FCC SAR Test Report

APPLICANT	:	Motorola Mobility LLC
EQUIPMENT	:	Mobile Cellular Phone
BRAND NAME	:	Motorola
MODEL NAME	:	10873
FCC ID	:	IHDT56WK2
STANDARD	:	FCC 47 CFR Part 2 (2.1093) ANSI/IEEE C95.1-1992 IEEE 1528-2013

We, Sporton International (Kunshan) 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 (Kunshan) Inc., the test report shall not be reproduced except in full.

Mark Qu

Approved by: Mark Qu / Manager

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TESTING
NVLAP LAB CODE 600155-0

Sporton International (Kunshan) Inc.
No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA761702	Rev. 01	Initial issue of report	Aug. 15, 2017

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **Motorola Mobility LLC, Mobile Cellular Phone, 10873**, are as follows.

Equipment Class	Frequency Band		Highest SAR Summary			Highest Simultaneous Transmission 1g SAR (W/kg)
			Head (Separation 0mm)	Hotspot (Separation 10mm)	Body-worn (Separation 10mm)	
			1g SAR (W/kg)			
Licensed	GSM	GSM850	0.35	0.90	0.90	1.59
		GSM1900	0.14	1.03	1.03	
	WCDMA	Band V	0.27	0.67	0.67	
		Band IV	0.13	**1.16**	**1.16**	
		Band II	0.14	1.13	1.13	
	LTE	Band 26/Band 5	0.45	0.75	0.75	
		Band 4	0.39	1.11	1.11	
		Band 2	0.30	0.97	0.97	
		Band 7	0.34	1.15	0.56	
		Band 41/Band 38	0.15	1.09	0.36	
DTS	WLAN	2.4GHz WLAN	0.91	0.54	0.54	1.58
NII		5GHz WLAN	**0.97**	0.83	0.83	1.59
DSS	Bluetooth	2.4GHz Bluetooth				1.49
Date of Testing:			2017/7/20~2017/7/21			

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6W/kg as averaged over any 1 gram of tissue) 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 (Kunshan) Inc.
Test Site Location	No.3-2 Ping-Xiang Rd, Kunshan Development Zone Kunshan City Jiangsu Province 215335 China TEL : +86-512-57900158 FAX : +86-512-57900958

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

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

3. Guidance Applied

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

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

4. Equipment Under Test (EUT) Information

4.1 General Information

Product Feature & Specification	
Equipment Name	Mobile Cellular Phone
Brand Name	Motorola
Model Name	10873
FCC ID	IHDT56WK2
IMEI Code	SIM1: 351899080031859 SIM2: 351899080031867
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 LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 7: 2502.5 MHz ~ 2567.5 MHz LTE Band 26: 814.7 MHz ~ 848.3 MHz LTE Band 38: 2572.5 MHz ~ 2617.5 MHz LTE Band 41: 2498.5 MHz ~ 2687.5 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz WLAN 5.2GHz Band: 5180 MHz ~ 5240 MHz WLAN 5.3GHz Band: 5260 MHz ~ 5320 MHz WLAN 5.5GHz Band: 5500 MHz ~ 5700 MHz WLAN 5.8GHz Band: 5745 MHz ~ 5825 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC : 13.56 MHz
Mode	GSM/GPRS/EGPRS RMC/AMR 12.2Kbps HSDPA HSUPA DC-HSDPA HSPA+ (16QAM uplink is not supported) LTE: QPSK, 16QAM, 64QAM WLAN 2.4GHz 802.11b/g/n HT20/HT40 WLAN 5GHz 802.11a/n HT20/HT40 WLAN 5GHz 802.11ac VHT20/VHT40/VHT80 Bluetooth v3.0+EDR, Bluetooth v4.0 LE, Bluetooth v4.1 LE, Bluetooth v4.2 LE, Bluetooth v5.0 LE NFC
HW Version	DVT2
SW Version	NPW26.75
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. WLAN operation in 5600 MHz ~ 5650 MHz is notched.
2. This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
3. This device 2.4GHz WLAN/5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WiFi Direct (GC/GO), and 5.3GHz / 5.5GHz supports WiFi Direct (GC only).
4. This device does not support DTM operation and supports GRPS/EGRPS mode up to multi-slot class 12.
5. For dual SIM card mobile has two SIM slots and supports dual SIM dual standby. The WWAN radio transmission will be enabled by either one SIM at a time (single active). After pre-scan two SIM cards power, we found test result of the SIM1 was the worse, so we chose SIM1 slot to perform all tests.
6. The device employs proximity sensors that detect the presence of the user's body at the front or back faces of the device. When front or back body worn condition is detected, WCDMA band II/IV and LTE band 2/4/7/38/41 reduced power will be active. (P-sensor can't work at detecting presence of the user's body at the four edges of the device.)
7. When hotspot mode is enabled, power reduction will be activated to limit the maximum power of WCDMA band II/IV

and LTE band 2/4/7/38/41.

8. This device hotspot reduced power and P-sensor reduced power level are the same. So only show one reduced power level for hotspot reduced power and P-sensor reduced power for this application.
9. When the phone is in talking mode and receiver worked, then power reduction will be implemented immediately at WLAN2.4GHz and WLAN5GHz.
10. This device has two antennas. WWAN antenna 1 is located on the left side of bottom edge of the device and WWAN antenna 2 is located on the right side of bottom edge of the device which can refer to antenna location chapter. WWAN antenna 1 frequency bands include GSM850/1900, WCDMA Band II/IV/V, LTE Band 2/4/5/26 and WWAN antenna 2 frequency bands only include LTE Band 7/38/41.
11. This device implements antenna tuning techniques for several WWAN (cellular) operating modes and frequencies for the purpose of improving antenna efficiency over a broad range of frequencies. Specifically, these techniques are employed in the WCDMA and LTE modes of WWAN antenna 1.

4.2 Specification of Accessory

Specification of Accessory				
AC Adapter 1	**Brand Name**	Motorola(Salom)	**Model Name**	SC-22
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5Vdc or 9Vdc or 12Vdc, 3000mA or 1600mA or 1200mA		
AC Adapter 2	**Brand Name**	Motorola(Chenyang)	**Model Name**	SC-22
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5Vdc or 9Vdc or 12Vdc, 3000mA or 1600mA or 1200mA		
AC Adapter 3	**Brand Name**	Motorola(LiteOn)	**Model Name**	SC-22
	Power Rating	I/P: 100-240Vac, 500mA, O/P: 5Vdc or 9Vdc or 12Vdc, 3000mA or 1600mA or 1200mA		
Battery	**Brand Name**	Motorola (SUNWODA)	**Model Name**	HX40
	Power Rating	3.8Vdc,2810mAh	**Type**	Li-ion
Earphone	**Brand Name**	Motorola (Cosonic)	**Model Name**	SH38C16617
	Signal Line Type	1.1 meter, non-shielded cable, without ferrite core		
USB Cable 1	**Brand Name**	Motorola (Saibao)	**Model Name**	SKN6473A
	Signal Line Type	1.1 meter, shielded cable, without core		
USB Cable 2	**Brand Name**	Motorola (Foxlink)	**Model Name**	SKN6473A
	Signal Line Type	1.1 meter, shielded cable, without core		
USB Cable 3	**Brand Name**	Motorola (Cabletech)	**Model Name**	SKN6473A
	Signal Line Type	1.1 meter, shielded cable, without core		

4.3 General LTE SAR Test and Reporting Considerations

<table>
<tr><th colspan="2">Summarized necessary items addressed in KDB 941225 D05 v02r05</th></tr>
<tr><td>FCC ID</td><td>IHDT56WK2</td></tr>
<tr><td>Equipment Name</td><td>Mobile Cellular Phone</td></tr>
<tr><td>Operating Frequency Range of each LTE transmission band</td><td>LTE Band 2: 1850.7 MHz ~ 1909.3 MHz
LTE Band 4: 1710.7 MHz ~ 1754.3 MHz
LTE Band 5: 824.7 MHz ~ 848.3 MHz
LTE Band 7: 2502.5 MHz ~ 2567.5 MHz
LTE Band 26: 814.7 MHz ~ 848.3 MHz
LTE Band 38: 2572.5 MHz ~ 2617.5 MHz
LTE Band 41: 2498.5 MHz ~ 2687.5 MHz</td></tr>
<tr><td>Channel Bandwidth</td><td>LTE Band 2:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 4:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 5:1.4MHz, 3MHz, 5MHz, 10MHz
LTE Band 7: 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 26:1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz
LTE Band 38: 5MHz, 10MHz, 15MHz, 20MHz
LTE Band 41: 5MHz, 10MHz, 15MHz, 20MHz</td></tr>
<tr><td>uplink modulations used</td><td>QPSK, 16QAM and 64QAM</td></tr>
<tr><td>LTE Voice / Data requirements</td><td>Voice and Data</td></tr>
<tr><td>LTE Release Version</td><td>R11, Cat 5</td></tr>
<tr><td>CA Support</td><td>Yes, Downlink Only</td></tr>
<tr><td>LTE MPR permanently built-in by design</td><td>
Table 6.2.3.3-1: Maximum Power Reduction (MPR) for Power Class 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth configuration [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>
<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>
</table>
Table 6.2.3_3.3-1: Maximum Power Reduction (MPR) for Power Class 3
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<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>
<tr><td>64 QAM</td><td>≤ 5</td><td>≤ 4</td><td>≤ 8</td><td>≤ 12</td><td>≤ 16</td><td>≤ 18</td><td>≤ 2</td></tr>
<tr><td>64 QAM</td><td>> 5</td><td>> 4</td><td>> 8</td><td>> 12</td><td>> 16</td><td>> 18</td><td>≤ 3</td></tr>
</table>
</td></tr>
<tr><td>LTE A-MPR</td><td>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)</td></tr>
<tr><td>Spectrum plots for RB configuration</td><td>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.</td></tr>
<tr><td>Power reduction applied to satisfy SAR compliance</td><td>Yes
1. The device employs proximity sensors that detect the presence of the user's body at the front or back faces of the device. When front or back body worn condition is detected, WCDMA band II/IV and LTE band 2/4/7/38/41 reduced power will be active. (P-sensor can't work at detecting presence of the user's body at the four edges of the device.)
2. When hotspot mode is enabled, power reduction will be activated to limit the maximum power of WCDMA band II/IV and LTE band 2/4/7/38/41.
3. When the phone is in talking mode and receiver worked, then power reduction will be implemented immediately at WLAN2.4GHz and WLAN5GHz.</td></tr>
<tr><td>LTE Carrier Aggregation Combinations</td><td>Intra-Band possible combinations as below page and the detail power verification please referred to section 13.</td></tr>
<tr><td>LTE Carrier Aggregation Additional Information</td><td>This device supports maximum of 2 and 3 carriers in the downlink only. All uplink communications are identical to the Release 8 Specifications. Uplink communications are done on the PCC. Due to carrier capability, only the combinations listed above are supported. The following LTE Release features are not supported: Relay, HetNet, Enhanced MIMO, eICI, WiFi Offloading, MDH, eMBMA, Cross-Carrier Scheduling, Enhanced SC-FDMA.</td></tr>
</table>

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)
L	20407	824.7	20415	825.5	20425	826.5	20450	829
M	20525	836.5	20525	836.5	20525	836.5	20525	836.5
H	20643	848.3	20635	847.5	20625	846.5	20600	844
LTE Band 7								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	20775	2502.5	20800	2505	20825	2507.5	20850	2510
M	21100	2535	21100	2535	21100	2535	21100	2535
H	21425	2567.5	21400	2565	21375	2562.5	21350	2560
LTE Band 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	26765	821.5
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 38								
	Bandwidth 5 MHz		Bandwidth 10 MHz		Bandwidth 15 MHz		Bandwidth 20 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	37775	2572.5	37800	2575	37825	2577.5	37850	2580
M	38000	2595	38000	2595	38000	2595	38000	2595
H	38225	2617.5	38200	2615	38175	2612.5	38150	2610
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 M	40148	2545.8	40160	2547	40173	2548.3	40185	2549.5
M	40620	2593	40620	2593	40620	2593	40620	2593
H M	41093	2640.3	41080	2639	41068	2637.8	41055	2636.5
H	41565	2687.5	41540	2685	41515	2682.5	41490	2680

5. Re-use of Measured Data

5.1 Introduction Section

This application re-uses data collected on a similar device. The subject device of this application (Model: 10873, FCC ID: IHDT56WK2) is electrically identical to the reference device (Model: 10647, FCC ID: IHDT56WK1 and Model: 10870, 10869, FCC ID: IHDT56WK4) for the portions of the circuitry corresponding to the data being re-used, as treated by KDB Publication 178919 D01.

5.2 Difference Section

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

The re-used RF data includes the following bands provided in Appendix E.

a. Sporton SAR Report No. FA761702-01 for the reference device Model: 10647, FCC ID: IHDT56WK1 for WWAN.
   -GSM850/1900
   -WCDMA Band V/IV/II
   -LTE Band 2/5/7/26/38/41

b. Sporton SAR Report No. FA761702-03 for the reference device Model: 10870, 10869, FCC ID: IHDT56WK4 for WLAN/BT.

- WLAN/BT

LTE Band 4 full SAR test, spot check for WWAN (except LTE Band 4) and WLAN are performed for ensure that SAR measurement for both device are the same. So, the original SAR value can represent this application.

