table 8-32
LTE Band 26 Conducted Powers Antenna C – 1.4 MHz Bandwidth

LTE Band 26 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26697 (814.7 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27033 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	18.99	18.74	18.96	0	0
	1	2	18.97	18.73	18.94		0
	1	5	18.93	18.75	18.98		0
	3	0	19.00	18.77	18.83		0
	3	2	18.94	18.76	18.84		0
	3	3	18.95	18.75	18.86		0
	6	0	18.93	18.73	18.83	0-1	0
16QAM	1	0	18.94	18.62	18.64	0-1	0
	1	2	18.90	18.57	18.55		0
	1	5	18.89	18.60	18.65		0
	3	0	18.64	18.52	18.59		0
	3	2	18.59	18.53	18.53		0
	3	3	18.63	18.46	18.54		0
	6	0	18.57	18.43	18.44	0-2	0
64QAM	1	0	18.97	18.66	18.88	0-2	0
	1	2	18.96	18.60	18.89		0
	1	5	18.90	18.54	18.86		0
	3	0	18.67	18.54	18.68		0
	3	2	18.59	18.53	18.67		0
	3	3	18.58	18.52	18.66		0
	6	0	18.56	18.44	18.47	0-3	0

Table 8-33
LTE Band 26 Conducted Powers Antenna D – 10 MHz Bandwidth

LTE Band 26 (Cell) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26740 (819.0 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 26990 (844.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	**17.88**	17.61	17.60	0	0
	1	25	17.78	17.55	17.58		0
	1	49	17.70	17.62	17.61		0
	25	0	17.65	17.67	17.65	0-1	0
	25	12	17.63	17.59	17.62		0
	25	25	**17.71**	17.58	17.58		0
	50	0	17.70	17.58	17.60		0
16QAM	1	0	17.89	17.90	17.60	0-1	0
	1	25	17.90	17.89	17.62		0
	1	49	17.82	17.85	17.75		0
	25	0	17.44	17.49	17.55	0-2	0
	25	12	17.43	17.46	17.49		0
	25	25	17.56	17.47	17.44		0
	50	0	17.50	17.46	17.43		0
64QAM	1	0	18.16	17.99	17.94	0-2	0
	1	25	18.01	17.89	18.00		0
	1	49	18.02	17.95	17.90		0
	25	0	17.70	17.73	17.77	0-3	0
	25	12	17.67	17.66	17.75		0
	25	25	17.72	17.67	17.69		0
	50	0	17.72	17.68	17.69		0

Table 8-34
LTE Band 26 Conducted Powers Antenna D – 5 MHz Bandwidth

LTE Band 26 (Cell) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26715 (816.5 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27015 (846.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	17.82	17.88	17.82	0	0
	1	12	17.79	17.81	17.81		0
	1	24	17.71	17.84	17.86		0
	12	0	17.81	17.81	17.83	0-1	0
	12	6	17.79	17.75	17.79		0
	12	13	17.78	17.77	17.85		0
	25	0	17.72	17.75	17.79		0
16QAM	1	0	17.79	17.73	17.74	0-1	0
	1	12	17.72	17.64	17.78		0
	1	24	17.68	17.57	17.74		0
	12	0	17.59	17.49	17.48	0-2	0
	12	6	17.53	17.43	17.47		0
	12	13	17.50	17.45	17.51		0
	25	0	17.48	17.42	17.48		0
64QAM	1	0	18.12	17.99	17.96	0-2	0
	1	12	18.06	17.94	17.91		0
	1	24	18.02	17.91	17.97		0
	12	0	17.60	17.71	17.68	0-3	0
	12	6	17.50	17.62	17.67		0
	12	13	17.50	17.57	17.75		0
	25	0	17.46	17.54	17.63		0

Table 8-35
LTE Band 26 Conducted Powers Antenna D – 3 MHz Bandwidth

LTE Band 26 (Cell) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26705 (815.5 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27025 (847.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	17.78	17.88	17.85	0	0
	1	7	17.82	17.84	17.99		0
	1	14	17.72	17.78	17.91		0
	8	0	17.91	17.93	17.95	0-1	0
	8	4	17.87	17.83	17.96		0
	8	7	17.81	17.85	17.96		0
	15	0	17.85	17.87	17.98		0
16QAM	1	0	17.89	17.82	17.86	0-1	0
	1	7	17.88	17.72	18.01		0
	1	14	17.77	17.65	17.88		0
	8	0	17.75	17.59	17.71	0-2	0
	8	4	17.72	17.51	17.73		0
	8	7	17.65	17.49	17.68		0
	15	0	17.63	17.47	17.69		0
64QAM	1	0	18.11	17.97	17.95	0-2	0
	1	7	18.05	17.86	18.04		0
	1	14	17.97	17.77	17.97		0
	8	0	17.95	17.83	17.80	0-3	0
	8	4	17.91	17.79	17.81		0
	8	7	17.88	17.78	17.83		0
	15	0	17.79	17.65	17.75		0

Table 8-36
LTE Band 26 Conducted Powers Antenna D – 1.4 MHz Bandwidth

LTE Band 26 (Cell) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26697 (814.7 MHz)	Mid Channel 26865 (831.5 MHz)	High Channel 27033 (848.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	17.68	17.68	17.64	0	0
	1	2	17.66	17.67	17.61		0
	1	5	17.62	17.71	17.62		0
	3	0	17.74	17.52	17.71		0
	3	2	17.75	17.52	17.70		0
	3	3	17.76	17.51	17.72		0
	6	0	17.73	17.54	17.71	0-1	0
16QAM	1	0	17.88	17.82	17.81	0-1	0
	1	2	17.87	17.76	17.79		0
	1	5	17.88	17.77	17.89		0
	3	0	17.75	17.61	17.77		0
	3	2	17.77	17.66	17.74		0
	3	3	17.74	17.62	17.71		0
	6	0	17.68	17.61	17.68	0-2	0
64QAM	1	0	18.16	17.97	18.04	0-2	0
	1	2	17.98	17.95	18.02		0
	1	5	18.09	17.92	18.01		0
	3	0	18.02	17.95	17.96		0
	3	2	18.04	17.88	17.94		0
	3	3	17.98	17.88	17.99		0
	6	0	17.95	17.75	17.83	0-3	0

8.3.6 LTE Band 66

Table 8-37
LTE Band 66 Conducted Powers Antenna C – 20 MHz Bandwidth

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	**13.30**	13.11	12.82	0	0
	1	50	13.17	13.05	12.87		0
	1	99	13.01	12.94	12.98		0
	50	0	13.08	12.96	12.90	0-1	0
	50	25	**13.10**	12.91	12.91		0
	50	50	13.03	12.88	12.94		0
	100	0	13.09	12.94	12.95		0
16QAM	1	0	13.20	12.81	12.65	0-1	0
	1	50	13.03	12.67	12.78		0
	1	99	12.91	12.51	12.78		0
	50	0	12.59	12.53	12.43	0-2	0
	50	25	12.57	12.42	12.44		0
	50	50	12.55	12.38	12.48		0
	100	0	12.60	12.50	12.48		0
64QAM	1	0	13.07	12.75	12.80	0-2	0
	1	50	12.94	12.67	12.87		0
	1	99	12.82	12.58	12.91		0
	50	0	12.65	12.55	12.41	0-3	0
	50	25	12.63	12.47	12.43		0
	50	50	12.60	12.45	12.43		0
	100	0	12.64	12.45	12.46		0

Table 8-38
LTE Band 66 Conducted Powers Antenna C – 15 MHz Bandwidth

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	13.29	13.01	12.88	0	0
	1	36	13.24	12.98	12.85		0
	1	74	13.03	12.80	12.81		0
	36	0	13.08	13.01	12.94	0-1	0
	36	18	13.08	12.94	12.93		0
	36	37	13.03	12.87	12.90		0
	75	0	13.04	12.95	12.91		0
16QAM	1	0	13.27	13.04	13.05	0-1	0
	1	36	13.20	13.01	12.99		0
	1	74	13.02	12.81	12.87		0
	36	0	12.89	12.87	12.81	0-2	0
	36	18	12.91	12.82	12.75		0
	36	37	12.85	12.73	12.74		0
	75	0	12.89	12.73	12.72		0
64QAM	1	0	13.21	13.00	13.05	0-2	0
	1	36	13.15	13.02	13.02		0
	1	74	13.00	12.97	13.00		0
	36	0	12.95	12.81	12.74	0-3	0
	36	18	12.96	12.75	12.72		0
	36	37	12.92	12.69	12.70		0
	75	0	12.89	12.73	12.66		0

Table 8-39
LTE Band 66 Conducted Powers Antenna C – 10 MHz Bandwidth

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	13.25	13.03	13.06	0	0
	1	25	13.09	12.88	12.93		0
	1	49	13.15	12.88	12.88		0
	25	0	13.21	13.01	12.98	0-1	0
	25	12	13.16	12.96	12.95		0
	25	25	13.11	12.95	12.93		0
	50	0	13.19	12.97	12.99		0
16QAM	1	0	13.27	13.00	13.02	0-1	0
	1	25	13.17	12.87	12.95		0
	1	49	13.05	12.85	12.92		0
	25	0	12.91	12.71	12.66	0-2	0
	25	12	12.87	12.65	12.65		0
	25	25	12.81	12.67	12.60		0
	50	0	12.84	12.68	12.65		0
64QAM	1	0	13.12	12.82	12.84	0-2	0
	1	25	13.02	12.65	12.72		0
	1	49	12.96	12.52	12.62		0
	25	0	12.70	12.49	12.47	0-3	0
	25	12	12.65	12.44	12.46		0
	25	25	12.59	12.47	12.44		0
	50	0	12.68	12.47	12.49		0

Table 8-40
LTE Band 66 Conducted Powers Antenna C – 5 MHz Bandwidth

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	13.25	12.78	12.89	0	0
	1	12	13.20	12.68	12.80		0
	1	24	13.21	12.68	12.75		0
	12	0	13.14	12.71	12.91	0-1	0
	12	6	13.10	12.70	12.86		0
	12	13	13.10	12.69	12.85		0
	25	0	13.07	12.68	12.87		0
16QAM	1	0	13.21	12.87	12.88	0-1	0
	1	12	13.13	12.84	12.82		0
	1	24	13.18	12.87	12.81		0
	12	0	13.00	12.56	12.74	0-2	0
	12	6	12.95	12.49	12.63		0
	12	13	12.95	12.51	12.61		0
	25	0	12.91	12.53	12.61		0
64QAM	1	0	13.07	12.63	12.87	0-2	0
	1	12	12.99	12.66	12.81		0
	1	24	12.99	12.54	12.83		0
	12	0	12.85	12.42	12.57	0-3	0
	12	6	12.85	12.38	12.50		0
	12	13	12.82	12.35	12.55		0
	25	0	12.81	12.39	12.48		0

Table 8-41
LTE Band 66 Conducted Powers Antenna C – 3 MHz Bandwidth

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131987 (1711.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132657 (1778.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	13.16	12.91	12.85	0	0
	1	7	13.18	12.94	12.90		0
	1	14	13.15	12.87	12.78		0
	8	0	13.27	12.89	12.96	0-1	0
	8	4	13.28	12.88	12.96		0
	8	7	13.26	12.86	12.93		0
	15	0	13.28	12.86	12.95		0
16QAM	1	0	13.21	12.72	12.83	0-1	0
	1	7	13.18	12.75	12.92		0
	1	14	13.17	12.68	12.75		0
	8	0	13.01	12.59	12.70	0-2	0
	8	4	13.03	12.55	12.71		0
	8	7	12.98	12.53	12.71		0
	15	0	12.99	12.54	12.69		0
64QAM	1	0	13.04	12.67	12.79	0-2	0
	1	7	13.03	12.61	12.62		0
	1	14	13.02	12.60	12.63		0
	8	0	12.94	12.50	12.67	0-3	0
	8	4	12.92	12.45	12.57		0
	8	7	12.91	12.46	12.71		0
	15	0	12.89	12.41	12.52		0

Table 8-42
LTE Band 66 Conducted Powers Antenna C – 1.4 MHz Bandwidth

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131979 (1710.7 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	13.18	12.91	12.85	0	0
	1	2	13.18	12.87	12.82		0
	1	5	13.20	12.88	12.82		0
	3	0	13.28	12.84	12.91		0
	3	2	13.29	12.85	12.89		0
	3	3	13.30	12.84	12.87		0
	6	0	13.28	12.84	12.89	0-1	0
16QAM	1	0	13.17	12.72	12.75	0-1	0
	1	2	13.11	12.58	12.85		0
	1	5	13.08	12.71	12.75		0
	3	0	13.04	12.49	12.69		0
	3	2	13.01	12.46	12.66		0
	3	3	13.02	12.48	12.65		0
	6	0	12.91	12.51	12.71	0-2	0
64QAM	1	0	13.08	12.71	12.83	0-2	0
	1	2	13.04	12.67	12.73		0
	1	5	13.06	12.63	12.73		0
	3	0	12.98	12.50	12.81		0
	3	2	12.95	12.55	12.82		0
	3	3	12.97	12.51	12.75		0
	6	0	12.98	12.46	12.57	0-3	0

Table 8-43
LTE Band 66 Conducted Powers Antenna D – 20 MHz Bandwidth

LTE Band 66 (AWS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132072 (1720.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132572 (1770.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.91	13.12	13.06	0	0
	1	50	12.83	**13.15**	13.07		0
	1	99	12.81	13.02	12.92		0
	50	0	12.91	12.98	12.93	0-1	0
	50	25	12.90	**12.99**	12.93		0
	50	50	12.90	12.97	12.89		0
	100	0	12.92	12.97	12.94		0
16QAM	1	0	13.12	13.12	12.95	0-1	0
	1	50	13.15	13.17	12.86		0
	1	99	13.02	13.08	12.82		0
	50	0	12.80	12.88	12.74	0-2	0
	50	25	12.80	12.92	12.76		0
	50	50	12.79	12.86	12.72		0
	100	0	12.82	12.87	12.75		0
64QAM	1	0	13.10	13.19	12.94	0-2	0
	1	50	12.80	13.19	12.91		0
	1	99	12.94	13.09	12.82		0
	50	0	12.65	12.71	12.64	0-3	0
	50	25	12.60	12.69	12.63		0
	50	50	12.58	12.67	12.55		0
	100	0	12.58	12.70	12.62		0

Table 8-44
LTE Band 66 Conducted Powers Antenna D – 15 MHz Bandwidth

LTE Band 66 (AWS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132047 (1717.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132597 (1772.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.90	12.90	13.15	0	0
	1	36	12.85	13.00	13.19		0
	1	74	12.79	12.86	12.97		0
	36	0	12.91	13.03	13.03	0-1	0
	36	18	12.94	13.07	13.02		0
	36	37	12.90	13.02	12.94		0
	75	0	12.94	13.05	13.02		0
16QAM	1	0	13.12	13.15	13.17	0-1	0
	1	36	13.05	13.19	13.13		0
	1	74	13.01	13.15	12.90		0
	36	0	12.75	12.88	12.85	0-2	0
	36	18	12.75	12.92	12.85		0
	36	37	12.71	12.90	12.80		0
	75	0	12.74	12.92	12.83		0
64QAM	1	0	12.95	13.17	13.07	0-2	0
	1	36	12.99	13.18	13.16		0
	1	74	12.84	13.07	12.91		0
	36	0	12.75	12.79	12.80	0-3	0
	36	18	12.75	12.83	12.82		0
	36	37	12.72	12.82	12.74		0
	75	0	12.72	12.79	12.76		0

Table 8-45
LTE Band 66 Conducted Powers Antenna D – 10 MHz Bandwidth

LTE Band 66 (AWS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 132022 (1715.0 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132622 (1775.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.94	13.00	12.95	0	0
	1	25	12.81	12.97	12.85		0
	1	49	12.83	12.98	12.80		0
	25	0	12.90	13.05	12.96	0-1	0
	25	12	12.90	13.04	12.91		0
	25	25	12.90	13.04	12.88		0
	50	0	12.91	13.04	12.94		0
16QAM	1	0	13.17	13.14	13.03	0-1	0
	1	25	12.92	13.12	12.96		0
	1	49	13.03	13.01	12.87		0
	25	0	12.67	12.80	12.70	0-2	0
	25	12	12.66	12.78	12.63		0
	25	25	12.67	12.76	12.62		0
	50	0	12.66	12.77	12.64		0
64QAM	1	0	13.05	13.18	13.09	0-2	0
	1	25	12.88	13.06	13.02		0
	1	49	12.91	12.99	12.99		0
	25	0	12.72	12.81	12.70	0-3	0
	25	12	12.69	12.81	12.65		0
	25	25	12.70	12.79	12.62		0
	50	0	12.69	12.80	12.65		0

Table 8-46
LTE Band 66 Conducted Powers Antenna D – 5 MHz Bandwidth

LTE Band 66 (AWS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131997 (1712.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132647 (1777.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	13.05	13.12	12.96	0	0
	1	12	12.94	13.11	12.89		0
	1	24	12.96	13.11	12.86		0
	12	0	13.03	13.02	12.94	0-1	0
	12	6	12.96	13.02	12.89		0
	12	13	12.97	13.00	12.87		0
	25	0	12.96	13.01	12.91		0
16QAM	1	0	13.13	13.12	13.09	0-1	0
	1	12	12.98	13.07	13.02		0
	1	24	13.11	13.05	13.00		0
	12	0	12.84	12.91	12.80	0-2	0
	12	6	12.85	12.91	12.74		0
	12	13	12.82	12.89	12.69		0
	25	0	12.80	12.88	12.72		0
64QAM	1	0	13.16	13.16	13.04	0-2	0
	1	12	13.15	13.08	13.01		0
	1	24	13.07	13.02	12.92		0
	12	0	12.86	12.92	12.80	0-3	0
	12	6	12.81	12.92	12.74		0
	12	13	12.78	12.88	12.73		0
	25	0	12.78	12.89	12.72		0

Table 8-47
LTE Band 66 Conducted Powers Antenna D – 3 MHz Bandwidth

LTE Band 66 (AWS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131987 (1711.5 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132657 (1778.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	13.06	12.99	12.82	0	0
	1	7	13.09	13.09	12.86		0
	1	14	12.94	12.97	12.75		0
	8	0	13.12	13.15	12.94	0-1	0
	8	4	13.11	13.14	12.90		0
	8	7	13.05	13.11	12.89		0
	15	0	13.04	13.10	12.85		0
16QAM	1	0	13.18	13.19	13.03	0-1	0
	1	7	13.16	13.14	12.82		0
	1	14	13.01	13.08	12.79		0
	8	0	12.85	13.02	12.69	0-2	0
	8	4	12.86	12.98	12.65		0
	8	7	12.70	12.96	12.64		0
	15	0	12.84	12.95	12.61		0
64QAM	1	0	13.03	13.02	12.76	0-2	0
	1	7	12.99	13.12	12.74		0
	1	14	12.84	13.10	12.75		0
	8	0	12.85	12.92	12.64	0-3	0
	8	4	12.84	12.82	12.62		0
	8	7	12.79	12.80	12.53		0
	15	0	12.78	12.75	12.52		0

Table 8-48
LTE Band 66 Conducted Powers Antenna D – 1.4 MHz Bandwidth

LTE Band 66 (AWS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 131979 (1710.7 MHz)	Mid Channel 132322 (1745.0 MHz)	High Channel 132665 (1779.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.85	13.15	12.71	0	0
	1	2	12.83	13.14	12.65		0
	1	5	12.86	13.17	12.70		0
	3	0	12.88	12.94	12.71		0
	3	2	12.89	12.95	12.70		0
	3	3	12.86	12.94	12.69		0
	6	0	12.84	12.93	12.68	0-1	0
16QAM	1	0	13.12	13.14	12.68	0-1	0
	1	2	13.01	13.11	12.66		0
	1	5	13.07	13.04	12.67		0
	3	0	12.93	12.97	12.68		0
	3	2	12.86	12.95	12.67		0
	3	3	13.01	12.97	12.66		0
	6	0	12.78	12.90	12.57	0-2	0
64QAM	1	0	13.04	13.13	12.92	0-2	0
	1	2	12.99	13.04	12.78		0
	1	5	12.97	13.02	12.86		0
	3	0	12.98	13.08	12.68		0
	3	2	12.85	13.01	12.61		0
	3	3	12.90	12.99	12.58		0
	6	0	12.88	12.78	12.52	0-3	0

8.3.7 LTE Band 25

Table 8-49
LTE Band 25 Conducted Powers Antenna C – 20 MHz Bandwidth

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26140 (1860.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26590 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	13.02	12.91	**13.10**	0	0
	1	50	12.80	12.70	12.95		0
	1	99	12.96	12.88	13.09		0
	50	0	12.92	12.84	**13.04**	0-1	0
	50	25	12.84	12.80	12.96		0
	50	50	12.84	12.86	12.99		0
	100	0	12.91	12.95	12.97		0
16QAM	1	0	12.80	12.65	12.96	0-1	0
	1	50	12.60	12.45	12.83		0
	1	99	12.77	12.65	12.93		0
	50	0	12.46	12.39	12.55	0-2	0
	50	25	12.33	12.33	12.48		0
	50	50	12.33	12.42	12.54		0
	100	0	12.41	12.43	12.50		0
64QAM	1	0	12.92	12.72	12.78	0-2	0
	1	50	12.65	12.50	12.58		0
	1	99	12.83	12.73	12.64		0
	50	0	12.44	12.38	12.56	0-3	0
	50	25	12.33	12.31	12.49		0
	50	50	12.31	12.41	12.50		0
	100	0	12.41	12.42	12.50		0

Table 8-50
LTE Band 25 Conducted Powers Antenna C – 15 MHz Bandwidth

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26115 (1857.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26615 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.94	12.67	13.03	0	0
	1	36	12.86	12.63	13.03		0
	1	74	12.72	12.70	13.02		0
	36	0	12.94	12.67	12.85	0-1	0
	36	18	12.85	12.68	12.91		0
	36	37	12.78	12.69	12.86		0
	75	0	12.87	12.73	12.92		0
16QAM	1	0	12.85	12.65	12.93	0-1	0
	1	36	12.79	12.64	12.82		0
	1	74	12.68	12.61	12.82		0
	36	0	12.68	12.47	12.59	0-2	0
	36	18	12.61	12.41	12.60		0
	36	37	12.53	12.42	12.64		0
	75	0	12.59	12.44	12.64		0
64QAM	1	0	12.92	12.74	12.77	0-2	0
	1	36	12.86	12.72	12.83		0
	1	74	12.72	12.81	12.71		0
	36	0	12.75	12.52	12.61	0-3	0
	36	18	12.65	12.51	12.65		0
	36	37	12.55	12.51	12.64		0
	75	0	12.58	12.49	12.64		0

Table 8-51
LTE Band 25 Conducted Powers Antenna C – 10 MHz Bandwidth

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26090 (1855.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26640 (1910.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	13.00	12.86	13.00	0	0
	1	25	12.93	12.74	12.90		0
	1	49	12.72	12.75	13.01		0
	25	0	13.01	12.74	12.81	0-1	0
	25	12	12.95	12.72	12.80		0
	25	25	12.83	12.70	12.92		0
	50	0	12.95	12.69	12.90		0
16QAM	1	0	12.86	12.71	12.86	0-1	0
	1	25	12.92	12.65	12.77		0
	1	49	12.71	12.72	12.82		0
	25	0	12.72	12.44	12.49	0-2	0
	25	12	12.69	12.38	12.48		0
	25	25	12.60	12.35	12.61		0
	50	0	12.65	12.41	12.60		0
64QAM	1	0	13.01	12.82	12.79	0-2	0
	1	25	12.97	12.73	12.71		0
	1	49	12.73	12.69	12.83		0
	25	0	12.75	12.47	12.51	0-3	0
	25	12	12.74	12.39	12.52		0
	25	25	12.62	12.40	12.65		0
	50	0	12.71	12.41	12.61		0

Table 8-52
LTE Band 25 Conducted Powers Antenna C – 5 MHz Bandwidth

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26065 (1852.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26665 (1912.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.91	12.61	12.81	0	0
	1	12	12.94	12.57	12.81		0
	1	24	12.93	12.55	12.88		0
	12	0	13.06	12.56	12.83	0-1	0
	12	6	13.04	12.55	12.85		0
	12	13	13.02	12.54	12.92		0
	25	0	13.01	12.55	12.89		0
16QAM	1	0	12.95	12.61	12.94	0-1	0
	1	12	12.97	12.52	12.91		0
	1	24	13.00	12.51	12.92		0
	12	0	12.88	12.38	12.66	0-2	0
	12	6	12.87	12.39	12.61		0
	12	13	12.90	12.36	12.62		0
	25	0	12.80	12.38	12.63		0
64QAM	1	0	12.94	12.57	12.81	0-2	0
	1	12	13.02	12.48	12.79		0
	1	24	13.02	12.54	12.91		0
	12	0	12.71	12.39	12.69	0-3	0
	12	6	12.74	12.36	12.69		0
	12	13	12.76	12.34	12.67		0
	25	0	12.71	12.38	12.67		0

Table 8-53
LTE Band 25 Conducted Powers Antenna C – 3 MHz Bandwidth

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26055 (1851.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26675 (1913.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.92	12.45	12.83	0	0
	1	7	13.02	12.49	12.87		0
	1	14	12.96	12.51	12.81		0
	8	0	13.03	12.61	12.90	0-1	0
	8	4	13.05	12.58	12.89		0
	8	7	13.02	12.56	12.82		0
	15	0	13.01	12.50	12.80		0
16QAM	1	0	12.95	12.89	13.01	0-1	0
	1	7	13.06	12.92	12.87		0
	1	14	12.99	12.85	13.00		0
	8	0	13.05	12.67	12.92	0-2	0
	8	4	13.07	12.58	12.92		0
	8	7	13.04	12.56	12.95		0
	15	0	13.05	12.58	12.91		0
64QAM	1	0	13.05	12.35	12.81	0-2	0
	1	7	13.08	12.34	12.80		0
	1	14	12.98	12.39	12.60		0
	8	0	12.76	12.36	12.66	0-3	0
	8	4	12.79	12.36	12.69		0
	8	7	12.73	12.33	12.67		0
	15	0	12.77	12.35	12.65		0

Table 8-54
LTE Band 25 Conducted Powers Antenna C – 1.4 MHz Bandwidth

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26047 (1850.7 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26683 (1914.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	13.04	12.70	13.01	0	0
	1	2	13.05	12.64	12.96		0
	1	5	13.02	12.61	13.00		0
	3	0	13.06	12.55	12.85		0
	3	2	13.07	12.54	12.86		0
	3	3	13.08	12.53	12.86		0
	6	0	13.05	12.52	12.84	0-1	0
16QAM	1	0	13.01	12.84	13.06	0-1	0
	1	2	13.09	12.80	13.04		0
	1	5	13.06	12.75	13.05		0
	3	0	13.05	12.64	12.95		0
	3	2	13.02	12.63	13.01		0
	3	3	12.99	12.64	12.96		0
	6	0	12.95	12.51	12.84	0-2	0
64QAM	1	0	13.00	12.59	12.95	0-2	0
	1	2	13.10	12.50	12.85		0
	1	5	13.04	12.59	13.03		0
	3	0	12.74	12.48	12.88		0
	3	2	12.75	12.50	12.80		0
	3	3	12.73	12.44	12.83		0
	6	0	12.85	12.39	12.71	0-3	0

Table 8-55
LTE Band 25 Conducted Powers Antenna D – 20 MHz Bandwidth

LTE Band 25 (PCS) 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26140 (1860.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26590 (1905.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	**11.99**	11.60	11.63	0	0
	1	50	11.90	11.47	11.67		0
	1	99	11.80	11.43	11.66		0
	50	0	**11.84**	11.57	11.70	0-1	0
	50	25	11.83	11.56	11.71		0
	50	50	11.77	11.59	11.67		0
	100	0	11.83	11.63	11.67		0
16QAM	1	0	11.98	11.54	11.60	0-1	0
	1	50	11.89	11.34	11.71		0
	1	99	11.82	11.35	11.67		0
	50	0	11.84	11.49	11.64	0-2	0
	50	25	11.80	11.48	11.64		0
	50	50	11.79	11.51	11.63		0
	100	0	11.84	11.57	11.62		0
64QAM	1	0	11.97	11.67	11.87	0-2	0
	1	50	11.87	11.48	11.83		0
	1	99	11.73	11.54	11.79		0
	50	0	11.66	11.32	11.45	0-3	0
	50	25	11.54	11.26	11.40		0
	50	50	11.51	11.32	11.39		0
	100	0	11.54	11.34	11.39		0

Table 8-56
LTE Band 25 Conducted Powers Antenna D – 15 MHz Bandwidth

LTE Band 25 (PCS) 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26115 (1857.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26615 (1907.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	11.83	11.51	11.78	0	0
	1	36	11.80	11.48	11.77		0
	1	74	11.66	11.47	11.75		0
	36	0	11.98	11.58	11.61	0-1	0
	36	18	11.88	11.60	11.68		0
	36	37	11.84	11.63	11.60		0
	75	0	11.85	11.62	11.68		0
16QAM	1	0	11.84	11.59	11.62	0-1	0
	1	36	11.79	11.51	11.61		0
	1	74	11.72	11.51	11.56		0
	36	0	11.68	11.30	11.35	0-2	0
	36	18	11.61	11.31	11.42		0
	36	37	11.56	11.34	11.35		0
	75	0	11.54	11.33	11.41		0
64QAM	1	0	11.97	11.67	11.83	0-2	0
	1	36	11.99	11.64	11.84		0
	1	74	11.87	11.61	11.77		0
	36	0	11.85	11.43	11.45	0-3	0
	36	18	11.83	11.46	11.52		0
	36	37	11.75	11.49	11.48		0
	75	0	11.74	11.46	11.50		0

Table 8-57
LTE Band 25 Conducted Powers Antenna D – 10 MHz Bandwidth

LTE Band 25 (PCS) 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26090 (1855.0 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26640 (1910.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	11.90	11.58	11.66	0	0
	1	25	11.88	11.55	11.56		0
	1	49	11.84	11.61	11.57		0
	25	0	11.99	11.55	11.68	0-1	0
	25	12	11.95	11.51	11.60		0
	25	25	11.87	11.50	11.57		0
	50	0	11.95	11.50	11.60		0
16QAM	1	0	11.95	11.55	11.58	0-1	0
	1	25	11.91	11.50	11.56		0
	1	49	11.75	11.48	11.51		0
	25	0	11.74	11.26	11.30	0-2	0
	25	12	11.68	11.22	11.29		0
	25	25	11.58	11.21	11.26		0
	50	0	11.65	11.21	11.30		0
64QAM	1	0	11.98	11.67	11.79	0-2	0
	1	25	11.93	11.58	11.71		0
	1	49	11.89	11.63	11.76		0
	25	0	11.84	11.44	11.48	0-3	0
	25	12	11.86	11.40	11.46		0
	25	25	11.78	11.35	11.44		0
	50	0	11.78	11.42	11.46		0

Table 8-58
LTE Band 25 Conducted Powers Antenna D – 5 MHz Bandwidth

LTE Band 25 (PCS) 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26065 (1852.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26665 (1912.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	11.86	11.53	11.41	0	0
	1	12	11.85	11.49	11.39		0
	1	24	11.80	11.48	11.42		0
	12	0	11.98	11.44	11.42	0-1	0
	12	6	11.91	11.43	11.38		0
	12	13	11.91	11.42	11.45		0
	25	0	11.92	11.45	11.40		0
16QAM	1	0	11.97	11.51	11.54	0-1	0
	1	12	11.95	11.47	11.47		0
	1	24	11.91	11.49	11.58		0
	12	0	11.87	11.32	11.38	0-2	0
	12	6	11.88	11.30	11.35		0
	12	13	11.91	11.28	11.39		0
	25	0	11.81	11.29	11.32		0
64QAM	1	0	11.98	11.65	11.52	0-2	0
	1	12	11.99	11.65	11.52		0
	1	24	11.99	11.62	11.57		0
	12	0	11.80	11.29	11.38	0-3	0
	12	6	11.81	11.28	11.34		0
	12	13	11.80	11.31	11.32		0
	25	0	11.78	11.25	11.27		0

Table 8-59
LTE Band 25 Conducted Powers Antenna D – 3 MHz Bandwidth

LTE Band 25 (PCS) 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26055 (1851.5 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26675 (1913.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	11.79	11.39	11.36	0	0
	1	7	11.87	11.41	11.42		0
	1	14	11.83	11.34	11.46		0
	8	0	11.93	11.41	11.33	0-1	0
	8	4	11.94	11.41	11.39		0
	8	7	11.93	11.42	11.40		0
	15	0	11.96	11.42	11.40		0
16QAM	1	0	11.93	11.50	11.57	0-1	0
	1	7	11.96	11.49	11.51		0
	1	14	11.97	11.43	11.52		0
	8	0	11.78	11.33	11.30	0-2	0
	8	4	11.81	11.31	11.35		0
	8	7	11.82	11.34	11.39		0
	15	0	11.84	11.31	11.35		0
64QAM	1	0	11.91	11.47	11.43	0-2	0
	1	7	11.98	11.45	11.39		0
	1	14	11.95	11.41	11.45		0
	8	0	11.88	11.34	11.44	0-3	0
	8	4	11.87	11.31	11.39		0
	8	7	11.90	11.31	11.48		0
	15	0	11.85	11.31	11.41		0

Table 8-60
LTE Band 25 Conducted Powers Antenna D – 1.4 MHz Bandwidth

LTE Band 25 (PCS) 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 26047 (1850.7 MHz)	Mid Channel 26365 (1882.5 MHz)	High Channel 26683 (1914.3 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	11.95	11.37	11.40	0	0
	1	2	11.94	11.35	11.34		0
	1	5	11.95	11.32	11.38		0
	3	0	11.84	11.32	11.33		0
	3	2	11.84	11.27	11.32		0
	3	3	11.85	11.28	11.34		0
	6	0	11.87	11.28	11.32	0-1	0
16QAM	1	0	11.98	11.51	11.54	0-1	0
	1	2	11.98	11.41	11.48		0
	1	5	11.99	11.47	11.42		0
	3	0	11.87	11.41	11.37		0
	3	2	11.86	11.34	11.39		0
	3	3	11.85	11.35	11.40		0
	6	0	11.85	11.38	11.28	0-2	0
64QAM	1	0	11.96	11.51	11.36	0-2	0
	1	2	11.95	11.43	11.29		0
	1	5	11.98	11.51	11.27		0
	3	0	11.89	11.41	11.29		0
	3	2	11.95	11.40	11.28		0
	3	3	11.92	11.38	11.34		0
	6	0	11.79	11.25	11.30	0-3	0

8.3.8 LTE Band 30

Table 8-61
LTE Band 30 Conducted Powers Antenna C – 10 MHz Bandwidth

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**13.19**	0	0
	1	25	13.08		0
	1	49	13.06		0
	25	0	**13.06**	0-1	0
	25	12	13.05		0
	25	25	13.00		0
	50	0	13.05		0
16QAM	1	0	13.10	0-1	0
	1	25	13.06		0
	1	49	13.03		0
	25	0	12.75	0-2	0
	25	12	12.74		0
	25	25	12.69		0
	50	0	12.77		0
64QAM	1	0	13.13	0-2	0
	1	25	13.16		0
	1	49	13.06		0
	25	0	12.74	0-3	0
	25	12	12.75		0
	25	25	12.71		0
	50	0	12.79		0

Table 8-62
LTE Band 30 Conducted Powers Antenna C – 5 MHz Bandwidth

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	13.18	0	0
	1	12	13.15		0
	1	24	13.13		0
	12	0	13.16	0-1	0
	12	6	13.14		0
	12	13	13.07		0
	25	0	13.15		0
16QAM	1	0	13.17	0-1	0
	1	12	13.18		0
	1	24	13.14		0
	12	0	12.87	0-2	0
	12	6	12.84		0
	12	13	12.84		0
	25	0	12.83		0
64QAM	1	0	13.12	0-2	0
	1	12	13.09		0
	1	24	13.14		0
	12	0	12.72	0-3	0
	12	6	12.76		0
	12	13	12.74		0
	25	0	12.73		0

Note: LTE Band 30 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

Table 8-63
LTE Band 30 Conducted Powers Antenna D – 10 MHz Bandwidth

LTE Band 30 10 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	**12.60**	0	0
	1	25	12.56		0
	1	49	12.53		0
	25	0	**12.59**	0-1	0
	25	12	12.57		0
	25	25	12.58		0
	50	0	12.58		0
16QAM	1	0	12.60	0-1	0
	1	25	12.59		0
	1	49	12.55		0
	25	0	12.20	0-2	0
	25	12	12.17		0
	25	25	12.17		0
	50	0	12.13		0
64QAM	1	0	12.60	0-2	0
	1	25	12.58		0
	1	49	12.55		0
	25	0	12.29	0-3	0
	25	12	12.26		0
	25	25	12.28		0
	50	0	12.27		0

Table 8-64
LTE Band 30 Conducted Powers Antenna D – 5 MHz Bandwidth

LTE Band 30 5 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 27710 (2310.0 MHz) Conducted Power [dBm]	MPR Allowed per 3GPP [dB]	MPR [dB]
QPSK	1	0	12.56	0	0
	1	12	12.55		0
	1	24	12.60		0
	12	0	12.59	0-1	0
	12	6	12.60		0
	12	13	12.58		0
	25	0	12.58		0
16QAM	1	0	12.58	0-1	0
	1	12	12.57		0
	1	24	12.58		0
	12	0	12.20	0-2	0
	12	6	12.17		0
	12	13	12.19		0
	25	0	12.20		0
64QAM	1	0	12.59	0-2	0
	1	12	12.56		0
	1	24	12.54		0
	12	0	12.30	0-3	0
	12	6	12.29		0
	12	13	12.31		0
	25	0	12.28		0

Note: LTE Band 30 at 5 MHz bandwidth does not support three non-overlapping channels. Per KDB Publication 941225 D05v02, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.

8.3.9 LTE Band 7

Table 8-65
LTE Band 7 Conducted Powers Antenna C – 20 MHz Bandwidth

LTE Band 7 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20850 (2510.0 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21350 (2560.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.19	12.18	12.07	0	0
	1	50	12.24	12.11	12.03		0
	1	99	**12.33**	12.09	11.99		0
	50	0	12.17	12.18	11.98	0-1	0
	50	25	12.21	12.16	12.03		0
	50	50	**12.23**	12.21	11.95		0
	100	0	12.22	12.21	12.11		0
16QAM	1	0	12.10	12.28	12.17	0-1	0
	1	50	12.18	12.21	12.24		0
	1	99	12.23	12.20	12.23		0
	50	0	11.98	11.97	11.84	0-2	0
	50	25	12.01	11.96	11.84		0
	50	50	12.08	11.98	11.79		0
	100	0	12.09	12.00	11.91		0
64QAM	1	0	12.06	12.35	12.08	0-2	0
	1	50	12.15	12.27	12.04		0
	1	99	12.23	12.28	12.06		0
	50	0	12.00	11.97	11.78	0-3	0
	50	25	12.07	11.96	11.77		0
	50	50	12.08	11.97	11.76		0
	100	0	12.11	11.98	11.88		0

Table 8-66
LTE Band 7 Conducted Powers Antenna C – 15 MHz Bandwidth

LTE Band 7 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20825 (2507.5 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21375 (2562.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.18	12.28	12.01	0	0
	1	36	12.21	12.29	12.07		0
	1	74	12.16	12.04	12.08		0
	36	0	12.29	12.37	12.14	0-1	0
	36	18	12.34	12.35	12.19		0
	36	37	12.26	12.24	12.13		0
	75	0	12.15	12.33	12.06		0
16QAM	1	0	12.24	12.20	11.95	0-1	0
	1	36	12.27	12.28	12.16		0
	1	74	12.21	12.20	12.08		0
	36	0	12.00	12.06	11.78	0-2	0
	36	18	11.98	12.00	11.84		0
	36	37	12.01	11.92	11.84		0
	75	0	12.03	11.97	11.85		0
64QAM	1	0	12.26	12.22	11.85	0-2	0
	1	36	12.14	12.29	11.98		0
	1	74	12.30	12.01	12.02		0
	36	0	11.99	12.15	11.81	0-3	0
	36	18	11.99	12.07	11.89		0
	36	37	11.96	12.02	11.87		0
	75	0	11.93	12.01	11.83		0

Table 8-67
LTE Band 7 Conducted Powers Antenna C – 10 MHz Bandwidth

LTE Band 7 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20800 (2505.0 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21400 (2565.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.27	12.28	12.08	0	0
	1	25	12.14	12.13	12.11		0
	1	49	12.17	12.14	12.10		0
	25	0	12.38	12.27	12.17	0-1	0
	25	12	12.28	12.28	12.12		0
	25	25	12.26	12.29	12.15		0
	50	0	12.25	12.25	12.10		0
16QAM	1	0	12.14	12.38	11.95	0-1	0
	1	25	12.11	12.25	12.16		0
	1	49	12.09	12.27	12.15		0
	25	0	11.92	12.04	11.85	0-2	0
	25	12	11.90	11.90	11.84		0
	25	25	11.89	11.87	11.86		0
	50	0	11.87	11.85	11.82		0
64QAM	1	0	12.26	12.34	11.83	0-2	0
	1	25	12.09	12.28	11.90		0
	1	49	12.12	12.31	12.05		0
	25	0	12.11	12.05	11.83	0-3	0
	25	12	12.06	12.02	11.85		0
	25	25	12.04	12.06	11.90		0
	50	0	12.03	12.01	11.81		0

Table 8-68
LTE Band 7 Conducted Powers Antenna C – 5 MHz Bandwidth

LTE Band 7 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20775 (2502.5 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21425 (2567.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.27	12.26	12.24	0	0
	1	12	12.32	12.23	12.28		0
	1	24	12.25	12.24	12.35		0
	12	0	12.32	12.35	12.19	0-1	0
	12	6	12.37	12.36	12.20		0
	12	13	12.30	12.36	12.21		0
	25	0	12.35	12.22	12.19		0
16QAM	1	0	12.24	12.29	12.14	0-1	0
	1	12	12.29	12.17	12.23		0
	1	24	12.21	12.31	12.23		0
	12	0	12.10	12.07	11.93	0-2	0
	12	6	12.13	12.02	11.91		0
	12	13	12.03	12.04	11.94		0
	25	0	12.04	12.01	11.90		0
64QAM	1	0	12.22	12.14	11.92	0-2	0
	1	12	12.27	12.11	11.93		0
	1	24	12.14	12.08	11.89		0
	12	0	11.93	12.05	11.93	0-3	0
	12	6	11.99	12.05	11.96		0
	12	13	11.90	12.04	11.97		0
	25	0	11.92	12.01	11.92		0

Table 8-69
LTE Band 7 Conducted Powers Antenna D – 20 MHz Bandwidth

LTE Band 7 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20850 (2510.0 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21350 (2560.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.00	12.12	12.11	0	0
	1	50	12.02	12.18	12.17		0
	1	99	12.03	12.15	**12.20**		0
	50	0	12.12	12.09	12.05	0-1	0
	50	25	12.13	12.14	12.14		0
	50	50	12.17	**12.19**	12.11		0
	100	0	12.18	12.15	12.13		0
16QAM	1	0	11.80	12.04	11.79	0-1	0
	1	50	11.78	12.15	11.89		0
	1	99	11.92	12.14	11.95		0
	50	0	11.73	11.72	11.61	0-2	0
	50	25	11.74	11.82	11.72		0
	50	50	11.76	11.85	11.70		0
	100	0	11.81	11.82	11.75		0
64QAM	1	0	12.12	12.19	11.92	0-2	0
	1	50	12.20	12.20	11.93		0
	1	99	12.15	12.17	12.00		0
	50	0	11.92	11.81	11.75	0-3	0
	50	25	11.99	11.87	11.85		0
	50	50	12.02	11.88	11.83		0
	100	0	12.05	11.90	11.91		0

Table 8-70
LTE Band 7 Conducted Powers Antenna D – 15 MHz Bandwidth

LTE Band 7 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20825 (2507.5 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21375 (2562.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	11.98	12.10	11.88	0	0
	1	36	12.00	12.18	12.04		0
	1	74	11.96	12.15	12.02		0
	36	0	12.04	12.04	12.12	0-1	0
	36	18	12.10	12.09	12.15		0
	36	37	12.12	12.10	12.18		0
	75	0	12.14	12.09	12.18		0
16QAM	1	0	11.84	11.82	11.75	0-1	0
	1	36	11.83	11.85	11.94		0
	1	74	11.79	11.82	11.88		0
	36	0	11.61	11.60	11.65	0-2	0
	36	18	11.70	11.66	11.71		0
	36	37	11.65	11.66	11.72		0
	75	0	11.70	11.69	11.70		0
64QAM	1	0	12.07	12.14	11.99	0-2	0
	1	36	12.15	12.17	12.17		0
	1	74	12.12	12.19	12.18		0
	36	0	11.97	11.89	12.05	0-3	0
	36	18	12.03	11.98	12.02		0
	36	37	12.00	12.01	12.04		0
	75	0	12.02	11.96	12.02		0

Table 8-71
LTE Band 7 Conducted Powers Antenna D – 10 MHz Bandwidth

LTE Band 7 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20800 (2505.0 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21400 (2565.0 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	12.04	11.92	12.01	0	0
	1	25	11.96	11.95	12.05		0
	1	49	11.99	12.02	12.13		0
	25	0	12.02	12.03	12.18	0-1	0
	25	12	12.06	12.05	12.17		0
	25	25	12.07	12.10	12.20		0
	50	0	12.09	12.07	12.17		0
16QAM	1	0	11.90	11.91	12.00	0-1	0
	1	25	11.89	11.85	11.95		0
	1	49	11.91	11.93	12.02		0
	25	0	11.69	11.71	11.79	0-2	0
	25	12	11.76	11.74	11.78		0
	25	25	11.74	11.79	11.85		0
	50	0	11.76	11.75	11.82		0
64QAM	1	0	12.16	12.04	12.18	0-2	0
	1	25	12.07	12.05	12.18		0
	1	49	12.07	12.07	12.20		0
	25	0	11.88	11.97	12.03	0-3	0
	25	12	11.91	12.00	12.02		0
	25	25	11.94	12.02	12.11		0
	50	0	11.94	11.95	12.05		0

Table 8-72
LTE Band 7 Conducted Powers Antenna D – 5 MHz Bandwidth

LTE Band 7 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20775 (2502.5 MHz)	Mid Channel 21100 (2535.0 MHz)	High Channel 21425 (2567.5 MHz)	MPR Allowed per 3GPP [dB]	MPR [dB]
			Conducted Power [dBm]				
QPSK	1	0	11.97	11.78	12.04	0	0
	1	12	11.90	11.77	12.09		0
	1	24	11.91	11.83	12.06		0
	12	0	11.92	11.84	12.15	0-1	0
	12	6	11.85	11.84	12.17		0
	12	13	11.89	11.86	12.12		0
	25	0	11.88	11.86	12.17		0
16QAM	1	0	11.92	11.96	12.07	0-1	0
	1	12	11.85	11.91	12.11		0
	1	24	11.85	12.00	12.04		0
	12	0	11.77	11.67	12.00	0-2	0
	12	6	11.75	11.65	11.99		0
	12	13	11.71	11.66	11.96		0
	25	0	11.67	11.66	11.94		0
64QAM	1	0	12.17	12.02	12.19	0-2	0
	1	12	12.19	12.08	12.19		0
	1	24	12.19	12.02	12.18		0
	12	0	11.97	11.91	12.15	0-3	0
	12	6	11.92	11.90	12.18		0
	12	13	11.95	11.92	12.14		0
	25	0	11.91	11.89	12.12		0

8.3.10 LTE Band 41 PC3

Table 8-73
LTE Band 41 PC3 Conducted Powers Antenna C – 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	**15.40**	15.17	15.20	14.97	14.83	0	0
	1	50	15.34	15.16	15.21	14.94	14.89		0
	1	99	15.28	15.16	15.17	14.81	14.90		0
	50	0	**15.37**	15.10	15.11	14.89	14.82	0-1	0
	50	25	15.30	15.13	15.09	14.90	14.84		0
	50	50	15.31	15.11	15.09	14.83	14.83		0
	100	0	15.29	15.12	15.10	14.89	14.83		0
16QAM	1	0	15.40	15.11	15.26	15.07	14.75	0-1	0
	1	50	15.30	15.15	15.31	15.06	14.74		0
	1	99	15.28	15.00	15.20	14.88	14.80		0
	50	0	15.20	14.99	15.00	14.79	14.68	0-2	0
	50	25	15.11	15.01	15.01	14.78	14.70		0
	50	50	15.16	14.96	15.00	14.70	14.69		0
	100	0	15.13	15.00	14.99	14.78	14.69		0
64QAM	1	0	15.40	15.22	15.17	14.98	14.83	0-2	0
	1	50	15.32	15.24	15.24	14.90	14.89		0
	1	99	15.25	15.23	15.00	14.82	14.86		0
	50	0	15.22	15.02	15.02	14.78	14.72	0-3	0
	50	25	15.15	15.06	15.04	14.81	14.75		0
	50	50	15.19	15.01	15.03	14.75	14.74		0
	100	0	15.20	15.05	15.03	14.79	14.74		0

Table 8-74
LTE Band 41 PC3 Conducted Powers Antenna C – 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	15.22	15.19	15.07	14.91	14.80	0	0
	1	36	15.37	15.25	15.07	14.90	14.82		0
	1	74	15.28	15.03	14.98	14.75	14.76		0
	36	0	15.23	15.15	15.03	14.92	14.76	0-1	0
	36	18	15.33	15.19	15.00	14.91	14.79		0
	36	37	15.31	15.10	14.96	14.82	14.76		0
	75	0	15.29	15.18	14.99	14.90	14.79		0
16QAM	1	0	15.37	15.20	15.19	15.11	14.83	0-1	0
	1	36	15.37	15.25	15.12	15.08	14.91		0
	1	74	15.30	15.11	15.08	15.01	14.81		0
	36	0	15.28	15.14	15.09	15.00	14.81	0-2	0
	36	18	15.36	15.17	15.07	14.98	14.82		0
	36	37	15.32	15.14	15.01	14.91	14.79		0
	75	0	15.29	15.19	15.03	14.96	14.82		0
64QAM	1	0	15.27	15.16	14.97	15.01	14.85	0-2	0
	1	36	15.35	15.08	14.97	15.02	14.89		0
	1	74	15.32	14.91	14.91	14.81	14.81		0
	36	0	15.18	15.12	15.00	14.89	14.72	0-3	0
	36	18	15.25	15.16	14.98	14.88	14.74		0
	36	37	15.23	15.08	14.94	14.80	14.71		0
	75	0	15.23	15.15	14.95	14.89	14.76		0

Table 8-75
LTE Band 41 PC3 Conducted Powers Antenna C – 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	15.33	15.17	15.12	15.04	14.86	0	0
	1	25	15.29	15.18	15.05	14.98	14.82		0
	1	49	15.36	15.16	15.06	14.94	14.84		0
	25	0	15.30	15.15	15.01	14.98	14.81	0-1	0
	25	12	15.32	15.16	15.01	14.95	14.80		0
	25	25	15.31	15.13	15.02	14.92	14.81		0
	50	0	15.31	15.17	15.03	14.97	14.82		0
16QAM	1	0	15.37	15.21	15.22	15.05	14.96	0-1	0
	1	25	15.31	15.19	15.15	15.03	14.97		0
	1	49	15.37	15.25	15.19	15.02	14.91		0
	25	0	15.30	15.12	15.01	14.95	14.80	0-2	0
	25	12	15.32	15.13	15.01	14.91	14.81		0
	25	25	15.28	15.12	15.02	14.89	14.79		0
	50	0	15.27	15.15	15.01	14.94	14.82		0
64QAM	1	0	15.39	15.27	15.18	15.05	14.90	0-2	0
	1	25	15.31	15.17	15.15	15.00	14.82		0
	1	49	15.37	15.15	15.11	14.97	14.85		0
	25	0	15.37	15.21	15.07	15.04	14.86	0-3	0
	25	12	15.38	15.22	15.08	15.01	14.84		0
	25	25	15.39	15.17	15.08	14.98	14.83		0
	50	0	15.31	15.21	15.07	15.00	14.86		0

Table 8-76
LTE Band 41 PC3 Conducted Powers Antenna C – 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	15.34	15.17	15.00	14.97	14.83	0	0
	1	12	15.31	15.15	14.98	14.91	14.72		0
	1	24	15.38	15.09	14.99	14.90	14.73		0
	12	0	15.25	15.12	14.97	14.91	14.71	0-1	0
	12	6	15.24	15.14	14.95	14.89	14.69		0
	12	13	15.23	15.08	14.98	14.87	14.70		0
	25	0	15.21	15.14	14.97	14.90	14.71		0
16QAM	1	0	15.36	15.21	15.23	15.05	14.81	0-1	0
	1	12	15.21	15.19	15.15	14.96	14.82		0
	1	24	15.23	15.11	15.05	14.88	14.85		0
	12	0	15.19	15.13	15.03	14.93	14.77	0-2	0
	12	6	15.21	15.14	15.02	14.92	14.75		0
	12	13	15.19	15.11	15.02	14.90	14.74		0
	25	0	15.18	15.15	15.05	14.93	14.77		0
64QAM	1	0	15.33	15.21	15.10	15.00	14.82	0-2	0
	1	12	15.22	15.15	15.05	14.88	14.72		0
	1	24	15.24	15.23	15.01	14.90	14.81		0
	12	0	15.27	15.17	15.00	14.88	14.70	0-3	0
	12	6	15.26	15.15	14.99	14.85	14.71		0
	12	13	15.24	15.10	14.97	14.82	14.71		0
	25	0	15.22	15.12	14.97	14.86	14.71		0

Table 8-77
LTE Band 41 PC3 Conducted Powers Antenna D – 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	**15.39**	15.15	15.19	14.89	15.28	0	0
	1	50	15.26	15.19	15.11	15.01	15.27		0
	1	99	15.16	15.24	14.94	15.16	15.16		0
	50	0	**15.23**	15.03	15.10	14.82	15.20	0-1	0
	50	25	15.13	15.12	15.06	14.95	15.18		0
	50	50	15.15	15.06	14.96	15.17	15.12		0
	100	0	15.11	15.08	15.06	14.85	15.19		0
16QAM	1	0	15.39	15.20	15.38	14.82	15.22	0-1	0
	1	50	15.35	15.22	15.36	14.85	15.20		0
	1	99	15.28	15.32	15.22	14.94	15.13		0
	50	0	15.20	15.05	15.11	14.78	15.16	0-2	0
	50	25	15.11	15.09	15.07	14.83	15.13		0
	50	50	15.11	15.10	15.00	14.88	15.09		0
	100	0	15.08	15.09	15.06	14.84	15.15		0
64QAM	1	0	15.38	15.23	15.30	14.91	15.35	0-2	0
	1	50	15.26	15.29	15.10	14.97	15.30		0
	1	99	15.10	15.37	15.12	15.16	15.22		0
	50	0	15.26	15.11	15.06	14.76	15.24	0-3	0
	50	25	15.18	15.18	14.99	14.82	15.21		0
	50	50	15.14	15.12	14.94	14.93	15.14		0
	100	0	15.18	15.18	15.03	14.83	15.20		0

Table 8-78
LTE Band 41 PC3 Conducted Powers Antenna D – 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	15.39	15.13	15.24	14.81	15.25	0	0
	1	36	15.38	15.24	15.23	14.94	15.27		0
	1	74	15.21	15.15	15.04	14.93	15.10		0
	36	0	15.28	15.13	15.12	14.93	15.24	0-1	0
	36	18	15.25	15.19	15.12	14.96	15.25		0
	36	37	15.15	15.11	15.03	14.91	15.18		0
	75	0	15.17	15.19	15.11	14.96	15.25		0
16QAM	1	0	15.39	15.17	15.22	14.81	15.23	0-1	0
	1	36	15.30	15.21	15.21	14.93	15.19		0
	1	74	15.21	15.19	15.02	14.95	15.01		0
	36	0	15.15	15.00	15.01	14.73	15.08	0-2	0
	36	18	15.10	15.05	15.00	14.79	15.07		0
	36	37	15.02	15.00	14.90	14.74	15.05		0
	75	0	15.02	15.05	14.98	14.79	15.07		0
64QAM	1	0	15.34	15.17	15.31	14.81	15.21	0-2	0
	1	36	15.27	15.19	15.24	15.00	15.23		0
	1	74	15.10	15.12	15.21	14.90	15.02		0
	36	0	15.27	15.11	15.12	14.85	15.19	0-3	0
	36	18	15.21	15.16	15.11	14.93	15.21		0
	36	37	15.15	15.11	15.01	14.91	15.15		0
	75	0	15.15	15.15	15.09	14.94	15.18		0

Table 8-79
LTE Band 41 PC3 Conducted Powers Antenna D – 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	15.39	15.27	15.27	14.99	15.29	0	0
	1	25	15.23	15.28	15.18	14.96	15.24		0
	1	49	15.27	15.27	15.12	14.97	15.20		0
	25	0	15.31	15.23	15.19	14.92	15.24	0-1	0
	25	12	15.27	15.24	15.14	14.92	15.21		0
	25	25	15.22	15.18	15.10	14.91	15.19		0
	50	0	15.21	15.26	15.16	14.96	15.23		0
16QAM	1	0	15.31	15.22	15.25	14.87	15.22	0-1	0
	1	25	15.22	15.19	15.16	14.91	15.18		0
	1	49	15.21	15.14	15.06	14.92	15.11		0
	25	0	15.12	15.00	14.99	14.71	15.07	0-2	0
	25	12	15.08	15.02	14.96	14.74	15.05		0
	25	25	15.02	14.99	14.91	14.72	15.01		0
	50	0	15.03	15.01	14.96	14.77	15.04		0
64QAM	1	0	15.37	15.19	15.25	14.96	15.27	0-2	0
	1	25	15.21	15.17	15.11	15.01	15.26		0
	1	49	15.20	15.12	15.02	15.02	15.21		0
	25	0	15.22	15.11	15.10	14.82	15.19	0-3	0
	25	12	15.17	15.09	15.08	14.88	15.16		0
	25	25	15.14	15.09	15.01	14.89	15.12		0
	50	0	15.08	15.13	15.07	14.91	15.17		0

Table 8-80
LTE Band 41 PC3 Conducted Powers Antenna D – 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	15.39	15.31	15.30	14.96	15.35	0	0
	1	12	15.28	15.30	15.27	15.00	15.32		0
	1	24	15.33	15.34	15.21	15.01	15.30		0
	12	0	15.32	15.30	15.28	14.94	15.32	0-1	0
	12	6	15.32	15.31	15.26	15.01	15.31		0
	12	13	15.27	15.32	15.22	15.01	15.29		0
	25	0	15.28	15.32	15.26	15.01	15.32		0
16QAM	1	0	15.35	15.25	15.32	14.85	15.29	0-1	0
	1	12	15.32	15.16	15.22	14.86	15.22		0
	1	24	15.25	15.25	15.09	14.87	15.16		0
	12	0	15.11	15.14	15.15	14.75	15.14	0-2	0
	12	6	15.15	15.15	15.08	14.82	15.11		0
	12	13	15.11	15.17	15.04	14.80	15.12		0
	25	0	15.07	15.15	15.07	14.82	15.13		0
64QAM	1	0	15.37	15.37	15.35	14.99	15.29	0-2	0
	1	12	15.29	15.34	15.28	14.97	15.27		0
	1	24	15.27	15.39	15.21	14.98	15.28		0
	12	0	15.27	15.26	15.22	14.89	15.28	0-3	0
	12	6	15.28	15.30	15.21	14.91	15.25		0
	12	13	15.21	15.31	15.19	14.92	15.23		0
	25	0	15.19	15.29	15.19	14.93	15.25		0

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Table 8-81
LTE Band 41 PC2 Conducted Powers Antenna C – 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	**15.37**	15.17	15.28	15.11	14.86	0	0
	1	50	15.34	15.18	15.29	15.09	14.92		0
	1	99	15.29	15.15	15.25	15.00	14.90		0
	50	0	**15.35**	15.10	15.10	14.91	14.83	0-1	0
	50	25	15.29	15.13	15.09	14.92	14.87		0
	50	50	15.31	15.12	15.07	14.85	14.85		0
	100	0	15.30	15.12	15.08	14.91	14.86		0
16QAM	1	0	15.35	15.34	15.34	15.25	14.97	0-1	0
	1	50	15.36	15.31	15.13	15.06	14.85		0
	1	99	15.37	15.27	15.00	14.99	14.59		0
	50	0	15.05	14.96	14.96	14.84	14.60	0-2	0
	50	25	15.08	14.97	14.81	14.77	14.59		0
	50	50	15.17	14.95	14.95	14.70	14.58		0
	100	0	15.12	15.01	14.83	14.80	14.65		0
64QAM	1	0	15.38	15.29	15.25	15.29	14.92	0-2	0
	1	50	15.31	15.20	14.97	15.01	14.94		0
	1	99	15.32	15.21	14.92	14.95	14.82		0
	50	0	14.95	14.80	14.81	14.73	14.50	0-3	0
	50	25	14.94	14.81	14.71	14.67	14.49		0
	50	50	15.03	14.82	14.65	14.58	14.49		0
	100	0	14.99	14.84	14.71	14.67	14.52		0

Table 8-82
LTE Band 41 PC2 Conducted Powers Antenna C – 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	15.30	15.17	15.10	14.99	14.78	0	0
	1	36	15.40	15.25	15.16	14.99	14.87		0
	1	74	15.38	15.06	15.09	14.84	14.84		0
	36	0	15.24	15.08	15.06	14.87	14.73	0-1	0
	36	18	15.33	15.15	15.06	14.87	14.76		0
	36	37	15.26	15.07	15.03	14.80	14.74		0
	75	0	15.26	15.13	15.06	14.87	14.78		0
16QAM	1	0	15.32	15.27	15.27	15.16	14.96	0-1	0
	1	36	15.39	15.32	15.23	15.07	14.90		0
	1	74	15.40	15.21	15.13	15.04	14.91		0
	36	0	15.10	14.96	14.93	14.81	14.60	0-2	0
	36	18	15.21	15.00	14.83	14.77	14.61		0
	36	37	15.17	14.94	14.80	14.70	14.58		0
	75	0	15.14	15.00	14.82	14.77	14.61		0
64QAM	1	0	15.33	15.26	15.24	15.10	15.06	0-2	0
	1	36	15.38	15.30	15.19	15.03	14.88		0
	1	74	15.36	15.21	15.20	14.96	14.89		0
	36	0	14.96	14.82	14.80	14.72	14.48	0-3	0
	36	18	15.05	14.85	14.73	14.69	14.50		0
	36	37	15.04	14.86	14.70	14.60	14.49		0
	75	0	14.99	14.85	14.73	14.68	14.49		0

Table 8-83
LTE Band 41 PC2 Conducted Powers Antenna C – 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	15.40	15.28	15.23	15.13	14.92	0	0
	1	25	15.35	15.31	15.10	15.08	14.88		0
	1	49	15.40	15.35	15.15	15.03	14.94		0
	25	0	15.40	15.18	15.11	14.91	14.88	0-1	0
	25	12	15.40	15.21	15.11	14.88	14.88		0
	25	25	15.39	15.18	15.13	14.87	14.89		0
	50	0	15.38	15.23	15.13	14.97	14.98		0
16QAM	1	0	15.35	15.28	15.27	15.15	14.97	0-1	0
	1	25	15.39	15.27	15.13	15.06	14.87		0
	1	49	15.40	15.25	15.15	15.03	14.90		0
	25	0	15.16	14.96	14.87	14.82	14.61	0-2	0
	25	12	15.20	14.99	14.84	14.79	14.60		0
	25	25	15.19	14.94	14.83	14.76	14.61		0
	50	0	15.13	14.97	14.83	14.77	14.61		0
64QAM	1	0	15.33	15.27	15.22	15.11	14.90	0-2	0
	1	25	15.37	15.21	15.18	15.03	14.82		0
	1	49	15.40	15.15	15.13	15.01	14.83		0
	25	0	15.00	14.81	14.74	14.70	14.49	0-3	0
	25	12	15.08	14.80	14.70	14.65	14.48		0
	25	25	15.02	14.80	14.71	14.62	14.49		0
	50	0	15.00	14.81	14.72	14.67	14.49		0

Table 8-84
LTE Band 41 PC2 Conducted Powers Antenna C – 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	15.38	15.28	15.25	15.07	14.94	0	0
	1	12	15.31	15.28	15.24	14.99	14.95		0
	1	24	15.39	15.29	15.25	15.01	14.97		0
	12	0	15.38	15.17	15.17	14.94	14.84	0-1	0
	12	6	15.32	15.18	15.18	14.93	14.82		0
	12	13	15.28	15.16	15.19	14.92	14.81		0
	25	0	15.29	15.20	15.17	14.93	14.86		0
16QAM	1	0	15.38	15.30	15.26	15.12	14.92	0-1	0
	1	12	15.36	15.24	15.21	15.09	14.91		0
	1	24	15.40	15.27	15.22	15.03	14.90		0
	12	0	15.16	14.97	14.88	14.81	14.60	0-2	0
	12	6	15.16	14.99	14.86	14.79	14.58		0
	12	13	15.11	14.94	14.90	14.77	14.61		0
	25	0	15.10	14.97	14.87	14.79	14.58		0
64QAM	1	0	15.36	15.26	15.23	15.13	14.97	0-2	0
	1	12	15.30	15.21	15.18	15.08	14.87		0
	1	24	15.34	15.22	15.20	15.07	14.81		0
	12	0	15.00	14.81	14.76	14.72	14.48	0-3	0
	12	6	14.99	14.84	14.74	14.69	14.44		0
	12	13	14.95	14.80	14.77	14.70	14.49		0
	25	0	14.92	14.83	14.75	14.67	14.45		0

Table 8-85
LTE Band 41 PC2 Conducted Powers Antenna D – 20 MHz Bandwidth

LTE Band 41 20 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	**15.40**	15.23	15.26	14.92	15.24	0	0
	1	50	15.18	15.24	15.13	14.91	15.16		0
	1	99	15.17	15.32	15.05	15.01	15.10		0
	50	0	**15.28**	15.12	15.20	14.91	15.19	0-1	0
	50	25	15.15	15.17	15.13	14.90	15.15		0
	50	50	15.16	15.14	15.05	14.99	15.11		0
	100	0	15.20	15.19	15.15	14.93	15.20		0
16QAM	1	0	15.40	15.25	15.30	14.88	15.31	0-1	0
	1	50	15.16	15.22	15.21	15.01	15.29		0
	1	99	15.15	15.24	15.23	14.99	15.16		0
	50	0	14.90	14.79	14.90	14.52	14.89	0-2	0
	50	25	14.79	14.78	14.89	14.53	14.86		0
	50	50	14.85	14.80	14.80	14.59	14.79		0
	100	0	14.86	14.83	14.88	14.61	14.84		0
64QAM	1	0	15.40	15.22	15.38	14.95	15.38	0-2	0
	1	50	15.29	15.21	15.28	15.01	15.35		0
	1	99	15.20	15.30	15.15	15.09	15.25		0
	50	0	14.99	14.80	14.87	14.55	14.92	0-3	0
	50	25	14.85	14.83	14.82	14.62	14.87		0
	50	50	14.87	14.86	14.73	14.64	14.82		0
	100	0	14.89	14.88	14.83	14.65	14.90		0

Table 8-86
LTE Band 41 PC2 Conducted Powers Antenna D – 15 MHz Bandwidth

LTE Band 41 15 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	15.37	15.28	15.30	14.95	15.33	0	0
	1	36	15.34	15.32	15.30	15.11	15.36		0
	1	74	15.24	15.25	15.11	15.02	15.20		0
	36	0	15.28	15.13	15.15	14.89	15.22	0-1	0
	36	18	15.22	15.19	15.16	14.98	15.24		0
	36	37	15.17	15.14	15.06	14.93	15.17		0
	75	0	15.16	15.19	15.14	14.98	15.23		0
16QAM	1	0	15.39	15.21	15.27	14.82	15.21	0-1	0
	1	36	15.37	15.24	15.21	14.88	15.19		0
	1	74	15.27	15.21	15.00	14.82	15.08		0
	36	0	14.80	14.60	14.65	14.35	14.71	0-2	0
	36	18	14.74	14.65	14.65	14.40	14.72		0
	36	37	14.68	14.63	14.54	14.39	14.66		0
	75	0	14.67	14.66	14.63	14.44	14.71		0
64QAM	1	0	15.39	15.36	15.39	15.01	15.32	0-2	0
	1	36	15.39	15.39	15.40	15.19	15.33		0
	1	74	15.24	15.37	15.21	15.16	15.17		0
	36	0	14.82	14.67	14.72	14.45	14.80	0-3	0
	36	18	14.78	14.74	14.72	14.50	14.81		0
	36	37	14.73	14.64	14.62	14.46	14.74		0
	75	0	14.71	14.75	14.69	14.51	14.77		0

Table 8-87
LTE Band 41 PC2 Conducted Powers Antenna D – 10 MHz Bandwidth

LTE Band 41 10 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	15.36	15.19	15.25	14.94	15.32	0	0
	1	25	15.23	15.20	15.18	14.96	15.27		0
	1	49	15.26	15.21	15.11	14.97	15.25		0
	25	0	15.19	15.06	15.07	14.80	15.17	0-1	0
	25	12	15.15	15.07	15.05	14.85	15.16		0
	25	25	15.13	15.04	14.99	14.84	15.13		0
	50	0	15.13	15.10	15.06	14.87	15.18		0
16QAM	1	0	15.37	15.18	15.22	14.93	15.31	0-1	0
	1	25	15.20	15.21	15.12	14.92	15.25		0
	1	49	15.22	15.19	15.00	14.89	15.12		0
	25	0	14.70	14.62	14.57	14.33	14.64	0-2	0
	25	12	14.66	14.61	14.53	14.34	14.63		0
	25	25	14.62	14.59	14.50	14.33	14.61		0
	50	0	14.61	14.63	14.55	14.35	14.64		0
64QAM	1	0	15.37	15.23	15.24	14.91	15.39	0-2	0
	1	25	15.24	15.21	15.22	14.88	15.31		0
	1	49	15.22	15.21	15.16	14.91	15.30		0
	25	0	14.65	14.57	14.55	14.27	14.63	0-3	0
	25	12	14.61	14.57	14.51	14.30	14.61		0
	25	25	14.55	14.51	14.46	14.31	14.59		0
	50	0	14.55	14.56	14.51	14.30	14.61		0

Table 8-88
LTE Band 41 PC2 Conducted Powers Antenna D – 5 MHz Bandwidth

LTE Band 41 5 MHz Bandwidth									
Modulation	RB Size	RB Offset	Low Channel	Low-Mid Channel	Mid Channel	Mid-High Channel	High Channel	MPR Allowed per 3GPP [dB]	MPR [dB]
			39750 (2506.0 MHz)	40185 (2549.5 MHz)	40620 (2593.0 MHz)	41055 (2636.5 MHz)	41490 (2680.0 MHz)		
			Conducted Power [dBm]						
QPSK	1	0	15.40	15.29	15.27	14.95	15.32	0	0
	1	12	15.27	15.29	15.23	14.94	15.29		0
	1	24	15.32	15.33	15.18	14.95	15.27		0
	12	0	15.26	15.26	15.23	14.92	15.26	0-1	0
	12	6	15.27	15.27	15.21	14.92	15.24		0
	12	13	15.20	15.28	15.16	14.93	15.25		0
	25	0	15.19	15.29	15.21	14.94	15.25		0
16QAM	1	0	15.39	15.40	15.31	15.02	15.40	0-1	0
	1	12	15.22	15.35	15.27	15.05	15.32		0
	1	24	15.24	15.40	15.18	15.06	15.31		0
	12	0	14.87	14.87	14.82	14.51	14.90	0-2	0
	12	6	14.87	14.82	14.79	14.52	14.86		0
	12	13	14.78	14.90	14.74	14.55	14.87		0
	25	0	14.74	14.85	14.77	14.52	14.82		0
64QAM	1	0	15.39	15.28	15.29	14.94	15.27	0-2	0
	1	12	15.23	15.29	15.25	14.87	15.23		0
	1	24	15.27	15.27	15.19	14.87	15.27		0
	12	0	14.69	14.61	14.63	14.31	14.67	0-3	0
	12	6	14.66	14.65	14.64	14.33	14.66		0
	12	13	14.61	14.67	14.60	14.29	14.64		0
	25	0	14.52	14.62	14.57	14.30	14.63		0

8.3.12 LTE Uplink Carrier Aggregation Conducted Powers

Table 8-89
LTE Uplink Carrier Aggregation Conducted Powers – Antenna C

Combination	PCC Band	PCC Bandwidth [MHz]	PCC UL Channel	PCC UL Frequency [MHz]	PCC DL Channel	PCC DL Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC UL Channel	SCC UL Frequency [MHz]	SCC DL Channel	SCC DL Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_7C	LTE B7	20	21350	2560.0	3350	2680.0	QPSK	50	0	LTE B7	20	21152	2540.2	3152	2660.2	QPSK	50	50	12.20	11.98

Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/DL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41C	LTE B41	20	41055	2636.5	QPSK	1	0	LTE B41	20	40857	2616.7	QPSK	1	99	15.21	14.97

Table 8-90
LTE Uplink Carrier Aggregation Conducted Powers – Antenna D

Combination	PCC Band	PCC Bandwidth [MHz]	PCC UL Channel	PCC UL Frequency [MHz]	PCC DL Channel	PCC DL Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC UL Channel	SCC UL Frequency [MHz]	SCC DL Channel	SCC DL Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_7C	LTE B7	20	21350	2560.0	3350	2680.0	QPSK	50	0	LTE B7	20	21152	2540.2	3152	2660.2	QPSK	50	50	12.06	12.05

Combination	PCC Band	PCC Bandwidth [MHz]	PCC (UL/DL) Channel	PCC (UL/DL) Frequency [MHz]	Modulation	PCC UL# RB	PCC UL RB Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL/DL) Channel	SCC (UL/DL) Frequency [MHz]	Modulation	SCC UL# RB	SCC UL RB Offset	LTE Tx.Power with UL CA Enabled (dBm)	LTE Single Carrier Tx Power (dBm)
CA_41C	LTE B41	20	41055	2636.5	QPSK	1	99	LTE B41	20	41253	2656.3	QPSK	1	0	15.24	15.16

Notes:

1. This device supports uplink carrier aggregation for LTE CA_41C and LTE CA_7C with a maximum of two 20 MHz component carriers. For intraband contiguous carrier aggregation scenarios, 3GPP 36.101 Table 6.2.2A-1 specifies that the aggregate maximum allowed output power is equivalent to the single carrier scenario. 3GPP 36.101 6.2.3A allows for several dB of MPR to be applied when non-contiguous RB allocation is implemented. The conducted powers and MPR settings in this device are permanently implemented per the above 3GPP requirements.
2. Per FCC Guidance, the output power with uplink CA active was measured for the configuration with the highest reported SAR with single carrier for each exposure condition. The power was measured with wideband signal integration over both component carriers.
3. Uplink carrier aggregation is only possible when the device is operating with Power Class 3 for LTE Band 41.

