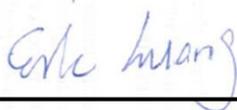


FCC SAR Test Report

APPLICANT : Motorola Mobility, LLC
EQUIPMENT : Mobile Cellular Phone
BRAND NAME : Motorola
MODEL NAME : 6918
FCC ID : IHDT56VA5
STANDARD : FCC 47 CFR Part 2 (2.1093)
ANSI/IEEE C95.1-1992
IEEE 1528-2013

We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.



Reviewed by: Eric Huang / Deputy Manager



Approved by: Jones Tsai / Manager



SPORTON INTERNATIONAL INC.

No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.)



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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, 6918**, are as follows.

Equipment Class	Frequency Band	Highest 1g SAR Summary				Highest Simultaneous Transmission 1g SAR (W/kg)	Highest Simultaneous Transmission 10g SAR (W/kg)
		Head (Separation 0mm)	Body-worn (Separation 10mm)	Hotspot (Separation 10mm)	Product specific (Separation 0mm)		
		1g SAR (W/kg)			10g SAR (W/kg)		
Licensed	GSM850	0.45	0.89	0.75		1.56	3.90
	GSM1900	0.38	0.68	0.68			
	WCDMA II	0.88	0.80	0.80			
	WCDMA IV	0.79	0.97	0.97	2.95		
	WCDMA V	0.33	0.63	0.63			
	CDMA2000 BC0	0.39	0.50	0.56			
	CDMA2000 BC1	1.23	1.10	1.05	3.23		
	CDMA2000 BC10	0.38	0.48	0.57			
	LTE Band 4	0.53	0.95	0.95	2.73		
	LTE Band 7	0.66	1.01	1.01			
	LTE Band 12/17	0.30	0.61	0.61			
	LTE Band 13	0.44	0.88	0.88			
	LTE Band 2/25	0.89	1.10	1.10			
	LTE Band 5/26	0.39	0.60	0.60			
LTE Band 41	0.24	0.86	0.86				
DTS	2.4GHz WLAN	1.12	0.18	0.18		1.56	3.23
NII	5GHz WLAN	0.63	0.37	0.37	0.67	1.52	3.90
DSS	Bluetooth		0.05			1.13	3.53
Date of Testing:		2016/3/20 ~ 2016/4/9					

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg for Partial-Body, 4.0 W/kg for Product specific) 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 INC.
Test Site Location	No.52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan District, Taoyuan City, Taiwan (R.O.C.) TEL: +886-3-327-3456 FAX: +886-3-328-4978

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 Standard

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 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	6918
FCC ID	IHDT56VA5
IMEI Code	354113070022689
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 IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz CDMA2000 BC0: 824.7 MHz ~ 848.31 MHz CDMA 2000 BC1: 1851.25 MHz ~ 1908.75 MHz CDMA 2000 BC10: 817.9 MHz ~ 823.1 MHz LTE Band 2: 1850 MHz ~ 1910 MHz LTE Band 4: 1710 MHz ~ 1755 MHz LTE Band 5: 824 MHz ~ 849 MHz LTE Band 7: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 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
Mode	· GSM/GPRS/EGPRS · RMC/AMR 12.2Kbps · HSDPA · HSUPA · DC-HSDPA · CDMA2000: 1xRTT/1xEv-Do(Rev.0)/1xEv-Do(Rev.A) · LTE: QPSK, 16QAM · 802.11a/b/g/n HT20/HT40 · Bluetooth v3.0+EDR · Bluetooth v4.0-LE
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:	
1. This device 2.4GHz / 5.2GHz / 5.8GHz WLAN supports Hotspot operation and WiFi Direct (Group Client / Group Owner), and 5.3GHz / 5.5GHz WLAN supports WiFi Direct (Group Client). 2. While operating in "Front" and "Back" configuration by end user, the device will limit different maximum output powers on the WCDMA B2 / B4, CDMA BC1 and LTE B2 / B4 / B7 / B25 transmitter and detail descriptions of the power reduction mechanism are included in the operational description. 3. While operating in body-adjacent exposure configuration during a mobile hotspot session, the device will reduced output powers on the WCDMA B2 / B4, CDMA BC1 and LTE B2 / B4 / B7 / B25 transmitter and detail descriptions of the power reduction mechanism are included in the operational description.	



4.2 Re-use of Measured Data

- 1. This application re-uses data collected on a similar device. The subject device of this application (Model 6918, FCC ID IHDT56VA5) is electrically identical to the reference device (Model 8028, FCC ID IHDT56VA2 and Model 7882, FCC ID: IHDT56VA4) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 178919 D01.
2. For details concerning the similarity with respect to component placement, mechanical/electrical design etc., please refer to the Operational Description.
3. The re-used SAR data includes the following bands provided in Appendix E (Sporton SAR Report No. FA620325 for the reference device Model 8028, FCC ID IHDT56VA2): GSM850/1900, LTE B7, 2.4GHz/5GHz WLAN and Bluetooth.
4. The following bands from the reference device report in Appendix E are not applicable to the Model 6918 (FCC ID IHDT56VA5) subject device of this application: WCDMA B2 / B5 and LTE B5.
5. The re-used SAR data includes the following bands provided in Appendix F (Sporton SAR Report No. FA620325-03 for the reference device Model 7882, FCC ID IHDT56VA4): WCDMA B4 and LTE B4 / B12 / B17.
6. The following bands from the reference device report in Appendix F are not applicable to the Model 6918 (FCC ID IHDT56VA5) subject device of this application: WCDMA B2 and LTE B2 / B7.
7. In order to confirm hardware similarity of the subject device with the reference device, spot check measurements were performed on the subject device for the individual cases within each frequency band and test condition (head, body-worn, hotspot and extremity) having maximum reported SAR, for those frequency bands and test conditions where such maximum SAR exceeded half of the FCC allowed value. The spot check test cases and qualifying criteria to confirm equivalence was as follows table.
8. Assertions concerning the similarity of these devices are based on representations by the applicant. The applicant accepts full responsibility for the validity of the similarity claim, and for the determination that verification test data are sufficient to support it.
9. Spot Check Results within one expanded STD uncertainty of reference device.

<Spot Check Exposure Condition>

<Head Exposure Condition>

Table with 6 columns: Band, Mode, Test Position, Gap (mm), Ch., Freq. (MHz). Row 1: WLAN2.4GHz, 802.11b 1Mbps, Right Cheek, 0mm, 1, 2412

<Hotspot Exposure Condition>

Table with 6 columns: Band, Mode, Test Position, Gap (mm), Ch., Freq. (MHz). Row 1: LTE Band 7, QPSK_100RB_0 Offset, Back, 10mm, 20850, 2510

<Product specific Condition>

Table with 6 columns: Band, Mode, Test Position, Gap (mm), Ch., Freq. (MHz). Row 1: WCDMA IV, RMC12.2Kbps, Bottom Side, 0mm, 1413, 1732.6

<Body-Worn Exposure Condition>

Table with 6 columns: Band, Mode, Test Position, Gap (mm), Ch., Freq. (MHz). Row 1: LTE Band 7, QPSK_100RB_0 Offset, Back, 10mm, 20850, 2510



4.3 General LTE SAR Test and Reporting Considerations

Summarized necessary items addressed in KDB 941225 D05 v02r05																																																		
FCC ID	IHDT56VA5																																																	
Equipment Name	Mobile Cellular Phone																																																	
Operating Frequency Range of each LTE transmission band	LTE Band 02: 1850 MHz ~ 1910 MHz LTE Band 04: 1710 MHz ~ 1755 MHz LTE Band 05: 824 MHz ~ 849 MHz LTE Band 07: 2500 MHz ~ 2570 MHz LTE Band 12: 699 MHz ~ 716 MHz LTE Band 13: 777 MHz ~ 787 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 25: 1850 MHz ~ 1915 MHz LTE Band 26: 814 MHz ~ 849 MHz LTE Band 41: 2496 MHz ~ 2690 MHz																																																	
Channel Bandwidth	LTE Band 02: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 04: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 05: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 07: 5MHz, 10MHz, 15MHz, 20MHz LTE Band 12: 1.4MHz, 3MHz, 5MHz, 10MHz LTE Band 13: 5MHz, 10MHz LTE Band 17: 5MHz, 10MHz LTE Band 25: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz LTE Band 26: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz																																																	
uplink modulations used	QPSK, and 16QAM																																																	
LTE Voice / Data requirements	Data only																																																	
LTE MPR permanently built-in by design	<p style="text-align: center;">Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Modulation</th> <th colspan="6">Channel bandwidth / Transmission bandwidth (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> </tbody> </table>												Modulation	Channel bandwidth / Transmission bandwidth (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
Modulation	Channel bandwidth / Transmission bandwidth (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																																											
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.																																																	
Transmission (H, M, L) channel numbers and frequencies in each LTE band																																																		
LTE Band 2																																																		
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz																																							
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)																																						
L	18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860																																						
M	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880	18900	1880																																						
H	19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900																																						
LTE Band 4																																																		
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz																																							
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)																																						
L	19957	1710.7	19965	1711.5	19975	1712.5	20000	1715	20025	1717.5	20050	1720																																						
M	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5	20175	1732.5																																						
H	20393	1754.3	20385	1753.5	20375	1752.5	20350	1750	20325	1747.5	20300	1745																																						
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)	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	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 12												
	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	23017	699.7	23025	700.5	23035	701.5	23060	704				
M	23095	707.5	23095	707.5	23095	707.5	23095	707.5				
H	23173	715.3	23165	714.5	23155	713.5	23130	711				
LTE Band 13												
	Bandwidth 5 MHz				Bandwidth 10 MHz							
	Channel #		Freq.(MHz)		Channel #		Freq.(MHz)					
L	23205		779.5		23230		782					
M	23230		782									
H	23255		784.5									
LTE Band 17												
	Bandwidth 5 MHz				Bandwidth 10 MHz							
	Channel #		Freq.(MHz)		Channel #		Freq. (MHz)					
L	23755		706.5		23780		709					
M	23790		710		23790		710					
H	23825		713.5		23800		711					
LTE Band 25												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	26047	1850.7	26055	1851.5	26065	1852.5	26090	1855	26115	1857.5	26140	1860
M	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880	26340	1880
H	26683	1914.3	26675	1913.5	26665	1912.5	26640	1910	26615	1907.5	26590	1905
LTE Band 26												
	Bandwidth 1.4 MHz		Bandwidth 3 MHz		Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz			
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)		
L	26697	814.7	26705	815.5	26715	816.5	26740	819				
M	26865	831.5	26865	831.5	26865	831.5	26865	831.5	26865	831.5		
H	27033	848.3	27025	847.5	27015	846.5	26990	844	26965	841.5		
LTE Band 41												
	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	39675	2498.5	39700	2501	39725	2503.5	39750	2506				
L	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5				
M												
M	40620	2593	40620	2593	40620	2593	40620	2593				
H	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5				
M												
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680				



5. RF Exposure Limits

5.1 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.

5.2 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

1. 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.

6. Specific Absorption Rate (SAR)

6.1 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.

6.2 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:

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

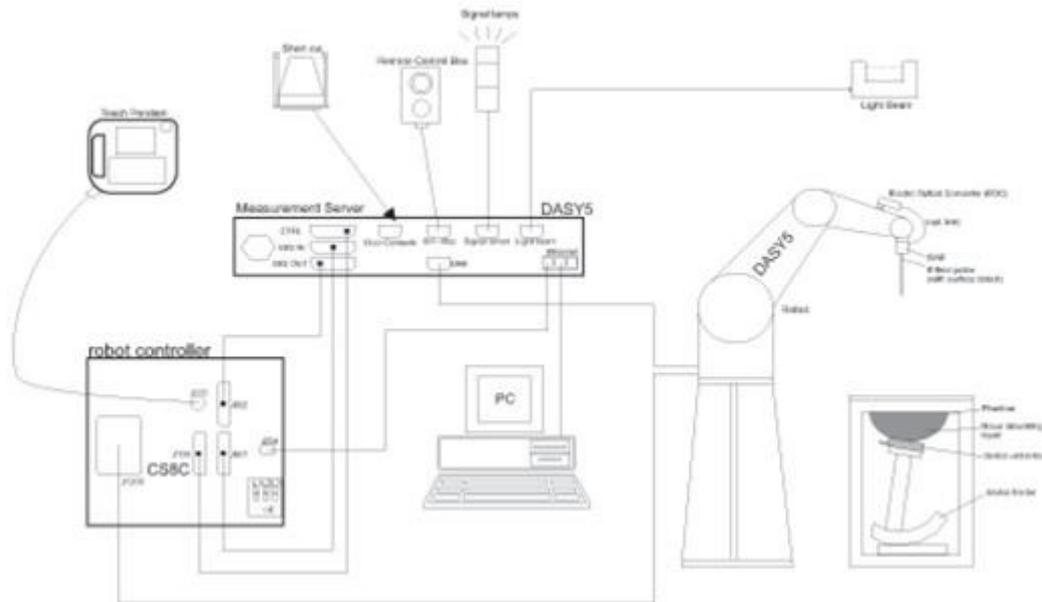
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

7. 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.

7.1 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.

<ES3DV3 Probe>

Construction	Symmetric design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	
Frequency	10 MHz – 4 GHz; Linearity: ± 0.2 dB (30 MHz – 4 GHz)	
Directivity	± 0.2 dB in TSL (rotation around probe axis) ± 0.3 dB in TSL (rotation normal to probe axis)	
Dynamic Range	5 μ W/g – >100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 337 mm (tip: 20 mm) Tip diameter: 3.9 mm (body: 12 mm) Distance from probe tip to dipole centers: 3.0 mm	

<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 μ W/g – >100 mW/g Linearity: ± 0.2 dB (noise: typically <1 μ W/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	

7.2 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

7.3 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.

7.4 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



8. 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

8.1 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

8.2 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.

8.3 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: $\Delta x_{Area}, \Delta y_{Area}$	≤ 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.	

8.4 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.				

8.5 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.

8.6 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.



9. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1012	May. 28, 2015	May. 27, 2016
SPEAG	835MHz System Validation Kit	D835V2	4d092	Jun. 23, 2015	Jun. 22, 2016
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Oct. 22, 2015	Oct. 21, 2016
SPEAG	2600MHz System Validation Kit	D2600V2	1008	Aug. 19, 2015	Aug. 18, 2016
SPEAG	Data Acquisition Electronics	DAE3	495	May. 22, 2015	May. 21, 2016
SPEAG	Data Acquisition Electronics	DAE4	778	Feb. 18, 2016	Feb. 17, 2017
SPEAG	Data Acquisition Electronics	DAE3	577	Sep. 24, 2015	Sep. 23, 2016
SPEAG	Data Acquisition Electronics	DAE4	1399	Nov. 23, 2015	Nov. 22, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3925	May. 27, 2015	May. 26, 2016
SPEAG	Dosimetric E-Field Probe	ES3DV3	3270	Sep. 28, 2015	Sep. 27, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3931	Oct. 01, 2015	Sep. 30, 2016
SPEAG	Dosimetric E-Field Probe	EX3DV4	3955	Nov. 24, 2015	Nov. 23, 2016
WonDer	Thermometer	WD-5015	TM642	Oct. 16, 2015	Oct. 15, 2016
WonDer	Thermometer	WD-5015	TM281	Oct. 16, 2015	Oct. 15, 2016
Wisewind	Thermometer	HTC-1	TM560	Oct. 16, 2015	Oct. 15, 2016
Wisewind	Thermometer	HTC-1	TM225	Oct. 16, 2015	Oct. 15, 2016
Anritsu	Radio Communication Analyzer	MT8820C	6201341950	Dec. 18, 2015	Dec. 17, 2016
Agilent	Wireless Communication Test Set	E5515C	MY50266977	May. 14, 2015	May. 13, 2016
SPEAG	Device Holder	N/A	N/A	N/A	N/A
R&S	Signal Generator	MG3710A	6201502524	Dec. 18, 2015	Dec. 17, 2016
Agilent	ENA Network Analyzer	E5071C	MY46316648	Jan. 12, 2016	Jan. 11, 2017
SPEAG	Dielectric Probe Kit	DAK-3.5	1126	Jul. 21, 2015	Jul. 20, 2016
LINE SEIKI	Digital Thermometer	LKMelectronic	DTM3000SPEZIAL/90900	Aug. 26, 2015	Aug. 25, 2016
Anritsu	Power Meter	ML2495A	1419002	May. 13, 2015	May. 12, 2016
Anritsu	Power Sensor	MA2411B	1339124	May. 13, 2015	May. 12, 2016
Agilent	Spectrum Analyzer	E4408B	MY44211028	Aug. 24, 2015	Aug. 23, 2016
ATM	Dual Directional Coupler	C122H-10	P610410z-02	Note 1	
Woken	Attenuator 1	WK0602-XX	N/A	Note 1	
PE	Attenuator 2	PE7005-10	N/A	Note 1	
PE	Attenuator 3	PE7005- 3	N/A	Note 1	
AR	Power Amplifier	5S1G4M2	0328767	Note 1	
Mini-Circuits	Power Amplifier	ZVE-3W	162601250	Note 1	

General Note:

1. 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 source.



10. System Verification

10.1 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								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
900	40.3	57.9	0.2	1.4	0.2	0	0.97	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
2600	54.8	0	0	0.1	0	45.1	1.96	39.0
For Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
900	50.8	48.2	0	0.9	0.1	0	1.05	55.0
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7
2600	68.1	0	0	0.1	0	31.8	2.16	52.5

Simulating Liquid for 5GHz, Manufactured by SPEAG

Ingredients	(% by weight)
Water	64~78%
Mineral oil	11~18%
Emulsifiers	9~15%
Additives and Salt	2~3%

<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
750	HSL	22.5	0.901	42.700	0.89	41.90	1.24	1.91	±5	2016/3/22
750	MSL	22.5	0.975	56.684	0.96	55.50	1.56	2.13	±5	2016/3/20
750	MSL	22.4	0.958	55.700	0.96	55.50	-0.21	0.36	±5	2016/3/25
835	HSL	22.5	0.876	41.000	0.90	41.50	-2.67	-1.20	±5	2016/3/23
835	HSL	22.5	0.876	41.000	0.90	41.50	-2.67	-1.20	±5	2016/3/23
835	MSL	22.1	0.979	57.723	0.97	55.20	0.93	4.57	±5	2016/3/20
835	MSL	22.1	0.979	57.723	0.97	55.20	0.93	4.57	±5	2016/3/20
835	MSL	22.3	1.000	55.500	0.97	55.20	3.09	0.54	±5	2016/3/24
835	MSL	22.5	0.987	57.091	0.97	55.20	1.75	3.43	±5	2016/4/8
1900	HSL	22.3	1.390	39.000	1.40	40.00	-0.71	-2.50	±5	2016/3/24
1900	MSL	22.5	1.540	51.900	1.52	53.30	1.32	-2.63	±5	2016/3/29
1900	MSL	22.5	1.524	54.950	1.52	53.30	0.26	3.10	±5	2016/4/9
2600	HSL	22.4	1.980	37.700	1.96	39.00	1.02	-3.33	±5	2016/3/25
2600	MSL	22.2	2.200	52.500	2.16	52.50	1.85	0.00	±5	2016/3/26



<Tissue Dielectric Parameter Check for Low / Middle / High Frequencies>

General Note:

The tissue measure results for low / middle / high frequencies list below, the results were used in the Dasy SAR system to perform interpolation to determine the dielectric parameters on the SAR test device. The SAR test plots may slightly difference between the tables below due to the digit rounding in the software calculated.