5.3 Spot Check Verification Data Section

Band	BW (MHz)	Modulation	RB Size	RB Offset	Mode	Test Position	Gap (mm)	Power Mode	Ch.	Freq. (MHz)	Original model (FCC ID: IHDT56WK1, IHDT56WK4)				Spot check model (FCC ID: IHDT56WK2)				Deviation
											Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	Average Power (dBm)	Tune-Up Limit (dBm)	Measured 1g SAR (W/kg)	Reported 1g SAR (W/kg)	
GSM850	-	-	-	-	GPRS 2 Tx slots	Back	10	Full	251	848.8	30.69	31	0.835	0.897	30.69	31	0.831	0.892	-0.56%
GSM1900	-	-	-	-	GPRS 2 Tx slots	Front	10	Full	512	1850.2	26.75	27.5	0.863	1.026	26.75	27.5	0.739	0.878	-14.42%
WCDMA Band V	-	-	-	-	RMC 12.2Kbps	Back	10	Full	4182	836.4	23.1	23.5	0.607	0.666	23.10	23.5	0.683	0.749	12.46%
WCDMA Band IV	-	-	-	-	RMC 12.2Kbps	Front	10	Reduced	1513	1752.6	21.58	22	1.050	1.157	21.58	22	1.050	1.157	0%
WCDMA Band II	-	-	-	-	RMC 12.2Kbps	Back	10	Reduced	9262	1852.4	21.49	22	1.000	1.125	21.49	22	1.030	1.158	2.93%
LTE Band 26	15M	QPSK	1	0	-	Back	10	Full	26865	831.5	22.94	23.5	0.663	0.754	22.94	23.5	0.686	0.780	3.45%
LTE Band 25/2	20M	QPSK	1	0	-	Back	10	Reduced	26340	1880	20.57	21.5	0.780	0.966					-4.14%
LTE Band 2	20M	QPSK	1	0	-	Back	10	Reduced	19100	1900					20.89	21.5	0.805	0.926	
LTE Band 7	20M	QPSK	1	0	-	Bottom Side	10	Reduced	20850	2510	20.22	20.5	1.080	1.152	20.22	20.5	1.030	1.099	-4.60%
LTE Band 41	20M	QPSK	1	0	-	Bottom Side	10	Reduced	39750	2506	22.08	22.5	0.987	1.094	22.08	22.5	1.030	1.141	4.30%
WLAN2.4GHz	-	-	-	-	802.11b 1Mbps	Left Cheek	-	Reduced	1	2412	16.52	17	0.814	0.909	16.52	17	0.655	0.732	-19.47%
WLAN5.2GHz	-	-	-	-	802.11a 6Mbps	Back	10	Full	36	5180	16.95	17.5	0.303	0.366	16.95	17.5	0.251	0.303	-17.21%
WLAN5.3GHz	-	-	-	-	802.11a 6Mbps	Left Tilted	-	Reduced	60	5300	14.86	15	0.879	0.965	14.86	15	0.715	0.785	-18.65%
WLAN5.5GHz	-	-	-	-	802.11a 6Mbps	Left Cheek	-	Reduced	100	5500	14.68	15	0.826	0.945	14.68	15	0.762	0.872	-7.72%
WLAN5.8GHz	-	-	-	-	802.11a 6Mbps	Back	10	Full	165	5825	17.29	17.5	0.746	0.832	17.29	17.5	0.619	0.691	-16.95%

Note: In the table above, all the deviation of SAR test results are compliant with uncertainty budget.

5.4 Reference detail Section

Reference FCC ID	Folder Test/RF Exposure	Report Title/Section
IHDT56WK1	RF Exposure(FA761702-01)	All sections applicable (Only WWAN except LTE Band 4)
IHDT56WK4	RF Exposure(FA761702-03)	All sections applicable (Only WLAN/BT)

6. RF Exposure Limits

6.1 Uncontrolled Environment

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

6.2 Controlled Environment

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

Limits for Occupational/Controlled Exposure (W/kg)

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

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

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

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

7. Specific Absorption Rate (SAR)

7.1 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.

7.2 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:

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

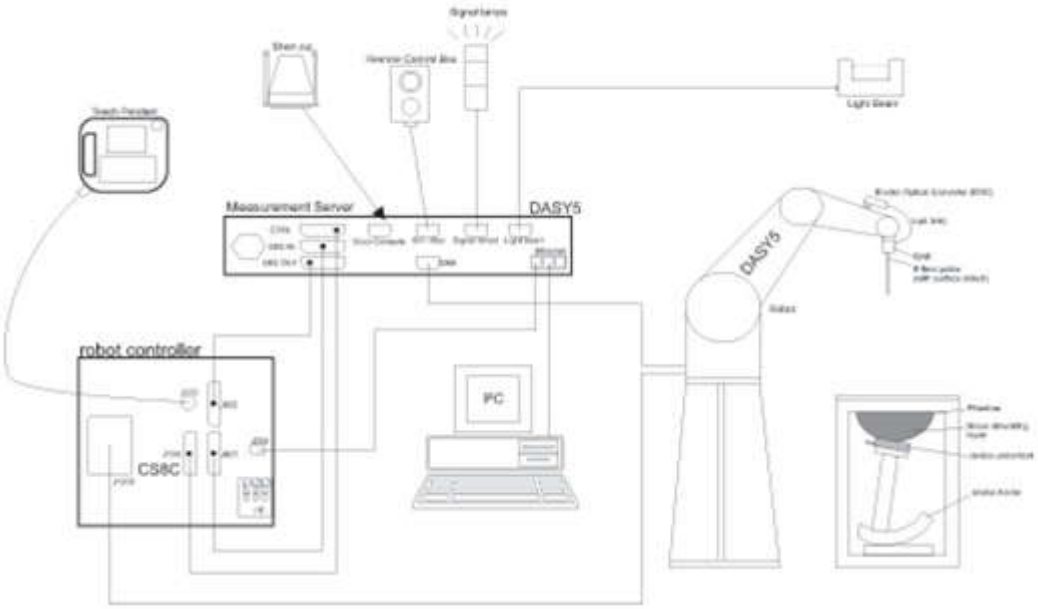
SAR is expressed in units of Watts per kilogram (W/kg)

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

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

8. 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.

8.1 E-Field Probe

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

<EX3DV4 Probe>

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

8.2 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

8.3 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

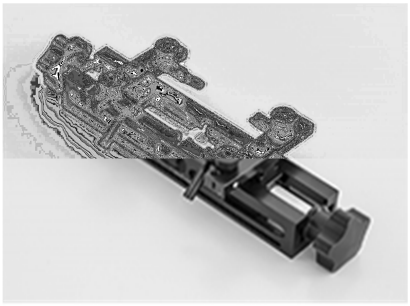
The ELI phantom is intended for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with standard and all known tissue simulating liquids.

8.4 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

9. 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.

<SAR measurement>

(a) Use base station simulator to configure EUT WWAN transmission in radiated connection 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

9.1 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 form 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

9.2 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.

9.3 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	½·δ·ln(2) ± 0.5 mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location	30° ± 1°	20° ± 1°
Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}	≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
	When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	

9.4 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: Δx_{Zoom}, Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	≤ 1.5·$\Delta z_{Zoom}(n-1)$	
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 *reported* SAR from the *area scan based 1-g SAR estimation* 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.

9.5 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.

9.6 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.

10. Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	1750MHz System Validation Kit	D1750V2	1090	2017/3/23	2018/3/22
SPEAG	Data Acquisition Electronics	DAE4	1358	2016/9/5	2017/9/4
SPEAG	Dosimetric E-Field Probe	EX3DV4	3935	2016/11/28	2017/11/27
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1753	NCR	NCR
SPEAG	SAM Twin Phantom	QD 000 P40 CD	TP-1754	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201074235	2016/12/5	2017/12/4
Anritsu	Radio communication analyzer	MT8821C	6201692204	2017/3/29	2018/3/28
Agilent	ENA Series Network Analyzer	E5071C	MY46317418	2016/12/5	2017/12/4
Agilent	Dielectric Probe Kit	85070E	MY44300751	NCR	NCR
Anritsu	Power Senor	MA2411B	1644003	2016/12/23	2017/12/22
Anritsu	Power Meter	ML2495A	1531197	2016/12/23	2017/12/22
Anritsu	Power Senor	MA2411B	1644004	2016/12/23	2017/12/22
Anritsu	Power Meter	ML2495A	1531198	2016/12/23	2017/12/22
R&S	Signal Generator	N5181A	MY50145381	2017/1/3	2018/1/2
R&S	CBT BLUETOOTH TESTER	CBT	101137	2016/8/9	2017/8/8
TES	Liquid thermometer	TES 1310	141004807	2017/4/21	2018/4/20
VICTOR	Temperature and humidity meter	VC230	H-3	2017/4/18	2018/4/17
R&S	Spectrum Analyzer	FSV 7	101632	2016/12/5	2017/12/4
ARRA	Power Divider	A3200-2	NA	Note	
Agilent	Dual Directional Coupler	778D	50422	Note	
PASTERNACK	Dual Directional Coupler	PE2214-10	N/A	Note	
Woken	Attenuation1	WK0602-XX	N/A	Note	
PE	Attenuation2	PE7005-10	N/A	Note	
PE	Attenuation3	PE7005-3	N/A	Note	
AR	Amplifier	5S1G4	342137	Note	

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

11. System Verification

11.1 Tissue Simulating Liquids

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

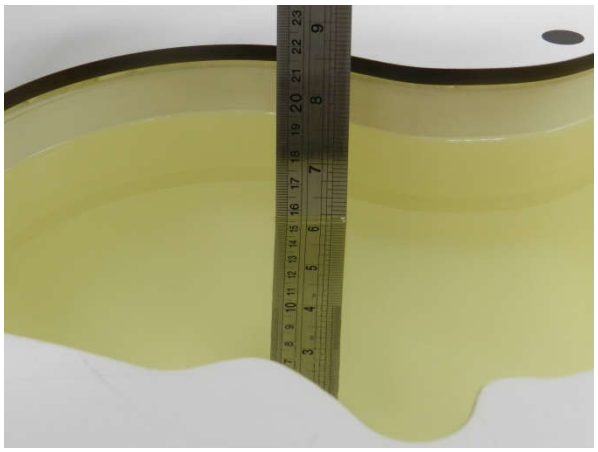


Fig 10.1Photo of Liquid Height for Head SAR

Fig 10.2 Photo of Liquid Height for Body SAR

11.2 Tissue Verification

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

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (εr)
For Head								
1750	55.2	0	0	0.3	0	44.5	1.37	40.10
For Body								
1750	70.2	0	0	0.4	0	29.4	1.49	53.40

<Tissue Dielectric Parameter Check Results>

Frequency (MHz)	Tissue Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
1750	Head	22.6	1.358	40.254	1.37	40.10	-0.88	0.38	±5	2017/7/21
1750	Body	22.3	1.514	53.693	1.49	53.40	1.61	0.55	±5	2017/7/20

11.3 System Performance Check Results

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

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 (%)
2017/7/21	1750	Head	250	1090	3935	1358	8.85	37.00	35.4	-4.32
2017/7/20	1750	Body	250	1090	3935	1358	9.44	38.10	37.76	-0.89

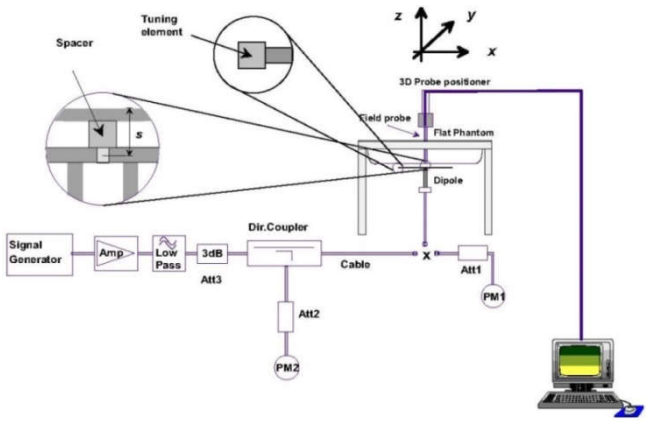


Fig 8.3.1 System Performance Check Setup

Fig 8.3.2 Setup Photo

12. RF Exposure Positions

12.1 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.

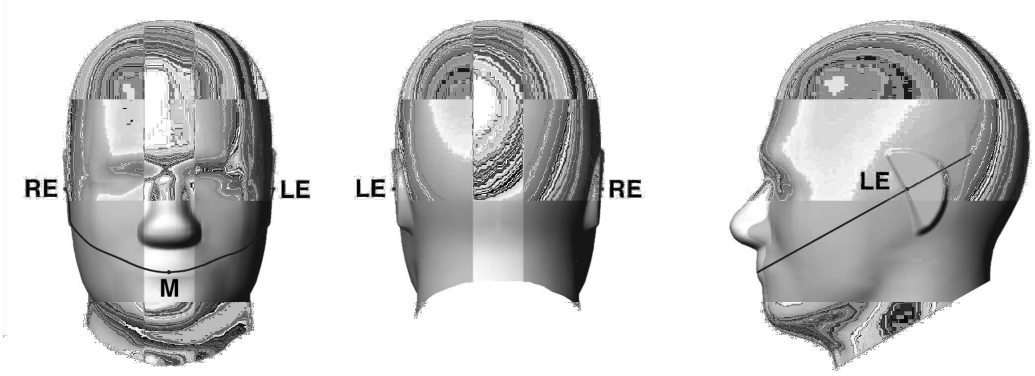


Fig 9.1.1 Front, back, and side views of SAM twin phantom

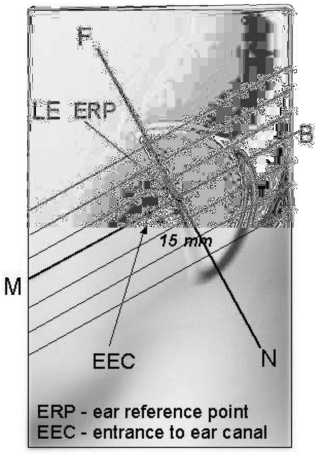


Fig 9.1.2 Close-up side view of phantom showing the ear region.

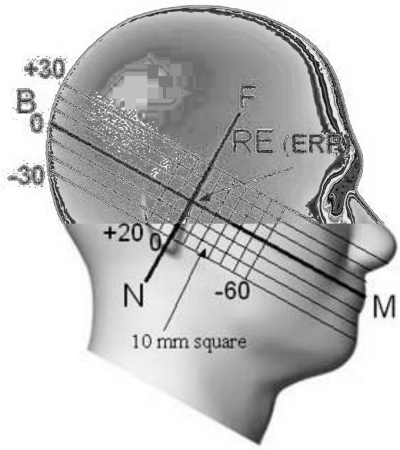


Fig 9.1.3 Side view of the phantom showing relevant markings and seven cross-sectional plane locations

12.2 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 wt 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 wb 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.

