TEST REPORT

DT&C Co., Ltd.
42, Yurim-ro, 154Beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Korea, 17042
Tel : 031-321-2664, Fax : 031-321-1664

1. Report No : DRRFCC2001-0003(1)
2. Customer
   - Name : LG Electronics USA, Inc.
   - Address : 1000 Sylvan Ave. Englewood Cliffs, New Jersey, United States 07632
3. Use of Report : FCC Original Grant
4. Product Name / Model Name : Mobile Phone / OA2001
   FCC ID : ZNFOA2001
5. Test Method Used : IEEE 1528-2013, FCC SAR KDB Publications (Details in test report)
   Test Specification : CFR 47 Part 2 subpart 2.1093
6. Date of Test : 2019.12.02 ~ 2019.12.12
7. Testing Environment : Refer to appended test report.
8. Test Result : Refer to attached test report.

Affirmation	Tested by Name : BumJun Park (Signature)	Reviewed by Name : HakMin Kim (Signature)

2020 . 01 . 23.

DT&C Co., Ltd.

If this report is required to confirmation of authenticity, please contact to report@dtnc.net

Test Report Version

Test Report No.	Date	Description	Tested by	Reviewed by
DRRFCC2001-0003	Jan. 16, 2020	Initial issue	BumJun Park	HakMin Kim
DRRFCC2001-0003(1)	Jan. 23, 2020	Revise of Section 12.	BumJun Park	HakMin Kim

Table of Contents

1. DESCRIPTION OF DEVICE 5

1.1 General Information 5
1.2 Power Reduction for SAR 7
1.3 Nominal and Maximum Output Power Specifications 7
1.4 DUT Antenna Locations 7
1.5 Simultaneous Transmission Capabilities 7
1.6 Miscellaneous SAR Test Considerations 8
1.7 Guidance Applied 9
1.8 Device Serial Numbers 9

2. LTE INFORMATION 10

3. INTROCUCTION 11

4. DOSIMETRIC ASSESSMENT 12

4.1 Measurement Procedure 12

5. DEFINITION OF REFERENCE POINTS 14

5.1 Ear Reference Point 14
5.2 Handset Reference Points 14

6. TEST CONFIGURATION POSITIONS FOR HANDSETS 15

6.1 Device Holder 15
6.2 Positioning for Cheek/Touch 15
6.3 Positioning for Ear / 15 ° Tilt 15
6.4 Body-Worn Accessory Configurations 16
6.5 Extremity Exposure Configurations 16
6.6 Wireless Router Configurations 17
6.7 Phablet Configurations 17

7. RF EXPOSURE LIMITS 18

8. FCC MEASUREMENT PROCEDURES 19

8.1 Measured and Reported SAR 19
8.2 Procedures Used to Establish RF Signal for SAR 19
8.3 SAR Measurement Conditions for WCDMA (UMTS) 19
8.3.1 Output Power Verification 19
8.3.2 Head SAR Measurements for Handsets 19
8.3.3 Body SAR Measurements 20
8.3.4 Release 5 HSDPA Data Devices 20
8.3.5 Release 6 HSUPA Data Devices 20
8.3.6 SAR Measurement Conditions for DC-HSDPA 21
8.4 SAR Measurement Conditions for LTE 22
8.4.1 Spectrum Plots for RB Configurations 22
8.4.2 MPR 22
8.4.3 A-MPR 22
8.4.4 Required RB Size and RB Offsets for SAR Testing 22
8.4.5 64QAM uplink 22
8.5 SAR Testing with 802.11 Transmitters 23
8.5.1 General Device Setup 23
8.5.2 U-NII and U-NII-2A 23
8.5.3 U-NII-2C and U-NII-3 23
8.5.4 Initial Test Position Procedure 24
8.5.5 2.4 GHz SAR Test Requirements 24
8.5.6 OFDM Transmission Mode and SAR Test Channel Selection 24
8.5.7 Initial Test Configuration Procedure 24
8.5.8 Subsequent Test Configuration Procedures 25
8.5.9 MIMO SAR Considerations 25

9. RF CONDUCTED POWERS 26

9.1 GSM Nominal and Maximum Output Power Spec and Conducted Powers 26
9.2 WCDMA Nominal and Maximum Output Power Spec and Conducted Powers 27
9.3 LTE Nominal and Maximum Output Power Spec and Conducted Powers 28
9.4 WLAN Nominal and Maximum Output Power Spec and Conducted Powers 37
9.5 Bluetooth Conducted Powers 40

10. SYSTEM VERIFICATION 42
10.1 Tissue Verification 42
10.2 Test System Verification 45
11. SAR TEST RESULTS 46
11.1 Head SAR Results 46
11.2 Standalone Body-Worn SAR Worn SAR Results 50
11.3 Standalone Hotspot SAR Results 52
11.4 Standalone Phablet SAR Results 54
11.5 SAR Test Notes 55
12. FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS 58
12.1 Introduction 58
12.2 Simultaneous Transmission Procedures 58
12.3 Simultaneous Transmission Capabilities 58
12.4 Head SAR Simultaneous Transmission Analysis 60
12.5 Body-Worn Simultaneous Transmission Analysis 71
12.6 Hotspot SAR Simultaneous Transmission Analysis 77
12.7 Phablet SAR Simultaneous Transmission Analysis 84
12.8 Simultaneous Transmission Conclusion 84
13. SAR MEASUREMENT VARIABILITY 85
13.1 Measurement Variability 85
13.2 Measurement Uncertainty 85
14. EQUIPMENT LIST 86
15. MEASUREMENT UNCERTAINTIES 87
16. CONCLUSION 104
17. REFERENCES 105
APPENDIX A. – Probe Calibration Data 107
APPENDIX B. – Dipole Calibration Data 160
APPENDIX C. – SAR Tissue Specifications 217
APPENDIX D. – SAR SYSTEM VALIDATION 220
APPENDIX E. – IEEE 802.11AX RU SAR EXCLUSION 222
APPENDIX F. – Description of Test Equipment 230

1. DESCRIPTION OF DEVICE

1.1 General Information

EUT type	Mobile Phone				
FCC ID	ZNFOA2001				
Equipment model name	OA2001				
Equipment add model name	KA2004				
Equipment serial no.	Identical prototype				
Mode(s) of Operation	GSM 850, GSM 1900, WCDMA 850, WCDMA 1700, WCDMA 1900, LTE Band 12, 17, 13, 5, 4, 2, 2.4 G W-LAN (802.11b/g/n/ac/ax), 5 G W-LAN (802.11a/n/ac/ax), Bluetooth				
TX Frequency Range	**Band**	**Mode**	**Operating Modes**	**Bandwidth**	**Frequency**
	GSM 850	GSM/GPRS	Voice/Data	-	824.2 ~ 848.8 MHz
	GSM 1900	GSM/GPRS	Voice/Data	-	1850.2 ~ 1909.8 MHz
	WCDMA 850	WCDMA	Voice/Data	-	826.4 ~ 846.6 MHz
	WCDMA 1700	WCDMA	Voice/Data	-	1712.4 ~ 1752.6 MHz
	WCDMA 1900	WCDMA	Voice/Data	-	1852.4 ~ 1907.6 MHz
	LTE Band 12	LTE	Voice/Data	1.4/3/5/10MHz	699.7 ~ 715.3 MHz
	LTE Band 17	LTE	Voice/Data	5/10MHz	706.5 ~ 713.5 MHz
	LTE Band 13	LTE	Voice/Data	5/10MHz	779.5 ~ 784.5 MHz
	LTE Band 5	LTE	Voice/Data	1.4/3/5/10MHz	824.7 ~ 848.3 MHz
	LTE Band 4	LTE	Voice/Data	1.4/3/5/10/15/20MHz	1710.7 ~ 1754.3 MHz
	LTE Band 2	LTE	Voice/Data	1.4/3/5/10/15/20MHz	1850.7 ~ 1909.3 MHz
	2.4 GHz W-LAN	802.11b/g/n/ac/ax	Voice/Data	20MHz	2412 ~ 2472 MHz
	5.2 GHz W-LAN	802.11a/n/ac/ax	Voice/Data	20MHz	5180 ~ 5240 MHz
		802.11n/ac/ax	Voice/Data	40MHz	5190 ~ 5230 MHz
		802.11ac/ax	Voice/Data	80MHz	5210 MHz
	5.3 GHz W-LAN	802.11a/n/ac/ax	Voice/Data	20MHz	5260 ~ 5320 MHz
		802.11n/ac/ax	Voice/Data	40MHz	5270 ~ 5310 MHz
		802.11ac/ax	Voice/Data	80MHz	5290 MHz
	5.6 GHz W-LAN	802.11a/n/ac/ax	Voice/Data	20MHz	5500 ~ 5720 MHz
		802.11n/ac/ax	Voice/Data	40MHz	5510 ~ 5710 MHz
		802.11ac/ax	Voice/Data	80MHz	5530 ~ 5690 MHz
	5.8 GHz W-LAN	802.11a/n/ac/ax	Voice/Data	20MHz	5745 ~ 5825 MHz
		802.11n/ac/ax	Voice/Data	40MHz	5755 ~ 5795 MHz
		802.11ac/ax	Voice/Data	80MHz	5775 MHz
	Bluetooth	-	Data	-	2402 ~ 2480 MHz
RX Frequency Range	GSM 850	GSM/GPRS	Voice/Data	-	869.2 ~ 893.8 MHz
	GSM 1900	GSM/GPRS	Voice/Data	-	1930.2 ~ 1989.8 MHz
	WCDMA 850	WCDMA	Voice/Data	-	871.4 ~ 891.6 MHz
	WCDMA 1700	WCDMA	Voice/Data	-	2112.4 ~ 2152.6 MHz
	WCDMA 1900	WCDMA	Voice/Data	-	1932.4 ~ 1987.6 MHz
	LTE Band 12	LTE	Voice/Data	1.4/3/5/10MHz	729.7 ~ 745.3 MHz
	LTE Band 17	LTE	Voice/Data	5/10MHz	736.5 ~ 743.5 MHz
	LTE Band 13	LTE	Voice/Data	5/10MHz	748.5 ~ 753.5 MHz
	LTE Band 5	LTE	Voice/Data	1.4/3/5/10MHz	869.7 ~ 893.3 MHz
	LTE Band 4	LTE	Voice/Data	1.4/3/5/10/15/20MHz	2110.7 ~ 2154.3 MHz
	LTE Band 2	LTE	Voice/Data	1.4/3/5/10/15/20MHz	1930.7 ~ 1989.3 MHz
	2.4 GHz W-LAN	802.11b/g/n/ac/ax	Voice/Data	20MHz	2412 ~ 2472 MHz
	5.2 GHz W-LAN	802.11a/n/ac/ax	Voice/Data	20MHz	5180 ~ 5240 MHz
		802.11n/ac/ax	Voice/Data	40MHz	5190 ~ 5230 MHz
		802.11ac/ax	Voice/Data	80MHz	5210 MHz
	5.3 GHz W-LAN	802.11a/n/ac/ax	Voice/Data	20MHz	5260 ~ 5320 MHz
		802.11n/ac/ax	Voice/Data	40MHz	5270 ~ 5310 MHz
		802.11ac/ax	Voice/Data	80MHz	5290 MHz
	5.6 GHz W-LAN	802.11a/n/ac/ax	Voice/Data	20MHz	5500 ~ 5720 MHz
		802.11n/ac/ax	Voice/Data	40MHz	5510 ~ 5710 MHz
		802.11ac/ax	Voice/Data	80MHz	5530 ~ 5690 MHz
	5.8 GHz W-LAN	802.11a/n/ac/ax	Voice/Data	20MHz	5745 ~ 5825 MHz
		802.11n/ac/ax	Voice/Data	40MHz	5755 ~ 5795 MHz
		802.11ac/ax	Voice/Data	80MHz	5775 MHz
	Bluetooth	-	Data	-	2402 ~ 2480 MHz

SAR Summary Table

Equipment Class	Band	Reported SAR			
		1g SAR (W/kg)			10g SAR (W/kg)
		Head	Body-Worn	Hotspot	Phablet
PCE	GSM 850	< 0.1	0.23	-	-
PCE	GPRS 850	< 0.1	0.26	0.26	-
PCE	GSM 1900	< 0.1	0.36	-	-
PCE	GPRS 1900	< 0.1	0.40	**0.62**	-
PCE	WCDMA 850	< 0.1	0.22	0.22	-
PCE	WCDMA 1700	< 0.1	0.31	0.55	-
PCE	WCDMA 1900	< 0.1	**0.42**	0.61	-
PCE	LTE Band 12	**0.15**	0.35	0.35	-
PCE	LTE Band 17	-	-	-	-
PCE	LTE Band 13	0.13	0.37	0.37	-
PCE	LTE Band 5	< 0.1	0.28	0.28	-
PCE	LTE Band 4	< 0.1	0.35	0.58	-
PCE	LTE Band 2	< 0.1	0.41	0.61	-
DTS(SISO)	2.4 GHz W-LAN	0.51	0.12	0.16	-
DTS(MIMO)	2.4 GHz W-LAN	0.56	0.14	0.17	-
U-NII-1(SISO)	5.2 GHz W-LAN	-	-	0.29	-
U-NII-1(MIMO)	5.2 GHz W-LAN	-	-	0.37	-
U-NII-2A(SISO)	5.3 GHz W-LAN	0.34	0.28	-	0.80
U-NII-2A(MIMO)	5.3 GHz W-LAN	0.32	0.38	-	**1.29**
U-NII-2C(SISO)	5.6 GHz W-LAN	0.59	0.19	-	0.87
U-NII-2C(MIMO)	5.6 GHz W-LAN	**0.66**	0.18	-	0.82
U-NII-3(SISO)	5.8 GHz W-LAN	0.43	0.24	0.22	0.64
U-NII-3(MIMO)	5.8 GHz W-LAN	0.47	0.28	0.24	1.13
DSS	Bluetooth	0.26	< 0.1	< 0.1	-
Simultaneous SAR per KDB 690783 D01v01r03		**1.34**	**0.87**	**0.86**	-

FCC Equipment Class	Licensed Portable Transmitter Held to Ear (PCE) Part 15 Spread Spectrum Transmitter(DSS) Digital Transmission System(DTS) Unlicensed National Information Infrastructure (UNII)
Date(s) of Tests	2019.12.02 ~ 2019.12.12
Antenna Type	Internal Antenna
Functions	● GSM/GPRS (GPRS Class: 12) supported. * DTM not supported. ● Simultaneous transmission between [GSM, WCDMA voice & WLAN], [GPRS, WCDMA & WLAN], [LTE & WLAN]. ● VoIP is supported. ● W-LAN 2.4GHz is supported Hotspot. ● W-LAN 5 GHz is supported Hotspot in UNII B1, B3.

1.2 Power Reduction for SAR

There is no power reduction used for any band/mode implemented in this device for SAR purposes.

1.3 Nominal and Maximum Output Power Specifications

The Nominal and Maximum Output Power Specifications are in section 9 of this test report.

1.4 DUT Antenna Locations

The overall dimensions of this device are > 9 x 5 cm. A diagram showing the location of the device of the device antenna can be found in ZNFOA2001_Antenna Location. Since the diagonal dimension of this device is > 160 mm and < 200 mm. it is considered a “phablet”.

Mode	Device Sides for SAR Testing					
	Top	Bottom	Front	Rear	Right	Left
GSM/GPRS 850	X	O	O	O	O	X
GSM/GPRS 1900	X	O	O	O	X	O
WCDMA 850	X	O	O	O	O	X
WCDMA 1700	X	O	O	O	X	O
WCDMA 1900	X	O	O	O	X	O
LTE Band 12	X	O	O	O	O	X
LTE Band 17	X	O	O	O	O	X
LTE Band 13	X	O	O	O	O	X
LTE Band 5	X	O	O	O	O	X
LTE Band 4	X	O	O	O	X	O
LTE Band 2	X	O	O	O	X	O
2.4G W-LAN Ant.1	O	X	O	O	X	O
2.4G W-LAN Ant.2	O	X	O	O	X	O
2.4G W-LAN MIMO	O	X	O	O	X	O
5G W-LAN Ant.1	O Note 2	X	O	O	X	O Note 2
5G W-LAN Ant.2	O Note 2	X	O	O	X	O Note 2
5G W-LAN MIMO	O Note 2	X	O	O	X	O Note 2
Bluetooth	O	X	O	O	X	O

Note 1: Particular DUT edges were not required to be evaluated for Hotspot SAR or Phablet SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 648474 D04v01r03.The antenna document shows the distances between the transmit antennas and the edges of the device.

Note 2: WLAN Hotspot UNII-1, 3 supported.

Note 3: O - Test / X - Not test.

Note 4: This DUT has NFC operations. The NFC antenna is integrated into the back side.
The SAR tests were performed with NFC antenna already incorporated.
A diagram showing the location of the device antenna can be found in ZNFOA2001_Antenna Location.

1.5 Simultaneous Transmission Capabilities

The Simultaneous Transmission Capabilities are in section 12 of this test report.

1.6 Miscellaneous SAR Test Considerations

(A) WIFI/BT

Since U-NII-1 and U-NII-2A bands have the same maximum output power and the highest reported SAR for U-NII-2A is less than 1.2 W/kg, SAR is not required for U-NII-1 band according to FCC KDB publication 248227 D01v02r02.

Since Wireless Router operations are not allowed by the chipset firmware using U-NII-2A & U-NII-2C WIFI, only 2.4GHz, U-NII-1, U-NII-3 WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v02r01.

Per FCC KDB 447498 D01v06, the 1g SAR exclusion threshold for distances < 50 mm is defined by the following equation:

$$\frac{Max\ Power\ of\ Channel\ (mW)}{Test\ Separation\ Dist\ (mm)} * \sqrt{Frequency(GHz)} \leq 3.0$$

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, body-worn and hotspot **Bluetooth SAR was not required; [(14/10)*√2.480] = 2.1 (< 3.0)**. Per KDB Publication 447498 D01 v06, the maximum power of the channel was rounded to the nearest mW before calculation.

Per FCC KDB 447498 D01v06, the 10g SAR exclusion threshold for distance < 50 mm is defined by the following equation:

$$\frac{Max\ Power\ of\ Channel\ (mW)}{Test\ Separation\ Dist\ (mm)} * \sqrt{Frequency(GHz)} \leq 7.5$$

Based on the maximum conducted power of Bluetooth (rounded to the nearest mW) and the antenna to user separation distance, phablet **Bluetooth SAR was not required; [(14/5)*√2.480] = 4.3 (< 7.5)**. Per KDB Publication 447498 D01v06, the maximum power of the channel was rounded to the nearest mW before calculation.

Per FCC KDB Publication 648474 D04v01r03, this device is considered a “phablet” since the diagonal dimension is greater than 160 mm and less than 200 mm. Phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg. Because wireless router operations are not supported for U-NII-2A & U-NII-2C & U-NII-3 WLAN(CH 165), phablet SAR tests were performed. Phablet SAR was not evaluated for 2.4 GHz WLAN operations since wireless router 1g SAR was < 1.2 W/kg.

Per April 2019 TCB Workshop Notes, 802.11ax was considered a higher order 802.11 mode when compared to a/b/g/n/ac to apply KDB Publication 248227 D01v02r02 for OFDM mode selection.

The 802.11ax specified maximum output power of this device is not greater than the other 802.11 modes.

Also the maximum conducted powers were measured for each RU size to demonstrate that the output powers would not be higher than the other OFDM 802.11 modes.

In conclusion, SAR tests were not required for 802.11ax based on the maximum allowed output powers of OFDM modes and the reported SAR values.

(B) Licensed Transmitter(s)

GSM/GPRS DTM is not supported for US bands. Therefore, the GSM Voice modes in this report do not transmit simultaneously with GPRS Data.

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.

Per FCC KDB Publication 648474 D04 v01r03, this device is considered a “phablet” since the diagonal dimension is greater than 160 mm and less than 200 mm. Therefore, phablet SAR tests are required when wireless router mode does not apply or if wireless router 1g SAR > 1.2 W/kg.

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 lager 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.

1.7 Guidance Applied

- IEEE 1528-2013
- FCC KDB Publication 941225 D01v03r01 (3G SAR Procedures)
- FCC KDB Publication 941225 D05v02r05 (SAR for LTE Devices)
- FCC KDB Publication 941225 D05Av01r02 (LTE Rel.10 KDB Inquiry Sheet)
- FCC KDB Publication 941225 D06v02r01(Hotspot Mode)
- FCC KDB Publication 248227 D01v02r02 (802.11 Wi-Fi SAR)
- FCC KDB Publication 447498 D01v06 (General RF Exposure Guidance)
- FCC KDB Publication 648474 D04v01r03 (Handset SAR)
- FCC KDB Publication 690783 D01v01r03 (SAR Listings on Grants)
- FCC KDB Publication 865664 D01v01r04 (SAR Measurement 100 MHz to 6 GHz)
- FCC KDB Publication 865664 D02v01r02 (RF Exposure Reporting)
- October 2013 TCB Workshop Notes (GPRS testing criteria)
- April 2015 TCB Workshop Notes (Simultaneous transmission summation clarified)
- October 2016 TCB Workshop Notes (Bluetooth Duty Factor)
- April 2019 TCB Workshop Notes (802.11ax Transmitters)
- FCC KDB Inquiry (Tracking No. 372568)

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 11.

2. LTE INFORMATION

LTE Information					
FCC ID	**ZNFOA2001**				
Form Factor	Mobile Phone				
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 5 (Cell) (824.7 ~ 848.3 MHz) LTE Band 4 (AWS) (1710.7 ~ 1754.3 MHz) LTE Band 2 (PCS) (1850.7 ~ 1909.3 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 5 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz LTE Band 4 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz LTE Band 2 : 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz				
Channel Number and Frequencies(MHz)	Low	Low-Mid	Mid	Mid-High	High
LTE Band 12: 1.4 MHz	699.7 (23017)	N/A	707.5 (23095)	N/A	715.3 (23173)
LTE Band 12: 3 MHz	700.5 (23025)	N/A	707.5 (23095)	N/A	714.5 (23165)
LTE Band 12: 5 MHz	701.5 (23035)	N/A	707.5 (23095)	N/A	713.5 (23155)
LTE Band 12: 10 MHz	704.0 (23060)	N/A	**707.5 (23095)**Note1	N/A	711.0 (23130)
LTE Band 17: 5 MHz	706.5(23755)	N/A	710.0(23790)	N/A	713.5(23825)
LTE Band 17: 10 MHz	709.0(23780)	N/A	710.0(23790)	N/A	711.0(23800)
LTE Band 13: 5 MHz	779.5(23205)	N/A	782.0(23230)Note2	N/A	784.5(23255)
LTE Band 13: 10 MHz	N/A	N/A	**782.0(23230)**	N/A	N/A
LTE Band 5 (Cell): 1.4 MHz	824.7 (20407)	N/A	836.5 (20525)	N/A	848.3 (20643)
LTE Band 5 (Cell): 3 MHz	825.5 (20415)	N/A	836.5 (20525)	N/A	847.5 (20635)
LTE Band 5 (Cell): 5 MHz	826.5 (20425)	N/A	836.5 (20525)	N/A	846.5 (20625)
LTE Band 5 (Cell): 10 MHz	829.0 (20450)	N/A	**836.5 (20525)**Note3	N/A	844.0 (20600)
LTE Band 4 (AWS): 1.4 MHz	1710.7 (19957)	N/A	1732.5 (20175)	N/A	1754.3 (20393)
LTE Band 4 (AWS): 3 MHz	1711.5 (19965)	N/A	1732.5 (20175)	N/A	1753.5 (20385)
LTE Band 4 (AWS): 5 MHz	1712.5 (19975)	N/A	1732.5 (20175)	N/A	1752.5 (20375)
LTE Band 4 (AWS): 10 MHz	1715.0 (20000)	N/A	1732.5 (20175)	N/A	1750.0 (20350)
LTE Band 4 (AWS): 15 MHz	1717.5 (20025)	N/A	1732.5 (20175)	N/A	1747.5 (20325)
LTE Band 4 (AWS): 20 MHz	1720.0 (20050)	N/A	**1732.5 (20175)** Note4	N/A	1745.0 (20300)
LTE Band 2 (PCS): 1.4 MHz	1850.7 (18607)	N/A	1880.0 (18900)	N/A	1909.3 (19193)
LTE Band 2 (PCS): 3 MHz	1851.5 (18615)	N/A	1880.0 (18900)	N/A	1908.5 (19185)
LTE Band 2 (PCS): 5 MHz	1852.5 (18625)	N/A	1880.0 (18900)	N/A	1907.5 (19175)
LTE Band 2 (PCS): 10 MHz	1855.0 (18650)	N/A	1880.0 (18900)	N/A	1905.0 (19150)
LTE Band 2 (PCS): 15 MHz	1857.5 (18675)	N/A	1880.0 (18900)	N/A	1902.5 (19125)
LTE Band 2 (PCS): 20 MHz	1860.0 (18700)	N/A	**1880.0 (18900)**	N/A	1900.0 (19100)
UE Category	LTE Rel.15 LTE UE Cat (DL UE Cat 20, UL UE Cat 13)				
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	LTE Carrier Aggregation is not supported.				
LTE Additional Information	This device does not support full CA features on 3GPP Release 15. All uplink communications are identical to the Release 8 Specifications. The following LTE Release 15 Features are not supported: Relay, HetNet, Enhanced MIMO, eICIC, WIFI Offloading, MDH, eMBMS, Cross-Carrier Scheduling, Enhanced SC-FDMA.				

Note(s)
1. LTE B12 can not contain three non-overlapping channels of 10 MHz bandwidth.
   Per KDB 941225 D05v02r05, 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.
2. LTE B13 can not contain three non-overlapping channels of 5 MHz bandwidth.
   Per KDB 941225 D05v02r05, 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.
3. LTE B5(Cell) can not contain three non-overlapping channels of 10 MHz bandwidth.
   Per KDB 941225 D05v02r05, 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.
4. LTE B4 (AWS) can not contain three non-overlapping channels of 20 MHz bandwidth.
   Per KDB 941225 D05v02r05, 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.

3. INTROCUCTION

The FCC and Industry 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.

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices. 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. The measurement procedure described in IEEE/ANSI C95.3-2002 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring 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 National Council on Radiation Protection and Measurements (NCRP) in Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86 NCRP, 1986, Bethesda, MD 20814. 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.

SAR Definition

Specific Absorption Rate (SAR) 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 Fig. 3.1)

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

Fig. 3.1 SAR Mathematical Equation

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 relations 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.

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:

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 IEEE1528-2013.

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.

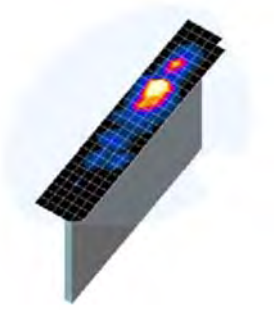


Figure 4.1
Sample SAR Area Scan

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.

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 mm ± 1 mm	½·δ·ln(2) mm ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$ mm	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm

Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see IEEE Std 1528-2013 for details.

* When zoom scan is required and the *reported* SAR from the *area scan based 1-g SAR estimation* procedures of KDB Publication 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.

Table 4.1 Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r04*

5. DEFINITION OF REFERENCE POINTS

5.1 Ear Reference Point

Figure 5.1 shows the front, back and side views of the SAM Twin Phantom. The point"M" is the reference point for the center of the mouth, "LE" is the left ear reference point(ERP), and "RE" is the right ERP. The ERPs are 15 mm posterior to the entrance to the Ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 5.1. The plane Passing, through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck- Front) is perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 5.1). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning.

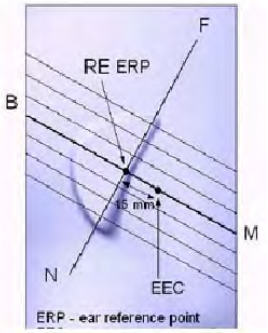


Figure 5.1
Close-up side view of ERP

5.2 Handset Reference Points

Two imaginary lines on the handset were established: the vertical centerline and the horizontal line. The test device was placed in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (See Fig. 5.3). The "test device reference point" was than located at the same level as the center of the ear reference point. The test device was positioned so that the "vertical centerline" was bisecting the front surface of the handset at it's top and bottom edges, positioning the "ear reference point" on the outer surface of the both the left and right head phantoms on the ear reference point.

Figure 5.2 Front, back and side view SAM Twin Phantom

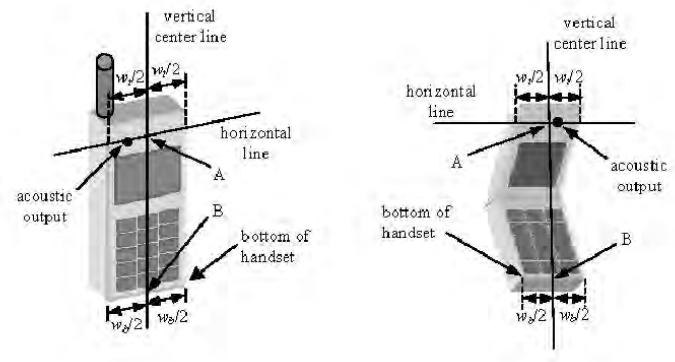


Figure 5.3 Handset Vertical Center & Horizontal Line Reference Points

6. TEST CONFIGURATION POSITIONS FOR HANDSETS

6.1 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.

6.2 Positioning for Cheek/Touch

1. The test device was positioned with the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 6.1), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.

Figure 6.1 Front, Side and Top View of Cheek/Touch Position

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).
4. The phone was hen rotated around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, the handset was rotated about the line NF until any point on the handset made contact with a phantom point below the ear (cheek). (See Figure 6.2)

6.3 Positioning for Ear / 15 ° Tilt

With the test device aligned in the “Cheek/Touch Position”:

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15 degree.
2. The phone was then rotated around the horizontal line by 15 degree.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference plane until any part of the phone touches the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. The tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 6.3).

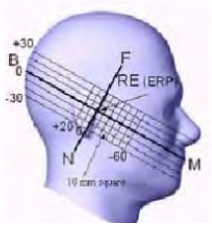


Figure 6.2 Side view w/relevant markings

Figure 6.3 Front, Side and Top View of Ear/15º Position

6.4 Body-Worn Accessory Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 6.4). Per FCC KDB Publication 648474 D04v01r03, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01v06 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

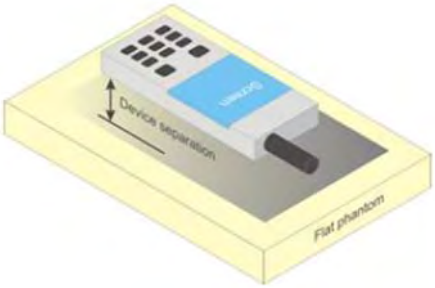


Figure 6.4 Sample Body-Worn Diagram

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented.
Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

6.5 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1-g body and 10-g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01v06 should be applied to determine SAR test requirements.

Per KDB Publication 447498 D01v06, Cell phones (handsets) are not normally designed to be used on extremities or operated in extremity only exposure conditions. The maximum output power levels of handsets generally do not require extremity SAR testing to show compliance. Therefore, extremity SAR was not evaluated for this device.

6.6 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06v02r01 where SAR test considerations for handsets (L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front the front, rear and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. When the same wireless transmission configuration is used for testing body-worn accessory and hotspot mode SAR, respectively, in voice and data mode, SAR results for the most conservative test separation distance configuration may be used to support both SAR conditions.

When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitter often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SAR must be evaluated for each KDB Publication 447498 D01v06 procedures. The “Portable Hotspot” feature on the handset was not activated during SAR assessment, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

6.7 Phablet Configurations

For smart phones with a display diagonal > 150 mm or an overall diagonal dimension > 160 mm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the phablets procedures outlined in KDB Publication 648474 D04v01r03 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna ≤ 25mm from that surface or edge, in direct contact with the phantom, for 10g SAR. The UMPC mini-tablet 1g SAR at 5 mm is not required. When hotspot mode applies, 10g SAR is required only for the surfaces and edges with hotspot mode 1g SAR > 1.2 W/kg.

7. RF EXPOSURE LIMITS

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.

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 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 7.1.SAR Human Exposure Specified in ANSI/IEEE C95.1-1992

	HUMAN EXPOSURE LIMITS	
	General Public Exposure (W/kg) or (mW/g)	Occupational Exposure (W/kg) or (mW/g)
SPATIAL PEAK SAR * (Brain)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.0

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.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

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).

8. FCC MEASUREMENT PROCEDURES

Power measurements were performed using a base station simulator under digital average power.

8.1 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.

8.2 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01v03r01.

The device was 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 were 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 was 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 deviated by more than 5%, the SAR test and drift measurements were repeated.

8.3 SAR Measurement Conditions for WCDMA (UMTS)

8.3.1 Output Power Verification

Maximum output power is measured on the High, Middle and Low channels for each applicable transmission band according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all “1s”.

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 (release 5), 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.

8.3.2 Head SAR Measurements for Handsets

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all “1s”. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than 0.25 dB higher than that measured in12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signaling radio bearer) using the exposure configuration that resulted in the highest SAR for that RF channel in the 12.2 kbps RMC mode.

8.3.3 Body SAR Measurements

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all“1s”.

8.3.4 Release 5 HSDPA Data Devices

The following procedures are applicable to HSDPA data devices operating under 3GPP Release 5. SAR is required for devices in body-worn accessory and other body exposure conditions, including handsets and data modems operating in various electronic devices. HSDPA operates in conjunction with WCDMA and requires an active DPCCH. The default test configuration is to measure SAR in WCDMA with HSDPA remain inactive, to establish a radio link between the test device and a communication test set using a 12.2 kbps RMC configured in Test Loop Mode 1. SAR for HSDPA is selectively measured using the highest reported SAR configuration in WCDMA, with an FRC in H-set 1 and a 12.2 kbps RMC. SAR is selectively confirmed for other physical channel configurations (DPCCH & DPDCHn) according to exposure conditions, device operating capabilities and maximum output power specified for production units, including tune-up tolerance by applying the 3G SAR test reduction procedures. Maximum output power is verified according to the applicable versions of 3GPP TS 34.121. SAR must be measured based on these maximum output conditions and requirements in KDB Publication 447498, with respect to the UE Categories, and explained in the SAR report. When Maximum Power Reduction (MPR) applies, the implementations must be clearly identified in the SAR report to support test results according to Cubic Metric (CM) and, as appropriate, Enhanced MPR (E-MPR) requirements.

Sub-test	β_c	β_d	β_d *(SF)*	β_c/β_d	β_{hs} (1)	CM (dB) (2)
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 (3)	15/15 (3)	64	12/15 (3)	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15.
Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

Figure 9.1 Table 1

8.3.5 Release 6 HSUPA Data Devices

The following procedures are applicable to HSPA (HSUPA/HSDPA) data devices operating under 3GPP Release 6. SAR is required for devices in body-worn accessory and other body exposure conditions, including handsets and data modems operating in various electronic devices. HSUPA operates in conjunction with WCDMA and HSDPA. SAR is initially measured in WCDMA test configurations with HSPA remain inactive. The default test configuration is to establish a radio link between the test device and a communication test set to configure a 12.2 kbps RMC in Test Loop Mode 1. SAR for HSPA is selectively measured with HS-DPCCH, E-DPCCH and E-DPDCH, all enabled, along with a 12.2 kbps RMC using the highest reported SAR configuration in WCDMA with 12.2 kbps RMC only.
An FRC is configured according to HS-DPCCH Sub-test 1 using H-set 1 and QPSK. HSPA is configured according to E-DCH Sub-test 5 requirements. SAR for other HSPA sub-test configurations is confirmed selectively according to exposure conditions, E-DCH UE Category and maximum output power of production units, including tune-up tolerance by applying the 3G SAR test reduction procedure. Maximum output power is verified according to procedures in applicable versions of 3GPP TS 34.121. SAR must be measured based on these maximum output conditions and requirements in KDB Publication 447498, with respect to the UE Categories for HS-DPCCH and HSPA, and explained in the SAR report. When Maximum Power Reduction (MPR) applies, the implementations must be clearly identified in the SAR report to support test results according to Cubic Metric (CM) and, as appropriate, Enhanced MPR (E-MPR) requirements.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{hs}(1)	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM(2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed1}: 47/15 β_{ed2}: 47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} cannot be set directly; it is set by Absolute Grant Value.

Figure 9.2 Table 2

8.3.6 SAR Measurement Conditions for DC-HSDPA

In the following DB 941225 D01v03r01 procedures, the mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is ≤ ¼ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as “otherwise” in the applicable procedures; SAR measurement is required for the secondary mode.

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.

8.4 SAR Measurement Conditions for LTE

LTE modes were tested according to FCC KDB 941225 D05v02r05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR. The call simulator was used for LTE output power measurement 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).

8.4.1 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.

8.4.2 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.

8.4.3 A-MPR

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

8.4.4 Required RB Size and RB Offsets for SAR Testing

According to FCC KDB 941225 D05v02r05:

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 $\leq$ 0.8 W/kg, testing of the remaining RB offset configurations and required test channel 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. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
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 0.5 dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is < 1.45 W/kg.

8.4.5 64QAM uplink

(1) Per KDB 941225 D05 V02r05, we'll measure conducted powers per Section 5.1 for all uplink modulations (QPSK, 16QAM, 64QAM) and include in the test report.

(2) From these power measurements, we will apply the procedures in Section 5.2.4 ("Higher Order Modulations") to determine SAR test reduction for 16QAM and 64QAM test cases.

8.5 SAR Testing with 802.11 Transmitters

The normal network operating configurations are not suitable for measuring the SAR of 802.11 b/g/n transmitters. 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 248227D01v02r02 for more details.

8.5.1 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. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be used for all measurements.

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the 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.

8.5.2 U-NII and U-NII-2A

For devices that operate in only one of the U-NII-1 and U-NII-2A bands, the normally required SAR procedures for OFDM configurations are applied. For devices that operate in both U-NII bands using the same transmitter and antenna(s), SAR test reduction is determined according to the following, with respect to the highest reported SAR and maximum output power specified for production units. The procedures are applied independently to each exposure configuration; for example, head, body, hotspot mode etc.

1) When the same maximum output power is specified for both bands, begin SAR measurement in U-NII-2A band by applying the OFDM SAR requirements. If the highest reported SAR for a test configuration is ≤ 1.2 W/kg, SAR is not required for U-NII-1 band for that configuration (802.11 mode and exposure condition); otherwise, each band is tested independently for SAR.
2) When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration; otherwise, each band is tested independently for SAR.

8.5.3 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 Rader (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. When band gap channels are disabled, each band is tested independently according to the normally required OFDM SAR measurements and probe calibration frequency points requirements.

8.5.4 Initial Test Position Procedure

For exposure conditions with multiple test positions, such as handset operating next to the ear, devices with hotspot mode or UMPC mini-tablet, procedures for initial test position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all position in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR position until the reported SAR result is ≤ 0.8 W/kg or all test position are measured.

8.5.5 2.4 GHz SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either a 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 exposure configuration 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.

8.5.6 OFDM Transmission Mode and SAR Test Channel Selection

For the 2.4 GHz and 5 GHz bands, 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 802.11 ac or 802.11g, 802.11n and 802.11ac 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 and 802.11ac is used for SAR measurement. Per April 2019 TCB Workshop guidance, 802.11ax was considered the highest order 802.11 mode. When the maximum output power ware 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.

8.5.7 Initial Test Configuration Procedure

For OFDM, in both 2.4 and 5 GHz bands, 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 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, and lowest data rate. 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.

8.5.8 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 applicable. When the highest reported SAR for the initial test configuration, adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power is ≤ 1.2 W/kg, no additional SAR testing for the subsequent test configurations is required.

8.5.9 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.

9. RF CONDUCTED POWERS

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

9.1 GSM Nominal and Maximum Output Power Spec and Conducted Powers

Band & Mode		Voice[dBm]	Burst Average GMSK [dBm]			
		1 TX Slot	1 TX Slot	2 TX Slot	3 TX Slot	4 TX Slot
GSM/GPRS 850	Maximum	33.70	33.70	31.20	28.20	26.20
	Nominal	33.20	33.20	30.70	27.70	25.70
GSM/GPRS 1900	Maximum	30.70	30.70	29.20	27.20	25.70
	Nominal	30.20	30.20	28.70	26.70	25.20

Table 9.1.1 GSM Nominal and Maximum Output Power Spec

Band	Channel	Maximum Burst-Averaged Output Power(dBm)				
		Voice	GPRS Data (GMSK)			
		GSM CS 1 Slot	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot
GSM850	128	33.50	33.50	31.00	27.70	25.60
	190	33.60	33.60	31.20	27.90	25.90
	251	33.50	33.50	30.80	27.60	25.60
PCS 1900	512	30.20	30.20	29.20	27.20	25.40
	661	30.40	30.40	29.10	27.10	25.60
	810	30.30	30.30	29.00	27.00	25.40
Band	Channel	Calculated Maximum Frame-Averaged Output Power(dBm)				
		Voice	GPRS Data (GMSK)			
		GSM CS 1 Slot	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot
GSM850	128	24.47	24.47	24.98	23.44	22.59
	190	24.57	24.57	25.18	23.64	22.89
	251	24.47	24.47	24.78	23.34	22.59
PCS 1900	512	21.17	21.17	23.18	22.94	22.39
	661	21.37	21.37	23.08	22.84	22.59
	810	21.27	21.27	22.98	22.74	22.39
GSM850	Frame Avg. Targets:	24.17	24.17	24.68	23.44	22.69
PCS 1900		21.17	21.17	22.68	22.44	22.19

Table 9.1.2 GSM Conducted Power

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 (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.

GPRS Multislot class: 12 (max 4 TX Uplink slots)
DTM Multislot Class: N/A

Figure 9.1 Power Measurement Setup

9.2 WCDMA Nominal and Maximum Output Power Spec and Conducted Powers

3GPP Release Version	Mode			Cellular Band (dBm)	AWS Band (dBm)	PCS Band (dBm)	3GPP MPR (dB)
99	WCDMA	Voice	Maximum	25.5	23.2	23.2	-
			Nominal	25.0	22.7	22.7	
5	HSDPA	Subtest 1	Maximum	25.5	23.2	23.2	0
			Nominal	25.0	23.7	23.7	
5		Subtest 2	Maximum	25.5	23.2	23.2	0
			Nominal	25.0	23.7	23.7	
5		Subtest 3	Maximum	25.0	22.7	22.7	0.5
			Nominal	24.5	22.2	22.2	
5		Subtest 4	Maximum	25.0	22.7	22.7	0.5
			Nominal	24.5	22.2	22.2	
6	HSUPA	Subtest 1	Maximum	25.5	23.2	23.2	0
			Nominal	25.0	23.7	23.7	
6		Subtest 2	Maximum	23.5	21.2	21.2	2
			Nominal	23.0	20.7	20.7	
6		Subtest 3	Maximum	24.5	22.2	22.2	1
			Nominal	24.0	21.7	21.7	
6		Subtest 4	Maximum	23.5	21.2	21.2	2
			Nominal	23.0	20.7	20.7	
6		Subtest 5	Maximum	25.5	23.2	23.2	0
			Nominal	25.0	23.7	23.7	
8	DC-HSDPA	Subtest 1	Maximum	25.5	23.2	23.2	0
			Nominal	25.0	23.7	23.7	
8		Subtest 2	Maximum	25.5	23.2	23.2	0
			Nominal	25.0	23.7	23.7	
8		Subtest 3	Maximum	25.0	22.7	22.7	0.5
			Nominal	24.5	22.2	22.2	
8		Subtest 4	Maximum	25.0	22.7	22.7	0.5
			Nominal	24.5	22.2	22.2	

Table 9.2.1 WCDMA Nominal and Maximum Output Power Spec

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	25.37	25.38	24.84	22.88	22.94	22.86	22.84	22.88	22.87	-
99		12.2 kbps AMR	25.36	25.39	24.96	22.88	22.96	22.88	22.82	22.87	22.89	-
5	HSDPA	Subtest 1	24.36	24.38	23.93	21.89	21.98	21.89	21.86	21.89	21.90	0
5		Subtest 2	24.36	24.36	23.95	21.90	21.96	21.88	21.87	21.90	21.91	0
5		Subtest 3	23.85	23.87	23.50	21.39	21.48	21.39	21.38	21.38	21.39	0.5
5		Subtest 4	23.85	23.87	23.49	21.39	21.46	21.38	21.35	21.39	21.38	0.5
6	HSUPA	Subtest 1	24.36	24.36	23.95	21.90	21.96	21.89	21.86	21.89	21.89	0
6		Subtest 2	22.35	22.38	22.03	19.91	19.99	19.91	19.85	19.89	19.89	2
6		Subtest 3	23.36	23.39	22.99	20.89	20.96	20.90	20.88	20.88	20.90	1
6		Subtest 4	22.35	22.40	21.99	19.91	19.99	19.91	19.88	19.92	19.89	2
6		Subtest 5	25.19	25.29	25.33	21.92	21.96	21.90	21.87	21.90	21.90	0
8	DC-HSDPA	Subtest 1	24.00	24.12	23.72	21.73	21.89	21.83	21.72	21.76	21.75	0
8		Subtest 2	24.00	24.11	23.70	21.73	21.88	21.82	21.72	21.76	21.76	0
8		Subtest 3	23.51	23.61	23.22	21.24	21.39	21.33	21.21	21.25	21.25	0.5
8		Subtest 4	23.50	23.61	23.20	21.23	21.38	21.32	21.22	21.24	21.23	0.5

Table 9.2.2 WCDMA Conducted Power

WCDMA SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v03r01. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

The manufacturer declares that the HSDPA, HSUPA and DC-HSDPA transmitter's power will not exceed the R99 maximum transmit power in devices based on Qualcomm's HSPA chipset solutions.

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 9.2 Power Measurement Setup

9.3 LTE Nominal and Maximum Output Power Spec and Conducted Powers

Band & Mode		Modulated Average[dBm]
LTE Band 12	Maximum	25.5
	Nominal	25.0

Table 9.3.1.1 Nominal and Maximum Output Power Spec

1) LTE Band 12

LTE Band 12 Conducted Power– 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	24.81	≤ 1	0
	1	25	24.83		
	1	**49**	**24.88**		
	25	0	23.81		1
	25	**12**	**23.91**		
	25	25	23.82		
	50	0	23.85		1
16QAM	1	0	23.95	≤ 1	1
	1	25	23.92		
	1	49	24.00		
	25	0	23.00	≤ 2	2
	25	12	23.05		
	25	25	23.02		
	50	0	22.99		2
64QAM	1	0	22.83	≤ 2	2
	1	25	22.96		
	1	49	23.07		
	25	0	21.98	≤ 3	3
	25	12	22.08		
	25	25	22.01		
	50	0	21.97		3

Table 9.3.1.2 LTE Conducted Power

Note : LTE B12 can not contain three non-overlapping channels of 10 MHz bandwidth.
Per KDB 941225 D05v02r05, 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.

LTE Band 12 Conducted Power– 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	24.80	24.81	24.80	≤ 1	0
	1	12	24.87	24.93	24.86		
	1	24	24.84	24.84	24.82		
	12	0	23.92	23.88	23.90		1
	12	6	23.94	23.93	23.90		
	12	13	23.93	23.95	23.94		
	25	0	23.89	23.92	23.88		1
16QAM	1	0	23.91	23.92	23.98	≤ 1	1
	1	12	23.98	24.06	24.02		
	1	24	23.97	24.00	23.98		
	12	0	22.97	22.95	22.93	≤ 2	2
	12	6	22.98	22.96	22.94		
	12	13	22.95	23.02	22.95		
	25	0	22.92	22.93	22.91		2
64QAM	1	0	22.80	22.80	22.88	≤ 2	2
	1	12	22.90	22.99	22.94		
	1	24	22.89	22.95	22.86		
	12	0	21.99	21.99	21.98	≤ 3	3
	12	6	22.00	22.02	22.00		
	12	13	22.00	22.05	22.00		
	15	0	21.93	21.94	21.88		3

Table 9.3.1.3 LTE Conducted Power

LTE Band 12 Conducted Power– 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			23025 (700.5 MHz)	23095 (707.5 MHz)	23165 (714.5 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	24.86	24.80	24.80	≤ 1	0
	1	7	24.90	24.93	24.92		
	1	14	24.84	24.84	24.81		
	8	0	23.92	23.91	23.83		1
	8	4	23.97	23.92	23.94		
	8	7	23.92	23.98	23.93		
	15	0	23.94	23.91	23.84		1
16QAM	1	0	24.03	23.98	23.94	≤ 1	1
	1	7	24.05	24.09	24.00		
	1	14	23.92	24.01	23.96		
	8	0	22.97	22.98	22.94	≤ 2	2
	8	4	22.99	22.96	23.01		
	8	7	22.96	23.01	23.00		
	15	0	22.95	22.97	22.90		2
64QAM	1	0	22.93	22.87	22.82	≤ 2	2
	1	7	22.94	22.97	23.01		
	1	14	22.83	22.95	22.89		
	8	0	21.98	21.97	21.92	≤ 3	3
	8	4	22.00	21.98	22.02		
	8	7	21.94	22.03	21.95		
	15	0	21.93	21.95	21.90		3

Table 9.3.1.4 LTE Conducted Power

LTE Band 12 Conducted Power– 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			23017 (699.7 MHz)	23095 (707.5 MHz)	23173 (715.3 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	24.80	24.80	24.80	≤ 1	0
	1	2	24.90	24.91	24.89		
	1	5	24.83	24.81	24.83		
	3	0	24.84	24.82	24.81		0
	3	2	24.85	24.84	24.83		
	3	3	24.81	24.80	24.80		
	6	0	23.89	23.85	23.83		1
16QAM	1	0	23.95	23.85	23.93	≤ 1	1
	1	2	23.96	23.98	23.95		
	1	5	23.92	23.89	23.86		
	3	0	23.87	23.83	23.85		1
	3	2	23.95	23.96	23.89		
	3	3	23.88	23.90	23.87		
	6	0	22.93	22.91	22.92	≤ 2	2
64QAM	1	0	22.81	22.81	22.81	≤ 2	2
	1	2	22.84	22.90	22.82		
	1	5	22.83	22.82	22.81		
	3	0	22.98	22.96	22.96		2
	3	2	23.02	23.03	22.98		
	3	3	22.93	22.99	22.91		
	6	0	21.85	21.83	21.86	≤ 3	3

Table 9.3.1.5 LTE Conducted Power

Band & Mode		Modulated Average[dBm]
LTE Band 13	Maximum	25.5
	Nominal	25.0

Table 9.3.2.1 Nominal and Maximum Output Power Spec

2) LTE Band 13

LTE Band 13 Conducted Power– 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	25.01	≤ 1	0
	1	25	25.02		
	1	**49**	**25.08**		
	25	0	23.82		1
	25	**12**	**23.87**		
	25	25	23.86		
	50	0	23.82		1
16QAM	1	0	23.91	≤ 1	1
	1	25	24.08		
	1	49	24.09		
	25	0	22.80	≤ 2	2
	25	12	22.85		
	25	25	22.84		
	50	0	22.80		2
64QAM	1	0	22.90	≤ 2	2
	1	25	23.01		
	1	49	23.03		
	25	0	21.84	≤ 3	3
	25	12	21.89		
	25	25	21.86		
	50	0	21.80		3

Table 9.3.2.2 LTE Conducted Power

LTE Band 13 Conducted Power– 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	24.91	≤ 1	0
	1	12	24.93		
	1	24	25.00		
	12	0	23.81		1
	12	6	23.82		
	12	13	23.85		
	25	0	23.82		1
16QAM	1	0	24.02	≤ 1	1
	1	12	24.03		
	1	24	24.06		
	12	0	22.81	≤ 2	2
	12	6	22.85		
	12	13	22.83		
	25	0	22.82		2
64QAM	1	0	22.92	≤ 2	2
	1	12	22.96		
	1	24	23.00		
	12	0	21.83	≤ 3	3
	12	6	21.90		
	12	13	21.85		
	15	0	21.82		3

Table 9.3.2.3 LTE Conducted Power

Note : LTE B13 can not contain three non-overlapping channels of 5 MHz bandwidth.
Per KDB 941225 D05v02r05, 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.

