FCC SAR Test Report

APPLICANT	:	**NEC CASIO Mobile Communications, Ltd.**
EQUIPMENT	:	**GSM / EGPRS / WCDMA / LTE Mobile Phone**
BRAND NAME	:	**NEC**
MODEL NAME	:	**NE-201A1A**
MARKETING NAME	:	**KMP7R4AE1-1AB**
FCC ID	:	**A98-RSZ3446**
STANDARD	:	**FCC 47 CFR Part 2 (2.1093)** **ANSI/IEEE C95.1-1992** **IEEE 1528-2003** **FCC OET Bulletin 65 Supplement C (Edition 01-01)**

The product was completely tested on Dec. 08, 2012. We, SPORTON INTERNATIONAL 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 INC., the test report shall not be reproduced except in full.

Reviewed by:

Jones Tsai

Jones Tsai / Manager

ilac-MRA TAF Testing Laboratory 1190

SPORTON INTERNATIONAL INC.
No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C.

Table of Contents

Appendix A. Plots of System Performance Check
Appendix B. Plots of SAR Measurement
Appendix C. DASY Calibration Certificate
Appendix D. Product Photos
Appendix E. Test Setup Photos

Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA2O3103	Rev. 01	Initial issue of report	Dec. 25, 2012

1. Statement of Compliance

The maximum results of Specific Absorption Rate (SAR) found during testing for **NEC CASIO Mobile Communications, Ltd. GSM / EGPRS / WCDMA / LTE Mobile Phone, NEC, NE-201A1A, KMP7R4AE1-1AB** are as follows.

Exposure Position	Frequency Band	Highest Reported 1g-SAR (W/kg)	Equipment Class	Highest Reported 1g-SAR (W/kg)
Head	GSM850	**0.48**	PCE	**1.00**
	GSM1900	**0.44**		
	WCDMA Band V	**0.51**		
	WCDMA Band II	**0.96**		
	LTE Band 17	**0.44**		
	LTE Band 5	**0.64**		
	LTE Band 4	**0.64**		
	LTE Band 2	**1.00**		
	WLAN, 2412 - 2462 MHz	**0.79**	DTS	**0.79**
Hotspot (1cm Gap)	GSM850	**1.05**	PCE	**1.05**
	GSM1900	**0.70**		
	WCDMA Band V	**0.57**		
	WCDMA Band II	**0.73**		
	LTE Band 17	**0.45**		
	LTE Band 5	**0.66**		
	LTE Band 4	**0.65**		
	LTE Band 2	**0.80**		
	WLAN, 2412 - 2462 MHz	**0.17**	DTS	**0.17**
Body-worn (1cm Gap)	GSM850	**1.05**	PCE	**1.05**
	GSM1900	**0.70**		
	WCDMA Band V	**0.57**		
	WCDMA Band II	**0.73**		
	LTE Band 17	**0.45**		
	LTE Band 5	**0.66**		
	LTE Band 4	**0.65**		
	LTE Band 2	**0.80**		
	WLAN, 2412 - 2462 MHz	**0.15**	DTS	**0.15**

Exposure Position	Frequency Band	Equipment Class	Highest Reported Simultaneous Transmission 1g-SAR (W/kg)
Head	LTE Band 5 WLAN, 2412 - 2462 MHz	PCE DTS	1.43

Exposure Position	Frequency Band	Equipment Class	Highest Reported Simultaneous Transmission 1g-SAR (W/kg)
Hotspot (1cm Gap)	GSM850 Bluetooth	PCE DSS	1.09

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 and FCC OET Bulletin 65 Supplement C (Edition 01-01).

2. Administration Data

2.1 Testing Laboratory

Test Site	SPORTON INTERNATIONAL INC.
Test Site Location	No. 52, Hwa Ya 1st Rd., Hwa Ya Technology Park, Kwei-Shan Hsiang, Tao Yuan Hsien, Taiwan, R.O.C. TEL: +886-3-327-3456 FAX: +886-3-328-4978

2.2 Applicant

Company Name	NEC CASIO Mobile Communications, Ltd.
Address	31Fl., Tamagawa Renaissance City Tower N, 1753 Shimonumabe, Nakahara-ku, Kawasaki, Kanagawa 211-8666 Japan 2.

2.3 Manufacturer

Company Name	Arima Communications Corp
Address	6F, No 866, Jhongjheng Rd., Jhonghe Dist., New Taipei City 23586, Taiwan

2.4 Application Details

Date of Start during the Test	Nov. 24, 2012
Date of End during the Test	Dec. 08, 2012

3. General Information

3.1 Description of Equipment Under Test (EUT)

Product Feature & Specification	
EUT	GSM / EGPRS / WCDMA / LTE Mobile Phone
Brand Name	NEC
Model Name	NE-201A1A
Marketing Name	KMP7R4AE1-1AB
FCC ID	A98-RSZ3446
Tx Frequency	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 II: 1852.4 MHz ~ 1907.6 MHz LTE Band 17: 706.5 MHz ~ 713.5 MHz LTE Band 5: 824.7MHz ~ 848.3MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 2: 1850.7MHz~1909.3MHz WLAN2.4G: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz NFC: 13.56MHz
Measure Maximum Average Output Power to Antenna	GSM850: 33.20 dBm GSM1900: 30.06 dBm WCDMA Band V: 23.61 dBm WCDMA Band II: 23.30 dBm LTE Band 17 : 23.69 dBm LTE Band 5 : 23.58 dBm LTE Band 4 : 23.99 dBm LTE Band 2 : 23.96 dBm 802.11b: 17.09 dBm 802.11g: 13.38 dBm 802.11n-HT20 (2.4GHz) : 11.46 dBm Bluetooth: 2.93 dBm
Antenna Type	WWAN: Embedded Antenna WLAN: Chip Antenna Bluetooth: Chip Antenna LTE: Embedded Antenna NFC: Intergrate Antenna
HW Version	EP2
SW Version	3.0.8
Uplink Modulations	GSM: GMSK GPRS: GMSK EDGE: GMSK / 8PSK WCDMA (Rel 99): QPSK HSDPA (Rel 6): QPSK HSUPA (Rel 6): QPSK LTE: QPSK / 16QAM 802.11b: DSSS (BPSK / QPSK / CCK) 802.11g/n: OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth : GFSK Bluetooth EDR : π/4-DQPSK, 8-DPSK Bluetooth 4.0 LE: GFSK NFC : ASK
Dual Transfer Mode (DTM) Category	Class B – EUT cannot support Packet Switched and Circuit Switched Network simultaneously
EUT Stage	Identical Prototype
Remark: The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description.	

The table below summarized necessary items addressed in KDB 941225 D05 v02.

FCC ID	A98-RSZ3446
EUT	GSM / EGPRS / WCDMA / LTE Mobile Phone
Operating Frequency Range of each LTE transmission band	LTE Band 2: 1850.7 MHz ~1909.3 MHz LTE Band 4: 1710.7 MHz ~ 1754.3 MHz LTE Band 5: 824.7 MHz ~ 848.3 MHz LTE Band 17: 706.5 MHz ~ 713.5 MHz
Channel Bandwidth	Band 2: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz Band 4: 1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz Band 5: 1.4MHz, 3MHz, 5MHz, 10MHz Band 17: 5MHz, 10MHz

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

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	19150	1905	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	18650	1855	19125	1902.5	19100	1900

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	20325	1747.5	20300	1745
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	20025	1717.5	20050	1720

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

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

<table>
<tr><td>UE category, uplink modulations used</td><td colspan="2">Category 3, QPSK, and 16QAM</td></tr>
<tr><td>LTE transmitter and antenna implementation (standalone or sharing hardware components / antennas)</td><td colspan="2">Main Antenna: LTE share the antenna with UMTS.</td></tr>
<tr><td>LTE Voice / Data requirements</td><td colspan="2">Data only</td></tr>
<tr><td>LTE MPR permanently built-in by design</td><td colspan="2">Yes</td></tr>
<tr><td>LTE A-MPR</td><td colspan="2">Disabled during SAR testing. With CMW500, set NS value to NS_01 to disable A-MPR.</td></tr>
<tr><td>LTE maximum averaged conducted output power</td><td colspan="2">LTE Band 17 : 23.69 dBm
LTE Band 5 : 23.58 dBm
LTE Band 4 : 23.99 dBm
LTE Band 2 : 23.96 dBm</td></tr>
<tr><td rowspan="5">Other U.S. wireless operating modes / bands</td><td>GSM/GPRS/EDGE</td><td>GSM850: Tx: 824.2 ~ 848.8 MHz;
GSM1900: Tx: 1850.2 ~ 1909.8 MHz;</td></tr>
<tr><td>WCDMA
HSDPA / HSUPA</td><td>Band V: Tx: 826.4 ~ 846.6 MHz;
Band II: Tx: 1852.4 ~ 1907.6 MHz;</td></tr>
<tr><td>WLAN</td><td>2.4G: 2412~2462 MHz</td></tr>
<tr><td>Bluetooth</td><td>2402~2480 MHz</td></tr>
<tr><td>NFC</td><td>13.56 MHz</td></tr>
<tr><td>Simultaneous transmission configurations</td><td colspan="2">In Section 11.4</td></tr>
<tr><td>Power reduction applied to satisfy SAR compliance</td><td colspan="2">No.</td></tr>
</table>

