FCC SAR Test Report

APPLICANT	:	**TCT Mobile Limited**
EQUIPMENT	:	**Tablet PC**
BRAND NAME	:	**ALCATEL** **one touch**
MODEL NAME	:	**ONE TOUCH EVO 7HD / ONE TOUCH E710** **(Module:one touch M800O)**
FCC ID	:	**RAD456**
STANDARD	:	**FCC 47 CFR Part 2 (2.1093)** **ANSI/IEEE C95.1-1992** **IEEE 1528-2003**

The product was integrated the WWAN Module (Brand Name: ALCATEL / one touch, Model Name: Module:one touch M800O, FCC ID: RAD382) during test.

The product was completely tested on Nov. 25, 2013. We, SPORTON INTERNATIONAL (SHENZHEN) INC., would like to declare that the tested sample has been evaluated in accordance with the procedures and shown the 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 (SHENZHEN) INC., the test report shall not be reproduced except in full.

Reviewed by: Eric Huang / Deputy Manager

Approved by: Jones Tsai / Manager

ilac-MRA

TAF Testing Laboratory 2353

SPORTON INTERNATIONAL (SHENZHEN) INC.
No. 101, Complex Building C, Guanlong Village, Xili Town, Nanshan District, Shenzhen, Guangdong, P.R.C.

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA361311-01	Rev. 01	Initial issue of report	Dec. 02, 2013

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **TCT Mobile Limited DUT: Tablet PC, Brand Name: ALCATEL / one touch, Model Name: ONE TOUCH EVO 7HD / ONE TOUCH E710 (Module: one touch M800O)** are as follows.

<Highest SAR Summary>

Exposure Position	Frequency Band	Reported 1g-SAR (W/kg)	Equipment Class	Highest Reported 1g-SAR (W/kg)
Body (0cm Gap)	GPRS850	**1.30**	PCB	**1.35**
	GPRS1900	**0.57**		
	WCDMA Band V	**1.35**		
	WCDMA Band IV	**1.12**		
	WCDMA Band II	**1.12**		
	LTE Band 17	**1.19**		
	LTE Band 5	**1.26**		
	LTE Band 4	**0.96**		
	LTE Band 2	**1.19**		
	LTE Band 7	**0.98**		
	WLAN 2.4GHz Band	**1.13**	DTS	**1.13**

<Highest Simultaneous transmission SAR>

Exposure Position	Frequency Band	Equipment Class	Highest Reported Simultaneous Transmission 1g-SAR (W/kg)
Body (0cm Gap)	LTE Band 2	PCB	1.19
	WLAN 2.4GHz Band	DTS	
Body (0cm Gap)	WCDMA Band V	PCB	1.51
	Bluetooth	DSS	

This device is in compliance with Specific Absorption Rate (SAR) for general population/uncontrolled exposure limits (1.6 W/kg) 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 1528-2003.

2. Administration Data

2.1 Testing Laboratory

Test Site	SPORTON INTERNATIONAL (SHENZHEN) INC.
Test Site Location	No. 101, Complex Building C, Guanlong Village, Xili Town, Nanshan District, Shenzhen, Guangdong, P.R.C. TEL: +86-755-8637-9589 FAX: +86-755-8637-9595

2.2 Applicant

Company Name	TCT Mobile Limited
Address	5F, C building, No. 232, Liang Jing Road ZhangJiang High-Tech Park, Pudong Area Shanghai, P.R. China. 201203

2.3 Manufacturer

Company Name	TCL COMMUNICATION TECHNOLOGY HOLDINGS LIMITED
Address	70 Huifeng 4rd, ZhongKai Hi-tech Development District, Huizhou, Guangdong 516006 P.R.China (TCL Mobile Communication Co., LTD. Huizhou)

2.4 Application Details

Date of Start during the Test	Nov. 15, 2013
Date of End during the Test	Nov. 25, 2013

3. General Information

3.1 Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT	Tablet PC
Brand Name	ALCATEL one touch
Model Name	ONE TOUCH EVO 7HD / ONE TOUCH E710 (Module: one touch M800O)
FCC ID	RAD456
Wireless Technology and Frequency Range	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8 MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band IV: 1712.4 MHz ~ 1752.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 7: 2506.5 MHz ~ 2534.5 MHz and 2562.5 MHz ~ 2567.5 MHz WLAN 2.4GHz Band: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Mode	• GPRS/EGPRS • RMC/AMR 12.2Kbps Rel 99 • HSDPA Rel 7, Cat14 • HSUPA Rel 6, Cat6 • DC-HSDPA Rel 8 Cat24 • HSPA+ Rel 7, Cat 7 • LTE: QPSK, 16QAM • 802.11b/g/n HT20/HT40 • Bluetooth v3.0 + EDR
Antenna Type	WWAN: IFA Antenna WLAN: PIFA Antenna Bluetooth: PIFA Antenna
HW Version	JUPITER_MAIN_V6.0
SW Version	UPDATA_111_104
EUT Stage	Production Unit

Remark:
1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.
2. This device supports GPRS/EGPRS operation up to class12.

3.2 Maximum RF output power among production units

Maximum Target Burst Average Power for Production Unit		
Mode / Band	GSM 850	GSM 1900
GPRS/ EDGE (GMSK, 1 Tx slot)	33	30
GPRS/ EDGE (GMSK, 2 Tx slots)	30	29
GPRS/ EDGE (GMSK, 3 Tx slots)	28	25
GPRS/ EDGE (GMSK, 4 Tx slots)	26.5	24
EDGE (8PSK, 1 Tx slot)	27	26.5
EDGE (8PSK, 2 Tx slots)	24	23
EDGE (8PSK, 3 Tx slots)	22	22
EDGE (8PSK, 4 Tx slots)	21	21

Maximum Target Power for Production Unit			
Mode / Band	WCDMA Band V	WCDMA Band II	WCDMA Band IV
RMC 12.2K	23	23.5	22.5
HSDPA Subtest-1	22	22	22
HSDPA Subtest-2	22	22	22
HSDPA Subtest-3	22	22	22
HSDPA Subtest-4	22	22	22
DC-HSDPA Subtest-1	21	21	21
DC-HSDPA Subtest-2	21	21	21
DC-HSDPA Subtest-3	21	21	21
DC-HSDPA Subtest-4	21	20	20
HSUPA Subtest-1	21.5	21	20
HSUPA Subtest-2	21	21	20
HSUPA Subtest-3	20	20	19
HSUPA Subtest-4	21	22	21
HSUPA Subtest-5	21	21	20
HSPA+ (16QAM) Subtest-1	21	21	21

LTE Band 17				
average power(dBm)				
Modulation	**BW (MHz)**	**RB size**	**Target MPR**	**Target Power**
QPSK	10	≤ 12	**0**	**24.5**
QPSK	10	> 12	**1**	**23.5**
16QAM	10	≤ 12	**1**	**23.5**
16QAM	10	> 12	**2**	**22.5**
QPSK	5	≤ 8	**0**	**24.5**
QPSK	5	> 8	**1**	**23.5**
16QAM	5	≤ 8	**1**	**23.5**
16QAM	5	> 8	**2**	**22.5**

LTE Band 5				
average power(dBm)				
Modulation	**BW (MHz)**	**RB size**	**Target MPR**	**Target Power**
QPSK	10	≤ 12	**0**	**23.5**
QPSK	10	> 12	**1**	**23**
16QAM	10	≤ 12	**1**	**23**
16QAM	10	> 12	**2**	**22**
QPSK	5	≤ 8	**0**	**23.5**
QPSK	5	> 8	**1**	**23**
16QAM	5	≤ 8	**1**	**23**
16QAM	5	> 8	**2**	**22**
QPSK	3	≤ 4	**0**	**23.5**
QPSK	3	> 4	**1**	**23**
16QAM	3	≤ 4	**1**	**23**
16QAM	3	> 4	**2**	**22**
QPSK	1.4	≤ 5	**0**	**23.5**
QPSK	1.4	> 5	**1**	**23**
16QAM	1.4	≤ 5	**1**	**23**
16QAM	1.4	> 5	**2**	**22**

LTE Band 4				
average power(dBm)				
Modulation	**BW (MHz)**	**RB size**	**Target MPR**	**Target Power**
QPSK	20	≤ 18	**0**	**23**
QPSK	20	> 18	**1**	**22**
16QAM	20	≤ 18	**1**	**22.5**
16QAM	20	> 18	**2**	**21.5**
QPSK	15	≤ 16	**0**	**23**
QPSK	15	> 16	**1**	**22**
16QAM	15	≤ 16	**1**	**22.5**
16QAM	15	> 16	**2**	**21.5**
QPSK	10	≤ 12	**0**	**23**
QPSK	10	> 12	**1**	**22**
16QAM	10	≤ 12	**1**	**22.5**
16QAM	10	> 12	**2**	**21.5**
QPSK	5	≤ 8	**0**	**23**
QPSK	5	> 8	**1**	**22**
16QAM	5	≤ 8	**1**	**22.5**
16QAM	5	> 8	**2**	**21.5**
QPSK	3	≤ 4	**0**	**23**
QPSK	3	> 4	**1**	**22**
16QAM	3	≤ 4	**1**	**22.5**
16QAM	3	> 4	**2**	**21.5**
QPSK	1.4	≤ 5	**0**	**23**
QPSK	1.4	> 5	**1**	**22**
16QAM	1.4	≤ 5	**1**	**22.5**
16QAM	1.4	> 5	**2**	**21.5**

LTE Band 2				
average power(dBm)				
Modulation	**BW (MHz)**	**RB size**	**Target MPR**	**Target Power**
QPSK	20	≤ 18	**0**	**24.5**
QPSK	20	> 18	**1**	**23.5**
16QAM	20	≤ 18	**1**	**23.5**
16QAM	20	> 18	**2**	**22**
QPSK	15	≤ 16	**0**	**24.5**
QPSK	15	> 16	**1**	**23.5**
16QAM	15	≤ 16	**1**	**23.5**
16QAM	15	> 16	**2**	**22**
QPSK	10	≤ 12	**0**	**24.5**
QPSK	10	> 12	**1**	**23.5**
16QAM	10	≤ 12	**1**	**23.5**
16QAM	10	> 12	**2**	**22**
QPSK	5	≤ 8	**0**	**24.5**
QPSK	5	> 8	**1**	**23.5**
16QAM	5	≤ 8	**1**	**23.5**
16QAM	5	> 8	**2**	**22**
QPSK	3	≤ 4	**0**	**24.5**
QPSK	3	> 4	**1**	**23.5**
16QAM	3	≤ 4	**1**	**23.5**
16QAM	3	> 4	**2**	**22**
QPSK	1.4	≤ 5	**0**	**24.5**
QPSK	1.4	> 5	**1**	**23.5**
16QAM	1.4	≤ 5	**1**	**23.5**
16QAM	1.4	> 5	**2**	**22**

LTE Band 7				
average power(dBm)				
Modulation	**BW (MHz)**	**RB size**	**Target MPR**	**Target Power**
QPSK	20	≤ 18	**0**	**23.5**
QPSK	20	> 18	**1**	**23**
16QAM	20	≤ 18	**1**	**23**
16QAM	20	> 18	**2**	**23**
QPSK	15	≤ 16	**0**	**23.5**
QPSK	15	> 16	**1**	**23**
16QAM	15	≤ 16	**1**	**23**
16QAM	15	> 16	**2**	**23**
QPSK	10	≤ 12	**0**	**23.5**
QPSK	10	> 12	**1**	**23**
16QAM	10	≤ 12	**1**	**23**
16QAM	10	> 12	**2**	**23**
QPSK	5	≤ 8	**0**	**23.5**
QPSK	5	> 8	**1**	**23**
16QAM	5	≤ 8	**1**	**23**
16QAM	5	> 8	**2**	**23**

Remark:
1. By design, maximum LTE RF power of smaller supported bandwidth does not exceed the RF power of largest supported bandwidth; the information is included in “tune-up procedure” exhibit
2. LTE MPR implementation is the same for normal mode.

Maximum Target Average Power for Production Unit					
Mode/Band	a	b	g	n-HT20	n-HT40
WLAN 2.4GHz Band		13.5	14	14	13.5

Maximum Target Average Power for Production Unit			
Mode / Band	1Mbps (GFSK)	2Mbps (π/4-DQPSK)	3Mbps (8-DPSK)
Bluetooth	6	4	5

The table below summarized necessary items addressed in KDB 941225 D05 v02r02.

FCC ID	RAD456
EUT	Tablet PC
Operating Frequency Range of each LTE transmission band	LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 2: 1850.7 MHz ~ 1909.3 MHz LTE Band 7: 2504.7 MHz ~ 2535 MHz and 2553.5 MHz ~ 2569.3 MHz
Channel Bandwidth	5MHz / 10MHz (LTE Band 17) 1.4MHz / 3MHz / 5MHz/ 10MHz (LTE Band 5) 5MHz / 10MHz / 15MHz/ 20MHz (LTE Band 7) 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz (LTE Band 2/Band 4)

Transmission (H, M, L) channel numbers and frequencies in each LTE band

Band 17

	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Channel #	Frequency (MHz)	Channel #	Frequency (MHz)
L	23755	706.5	23780	709
M	23790	710	23790	710
H	23825	713.5	23800	711

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 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 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 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	20815	2506.5	20840	2509	20865	2511.5	20890	2514
M	21095	2534.5	21070	2532	21045	2529.5	21020	2527
H	21425	2567.5	21400	2565	21375	2562.5		

<table>
<tr><td>E category, uplink modulations used</td><td>Category 3, QPSK and 16QAM</td></tr>
<tr><td>LTE transmitter and antenna implementation (standalone or sharing hardware components / antennas)</td><td>LTE and WCDMA share the same antenna, and cannot transmit simultaneously.</td></tr>
<tr><td>LTE Voice / Data requirements</td><td>Data only</td></tr>
<tr><td>LTE MPR permanently built-in by design</td><td>Yes, per 3GPP TS 36.101 v11.0.0
Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3
<table>
<tr><th rowspan="2">Modulation</th><th colspan="6">Channel bandwidth / Transmission bandwidth (RB)</th><th rowspan="2">MPR (dB)</th></tr>
<tr><th>1.4 MHz</th><th>3.0 MHz</th><th>5 MHz</th><th>10 MHz</th><th>15 MHz</th><th>20 MHz</th></tr>
<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></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.</td></tr>
<tr><td>Base station simulator used for Testing</td><td>Anritsu MT8820C</td></tr>
<tr><td>Power reduction applied to satisfy SAR compliance</td><td>No, The EUT doesn’t support power reduction.</td></tr>
</table>

3.3 Applied Standard

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

- FCC 47 CFR Part 2 (2.1093)
- ANSI/IEEE C95.1-1992
- IEEE 1528-2003
- FCC KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r01
- FCC KDB 865664 D02 SAR Reporting v01r01
- FCC KDB 447498 D01 General RF Exposure Guidance v05r01
- FCC KDB 248227 D01 SAR meas for 802 11abg v01r02
- FCC KDB 616217 D04 SAR for laptop and tablets v01r01
- FCC KDB 941225 D01 SAR test for 3G devices v02
- FCC KDB 941225 D02 HSPA and 1x Advanced v02r02
- FCC KDB 941225 D03 SAR Test Reduction GSM GPRS EDGE v01
- FCC KDB 941225 D05 SAR for LTE Devices v02r02

3.4 Device Category and SAR Limits

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. Limit for General Population/Uncontrolled exposure should be applied for this device, it is 1.6 W/kg as averaged over any 1 gram of tissue.

3.5 Test Conditions

Ambient Condition

Ambient Temperature	20 to 24 ℃
Humidity	< 60 %

Test Configuration

For WWAN SAR testing, the device was controlled by using a base station emulator. Communication between the device and the emulator was established by air link. The distance between the EUT and the antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of EUT.

During WLAN SAR testing EUT is configured with the WLAN continuous TX tool, and the transmission duty factor was monitored on the spectrum analyzer with zero-span setting
Duty factor observed as below:

802.11b, 1Mbps: 100%
802.11g, 6Mbps: 97.21%
802.11n-HT20, MCS0,: 97.31%
802.11n-HT40, MCS0,: 94.77%

For WLAN SAR testing, WLAN engineering testing software installed on the EUT can provide continuous transmitting RF signal.

4. Specific Absorption Rate (SAR)

4.1 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.

4.2 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)

SAR measurement can be either related to the temperature elevation in tissue by

$$\mathbf{SAR} = \mathbf{C}\left(\frac{\boldsymbol{\delta}\mathbf{T}}{\boldsymbol{\delta}\mathbf{t}}\right)$$

Where: C is the specific heat capacity, δT is the temperature rise and δt is the exposure duration, or related to the electrical field in the tissue by

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

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

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

5. SAR Measurement System

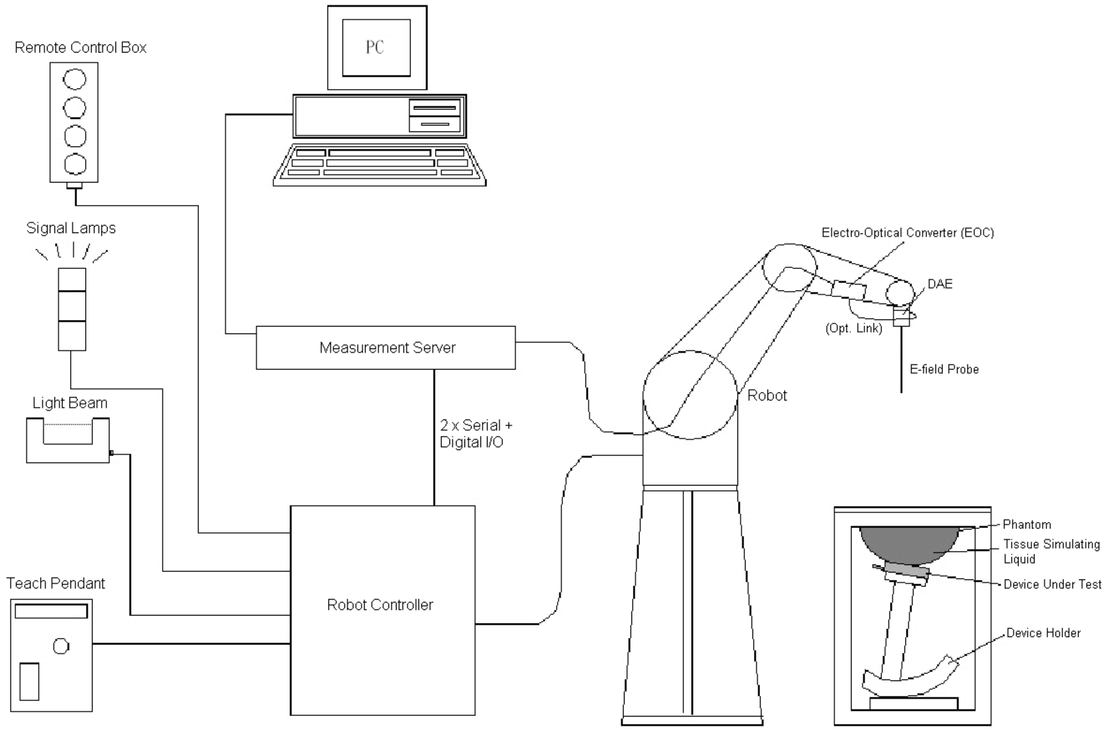


Fig 5.1 SPEAG DASY System Configurations

The DASY system for performance compliance tests is illustrated above graphically. This system consists of the following items:

- A standard high precision 6-axis robot with controller, a teach pendant and software
- A data acquisition electronic (DAE) attached to the robot arm extension
- A dosimetric probe equipped with an optical surface detector system
- The electro-optical converter (EOC) performs the conversion between optical and electrical signals
- A measurement server performs the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the accuracy of the probe positioning
- A computer operating Windows XP
- DASY software
- Remove control with teach pendant and additional circuitry for robot safety such as warming lamps, etc.
- The SAM twin phantom
- A device holder
- Tissue simulating liquid
- Dipole for evaluating the proper functioning of the system

Component details are described in in the following sub-sections.

5.1 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.

5.1.1 E-Field Probe Specification

<EX3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)
Dynamic Range	10 µW/g to 100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm

Fig 5.2 Photo of EX3DV4

5.1.2 E-Field Probe Calibration

Each probe needs to be calibrated according to a dosimetric assessment procedure with accuracy better than ± 10%. The spherical isotropy shall be evaluated and within ± 0.25dB. The sensitivity parameters (NormX, NormY, and NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe are tested. The calibration data can be referred to appendix C of this report.

5.2 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 5.3 Photo of DAE

5.3 Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY5: CS8c) from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability ±0.035 mm)
- High reliability (industrial design)
- Jerk-free straight movements
- Low ELF interference (the closed metallic construction shields against motor control fields)

Fig 5.4 Photo of DASY5

5.4 Measurement Server

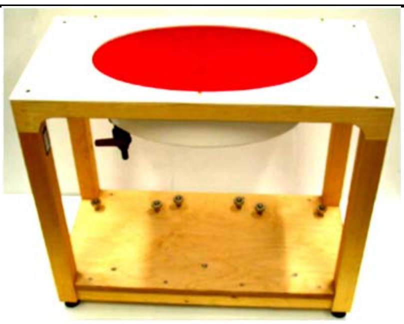
The measurement server is based on a PC/104 CPU board with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5: 128 MB), RAM (DASY5: 128 MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all the real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operations.