CH	Frequency (MHz)	Liquid Type	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
4132	826.4	Body	0.97	57.81	0.969	55.230	0.03	4.72	±5	2016/3/20
4182	836.4	Body	0.98	57.71	0.972	55.196	1.02	4.55	±5	2016/3/20
4233	846.6	Body	0.99	57.62	0.984	55.164	0.94	4.38	±5	2016/3/20
23230	782	Body	1.01	56.36	0.96	55.68	4.94	1.19	±5	2016/3/20
26765	821.5	Body	0.97	57.85	0.97	55.25	-0.43	4.80	±5	2016/3/20
26865	831.5	Body	0.98	57.76	0.97	55.21	0.53	4.63	±5	2016/3/20
26965	841.5	Body	0.98	57.66	0.98	55.18	0.45	4.46	±5	2016/3/20
1013	824.7	Body	0.97	57.82	0.97	55.24	-0.10	4.75	±5	2016/3/20
384	836.52	Body	0.98	57.71	0.97	55.2	1.03	4.55	±5	2016/3/20
777	848.31	Body	0.99	57.60	0.99	55.16	0.10	4.35	±5	2016/3/20
476	817.9	Body	0.96	57.88	0.97	55.26	-0.72	4.67	±5	2016/3/20
580	820.5	Body	0.97	57.86	0.97	55.25	-0.52	4.63	±5	2016/3/20
676	822.9	Body	0.97	57.84	0.97	55.24	-0.31	4.78	±5	2016/3/20
23230	782	Head	0.93	42.25	0.89	42.15	4.78	0.36	±5	2016/3/22
4132	826.4	Head	0.87	41.13	0.90	41.54	-3.54	-0.90	±5	2016/3/23
4182	836.4	Head	0.88	41.00	0.90	41.50	-2.55	-1.21	±5	2016/3/23
4233	846.6	Head	0.89	40.86	0.91	41.50	-2.57	-1.54	±5	2016/3/23
476	817.9	Head	0.86	41.23	0.90	41.58	-4.33	-0.88	±5	2016/3/23
580	820.5	Head	0.86	41.21	0.90	41.57	-4.08	-0.95	±5	2016/3/23
684	823.1	Head	0.87	41.17	0.90	41.56	-3.85	-1.03	±5	2016/3/23
1013	824.7	Head	0.87	41.15	0.90	41.55	-3.70	-0.84	±5	2016/3/23
384	836.52	Head	0.88	40.99	0.90	41.50	-2.53	-1.22	±5	2016/3/23
777	848.31	Head	0.89	40.84	0.91	41.50	-2.41	-1.59	±5	2016/3/23
26765	821.5	Head	0.86	41.19	0.90	41.56	-4.00	-0.98	±5	2016/3/23
26865	831.5	Head	0.87	41.06	0.90	41.52	-3.02	-1.07	±5	2016/3/23
26965	841.5	Head	0.88	40.93	0.91	41.50	-3.07	-1.38	±5	2016/3/23
26140	1860	Head	1.35	39.18	1.40	40.00	-3.42	-2.05	±5	2016/3/24
26340	1880	Head	1.37	39.10	1.40	40.00	-2.13	-2.24	±5	2016/3/24
26590	1905	Head	1.40	39.00	1.40	40.00	-0.35	-2.51	±5	2016/3/24
25	1851.25	Head	1.35	39.21	1.40	40.00	-3.90	-1.97	±5	2016/3/24
600	1880	Head	1.37	39.10	1.40	40.00	-2.13	-2.24	±5	2016/3/24
1175	1908.75	Head	1.40	38.98	1.40	40.00	-0.12	-2.54	±5	2016/3/24
9262	1852.4	Head	1.35	39.21	1.40	40.00	-3.83	-1.99	±5	2016/3/24
9400	1880	Head	1.37	39.10	1.40	40.00	-2.13	-2.24	±5	2016/3/24
9538	1907.6	Head	1.40	38.99	1.40	40.00	-0.19	-2.53	±5	2016/3/24

Table of Low/Middle/High Channel for Liquid Validation



CH	Frequency (MHz)	Liquid Type	Conductivity (σ)	Permittivity (ϵ_r)	Conductivity Target (σ)	Permittivity Target (ϵ_r)	Delta (σ) (%)	Delta (ϵ_r) (%)	Limit (%)	Date
26765	821.5	Body	0.99	55.64	0.97	55.25	1.92	0.80	±5	2016/3/24
26865	831.5	Body	1.00	55.54	0.97	55.21	2.73	0.62	±5	2016/3/24
26965	841.5	Body	1.01	55.47	0.98	55.18	2.59	0.48	±5	2016/3/24
4132	826.4	Body	0.99	55.59	0.97	55.23	2.32	0.71	±5	2016/3/24
4182	836.4	Body	1.00	55.51	0.97	55.20	3.22	0.56	±5	2016/3/24
4233	846.6	Body	1.01	55.44	0.98	55.16	3.13	0.43	±5	2016/3/24
1013	824.7	Body	0.99	55.62	0.97	55.24	2.16	0.75	±5	2016/3/24
384	836.52	Body	1.00	55.51	0.97	55.20	3.23	0.56	±5	2016/3/24
777	848.31	Body	1.01	55.42	0.99	55.16	2.27	0.40	±5	2016/3/24
476	817.9	Body	0.98	55.66	0.97	55.26	1.54	0.65	±5	2016/3/24
580	820.5	Body	0.99	55.65	0.97	55.25	1.83	0.62	±5	2016/3/24
676	822.9	Body	0.99	55.63	0.97	55.24	2.04	0.78	±5	2016/3/24
39750	2506	Head	1.87	38.06	1.857	39.123	0.43	-2.65	±5	2016/3/25
40185	2549.5	Head	1.92	37.89	1.904	39.065	1.03	-3.08	±5	2016/3/25
40620	2593	Head	1.97	37.72	1.952	39.009	1.15	-3.28	±5	2016/3/25
41055	2636.5	Head	2.02	37.55	2.000	38.954	1.14	-3.71	±5	2016/3/25
41490	2680	Head	2.07	37.38	2.05	38.90	1.19	-3.92	±5	2016/3/25
23230	782	Body	0.99	55.35	0.96	55.68	2.98	-0.63	±5	2016/3/25
39750	2506	Body	2.07	52.82	2.03	52.63	1.93	0.42	±5	2016/3/26
40185	2549.5	Body	2.13	52.66	2.09	52.57	1.93	0.11	±5	2016/3/26
40620	2593	Body	2.19	52.49	2.15	52.52	2.04	-0.03	±5	2016/3/26
41055	2636.5	Body	2.25	52.31	2.21	52.46	2.01	-0.37	±5	2016/3/26
41490	2680	Body	2.31	52.12	2.28	52.41	1.53	-0.54	±5	2016/3/26
25	1851.25	Body	1.50	52.03	1.52	53.3	-1.58	-2.39	±5	2016/3/29
600	1880	Body	1.52	51.93	1.52	53.3	0.28	-2.56	±5	2016/3/29
1175	1908.75	Body	1.55	51.83	1.52	53.3	2.18	-2.75	±5	2016/3/29
1013	824.7	Body	0.98	57.19	0.97	55.24	1.13	3.61	±5	2016/4/8
384	836.52	Body	0.99	57.07	0.97	55.20	1.96	3.39	±5	2016/4/8
777	848.31	Body	1.01	56.98	0.99	55.16	2.12	3.23	±5	2016/4/8
476	817.9	Body	0.96	57.38	0.97	55.26	-0.72	3.76	±5	2016/4/8
580	820.5	Body	0.97	57.21	0.97	55.25	0.41	3.46	±5	2016/4/8
676	822.9	Body	0.98	57.06	0.97	55.24	1.34	3.37	±5	2016/4/8
9262	1852.4	Body	1.47	55.07	1.52	53.3	-3.41	3.32	±5	2016/4/9
9400	1880	Body	1.50	55.01	1.52	53.3	-1.40	3.21	±5	2016/4/9
9538	1907.6	Body	1.53	54.92	1.52	53.3	0.89	3.04	±5	2016/4/9
26140	1860	Body	1.48	55.06	1.52	53.3	-2.89	3.30	±5	2016/4/9
26340	1880	Body	1.50	55.01	1.52	53.3	-1.38	3.21	±5	2016/4/9
26590	1905	Body	1.53	54.93	1.52	53.3	0.66	3.06	±5	2016/4/9
25	1851.25	Body	1.47	55.07	1.52	53.3	-3.49	3.32	±5	2016/4/9
600	1880	Body	1.50	55.01	1.52	53.3	-1.38	3.21	±5	2016/4/9
1175	1908.75	Body	1.54	54.92	1.52	53.3	0.99	3.04	±5	2016/4/9

Table of Low/Middle/High Channel for Liquid Validation

10.2 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.

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 (%)
2016/3/22	750	HSL	250	D750V3-1012	ES3DV3 - SN3270	DAE4 Sn778	2.08	8.22	8.32	1.22
2016/3/20	750	MSL	250	D750V3-1012	EX3DV4 - SN3955	DAE4 Sn1399	2.24	8.61	8.96	4.07
2016/3/25	750	MSL	250	D750V3-1012	ES3DV3 - SN3270	DAE4 Sn778	2.33	8.61	9.32	8.25
2016/3/23	835	HSL	250	D835V2-4d092	EX3DV4 - SN3925	DAE3 Sn495	2.40	9.26	9.60	3.67
2016/3/23	835	HSL	250	D835V2-4d092	ES3DV3 - SN3270	DAE4 Sn778	2.21	9.26	8.84	-4.54
2016/3/20	835	MSL	250	D835V2-4d092	EX3DV4 - SN3955	DAE4 Sn1399	2.51	9.40	10.04	6.81
2016/3/20	835	MSL	250	D835V2-4d092	ES3DV3 - SN3270	DAE4 Sn778	2.33	9.40	9.32	-0.85
2016/3/24	835	MSL	250	D835V2-4d092	ES3DV3 - SN3270	DAE4 Sn778	2.44	9.40	9.76	3.83
2016/4/8	835	MSL	250	D835V2-4d092	EX3DV4 - SN3955	DAE4 Sn1399	2.53	9.40	10.12	7.66
2016/3/24	1900	HSL	250	D1900V2-5d041	ES3DV3 - SN3270	DAE4 Sn778	9.51	39.80	38.04	-4.42
2016/3/29	1900	MSL	250	D1900V2-5d041	ES3DV3 - SN3270	DAE4 Sn778	9.21	40.00	36.84	-7.90
2016/4/9	1900	MSL	250	D1900V2-5d041	EX3DV4 - SN3931	DAE3 Sn577	10.20	40.00	40.80	2.00
2016/3/25	2600	HSL	250	D2600V2-1008	ES3DV3 - SN3270	DAE4 Sn778	13.60	56.30	54.40	-3.37
2016/3/26	2600	MSL	250	D2600V2-1008	ES3DV3 - SN3270	DAE4 Sn778	14.30	55.80	57.20	2.51

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 (%)
2016/3/29	1900	MSL	250	D1900V2-5d041	ES3DV3 - SN3270	DAE4 Sn778	4.95	21.20	19.8	-6.60

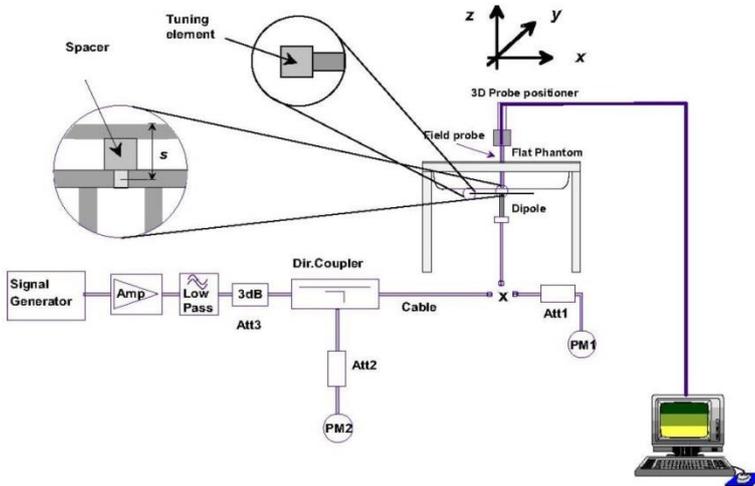


Fig 8.3.1 System Performance Check Setup



Fig 8.3.2 Setup Photo

11. RF Exposure Positions

11.1 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.

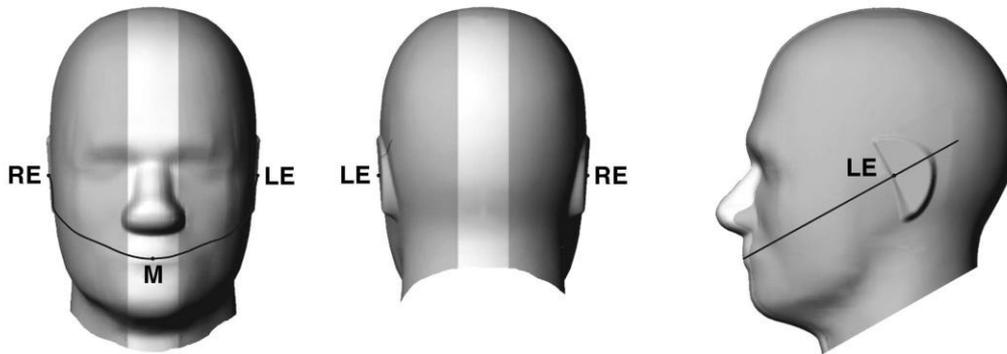


Fig 9.1.1 Front, back, and side views of SAM twin phantom

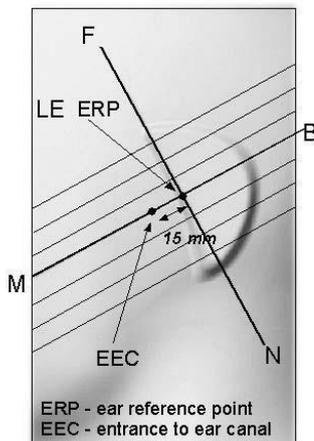


Fig 9.1.2 Close-up side view of phantom showing the ear region.

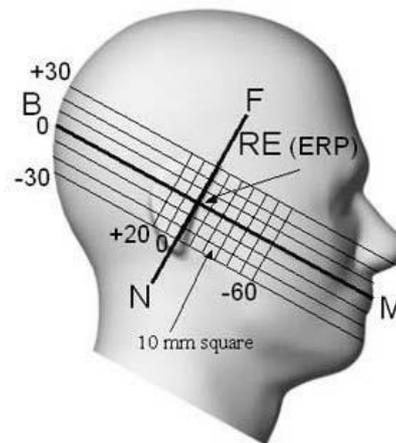


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

11.2 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.

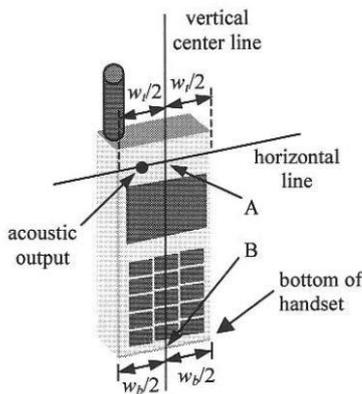


Fig 9.2.1 Handset vertical and horizontal reference lines—“fixed case”

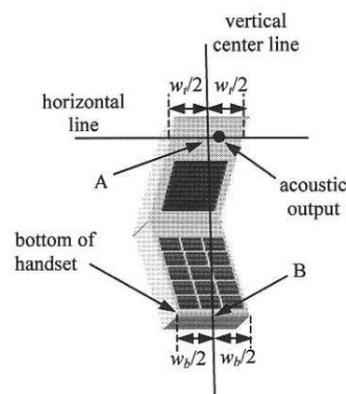


Fig 9.2.2 Handset vertical and horizontal reference lines—“clam-shell case”

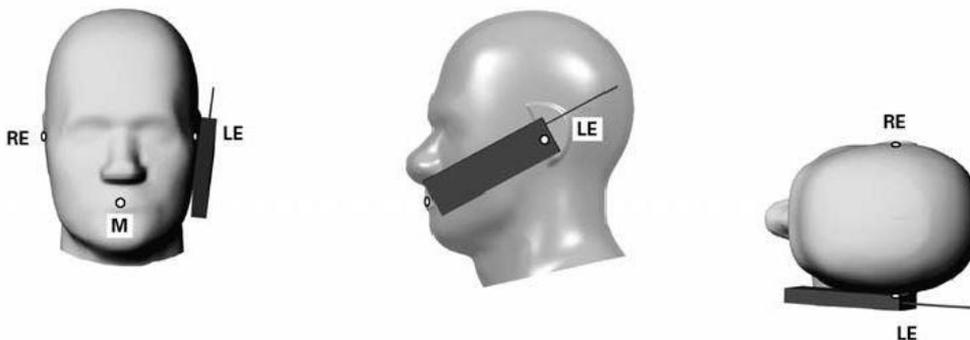


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

11.3 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

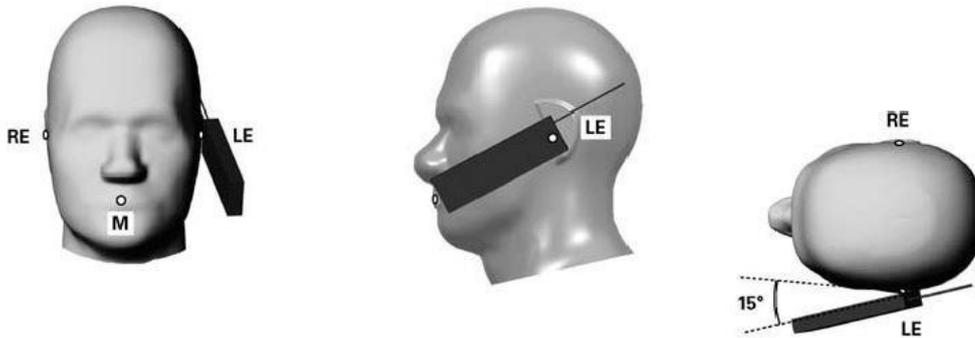


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

11.4 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 test 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.

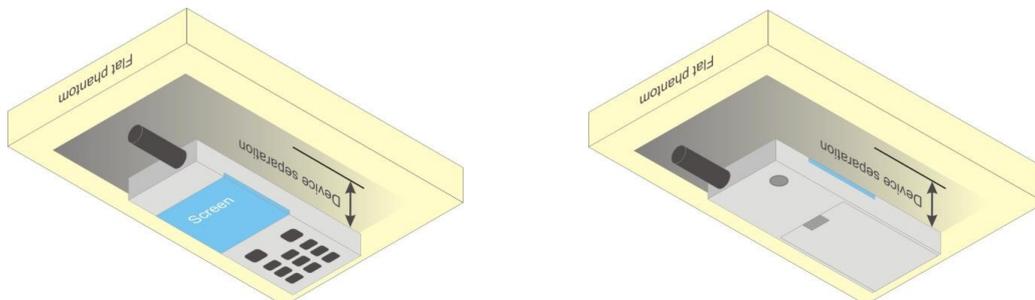


Fig 9.4 Body Worn Position

11.5 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 x 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.