3.2 Maximum RF output power among production units

Nominal Target Burst Average power for Production Unit		
Mode	GSM 850	GSM 1900
GSM (GMSK, 1 Tx slot)	33.5	30.5
GPRS/EDGE (GMSK, 1 Tx slot)	33.5	30.5
GPRS/EDGE (GMSK, 2 Tx slots)	33.5	30.5
EDGE (8PSK, 1 Tx slot)	27.5	26.5
EDGE (8PSK, 2 Tx slots)	27.5	26.5

Nominal Target Power for Production Unit		
Mode	WCDMA Band V	WCDMA Band II
RMC 12.2K	24	24
HSDPA Subtest-1	24	24
HSUPA Subtest-5	24	24

Nominal Target Power for Production Unit				
LTE Band 2				
Modulation	**BW (MHz)**	**RB size**	**Target MPR**	**Target Power**
QPSK	20	≤ 18	0	24
QPSK	20	> 18	0.5	23.5
16QAM	20	≤ 18	0.5	23.5
16QAM	20	> 18	1.5	22.5
QPSK	15	≤ 16	0	24
QPSK	15	> 16	0.5	23.5
16QAM	15	≤ 16	0.5	23.5
16QAM	15	> 16	1.5	22.5
QPSK	10	≤ 12	0	24
QPSK	10	> 12	0.5	23.5
16QAM	10	≤ 12	0.5	23.5
16QAM	10	> 12	1.5	22.5
QPSK	5	≤ 8	0	24
QPSK	5	> 8	0.5	23.5
16QAM	5	≤ 8	0.5	23.5
16QAM	5	> 8	1.5	22.5
QPSK	3	≤ 4	0	24
QPSK	3	> 4	0.5	23.5
16QAM	3	≤ 4	0.5	23.5
16QAM	3	> 4	1.5	22.5
QPSK	1.4	≤ 5	0	24
QPSK	1.4	> 5	0.5	23.5
16QAM	1.4	≤ 5	0.5	23.5
16QAM	1.4	> 5	1.5	22.5

Nominal Target Power for Production Unit				
LTE Band 4				
Modulation	**BW (MHz)**	**RB size**	**Target MPR**	**Target Power**
QPSK	20	≤ 18	**0**	**24**
QPSK	20	> 18	**0.5**	**23.5**
16QAM	20	≤ 18	**0.5**	**23.5**
16QAM	20	> 18	**1.5**	**22.5**
QPSK	15	≤ 16	**0**	**24**
QPSK	15	> 16	**0.5**	**23.5**
16QAM	15	≤ 16	**0.5**	**23.5**
16QAM	15	> 16	**1.5**	**22.5**
QPSK	10	≤ 12	**0**	**24**
QPSK	10	> 12	**0.5**	**23.5**
16QAM	10	≤ 12	**0.5**	**23.5**
16QAM	10	> 12	**1.5**	**22.5**
QPSK	5	≤ 8	**0**	**24**
QPSK	5	> 8	**0.5**	**23.5**
16QAM	5	≤ 8	**0.5**	**23.5**
16QAM	5	> 8	**1.5**	**22.5**
QPSK	3	≤ 4	**0**	**24**
QPSK	3	> 4	**0.5**	**23.5**
16QAM	3	≤ 4	**0.5**	**23.5**
16QAM	3	> 4	**1.5**	**22.5**
QPSK	1.4	≤ 5	**0**	**24**
QPSK	1.4	> 5	**0.5**	**23.5**
16QAM	1.4	≤ 5	**0.5**	**23.5**
16QAM	1.4	> 5	**1.5**	**22.5**

Nominal Target Power for Production Unit				
LTE Band 5				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	10	≤ 12	**0**	**24**
QPSK	10	> 12	**0.5**	**23.5**
16QAM	10	≤ 12	**0.5**	**23.5**
16QAM	10	> 12	**1.5**	**22.5**
QPSK	5	≤ 8	**0**	**24**
QPSK	5	> 8	**0.5**	**23.5**
16QAM	5	≤ 8	**0.5**	**23.5**
16QAM	5	> 8	**1.5**	**22.5**
QPSK	3	≤ 4	**0**	**24**
QPSK	3	> 4	**0.5**	**23.5**
16QAM	3	≤ 4	**0.5**	**23.5**
16QAM	3	> 4	**1.5**	**22.5**
QPSK	1.4	≤ 5	**0**	**24**
QPSK	1.4	> 5	**0.5**	**23.5**
16QAM	1.4	≤ 5	**0.5**	**23.5**
16QAM	1.4	> 5	**1.5**	**22.5**

Nominal Target Power for Production Unit				
LTE Band 17				
Modulation	BW (MHz)	RB size	Target MPR	Target Power
QPSK	10	≤ 12	**0**	**24**
QPSK	10	> 12	**0.5**	**23.5**
16QAM	10	≤ 12	**0.5**	**23.5**
16QAM	10	> 12	**1.5**	**22.5**
QPSK	5	≤ 8	**0**	**24**
QPSK	5	> 8	**0.5**	**23.5**
16QAM	5	≤ 8	**0.5**	**23.5**
16QAM	5	> 8	**1.5**	**22.5**

For Band 2:

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR Target (dB)						3GPP MPR (dB)
	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	0.5	0.5	0.5	0.5	0.5	0.5	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	0.5	0.5	0.5	0.5	0.5	0.5	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	1.5	1.5	1.5	1.5	1.5	1.5	≤ 2

For Band 4:

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]						MPR Target (dB)						3GPP MPR (dB)
	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	1.4 MHz	3 MHz	5 MHz	10 MHz	15 MHz	20 MHz	
QPSK	> 5	> 4	> 8	> 12	> 16	> 18	0.5	0.5	0.5	0.5	0.5	0.5	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	≤ 16	≤ 18	0.5	0.5	0.5	0.5	0.5	0.5	≤ 1
16 QAM	> 5	> 4	> 8	> 12	> 16	> 18	1.5	1.5	1.5	1.5	1.5	1.5	≤ 2

For Band 5:

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]				MPR Target (dB)				3GPP MPR (dB)
	1.4 MHz	3 MHz	5 MHz	10 MHz	1.4 MHz	3 MHz	5 MHz	10 MHz	
QPSK	> 5	> 4	> 8	> 12	0.5	0.5	0.5	0.5	≤ 1
16 QAM	≤ 5	≤ 4	≤ 8	≤ 12	0.5	0.5	0.5	0.5	≤ 1
16 QAM	> 5	> 4	> 8	> 12	1.5	1.5	1.5	1.5	≤ 2

For Band 17:

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]		MPR Target (dB)		3GPP MPR (dB)
	5 MHz	10 MHz	5 MHz	10 MHz	
QPSK	> 8	> 12	0.5	0.5	≤ 1
16 QAM	≤ 8	≤ 12	0.5	0.5	≤ 1
16 QAM	> 8	> 12	1.5	1.5	≤ 2

Max Target Average Power for Production Unit				
Mode / Band	IEEE 802.11			
	a	b	g	n
2.4 GHz WIFI		17.5	14	12

Mode / Band	Bluetooth			
	1Mbps (GMSK)	2Mbps (π/4-DQPSK)	3Mbps (8-DPSK)	BT4.0-LE (GMSK)
2.4 GHz Bluetooth	3	3	3	3

3.3 Product Photos

Please refer to Appendix D.

3.4 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 OET Bulletin 65 Supplement C (Edition 01-01)
- FCC KDB 447498 D01 v05
- FCC KDB 648474 D01 v01r05
- FCC KDB 941225 D01 v02
- FCC KDB 941225 D03 v01
- FCC KDB 941225 D05 v02
- FCC KDB 941225 D06 v01
- FCC KDB 248227 D01 v01r02

3.5 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.

