

FCC SAR Test Report

APPLICANT : Motorola Mobility LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : XT1926-2, XT1926-3
FCC ID : IHDT56WL2
STANDARD : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2013

We, Sporton International (Xi'an) Inc., would like to declare that the tested sample has been evaluated in accordance with the procedures and had been in compliance with the applicable technical standards.

The test results in this report apply exclusively to the tested model / sample. Without written approval of Sporton International (Xi'an) Inc., the test report shall not be reproduced except in full.



Approved by: Mark Qu / Manager



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1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for Motorola Mobility LLC, Mobile Cellular Phone, XT1926-2, XT1926-3, are as follows.

Highest 1g SAR Summary						
Equipment Class	Frequency Band		Head (Separation 0mm)	Hotspot (Separation 5mm)	Body-worn (Separation 5mm)	Highest Simultaneous Transmission 1g SAR (W/kg)
			1g SAR (W/kg)			
Licensed	GSM	GSM850	0.33	1.10	1.10	1.57
		GSM1900	0.11	0.74	0.47	
	WCDMA	Band V	0.35	1.18	1.18	
		Band II	0.21	0.92	0.60	
	LTE	Band 5	0.32	1.16	1.16	
		Band 7	0.50	0.90	0.90	
		Band 38	0.44	0.66	0.66	
DTS	WLAN	2.4GHz WLAN	1.03	0.53	0.53	1.50
NII		5GHz WLAN	0.78	1.07	0.94	1.57
DSS	Bluetooth	2.4GHz Bluetooth		<0.10	<0.10	1.23
Highest 10g SAR Summary						
Equipment Class	Frequency Band		Product Specific 10g SAR (W/kg) (Separation 0mm)			Highest Simultaneous Transmission 10g SAR (W/kg)
Licensed	GSM	GSM1900	2.30			3.23
	WCDMA	Band II	2.55			
	LTE	Band 7	2.68			
		Band 38	2.50			
NII	WLAN	5GHz WLAN	0.94			3.23
Date of Testing:			2017/12/31~2018/1/13			

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body 1g SAR, 4.0 W/kg for Product Specific 10g SAR) specified in FCC 47 CFR part 2 (2.1093) and ANSI/IEEE C95.1-1992, and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528-2013 and FCC KDB publications.



2. Administration Data

Testing Laboratory	
Test Site	Sporton International (Xi'an) Inc.
Test Site Location	1F, Bldg. A3, No.39, Chuangye Ave. New Industrial Park, High-Tech District Xi'an Shaanxi Province 710119 China TEL: +86-29-8860-8767 FAX: +86-29-8860-8791

Applicant	
Company Name	Motorola Mobility LLC
Address	222 W,Merchandise Mart Plaza, Chicago IL 60654 USA

Manufacturer	
Company Name	Motorola Mobility LLC
Address	222 W, Merchandise Mart Plaza, Chicago IL 60654 USA

3. Guidance Applied

The Specific Absorption Rate (SAR) testing specification, method, and procedure for this device is in accordance with the following standards:

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2013
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04
- FCC KDB 865664 D02 SAR Reporting v01r02
- FCC KDB 447498 D01 General RF Exposure Guidance v06
- FCC KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets v01r03
- FCC KDB 248227 D01 802.11 Wi-Fi SAR v02r02
- FCC KDB 941225 D01 3G SAR Procedures v03r01
- FCC KDB 941225 D05 SAR for LTE Devices v02r05
- FCC KDB 941225 D05A Rel.10 LTE SAR Test Guidance v01r02
- FCC KDB 941225 D06 Hotspot Mode SAR v02r01

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Mobile Cellular Phone
Brand Name	Motorola
Model Name	XT1926-2, XT1926-3
FCC ID	IHDT56WL2
IMEI Code	SIM1: 351854090024659 SIM2: 351854090024667
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ LTE: QPSK, 16QAM, 64QAM WLAN 2.4GHz 802.11b/g/n HT20 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0+EDR, Bluetooth v4.0 LE, Bluetooth v4.1 LE, Bluetooth v4.2 LE, Bluetooth v5.0 LE NFC:ASK
HW Version	DVT1B
SW Version	evert_n-userdebug 8.0.0 OPW27.88 1825 intcfg,test-keys
GSM / (E)GPRS Transfer mode	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously but can automatically switch between Packet and Circuit Switched Network.
EUT Stage	Identical Prototype
Remark:	
<ol style="list-style-type: none"> This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation. This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications. This device 2.4GHz WLAN/5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only). This device does not support DTM operation and supports GRPS/EGRPS mode up to multi-slot class 12. When the phone is in talking mode and receiver worked, then power reduction will be implemented immediately at WLAN2.4/5.2/5.3/5.5/5.8GHz. When operating in any other radiated condition, the device uses the default power which is the same as full power level. The device employs proximity sensors that detect the presence of the user's body at the front or back faces of the device. When front or back body worn condition is detected, GSM1900, WCDMA band II and LTE band 7/38 reduced power will be active. (P-sensor can't work at detecting presence of the user's body at the four edges of the device.) When hotspot mode is enabled, power reduction will be activated to limit the maximum power of GSM1900, WCDMA band II and LTE band 7/38. This device hotspot reduced power and P-sensor reduced power level are the same. So only show one reduced power 	



level for hotspot reduced power and P-sensor reduced power for this application.

10. The device additionally employs proximity sensors that detect the presence of tissue near the currently active transmit antenna, the handheld reduced power table which at GSM1900, WCDMA band II and LTE band 7 reduced powers will be active.
11. This device has three WWAN transmitter antennas. WWAN antenna 1 is located at the middle of bottom edge of the device, WWAN antenna 2 is located at the left side of bottom edge of the device, and WWAN antenna 3 is located at the right side of bottom edge of the device which can refer to antenna location chapter. WWAN antenna 1 frequency bands include GSM850/1900, WCDMA Band II/V and LTE Band 5, WWAN antenna 2 frequency bands include LTE Band 7/38 and WWAN antenna 3 frequency bands also include LTE Band 7/38.
12. The device is capable of switching between the WWAN antenna 2 and WWAN antenna 3 based on signal strength. When WWAN antenna 2 acted as a transmitter, then WWAN antenna 3 acted as a receiver. The same as the reversed.
13. There are two different types of EUT. They are dual SIM card mobile (XT1926-3) and single SIM card mobile (XT1926-2). It is special to declare. The others are the same including circuit design, PCB board, structure and all components. After pre-scan two types of EUT, we found test result of the sample that dual SIM was the worst, so we chose dual SIM card mobile to perform all tests.
14. For dual SIM card mobile has two SIM slots and supports dual SIM dual standby. The WWAN radio transmission will be enabled by either one SIM at a time (single active). After pre-scan two SIM cards power, we found test result of the SIM1 was the worse, so we chose SIM1 slot to perform all tests.
15. This device implements antenna tuning techniques for several WWAN (cellular) operating modes and frequencies for the purpose of improving antenna efficiency over a broad range of frequencies. Specifically, these techniques are employed in the GSM, WCDMA and LTE modes of WWAN antenna 1. In this report SAR was measured according to the normally required SAR configurations with the tuner active and worst tune state (auto tune) was used for SAR testing. The detail descriptions of the antenna tuner are included in the operational description and supplemental data for additional information on section18.

4.2 Specification of Accessory

Specification of Accessory			
AC Adapter 1(US)	Brand Name	Motorola (Salom)	Model Name SC-22
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA	
AC Adapter 1(EU)	Brand Name	Motorola (Salom)	Model Name SC-23
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA	
AC Adapter 1(UK)	Brand Name	Motorola (Salom)	Model Name SC-24
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA	
AC Adapter 1(IN)	Brand Name	Motorola (Salom)	Model Name SC-25
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA	
AC Adapter 1(AU)	Brand Name	Motorola (Salom)	Model Name SC-26
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA	
AC Adapter 2(US)	Brand Name	Motorola (Chenyang)	Model Name SC-22
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA	
AC Adapter 2(EU)	Brand Name	Motorola (Chenyang)	Model Name SC-23
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA	
AC Adapter 2(UK)	Brand Name	Motorola (Chenyang)	Model Name SC-24
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA	
AC Adapter 2(IN)	Brand Name	Motorola (Chenyang)	Model Name SC-25
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA	
AC Adapter 2(AU)	Brand Name	Motorola (Chenyang)	Model Name SC-26
	Power Rating	I/P: 100-240 Vac, 500mA, O/P: 5Vdc,3000mA or 9Vdc,1600mA or 12Vdc,1200mA	
Battery	Brand Name	Motorola (ATL)	Model Name JT40
	Power Rating	3.8Vdc,3200mAh	Type Li-ion Polymer
Earphone 1	Brand Name	Motorola (Jiahe)	Model Name LS-118M-12
	Signal Line Type	1.2 meter, non-shielded cable, without ferrite core	
Earphone 2	Brand Name	Motorola (Lianyun)	Model Name TS910A-38AMS01WHR-M
	Signal Line Type	1.2 meter, non-shielded cable, without ferrite core	
USB Cable	Brand Name	Motorola (Liqi)	Model Name L32B-053000100-ALL
	Signal Line Type	1.0 meter, shielded cable, without ferrite core	



4.3 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05																																																															
FCC ID	IHDT56WL2																																																														
Equipment Name	Mobile Cellular Phone																																																														
Operating Frequency Range of each LTE transmission band	LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz																																																														
Channel Bandwidth	LTE Band 5: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz																																																														
uplink modulations used	QPSK, 16QAM and 64QAM																																																														
LTE Voice / Data requirements	Voice and Data																																																														
LTE Release Version	R8, Cat5																																																														
CA Support	Yes, Downlink Only																																																														
LTE MPR permanently built-in by design	<p align="center">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 1, 2 and 3</p> <table border="1"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (N_{RB})</th> <th rowspan="2">MPR (dB)</th> </tr> <tr> <th>1.4 MHz</th> <th>3.0 MHz</th> <th>5 MHz</th> <th>10 MHz</th> <th>15 MHz</th> <th>20 MHz</th> </tr> </thead> <tbody> <tr> <td>QPSK</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 1</td> </tr> <tr> <td>16 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>≤ 5</td> <td>≤ 4</td> <td>≤ 8</td> <td>≤ 12</td> <td>≤ 16</td> <td>≤ 18</td> <td>≤ 2</td> </tr> <tr> <td>64 QAM</td> <td>> 5</td> <td>> 4</td> <td>> 8</td> <td>> 12</td> <td>> 16</td> <td>> 18</td> <td>≤ 3</td> </tr> <tr> <td>256 QAM</td> <td colspan="6">≥ 1</td> <td>≤ 5</td> </tr> </tbody> </table>	Modulation	Channel bandwidth / Transmission bandwidth (N _{RB})						MPR (dB)	1.4 MHz	3.0 MHz	5 MHz	10 MHz	15 MHz	20 MHz	QPSK	> 5	> 4	> 8	> 12	> 16	> 18	≤ 1	16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 1	16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 2	64 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	≤ 2	64 QAM	> 5	> 4	> 8	> 12	> 16	> 18	≤ 3	256 QAM	≥ 1						≤ 5
Modulation	Channel bandwidth / Transmission bandwidth (N _{RB})						MPR (dB)																																																								
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256 QAM	≥ 1						≤ 5																																																								
LTE A-MPR	In the base station simulator configuration, Network Setting value is set to NS_01 to disable A-MPR during SAR testing and the LTE SAR tests was transmitting on all TTI frames (Maximum TTI)																																																														
Spectrum plots for RB configuration	A properly configured base station simulator was used for the SAR and power measurement; therefore, spectrum plots for each RB allocation and offset configuration are not included in the SAR report.																																																														
Power reduction applied to satisfy SAR compliance	<p>Yes</p> <ol style="list-style-type: none"> The device employs proximity sensors that detect the presence of the user's body at the front or back faces of the device. When front or back body worn condition is detected, LTE band 7/38 reduced power will be active. (P-sensor can't work at detecting presence of the user's body at the four edges of the device.) When hotspot mode is enabled, power reduction will be activated to limit the maximum power of LTE band 7/38. P-sensor can detect handheld state, for product specific 10g SAR condition LTE band 7 reduced powers will be active. 																																																														
LTE Carrier Aggregation Combinations	Intra-Band possible combinations as below page and the detail power verification please referred to section 14.																																																														
LTE Carrier Aggregation Additional Information	This device does not support full CA features on 3GPP Release 10. It supports a maximum of 2 carriers in the downlink only. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. Due to carrier capability, only the combinations listed above are supported. The following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.																																																														

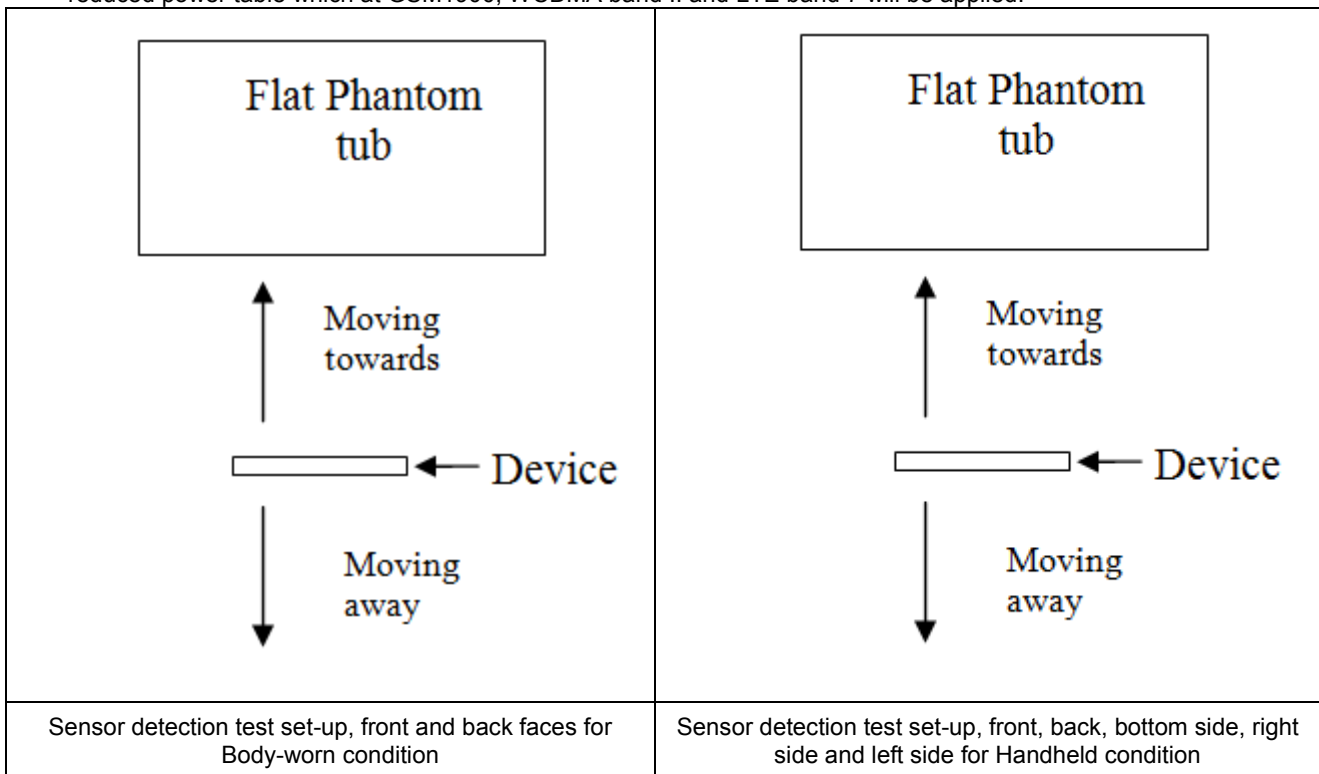


Transmission (H, M, L) channel numbers and frequencies in each LTE band								
LTE Band 5								
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844
LTE Band 7								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560
LTE Band 38								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580
M	38000	2595	38000	2595	38000	2595	38000	2595
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610

5. Proximity Sensor Triggering Test

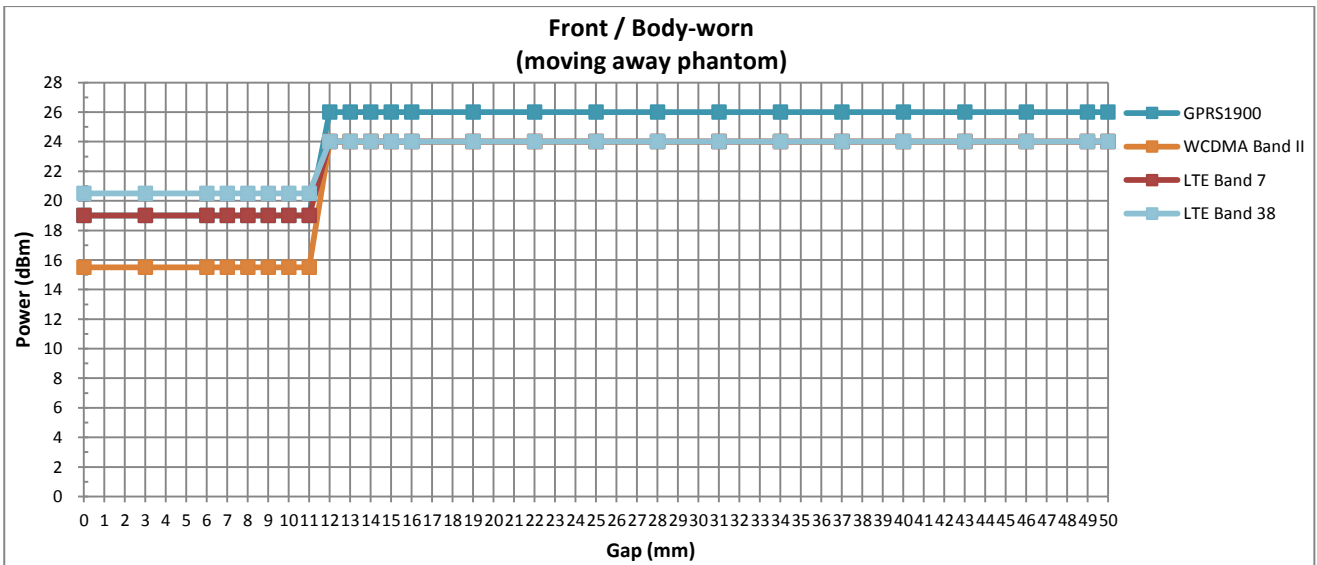
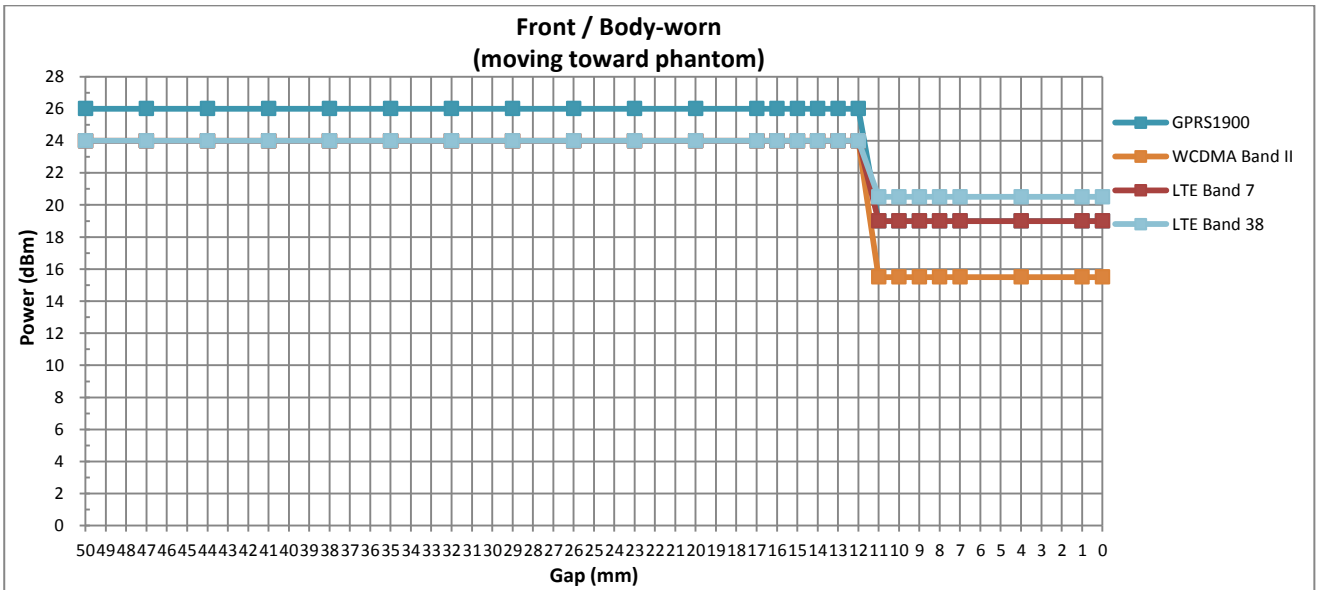
<Proximity Sensor Triggering Distance

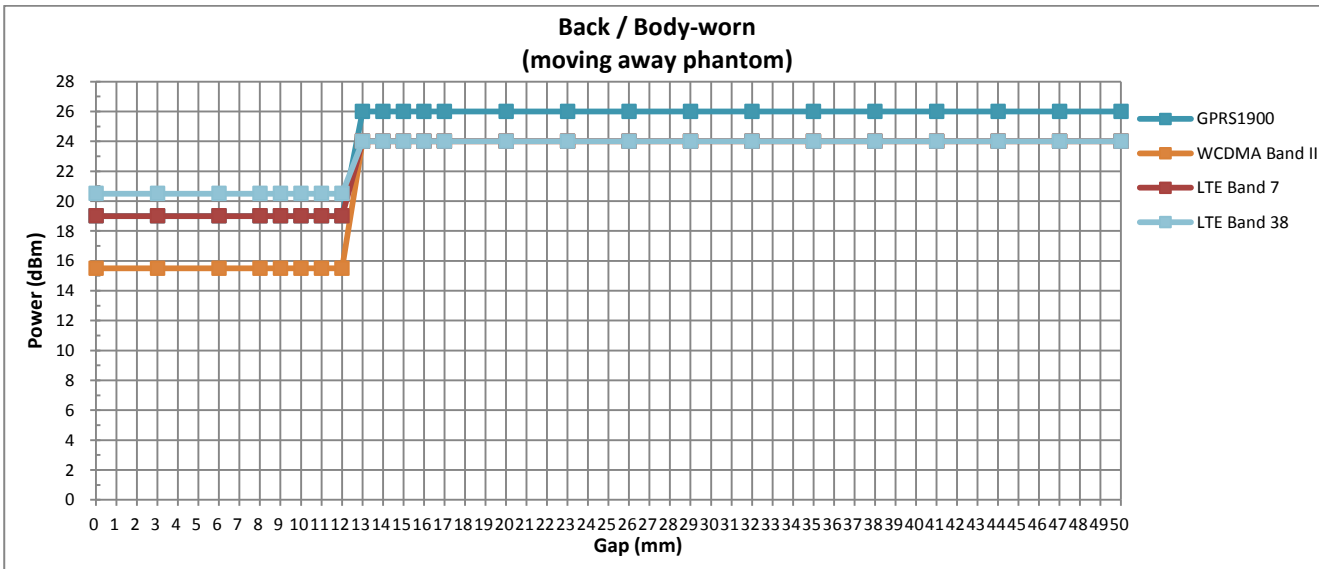
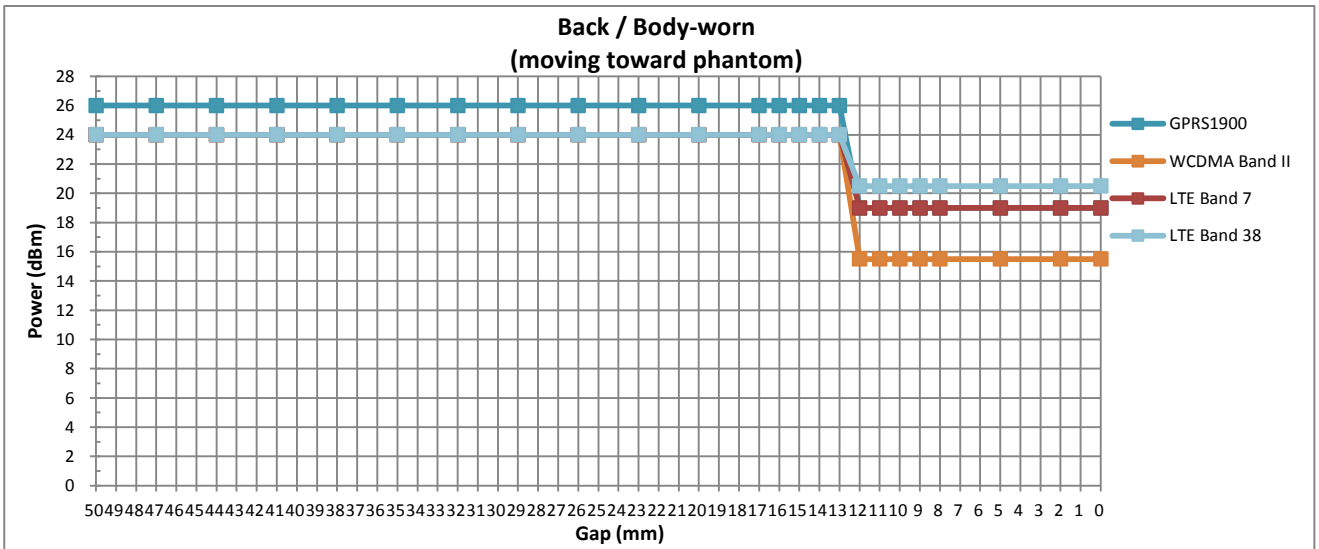
1. Proximity sensor triggering distance testing was performed according to the procedures outlined in KDB 616217 D04 section 6.2, and EUT moving further away from the flat phantom and EUT moving toward the flat phantom were both assessed.
2. In the preliminary triggering distance testing, the tissue-equivalent medium for different frequency bands were used for verification; no other frequency bands tissue-equivalent medium was found to result in shortest triggering distance than that for 1900MHz, and the tissue-equivalent medium for 1900MHz was used for formal proximity sensor triggering testing.
3. Capacitive proximity sensors placed coincident with antenna elements at the top and bottom ends of the phone are utilized to determine when the device comes in proximity of the user's body at the front or back of the device.
4. The output power will reduce to body worn power level when top and bottom sensor pad be detected, the output power will reduce to handheld power level when bottom sensor pad only be detected.
5. The sensors used to detect the proximity of the user's body (Body-worn condition) at the front or back surface of the device use a detection threshold distance. The data shown in the sections below shows the distance(s). When the sensor is active, GSM1900, WCDMA band II and LTE band 7/38 reduced power will be active.
6. The device additionally employs proximity sensors that detect the presence of tissue near the currently active transmit antenna (if that antenna may require reduced power relative the Default power table in order to meet extremity SAR limits). The control logic is such that, if the Body-Worn, At-Head or WiFi Hotspot conditions are not detected, but tissue (as a finger or hand, for example) is detected near the transmitting antenna, the handheld reduced power table which at GSM1900, WCDMA band II and LTE band 7 will be applied.

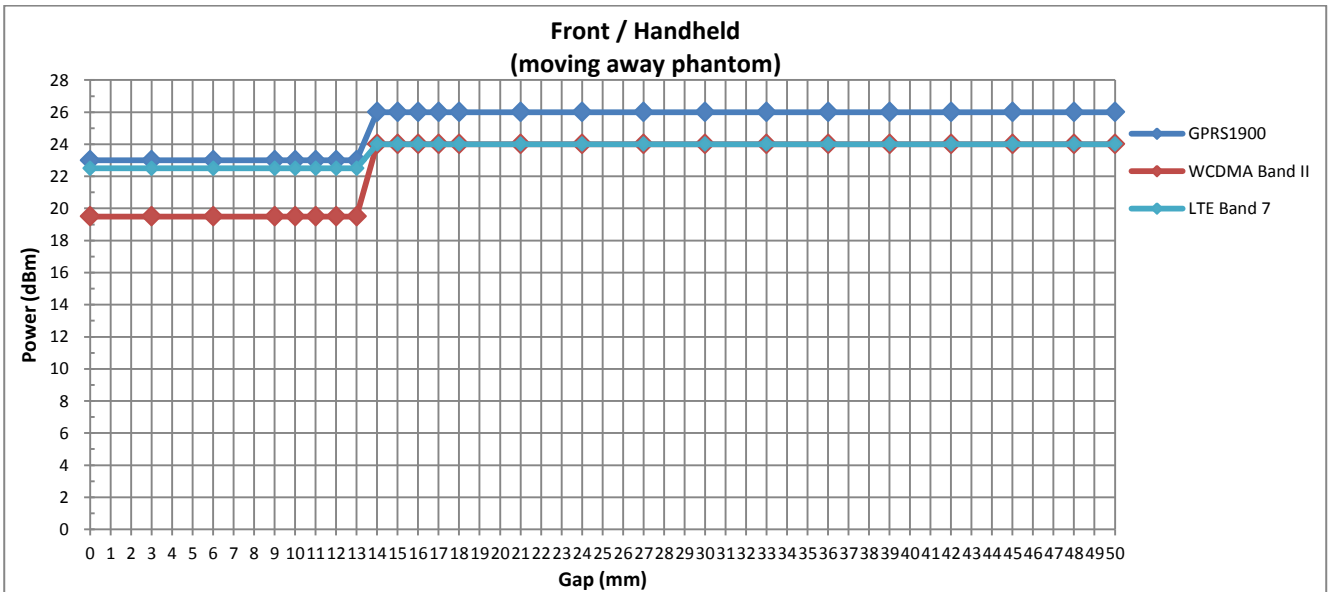
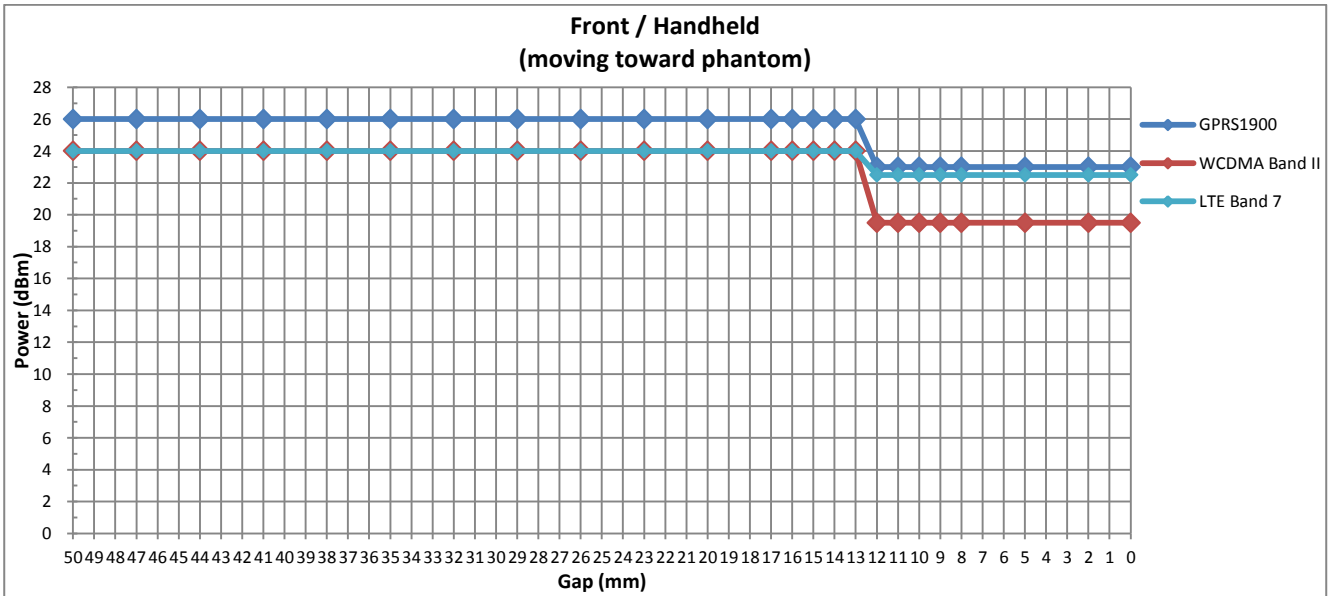