Figure 8-3
Power Measurement Setup

8.4 WLAN Conducted Powers

8.4.1 Variant 1

Table 8-91
2.4 GHz WLAN Average RF Power – Antenna A

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	15.45	14.99	14.97
2417	2	N/A	15.50	15.50
2437	6	15.48	15.48	15.45
2457	10	N/A	15.46	15.43
2462	11	**15.50**	13.46	13.49

Table 8-92
2.4 GHz WLAN Average RF Power – Antenna B

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	15.48	15.00	15.00
2417	2	N/A	15.46	15.42
2437	6	**15.50**	15.50	15.50
2457	10	N/A	15.48	15.49
2462	11	15.42	13.50	13.49

Table 8-93
5 GHz WLAN Average RF Power – Antenna A

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
5190	38	13.87	14.00
5230	46	16.48	16.46
5270	54	**16.90**	17.00
5310	62	14.45	14.42

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
5530	106	13.95
5610	122	16.85
5690	138	**17.00**
5775	155	**16.00**

Table 8-94
5 GHz WLAN Average RF Power – Antenna B

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
5190	38	14.00	13.97
5230	46	16.25	16.21
5270	54	**16.75**	16.71
5310	62	14.42	14.46

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
5530	106	14.00
5610	122	**17.00**
5690	138	16.92
5775	155	**16.46**

8.4.2 Variant 2

Table 8-95
2.4 GHz WLAN Average RF Power – Antenna A

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	15.49	15.00	15.00
2417	2	N/A	15.50	15.49
2437	6	15.46	15.49	15.47
2457	10	N/A	15.46	15.43
2462	11	**15.50**	13.46	13.41

Table 8-96
2.4 GHz WLAN Average RF Power – Antenna B

2.4GHz Conducted Power [dBm]				
Freq [MHz]	Channel	IEEE Transmission Mode		
		802.11b	802.11g	802.11n
2412	1	15.49	14.99	14.96
2417	2	N/A	15.48	15.50
2437	6	**15.50**	15.50	15.45
2457	10	N/A	15.44	15.47
2462	11	15.48	13.31	13.36

Table 8-97
5 GHz WLAN Average RF Power – Antenna A

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
5190	38	13.96	13.75
5230	46	16.49	16.39
5270	54	**17.00**	16.91
5310	62	14.49	14.40

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
5530	106	14.00
5610	122	**16.85**
5690	138	16.84
5775	155	**16.21**

Table 8-98
5 GHz WLAN Average RF Power – Antenna B

5GHz (40MHz) Conducted Power [dBm]			
Freq [MHz]	Channel	IEEE Transmission Mode	
		802.11n	802.11ac
5190	38	14.00	13.95
5230	46	16.13	16.25
5270	54	**16.75**	16.75
5310	62	14.43	14.50

5GHz (80MHz) Conducted Power [dBm]		
Freq [MHz]	Channel	IEEE Transmission Mode
		802.11ac
5530	106	14.00
5610	122	**16.83**
5690	138	16.82
5775	155	**16.35**

8.4.3 Notes for WLAN

Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission modes with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured.
- The WLAN chipset in this device is produced by two different suppliers. The electrically identical modules are manufactured with the identical mechanical structure to meet the same specifications and functions. Two device variants are referenced as Variant 1 and Variant 2 in this report.
- WLAN SAR worst case configuration was evaluated for Variant 1 and Variant 2. The Variant with the highest reported SAR value was evaluated for the remaining WLAN configurations.
- Full power measurements were performed for Variant 1 and Variant 2 per FCC KDB Procedures 248227.
- The bolded data rate and channel above were tested for SAR.

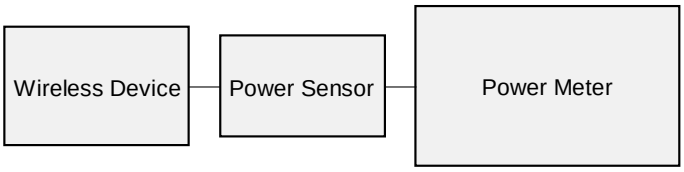

Figure 8-4
Power Measurement Setup

8.5 Bluetooth Conducted Powers

Table 8-99
Maximum Bluetooth Average RF Power – Antenna A- Variant 1

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	GFSK	1.0	0	16.15	41.210
2441	GFSK	1.0	39	**16.16**	41.305
2480	GFSK	1.0	78	15.00	31.623

Table 8-100
Maximum Bluetooth Average RF Power – Antenna A- Variant 2

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	GFSK	1.0	0	**16.49**	44.566
2441	GFSK	1.0	39	15.90	38.905
2480	GFSK	1.0	78	15.00	31.623

Table 8-101
Reduced Bluetooth Average RF Power – Antenna A- Variant 1

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	GFSK	1.0	0	**9.42**	8.750
2441	GFSK	1.0	39	9.28	8.472
2480	GFSK	1.0	78	9.41	8.730

Table 8-102
Reduced Bluetooth Average RF Power – Antenna A- Variant 2

Frequency [MHz]	Modulation	Data Rate [Mbps]	Channel No.	Avg Conducted Power	
				[dBm]	[mW]
2402	GFSK	1.0	0	9.37	8.650
2441	GFSK	1.0	39	**9.60**	9.120
2480	GFSK	1.0	78	9.17	8.260

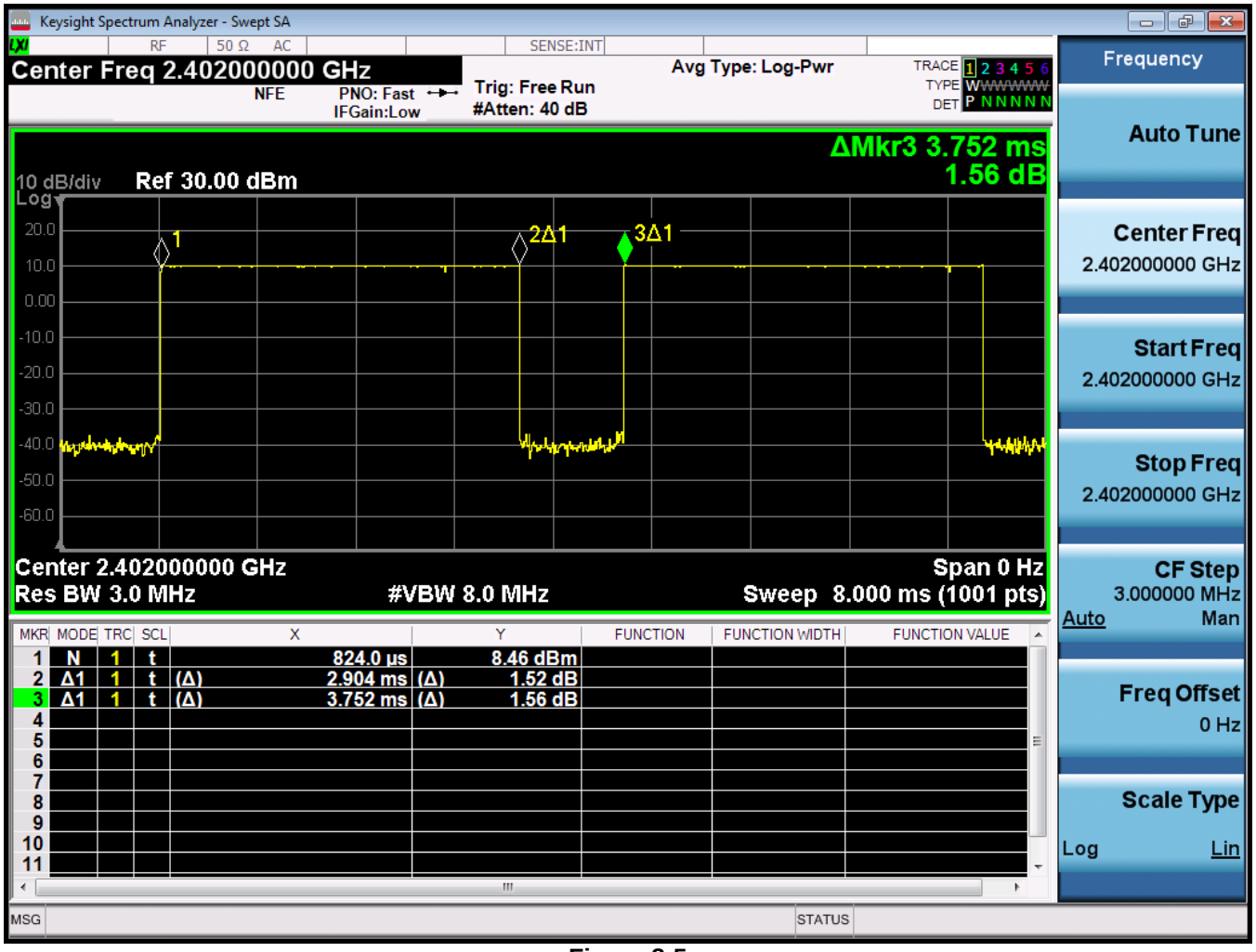

Figure 8-5
Bluetooth Transmission Plot & Duty Cycle Calculation – Antenna A Variant 1

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.904\ ms}{3.752\ ms} * 100\% = 77.4\%$$

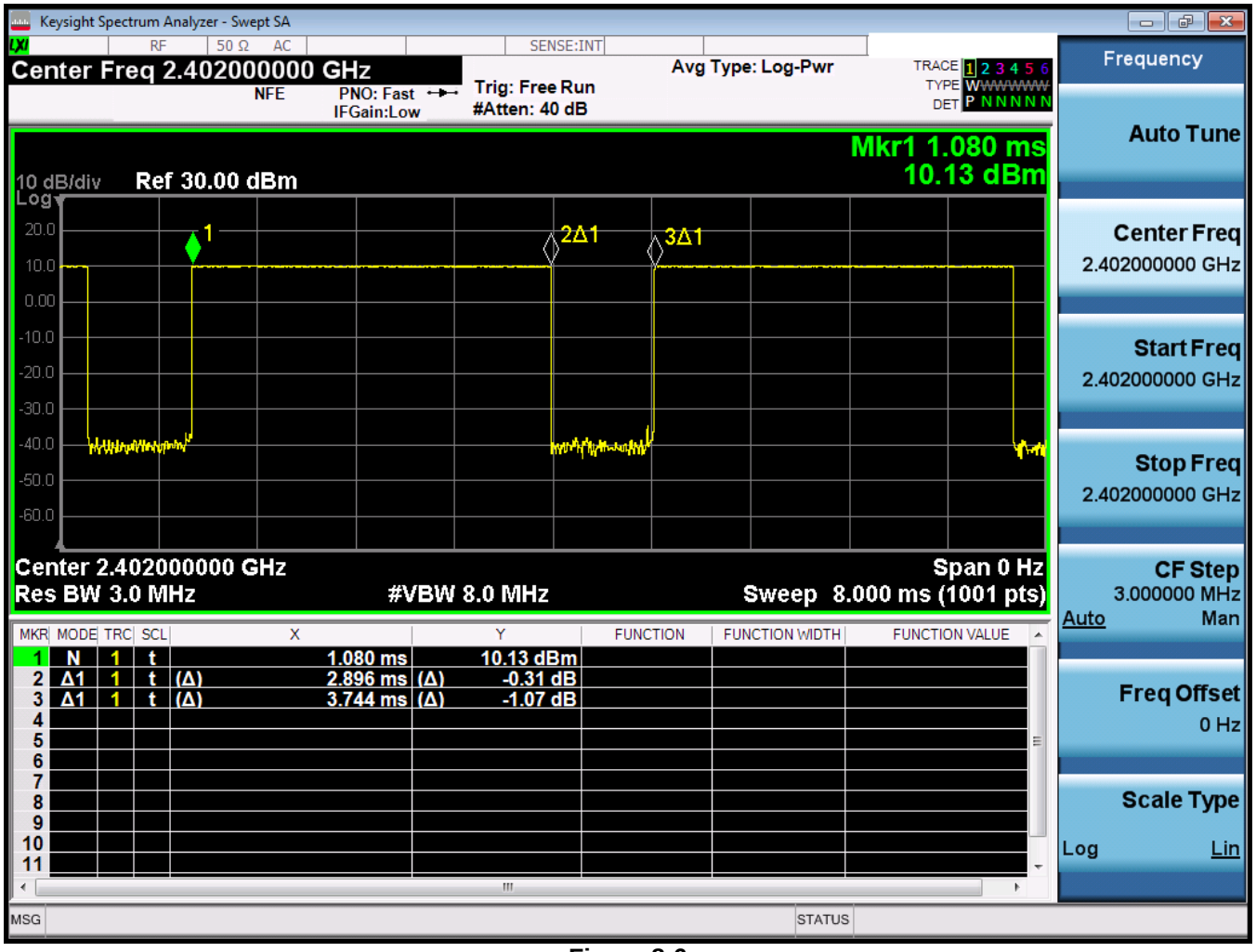

Figure 8-6
Bluetooth Transmission Plot & Duty Cycle Calculation – Antenna A Variant 2

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.896\ ms}{3.744\ ms} * 100\% = 77.4\%$$

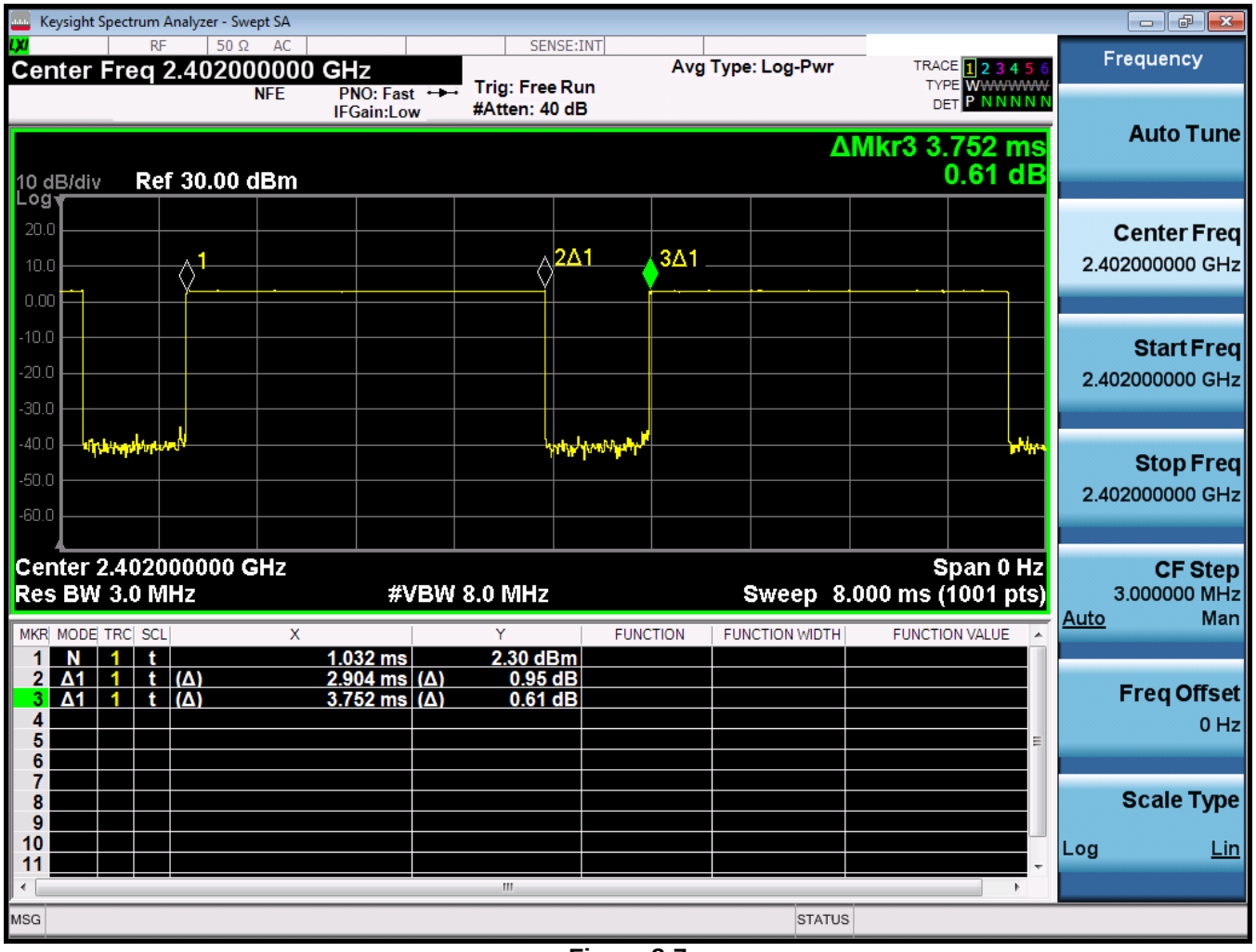

Figure 8-7
Reduced Bluetooth Transmission Plot & Duty Cycle Calculation – Antenna A Variant 2

$$Duty\ Cycle = \frac{Pulse\ Width}{Period} * 100\% = \frac{2.904\ ms}{3.752\ ms} * 100\% = 77.4\%$$

8.5.1 Bluetooth Power Reduction Verification Summary

Table 8-103
Bluetooth Power Reduction Verification

Antenna	Mode/Band	Condition (s)	Maximum Target Power [dBm] (Tolerance [dB])	Reduced Target Power [dBm] (Tolerance [dB])	Maximum Measured Power [dBm]	Reduced Measured Power [dBm]	Verdict
A	2.4 GHz Bluetooth	5 GHz WLAN ON Antenna A	15.50 (+1.5/-2.0)	8.50 (+1.5/-2.0)	15.7	8.3	PASS
	2.4 GHz Bluetooth	5 GHz WLAN ON Antenna B	15.50 (+1.5/-2.0)	8.50 (+1.5/-2.0)	15.7	7.62	PASS
	2.4 GHz Bluetooth	5 GHz WLAN ON Antenna A & B	15.50 (+1.5/-2.0)	8.50 (+1.5/-2.0)	15.7	8.4	PASS

Conducted powers were measured for each Mode/Band and applied condition. All conducted power measurements were verified to be within tolerance.

8.5.2 Notes for Bluetooth

- The Bluetooth chipset in this device is produced by two different suppliers. The electrically identical modules are manufactured with the identical mechanical structure to meet the same specifications and functions. Two device variants are referenced as Variant 1 and Variant 2 in this report.
- Bluetooth SAR worst case configuration was evaluated for Variant 1 and Variant 2. The Variant with the highest reported SAR value was evaluated for the remaining Bluetooth configurations.
- Full power measurements were performed for Variant 1 and Variant 2 per FCC KDB Procedures 248227.

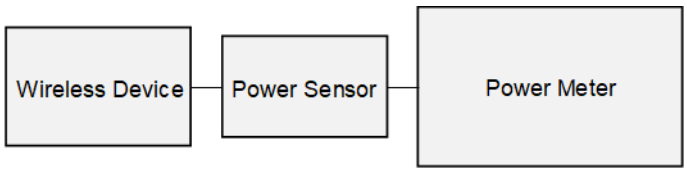

Figure 8-8
Power Measurement Setup

9 SYSTEM VERIFICATION

9.1 Tissue Verification

Table 9-1
Measured Tissue Properties

Calibrated for Tests Performed on:	Tissue Type	Tissue Temp During Calibration (°C)	Measured Frequency (MHz)	Measured Conductivity, σ (S/m)	Measured Dielectric Constant, ε	TARGET Conductivity, σ (S/m)	TARGET Dielectric Constant, ε	% dev σ	% dev ε
5/28/2019	750B	22.5	680	0.915	55.520	0.958	55.804	-4.49%	-0.51%
			695	0.920	55.505	0.959	55.745	-4.07%	-0.43%
			700	0.922	55.500	0.959	55.726	-3.86%	-0.41%
			710	0.925	55.488	0.960	55.687	-3.65%	-0.36%
			720	0.929	55.474	0.961	55.648	-3.33%	-0.31%
			725	0.931	55.465	0.961	55.629	-3.12%	-0.29%
			740	0.936	55.432	0.963	55.570	-2.80%	-0.25%
			755	0.942	55.398	0.964	55.512	-2.28%	-0.21%
			770	0.947	55.364	0.965	55.453	-1.87%	-0.16%
			785	0.953	55.332	0.966	55.395	-1.35%	-0.11%
6/3/2019	750B	21.4	680	0.930	54.410	0.958	55.804	-2.92%	-2.50%
			695	0.935	54.377	0.959	55.745	-2.50%	-2.45%
			700	0.937	54.364	0.959	55.726	-2.29%	-2.44%
			710	0.940	54.343	0.960	55.687	-2.08%	-2.41%
			720	0.944	54.321	0.961	55.648	-1.77%	-2.38%
			725	0.946	54.309	0.961	55.629	-1.56%	-2.37%
			740	0.952	54.267	0.963	55.570	-1.14%	-2.34%
			755	0.957	54.230	0.964	55.512	-0.73%	-2.31%
			770	0.962	54.203	0.965	55.453	-0.31%	-2.25%
			785	0.967	54.178	0.966	55.395	0.10%	-2.20%
			800	0.972	54.154	0.967	55.336	0.52%	-2.14%
5/28/2019	835B	19.7	800	0.989	53.749	0.967	55.336	2.28%	-2.87%
			820	0.997	53.700	0.969	55.258	2.89%	-2.82%
			835	1.003	53.678	0.970	55.200	3.40%	-2.76%
			850	1.010	53.662	0.988	55.154	2.23%	-2.71%
5/28/2019	835B	22.0	800	0.923	53.247	0.967	55.336	-4.55%	-3.78%
			820	0.930	53.187	0.969	55.258	-4.02%	-3.75%
			835	0.936	53.155	0.970	55.200	-3.51%	-3.70%
			850	0.942	53.129	0.988	55.154	-4.66%	-3.67%
5/24/2019	1750B	21.5	1710	1.433	52.880	1.463	53.537	-2.05%	-1.23%
			1750	1.461	52.823	1.488	53.432	-1.81%	-1.14%
			1790	1.489	52.763	1.514	53.326	-1.65%	-1.06%
5/28/2019	1750B	22.2	1710	1.434	52.742	1.463	53.537	-1.98%	-1.48%
			1750	1.463	52.692	1.488	53.432	-1.68%	-1.38%
			1790	1.491	52.627	1.514	53.326	-1.52%	-1.31%
5/28/2019	1900B	22.2	1850	1.531	52.530	1.520	53.300	0.72%	-1.44%
			1880	1.552	52.482	1.520	53.300	2.11%	-1.53%
			1910	1.572	52.448	1.520	53.300	3.42%	-1.60%
6/3/2019	2300B	21.4	2300	1.884	51.991	1.809	52.900	4.15%	-1.72%
			2310	1.892	51.979	1.816	52.887	4.19%	-1.72%
			2320	1.901	51.967	1.826	52.873	4.11%	-1.71%
5/21/2019	2450B	21.2	2400	1.992	51.834	1.902	52.767	4.73%	-1.77%
			2450	2.037	51.753	1.950	52.700	4.46%	-1.80%
			2500	2.081	51.685	2.021	52.636	2.97%	-1.81%
5/28/2019	2450B	20.1	2400	1.983	51.280	1.902	52.767	4.26%	-2.82%
			2450	2.028	51.200	1.950	52.700	4.00%	-2.85%
			2500	2.073	51.123	2.021	52.636	2.57%	-2.87%
			2550	2.119	51.038	2.092	52.573	1.29%	-2.92%
			2600	2.166	50.955	2.163	52.509	0.14%	-2.96%
			2650	2.215	50.861	2.234	52.445	-0.85%	-3.02%
			2700	2.262	50.791	2.305	52.382	-1.87%	-3.04%
5/30/2019	2450B	22.3	2400	1.978	50.685	1.902	52.767	4.00%	-3.95%
			2450	2.022	50.616	1.950	52.700	3.69%	-3.95%
			2500	2.064	50.546	2.021	52.636	2.13%	-3.97%
			2550	2.109	50.474	2.092	52.573	0.81%	-3.99%
			2600	2.155	50.405	2.163	52.509	-0.37%	-4.01%
			2650	2.203	50.315	2.234	52.445	-1.39%	-4.06%
			2700	2.250	50.223	2.305	52.382	-2.39%	-4.12%
6/5/2019	2450B	22.2	2400	1.980	50.792	1.902	52.767	4.10%	-3.74%
			2450	2.024	50.720	1.950	52.700	3.79%	-3.76%
			2500	2.067	50.641	2.021	52.636	2.28%	-3.79%
05/20/2019	5200B-5800B	20.9	5180	5.293	46.915	5.276	49.041	0.32%	-4.34%
			5200	5.318	46.882	5.299	49.014	0.36%	-4.35%
			5220	5.339	46.846	5.323	48.987	0.30%	-4.37%
			5240	5.368	46.792	5.346	48.960	0.41%	-4.43%
			5260	5.396	46.778	5.369	48.933	0.50%	-4.40%
			5280	5.419	46.749	5.393	48.906	0.48%	-4.41%
			5300	5.438	46.699	5.416	48.879	0.41%	-4.46%
			5320	5.469	46.655	5.439	48.851	0.55%	-4.50%
			5500	5.703	46.360	5.650	48.607	0.94%	-4.62%
			5520	5.727	46.331	5.673	48.580	0.95%	-4.63%
			5540	5.754	46.309	5.696	48.553	1.02%	-4.62%
			5560	5.782	46.283	5.720	48.526	1.08%	-4.62%
			5580	5.817	46.249	5.743	48.499	1.29%	-4.64%
			5600	5.839	46.199	5.766	48.471	1.27%	-4.69%
			5620	5.866	46.183	5.790	48.444	1.31%	-4.67%
			5640	5.894	46.142	5.813	48.417	1.39%	-4.70%
			5660	5.925	46.124	5.837	48.390	1.51%	-4.68%
			5680	5.950	46.095	5.860	48.363	1.54%	-4.69%
			5700	5.972	46.054	5.883	48.336	1.51%	-4.72%
			5745	6.030	46.015	5.936	48.275	1.58%	-4.68%
			5765	6.060	45.977	5.959	48.248	1.69%	-4.71%
			5785	6.088	45.949	5.982	48.220	1.77%	-4.71%
			5800	6.105	45.925	6.000	48.200	1.75%	-4.72%
			5805	6.109	45.920	6.006	48.193	1.71%	-4.72%
			5825	6.136	45.890	6.029	48.166	1.77%	-4.73%

The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per KDB Publication 865664 D01v01r04 and IEEE 1528-2013 6.6.1.2). The tissue parameters listed in the SAR test plots may slightly differ from the table above due to significant digit rounding in the software.

9.2 Test System Verification

Prior to SAR assessment, the system is verified to ±10% of the SAR measurement on the reference dipole at the time of calibration by the calibration facility. Full system validation status and result summary can be found in Appendix E.

Table 9-2
System Verification Results – 1g

System Verification TARGET & MEASURED												
SAR System #	Tissue Frequency (MHz)	Tissue Type	Date	Amb. Temp (°C)	Liquid Temp (°C)	Input Power (W)	Source SN	Probe SN	Measured SAR_{1g} (W/kg)	1 W Target SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	$Deviation_{1g}$ (%)
AM7	750	BODY	05/28/2019	22.2	20.8	0.200	1097	3837	1.840	8.560	9.200	7.48%
AM7	750	BODY	06/03/2019	20.9	20.5	0.200	1097	3837	1.800	8.560	9.000	5.14%
AM2	835	BODY	05/28/2019	21.3	20.1	0.200	4d040	7416	2.040	9.560	10.200	6.69%
AM6	835	BODY	05/28/2019	23.1	21.0	0.200	4d040	7427	1.800	9.560	9.000	-5.86%
AM3	1750	BODY	05/24/2019	21.0	20.5	0.100	1104	7420	3.880	36.600	38.800	6.01%
AM3	1750	BODY	05/28/2019	20.9	20.2	0.100	1104	7420	3.910	36.600	39.100	6.83%
AM3	1900	BODY	05/28/2019	20.9	20.2	0.100	5d181	7420	3.760	39.500	37.600	-4.81%
AM7	2300	BODY	06/03/2019	20.9	20.5	0.100	1038	3837	4.790	46.700	47.900	2.57%
AM1	2450	BODY	05/21/2019	20.6	21.7	0.100	921	7421	5.190	50.800	51.900	2.17%
AM5	2450	BODY	05/28/2019	21.4	20.0	0.100	921	3318	5.410	50.800	54.100	6.50%
AM5	2450	BODY	05/30/2019	21.4	20.4	0.100	921	3318	5.290	50.800	52.900	4.13%
AM5	2450	BODY	06/05/2019	19.9	20.8	0.100	921	3318	5.300	50.800	53.000	4.33%
AM5	2600	BODY	05/28/2019	21.4	20.0	0.100	1069	3318	5.810	55.300	58.100	5.06%
AM5	2600	BODY	05/30/2019	21.4	20.4	0.100	1069	3318	5.820	55.300	58.200	5.24%
AM7	5250	BODY	05/20/2019	21.7	20.9	0.050	1163	3837	3.580	77.700	71.600	-7.85%
AM7	5600	BODY	05/20/2019	21.7	20.9	0.050	1163	3837	4.150	80.100	83.000	3.62%
AM7	5750	BODY	05/20/2019	21.7	20.9	0.050	1163	3837	3.770	77.800	75.400	-3.08%

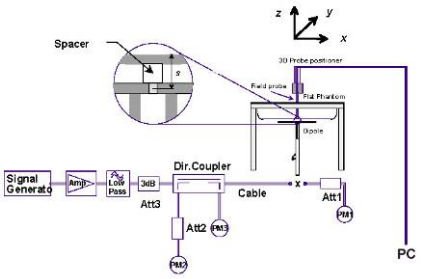

Figure 9-1
System Verification Setup Diagram

Figure 9-2
System Verification Setup Photo

10 SAR DATA SUMMARY

10.1 Standalone Body SAR Data

Table 10-1
GPRS 850 MHz Antenna C Body SAR Data

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	(W/kg)	(W/kg)	
824.20	128	GSM 850	GPRS	24.75	23.81	-0.05	0 mm	Antenna C	F9FYL00TMLX0	2	1:4.15	back	0.857	1.242	1.064	0.426	0.529	
836.60	190	GSM 850	GPRS	24.75	23.90	-0.05	0 mm	Antenna C	F9FYL00TMLX0	2	1:4.15	back	0.811	1.216	0.986	0.402	0.489	
848.80	251	GSM 850	GPRS	24.75	23.81	-0.09	0 mm	Antenna C	F9FYL00TMLX0	2	1:4.15	back	0.779	1.242	0.968	0.388	0.482	
824.20	128	GSM 850	GPRS	24.75	23.81	0.03	0 mm	Antenna C	F9FYL00TMLX0	2	1:4.15	top	0.670	1.242	0.832	0.388	0.482	
836.60	190	GSM 850	GPRS	24.75	23.90	0.02	0 mm	Antenna C	F9FYL00TMLX0	2	1:4.15	top	0.696	1.216	0.846	0.375	0.456	
848.80	251	GSM 850	GPRS	24.75	23.81	-0.04	0 mm	Antenna C	F9FYL00TMLX0	2	1:4.15	top	0.623	1.242	0.774	0.356	0.442	
836.60	190	GSM 850	GPRS	24.75	23.90	0.17	0 mm	Antenna C	F9FYL00TMLX0	2	1:4.15	bottom	0.024	1.216	0.029	0.011	0.013	
836.60	190	GSM 850	GPRS	24.75	23.90	-0.03	0 mm	Antenna C	F9FYL00TMLX0	2	1:4.15	right	0.163	1.216	0.198	0.077	0.094	
836.60	190	GSM 850	GPRS	24.75	23.90	0.04	0 mm	Antenna C	F9FYL00TMLX0	2	1:4.15	left	0.020	1.216	0.024	0.009	0.011	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 10-2
GPRS 850 MHz Antenna D Body SAR Data

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	(W/kg)	(W/kg)	
824.20	128	GSM 850	GPRS	25.50	25.43	-0.10	0 mm	Antenna D	F9FYL00BMLX0	2	1:4.15	back	1.160	1.016	**1.179**	0.575	**0.584**	A1
836.60	190	GSM 850	GPRS	25.50	25.19	-0.15	0 mm	Antenna D	F9FYL00BMLX0	2	1:4.15	back	1.070	1.074	1.149	0.539	0.579	
848.80	251	GSM 850	GPRS	25.50	25.18	-0.09	0 mm	Antenna D	F9FYL00BMLX0	2	1:4.15	back	1.010	1.076	1.087	0.501	0.539	
824.20	128	GSM 850	GPRS	25.50	25.43	0.15	0 mm	Antenna D	F9FYL00BMLX0	2	1:4.15	top	0.909	1.016	0.924	0.508	0.516	
836.60	190	GSM 850	GPRS	25.50	25.19	0.00	0 mm	Antenna D	F9FYL00BMLX0	2	1:4.15	top	1.020	1.074	1.095	0.555	0.596	
848.80	251	GSM 850	GPRS	25.50	25.18	0.18	0 mm	Antenna D	F9FYL00BMLX0	2	1:4.15	top	0.907	1.076	0.976	0.470	0.506	
836.60	190	GSM 850	GPRS	25.50	25.19	0.17	0 mm	Antenna D	F9FYL00BMLX0	2	1:4.15	bottom	0.025	1.074	0.027	0.011	0.012	
836.60	190	GSM 850	GPRS	25.50	25.19	0.13	0 mm	Antenna D	F9FYL00BMLX0	2	1:4.15	right	0.030	1.074	0.032	0.014	0.015	
836.60	190	GSM 850	GPRS	25.50	25.19	-0.04	0 mm	Antenna D	F9FYL00BMLX0	2	1:4.15	left	0.116	1.074	0.125	0.054	0.058	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 10-3
GPRS 1900 MHz Antenna C Body SAR Data

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	(W/kg)	(W/kg)	
1850.20	512	GSM 1900	GPRS	18.95	18.69	0.00	0 mm	Antenna C	F9FYL00HMLX0	2	1:4.15	back	0.929	1.062	0.987	0.424	0.450	
1880.00	661	GSM 1900	GPRS	18.95	18.44	-0.03	0 mm	Antenna C	F9FYL00HMLX0	2	1:4.15	back	0.942	1.125	1.060	0.432	0.486	
1909.80	810	GSM 1900	GPRS	18.95	18.59	0.02	0 mm	Antenna C	F9FYL00HMLX0	2	1:4.15	back	0.965	1.086	1.048	0.443	0.481	
1880.00	661	GSM 1900	GPRS	18.95	18.44	-0.02	0 mm	Antenna C	F9FYL00HMLX0	2	1:4.15	top	0.648	1.125	0.729	0.305	0.343	
1880.00	661	GSM 1900	GPRS	18.95	18.44	0.10	0 mm	Antenna C	F9FYL00HMLX0	2	1:4.15	bottom	0.000	1.125	0.000	0.000	0.000	
1880.00	661	GSM 1900	GPRS	18.95	18.44	0.14	0 mm	Antenna C	F9FYL00HMLX0	2	1:4.15	right	0.087	1.125	0.098	0.040	0.045	
1880.00	661	GSM 1900	GPRS	18.95	18.44	0.00	0 mm	Antenna C	F9FYL00HMLX0	2	1:4.15	left	0.022	1.125	0.025	0.011	0.012	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 10-4
GPRS 1900 MHz Antenna D Body SAR Data

MEASUREMENT RESULTS																		
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	# of Time Slots	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.												(W/kg)		(W/kg)	(W/kg)	(W/kg)	
1850.20	512	GSM 1900	GPRS	18.25	17.99	0.01	0 mm	Antenna D	F9FYL00HMLX0	2	1:4.15	back	0.911	1.062	0.967	0.398	0.423	
1880.00	661	GSM 1900	GPRS	18.25	17.87	-0.05	0 mm	Antenna D	F9FYL00HMLX0	2	1:4.15	back	0.945	1.091	1.031	0.411	0.448	
1909.80	810	GSM 1900	GPRS	18.25	17.84	-0.02	0 mm	Antenna D	F9FYL00HMLX0	2	1:4.15	back	1.020	1.099	1.121	0.437	0.480	A2
1880.00	661	GSM 1900	GPRS	18.25	17.87	-0.01	0 mm	Antenna D	F9FYL00HMLX0	2	1:4.15	top	0.685	1.091	0.747	0.313	0.341	
1880.00	661	GSM 1900	GPRS	18.25	17.87	0.10	0 mm	Antenna D	F9FYL00HMLX0	2	1:4.15	bottom	0.000	1.091	0.000	0.000	0.000	
1880.00	661	GSM 1900	GPRS	18.25	17.87	-0.04	0 mm	Antenna D	F9FYL00HMLX0	2	1:4.15	right	0.015	1.091	0.016	0.007	0.008	
1880.00	661	GSM 1900	GPRS	18.25	17.87	0.00	0 mm	Antenna D	F9FYL00HMLX0	2	1:4.15	left	0.061	1.091	0.067	0.027	0.029	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 10-5
UMTS 850 MHz Antenna C Body SAR Data

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	(W/kg)	(W/kg)	
826.40	4132	UMTS 850	RMC	17.7	17.70	0.10	0 mm	Antenna C	F9FYL00HMLX0	1:1	back	1.030	1.000	1.030	0.522	0.522	
836.60	4183	UMTS 850	RMC	17.7	17.66	0.13	0 mm	Antenna C	F9FYL00HMLX0	1:1	back	0.995	1.009	1.004	0.505	0.510	
846.60	4233	UMTS 850	RMC	17.7	17.65	0.10	0 mm	Antenna C	F9FYL00HMLX0	1:1	back	0.949	1.012	0.960	0.482	0.488	
826.40	4132	UMTS 850	RMC	17.7	17.70	0.03	0 mm	Antenna C	F9FYL00HMLX0	1:1	top	0.782	1.000	0.782	0.447	0.447	
836.60	4183	UMTS 850	RMC	17.7	17.66	-0.07	0 mm	Antenna C	F9FYL00HMLX0	1:1	top	0.856	1.009	0.864	0.483	0.487	
846.60	4233	UMTS 850	RMC	17.7	17.65	0.07	0 mm	Antenna C	F9FYL00HMLX0	1:1	top	0.748	1.012	0.757	0.423	0.428	
836.60	4183	UMTS 850	RMC	17.7	17.66	0.05	0 mm	Antenna C	F9FYL00HMLX0	1:1	bottom	0.026	1.009	0.026	0.013	0.013	
836.60	4183	UMTS 850	RMC	17.7	17.66	-0.04	0 mm	Antenna C	F9FYL00HMLX0	1:1	right	0.152	1.009	0.153	0.073	0.074	
836.60	4183	UMTS 850	RMC	17.7	17.66	0.20	0 mm	Antenna C	F9FYL00HMLX0	1:1	left	0.018	1.009	0.018	0.008	0.008	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram					

Table 10-6
UMTS 850 MHz Antenna D Body SAR Data

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	(W/kg)	(W/kg)	
826.40	4132	UMTS 850	RMC	19.2	19.17	0.10	0 mm	Antenna D	F9FYL00HMLX0	1:1	back	0.976	1.007	0.983	0.479	0.482	
836.60	4183	UMTS 850	RMC	19.2	19.14	-0.03	0 mm	Antenna D	F9FYL00HMLX0	1:1	back	1.110	1.014	1.126	0.549	0.557	A3
846.60	4233	UMTS 850	RMC	19.2	19.20	-0.09	0 mm	Antenna D	F9FYL00HMLX0	1:1	back	1.020	1.000	1.020	0.501	0.501	
826.40	4132	UMTS 850	RMC	19.2	19.17	-0.03	0 mm	Antenna D	F9FYL00HMLX0	1:1	top	1.080	1.007	1.088	0.579	0.583	
836.60	4183	UMTS 850	RMC	19.2	19.14	0.07	0 mm	Antenna D	F9FYL00HMLX0	1:1	top	0.894	1.014	0.907	0.476	0.483	
846.60	4233	UMTS 850	RMC	19.2	19.20	0.00	0 mm	Antenna D	F9FYL00HMLX0	1:1	top	0.985	1.000	0.985	0.524	0.524	
836.60	4183	UMTS 850	RMC	19.2	19.14	0.03	0 mm	Antenna D	F9FYL00HMLX0	1:1	bottom	0.026	1.014	0.026	0.012	0.012	
836.60	4183	UMTS 850	RMC	19.2	19.14	0.12	0 mm	Antenna D	F9FYL00HMLX0	1:1	right	0.031	1.014	0.031	0.014	0.014	
836.60	4183	UMTS 850	RMC	19.2	19.14	0.09	0 mm	Antenna D	F9FYL00HMLX0	1:1	left	0.243	1.014	0.246	0.114	0.116	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 10-7
UMTS 1750 MHz Antenna C Body SAR Data

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	(W/kg)	(W/kg)	
1712.40	1312	UMTS 1750	RMC	13.3	13.29	0.00	0 mm	Antenna C	F9FYL00TMLX0	1:1	back	0.946	1.002	0.948	0.450	0.451	
1732.40	1412	UMTS 1750	RMC	13.3	13.13	0.02	0 mm	Antenna C	F9FYL00TMLX0	1:1	back	0.961	1.040	0.999	0.459	0.477	
1752.60	1513	UMTS 1750	RMC	13.3	13.12	0.00	0 mm	Antenna C	F9FYL00TMLX0	1:1	back	0.960	1.042	1.000	0.461	0.480	
1732.40	1412	UMTS 1750	RMC	13.3	13.13	-0.02	0 mm	Antenna C	F9FYL00TMLX0	1:1	top	0.644	1.040	0.670	0.315	0.328	
1732.40	1412	UMTS 1750	RMC	13.3	13.13	0.20	0 mm	Antenna C	F9FYL00TMLX0	1:1	bottom	0.002	1.040	0.002	0.001	0.001	
1732.40	1412	UMTS 1750	RMC	13.3	13.13	0.07	0 mm	Antenna C	F9FYL00TMLX0	1:1	right	0.068	1.040	0.071	0.031	0.032	
1732.40	1412	UMTS 1750	RMC	13.3	13.13	0.09	0 mm	Antenna C	F9FYL00TMLX0	1:1	left	0.016	1.040	0.017	0.008	0.008	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 10-8
UMTS 1750 MHz Antenna D Body SAR Data

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	(W/kg)	(W/kg)	
1712.40	1312	UMTS 1750	RMC	13.2	13.17	-0.01	0 mm	Antenna D	F9FYL00TMLX0	1:1	back	0.860	1.007	0.866	0.381	0.384	
1732.40	1412	UMTS 1750	RMC	13.2	13.15	-0.02	0 mm	Antenna D	F9FYL00TMLX0	1:1	back	0.702	1.012	0.710	0.309	0.313	
1752.60	1513	UMTS 1750	RMC	13.2	13.20	0.00	0 mm	Antenna D	F9FYL00TMLX0	1:1	back	0.995	1.000	0.995	0.438	0.438	A4
1732.40	1412	UMTS 1750	RMC	13.2	13.15	0.01	0 mm	Antenna D	F9FYL00TMLX0	1:1	top	0.506	1.012	0.512	0.235	0.238	
1732.40	1412	UMTS 1750	RMC	13.2	13.15	0.16	0 mm	Antenna D	F9FYL00TMLX0	1:1	bottom	0.001	1.012	0.001	0.000	0.000	
1732.40	1412	UMTS 1750	RMC	13.2	13.15	0.03	0 mm	Antenna D	F9FYL00TMLX0	1:1	right	0.008	1.012	0.008	0.004	0.004	
1732.40	1412	UMTS 1750	RMC	13.2	13.15	0.02	0 mm	Antenna D	F9FYL00TMLX0	1:1	left	0.050	1.012	0.051	0.024	0.024	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 10-9
UMTS 1900 MHz Antenna C Body SAR Data

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	(W/kg)	(W/kg)	
1852.40	9262	UMTS 1900	RMC	13.1	13.10	0.03	0 mm	Antenna C	F9FYL00HMLX0	1:1	back	1.180	1.000	**1.180**	0.541	**0.541**	A5
1880.00	9400	UMTS 1900	RMC	13.1	13.06	0.01	0 mm	Antenna C	F9FYL00HMLX0	1:1	back	1.170	1.009	**1.181**	0.542	**0.547**	
1907.60	9538	UMTS 1900	RMC	13.1	13.09	-0.02	0 mm	Antenna C	F9FYL00HMLX0	1:1	back	1.140	1.002	1.142	0.529	0.530	
1852.40	9262	UMTS 1900	RMC	13.1	13.10	-0.02	0 mm	Antenna C	F9FYL00HMLX0	1:1	top	0.755	1.000	0.755	0.352	0.352	
1880.00	9400	UMTS 1900	RMC	13.1	13.06	-0.01	0 mm	Antenna C	F9FYL00HMLX0	1:1	top	0.858	1.009	0.866	0.401	0.405	
1907.60	9538	UMTS 1900	RMC	13.1	13.09	-0.01	0 mm	Antenna C	F9FYL00HMLX0	1:1	top	0.824	1.002	0.826	0.382	0.383	
1880.00	9400	UMTS 1900	RMC	13.1	13.06	0.00	0 mm	Antenna C	F9FYL00HMLX0	1:1	bottom	0.000	1.009	0.000	0.000	0.000	
1880.00	9400	UMTS 1900	RMC	13.1	13.06	-0.10	0 mm	Antenna C	F9FYL00HMLX0	1:1	right	0.100	1.009	0.101	0.047	0.047	
1880.00	9400	UMTS 1900	RMC	13.1	13.06	-0.13	0 mm	Antenna C	F9FYL00HMLX0	1:1	left	0.029	1.009	0.029	0.015	0.015	
1852.40	9262	UMTS 1900	RMC	13.1	13.10	0.03	0 mm	Antenna C	F9FYL00HMLX0	1:1	back	1.180	1.000	**1.180**	0.543	**0.543**	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**												**Body** **1.6 W/kg (mW/g)** averaged over 1 gram					

Note: Blue entries indicate variability measurements.

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Tabe 10-10
UMTS 1900 MHz Antenna D Body SAR Data

MEASUREMENT RESULTS																	
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Device Serial Number	Duty Cycle	Side	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.											(W/kg)		(W/kg)	(W/kg)	(W/kg)	
1852.40	9262	UMTS 1900	RMC	12.0	12.00	0.01	0 mm	Antenna D	F9FYL00HMLX0	1:1	back	1.050	1.000	1.050	0.452	0.452	
1880.00	9400	UMTS 1900	RMC	12.0	11.75	-0.05	0 mm	Antenna D	F9FYL00HMLX0	1:1	back	0.833	1.059	0.882	0.359	0.380	
1907.60	9538	UMTS 1900	RMC	12.0	11.86	-0.02	0 mm	Antenna D	F9FYL00HMLX0	1:1	back	1.110	1.033	1.147	0.475	0.491	
1880.00	9400	UMTS 1900	RMC	12.0	11.75	0.00	0 mm	Antenna D	F9FYL00HMLX0	1:1	top	0.654	1.059	0.693	0.298	0.316	
1880.00	9400	UMTS 1900	RMC	12.0	11.75	-0.10	0 mm	Antenna D	F9FYL00HMLX0	1:1	bottom	0.000	1.059	0.000	0.000	0.000	
1880.00	9400	UMTS 1900	RMC	12.0	11.75	0.06	0 mm	Antenna D	F9FYL00HMLX0	1:1	right	0.010	1.059	0.011	0.004	0.004	
1880.00	9400	UMTS 1900	RMC	12.0	11.75	0.01	0 mm	Antenna D	F9FYL00HMLX0	1:1	left	0.058	1.059	0.061	0.026	0.028	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population**												**Body** **1.6 W/kg (mW/g)** averaged over 1 gram					

Table 10-11
LTE Band 12 Antenna C Body SAR

MEASUREMENT RESULTS																								
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
707.50	23095	Mid	LTE Band 12	10	17.5	17.48	0.10	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	back	1:1	1.020	1.005	1.025	0.498	0.500	
707.50	23095	Mid	LTE Band 12	10	17.5	17.46	0.16	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	back	1:1	1.080	1.009	1.090	0.520	0.525	
707.50	23095	Mid	LTE Band 12	10	17.5	17.44	0.14	0	Antenna C	F9FYL00BMLX0	QPSK	50	0	0 mm	back	1:1	1.060	1.014	1.075	0.510	0.517	
707.50	23095	Mid	LTE Band 12	10	17.5	17.48	-0.03	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	top	1:1	0.548	1.005	0.551	0.298	0.299	
707.50	23095	Mid	LTE Band 12	10	17.5	17.46	-0.04	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	top	1:1	0.569	1.009	0.574	0.313	0.316	
707.50	23095	Mid	LTE Band 12	10	17.5	17.48	-0.19	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	bottom	1:1	0.021	1.005	0.021	0.008	0.008	
707.50	23095	Mid	LTE Band 12	10	17.5	17.46	0.03	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	bottom	1:1	0.014	1.009	0.014	0.006	0.006	
707.50	23095	Mid	LTE Band 12	10	17.5	17.48	-0.05	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	right	1:1	0.089	1.005	0.089	0.045	0.045	
707.50	23095	Mid	LTE Band 12	10	17.5	17.46	0.02	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	right	1:1	0.081	1.009	0.082	0.041	0.041	
707.50	23095	Mid	LTE Band 12	10	17.5	17.48	-0.05	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	left	1:1	0.016	1.005	0.016	0.008	0.008	
707.50	23095	Mid	LTE Band 12	10	17.5	17.46	0.03	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	left	1:1	0.017	1.009	0.017	0.009	0.009	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram														

Table 10-12
LTE Band 12 Antenna D Body SAR

MEASUREMENT RESULTS																								
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
707.50	23095	Mid	LTE Band 12	10	17.2	17.19	0.06	0	Antenna D	F9FYL00BMLX0	QPSK	1	0	0 mm	back	1:1	1.130	1.002	1.132	0.530	0.531	A6
707.50	23095	Mid	LTE Band 12	10	17.2	17.20	0.03	0	Antenna D	F9FYL00BMLX0	QPSK	25	0	0 mm	back	1:1	1.130	1.000	1.130	0.536	0.536	
707.50	23095	Mid	LTE Band 12	10	17.2	17.16	0.01	0	Antenna D	F9FYL00BMLX0	QPSK	50	0	0 mm	back	1:1	1.110	1.009	1.120	0.520	0.525	
707.50	23095	Mid	LTE Band 12	10	17.2	17.19	0.06	0	Antenna D	F9FYL00BMLX0	QPSK	1	0	0 mm	top	1:1	0.476	1.002	0.477	0.249	0.249	
707.50	23095	Mid	LTE Band 12	10	17.2	17.20	-0.01	0	Antenna D	F9FYL00BMLX0	QPSK	25	0	0 mm	top	1:1	0.480	1.000	0.480	0.260	0.260	
707.50	23095	Mid	LTE Band 12	10	17.2	17.19	-0.05	0	Antenna D	F9FYL00BMLX0	QPSK	1	0	0 mm	bottom	1:1	0.016	1.002	0.016	0.009	0.009	
707.50	23095	Mid	LTE Band 12	10	17.2	17.20	-0.05	0	Antenna D	F9FYL00BMLX0	QPSK	25	0	0 mm	bottom	1:1	0.016	1.000	0.016	0.009	0.009	
707.50	23095	Mid	LTE Band 12	10	17.2	17.19	0.04	0	Antenna D	F9FYL00BMLX0	QPSK	1	0	0 mm	right	1:1	0.012	1.002	0.012	0.006	0.006	
707.50	23095	Mid	LTE Band 12	10	17.2	17.20	0.01	0	Antenna D	F9FYL00BMLX0	QPSK	25	0	0 mm	right	1:1	0.012	1.000	0.012	0.006	0.006	
707.50	23095	Mid	LTE Band 12	10	17.2	17.19	-0.11	0	Antenna D	F9FYL00BMLX0	QPSK	1	0	0 mm	left	1:1	0.063	1.002	0.063	0.034	0.034	
707.50	23095	Mid	LTE Band 12	10	17.2	17.20	-0.19	0	Antenna D	F9FYL00BMLX0	QPSK	25	0	0 mm	left	1:1	0.065	1.000	0.065	0.036	0.036	
707.50	23095	Mid	LTE Band 12	10	17.2	17.19	0.02	0	Antenna D	F9FYL00BMLX0	QPSK	1	0	0 mm	back	1:1	0.980	1.002	0.982	0.473	0.474	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram														

Note: Blue entries indicate variability measurements.