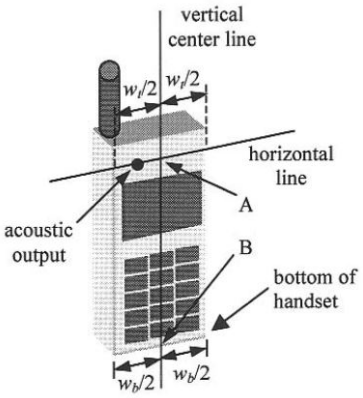


Fig 9.2.1 Handset vertical and horizontal reference lines—"fixed case

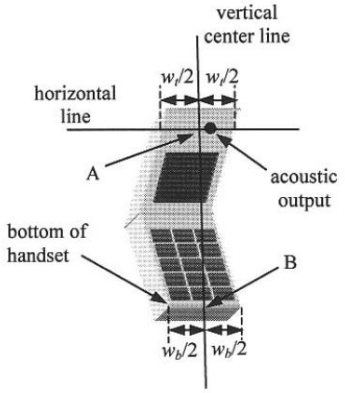


Fig 9.2.2 Handset vertical and horizontal reference lines—"clam-shell case"

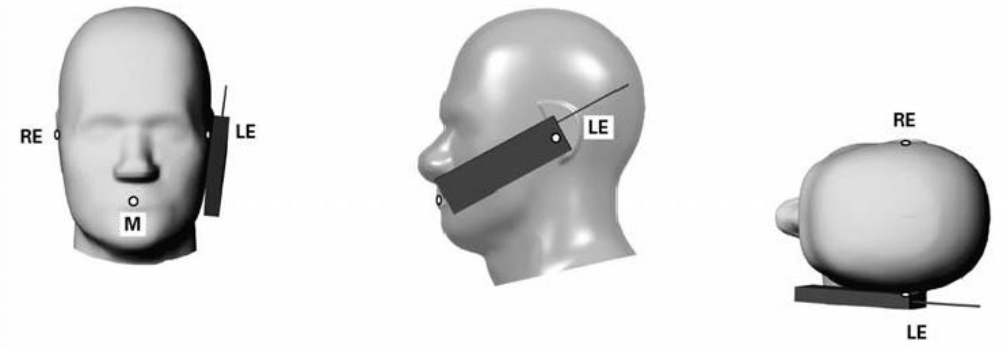


Fig 9.2.3 cheek or touch position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which establish the Reference Plane for handset positioning, are indicated.

12.3 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

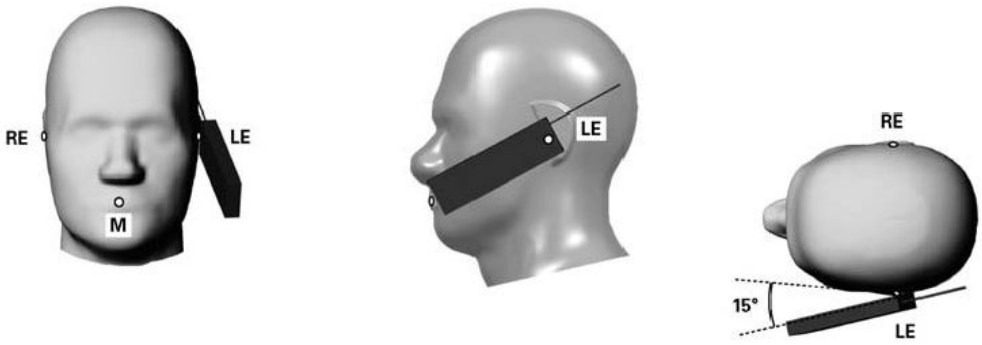


Fig 9.3.1 Tilt position. The reference points for the right ear (RE), left ear (LE), and mouth (M), which define the Reference Plane for handset positioning, are indicated.

12.4 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 handset 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 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.

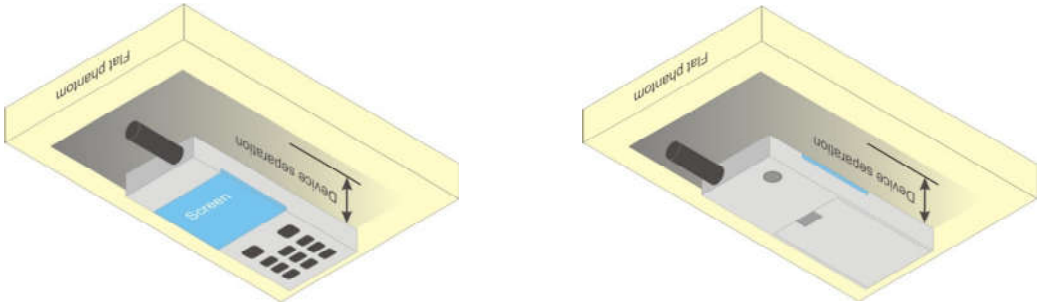


Fig 9.4 Body Worn Position

12.5 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 ≥ 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 form 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.

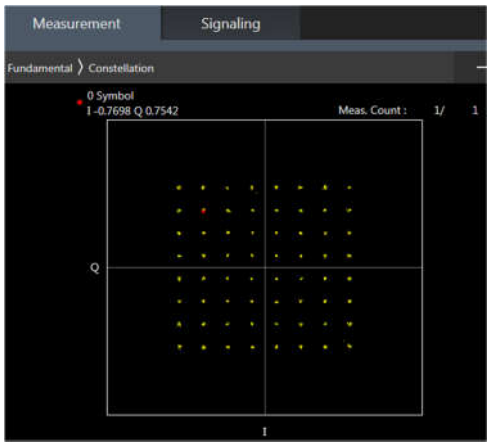
When the user enables the personal wireless router functions for the handset, actual operations include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for 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.

13. Conducted RF Output Power (Unit: dBm)

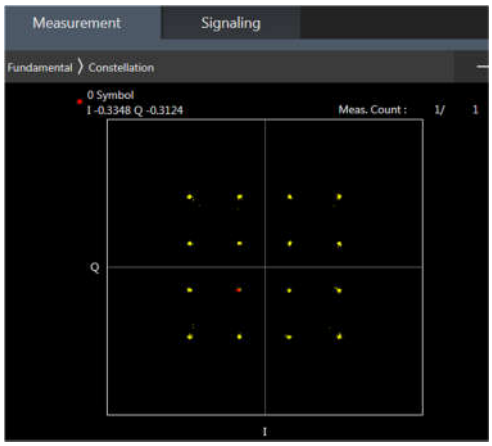
<LTE Conducted Power>

General Note:

1. Anritsu MT8820C base station simulator was used to setup the connection with EUT; the frequency band, channel bandwidth, RB allocation configuration, modulation type are set in the base station simulator to configure EUT transmitting at maximum power and at different configurations which are requested to be reported to FCC, for conducted power measurement and SAR testing.
2. Per KDB 941225 D05v02r05, when a properly configured base station simulator is used for the SAR and power measurements, spectrum plots for each RB allocation and offset configuration is not required.
3. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
4. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r05, for QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
6. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
7. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is > not ½ 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 B4 the maximum bandwidth does not support three non-overlapping channels, per KDB 941225 D05v02r05, when a device supports overlapping channel assignment in a channel bandwidth configuration, the middle channel of the group of overlapping channels should be selected for testing.
9. According to 2017 TCB workshop, for 64QAM and 16QAM should be verified by checking the signal constellation with a call box to avoid incorrect maximum power levels due to MPR and other requirements associated with signal modulation, and the following figure is taken from the "Fundamental Measurement >> Modulation Analysis >> constellation" mode of the device connect to the MT8821C base station, therefore, the device 64QAM and 16QAM signal modulation are correct.



64QAM



16QAM

<Full Power Mode>

<LTE Band 4>

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				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	23.04	23.1	23.12	23.5	0
20	QPSK	1	49	22.78	22.86	22.94		
20	QPSK	1	99	22.84	22.78	22.86		
20	QPSK	50	0	21.98	22.03	22.06	22.5	1
20	QPSK	50	24	21.93	21.95	22.04		
20	QPSK	50	50	21.94	21.91	21.99		
20	QPSK	100	0	21.91	21.99	22.08		
20	16QAM	1	0	22.34	22.4	22.4	22.5	1
20	16QAM	1	49	22.12	22.17	22.3		
20	16QAM	1	99	22.17	22.09	22.17		
20	16QAM	50	0	21	21.08	21.06	21.5	2
20	16QAM	50	24	20.89	20.98	21.08		
20	16QAM	50	50	20.94	20.92	20.99		
20	16QAM	100	0	20.93	20.97	21.06		
20	64QAM	1	0	22.24	22.3	22.24	22.5	1
20	64QAM	1	49	21.96	22.06	22.12		
20	64QAM	1	99	22	21.94	22.03		
20	64QAM	50	0	20.98	21.06	21.01	21.5	2
20	64QAM	50	24	20.89	20.98	21.07		
20	64QAM	50	50	20.93	20.92	20.98		
20	64QAM	100	0	20.92	20.97	21.08		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	22.98	23.05	23.05	23.5	0
15	QPSK	1	37	22.78	22.87	22.93		
15	QPSK	1	74	22.88	22.84	22.92		
15	QPSK	36	0	21.93	22.02	22.07	22.5	1
15	QPSK	36	20	21.87	21.98	22.06		
15	QPSK	36	39	21.98	21.9	21.96		
15	QPSK	75	0	21.91	21.98	22.03		
15	16QAM	1	0	22.28	22.39	22.35	22.5	1
15	16QAM	1	37	22.1	22.21	22.25		
15	16QAM	1	74	22.18	22.18	22.2		
15	16QAM	36	0	20.96	21.04	21.08	21.5	2
15	16QAM	36	20	20.92	20.99	21		
15	16QAM	36	39	20.95	20.89	20.99		
15	16QAM	75	0	20.88	20.98	21.04		
15	64QAM	1	0	22.2	22.22	22.19	22.5	1
15	64QAM	1	37	22.03	22.05	22.08		
15	64QAM	1	74	22.1	22.01	22.07		
15	64QAM	36	0	20.95	20.98	21.08	21.5	2
15	64QAM	36	20	20.92	20.98	21.02		
15	64QAM	36	39	20.97	20.89	20.99		
15	64QAM	75	0	20.88	20.96	21.04		

Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	22.85	22.98	23.04	23.5	0
10	QPSK	1	25	22.75	22.86	22.95		
10	QPSK	1	49	22.7	22.82	22.88		
10	QPSK	25	0	21.81	21.99	22.05	22.5	1
10	QPSK	25	12	21.78	21.94	22.01		
10	QPSK	25	25	21.74	21.9	21.98		
10	QPSK	50	0	21.78	21.92	22.02		
10	16QAM	1	0	22.13	22.3	22.38	22.5	1
10	16QAM	1	25	22.01	22.17	22.28		
10	16QAM	1	49	21.98	22.14	22.22		
10	16QAM	25	0	20.82	20.98	21.03	21.5	2
10	16QAM	25	12	20.79	20.97	20.99		
10	16QAM	25	25	20.75	20.92	20.95		
10	16QAM	50	0	20.8	20.94	21.01		
10	64QAM	1	0	21.99	22.13	22.22	22.5	1
10	64QAM	1	25	21.92	22.01	22.13		
10	64QAM	1	49	21.83	22	22.07		
10	64QAM	25	0	20.81	20.97	21.04	21.5	2
10	64QAM	25	12	20.8	20.98	20.99		
10	64QAM	25	25	20.74	20.93	20.95		
10	64QAM	50	0	20.77	20.94	21.01		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	22.81	22.9	22.99	23.5	0
5	QPSK	1	12	22.74	22.85	22.93		
5	QPSK	1	24	22.68	22.86	22.9		
5	QPSK	12	0	21.76	21.9	21.97	22.5	1
5	QPSK	12	7	21.8	21.95	21.96		
5	QPSK	12	13	21.75	21.88	21.97		
5	QPSK	25	0	21.75	21.9	21.99		
5	16QAM	1	0	22.05	22.27	22.24	22.5	1
5	16QAM	1	12	22.03	22.23	22.25		
5	16QAM	1	24	21.98	22.13	22.25		
5	16QAM	12	0	20.76	20.92	20.99	21.5	2
5	16QAM	12	7	20.78	20.97	21		
5	16QAM	12	13	20.75	20.93	20.94		
5	16QAM	25	0	20.78	20.93	20.95		
5	64QAM	1	0	21.97	22.09	22.14	22.5	1
5	64QAM	1	12	21.9	22.02	22.07		
5	64QAM	1	24	21.9	22	22.05		
5	64QAM	12	0	20.77	20.92	21	21.5	2
5	64QAM	12	7	20.76	20.97	20.97		
5	64QAM	12	13	20.75	20.91	20.93		
5	64QAM	25	0	20.77	20.93	20.93		

Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	22.73	22.89	22.94	23.5	0
3	QPSK	1	8	22.84	22.97	23.01		
3	QPSK	1	14	22.71	22.85	22.88		
3	QPSK	8	0	21.76	21.92	21.93	22.5	1
3	QPSK	8	4	21.75	21.93	21.98		
3	QPSK	8	7	21.77	21.88	21.95		
3	QPSK	15	0	21.75	21.93	21.95		
3	16QAM	1	0	22.01	22.19	22.19	22.5	1
3	16QAM	1	8	22.07	22.28	22.31		
3	16QAM	1	14	21.96	22.12	22.19		
3	16QAM	8	0	20.83	20.99	21.01	21.5	2
3	16QAM	8	4	20.83	21	21.01		
3	16QAM	8	7	20.8	20.94	20.97		
3	16QAM	15	0	20.8	20.91	20.95		
3	64QAM	1	0	21.93	22.03	22.08	22.5	1
3	64QAM	1	8	22	22.13	22.15		
3	64QAM	1	14	21.85	21.97	22		
3	64QAM	8	0	20.76	20.95	20.97	21.5	2
3	64QAM	8	4	20.81	20.96	20.98		
3	64QAM	8	7	20.73	20.89	20.94		
3	64QAM	15	0	20.77	20.87	20.91		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	22.63	22.79	22.85	23.5	0
1.4	QPSK	1	3	22.73	22.84	22.91		
1.4	QPSK	1	5	22.62	22.78	22.81		
1.4	QPSK	3	0	22.71	22.82	22.87		
1.4	QPSK	3	1	22.76	22.88	22.92		
1.4	QPSK	3	3	22.77	22.91	22.94		
1.4	QPSK	6	0	21.66	21.84	21.88	22.5	1
1.4	16QAM	1	0	21.94	22.11	22.18	22.5	1
1.4	16QAM	1	3	22.01	22.17	22.22		
1.4	16QAM	1	5	21.93	22.09	22.17		
1.4	16QAM	3	0	21.72	21.85	21.92		
1.4	16QAM	3	1	21.77	21.9	21.95		
1.4	16QAM	3	3	21.77	21.91	21.95		
1.4	16QAM	6	0	20.77	20.91	20.95	21.5	2
1.4	64QAM	1	0	21.8	22.01	22	22.5	1
1.4	64QAM	1	3	21.88	22.05	22.11		
1.4	64QAM	1	5	21.78	21.96	22		
1.4	64QAM	3	0	21.73	21.89	21.96		
1.4	64QAM	3	1	21.78	21.91	21.98		
1.4	64QAM	3	3	21.78	21.94	21.97		
1.4	64QAM	6	0	20.7	20.81	20.89	21.5	2