11.6 Product specific Exposure Configurations

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

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, unless it is confirmed otherwise through KDB inquiries, the following phablet procedures should be applied to evaluate SAR compliance for each applicable wireless mode and frequency band. Devices marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. The normally required head and body-worn accessory SAR test procedures for handsets, including hotspot mode, must be applied. The UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna located at \leq 25 mm from that surface or edge, in direct contact with a flat phantom, for 10-g Product specific 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 Product specific 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. The normal tablet procedures in KDB 616217 are required when the over diagonal dimension of the device is > 20.0 cm. Hotspot mode SAR is not required when normal tablet procedures are applied. Product specific 10-g SAR is also not required for the front (top) surface of large form factor full size tablets. The more conservative tablet SAR results can be used to support the 10-g Product specific SAR for phablet mode. The simultaneous transmission operating configurations applicable to voice and data transmissions for both phone and mini-tablet modes must be taken into consideration separately for 1-g and 10-g SAR to determine the simultaneous transmission SAR test exclusion and measurement requirements for the relevant wireless mode and exposure conditions

12. Conducted RF Output Power (Unit: dBm)

<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.

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_c/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 DPCCH, DPDCCH 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-TFCl
 - viii. Confirm that E-TFCl is equal to the target E-TFCl of 75 for sub-test 1, and other subtest's E-TFCl
- 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 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCl
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	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	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 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

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

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: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: 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 6: β_{ed} can not be set directly, it is set by Absolute Grant Value.

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.		

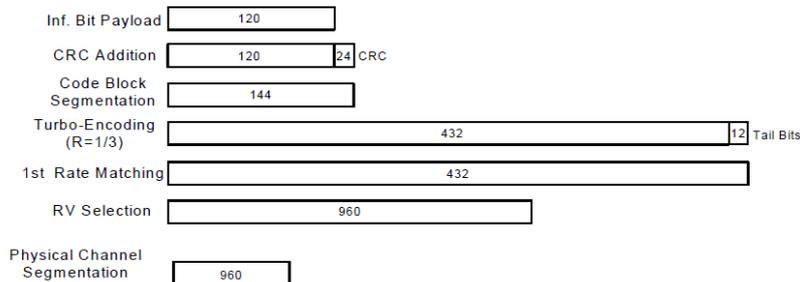


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration



<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. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA 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 to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.

<WCDMA B5 for Head / Hotspot / Body-worn condition>

Band		WCDMA 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	22.95	23.10	22.94	24.00
3GPP Rel 99	RMC 12.2Kbps	22.98	23.12	22.98	24.00
3GPP Rel 6	HSDPA Subtest-1	21.94	22.05	22.02	23.00
3GPP Rel 6	HSDPA Subtest-2	21.69	21.78	21.70	23.00
3GPP Rel 6	HSDPA Subtest-3	21.15	21.25	21.22	22.50
3GPP Rel 6	HSDPA Subtest-4	21.12	21.28	21.23	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	21.90	22.02	22.00	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.65	21.75	21.69	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	21.12	21.25	21.21	22.50
3GPP Rel 8	DC-HSDPA Subtest-4	21.10	21.25	21.22	22.50
3GPP Rel 6	HSUPA Subtest-1	21.40	21.56	21.42	23.00
3GPP Rel 6	HSUPA Subtest-2	19.35	19.48	19.35	21.00
3GPP Rel 6	HSUPA Subtest-3	20.42	20.50	20.46	22.00
3GPP Rel 6	HSUPA Subtest-4	19.35	19.49	19.38	21.00
3GPP Rel 6	HSUPA Subtest-5	21.80	21.99	21.96	23.00

<WCDMA B2 for Head condition>

Band		WCDMA 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	23.40	23.00	22.98	24.00
3GPP Rel 99	RMC 12.2Kbps	23.46	23.05	23.03	24.00
3GPP Rel 6	HSDPA Subtest-1	22.43	22.03	22.04	23.00
3GPP Rel 6	HSDPA Subtest-2	22.18	21.88	21.87	23.00
3GPP Rel 6	HSDPA Subtest-3	21.82	21.53	21.37	22.50
3GPP Rel 6	HSDPA Subtest-4	21.91	22.45	21.39	22.50
3GPP Rel 8	DC-HSDPA Subtest-1	22.41	22.00	22.02	23.00
3GPP Rel 8	DC-HSDPA Subtest-2	21.15	21.87	21.86	23.00
3GPP Rel 8	DC-HSDPA Subtest-3	21.81	21.52	21.33	22.50
3GPP Rel 8	DC-HSDPA Subtest-4	21.88	21.42	21.34	22.50
3GPP Rel 6	HSUPA Subtest-1	21.74	21.50	21.50	23.00
3GPP Rel 6	HSUPA Subtest-2	19.81	19.70	19.60	21.00
3GPP Rel 6	HSUPA Subtest-3	20.85	20.70	20.72	22.00
3GPP Rel 6	HSUPA Subtest-4	19.95	19.72	19.62	21.00
3GPP Rel 6	HSUPA Subtest-5	22.32	22.06	21.93	23.00



<WCDMA B2 for Hotspot / Body-worn condition>

Band		WCDMA 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	20.22	19.95	19.72	21.00
3GPP Rel 99	RMC 12.2Kbps	20.25	20.00	19.77	21.00
3GPP Rel 6	HSDPA Subtest-1	19.22	18.98	18.78	20.00
3GPP Rel 6	HSDPA Subtest-2	18.97	18.83	18.61	20.00
3GPP Rel 6	HSDPA Subtest-3	18.61	18.48	18.11	19.50
3GPP Rel 6	HSDPA Subtest-4	18.70	19.40	18.13	19.50
3GPP Rel 8	DC-HSDPA Subtest-1	19.20	18.95	18.76	20.00
3GPP Rel 8	DC-HSDPA Subtest-2	18.94	18.82	18.60	20.00
3GPP Rel 8	DC-HSDPA Subtest-3	18.60	18.47	18.07	19.50
3GPP Rel 8	DC-HSDPA Subtest-4	18.67	18.37	18.08	19.50
3GPP Rel 6	HSUPA Subtest-1	18.53	18.45	18.24	20.00
3GPP Rel 6	HSUPA Subtest-2	16.60	16.65	16.34	18.00
3GPP Rel 6	HSUPA Subtest-3	17.64	17.65	17.46	19.00
3GPP Rel 6	HSUPA Subtest-4	16.74	16.67	16.36	18.00
3GPP Rel 6	HSUPA Subtest-5	19.11	19.01	18.67	20.00



<CDMA2000 Conducted Power>

General Note:

1. Per KDB 941225 D01v03r01, SAR for head exposure is measured in RC3 with the handset configured to transmit at full rate in SO55.
2. Per KDB 941225 D01v03r01, in Hotspot mode EUT is treated as data device and SAR is tested with Ev-Do Rev 0 (RTAP 153.6kbps) as the primary mode.
3. Per KDB 941225 D01v03r01, for Body-worn accessory SAR is measured in RC3 with the handset configured in TDSO/SO32 to transmit at full rate on FCH only with all other code channels disabled. The body-worn accessory procedures in KDB Publication 447498 are applied. The 3G SAR test reduction procedure is applied to the multiple code channel configuration (FCH+SCH), with FCH only as the primary mode.

<CDMA BC0 / BC10 for Head / Hotspot / Body-worn condition>

Band	CDMA2000 BC0			Tune-up Limit (dBm)	CDMA2000 BC10			Tune-up Limit (dBm)
	TX Channel	1013	384		777	476	580	
Frequency (MHz)	824.7	836.52	848.31		817.9	820.5	822.9	
RC1 SO55	24.39	24.40	24.38	25.00	24.40	24.37	24.15	25.00
RC3 SO55	24.43	24.44	24.41	25.00	24.42	24.39	24.19	25.00
RC3 SO32(F+SCH)	24.28	24.37	24.29	25.00	24.41	24.40	24.19	25.00
RC3 SO32(+SCH)	24.39	24.32	24.41	25.00	24.39	24.44	24.21	25.00
RTAP 153.6Kbps	24.26	24.27	24.25	25.00	24.07	24.28	23.98	25.00
RETAP 4096Bits	24.23	24.35	24.26	25.00	24.13	24.29	23.92	25.00

<CDMA BC1 for Head condition>

Band	CDMA2000 BC1			Tune-up Limit (dBm)
	TX Channel	25	600	
Frequency (MHz)	1851.25	1880	1908.75	
RC1 SO55	24.35	24.21	24.20	25.00
RC3 SO55	24.39	24.22	24.22	25.00
RC3 SO32(F+SCH)	24.41	24.21	24.26	25.00
RC3 SO32(+SCH)	24.54	24.25	24.29	25.00
RTAP 153.6Kbps	24.09	23.92	23.85	25.00
RETAP 4096Bits	23.14	23.86	23.88	25.00

<CDMA BC1 for Hotspot / Body-worn condition>

Band	CDMA2000 BC1			Tune-up Limit (dBm)
	TX Channel	25	600	
Frequency (MHz)	1851.25	1880	1908.75	
RC1 SO55	20.42	20.26	20.22	21.50
RC3 SO55	20.46	20.30	20.15	21.50
RC3 SO32(F+SCH)	20.49	20.29	20.21	21.50
RC3 SO32(+SCH)	20.45	20.35	20.22	21.50
RTAP 153.6Kbps	20.56	20.24	20.21	21.50
RETAP 4096Bits	20.53	20.53	20.53	21.50

**<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 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 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 / B26 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. LTE band 2 / 5 SAR test was covered by Band 25 / 26 according to April 2015 TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. the maximum output power, including tolerance, for the smaller band is \leq the larger band to qualify for the SAR test exclusion
 - b. the channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band



<LTE Band 2 for Head Condition>

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				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	22.74	22.65	22.56	24	0
20	QPSK	1	49	22.76	22.77	22.80		
20	QPSK	1	99	22.58	22.51	22.40		
20	QPSK	50	0	21.97	21.88	21.85	23	1
20	QPSK	50	24	21.87	21.83	21.84		
20	QPSK	50	50	21.78	21.79	21.71		
20	QPSK	100	0	21.90	21.77	21.69		
20	16QAM	1	0	21.61	21.52	21.48	23	1
20	16QAM	1	49	21.51	21.50	21.52		
20	16QAM	1	99	21.30	21.21	21.41		
20	16QAM	50	0	21.02	20.83	20.87	22	2
20	16QAM	50	24	20.88	20.72	20.86		
20	16QAM	50	50	20.79	20.78	20.75		
20	16QAM	100	0	20.84	20.73	20.71		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	23.00	22.77	22.59	24	0
15	QPSK	1	37	22.99	22.96	22.89		
15	QPSK	1	74	22.76	22.44	22.65		
15	QPSK	36	0	22.01	21.94	21.87	23	1
15	QPSK	36	20	21.94	21.81	21.76		
15	QPSK	36	39	21.92	21.91	21.82		
15	QPSK	75	0	21.95	21.81	21.73	23	1
15	16QAM	1	0	21.84	21.71	21.59		
15	16QAM	1	37	21.66	21.51	21.41		
15	16QAM	1	74	21.55	21.55	21.53		
15	16QAM	36	0	20.96	20.96	20.80	22	2
15	16QAM	36	20	20.93	20.78	20.73		
15	16QAM	36	39	20.81	20.81	20.63		
15	16QAM	75	0	20.88	20.88	20.75		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	22.98	22.79	22.73	24	0
10	QPSK	1	25	23.27	23.01	23.17		
10	QPSK	1	49	22.68	22.59	22.46		
10	QPSK	25	0	22.04	21.87	21.80	23	1
10	QPSK	25	12	22.06	21.89	21.86		
10	QPSK	25	25	21.90	21.81	21.82		
10	QPSK	50	0	22.06	21.83	21.79	23	1
10	16QAM	1	0	21.80	21.70	21.66		
10	16QAM	1	25	21.80	21.57	21.50		
10	16QAM	1	49	21.68	21.55	21.52		
10	16QAM	25	0	21.19	20.90	20.97	22	2
10	16QAM	25	12	21.16	20.81	20.93		
10	16QAM	25	25	20.88	20.87	20.86		
10	16QAM	50	0	21.10	20.82	20.61		



Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	22.93	22.45	22.63	24	0
5	QPSK	1	12	23.27	23.06	23.12		
5	QPSK	1	24	22.73	22.50	22.50		
5	QPSK	12	0	22.00	21.85	21.79	23	1
5	QPSK	12	7	22.01	21.83	21.75		
5	QPSK	12	13	21.98	21.87	21.87		
5	QPSK	25	0	22.01	21.88	21.85		
5	16QAM	1	0	21.74	21.56	21.56	23	1
5	16QAM	1	12	21.64	21.46	21.55		
5	16QAM	1	24	21.70	21.61	21.60		
5	16QAM	12	0	20.92	20.64	20.79	22	2
5	16QAM	12	7	20.78	20.85	20.90		
5	16QAM	12	13	20.78	20.64	20.82		
5	16QAM	25	0	21.03	21.06	20.98		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	22.58	22.63	22.61	24	0
3	QPSK	1	8	22.95	22.94	23.01		
3	QPSK	1	14	22.10	22.52	22.60		
3	QPSK	8	0	21.70	21.79	21.79	23	1
3	QPSK	8	4	21.84	21.74	21.83		
3	QPSK	8	7	21.90	21.79	21.77		
3	QPSK	15	0	21.81	21.81	21.77		
3	16QAM	1	0	21.65	21.64	21.77	23	1
3	16QAM	1	8	21.27	21.42	21.55		
3	16QAM	1	14	21.67	21.58	21.62		
3	16QAM	8	0	20.95	20.82	20.84	22	2
3	16QAM	8	4	20.87	20.82	20.86		
3	16QAM	8	7	20.95	20.92	20.88		
3	16QAM	15	0	20.87	20.79	20.78		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	22.71	22.70	22.76	24	0
1.4	QPSK	1	3	22.88	22.48	22.74		
1.4	QPSK	1	5	22.88	22.71	22.73		
1.4	QPSK	3	0	22.88	22.84	22.82		
1.4	QPSK	3	1	22.88	22.95	22.86		
1.4	QPSK	3	3	22.88	22.76	22.82		
1.4	QPSK	6	0	22.88	21.79	21.80	23	1
1.4	16QAM	1	0	22.88	21.62	21.59	23	1
1.4	16QAM	1	3	22.88	21.58	21.54		
1.4	16QAM	1	5	22.88	21.63	21.61		
1.4	16QAM	3	0	21.92	21.79	21.71		
1.4	16QAM	3	1	21.95	21.77	21.94		
1.4	16QAM	3	3	22.01	21.78	21.86		
1.4	16QAM	6	0	20.74	20.75	20.61		



<LTE Band 2 for Hotspot / Body-worn Condition>

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				18700	18900	19100		
Frequency (MHz)				1860	1880	1900		
20	QPSK	1	0	19.86	19.52	19.34	21	0
20	QPSK	1	49	20.19	20.01	19.47		
20	QPSK	1	99	19.80	19.69	19.45		
20	QPSK	50	0	20.21	19.91	19.71	21	0
20	QPSK	50	24	20.15	19.78	19.67		
20	QPSK	50	50	20.14	19.78	19.61		
20	QPSK	100	0	20.20	19.82	19.58		
20	16QAM	1	0	19.86	19.63	19.49	21	0
20	16QAM	1	49	19.89	19.65	19.52		
20	16QAM	1	99	19.84	19.48	19.44		
20	16QAM	50	0	20.23	19.85	19.66	21	0
20	16QAM	50	24	20.20	19.78	19.61		
20	16QAM	50	50	20.16	19.82	19.66		
20	16QAM	100	0	20.11	19.83	19.64		
Channel				18675	18900	19125	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5		
15	QPSK	1	0	19.91	19.46	19.28	21	0
15	QPSK	1	37	20.27	19.98	19.47		
15	QPSK	1	74	19.83	19.63	19.43		
15	QPSK	36	0	20.18	19.83	19.68	21	0
15	QPSK	36	20	20.19	19.83	19.70		
15	QPSK	36	39	20.20	19.76	19.63		
15	QPSK	75	0	20.21	19.92	19.52		
15	16QAM	1	0	19.94	19.66	19.44	21	0
15	16QAM	1	37	19.92	19.68	19.46		
15	16QAM	1	74	19.93	19.41	19.36		
15	16QAM	36	0	20.29	19.91	19.69	21	0
15	16QAM	36	20	20.17	19.75	19.61		
15	16QAM	36	39	20.20	19.92	19.66		
15	16QAM	75	0	20.16	19.91	19.57		
Channel				18650	18900	19150	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1905		
10	QPSK	1	0	19.82	19.45	19.32	21	0
10	QPSK	1	25	20.34	19.97	19.48		
10	QPSK	1	49	19.82	19.54	19.43		
10	QPSK	25	0	20.11	19.85	19.68	21	0
10	QPSK	25	12	20.16	19.76	19.65		
10	QPSK	25	25	20.12	19.74	19.56		
10	QPSK	50	0	20.19	19.95	19.62		
10	16QAM	1	0	19.94	19.70	19.37	21	0
10	16QAM	1	25	19.93	19.59	19.39		
10	16QAM	1	49	19.83	19.45	19.45		
10	16QAM	25	0	20.32	19.81	19.73	21	0
10	16QAM	25	12	20.14	19.67	19.51		
10	16QAM	25	25	20.11	19.93	19.58		
10	16QAM	50	0	20.09	19.97	19.58		