3.6 Test Conditions

Ambient Condition

Ambient Temperature	20 to 24 ℃
Humidity	< 60 %

Test Configuration

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. The EUT was set from the emulator to radiate maximum output power during all tests.

During WLAN SAR testing EUT is configured with the WLAN continuous TX tool,

The EUT was set from the emulator to radiate maximum WWAN output power during all tests

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

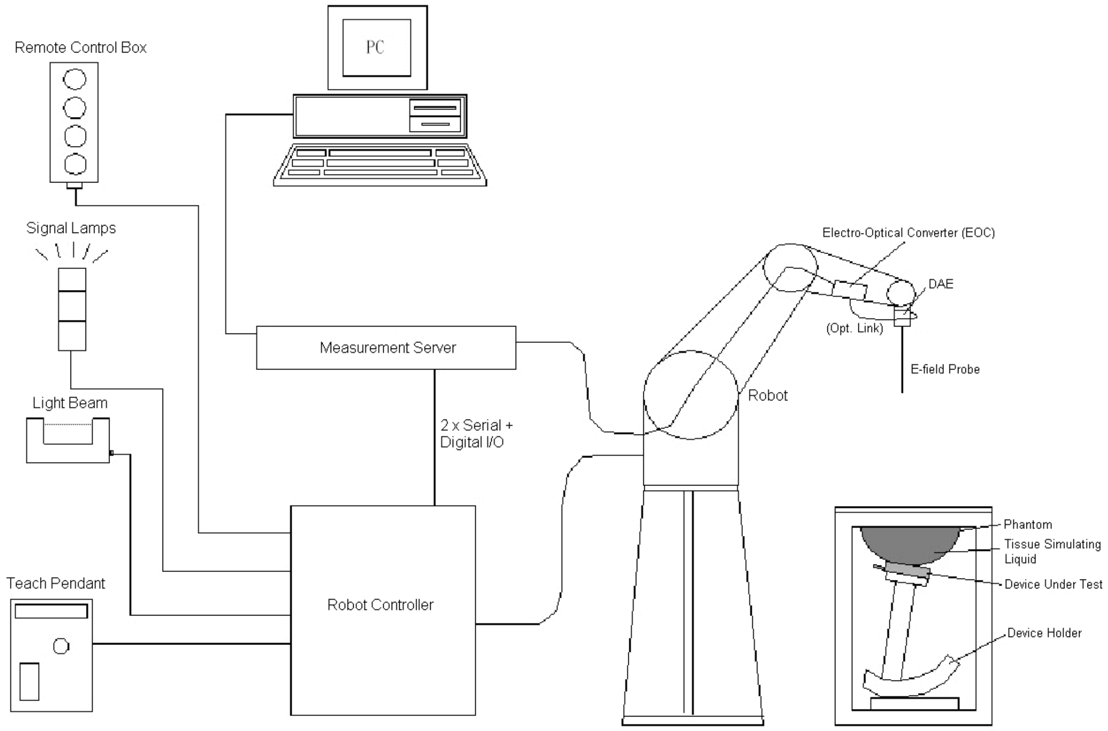


Fig 5.1 SPEAG DASY System Configurations

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

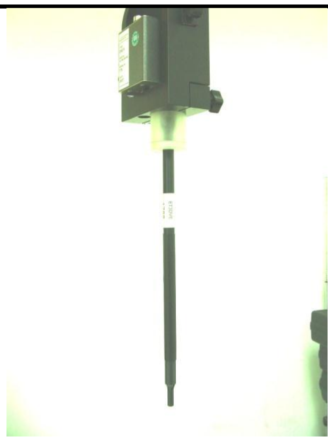
Component details are described in in the following sub-sections.

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

<ET3DV6 / ET3DV6R Probe >

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection system. Built-in shielding against static charges. PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	 **Fig 5.2 Photo of ET3DV6/ET3DV6**
Frequency	10 MHz to 3 GHz; Linearity: ± 0.2 dB	
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.4 dB in HSL (rotation normal to probe axis)	
Dynamic Range	5 µW/g to 100 mW/g; Linearity: ± 0.2 dB	
Dimensions	Overall length: 330 mm (Tip: 16 mm) Tip diameter: 6.8 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.7 mm	

<EX3DV4 / ES3DV4 Probe>

Construction	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)	 **Fig 5.3 Photo of EX3DV4/ES3DV4**
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	

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 5.4 Photo of DAE

5.3 Robot

The SPEAG DASY system uses the high precision robots (DASY4: RX90BL; DASY5: TX90XL) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version (DASY4: CS7MB; 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)

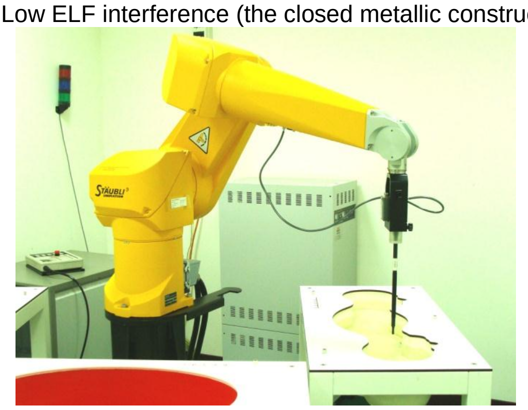


Fig 5.5 Photo of DASY4

Fig 5.6 Photo of DASY5

5.4 Measurement Server

The measurement server is based on a PC/104 CPU board with CPU (DASY4: 166 MHz, Intel Pentium; DASY5: 400 MHz, Intel Celeron), chipdisk (DASY4: 32 MB; DASY5: 128 MB), RAM (DASY4: 64 MB, 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 5.7 Photo of Server for DASY4

Fig 5.8 Photo of Server for DASY5

5.5 Phantom

<SAM Twin Phantom>

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

Fig 5.9 Photo of SAM Phantom

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

<ELI4 Phantom>

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

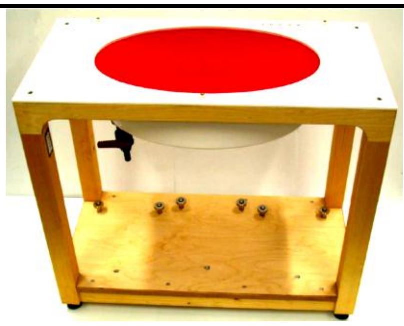


Fig 5.10 Photo of ELI4 Phantom

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 $\varepsilon = 3$ and loss tangent $\delta = 0.02$. 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 5.11 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.

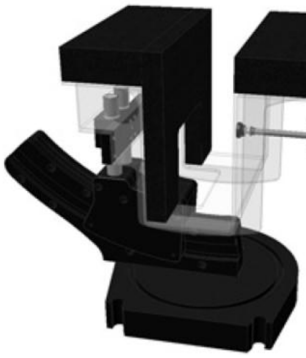


Fig 5.12 Laptop Extension Kit

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：

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

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：$\mathbf{E_i} = \sqrt{\frac{\mathbf{V_i}}{\mathbf{Norm_i \cdot ConvF}}}$

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

with V_i = compensated signal of channel i, (i = x, y, z)
$Norm_i$ = sensor sensitivity of channel i, (i = x, y, z), $\mu V/(V/m)^2$ 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)：

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

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

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

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	1012	Jun. 11, 2010	Jun. 10, 2013
SPEAG	835MHz System Validation Kit	D835V2	499	Mar. 22, 2010	Mar. 21, 2013
SPEAG	1750MHz System Validation Kit	D1750V2	1068	Jun. 20, 2012	Jun. 19, 2013
SPEAG	1900MHz System Validation Kit	D1900V2	5d041	Mar. 23, 2010	Mar. 22, 2013
SPEAG	2450MHz System Validation Kit	D2450V2	736	Jul. 25, 2011	Jul. 24, 2013
SPEAG	Data Acquisition Electronics	DAE4	778	Aug. 27, 2012	Aug. 26, 2013
SPEAG	Data Acquisition Electronics	DAE3	495	Apr. 23, 2012	Apr. 22, 2013
SPEAG	Data Acquisition Electronics	DAE4	1279	May. 03, 2012	May. 02, 2013
SPEAG	Dosimetric E-Field Probe	ET3DV6	1787	May. 29, 2012	May. 28, 2013
SPEAG	Dosimetric E-Field Probe	EX3DV4	3697	Sep. 28, 2012	Sep. 27, 2013
SPEAG	Dosimetric E-Field Probe	ES3DV3	3270	Sep. 28, 2012	Sep. 27, 2013
SPEAG	Device Holder	N/A	N/A	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 CD	TP-1718	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 CD	TP-1719	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1383	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 CD	TP-1644	NCR	NCR
Agilent	Network Analyzer	E5071C	MY46101588	May. 11, 2012	May. 10, 2013
Agilent	ESG Vector Series Signal Generator	E4438C	MY49070755	Oct. 02, 2012	Oct. 01, 2013
Anritsu	Power Meter	ML2495A	1132003	Aug. 14, 2012	Aug. 13, 2013
Anritsu	Radio Communication Analyzer	MT8820C	6201074414	Dec. 21, 2011	Dec. 20, 2012
Agilent	Dual Directional Coupler	778D	50422	NCR	NCR
Woken	Attenuator	WK0602-XX	N/A	NCR	NCR
AR	Power Amplifier	5S1G4M2	0328767	NCR	NCR
R&S	Spectrum Analyzer	FSP	101131	Jul. 23, 2012	Jul. 22, 2013

Table 5.1 Test Equipment List

Note:
1. The calibration certificate of DASY can be referred to appendix C of this report.
2. Referring to 865664 D01v01, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
3. The justification data of dipole D750V3, SN: 1012, D835V2, SN: 499, D1900V2, SN: 5d041, D2450V2, SN: 736 can be found in appendix C. The return loss is < -20dB, within 20% of prior calibration, the impedance is within 5 ohm of prior calibration.