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

<LTE Band 4>

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				20050	20175	20300		
Frequency (MHz)				1720	1732.5	1745		
20	QPSK	1	0	21	21.04	21.06	21.5	0
20	QPSK	1	49	20.75	20.84	20.91		
20	QPSK	1	99	20.79	20.73	20.85		
20	QPSK	50	0	19.97	20.02	20.03	20.5	1
20	QPSK	50	24	19.89	19.92	20		
20	QPSK	50	50	19.92	19.87	19.97		
20	QPSK	100	0	19.88	19.93	20.01		
20	16QAM	1	0	20.31	20.36	20.36	20.5	1
20	16QAM	1	49	20.06	20.16	20.24		
20	16QAM	1	99	20.1	20.05	20.16		
20	16QAM	50	0	18.99	19.01	18.99	19.5	2
20	16QAM	50	24	18.88	18.97	19.02		
20	16QAM	50	50	18.91	18.87	18.94		
20	16QAM	100	0	18.88	18.92	19.01		
20	64QAM	1	0	20.15	20.23	20.24	20.5	1
20	64QAM	1	49	19.93	20	20.07		
20	64QAM	1	99	19.94	19.94	19.99		
20	64QAM	50	0	18.97	19	18.97	19.5	2
20	64QAM	50	24	18.88	18.95	19.01		
20	64QAM	50	50	18.92	18.84	18.95		
20	64QAM	100	0	18.9	18.92	19.02		
Channel				20025	20175	20325	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5		
15	QPSK	1	0	20.98	21.03	21.02	21.5	0
15	QPSK	1	37	20.77	20.84	20.9		
15	QPSK	1	74	20.88	20.83	20.86		
15	QPSK	36	0	19.95	20.02	20.02	20.5	1
15	QPSK	36	20	19.93	19.93	19.98		
15	QPSK	36	39	19.94	19.9	19.96		
15	QPSK	75	0	19.89	19.93	20		
15	16QAM	1	0	20.28	20.33	20.33	20.5	1
15	16QAM	1	37	20.06	20.15	20.25		
15	16QAM	1	74	20.17	20.12	20.19		
15	16QAM	36	0	18.94	18.99	19.06	19.5	2
15	16QAM	36	20	18.92	18.93	18.98		
15	16QAM	36	39	18.94	18.89	18.94		
15	16QAM	75	0	18.89	18.92	19.01		
15	64QAM	1	0	20.14	20.21	20.19	20.5	1
15	64QAM	1	37	19.95	19.99	20.05		
15	64QAM	1	74	20	19.97	20.07		
15	64QAM	36	0	18.94	18.99	19.02	19.5	2
15	64QAM	36	20	18.92	18.91	18.98		
15	64QAM	36	39	18.95	18.89	18.97		
15	64QAM	75	0	18.88	18.91	19		

Channel				20000	20175	20350	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1715	1732.5	1750		
10	QPSK	1	0	20.84	20.95	21.02	21.5	0
10	QPSK	1	25	20.74	20.83	20.93		
10	QPSK	1	49	20.69	20.79	20.83		
10	QPSK	25	0	19.83	19.96	20.02	20.5	1
10	QPSK	25	12	19.82	19.9	19.99		
10	QPSK	25	25	19.74	19.86	19.92		
10	QPSK	50	0	19.79	19.88	19.95		
10	16QAM	1	0	20.13	20.24	20.33	20.5	1
10	16QAM	1	25	20	20.16	20.22		
10	16QAM	1	49	19.95	20.09	20.19		
10	16QAM	25	0	18.81	18.93	19	19.5	2
10	16QAM	25	12	18.82	18.9	18.99		
10	16QAM	25	25	18.75	18.85	18.94		
10	16QAM	50	0	18.81	18.95	18.96		
10	64QAM	1	0	19.98	20.1	20.15	20.5	1
10	64QAM	1	25	19.9	20.02	20.06		
10	64QAM	1	49	19.84	19.95	19.98		
10	64QAM	25	0	18.81	18.92	18.99	19.5	2
10	64QAM	25	12	18.83	18.93	19		
10	64QAM	25	25	18.73	18.84	18.92		
10	64QAM	50	0	18.8	18.92	18.96		
Channel				19975	20175	20375	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5		
5	QPSK	1	0	20.77	20.89	20.96	21.5	0
5	QPSK	1	12	20.7	20.85	20.89		
5	QPSK	1	24	20.7	20.82	20.89		
5	QPSK	12	0	19.81	19.9	19.96	20.5	1
5	QPSK	12	7	19.8	19.93	19.94		
5	QPSK	12	13	19.76	19.87	19.92		
5	QPSK	25	0	19.77	19.89	19.97		
5	16QAM	1	0	20.08	20.21	20.23	20.5	1
5	16QAM	1	12	20.01	20.22	20.21		
5	16QAM	1	24	19.99	20.13	20.21		
5	16QAM	12	0	18.79	18.93	18.97	19.5	2
5	16QAM	12	7	18.81	18.9	18.95		
5	16QAM	12	13	18.76	18.9	18.92		
5	16QAM	25	0	18.75	18.87	18.92		
5	64QAM	1	0	19.93	20.07	20.11	20.5	1
5	64QAM	1	12	19.88	20.01	20.03		
5	64QAM	1	24	19.87	19.95	20.01		
5	64QAM	12	0	18.78	18.91	18.96	19.5	2
5	64QAM	12	7	18.8	18.88	18.94		
5	64QAM	12	13	18.74	18.85	18.92		
5	64QAM	25	0	18.74	18.87	18.92		

Channel				19965	20175	20385	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5		
3	QPSK	1	0	20.73	20.83	20.91	21.5	0
3	QPSK	1	8	20.8	20.92	21		
3	QPSK	1	14	20.68	20.8	20.87		
3	QPSK	8	0	19.76	19.88	19.9	20.5	1
3	QPSK	8	4	19.78	19.88	19.93		
3	QPSK	8	7	19.77	19.85	19.9		
3	QPSK	15	0	19.75	19.87	19.91		
3	16QAM	1	0	20	20.18	20.23	20.5	1
3	16QAM	1	8	20.15	20.27	20.25		
3	16QAM	1	14	19.98	20.12	20.19		
3	16QAM	8	0	18.83	18.93	18.99	19.5	2
3	16QAM	8	4	18.84	18.95	18.99		
3	16QAM	8	7	18.8	18.93	18.99		
3	16QAM	15	0	18.79	18.9	18.92		
3	64QAM	1	0	19.88	20.01	20.03	20.5	1
3	64QAM	1	8	19.95	20.04	20.15		
3	64QAM	1	14	19.84	19.96	19.99		
3	64QAM	8	0	18.75	18.87	18.93	19.5	2
3	64QAM	8	4	18.8	18.89	18.93		
3	64QAM	8	7	18.76	18.88	18.93		
3	64QAM	15	0	18.75	18.88	18.9		
Channel				19957	20175	20393	Tune-up limit (dBm)	MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3		
1.4	QPSK	1	0	20.7	20.76	20.81	21.5	0
1.4	QPSK	1	3	20.79	20.82	20.88		
1.4	QPSK	1	5	20.69	20.74	20.78		
1.4	QPSK	3	0	20.77	20.82	20.87		
1.4	QPSK	3	1	20.81	20.85	20.88		
1.4	QPSK	3	3	20.71	20.87	20.91		
1.4	QPSK	6	0	19.67	19.81	19.83	20.5	1
1.4	16QAM	1	0	19.9	20.05	20.08	20.5	1
1.4	16QAM	1	3	20	20.13	20.16		
1.4	16QAM	1	5	19.91	20.05	20.08		
1.4	16QAM	3	0	19.7	19.85	19.89		
1.4	16QAM	3	1	19.74	19.89	19.92		
1.4	16QAM	3	3	19.71	19.89	19.91		
1.4	16QAM	6	0	18.73	18.85	18.9	19.5	2
1.4	64QAM	1	0	19.85	19.91	20.02	20.5	1
1.4	64QAM	1	3	19.89	19.95	20.1		
1.4	64QAM	1	5	19.81	19.87	19.97		
1.4	64QAM	3	0	19.73	19.84	19.88		
1.4	64QAM	3	1	19.72	19.85	19.94		
1.4	64QAM	3	3	19.75	19.89	19.91		
1.4	64QAM	6	0	18.7	18.77	18.83	19.5	2

<LTE Carrier Aggregation>

General Note:

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

E-UTRA CA configuration / Bandwidth combination set							
E-UTRA CA configuration	Uplink CA configurations	Component carriers in order of increasing carrier frequency				Maximum aggregated bandwidth [MHz]	Bandwidth combination set
		Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]	Channel bandwidths for carrier [MHz]		
CA_7B	-	15	5			20	0
CA_7C	-	15	15	15		40	0
		20	20	20			
		10	20	10		40	1
		15	15, 20	15			
		20	10, 15, 20	20			
		15	10, 15	15		40	2
		20	15, 20	20			
CA_41C	-	10	20			40	0
		15	15, 20				
		20	10, 15, 20				
		5, 10	20			40	1
		15	15, 20				
		20	5, 10, 15, 20				
		10	15, 20			40	2
		15	10, 15, 20				
		20	10, 15, 20				
		10	20			40	3
		20	20				
CA_7A-7A	-	5	15			40	0
		10	10, 15				
		15	15, 20				
		20	20				
		5, 10, 15, 20	5, 10, 15, 20			40	1
		5, 10, 15, 20	5, 10			30	2
		10, 15, 20	10, 15, 20			40	3
CA_41A-41A	-	10, 15, 20	10, 15, 20			40	0
		5, 10, 15, 20	5, 10, 15, 20			40	1
CA_41D	-	10	20	15		60	0
		10	15, 20	20			
		15	20	10, 15			
		15	10, 15, 20	20			
		20	15, 20	10			
		20	10, 15, 20	15, 20			
CA_41A-41C	-	5, 10, 15, 20	See CA_41C Bandwidth Combination Set 1 in Table 5.6A.1-1			60	0
		See CA_41C Bandwidth Combination Set 1 in Table 5.6A.1-1			5, 10, 15, 20		

LTE Carrier Aggregation Conducted Power (Downlink)

General Note:

i. According to KDB941225 D05A v01r02, Uplink maximum output power measurement with downlink carrier aggregation active should be measured, using the highest output channel measured without downlink carrier aggregation, to confirm that uplink maximum output power with downlink carrier aggregation active remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output measured without downlink carrier aggregation active.

ii. Uplink maximum output power with downlink carrier aggregation active does not show more than ¼ dB higher than the maximum output power without downlink carrier aggregation active, therefore SAR evaluation with downlink carrier aggregation active can be excluded.

iii. The device supports downlink carrier aggregation only. Uplink carrier aggregation is not supported. For power measurement were control and acknowledge data is sent on uplink channels that operate identical to specifications when downlink carrier aggregation is inactive.

iv. Selected highest measured power when downlink carrier aggregation is inactive for conducted power comparison with downlink carrier aggregation is active, to confirm that when downlink carrier aggregation is active uplink maximum output power remains within the specified tune-up tolerance limits and not more than ¼ dB higher than the maximum output power measured when downlink carrier aggregation inactive.

v. For non-contiguous intra-band CA, the SCC selected to provide maximum separation from the PCC and must remain fully within the downlink transmission band. For SCC DL RB size and offset will base on the PCC corresponding RB allocation.

vi. For Intra-band, contiguous CA, the downlink channels selected to perform the uplink power measurement must satisfy 3GPP channel spacing (5.4.1A of 3GPP TS 36.521 or equivalent) and channel bandwidth (5.4.2A) requirements.