Fig 5.5 Photo of Server for DASY5

5.5 Phantom

<ELI4 Phantom>

Shell Thickness	2 ± 0.2 mm (sagging: <1%)	 Fig 5.6 Photo of ELI4 Phantom
Filling Volume	Approx. 30 liters	
Dimensions	Major ellipse axis: 600 mm Minor axis: 400 mm	

The ELI4 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.

5.6 Device Holder

<Device Holder for SAM Twin Phantom>

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation center for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.

The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity ε = 3 and loss tangent δ = 0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

Fig 5.7 Device Holder

<Laptop Extension Kit>

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.

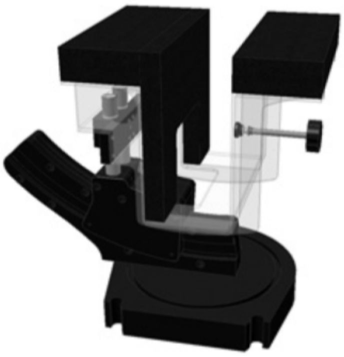


Fig 5.8 Laptop Extension Kit

5.7 Data Storage and Evaluation

5.7.1 Data Storage

The DASY software stores the assessed data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all the necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files. The post-processing software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of erroneous parameter settings. For example, if a measurement has been performed with an incorrect crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be reevaluated.

The measured data can be visualized or exported in different units or formats, depending on the selected probe type (e.g., [V/m], [A/m], [mW/g]). Some of these units are not available in certain situations or give meaningless results, e.g., a SAR-output in a non-lose media, will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

5.7.2 Data Evaluation

The DASY post-processing software (SEMCAD) automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software：

Probe parameters：	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcp_i
Device parameters：	- Frequency	f
	- Crest factor	cf
Media parameters：	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as：

$$\mathbf{V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}}$$

with V_i = compensated signal of channel i, (i = x, y, z)
U_i = input signal of channel i, (i = x, y, z)
cf = crest factor of exciting field (DASY parameter)
dcp_i = diode compression point (DASY parameter)

From the compensated input signals, the primary field data for each channel can be evaluated：

E-field Probes：$\mathbf{E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}}$

H-field Probes：$\mathbf{H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}}$

with V_i = compensated signal of channel i, (i = x, y, z)
$Norm_i$ = sensor sensitivity of channel i, (i = x, y, z), μV/(V/m)^2 for E-field Probes
ConvF = sensitivity enhancement in solution
a_{ij} = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
E_i = electric field strength of channel i in V/m
H_i = magnetic field strength of channel i in A/m

The RSS value of the field components gives the total field strength (Hermitian magnitude)：

$$\mathbf{E_{tot} = \sqrt{E_x^2 + E_y^2 + E_z^2}}$$

The primary field data are used to calculate the derived field units.

$$\mathbf{SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000}}$$

with SAR = local specific absorption rate in mW/g
E_{tot} = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm^3

Note that the density is set to 1, to account for actual head tissue density rather than the density of the tissue simulating liquid.

5.8 Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	750MHz System Validation Kit	D750V3	1087	Apr. 09, 2013	Apr. 08, 2014
SPEAG	835MHz System Validation Kit	D835V2	4d151	Mar. 25. 2013	Mar. 24. 2014
SPEAG	1750MHz System Validation Kit	D1750V2	1090	Mar. 27, 2013	Mar. 26, 2014
SPEAG	1900MHz System Validation Kit	D1900V2	5d170	Mar. 27, 2013	Mar. 26, 2014
SPEAG	2450MHz System Validation Kit	D2450V2	840	Mar. 26. 2013	Mar. 25. 2014
SPEAG	2600MHz System Validation Kit	D2600V2	1061	Mar. 26. 2013	Mar. 25. 2014
SPEAG	Data Acquisition Electronics	DAE4	905	Jun. 11, 2013	Jun. 10, 2014
SPEAG	Dosimetric E-Field Probe	EX3DV4	3578	Jun. 20, 2013	Jun. 19, 2014
SPEAG	Dosimetric E-Field Probe	EX3DV4	3819	Nov. 26, 2012	Nov. 25, 2013
SPEAG	ELI4 Phantom	QD OVA 002 AA	1149	NCR	NCR
SPEAG	Phone Positioner	N/A	N/A	NCR	NCR
Anritsu	Radio communication analyzer	MT8820C	6201091028	Jul. 11, 2013	Jul. 10, 2014
Agilent	Wireless Communication Test Set	E5515C	MY50266977	May 06, 2013	May 05, 2015
R&S	Network Analyzer	ZVB8	100106	Nov. 07, 2013	Nov. 06, 2014
Speag	Dielectric Assessment KIT	DAK-3.5	1032	NCR	NCR
Anritsu	Power Meter	ML2495A	1218010	Mar. 28. 2013	Mar. 27, 2014
Anritsu	Power Sensor	MA2411B	1207253	Mar. 28. 2013	Mar. 27, 2014
Agilent	Wireless Communication Test Set	E5515E	MY52112100	Oct. 24, 2013	Oct. 23, 2014
Agilent	Dual Directional Coupler	778D	50422	Note 2	
Woken	Attenuator 1	WK0602-XX	N/A	Note 2	
PE	Attenuator 2	PE7005-10	N/A	Note 2	
PE	Attenuator 3	PE7005- 3	N/A	Note 2	
AR	Power Amplifier	5S1G4M2	328767	Note 3	
R&S	Spectrum Analyzer	FSP7	101230	Jun. 13, 2013	Jun. 12, 2014

Table 5.1 Test Equipment List

Note:

1. The calibration certificate of DASY can be referred to appendix C of this report.
2. The Insertion Loss calibration of Dual Directional Coupler and Attenuator were characterized via the network analyzer and compensated during system check.
3. In system check we need to monitor the level on the power meter, and adjust the power amplifier level to have precise power level to the dipole; the measured SAR will be normalized to 1W input power according to the ratio of 1W to the input power to the dipole. For system check, the calibration of the power amplifier is deemed not critically required for correct measurement; the power meter is critical and we do have calibration for it
4. Attenuator 1 insertion loss is calibrated by the network Analyzer, which the calibration is valid, before system check.

6. 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 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. 6.1.

Fig 6.1 Photo of Liquid Height for Body SAR

The following table gives the recipes for tissue simulating liquid.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ε_r)
For Body								
750	51.7	47.2	0	0.9	0.1	0	0.96	55.5
835	50.8	48.2	0	0.9	0.1	0	0.97	55.2
1800, 1900, 2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7

Table 6.1 Recipes of Tissue Simulating Liquid

The dielectric parameters of the liquids were verified prior to the SAR evaluation using an SPEAG DAK-3.5 Dielectric Probe Kit and an R&S Network Analyzer.

The following table shows the measuring results for simulating liquid.

Frequency (MHz)	Liquid Type	Liquid Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	Body	22.6	0.961	53.913	0.96	55.5	0.10	-2.86	±5	Nov. 20, 2013
835	Body	22.6	1.011	56.243	0.97	55.2	4.23	1.89	±5	Nov. 15, 2013
1750	Body	22.7	1.514	53.575	1.49	53.4	1.61	0.33	±5	Nov. 25, 2013
1900	Body	22.7	1.533	54.611	1.52	53.3	0.86	2.46	±5	Nov. 17, 2013
2450	Body	22.8	1.949	51.667	1.95	52.7	-0.05	-1.96	±5	Nov. 21, 2013
2600	Body	22.8	2.209	51.123	2.16	52.5	2.27	-2.62	±5	Nov. 20, 2013

Table 6.2 Measuring Results for Simulating Liquid

7. System Verification Procedures

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performance check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

7.1 Purpose of System Performance check

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

7.2 System Setup

In the simplified setup for system evaluation, the EUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:

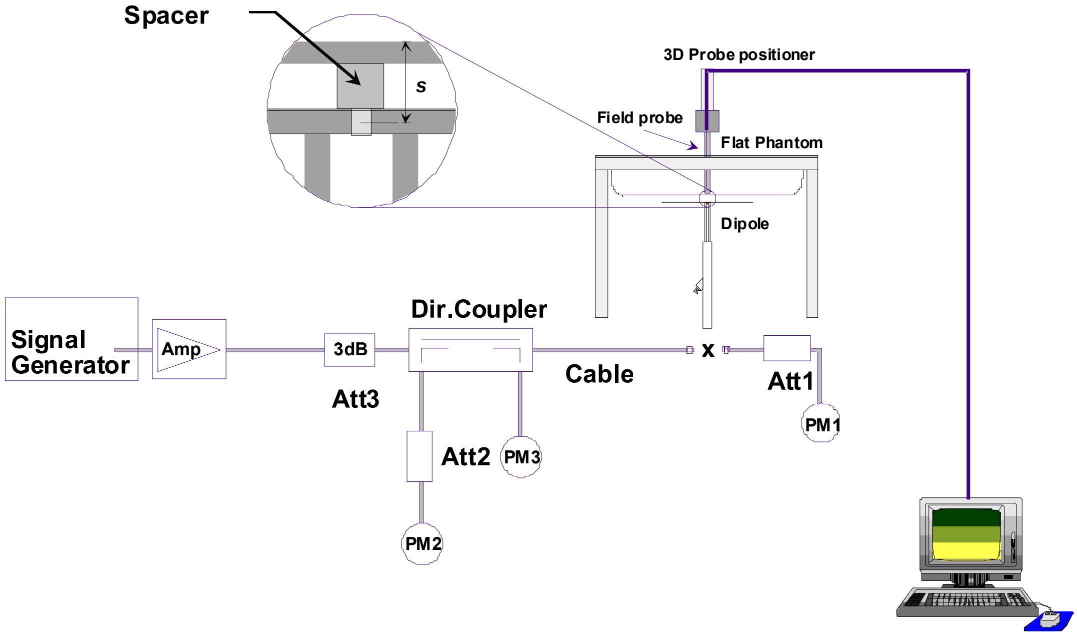


Fig 7.1 System Setup for System Evaluation

1. Signal Generator
2. Amplifier
3. Directional Coupler
4. Power Meter
5. Calibrated Dipole

Fig 7.2 Photo of Dipole Setup

7.3 SAR System Verification Results

Comparing to the original SAR value provided by SPEAG, the verification data should be within its specification of 10 %. Table 7.1 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)	Liquid Type	Power fed onto reference dipole (mW)	Targeted SAR (W/kg)	Measured SAR (W/kg)	Normalized SAR (W/kg)	Deviation (%)
Nov. 20, 2013	750	Body	250	8.58	2.22	8.88	3.50
Nov. 15, 2013	835	Body	250	9.43	2.45	9.8	3.92
Nov. 25, 2013	1750	Body	250	38.1	9.13	36.52	-4.15
Nov. 17, 2013	1900	Body	250	41.2	10.2	40.8	-0.97
Nov. 21, 2013	2450	Body	250	50.4	13.3	53.2	5.56
Nov. 20, 2013	2600	Body	250	55.6	14.6	58.4	5.04

Table 7.1 Target and Measurement SAR after Normalized

8. EUT Testing Position

This EUT was tested in five different positions. They are bottom-face, Edge2, Edge3, Edge4, and Curved surface of Edge3. In these positions, the surface of EUT is touching with phantom 0cm. Please refer to Appendix D for the test setup photos.

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.
(c) For WLAN/BT power measurement, use engineering software to configure EUT WLAN/BT continuously transmission, at maximum RF power in each supported wireless interface and frequency band
(d) Connect EUT RF port through RF cable to the power meter, and measure WLAN/BT output power

<SAR measurement>

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

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

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

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 & Zoom Scan Procedures

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r01 quoted below.

When the 1-g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

<table>
<tr><td colspan="3"></td><td>≤ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">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.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">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 <u>reported</u> 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.</td></tr>
</table>

9.4 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.

9.5 SAR Averaged Methods

In DASY, the interpolation and extrapolation are both based on the modified Quadratic Shepard's method. The interpolation scheme combines a least-square fitted function method and a weighted average method which are the two basic types of computational interpolation and approximation.

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty within 1% for the 1 g and 10 g cubes, the extrapolation distance should not be larger than 5 mm.

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. Conducted RF Output Power (Unit: dBm)

<GSM Conducted Power>

Note:
1. Per KDB 447498 D01v05r01, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. The EUT do not support DTM function.
3. For Body SAR testing, GPRS and EDGE should be evaluated, therefore the EUT was set in GPRS 2 Tx slots for GSM850 and GSM1900 due to its highest frame-average power.

Band: GSM850	Burst Average Power (dBm)			Frame-Average Power (dBm)		
Channel	128	189	251	128	189	251
Frequency (MHz)	824.2	836.4	848.8	824.2	836.4	848.8
GPRS (GMSK, 1 Tx slot) – CS1	32.54	32.46	32.39	23.54	23.46	23.39
GPRS (GMSK, 2 Tx slots) – CS1	29.70	29.53	29.40	23.70	23.53	23.40
GPRS (GMSK, 3 Tx slots) – CS1	27.05	26.99	26.93	22.79	22.73	22.67
GPRS (GMSK, 4 Tx slots) – CS1	25.79	25.77	25.70	22.79	22.77	22.70
EDGE (GMSK, 1 Tx slot) – MCS1	32.39	32.29	32.30	23.39	23.29	23.30
EDGE (GMSK, 2 Tx slots) – MCS1	29.12	28.95	28.95	23.12	22.95	22.95
EDGE (GMSK, 3 Tx slots) – MCS1	26.90	26.80	27.14	22.64	22.54	22.88
EDGE (GMSK, 4 Tx slots) – MCS1	25.76	25.90	26.03	22.76	22.90	23.03
EDGE (8PSK, 1 Tx slot) – MCS5	26.34	26.35	26.38	17.34	17.35	17.38
EDGE (8PSK, 2 Tx slots) – MCS5	23.05	23.02	23.10	17.05	17.02	17.10
EDGE (8PSK, 3 Tx slots) – MCS5	21.70	21.77	21.74	17.44	17.51	17.48
EDGE (8PSK, 4 Tx slots) – MCS5	20.70	20.52	20.65	17.70	17.52	17.65

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.
The calculated method are shown as below:
Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

Band: GSM1900	Burst Average Power (dBm)			Frame-Average Power (dBm)		
Channel	512	661	810	512	661	810
Frequency (MHz)	1850.2	1880.0	1909.8	1850.2	1880.0	1909.8
GPRS (GMSK, 1 Tx slot) – CS1	29.24	29.58	29.64	20.24	20.58	20.64
GPRS (GMSK, 2 Tx slots) – CS1	28.18	28.45	28.56	22.18	22.45	22.56
GPRS (GMSK, 3 Tx slots) – CS1	24.13	24.46	24.55	19.87	20.20	20.29
GPRS (GMSK, 4 Tx slots) – CS1	23.01	23.28	23.35	20.01	20.28	20.35
EDGE (GMSK, 1 Tx slot) – MCS1	29.18	29.52	29.62	20.18	20.52	20.62
EDGE (GMSK, 2 Tx slots) – MCS1	28.19	28.43	28.53	22.19	22.43	22.53
EDGE (GMSK, 3 Tx slots) – MCS1	24.13	24.52	24.55	19.87	20.26	20.29
EDGE (GMSK, 4 Tx slots) – MCS1	23.04	23.30	23.38	20.04	20.30	20.38
EDGE (8PSK, 1 Tx slot) – MCS5	25.70	25.89	26.03	16.70	16.89	17.03
EDGE (8PSK, 2 Tx slots) – MCS5	22.49	22.76	22.99	16.49	16.76	16.99
EDGE (8PSK, 3 Tx slots) – MCS5	21.08	21.32	21.59	16.82	17.06	17.33
EDGE (8PSK, 4 Tx slots) – MCS5	19.82	20.02	20.38	16.82	17.02	17.38

Remark: The frame-averaged power is linearly scaled the maximum burst averaged power over 8 time slots.
The calculated method are shown as below:
Frame-averaged power = Maximum burst averaged power (1 Tx Slot) - 9 dB
Frame-averaged power = Maximum burst averaged power (2 Tx Slots) - 6 dB
Frame-averaged power = Maximum burst averaged power (3 Tx Slots) - 4.26 dB
Frame-averaged power = Maximum burst averaged power (4 Tx Slots) - 3 dB

<WCDMA Conducted Power>

The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.

A summary of these settings are illustrated below:

HSDPA Setup Configuration:

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

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

Sub-test	β_c	β_d	β_d *(SF)*	β_c/β_d	β_{HS} *(Note1, Note 2)*	CM (dB) *(Note 3)*	MPR (dB) *(Note 3)*
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 *(Note 4)*	15/15 *(Note 4)*	64	12/15 *(Note 4)*	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

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

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

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

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

Setup Configuration

HSUPA Setup Configuration:

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

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

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (Note 5) (Note 6)	β_{ed} (SF)	β_{ed} (Codes)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 6)	E-TFCI
1	11/15 (Note 3)	15/15 (Note 3)	64	11/15 (Note 3)	22/15	209/225	1309/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	β_{ed}1: 47/15 β_{ed}2: 47/15	4 4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 (Note 4)	15/15 (Note 4)	64	15/15 (Note 4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c .
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.
Note 6: β_{ed} can not be set directly, it is set by Absolute Grant Value.

Setup Configuration

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

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

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

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c.
Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.
Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signaled to use the extrapolation algorithm.

Setup Configuration

DC-HSDPA 3GPP release 8 Setup Configuration:

a. The EUT was connected to Base Station Agilent E5515E referred to the Setup Configuration below
b. The RF path losses were compensated into the measurements.
c. A call was established between EUT and Base Station with following setting:
   i. Set RMC 12.2Kbps + HSDPA mode.
   ii. Set Cell Power = -25 dBm
   iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
   iv. Select HSDPA Uplink Parameters
   v. Set Gain Factors (β_c and β_d) and parameters were set according to each Specific sub-test in the following table, C10.1.4, quoted from the TS 34.121
      a). Subtest 1: β_c/β_d=2/15
      b). Subtest 2: β_c/β_d=12/15
      c). Subtest 3: β_c/β_d=15/8
      d). Subtest 4: β_c/β_d=15/4
   vi. Set Delta ACK, Delta NACK and Delta CQI = 8
   vii. Set Ack-Nack Repetition Factor to 3
   viii. Set CQI Feedback Cycle (k) to 4 ms
   ix. Set CQI Repetition Factor to 2
   x. Power Ctrl Mode = All Up bits
d. The transmitted maximum output power was recorded.

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

C.8.1.12 Fixed Reference Channel Definition H-Set 12

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

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		

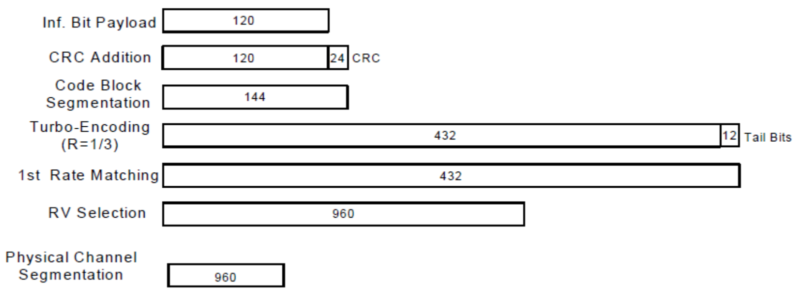


Figure C.8.19: Coding rate for Fixed reference Channel H-Set 12 (QPSK)

Setup Configuration

<u><WCDMA Conducted Power></u>

Note:

1. Applying the subtest setup in Table C10.1.4 and Table C.11.1.3 of 3GPP TS 34.121-1 V9.1.0 to Rel. 6 HSPA, the subtest setup in Table C.11.1.4 to Rel. 7 HSPA+, and the subtest setup in Table C.8.1.2 to Rel. 8 DC-HSDPA .
2. Per KDB 941225 D02v02r02, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA/HSPA+/DC HSDPA output power is < 0.25dB higher than RMC, or reported SAR with RMC 12.2kbps setting is ≤ 1.2W/kg, HSDPA/HSUPA/HSPA+/DC-HSDPA SAR evaluation can be excluded.