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 head SAR testing, the liquid height from the ear reference point (ERP) of the phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 6.1. For body SAR testing, the liquid height from the center of the flat phantom to the liquid top surface is larger than 15 cm, which is shown in Fig. 6.2.

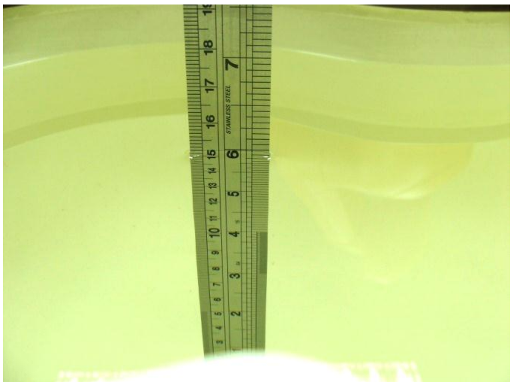


Fig 6.1 Photo of Liquid Height for Head SAR

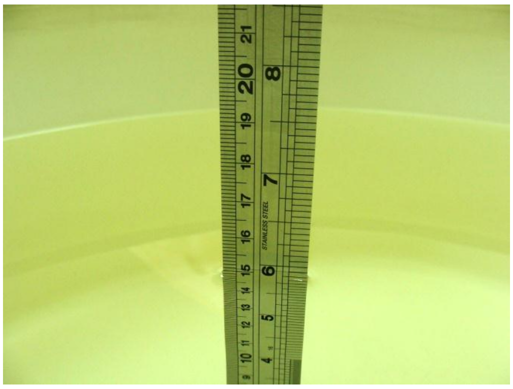


Fig 6.2 Photo of Liquid Height for Body SAR

The following table gives the recipes for tissue simulating liquid.

Frequency (MHz)	Water (%)	Sugar (%)	Cellulose (%)	Salt (%)	Preventol (%)	DGBE (%)	Conductivity (σ)	Permittivity (ε_r)
For Head								
750	41.1	57.0	0.2	1.4	0.2	0	0.89	41.9
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800, 1900, 2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
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 Agilent 85070D Dielectric Probe Kit and an Agilent Network Analyzer.

The following table shows the measuring results for simulating liquid.

Freq. (MHz)	Liquid Type	Temp. (℃)	Conductivity (σ)	Permittivity (ε_r)	Conductivity Target (σ)	Permittivity Target (ε_r)	Delta (σ) (%)	Delta (ε_r) (%)	Limit (%)	Date
750	Head	21.6	0.888	40.879	0.89	41.9	-0.22	-2.44	±5	2012/12/8
750	Body	21.3	0.961	53.917	0.96	55.5	0.10	-2.85	±5	2012/12/8
835	Head	21.6	0.894	41.661	0.9	41.5	-0.67	0.39	±5	2012/11/29
835	Head	21.6	0.899	40.548	0.9	41.5	-0.11	-2.29	±5	2012/12/8
835	Body	21.6	0.963	53.612	0.97	55.2	-0.72	-2.88	±5	2012/11/24
835	Body	21.4	0.963	54.572	0.97	55.2	-0.72	-1.14	±5	2012/12/7
1750	Head	21.5	1.381	40.07	1.4	40	-1.36	0.18	±5	2012/12/6
1750	Body	21.2	1.541	51.611	1.52	53.3	1.38	-3.17	±5	2012/12/7
1900	Head	21.2	1.446	38.297	1.4	40	3.29	-4.26	±5	2012/11/29
1900	Head	21.3	1.438	39.21	1.4	40	2.71	-1.98	±5	2012/12/4
1900	Body	21.4	1.523	54.798	1.52	53.3	0.20	2.81	±5	2012/11/27
1900	Body	21.2	1.53	52.859	1.52	53.3	0.66	-0.83	±5	2012/12/7
2450	Head	21.4	1.836	39.308	1.8	39.2	2.00	0.28	±5	2012/11/27
2450	Body	21.5	2.005	53.959	1.95	52.7	2.82	2.39	±5	2012/11/27

Table 6.2 Measuring Results for Simulating Liquid

7. SAR Measurement Evaluation

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:

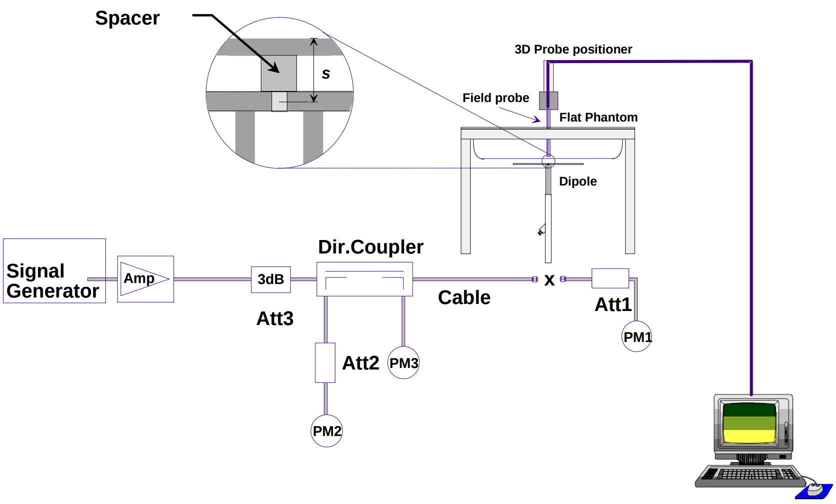


Fig 7.1 System Setup for System Evaluation

Fig 7.2 Photo of Dipole Setup

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

The output power on dipole port must be calibrated to 24 dBm (250 mW) before dipole is connected.

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.

Measurement Date	Frequency (MHz)	Liquid Type	Input power fed to dipole (mW)	Targeted SAR_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	Normalized SAR_{1g} (W/kg)	Deviation (%)
2012/12/8	750	Head	250	8.28	2.02	8.08	-2.42
2012/12/8	750	Body	250	8.86	2.23	8.92	0.68
2012/11/29	835	Head	250	9.71	2.44	9.76	0.51
2012/12/8	835	Head	250	9.71	2.32	9.28	-4.43
2012/11/24	835	Body	250	9.82	2.45	9.80	-0.20
2012/12/7	835	Body	250	9.82	2.37	9.48	-3.46
2012/12/6	1750	Head	250	36.1	8.34	33.36	-7.59
2012/12/7	1750	Body	250	36.8	8.67	34.68	-5.76
2012/11/29	1900	Head	250	39.8	9.19	36.76	-7.64
2012/12/4	1900	Head	250	39.8	10.4	41.60	4.52
2012/11/27	1900	Body	250	40	10.1	40.40	1.00
2012/12/7	1900	Body	250	40	9.58	38.32	-4.20
2012/11/27	2450	Head	250	54.8	13	52.00	-5.11
2012/11/27	2450	Body	250	52.3	14	56.00	7.07

Table 7.1 Target and Measurement SAR after Normalized

8. EUT Testing Position

8.1 Define two imaginary lines on the handset

(a) The vertical centerline passes through two points on the front side of the handset - the midpoint of the width w_t of the handset at the level of the acoustic output, and the midpoint of the width w_b of the bottom of the handset.

(b) The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.

(c) The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output; however, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.