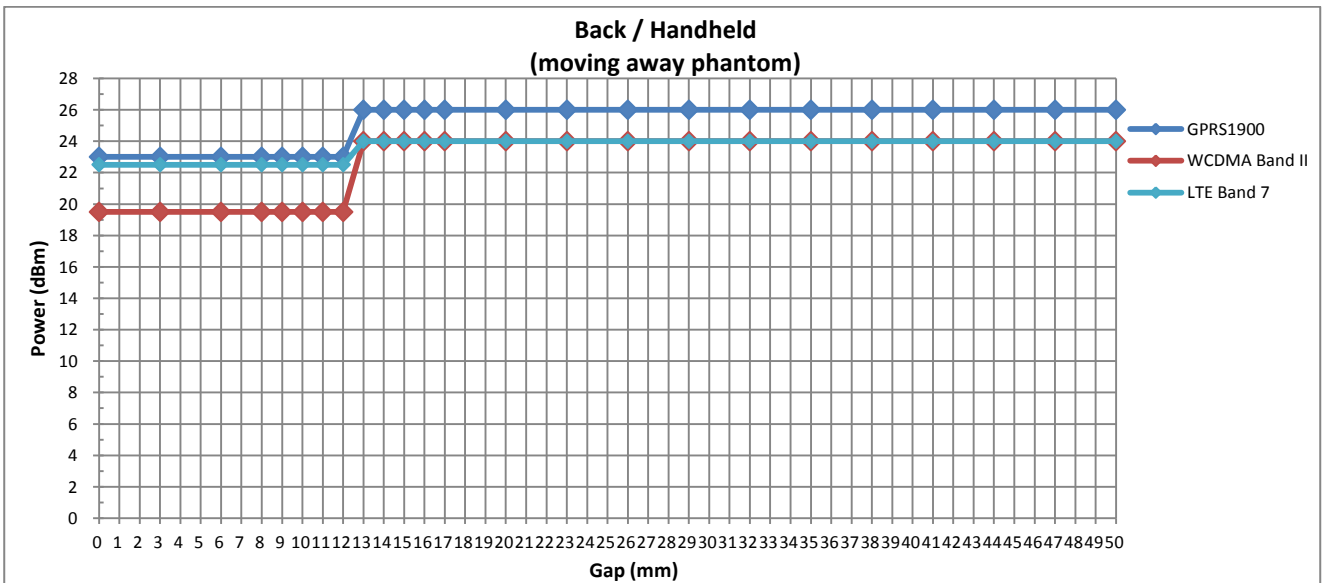
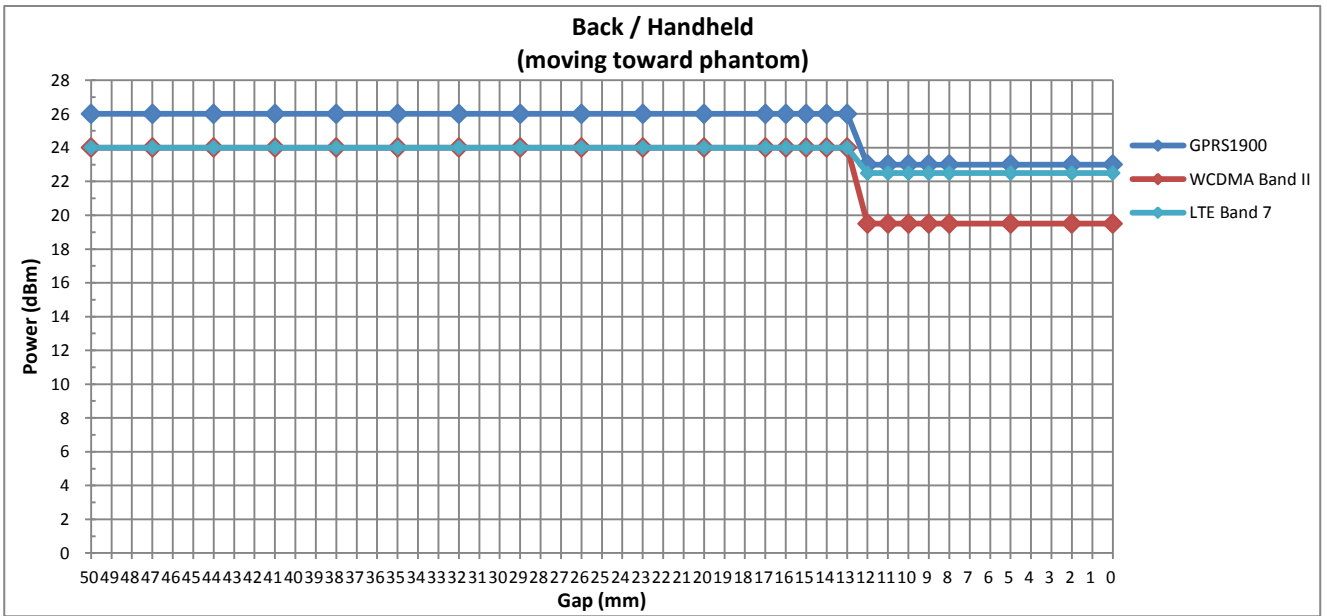
Proximity Sensor Triggering Distance (mm)															
Condition	Body-worn				Handheld										
	Front		Back		Front		Back		Bottom Side		Right Side		Left Side		
Position	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	Moving towards	Moving away	
Minimum	11	11	12	12	12	13	12	12	11	12	6	7	5	6	

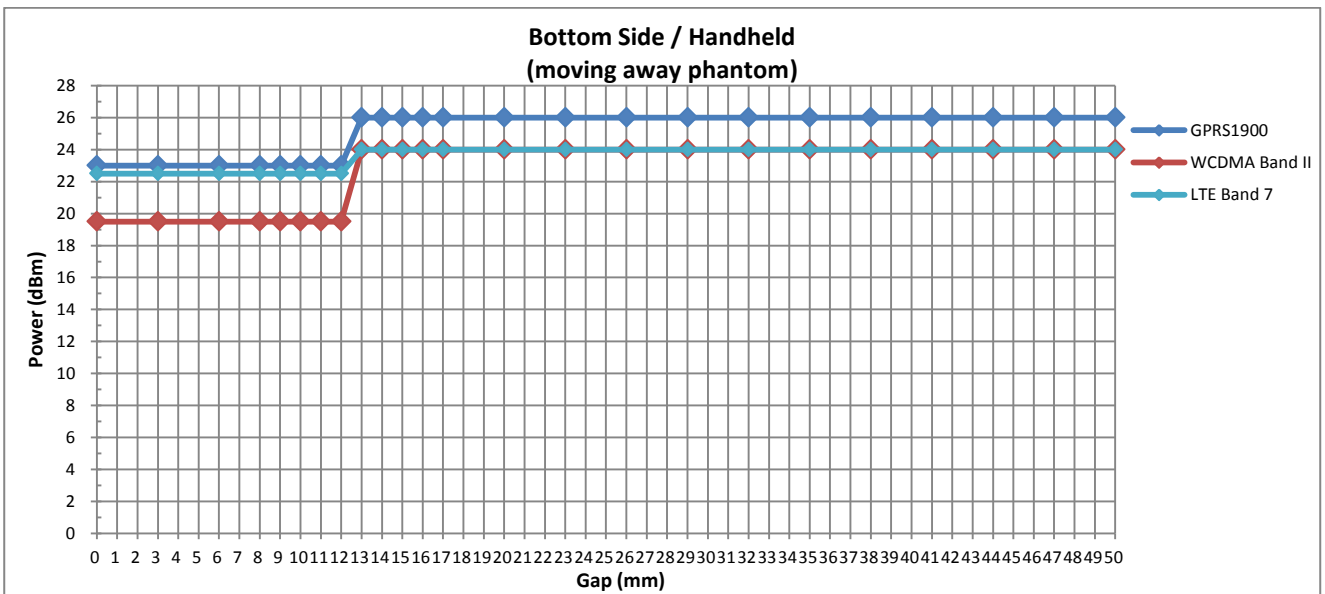
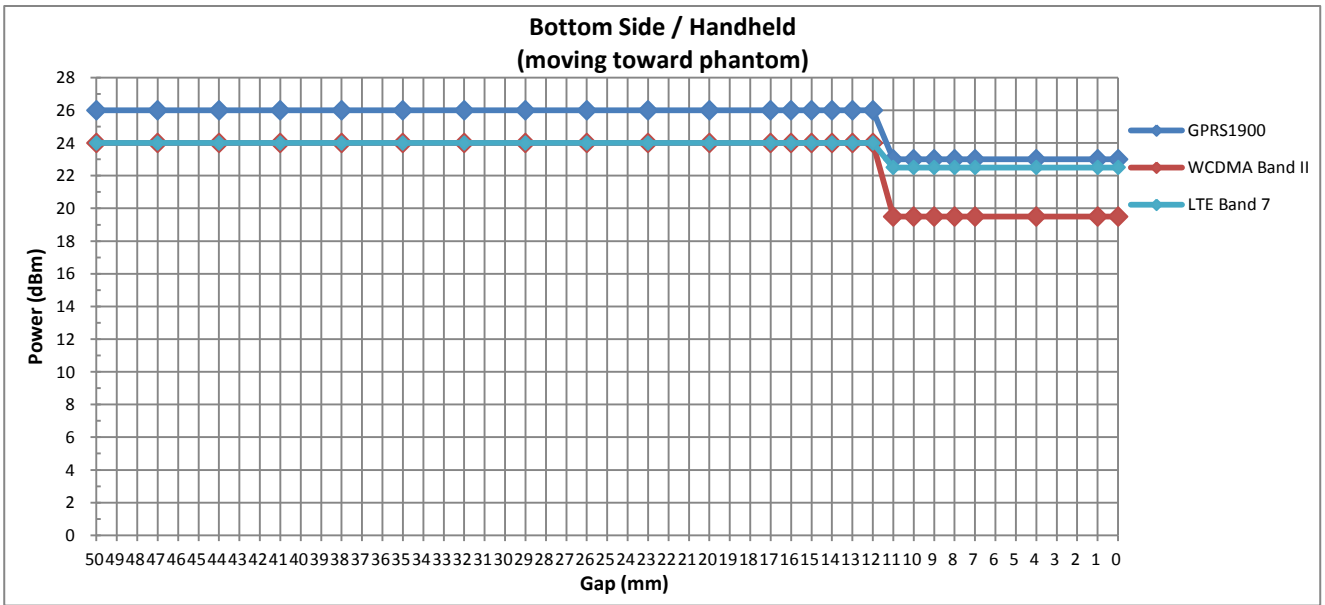
<Sensor Trigger Distance and Measured Power>

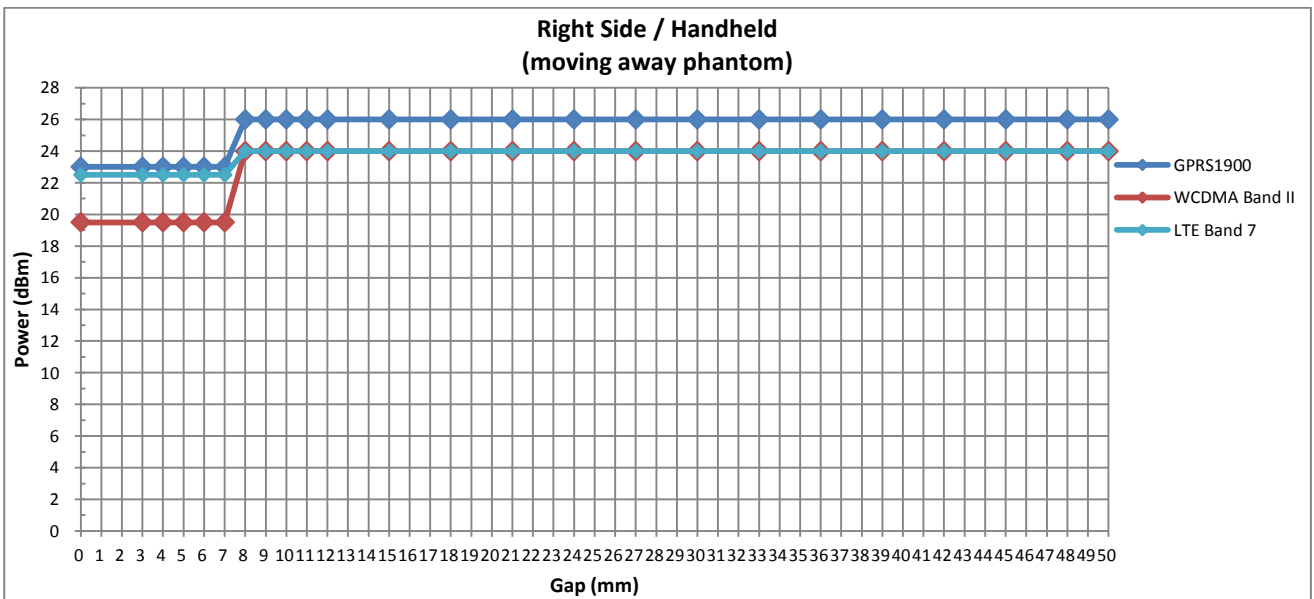
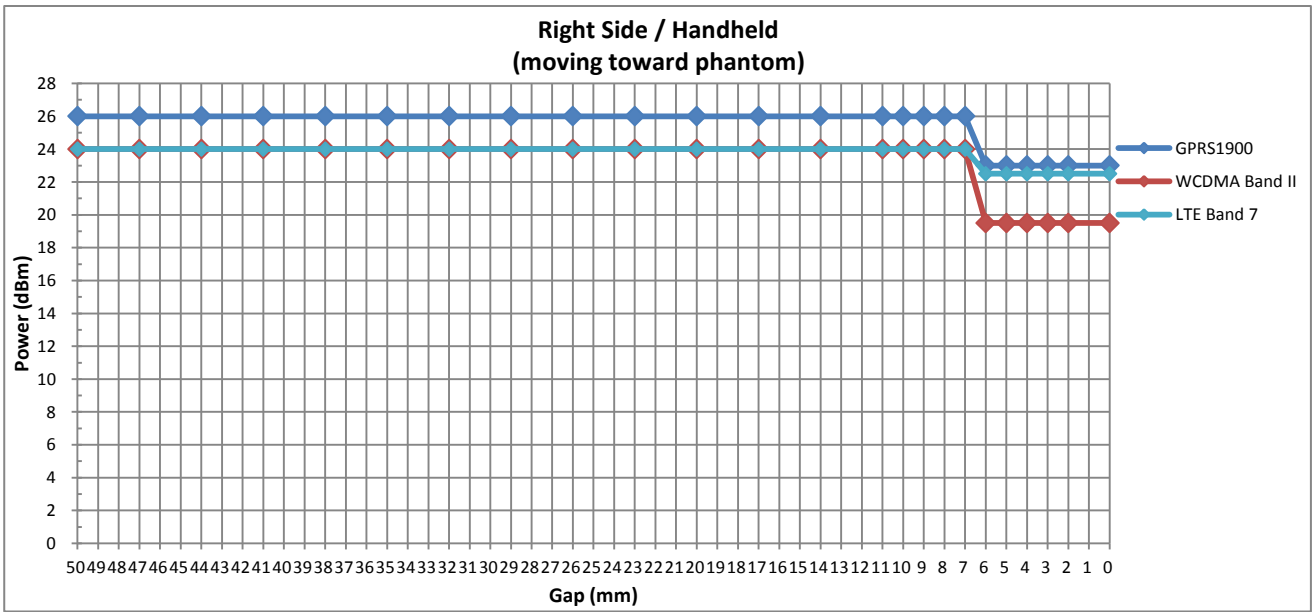


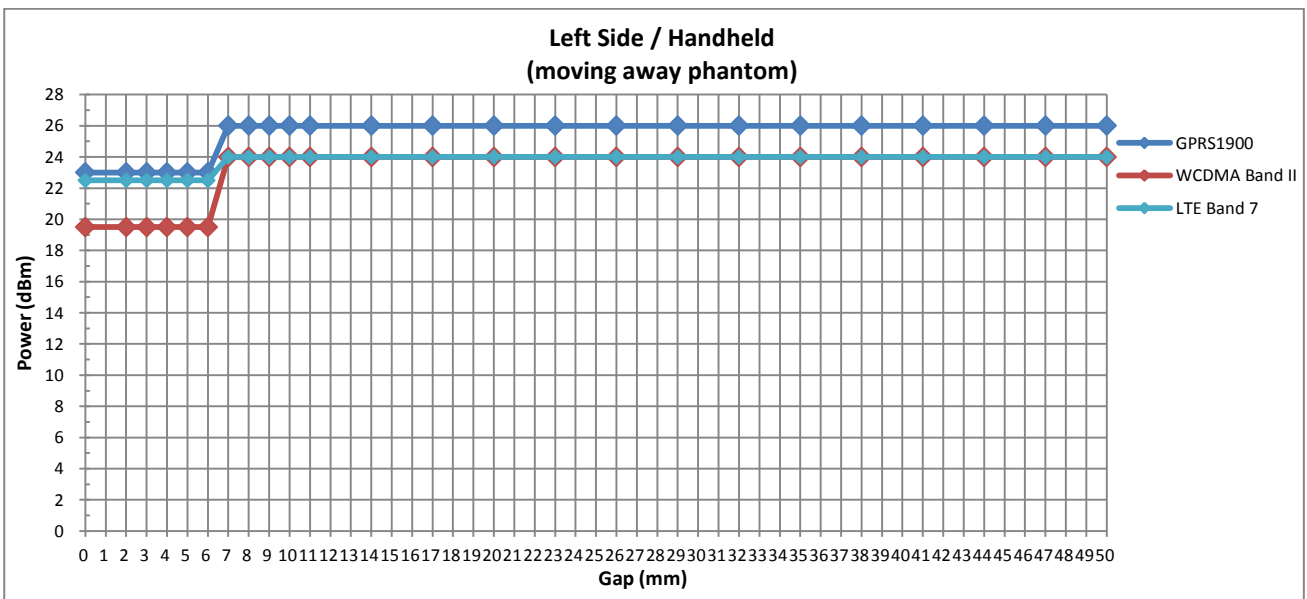
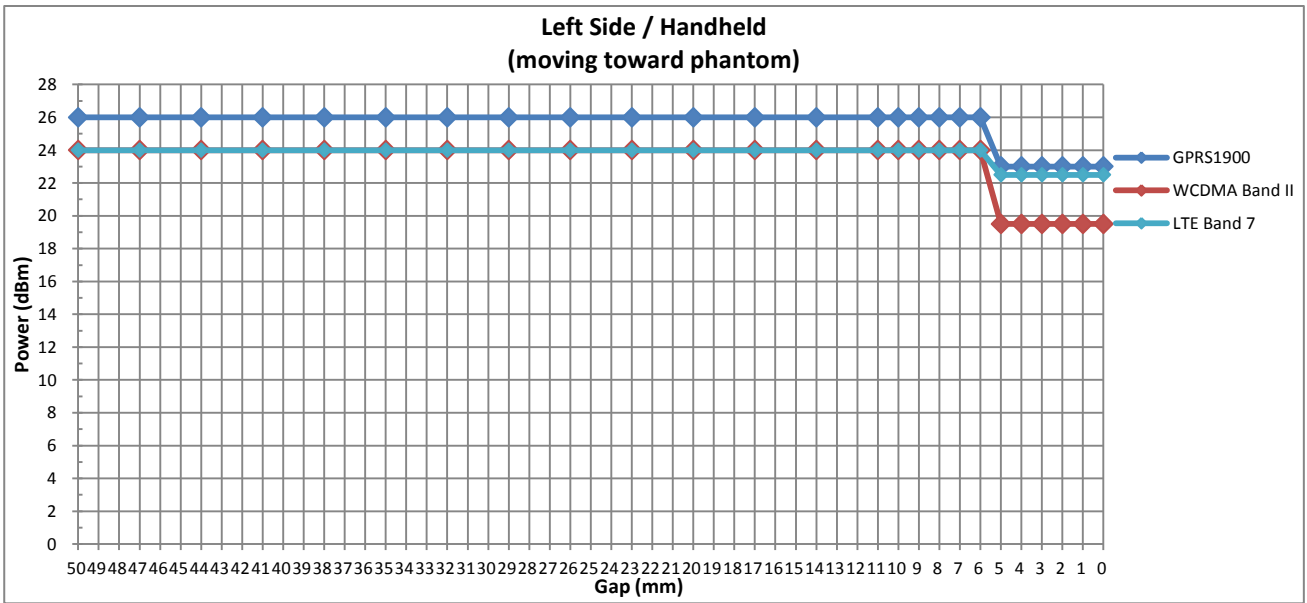












6. Re-use of Measured Data

6.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: XT1926-2, XT1926-3, FCC ID: IHDT56WL2) is electrically identical to the reference device (Model: XT1926-6, XT1926-7, FCC ID: IHDT56WL4) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 178919 D01.

6.2 Difference Section

For details concerning the similarity with respect to component placement, mechanical/electrical design etc., please refer to the Product Equality Declaration “PED” file.

The re-used RF data includes the following bands provided in Appendix F. Sporton SAR Report No. FA7D2702 for the reference device Model: XT1926-6, XT1926-7, FCC ID: IHDT56WL4.

- WLAN 2.4GHz
- WLAN 5GHz
- Bluetooth

All WWAN bands are for full SAR test, spot check for BT/WLAN are performed for ensure that SAR measurement for both device are the same. So, the original SAR value can represent this application.

6.3 Spot Check Verification Data Section

Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Original model (FCC ID: IHDT56WL4)						Spot check model (FCC ID: IHDT56WL2)						Deviation		
							Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor		Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
WLAN2.4GHz	802.11b 1Mbps	Right Cheek	0	Receiver On	11	2462	17.33	17.50	1.040	100	1.000	0.991	1.031	17.33	17.50	1.040	100	1.000	0.984	1.023	-0.78%
WLAN5.2GHz	802.11a 6Mbps	Top Side	5	Full	48	5240	15.98	16.50	1.128	95.54	1.047	0.910	1.074	15.98	16.50	1.128	95.54	1.047	0.960	1.133	5.49%
Bluetooth	1Mbps	Front	5	Full	0	2402	10.62	12.00	1.374	76.94	1.083	0.040	0.060	10.62	12.00	1.374	76.94	1.083	0.035	0.052	-13.33

Note: In the table above, we chose the worst SAR of WLAN/BT to verify, all the deviation of SAR test results are compliant with uncertainty budget.

6.4 Reference detail Section

Reference FCC ID	Folder Test/RF Exposure	Report Title/Section
IHDT56WL4	RF Exposure(FA7D2702)	All sections applicable for BT/WLAN

7. RF Exposure Limits

7.1 Uncontrolled Environment

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

7.2 Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. The 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.

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

8. Specific Absorption Rate (SAR)

8.1 Introduction

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

8.2 SAR Definition

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

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

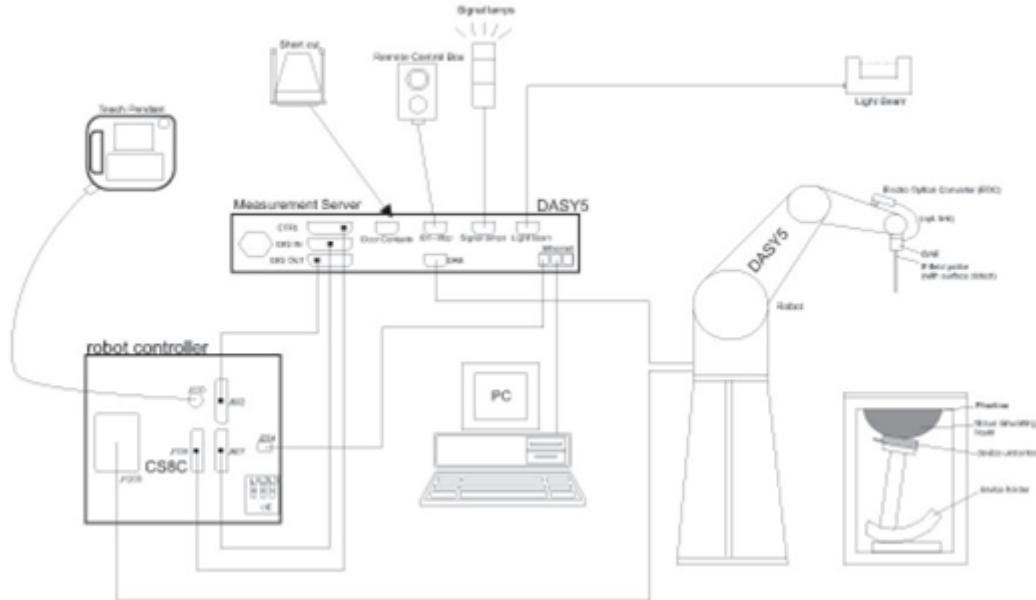
SAR is expressed in units of Watts per kilogram (W/kg)

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

Where: σ is the conductivity of the tissue, ρ is the mass density of the tissue and E is the RMS electrical field strength.

9. System Description and Setup

The DASY system used for performing compliance tests consists of the following items:




- A standard high precision 6-axis robot with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic Field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP or Win7 and the DASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

9.1 E-Field Probe

The SAR measurement is conducted with the dosimetric probe (manufactured by SPEAG).The probe is specially designed and calibrated for use in liquid with high permittivity. The dosimetric probe has special calibration in liquid at different frequency. This probe has a built in optical surface detection system to prevent from collision with phantom.

<EX3DV4 Probe>

Construction	Symmetric design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – >6 GHz Linearity: ±0.2 dB (30 MHz – 6 GHz)	
Directivity	±0.3 dB in TSL (rotation around probe axis) ±0.5 dB in TSL (rotation normal to probe axis)	
Dynamic Range	10 µW/g – >100 mW/g Linearity: ±0.2 dB (noise: typically <1 µW/g)	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 2.5 mm (body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	

9.2 Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE) consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock.


The input impedance of the DAE is 200 MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.



Fig 5.1 Photo of DAE


9.3 Phantom

<SAM Twin Phantom>

Shell Thickness	2 ± 0.2 mm; Center ear point: 6 ± 0.2 mm	
Filling Volume	Approx. 25 liters	
Dimensions	Length: 1000 mm; Width: 500 mm; Height: adjustable feet	
Measurement Areas	Left Hand, Right Hand, Flat Phantom	

The bottom plate contains three pair of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. A white cover is provided to tap the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. On the phantom top, three reference markers are provided to identify the phantom position with respect to the robot.

<ELI Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm	

The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

9.4 Device Holder

<Mounting Device for Hand-Held Transmitter>

In combination with the Twin SAM V5.0/V5.0c or ELI phantoms, the Mounting Device for Hand-Held Transmitters enables rotation of the mounted transmitter device to specified spherical coordinates. At the heads, the rotation axis is at the ear opening. Transmitter devices can be easily and accurately positioned according to IEC 62209-1, IEEE 1528, FCC, or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat). And upgrade kit to Mounting Device to enable easy mounting of wider devices like big smart-phones, e-books, small tablets, etc. It holds devices with width up to 140 mm.



Mounting Device for Hand-Held Transmitters



Mounting Device Adaptor for Wide-Phones

<Mounting Device for Laptops and other Body-Worn Transmitters>

The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the mounting device in place of the phone positioned. The extension is fully compatible with the SAM Twin and ELI phantoms.



Mounting Device for Laptops

10. Measurement Procedures

The measurement procedures are as follows:

<Conducted power measurement>

- (a) For WWAN power measurement, use base station simulator to configure EUT WWAN transmission in conducted connection with RF cable, at maximum power in each supported wireless interface and frequency band.
- (b) Read the WWAN RF power level from the base station simulator.
- (c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
- (d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

- (a) Use base station simulator to configure EUT WWAN transmission in radiated connection, and engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power, in the highest power channel.
- (b) Place the EUT in the positions as Appendix D demonstrates.
- (c) Set scan area, grid size and other setting on the DASY software.
- (d) Measure SAR results for the highest power channel on each testing position.
- (e) Find out the largest SAR result on these testing positions of each band
- (f) Measure SAR results for other channels in worst SAR testing position if the reported SAR of highest power channel is larger than 0.8 W/kg

According to the test standard, the recommended procedure for assessing the peak spatial-average SAR value consists of the following steps:

- (a) Power reference measurement
- (b) Area scan
- (c) Zoom scan
- (d) Power drift measurement

10.1 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the test standard. It can be conducted for 1g and 10g, as well as for user-specific masses. The DASY software includes all numerical procedures necessary to evaluate the spatial peak SAR value.

The base for the evaluation is a "cube" measurement. The measured volume must include the 1g and 10g cubes with the highest averaged SAR values. For that purpose, the center of the measured volume is aligned to the interpolated peak SAR value of a previously performed area scan.

The entire evaluation of the spatial peak values is performed within the post-processing engine (SEMCAD). The system always gives the maximum values for the 1g and 10g cubes. The algorithm to find the cube with highest averaged SAR is divided into the following stages:

- (a) Extraction of the measured data (grid and values) from the Zoom Scan
- (b) Calculation of the SAR value at every measurement point based on all stored data (A/D values and measurement parameters)
- (c) Generation of a high-resolution mesh within the measured volume
- (d) Interpolation of all measured values from the measurement grid to the high-resolution grid
- (e) Extrapolation of the entire 3-D field distribution to the phantom surface over the distance from sensor to surface
- (f) Calculation of the averaged SAR within masses of 1g and 10g

10.2 Power Reference Measurement

The Power Reference Measurement and Power Drift Measurements are for monitoring the power drift of the device under test in the batch process. The minimum distance of probe sensors to surface determines the closest measurement point to phantom surface. This distance cannot be smaller than the distance of sensor calibration points to probe tip as defined in the probe properties.

10.3 Area Scan

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a fine measurement around the hot spot. The sophisticated interpolation routines implemented in DASY software can find the maximum found in the scanned area, within a range of the global maximum. The range (in dB0 is specified in the standards for compliance testing. For example, a 2 dB range is required in IEEE standard 1528 and IEC 62209 standards, whereby 3 dB is a requirement when compliance is assessed in accordance with the ARIB standard (Japan), if only one zoom scan follows the area scan, then only the absolute maximum will be taken as reference. For cases where multiple maximums are detected, the number of zoom scans has to be increased accordingly.

Area scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

	≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface	5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ 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.	

10.4 Zoom Scan

Zoom scans are used assess the peak spatial SAR values within a cubic averaging volume containing 1 gram and 10 gram of simulated tissue. The zoom scan measures points (refer to table below) within a cube shoes base faces are centered on the maxima found in a preceding area scan job within the same procedure. When the measurement is done, the zoom scan evaluates the averaged SAR for 1 gram and 10 gram and displays these values next to the job's label.

Zoom scan parameters extracted from FCC KDB 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz.

			≤ 3 GHz	> 3 GHz
Maximum zoom scan spatial resolution: $\Delta x_{Zoom}, \Delta y_{Zoom}$			≤ 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 1 st 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	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
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 draft standard IEEE P1528-2011 for details. * When zoom scan is required and the <i>reported</i> SAR from the <i>area scan based 1-g SAR estimation</i> procedures of KDB 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.				

10.5 Volume Scan Procedures

The volume scan is used for assess overlapping SAR distributions for antennas transmitting in different frequency bands. It is equivalent to an oversized zoom scan used in standalone measurements. The measurement volume will be used to enclose all the simultaneous transmitting antennas. For antennas transmitting simultaneously in different frequency bands, the volume scan is measured separately in each frequency band. In order to sum correctly to compute the 1g aggregate SAR, the EUT remain in the same test position for all measurements and all volume scan use the same spatial resolution and grid spacing. When all volume scan were completed, the software, SEMCAD postprocessor can combine and subsequently superpose these measurement data to calculating the multiband SAR.

10.6 Power Drift Monitoring

All SAR testing is under the EUT install full charged battery and transmit maximum output power. In DASY measurement software, the power reference measurement and power drift measurement procedures are used for monitoring the power drift of EUT during SAR test. Both these procedures measure the field at a specified reference position before and after the SAR testing. The software will calculate the field difference in dB. If the power drifts more than 5%, the SAR will be retested.



11. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	835MHz System Validation Kit	D835V2	4d151	2017/3/20	2018/3/19
SPEAG	1900MHz System Validation Kit	D1900V2	5d170	2017/3/22	2018/3/21
SPEAG	2600MHz System Validation Kit	D2600V2	1112	2017/9/18	2018/9/17
SPEAG	Data Acquisition Electronics	DAE4	1358	2017/10/24	2018/10/23
SPEAG	Dosimetric E-Field Probe	EX3DV4	3935	2017/12/14	2018/12/13
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1753	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1754	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201300653	2017/7/19	2018/7/18
Anritsu	Radio communication analyzer	MT8821C	6201692204	2017/3/29	2018/3/28
Agilent	Wireless Communication Test Set	E5515C	MY50267224	2017/9/12	2018/9/11
Agilent	Network Analyzer	E5071C	MY46523671	2017/10/18	2018/10/17
Speag	Dielectric Assessment KIT	DAK-3.5	1071	2017/11/28	2018/11/27
Agilent	Signal Generator	N5181A	MY50145381	2017/12/26	2018/12/25
Anritsu	Power Sensor	ML2495A	1602009	2017/4/22	2018/4/21
Anritsu	Power Meter	MA2411B	1531051	2017/5/18	2018/5/17
Anritsu	Power Sensor	MA2411B	1306099	2017/8/21	2018/8/20
Anritsu	Power Meter	ML2495A	1349001	2017/7/19	2018/7/18
R&S	CBT BLUETOOTH TESTER	CBT	100963	2017/12/26	2018/12/25
R&S	Spectrum Analyzer	FSP7	100818	2017/7/19	2018/7/18
LKM electronic	Hygrometer	DTM3000	3241	2017/7/21	2018/7/20
Anymetre	Thermo-Hygrometer	JR593	2015030903	2018/1/1	2018/12/31
ARRA	Power Divider	A3200-2	N/A	Note	
Agilent	Dual Directional Coupler	778D	50422	Note	
PASTERNAK	Dual Directional Coupler	PE2214-10	N/A	Note	
MCL	Attenuation1	BW-S10W5	N/A	Note	
Weinschel	Attenuation2	3M-20	N/A	Note	
Zhongjilianhe	Attenuation3	MVE2214-03	N/A	Note	
mini-circuits	Amplifier	ZHL-42W+	QA1341002	Note	
mini-circuits	Amplifier	ZVE-3W-83+	599201528	Note	

Note:

Prior to system verification and validation, the path loss from the signal generator to the system check source and the power meter, which includes the amplifier, cable, attenuator and directional coupler, was measured by the network analyzer. The reading of the power meter was offset by the path loss difference between the path to the power meter and the path to the system check source to monitor the actual power level fed to the system check

12. System Verification

12.1 Tissue Simulating Liquids

For the measurement of the field distribution inside the SAM phantom with DASy, the phantom must be filled with around 25 liters of homogeneous body tissue simulating liquid. For head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 10.2.

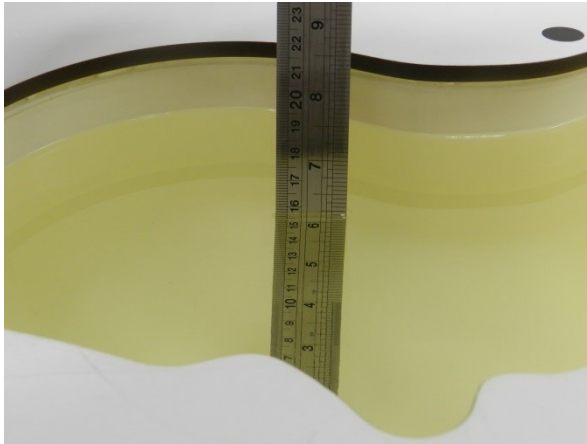


Fig 10.1 Photo of Liquid Height for Head SAR

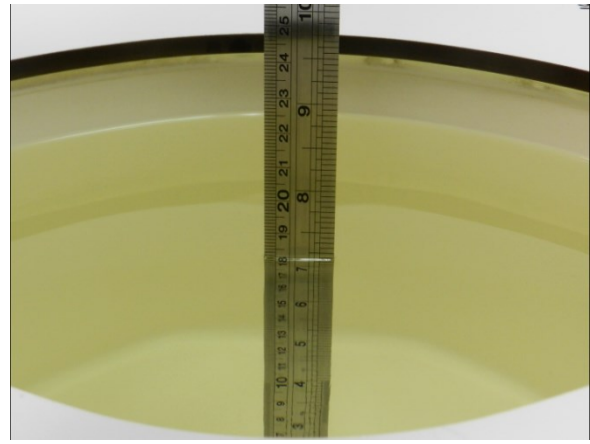


Fig 10.2 Photo of Liquid Height for Body SAR

12.2 Tissue Verification

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ϵ_r)
For Head								
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
For Body								
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (°C)	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
835	Head	22.6	0.905	42.268	0.90	41.50	0.56	1.85	±5	2018/1/2
1900	Head	22.4	1.465	39.148	1.40	40.00	4.64	-2.13	±5	2018/1/4
2600	Head	22.3	2.038	39.032	1.96	39.00	3.98	0.08	±5	2018/1/3
835	Body	22.6	0.995	55.191	0.97	55.20	2.58	-0.02	±5	2017/12/31
1900	Body	22.4	1.547	51.464	1.52	53.30	1.78	-3.44	±5	2018/1/13
2600	Body	22.8	2.171	51.943	2.16	52.50	0.51	-1.06	±5	2018/1/12

12.3 System Performance Check Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Below table shows the target SAR and measured SAR after normalized to 1W input power. The table below indicates the system performance check can meet the variation criterion and the plots can be referred to Appendix A of this report.