Band		WCDMA Band V			WCDMA Band II			WCDMA Band IV		
Tx Channel		4132	4182	4233	9262	9400	9538	1312	1413	1513
Rx Channel		4357	4407	4458	9662	9800	9938	1537	1638	1738
Frequency (MHz)		826.4	836.4	846.6	1852.4	1880	1907.6	1712.4	1732.6	1752.6
3GPP Rel 99	RMC 12.2Kbps	**22.85**	22.28	21.85	22.57	**22.91**	22.75	21.75	21.74	**21.92**
3GPP Rel 6	HSDPA Subtest-1	21.02	21.26	20.86	21.13	21.28	21.22	20.15	20.35	20.95
3GPP Rel 6	HSDPA Subtest-2	21.02	21.19	20.90	20.98	21.42	21.17	20.23	20.15	20.98
3GPP Rel 6	HSDPA Subtest-3	21.14	21.25	20.96	21.14	21.44	21.15	20.25	20.21	21.17
3GPP Rel 6	HSDPA Subtest-4	21.08	21.32	20.86	21.19	21.33	21.14	20.28	20.18	21.14
3GPP Rel 8	DC-HSDPA Subtest-1	20.92	20.95	20.49	20.27	20.33	20.19	19.58	20.10	20.38
3GPP Rel 8	DC-HSDPA Subtest-2	20.78	20.67	20.28	20.21	20.18	20.14	19.43	19.83	20.22
3GPP Rel 8	DC-HSDPA Subtest-3	20.46	20.44	20.16	20.11	19.97	19.93	19.29	19.61	20.02
3GPP Rel 8	DC-HSDPA Subtest-4	20.44	20.40	20.02	19.94	19.84	19.81	19.09	19.43	19.73
3GPP Rel 6	HSUPA Subtest-1	21.12	20.90	20.34	20.47	20.58	20.55	19.96	19.96	19.81
3GPP Rel 6	HSUPA Subtest-2	19.87	20.30	19.69	20.06	20.21	20.13	19.79	19.77	19.64
3GPP Rel 6	HSUPA Subtest-3	19.63	19.95	19.37	19.72	19.81	19.75	18.92	18.93	18.77
3GPP Rel 6	HSUPA Subtest-4	19.92	20.23	19.67	20.92	21.07	21.05	20.09	20.08	19.95
3GPP Rel 6	HSUPA Subtest-5	19.94	20.24	19.66	20.08	20.14	20.12	19.82	19.78	19.64
3GPP Rel 7	HSPA+ (16QAM) Subtest-1	20.93	20.96	20.51	20.43	20.70	20.25	19.93	20.16	20.36
3GPP MPR specification	MPR result	WCDMA Band V			WCDMA Band II			WCDMA Band IV		
0	HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	HSDPA Subtest-2	0.00	0.07	-0.04	0.15	-0.14	0.05	-0.08	0.20	-0.03
≦0.5	HSDPA Subtest-3	-0.12	0.01	-0.10	-0.01	-0.16	0.07	-0.10	0.14	-0.22
≦0.5	HSDPA Subtest-4	-0.06	-0.06	0.00	-0.06	-0.05	0.08	-0.13	0.17	-0.19
0	DC-HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	DC-HSDPA Subtest-2	0.14	0.28	0.21	0.06	0.15	0.05	0.15	0.27	0.16
≦0.5	DC-HSDPA Subtest-3	0.46	0.51	0.33	0.16	0.36	0.26	0.29	0.49	0.36
≦0.5	DC-HSDPA Subtest-4	0.48	0.55	0.47	0.33	0.49	0.38	0.49	0.67	0.65
≦0	HSUPA Subtest-1	-1.18	-0.66	-0.68	-0.39	-0.44	-0.43	-0.14	-0.18	-0.17
≦2	HSUPA Subtest-2	0.07	-0.06	-0.03	0.02	-0.07	-0.01	0.03	0.01	0.00
≦1	HSUPA Subtest-3	0.31	0.29	0.29	0.36	0.33	0.37	0.90	0.85	0.87
≦2	HSUPA Subtest-4	0.02	0.01	-0.01	-0.84	-0.93	-0.93	-0.27	-0.30	-0.31
≦0	HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
≦2.5	HSPA+ (16QAM) Subtest-1	-0.99	-0.72	-0.85	-0.35	-0.56	-0.13	-0.11	-0.38	-0.72

<LTE Conducted Power>

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 D05v02r02, 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 D05v02r02, 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 D05v02r02, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure.
5. Per KDB 941225 D05v02r02, when reported SAR of 1RB and 50%RB allocation for QPSK ≤0.8W/kg, and 100%RB with QPSK output power is less than 1RB and 50%RB, 100%RB allocation for QPSK is not required.
6. Per KDB 941225 D05v02r02, when reported SAR of 1RB and 50%RB allocation for QPSK >0.8W/kg for any exposure position, SAR testing of 100%RB allocation for QPSK is performed at the highest power channel.
7. 16QAM 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 D05v02, 16QAM SAR testing is not required.
8. 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 D05v02r02, smaller bandwidth SAR testing is not required.

<LTE Band 17 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Target MPR (dB)
Channel				23780	23790	23800	
Frequency (MHz)				709	710	711	
10	QPSK	1	0	23.64	23.60	23.46	0
10	QPSK	1	24	24.00	23.74	23.68	
10	QPSK	1	49	23.66	23.69	23.07	
10	QPSK	25	0	22.51	22.78	22.22	1
10	QPSK	25	12	22.38	22.43	22.43	
10	QPSK	25	24	22.52	22.70	22.62	
10	QPSK	50	0	22.39	22.43	22.37	
10	16QAM	1	0	22.74	22.72	22.48	1
10	16QAM	1	24	22.39	22.39	22.72	
10	16QAM	1	49	22.85	22.47	22.86	
10	16QAM	25	0	21.36	21.58	21.39	2
10	16QAM	25	12	21.49	21.45	21.54	
10	16QAM	25	24	21.64	21.59	21.73	
10	16QAM	50	0	21.59	21.36	21.26	
Channel				23755	23790	23825	Target MPR (dB)
Frequency (MHz)				706.5	710	713.5	
5	QPSK	1	0	23.68	23.56	23.53	0
5	QPSK	1	12	23.65	23.64	23.54	
5	QPSK	1	24	23.41	23.61	23.52	
5	QPSK	12	0	22.58	22.46	22.80	1
5	QPSK	12	6	22.60	22.56	22.84	
5	QPSK	12	11	22.59	22.57	22.83	
5	QPSK	25	0	22.43	22.47	22.62	
5	16QAM	1	0	22.58	22.90	22.57	1
5	16QAM	1	12	22.61	22.94	22.55	
5	16QAM	1	24	22.53	22.68	22.74	
5	16QAM	12	0	21.53	21.58	21.88	2
5	16QAM	12	6	21.88	21.54	21.84	
5	16QAM	12	11	21.64	21.71	22.03	
5	16QAM	25	0	21.46	21.55	21.70	

<LTE Band 5 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Target MPR (dB)
Channel				20450	20525	20600	
Frequency (MHz)				829	836.5	844	
10	QPSK	1	0	23.04	22.16	23.28	0
10	QPSK	1	24	23.13	22.76	23.23	
10	QPSK	1	49	22.62	22.61	22.77	
10	QPSK	25	0	22.43	22.68	22.28	1
10	QPSK	25	12	22.09	21.61	21.99	
10	QPSK	25	24	21.70	21.87	21.69	
10	QPSK	50	0	21.88	21.51	21.67	
10	16QAM	1	0	21.78	21.21	22.13	1
10	16QAM	1	24	22.32	21.54	22.43	
10	16QAM	1	49	21.51	21.75	22.09	
10	16QAM	25	0	21.54	20.37	21.39	2
10	16QAM	25	12	21.11	20.65	21.15	
10	16QAM	25	24	20.52	20.95	20.83	
10	16QAM	50	0	20.92	20.53	20.72	
Channel				20425	20525	20625	Target MPR (dB)
Frequency (MHz)				826.5	836.5	846.5	
5	QPSK	1	0	22.64	22.47	22.07	0
5	QPSK	1	12	23.11	22.73	22.22	
5	QPSK	1	24	23.07	22.72	22.04	
5	QPSK	12	0	22.70	21.59	21.49	1
5	QPSK	12	6	22.82	21.68	21.23	
5	QPSK	12	11	22.63	21.94	21.21	
5	QPSK	25	0	22.65	21.66	21.07	
5	16QAM	1	0	21.59	21.70	21.02	1
5	16QAM	1	12	22.16	21.78	21.15	
5	16QAM	1	24	22.15	22.21	21.31	
5	16QAM	12	0	21.79	20.67	20.66	2
5	16QAM	12	6	21.95	20.86	20.49	
5	16QAM	12	11	21.94	20.99	20.43	
5	16QAM	25	0	21.94	20.75	20.52	
Channel				20415	20525	20635	Target MPR (dB)
Frequency (MHz)				825.5	836.5	847.5	
3	QPSK	1	0	22.34	22.56	22.55	0
3	QPSK	1	7	22.89	22.55	22.38	
3	QPSK	1	14	22.79	22.61	22.08	
3	QPSK	8	0	22.68	21.72	22.35	1
3	QPSK	8	4	22.84	21.77	21.37	
3	QPSK	8	7	22.74	21.81	21.33	
3	QPSK	15	0	22.70	21.81	21.21	
3	16QAM	1	0	21.72	21.87	21.59	1
3	16QAM	1	7	21.94	21.77	21.62	
3	16QAM	1	14	21.89	21.82	21.05	
3	16QAM	8	0	21.73	20.65	20.44	2
3	16QAM	8	4	21.96	20.83	20.51	
3	16QAM	8	7	21.90	20.80	20.34	
3	16QAM	15	0	21.89	20.77	20.39	

Channel				20407	20525	20643	Target MPR (dB)
Frequency (MHz)				824.7	836.5	848.3	
1.4	QPSK	1	0	23.13	22.59	22.21	0
1.4	QPSK	1	2	23.03	22.60	22.19	
1.4	QPSK	1	5	23.14	22.61	22.15	
1.4	QPSK	3	0	23.06	22.55	22.17	
1.4	QPSK	3	1	23.08	22.53	22.16	
1.4	QPSK	3	2	23.06	22.56	22.07	
1.4	QPSK	6	0	22.57	21.88	21.19	1
1.4	16QAM	1	0	22.44	22.00	21.43	1
1.4	16QAM	1	2	22.48	21.84	21.55	
1.4	16QAM	1	5	22.81	21.90	21.21	
1.4	16QAM	3	0	22.23	22.07	21.39	
1.4	16QAM	3	1	22.36	22.14	21.45	
1.4	16QAM	3	2	22.26	22.07	21.30	
1.4	16QAM	6	0	21.95	20.89	20.32	2

<LTE Band 4 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Target MPR (dB)
Channel				20050	20175	20300	
Frequency (MHz)				1720	1732.5	1745	
20	QPSK	1	0	22.57	21.86	21.95	0
20	QPSK	1	49	22.54	21.92	22.19	
20	QPSK	1	99	22.29	22.10	22.15	
20	QPSK	50	0	21.20	20.79	21.22	1
20	QPSK	50	24	21.17	20.79	20.92	
20	QPSK	50	49	21.15	20.92	20.94	
20	QPSK	100	0	21.08	20.78	21.12	
20	16QAM	1	0	21.54	21.38	21.00	1
20	16QAM	1	49	21.78	21.24	21.16	
20	16QAM	1	99	21.10	21.61	21.07	
20	16QAM	50	0	20.08	19.80	19.98	2
20	16QAM	50	24	20.02	19.80	19.93	
20	16QAM	50	49	19.95	19.89	20.02	
20	16QAM	100	0	20.09	19.74	20.04	
Channel				20025	20175	20325	Target MPR (dB)
Frequency (MHz)				1717.5	1732.5	1747.5	
15	QPSK	1	0	22.23	21.85	21.87	0
15	QPSK	1	37	22.39	21.80	22.14	
15	QPSK	1	74	22.05	21.85	22.04	
15	QPSK	36	0	21.17	20.86	21.02	1
15	QPSK	36	18	21.12	20.80	21.04	
15	QPSK	36	37	21.09	20.88	21.00	
15	QPSK	75	0	21.00	20.81	21.00	
15	16QAM	1	0	21.31	21.07	21.64	1
15	16QAM	1	37	21.56	21.34	21.81	
15	16QAM	1	74	21.43	21.33	21.40	
15	16QAM	36	0	20.18	19.96	20.06	2
15	16QAM	36	18	20.15	19.94	20.01	
15	16QAM	36	37	20.14	19.93	20.02	
15	16QAM	75	0	19.92	19.84	20.04	
Channel				20000	20175	20350	Target MPR (dB)
Frequency (MHz)				1715	1732.5	1750	
10	QPSK	1	0	22.22	22.10	22.30	0
10	QPSK	1	24	22.37	21.96	22.15	
10	QPSK	1	49	22.26	21.98	22.22	
10	QPSK	25	0	21.17	20.82	21.24	1
10	QPSK	25	12	21.19	20.85	21.15	
10	QPSK	25	24	21.07	20.84	21.07	
10	QPSK	50	0	21.02	20.68	21.04	
10	16QAM	1	0	21.15	20.90	21.00	1
10	16QAM	1	24	21.47	20.58	21.19	
10	16QAM	1	49	21.38	20.93	21.12	
10	16QAM	25	0	20.26	19.93	20.16	2
10	16QAM	25	12	20.13	19.89	20.23	
10	16QAM	25	24	20.14	19.86	20.21	
10	16QAM	50	0	20.00	19.75	20.06	

Channel				19975	20175	20375	Target MPR (dB)
Frequency (MHz)				1712.5	1732.5	1752.5	
5	QPSK	1	0	22.14	21.85	22.20	0
5	QPSK	1	12	22.22	21.85	22.17	
5	QPSK	1	24	22.14	21.74	22.05	
5	QPSK	12	0	21.18	20.85	21.25	1
5	QPSK	12	6	21.24	20.95	21.22	
5	QPSK	12	11	21.23	20.97	21.25	
5	QPSK	25	0	21.17	20.81	21.34	
5	16QAM	1	0	21.14	20.94	22.21	1
5	16QAM	1	12	21.30	20.85	22.22	
5	16QAM	1	24	21.28	20.83	22.17	
5	16QAM	12	0	20.37	19.95	21.21	2
5	16QAM	12	6	20.13	20.11	21.20	
5	16QAM	12	11	20.33	20.09	21.22	
5	16QAM	25	0	20.17	19.87	21.20	
Channel				19965	20175	20385	Target MPR (dB)
Frequency (MHz)				1711.5	1732.5	1753.5	
3	QPSK	1	0	22.16	21.79	22.27	0
3	QPSK	1	7	22.19	21.92	22.12	
3	QPSK	1	14	22.16	21.92	22.19	
3	QPSK	8	0	21.25	20.90	21.34	1
3	QPSK	8	4	21.10	20.91	21.28	
3	QPSK	8	7	21.13	20.89	21.21	
3	QPSK	15	0	21.09	20.83	21.22	
3	16QAM	1	0	21.41	20.99	21.65	1
3	16QAM	1	7	21.18	20.98	21.38	
3	16QAM	1	14	21.22	20.81	21.32	
3	16QAM	8	0	20.07	20.13	20.24	2
3	16QAM	8	4	20.09	19.98	20.18	
3	16QAM	8	7	20.22	19.94	20.24	
3	16QAM	15	0	20.06	19.92	20.35	
Channel				19957	20175	20393	Target MPR (dB)
Frequency (MHz)				1710.7	1732.5	1754.3	
1.4	QPSK	1	0	22.07	21.90	22.37	0
1.4	QPSK	1	2	22.30	21.93	22.23	
1.4	QPSK	1	5	22.21	21.99	22.16	
1.4	QPSK	3	0	22.19	21.92	22.19	
1.4	QPSK	3	1	22.18	21.99	22.19	
1.4	QPSK	3	2	22.16	21.90	22.30	
1.4	QPSK	6	0	21.16	20.91	21.27	1
1.4	16QAM	1	0	21.24	20.77	21.05	1
1.4	16QAM	1	2	21.08	20.78	21.23	
1.4	16QAM	1	5	21.02	20.75	21.43	
1.4	16QAM	3	0	21.37	21.28	21.45	
1.4	16QAM	3	1	21.50	21.18	21.46	
1.4	16QAM	3	2	21.52	21.15	21.34	
1.4	16QAM	6	0	20.11	20.06	20.43	2

<LTE Band 2 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Target MPR (dB)
Channel				18700	18900	19100	
Frequency (MHz)				1860	1880	1900	
20	QPSK	1	0	23.70	23.87	23.39	0
20	QPSK	1	49	23.37	23.65	23.40	
20	QPSK	1	99	23.55	23.37	23.74	
20	QPSK	50	0	22.22	22.42	22.18	1
20	QPSK	50	24	22.21	22.53	22.10	
20	QPSK	50	49	22.24	22.46	22.09	
20	QPSK	100	0	22.26	22.40	22.15	
20	16QAM	1	0	22.59	22.69	22.79	1
20	16QAM	1	49	22.14	22.75	22.39	
20	16QAM	1	99	22.86	22.46	22.78	
20	16QAM	50	0	21.26	21.48	21.37	2
20	16QAM	50	24	21.33	21.69	21.08	
20	16QAM	50	49	21.42	21.37	21.11	
20	16QAM	100	0	21.32	21.48	21.15	
Channel				18675	18900	19125	Target MPR (dB)
Frequency (MHz)				1857.5	1880	1902.5	
15	QPSK	1	0	23.59	23.80	23.39	0
15	QPSK	1	37	23.42	23.77	23.40	
15	QPSK	1	74	23.49	23.70	23.56	
15	QPSK	36	0	22.39	22.57	22.05	1
15	QPSK	36	18	22.33	22.61	22.08	
15	QPSK	36	37	22.31	22.43	22.42	
15	QPSK	75	0	22.22	22.48	22.52	
15	16QAM	1	0	22.54	23.00	22.75	1
15	16QAM	1	37	22.83	23.06	22.72	
15	16QAM	1	74	22.34	22.55	22.80	
15	16QAM	36	0	21.31	21.57	21.25	2
15	16QAM	36	18	21.34	21.53	21.11	
15	16QAM	36	37	21.37	21.40	21.12	
15	16QAM	75	0	21.21	21.47	21.21	
Channel				18650	18900	19150	Target MPR (dB)
Frequency (MHz)				1855	1880	1905	
10	QPSK	1	0	23.59	23.85	23.29	0
10	QPSK	1	24	23.53	23.64	23.38	
10	QPSK	1	49	23.48	23.76	23.66	
10	QPSK	25	0	22.41	22.69	23.49	1
10	QPSK	25	12	22.38	22.66	22.61	
10	QPSK	25	24	22.39	22.65	22.60	
10	QPSK	50	0	22.19	22.46	22.56	
10	16QAM	1	0	22.76	23.06	22.35	1
10	16QAM	1	24	22.37	22.67	22.32	
10	16QAM	1	49	22.67	22.58	22.45	
10	16QAM	25	0	21.45	21.59	21.63	2
10	16QAM	25	12	21.38	21.64	21.31	
10	16QAM	25	24	21.33	21.59	21.71	
10	16QAM	50	0	21.32	21.47	21.22	

Channel				18625	18900	19175	Target MPR (dB)
Frequency (MHz)				1852.5	1880	1907.5	
5	QPSK	1	0	23.59	23.77	23.36	0
5	QPSK	1	12	23.51	23.56	23.44	
5	QPSK	1	24	23.43	23.64	23.53	
5	QPSK	12	0	22.54	22.75	22.44	1
5	QPSK	12	6	22.60	22.60	22.65	
5	QPSK	12	11	22.57	22.71	22.57	
5	QPSK	25	0	22.44	22.62	22.48	
5	16QAM	1	0	22.45	22.98	22.59	1
5	16QAM	1	12	22.60	22.93	22.53	
5	16QAM	1	24	22.39	22.45	22.82	
5	16QAM	12	0	21.56	21.90	21.60	2
5	16QAM	12	6	21.63	21.79	21.78	
5	16QAM	12	11	21.68	21.70	21.73	
5	16QAM	25	0	21.51	21.54	21.68	
Channel				18615	18900	19185	Target MPR (dB)
Frequency (MHz)				1851.5	1880	1908.5	
3	QPSK	1	0	23.37	23.59	23.84	0
3	QPSK	1	7	23.41	23.66	23.31	
3	QPSK	1	14	23.49	23.55	23.50	
3	QPSK	8	0	22.48	22.70	22.50	1
3	QPSK	8	4	22.45	22.62	22.59	
3	QPSK	8	7	22.46	22.69	22.49	
3	QPSK	15	0	22.51	22.66	22.51	
3	16QAM	1	0	22.89	22.81	22.65	1
3	16QAM	1	7	22.35	22.74	22.60	
3	16QAM	1	14	22.60	22.68	22.91	
3	16QAM	8	0	21.32	21.64	21.69	2
3	16QAM	8	4	21.39	21.61	21.35	
3	16QAM	8	7	21.45	21.55	21.31	
3	16QAM	15	0	21.30	21.47	21.79	
Channel				18607	18900	19193	Target MPR (dB)
Frequency (MHz)				1850.7	1880	1909.3	
1.4	QPSK	1	0	23.45	23.72	23.54	0
1.4	QPSK	1	2	23.56	23.58	23.39	
1.4	QPSK	1	5	23.49	23.70	23.36	
1.4	QPSK	3	0	23.46	23.65	23.46	
1.4	QPSK	3	1	23.55	23.61	23.47	
1.4	QPSK	3	2	23.58	23.62	23.41	
1.4	QPSK	6	0	22.58	22.65	22.59	1
1.4	16QAM	1	0	22.68	22.40	22.65	1
1.4	16QAM	1	2	22.36	22.62	22.60	
1.4	16QAM	1	5	22.37	22.86	22.46	
1.4	16QAM	3	0	22.97	22.85	22.37	
1.4	16QAM	3	1	22.35	22.66	22.67	
1.4	16QAM	3	2	22.54	22.87	22.48	
1.4	16QAM	6	0	21.58	21.73	21.36	2