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

<Full Power Mode for Two Carrier Power Verification>

Configure		PCC							SCC				Power	
		LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx. Power (dBm)	Without CA Tx. Power (dBm)
Intra-Band	Contiguous	Band 7	15M	2562.5	21375	QPSK	1	37	Band 7	5M	2691.8	3468	23.48	23.49
		Band 7	20M	2560	21350	QPSK	1	0	Band 7	20M	2660.2	3152	23.42	23.46
		Band 41	20M	2680	41490	QPSK	1	0	Band 41	20M	2660.2	41292	23.31	23.34
	Non-Contiguous	Band 7	20M	2560	21350	QPSK	1	0	Band 7	5M	2622.5	2775	23.41	23.46
		Band 41	20M	2680	41490	QPSK	1	0	Band 41	5M	2498.5	39675	23.32	23.34

<Full Power Mode for Three Carrier Power Verification>

Configure			PCC							SCC1				SCC2				Power	
			LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx. Power (dBm)	Without CA Tx. Power (dBm)
Intra-Band	Contiguous	CA_41D	Band 41	20M	2680	41490	QPSK	1	0	Band 41	20M	2660.2	41292	Band 41	20M	2640.4	41094	23.31	23.34
	Non-Contiguous	CA_41A-41C	Band 41	20M	2680	41490	QPSK	1	0	Band 41	5M	2498.5	39675	Band 41	20M	2510.2	39792	23.33	23.34
			Band 41	20M	2680	41490	QPSK	1	0	Band 41	20M	2660.2	41292	Band 41	5M	2498.5	39675	23.28	23.34

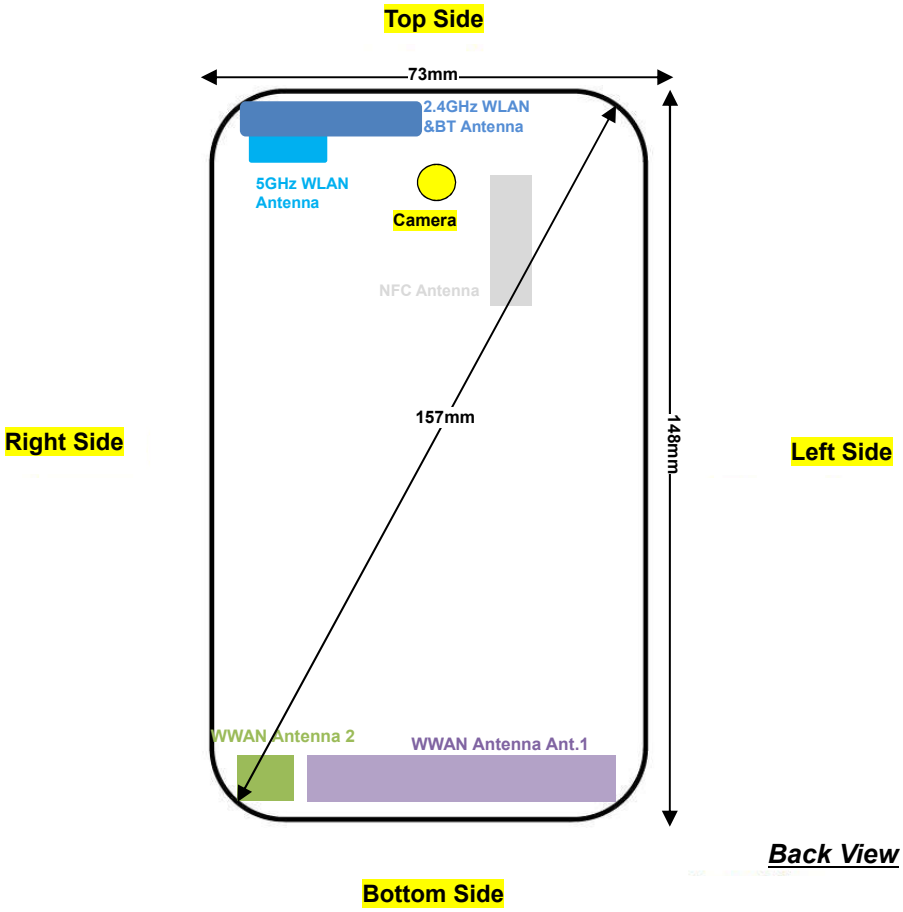
<Reduced Power Mode for Two Carrier Power Verification>

Configure		PCC							SCC				Power	
		LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx. Power (dBm)	Without CA Tx. Power (dBm)
Intra-Band	Contiguous	Band 7	15M	2562.5	21375	QPSK	1	0	Band 7	5M	2691.8	3468	20.41	20.45
		Band 7	20M	2560	21350	QPSK	1	0	Band 7	20M	2660.2	3152	20.42	20.44
		Band 41	20M	2680	41490	QPSK	1	0	Band 41	20M	2660.2	41292	22.24	22.25
	Non-Contiguous	Band 7	20M	2560	21350	QPSK	1	0	Band 7	5M	2622.5	2775	20.41	20.44
		Band 41	20M	2680	41490	QPSK	1	0	Band 41	5M	2498.5	39675	22.21	22.25

<Reduced Power Mode for Three Carrier Power Verification>

Configure			PCC							SCC1				SCC2				Power	
			LTE Band	BW (MHz)	UL Freq. (MHz)	UL Channel	Mod.	UL# RB	UL RB Offset	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	LTE Band	BW (MHz)	DL Freq. (MHz)	DL Channel	With CA Tx. Power (dBm)	Without CA Tx. Power (dBm)
Intra-Band	Contiguous	CA_41D	Band 41	20M	2680	41490	QPSK	1	0	Band 41	20M	2660.2	41292	Band 41	20M	2640.4	41094	22.18	22.25
	Non-Contiguous	CA_41A-41C	Band 41	20M	2680	41490	QPSK	1	0	Band 41	5M	2498.5	39675	Band 41	20M	2510.2	39792	22.23	22.25
			Band 41	20M	2680	41490	QPSK	1	0	Band 41	20M	2660.2	41292	Band 41	5M	2498.5	39675	22.22	22.25

14. Antenna Location



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

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

General Note:

1. WWAN antenna 1 frequency bands include GSM850/1900, WCDMA Band II/IV/V, LTE Band 2/4/5/26 and WWAN antenna 2 frequency bands only include LTE Band 7/38/41.
2. 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.

15. 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
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 ≥0.8W/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.

LTE Note:

1. Per KDB 941225 D05v02r05, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel.
2. Per KDB 941225 D05v02r05, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
3. Per KDB 941225 D05v02r05, For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel; and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.
4. Per KDB 941225 D05v02r05, 16QAM/64QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK and the reported SAR for the QPSK configuration is ≤ 1.45 W/kg; Per KDB 941225 D05v02r05, 16QAM/64QAM SAR testing is not required.
5. Per KDB 941225 D05v02r05, smaller bandwidth output power for each RB allocation configuration is > not ½ 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 B4 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.

15.1 Head SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Power Mode	Ant.	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 4	20M	QPSK	1	0	Right Cheek	Full	1	20175	1732.5	23.10	23.50	1.096	0.11	0.340	0.373
	LTE Band 4	20M	QPSK	50	0	Right Cheek	Full	1	20175	1732.5	22.03	22.50	1.114	0.19	0.214	0.238
	LTE Band 4	20M	QPSK	1	0	Right Tilted	Full	1	20175	1732.5	23.10	23.50	1.096	0.01	0.123	0.135
	LTE Band 4	20M	QPSK	50	0	Right Tilted	Full	1	20175	1732.5	22.03	22.50	1.114	0.14	0.043	0.048
#01	LTE Band 4	20M	QPSK	1	0	Left Cheek	Full	1	20175	1732.5	23.10	23.50	1.096	0.04	0.356	**0.390**
	LTE Band 4	20M	QPSK	50	0	Left Cheek	Full	1	20175	1732.5	22.03	22.50	1.114	0.14	0.222	0.247
	LTE Band 4	20M	QPSK	1	0	Left Tilted	Full	1	20175	1732.5	23.10	23.50	1.096	0.05	0.068	0.075
	LTE Band 4	20M	QPSK	50	0	Left Tilted	Full	1	20175	1732.5	22.03	22.50	1.114	0.06	0.043	0.048

15.2 Hotspot SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Antenna	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)
#02	LTE Band 4	20M	QPSK	1	0	Front	10	Reduced	1	20175	1732.5	21.04	21.5	1.112	0.06	1.000	**1.112**
	LTE Band 4	20M	QPSK	50	0	Front	10	Reduced	1	20175	1732.5	20.02	20.5	1.117	0.11	0.783	0.875
	LTE Band 4	20M	QPSK	100	0	Front	10	Reduced	1	20175	1732.5	19.93	20.5	1.140	0.09	0.777	0.886
	LTE Band 4	20M	QPSK	1	0	Back	10	Reduced	1	20175	1732.5	21.04	21.5	1.112	-0.07	0.756	0.840
	LTE Band 4	20M	QPSK	50	0	Back	10	Reduced	1	20175	1732.5	20.02	20.5	1.117	0.03	0.597	0.667
	LTE Band 4	20M	QPSK	100	0	Back	10	Reduced	1	20175	1732.5	19.93	20.5	1.140	0.05	0.597	0.681
	LTE Band 4	20M	QPSK	1	0	Left side	10	Reduced	1	20175	1732.5	21.04	21.5	1.112	0.05	0.178	0.198
	LTE Band 4	20M	QPSK	50	0	Left side	10	Reduced	1	20175	1732.5	20.02	20.5	1.117	0.09	0.138	0.154
	LTE Band 4	20M	QPSK	1	0	Right side	10	Reduced	1	20175	1732.5	21.04	21.5	1.112	-0.02	0.027	0.030
	LTE Band 4	20M	QPSK	50	0	Right side	10	Reduced	1	20175	1732.5	20.02	20.5	1.117	0.12	0.022	0.025
	LTE Band 4	20M	QPSK	1	0	Bottom side	10	Reduced	1	20175	1732.5	21.04	21.5	1.112	-0.06	0.890	0.989
	LTE Band 4	20M	QPSK	50	0	Bottom side	10	Reduced	1	20175	1732.5	20.02	20.5	1.117	-0.02	0.707	0.790
	LTE Band 4	20M	QPSK	100	0	Bottom side	10	Reduced	1	20175	1732.5	19.93	20.5	1.140	-0.07	0.697	0.795

15.3 Body Worn Accessory SAR

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Antenna	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)
#03	LTE Band 4	20M	QPSK	1	0	Front	10	Reduced	1	20175	1732.5	21.04	21.5	1.112	0.06	1.000	**1.112**
	LTE Band 4	20M	QPSK	50	0	Front	10	Reduced	1	20175	1732.5	20.02	20.5	1.117	0.11	0.783	0.875
	LTE Band 4	20M	QPSK	100	0	Front	10	Reduced	1	20175	1732.5	19.93	20.5	1.140	0.09	0.777	0.886
	LTE Band 4	20M	QPSK	1	0	Back	10	Reduced	1	20175	1732.5	21.04	21.5	1.112	-0.07	0.756	0.840
	LTE Band 4	20M	QPSK	50	0	Back	10	Reduced	1	20175	1732.5	20.02	20.5	1.117	0.03	0.597	0.667
	LTE Band 4	20M	QPSK	100	0	Back	10	Reduced	1	20175	1732.5	19.93	20.5	1.140	0.05	0.597	0.681

15.4 Repeated SAR Measurement

No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (mm)	Power Mode	Antenna	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured 1g SAR (W/kg)	Ratio	Reported 1g SAR (W/kg)
1st	LTE Band 4	20M	QPSK	1	0	Front	10	Reduced	1	20175	1732.5	21.04	21.5	1.112	0.06	1.000	1	1.112
2nd	LTE Band 4	20M	QPSK	1	0t	Front	10	Reduced	1	20175	1732.5	21.04	21.5	1.112	0.09	0.994	1.006	1.105

General Note:

1. Per KDB 865664 D01v01r04, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥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. The ratio is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

16. Simultaneous Transmission Analysis

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

General Note:

1. This device supports VoIP in GPRS, EGPRS, WCDMA and LTE (e.g. for 3rd-party VoIP), LTE supports VoLTE operation.
2. EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not operate simultaneously at any moment.
3. This device 2.4GHz WLAN/ 5.2GHz WLAN/5.8GHz WLAN support hotspot operation, and 5.2GHz WLAN/5.8GHz WLAN supports WLAN Direct (GC/GO), and 5.3GHz / 5.5GHz supports WLAN Direct (GC only).
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 though they have independent antenna.
5. WLAN 2.4GHz and Bluetooth share the same antenna so can't transmit simultaneously.
6. According to the EUT character, WLAN 5GHz and Bluetooth can't transmit simultaneously.
7. Chose the worst zoom scan SAR of WLAN correspondingly for co-located with WWAN analysis.
8. The reported SAR summation is calculated based on the same configuration and test position.
9. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = (SAR1 + SAR2)^1.5 / (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 ≤ 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 16.4.
10. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v06 based on the formula below.
   i) (*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 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 (dBm)	Exposure Position	Hotspot & Body worn
	Test separation	10 mm
12	Estimated SAR (W/kg)	0.336

16.1 Head 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	Right Cheek	0.233	0.570	0.673	0.80	0.91
		Right Tilted	0.195	0.909	0.965	1.10	1.16
		Left Cheek	0.354	0.909	0.945	1.26	1.30
		Left Tilted	0.166	0.824	0.965	0.99	1.13
	GSM1900	Right Cheek	0.136	0.570	0.673	0.71	0.81
		Right Tilted	0.030	0.909	0.965	0.94	1.00
		Left Cheek	0.075	0.909	0.945	0.98	1.02
		Left Tilted	0.026	0.824	0.965	0.85	0.99
WCDMA	Band V	Right Cheek	0.226	0.570	0.673	0.80	0.90
		Right Tilted	0.177	0.909	0.965	1.09	1.14
		Left Cheek	0.272	0.909	0.945	1.18	1.22
		Left Tilted	0.136	0.824	0.965	0.96	1.10
	Band IV	Right Cheek	0.127	0.570	0.673	0.70	0.80
		Right Tilted	0.046	0.909	0.965	0.96	1.01
		Left Cheek	0.107	0.909	0.945	1.02	1.05
		Left Tilted	0.030	0.824	0.965	0.85	1.00
	Band II	Right Cheek	0.138	0.570	0.673	0.71	0.81
		Right Tilted	0.052	0.909	0.965	0.96	1.02
		Left Cheek	0.072	0.909	0.945	0.98	1.02
		Left Tilted	0.072	0.824	0.965	0.90	1.04

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)		
LTE	Band 26	Right Cheek	0.204	0.570	0.673	0.77	0.88
		Right Tilted	0.160	0.909	0.965	1.07	1.13
		Left Cheek	0.454	0.909	0.945	1.36	1.40
		Left Tilted	0.265	0.824	0.965	1.09	1.23
	Band 2	Right Cheek	0.300	0.570	0.673	0.87	0.97
		Right Tilted	0.094	0.909	0.965	1.00	1.06
		Left Cheek	0.218	0.909	0.945	1.13	1.16
		Left Tilted	0.055	0.824	0.965	0.88	1.02
	Band 4	Right Cheek	0.373	0.570	0.673	0.94	1.05
		Right Tilted	0.135	0.909	0.965	1.04	1.10
		Left Cheek	0.390	0.909	0.945	1.30	1.34
		Left Tilted	0.075	0.824	0.965	0.90	1.04
	Band 7	Right Cheek	0.335	0.570	0.673	0.91	1.01
		Right Tilted	0.112	0.909	0.965	1.02	1.08
		Left Cheek	0.276	0.909	0.945	1.19	1.22
		Left Tilted	0.160	0.824	0.965	0.98	1.13
	Band 41	Right Cheek	0.148	0.570	0.673	0.72	0.82
		Right Tilted	0.042	0.909	0.965	0.95	1.01
		Left Cheek	0.100	0.909	0.945	1.01	1.05
		Left Tilted	0.066	0.824	0.965	0.89	1.03