<1g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 1g SAR (W/kg)	Targeted 1g SAR (W/kg)	Normalized 1g SAR (W/kg)	Deviation (%)
2018/1/2	835	Head	250	4d151	3935	1358	2.47	9.73	9.88	1.54
2018/1/4	1900	Head	250	5d170	3935	1358	10.30	40.00	41.2	3.00
2018/1/3	2600	Head	250	1112	3935	1358	14.30	56.40	57.2	1.42
2017/12/31	835	Body	250	4d151	3935	1358	2.53	9.72	10.12	4.12
2018/1/13	1900	Body	250	5d170	3935	1358	10.80	40.70	43.2	6.14
2018/1/12	2600	Body	250	1112	3935	1358	14.30	55.00	57.2	4.00

<10g SAR>

Date	Frequency (MHz)	Tissue Type	Input Power (mW)	Dipole S/N	Probe S/N	DAE S/N	Measured 10g SAR (W/kg)	Targeted 10g SAR (W/kg)	Normalized 10g SAR (W/kg)	Deviation (%)
2018/1/13	1900	Body	250	5d170	3935	1358	5.59	21.40	22.36	4.49
2018/1/12	2600	Body	250	1112	3935	1358	6.41	24.40	25.64	5.08

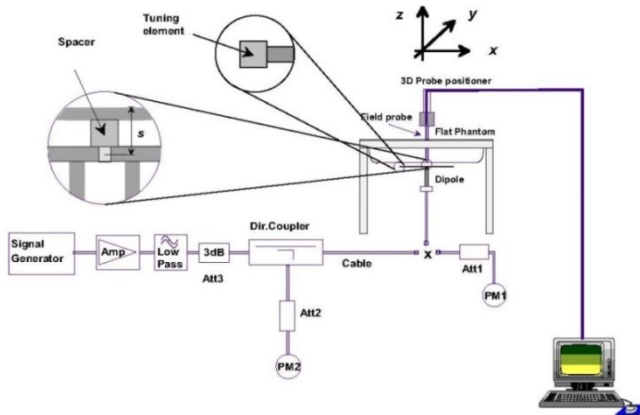


Fig 8.3.1 System Performance Check Setup

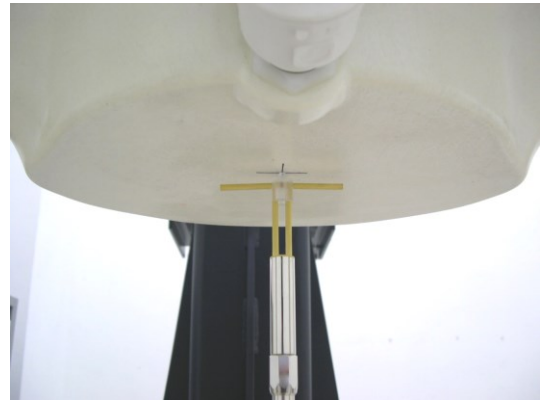


Fig 8.3.2 Setup Photo

13. RF Exposure Positions

13.1 Ear and handset reference point

Figure 9.1.1 shows the front, back, and side views of the SAM phantom. The center-of-mouth reference point is labeled “M,” the left ear reference point (ERP) is marked “LE,” and the right ERP is marked “RE.” Each ERP is 15 mm along the B-M (back-mouth) line behind the entrance-to-ear-canal (EEC) point, as shown in Figure 9.1.2 The Reference Plane is defined as passing through the two ear reference points and point M. The line N-F (neck-front), also called the reference pivoting line, is normal to the Reference Plane and perpendicular to both a line passing through RE and LE and the B-M line (see Figure 9.1.3). Both N-F and B-M lines should be marked on the exterior of the phantom shell to facilitate handset positioning. Posterior to the N-F line the ear shape is a flat surface with 6 mm thickness at each ERP, and forward of the N-F line the ear is truncated, as illustrated in Figure 9.1.2. The ear truncation is introduced to preclude the ear lobe from interfering with handset tilt, which could lead to unstable positioning at the cheek.

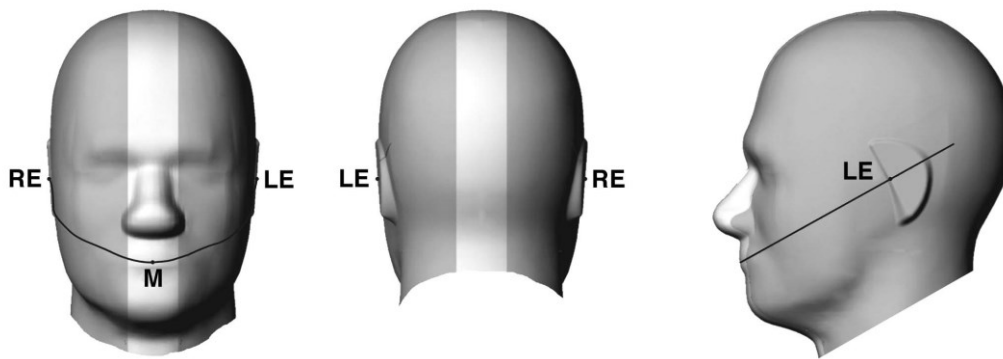


Fig 9.1.1 Front, back, and side views of SAM twin phantom

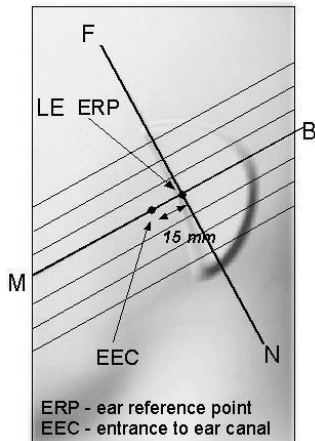


Fig 9.1.2 Close-up side view of phantom showing the ear region.

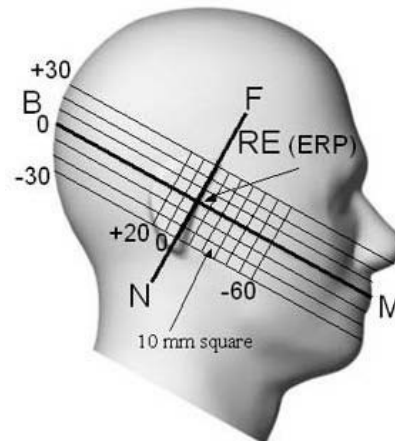


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

13.2 Definition of the cheek position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. Define two imaginary lines on the handset—the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset—the midpoint of the width w_t of the handset at the level of the acoustic output (point A in Figure 9.2.1 and Figure 9.2.2), and the midpoint of the width w_b of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 9.2.1). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 9.2.2), especially for clamshell handsets, handsets with flip covers, and other irregularly-shaped handsets.
3. Position 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 9.2.3), such that the plane defined by the vertical centerline and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.
4. Translate the handset towards the phantom along the line passing through RE and LE until handset point A touches the pinna at the ERP.
5. While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to the plane containing B-M and N-F lines, i.e., the Reference Plane.
6. Rotate the handset around the vertical centerline until the handset (horizontal line) is parallel to the N-F line.
7. While maintaining the vertical centerline in the Reference Plane, keeping point A on the line passing through RE and LE, and maintaining the handset contact with the pinna, rotate the handset about the N-F line until any point on the handset is in contact with a phantom point below the pinna on the cheek. See Figure 9.2.3. The actual rotation angles should be documented in the test report.

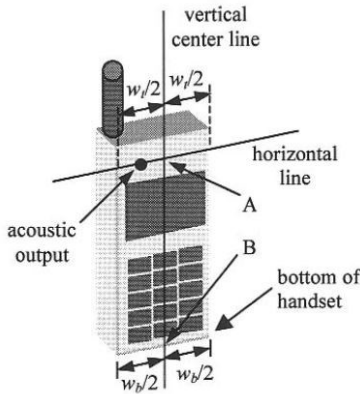


Fig 9.2.1 Handset vertical and horizontal reference lines—“fixed case”

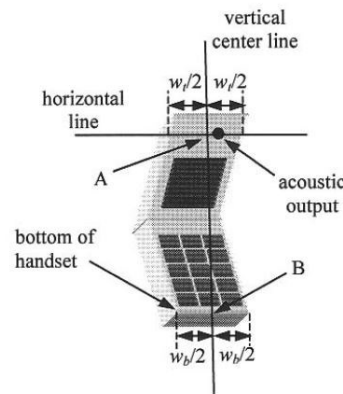


Fig 9.2.2 Handset vertical and horizontal reference lines—“clam-shell case”

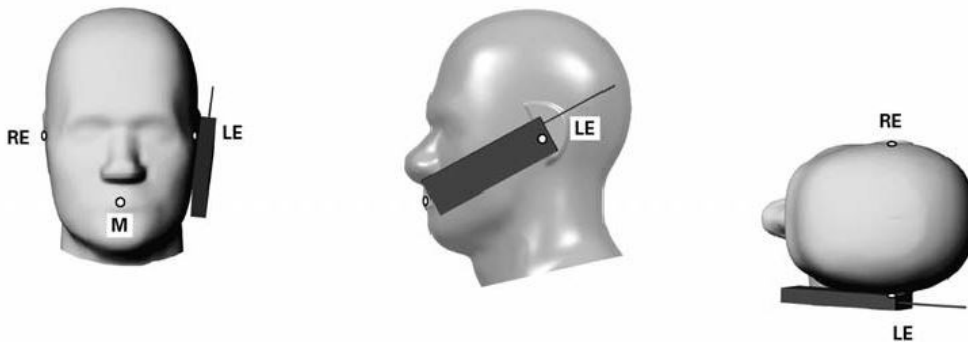


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

13.3 Definition of the tilt position

1. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece (flip cover), open the cover. If the handset can transmit with the cover closed, both configurations must be tested.
2. While maintaining the orientation of the handset, move the handset away from the pinna along the line passing through RE and LE far enough to allow a rotation of the handset away from the cheek by 15°.
3. Rotate the handset around the horizontal line by 15°.
4. While maintaining the orientation of the handset, move the handset towards the phantom on the line passing through RE and LE until any part of the handset touches the ear. The tilt position is obtained when the contact point is on the pinna. See Figure 9.3.1. If contact occurs at any location other than the pinna, e.g., the antenna at the back of the phantom head, the angle of the handset should be reduced. In this case, the tilt position is obtained if any point on the handset is in contact with the pinna and a second point

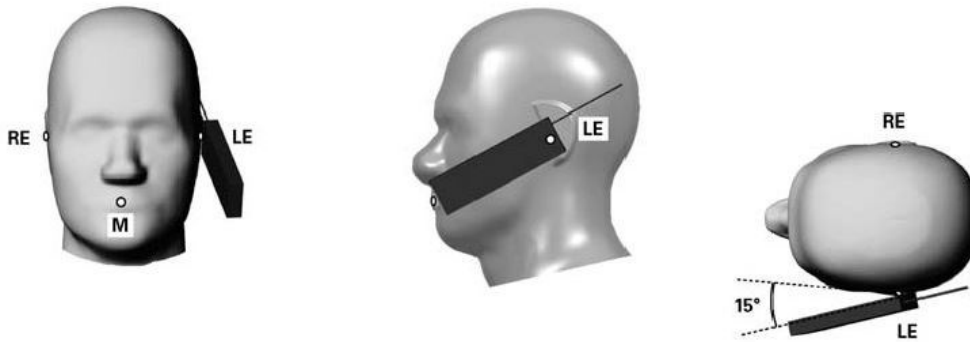


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

13.4 Body Worn Accessory

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 9.4). Per KDB648474 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 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 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.

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-chip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

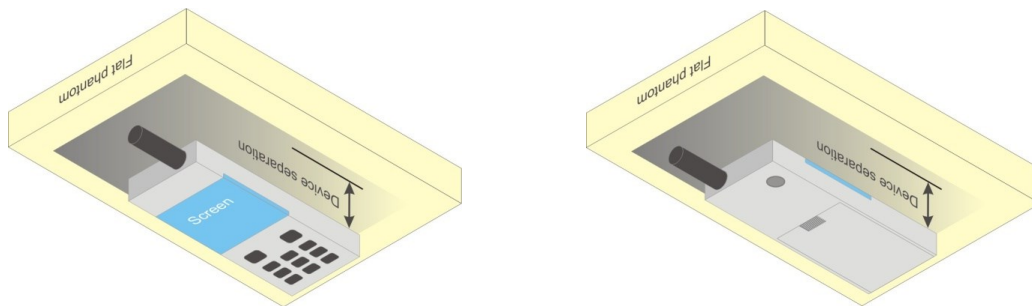


Fig 9.4 Body Worn Position



13.5 Product Specific 10g SAR Exposure

For smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm 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, According to KDB648474 D04v01r03, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless modes and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance

1. The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied.
2. The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at ≤ 25 mm from that surface or edge, in direct contact with a flat phantom, for 10-g extremity SAR according to the body-equivalent tissue dielectric parameters in KDB 865664 to address interactive hand use exposure conditions.6 The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg.

13.6 Wireless Router

Some battery-operated handsets have the capability to transmit and receive user through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 v02r01 where SAR test considerations for handsets ($L \times W \geq 9$ cm x 5 cm) are based on a composite test separation distance of 10mm from the front, back and edges of the device containing transmitting antennas within 2.5cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the body-worn accessory SAR requirements, the more conservative configurations can be considered, thus excluding some body-worn accessory SAR tests.

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 transmitters 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 frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v06 publication procedures. The "Portable Hotspot" feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

14. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS 4Tx slots for GSM850/GSM1900 are considered as the primary mode.
3. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode, SAR measurement is not required for the secondary mode.
4. When the phone is in talking mode and receiver worked, receiver on power will be implemented immediately in GSM1900 band, for SAR testing EUT was set in reduced on mode and GPRS 4 Tx slots due to its highest frame-average power.
5. Power reduction which is triggered by hotspot mode/p-sensor on/p-sensor detects handheld state for product specific 10g SAR condition are implemented in GSM1900 band, for SAR testing EUT was set in reduced power mode and GPRS 4 Tx slots due to its highest frame-average power.

<Full/Receiver On Power Mode>

GSM850 Tx Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	128	189	251		128	189	251	
Frequency (MHz)	824.2	836.4	848.8		824.2	836.4	848.8	
GSM 1 Tx slot	32.79	33.03	33.10	34.00	23.79	24.03	24.10	25.00
GPRS 1 Tx slot	32.64	32.87	32.99	34.00	23.64	23.87	23.99	25.00
GPRS 2 Tx slots	29.98	30.15	30.56	31.50	23.98	24.15	24.56	25.50
GPRS 3 Tx slots	28.71	28.95	28.34	29.50	24.45	24.69	24.08	25.24
GPRS 4 Tx slots	27.45	27.74	28.06	28.50	24.45	24.74	25.06	25.50
EDGE 1 Tx slot	26.03	26.03	26.13	27.50	17.03	17.03	17.13	18.50
EDGE 2 Tx slots	25.40	25.33	25.48	27.00	19.40	19.33	19.48	21.00
EDGE 3 Tx slots	23.27	23.22	23.40	25.00	19.01	18.96	19.14	20.74
EDGE 4 Tx slots	22.11	22.14	22.30	24.00	19.11	19.14	19.30	21.00
GSM1900								
	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
Tx Channel	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	29.55	29.30	29.01	30.50	20.55	20.30	20.01	21.50
GPRS 1 Tx slot	29.54	29.16	29.00	30.50	20.54	20.16	20.00	21.50
GPRS 2 Tx slots	27.87	27.39	27.15	28.50	21.87	21.39	21.15	22.50
GPRS 3 Tx slots	26.67	26.30	26.03	27.00	22.41	22.04	21.77	22.74
GPRS 4 Tx slots	25.45	25.07	24.76	26.00	22.45	22.07	21.76	23.00
EDGE 1 Tx slot	25.00	25.11	25.10	26.50	16.00	16.11	16.10	17.50
EDGE 2 Tx slots	23.41	23.54	23.50	25.00	17.41	17.54	17.50	19.00
EDGE 3 Tx slots	22.32	22.46	22.37	24.00	18.06	18.20	18.11	19.74
EDGE 4 Tx slots	21.16	21.32	21.26	23.00	18.16	18.32	18.26	20.00

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

- Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
- Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
- Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
- Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

<Reduced Power Mode for Hotspot On/P-Sensor On>

GSM1900 Tx Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	22.05	21.72	21.60	23.50	13.05	12.72	12.60	14.50
GPRS 1 Tx slot	22.04	21.71	21.55	23.50	13.04	12.71	12.55	14.50
GPRS 2 Tx slots	20.47	20.04	19.85	21.50	14.47	14.04	13.85	15.50
GPRS 3 Tx slots	19.20	18.80	18.50	20.00	14.94	14.54	14.24	15.74
GPRS 4 Tx slots	18.00	17.63	17.35	19.00	15.00	14.63	14.35	16.00
EDGE 1 Tx slot	18.55	18.53	18.57	19.50	9.55	9.53	9.57	10.50
EDGE 2 Tx slots	17.40	17.10	16.66	18.00	11.40	11.10	10.66	12.00
EDGE 3 Tx slots	16.37	15.95	15.50	17.00	12.11	11.69	11.24	12.74
EDGE 4 Tx slots	15.15	14.79	14.43	16.00	12.15	11.79	11.43	13.00

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

<Reduced Power Mode for Product Specific 10g SAR>

GSM1900 Tx Channel	Burst Average Power (dBm)			Tune-up Limit (dBm)	Frame-Average Power (dBm)			Tune-up Limit (dBm)
	512	661	810		512	661	810	
Frequency (MHz)	1850.2	1880	1909.8		1850.2	1880	1909.8	
GSM 1 Tx slot	26.07	25.75	25.56	27.50	17.07	16.75	16.56	18.50
GPRS 1 Tx slot	26.10	25.90	25.50	27.50	17.10	16.90	16.50	18.50
GPRS 2 Tx slots	24.50	24.17	23.80	25.50	18.50	18.17	17.80	19.50
GPRS 3 Tx slots	23.40	23.03	22.58	24.00	19.14	18.77	18.32	19.74
GPRS 4 Tx slots	22.05	21.72	21.32	23.00	19.05	18.72	18.32	20.00
EDGE 1 Tx slot	22.68	22.67	22.70	23.50	13.68	13.67	13.70	14.50
EDGE 2 Tx slots	20.55	20.54	20.60	22.00	14.55	14.54	14.60	16.00
EDGE 3 Tx slots	19.30	19.28	19.30	21.00	15.04	15.02	15.04	16.74
EDGE 4 Tx slots	18.10	18.15	18.20	20.00	15.10	15.15	15.20	17.00

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.

The calculated method are shown as below:

Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB

Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB

Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB

Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

<WCDMA Conducted Power>

1. The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.
2. The procedures in KDB 941225 D01v03r01 are applied for 3GPP Rel. 6 HSPA to configure the device in the required sub-test mode(s) to determine SAR test exclusion.
3. For HSPA+ devices supporting 16 QAM in the uplink, power measurements procedure is according to the configurations in Table C.11.1.4 of 3GPP TS 34.121-1.
4. For DC-HSDPA, the device was configured according to the H-Set 12, Fixed Reference Channel (FRC) configuration in Table C.8.1.12 of 3GPP TS 34.121-1, with the primary and the secondary serving HS-DSCH Cell enabled during the power measurement.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
 - i. Set Gain Factors (β_c and β_d) and parameters were set according to each
 - ii. Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
 - iii. Set RMC 12.2Kbps + HSDPA mode.
 - iv. Set Cell Power = -86 dBm
 - v. Set HS-DSCH Configuration Type to FRC (H-set 1, QPSK)
 - vi. Select HSDPA Uplink Parameters
 - vii. Set Delta ACK, Delta NACK and Delta CQI = 8
 - viii. Set Ack-Nack Repetition Factor to 3
 - ix. Set CQI Feedback Cycle (k) to 4 ms
 - x. Set CQI Repetition Factor to 2
 - xi. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

Sub-test	β_c	β_d	β_d (SF)	β_d/β_d	β_{hs} (Note 1, Note 2)	CM (dB) (Note 3)	MPR (dB) (Note 3)
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 (Note 4)	15/15 (Note 4)	64	12/15 (Note 4)	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$.

Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and $\Delta_{NACK} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$, and $\Delta_{CQI} = 24/15$ with $\beta_{hs} = 24/15 * \beta_c$.

Note 3: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Note 4: 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 signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

Setup Configuration

HSUPA Setup Configuration:

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting * :
 - i. Call Configs = 5.2B, 5.9B, 5.10B, and 5.13.2B with QPSK
 - ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.3, quoted from the TS 34.121
 - iii. Set Cell Power = -86 dBm
 - iv. Set Channel Type = 12.2k + HSPA
 - v. Set UE Target Power
 - vi. Power Ctrl Mode= Alternating bits
 - vii. Set and observe the E-TFCI
 - viii. Confirm that E-TFCI is equal to the target E-TFCI of 75 for sub-test 1, and other subtest's E-TFCI
- d. The transmitted maximum output power was recorded.

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note 1)	β_{ec}	β_{ed} (Note 4) (Note 5)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2) (Note 6)	AG Index (Note 5)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/25	1309/225	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 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	0	-	-	5/15	5/15	47/15	4	1	1.0	0.0	12	67

- Note 1: For sub-test 1 to 4, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$. For sub-test 5, Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 5/15$ with $\beta_{hs} = 5/15 * \beta_c$.
- Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. 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 signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.
- Note 4: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.
- Note 5: β_{ed} can not be set directly; it is set by Absolute Grant Value.
- Note 6: For subtests 2, 3 and 4, UE may perform E-DPDCH power scaling at max power which could results in slightly smaller MPR values.

Setup Configuration

DC-HSDPA 3GPP release 8 Setup Configuration:

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration below
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting:
 - i. Set RMC 12.2Kbps + HSDPA mode.
 - ii. Set Cell Power = -25 dBm
 - iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
 - iv. Select HSDPA Uplink Parameters
 - v. Set Gain Factors (β_c and β_d) and parameters were set according to each Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
 - a). Subtest 1: $\beta_c/\beta_d=2/15$
 - b). Subtest 2: $\beta_c/\beta_d=12/15$
 - c). Subtest 3: $\beta_c/\beta_d=15/8$
 - d). Subtest 4: $\beta_c/\beta_d=15/4$
 - vi. Set Delta ACK, Delta NACK and Delta CQI = 8
 - vii. Set Ack-Nack Repetition Factor to 3
 - viii. Set CQI Feedback Cycle (k) to 4 ms
 - ix. Set CQI Repetition Factor to 2
 - x. Power Ctrl Mode = All Up bits
- d. The transmitted maximum output power was recorded.

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification. A summary of these settings are illustrated below:

C.8.1.12 Fixed Reference Channel Definition H-Set 12

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK

Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.
 Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.

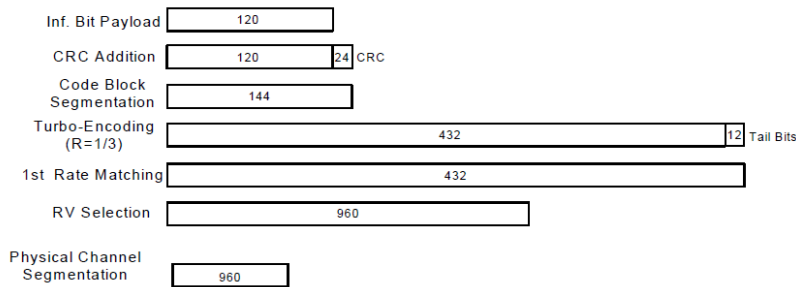


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

HSPA+ 3GPP release 7 (uplink category 7) 16QAM, Setup Configuration:

- a. The EUT was connected to Base Station Agilent E5515C referred to the Setup Configuration.
- b. The RF path losses were compensated into the measurements.
- c. A call was established between EUT and Base Station with following setting * :
 - i. Call Configs = 5.2E:HSPA+:UL with 16QAM
 - ii. Set the Gain Factors (β_c and β_d) and parameters (AG Index) were set according to each specific sub-test in the following table, C11.1.4, quoted from the TS 34.121-1 s5.2E
 - iii. Set Channel Parmns
 - iv. Set Cell Power = -86 dBm
 - v. Set Channel Type = HSPA
 - vi. Set UE Target Power =21 dBm
 - vii. Power Ctrl Mode= All Up Bits
 - viii. Set Manual Uplink DPCH Bc/Bd = Manual
 - ix. Set Manual Uplink DPCH Bc and Bd=15,15(for 34.121-1 v8.10.0 table C11.1.4 sub-test 1)
 - x. Set HSPA Conn DL Channel Levels
 - xi. Set HS-SCCH Configs
 - xii. Set RB Test Mode Setup
 - xiii. Set Common HSUPA Parameters
 - xiv. Set Serving Grant
 - xv. Confirm that E-TFCI is equal to the target E-TFCI of 105 for sub-test 1, and other subtest's E-TFCI
- d. The transmitted maximum output power was recorded.

Table C.11.1.4: β values for transmitter characteristics tests with HS-DPCCH and E-DCH with 16QAM

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed1} : 30/15 β_{ed2} : 30/15	β_{ed3} : 24/15 β_{ed4} : 24/15	3.5	2.5	14	105	105

Note 1: $\Delta_{ACK}, \Delta_{NACK}$ and $\Delta_{CQI} = 30/15$ with $\beta_{ts} = 30/15 * \beta_c$.

Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).

Note 3: DPDCH is not configured, therefore the β_c is set to 1 and $\beta_d = 0$ by default.

Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.

Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signaled to use the extrapolation algorithm.

Setup Configuration



<WCDMA Conducted Power>

General Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is $\leq \frac{1}{4}$ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA / DC-HSDPA / HSPA+) are less than $\frac{1}{4}$ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.

<Full/Receiver On Power Mode>

Band		WCDMA Band V			Tune-up Limit (dBm)
Tx Channel		4132	4182	4233	
Rx Channel		4357	4407	4458	
Frequency (MHz)		826.4	836.4	846.6	
3GPP Rel 99	AMR 12.2Kbps	22.72	22.80	22.95	24.00
3GPP Rel 99	RMC 12.2Kbps	22.74	22.82	23.00	24.00
3GPP Rel 6	HSDPA Subtest-1	21.70	21.79	21.89	23.00
3GPP Rel 6	HSDPA Subtest-2	21.73	21.83	21.93	23.00
3GPP Rel 6	HSDPA Subtest-3	21.25	21.35	21.42	22.50
3GPP Rel 6	HSDPA Subtest-4	21.23	21.34	21.43	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	21.36	21.41	21.43	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.26	21.35	21.36	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	20.52	21.03	21.06	22.50
3GPP Rel 8	DC-HSDPA Subtest-4	20.71	21.00	21.09	22.50
3GPP Rel 6	HSUPA Subtest-1	21.52	21.65	21.52	23.00
3GPP Rel 6	HSUPA Subtest-2	19.67	19.53	19.56	21.00
3GPP Rel 6	HSUPA Subtest-3	20.36	20.58	20.58	22.00
3GPP Rel 6	HSUPA Subtest-4	19.32	19.63	19.56	21.00
3GPP Rel 6	HSUPA Subtest-5	21.25	21.52	21.57	23.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	20.15	20.08	20.32	21.00



<Full Power Mode>

Band		WCDMA Band II			Tune-up Limit (dBm)
Tx Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	AMR 12.2Kbps	21.23	21.35	21.41	22.00
3GPP Rel 99	RMC 12.2Kbps	21.25	21.47	21.43	22.00
3GPP Rel 6	HSDPA Subtest-1	20.01	20.08	20.18	21.00
3GPP Rel 6	HSDPA Subtest-2	20.05	20.24	20.15	21.00
3GPP Rel 6	HSDPA Subtest-3	19.65	19.78	19.85	20.50
3GPP Rel 6	HSDPA Subtest-4	19.60	19.79	19.71	20.50
3GPP Rel 8	DC-HSDPA Subtest-1	20.08	20.21	20.18	21.00
3GPP Rel 8	DC-HSDPA Subtest-2	20.01	20.08	20.08	21.00
3GPP Rel 8	DC-HSDPA Subtest-3	19.60	19.88	19.38	20.50
3GPP Rel 8	DC-HSDPA Subtest-4	19.58	19.81	19.61	20.50
3GPP Rel 6	HSUPA Subtest-1	20.12	20.28	20.18	21.00
3GPP Rel 6	HSUPA Subtest-2	18.08	18.21	18.08	19.00
3GPP Rel 6	HSUPA Subtest-3	19.50	19.18	19.18	20.00
3GPP Rel 6	HSUPA Subtest-4	18.21	18.21	18.21	19.00
3GPP Rel 6	HSUPA Subtest-5	21.23	21.35	21.41	21.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	18.03	18.15	18.28	19.00

<Receiver On Power Mode>

Band		WCDMA Band II			Tune-up Limit (dBm)
Tx Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	AMR 12.2Kbps	22.59	22.62	22.61	24.00
3GPP Rel 99	RMC 12.2Kbps	22.61	22.66	22.63	24.00
3GPP Rel 6	HSDPA Subtest-1	21.58	21.67	21.63	23.00
3GPP Rel 6	HSDPA Subtest-2	21.62	21.70	21.65	23.00
3GPP Rel 6	HSDPA Subtest-3	21.15	21.18	21.16	22.50
3GPP Rel 6	HSDPA Subtest-4	21.14	21.19	21.15	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	21.56	21.65	21.68	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.21	21.54	21.65	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	20.82	21.16	21.04	22.50
3GPP Rel 8	DC-HSDPA Subtest-4	20.80	21.07	21.04	22.50
3GPP Rel 6	HSUPA Subtest-1	21.34	21.64	21.66	23.00
3GPP Rel 6	HSUPA Subtest-2	19.31	19.56	19.58	21.00
3GPP Rel 6	HSUPA Subtest-3	20.43	20.65	20.57	22.00
3GPP Rel 6	HSUPA Subtest-4	19.65	19.63	19.96	21.00
3GPP Rel 6	HSUPA Subtest-5	21.48	21.61	21.63	23.00
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	19.18	19.62	19.52	21.00

<Reduced Power Mode for Hotspot On/P-Sensor On>

Band		WCDMA Band II			Tune-up Limit (dBm)
Tx Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	AMR 12.2Kbps	13.93	14.11	14.02	15.50
3GPP Rel 99	RMC 12.2Kbps	13.94	14.12	14.03	15.50
3GPP Rel 6	HSDPA Subtest-1	12.90	13.05	13.00	13.50
3GPP Rel 6	HSDPA Subtest-2	12.85	13.03	12.98	13.50
3GPP Rel 6	HSDPA Subtest-3	12.46	12.57	12.45	13.50
3GPP Rel 6	HSDPA Subtest-4	12.46	12.59	12.50	13.50
3GPP Rel 8	DC-HSDPA Subtest-1	12.93	13.10	13.11	13.50
3GPP Rel 8	DC-HSDPA Subtest-2	12.58	13.32	13.26	13.50
3GPP Rel 8	DC-HSDPA Subtest-3	12.15	12.43	12.40	13.50
3GPP Rel 8	DC-HSDPA Subtest-4	12.14	12.54	12.45	13.50
3GPP Rel 6	HSUPA Subtest-1	12.71	13.14	13.11	13.50
3GPP Rel 6	HSUPA Subtest-2	10.65	11.00	10.90	11.50
3GPP Rel 6	HSUPA Subtest-3	11.81	12.19	11.91	12.50
3GPP Rel 6	HSUPA Subtest-4	11.02	11.19	11.36	11.50
3GPP Rel 6	HSUPA Subtest-5	12.89	13.29	13.04	13.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	11.25	11.31	11.48	11.50

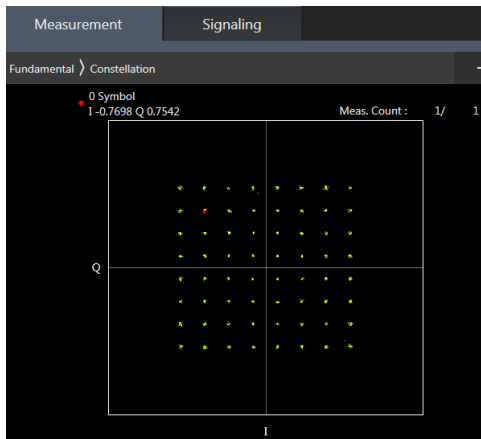
<Reduced Power Mode for Product Specific 10g SAR>

Band		WCDMA Band II			Tune-up Limit (dBm)
Tx Channel		9262	9400	9538	
Rx Channel		9662	9800	9938	
Frequency (MHz)		1852.4	1880	1907.6	
3GPP Rel 99	AMR 12.2Kbps	17.85	18.02	17.97	19.50
3GPP Rel 99	RMC 12.2Kbps	17.87	18.04	18.01	19.50
3GPP Rel 6	HSDPA Subtest-1	16.93	17.08	17.05	18.50
3GPP Rel 6	HSDPA Subtest-2	16.94	17.11	17.04	18.50
3GPP Rel 6	HSDPA Subtest-3	16.46	16.61	16.58	18.00
3GPP Rel 6	HSDPA Subtest-4	16.48	16.59	16.56	18.00
3GPP Rel 8	DC-HSDPA Subtest-1	16.84	17.04	17.07	18.50
3GPP Rel 8	DC-HSDPA Subtest-2	16.47	16.93	17.04	18.50
3GPP Rel 8	DC-HSDPA Subtest-3	16.12	16.23	16.35	18.00
3GPP Rel 8	DC-HSDPA Subtest-4	16.13	16.23	16.24	18.00
3GPP Rel 6	HSUPA Subtest-1	16.60	17.03	17.05	18.50
3GPP Rel 6	HSUPA Subtest-2	15.06	15.09	15.09	16.50
3GPP Rel 6	HSUPA Subtest-3	15.69	16.04	15.96	17.50
3GPP Rel 6	HSUPA Subtest-4	15.08	15.02	15.35	16.50
3GPP Rel 6	HSUPA Subtest-5	16.74	17.02	17.09	17.50
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	15.32	15.61	15.38	16.50

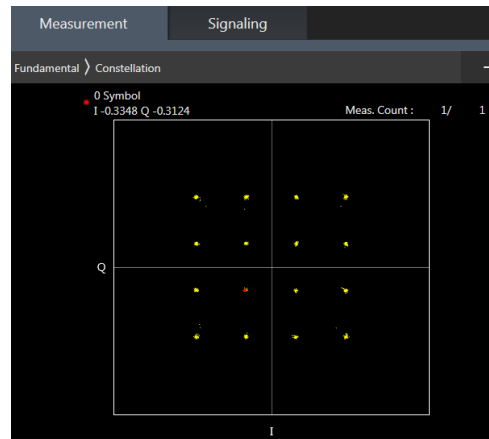
<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 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.
6. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
8. For LTE B5 the maximum bandwidth does not support three non-overlapping channels, 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.
9. According to 2017 TCB workshop, for 64QAM and 16QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