Table 10-13
LTE Band 13 Antenna C Body SAR

MEASUREMENT RESULTS																								
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
782.00	23230	Mid	LTE Band 13	10	18.1	18.09	0.08	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	back	1:1	0.984	1.002	0.986	0.483	0.484	A7
782.00	23230	Mid	LTE Band 13	10	18.1	17.85	0.07	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	back	1:1	0.897	1.059	0.950	0.440	0.466	
782.00	23230	Mid	LTE Band 13	10	18.1	17.79	0.06	0	Antenna C	F9FYL00BMLX0	QPSK	50	0	0 mm	back	1:1	0.867	1.074	0.931	0.428	0.460	
782.00	23230	Mid	LTE Band 13	10	18.1	18.09	-0.03	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	top	1:1	0.534	1.002	0.535	0.285	0.286	
782.00	23230	Mid	LTE Band 13	10	18.1	17.85	-0.06	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	top	1:1	0.492	1.059	0.521	0.258	0.273	
782.00	23230	Mid	LTE Band 13	10	18.1	18.09	-0.03	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	bottom	1:1	0.025	1.002	0.025	0.013	0.013	
782.00	23230	Mid	LTE Band 13	10	18.1	17.85	0.06	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	bottom	1:1	0.022	1.059	0.023	0.012	0.013	
782.00	23230	Mid	LTE Band 13	10	18.1	18.09	-0.05	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	right	1:1	0.131	1.002	0.131	0.069	0.069	
782.00	23230	Mid	LTE Band 13	10	18.1	17.85	0.04	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	right	1:1	0.118	1.059	0.125	0.063	0.067	
782.00	23230	Mid	LTE Band 13	10	18.1	18.09	-0.14	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	left	1:1	0.027	1.002	0.027	0.014	0.014	
782.00	23230	Mid	LTE Band 13	10	18.1	17.85	-0.12	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	left	1:1	0.022	1.059	0.023	0.011	0.012	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram														

Table 10-14
LTE Band 13 Antenna D Body SAR

MEASUREMENT RESULTS																							
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
782.00	23230	Mid	LTE Band 13	10	18.3	18.00	0.02	0	Antenna D	F9FYL00FMLX0	QPSK	1	0	0 mm	back	1:1	0.946	1.072	1.014	0.455	0.488	
782.00	23230	Mid	LTE Band 13	10	18.3	17.71	0.05	0	Antenna D	F9FYL00FMLX0	QPSK	25	0	0 mm	back	1:1	0.849	1.146	0.973	0.406	0.465	
782.00	23230	Mid	LTE Band 13	10	18.3	17.66	0.03	0	Antenna D	F9FYL00FMLX0	QPSK	50	0	0 mm	back	1:1	0.805	1.159	0.933	0.387	0.449	
782.00	23230	Mid	LTE Band 13	10	18.3	18.00	-0.14	0	Antenna D	F9FYL00FMLX0	QPSK	1	0	0 mm	top	1:1	0.694	1.072	0.744	0.370	0.397	
782.00	23230	Mid	LTE Band 13	10	18.3	17.71	-0.04	0	Antenna D	F9FYL00FMLX0	QPSK	25	0	0 mm	top	1:1	0.642	1.146	0.736	0.356	0.408	
782.00	23230	Mid	LTE Band 13	10	18.3	18.00	-0.08	0	Antenna D	F9FYL00FMLX0	QPSK	1	0	0 mm	bottom	1:1	0.020	1.072	0.021	0.012	0.013	
782.00	23230	Mid	LTE Band 13	10	18.3	17.71	-0.04	0	Antenna D	F9FYL00FMLX0	QPSK	25	0	0 mm	bottom	1:1	0.019	1.146	0.022	0.011	0.013	
782.00	23230	Mid	LTE Band 13	10	18.3	18.00	0.10	0	Antenna D	F9FYL00FMLX0	QPSK	1	0	0 mm	right	1:1	0.031	1.072	0.033	0.017	0.018	
782.00	23230	Mid	LTE Band 13	10	18.3	17.71	0.08	0	Antenna D	F9FYL00FMLX0	QPSK	25	0	0 mm	right	1:1	0.032	1.146	0.037	0.017	0.019	
782.00	23230	Mid	LTE Band 13	10	18.3	18.00	-0.10	0	Antenna D	F9FYL00FMLX0	QPSK	1	0	0 mm	left	1:1	0.145	1.072	0.155	0.076	0.081	
782.00	23230	Mid	LTE Band 13	10	18.3	17.71	-0.13	0	Antenna D	F9FYL00FMLX0	QPSK	25	0	0 mm	left	1:1	0.126	1.146	0.144	0.067	0.077	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 10-15
LTE Band 14 Antenna C Body SAR

MEASUREMENT RESULTS																						
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
793.00	23330	Mid	LTE Band 14	10	18.1	18.10	0.01	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	back	1:1	0.909	1.000	0.909	0.451	0.451	
793.00	23330	Mid	LTE Band 14	10	18.1	18.09	0.06	0	Antenna C	F9FYL00BMLX0	QPSK	25	25	0 mm	back	1:1	0.890	1.002	0.892	0.440	0.441	
793.00	23330	Mid	LTE Band 14	10	18.1	18.07	0.20	0	Antenna C	F9FYL00BMLX0	QPSK	50	0	0 mm	back	1:1	0.940	1.007	0.947	0.451	0.454	A8
793.00	23330	Mid	LTE Band 14	10	18.1	18.10	-0.04	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	top	1:1	0.525	1.000	0.525	0.281	0.281	
793.00	23330	Mid	LTE Band 14	10	18.1	18.09	-0.03	0	Antenna C	F9FYL00BMLX0	QPSK	25	25	0 mm	top	1:1	0.529	1.002	0.530	0.282	0.283	
793.00	23330	Mid	LTE Band 14	10	18.1	18.10	-0.11	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	bottom	1:1	0.018	1.000	0.018	0.010	0.010	
793.00	23330	Mid	LTE Band 14	10	18.1	18.09	-0.15	0	Antenna C	F9FYL00BMLX0	QPSK	25	25	0 mm	bottom	1:1	0.021	1.002	0.021	0.012	0.012	
793.00	23330	Mid	LTE Band 14	10	18.1	18.10	-0.09	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	right	1:1	0.104	1.000	0.104	0.053	0.053	
793.00	23330	Mid	LTE Band 14	10	18.1	18.09	0.03	0	Antenna C	F9FYL00BMLX0	QPSK	25	25	0 mm	right	1:1	0.109	1.002	0.109	0.056	0.056	
793.00	23330	Mid	LTE Band 14	10	18.1	18.10	0.06	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	left	1:1	0.006	1.000	0.006	0.003	0.003	
793.00	23330	Mid	LTE Band 14	10	18.1	18.09	-0.03	0	Antenna C	F9FYL00BMLX0	QPSK	25	25	0 mm	left	1:1	0.008	1.002	0.008	0.004	0.004	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 10-16
LTE Band 14 Antenna D Body SAR

MEASUREMENT RESULTS																							
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
793.00	23330	Mid	LTE Band 14	10	18.3	17.97	0.03	0	Antenna D	F9FYL00BMLX0	QPSK	1	49	0 mm	back	1:1	0.751	1.079	0.810	0.375	0.405	
793.00	23330	Mid	LTE Band 14	10	18.3	18.00	0.00	0	Antenna D	F9FYL00BMLX0	QPSK	25	25	0 mm	back	1:1	0.798	1.072	0.855	0.394	0.422	
793.00	23330	Mid	LTE Band 14	10	18.3	17.94	-0.01	0	Antenna D	F9FYL00BMLX0	QPSK	50	0	0 mm	back	1:1	0.823	1.086	0.894	0.407	0.442	
793.00	23330	Mid	LTE Band 14	10	18.3	17.97	-0.04	0	Antenna D	F9FYL00BMLX0	QPSK	1	49	0 mm	top	1:1	0.692	1.079	0.747	0.369	0.398	
793.00	23330	Mid	LTE Band 14	10	18.3	18.00	-0.03	0	Antenna D	F9FYL00BMLX0	QPSK	25	25	0 mm	top	1:1	0.681	1.072	0.730	0.381	0.408	
793.00	23330	Mid	LTE Band 14	10	18.3	17.97	-0.05	0	Antenna D	F9FYL00BMLX0	QPSK	1	49	0 mm	bottom	1:1	0.018	1.079	0.019	0.010	0.011	
793.00	23330	Mid	LTE Band 14	10	18.3	18.00	-0.05	0	Antenna D	F9FYL00BMLX0	QPSK	25	25	0 mm	bottom	1:1	0.023	1.072	0.025	0.013	0.014	
793.00	23330	Mid	LTE Band 14	10	18.3	17.97	-0.11	0	Antenna D	F9FYL00BMLX0	QPSK	1	49	0 mm	right	1:1	0.039	1.079	0.042	0.020	0.022	
793.00	23330	Mid	LTE Band 14	10	18.3	18.00	0.10	0	Antenna D	F9FYL00BMLX0	QPSK	25	25	0 mm	right	1:1	0.042	1.072	0.045	0.022	0.024	
793.00	23330	Mid	LTE Band 14	10	18.3	17.97	-0.16	0	Antenna D	F9FYL00BMLX0	QPSK	1	49	0 mm	left	1:1	0.146	1.079	0.158	0.078	0.084	
793.00	23330	Mid	LTE Band 14	10	18.3	18.00	-0.20	0	Antenna D	F9FYL00BMLX0	QPSK	25	25	0 mm	left	1:1	0.143	1.072	0.153	0.079	0.085	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram													

Table 10-17
LTE Band 5 (Cell) Antenna C Body SAR

MEASUREMENT RESULTS																							
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	17.7	17.69	0.10	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	back	1:1	1.030	1.002	1.032	0.528	0.529	
836.50	20525	Mid	LTE Band 5 (Cell)	10	17.7	17.67	0.11	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	back	1:1	1.050	1.007	1.057	0.531	0.535	
836.50	20525	Mid	LTE Band 5 (Cell)	10	17.7	17.66	0.10	0	Antenna C	F9FYL00BMLX0	QPSK	50	0	0 mm	back	1:1	1.050	1.009	1.059	0.533	0.538	
836.50	20525	Mid	LTE Band 5 (Cell)	10	17.7	17.69	0.01	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	top	1:1	0.786	1.002	0.788	0.440	0.441	
836.50	20525	Mid	LTE Band 5 (Cell)	10	17.7	17.67	0.00	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	top	1:1	0.766	1.007	0.771	0.428	0.431	
836.50	20525	Mid	LTE Band 5 (Cell)	10	17.7	17.69	-0.04	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	bottom	1:1	0.022	1.002	0.022	0.011	0.011	
836.50	20525	Mid	LTE Band 5 (Cell)	10	17.7	17.67	-0.03	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	bottom	1:1	0.023	1.007	0.023	0.011	0.011	
836.50	20525	Mid	LTE Band 5 (Cell)	10	17.7	17.69	-0.07	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	right	1:1	0.156	1.002	0.156	0.074	0.074	
836.50	20525	Mid	LTE Band 5 (Cell)	10	17.7	17.67	-0.03	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	right	1:1	0.142	1.007	0.143	0.068	0.068	
836.50	20525	Mid	LTE Band 5 (Cell)	10	17.7	17.69	0.16	0	Antenna C	F9FYL00BMLX0	QPSK	1	49	0 mm	left	1:1	0.025	1.002	0.025	0.011	0.011	
836.50	20525	Mid	LTE Band 5 (Cell)	10	17.7	17.67	0.07	0	Antenna C	F9FYL00BMLX0	QPSK	25	0	0 mm	left	1:1	0.015	1.007	0.015	0.007	0.007	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram													

Table 10-18
LTE Band 5 (Cell) Antenna D Body SAR

MEASUREMENT RESULTS																							
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.2	19.13	0.12	0	Antenna D	F9FYL00HMLX0	QPSK	1	49	0 mm	back	1:1	1.120	1.016	1.138	0.569	0.578	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.2	19.17	0.08	0	Antenna D	F9FYL00HMLX0	QPSK	25	0	0 mm	back	1:1	1.150	1.007	1.158	0.581	0.585	A9
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.2	19.12	0.14	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	back	1:1	1.140	1.019	1.162	0.574	0.585	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.2	19.13	-0.01	0	Antenna D	F9FYL00HMLX0	QPSK	1	49	0 mm	top	1:1	1.100	1.016	1.118	0.597	0.607	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.2	19.17	-0.08	0	Antenna D	F9FYL00HMLX0	QPSK	25	0	0 mm	top	1:1	1.130	1.007	1.138	0.611	0.615	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.2	19.12	0.00	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	top	1:1	1.120	1.019	1.141	0.612	0.624	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.2	19.13	0.03	0	Antenna D	F9FYL00HMLX0	QPSK	1	49	0 mm	bottom	1:1	0.041	1.016	0.042	0.019	0.019	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.2	19.17	0.06	0	Antenna D	F9FYL00HMLX0	QPSK	25	0	0 mm	bottom	1:1	0.034	1.007	0.034	0.015	0.015	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.2	19.13	0.04	0	Antenna D	F9FYL00HMLX0	QPSK	1	49	0 mm	right	1:1	0.025	1.016	0.025	0.011	0.011	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.2	19.17	0.14	0	Antenna D	F9FYL00HMLX0	QPSK	25	0	0 mm	right	1:1	0.034	1.007	0.034	0.016	0.016	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.2	19.13	0.08	0	Antenna D	F9FYL00HMLX0	QPSK	1	49	0 mm	left	1:1	0.262	1.016	0.266	0.122	0.124	
836.50	20525	Mid	LTE Band 5 (Cell)	10	19.2	19.17	0.12	0	Antenna D	F9FYL00HMLX0	QPSK	25	0	0 mm	left	1:1	0.237	1.007	0.239	0.110	0.111	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram													

Table 10-19
LTE Band 26 (Cell) Antenna C Body SAR

MEASUREMENT RESULTS																							
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
819.00	26740	Low	LTE Band 26 (Cell)	10	19.0	18.98	0.01	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	back	1:1	1.170	1.005	**1.176**	0.602	**0.605**	A10
831.50	26865	Mid	LTE Band 26 (Cell)	10	19.0	18.91	-0.01	0	Antenna C	F9FYL00HMLX0	QPSK	1	49	0 mm	back	1:1	1.040	1.021	1.062	0.533	0.544	
844.00	26990	High	LTE Band 26 (Cell)	10	19.0	18.90	0.00	0	Antenna C	F9FYL00HMLX0	QPSK	1	25	0 mm	back	1:1	1.030	1.023	1.054	0.531	0.543	
819.00	26740	Low	LTE Band 26 (Cell)	10	19.0	18.91	0.00	0	Antenna C	F9FYL00HMLX0	QPSK	25	25	0 mm	back	1:1	1.150	1.021	1.174	0.589	0.601	
831.50	26865	Mid	LTE Band 26 (Cell)	10	19.0	18.94	0.00	0	Antenna C	F9FYL00HMLX0	QPSK	25	0	0 mm	back	1:1	1.080	1.014	1.095	0.553	0.561	
844.00	26990	High	LTE Band 26 (Cell)	10	19.0	19.00	0.01	0	Antenna C	F9FYL00HMLX0	QPSK	25	12	0 mm	back	1:1	1.060	1.000	1.060	0.542	0.542	
844.00	26990	High	LTE Band 26 (Cell)	10	19.0	18.97	0.00	0	Antenna C	F9FYL00HMLX0	QPSK	50	0	0 mm	back	1:1	1.070	1.007	1.077	0.544	0.548	
819.00	26740	Low	LTE Band 26 (Cell)	10	19.0	18.98	0.00	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	top	1:1	0.944	1.005	0.949	0.540	0.543	
831.50	26865	Mid	LTE Band 26 (Cell)	10	19.0	18.91	-0.08	0	Antenna C	F9FYL00HMLX0	QPSK	1	49	0 mm	top	1:1	0.963	1.021	0.983	0.554	0.566	
844.00	26990	High	LTE Band 26 (Cell)	10	19.0	18.90	-0.06	0	Antenna C	F9FYL00HMLX0	QPSK	1	25	0 mm	top	1:1	0.941	1.023	0.963	0.542	0.554	
819.00	26740	Low	LTE Band 26 (Cell)	10	19.0	18.91	-0.02	0	Antenna C	F9FYL00HMLX0	QPSK	25	25	0 mm	top	1:1	0.840	1.021	0.858	0.479	0.489	
831.50	26865	Mid	LTE Band 26 (Cell)	10	19.0	18.94	-0.04	0	Antenna C	F9FYL00HMLX0	QPSK	25	0	0 mm	top	1:1	0.885	1.014	0.897	0.506	0.513	
844.00	26990	High	LTE Band 26 (Cell)	10	19.0	19.00	-0.08	0	Antenna C	F9FYL00HMLX0	QPSK	25	12	0 mm	top	1:1	0.944	1.000	0.944	0.543	0.543	
844.00	26990	High	LTE Band 26 (Cell)	10	19.0	18.97	-0.07	0	Antenna C	F9FYL00HMLX0	QPSK	50	0	0 mm	top	1:1	0.859	1.007	0.865	0.485	0.488	
819.00	26740	Low	LTE Band 26 (Cell)	10	19.0	18.98	-0.13	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	bottom	1:1	0.033	1.005	0.033	0.018	0.018	
844.00	26990	High	LTE Band 26 (Cell)	10	19.0	19.00	0.03	0	Antenna C	F9FYL00HMLX0	QPSK	25	12	0 mm	bottom	1:1	0.019	1.000	0.019	0.011	0.011	
819.00	26740	Low	LTE Band 26 (Cell)	10	19.0	18.98	-0.04	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	right	1:1	0.111	1.005	0.112	0.059	0.059	
844.00	26990	High	LTE Band 26 (Cell)	10	19.0	19.00	0.02	0	Antenna C	F9FYL00HMLX0	QPSK	25	12	0 mm	right	1:1	0.135	1.000	0.135	0.072	0.072	
819.00	26740	Low	LTE Band 26 (Cell)	10	19.0	18.98	0.16	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	left	1:1	0.005	1.005	0.005	0.002	0.002	
844.00	26990	High	LTE Band 26 (Cell)	10	19.0	19.00	0.07	0	Antenna C	F9FYL00HMLX0	QPSK	25	12	0 mm	left	1:1	0.030	1.000	0.030	0.015	0.015	
819.00	26740	Low	LTE Band 26 (Cell)	10	19.0	18.98	-0.03	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	back	1:1	1.140	1.005	1.146	0.596	0.599	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram										

Note: Blue entries indicate variability measurements.

Table 10-20
LTE Band 26 (Cell) Antenna D Body SAR

MEASUREMENT RESULTS																							
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
819.00	26740	Low	LTE Band 26 (Cell)	10	18.2	17.88	0.09	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	back	1:1	1.020	1.076	1.098	0.514	0.553	
831.50	26865	Mid	LTE Band 26 (Cell)	10	18.2	17.62	0.20	0	Antenna D	F9FYL00HMLX0	QPSK	1	49	0 mm	back	1:1	0.832	1.143	0.951	0.418	0.478	
844.00	26990	High	LTE Band 26 (Cell)	10	18.2	17.61	0.18	0	Antenna D	F9FYL00HMLX0	QPSK	1	49	0 mm	back	1:1	0.765	1.146	0.877	0.386	0.442	
819.00	26740	Low	LTE Band 26 (Cell)	10	18.2	17.71	0.10	0	Antenna D	F9FYL00HMLX0	QPSK	25	25	0 mm	back	1:1	0.991	1.119	1.109	0.495	0.554	
831.50	26865	Mid	LTE Band 26 (Cell)	10	18.2	17.67	0.20	0	Antenna D	F9FYL00HMLX0	QPSK	25	0	0 mm	back	1:1	0.839	1.130	0.948	0.419	0.473	
844.00	26990	High	LTE Band 26 (Cell)	10	18.2	17.65	0.16	0	Antenna D	F9FYL00HMLX0	QPSK	25	0	0 mm	back	1:1	0.803	1.135	0.911	0.403	0.457	
819.00	26740	Low	LTE Band 26 (Cell)	10	18.2	17.70	0.08	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	back	1:1	1.010	1.122	1.133	0.505	0.567	
819.00	26740	Low	LTE Band 26 (Cell)	10	18.2	17.88	0.17	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	top	1:1	0.904	1.076	0.973	0.479	0.515	
831.50	26865	Mid	LTE Band 26 (Cell)	10	18.2	17.62	0.05	0	Antenna D	F9FYL00HMLX0	QPSK	1	49	0 mm	top	1:1	0.844	1.143	0.965	0.455	0.520	
844.00	26990	High	LTE Band 26 (Cell)	10	18.2	17.61	0.08	0	Antenna D	F9FYL00HMLX0	QPSK	1	49	0 mm	top	1:1	0.738	1.146	0.846	0.404	0.463	
819.00	26740	Low	LTE Band 26 (Cell)	10	18.2	17.71	0.16	0	Antenna D	F9FYL00HMLX0	QPSK	25	25	0 mm	top	1:1	0.867	1.119	0.970	0.467	0.523	
831.50	26865	Mid	LTE Band 26 (Cell)	10	18.2	17.67	0.07	0	Antenna D	F9FYL00HMLX0	QPSK	25	0	0 mm	top	1:1	0.824	1.130	0.931	0.441	0.498	
844.00	26990	High	LTE Band 26 (Cell)	10	18.2	17.65	0.14	0	Antenna D	F9FYL00HMLX0	QPSK	25	0	0 mm	top	1:1	0.802	1.135	0.910	0.437	0.496	
819.00	26740	Low	LTE Band 26 (Cell)	10	18.2	17.70	0.12	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	top	1:1	0.882	1.122	0.990	0.474	0.532	
819.00	26740	Low	LTE Band 26 (Cell)	10	18.2	17.88	0.03	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	bottom	1:1	0.023	1.076	0.025	0.010	0.011	
819.00	26740	Low	LTE Band 26 (Cell)	10	18.2	17.71	0.15	0	Antenna D	F9FYL00HMLX0	QPSK	25	25	0 mm	bottom	1:1	0.023	1.119	0.026	0.010	0.011	
819.00	26740	Low	LTE Band 26 (Cell)	10	18.2	17.88	0.17	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	right	1:1	0.023	1.076	0.025	0.010	0.011	
819.00	26740	Low	LTE Band 26 (Cell)	10	18.2	17.71	0.06	0	Antenna D	F9FYL00HMLX0	QPSK	25	25	0 mm	right	1:1	0.022	1.119	0.025	0.010	0.011	
819.00	26740	Low	LTE Band 26 (Cell)	10	18.2	17.88	0.03	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	left	1:1	0.134	1.076	0.144	0.063	0.068	
819.00	26740	Low	LTE Band 26 (Cell)	10	18.2	17.71	0.02	0	Antenna D	F9FYL00HMLX0	QPSK	25	25	0 mm	left	1:1	0.151	1.119	0.169	0.071	0.079	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population												Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 10-21
LTE Band 66 (AWS) Antenna C Body SAR

MEASUREMENT RESULTS																							
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.3	13.30	0.00	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	back	1:1	1.090	1.000	1.090	0.519	0.519	A11
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.3	13.11	-0.02	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	back	1:1	1.070	1.045	1.118	0.510	0.533	
1770.00	132572	High	LTE Band 66 (AWS)	20	13.3	12.98	-0.01	0	Antenna C	F9FYL00BMLX0	QPSK	1	99	0 mm	back	1:1	1.040	1.076	1.119	0.498	0.536	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.3	13.10	0.00	0	Antenna C	F9FYL00BMLX0	QPSK	50	25	0 mm	back	1:1	1.040	1.047	1.089	0.495	0.518	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.3	12.96	-0.02	0	Antenna C	F9FYL00BMLX0	QPSK	50	0	0 mm	back	1:1	1.070	1.081	1.157	0.507	0.548	
1770.00	132572	High	LTE Band 66 (AWS)	20	13.3	12.94	-0.01	0	Antenna C	F9FYL00BMLX0	QPSK	50	50	0 mm	back	1:1	1.050	1.086	1.140	0.503	0.546	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.3	13.09	-0.01	0	Antenna C	F9FYL00BMLX0	QPSK	100	0	0 mm	back	1:1	1.060	1.050	1.113	0.502	0.527	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.3	13.30	-0.03	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	top	1:1	0.570	1.000	0.570	0.281	0.281	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.3	13.10	-0.01	0	Antenna C	F9FYL00BMLX0	QPSK	50	25	0 mm	top	1:1	0.557	1.047	0.583	0.273	0.286	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.3	13.30	-0.04	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	bottom	1:1	0.002	1.000	0.002	0.000	0.000	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.3	13.10	-0.20	0	Antenna C	F9FYL00BMLX0	QPSK	50	25	0 mm	bottom	1:1	0.002	1.047	0.002	0.001	0.001	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.3	13.30	0.04	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	right	1:1	0.056	1.000	0.056	0.027	0.027	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.3	13.10	-0.04	0	Antenna C	F9FYL00BMLX0	QPSK	50	25	0 mm	right	1:1	0.054	1.047	0.057	0.026	0.027	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.3	13.30	0.13	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	left	1:1	0.027	1.000	0.027	0.013	0.013	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.3	13.10	0.03	0	Antenna C	F9FYL00BMLX0	QPSK	50	25	0 mm	left	1:1	0.023	1.047	0.024	0.011	0.012	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.3	13.30	0.02	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	back	1:1	1.030	1.000	1.030	0.494	0.494	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram													

Note: Blue entries indicate variability measurements.

Table 10-22
LTE Band 66 (AWS) Antenna D Body SAR

MEASUREMENT RESULTS																							
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.2	12.91	-0.03	0	Antenna D	F9FYL00TMLX0	QPSK	1	0	0 mm	back	1:1	0.823	1.069	0.880	0.366	0.391	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.2	13.15	-0.04	0	Antenna D	F9FYL00TMLX0	QPSK	1	50	0 mm	back	1:1	0.887	1.012	0.898	0.389	0.394	
1770.00	132572	High	LTE Band 66 (AWS)	20	13.2	13.07	-0.03	0	Antenna D	F9FYL00TMLX0	QPSK	1	50	0 mm	back	1:1	1.020	1.030	1.051	0.446	0.459	
1720.00	132072	Low	LTE Band 66 (AWS)	20	13.2	12.91	-0.04	0	Antenna D	F9FYL00TMLX0	QPSK	50	0	0 mm	back	1:1	0.814	1.069	0.870	0.359	0.384	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.2	12.99	-0.02	0	Antenna D	F9FYL00TMLX0	QPSK	50	25	0 mm	back	1:1	0.886	1.050	0.930	0.389	0.408	
1770.00	132572	High	LTE Band 66 (AWS)	20	13.2	12.93	-0.03	0	Antenna D	F9FYL00TMLX0	QPSK	50	25	0 mm	back	1:1	1.030	1.064	1.096	0.447	0.476	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.2	12.97	-0.06	0	Antenna D	F9FYL00TMLX0	QPSK	100	0	0 mm	back	1:1	0.888	1.054	0.936	0.389	0.410	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.2	13.15	-0.04	0	Antenna D	F9FYL00TMLX0	QPSK	1	50	0 mm	top	1:1	0.540	1.012	0.546	0.256	0.259	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.2	12.99	-0.02	0	Antenna D	F9FYL00TMLX0	QPSK	50	25	0 mm	top	1:1	0.538	1.050	0.565	0.255	0.268	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.2	13.15	-0.04	0	Antenna D	F9FYL00TMLX0	QPSK	1	50	0 mm	bottom	1:1	0.002	1.012	0.002	0.001	0.001	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.2	12.99	-0.05	0	Antenna D	F9FYL00TMLX0	QPSK	50	25	0 mm	bottom	1:1	0.001	1.050	0.001	0.000	0.000	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.2	13.15	0.15	0	Antenna D	F9FYL00TMLX0	QPSK	1	50	0 mm	right	1:1	0.006	1.012	0.006	0.002	0.002	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.2	12.99	0.04	0	Antenna D	F9FYL00TMLX0	QPSK	50	25	0 mm	right	1:1	0.006	1.050	0.006	0.002	0.002	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.2	13.15	-0.03	0	Antenna D	F9FYL00TMLX0	QPSK	1	50	0 mm	left	1:1	0.065	1.012	0.066	0.030	0.030	
1745.00	132322	Mid	LTE Band 66 (AWS)	20	13.2	12.99	0.06	0	Antenna D	F9FYL00TMLX0	QPSK	50	25	0 mm	left	1:1	0.066	1.050	0.069	0.030	0.032	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram													

Table 10-23
LTE Band 25 (PCS) Antenna C Body SAR

MEASUREMENT RESULTS																								
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
1860.00	26140	Low	LTE Band 25 (PCS)	20	13.1	13.02	-0.02	0	Antenna C	F9FYL00TMLX0	QPSK	1	0	0 mm	back	1:1	1.090	1.019	1.111	0.508	0.518	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	13.1	12.91	-0.02	0	Antenna C	F9FYL00TMLX0	QPSK	1	0	0 mm	back	1:1	1.080	1.045	1.129	0.506	0.529	
1905.00	26590	High	LTE Band 25 (PCS)	20	13.1	13.10	-0.03	0	Antenna C	F9FYL00TMLX0	QPSK	1	0	0 mm	back	1:1	1.090	1.000	1.090	0.507	0.507	
1860.00	26140	Low	LTE Band 25 (PCS)	20	13.1	12.92	-0.01	0	Antenna C	F9FYL00TMLX0	QPSK	50	0	0 mm	back	1:1	1.090	1.042	1.136	0.510	0.531	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	13.1	12.86	-0.01	0	Antenna C	F9FYL00TMLX0	QPSK	50	50	0 mm	back	1:1	1.110	1.057	1.173	0.512	0.541	A12
1905.00	26590	High	LTE Band 25 (PCS)	20	13.1	13.04	-0.02	0	Antenna C	F9FYL00TMLX0	QPSK	50	0	0 mm	back	1:1	1.080	1.014	1.095	0.502	0.509	
1905.00	26590	High	LTE Band 25 (PCS)	20	13.1	12.97	0.00	0	Antenna C	F9FYL00TMLX0	QPSK	100	0	0 mm	back	1:1	1.090	1.030	1.123	0.505	0.520	
1860.00	26140	Low	LTE Band 25 (PCS)	20	13.1	13.02	-0.02	0	Antenna C	F9FYL00TMLX0	QPSK	1	0	0 mm	top	1:1	0.812	1.019	0.827	0.393	0.400	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	13.1	12.91	-0.04	0	Antenna C	F9FYL00TMLX0	QPSK	1	0	0 mm	top	1:1	0.813	1.045	0.850	0.393	0.411	
1905.00	26590	High	LTE Band 25 (PCS)	20	13.1	13.10	-0.02	0	Antenna C	F9FYL00TMLX0	QPSK	1	0	0 mm	top	1:1	0.858	1.000	0.858	0.400	0.400	
1860.00	26140	Low	LTE Band 25 (PCS)	20	13.1	12.92	-0.03	0	Antenna C	F9FYL00TMLX0	QPSK	50	0	0 mm	top	1:1	0.802	1.042	0.836	0.389	0.405	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	13.1	12.86	-0.03	0	Antenna C	F9FYL00TMLX0	QPSK	50	50	0 mm	top	1:1	0.802	1.057	0.848	0.387	0.409	
1905.00	26590	High	LTE Band 25 (PCS)	20	13.1	13.04	0.01	0	Antenna C	F9FYL00TMLX0	QPSK	50	0	0 mm	top	1:1	0.833	1.014	0.845	0.386	0.391	
1905.00	26590	High	LTE Band 25 (PCS)	20	13.1	12.97	0.00	0	Antenna C	F9FYL00TMLX0	QPSK	100	0	0 mm	top	1:1	0.827	1.030	0.852	0.384	0.396	
1905.00	26590	High	LTE Band 25 (PCS)	20	13.1	13.10	0.20	0	Antenna C	F9FYL00TMLX0	QPSK	1	0	0 mm	bottom	1:1	0.000	1.000	0.000	0.000	0.000	
1905.00	26590	High	LTE Band 25 (PCS)	20	13.1	13.04	0.20	0	Antenna C	F9FYL00TMLX0	QPSK	50	0	0 mm	bottom	1:1	0.000	1.014	0.000	0.000	0.000	
1905.00	26590	High	LTE Band 25 (PCS)	20	13.1	13.10	0.14	0	Antenna C	F9FYL00TMLX0	QPSK	1	0	0 mm	right	1:1	0.091	1.000	0.091	0.042	0.042	
1905.00	26590	High	LTE Band 25 (PCS)	20	13.1	13.04	0.02	0	Antenna C	F9FYL00TMLX0	QPSK	50	0	0 mm	right	1:1	0.087	1.014	0.088	0.040	0.041	
1905.00	26590	High	LTE Band 25 (PCS)	20	13.1	13.10	0.12	0	Antenna C	F9FYL00TMLX0	QPSK	1	0	0 mm	left	1:1	0.027	1.000	0.027	0.013	0.013	
1905.00	26590	High	LTE Band 25 (PCS)	20	13.1	13.04	-0.19	0	Antenna C	F9FYL00TMLX0	QPSK	50	0	0 mm	left	1:1	0.026	1.014	0.026	0.013	0.013	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram														

Table 10-24
LTE Band 25 (PCS) Antenna D Body SAR

MEASUREMENT RESULTS																								
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
1860.00	26140	Low	LTE Band 25 (PCS)	20	12.0	11.99	-0.03	0	Antenna D	F9FYL00TMLX0	QPSK	1	0	0 mm	back	1:1	1.060	1.002	1.062	0.457	0.458	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	12.0	11.60	-0.03	0	Antenna D	F9FYL00TMLX0	QPSK	1	0	0 mm	back	1:1	1.070	1.096	1.173	0.462	0.506	
1905.00	26590	High	LTE Band 25 (PCS)	20	12.0	11.67	0.01	0	Antenna D	F9FYL00TMLX0	QPSK	1	50	0 mm	back	1:1	1.050	1.079	1.133	0.453	0.489	
1860.00	26140	Low	LTE Band 25 (PCS)	20	12.0	11.84	-0.02	0	Antenna D	F9FYL00TMLX0	QPSK	50	0	0 mm	back	1:1	1.040	1.038	1.080	0.447	0.464	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	12.0	11.59	0.02	0	Antenna D	F9FYL00TMLX0	QPSK	50	50	0 mm	back	1:1	1.060	1.099	1.165	0.455	0.500	
1905.00	26590	High	LTE Band 25 (PCS)	20	12.0	11.71	0.00	0	Antenna D	F9FYL00TMLX0	QPSK	50	25	0 mm	back	1:1	1.050	1.069	1.122	0.446	0.477	
1860.00	26140	Low	LTE Band 25 (PCS)	20	12.0	11.83	0.01	0	Antenna D	F9FYL00TMLX0	QPSK	100	0	0 mm	back	1:1	1.030	1.040	1.071	0.446	0.464	
1860.00	26140	Low	LTE Band 25 (PCS)	20	12.0	11.99	-0.01	0	Antenna D	F9FYL00TMLX0	QPSK	1	0	0 mm	top	1:1	0.797	1.002	0.799	0.363	0.364	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	12.0	11.60	0.00	0	Antenna D	F9FYL00TMLX0	QPSK	1	0	0 mm	top	1:1	0.806	1.096	0.883	0.359	0.393	
1905.00	26590	High	LTE Band 25 (PCS)	20	12.0	11.67	0.00	0	Antenna D	F9FYL00TMLX0	QPSK	1	50	0 mm	top	1:1	0.853	1.079	0.920	0.380	0.410	
1860.00	26140	Low	LTE Band 25 (PCS)	20	12.0	11.84	-0.04	0	Antenna D	F9FYL00TMLX0	QPSK	50	0	0 mm	top	1:1	0.788	1.038	0.818	0.359	0.373	
1882.50	26365	Mid	LTE Band 25 (PCS)	20	12.0	11.59	-0.05	0	Antenna D	F9FYL00TMLX0	QPSK	50	50	0 mm	top	1:1	0.809	1.099	0.889	0.359	0.395	
1905.00	26590	High	LTE Band 25 (PCS)	20	12.0	11.71	-0.02	0	Antenna D	F9FYL00TMLX0	QPSK	50	25	0 mm	top	1:1	0.863	1.069	0.923	0.381	0.407	
1860.00	26140	Low	LTE Band 25 (PCS)	20	12.0	11.83	-0.04	0	Antenna D	F9FYL00TMLX0	QPSK	100	0	0 mm	top	1:1	0.768	1.040	0.799	0.349	0.363	
1860.00	26140	Low	LTE Band 25 (PCS)	20	12.0	11.99	0.20	0	Antenna D	F9FYL00TMLX0	QPSK	1	0	0 mm	bottom	1:1	0.000	1.002	0.000	0.000	0.000	
1860.00	26140	Low	LTE Band 25 (PCS)	20	12.0	11.84	0.20	0	Antenna D	F9FYL00TMLX0	QPSK	50	0	0 mm	bottom	1:1	0.000	1.038	0.000	0.000	0.000	
1860.00	26140	Low	LTE Band 25 (PCS)	20	12.0	11.99	0.07	0	Antenna D	F9FYL00TMLX0	QPSK	1	0	0 mm	right	1:1	0.013	1.002	0.013	0.006	0.006	
1860.00	26140	Low	LTE Band 25 (PCS)	20	12.0	11.84	0.10	0	Antenna D	F9FYL00TMLX0	QPSK	50	0	0 mm	right	1:1	0.013	1.038	0.013	0.006	0.006	
1860.00	26140	Low	LTE Band 25 (PCS)	20	12.0	11.99	-0.09	0	Antenna D	F9FYL00TMLX0	QPSK	1	0	0 mm	left	1:1	0.071	1.002	0.071	0.033	0.033	
1860.00	26140	Low	LTE Band 25 (PCS)	20	12.0	11.84	-0.01	0	Antenna D	F9FYL00TMLX0	QPSK	50	0	0 mm	left	1:1	0.068	1.038	0.071	0.031	0.032	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population										Body 1.6 W/kg (mW/g) averaged over 1 gram														

Table 10-25
LTE Band 30 Antenna C Body SAR

MEASUREMENT RESULTS																								
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
2310.00	27710	Mid	LTE Band 30	10	13.2	13.19	0.02	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	back	1:1	0.602	1.002	0.603	0.284	0.285	
2310.00	27710	Mid	LTE Band 30	10	13.2	13.06	0.02	0	Antenna C	F9FYL00HMLX0	QPSK	25	0	0 mm	back	1:1	0.599	1.033	0.619	0.282	0.291	
2310.00	27710	Mid	LTE Band 30	10	13.2	13.19	-0.07	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	top	1:1	0.892	1.002	0.894	0.384	0.385	
2310.00	27710	Mid	LTE Band 30	10	13.2	13.06	-0.07	0	Antenna C	F9FYL00HMLX0	QPSK	25	0	0 mm	top	1:1	0.887	1.033	0.916	0.380	0.393	
2310.00	27710	Mid	LTE Band 30	10	13.2	13.05	-0.09	0	Antenna C	F9FYL00HMLX0	QPSK	50	0	0 mm	top	1:1	0.899	1.035	0.930	0.385	0.398	A13
2310.00	27710	Mid	LTE Band 30	10	13.2	13.19	-0.17	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	bottom	1:1	0.000	1.002	0.000	0.000	0.000	
2310.00	27710	Mid	LTE Band 30	10	13.2	13.06	-0.08	0	Antenna C	F9FYL00HMLX0	QPSK	25	0	0 mm	bottom	1:1	0.000	1.033	0.000	0.000	0.000	
2310.00	27710	Mid	LTE Band 30	10	13.2	13.19	0.10	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	right	1:1	0.102	1.002	0.102	0.043	0.043	
2310.00	27710	Mid	LTE Band 30	10	13.2	13.06	0.05	0	Antenna C	F9FYL00HMLX0	QPSK	25	0	0 mm	right	1:1	0.101	1.033	0.104	0.043	0.044	
2310.00	27710	Mid	LTE Band 30	10	13.2	13.19	0.07	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	left	1:1	0.019	1.002	0.019	0.009	0.009	
2310.00	27710	Mid	LTE Band 30	10	13.2	13.06	0.11	0	Antenna C	F9FYL00HMLX0	QPSK	25	0	0 mm	left	1:1	0.020	1.033	0.021	0.009	0.009	
2310.00	27710	Mid	LTE Band 30	10	13.2	13.05	-0.05	0	Antenna C	F9FYL00HMLX0	QPSK	50	0	0 mm	top	1:1	0.804	1.035	0.832	0.366	0.379	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Body 1.6 W/kg (mW/g) averaged over 1 gram							

Note: Blue entries indicate variability measurements.

Table 10-26
LTE Band 30 Antenna D Body SAR

MEASUREMENT RESULTS																								
FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
2310.00	27710	Mid	LTE Band 30	10	12.8	12.60	-0.04	0	Antenna D	F9FYL00BMLX0	QPSK	1	0	0 mm	back	1:1	0.688	1.047	0.720	0.333	0.349	
2310.00	27710	Mid	LTE Band 30	10	12.8	12.59	-0.04	0	Antenna D	F9FYL00BMLX0	QPSK	25	0	0 mm	back	1:1	0.664	1.050	0.697	0.320	0.336	
2310.00	27710	Mid	LTE Band 30	10	12.8	12.60	-0.01	0	Antenna D	F9FYL00BMLX0	QPSK	1	0	0 mm	top	1:1	0.676	1.047	0.708	0.301	0.315	
2310.00	27710	Mid	LTE Band 30	10	12.8	12.59	-0.05	0	Antenna D	F9FYL00BMLX0	QPSK	25	0	0 mm	top	1:1	0.644	1.050	0.676	0.292	0.307	
2310.00	27710	Mid	LTE Band 30	10	12.8	12.60	-0.06	0	Antenna D	F9FYL00BMLX0	QPSK	1	0	0 mm	bottom	1:1	0.000	1.047	0.000	0.000	0.000	
2310.00	27710	Mid	LTE Band 30	10	12.8	12.59	-0.20	0	Antenna D	F9FYL00BMLX0	QPSK	25	0	0 mm	bottom	1:1	0.000	1.050	0.000	0.000	0.000	
2310.00	27710	Mid	LTE Band 30	10	12.8	12.60	0.03	0	Antenna D	F9FYL00BMLX0	QPSK	1	0	0 mm	right	1:1	0.034	1.047	0.036	0.016	0.017	
2310.00	27710	Mid	LTE Band 30	10	12.8	12.59	-0.10	0	Antenna D	F9FYL00BMLX0	QPSK	25	0	0 mm	right	1:1	0.034	1.050	0.036	0.016	0.017	
2310.00	27710	Mid	LTE Band 30	10	12.8	12.60	-0.05	0	Antenna D	F9FYL00BMLX0	QPSK	1	0	0 mm	left	1:1	0.130	1.047	0.136	0.052	0.054	
2310.00	27710	Mid	LTE Band 30	10	12.8	12.59	0.01	0	Antenna D	F9FYL00BMLX0	QPSK	25	0	0 mm	left	1:1	0.144	1.050	0.151	0.061	0.064	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 10-27
LTE Band 7 Antenna C Body SAR

MEASUREMENT RESULTS																								
1 CC Uplink	Component Carrier	FREQUENCY MHz	FREQUENCY Ch.		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Reported SAR (1g) (W/kg)	SAR (10g) (W/kg)	Reported SAR (10g) (W/kg)	Plot #
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.33	-0.06	0	Antenna C	F9FYL00BMLX0	QPSK	1	99	0 mm	back	1:1	0.759	1.016	0.771	0.320	0.325	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.23	-0.04	0	Antenna C	F9FYL00BMLX0	QPSK	50	50	0 mm	back	1:1	0.768	1.040	0.799	0.322	0.335	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.33	-0.03	0	Antenna C	F9FYL00BMLX0	QPSK	1	99	0 mm	top	1:1	0.841	1.016	0.854	0.359	0.365	
1 CC Uplink	N/A	2535.00	21100	Mid	LTE Band 7	20	12.4	12.18	0.03	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	top	1:1	0.863	1.052	0.908	0.368	0.387	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	12.4	12.07	0.02	0	Antenna C	F9FYL00BMLX0	QPSK	1	0	0 mm	top	1:1	0.876	1.079	0.945	0.372	0.401	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.23	0.06	0	Antenna C	F9FYL00BMLX0	QPSK	50	50	0 mm	top	1:1	0.845	1.040	0.879	0.360	0.374	
1 CC Uplink	N/A	2535.00	21100	Mid	LTE Band 7	20	12.4	12.21	0.00	0	Antenna C	F9FYL00BMLX0	QPSK	50	50	0 mm	top	1:1	0.870	1.045	0.909	0.369	0.386	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	12.4	11.98	0.00	0	Antenna C	F9FYL00BMLX0	QPSK	50	0	0 mm	top	1:1	0.862	1.102	0.950	0.364	0.401	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	12.4	12.03	-0.05	0	Antenna C	F9FYL00BMLX0	QPSK	50	25	0 mm	top	1:1	0.949	1.089	1.033	0.399	0.435	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.22	-0.05	0	Antenna C	F9FYL00BMLX0	QPSK	100	0	0 mm	top	1:1	0.823	1.042	0.858	0.352	0.367	
2 CC Uplink	PCC	2560.00	21350	High	LTE Band 7	20	12.4	12.20	-0.02	0	Antenna C	F9FYL00BMLX0	QPSK	50	0	0 mm	top	1:1	0.933	1.047	0.977	0.391	0.409	
	SCC	2540.20	21152	High	LTE Band 7	20								50	50									
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.33	0.10	0	Antenna C	F9FYL00BMLX0	QPSK	1	99	0 mm	bottom	1:1	0.000	1.016	0.000	0.000	0.000	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.23	0.10	0	Antenna C	F9FYL00BMLX0	QPSK	50	50	0 mm	bottom	1:1	0.000	1.040	0.000	0.000	0.000	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.33	0.05	0	Antenna C	F9FYL00BMLX0	QPSK	1	99	0 mm	right	1:1	0.105	1.016	0.107	0.042	0.043	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.23	0.05	0	Antenna C	F9FYL00BMLX0	QPSK	50	50	0 mm	right	1:1	0.104	1.040	0.108	0.042	0.044	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.33	0.08	0	Antenna C	F9FYL00BMLX0	QPSK	1	99	0 mm	left	1:1	0.022	1.016	0.022	0.009	0.009	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.23	0.19	0	Antenna C	F9FYL00BMLX0	QPSK	50	50	0 mm	left	1:1	0.021	1.040	0.022	0.009	0.009	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 10-28
LTE Band 7 Antenna D Body SAR

MEASUREMENT RESULTS																								
1 CC Uplink	Component Carrier	FREQUENCY MHz	FREQUENCY Ch.		Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Reported SAR (1g) (W/kg)	SAR (10g) (W/kg)	Reported SAR (10g) (W/kg)	Plot #
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	12.4	12.20	-0.20	0	Antenna D	F9FYL00TMLX0	QPSK	1	99	0 mm	back	1:1	0.716	1.047	0.750	0.317	0.332	
1 CC Uplink	N/A	2535.00	21100	Mid	LTE Band 7	20	12.4	12.19	0.00	0	Antenna D	F9FYL00TMLX0	QPSK	50	50	0 mm	back	1:1	0.745	1.050	0.782	0.330	0.347	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.03	-0.08	0	Antenna D	F9FYL00TMLX0	QPSK	1	99	0 mm	top	1:1	0.946	1.089	1.030	0.392	0.427	
1 CC Uplink	N/A	2535.00	21100	Mid	LTE Band 7	20	12.4	12.18	0.00	0	Antenna D	F9FYL00TMLX0	QPSK	1	50	0 mm	top	1:1	0.948	1.052	0.997	0.391	0.411	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	12.4	12.20	-0.08	0	Antenna D	F9FYL00TMLX0	QPSK	1	99	0 mm	top	1:1	0.982	1.047	1.028	0.403	0.422	A14
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.17	-0.09	0	Antenna D	F9FYL00TMLX0	QPSK	50	50	0 mm	top	1:1	0.934	1.054	0.984	0.388	0.409	
1 CC Uplink	N/A	2535.00	21100	Mid	LTE Band 7	20	12.4	12.19	-0.09	0	Antenna D	F9FYL00TMLX0	QPSK	50	50	0 mm	top	1:1	0.966	1.050	1.014	0.395	0.415	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	12.4	12.05	-0.06	0	Antenna D	F9FYL00TMLX0	QPSK	50	0	0 mm	top	1:1	0.833	1.084	0.903	0.345	0.374	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	12.4	12.14	-0.02	0	Antenna D	F9FYL00TMLX0	QPSK	50	25	0 mm	top	1:1	0.980	1.062	1.041	0.405	0.430	
1 CC Uplink	N/A	2510.00	20850	Low	LTE Band 7	20	12.4	12.18	-0.03	0	Antenna D	F9FYL00TMLX0	QPSK	100	0	0 mm	top	1:1	0.959	1.052	1.009	0.393	0.413	
2 CC Uplink	PCC	2560.00	21350	High	LTE Band 7	20	12.4	12.06	-0.12	0	Antenna D	F9FYL00TMLX0	QPSK	50	0	0 mm	top	1:1	0.875	1.081	0.946	0.362	0.391	
	SCC	2540.20	21152	High	LTE Band 7	20								50	50									
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	12.4	12.20	0.10	0	Antenna D	F9FYL00TMLX0	QPSK	1	99	0 mm	bottom	1:1	0.000	1.047	0.000	0.000	0.000	
1 CC Uplink	N/A	2535.00	21100	Mid	LTE Band 7	20	12.4	12.19	0.10	0	Antenna D	F9FYL00TMLX0	QPSK	50	50	0 mm	bottom	1:1	0.000	1.050	0.000	0.000	0.000	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	12.4	12.20	0.04	0	Antenna D	F9FYL00TMLX0	QPSK	1	99	0 mm	right	1:1	0.018	1.047	0.019	0.007	0.007	
1 CC Uplink	N/A	2535.00	21100	Mid	LTE Band 7	20	12.4	12.19	0.05	0	Antenna D	F9FYL00TMLX0	QPSK	50	50	0 mm	right	1:1	0.017	1.050	0.018	0.007	0.007	
1 CC Uplink	N/A	2560.00	21350	High	LTE Band 7	20	12.4	12.20	0.06	0	Antenna D	F9FYL00TMLX0	QPSK	1	99	0 mm	left	1:1	0.157	1.047	0.164	0.062	0.065	
1 CC Uplink	N/A	2535.00	21100	Mid	LTE Band 7	20	12.4	12.19	0.10	0	Antenna D	F9FYL00TMLX0	QPSK	50	50	0 mm	left	1:1	0.168	1.050	0.176	0.067	0.070	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population														Body 1.6 W/kg (mW/g) averaged over 1 gram										

Table 10-29
LTE Band 41 Antenna C Body SAR

MEASUREMENT RESULTS																								
1 CC Uplink | 2 CC Uplink, Power Class	Component Carrier	FREQUENCY			Mode	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g)	Scaling Factor	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
		MHz	Ch.																(W/kg)		(W/kg)	(W/kg)	(W/kg)	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.40	0.05	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	back	1:1.58	0.970	1.000	0.970	0.401	0.401	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	15.4	15.17	0.06	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	back	1:1.58	0.996	1.054	1.050	0.407	0.429	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	15.4	15.21	-0.13	0	Antenna C	F9FYL00HMLX0	QPSK	1	50	0 mm	back	1:1.58	0.924	1.045	0.966	0.367	0.384	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Mid-High	LTE Band 41	20	15.4	14.97	0.10	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	back	1:1.58	0.902	1.104	0.996	0.357	0.394	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	15.4	14.90	-0.15	0	Antenna C	F9FYL00HMLX0	QPSK	1	99	0 mm	back	1:1.58	0.793	1.122	0.890	0.292	0.328	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.37	0.03	0	Antenna C	F9FYL00HMLX0	QPSK	50	0	0 mm	back	1:1.58	0.971	1.007	0.978	0.400	0.403	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	15.4	15.13	0.08	0	Antenna C	F9FYL00HMLX0	QPSK	50	25	0 mm	back	1:1.58	0.981	1.064	1.044	0.399	0.425	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	15.4	15.11	0.08	0	Antenna C	F9FYL00HMLX0	QPSK	50	0	0 mm	back	1:1.58	0.947	1.069	1.012	0.378	0.404	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Mid-High	LTE Band 41	20	15.4	14.90	0.11	0	Antenna C	F9FYL00HMLX0	QPSK	50	25	0 mm	back	1:1.58	0.848	1.122	0.951	0.340	0.381	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	15.4	14.84	0.10	0	Antenna C	F9FYL00HMLX0	QPSK	50	25	0 mm	back	1:1.58	0.836	1.138	0.951	0.328	0.373	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.29	0.07	0	Antenna C	F9FYL00HMLX0	QPSK	100	0	0 mm	back	1:1.58	0.977	1.026	1.002	0.402	0.412	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.40	0.08	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	top	1:1.58	0.856	1.000	0.856	0.401	0.401	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	15.4	15.17	-0.03	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	top	1:1.58	1.020	1.054	1.075	0.433	0.456	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	15.4	15.21	0.00	0	Antenna C	F9FYL00HMLX0	QPSK	1	50	0 mm	top	1:1.58	0.904	1.045	0.945	0.397	0.415	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Mid-High	LTE Band 41	20	15.4	14.97	-0.02	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	top	1:1.58	1.010	1.104	1.115	0.412	0.455	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	15.4	14.90	-0.04	0	Antenna C	F9FYL00HMLX0	QPSK	1	99	0 mm	top	1:1.58	0.929	1.122	1.042	0.390	0.438	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.37	-0.02	0	Antenna C	F9FYL00HMLX0	QPSK	50	0	0 mm	top	1:1.58	0.940	1.007	0.947	0.402	0.405	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	15.4	15.13	-0.03	0	Antenna C	F9FYL00HMLX0	QPSK	50	25	0 mm	top	1:1.58	1.020	1.064	1.085	0.432	0.460	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	15.4	15.11	-0.03	0	Antenna C	F9FYL00HMLX0	QPSK	50	0	0 mm	top	1:1.58	0.965	1.069	1.032	0.396	0.423	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Mid-High	LTE Band 41	20	15.4	14.90	0.17	0	Antenna C	F9FYL00HMLX0	QPSK	50	25	0 mm	top	1:1.58	0.987	1.122	1.107	0.409	0.459	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	15.4	14.84	-0.10	0	Antenna C	F9FYL00HMLX0	QPSK	50	25	0 mm	top	1:1.58	0.942	1.138	1.072	0.380	0.432	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.29	-0.02	0	Antenna C	F9FYL00HMLX0	QPSK	100	0	0 mm	top	1:1.58	0.924	1.026	0.948	0.393	0.403	
1 CC Uplink - Power Class 2	N/A	2636.50	41055	Mid-High	LTE Band 41	20	15.4	15.11	0.00	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	top	1:2.31	0.688	1.069	0.735	0.287	0.307	
2 CC Uplink - Power Class 3	PCC	2636.50	41055	Mid-High	LTE Band 41	20	15.4	15.21	-0.01	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	top	1:1.58	1.120	1.045	1.170	0.463	0.484	
	SCC	2616.70	40857	Mid-High	LTE Band 41	20							QPSK	1	99									
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.40	0.10	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	bottom	1:1.58	0.000	1.000	0.000	0.000	0.000	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.37	0.10	0	Antenna C	F9FYL00HMLX0	QPSK	50	0	0 mm	bottom	1:1.58	0.000	1.007	0.000	0.000	0.000	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.40	0.04	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	right	1:1.58	0.124	1.000	0.124	0.051	0.051	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.37	-0.20	0	Antenna C	F9FYL00HMLX0	QPSK	50	0	0 mm	right	1:1.58	0.123	1.007	0.124	0.050	0.050	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.40	0.08	0	Antenna C	F9FYL00HMLX0	QPSK	1	0	0 mm	left	1:1.58	0.023	1.000	0.023	0.009	0.009	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.37	0.20	0	Antenna C	F9FYL00HMLX0	QPSK	50	0	0 mm	left	1:1.58	0.022	1.007	0.022	0.009	0.009	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Body
Spatial Peak	1.6 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 1 gram

Table 10-30
LTE Band 41 Antenna D Body SAR

MEASUREMENT RESULTS																								
1 CC Uplink | 2 CC Uplink, Power Class	Component Carrier	FREQUENCY MHz	FREQUENCY Ch.		Mode	Bandwidth	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	MPR [dB]	Antenna Config.	Device Serial Number	Modulation	RB Size	RB Offset	Spacing	Side	Duty Cycle	SAR (1g) (W/kg)	Scaling Factor	Reported SAR (1g) (W/kg)	SAR (10g) (W/kg)	Reported SAR (10g) (W/kg)	Plot #
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.39	0.02	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	back	1:1.58	0.908	1.002	0.910	0.414	0.415	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	15.4	15.24	0.03	0	Antenna D	F9FYL00HMLX0	QPSK	1	99	0 mm	back	1:1.58	0.880	1.038	0.913	0.377	0.391	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	15.4	15.19	0.00	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	back	1:1.58	0.871	1.050	0.915	0.370	0.389	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Mid-High	LTE Band 41	20	15.4	15.16	0.00	0	Antenna D	F9FYL00HMLX0	QPSK	1	99	0 mm	back	1:1.58	0.712	1.057	0.753	0.297	0.314	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	15.4	15.28	-0.03	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	back	1:1.58	0.721	1.028	0.741	0.300	0.308	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.23	0.04	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	back	1:1.58	1.010	1.040	1.050	0.435	0.452	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	15.4	15.12	0.00	0	Antenna D	F9FYL00HMLX0	QPSK	50	25	0 mm	back	1:1.58	0.883	1.067	0.942	0.378	0.403	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	15.4	15.10	0.01	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	back	1:1.58	0.849	1.072	0.910	0.361	0.387	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Mid-High	LTE Band 41	20	15.4	15.17	0.02	0	Antenna D	F9FYL00HMLX0	QPSK	50	50	0 mm	back	1:1.58	0.717	1.054	0.756	0.300	0.316	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	15.4	15.20	0.00	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	back	1:1.58	0.691	1.047	0.723	0.286	0.299	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	15.4	15.19	-0.08	0	Antenna D	F9FYL00HMLX0	QPSK	100	0	0 mm	back	1:1.58	0.609	1.050	0.639	0.258	0.271	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.39	0.02	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	top	1:1.58	1.030	1.002	1.032	0.430	0.431	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	15.4	15.24	0.05	0	Antenna D	F9FYL00HMLX0	QPSK	1	99	0 mm	top	1:1.58	1.140	1.038	**1.183**	0.464	**0.482**	A15
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	15.4	15.19	-0.02	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	top	1:1.58	0.975	1.050	1.024	0.404	0.424	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Mid-High	LTE Band 41	20	15.4	15.16	-0.02	0	Antenna D	F9FYL00HMLX0	QPSK	1	99	0 mm	top	1:1.58	1.120	1.057	**1.184**	0.457	**0.483**	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	15.4	15.28	-0.02	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	top	1:1.58	1.140	1.028	1.172	0.460	0.473	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.23	-0.04	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	top	1:1.58	0.887	1.040	0.922	0.375	0.390	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	15.4	15.12	-0.13	0	Antenna D	F9FYL00HMLX0	QPSK	50	25	0 mm	top	1:1.58	1.110	1.067	**1.184**	0.456	**0.487**	
1 CC Uplink - Power Class 3	N/A	2593.00	40620	Mid	LTE Band 41	20	15.4	15.10	-0.01	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	top	1:1.58	0.870	1.072	0.933	0.350	0.375	
1 CC Uplink - Power Class 3	N/A	2636.50	41055	Mid-High	LTE Band 41	20	15.4	15.17	0.00	0	Antenna D	F9FYL00HMLX0	QPSK	50	50	0 mm	top	1:1.58	1.120	1.054	**1.180**	0.452	**0.476**	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	15.4	15.20	0.01	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	top	1:1.58	1.120	1.047	1.173	0.449	0.470	
1 CC Uplink - Power Class 3	N/A	2680.00	41490	High	LTE Band 41	20	15.4	15.19	-0.02	0	Antenna D	F9FYL00HMLX0	QPSK	100	0	0 mm	top	1:1.58	1.090	1.050	1.145	0.437	0.459	
1 CC Uplink - Power Class 2	N/A	2636.50	41055	Mid-High	LTE Band 41	20	15.4	15.01	0.14	0	Antenna D	F9FYL00HMLX0	QPSK	1	99	0 mm	top	1:2.31	0.775	1.094	0.848	0.314	0.344	
2 CC Uplink - Power Class 3	PCC	2636.50	41055	Mid-High	LTE Band 41	20	15.4	15.24	-0.20	0	Antenna D	F9FYL00HMLX0	QPSK	1	99	0 mm	top	1:1.58	1.140	1.038	**1.183**	0.458	**0.475**	
	SCC	2656.30	41253	Mid-High	LTE Band 41	20							QPSK	1	0									
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.39	0.00	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	bottom	1:1.58	0.000	1.002	0.000	0.000	0.000	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.23	0.00	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	bottom	1:1.58	0.000	1.040	0.000	0.000	0.000	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.39	0.02	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	right	1:1.58	0.025	1.002	0.025	0.010	0.010	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.23	0.14	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	right	1:1.58	0.023	1.040	0.024	0.010	0.010	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.39	0.13	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	left	1:1.58	0.165	1.002	0.165	0.066	0.066	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.23	-0.06	0	Antenna D	F9FYL00HMLX0	QPSK	50	0	0 mm	left	1:1.58	0.211	1.040	0.219	0.085	0.088	
1 CC Uplink - Power Class 3	N/A	2506.00	39750	Low	LTE Band 41	20	15.4	15.39	-0.05	0	Antenna D	F9FYL00HMLX0	QPSK	1	0	0 mm	top	1:1.58	1.020	1.002	1.022	0.423	0.424	
1 CC Uplink - Power Class 3	N/A	2549.50	40185	Low-Mid	LTE Band 41	20	15.4	15.24	0.02	0	Antenna D	F9FYL00HMLX0	QPSK	1	99	0 mm	top	1:1.58	1.080	1.038	1.121	0.446	0.463	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population																	Body 1.6 W/kg (mW/g) averaged over 1 gram							

Note: Blue entries indicate variability measurements.

Table 10-31
2.4GHz WLAN Body SAR- Antenna A

MEASUREMENT RESULTS																						
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Variant	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.														(W/kg)			(W/kg)	(W/kg)	(W/kg)	
2462	11	802.11b	DSSS	22	16.0	15.50	-0.03	0 mm	Antenna A	V2	F9FYL00LMLX0	1	back	100.0	0.055	1.122	1.000	0.062	0.025	0.028	
2462	11	802.11b	DSSS	22	16.0	15.50	0.10	0 mm	Antenna A	V2	F9FYL00LMLX0	1	top	100.0	0.001	1.122	1.000	0.001	0.000	0.000	
2412	1	802.11b	DSSS	22	16.0	15.49	-0.08	0 mm	Antenna A	V2	F9FYL00LMLX0	1	bottom	100.0	0.797	1.125	1.000	0.897	0.259	0.291	
2437	6	802.11b	DSSS	22	16.0	15.46	0.12	0 mm	Antenna A	V2	F9FYL00LMLX0	1	bottom	100.0	0.866	1.132	1.000	**0.980**	0.277	**0.314**	A16
2437	6	802.11b	DSSS	22	16.0	15.48	0.03	0 mm	Antenna A	V1	F9FYM000MLX1	1	bottom	100.0	0.750	1.127	1.000	0.845	0.245	0.276	
2462	11	802.11b	DSSS	22	16.0	15.50	0.18	0 mm	Antenna A	V2	F9FYL00LMLX0	1	bottom	100.0	0.852	1.122	1.000	0.956	0.276	0.310	
2462	11	802.11b	DSSS	22	16.0	15.50	0.11	0 mm	Antenna A	V2	F9FYL00LMLX0	1	right	100.0	0.003	1.122	1.000	0.003	0.001	0.001	
2462	11	802.11b	DSSS	22	16.0	15.50	0.09	0 mm	Antenna A	V2	F9FYL00LMLX0	1	left	100.0	0.135	1.122	1.000	0.151	0.060	0.067	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Body
Spatial Peak	1.6 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 1 gram

Table 10-32
2.4GHz WLAN Body SAR- Antenna B

MEASUREMENT RESULTS																						
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Variant	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.														(W/kg)			(W/kg)	(W/kg)	(W/kg)	
2437	6	802.11b	DSSS	22	16.0	15.50	0.03	0 mm	Antenna B	V1	F9FYM000MLX1	1	back	100.0	0.047	1.122	1.000	0.053	0.021	0.024	
2437	6	802.11b	DSSS	22	16.0	15.50	0.14	0 mm	Antenna B	V1	F9FYM000MLX1	1	top	100.0	0.005	1.122	1.000	0.006	0.001	0.001	
2412	1	802.11b	DSSS	22	16.0	15.48	-0.05	0 mm	Antenna B	V1	F9FYM000MLX1	1	bottom	100.0	0.739	1.127	1.000	0.833	0.239	0.269	
2412	1	802.11b	DSSS	22	16.0	15.49	-0.07	0 mm	Antenna B	V2	F9FYL00MMLX0	1	bottom	100.0	0.652	1.125	1.000	0.734	0.212	0.239	
2437	6	802.11b	DSSS	22	16.0	15.50	0.15	0 mm	Antenna B	V1	F9FYM000MLX1	1	bottom	100.0	0.689	1.122	1.000	0.773	0.224	0.251	
2462	11	802.11b	DSSS	22	16.0	15.42	-0.20	0 mm	Antenna B	V1	F9FYM000MLX1	1	bottom	100.0	0.580	1.143	1.000	0.663	0.190	0.217	
2437	6	802.11b	DSSS	22	16.0	15.50	0.04	0 mm	Antenna B	V1	F9FYM000MLX1	1	right	100.0	0.146	1.122	1.000	0.164	0.061	0.068	
2437	6	802.11b	DSSS	22	16.0	15.50	0.00	0 mm	Antenna B	V1	F9FYM000MLX1	1	left	100.0	0.001	1.122	1.000	0.001	0.000	0.000	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Body
Spatial Peak	1.6 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 1 gram

Table 10-33
5GHz WLAN Body SAR UNII-2A

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Variant	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.														(W/kg)			(W/kg)	(W/kg)	(W/kg)	
5270	54	802.11n	OFDM	40	17.00	16.90	0.04	0 mm	Antenna A	V1	F9FYM000MLX1	13.5	back	97.7	0.041	1.023	1.024	0.043	0.014	0.015	
5270	54	802.11n	OFDM	40	17.00	16.90	0.03	0 mm	Antenna A	V1	F9FYM000MLX1	13.5	top	97.7	0.016	1.023	1.024	0.017	0.004	0.004	
5270	54	802.11n	OFDM	40	17.00	16.90	-0.11	0 mm	Antenna A	V1	F9FYM000MLX1	13.5	bottom	97.7	0.806	1.023	1.024	0.844	0.261	0.273	
5270	54	802.11n	OFDM	40	17.00	17.00	-0.11	0 mm	Antenna A	V2	F9FYL00MMLX0	13.5	bottom	97.7	0.744	1.000	1.024	0.762	0.247	0.253	
5310	62	802.11n	OFDM	40	14.50	14.45	-0.03	0 mm	Antenna A	V1	F9FYM000MLX1	13.5	bottom	97.7	0.397	1.012	1.024	0.411	0.127	0.132	
5270	54	802.11n	OFDM	40	17.00	16.90	-0.20	0 mm	Antenna A	V1	F9FYM000MLX1	13.5	right	97.7	0.000	1.023	1.024	0.000	0.000	0.000	
5270	54	802.11n	OFDM	40	17.00	16.90	0.16	0 mm	Antenna A	V1	F9FYM000MLX1	13.5	left	97.7	0.083	1.023	1.024	0.087	0.032	0.034	
5270	54	802.11n	OFDM	40	16.75	16.75	0.02	0 mm	Antenna B	V1	F9FYM000MLX1	13.5	back	97.6	0.048	1.000	1.025	0.049	0.018	0.018	
5270	54	802.11n	OFDM	40	16.75	16.75	0.04	0 mm	Antenna B	V1	F9FYM000MLX1	13.5	top	97.6	0.017	1.000	1.025	0.017	0.005	0.005	
5270	54	802.11n	OFDM	40	16.75	16.75	-0.02	0 mm	Antenna B	V1	F9FYM000MLX1	13.5	bottom	97.6	0.901	1.000	1.025	0.924	0.313	0.321	
5270	54	802.11n	OFDM	40	16.75	16.75	0.08	0 mm	Antenna B	V2	F9FYL00MMLX0	13.5	bottom	97.6	0.831	1.000	1.025	0.852	0.279	0.286	
5310	62	802.11n	OFDM	40	14.50	14.42	-0.03	0 mm	Antenna B	V1	F9FYM000MLX1	13.5	bottom	97.6	0.536	1.019	1.025	0.560	0.182	0.190	
5270	54	802.11n	OFDM	40	16.75	16.75	0.19	0 mm	Antenna B	V1	F9FYM000MLX1	13.5	right	97.6	0.109	1.000	1.025	0.112	0.041	0.042	
5270	54	802.11n	OFDM	40	16.75	16.75	0.20	0 mm	Antenna B	V1	F9FYM000MLX1	13.5	left	97.6	0.000	1.000	1.025	0.000	0.000	0.000	
5270	54	802.11n	OFDM	40	16.75	16.75	0.11	0 mm	Antenna B	V1	F9FYM000MLX1	13.5	bottom	97.6	0.897	1.000	1.025	0.919	0.291	0.298	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Body 1.6 W/kg (mW/g) averaged over 1 gram						

Note: Blue entries indicate variability measurements.

Table 10-34
5GHz WLAN Body SAR- UNII-2C

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Variant	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.														(W/kg)			(W/kg)	(W/kg)	(W/kg)	
5690	138	802.11ac	OFDM	80	17.50	17.00	0.03	0 mm	Antenna A	V1	F9FYM000MLX1	29.3	back	95.3	0.064	1.122	1.049	0.075	0.021	0.025	
5690	138	802.11ac	OFDM	80	17.50	17.00	0.03	0 mm	Antenna A	V1	F9FYM000MLX1	29.3	top	95.3	0.018	1.122	1.049	0.021	0.006	0.007	
5530	106	802.11ac	OFDM	80	14.00	13.95	-0.20	0 mm	Antenna A	V1	F9FYM000MLX1	29.3	bottom	95.3	0.386	1.012	1.049	0.410	0.133	0.141	
5610	122	802.11ac	OFDM	80	17.00	16.85	0.08	0 mm	Antenna A	V1	F9FYM000MLX1	29.3	bottom	95.3	0.831	1.035	1.049	0.902	0.289	0.314	
5690	138	802.11ac	OFDM	80	17.50	17.00	-0.13	0 mm	Antenna A	V1	F9FYL000MLX1	29.3	bottom	95.3	0.843	1.122	1.049	**0.992**	0.298	0.351	
5690	138	802.11ac	OFDM	80	17.50	16.84	-0.08	0 mm	Antenna A	V2	F9FYM00MMLX0	29.3	bottom	95.3	0.777	1.164	1.049	0.949	0.269	0.328	
5690	138	802.11ac	OFDM	80	17.50	17.00	0.20	0 mm	Antenna A	V1	F9FYM000MLX1	29.3	right	95.3	0.000	1.122	1.049	0.000	0.000	0.000	
5690	138	802.11ac	OFDM	80	17.50	17.00	0.20	0 mm	Antenna A	V1	F9FYM000MLX1	29.3	left	95.3	0.131	1.122	1.049	0.154	0.044	0.052	
5690	138	802.11ac	OFDM	80	17.25	16.92	0.16	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	back	95.2	0.085	1.079	1.050	0.096	0.031	0.035	
5690	138	802.11ac	OFDM	80	17.25	16.92	0.12	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	top	95.2	0.021	1.079	1.050	0.024	0.006	0.007	
5530	106	802.11ac	OFDM	80	14.00	14.00	-0.04	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	bottom	95.2	0.400	1.000	1.050	0.420	0.142	0.149	
5610	122	802.11ac	OFDM	80	17.00	17.00	0.18	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	bottom	95.2	0.945	1.000	1.050	**0.992**	0.332	0.349	A17
5610	122	802.11ac	OFDM	80	17.00	16.83	-0.07	0 mm	Antenna B	V2	F9FYL00LMLX0	29.3	bottom	95.2	0.782	1.040	1.050	0.854	0.272	0.297	
5690	138	802.11ac	OFDM	80	17.25	16.92	-0.12	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	bottom	95.2	0.846	1.079	1.050	0.958	0.309	0.350	
5690	138	802.11ac	OFDM	80	17.25	16.92	0.04	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	right	95.2	0.099	1.079	1.050	0.112	0.035	0.040	
5690	138	802.11ac	OFDM	80	17.25	16.92	0.00	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	left	95.2	0.000	1.079	1.050	0.000	0.000	0.000	
5610	122	802.11ac	OFDM	80	17.00	17.00	0.15	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	bottom	95.2	0.922	1.000	1.050	0.968	0.318	0.334	
5690	138	802.11ac	OFDM	80	17.25	16.92	-0.07	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	bottom	95.2	0.874	1.079	1.050	**0.990**	0.304	**0.344**	
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population															Body 1.6 W/kg (mW/g) averaged over 1 gram						

Note: Blue entries indicate variability measurements.

Table 10-35
5GHz WLAN Body SAR- UNII-3

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Bandwidth [MHz]	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Variant	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.														(W/kg)			(W/kg)	(W/kg)	(W/kg)	
5775	155	802.11ac	OFDM	80	16.25	16.00	0.03	0 mm	Antenna A	V1	F9FYM000MLX1	29.3	back	95.3	0.042	1.059	1.049	0.047	0.015	0.017	
5775	155	802.11ac	OFDM	80	16.25	16.00	0.03	0 mm	Antenna A	V1	F9FYM000MLX1	29.3	top	95.3	0.013	1.059	1.049	0.014	0.004	0.004	
5775	155	802.11ac	OFDM	80	16.25	16.00	-0.11	0 mm	Antenna A	V1	F9FYM000MLX1	29.3	bottom	95.3	0.732	1.059	1.049	0.813	0.251	0.279	
5775	155	802.11ac	OFDM	80	16.25	16.21	-0.06	0 mm	Antenna A	V2	F9FYL00MMLX0	29.3	bottom	95.3	0.729	1.009	1.049	0.772	0.255	0.270	
5775	155	802.11ac	OFDM	80	16.25	16.00	0.07	0 mm	Antenna A	V1	F9FYM000MLX1	29.3	right	95.3	0.000	1.059	1.049	0.000	0.000	0.000	
5775	155	802.11ac	OFDM	80	16.25	16.00	0.06	0 mm	Antenna A	V1	F9FYM000MLX1	29.3	left	95.3	0.089	1.059	1.049	0.099	0.029	0.032	
5775	155	802.11ac	OFDM	80	16.50	16.46	0.17	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	back	95.2	0.048	1.009	1.050	0.051	0.017	0.018	
5775	155	802.11ac	OFDM	80	16.50	16.46	0.12	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	top	95.2	0.009	1.009	1.050	0.010	0.002	0.002	
5775	155	802.11ac	OFDM	80	16.50	16.46	0.01	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	bottom	95.2	0.786	1.009	1.050	0.833	0.275	0.291	
5775	155	802.11ac	OFDM	80	16.50	16.35	-0.06	0 mm	Antenna B	V2	F9FYL00LMLX0	29.3	bottom	95.2	0.759	1.035	1.050	0.825	0.266	0.289	
5775	155	802.11ac	OFDM	80	16.50	16.46	0.06	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	right	95.2	0.072	1.009	1.050	0.076	0.024	0.025	
5775	155	802.11ac	OFDM	80	16.50	16.46	-0.07	0 mm	Antenna B	V1	F9FYM000MLX1	29.3	left	95.2	0.000	1.009	1.050	0.000	0.000	0.000	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Body
Spatial Peak	1.6 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 1 gram

Table 10-36
Bluetooth Body SAR- Antenna A

MEASUREMENT RESULTS																					
FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Power Drift [dB]	Spacing	Antenna Config.	Variant	Device Serial Number	Data Rate (Mbps)	Side	Duty Cycle (%)	SAR (1g)	Scaling Factor (Cond Power)	Scaling Factor (Duty Cycle)	Reported SAR (1g)	SAR (10g)	Reported SAR (10g)	Plot #
MHz	Ch.													(W/kg)			(W/kg)	(W/kg)	(W/kg)	
2402	0	Bluetooth	FHSS	17.00	16.49	-0.06	0 mm	Antenna A	V2	F9FYL00LMLX0	1	back	77.4	0.045	1.125	1.001	0.051	0.022	0.025	
2402	0	Bluetooth	FHSS	17.00	16.49	0.03	0 mm	Antenna A	V2	F9FYL00LMLX0	1	top	77.4	0.006	1.125	1.001	0.007	0.003	0.003	
2402	0	Bluetooth	FHSS	17.00	16.49	0.05	0 mm	Antenna A	V2	F9FYL00LMLX0	1	bottom	77.4	0.931	1.125	1.001	1.048	0.311	0.350	A18
2441	39	Bluetooth	FHSS	17.00	15.90	0.15	0 mm	Antenna A	V2	F9FYL00LMLX0	1	bottom	77.4	0.839	1.288	1.001	**1.082**	0.293	**0.378**	
2441	39	Bluetooth	FHSS	17.00	16.16	-0.07	0 mm	Antenna A	V1	F9FYM000MLX1	1	bottom	77.4	0.778	1.213	1.001	0.945	0.252	0.306	
2480	78	Bluetooth	FHSS	17.00	15.00	0.08	0 mm	Antenna A	V2	F9FYL00LMLX0	1	bottom	77.4	0.559	1.585	1.001	0.887	0.197	0.313	
2402	0	Bluetooth	FHSS	17.00	16.49	0.05	0 mm	Antenna A	V2	F9FYL00LMLX0	1	right	77.4	0.001	1.125	1.001	0.001	0.000	0.000	
2402	0	Bluetooth	FHSS	17.00	16.49	-0.01	0 mm	Antenna A	V2	F9FYL00LMLX0	1	left	77.4	0.106	1.125	1.001	0.119	0.047	0.053	
2441	39	Bluetooth	FHSS	10.00	9.60	0.04	0 mm	Antenna A	V2	F9FYL00LMLX0	1	back	77.4	0.019	1.096	1.001	0.021	0.008	0.009	
2441	39	Bluetooth	FHSS	10.00	9.60	0.06	0 mm	Antenna A	V2	F9FYL00LMLX0	1	top	77.4	0.003	1.096	1.001	0.003	0.001	0.001	
2441	39	Bluetooth	FHSS	10.00	9.60	-0.16	0 mm	Antenna A	V2	F9FYL00LMLX0	1	bottom	77.4	0.284	1.096	1.001	0.312	0.092	0.101	
2441	39	Bluetooth	FHSS	10.00	9.60	-0.20	0 mm	Antenna A	V2	F9FYL00LMLX0	1	right	77.4	0.000	1.096	1.001	0.000	0.000	0.000	
2441	39	Bluetooth	FHSS	10.00	9.60	-0.08	0 mm	Antenna A	V2	F9FYL00LMLX0	1	left	77.4	0.041	1.096	1.001	0.045	0.018	0.020	

ANSI / IEEE C95.1 1992 - SAFETY LIMIT	Body
Spatial Peak	1.6 W/kg (mW/g)
Uncontrolled Exposure/General Population	averaged over 1 gram

Note: The reported SAR was scaled to the 77.5% transmission duty factor to determine compliance since the duty factor of the device is permanently limited to 77.5% per the manufacturer.