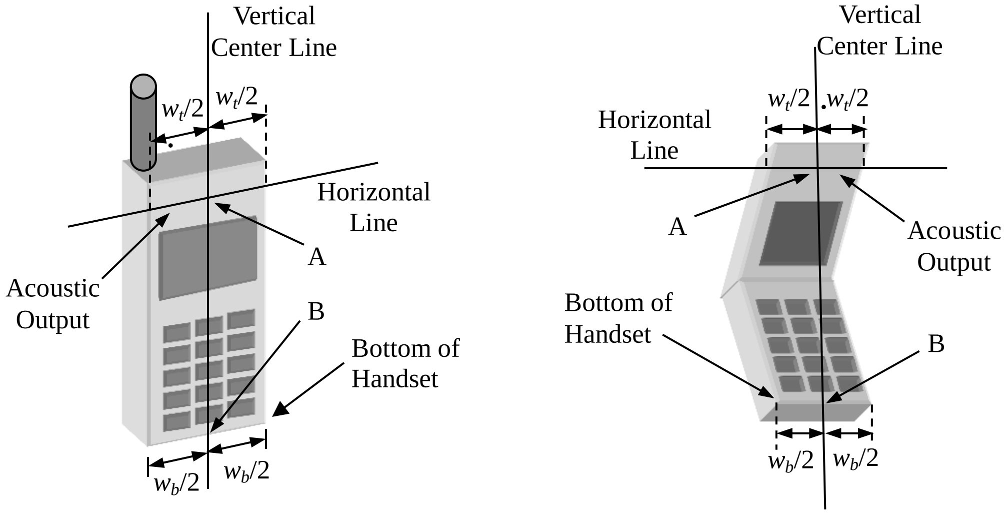


Fig 8.1 Illustration for Handset Vertical and Horizontal Reference Lines

8.2 Cheek Position

(a) To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the three ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.

(b) To move the device towards the phantom with the ear piece aligned with the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost (see Fig. 8.2).

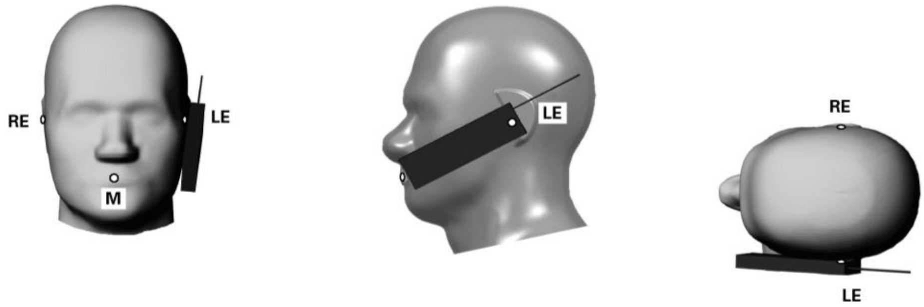


Fig 8.2 Illustration for Cheek Position

8.3 Tilted Position

(a) To position the device in the “cheek” position described above.

(b) While maintaining the device the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost (see Fig. 8.3).

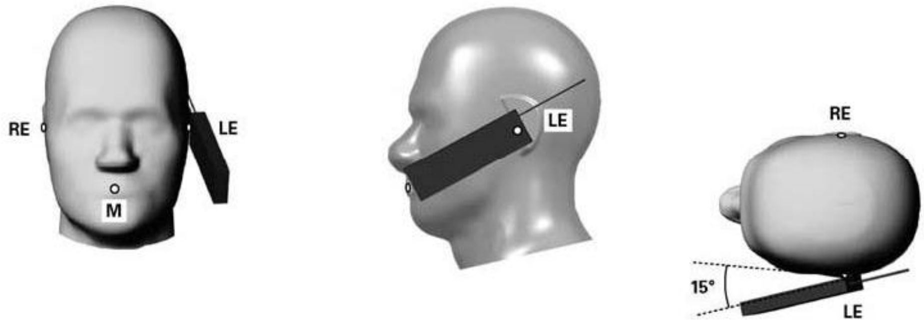


Fig 8.3 Illustration for Tilted Position

8.4 Body Worn Position

(a) To position the device parallel to the phantom surface with either keypad up or down.
(b) To adjust the device parallel to the flat phantom.
(c) To adjust the distance between the device surface and the flat phantom to 1 cm.

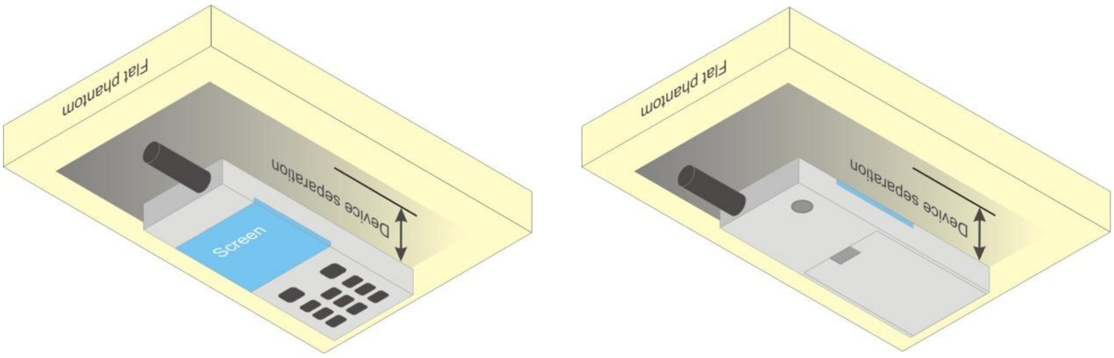


Fig 8.4 Illustration for Body Worn Position

8.5 Hotspot Position

(a) To position the device parallel to the phantom surface with all sides and either keypad up or down.
(b) To adjust the device parallel to the flat phantom.
(c) To adjust the distance between the device and the flat phantom to 1.0cm.

<EUT Setup Photos>

Please refer to Appendix E 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 E 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 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 D01v01 quoted below.

<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>

9.3 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.

9.4 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.

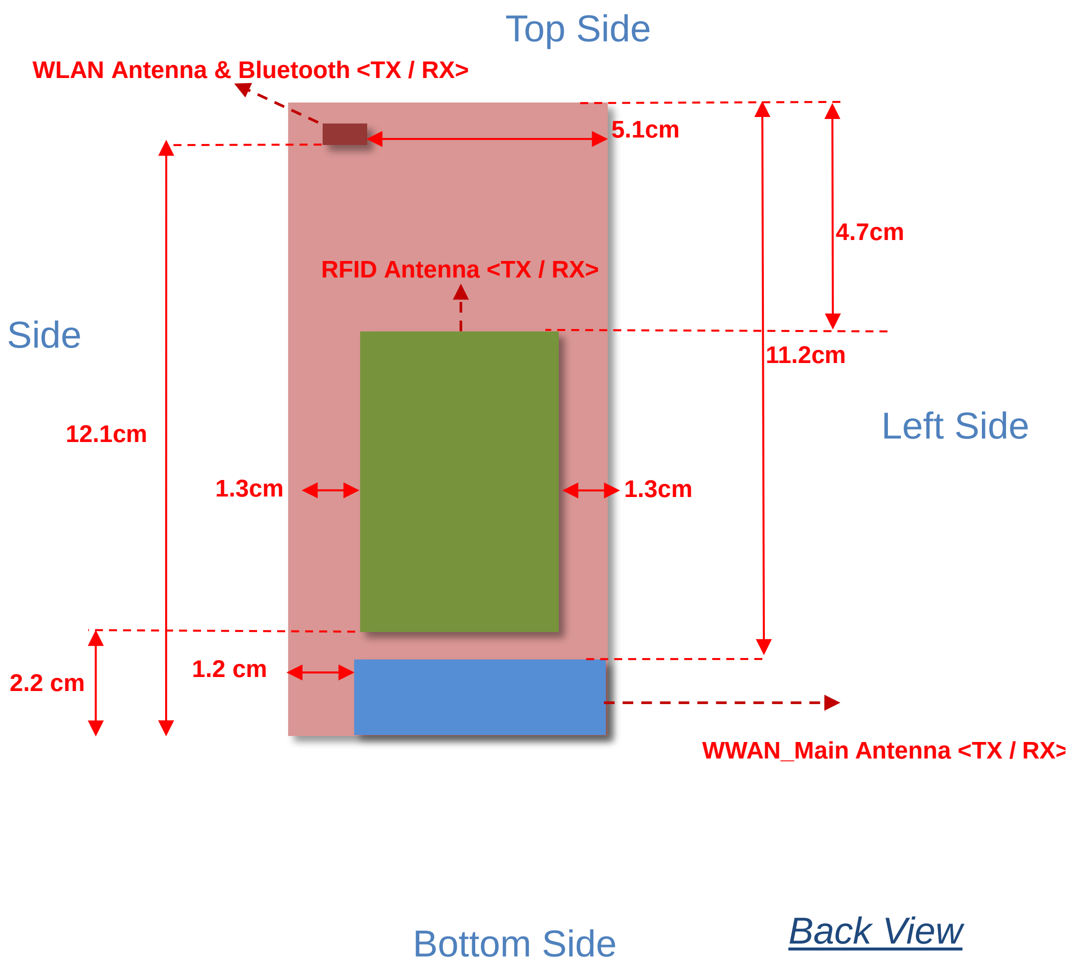
Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. The uncertainty increases with the extrapolation distance. To keep the uncertainty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