<LTE Band 7 Conducted Power>

BW [MHz]	Modulation	RB Size	RB Offset	Power Low Ch. / Freq.	Power Middle Ch. / Freq.	Power High Ch. / Freq.	Target MPR (dB)
Channel				20890	21020		
Frequency (MHz)				2514	2527		
20	QPSK	1	0	21.96	22.56		0
20	QPSK	1	49	21.93	22.55		
20	QPSK	1	99	22.58	**22.71**		
20	QPSK	50	0	21.67	22.45		1
20	QPSK	50	24	21.77	22.55		
20	QPSK	50	49	21.87	22.59		
20	QPSK	100	0	21.89	22.46		
20	16QAM	1	0	22.13	22.70		1
20	16QAM	1	49	22.43	22.47		
20	16QAM	1	99	22.48	22.36		
20	16QAM	50	0	22.05	22.57		2
20	16QAM	50	24	22.11	22.33		
20	16QAM	50	49	22.24	22.51		
20	16QAM	100	0	22.42	22.54		
Channel				20865	21045	21375	Target MPR (dB)
Frequency (MHz)				2511.5	2529.5	2562.5	
15	QPSK	1	0	22.13	22.59	22.68	0
15	QPSK	1	37	22.32	22.61	22.30	
15	QPSK	1	74	22.18	22.69	22.32	
15	QPSK	36	0	22.12	22.42	22.37	1
15	QPSK	36	18	22.23	22.60	22.04	
15	QPSK	36	37	22.31	22.52	22.26	
15	QPSK	75	0	22.09	22.49	22.13	
15	16QAM	1	0	22.31	22.53	22.22	1
15	16QAM	1	37	22.29	22.45	22.46	
15	16QAM	1	74	22.30	22.62	22.67	
15	16QAM	36	0	22.28	22.55	22.25	2
15	16QAM	36	18	22.17	22.52	22.08	
15	16QAM	36	37	22.15	22.44	22.28	
15	16QAM	75	0	22.16	22.40	22.17	
Channel				20840	20840	21400	Target MPR (dB)
Frequency (MHz)				2509	2509	2565	
10	QPSK	1	0	22.48	22.61	22.44	0
10	QPSK	1	24	22.26	22.66	22.27	
10	QPSK	1	49	22.35	22.39	22.07	
10	QPSK	25	0	22.46	22.60	22.19	1
10	QPSK	25	12	22.35	22.58	22.65	
10	QPSK	25	24	22.21	22.57	22.14	
10	QPSK	50	0	22.33	22.43	22.16	
10	16QAM	1	0	22.49	22.62	22.23	1
10	16QAM	1	24	22.33	22.63	22.16	
10	16QAM	1	49	22.21	22.61	22.52	
10	16QAM	25	0	22.13	22.47	22.03	2
10	16QAM	25	12	22.19	22.61	22.65	
10	16QAM	25	24	22.37	22.40	22.60	
10	16QAM	50	0	22.04	22.57	22.03	

Channel				20815	21095	21425	Target MPR (dB)
Frequency (MHz)				2506.5	2534.5	2567.5	
5	QPSK	1	0	22.33	22.58	22.64	0
5	QPSK	1	12	22.55	22.67	22.12	
5	QPSK	1	24	22.39	22.47	22.35	
5	QPSK	12	0	22.16	22.65	22.54	1
5	QPSK	12	6	22.51	22.65	22.56	
5	QPSK	12	11	22.51	22.49	22.57	
5	QPSK	25	0	21.94	22.57	22.50	
5	16QAM	1	0	22.31	22.48	22.54	1
5	16QAM	1	12	22.23	22.55	22.66	
5	16QAM	1	24	22.51	22.59	22.57	
5	16QAM	12	0	22.48	22.56	22.60	2
5	16QAM	12	6	22.19	22.47	22.07	
5	16QAM	12	11	22.29	22.38	22.59	
5	16QAM	25	0	22.09	22.42	22.47	

<WLAN 2.4GHz Conducted Power>

WLAN 2.4GHz Band 802.11b Average Power (dBm)					
Channel	Frequency (MHz)	Data Rate (bps)			
		1M	2M	5.5M	11M
CH 01	2412	12.96	12.92	12.04	11.59
CH 06	2437	13.13	13.12	12.21	12.31
CH 11	2462	**13.42**	13.35	12.71	12.53

WLAN 2.4GHz Band 802.11g Average Power (dBm)									
Channel	Frequency (MHz)	Data Rate (bps)							
		6M	9M	12M	18M	24M	36M	48M	54M
CH 01	2412	13.19	13.19	13.20	13.26	13.25	13.28	13.32	12.90
CH 06	2437	13.51	13.49	13.51	13.54	13.53	13.52	13.50	13.48
CH 11	2462	**13.58**	13.54	13.52	13.51	13.49	13.47	13.50	13.52

WLAN 2.4GHz Band 802.11n (HT 20) Average Power (dBm)									
Channel	Frequency (MHz)	MCS Index							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412	13.29	13.28	13.32	12.86	12.93	12.73	12.54	13.03
CH 06	2437	13.59	13.60	13.57	13.59	13.61	13.60	13.56	13.58
CH 11	2462	**13.63**	13.61	13.61	13.59	13.60	13.58	13.58	13.57

WLAN 2.4GHz Band 802.11n (HT 40) Average Power (dBm)									
Channel	Frequency (MHz)	MCS Index							
		MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 03	2422	11.88	11.89	11.84	11.79	11.65	11.70	11.69	11.69
CH 06	2437	13.18	13.22	13.17	13.11	13.14	13.20	13.23	13.22
CH 09	2452	**13.35**	13.33	13.27	13.28	13.31	13.26	13.25	13.13

Note:

1. Per KDB 248227 D01 v01r02, choose the highest output power channel to test SAR and determine further SAR exclusion
2. For each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 1/4dB higher than those measured at the lowest data rate
3. Per KDB 248227 D01 v01r02, 11g, 11n-HT20 and 11n-HT40 average output power is less than 1/4dB higher than 11b mode, their SAR can be excluded. But according to higher turn up limit for 11g and 11n-HT20, is more than 1/4dB higher than 11b mode, so their SAR test were verified at the highest RF exposure position found in 802.11b SAR testing.

Bluetooth average power (dBm)			
Mode	**1Mbps (GFSK)**	**2Mbps (π/4-DQPSK)**	**3Mbps (8-DPSK)**
Tune Up Limit	**6**	**4**	**5**

Note:

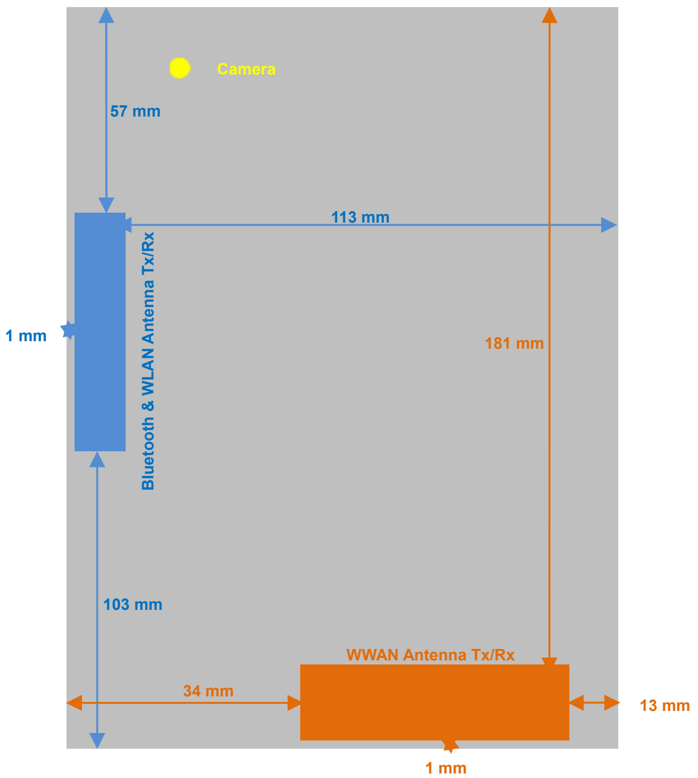
1. Per KDB 447498 D01v05r01, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[$\sqrt{f(GHz)}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison
   - If the distance of the antenna to the user is < 5mm, 5mm is used to determine SAR exclusion threshold

Bluetooth Max Power (dBm)	mW	Test Distance (mm)	Frequency (GHz)	exclusion thresholds
6	3.98	0	2.48	1.25

Per KDB 447498 D01v05r01 exclusion thresholds is 1.25 < 3, RF exposure evaluation is not required.

11. Antenna Location

Edge1



Edge2

Edge4

Edge3

Back View

Antennas	Wireless Interface
WWAN Antenna (Tx / Rx)	GSM850 GSM1900 WCDMA Band V WCDMA Band IV WCDMA Band II LTE Band 17 LTE Band 5 LTE Band 4 LTE Band 2 LTE Band 7
BT&WLAN Antenna (Tx / Rx)	WLAN 2.4GHz Bluetooth

SAR test exclusion table distance is ≤ 50mm

Exposure Position	Wireless Interface	GPRS850 2 Tx slot	GPRS1900 2 Tx slot	WCDMA Band V	WCDMA Band IV	WCDMA Band II	LTE	WLAN 2.4GHz
	Tune-up Maximum power (dBm)	24	23	23	22.5	23.5	23.5	14
Bottom Face	Antenna to user (mm)	5						5
	SAR exclusion threshold	46.26	55.14	36.7	47.05	61.83	71.76	7.88
	SAR testing required?	**Yes**	**Yes**	**Yes**	**Yes**	**YES**	**YES**	**YES**
Edge 2	Antenna to user (mm)	34						5
	SAR exclusion threshold	6.80	8.11	5.4	6.92	9.09	10.55	7.88
	SAR testing required?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**YES**
Edge 3	Antenna to user (mm)	5						
	SAR exclusion threshold	46.26	55.14	36.7	47.05	61.83	71.76	
	SAR testing required?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	
Edge 4	Antenna to user (mm)	13						
	SAR exclusion threshold	17.79	21.21	14.12	18.10	23.78	27.60	
	SAR testing required?	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	**Yes**	

SAR test exclusion table distance is > 50mm

Exposure Position	Wireless Interface	GPRS850 2 Tx slot	GPRS1900 2 Tx slot	WCDMA Band V	WCDMA Band IV	WCDMA Band II	LTE	WLAN 2.4GHz
	Tune-up Maximum power (dBm)	24	23	23	22.5	23.5	23.5	14
	Tune-up Maximum rated power (mW)	251.19	199.53	199.53	177.83	223.87	223.87	25.12
Edge 1	Antenna to user (mm)	181						57
	SAR exclusion threshold	903.48	1418.56	901.92	1423.39	1418.62	1403.59	165.6
	SAR testing required?	No	No	No	No	No	No	No
Edge 3	Antenna to user (mm)							103
	SAR exclusion threshold							625.6
	SAR testing required?							No
Edge 4	Antenna to user (mm)							113
	SAR exclusion threshold							725.6
	SAR testing required?							No

Note:

1. Maximum power is the source-based time-average power and represents the maximum RF output power among production units
2. Per KDB 447498 D01v05r01, for larger devices, the test separation distance is determined by the closest separation between the antenna and the user.
3. Per KDB 447498 D01v05r01, standalone SAR test exclusion threshold is applied; If the test separation distance is < 5mm, 5mm is used to determine SAR exclusion threshold.
4. Per KDB 447498 D01v05r01, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
   [(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] ·[$\sqrt{f(GHz)}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR
   - f(GHz) is the RF channel transmit frequency in GHz
   - Power and distance are rounded to the nearest mW and mm before calculation
   - The result is rounded to one decimal place for comparison
5. Per KDB 447498 D01v05r01, at 100 MHz to 6 GHz and for *test separation distances* > 50 mm, the SAR test exclusion threshold is determined according to the following
   a) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz
   b) [Threshold at 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

12. SAR Test Results

Note:

1. Per KDB 447498 D01v05, the reported SAR is the measured SAR value adjusted for maximum tune-up tolerance.
   Scaling Factor = tune-up limit power (mW) / EUT RF power (mW), where tune-up limit is the maximum rated power among all production units.
   Reported SAR(W/kg)= Measured SAR(W/kg) Scaling Factor*
2. Per KDB 447498 D01v05r01, for each exposure position, if the highest output channel reported SAR ≤0.8W/kg, other channels SAR testing is not necessary.
3. Considering the curvature transition from bottom face to the edge, SAR testing at the curvature was performed. The SAR test setup is included in test setup photo exhibit, and the details of the curvature are included in operation description exhibit.
4. Per KDB 616217 D04v01r01, the additional separation introduced by the contour against a flat phantom is < 5 mm and reported SAR is < 1.2 W/kg, a curved or contoured back surface or edge SAR is not required, more detail information please refer to the setup photo.
5. Per KDB 941225 D05v02r02, when reported SAR of 1RB and 50%RB allocation for QPSK >0.8W/kg for any exposure position, SAR testing of 100%RB allocation for QPSK is performed at the highest power channel.
6. 16QAM 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 D05v02, 16QAM SAR testing is not required.
7. Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth.
8. For QPSK with 100% RB allocation, if the reported SAR is > 1.45 W/kg, the remaining required test channels must be tested

12.1 Body Worn SAR

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
1	GSM850	GPRS (2 Tx slots)	Bottom Face	0	128	824.2	29.7	30	1.072	0.02	1.180	1.264
2	GSM850	GPRS (2 Tx slots)	Edge 2	0	128	824.2	29.7	30	1.072	-0.1	0.082	0.088
3	GSM850	GPRS (2 Tx slots)	Edge 3	0	128	824.2	29.7	30	1.072	0.05	0.549	0.588
4	GSM850	GPRS (2 Tx slots)	Edge 4	0	128	824.2	29.7	30	1.072	0.01	0.103	0.110
5	**GSM850**	**GPRS (2 Tx slots)**	**Bottom Face**	**0**	**189**	**836.4**	**29.53**	**30**	**1.114**	**0.04**	**1.170**	**1.304**
6	GSM850	GPRS (2 Tx slots)	Bottom Face	0	251	848.8	29.4	30	1.148	0.02	1.060	1.217
7	GSM850	GPRS (2 Tx slots)	Curved surface of Edge3	0	128	824.2	29.7	30	1.072	-0.09	0.474	0.508
8	GSM850	GPRS (2 Tx slots)	Curved surface of Edge3	0	189	836.4	29.53	30	1.114	-0.06	0.496	0.553
9	GSM850	GPRS (2 Tx slots)	Curved surface of Edge3	0	251	848.8	29.4	30	1.148	0.02	0.296	0.340
70	GSM1900	GPRS (2 Tx slots)	Bottom Face	0	810	1909.8	28.56	29	1.107	0.01	0.427	0.473
71	GSM1900	GPRS (2 Tx slots)	Edge 2	0	810	1909.8	28.56	29	1.107	0.01	0.00626	0.007
72	**GSM1900**	**GPRS (2 Tx slots)**	**Edge 3**	**0**	**810**	**1909.8**	**28.56**	**29**	**1.107**	**0.01**	**0.517**	**0.572**
73	GSM1900	GPRS (2 Tx slots)	Edge 4	0	810	1909.8	28.56	29	1.107	0.04	0.073	0.081

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
11	**WCDMA Band V**	**RMC 12.2K**	**Bottom Face**	**0**	**4132**	**826.4**	**22.85**	**23**	**1.035**	**0.05**	**1.300**	**1.346**
12	WCDMA Band V	RMC 12.2K	Edge 2	0	4132	826.4	22.85	23	1.035	-0.04	0.084	0.087
13	WCDMA Band V	RMC 12.2K	Edge 3	0	4132	826.4	22.85	23	1.035	0.05	0.597	0.618
14	WCDMA Band V	RMC 12.2K	Edge 4	0	4132	826.4	22.85	23	1.035	-0.03	0.116	0.120
15	WCDMA Band V	RMC 12.2K	Bottom Face	0	4182	836.4	22.28	23	1.180	0.06	0.907	1.071
16	WCDMA Band V	RMC 12.2K	Bottom Face	0	4233	846.6	21.85	23	1.303	-0.06	0.731	0.953
18	WCDMA Band V	RMC 12.2K	Curved surface of Edge3	0	4132	826.4	22.85	23	1.035	0.05	0.834	0.863
19	WCDMA Band V	RMC 12.2K	Curved surface of Edge3	0	4182	836.4	22.28	23	1.180	-0.11	0.589	0.695
20	WCDMA Band V	RMC 12.2K	Curved surface of Edge3	0	4233	846.6	21.85	23	1.303	-0.01	0.456	0.594
240	WCDMA Band IV	RMC 12.2K	Bottom Face	0	1513	1752.6	21.92	22.5	1.143	-0.05	0.662	0.757
241	WCDMA Band IV	RMC 12.2K	Edge 2	0	1513	1752.6	21.92	22.5	1.143	0.03	0.020	0.023
242	WCDMA Band IV	RMC 12.2K	Edge 3	0	1513	1752.6	21.92	22.5	1.143	0.07	0.968	1.106
243	WCDMA Band IV	RMC 12.2K	Edge 4	0	1513	1752.6	21.92	22.5	1.143	-0.06	0.115	0.131
244	**WCDMA Band IV**	**RMC 12.2K**	**Edge 3**	**0**	**1312**	**1712.4**	**21.75**	**22.5**	**1.189**	**0.08**	**0.938**	**1.115**
245	WCDMA Band IV	RMC 12.2K	Edge 3	0	1413	1732.6	21.74	22.5	1.191	0.07	0.748	0.891
81	WCDMA Band II	RMC 12.2K	Bottom Face	0	9400	1880	22.91	23.5	1.146	0.09	0.654	0.749
82	WCDMA Band II	RMC 12.2K	Edge 2	0	9400	1880	22.91	23.5	1.146	0.09	0.020	0.023
83	WCDMA Band II	RMC 12.2K	Edge 3	0	9400	1880	22.91	23.5	1.146	-0.07	0.825	0.945
84	WCDMA Band II	RMC 12.2K	Edge 4	0	9400	1880	22.91	23.5	1.146	-0.02	0.110	0.126
85	**WCDMA Band II**	**RMC 12.2K**	**Edge 3**	**0**	**9262**	**1852.4**	**22.57**	**23.5**	**1.239**	**0.06**	**0.905**	**1.121**
86	WCDMA Band II	RMC 12.2K	Edge 3	0	9538	1907.6	22.75	23.5	1.189	-0.09	0.698	0.830