10.2 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in FCC KDB Publication 616217 D04v01r02 and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v06.
6. Per FCC KDB 865664 D01v01r04, variability SAR tests were performed when the measured SAR results for a frequency band were greater than or equal to 0.8 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 12 for variability analysis.
7. FCC KDB Publication 616217 D04v01r02 Section 4.3, SAR tests are required for the back surface and edges of the tablet with the tablet touching the phantom. The SAR Exclusion Threshold in FCC KDB 447498 D01v06 was applied to determine SAR test exclusion for adjacent edge configurations.

GSM Test Notes:

1. Justification for reduced test configurations per KDB Publication 941225 D01v03r01 and October 2013 TCB Workshop Notes: The source-based frame-averaged output power was evaluated for all GPRS/EDGE slot configurations. The configuration with the highest target frame averaged output power was evaluated for SAR. When the maximum frame-averaged powers are equivalent across two or more slots (within 0.25 dB), the configuration with the most number of time slots was tested.
2. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g evaluations then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

UMTS Notes:

1. UMTS mode in was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03r01. AMR and HSPA SAR was not required per the 3G Test Reduction Procedure in KDB Publication 941225 D01v03r01.
2. Per FCC KDB Publication 447498 D01v06, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg for 1g evaluations then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Considerations for LTE Devices in FCC KDB Publication 941225 D05v02r04. The general test procedures used for testing can be found in Section 7.5.4.
2. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.
3. A-MPR was disabled for all SAR tests by setting NS=01 and MCC=001 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

4. Per FCC KDB Publication 447498 D01v06, when the reported LTE Band 41 SAR measured at the highest output power channel in a given a test configuration was > 0.6 W/kg for 1g evaluations, testing at the other channels was required for such test configurations.
5. TDD LTE was tested per the guidance provided in FCC KDB Publication 941225 D05v02r04. Testing was performed using UL-DL configuration 0 with 6 UL subframes and 2 S subframes using extended cyclic prefix only and special subframe configuration 6. SAR tests were performed at maximum output power and worst-case transmission duty factor in extended cyclic prefix. Per 3GPP 36.211 Section 4, the duty factor for special subframe configuration 6 using extended cyclic prefix is 0.633.
6. Per KDB Publication 941225 D05Av01r02, SAR for downlink only LTE CA operations was not needed since the maximum average output power in LTE CA mode was not >0.25 dB higher than the maximum output power when downlink carrier aggregation was inactive.
7. This device supports Power Class 2 and Power Class 3 operations for LTE Band 41. The highest available duty cycle for Power Class 2 operations is 43.3 % using UL-DL configuration 1. Per FCC Guidance, all SAR tests were performed using Power Class 3. SAR with power class 2 at the available duty factor was additionally performed for the power class 3 configuration with the highest SAR configuration for each exposure conditions. Please see Section 13.1 for linearity results.
8. For LTE Band 41 PC3 and LTE Band 7, per FCC guidance, SAR was first measured with only a single carrier active in the uplink (carrier aggregation not active). For each exposure condition, the uplink CA scenario with two component carriers was additionally tested for the configuration with the highest SAR when carrier aggregation was not active. The SCC was configured with the closest available contiguous channel. The two component carriers were configured so the resource blocks are physically allocated side by side to achieve the maximum output power.

WLAN Notes:

1. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 2.4 GHz WIFI single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR. See Section 7.6.4 for more information.
2. Justification for test configurations for WLAN per KDB Publication 248227 D01v02r02 for 5 GHz WIFI single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission modes were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg for 1g evaluations. See Section 7.6.5 for more information.
3. Per KDB Publication 248227 D01v02r02, SAR for MIMO was evaluated by following the simultaneous SAR provisions from KDB Publication 447498 D01v06 by either evaluating the sum of the 1g SAR values of each antenna transmitting independently or making a SAR measurement with both antennas transmitting simultaneously. Please see Section 11 for complete analysis.
4. When the maximum reported 1g averaged SAR is ≤0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg for 1g evaluations or all test channels were measured.
5. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8 MHz, VBW = 50 MHz, and detector = peak per guidance of Section 6.0 b) of ANSI C63. 10-2013 and KDB 558074 D01 v04. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100.

Bluetooth Notes:

1. Bluetooth SAR was evaluated with a test mode with hopping disabled with DH5 operation. The reported SAR was scaled to the 77.5% transmission duty factor to determine compliance since the duty factor of the device is limited to 77.5% per the manufacturer. See Section 8.6 for the time domain plot and calculation for the duty factor of the device.

11 FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

11.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v06 are applicable to devices with built-in unlicensed transmitters such as 802.11 and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

11.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore, simultaneous transmission analysis is required. Per FCC KDB Publication 447498 D01v06 4.3.2 and IEEE 1528-2013 Section 6.3.4.1.2, simultaneous transmission SAR test exclusion may be applied when the sum of the 1g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤1.6 W/kg. The different test positions in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1g.

Note: ** The SAR distributions for at least one of the antennas are spatially separated from the other antennas per FCC KDB Publication 248227 Section 6.1 procedures. Therefore, the simultaneous transmission were treated independently for this configuration. See Section 11.4 for more information about the Spatial Separation Analysis.

For each position, the highest SAR value across all modes for the applicable cellular band antenna was considered for summation to determine simultaneous SAR test exclusion.

11.3 Body Simultaneous Transmission Analysis

Table 11-1
Cellular Band Antenna C Simultaneous Transmission Scenario with 2.4 GHz WLAN

Simult Tx	Configuration	Cellular Antenna C SAR (W/kg)	2.4 GHz WLAN Antenna A SAR (W/kg)	2.4 GHz WLAN Antenna B SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body SAR	Back	1.181	0.062	0.053	1.243	1.234	**1.296**
	Top	1.170	0.001	0.006	1.171	1.176	1.177
	Bottom	0.033	0.980	0.833	1.013	0.866	1.013**
	Right	0.198	0.003	0.164	0.201	0.362	0.365
	Left	0.030	0.151	0.001	0.181	0.031	0.182

Table 11-2
Cellular Band Antenna D Simultaneous Transmission Scenario with 2.4 GHz WLAN

Simult Tx	Configuration	Cellular Antenna D SAR (W/kg)	2.4 GHz WLAN Antenna A SAR (W/kg)	2.4 GHz WLAN Antenna B SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body SAR	Back	1.179	0.062	0.053	1.241	1.232	**1.294**
	Top	1.184	0.001	0.006	1.185	1.190	1.191
	Bottom	0.042	0.980	0.833	1.022	0.875	1.022**
	Right	0.045	0.003	0.164	0.048	0.209	0.212
	Left	0.266	0.151	0.001	0.417	0.267	0.418

Table 11-3
Cellular Band Antenna C Simultaneous Transmission Scenario with 5 GHz WLAN

Simult Tx	Configuration	Cellular Antenna C SAR (W/kg)	5 GHz WLAN Antenna A SAR (W/kg)	5 GHz WLAN Antenna B SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body SAR	Back	1.181	0.075	0.096	1.256	1.277	**1.352**
	Top	1.170	0.021	0.024	1.191	1.194	1.215
	Bottom	0.033	0.992	0.992	1.025	1.025	1.025**
	Right	0.198	0.000	0.112	0.198	0.310	0.310
	Left	0.030	0.154	0.000	0.184	0.030	0.184

Table 11-4
Cellular Band Antenna D Simultaneous Transmission Scenario with 5 GHz WLAN

Simult Tx	Configuration	Cellular Antenna D SAR (W/kg)	5 GHz WLAN Antenna A SAR (W/kg)	5 GHz WLAN Antenna B SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	1+2	1+3	1+2+3
Body SAR	Back	1.179	0.075	0.096	1.254	1.275	**1.350**
	Top	1.184	0.021	0.024	1.205	1.208	1.229
	Bottom	0.042	0.992	0.992	1.034	1.034	1.034**
	Right	0.045	0.000	0.112	0.045	0.157	0.157
	Left	0.266	0.154	0.000	0.420	0.266	0.420

Table 11-5
Cellular Band Antenna C Simultaneous Transmission Scenario with Bluetooth

Simult Tx	Configuration	Cellular Antenna C SAR (W/kg)	Bluetooth Antenna A at 17.0 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	2	1+2
Body SAR	Back	1.181	0.051	**1.232**
	Top	1.170	0.007	1.177
	Bottom	0.033	1.082	1.115
	Right	0.198	0.001	0.199
	Left	0.030	0.119	0.149

Table 11-6
Cellular Band Antenna D Simultaneous Transmission Scenario with Bluetooth

Simult Tx	Configuration	Cellular Antenna D SAR (W/kg)	Bluetooth Antenna A at 17.0 dBm SAR (W/kg)	Σ SAR (W/kg)
		1	1	1+2
Body SAR	Back	1.179	0.051	**1.230**
	Top	1.184	0.007	1.191
	Bottom	0.042	1.082	1.124
	Right	0.045	0.001	0.046
	Left	0.266	0.119	0.385

Table 11-7
Cellular Band Antenna C Simultaneous Transmission Scenario with Bluetooth and 5 GHz WLAN

Simult Tx	Configuration	Cellular Antenna C SAR (W/kg)	Bluetooth Antenna A Reduced at 10.0 dBm SAR (W/kg)	5 GHz WLAN Antenna A SAR (W/kg)	5 GHz WLAN Antenna B SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	4	1+2+3	1+2+4	1+2+3+4
Body SAR	Back	1.181	0.021	0.075	0.096	1.277	1.298	**1.373**
	Top	1.170	0.003	0.021	0.024	1.194	1.197	1.218
	Bottom	0.033	0.312	0.992	0.992	1.337	1.337	1.337**
	Right	0.198	0.000	0.000	0.112	0.198	0.310	0.310
	Left	0.030	0.045	0.154	0.000	0.229	0.075	0.229

Table 11-8
Cellular Band Antenna D Simultaneous Transmission Scenario with Bluetooth and 5 GHz WLAN

Simult Tx	Configuration	Cellular Antenna D SAR (W/kg)	Bluetooth Antenna A Reduced at 10.0 dBm SAR (W/kg)	5 GHz WLAN Antenna A SAR (W/kg)	5 GHz WLAN Antenna B SAR (W/kg)	Σ SAR (W/kg)		
		1	2	3	4	1+2+3	1+2+4	1+2+3+4
Body SAR	Back	1.179	0.021	0.075	0.096	1.275	1.296	**1.371**
	Top	1.184	0.003	0.021	0.024	1.208	1.211	1.232
	Bottom	0.042	0.312	0.992	0.992	1.346	1.346	1.346**
	Right	0.045	0.000	0.000	0.112	0.045	0.157	0.157
	Left	0.266	0.045	0.154	0.000	0.465	0.311	0.465

Table 11-9
Simultaneous Transmission Scenario with Bluetooth and 5 GHz WLAN

Simult Tx	Bluetooth Antenna A Reduced at 10.0 dBm SAR (W/kg)	5 GHz WLAN Antenna A SAR (W/kg)	5 GHz WLAN Antenna B SAR (W/kg)	Σ SAR (W/kg)		
	1	2	3	1+2	1+3	1+2+3
Body SAR	0.021	0.075	0.096	0.096	0.117	0.192
	0.003	0.021	0.024	0.024	0.027	0.048
	0.312	0.992	0.992	**1.304**	**1.304**	**1.304****
	0.000	0.000	0.112	0.000	0.112	0.112
	0.045	0.154	0.000	0.199	0.045	0.199

11.4 Spatial Separation Analysis

Per FCC KDB Publication 248227, antennas may be considered spatially separated when the aggregate SAR from multiple antennas at any location in the combined SAR distribution is either ≤ 1.2 W/kg where at least 90% of the SAR is attributed to a single SAR distribution or ≤ 0.4 W/kg where no more than one SAR distribution is contributing > 0.1 W/kg.

Spatial separation was determined by inspection of the area scan SAR distributions to confirm that at all locations, SAR was < 1.2 W/kg, where at least 90% of the SAR is attributed to a single SAR distribution. See below for illustrations of the spatial separated antennas considered.

11.4.1 Bottom Edge Spatial Separation Analysis

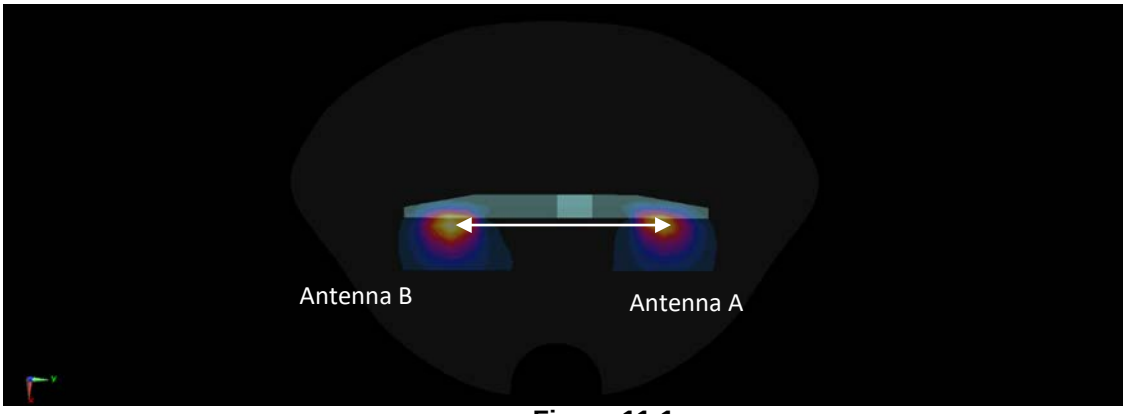


Figure 11-1
Bottom Edge Spatial Separation for Antenna A and Antenna B

11.1 Simultaneous Transmission Conclusion

The above numerical summed SAR results and spatial separation analysis for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v06 and IEEE 1528-2013 Section 6.3.4.1.2.

12 SAR MEASUREMENT VARIABILITY

12.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r04, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1g SAR limit).
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

Table 12-1
Body SAR Measurement Variability Results

BODY VARIABILITY RESULTS														
Band	FREQUENCY		Mode	Service	Data Rate (Mbps)	Side	Spacing	Measured SAR (1g)	1st Repeated SAR (1g)	Ratio	2nd Repeated SAR (1g)	Ratio	3rd Repeated SAR (1g)	Ratio
	MHz	Ch.						(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1900	1852.40	9262	UMTS 1900, Antenna C	RMC	N/A	back	0 mm	1.180	1.180	1.00	N/A	N/A	N/A	N/A
750	707.50	23095	LTE Band 12, 10 MHz Bandwidth, Antenna D	QPSK, 1 RB, 0 RB Offset	N/A	back	0 mm	1.130	0.980	1.15	N/A	N/A	N/A	N/A
850	819.00	26740	LTE Band 26 (Cell), 10 MHz Bandwidth, Antenna C	QPSK, 1 RB, 0 RB Offset	N/A	back	0 mm	1.170	1.140	1.03	N/A	N/A	N/A	N/A
1750	1720.00	132072	LTE Band 66 (AWS), 20 MHz Bandwidth, Antenna C	QPSK, 1 RB, 0 RB Offset	N/A	back	0 mm	1.090	1.030	1.06	N/A	N/A	N/A	N/A
2300	2310.00	27710	LTE Band 30, 10 MHz Bandwidth, Antenna C	QPSK, 50 RB, 0 RB Offset	N/A	top	0 mm	0.899	0.804	1.12	N/A	N/A	N/A	N/A
2450	2506.00	39750	LTE Band 41, 20 MHz Bandwidth, Antenna D	QPSK, 1 RB, 0 RB Offset	N/A	top	0 mm	1.030	1.020	1.01	N/A	N/A	N/A	N/A
2600	2549.50	40185	LTE Band 41, 20 MHz Bandwidth, Antenna D	QPSK, 1 RB, 99 RB Offset	N/A	top	0 mm	1.140	1.080	1.06	N/A	N/A	N/A	N/A
5250	5270.00	54	802.11n, 40 MHz Bandwidth, Antenna B	OFDM	13.5	bottom	0 mm	0.901	0.897	1.00	N/A	N/A	N/A	N/A
5600	5610.00	122	802.11ac, 80 MHz Bandwidth, Antenna B	OFDM	29.3	bottom	0 mm	0.945	0.922	1.02	N/A	N/A	N/A	N/A
5750	5690.00	138	802.11 ac, 80 MHz Bandwidth, Antenna B	OFDM	29.3	bottom	0 mm	0.846	0.874	1.03	N/A	N/A	N/A	N/A
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population							Body 1.6 W/kg (mW/g) averaged over 1 gram							

12.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for 1g for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE 1528-2013 was not required.

13 ADDITIONAL TESTING PER FCC GUIDANCE

13.1 LTE Band 41 Power Class 2 and Power Class 3 Linearity

This device supports Power Class 2 and Power Class 3 operations for LTE Band 41. The highest available duty cycle for Power Class 2 operations is 43.3 % using UL-DL configuration 1. Per May 2017 TCB Workshop Notes based on the device behavior, all SAR tests were performed using Power Class 3. SAR with Power Class 2 at the highest power and available duty factor was additionally performed for the Power Class 3 configuration with the highest SAR for each exposure condition. The linearity between the Power Class 2 and Power Class 3 SAR results and the respective frame averaged powers was calculated to determine that the results were linear. Per May 2017 TCB Workshop, no additional SAR measurements were required since the linearity between power classes was < 10% and all reported SAR values were < 1.4 W/kg for 1g.

LTE Band 41 SAR testing with power class 2 at the highest power and available duty factor was additionally performed for the power class 3 configuration with the highest SAR for each exposure condition.

Table 13-1
LTE Band 41 Body Linearity Data – Antenna C

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	15.4	15.4
Measured Output Power (dBm)	14.97	15.11
Measured SAR (W/kg)	1.01	0.688
Measured Power (mW)	31.41	32.43
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	19.88	14.04
% deviation from expected linearity		-3.58%

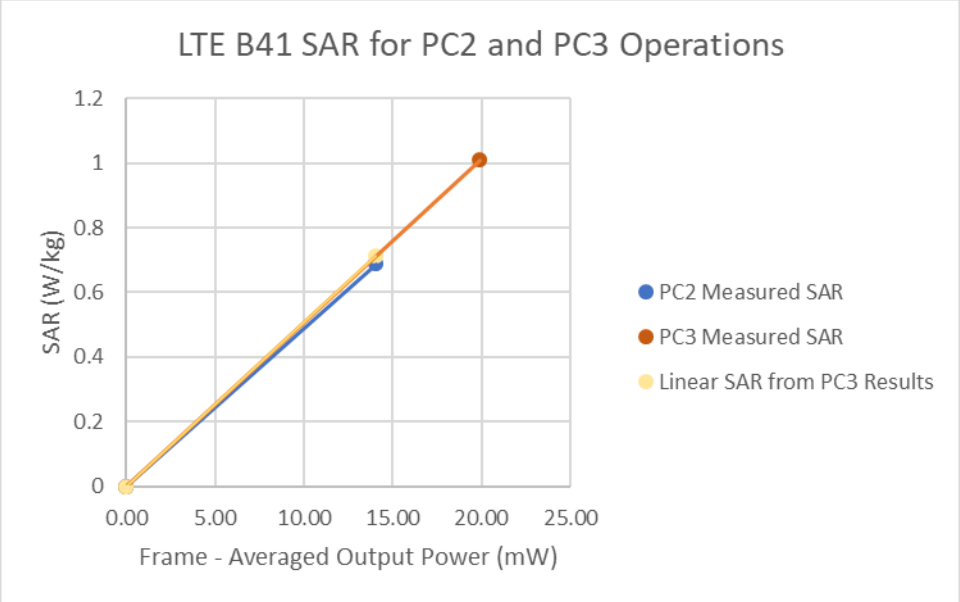
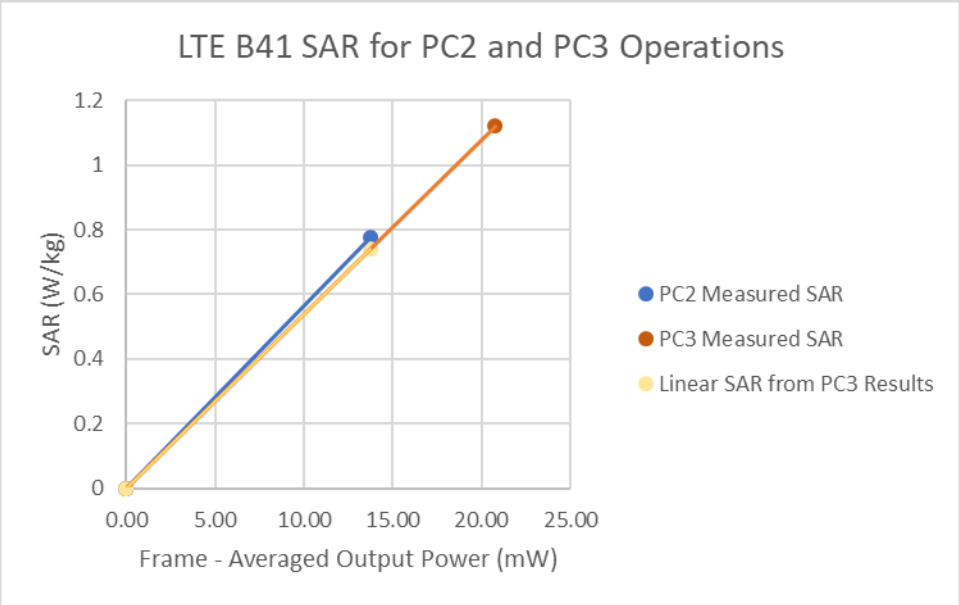


Table 13-2
LTE Band 41 Body Linearity – Antenna D

	LTE Band 41 PC3	LTE Band 41 PC2
Maximum Allowed Output Power (dBm)	15.4	15.4
Measured Output Power (dBm)	15.16	15.01
Measured SAR (W/kg)	1.12	0.775
Measured Power (mW)	32.81	31.70
Duty Cycle	63.3%	43.3%
Frame Averaged Output Power (mW)	20.77	13.72
% deviation from expected linearity		4.71%



14 EQUIPMENT LIST

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	85033E	3.5mm Standard Calibration Kit	8/13/2018	Annual	8/13/2019	MY53402352
Agilent	8753ES	S-Parameter Network Analyzer	10/2/2018	Annual	10/2/2019	US39170118
Agilent	E4438C	ESG Vector Signal Generator	6/22/2018	Annual	6/22/2019	MY53401181
Agilent	E4440A	PSA Series Spectrum Analyzer	11/14/2018	Annual	11/14/2019	MY46186272
Agilent	E5515C	Wireless Communications Test Set	2/28/2018	Biennial	2/28/2020	GB41450275
Agilent	N5182A	MXG Vector Signal Generator	6/15/2018	Annual	6/15/2019	MY47420837
Keysight Technologies	N9030A	PXA Signal Analyzer	8/6/2018	Annual	8/6/2019	MY54490576
Amplifier Research	150A100C	Amplifier	CBT	N/A	CBT	350132
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	MA24106A	USB Power Sensor	7/17/2018	Annual	7/17/2019	1827527
Anritsu	MA24106A	USB Power Sensor	5/6/2019	Annual	5/6/2020	1231538
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	846215
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1027293
Anritsu	MT8820C	Radio Communication Analyzer	6/27/2018	Annual	6/27/2019	6201240328
Anritsu	MT8821C	Radio Communication Analyzer	3/18/2019	Annual	3/18/2020	6201144419
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330160
Control Company	4352	Ultra Long Stem Thermometer	2/28/2018	Biennial	2/28/2020	170330158
MCL	BW-N6W5+	6dB Attenuator	CBT	N/A	CBT	1139
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-1200+	Low Pass Filter DC to 1000 MHz	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mitutoyo	CD-6"CSX	Digital Caliper	4/18/2018	Biennial	4/18/2020	13264165
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Narda	BW-S3W2	Attenuator (3dB)	CBT	N/A	CBT	120
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Narda	4014C-6	4 - 8 GHz SMA 6 dB Directional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Rohde & Schwarz	CMW500	Radio Communication Tester	7/5/2018	Annual	7/5/2019	106578
Rohde & Schwarz	CMW500	Radio Communication Tester	4/15/2019	Annual	4/15/2020	167284
Rohde& Schwarz	CMW500	Wideband Radio Communication Tester	7/6/2018	Annual	7/6/2019	151849
SPEAG	DAKS-3.5	Portable DAK	9/11/2018	Annual	9/11/2019	1045
SPEAG	D750V3	750 MHz SAR Dipole	9/8/2017	Biennial	9/8/2019	1097
SPEAG	D835V2	835 MHz SAR Dipole	6/13/2017	Biennial	6/13/2019	4d040
SPEAG	D1750V2	1750 MHz SAR Dipole	9/7/2017	Biennial	9/7/2019	1104
SPEAG	D1900V2	1900 MHz SAR Dipole	9/7/2017	Biennial	9/7/2019	5d181
SPEAG	D2300V2	2300 MHz SAR Dipole	3/7/2018	Biennial	3/7/2020	1038
SPEAG	D2450V2	2450 MHz SAR Dipole	11/12/2018	Annual	11/12/2019	921
SPEAG	D2600V2	2600 MHz SAR Dipole	9/11/2017	Biennial	9/11/2019	1069
SPEAG	D5GHzV2	5 GHz SAR Dipole	9/13/2018	Annual	9/13/2019	1163
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/15/2019	Annual	1/15/2020	793
SPEAG	DAE4	Dasy Data Acquisition Electronics	7/10/2018	Annual	7/10/2019	1402
SPEAG	DAE4	Dasy Data Acquisition Electronics	2/13/2019	Annual	2/13/2020	1403
SPEAG	DAE4	Dasy Data Acquisition Electronics	11/12/2018	Annual	11/12/2019	1449
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/13/2019	Annual	3/13/2020	604
SPEAG	DAE4	Dasy Data Acquisition Electronics	8/14/2018	Annual	8/14/2019	1408
SPEAG	EX3DV4	SAR Probe	1/28/2019	Annual	1/28/2020	3837
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7416
SPEAG	EX3DV4	SAR Probe	2/19/2019	Annual	2/19/2020	7427
SPEAG	EX3DV4	SAR Probe	9/18/2018	Annual	9/18/2019	7420
SPEAG	EX3DV4	SAR Probe	3/18/2019	Annual	3/18/2020	7421
SPEAG	ES3DV3	SAR Probe	11/19/2018	Annual	11/19/2019	3318

Note: CBT (Calibrated Before Testing). Prior to testing, the measurement paths containing a cable, amplifier, attenuator, coupler or filter were connected to a calibrated source (i.e. a signal generator) to determine the losses of the measurement path. The power meter offset was then adjusted to compensate for the measurement system losses. This level offset is stored within the power meter before measurements are made. This calibration verification procedure applies to the system verification and output power measurements. The calibrated reading is then taken directly from the power meter after compensation of the losses for all final power measurements.

15 MEASUREMENT UNCERTAINTIES

a	c	d	e= f(d,k)	f	g	h = c x f/e	i = c x g/e	k
Uncertainty Component	**Tol. (± %)**	**Prob. Dist.**	**Div.**	**c_i 1gm**	**c_i 10 gms**	**1gm u_i (± %)**	**10gms u_i (± %)**	**v_i**
Measurement System								
Probe Calibration	6.55	N	1	1.0	1.0	6.6	6.6	∞
Axial Isotropy	0.25	N	1	0.7	0.7	0.2	0.2	∞
Hemishperical Isotropy	1.3	N	1	0.7	0.7	0.9	0.9	∞
Boundary Effect	2.0	R	1.73	1.0	1.0	1.2	1.2	∞
Linearity	0.3	N	1	1.0	1.0	0.3	0.3	∞
System Detection Limits	0.25	R	1.73	1.0	1.0	0.1	0.1	∞
Readout Electronics	0.3	N	1	1.0	1.0	0.3	0.3	∞
Response Time	0.8	R	1.73	1.0	1.0	0.5	0.5	∞
Integration Time	2.6	R	1.73	1.0	1.0	1.5	1.5	∞
RF Ambient Conditions - Noise	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
RF Ambient Conditions - Reflections	3.0	R	1.73	1.0	1.0	1.7	1.7	∞
Probe Positioner Mechanical Tolerance	0.4	R	1.73	1.0	1.0	0.2	0.2	∞
Probe Positioning w/ respect to Phantom	6.7	R	1.73	1.0	1.0	3.9	3.9	∞
Extrapolation, Interpolation & Integration algorithms for Max. SAR Evaluation	4.0	R	1.73	1.0	1.0	2.3	2.3	∞
Test Sample Related								
Test Sample Positioning	2.7	N	1	1.0	1.0	2.7	2.7	35
Device Holder Uncertainty	1.67	N	1	1.0	1.0	1.7	1.7	5
Output Power Variation - SAR drift measurement	5.0	R	1.73	1.0	1.0	2.9	2.9	∞
SAR Scaling	0.0	R	1.73	1.0	1.0	0.0	0.0	∞
Phantom & Tissue Parameters								
Phantom Uncertainty (Shape & Thickness tolerances)	7.6	R	1.73	1.0	1.0	4.4	4.4	∞
Liquid Conductivity - measurement uncertainty	4.2	N	1	0.78	0.71	3.3	3.0	10
Liquid Permittivity - measurement uncertainty	4.1	N	1	0.23	0.26	1.0	1.1	10
Liquid Conductivity - Temperature Uncertainty	3.4	R	1.73	0.78	0.71	1.5	1.4	∞
Liquid Permittivity - Temperature Unceritainty	0.6	R	1.73	0.23	0.26	0.1	0.1	∞
Liquid Conductivity - deviation from target values	5.0	R	1.73	0.64	0.43	1.8	1.2	∞
Liquid Permittivity - deviation from target values	5.0	R	1.73	0.60	0.49	1.7	1.4	∞
Combined Standard Uncertainty (k=1)		RSS				11.5	11.3	60
Expanded Uncertainty (95% CONFIDENCE LEVEL)		k=2				23.0	22.6	

16 CONCLUSION

16.1 Measurement Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits of the FCC and Innovation, Science, and Economic Development Canada, with respect to all parameters subject to this test. These measurements were taken to simulate the RF effects of RF exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role in possible biological effects are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease). Because various factors may interact with one another to vary the specific biological outcome of an exposure to electromagnetic fields, any protection guide should consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables. [3]

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APPENDIX A: SAR TEST DATA

PCTEST ENGINEERING LABORATORY, INC.

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00BMLX0

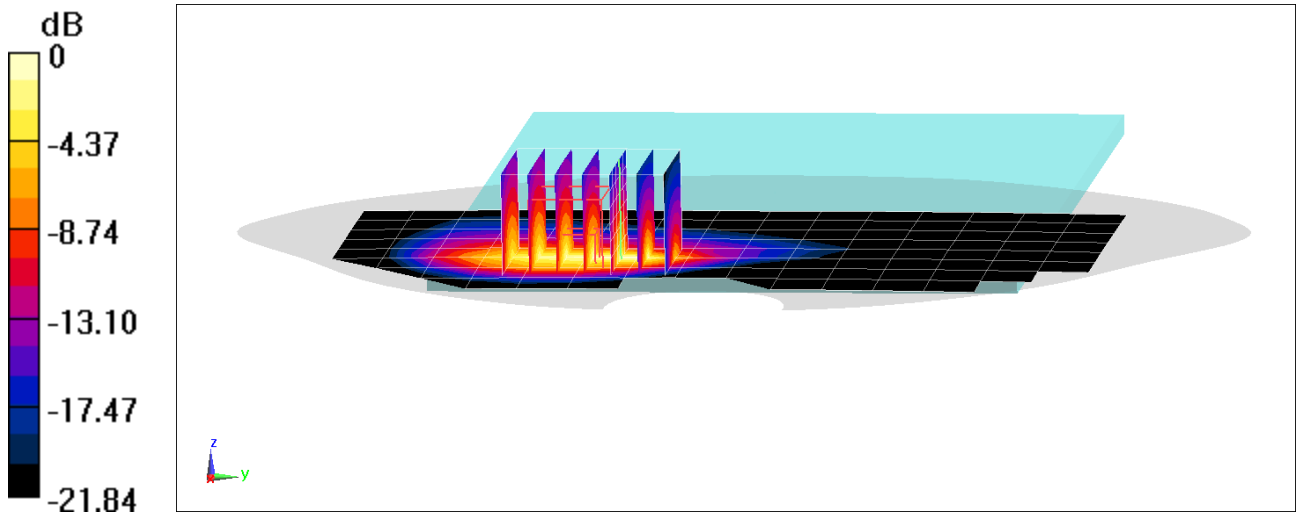
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 824.2 MHz; Duty Cycle: 1:4.15
Medium: 835 MHz Body Medium parameters used (interpolated):
f = 824.2 MHz; σ = 0.999 S/m; ε_r = 53.694; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-28-2019; Ambient Temp: 21.3°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7416; ConvF(9.4, 9.4, 9.4) @ 824.2 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2018
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CA; Serial: 1275
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 850 Antenna D, Body SAR, Back side, Low.ch, 2 Tx Slots

Area Scan (9x16x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (6x7x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.70 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 3.14 W/kg
SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.575 W/kg



0 dB = 2.26 W/kg = 3.54 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00HMLX0

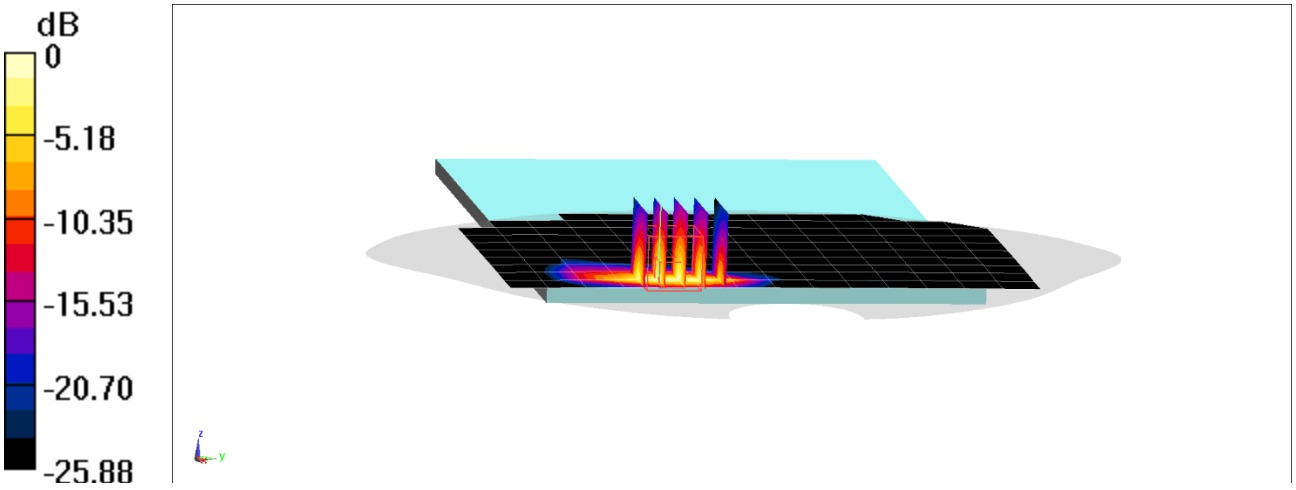
Communication System: UID 0, GSM GPRS; 2 Tx slots; Frequency: 1909.8 MHz; Duty Cycle: 1:4.15
Medium: 1900 MHz Body Medium parameters used:
f = 1910 MHz; σ = 1.572 S/m; ε_r = 52.448; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-28-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.2°C

Probe: EX3DV4 - SN7420; ConvF(7.7, 7.7, 7.7) @ 1909.8 MHz; Calibrated: 9/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1449; Calibrated: 11/12/2018
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1596
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: GPRS 1900 Antenna D, Body SAR, Back side, High.ch, 2 Tx Slots

Area Scan (11x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.50 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 2.19 W/kg
SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.437 W/kg



0 dB = 1.81 W/kg = 2.58 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00HMLX0

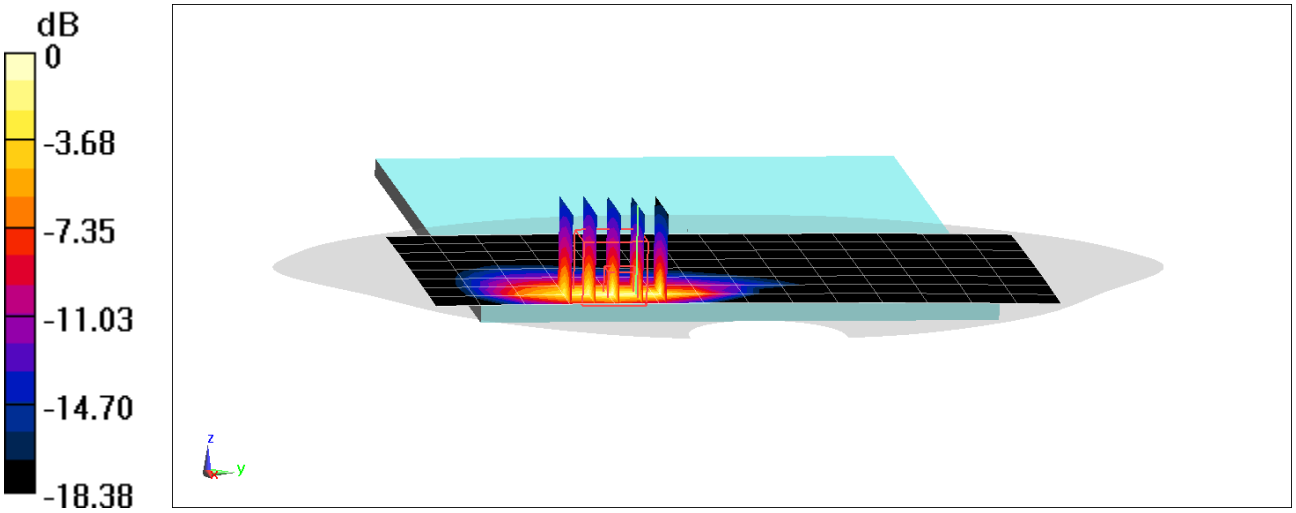
Communication System: UID 0, UMTS; Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium: 835 MHz Body Medium parameters used (interpolated):
f = 836.6 MHz; σ = 1.004 S/m; ε_r = 53.676; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-28-2019; Ambient Temp: 21.3°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7416; ConvF(9.4, 9.4, 9.4) @ 836.6 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2018
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CA; Serial: 1275
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 850 Antenna D, Body SAR, Back side, Mid.ch

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.46 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 2.97 W/kg
SAR(1 g) = 1.11 W/kg; SAR(10 g) = 0.549 W/kg



0 dB = 2.24 W/kg = 3.50 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00TMLX0

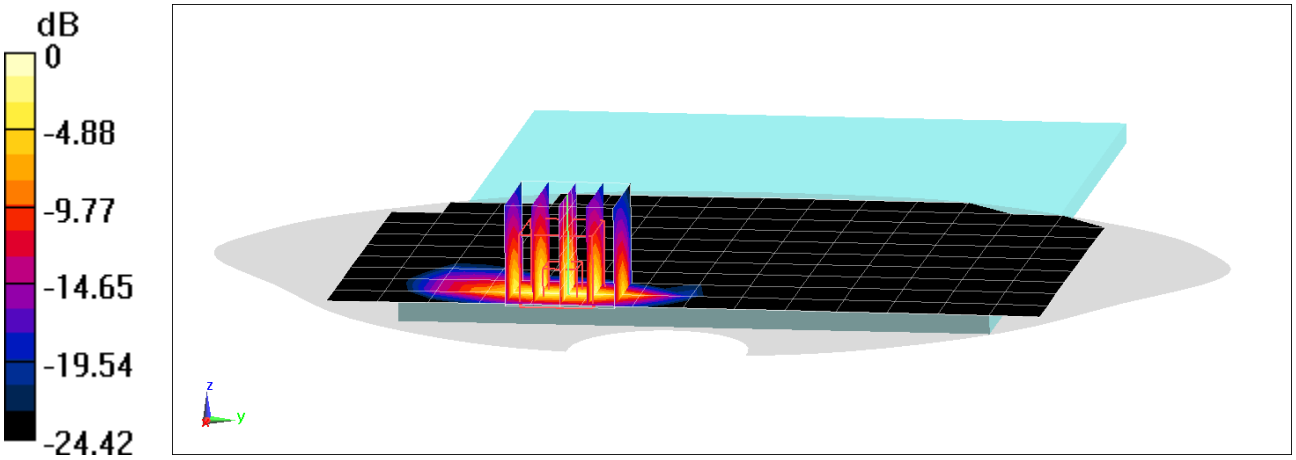
Communication System: UID 0, UMTS; Frequency: 1752.6 MHz; Duty Cycle: 1:1
Medium: 1750 MHz Body Medium parameters used (interpolated):
f = 1752.6 MHz; σ = 1.465 S/m; ε_r = 52.688; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-28-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.2°C

Probe: EX3DV4 - SN7420; ConvF(8.03, 8.03, 8.03) @ 1752.6 MHz; Calibrated: 9/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1449; Calibrated: 11/12/2018
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1596
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1750 Antenna D, Body SAR, Back side, High .ch

Area Scan (11x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.23 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 2.11 W/kg
SAR(1 g) = 0.995 W/kg; SAR(10 g) = 0.438 W/kg



0 dB = 1.67 W/kg = 2.23 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00HMLX0

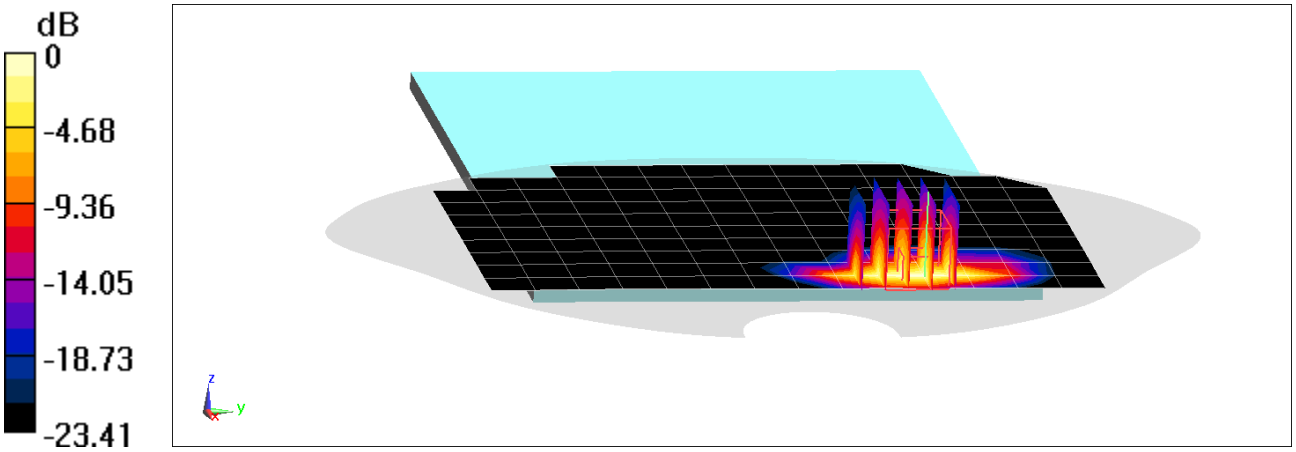
Communication System: UID 0, UMTS; Frequency: 1852.4 MHz; Duty Cycle: 1:1
Medium: 1900 MHz Body Medium parameters used (interpolated):
f = 1852.4 MHz; σ = 1.533 S/m; ε_r = 52.526; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-28-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.2°C

Probe: EX3DV4 - SN7420; ConvF(7.7, 7.7, 7.7) @ 1852.4 MHz; Calibrated: 9/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1449; Calibrated: 11/12/2018
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1596
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: UMTS 1900 Antenna C, Body SAR, Back side, Low.ch

Area Scan (11x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.80 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 2.43 W/kg
SAR(1 g) = 1.18 W/kg; SAR(10 g) = 0.541 W/kg



0 dB = 2.03 W/kg = 3.07 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00BMLX0

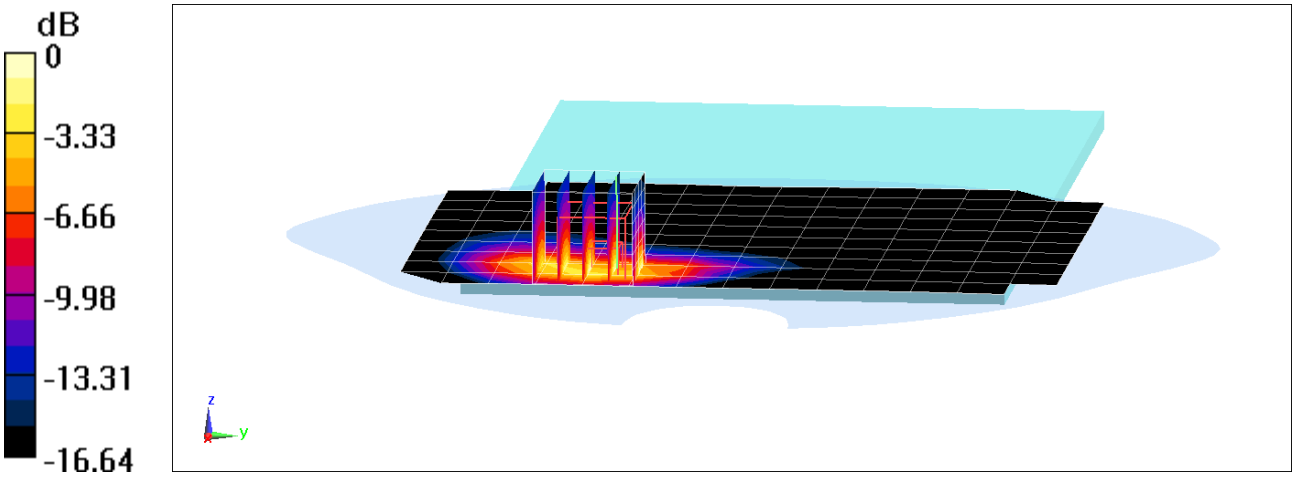
Communication System: UID 0, LTE Band 12; Frequency: 707.5 MHz; Duty Cycle: 1:1
Medium: 750 MHz Body Medium parameters used (interpolated):
f = 707.5 MHz; σ = 0.924 S/m; ε_r = 55.491; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-28-2019; Ambient Temp: 22.2°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN3837; ConvF(9.2, 9.2, 9.2) @ 707.5 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 12 Antenna D, Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (11x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 31.83 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 3.30 W/kg
SAR(1 g) = 1.13 W/kg; SAR(10 g) = 0.530 W/kg



0 dB = 1.77 W/kg = 2.48 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00BMLX0

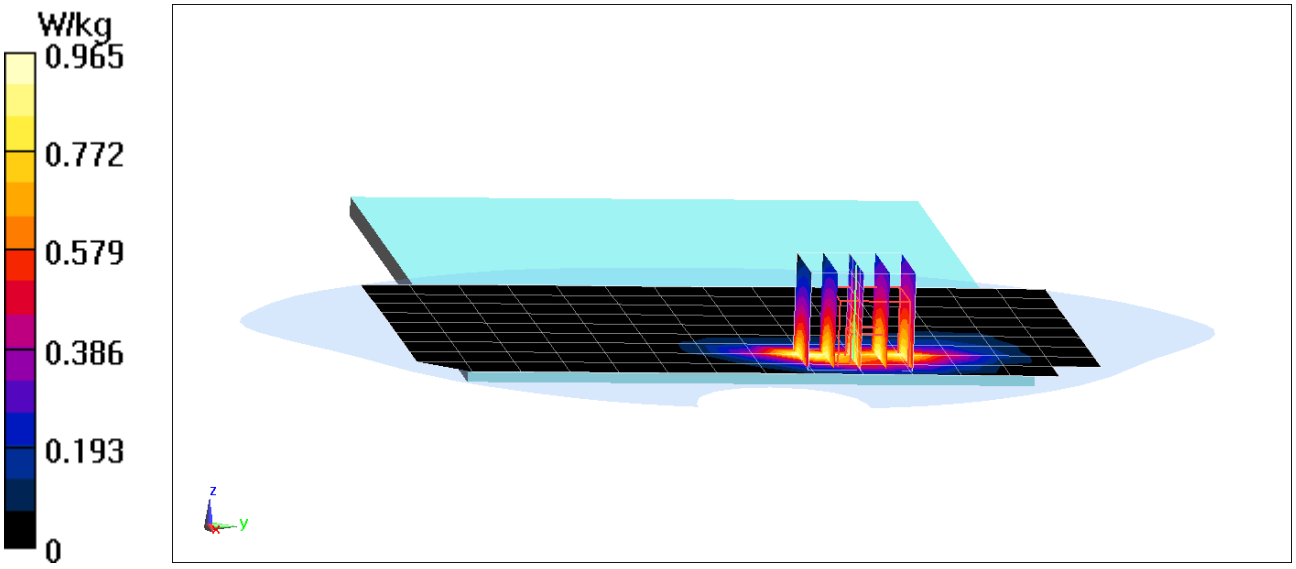
Communication System: UID 0, LTE Band 13; Frequency: 782 MHz; Duty Cycle: 1:1
Medium: 750 MHz Body Medium parameters used (interpolated):
$f = 782$ MHz; $\sigma = 0.952$ S/m; $\varepsilon_r = 55.338$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-28-2019; Ambient Temp: 22.2°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN3837; ConvF(9.2, 9.2, 9.2) @ 782 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 13 Antenna C, Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.59 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 2.38 W/kg
SAR(1 g) = 0.984 W/kg; SAR(10 g) = 0.483 W/kg



DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00BMLX0

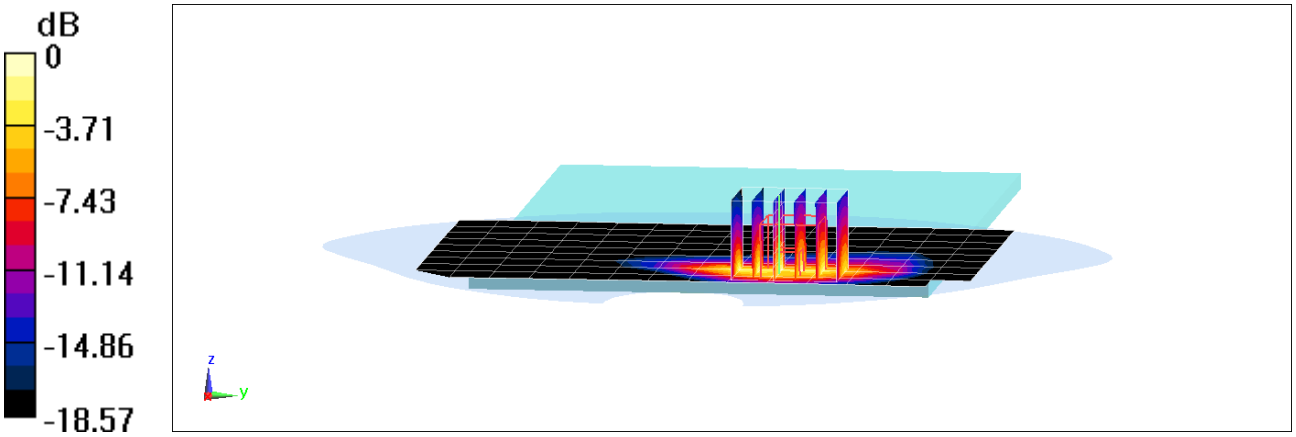
Communication System: UID 0, LTE Band 14; Frequency: 793 MHz; Duty Cycle: 1:1
Medium: 750 MHz Body Medium parameters used (interpolated):
f = 793 MHz; σ = 0.97 S/m; ε_r = 54.165; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-03-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3837; ConvF(9.2, 9.2, 9.2) @ 793 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 14 Antenna C, Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset

Area Scan (10x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 30.24 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 2.40 W/kg
SAR(1 g) = 0.940 W/kg; SAR(10 g) = 0.451 W/kg



0 dB = 1.51 W/kg = 1.79 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00HMLX0

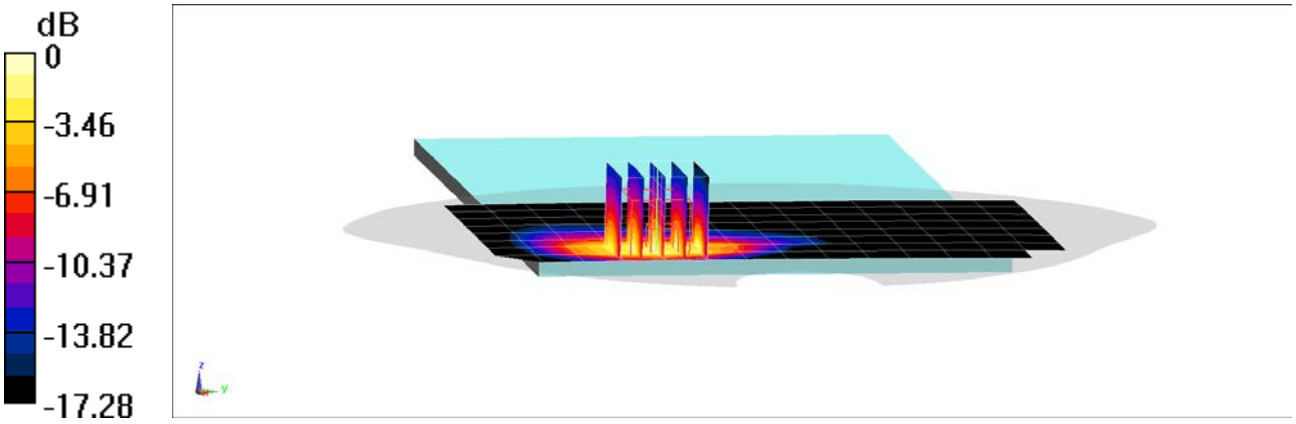
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: 835 MHz Body Medium parameters used (interpolated):
$f = 836.5$ MHz; $\sigma = 1.004$ S/m; $\varepsilon_r = 53.676$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-28-2019; Ambient Temp: 21.3°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7416; ConvF(9.4, 9.4, 9.4) @ 836.5 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2018
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CA; Serial: 1275
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 5 (Cell.) Antenna D, Body SAR, Back side, Mid.ch, 10 MHz Bandwidth, QPSK, 25 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 36.39 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 2.91 W/kg
SAR(1 g) = 1.15 W/kg; SAR(10 g) = 0.581 W/kg



0 dB = 1.93 W/kg = 2.86 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00HMLX0

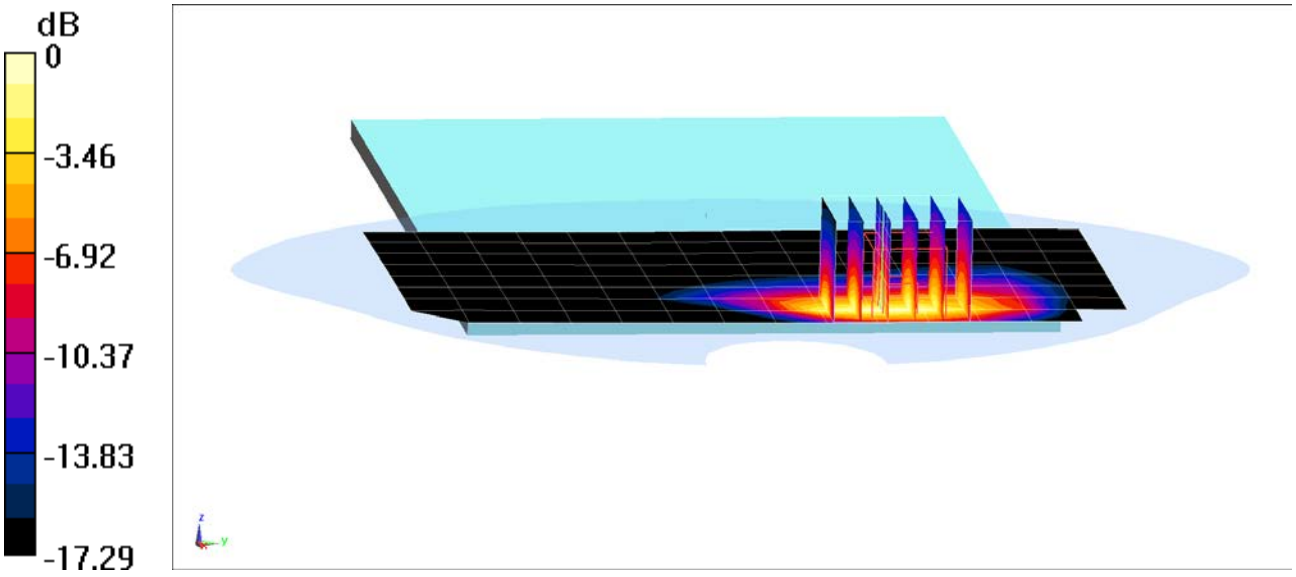
Communication System: UID 0, _LTE Band 26; Frequency: 819 MHz; Duty Cycle: 1:1
Medium: 835 MHz Body Medium parameters used (interpolated):
f = 819 MHz; σ = 0.93 S/m; ε_r = 53.19; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-28-2019; Ambient Temp: 23.1°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7427; ConvF(10.18, 10.18, 10.18) @ 819 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1403; Calibrated: 2/13/2019
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 26 (Cell.) Antenna C, Body SAR, Back side, Low.ch, 10 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 37.12 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 2.61 W/kg
SAR(1 g) = 1.17 W/kg; SAR(10 g) = 0.602 W/kg



0 dB = 2.06 W/kg = 3.14 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00BMLX0

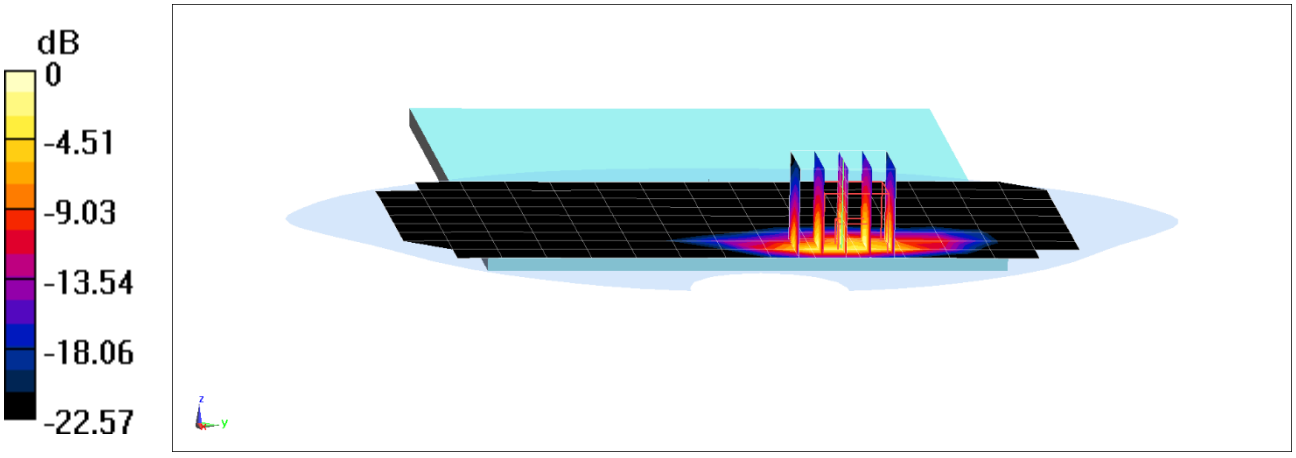
Communication System: UID 0, _LTE Band 66 (AWS); Frequency: 1720 MHz; Duty Cycle: 1:1
Medium: 1750 MHz Body Medium parameters used (interpolated):
$f = 1720$ MHz; $\sigma = 1.44$ S/m; $\varepsilon_r = 52.866$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-24-2019; Ambient Temp: 21.0°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN7420; ConvF(8.03, 8.03, 8.03) @ 1720 MHz; Calibrated: 9/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1449; Calibrated: 11/12/2018
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1596
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 66 (AWS) Antenna C, Body SAR, Back side, Low.ch, 20 MHz Bandwidth, QPSK, 1 RB, 0 RB Offset

Area Scan (9x10x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 29.42 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 2.24 W/kg
SAR(1 g) = 1.09 W/kg; SAR(10 g) = 0.519 W/kg



0 dB = 1.87 W/kg = 2.72 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00TMLX0

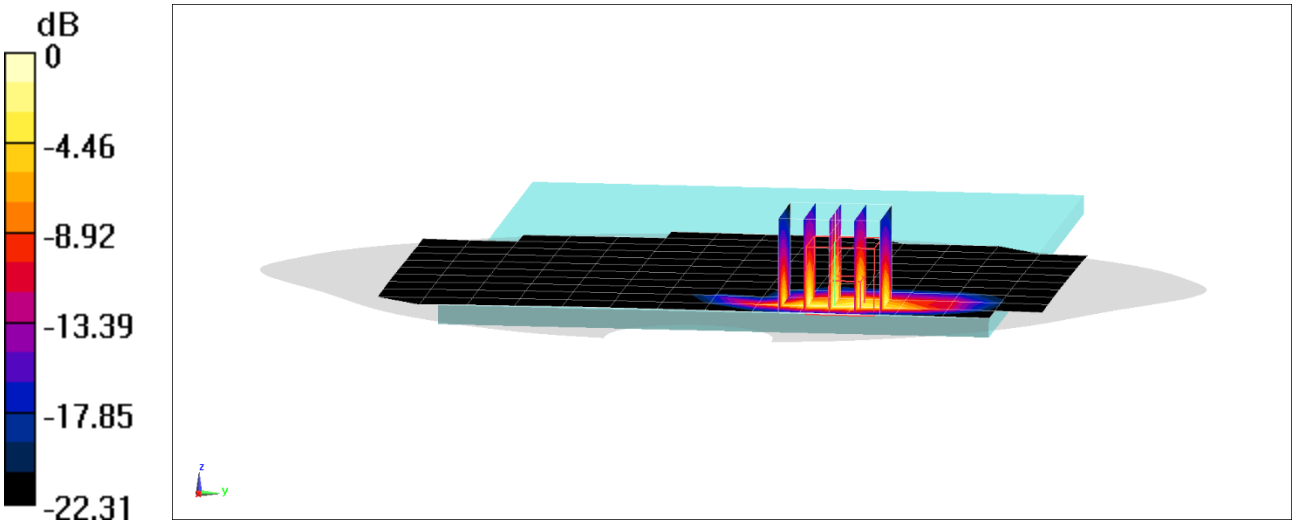
Communication System: UID 0, LTE Band 25 (PCS); Frequency: 1882.5 MHz; Duty Cycle: 1:1
Medium: 1900 MHz Body Medium parameters used (interpolated):
f = 1882.5 MHz; σ = 1.554 S/m; ε_r = 52.479; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-28-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.2°C

Probe: EX3DV4 - SN7420; ConvF(7.7, 7.7, 7.7) @ 1882.5 MHz; Calibrated: 9/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1449; Calibrated: 11/12/2018
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1596
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 25 (PCS) Antenna C, Body SAR, Back side, Mid.ch, 20 MHz Bandwidth, QPSK, 50 RB, 50 RB Offset

Area Scan (12x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 28.53 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 2.29 W/kg
SAR(1 g) = 1.11 W/kg; SAR(10 g) = 0.512 W/kg



0 dB = 1.86 W/kg = 2.70 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00HMLX0

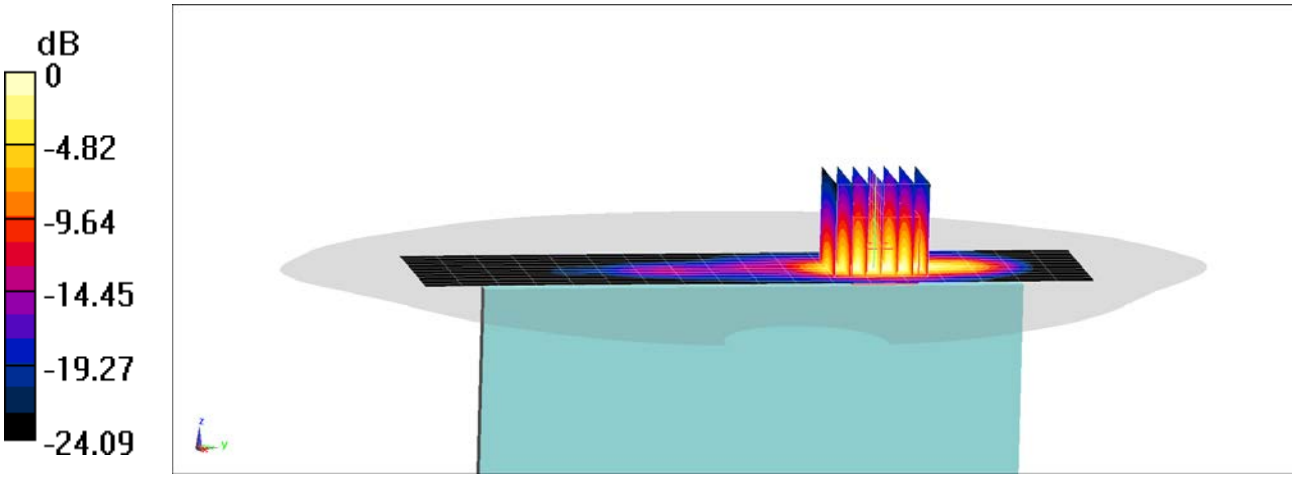
Communication System: UID 0, _LTE Band 30; Frequency: 2310 MHz; Duty Cycle: 1:1
Medium: 2300 MHz Body Medium parameters used:
f = 2310 MHz; σ = 1.892 S/m; ε_r = 51.979; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-03-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3837; ConvF(7.44, 7.44, 7.44) @ 2310 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 30 Antenna C, Body SAR, Top Edge, Mid.ch,
10 MHz Bandwidth, QPSK, 50 RB, 0 RB Offset