Band & Mode		Modulated Average[dBm]
LTE Band 5	Maximum	25.5
	Nominal	25.0

Table 9.3.3.1 Nominal and Maximum Output Power Spec

3) LTE Band 5 (Cell)

LTE Band 5 (Cell) Conducted Power– 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	25.02	≤ 1	0
	1	**25**	**25.03**		
	1	49	24.96		
	25	0	23.96		1
	25	**12**	**24.03**		
	25	25	23.99		
	50	0	23.95		1
16QAM	1	0	24.11	≤ 1	1
	1	25	24.15		
	1	49	24.12		
	25	0	23.01	≤ 2	2
	25	12	23.09		
	25	25	23.06		
	50	0	22.98		2
64QAM	1	0	23.02	≤ 2	2
	1	25	23.09		
	1	49	23.05		
	25	0	22.03	≤ 3	3
	25	12	22.13		
	25	25	22.11		
	50	0	22.04		3

Table 9.3.3.2 LTE Conducted Power

Note : LTE B5(Cell) can not contain three non-overlapping channels of 10 MHz bandwidth.
Per KDB 941225 D05v02r05, 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.

LTE Band 5 (Cell) Conducted Power– 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	24.87	24.80	24.81	≤ 1	0
	1	12	24.94	24.90	24.90		
	1	24	24.86	24.87	24.82		
	12	0	24.00	23.91	23.88		1
	12	6	24.03	24.02	23.95		
	12	13	23.99	24.01	23.93		
	25	0	23.98	24.02	23.91		1
16QAM	1	0	24.04	23.99	23.95	≤ 1	1
	1	12	24.14	24.08	24.07		
	1	24	24.05	24.05	23.96		
	12	0	23.01	22.99	22.94	≤ 2	2
	12	6	23.03	23.06	22.97		
	12	13	22.99	23.04	22.93		
	25	0	23.02	23.06	22.93		2
64QAM	1	0	22.98	22.96	22.94	≤ 2	2
	1	12	23.09	23.05	23.03		
	1	24	23.01	23.03	22.92		
	12	0	22.11	22.10	21.99	≤ 3	3
	12	6	22.16	22.17	22.07		
	12	13	22.09	22.11	22.05		
	25	0	22.09	22.09	21.96		3

Table 9.3.3.3 LTE Conducted Power

LTE Band 5 (Cell) Conducted Power– 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			20415 (825.5 MHz)	20525 (836.5 MHz)	20635 (847.5 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	24.90	24.89	24.80	≤ 1	0
	1	7	24.97	24.99	24.95		
	1	14	24.85	24.90	24.82		
	8	0	23.98	24.00	23.89		1
	8	4	24.04	24.02	23.95		
	8	7	23.98	24.00	23.94		
	15	0	24.01	24.00	23.90		1
16QAM	1	0	24.04	24.01	23.97	≤ 1	1
	1	7	24.13	24.13	24.07		
	1	14	24.02	24.06	24.01		
	8	0	23.08	23.04	22.96	≤ 2	2
	8	4	23.10	23.10	23.04		
	8	7	23.05	23.09	23.00		
	15	0	23.07	23.08	22.93		2
64QAM	1	0	23.05	22.98	22.96	≤ 2	2
	1	7	23.13	23.14	23.05		
	1	14	23.01	23.08	22.93		
	8	0	22.06	22.10	22.02	≤ 3	3
	8	4	22.16	22.17	22.09		
	8	7	22.11	22.14	22.05		
	15	0	22.04	22.08	21.94		3

Table 9.3.3.4 LTE Conducted Power

LTE Band 5 (Cell) Conducted Power– 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			20407 (824.7 MHz)	20525 (836.5 MHz)	20643 (848.3 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	24.86	24.87	24.80	≤ 1	0
	1	2	24.96	24.96	24.85		
	1	5	24.88	24.94	24.82		
	3	0	24.92	24.85	24.80		0
	3	2	24.93	24.92	24.83		
	3	3	24.89	24.91	24.81		
	6	0	23.96	23.96	23.84		1
16QAM	1	0	23.98	23.96	23.95	≤ 1	1
	1	2	24.09	24.08	24.01		
	1	5	24.01	23.95	23.95		
	3	0	23.97	23.93	23.89		1
	3	2	24.03	24.01	23.91		
	3	3	23.90	23.98	23.89		
	6	0	22.98	23.05	22.97	≤ 2	2
64QAM	1	0	22.99	22.92	22.90	≤ 2	2
	1	2	23.01	22.99	22.89		
	1	5	22.91	22.96	22.89		
	3	0	23.11	23.03	22.99		2
	3	2	23.12	23.11	23.01		
	3	3	23.03	23.07	22.92		
	6	0	22.01	21.99	21.91	≤ 3	3

Table 9.3.3.5 LTE Conducted Power

Band & Mode		Modulated Average[dBm]
LTE Band 4	Maximum	23.2
	Nominal	22.7

Table 9.3.4.1 Nominal and Maximum Output Power Spec

4) LTE Band 4

LTE Band 4 (AWS) Conducted Power– 20 MHz Bandwidth					
Modulation	RB Size	RB Offset	Mid Channel 20175 (1732.5 MHz) Conducted Power (dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
QPSK	1	0	22.51	≤ 1	0
	1	**50**	**22.56**		
	1	99	22.50		
	50	0	21.60		1
	50	**25**	**21.63**		
	50	50	21.61		
	100	0	21.56		1
16QAM	1	0	21.67	≤ 1	1
	1	50	21.69		
	1	99	21.53		
	50	0	20.65	≤ 2	2
	50	25	20.68		
	50	50	20.68		
	100	0	20.60		2
64QAM	1	0	20.57	≤ 2	2
	1	50	20.75		
	1	99	20.53		
	50	0	19.65	≤ 3	3
	50	25	19.71		
	50	50	19.67		
	100	0	19.64		3

Table 9.3.4.2 LTE Conducted Power

Note: LTE B4 (AWS) can not contain three non-overlapping channels of 20 MHz bandwidth.
Per KDB 941225 D05v02r05, 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.

LTE Band 4 (AWS) Conducted Power– 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20025 (1717.5 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20325 (1747.5 MHz) Conducted Power (dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
QPSK	1	0	22.59	22.56	22.59	≤ 1	0
	1	36	22.65	22.66	22.64		
	1	74	22.59	22.50	22.50		
	36	0	21.59	21.63	21.67		1
	36	18	21.67	21.68	21.65		
	36	37	21.64	21.67	21.66		
	75	0	21.64	21.66	21.61		1
16QAM	1	0	21.71	21.73	21.76	≤ 1	1
	1	36	21.79	21.82	21.83		
	1	74	21.71	21.70	21.62		
	36	0	20.57	20.63	20.66	≤ 2	2
	36	18	20.70	20.67	20.65		
	36	37	20.61	20.66	20.64		
	75	0	20.64	20.65	20.65		2
64QAM	1	0	20.68	20.68	20.72	≤ 2	2
	1	36	20.83	20.83	20.75		
	1	74	20.64	20.68	20.65		
	36	0	19.67	19.71	19.75	≤ 3	3
	36	18	19.73	19.72	19.70		
	36	37	19.68	19.71	19.68		
	75	0	19.66	19.65	19.64		3

Table 9.3.4.3 LTE Conducted Power

LTE Band 4 (AWS) Conducted Power– 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel 20000 (1715.0 MHz)	Mid Channel 20175 (1732.5 MHz)	High Channel 20350 (1750.0 MHz) Conducted Power (dBm)	MPR Allowed Per 3GPP(dB)	MPR (dB)
QPSK	1	0	22.58	22.52	22.56	≤ 1	0
	1	25	22.66	22.70	22.69		
	1	49	22.53	22.50	22.52		
	25	0	21.76	21.74	21.75		1
	25	12	21.78	21.79	21.78		
	25	25	21.67	21.74	21.72		
	50	0	21.73	21.75	21.68		1
16QAM	1	0	21.61	21.66	21.69	≤ 1	1
	1	25	21.85	21.88	21.89		
	1	49	21.55	21.53	21.54		
	25	0	20.81	20.80	20.77	≤ 2	2
	25	12	20.85	20.85	20.85		
	25	25	20.72	20.79	20.77		
	50	0	20.77	20.78	20.74		2
64QAM	1	0	20.53	20.52	20.53	≤ 2	2
	1	25	20.76	20.82	20.83		
	1	49	20.52	20.58	20.51		
	25	0	19.79	19.75	19.75	≤ 3	3
	25	12	19.84	19.82	19.84		
	25	25	19.69	19.76	19.74		
	50	0	19.73	19.74	19.72		3

Table 9.3.4.4 LTE Conducted Power

LTE Band 4 (AWS) Conducted Power– 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			19975 (1712.5 MHz)	20175 (1732.5 MHz)	20375 (1752.5 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	22.53	22.58	22.60	≤ 1	0
	1	12	22.64	22.70	22.67		
	1	24	22.51	22.55	22.51		
	12	0	21.52	21.53	21.55		1
	12	6	21.54	21.56	21.54		
	12	13	21.51	21.51	21.52		
	25	0	21.50	21.53	21.52		1
16QAM	1	0	21.71	21.73	21.76	≤ 1	1
	1	12	21.75	21.82	21.81		
	1	24	21.59	21.68	21.66		
	12	0	20.56	20.56	20.61	≤ 2	2
	12	6	20.57	20.57	20.61		
	12	13	20.50	20.54	20.50		
	25	0	20.52	20.59	20.56		2
64QAM	1	0	20.62	20.62	20.70	≤ 2	2
	1	12	20.65	20.75	20.75		
	1	24	20.50	20.57	20.57		
	12	0	19.57	19.59	19.66	≤ 3	3
	12	6	19.58	19.61	19.65		
	12	13	19.50	19.56	19.51		
	25	0	19.52	19.50	19.56		3

Table 9.3.4.5 LTE Conducted Power

LTE Band 4 (AWS) Conducted Power– 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			19965 (1711.5 MHz)	20175 (1732.5 MHz)	20385 (1753.5 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	22.62	22.61	22.56	≤ 1	0
	1	7	22.65	22.68	22.57		
	1	14	22.52	22.56	22.50		
	8	0	21.51	21.53	21.54		1
	8	4	21.55	21.59	21.53		
	8	7	21.50	21.54	21.50		
	15	0	21.50	21.55	21.52		1
16QAM	1	0	21.78	21.76	21.70	≤ 1	1
	1	7	21.84	21.80	21.72		
	1	14	21.71	21.72	21.67		
	8	0	20.60	20.58	20.65	≤ 2	2
	8	4	20.61	20.61	20.64		
	8	7	20.55	20.57	20.55		
	15	0	20.53	20.56	20.57		2
64QAM	1	0	20.66	20.67	20.67	≤ 2	2
	1	7	20.67	20.72	20.71		
	1	14	20.60	20.69	20.61		
	8	0	19.59	19.55	19.61	≤ 3	3
	8	4	19.60	19.65	19.59		
	8	7	19.50	19.56	19.57		
	15	0	19.51	19.53	19.53		3

Table 9.3.4.6 LTE Conducted Power

TE Band 4 (AWS) Conducted Power– 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			19957 (1710.7 MHz)	20175 (1732.5 MHz)	20393 (1754.3 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	22.53	22.57	22.52	≤ 1	0
	1	2	22.58	22.59	22.55		
	1	5	22.52	22.51	22.50		
	3	0	22.53	22.57	22.55		0
	3	2	22.56	22.60	22.56		
	3	3	22.50	22.54	22.52		
	6	0	21.64	21.66	21.63		1
16QAM	1	0	21.50	21.70	21.64	≤ 1	1
	1	2	21.77	21.74	21.63		
	1	5	21.66	21.67	21.64		
	3	0	21.67	21.69	21.74		1
	3	2	21.72	21.75	21.76		
	3	3	21.62	21.65	21.71		
	6	0	20.77	20.81	20.76	≤ 2	2
64QAM	1	0	20.62	20.65	20.63	≤ 2	2
	1	2	20.72	20.70	20.70		
	1	5	20.59	20.60	20.57		
	3	0	20.69	20.73	20.71		2
	3	2	20.70	20.77	20.74		
	3	3	20.67	20.71	20.65		
	6	0	19.66	19.72	19.69	≤ 3	3

Table 9.3.4.7 LTE Conducted Power

Band & Mode		Modulated Average[dBm]
LTE Band 2(PCS)	Maximum	23.2
	Nominal	22.7

Table 9.3.5.1 Nominal and Maximum Output Power Spec

5) LTE Band 2 (PCS)

LTE Band 2 (PCS) Conducted Power– 20 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			18700 (1860.0 MHz)	18900 (1880.0 MHz)	19100 (1900.0 MHz)		
			Conducted Power (dBm)				
QPSK	**1**	**0**	22.79	**22.82**	22.73	≤ 1	0
	1	50	22.67	22.71	22.65		
	1	99	22.66	22.67	22.66		
	50	0	21.63	21.73	21.66		1
	50	**25**	21.74	**21.76**	21.75		
	50	50	21.70	21.70	21.74		
	100	0	21.68	21.71	21.70		1
16QAM	1	0	21.99	21.97	21.91	≤ 1	1
	1	50	21.83	21.91	21.82		
	1	99	21.80	21.85	21.83		
	50	0	20.65	20.66	20.51	≤ 2	2
	50	25	20.77	20.74	20.66		
	50	50	20.72	20.75	20.60		
	100	0	20.71	20.66	20.52		2
64QAM	1	0	20.89	21.00	20.81	≤ 2	2
	1	50	20.80	20.89	20.79		
	1	99	20.83	20.84	20.77		
	50	0	19.72	19.72	19.59	≤ 3	3
	50	25	19.83	19.77	19.70		
	50	50	19.76	19.78	19.67		
	100	0	19.76	19.70	19.56		3

Table 9.3.5.2 LTE Conducted Power

LTE Band 2 (PCS) Conducted Power– 15 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			18675 (1857.5 MHz)	18900 (1880.0 MHz)	19125 (1902.5 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	22.50	22.69	22.62	≤ 1	0
	1	36	22.60	22.63	22.57		
	1	74	22.50	22.59	22.54		
	36	0	21.61	21.64	21.59		1
	36	18	21.73	21.75	21.71		
	36	37	21.68	21.73	21.69		
	75	0	21.70	21.72	21.59		1
16QAM	1	0	21.67	21.84	21.78	≤ 1	1
	1	36	21.72	21.76	21.71		
	1	74	21.60	21.77	21.72		
	36	0	20.65	20.66	20.59	≤ 2	2
	36	18	20.77	20.72	20.71		
	36	37	20.73	20.75	20.71		
	75	0	20.72	20.70	20.65		2
64QAM	1	0	20.58	20.79	20.72	≤ 2	2
	1	36	20.71	20.75	20.70		
	1	74	20.63	20.75	20.68		
	36	0	19.71	19.78	19.72	≤ 3	3
	36	18	19.82	19.81	19.84		
	36	37	19.82	19.85	19.84		
	75	0	19.74	19.70	19.70		3

Table 9.3.5.3 LTE Conducted Power

LTE Band 2 (PCS) Conducted Power– 10 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			18650 (1855.0 MHz)	18900 (1880.0 MHz)	19150 (1905.0 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	22.53	22.56	22.72	≤ 1	0
	1	**25**	22.74	**22.81**	22.63		
	1	49	22.52	22.57	22.66		
	25	0	21.84	21.80	21.52		1
	25	12	21.84	21.89	21.59		
	25	25	21.77	21.83	21.55		
	50	0	21.80	21.82	21.53		1
16QAM	1	0	21.55	21.65	21.89	≤ 1	1
	1	25	21.87	21.92	21.82		
	1	49	21.61	21.70	21.85		
	25	0	20.87	20.80	20.58	≤ 2	2
	25	12	20.92	20.87	20.63		
	25	25	20.81	20.85	20.54		
	50	0	20.82	20.83	20.50		2
64QAM	1	0	20.50	20.53	20.88	≤ 2	2
	1	25	20.78	20.83	20.76		
	1	49	20.52	20.58	20.81		
	25	0	19.89	19.83	19.57	≤ 3.	3
	25	12	19.97	19.94	19.68		
	25	25	19.83	19.87	19.62		
	50	0	19.86	19.80	19.54		3

Table 9.3.5.4 LTE Conducted Power

LTE Band 2 (PCS) Conducted Power– 5 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			18625 (1852.5 MHz)	18900 (1880.0 MHz)	19175 (1907.5 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	22.54	22.56	22.52	≤ 1	0
	1	12	22.57	22.63	22.59		
	1	24	22.53	22.55	22.50		
	12	0	21.59	21.55	21.64		1
	12	6	21.59	21.60	21.57		
	12	13	21.51	21.56	21.53		
	25	0	21.54	21.55	21.52		1
16QAM	1	0	21.74	21.70	21.66	≤ 1	1
	1	12	21.76	21.83	21.71		
	1	24	21.69	21.67	21.59		
	12	0	20.60	20.59	20.59	≤ 2	2
	12	6	20.61	20.59	20.60		
	12	13	20.50	20.54	20.52		
	25	0	20.55	20.55	20.51		2
64QAM	1	0	20.73	20.67	20.62	≤ 2	2
	1	12	20.74	20.75	20.72		
	1	24	20.72	20.68	20.57		
	12	0	19.74	19.70	19.68	≤ 3	3
	12	6	19.77	19.72	19.69		
	12	13	19.66	19.66	19.57		
	25	0	19.64	19.62	19.59		3

Table 9.3.5.5 LTE Conducted Power

LTE Band 2 (PCS) Conducted Power– 3 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			18615 (1851.5 MHz)	18900 (1880.0 MHz)	19185 (1908.5 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	22.60	22.51	22.54	≤ 1	0
	1	7	22.53	22.57	22.55		
	1	14	22.51	22.53	22.51		
	8	0	21.59	21.52	21.55		1
	8	4	21.58	21.57	21.52		
	8	7	21.51	21.54	21.51		
	15	0	21.55	21.54	21.50		1
16QAM	1	0	21.73	21.63	21.71	≤ 1	1
	1	7	21.71	21.69	21.73		
	1	14	21.57	21.55	21.63		
	8	0	20.65	20.53	20.60	≤ 2	2
	8	4	20.64	20.68	20.59		
	8	7	20.58	20.62	20.55		
	15	0	20.57	20.55	20.56		2
64QAM	1	0	20.75	20.63	20.69	≤ 2	2
	1	7	20.72	20.73	20.74		
	1	14	20.64	20.53	20.60		
	8	0	19.74	19.62	19.71	≤ 3	3
	8	4	19.72	19.76	19.70		
	8	7	19.64	19.69	19.63		
	15	0	19.67	19.62	19.61		3

Table 9.3.5.6 LTE Conducted Power

LTE Band 2 (PCS) Conducted Power– 1.4 MHz Bandwidth							
Modulation	RB Size	RB Offset	Low Channel	Mid Channel	High Channel	MPR Allowed Per 3GPP(dB)	MPR (dB)
			18607 (1850.7 MHz)	18900 (1880.0 MHz)	19193 (1909.3 MHz)		
			Conducted Power (dBm)				
QPSK	1	0	22.59	22.61	22.53	≤ 1	0
	1	2	22.63	22.68	22.61		
	1	5	22.53	22.59	22.53		
	3	0	22.60	22.77	22.57		0
	3	2	22.61	22.78	22.57		
	3	3	22.57	22.75	22.52		
	6	0	21.69	21.70	21.62		1
16QAM	1	0	21.69	21.79	21.71	≤ 1	1
	1	2	21.74	21.79	21.76		
	1	5	21.64	21.70	21.60		
	3	0	21.71	21.86	21.74		1
	3	2	21.73	21.88	21.75		
	3	3	21.72	21.81	21.72		
	6	0	20.86	20.86	20.74	≤ 2	2
64QAM	1	0	20.62	20.73	20.58	≤ 2	2
	1	2	20.64	20.75	20.65		
	1	5	20.51	20.62	20.56		
	3	0	20.57	20.94	20.53		2
	3	2	20.62	20.96	20.59		
	3	3	20.53	20.92	20.50		
	6	0	19.75	19.76	19.69	≤ 3	3

Table 9.3.5.7 LTE Conducted Power

9.4 WLAN Nominal and Maximum Output Power Spec and Conducted Powers

Band (GHz)	Mode	Ch	Modulated Average[dBm]					
			Ant.1		Ant.2		MIMO(CDD/SDM)	
			Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
2.4	802.11b	1~2	15.5	14.5	15.5	14.5	-	-
		3~9	15.5	14.5	15.5	14.5	-	-
		10~11	15.5	14.5	15.5	14.5	-	-
		12-13	-5.0	-6.0	-5.0	-6.0	-	-
	802.11g	1~2	15.5	14.5	15.5	14.5	18.5	17.5
		3~9	15.5	14.5	15.5	14.5	18.5	17.5
		10~11	15.5	14.5	15.5	14.5	18.5	17.5
		12-13	-5.0	-6.0	-5.0	-6.0	-2.0	-3.0
	802.11n	1~2	15.5	14.5	15.5	14.5	18.5	17.5
		3~9	15.5	14.5	15.5	14.5	18.5	17.5
		10~11	13.5	12.5	13.5	12.5	16.5	15.5
		12-13	-5.0	-6.0	-5.0	-6.0	-2.0	-3.0
	802.11ac	1~2	13.5	12.5	13.5	12.5	16.5	15.5
		3~9	13.5	12.5	13.5	12.5	16.5	15.5
		10~11	13.5	12.5	13.5	12.5	16.5	15.5
		12-13	-5.0	-6.0	-5.0	-6.0	-2.0	-3.0
	802.11ax OFDM	1~2	14.5	13.5	14.5	13.5	17.5	16.5
		3~9	14.5	13.5	14.5	13.5	17.5	16.5
		10~11	13.5	12.5	13.5	12.5	16.5	15.5
		12-13	-5.0	-6.0	-5.0	-6.0	-2.0	-3.0

Table 9.4.1 Nominal and Maximum Output Power Spec

Mode	Freq.	Channel	IEEE 802.11 (2.4 GHz) Conducted Power[dBm]			
	(MHz)		Ant.1	Ant.2	MIMO(CDD)	MIMO(SDM)
802.11b	**2412**	**1**	14.51	15.13	-	-
	2437	6	15.01	14.46	-	-
	2462	**11**	15.06	14.82	-	-
	2467	12	-5.21	-5.64	-	-
	2472	13	-5.48	-5.71	-	-
802.11g	2412	1	14.40	14.72	17.57	-
	2437	6	14.73	14.36	17.56	-
	2462	**11**	14.81	14.49	17.66	-
	2467	12	-5.10	-5.08	-2.08	-
	2472	13	-6.32	-6.72	-3.51	-
802.11n (HT-20)	2412	1	14.09	14.74	17.44	17.23
	2437	6	14.42	14.52	17.48	17.26
	2462	11	12.63	13.05	15.86	15.73
	2467	12	-5.06	-5.11	-2.08	-2.19
	2472	13	-6.60	-6.58	-3.58	-3.30
802.11ac (VHT-20)	2412	1	12.49	13.15	15.84	15.87
	2437	6	12.53	12.18	15.37	15.35
	2462	11	12.82	13.12	15.98	15.73
	2467	12	-5.03	-5.25	-2.13	-2.19
	2472	13	-6.04	-6.37	-3.19	-3.18
802.11ax OFDM	2412	1	13.45	14.18	16.84	16.85
	2437	6	13.66	13.25	16.47	16.41
	2462	11	12.61	13.05	15.85	15.75
	2467	12	-5.44	-5.41	-2.41	-2.23
	2472	13	-5.59	-5.49	-2.53	-3.57

Table 9.4.2 IEEE 802.11 Average RF Power

Band (GHz)	Mode	Ch	Modulated Average[dBm]					
			Ant.1		Ant.2		MIMO(CDD/SDM)	
			Maximum	Nominal	Maximum	Nominal	Maximum	Nominal
5 (UNII)	802.11a	36-165	16.0	15.0	16.0	15.0	19.0	18.0
	802.11n/ac/ax (20MHz)	36-165	15.0	14.0	15.0	14.0	18.0	17.0
	802.11n/ac/ax (40MHz)	38, 62	11.5	10.5	11.5	10.5	14.5	13.5
		46-54, 102-159	15.0	14.0	15.0	14.0	18.0	17.0
	802.11ac/ax (80MHz)	42-58	11.5	10.5	11.5	10.5	14.5	13.5
		106-155	13.5	12.5	13.5	12.5	16.5	15.5

Table 9.4.3 Nominal and Maximum Output Power Spec

Mode	Freq. (MHz)	Channel	IEEE 802.11a (5 GHz) Conducted Power[dBm]			
			Ant.1	Ant.2	MIMO(CDD)	MIMO(SDM)
802.11a	5180	36	15.27	15.31	18.30	-
	5200	40	15.42	15.34	18.39	-
	5220	**44**	15.43	15.39	18.42	-
	5240	**48**	15.35	15.44	18.41	-
	5260	52	15.37	15.52	18.46	-
	5280	56	15.36	15.54	18.46	-
	5300	**60**	15.58	15.70	18.65	-
	5320	64	15.37	15.58	18.49	-
	5500	**100**	15.39	14.65	18.05	-
	5600	120	15.26	14.65	17.98	-
	5660	132	15.29	14.58	17.96	-
	5720	**144**	15.23	14.96	18.11	-
	5745	**149**	15.23	15.02	18.14	-
	5785	**157**	15.19	15.47	18.34	-
	5825	**165**	15.05	15.75	18.42	-

Table 9.4.4 IEEE 802.11a Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11n HT20 (5 GHz) Conducted Power[dBm]			
			Ant.1	Ant.2	MIMO(CDD)	MIMO(SDM)
802.11n (HT-20)	5180	36	14.35	14.35	17.36	17.45
	5200	40	14.48	14.35	17.43	17.50
	5220	44	14.50	14.29	17.41	17.51
	5240	48	14.39	14.33	17.37	17.47
	5260	52	14.35	14.43	17.40	17.52
	5280	56	14.31	14.50	17.41	17.53
	5300	60	14.60	14.49	17.56	17.64
	5320	64	14.26	14.50	17.39	17.50
	5500	100	14.38	13.55	17.00	17.17
	5600	120	14.12	13.70	16.93	17.11
	5660	132	14.19	13.64	16.94	17.15
	5720	144	14.23	13.92	17.09	17.24
	5745	149	14.10	14.08	17.10	17.24
	5785	157	14.01	14.68	17.37	17.50
	5825	165	13.92	14.82	17.40	17.50

Table 9.4.5 IEEE 802.11n HT20 Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11ac VHT20 (5 GHz) Conducted Power[dBm]			
			Ant.1	Ant.2	MIMO(CDD)	MIMO(SDM)
802.11ac (VHT-20)	5180	36	14.40	14.38	17.40	17.46
	5200	40	14.52	14.39	17.47	17.53
	5220	44	14.53	14.38	17.47	17.53
	5240	48	14.47	14.40	17.45	17.51
	5260	52	14.42	14.48	17.46	17.57
	5280	56	14.35	14.53	17.45	17.58
	5300	60	14.52	14.55	17.55	17.62
	5320	64	14.26	14.54	17.41	17.55
	5500	100	14.40	13.60	17.03	17.21
	5600	120	14.16	13.76	16.97	17.12
	5660	132	14.23	13.69	16.98	17.17
	5720	144	14.22	14.02	17.13	17.29
	5745	149	14.15	14.11	17.14	17.29
	5785	157	14.06	14.74	17.42	17.50
	5825	165	13.91	14.88	17.43	17.53

Table 9.4.6 IEEE 802.11ac VHT20 Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11ax (5 GHz) Conducted Power[dBm]			
			Ant.1	Ant.2	MIMO(CDD)	MIMO(SDM)
802.11ax (20MHz)	5180	36	14.49	14.56	17.54	17.60
	5200	40	14.74	14.57	17.67	17.63
	5220	44	14.64	14.52	17.59	17.59
	5240	48	14.54	14.51	17.54	17.58
	5260	52	14.49	14.65	17.58	17.60
	5280	56	14.48	14.67	17.59	17.62
	5300	60	14.61	14.66	17.65	17.74
	5320	64	14.45	14.63	17.55	17.61
	5500	100	14.57	14.02	17.31	17.34
	5600	120	14.51	14.12	17.33	17.43
	5660	132	14.46	13.96	17.23	17.49
	5720	144	14.46	14.26	17.37	17.58
	5745	149	14.14	14.24	17.20	17.47
	5785	157	14.29	14.73	17.53	17.74
	5825	165	14.19	14.82	17.53	17.70

Table 9.4.7 IEEE 802.11ax Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11n HT40 (5 GHz) Conducted Power[dBm]			
			Ant.1	Ant.2	MIMO(CDD)	MIMO(SDM)
802.11n (HT-40)	5190	38	11.16	11.28	14.23	14.32
	5230	46	14.58	14.49	17.55	17.64
	5270	54	14.42	14.58	17.51	17.64
	5310	62	11.22	11.48	14.36	14.45
	5510	102	14.31	13.66	17.01	17.17
	5590	118	14.25	13.98	17.13	17.31
	5670	134	14.35	13.89	17.14	17.32
	5710	142	14.38	13.80	17.11	17.24
	5755	151	14.33	14.42	17.39	17.50
	5795	159	14.17	14.81	17.51	17.79

Table 9.4.8 IEEE 802.11n HT40 Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11ac VHT40 (5 GHz) Conducted Power[dBm]			
			Ant.1	Ant.2	MIMO(CDD)	MIMO(SDM)
802.11ac (VHT-40)	5190	38	11.17	11.34	14.27	14.35
	5230	46	14.61	14.54	17.59	17.67
	5270	54	14.45	14.65	17.56	17.69
	5310	62	11.23	11.45	14.35	14.44
	5510	102	14.35	13.70	17.05	17.18
	5590	118	14.28	14.05	17.18	17.31
	5670	134	14.38	13.95	17.18	17.34
	5710	142	14.38	13.84	17.13	17.26
	5755	151	14.34	14.44	17.40	17.52
	5795	159	14.16	14.87	17.54	17.77

Table 9.4.9 IEEE 802.11ac VHT40 Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11ax (5 GHz) Conducted Power[dBm]			
			Ant.1	Ant.2	MIMO(CDD)	MIMO(SDM)
802.11ax (40MHz)	5190	38	10.79	11.37	14.10	14.14
	5230	46	14.20	14.55	17.39	17.45
	5270	54	14.22	14.61	17.43	17.45
	5310	62	10.81	11.41	14.13	14.22
	5510	102	14.01	13.97	17.00	17.11
	5590	118	14.04	14.25	17.16	17.29
	5670	134	14.11	14.02	17.08	17.23
	5710	142	13.92	13.88	16.91	17.07
	5755	151	13.91	14.36	17.15	17.28
	5795	159	13.77	14.82	17.34	17.55

Table 9.4.10 IEEE 802.11ax Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11ac VHT80 (5 GHz) Conducted Power[dBm]			
			Ant.1	Ant.2	MIMO(CDD)	MIMO(SDM)
802.11ac (VHT-80)	5210	42	10.94	10.96	13.96	13.99
	5290	58	10.79	11.07	13.94	14.00
	5530	106	12.47	12.10	15.30	15.42
	5610	122	12.48	11.96	15.24	15.37
	5690	138	12.65	11.96	15.33	15.46
	5775	155	12.64	12.79	15.73	15.77

Table 9.4.11 IEEE 802.11ac VHT80 Average RF Power

Mode	Freq. (MHz)	Channel	IEEE 802.11ax (5 GHz) Conducted Power[dBm]			
			Ant.1	Ant.2	MIMO(CDD)	MIMO(SDM)
802.11ax (80MHz)	5210	42	10.81	11.07	13.95	13.98
	5290	58	10.72	11.27	14.01	14.13
	5530	106	12.76	12.76	15.77	15.78
	5610	122	12.63	12.47	15.56	15.54
	5690	138	12.68	12.41	15.56	15.63
	5775	155	12.67	12.96	15.83	15.93

Table 9.4.12 IEEE 802.11ax Average RF Power

Justification for reduced test configurations for WIFI channels 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, duo to an even number of channels, both channels were measured.
- Output Power and SAR is not required for 802.11 g/n HT20/ac VHT20 channels when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjust SAR is ≤ 1.2 W/kg.
- The underlined data rate and channel above were tested for SAR.

The average output powers of this device were tested by below configuration.

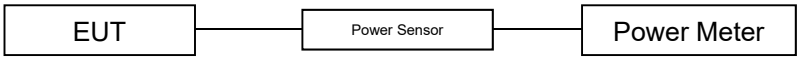


Figure 9.4 Power Measurement Setup

9.5 Bluetooth Conducted Powers

Burst Modulated Average[dBm]		
Bluetooth 1 Mbps	Maximum	12.5
	Nominal	11.5
Bluetooth 2 Mbps	Maximum	12.5
	Nominal	11.5
Bluetooth 3 Mbps	Maximum	12.5
	Nominal	11.5
Bluetooth LE	Maximum	7.0
	Nominal	6.0

Table 9.5.1 Nominal and Maximum Output Power Spec (Burst)

Frame Modulated Average[dBm]		
Bluetooth 1 Mbps	Maximum	11.35
	Nominal	10.35
Bluetooth 2 Mbps	Maximum	11.35
	Nominal	10.35
Bluetooth 3 Mbps	Maximum	11.35
	Nominal	10.35
Bluetooth (LE / 1Mbps)	Maximum	6.30
	Nominal	5.30
Bluetooth (LE / 2Mbps)	Maximum	4.59
	Nominal	3.59

Table 9.5.2 Nominal and Maximum Output Power Spec (Frame)

Channel	Frequency	Burst AVG Output Power (1Mbps)	Frame AVG Output Power (1Mbps)	Burst AVG Output Power (2Mbps)	Frame AVG Output Power (2Mbps)	Burst AVG Output Power (3Mbps)	Frame AVG Output Power (3Mbps)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2402	10.41	9.26	9.35	8.20	9.36	8.21
Mid	2441	11.17	10.02	9.98	8.83	9.98	8.83
High	2480	10.19	9.04	9.06	7.91	9.08	7.93

Table 9.5.3 Bluetooth Burst and Frame Average RF Power

Channel	Frequency	Burst AVG Output Power(LE / 1Mbps)	Frame AVG Output Power(LE / 1Mbps)	Burst AVG Output Power(LE / 2Mbps)	Frame AVG Output Power(LE / 2Mbps)
	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)
Low	2402	4.78	4.08	4.75	2.34
Mid	2440	4.87	4.17	4.84	2.43
High	2480	4.85	4.15	4.85	2.44

Table 9.5.4 Bluetooth LE Burst and Frame Average RF Power

- **Bluetooth Conducted Powers procedures**

1. Bluetooth (BDR, EDR)
   1) Enter DUT mode in EUT and operate it.
      When it operating, The EUT is transmitting at maximum power level and duty cycle fixed.
   2) Instruments and EUT were connected like Figure 9.5.1(A).
   3) The maximum output powers of BDR(1 Mbps), EDR(2, 3 Mbps) and each frequency were set by a Bluetooth Tester.
   4) Power levels were measured by a Power Meter.

2. Bluetooth (LE)
   1) Enter LE mode in EUT and operate it.
      When it operating, The EUT is transmitting at maximum power level and duty cycle fixed.
   2) Instruments and EUT were connected like Figure 9.5.1(B).
   3) The average conducted output powers of LE and each frequency can measurement according to setting program in EUT.
   4) Power levels were measured by a Power Meter.

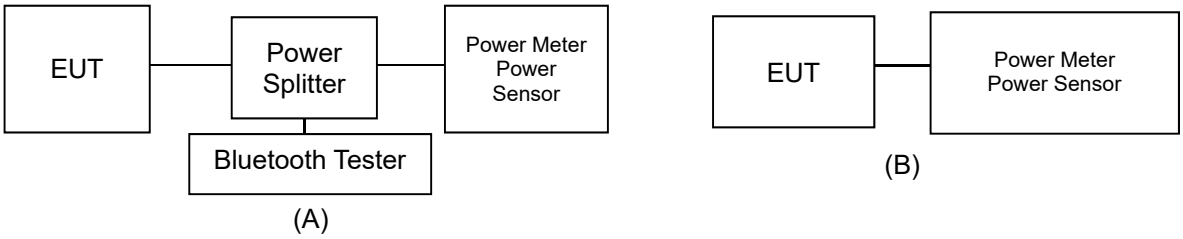


Figure 9.5.1 Average Power Measurement Setup

- **Bluetooth Transmission Plot**

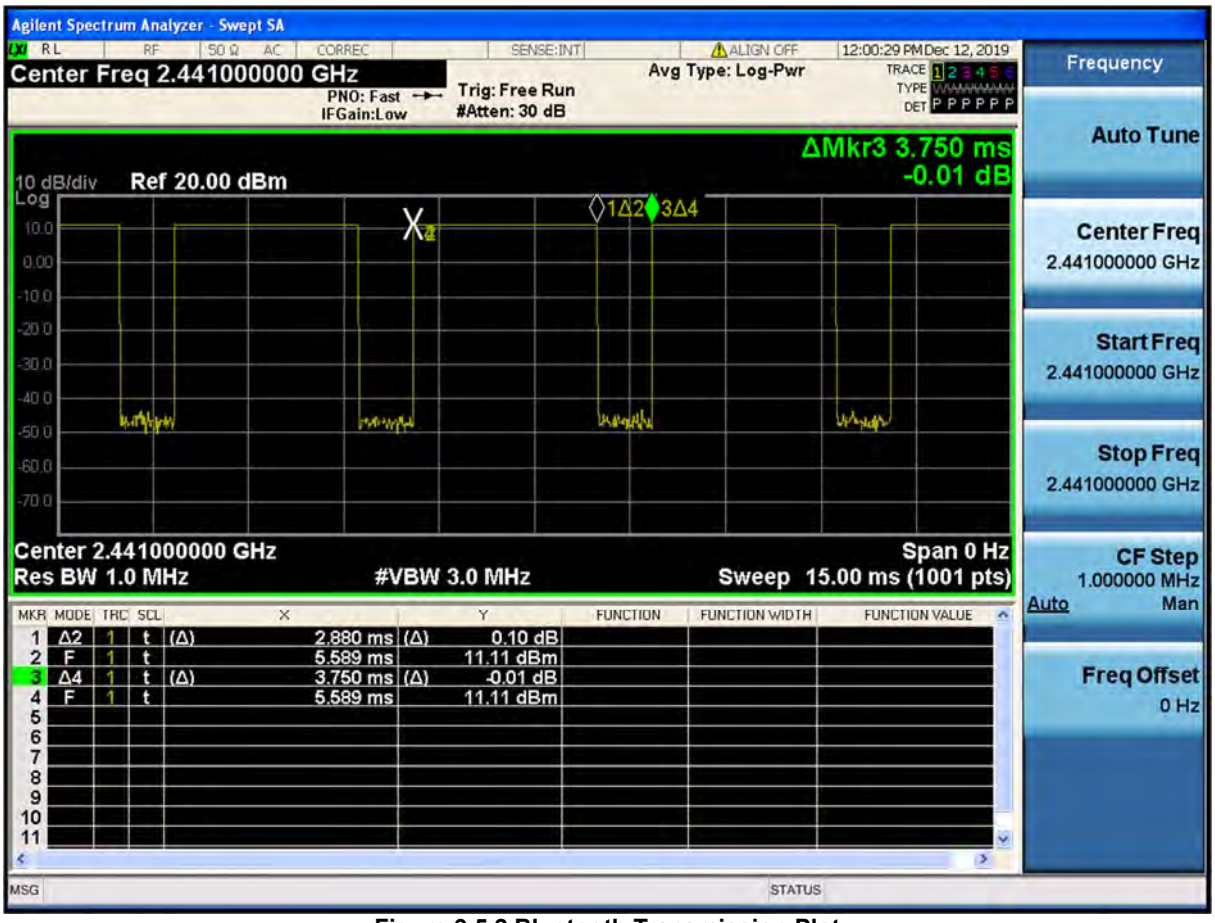


Figure 9.5.2 Bluetooth Transmission Plot

- **Bluetooth Duty Cycle Calculation**

Duty Cycle = Pulse/Period * 100% = (2.880/3.750) * 100 = 76.8%

10. SYSTEM VERIFICATION

10.1 Tissue Verification

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp.[°C]	Liquid Temp.[°C]	Measured Frequency [MHz]	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	Er Deviation [%]	σ Deviation [%]
Dec. 05. 2019	750 Head	20.0	20.8	707.5	42.129	0.887	42.908	0.857	1.85	-3.38
				750.0	41.900	0.890	42.371	0.894	1.12	0.45
				782.0	41.749	0.894	41.959	0.926	0.50	3.58
Dec. 05. 2019	750 Body	21.1	20.9	707.5	55.699	0.960	56.309	0.937	1.10	-2.40
				750.0	55.531	0.963	55.757	0.981	0.41	1.87
Dec. 06. 2019	750 Body	20.1	20.3	750.0	55.531	0.963	55.168	0.971	-0.65	0.83
				782.0	55.406	0.966	54.790	1.003	-1.11	3.83
Dec. 02. 2019	835 Head	22.2	22.6	821.5	41.566	0.898	42.365	0.886	1.92	-1.34
				824.2	41.552	0.899	42.329	0.888	1.87	-1.22
				826.4	41.542	0.899	42.299	0.890	1.82	-1.00
				829.0	41.528	0.899	42.261	0.892	1.77	-0.78
				831.5	41.519	0.900	42.228	0.894	1.71	-0.67
				835.0	41.500	0.900	42.173	0.897	1.62	-0.33
				836.5	41.500	0.901	42.149	0.898	1.56	-0.33
				836.6	41.500	0.901	42.147	0.898	1.56	-0.33
				841.5	41.500	0.906	42.059	0.902	1.35	-0.44
				844.0	41.500	0.910	42.012	0.903	1.23	-0.77
				846.6	41.500	0.912	41.962	0.905	1.11	-0.77
				848.8	41.500	0.914	41.917	0.906	1.00	-0.88
Dec. 02. 2019	835 Body	20.8	20.5	821.5	55.255	0.969	53.523	0.947	-3.13	-2.27
				824.2	55.243	0.969	53.492	0.949	-3.17	-2.06
				826.4	55.235	0.969	53.467	0.951	-3.20	-1.86
				829.0	55.223	0.970	53.438	0.954	-3.23	-1.65
				831.5	55.216	0.970	53.405	0.956	-3.28	-1.44
				835.0	55.200	0.970	53.370	0.960	-3.32	-1.03
				836.5	55.197	0.971	53.350	0.961	-3.35	-1.03
				836.6	55.197	0.971	53.350	0.961	-3.35	-1.03
				841.5	55.182	0.977	53.283	0.965	-3.44	-1.23
				844.0	55.172	0.981	53.250	0.968	-3.48	-1.33
				846.6	55.166	0.984	53.220	0.970	-3.53	-1.42
				848.8	55.160	0.986	53.194	0.972	-3.56	-1.42
Dec. 04. 2019	1800 Head	22.1	22.6	1712.4	40.126	1.350	41.493	1.302	3.41	-3.56
				1720.0	40.114	1.354	41.438	1.307	3.30	-3.47
				1732.4	40.097	1.361	41.350	1.316	3.12	-3.31
				1732.5	40.097	1.361	41.349	1.317	3.12	-3.23
				1745.0	40.079	1.369	41.268	1.326	2.97	-3.14
				1752.6	40.069	1.373	41.221	1.332	2.88	-2.99
				1770.0	40.043	1.383	41.118	1.347	2.68	-2.60
				1800.0	40.000	1.400	40.963	1.375	2.41	-1.79
Dec. 04. 2019	1800 Body	21.1	21.2	1712.4	53.596	1.464	52.493	1.499	-2.06	2.39
				1720.0	53.580	1.469	52.459	1.506	-2.09	2.52
				1732.4	53.556	1.477	52.403	1.516	-2.15	2.64
				1732.5	53.556	1.477	52.402	1.516	-2.15	2.64
				1745.0	53.530	1.485	52.343	1.525	-2.22	2.69
				1752.6	53.516	1.489	52.311	1.531	-2.25	2.82
				1770.0	53.480	1.501	52.231	1.544	-2.34	2.86
				1800.0	53.300	1.520	52.109	1.567	-2.23	3.09
Dec. 03. 2019	1900 Head	22.4	22.1	1850.2	40.000	1.400	40.022	1.354	0.05	-3.29
				1852.4	40.000	1.400	40.017	1.357	0.04	-3.07
				1860.0	40.000	1.400	39.996	1.363	-0.01	-2.64
				1880.0	40.000	1.400	39.935	1.382	-0.16	-1.29
				1900.0	40.000	1.400	39.872	1.401	-0.32	0.07
				1907.6	40.000	1.400	39.852	1.407	-0.37	0.50
				1909.8	40.000	1.400	39.846	1.409	-0.39	0.64
Dec. 03. 2019	1900 Body	20.7	20.9	1850.2	53.300	1.520	52.401	1.478	-1.69	-2.76
				1852.4	53.300	1.520	52.398	1.480	-1.69	-2.63
				1860.0	53.300	1.520	52.382	1.487	-1.72	-2.17
				1880.0	53.300	1.520	52.335	1.505	-1.81	-0.99
				1900.0	53.300	1.520	52.289	1.523	-1.90	0.20
				1907.6	53.300	1.520	52.273	1.530	-1.93	0.66
				1909.8	53.300	1.520	52.268	1.532	-1.94	0.79

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp.[°C]	Liquid Temp.[°C]	Measured Frequency [MHz]	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	Er Deviation [%]	σ Deviation [%]
Dec. 02. 2019	2450 Head	20.1	20.3	2402.0	39.282	1.757	40.405	1.778	2.86	1.20
				2412.0	39.265	1.766	40.368	1.790	2.81	1.36
				2437.0	39.222	1.788	40.281	1.819	2.70	1.73
				2441.0	39.215	1.792	40.268	1.823	2.69	1.73
				2450.0	39.200	1.800	40.238	1.834	2.65	1.89
				2462.0	39.184	1.813	40.203	1.846	2.60	1.82
				2467.0	39.177	1.818	40.186	1.852	2.58	1.87
				2472.0	39.171	1.823	40.168	1.857	2.55	1.87
				2480.0	39.160	1.832	40.139	1.866	2.50	1.86
Dec. 03. 2019	2450 Head	20.1	20.0	2402.0	39.282	1.757	40.394	1.778	2.83	1.20
				2412.0	39.265	1.766	40.357	1.790	2.78	1.36
				2437.0	39.222	1.788	40.269	1.819	2.67	1.73
				2441.0	39.215	1.792	40.255	1.824	2.65	1.79
				2450.0	39.200	1.800	40.227	1.834	2.62	1.89
				2462.0	39.184	1.813	40.191	1.847	2.57	1.88
				2467.0	39.177	1.818	40.173	1.852	2.54	1.87
				2472.0	39.171	1.823	40.156	1.858	2.51	1.92
				2480.0	39.160	1.832	40.128	1.867	2.47	1.91
Dec. 06. 2019	2450 Body	21.4	22.0	2402.0	52.764	1.904	51.254	1.851	-2.86	-2.78
				2412.0	52.751	1.914	51.225	1.864	-2.89	-2.61
				2437.0	52.717	1.938	51.174	1.895	-2.93	-2.22
				2441.0	52.712	1.941	51.166	1.900	-2.93	-2.11
				2450.0	52.700	1.950	51.151	1.910	-2.94	-2.05
				2462.0	52.685	1.967	51.127	1.922	-2.96	-2.29
				2467.0	52.678	1.974	51.113	1.927	-2.97	-2.38
				2472.0	52.672	1.981	51.097	1.933	-2.99	-2.42
				2480.0	52.662	1.993	51.070	1.941	-3.02	-2.61
Dec. 09. 2019	5200 Body	20.7	20.8	5180.0	49.041	5.276	49.825	5.151	1.60	-2.37
				5190.0	49.028	5.288	49.732	5.159	1.44	-2.44
				5200.0	49.014	5.299	49.620	5.165	1.24	-2.53
				5210.0	49.001	5.311	49.516	5.170	1.05	-2.65
				5220.0	48.987	5.323	49.429	5.175	0.90	-2.78
				5230.0	48.974	5.334	49.352	5.181	0.77	-2.87
				5240.0	48.960	5.346	49.291	5.191	0.68	-2.90
Dec. 04. 2019	5300 Head	20.2	20.3	5260.0	35.940	4.720	35.487	4.897	-1.26	3.75
				5270.0	35.930	4.730	35.474	4.909	-1.27	3.78
				5280.0	35.920	4.740	35.464	4.917	-1.27	3.73
				5290.0	35.910	4.750	35.447	4.924	-1.29	3.66
				5300.0	35.900	4.760	35.417	4.935	-1.35	3.68
				5310.0	35.890	4.770	35.393	4.947	-1.38	3.71
				5320.0	35.880	4.780	35.378	4.960	-1.40	3.77
Dec. 07. 2019	5300 Body	21.0	21.4	5260.0	48.933	5.369	49.636	5.250	1.44	-2.22
				5270.0	48.919	5.381	49.608	5.263	1.41	-2.19
				5280.0	48.906	5.393	49.582	5.275	1.38	-2.19
				5290.0	48.892	5.404	49.548	5.286	1.34	-2.18
				5300.0	48.879	5.416	49.514	5.300	1.30	-2.14
				5310.0	48.865	5.428	49.484	5.317	1.27	-2.04
				5320.0	48.851	5.439	49.461	5.332	1.25	-1.97

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp.[°C]	Liquid Temp.[°C]	Measured Frequency [MHz]	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	Er Deviation [%]	σ Deviation [%]
Dec. 06. 2019	5600 Head	20.3	20.7	5500.0	35.650	4.965	36.815	4.934	3.27	-0.62
				5510.0	35.635	4.976	36.796	4.943	3.26	-0.66
				5530.0	35.605	4.997	36.759	4.962	3.24	-0.70
				5550.0	35.575	5.018	36.726	4.976	3.24	-0.84
				5580.0	35.530	5.049	36.647	5.020	3.14	-0.57
				5600.0	35.500	5.070	36.635	5.050	3.20	-0.39
				5660.0	35.440	5.130	36.530	5.092	3.08	-0.74
				5670.0	35.430	5.140	36.496	5.104	3.01	-0.70
				5690.0	35.410	5.160	36.451	5.139	2.94	-0.41
				5710.0	35.390	5.180	36.448	5.169	2.99	-0.21
				5720.0	35.380	5.190	36.443	5.177	3.00	-0.25
				5800.0	35.300	5.270	36.262	5.257	2.73	-0.25
Dec. 10. 2019	5600 Body	20.1	20.4	5500.0	48.607	5.650	49.784	5.692	2.42	0.74
				5510.0	48.594	5.661	49.715	5.701	2.31	0.71
				5530.0	48.566	5.685	49.567	5.726	2.06	0.72
				5550.0	48.539	5.708	49.448	5.749	1.87	0.72
				5580.0	48.499	5.743	49.275	5.793	1.60	0.87
				5600.0	48.471	5.766	49.178	5.817	1.46	0.88
				5660.0	48.390	5.836	48.852	5.884	0.95	0.82
				5670.0	48.376	5.848	48.802	5.898	0.88	0.85
				5690.0	48.349	5.872	48.712	5.932	0.75	1.02
				5710.0	48.322	5.895	48.636	5.958	0.65	1.07
				5720.0	48.309	5.907	48.586	5.965	0.57	0.98
				5800.0	48.200	6.000	48.225	6.079	0.05	1.32
Dec. 05. 2019	5800 Head	20.0	20.2	5745.0	35.355	5.215	35.818	5.105	1.31	-2.11
				5755.0	35.345	5.225	35.802	5.110	1.29	-2.20
				5775.0	35.325	5.245	35.748	5.122	1.20	-2.35
				5785.0	35.315	5.255	35.714	5.137	1.13	-2.25
				5795.0	35.305	5.265	35.689	5.156	1.09	-2.07
				5800.0	35.300	5.270	35.681	5.166	1.08	-1.97
				5825.0	35.275	5.296	35.688	5.199	1.17	-1.83
Dec. 09. 2019	5800 Body	22.4	22.3	5745.0	48.275	5.936	49.691	6.081	2.93	2.44
				5755.0	48.261	5.947	49.684	6.098	2.95	2.54
				5775.0	48.234	5.971	49.660	6.117	2.96	2.45
				5785.0	48.220	5.982	49.640	6.126	2.94	2.41
				5795.0	48.207	5.994	49.615	6.136	2.92	2.37
				5800.0	48.200	6.000	49.599	6.141	2.90	2.35
				5825.0	48.166	6.029	49.518	6.170	2.81	2.34

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 865664 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.