<LTE SAR>

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Tune-up Scaling Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
121	LTE Band 17	10M	QPSK	1	24	Bottom Face	0	23780	709	24	24.5	1.122	0.06	0.969	1.087
122	LTE Band 17	10M	QPSK	1	24	Edge 2	0	23780	709	24	24.5	1.122	-0.1	0.046	0.052
123	LTE Band 17	10M	QPSK	1	24	Edge 3	0	23780	709	24	24.5	1.122	-0.05	0.572	0.642
124	LTE Band 17	10M	QPSK	1	24	Edge 4	0	23780	709	24	24.5	1.122	-0.06	0.010	0.011
125	LTE Band 17	10M	QPSK	1	24	Bottom Face	0	23790	710	23.74	24.5	1.191	-0.04	0.955	1.138
126	**LTE Band 17**	**10M**	**QPSK**	**1**	**24**	**Bottom Face**	**0**	**23800**	**711**	**23.68**	**24.5**	**1.208**	**-0.08**	**0.981**	**1.185**
131	LTE Band 17	10M	QPSK	25	0	Bottom Face	0	23790	710	22.78	23.5	1.180	-0.03	0.735	0.868
132	LTE Band 17	10M	QPSK	25	0	Edge 2	0	23790	710	22.78	23.5	1.180	0.06	0.024	0.028
133	LTE Band 17	10M	QPSK	25	0	Edge 3	0	23790	710	22.78	23.5	1.180	0.04	0.545	0.643
134	LTE Band 17	10M	QPSK	25	0	Edge 4	0	23790	710	22.78	23.5	1.180	0.05	0.015	0.018
135	LTE Band 17	10M	QPSK	25	0	Bottom Face	0	23780	709	22.51	23.5	1.253	-0.05	0.692	0.867
136	LTE Band 17	10M	QPSK	25	0	Bottom Face	0	23800	711	22.22	23.5	1.225	0.03	0.676	0.828
141	LTE Band 17	10M	QPSK	50	0	Bottom Face	0	23790	710	22.43	23.5	1.279	-0.07	0.778	0.995
142	LTE Band 17	10M	QPSK	50	0	Edge 2	0	23790	710	22.43	23.5	1.279	-0.06	0.026	0.033
143	LTE Band 17	10M	QPSK	50	0	Edge 3	0	23790	710	22.43	23.5	1.279	0.05	0.580	0.742
144	LTE Band 17	10M	QPSK	50	0	Edge 4	0	23790	710	22.43	23.5	1.279	-0.05	0.014	0.018
31	LTE Band 5	10M	QPSK	1	0	Bottom Face	0	20600	844	23.28	23.5	1.052	0.09	1.150	1.210
32	LTE Band 5	10M	QPSK	1	0	Edge 2	0	20600	844	23.28	23.5	1.052	-0.06	0.059	0.062
33	LTE Band 5	10M	QPSK	1	0	Edge 3	0	20600	844	23.28	23.5	1.052	-0.05	0.466	0.490
34	LTE Band 5	10M	QPSK	1	0	Edge 4	0	20600	844	23.28	23.5	1.052	-0.05	0.097	0.102
35	**LTE Band 5**	**10M**	**QPSK**	**1**	**0**	**Bottom Face**	**0**	**20450**	**829**	**23.04**	**23.5**	**1.089**	**-0.06**	**1.160**	**1.263**
36	LTE Band 5	10M	QPSK	1	0	Bottom Face	0	20525	836.5	22.16	23.5	1.186	-0.02	1.050	1.245
37	LTE Band 5	10M	QPSK	1	0	Curved surface of Edge3	0	20600	844	23.28	23.5	1.052	0.08	0.502	0.528
38	LTE Band 5	10M	QPSK	1	0	Curved surface of Edge3	0	20450	829	23.04	23.5	1.089	-0.03	0.514	0.560
39	LTE Band 5	10M	QPSK	1	0	Curved surface of Edge3	0	20525	836.5	22.16	23.5	1.186	-0.04	0.498	0.591
40	LTE Band 5	10M	QPSK	25	0	Bottom Face	0	20525	836.5	22.68	23	1.076	-0.02	0.692	0.745
41	LTE Band 5	10M	QPSK	25	0	Edge 2	0	20525	836.5	22.68	23	1.076	0.08	0.042	0.045
42	LTE Band 5	10M	QPSK	25	0	Edge 3	0	20525	836.5	22.68	23	1.076	0.07	0.363	0.391
43	LTE Band 5	10M	QPSK	25	0	Edge 4	0	20525	836.5	22.68	23	1.076	-0.08	0.065	0.070
44	LTE Band 5	10M	QPSK	50	0	Bottom Face	0	20450	829	21.88	23	1.294	0.02	0.788	1.020
45	LTE Band 5	10M	QPSK	50	0	Edge 2	0	20450	829	21.88	23	1.294	-0.06	0.053	0.069
46	LTE Band 5	10M	QPSK	50	0	Edge 3	0	20450	829	21.88	23	1.294	-0.05	0.422	0.546
47	LTE Band 5	10M	QPSK	50	0	Edge 4	0	20450	829	21.88	23	1.294	0.05	0.078	0.101
211	LTE Band 4	20M	QPSK	1	0	Bottom Face	0	20050	1720	22.57	23	1.104	0.02	0.563	0.622
212	LTE Band 4	20M	QPSK	1	0	Edge 2	0	20050	1720	22.57	23	1.104	0.09	0.011	0.012
213	LTE Band 4	20M	QPSK	1	0	Edge 3	0	20050	1720	22.57	23	1.104	-0.02	0.744	0.821
214	LTE Band 4	20M	QPSK	1	0	Edge 4	0	20050	1720	22.57	23	1.104	-0.05	0.092	0.102
215	LTE Band 4	20M	QPSK	1	0	Edge 3	0	20175	1732.5	21.86	23	1.230	0.02	0.732	0.901
216	**LTE Band 4**	**20M**	**QPSK**	**1**	**0**	**Edge 3**	**0**	**20300**	**1745**	**21.95**	**23**	**1.205**	**0.09**	**0.798**	**0.962**
221	LTE Band 4	20M	QPSK	50	0	Bottom Face	0	20300	1745	21.22	22	1.197	0.03	0.444	0.531
222	LTE Band 4	20M	QPSK	50	0	Edge 2	0	20300	1745	21.22	22	1.197	0.04	0.016	0.019
223	LTE Band 4	20M	QPSK	50	0	Edge 3	0	20300	1745	21.22	22	1.197	-0.08	0.552	0.661
224	LTE Band 4	20M	QPSK	50	0	Edge 4	0	20300	1745	21.22	22	1.197	0.08	0.060	0.072
231	LTE Band 4	20M	QPSK	100	0	Bottom Face	0	20300	1745	21.12	22	1.225	0.02	0.450	0.551
232	LTE Band 4	20M	QPSK	100	0	Edge 2	0	20300	1745	21.12	22	1.225	-0.06	0.019	0.023
233	LTE Band 4	20M	QPSK	100	0	Edge 3	0	20300	1745	21.12	22	1.225	0.11	0.709	0.868
234	LTE Band 4	20M	QPSK	100	0	Edge 4	0	20300	1745	21.12	22	1.225	-0.01	0.076	0.093

91	LTE Band 2	20M	QPSK	1	0	Bottom Face	0	18900	1880	23.87	24.5	1.156	0.08	0.672	0.777
92	LTE Band 2	20M	QPSK	1	0	Edge 2	0	18900	1880	23.87	24.5	1.156	-0.02	0.014	0.016
93	LTE Band 2	20M	QPSK	1	0	Edge 3	0	18900	1880	23.87	24.5	1.156	-0.06	0.799	0.924
94	LTE Band 2	20M	QPSK	1	0	Edge 4	0	18900	1880	23.87	24.5	1.156	-0.08	0.100	0.116
95	**LTE Band 2**	**20M**	**QPSK**	**1**	**0**	**Edge 3**	**0**	**18700**	**1860**	**23.7**	**24.5**	**1.202**	**-0.07**	**0.990**	**1.190**
96	LTE Band 2	20M	QPSK	1	0	Edge 3	0	19100	1900	23.39	24.5	1.191	-0.07	0.793	0.945
101	LTE Band 2	20M	QPSK	50	24	Bottom Face	0	18900	1880	22.53	23.5	1.250	0.03	0.593	0.741
102	LTE Band 2	20M	QPSK	50	24	Edge 2	0	18900	1880	22.53	23.5	1.250	0.02	0.013	0.016
103	LTE Band 2	20M	QPSK	50	24	Edge 3	0	18900	1880	22.53	23.5	1.250	0.07	0.627	0.784
104	LTE Band 2	20M	QPSK	50	24	Edge 4	0	18900	1880	22.53	23.5	1.250	0.05	0.085	0.106
111	LTE Band 2	20M	QPSK	100	0	Bottom Face	0	18900	1880	22.4	23.5	1.288	0.01	0.615	0.792
112	LTE Band 2	20M	QPSK	100	0	Edge 2	0	18900	1880	22.4	23.5	1.288	-0.05	0.017	0.022
113	LTE Band 2	20M	QPSK	100	0	Edge 3	0	18900	1880	22.4	23.5	1.288	-0.06	0.690	0.889
114	LTE Band 2	20M	QPSK	100	0	Edge 4	0	18900	1880	22.4	23.5	1.288	-0.03	0.087	0.112
171	LTE Band 7	20M	QPSK	1	99	Bottom Face	0	21020	2527	22.71	23.5	1.199	0.05	0.750	0.900
172	LTE Band 7	20M	QPSK	1	99	Edge 2	0	21020	2527	22.71	23.5	1.199	0.07	0.019	0.023
173	LTE Band 7	20M	QPSK	1	99	Edge 3	0	21020	2527	22.71	23.5	1.199	-0.04	0.551	0.661
174	LTE Band 7	20M	QPSK	1	99	Edge 4	0	21020	2527	22.71	23.5	1.199	-0.08	0.019	0.023
175	LTE Band 7	20M	QPSK	1	99	Bottom Face	0	20890	2514	22.58	23.5	1.236	-0.08	0.672	0.831
181	LTE Band 7	20M	QPSK	50	49	Bottom Face	0	21020	2527	22.59	23	1.099	-0.08	0.791	0.869
182	LTE Band 7	20M	QPSK	50	49	Edge 2	0	21020	2527	22.59	23	1.099	0.02	0.020	0.022
183	LTE Band 7	20M	QPSK	50	49	Edge 3	0	21020	2527	22.59	23	1.099	0.01	0.580	0.637
184	LTE Band 7	20M	QPSK	50	49	Edge 4	0	21020	2527	22.59	23	1.099	-0.01	0.019	0.021
185	**LTE Band 7**	**20M**	**QPSK**	**50**	**49**	**Bottom Face**	**0**	**20890**	**2514**	**21.87**	**23**	**1.297**	**-0.04**	**0.757**	**0.982**
191	LTE Band 7	20M	QPSK	100	0	Bottom Face	0	21020	2527	22.46	23	1.132	-0.08	0.774	0.876
192	LTE Band 7	20M	QPSK	100	0	Edge 2	0	21020	2527	22.46	23	1.132	-0.03	0.022	0.025
193	LTE Band 7	20M	QPSK	100	0	Edge 3	0	21020	2527	22.46	23	1.132	0.03	0.584	0.661
194	LTE Band 7	20M	QPSK	100	0	Edge 4	0	21020	2527	22.46	23	1.132	-0.03	0.020	0.023

<WLAN2.4GHz SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Data Rate	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Compensate Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Reported SAR_{1g} (W/kg)
201	WLAN 2.4GHz	802.11b	Bottom Face	0	11	2462	1M	13.42	13.5	1.019	100	1.000	-0.06	0.922	0.939
202	WLAN 2.4GHz	802.11b	Edge 2	0	11	2462	1M	13.42	13.5	1.019	100	1.000	-0.02	0.538	0.548
203	WLAN 2.4GHz	802.11b	Bottom Face	0	1	2412	1M	12.96	13.5	1.132	100	1.000	-0.01	0.741	0.839
204	WLAN 2.4GHz	802.11b	Bottom Face	0	6	2437	1M	13.13	13.5	1.089	100	1.000	0.01	0.781	0.850
206	WLAN 2.4GHz	802.11g	Bottom Face	0	11	2462	6M	13.58	14	1.102	97.21	1.029	-0.01	0.646	0.712
207	WLAN 2.4GHz	802.11n HT20	Bottom Face	0	11	2462	MCS0	13.63	14	1.089	97.31	1.028	-0.04	0.819	0.892
208	WLAN 2.4GHz	802.11n HT20	Bottom Face	0	1	2412	MCS0	13.29	14	1.178	97.31	1.028	-0.01	0.851	1.002
209	**WLAN 2.4GHz**	**802.11n HT20**	**Bottom Face**	**0**	**6**	**2437**	**MCS0**	**13.59**	**14**	**1.099**	**97.31**	**1.028**	**-0.02**	**1.030**	**1.132**

12.2 Repeated SAR Measurement

Plot No.	Band	BW (MHz)	Modulation	RB Size	RB Offset	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Data Rate	Average Power (dBm)	Tune-up Limit (dBm)	Tune-up Scaling Factor	Duty Cycle %	Duty Cycle Compensate Factor	Power Drift (dB)	Measured SAR_{1g} (W/kg)	Ratio	Reported SAR_{1g} (W/kg)
11	WCDMA Band V	-	-	-	-	RMC 12.2K	Bottom Face	0	4132	826.4	-	22.85	23	1.035	-	-	0.05	1.300	1	1.346
17	WCDMA Band V	-	-	-	-	RMC 12.2K	Bottom Face	0	4132	826.4	-	22.85	23	1.035	-	-	0.01	1.090	1.162	1.128
242	WCDMA Band IV	-	-	-	-	RMC 12.2K	Edge 3	0	1513	1752.6		21.92	22.5	1.143	-	-	0.07	0.968	1	1.106
246	WCDMA Band IV	-	-	-	-	RMC 12.2K	Edge 3	0	1513	1752.6		21.92	22.5	1.143	-	-	0.02	0.964	1.908	1.102
126	LTE Band 17	10M	QPSK	1	24	-	Bottom Face	0	23800	711	-	23.68	24.5	1.208	-	-	-0.08	0.981	1	1.185
127	LTE Band 17	10M	QPSK	1	24	-	Bottom Face	0	23800	711	-	23.68	24.5	1.208	-	-	-0.01	0.923	1.059	1.115
95	LTE Band 2	20M	QPSK	1	0	-	Edge 3	0	18700	1860	-	23.7	24.5	1.202	-	-	-0.07	0.990	1	1.190
97	LTE Band 2	20M	QPSK	1	0	-	Edge 3	0	18700	1860	-	23.7	24.5	1.202	-	-	-0.03	0.980	1.010	1.178
209	WLAN 2.4GHz	-	-	-	-	802.11n HT20	Bottom Face	0	6	2437	MCS0	13.59	14	1.099	97.31	1.028	-0.02	1.030	1	1.132
210	WLAN 2.4GHz	-	-	-	-	802.11n HT20	Bottom Face	0	6	2437	MCS0	13.59	14	1.099	97.31	1.028	-0.02	1.020	1.010	1.121

Note:

1. Per KDB 865664 D01v01r01, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg
2. Per KDB 865664 D01v01r01, 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 largest SAR to the smallest SAR among original and repeated measurement.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

12.3 Highest SAR Plot

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2013.11.15

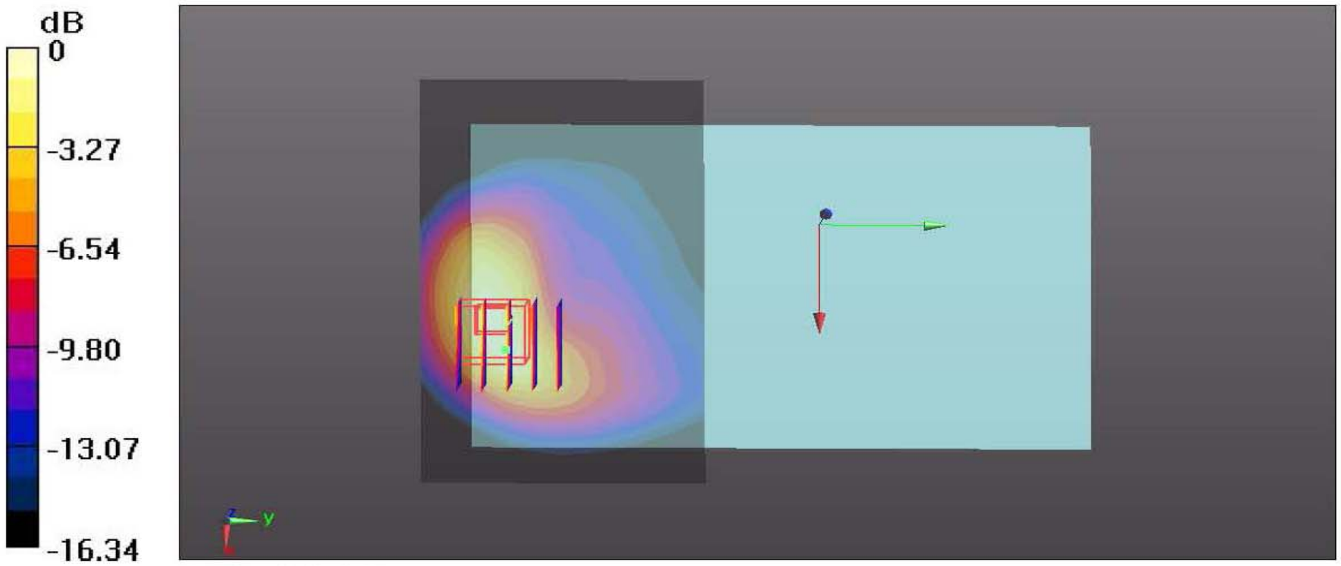
05 GSM850_GPRS (2 Tx slots)_Bottom Face_0cm_Ch189

Communication System: UID 0, GPRS/EDGE10; Frequency: 836.4 MHz;Duty Cycle: 1:4.15
Medium: MSL_835_131115 Medium parameters used: f = 836.4 MHz; σ = 1.013 S/m; ε_r = 56.228; ρ = 1000 kg/m^3
Ambient Temperature : 23.2 ℃; Liquid Temperature : 22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3578; ConvF(8.5, 8.5, 8.5); Calibrated: 2013.06.20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2013.06.11
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch189/Area Scan (101x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.33 W/kg

Ch189/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.244 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 2.17 W/kg
SAR(1 g) = 1.170 W/kg; SAR(10 g) = 0.590 W/kg
Maximum value of SAR (measured) = 1.51 W/kg



0 dB = 1.51 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2013.11.17

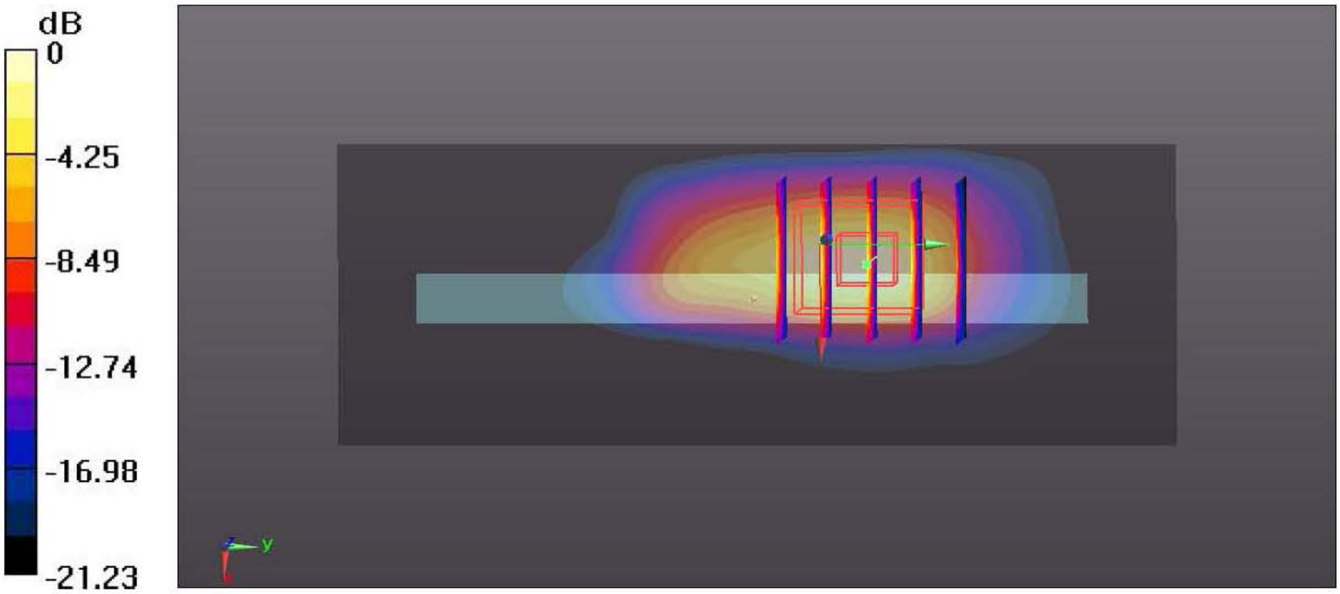
72 GSM1900_GPRS (2 Tx slots)_Edge 3_0cm_Ch810

Communication System: UID 0, GPRS/EDGE10; Frequency: 1909.8 MHz;Duty Cycle: 1:4.15
Medium: MSL_1900_131117 Medium parameters used: f = 1910 MHz; σ = 1.544 S/m; ε_r = 54.586; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3578; ConvF(6.78, 6.78, 6.78); Calibrated: 2013.06.20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2013.06.11
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch810/Area Scan (41x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.824 W/kg

Ch810/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.330 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.15 W/kg
SAR(1 g) = 0.517 W/kg; SAR(10 g) = 0.221 W/kg
Maximum value of SAR (measured) = 0.859 W/kg



0 dB = 0.859 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2013.11.15

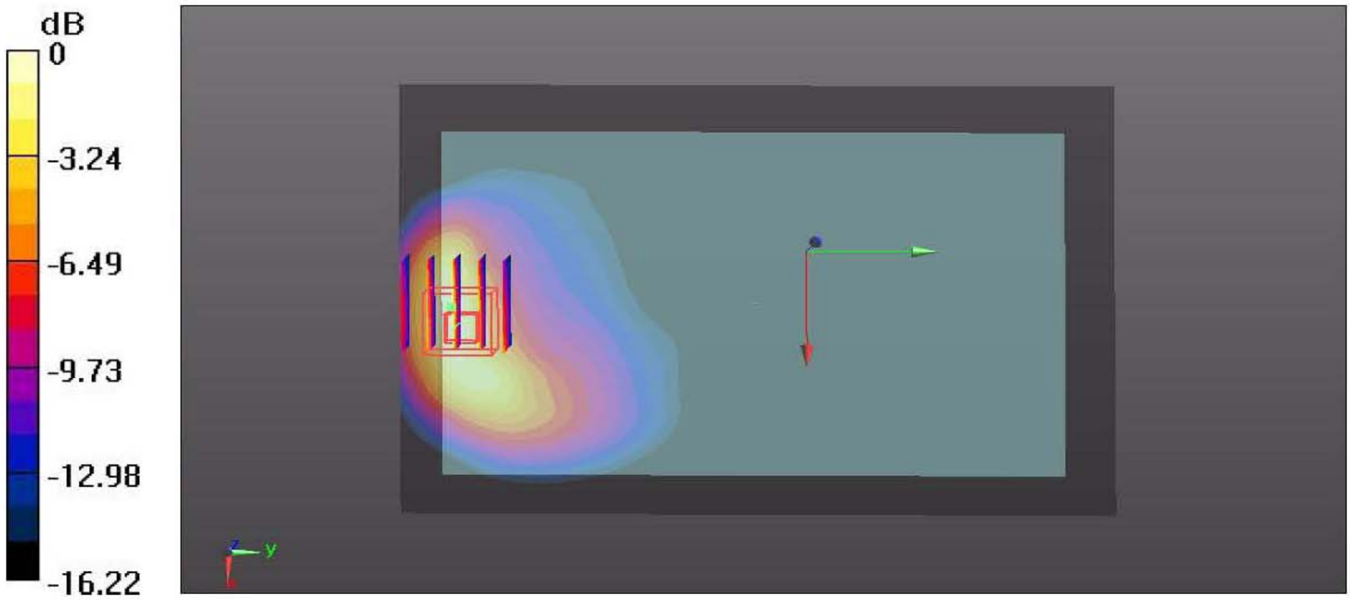
11 WCDMA Band V_RMC 12.2K_Bottom Face_0cm_Ch4132