Area Scan (11x16x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.01 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 2.13 W/kg
SAR(1 g) = 0.899 W/kg; SAR(10 g) = 0.385 W/kg



0 dB = 1.50 W/kg = 1.76 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00TMLX0

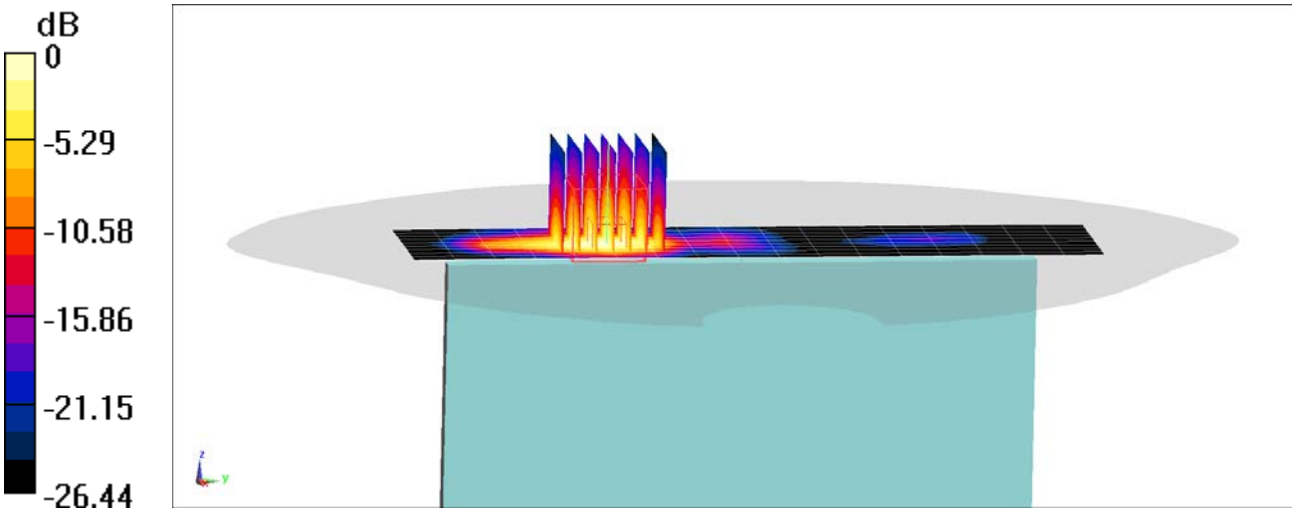
Communication System: UID 0, LTE Band 7; Frequency: 2560 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used (interpolated):
$f = 2560$ MHz; $\sigma = 2.128$ S/m; $\varepsilon_r = 51.021$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-28-2019; Ambient Temp: 21.4°C; Tissue Temp: 20.0°C

Probe: ES3DV3 - SN3318; ConvF(4.32, 4.32, 4.32) @ 2560 MHz; Calibrated: 11/19/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 8/14/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 7 Antenna D, Body SAR, Top Edge, High.ch, 20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (10x18x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.34 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 2.24 W/kg
SAR(1 g) = 0.982 W/kg; SAR(10 g) = 0.403 W/kg



0 dB = 1.33 W/kg = 1.24 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00HMLX0

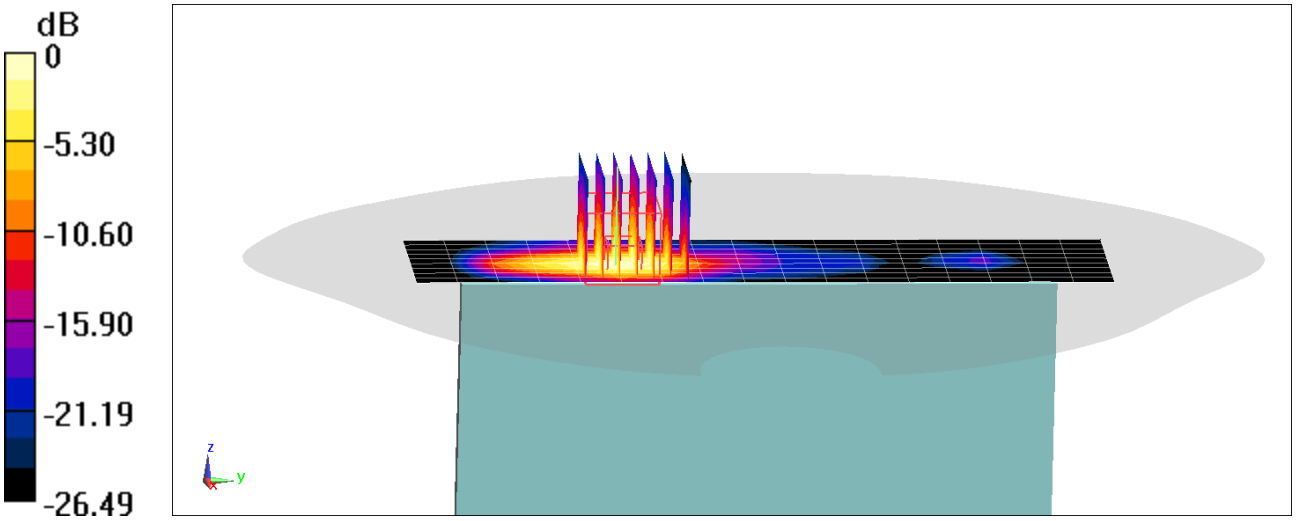
Communication System: UID 0, _LTE Band 41; Frequency: 2549.5 MHz; Duty Cycle: 1:1.58
Medium: 2450 MHz Body Medium parameters used;
f = 2550 MHz; σ = 2.109 S/m; ε_r = 50.474; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-30-2019; Ambient Temp: 21.4°C; Tissue Temp: 20.4°C

Probe: ES3DV3 - SN3318; ConvF(4.32, 4.32, 4.32) @ 2549.5 MHz; Calibrated: 11/19/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 8/14/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: LTE Band 41 Antenna D, Body SAR, Top Edge, Low-Mid.ch, 20 MHz Bandwidth, QPSK, 1 RB, 99 RB Offset

Area Scan (10x18x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 24.97 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.59 W/kg
SAR(1 g) = 1.14 W/kg; SAR(10 g) = 0.464 W/kg



0 dB = 1.53 W/kg = 1.85 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00LMLX0

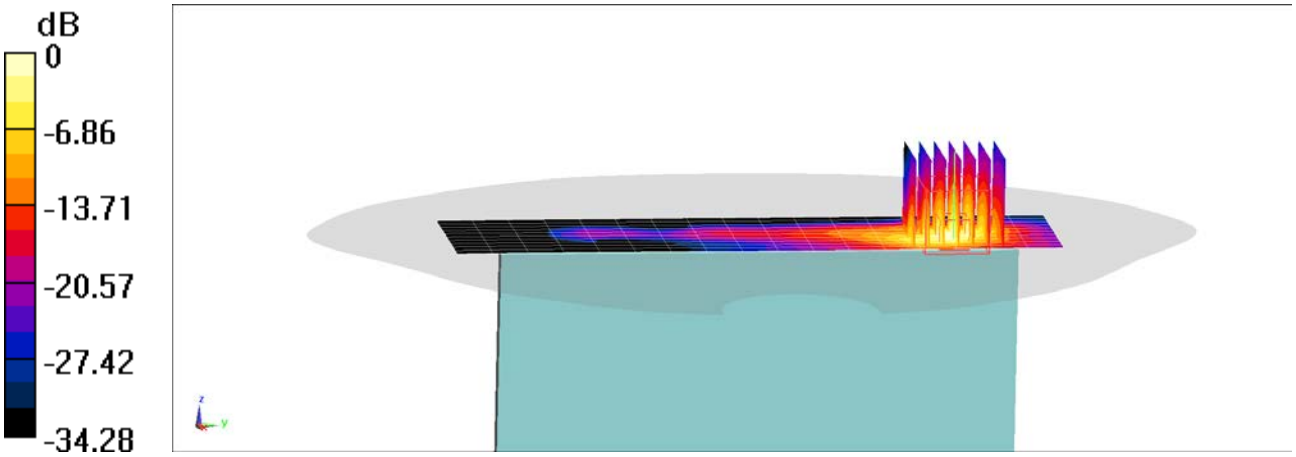
Communication System: UID 0, _IEEE 802.11b; Frequency: 2437 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used (interpolated):
$f = 2437$ MHz; $\sigma = 2.013$ S/m; $\varepsilon_r = 50.739$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 06-05-2019; Ambient Temp: 19.9°C; Tissue Temp: 20.8°C

Probe: ES3DV3 - SN3318; ConvF(4.49, 4.49, 4.49) @ 2437 MHz; Calibrated: 11/19/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 8/14/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11b, Antenna A, Variant 2, 22 MHz Bandwidth, Body SAR, Ch 6, 1 Mbps, Bottom Edge

Area Scan (11x18x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.25 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 2.86 W/kg
SAR(1 g) = 0.866 W/kg; SAR(10 g) = 0.277 W/kg



0 dB = 1.31 W/kg = 1.17 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYM000MLX1

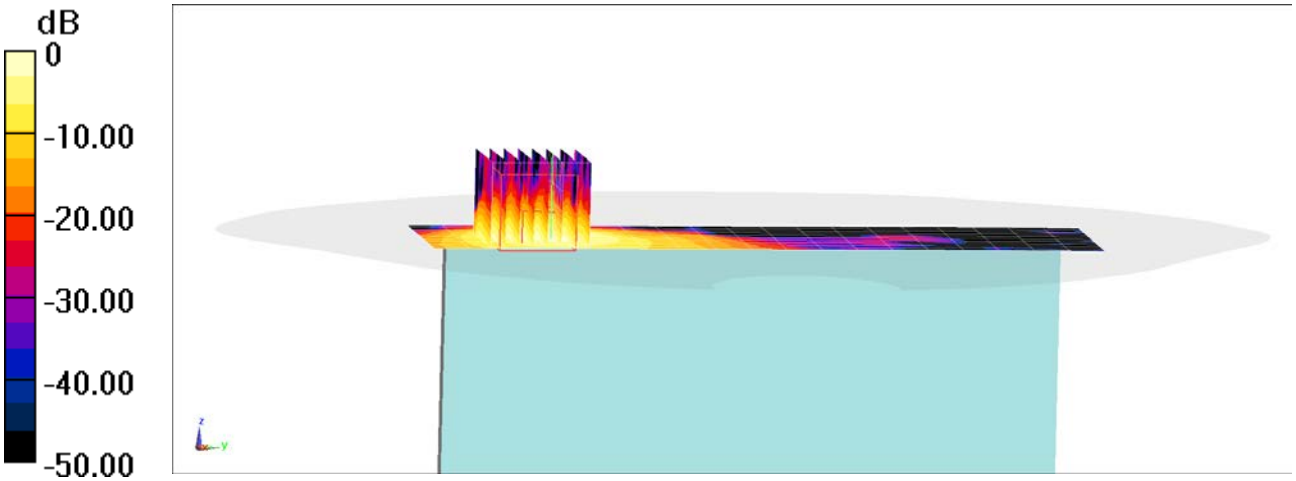
Communication System: UID 0, _IEEE 802.11ac; Frequency: 5610 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5610 MHz; σ = 5.853 S/m; ε_r = 46.191; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-20-2019; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3837; ConvF(4.08, 4.08, 4.08) @ 5610 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: IEEE 802.11ac, U-NII-2C, Antenna B, Variant 1, 80 MHz Bandwidth, Body SAR, Ch 122, 29.3 Mbps, Bottom Edge

Area Scan (10x10x1): Measurement grid: dx=5mm, dy=10mm
Zoom Scan (9x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Reference Value = 13.00 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 4.39 W/kg
SAR(1 g) = 0.945 W/kg; SAR(10 g) = 0.332 W/kg



0 dB = 2.32 W/kg = 3.65 dBW/kg

DUT: BCGA2198; Type: Tablet Device; Serial: F9FYL00LMLX0

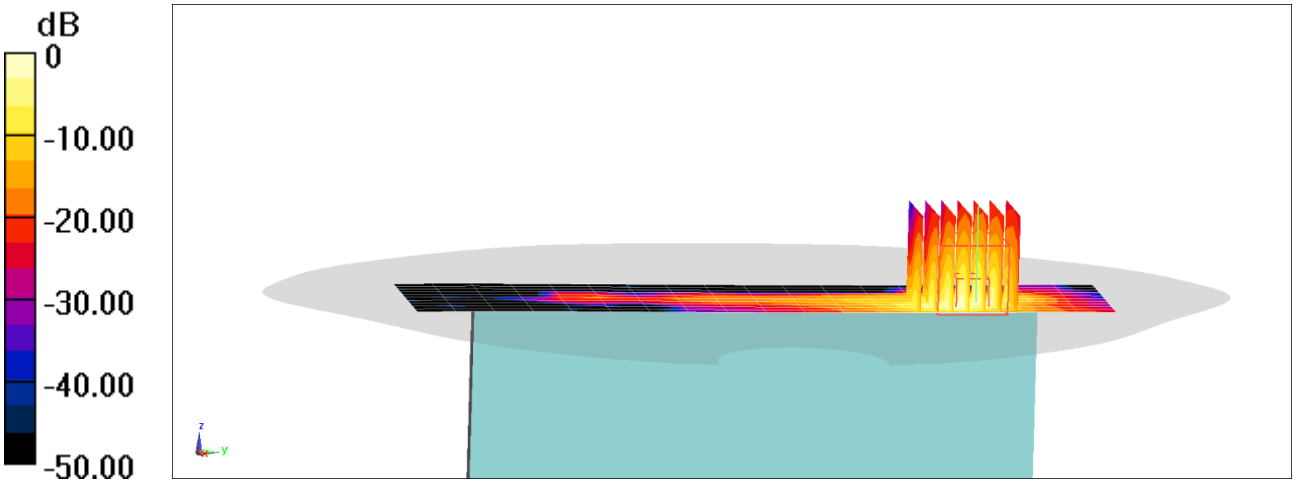
Communication System: UID 0, Bluetooth; Frequency: 2402 MHz; Duty Cycle: 1:1.292
Medium: 2450 MHz Body Medium parameters used (interpolated):
f = 2402 MHz; σ = 1.994 S/m; ε_r = 51.831; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 0.0 cm

Test Date: 05-21-2019; Ambient Temp: 20.6°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN7421; ConvF(7.46, 7.46, 7.46) @ 2402 MHz; Calibrated: 3/18/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn604; Calibrated: 3/13/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CD; Serial: 1736
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

Mode: Bluetooth, Antenna A, Variant 2, Body SAR, Ch 0, 1 Mbps, Bottom Edge

Area Scan (11x19x1): Measurement grid: dx=5mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.33 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.87 W/kg
SAR(1 g) = 0.931 W/kg; SAR(10 g) = 0.311 W/kg



0 dB = 1.88 W/kg = 2.74 dBW/kg

APPENDIX B: SYSTEM VERIFICATION

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1097

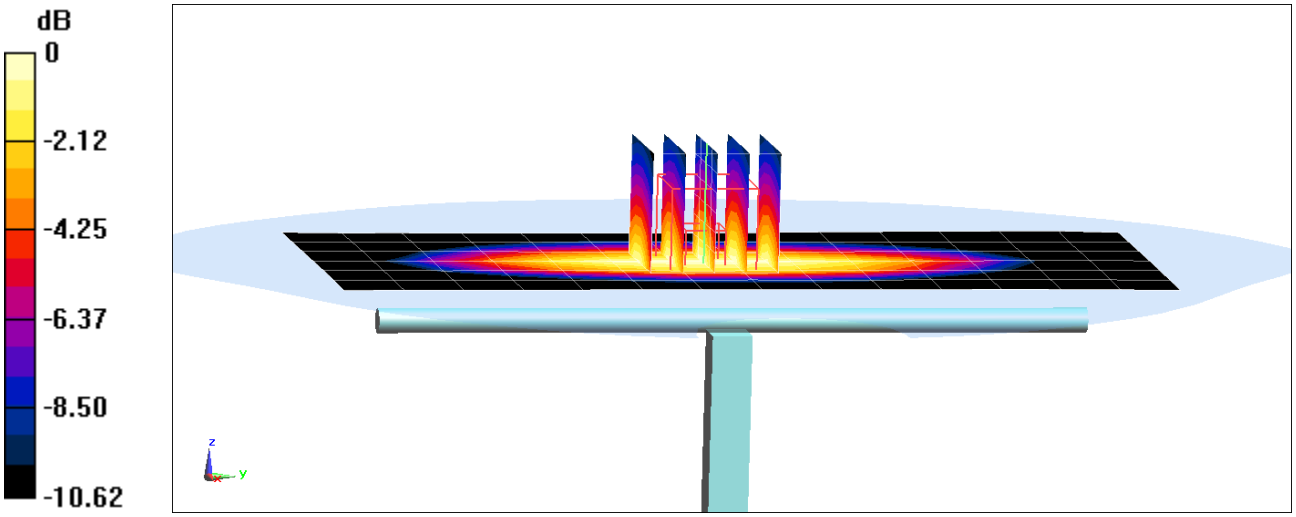
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 MHz Body Medium parameters used (interpolated):
f = 750 MHz; σ = 0.94 S/m; ε_r = 55.409; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 05-28-2019; Ambient Temp: 22.2°C; Tissue Temp: 20.8°C

Probe: EX3DV4 - SN3837; ConvF(9.2, 9.2, 9.2) @ 750 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

750 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.90 W/kg
SAR(1 g) = 1.84 W/kg; SAR(10 g) = 1.19 W/kg
Deviation(1 g) = 7.48%; Deviation(10 g) = 4.75%



0 dB = 2.44 W/kg = 3.87 dBW/kg

DUT: Dipole 750 MHz; Type: D750V3; Serial: 1097

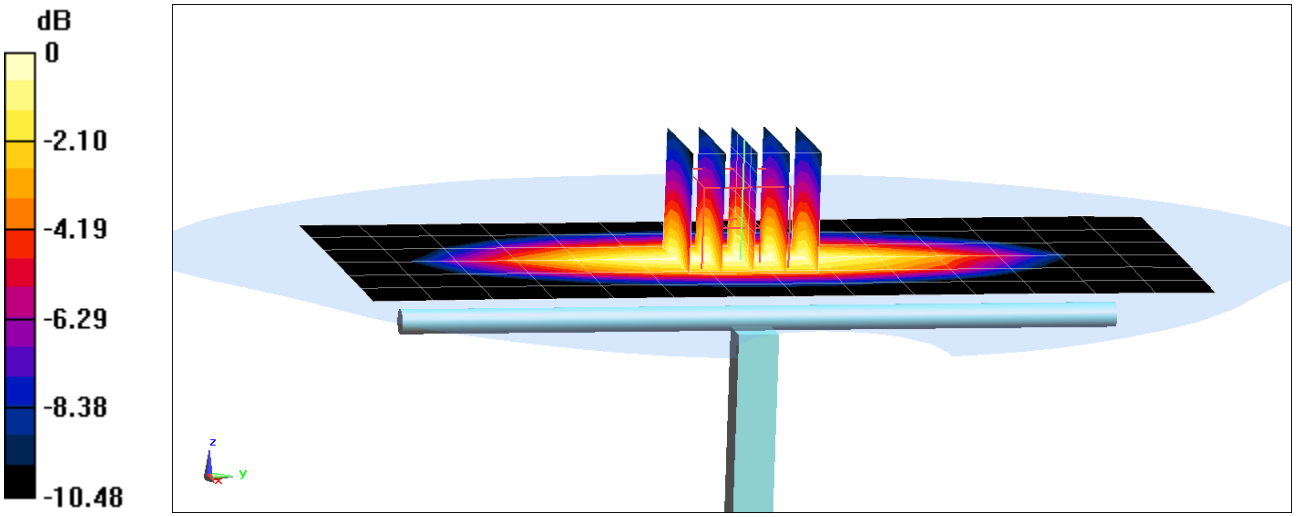
Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium: 750 MHz Body Medium parameters used (interpolated):
f = 750 MHz; σ = 0.955 S/m; ε_r = 54.242; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 06-03-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3837; ConvF(9.2, 9.2, 9.2) @ 750 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

750 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x15x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.74 W/kg
SAR(1 g) = 1.8 W/kg; SAR(10 g) = 1.18 W/kg
Deviation(1 g) = 5.14%; Deviation(10 g) = 3.87%



0 dB = 2.39 W/kg = 3.78 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d040

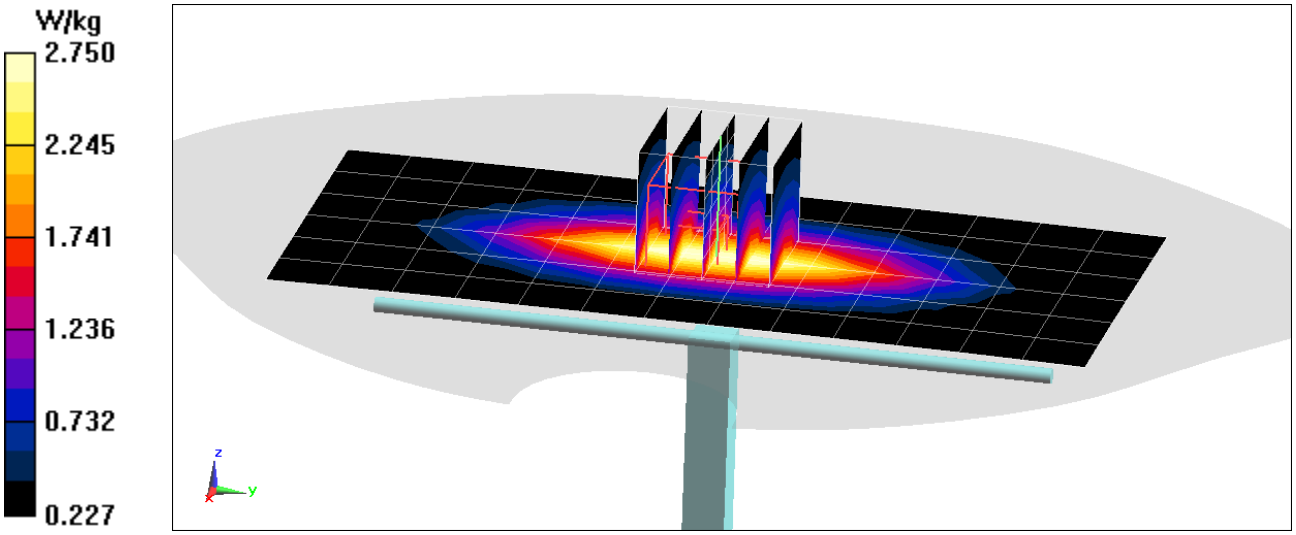
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 MHz Body Medium parameters used:
f = 835 MHz; σ = 1.003 S/m; ε_r = 53.678; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 05-28-2019; Ambient Temp: 21.3°C; Tissue Temp: 20.1°C

Probe: EX3DV4 - SN7416; ConvF(9.4, 9.4, 9.4) @ 835 MHz; Calibrated: 7/20/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1402; Calibrated: 7/10/2018
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CA; Serial: 1275
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 3.14 W/kg
SAR(1 g) = 2.04 W/kg; SAR(10 g) = 1.33 W/kg
Deviation(1 g) = 6.69%; Deviation(10 g) = 5.89%



PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 835 MHz; Type: D835V2; Serial: 4d040

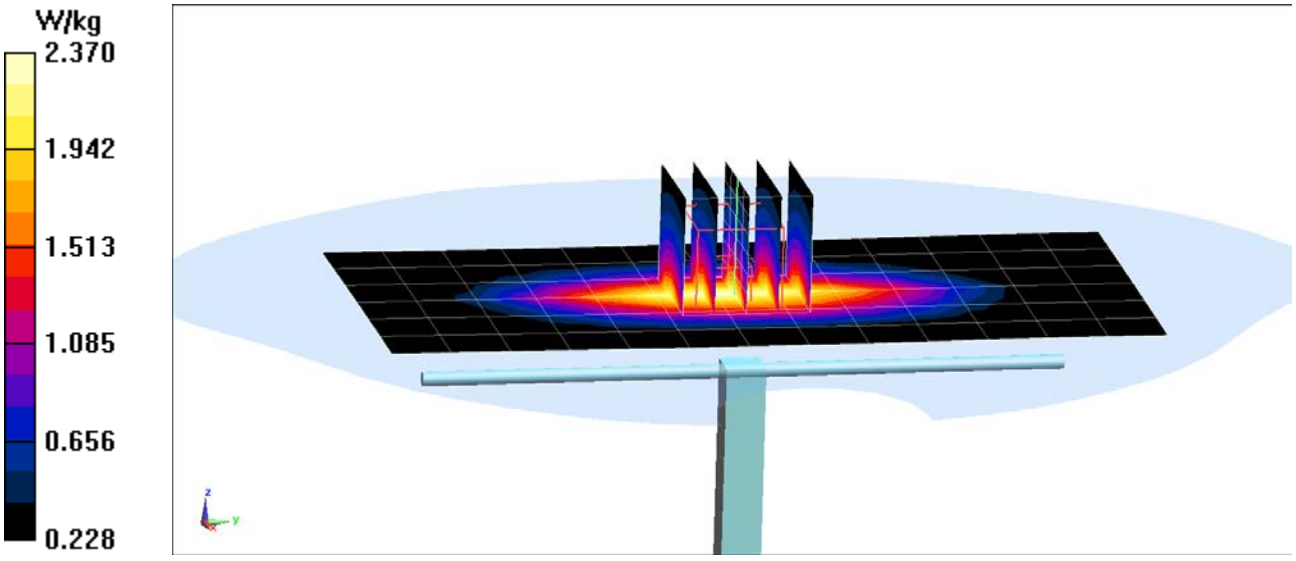
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium: 835 MHz Body Medium parameters used:
f = 835 MHz; σ = 0.936 S/m; ε_r = 53.155; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.5 cm

Test Date: 05-28-2019; Ambient Temp: 23.1°C; Tissue Temp: 21.0°C

Probe: EX3DV4 - SN7427; ConvF(10.18, 10.18, 10.18) @ 835 MHz; Calibrated: 2/19/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1403; Calibrated: 2/13/2019
Phantom: SAM Main; Type: SAM 4.0; Serial: TP-1406
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

835 MHz System Verification at 23.0 dBm (200 mW)

Area Scan (7x14x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 2.68 W/kg
SAR(1 g) = 1.8 W/kg; SAR(10 g) = 1.19 W/kg
Deviation(1 g) = -5.86%; Deviation(10 g) = -5.25%



DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1104

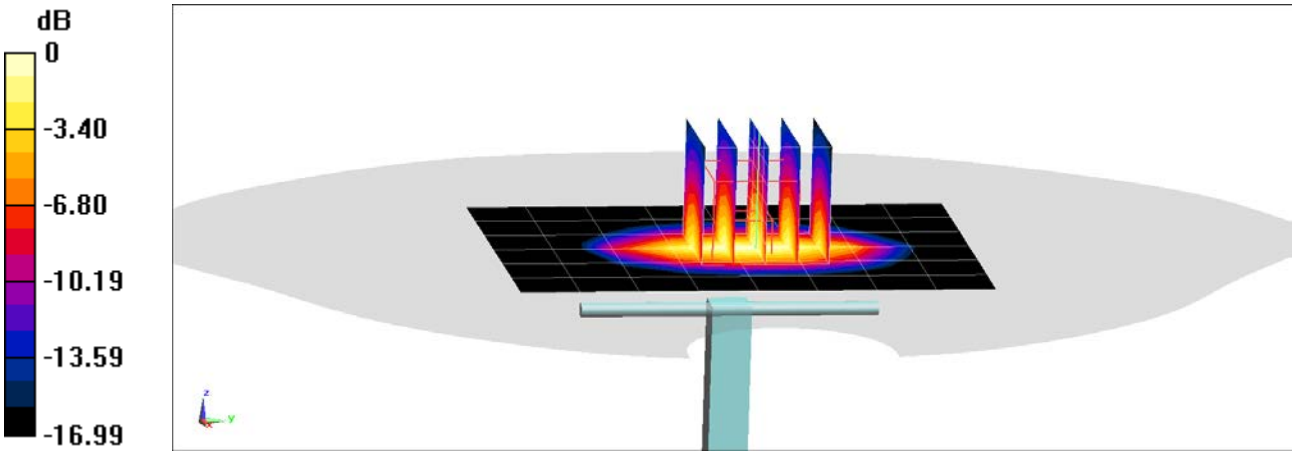
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 MHz Body Medium parameters used:
f = 1750 MHz; σ = 1.461 S/m; ε_r = 52.823; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-24-2019; Ambient Temp: 21.0°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN7420; ConvF(8.03, 8.03, 8.03) @ 1750 MHz; Calibrated: 9/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1449; Calibrated: 11/12/2018
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1596
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.01 W/kg
SAR(1 g) = 3.88 W/kg; SAR(10 g) = 2.06 W/kg
Deviation(1 g) = 6.01%; Deviation(10 g) = 5.10%



0 dB = 5.95 W/kg = 7.75 dBW/kg

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: 1104

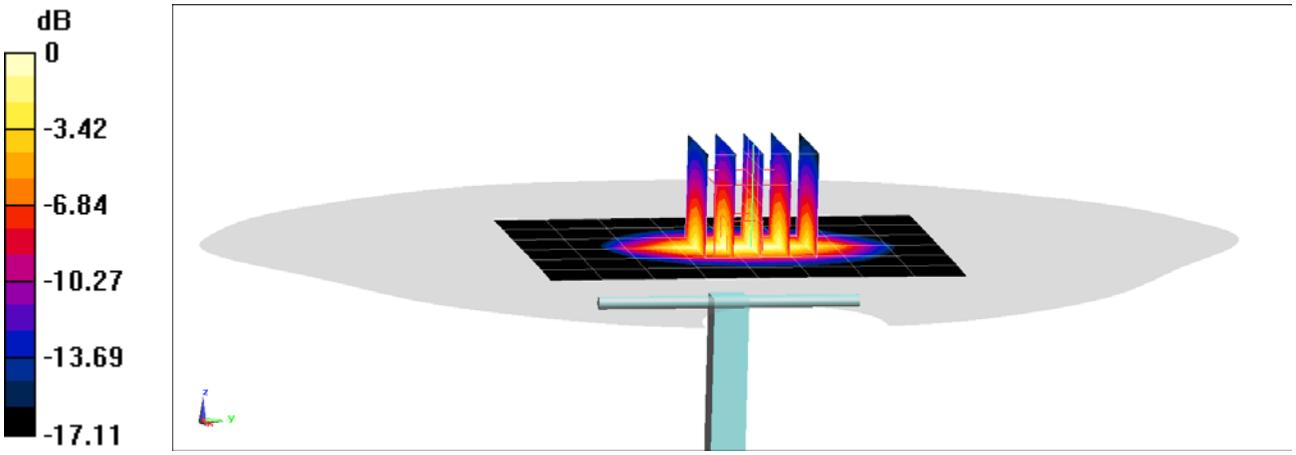
Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1
Medium: 1750 MHz Body Medium parameters used:
f = 1750 MHz; σ = 1.463 S/m; ε_r = 52.692; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.2°C

Probe: EX3DV4 - SN7420; ConvF(8.03, 8.03, 8.03) @ 1750 MHz; Calibrated: 9/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1449; Calibrated: 11/12/2018
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1596
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1750 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x9x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 7.11 W/kg
SAR(1 g) = 3.91 W/kg; SAR(10 g) = 2.07 W/kg
Deviation(1 g) = 6.83%; Deviation(10 g) = 5.61%



0 dB = 5.99 W/kg = 7.77 dBW/kg

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: 5d181

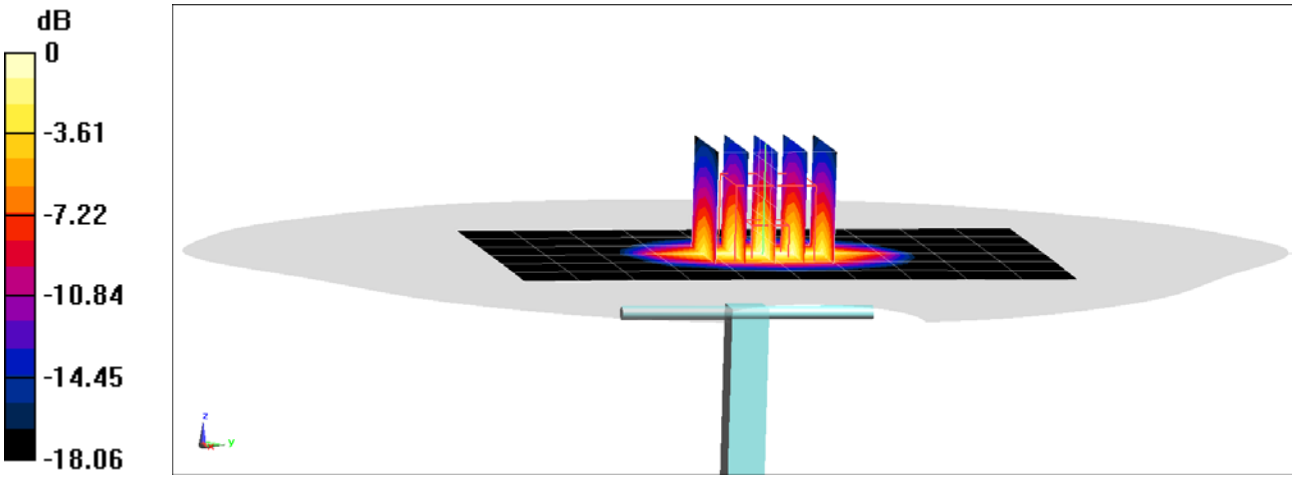
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium: 1900 MHz Body Medium parameters used (interpolated):
f = 1900 MHz; σ = 1.565 S/m; ε_r = 52.459; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.2°C

Probe: EX3DV4 - SN7420; ConvF(7.7, 7.7, 7.7) @ 1900 MHz; Calibrated: 9/18/2018
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1449; Calibrated: 11/12/2018
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CC; Serial: 1596
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

1900 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Peak SAR (extrapolated) = 6.84 W/kg
SAR(1 g) = 3.76 W/kg; SAR(10 g) = 1.95 W/kg
Deviation(1 g) = -4.81%; Deviation(10 g) = -6.70%



0 dB = 5.79 W/kg = 7.63 dBW/kg

DUT: Dipole 2300 MHz; Type: D2300V3; Serial: 1038

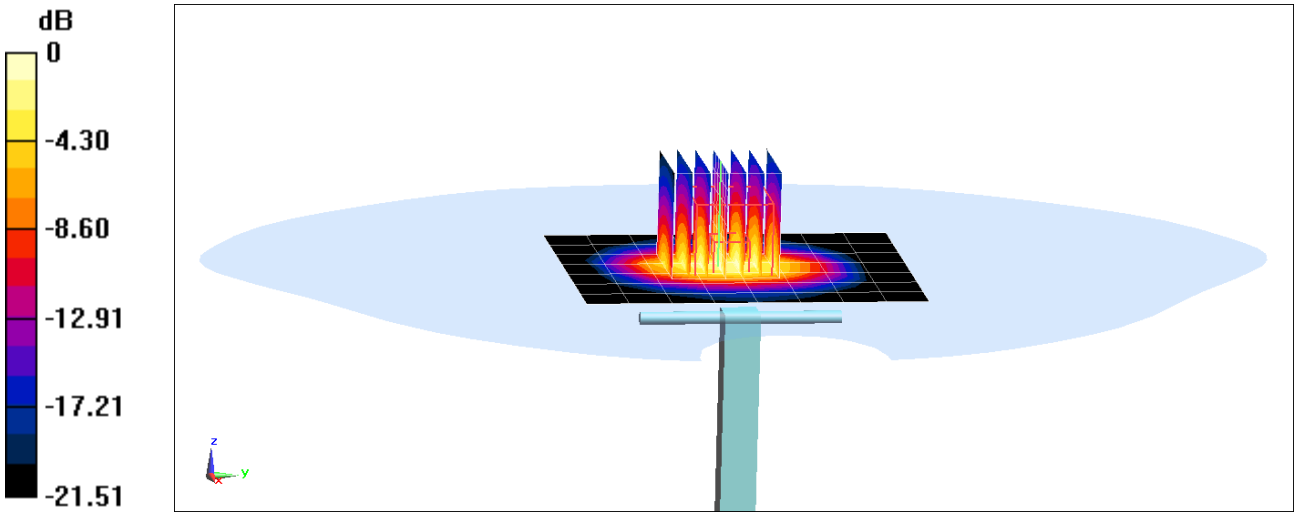
Communication System: UID 0, CW; Frequency: 2300 MHz; Duty Cycle: 1:1
Medium: 2300 MHz Body Medium parameters used:
f = 2300 MHz; σ = 1.884 S/m; ε_r = 51.991; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-03-2019; Ambient Temp: 20.9°C; Tissue Temp: 20.5°C

Probe: EX3DV4 - SN3837; ConvF(7.44, 7.44, 7.44) @ 2300 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2300 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 10.1 W/kg
SAR(1 g) = 4.79 W/kg; SAR(10 g) = 2.23 W/kg
Deviation(1 g) = 2.57%; Deviation(10 g) = -0.89%



0 dB = 7.67 W/kg = 8.85 dBW/kg

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 921

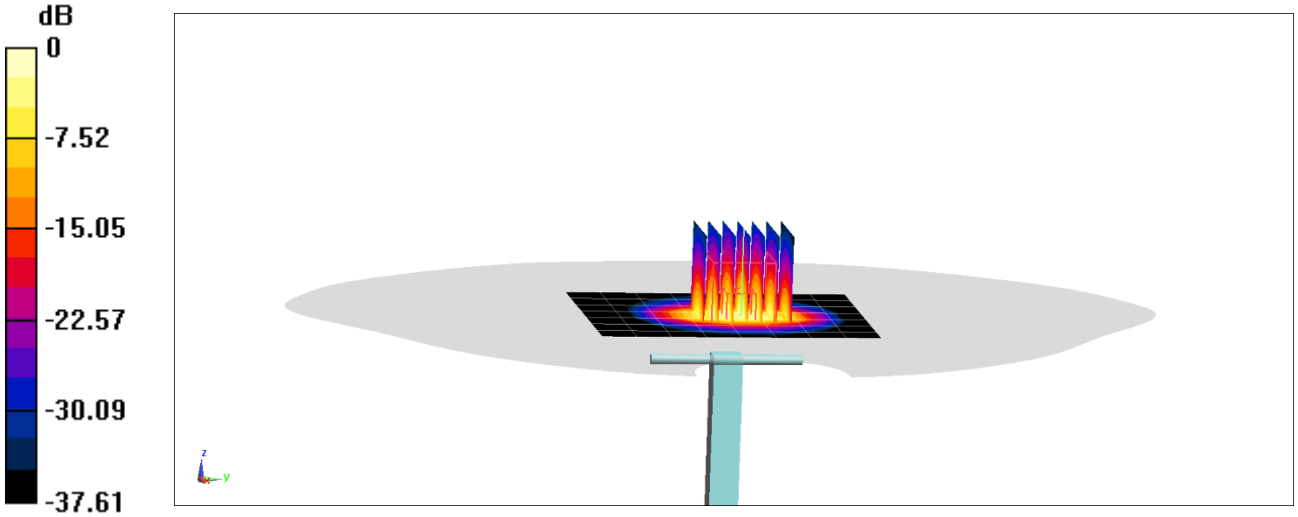
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2450 MHz; σ = 2.037 S/m; ε_r = 51.753; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-21-2019; Ambient Temp: 20.6°C; Tissue Temp: 21.7°C

Probe: EX3DV4 - SN7421; ConvF(7.46, 7.46, 7.46) @ 2450 MHz; Calibrated: 3/18/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn604; Calibrated: 3/13/2019
Phantom: Twin-SAM V4.0; Type: QD 000 P40 CD; Serial: 1736
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.0 W/kg
SAR(1 g) = 5.19 W/kg; SAR(10 g) = 2.39 W/kg
Deviation(1 g) = 2.17%; Deviation(10 g) = 0.42%



0 dB = 6.05 W/kg = 7.82 dBW/kg

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 921

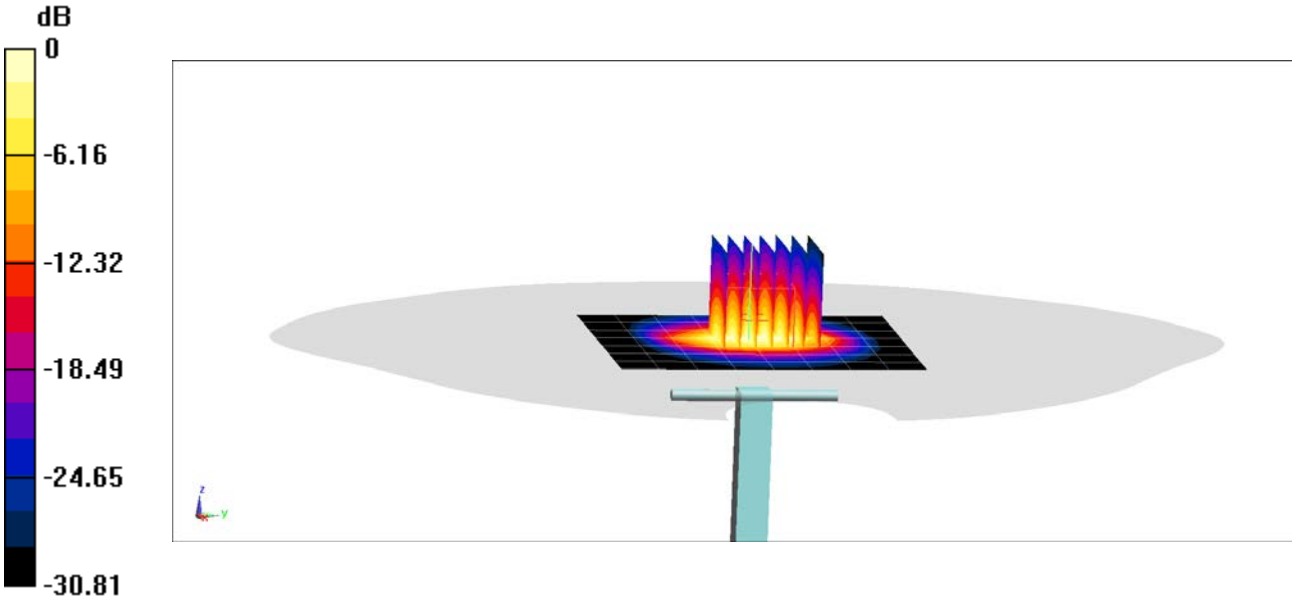
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2450 MHz; σ = 2.028 S/m; ε_r = 51.2; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2019; Ambient Temp: 21.4°C; Tissue Temp: 20.0°C

Probe: ES3DV3 - SN3318; ConvF(4.49, 4.49, 4.49) @ 2450 MHz; Calibrated: 11/19/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 8/14/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.7 W/kg
SAR(1 g) = 5.41 W/kg; SAR(10 g) = 2.47 W/kg
Deviation(1 g) = 6.5%; Deviation(10 g) = 3.78%



0 dB = 7.43 W/kg = 8.71 dBW/kg

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 921

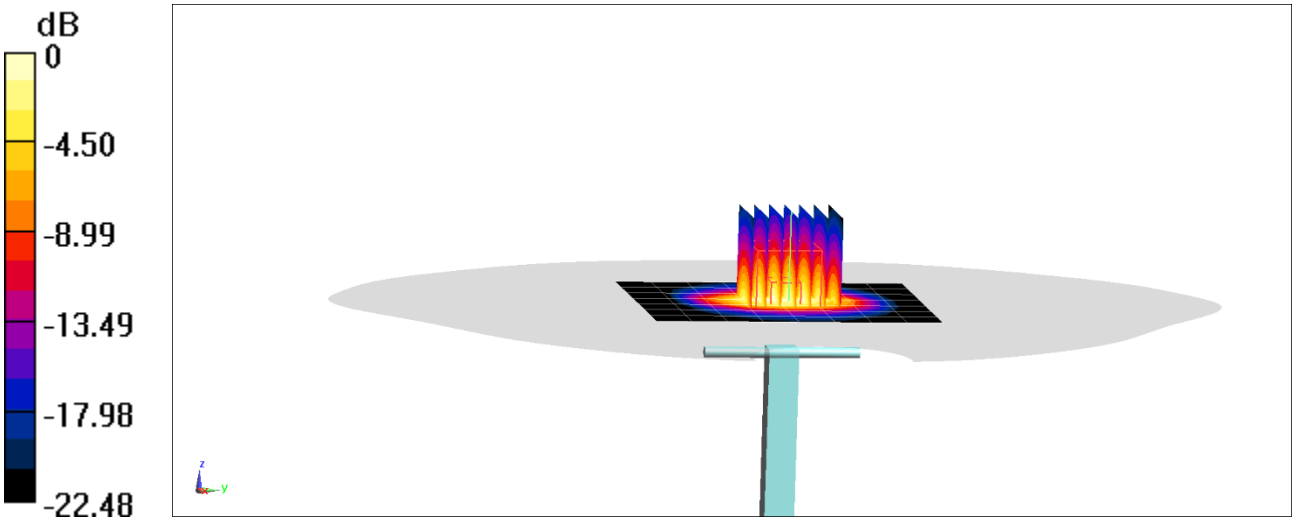
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2450 MHz; σ = 2.022 S/m; ε_r = 50.616; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2019; Ambient Temp: 21.4°C; Tissue Temp: 20.4°C

Probe: ES3DV3 - SN3318; ConvF(4.49, 4.49, 4.49) @ 2450 MHz; Calibrated: 11/19/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 8/14/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.5 W/kg
SAR(1 g) = 5.29 W/kg; SAR(10 g) = 2.4 W/kg
Deviation(1 g) = 4.13%; Deviation(10 g) = 0.84%



0 dB = 6.98 W/kg = 8.44 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: 921

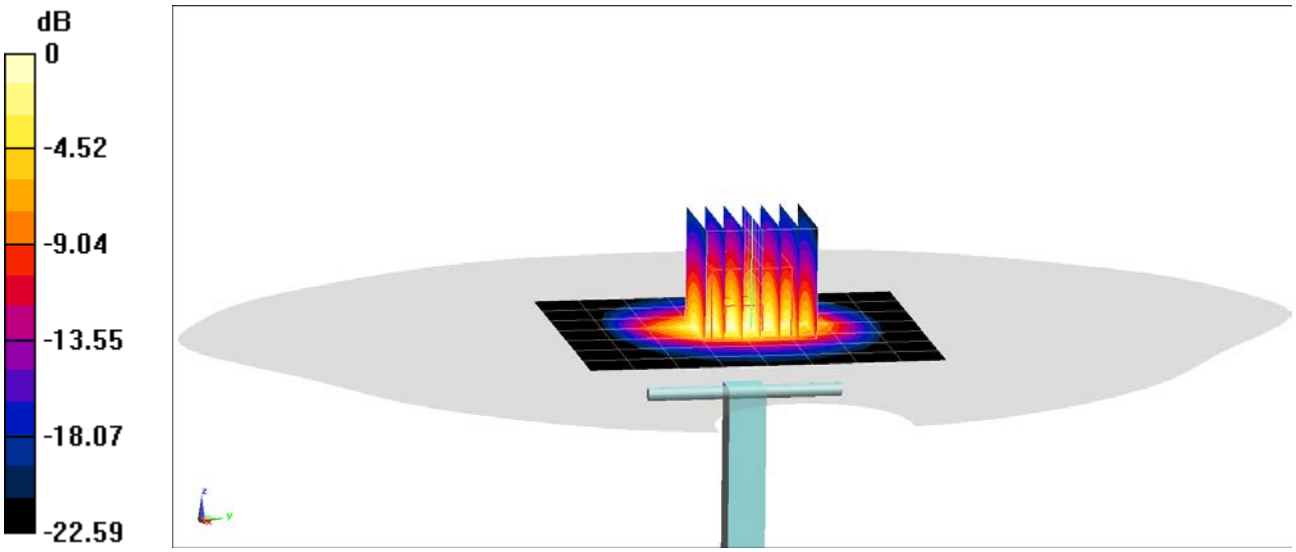
Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2450 MHz; σ = 2.024 S/m; ε_r = 50.72; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 06-05-2019; Ambient Temp: 19.9°C; Tissue Temp: 20.8°C

Probe: ES3DV3 - SN3318; ConvF(4.49, 4.49, 4.49) @ 2450 MHz; Calibrated: 11/19/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 8/14/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2450 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 11.4 W/kg
SAR(1 g) = 5.3 W/kg; SAR(10 g) = 2.42 W/kg
Deviation(1 g) = 4.33%; Deviation(10 g) = 1.68%



0 dB = 6.97 W/kg = 8.43 dBW/kg

PCTEST ENGINEERING LABORATORY, INC.

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1069

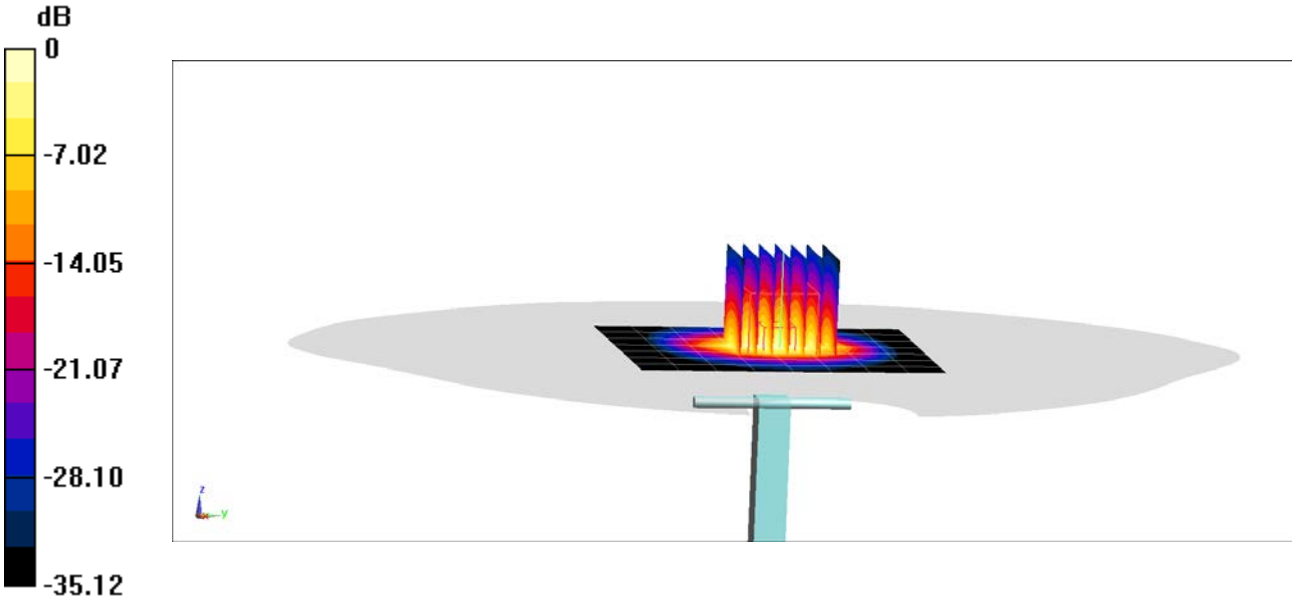
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2600 MHz; σ = 2.166 S/m; ε_r = 50.955; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-28-2019; Ambient Temp: 21.4°C; Tissue Temp: 20.0°C

Probe: ES3DV3 - SN3318; ConvF(4.32, 4.32, 4.32) @ 2600 MHz; Calibrated: 11/19/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 8/14/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 13.0 W/kg
SAR(1 g) = 5.81 W/kg; SAR(10 g) = 2.56 W/kg
Deviation(1 g) = 5.06%; Deviation(10 g) = 3.23%



0 dB = 7.73 W/kg = 8.88 dBW/kg

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: 1069

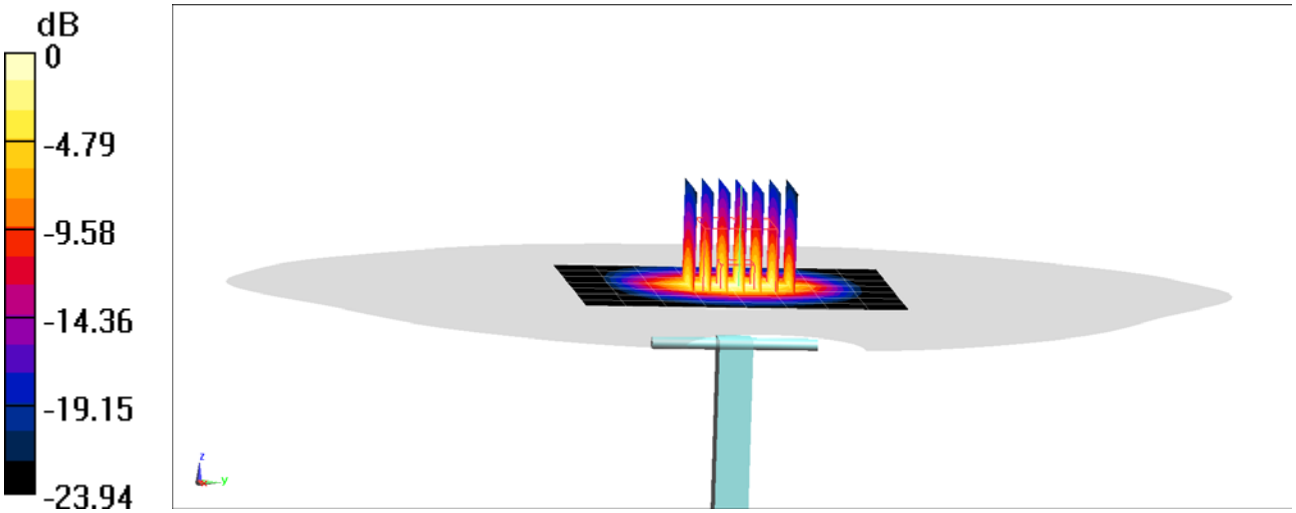
Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: 2450 MHz Body Medium parameters used:
f = 2600 MHz; σ = 2.155 S/m; ε_r = 50.405; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-30-2019; Ambient Temp: 21.4°C; Tissue Temp: 20.4°C

Probe: ES3DV3 - SN3318; ConvF(4.32, 4.32, 4.32) @ 2600 MHz; Calibrated: 11/19/2018
Sensor-Surface: 3mm (Mechanical Surface Detection)
Electronics: DAE4 Sn1408; Calibrated: 8/14/2018
Phantom: Twin-SAM V8.0; Type: QD 000 P41 Ax; Serial: 1936
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

2600 MHz System Verification at 20.0 dBm (100 mW)

Area Scan (8x9x1): Measurement grid: dx=12mm, dy=12mm
Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Peak SAR (extrapolated) = 13.1 W/kg
SAR(1 g) = 5.82 W/kg; SAR(10 g) = 2.56 W/kg
Deviation(1 g) = 5.24%; Deviation(10 g) = 3.23%



0 dB = 7.75 W/kg = 8.89 dBW/kg

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1163

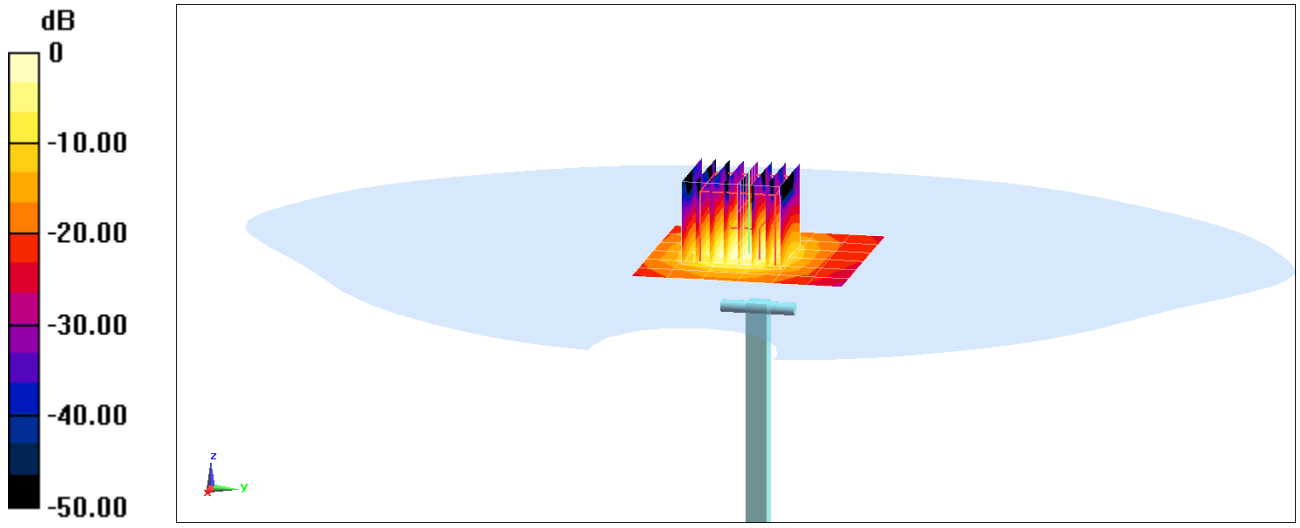
Communication System: UID 0, CW; Frequency: 5250 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5250 MHz; σ = 5.382 S/m; ε_r = 46.785; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-20-2019; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3837; ConvF(4.77, 4.77, 4.77) @ 5250 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

5250 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 14.4 W/kg
SAR(1 g) = 3.58 W/kg; SAR(10 g) = 1.01 W/kg
Deviation(1 g) = -7.85%; Deviation(10 g) = -6.05%



0 dB = 8.64 W/kg = 9.37 dBW/kg

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1163

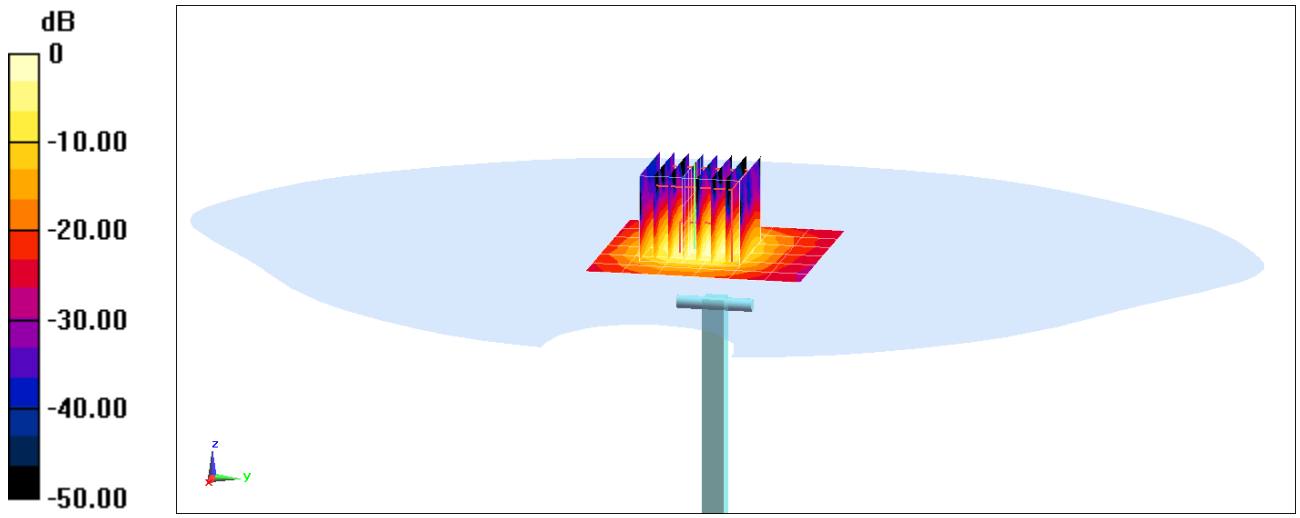
Communication System: UID 0, CW; Frequency: 5600 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used:
f = 5600 MHz; σ = 5.839 S/m; ε_r = 46.199; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-20-2019; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3837; ConvF(4.08, 4.08, 4.08) @ 5600 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

5600 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 19.3 W/kg
SAR(1 g) = 4.15 W/kg; SAR(10 g) = 1.16 W/kg
Deviation(1 g) = 3.62%; Deviation(10 g) = 4.04%



0 dB = 10.5 W/kg = 10.21 dBW/kg

DUT: Dipole 5 GHz; Type: D5GHzV2; Serial: 1163

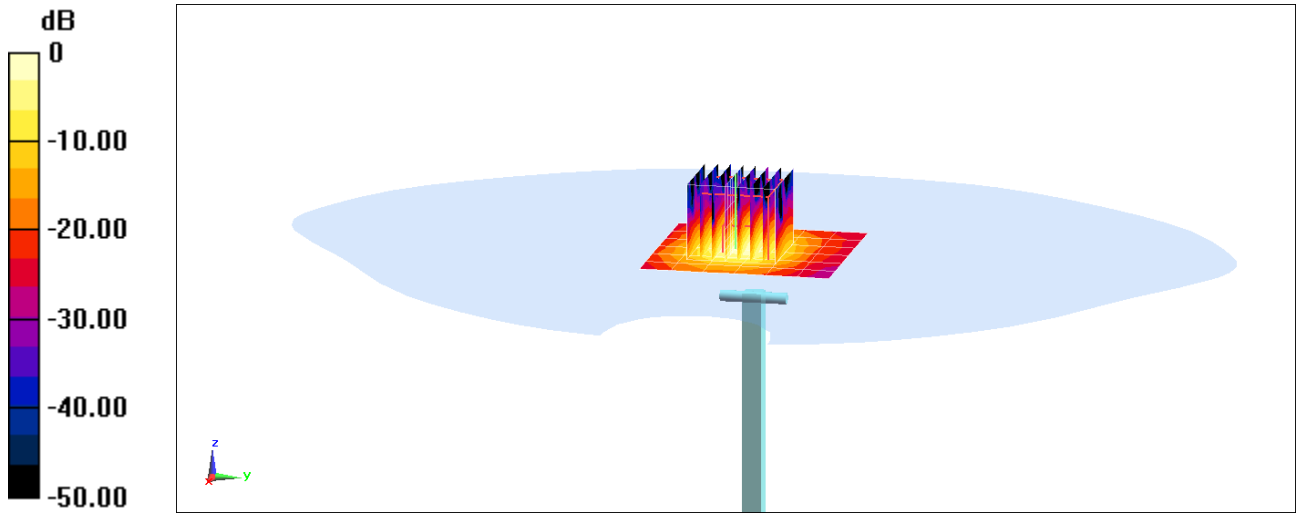
Communication System: UID 0, CW; Frequency: 5750 MHz; Duty Cycle: 1:1
Medium: 5 GHz Body Medium parameters used (interpolated):
f = 5750 MHz; σ = 6.038 S/m; ε_r = 46.005; ρ = 1000 kg/m^3
Phantom section: Flat Section; Space: 1.0 cm

Test Date: 05-20-2019; Ambient Temp: 21.7°C; Tissue Temp: 20.9°C

Probe: EX3DV4 - SN3837; ConvF(4.34, 4.34, 4.34) @ 5750 MHz; Calibrated: 1/28/2019
Sensor-Surface: 1.4mm (Mechanical Surface Detection)
Electronics: DAE4 Sn793; Calibrated: 1/15/2019
Phantom: SAM Sub; Type: SAM 4.0; Serial: TP-1403
Measurement SW: DASY52, Version 52.10 (2);SEMCAD X Version 14.6.12 (7450)

5750 MHz System Verification at 17.0 dBm (50 mW)

Area Scan (7x7x1): Measurement grid: dx=10mm, dy=10mm
Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm; Graded Ratio: 1.4
Peak SAR (extrapolated) = 18.7 W/kg
SAR(1 g) = 3.77 W/kg; SAR(10 g) = 1.05 W/kg
Deviation(1 g) = -3.08 %; Deviation(10 g) = -2.33%



0 dB = 9.85 W/kg = 9.93 dBW/kg

APPENDIX C: PROBE CALIBRATION

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client **PC Test** Certificate No: **D750V3-1097_Sep17**

CALIBRATION CERTIFICATE

Object	D750V3 - SN:1097
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	September 08, 2017

SC ✓ 10/03/2017

SC ✓ 9/8/2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 8, 2017

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.2 ± 6 %	0.90 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.08 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.22 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.39 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.5 ± 6 %	0.96 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.56 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.42 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.68 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.4 Ω - 0.6 jΩ
Return Loss	- 27.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.0 Ω - 3.6 jΩ
Return Loss	- 28.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.034 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 05, 2013

DASY5 Validation Report for Head TSL

Date: 08.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1097

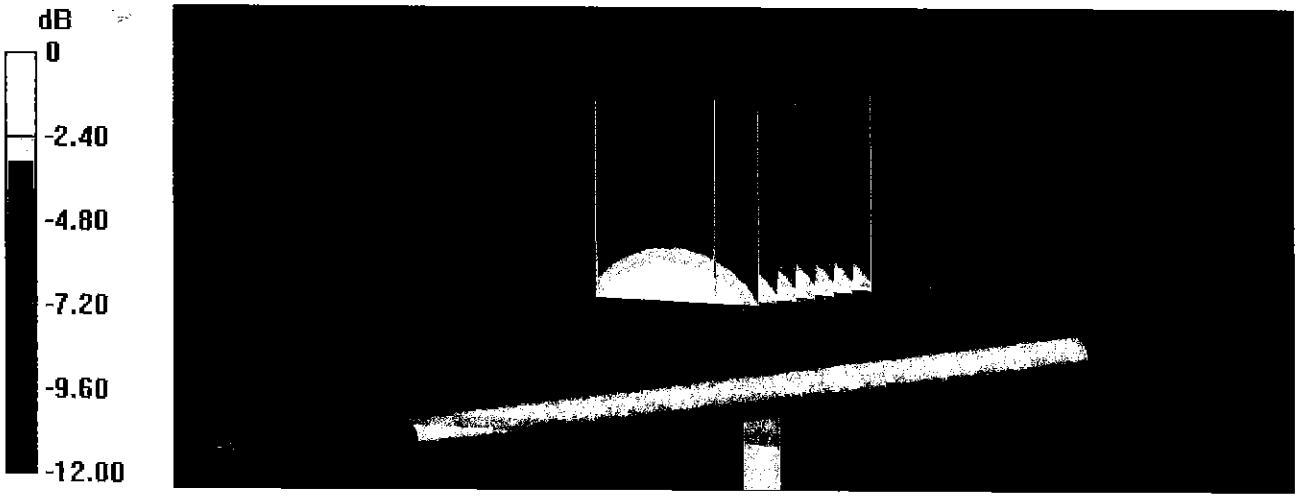
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.9 S/m; ε_r = 41.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.49, 10.49, 10.49); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