Measurement Procedure for Tissue verification:

1) The network analyzer and probe system was configured and calibrated.
2) The probe was immersed in the sample which was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
3) The complex admittance with respect to the probe aperture was measured
4) The complex relative permittivity , for example from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\varepsilon_r\varepsilon_0}{[\ln(b/a)]^2}\int_a^b\int_a^b\int_0^\pi \cos\phi' \frac{\exp\left[-j\omega r(\mu_0\varepsilon_r'\varepsilon_0)^{1/2}\right]}{r} d\phi' d\rho' d\rho$$

where Y is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively, $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$, ω is the angular frequency, and $j = \sqrt{-1}$.

10.2 Test System Verification

Prior to assessment, the system is verified to the ± 10 % of the specifications at using the SAR Dipole kit(s). (Graphic Plots Attached)

Table 10.2.1 System Verification Results (1g)

SYSTEM DIPOLE VERIFICATION TARGET & MEASURED												
SAR System #	Freq. [MHz]	SAR Dipole kits	Date(s)	Tissue Type	Ambient Temp. [°C]	Liquid Temp. [°C]	Probe S/N	Input Power (mW)	1 W Target SAR_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	Deviation [%]
D	750	D750V3, SN:1049	Dec. 05. 2019	Head	20.0	20.8	3933	250	8.38	1.97	7.88	-5.97
C	750	D750V3, SN:1049	Dec. 05. 2019	Body	21.1	20.9	3327	250	8.70	2.22	8.88	2.07
C	750	D750V3, SN:1049	Dec. 06. 2019	Body	20.1	20.3	3327	250	8.70	2.20	8.80	1.15
D	835	D835V2, SN:464	Dec. 02. 2019	Head	22.2	22.6	3933	250	9.59	2.27	9.08	-5.32
C	835	D835V2, SN:464	Dec. 02. 2019	Body	20.8	20.5	3327	250	9.68	2.44	9.76	0.83
D	1800	D1800V2, SN:2d047	Dec. 04. 2019	Head	22.1	22.6	3933	100	38.1	3.83	38.30	0.52
C	1800	D1800V2, SN:2d047	Dec. 04. 2019	Body	21.1	21.2	3327	100	38.0	3.95	39.50	3.95
D	1900	D1900V2, SN:5d029	Dec. 03. 2019	Head	22.4	22.1	3933	100	40.4	3.98	39.80	-1.49
C	1900	D1900V2, SN:5d029	Dec. 03. 2019	Body	20.7	20.9	3327	100	39.9	4.01	40.10	0.50
B	2450	D2450V2, SN: 726	Dec. 02. 2019	Head	20.1	20.3	7368	100	51.2	5.46	54.60	6.64
B	2450	D2450V2, SN: 726	Dec. 03. 2019	Head	20.1	20.0	7368	100	51.2	5.29	52.90	3.32
D	2450	D2450V2, SN: 726	Dec. 06. 2019	Body	21.4	22.0	3933	100	52.0	5.33	53.30	2.50
C	5200	D5GHzV2, SN:1103	Dec. 09. 2019	Body	20.7	20.8	3930	100	75.5	7.52	75.20	-0.40
B	5300	D5GHzV2, SN:1103	Dec. 04. 2019	Head	20.2	20.3	7368	100	82.4	8.44	84.40	2.43
D	5300	D5GHzV2, SN:1103	Dec. 07. 2019	Body	21.0	21.4	3933	100	74.4	7.35	73.50	-1.21
B	5500	D5GHzV2, SN:1103	Dec. 06. 2019	Head	20.3	20.7	7368	100	84.0	8.80	88.00	4.76
C	5500	D5GHzV2, SN:1103	Dec. 10. 2019	Body	20.1	20.4	3930	100	79.6	8.15	81.50	2.39
B	5800	D5GHzV2, SN:1103	Dec. 06. 2019	Head	20.3	20.7	7368	100	81.4	7.98	79.80	-1.97
C	5800	D5GHzV2, SN:1103	Dec. 10. 2019	Body	20.1	20.4	3930	100	74.8	7.80	78.00	4.28
B	5800	D5GHzV2, SN:1103	Dec. 05. 2019	Head	20.0	20.2	7368	100	81.4	8.08	80.80	-0.74
D	5800	D5GHzV2, SN:1103	Dec. 09. 2019	Body	22.4	22.3	3933	100	74.8	7.61	76.10	1.74

Table 10.2.2 System Verification Results (10g)

SYSTEM DIPOLE VERIFICATION TARGET & MEASURED												
SAR System #	Freq. [MHz]	SAR Dipole kits	Date(s)	Tissue Type	Ambient Temp. [°C]	Liquid Temp. [°C]	Probe S/N	Input Power (mW)	1 W Target SAR_{10g} (W/kg)	Measured SAR_{10g} (W/kg)	1 W Normalized SAR_{10g} (W/kg)	Deviation [%]
D	5300	D5GHzV2, SN:1103	Dec. 07. 2019	Body	21.0	21.4	3933	100	20.9	2.04	20.40	-2.39
C	5500	D5GHzV2, SN:1103	Dec. 10. 2019	Body	20.1	20.4	3930	100	22.1	2.37	23.70	7.24
C	5800	D5GHzV2, SN:1103	Dec. 10. 2019	Body	20.1	20.4	3930	100	20.9	2.25	22.50	7.66
D	5800	D5GHzV2, SN:1103	Dec. 09. 2019	Body	22.4	22.3	3933	100	20.9	2.12	21.20	1.44

Note(s)
1. System Verification was measured with input 250 mW, 100 mW and normalized to 1W.
2. Full system validation status and results can be found in Appendix D.

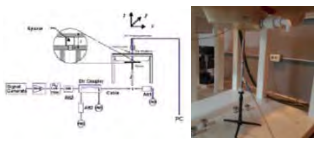


Figure 10.1 Dipole Verification Test Setup Diagram & Photo

11. SAR TEST RESULTS

11.1 Head SAR Results

Table 11.1.1 GSM/GPRS 850 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch													
836.6	190	GSM850	GSM	33.70	33.60	0.010	Left Touch	FCC #1	1	1:8.3	0.051	1.023	**0.052**	A1
836.6	190	GSM850	GSM	33.70	33.60	-0.010	Right Touch	FCC #1	1	1:8.3	0.045	1.023	0.046	
836.6	190	GSM850	GSM	33.70	33.60	0.000	Left Tilt	FCC #1	1	1:8.3	0.030	1.023	0.031	
836.6	190	GSM850	GSM	33.70	33.60	0.140	Right Tilt	FCC #1	1	1:8.3	0.029	1.023	0.030	
836.6	190	GSM850	GPRS	31.20	31.20	0.180	Left Touch	FCC #1	2	1:4.15	0.057	1.000	**0.057**	A2
836.6	190	GSM850	GPRS	31.20	31.20	0.110	Right Touch	FCC #1	2	1:4.15	0.051	1.000	0.051	
836.6	190	GSM850	GPRS	31.20	31.20	-0.130	Left Tilt	FCC #1	2	1:4.15	0.038	1.000	0.038	
836.6	190	GSM850	GPRS	31.20	31.20	-0.010	Right Tilt	FCC #1	2	1:4.15	0.035	1.000	0.035	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Head 1.6 W/kg (mW/g) averaged over 1 gram						

Table 11.1.2 PCS/GPRS 1900 Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch													
1880.0	661	PCS1900	PCS	30.70	30.40	0.000	Left Touch	FCC #1	1	1:8.3	0.043	1.072	**0.046**	A3
1880.0	661	PCS1900	PCS	30.70	30.40	0.130	Right Touch	FCC #1	1	1:8.3	0.031	1.072	0.033	
1880.0	661	PCS1900	PCS	30.70	30.40	0.000	Left Tilt	FCC #1	1	1:8.3	0.029	1.072	0.031	
1880.0	661	PCS1900	PCS	30.70	30.40	0.060	Right Tilt	FCC #1	1	1:8.3	0.025	1.072	0.027	
1880.0	661	PCS1900	GPRS	27.20	27.10	0.040	Left Touch	FCC #1	3	1:2.77	0.052	1.023	**0.053**	A4
1880.0	661	PCS1900	GPRS	27.20	27.10	0.190	Right Touch	FCC #1	3	1:2.77	0.039	1.023	0.040	
1880.0	661	PCS1900	GPRS	27.20	27.10	0.000	Left Tilt	FCC #1	3	1:2.77	0.035	1.023	0.036	
1880.0	661	PCS1900	GPRS	27.20	27.10	-0.000	Right Tilt	FCC #1	3	1:2.77	0.034	1.023	0.035	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Head 1.6 W/kg (mW/g) averaged over 1 gram						

Table 11.1.3 WCDMA 850 Head SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch												
836.6	4183	WCDMA 850	RMC	25.50	25.38	-0.060	Left Touch	FCC #1	1:1	0.083	1.028	**0.085**	A5
836.6	4183	WCDMA 850	RMC	25.50	25.38	0.000	Right Touch	FCC #1	1:1	0.061	1.028	0.063	
836.6	4183	WCDMA 850	RMC	25.50	25.38	0.120	Left Tilt	FCC #1	1:1	0.048	1.028	0.049	
836.6	4183	WCDMA 850	RMC	25.50	25.38	-0.120	Right Tilt	FCC #1	1:1	0.048	1.028	0.049	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Head 1.6 W/kg (mW/g) averaged over 1 gram					

Table 11.1.4 WCDMA 1700 Head SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch												
1732.4	1412	WCDMA 1700	RMC	23.20	22.94	0.000	Left Touch	FCC #1	1:1	0.032	1.062	**0.034**	A6
1732.4	1412	WCDMA 1700	RMC	23.20	22.94	0.000	Right Touch	FCC #1	1:1	0.030	1.062	0.032	
1732.4	1412	WCDMA 1700	RMC	23.20	22.94	0.000	Left Tilt	FCC #1	1:1	0.011	1.062	0.012	
1732.4	1412	WCDMA 1700	RMC	23.20	22.94	0.180	Right Tilt	FCC #1	1:1	0.016	1.062	0.017	
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Head 1.6 W/kg (mW/g) averaged over 1 gram					

Table 11.1.5 WCDMA 1900 Head SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch												
1880.0	9400	WCDMA 1900	RMC	23.20	22.88	0.170	Left Touch	FCC #1	1:1	0.049	1.076	**0.053**	A7
1880.0	9400	WCDMA 1900	RMC	23.20	22.88	-0.170	Right Touch	FCC #1	1:1	0.033	1.076	0.036	
1880.0	9400	WCDMA 1900	RMC	23.20	22.88	-0.090	Left Tilt	FCC #1	1:1	0.032	1.076	0.034	
1880.0	9400	WCDMA 1900	RMC	23.20	22.88	0.180	Right Tilt	FCC #1	1:1	0.026	1.076	0.028	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Head 1.6 W/kg (mW/g) averaged over 1 gram					

Table 11.1.6 LTE Band 12 Head SAR

MEASUREMENT RESULTS																		
FREQUENCY		Mode/ Band	BW [MHz]	Dual Display Accessory Configuration	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																	
707.5	23095	LTE B12	10	-	25.50	24.88	0.090	0	Left Touch	FCC #1	QPSK	1	49	1:1	0.130	1.153	**0.150**	A8
707.5	23095	LTE B12	10	-	24.50	23.91	-0.050	1	Left Touch	FCC #1	QPSK	25	12	1:1	0.090	1.146	0.103	
707.5	23095	LTE B12	10	-	25.50	24.88	-0.100	0	Right Touch	FCC #1	QPSK	1	49	1:1	0.103	1.153	0.119	
707.5	23095	LTE B12	10	-	24.50	23.91	0.010	1	Right Touch	FCC #1	QPSK	25	12	1:1	0.081	1.146	0.093	
707.5	23095	LTE B12	10	-	25.50	24.88	-0.060	0	Left Tilt	FCC #1	QPSK	1	49	1:1	0.070	1.153	0.081	
707.5	23095	LTE B12	10	-	24.50	23.91	0.040	1	Left Tilt	FCC #1	QPSK	25	12	1:1	0.044	1.146	0.050	
707.5	23095	LTE B12	10	-	25.50	24.88	-0.190	0	Right Tilt	FCC #1	QPSK	1	49	1:1	0.058	1.153	0.067	
707.5	23095	LTE B12	10	-	24.50	23.91	0.160	1	Right Tilt	FCC #1	QPSK	25	12	1:1	0.045	1.146	0.052	
707.5	23095	LTE B12	10	#1	25.50	24.88	0.100	0	Left Touch	FCC #1	QPSK	1	49	1:1	0.021	1.153	0.024	
707.5	23095	LTE B12	10	#2	25.50	24.88	0.110	0	Left Touch	FCC #1	QPSK	1	49	1:1	0.051	1.153	0.059	
707.5	23095	LTE B12	10	#3	25.50	24.88	0.030	0	Left Touch	FCC #1	QPSK	1	49	1:1	0.047	1.153	0.054	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure												Head 1.6 W/kg (mW/g) averaged over 1 gram						

Note(s):
1. Blue entries represent additional Head SAR Test Position (#1: DD angle: 0 degree) with the worst case position.
2. Green entries represent additional Head SAR Test Position (#2: DD angle: 180 degree) with the worst case position.
3. Orange entries represent additional Head SAR Test Position (#3: DD angle: 360 degree) with the worst case position.

Table 11.1.7 LTE Band 13 Head SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
782.0	23230	LTE B13	10	25.50	25.08	-0.040	0	Left Touch	FCC #1	QPSK	1	49	1:1	0.116	1.102	**0.128**	A9
782.0	23230	LTE B13	10	24.50	23.87	-0.050	1	Left Touch	FCC #1	QPSK	25	12	1:1	0.072	1.156	0.083	
782.0	23230	LTE B13	10	25.50	25.08	0.180	0	Right Touch	FCC #1	QPSK	1	49	1:1	0.095	1.102	0.105	
782.0	23230	LTE B13	10	24.50	23.87	0.080	1	Right Touch	FCC #1	QPSK	25	12	1:1	0.076	1.156	0.088	
782.0	23230	LTE B13	10	25.50	25.08	0.070	0	Left Tilt	FCC #1	QPSK	1	49	1:1	0.062	1.102	0.068	
782.0	23230	LTE B13	10	24.50	23.87	0.150	1	Left Tilt	FCC #1	QPSK	25	12	1:1	0.037	1.156	0.043	
782.0	23230	LTE B13	10	25.50	25.08	-0.000	0	Right Tilt	FCC #1	QPSK	1	49	1:1	0.065	1.102	0.072	
782.0	23230	LTE B13	10	24.50	23.87	0.120	1	Right Tilt	FCC #1	QPSK	25	12	1:1	0.049	1.156	0.057	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure												Head 1.6 W/kg (mW/g) averaged over 1 gram					

Table 11.1.8 LTE Band 5 (Cell) Head SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
836.5	20525	LTE B5	10	25.50	25.03	-0.070	0	Left Touch	FCC #1	QPSK	1	25	1:1	0.066	1.114	0.074	
836.5	20525	LTE B5	10	24.50	24.03	-0.130	1	Left Touch	FCC #1	QPSK	25	12	1:1	0.043	1.114	0.048	
836.5	20525	LTE B5	10	25.50	25.03	-0.120	0	Right Touch	FCC #1	QPSK	1	25	1:1	0.085	1.114	**0.095**	A10
836.5	20525	LTE B5	10	24.50	24.03	-0.100	1	Right Touch	FCC #1	QPSK	25	12	1:1	0.061	1.114	0.068	
836.5	20525	LTE B5	10	25.50	25.03	-0.180	0	Left Tilt	FCC #1	QPSK	1	25	1:1	0.049	1.114	0.055	
836.5	20525	LTE B5	10	24.50	24.03	-0.070	1	Left Tilt	FCC #1	QPSK	25	12	1:1	0.031	1.114	0.035	
836.5	20525	LTE B5	10	25.50	25.03	-0.190	0	Right Tilt	FCC #1	QPSK	1	25	1:1	0.046	1.114	0.051	
836.5	20525	LTE B5	10	24.50	24.03	0.090	1	Right Tilt	FCC #1	QPSK	25	12	1:1	0.034	1.114	0.038	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure												Head 1.6 W/kg (mW/g) averaged over 1 gram					

Table 11.1.9 LTE Band 4 (AWS) Head SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
1732.5	20175	LTE B4	20	23.20	22.56	0.000	0	Left Touch	FCC #1	QPSK	1	50	1:1	0.038	1.159	**0.044**	A11
1732.5	20175	LTE B4	20	22.20	21.63	0.000	1	Left Touch	FCC #1	QPSK	50	25	1:1	0.033	1.140	0.038	
1732.5	20175	LTE B4	20	23.20	22.56	0.000	0	Right Touch	FCC #1	QPSK	1	50	1:1	0.023	1.159	0.027	
1732.5	20175	LTE B4	20	22.20	21.63	0.000	1	Right Touch	FCC #1	QPSK	50	25	1:1	0.015	1.140	0.017	
1732.5	20175	LTE B4	20	23.20	22.56	0.120	0	Left Tilt	FCC #1	QPSK	1	50	1:1	0.012	1.159	0.014	
1732.5	20175	LTE B4	20	22.20	21.63	0.110	1	Left Tilt	FCC #1	QPSK	50	25	1:1	0.009	1.140	0.010	
1732.5	20175	LTE B4	20	23.20	22.56	-0.050	0	Right Tilt	FCC #1	QPSK	1	50	1:1	0.020	1.159	0.023	
1732.5	20175	LTE B4	20	22.20	21.63	0.140	1	Right Tilt	FCC #1	QPSK	50	25	1:1	0.016	1.140	0.018	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure												Head 1.6 W/kg (mW/g) averaged over 1 gram					

Table 11.1.10 LTE Band 2 (PCS) Head SAR

MEASUREMENT RESULTS																	
FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
1880.0	18900	LTE B2	20	23.20	22.82	0.000	0	Left Touch	FCC #1	QPSK	1	0	1:1	0.055	1.091	**0.060**	A12
1880.0	18900	LTE B2	20	22.20	21.76	0.000	1	Left Touch	FCC #1	QPSK	50	25	1:1	0.047	1.107	0.052	
1880.0	18900	LTE B2	20	23.20	22.82	0.000	0	Right Touch	FCC #1	QPSK	1	0	1:1	0.031	1.091	0.034	
1880.0	18900	LTE B2	20	22.20	21.76	0.000	1	Right Touch	FCC #1	QPSK	50	25	1:1	0.023	1.107	0.025	
1880.0	18900	LTE B2	20	23.20	22.82	0.150	0	Left Tilt	FCC #1	QPSK	1	0	1:1	0.032	1.091	0.035	
1880.0	18900	LTE B2	20	22.20	21.76	0.040	1	Left Tilt	FCC #1	QPSK	50	25	1:1	0.027	1.107	0.030	
1880.0	18900	LTE B2	20	23.20	22.82	0.020	0	Right Tilt	FCC #1	QPSK	1	0	1:1	0.041	1.091	0.045	
1880.0	18900	LTE B2	20	22.20	21.76	0.170	1	Right Tilt	FCC #1	QPSK	50	25	1:1	0.031	1.107	0.034	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure												Head 1.6 W/kg (mW/g) averaged over 1 gram					

Table 11.1.11 DTS Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode (Antenna)	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
2462.0	11	802.11b (Ant.1)	15.50	15.06	0.180	Left Touch	FCC #2	0.094	1	99.7	0.076	1.107	1.003	0.084	
2462.0	11	802.11b (Ant.1)	15.50	15.06	-0.030	Right Touch	FCC #2	0.414	1	99.7	0.461	1.107	1.003	**0.512**	A13
2462.0	11	802.11b (Ant.1)	15.50	15.06	0.010	Left Tilt	FCC #2	0.095	1	99.7	0.086	1.107	1.003	0.095	
2462.0	11	802.11b (Ant.1)	15.50	15.06	0.120	Right Tilt	FCC #2	0.256	1	99.7	0.223	1.107	1.003	0.248	
2412.0	1	802.11b (Ant.2)	15.50	15.13	0.040	Left Touch	FCC #2	0.078	1	99.7	0.058	1.089	1.003	0.063	
2412.0	1	802.11b (Ant.2)	15.50	15.13	0.120	Right Touch	FCC #2	0.423	1	99.7	0.451	1.089	1.003	**0.493**	A14
2412.0	1	802.11b (Ant.2)	15.50	15.13	-0.020	Left Tilt	FCC #2	0.070	1	99.7	0.060	1.089	1.003	0.066	
2412.0	1	802.11b (Ant.2)	15.50	15.13	0.160	Right Tilt	FCC #2	0.202	1	99.7	0.178	1.089	1.003	0.194	
2462.0	11	802.11g (MIMO)	18.50	17.66	0.140	Left Touch	FCC #2	0.098	1	99.4	0.078	1.213	1.006	0.095	
2462.0	11	802.11g (MIMO)	18.50	17.66	0.150	Right Touch	FCC #2	0.390	1	99.4	0.456	1.213	1.006	**0.556**	A15
2462.0	11	802.11g (MIMO)	18.50	17.66	0.040	Left Tilt	FCC #2	0.104	1	99.4	0.088	1.213	1.006	0.107	
2462.0	11	802.11g (MIMO)	18.50	17.66	0.080	Right Tilt	FCC #2	0.266	1	99.4	0.235	1.213	1.006	0.287	

Adjusted SAR results for OFDM SAR											
FREQUENCY		Mode/ Antenna	Service	Maximum Allowed Power [dBm]	1g Scaled SAR (W/kg)	FREQUENCY [MHz]	Mode	Service	Maximum Allowed Power [dBm	Ratio of OFDM to DSSS	1g Adjusted SAR (W/kg)	Determine OFDM SAR
MHz	Ch											
2462.0	11	802.11b (Ant.1)	DSSS	15.5	0.512	2437	802.11g	OFDM	15.5	1.000	**0.512**	X
2462.0	11	802.11b (Ant.1)	DSSS	15.5	0.512	2437	802.11n	OFDM	15.5	1.000	**0.512**	X
2462.0	11	802.11b (Ant.1)	DSSS	15.5	0.512	2437	802.11ac	OFDM	15.5	1.000	**0.512**	X
2462.0	11	802.11b (Ant.1)	DSSS	15.5	0.512	2437	802.11ax	OFDM	14.5	0.794	**0.407**	X
2412.0	1	802.11b (Ant.2)	DSSS	15.5	0.493	2437	802.11g	OFDM	15.5	1.000	**0.493**	X
2412.0	1	802.11b (Ant.2)	DSSS	15.5	0.493	2437	802.11n	OFDM	15.5	1.000	**0.493**	X
2412.0	1	802.11b (Ant.2)	DSSS	15.5	0.493	2437	802.11ac	OFDM	15.5	1.000	**0.493**	X
2412.0	1	802.11b (Ant.2)	DSSS	15.5	0.493	2437	802.11ax	OFDM	14.5	0.794	**0.391**	X
2462.0	11	802.11g (MIMO)	OFDM	18.5	0.556	2437	802.11n	OFDM	18.5	1.000	**0.556**	X
2462.0	11	802.11g (MIMO)	OFDM	18.5	0.556	2437	802.11ac	OFDM	18.5	1.000	**0.556**	X
2462.0	11	802.11g (MIMO)	OFDM	18.5	0.556	2437	802.11ax	OFDM	17.5	0.794	**0.441**	X
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure						**Head 1.6 W/kg (mW/g) averaged over 1 gram**						

Note(s):
1. SAR is not required for the following 2.4 GHz OFDM conditions. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per April 2019 TCB Workshop Notes, 802.11ax was considered a higher order 802.11 mode when compared to a/b/g/n/ac to apply KDB Publication 248227 D01v02r02 for OFDM mode selection.
3. Therefore, SAR tests were not required for 802.11ax based on the maximum allowed output powers of OFDM modes and the reported SAR values.

Table 11.1.12 UNII Head SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode (Antenna)	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5300.0	60	802.11a (Ant.1)	16.00	15.58	-0.090	Left Touch	FCC #2	0.130	6	99.0	0.084	1.101	1.010	0.093	
5300.0	60	802.11a (Ant.1)	16.00	15.58	0.170	Right Touch	FCC #2	0.358	6	99.0	0.302	1.101	1.010	**0.336**	A16
5300.0	60	802.11a (Ant.1)	16.00	15.58	0.050	Left Tilt	FCC #2	0.110	6	99.0	0.064	1.101	1.010	0.071	
5300.0	60	802.11a (Ant.1)	16.00	15.58	0.130	Right Tilt	FCC #2	0.254	6	99.0	0.215	1.101	1.010	0.239	
5300.0	60	802.11a (Ant.2)	16.00	15.70	0.170	Left Touch	FCC #2	0.144	6	99.0	0.101	1.073	1.010	0.109	
5300.0	60	802.11a (Ant.2)	16.00	15.70	-0.010	Right Touch	FCC #2	0.120	6	99.0	0.102	1.073	1.010	0.111	
5300.0	60	802.11a (Ant.2)	16.00	15.70	0.160	Left Tilt	FCC #2	0.161	6	99.0	0.158	1.073	1.010	0.171	
5300.0	60	802.11a (Ant.2)	16.00	15.70	0.000	Right Tilt	FCC #2	0.171	6	99.0	0.164	1.073	1.010	**0.178**	A17
5300.0	60	802.11a (MIMO)	19.00	18.65	-0.060	Left Touch	FCC #2	0.196	6	99.0	0.136	1.101	1.010	0.151	
5300.0	60	802.11a (MIMO)	19.00	18.65	0.190	Right Touch	FCC #2	0.325	6	99.0	0.276	1.101	1.010	0.307	
5300.0	60	802.11a (MIMO)	19.00	18.65	-0.100	Left Tilt	FCC #2	0.202	6	99.0	0.177	1.101	1.010	0.197	
5300.0	60	802.11a (MIMO)	19.00	18.65	0.060	Right Tilt	FCC #2	0.312	6	99.0	0.285	1.101	1.010	**0.317**	A18
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Head 1.6 W/kg (mW/g) averaged over 1 gram**							

Adjusted SAR results for UNII-1 and UNII-2A SAR											
FREQUENCY		Mode/ Antenna	Service	Maximum Allowed Power [dBm]	1g Scaled SAR (W/kg)	FREQUENCY [MHz]	Mode	Service	Maximum Allowed Power [dBm	Adjusted Factor	1g Adjusted SAR (W/kg)	**SAR for** the band with lower maximum output power
MHz	Ch											
5300.0	60	802.11a (Ant.1)	OFDM	16.0	0.336	5240	802.11a	OFDM	16.0	1.000	**0.336**	X
5300.0	60	802.11a (Ant.2)	OFDM	16.0	0.178	5180	802.11a	OFDM	16.0	1.000	**0.178**	X
5300.0	60	802.11a (MIMO)	OFDM	19.0	0.317	5240	802.11a	OFDM	19.0	1.000	**0.317**	X
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure						**Head 1.6 W/kg (mW/g) averaged over 1 gram**						

Note: U-NII-1 and U-NII-2A Bands: When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration.

Table 11.1.13 UNII Head SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode (Antenna)	Dual Display Accessory Configuration	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch															
5500.0	100	802.11a (Ant.1)	-	16.00	15.39	0.020	Left Touch	FCC #2	0.166	6	99.0	0.119	1.152	1.010	0.138	
5500.0	100	802.11a (Ant.1)	-	16.00	15.39	0.150	Right Touch	FCC #2	0.282	6	99.0	0.276	1.152	1.010	**0.321**	A19
5500.0	100	802.11a (Ant.1)	-	16.00	15.39	0.000	Left Tilt	FCC #2	0.154	6	99.0	0.096	1.152	1.010	0.112	
5500.0	100	802.11a (Ant.1)	-	16.00	15.39	-0.040	Right Tilt	FCC #2	0.313	6	99.0	0.275	1.152	1.010	0.320	
5720.0	144	802.11a (Ant.2)	-	16.00	14.96	-0.030	Left Touch	FCC #2	0.320	6	99.0	0.249	1.269	1.010	0.319	
5720.0	144	802.11a (Ant.2)	-	16.00	14.96	0.120	Right Touch	FCC #2	0.457	6	99.0	0.457	1.269	1.010	**0.586**	A20
5720.0	144	802.11a (Ant.2)	-	16.00	14.96	0.180	Left Tilt	FCC #2	0.284	6	99.0	0.215	1.269	1.010	0.276	
5720.0	144	802.11a (Ant.2)	-	16.00	14.96	-0.160	Right Tilt	FCC #2	0.346	6	99.0	0.324	1.269	1.010	0.415	
5720.0	144	802.11a (MIMO)	-	19.00	18.11	0.000	Left Touch	FCC #2	0.340	6	99.0	0.288	1.269	1.010	0.369	
5720.0	144	802.11a (MIMO)	-	19.00	18.11	0.010	Right Touch	FCC #2	0.527	6	99.0	0.516	1.269	1.010	**0.661**	A21
5720.0	144	802.11a (MIMO)	-	19.00	18.11	-0.190	Left Tilt	FCC #2	0.323	6	99.0	0.276	1.269	1.010	0.354	
5720.0	144	802.11a (MIMO)	-	19.00	18.11	-0.000	Right Tilt	FCC #2	0.497	6	99.0	0.440	1.269	1.010	0.564	
5720.0	144	802.11a (MIMO)	#1	19.00	18.11	0.130	Right Touch	FCC #2	0.095	6	99.0	0.091	1.269	1.010	0.117	
5720.0	144	802.11a (MIMO)	#2	19.00	18.11	0.110	Right Touch	FCC #2	0.258	6	99.0	0.262	1.269	1.010	0.336	
5720.0	144	802.11a (MIMO)	#3	19.00	18.11	-0.190	Right Touch	FCC #2	0.392	6	99.0	0.401	1.269	1.010	0.514	
5745.0	149	802.11a (Ant.1)	-	16.00	15.23	0.000	Left Touch	FCC #2	0.168	6	99.0	0.091	1.195	1.010	0.110	
5745.0	149	802.11a (Ant.1)	-	16.00	15.23	0.080	Right Touch	FCC #2	0.201	6	99.0	0.166	1.195	1.010	0.200	
5745.0	149	802.11a (Ant.1)	-	16.00	15.23	0.000	Left Tilt	FCC #2	0.154	6	99.0	0.092	1.195	1.010	0.111	
5745.0	149	802.11a (Ant.1)	-	16.00	15.23	0.080	Right Tilt	FCC #2	0.254	6	99.0	0.237	1.195	1.010	**0.286**	A22
5825.0	165	802.11a (Ant.2)	-	16.00	15.75	-0.080	Left Touch	FCC #2	0.208	6	99.0	0.169	1.058	1.010	0.181	
5825.0	165	802.11a (Ant.2)	-	16.00	15.75	0.100	Right Touch	FCC #2	0.438	6	99.0	0.402	1.058	1.010	**0.430**	A23
5825.0	165	802.11a (Ant.2)	-	16.00	15.75	0.160	Left Tilt	FCC #2	0.217	6	99.0	0.160	1.058	1.010	0.171	
5825.0	165	802.11a (Ant.2)	-	16.00	15.75	0.110	Right Tilt	FCC #2	0.310	6	99.0	0.289	1.058	1.010	0.309	
5825.0	165	802.11a (MIMO)	-	19.00	18.42	0.170	Left Touch	FCC #2	0.238	6	99.0	0.163	1.195	1.010	0.197	
5825.0	165	802.11a (MIMO)	-	19.00	18.42	-0.140	Right Touch	FCC #2	0.437	6	99.0	0.386	1.195	1.010	**0.466**	A24
5825.0	165	802.11a (MIMO)	-	19.00	18.42	0.170	Left Tilt	FCC #2	0.229	6	99.0	0.185	1.195	1.010	0.223	
5825.0	165	802.11a (MIMO)	-	19.00	18.42	0.110	Right Tilt	FCC #2	0.334	6	99.0	0.309	1.195	1.010	0.373	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure												**Head 1.6 W/kg (mW/g) averaged over 1 gram**				

Note(s):
1. Blue entries represent additional Head SAR Test Position (#1: DD angle: 0 degree) with the worst case position.
2. Green entries represent additional Head SAR Test Position (#2: DD angle: 180 degree) with the worst case position.
3. Orange entries represent additional Head SAR Test Position (#3: DD angle: 360 degree) with the worst case position.

Table 11.1.14 Bluetooth Head SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Rate [Mbps]	Duty Cycle (%)	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch													
2441.0	39	Bluetooth	11.35	10.02	-0.020	Left Touch	FCC #2	1	76.8	0.018	1.358	1.302	0.032	
2441.0	39	Bluetooth	11.35	10.02	0.090	Right Touch	FCC #2	1	76.8	0.147	1.358	1.302	**0.260**	A25
2441.0	39	Bluetooth	11.35	10.02	-0.040	Left Tilt	FCC #2	1	76.8	0.014	1.358	1.302	0.025	
2441.0	39	Bluetooth	11.35	10.02	0.100	Right Tilt	FCC #2	1	76.8	0.063	1.358	1.302	0.111	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure										**Head 1.6 W/kg (mW/g) averaged over 1 gram**				

11.2 Standalone Body-Worn SAR Worn SAR Results

Table 11.2.1 GSM/PCS/GPRS/WCDMA Body-Worn SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/ Band	Service	Dual Display Accessory Configuration	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
836.6	190	GSM850	GSM	-	33.70	33.60	-0.000	10 mm [Front]	FCC #1	1	1:8.3	0.211	1.023	0.216	
836.6	190	GSM850	GSM	-	33.70	33.60	0.080	10 mm [Rear]	FCC #1	1	1:8.3	0.228	1.023	**0.233**	A26
836.6	190	GSM850	GPRS	-	31.20	31.20	-0.010	10 mm [Front]	FCC #1	2	1:4.15	0.226	1.000	0.226	
836.6	190	GSM850	GPRS	-	31.20	31.20	-0.020	10 mm [Rear]	FCC #1	2	1:4.15	0.264	1.000	**0.264**	A27
1880.0	661	PCS1900	PCS	-	30.70	30.40	-0.050	10 mm [Front]	FCC #1	1	1:8.3	0.334	1.072	**0.358**	A28
1880.0	661	PCS1900	PCS	-	30.70	30.40	-0.020	10 mm [Rear]	FCC #1	1	1:8.3	0.273	1.072	0.293	
1880.0	661	PCS1900	GPRS	-	27.20	27.10	0.040	10 mm [Front]	FCC #1	3	1:2.77	0.378	1.023	0.387	
1880.0	661	PCS1900	GPRS	-	27.20	27.10	-0.150	10 mm [Rear]	FCC #1	3	1:2.77	0.391	1.023	**0.400**	A29
836.6	4183	WCDMA 850	RMC	-	25.50	25.38	0.020	10 mm [Front]	FCC #1	N/A	1:1	0.216	1.028	**0.222**	A30
836.6	4183	WCDMA 850	RMC	-	25.50	25.38	0.060	10 mm [Rear]	FCC #1	N/A	1:1	0.181	1.028	0.186	
1732.4	1412	WCDMA 1700	RMC	-	23.20	22.94	-0.050	10 mm [Front]	FCC #1	N/A	1:1	0.278	1.062	0.295	
1732.4	1412	WCDMA 1700	RMC	-	23.20	22.94	0.000	10 mm [Rear]	FCC #1	N/A	1:1	0.288	1.062	**0.306**	A31
1880.0	9400	WCDMA 1900	RMC	-	23.20	22.88	-0.030	10 mm [Front]	FCC #1	N/A	1:1	0.393	1.076	**0.423**	A32
1880.0	9400	WCDMA 1900	RMC	-	23.20	22.88	0.030	10 mm [Rear]	FCC #1	N/A	1:1	0.370	1.076	0.398	
1880.0	9400	WCDMA 1900	RMC	#1	23.20	22.88	0.020	10 mm [Front]	FCC #1	N/A	1:1	0.197	1.076	0.212	
1880.0	9400	WCDMA 1900	RMC	#2	23.20	22.88	0.010	10 mm [Front]	FCC #1	N/A	1:1	0.265	1.076	0.285	
1880.0	9400	WCDMA 1900	RMC	#3	23.20	22.88	-0.010	10 mm [Front]	FCC #1	N/A	1:1	0.381	1.076	0.410	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure										Body 1.6 W/kg (mW/g) averaged over 1 gram					

Note(s):
1. Blue entries represent additional Body-Worn SAR Test Position (#1: DD angle: 0 degree) with the worst case position.
2. Green entries represent additional Body-Worn SAR Test Position (#2: DD angle: 180 degree) with the worst case position.
3. Orange entries represent additional Body-Worn SAR Test Position (#3: DD angle: 360 degree) with the worst case position.

Table 11.2.2 LTE B12, B13, B5, B4, B2 Body-Worn SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
707.5	23095	LTE B12	10	25.50	24.88	-0.020	0	10 mm [Front]	FCC #1	QPSK	1	49	1:1	0.264	1.153	0.304	
707.5	23095	LTE B12	10	24.50	23.91	-0.020	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.181	1.146	0.207	
707.5	23095	LTE B12	10	25.50	24.88	0.010	0	10 mm [Rear]	FCC #1	QPSK	1	49	1:1	0.300	1.153	**0.346**	A33
707.5	23095	LTE B12	10	24.50	23.91	0.040	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.202	1.146	0.231	
782.0	23230	LTE B13	10	25.50	25.08	0.020	0	10 mm [Front]	FCC #1	QPSK	1	49	1:1	0.281	1.102	0.310	
782.0	23230	LTE B13	10	24.50	23.87	-0.010	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.195	1.156	0.225	
782.0	23230	LTE B13	10	25.50	25.08	-0.010	0	10 mm [Rear]	FCC #1	QPSK	1	49	1:1	0.339	1.102	**0.374**	A34
782.0	23230	LTE B13	10	24.50	23.87	0.060	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.216	1.156	0.250	
836.5	20525	LTE B5	10	25.50	25.03	-0.030	0	10 mm [Front]	FCC #1	QPSK	1	25	1:1	0.205	1.114	0.228	
836.5	20525	LTE B5	10	24.50	24.03	-0.060	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.144	1.114	0.160	
836.5	20525	LTE B5	10	25.50	25.03	0.000	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.252	1.114	**0.281**	A35
836.5	20525	LTE B5	10	24.50	24.03	-0.060	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.190	1.114	0.212	
1732.5	20175	LTE B4	20	23.20	22.56	-0.050	0	10 mm [Front]	FCC #1	QPSK	1	50	1:1	0.270	1.159	0.313	
1732.5	20175	LTE B4	20	22.20	21.63	-0.030	1	10 mm [Front]	FCC #1	QPSK	50	25	1:1	0.224	1.140	0.255	
1732.5	20175	LTE B4	20	23.20	22.56	-0.010	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.301	1.159	**0.349**	A36
1732.5	20175	LTE B4	20	22.20	21.63	0.020	1	10 mm [Rear]	FCC #1	QPSK	50	25	1:1	0.268	1.140	0.306	
1880.0	18900	LTE B2	20	23.20	22.82	-0.050	0	10 mm [Front]	FCC #1	QPSK	1	0	1:1	0.369	1.091	0.403	
1880.0	18900	LTE B2	20	22.20	21.76	-0.080	1	10 mm [Front]	FCC #1	QPSK	50	25	1:1	0.327	1.107	0.362	
1880.0	18900	LTE B2	20	23.20	22.82	0.030	0	10 mm [Rear]	FCC #1	QPSK	1	0	1:1	0.374	1.091	**0.408**	A37
1880.0	18900	LTE B2	20	22.20	21.76	0.040	1	10 mm [Rear]	FCC #1	QPSK	50	25	1:1	0.332	1.107	0.368	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure											Body 1.6 W/kg (mW/g) averaged over 1 gram						

Table 11.2.3 DTS Body-Worn SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	SAR (W/kg)	Plots #
MHz	Ch														
2462.0	11	802.11b (Ant.1)	15.50	15.06	-0.050	10 mm [Front]	FCC #2	0.105	1	99.7	0.107	1.107	1.003	**0.119**	A38
2462.0	11	802.11b (Ant.1)	15.50	15.06	0.010	10 mm [Rear]	FCC #2	0.071	1	99.7	0.070	1.107	1.003	0.078	
2412.0	1	802.11b (Ant.2)	15.50	15.13	0.130	10 mm [Front]	FCC #2	0.031	1	99.7	0.029	1.089	1.003	**0.032**	A39
2412.0	1	802.11b (Ant.2)	15.50	15.13	-0.040	10 mm [Rear]	FCC #2	0.033	1	99.7	0.018	1.089	1.003	0.020	
2462.0	11	802.11g (MIMO)	18.50	17.66	0.130	10 mm [Front]	FCC #2	0.111	1	99.4	0.112	1.213	1.006	**0.137**	A40
2462.0	11	802.11g (MIMO)	18.50	17.66	-0.040	10 mm [Rear]	FCC #2	0.072	1	99.4	0.070	1.213	1.006	0.085	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure											Body 1.6 W/kg (mW/g) averaged over 1 gram				

Adjusted SAR results for OFDM SAR												
FREQUENCY		Mode/ Antenna	Service	Maximum Allowed Power [dBm]	1g Scaled SAR (W/kg)	FREQUENCY [MHz]	Mode	Service	Maximum Allowed Power [dBm	Ratio of OFDM to DSSS	1g Adjusted SAR (W/kg)	Determine OFDM SAR
MHz	Ch											
2462.0	11	802.11b (Ant.1)	DSSS	15.5	0.119	2437	802.11g	OFDM	15.5	1.000	**0.119**	X
2462.0	11	802.11b (Ant.1)	DSSS	15.5	0.119	2437	802.11n	OFDM	15.5	1.000	**0.119**	X
2462.0	11	802.11b (Ant.1)	DSSS	15.5	0.119	2437	802.11ac	OFDM	15.5	1.000	**0.119**	X
2462.0	11	802.11b (Ant.1)	DSSS	15.5	0.119	2437	802.11ax	OFDM	14.5	0.794	**0.094**	X
2412.0	1	802.11b (Ant.2)	DSSS	15.5	0.032	2437	802.11g	OFDM	15.5	1.000	**0.032**	X
2412.0	1	802.11b (Ant.2)	DSSS	15.5	0.032	2437	802.11n	OFDM	15.5	1.000	**0.032**	X
2412.0	1	802.11b (Ant.2)	DSSS	15.5	0.032	2437	802.11ac	OFDM	15.5	1.000	**0.032**	X
2412.0	1	802.11b (Ant.2)	DSSS	15.5	0.032	2437	802.11ax	OFDM	14.5	0.794	**0.025**	X
2462.0	11	802.11g (MIMO)	OFDM	18.5	0.137	2437	802.11n	OFDM	18.5	1.000	**0.137**	X
2462.0	11	802.11g (MIMO)	OFDM	18.5	0.137	2437	802.11ac	OFDM	18.5	1.000	**0.137**	X
2462.0	11	802.11g (MIMO)	OFDM	18.5	0.137	2437	802.11ax	OFDM	17.5	0.794	**0.109**	X
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure									Head 1.6 W/kg (mW/g) averaged over 1 gram			

Note(s):
1. SAR is not required for the following 2.4 GHz OFDM conditions. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per April 2019 TCB Workshop Notes, 802.11ax was considered a higher order 802.11 mode when compared to a/b/g/n/ac to apply KDB Publication 248227 D01v02r02 for OFDM mode selection.
3. Therefore, SAR tests were not required for 802.11ax based on the maximum allowed output powers of OFDM modes and the reported SAR values.

Table 11.2.4 UNII Body-Worn SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5300.0	60	802.11a (Ant.1)	16.00	15.58	0.020	10 mm [Front]	FCC #2	0.044	6	99.0	0.036	1.101	1.010	0.040	
5300.0	60	802.11a (Ant.1)	16.00	15.58	-0.140	10 mm [Rear]	FCC #2	0.183	6	99.0	0.183	1.101	1.010	**0.204**	A41
5300.0	60	802.11a (Ant.2)	16.00	15.70	-0.100	10 mm [Front]	FCC #2	0.019	6	99.0	0.013	1.073	1.010	0.014	
5300.0	60	802.11a (Ant.2)	16.00	15.70	0.010	10 mm [Rear]	FCC #2	0.255	6	99.0	0.259	1.073	1.010	**0.281**	A42
5300.0	60	802.11a (MIMO)	19.00	18.65	-0.140	10 mm [Front]	FCC #2	0.045	6	99.0	0.024	1.101	1.010	0.027	
5300.0	60	802.11a (MIMO)	19.00	18.65	-0.090	10 mm [Rear]	FCC #2	0.335	6	99.0	0.341	1.101	1.010	**0.379**	A43
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Adjusted SAR results for UNII-1 and UNII-2A SAR											
FREQUENCY		Mode/ Antenna	Service	Maximum Allowed Power [dBm]	1g Scaled SAR (W/kg)	FREQUENCY [MHz]	Mode	Service	Maximum Allowed Power [dBm	Adjusted Factor	1g Adjusted SAR (W/kg)	SAR for the band with lower maximum output power
MHz	Ch											
5300.0	60	802.11a (Ant.1)	OFDM	16.0	0.204	5240	802.11a	OFDM	16.0	1.000	**0.204**	X
5300.0	60	802.11a (Ant.2)	OFDM	16.0	0.281	5180	802.11a	OFDM	16.0	1.000	**0.281**	X
5300.0	60	802.11a (MIMO)	OFDM	19.0	0.379	5240	802.11a	OFDM	19.0	1.000	**0.379**	X
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure						Body 1.6 W/kg (mW/g) averaged over 1 gram						

Note: U-NII-1 and U-NII-2A Bands: When different maximum output power is specified for the bands, begin SAR measurement in the band with higher specified maximum output power. The highest reported SAR for the tested configuration is adjusted by the ratio of lower to higher specified maximum output power for the two bands. When the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for the band with lower maximum output power in that test configuration.