Channel				18625	18900	19175	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5		
5	QPSK	1	0	19.82	19.54	19.25	21	0
5	QPSK	1	12	20.40	20.00	19.58		
5	QPSK	1	24	19.90	19.64	19.42		
5	QPSK	12	0	20.16	19.89	19.77	21	0
5	QPSK	12	7	20.23	19.67	19.74		
5	QPSK	12	13	20.04	19.74	19.61		
5	QPSK	25	0	20.28	19.95	19.65		
5	16QAM	1	0	19.90	19.71	19.41	21	0
5	16QAM	1	12	19.95	19.64	19.45		
5	16QAM	1	24	19.80	19.46	19.37		
5	16QAM	12	0	20.27	19.81	19.68	21	0
5	16QAM	12	7	20.08	19.58	19.61		
5	16QAM	12	13	20.04	19.94	19.60		
5	16QAM	25	0	20.03	19.96	19.59		
Channel				18615	18900	19185	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5		
3	QPSK	1	0	19.83	19.64	19.28	21	0
3	QPSK	1	8	20.38	19.98	19.54		
3	QPSK	1	14	19.83	19.72	19.38		
3	QPSK	8	0	20.26	19.89	19.74	21	0
3	QPSK	8	4	20.24	19.68	19.81		
3	QPSK	8	7	20.04	19.74	19.65		
3	QPSK	15	0	20.34	19.93	19.69		
3	16QAM	1	0	19.85	19.68	19.43	21	0
3	16QAM	1	8	19.88	19.63	19.51		
3	16QAM	1	14	19.83	19.41	19.43		
3	16QAM	8	0	20.25	19.86	19.64	21	0
3	16QAM	8	4	20.04	19.68	19.55		
3	16QAM	8	7	20.05	19.88	19.68		
3	16QAM	15	0	20.00	19.94	19.62		
Channel				18607	18900	19193	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3		
1.4	QPSK	1	0	19.82	19.69	19.38	21	0
1.4	QPSK	1	3	20.34	19.97	19.49		
1.4	QPSK	1	5	19.82	19.72	19.44		
1.4	QPSK	3	0	20.19	19.98	19.81		
1.4	QPSK	3	1	20.28	19.71	19.79		
1.4	QPSK	3	3	20.10	19.81	19.63		
1.4	QPSK	6	0	20.25	19.85	19.76	21	0
1.4	16QAM	1	0	19.87	19.72	19.37	21	0
1.4	16QAM	1	3	19.84	19.57	19.56		
1.4	16QAM	1	5	19.86	19.49	19.44		
1.4	16QAM	3	0	20.17	19.80	19.65		
1.4	16QAM	3	1	20.05	19.77	19.51		
1.4	16QAM	3	3	19.97	19.86	19.63		
1.4	16QAM	6	0	19.90	19.98	19.53	21	0



<LTE Band 5 for Head / Hotspot / Body-worn Condition>

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	22.55	22.69	22.88	24	0
10	QPSK	1	25	22.89	23.16	23.07		
10	QPSK	1	49	22.53	22.63	22.54		
10	QPSK	25	0	21.80	22.06	22.03	23	1
10	QPSK	25	12	21.88	22.03	21.94		
10	QPSK	25	25	21.89	22.04	21.92		
10	QPSK	50	0	21.93	22.04	21.92		
10	16QAM	1	0	21.52	21.68	21.77	23	1
10	16QAM	1	25	21.69	21.75	21.68		
10	16QAM	1	49	21.65	21.71	21.43		
10	16QAM	25	0	20.68	21.21	21.12	22	2
10	16QAM	25	12	20.88	21.10	20.99		
10	16QAM	25	25	20.80	21.02	20.98		
10	16QAM	50	0	20.91	20.98	20.79		
Channel				20425	20525	20625		
Frequency (MHz)				826.5	836.5	846.5		
5	QPSK	1	0	22.46	22.79	22.44	24	0
5	QPSK	1	12	23.01	23.25	23.10		
5	QPSK	1	24	22.46	22.70	22.36		
5	QPSK	12	0	21.83	21.98	21.87	23	1
5	QPSK	12	7	21.87	22.15	21.96		
5	QPSK	12	13	21.97	22.02	21.87		
5	QPSK	25	0	21.80	22.02	21.88		
5	16QAM	1	0	21.53	21.71	21.53	23	1
5	16QAM	1	12	21.72	22.02	21.47		
5	16QAM	1	24	21.62	21.67	21.50		
5	16QAM	12	0	20.72	20.98	20.95	22	2
5	16QAM	12	7	20.92	21.15	20.86		
5	16QAM	12	13	20.97	21.01	20.97		
5	16QAM	25	0	20.97	21.11	20.97		
Channel				20415	20525	20635		
Frequency (MHz)				825.5	836.5	847.5		
3	QPSK	1	0	22.52	22.93	22.79	24	0
3	QPSK	1	8	22.76	22.92	22.81		
3	QPSK	1	14	22.69	22.64	22.38		
3	QPSK	8	0	21.96	22.01	21.89	23	1
3	QPSK	8	4	21.84	22.05	21.90		
3	QPSK	8	7	21.80	22.03	21.93		
3	QPSK	15	0	21.89	22.10	21.88		
3	16QAM	1	0	21.66	21.86	21.69	23	1
3	16QAM	1	8	21.56	21.66	21.57		
3	16QAM	1	14	21.64	21.83	21.64		
3	16QAM	8	0	20.83	21.07	20.84	22	2
3	16QAM	8	4	20.93	21.22	20.74		
3	16QAM	8	7	20.83	20.99	21.00		
3	16QAM	15	0	20.88	21.08	20.74		



Channel				20407	20525	20643	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				824.7	836.5	848.3		
1.4	QPSK	1	0	22.70	22.95	22.78	24	0
1.4	QPSK	1	3	22.83	23.06	22.86		
1.4	QPSK	1	5	22.74	22.89	22.69		
1.4	QPSK	3	0	22.78	23.09	22.91		
1.4	QPSK	3	1	22.91	23.03	23.01		
1.4	QPSK	3	3	22.72	23.11	22.75		
1.4	QPSK	6	0	21.81	21.97	21.82	23	1
1.4	16QAM	1	0	21.66	21.83	21.71	23	1
1.4	16QAM	1	3	21.57	21.73	21.61		
1.4	16QAM	1	5	21.59	21.79	21.62		
1.4	16QAM	3	0	21.80	21.95	22.07		
1.4	16QAM	3	1	21.88	22.06	21.79		
1.4	16QAM	3	3	21.88	22.11	21.89		
1.4	16QAM	6	0	20.72	20.90	20.67	22	2



<LTE Band 13 for Head / Hotspot / Body-worn Condition>

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				23230				
Frequency (MHz)				782				
10	QPSK	1	0	22.58			24	0
10	QPSK	1	25	23.09				
10	QPSK	1	49	22.95				
10	QPSK	25	0	21.75			23	1
10	QPSK	25	12	21.94				
10	QPSK	25	25	21.94				
10	QPSK	50	0	21.89				
10	16QAM	1	0	21.44			23	1
10	16QAM	1	25	21.64				
10	16QAM	1	49	21.70				
10	16QAM	25	0	20.90			22	2
10	16QAM	25	12	20.85				
10	16QAM	25	25	20.78				
10	16QAM	50	0	20.81				
Channel				23205	23230	23255	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				779.5	782	784.5		
5	QPSK	1	0	22.60	22.57	22.92	24	0
5	QPSK	1	12	22.91	23.00	23.37		
5	QPSK	1	24	22.58	22.58	23.18		
5	QPSK	12	0	21.73	21.87	21.88	23	1
5	QPSK	12	7	21.90	21.91	22.09		
5	QPSK	12	13	21.84	21.96	22.04		
5	QPSK	25	0	21.69	21.94	22.06		
5	16QAM	1	0	21.48	21.51	21.66	23	1
5	16QAM	1	12	21.51	21.61	21.75		
5	16QAM	1	24	21.58	21.59	21.72		
5	16QAM	12	0	20.58	20.89	20.81	22	2
5	16QAM	12	7	20.72	20.98	20.97		
5	16QAM	12	13	20.73	20.80	20.90		
5	16QAM	12	7	20.72	20.98	20.97		
5	16QAM	25	0	20.86	20.81	20.96		



<LTE Band 25 for Head Condition>

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				26140	26340	26590		
Frequency (MHz)				1860	1880	1905		
20	QPSK	1	0	22.98	22.82	22.69	24	0
20	QPSK	1	49	23.17	23.13	23.15		
20	QPSK	1	99	22.68	22.57	22.43		
20	QPSK	50	0	22.07	21.95	21.90	23	1
20	QPSK	50	24	22.04	21.86	21.83		
20	QPSK	50	50	21.93	21.92	21.84		
20	QPSK	100	0	22.03	21.91	21.83		
20	16QAM	1	0	21.86	21.69	21.60	23	1
20	16QAM	1	49	21.78	21.66	21.60		
20	16QAM	1	99	21.52	21.49	21.59		
20	16QAM	50	0	21.06	21.05	20.88	22	2
20	16QAM	50	24	21.06	20.88	20.85		
20	16QAM	50	50	20.92	20.94	20.74		
20	16QAM	100	0	21.05	20.81	20.71		
Channel				26115	26340	26615	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1907.5		
15	QPSK	1	0	23.13	23.00	22.85	24	0
15	QPSK	1	37	23.30	23.09	23.01		
15	QPSK	1	74	23.01	22.79	22.58		
15	QPSK	36	0	22.18	22.00	21.87	23	1
15	QPSK	36	20	22.05	21.91	21.86		
15	QPSK	36	39	22.08	21.90	21.94		
15	QPSK	75	0	22.03	21.96	21.91		
15	16QAM	1	0	21.99	21.65	21.69	23	1
15	16QAM	1	37	21.81	21.60	21.24		
15	16QAM	1	74	21.70	21.52	21.69		
15	16QAM	36	0	21.17	20.97	20.85	22	2
15	16QAM	36	20	21.04	20.92	20.83		
15	16QAM	36	39	21.03	20.91	20.89		
15	16QAM	75	0	21.11	20.96	20.84		
Channel				26090	26340	26640	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1910		
10	QPSK	1	0	23.13	22.92	22.67	24	0
10	QPSK	1	25	23.44	23.05	23.01		
10	QPSK	1	49	22.95	22.94	22.59		
10	QPSK	25	0	22.16	21.96	21.91	23	1
10	QPSK	25	12	22.20	21.98	21.95		
10	QPSK	25	25	22.04	21.97	21.94		
10	QPSK	50	0	22.10	21.95	21.92		
10	16QAM	1	0	21.93	21.72	21.63	23	1
10	16QAM	1	25	21.85	21.62	21.59		
10	16QAM	1	49	21.78	21.62	21.72		
10	16QAM	25	0	21.46	20.99	21.03	22	2
10	16QAM	25	12	21.29	20.91	20.93		
10	16QAM	25	25	21.02	21.19	21.24		
10	16QAM	50	0	21.21	20.87	20.93		



Channel				26065	26340	26665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1912.5		
5	QPSK	1	0	22.81	22.75	22.55	24	0
5	QPSK	1	12	23.17	23.15	22.93		
5	QPSK	1	24	22.69	22.58	22.49		
5	QPSK	12	0	22.13	21.93	22.00	23	1
5	QPSK	12	7	22.18	22.03	21.92		
5	QPSK	12	13	22.17	21.93	21.91		
5	QPSK	25	0	22.11	21.96	21.90	23	1
5	16QAM	1	0	21.87	21.61	21.58		
5	16QAM	1	12	21.80	21.61	21.62		
5	16QAM	1	24	21.78	21.59	21.48	22	2
5	16QAM	12	0	21.15	20.96	20.71		
5	16QAM	12	7	21.03	21.05	20.93		
5	16QAM	12	13	21.20	21.10	20.73	22	2
5	16QAM	25	0	21.31	21.08	20.94		
5	16QAM	25	0	21.31	21.08	20.94		
Channel				26055	26340	26675	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1913.5		
3	QPSK	1	0	23.13	22.65	22.89	24	0
3	QPSK	1	8	23.03	22.81	22.59		
3	QPSK	1	14	22.95	22.72	22.55		
3	QPSK	8	0	22.14	21.90	22.00	23	1
3	QPSK	8	4	22.14	21.98	21.94		
3	QPSK	8	7	22.15	21.93	21.93		
3	QPSK	15	0	22.12	21.88	21.97	23	1
3	16QAM	1	0	21.92	21.71	22.01		
3	16QAM	1	8	22.04	21.63	21.40		
3	16QAM	1	14	21.82	21.75	21.69	22	2
3	16QAM	8	0	21.38	21.08	21.00		
3	16QAM	8	4	21.26	21.03	20.82		
3	16QAM	8	7	21.27	21.02	20.72	22	2
3	16QAM	15	0	21.17	20.92	20.73		
3	16QAM	15	0	21.17	20.92	20.73		
Channel				26047	26340	26683	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1914.3		
1.4	QPSK	1	0	22.81	22.80	22.62	24	0
1.4	QPSK	1	3	22.99	22.80	22.84		
1.4	QPSK	1	5	22.84	22.73	22.58		
1.4	QPSK	3	0	23.08	22.93	22.82		
1.4	QPSK	3	1	23.18	22.91	22.80		
1.4	QPSK	3	3	23.02	22.85	22.93		
1.4	QPSK	6	0	22.02	21.78	21.80	23	1
1.4	16QAM	1	0	21.83	21.63	21.62	23	1
1.4	16QAM	1	3	21.79	21.58	21.55		
1.4	16QAM	1	5	21.84	21.65	21.87		
1.4	16QAM	3	0	21.96	21.76	21.89		
1.4	16QAM	3	1	22.01	21.99	21.82		
1.4	16QAM	3	3	21.95	22.05	22.07		
1.4	16QAM	6	0	20.82	20.76	20.61	22	2



<LTE Band 25 for Hotspot / Body-worn Condition>

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				26140	26340	26590		
Frequency (MHz)				1860	1880	1905		
20	QPSK	1	0	20.38	20.20	20.27	21.5	0
20	QPSK	1	49	20.86	20.76	20.39		
20	QPSK	1	99	20.26	20.16	19.97		
20	QPSK	50	0	20.53	20.37	20.40	21.5	0
20	QPSK	50	24	20.46	20.34	20.28		
20	QPSK	50	50	20.39	20.29	20.33		
20	QPSK	100	0	20.46	20.31	20.26		
20	16QAM	1	0	20.31	20.09	20.10	21.5	0
20	16QAM	1	49	20.28	20.09	20.02		
20	16QAM	1	99	19.98	19.94	19.99		
20	16QAM	50	0	20.55	20.42	20.39	21.5	0
20	16QAM	50	24	20.58	20.30	20.25		
20	16QAM	50	50	20.45	20.36	20.32		
20	16QAM	100	0	20.56	20.35	20.19		
Channel				26115	26340	26615	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1857.5	1880	1907.5		
15	QPSK	1	0	20.70	20.43	20.44	21.5	0
15	QPSK	1	37	20.80	20.66	20.67		
15	QPSK	1	74	20.54	20.32	20.31		
15	QPSK	36	0	20.62	20.49	20.33	21.5	0
15	QPSK	36	20	20.47	20.34	20.36		
15	QPSK	36	39	20.58	20.36	20.35		
15	QPSK	75	0	20.51	20.38	20.37		
15	16QAM	1	0	20.42	20.27	20.09	21.5	0
15	16QAM	1	37	20.32	19.93	20.12		
15	16QAM	1	74	20.17	19.98	19.95		
15	16QAM	36	0	20.63	20.45	20.30	21.5	0
15	16QAM	36	20	20.54	20.34	20.34		
15	16QAM	36	39	20.53	20.41	20.48		
15	16QAM	75	0	20.65	20.48	20.37		
Channel				26090	26340	26640	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1855	1880	1910		
10	QPSK	1	0	20.74	20.50	20.48	21.5	0
10	QPSK	1	25	20.75	20.57	20.69		
10	QPSK	1	49	20.53	20.31	20.38		
10	QPSK	25	0	20.54	20.59	20.24	21.5	0
10	QPSK	25	12	20.48	20.43	20.34		
10	QPSK	25	25	20.65	20.37	20.44		
10	QPSK	50	0	20.49	20.37	20.36		
10	16QAM	1	0	20.46	20.26	20.11	21.5	0
10	16QAM	1	25	20.42	20.03	20.19		
10	16QAM	1	49	20.07	19.95	20.05		
10	16QAM	25	0	20.71	20.55	20.25	21.5	0
10	16QAM	25	12	20.46	20.25	20.26		
10	16QAM	25	25	20.53	20.36	20.44		
10	16QAM	50	0	20.71	20.55	20.27		



Channel				26065	26340	26665	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1852.5	1880	1912.5		
5	QPSK	1	0	20.82	20.40	20.48	21.5	0
5	QPSK	1	12	20.84	20.52	20.68		
5	QPSK	1	24	20.44	20.36	20.44		
5	QPSK	12	0	20.52	20.65	20.18	21.5	0
5	QPSK	12	7	20.42	20.35	20.36		
5	QPSK	12	13	20.56	20.31	20.51		
5	QPSK	25	0	20.48	20.40	20.37		
5	16QAM	1	0	20.48	20.34	20.11	21.5	0
5	16QAM	1	12	20.45	20.05	20.11		
5	16QAM	1	24	20.13	20.03	20.05		
5	16QAM	12	0	20.71	20.53	20.27	21.5	0
5	16QAM	12	7	20.49	20.29	20.31		
5	16QAM	12	13	20.52	20.32	20.37		
5	16QAM	25	0	20.74	20.46	20.22		
Channel				26055	26340	26675	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1851.5	1880	1913.5		
3	QPSK	1	0	20.88	20.36	20.46	21.5	0
3	QPSK	1	8	20.85	20.57	20.75		
3	QPSK	1	14	20.51	20.45	20.52		
3	QPSK	8	0	20.44	20.64	20.22	21.5	0
3	QPSK	8	4	20.36	20.34	20.31		
3	QPSK	8	7	20.65	20.21	20.56		
3	QPSK	15	0	20.53	20.48	20.35		
3	16QAM	1	0	20.54	20.38	20.10	21.5	0
3	16QAM	1	8	20.43	20.06	20.10		
3	16QAM	1	14	20.21	19.97	20.10		
3	16QAM	8	0	20.68	20.45	20.32	21.5	0
3	16QAM	8	4	20.39	20.20	20.32		
3	16QAM	8	7	20.46	20.26	20.36		
3	16QAM	15	0	20.67	20.51	20.21		
Channel				26047	26340	26683	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1850.7	1880	1914.3		
1.4	QPSK	1	0	20.80	20.44	20.44	21.5	0
1.4	QPSK	1	3	20.78	20.65	20.84		
1.4	QPSK	1	5	20.54	20.54	20.58		
1.4	QPSK	3	0	20.46	20.57	20.32		
1.4	QPSK	3	1	20.33	20.26	20.41		
1.4	QPSK	3	3	20.61	20.26	20.64		
1.4	QPSK	6	0	20.49	20.38	20.36	21.5	0
1.4	16QAM	1	0	20.56	20.45	20.02	21.5	0
1.4	16QAM	1	3	20.49	20.04	20.12		
1.4	16QAM	1	5	20.13	19.89	20.03		
1.4	16QAM	3	0	20.67	20.50	20.35		
1.4	16QAM	3	1	20.47	20.17	20.25		
1.4	16QAM	3	3	20.50	20.17	20.31		
1.4	16QAM	6	0	20.59	20.60	20.23	21.5	0