16.2 Hotspot Exposure Conditions

WWAN Band		Exposure Position	1	2	3	4	1+2			1+3			1+4		
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth									
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No
GSM	GSM850	Front	0.599	0.421	0.138	0.336	1.02			0.74			0.94		
		Back	0.897	0.540	0.832	0.336	1.44			**1.73**	**0.02**	**#3**	1.23		
		Left Side	0.613				0.61			0.61			0.61		
		Right Side	0.079	0.540	0.232	0.336	0.62			0.31			0.42		
		Top Side		0.540	0.832	0.336	0.54			0.83			0.34		
		Bottom Side	0.375				0.38			0.38			0.38		
	GSM1900	Front	1.026	0.421	0.138	0.336	1.45			1.16			1.36		
		Back	0.755	0.540	0.832	0.336	1.30			**1.59**			1.09		
		Left Side	0.166				0.17			0.17			0.17		
		Right Side	0.036	0.540	0.232	0.336	0.58			0.27			0.37		
		Top Side		0.540	0.832	0.336	0.54			0.83			0.34		
		Bottom Side	0.664				0.66			0.66			0.66		
WCDMA	Band V	Front	0.431	0.421	0.138	0.336	0.85			0.57			0.77		
		Back	0.666	0.540	0.832	0.336	1.21			1.50			1.00		
		Left Side	0.531				0.53			0.53			0.53		
		Right Side	0.101	0.540	0.232	0.336	0.64			0.33			0.44		
		Top Side		0.540	0.832	0.336	0.54			0.83			0.34		
		Bottom Side	0.273				0.27			0.27			0.27		
	Band IV	Front	1.157	0.421	0.138	0.336	1.58			1.30			1.49		
		Back	1.080	0.540	0.832	0.336	**1.62**	**0.02**	**#1**	**1.91**	**0.02**	**#4**	1.42		
		Left Side	0.288				0.29			0.29			0.29		
		Right Side	0.033	0.540	0.232	0.336	0.57			0.27			0.37		
		Top Side		0.540	0.832	0.336	0.54			0.83			0.34		
		Bottom Side	1.073				1.07			1.07			1.07		
	Band II	Front	1.029	0.421	0.138	0.336	1.45			1.17			1.37		
		Back	1.125	0.540	0.832	0.336	**1.67**	**0.02**	**#2**	**1.96**	**0.02**	**#5**	1.46		
		Left Side	0.189				0.19			0.19			0.19		
		Right Side	0.049	0.540	0.232	0.336	0.59			0.28			0.39		
		Top Side		0.540	0.832	0.336	0.54			0.83			0.34		
		Bottom Side	1.023				1.02			1.02			1.02		

WWAN Band		Exposure Position	1	2	3	4	1+2			1+3			1+4		
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth									
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No
LTE	Band 26	Front	0.671	0.421	0.212	0.336	1.09			0.88			1.01		
		Back	0.754	0.540	0.832	0.336	1.29			**1.59**			1.09		
		Left Side	0.619				0.62			0.62			0.62		
		Right Side	0.162	0.540	0.232	0.336	0.72			0.44			0.39		
		Top Side		0.540	0.832	0.336	0.56			1.11			0.23		
		Bottom Side	0.383				0.38			0.38			0.38		
	Band 2	Front	0.789	0.421	0.138	0.336	1.21			0.93			1.13		
		Back	0.966	0.540	0.832	0.336	1.51			**1.80**	**0.02**	**#6**	1.30		
		Left Side	0.160				0.16			0.16			0.16		
		Right Side	0.037	0.540	0.232	0.336	0.58			0.27			0.37		
		Top Side		0.540	0.832	0.336	0.54			0.83			0.34		
		Bottom Side	0.706				0.71			0.71			0.71		
	Band 4	Front	1.112	0.421	0.138	0.336	1.53			1.25			1.45		
		Back	0.840	0.540	0.832	0.336	1.38			**1.67**	**0.02**	**#7**	1.18		
		Left Side	0.198				0.20			0.20			0.20		
		Right Side	0.030	0.540	0.232	0.336	0.57			0.26			0.37		
		Top Side		0.540	0.832	0.336	0.54			0.83			0.34		
		Bottom Side	0.989				0.99			0.99			0.99		
	Band 7	Front	0.563	0.421	0.138	0.336	0.98			0.70			0.90		
		Back	0.473	0.540	0.832	0.336	1.01			1.31			0.81		
		Right Side	0.230	0.540	0.232	0.336	0.77			0.46			0.57		
		Top Side		0.540	0.832	0.336	0.54			0.83			0.34		
		Bottom Side	1.152				1.15			1.15			1.15		
	Band 41	Front	0.361	0.421	0.138	0.336	0.92			0.50			0.59		
		Back	0.310	0.540	0.832	0.336	0.76			1.42			0.54		
		Right Side	0.182	0.540	0.232	0.336	0.74			0.46			0.41		
		Top Side		0.540	0.832	0.336	0.56			1.11			0.23		
		Bottom Side	1.094				1.09			1.09			1.09		

16.3 Body-Worn Accessory Exposure Conditions

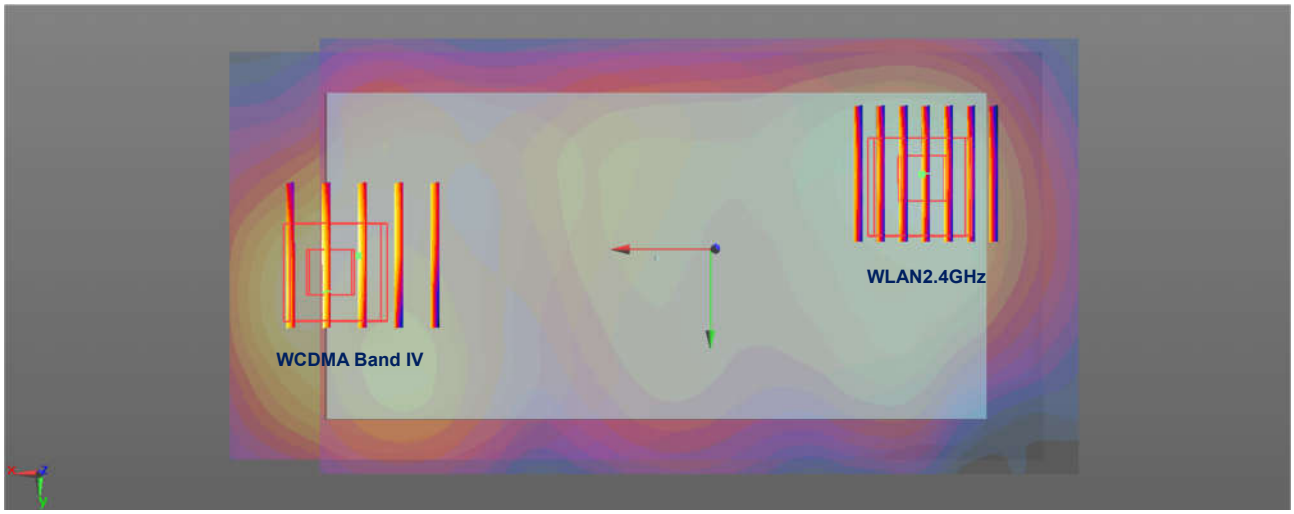
WWAN Band		Exposure Position	1	2	3	4	1+2			1+3			1+4		
			WWAN	2.4GHz WLAN	5GHz WLAN	Bluetooth	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No	Summed 1g SAR (W/kg)	SPLSR	Case No
			1g SAR (W/kg)	1g SAR (W/kg)	1g SAR (W/kg)	Estimated 1g SAR (W/kg)									
GSM	GSM850	Front	0.599	0.421	0.212	0.336	1.02			0.81			0.94		
		Back	0.897	0.540	0.832	0.336	1.44			**1.73**	**0.02**	**#3**	1.23		
	GSM1900	Front	1.026	0.421	0.212	0.336	1.45			1.24			1.36		
		Back	0.755	0.540	0.832	0.336	1.30			**1.59**			1.09		
WCDMA	Band V	Front	0.431	0.421	0.212	0.336	0.85			0.64			0.77		
		Back	0.666	0.540	0.832	0.336	1.21			1.50			1.00		
	Band IV	Front	1.157	0.421	0.212	0.336	**1.58**			1.37			**1.49**		
		Back	1.080	0.540	0.832	0.336	**1.62**	**0.02**	**#1**	**1.91**	**0.02**	**#4**	1.42		
	Band II	Front	1.029	0.421	0.212	0.336	1.45			1.24			1.37		
		Back	1.125	0.540	0.832	0.336	**1.67**	**0.02**	**#2**	**1.96**	**0.02**	**#5**	1.46		
LTE	Band 26	Front	0.671	0.421	0.212	0.336	1.09			0.88			1.01		
		Back	0.754	0.540	0.832	0.336	1.29			1.59			1.09		
	Band 2	Front	0.789	0.421	0.138	0.336	1.21			0.93			1.13		
		Back	0.966	0.540	0.832	0.336	1.51			**1.80**	**0.02**	**#6**	1.30		
	Band 4	Front	1.112	0.421	0.212	0.336	1.53			1.32			1.45		
		Back	0.840	0.540	0.832	0.336	1.38			**1.67**	**0.02**	**#7**	1.18		
	Band 7	Front	0.563	0.421	0.212	0.336	0.98			0.78			0.90		
		Back	0.473	0.540	0.832	0.336	1.01			1.31			0.81		
	Band 41	Front	0.361	0.421	0.212	0.336	0.78			0.57			0.70		
		Back	0.310	0.540	0.832	0.336	0.85			1.14			0.65		

16.4 SPLSR Evaluation and Analysis

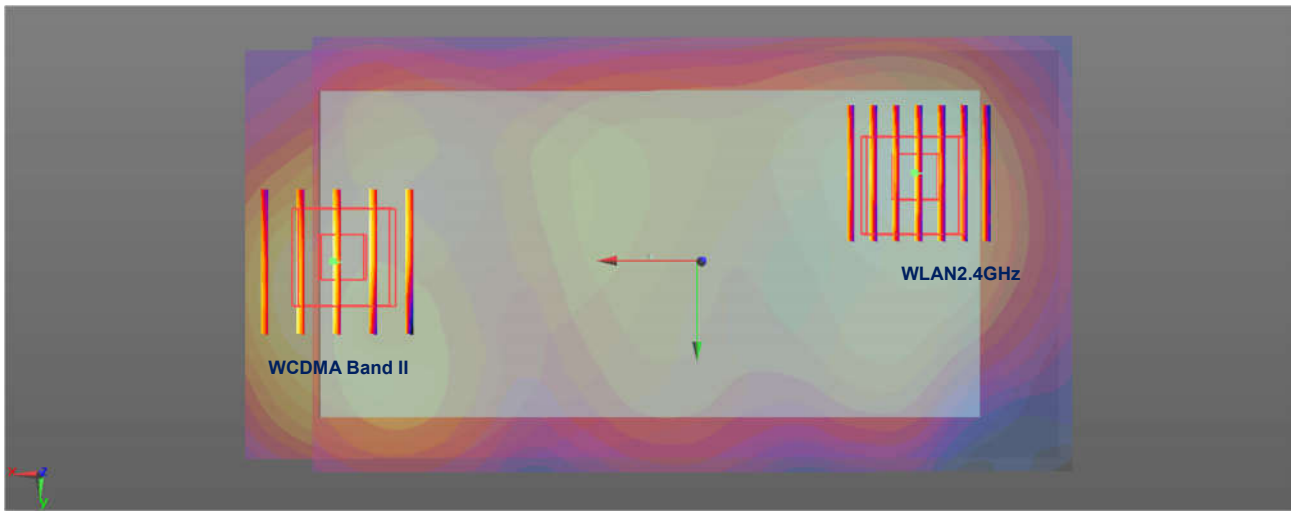
General Note:

1. When standalone SAR is measured for both antennas in the pair, the peak location separation distance is computed by the square root of [(x1−x2)2 + (y1−y2)2 + (z1−z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates in the area scans or extrapolated peak SAR locations in the zoom scans, as appropriate.
2. SPLSR = (SAR1 + SAR2)1.5 / (min. separation distance, mm). If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.