9.5 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. SAR Test Configurations

10.1 Exposure Positions Consideration



Back View

Antennas	Wireless Interface
WWAN Main Antenna (Tx / Rx)	GSM 850 GSM 1900 WCDMA Band V WCDMA Band II LTE: band 17/5/4/2
BT&WLAN Antenna (Tx / Rx)	WLAN 2.4GHz Bluetooth
NFC Antenna(Tx/Rx)	NFC

Sides for SAR tests; Hotspot mode Test distance: 10 mm						
Antennas	**Back**	**Front**	**Top Side**	**Bottom Side**	**Right Side**	**Left Side**
WWAN Main	YES	YES	NO	YES	YES	YES
BT&WLAN	YES	YES	YES	NO	YES	NO

Note:

1. Head/Body-worn/Hotspot mode SAR assessments are required.
2. Referring to KDB 941225 D06, when the overall device length and width are ≥ 9cm*5cm, the test distance is 10 mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
3. For WWAN Main antenna, SAR measurements at Top side are not required since the distance between the transmitting antenna and surface of device is > 25mm.
4. For BT&WLAN antenna, SAR measurements Bottom/Left side are not required since the distance between the transmitting antenna and surface of device is > 25mm.
5. Base on KDB 447498 D01 v05, BT SAR is excluded as below table.

	Wireless Interface	Bluetooth
Tune-up Maximum power (dBm)		3
Tune-up Maximum rated power (mW)		2.00
Head	Antenna to user (mm)	5
	SAR exclusion threshold (mW)	10
	SAR testing required?	**NO**
Body	Antenna to user (mm)	10
	SAR exclusion threshold (mW)	19
	SAR testing required?	**NO**

10.2 Conducted RF Output Power (Unit: dBm)

<GSM Conducted 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
GSM (GMSK, 1 Tx slot)	33.20	33.01	33.13	24.20	24.01	24.13
GPRS (GMSK, 1 Tx slot) – CS1	33.17	32.99	33.10	24.17	23.99	24.10
GPRS (GMSK, 2 Tx slots) – CS1	33.05	32.81	32.95	27.05	26.81	26.95
EDGE (GMSK, 1 Tx slot) – MCS1	33.16	32.98	33.09	24.16	23.98	24.09
EDGE (GMSK, 2 Tx slots) – MCS1	33.02	32.80	32.92	27.02	26.80	26.92
EDGE (8PSK, 1 Tx slot) – MCS5	26.99	26.91	26.94	17.99	17.91	17.94
EDGE (8PSK, 2 Tx slots) – MCS5	26.80	26.74	26.78	20.80	20.74	20.78

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

Note:
1. For Head SAR testing, GSM should be evaluated, therefore the EUT was set in GSM Voice for GSM850 due to its highest frame-average power.
2. For Hotspot SAR testing, GPRS and EDGE should be evaluated, therefore the EUT was set in GPRS 2 Tx slots for GSM850 due to its highest frame-average power.
3. For Body-worn SAR testing, GSM should be evaluated, therefore the EUT was set in GSM Voice for GSM850 due to its highest frame-average power.
4. Per KDB 447498 D01v05, the maximum output power channel is used for SAR testing and for further SAR test reduction.
5. The EUT do not support DTM function.

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
GSM (GMSK, 1 Tx slot)	30.06	29.88	29.87	21.06	20.88	20.87
GPRS (GMSK, 1 Tx slot) – CS1	30.04	29.87	29.86	21.04	20.87	20.86
GPRS (GMSK, 2 Tx slots) – CS1	29.89	29.74	29.76	23.89	23.74	23.76
EDGE (GMSK, 1 Tx slot) – MCS1	30.02	29.86	29.86	21.02	20.86	20.86
EDGE (GMSK, 2 Tx slots) – MCS1	29.86	29.72	29.75	23.86	23.72	23.75
EDGE (8PSK, 1 Tx slot) – MCS5	26.06	26.10	26.08	17.06	17.10	17.08
EDGE (8PSK, 2 Tx slots) – MCS5	25.88	25.94	25.89	19.88	19.94	19.89

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

Note:
1. For Head SAR testing, GSM should be evaluated, therefore the EUT was set in GSM Voice for GSM1900 due to its highest frame-average power.
2. For Hotspot SAR testing, GPRS and EDGE should be evaluated, therefore the EUT was set in GPRS 2 Tx slots for GSM1900 due to its highest frame-average power.
3. For Body-worn SAR testing, GSM should be evaluated, therefore the EUT was set in GSM Voice for GSM1900 due to its highest frame-average power.
4. Per KDB 447498 D01v05, the maximum output power channel is used for SAR testing and for further SAR test reduction.
5. The EUT do not support DTM function.

<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 referred to the drawing of 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 β_{hs} = 30/15 * β_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 β_{hs} = 30/15 * β_c, and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_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 referred to the drawing of 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

WCDMA Average power (dBm)							
Band		WCDMA Band V			WCDMA Band II		
Channel		4132	4182	4233	9262	9400	9538
Frequency (MHz)		826.4	836.4	846.6	1852.4	1880.0	1907.6
3GPP Rel 99	AMR 12.2K	23.40	23.27	23.57	23.08	23.21	22.64
3GPP Rel 99	RMC 12.2K	23.50	23.32	23.61	23.10	23.30	22.68
3GPP Rel 6	HSDPA Subtest-1	23.45	23.30	23.56	23.08	23.27	22.61
3GPP Rel 6	HSDPA Subtest-2	23.46	23.31	23.58	23.06	23.27	22.51
3GPP Rel 6	HSDPA Subtest-3	23.04	22.81	23.12	22.58	22.79	22.12
3GPP Rel 6	HSDPA Subtest-4	23.06	22.83	23.08	22.60	22.78	22.09
3GPP Rel 6	HSUPA Subtest-1	22.80	22.73	22.92	22.70	22.99	22.32
3GPP Rel 6	HSUPA Subtest-2	21.86	21.65	21.72	21.39	21.48	21.11
3GPP Rel 6	HSUPA Subtest-3	22.43	22.13	21.87	21.82	22.18	21.37
3GPP Rel 6	HSUPA Subtest-4	21.57	21.85	21.95	21.31	21.43	21.07
3GPP Rel 6	HSUPA Subtest-5	23.48	23.27	23.54	23.07	23.21	22.69

MPR (dB)								
3GPP MPR	Subtest		WCDMA Band V			WCDMA Band II		
0	3GPP Rel 6	HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00
0	3GPP Rel 6	HSDPA Subtest-2	-0.01	-0.01	-0.02	0.02	0.00	0.10
≤ 0.5	3GPP Rel 6	HSDPA Subtest-3	0.41	0.49	0.44	0.50	0.48	0.49
≤ 0.5	3GPP Rel 6	HSDPA Subtest-4	0.39	0.47	0.48	0.48	0.49	0.52
0	3GPP Rel 6	HSUPA Subtest-1	0.68	0.54	0.62	0.37	0.22	0.37
≤ 2	3GPP Rel 6	HSUPA Subtest-2	1.62	1.62	1.82	1.68	1.73	1.58
≤ 1	3GPP Rel 6	HSUPA Subtest-3	1.05	1.14	1.67	1.25	1.03	1.32
≤ 2	3GPP Rel 6	HSUPA Subtest-4	1.91	1.42	1.59	1.76	1.78	1.62
0	3GPP Rel 6	HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0.00

Note:

1. Applying the subtest setup in Table C.11.1.3 of 3GPP TS 34.121-1 V9.1.0 to Rel. 6 HSPA.
2. Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA output power is < 0.25dB higher than RMC, HSDPA/HSUPA SAR evaluation can be excluded.
3. By design, HSDPA/HSUPA RF power will not be larger than RMC 12.2kbps, detailed information is included in Tune-up Procure exhibit.
4. It is expected by the manufacturer that MPR for some HSDPA/HSUPA subtests may differ from the specification of 3GPP, according to the chipset implementation in this model. The implementation and expected deviation are detailed in tune-up procedure exhibit.
5. By design, AMR, HSDPA/HSUPA and RF power will not be larger than RMC 12.2kbps, detailed information is included in Tune-up Procure exhibit.
6. It is expected by the manufacturer that MPR for some HSDPA/HSUPA, subtests may differ from the specification of 3GPP, according to the chipset implementation in this model. The implementation and expected deviation are detailed in tune-up procedure exhibit.