Table 11.2.5 UNII Body-Worn SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5500.0	100	802.11a (Ant.1)	16.00	15.39	0.000	10 mm [Front]	FCC #2	0.049	6	99.0	0.037	1.152	1.010	0.043	
5500.0	100	802.11a (Ant.1)	16.00	15.39	-0.140	10 mm [Rear]	FCC #2	0.169	6	99.0	0.166	1.152	1.010	**0.193**	A44
5720.0	144	802.11a (Ant.2)	16.00	14.96	0.130	10 mm [Front]	FCC #2	0.054	6	99.0	0.027	1.269	1.010	0.035	
5720.0	144	802.11a (Ant.2)	16.00	14.96	-0.140	10 mm [Rear]	FCC #2	0.139	6	99.0	0.112	1.269	1.010	**0.144**	A45
5720.0	144	802.11a (MIMO)	19.00	18.11	-0.170	10 mm [Front]	FCC #2	0.053	6	99.0	0.038	1.269	1.010	0.049	
5720.0	144	802.11a (MIMO)	19.00	18.11	-0.130	10 mm [Rear]	FCC #2	0.164	6	99.0	0.142	1.269	1.010	**0.182**	A46
5745.0	149	802.11a (Ant.1)	16.00	15.23	0.170	10 mm [Front]	FCC #2	0.038	6	99.0	0.034	1.195	1.010	0.041	
5745.0	149	802.11a (Ant.1)	16.00	15.23	-0.160	10 mm [Rear]	FCC #2	0.171	6	99.0	0.161	1.195	1.010	**0.194**	A47
5825.0	165	802.11a (Ant.2)	16.00	15.75	-0.180	10 mm [Front]	FCC #2	0.056	6	99.0	0.041	1.058	1.010	0.044	
5825.0	165	802.11a (Ant.2)	16.00	15.75	-0.020	10 mm [Rear]	FCC #2	0.226	6	99.0	0.226	1.058	1.010	**0.242**	A48
5825.0	165	802.11a (MIMO)	19.00	18.42	-0.160	10 mm [Front]	FCC #2	0.065	6	99.0	0.060	1.195	1.010	0.072	
5825.0	165	802.11a (MIMO)	19.00	18.42	0.060	10 mm [Rear]	FCC #2	0.225	6	99.0	0.229	1.195	1.010	**0.276**	A49
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11.2.6 Bluetooth Body-Worn SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Rate [Mbps]	Duty Cycle (%)	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch													
2441.0	39	Bluetooth	11.35	10.02	-0.000	10 mm [Front]	FCC #2	1	76.8	0.038	1.358	1.302	**0.067**	A50
2441.0	39	Bluetooth	11.35	10.02	-0.110	10 mm [Rear]	FCC #2	1	76.8	0.024	1.358	1.302	0.042	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram						

11.3 Standalone Hotspot SAR Results

Table 11.3.1 GPRS/WCDMA Hotspot SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode/ Band	Service	Dual Display Accessory Configuration	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
836.6	190	GSM850	GPRS	-	31.20	31.20	-0.080	10 mm [Bottom]	FCC #1	2	1:4.15	0.091	1.000	0.091	
836.6	190	GSM850	GPRS	-	31.20	31.20	-0.010	10 mm [Front]	FCC #1	2	1:4.15	0.226	1.000	0.226	
836.6	190	GSM850	GPRS	-	31.20	31.20	-0.020	10 mm [Rear]	FCC #1	2	1:4.15	0.264	1.000	**0.264**	A27
836.6	190	GSM850	GPRS	-	31.20	31.20	0.080	10 mm [Right]	FCC #1	2	1:4.15	0.070	1.000	0.070	
1880.0	661	PCS1900	GPRS	-	27.20	27.10	-0.130	10 mm [Bottom]	FCC #1	3	1:2.77	0.607	1.023	**0.621**	A51
1880.0	661	PCS1900	GPRS	-	27.20	27.10	0.040	10 mm [Front]	FCC #1	3	1:2.77	0.378	1.023	0.387	
1880.0	661	PCS1900	GPRS	-	27.20	27.10	-0.150	10 mm [Rear]	FCC #1	3	1:2.77	0.391	1.023	0.400	
1880.0	661	PCS1900	GPRS	-	27.20	27.10	-0.110	10 mm [Left]	FCC #1	3	1:2.77	0.097	1.023	0.099	
1880.0	661	PCS1900	GPRS	#1	27.20	27.10	0.040	10 mm [Bottom]	FCC #1	3	1:2.77	0.345	1.023	0.353	
1880.0	661	PCS1900	GPRS	#2	27.20	27.10	-0.020	10 mm [Bottom]	FCC #1	3	1:2.77	0.287	1.023	0.294	
1880.0	661	PCS1900	GPRS	#3	27.20	27.10	-0.190	10 mm [Bottom]	FCC #1	3	1:2.77	0.296	1.023	0.303	
836.6	4183	WCDMA 850	RMC	-	25.50	25.38	-0.030	10 mm [Bottom]	FCC #1	N/A	1:1	0.063	1.028	0.065	
836.6	4183	WCDMA 850	RMC	-	25.50	25.38	0.020	10 mm [Front]	FCC #1	N/A	1:1	0.216	1.028	**0.222**	A30
836.6	4183	WCDMA 850	RMC	-	25.50	25.38	0.060	10 mm [Rear]	FCC #1	N/A	1:1	0.181	1.028	0.186	
836.6	4183	WCDMA 850	RMC	-	25.50	25.38	0.080	10 mm [Right]	FCC #1	N/A	1:1	0.051	1.028	0.052	
1732.4	1412	WCDMA 1700	RMC	-	23.20	22.94	-0.130	10 mm [Bottom]	FCC #1	N/A	1:1	0.521	1.062	**0.553**	A52
1732.4	1412	WCDMA 1700	RMC	-	23.20	22.94	-0.050	10 mm [Front]	FCC #1	N/A	1:1	0.278	1.062	0.295	
1732.4	1412	WCDMA 1700	RMC	-	23.20	22.94	0.000	10 mm [Rear]	FCC #1	N/A	1:1	0.288	1.062	0.306	
1732.4	1412	WCDMA 1700	RMC	-	23.20	22.94	-0.130	10 mm [Left]	FCC #1	N/A	1:1	0.098	1.062	0.104	
1880.0	9400	WCDMA 1900	RMC	-	23.20	22.88	0.040	10 mm [Bottom]	FCC #1	N/A	1:1	0.571	1.076	**0.614**	A53
1880.0	9400	WCDMA 1900	RMC	-	23.20	22.88	-0.030	10 mm [Front]	FCC #1	N/A	1:1	0.393	1.076	0.423	
1880.0	9400	WCDMA 1900	RMC	-	23.20	22.88	0.030	10 mm [Rear]	FCC #1	N/A	1:1	0.370	1.076	0.398	
1880.0	9400	WCDMA 1900	RMC	-	23.20	22.88	-0.100	10 mm [Left]	FCC #1	N/A	1:1	0.112	1.076	0.121	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure									**Body 1.6 W/kg (mW/g) averaged over 1 gram**						

Note(s):
1. Blue entries represent additional Hotspot SAR Test Position (#1: DD angle: 0 degree) with the worst case position.
2. Green entries represent additional Hotspot SAR Test Position (#2: DD angle: 180 degree) with the worst case position.
3. Orange entries represent additional Hotspot SAR Test Position (#3: DD angle: 360 degree) with the worst case position.

Table 11.3.2 LTE B12, B13, B5, B4, B2 Hotspot SAR

MEASUREMENT RESULTS																
FREQUENCY		Mode/ Band	BW [MHz]	Max Allowed Power [dBm]	Cond. PWR [dBm]	Drift Power [dB]	MPR	Position	Device Serial Number	Mod.	RB Size	RB Offs.	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)	Plots #
MHz	Ch																
707.5	23095	LTE B12	10	25.50	24.88	-0.010	0	10 mm [Bottom]	FCC #1	QPSK	1	49	1:1	0.116	1.153	0.134	
707.5	23095	LTE B12	10	24.50	23.91	-0.050	1	10 mm [Bottom]	FCC #1	QPSK	25	12	1:1	0.078	1.146	0.089	
707.5	23095	LTE B12	10	25.50	24.88	-0.020	0	10 mm [Front]	FCC #1	QPSK	1	49	1:1	0.264	1.153	0.304	
707.5	23095	LTE B12	10	24.50	23.91	-0.020	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.181	1.146	0.207	
707.5	23095	LTE B12	10	25.50	24.88	0.010	0	10 mm [Rear]	FCC #1	QPSK	1	49	1:1	0.300	1.153	**0.346**	A33
707.5	23095	LTE B12	10	24.50	23.91	0.040	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.202	1.146	0.231	
707.5	23095	LTE B12	10	25.50	24.88	0.020	0	10 mm [Right]	FCC #1	QPSK	1	49	1:1	0.225	1.153	0.259	
707.5	23095	LTE B12	10	24.50	23.91	-0.030	1	10 mm [Right]	FCC #1	QPSK	25	12	1:1	0.156	1.146	0.179	
782.0	23230	LTE B13	10	25.50	25.08	-0.110	0	10 mm [Bottom]	FCC #1	QPSK	1	49	1:1	0.083	1.102	0.091	
782.0	23230	LTE B13	10	24.50	23.87	-0.060	1	10 mm [Bottom]	FCC #1	QPSK	25	12	1:1	0.066	1.156	0.076	
782.0	23230	LTE B13	10	25.50	25.08	0.020	0	10 mm [Front]	FCC #1	QPSK	1	49	1:1	0.281	1.102	0.310	
782.0	23230	LTE B13	10	24.50	23.87	-0.010	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.195	1.156	0.225	
782.0	23230	LTE B13	10	25.50	25.08	-0.010	0	10 mm [Rear]	FCC #1	QPSK	1	49	1:1	0.339	1.102	**0.374**	A34
782.0	23230	LTE B13	10	24.50	23.87	0.060	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.216	1.156	0.250	
782.0	23230	LTE B13	10	25.50	25.08	-0.010	0	10 mm [Right]	FCC #1	QPSK	1	49	1:1	0.159	1.102	0.175	
782.0	23230	LTE B13	10	24.50	23.87	0.050	1	10 mm [Right]	FCC #1	QPSK	25	12	1:1	0.117	1.156	0.135	
836.5	20525	LTE B5	10	25.50	25.03	-0.010	0	10 mm [Bottom]	FCC #1	QPSK	1	25	1:1	0.106	1.114	0.118	
836.5	20525	LTE B5	10	24.50	24.03	-0.010	1	10 mm [Bottom]	FCC #1	QPSK	25	12	1:1	0.073	1.114	0.081	
836.5	20525	LTE B5	10	25.50	25.03	-0.030	0	10 mm [Front]	FCC #1	QPSK	1	25	1:1	0.205	1.114	0.228	
836.5	20525	LTE B5	10	24.50	24.03	-0.060	1	10 mm [Front]	FCC #1	QPSK	25	12	1:1	0.144	1.114	0.160	
836.5	20525	LTE B5	10	25.50	25.03	0.000	0	10 mm [Rear]	FCC #1	QPSK	1	25	1:1	0.252	1.114	**0.281**	A35
836.5	20525	LTE B5	10	24.50	24.03	-0.060	1	10 mm [Rear]	FCC #1	QPSK	25	12	1:1	0.190	1.114	0.212	
836.5	20525	LTE B5	10	25.50	25.03	0.050	0	10 mm [Right]	FCC #1	QPSK	1	25	1:1	0.086	1.114	0.096	
836.5	20525	LTE B5	10	24.50	24.03	0.010	1	10 mm [Right]	FCC #1	QPSK	25	12	1:1	0.064	1.114	0.071	
1732.5	20175	LTE B4	20	23.20	22.56	0.020	0	10 mm [Bottom]	FCC #1	QPSK	1	50	1:1	0.504	1.159	**0.584**	A54
1732.5	20175	LTE B4	20	22.20	21.63	0.010	1	10 mm [Bottom]	FCC #1	QPSK	50	25	1:1	0.452	1.140	0.515	
1732.5	20175	LTE B4	20	23.20	22.56	-0.050	0	10 mm [Front]	FCC #1	QPSK	1	50	1:1	0.270	1.159	0.313	
1732.5	20175	LTE B4	20	22.20	21.63	-0.030	1	10 mm [Front]	FCC #1	QPSK	50	25	1:1	0.224	1.140	0.255	
1732.5	20175	LTE B4	20	23.20	22.56	-0.010	0	10 mm [Rear]	FCC #1	QPSK	1	50	1:1	0.301	1.159	0.349	
1732.5	20175	LTE B4	20	22.20	21.63	0.020	1	10 mm [Rear]	FCC #1	QPSK	50	25	1:1	0.268	1.140	0.306	
1732.5	20175	LTE B4	20	23.20	22.56	-0.090	0	10 mm [Left]	FCC #1	QPSK	1	50	1:1	0.095	1.159	0.110	
1732.5	20175	LTE B4	20	22.20	21.63	-0.080	1	10 mm [Left]	FCC #1	QPSK	50	25	1:1	0.084	1.140	0.096	
1880.0	18900	LTE B2	20	23.20	22.82	0.050	0	10 mm [Bottom]	FCC #1	QPSK	1	0	1:1	0.562	1.091	**0.613**	A55
1880.0	18900	LTE B2	20	22.20	21.76	-0.010	1	10 mm [Bottom]	FCC #1	QPSK	50	25	1:1	0.497	1.107	0.550	
1880.0	18900	LTE B2	20	23.20	22.82	-0.050	0	10 mm [Front]	FCC #1	QPSK	1	0	1:1	0.369	1.091	0.403	
1880.0	18900	LTE B2	20	22.20	21.76	-0.080	1	10 mm [Front]	FCC #1	QPSK	50	25	1:1	0.327	1.107	0.362	
1880.0	18900	LTE B2	20	23.20	22.82	0.030	0	10 mm [Rear]	FCC #1	QPSK	1	0	1:1	0.374	1.091	0.408	
1880.0	18900	LTE B2	20	22.20	21.76	0.040	1	10 mm [Rear]	FCC #1	QPSK	50	25	1:1	0.332	1.107	0.368	
1880.0	18900	LTE B2	20	23.20	22.82	-0.070	0	10 mm [Left]	FCC #1	QPSK	1	0	1:1	0.101	1.091	0.110	
1880.0	18900	LTE B2	20	22.20	21.76	-0.080	1	10 mm [Left]	FCC #1	QPSK	50	25	1:1	0.086	1.107	0.095	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure											**Body 1.6 W/kg (mW/g) averaged over 1 gram**						

Table 11.3.3 DTS Hotspot SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	SAR (W/kg)	Plots #
MHz	Ch														
2462.0	11	802.11b (Ant.1)	15.50	15.06	-0.150	10 mm [Top]	FCC #2	0.043	1	99.7	0.045	1.107	1.003	0.050	
2462.0	11	802.11b (Ant.1)	15.50	15.06	-0.050	10 mm [Front]	FCC #2	0.105	1	99.7	0.107	1.107	1.003	0.119	
2462.0	11	802.11b (Ant.1)	15.50	15.06	0.010	10 mm [Rear]	FCC #2	0.071	1	99.7	0.070	1.107	1.003	0.078	
2462.0	11	802.11b (Ant.1)	15.50	15.06	-0.030	10 mm [Left]	FCC #2	0.148	1	99.7	0.147	1.107	1.003	**0.163**	A56
2412.0	1	802.11b (Ant.2)	15.50	15.13	0.180	10 mm [Top]	FCC #2	0.048	1	99.7	0.049	1.089	1.003	**0.054**	A57
2412.0	1	802.11b (Ant.2)	15.50	15.13	0.130	10 mm [Front]	FCC #2	0.031	1	99.7	0.029	1.089	1.003	0.032	
2412.0	1	802.11b (Ant.2)	15.50	15.13	-0.040	10 mm [Rear]	FCC #2	0.033	1	99.7	0.018	1.089	1.003	0.020	
2412.0	1	802.11b (Ant.2)	15.50	15.13	0.000	10 mm [Left]	FCC #2	0.004	1	99.7	0.002	1.089	1.003	0.002	
2462.0	11	802.11g (MIMO)	18.50	17.66	-0.100	10 mm [Top]	FCC #2	0.079	1	99.4	0.079	1.213	1.006	0.096	
2462.0	11	802.11g (MIMO)	18.50	17.66	0.130	10 mm [Front]	FCC #2	0.111	1	99.4	0.112	1.213	1.006	0.137	
2462.0	11	802.11g (MIMO)	18.50	17.66	-0.040	10 mm [Rear]	FCC #2	0.072	1	99.4	0.070	1.213	1.006	0.085	
2462.0	11	802.11g (MIMO)	18.50	17.66	0.040	10 mm [Left]	FCC #2	0.139	1	99.4	0.137	1.213	1.006	**0.167**	A58
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Adjusted SAR results for OFDM SAR											
FREQUENCY		Mode/ Antenna	Service	Maximum Allowed Power [dBm]	1g Scaled SAR (W/kg)	FREQUENCY [MHz]	Mode	Service	Maximum Allowed Power [dBm	Ratio of OFDM to DSSS	1g Adjusted SAR (W/kg)	Determine OFDM SAR
MHz	Ch											
2462.0	11	802.11b (Ant.1)	DSSS	15.5	0.163	2437	802.11g	OFDM	15.5	1.000	**0.163**	X
2462.0	11	802.11b (Ant.1)	DSSS	15.5	0.163	2437	802.11n	OFDM	15.5	1.000	**0.163**	X
2462.0	11	802.11b (Ant.1)	DSSS	15.5	0.163	2437	802.11ac	OFDM	15.5	1.000	**0.163**	X
2462.0	11	802.11b (Ant.1)	DSSS	15.5	0.163	2437	802.11ax	OFDM	14.5	0.794	**0.129**	X
2412.0	1	802.11b (Ant.2)	DSSS	15.5	0.054	2437	802.11g	OFDM	15.5	1.000	**0.054**	X
2412.0	1	802.11b (Ant.2)	DSSS	15.5	0.054	2437	802.11n	OFDM	15.5	1.000	**0.054**	X
2412.0	1	802.11b (Ant.2)	DSSS	15.5	0.054	2437	802.11ac	OFDM	15.5	1.000	**0.054**	X
2412.0	1	802.11b (Ant.2)	DSSS	15.5	0.054	2437	802.11ax	OFDM	14.5	0.794	**0.043**	X
2462.0	11	802.11g (MIMO)	OFDM	18.5	0.167	2437	802.11n	OFDM	18.5	1.000	**0.167**	X
2462.0	11	802.11g (MIMO)	OFDM	18.5	0.167	2437	802.11ac	OFDM	18.5	1.000	**0.167**	X
2462.0	11	802.11g (MIMO)	OFDM	18.5	0.167	2437	802.11ax	OFDM	17.5	0.794	**0.133**	X
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure						Head 1.6 W/kg (mW/g) averaged over 1 gram						

Note(s):
1. SAR is not required for the following 2.4 GHz OFDM conditions. When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.
2. Per April 2019 TCB Workshop Notes, 802.11ax was considered a higher order 802.11 mode when compared to a/b/g/n/ac to apply KDB Publication 248227 D01v02r02 for OFDM mode selection.
3. Therefore, SAR tests were not required for 802.11ax based on the maximum allowed output powers of OFDM modes and the reported SAR values.

Table 11.3.4 UNII Hotspot SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5220.0	44	802.11a (Ant.1)	16.00	15.43	-0.140	10 mm [Top]	FCC #2	0.041	6	99.0	0.030	1.142	1.010	0.035	
5220.0	44	802.11a (Ant.1)	16.00	15.43	0.000	10 mm [Front]	FCC #2	0.042	6	99.0	0.035	1.142	1.010	0.040	
5220.0	44	802.11a (Ant.1)	16.00	15.43	0.030	10 mm [Rear]	FCC #2	0.209	6	99.0	0.197	1.142	1.010	**0.227**	A59
5220.0	44	802.11a (Ant.1)	16.00	15.43	-0.150	10 mm [Left]	FCC #2	0.071	6	99.0	0.063	1.142	1.010	0.073	
5240.0	48	802.11a (Ant.2)	16.00	15.44	-0.040	10 mm [Top]	FCC #2	0.113	6	99.0	0.098	1.138	1.010	0.113	
5240.0	48	802.11a (Ant.2)	16.00	15.44	0.000	10 mm [Front]	FCC #2	0.021	6	99.0	0.011	1.138	1.010	0.013	
5240.0	48	802.11a (Ant.2)	16.00	15.44	0.060	10 mm [Rear]	FCC #2	0.253	6	99.0	0.254	1.138	1.010	**0.292**	A60
5240.0	48	802.11a (Ant.2)	16.00	15.44	0.160	10 mm [Left]	FCC #2	0.055	6	99.0	0.046	1.138	1.010	0.053	
5220.0	44	802.11a (MIMO)	19.00	18.42	-0.020	10 mm [Top]	FCC #2	0.133	6	99.0	0.108	1.143	1.010	0.125	
5220.0	44	802.11a (MIMO)	19.00	18.42	-0.050	10 mm [Front]	FCC #2	0.048	6	99.0	0.039	1.143	1.010	0.045	
5220.0	44	802.11a (MIMO)	19.00	18.42	0.030	10 mm [Rear]	FCC #2	0.324	6	99.0	0.316	1.143	1.010	**0.365**	A61
5220.0	44	802.11a (MIMO)	19.00	18.42	-0.060	10 mm [Left]	FCC #2	0.096	6	99.0	0.079	1.143	1.010	0.091	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Table 11.3.5 UNII Hotspot SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5745.0	149	802.11a (Ant.1)	16.00	15.23	-0.120	10 mm [Top]	FCC #2	0.032	6	99.0	0.026	1.195	1.010	0.031	
5745.0	149	802.11a (Ant.1)	16.00	15.23	0.170	10 mm [Front]	FCC #2	0.038	6	99.0	0.034	1.195	1.010	0.041	
5745.0	149	802.11a (Ant.1)	16.00	15.23	-0.160	10 mm [Rear]	FCC #2	0.171	6	99.0	0.161	1.195	1.010	**0.194**	A47
5745.0	149	802.11a (Ant.1)	16.00	15.23	-0.040	10 mm [Left]	FCC #2	0.078	6	99.0	0.069	1.195	1.010	0.083	
5785.0	157	802.11a (Ant.2)	16.00	15.47	0.160	10 mm [Top]	FCC #2	0.051	6	99.0	0.040	1.130	1.010	0.046	
5785.0	157	802.11a (Ant.2)	16.00	15.47	0.110	10 mm [Front]	FCC #2	0.062	6	99.0	0.051	1.130	1.010	0.058	
5785.0	157	802.11a (Ant.2)	16.00	15.47	-0.150	10 mm [Rear]	FCC #2	0.195	6	99.0	0.189	1.130	1.010	**0.216**	A62
5785.0	157	802.11a (Ant.2)	16.00	15.47	0.000	10 mm [Left]	FCC #2	0.017	6	99.0	0.009	1.130	1.010	0.010	
5785.0	157	802.11a (MIMO)	19.00	18.34	-0.180	10 mm [Top]	FCC #2	0.095	6	99.0	0.070	1.195	1.010	0.084	
5785.0	157	802.11a (MIMO)	19.00	18.34	-0.120	10 mm [Front]	FCC #2	0.070	6	99.0	0.064	1.195	1.010	0.077	
5785.0	157	802.11a (MIMO)	19.00	18.34	0.020	10 mm [Rear]	FCC #2	0.200	6	99.0	0.199	1.195	1.010	**0.240**	A63
5785.0	157	802.11a (MIMO)	19.00	18.34	-0.190	10 mm [Left]	FCC #2	0.082	6	99.0	0.070	1.195	1.010	0.084	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram							

Note: UNII-3 Band CH 165(5825 MHz) is not support Hotspot mode as described on operational description, so other required CHs are tested.

Table 11.3.6 Bluetooth Hotspot SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Rate [Mbps]	Duty Cycle (%)	1g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	1g Scaled SAR (W/kg)	Plots #
MHz	Ch													
2441.0	39	Bluetooth	11.35	10.02	-0.190	10 mm [Top]	FCC #2	1	76.8	0.009	1.358	1.302	0.016	
2441.0	39	Bluetooth	11.35	10.02	-0.000	10 mm [Front]	FCC #2	1	76.8	0.038	1.358	1.302	**0.067**	A50
2441.0	39	Bluetooth	11.35	10.02	-0.110	10 mm [Rear]	FCC #2	1	76.8	0.024	1.358	1.302	0.042	
2441.0	39	Bluetooth	11.35	10.02	0.150	10 mm [Left]	FCC #2	1	76.8	0.037	1.358	1.302	0.065	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Body 1.6 W/kg (mW/g) averaged over 1 gram						

11.4 Standalone Phablet SAR Results

Per FCC KDB Publication 648474 D04 Handset SAR, Phablet SAR tests were not required when Hotspot 1g SAR (scaled to maximum output power including tolerance) < 1.2 W/kg.

Table 11.4.1 UNII Phablet SAR

MEASUREMENT RESULTS															
FREQUENCY		Mode	Dual Display Accessory Configuration	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	10g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	10g Scaled SAR (W/kg)	Plots #
MHz	Ch															
5300.0	60	802.11a (Ant.1)	-	16.00	15.58	-0.170	0 mm [Top]	FCC #2	0.068	6	99.0	0.054	1.101	1.010	0.060	
5300.0	60	802.11a (Ant.1)	-	16.00	15.58	0.190	0 mm [Front]	FCC #2	0.217	6	99.0	0.230	1.101	1.010	0.256	
5300.0	60	802.11a (Ant.1)	-	16.00	15.58	-0.080	0 mm [Rear]	FCC #2	0.750	6	99.0	0.723	1.101	1.010	**0.804**	A64
5300.0	60	802.11a (Ant.1)	-	16.00	15.58	0.120	0 mm [Left]	FCC #2	0.305	6	99.0	0.285	1.101	1.010	0.317	
5300.0	60	802.11a (Ant.2)	-	16.00	15.70	-0.090	0 mm [Top]	FCC #2	0.278	6	99.0	0.288	1.073	1.010	0.312	
5300.0	60	802.11a (Ant.2)	-	16.00	15.70	-0.170	0 mm [Front]	FCC #2	0.098	6	99.0	0.094	1.073	1.010	0.102	
5300.0	60	802.11a (Ant.2)	-	16.00	15.70	-0.100	0 mm [Rear]	FCC #2	0.593	6	99.0	0.551	1.073	1.010	**0.597**	A65
5300.0	60	802.11a (Ant.2)	-	16.00	15.70	0.190	0 mm [Left]	FCC #2	0.105	6	99.0	0.088	1.073	1.010	0.095	
5300.0	60	802.11a (MIMO)	-	19.00	18.65	0.170	0 mm [Top]	FCC #2	0.283	6	99.0	0.284	1.101	1.010	0.316	
5300.0	60	802.11a (MIMO)	-	19.00	18.65	0.070	0 mm [Front]	FCC #2	0.337	6	99.0	0.327	1.101	1.010	0.364	
5300.0	60	802.11a (MIMO)	-	19.00	18.65	-0.150	0 mm [Rear]	FCC #2	1.220	6	99.0	1.160	1.101	1.010	**1.290**	A66
5300.0	60	802.11a (MIMO)	-	19.00	18.65	-0.020	0 mm [Left]	FCC #2	0.352	6	99.0	0.331	1.101	1.010	0.368	
5300.0	60	802.11a (MIMO)	#1	19.00	18.65	-0.050	0 mm [Rear]	FCC #2	0.758	6	99.0	0.792	1.101	1.010	0.881	
5300.0	60	802.11a (MIMO)	#2	19.00	18.65	-0.170	0 mm [Rear]	FCC #2	0.681	6	99.0	0.759	1.101	1.010	0.844	
5300.0	60	802.11a (MIMO)	#3	19.00	18.65	-0.130	0 mm [Rear]	FCC #2	0.070	6	99.0	0.053	1.101	1.010	0.059	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure									Phablet 4.0 W/kg (mW/g) averaged over 10 gram							

Note(s):
1. Blue entries represent additional Phablet SAR Test Position (#1: DD angle: 0 degree) with the worst case position.
2. Green entries represent additional Phablet SAR Test Position (#2: DD angle: 180 degree) with the worst case position.
3. Orange entries represent additional Phablet SAR Test Position (#3: DD angle: 360 degree) with the worst case position.

Table 11.4.2 UNII Phablet SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	10g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	10g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5500.0	100	802.11a (Ant.1)	16.00	15.39	0.080	0 mm [Top]	FCC #2	0.116	6	99.0	0.111	1.152	1.019	0.130	
5500.0	100	802.11a (Ant.1)	16.00	15.39	0.140	0 mm [Front]	FCC #2	0.208	6	99.0	0.211	1.152	1.019	0.248	
5500.0	100	802.11a (Ant.1)	16.00	15.39	-0.130	0 mm [Rear]	FCC #2	0.742	6	99.0	0.739	1.152	1.019	**0.868**	A67
5500.0	100	802.11a (Ant.1)	16.00	15.39	-0.040	0 mm [Left]	FCC #2	0.203	6	99.0	0.204	1.152	1.019	0.239	
5720.0	144	802.11a (Ant.2)	16.00	14.96	0.000	0 mm [Top]	FCC #2	0.113	6	99.0	0.094	1.269	1.019	0.122	
5720.0	144	802.11a (Ant.2)	16.00	14.96	-0.150	0 mm [Front]	FCC #2	0.227	6	99.0	0.209	1.269	1.019	0.270	
5720.0	144	802.11a (Ant.2)	16.00	14.96	-0.100	0 mm [Rear]	FCC #2	0.338	6	99.0	0.352	1.269	1.019	**0.455**	A68
5720.0	144	802.11a (Ant.2)	16.00	14.96	-0.000	0 mm [Left]	FCC #2	0.168	6	99.0	0.161	1.269	1.019	0.208	
5720.0	144	802.11a (MIMO)	19.00	18.11	0.160	0 mm [Top]	FCC #2	0.125	6	99.0	0.102	1.269	1.019	0.132	
5720.0	144	802.11a (MIMO)	19.00	18.11	-0.030	0 mm [Front]	FCC #2	0.354	6	99.0	0.311	1.269	1.019	0.402	
5720.0	144	802.11a (MIMO)	19.00	18.11	-0.010	0 mm [Rear]	FCC #2	0.660	6	99.0	0.632	1.269	1.019	**0.817**	A69
5720.0	144	802.11a (MIMO)	19.00	18.11	-0.000	0 mm [Left]	FCC #2	0.168	6	99.0	0.161	1.269	1.019	0.208	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Phablet 4.0 W/kg (mW/g) averaged over 10 gram							

Table 11.4.3 UNII Phablet SAR

MEASUREMENT RESULTS														
FREQUENCY		Mode	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Peak SAR of Area Scan	Data Rate [Mbps]	Duty Cycle	10g SAR (W/kg)	Scaling Factor	Scaling Factor (Duty Cycle)	10g Scaled SAR (W/kg)	Plots #
MHz	Ch														
5825.0	165	802.11a (Ant.1)	16.00	15.05	0.080	0 mm [Top]	FCC #2	0.062	6	99.0	0.055	1.244	1.010	0.069	
5825.0	165	802.11a (Ant.1)	16.00	15.05	-0.170	0 mm [Front]	FCC #2	0.079	6	99.0	0.065	1.244	1.010	0.082	
5825.0	165	802.11a (Ant.1)	16.00	15.05	0.020	0 mm [Rear]	FCC #2	0.380	6	99.0	0.391	1.244	1.010	**0.491**	A70
5825.0	165	802.11a (Ant.1)	16.00	15.05	-0.080	0 mm [Left]	FCC #2	0.152	6	99.0	0.140	1.244	1.010	0.176	
5825.0	165	802.11a (Ant.2)	16.00	15.75	-0.010	0 mm [Top]	FCC #2	0.092	6	99.0	0.149	1.058	1.010	0.159	
5825.0	165	802.11a (Ant.2)	16.00	15.75	0.050	0 mm [Front]	FCC #2	0.305	6	99.0	0.301	1.058	1.010	0.322	
5825.0	165	802.11a (Ant.2)	16.00	15.75	0.010	0 mm [Rear]	FCC #2	0.656	6	99.0	0.599	1.058	1.010	**0.640**	A71
5825.0	165	802.11a (Ant.2)	16.00	15.75	-0.080	0 mm [Left]	FCC #2	0.038	6	99.0	0.035	1.058	1.010	0.037	
5825.0	165	802.11a (MIMO)	19.00	18.42	-0.180	0 mm [Top]	FCC #2	0.128	6	99.0	0.143	1.244	1.010	0.180	
5825.0	165	802.11a (MIMO)	19.00	18.42	-0.160	0 mm [Front]	FCC #2	0.425	6	99.0	0.375	1.244	1.010	0.471	
5825.0	165	802.11a (MIMO)	19.00	18.42	-0.140	0 mm [Rear]	FCC #2	0.937	6	99.0	0.896	1.244	1.010	**1.126**	A72
5825.0	165	802.11a (MIMO)	19.00	18.42	0.080	0 mm [Left]	FCC #2	0.160	6	99.0	0.163	1.244	1.010	0.205	
ANSI / IEEE C95.1-1992– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								Phablet 4.0 W/kg (mW/g) averaged over 10 gram							

Note: UNII-3 Band CH 165 (5825 MHz) is not support Hotspot mode as described on operational description of this device, so phablet SAR is tested on this CH.

11.5 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2013, and FCC KDB Publication 447498 D01v06.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all 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. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r03, body-worn SAR was evaluated without a headset connected to the device. Since the standalone reported boy-worn SAR was not > 1.2 W/kg, no additional body-worn SAR evaluations using a headset cable were performed.
8. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v02r01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated.
9. SAR measurements were performed using the DASY5 automated system. The procedure for spatial peak SAR evaluation has been implemented according to the IEEE 1528 standard. During a maximum search, global and local maxima searches are automatically performed in 2-D after each area scan measurement. The algorithm will find the global maximum and all local maxima within 2 dB of the global maxima for all SAR distributions. All local maxima within 2 dB of the global maximum were searched and passed for the Zoom Scan measurement.

GSM Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
2. This device supports GSM VOIP in the head and body-worn configurations; therefore GPRS was additionally evaluated for head and body-worn compliance.
3. Justification for reduced test configurations per KDB Publication 941225 D01v03r01 and October2013 TCB Workshop Notes: The source-based frame-averaged output power was evaluated for all GPRS slot configurations. The configuration with the highest target frame averaged output power was evaluated for hotspot SAR.
4. 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 then testing at the other channels is not required for such test configuration(s). Since the maximum output power variation across the required test channels is not > ½ dB, the middle channel was used for testing.

WCDMA (UMTS) Notes:

1. WCDMA (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 since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.
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 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 D05v02r05. The general test procedures used for testing can be found in Section 8.4.4.
2. According to FCC KDB 941225 D05v02r05, when the reported SAR is ≤ 0.8 W/kg, testing of the 100% RB allocation and required test channels is not required.
   Otherwise, SAR is required for the remaining required test channels using the 1 RB, 50% RB and 100% RB allocation with highest output power for that channel.
   Only one channel, and as reported SAR values for 1 RB allocation and 50% RB allocation were less than 1.45 W/kg only the highest power RB offset for each allocation was required.
3. 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.
4. A-MPR was disabled for all SAR tests by setting NS=1 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).
5. SAR test reduction is applied using the following criteria:
   Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is > 0.8 W/kg, testing for other channels is performed at the highest output power level for 1 RB, and 50% RB configuration for that channel. Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High channel when the highest reported SAR for 1 RB and 50% RB are > 0.8 W/kg, Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation < 1.45 W/kg. Testing for 16QAM modulation is not required because the reported SAR for QPSK is < 1.45 W/kg and its output power is not more than 0.5 dB higher than that a QPSK. Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is < 1.45 W/kg and its output power is not more than 0.5 dB higher than that of the highest channel bandwidth.

WLAN Notes:

1. The initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.
2. 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 duo to the maximum allowed powers and the highest reported DSSS SAR when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output and the adjust SAR is ≤ 1.2 W/kg.
3. 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.
4. When the maximum reported 1g averaged SAR ≤ 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 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 to determine compliance.
6. Per KDB Publication 248227 D01v02r02, SAR for MIMO was evaluated by following the simultaneous SAR provisions from KDB Publication 447498 D01v06 by making a SAR measurement with both antennas transmitting simultaneously.

Bluetooth Notes:

1. Bluetooth SAR was measured with the device connected to a call with hopping disabled with DH5 operation and Tx test mode type. Per October 2016 TCB Workshop Notes, the reported SAR was scaled to the 100% transmission duty factor to determine compliance. Refer to section 9.5 for the time-domain plot and calculation for the duty factor of the device.
2. Head and hotspot Bluetooth SAR were evaluated for BT tethering applications.

12. FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

12.1 Introduction

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

12.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 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 sum 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is $\leq$ 1.6 W/kg. The different test positon in an exposure condition may be considered collectively to determine SAR test exclusion according to the sum of 1-g or 10-g SAR.

12.3 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v06, transmitters are considered to be transmitting 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.

Table 12.3.1 Simultaneous SAR Cases

No.	Capable Transmit Configuration	Head SAR	Body-Worn SAR	Hotspot SAR	Phablet SAR	Note
1	GSM Voice + Wi-Fi 2.4 GHz	Yes	Yes	N/A	Yes	
2	GSM Voice + Wi-Fi 5 GHz	Yes	Yes	N/A	Yes	
3	GSM Voice + Bluetooth 2.4 GHz	Yes^	Yes	N/A	Yes	^Bluetooth Tethering is considered.
4	GSM Voice + Wi-Fi 2.4 GHz MIMO	Yes	Yes	N/A	Yes	
5	GSM Voice + Wi-Fi 5 GHz MIMO	Yes	Yes	N/A	Yes	
6	GSM Voice + Wi-Fi 2.4 GHz MIMO + Wi-Fi 5GHz MIMO	Yes	Yes	N/A	Yes	
7	GSM Voice + BT 2.4 GHz Ant.1 + Wi-Fi 2.4 GHz Ant.2	Yes^	Yes	N/A	Yes	^Bluetooth Tethering is considered.
8	GSM Voice + Bluetooth 2.4 GHz + Wi-Fi 5GHz MIMO	Yes^	Yes	N/A	Yes	^Bluetooth Tethering is considered.
9	WCDMA + Wi-Fi 2.4 GHz	Yes	Yes	Yes	Yes	
10	WCDMA + Wi-Fi 5 GHz	Yes	Yes	Yes`	Yes	` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
11	WCDMA + Bluetooth 2.4 GHz	Yes^	Yes	Yes	Yes	^Bluetooth Tethering is considered.
12	WCDMA + Wi-Fi 2.4 GHz MIMO	Yes	Yes	Yes	Yes	
13	WCDMA + Wi-Fi 5 GHz MIMO	Yes	Yes	Yes`	Yes	` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
14	WCMDA + Wi-Fi 2.4 GHz MIMO + Wi-Fi 5GHz MIMO	Yes	Yes	Yes`	Yes	` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
15	WCMDA + BT 2.4 GHz Ant.1 + Wi-Fi 2.4 GHz Ant.2	Yes^	Yes	Yes	Yes	^Bluetooth Tethering is considered.
16	WCMDA + Bluetooth 2.4 GHz + Wi-Fi 5GHz MIMO	Yes^	Yes	Yes`	Yes	^Bluetooth Tethering is considered. ` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
17	LTE + Wi-Fi 2.4 GHz	Yes	Yes	Yes	Yes	
18	LTE + Wi-Fi 5 GHz	Yes	Yes	Yes`	Yes	` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
19	LTE + Bluetooth 2.4 GHz	Yes^	Yes	Yes	Yes	^Bluetooth Tethering is considered.
20	LTE + Wi-Fi 2.4 GHz MIMO	Yes	Yes	Yes	Yes	
21	LTE + Wi-Fi 5 GHz MIMO	Yes	Yes	Yes`	Yes	` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
22	LTE + Wi-Fi 2.4 GHz MIMO + Wi-Fi 5GHz MIMO	Yes	Yes	Yes`	Yes	` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
23	LTE + BT 2.4 GHz Ant.1 + Wi-Fi 2.4 GHz Ant.2	Yes^	Yes	Yes	Yes	^Bluetooth Tethering is considered.
24	LTE + Bluetooth 2.4 GHz + Wi-Fi 5GHz MIMO	Yes^	Yes	Yes`	Yes	^Bluetooth Tethering is considered. ` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
25	GPRS + Wi-Fi 2.4 GHz	Yes*	Yes*	Yes	Yes	*Pre-installed VOIP applications are considered.
26	GPRS + Wi-Fi 5 GHz	Yes*	Yes*	Yes`	Yes	*Pre-installed VOIP applications are considered. ` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
27	GPRS + Bluetooth 2.4 GHz	Yes*^	Yes*	Yes	Yes	*Pre-installed VOIP applications are considered. ^Bluetooth Tethering is considered.
28	GPRS + Wi-Fi 2.4 GHz MIMO	Yes*	Yes*	Yes	Yes	*Pre-installed VOIP applications are considered.
29	GPRS + Wi-Fi 5 GHz MIMO	Yes*	Yes*	Yes`	Yes	*Pre-installed VOIP applications are considered. ` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
30	GPRS + Wi-Fi 2.4 GHz MIMO + Wi-Fi 5GHz MIMO	Yes*	Yes*	Yes`	Yes	*Pre-installed VOIP applications are considered. ` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
31	GPRS + BT 2.4 GHz Ant.1 + Wi-Fi 2.4 GHz Ant.2	Yes*^	Yes*	Yes`	Yes	*Pre-installed VOIP applications are considered. ^Bluetooth Tethering is considered. ` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
32	GPRS + Bluetooth 2.4 GHz + Wi-Fi 5GHz MIMO	Yes*^	Yes*	Yes`	Yes	*Pre-installed VOIP applications are considered. ^Bluetooth Tethering is considered. ` Hotspot of UNII-1 & UNII-3 can be operated simultaneous transmission.
33	Wi-Fi 2.4GHz MIMO + Wi-Fi 5GHz MIMO	Yes	Yes	N/A	Yes	
34	Bluetooth 2.4GHz Ant.1 + Wi-Fi 2.4GHz Ant.2	Yes^	Yes	N/A	Yes	^Bluetooth Tethering is considered.
35	Bluetooth 2.4GHz + Wi-Fi 5GHz MIMO	Yes^	Yes	N/A	Yes	^Bluetooth Tethering is considered.

Notes:

1. WiFi 2.4GHz is supported Hotspot and WiFi-Direct(GO/GC).
2. WiFi 5GHz is supported Hotspot in UNII B1,B3 and WiFi-Direct(GO/GC) in UNII B1,B3.
3. LTE, WCDMA, GPRS is supported Hotspot.
4. VoIP is supported in LTE, WCDMA, GSM
5. GSM, WCDMA and LTE can not transmit simultaneously since they share the same chip.
6. When the user utilizes multiple services in UMTS 3G mode it uses multi-Radio Access Bearer or multi-RAB. The power control is based on a physical control channel (Dedicated Physical Control Channel [DPCCH]) and power control will be adjusted to meet the needs of both services. Therefore, the UMTS+WLAN scenario also represents the UMTS Voice/DATA + WLAN Hotspot scenario.
7. Per the manufacturer, WIFI Direct is expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Simultaneous transmission scenarios involving WIFI direct are included in the above table.