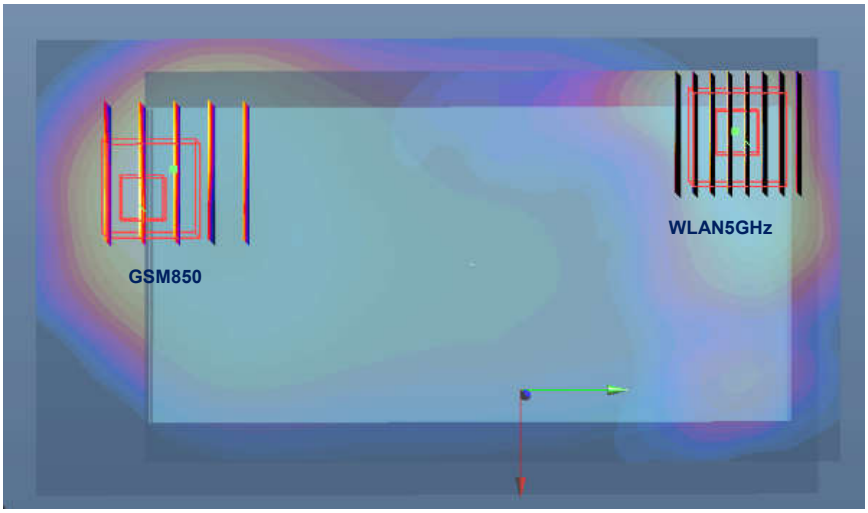
Case	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
#1	WCDMA Band IV	Back	1.080	10	0.0745	0.008	-0.176	135.23	1.62	0.02	Not required
	WLAN2.4GHz		0.540	10	-0.0582	-0.018	-0.177				



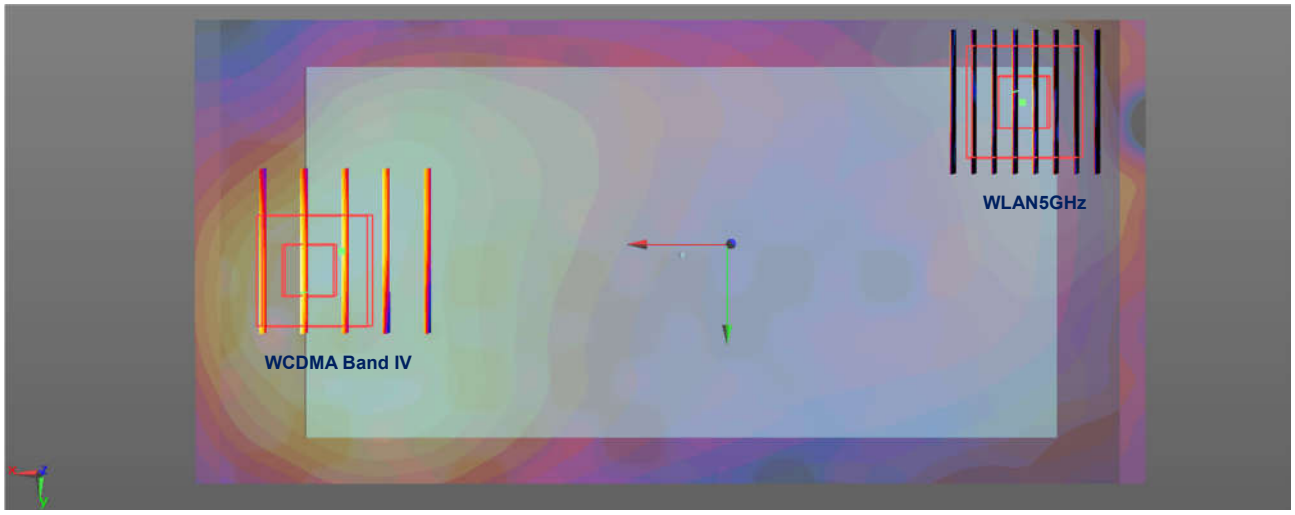
Case	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
#2	WCDMA Band II	Back	1.125	10	0.0705	0.0015	-0.177	130.17	1.67	0.02	Not required
	WLAN2.4GHz		0.540	10	-0.0582	-0.018	-0.177				



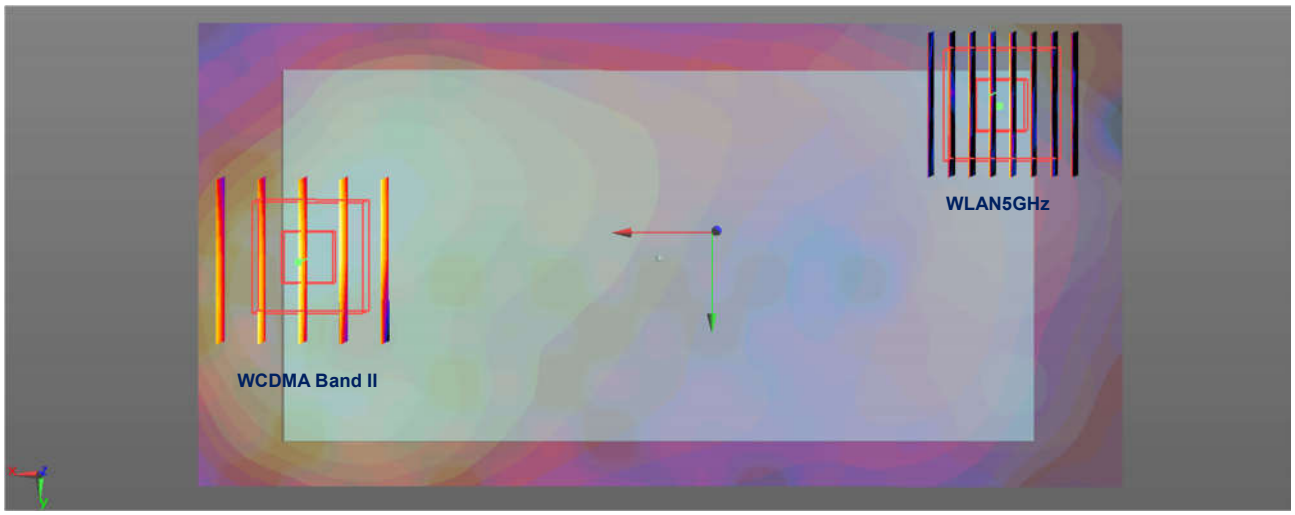
Case #3	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	GSM850	Back	0.897	10	-0.0315	-0.0765	-0.206	143.25	1.73	0.02	Not required
	WLAN5GHz		0.832	10	-0.064	0.063	-0.204				



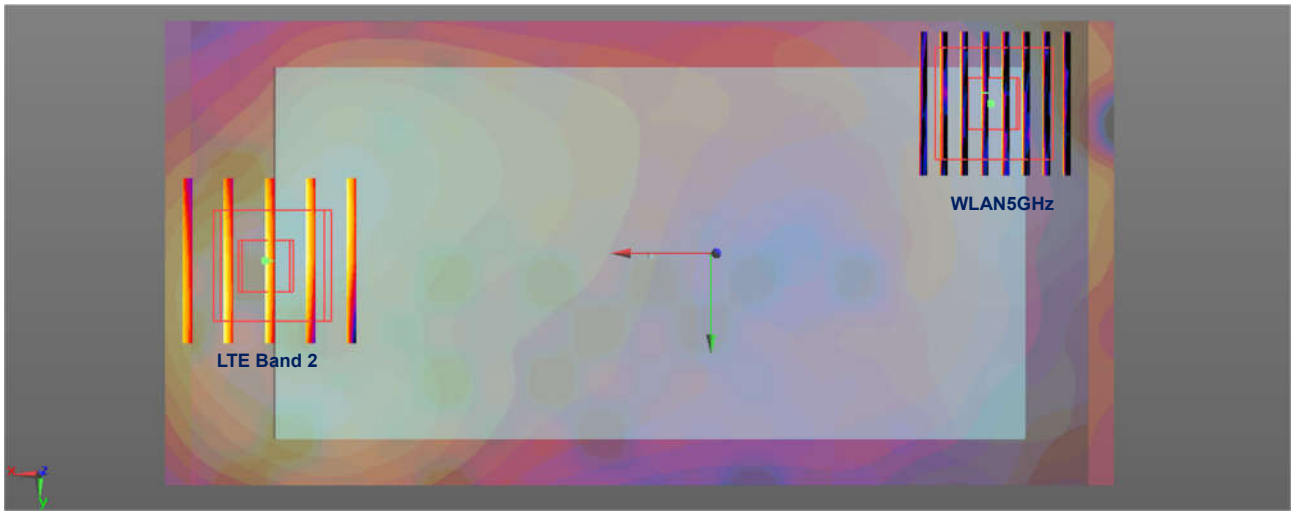
Case #4	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	WCDMA Band IV	Back	1.080	10	0.0745	0.008	-0.176	151.63	1.91	0.02	Not required
	WLAN5GHz		0.832	10	-0.064	0.063	-0.204				



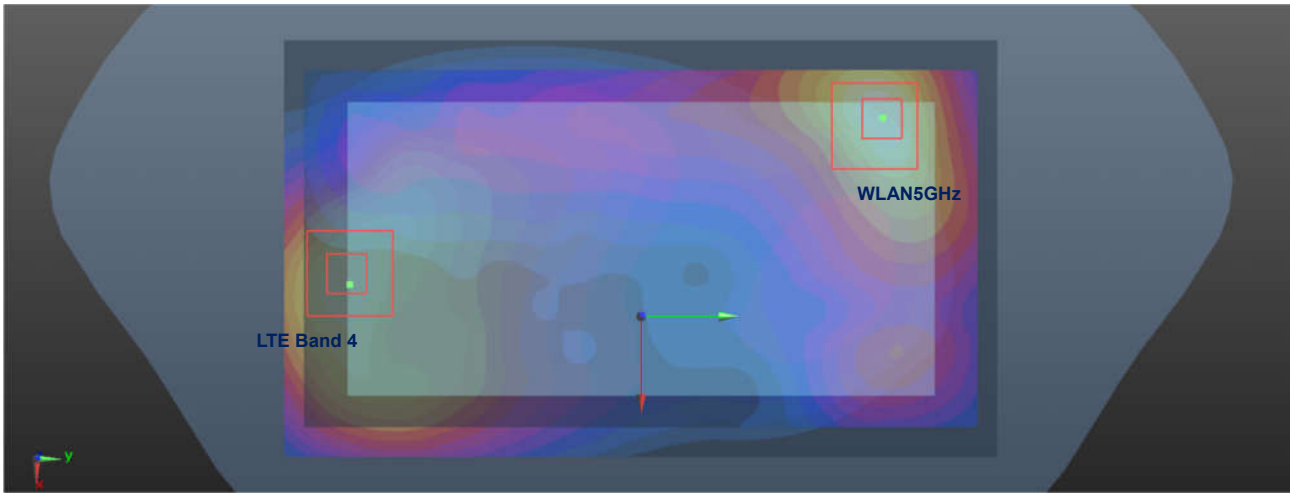
	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case #5	WCDMA Band II	Back	1.125	10	0.0705	0.0015	-0.177	150.34	1.96	0.02	Not required
	WLAN5GHz		0.832	10	-0.064	0.063	-0.204				



	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
Case #6	LTE Band 2	Back	0.966	10	0.0755	0.0015	-0.177	154.83	1.80	0.02	Not required
	WLAN5GHz		0.832	10	-0.064	0.063	-0.204				



Case #7	Band	Position	SAR (W/kg)	Gap (mm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Summed SAR (W/kg)	SPLSR Results	Simultaneous SAR
	LTE Band 4	Back	0.840	10	-0.009	-0.0725	-0.211	141.0	1.67	0.02	Not required
	WLAN5GHz		0.832	10	-0.051	0.062	-0.205				



Test Engineer: Nick Hu

17. Uncertainty Assessment

The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type An 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]	$1/\sqrt{3}$	$1/\sqrt{6}$	$1/\sqrt{2}$

(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 17.1. 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 17.2. 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	6.55	N	1	1	1	6.6	6.6
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						12.5%	12.5%
Coverage Factor for 95 %						K=2	K=2
Expanded STD Uncertainty						25.1%	25.0%

Table 17.3. Uncertainty Budget for frequency range 3 GHz to 6 GHz

18. References

[1] FCC 47 CFR Part 2 “Frequency Allocations and Radio Treaty Matters; General Rules and Regulations”

[2] ANSI/IEEE Std. C95.1-1992, “IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz”, September 1992

[3] IEEE Std. 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, Sep 2013

[4] SPEAG DASY System Handbook

[5] FCC KDB 248227 D01 v02r02, “SAR Guidance for IEEE 802.11 (WiFi) Transmitters”, Oct 2015.

[6] FCC KDB 447498 D01 v06, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, Oct 2015

[7] FCC KDB 648474 D04 v01r03, “SAR Evaluation Considerations for Wireless Handsets”, Oct 2015.

[8] FCC KDB 941225 D01 v03r01, “3G SAR MEAUREMENT PROCEDURES”, Oct 2015

[9] FCC KDB 941225 D05 v02r05, “SAR Evaluation Considerations for LTE Devices”, Dec 2015

[10] FCC KDB 941225 D05A v01r02, “Rel. 10 LTE SAR Test Guidance and KDB Inquiries”, Oct 2015

[11] FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 2015.

[12] FCC KDB 865664 D01 v01r04, "SAR Measurement Requirements for 100 MHz to 6 GHz", Aug 2015.

[13] FCC KDB 865664 D02 v01r02, “RF Exposure Compliance Reporting and Documentation Considerations” Oct 2015.

Appendix A. Plots of System Performance Check

The plots are shown as follows.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/7/21

System Check_Head_1750MHz_20170721

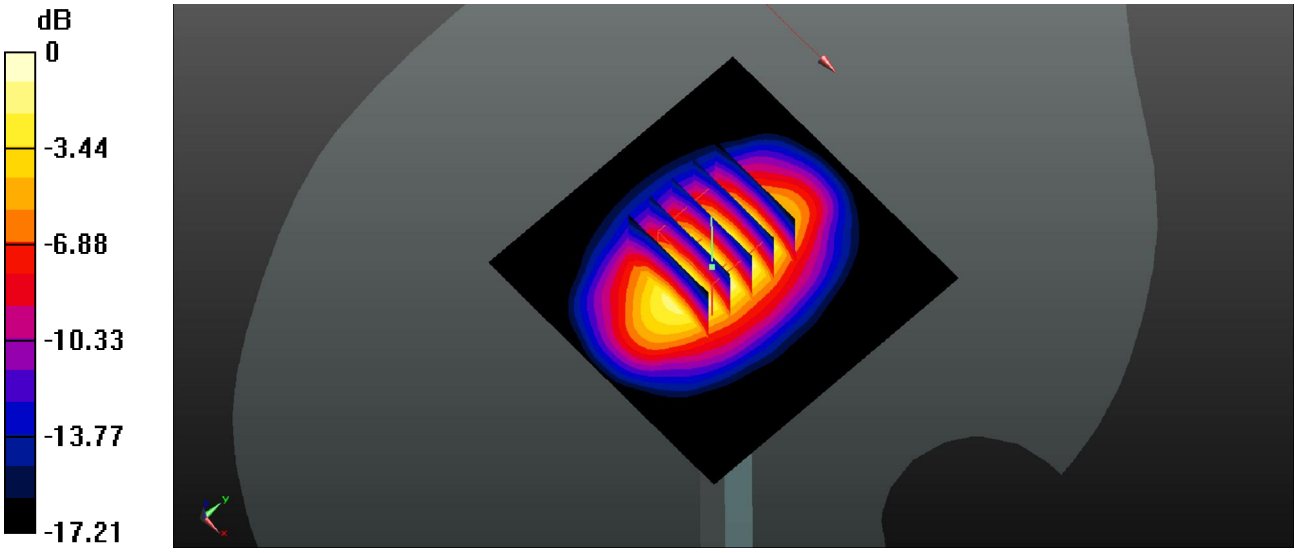
DUT: D1750V2 - SN: 1090

Communication System: UID 0, CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: HSL_1750_2017/07/21 Medium parameters used: f = 1750 MHz; σ = 1.358 S/m; ε_r = 40.254; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(9.03, 9.03, 9.03); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 13.5 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 94.20 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 16.3 W/kg
SAR(1 g) = 8.85 W/kg; SAR(10 g) = 4.68 W/kg
Maximum value of SAR (measured) = 13.7 W/kg