<LTE Band 2 Conducted Power >

BW [MHz]	Mod / RB (Size - Offset)	Average Power. (dBm)			3GPP MPR	MPR Result (dB)		
		Low Ch	Mid Ch	High Ch		Low Ch	Mid Ch	High Ch
	Channel	18700	18900	19100		18700	18900	19100
	Frequency (MHz)	1860	1880	1900		1860	1880	1900
20	QPSK 1-0	23.74	**23.96**	23.66	0	0.16	0.00	0.24
20	QPSK 1-49	23.90	23.69	23.90		0.00	0.27	0.00
20	QPSK 1-99	23.82	23.50	23.57		0.08	0.46	0.33
20	QPSK 50-0	22.76	22.89	22.71	≤ 1	1.14	1.07	1.19
20	QPSK 50-24	22.71	22.81	22.70		1.19	1.15	1.20
20	QPSK 50-49	22.71	22.91	22.72		1.19	1.05	1.18
20	QPSK100-0	22.72	22.83	22.72		1.18	1.13	1.18
20	16QAM 1-0	22.70	22.78	23.02	≤ 1	1.20	1.18	0.88
20	16QAM 1-49	22.85	22.77	22.80		1.05	1.19	1.10
20	16QAM 1-99	22.76	22.77	22.74		1.14	1.19	1.16
20	16QAM 50-0	21.72	21.77	21.82	≤ 2	2.18	2.19	2.08
20	16QAM 50-24	21.81	21.78	21.74		2.09	2.18	2.16
20	16QAM 50-49	21.78	21.78	21.84		2.12	2.18	2.06
20	16QAM 100-0	21.75	21.92	21.84		2.15	2.04	2.06
	Channel	18675	18900	19125		18675	18900	19125
	Frequency (MHz)	1857.5	1880	1902.5		1857.5	1880	1902.5
15	QPSK 1-0	23.65	23.82	23.35	0	0.10	0.00	0.29
15	QPSK 1-37	23.75	23.70	23.64		0.00	0.12	0.00
15	QPSK 1-74	23.64	23.52	23.43		0.11	0.30	0.21
15	QPSK 36-0	23.42	23.44	23.27	≤ 1	0.33	0.38	0.37
15	QPSK 36-19	23.42	23.47	23.27		0.33	0.35	0.37
15	QPSK 36-39	23.44	23.49	23.17		0.31	0.33	0.47
15	QPSK 75-0	22.59	22.64	22.46		1.16	1.18	1.18
15	16QAM 1-0	22.58	22.65	22.46	≤ 1	1.17	1.17	1.18
15	16QAM 1-37	22.84	22.74	22.47		0.91	1.08	1.17
15	16QAM 1-74	22.85	22.65	22.54		0.90	1.17	1.10
15	16QAM 38-0	22.44	22.44	22.30	≤ 2	1.31	1.38	1.34
15	16QAM 38-18	22.39	22.48	22.27		1.36	1.34	1.37
15	16QAM 38-37	22.29	22.45	22.32		1.46	1.37	1.32
15	16QAM 75-0	21.55	21.69	21.47		2.20	2.13	2.17
	Channel	18650	18900	19150		18650	18900	19150
	Frequency (MHz)	1855	1880	1905		1855	1880	1905
10	QPSK 1-0	23.58	23.70	23.63	0	0.36	0.22	0.28
10	QPSK 1-24	23.94	23.92	23.91		0.00	0.00	0.00
10	QPSK 1-49	23.93	23.82	23.68		0.01	0.10	0.23
10	QPSK 25-0	22.88	22.77	22.93	≤ 1	1.06	1.15	0.98
10	QPSK 25-12	22.75	22.74	22.74		1.19	1.18	1.17
10	QPSK 25-24	22.83	22.73	22.83		1.11	1.19	1.08
10	QPSK 50-0	22.81	22.74	22.81		1.13	1.18	1.10
10	16QAM 1-0	22.79	22.74	22.78	≤ 1	1.15	1.18	1.13
10	16QAM 1-24	22.78	22.97	23.03		1.16	0.95	0.88
10	16QAM 1-49	23.09	22.96	22.72		0.85	0.96	1.19
10	16QAM 25-0	21.76	21.82	21.71	≤ 2	2.18	2.10	2.20
10	16QAM 25-12	21.80	21.83	21.75		2.14	2.09	2.16
10	16QAM 25-24	21.83	21.92	21.74		2.11	2.00	2.17
10	16QAM 50-0	21.75	21.79	21.78		2.19	2.13	2.13
	Channel	18625	18900	19175		18625	18900	19175
	Frequency (MHz)	1852.5	1880	1907.5		1852.5	1880	1907.5
5	QPSK 1-0	23.47	23.87	23.63	0	0.27	0.09	0.27
5	QPSK 1-12	23.74	23.75	23.90		0.00	0.21	0.00
5	QPSK 1-24	23.73	**23.96**	23.49		0.01	0.00	0.41
5	QPSK 12-0	22.95	22.90	22.81	≤ 1	0.79	1.06	1.09
5	QPSK 12-6	22.69	22.79	22.79		1.05	1.17	1.11
5	QPSK 12-11	22.77	22.84	22.74		0.97	1.12	1.16
5	QPSK 25-0	22.69	22.79	22.72		1.05	1.17	1.18
5	16QAM 1-0	22.69	23.11	23.17	≤ 1	1.05	0.85	0.73
5	16QAM 1-12	23.12	22.87	22.82		0.62	1.09	1.08
5	16QAM 1-24	22.77	22.82	22.76		0.97	1.14	1.14
5	16QAM 12-0	21.88	21.79	21.79	≤ 2	1.86	2.17	2.11
5	16QAM 12-6	21.88	21.80	21.94		1.86	2.16	1.96
5	16QAM 12-11	21.88	21.79	21.76		1.86	2.17	2.14
5	16QAM 25-0	21.64	21.80	21.78		2.10	2.16	2.12

	Channel	18615	18900	19185		18615	18900	19185
	Frequency (MHz)	1851.5	1880	1908.5		1851.5	1880	1908.5
3	QPSK 1-0	23.28	23.53	23.64	0	0.35	0.34	0.00
3	QPSK 1-7	23.58	23.57	23.60		0.05	0.30	0.04
3	QPSK 1-14	23.63	23.87	23.43		0.00	0.00	0.21
3	QPSK 8-0	22.72	22.85	22.81	≤ 1	0.91	1.02	0.83
3	QPSK 8-4	22.62	22.83	22.50		1.01	1.04	1.14
3	QPSK 8-7	22.58	22.77	22.55		1.05	1.10	1.09
3	QPSK 15-0	22.46	22.74	22.51		1.17	1.13	1.13
3	16QAM 1-0	22.68	23.16	22.89	≤ 1	0.95	0.71	0.75
3	16QAM 1-7	22.45	22.69	22.48		1.18	1.18	1.16
3	16QAM 1-14	22.56	22.73	22.45		1.07	1.14	1.19
3	16QAM 8-0	21.54	21.68	21.67	≤ 2	2.09	2.19	1.97
3	16QAM 8-4	21.66	21.69	21.48		1.97	2.18	2.16
3	16QAM 8-7	21.67	21.75	21.44		1.96	2.12	2.20
3	16QAM 15-0	21.49	21.73	21.58		2.14	2.14	2.06
	Channel	18607	18900	19193		18607	18900	19193
	Frequency (MHz)	1850.7	1880	1909.3		1850.7	1880	1909.3
1.4	QPSK 1-0	23.62	23.69	23.48	0	0.08	0.06	0.06
1.4	QPSK 1-2	23.59	23.59	23.35		0.11	0.16	0.19
1.4	QPSK 1-5	23.70	23.58	23.30		0.00	0.17	0.24
1.4	QPSK 3-0	23.53	23.54	23.29		0.17	0.21	0.25
1.4	QPSK 3-1	23.59	23.75	23.54		0.11	0.00	0.00
1.4	QPSK 3-2	23.59	23.71	23.52		0.11	0.04	0.02
1.4	QPSK 6-0	22.61	22.79	22.58	≤ 1	1.09	0.96	0.96
1.4	16QAM 1-0	22.60	22.89	22.83	≤ 1	1.10	0.86	0.71
1.4	16QAM 1-2	22.55	23.02	22.68		1.15	0.73	0.86
1.4	16QAM 1-5	22.57	22.82	22.41		1.13	0.93	1.13
1.4	16QAM 3-0	22.57	22.58	22.34		1.13	1.17	1.20
1.4	16QAM 3-1	22.53	22.78	22.56		1.17	0.97	0.98
1.4	16QAM 3-2	22.72	22.89	22.47		0.98	0.86	1.07
1.4	16QAM 6-0	21.54	21.59	21.48	≤ 2	2.16	2.16	2.06