12.4 Head SAR Simultaneous Transmission Analysis

Table 12.4.1 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN MIMO + 5.3 GHz W-LAN MIMO (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN MIMO SAR (W/kg)	5.3G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Head SAR	GSM 850	Left Touch	0.052	0.095	0.151	0.147	0.203	0.298
		Right Touch	0.046	0.556	0.307	0.602	0.353	0.909
		Left Tilt	0.031	0.107	0.197	0.138	0.228	0.335
		Right Tilt	0.030	0.287	0.317	0.317	0.347	0.634
	GPRS 850	Left Touch	0.057	0.095	0.151	0.152	0.208	0.303
		Right Touch	0.051	0.556	0.307	0.607	0.358	0.914
		Left Tilt	0.038	0.107	0.197	0.145	0.235	0.342
		Right Tilt	0.035	0.287	0.317	0.322	0.352	0.639
	GSM 1900	Left Touch	0.046	0.095	0.151	0.141	0.197	0.292
		Right Touch	0.033	0.556	0.307	0.589	0.340	0.896
		Left Tilt	0.031	0.107	0.197	0.138	0.228	0.335
		Right Tilt	0.027	0.287	0.317	0.314	0.344	0.631
	GPRS 1900	Left Touch	0.053	0.095	0.151	0.148	0.204	0.299
		Right Touch	0.040	0.556	0.307	0.596	0.347	0.903
		Left Tilt	0.036	0.107	0.197	0.143	0.233	0.340
		Right Tilt	0.035	0.287	0.317	0.322	0.352	0.639
	WCDMA 850	Left Touch	0.085	0.095	0.151	0.180	0.236	0.331
		Right Touch	0.063	0.556	0.307	0.619	0.370	0.926
		Left Tilt	0.049	0.107	0.197	0.156	0.246	0.353
		Right Tilt	0.049	0.287	0.317	0.336	0.366	0.653
	WCDMA 1700	Left Touch	0.034	0.095	0.151	0.129	0.185	0.280
		Right Touch	0.032	0.556	0.307	0.588	0.339	0.895
		Left Tilt	0.012	0.107	0.197	0.119	0.209	0.316
		Right Tilt	0.017	0.287	0.317	0.304	0.334	0.621
	WCDMA 1900	Left Touch	0.053	0.095	0.151	0.148	0.204	0.299
		Right Touch	0.036	0.556	0.307	0.592	0.343	0.899
		Left Tilt	0.034	0.107	0.197	0.141	0.231	0.338
		Right Tilt	0.028	0.287	0.317	0.315	0.345	0.632
	LTE Band 12	Left Touch	0.150	0.095	0.151	0.245	0.301	0.396
		Right Touch	0.119	0.556	0.307	0.675	0.426	0.982
		Left Tilt	0.081	0.107	0.197	0.188	0.278	0.385
		Right Tilt	0.067	0.287	0.317	0.354	0.384	0.671
	LTE Band 13	Left Touch	0.128	0.095	0.151	0.223	0.279	0.374
		Right Touch	0.105	0.556	0.307	0.661	0.412	0.968
		Left Tilt	0.068	0.107	0.197	0.175	0.265	0.372
		Right Tilt	0.072	0.287	0.317	0.359	0.389	0.676
	LTE Band 5	Left Touch	0.074	0.095	0.151	0.169	0.225	0.320
		Right Touch	0.095	0.556	0.307	0.651	0.402	0.958
		Left Tilt	0.055	0.107	0.197	0.162	0.252	0.359
		Right Tilt	0.051	0.287	0.317	0.338	0.368	0.655
	LTE Band 4	Left Touch	0.044	0.095	0.151	0.139	0.195	0.290
		Right Touch	0.027	0.556	0.307	0.583	0.334	0.890
		Left Tilt	0.014	0.107	0.197	0.121	0.211	0.318
		Right Tilt	0.023	0.287	0.317	0.310	0.340	0.627
	LTE Band 2	Left Touch	0.060	0.095	0.151	0.155	0.211	0.306
		Right Touch	0.034	0.556	0.307	0.590	0.341	0.897
		Left Tilt	0.035	0.107	0.197	0.142	0.232	0.339
		Right Tilt	0.045	0.287	0.317	0.332	0.362	0.649

Table 12.4.2 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN MIMO + 5.6 GHz W-LAN MIMO (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN MIMO SAR (W/kg)	5.6G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Head SAR	GSM 850	Left Touch	0.052	0.095	0.369	0.147	0.421	0.516
		Right Touch	0.046	0.556	0.661	0.602	0.707	**1.263**
		Left Tilt	0.031	0.107	0.354	0.138	0.385	0.492
		Right Tilt	0.030	0.287	0.564	0.317	0.594	0.881
	GPRS 850	Left Touch	0.057	0.095	0.369	0.152	0.426	0.521
		Right Touch	0.051	0.556	0.661	0.607	0.712	**1.268**
		Left Tilt	0.038	0.107	0.354	0.145	0.392	0.499
		Right Tilt	0.035	0.287	0.564	0.322	0.599	0.886
	GSM 1900	Left Touch	0.046	0.095	0.369	0.141	0.415	0.510
		Right Touch	0.033	0.556	0.661	0.589	0.694	**1.250**
		Left Tilt	0.031	0.107	0.354	0.138	0.385	0.492
		Right Tilt	0.027	0.287	0.564	0.314	0.591	0.878
	GPRS 1900	Left Touch	0.053	0.095	0.369	0.148	0.422	0.517
		Right Touch	0.040	0.556	0.661	0.596	0.701	**1.257**
		Left Tilt	0.036	0.107	0.354	0.143	0.390	0.497
		Right Tilt	0.035	0.287	0.564	0.322	0.599	0.886
	WCDMA 850	Left Touch	0.085	0.095	0.369	0.180	0.454	0.549
		Right Touch	0.063	0.556	0.661	0.619	0.724	**1.280**
		Left Tilt	0.049	0.107	0.354	0.156	0.403	0.510
		Right Tilt	0.049	0.287	0.564	0.336	0.613	0.900
	WCDMA 1700	Left Touch	0.034	0.095	0.369	0.129	0.403	0.498
		Right Touch	0.032	0.556	0.661	0.588	0.693	**1.249**
		Left Tilt	0.012	0.107	0.354	0.119	0.366	0.473
		Right Tilt	0.017	0.287	0.564	0.304	0.581	0.868
	WCDMA 1900	Left Touch	0.053	0.095	0.369	0.148	0.422	0.517
		Right Touch	0.036	0.556	0.661	0.592	0.697	**1.253**
		Left Tilt	0.034	0.107	0.354	0.141	0.388	0.495
		Right Tilt	0.028	0.287	0.564	0.315	0.592	0.879
	LTE Band 12	Left Touch	0.150	0.095	0.369	0.245	0.519	0.614
		Right Touch	**0.119**	**0.556**	**0.661**	**0.675**	**0.780**	1.336
		Left Tilt	0.081	0.107	0.354	0.188	0.435	0.542
		Right Tilt	0.067	0.287	0.564	0.354	0.631	0.918
	LTE Band 13	Left Touch	0.128	0.095	0.369	0.223	0.497	0.592
		Right Touch	0.105	0.556	0.661	0.661	0.766	**1.322**
		Left Tilt	0.068	0.107	0.354	0.175	0.422	0.529
		Right Tilt	0.072	0.287	0.564	0.359	0.636	0.923
	LTE Band 5	Left Touch	0.074	0.095	0.369	0.169	0.443	0.538
		Right Touch	0.095	0.556	0.661	0.651	0.756	**1.312**
		Left Tilt	0.055	0.107	0.354	0.162	0.409	0.516
		Right Tilt	0.051	0.287	0.564	0.338	0.615	0.902
	LTE Band 4	Left Touch	0.044	0.095	0.369	0.139	0.413	0.508
		Right Touch	0.027	0.556	0.661	0.583	0.688	**1.244**
		Left Tilt	0.014	0.107	0.354	0.121	0.368	0.475
		Right Tilt	0.023	0.287	0.564	0.310	0.587	0.874
	LTE Band 2	Left Touch	0.060	0.095	0.369	0.155	0.429	0.524
		Right Touch	0.034	0.556	0.661	0.590	0.695	**1.251**
		Left Tilt	0.035	0.107	0.354	0.142	0.389	0.496
		Right Tilt	0.045	0.287	0.564	0.332	0.609	0.896

Table 12.4.3 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN MIMO + 5.8 GHz W-LAN MIMO (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN MIMO SAR (W/kg)	5.8G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Head SAR	GSM 850	Left Touch	0.052	0.095	0.197	0.147	0.249	0.344
		Right Touch	0.046	0.556	0.466	0.602	0.512	**1.068**
		Left Tilt	0.031	0.107	0.223	0.138	0.254	0.361
		Right Tilt	0.030	0.287	0.373	0.317	0.403	0.690
	GPRS 850	Left Touch	0.057	0.095	0.197	0.152	0.254	0.349
		Right Touch	0.051	0.556	0.466	0.607	0.517	**1.073**
		Left Tilt	0.038	0.107	0.223	0.145	0.261	0.368
		Right Tilt	0.035	0.287	0.373	0.322	0.408	0.695
	GSM 1900	Left Touch	0.046	0.095	0.197	0.141	0.243	0.338
		Right Touch	0.033	0.556	0.466	0.589	0.499	**1.055**
		Left Tilt	0.031	0.107	0.223	0.138	0.254	0.361
		Right Tilt	0.027	0.287	0.373	0.314	0.400	0.687
	GPRS 1900	Left Touch	0.053	0.095	0.197	0.148	0.250	0.345
		Right Touch	0.040	0.556	0.466	0.596	0.506	**1.062**
		Left Tilt	0.036	0.107	0.223	0.143	0.259	0.366
		Right Tilt	0.035	0.287	0.373	0.322	0.408	0.695
	WCDMA 850	Left Touch	0.085	0.095	0.197	0.180	0.282	0.377
		Right Touch	0.063	0.556	0.466	0.619	0.529	**1.085**
		Left Tilt	0.049	0.107	0.223	0.156	0.272	0.379
		Right Tilt	0.049	0.287	0.373	0.336	0.422	0.709
	WCDMA 1700	Left Touch	0.034	0.095	0.197	0.129	0.231	0.326
		Right Touch	0.032	0.556	0.466	0.588	0.498	**1.054**
		Left Tilt	0.012	0.107	0.223	0.119	0.235	0.342
		Right Tilt	0.017	0.287	0.373	0.304	0.390	0.677
	WCDMA 1900	Left Touch	0.053	0.095	0.197	0.148	0.250	0.345
		Right Touch	0.036	0.556	0.466	0.592	0.502	**1.058**
		Left Tilt	0.034	0.107	0.223	0.141	0.257	0.364
		Right Tilt	0.028	0.287	0.373	0.315	0.401	0.688
	LTE Band 12	Left Touch	0.150	0.095	0.197	0.245	0.347	0.442
		Right Touch	0.119	0.556	0.466	0.675	0.585	**1.141**
		Left Tilt	0.081	0.107	0.223	0.188	0.304	0.411
		Right Tilt	0.067	0.287	0.373	0.354	0.440	0.727
	LTE Band 13	Left Touch	0.128	0.095	0.197	0.223	0.325	0.420
		Right Touch	0.105	0.556	0.466	0.661	0.571	**1.127**
		Left Tilt	0.068	0.107	0.223	0.175	0.291	0.398
		Right Tilt	0.072	0.287	0.373	0.359	0.445	0.732
	LTE Band 5	Left Touch	0.074	0.095	0.197	0.169	0.271	0.366
		Right Touch	0.095	0.556	0.466	0.651	0.561	**1.117**
		Left Tilt	0.055	0.107	0.223	0.162	0.278	0.385
		Right Tilt	0.051	0.287	0.373	0.338	0.424	0.711
	LTE Band 4	Left Touch	0.044	0.095	0.197	0.139	0.241	0.336
		Right Touch	0.027	0.556	0.466	0.583	0.493	**1.049**
		Left Tilt	0.014	0.107	0.223	0.121	0.237	0.344
		Right Tilt	0.023	0.287	0.373	0.310	0.396	0.683
	LTE Band 2	Left Touch	0.060	0.095	0.197	0.155	0.257	0.352
		Right Touch	0.034	0.556	0.466	0.590	0.500	**1.056**
		Left Tilt	0.035	0.107	0.223	0.142	0.258	0.365
		Right Tilt	0.045	0.287	0.373	0.332	0.418	0.705

Table 12.4.4 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth Ant.1 + 5.3 GHz W-LAN MIMO (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth Ant.1 SAR (W/kg)	5.3G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Head SAR	GSM 850	Left Touch	0.052	0.032	0.151	0.084	0.203	0.235
		Right Touch	0.046	0.260	0.307	0.306	0.353	**0.613**
		Left Tilt	0.031	0.025	0.197	0.056	0.228	0.253
		Right Tilt	0.030	0.111	0.317	0.141	0.347	0.458
	GPRS 850	Left Touch	0.057	0.032	0.151	0.089	0.208	0.240
		Right Touch	0.051	0.260	0.307	0.311	0.358	**0.618**
		Left Tilt	0.038	0.025	0.197	0.063	0.235	0.260
		Right Tilt	0.035	0.111	0.317	0.146	0.352	0.463
	GSM 1900	Left Touch	0.046	0.032	0.151	0.078	0.197	0.229
		Right Touch	0.033	0.260	0.307	0.293	0.340	**0.600**
		Left Tilt	0.031	0.025	0.197	0.056	0.228	0.253
		Right Tilt	0.027	0.111	0.317	0.138	0.344	0.455
	GPRS 1900	Left Touch	0.053	0.032	0.151	0.085	0.204	0.236
		Right Touch	0.040	0.260	0.307	0.300	0.347	**0.607**
		Left Tilt	0.036	0.025	0.197	0.061	0.233	0.258
		Right Tilt	0.035	0.111	0.317	0.146	0.352	0.463
	WCDMA 850	Left Touch	0.085	0.032	0.151	0.117	0.236	0.268
		Right Touch	0.063	0.260	0.307	0.323	0.370	**0.630**
		Left Tilt	0.049	0.025	0.197	0.074	0.246	0.271
		Right Tilt	0.049	0.111	0.317	0.160	0.366	0.477
	WCDMA 1700	Left Touch	0.034	0.032	0.151	0.066	0.185	0.217
		Right Touch	0.032	0.260	0.307	0.292	0.339	**0.599**
		Left Tilt	0.012	0.025	0.197	0.037	0.209	0.234
		Right Tilt	0.017	0.111	0.317	0.128	0.334	0.445
	WCDMA 1900	Left Touch	0.053	0.032	0.151	0.085	0.204	0.236
		Right Touch	0.036	0.260	0.307	0.296	0.343	**0.603**
		Left Tilt	0.034	0.025	0.197	0.059	0.231	0.256
		Right Tilt	0.028	0.111	0.317	0.139	0.345	0.456
	LTE Band 12	Left Touch	0.150	0.032	0.151	0.182	0.301	0.333
		Right Touch	0.119	0.260	0.307	0.379	0.426	**0.686**
		Left Tilt	0.081	0.025	0.197	0.106	0.278	0.303
		Right Tilt	0.067	0.111	0.317	0.178	0.384	0.495
	LTE Band 13	Left Touch	0.128	0.032	0.151	0.160	0.279	0.311
		Right Touch	0.105	0.260	0.307	0.365	0.412	**0.672**
		Left Tilt	0.068	0.025	0.197	0.093	0.265	0.290
		Right Tilt	0.072	0.111	0.317	0.183	0.389	0.500
	LTE Band 5	Left Touch	0.074	0.032	0.151	0.106	0.225	0.257
		Right Touch	0.095	0.260	0.307	0.355	0.402	**0.662**
		Left Tilt	0.055	0.025	0.197	0.080	0.252	0.277
		Right Tilt	0.051	0.111	0.317	0.162	0.368	0.479
	LTE Band 4	Left Touch	0.044	0.032	0.151	0.076	0.195	0.227
		Right Touch	0.027	0.260	0.307	0.287	0.334	**0.594**
		Left Tilt	0.014	0.025	0.197	0.039	0.211	0.236
		Right Tilt	0.023	0.111	0.317	0.134	0.340	0.451
	LTE Band 2	Left Touch	0.060	0.032	0.151	0.092	0.211	0.243
		Right Touch	0.034	0.260	0.307	0.294	0.341	**0.601**
		Left Tilt	0.035	0.025	0.197	0.060	0.232	0.257
		Right Tilt	0.045	0.111	0.317	0.156	0.362	0.473

Table 12.4.5 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth Ant.1 + 5.6 GHz W-LAN MIMO (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth Ant.1 SAR (W/kg)	5.6G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Head SAR	GSM 850	Left Touch	0.052	0.032	0.369	0.084	0.421	0.453
		Right Touch	0.046	0.260	0.661	0.306	0.707	**0.967**
		Left Tilt	0.031	0.025	0.354	0.056	0.385	0.410
		Right Tilt	0.030	0.111	0.564	0.141	0.594	0.705
	GPRS 850	Left Touch	0.057	0.032	0.369	0.089	0.426	0.458
		Right Touch	0.051	0.260	0.661	0.311	0.712	**0.972**
		Left Tilt	0.038	0.025	0.354	0.063	0.392	0.417
		Right Tilt	0.035	0.111	0.564	0.146	0.599	0.710
	GSM 1900	Left Touch	0.046	0.032	0.369	0.078	0.415	0.447
		Right Touch	0.033	0.260	0.661	0.293	0.694	**0.954**
		Left Tilt	0.031	0.025	0.354	0.056	0.385	0.410
		Right Tilt	0.027	0.111	0.564	0.138	0.591	0.702
	GPRS 1900	Left Touch	0.053	0.032	0.369	0.085	0.422	0.454
		Right Touch	0.040	0.260	0.661	0.300	0.701	**0.961**
		Left Tilt	0.036	0.025	0.354	0.061	0.390	0.415
		Right Tilt	0.035	0.111	0.564	0.146	0.599	0.710
	WCDMA 850	Left Touch	0.085	0.032	0.369	0.117	0.454	0.486
		Right Touch	0.063	0.260	0.661	0.323	0.724	**0.984**
		Left Tilt	0.049	0.025	0.354	0.074	0.403	0.428
		Right Tilt	0.049	0.111	0.564	0.160	0.613	0.724
	WCDMA 1700	Left Touch	0.034	0.032	0.369	0.066	0.403	0.435
		Right Touch	0.032	0.260	0.661	0.292	0.693	**0.953**
		Left Tilt	0.012	0.025	0.354	0.037	0.366	0.391
		Right Tilt	0.017	0.111	0.564	0.128	0.581	0.692
	WCDMA 1900	Left Touch	0.053	0.032	0.369	0.085	0.422	0.454
		Right Touch	0.036	0.260	0.661	0.296	0.697	**0.957**
		Left Tilt	0.034	0.025	0.354	0.059	0.388	0.413
		Right Tilt	0.028	0.111	0.564	0.139	0.592	0.703
	LTE Band 12	Left Touch	0.150	0.032	0.369	0.182	0.519	0.551
		Right Touch	0.119	0.260	0.661	0.379	0.780	**1.040**
		Left Tilt	0.081	0.025	0.354	0.106	0.435	0.460
		Right Tilt	0.067	0.111	0.564	0.178	0.631	0.742
	LTE Band 13	Left Touch	0.128	0.032	0.369	0.160	0.497	0.529
		Right Touch	0.105	0.260	0.661	0.365	0.766	**1.026**
		Left Tilt	0.068	0.025	0.354	0.093	0.422	0.447
		Right Tilt	0.072	0.111	0.564	0.183	0.636	0.747
	LTE Band 5	Left Touch	0.074	0.032	0.369	0.106	0.443	0.475
		Right Touch	0.095	0.260	0.661	0.355	0.756	**1.016**
		Left Tilt	0.055	0.025	0.354	0.080	0.409	0.434
		Right Tilt	0.051	0.111	0.564	0.162	0.615	0.726
	LTE Band 4	Left Touch	0.044	0.032	0.369	0.076	0.413	0.445
		Right Touch	0.027	0.260	0.661	0.287	0.688	**0.948**
		Left Tilt	0.014	0.025	0.354	0.039	0.368	0.393
		Right Tilt	0.023	0.111	0.564	0.134	0.587	0.698
	LTE Band 2	Left Touch	0.060	0.032	0.369	0.092	0.429	0.461
		Right Touch	0.034	0.260	0.661	0.294	0.695	**0.955**
		Left Tilt	0.035	0.025	0.354	0.060	0.389	0.414
		Right Tilt	0.045	0.111	0.564	0.156	0.609	0.720

Table 12.4.6 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth Ant.1 + 5.8 GHz W-LAN MIMO (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth Ant.1 SAR (W/kg)	5.8G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Head SAR	GSM 850	Left Touch	0.052	0.032	0.197	0.084	0.249	0.281
		Right Touch	0.046	0.260	0.466	0.306	0.512	**0.772**
		Left Tilt	0.031	0.025	0.223	0.056	0.254	0.279
		Right Tilt	0.030	0.111	0.373	0.141	0.403	0.514
	GPRS 850	Left Touch	0.057	0.032	0.197	0.089	0.254	0.286
		Right Touch	0.051	0.260	0.466	0.311	0.517	**0.777**
		Left Tilt	0.038	0.025	0.223	0.063	0.261	0.286
		Right Tilt	0.035	0.111	0.373	0.146	0.408	0.519
	GSM 1900	Left Touch	0.046	0.032	0.197	0.078	0.243	0.275
		Right Touch	0.033	0.260	0.466	0.293	0.499	**0.759**
		Left Tilt	0.031	0.025	0.223	0.056	0.254	0.279
		Right Tilt	0.027	0.111	0.373	0.138	0.400	0.511
	GPRS 1900	Left Touch	0.053	0.032	0.197	0.085	0.250	0.282
		Right Touch	0.040	0.260	0.466	0.300	0.506	**0.766**
		Left Tilt	0.036	0.025	0.223	0.061	0.259	0.284
		Right Tilt	0.035	0.111	0.373	0.146	0.408	0.519
	WCDMA 850	Left Touch	0.085	0.032	0.197	0.117	0.282	0.314
		Right Touch	0.063	0.260	0.466	0.323	0.529	**0.789**
		Left Tilt	0.049	0.025	0.223	0.074	0.272	0.297
		Right Tilt	0.049	0.111	0.373	0.160	0.422	0.533
	WCDMA 1700	Left Touch	0.034	0.032	0.197	0.066	0.231	0.263
		Right Touch	0.032	0.260	0.466	0.292	0.498	**0.758**
		Left Tilt	0.012	0.025	0.223	0.037	0.235	0.260
		Right Tilt	0.017	0.111	0.373	0.128	0.390	0.501
	WCDMA 1900	Left Touch	0.053	0.032	0.197	0.085	0.250	0.282
		Right Touch	0.036	0.260	0.466	0.296	0.502	**0.762**
		Left Tilt	0.034	0.025	0.223	0.059	0.257	0.282
		Right Tilt	0.028	0.111	0.373	0.139	0.401	0.512
	LTE Band 12	Left Touch	0.150	0.032	0.197	0.182	0.347	0.379
		Right Touch	0.119	0.260	0.466	0.379	0.585	**0.845**
		Left Tilt	0.081	0.025	0.223	0.106	0.304	0.329
		Right Tilt	0.067	0.111	0.373	0.178	0.440	0.551
	LTE Band 13	Left Touch	0.128	0.032	0.197	0.160	0.325	0.357
		Right Touch	0.105	0.260	0.466	0.365	0.571	**0.831**
		Left Tilt	0.068	0.025	0.223	0.093	0.291	0.316
		Right Tilt	0.072	0.111	0.373	0.183	0.445	0.556
	LTE Band 5	Left Touch	0.074	0.032	0.197	0.106	0.271	0.303
		Right Touch	0.095	0.260	0.466	0.355	0.561	**0.821**
		Left Tilt	0.055	0.025	0.223	0.080	0.278	0.303
		Right Tilt	0.051	0.111	0.373	0.162	0.424	0.535
	LTE Band 4	Left Touch	0.044	0.032	0.197	0.076	0.241	0.273
		Right Touch	0.027	0.260	0.466	0.287	0.493	**0.753**
		Left Tilt	0.014	0.025	0.223	0.039	0.237	0.262
		Right Tilt	0.023	0.111	0.373	0.134	0.396	0.507
	LTE Band 2	Left Touch	0.060	0.032	0.197	0.092	0.257	0.289
		Right Touch	0.034	0.260	0.466	0.294	0.500	**0.760**
		Left Tilt	0.035	0.025	0.223	0.060	0.258	0.283
		Right Tilt	0.045	0.111	0.373	0.156	0.418	0.529

Table 12.4.7 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth Ant.1 + 2.4 GHz W-LAN Ant.2 (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth Ant.1 SAR (W/kg)	2.4G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Head SAR	GSM 850	Left Touch	0.052	0.032	0.063	0.084	0.115	0.147
		Right Touch	0.046	0.260	0.493	0.306	0.539	**0.799**
		Left Tilt	0.031	0.025	0.066	0.056	0.097	0.122
		Right Tilt	0.030	0.111	0.194	0.141	0.224	0.335
	GPRS 850	Left Touch	0.057	0.032	0.063	0.089	0.120	0.152
		Right Touch	0.051	0.260	0.493	0.311	0.544	**0.804**
		Left Tilt	0.038	0.025	0.066	0.063	0.104	0.129
		Right Tilt	0.035	0.111	0.194	0.146	0.229	0.340
	GSM 1900	Left Touch	0.046	0.032	0.063	0.078	0.109	0.141
		Right Touch	0.033	0.260	0.493	0.293	0.526	**0.786**
		Left Tilt	0.031	0.025	0.066	0.056	0.097	0.122
		Right Tilt	0.027	0.111	0.194	0.138	0.221	0.332
	GPRS 1900	Left Touch	0.053	0.032	0.063	0.085	0.116	0.148
		Right Touch	0.040	0.260	0.493	0.300	0.533	**0.793**
		Left Tilt	0.036	0.025	0.066	0.061	0.102	0.127
		Right Tilt	0.035	0.111	0.194	0.146	0.229	0.340
	WCDMA 850	Left Touch	0.085	0.032	0.063	0.117	0.148	0.180
		Right Touch	0.063	0.260	0.493	0.323	0.556	**0.816**
		Left Tilt	0.049	0.025	0.066	0.074	0.115	0.140
		Right Tilt	0.049	0.111	0.194	0.160	0.243	0.354
	WCDMA 1700	Left Touch	0.034	0.032	0.063	0.066	0.097	0.129
		Right Touch	0.032	0.260	0.493	0.292	0.525	**0.785**
		Left Tilt	0.012	0.025	0.066	0.037	0.078	0.103
		Right Tilt	0.017	0.111	0.194	0.128	0.211	0.322
	WCDMA 1900	Left Touch	0.053	0.032	0.063	0.085	0.116	0.148
		Right Touch	0.036	0.260	0.493	0.296	0.529	**0.789**
		Left Tilt	0.034	0.025	0.066	0.059	0.100	0.125
		Right Tilt	0.028	0.111	0.194	0.139	0.222	0.333
	LTE Band 12	Left Touch	0.150	0.032	0.063	0.182	0.213	0.245
		Right Touch	0.119	0.260	0.493	0.379	0.612	**0.872**
		Left Tilt	0.081	0.025	0.066	0.106	0.147	0.172
		Right Tilt	0.067	0.111	0.194	0.178	0.261	0.372
	LTE Band 13	Left Touch	0.128	0.032	0.063	0.160	0.191	0.223
		Right Touch	0.105	0.260	0.493	0.365	0.598	**0.858**
		Left Tilt	0.068	0.025	0.066	0.093	0.134	0.159
		Right Tilt	0.072	0.111	0.194	0.183	0.266	0.377
	LTE Band 5	Left Touch	0.074	0.032	0.063	0.106	0.137	0.169
		Right Touch	0.095	0.260	0.493	0.355	0.588	**0.848**
		Left Tilt	0.055	0.025	0.066	0.080	0.121	0.146
		Right Tilt	0.051	0.111	0.194	0.162	0.245	0.356
	LTE Band 4	Left Touch	0.044	0.032	0.063	0.076	0.107	0.139
		Right Touch	0.027	0.260	0.493	0.287	0.520	**0.780**
		Left Tilt	0.014	0.025	0.066	0.039	0.080	0.105
		Right Tilt	0.023	0.111	0.194	0.134	0.217	0.328
	LTE Band 2	Left Touch	0.060	0.032	0.063	0.092	0.123	0.155
		Right Touch	0.034	0.260	0.493	0.294	0.527	**0.787**
		Left Tilt	0.035	0.025	0.066	0.060	0.101	0.126
		Right Tilt	0.045	0.111	0.194	0.156	0.239	0.350

Table 12.4.8 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN Ant.1 (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN Ant.1 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.084	0.136
		Right Touch	0.046	0.512	**0.558**
		Left Tilt	0.031	0.095	0.126
		Right Tilt	0.030	0.248	0.278
	GPRS 850	Left Touch	0.057	0.084	0.141
		Right Touch	0.051	0.512	**0.563**
		Left Tilt	0.038	0.095	0.133
		Right Tilt	0.035	0.248	0.283
	GSM 1900	Left Touch	0.046	0.084	0.130
		Right Touch	0.033	0.512	**0.545**
		Left Tilt	0.031	0.095	0.126
		Right Tilt	0.027	0.248	0.275
	GPRS 1900	Left Touch	0.053	0.084	0.137
		Right Touch	0.040	0.512	**0.552**
		Left Tilt	0.036	0.095	0.131
		Right Tilt	0.035	0.248	0.283
	WCDMA 850	Left Touch	0.085	0.084	0.169
		Right Touch	0.063	0.512	**0.575**
		Left Tilt	0.049	0.095	0.144
		Right Tilt	0.049	0.248	0.297
	WCDMA 1700	Left Touch	0.034	0.084	0.118
		Right Touch	0.032	0.512	**0.544**
		Left Tilt	0.012	0.095	0.107
		Right Tilt	0.017	0.248	0.265
	WCDMA 1900	Left Touch	0.053	0.084	0.137
		Right Touch	0.036	0.512	**0.548**
		Left Tilt	0.034	0.095	0.129
		Right Tilt	0.028	0.248	0.276
	LTE Band 12	Left Touch	0.150	0.084	0.234
		Right Touch	0.119	0.512	**0.631**
		Left Tilt	0.081	0.095	0.176
		Right Tilt	0.067	0.248	0.315
	LTE Band 13	Left Touch	0.128	0.084	0.212
		Right Touch	0.105	0.512	**0.617**
		Left Tilt	0.068	0.095	0.163
		Right Tilt	0.072	0.248	0.320
	LTE Band 5	Left Touch	0.074	0.084	0.158
		Right Touch	0.095	0.512	**0.607**
		Left Tilt	0.055	0.095	0.150
		Right Tilt	0.051	0.248	0.299
	LTE Band 4	Left Touch	0.044	0.084	0.128
		Right Touch	0.027	0.512	**0.539**
		Left Tilt	0.014	0.095	0.109
		Right Tilt	0.023	0.248	0.271
	LTE Band 2	Left Touch	0.060	0.084	0.144
		Right Touch	0.034	0.512	**0.546**
		Left Tilt	0.035	0.095	0.130
		Right Tilt	0.045	0.248	0.293

Table 12.4.9 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN Ant.2 (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.063	0.115
		Right Touch	0.046	0.493	**0.539**
		Left Tilt	0.031	0.066	0.097
		Right Tilt	0.030	0.194	0.224
	GPRS 850	Left Touch	0.057	0.063	0.120
		Right Touch	0.051	0.493	**0.544**
		Left Tilt	0.038	0.066	0.104
		Right Tilt	0.035	0.194	0.229
	GSM 1900	Left Touch	0.046	0.063	0.109
		Right Touch	0.033	0.493	**0.526**
		Left Tilt	0.031	0.066	0.097
		Right Tilt	0.027	0.194	0.221
	GPRS 1900	Left Touch	0.053	0.063	0.116
		Right Touch	0.040	0.493	**0.533**
		Left Tilt	0.036	0.066	0.102
		Right Tilt	0.035	0.194	0.229
	WCDMA 850	Left Touch	0.085	0.063	0.148
		Right Touch	0.063	0.493	**0.556**
		Left Tilt	0.049	0.066	0.115
		Right Tilt	0.049	0.194	0.243
	WCDMA 1700	Left Touch	0.034	0.063	0.097
		Right Touch	0.032	0.493	**0.525**
		Left Tilt	0.012	0.066	0.078
		Right Tilt	0.017	0.194	0.211
	WCDMA 1900	Left Touch	0.053	0.063	0.116
		Right Touch	0.036	0.493	**0.529**
		Left Tilt	0.034	0.066	0.100
		Right Tilt	0.028	0.194	0.222
	LTE Band 12	Left Touch	0.150	0.063	0.213
		Right Touch	0.119	0.493	**0.612**
		Left Tilt	0.081	0.066	0.147
		Right Tilt	0.067	0.194	0.261
	LTE Band 13	Left Touch	0.128	0.063	0.191
		Right Touch	0.105	0.493	**0.598**
		Left Tilt	0.068	0.066	0.134
		Right Tilt	0.072	0.194	0.266
	LTE Band 5	Left Touch	0.074	0.063	0.137
		Right Touch	0.095	0.493	**0.588**
		Left Tilt	0.055	0.066	0.121
		Right Tilt	0.051	0.194	0.245
	LTE Band 4	Left Touch	0.044	0.063	0.107
		Right Touch	0.027	0.493	**0.520**
		Left Tilt	0.014	0.066	0.080
		Right Tilt	0.023	0.194	0.217
	LTE Band 2	Left Touch	0.060	0.063	0.123
		Right Touch	0.034	0.493	**0.527**
		Left Tilt	0.035	0.066	0.101
		Right Tilt	0.045	0.194	0.239

Table 12.4.10 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN MIMO (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.095	0.147
		Right Touch	0.046	0.556	**0.602**
		Left Tilt	0.031	0.107	0.138
		Right Tilt	0.030	0.287	0.317
	GPRS 850	Left Touch	0.057	0.095	0.152
		Right Touch	0.051	0.556	**0.607**
		Left Tilt	0.038	0.107	0.145
		Right Tilt	0.035	0.287	0.322
	GSM 1900	Left Touch	0.046	0.095	0.141
		Right Touch	0.033	0.556	**0.589**
		Left Tilt	0.031	0.107	0.138
		Right Tilt	0.027	0.287	0.314
	GPRS 1900	Left Touch	0.053	0.095	0.148
		Right Touch	0.040	0.556	**0.596**
		Left Tilt	0.036	0.107	0.143
		Right Tilt	0.035	0.287	0.322
	WCDMA 850	Left Touch	0.085	0.095	0.180
		Right Touch	0.063	0.556	**0.619**
		Left Tilt	0.049	0.107	0.156
		Right Tilt	0.049	0.287	0.336
	WCDMA 1700	Left Touch	0.034	0.095	0.129
		Right Touch	0.032	0.556	**0.588**
		Left Tilt	0.012	0.107	0.119
		Right Tilt	0.017	0.287	0.304
	WCDMA 1900	Left Touch	0.053	0.095	0.148
		Right Touch	0.036	0.556	**0.592**
		Left Tilt	0.034	0.107	0.141
		Right Tilt	0.028	0.287	0.315
	LTE Band 12	Left Touch	0.150	0.095	0.245
		Right Touch	0.119	0.556	**0.675**
		Left Tilt	0.081	0.107	0.188
		Right Tilt	0.067	0.287	0.354
	LTE Band 13	Left Touch	0.128	0.095	0.223
		Right Touch	0.105	0.556	**0.661**
		Left Tilt	0.068	0.107	0.175
		Right Tilt	0.072	0.287	0.359
	LTE Band 5	Left Touch	0.074	0.095	0.169
		Right Touch	0.095	0.556	**0.651**
		Left Tilt	0.055	0.107	0.162
		Right Tilt	0.051	0.287	0.338
	LTE Band 4	Left Touch	0.044	0.095	0.139
		Right Touch	0.027	0.556	**0.583**
		Left Tilt	0.014	0.107	0.121
		Right Tilt	0.023	0.287	0.310
	LTE Band 2	Left Touch	0.060	0.095	0.155
		Right Touch	0.034	0.556	**0.590**
		Left Tilt	0.035	0.107	0.142
		Right Tilt	0.045	0.287	0.332

Table 12.4.11 Simultaneous Transmission Scenario : 2G/3G/4G + 5.3 GHz W-LAN Ant.1 (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.3G W-LAN Ant.1 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.093	0.145
		Right Touch	0.046	0.336	**0.382**
		Left Tilt	0.031	0.071	0.102
		Right Tilt	0.030	0.239	0.269
	GPRS 850	Left Touch	0.057	0.093	0.150
		Right Touch	0.051	0.336	**0.387**
		Left Tilt	0.038	0.071	0.109
		Right Tilt	0.035	0.239	0.274
	GSM 1900	Left Touch	0.046	0.093	0.139
		Right Touch	0.033	0.336	**0.369**
		Left Tilt	0.031	0.071	0.102
		Right Tilt	0.027	0.239	0.266
	GPRS 1900	Left Touch	0.053	0.093	0.146
		Right Touch	0.040	0.336	**0.376**
		Left Tilt	0.036	0.071	0.107
		Right Tilt	0.035	0.239	0.274
	WCDMA 850	Left Touch	0.085	0.093	0.178
		Right Touch	0.063	0.336	**0.399**
		Left Tilt	0.049	0.071	0.120
		Right Tilt	0.049	0.239	0.288
	WCDMA 1700	Left Touch	0.034	0.093	0.127
		Right Touch	0.032	0.336	**0.368**
		Left Tilt	0.012	0.071	0.083
		Right Tilt	0.017	0.239	0.256
	WCDMA 1900	Left Touch	0.053	0.093	0.146
		Right Touch	0.036	0.336	**0.372**
		Left Tilt	0.034	0.071	0.105
		Right Tilt	0.028	0.239	0.267
	LTE Band 12	Left Touch	0.150	0.093	0.243
		Right Touch	0.119	0.336	**0.455**
		Left Tilt	0.081	0.071	0.152
		Right Tilt	0.067	0.239	0.306
	LTE Band 13	Left Touch	0.128	0.093	0.221
		Right Touch	0.105	0.336	**0.441**
		Left Tilt	0.068	0.071	0.139
		Right Tilt	0.072	0.239	0.311
	LTE Band 5	Left Touch	0.074	0.093	0.167
		Right Touch	0.095	0.336	**0.431**
		Left Tilt	0.055	0.071	0.126
		Right Tilt	0.051	0.239	0.290
	LTE Band 4	Left Touch	0.044	0.093	0.137
		Right Touch	0.027	0.336	**0.363**
		Left Tilt	0.014	0.071	0.085
		Right Tilt	0.023	0.239	0.262
	LTE Band 2	Left Touch	0.060	0.093	0.153
		Right Touch	0.034	0.336	**0.370**
		Left Tilt	0.035	0.071	0.106
		Right Tilt	0.045	0.239	0.284

Table 12.4.12 Simultaneous Transmission Scenario : 2G/3G/4G + 5.3 GHz W-LAN Ant.2 (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.3G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.109	0.161
		Right Touch	0.046	0.111	0.157
		Left Tilt	0.031	0.171	0.202
		Right Tilt	0.030	0.178	**0.208**
	GPRS 850	Left Touch	0.057	0.109	0.166
		Right Touch	0.051	0.111	0.162
		Left Tilt	0.038	0.171	0.209
		Right Tilt	0.035	0.178	**0.213**
	GSM 1900	Left Touch	0.046	0.109	0.155
		Right Touch	0.033	0.111	0.144
		Left Tilt	0.031	0.171	0.202
		Right Tilt	0.027	0.178	**0.205**
	GPRS 1900	Left Touch	0.053	0.109	0.162
		Right Touch	0.040	0.111	0.151
		Left Tilt	0.036	0.171	0.207
		Right Tilt	0.035	0.178	**0.213**
	WCDMA 850	Left Touch	0.085	0.109	0.194
		Right Touch	0.063	0.111	0.174
		Left Tilt	0.049	0.171	0.220
		Right Tilt	0.049	0.178	**0.227**
	WCDMA 1700	Left Touch	0.034	0.109	0.143
		Right Touch	0.032	0.111	0.143
		Left Tilt	0.012	0.171	0.183
		Right Tilt	0.017	0.178	**0.195**
	WCDMA 1900	Left Touch	0.053	0.109	0.162
		Right Touch	0.036	0.111	0.147
		Left Tilt	0.034	0.171	0.205
		Right Tilt	0.028	0.178	**0.206**
	LTE Band 12	Left Touch	0.150	0.109	0.259
		Right Touch	0.119	0.111	0.230
		Left Tilt	0.081	0.171	**0.252**
		Right Tilt	0.067	0.178	0.245
	LTE Band 13	Left Touch	0.128	0.109	0.237
		Right Touch	0.105	0.111	0.216
		Left Tilt	0.068	0.171	0.239
		Right Tilt	0.072	0.178	**0.250**
	LTE Band 5	Left Touch	0.074	0.109	0.183
		Right Touch	0.095	0.111	0.206
		Left Tilt	0.055	0.171	0.226
		Right Tilt	0.051	0.178	**0.229**
	LTE Band 4	Left Touch	0.044	0.109	0.153
		Right Touch	0.027	0.111	0.138
		Left Tilt	0.014	0.171	0.185
		Right Tilt	0.023	0.178	**0.201**
	LTE Band 2	Left Touch	0.060	0.109	0.169
		Right Touch	0.034	0.111	0.145
		Left Tilt	0.035	0.171	0.206
		Right Tilt	0.045	0.178	**0.223**

Table 12.4.13 Simultaneous Transmission Scenario: 2G/3G/4G + 5.3 GHz W-LAN MIMO (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.3G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.151	0.203
		Right Touch	0.046	0.307	**0.353**
		Left Tilt	0.031	0.197	0.228
		Right Tilt	0.030	0.317	0.347
	GPRS 850	Left Touch	0.057	0.151	0.208
		Right Touch	0.051	0.307	**0.358**
		Left Tilt	0.038	0.197	0.235
		Right Tilt	0.035	0.317	0.352
	GSM 1900	Left Touch	0.046	0.151	0.197
		Right Touch	0.033	0.307	0.340
		Left Tilt	0.031	0.197	0.228
		Right Tilt	0.027	0.317	**0.344**
	GPRS 1900	Left Touch	0.053	0.151	0.204
		Right Touch	0.040	0.307	0.347
		Left Tilt	0.036	0.197	0.233
		Right Tilt	0.035	0.317	**0.352**
	WCDMA 850	Left Touch	0.085	0.151	0.236
		Right Touch	0.063	0.307	**0.370**
		Left Tilt	0.049	0.197	0.246
		Right Tilt	0.049	0.317	0.366
	WCDMA 1700	Left Touch	0.034	0.151	0.185
		Right Touch	0.032	0.307	**0.339**
		Left Tilt	0.012	0.197	0.209
		Right Tilt	0.017	0.317	0.334
	WCDMA 1900	Left Touch	0.053	0.151	0.204
		Right Touch	0.036	0.307	0.343
		Left Tilt	0.034	0.197	0.231
		Right Tilt	0.028	0.317	**0.345**
	LTE Band 12	Left Touch	0.150	0.151	0.301
		Right Touch	0.119	0.307	**0.426**
		Left Tilt	0.081	0.197	0.278
		Right Tilt	0.067	0.317	0.384
	LTE Band 13	Left Touch	0.128	0.151	0.279
		Right Touch	0.105	0.307	**0.412**
		Left Tilt	0.068	0.197	0.265
		Right Tilt	0.072	0.317	0.389
	LTE Band 5	Left Touch	0.074	0.151	0.225
		Right Touch	0.095	0.307	**0.402**
		Left Tilt	0.055	0.197	0.252
		Right Tilt	0.051	0.317	0.368
	LTE Band 4	Left Touch	0.044	0.151	0.195
		Right Touch	0.027	0.307	0.334
		Left Tilt	0.014	0.197	0.211
		Right Tilt	0.023	0.317	**0.340**
	LTE Band 2	Left Touch	0.060	0.151	0.211
		Right Touch	0.034	0.307	0.341
		Left Tilt	0.035	0.197	0.232
		Right Tilt	0.045	0.317	**0.362**

Table 12.4.14 Simultaneous Transmission Scenario : 2G/3G/4G + 5.6 GHz W-LAN Ant.1 (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.6G W-LAN Ant.1 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.138	0.190
		Right Touch	0.046	0.321	**0.367**
		Left Tilt	0.031	0.112	0.143
		Right Tilt	0.030	0.320	0.350
	GPRS 850	Left Touch	0.057	0.138	0.195
		Right Touch	0.051	0.321	**0.372**
		Left Tilt	0.038	0.112	0.150
		Right Tilt	0.035	0.320	0.355
	GSM 1900	Left Touch	0.046	0.138	0.184
		Right Touch	0.033	0.321	**0.354**
		Left Tilt	0.031	0.112	0.143
		Right Tilt	0.027	0.320	0.347
	GPRS 1900	Left Touch	0.053	0.138	0.191
		Right Touch	0.040	0.321	**0.361**
		Left Tilt	0.036	0.112	0.148
		Right Tilt	0.035	0.320	0.355
	WCDMA 850	Left Touch	0.085	0.138	0.223
		Right Touch	0.063	0.321	**0.384**
		Left Tilt	0.049	0.112	0.161
		Right Tilt	0.049	0.320	0.369
	WCDMA 1700	Left Touch	0.034	0.138	0.172
		Right Touch	0.032	0.321	**0.353**
		Left Tilt	0.012	0.112	0.124
		Right Tilt	0.017	0.320	0.337
	WCDMA 1900	Left Touch	0.053	0.138	0.191
		Right Touch	0.036	0.321	**0.357**
		Left Tilt	0.034	0.112	0.146
		Right Tilt	0.028	0.320	0.348
	LTE Band 12	Left Touch	0.150	0.138	0.288
		Right Touch	0.119	0.321	**0.440**
		Left Tilt	0.081	0.112	0.193
		Right Tilt	0.067	0.320	0.387
	LTE Band 13	Left Touch	0.128	0.138	0.266
		Right Touch	0.105	0.321	**0.426**
		Left Tilt	0.068	0.112	0.180
		Right Tilt	0.072	0.320	0.392
	LTE Band 5	Left Touch	0.074	0.138	0.212
		Right Touch	0.095	0.321	**0.416**
		Left Tilt	0.055	0.112	0.167
		Right Tilt	0.051	0.320	0.371
	LTE Band 4	Left Touch	0.044	0.138	0.182
		Right Touch	0.027	0.321	**0.348**
		Left Tilt	0.014	0.112	0.126
		Right Tilt	0.023	0.320	0.343
	LTE Band 2	Left Touch	0.060	0.138	0.198
		Right Touch	0.034	0.321	0.355
		Left Tilt	0.035	0.112	0.147
		Right Tilt	0.045	0.320	**0.365**

Table 12.4.15 Simultaneous Transmission Scenario : 2G/3G/4G + 5.6 GHz W-LAN Ant.2 (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.6G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.319	0.371
		Right Touch	0.046	0.586	**0.632**
		Left Tilt	0.031	0.276	0.307
		Right Tilt	0.030	0.415	0.445
	GPRS 850	Left Touch	0.057	0.319	0.376
		Right Touch	0.051	0.586	**0.637**
		Left Tilt	0.038	0.276	0.314
		Right Tilt	0.035	0.415	0.450
	GSM 1900	Left Touch	0.046	0.319	0.365
		Right Touch	0.033	0.586	**0.619**
		Left Tilt	0.031	0.276	0.307
		Right Tilt	0.027	0.415	0.442
	GPRS 1900	Left Touch	0.053	0.319	0.372
		Right Touch	0.040	0.586	**0.626**
		Left Tilt	0.036	0.276	0.312
		Right Tilt	0.035	0.415	0.450
	WCDMA 850	Left Touch	0.085	0.319	0.404
		Right Touch	0.063	0.586	**0.649**
		Left Tilt	0.049	0.276	0.325
		Right Tilt	0.049	0.415	0.464
	WCDMA 1700	Left Touch	0.034	0.319	0.353
		Right Touch	0.032	0.586	**0.618**
		Left Tilt	0.012	0.276	0.288
		Right Tilt	0.017	0.415	0.432
	WCDMA 1900	Left Touch	0.053	0.319	0.372
		Right Touch	0.036	0.586	**0.622**
		Left Tilt	0.034	0.276	0.310
		Right Tilt	0.028	0.415	0.443
	LTE Band 12	Left Touch	0.150	0.319	0.469
		Right Touch	0.119	0.586	**0.705**
		Left Tilt	0.081	0.276	0.357
		Right Tilt	0.067	0.415	0.482
	LTE Band 13	Left Touch	0.128	0.319	0.447
		Right Touch	0.105	0.586	**0.691**
		Left Tilt	0.068	0.276	0.344
		Right Tilt	0.072	0.415	0.487
	LTE Band 5	Left Touch	0.074	0.319	0.393
		Right Touch	0.095	0.586	**0.681**
		Left Tilt	0.055	0.276	0.331
		Right Tilt	0.051	0.415	0.466
	LTE Band 4	Left Touch	0.044	0.319	0.363
		Right Touch	0.027	0.586	**0.613**
		Left Tilt	0.014	0.276	0.290
		Right Tilt	0.023	0.415	0.438
	LTE Band 2	Left Touch	0.060	0.319	0.379
		Right Touch	0.034	0.586	**0.620**
		Left Tilt	0.035	0.276	0.311
		Right Tilt	0.045	0.415	0.460

Table 12.4.16 Simultaneous Transmission Scenario : 2G/3G/4G + 5.6 GHz W-LAN MIMO (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.6G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.369	0.421
		Right Touch	0.046	0.661	**0.707**
		Left Tilt	0.031	0.354	0.385
		Right Tilt	0.030	0.564	0.594
	GPRS 850	Left Touch	0.057	0.369	0.426
		Right Touch	0.051	0.661	**0.712**
		Left Tilt	0.038	0.354	0.392
		Right Tilt	0.035	0.564	0.599
	GSM 1900	Left Touch	0.046	0.369	0.415
		Right Touch	0.033	0.661	**0.694**
		Left Tilt	0.031	0.354	0.385
		Right Tilt	0.027	0.564	0.591
	GPRS 1900	Left Touch	0.053	0.369	0.422
		Right Touch	0.040	0.661	**0.701**
		Left Tilt	0.036	0.354	0.390
		Right Tilt	0.035	0.564	0.599
	WCDMA 850	Left Touch	0.085	0.369	0.454
		Right Touch	0.063	0.661	**0.724**
		Left Tilt	0.049	0.354	0.403
		Right Tilt	0.049	0.564	0.613
	WCDMA 1700	Left Touch	0.034	0.369	0.403
		Right Touch	0.032	0.661	**0.693**
		Left Tilt	0.012	0.354	0.366
		Right Tilt	0.017	0.564	0.581
	WCDMA 1900	Left Touch	0.053	0.369	0.422
		Right Touch	0.036	0.661	**0.697**
		Left Tilt	0.034	0.354	0.388
		Right Tilt	0.028	0.564	0.592
	LTE Band 12	Left Touch	0.150	0.369	0.519
		Right Touch	0.119	0.661	**0.780**
		Left Tilt	0.081	0.354	0.435
		Right Tilt	0.067	0.564	0.631
	LTE Band 13	Left Touch	0.128	0.369	0.497
		Right Touch	0.105	0.661	**0.766**
		Left Tilt	0.068	0.354	0.422
		Right Tilt	0.072	0.564	0.636
	LTE Band 5	Left Touch	0.074	0.369	0.443
		Right Touch	0.095	0.661	**0.756**
		Left Tilt	0.055	0.354	0.409
		Right Tilt	0.051	0.564	0.615
	LTE Band 4	Left Touch	0.044	0.369	0.413
		Right Touch	0.027	0.661	**0.688**
		Left Tilt	0.014	0.354	0.368
		Right Tilt	0.023	0.564	0.587
	LTE Band 2	Left Touch	0.060	0.369	0.429
		Right Touch	0.034	0.661	**0.695**
		Left Tilt	0.035	0.354	0.389
		Right Tilt	0.045	0.564	0.609

Table 12.4.17 Simultaneous Transmission Scenario : 2G/3G/4G + 5.8 GHz W-LAN Ant.1 (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.8G W-LAN Ant.1 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.110	0.162
		Right Touch	0.046	0.200	0.246
		Left Tilt	0.031	0.111	0.142
		Right Tilt	0.030	0.286	**0.316**
	GPRS 850	Left Touch	0.057	0.110	0.167
		Right Touch	0.051	0.200	0.251
		Left Tilt	0.038	0.111	0.149
		Right Tilt	0.035	0.286	**0.321**
	GSM 1900	Left Touch	0.046	0.110	0.156
		Right Touch	0.033	0.200	0.233
		Left Tilt	0.031	0.111	0.142
		Right Tilt	0.027	0.286	**0.313**
	GPRS 1900	Left Touch	0.053	0.110	0.163
		Right Touch	0.040	0.200	0.240
		Left Tilt	0.036	0.111	0.147
		Right Tilt	0.035	0.286	**0.321**
	WCDMA 850	Left Touch	0.085	0.110	0.195
		Right Touch	0.063	0.200	0.263
		Left Tilt	0.049	0.111	0.160
		Right Tilt	0.049	0.286	**0.335**
	WCDMA 1700	Left Touch	0.034	0.110	0.144
		Right Touch	0.032	0.200	0.232
		Left Tilt	0.012	0.111	0.123
		Right Tilt	0.017	0.286	**0.303**
	WCDMA 1900	Left Touch	0.053	0.110	0.163
		Right Touch	0.036	0.200	0.236
		Left Tilt	0.034	0.111	0.145
		Right Tilt	0.028	0.286	**0.314**
	LTE Band 12	Left Touch	0.150	0.110	0.260
		Right Touch	0.119	0.200	0.319
		Left Tilt	0.081	0.111	0.192
		Right Tilt	0.067	0.286	**0.353**
	LTE Band 13	Left Touch	0.128	0.110	0.238
		Right Touch	0.105	0.200	0.305
		Left Tilt	0.068	0.111	0.179
		Right Tilt	0.072	0.286	**0.358**
	LTE Band 5	Left Touch	0.074	0.110	0.184
		Right Touch	0.095	0.200	0.295
		Left Tilt	0.055	0.111	0.166
		Right Tilt	0.051	0.286	**0.337**
	LTE Band 4	Left Touch	0.044	0.110	0.154
		Right Touch	0.027	0.200	0.227
		Left Tilt	0.014	0.111	0.125
		Right Tilt	0.023	0.286	**0.309**
	LTE Band 2	Left Touch	0.060	0.110	0.170
		Right Touch	0.034	0.200	0.234
		Left Tilt	0.035	0.111	0.146
		Right Tilt	0.045	0.286	**0.331**

Table 12.4.18 Simultaneous Transmission Scenario : 2G/3G/4G + 5.8 GHz W-LAN Ant.2 (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.8G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.181	0.233
		Right Touch	0.046	0.430	**0.476**
		Left Tilt	0.031	0.171	0.202
		Right Tilt	0.030	0.309	0.339
	GPRS 850	Left Touch	0.057	0.181	0.238
		Right Touch	0.051	0.430	**0.481**
		Left Tilt	0.038	0.171	0.209
		Right Tilt	0.035	0.309	0.344
	GSM 1900	Left Touch	0.046	0.181	0.227
		Right Touch	0.033	0.430	**0.463**
		Left Tilt	0.031	0.171	0.202
		Right Tilt	0.027	0.309	0.336
	GPRS 1900	Left Touch	0.053	0.181	0.234
		Right Touch	0.040	0.430	**0.470**
		Left Tilt	0.036	0.171	0.207
		Right Tilt	0.035	0.309	0.344
	WCDMA 850	Left Touch	0.085	0.181	0.266
		Right Touch	0.063	0.430	**0.493**
		Left Tilt	0.049	0.171	0.220
		Right Tilt	0.049	0.309	0.358
	WCDMA 1700	Left Touch	0.034	0.181	0.215
		Right Touch	0.032	0.430	**0.462**
		Left Tilt	0.012	0.171	0.183
		Right Tilt	0.017	0.309	0.326
	WCDMA 1900	Left Touch	0.053	0.181	0.234
		Right Touch	0.036	0.430	**0.466**
		Left Tilt	0.034	0.171	0.205
		Right Tilt	0.028	0.309	0.337
	LTE Band 12	Left Touch	0.150	0.181	0.331
		Right Touch	0.119	0.430	**0.549**
		Left Tilt	0.081	0.171	0.252
		Right Tilt	0.067	0.309	0.376
	LTE Band 13	Left Touch	0.128	0.181	0.309
		Right Touch	0.105	0.430	**0.535**
		Left Tilt	0.068	0.171	0.239
		Right Tilt	0.072	0.309	0.381
	LTE Band 5	Left Touch	0.074	0.181	0.255
		Right Touch	0.095	0.430	**0.525**
		Left Tilt	0.055	0.171	0.226
		Right Tilt	0.051	0.309	0.360
	LTE Band 4	Left Touch	0.044	0.181	0.225
		Right Touch	0.027	0.430	**0.457**
		Left Tilt	0.014	0.171	0.185
		Right Tilt	0.023	0.309	0.332
	LTE Band 2	Left Touch	0.060	0.181	0.241
		Right Touch	0.034	0.430	**0.464**
		Left Tilt	0.035	0.171	0.206
		Right Tilt	0.045	0.309	0.354