64QAM



16QAM



<Full/Receiver On Power Mode>

<LTE Band 5>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20450	20525	20600		
Frequency (MHz)				829	836.5	844		
10	QPSK	1	0	23.32	23.29	23.27	24	0
10	QPSK	1	25	23.21	23.20	23.24		
10	QPSK	1	49	23.24	23.22	23.26		
10	QPSK	25	0	22.27	22.26	22.26	23	1
10	QPSK	25	12	22.14	22.23	22.24		
10	QPSK	25	25	22.09	22.18	22.19		
10	QPSK	50	0	22.22	22.20	22.18	23	1
10	16QAM	1	0	22.52	22.65	22.59		
10	16QAM	1	25	22.34	22.58	22.54		
10	16QAM	1	49	22.39	22.54	22.63	22	2
10	16QAM	25	0	21.22	21.37	21.38		
10	16QAM	25	12	21.21	21.36	21.33		
10	16QAM	25	25	21.13	21.29	21.32	22	2
10	16QAM	50	0	21.22	21.33	21.37		
10	64QAM	1	0	21.68	21.45	21.43		
10	64QAM	1	25	21.62	21.50	21.46	22	2
10	64QAM	1	49	21.63	21.51	21.44		
10	64QAM	25	0	20.49	20.35	20.28		
10	64QAM	25	12	20.44	20.37	20.31	21	3
10	64QAM	25	25	20.43	20.31	20.26		
10	64QAM	50	0	20.38	20.33	20.30		
Channel				20425	20525	20625	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	23.13	23.09	23.17	24	0
5	QPSK	1	12	23.18	23.14	23.15		
5	QPSK	1	24	23.15	23.21	23.21		
5	QPSK	12	0	22.26	22.23	22.18	23	1
5	QPSK	12	7	22.27	22.24	22.21		
5	QPSK	12	13	22.21	22.18	22.18		
5	QPSK	25	0	22.19	22.16	22.14	23	1
5	16QAM	1	0	22.55	22.52	22.52		
5	16QAM	1	12	22.56	22.57	22.53		
5	16QAM	1	24	22.54	22.58	22.58	22	2
5	16QAM	12	0	21.38	21.35	21.33		
5	16QAM	12	7	21.15	21.34	21.33		
5	16QAM	12	13	21.37	21.23	21.29	22	2
5	16QAM	25	0	21.33	20.85	21.30		
5	64QAM	1	0	21.73	21.56	21.53		
5	64QAM	1	12	21.71	21.55	21.52	22	2
5	64QAM	1	24	21.73	21.58	21.51		
5	64QAM	12	0	20.62	20.43	20.33		
5	64QAM	12	7	20.50	20.43	20.35	21	3
5	64QAM	12	13	20.50	20.40	20.29		
5	64QAM	25	0	20.47	20.40	20.39		



Channel				20415	20525	20635	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.67	22.76	22.70	24	0
3	QPSK	1	8	22.76	22.73	22.77		
3	QPSK	1	14	22.74	22.83	22.76		
3	QPSK	8	0	21.79	21.79	21.70	23	1
3	QPSK	8	4	21.82	21.82	21.75		
3	QPSK	8	7	21.77	21.79	21.80		
3	QPSK	15	0	21.81	21.74	21.70	23	1
3	16QAM	1	0	22.09	22.09	22.06		
3	16QAM	1	8	22.17	22.07	22.12		
3	16QAM	1	14	22.10	22.09	22.12	22	2
3	16QAM	8	0	21.00	20.90	20.86		
3	16QAM	8	4	21.05	20.89	20.83		
3	16QAM	8	7	20.96	20.90	21.23	22	2
3	16QAM	15	0	20.93	20.85	21.29		
3	64QAM	1	0	21.79	21.65	21.66		
3	64QAM	1	8	21.78	21.65	21.57	22	2
3	64QAM	1	14	21.81	21.63	21.57		
3	64QAM	8	0	20.72	20.51	20.40		
3	64QAM	8	4	20.55	20.49	20.44	21	3
3	64QAM	8	7	20.56	20.43	20.37		
3	64QAM	15	0	20.50	20.45	20.46		
Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.54	22.63	22.70	24	0
1.4	QPSK	1	3	22.49	22.68	22.75		
1.4	QPSK	1	5	22.58	22.62	22.67		
1.4	QPSK	3	0	22.57	22.69	22.70		
1.4	QPSK	3	1	22.57	22.73	22.73		
1.4	QPSK	3	3	22.68	22.68	22.72		
1.4	QPSK	6	0	21.64	21.68	21.72	23	1
1.4	16QAM	1	0	21.99	21.95	21.97	23	1
1.4	16QAM	1	3	22.02	22.04	22.04		
1.4	16QAM	1	5	22.03	21.94	22.01		
1.4	16QAM	3	0	21.74	21.74	21.79		
1.4	16QAM	3	1	21.82	21.79	21.83		
1.4	16QAM	3	3	21.85	21.77	21.78		
1.4	16QAM	6	0	20.93	20.82	20.87	22	2
1.4	64QAM	1	0	21.85	21.74	21.79	22	2
1.4	64QAM	1	3	21.78	21.75	21.62		
1.4	64QAM	1	5	21.89	21.68	21.63		
1.4	64QAM	3	0	20.82	20.59	20.47		
1.4	64QAM	3	1	20.60	20.55	20.53		
1.4	64QAM	3	3	20.62	20.46	20.45		
1.4	64QAM	6	0	20.53	20.50	20.53	21	3



<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	22.32	22.41	22.40	24	0
20	QPSK	1	49	22.38	22.32	22.56		
20	QPSK	1	99	22.46	22.40	22.51		
20	QPSK	50	0	21.31	21.35	21.46	23	1
20	QPSK	50	24	21.34	21.34	21.43		
20	QPSK	50	50	21.43	21.33	21.45		
20	QPSK	100	0	21.36	21.35	21.45	23	1
20	16QAM	1	0	21.74	21.77	21.79		
20	16QAM	1	49	21.84	21.64	21.89		
20	16QAM	1	99	21.95	21.83	21.92	22	2
20	16QAM	50	0	20.54	20.47	20.53		
20	16QAM	50	24	20.52	20.50	20.57		
20	16QAM	50	50	20.65	20.46	20.56	22	2
20	16QAM	100	0	20.54	20.49	20.62		
20	64QAM	1	0	20.52	20.58	20.75		
20	64QAM	1	49	20.49	20.55	20.81	22	2
20	64QAM	1	99	20.54	20.54	20.79		
20	64QAM	50	0	19.53	19.42	19.68		
20	64QAM	50	24	19.55	19.50	19.66	21	3
20	64QAM	50	50	19.60	19.54	19.67		
20	64QAM	100	0	19.52	19.48	19.62		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	22.35	22.43	22.42	24	0
15	QPSK	1	37	22.39	22.32	22.53		
15	QPSK	1	74	22.46	22.43	22.50		
15	QPSK	36	0	21.39	21.36	21.53	23	1
15	QPSK	36	20	21.44	21.39	21.58		
15	QPSK	36	39	21.42	21.37	21.55		
15	QPSK	75	0	21.37	21.41	21.52	23	1
15	16QAM	1	0	21.77	21.80	21.82		
15	16QAM	1	37	21.81	21.67	21.89		
15	16QAM	1	74	21.93	21.85	22.02	22	2
15	16QAM	36	0	20.55	20.49	20.64		
15	16QAM	36	20	20.55	20.55	20.63		
15	16QAM	36	39	20.63	20.53	20.68	22	2
15	16QAM	75	0	20.57	20.50	20.65		
15	64QAM	1	0	20.57	20.69	20.85		
15	64QAM	1	37	20.58	20.60	20.87	22	2
15	64QAM	1	74	20.64	20.61	20.86		
15	64QAM	36	0	19.66	19.50	19.73		
15	64QAM	36	20	19.61	19.56	19.70	21	3
15	64QAM	36	39	19.67	19.63	19.70		
15	64QAM	75	0	19.61	19.55	19.71		



Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	22.31	22.26	22.54	24	0
10	QPSK	1	25	22.19	22.27	22.43		
10	QPSK	1	49	22.35	22.34	22.49		
10	QPSK	25	0	21.32	21.30	21.40	23	1
10	QPSK	25	12	21.34	21.32	21.42		
10	QPSK	25	25	21.33	21.27	21.44		
10	QPSK	50	0	21.31	21.31	21.37	23	1
10	16QAM	1	0	21.71	21.66	21.93		
10	16QAM	1	25	21.69	21.67	21.79		
10	16QAM	1	49	21.86	21.75	21.96	22	2
10	16QAM	25	0	20.50	20.40	20.50		
10	16QAM	25	12	20.52	20.43	20.53		
10	16QAM	25	25	20.55	20.45	20.55	22	2
10	16QAM	50	0	20.53	20.45	20.50		
10	64QAM	1	0	20.63	20.78	20.98		
10	64QAM	1	25	20.65	20.70	20.92	22	2
10	64QAM	1	49	20.72	20.66	20.92		
10	64QAM	25	0	19.76	19.58	19.80		
10	64QAM	25	12	19.66	19.62	19.79	21	3
10	64QAM	25	25	19.73	19.66	19.78		
10	64QAM	50	0	19.64	19.60	19.78		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	22.34	22.23	22.49	24	0
5	QPSK	1	12	22.27	22.31	22.42		
5	QPSK	1	24	22.31	22.27	22.45		
5	QPSK	12	0	21.41	21.27	21.43	23	1
5	QPSK	12	7	21.45	21.31	21.45		
5	QPSK	12	13	21.36	21.29	21.46		
5	QPSK	25	0	21.39	21.27	21.37	23	1
5	16QAM	1	0	21.66	21.67	21.79		
5	16QAM	1	12	21.65	21.71	21.78		
5	16QAM	1	24	21.67	21.69	21.87	22	2
5	16QAM	12	0	20.50	20.44	20.50		
5	16QAM	12	7	20.52	20.44	20.51		
5	16QAM	12	13	20.42	20.48	20.54	22	2
5	16QAM	25	0	20.48	20.42	20.48		
5	64QAM	1	0	20.69	20.87	21.11		
5	64QAM	1	12	20.72	20.80	20.97	22	2
5	64QAM	1	24	20.80	20.71	20.98		
5	64QAM	12	0	19.86	19.66	19.87		
5	64QAM	12	7	19.71	19.68	19.88	21	3
5	64QAM	12	13	19.79	19.69	19.86		
5	64QAM	25	0	19.67	19.65	19.85		

<Reduced Power Mode for Hotspot On/P-Sensor On>

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	18.06	18.06	18.13	19	0
20	QPSK	1	49	18.13	17.95	18.29		
20	QPSK	1	99	18.18	17.99	18.01		
20	QPSK	50	0	18.24	18.06	18.25	19	0
20	QPSK	50	24	18.24	18.05	18.11		
20	QPSK	50	50	18.23	18.04	18.12		
20	QPSK	100	0	18.24	18.07	18.25	19	0
20	16QAM	1	0	18.25	18.24	18.20		
20	16QAM	1	49	18.20	18.18	18.20		
20	16QAM	1	99	18.23	18.24	18.18	19	0
20	16QAM	50	0	18.25	18.12	18.17		
20	16QAM	50	24	18.24	18.15	18.17		
20	16QAM	50	50	18.25	18.14	18.18	19	0
20	16QAM	100	0	18.20	18.16	18.21		
20	64QAM	1	0	18.05	17.93	18.13		
20	64QAM	1	49	18.01	17.83	18.08	19	0
20	64QAM	1	99	17.85	17.77	17.95		
20	64QAM	50	0	17.82	17.79	17.93		
20	64QAM	50	24	17.81	17.76	17.88	19	0
20	64QAM	50	50	17.80	17.79	17.83		
20	64QAM	100	0	17.82	17.77	17.90		
Channel				20825	21100	21375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	18.11	18.11	18.13	19	0
15	QPSK	1	37	18.17	17.99	18.15		
15	QPSK	1	74	18.25	18.05	18.08		
15	QPSK	36	0	18.25	18.04	18.24	19	0
15	QPSK	36	20	18.26	18.10	18.10		
15	QPSK	36	39	18.28	18.03	18.11		
15	QPSK	75	0	18.26	18.04	18.11	19	0
15	16QAM	1	0	18.21	18.25	18.20		
15	16QAM	1	37	18.20	18.21	18.21		
15	16QAM	1	74	18.19	18.20	18.14	19	0
15	16QAM	36	0	18.17	18.10	18.25		
15	16QAM	36	20	18.19	18.13	18.16		
15	16QAM	36	39	18.19	18.13	18.18	19	0
15	16QAM	75	0	18.17	18.17	18.19		
15	64QAM	1	0	18.21	18.05	18.10		
15	64QAM	1	37	18.16	17.99	18.03	19	0
15	64QAM	1	74	18.10	17.97	18.05		
15	64QAM	36	0	18.09	17.93	18.11		
15	64QAM	36	20	18.20	18.00	18.06	19	0
15	64QAM	36	39	18.18	18.01	18.05		
15	64QAM	75	0	18.14	17.97	17.99		



Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	18.04	17.99	18.13	19	0
10	QPSK	1	25	18.16	17.98	18.01		
10	QPSK	1	49	18.18	17.99	18.03		
10	QPSK	25	0	18.20	18.03	18.03	19	0
10	QPSK	25	12	18.24	18.06	18.07		
10	QPSK	25	25	18.24	18.04	18.07		
10	QPSK	50	0	18.24	18.05	18.03	19	0
10	16QAM	1	0	18.17	18.18	18.18		
10	16QAM	1	25	18.24	18.21	18.17		
10	16QAM	1	49	18.21	18.20	18.21	19	0
10	16QAM	25	0	18.18	18.09	18.05		
10	16QAM	25	12	18.25	18.09	18.10		
10	16QAM	25	25	18.23	18.10	18.09	19	0
10	16QAM	50	0	18.24	18.14	18.10		
10	64QAM	1	0	18.00	17.98	18.06		
10	64QAM	1	25	18.05	18.07	18.10	19	0
10	64QAM	1	49	17.95	18.03	18.09		
10	64QAM	25	0	17.96	17.99	18.16		
10	64QAM	25	12	18.01	18.06	18.12	19	0
10	64QAM	25	25	18.00	18.04	18.15		
10	64QAM	50	0	18.06	18.02	18.11		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	18.15	17.96	17.95	19	0
5	QPSK	1	12	18.20	18.00	17.96		
5	QPSK	1	24	18.18	17.97	17.97		
5	QPSK	12	0	18.23	17.99	18.01	19	0
5	QPSK	12	7	18.25	18.06	18.03		
5	QPSK	12	13	18.22	18.01	18.02		
5	QPSK	25	0	18.24	18.03	18.00	19	0
5	16QAM	1	0	18.25	18.23	18.13		
5	16QAM	1	12	18.20	18.18	18.17		
5	16QAM	1	24	18.14	18.15	18.17	19	0
5	16QAM	12	0	18.21	18.04	17.97		
5	16QAM	12	7	18.16	18.12	18.04		
5	16QAM	12	13	18.18	18.10	18.04	19	0
5	16QAM	25	0	18.13	18.08	18.05		
5	64QAM	1	0	17.96	18.02	18.11		
5	64QAM	1	12	18.05	18.10	18.06	19	0
5	64QAM	1	24	18.00	18.04	18.04		
5	64QAM	12	0	18.06	18.00	17.95		
5	64QAM	12	7	18.10	18.04	17.98	19	0
5	64QAM	12	13	18.09	18.03	17.96		
5	64QAM	25	0	18.07	18.08	18.02		



<Reduced Power Mode for Product Specific 10q SAR>

<LTE Band 7>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				20850	21100	21350		
Frequency (MHz)				2510	2535	2560		
20	QPSK	1	0	21.91	21.77	21.80	22.5	0
20	QPSK	1	49	21.89	21.92	22.10		
20	QPSK	1	99	21.90	21.81	21.81		
20	QPSK	50	0	22.00	22.05	22.08	22.5	0
20	QPSK	50	24	22.00	21.76	21.60		
20	QPSK	50	50	22.07	21.75	21.97		
20	QPSK	100	0	21.90	21.92	21.99		
20	16QAM	1	0	22.05	22.05	22.07	22.5	0
20	16QAM	1	49	22.06	22.07	22.01		
20	16QAM	1	99	22.06	22.05	22.06		
20	16QAM	50	0	21.52	21.50	21.42	22.5	0
20	16QAM	50	24	21.56	21.39	21.61		
20	16QAM	50	50	21.53	21.33	21.15		
20	16QAM	100	0	21.56	21.54	21.22		
20	64QAM	1	0	21.30	21.32	21.32	22	0.5
20	64QAM	1	49	21.66	21.42	21.62		
20	64QAM	1	99	21.61	21.50	21.52		
20	64QAM	50	0	20.42	20.30	20.43	21	1.5
20	64QAM	50	24	20.41	20.35	20.47		
20	64QAM	50	50	20.41	20.35	20.48		
20	64QAM	100	0	20.45	20.37	20.46		
Channel				20825	21100	21375		
Frequency (MHz)				2507.5	2535	2562.5		
15	QPSK	1	0	21.82	21.87	21.93	22.5	0
15	QPSK	1	37	21.85	21.78	21.77		
15	QPSK	1	74	21.98	21.87	21.89		
15	QPSK	36	0	21.90	21.79	22.07	22.5	0
15	QPSK	36	20	22.06	21.83	21.93		
15	QPSK	36	39	21.81	21.90	21.92		
15	QPSK	75	0	21.96	21.84	22.07		
15	16QAM	1	0	21.99	22.02	22.01	22.5	0
15	16QAM	1	37	22.05	21.84	22.02		
15	16QAM	1	74	22.02	22.01	21.96		
15	16QAM	36	0	21.59	21.44	21.59	22.5	0
15	16QAM	36	20	21.74	21.37	21.45		
15	16QAM	36	39	21.74	21.50	21.60		
15	16QAM	75	0	21.65	21.39	21.67		
15	64QAM	1	0	21.31	21.44	21.36	22	0.5
15	64QAM	1	37	21.59	21.40	21.44		
15	64QAM	1	74	21.59	21.46	21.43		
15	64QAM	36	0	20.48	20.31	20.39	21	1.5
15	64QAM	36	20	20.54	20.36	20.32		
15	64QAM	36	39	20.58	20.35	20.37		
15	64QAM	75	0	20.41	20.31	20.27		



Channel				20800	21100	21400	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2505	2535	2565		
10	QPSK	1	0	21.72	21.70	22.02	22.5	0
10	QPSK	1	25	21.96	21.67	21.91		
10	QPSK	1	49	21.97	21.82	21.95		
10	QPSK	25	0	21.91	21.78	21.71	22.5	0
10	QPSK	25	12	21.87	21.73	21.76		
10	QPSK	25	25	21.92	21.80	21.87		
10	QPSK	50	0	21.90	21.77	21.81		
10	16QAM	1	0	22.07	22.06	22.07	22.5	0
10	16QAM	1	25	22.00	21.90	21.92		
10	16QAM	1	49	22.05	22.02	22.01		
10	16QAM	25	0	21.56	21.36	21.37	22.5	0
10	16QAM	25	12	21.52	21.45	21.41		
10	16QAM	25	25	21.66	21.31	21.44		
10	16QAM	50	0	21.60	21.40	21.46		
10	64QAM	1	0	21.34	21.24	21.30	22	0.5
10	64QAM	1	25	21.61	21.43	21.46		
10	64QAM	1	49	21.57	21.39	21.35		
10	64QAM	25	0	20.36	20.25	20.33	21	1.5
10	64QAM	25	12	20.42	20.27	20.34		
10	64QAM	25	25	20.45	20.26	20.29		
10	64QAM	50	0	20.44	20.28	20.34		
Channel				20775	21100	21425	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2502.5	2535	2567.5		
5	QPSK	1	0	21.80	21.68	21.67	22.5	0
5	QPSK	1	12	22.03	21.65	21.69		
5	QPSK	1	24	21.89	21.64	21.62		
5	QPSK	12	0	21.84	21.74	21.71	22.5	0
5	QPSK	12	7	21.83	21.79	21.81		
5	QPSK	12	13	21.90	21.74	21.87		
5	QPSK	25	0	21.92	21.76	21.75		
5	16QAM	1	0	21.96	21.89	22.04	22.5	0
5	16QAM	1	12	22.05	21.97	21.96		
5	16QAM	1	24	22.00	21.86	22.03		
5	16QAM	12	0	21.54	21.35	21.33	22.5	0
5	16QAM	12	7	21.63	21.35	21.32		
5	16QAM	12	13	21.61	21.29	21.36		
5	16QAM	25	0	21.54	21.31	21.36		
5	64QAM	1	0	21.41	21.28	21.31	22	0.5
5	64QAM	1	12	21.58	21.41	21.39		
5	64QAM	1	24	21.51	21.39	21.33		
5	64QAM	12	0	20.41	20.27	20.14	21	1.5
5	64QAM	12	7	20.47	20.33	20.24		
5	64QAM	12	13	20.48	20.27	20.26		
5	64QAM	25	0	20.36	20.31	20.27		

<TDD LTE SAR Measurement>

TDD LTE configuration setup for SAR measurement

SAR was tested with a fixed periodic duty factor according to the highest transmission duty factor implemented for the device and supported by 3GPP.

- a. 3GPP TS 36.211 section 4.2 for Type 2 Frame Structure and Table 4.2-2 for uplink-downlink configurations
- b. "special subframe S" contains both uplink and downlink transmissions, it has been taken into consideration to determine the transmission duty factor according to the worst case uplink and downlink cyclic prefix requirements for UpPTS
- c. Establishing connections with base station simulators ensure a consistent means for testing SAR and recommended for evaluating SAR. The Anritsu MT8820C (firmware: #22.52#004) was used for LTE output power measurements and SAR testing.

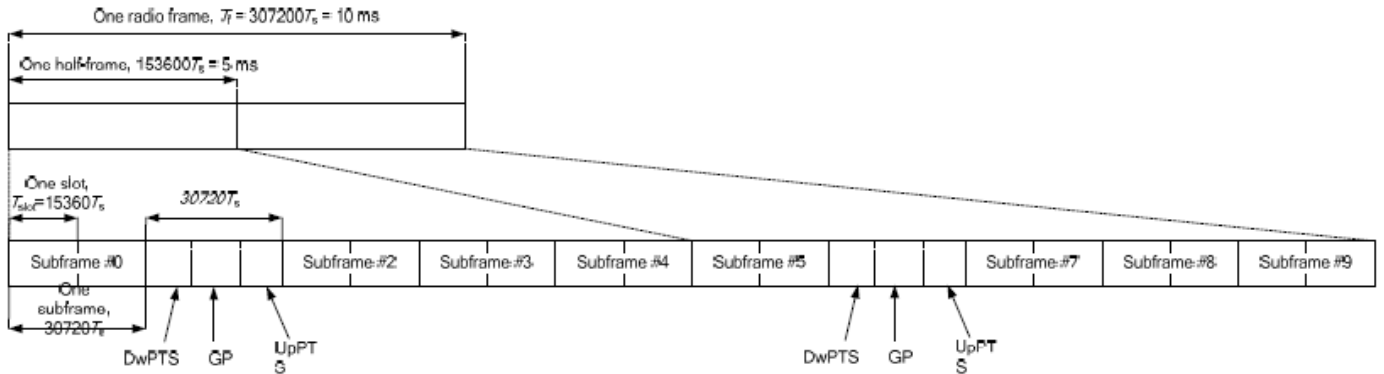


Figure 4.2-1: Frame structure type 2 (for 5 ms switch-point periodicity).

Table 4.2-2: Uplink-downlink configurations.

Uplink-downlink configuration	Downlink-to-Uplink Switch-point periodicity	Subframe number									
		0	1	2	3	4	5	6	7	8	9
0	5 ms	D	S	U	U	U	D	S	U	U	U
1	5 ms	D	S	U	U	D	D	S	U	U	D
2	5 ms	D	S	U	D	D	D	S	U	D	D
3	10 ms	D	S	U	U	U	D	D	D	D	D
4	10 ms	D	S	U	U	D	D	D	D	D	D
5	10 ms	D	S	U	D	D	D	D	D	D	D
6	5 ms	D	S	U	U	U	D	S	U	U	D

Table 4.2-1: Configuration of special subframe (lengths of DwPTS/GP/UpPTS).

Special subframe configuration	Normal cyclic prefix in downlink			Extended cyclic prefix in downlink		
	DwPTS	UpPTS		DwPTS	UpPTS	
		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink		Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
0	$6592 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$	$7680 \cdot T_s$	$2192 \cdot T_s$	$2560 \cdot T_s$
1	$19760 \cdot T_s$			$20480 \cdot T_s$		
2	$21952 \cdot T_s$			$23040 \cdot T_s$		
3	$24144 \cdot T_s$			$25600 \cdot T_s$		
4	$26336 \cdot T_s$			$7680 \cdot T_s$		
5	$6592 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$	$20480 \cdot T_s$	$4384 \cdot T_s$	$5120 \cdot T_s$
6	$19760 \cdot T_s$			$23040 \cdot T_s$		
7	$21952 \cdot T_s$			$12800 \cdot T_s$		
8	$24144 \cdot T_s$			-		
9	$13168 \cdot T_s$	-	-	-	-	-

Special subframe (30720·T _s): Normal cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
Uplink duty factor in one special subframe	0~4	7.13%	8.33%
	5~9	14.3%	16.7%

Special subframe(30720·T _s): Extended cyclic prefix in downlink (UpPTS)			
	Special subframe configuration	Normal cyclic prefix in uplink	Extended cyclic prefix in uplink
Uplink duty factor in one special subframe	0~3	7.13%	8.33%
	4~7	14.3%	16.7%

The highest duty factor is resulted from:

- i. Uplink-downlink configuration: 0. In a half-frame consisted of 5 subframes, uplink operation is in 3 uplink subframes and 1 special subframe.
- ii. special subframe configuration: 5-9 for normal cyclic prefix in downlink, 4-7 for extended cyclic prefix in downlink
- iii. for special subframe with extended cyclic prefix in uplink, the total uplink duty factor in one half-frame is: $(3+0.167)/5 = 63.3\%$
- iv. for special subframe with normal cyclic prefix in uplink, the total uplink duty factor in one half-frame is: $(3+0.143)/5 = 62.9\%$
- v. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix $63.3\%/62.9\% = 1.006$ is applied to scale-up the measured SAR result. The scaled TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.



<Full/Receiver On Power Mode>

<LTE Band 38>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				37850	38000	38150		
Frequency (MHz)				2580	2595	2610		
20	QPSK	1	0	22.28	22.29	22.26	24	0
20	QPSK	1	49	22.37	22.14	22.09		
20	QPSK	1	99	22.24	22.16	22.23		
20	QPSK	50	0	21.22	21.18	21.26	23	1
20	QPSK	50	24	21.30	21.24	21.26		
20	QPSK	50	50	21.25	21.18	21.28		
20	QPSK	100	0	21.28	21.21	21.27	23	1
20	16QAM	1	0	21.36	21.47	21.38		
20	16QAM	1	49	21.42	21.24	21.20		
20	16QAM	1	99	21.32	21.26	21.31	22	2
20	16QAM	50	0	20.30	20.35	20.37		
20	16QAM	50	24	20.41	20.30	20.33		
20	16QAM	50	50	20.38	20.32	20.35	21	3
20	16QAM	100	0	20.37	20.33	20.36		
20	64QAM	1	0	20.65	20.43	20.35		
20	64QAM	1	49	20.59	20.36	20.28	22	2
20	64QAM	1	99	20.42	20.27	20.19		
20	64QAM	50	0	19.58	19.44	19.34		
20	64QAM	50	24	19.48	19.36	19.27	21	3
20	64QAM	50	50	19.53	19.35	19.26		
20	64QAM	100	0	19.62	19.42	19.37		
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	22.25	22.30	22.27	24	0
15	QPSK	1	37	22.27	22.16	22.19		
15	QPSK	1	74	22.32	22.20	22.27		
15	QPSK	36	0	21.26	21.17	21.23	23	1
15	QPSK	36	20	21.28	21.18	21.26		
15	QPSK	36	39	21.23	21.17	21.28		
15	QPSK	75	0	21.24	21.18	21.27	23	1
15	16QAM	1	0	21.38	21.44	21.38		
15	16QAM	1	37	21.41	21.22	21.32		
15	16QAM	1	74	21.39	21.30	21.39	22	2
15	16QAM	36	0	20.34	20.16	20.30		
15	16QAM	36	20	20.33	20.30	20.34		
15	16QAM	36	39	20.30	20.22	20.32	22	2
15	16QAM	75	0	20.30	20.29	20.36		
15	64QAM	1	0	20.60	20.54	20.27		
15	64QAM	1	37	20.50	20.41	20.22	21	3
15	64QAM	1	74	20.32	20.34	20.12		
15	64QAM	36	0	19.45	19.52	19.29		
15	64QAM	36	20	19.42	19.42	19.23	21	3
15	64QAM	36	39	19.46	19.44	19.23		
15	64QAM	75	0	19.53	19.49	19.28		



Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	22.30	22.21	22.21	24	0
10	QPSK	1	25	22.28	22.15	22.34		
10	QPSK	1	49	22.30	22.18	22.32		
10	QPSK	25	0	21.35	21.17	21.33	23	1
10	QPSK	25	12	21.33	21.20	21.32		
10	QPSK	25	25	21.33	21.15	21.32		
10	QPSK	50	0	21.36	21.14	21.33	23	1
10	16QAM	1	0	21.50	21.32	21.35		
10	16QAM	1	25	21.38	21.27	21.39		
10	16QAM	1	49	21.55	21.29	21.43	22	2
10	16QAM	25	0	20.41	20.25	20.40		
10	16QAM	25	12	20.42	20.30	20.41		
10	16QAM	25	25	20.46	20.29	20.44	21	3
10	16QAM	50	0	20.43	20.21	20.43		
10	64QAM	1	0	20.55	20.43	20.19		
10	64QAM	1	25	20.59	20.46	20.28	22	2
10	64QAM	1	49	20.22	20.27	20.15		
10	64QAM	25	0	19.58	19.60	19.34		
10	64QAM	25	12	19.36	19.36	19.19	21	3
10	64QAM	25	25	19.53	19.53	19.26		
10	64QAM	50	0	19.44	19.42	19.19		
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	22.31	22.12	22.28	24	0
5	QPSK	1	12	22.36	22.16	22.31		
5	QPSK	1	24	22.26	22.09	22.25		
5	QPSK	12	0	21.36	21.16	21.32	23	1
5	QPSK	12	7	21.37	21.11	21.32		
5	QPSK	12	13	21.35	21.13	21.33		
5	QPSK	25	0	21.30	21.16	21.31	23	1
5	16QAM	1	0	21.42	21.24	21.38		
5	16QAM	1	12	21.42	21.24	21.43		
5	16QAM	1	24	21.47	21.30	21.40	22	2
5	16QAM	12	0	20.33	20.13	20.35		
5	16QAM	12	7	20.38	20.18	20.38		
5	16QAM	12	13	20.42	20.21	20.36	21	3
5	16QAM	25	0	20.45	20.20	20.44		
5	64QAM	1	0	20.60	20.54	20.29		
5	64QAM	1	12	20.68	20.51	20.34	22	2
5	64QAM	1	24	20.32	20.34	20.22		
5	64QAM	12	0	19.71	19.68	19.39		
5	64QAM	12	7	19.42	19.42	19.23	21	3
5	64QAM	12	13	19.60	19.62	19.29		
5	64QAM	25	0	19.53	19.49	19.28		

<Reduced Power Mode for Hotspot On/P-Sensor On>

<LTE Band 38>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				37850	38000	38150		
Frequency (MHz)				2580	2595	2610		
20	QPSK	1	0	19.14	18.98	19.05	20.5	0
20	QPSK	1	49	19.25	18.91	19.09		
20	QPSK	1	99	18.85	18.90	19.15		
20	QPSK	50	0	19.07	19.02	19.02	20.5	0
20	QPSK	50	24	19.14	18.99	19.13		
20	QPSK	50	50	19.02	18.97	19.09		
20	QPSK	100	0	19.15	18.98	19.14	20.5	0
20	16QAM	1	0	19.06	19.10	19.11		
20	16QAM	1	49	19.15	19.02	19.15		
20	16QAM	1	99	18.95	18.99	19.13	20.5	0
20	16QAM	50	0	19.13	19.08	19.10		
20	16QAM	50	24	19.06	19.08	19.15		
20	16QAM	50	50	19.11	19.08	19.13	20.5	0
20	16QAM	100	0	19.15	19.09	19.11		
20	64QAM	1	0	18.75	18.64	18.73		
20	64QAM	1	49	18.82	18.71	18.77	20.5	0
20	64QAM	1	99	18.66	18.54	18.64		
20	64QAM	50	0	19.03	18.96	19.00		
20	64QAM	50	24	18.99	18.94	18.95	20.5	0
20	64QAM	50	50	19.01	18.94	18.97		
20	64QAM	100	0	19.10	19.04	19.06		
Channel				37825	38000	38175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2577.5	2595	2612.5		
15	QPSK	1	0	19.19	19.00	19.15	20.5	0
15	QPSK	1	37	18.97	18.97	19.11		
15	QPSK	1	74	19.07	18.97	19.24		
15	QPSK	36	0	19.07	19.01	19.13	20.5	0
15	QPSK	36	20	19.07	19.00	19.16		
15	QPSK	36	39	19.03	18.98	19.11		
15	QPSK	75	0	19.07	19.01	19.12	20.5	0
15	16QAM	1	0	19.07	19.05	19.10		
15	16QAM	1	37	19.13	19.07	19.06		
15	16QAM	1	74	19.08	19.04	19.12	20.5	0
15	16QAM	36	0	19.14	19.04	19.15		
15	16QAM	36	20	19.14	19.05	19.12		
15	16QAM	36	39	19.09	19.05	19.15	20.5	0
15	16QAM	75	0	19.13	19.09	19.12		
15	64QAM	1	0	18.76	18.67	18.68		
15	64QAM	1	37	18.82	18.78	18.75	20.5	0
15	64QAM	1	74	18.73	18.67	18.63		
15	64QAM	36	0	19.11	19.00	19.06		
15	64QAM	36	20	19.14	19.01	19.05	20.5	0
15	64QAM	36	39	19.08	19.00	19.03		
15	64QAM	75	0	19.06	18.99	19.05		



Channel				37800	38000	38200	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2575	2595	2615		
10	QPSK	1	0	19.16	18.84	19.17	20.5	0
10	QPSK	1	25	19.11	18.88	19.18		
10	QPSK	1	49	19.04	18.94	19.19		
10	QPSK	25	0	19.14	18.93	19.20	20.5	0
10	QPSK	25	12	19.08	18.93	19.21		
10	QPSK	25	25	19.04	18.95	19.16		
10	QPSK	50	0	19.03	18.98	19.17	20.5	0
10	16QAM	1	0	19.14	18.99	19.09		
10	16QAM	1	25	19.09	19.03	19.12		
10	16QAM	1	49	19.14	19.01	19.12	20.5	0
10	16QAM	25	0	19.10	19.02	19.12		
10	16QAM	25	12	19.15	19.09	19.12		
10	16QAM	25	25	19.13	19.04	19.12	20.5	0
10	16QAM	50	0	19.12	19.01	19.10		
10	64QAM	1	0	18.62	18.55	18.57		
10	64QAM	1	25	18.79	18.70	18.69	20.5	0
10	64QAM	1	49	18.77	18.63	18.72		
10	64QAM	25	0	19.05	18.91	18.94		
10	64QAM	25	12	19.03	18.93	18.96	20.5	0
10	64QAM	25	25	18.96	18.90	18.99		
10	64QAM	50	0	19.08	18.93	18.98		
Channel				37775	38000	38225	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2572.5	2595	2617.5		
5	QPSK	1	0	19.11	18.88	19.23	20.5	0
5	QPSK	1	12	19.08	18.91	19.23		
5	QPSK	1	24	19.10	18.90	19.21		
5	QPSK	12	0	19.14	18.94	19.24	20.5	0
5	QPSK	12	7	19.18	18.94	19.16		
5	QPSK	12	13	19.17	18.95	19.16		
5	QPSK	25	0	19.12	18.93	19.15	20.5	0
5	16QAM	1	0	19.09	18.99	19.10		
5	16QAM	1	12	19.11	19.02	19.14		
5	16QAM	1	24	19.05	19.05	19.06	20.5	0
5	16QAM	12	0	19.08	18.94	19.06		
5	16QAM	12	7	19.10	19.00	19.14		
5	16QAM	12	13	19.10	18.98	19.12	20.5	0
5	16QAM	25	0	19.12	19.02	19.09		
5	64QAM	1	0	18.73	18.66	18.70		
5	64QAM	1	12	18.81	18.72	18.69	20.5	0
5	64QAM	1	24	18.79	18.68	18.66		
5	64QAM	12	0	19.06	18.94	18.89		
5	64QAM	12	7	19.08	18.95	18.92	20.5	0
5	64QAM	12	13	19.05	18.95	18.89		
5	64QAM	25	0	19.02	18.98	18.96		

<LTE Carrier Aggregation>

General Note:

This device supports Carrier Aggregation on downlink for intra band, uplink CA is not supported. For the device supports bands and bandwidths and configurations are provided as follow table was according to 3GPP.