<LTE Band 26 for Head / Hotspot / Body-worn Condition>

BW [MHz]	Modulation	RB Size	RB Offset		Power Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel					26865	26965		
Frequency (MHz)					831.5	841.5		
15	QPSK	1	0		22.81	22.68	24	0
15	QPSK	1	37		23.14	23.11		
15	QPSK	1	74		22.70	22.79		
15	QPSK	36	0		21.94	21.90	23	1
15	QPSK	36	20		21.98	21.99		
15	QPSK	36	39		22.04	21.87		
15	QPSK	75	0		21.97	21.89		
15	16QAM	1	0		21.72	21.73	23	1
15	16QAM	1	37		21.70	21.64		
15	16QAM	1	74		21.62	21.54		
15	16QAM	36	0		21.00	20.86	22	2
15	16QAM	36	20		20.89	20.83		
15	16QAM	36	39		20.84	20.95		
15	16QAM	75	0		20.90	20.97		
Channel				26740	26865	26990	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				819	831.5	844		
10	QPSK	1	0	22.67	22.77	22.76	24	0
10	QPSK	1	25	23.29	22.92	23.11		
10	QPSK	1	49	22.82	22.60	22.51		
10	QPSK	25	0	21.99	21.94	21.90	23	1
10	QPSK	25	12	21.99	21.97	21.97		
10	QPSK	25	25	22.01	21.98	21.94		
10	QPSK	50	0	21.99	21.96	21.92		
10	16QAM	1	0	21.63	21.71	21.68	23	1
10	16QAM	1	25	21.69	21.72	21.68		
10	16QAM	1	49	21.68	21.63	21.61		
10	16QAM	25	0	21.13	20.93	20.86	22	2
10	16QAM	25	12	21.00	20.97	20.89		
10	16QAM	25	25	21.10	21.06	20.83		
10	16QAM	50	0	21.02	20.95	20.93		
Channel				26715	26865	27015	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				816.5	831.5	846.5		
5	QPSK	1	0	22.56	22.61	22.43	24	0
5	QPSK	1	12	23.19	23.17	23.11		
5	QPSK	1	24	23.01	22.57	22.43		
5	QPSK	12	0	21.98	21.97	21.84	23	1
5	QPSK	12	7	22.03	21.91	21.91		
5	QPSK	12	13	22.02	21.97	21.87		
5	QPSK	25	0	22.01	21.90	21.86		
5	16QAM	1	0	21.64	21.67	21.55	23	1
5	16QAM	1	12	21.65	21.57	21.57		
5	16QAM	1	24	21.68	21.60	21.51		
5	16QAM	12	0	21.09	20.86	21.01	22	2
5	16QAM	12	7	20.92	21.05	20.94		
5	16QAM	12	13	21.13	21.06	20.75		
5	16QAM	25	0	20.98	20.97	20.85		



Channel				26705	26865	27025	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				815.5	831.5	847.5		
3	QPSK	1	0	22.90	22.86	22.79	24	0
3	QPSK	1	8	23.20	23.13	23.11		
3	QPSK	1	14	22.99	22.76	22.44		
3	QPSK	8	0	21.99	21.85	21.87	23	1
3	QPSK	8	4	21.98	21.99	21.89		
3	QPSK	8	7	22.01	22.02	21.93		
3	QPSK	15	0	21.94	21.91	21.81		
3	16QAM	1	0	21.80	21.64	21.70	23	1
3	16QAM	1	8	21.60	21.58	21.56		
3	16QAM	1	14	21.81	21.75	21.59		
3	16QAM	8	0	21.06	21.22	20.92	22	2
3	16QAM	8	4	21.08	21.06	20.74		
3	16QAM	8	7	21.08	21.15	20.94		
3	16QAM	15	0	20.98	20.93	20.72		
Channel				26697	26865	27033	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				814.7	831.5	848.3		
1.4	QPSK	1	0	22.79	22.86	22.80	24	0
1.4	QPSK	1	3	22.90	22.91	22.91		
1.4	QPSK	1	5	22.87	22.62	22.77		
1.4	QPSK	3	0	23.01	22.90	22.90		
1.4	QPSK	3	1	23.07	22.96	23.01		
1.4	QPSK	3	3	23.03	22.98	22.92		
1.4	QPSK	6	0	22.02	21.95	21.89	23	1
1.4	16QAM	1	0	21.79	21.73	21.73	23	1
1.4	16QAM	1	3	21.76	21.68	21.62		
1.4	16QAM	1	5	21.76	21.72	21.66		
1.4	16QAM	3	0	21.93	21.90	21.90		
1.4	16QAM	3	1	22.01	21.93	21.93		
1.4	16QAM	3	3	22.03	21.91	21.96		
1.4	16QAM	6	0	20.98	20.99	20.89	22	2

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.



<LTE Band 41 for Head / Hotspot / Body-worn Condition>

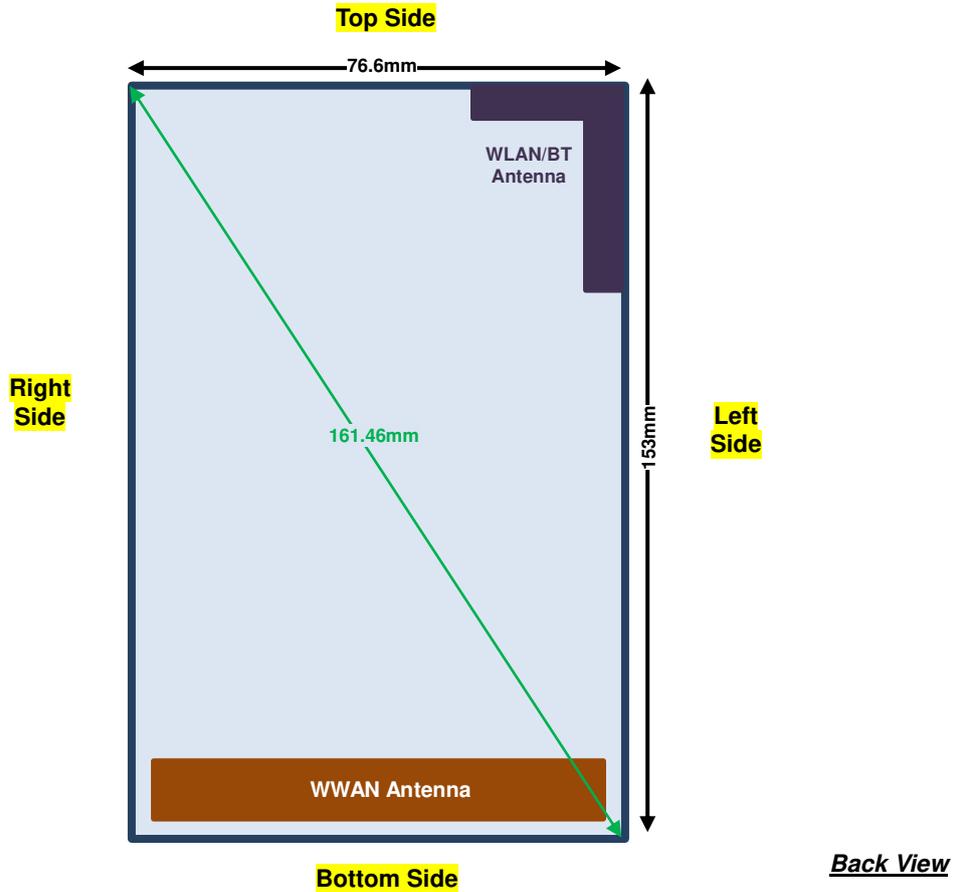
BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Low Middle Ch. / Freq.	Power Middle Ch. / Freq.	Power High Middle Ch. / Freq.	Power High Ch. / Freq.	Tune-up limit (dBm)	MPR (dB)
Channel				39750	40185	40620	41055	41490		
Frequency (MHz)				2506	2549.5	2593	2636.5	2680		
20	QPSK	1	0	22.48	22.39	22.33	22.55	23.07	24	0
20	QPSK	1	49	22.53	22.45	22.56	22.84	23.02		
20	QPSK	1	99	22.42	22.48	22.53	22.96	22.85		
20	QPSK	50	0	21.54	21.74	21.41	21.76	22.38	23	1
20	QPSK	50	24	21.53	21.58	21.48	21.77	22.28		
20	QPSK	50	50	21.61	21.55	21.50	21.82	22.04		
20	QPSK	100	0	21.57	21.59	21.49	22.12	22.13	23	1
20	16QAM	1	0	21.04	21.01	21.10	21.12	21.90		
20	16QAM	1	49	21.32	21.30	21.17	21.51	21.80		
20	16QAM	1	99	21.28	21.01	21.40	21.67	21.44	22	2
20	16QAM	50	0	20.54	20.51	20.45	20.76	21.44		
20	16QAM	50	24	20.54	20.91	20.53	20.84	21.00		
20	16QAM	50	50	20.54	20.63	20.58	21.17	21.35	22	2
20	16QAM	100	0	20.50	20.54	20.48	21.06	21.07		
Channel				39725	40173	40620	41068	41515	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2503.5	2548.3	2593	2637.8	2682.5		
15	QPSK	1	0	22.39	22.44	22.36	22.51	22.94	24	0
15	QPSK	1	37	22.72	22.79	22.77	23.22	23.40		
15	QPSK	1	74	22.55	22.52	22.42	22.88	22.90		
15	QPSK	36	0	21.67	21.51	21.44	21.72	22.23	23	1
15	QPSK	36	20	21.57	21.62	21.56	21.86	22.32		
15	QPSK	36	39	21.65	21.54	21.48	21.85	22.00		
15	QPSK	75	0	21.56	21.67	21.45	22.17	22.27	23	1
15	16QAM	1	0	21.23	21.42	21.19	21.30	21.97		
15	16QAM	1	37	21.51	21.59	21.32	21.78	22.28		
15	16QAM	1	74	21.06	21.42	21.09	21.77	21.54	22	2
15	16QAM	36	0	20.62	20.67	20.43	20.91	21.31		
15	16QAM	36	20	20.53	20.79	20.70	20.85	21.18		
15	16QAM	36	39	20.45	20.64	20.53	21.15	21.29	22	2
15	16QAM	75	0	20.57	20.68	20.53	20.90	21.50		
Channel				39700	40160	40620	41080	41540	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2501	2547	2593	2639	2685		
10	QPSK	1	0	22.75	22.46	22.44	23.05	22.83	24	0
10	QPSK	1	25	22.80	22.53	22.68	23.27	23.04		
10	QPSK	1	49	22.85	22.54	22.41	23.12	23.02		
10	QPSK	25	0	21.73	21.49	21.50	22.08	21.76	23	1
10	QPSK	25	12	22.12	21.74	21.53	22.32	21.86		
10	QPSK	25	25	21.69	21.56	21.52	22.08	21.86		
10	QPSK	50	0	22.09	21.62	21.50	22.18	21.85	23	1
10	16QAM	1	0	21.14	21.02	21.10	21.61	21.31		
10	16QAM	1	25	21.42	21.63	21.19	21.73	21.60		
10	16QAM	1	49	21.46	21.42	21.24	21.30	21.19	22	2
10	16QAM	25	0	21.03	20.72	20.75	21.43	20.97		
10	16QAM	25	12	21.04	20.78	20.78	21.36	21.00		
10	16QAM	25	25	20.89	20.79	20.76	21.01	21.12	22	2
10	16QAM	50	0	20.83	20.66	20.57	21.13	20.85		



Channel				39675	40148	40620	41093	41565	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				2498.5	2545.8	2593	2640.30	2687.5		
5	QPSK	1	0	22.64	22.21	22.20	22.60	23.02	24	0
5	QPSK	1	12	22.80	22.52	22.44	22.79	23.14		
5	QPSK	1	24	22.58	22.29	22.19	22.56	22.94		
5	QPSK	12	0	22.04	21.44	21.51	21.83	22.00	23	1
5	QPSK	12	7	21.74	21.59	21.52	21.82	21.97		
5	QPSK	12	13	21.74	21.49	21.53	21.82	21.96		
5	QPSK	25	0	21.75	21.53	21.51	21.84	22.02		
5	16QAM	1	0	21.52	21.09	21.18	21.20	21.66	23	1
5	16QAM	1	12	21.97	21.25	21.39	22.01	21.55		
5	16QAM	1	24	21.47	21.33	21.19	21.59	21.73		
5	16QAM	12	0	20.73	20.67	20.53	20.72	21.08	22	2
5	16QAM	12	7	21.00	20.41	20.43	20.72	21.10		
5	16QAM	12	13	20.78	20.57	20.42	20.89	21.00		
5	16QAM	25	0	21.05	20.74	20.74	20.78	20.96		

13. Antenna Location

<Mobile Phone>



Distance of the Antenna to the EUT surface/edge						
Antennas	Back	Front	Top Side	Bottom Side	Right Side	Left Side
WWAN Main	≤ 25mm	≤ 25mm	> 25mm	≤ 25mm	≤ 25mm	≤ 25mm
BT&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 Main	Yes	Yes	No	Yes	Yes	Yes
BT&WLAN	Yes	Yes	Yes	No	No	Yes

General Note:

- 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



14. 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. For SAR testing of WLAN signal with non-100% duty cycle, the measured SAR is scaled-up by the duty cycle scaling factor which is equal to "1/(duty cycle)"
 - c. For WWAN: Reported SAR(W/kg)= Measured SAR(W/kg)*Tune-up Scaling Factor
 - d. 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 only when the measured SAR is ≥ 0.8 W/kg.
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. 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 Product specific SAR is required only for the edges according to "operational description" 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 1.2W/kg SAR test reduction threshold, for this device all the edges SAR scaled to maximum output power is less than 1.2W/kg of UMTS B2 and LTE B2 / B7 / B25, the Product specific SAR is required only for Bottom side of UMTS B4, CDMA BC1 and LTE B4.
6. While operating in "Front" and "Back" configuration by end user, the device will limit different maximum output powers on the WCDMA B2 / B4, CDMA BC1 and LTE B2 / B4 / B7 / B25 transmitter and detail descriptions of the power reduction mechanism are included in the operational description.
7. While operating in body-adjacent exposure configuration during a mobile hotspot session, the device will reduced output powers on the WCDMA B2 / B4, CDMA BC1 and LTE B2 / B4 / B7 / B25 transmitter and detail descriptions of the power reduction mechanism are included in the operational description.

UMTS 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. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA 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 to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA.



CMDA Note:

1. Per KDB 941225 D01v03r01, SAR for next to the ear head exposure is measured in RC3 with the handset configured to transmit at full rate in SO55.
2. Per KDB 941225 D01v03r01, in Hotspot mode EUT is treated as data device and SAR is tested with Ev-Do Rev 0 (RTAP 153.6kbps) as the primary mode.
3. Per KDB 941225 D01v03r01, for Body-worn accessory SAR is measured in RC3 with the handset configured in TDSO/SO32 to transmit at full rate on FCH only with all other code channels disabled. The body-worn accessory procedures in KDB Publication 447498 are applied. The 3G SAR test reduction procedure is applied to the multiple code channel configuration (FCH+SCH), with FCH only as the primary mode.

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 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 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 / B26 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.
7. LTE band 2 / 5 SAR test was covered by Band 25 / 26; according to TCB workshop, SAR test for overlapping LTE bands can be reduced if
 - a. The maximum output power, including tolerance, for the smaller band is \leq the larger band to qualify for the SAR test exclusion.
 - b. The channel bandwidth and other operating parameters for the smaller band are fully supported by the larger band.



14.1 Head SAR

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	WCDMA II	RMC 12.2Kbps	Right Cheek	0mm	9262	1852.4	23.46	24.00	1.132	0.019	0.740	0.838
01	WCDMA II	RMC 12.2Kbps	Right Cheek	0mm	9400	1880	23.05	24.00	1.245	-0.038	0.709	0.882
	WCDMA II	RMC 12.2Kbps	Right Cheek	0mm	9538	1907.6	23.03	24.00	1.250	0.015	0.687	0.859
	WCDMA II	RMC 12.2Kbps	Right Tilted	0mm	9262	1852.4	23.46	24.00	1.132	0.085	0.462	0.523
	WCDMA II	RMC 12.2Kbps	Left Cheek	0mm	9262	1852.4	23.46	24.00	1.132	0.046	0.642	0.727
	WCDMA II	RMC 12.2Kbps	Left Tilted	0mm	9262	1852.4	23.46	24.00	1.132	0.033	0.522	0.591
	WCDMA V	RMC 12.2Kbps	Right Cheek	0mm	4182	836.4	23.12	24.00	1.225	0.06	0.242	0.296
	WCDMA V	RMC 12.2Kbps	Right Tilted	0mm	4182	836.4	23.12	24.00	1.225	0.127	0.148	0.181
02	WCDMA V	RMC 12.2Kbps	Left Cheek	0mm	4182	836.4	23.12	24.00	1.225	0.082	0.269	0.329
	WCDMA V	RMC 12.2Kbps	Left Tilted	0mm	4182	836.4	23.12	24.00	1.225	-0.061	0.169	0.207

<CDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	CDMA2000 BC0	1xRTT RC3 SO55	Right Cheek	0mm	384	836.52	24.44	25.00	1.138	-0.026	0.317	0.361
	CDMA2000 BC0	1xRTT RC3 SO55	Right Tilted	0mm	384	836.52	24.44	25.00	1.138	0.028	0.193	0.220
03	CDMA2000 BC0	1xRTT RC3 SO55	Left Cheek	0mm	384	836.52	24.44	25.00	1.138	0.026	0.343	0.390
	CDMA2000 BC0	1xRTT RC3 SO55	Left Tilted	0mm	384	836.52	24.44	25.00	1.138	-0.134	0.188	0.214
	CDMA2000 BC1	1xRTT RC3 SO55	Right Cheek	0mm	25	1851.25	24.39	25.00	1.151	-0.078	0.936	1.077
	CDMA2000 BC1	1xRTT RC3 SO55	Right Cheek	0mm	600	1880	24.22	25.00	1.197	0.065	0.895	1.071
	CDMA2000 BC1	1xRTT RC3 SO55	Right Cheek	0mm	1175	1908.75	24.22	25.00	1.197	-0.193	0.788	0.943
	CDMA2000 BC1	1xRTT RC3 SO55	Right Tilted	0mm	25	1851.25	24.39	25.00	1.151	-0.026	0.642	0.739
	CDMA2000 BC1	1xRTT RC3 SO55	Left Cheek	0mm	25	1851.25	24.39	25.00	1.151	0.067	0.956	1.100
04	CDMA2000 BC1	1xRTT RC3 SO55	Left Cheek	0mm	600	1880	24.22	25.00	1.197	0.11	1.030	1.233
	CDMA2000 BC1	1xRTT RC3 SO55	Left Cheek	0mm	1175	1908.75	24.22	25.00	1.197	-0.089	0.961	1.150
	CDMA2000 BC1	1xRTT RC3 SO55	Left Tilted	0mm	25	1851.25	24.39	25.00	1.151	-0.11	0.733	0.844
	CDMA2000 BC1	1xRTT RC3 SO55	Left Tilted	0mm	600	1880	24.22	25.00	1.197	-0.11	0.753	0.901
	CDMA2000 BC1	1xRTT RC3 SO55	Left Tilted	0mm	1175	1908.75	24.22	25.00	1.197	-0.11	0.776	0.929
	CDMA2000 BC10	1xRTT RC3 SO55	Right Cheek	0mm	580	820.5	24.39	25.00	1.151	0.178	0.286	0.329
	CDMA2000 BC10	1xRTT RC3 SO55	Right Tilted	0mm	580	820.5	24.39	25.00	1.151	0.14	0.189	0.218
05	CDMA2000 BC10	1xRTT RC3 SO55	Left Cheek	0mm	580	820.5	24.39	25.00	1.151	0.023	0.328	0.377
	CDMA2000 BC10	1xRTT RC3 SO55	Left Tilted	0mm	580	820.5	24.39	25.00	1.151	-0.185	0.202	0.232