Table 12.4.19 Simultaneous Transmission Scenario : 2G/3G/4G + 5.8 GHz W-LAN MIMO (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.8G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.197	0.249
		Right Touch	0.046	0.466	**0.512**
		Left Tilt	0.031	0.223	0.254
		Right Tilt	0.030	0.373	0.403
	GPRS 850	Left Touch	0.057	0.197	0.254
		Right Touch	0.051	0.466	**0.517**
		Left Tilt	0.038	0.223	0.261
		Right Tilt	0.035	0.373	0.408
	GSM 1900	Left Touch	0.046	0.197	0.243
		Right Touch	0.033	0.466	**0.499**
		Left Tilt	0.031	0.223	0.254
		Right Tilt	0.027	0.373	0.400
	GPRS 1900	Left Touch	0.053	0.197	0.250
		Right Touch	0.040	0.466	**0.506**
		Left Tilt	0.036	0.223	0.259
		Right Tilt	0.035	0.373	0.408
	WCDMA 850	Left Touch	0.085	0.197	0.282
		Right Touch	0.063	0.466	**0.529**
		Left Tilt	0.049	0.223	0.272
		Right Tilt	0.049	0.373	0.422
	WCDMA 1700	Left Touch	0.034	0.197	0.231
		Right Touch	0.032	0.466	**0.498**
		Left Tilt	0.012	0.223	0.235
		Right Tilt	0.017	0.373	0.390
	WCDMA 1900	Left Touch	0.053	0.197	0.250
		Right Touch	0.036	0.466	**0.502**
		Left Tilt	0.034	0.223	0.257
		Right Tilt	0.028	0.373	0.401
	LTE Band 12	Left Touch	0.150	0.197	0.347
		Right Touch	0.119	0.466	**0.585**
		Left Tilt	0.081	0.223	0.304
		Right Tilt	0.067	0.373	0.440
	LTE Band 13	Left Touch	0.128	0.197	0.325
		Right Touch	0.105	0.466	**0.571**
		Left Tilt	0.068	0.223	0.291
		Right Tilt	0.072	0.373	0.445
	LTE Band 5	Left Touch	0.074	0.197	0.271
		Right Touch	0.095	0.466	**0.561**
		Left Tilt	0.055	0.223	0.278
		Right Tilt	0.051	0.373	0.424
	LTE Band 4	Left Touch	0.044	0.197	0.241
		Right Touch	0.027	0.466	**0.493**
		Left Tilt	0.014	0.223	0.237
		Right Tilt	0.023	0.373	0.396
	LTE Band 2	Left Touch	0.060	0.197	0.257
		Right Touch	0.034	0.466	**0.500**
		Left Tilt	0.035	0.223	0.258
		Right Tilt	0.045	0.373	0.418

Table 12.4.20 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth (Held to Ear)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	GSM 850	Left Touch	0.052	0.032	0.084
		Right Touch	0.046	0.260	**0.306**
		Left Tilt	0.031	0.025	0.056
		Right Tilt	0.030	0.111	0.141
	GPRS 850	Left Touch	0.057	0.032	0.089
		Right Touch	0.051	0.260	**0.311**
		Left Tilt	0.038	0.025	0.063
		Right Tilt	0.035	0.111	0.146
	GSM 1900	Left Touch	0.046	0.032	0.078
		Right Touch	0.033	0.260	**0.293**
		Left Tilt	0.031	0.025	0.056
		Right Tilt	0.027	0.111	0.138
	GPRS 1900	Left Touch	0.053	0.032	0.085
		Right Touch	0.040	0.260	**0.300**
		Left Tilt	0.036	0.025	0.061
		Right Tilt	0.035	0.111	0.146
	WCDMA 850	Left Touch	0.085	0.032	0.117
		Right Touch	0.063	0.260	**0.323**
		Left Tilt	0.049	0.025	0.074
		Right Tilt	0.049	0.111	0.160
	WCDMA 1700	Left Touch	0.034	0.032	0.066
		Right Touch	0.032	0.260	**0.292**
		Left Tilt	0.012	0.025	0.037
		Right Tilt	0.017	0.111	0.128
	WCDMA 1900	Left Touch	0.053	0.032	0.085
		Right Touch	0.036	0.260	**0.296**
		Left Tilt	0.034	0.025	0.059
		Right Tilt	0.028	0.111	0.139
	LTE Band 12	Left Touch	0.150	0.032	0.182
		Right Touch	0.119	0.260	**0.379**
		Left Tilt	0.081	0.025	0.106
		Right Tilt	0.067	0.111	0.178
	LTE Band 13	Left Touch	0.128	0.032	0.160
		Right Touch	0.105	0.260	**0.365**
		Left Tilt	0.068	0.025	0.093
		Right Tilt	0.072	0.111	0.183
	LTE Band 5	Left Touch	0.074	0.032	0.106
		Right Touch	0.095	0.260	**0.355**
		Left Tilt	0.055	0.025	0.080
		Right Tilt	0.051	0.111	0.162
	LTE Band 4	Left Touch	0.044	0.032	0.076
		Right Touch	0.027	0.260	**0.287**
		Left Tilt	0.014	0.025	0.039
		Right Tilt	0.023	0.111	0.134
	LTE Band 2	Left Touch	0.060	0.032	0.092
		Right Touch	0.034	0.260	**0.294**
		Left Tilt	0.035	0.025	0.060
		Right Tilt	0.045	0.111	0.156

Table 12.4.21 Simultaneous Transmission Scenario : 2.4 GHz W-LAN MIMO + 5 GHz W-LAN MIMO (Held to Ear)

Exposure Condition	Mode	Configuration	2.4G W-LAN MIMO SAR (W/kg)	5G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	5.2G W-LAN MIMO	Left Touch	0.095	0.151	0.246
		Right Touch	0.556	0.307	**0.863**
		Left Tilt	0.107	0.197	0.304
		Right Tilt	0.287	0.317	0.604
	5.6G W-LAN MIMO	Left Touch	0.095	0.369	0.464
		Right Touch	0.556	0.661	**1.217**
		Left Tilt	0.107	0.354	0.461
		Right Tilt	0.287	0.564	0.851
	5.8G W-LAN MIMO	Left Touch	0.095	0.197	0.292
		Right Touch	0.556	0.466	**1.022**
		Left Tilt	0.107	0.223	0.330
		Right Tilt	0.287	0.373	0.660

Table 12.4.22 Simultaneous Transmission Scenario : Bluetooth Ant.1 + 5 GHz W-LAN MIMO (Held to Ear)

Exposure Condition	Mode	Configuration	Bluetooth Ant.1 SAR (W/kg)	5G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	5.2G W-LAN MIMO	Left Touch	0.032	0.151	0.183
		Right Touch	0.260	0.307	**0.567**
		Left Tilt	0.025	0.197	0.222
		Right Tilt	0.111	0.317	0.428
	5.6G W-LAN MIMO	Left Touch	0.032	0.369	0.401
		Right Touch	0.260	0.661	**0.921**
		Left Tilt	0.025	0.354	0.379
		Right Tilt	0.111	0.564	0.675
	5.8G W-LAN MIMO	Left Touch	0.032	0.197	0.229
		Right Touch	0.260	0.466	**0.726**
		Left Tilt	0.025	0.223	0.248
		Right Tilt	0.111	0.373	0.484

Table 12.4.23 Simultaneous Transmission Scenario : Bluetooth Ant.1 + 2.4 GHz W-LAN Ant.2 (Held to Ear)

Exposure Condition	Mode	Configuration	Bluetooth Ant.1 SAR (W/kg)	2.4G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Head SAR	2.4G W-LAN Ant.2	Left Touch	0.032	0.063	0.095
		Right Touch	0.260	0.493	**0.753**
		Left Tilt	0.025	0.066	0.091
		Right Tilt	0.111	0.194	0.305

12.5 Body-Worn Simultaneous Transmission Analysis

Table 12.5.1 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN MIMO + 5.3 GHz W-LAN MIMO (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN MIMO SAR (W/kg)	5.3G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Body-Worn SAR	GSM 850	Front	0.216	0.137	0.027	0.353	0.243	0.380
		Rear	0.233	0.085	0.379	0.318	0.612	**0.697**
	GPRS 850	Front	0.226	0.137	0.027	0.363	0.253	0.390
		Rear	0.264	0.085	0.379	0.349	0.643	**0.728**
	GSM 1900	Front	0.358	0.137	0.027	0.495	0.385	0.522
		Rear	0.293	0.085	0.379	0.378	0.672	**0.757**
	GPRS 1900	Front	0.387	0.137	0.027	0.524	0.414	0.551
		Rear	0.400	0.085	0.379	0.485	0.779	**0.864**
	WCDMA 850	Front	0.222	0.137	0.027	0.359	0.249	0.386
		Rear	0.186	0.085	0.379	0.271	0.565	**0.650**
	WCDMA 1700	Front	0.295	0.137	0.027	0.432	0.322	0.459
		Rear	0.306	0.085	0.379	0.391	0.685	**0.770**
	WCDMA 1900	Front	0.423	0.137	0.027	0.560	0.450	0.587
		Rear	0.398	0.085	0.379	0.483	0.777	**0.862**
	LTE Band 12	Front	0.304	0.137	0.027	0.441	0.331	0.468
		Rear	0.346	0.085	0.379	0.431	0.725	**0.810**
	LTE Band 13	Front	0.310	0.137	0.027	0.447	0.337	0.474
		Rear	0.374	0.085	0.379	0.459	0.753	**0.838**
	LTE Band 5	Front	0.228	0.137	0.027	0.365	0.255	0.392
		Rear	0.281	0.085	0.379	0.366	0.660	**0.745**
	LTE Band 4	Front	0.313	0.137	0.027	0.450	0.340	0.477
		Rear	0.349	0.085	0.379	0.434	0.728	**0.813**
	LTE Band 2	Front	0.403	0.137	0.027	0.540	0.430	0.567
		Rear	**0.408**	**0.085**	**0.379**	**0.493**	**0.787**	0.872

Table 12.5.2 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN MIMO + 5.6 GHz W-LAN MIMO (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN MIMO SAR (W/kg)	5.6G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Body-Worn SAR	GSM 850	Front	0.216	0.137	0.049	0.353	0.265	0.402
		Rear	0.233	0.085	0.182	0.318	0.415	**0.500**
	GPRS 850	Front	0.226	0.137	0.049	0.363	0.275	0.412
		Rear	0.264	0.085	0.182	0.349	0.446	**0.531**
	GSM 1900	Front	0.358	0.137	0.049	0.495	0.407	0.544
		Rear	0.293	0.085	0.182	0.378	0.475	**0.560**
	GPRS 1900	Front	0.387	0.137	0.049	0.524	0.436	0.573
		Rear	0.400	0.085	0.182	0.485	0.582	**0.667**
	WCDMA 850	Front	0.222	0.137	0.049	0.359	0.271	0.408
		Rear	0.186	0.085	0.182	0.271	0.368	**0.453**
	WCDMA 1700	Front	0.295	0.137	0.049	0.432	0.344	0.481
		Rear	0.306	0.085	0.182	0.391	0.488	**0.573**
	WCDMA 1900	Front	0.423	0.137	0.049	0.560	0.472	0.609
		Rear	0.398	0.085	0.182	0.483	0.580	**0.665**
	LTE Band 12	Front	0.304	0.137	0.049	0.441	0.353	0.490
		Rear	0.346	0.085	0.182	0.431	0.528	**0.613**
	LTE Band 13	Front	0.310	0.137	0.049	0.447	0.359	0.496
		Rear	0.374	0.085	0.182	0.459	0.556	**0.641**
	LTE Band 5	Front	0.228	0.137	0.049	0.365	0.277	0.414
		Rear	0.281	0.085	0.182	0.366	0.463	**0.548**
	LTE Band 4	Front	0.313	0.137	0.049	0.450	0.362	0.499
		Rear	0.349	0.085	0.182	0.434	0.531	**0.616**
	LTE Band 2	Front	0.403	0.137	0.049	0.540	0.452	0.589
		Rear	0.408	0.085	0.182	0.493	0.590	**0.675**

Table 12.5.3 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN MIMO + 5.8 GHz W-LAN MIMO (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN MIMO SAR (W/kg)	5.8G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Body-Worn SAR	GSM 850	Front	0.216	0.137	0.072	0.353	0.288	0.425
		Rear	0.233	0.085	0.276	0.318	0.509	**0.594**
	GPRS 850	Front	0.226	0.137	0.072	0.363	0.298	0.435
		Rear	0.264	0.085	0.276	0.349	0.540	**0.625**
	GSM 1900	Front	0.358	0.137	0.072	0.495	0.430	0.567
		Rear	0.293	0.085	0.276	0.378	0.569	**0.654**
	GPRS 1900	Front	0.387	0.137	0.072	0.524	0.459	0.596
		Rear	0.400	0.085	0.276	0.485	0.676	**0.761**
	WCDMA 850	Front	0.222	0.137	0.072	0.359	0.294	0.431
		Rear	0.186	0.085	0.276	0.271	0.462	**0.547**
	WCDMA 1700	Front	0.295	0.137	0.072	0.432	0.367	0.504
		Rear	0.306	0.085	0.276	0.391	0.582	**0.667**
	WCDMA 1900	Front	0.423	0.137	0.072	0.560	0.495	0.632
		Rear	0.398	0.085	0.276	0.483	0.674	**0.759**
	LTE Band 12	Front	0.304	0.137	0.072	0.441	0.376	0.513
		Rear	0.346	0.085	0.276	0.431	0.622	**0.707**
	LTE Band 13	Front	0.310	0.137	0.072	0.447	0.382	0.519
		Rear	0.374	0.085	0.276	0.459	0.650	**0.735**
	LTE Band 5	Front	0.228	0.137	0.072	0.365	0.300	0.437
		Rear	0.281	0.085	0.276	0.366	0.557	**0.642**
	LTE Band 4	Front	0.313	0.137	0.072	0.450	0.385	0.522
		Rear	0.349	0.085	0.276	0.434	0.625	**0.710**
	LTE Band 2	Front	0.403	0.137	0.072	0.540	0.475	0.612
		Rear	0.408	0.085	0.276	0.493	0.684	**0.769**

Table 12.5.4 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth Ant.1 + 5.3 GHz W-LAN MIMO (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth Ant.1 SAR (W/kg)	5.3G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Body-Worn SAR	GSM 850	Front	0.216	0.067	0.027	0.283	0.243	0.310
		Rear	0.233	0.042	0.379	0.275	0.612	**0.654**
	GPRS 850	Front	0.226	0.067	0.027	0.293	0.253	0.320
		Rear	0.264	0.042	0.379	0.306	0.643	**0.685**
	GSM 1900	Front	0.358	0.067	0.027	0.425	0.385	0.452
		Rear	0.293	0.042	0.379	0.335	0.672	**0.714**
	GPRS 1900	Front	0.387	0.067	0.027	0.454	0.414	0.481
		Rear	0.400	0.042	0.379	0.442	0.779	**0.821**
	WCDMA 850	Front	0.222	0.067	0.027	0.289	0.249	0.316
		Rear	0.186	0.042	0.379	0.228	0.565	**0.607**
	WCDMA 1700	Front	0.295	0.067	0.027	0.362	0.322	0.389
		Rear	0.306	0.042	0.379	0.348	0.685	**0.727**
	WCDMA 1900	Front	0.423	0.067	0.027	0.490	0.450	0.517
		Rear	0.398	0.042	0.379	0.440	0.777	**0.819**
	LTE Band 12	Front	0.304	0.067	0.027	0.371	0.331	0.398
		Rear	0.346	0.042	0.379	0.388	0.725	**0.767**
	LTE Band 13	Front	0.310	0.067	0.027	0.377	0.337	0.404
		Rear	0.374	0.042	0.379	0.416	0.753	**0.795**
	LTE Band 5	Front	0.228	0.067	0.027	0.295	0.255	0.322
		Rear	0.281	0.042	0.379	0.323	0.660	**0.702**
	LTE Band 4	Front	0.313	0.067	0.027	0.380	0.340	0.407
		Rear	0.349	0.042	0.379	0.391	0.728	**0.770**
	LTE Band 2	Front	0.403	0.067	0.027	0.470	0.430	0.497
		Rear	0.408	0.042	0.379	0.450	0.787	**0.829**

Table 12.5.5 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth Ant.1 + 5.6 GHz W-LAN MIMO (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth Ant.1 SAR (W/kg)	5.6G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Body-Worn SAR	GSM 850	Front	0.216	0.067	0.049	0.283	0.265	0.332
		Rear	0.233	0.042	0.182	0.275	0.415	**0.457**
	GPRS 850	Front	0.226	0.067	0.049	0.293	0.275	0.342
		Rear	0.264	0.042	0.182	0.306	0.446	**0.488**
	GSM 1900	Front	0.358	0.067	0.049	0.425	0.407	0.474
		Rear	0.293	0.042	0.182	0.335	0.475	**0.517**
	GPRS 1900	Front	0.387	0.067	0.049	0.454	0.436	0.503
		Rear	0.400	0.042	0.182	0.442	0.582	**0.624**
	WCDMA 850	Front	0.222	0.067	0.049	0.289	0.271	0.338
		Rear	0.186	0.042	0.182	0.228	0.368	**0.410**
	WCDMA 1700	Front	0.295	0.067	0.049	0.362	0.344	0.411
		Rear	0.306	0.042	0.182	0.348	0.488	**0.530**
	WCDMA 1900	Front	0.423	0.067	0.049	0.490	0.472	0.539
		Rear	0.398	0.042	0.182	0.440	0.580	**0.622**
	LTE Band 12	Front	0.304	0.067	0.049	0.371	0.353	0.420
		Rear	0.346	0.042	0.182	0.388	0.528	**0.570**
	LTE Band 13	Front	0.310	0.067	0.049	0.377	0.359	0.426
		Rear	0.374	0.042	0.182	0.416	0.556	**0.598**
	LTE Band 5	Front	0.228	0.067	0.049	0.295	0.277	0.344
		Rear	0.281	0.042	0.182	0.323	0.463	**0.505**
	LTE Band 4	Front	0.313	0.067	0.049	0.380	0.362	0.429
		Rear	0.349	0.042	0.182	0.391	0.531	**0.573**
	LTE Band 2	Front	0.403	0.067	0.049	0.470	0.452	0.519
		Rear	0.408	0.042	0.182	0.450	0.590	**0.632**

Table 12.5.6 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth Ant.1 + 5.8 GHz W-LAN MIMO (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth Ant.1 SAR (W/kg)	5.8G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Body-Worn SAR	GSM 850	Front	0.216	0.067	0.072	0.283	0.288	0.355
		Rear	0.233	0.042	0.276	0.275	0.509	**0.551**
	GPRS 850	Front	0.226	0.067	0.072	0.293	0.298	0.365
		Rear	0.264	0.042	0.276	0.306	0.540	**0.582**
	GSM 1900	Front	0.358	0.067	0.072	0.425	0.430	0.497
		Rear	0.293	0.042	0.276	0.335	0.569	**0.611**
	GPRS 1900	Front	0.387	0.067	0.072	0.454	0.459	0.526
		Rear	0.400	0.042	0.276	0.442	0.676	**0.718**
	WCDMA 850	Front	0.222	0.067	0.072	0.289	0.294	0.361
		Rear	0.186	0.042	0.276	0.228	0.462	**0.504**
	WCDMA 1700	Front	0.295	0.067	0.072	0.362	0.367	0.434
		Rear	0.306	0.042	0.276	0.348	0.582	**0.624**
	WCDMA 1900	Front	0.423	0.067	0.072	0.490	0.495	0.562
		Rear	0.398	0.042	0.276	0.440	0.674	**0.716**
	LTE Band 12	Front	0.304	0.067	0.072	0.371	0.376	0.443
		Rear	0.346	0.042	0.276	0.388	0.622	**0.664**
	LTE Band 13	Front	0.310	0.067	0.072	0.377	0.382	0.449
		Rear	0.374	0.042	0.276	0.416	0.650	**0.692**
	LTE Band 5	Front	0.228	0.067	0.072	0.295	0.300	0.367
		Rear	0.281	0.042	0.276	0.323	0.557	**0.599**
	LTE Band 4	Front	0.313	0.067	0.072	0.380	0.385	0.452
		Rear	0.349	0.042	0.276	0.391	0.625	**0.667**
	LTE Band 2	Front	0.403	0.067	0.072	0.470	0.475	0.542
		Rear	0.408	0.042	0.276	0.450	0.684	**0.726**

Table 12.5.7 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth Ant.1 + 2.4 GHz W-LAN Ant.2 (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth Ant.1 SAR (W/kg)	2.4G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Body-Worn SAR	GSM 850	Front	0.216	0.067	0.032	0.283	0.248	**0.315**
		Rear	0.233	0.042	0.020	0.275	0.253	0.295
	GPRS 850	Front	0.226	0.067	0.032	0.293	0.258	0.325
		Rear	0.264	0.042	0.020	0.306	0.284	**0.326**
	GSM 1900	Front	0.358	0.067	0.032	0.425	0.390	**0.457**
		Rear	0.293	0.042	0.020	0.335	0.313	0.355
	GPRS 1900	Front	0.387	0.067	0.032	0.454	0.419	**0.486**
		Rear	0.400	0.042	0.020	0.442	0.420	0.462
	WCDMA 850	Front	0.222	0.067	0.032	0.289	0.254	**0.321**
		Rear	0.186	0.042	0.020	0.228	0.206	0.248
	WCDMA 1700	Front	0.295	0.067	0.032	0.362	0.327	**0.394**
		Rear	0.306	0.042	0.020	0.348	0.326	0.368
	WCDMA 1900	Front	0.423	0.067	0.032	0.490	0.455	**0.522**
		Rear	0.398	0.042	0.020	0.440	0.418	0.460
	LTE Band 12	Front	0.304	0.067	0.032	0.371	0.336	0.403
		Rear	0.346	0.042	0.020	0.388	0.366	**0.408**
	LTE Band 13	Front	0.310	0.067	0.032	0.377	0.342	0.409
		Rear	0.374	0.042	0.020	0.416	0.394	**0.436**
	LTE Band 5	Front	0.228	0.067	0.032	0.295	0.260	0.327
		Rear	0.281	0.042	0.020	0.323	0.301	**0.343**
	LTE Band 4	Front	0.313	0.067	0.032	0.380	0.345	**0.412**
		Rear	0.349	0.042	0.020	0.391	0.369	0.411
	LTE Band 2	Front	0.403	0.067	0.032	0.470	0.435	**0.502**
		Rear	0.408	0.042	0.020	0.450	0.428	0.470

Table 12.5.8 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN Ant.1 (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN Ant.1 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.119	**0.335**
		Rear	0.233	0.078	0.311
	GPRS 850	Front	0.226	0.119	**0.345**
		Rear	0.264	0.078	0.342
	GSM 1900	Front	0.358	0.119	**0.477**
		Rear	0.293	0.078	0.371
	GPRS 1900	Front	0.387	0.119	**0.506**
		Rear	0.400	0.078	0.478
	WCDMA 850	Front	0.222	0.119	**0.341**
		Rear	0.186	0.078	0.264
	WCDMA 1700	Front	0.295	0.119	**0.414**
		Rear	0.306	0.078	0.384
	WCDMA 1900	Front	0.423	0.119	**0.542**
		Rear	0.398	0.078	0.476
	LTE Band 12	Front	0.304	0.119	0.423
		Rear	0.346	0.078	**0.424**
	LTE Band 13	Front	0.310	0.119	0.429
		Rear	0.374	0.078	**0.452**
	LTE Band 5	Front	0.228	0.119	0.347
		Rear	0.281	0.078	**0.359**
	LTE Band 4	Front	0.313	0.119	**0.432**
		Rear	0.349	0.078	0.427
	LTE Band 2	Front	0.403	0.119	**0.522**
		Rear	0.408	0.078	0.486

Table 12.5.9 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN Ant.2 (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.032	0.248
		Rear	0.233	0.020	**0.253**
	GPRS 850	Front	0.226	0.032	0.258
		Rear	0.264	0.020	**0.284**
	GSM 1900	Front	0.358	0.032	**0.390**
		Rear	0.293	0.020	0.313
	GPRS 1900	Front	0.387	0.032	0.419
		Rear	0.400	0.020	**0.420**
	WCDMA 850	Front	0.222	0.032	**0.254**
		Rear	0.186	0.020	0.206
	WCDMA 1700	Front	0.295	0.032	**0.327**
		Rear	0.306	0.020	0.326
	WCDMA 1900	Front	0.423	0.032	**0.455**
		Rear	0.398	0.020	0.418
	LTE Band 12	Front	0.304	0.032	0.336
		Rear	0.346	0.020	**0.366**
	LTE Band 13	Front	0.310	0.032	0.342
		Rear	0.374	0.020	**0.394**
	LTE Band 5	Front	0.228	0.032	0.260
		Rear	0.281	0.020	**0.301**
	LTE Band 4	Front	0.313	0.032	0.345
		Rear	0.349	0.020	**0.369**
	LTE Band 2	Front	0.403	0.032	**0.435**
		Rear	0.408	0.020	0.428

Table 12.5.10 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN MIMO (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.137	**0.353**
		Rear	0.233	0.085	0.318
	GPRS 850	Front	0.226	0.137	**0.363**
		Rear	0.264	0.085	0.349
	GSM 1900	Front	0.358	0.137	**0.495**
		Rear	0.293	0.085	0.378
	GPRS 1900	Front	0.387	0.137	**0.524**
		Rear	0.400	0.085	0.485
	WCDMA 850	Front	0.222	0.137	**0.359**
		Rear	0.186	0.085	0.271
	WCDMA 1700	Front	0.295	0.137	**0.432**
		Rear	0.306	0.085	0.391
	WCDMA 1900	Front	0.423	0.137	**0.560**
		Rear	0.398	0.085	0.483
	LTE Band 12	Front	0.304	0.137	**0.441**
		Rear	0.346	0.085	0.431
	LTE Band 13	Front	0.310	0.137	0.447
		Rear	0.374	0.085	**0.459**
	LTE Band 5	Front	0.228	0.137	0.365
		Rear	0.281	0.085	**0.366**
	LTE Band 4	Front	0.313	0.137	**0.450**
		Rear	0.349	0.085	0.434
	LTE Band 2	Front	0.403	0.137	**0.540**
		Rear	0.408	0.085	0.493

Table 12.5.11 Simultaneous Transmission Scenario : 2G/3G/4G + 5.3 GHz W-LAN Ant.1 (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.3G W-LAN Ant.1 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.040	0.256
		Rear	0.233	0.204	**0.437**
	GPRS 850	Front	0.226	0.040	0.266
		Rear	0.264	0.204	**0.468**
	GSM 1900	Front	0.358	0.040	0.398
		Rear	0.293	0.204	**0.497**
	GPRS 1900	Front	0.387	0.040	0.427
		Rear	0.400	0.204	**0.604**
	WCDMA 850	Front	0.222	0.040	0.262
		Rear	0.186	0.204	**0.390**
	WCDMA 1700	Front	0.295	0.040	0.335
		Rear	0.306	0.204	**0.510**
	WCDMA 1900	Front	0.423	0.040	0.463
		Rear	0.398	0.204	**0.602**
	LTE Band 12	Front	0.304	0.040	0.344
		Rear	0.346	0.204	**0.550**
	LTE Band 13	Front	0.310	0.040	0.350
		Rear	0.374	0.204	**0.578**
	LTE Band 5	Front	0.228	0.040	0.268
		Rear	0.281	0.204	**0.485**
	LTE Band 4	Front	0.313	0.040	0.353
		Rear	0.349	0.204	**0.553**
	LTE Band 2	Front	0.403	0.040	0.443
		Rear	0.408	0.204	**0.612**

Table 12.5.12 Simultaneous Transmission Scenario : 2G/3G/4G + 5.3 GHz W-LAN Ant.2 (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.3G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.014	0.230
		Rear	0.233	0.281	**0.514**
	GPRS 850	Front	0.226	0.014	0.240
		Rear	0.264	0.281	**0.545**
	GSM 1900	Front	0.358	0.014	0.372
		Rear	0.293	0.281	**0.574**
	GPRS 1900	Front	0.387	0.014	0.401
		Rear	0.400	0.281	**0.681**
	WCDMA 850	Front	0.222	0.014	0.236
		Rear	0.186	0.281	**0.467**
	WCDMA 1700	Front	0.295	0.014	0.309
		Rear	0.306	0.281	**0.587**
	WCDMA 1900	Front	0.423	0.014	0.437
		Rear	0.398	0.281	**0.679**
	LTE Band 12	Front	0.304	0.014	0.318
		Rear	0.346	0.281	**0.627**
	LTE Band 13	Front	0.310	0.014	0.324
		Rear	0.374	0.281	**0.655**
	LTE Band 5	Front	0.228	0.014	0.242
		Rear	0.281	0.281	**0.562**
	LTE Band 4	Front	0.313	0.014	0.327
		Rear	0.349	0.281	**0.630**
	LTE Band 2	Front	0.403	0.014	0.417
		Rear	0.408	0.281	**0.689**

Table 12.5.13 Simultaneous Transmission Scenario : 2G/3G/4G + 5.3 GHz W-LAN MIMO (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.3G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.027	0.243
		Rear	0.233	0.379	**0.612**
	GPRS 850	Front	0.226	0.027	0.253
		Rear	0.264	0.379	**0.643**
	GSM 1900	Front	0.358	0.027	0.385
		Rear	0.293	0.379	**0.672**
	GPRS 1900	Front	0.387	0.027	0.414
		Rear	0.400	0.379	**0.779**
	WCDMA 850	Front	0.222	0.027	0.249
		Rear	0.186	0.379	**0.565**
	WCDMA 1700	Front	0.295	0.027	0.322
		Rear	0.306	0.379	**0.685**
	WCDMA 1900	Front	0.423	0.027	0.450
		Rear	0.398	0.379	**0.777**
	LTE Band 12	Front	0.304	0.027	0.331
		Rear	0.346	0.379	**0.725**
	LTE Band 13	Front	0.310	0.027	0.337
		Rear	0.374	0.379	**0.753**
	LTE Band 5	Front	0.228	0.027	0.255
		Rear	0.281	0.379	**0.660**
	LTE Band 4	Front	0.313	0.027	0.340
		Rear	0.349	0.379	**0.728**
	LTE Band 2	Front	0.403	0.027	0.430
		Rear	0.408	0.379	**0.787**

Table 12.5.14 Simultaneous Transmission Scenario : 2G/3G/4G + 5.6 GHz W-LAN Ant.1 (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.6G W-LAN Ant.1 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.043	0.259
		Rear	0.233	0.193	**0.426**
	GPRS 850	Front	0.226	0.043	0.269
		Rear	0.264	0.193	**0.457**
	GSM 1900	Front	0.358	0.043	0.401
		Rear	0.293	0.193	**0.486**
	GPRS 1900	Front	0.387	0.043	0.430
		Rear	0.400	0.193	**0.593**
	WCDMA 850	Front	0.222	0.043	0.265
		Rear	0.186	0.193	**0.379**
	WCDMA 1700	Front	0.295	0.043	0.338
		Rear	0.306	0.193	**0.499**
	WCDMA 1900	Front	0.423	0.043	0.466
		Rear	0.398	0.193	**0.591**
	LTE Band 12	Front	0.304	0.043	0.347
		Rear	0.346	0.193	**0.539**
	LTE Band 13	Front	0.310	0.043	0.353
		Rear	0.374	0.193	**0.567**
	LTE Band 5	Front	0.228	0.043	0.271
		Rear	0.281	0.193	**0.474**
	LTE Band 4	Front	0.313	0.043	0.356
		Rear	0.349	0.193	**0.542**
	LTE Band 2	Front	0.403	0.043	0.446
		Rear	0.408	0.193	**0.601**

Table 12.5.15 Simultaneous Transmission Scenario : 2G/3G/4G + 5.6 GHz W-LAN Ant.2 (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.6G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.035	0.251
		Rear	0.233	0.144	**0.377**
	GPRS 850	Front	0.226	0.035	0.261
		Rear	0.264	0.144	**0.408**
	GSM 1900	Front	0.358	0.035	0.393
		Rear	0.293	0.144	**0.437**
	GPRS 1900	Front	0.387	0.035	0.422
		Rear	0.400	0.144	**0.544**
	WCDMA 850	Front	0.222	0.035	0.257
		Rear	0.186	0.144	**0.330**
	WCDMA 1700	Front	0.295	0.035	0.330
		Rear	0.306	0.144	**0.450**
	WCDMA 1900	Front	0.423	0.035	0.458
		Rear	0.398	0.144	**0.542**
	LTE Band 12	Front	0.304	0.035	0.339
		Rear	0.346	0.144	**0.490**
	LTE Band 13	Front	0.310	0.035	0.345
		Rear	0.374	0.144	**0.518**
	LTE Band 5	Front	0.228	0.035	0.263
		Rear	0.281	0.144	**0.425**
	LTE Band 4	Front	0.313	0.035	0.348
		Rear	0.349	0.144	**0.493**
	LTE Band 2	Front	0.403	0.035	0.438
		Rear	0.408	0.144	**0.552**

Table 12.5.16 Simultaneous Transmission Scenario : 2G/3G/4G + 5.6 GHz W-LAN MIMO (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.6G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.049	0.265
		Rear	0.233	0.182	**0.415**
	GPRS 850	Front	0.226	0.049	0.275
		Rear	0.264	0.182	**0.446**
	GSM 1900	Front	0.358	0.049	0.407
		Rear	0.293	0.182	**0.475**
	GPRS 1900	Front	0.387	0.049	0.436
		Rear	0.400	0.182	**0.582**
	WCDMA 850	Front	0.222	0.049	0.271
		Rear	0.186	0.182	**0.368**
	WCDMA 1700	Front	0.295	0.049	0.344
		Rear	0.306	0.182	**0.488**
	WCDMA 1900	Front	0.423	0.049	0.472
		Rear	0.398	0.182	**0.580**
	LTE Band 12	Front	0.304	0.049	0.353
		Rear	0.346	0.182	**0.528**
	LTE Band 13	Front	0.310	0.049	0.359
		Rear	0.374	0.182	**0.556**
	LTE Band 5	Front	0.228	0.049	0.277
		Rear	0.281	0.182	**0.463**
	LTE Band 4	Front	0.313	0.049	0.362
		Rear	0.349	0.182	**0.531**
	LTE Band 2	Front	0.403	0.049	0.452
		Rear	0.408	0.182	**0.590**

Table 12.5.17 Simultaneous Transmission Scenario : 2G/3G/4G + 5.8 GHz W-LAN Ant.1 (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.8G W-LAN Ant.1 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.041	0.257
		Rear	0.233	0.194	**0.427**
	GPRS 850	Front	0.226	0.041	0.267
		Rear	0.264	0.194	**0.458**
	GSM 1900	Front	0.358	0.041	0.399
		Rear	0.293	0.194	**0.487**
	GPRS 1900	Front	0.387	0.041	0.428
		Rear	0.400	0.194	**0.594**
	WCDMA 850	Front	0.222	0.041	0.263
		Rear	0.186	0.194	**0.380**
	WCDMA 1700	Front	0.295	0.041	0.336
		Rear	0.306	0.194	**0.500**
	WCDMA 1900	Front	0.423	0.041	0.464
		Rear	0.398	0.194	**0.592**
	LTE Band 12	Front	0.304	0.041	0.345
		Rear	0.346	0.194	**0.540**
	LTE Band 13	Front	0.310	0.041	0.351
		Rear	0.374	0.194	**0.568**
	LTE Band 5	Front	0.228	0.041	0.269
		Rear	0.281	0.194	**0.475**
	LTE Band 4	Front	0.313	0.041	0.354
		Rear	0.349	0.194	**0.543**
	LTE Band 2	Front	0.403	0.041	0.444
		Rear	0.408	0.194	**0.602**

Table 12.5.18 Simultaneous Transmission Scenario : 2G/3G/4G + 5.8 GHz W-LAN Ant.2 (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.8G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.044	0.260
		Rear	0.233	0.242	**0.475**
	GPRS 850	Front	0.226	0.044	0.270
		Rear	0.264	0.242	**0.506**
	GSM 1900	Front	0.358	0.044	0.402
		Rear	0.293	0.242	**0.535**
	GPRS 1900	Front	0.387	0.044	0.431
		Rear	0.400	0.242	**0.642**
	WCDMA 850	Front	0.222	0.044	0.266
		Rear	0.186	0.242	**0.428**
	WCDMA 1700	Front	0.295	0.044	0.339
		Rear	0.306	0.242	**0.548**
	WCDMA 1900	Front	0.423	0.044	0.467
		Rear	0.398	0.242	**0.640**
	LTE Band 12	Front	0.304	0.044	0.348
		Rear	0.346	0.242	**0.588**
	LTE Band 13	Front	0.310	0.044	0.354
		Rear	0.374	0.242	**0.616**
	LTE Band 5	Front	0.228	0.044	0.272
		Rear	0.281	0.242	**0.523**
	LTE Band 4	Front	0.313	0.044	0.357
		Rear	0.349	0.242	**0.591**
	LTE Band 2	Front	0.403	0.044	0.447
		Rear	0.408	0.242	**0.650**

Table 12.5.19 Simultaneous Transmission Scenario : 2G/3G/4G + 5.8 GHz W-LAN MIMO (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.8G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.072	0.288
		Rear	0.233	0.276	**0.509**
	GPRS 850	Front	0.226	0.072	0.298
		Rear	0.264	0.276	**0.540**
	GSM 1900	Front	0.358	0.072	0.430
		Rear	0.293	0.276	**0.569**
	GPRS 1900	Front	0.387	0.072	0.459
		Rear	0.400	0.276	**0.676**
	WCDMA 850	Front	0.222	0.072	0.294
		Rear	0.186	0.276	**0.462**
	WCDMA 1700	Front	0.295	0.072	0.367
		Rear	0.306	0.276	**0.582**
	WCDMA 1900	Front	0.423	0.072	0.495
		Rear	0.398	0.276	**0.674**
	LTE Band 12	Front	0.304	0.072	0.376
		Rear	0.346	0.276	**0.622**
	LTE Band 13	Front	0.310	0.072	0.382
		Rear	0.374	0.276	**0.650**
	LTE Band 5	Front	0.228	0.072	0.300
		Rear	0.281	0.276	**0.557**
	LTE Band 4	Front	0.313	0.072	0.385
		Rear	0.349	0.276	**0.625**
	LTE Band 2	Front	0.403	0.072	0.475
		Rear	0.408	0.276	**0.684**

Table 12.5.20 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	GSM 850	Front	0.216	0.067	**0.283**
		Rear	0.233	0.042	0.275
	GPRS 850	Front	0.226	0.067	0.293
		Rear	0.264	0.042	**0.306**
	GSM 1900	Front	0.358	0.067	**0.425**
		Rear	0.293	0.042	0.335
	GPRS 1900	Front	0.387	0.067	**0.454**
		Rear	0.400	0.042	0.442
	WCDMA 850	Front	0.222	0.067	**0.289**
		Rear	0.186	0.042	0.228
	WCDMA 1700	Front	0.295	0.067	**0.362**
		Rear	0.306	0.042	0.348
	WCDMA 1900	Front	0.423	0.067	**0.490**
		Rear	0.398	0.042	0.440
	LTE Band 12	Front	0.304	0.067	0.371
		Rear	0.346	0.042	**0.388**
	LTE Band 13	Front	0.310	0.067	0.377
		Rear	0.374	0.042	**0.416**
	LTE Band 5	Front	0.228	0.067	0.295
		Rear	0.281	0.042	**0.323**
	LTE Band 4	Front	0.313	0.067	0.380
		Rear	0.349	0.042	**0.391**
	LTE Band 2	Front	0.403	0.067	**0.470**
		Rear	0.408	0.042	0.450

Table 12.5.21 Simultaneous Transmission Scenario : 2.4 GHz W-LAN MIMO + 5 GHz W-LAN MIMO (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	2.4G W-LAN MIMO SAR (W/kg)	5G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	5.2G W-LAN MIMO	Front	0.137	0.027	0.164
		Rear	0.085	0.379	**0.464**
	5.6G W-LAN MIMO	Front	0.137	0.049	0.186
		Rear	0.085	0.182	**0.267**
	5.8G W-LAN MIMO	Front	0.137	0.072	0.209
		Rear	0.085	0.276	**0.361**

Table 12.5.22 Simultaneous Transmission Scenario : Bluetooth Ant.1 + 5 GHz W-LAN MIMO (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	Bluetooth Ant.1 SAR (W/kg)	5G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	5.3G W-LAN MIMO	Front	0.067	0.027	0.094
		Rear	0.042	0.379	**0.421**
	5.6G W-LAN MIMO	Front	0.067	0.049	0.116
		Rear	0.042	0.182	**0.224**
	5.8G W-LAN MIMO	Front	0.067	0.072	0.139
		Rear	0.042	0.276	**0.318**

Table 12.5.23 Simultaneous Transmission Scenario : Bluetooth Ant.1 + 2.4 GHz W-LAN Ant.2 (Body-Worn at 10 mm)

Exposure Condition	Mode	Configuration	Bluetooth Ant.1 SAR (W/kg)	2.4G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Body-Worn SAR	5.3G W-LAN MIMO	Front	0.067	0.032	**0.099**
		Rear	0.042	0.020	0.062

12.6 Hotspot SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 941225 D06v02r01, the device edges with antennas more than 2.5 cm from edge are not required to be evaluated for SAR ("-").

Table 12.6.1 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN MIMO + 5.2 GHz W-LAN MIMO (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN MIMO SAR (W/kg)	5.2G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	Top	-	0.096	0.125	0.096	0.125	0.221
		Bottom	0.091	-	-	0.091	0.091	0.091
		Front	0.226	0.137	0.045	0.363	0.271	0.408
		Rear	0.264	0.085	0.365	0.349	0.629	**0.714**
		Right	0.070	-	-	0.070	0.070	0.070
		Left	-	0.167	0.091	0.167	0.091	0.258
	GPRS 1900	Top	-	0.096	0.125	0.096	0.125	0.221
		Bottom	0.621	-	-	0.621	0.621	0.621
		Front	0.387	0.137	0.045	0.524	0.432	0.569
		Rear	0.400	0.085	0.365	0.485	0.765	**0.850**
		Right	-	-	-	-	-	-
		Left	0.099	0.167	0.091	0.266	0.190	0.357
	WCDMA 850	Top	-	0.096	0.125	0.096	0.125	0.221
		Bottom	0.065	-	-	0.065	0.065	0.065
		Front	0.222	0.137	0.045	0.359	0.267	0.404
		Rear	0.186	0.085	0.365	0.271	0.551	**0.636**
		Right	0.052	-	-	0.052	0.052	0.052
		Left	-	0.167	0.091	0.167	0.091	0.258
	WCDMA 1700	Top	-	0.096	0.125	0.096	0.125	0.221
		Bottom	0.553	-	-	0.553	0.553	0.553
		Front	0.295	0.137	0.045	0.432	0.340	0.477
		Rear	0.306	0.085	0.365	0.391	0.671	**0.756**
		Right	-	-	-	-	-	-
		Left	0.104	0.167	0.091	0.271	0.195	0.362
	WCDMA 1900	Top	-	0.096	0.125	0.096	0.125	0.221
		Bottom	0.614	-	-	0.614	0.614	0.614
		Front	0.423	0.137	0.045	0.560	0.468	0.605
		Rear	0.398	0.085	0.365	0.483	0.763	**0.848**
		Right	-	-	-	-	-	-
		Left	0.121	0.167	0.091	0.288	0.212	0.379
	LTE Band 12	Top	-	0.096	0.125	0.096	0.125	0.221
		Bottom	0.134	-	-	0.134	0.134	0.134
		Front	0.304	0.137	0.045	0.441	0.349	0.486
		Rear	0.346	0.085	0.365	0.431	0.711	**0.796**
		Right	0.259	-	-	0.259	0.259	0.259
		Left	-	0.167	0.091	0.167	0.091	0.258
	LTE Band 13	Top	-	0.096	0.125	0.096	0.125	0.221
		Bottom	0.091	-	-	0.091	0.091	0.091
		Front	0.310	0.137	0.045	0.447	0.355	0.492
		Rear	0.374	0.085	0.365	0.459	0.739	**0.824**
		Right	0.175	-	-	0.175	0.175	0.175
		Left	-	0.167	0.091	0.167	0.091	0.258
	LTE Band 5	Top	-	0.096	0.125	0.096	0.125	0.221
		Bottom	0.118	-	-	0.118	0.118	0.118
		Front	0.228	0.137	0.045	0.365	0.273	0.410
		Rear	0.281	0.085	0.365	0.366	0.646	**0.731**
		Right	0.096	-	-	0.096	0.096	0.096
		Left	-	0.167	0.091	0.167	0.091	0.258
	LTE Band 4	Top	-	0.096	0.125	0.096	0.125	0.221
		Bottom	0.584	-	-	0.584	0.584	0.584
		Front	0.313	0.137	0.045	0.450	0.358	0.495
		Rear	0.349	0.085	0.365	0.434	0.714	**0.799**
		Right	-	-	-	-	-	-
		Left	0.259	0.167	0.091	0.426	0.350	0.517
	LTE Band 2	Top	-	0.096	0.125	0.096	0.125	0.221
		Bottom	0.613	-	-	0.613	0.613	0.613
		Front	0.403	0.137	0.045	0.540	0.448	0.585
		Rear	**0.408**	**0.085**	**0.365**	**0.493**	**0.773**	0.858
		Right	-	-	-	-	-	-
		Left	0.110	0.167	0.091	0.277	0.201	0.368

Table 12.6.2 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN MIMO + 5.8 GHz W-LAN MIMO (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN MIMO SAR (W/kg)	5.8G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	Top	-	0.096	0.084	0.096	0.084	0.180
		Bottom	0.091	-	-	0.091	0.091	0.091
		Front	0.226	0.137	0.077	0.363	0.303	0.440
		Rear	0.264	0.085	0.240	0.349	0.504	**0.589**
		Right	0.070	-	-	0.070	0.070	0.070
		Left	-	0.167	0.084	0.167	0.084	0.251
	GPRS 1900	Top	-	0.096	0.084	0.096	0.084	0.180
		Bottom	0.621	-	-	0.621	0.621	0.621
		Front	0.387	0.137	0.077	0.524	0.464	0.601
		Rear	0.400	0.085	0.240	0.485	0.640	**0.725**
		Right	-	-	-	-	-	-
		Left	0.099	0.167	0.084	0.266	0.183	0.350
	WCDMA 850	Top	-	0.096	0.084	0.096	0.084	0.180
		Bottom	0.065	-	-	0.065	0.065	0.065
		Front	0.222	0.137	0.077	0.359	0.299	0.436
		Rear	0.186	0.085	0.240	0.271	0.426	**0.511**
		Right	0.052	-	-	0.052	0.052	0.052
		Left	-	0.167	0.084	0.167	0.084	0.251
	WCDMA 1700	Top	-	0.096	0.084	0.096	0.084	0.180
		Bottom	0.553	-	-	0.553	0.553	0.553
		Front	0.295	0.137	0.077	0.432	0.372	0.509
		Rear	0.306	0.085	0.240	0.391	0.546	**0.631**
		Right	-	-	-	-	-	-
		Left	0.104	0.167	0.084	0.271	0.188	0.355
	WCDMA 1900	Top	-	0.096	0.084	0.096	0.084	0.180
		Bottom	0.614	-	-	0.614	0.614	0.614
		Front	0.423	0.137	0.077	0.560	0.500	0.637
		Rear	0.398	0.085	0.240	0.483	0.638	**0.723**
		Right	-	-	-	-	-	-
		Left	0.121	0.167	0.084	0.288	0.205	0.372
	LTE Band 12	Top	-	0.096	0.084	0.096	0.084	0.180
		Bottom	0.134	-	-	0.134	0.134	0.134
		Front	0.304	0.137	0.077	0.441	0.381	0.518
		Rear	0.346	0.085	0.240	0.431	0.586	**0.671**
		Right	0.259	-	-	0.259	0.259	0.259
		Left	-	0.167	0.084	0.167	0.084	0.251
	LTE Band 13	Top	-	0.096	0.084	0.096	0.084	0.180
		Bottom	0.091	-	-	0.091	0.091	0.091
		Front	0.310	0.137	0.077	0.447	0.387	0.524
		Rear	0.374	0.085	0.240	0.459	0.614	**0.699**
		Right	0.175	-	-	0.175	0.175	0.175
		Left	-	0.167	0.084	0.167	0.084	0.251
	LTE Band 5	Top	-	0.096	0.084	0.096	0.084	0.180
		Bottom	0.118	-	-	0.118	0.118	0.118
		Front	0.228	0.137	0.077	0.365	0.305	0.442
		Rear	0.281	0.085	0.240	0.366	0.521	**0.606**
		Right	0.096	-	-	0.096	0.096	0.096
		Left	-	0.167	0.084	0.167	0.084	0.251
	LTE Band 4	Top	-	0.096	0.084	0.096	0.084	0.180
		Bottom	0.584	-	-	0.584	0.584	0.584
		Front	0.313	0.137	0.077	0.450	0.390	0.527
		Rear	0.349	0.085	0.240	0.434	0.589	**0.674**
		Right	-	-	-	-	-	-
		Left	0.259	0.167	0.084	0.426	0.343	0.510
	LTE Band 2	Top	-	0.096	0.084	0.096	0.084	0.180
		Bottom	0.613	-	-	0.613	0.613	0.613
		Front	0.403	0.137	0.077	0.540	0.480	0.617
		Rear	0.408	0.085	0.240	0.493	0.648	**0.733**
		Right	-	-	-	-	-	-
		Left	0.110	0.167	0.084	0.277	0.194	0.361