<Intra-Band Carrier Combination>

E-UTRA CA configuration / Bandwidth combination set							
E-UTRA CA configuration	Uplink CA configurations	Component carriers in order of increasing carrier frequency				Maximum aggregated bandwidth [MHz]	Bandwidth combination set
		Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]		
CA_7C	-	15	15			40	0
		20	20				
		10	20			40	1
		15	15, 20				
		20	10, 15, 20			40	2
		15	10, 15				
CA_38C	-	15	15			40	0
		20	20				
CA_7A-7A	-	5	15			40	0
		10	10, 15				
		15	15, 20				
		20	20			40	1
		5, 10, 15, 20	5, 10, 15, 20				
		5, 10, 15, 20	5, 10				
	10, 15, 20	10, 15, 20			40	3	

LTE Carrier Aggregation Conducted Power (Downlink)

General Note:

- i. According to KDB941225 D05A v01r02, Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.
- ii. Uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.
- iii. The device supports downlink carrier aggregation only. Uplink carrier aggregation is not supported. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.
- iv. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.
- v. For non-contiguous intra-band CA, the SCC selected to provide maximum separation from the PCC and must remain fully within the downlink transmission band. For SCC DL RB size and offset will base on the PCC corresponding RB allocation.
- vi. For Intra-band, contiguous CA, the downlink channels selected to perform the uplink power measurement must satisfy 3GPP channel spacing (5.4.1A of 3GPP TS 36.521 or equivalent) and channel bandwidth (5.4.2A) requirements.

$$\text{Nominal channel spacing} = \left\lceil \frac{BW_{\text{Channel}(1)} + BW_{\text{Channel}(2)} - 0.1|BW_{\text{Channel}(1)} - BW_{\text{Channel}(2)}|}{0.6} \right\rceil 0.3 \text{ [MHz]}$$

<Full/Receiver On Power Mode>

Configure		PCC							SCC				Power	
		LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx. Power (dBm)	Without CA Tx. Power (dBm)
Intra-Band	Contiguous	Band 7	20M	2560	21350	QPSK	1	49	Band 7	20M	2660.2	3152	22.53	22.56
		Band 38	20M	2580	37850	QPSK	1	49	Band 38	20M	2599.8	38048	22.30	22.37
	Non-Contiguous	Band 7	20M	2560	21350	QPSK	1	49	Band 7	5M	2622.5	2775	22.54	22.56

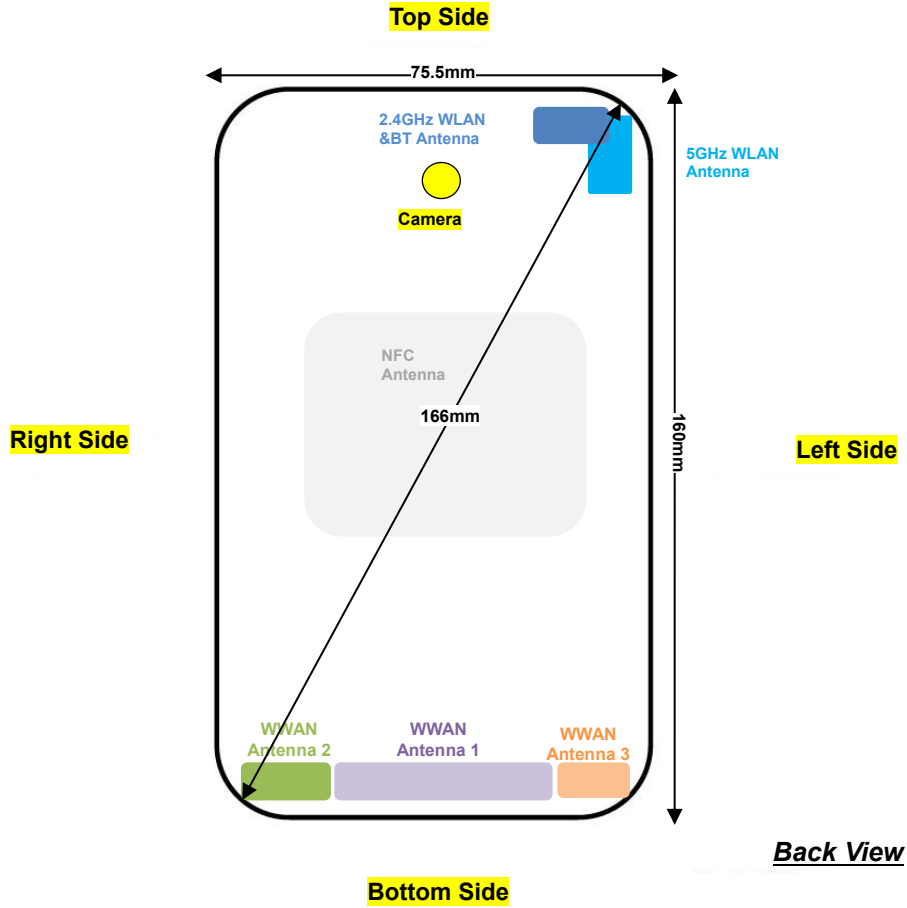
<Reduced Power Mode for Hotspot On/P-Sensor On>

Configure		PCC							SCC				Power	
		LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx. Power (dBm)	Without CA Tx. Power (dBm)
Intra-Band	Contiguous	Band 7	20M	2560	21350	QPSK	1	49	Band 7	20M	2660.2	3152	18.24	18.29
		Band 38	20M	2580	37850	QPSK	1	49	Band 38	20M	2599.8	38048	19.22	19.25
	Non-Contiguous	Band 7	20M	2560	21350	QPSK	1	49	Band 7	5M	2622.5	2775	18.23	18.29

<Reduced Power Mode for Product Specific 10g SAR>

Configure		PCC							SCC				Power	
		LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx. Power (dBm)	Without CA Tx. Power (dBm)
Intra-Band	Contiguous	Band 7	20M	2560	21350	QPSK	1	49	Band 7	20M	2660.2	3152	22.05	22.10
	Non-Contiguous	Band 7	20M	2560	21350	QPSK	1	49	Band 7	5M	2622.5	2775	22.03	22.10

15. Antenna Location



Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Antenna 1	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	≤ 25mm
WWAN Antenna 2	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	≤ 25mm	>25mm
WWAN Antenna 3	≤ 25mm	≤ 25mm	>25mm	≤ 25mm	>25mm	≤ 25mm
2.4GHz WLAN & BT	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	>25mm	≤ 25mm
5GHz WLAN	≤ 25mm	≤ 25mm	≤ 25mm	>25mm	>25mm	≤ 25mm

Positions for SAR tests; Hotspot mode						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Antenna 1	Yes	Yes	No	Yes	Yes	Yes
WWAN Antenna 2	Yes	Yes	No	Yes	Yes	No
WWAN Antenna 3	Yes	Yes	No	Yes	No	Yes
2.4GHz WLAN & BT	Yes	Yes	Yes	No	No	Yes
5GHz WLAN	Yes	Yes	Yes	No	No	Yes

General Note:

1. This device has three WWAN transmitter antennas. WWAN antenna 1 is located at the middle of bottom edge of the device, WWAN antenna 2 is located at the left side of bottom edge of the device, and WWAN antenna 3 is located at the right side of bottom edge of the device which can refer to antenna location chapter. WWAN antenna 1 frequency bands include GSM850/1900, WCDMA Band II/V and LTE Band 5, WWAN antenna 2 frequency bands include LTE Band 7/38 and WWAN antenna 3 frequency bands also include LTE Band 7/38.
2. The device is capable of switching between the WWAN antenna 2 and WWAN antenna 3 based on signal strength. When WWAN antenna 2 acted as a transmitter, then WWAN antenna 3 acted as a receiver. The same as the reversed.
3. Referring to KDB 941225 D06 v02r01, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.

16. SAR Test Results

General Note:

1. Per KDB 447498 D01v06, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
 - a. Tune-up scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
 - b. Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - c. For TDD LTE SAR measurement, the duty cycle 1:1.59 (62.9 %) was used perform testing and considering the theoretical duty cycle of 63.3% for extended cyclic prefix in the uplink, and the theoretical duty cycle of 62.9% for normal cyclic prefix in uplink, a scaling factor of extended cyclic prefix 63.3%/62.9% = 1.006 is applied to scale-up the measured SAR result.
The Reported TDD LTE SAR = measured SAR (W/kg)* Tune-up Scaling Factor* scaling factor for extended cyclic prefix.
2. Per KDB 447498 D01v06, for each exposure position, testing of other required channels within the operating mode of a frequency band is not required when the *reported* 1-g or 10-g SAR for the mid-band or highest output power channel is:
 - ≤ 0.8 W/kg or 2.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≤ 100 MHz
 - ≤ 0.6 W/kg or 1.5 W/kg, for 1-g or 10-g respectively, when the transmission band is between 100 MHz and 200 MHz
 - ≤ 0.4 W/kg or 1.0 W/kg, for 1-g or 10-g respectively, when the transmission band is ≥ 200 MHz
3. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required when the measured SAR is ≥ 0.8 W/kg. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. Per KDB 648474 D04v01r03, when the reported SAR for a body-worn accessory measured without a headset connected to the handset is ≤ 1.2 W/kg, SAR testing with a headset connected to the handset is not required.
5. The device employs proximity sensors that detect the presence of the user's body at the front or back faces of the device. When front or back body worn condition is detected, GSM1900, WCDMA band II and LTE band 7/38 reduced power will be active. (P-sensor can't work at detecting presence of the user's body at the four edges of the device.)
6. When hotspot mode is enabled, power reduction will be activated to limit the maximum power of GSM1900, WCDMA band II and LTE band 7/38.
7. This device hotspot reduced power and P-sensor reduced power level are the same. So only show one reduced power level for hotspot reduced power and P-sensor reduced power for this application.
8. P-sensor can detect handheld state, for product specific 10g SAR condition, GSM1900, WCDMA band II and LTE band 7 reduced powers will be active.
9. This device has three WWAN transmitter antennas. WWAN antenna 1 is located at the middle of bottom edge of the device, WWAN antenna 2 is located at the left side of bottom edge of the device, and WWAN antenna 3 is located at the right side of bottom edge of the device which can refer to antenna location chapter. WWAN antenna 1 frequency bands include GSM850/1900, WCDMA Band II/V and LTE Band 5, WWAN antenna 2 frequency bands include LTE Band 7/38 and WWAN antenna 3 frequency bands also include LTE Band 7/38.
10. The device is capable of switching between the WWAN antenna 2 and WWAN antenna 3 based on signal strength. When WWAN antenna 2 acted as a transmitter, then WWAN antenna 3 acted as a receiver. The same as the reversed.
11. Per KDB648474 D04v01r03, for smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm, when hotspot mode applies, 10-g extremity SAR is required only for the surfaces and edges with hotspot mode 1-g reported SAR > 1.2 W/kg, however, when power reduction applies to hotspot mode the measured SAR must be scaled to the maximum output power, including tolerance, allowed for phablet modes to compare with the 1.2 W/kg SAR test reduction threshold.
 - a. For this device SAR for WWAN transmitter scaled to reduced power mode for product specific 10g SAR is higher than 1.2W/kg of GSM1900, WCDMA Band II, LTE Band 7/38, therefore product specific 10g SAR is necessary.
 - b. When 10-g product specific 10g SAR is considered, SAR thresholds is specified in the procedures for SAR test reduction and exclusion should be multiplied by 2.5.

GSM Note:

1. Per KDB 941225 D01v03r01, for SAR test reduction for GSM / GPRS / EDGE modes is determined by the source-based time-averaged output power including tune-up tolerance. The mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested. Therefore, the GPRS 4Tx slots for GSM850/GSM1900 are considered as the primary mode.
2. Other configurations of GSM / GPRS / EDGE are considered as secondary modes. The 3G SAR test reduction procedure is applied, when the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode, SAR measurement is not required for the secondary mode.
3. Power reduction which is triggered by hotspot mode/P-Sensor is implemented in GSM1900 band, for SAR testing EUT was set in reduced power mode and GPRS 4 Tx slots due to its highest frame-average power.
4. When the phone is in talking mode and receiver worked, receiver on power will be implemented immediately in GSM1900 band, for SAR testing EUT was set in reduced on mode and GPRS 4 Tx slots due to its highest frame-average power.
5. Power reduction which is triggered by hotspot mode/P-Sensor/P-sensor detects handheld state for product specific 10g SAR condition are implemented in GSM1900 band, for SAR testing EUT was set in reduced power mode and GPRS 4 Tx slots due to its highest frame-average power.

WCDMA Note:

1. Per KDB 941225 D01v03r01, for SAR testing is measured using a 12.2 kbps RMC with TPC bits configured to all "1's".
2. Per KDB 941225 D01v03r01, RMC 12.2kbps setting is used to evaluate SAR. The maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA / HSPA+ is $\leq \frac{1}{4}$ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA / HSPA+ to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+, and according to the following RF output power, the output power results of the secondary modes (HSDPA / HSUPA / DC-HSDPA / HSPA+) are less than $\frac{1}{4}$ dB higher than the primary modes; therefore, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA / HSPA+.

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 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.
4. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is $>$ not $\frac{1}{2}$ dB higher than the same configuration in the largest supported bandwidth, and the reported SAR for the largest supported bandwidth is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, smaller bandwidth SAR testing is not required.
6. For LTE B5 the maximum bandwidth does not support three non-overlapping channels, 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.



16.1 Head SAR

<GSM SAR>

Plot No.	Ant.	Band	Mode	Test Position	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	1	GSM850	GPRS 4 Tx slots	Right Cheek	Receiver On	251	848.8	28.06	28.50	1.107	0.15	0.237	0.262
	1	GSM850	GPRS 4 Tx slots	Right Tilted	Receiver On	251	848.8	28.06	28.50	1.107	0.13	0.161	0.178
01	1	GSM850	GPRS 4 Tx slots	Left Cheek	Receiver On	251	848.8	28.06	28.50	1.107	0.11	0.302	0.334
	1	GSM850	GPRS 4 Tx slots	Left Tilted	Receiver On	251	848.8	28.06	28.50	1.107	0.15	0.165	0.183
02	1	GSM1900	GPRS 4 Tx slots	Right Cheek	Receiver On	512	1850.2	25.45	26.00	1.135	0.05	0.100	0.114
	1	GSM1900	GPRS 4 Tx slots	Right Tilted	Receiver On	512	1850.2	25.45	26.00	1.135	0.12	0.029	0.033
	1	GSM1900	GPRS 4 Tx slots	Left Cheek	Receiver On	512	1850.2	25.45	26.00	1.135	0.06	0.095	0.108
	1	GSM1900	GPRS 4 Tx slots	Left Tilted	Receiver On	512	1850.2	25.45	26.00	1.135	0.04	0.052	0.059

<WCDMA SAR>

Plot No.	Ant.	Band	Mode	Test Position	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	1	WCDMA Band V	RMC 12.2Kbps	Right Cheek	Receiver On	4233	846.6	23.00	24.00	1.259	-0.03	0.227	0.286
	1	WCDMA Band V	RMC 12.2Kbps	Right Tilted	Receiver On	4233	846.6	23.00	24.00	1.259	0.15	0.147	0.185
03	1	WCDMA Band V	RMC 12.2Kbps	Left Cheek	Receiver On	4233	846.6	23.00	24.00	1.259	0.11	0.274	0.345
	1	WCDMA Band V	RMC 12.2Kbps	Left Tilted	Receiver On	4233	846.6	23.00	24.00	1.259	0.19	0.147	0.185
04	1	WCDMA Band II	RMC 12.2Kbps	Right Cheek	Receiver On	9400	1880	22.66	24.00	1.361	0.07	0.155	0.211
	1	WCDMA Band II	RMC 12.2Kbps	Right Tilted	Receiver On	9400	1880	22.66	24.00	1.361	0.13	0.072	0.098
	1	WCDMA Band II	RMC 12.2Kbps	Left Cheek	Receiver On	9400	1880	22.66	24.00	1.361	0.14	0.151	0.206
	1	WCDMA Band II	RMC 12.2Kbps	Left Tilted	Receiver On	9400	1880	22.66	24.00	1.361	0.08	0.087	0.118



<FDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	1	LTE Band 5	10M	QPSK	1	0	Right Cheek	Receiver On	20525	836.5	23.29	24.00	1.178	0.08	0.224	0.264
	1	LTE Band 5	10M	QPSK	1	0	Right Tilted	Receiver On	20525	836.5	23.29	24.00	1.178	0.02	0.138	0.163
05	1	LTE Band 5	10M	QPSK	1	0	Left Cheek	Receiver On	20525	836.5	23.29	24.00	1.178	0.02	0.270	0.318
	1	LTE Band 5	10M	QPSK	1	0	Left Tilted	Receiver On	20525	836.5	23.29	24.00	1.178	0.05	0.134	0.158
	1	LTE Band 5	10M	QPSK	25	0	Right Cheek	Receiver On	20525	836.5	22.26	23.00	1.186	0.06	0.128	0.152
	1	LTE Band 5	10M	QPSK	25	0	Right Tilted	Receiver On	20525	836.5	22.26	23.00	1.186	0.05	0.078	0.092
	1	LTE Band 5	10M	QPSK	25	0	Left Cheek	Receiver On	20525	836.5	22.26	23.00	1.186	-0.08	0.153	0.181
	1	LTE Band 5	10M	QPSK	25	0	Left Tilted	Receiver On	20525	836.5	22.26	23.00	1.186	0.07	0.110	0.130
	2	LTE Band 7	20M	QPSK	1	49	Right Cheek	Receiver On	21350	2560	22.56	24.00	1.393	0.03	0.291	0.405
	2	LTE Band 7	20M	QPSK	1	49	Right Tilted	Receiver On	21350	2560	22.56	24.00	1.393	0.03	0.086	0.120
	2	LTE Band 7	20M	QPSK	1	49	Left Cheek	Receiver On	21350	2560	22.56	24.00	1.393	0.03	0.216	0.301
	2	LTE Band 7	20M	QPSK	1	49	Left Tilted	Receiver On	21350	2560	22.56	24.00	1.393	-0.04	0.160	0.223
	2	LTE Band 7	20M	QPSK	50	0	Right Cheek	Receiver On	21350	2560	21.46	23.00	1.426	0.07	0.186	0.265
	2	LTE Band 7	20M	QPSK	50	0	Right Tilted	Receiver On	21350	2560	21.46	23.00	1.426	0.09	0.055	0.078
	2	LTE Band 7	20M	QPSK	50	0	Left Cheek	Receiver On	21350	2560	21.46	23.00	1.426	0.01	0.138	0.197
	2	LTE Band 7	20M	QPSK	50	0	Left Tilted	Receiver On	21350	2560	21.46	23.00	1.426	0.06	0.100	0.143
	3	LTE Band 7	20M	QPSK	1	49	Right Cheek	Receiver On	21350	2560	22.56	24.00	1.393	0.03	0.321	0.447
06	3	LTE Band 7	20M	QPSK	1	49	Right Tilted	Receiver On	21350	2560	22.56	24.00	1.393	0.09	0.362	0.504
	3	LTE Band 7	20M	QPSK	1	49	Left Cheek	Receiver On	21350	2560	22.56	24.00	1.393	0.12	0.149	0.208
	3	LTE Band 7	20M	QPSK	1	49	Left Tilted	Receiver On	21350	2560	22.56	24.00	1.393	0.06	0.104	0.145
	3	LTE Band 7	20M	QPSK	50	0	Right Cheek	Receiver On	21350	2560	21.46	23.00	1.426	0.02	0.199	0.284
	3	LTE Band 7	20M	QPSK	50	0	Right Tilted	Receiver On	21350	2560	21.46	23.00	1.426	0.08	0.228	0.325
	3	LTE Band 7	20M	QPSK	50	0	Left Cheek	Receiver On	21350	2560	21.46	23.00	1.426	-0.01	0.091	0.130
	3	LTE Band 7	20M	QPSK	50	0	Left Tilted	Receiver On	21350	2560	21.46	23.00	1.426	0.01	0.064	0.091

<TDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	2	LTE Band 38	20M	QPSK	1	49	Right Cheek	Receiver On	37850	2580	22.37	24.00	1.455	62.9	1.006	0.13	0.185	0.271
	2	LTE Band 38	20M	QPSK	1	49	Right Tilted	Receiver On	37850	2580	22.37	24.00	1.455	62.9	1.006	0.14	0.044	0.064
	2	LTE Band 38	20M	QPSK	1	49	Left Cheek	Receiver On	37850	2580	22.37	24.00	1.455	62.9	1.006	0.01	0.126	0.184
	2	LTE Band 38	20M	QPSK	1	49	Left Tilted	Receiver On	37850	2580	22.37	24.00	1.455	62.9	1.006	0.17	0.086	0.126
	2	LTE Band 38	20M	QPSK	50	24	Right Cheek	Receiver On	37850	2580	21.30	23.00	1.479	62.9	1.006	-0.15	0.117	0.174
	2	LTE Band 38	20M	QPSK	50	24	Right Tilted	Receiver On	37850	2580	21.30	23.00	1.479	62.9	1.006	0.07	0.026	0.039
	2	LTE Band 38	20M	QPSK	50	24	Left Cheek	Receiver On	37850	2580	21.30	23.00	1.479	62.9	1.006	0.15	0.076	0.113
	2	LTE Band 38	20M	QPSK	50	24	Left Tilted	Receiver On	37850	2580	21.30	23.00	1.479	62.9	1.006	-0.05	0.053	0.079
	3	LTE Band 38	20M	QPSK	1	49	Right Cheek	Receiver On	37850	2580	22.37	24.00	1.455	62.9	1.006	0.17	0.186	0.272
	3	LTE Band 38	20M	QPSK	1	49	Right Tilted	Receiver On	37850	2580	22.37	24.00	1.455	62.9	1.006	0.19	0.232	0.340
07	3	LTE Band 38	20M	QPSK	1	49	Left Cheek	Receiver On	37850	2580	22.37	24.00	1.455	62.9	1.006	0.19	0.299	0.438
	3	LTE Band 38	20M	QPSK	1	49	Left Tilted	Receiver On	37850	2580	22.37	24.00	1.455	62.9	1.006	0.12	0.117	0.171
	3	LTE Band 38	20M	QPSK	50	24	Right Cheek	Receiver On	37850	2580	21.30	23.00	1.479	62.9	1.006	0.01	0.119	0.177
	3	LTE Band 38	20M	QPSK	50	24	Right Tilted	Receiver On	37850	2580	21.30	23.00	1.479	62.9	1.006	0.16	0.148	0.220
	3	LTE Band 38	20M	QPSK	50	24	Left Cheek	Receiver On	37850	2580	21.30	23.00	1.479	62.9	1.006	0.12	0.196	0.292
	3	LTE Band 38	20M	QPSK	50	24	Left Tilted	Receiver On	37850	2580	21.30	23.00	1.479	62.9	1.006	0.17	0.074	0.110



16.2 Hotspot SAR

<GSM SAR>

Plot No.	Ant.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	1	GSM850	GPRS 4 Tx slots	Front	5	Full	251	848.8	28.06	28.50	1.107	0.1	0.674	0.746
	1	GSM850	GPRS 4 Tx slots	Back	5	Full	251	848.8	28.06	28.50	1.107	-0.19	0.881	0.975
	1	GSM850	GPRS 4 Tx slots	Left side	5	Full	251	848.8	28.06	28.50	1.107	0.12	0.534	0.591
	1	GSM850	GPRS 4 Tx slots	Right side	5	Full	251	848.8	28.06	28.50	1.107	0.06	0.285	0.315
	1	GSM850	GPRS 4 Tx slots	Bottom side	5	Full	251	848.8	28.06	28.50	1.107	0.16	0.453	0.501
	1	GSM850	GPRS 4 Tx slots	Back	5	Full	128	824.2	27.45	28.50	1.274	-0.09	0.865	1.102
08	1	GSM850	GPRS 4 Tx slots	Back	5	Full	189	836.4	27.74	28.50	1.191	-0.15	0.926	1.103
	1	GSM1900	GPRS 4 Tx slots	Front	5	Hotspot On	512	1850.2	18.00	19.00	1.259	-0.19	0.372	0.468
	1	GSM1900	GPRS 4 Tx slots	Back	5	Hotspot On	512	1850.2	18.00	19.00	1.259	0.16	0.374	0.471
	1	GSM1900	GPRS 4 Tx slots	Left side	5	Hotspot On	512	1850.2	18.00	19.00	1.259	0.18	0.025	0.031
	1	GSM1900	GPRS 4 Tx slots	Right side	5	Hotspot On	512	1850.2	18.00	19.00	1.259	0.18	0.034	0.043
09	1	GSM1900	GPRS 4 Tx slots	Bottom side	5	Hotspot On	512	1850.2	18.00	19.00	1.259	-0.06	0.590	0.743

<WCDMA SAR>

Plot No.	Ant.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	1	WCDMA Band V	RMC 12.2Kbps	Front	5	Full	4233	846.6	23.00	24.00	1.259	0.09	0.769	0.968
10	1	WCDMA Band V	RMC 12.2Kbps	Back	5	Full	4233	846.6	23.00	24.00	1.259	-0.09	0.940	1.183
	1	WCDMA Band V	RMC 12.2Kbps	Left side	5	Full	4233	846.6	23.00	24.00	1.259	0.13	0.539	0.679
	1	WCDMA Band V	RMC 12.2Kbps	Right side	5	Full	4233	846.6	23.00	24.00	1.259	0.02	0.280	0.352
	1	WCDMA Band V	RMC 12.2Kbps	Bottom side	5	Full	4233	846.6	23.00	24.00	1.259	0.09	0.480	0.604
	1	WCDMA Band V	RMC 12.2Kbps	Front	5	Full	4132	826.4	22.74	24.00	1.337	0.03	0.613	0.819
	1	WCDMA Band V	RMC 12.2Kbps	Front	5	Full	4182	836.4	22.82	24.00	1.312	0.01	0.644	0.845
	1	WCDMA Band V	RMC 12.2Kbps	Back	5	Full	4132	826.4	22.74	24.00	1.337	0.09	0.831	1.111
	1	WCDMA Band V	RMC 12.2Kbps	Back	5	Full	4182	836.4	22.82	24.00	1.312	0.01	0.900	1.181
	1	WCDMA Band II	RMC 12.2Kbps	Front	5	Hotspot On	9400	1880	14.12	15.50	1.374	-0.16	0.393	0.540
	1	WCDMA Band II	RMC 12.2Kbps	Back	5	Hotspot On	9400	1880	14.12	15.50	1.374	0.05	0.434	0.596
	1	WCDMA Band II	RMC 12.2Kbps	Left side	5	Hotspot On	9400	1880	14.12	15.50	1.374	0.14	0.030	0.041
	1	WCDMA Band II	RMC 12.2Kbps	Right side	5	Hotspot On	9400	1880	14.12	15.50	1.374	0.15	0.033	0.045
	1	WCDMA Band II	RMC 12.2Kbps	Bottom side	5	Hotspot On	9400	1880	14.12	15.50	1.374	0.07	0.641	0.881
	1	WCDMA Band II	RMC 12.2Kbps	Bottom side	5	Hotspot On	9262	1852.4	13.94	15.50	1.432	0.07	0.549	0.786
11	1	WCDMA Band II	RMC 12.2Kbps	Bottom side	5	Hotspot On	9538	1907.6	14.03	15.50	1.403	0.07	0.657	0.922



<FDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	1	LTE Band 5	10M	QPSK	1	0	Front	5	Full	20525	836.5	23.29	24.00	1.178	0.09	0.749	0.882
12	1	LTE Band 5	10M	QPSK	1	0	Back	5	Full	20525	836.5	23.29	24.00	1.178	-0.03	0.983	1.158
	1	LTE Band 5	10M	QPSK	1	0	Left side	5	Full	20525	836.5	23.29	24.00	1.178	0.02	0.496	0.584
	1	LTE Band 5	10M	QPSK	1	0	Right side	5	Full	20525	836.5	23.29	24.00	1.178	0.05	0.282	0.332
	1	LTE Band 5	10M	QPSK	1	0	Bottom side	5	Full	20525	836.5	23.29	24.00	1.178	0.01	0.529	0.623
	1	LTE Band 5	10M	QPSK	25	0	Front	5	Full	20525	836.5	22.26	23.00	1.186	0.04	0.340	0.403
	1	LTE Band 5	10M	QPSK	25	0	Back	5	Full	20525	836.5	22.26	23.00	1.186	0.12	0.469	0.556
	1	LTE Band 5	10M	QPSK	25	0	Left side	5	Full	20525	836.5	22.26	23.00	1.186	0.01	0.276	0.327
	1	LTE Band 5	10M	QPSK	25	0	Right side	5	Full	20525	836.5	22.26	23.00	1.186	0.03	0.149	0.177
	1	LTE Band 5	10M	QPSK	25	0	Bottom side	5	Full	20525	836.5	22.26	23.00	1.186	0.1	0.234	0.277
	1	LTE Band 5	10M	QPSK	50	0	Front	5	Full	20525	836.5	22.20	23.00	1.202	0.02	0.422	0.507
	1	LTE Band 5	10M	QPSK	50	0	Back	5	Full	20525	836.5	22.20	23.00	1.202	0.01	0.534	0.642
	2	LTE Band 7	20M	QPSK	1	49	Front	5	Hotspot On	21350	2560	18.29	19.00	1.178	0.06	0.601	0.708
	2	LTE Band 7	20M	QPSK	1	49	Back	5	Hotspot On	21350	2560	18.29	19.00	1.178	0.02	0.426	0.502
	2	LTE Band 7	20M	QPSK	1	49	Right side	5	Hotspot On	21350	2560	18.29	19.00	1.178	0.11	0.322	0.379
	2	LTE Band 7	20M	QPSK	1	49	Bottom side	5	Hotspot On	21350	2560	18.29	19.00	1.178	0.07	0.115	0.135
	2	LTE Band 7	20M	QPSK	50	0	Front	5	Hotspot On	21350	2560	18.25	19.00	1.189	0.02	0.649	0.771
	2	LTE Band 7	20M	QPSK	50	0	Back	5	Hotspot On	21350	2560	18.25	19.00	1.189	0.05	0.435	0.517
	2	LTE Band 7	20M	QPSK	50	0	Right side	5	Hotspot On	21350	2560	18.25	19.00	1.189	0.08	0.337	0.401
	2	LTE Band 7	20M	QPSK	50	0	Bottom side	5	Hotspot On	21350	2560	18.25	19.00	1.189	-0.08	0.118	0.140
13	3	LTE Band 7	20M	QPSK	1	49	Front	5	Hotspot On	21350	2560	18.29	19.00	1.178	0.06	0.762	0.897
	3	LTE Band 7	20M	QPSK	1	49	Back	5	Hotspot On	21350	2560	18.29	19.00	1.178	0.12	0.568	0.669
	3	LTE Band 7	20M	QPSK	1	49	Left side	5	Hotspot On	21350	2560	18.29	19.00	1.178	0.12	0.432	0.509
	3	LTE Band 7	20M	QPSK	1	49	Bottom side	5	Hotspot On	21350	2560	18.29	19.00	1.178	-0.02	0.243	0.286
	3	LTE Band 7	20M	QPSK	1	49	Front	5	Hotspot On	20850	2510	18.13	19.00	1.222	0.13	0.585	0.715
	3	LTE Band 7	20M	QPSK	1	49	Front	5	Hotspot On	21100	2535	17.95	19.00	1.274	0.11	0.678	0.863
	3	LTE Band 7	20M	QPSK	50	0	Front	5	Hotspot On	21350	2560	18.25	19.00	1.189	0.08	0.753	0.895
	3	LTE Band 7	20M	QPSK	50	0	Back	5	Hotspot On	21350	2560	18.25	19.00	1.189	0.06	0.580	0.689
	3	LTE Band 7	20M	QPSK	50	0	Left side	5	Hotspot On	21350	2560	18.25	19.00	1.189	0.08	0.431	0.512
	3	LTE Band 7	20M	QPSK	50	0	Bottom side	5	Hotspot On	21350	2560	18.25	19.00	1.189	0.17	0.248	0.295
	3	LTE Band 7	20M	QPSK	50	0	Front	5	Hotspot On	20850	2510	18.24	19.00	1.191	0.07	0.580	0.691
	3	LTE Band 7	20M	QPSK	50	0	Front	5	Hotspot On	21100	2535	18.06	19.00	1.242	0.14	0.675	0.838
	3	LTE Band 7	20M	QPSK	100	0	Front	5	Hotspot On	21350	2560	18.25	19.00	1.189	0.15	0.749	0.890



<TDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	2	LTE Band 38	20M	QPSK	1	49	Front	5	Hotspot On	37850	2580	19.25	20.50	1.334	62.9	1.006	0.1	0.462	0.620
	2	LTE Band 38	20M	QPSK	1	49	Back	5	Hotspot On	37850	2580	19.25	20.50	1.334	62.9	1.006	0.01	0.357	0.479
	2	LTE Band 38	20M	QPSK	1	49	Right side	5	Hotspot On	37850	2580	19.25	20.50	1.334	62.9	1.006	0.16	0.344	0.461
	2	LTE Band 38	20M	QPSK	1	49	Bottom side	5	Hotspot On	37850	2580	19.25	20.50	1.334	62.9	1.006	-0.05	0.106	0.142
	2	LTE Band 38	20M	QPSK	50	24	Front	5	Hotspot On	37850	2580	19.14	20.50	1.368	62.9	1.006	0.04	0.470	0.647
	2	LTE Band 38	20M	QPSK	50	24	Back	5	Hotspot On	37850	2580	19.14	20.50	1.368	62.9	1.006	0.02	0.366	0.504
	2	LTE Band 38	20M	QPSK	50	24	Right side	5	Hotspot On	37850	2580	19.14	20.50	1.368	62.9	1.006	0.1	0.353	0.486
	2	LTE Band 38	20M	QPSK	50	24	Bottom side	5	Hotspot On	37850	2580	19.14	20.50	1.368	62.9	1.006	0.11	0.108	0.149
14	3	LTE Band 38	20M	QPSK	1	49	Front	5	Hotspot On	37850	2580	19.25	20.50	1.334	62.9	1.006	0.01	0.492	0.660
	3	LTE Band 38	20M	QPSK	1	49	Back	5	Hotspot On	37850	2580	19.25	20.50	1.334	62.9	1.006	0.17	0.466	0.625
	3	LTE Band 38	20M	QPSK	1	49	Left side	5	Hotspot On	37850	2580	19.25	20.50	1.334	62.9	1.006	0.13	0.331	0.444
	3	LTE Band 38	20M	QPSK	1	49	Bottom side	5	Hotspot On	37850	2580	19.25	20.50	1.334	62.9	1.006	0.02	0.113	0.152
	3	LTE Band 38	20M	QPSK	50	24	Front	5	Hotspot On	37850	2580	19.14	20.50	1.368	62.9	1.006	0.07	0.479	0.659
	3	LTE Band 38	20M	QPSK	50	24	Back	5	Hotspot On	37850	2580	19.14	20.50	1.368	62.9	1.006	0.04	0.430	0.592
	3	LTE Band 38	20M	QPSK	50	24	Left side	5	Hotspot On	37850	2580	19.14	20.50	1.368	62.9	1.006	0.1	0.330	0.454
	3	LTE Band 38	20M	QPSK	50	24	Bottom side	5	Hotspot On	37850	2580	19.14	20.50	1.368	62.9	1.006	0.06	0.114	0.157

16.3 Body Worn Accessory SAR

<GSM SAR>

Plot No.	Ant.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	1	GSM850	GPRS 4 Tx slots	Front	5	Full	251	848.8	28.06	28.5	1.107	0.1	0.674	0.746
	1	GSM850	GPRS 4 Tx slots	Back	5	Full	251	848.8	28.06	28.5	1.107	-0.19	0.881	0.975
	1	GSM850	GPRS 4 Tx slots	Back	5	Full	128	824.2	27.45	28.5	1.274	-0.09	0.865	1.102
15	1	GSM850	GPRS 4 Tx slots	Back	5	Full	189	836.4	27.74	28.5	1.191	-0.15	0.926	1.103
	1	GSM1900	GPRS 4 Tx slots	Front	5	P-Sensor On	512	1850.2	18.00	19.00	1.259	-0.19	0.372	0.468
16	1	GSM1900	GPRS 4 Tx slots	Back	5	P-Sensor On	512	1850.2	18.00	19.00	1.259	0.16	0.374	0.471

<WCDMA SAR>

Plot No.	Ant.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	1	WCDMA Band V	RMC 12.2Kbps	Front	5	Full	4233	846.6	23.00	24.00	1.259	0.09	0.769	0.968
17	1	WCDMA Band V	RMC 12.2Kbps	Back	5	Full	4233	846.6	23.00	24.00	1.259	-0.09	0.940	1.183
	1	WCDMA Band V	RMC 12.2Kbps	Front	5	Full	4132	826.4	22.74	24.00	1.337	0.03	0.613	0.819
	1	WCDMA Band V	RMC 12.2Kbps	Front	5	Full	4182	836.4	22.82	24.00	1.312	0.01	0.644	0.845
	1	WCDMA Band V	RMC 12.2Kbps	Back	5	Full	4132	826.4	22.74	24.00	1.337	0.09	0.831	1.111
	1	WCDMA Band V	RMC 12.2Kbps	Back	5	Full	4182	836.4	22.82	24.00	1.312	0.01	0.900	1.181
	1	WCDMA Band II	RMC 12.2Kbps	Front	5	P-Sensor On	9400	1880	14.12	15.50	1.374	-0.16	0.393	0.540
18	1	WCDMA Band II	RMC 12.2Kbps	Back	5	P-Sensor On	9400	1880	14.12	15.50	1.374	0.05	0.434	0.596



<FDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	1	LTE Band 5	10M	QPSK	1	0	Front	5	Full	20525	836.5	23.29	24.00	1.178	0.09	0.749	0.882
19	1	LTE Band 5	10M	QPSK	1	0	Back	5	Full	20525	836.5	23.29	24.00	1.178	-0.03	0.983	1.158
	1	LTE Band 5	10M	QPSK	25	0	Front	5	Full	20525	836.5	22.26	23.00	1.186	0.04	0.340	0.403
	1	LTE Band 5	10M	QPSK	25	0	Back	5	Full	20525	836.5	22.26	23.00	1.186	0.12	0.469	0.556
	1	LTE Band 5	10M	QPSK	50	0	Front	5	Full	20525	836.5	22.20	23.00	1.202	0.02	0.422	0.507
	1	LTE Band 5	10M	QPSK	50	0	Back	5	Full	20525	836.5	22.20	23.00	1.202	0.01	0.534	0.642
	2	LTE Band 7	20M	QPSK	1	49	Front	5	P-Sensor On	21350	2560	18.29	19.00	1.178	0.06	0.601	0.708
	2	LTE Band 7	20M	QPSK	1	49	Back	5	P-Sensor On	21350	2560	18.29	19.00	1.178	0.02	0.426	0.502
	2	LTE Band 7	20M	QPSK	50	0	Front	5	P-Sensor On	21350	2560	18.25	19.00	1.189	0.02	0.649	0.771
	2	LTE Band 7	20M	QPSK	50	0	Back	5	P-Sensor On	21350	2560	18.25	19.00	1.189	0.05	0.435	0.517
20	3	LTE Band 7	20M	QPSK	1	49	Front	5	P-Sensor On	21350	2560	18.29	19.00	1.178	0.06	0.762	0.897
	3	LTE Band 7	20M	QPSK	1	49	Back	5	P-Sensor On	21350	2560	18.29	19.00	1.178	0.12	0.568	0.669
	3	LTE Band 7	20M	QPSK	1	49	Front	5	P-Sensor On	20850	2510	18.13	19.00	1.222	0.13	0.585	0.715
	3	LTE Band 7	20M	QPSK	1	49	Front	5	P-Sensor On	21100	2535	17.95	19.00	1.274	0.11	0.678	0.863
	3	LTE Band 7	20M	QPSK	50	0	Front	5	P-Sensor On	21350	2560	18.25	19.00	1.189	0.08	0.753	0.895
	3	LTE Band 7	20M	QPSK	50	0	Back	5	P-Sensor On	21350	2560	18.25	19.00	1.189	0.06	0.580	0.689
	3	LTE Band 7	20M	QPSK	50	0	Front	5	P-Sensor On	20850	2510	18.24	19.00	1.191	0.07	0.580	0.691
	3	LTE Band 7	20M	QPSK	50	0	Front	5	P-Sensor On	21100	2535	18.06	19.00	1.242	0.14	0.675	0.838
	3	LTE Band 7	20M	QPSK	100	0	Front	5	P-Sensor On	21350	2560	18.25	19.00	1.189	0.15	0.749	0.890

<TDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)
	2	LTE Band 38	20M	QPSK	1	49	Front	5	P-Sensor On	37850	2580	19.25	20.50	1.334	62.9	1.006	0.1	0.462	0.620
	2	LTE Band 38	20M	QPSK	1	49	Back	5	P-Sensor On	37850	2580	19.25	20.50	1.334	62.9	1.006	0.01	0.357	0.479
	2	LTE Band 38	20M	QPSK	50	24	Front	5	P-Sensor On	37850	2580	19.14	20.50	1.368	62.9	1.006	0.04	0.470	0.647
	2	LTE Band 38	20M	QPSK	50	24	Back	5	P-Sensor On	37850	2580	19.14	20.50	1.368	62.9	1.006	0.02	0.366	0.504
21	3	LTE Band 38	20M	QPSK	1	49	Front	5	P-Sensor On	37850	2580	19.25	20.50	1.334	62.9	1.006	0.01	0.492	0.660
	3	LTE Band 38	20M	QPSK	1	49	Back	5	P-Sensor On	37850	2580	19.25	20.50	1.334	62.9	1.006	0.17	0.466	0.625
	3	LTE Band 38	20M	QPSK	50	24	Front	5	P-Sensor On	37850	2580	19.14	20.50	1.368	62.9	1.006	0.07	0.479	0.659
	3	LTE Band 38	20M	QPSK	50	24	Back	5	P-Sensor On	37850	2580	19.14	20.50	1.368	62.9	1.006	0.04	0.430	0.592



16.4 Product specific 10g SAR

<GSM SAR>

Plot No.	Ant.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	1	GSM1900	GPRS 4 Tx slots	Bottom side	0	Handheld On	512	1850.2	22.05	23.00	1.245	0.01	1.740	2.165
	1	GSM1900	GPRS 4 Tx slots	Bottom side	0	Handheld On	661	1880	21.72	23.00	1.343	0.04	1.660	2.229
22	1	GSM1900	GPRS 4 Tx slots	Bottom side	0	Handheld On	810	1909.8	21.32	23.00	1.472	0.07	1.560	2.297

<WCDMA SAR>

Plot No.	Ant.	Band	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	1	WCDMA Band II	RMC 12.2Kbps	Front	0	Handheld On	9400	1880	18.04	19.50	1.400	0.08	1.310	1.833
	1	WCDMA Band II	RMC 12.2Kbps	Back	0	Handheld On	9400	1880	18.04	19.50	1.400	0.06	1.380	1.931
23	1	WCDMA Band II	RMC 12.2Kbps	Bottom side	0	Handheld On	9400	1880	18.04	19.50	1.400	0.01	1.820	2.547
	1	WCDMA Band II	RMC 12.2Kbps	Bottom side	0	Handheld On	9262	1852.4	17.87	19.50	1.455	0.03	1.700	2.474
	1	WCDMA Band II	RMC 12.2Kbps	Bottom side	0	Handheld On	9538	1907.6	18.01	19.50	1.409	0.01	1.740	2.452

<FDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	2	LTE Band 7	20M	QPSK	1	49	Front	0	Handheld On	21350	2560	22.10	22.50	1.096	0.15	1.790	1.963
	2	LTE Band 7	20M	QPSK	50	0	Front	0	Handheld On	21350	2560	22.08	22.50	1.102	0.08	1.900	2.093
	2	LTE Band 7	20M	QPSK	50	0	Front	0	Handheld On	20850	2510	22.00	22.50	1.122	0.07	1.850	2.076
	2	LTE Band 7	20M	QPSK	50	0	Front	0	Handheld On	21100	2535	22.05	22.50	1.109	0.15	1.800	1.997
	2	LTE Band 7	20M	QPSK	100	0	Front	0	Handheld On	21350	2560	21.99	22.50	1.125	0.15	1.850	2.081
	3	LTE Band 7	20M	QPSK	1	49	Front	0	Handheld On	21350	2560	22.10	22.50	1.096	0.01	2.060	2.259
24	3	LTE Band 7	20M	QPSK	1	49	Back	0	Handheld On	21350	2560	22.10	22.50	1.096	0.08	2.440	2.675
	3	LTE Band 7	20M	QPSK	1	49	Front	0	Handheld On	20850	2510	21.89	22.50	1.151	0.05	1.930	2.221
	3	LTE Band 7	20M	QPSK	1	49	Front	0	Handheld On	21100	2535	21.92	22.50	1.143	0.02	2.030	2.320
	3	LTE Band 7	20M	QPSK	1	49	Back	0	Handheld On	20850	2510	21.89	22.50	1.151	0.09	2.150	2.474
	3	LTE Band 7	20M	QPSK	1	49	Back	0	Handheld On	21100	2535	21.92	22.50	1.143	0.17	2.310	2.640
	3	LTE Band 7	20M	QPSK	50	0	Front	0	Handheld On	21350	2560	22.08	22.50	1.102	0.04	2.070	2.280
	3	LTE Band 7	20M	QPSK	50	0	Back	0	Handheld On	21350	2560	22.08	22.50	1.102	0.01	2.400	2.644
	3	LTE Band 7	20M	QPSK	50	0	Front	0	Handheld On	20850	2510	22.00	22.50	1.122	0.06	2.060	2.311
	3	LTE Band 7	20M	QPSK	50	0	Front	0	Handheld On	21100	2535	22.05	22.50	1.109	0.06	2.250	2.496
	3	LTE Band 7	20M	QPSK	50	0	Back	0	Handheld On	20850	2510	22.00	22.50	1.122	0.11	2.290	2.569
	3	LTE Band 7	20M	QPSK	50	0	Back	0	Handheld On	21100	2535	22.05	22.50	1.109	0.07	2.390	2.651
	3	LTE Band 7	20M	QPSK	100	0	Front	0	Handheld On	21350	2560	21.99	22.50	1.125	0.07	2.140	2.407
	3	LTE Band 7	20M	QPSK	100	0	Back	0	Handheld On	21350	2560	21.99	22.50	1.125	-0.01	2.040	2.294



<TDD LTE SAR>

Plot No.	Ant.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Reported 10g SAR (W/kg)
	2	LTE Band 38	20M	QPSK	1	49	Front	0	Full	37850	2580	22.37	24.00	1.455	62.9	1.006	0.01	1.090	1.596
	2	LTE Band 38	20M	QPSK	50	24	Front	0	Full	37850	2580	21.30	23.00	1.479	62.9	1.006	0.09	0.863	1.284
25	3	LTE Band 38	20M	QPSK	1	49	Front	0	Full	37850	2580	22.37	24.00	1.455	62.9	1.006	0.05	1.710	2.504
	3	LTE Band 38	20M	QPSK	1	49	Back	0	Full	37850	2580	22.37	24.00	1.455	62.9	1.006	-0.12	1.700	2.489
	3	LTE Band 38	20M	QPSK	1	49	Front	0	Full	38000	2595	22.14	24.00	1.535	62.9	1.006	0.06	1.600	2.470
	3	LTE Band 38	20M	QPSK	1	49	Front	0	Full	38150	2610	22.09	24.00	1.552	62.9	1.006	0.01	1.590	2.483
	3	LTE Band 38	20M	QPSK	1	49	Back	0	Full	38000	2595	22.14	24.00	1.535	62.9	1.006	0.05	1.590	2.455
	3	LTE Band 38	20M	QPSK	1	49	Back	0	Full	38150	2610	22.09	24.00	1.552	62.9	1.006	0.11	1.600	2.499
	3	LTE Band 38	20M	QPSK	50	24	Front	0	Full	37850	2580	21.30	23.00	1.479	62.9	1.006	0.04	1.370	2.039
	3	LTE Band 38	20M	QPSK	50	24	Back	0	Full	37850	2580	21.30	23.00	1.479	62.9	1.006	0.04	1.260	1.875
	3	LTE Band 38	20M	QPSK	50	24	Front	0	Full	38000	2595	21.24	23.00	1.500	62.9	1.006	0.09	1.510	2.278
	3	LTE Band 38	20M	QPSK	50	24	Front	0	Full	38150	2610	21.26	23.00	1.493	62.9	1.006	0.05	1.520	2.283
	3	LTE Band 38	20M	QPSK	100	0	Front	0	Full	37850	2580	21.28	23.00	1.486	62.9	1.006	0.06	1.300	1.943
	3	LTE Band 38	20M	QPSK	100	0	Back	0	Full	37850	2580	21.28	23.00	1.486	62.9	1.006	0.15	1.370	2.048

16.5 Repeated SAR Measurement

<1g SAR>

No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 5	10M	QPSK	1	0	Back	5	Full	20525	836.5	23.29	24.00	1.178	-0.03	0.983	1	1.158
2nd	LTE Band 5	10M	QPSK	1	0	Back	5	Full	20525	836.5	23.29	24.00	1.178	0.01	0.960	1.024	1.131

<10g SAR>

No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 10g SAR (W/kg)	Ratio	Reported 10g SAR (W/kg)
1st	LTE Band 7	20M	QPSK	1	49	Back	0	Handheld On	21350	2560	22.10	22.50	1.096	0.08	2.440	1	2.675
2nd	LTE Band 7	20M	QPSK	1	49	Back	0	Handheld On	21350	2560	22.10	22.50	1.096	0.19	2.300	1.061	2.522

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is $\geq 0.8W/kg$.
2. Per KDB 865664 D01v01r04, if the ratio among the repeated measurement is ≤ 1.2 and the measured SAR $< 1.45W/kg$, only one repeated measurement is required.
3. Per KDB 865664 D01v01r04, if the extremity repeated SAR is necessary, the same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.
4. The ratio is the difference in percentage between original and repeated *measured SAR*.
5. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

17. Simultaneous Transmission Analysis

No.	Simultaneous Transmission Configurations	Portable Handset				Note
		Head	Body-worn	Hotspot	Product specific 10g SAR	
1.	GSM Voice + WLAN2.4GHz	Yes	Yes			
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes	Yes	WLAN Hotspot
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	Yes	WLAN Hotspot
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes	Yes	WLAN Hotspot
5.	GSM Voice + WLAN5.3/5.5GHz	Yes	Yes			
6.	GPRS/EDGE + WLAN5.3/5.5GHz	Yes	Yes		Yes	WLAN Direct (GC only)
7.	WCDMA + WLAN5.3/5.5GHz	Yes	Yes		Yes	WLAN Direct (GC only)
8.	LTE + WLAN5.3/5.5GHz	Yes	Yes		Yes	WLAN Direct (GC only)
9.	GSM Voice + WLAN5.2/5.8GHz	Yes	Yes			
10.	GPRS/EDGE + WLAN5.2/5.8GHz	Yes	Yes	Yes	Yes	WLAN Hotspot/Direct(GC/GO)
11.	WCDMA + WLAN5.2/5.8GHz	Yes	Yes	Yes	Yes	WLAN Hotspot/Direct(GC/GO)
12.	LTE + WLAN5.2/5.8GHz	Yes	Yes	Yes	Yes	WLAN Hotspot/Direct(GC/GO)
13.	GSM Voice + Bluetooth		Yes			
14.	GPRS/EDGE + Bluetooth		Yes	Yes	Yes	BT Tethering
15.	WCDMA + Bluetooth		Yes	Yes	Yes	BT Tethering
16.	LTE + Bluetooth		Yes	Yes	Yes	BT Tethering

General Note:

1. This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
2. EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
3. This device 2.4GHz WLAN support hotspot operation and Bluetooth support tethering applications.
4. This device 2.4GHz WLAN/ 5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WLAN Direct (GC/GO), and 5.3GHz / 5.5GHz supports WLAN Direct (GC only).
5. EUT will choose either WLAN 2.4GHz or WLAN 5GHz according to the network signal condition; therefore, 2.4GHz WLAN and 5GHz WLAN will not operate simultaneously at any moment though they have independent antenna.
6. WLAN 2.4GHz and Bluetooth share the same antenna so can't transmit simultaneously.
7. According to the EUT character, WLAN 5GHz and Bluetooth can't transmit simultaneously.
8. Chose the worst zoom scan SAR of WLAN correspondingly for co-located with WWAN analysis.
9. The reported SAR summation is calculated based on the same configuration and test position.
10. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - i) 1g Scalar SAR summation < 1.6W/kg and 10g Scalar SAR summation < 4.0W/kg.
 - ii) $SPLSR = (SAR1 + SAR2)^{1.5} / (\text{min. separation distance, mm})$, and the peak separation distance is determined from the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan.
 - iii) If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary.
 - iv) Simultaneously transmission SAR measurement, and the reported multi-band 1g SAR < 1.6W/kg and 10g SAR < 4.0W/kg.
 - v) The SPLSR calculated results please refer to section 17.5.



17.1 Head Exposure Conditions

WWAN Band		Exposure Position	1		2	3	1+2		1+3			
			WWAN		2.4GHz WLAN	5GHz WLAN	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No
			Ant.	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)						
GSM	GSM850	Right Cheek	1	0.262	1.031	0.482	1.29			0.74		
		Right Tilted	1	0.178	1.000	0.780	1.18			0.96		
		Left Cheek	1	0.334	0.513	0.281	0.85			0.62		
		Left Tilted	1	0.183	1.031	0.274	1.21			0.46		
	GSM1900	Right Cheek	1	0.114	1.031	0.482	1.15			0.60		
		Right Tilted	1	0.033	1.000	0.780	1.03			0.81		
		Left Cheek	1	0.108	0.513	0.281	0.62			0.39		
		Left Tilted	1	0.059	1.031	0.274	1.09			0.33		
WCDMA	Band V	Right Cheek	1	0.286	1.031	0.482	1.32			0.77		
		Right Tilted	1	0.185	1.000	0.780	1.19			0.97		
		Left Cheek	1	0.345	0.513	0.281	0.86			0.63		
		Left Tilted	1	0.185	1.031	0.274	1.22			0.46		
	Band II	Right Cheek	1	0.211	1.031	0.482	1.24			0.69		
		Right Tilted	1	0.098	1.000	0.780	1.10			0.88		
		Left Cheek	1	0.206	0.513	0.281	0.72			0.49		
		Left Tilted	1	0.118	1.031	0.274	1.15			0.39		
LTE	Band 5	Right Cheek	1	0.264	1.031	0.482	1.30			0.75		
		Right Tilted	1	0.163	1.000	0.780	1.16			0.94		
		Left Cheek	1	0.318	0.513	0.281	0.83			0.60		
		Left Tilted	1	0.158	1.031	0.274	1.19			0.43		
	Band 7	Right Cheek	2	0.405	1.031	0.482	1.44			0.89		
		Right Tilted	2	0.120	1.000	0.780	1.12			0.90		
		Left Cheek	2	0.301	0.513	0.281	0.81			0.58		
		Left Tilted	2	0.223	1.031	0.274	1.25			0.50		
		Right Cheek	3	0.447	1.031	0.482	1.48			0.93		
		Right Tilted	3	0.504	1.000	0.780	1.50			1.28		
		Left Cheek	3	0.208	0.513	0.281	0.72			0.49		
		Right Cheek	2	0.145	1.031	0.274	1.18			0.42		
	Band 38	Right Cheek	2	0.271	1.031	0.482	1.30			0.75		
		Right Tilted	2	0.064	1.000	0.780	1.06			0.84		
		Left Cheek	2	0.184	0.513	0.281	0.70			0.47		
		Left Tilted	2	0.126	1.031	0.274	1.16			0.40		
Right Cheek		3	0.272	1.031	0.482	1.30			0.75			
Right Tilted		3	0.340	1.000	0.780	1.34			1.12			
Left Cheek		3	0.438	0.513	0.281	0.95			0.72			
Left Tilted		3	0.171	1.031	0.274	1.20			0.45			



17.2 Hotspot Exposure Conditions

WWAN Band	Exposure Position	1		2	3	4	1+2			1+3			1+4			
		WWAN		2.4GHz WLAN	5GHz WLAN	Bluetooth	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No	
		Ant.	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)										
GSM	GSM850	Front	1	0.746	0.492	0.659	0.060	1.24			1.41			0.81		
		Back	1	1.103	0.533	1.050	0.050	1.64	0.01	#1	2.15	0.02	#2	1.15		
		Left Side	1	0.591	0.533	0.260	0.005	1.12			0.85			0.60		
		Right Side	1	0.315				0.32			0.32			0.32		
		Top Side	1		0.533	1.074	0.053	0.53			1.07			0.05		
		Bottom Side	1	0.501				0.50			0.50			0.50		
	GSM1900	Front	1	0.468	0.492	0.659	0.060	0.96			1.13			0.53		
		Back	1	0.471	0.533	1.050	0.050	1.00			1.52			0.52		
		Left Side	1	0.031	0.533	0.260	0.005	0.56			0.29			0.04		
		Right Side	1	0.043				0.04			0.04			0.04		
		Top Side	1		0.533	1.074	0.053	0.53			1.07			0.05		
		Bottom Side	1	0.743				0.74			0.74			0.74		
WCDMA	Band V	Front	1	0.968	0.492	0.659	0.060	1.46			1.63	0.01	#3	1.03		
		Back	1	1.183	0.533	1.050	0.050	1.72	0.01	#4	2.23	0.02	#5	1.23		
		Left Side	1	0.679	0.533	0.260	0.005	1.21			0.94			0.68		
		Right Side	1	0.352				0.35			0.35			0.35		
		Top Side	1		0.533	1.074	0.053	0.53			1.07			0.05		
		Bottom Side	1	0.604				0.60			0.60			0.60		
	Band II	Front	1	0.540	0.492	0.659	0.060	1.03			1.20			0.60		
		Back	1	0.596	0.533	1.050	0.050	1.13			1.65	0.01	#6	0.65		
		Left Side	1	0.041	0.533	0.260	0.005	0.57			0.30			0.05		
		Right Side	1	0.045				0.05			0.05			0.05		
		Top Side	1		0.533	1.074	0.053	0.53			1.07			0.05		
		Bottom Side	1	0.922				0.92			0.92			0.92		



WWAN Band	Exposure Position	1		2	3	4	1+2			1+3			1+4			
		WWAN		2.4GHz WLAN	5GHz WLAN	Bluetooth	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No	
		Ant.	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)										
LTE	Band 5	Front	1	0.882	0.492	0.659	0.060	1.37			1.54			0.94		
		Back	1	1.158	0.533	1.050	0.050	1.69	0.01	#7	2.21	0.02	#8	1.21		
		Left Side	1	0.584	0.533	0.260	0.005	1.12			0.84			0.59		
		Right Side	1	0.332				0.33			0.33			0.33		
		Top Side	1		0.533	1.074	0.053	0.53			1.07			0.05		
		Bottom Side	1	0.623				0.62			0.62			0.62		
	Band 7	Front	2	0.771	0.492	0.659	0.060	1.26			1.43			0.83		
		Back	2	0.517	0.533	1.050	0.050	1.05			1.57			0.57		
		Left Side	2		0.533	0.260	0.005	0.53			0.26			0.01		
		Right Side	2	0.401				0.40			0.40			0.40		
		Top Side	2		0.533	1.074	0.053	0.53			1.07			0.05		
		Bottom Side	2	0.140				0.14			0.14			0.14		
		Front	3	0.897	0.492	0.659	0.060	1.39			1.56			0.96		
		Back	3	0.689	0.533	1.050	0.050	1.22			1.74	0.02	#9	0.74		
		Left Side	3	0.512				0.51			0.51			0.51		
		Top Side	3		0.533	1.074	0.053	0.53			1.07			0.05		
	Bottom Side	3	0.295				0.30			0.30			0.30			
	Band 38	Front	2	0.647	0.492	0.659	0.060	1.14			1.31			0.71		
		Back	2	0.504	0.533	1.050	0.050	1.04			1.55			0.55		
		Left Side	2		0.533	0.260	0.005	0.53			0.26			0.01		
		Right Side	2	0.486				0.49			0.49			0.49		
		Top Side	2		0.533	1.074	0.053	0.53			1.07			0.05		
		Bottom Side	2	0.149				0.15			0.15			0.15		
		Front	3	0.660	0.492	0.659	0.060	1.15			1.32			0.72		
		Back	3	0.625	0.533	1.050	0.050	1.16			1.68	0.02	#10	0.68		
		Left Side	3	0.454	0.533	0.260	0.005	0.99			0.71			0.46		
		Top Side	3		0.533	1.074	0.053	0.53			1.07			0.05		
Bottom Side		3	0.157				0.16			0.16			0.16			



17.3 Body-Worn Accessory Exposure Conditions

WWAN Band		Exposure Position	1		2	3	4	1+2			1+3			1+4		
			WWAN		2.4GHz WLAN	5GHz WLAN	Bluetooth	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No
			Ant.	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)									
GSM	GSM850	Front	1	0.746	0.492	0.576	0.060	1.24			1.32			0.81		
		Back	1	1.103	0.533	0.941	0.050	1.64	0.01	#1	2.04	0.02	#11	1.15		
	GSM1900	Front	1	0.468	0.492	0.576	0.060	0.96			1.04			0.53		
		Back	1	0.471	0.533	0.941	0.050	1.00			1.41			0.52		
WCDMA	Band V	Front	1	0.968	0.492	0.576	0.060	1.46			1.54			1.03		
		Back	1	1.183	0.533	0.941	0.050	1.72	0.01	#4	2.12	0.02	#12	1.23		
	Band II	Front	1	0.540	0.492	0.576	0.060	1.03			1.12			0.60		
		Back	1	0.596	0.533	0.941	0.050	1.13			1.54			0.65		
LTE	Band 5	Front	1	0.882	0.492	0.576	0.060	1.37			1.46			0.94		
		Back	1	1.158	0.533	0.941	0.050	1.69	0.01	#7	2.10	0.02	#13	1.21		
	Band 7	Front	2	0.771	0.492	0.576	0.060	1.26			1.35			0.83		
		Back	2	0.517	0.533	0.941	0.050	1.05			1.46			0.57		
		Front	3	0.897	0.492	0.576	0.060	1.39			1.47			0.96		
		Back	3	0.689	0.533	0.941	0.050	1.22			1.63	0.02	#14	0.74		
	Band 38	Front	2	0.647	0.492	0.576	0.060	1.14			1.22			0.71		
		Back	2	0.504	0.533	0.941	0.050	1.04			1.45			0.55		
		Front	3	0.660	0.492	0.576	0.060	1.15			1.24			0.72		
		Back	3	0.625	0.533	0.941	0.050	1.16			1.57			0.68		



17.4 Product specific 10g SAR Exposure Conditions

WWAN Band		Exposure Position	1		2	1+2		
			WWAN		5GHz WLAN	Summed 10g SAR (W/kg)	SPLSR	Case No
			Ant.	10g SAR (W/kg)	10g SAR (W/kg)			
GSM	GSM1900	Bottom side	1	2.297		2.30		
WCDMA	Band II	Front	1	1.833	0.728	2.56		
		Back	1	1.931	0.507	2.44		
		Bottom side	1	2.547		2.55		
LTE	Band 7	Front	2	2.093	0.728	2.82		
		Front	3	2.496	0.728	3.22		
		Back	3	2.675	0.507	3.18		
	Band 38	Front	2	1.596	0.728	2.32		
		Front	3	2.504	0.728	3.23		
		Back	3	2.499	0.507	3.01		

Remark:

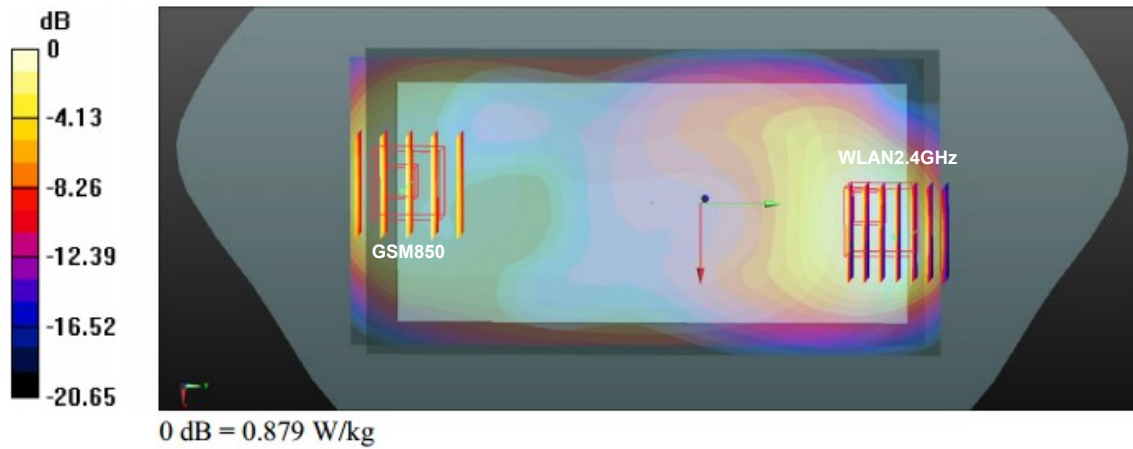
For Bluetooth/WLAN 2.4GHz product specific 10g stand-alone SAR is not required for a transmitter or antenna, due to 1g hotspot SAR is <1.2W/kg.

17.5 SPLSR Evaluation and Analysis

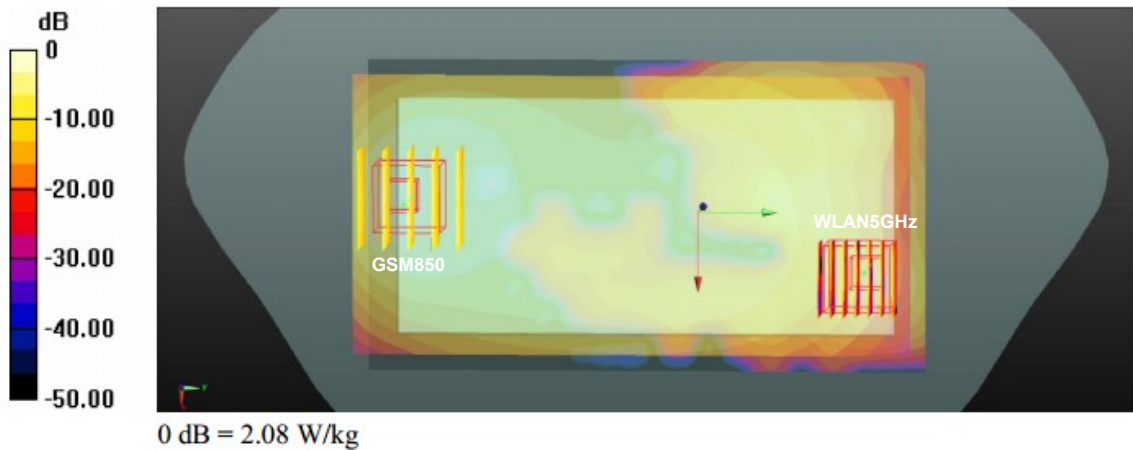
General Note:

- When standalone SAR is measured for both antennas in the pair, the peak location separation distance is computed by the square root of $[(x1-x2)^2 + (y1-y2)^2 + (z1-z2)^2]$, where (x1, y1, z1) and (x2, y2, z2) are the coordinates in the area scans or extrapolated peak SAR locations in the zoom scans, as appropriate.
- $SPLSR = (SAR_1 + SAR_2)^{1.5} / (min. \text{ separation distance, mm})$. If $SPLSR \leq 0.04$ for 1g SAR and $SPLSR \leq 0.10$ for 10g SAR, simultaneously transmission SAR measurement is not necessary.