<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	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)
06	LTE Band 13	10M	QPSK	1	25	Right Cheek	0mm	23230	782	23.09	24.00	1.233	-0.059	0.360	0.444
	LTE Band 13	10M	QPSK	25	12	Right Cheek	0mm	23230	782	21.94	23.00	1.276	-0.018	0.228	0.291
	LTE Band 13	10M	QPSK	1	25	Right Tilted	0mm	23230	782	23.09	24.00	1.233	0.023	0.251	0.310
	LTE Band 13	10M	QPSK	25	12	Right Tilted	0mm	23230	782	21.94	23.00	1.276	0.005	0.155	0.198
	LTE Band 13	10M	QPSK	1	25	Left Cheek	0mm	23230	782	23.09	24.00	1.233	0.013	0.359	0.443
	LTE Band 13	10M	QPSK	25	12	Left Cheek	0mm	23230	782	21.94	23.00	1.276	0.103	0.219	0.280
	LTE Band 13	10M	QPSK	1	25	Left Tilted	0mm	23230	782	23.09	24.00	1.233	-0.01	0.213	0.263
	LTE Band 13	10M	QPSK	25	12	Left Tilted	0mm	23230	782	21.94	23.00	1.276	-0.121	0.129	0.165
07	LTE Band 25	20M	QPSK	1	49	Right Cheek	0mm	26140	1860	23.17	24.00	1.211	0.053	0.731	0.885
	LTE Band 25	20M	QPSK	1	49	Right Cheek	0mm	26340	1880	23.13	24.00	1.222	-0.012	0.675	0.825
	LTE Band 25	20M	QPSK	1	49	Right Cheek	0mm	26590	1905	23.15	24.00	1.216	0.054	0.664	0.808
	LTE Band 25	20M	QPSK	50	0	Right Cheek	0mm	26140	1860	22.07	23.00	1.239	-0.032	0.466	0.577
	LTE Band 25	20M	QPSK	100	0	Right Cheek	0mm	26140	1860	22.03	23.00	1.250	0.038	0.447	0.559
	LTE Band 25	20M	QPSK	1	49	Right Tilted	0mm	26140	1860	23.17	24.00	1.211	0.122	0.528	0.639
	LTE Band 25	20M	QPSK	50	0	Right Tilted	0mm	26140	1860	22.07	23.00	1.239	-0.024	0.332	0.411
	LTE Band 25	20M	QPSK	1	49	Left Cheek	0mm	26140	1860	23.17	24.00	1.211	0.096	0.579	0.701
	LTE Band 25	20M	QPSK	50	0	Left Cheek	0mm	26140	1860	22.07	23.00	1.239	0.017	0.374	0.463
	LTE Band 25	20M	QPSK	1	49	Left Tilted	0mm	26140	1860	23.17	24.00	1.211	0.11	0.525	0.636
	LTE Band 25	20M	QPSK	50	0	Left Tilted	0mm	26140	1860	22.07	23.00	1.239	-0.075	0.333	0.413
	LTE Band 26	15M	QPSK	1	37	Right Cheek	0mm	26865	831.5	23.14	24.00	1.219	0.085	0.264	0.322
	LTE Band 26	15M	QPSK	36	39	Right Cheek	0mm	26865	831.5	22.04	23.00	1.247	-0.072	0.148	0.185
	LTE Band 26	15M	QPSK	1	37	Right Tilted	0mm	26865	831.5	23.14	24.00	1.219	-0.007	0.133	0.162
	LTE Band 26	15M	QPSK	36	39	Right Tilted	0mm	26865	831.5	22.04	23.00	1.247	0.034	0.087	0.109
08	LTE Band 26	15M	QPSK	1	37	Left Cheek	0mm	26865	831.5	23.14	24.00	1.219	0.055	0.320	0.390
	LTE Band 26	15M	QPSK	36	39	Left Cheek	0mm	26865	831.5	22.04	23.00	1.247	0.003	0.201	0.251
	LTE Band 26	15M	QPSK	1	37	Left Tilted	0mm	26865	831.5	23.14	24.00	1.219	0.012	0.170	0.207
	LTE Band 26	15M	QPSK	36	39	Left Tilted	0mm	26865	831.5	22.04	23.00	1.247	-0.06	0.105	0.131

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	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)
	LTE Band 41	20M	QPSK	1	0	Right Cheek	0mm	41490	2680	23.07	24.00	1.239	62.9	1.006	0.004	0.153	0.191
	LTE Band 41	20M	QPSK	50	0	Right Cheek	0mm	41490	2680	22.38	23.00	1.153	62.9	1.006	0.132	0.100	0.116
	LTE Band 41	20M	QPSK	1	0	Right Tilted	0mm	41490	2680	23.07	24.00	1.239	62.9	1.006	-0.07	0.152	0.189
	LTE Band 41	20M	QPSK	50	0	Right Tilted	0mm	41490	2680	22.38	23.00	1.153	62.9	1.006	-0.18	0.100	0.116
09	LTE Band 41	20M	QPSK	1	0	Left Cheek	0mm	41490	2680	23.07	24.00	1.239	62.9	1.006	0.065	0.196	0.244
	LTE Band 41	20M	QPSK	50	0	Left Cheek	0mm	41490	2680	22.38	23.00	1.153	62.9	1.006	-0.01	0.129	0.150
	LTE Band 41	20M	QPSK	1	0	Left Tilted	0mm	41490	2680	23.07	24.00	1.239	62.9	1.006	-0.112	0.169	0.211
	LTE Band 41	20M	QPSK	50	0	Left Tilted	0mm	41490	2680	22.38	23.00	1.153	62.9	1.006	-0.032	0.106	0.123



14.2 Hotspot SAR

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	WCDMA II	RMC 12.2Kbps	Front	10mm	9262	1852.4	20.25	21.00	1.189	-0.11	0.464	0.551
10	WCDMA II	RMC 12.2Kbps	Back	10mm	9262	1852.4	20.25	21.00	1.189	0.08	0.672	0.799
	WCDMA II	RMC 12.2Kbps	Left Side	10mm	9262	1852.4	20.25	21.00	1.189	-0.15	0.234	0.278
	WCDMA II	RMC 12.2Kbps	Right Side	10mm	9262	1852.4	20.25	21.00	1.189	0.05	0.246	0.292
	WCDMA II	RMC 12.2Kbps	Bottom Side	10mm	9262	1852.4	20.25	21.00	1.189	-0.02	0.434	0.516
	WCDMA V	RMC 12.2Kbps	Front	10mm	4182	836.4	23.12	24.00	1.225	-0.08	0.397	0.486
11	WCDMA V	RMC 12.2Kbps	Back	10mm	4182	836.4	23.12	24.00	1.225	0.02	0.517	0.633
	WCDMA V	RMC 12.2Kbps	Left Side	10mm	4182	836.4	23.12	24.00	1.225	-0.132	0.463	0.567
	WCDMA V	RMC 12.2Kbps	Right Side	10mm	4182	836.4	23.12	24.00	1.225	-0.07	0.314	0.385
	WCDMA V	RMC 12.2Kbps	Bottom Side	10mm	4182	836.4	23.12	24.00	1.225	-0.13	0.043	0.053

<CDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	CDMA2000 BC0	RTAP 153.6Kbps	Front	10mm	384	836.52	24.27	25.00	1.183	-0.04	0.327	0.387
12	CDMA2000 BC0	RTAP 153.6Kbps	Back	10mm	384	836.52	24.27	25.00	1.183	-0.17	0.477	0.564
	CDMA2000 BC0	RTAP 153.6Kbps	Left Side	10mm	384	836.52	24.27	25.00	1.183	0.086	0.343	0.406
	CDMA2000 BC0	RTAP 153.6Kbps	Right Side	10mm	384	836.52	24.27	25.00	1.183	-0.04	0.267	0.316
	CDMA2000 BC0	RTAP 153.6Kbps	Bottom Side	10mm	384	836.52	24.27	25.00	1.183	-0.027	0.053	0.063
	CDMA2000 BC1	RTAP 153.6Kbps	Front	10mm	25	1851.25	20.56	21.50	1.242	-0.01	0.658	0.817
	CDMA2000 BC1	RTAP 153.6Kbps	Front	10mm	600	1880	20.24	21.50	1.337	0.06	0.620	0.829
	CDMA2000 BC1	RTAP 153.6Kbps	Front	10mm	1175	1908.75	20.21	21.50	1.346	-0.01	0.701	0.943
	CDMA2000 BC1	RTAP 153.6Kbps	Back	10mm	25	1851.25	20.56	21.50	1.242	0.03	0.759	0.942
	CDMA2000 BC1	RTAP 153.6Kbps	Back	10mm	600	1880	20.24	21.50	1.337	-0.14	0.740	0.989
13	CDMA2000 BC1	RTAP 153.6Kbps	Back	10mm	1175	1908.75	20.21	21.50	1.346	-0.04	0.782	1.052
	CDMA2000 BC1	RTAP 153.6Kbps	Left Side	10mm	25	1851.25	20.56	21.50	1.242	-0.05	0.279	0.346
	CDMA2000 BC1	RTAP 153.6Kbps	Right Side	10mm	25	1851.25	20.56	21.50	1.242	-0.06	0.285	0.354
	CDMA2000 BC1	RTAP 153.6Kbps	Bottom Side	10mm	25	1851.25	20.56	21.50	1.242	0.01	0.474	0.589
	CDMA2000 BC10	RTAP 153.6Kbps	Front	10mm	580	820.5	24.28	25.00	1.180	-0.139	0.378	0.446
14	CDMA2000 BC10	RTAP 153.6Kbps	Back	10mm	580	820.5	24.28	25.00	1.180	-0.13	0.485	0.572
	CDMA2000 BC10	RTAP 153.6Kbps	Left Side	10mm	580	820.5	24.28	25.00	1.180	0.059	0.438	0.517
	CDMA2000 BC10	RTAP 153.6Kbps	Right Side	10mm	580	820.5	24.28	25.00	1.180	0.053	0.355	0.419
	CDMA2000 BC10	RTAP 153.6Kbps	Bottom Side	10mm	580	820.5	24.28	25.00	1.180	0.072	0.065	0.077



<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	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)
	LTE Band 13	10M	QPSK	1	25	Front	10mm	23230	782	23.09	24.00	1.233	0.142	0.544	0.671
	LTE Band 13	10M	QPSK	25	12	Front	10mm	23230	782	21.94	23.00	1.276	0.164	0.328	0.419
15	LTE Band 13	10M	QPSK	1	25	Back	10mm	23230	782	23.09	24.00	1.233	0.01	0.711	0.877
	LTE Band 13	10M	QPSK	25	12	Back	10mm	23230	782	21.94	23.00	1.276	-0.024	0.418	0.534
	LTE Band 13	10M	QPSK	50	0	Back	10mm	23230	782	21.89	23.00	1.291	0.045	0.426	0.550
	LTE Band 13	10M	QPSK	1	25	Left Side	10mm	23230	782	23.09	24.00	1.233	0.137	0.658	0.811
	LTE Band 13	10M	QPSK	25	12	Left Side	10mm	23230	782	21.94	23.00	1.276	0.002	0.408	0.521
	LTE Band 13	10M	QPSK	50	0	Left Side	10mm	23230	782	21.89	23.00	1.291	-0.059	0.415	0.536
	LTE Band 13	10M	QPSK	1	25	Right Side	10mm	23230	782	23.09	24.00	1.233	0.068	0.516	0.636
	LTE Band 13	10M	QPSK	25	12	Right Side	10mm	23230	782	21.94	23.00	1.276	-0.011	0.319	0.407
	LTE Band 13	10M	QPSK	1	25	Bottom Side	10mm	23230	782	23.09	24.00	1.233	-0.073	0.055	0.068
	LTE Band 13	10M	QPSK	25	12	Bottom Side	10mm	23230	782	21.94	23.00	1.276	0.146	0.035	0.045
	LTE Band 25	20M	QPSK	1	49	Front	10mm	26140	1860	20.86	21.50	1.159	0.15	0.583	0.676
	LTE Band 25	20M	QPSK	50	0	Front	10mm	26140	1860	20.53	21.50	1.250	-0.08	0.571	0.714
	LTE Band 25	20M	QPSK	1	49	Back	10mm	26140	1860	20.86	21.50	1.159	-0.09	0.769	0.891
	LTE Band 25	20M	QPSK	1	49	Back	10mm	26340	1880	20.76	21.50	1.186	-0.1	0.772	0.915
	LTE Band 25	20M	QPSK	1	49	Back	10mm	26590	1905	20.39	21.50	1.291	-0.14	0.814	1.051
	LTE Band 25	20M	QPSK	50	0	Back	10mm	26140	1860	20.53	21.50	1.250	-0.11	0.787	0.984
	LTE Band 25	20M	QPSK	50	0	Back	10mm	26340	1880	20.37	21.50	1.297	-0.17	0.810	1.051
16	LTE Band 25	20M	QPSK	50	0	Back	10mm	26590	1905	20.40	21.50	1.288	-0.1	0.850	1.095
	LTE Band 25	20M	QPSK	100	0	Back	10mm	26140	1860	20.46	21.50	1.271	-0.05	0.794	1.009
	LTE Band 25	20M	QPSK	1	49	Left Side	10mm	26140	1860	20.86	21.50	1.159	-0.07	0.339	0.393
	LTE Band 25	20M	QPSK	50	0	Left Side	10mm	26140	1860	20.53	21.50	1.250	-0.1	0.372	0.465
	LTE Band 25	20M	QPSK	1	49	Right Side	10mm	26140	1860	20.86	21.50	1.159	-0.11	0.329	0.381
	LTE Band 25	20M	QPSK	50	0	Right Side	10mm	26140	1860	20.53	21.50	1.250	-0.03	0.337	0.421
	LTE Band 25	20M	QPSK	1	49	Bottom Side	10mm	26140	1860	20.86	21.50	1.159	0.1	0.438	0.508
	LTE Band 25	20M	QPSK	50	0	Bottom Side	10mm	26140	1860	20.53	21.50	1.250	0.13	0.459	0.574
	LTE Band 26	15M	QPSK	1	37	Front	10mm	26865	831.5	23.14	24.00	1.219	0.12	0.373	0.455
	LTE Band 26	15M	QPSK	36	39	Front	10mm	26865	831.5	22.04	23.00	1.247	0.001	0.246	0.307
17	LTE Band 26	15M	QPSK	1	37	Back	10mm	26865	831.5	23.14	24.00	1.219	-0.02	0.492	0.600
	LTE Band 26	15M	QPSK	36	39	Back	10mm	26865	831.5	22.04	23.00	1.247	0.039	0.331	0.413
	LTE Band 26	15M	QPSK	1	37	Left Side	10mm	26865	831.5	23.14	24.00	1.219	0.091	0.377	0.460
	LTE Band 26	15M	QPSK	36	39	Left Side	10mm	26865	831.5	22.04	23.00	1.247	-0.04	0.231	0.288
	LTE Band 26	15M	QPSK	1	37	Right Side	10mm	26865	831.5	23.14	24.00	1.219	0.001	0.307	0.374
	LTE Band 26	15M	QPSK	36	39	Right Side	10mm	26865	831.5	22.04	23.00	1.247	-0.067	0.190	0.237
	LTE Band 26	15M	QPSK	1	37	Bottom Side	10mm	26865	831.5	23.14	24.00	1.219	0.157	0.055	0.067
	LTE Band 26	15M	QPSK	36	39	Bottom Side	10mm	26865	831.5	22.04	23.00	1.247	0.069	0.036	0.045



<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	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)
	LTE Band 41	20M	QPSK	1	0	Front	10mm	41490	2680	23.07	24.00	1.239	62.9	1.006	0.032	0.642	0.800
	LTE Band 41	20M	QPSK	1	49	Front	10mm	39750	2506	22.53	24.00	1.403	62.9	1.006	0.198	0.608	0.858
	LTE Band 41	20M	QPSK	1	99	Front	10mm	40185	2549.5	22.48	24.00	1.419	62.9	1.006	-0.12	0.518	0.739
	LTE Band 41	20M	QPSK	1	49	Front	10mm	40620	2593	22.56	24.00	1.393	62.9	1.006	-0.029	0.564	0.790
	LTE Band 41	20M	QPSK	1	99	Front	10mm	41055	2636.5	22.96	24.00	1.271	62.9	1.006	0.157	0.580	0.741
	LTE Band 41	20M	QPSK	50	0	Front	10mm	41490	2680	22.38	23.00	1.153	62.9	1.006	0.05	0.379	0.440
	LTE Band 41	20M	QPSK	100	0	Front	10mm	41490	2680	22.13	23.00	1.222	62.9	1.006	-0.183	0.374	0.460
	LTE Band 41	20M	QPSK	1	0	Back	10mm	41490	2680	23.07	24.00	1.239	62.9	1.006	0.193	0.630	0.785
	LTE Band 41	20M	QPSK	1	49	Back	10mm	39750	2506	22.53	24.00	1.403	62.9	1.006	-0.057	0.610	0.861
18	LTE Band 41	20M	QPSK	1	99	Back	10mm	40185	2549.5	22.48	24.00	1.419	62.9	1.006	0.19	0.536	0.765
	LTE Band 41	20M	QPSK	1	49	Back	10mm	40620	2593	22.56	24.00	1.393	62.9	1.006	0.13	0.600	0.841
	LTE Band 41	20M	QPSK	1	99	Back	10mm	41055	2636.5	22.96	24.00	1.271	62.9	1.006	-0.056	0.582	0.744
	LTE Band 41	20M	QPSK	50	0	Back	10mm	41490	2680	22.38	23.00	1.153	62.9	1.006	0.084	0.604	0.701
	LTE Band 41	20M	QPSK	50	50	Back	10mm	39750	2506	21.61	23.00	1.377	62.9	1.006	-0.081	0.349	0.484
	LTE Band 41	20M	QPSK	50	0	Back	10mm	40185	2549.5	21.74	23.00	1.337	62.9	1.006	0.184	0.359	0.483
	LTE Band 41	20M	QPSK	50	50	Back	10mm	40620	2593	21.50	23.00	1.413	62.9	1.006	0.128	0.336	0.477
	LTE Band 41	20M	QPSK	50	50	Back	10mm	41055	2636.5	21.82	23.00	1.312	62.9	1.006	0.149	0.356	0.470
	LTE Band 41	20M	QPSK	100	0	Back	10mm	41490	2680	22.13	23.00	1.222	62.9	1.006	0.13	0.377	0.463
	LTE Band 41	20M	QPSK	1	0	Left Side	10mm	41490	2680	23.07	24.00	1.239	62.9	1.006	0.1	0.292	0.364
	LTE Band 41	20M	QPSK	50	0	Left Side	10mm	41490	2680	22.38	23.00	1.153	62.9	1.006	0.102	0.188	0.218
	LTE Band 41	20M	QPSK	1	0	Right Side	10mm	41490	2680	23.07	24.00	1.239	62.9	1.006	0.15	0.224	0.279
	LTE Band 41	20M	QPSK	50	0	Right Side	10mm	41490	2680	22.38	23.00	1.153	62.9	1.006	-0.142	0.134	0.155
	LTE Band 41	20M	QPSK	1	0	Bottom Side	10mm	41490	2680	23.07	24.00	1.239	62.9	1.006	0.058	0.619	0.771
	LTE Band 41	20M	QPSK	1	49	Bottom Side	10mm	39750	2506	22.53	24.00	1.403	62.9	1.006	-0.008	0.370	0.522
	LTE Band 41	20M	QPSK	1	99	Bottom Side	10mm	40185	2549.5	22.48	24.00	1.419	62.9	1.006	-0.018	0.386	0.551
	LTE Band 41	20M	QPSK	1	49	Bottom Side	10mm	40620	2593	22.56	24.00	1.393	62.9	1.006	-0.028	0.404	0.566
	LTE Band 41	20M	QPSK	1	99	Bottom Side	10mm	41055	2636.5	22.96	24.00	1.271	62.9	1.006	0.062	0.547	0.699
	LTE Band 41	20M	QPSK	50	0	Bottom Side	10mm	41490	2680	22.38	23.00	1.153	62.9	1.006	-0.005	0.387	0.449
	LTE Band 41	20M	QPSK	100	0	Bottom Side	10mm	41490	2680	22.13	23	1.222	62.9	1.006	-0.008	0.383	0.471