Table 12.6.3 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth Ant.1 + 5.2 GHz W-LAN MIMO (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth Ant.1 SAR (W/kg)	5.2G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	Top	-	0.016	0.125	0.016	0.125	0.141
		Bottom	0.091	-	-	0.091	0.091	0.091
		Front	0.226	0.067	0.045	0.293	0.271	0.338
		Rear	0.264	0.042	0.365	0.306	0.629	**0.671**
		Right	0.070	-	-	0.070	0.070	0.070
		Left	-	0.065	0.091	0.065	0.091	0.156
	GPRS 1900	Top	-	0.016	0.125	0.016	0.125	0.141
		Bottom	0.621	-	-	0.621	0.621	0.621
		Front	0.387	0.067	0.045	0.454	0.432	0.499
		Rear	0.400	0.042	0.365	0.442	0.765	**0.807**
		Right	-	-	-	-	-	-
		Left	0.099	0.065	0.091	0.164	0.190	0.255
	WCDMA 850	Top	-	0.016	0.125	0.016	0.125	0.141
		Bottom	0.065	-	-	0.065	0.065	0.065
		Front	0.222	0.067	0.045	0.289	0.267	0.334
		Rear	0.186	0.042	0.365	0.228	0.551	**0.593**
		Right	0.052	-	-	0.052	0.052	0.052
		Left	-	0.065	0.091	0.065	0.091	0.156
	WCDMA 1700	Top	-	0.016	0.125	0.016	0.125	0.141
		Bottom	0.553	-	-	0.553	0.553	0.553
		Front	0.295	0.067	0.045	0.362	0.340	0.407
		Rear	0.306	0.042	0.365	0.348	0.671	**0.713**
		Right	-	-	-	-	-	-
		Left	0.104	0.065	0.091	0.169	0.195	0.260
	WCDMA 1900	Top	-	0.016	0.125	0.016	0.125	0.141
		Bottom	0.614	-	-	0.614	0.614	0.614
		Front	0.423	0.067	0.045	0.490	0.468	0.535
		Rear	0.398	0.042	0.365	0.440	0.763	**0.805**
		Right	-	-	-	-	-	-
		Left	0.121	0.065	0.091	0.186	0.212	0.277
	LTE Band 12	Top	-	0.016	0.125	0.016	0.125	0.141
		Bottom	0.134	-	-	0.134	0.134	0.134
		Front	0.304	0.067	0.045	0.371	0.349	0.416
		Rear	0.346	0.042	0.365	0.388	0.711	**0.753**
		Right	0.259	-	-	0.259	0.259	0.259
		Left	-	0.065	0.091	0.065	0.091	0.156
	LTE Band 13	Top	-	0.016	0.125	0.016	0.125	0.141
		Bottom	0.091	-	-	0.091	0.091	0.091
		Front	0.310	0.067	0.045	0.377	0.355	0.422
		Rear	0.374	0.042	0.365	0.416	0.739	**0.781**
		Right	0.175	-	-	0.175	0.175	0.175
		Left	-	0.065	0.091	0.065	0.091	0.156
	LTE Band 5	Top	-	0.016	0.125	0.016	0.125	0.141
		Bottom	0.118	-	-	0.118	0.118	0.118
		Front	0.228	0.067	0.045	0.295	0.273	0.340
		Rear	0.281	0.042	0.365	0.323	0.646	**0.688**
		Right	0.096	-	-	0.096	0.096	0.096
		Left	-	0.065	0.091	0.065	0.091	0.156
	LTE Band 4	Top	-	0.016	0.125	0.016	0.125	0.141
		Bottom	0.584	-	-	0.584	0.584	0.584
		Front	0.313	0.067	0.045	0.380	0.358	0.425
		Rear	0.349	0.042	0.365	0.391	0.714	**0.756**
		Right	-	-	-	-	-	-
		Left	0.259	0.065	0.091	0.324	0.350	0.415
	LTE Band 2	Top	-	0.016	0.125	0.016	0.125	0.141
		Bottom	0.613	-	-	0.613	0.613	0.613
		Front	0.403	0.067	0.045	0.470	0.448	0.515
		Rear	0.408	0.042	0.365	0.450	0.773	**0.815**
		Right	-	-	-	-	-	-
		Left	0.110	0.065	0.091	0.175	0.201	0.266

Table 12.6.4 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth Ant.1 + 5.8 GHz W-LAN MIMO (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth Ant.1 SAR (W/kg)	5.8G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	Top	-	0.016	0.084	0.016	0.084	0.100
		Bottom	0.091	-	-	0.091	0.091	0.091
		Front	0.226	0.067	0.077	0.293	0.303	0.370
		Rear	0.264	0.042	0.240	0.306	0.504	**0.546**
		Right	0.070	-	-	0.070	0.070	0.070
		Left	-	0.065	0.084	0.065	0.084	0.149
	GPRS 1900	Top	-	0.016	0.084	0.016	0.084	0.100
		Bottom	0.621	-	-	0.621	0.621	0.621
		Front	0.387	0.067	0.077	0.454	0.464	0.531
		Rear	0.400	0.042	0.240	0.442	0.640	**0.682**
		Right	-	-	-	-	-	-
		Left	0.099	0.065	0.084	0.164	0.183	0.248
	WCDMA 850	Top	-	0.016	0.084	0.016	0.084	0.100
		Bottom	0.065	-	-	0.065	0.065	0.065
		Front	0.222	0.067	0.077	0.289	0.299	0.366
		Rear	0.186	0.042	0.240	0.228	0.426	**0.468**
		Right	0.052	-	-	0.052	0.052	0.052
		Left	-	0.065	0.084	0.065	0.084	0.149
	WCDMA 1700	Top	-	0.016	0.084	0.016	0.084	0.100
		Bottom	0.553	-	-	0.553	0.553	0.553
		Front	0.295	0.067	0.077	0.362	0.372	0.439
		Rear	0.306	0.042	0.240	0.348	0.546	**0.588**
		Right	-	-	-	-	-	-
		Left	0.104	0.065	0.084	0.169	0.188	0.253
	WCDMA 1900	Top	-	0.016	0.084	0.016	0.084	0.100
		Bottom	0.614	-	-	0.614	0.614	0.614
		Front	0.423	0.067	0.077	0.490	0.500	0.567
		Rear	0.398	0.042	0.240	0.440	0.638	**0.680**
		Right	-	-	-	-	-	-
		Left	0.121	0.065	0.084	0.186	0.205	0.270
	LTE Band 12	Top	-	0.016	0.084	0.016	0.084	0.100
		Bottom	0.134	-	-	0.134	0.134	0.134
		Front	0.304	0.067	0.077	0.371	0.381	0.448
		Rear	0.346	0.042	0.240	0.388	0.586	**0.628**
		Right	0.259	-	-	0.259	0.259	0.259
		Left	-	0.065	0.084	0.065	0.084	0.149
	LTE Band 13	Top	-	0.016	0.084	0.016	0.084	0.100
		Bottom	0.091	-	-	0.091	0.091	0.091
		Front	0.310	0.067	0.077	0.377	0.387	0.454
		Rear	0.374	0.042	0.240	0.416	0.614	**0.656**
		Right	0.175	-	-	0.175	0.175	0.175
		Left	-	0.065	0.084	0.065	0.084	0.149
	LTE Band 5	Top	-	0.016	0.084	0.016	0.084	0.100
		Bottom	0.118	-	-	0.118	0.118	0.118
		Front	0.228	0.067	0.077	0.295	0.305	0.372
		Rear	0.281	0.042	0.240	0.323	0.521	**0.563**
		Right	0.096	-	-	0.096	0.096	0.096
		Left	-	0.065	0.084	0.065	0.084	0.149
	LTE Band 4	Top	-	0.016	0.084	0.016	0.084	0.100
		Bottom	0.584	-	-	0.584	0.584	0.584
		Front	0.313	0.067	0.077	0.380	0.390	0.457
		Rear	0.349	0.042	0.240	0.391	0.589	**0.631**
		Right	-	-	-	-	-	-
		Left	0.259	0.065	0.084	0.324	0.343	0.408
	LTE Band 2	Top	-	0.016	0.084	0.016	0.084	0.100
		Bottom	0.613	-	-	0.613	0.613	0.613
		Front	0.403	0.067	0.077	0.470	0.480	0.547
		Rear	0.408	0.042	0.240	0.450	0.648	**0.690**
		Right	-	-	-	-	-	-
		Left	0.110	0.065	0.084	0.175	0.194	0.259

Table 12.6.5 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth Ant.1 + 2.4 GHz W-LAN Ant.2 (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth Ant.1 SAR (W/kg)	2.4G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)		
			1	2	3	1+2	1+3	1+2+3
Hotspot SAR	GPRS 850	Top	-	0.016	0.054	0.016	0.054	0.070
		Bottom	0.091	-	-	0.091	0.091	0.091
		Front	0.226	0.067	0.032	0.293	0.258	0.325
		Rear	0.264	0.042	0.020	0.306	0.284	**0.326**
		Right	0.070	-	-	0.070	0.070	0.070
		Left	-	0.065	0.002	0.065	0.002	0.067
	GPRS 1900	Top	-	0.016	0.054	0.016	0.054	0.070
		Bottom	0.621	-	-	0.621	0.621	**0.621**
		Front	0.387	0.067	0.032	0.454	0.419	0.486
		Rear	0.400	0.042	0.020	0.442	0.420	0.462
		Right	-	-	-	-	-	-
		Left	0.099	0.065	0.002	0.164	0.101	0.166
	WCDMA 850	Top	-	0.016	0.054	0.016	0.054	0.070
		Bottom	0.065	-	-	0.065	0.065	0.065
		Front	0.222	0.067	0.032	0.289	0.254	**0.321**
		Rear	0.186	0.042	0.020	0.228	0.206	0.248
		Right	0.052	-	-	0.052	0.052	0.052
		Left	-	0.065	0.002	0.065	0.002	0.067
	WCDMA 1700	Top	-	0.016	0.054	0.016	0.054	0.070
		Bottom	0.553	-	-	0.553	0.553	**0.553**
		Front	0.295	0.067	0.032	0.362	0.327	0.394
		Rear	0.306	0.042	0.020	0.348	0.326	0.368
		Right	-	-	-	-	-	-
		Left	0.104	0.065	0.002	0.169	0.106	0.171
	WCDMA 1900	Top	-	0.016	0.054	0.016	0.054	0.070
		Bottom	0.614	-	-	0.614	0.614	**0.614**
		Front	0.423	0.067	0.032	0.490	0.455	0.522
		Rear	0.398	0.042	0.020	0.440	0.418	0.460
		Right	-	-	-	-	-	-
		Left	0.121	0.065	0.002	0.186	0.123	0.188
	LTE Band 12	Top	-	0.016	0.054	0.016	0.054	0.070
		Bottom	0.134	-	-	0.134	0.134	0.134
		Front	0.304	0.067	0.032	0.371	0.336	0.403
		Rear	0.346	0.042	0.020	0.388	0.366	**0.408**
		Right	0.259	-	-	0.259	0.259	0.259
		Left	-	0.065	0.002	0.065	0.002	0.067
	LTE Band 13	Top	-	0.016	0.054	0.016	0.054	0.070
		Bottom	0.091	-	-	0.091	0.091	0.091
		Front	0.310	0.067	0.032	0.377	0.342	0.409
		Rear	0.374	0.042	0.020	0.416	0.394	**0.436**
		Right	0.175	-	-	0.175	0.175	0.175
		Left	-	0.065	0.002	0.065	0.002	0.067
	LTE Band 5	Top	-	0.016	0.054	0.016	0.054	0.070
		Bottom	0.118	-	-	0.118	0.118	0.118
		Front	0.228	0.067	0.032	0.295	0.260	0.327
		Rear	0.281	0.042	0.020	0.323	0.301	**0.343**
		Right	0.096	-	-	0.096	0.096	0.096
		Left	-	0.065	0.002	0.065	0.002	0.067
	LTE Band 4	Top	-	0.016	0.054	0.016	0.054	0.070
		Bottom	0.584	-	-	0.584	0.584	0.584
		Front	0.313	0.067	0.032	0.380	0.345	**0.412**
		Rear	0.349	0.042	0.020	0.391	0.369	0.411
		Right	-	-	-	-	-	-
		Left	0.259	0.065	0.002	0.324	0.261	0.326
	LTE Band 2	Top	-	0.016	0.054	0.016	0.054	0.070
		Bottom	0.613	-	-	0.613	0.613	**0.613**
		Front	0.403	0.067	0.032	0.470	0.435	0.502
		Rear	0.408	0.042	0.020	0.450	0.428	0.470
		Right	-	-	-	-	-	-
		Left	0.110	0.065	0.002	0.175	0.112	0.177

Table 12.6.6 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN Ant.1 (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN Ant.1 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top	-	0.050	0.050
		Bottom	0.091	-	0.091
		Front	0.226	0.119	**0.345**
		Rear	0.264	0.078	0.342
		Right	0.070	-	0.070
		Left	-	0.163	0.163
	GPRS 1900	Top	-	0.050	0.050
		Bottom	0.621	-	**0.621**
		Front	0.387	0.119	0.506
		Rear	0.400	0.078	0.478
		Right	-	-	-
		Left	0.099	0.163	0.262
	WCDMA 850	Top	-	0.050	0.050
		Bottom	0.065	-	0.065
		Front	0.222	0.119	**0.341**
		Rear	0.186	0.078	0.264
		Right	0.052	-	0.052
		Left	-	0.163	0.163
	WCDMA 1700	Top	-	0.050	0.050
		Bottom	0.553	-	**0.553**
		Front	0.295	0.119	0.414
		Rear	0.306	0.078	0.384
		Right	-	-	-
		Left	0.104	0.163	0.267
	WCDMA 1900	Top	-	0.050	0.050
		Bottom	0.614	-	**0.614**
		Front	0.423	0.119	0.542
		Rear	0.398	0.078	0.476
		Right	-	-	-
		Left	0.121	0.163	0.284
	LTE Band 12	Top	-	0.050	0.050
		Bottom	0.134	-	0.134
		Front	0.304	0.119	0.423
		Rear	0.346	0.078	**0.424**
		Right	0.259	-	0.259
		Left	-	0.163	0.163
	LTE Band 13	Top	-	0.050	0.050
		Bottom	0.091	-	0.091
		Front	0.310	0.119	0.429
		Rear	0.374	0.078	**0.452**
		Right	0.175	-	0.175
		Left	-	0.163	0.163
	LTE Band 5	Top	-	0.050	0.050
		Bottom	0.118	-	0.118
		Front	0.228	0.119	0.347
		Rear	0.281	0.078	**0.359**
		Right	0.096	-	0.096
		Left	-	0.163	0.163
	LTE Band 4	Top	-	0.050	0.050
		Bottom	0.584	-	**0.584**
		Front	0.313	0.119	0.432
		Rear	0.349	0.078	0.427
		Right	-	-	-
		Left	0.259	0.163	0.422
	LTE Band 2	Top	-	0.050	0.050
		Bottom	0.613	-	**0.613**
		Front	0.403	0.119	0.522
		Rear	0.408	0.078	0.486
		Right	-	-	-
		Left	0.110	0.163	0.273

Table 12.6.7 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN Ant.2 (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top	-	0.054	0.054
		Bottom	0.091	-	0.091
		Front	0.226	0.032	0.258
		Rear	0.264	0.020	**0.284**
		Right	0.070	-	0.070
		Left	-	0.002	0.002
	GPRS 1900	Top	-	0.054	0.054
		Bottom	0.621	-	**0.621**
		Front	0.387	0.032	0.419
		Rear	0.400	0.020	0.420
		Right	-	-	-
		Left	0.099	0.002	0.101
	WCDMA 850	Top	-	0.054	0.054
		Bottom	0.065	-	0.065
		Front	0.222	0.032	**0.254**
		Rear	0.186	0.020	0.206
		Right	0.052	-	0.052
		Left	-	0.002	0.002
	WCDMA 1700	Top	-	0.054	0.054
		Bottom	0.553	-	**0.553**
		Front	0.295	0.032	0.327
		Rear	0.306	0.020	0.326
		Right	-	-	-
		Left	0.104	0.002	0.106
	WCDMA 1900	Top	-	0.054	0.054
		Bottom	0.614	-	**0.614**
		Front	0.423	0.032	0.455
		Rear	0.398	0.020	0.418
		Right	-	-	-
		Left	0.121	0.002	0.123
	LTE Band 12	Top	-	0.054	0.054
		Bottom	0.134	-	0.134
		Front	0.304	0.032	0.336
		Rear	0.346	0.020	**0.366**
		Right	0.259	-	0.259
		Left	-	0.002	0.002
	LTE Band 13	Top	-	0.054	0.054
		Bottom	0.091	-	0.091
		Front	0.310	0.032	0.342
		Rear	0.374	0.020	**0.394**
		Right	0.175	-	0.175
		Left	-	0.002	0.002
	LTE Band 5	Top	-	0.054	0.054
		Bottom	0.118	-	0.118
		Front	0.228	0.032	0.260
		Rear	0.281	0.020	**0.301**
		Right	0.096	-	0.096
		Left	-	0.002	0.002
	LTE Band 4	Top	-	0.054	0.054
		Bottom	0.584	-	**0.584**
		Front	0.313	0.032	0.345
		Rear	0.349	0.020	0.369
		Right	-	-	-
		Left	0.259	0.002	0.261
	LTE Band 2	Top	-	0.054	0.054
		Bottom	0.613	-	**0.613**
		Front	0.403	0.032	0.435
		Rear	0.408	0.020	0.428
		Right	-	-	-
		Left	0.110	0.002	0.112

Table 12.6.8 Simultaneous Transmission Scenario : 2G/3G/4G + 2.4 GHz W-LAN MIMO (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	2.4G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top	-	0.096	0.096
		Bottom	0.091	-	0.091
		Front	0.226	0.137	**0.363**
		Rear	0.264	0.085	0.349
		Right	0.070	-	0.070
		Left	-	0.167	0.167
	GPRS 1900	Top	-	0.096	0.096
		Bottom	0.621	-	**0.621**
		Front	0.387	0.137	0.524
		Rear	0.400	0.085	0.485
		Right	-	-	-
		Left	0.099	0.167	0.266
	WCDMA 850	Top	-	0.096	0.096
		Bottom	0.065	-	0.065
		Front	0.222	0.137	**0.359**
		Rear	0.186	0.085	0.271
		Right	0.052	-	0.052
		Left	-	0.167	0.167
	WCDMA 1700	Top	-	0.096	0.096
		Bottom	0.553	-	**0.553**
		Front	0.295	0.137	0.432
		Rear	0.306	0.085	0.391
		Right	-	-	-
		Left	0.104	0.167	0.271
	WCDMA 1900	Top	-	0.096	0.096
		Bottom	0.614	-	**0.614**
		Front	0.423	0.137	0.560
		Rear	0.398	0.085	0.483
		Right	-	-	-
		Left	0.121	0.167	0.288
	LTE Band 12	Top	-	0.096	0.096
		Bottom	0.134	-	0.134
		Front	0.304	0.137	**0.441**
		Rear	0.346	0.085	0.431
		Right	0.259	-	0.259
		Left	-	0.167	0.167
	LTE Band 13	Top	-	0.096	0.096
		Bottom	0.091	-	0.091
		Front	0.310	0.137	0.447
		Rear	0.374	0.085	**0.459**
		Right	0.175	-	0.175
		Left	-	0.167	0.167
	LTE Band 5	Top	-	0.096	0.096
		Bottom	0.118	-	0.118
		Front	0.228	0.137	0.365
		Rear	0.281	0.085	**0.366**
		Right	0.096	-	0.096
		Left	-	0.167	0.167
	LTE Band 4	Top	-	0.096	0.096
		Bottom	0.584	-	**0.584**
		Front	0.313	0.137	0.450
		Rear	0.349	0.085	0.434
		Right	-	-	-
		Left	0.259	0.167	0.426
	LTE Band 2	Top	-	0.096	0.096
		Bottom	0.613	-	**0.613**
		Front	0.403	0.137	0.540
		Rear	0.408	0.085	0.493
		Right	-	-	-
		Left	0.110	0.167	0.277

Table 12.6.9 Simultaneous Transmission Scenario : 2G/3G/4G + 5.2 GHz W-LAN Ant.1 (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.2G W-LAN Ant.1 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top	-	0.035	0.035
		Bottom	0.091	-	0.091
		Front	0.226	0.040	0.266
		Rear	0.264	0.227	**0.491**
		Right	0.070	-	0.070
		Left	-	0.073	0.073
	GPRS 1900	Top	-	0.035	0.035
		Bottom	0.621	-	0.621
		Front	0.387	0.040	0.427
		Rear	0.400	0.227	**0.627**
		Right	-	-	-
		Left	0.099	0.073	0.172
	WCDMA 850	Top	-	0.035	0.035
		Bottom	0.065	-	0.065
		Front	0.222	0.040	0.262
		Rear	0.186	0.227	**0.413**
		Right	0.052	-	0.052
		Left	-	0.073	0.073
	WCDMA 1700	Top	-	0.035	0.035
		Bottom	0.553	-	**0.553**
		Front	0.295	0.040	0.335
		Rear	0.306	0.227	0.533
		Right	-	-	-
		Left	0.104	0.073	0.177
	WCDMA 1900	Top	-	0.035	0.035
		Bottom	0.614	-	0.614
		Front	0.423	0.040	0.463
		Rear	0.398	0.227	**0.625**
		Right	-	-	-
		Left	0.121	0.073	0.194
	LTE Band 12	Top	-	0.035	0.035
		Bottom	0.134	-	0.134
		Front	0.304	0.040	0.344
		Rear	0.346	0.227	**0.573**
		Right	0.259	-	0.259
		Left	-	0.073	0.073
	LTE Band 13	Top	-	0.035	0.035
		Bottom	0.091	-	0.091
		Front	0.310	0.040	0.350
		Rear	0.374	0.227	**0.601**
		Right	0.175	-	0.175
		Left	-	0.073	0.073
	LTE Band 5	Top	-	0.035	0.035
		Bottom	0.118	-	0.118
		Front	0.228	0.040	0.268
		Rear	0.281	0.227	**0.508**
		Right	0.096	-	0.096
		Left	-	0.073	0.073
	LTE Band 4	Top	-	0.035	0.035
		Bottom	0.584	-	**0.584**
		Front	0.313	0.040	0.353
		Rear	0.349	0.227	0.576
		Right	-	-	-
		Left	0.259	0.073	0.332
	LTE Band 2	Top	-	0.035	0.035
		Bottom	0.613	-	0.613
		Front	0.403	0.040	0.443
		Rear	0.408	0.227	**0.635**
		Right	-	-	-
		Left	0.110	0.073	0.183

Table 12.6.10 Simultaneous Transmission Scenario : 2G/3G/4G + 5.2 GHz W-LAN Ant.2 (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.2G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top	-	0.113	0.113
		Bottom	0.091	-	0.091
		Front	0.226	0.013	0.239
		Rear	0.264	0.292	**0.556**
		Right	0.070	-	0.070
		Left	-	0.053	0.053
	GPRS 1900	Top	-	0.113	0.113
		Bottom	0.621	-	0.621
		Front	0.387	0.013	0.400
		Rear	0.400	0.292	**0.692**
		Right	-	-	-
		Left	0.099	0.053	0.152
	WCDMA 850	Top	-	0.113	0.113
		Bottom	0.065	-	0.065
		Front	0.222	0.013	0.235
		Rear	0.186	0.292	**0.478**
		Right	0.052	-	0.052
		Left	-	0.053	0.053
	WCDMA 1700	Top	-	0.113	0.113
		Bottom	0.553	-	0.553
		Front	0.295	0.013	0.308
		Rear	0.306	0.292	**0.598**
		Right	-	-	-
		Left	0.104	0.053	0.157
	WCDMA 1900	Top	-	0.113	0.113
		Bottom	0.614	-	0.614
		Front	0.423	0.013	0.436
		Rear	0.398	0.292	**0.690**
		Right	-	-	-
		Left	0.121	0.053	0.174
	LTE Band 12	Top	-	0.113	0.113
		Bottom	0.134	-	0.134
		Front	0.304	0.013	0.317
		Rear	0.346	0.292	**0.638**
		Right	0.259	-	0.259
		Left	-	0.053	0.053
	LTE Band 13	Top	-	0.113	0.113
		Bottom	0.091	-	0.091
		Front	0.310	0.013	0.323
		Rear	0.374	0.292	**0.666**
		Right	0.175	-	0.175
		Left	-	0.053	0.053
	LTE Band 5	Top	-	0.113	0.113
		Bottom	0.118	-	0.118
		Front	0.228	0.013	0.241
		Rear	0.281	0.292	**0.573**
		Right	0.096	-	0.096
		Left	-	0.053	0.053
	LTE Band 4	Top	-	0.113	0.113
		Bottom	0.584	-	0.584
		Front	0.313	0.013	0.326
		Rear	0.349	0.292	**0.641**
		Right	-	-	-
		Left	0.259	0.053	0.312
	LTE Band 2	Top	-	0.113	0.113
		Bottom	0.613	-	0.613
		Front	0.403	0.013	0.416
		Rear	0.408	0.292	**0.700**
		Right	-	-	-
		Left	0.110	0.053	0.163

Table 12.6.11 Simultaneous Transmission Scenario : 2G/3G/4G + 5.2 GHz W-LAN MIMO (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.2G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top	-	0.125	0.125
		Bottom	0.091	-	0.091
		Front	0.226	0.045	0.271
		Rear	0.264	0.365	**0.629**
		Right	0.070	-	0.070
		Left	-	0.091	0.091
	GPRS 1900	Top	-	0.125	0.125
		Bottom	0.621	-	0.621
		Front	0.387	0.045	0.432
		Rear	0.400	0.365	**0.765**
		Right	-	-	-
		Left	0.099	0.091	0.190
	WCDMA 850	Top	-	0.125	0.125
		Bottom	0.065	-	0.065
		Front	0.222	0.045	0.267
		Rear	0.186	0.365	**0.551**
		Right	0.052	-	0.052
		Left	-	0.091	0.091
	WCDMA 1700	Top	-	0.125	0.125
		Bottom	0.553	-	0.553
		Front	0.295	0.045	0.340
		Rear	0.306	0.365	**0.671**
		Right	-	-	-
		Left	0.104	0.091	0.195
	WCDMA 1900	Top	-	0.125	0.125
		Bottom	0.614	-	0.614
		Front	0.423	0.045	0.468
		Rear	0.398	0.365	**0.763**
		Right	-	-	-
		Left	0.121	0.091	0.212
	LTE Band 12	Top	-	0.125	0.125
		Bottom	0.134	-	0.134
		Front	0.304	0.045	0.349
		Rear	0.346	0.365	**0.711**
		Right	0.259	-	0.259
		Left	-	0.091	0.091
	LTE Band 13	Top	-	0.125	0.125
		Bottom	0.091	-	0.091
		Front	0.310	0.045	0.355
		Rear	0.374	0.365	**0.739**
		Right	0.175	-	0.175
		Left	-	0.091	0.091
	LTE Band 5	Top	-	0.125	0.125
		Bottom	0.118	-	0.118
		Front	0.228	0.045	0.273
		Rear	0.281	0.365	**0.646**
		Right	0.096	-	0.096
		Left	-	0.091	0.091
	LTE Band 4	Top	-	0.125	0.125
		Bottom	0.584	-	0.584
		Front	0.313	0.045	0.358
		Rear	0.349	0.365	**0.714**
		Right	-	-	-
		Left	0.259	0.091	0.350
	LTE Band 2	Top	-	0.125	0.125
		Bottom	0.613	-	0.613
		Front	0.403	0.045	0.448
		Rear	0.408	0.365	**0.773**
		Right	-	-	-
		Left	0.110	0.091	0.201

Table 12.6.12 Simultaneous Transmission Scenario : 2G/3G/4G + 5.8 GHz W-LAN Ant.1 (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.8G W-LAN Ant.1 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top	-	0.031	0.031
		Bottom	0.091	-	0.091
		Front	0.226	0.041	0.267
		Rear	0.264	0.194	**0.458**
		Right	0.070	-	0.070
		Left	-	0.083	0.083
	GPRS 1900	Top	-	0.031	0.031
		Bottom	0.621	-	**0.621**
		Front	0.387	0.041	0.428
		Rear	0.400	0.194	0.594
		Right	-	-	-
		Left	0.099	0.083	0.182
	WCDMA 850	Top	-	0.031	0.031
		Bottom	0.065	-	0.065
		Front	0.222	0.041	0.263
		Rear	0.186	0.194	**0.380**
		Right	0.052	-	0.052
		Left	-	0.083	0.083
	WCDMA 1700	Top	-	0.031	0.031
		Bottom	0.553	-	**0.553**
		Front	0.295	0.041	0.336
		Rear	0.306	0.194	0.500
		Right	-	-	-
		Left	0.104	0.083	0.187
	WCDMA 1900	Top	-	0.031	0.031
		Bottom	0.614	-	**0.614**
		Front	0.423	0.041	0.464
		Rear	0.398	0.194	0.592
		Right	-	-	-
		Left	0.121	0.083	0.204
	LTE Band 12	Top	-	0.031	0.031
		Bottom	0.134	-	0.134
		Front	0.304	0.041	0.345
		Rear	0.346	0.194	**0.540**
		Right	0.259	-	0.259
		Left	-	0.083	0.083
	LTE Band 13	Top	-	0.031	0.031
		Bottom	0.091	-	0.091
		Front	0.310	0.041	0.351
		Rear	0.374	0.194	**0.568**
		Right	0.175	-	0.175
		Left	-	0.083	0.083
	LTE Band 5	Top	-	0.031	0.031
		Bottom	0.118	-	0.118
		Front	0.228	0.041	0.269
		Rear	0.281	0.194	**0.475**
		Right	0.096	-	0.096
		Left	-	0.083	0.083
	LTE Band 4	Top	-	0.031	0.031
		Bottom	0.584	-	**0.584**
		Front	0.313	0.041	0.354
		Rear	0.349	0.194	0.543
		Right	-	-	-
		Left	0.259	0.083	0.342
	LTE Band 2	Top	-	0.031	0.031
		Bottom	0.613	-	**0.613**
		Front	0.403	0.041	0.444
		Rear	0.408	0.194	0.602
		Right	-	-	-
		Left	0.110	0.083	0.193

Table 12.6.13 Simultaneous Transmission Scenario : 2G/3G/4G + 5.8 GHz W-LAN Ant.2 (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.8G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top	-	0.046	0.046
		Bottom	0.091	-	0.091
		Front	0.226	0.058	0.284
		Rear	0.264	0.216	**0.480**
		Right	0.070	-	0.070
		Left	-	0.010	0.010
	GPRS 1900	Top	-	0.046	0.046
		Bottom	0.621	-	**0.621**
		Front	0.387	0.058	0.445
		Rear	0.400	0.216	0.616
		Right	-	-	-
		Left	0.099	0.010	0.109
	WCDMA 850	Top	-	0.046	0.046
		Bottom	0.065	-	0.065
		Front	0.222	0.058	0.280
		Rear	0.186	0.216	**0.402**
		Right	0.052	-	0.052
		Left	-	0.010	0.010
	WCDMA 1700	Top	-	0.046	0.046
		Bottom	0.553	-	**0.553**
		Front	0.295	0.058	0.353
		Rear	0.306	0.216	0.522
		Right	-	-	-
		Left	0.104	0.010	0.114
	WCDMA 1900	Top	-	0.046	0.046
		Bottom	0.614	-	**0.614**
		Front	0.423	0.058	0.481
		Rear	0.398	0.216	0.614
		Right	-	-	-
		Left	0.121	0.010	0.131
	LTE Band 12	Top	-	0.046	0.046
		Bottom	0.134	-	0.134
		Front	0.304	0.058	0.362
		Rear	0.346	0.216	**0.562**
		Right	0.259	-	0.259
		Left	-	0.010	0.010
	LTE Band 13	Top	-	0.046	0.046
		Bottom	0.091	-	0.091
		Front	0.310	0.058	0.368
		Rear	0.374	0.216	**0.590**
		Right	0.175	-	0.175
		Left	-	0.010	0.010
	LTE Band 5	Top	-	0.046	0.046
		Bottom	0.118	-	0.118
		Front	0.228	0.058	0.286
		Rear	0.281	0.216	**0.497**
		Right	0.096	-	0.096
		Left	-	0.010	0.010
	LTE Band 4	Top	-	0.046	0.046
		Bottom	0.584	-	**0.584**
		Front	0.313	0.058	0.371
		Rear	0.349	0.216	0.565
		Right	-	-	-
		Left	0.259	0.010	0.269
	LTE Band 2	Top	-	0.046	0.046
		Bottom	0.613	-	0.613
		Front	0.403	0.058	0.461
		Rear	0.408	0.216	**0.624**
		Right	-	-	-
		Left	0.110	0.010	0.120

Table 12.6.14 Simultaneous Transmission Scenario : 2G/3G/4G + 5.8 GHz W-LAN MIMO (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	5.8G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top	-	0.084	0.084
		Bottom	0.091	-	0.091
		Front	0.226	0.077	0.303
		Rear	0.264	0.240	**0.504**
		Right	0.070	-	0.070
		Left	-	0.084	0.084
	GPRS 1900	Top	-	0.084	0.084
		Bottom	0.621	-	0.621
		Front	0.387	0.077	0.464
		Rear	0.400	0.240	**0.640**
		Right	-	-	-
		Left	0.099	0.084	0.183
	WCDMA 850	Top	-	0.084	0.084
		Bottom	0.065	-	0.065
		Front	0.222	0.077	0.299
		Rear	0.186	0.240	**0.426**
		Right	0.052	-	0.052
		Left	-	0.084	0.084
	WCDMA 1700	Top	-	0.084	0.084
		Bottom	0.553	-	**0.553**
		Front	0.295	0.077	0.372
		Rear	0.306	0.240	0.546
		Right	-	-	-
		Left	0.104	0.084	0.188
	WCDMA 1900	Top	-	0.084	0.084
		Bottom	0.614	-	0.614
		Front	0.423	0.077	0.500
		Rear	0.398	0.240	**0.638**
		Right	-	-	-
		Left	0.121	0.084	0.205
	LTE Band 12	Top	-	0.084	0.084
		Bottom	0.134	-	0.134
		Front	0.304	0.077	0.381
		Rear	0.346	0.240	**0.586**
		Right	0.259	-	0.259
		Left	-	0.084	0.084
	LTE Band 13	Top	-	0.084	0.084
		Bottom	0.091	-	0.091
		Front	0.310	0.077	0.387
		Rear	0.374	0.240	**0.614**
		Right	0.175	-	0.175
		Left	-	0.084	0.084
	LTE Band 5	Top	-	0.084	0.084
		Bottom	0.118	-	0.118
		Front	0.228	0.077	0.305
		Rear	0.281	0.240	**0.521**
		Right	0.096	-	0.096
		Left	-	0.084	0.084
	LTE Band 4	Top	-	0.084	0.084
		Bottom	0.584	-	0.584
		Front	0.313	0.077	0.390
		Rear	0.349	0.240	**0.589**
		Right	-	-	-
		Left	0.259	0.084	0.343
	LTE Band 2	Top	-	0.084	0.084
		Bottom	0.613	-	0.613
		Front	0.403	0.077	0.480
		Rear	0.408	0.240	**0.648**
		Right	-	-	-
		Left	0.110	0.084	0.194

Table 12.6.15 Simultaneous Transmission Scenario : 2G/3G/4G + Bluetooth (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2G/3G/4G SAR (W/kg)	Bluetooth SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	GPRS 850	Top	-	0.016	0.016
		Bottom	0.091	-	0.091
		Front	0.226	0.067	0.293
		Rear	0.264	0.042	**0.306**
		Right	0.070	-	0.070
		Left	-	0.065	0.065
	GPRS 1900	Top	-	0.016	0.016
		Bottom	0.621	-	**0.621**
		Front	0.387	0.067	0.454
		Rear	0.400	0.042	0.442
		Right	-	-	-
		Left	0.099	0.065	0.164
	WCDMA 850	Top	-	0.016	0.016
		Bottom	0.065	-	0.065
		Front	0.222	0.067	**0.289**
		Rear	0.186	0.042	0.228
		Right	0.052	-	0.052
		Left	-	0.065	0.065
	WCDMA 1700	Top	-	0.016	0.016
		Bottom	0.553	-	**0.553**
		Front	0.295	0.067	0.362
		Rear	0.306	0.042	0.348
		Right	-	-	-
		Left	0.104	0.065	0.169
	WCDMA 1900	Top	-	0.016	0.016
		Bottom	0.614	-	**0.614**
		Front	0.423	0.067	0.490
		Rear	0.398	0.042	0.440
		Right	-	-	-
		Left	0.121	0.065	0.186
	LTE Band 12	Top	-	0.016	0.016
		Bottom	0.134	-	0.134
		Front	0.304	0.067	0.371
		Rear	0.346	0.042	**0.388**
		Right	0.259	-	0.259
		Left	-	0.065	0.065
	LTE Band 13	Top	-	0.016	0.016
		Bottom	0.091	-	0.091
		Front	0.310	0.067	0.377
		Rear	0.374	0.042	**0.416**
		Right	0.175	-	0.175
		Left	-	0.065	0.065
	LTE Band 5	Top	-	0.016	0.016
		Bottom	0.118	-	0.118
		Front	0.228	0.067	0.295
		Rear	0.281	0.042	**0.323**
		Right	0.096	-	0.096
		Left	-	0.065	0.065
	LTE Band 4	Top	-	0.016	0.016
		Bottom	0.584	-	**0.584**
		Front	0.313	0.067	0.380
		Rear	0.349	0.042	0.391
		Right	-	-	-
		Left	0.259	0.065	0.324
	LTE Band 2	Top	-	0.016	0.016
		Bottom	0.613	-	**0.613**
		Front	0.403	0.067	0.470
		Rear	0.408	0.042	0.450
		Right	-	-	-
		Left	0.110	0.065	0.175

Table 12.6.16 Simultaneous Transmission Scenario : 2.4 GHz W-LAN MIMO + 5 GHz W-LAN MIMO (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	2.4G W-LAN MIMO SAR (W/kg)	5G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	5.2G W-LAN MIMO	Top	0.096	0.125	0.221
		Bottom	-	-	-
		Front	0.137	0.045	0.182
		Rear	0.085	0.365	**0.450**
		Right	-	-	-
		Left	0.167	0.091	0.258
	5.8G W-LAN MIMO	Top	0.096	0.084	0.180
		Bottom	-	-	-
		Front	0.137	0.077	0.214
		Rear	0.085	0.240	**0.325**
		Right	-	-	-
		Left	0.167	0.084	0.251

Table 12.6.17 Simultaneous Transmission Scenario : Bluetooth Ant.1 + 5 GHz W-LAN MIMO (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	Bluetooth Ant.1 SAR (W/kg)	5G W-LAN MIMO SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	5.2G W-LAN MIMO	Top	0.016	0.125	0.141
		Bottom	-	-	-
		Front	0.067	0.045	0.112
		Rear	0.042	0.365	**0.407**
		Right	-	-	-
		Left	0.065	0.091	0.156
	5.8G W-LAN MIMO	Top	0.016	0.084	0.100
		Bottom	-	-	-
		Front	0.067	0.077	0.144
		Rear	0.042	0.240	**0.282**
		Right	-	-	-
		Left	0.065	0.084	0.149

Table 12.6.18 Simultaneous Transmission Scenario : Bluetooth Ant.1 + 2.4 GHz W-LAN Ant.2 (Hotspot at 10 mm)

Exposure Condition	Mode	Configuration	Bluetooth Ant.1 SAR (W/kg)	2.4G W-LAN Ant.2 SAR (W/kg)	ΣSAR (W/kg)
			1	2	1+2
Hotspot SAR	2.4G W-LAN Ant.2	Top	0.016	0.054	0.070
		Bottom	-	-	-
		Front	0.067	0.032	**0.099**
		Rear	0.042	0.020	0.062
		Right	-	-	-
		Left	0.065	0.002	0.067

12.7 Phablet SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 648474 D04 Handset SAR, Phablet SAR tests were not required of Hotspot 1g SAR (scaled to maximum output power, including tolerance) < 1.2 W/kg. Therefore no further analysis was required to for Phablet Simultaneous Transmission Analysis.

12.8 Simultaneous Transmission Conclusion

The above numerical summed SAR results 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.

13. SAR MEASUREMENT VARIABILITY

13.1 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 1-g 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
5. The same procedures should be adapted for measurements according to extremity exposure limits by applying a factor of 2.5 for extremity exposure to the corresponding SAR thresholds.

13.2 Measurement Uncertainty

The measured SAR was < 1.5 W/kg for 1g and < 3.75 W/kg for 10g for all frequency bands. Therefore, per KDB Publication 865664 D01v01r04, the extended measurement uncertainty analysis per IEEE 1528-2013 was not required.

14. EQUIPMENT LIST

Table 14.1.1 Test Equipment Calibration

	Type	Manufacturer	Model	Cal.Date	Next.Cal.Date	S/N
☒	SEMITEC Engineering	SEMITEC	N/A	N/A	N/A	Shield Room
☒	SEMITEC Engineering	SEMITEC	N/A	N/A	N/A	Shield Room
☒	SEMITEC Engineering	SEMITEC	N/A	N/A	N/A	Shield Room
☒	Robot	SPEAG	TX90XL	N/A	N/A	F13/5RR2A1/A/01
☒	Robot	SPEAG	TX90XL	N/A	N/A	F13/5P9GA1/A/01
☒	Robot	SPEAG	TX60L	N/A	N/A	F14/5VR2A1/A/01
☒	Robot Controller	SPEAG	CS8C	N/A	N/A	F13/5RR2A1/C/01
☒	Robot Controller	SPEAG	CS8C	N/A	N/A	F13/5P9GA1/C/01
☒	Robot Controller	SPEAG	CS8C	N/A	N/A	F14/5VR2A1/C/01
☒	Joystick	SPEAG	N/A	N/A	N/A	S-13200990
☒	Joystick	SPEAG	N/A	N/A	N/A	S-12450905
☒	Joystick	SPEAG	N/A	N/A	N/A	D21142605A
☒	Intel Core i7-3770 3.40 GHz Windows 7 Professional	N/A	N/A	N/A	N/A	N/A
☒	Intel Core i7-3770 3.40 GHz Windows 7 Professional	N/A	N/A	N/A	N/A	N/A
☒	Intel Core i7-4770 3.40 GHz Windows 7 Professional	N/A	N/A	N/A	N/A	N/A
☒	Probe Alignment Unit LB	N/A	N/A	N/A	N/A	SE UKS 030 AA
☒	Probe Alignment Unit LB	N/A	N/A	N/A	N/A	SE UKS 030 AA
☒	Probe Alignment Unit LB	N/A	N/A	N/A	N/A	SE UKS 030 AA
☒	Device Holder	SPEAG	SD000H01HA	N/A	N/A	N/A
☒	Device Holder	SPEAG	SD000H01HA	N/A	N/A	N/A
☒	Device Holder	SPEAG	SD000H01HA	N/A	N/A	N/A
☒	Twin SAM Phantom	SPEAG	QD000P40CD	N/A	N/A	1785
☒	Twin SAM Phantom	SPEAG	QD000P40CD	N/A	N/A	1786
☒	Twin SAM Phantom	SPEAG	QD000P40CD	N/A	N/A	1782
☒	Twin SAM Phantom	SPEAG	QD000P40CD	N/A	N/A	1783
☒	Twin SAM Phantom	SPEAG	QD000P40CD	N/A	N/A	1220
☒	Data Acquisition Electronics	SPEAG	DAE4V1	2019-03-20	2020-03-20	1394
☒	Data Acquisition Electronics	SPEAG	DAE4V1	2019-04-18	2020-04-18	1391
☒	Data Acquisition Electronics	SPEAG	DAE4V1	2019-05-23	2020-05-23	1392
☒	Dosimetric E-Field Probe	SPEAG	ES3DV3	2019-08-27	2020-08-27	3327
☒	Dosimetric E-Field Probe	SPEAG	EX3DV4	2019-11-18	2020-11-18	3930
☒	Dosimetric E-Field Probe	SPEAG	EX3DV4	2019-09-27	2020-09-27	3933
☒	Dosimetric E-Field Probe	SPEAG	EX3DV4	2019-08-27	2020-08-27	7368
☒	750MHz SAR Dipole	SPEAG	D750V3	2019-01-25	2021-01-25	1049
☒	835MHz SAR Dipole	SPEAG	D835V2	2019-07-18	2020-07-18	464
☒	1800MHz SAR Dipole	SPEAG	D1800V2	2019-04-24	2021-04-24	2d047
☒	1900MHz SAR Dipole	SPEAG	D1900V2	2019-07-17	2020-07-17	5d029
☒	2450MHz SAR Dipole	SPEAG	D2450V2	2019-09-19	2021-09-19	726
☒	5GHz SAR Dipole	SPEAG	D5GHzV2	2019-02-28	2021-02-28	1103
☒	Network Analyzer	Agilent	E5071C	2019-06-24	2020-06-24	MY46106970
☒	Signal Generator	Agilent	E4438C	2019-06-24	2020-06-24	US41461520
☒	Amplifier	RFBAY.Inc	MPA-40-40	2018-12-20 2019-12-16	2019-12-20 2020-12-16	21151801
☒	Amplifier	EMPOWER	BBS3Q7ELU	2019-06-24	2020-06-24	1020
☒	High Power RF Amplifier	EMPOWER	BBS3Q8CCJ	2019-06-24	2020-06-24	1005
☒	Power Meter	HP	EPM-442A	2018-12-19 2019-12-18	2019-12-19 2020-12-18	GB37170267
☒	Power Meter	HP	EPM-442A	2018-12-18 2019-12-16	2019-12-18 2020-12-16	GB37170413
☒	Power Sensor	HP	8481A	2018-12-18 2019-12-16	2019-12-18 2020-12-16	US37294267
☒	Power Sensor	HP	8481A	2018-12-19 2019-12-18	2019-12-19 2020-12-18	3318A96566
☒	Power Sensor	HP	8481A	2018-12-19 2019-12-18	2019-12-19 2020-12-18	2702A65976
☒	Dual Directional Coupler	Agilent	778D-012	2018-12-19 2019-12-17	2019-12-19 2020-12-17	50228
☒	Directional Coupler	HP	772D	2019-06-24	2020-06-24	2889A01064
☒	Low Pass Filter 1GHz	Wainwright Instruments	WLK6-1000-1400-9000-60SS	2019-06-24	2020-06-24	165
☒	Low Pass Filter 1.5GHz	Micro LAB	LA-15N	2019-06-24	2020-06-24	2
☒	Low Pass Filter 3.0GHz	Micro LAB	LA-30N	2019-06-24	2020-06-24	2
☒	Low Pass Filter 6.0GHz	Micro LAB	LA-60N	2018-12-19 2019-12-17	2019-12-19 2020-12-17	03942
☒	Attenuators(10 dB)	WEINSCHEL	23-10-34	2018-12-19 2019-12-17	2019-12-19 2020-12-17	BP4387
☒	Attenuators	Cernexwave	CFADC2603U5	2019-06-27	2020-06-27	C11740
☒	Dielectric Probe kit	SPEAG	DAK-3.5	2019-11-19	2020-11-19	1092
☒	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	2019-06-28	2020-06-28	GB41321164
☒	Wideband Radio Communication Tester	Rohde Schwarz	CMW500	2018-12-19 2019-12-16	2019-12-19 2020-12-16	101414
☒	Wideband Radio Communication Tester	Rohde Schwarz	CMW500	2019-03-06	2020-03-06	127323
☒	Radio Communication Analyzer	Agilent	E5515E	2019-06-28	2020-06-28	MY52113012
☒	Power Splitter	Anritsu	K241B	2018-12-18 2019-12-16	2019-12-18 2020-12-16	1301183
☒	Bluetooth Tester	TESCOM	TC-3000B	2018-12-18	2019-12-18	3000B770243
☒	Bluetooth Tester	TESCOM	TC-3000C	2019-06-24	2020-06-24	3000C000563

NOTE(S):
1. The E-field probe was calibrated by SPEAG, by temperature measurement procedure. Dipole Verification measurement is performed by DT&C before each test. The brain and muscle simulating material are calibrated by DT&C using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain and muscle-equivalent material. Each equipment item was used solely within its respective calibration period.
2. 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. 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

750 MHz Head (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.1	Normal	1	0.78	0.71	± 3.2 %	± 2.9 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.2	Normal	1	0.23	0.26	± 1.0 %	± 1.1 %	10
Temp. unc. - Conductivity	± 1.9	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 2.0	Rectangular	√3	0.23	0.26	± 0.3%	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

750 MHz Body (SN: 3327)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.8	Normal	1	0.78	0.71	± 3.0 %	± 2.7 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.1	Normal	1	0.23	0.26	± 0.9 %	± 1.1 %	10
Temp. unc. - Conductivity	± 1.8	Rectangular	√3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

835 MHz Head (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.9	Normal	1	0.78	0.71	± 3.0 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 3.7	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 1.9	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 1.8	Rectangular	√3	0.23	0.26	± 0.2 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

835 MHz Body (SN: 3327)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.4	Normal	1	0.78	0.71	± 3.4 %	± 3.1 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.0	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 1.8	Rectangular	√3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.7 %**	**± 11.5 %**	330
Expanded Uncertainty (k=2)						**± 23.4 %**	**± 23.0 %**	

The above measurement uncertainties are according to IEEE Std 1528

1800 MHz Head (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.9	Normal	1	0.78	0.71	± 3.0 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.3	Normal	1	0.23	0.26	± 1.0 %	± 1.1 %	10
Temp. unc. - Conductivity	± 2.0	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 2.1	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

1800 MHz Body (SN: 3327)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.9	Normal	1	0.78	0.71	± 3.0 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 3.8	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 1.8	Rectangular	√3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 1.8	Rectangular	√3	0.23	0.26	± 0.2 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

1900 MHz Head (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.7	Normal	1	0.78	0.71	± 2.9 %	± 2.6 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 3.8	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 2.0	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 2.0	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

1900 MHz Body (SN: 3327)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.9	Normal	1	0.78	0.71	± 3.0 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 3.6	Normal	1	0.23	0.26	± 0.8 %	± 0.9 %	10
Temp. unc. - Conductivity	± 2.0	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

2450 MHz Head (SN: 7368)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.1	Normal	1	0.78	0.71	± 3.2 %	± 2.9 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 3.8	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 1.9	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

2450 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.0	Normal	1	1	1	± 6.0 %	± 6.0 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.0	Normal	1	0.78	0.71	± 3.1 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.3	Normal	1	0.23	0.26	± 1.0 %	± 1.1 %	10
Temp. unc. - Conductivity	± 1.8	Rectangular	√3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.6 %**	**± 11.4 %**	330
Expanded Uncertainty (k=2)						**± 23.2 %**	**± 22.8 %**	

The above measurement uncertainties are according to IEEE Std 1528

5200 MHz Body (SN: 3930)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.2	Normal	1	0.78	0.71	± 3.3 %	± 3.0 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.0	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 1.8	Rectangular	√3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 1.8	Rectangular	√3	0.23	0.26	± 0.2 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.8 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.6 %**	

The above measurement uncertainties are according to IEEE Std 1528

5300 MHz Head (SN: 7368)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.0	Normal	1	0.78	0.71	± 3.1 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.3	Normal	1	0.23	0.26	± 1.0 %	± 1.1 %	10
Temp. unc. - Conductivity	± 1.9	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 1.7	Rectangular	√3	0.23	0.26	± 0.2 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

5300 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.9	Normal	1	0.78	0.71	± 3.0 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.2	Normal	1	0.23	0.26	± 1.0 %	± 1.1 %	10
Temp. unc. - Conductivity	± 1.7	Rectangular	√3	0.78	0.71	± 0.8 %	± 0.7 %	∞
Temp. unc. - Permittivity	± 1.7	Rectangular	√3	0.23	0.26	± 0.2 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

5500 MHz Head (SN: 7368)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.9	Normal	1	0.78	0.71	± 3.0 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.0	Normal	1	0.23	0.26	± 0.9 %	± 1.0 %	10
Temp. unc. - Conductivity	± 1.9	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

5500 MHz Body (SN: 3930)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.8	Normal	1	0.78	0.71	± 3.0 %	± 2.7 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.1	Normal	1	0.23	0.26	± 0.9 %	± 1.1 %	10
Temp. unc. - Conductivity	± 1.9	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

5800 MHz Head (SN: 7368)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 3.7	Normal	1	0.78	0.71	± 2.9 %	± 2.6 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.1	Normal	1	0.23	0.26	± 0.9 %	± 1.1 %	10
Temp. unc. - Conductivity	± 1.9	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 2.0	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

5800 MHz Body (SN: 3933)

Error Description	Uncertainty value ±%	Probability Distribution	Divisor	(Ci) 1g	(Ci) 10g	Standard (1g)	Standard (10g)	vi 2 or Veff
Measurement System								
Probe calibration	± 6.55	Normal	1	1	1	± 6.6 %	± 6.6 %	∞
Isotropy	± 1.3	Normal	1	1	1	± 1.3 %	± 1.3 %	∞
Boundary Effects	± 2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %	∞
Probe Linearity	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Probe modulation response	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Detection limits	± 0.25	Rectangular	√3	1	1	± 0.14 %	± 0.14 %	∞
Readout Electronics	± 0.3	Normal	1	1	1	± 0.3 %	± 0.3 %	∞
Response time	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Integration time	± 2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %	∞
RF Ambient Conditions – Noise	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
RF Ambient Conditions – Reflections	± 3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %	∞
Probe Positioner	± 0.8	Rectangular	√3	1	1	± 0.46 %	± 0.46 %	∞
Probe Positioning	± 6.7	Rectangular	√3	1	1	± 3.9 %	± 3.9 %	∞
Algorithms for Max. SAR Eval.	± 4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %	∞
Test Sample Related								
Device Positioning	± 2.9	Normal	1	1	1	± 2.9 %	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	1	± 3.6 %	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %	∞
SAR Scaling	± 0.0	Rectangular	√3	1	1	± 0.0 %	± 0.0 %	∞
Physical Parameters								
Phantom Shell	± 7.6	Rectangular	√3	1	1	± 4.4 %	± 4.4 %	∞
SAR correction	± 0.0	Normal	1	1	0.84	± 0.0 %	± 0.0 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %	∞
Liquid conductivity (Meas.)	± 4.0	Normal	1	0.78	0.71	± 3.1 %	± 2.8 %	10
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.60	0.49	± 1.7 %	± 1.4 %	∞
Liquid permittivity (Meas.)	± 4.1	Normal	1	0.23	0.26	± 0.9 %	± 1.1 %	10
Temp. unc. - Conductivity	± 2.0	Rectangular	√3	0.78	0.71	± 0.9 %	± 0.8 %	∞
Temp. unc. - Permittivity	± 1.9	Rectangular	√3	0.23	0.26	± 0.3 %	± 0.3 %	∞
Combined Standard Uncertainty						**± 11.9 %**	**± 11.7 %**	330
Expanded Uncertainty (k=2)						**± 23.8 %**	**± 23.4 %**	

The above measurement uncertainties are according to IEEE Std 1528

16. CONCLUSION

Measurement Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under the worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests. The tested device complies with the requirements in respect to all parameters subject to the test. The test results and statements relate only to the item(s) tested.