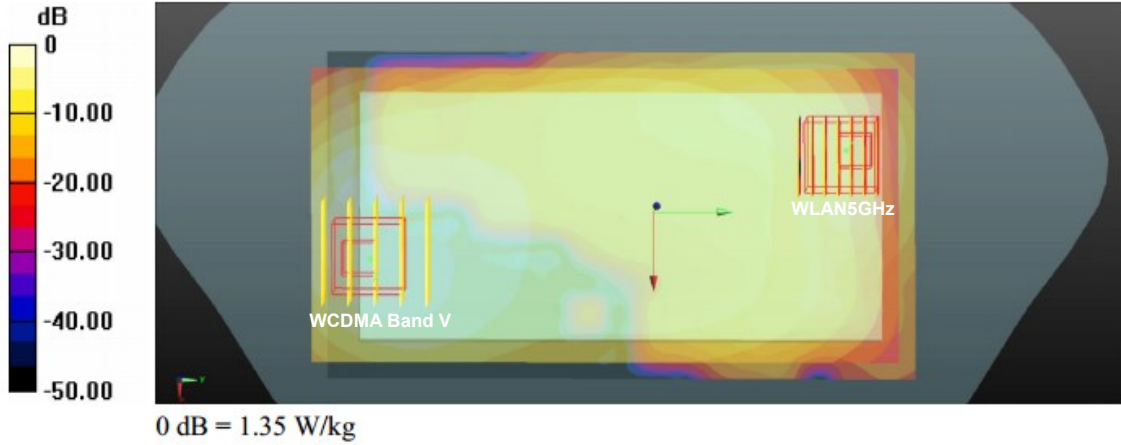
Case #1	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
	GSM850		1.103	5	X	Y	Z				
	WLAN2.4GHz	Back	0.533	5	1.48	7.96	-0.12	160.2	1.64	0.01	Not required



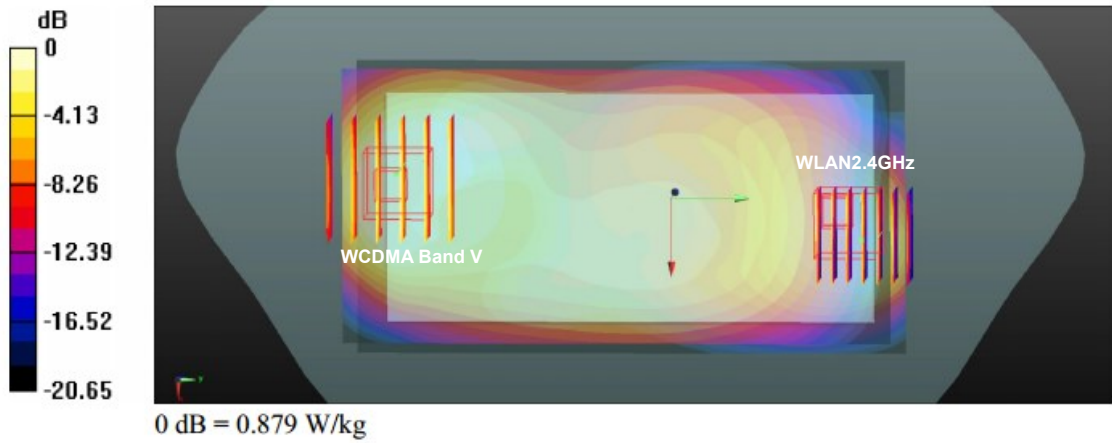
Case #2	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
	GSM850		1.183	5	X	Y	Z				
	WLAN5GHz	Back	1.050	5	1.94	7.02	-0.13	151.7	2.15	0.02	Not required



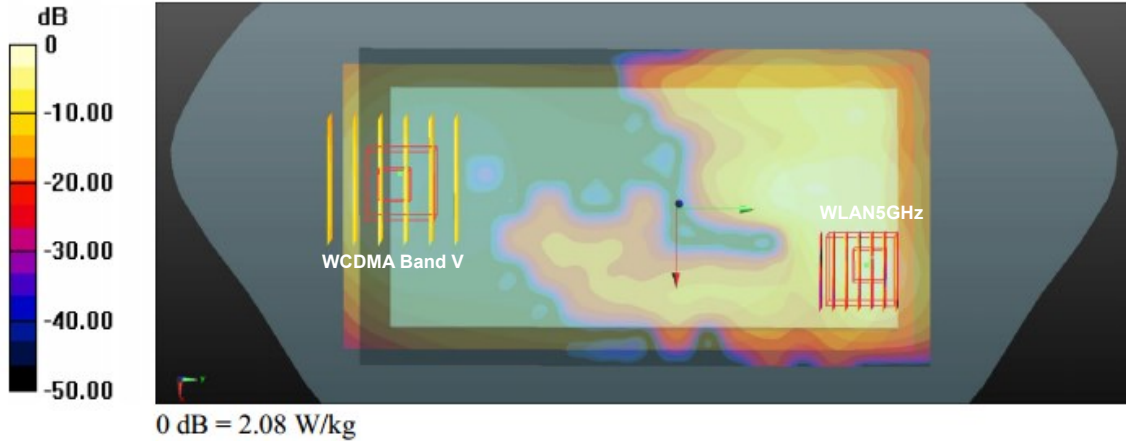
Case #3	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA Band V				X	Y	Z				
	WCDMA Band V	Front	0.968	5	1.25	-8.08	-0.17	154.9	1.63	0.01	Not required
	WLAN5GHz		0.659	5	-1.94	7.08	-0.14				



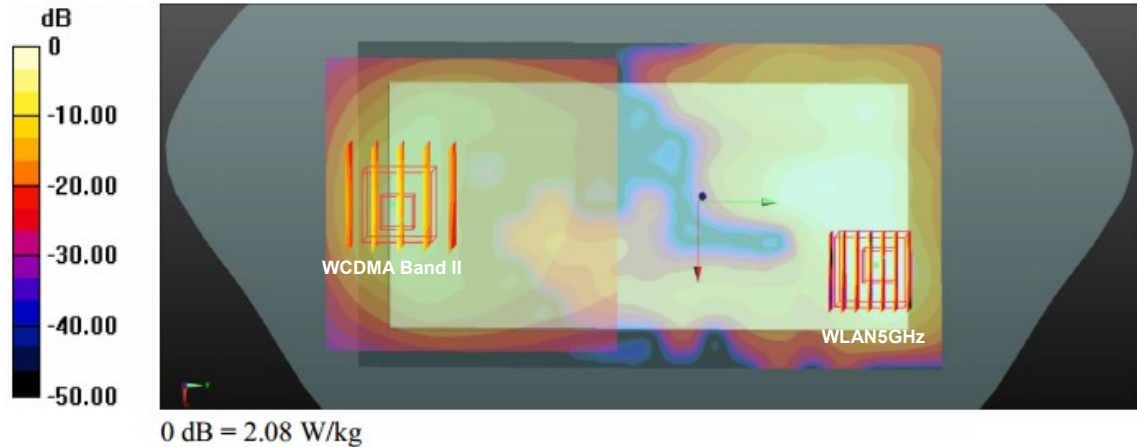
Case #4	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA Band V				X	Y	Z				
	WCDMA Band V	Back	1.183	5	-0.83	-7.92	-0.18	160.5	1.72	0.01	Not required
	WLAN2.4GHz		0.533	5	1.48	7.96	-0.12				



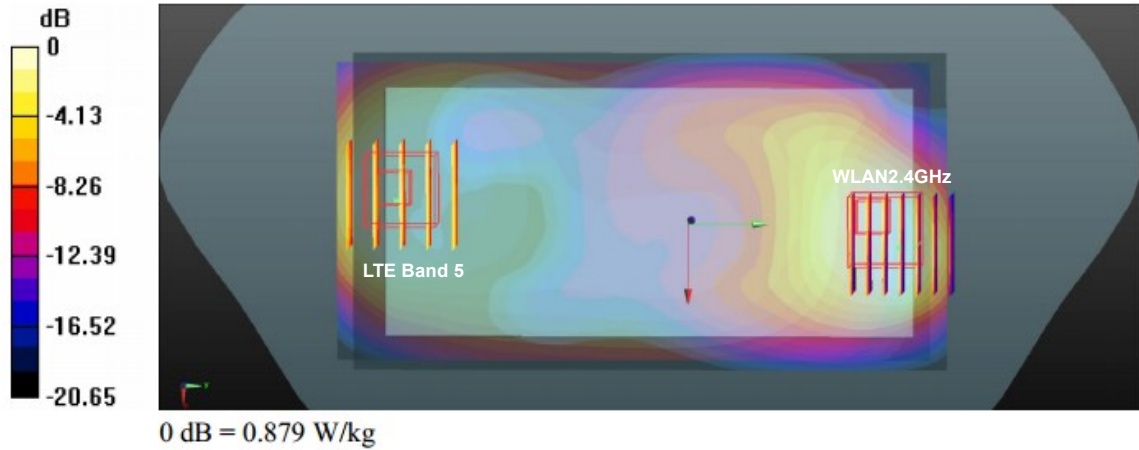
Case #5	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	WCDMA Band V	Back	1.183	5	-0.83	-7.92	-0.18	151.9	2.23	0.02	Not required
	WLAN5GHz		1.050	5	1.94	7.02	-0.13				



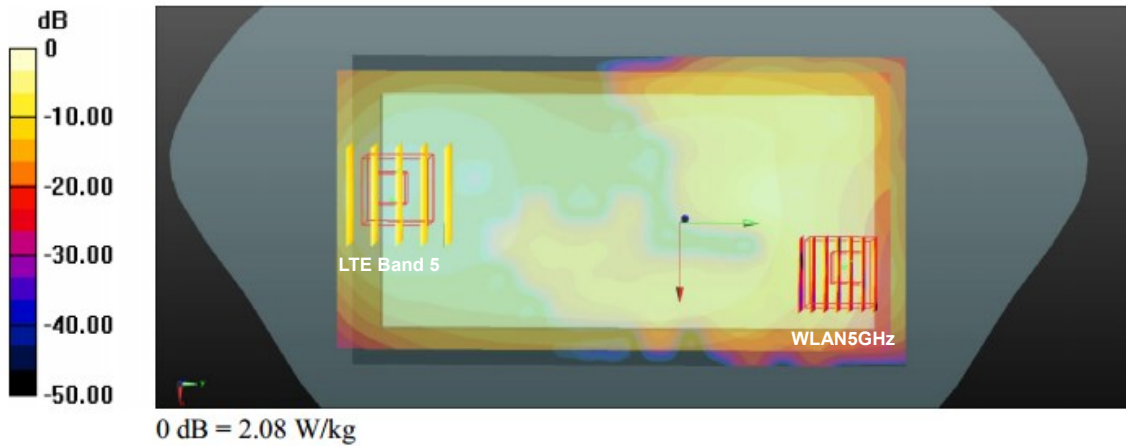
Case #6	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	WCDMA Band II	Back	0.596	5	0.38	-7.8	-0.22	149.0	1.65	0.01	Not required
	WLAN5GHz		1.050	5	1.94	7.02	-0.13				



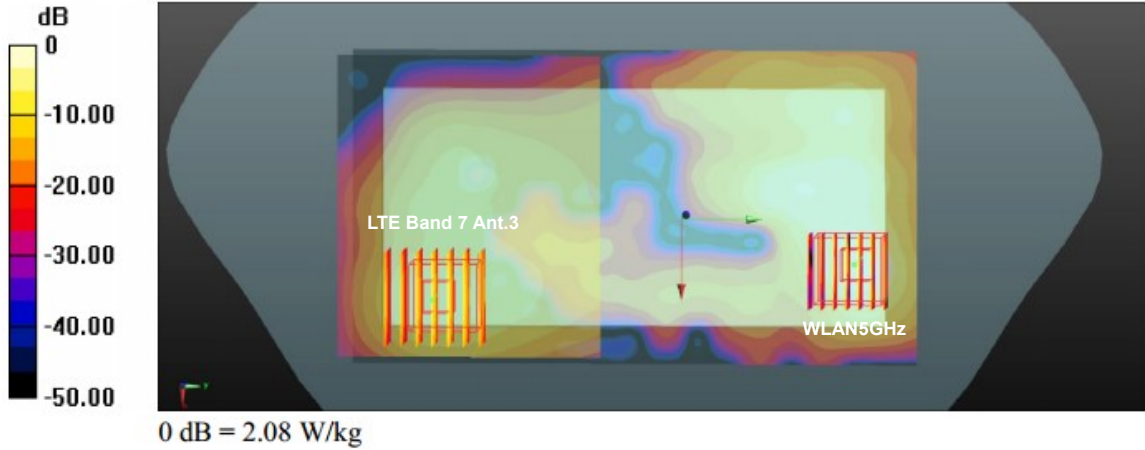
Case #7	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 5				X	Y	Z				
	WLAN2.4GHz	Back	0.533	5	1.48	7.96	-0.12	159.0	1.69	0.01	Not required



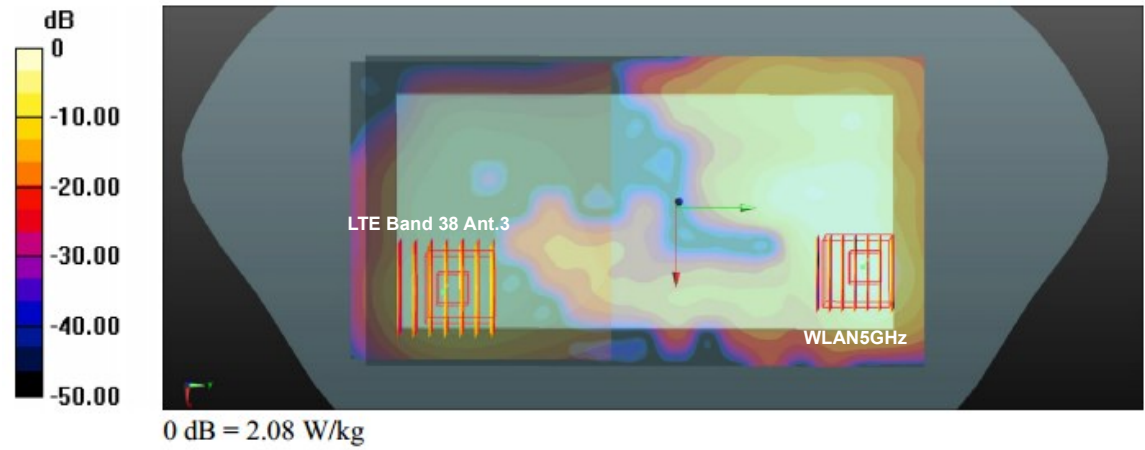
Case #08	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 5				X	Y	Z				
	WLAN5GHz	Back	1.050	5	1.94	7.02	-0.13	150.5	2.21	0.02	Not required



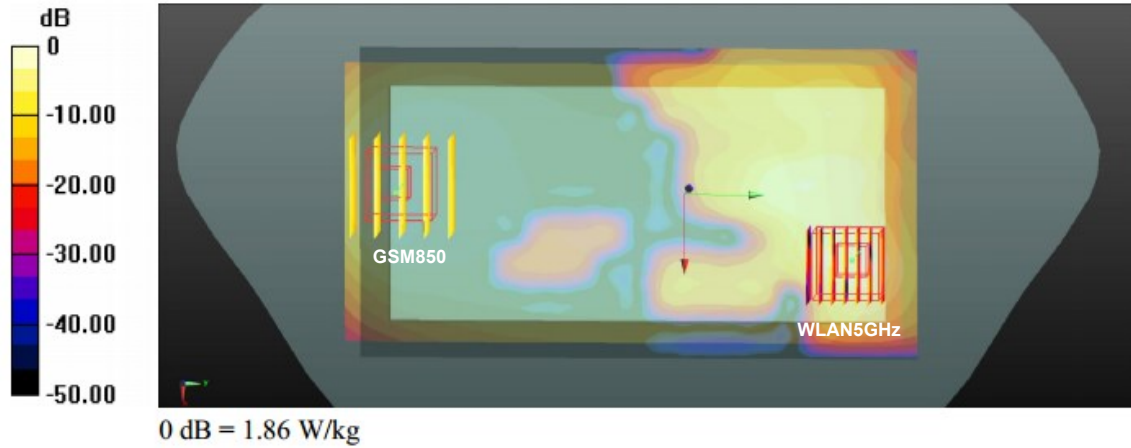
Case #9	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 7 Ant.3				X	Y	Z				
	WLAN5GHz	Back	1.050	5	1.94	7.02	-0.13	134.5	1.74	0.02	Not required



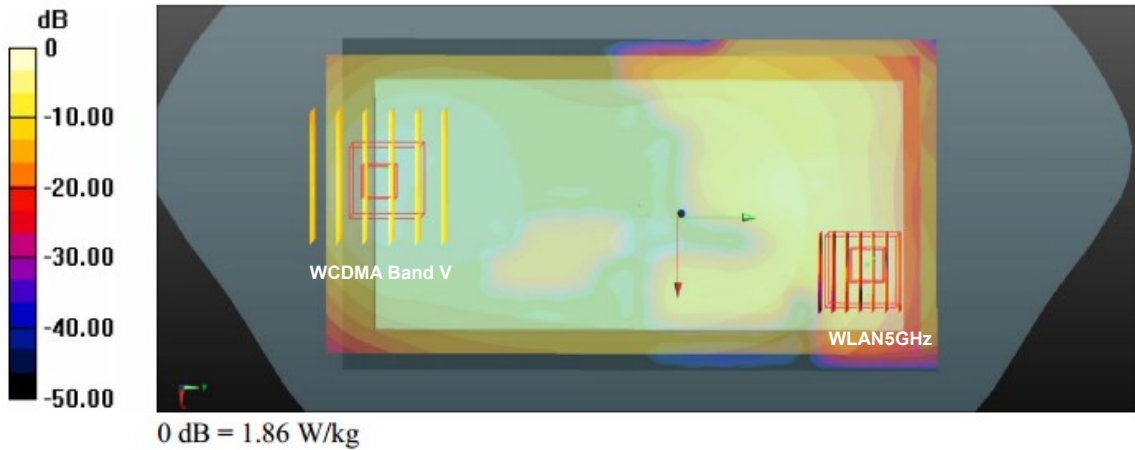
Case #10	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 38 Ant.3				X	Y	Z				
	WLAN5GHz	Back	1.050	5	1.94	7.02	-0.13	134.3	1.68	0.02	Not required



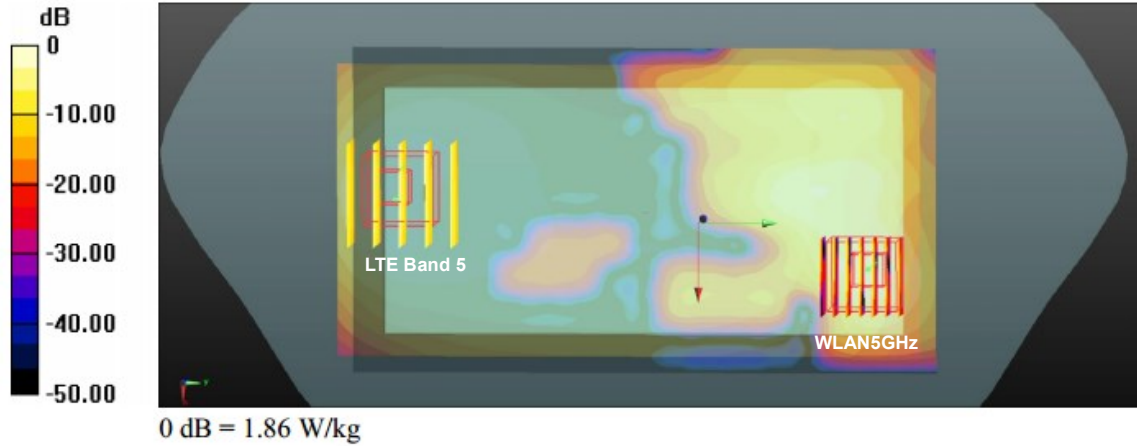
Case #11	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
	GSM850				X	Y	Z				
	GSM850	Back	1.103	5	-0.72	-7.91	-0.18	149.9	2.04	0.02	Not required
	WLAN5GHz		0.941	5	1.94	6.84	-0.14				



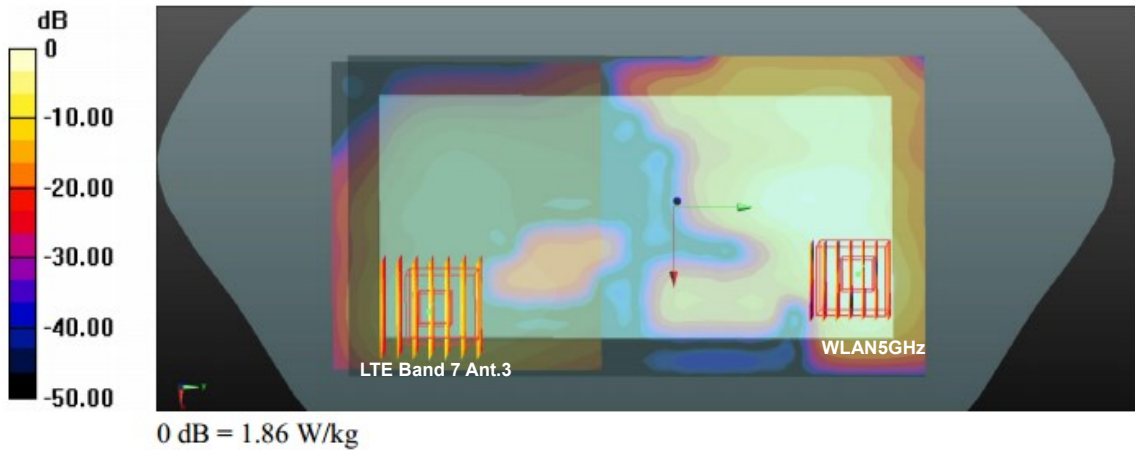
Case #12	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA Band V				X	Y	Z				
	WCDMA Band V	Back	1.183	5	-0.83	-7.92	-0.18	150.2	2.12	0.02	Not required
	WLAN5GHz		0.941	5	1.94	6.84	-0.14				



Case #13	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 5	Back	1.158	0	-0.88	-7.76	-0.18	148.7	2.10	0.02	Not required
	WLAN5GHz		0.941	5	1.94	6.84	-0.14				



Case #14	Band	Position	1g SAR (W/kg)	Gap (mm)	SAR peak location (cm)			3D distance (mm)	Summed 1g SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 7 Ant.3	Back	0.689	5	2.9	-6.4	-0.17	132.7	1.63	0.02	Not required
	WLAN5GHz		0.941	5	1.94	6.84	-0.14				





18. Supplemental Tuner Tests Results

General Note:

1. The following test procedure was followed to demonstrate that the SAR results in this report represent the appropriate SAR test conditions. For bands with dynamic tuning implemented, SAR will be measured according to the required FCC SAR test procedures with the dynamic tuner active to allow the device to automatically tune to the antenna state for the respective RF exposure test configurations. Additional single point SAR time-sweep measurements will be evaluated for other tuner states to determine that the other tuner configurations would result in equivalent or lower SAR values. The additional tuner hardware has no influence to the antenna characteristics, other than impedance matching.
2. To evaluate all of the tuner states, the 296 tuner states are divided evenly among band, mode and exposure combinations so that at least one single point SAR measurement is measured in each configuration. Single point time-sweep measurements will be performed at the peak SAR location determined by the zoom scan of the configuration with the highest reported SAR for each combination. The tuner state will be established remotely so that the device is not moved for the entire series of single point SAR for the tuner states in each combination. The SAR probe will remain stationary at the same position throughout the entire series of single point measurements for each combination. The bands which are dynamically tuned are split into two separate antennas, so each antenna system will have its own test plan to cover the corresponding 296 tuner states.
3. The operational decryption contains more information about the design and implementation of the dynamic antenna tuning.

18.1 Supplemental Tuner Head & Body SAR Results

Please refer to Appendix C.

Test Engineer: Nick Hu



19. Uncertainty Assessment

Per KDB 865664 D01 SAR measurement 100MHz to 6GHz, when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg and the measured 10-g SAR within a frequency band is < 3.75 W/kg. The expanded SAR measurement uncertainty must be $\leq 30\%$, for a confidence interval of $k = 2$. If these conditions are met, extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. For this device, the highest measured 1-g SAR is less 1.5W/kg and highest measured 10-g SAR is less 3.75W/kg. Therefore, the measurement uncertainty table is not required in this report.

20. References

- [1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”
- [2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992
- [3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013
- [4] SPEAG DASYS System Handbook
- [5] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.
- [6] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.
- [7] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015
- [8] FCC KDB 648474 D04 v01r03, “SAR Evaluation Considerations for Wireless Handsets”, Oct 2015.
- [9] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.
- [10] FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015
- [11] FCC KDB 941225 D05 v02r05, “SAR Evaluation Considerations for LTE Devices”, Dec 2015
- [12] FCC KDB 941225 D05A v01r02, “Rel. 10 LTE SAR Test Guidance and KDB Inquiries”, Oct 2015
- [13] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.



Appendix A. Plots of System Performance Check

The plots are shown as follows.

System Check_Head_835MHz_20180102

DUT: D835V2 -SN:4d151

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: HSL_835_Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.905 \text{ S/m}$; $\epsilon_r = 42.268$; $\rho = 1000 \text{ kg/m}^3$

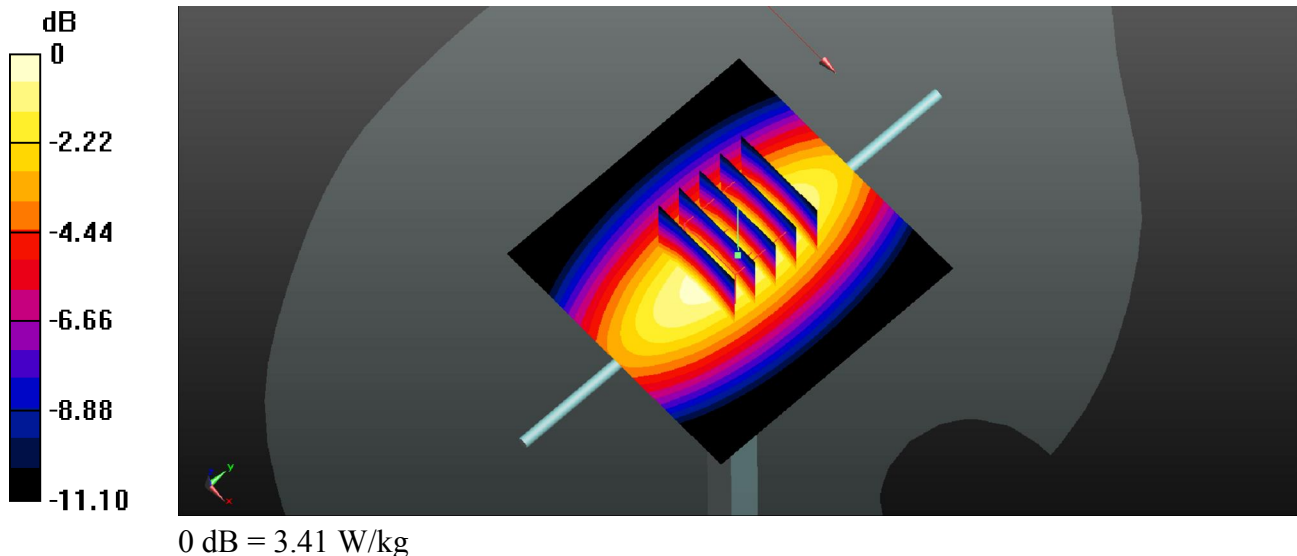
Ambient Temperature : $23.7 \text{ }^\circ\text{C}$; Liquid Temperature : $22.6 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(10.36, 10.36, 10.36); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 3.40 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 55.97 V/m ; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.97 W/kg
SAR(1 g) = 2.47 W/kg ; SAR(10 g) = 1.6 W/kg
Maximum value of SAR (measured) = 3.41 W/kg



System Check_Head_1900MHz_20180104

DUT: D1900V2 - SN:5d170

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: HSL_1900_Medium parameters used: $f = 1900$ MHz; $\sigma = 1.465$ S/m; $\epsilon_r = 39.148$; $\rho = 1000$ kg/m³

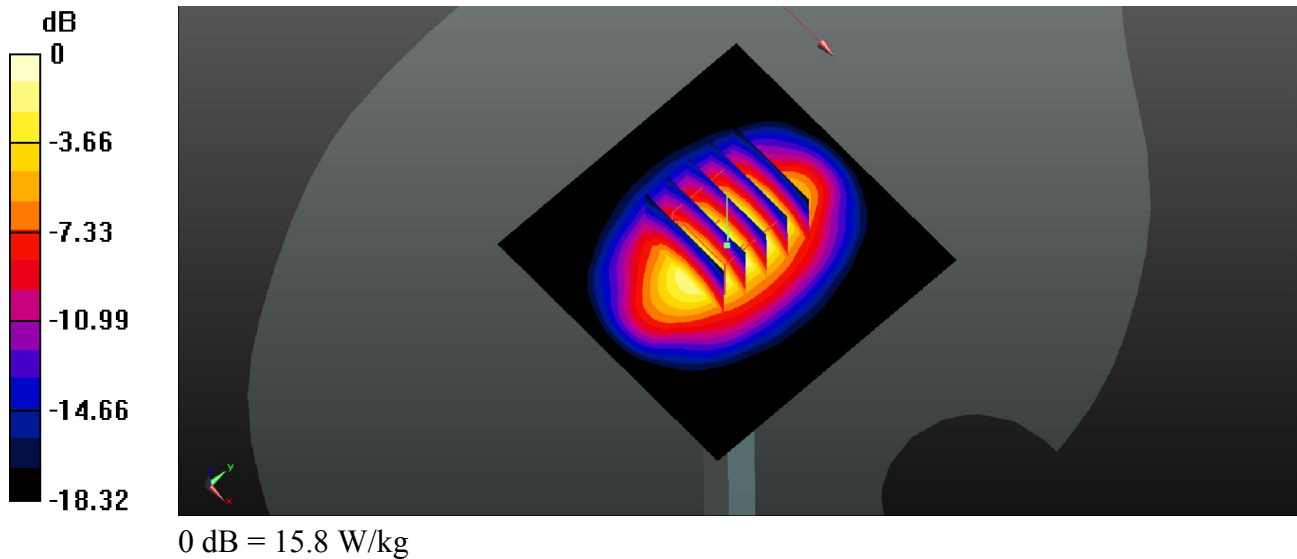
Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.4 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(8.41, 8.41, 8.41); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 16.2 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 101.0 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 19.0 W/kg
SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.31 W/kg
Maximum value of SAR (measured) = 15.8 W/kg



System Check_Head_2600MHz_20180103

DUT: D2600V2 - SN:1112

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: HSL_2600_Medium parameters used: $f = 2600$ MHz; $\sigma = 2.038$ S/m; $\epsilon_r = 39.032$; $\rho = 1000$ kg/m³

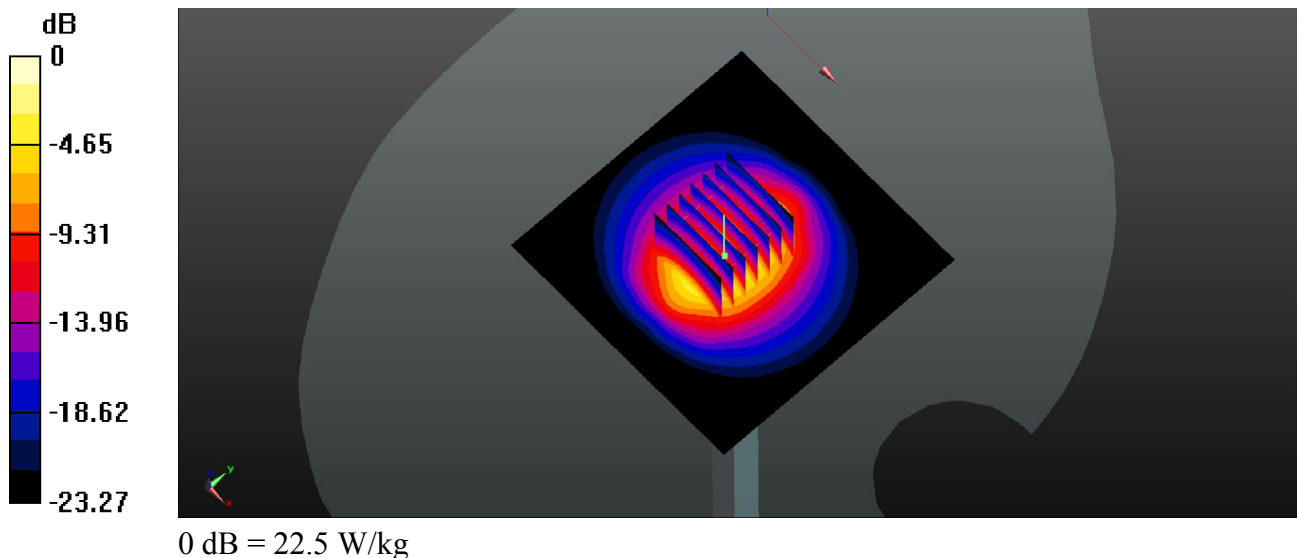
Ambient Temperature : 23.8 °C ; Liquid Temperature : 22.3 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(7.67, 7.67, 7.67); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 22.5 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.51 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 30.8 W/kg
SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.33 W/kg
Maximum value of SAR (measured) = 22.5 W/kg



System Check_Body_835MHz_20171231

DUT: D835V2 - SN:4d151

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1

Medium: MSL_835_Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.995 \text{ S/m}$; $\epsilon_r = 55.191$; $\rho = 1000 \text{ kg/m}^3$

Ambient Temperature : $23.5 \text{ }^\circ\text{C}$; Liquid Temperature : $22.6 \text{ }^\circ\text{C}$

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(10.33, 10.33, 10.33); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 3.39 W/kg