0 dB = 13.7 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/7/20

System Check_Body_1750MHz_20170720

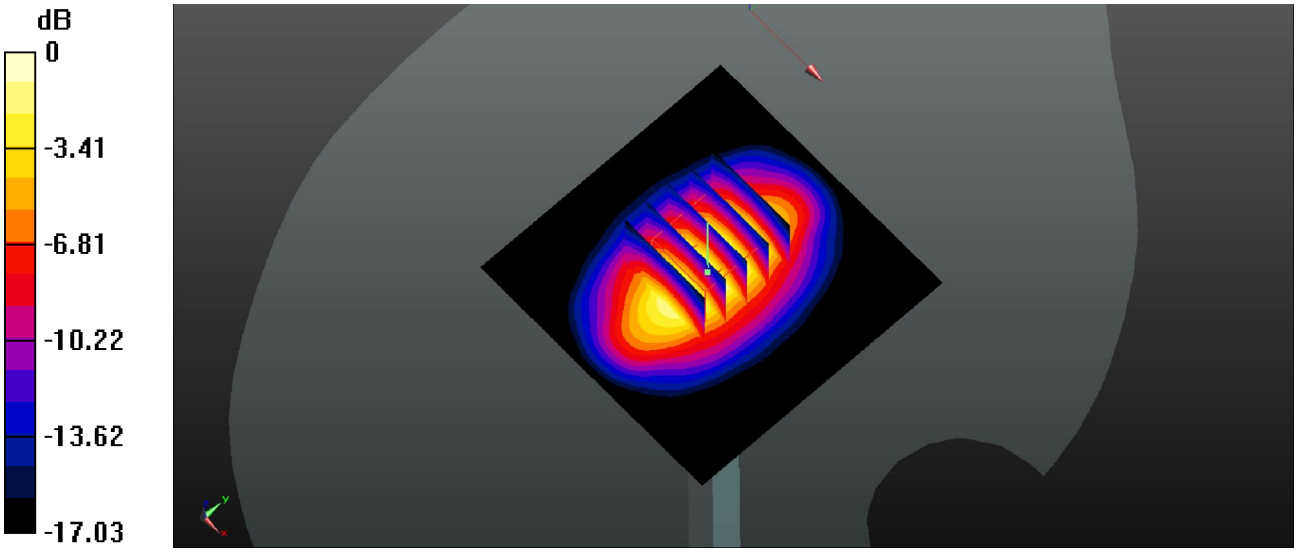
DUT: D1750V2 - SN: 1090

Communication System: UID 0, CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium: MSL_1750_2017/07/20 Medium parameters used: f = 1750 MHz; σ = 1.514 S/m; ε_r = 53.693; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.46, 8.46, 8.46); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Pin=250mW/Area Scan (61x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 14.4 W/kg

Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 94.09 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 17.0 W/kg
SAR(1 g) = 9.44 W/kg; SAR(10 g) = 4.99 W/kg
Maximum value of SAR (measured) = 14.5 W/kg



0 dB = 14.5 W/kg

Appendix B. Plots of High SAR Measurement

The plots are shown as follows.

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/7/21

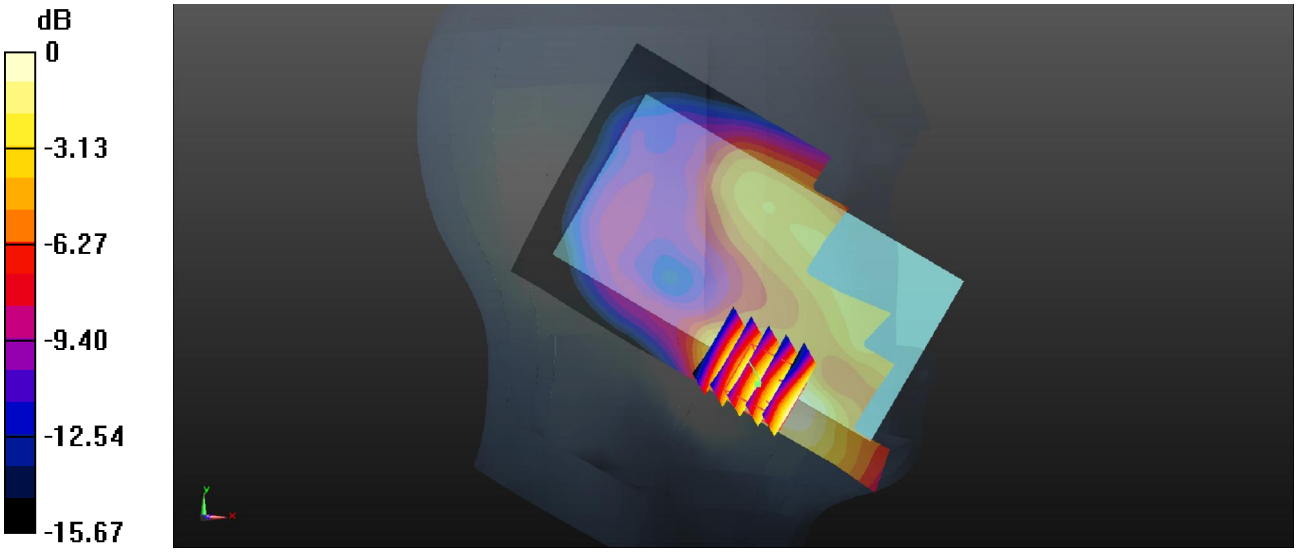
#01_LTE Band 4_20M_QPSK_1RB_0offset_Left Cheek_0mm_Ch20175

Communication System: UID 0, FDD-LTE (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: HSL_1750_2017/07/21 Medium parameters used: f = 1732.5 MHz; σ = 1.34 S/m; ε_r = 40.325; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature ：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(9.03, 9.03, 9.03); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM1; Type: QD000P40CD; Serial: TP:1753
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20175/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.507 W/kg

Ch20175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.942 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.538 W/kg
SAR(1 g) = 0.356 W/kg; SAR(10 g) = 0.227 W/kg
Maximum value of SAR (measured) = 0.476 W/kg



0 dB = 0.476 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/7/20

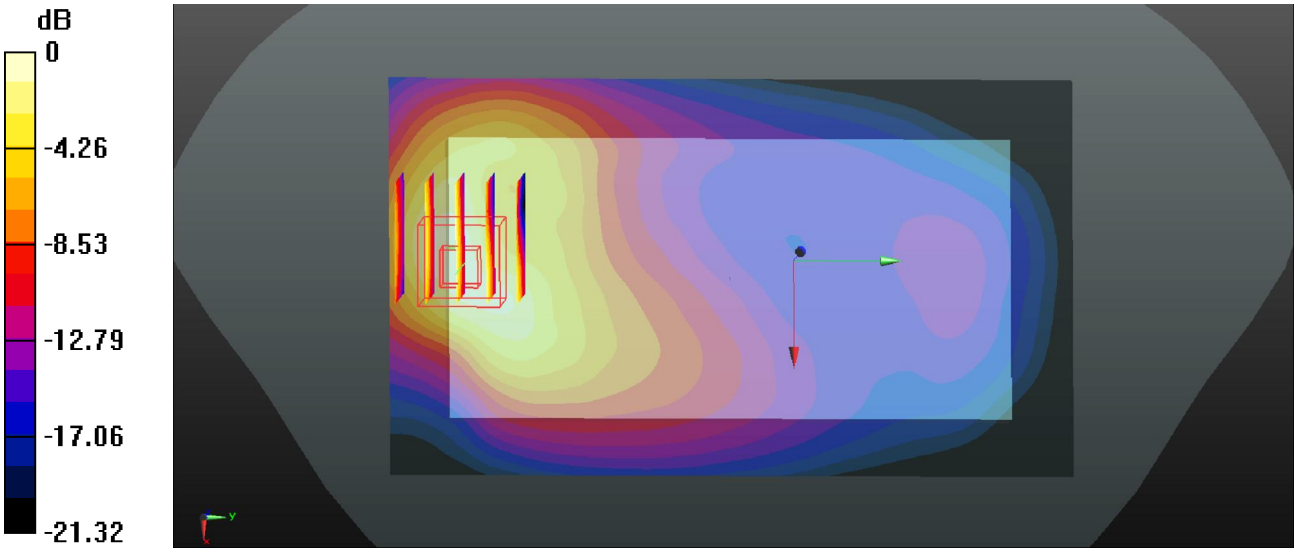
#02_LTE Band 4_20M_QPSK_1RB_0offset_Front_10mm_Ch20175

Communication System: UID 0, FDD-LTE (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: MSL_1750_2017/07/20 Medium parameters used: f = 1732.5 MHz; σ = 1.496 S/m; ε_r = 53.749; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.46, 8.46, 8.46); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20175/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.43 W/kg

Ch20175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.060 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.69 W/kg
SAR(1 g) = 1.000 W/kg; SAR(10 g) = 0.543 W/kg
Maximum value of SAR (measured) = 1.42 W/kg



0 dB = 1.42 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2017/7/20

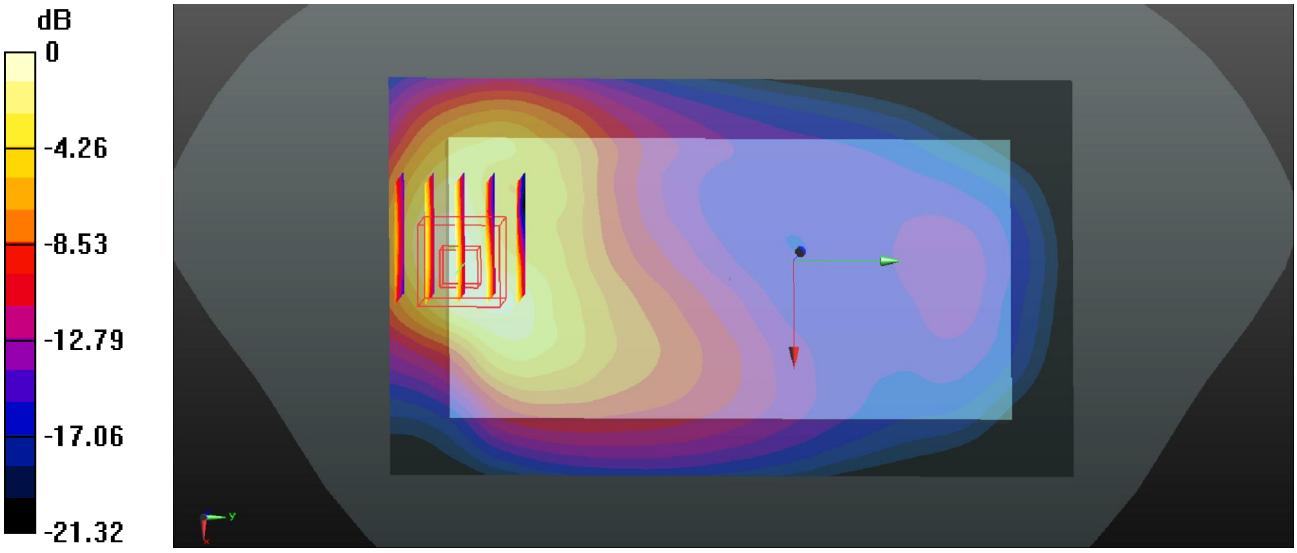
#03_LTE Band 4_20M_QPSK_1RB_0offset_Front_10mm_Ch20175

Communication System: UID 0, FDD-LTE (0); Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: MSL_1750_2017/07/20 Medium parameters used: f = 1732.5 MHz; σ = 1.496 S/m; ε_r = 53.749; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature ：22.3 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3935; ConvF(8.46, 8.46, 8.46); Calibrated: 2016/11/28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1358; Calibrated: 2016/9/5
- Phantom: SAM2; Type: QD000P40CD; Serial: TP:1754
- Measurement SW: DASY52, Version 52.8 (8); SEMCAD X Version 14.6.10 (7331)

Ch20175/Area Scan (71x121x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.43 W/kg

Ch20175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.060 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.69 W/kg
SAR(1 g) = 1.000 W/kg; SAR(10 g) = 0.543 W/kg
Maximum value of SAR (measured) = 1.42 W/kg



0 dB = 1.42 W/kg

Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.

In Collaboration with
s p e a g
CALIBRATION LABORATORY
Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com http://www.chinattl.cn

中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Client **Sporton_XA** **Certificate No: Z17-97040**

CALIBRATION CERTIFICATE

Object D1750V2 - SN: 1090

Calibration Procedure(s) FD-Z11-003-01
Calibration Procedures for dipole validation kits

Calibration date: March 23, 2017

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date(Calibrated by, Certificate No.)	Scheduled Calibration
Power Meter NRP2	101919	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Power sensor NRP-Z91	101547	27-Jun-16 (CTTL, No.J16X04777)	Jun-17
Reference Probe EX3DV4	SN 3617	23-Jan-17(SPEAG,No.EX3-3617_Jan17)	Jan-18
DAE4	SN 777	22-Aug-16(CTTL-SPEAG,No.Z16-97138)	Aug-17
Secondary Standards	**ID #**	**Cal Date(Calibrated by, Certificate No.)**	**Scheduled Calibration**
Signal Generator E4438C	MY49071430	13-Jan-17 (CTTL, No.J17X00286)	Jan-18
Network Analyzer E5071C	MY46110673	13-Jan-17 (CTTL, No.J17X00285)	Jan-18

	Name	Function	Signature
Calibrated by:	Zhao Jing	SAR Test Engineer	
Reviewed by:	Qi Dianyuan	SAR Project Leader	
Approved by:	Lu Bingsong	Deputy Director of the laboratory	

Issued: March 25, 2017