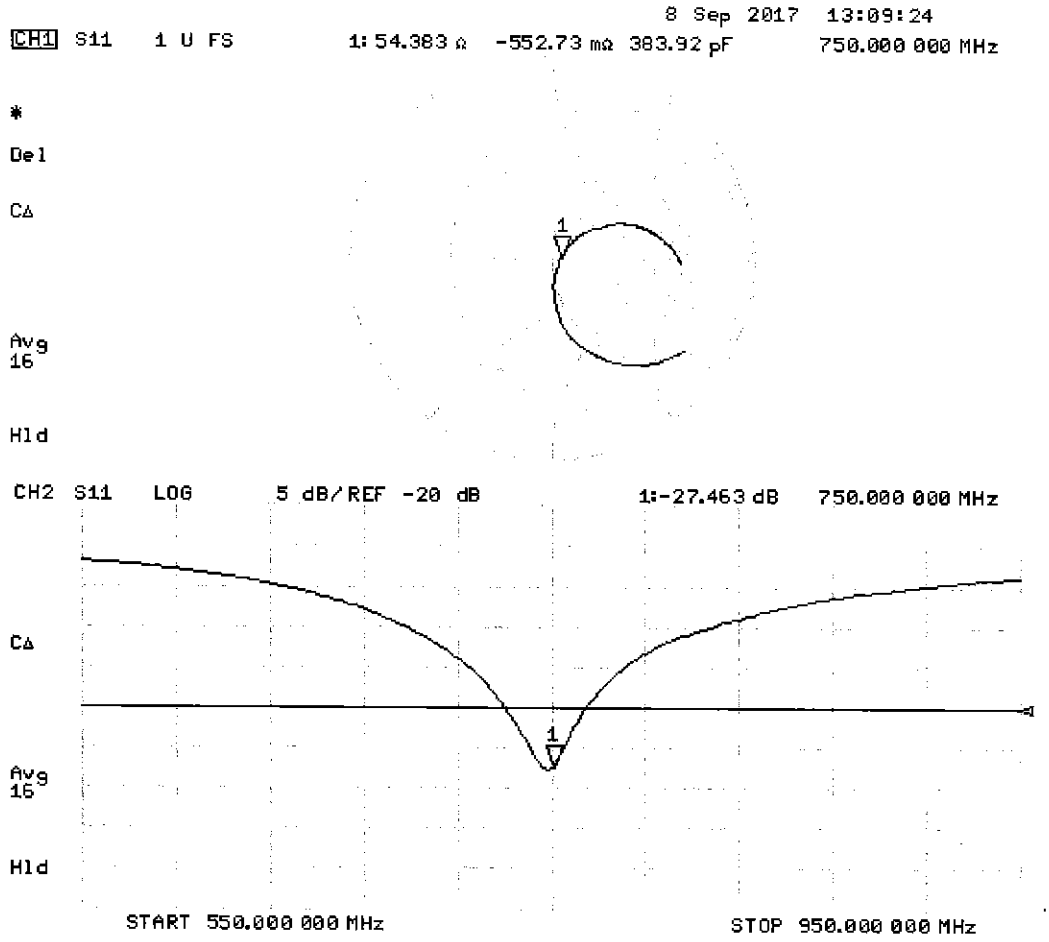
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.59 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.19 W/kg
SAR(1 g) = 2.08 W/kg; SAR(10 g) = 1.36 W/kg
Maximum value of SAR (measured) = 2.80 W/kg



0 dB = 2.80 W/kg = 4.47 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 08.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN:1097

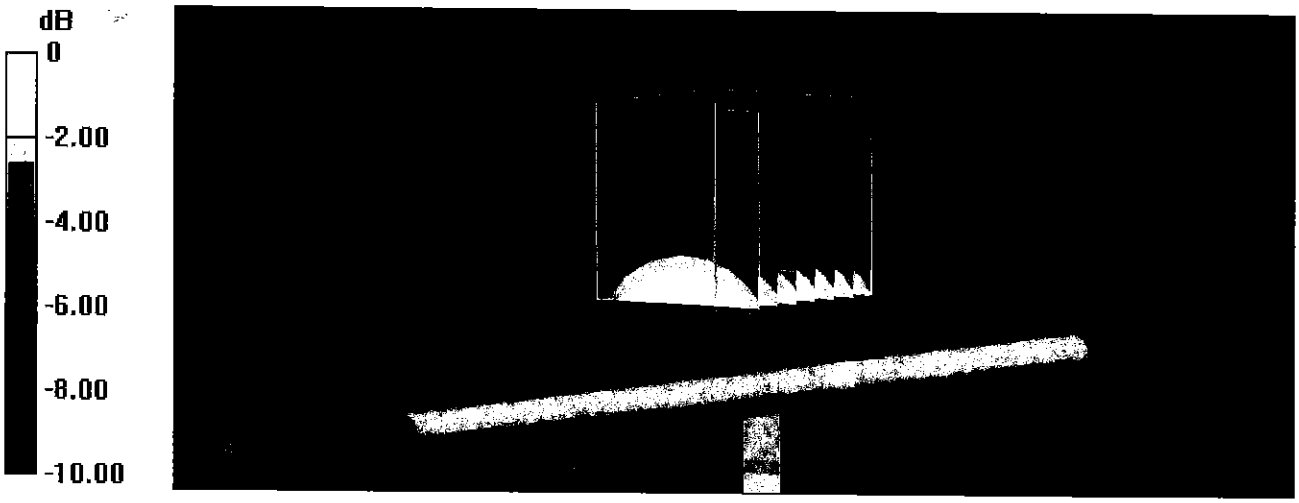
Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; σ = 0.96 S/m; ε_r = 55.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.35, 10.35, 10.35); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

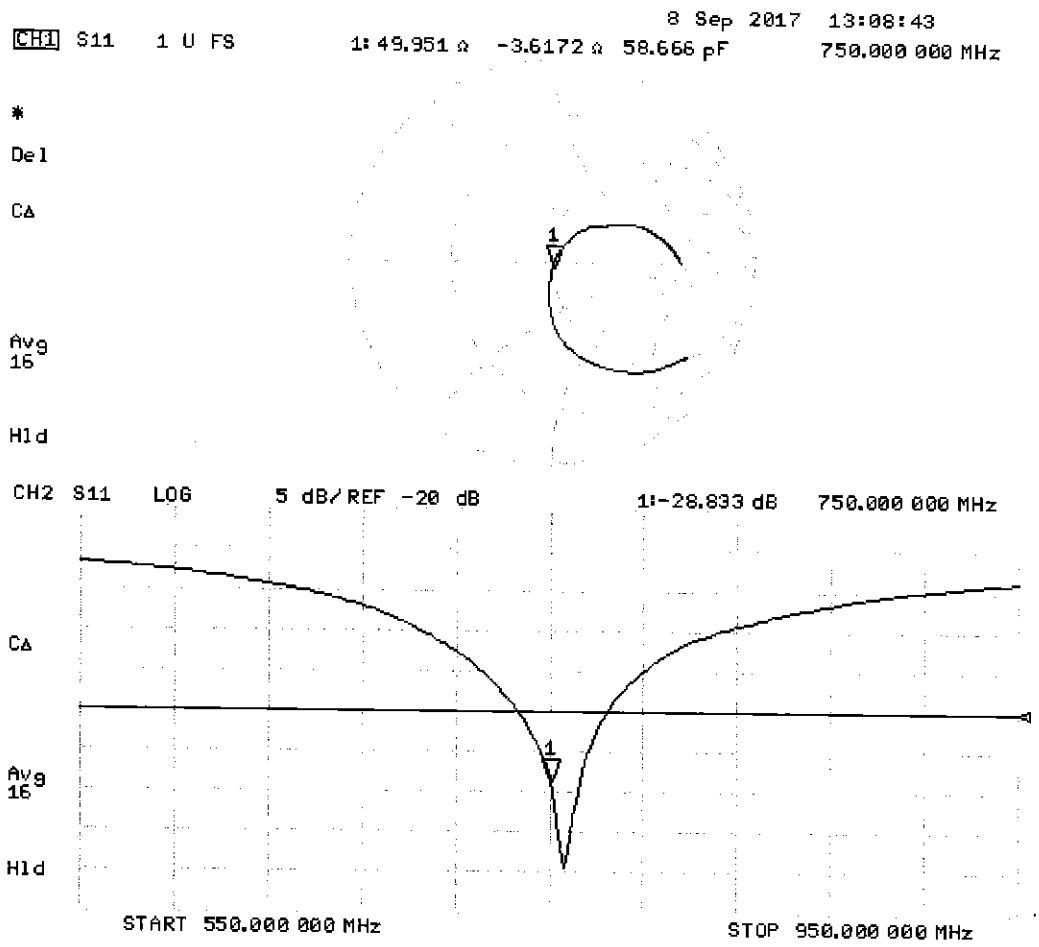
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.96 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 3.16 W/kg
SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.42 W/kg
Maximum value of SAR (measured) = 2.81 W/kg



0 dB = 2.81 W/kg = 4.49 dBW/kg

Impedance Measurement Plot for Body TSL



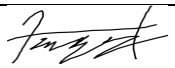
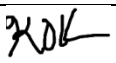
Certification of Calibration

Object	D750V3 – SN: 1097
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	September 08, 2018
Description:	SAR Validation Dipole at 750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Agilent	N5182A	MXG Vector Signal Generator	3/19/2018	Annual	3/19/2019	US46240505
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2496A	Power Meter	10/9/2017	Annual	10/9/2018	1138001
Anritsu	MA2411B	Pulse Power Sensor	11/15/2017	Annual	11/15/2018	1339007
Anritsu	MA2411B	Pulse Power Sensor	11/22/2017	Annual	11/22/2018	1339008
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/14/2017	Biennial	2/14/2019	170112507
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/15/2018	Annual	5/15/2019	1070
SPEAG	ES3DV3	SAR Probe	9/18/2017	Annual	9/18/2018	3287
SPEAG	DAE4	Data Acquisition Electronics	1/26/2018	Annual	1/26/2019	1533
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7416
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/18/2018	Annual	1/18/2019	793

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Sangmin Cha	Team Lead Engineer	
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

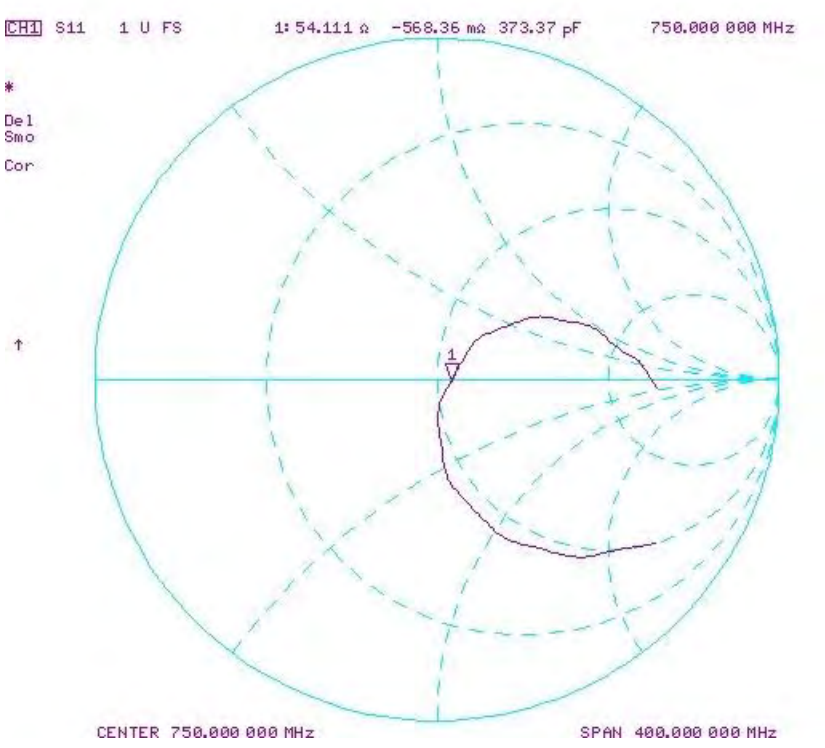
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

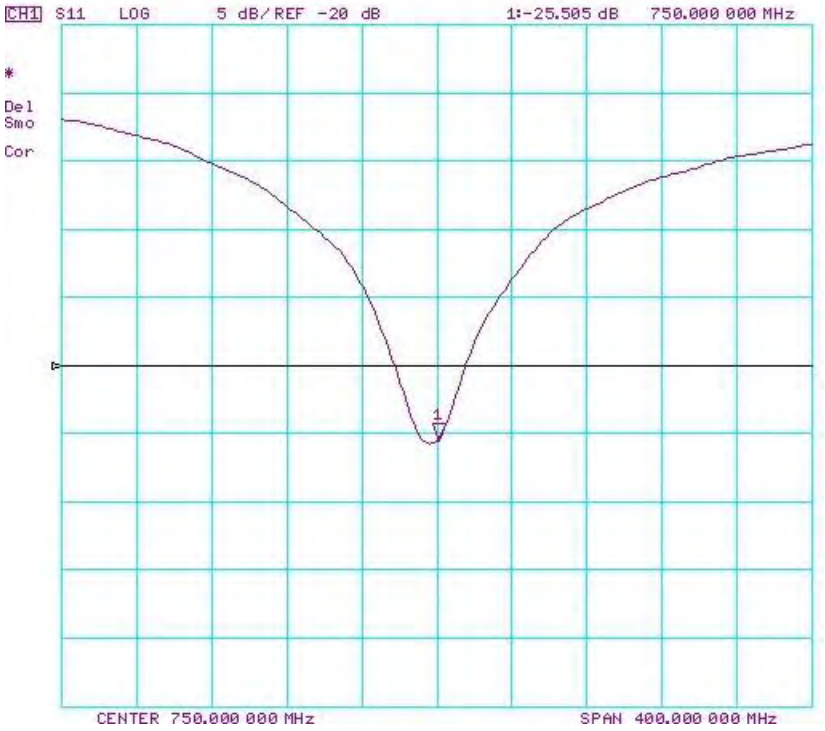
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 23.0 dBm	Measured Head SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 23.0 dBm	Measured Head SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
9/8/2017	9/8/2018	1.034	1.644	1.7	3.41%	1.078	1.12	3.90%	54.4	54.1	0.3	-0.6	-0.6	0	-27.5	-25.5	7.30%	PASS

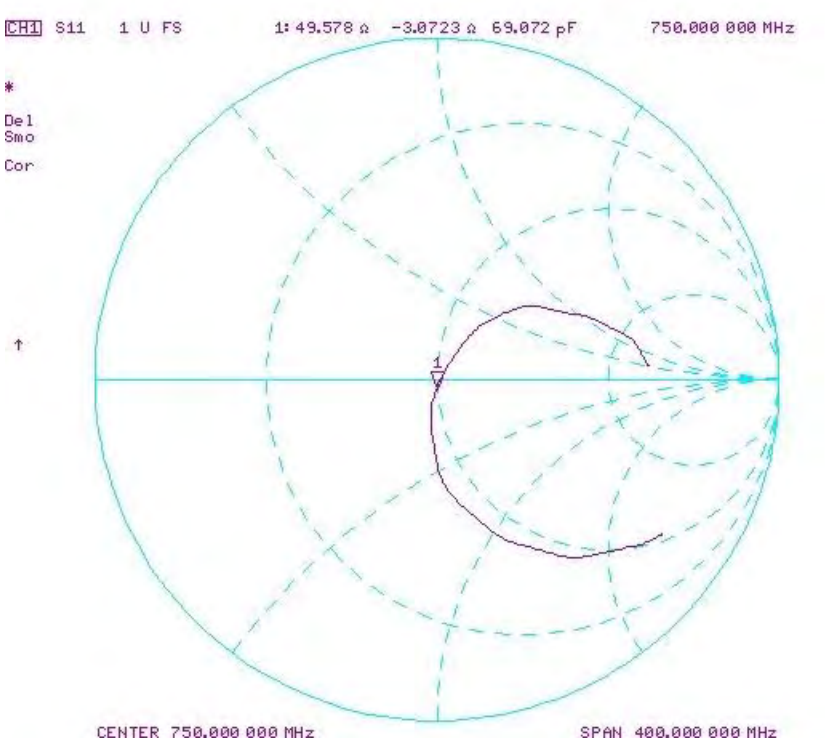
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	Measured Body SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
9/8/2017	9/8/2018	1.034	1.712	1.78	3.97%	1.136	1.17	2.99%	50	49.6	0.4	-3.6	-3.1	0.5	-28.8	-30.3	-5.20%	PASS

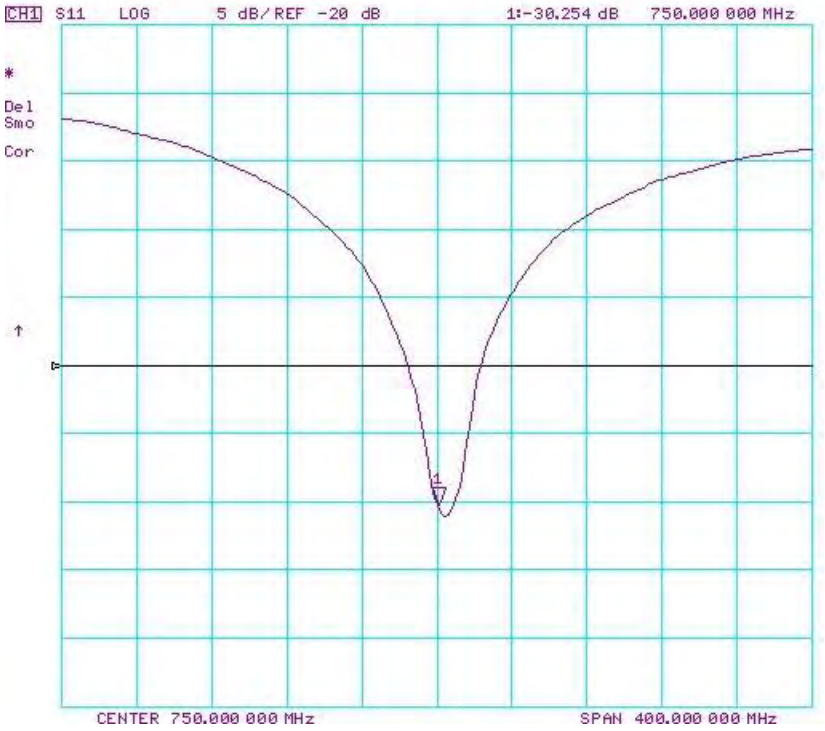
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D835V2-4d040_Jun17

CALIBRATION CERTIFICATE

Object D835V2 - SN:4d040

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

BNV 8/3/2017 SC ✓ 6/1/2018

Calibration date: June 13, 2017

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Johannes Kurikka	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: June 15, 2017

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.0 ± 6 %	0.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.46 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.56 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.11 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.7 ± 6 %	1.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.45 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.56 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.60 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.28 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.8 Ω - 4.4 jΩ
Return Loss	- 27.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.4 Ω - 6.5 jΩ
Return Loss	- 22.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.391 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 20, 2005

DASY5 Validation Report for Head TSL

Date: 13.06.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d040

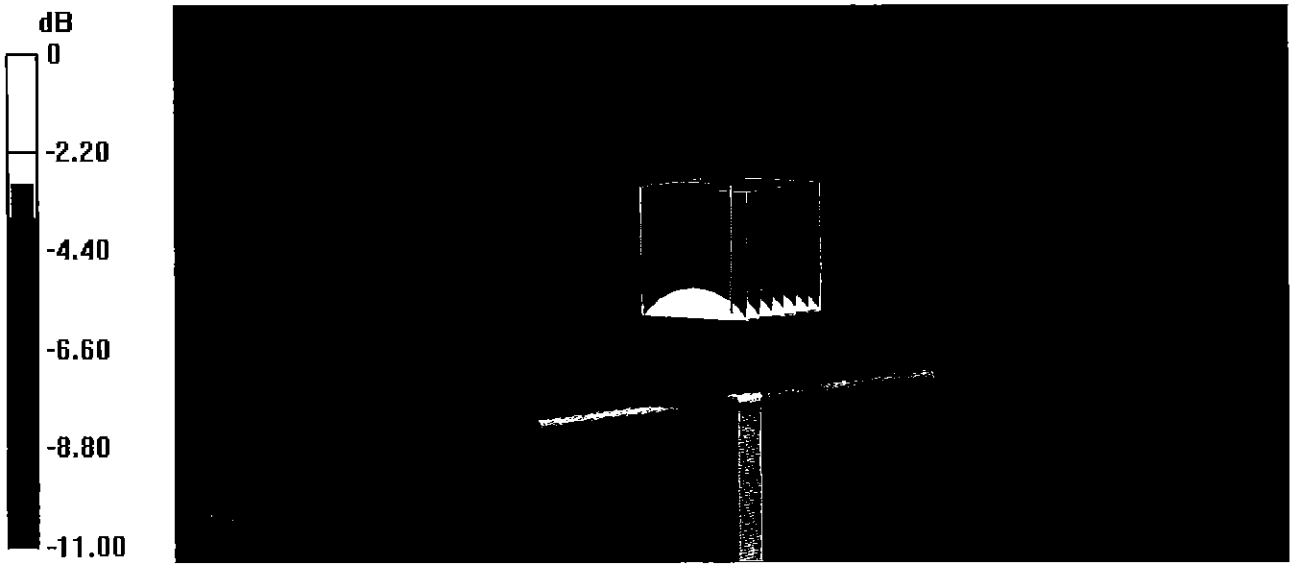
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; $\sigma = 0.93$ S/m; $\varepsilon_r = 41$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.07, 10.07, 10.07); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (front); Type: QD 00L P49 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

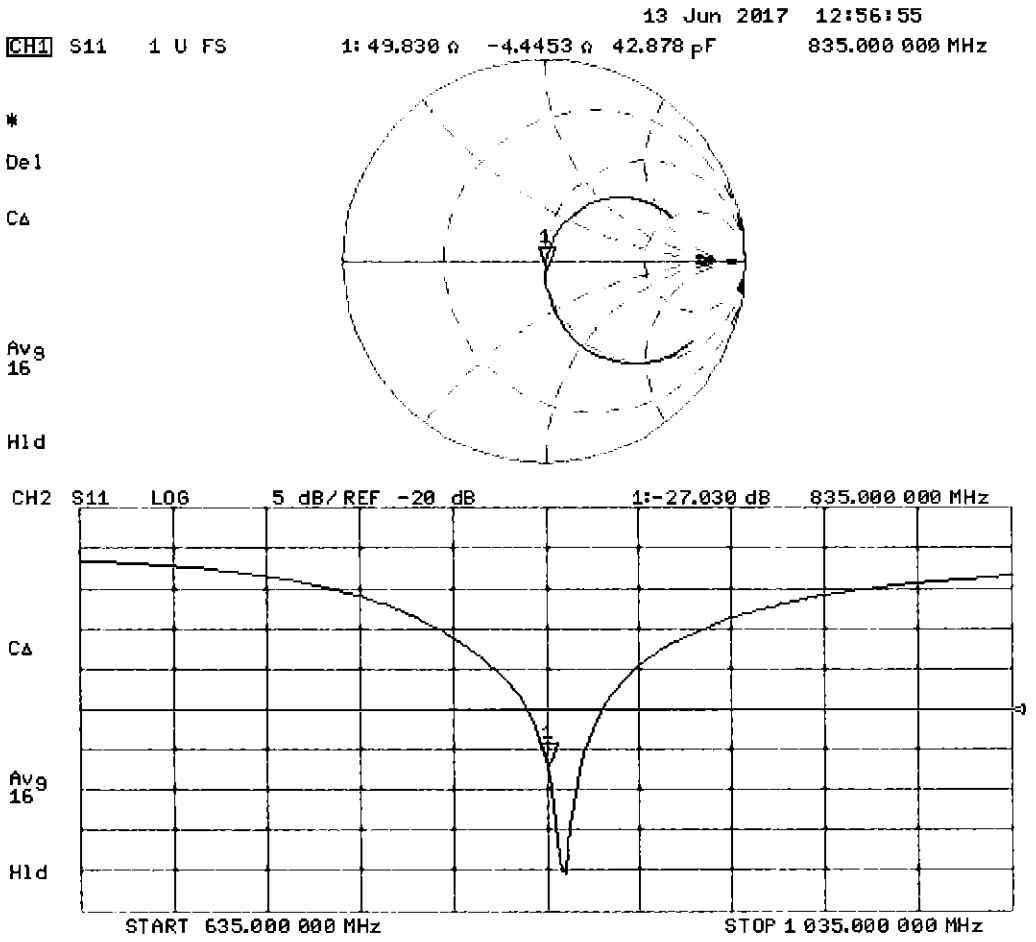
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 62.24 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 3.79 W/kg
SAR(1 g) = 2.43 W/kg; SAR(10 g) = 1.56 W/kg
Maximum value of SAR (measured) = 3.32 W/kg



0 dB = 3.32 W/kg = 5.21 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 12.06.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN:4d040

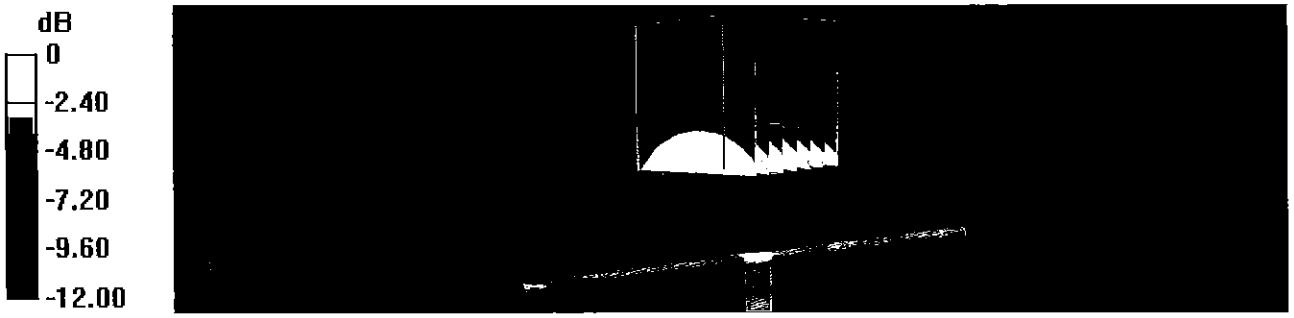
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1 S/m; ε_r = 54.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(10.2, 10.2, 10.2); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 4.9 (Back); Type: QD 00R P49 AA; Serial: 1005
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

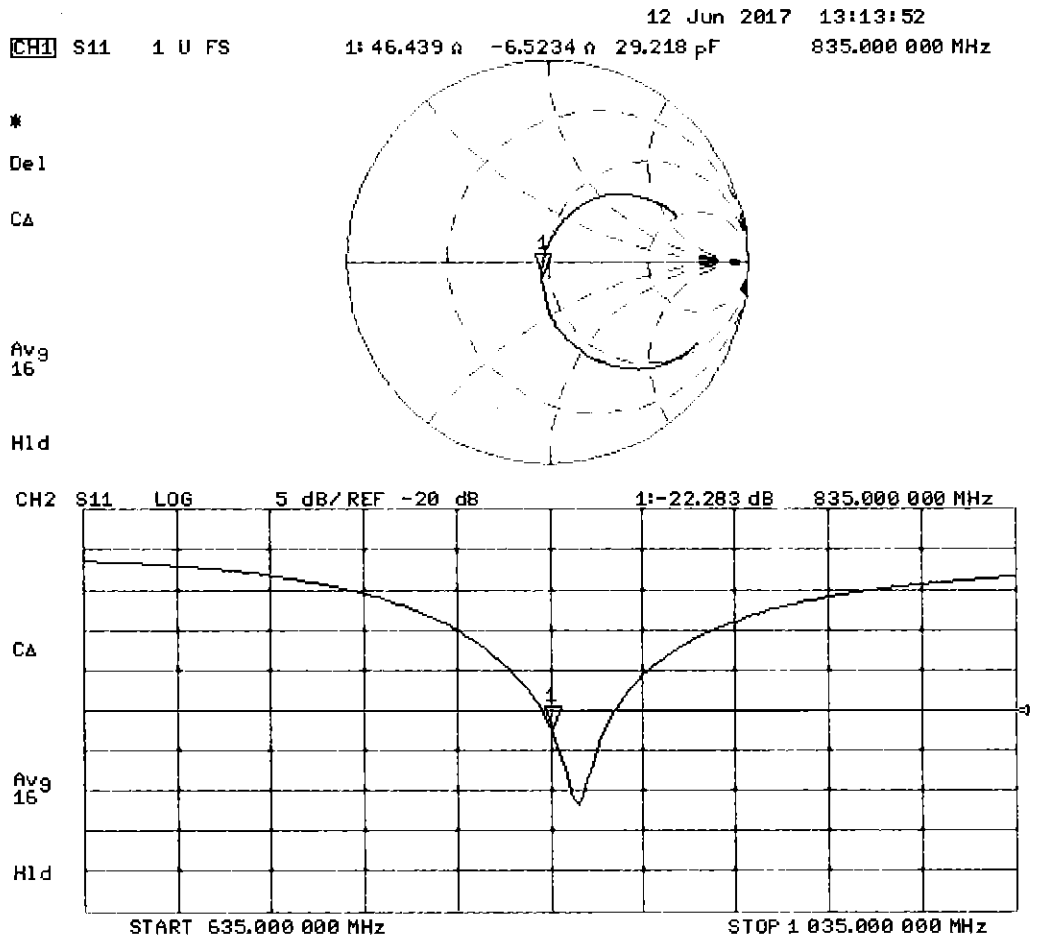
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 59.95 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 3.72 W/kg
SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.6 W/kg
Maximum value of SAR (measured) = 3.26 W/kg



0 dB = 3.26 W/kg = 5.13 dBW/kg

Impedance Measurement Plot for Body TSL



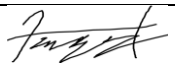
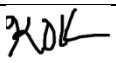
Certification of Calibration

Object	D835V2 – SN: 4d040
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	June 01, 2018
Description:	SAR Validation Dipole at 835 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Agilent	N5182A	MXG Vector Signal Generator	3/19/2018	Annual	3/19/2019	US46240505
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2496A	Power Meter	10/9/2017	Annual	10/9/2018	1138001
Anritsu	MA2411B	Pulse Power Sensor	11/15/2017	Annual	11/15/2018	1339007
Anritsu	MA2411B	Pulse Power Sensor	11/22/2017	Annual	11/22/2018	1339008
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/14/2017	Biennial	2/14/2019	170112507
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/1/2017	Annual	6/1/2018	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2208-6	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAKS-3.5	Portable DAK	9/5/2017	Annual	9/5/2018	1045
SPEAG	ES3DV3	SAR Probe	3/13/2018	Annual	3/13/2019	3131
SPEAG	EX3DV4	SAR Probe	1/26/2018	Annual	1/26/2019	7490
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/7/2018	Annual	3/7/2019	604
SPEAG	DAE4	Dasy Data Acquisition Electronics	1/26/2018	Annual	1/26/2019	1532

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Sangmin Cha	Biomedical Engineer II	
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

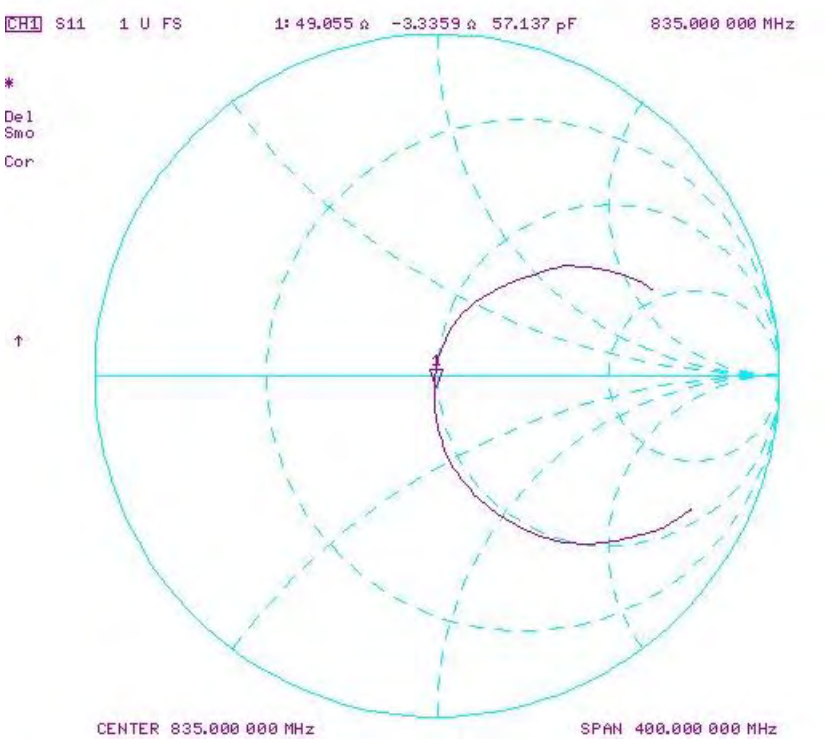
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

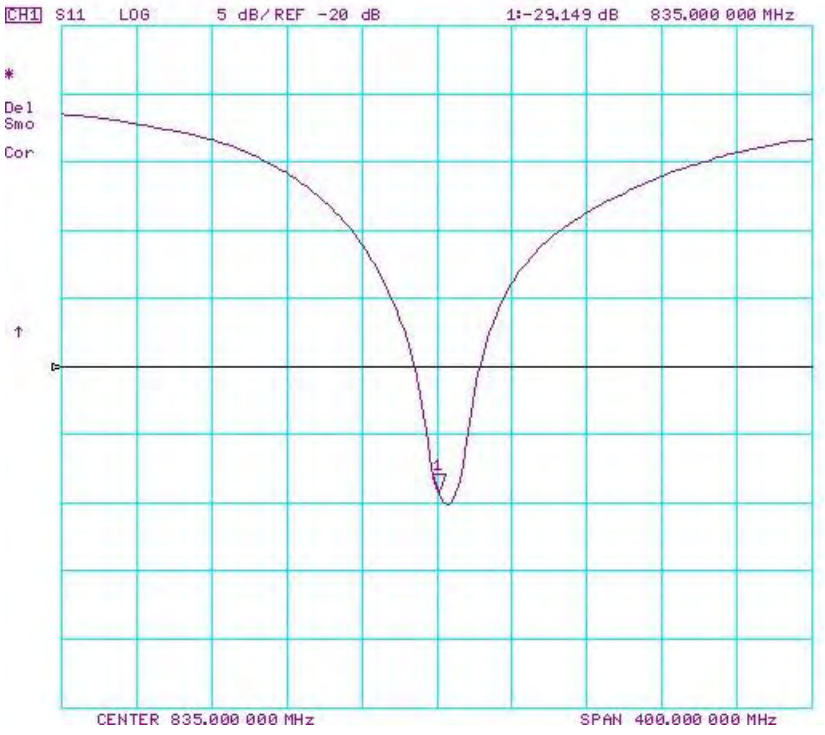
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 23.0 dBm	Measured Head SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 23.0 dBm	Measured Head SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
6/13/2017	6/1/2018	1.391	1.892	1.99	5.18%	1.222	1.3	6.38%	49.8	49.1	0.7	-4.4	-3.3	1.1	-27	-29.1	-7.80%	PASS

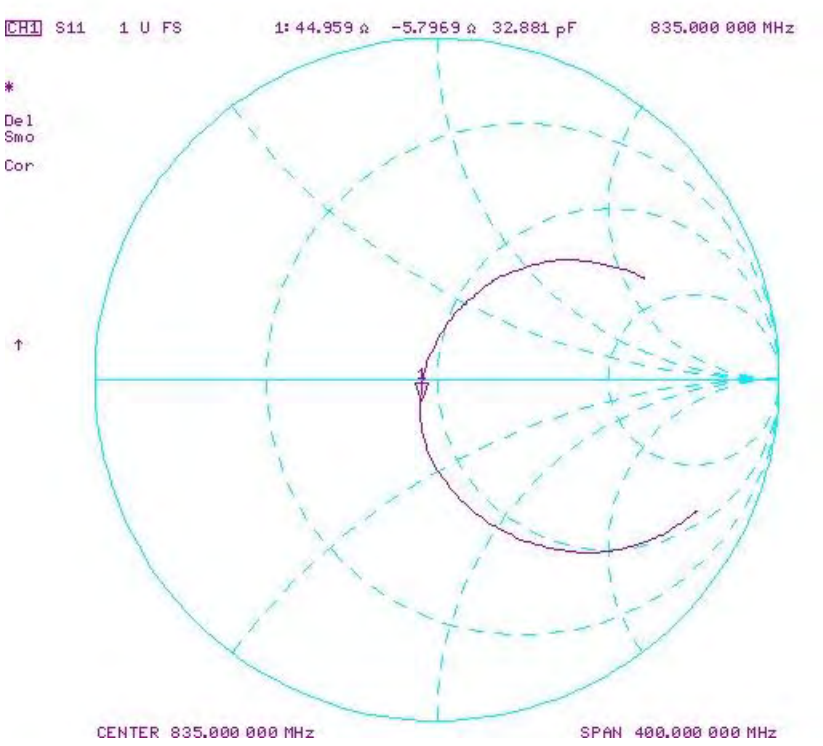
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 23.0 dBm	Measured Body SAR (1g) W/kg @ 23.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 23.0 dBm	Measured Body SAR (10g) W/kg @ 23.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
6/13/2017	6/1/2018	1.391	1.912	1.9	-0.63%	1.256	1.26	0.32%	46.4	45	1.4	-6.5	-5.8	0.7	-22.3	-22.5	-0.90%	PASS

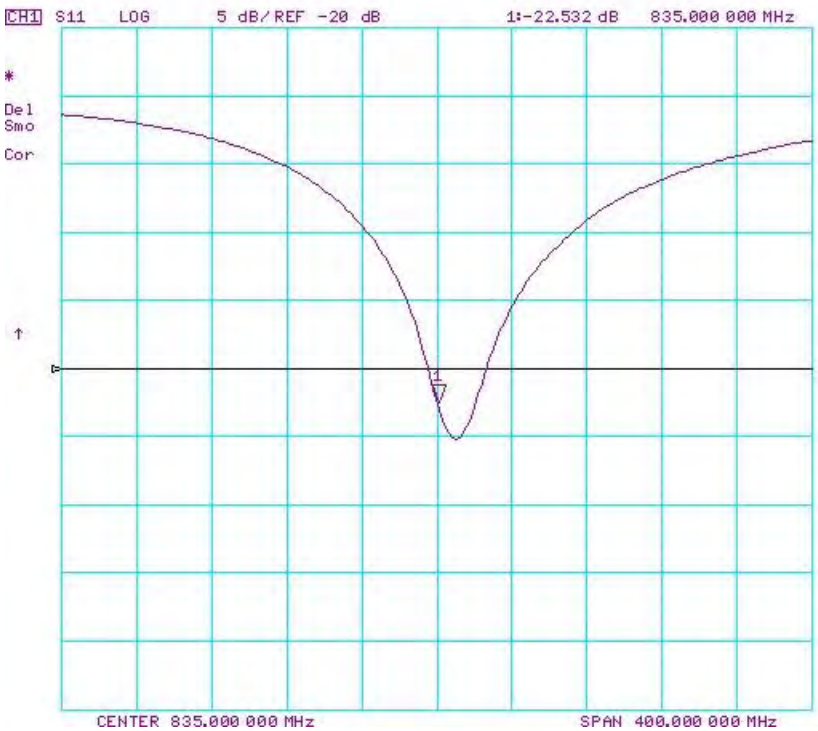
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D1750V2-1104_Sep17

CALIBRATION CERTIFICATE

Object	D1750V2 - SN:1104
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	September 07, 2017

SC ✓ 10/03/2017

SC ✓ 9/7/2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 7, 2017

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.1 ± 6 %	1.36 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.11 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**36.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.81 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**19.2 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.8 ± 6 %	1.46 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.03 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**36.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	4.85 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**19.6 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.8 Ω - 0.2 jΩ
Return Loss	- 41.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.5 Ω - 0.7 jΩ
Return Loss	- 28.7 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.217 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 16, 2013

DASY5 Validation Report for Head TSL

Date: 07.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1104

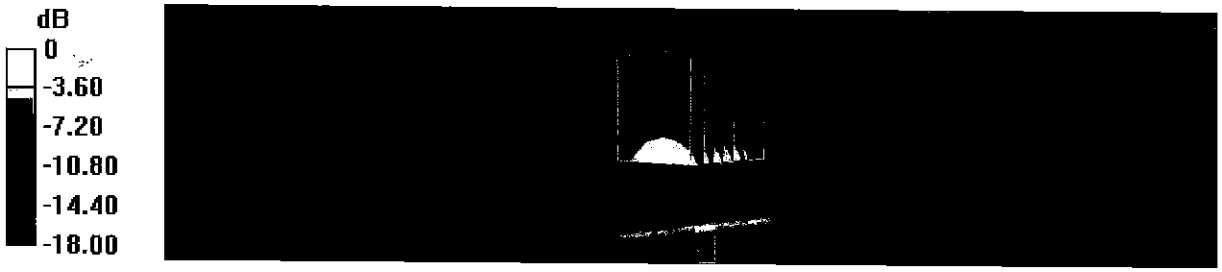
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.36 S/m; ε_r = 39.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.73, 8.73, 8.73); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

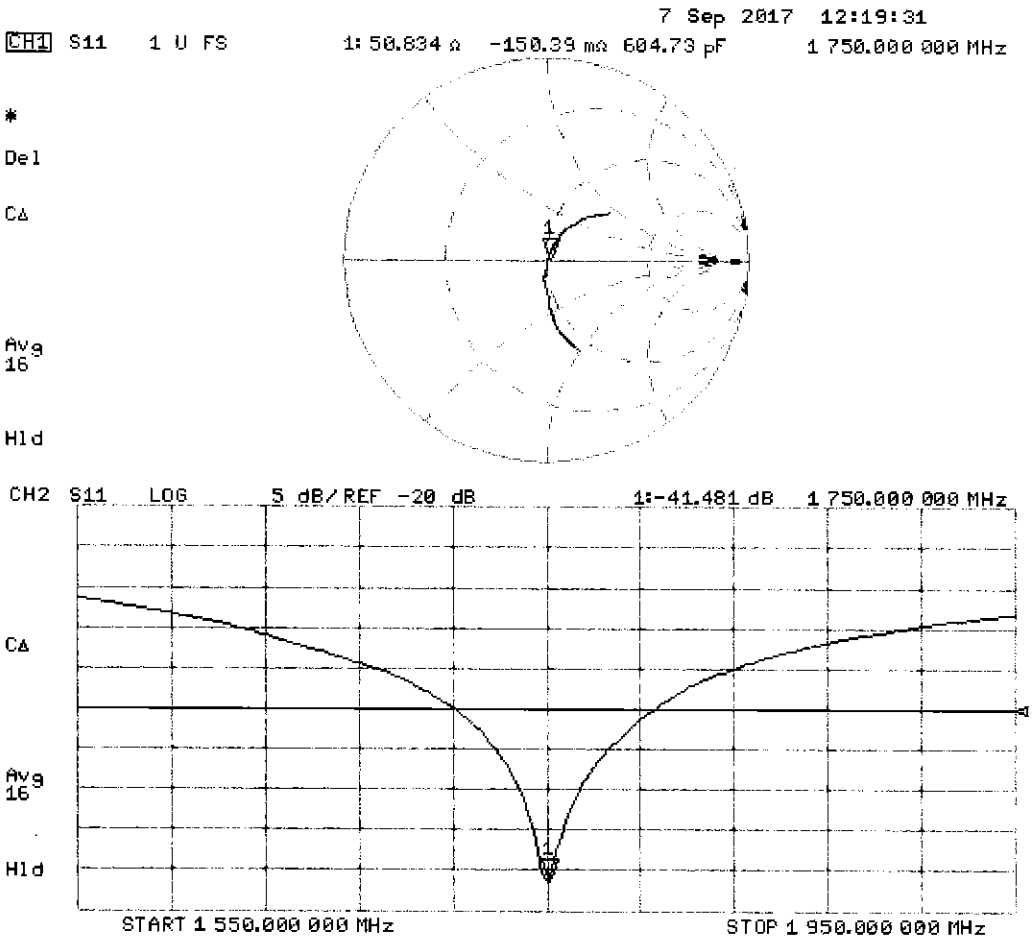
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.9 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.11 W/kg; SAR(10 g) = 4.81 W/kg
Maximum value of SAR (measured) = 13.9 W/kg



0 dB = 13.9 W/kg = 11.43 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1104

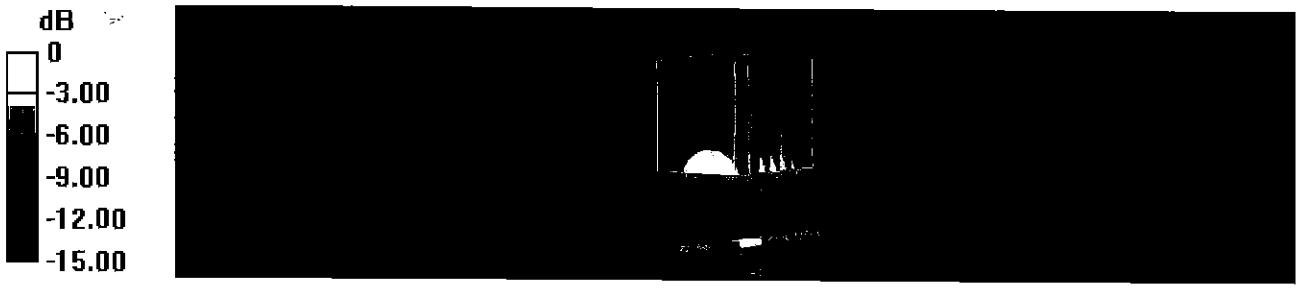
Communication System: UID 0 - CW; Frequency: 1750 MHz
Medium parameters used: f = 1750 MHz; σ = 1.46 S/m; ε_r = 53.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.46, 8.46, 8.46); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

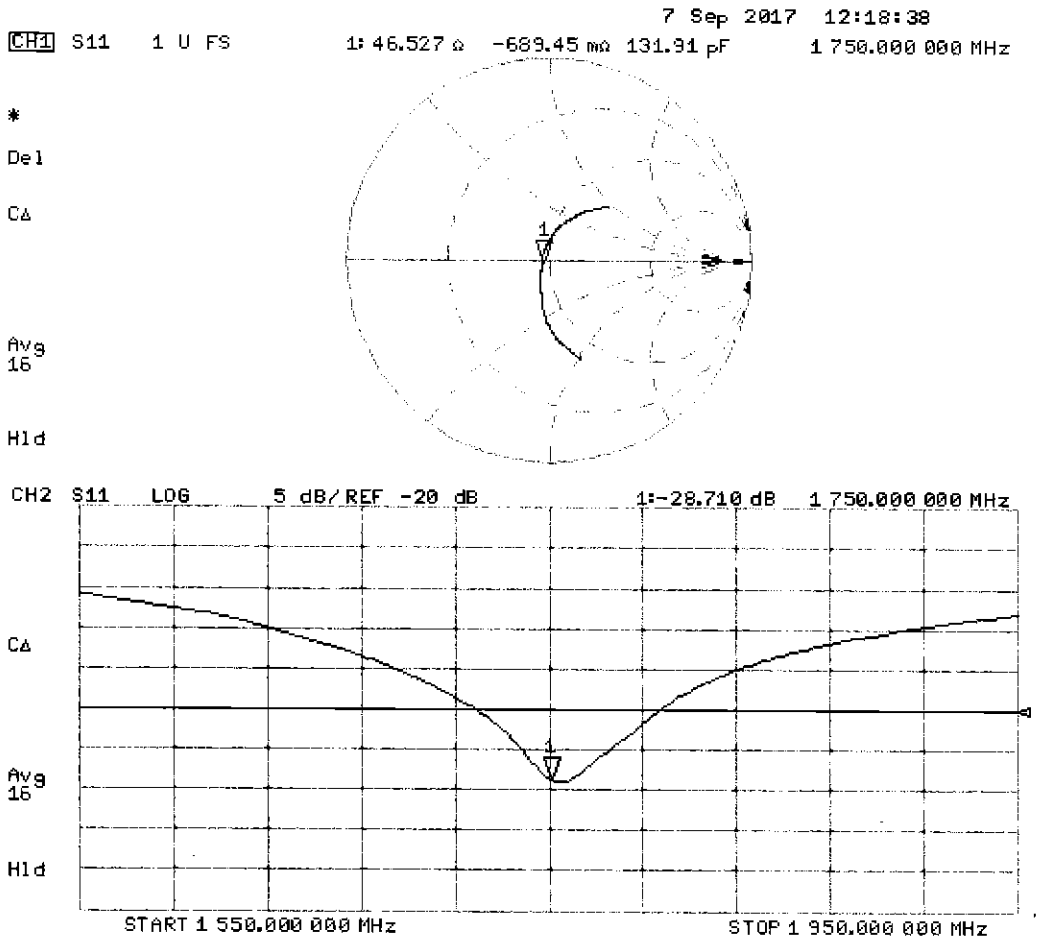
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.30 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 15.6 W/kg
SAR(1 g) = 9.03 W/kg; SAR(10 g) = 4.85 W/kg
Maximum value of SAR (measured) = 12.9 W/kg



0 dB = 12.9 W/kg = 11.11 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object	D1750V2 – SN: 1104
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	September 07, 2018
Description:	SAR Validation Dipole at 1750 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Agilent	N5182A	MXG Vector Signal Generator	3/19/2018	Annual	3/19/2019	US46240505
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2496A	Power Meter	10/9/2017	Annual	10/9/2018	1138001
Anritsu	MA2411B	Pulse Power Sensor	11/15/2017	Annual	11/15/2018	1339007
Anritsu	MA2411B	Pulse Power Sensor	11/22/2017	Annual	11/22/2018	1339008
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/14/2017	Biennial	2/14/2019	170112507
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/15/2018	Annual	5/15/2019	1070
SPEAG	ES3DV3	SAR Probe	9/18/2017	Annual	9/18/2018	3287
SPEAG	DAE4	Data Acquisition Electronics	1/26/2018	Annual	1/26/2019	1533

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Sangmin Cha	Team Lead Engineer	
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

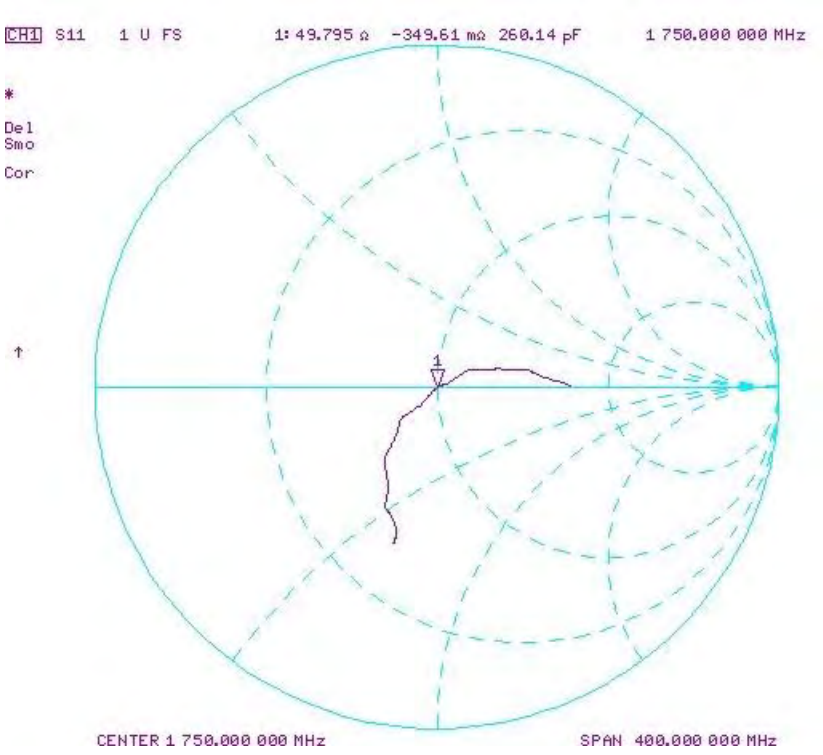
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

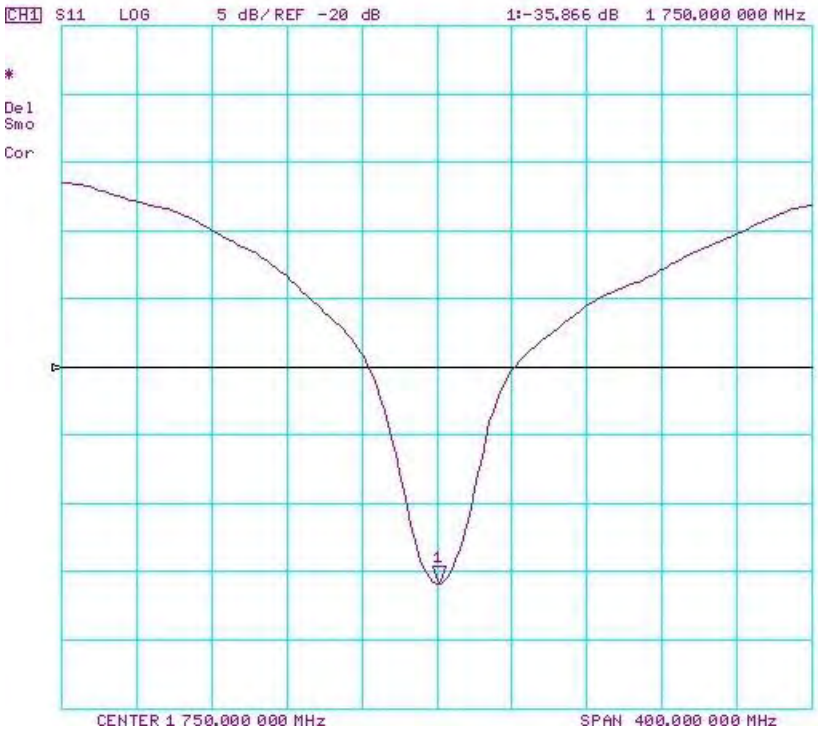
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
9/7/2017	9/7/2018	1.217	3.64	3.62	-0.55%	1.92	1.94	1.04%	50.8	49.8	1	-0.2	-0.3	0.1	-41.5	-35.9	13.50%	PASS

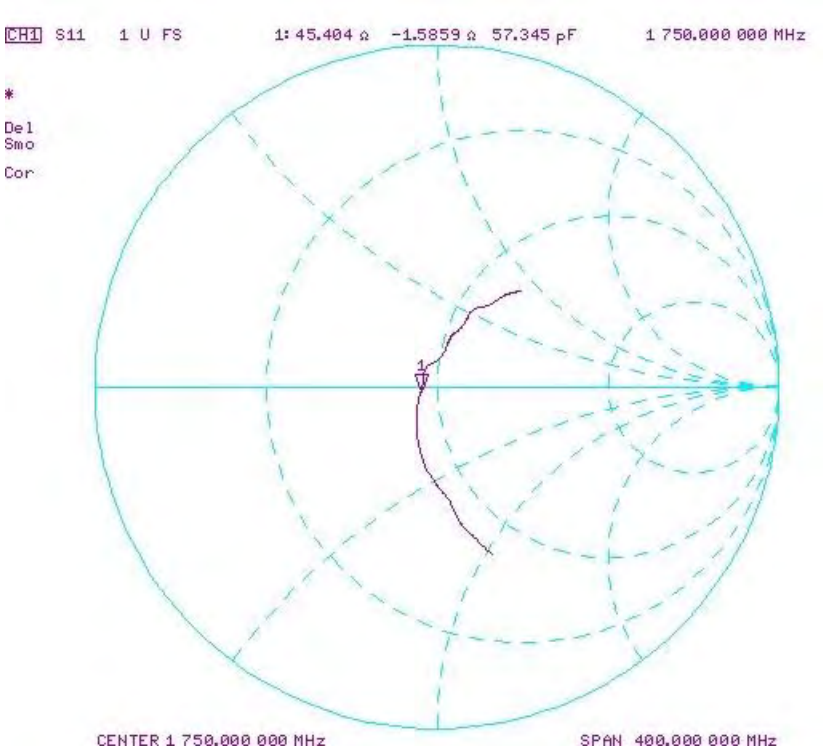
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
9/7/2017	9/7/2018	1.217	3.66	3.84	4.92%	1.96	2.07	5.61%	46.527	45.4	1.1	-0.69	-1.6	0.9	-28.7	-25.8	10.10%	PASS

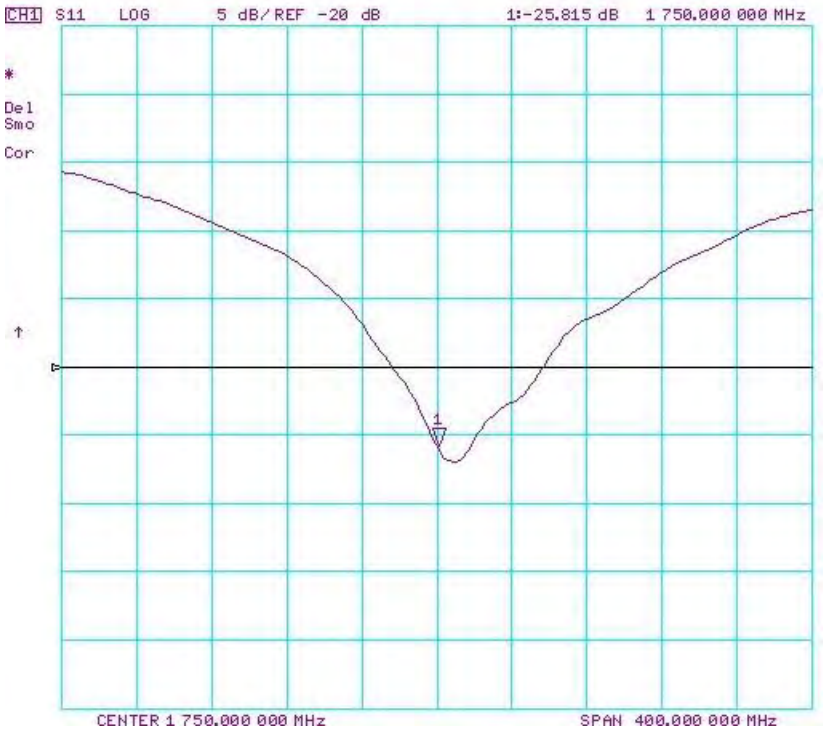
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client PC Test **Certificate No: D1900V2-5d181_Sep17**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN:5d181
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	September 07, 2017

SC ✓ 10/03/2017

SC ✓ 9/7/2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 7, 2017

Calibration Laboratory of
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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.0 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.85 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**39.5 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.15 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.6 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	54.3 ± 6 %	1.47 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.65 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**39.5 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.14 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.9 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.7 Ω + 4.6 jΩ
Return Loss	- 24.9 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.2 Ω + 5.6 jΩ
Return Loss	- 24.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.200 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	August 23, 2013

DASY5 Validation Report for Head TSL

Date: 07.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d181

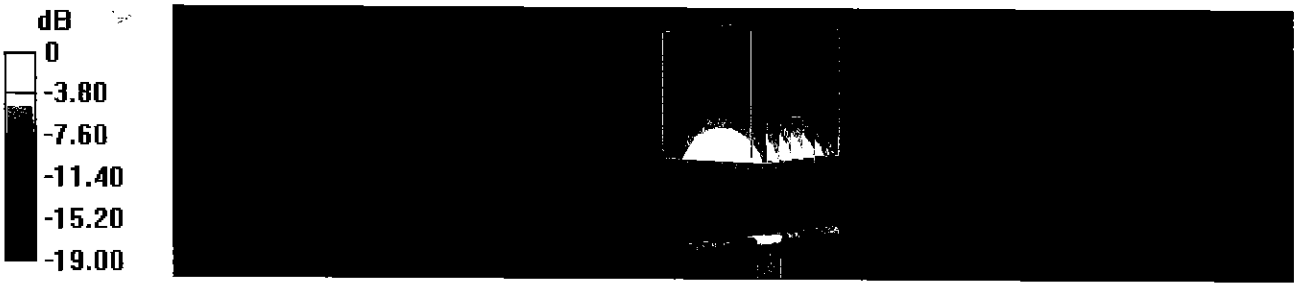
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.38 S/m; ε_r = 39; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.43, 8.43, 8.43); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

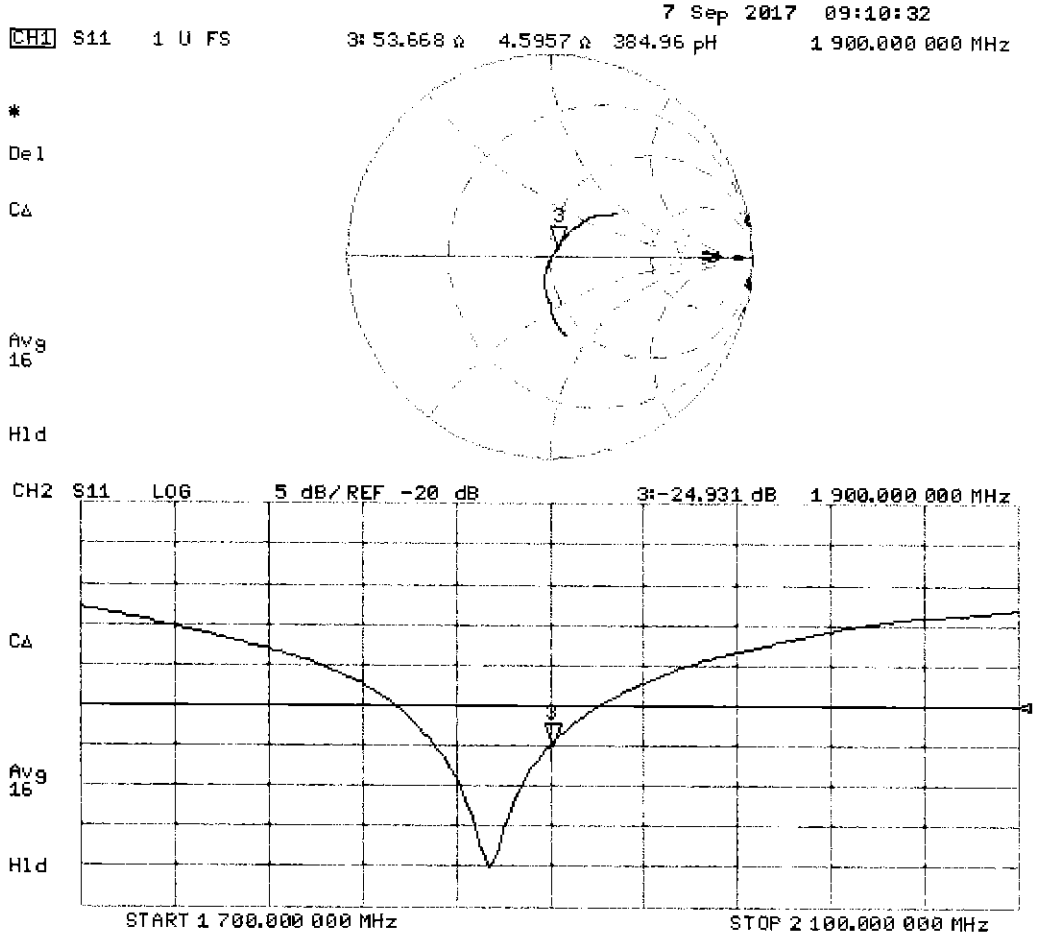
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 106.8 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 18.5 W/kg
SAR(1 g) = 9.85 W/kg; SAR(10 g) = 5.15 W/kg
Maximum value of SAR (measured) = 14.8 W/kg



0 dB = 14.8 W/kg = 11.70 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d181

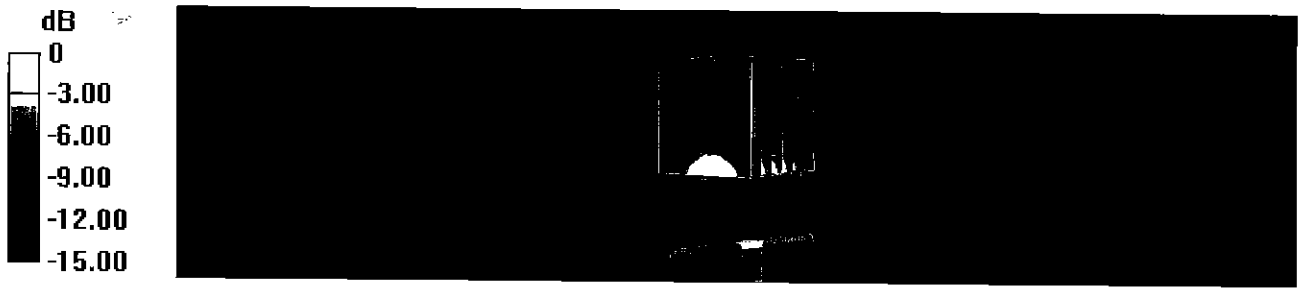
Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.47 S/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.2, 8.2, 8.2); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

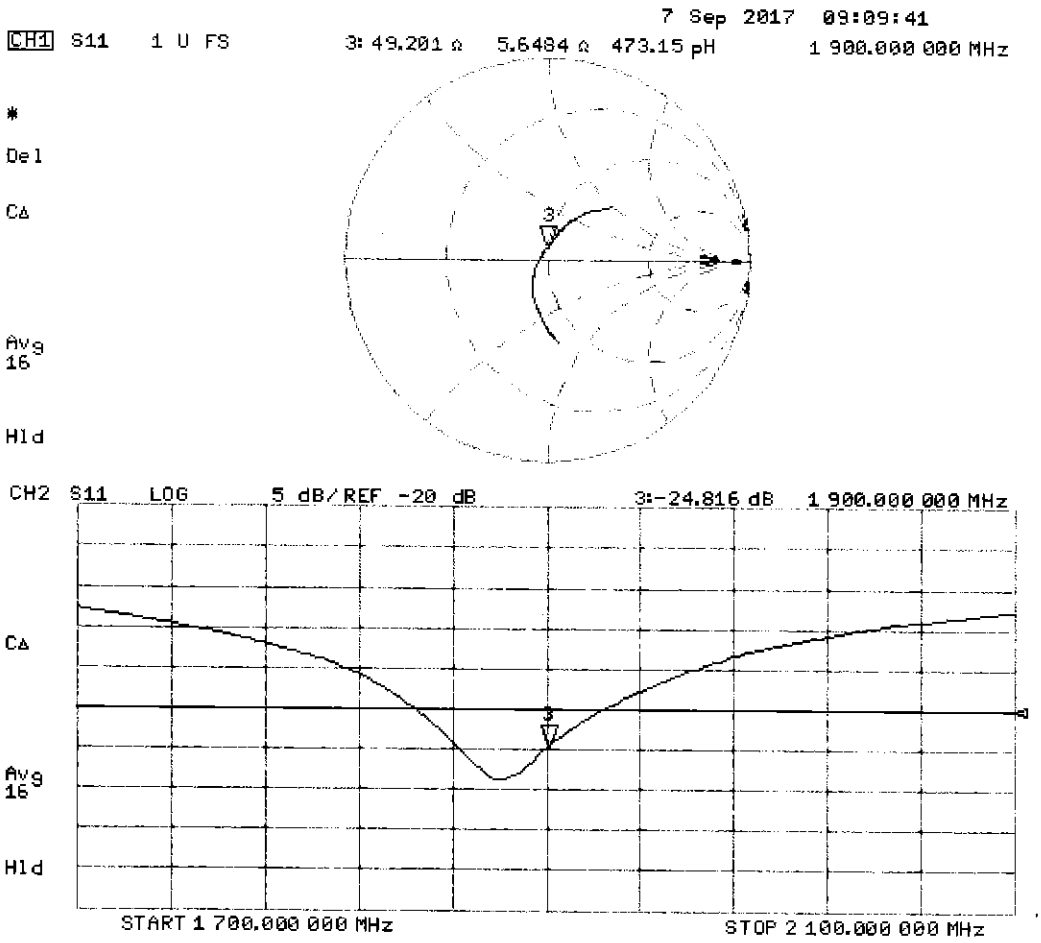
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.4 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.65 W/kg; SAR(10 g) = 5.14 W/kg
Maximum value of SAR (measured) = 13.8 W/kg



0 dB = 13.8 W/kg = 11.40 dBW/kg

Impedance Measurement Plot for Body TSL



Certification of Calibration

Object	D1900V2 – SN: 5d181
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	September 07, 2018
Description:	SAR Validation Dipole at 1900 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Agilent	N5182A	MXG Vector Signal Generator	3/19/2018	Annual	3/19/2019	US46240505
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2496A	Power Meter	10/9/2017	Annual	10/9/2018	1138001
Anritsu	MA2411B	Pulse Power Sensor	11/15/2017	Annual	11/15/2018	1339007
Anritsu	MA2411B	Pulse Power Sensor	11/22/2017	Annual	11/22/2018	1339008
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/14/2017	Biennial	2/14/2019	170112507
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/15/2018	Annual	5/15/2019	1070
SPEAG	ES3DV3	SAR Probe	9/18/2017	Annual	9/18/2018	3287
SPEAG	DAE4	Data Acquisition Electronics	1/26/2018	Annual	1/26/2019	1533
SPEAG	ES3DV3	SAR Probe	3/13/2018	Annual	3/13/2019	3131
SPEAG	DAE4	Dasy Data Acquisition Electronics	3/7/2018	Annual	3/7/2019	604