Communication System: UID 0, UMTS; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium: MSL_835_131115 Medium parameters used: f = 826.4 MHz; σ = 1.002 S/m; ε_r = 56.337; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3578; ConvF(8.5, 8.5, 8.5); Calibrated: 2013.06.20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2013.06.11
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch4132/Area Scan (101x151x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.57 W/kg

Ch4132/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.586 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.48 W/kg
SAR(1 g) = 1.300 W/kg; SAR(10 g) = 0.677 W/kg
Maximum value of SAR (measured) = 1.74 W/kg



0 dB = 1.74 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2013.11.25

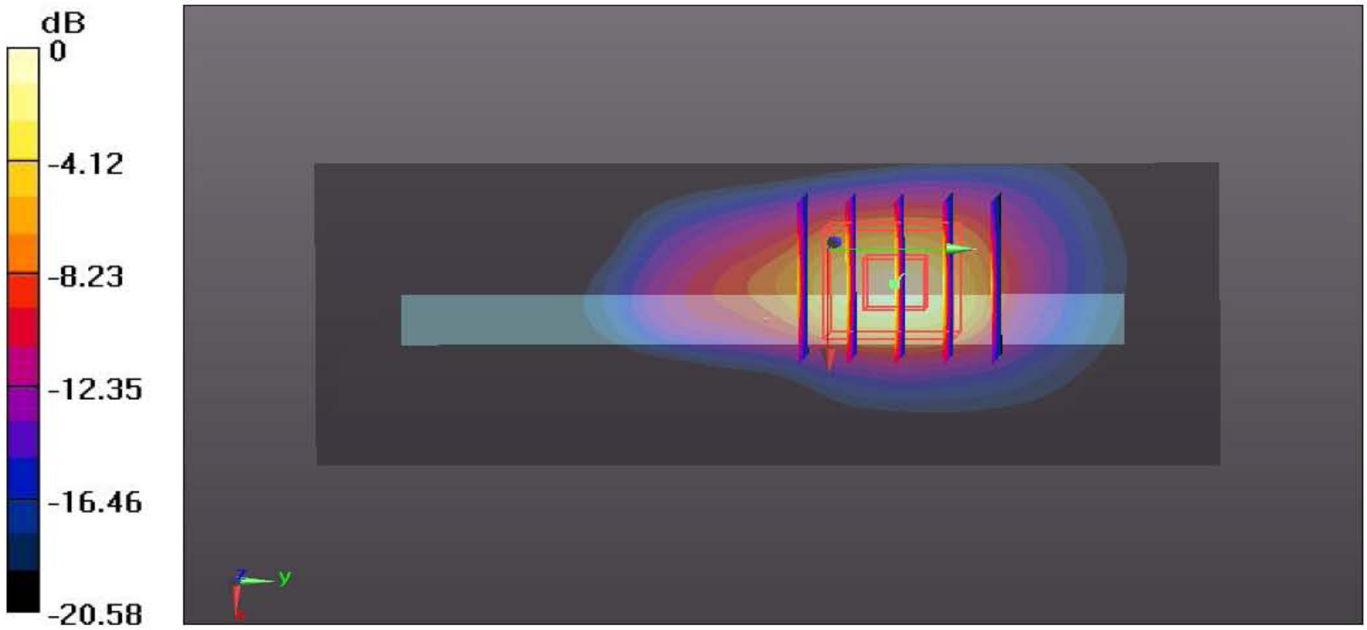
244 WCDMA Band IV_RMC 12.2K_Edge 3_0cm_Ch1312

Communication System: UID 0, UMTS; Frequency: 1712.4 MHz;Duty Cycle: 1:1
Medium: MSL_1800_131125 Medium parameters used: f = 1712.4 MHz; σ = 1.469 S/m; ε_r = 54.269; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3578; ConvF(7.18, 7.18, 7.18); Calibrated: 2013.06.20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2013.06.11
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch1312/Area Scan (41x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.37 W/kg

Ch1312/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.056 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 2.06 W/kg
SAR(1 g) = 0.938 W/kg; SAR(10 g) = 0.396 W/kg
Maximum value of SAR (measured) = 1.54 W/kg



0 dB = 1.54 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab   Date: 2013.11.17

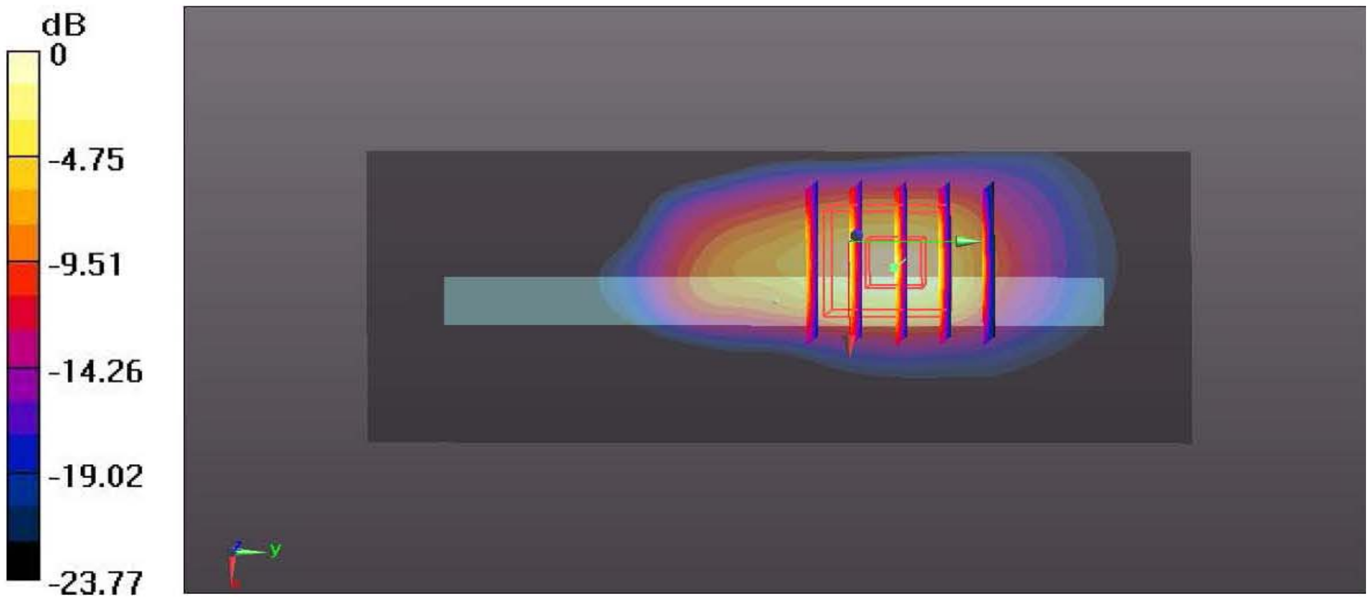
85 WCDMA Band II_RMC 12.2K_Edge 3_0cm_Ch9262

Communication System: UID 0, UMTS; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: MSL_1900_131117 Medium parameters used: f = 1852.4 MHz; σ = 1.471 S/m; ε_r = 54.836; ρ = 1000 kg/m^3
Ambient Temperature : 23.4 ℃; Liquid Temperature : 22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3578; ConvF(6.78, 6.78, 6.78); Calibrated: 2013.06.20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2013.06.11
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch9262/Area Scan (41x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.35 W/kg

Ch9262/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.931 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 2.01 W/kg
SAR(1 g) = 0.905 W/kg; SAR(10 g) = 0.382 W/kg
Maximum value of SAR (measured) = 1.50 W/kg



0 dB = 1.50 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2013.11.20

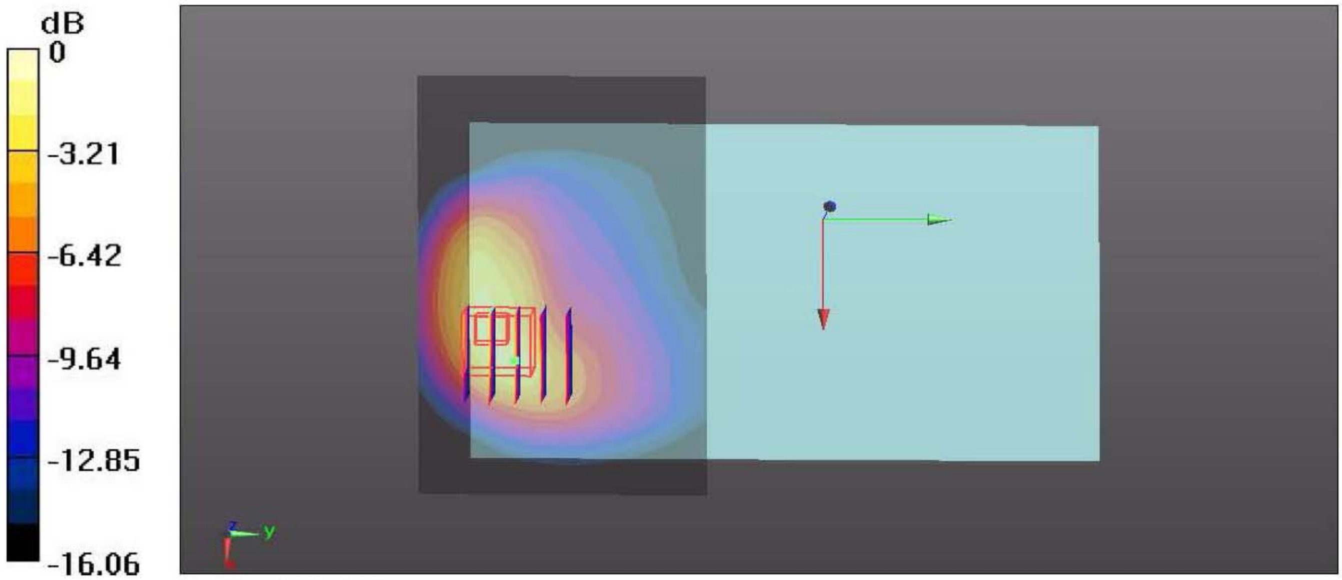
126 LTE Band 17_10M_QPSK 1RB 24offset_Bottom Face_0cm_Ch23800

Communication System: UID 0, LTE; Frequency: 711 MHz;Duty Cycle: 1:1
Medium: MSL_750_131120 Medium parameters used: f = 711 MHz; σ = 0.934 S/m; ε_r = 54.838; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3578; ConvF(8.68, 8.68, 8.68); Calibrated: 2013.06.20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2013.06.11
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch23800/Area Scan (101x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.17 W/kg

Ch23800/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.792 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 2.06 W/kg
SAR(1 g) = 0.981 W/kg; SAR(10 g) = 0.502 W/kg
Maximum value of SAR (measured) = 1.57 W/kg



0 dB = 1.57 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2013.11.15

35 LTE Band 5_10M_QPSK 1RB 24offset_Bottom Face_0cm_Ch20450

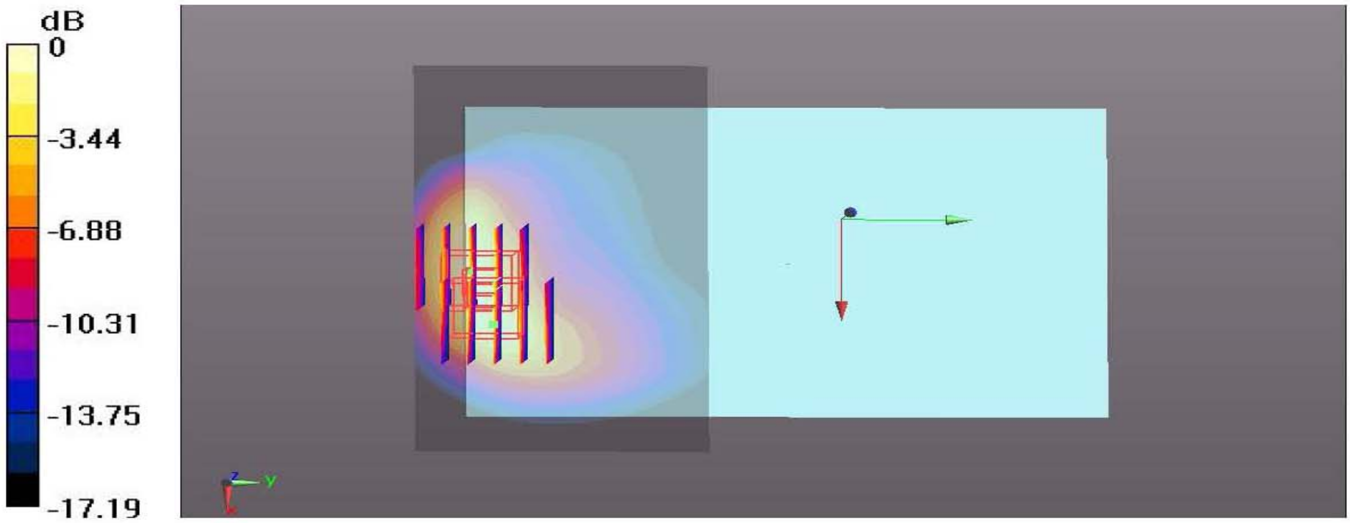
Communication System: UID 0, LTE; Frequency: 829 MHz;Duty Cycle: 1:1
Medium: MSL_835_131115 Medium parameters used: f = 829 MHz; σ = 1.005 S/m; ε_r = 56.307; ρ = 1000 kg/m^3
Ambient Temperature：23.2 ℃; Liquid Temperature：22.6 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3578; ConvF(8.5, 8.5, 8.5); Calibrated: 2013.06.20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2013.06.11
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch20450/Area Scan (101x61x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.32 W/kg

Ch20450/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.290 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 2.24 W/kg
SAR(1 g) = 1.160 W/kg; SAR(10 g) = 0.608 W/kg
Maximum value of SAR (measured) = 1.47 W/kg

Ch20450/Zoom Scan (5x5x7)/Cube 1: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.290 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 2.23 W/kg
SAR(1 g) = 1.12 W/kg; SAR(10 g) = 0.551 W/kg
Maximum value of SAR (measured) = 1.52 W/kg



0 dB = 1.52 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2013.11.25

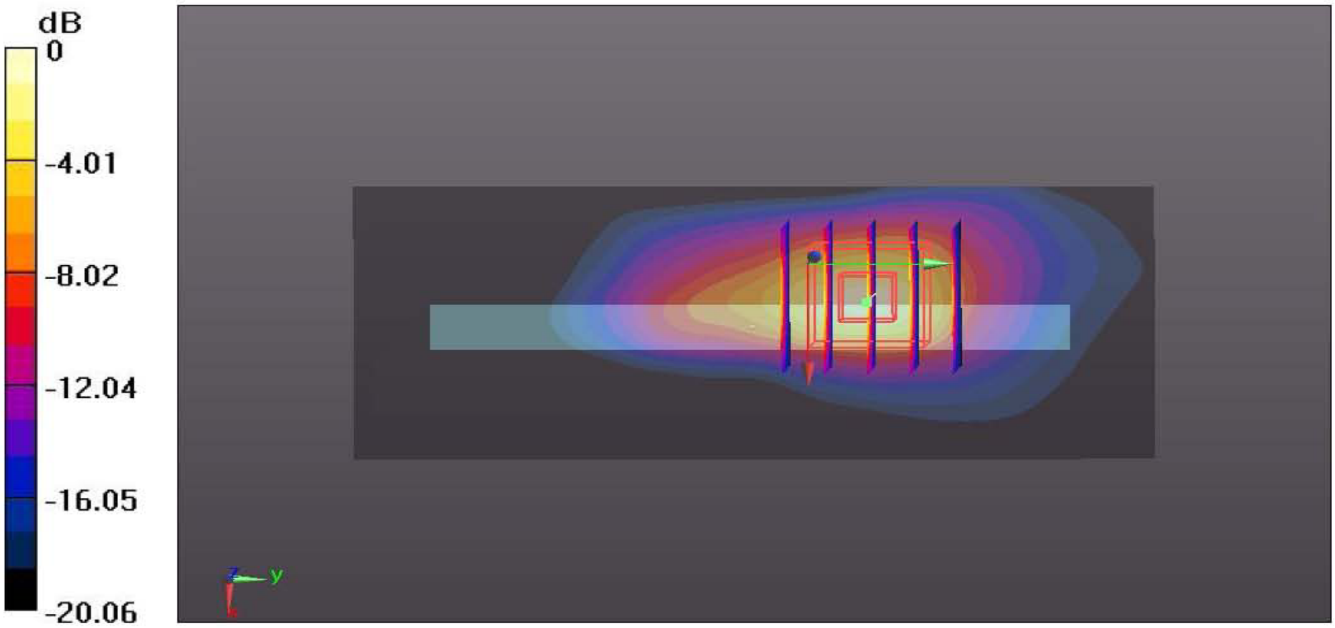
216 LTE Band4_20M_QPSK 1RB 49offset_Edge 3_0cm_Ch20300

Communication System: UID 0, LTE (0); Frequency: 1745 MHz;Duty Cycle: 1:1
Medium: MSL_1800_131125 Medium parameters used: f = 1745 MHz; σ = 1.509 S/m; ε_r = 53.565; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3578; ConvF(7.18, 7.18, 7.18); Calibrated: 2013.06.20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2013.06.11
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch20300/Area Scan (41x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.14 W/kg

Ch20300/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.846 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.76 W/kg
SAR(1 g) = 0.798 W/kg; SAR(10 g) = 0.340 W/kg
Maximum value of SAR (measured) = 1.30 W/kg



0 dB = 1.30 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2013.11.17

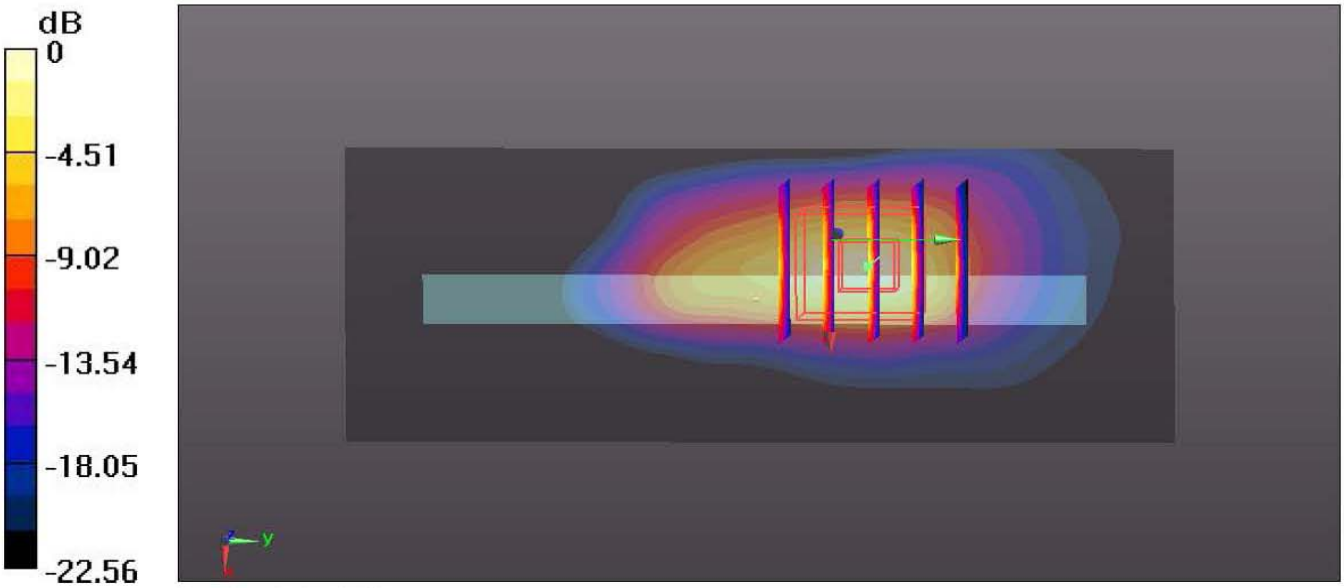
95 LTE Band2_20M_QPSK 1RB 0offset_Edge 3_0cm_Ch18700

Communication System: UID 0, LTE (0); Frequency: 1860 MHz;Duty Cycle: 1:1
Medium: MSL_1900_131117 Medium parameters used: f = 1860 MHz; σ = 1.48 S/m; ε_r = 54.807; ρ = 1000 kg/m^3
Ambient Temperature：23.4 ℃; Liquid Temperature：22.7 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3578; ConvF(6.78, 6.78, 6.78); Calibrated: 2013.06.20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2013.06.11
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch18700/Area Scan (41x101x1): Interpolated grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.45 W/kg