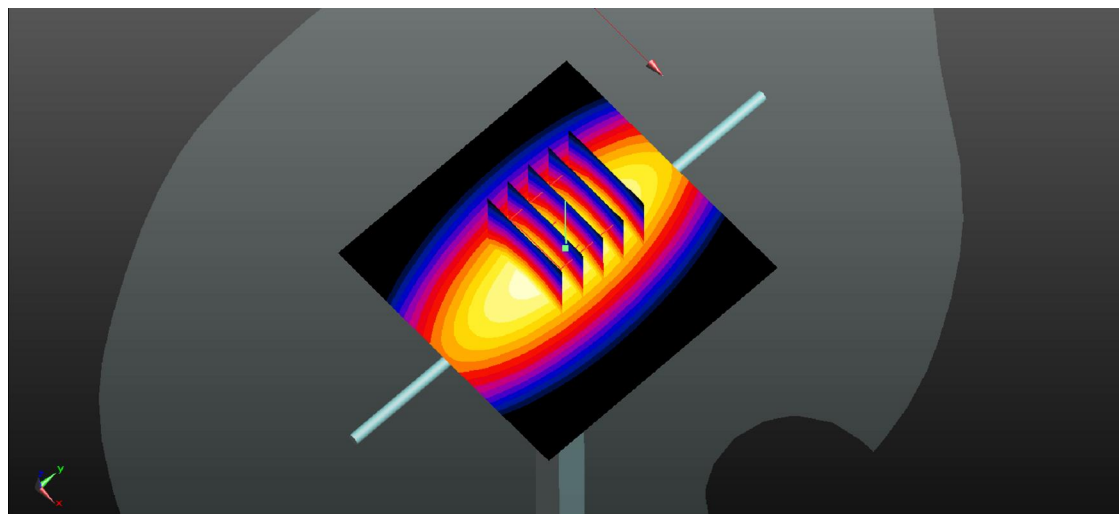
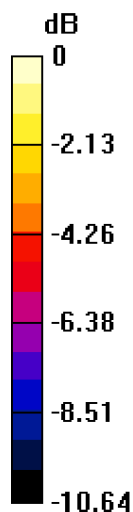
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 51.73 V/m ; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 3.87 W/kg

SAR(1 g) = 2.53 W/kg ; SAR(10 g) = 1.66 W/kg

Maximum value of SAR (measured) = 3.40 W/kg



0 dB = 3.40 W/kg

System Check_Body_1900MHz_20180113

DUT: D1900V2 - SN:5d170

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium: MSL_1900_Medium parameters used: $f = 1900$ MHz; $\sigma = 1.547$ S/m; $\epsilon_r = 51.464$; $\rho = 1000$ kg/m³

Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.4 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(8.3, 8.3, 8.3); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 16.6 W/kg

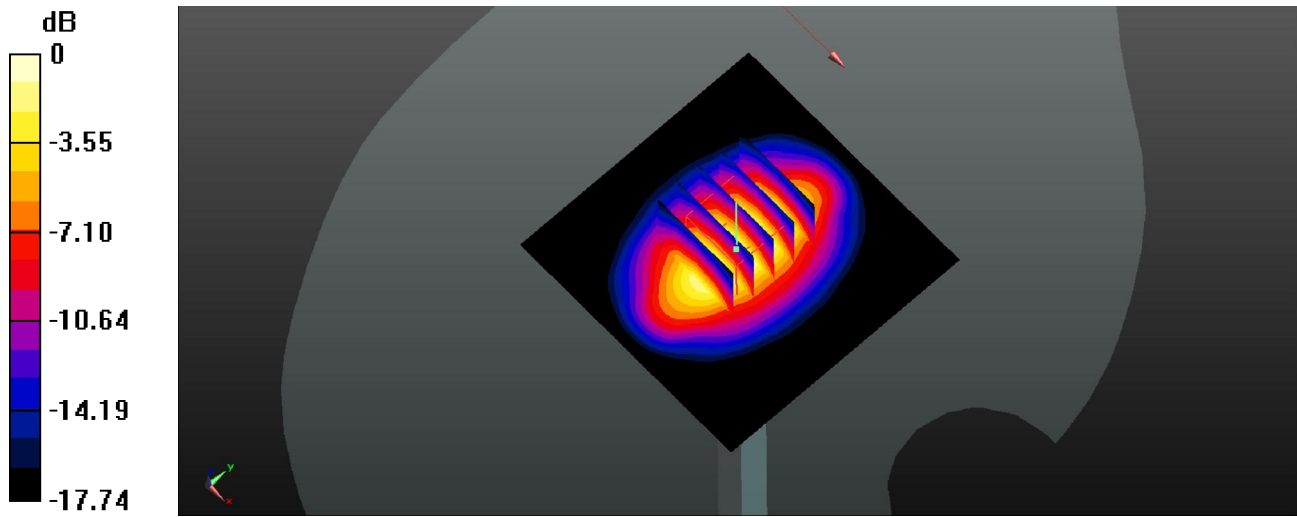
Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 87.83 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 19.3 W/kg

SAR(1 g) = 10.8 W/kg; SAR(10 g) = 5.59 W/kg

Maximum value of SAR (measured) = 16.3 W/kg



0 dB = 16.3 W/kg

System Check_Body_2600MHz_20180112

DUT: D2600V2 - SN:1112

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium: MSL_2600_Medium parameters used: $f = 2600$ MHz; $\sigma = 2.171$ S/m; $\epsilon_r = 51.943$; $\rho = 1000$ kg/m³

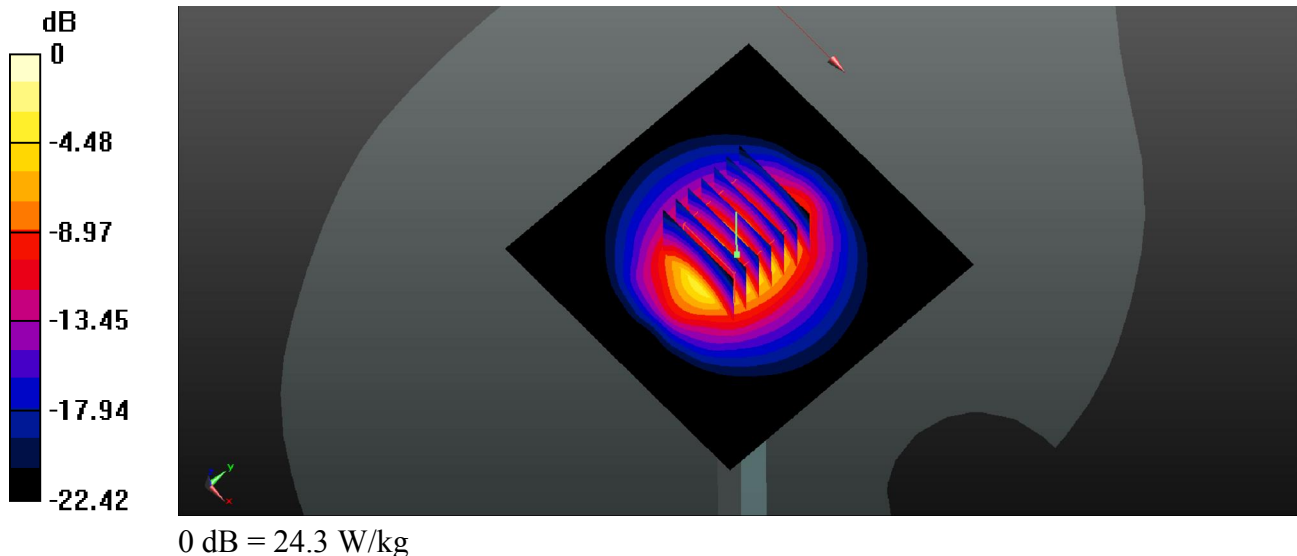
Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.8 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(7.71, 7.71, 7.71); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Pin=250mW/Area Scan (81x81x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 24.0 W/kg

Pin=250mW/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 85.52 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 30.0 W/kg
SAR(1 g) = 14.3 W/kg; SAR(10 g) = 6.41 W/kg
Maximum value of SAR (measured) = 24.3 W/kg





Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

01_GSM850_GPRS (4 Tx slots)_Left Cheek_0mm_Ch251

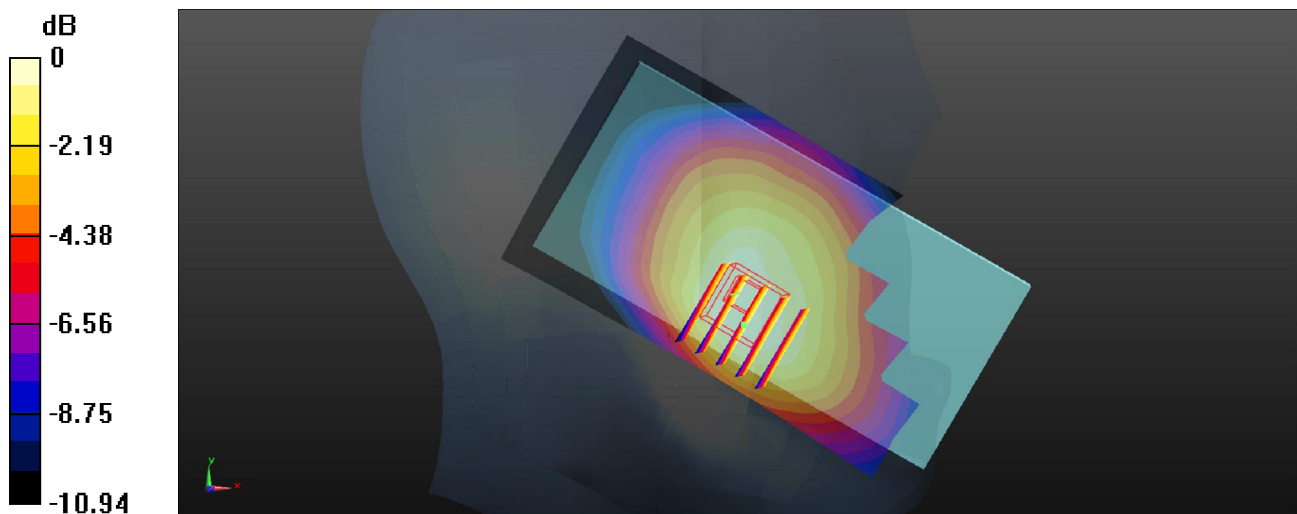
Communication System: UID 0, GPRS (GMSK 4 Tx slot) (0); Frequency: 848.8 MHz; Duty Cycle: 1:2.08
Medium: HSL_835_Medium parameters used: $f = 848.8$ MHz; $\sigma = 0.919$ S/m; $\epsilon_r = 42.108$;
 $\rho = 1000$ kg/m³
Ambient Temperature : 23.7 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(10.36, 10.36, 10.36); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch251/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.365 W/kg

Ch251/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.184 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.405 W/kg
SAR(1 g) = 0.302 W/kg; SAR(10 g) = 0.226 W/kg
Maximum value of SAR (measured) = 0.366 W/kg



0 dB = 0.366 W/kg

02_GSM1900_GPRS (4 Tx slots)_Right Cheek_0mm_Ch512

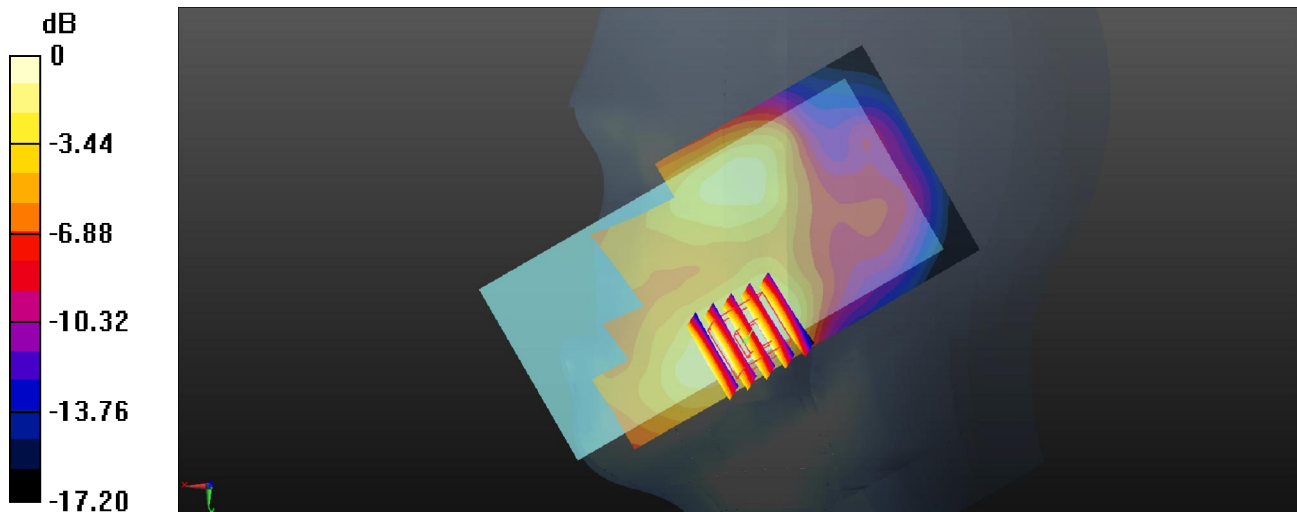
Communication System: UID 0, GPRS (GMSK 4 Tx slot) (0); Frequency: 1850.2 MHz; Duty Cycle: 1:2.08
Medium: HSL_1900_Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.414$ S/m; $\epsilon_r = 39.345$;
 $\rho = 1000$ kg/m³
Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.4 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(8.41, 8.41, 8.41); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch512/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.139 W/kg

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.220 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.159 W/kg
SAR(1 g) = 0.100 W/kg; SAR(10 g) = 0.062 W/kg
Maximum value of SAR (measured) = 0.135 W/kg



0 dB = 0.135 W/kg

03_WCDMA Band V_RMC 12.2Kbps_Left Cheek_0mm_Ch4233

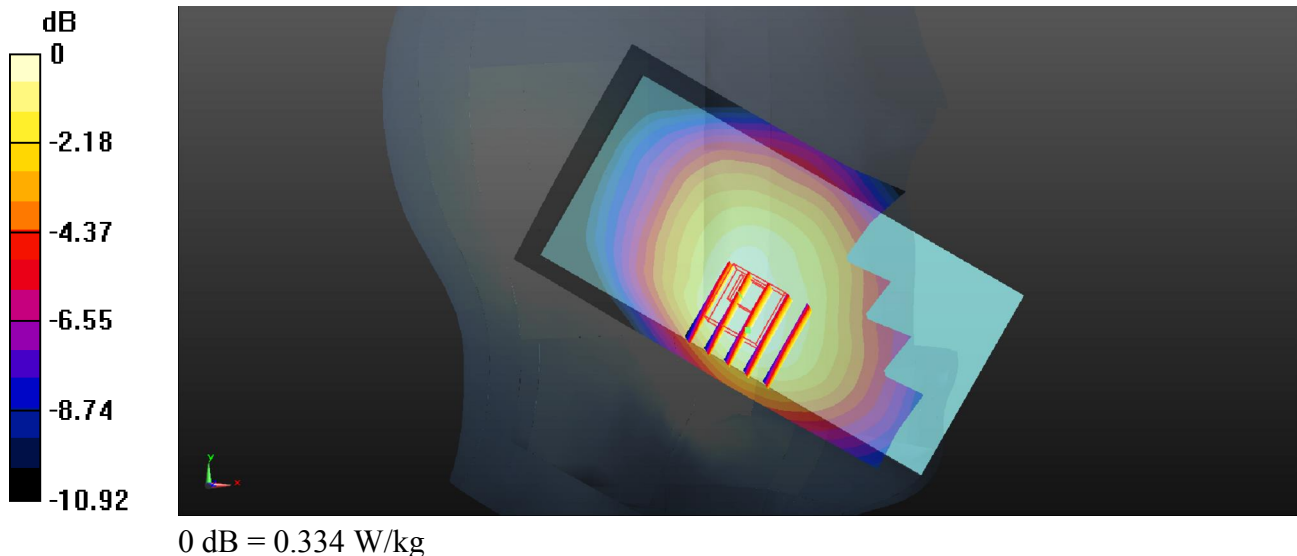
Communication System: UID 0, WCDMA (0); Frequency: 846.6 MHz; Duty Cycle: 1:1
Medium: HSL_835_Medium parameters used: $f = 846.6$ MHz; $\sigma = 0.917$ S/m; $\epsilon_r = 42.132$;
 $\rho = 1000$ kg/m³
Ambient Temperature : 23.7 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(10.36, 10.36, 10.36); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch4233/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.330 W/kg

Ch4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.112 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.367 W/kg
SAR(1 g) = 0.274 W/kg; SAR(10 g) = 0.206 W/kg
Maximum value of SAR (measured) = 0.334 W/kg



04_WCDMA Band II_RMC 12.2Kbps_Right Cheek_0mm_Ch9400

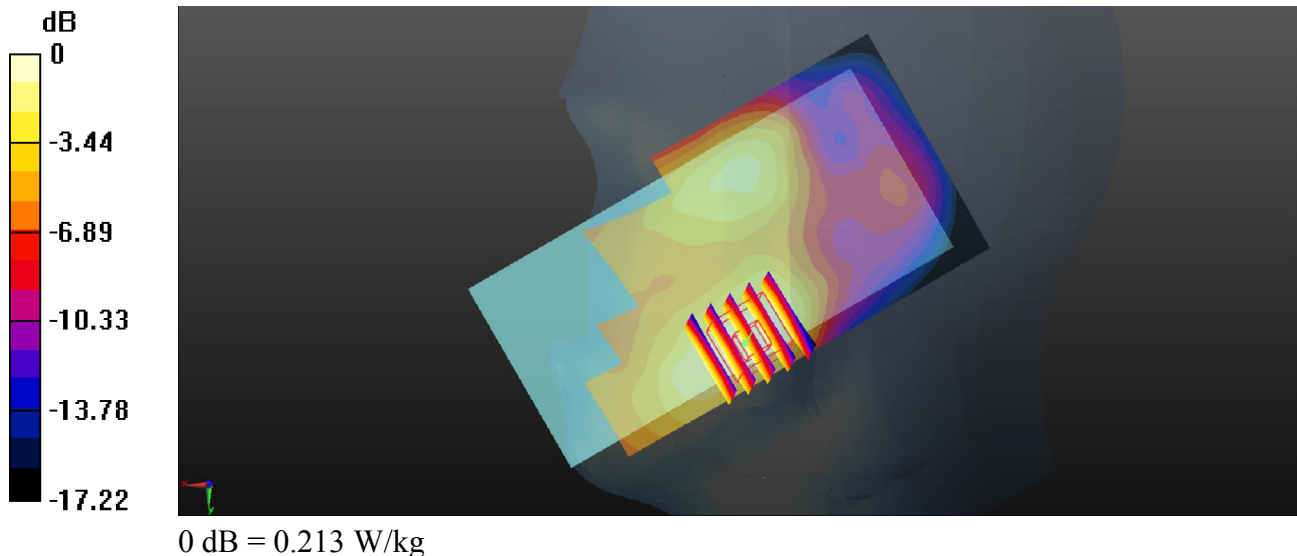
Communication System: UID 0, WCDMA (0); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium: HSL_1900_Medium parameters used: $f = 1880$ MHz; $\sigma = 1.443$ S/m; $\epsilon_r = 39.234$;
 $\rho = 1000$ kg/m³
Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.4 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(8.41, 8.41, 8.41); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch9400/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.216 W/kg

Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.323 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.248 W/kg
SAR(1 g) = 0.155 W/kg; SAR(10 g) = 0.096 W/kg
Maximum value of SAR (measured) = 0.213 W/kg



05_LTE Band 5_10M_QPSK_1RB_0offset_Left Cheek_0mm_Ch20525

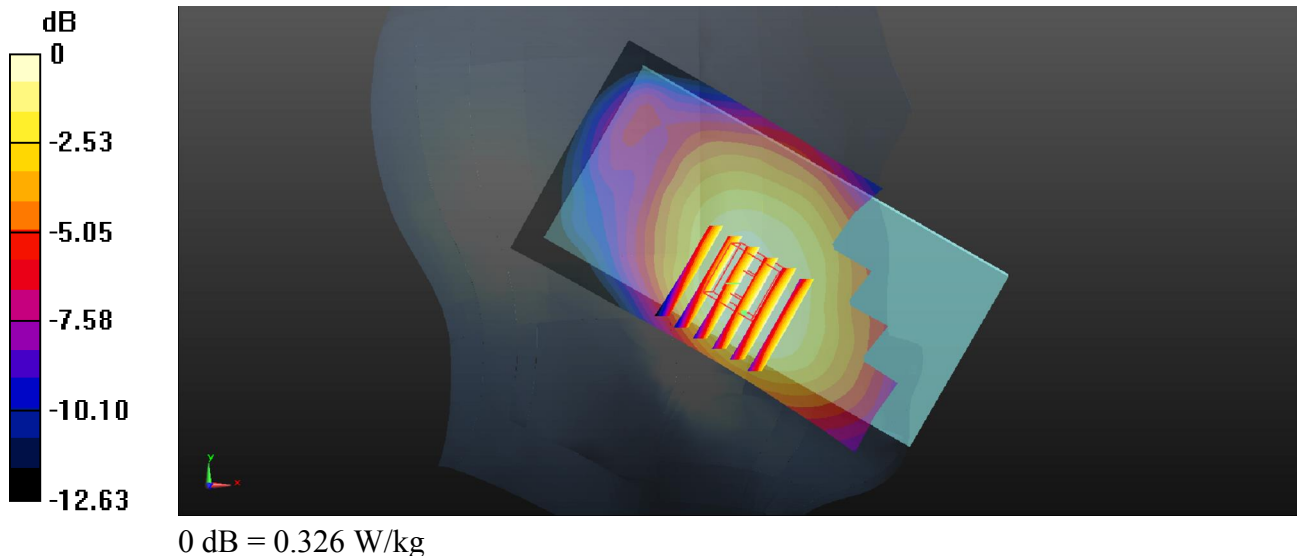
Communication System: UID 0, FDD-LTE (0); Frequency: 836.5 MHz; Duty Cycle: 1:1
Medium: HSL_835_Medium parameters used: $f = 836.5$ MHz; $\sigma = 0.907$ S/m; $\epsilon_r = 42.253$;
 $\rho = 1000$ kg/m³
Ambient Temperature : 23.7 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(10.36, 10.36, 10.36); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch20525/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.332 W/kg

Ch20525/Zoom Scan (6x6x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.198 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.360 W/kg
SAR(1 g) = 0.270 W/kg; SAR(10 g) = 0.208 W/kg
Maximum value of SAR (measured) = 0.326 W/kg



06_LTE Band 7_20M_QPSK_1RB_49offset_Right Tilted_0mm_Ch21350

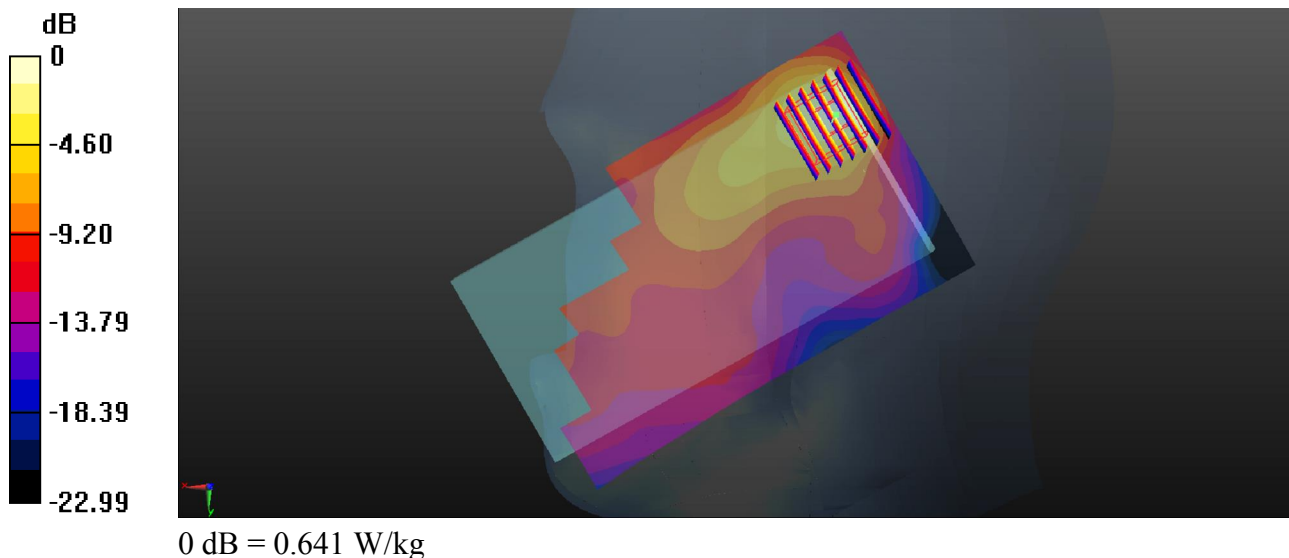
Communication System: UID 0, FDD-LTE (0); Frequency: 2560 MHz; Duty Cycle: 1:1
Medium: HSL_2600_Medium parameters used: $f = 2560$ MHz; $\sigma = 1.993$ S/m; $\epsilon_r = 39.192$;
 $\rho = 1000$ kg/m³
Ambient Temperature : 23.8 °C ; Liquid Temperature : 22.3 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(7.67, 7.67, 7.67); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch21350/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.598 W/kg

Ch21350/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.976 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.804 W/kg
SAR(1 g) = 0.362 W/kg; SAR(10 g) = 0.157 W/kg
Maximum value of SAR (measured) = 0.641 W/kg



07_LTE Band 38_20M_QPSK_1RB_49offset_Left Cheek_0mm_Ch37850

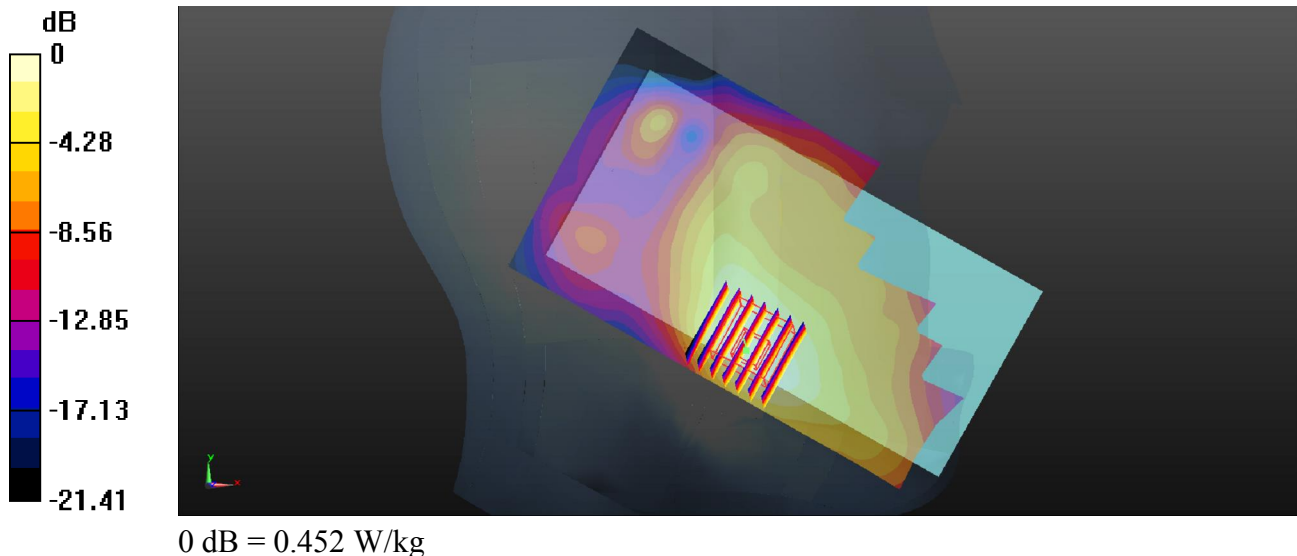
Communication System: UID 0, TDD-LTE (0); Frequency: 2580 MHz; Duty Cycle: 1:1.59
Medium: HSL_2600_Medium parameters used: $f = 2580$ MHz; $\sigma = 2.015$ S/m; $\epsilon_r = 39.118$;
 $\rho = 1000$ kg/m³
Ambient Temperature : 23.8 °C ; Liquid Temperature : 22.3 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(7.67, 7.67, 7.67); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch37850/Area Scan (81x151x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.485 W/kg

Ch37850/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.984 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.552 W/kg
SAR(1 g) = 0.299 W/kg; SAR(10 g) = 0.165 W/kg
Maximum value of SAR (measured) = 0.452 W/kg



08_GSM850_GPRS (4 Tx slots)_Back_5mm_Ch189

Communication System: UID 0, GPRS (GMSK 4 Tx slot) (0); Frequency: 836.4 MHz; Duty Cycle: 1:2.08

Medium: MSL_835_Medium parameters used: $f = 836.4$ MHz; $\sigma = 0.997$ S/m; $\epsilon_r = 55.178$;

$\rho = 1000$ kg/m³

Ambient Temperature : 23.5 °C ; Liquid Temperature : 22.6 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(10.33, 10.33, 10.33); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch189/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.46 W/kg

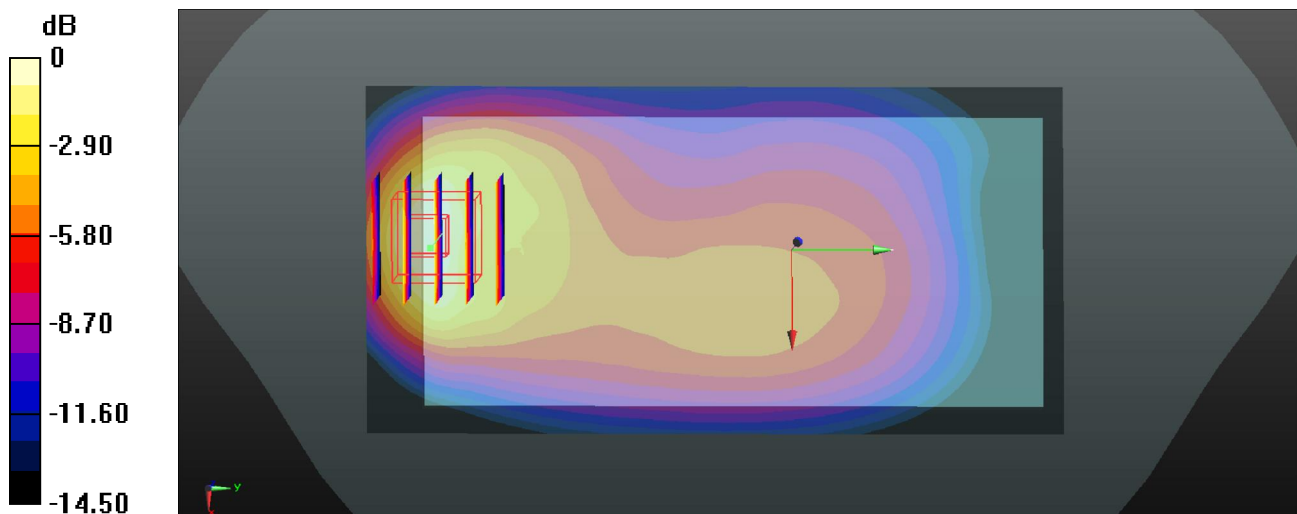
Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 18.60 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 1.81 W/kg

SAR(1 g) = 0.926 W/kg; SAR(10 g) = 0.508 W/kg

Maximum value of SAR (measured) = 1.43 W/kg



0 dB = 1.43 W/kg

09_GSM1900_GPRS (4 Tx slots)_Bottom side_5mm_Ch512

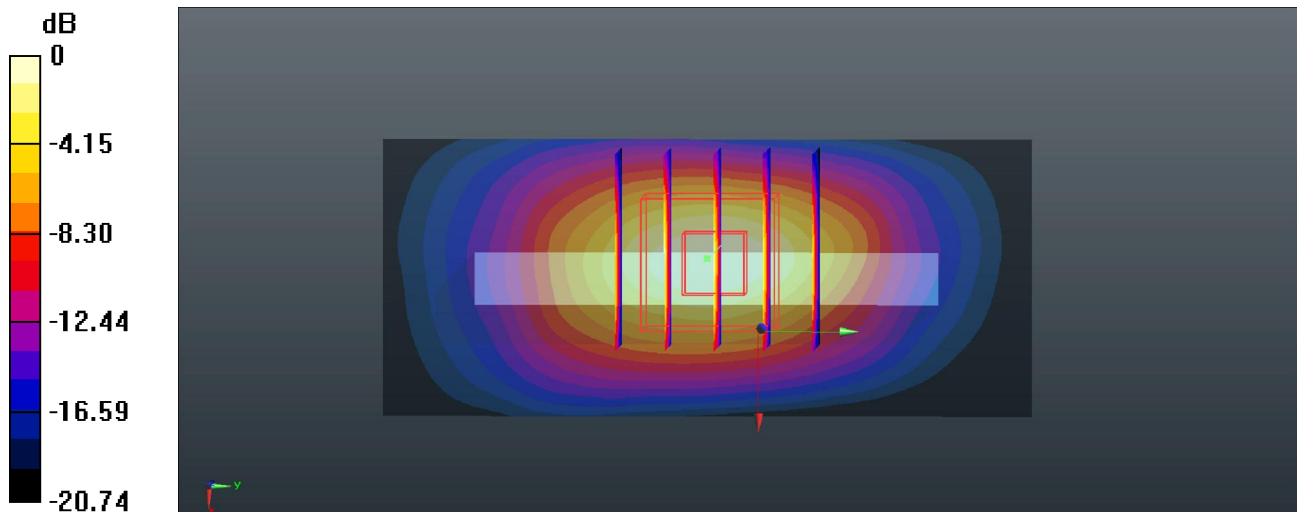
Communication System: UID 0, GPRS (GMSK 4 Tx slot) (0); Frequency: 1850.2 MHz; Duty Cycle: 1:2.08
Medium: MSL_1900_Medium parameters used: $f = 1850.2$ MHz; $\sigma = 1.491$ S/m; $\epsilon_r = 51.605$;
 $\rho = 1000$ kg/m³
Ambient Temperature : 23.6 °C ; Liquid Temperature : 22.4 °C

DASY5 Configuration:

- Probe: EX3DV4 - SN3935; ConvF(8.3, 8.3, 8.3); Calibrated: 2017/12/14;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2017/10/24
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7372)

Ch512/Area Scan (31x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.984 W/kg

Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.89 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 1.16 W/kg
SAR(1 g) = 0.590 W/kg; SAR(10 g) = 0.273 W/kg
Maximum value of SAR (measured) = 0.915 W/kg



0 dB = 0.915 W/kg