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Sangmin Cha	Team Lead Engineer	
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

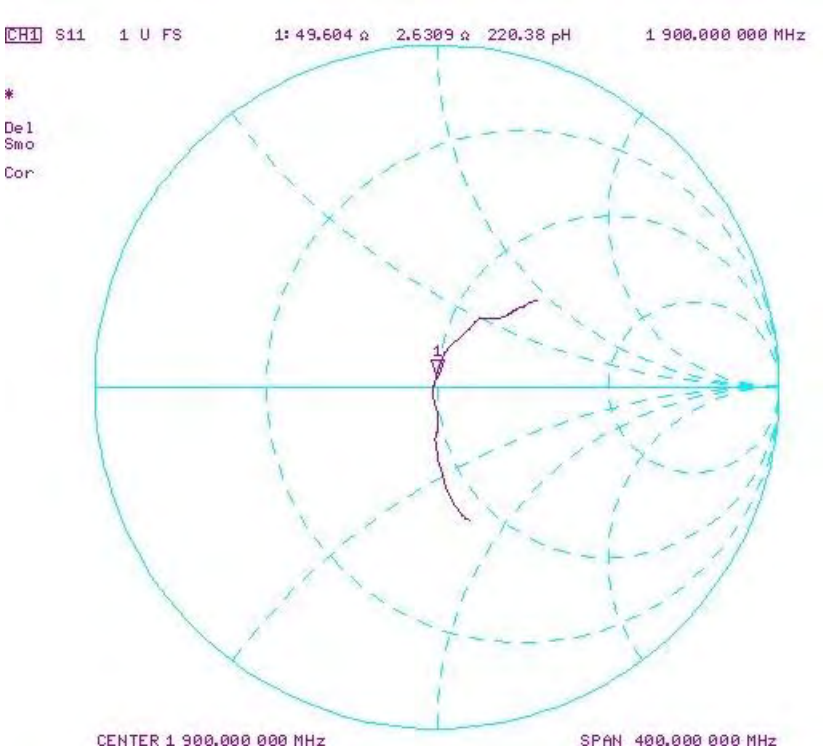
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

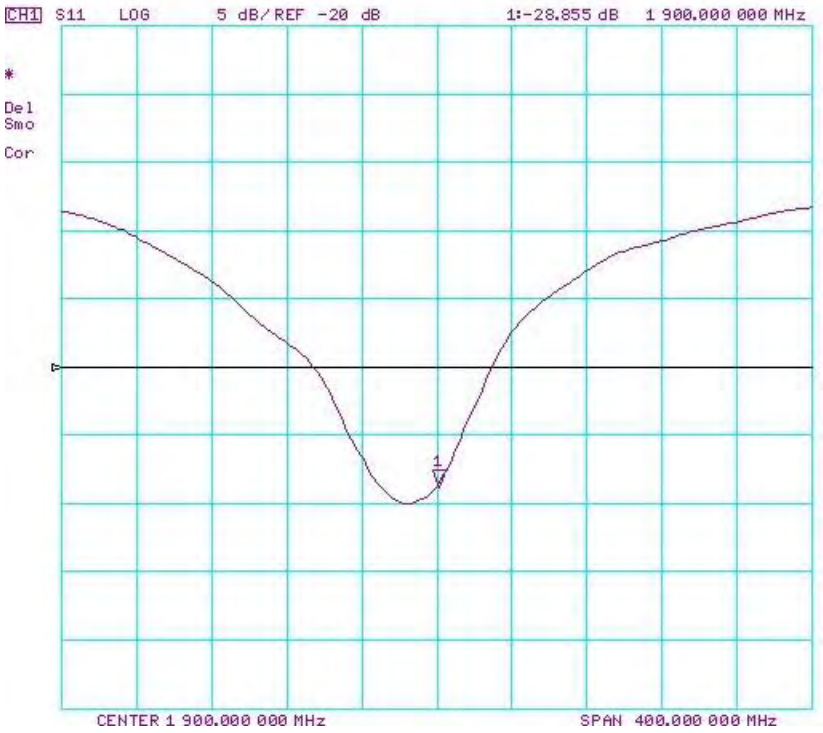
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
9/7/2017	9/7/2018	1.2	3.95	3.99	1.01%	2.06	2.07	0.49%	53.7	49.6	4.1	4.6	2.6	2	-24.9	-28.9	-16.10%	PASS

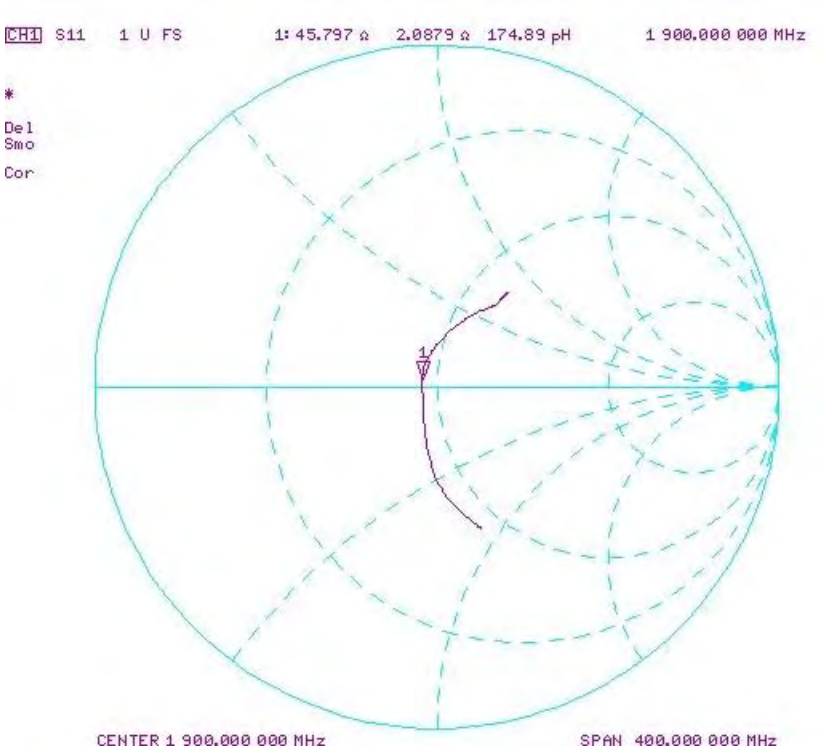
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
9/7/2017	9/7/2018	1.2	3.95	4.13	4.56%	2.09	2.14	2.39%	49.2	45.8	3.4	5.6	2.1	3.5	-24.8	-24.7	0.40%	PASS

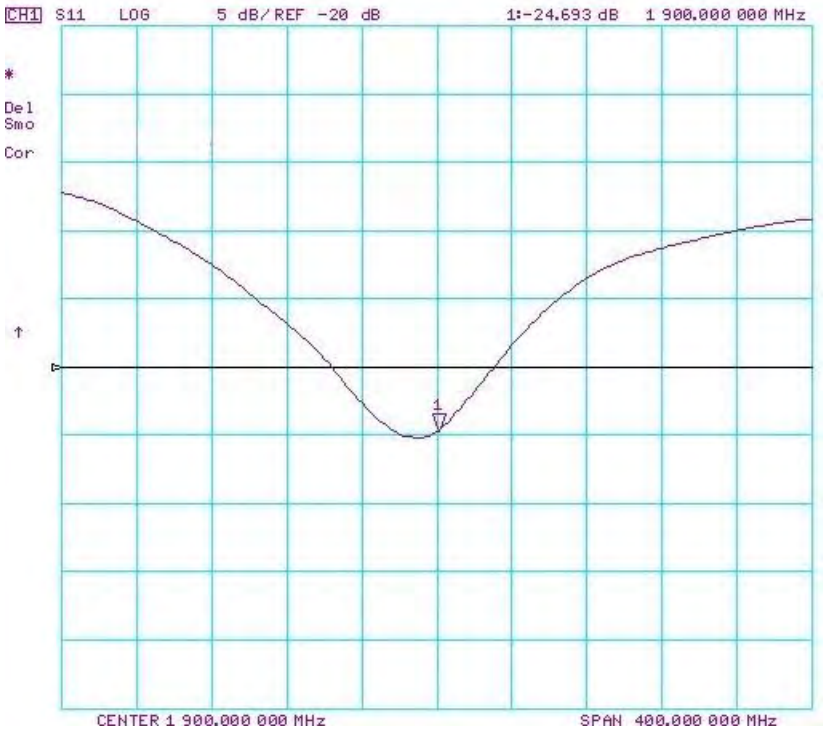
Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL





Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Swiss Calibration Service

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client PC Test

Certificate No: D2300V2-1038_Mar18

CALIBRATION CERTIFICATE

Object: D2300V2 - SN:1038

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

SC ✓ 3/21/18

SC ✓ 2/25/19

Calibration date: March 07, 2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 9, 2018

Calibration Laboratory of
Schmid & Partner
Engineering AG
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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2300 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.5	1.67 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.6 ± 6 %	1.70 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	12.5 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**49.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.94 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.6 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.9	1.81 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.6 ± 6 %	1.86 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	11.9 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**46.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.69 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.5 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.8 Ω - 4.9 jΩ
Return Loss	- 25.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	45.9 Ω - 3.4 jΩ
Return Loss	- 25.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.170 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 02, 2013

DASY5 Validation Report for Head TSL

Date: 07.03.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: D2300V2 - SN:1038

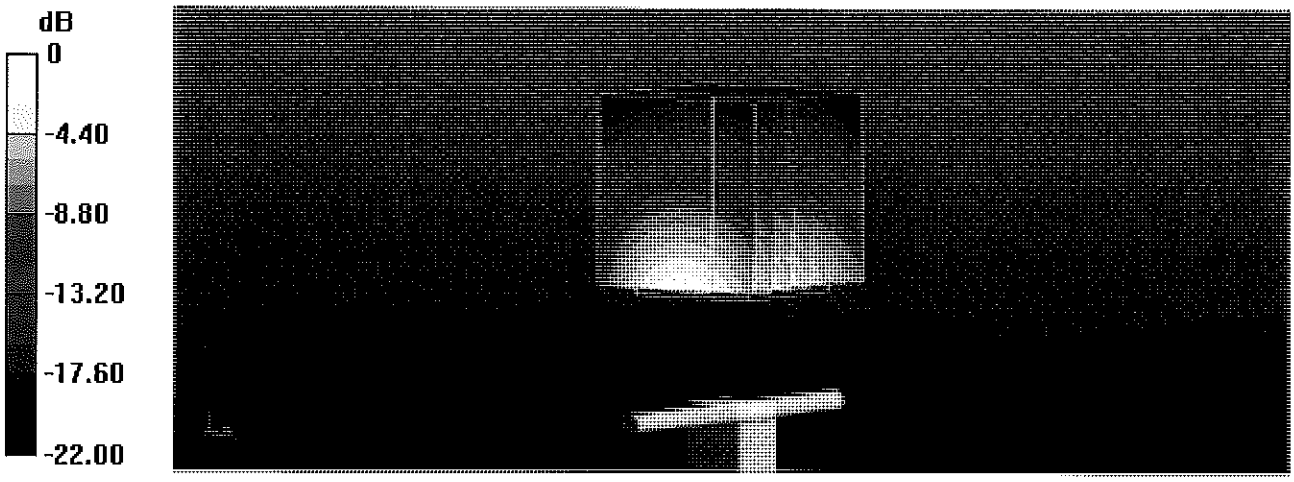
Communication System: UID 0 - CW; Frequency: 2300 MHz
Medium parameters used: f = 2300 MHz; σ = 1.7 S/m; ε_r = 38.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.08, 8.08, 8.08); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

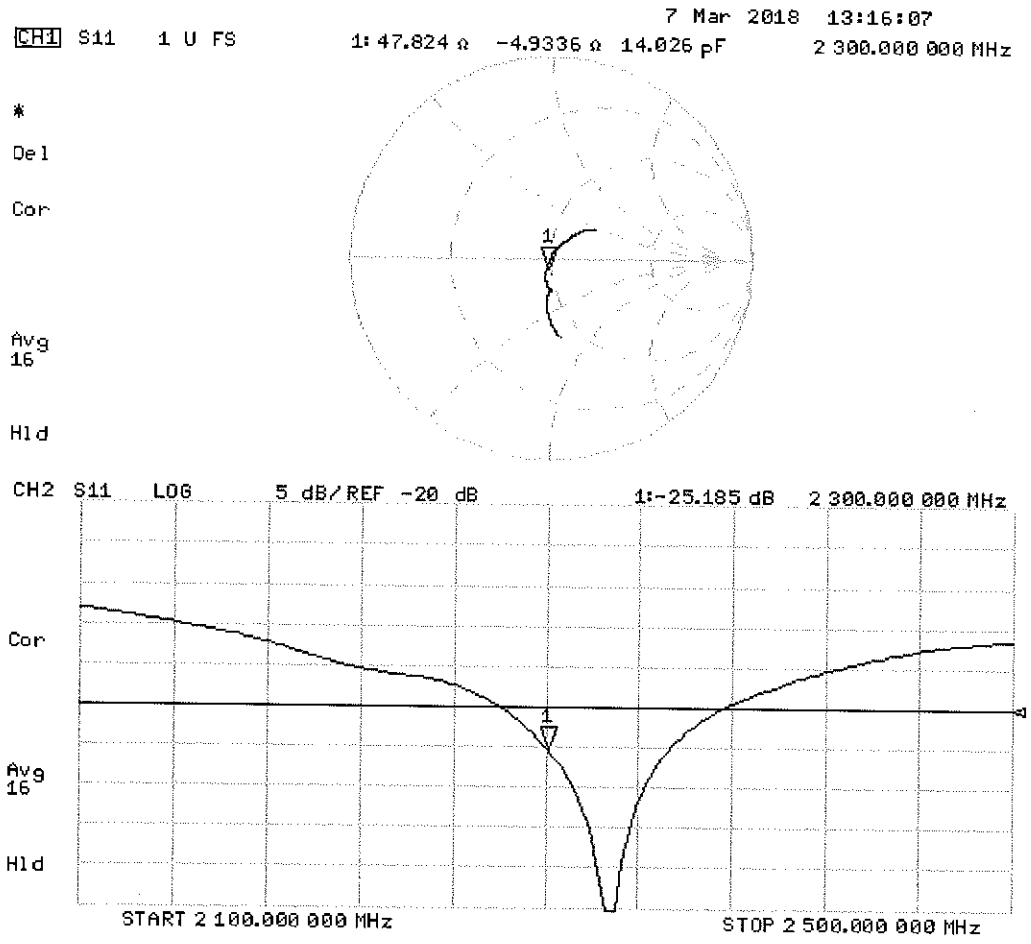
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 112.4 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 24.5 W/kg
SAR(1 g) = 12.5 W/kg; SAR(10 g) = 5.94 W/kg
Maximum value of SAR (measured) = 19.6 W/kg



0 dB = 19.6 W/kg = 12.92 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 07.03.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2300 MHz; Type: D2300V2; Serial: D2300V2 - SN:1038

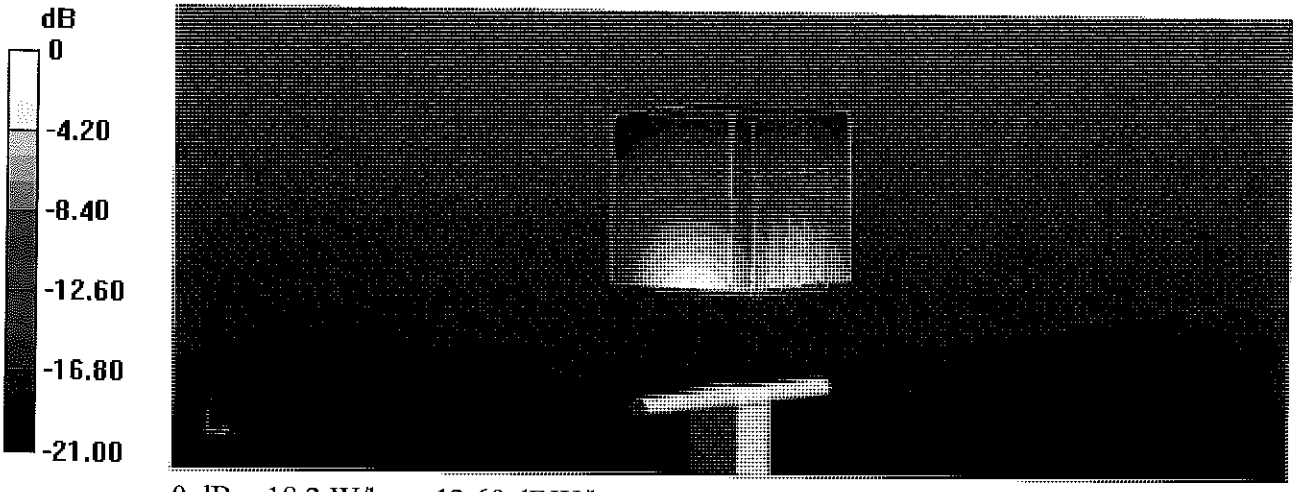
Communication System: UID 0 - CW; Frequency: 2300 MHz
Medium parameters used: f = 2300 MHz; σ = 1.86 S/m; ε_r = 51.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.08, 8.08, 8.08); Calibrated: 30.12.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

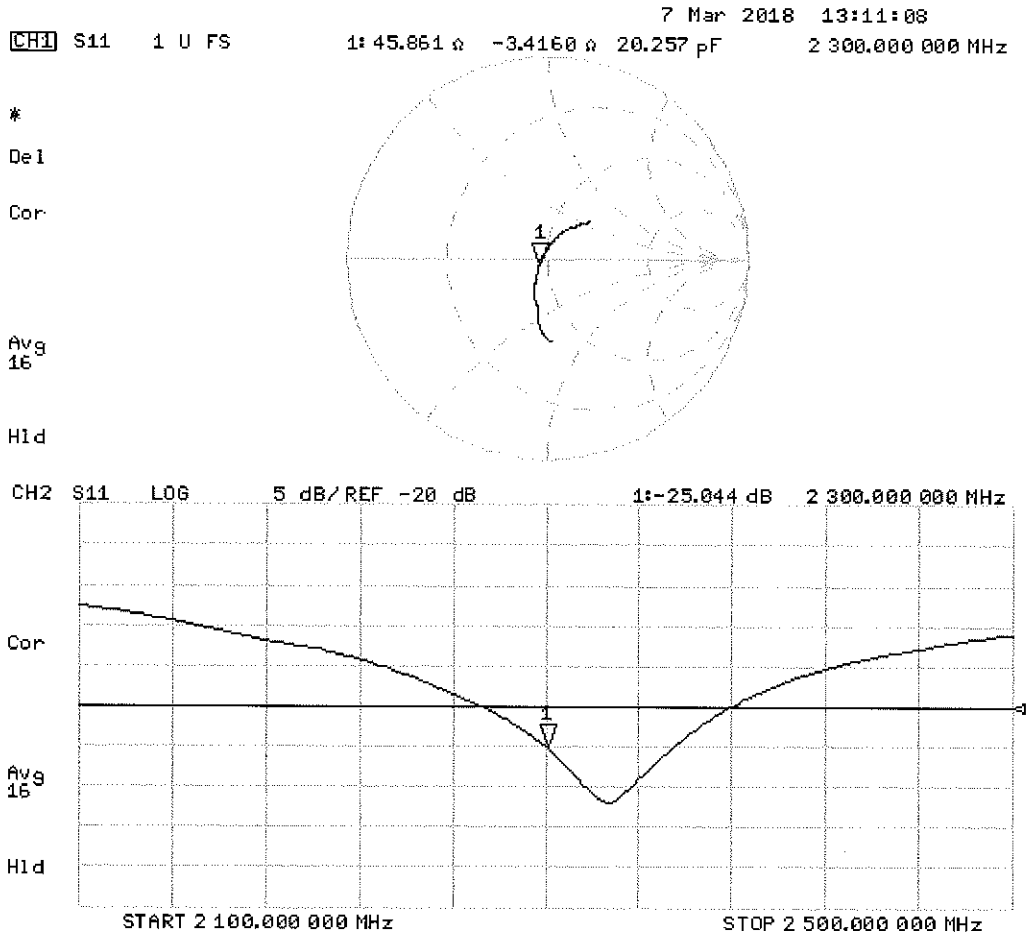
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 104.5 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 23.0 W/kg
SAR(1 g) = 11.9 W/kg; SAR(10 g) = 5.69 W/kg
Maximum value of SAR (measured) = 18.2 W/kg



0 dB = 18.2 W/kg = 12.60 dBW/kg

Impedance Measurement Plot for Body TSL



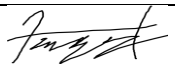
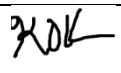
Certification of Calibration

Object	D2300V2 – SN: 1038
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	February 25, 2019
Description:	SAR Validation Dipole at 2300 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	10/2/2018	Annual	10/2/2019	US39170118
Agilent	N5182A	MXG Vector Signal Generator	6/15/2018	Annual	6/15/2019	MY47420837
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	1207470
Anritsu	MA2411B	Pulse Power Sensor	11/20/2018	Annual	11/20/2019	1339007
Anritsu	ML2496A	Power Meter	10/21/2018	Annual	10/21/2019	1138001
Control Company	4040	Therm./Clock/Humidity Monitor	3/31/2017	Biennial	3/31/2019	170232394
Control Company	4352	Ultra Long Stem Thermometer	5/2/2017	Biennial	5/2/2019	170330156
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Agilent	85033E	3.5mm Standard Calibration Kit	8/13/2018	Annual	8/13/2019	MY53402352
MiniCircuits	VLF-6000+	Low Pass Filter	CBT	N/A	CBT	N/A
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Seekonk	NC-100	Torque Wrench	7/11/2018	Annual	7/11/2019	N/A
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/12/2018	Annual	4/12/2019	501
SPEAG	DAE4	Dasy Data Acquisition Electronics	10/18/2018	Annual	10/18/2019	1364
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/15/2018	Annual	5/15/2019	1070
SPEAG	ES3DV3	SAR Probe	4/12/2018	Annual	4/12/2019	3275
SPEAG	EX3DV4	SAR Probe	7/20/2018	Annual	7/20/2019	7491

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Sangmin Cha	Team Lead Engineer	
Approved By:	Kaitlin O'Keefe	Managing Director	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

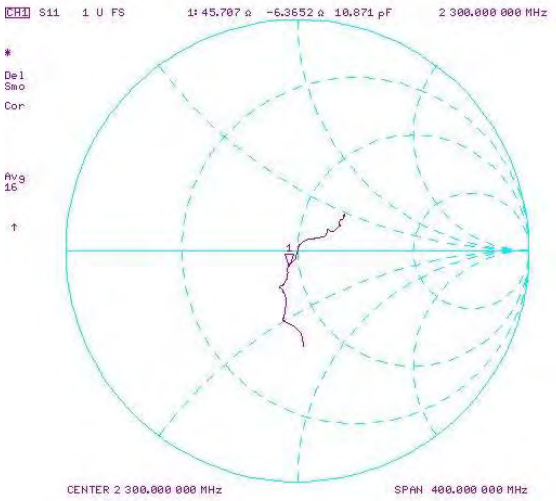
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

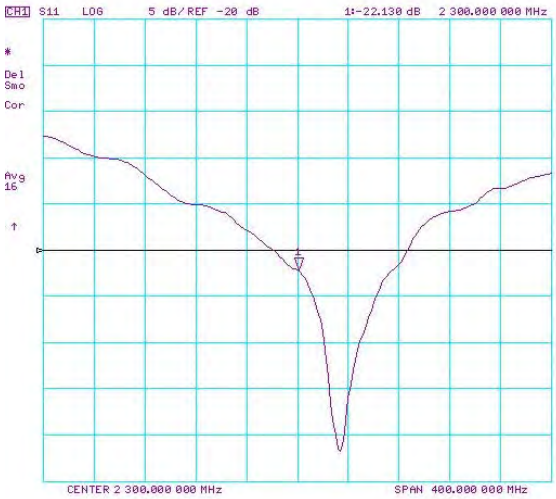
The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
3/7/2018	2/25/2019	1.17	4.93	4.77	-3.25%	2.36	2.29	-2.97%	47.8	45.7	2.1	-4.9	-6.4	1.5	-25.2	-22.1	12.30%	PASS

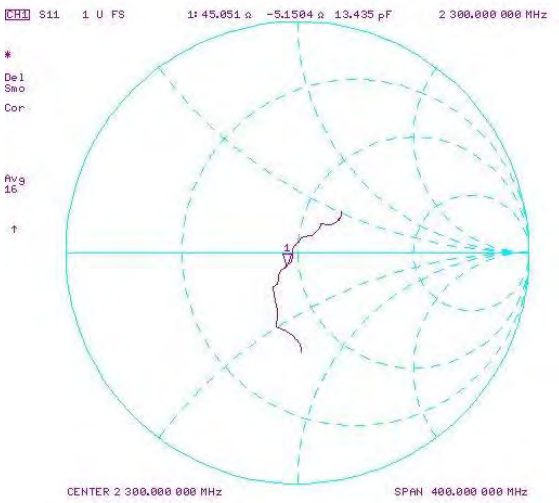
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
3/7/2018	2/25/2019	1.17	4.67	4.82	3.21%	2.25	2.27	0.89%	45.9	45.1	0.8	-3.4	-5.2	1.8	-25	-22.7	9.20%	PASS

Impedance & Return-Loss Measurement Plot for Head TSL





Impedance & Return-Loss Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client PC Test

Certificate No: D2450V2-921_Nov18

CALIBRATION CERTIFICATE

Object: D2450V2 - SN:921

Calibration procedure(s): QA CAL-05.v10
Calibration procedure for dipole validation kits above 700 MHz

SC ✓ 12/4/2018

Calibration date: November 12, 2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 7349	30-Dec-17 (No. EX3-7349_Dec17)	Dec-18
DAE4	SN: 601	04-Oct-18 (No. DAE4-601_Oct18)	Oct-19

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-18)	In house check: Oct-20
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-18)	In house check: Oct-20
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 12, 2018

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.9 ± 6 %	1.86 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.1 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.8 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.4 ± 6 %	2.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.0 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.03 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.8 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.7 Ω + 6.5 jΩ
Return Loss	- 22.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.7 Ω + 7.8 jΩ
Return Loss	- 22.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.157 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	September 26, 2013

DASY5 Validation Report for Head TSL

Date: 12.11.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:921

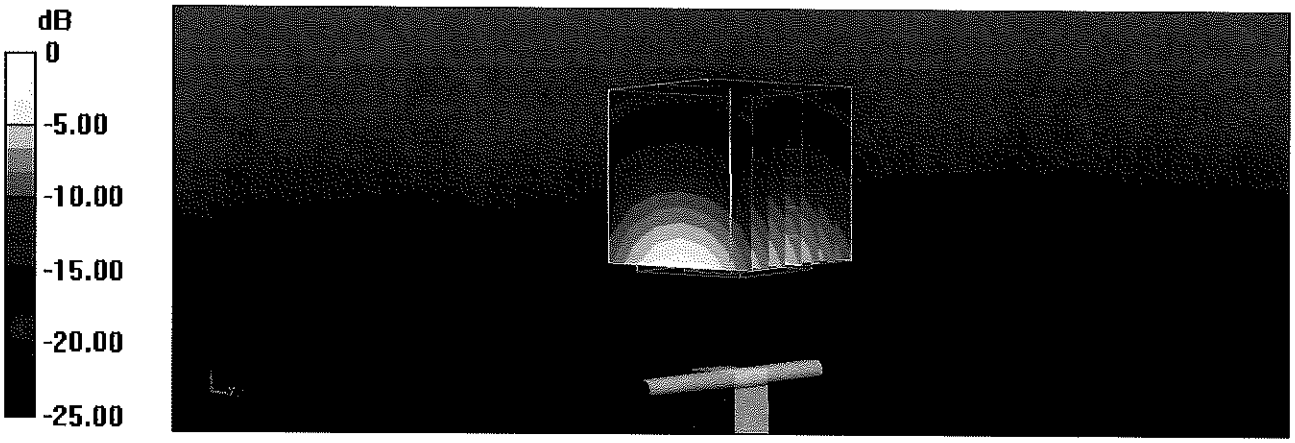
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.86 S/m; ε_r = 37.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.88, 7.88, 7.88) @ 2450 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

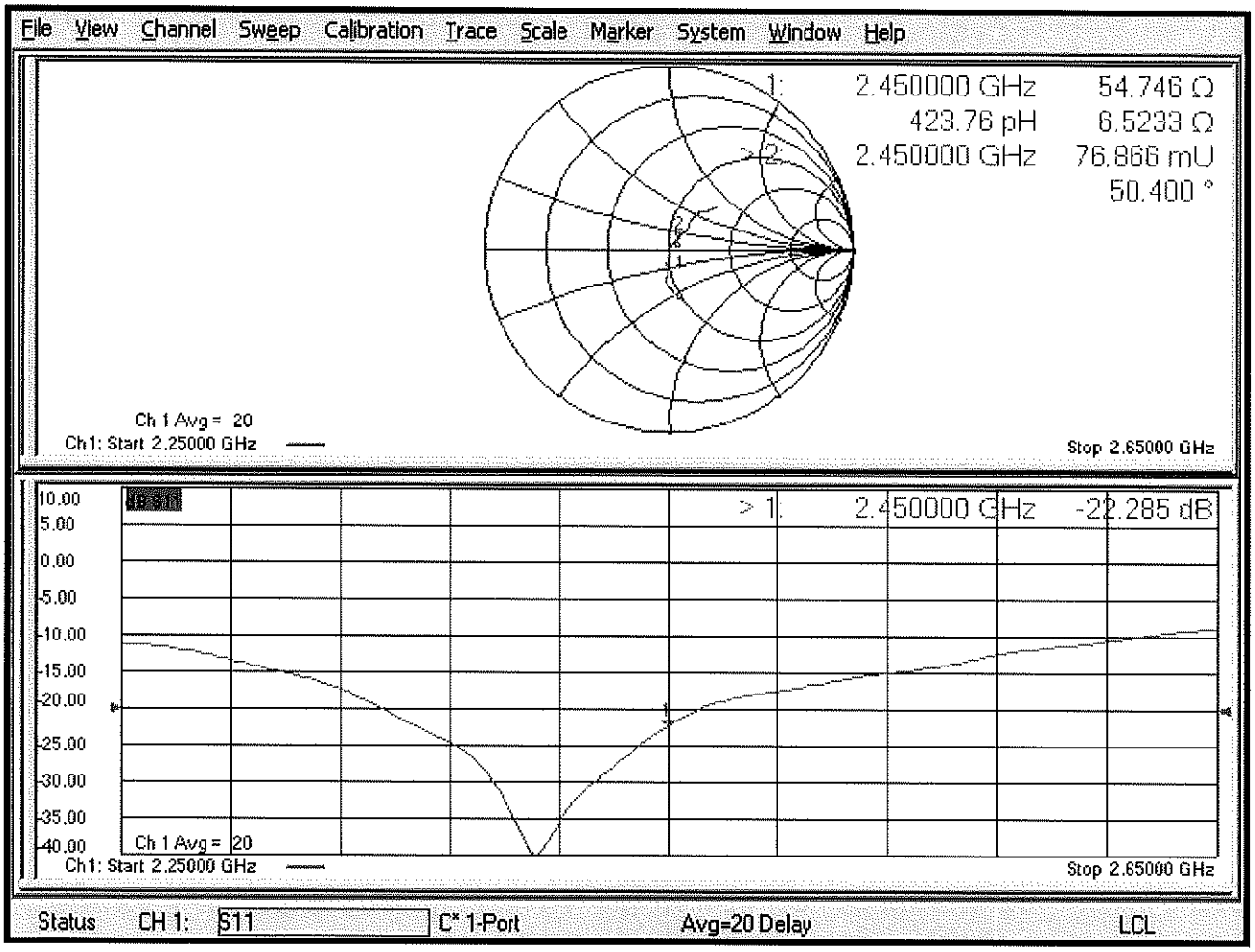
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 117.7 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 27.4 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.28 W/kg
Maximum value of SAR (measured) = 22.4 W/kg



0 dB = 22.4 W/kg = 13.50 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 12.11.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:921

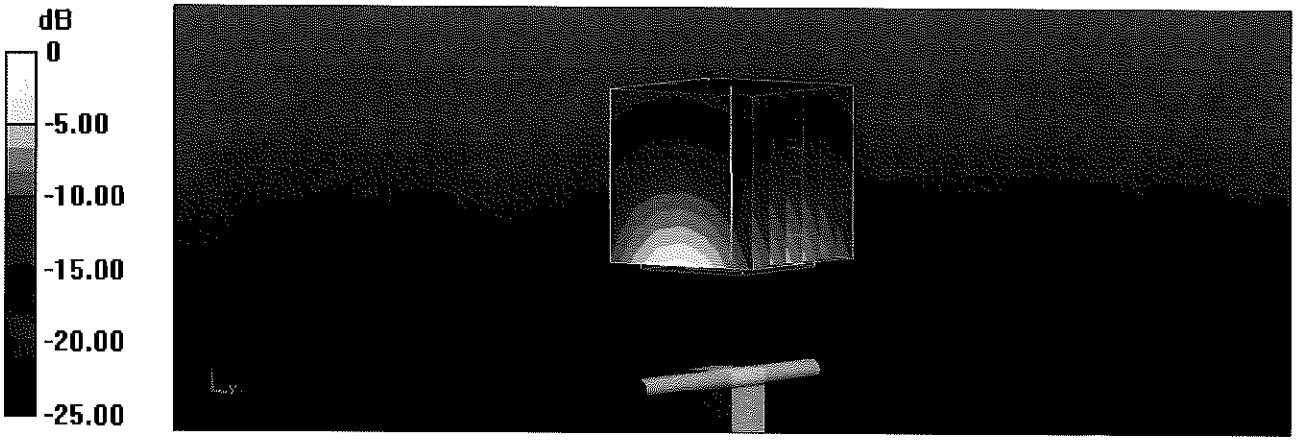
Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.02 S/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(8.01, 8.01, 8.01) @ 2450 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 04.10.2018
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.2(1495); SEMCAD X 14.6.12(7450)

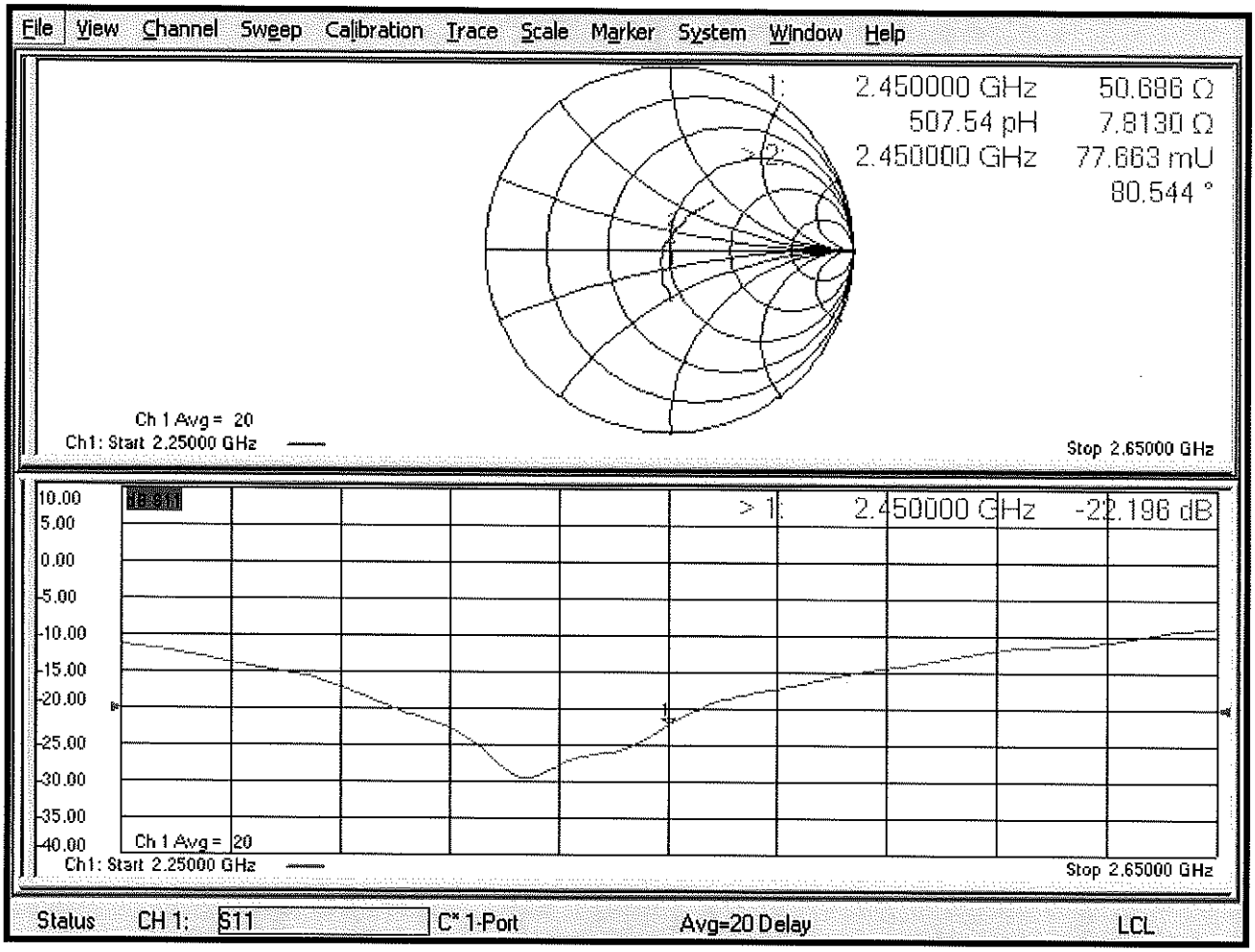
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 108.6 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 26.1 W/kg
SAR(1 g) = 13 W/kg; SAR(10 g) = 6.03 W/kg
Maximum value of SAR (measured) = 21.3 W/kg



0 dB = 21.3 W/kg = 13.28 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client **PC Test**

Certificate No: D2600V2-1069_Sep17

CALIBRATION CERTIFICATE

Object D2600V2 - SN:1069

Calibration procedure(s) QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

SCV 10/03/2017

Calibration date: September 11, 2017

SCV 9/10/2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-17 (No. 217-02521/02522)	Apr-18
Power sensor NRP-Z91	SN: 103244	04-Apr-17 (No. 217-02521)	Apr-18
Power sensor NRP-Z91	SN: 103245	04-Apr-17 (No. 217-02522)	Apr-18
Reference 20 dB Attenuator	SN: 5058 (20k)	07-Apr-17 (No. 217-02528)	Apr-18
Type-N mismatch combination	SN: 5047.2 / 06327	07-Apr-17 (No. 217-02529)	Apr-18
Reference Probe EX3DV4	SN: 7349	31-May-17 (No. EX3-7349_May17)	May-18
DAE4	SN: 601	28-Mar-17 (No. DAE4-601_Mar17)	Mar-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (In house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (In house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (In house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (In house check Oct-16)	In house check: Oct-18
Network Analyzer HP 8753E	SN: US37390585	18-Oct-01 (In house check Oct-16)	In house check: Oct-17

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 11, 2017

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.0
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.2 ± 6 %	2.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**56.9 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.45 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.4 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.4 ± 6 %	2.23 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	14.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**55.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.26 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.8 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.1 Ω - 6.1 jΩ
Return Loss	- 24.1 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.2 Ω - 4.7 jΩ
Return Loss	- 24.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.152 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 17, 2013

DASY5 Validation Report for Head TSL

Date: 11.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1069

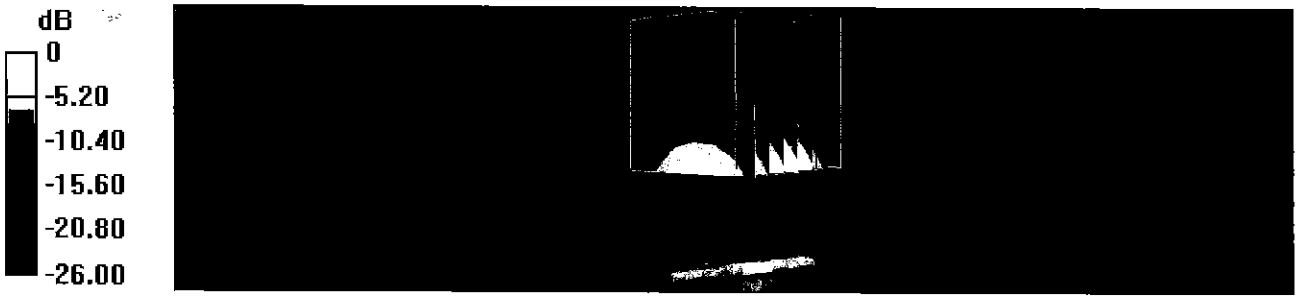
Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.03 S/m; ε_r = 37.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN7349; ConvF(7.96, 7.96, 7.96); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

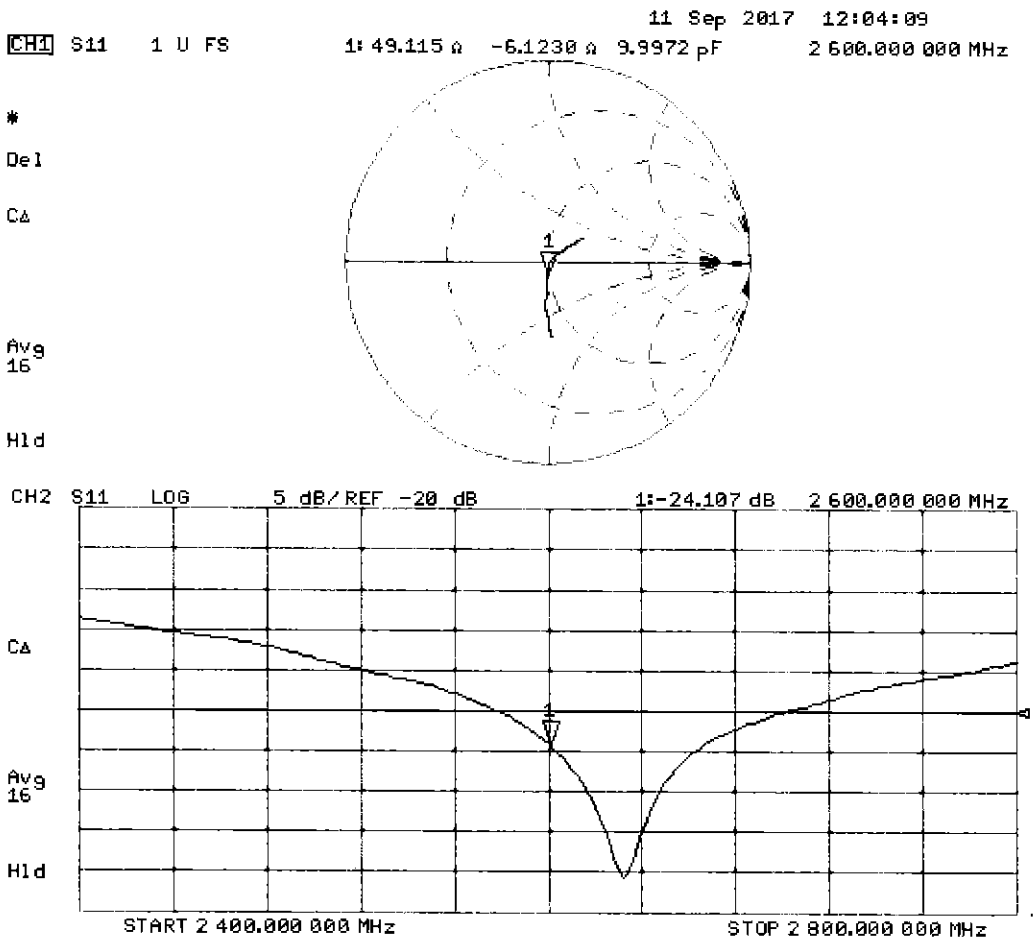
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 115.4 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 31.2 W/kg
SAR(1 g) = 14.6 W/kg; SAR(10 g) = 6.45 W/kg
Maximum value of SAR (measured) = 24.5 W/kg



0 dB = 24.5 W/kg = 13.89 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 11.09.2017

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1069

Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.23 S/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

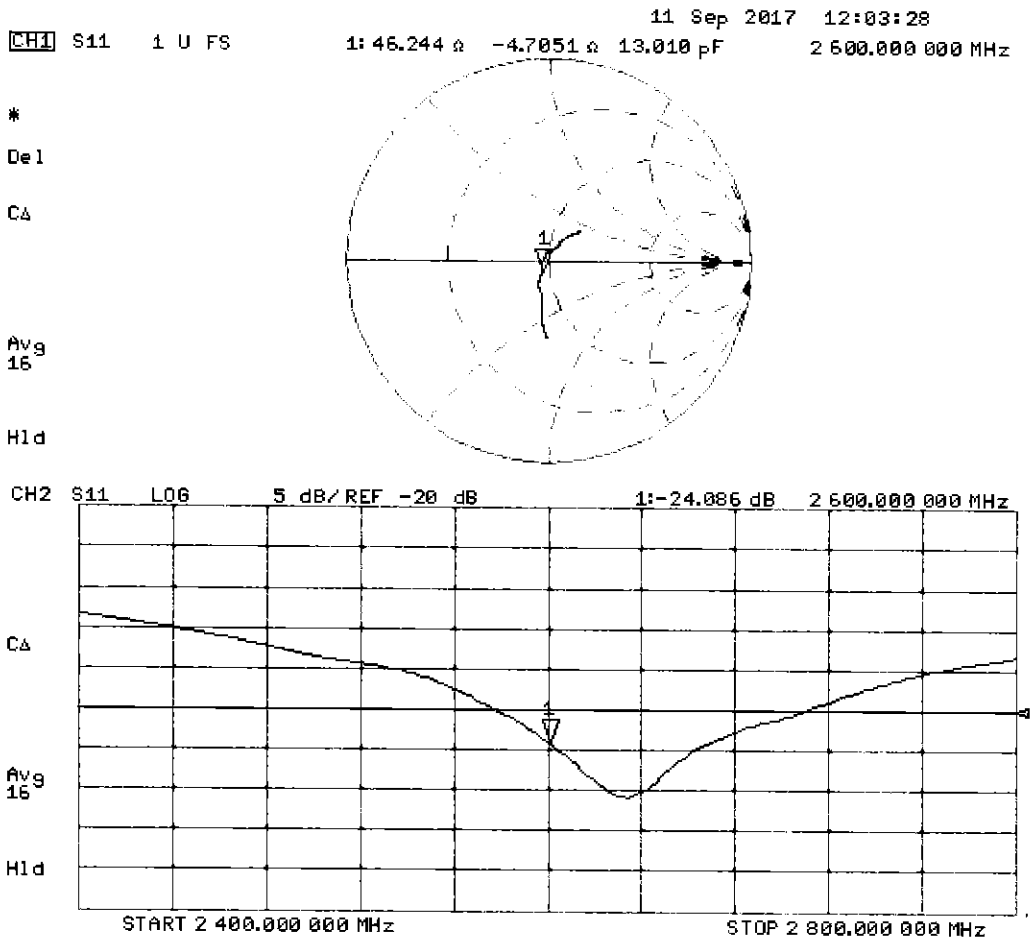
- Probe: EX3DV4 - SN7349; ConvF(7.94, 7.94, 7.94); Calibrated: 31.05.2017;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 28.03.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.0(1446); SEMCAD X 14.6.10(7417)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 105.7 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 29.9 W/kg
SAR(1 g) = 14.1 W/kg; SAR(10 g) = 6.26 W/kg
Maximum value of SAR (measured) = 22.9 W/kg

0 dB = 22.9 W/kg = 13.60 dBW/kg

Impedance Measurement Plot for Body TSL



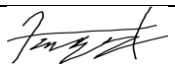
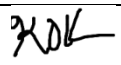
Certification of Calibration

Object	D2600V2 – SN: 1069
Calibration procedure(s)	Procedure for Calibration Extension for SAR Dipoles.
Extended Calibration date:	September 10, 2018
Description:	SAR Validation Dipole at 2600 MHz.

Calibration Equipment used:

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	8753ES	S-Parameter Network Analyzer	9/14/2017	Annual	9/14/2018	US39170118
Agilent	N5182A	MXG Vector Signal Generator	3/19/2018	Annual	3/19/2019	US46240505
Amplifier Research	15S1G6	Amplifier	CBT	N/A	CBT	343972
Anritsu	ML2496A	Power Meter	10/9/2017	Annual	10/9/2018	1138001
Anritsu	MA2411B	Pulse Power Sensor	11/15/2017	Annual	11/15/2018	1339007
Anritsu	MA2411B	Pulse Power Sensor	11/22/2017	Annual	11/22/2018	1339008
Control Company	4040	Temperature / Humidity Monitor	2/28/2018	Biennial	2/28/2020	150761911
Control Company	4352	Ultra Long Stem Thermometer	2/14/2017	Biennial	2/14/2019	170112507
Keysight	772D	Dual Directional Coupler	CBT	N/A	CBT	MY52180215
Keysight Technologies	85033E	Standard Mechanical Calibration Kit (DC to 9GHz, 3.5mm)	6/4/2018	Annual	6/4/2019	MY53401181
Mini-Circuits	BW-N20W5+	DC to 18 GHz Precision Fixed 20 dB Attenuator	CBT	N/A	CBT	N/A
Mini-Circuits	NLP-2950+	Low Pass Filter DC to 2700 MHz	CBT	N/A	CBT	N/A
Narda	4772-3	Attenuator (3dB)	CBT	N/A	CBT	9406
Pasternack	PE2209-10	Bidirectional Coupler	CBT	N/A	CBT	N/A
Pasternack	PE5011-1	Torque Wrench	7/19/2017	Biennial	7/19/2019	N/A
SPEAG	DAK-3.5	Dielectric Assessment Kit	5/15/2018	Annual	5/15/2019	1070
SPEAG	ES3DV3	SAR Probe	9/18/2017	Annual	9/18/2018	3287
SPEAG	DAE4	Data Acquisition Electronics	1/26/2018	Annual	1/26/2019	1533
SPEAG	ES3DV3	SAR Probe	4/12/2018	Annual	4/12/2019	3275
SPEAG	DAE4	Dasy Data Acquisition Electronics	4/12/2018	Annual	4/12/2019	501

Measurement Uncertainty = ±23% (k=2)

	Name	Function	Signature
Calibrated By:	Sangmin Cha	Team Lead Engineer	
Approved By:	Kaitlin O'Keefe	Senior Technical Manager	

DIPOLE CALIBRATION EXTENSION

Per KDB 865664 D01, calibration intervals of up to three years may be considered for reference dipoles when it is demonstrated that the SAR target, impedance and return loss of a dipole have remained stable according to the following requirements:

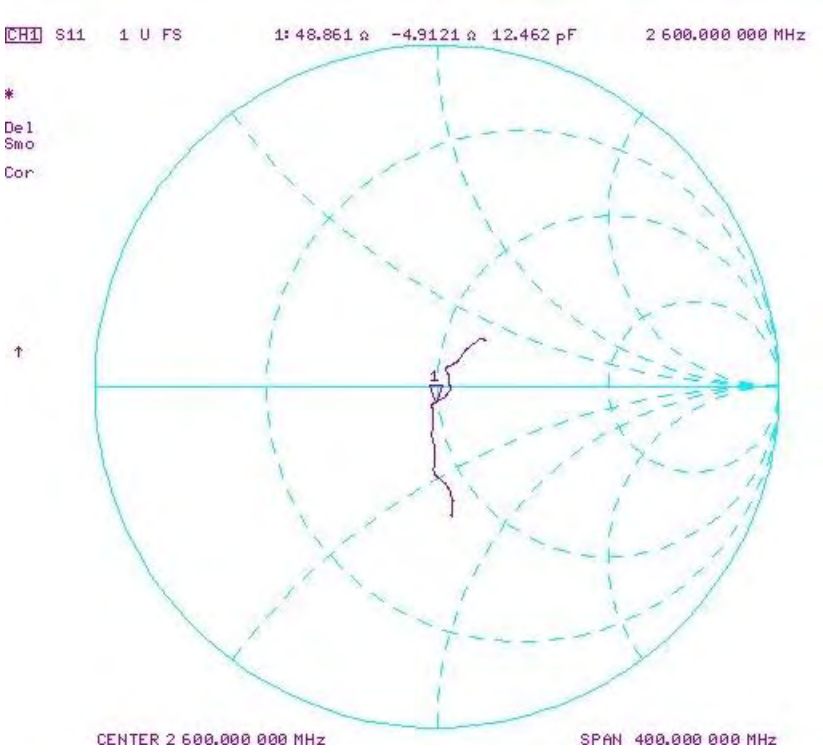
1. The measured SAR does not deviate more than 10% from the target on the calibration certificate.
2. The return-loss does not deviate more than 20% from the previous measurement and meets the required 20dB minimum return-loss requirement.
3. The measurement of real or imaginary parts of impedance does not deviate more than 5Ω from the previous measurement.

The following dipole was checked to pass the above 3 requirements to have 2-year calibration period from the calibration date:

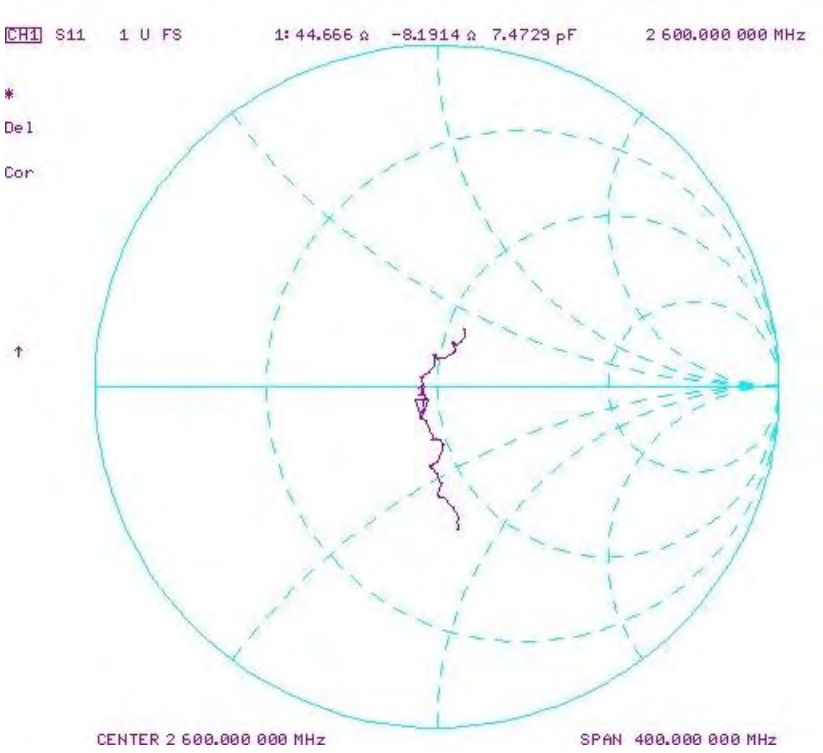
Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Head (1g) W/kg @ 20.0 dBm	Measured Head SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Head (10g) W/kg @ 20.0 dBm	Measured Head SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Head (Ohm) Real	Measured Impedance Head (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Head (Ohm) Imaginary	Measured Impedance Head (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Head (dB)	Measured Return Loss Head (dB)	Deviation (%)	PASS/FAIL
9/11/2017	9/10/2018	1.152	5.69	5.52	-2.99%	2.54	2.51	-1.18%	49.1	48.9	0.2	-6.1	-4.9	1.2	-24.1	-25.8	-7.10%	PASS

Calibration Date	Extension Date	Certificate Electrical Delay (ns)	Certificate SAR Target Body (1g) W/kg @ 20.0 dBm	Measured Body SAR (1g) W/kg @ 20.0 dBm	Deviation 1g (%)	Certificate SAR Target Body (10g) W/kg @ 20.0 dBm	Measured Body SAR (10g) W/kg @ 20.0 dBm	Deviation 10g (%)	Certificate Impedance Body (Ohm) Real	Measured Impedance Body (Ohm) Real	Difference (Ohm) Real	Certificate Impedance Body (Ohm) Imaginary	Measured Impedance Body (Ohm) Imaginary	Difference (Ohm) Imaginary	Certificate Return Loss Body (dB)	Measured Return Loss Body (dB)	Deviation (%)	PASS/FAIL
9/11/2017	9/10/2018	1.152	5.53	5.28	-4.52%	2.48	2.35	-5.24%	46.2	44.7	1.5	-4.7	-8.2	3.5	-24.1	-21.3	11.60%	PASS

Impedance & Return-Loss Measurement Plot for Head TSL



Impedance & Return-Loss Measurement Plot for Body TSL



Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 0108

Client PC Test

Certificate No: D5GHzV2-1163_Sep18

CALIBRATION CERTIFICATE

Object: D5GHzV2 - SN:1163

Calibration procedure(s): QA CAL-22.v3
Calibration procedure for dipole validation kits between 3-6 GHz

SC ✓ 9/24/2018

Calibration date: September 13, 2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: 5058 (20k)	04-Apr-18 (No. 217-02682)	Apr-19
Type-N mismatch combination	SN: 5047.2 / 06327	04-Apr-18 (No. 217-02683)	Apr-19
Reference Probe EX3DV4	SN: 3503	30-Dec-17 (No. EX3-3503_Dec17)	Dec-18
DAE4	SN: 601	26-Oct-17 (No. DAE4-601_Oct17)	Oct-18

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power meter EPM-442A	SN: GB37480704	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: US37292783	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
Power sensor HP 8481A	SN: MY41092317	07-Oct-15 (in house check Oct-16)	In house check: Oct-18
RF generator R&S SMT-06	SN: 100972	15-Jun-15 (in house check Oct-16)	In house check: Oct-18
Network Analyzer Agilent E8358A	SN: US41080477	31-Mar-14 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Manu Seitz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: September 19, 2018

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.10.1
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom **V**5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy = 4.0 mm, dz = 1.4 mm	Graded Ratio = 1.4 (Z direction)
Frequency	5250 MHz ± 1 MHz 5600 MHz ± 1 MHz 5750 MHz ± 1 MHz	

Head TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	35.9	4.71 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	35.3 ± 6 %	4.52 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.10 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**80.6 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.33 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.1 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.5	5.07 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.8 ± 6 %	4.87 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.43 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**83.8 W / kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.42 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.0 W/kg ± 19.5 % (k=2)**

Head TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	35.4	5.22 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	34.6 ± 6 %	5.03 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	100 mW input power	8.16 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**81.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	100 mW input power	2.32 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**23.0 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5250 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.9	5.36 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.9 ± 6 %	5.46 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5250 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.83 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.7 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.17 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.5 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5600 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.5	5.77 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.3 ± 6 %	5.93 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5600 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	8.08 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**80.1 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.25 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**22.3 W/kg ± 19.5 % (k=2)**

Body TSL parameters at 5750 MHz

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	48.3	5.94 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	46.0 ± 6 %	6.14 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL at 5750 MHz

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	100 mW input power	7.85 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**77.8 W/kg ± 19.9 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	100 mW input power	2.18 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.5 W/kg ± 19.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL at 5250 MHz

Impedance, transformed to feed point	48.0 Ω - 2.0 jΩ
Return Loss	- 30.9 dB

Antenna Parameters with Head TSL at 5600 MHz

Impedance, transformed to feed point	49.0 Ω + 4.4 jΩ
Return Loss	- 26.8 dB

Antenna Parameters with Head TSL at 5750 MHz

Impedance, transformed to feed point	50.9 Ω + 4.3 jΩ
Return Loss	- 27.2 dB

Antenna Parameters with Body TSL at 5250 MHz

Impedance, transformed to feed point	46.4 Ω - 0.4 jΩ
Return Loss	- 28.5 dB

Antenna Parameters with Body TSL at 5600 MHz

Impedance, transformed to feed point	50.2 Ω + 4.1 jΩ
Return Loss	- 27.8 dB

Antenna Parameters with Body TSL at 5750 MHz

Impedance, transformed to feed point	51.8 Ω + 5.9 jΩ
Return Loss	- 24.3 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.202 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	June 06, 2013

DASY5 Validation Report for Head TSL

Date: 13.09.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1163

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 4.52 S/m; ε_r = 35.3; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 4.87 S/m; ε_r = 34.8; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 5.03 S/m; ε_r = 34.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.51, 5.51, 5.51) @ 5250 MHz,
  ConvF(5.05, 5.05, 5.05) @ 5600 MHz, ConvF(4.98, 4.98, 4.98) @ 5750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601 (5GHz); Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (front); Type: QD 000 P50 AA; Serial: 1001
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

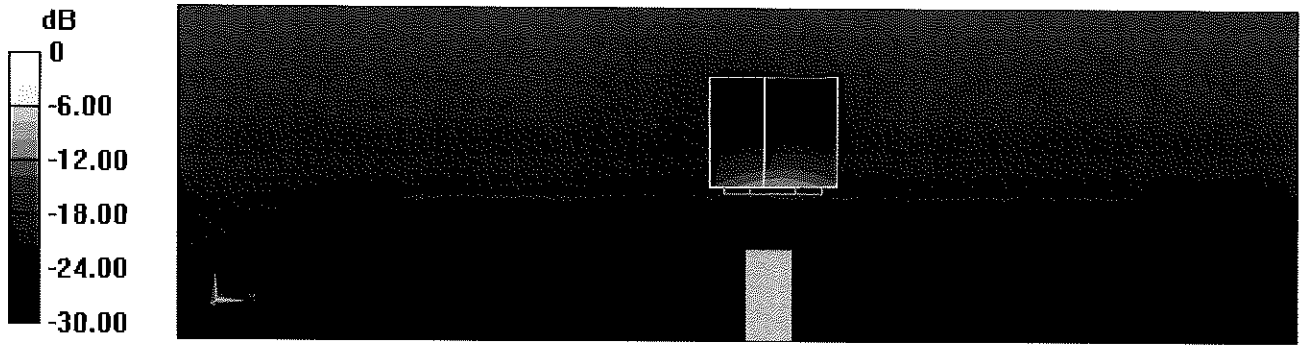
Reference Value = 77.54 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 26.6 W/kg
SAR(1 g) = 8.1 W/kg; SAR(10 g) = 2.33 W/kg
Maximum value of SAR (measured) = 17.9 W/kg

Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 77.29 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 30.6 W/kg
SAR(1 g) = 8.43 W/kg; SAR(10 g) = 2.42 W/kg
Maximum value of SAR (measured) = 19.3 W/kg

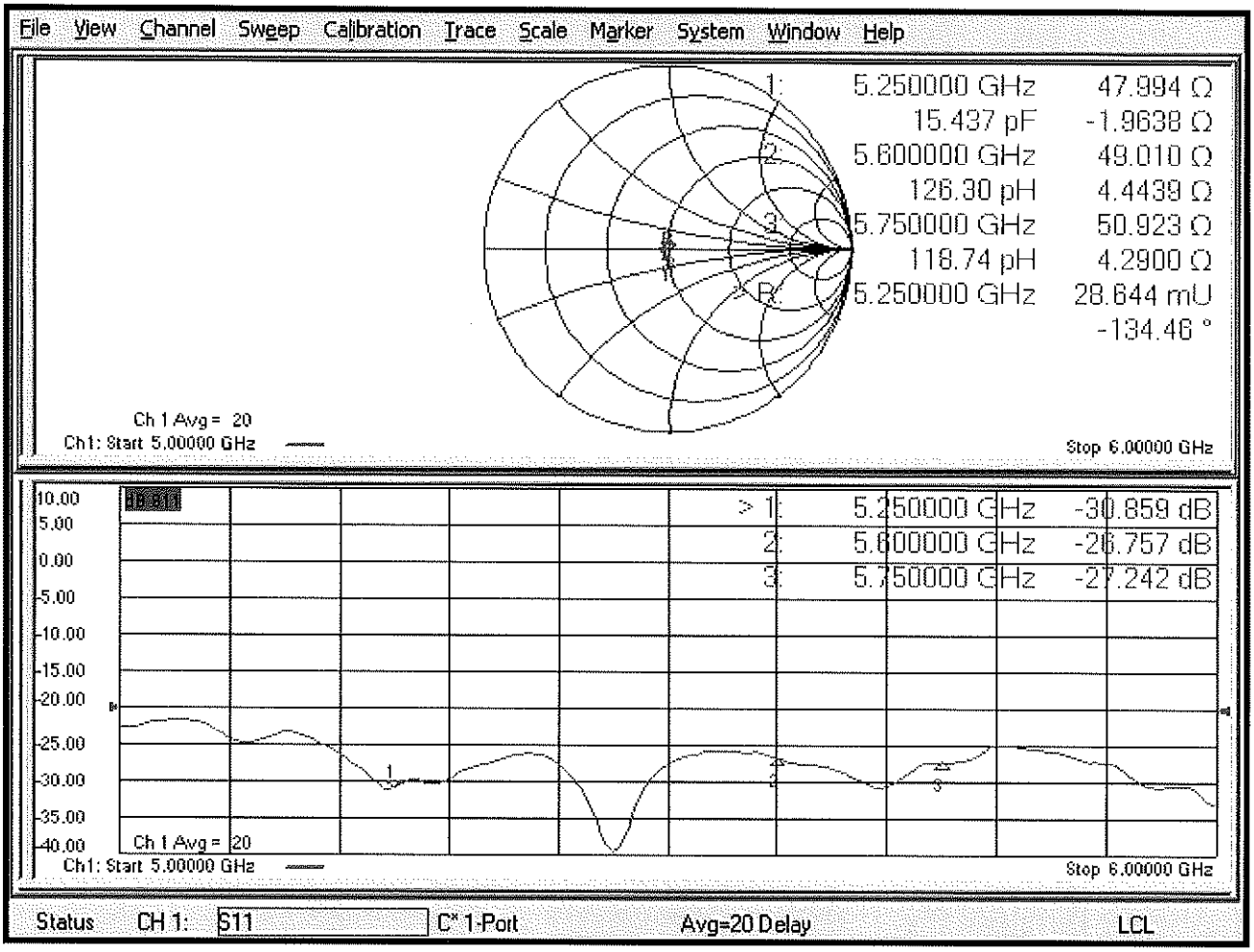
Dipole Calibration for Head Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm

Reference Value = 75.35 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 30.3 W/kg
SAR(1 g) = 8.16 W/kg; SAR(10 g) = 2.32 W/kg
Maximum value of SAR (measured) = 18.9 W/kg



0 dB = 17.9 W/kg = 12.53 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 12.09.2018

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole D5GHzV2; Type: D5GHzV2; Serial: D5GHzV2 - SN:1163

Communication System: UID 0 - CW; Frequency: 5250 MHz, Frequency: 5600 MHz, Frequency: 5750 MHz
Medium parameters used: f = 5250 MHz; σ = 5.46 S/m; ε_r = 46.9; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5600 MHz; σ = 5.93 S/m; ε_r = 46.3; ρ = 1000 kg/m^3 ,
Medium parameters used: f = 5750 MHz; σ = 6.14 S/m; ε_r = 46; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

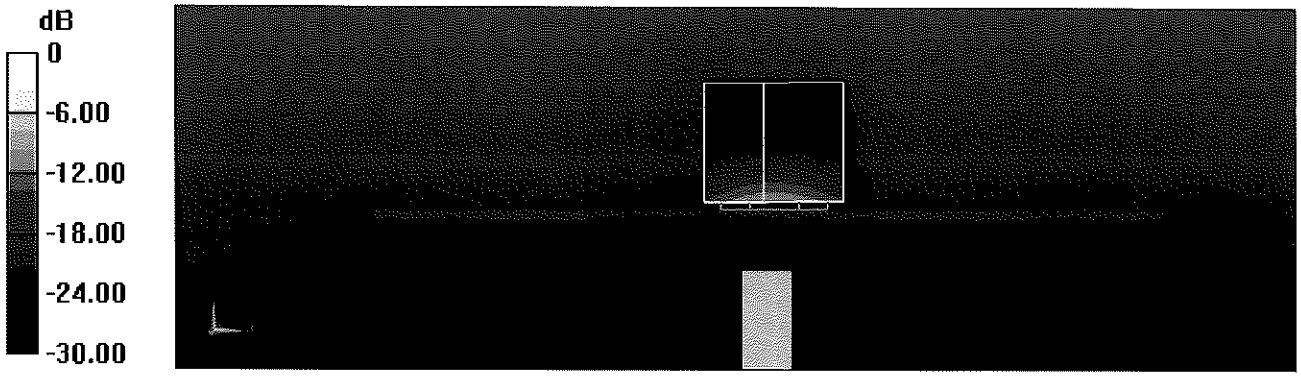
DASY52 Configuration:

- Probe: EX3DV4 - SN3503; ConvF(5.26, 5.26, 5.26) @ 5250 MHz,
  ConvF(4.65, 4.65, 4.65) @ 5600 MHz, ConvF(4.57, 4.57, 4.57) @ 5750 MHz; Calibrated: 30.12.2017
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601 (5GHz); Calibrated: 26.10.2017
- Phantom: Flat Phantom 5.0 (back); Type: QD 000 P50 AA; Serial: 1002
- DASY52 52.10.1(1476); SEMCAD X 14.6.11(7439)

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5250 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 69.57 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 29.9 W/kg
SAR(1 g) = 7.83 W/kg; SAR(10 g) = 2.17 W/kg
Maximum value of SAR (measured) = 17.8 W/kg

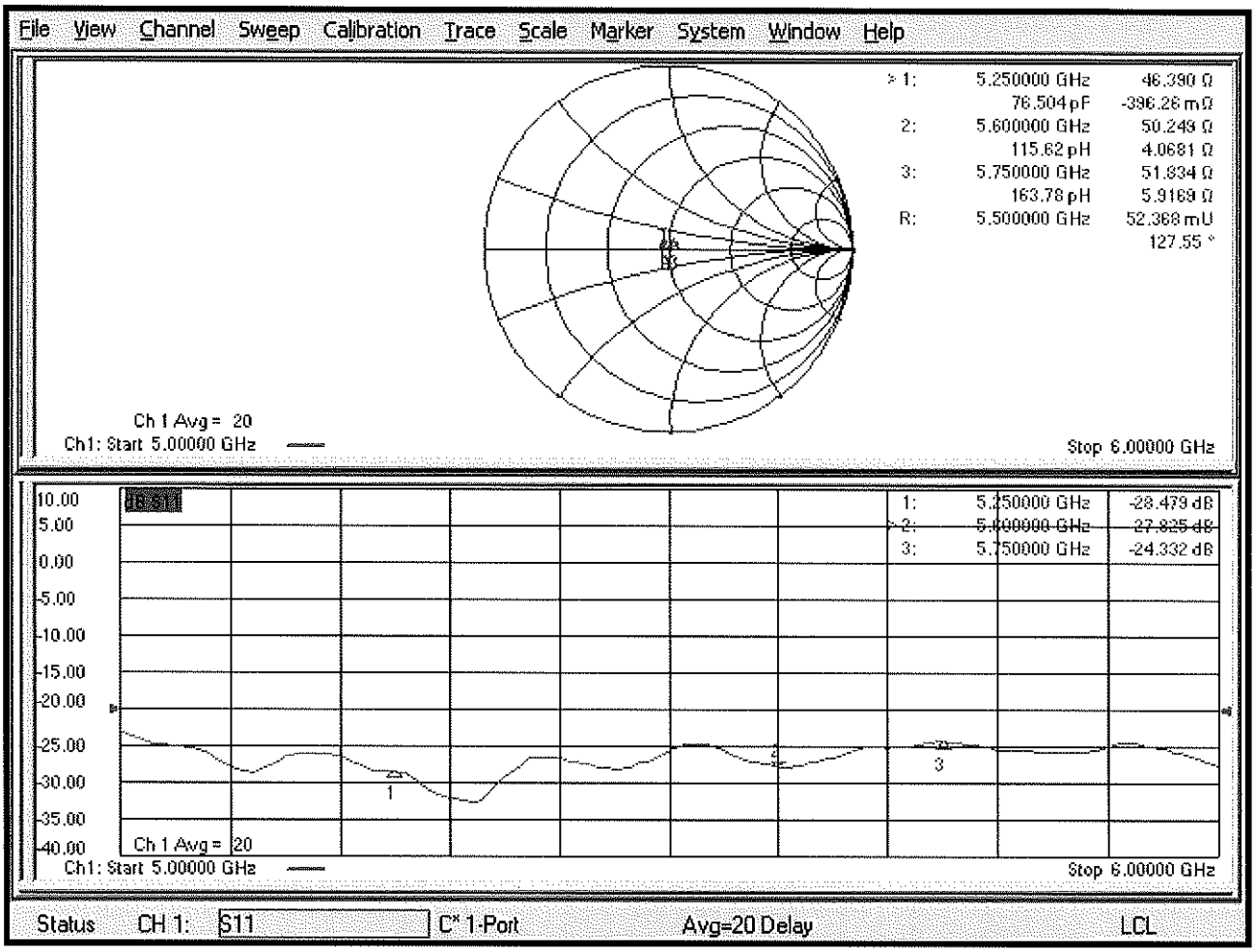
Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5600 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 68.75 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 33.7 W/kg
SAR(1 g) = 8.08 W/kg; SAR(10 g) = 2.25 W/kg
Maximum value of SAR (measured) = 19.2 W/kg

Dipole Calibration for Body Tissue/Pin=100mW, dist=10mm, f=5750 MHz/Zoom Scan, dist=1.4mm (8x8x7)/Cube 0: Measurement grid: dx=4mm, dy=4mm, dz=1.4mm
Reference Value = 67.61 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 33.2 W/kg
SAR(1 g) = 7.85 W/kg; SAR(10 g) = 2.18 W/kg
Maximum value of SAR (measured) = 18.6 W/kg



0 dB = 17.8 W/kg = 12.50 dBW/kg

Impedance Measurement Plot for Body TSL



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Accreditation No.: SCS 0108

Client PC Test

Certificate No: EX3-3837_Jan19

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3837

2/2/19 SC

Calibration procedure(s): QA CAL-01.v9, QA CAL-12.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7
Calibration procedure for dosimetric E-field probes

Calibration date: January 28, 2019

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-18 (No. 217-02682)	Apr-19
DAE4	SN: 660	19-Dec-18 (No. DAE4-660_Dec18)	Dec-19
Reference Probe ES3DV2	SN: 3013	31-Dec-18 (No. ES3-3013_Dec18)	Dec-19
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-18)	In house check: Oct-19

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 29, 2019

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, ", "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF.*
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF.* A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3837

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.46	0.46	0.24	± 10.1 %
DCP (mV)[B]	102.6	99.2	95.3	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max dev.	Max Unc[E] (k=2)
0	CW	X	0.00	0.00	1.00	0.00	176.7	± 2.5 %	± 4.7 %
		Y	0.00	0.00	1.00		176.1		
		Z	0.00	0.00	1.00		157.1		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	15.00	86.29	18.71	10.00	60.0	± 3.0 %	± 9.6 %
		Y	15.00	85.64	18.61		60.0		
		Z	6.24	74.93	14.96		60.0		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	15.00	88.29	18.44	6.99	80.0	± 2.0 %	± 9.6 %
		Y	15.00	86.66	17.62		80.0		
		Z	11.76	83.10	16.24		80.0		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	15.00	93.75	19.65	3.98	95.0	± 1.4 %	± 9.6 %
		Y	15.00	85.77	15.40		95.0		
		Z	15.00	84.99	14.89		95.0		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	15.00	107.13	24.50	2.22	120.0	± 1.4 %	± 9.6 %
		Y	0.43	61.63	5.73		120.0		
		Z	1.15	67.54	8.07		120.0		
10387-AAA	QPSK Waveform, 1 MHz	X	0.91	65.48	11.18	0.00	150.0	± 2.9 %	± 9.6 %
		Y	0.64	61.06	8.38		150.0		
		Z	1.01	66.00	12.05		150.0		
10388-AAA	QPSK Waveform, 10 MHz	X	2.61	71.44	17.69	0.00	150.0	± 1.1 %	± 9.6 %
		Y	2.24	68.30	15.76		150.0		
		Z	2.66	71.19	17.42		150.0		
10396-AAA	64-QAM Waveform, 100 kHz	X	3.51	74.06	20.43	3.01	150.0	± 0.7 %	± 9.6 %
		Y	3.05	70.30	18.79		150.0		
		Z	2.96	70.35	18.83		150.0		
10399-AAA	64-QAM Waveform, 40 MHz	X	3.69	68.44	16.65	0.00	150.0	± 2.2 %	± 9.6 %
		Y	3.53	67.24	15.89		150.0		
		Z	3.74	68.37	16.62		150.0		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	4.80	65.79	15.77	0.00	150.0	± 4.2 %	± 9.6 %
		Y	4.95	65.81	15.76		150.0		
		Z	4.93	65.72	15.81		150.0		

Note: For details on UID parameters see Appendix

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3837

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	43.0	318.33	35.21	9.84	0.30	5.04	1.44	0.26	1.01
Y	49.1	384.74	38.65	8.82	0.54	5.08	0.00	0.61	1.01
Z	53.7	413.46	37.69	6.35	0.68	5.02	0.00	0.54	1.01

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	75.1
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3837

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
30	55.0	0.75	14.07	14.07	14.07	0.00	1.00	± 13.3 %
64	54.2	0.75	12.22	12.22	12.22	0.00	1.00	± 13.3 %
750	41.9	0.89	9.71	9.71	9.71	0.51	0.83	± 12.0 %
835	41.5	0.90	9.37	9.37	9.37	0.52	0.80	± 12.0 %
1750	40.1	1.37	8.03	8.03	8.03	0.38	0.80	± 12.0 %
1900	40.0	1.40	7.85	7.85	7.85	0.35	0.80	± 12.0 %
2300	39.5	1.67	7.47	7.47	7.47	0.28	0.85	± 12.0 %
2450	39.2	1.80	7.15	7.15	7.15	0.38	0.85	± 12.0 %
2600	39.0	1.96	6.93	6.93	6.93	0.44	0.84	± 12.0 %
5250	35.9	4.71	5.36	5.36	5.36	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.79	4.79	4.79	0.40	1.80	± 13.1 %
5750	35.4	5.22	5.05	5.05	5.05	0.40	1.80	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

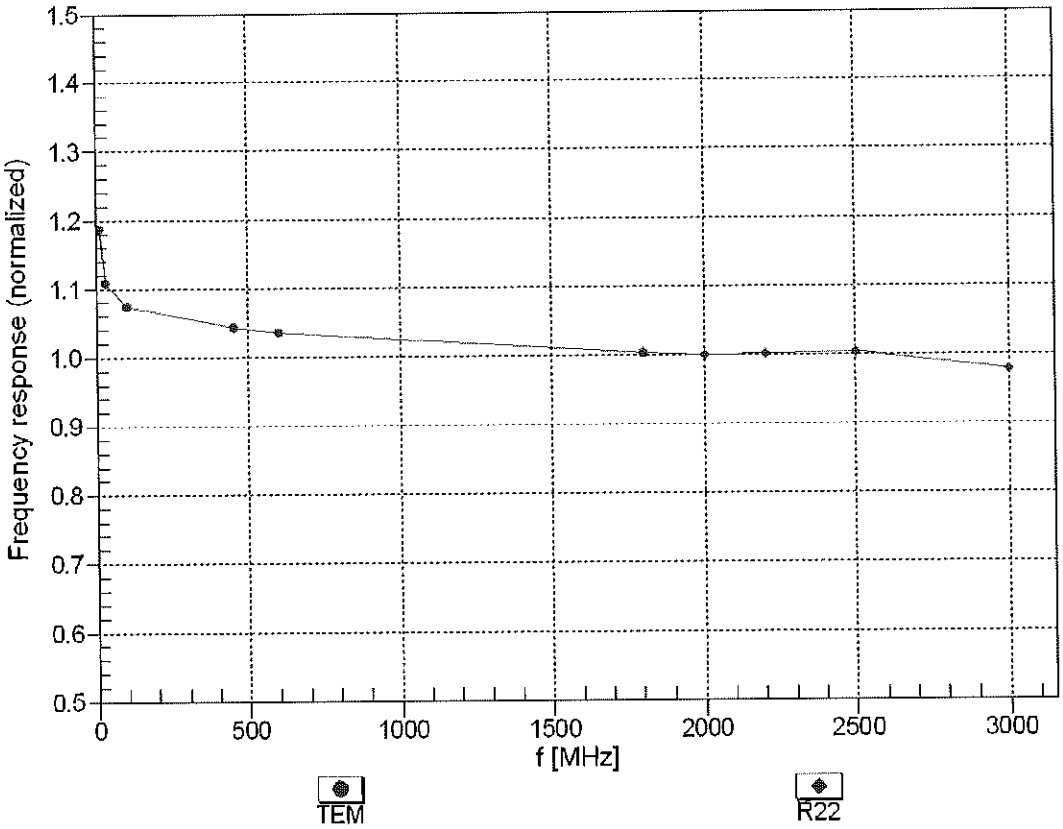
DASY/EASY - Parameters of Probe: EX3DV4 - SN:3837

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	9.20	9.20	9.20	0.36	0.92	± 12.0 %
835	55.2	0.97	9.08	9.08	9.08	0.51	0.80	± 12.0 %
1750	53.4	1.49	7.72	7.72	7.72	0.47	0.80	± 12.0 %
1900	53.3	1.52	7.54	7.54	7.54	0.35	0.84	± 12.0 %
2300	52.9	1.81	7.44	7.44	7.44	0.36	0.88	± 12.0 %
2450	52.7	1.95	7.35	7.35	7.35	0.32	0.90	± 12.0 %
2600	52.5	2.16	7.17	7.17	7.17	0.29	0.92	± 12.0 %
5250	48.9	5.36	4.77	4.77	4.77	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.08	4.08	4.08	0.50	1.90	± 13.1 %
5750	48.3	5.94	4.34	4.34	4.34	0.50	1.90	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Validity of ConvF assessed at 6 MHz is 4-9 MHz, and ConvF assessed at 13 MHz is 9-19 MHz. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

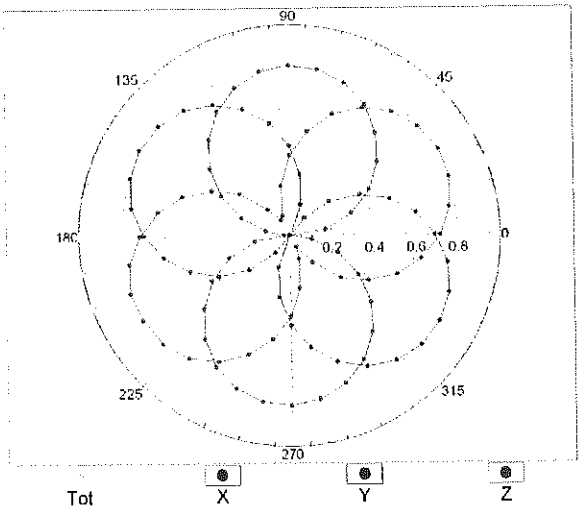
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



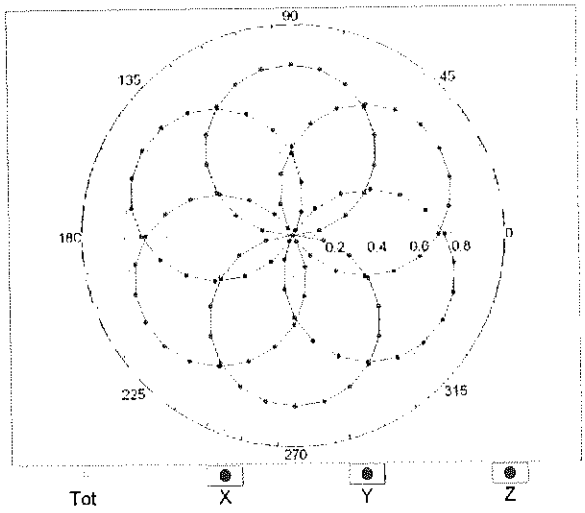
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

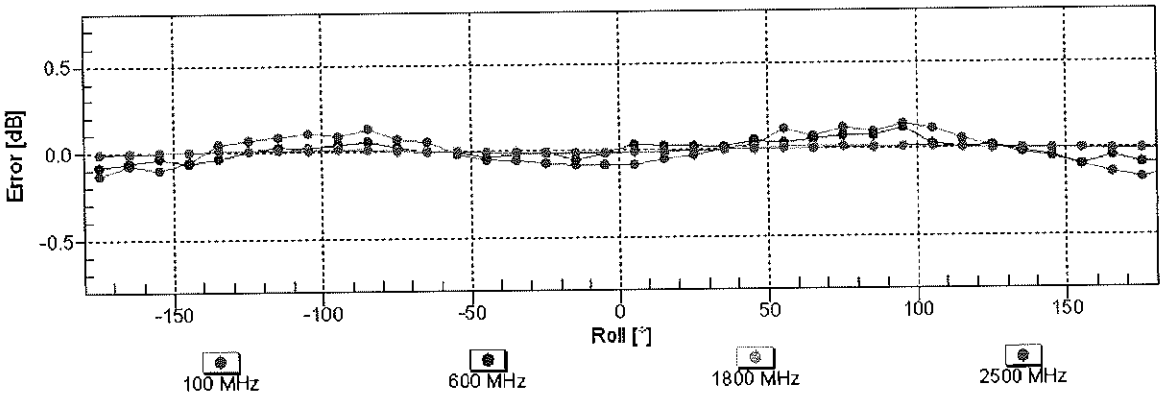
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



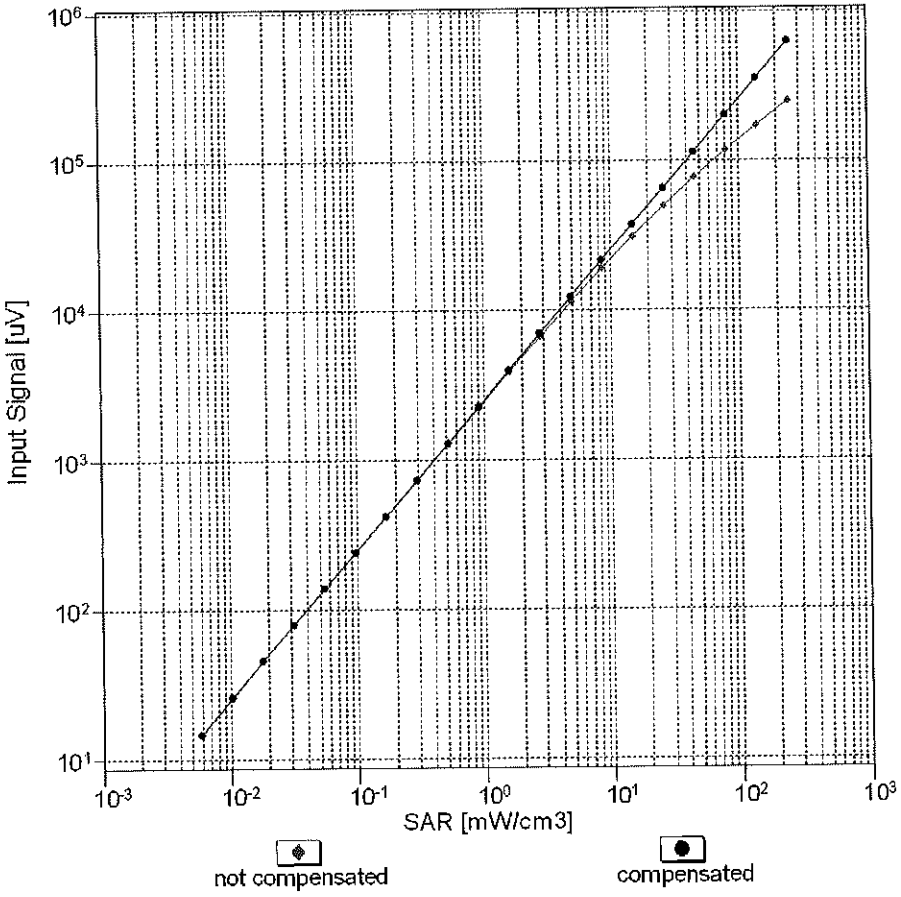
f=1800 MHz,R22

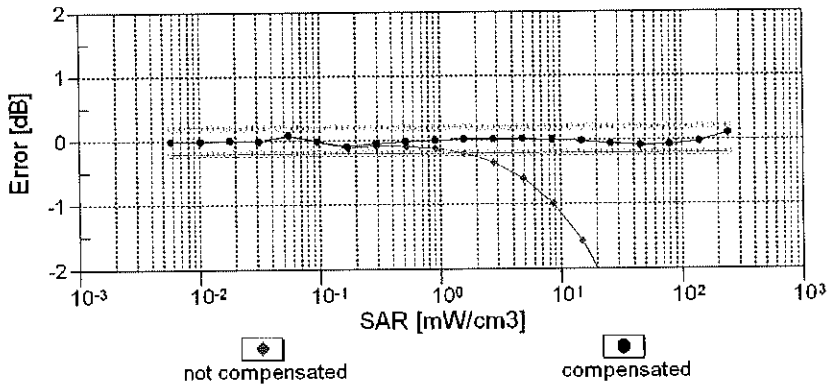




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

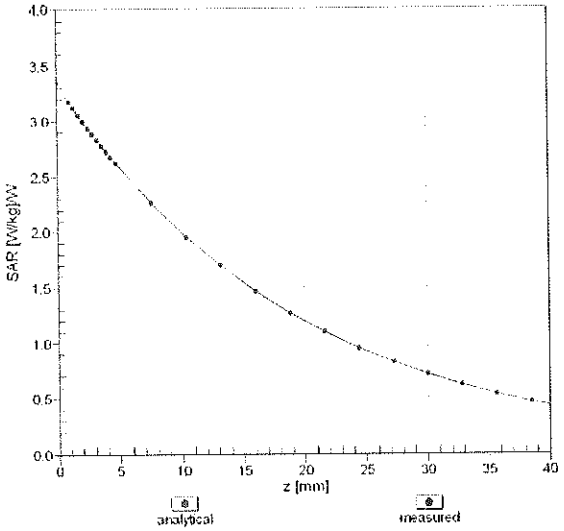




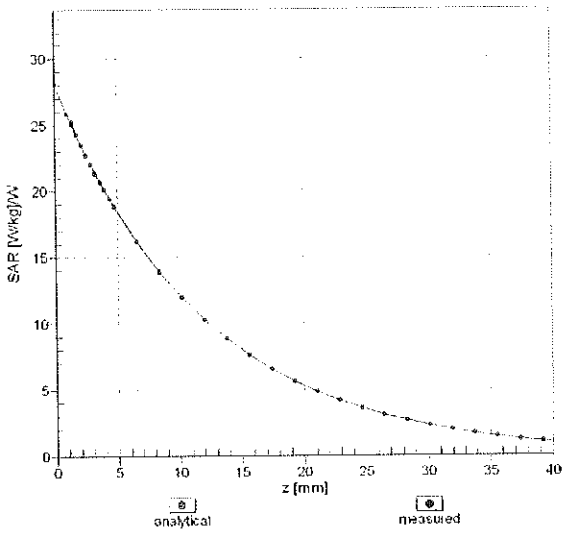
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

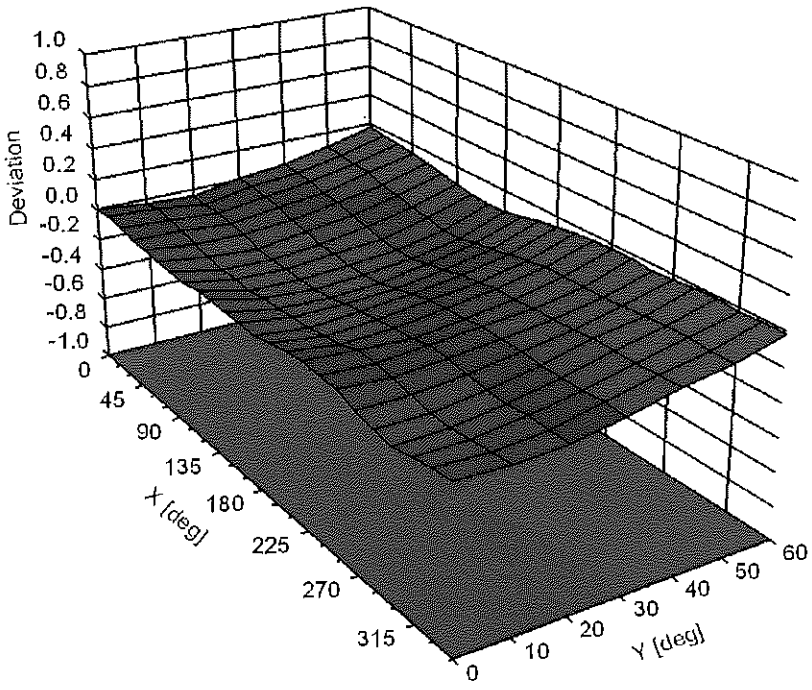


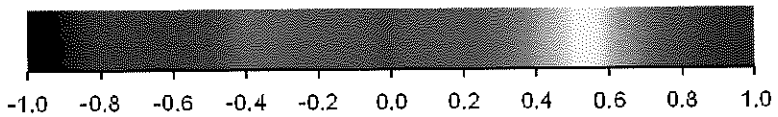
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Appendix: Modulation Calibration Parameters

UID	Rev	Communication System Name	Group	PAR (dB)	Unc[E] (k=2)
0		CW	CW	0.00	± 4.7 %
10010	CAA	SAR Validation (Square, 100ms, 10ms)	Test	10.00	± 9.6 %
10011	CAB	UMTS-FDD (WCDMA)	WCDMA	2.91	± 9.6 %
10012	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps)	WLAN	1.87	± 9.6 %
10013	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps)	WLAN	9.46	± 9.6 %
10021	DAC	GSM-FDD (TDMA, GMSK)	GSM	9.39	± 9.6 %
10023	DAC	GPRS-FDD (TDMA, GMSK, TN 0)	GSM	9.57	± 9.6 %
10024	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1)	GSM	6.56	± 9.6 %
10025	DAC	EDGE-FDD (TDMA, 8PSK, TN 0)	GSM	12.62	± 9.6 %
10026	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1)	GSM	9.55	± 9.6 %
10027	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2)	GSM	4.80	± 9.6 %
10028	DAC	GPRS-FDD (TDMA, GMSK, TN 0-1-2-3)	GSM	3.55	± 9.6 %
10029	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2)	GSM	7.78	± 9.6 %
10030	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH1)	Bluetooth	5.30	± 9.6 %
10031	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH3)	Bluetooth	1.87	± 9.6 %
10032	CAA	IEEE 802.15.1 Bluetooth (GFSK, DH5)	Bluetooth	1.16	± 9.6 %
10033	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH1)	Bluetooth	7.74	± 9.6 %
10034	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH3)	Bluetooth	4.53	± 9.6 %
10035	CAA	IEEE 802.15.1 Bluetooth (PI/4-DQPSK, DH5)	Bluetooth	3.83	± 9.6 %
10036	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH1)	Bluetooth	8.01	± 9.6 %
10037	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH3)	Bluetooth	4.77	± 9.6 %
10038	CAA	IEEE 802.15.1 Bluetooth (8-DPSK, DH5)	Bluetooth	4.10	± 9.6 %
10039	CAB	CDMA2000 (1xRTT, RC1)	CDMA2000	4.57	± 9.6 %
10042	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Halfrate)	AMPS	7.78	± 9.6 %
10044	CAA	IS-91/EIA/TIA-553 FDD (FDMA, FM)	AMPS	0.00	± 9.6 %
10048	CAA	DECT (TDD, TDMA/FDM, GFSK, Full Slot, 24)	DECT	13.80	± 9.6 %
10049	CAA	DECT (TDD, TDMA/FDM, GFSK, Double Slot, 12)	DECT	10.79	± 9.6 %
10056	CAA	UMTS-TDD (TD-SCDMA, 1.28 Mcps)	TD-SCDMA	11.01	± 9.6 %
10058	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-1-2-3)	GSM	6.52	± 9.6 %
10059	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps)	WLAN	2.12	± 9.6 %
10060	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps)	WLAN	2.83	± 9.6 %
10061	CAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps)	WLAN	3.60	± 9.6 %
10062	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps)	WLAN	8.68	± 9.6 %
10063	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps)	WLAN	8.63	± 9.6 %
10064	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps)	WLAN	9.09	± 9.6 %
10065	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps)	WLAN	9.00	± 9.6 %
10066	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps)	WLAN	9.38	± 9.6 %
10067	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps)	WLAN	10.12	± 9.6 %
10068	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps)	WLAN	10.24	± 9.6 %
10069	CAC	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps)	WLAN	10.56	± 9.6 %
10071	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 9 Mbps)	WLAN	9.83	± 9.6 %
10072	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 12 Mbps)	WLAN	9.62	± 9.6 %
10073	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 18 Mbps)	WLAN	9.94	± 9.6 %
10074	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 24 Mbps)	WLAN	10.30	± 9.6 %
10075	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 36 Mbps)	WLAN	10.77	± 9.6 %
10076	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 48 Mbps)	WLAN	10.94	± 9.6 %
10077	CAB	IEEE 802.11g WiFi 2.4 GHz (DSSS/OFDM, 54 Mbps)	WLAN	11.00	± 9.6 %
10081	CAB	CDMA2000 (1xRTT, RC3)	CDMA2000	3.97	± 9.6 %
10082	CAB	IS-54 / IS-136 FDD (TDMA/FDM, PI/4-DQPSK, Fullrate)	AMPS	4.77	± 9.6 %
10090	DAC	GPRS-FDD (TDMA, GMSK, TN 0-4)	GSM	6.56	± 9.6 %
10097	CAB	UMTS-FDD (HSDPA)	WCDMA	3.98	± 9.6 %
10098	CAB	UMTS-FDD (HSUPA, Subtest 2)	WCDMA	3.98	± 9.6 %
10099	DAC	EDGE-FDD (TDMA, 8PSK, TN 0-4)	GSM	9.55	± 9.6 %
10100	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-FDD	5.67	± 9.6 %
10101	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10102	CAE	LTE-FDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10103	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10104	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM)	LTE-TDD	9.97	± 9.6 %
10105	CAG	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM)	LTE-TDD	10.01	± 9.6 %
10108	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-FDD	5.80	± 9.6 %

10109	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10110	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10111	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM).	LTE-FDD	6.44	± 9.6 %
10112	CAG	LTE-FDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-FDD	6.59	± 9.6 %
10113	CAG	LTE-FDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10114	CAC	IEEE 802.11n (HT Greenfield, 13.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10115	CAC	IEEE 802.11n (HT Greenfield, 81 Mbps, 16-QAM)	WLAN	8.46	± 9.6 %
10116	CAC	IEEE 802.11n (HT Greenfield, 135 Mbps, 64-QAM)	WLAN	8.15	± 9.6 %
10117	CAC	IEEE 802.11n (HT Mixed, 13.5 Mbps, BPSK)	WLAN	8.07	± 9.6 %
10118	CAC	IEEE 802.11n (HT Mixed, 81 Mbps, 16-QAM)	WLAN	8.59	± 9.6 %
10119	CAC	IEEE 802.11n (HT Mixed, 135 Mbps, 64-QAM)	WLAN	8.13	± 9.6 %
10140	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10141	CAE	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-FDD	6.53	± 9.6 %
10142	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10143	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-FDD	6.35	± 9.6 %
10144	CAE	LTE-FDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-FDD	6.65	± 9.6 %
10145	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-FDD	5.76	± 9.6 %
10146	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.41	± 9.6 %
10147	CAF	LTE-FDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.72	± 9.6 %
10149	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-FDD	6.42	± 9.6 %
10150	CAE	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10151	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-TDD	9.28	± 9.6 %
10152	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10153	CAG	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM)	LTE-TDD	10.05	± 9.6 %
10154	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-FDD	5.75	± 9.6 %
10155	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10156	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-FDD	5.79	± 9.6 %
10157	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-FDD	6.49	± 9.6 %
10158	CAG	LTE-FDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-FDD	6.62	± 9.6 %
10159	CAG	LTE-FDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-FDD	6.56	± 9.6 %
10160	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-FDD	5.82	± 9.6 %
10161	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-FDD	6.43	± 9.6 %
10162	CAE	LTE-FDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-FDD	6.58	± 9.6 %
10166	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-FDD	5.46	± 9.6 %
10167	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.21	± 9.6 %
10168	CAF	LTE-FDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.79	± 9.6 %
10169	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10170	CAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10171	AAE	LTE-FDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-FDD	6.49	± 9.6 %
10172	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10173	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10174	CAG	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10175	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10176	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10177	CAI	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10178	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10179	CAG	LTE-FDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10180	CAG	LTE-FDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10181	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10182	CAE	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10183	AAD	LTE-FDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10184	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10185	CAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-FDD	6.51	± 9.6 %
10186	AAE	LTE-FDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10187	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-FDD	5.73	± 9.6 %
10188	CAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-FDD	6.52	± 9.6 %
10189	AAF	LTE-FDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-FDD	6.50	± 9.6 %
10193	CAC	IEEE 802.11n (HT Greenfield, 6.5 Mbps, BPSK)	WLAN	8.09	± 9.6 %
10194	CAC	IEEE 802.11n (HT Greenfield, 39 Mbps, 16-QAM)	WLAN	8.12	± 9.6 %
10195	CAC	IEEE 802.11n (HT Greenfield, 65 Mbps, 64-QAM)	WLAN	8.21	± 9.6 %
10196	CAC	IEEE 802.11n (HT Mixed, 6.5 Mbps, BPSK)	WLAN	8.10	± 9.6 %
10197	CAC	IEEE 802.11n (HT Mixed, 39 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10198	CAC	IEEE 802.11n (HT Mixed, 65 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10219	CAC	IEEE 802.11n (HT Mixed, 7.2 Mbps, BPSK)	WLAN	8.03	± 9.6 %

10220	CAC	IEEE 802.11n (HT Mixed, 43.3 Mbps, 16-QAM)	WLAN	8.13	± 9.6 %
10221	CAC	IEEE 802.11n (HT Mixed, 72.2 Mbps, 64-QAM)	WLAN	8.27	± 9.6 %
10222	CAC	IEEE 802.11n (HT Mixed, 15 Mbps, BPSK)	WLAN	8.06	± 9.6 %
10223	CAC	IEEE 802.11n (HT Mixed, 90 Mbps, 16-QAM)	WLAN	8.48	± 9.6 %
10224	CAC	IEEE 802.11n (HT Mixed, 150 Mbps, 64-QAM)	WLAN	8.08	± 9.6 %
10225	CAB	UMTS-FDD (HSPA+)	WCDMA	5.97	± 9.6 %
10226	CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.49	± 9.6 %
10227	CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.26	± 9.6 %
10228	CAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK)	LTE-TDD	9.22	± 9.6 %
10229	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10230	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10231	CAC	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK)	LTE-TDD	9.19	± 9.6 %
10232	CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10233	CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10234	CAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10235	CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10236	CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10237	CAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10238	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM)	LTE-TDD	9.48	± 9.6 %
10239	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM)	LTE-TDD	10.25	± 9.6 %
10240	CAF	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK)	LTE-TDD	9.21	± 9.6 %
10241	CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.82	± 9.6 %
10242	CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM)	LTE-TDD	9.86	± 9.6 %
10243	CAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK)	LTE-TDD	9.46	± 9.6 %
10244	CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10245	CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-TDD	10.06	± 9.6 %
10246	CAC	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10247	CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM)	LTE-TDD	9.91	± 9.6 %
10248	CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM)	LTE-TDD	10.09	± 9.6 %
10249	CAF	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK)	LTE-TDD	9.29	± 9.6 %
10250	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM)	LTE-TDD	9.81	± 9.6 %
10251	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM)	LTE-TDD	10.17	± 9.6 %
10252	CAF	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10253	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM)	LTE-TDD	9.90	± 9.6 %
10254	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM)	LTE-TDD	10.14	± 9.6 %
10255	CAF	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK)	LTE-TDD	9.20	± 9.6 %
10256	CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM)	LTE-TDD	9.96	± 9.6 %
10257	CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM)	LTE-TDD	10.08	± 9.6 %
10258	CAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK)	LTE-TDD	9.34	± 9.6 %
10259	CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM)	LTE-TDD	9.98	± 9.6 %
10260	CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM)	LTE-TDD	9.97	± 9.6 %
10261	CAC	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK)	LTE-TDD	9.24	± 9.6 %
10262	CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM)	LTE-TDD	9.83	± 9.6 %
10263	CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM)	LTE-TDD	10.16	± 9.6 %
10264	CAF	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK)	LTE-TDD	9.23	± 9.6 %
10265	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM)	LTE-TDD	9.92	± 9.6 %
10266	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM)	LTE-TDD	10.07	± 9.6 %
10267	CAF	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK)	LTE-TDD	9.30	± 9.6 %
10268	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM)	LTE-TDD	10.06	± 9.6 %
10269	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM)	LTE-TDD	10.13	± 9.6 %
10270	CAF	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-TDD	9.58	± 9.6 %
10274	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.10)	WCDMA	4.87	± 9.6 %
10275	CAB	UMTS-FDD (HSUPA, Subtest 5, 3GPP Rel8.4)	WCDMA	3.96	± 9.6 %
10277	CAA	PHS (QPSK)	PHS	11.81	± 9.6 %
10278	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.5)	PHS	11.81	± 9.6 %
10279	CAA	PHS (QPSK, BW 884MHz, Rolloff 0.38)	PHS	12.18	± 9.6 %
10290	AAB	CDMA2000, RC1, SO55, Full Rate	CDMA2000	3.91	± 9.6 %
10291	AAB	CDMA2000, RC3, SO55, Full Rate	CDMA2000	3.46	± 9.6 %
10292	AAB	CDMA2000, RC3, SO32, Full Rate	CDMA2000	3.39	± 9.6 %
10293	AAB	CDMA2000, RC3, SO3, Full Rate	CDMA2000	3.50	± 9.6 %
10295	AAB	CDMA2000, RC1, SO3, 1/8th Rate 25 fr.	CDMA2000	12.49	± 9.6 %
10297	AAD	LTE-FDD (SC-FDMA, 50% RB, 20 MHz, QPSK)	LTE-FDD	5.81	± 9.6 %
10298	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, QPSK)	LTE-FDD	5.72	± 9.6 %
10299	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM)	LTE-FDD	6.39	± 9.6 %

10300	AAD	LTE-FDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM)	LTE-FDD	6.60	± 9.6 %
10301	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC)	WiMAX	12.03	± 9.6 %
10302	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, QPSK, PUSC, 3 CTRL symbols)	WiMAX	12.57	± 9.6 %
10303	AAA	IEEE 802.16e WiMAX (31:15, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	12.52	± 9.6 %
10304	AAA	IEEE 802.16e WiMAX (29:18, 5ms, 10MHz, 64QAM, PUSC)	WiMAX	11.86	± 9.6 %
10305	AAA	IEEE 802.16e WiMAX (31:15, 10ms, 10MHz, 64QAM, PUSC, 15 symbols)	WiMAX	15.24	± 9.6 %
10306	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 64QAM, PUSC, 18 symbols)	WiMAX	14.67	± 9.6 %
10307	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, PUSC, 18 symbols)	WiMAX	14.49	± 9.6 %
10308	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, PUSC)	WiMAX	14.46	± 9.6 %
10309	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, 16QAM, AMC 2x3, 18 symbols)	WiMAX	14.58	± 9.6 %
10310	AAA	IEEE 802.16e WiMAX (29:18, 10ms, 10MHz, QPSK, AMC 2x3, 18 symbols)	WiMAX	14.57	± 9.6 %
10311	AAD	LTE-FDD (SC-FDMA, 100% RB, 15 MHz, QPSK)	LTE-FDD	6.06	± 9.6 %
10313	AAA	iDEN 1:3	iDEN	10.51	± 9.6 %
10314	AAA	iDEN 1:6	iDEN	13.48	± 9.6 %
10315	AAB	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 96pc duty cycle)	WLAN	1.71	± 9.6 %
10316	AAB	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.36	± 9.6 %
10317	AAC	IEEE 802.11a WiFi 5 GHz (OFDM, 6 Mbps, 96pc duty cycle)	WLAN	8.36	± 9.6 %
10352	AAA	Pulse Waveform (200Hz, 10%)	Generic	10.00	± 9.6 %
10353	AAA	Pulse Waveform (200Hz, 20%)	Generic	6.99	± 9.6 %
10354	AAA	Pulse Waveform (200Hz, 40%)	Generic	3.98	± 9.6 %
10355	AAA	Pulse Waveform (200Hz, 60%)	Generic	2.22	± 9.6 %
10356	AAA	Pulse Waveform (200Hz, 80%)	Generic	0.97	± 9.6 %
10387	AAA	QPSK Waveform, 1 MHz	Generic	5.10	± 9.6 %
10388	AAA	QPSK Waveform, 10 MHz	Generic	5.22	± 9.6 %
10396	AAA	64-QAM Waveform, 100 kHz	Generic	6.27	± 9.6 %
10399	AAA	64-QAM Waveform, 40 MHz	Generic	6.27	± 9.6 %
10400	AAD	IEEE 802.11ac WiFi (20MHz, 64-QAM, 99pc duty cycle)	WLAN	8.37	± 9.6 %
10401	AAD	IEEE 802.11ac WiFi (40MHz, 64-QAM, 99pc duty cycle)	WLAN	8.60	± 9.6 %
10402	AAD	IEEE 802.11ac WiFi (80MHz, 64-QAM, 99pc duty cycle)	WLAN	8.53	± 9.6 %
10403	AAB	CDMA2000 (1xEV-DO, Rev. 0)	CDMA2000	3.76	± 9.6 %
10404	AAB	CDMA2000 (1xEV-DO, Rev. A)	CDMA2000	3.77	± 9.6 %
10406	AAB	CDMA2000, RC3, SO32, SCH0, Full Rate	CDMA2000	5.22	± 9.6 %
10410	AAF	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9, Subframe Conf=4)	LTE-TDD	7.82	± 9.6 %
10414	AAA	WLAN CCDF, 64-QAM, 40MHz	Generic	8.54	± 9.6 %
10415	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 99pc duty cycle)	WLAN	1.54	± 9.6 %
10416	AAA	IEEE 802.11g WiFi 2.4 GHz (ERP-OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.23	± 9.6 %
10417	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 99pc duty cycle)	WLAN	8.23	± 9.6 %
10418	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Long preambule)	WLAN	8.14	± 9.6 %
10419	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 99pc duty cycle, Short preambule)	WLAN	8.19	± 9.6 %
10422	AAB	IEEE 802.11n (HT Greenfield, 7.2 Mbps, BPSK)	WLAN	8.32	± 9.6 %
10423	AAB	IEEE 802.11n (HT Greenfield, 43.3 Mbps, 16-QAM)	WLAN	8.47	± 9.6 %
10424	AAB	IEEE 802.11n (HT Greenfield, 72.2 Mbps, 64-QAM)	WLAN	8.40	± 9.6 %
10425	AAB	IEEE 802.11n (HT Greenfield, 15 Mbps, BPSK)	WLAN	8.41	± 9.6 %
10426	AAB	IEEE 802.11n (HT Greenfield, 90 Mbps, 16-QAM)	WLAN	8.45	± 9.6 %
10427	AAB	IEEE 802.11n (HT Greenfield, 150 Mbps, 64-QAM)	WLAN	8.41	± 9.6 %
10430	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1)	LTE-FDD	8.28	± 9.6 %
10431	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1)	LTE-FDD	8.38	± 9.6 %
10432	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1)	LTE-FDD	8.34	± 9.6 %
10433	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1)	LTE-FDD	8.34	± 9.6 %
10434	AAA	W-CDMA (BS Test Model 1, 64 DPCH)	WCDMA	8.60	± 9.6 %
10435	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10447	AAD	LTE-FDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.56	± 9.6 %
10448	AAD	LTE-FDD (OFDMA, 10 MHz, E-TM 3.1, Clippin 44%)	LTE-FDD	7.53	± 9.6 %
10449	AAC	LTE-FDD (OFDMA, 15 MHz, E-TM 3.1, Cliping 44%)	LTE-FDD	7.51	± 9.6 %
10450	AAC	LTE-FDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-FDD	7.48	± 9.6 %

10451	AAA	W-CDMA (BS Test Model 1, 64 DPCH, Clipping 44%)	WCDMA	7.59	± 9.6 %
10456	AAB	IEEE 802.11ac WiFi (160MHz, 64-QAM, 99pc duty cycle)	WLAN	8.63	± 9.6 %
10457	AAA	UMTS-FDD (DC-HSDPA)	WCDMA	6.62	± 9.6 %
10458	AAA	CDMA2000 (1xEV-DO, Rev. B, 2 carriers)	CDMA2000	6.55	± 9.6 %
10459	AAA	CDMA2000 (1xEV-DO, Rev. B, 3 carriers)	CDMA2000	8.25	± 9.6 %
10460	AAA	UMTS-FDD (WCDMA, AMR)	WCDMA	2.39	± 9.6 %
10461	AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10462	AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.30	± 9.6 %
10463	AAA	LTE-TDD (SC-FDMA, 1 RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.56	± 9.6 %
10464	AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10465	AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10466	AAB	LTE-TDD (SC-FDMA, 1 RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6 %
10467	AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10468	AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10469	AAE	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.56	± 9.6 %
10470	AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10471	AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10472	AAE	LTE-TDD (SC-FDMA, 1 RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6 %
10473	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.82	± 9.6 %
10474	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10475	AAE	LTE-TDD (SC-FDMA, 1 RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6 %
10477	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.32	± 9.6 %
10478	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.57	± 9.6 %
10479	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %
10480	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.18	± 9.6 %
10481	AAA	LTE-TDD (SC-FDMA, 50% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.45	± 9.6 %
10482	AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.71	± 9.6 %
10483	AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.39	± 9.6 %
10484	AAB	LTE-TDD (SC-FDMA, 50% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.47	± 9.6 %
10485	AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.59	± 9.6 %
10486	AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.38	± 9.6 %
10487	AAE	LTE-TDD (SC-FDMA, 50% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.60	± 9.6 %
10488	AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.70	± 9.6 %
10489	AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.31	± 9.6 %
10490	AAE	LTE-TDD (SC-FDMA, 50% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	± 9.6 %
10491	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %

10492	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.41	± 9.6 %
10493	AAE	LTE-TDD (SC-FDMA, 50% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.55	± 9.6 %
10494	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %
10495	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.37	± 9.6 %
10496	AAF	LTE-TDD (SC-FDMA, 50% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	± 9.6 %
10497	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.67	± 9.6 %
10498	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.40	± 9.6 %
10499	AAA	LTE-TDD (SC-FDMA, 100% RB, 1.4 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.68	± 9.6 %
10500	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.67	± 9.6 %
10501	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.44	± 9.6 %
10502	AAB	LTE-TDD (SC-FDMA, 100% RB, 3 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.52	± 9.6 %
10503	AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.72	± 9.6 %
10504	AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.31	± 9.6 %
10505	AAE	LTE-TDD (SC-FDMA, 100% RB, 5 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.54	± 9.6 %
10506	AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %
10507	AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.36	± 9.6 %
10508	AAE	LTE-TDD (SC-FDMA, 100% RB, 10 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.55	± 9.6 %
10509	AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.99	± 9.6 %
10510	AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.49	± 9.6 %
10511	AAE	LTE-TDD (SC-FDMA, 100% RB, 15 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.51	± 9.6 %
10512	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, QPSK, UL Subframe=2,3,4,7,8,9)	LTE-TDD	7.74	± 9.6 %
10513	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 16-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.42	± 9.6 %
10514	AAF	LTE-TDD (SC-FDMA, 100% RB, 20 MHz, 64-QAM, UL Subframe=2,3,4,7,8,9)	LTE-TDD	8.45	± 9.6 %
10515	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 99pc duty cycle)	WLAN	1.58	± 9.6 %
10516	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 99pc duty cycle)	WLAN	1.57	± 9.6 %
10517	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 99pc duty cycle)	WLAN	1.58	± 9.6 %
10518	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 99pc duty cycle)	WLAN	8.23	± 9.6 %
10519	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 99pc duty cycle)	WLAN	8.39	± 9.6 %
10520	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 99pc duty cycle)	WLAN	8.12	± 9.6 %
10521	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 99pc duty cycle)	WLAN	7.97	± 9.6 %
10522	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10523	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 99pc duty cycle)	WLAN	8.08	± 9.6 %
10524	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 99pc duty cycle)	WLAN	8.27	± 9.6 %
10525	AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 99pc duty cycle)	WLAN	8.36	± 9.6 %
10526	AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10527	AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 99pc duty cycle)	WLAN	8.21	± 9.6 %
10528	AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 99pc duty cycle)	WLAN	8.36	± 9.6 %
10529	AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 99pc duty cycle)	WLAN	8.36	± 9.6 %
10531	AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 99pc duty cycle)	WLAN	8.43	± 9.6 %
10532	AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 99pc duty cycle)	WLAN	8.29	± 9.6 %
10533	AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 99pc duty cycle)	WLAN	8.38	± 9.6 %
10534	AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 99pc duty cycle)	WLAN	8.45	± 9.6 %

10535	AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10536	AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 99pc duty cycle)	WLAN	8.32	± 9.6 %
10537	AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 99pc duty cycle)	WLAN	8.44	± 9.6 %
10538	AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 99pc duty cycle)	WLAN	8.54	± 9.6 %
10540	AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 99pc duty cycle)	WLAN	8.39	± 9.6 %
10541	AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 99pc duty cycle)	WLAN	8.46	± 9.6 %
10542	AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 99pc duty cycle)	WLAN	8.65	± 9.6 %
10543	AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 99pc duty cycle)	WLAN	8.65	± 9.6 %
10544	AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 99pc duty cycle)	WLAN	8.47	± 9.6 %
10545	AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 99pc duty cycle)	WLAN	8.55	± 9.6 %
10546	AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 99pc duty cycle)	WLAN	8.35	± 9.6 %
10547	AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 99pc duty cycle)	WLAN	8.49	± 9.6 %
10548	AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 99pc duty cycle)	WLAN	8.37	± 9.6 %
10550	AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 99pc duty cycle)	WLAN	8.38	± 9.6 %
10551	AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 99pc duty cycle)	WLAN	8.50	± 9.6 %
10552	AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 99pc duty cycle)	WLAN	8.42	± 9.6 %
10553	AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10554	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 99pc duty cycle)	WLAN	8.48	± 9.6 %
10555	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 99pc duty cycle)	WLAN	8.47	± 9.6 %
10556	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 99pc duty cycle)	WLAN	8.50	± 9.6 %
10557	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 99pc duty cycle)	WLAN	8.52	± 9.6 %
10558	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 99pc duty cycle)	WLAN	8.61	± 9.6 %
10560	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 99pc duty cycle)	WLAN	8.73	± 9.6 %
10561	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 99pc duty cycle)	WLAN	8.56	± 9.6 %
10562	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 99pc duty cycle)	WLAN	8.69	± 9.6 %
10563	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 99pc duty cycle)	WLAN	8.77	± 9.6 %
10564	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 99pc duty cycle)	WLAN	8.25	± 9.6 %
10565	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 99pc duty cycle)	WLAN	8.45	± 9.6 %
10566	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 99pc duty cycle)	WLAN	8.13	± 9.6 %
10567	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 99pc duty cycle)	WLAN	8.00	± 9.6 %
10568	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 99pc duty cycle)	WLAN	8.37	± 9.6 %
10569	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 99pc duty cycle)	WLAN	8.10	± 9.6 %
10570	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 99pc duty cycle)	WLAN	8.30	± 9.6 %
10571	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 1 Mbps, 90pc duty cycle)	WLAN	1.99	± 9.6 %
10572	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 2 Mbps, 90pc duty cycle)	WLAN	1.99	± 9.6 %
10573	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 5.5 Mbps, 90pc duty cycle)	WLAN	1.98	± 9.6 %
10574	AAA	IEEE 802.11b WiFi 2.4 GHz (DSSS, 11 Mbps, 90pc duty cycle)	WLAN	1.98	± 9.6 %
10575	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 6 Mbps, 90pc duty cycle)	WLAN	8.59	± 9.6 %
10576	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 9 Mbps, 90pc duty cycle)	WLAN	8.60	± 9.6 %
10577	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 12 Mbps, 90pc duty cycle)	WLAN	8.70	± 9.6 %
10578	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 18 Mbps, 90pc duty cycle)	WLAN	8.49	± 9.6 %
10579	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 24 Mbps, 90pc duty cycle)	WLAN	8.36	± 9.6 %
10580	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.76	± 9.6 %
10581	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.35	± 9.6 %
10582	AAA	IEEE 802.11g WiFi 2.4 GHz (DSSS-OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.67	± 9.6 %
10583	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 6 Mbps, 90pc duty cycle)	WLAN	8.59	± 9.6 %
10584	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 9 Mbps, 90pc duty cycle)	WLAN	8.60	± 9.6 %
10585	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 12 Mbps, 90pc duty cycle)	WLAN	8.70	± 9.6 %
10586	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 18 Mbps, 90pc duty cycle)	WLAN	8.49	± 9.6 %
10587	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 24 Mbps, 90pc duty cycle)	WLAN	8.36	± 9.6 %

10588	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 36 Mbps, 90pc duty cycle)	WLAN	8.76	± 9.6 %
10589	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 48 Mbps, 90pc duty cycle)	WLAN	8.35	± 9.6 %
10590	AAB	IEEE 802.11a/h WiFi 5 GHz (OFDM, 54 Mbps, 90pc duty cycle)	WLAN	8.67	± 9.6 %
10591	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS0, 90pc duty cycle)	WLAN	8.63	± 9.6 %
10592	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS1, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10593	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS2, 90pc duty cycle)	WLAN	8.64	± 9.6 %
10594	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS3, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10595	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS4, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10596	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS5, 90pc duty cycle)	WLAN	8.71	± 9.6 %
10597	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS6, 90pc duty cycle)	WLAN	8.72	± 9.6 %
10598	AAB	IEEE 802.11n (HT Mixed, 20MHz, MCS7, 90pc duty cycle)	WLAN	8.50	± 9.6 %
10599	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS0, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10600	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS1, 90pc duty cycle)	WLAN	8.88	± 9.6 %
10601	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS2, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10602	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS3, 90pc duty cycle)	WLAN	8.94	± 9.6 %
10603	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS4, 90pc duty cycle)	WLAN	9.03	± 9.6 %
10604	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS5, 90pc duty cycle)	WLAN	8.76	± 9.6 %
10605	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS6, 90pc duty cycle)	WLAN	8.97	± 9.6 %
10606	AAB	IEEE 802.11n (HT Mixed, 40MHz, MCS7, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10607	AAB	IEEE 802.11ac WiFi (20MHz, MCS0, 90pc duty cycle)	WLAN	8.64	± 9.6 %
10608	AAB	IEEE 802.11ac WiFi (20MHz, MCS1, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10609	AAB	IEEE 802.11ac WiFi (20MHz, MCS2, 90pc duty cycle)	WLAN	8.57	± 9.6 %
10610	AAB	IEEE 802.11ac WiFi (20MHz, MCS3, 90pc duty cycle)	WLAN	8.78	± 9.6 %
10611	AAB	IEEE 802.11ac WiFi (20MHz, MCS4, 90pc duty cycle)	WLAN	8.70	± 9.6 %
10612	AAB	IEEE 802.11ac WiFi (20MHz, MCS5, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10613	AAB	IEEE 802.11ac WiFi (20MHz, MCS6, 90pc duty cycle)	WLAN	8.94	± 9.6 %
10614	AAB	IEEE 802.11ac WiFi (20MHz, MCS7, 90pc duty cycle)	WLAN	8.59	± 9.6 %
10615	AAB	IEEE 802.11ac WiFi (20MHz, MCS8, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10616	AAB	IEEE 802.11ac WiFi (40MHz, MCS0, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10617	AAB	IEEE 802.11ac WiFi (40MHz, MCS1, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10618	AAB	IEEE 802.11ac WiFi (40MHz, MCS2, 90pc duty cycle)	WLAN	8.58	± 9.6 %
10619	AAB	IEEE 802.11ac WiFi (40MHz, MCS3, 90pc duty cycle)	WLAN	8.86	± 9.6 %
10620	AAB	IEEE 802.11ac WiFi (40MHz, MCS4, 90pc duty cycle)	WLAN	8.87	± 9.6 %
10621	AAB	IEEE 802.11ac WiFi (40MHz, MCS5, 90pc duty cycle)	WLAN	8.77	± 9.6 %
10622	AAB	IEEE 802.11ac WiFi (40MHz, MCS6, 90pc duty cycle)	WLAN	8.68	± 9.6 %
10623	AAB	IEEE 802.11ac WiFi (40MHz, MCS7, 90pc duty cycle)	WLAN	8.82	± 9.6 %
10624	AAB	IEEE 802.11ac WiFi (40MHz, MCS8, 90pc duty cycle)	WLAN	8.96	± 9.6 %
10625	AAB	IEEE 802.11ac WiFi (40MHz, MCS9, 90pc duty cycle)	WLAN	8.96	± 9.6 %
10626	AAB	IEEE 802.11ac WiFi (80MHz, MCS0, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10627	AAB	IEEE 802.11ac WiFi (80MHz, MCS1, 90pc duty cycle)	WLAN	8.88	± 9.6 %
10628	AAB	IEEE 802.11ac WiFi (80MHz, MCS2, 90pc duty cycle)	WLAN	8.71	± 9.6 %
10629	AAB	IEEE 802.11ac WiFi (80MHz, MCS3, 90pc duty cycle)	WLAN	8.85	± 9.6 %
10630	AAB	IEEE 802.11ac WiFi (80MHz, MCS4, 90pc duty cycle)	WLAN	8.72	± 9.6 %
10631	AAB	IEEE 802.11ac WiFi (80MHz, MCS5, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10632	AAB	IEEE 802.11ac WiFi (80MHz, MCS6, 90pc duty cycle)	WLAN	8.74	± 9.6 %
10633	AAB	IEEE 802.11ac WiFi (80MHz, MCS7, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10634	AAB	IEEE 802.11ac WiFi (80MHz, MCS8, 90pc duty cycle)	WLAN	8.80	± 9.6 %
10635	AAB	IEEE 802.11ac WiFi (80MHz, MCS9, 90pc duty cycle)	WLAN	8.81	± 9.6 %
10636	AAC	IEEE 802.11ac WiFi (160MHz, MCS0, 90pc duty cycle)	WLAN	8.83	± 9.6 %
10637	AAC	IEEE 802.11ac WiFi (160MHz, MCS1, 90pc duty cycle)	WLAN	8.79	± 9.6 %
10638	AAC	IEEE 802.11ac WiFi (160MHz, MCS2, 90pc duty cycle)	WLAN	8.86	± 9.6 %
10639	AAC	IEEE 802.11ac WiFi (160MHz, MCS3, 90pc duty cycle)	WLAN	8.85	± 9.6 %
10640	AAC	IEEE 802.11ac WiFi (160MHz, MCS4, 90pc duty cycle)	WLAN	8.98	± 9.6 %
10641	AAC	IEEE 802.11ac WiFi (160MHz, MCS5, 90pc duty cycle)	WLAN	9.06	± 9.6 %
10642	AAC	IEEE 802.11ac WiFi (160MHz, MCS6, 90pc duty cycle)	WLAN	9.06	± 9.6 %
10643	AAC	IEEE 802.11ac WiFi (160MHz, MCS7, 90pc duty cycle)	WLAN	8.89	± 9.6 %
10644	AAC	IEEE 802.11ac WiFi (160MHz, MCS8, 90pc duty cycle)	WLAN	9.05	± 9.6 %
10645	AAC	IEEE 802.11ac WiFi (160MHz, MCS9, 90pc duty cycle)	WLAN	9.11	± 9.6 %
10646	AAF	LTE-TDD (SC-FDMA, 1 RB, 5 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.96	± 9.6 %
10647	AAF	LTE-TDD (SC-FDMA, 1 RB, 20 MHz, QPSK, UL Subframe=2,7)	LTE-TDD	11.96	± 9.6 %
10648	AAA	CDMA2000 (1x Advanced)	CDMA2000	3.45	± 9.6 %
10652	AAD	LTE-TDD (OFDMA, 5 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.91	± 9.6 %
10653	AAD	LTE-TDD (OFDMA, 10 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.42	± 9.6 %
10654	AAD	LTE-TDD (OFDMA, 15 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	6.96	± 9.6 %

10655	AAE	LTE-TDD (OFDMA, 20 MHz, E-TM 3.1, Clipping 44%)	LTE-TDD	7.21	± 9.6 %
10658	AAA	Pulse Waveform (200Hz, 10%)	Test	10.00	± 9.6 %
10659	AAA	Pulse Waveform (200Hz, 20%)	Test	6.99	± 9.6 %
10660	AAA	Pulse Waveform (200Hz, 40%)	Test	3.98	± 9.6 %
10661	AAA	Pulse Waveform (200Hz, 60%)	Test	2.22	± 9.6 %
10662	AAA	Pulse Waveform (200Hz, 80%)	Test	0.97	± 9.6 %
10670	AAA	Bluetooth Low Energy	Bluetooth	2.19	± 9.6 %

[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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Accreditation No.: SCS 0108

Client **PC Test** **Certificate No: EX3-7416_Jul18**

CALIBRATION CERTIFICATE

SC ✓ 8/2/2018

Object EX3DV4 - SN:7416

Calibration procedure(s) QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: July 20, 2018

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter NRP	SN: 104778	04-Apr-18 (No. 217-02672/02673)	Apr-19
Power sensor NRP-Z91	SN: 103244	04-Apr-18 (No. 217-02672)	Apr-19
Power sensor NRP-Z91	SN: 103245	04-Apr-18 (No. 217-02673)	Apr-19
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-18 (No. 217-02682)	Apr-19
Reference Probe ES3DV2	SN: 3013	30-Dec-17 (No. ES3-3013_Dec17)	Dec-18
DAE4	SN: 660	21-Dec-17 (No. DAE4-660_Dec17)	Dec-18
Secondary Standards	ID	Check Date (in house)	Scheduled Check
Power meter E4419B	SN: GB41293874	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: MY41498087	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
Power sensor E4412A	SN: 000110210	06-Apr-16 (in house check Jun-18)	In house check: Jun-20
RF generator HP 8648C	SN: US3642U01700	04-Aug-99 (in house check Jun-18)	In house check: Jun-20
Network Analyzer E8358A	SN: US41080477	31-Mar-14 (in house check Oct-17)	In house check: Oct-18

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 21, 2018

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Accreditation No.: SCS 0108

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, ", "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe EX3DV4

SN:7416

Manufactured: March 10, 2016
Calibrated: July 20, 2018

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7416

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.59	0.52	0.53	± 10.1 %
DCP (mV)[B]	97.2	93.5	96.5	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	149.4	±3.3 %
		Y	0.0	0.0	1.0		140.2	
		Z	0.0	0.0	1.0		147.9	

Note: For details on UID parameters see Appendix.

Sensor Model Parameters

	C1 fF	C2 fF	α V^{-1}	T1 $ms.V^{-2}$	T2 $ms.V^{-1}$	T3 ms	T4 V^{-2}	T5 V^{-1}	T6
X	29.94	230.8	37.81	8.573	0.020	5.100	0.000	0.329	1.005
Y	35.08	270.5	37.53	5.275	0.109	5.067	0.000	0.317	1.010
Z	37.25	278.1	35.59	8.445	0.000	5.071	1.581	0.146	1.007

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of Norm X,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7416

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	41.9	0.89	9.95	9.95	9.95	0.38	1.03	± 12.0 %
835	41.5	0.90	9.45	9.45	9.45	0.35	0.96	± 12.0 %
1750	40.1	1.37	8.37	8.37	8.37	0.40	0.84	± 12.0 %
1900	40.0	1.40	8.04	8.04	8.04	0.42	0.90	± 12.0 %
2300	39.5	1.67	7.70	7.70	7.70	0.41	0.84	± 12.0 %
2450	39.2	1.80	7.25	7.25	7.25	0.45	0.81	± 12.0 %
2600	39.0	1.96	7.04	7.04	7.04	0.43	0.84	± 12.0 %
5250	35.9	4.71	5.21	5.21	5.21	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.75	4.75	4.75	0.40	1.80	± 13.1 %
5750	35.4	5.22	4.98	4.98	4.98	0.40	1.80	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7416

Calibration Parameter Determined in Body Tissue Simulating Media

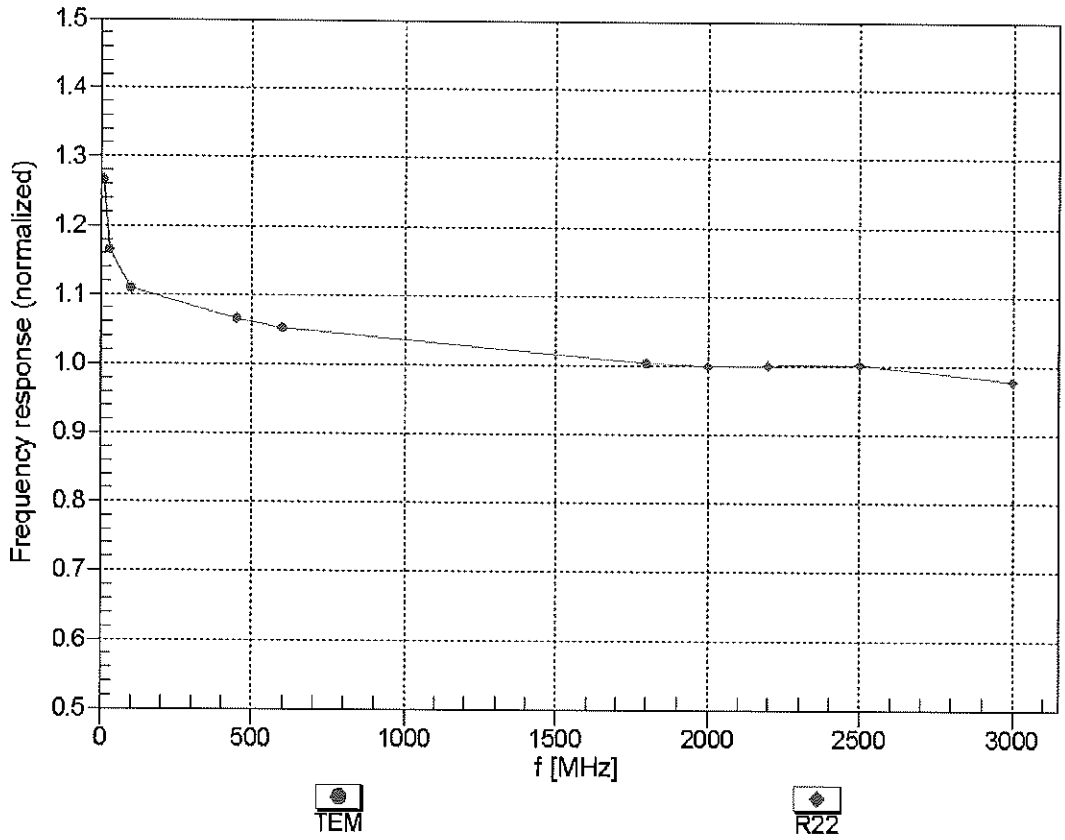
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unc (k=2)
750	55.5	0.96	9.60	9.60	9.60	0.47	0.80	± 12.0 %
835	55.2	0.97	9.40	9.40	9.40	0.46	0.85	± 12.0 %
1750	53.4	1.49	7.99	7.99	7.99	0.41	0.85	± 12.0 %
1900	53.3	1.52	7.69	7.69	7.69	0.40	0.84	± 12.0 %
2300	52.9	1.81	7.49	7.49	7.49	0.39	0.84	± 12.0 %
2450	52.7	1.95	7.31	7.31	7.31	0.32	0.96	± 12.0 %
2600	52.5	2.16	7.23	7.23	7.23	0.32	0.97	± 12.0 %
5250	48.9	5.36	4.61	4.61	4.61	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.02	4.02	4.02	0.50	1.90	± 13.1 %
5750	48.3	5.94	4.21	4.21	4.21	0.50	1.90	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)