Ch18700/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.162 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 2.19 W/kg
SAR(1 g) = 0.990 W/kg; SAR(10 g) = 0.422 W/kg
Maximum value of SAR (measured) = 1.64 W/kg



0 dB = 1.64 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2013.11.20

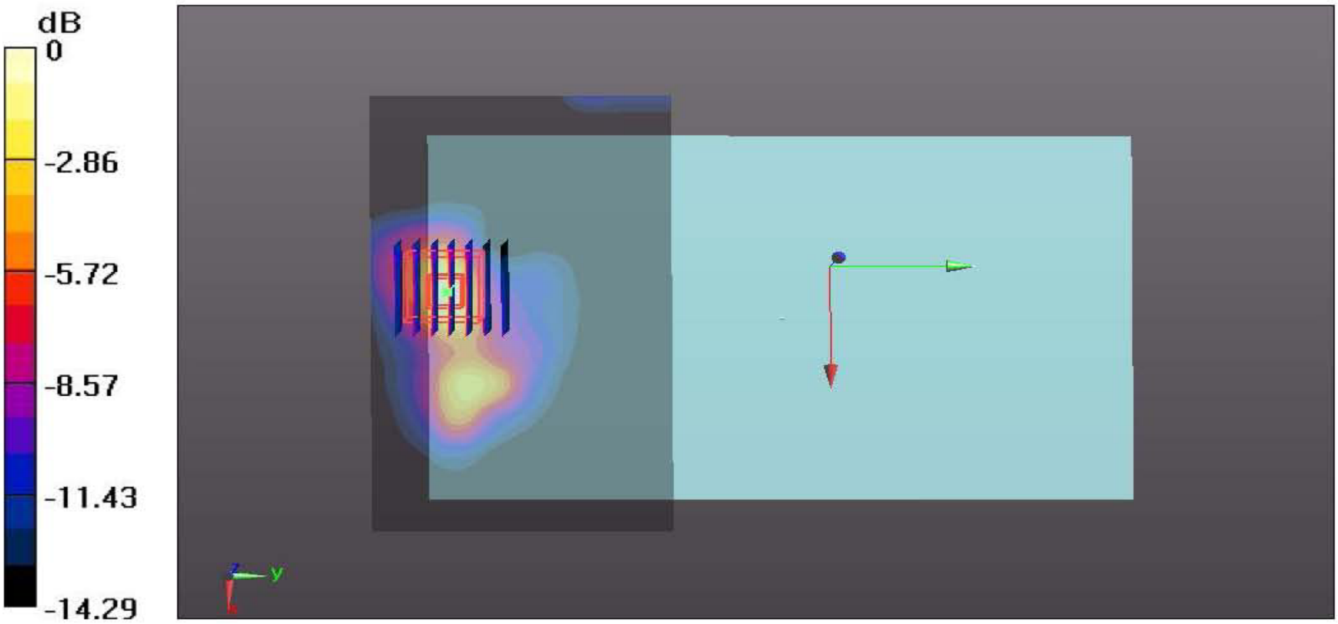
185 LTE Band 7_20M_QPSK 50RB 49offset_Bottom Face_0cm_Ch20890

Communication System: UID 0, LTE (0); Frequency: 2514 MHz;Duty Cycle: 1:1
Medium: MSL_2600_131120 Medium parameters used: f = 2514 MHz; σ = 2.105 S/m; ε_r = 51.284; ρ = 1000 kg/m^3
Ambient Temperature：23.3 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3819; ConvF(6.89, 6.89, 6.89); Calibrated: 2012.11.26;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2013.06.11
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch20890/Area Scan (121x71x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.33 W/kg

Ch20890/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.742 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 2.06 W/kg
SAR(1 g) = 0.757 W/kg; SAR(10 g) = 0.310 W/kg
Maximum value of SAR (measured) = 1.31 W/kg



0 dB = 1.31 W/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2013.11.21

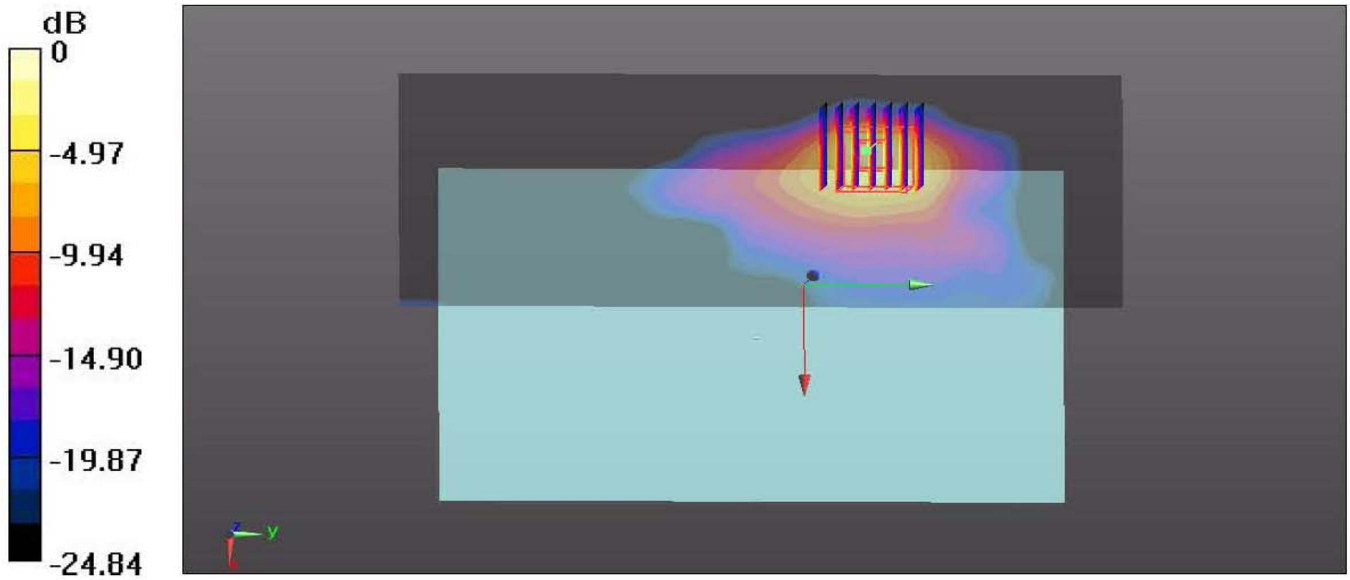
209 WLAN2.4GHz 802.11n HT20_Bottom Face_0cm_Ch6

Communication System: UID 0, WIFI; Frequency: 2437 MHz;Duty Cycle: 1:1.028
Medium: MSL_2450_131121 Medium parameters used: f = 2437 MHz; σ = 1.931 S/m; ε_r = 51.715; ρ = 1000 kg/m^3
Ambient Temperature：23.6 ℃; Liquid Temperature：22.8 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3578; ConvF(6.31, 6.31, 6.31); Calibrated: 2013.06.20;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn905; Calibrated: 2013.06.11
- Phantom: SAM3; Type: QDOVA002AA; Serial: TP:1149
- Measurement SW: DASY52, Version 52.8 (7); SEMCAD X Version 14.6.10 (7164)

Ch6/Area Scan (71x191x1): Interpolated grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.83 W/kg

Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 25.134 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 2.93 W/kg
SAR(1 g) = 1.030 W/kg; SAR(10 g) = 0.398 W/kg
Maximum value of SAR (measured) = 1.84 W/kg



0 dB = 1.84 W/kg

13. Simultaneous Transmission Analysis

NO.	Simultaneous Transmission Configurations	Tablet	Note
		Body	
1.	GPRS/EDGE(Data) + WLAN2.4GHz(data)	Yes	2.4GHz Hotspot
2.	WCDMA(Data) + WLAN2.4GHz(data)	Yes	2.4GHz Hotspot
3.	LTE(Data) + WLAN2.4GHz(data)	Yes	2.4GHz Hotspot
4.	GPRS/EDGE(Data) + Bluetooth(data)	Yes	Bluetooth Tethering
5.	WCDMA(Data) + Bluetooth(data)	Yes	Bluetooth Tethering
6.	LTE(Data) + Bluetooth(data)	Yes	Bluetooth Tethering

Note:

1. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
2. EUT will choose each GSM, WCDMA and LTE according to the network signal condition; therefore, they will not transmit simultaneously.
3. The Reported SAR summation is calculated based on the same configuration and test position.
4. Per KDB 447498 D01v05r01, simultaneous transmission SAR is compliant if,
   i) Scalar SAR summation < 1.6W/kg.
   ii) SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*), and the peak separation distance is determined from the square root of $[(x_1-x_2)^2 + (y_1-y_2)^2 + (z_1-z_2)^2]$, where ($x_1$, y_1, z_1) and (x_2, y_2, z_2) are the coordinates of the extrapolated peak SAR locations in the zoom scan
   If SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary
   iii) Simultaneously transmission SAR measurement, and the reported multi-band SAR < 1.6W/kg
5. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v05r01 based on the formula below.
   i) (*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)]·[$\sqrt{f(GHz)}/x$] 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 test 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.
   In this report, 50mm separation is applied to conservatively estimate SAR value for separation distance > 50mm

Max Power	Exposure Position	Bottom Face	Edge 2	Edge 3	Curved surface of Edge3	Edge 4
	Test separation (mm)	0	0	0	0	0
6 dBm	Antenna to user distance (mm)	0	1	103	103	113
	Estimated SAR (W/kg)	0.167	0.167	0.017	0.017	0.017

13.1 Tablet Body Co-location Simultaneous Transmission Analysis

<WWAN-PCB+WLAN2.4GHz-DTS>

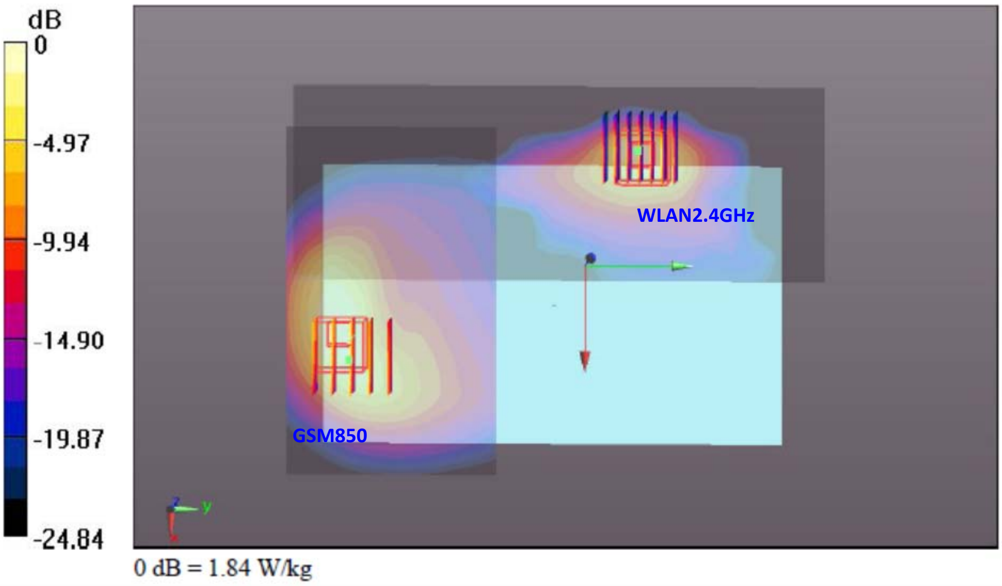
	WWAN-PCB			WLAN 2.4GHz-DTS		WWAN + WLAN 2.4GHz (W/kg)	SPLSR ≤0.04	Case No
Position	WWAN Band	Plot No	Max. WWAN SAR_{1g} (W/kg)	Plot No	Max. WLAN 2.4GHz SAR_{1g} (W/kg)			
Bottom Face	GSM850	5	1.304	209	1.132	2.44	0.03	#1
	GSM1900	70	0.473	209	1.132	1.61	0.01	#2
	WCDMA Band V	11	1.346	209	1.132	2.48	0.03	#3
	WCDMA Band IV	240	0.757	209	1.132	1.89	0.02	#4
	WCDMA Band II	81	0.749	209	1.132	1.88	0.02	#5
	LTE Band 17	126	1.185	209	1.132	2.32	0.02	#6
	LTE Band 5	35	1.263	209	1.132	2.40	0.03	#7
	LTE Band 4	211	0.622	209	1.132	1.75	0.01	#8
	LTE Band 2	111	0.792	209	1.132	1.92	0.02	#9
	LTE Band 7	185	0.982	209	1.132	2.11	0.02	#10
Edge2	GSM850	2	0.088	202	0.548	0.64	-	-
	GSM1900	71	0.007	202	0.548	0.56	-	-
	WCDMA Band V	12	0.087	202	0.548	0.64	-	-
	WCDMA Band IV	241	0.023	202	0.548	0.57		
	WCDMA Band II	82	0.023	202	0.548	0.57	-	-
	LTE Band 17	122	0.052	202	0.548	0.60		
	LTE Band 5	45	0.069	202	0.548	0.62		
	LTE Band 4	232	0.023	202	0.548	0.57		
	LTE Band 2	112	0.022	202	0.548	0.57		
	LTE Band 7	192	0.025	202	0.548	0.57		
Edge3	GSM850	3	0.588	-	-	0.59	-	-
	GSM1900	72	0.572	-	-	0.57	-	-
	WCDMA Band V	13	0.618	-	-	0.62	-	-
	WCDMA Band IV	244	1.115	-	-	1.12		
	WCDMA Band II	85	1.121	-	-	1.12	-	-
	LTE Band 17	143	0.742	-	-	0.74	-	-
	LTE Band 5	46	0.546	-	-	0.55	-	-
	LTE Band 4	216	0.962	-	-	0.96	-	-
	LTE Band 2	95	1.190	-	-	1.19	-	-
	LTE Band 7	193	0.661	-	-	0.66	-	-
Edge4	GSM850	4	0.110	-	-	0.11	-	-
	GSM1900	73	0.081	-	-	0.08	-	-
	WCDMA Band V	14	0.120	-	-	0.12	-	-
	WCDMA Band IV	243	0.131	-	-	0.13		
	WCDMA Band II	84	0.126	-	-	0.13	-	-
	LTE Band 17	134	0.018	-	-	0.02	-	-
	LTE Band 5	34	0.102	-	-	0.10	-	-
	LTE Band 4	214	0.102	-	-	0.10	-	-
	LTE Band 2	94	0.116	-	-	0.12	-	-
	LTE Band 7	194	0.023	-	-	0.02	-	-
Curved surface of Edge3	GSM850	8	0.553	-	-	0.55	-	-
	WCDMA Band V	18	0.863	-	-	0.86	-	-
	LTE Band 5	39	0.591	-	-	0.59	-	-

<WWAN-PCB + Bluetooth-DSS>

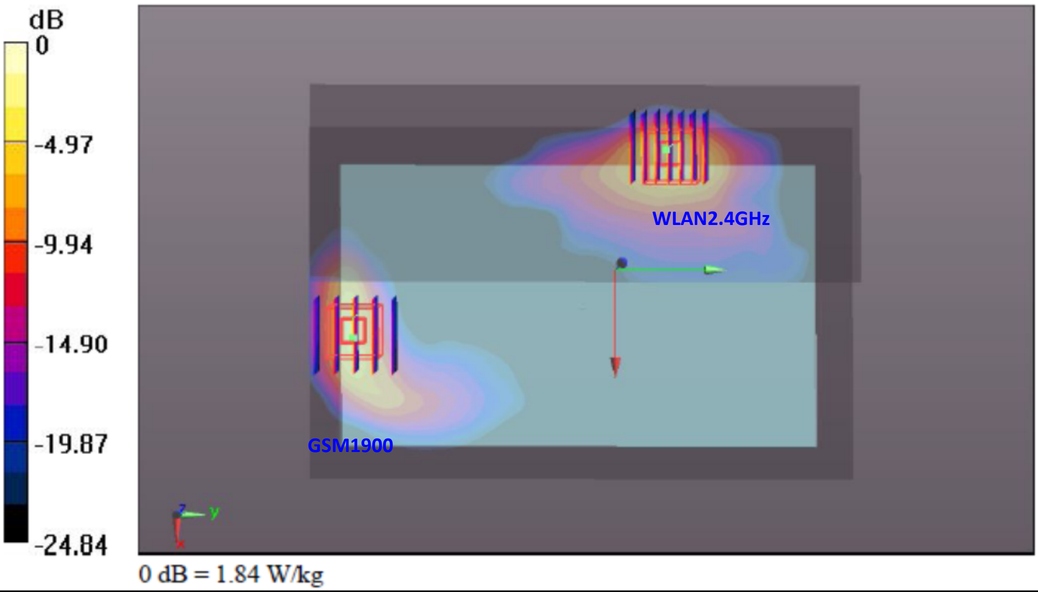
	WWAN-PCB			Bluetooth-DSS	WWAN + Bluetooth (W/kg)	SPLSR ≤0.04	Case No
Position	WWAN Band	Plot No	Max. WWAN SAR_{1g} (W/kg)	Estimated Bluetooth SAR (W/kg)			
Bottom Face	GSM850	5	1.304	0.167	1.47	-	-
	GSM1900	70	0.473	0.167	0.64	-	-
	WCDMA Band V	11	1.346	0.167	1.51	-	-
	WCDMA Band IV	240	0.757	0.167	0.92	-	-
	WCDMA Band II	81	0.749	0.167	0.92	-	-
	LTE Band 17	126	1.185	0.167	1.35	-	-
	LTE Band 5	35	1.263	0.167	1.43	-	-
	LTE Band 4	211	0.622	0.167	0.79	-	-
	LTE Band 2	111	0.792	0.167	0.96	-	-
	LTE Band 7	185	0.982	0.167	1.15	-	-
Edge2	GSM850	2	0.088	0.167	0.26	-	-
	GSM1900	71	0.007	0.167	0.17	-	-
	WCDMA Band V	12	0.087	0.167	0.25	-	-
	WCDMA Band IV	241	0.023	0.167	0.19	-	-
	WCDMA Band II	82	0.023	0.167	0.19	-	-
	LTE Band 17	122	0.052	0.167	0.22	-	-
	LTE Band 5	45	0.069	0.167	0.24	-	-
	LTE Band 4	232	0.023	0.167	0.19	-	-
	LTE Band 2	112	0.022	0.167	0.19	-	-
	LTE Band 7	192	0.025	0.167	0.19	-	-
Edge3	GSM850	3	0.588	0.017	0.61	-	-
	GSM1900	72	0.572	0.017	0.59	-	-
	WCDMA Band V	13	0.618	0.017	0.64	-	-
	WCDMA Band IV	244	1.115	0.017	1.13	-	-
	WCDMA Band II	85	1.121	0.017	1.14	-	-
	LTE Band 17	143	0.742	0.017	0.76	-	-
	LTE Band 5	46	0.546	0.017	0.56	-	-
	LTE Band 4	216	0.962	0.017	0.98	-	-
	LTE Band 2	95	1.19	0.017	1.21	-	-
	LTE Band 7	193	0.661	0.017	0.68	-	-
Edge4	GSM850	4	0.110	0.017	0.13	-	-
	GSM1900	73	0.081	0.017	0.10	-	-
	WCDMA Band V	14	0.120	0.017	0.14	-	-
	WCDMA Band IV	243	0.131	0.017	0.15	-	-
	WCDMA Band II	84	0.126	0.017	0.14	-	-
	LTE Band 17	134	0.018	0.017	0.04	-	-
	LTE Band 5	34	0.102	0.017	0.12	-	-
	LTE Band 4	214	0.102	0.017	0.12	-	-
	LTE Band 2	94	0.116	0.017	0.13	-	-
	LTE Band 7	194	0.023	0.017	0.04	-	-
Curved surface of Edge3	GSM850	8	0.553	0.017	0.57	-	-
	WCDMA Band V	18	0.863	0.017	0.88	-	-
	LTE Band 5	39	0.591	0.017	0.61	-	-

13.2 SPLSR Evaluation and Analysis

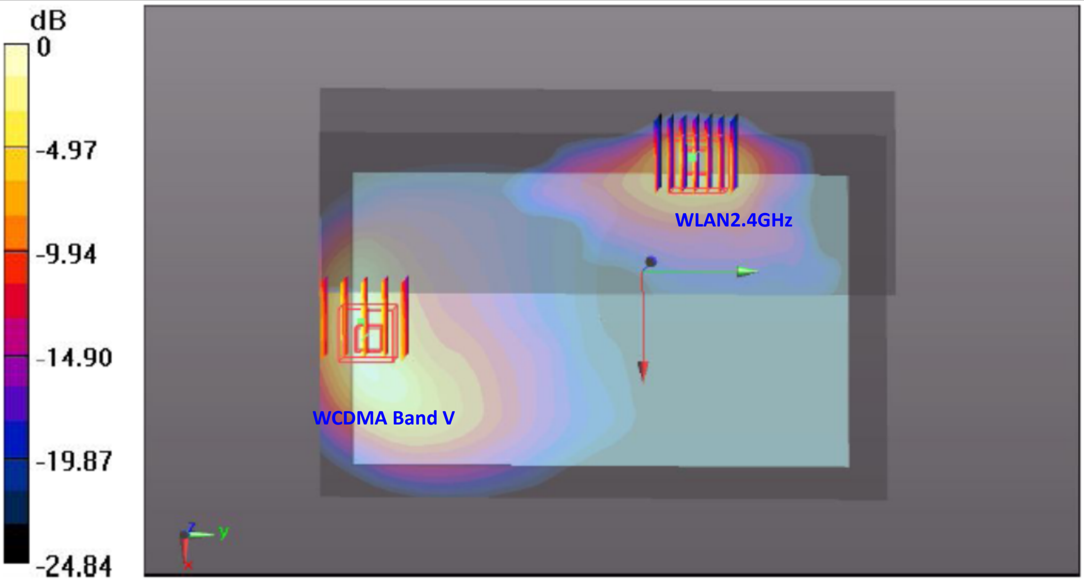
Case #1 Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
					X	Y	Z				
5	GSM850	Bottom Face	1.304	0	0.0175	-0.088	-0.181	148.8	2.44	0.03	Not required
209	WLAN2.4GHz		1.132	0	-0.0654	0.0356	-0.18				