14.3 Product specific SAR

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	CDMA2000 BC1	RTAP 153.6Kbps	Bottom Side	0mm	25	1851.25	24.09	25.00	1.233	0.15	2.360	2.910
	CDMA2000 BC1	RTAP 153.6Kbps	Bottom Side	0mm	600	1880	23.92	25.00	1.282	0.09	2.370	3.039
19	CDMA2000 BC1	RTAP 153.6Kbps	Bottom Side	0mm	1175	1908.75	23.85	25.00	1.303	0.101	2.480	3.232



14.4 Body Worn Accessory SAR

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	WCDMA II	RMC 12.2Kbps	Front	10mm	9262	1852.4	20.25	21.00	1.189	-0.11	0.464	0.551
20	WCDMA II	RMC 12.2Kbps	Back	10mm	9262	1852.4	20.25	21.00	1.189	0.08	0.672	0.799
	WCDMA V	RMC 12.2Kbps	Front	10mm	4182	836.4	23.12	24.00	1.225	-0.08	0.397	0.486
21	WCDMA V	RMC 12.2Kbps	Back	10mm	4182	836.4	23.12	24.00	1.225	0.02	0.517	0.633

<CDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (mm)	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)
	CDMA2000 BC0	1xRTT RC3 SO32	Front	10mm	384	836.52	24.37	25.00	1.156	0.01	0.314	0.363
22	CDMA2000 BC0	1xRTT RC3 SO32	Back	10mm	384	836.52	24.37	25.00	1.156	0.07	0.428	0.495
	CDMA2000 BC1	1xRTT RC3 SO32	Front	10mm	25	1851.25	20.49	21.50	1.262	0.05	0.577	0.728
	CDMA2000 BC1	1xRTT RC3 SO32	Back	10mm	25	1851.25	20.49	21.50	1.262	-0.09	0.761	0.960
	CDMA2000 BC1	1xRTT RC3 SO32	Back	10mm	600	1880	20.29	21.50	1.321	-0.1	0.772	1.020
23	CDMA2000 BC1	1xRTT RC3 SO32	Back	10mm	1175	1908.75	20.21	21.50	1.346	-0.14	0.818	1.101
	CDMA2000 BC10	1xRTT RC3 SO32	Front	10mm	580	820.5	24.40	25.00	1.148	0.01	0.307	0.352
24	CDMA2000 BC10	1xRTT RC3 SO32	Back	10mm	580	820.5	24.40	25.00	1.148	0.07	0.419	0.481

<FDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	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)
	LTE Band 13	10M	QPSK	1	25	Front	10mm	23230	782	23.09	24.00	1.233	0.142	0.544	0.671
	LTE Band 13	10M	QPSK	25	12	Front	10mm	23230	782	21.94	23.00	1.276	0.164	0.328	0.419
25	LTE Band 13	10M	QPSK	1	25	Back	10mm	23230	782	23.09	24.00	1.233	0.01	0.711	0.877
	LTE Band 13	10M	QPSK	25	12	Back	10mm	23230	782	21.94	23.00	1.276	-0.024	0.418	0.534
	LTE Band 13	10M	QPSK	50	0	Back	10mm	23230	782	21.89	23.00	1.291	0.045	0.426	0.550
	LTE Band 25	20M	QPSK	1	49	Front	10mm	26140	1860	20.86	21.50	1.159	0.15	0.583	0.676
	LTE Band 25	20M	QPSK	50	0	Front	10mm	26140	1860	20.53	21.50	1.250	-0.08	0.571	0.714
	LTE Band 25	20M	QPSK	1	49	Back	10mm	26140	1860	20.86	21.50	1.159	-0.09	0.769	0.891
	LTE Band 25	20M	QPSK	1	49	Back	10mm	26340	1880	20.76	21.50	1.186	-0.1	0.772	0.915
	LTE Band 25	20M	QPSK	1	49	Back	10mm	26590	1905	20.39	21.50	1.291	-0.14	0.814	1.051
	LTE Band 25	20M	QPSK	50	0	Back	10mm	26140	1860	20.53	21.50	1.250	-0.11	0.787	0.984
	LTE Band 25	20M	QPSK	50	0	Back	10mm	26340	1880	20.37	21.50	1.297	-0.17	0.810	1.051
26	LTE Band 25	20M	QPSK	50	0	Back	10mm	26590	1905	20.40	21.50	1.288	-0.1	0.850	1.095
	LTE Band 25	20M	QPSK	100	0	Back	10mm	26140	1860	20.46	21.50	1.271	-0.05	0.794	1.009
	LTE Band 26	15M	QPSK	1	37	Front	10mm	26865	831.5	23.14	24.00	1.219	0.12	0.373	0.455
	LTE Band 26	15M	QPSK	36	39	Front	10mm	26865	831.5	22.04	23.00	1.247	0.001	0.246	0.307
27	LTE Band 26	15M	QPSK	1	37	Back	10mm	26865	831.5	23.14	24.00	1.219	-0.02	0.492	0.600
	LTE Band 26	15M	QPSK	36	39	Back	10mm	26865	831.5	22.04	23.00	1.247	0.039	0.331	0.413

<TDD LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB offset	Test Position	Gap (mm)	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)
	LTE Band 41	20M	QPSK	1	0	Front	10mm	41490	2680	23.07	24.00	1.239	62.9	1.006	0.032	0.642	0.800
	LTE Band 41	20M	QPSK	1	49	Front	10mm	39750	2506	22.53	24.00	1.403	62.9	1.006	0.198	0.608	0.858
	LTE Band 41	20M	QPSK	1	99	Front	10mm	40185	2549.5	22.48	24.00	1.419	62.9	1.006	-0.12	0.518	0.739
	LTE Band 41	20M	QPSK	1	49	Front	10mm	40620	2593	22.56	24.00	1.393	62.9	1.006	-0.029	0.564	0.790
	LTE Band 41	20M	QPSK	1	99	Front	10mm	41055	2636.5	22.96	24.00	1.271	62.9	1.006	0.157	0.580	0.741
	LTE Band 41	20M	QPSK	50	0	Front	10mm	41490	2680	22.38	23.00	1.153	62.9	1.006	0.05	0.379	0.440
	LTE Band 41	20M	QPSK	100	0	Front	10mm	41490	2680	22.13	23.00	1.222	62.9	1.006	-0.183	0.374	0.460
	LTE Band 41	20M	QPSK	1	0	Back	10mm	41490	2680	23.07	24.00	1.239	62.9	1.006	0.193	0.630	0.785
28	LTE Band 41	20M	QPSK	1	49	Back	10mm	39750	2506	22.53	24.00	1.403	62.9	1.006	-0.057	0.610	0.861
	LTE Band 41	20M	QPSK	1	99	Back	10mm	40185	2549.5	22.48	24.00	1.419	62.9	1.006	0.19	0.536	0.765
	LTE Band 41	20M	QPSK	1	49	Back	10mm	40620	2593	22.56	24.00	1.393	62.9	1.006	0.13	0.600	0.841
	LTE Band 41	20M	QPSK	1	99	Back	10mm	41055	2636.5	22.96	24.00	1.271	62.9	1.006	-0.056	0.582	0.744
	LTE Band 41	20M	QPSK	50	0	Back	10mm	41490	2680	22.38	23.00	1.153	62.9	1.006	0.084	0.604	0.701
	LTE Band 41	20M	QPSK	50	50	Back	10mm	39750	2506	21.61	23.00	1.377	62.9	1.006	-0.081	0.349	0.484
	LTE Band 41	20M	QPSK	50	0	Back	10mm	40185	2549.5	21.74	23.00	1.337	62.9	1.006	0.184	0.359	0.483
	LTE Band 41	20M	QPSK	50	50	Back	10mm	40620	2593	21.50	23.00	1.413	62.9	1.006	0.128	0.336	0.477
	LTE Band 41	20M	QPSK	50	50	Back	10mm	41055	2636.5	21.82	23.00	1.312	62.9	1.006	0.149	0.356	0.470
	LTE Band 41	20M	QPSK	100	0	Back	10mm	41490	2680	22.13	23.00	1.222	62.9	1.006	0.13	0.377	0.463

14.5 Repeated SAR Measurement

No.	Band	Mode	Test Position	Gap (mm)	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	CDMA2000 BC1	1xRTT RC3 SO55	Left Cheek	0mm	600	1880	24.22	25.00	1.197	0.11	1.030	-	1.233
2nd	CDMA2000 BC1	1xRTT RC3 SO55	Left Cheek	0mm	600	1880	24.22	25.00	1.197	0.115	0.982	1.05	1.175

No.	Band	Mode	Test Position	Gap (mm)	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	CDMA2000 BC1	RTAP 153.6Kbps	Bottom Side	0mm	1175	1908.75	23.85	25.00	1.303	0.101	2.480	-	3.232
2nd	CDMA2000 BC1	RTAP 153.6Kbps	Bottom Side	0mm	1175	1908.75	23.85	25.00	1.303	0.06	2.410	1.03	3.141

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 Product specific repeated SAR is necessary, the same procedures should be adapted for measurements according to Product specific and occupational exposure limits by applying a factor of 2.5 for Product specific 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.

15. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Portable Handset				Note
		Head	Body-worn	Hotspot	Product specific	
1.	GSM Voice + WLAN2.4GHz	Yes	Yes		Yes	
2.	GPRS/EDGE + WLAN2.4GHz	Yes	Yes	Yes	Yes	Hotspot
3.	WCDMA + WLAN2.4GHz	Yes	Yes	Yes	Yes	Hotspot
4.	LTE + WLAN2.4GHz	Yes	Yes	Yes	Yes	Hotspot
5.	GSM Voice + Bluetooth		Yes		Yes	
6.	GPRS/EDGE + Bluetooth		Yes		Yes	WWAN VoIP
7.	WCDMA+ Bluetooth		Yes		Yes	WWAN VoIP
8.	LTE + Bluetooth		Yes		Yes	WWAN VoIP
9.	GSM Voice + WLAN5GHz	Yes	Yes		Yes	
10.	GPRS/EDGE + WLAN5GHz	Yes	Yes	Yes	Yes	WWAN VoIP
11.	WCDMA + WLAN5GHz	Yes	Yes	Yes	Yes	WWAN VoIP
12.	LTE + WLAN5GHz	Yes	Yes	Yes	Yes	WWAN VoIP

General Note:

1. This device supported VoIP in EGPRS, WCDMA, LTE (e.g. 3rd party VoIP).
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. This device 2.4GHz / 5.2GHz / 5.8GHz WLAN supports Hotspot operation and WiFi Direct (Group Client / Group Owner), and 5.3GHz / 5.5GHz WLAN supports WiFi Direct (Group Client).
4. 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.
5. The Scaled SAR summation is calculated based on the same configuration and test position.
6. The worst WWAN and WLAN reported SAR for each configuration was used for SAR summation, Therefore, the following summations represent the absolute worst cases for simultaneous transmission with WWAN and WLAN.
7. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
 - i) Scalar SAR summation < 1.6W/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 SAR < 1.6W/kg.
 - v) The SPLSR calculated results please refer to section 15.5.
8. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v06 based on the formula below.
 - i) $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})/x}] \text{ W/kg}$ for test separation distances $\leq 50 \text{ mm}$; where $x = 7.5$ for 1-g SAR, and $x = 18.75$ for 10-g SAR.
 - ii) When the minimum separation distance is < 5mm, the distance is used 5mm to determine SAR test exclusion.
 - iii) 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Bluetooth Max Power	Exposure Position	Product specific
12.5 dBm	Estimated SAR (W/kg)	0.302 W/kg



15.1 Head Exposure Conditions

WWAN Band		Exposure Position	1	2	1+2 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN 1g SAR (W/kg)	2.4GHz WLAN 1g SAR (W/kg)			
GSM	GSM850	Right Cheek	0.332	1.118	1.45		
		Right Tilted	0.244	0.560	0.80		
		Left Cheek	0.454	0.531	0.99		
		Left Tilted	0.240	0.526	0.77		
	GSM1900	Right Cheek	0.375	1.118	1.49		
		Right Tilted	0.245	0.560	0.81		
		Left Cheek	0.336	0.531	0.87		
		Left Tilted	0.252	0.526	0.78		
WCDMA	WCDMA II	Right Cheek	0.882	1.118	2.00	0.03	Case 1
		Right Tilted	0.523	0.560	1.08		
		Left Cheek	0.727	0.531	1.26		
		Left Tilted	0.591	0.526	1.12		
	WCDMA IV	Right Cheek	0.791	1.118	1.91	0.03	Case 2
		Right Tilted	0.313	0.560	0.87		
		Left Cheek	0.298	0.531	0.83		
		Left Tilted	0.319	0.526	0.85		
	WCDMA V	Right Cheek	0.296	1.118	1.41		
		Right Tilted	0.181	0.560	0.74		
		Left Cheek	0.329	0.531	0.86		
		Left Tilted	0.207	0.526	0.73		
CDMA	CDMA2000 BC0	Right Cheek	0.361	1.118	1.48		
		Right Tilted	0.220	0.560	0.78		
		Left Cheek	0.390	0.531	0.92		
		Left Tilted	0.214	0.526	0.74		
	CDMA2000 BC1	Right Cheek	1.077	1.118	2.20	0.04	Case 3
		Right Tilted	0.739	0.560	1.30		
		Left Cheek	1.233	0.531	1.76	0.03	Case 4
		Left Tilted	0.929	0.526	1.46		
	CDMA2000 BC10	Right Cheek	0.329	1.118	1.45		
		Right Tilted	0.218	0.560	0.78		
		Left Cheek	0.377	0.531	0.91		
		Left Tilted	0.232	0.526	0.76		
LTE	LTE Band 4	Right Cheek	0.533	1.118	1.65	0.02	Case 5
		Right Tilted	0.268	0.560	0.83		
		Left Cheek	0.256	0.531	0.79		
		Left Tilted	0.287	0.526	0.81		
	LTE Band 7	Right Cheek	0.442	1.118	1.56		
		Right Tilted	0.416	0.560	0.98		
		Left Cheek	0.658	0.531	1.19		
		Left Tilted	0.406	0.526	0.93		
	LTE Band 12	Right Cheek	0.264	1.118	1.38		
		Right Tilted	0.144	0.560	0.70		
		Left Cheek	0.298	0.531	0.83		
		Left Tilted	0.174	0.526	0.70		
	LTE Band 13	Right Cheek	0.444	1.118	1.56		
		Right Tilted	0.310	0.560	0.87		
		Left Cheek	0.443	0.531	0.97		
		Left Tilted	0.263	0.526	0.79		
	LTE Band 25	Right Cheek	0.885	1.118	2.00	0.03	Case 6
		Right Tilted	0.639	0.560	1.20		
		Left Cheek	0.701	0.531	1.23		
		Left Tilted	0.636	0.526	1.16		
	LTE Band 26	Right Cheek	0.322	1.118	1.44		
		Right Tilted	0.162	0.560	0.72		
		Left Cheek	0.390	0.531	0.92		
		Left Tilted	0.207	0.526	0.73		
LTE Band 41	Right Cheek	0.191	1.118	1.31			
	Right Tilted	0.189	0.560	0.75			
	Left Cheek	0.244	0.531	0.78			
	Left Tilted	0.211	0.526	0.74			



WWAN Band		Exposure Position	1	3	1+3 Summed 1g SAR (W/kg)	SPLSR	Case No
			WWAN 1g SAR (W/kg)	5GHz WLAN 1g SAR (W/kg)			
GSM	GSM850	Right Cheek	0.332	0.633	0.97		
		Right Tilted	0.244	0.443	0.69		
		Left Cheek	0.454	0.482	0.94		
		Left Tilted	0.240	0.537	0.78		
	GSM1900	Right Cheek	0.375	0.633	1.01		
		Right Tilted	0.245	0.443	0.69		
		Left Cheek	0.336	0.482	0.82		
		Left Tilted	0.252	0.537	0.79		
WCDMA	WCDMA II	Right Cheek	0.882	0.633	1.52		
		Right Tilted	0.523	0.443	0.97		
		Left Cheek	0.727	0.482	1.21		
		Left Tilted	0.591	0.537	1.13		
	WCDMA IV	Right Cheek	0.791	0.633	1.42		
		Right Tilted	0.313	0.443	0.76		
		Left Cheek	0.298	0.482	0.78		
		Left Tilted	0.319	0.537	0.86		
	WCDMA V	Right Cheek	0.296	0.633	0.93		
		Right Tilted	0.181	0.443	0.62		
		Left Cheek	0.329	0.482	0.81		
		Left Tilted	0.207	0.537	0.74		
CDMA	CDMA2000 BC0	Right Cheek	0.361	0.633	0.99		
		Right Tilted	0.220	0.443	0.66		
		Left Cheek	0.390	0.482	0.87		
		Left Tilted	0.214	0.537	0.75		
	CDMA2000 BC1	Right Cheek	1.077	0.633	1.71	0.02	Case 7
		Right Tilted	0.739	0.443	1.18		
		Left Cheek	1.233	0.482	1.72	0.03	Case 8
		Left Tilted	0.929	0.537	1.47		
	CDMA2000 BC10	Right Cheek	0.329	0.633	0.96		
		Right Tilted	0.218	0.443	0.66		
		Left Cheek	0.377	0.482	0.86		
		Left Tilted	0.232	0.537	0.77		
LTE	LTE Band 4	Right Cheek	0.533	0.633	1.17		
		Right Tilted	0.268	0.443	0.71		
		Left Cheek	0.256	0.482	0.74		
		Left Tilted	0.287	0.537	0.82		
	LTE Band 7	Right Cheek	0.442	0.633	1.08		
		Right Tilted	0.416	0.443	0.86		
		Left Cheek	0.658	0.482	1.14		
		Left Tilted	0.406	0.537	0.94		
	LTE Band 12	Right Cheek	0.264	0.633	0.90		
		Right Tilted	0.144	0.443	0.59		
		Left Cheek	0.298	0.482	0.78		
		Left Tilted	0.174	0.537	0.71		
	LTE Band 13	Right Cheek	0.444	0.633	1.08		
		Right Tilted	0.310	0.443	0.75		
		Left Cheek	0.443	0.482	0.93		
		Left Tilted	0.263	0.537	0.80		
	LTE Band 25	Right Cheek	0.885	0.633	1.52		
		Right Tilted	0.639	0.443	1.08		
		Left Cheek	0.701	0.482	1.18		
		Left Tilted	0.636	0.537	1.17		
	LTE Band 26	Right Cheek	0.322	0.633	0.96		
		Right Tilted	0.162	0.443	0.61		
		Left Cheek	0.390	0.482	0.87		
		Left Tilted	0.207	0.537	0.74		
LTE Band 41	Right Cheek	0.191	0.633	0.82			
	Right Tilted	0.189	0.443	0.63			
	Left Cheek	0.244	0.482	0.73			
	Left Tilted	0.211	0.537	0.75			