Please note that the absorption and distribution of electromagnetic energy in the body are every 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 impossible biological effect 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 innumerable factors may interact to determine the specific biological outcome of an exposure to electromagnetic fields, any protection guide shall consider maximal amplification of biological effects as a result of field-body interactions, environmental conditions, and physiological variables.

17. REFERENCES

[1] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radiofrequency Radiation, Aug. 1996.

[2] ANSI/IEEE C95.1-2005, American National Standard safety levels with respect to human exposure to radiofrequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, 2006.

[3] ANSI/IEEE C95.1-1992, American National Standard safety levels with respect to human exposure to radiofrequency electromagnetic fields, 3kHz to 300GHz, New York: IEEE, Sept. 1992.

[4] ANSI/IEEE C95.3-2002, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: IEEE, December 2002.

[5] IEEE Standards Coordinating Committee 39 –Standards Coordinating Committee 34 – IEEE Std. 1528-2003,Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices.

[6] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.

[7] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.

[8] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. -124.

[9] K. Pokovic, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.

[10] Schmid& Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.

[11] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Modeling at 900 MHz, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct.1996, pp. 1865-1873.

[12] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300MHz, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.

[13] G. Hartsgrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bio electromagnetics, Canada: 1987, pp. 29-36.

[14] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.

[15] W. Gander, Computer mathematick, Birkhaeuser, Basel, 1992.

[16] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recipes in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.

[17] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.

[18] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Fields High-frequency: 10kHz-300GHz, Jan. 1995.

[19] Prof. Dr. Niels Kuster, ETH, Eidgenössische Technische Hoschschule Zürich, Dosimetric Evaluation of the Cellular Phone.

[20] IEC 62209-1, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3 GHz), Feb. 2005.

[21] Industry Canada RSS-102 Radio Frequency Exposure Compliance of Radio communication Apparatus (All Frequency Bands) Issue 5, March 2015.

[22] Health Canada Safety Code 6 Limits of Human Exposure to Radio Frequency Electromagnetic Fields in the Frequency Range from 3 kHz – 300 GHz, 2009

[23] FCC SAR Test Procedures for 2G-3G Devices, Mobile Hotspot and UMPC Devices KDB Publications 941225,D01-D07

[24] SAR Measurement procedures for IEEE 802.11a/b/g KDB Publication 248227 D01v02

[25] FCC SAR Considerations for Handsets with Multiple Transmitters and Antennas, KDB Publications 648474D02-D04

[26] FCC SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers, FCC KDB Publication 616217 D04

[27] FCC SAR Measurement and Reporting Requirements for 100MHz – 6 GHz, KDB Publications 865664 D01-D02

[28] FCC General RF Exposure Guidance and SAR Procedures for Dongles, KDB Publication 447498, D01-D02

[29] 615223 D01 802 16e WI-Max SAR Guidance v01, Nov. 13, 2009

[30] Anexo à Resolução No. 533, de 10 de September de 2009.

[31] IEC 62209-2, Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures - Part 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), Mar. 2010.

APPENDIX A. – Probe Calibration Data

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 DT&C (Dymstec) Certificate No: ES3-3327_Aug19

CALIBRATION CERTIFICATE

Object ES3DV3 - SN:3327

Calibration procedure(s) QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v7
Calibration procedure for dosimetric E-field probes

Calibration date: August 27, 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	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
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:	Manu Sietz	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 29, 2019

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) Accreditation No.: **SCS 0108**
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

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).

ES3DV3 – SN:3327 August 27, 2019

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3327

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.12	1.08	1.01	± 10.1 %
DCP (mV)[B]	105.3	106.4	106.5	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max dev.	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	198.0	±3.0 %	± 4.7 %
		Y	0.0	0.0	1.0		196.8		
		Y	0.0	0.0	1.0		194.1		

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: ES3DV3 - SN:3327

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	6
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

DASY/EASY - Parameters of Probe: ES3DV3 - SN:3327

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	6.64	6.64	6.64	0.60	1.34	± 12.0 %
835	41.5	0.90	6.46	6.46	6.46	0.75	1.19	± 12.0 %
900	41.5	0.97	6.35	6.35	6.35	0.49	1.45	± 12.0 %
1750	40.1	1.37	5.59	5.59	5.59	0.80	1.18	± 12.0 %
1900	40.0	1.40	5.34	5.34	5.34	0.73	1.24	± 12.0 %
2450	39.2	1.80	4.65	4.65	4.65	0.75	1.27	± 12.0 %
2600	39.0	1.96	4.58	4.58	4.58	0.80	1.32	± 12.0 %

[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: ES3DV3 - SN:3327

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	6.49	6.49	6.49	0.80	1.14	± 12.0 %
835	55.2	0.97	6.38	6.38	6.38	0.80	1.15	± 12.0 %
900	55.0	1.05	6.28	6.28	6.28	0.70	1.28	± 12.0 %
1750	53.4	1.49	5.27	5.27	5.27	0.65	1.38	± 12.0 %
1900	53.3	1.52	5.00	5.00	5.00	0.63	1.50	± 12.0 %
2450	52.7	1.95	4.61	4.61	4.61	0.80	1.24	± 12.0 %
2600	52.5	2.16	4.41	4.41	4.41	0.80	1.25	± 12.0 %

[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.

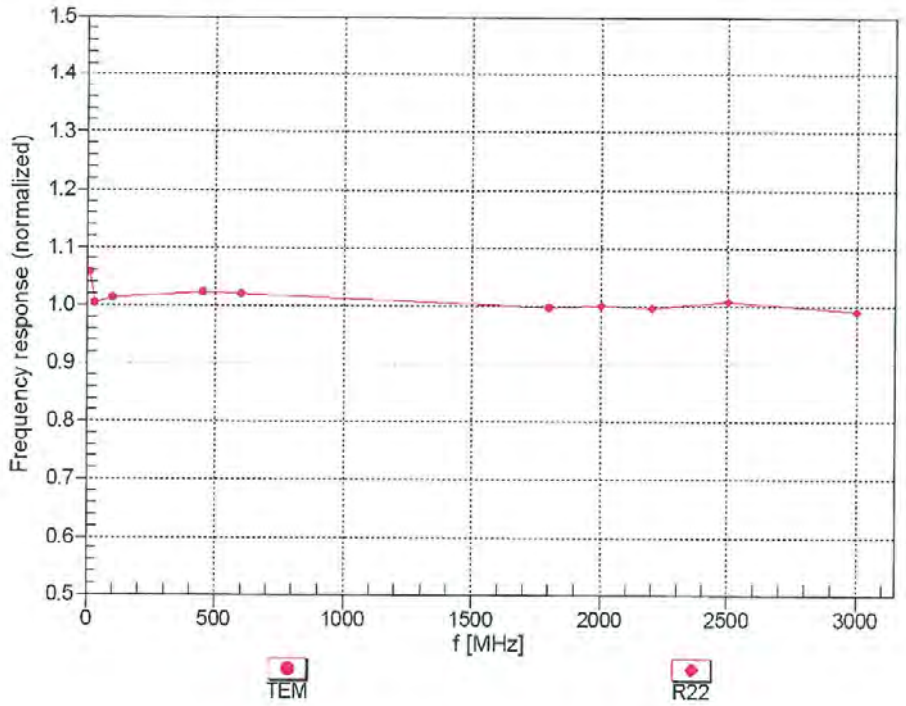
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF 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.

ES3DV3– SN:3327 August 27, 2019

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)

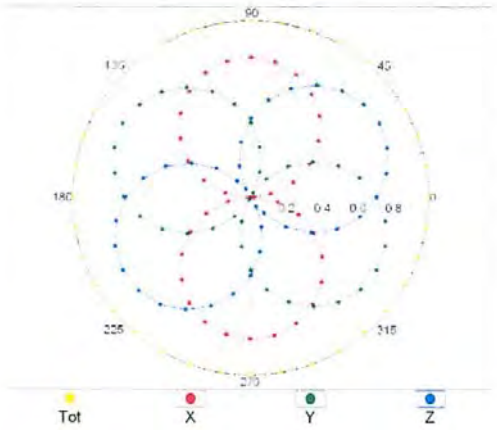


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

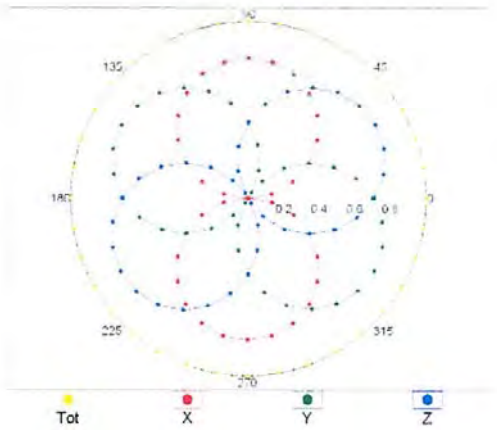
ES3DV3– SN:3327 August 27, 2019

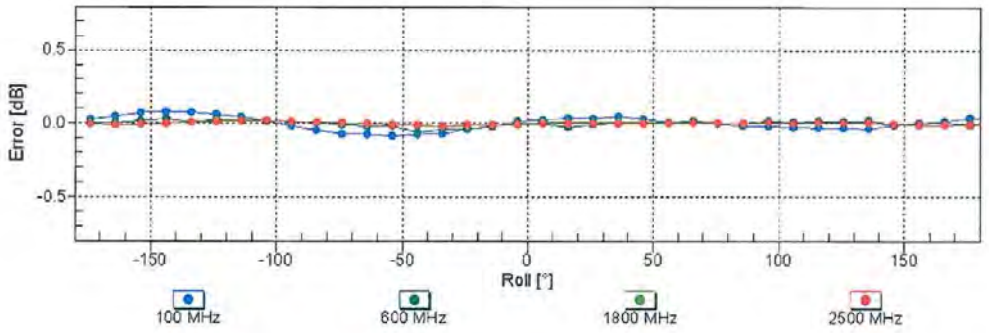
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

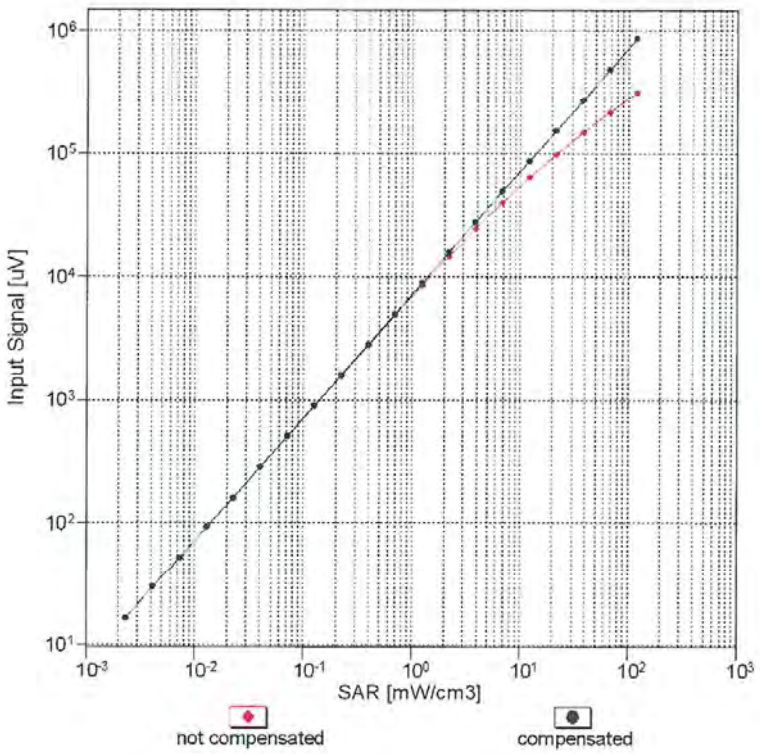


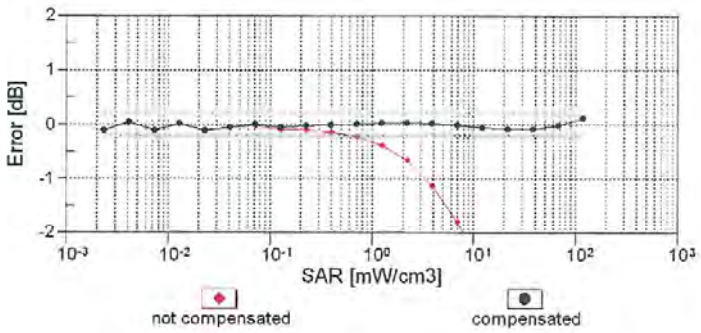


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

ES3DV3– SN:3327 August 27, 2019

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)



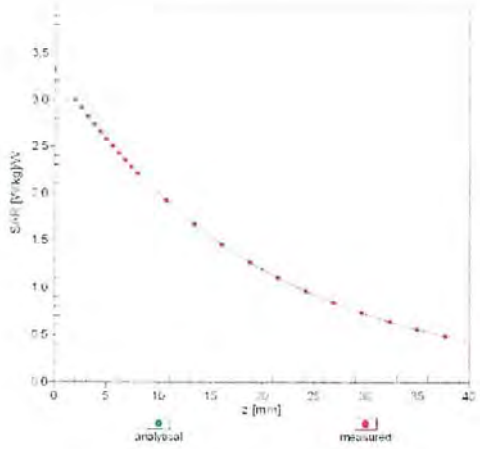


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

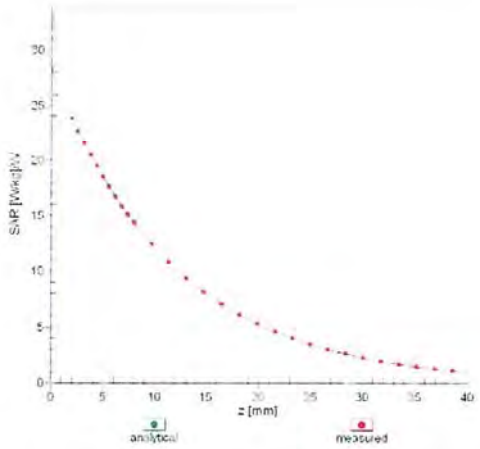
ES3DV3– SN:3327 August 27, 2019

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

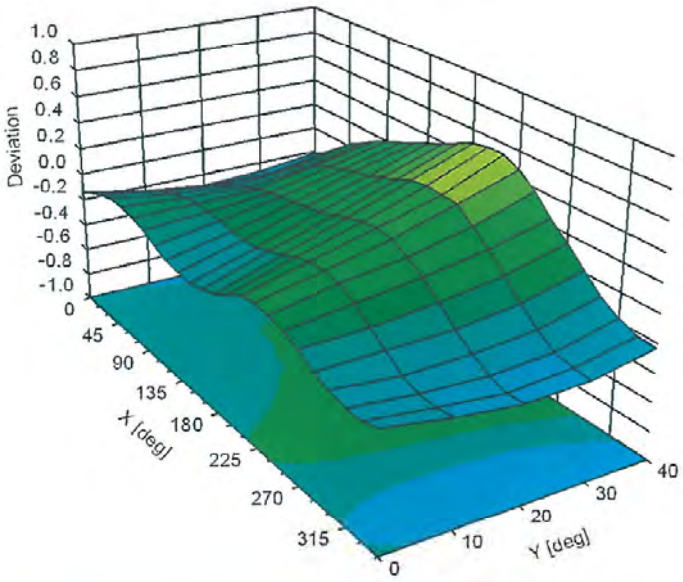


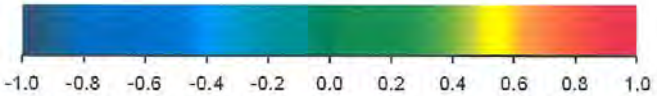
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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

S C S Schweizerischer Kalibrierdienst
Service suisse d'étalonnage
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

Client DT&C (Dymstec) Certificate No. EX3-3930_Nov19

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3930
Calibration procedure(s)	QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7 Calibration procedure for dosimetric E-field probes
Calibration date	November 18, 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	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
DAE4	SN: 660	07-Oct-19 (No. DAE4-660_Oct19)	Oct-20
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-19)	In house check: Oct-20

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: November 18, 2019

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
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:3930

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.38	0.36	0.44	± 10.1 %
DCP (mV)[B]	106.8	104.5	106.6	

Calibration Results for Modulation Response

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Max dev.	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	144.6	±3.3 %	± 4.7 %
		Y	0.0	0.0	1.0		152.8		
		Z	0.0	0.0	1.0		156.3		

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:3930

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	102.9
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:3930

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)
2450	39.2	1.80	7.66	7.66	7.66	0.41	0.90	± 12.0 %
2600	39.0	1.96	7.50	7.50	7.50	0.45	0.90	± 12.0 %
3300	38.2	2.71	7.00	7.00	7.00	0.35	1.30	± 13.1 %
3500	37.9	2.91	6.95	6.95	6.95	0.35	1.30	± 13.1 %
3700	37.7	3.12	6.80	6.80	6.80	0.35	1.30	± 13.1 %
3900	37.5	3.32	6.50	6.50	6.50	0.40	1.50	± 13.1 %
4100	37.2	3.53	6.27	6.27	6.27	0.40	1.50	± 13.1 %
4200	37.1	3.63	6.26	6.26	6.26	0.40	1.50	± 13.1 %
4400	36.9	3.84	6.09	6.09	6.09	0.40	1.60	± 13.1 %
4600	36.7	4.04	6.08	6.08	6.08	0.40	1.70	± 13.1 %
4800	36.4	4.25	5.92	5.92	5.92	0.40	1.80	± 13.1 %
4950	36.3	4.40	5.87	5.87	5.87	0.40	1.80	± 13.1 %
5200	36.0	4.66	5.55	5.55	5.55	0.40	1.80	± 13.1 %
5300	35.9	4.76	5.30	5.30	5.30	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.99	4.99	4.99	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.81	4.81	4.81	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.90	4.90	4.90	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:3930

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)
2450	52.7	1.95	7.88	7.88	7.88	0.30	0.90	± 12.0 %
2600	52.5	2.16	7.74	7.74	7.74	0.29	0.90	± 12.0 %
3300	51.6	3.08	6.65	6.65	6.65	0.40	1.35	± 13.1 %
3500	51.3	3.31	6.44	6.44	6.44	0.40	1.35	± 13.1 %
3700	51.0	3.55	6.34	6.34	6.34	0.40	1.35	± 13.1 %
3900	51.2	3.78	6.47	6.47	6.47	0.40	1.50	± 13.1 %
4100	50.5	4.01	6.18	6.18	6.18	0.40	1.50	± 13.1 %
4200	50.4	4.13	5.82	5.82	5.82	0.40	1.50	± 13.1 %
4400	50.1	4.37	5.73	5.73	5.73	0.40	1.60	± 13.1 %
4600	49.8	4.60	5.61	5.61	5.61	0.40	1.80	± 13.1 %
4800	49.6	4.83	5.38	5.38	5.38	0.50	1.90	± 13.1 %
4950	49.4	5.01	5.10	5.10	5.10	0.50	1.90	± 13.1 %
5200	49.0	5.30	4.65	4.65	4.65	0.50	1.90	± 13.1 %
5300	48.9	5.42	4.50	4.50	4.50	0.50	1.90	± 13.1 %
5500	48.6	5.65	4.30	4.30	4.30	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.12	4.12	4.12	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.10	4.10	4.10	0.50	1.90	± 13.1 %

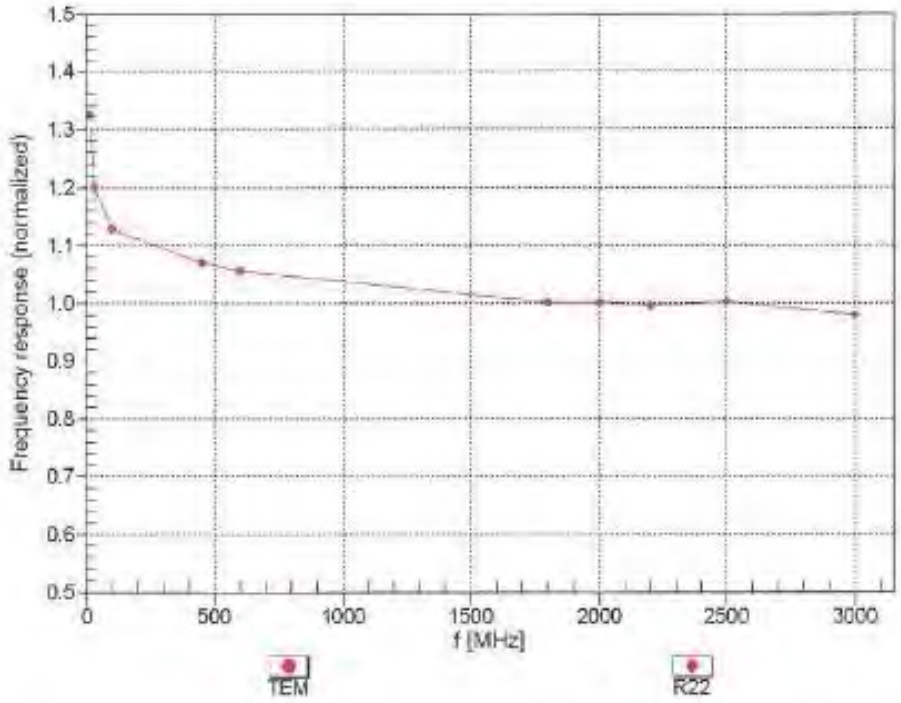
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz 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.

EX3DV4– SN:3930 November 18, 2019

Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



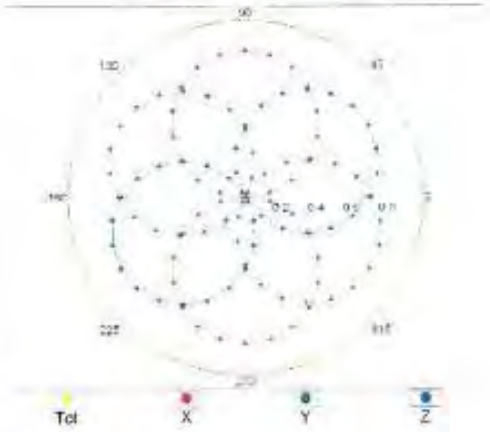
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

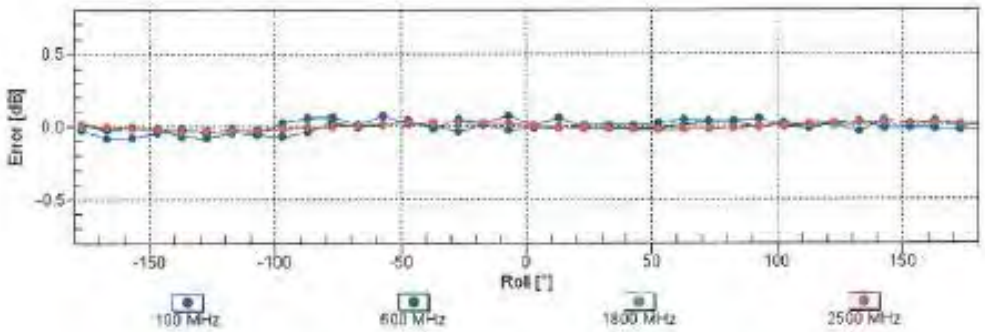
EX3DV4– SN:3930 November 18, 2019

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM

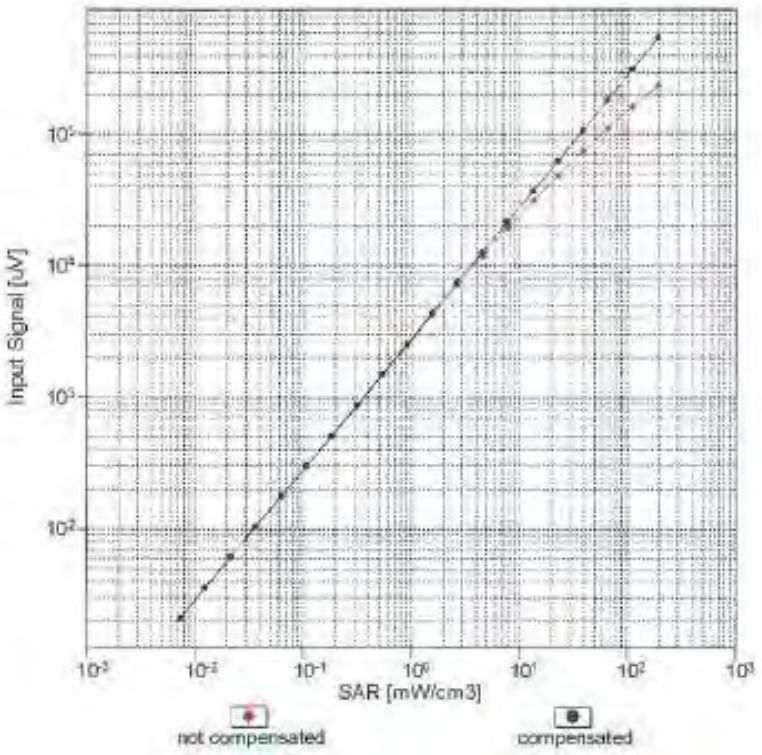
f=1800 MHz,R22

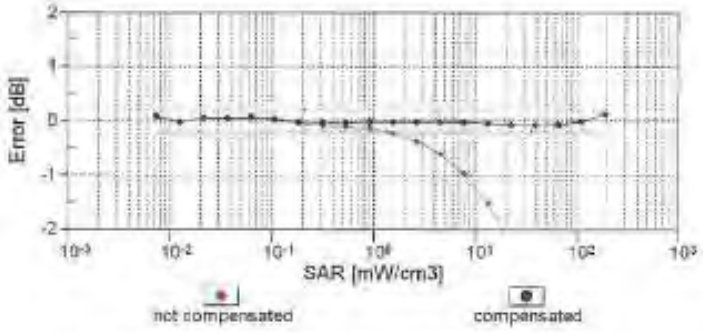




Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)



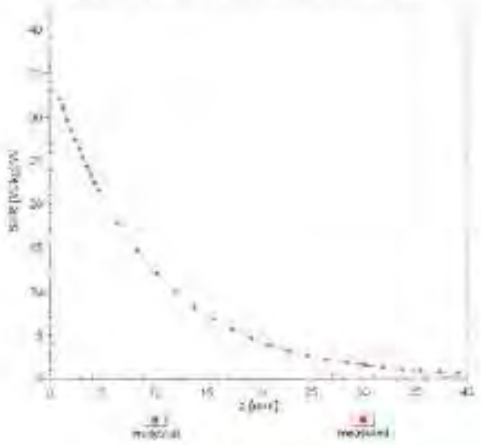


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

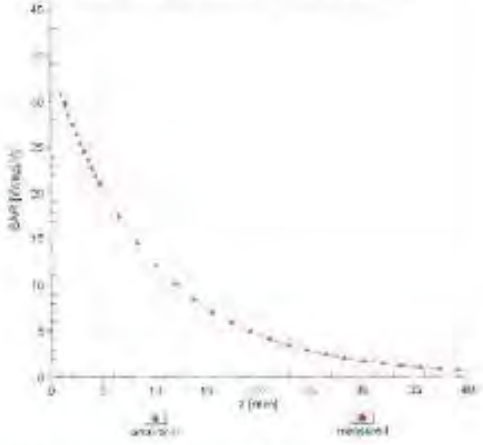
EX3DV4– SN:3930 November 18, 2019

Conversion Factor Assessment

f = 2450 MHz,WGLS R22 (H_convF)

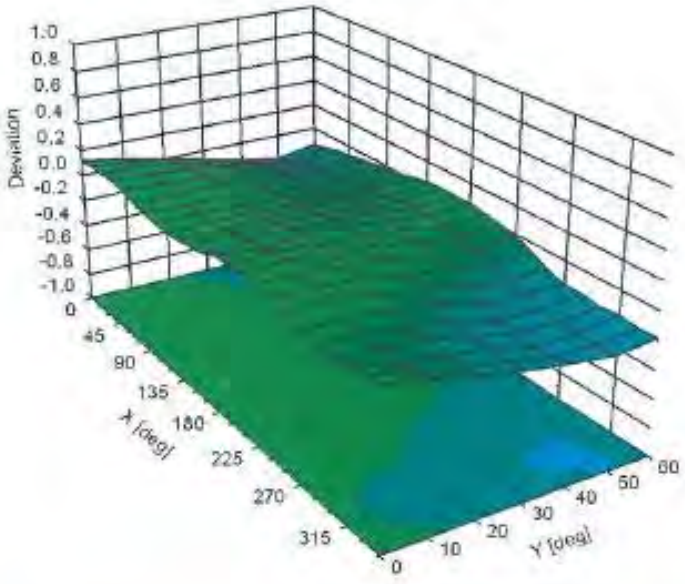


f = 2450 MHz,WGLS R22 (M_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: EX3-3930_Nov19 Page 10 of 10

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**

Client **DT&C (Dymstec)** Certificate No: **EX3-3933_Sep19**

CALIBRATION CERTIFICATE

Object EX3DV4 - SN:3933

Calibration procedure(s) QA CAL-01.v9, QA CAL-14.v5, QA CAL-23.v5, QA CAL-25.v7
Calibration procedure for dosimetric E-field probes

Calibration date: September 27, 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	03-Apr-19 (No. 217-02892/02893)	Apr-20
Power sensor NRP-Z91	SN: 103244	03-Apr-19 (No. 217-02892)	Apr-20
Power sensor NRP-Z91	SN: 103245	03-Apr-19 (No. 217-02893)	Apr-20
Reference 20 dB Attenuator	SN: S5277 (20x)	04-Apr-19 (No. 217-02894)	Apr-20
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: September 30, 2019

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
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:3933

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.49	0.52	0.19	± 10.1 %
DCP (mV)[B]	105.1	100.3	95.6	

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	163.3	± 2.2 %	± 4.7 %
		Y	0.00	0.00	1.00		166.6		
		Z	0.00	0.00	1.00		158.8		
10352-AAA	Pulse Waveform (200Hz, 10%)	X	15.00	90.30	22.21	10.00	60.0	± 3.2 %	± 9.6 %
		Y	15.00	89.45	22.16		60.0		
		Z	15.00	90.07	22.52		60.0		
10353-AAA	Pulse Waveform (200Hz, 20%)	X	15.00	93.23	22.50	6.99	80.0	± 2.1 %	± 9.6 %
		Y	15.00	90.02	21.08		80.0		
		Z	15.00	92.33	21.94		80.0		
10354-AAA	Pulse Waveform (200Hz, 40%)	X	15.00	102.11	25.43	3.98	95.0	± 2.4 %	± 9.6 %
		Y	15.00	91.85	20.31		95.0		
		Z	15.00	161.21	54.32		95.0		
10355-AAA	Pulse Waveform (200Hz, 60%)	X	15.00	127.83	36.23	2.22	120.0	± 3.0 %	± 9.6 %
		Y	15.00	100.88	23.08		120.0		
		Z	0.11	60.00	30.00		120.0		
10387-AAA	QPSK Waveform, 1 MHz	X	15.00	94.61	19.88	0.00	150.0	± 4.9 %	± 9.6 %
		Y	0.98	66.33	11.74		150.0		
		Z	0.03	60.00	30.00		150.0		
10388-AAA	QPSK Waveform, 10 MHz	X	4.47	82.57	22.97	0.00	150.0	± 4.7 %	± 9.6 %
		Y	2.77	72.49	18.16		150.0		
		Z	15.00	116.88	37.35		150.0		
10396-AAA	64-QAM Waveform, 100 kHz	X	3.14	73.89	21.30	3.01	150.0	± 3.7 %	± 9.6 %
		Y	3.97	75.80	21.70		150.0		
		Z	15.00	121.14	42.19		150.0		
10399-AAA	64-QAM Waveform, 40 MHz	X	4.01	70.75	18.20	0.00	150.0	± 3.5 %	± 9.6 %
		Y	3.70	68.48	16.76		150.0		
		Z	6.59	83.14	25.05		150.0		
10414-AAA	WLAN CCDF, 64-QAM, 40MHz	X	4.96	67.04	16.71	0.00	150.0	± 4.5 %	± 9.6 %
		Y	4.95	66.11	16.05		150.0		
		Z	5.53	71.03	19.84		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:3933

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	37.1	274.02	35.44	16.09	0.81	5.10	0.05	0.40	1.01
Y	48.6	371.39	37.26	21.32	1.16	5.10	0.67	0.53	1.01
Z	27.0	217.61	42.23	8.67	1.66	5.07	0.00	0.24	1.01

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	76.2
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:3933

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	10.68	10.68	10.68	0.45	0.86	± 12.0 %
835	41.5	0.90	10.32	10.32	10.32	0.41	0.90	± 12.0 %
900	41.5	0.97	10.01	10.01	10.01	0.52	0.80	± 12.0 %
1750	40.1	1.37	8.87	8.87	8.87	0.34	0.87	± 12.0 %
1900	40.0	1.40	8.57	8.57	8.57	0.30	0.87	± 12.0 %
2300	39.5	1.67	8.19	8.19	8.19	0.29	0.90	± 12.0 %
2450	39.2	1.80	7.84	7.84	7.84	0.33	0.90	± 12.0 %
2600	39.0	1.96	7.62	7.62	7.62	0.25	0.90	± 12.0 %
3500	37.9	2.91	7.27	7.27	7.27	0.30	1.35	± 13.1 %
3700	37.7	3.12	6.99	6.99	6.99	0.30	1.35	± 13.1 %
5200	36.0	4.66	5.29	5.29	5.29	0.40	1.80	± 13.1 %
5300	35.9	4.76	5.10	5.10	5.10	0.40	1.80	± 13.1 %
5500	35.6	4.96	4.95	4.95	4.95	0.40	1.80	± 13.1 %
5600	35.5	5.07	4.80	4.80	4.80	0.40	1.80	± 13.1 %
5800	35.3	5.27	4.75	4.75	4.75	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:3933

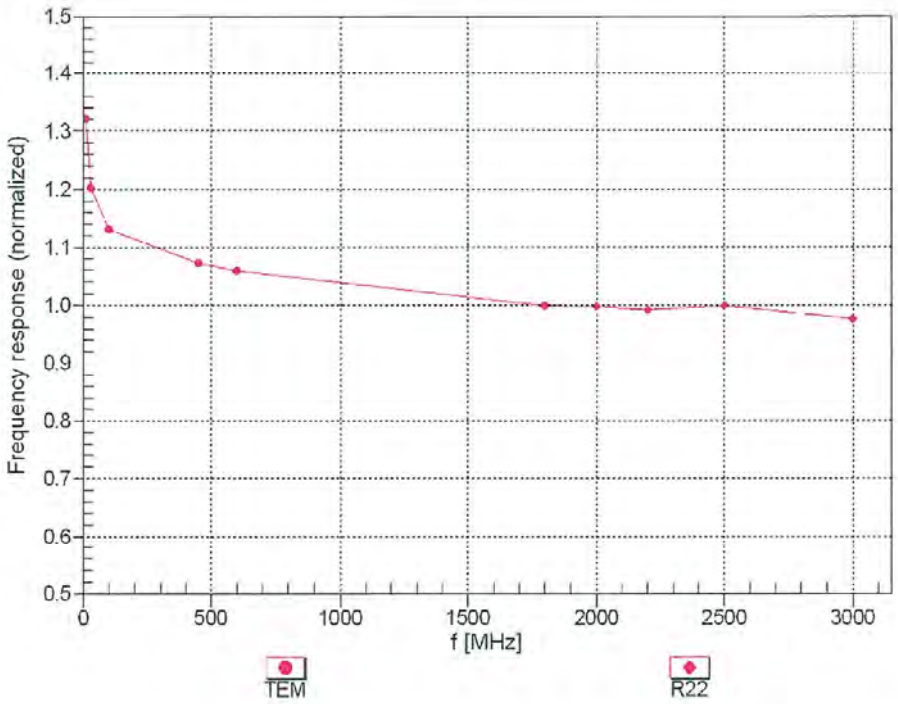
Calibration Parameter Determined in Body Tissue Simulating Media

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	10.44	10.44	10.44	0.45	0.80	± 12.0 %
835	55.2	0.97	10.24	10.24	10.24	0.40	0.80	± 12.0 %
900	55.0	1.05	10.14	10.14	10.14	0.47	0.80	± 12.0 %
1750	53.4	1.49	8.64	8.64	8.64	0.40	0.87	± 12.0 %
1900	53.3	1.52	8.15	8.15	8.15	0.40	0.87	± 12.0 %
2300	52.9	1.81	7.94	7.94	7.94	0.39	0.90	± 12.0 %
2450	52.7	1.95	7.75	7.75	7.75	0.38	0.90	± 12.0 %
2600	52.5	2.16	7.57	7.57	7.57	0.31	0.90	± 12.0 %
3500	51.3	3.31	6.88	6.88	6.88	0.40	1.35	± 13.1 %
3700	51.0	3.55	6.82	6.82	6.82	0.40	1.35	± 13.1 %
5200	49.0	5.30	4.66	4.66	4.66	0.50	1.90	± 13.1 %
5300	48.9	5.42	4.56	4.56	4.56	0.50	1.90	± 13.1 %
5500	48.6	5.65	4.20	4.20	4.20	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.05	4.05	4.05	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.13	4.13	4.13	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.

EX3DV4– SN:3933 September 27, 2019

Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)



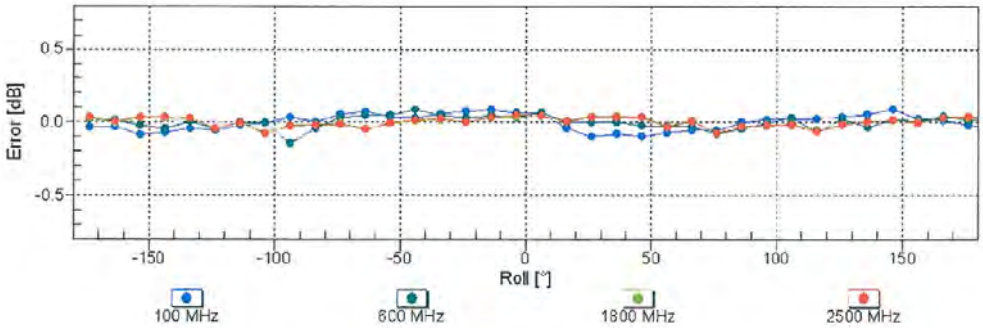
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

EX3DV4– SN:3933 September 27, 2019

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM

f=1800 MHz,R22

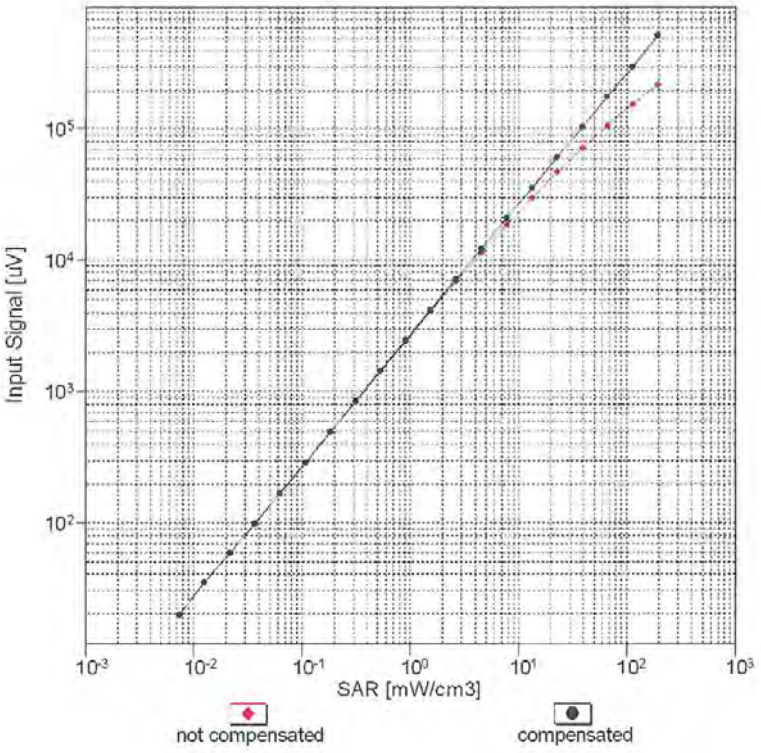


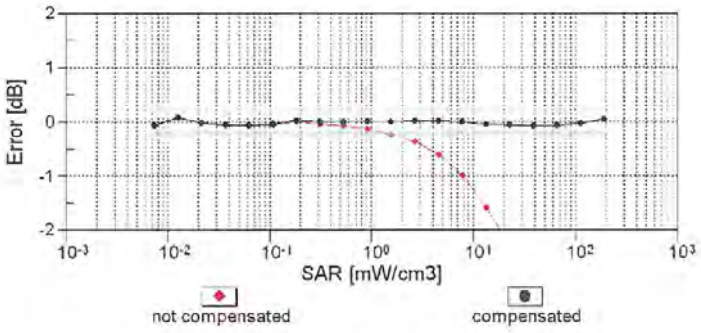
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

EX3DV4– SN:3933 September 27, 2019

Dynamic Range f(SAR_{head})

(TEM cell , f_{eval}= 1900 MHz)



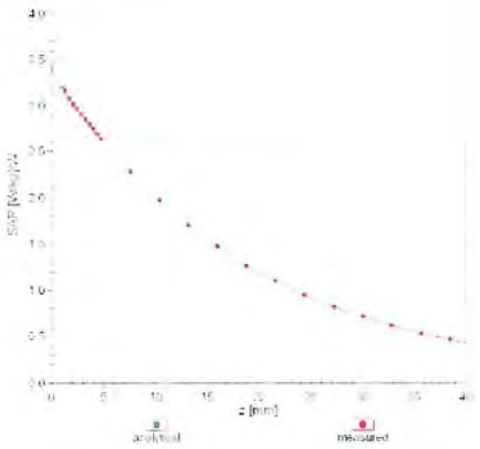


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

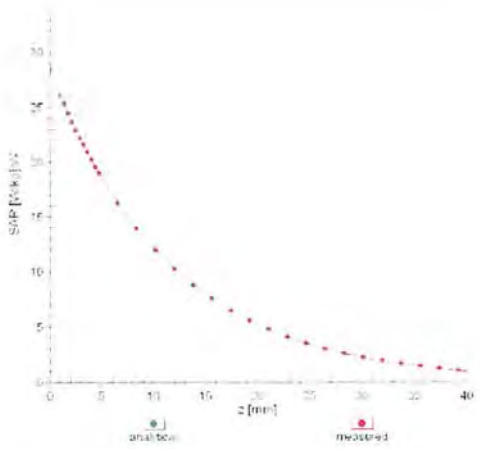
EX3DV4– SN:3933 September 27, 2019

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

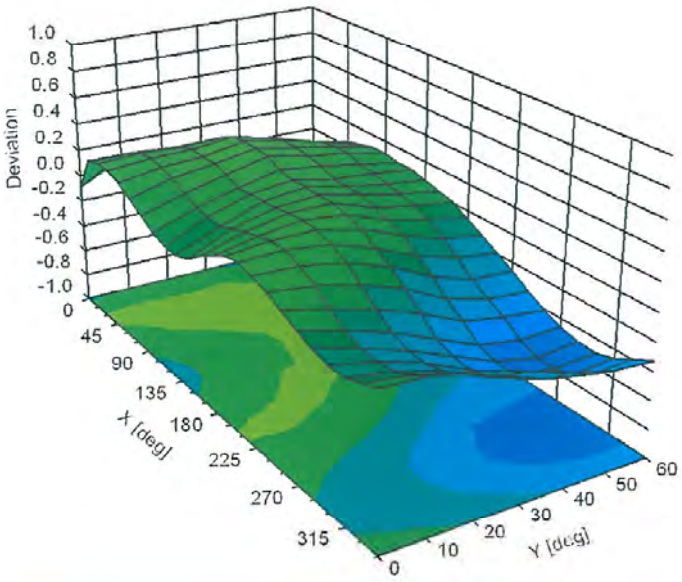


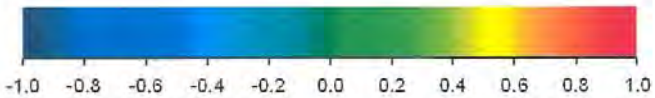
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)