Case #2 Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
					X	Y	Z				
70	GSM1900	Bottom Face	0.473	0	0.007	-0.0945	-0.181	148.9	1.61	0.01	Not required
209	WLAN2.4GHz		1.132	0	-0.0654	0.0356	-0.18				

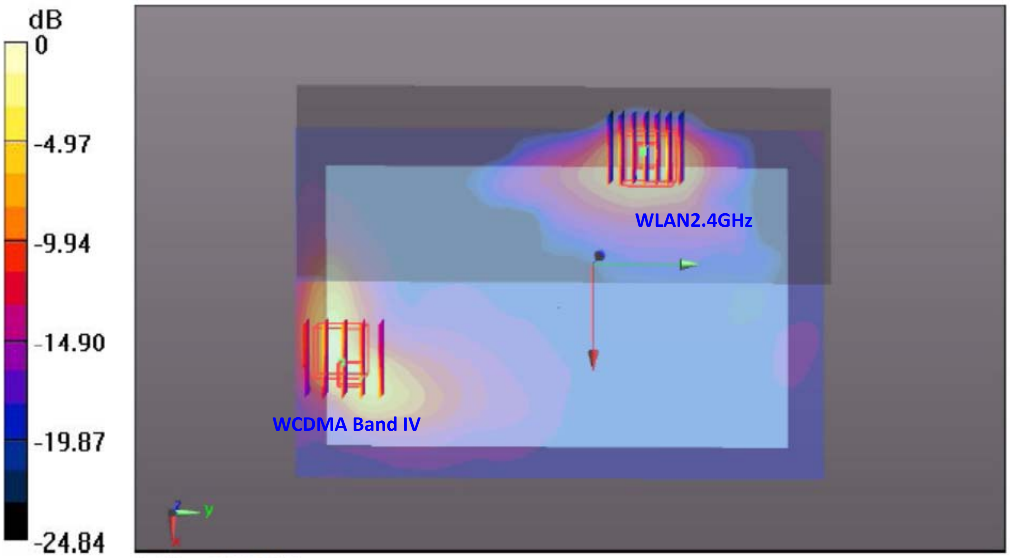


Case #3 Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
11	WCDMA Band V	Bottom Face	1.346	0	0.011	-0.096	-0.181	152.2	2.48	0.03	Not required
209	WLAN2.4GHz		1.132	0	-0.0654	0.0356	-0.18				



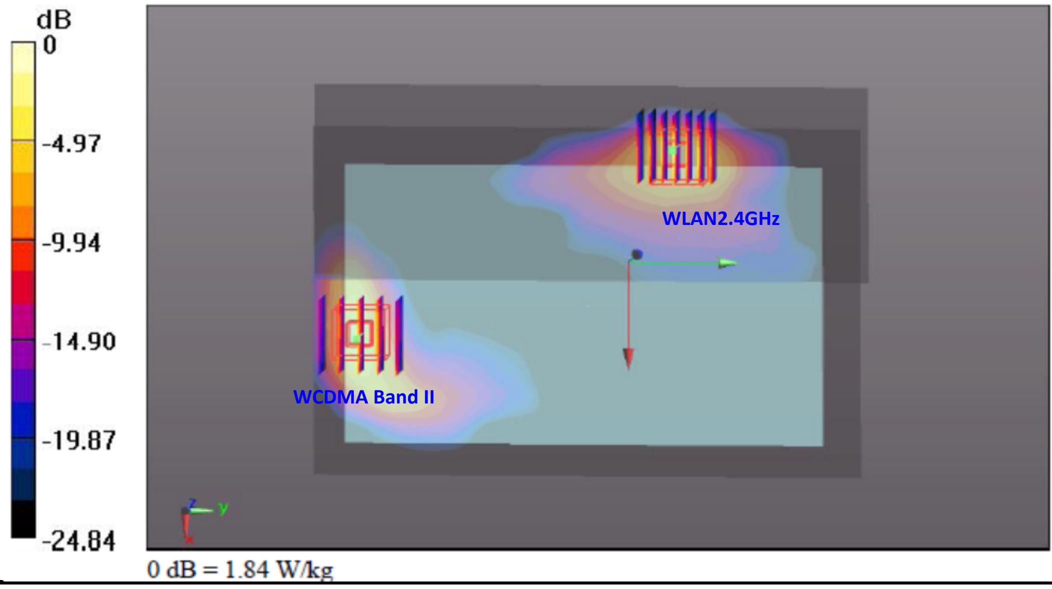
0 dB = 1.84 W/kg

Case #4 Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m) X	Y	Z	3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
240	WCDMA Band IV	Bottom Face	0.757	0	0.0335	-0.085	-0.181	156.0	1.89	0.02	Not required
209	WLAN2.4GHz		1.132	0	-0.0654	0.0356	-0.18				

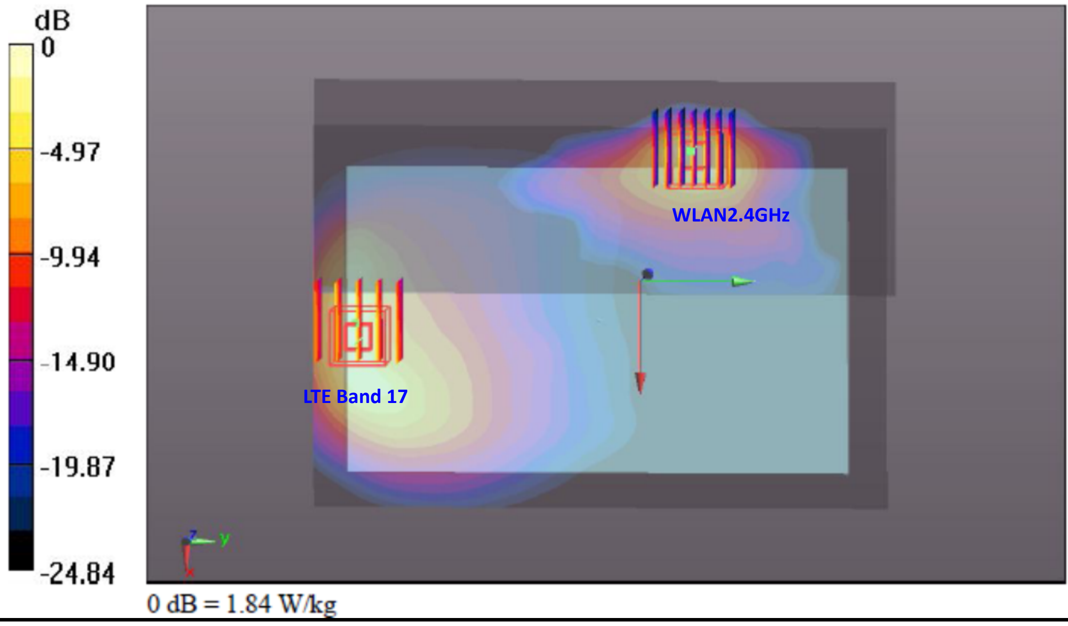


0 dB = 1.84 W/kg

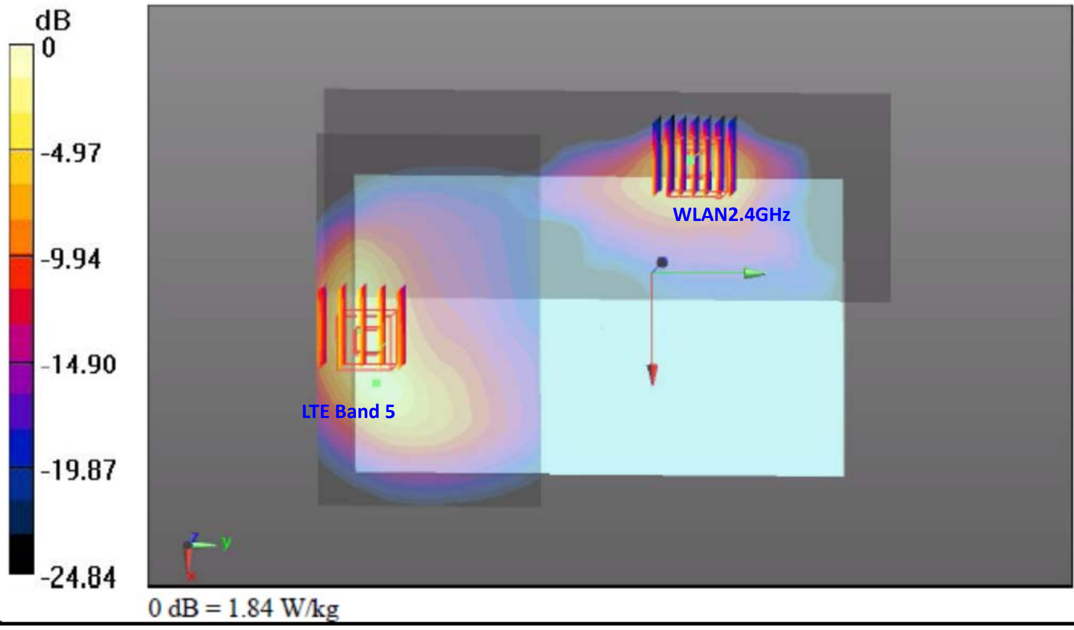
Case #5 Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
					X	Y	Z				
81	WCDMA Band II	Bottom Face	0.749	0	0.0085	-0.0945	-0.181	149.6	1.88	0.02	Not required
209	WLAN2.4GHz		1.132	0	-0.0654	0.0356	-0.18				



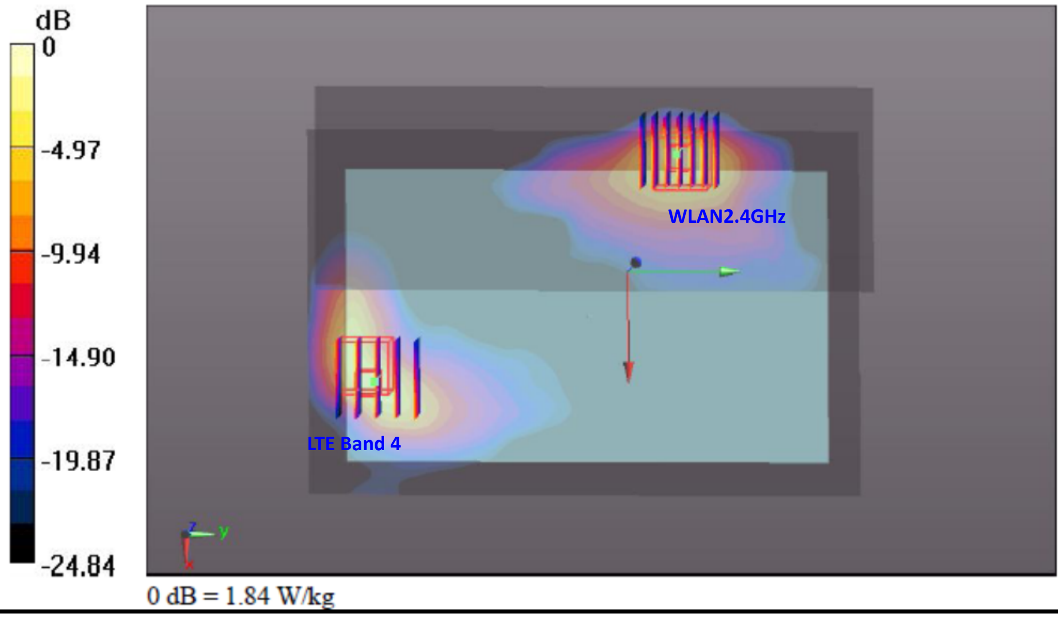
Case #6 Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
					X	Y	Z				
126	LTE Band 17	Bottom Face	1.187	0	0.011	-0.093	-0.181	149.6	2.32	0.02	Not required
209	WLAN2.4GHz		1.132	0	-0.0654	0.0356	-0.18				



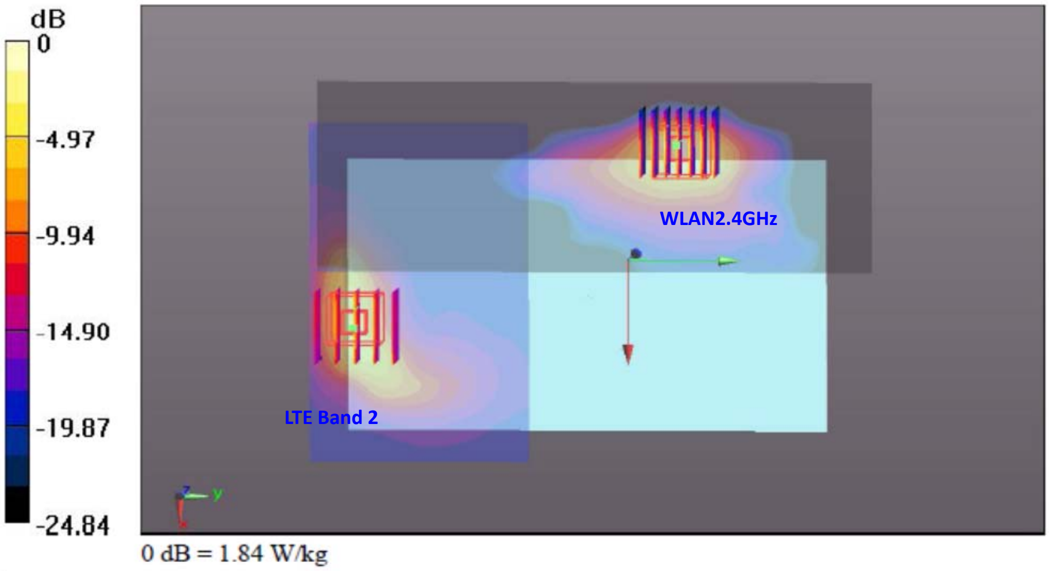
Case #7 Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
					X	Y	Z				
35	LTE Band 5	Bottom Face	1.263	0	0.0125	-0.0905	-0.18	148.2	2.40	0.03	Not required
209	WLAN2.4GHz		1.132	0	-0.0654	0.0356	-0.18				



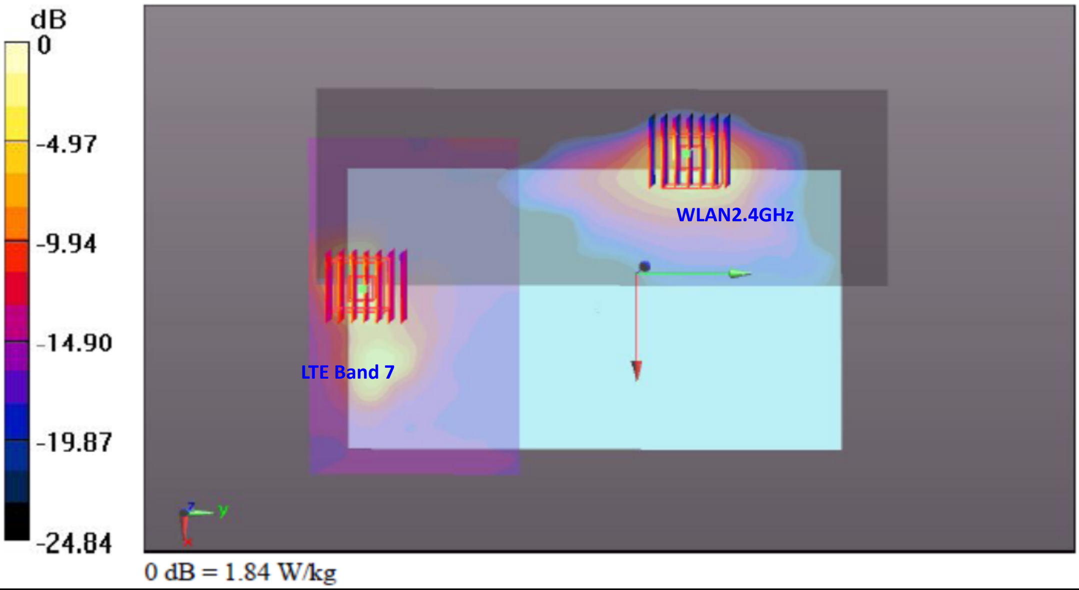
Case #8 Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
					X	Y	Z				
211	LTE Band 4	Bottom Face	0.622	0	0.0285	-0.088	-0.181	155.2	1.75	0.01	Not required
209	WLAN2.4GHz		1.132	0	-0.0654	0.0356	-0.18				



Case #9 Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
					X	Y	Z				
111	LTE Band 2	Bottom Face	0.792	0	0.0085	-0.097	-0.181	151.8	1.92	0.02	Not required
209	WLAN2.4GHz		1.132	0	-0.0654	0.0356	-0.18				



Case #10 Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (mm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
					X	Y	Z				
185	LTE Band 7	Bottom Face	0.982	0	-0.0072	-0.0934	-0.18	141.5	2.11	0.02	Not required
209	WLAN2.4GHz		1.132	0	-0.0654	0.0356	-0.18				



Remark: Per KDB 447498 D01v05r01, if SPLSR ≤ 0.04, further evaluation is not required.

Test Engineer： Luke Lu

14. 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 14.1

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 15.1. 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 Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.0	Normal	1	1	1	± 6.0 %	± 6.0 %
Axial Isotropy	4.7	Rectangular	√3	0.7	0.7	± 1.9 %	± 1.9 %
Hemispherical Isotropy	9.6	Rectangular	√3	0.7	0.7	± 3.9 %	± 3.9 %
Boundary Effects	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Linearity	4.7	Rectangular	√3	1	1	± 2.7 %	± 2.7 %
System Detection Limits	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Readout Electronics	0.3	Normal	1	1	1	± 0.3 %	± 0.3 %
Response Time	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Integration Time	2.6	Rectangular	√3	1	1	± 1.5 %	± 1.5 %
RF Ambient Noise	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
RF Ambient Reflections	3.0	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Probe Positioner	0.4	Rectangular	√3	1	1	± 0.2 %	± 0.2 %
Probe Positioning	2.9	Rectangular	√3	1	1	± 1.7 %	± 1.7 %
Max. SAR Eval.	1.0	Rectangular	√3	1	1	± 0.6 %	± 0.6 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
Device Holder	3.6	Normal	1	1	1	± 3.6 %	± 3.6 %
Power Drift	5.0	Rectangular	√3	1	1	± 2.9 %	± 2.9 %
Phantom and Setup							
Phantom Uncertainty	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Liquid Conductivity (Target)	5.0	Rectangular	√3	0.64	0.43	± 1.8 %	± 1.2 %
Liquid Conductivity (Meas.)	2.5	Normal	1	0.64	0.43	± 1.6 %	± 1.1 %
Liquid Permittivity (Target)	5.0	Rectangular	√3	0.6	0.49	± 1.7 %	± 1.4 %
Liquid Permittivity (Meas.)	2.5	Normal	1	0.6	0.49	± 1.5 %	± 1.2 %
Combined Standard Uncertainty						± 11.0 %	± 10.8 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						**± 22.0 %**	**± 21.5 %**

Table 15.2. Uncertainty Budget for frequency range 300 MHz to 3 GHz

15. 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. 1528-2003, "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003

[4] SPEAG DASY System Handbook

[5] FCC KDB 248227 D01 v01r02, "SAR Measurement Procedures for 802.11 a/b/g Transmitters", May 2007

[6] FCC KDB 447498 D01 v05r01, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", May 2013

[7] FCC KDB 941225 D03 v01, "Recommended SAR Test Reduction Procedures for GSM / GPRS / EDGE", December 2008

[8] FCC KDB 941225 D05 v02r02, "SAR Evaluation Considerations for LTE Devices", May 2013

[9] FCC KDB 941225 D01 v02, "SAR Measurement Procedures for 3G Devices – CDMA 2000 / Ev-Do / WCDMA / HSDPA / HSPA", October 2007

[10] FCC KDB 941225 D02 v02r02, "SAR Guidance for HSPA, HSPA+, DC-HSDPA and 1x-Advanced", May 2013.

[11] FCC KDB 616217 D04 v01r01, "SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers", May 2013

[12] FCC KDB 865664 D01 v01r01, "SAR Measurement Requirements for 100 MHz to 6 GHz", May 2013.

[13] FCC KDB 865664 D02 v01r01, "RF Exposure Compliance Reporting and Documentation Considerations", May 2013