15.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN		
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)		
GSM	GSM850	Front	0.525	0.145	0.067	0.67	0.59
		Back	0.724	0.184	0.366	0.91	1.09
		Left side	0.746	0.093	0.260	0.84	1.01
		Right side	0.596			0.60	0.60
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.056			0.06	0.06
	GSM1900	Front	0.558	0.145	0.067	0.70	0.63
		Back	0.680	0.184	0.366	0.86	1.05
		Left side	0.237	0.093	0.260	0.33	0.50
		Right side	0.198			0.20	0.20
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.336			0.34	0.34
WCDMA	WCDMA II	Front	0.551	0.145	0.067	0.70	0.62
		Back	0.799	0.184	0.366	0.98	1.17
		Left side	0.278	0.093	0.260	0.37	0.54
		Right side	0.292			0.29	0.29
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.516			0.52	0.52
	WCDMA IV	Front	0.339	0.145	0.067	0.48	0.41
		Back	0.965	0.184	0.366	1.15	1.33
		Left side	0.075	0.093	0.260	0.17	0.34
		Right side	0.106			0.11	0.11
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.605			0.61	0.61
	WCDMA V	Front	0.486	0.145	0.067	0.63	0.55
		Back	0.633	0.184	0.366	0.82	1.00
		Left side	0.567	0.093	0.260	0.66	0.83
		Right side	0.385			0.39	0.39
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.053			0.05	0.05
CDMA	CDMA2000 BC0	Front	0.387	0.145	0.067	0.53	0.45
		Back	0.564	0.184	0.366	0.75	0.93
		Left side	0.406	0.093	0.260	0.50	0.67
		Right side	0.316			0.32	0.32
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.063			0.06	0.06
	CDMA2000 BC1	Front	0.943	0.145	0.067	1.09	1.01
		Back	1.052	0.184	0.366	1.24	1.42
		Left side	0.346	0.093	0.260	0.44	0.61
		Right side	0.354			0.35	0.35
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.589			0.59	0.59
	CDMA2000 BC10	Front	0.446	0.145	0.067	0.59	0.51
		Back	0.572	0.184	0.366	0.76	0.94
		Left side	0.517	0.093	0.260	0.61	0.78
		Right side	0.419			0.42	0.42
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.077			0.08	0.08



WWAN Band		Exposure Position	1	2	3	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)
			WWAN 1g SAR (W/kg)	2.4GHz WLAN 1g SAR (W/kg)	5GHz WLAN 1g SAR (W/kg)		
LTE	LTE Band 4	Front	0.376	0.145	0.067	0.52	0.44
		Back	0.946	0.184	0.366	1.13	1.31
		Left side	0.077	0.093	0.260	0.17	0.34
		Right side	0.109			0.11	0.11
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.773			0.77	0.77
	LTE Band 7	Front	0.825	0.145	0.067	0.97	0.89
		Back	1.005	0.184	0.366	1.19	1.37
		Left side	0.377	0.093	0.260	0.47	0.64
		Right side	0.139			0.14	0.14
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.499			0.50	0.50
	LTE Band 12	Front	0.400	0.145	0.067	0.55	0.47
		Back	0.610	0.184	0.366	0.79	0.98
		Left side	0.419	0.093	0.260	0.51	0.68
		Right side	0.397			0.40	0.40
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.041			0.04	0.04
	LTE Band 13	Front	0.671	0.145	0.067	0.82	0.74
		Back	0.877	0.184	0.366	1.06	1.24
		Left side	0.811	0.093	0.260	0.90	1.07
		Right side	0.636			0.64	0.64
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.068			0.07	0.07
	LTE Band 25	Front	0.714	0.145	0.067	0.86	0.78
		Back	1.095	0.184	0.366	1.28	1.46
		Left side	0.465	0.093	0.260	0.56	0.73
		Right side	0.421			0.42	0.42
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.574			0.57	0.57
	LTE Band 26	Front	0.455	0.145	0.067	0.60	0.52
		Back	0.600	0.184	0.366	0.78	0.97
		Left side	0.460	0.093	0.260	0.55	0.72
		Right side	0.374			0.37	0.37
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.067			0.07	0.07
	LTE Band 41	Front	0.858	0.145	0.067	1.00	0.93
		Back	0.861	0.184	0.366	1.05	1.23
		Left side	0.364	0.093	0.260	0.46	0.62
		Right side	0.279			0.28	0.28
		Top side		0.125	0.128	0.13	0.13
		Bottom side	0.771			0.77	0.77



15.3 Product specific Exposure Conditions

1	2	3	4	1+2 Summed 10g SAR (W/kg)	1+3 Summed 10g SAR (W/kg)	1+4 Summed 10g SAR (W/kg)
WWAN	2.4GHz WLAN	5GHz WLAN	2.4GHz Bluetooth			
10g SAR (W/kg)	10g SAR (W/kg)	10g SAR (W/kg)	Estimated 10g SAR (W/kg)			
3.232	-	0.670	0.302	3.23	3.90	3.53

Remark:

1. According to KDB 648474 D04v01r03, for 2.4GHz WLAN hand SAR (“-”) was excluded, due to SAR was < 1.2W/kg.
2. The worst case Product specific SAR was used perform simultaneous transmission analysis.

15.4 Body-Worn Accessory Exposure Conditions

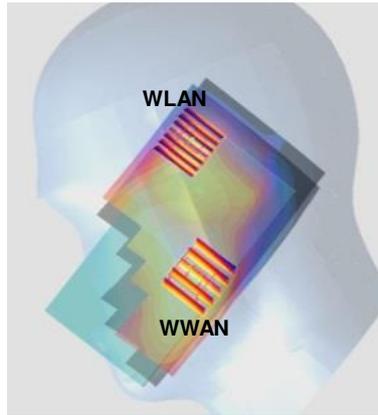
WWAN Band		Exposure Position	1	2	3	4	1+2 Summed 1g SAR (W/kg)	1+3 Summed 1g SAR (W/kg)	1+4 Summed 1g SAR (W/kg)
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth			
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)			
GSM	GSM850	Front	0.525	0.145	0.067	0.048	0.67	0.59	0.57
		Back	0.885	0.184	0.366	0.046	1.07	1.25	0.93
	GSM1900	Front	0.558	0.145	0.067	0.048	0.70	0.63	0.61
		Back	0.680	0.184	0.366	0.046	0.86	1.05	0.73
WCDMA	WCDMA II	Front	0.551	0.145	0.040	0.026	0.70	0.59	0.58
		Back	0.799	0.184	0.252	0.024	0.98	1.05	0.82
	WCDMA IV	Front	0.339	0.145	0.040	0.026	0.48	0.38	0.37
		Back	0.965	0.184	0.252	0.024	1.15	1.22	0.99
	WCDMA V	Front	0.486	0.145	0.040	0.026	0.63	0.53	0.51
		Back	0.633	0.184	0.252	0.024	0.82	0.89	0.66
CDMA	CDMA2000 BC0	Front	0.363	0.145	0.040	0.026	0.51	0.40	0.39
		Back	0.495	0.184	0.252	0.024	0.68	0.75	0.52
	CDMA2000 BC1	Front	0.728	0.145	0.040	0.026	0.87	0.77	0.75
		Back	1.101	0.184	0.252	0.024	1.29	1.35	1.13
	CDMA2000 BC10	Front	0.352	0.145	0.040	0.026	0.50	0.39	0.38
		Back	0.481	0.184	0.252	0.024	0.67	0.73	0.51
LTE	LTE Band 4	Front	0.376	0.145	0.040	0.026	0.52	0.42	0.40
		Back	0.946	0.184	0.252	0.024	1.13	1.20	0.97
	LTE Band 7	Front	0.825	0.145	0.067	0.048	0.97	0.89	0.87
		Back	1.005	0.184	0.366	0.046	1.19	1.37	1.05
	LTE Band 12	Front	0.400	0.145	0.040	0.026	0.55	0.44	0.43
		Back	0.610	0.184	0.252	0.024	0.79	0.86	0.63
	LTE Band 13	Front	0.671	0.145	0.040	0.026	0.82	0.71	0.70
		Back	0.877	0.184	0.252	0.024	1.06	1.13	0.90
	LTE Band 25	Front	0.714	0.145	0.040	0.026	0.86	0.75	0.74
		Back	1.095	0.184	0.252	0.024	1.28	1.35	1.12
	LTE Band 26	Front	0.455	0.145	0.040	0.026	0.60	0.50	0.48
		Back	0.600	0.184	0.252	0.024	0.78	0.85	0.62
LTE Band 41	Front	0.858	0.145	0.040	0.026	1.00	0.90	0.88	
	Back	0.861	0.184	0.252	0.024	1.05	1.11	0.89	

15.5 SPLSR Evaluation and Analysis

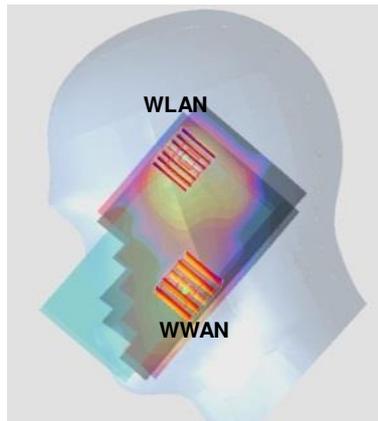
General Note:

- SPLSR = $(SAR_1 + SAR_2)^{1.5} / (min. \text{ separation distance, mm})$. If $SPLSR \leq 0.04$, simultaneously transmission SAR measurement is not necessary

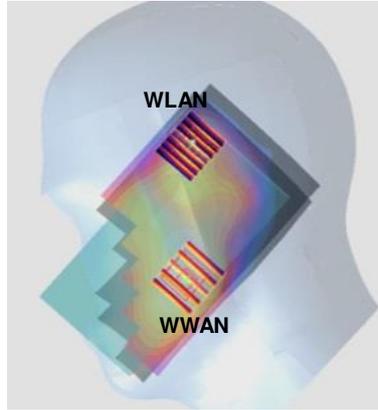
Case 1	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA II		0.882	0	X	Y	Z				
	WLAN2.4GHz		1.118	0	1.72	-2.38	-0.13				



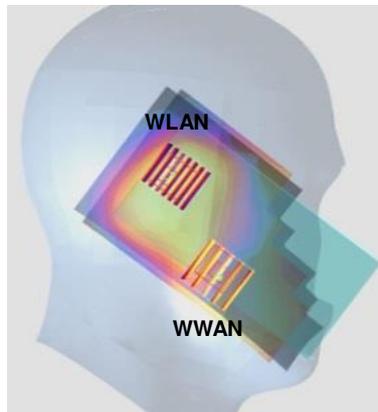
Case 2	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA IV		0.791	0	X	Y	Z				
	WLAN2.4GHz		1.118	0	1.72	-2.38	-0.13				



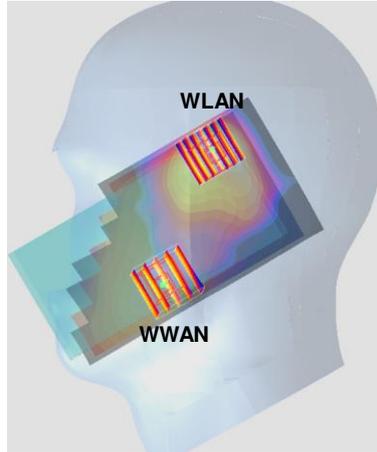
Case 3	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	CDMA2000 BC1	Right Cheek	1.077	0	5.09	6.19	0.02	92.1	2.20	0.04	Not required
	WLAN2.4GHz		1.118	0	1.72	-2.38	-0.13				



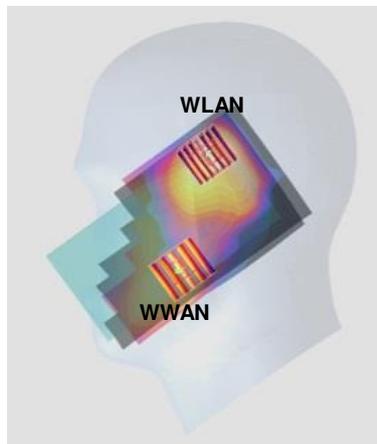
Case 4	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	CDMA2000 BC1	Left Cheek	1.233	0	4.6	-6	0.03	73.0	1.76	0.03	Not required
	WLAN2.4GHz		0.531	0	0.31	-0.09	-0.05				



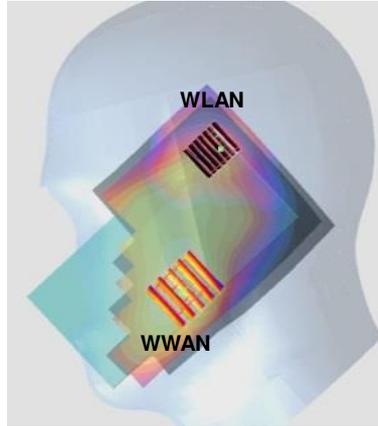
Case 5	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 4	Right Cheek	0.533	0	5.36	6.33	0.09	94.4	1.65	0.02	Not required
	WLAN2.4GHz		1.118	0	1.72	-2.38	-0.13				



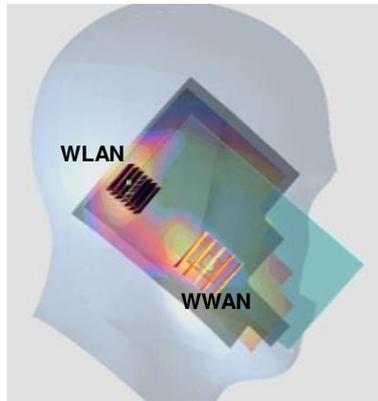
Case 6	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	LTE Band 25	Right Cheek	0.885	0	5.27	6.11	0.01	92.0	2.00	0.03	Not required
	WLAN2.4GHz		1.118	0	1.72	-2.38	-0.13				



Case 7	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	CDMA2000 BC1	Right Cheek	1.077	0	5.09	6.19	0.02	99.4	1.71	0.02	Not required
	WLAN5GHz		0.633	0	0.95	-2.84	0.46				



Case 8	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (cm)			3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
					X	Y	Z				
	CDMA2000 BC1	Left Cheek	1.233	0	4.6	-6	0.03	75.7	1.72	0.03	Not required
	WLAN5GHz		0.482	0	-1.93	-2.18	0.08				



Test Engineer : Galen Chang, Tommy Chen, Jerry Hu, Bevis Chang, Kurt Lu, Poa Chen and Lawrence Chen

16. Uncertainty Assessment

The component of uncertainty may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainty by the statistical analysis of a series of observations is termed a Type A evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance.

A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.

A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience, and knowledge of the behavior and properties of relevant materials and instruments, manufacture’s specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in table below.

Uncertainty Distributions	Normal	Rectangular	Triangular	U-Shape
Multi-plying Factor ^(a)	1/k ^(b)	1/√3	1/√6	1/√2

(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity

(b) κ is the coverage factor

Table 16.1. Standard Uncertainty for Assumed Distribution

The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type B evaluation using the usual “root-sum-squares” (RSS) methods of combining standard deviations by taking the positive square root of the estimated variances.

Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %. The DASY uncertainty Budget is shown in the following tables.



Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	6.0	N	1	1	1	6.0	6.0
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	1.0	R	1.732	1	1	0.6	0.6
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	2.9	R	1.732	1	1	1.7	1.7
Max. SAR Eval.	2.0	R	1.732	1	1	1.2	1.2
Test Sample Related							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	3.6	3.6
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.1	R	1.732	1	1	3.5	3.5
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						11.4%	11.4%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						22.9%	22.7%

Table 16.2. Uncertainty Budget for frequency range 300 MHz to 3 GHz



Error Description	Uncertainty Value (±%)	Probability	Divisor	(Ci) 1g	(Ci) 10g	Standard Uncertainty (1g) (±%)	Standard Uncertainty (10g) (±%)
Measurement System							
Probe Calibration	7.0	N	1	1	1	7.0	7.0
Axial Isotropy	4.7	R	1.732	0.7	0.7	1.9	1.9
Hemispherical Isotropy	9.6	R	1.732	0.7	0.7	3.9	3.9
Boundary Effects	2.0	R	1.732	1	1	1.2	1.2
Linearity	4.7	R	1.732	1	1	2.7	2.7
System Detection Limits	1.0	R	1.732	1	1	0.6	0.6
Modulation Response	3.2	R	1.732	1	1	1.8	1.8
Readout Electronics	0.3	N	1	1	1	0.3	0.3
Response Time	0.0	R	1.732	1	1	0.0	0.0
Integration Time	2.6	R	1.732	1	1	1.5	1.5
RF Ambient Noise	3.0	R	1.732	1	1	1.7	1.7
RF Ambient Reflections	3.0	R	1.732	1	1	1.7	1.7
Probe Positioner	0.4	R	1.732	1	1	0.2	0.2
Probe Positioning	6.7	R	1.732	1	1	3.9	3.9
Max. SAR Eval.	4.0	R	1.732	1	1	2.3	2.3
Test Sample Related							
Device Positioning	3.0	N	1	1	1	3.0	3.0
Device Holder	3.6	N	1	1	1	3.6	3.6
Power Drift	5.0	R	1.732	1	1	2.9	2.9
Power Scaling	0.0	R	1.732	1	1	0.0	0.0
Phantom and Setup							
Phantom Uncertainty	6.6	R	1.732	1	1	3.8	3.8
SAR correction	0.0	R	1.732	1	0.84	0.0	0.0
Liquid Conductivity Repeatability	0.2	N	1	0.78	0.71	0.1	0.1
Liquid Conductivity (target)	5.0	R	1.732	0.78	0.71	2.3	2.0
Liquid Conductivity (mea.)	2.5	R	1.732	0.78	0.71	1.1	1.0
Temp. unc. - Conductivity	3.4	R	1.732	0.78	0.71	1.5	1.4
Liquid Permittivity Repeatability	0.15	N	1	0.23	0.26	0.0	0.0
Liquid Permittivity (target)	5.0	R	1.732	0.23	0.26	0.7	0.8
Liquid Permittivity (mea.)	2.5	R	1.732	0.23	0.26	0.3	0.4
Temp. unc. - Permittivity	0.83	R	1.732	0.23	0.26	0.1	0.1
Combined Std. Uncertainty						12.8%	12.7%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						25.5%	25.4%

Table 16.3. Uncertainty Budget for frequency range 3 GHz to 6 GHz



17. 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
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