Note:

1. Per KDB 941225 D05v02, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and *required test channel* combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each *required test channel*.
2. Per KDB 941225 D05v02, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure
3. 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK
4. Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth

<LTE Band 4 Conducted Power >

BW [MHz]	Mod / RB (Size - Offset)	Average Power. (dBm)			3GPP MPR	MPR Result (dB)		
		Low Ch	Mid Ch	High Ch		Low Ch	Mid Ch	High Ch
	Channel	20050	20175	20300		20050	20175	20300
	Frequency (MHz)	1720	1732.5	1745		1720	1732.5	1745
20	QPSK 1-0	23.94	23.99	23.71	0	0.02	0.00	0.18
20	QPSK 1-49	23.96	23.98	23.89		0.00	0.01	0.00
20	QPSK 1-99	23.69	23.72	23.66		0.27	0.27	0.23
20	QPSK 50-0	23.00	23.01	23.18	≤ 1	0.96	0.98	0.71
20	QPSK 50-24	22.98	23.02	23.16		0.98	0.97	0.73
20	QPSK 50-49	22.97	23.05	23.17		0.99	0.94	0.72
20	QPSK100-0	22.99	23.00	23.20		0.97	0.99	0.69
20	16QAM 1-0	22.88	22.98	22.77	≤ 1	1.08	1.01	1.12
20	16QAM 1-49	22.94	22.93	22.74		1.02	1.06	1.15
20	16QAM 1-99	22.96	22.95	22.70		1.00	1.04	1.19
20	16QAM 50-0	21.96	21.81	21.74	≤ 2	2.00	2.18	2.15
20	16QAM 50-24	21.83	21.80	21.78		2.13	2.19	2.11
20	16QAM 50-49	21.79	21.83	21.75		2.17	2.16	2.14
20	16QAM 100-0	21.84	21.84	21.77		2.12	2.15	2.12
	Channel	20025	20175	20325		20025	20175	20325
	Frequency (MHz)	1717.5	1732.5	1747.5		1717.5	1732.5	1747.5
15	QPSK 1-0	23.98	23.93	23.88	0	0.00	0.00	0.00
15	QPSK 1-37	23.94	23.82	23.73		0.04	0.11	0.15
15	QPSK 1-74	23.83	23.76	23.68		0.15	0.17	0.20
15	QPSK 36-0	23.49	23.48	23.48	≤ 1	0.49	0.45	0.40
15	QPSK 36-19	23.44	23.40	23.44		0.54	0.53	0.44
15	QPSK 36-39	23.47	23.41	23.45		0.51	0.52	0.43
15	QPSK 75-0	23.47	23.38	23.41		0.51	0.55	0.47
15	16QAM 1-0	22.98	22.90	22.93	≤ 1	1.00	1.03	0.95
15	16QAM 1-37	22.97	22.95	22.84		1.01	0.98	1.04
15	16QAM 1-74	22.95	22.96	22.71		1.03	0.97	1.17
15	16QAM 38-0	21.98	21.96	21.89	≤ 2	2.00	1.97	1.99
15	16QAM 38-18	21.98	21.95	21.96		2.00	1.98	1.92
15	16QAM 38-37	21.99	21.97	21.97		1.99	1.96	1.91
15	16QAM 75-0	21.97	21.93	21.95		2.01	2.00	1.93
	Channel	20000	20175	20350		20000	20175	20350
	Frequency (MHz)	1715	1732.5	1750		1715	1732.5	1750
10	QPSK 1-0	23.80	23.81	23.81	0	0.18	0.06	0.00
10	QPSK 1-24	23.98	23.87	23.62		0.00	0.00	0.19
10	QPSK 1-49	23.83	23.61	23.66		0.15	0.26	0.15
10	QPSK 25-0	23.12	23.33	23.18	≤ 1	0.86	0.54	0.63
10	QPSK 25-12	23.02	23.28	23.21		0.96	0.59	0.60
10	QPSK 25-24	23.01	23.25	23.24		0.97	0.62	0.57
10	QPSK 50-0	23.03	23.29	23.22		0.95	0.58	0.59
10	16QAM 1-0	22.82	22.99	22.77	≤ 1	1.16	0.88	1.04
10	16QAM 1-24	22.81	22.75	22.64		1.17	1.12	1.17
10	16QAM 1-49	22.80	22.69	22.63		1.18	1.18	1.18
10	16QAM 25-0	21.88	21.87	21.69	≤ 2	2.10	2.00	2.12
10	16QAM 25-12	21.87	21.84	21.76		2.11	2.03	2.05
10	16QAM 25-24	21.81	21.83	21.70		2.17	2.04	2.11
10	16QAM 50-0	21.79	21.88	21.65		2.19	1.99	2.16
	Channel	19975	20175	20375		19975	20175	20375
	Frequency (MHz)	1712.5	1732.5	1752.5		1712.5	1732.5	1752.5
5	QPSK 1-0	23.98	23.78	23.66	0	0.00	0.08	0.05
5	QPSK 1-12	23.92	23.86	23.71		0.06	0.00	0.00
5	QPSK 1-24	23.93	23.80	23.66		0.05	0.06	0.05
5	QPSK 12-0	23.11	22.96	22.86	≤ 1	0.87	0.90	0.85
5	QPSK 12-6	23.20	23.36	22.98		0.78	0.50	0.73
5	QPSK 12-11	23.09	23.35	22.89		0.89	0.51	0.82
5	QPSK 25-0	23.05	23.32	23.20		0.93	0.54	0.51
5	16QAM 1-0	22.91	22.88	22.67	≤ 1	1.07	0.98	1.04
5	16QAM 1-12	22.94	22.87	22.76		1.04	0.99	0.95
5	16QAM 1-24	22.97	22.78	22.69		1.01	1.08	1.02
5	16QAM 12-0	21.97	21.92	21.81	≤ 2	2.01	1.94	1.90
5	16QAM 12-6	21.95	21.91	21.80		2.03	1.95	1.91
5	16QAM 12-11	21.96	21.94	21.73		2.02	1.92	1.98
5	16QAM 25-0	21.87	21.74	21.58		2.11	2.12	2.13

	Channel	19965	20175	20385		19965	20175	20385
	Frequency (MHz)	1711.5	1732.5	1753.5		1711.5	1732.5	1753.5
3	QPSK 1-0	23.91	23.85	23.70	0	0.07	0.00	0.05
3	QPSK 1-7	23.98	23.68	23.75		0.00	0.17	0.00
3	QPSK 1-14	23.83	23.84	23.64		0.15	0.01	0.11
3	QPSK 8-0	23.09	22.96	22.84	≤ 1	0.89	0.89	0.91
3	QPSK 8-4	22.99	23.22	23.19		0.99	0.63	0.56
3	QPSK 8-7	23.12	23.21	23.27		0.86	0.64	0.48
3	QPSK 15-0	22.98	23.19	23.25		1.00	0.66	0.50
3	16QAM 1-0	22.95	22.90	22.75	≤ 1	1.03	0.95	1.00
3	16QAM 1-7	22.97	22.80	22.72		1.01	1.05	1.03
3	16QAM 1-14	22.95	22.77	22.70		1.03	1.08	1.05
3	16QAM 8-0	21.87	21.80	21.66	≤ 2	2.11	2.05	2.09
3	16QAM 8-4	21.96	21.95	21.63		2.02	1.90	2.12
3	16QAM 8-7	21.90	21.73	21.63		2.08	2.12	2.12
3	16QAM 15-0	21.80	21.86	21.63		2.18	1.99	2.12
	Channel	19957	20175	20393		19957	20175	20393
	Frequency (MHz)	1710.7	1732.5	1754.3		1710.7	1732.5	1754.3
1.4	QPSK 1-0	23.83	23.84	23.63	0	0.11	0.04	0.00
1.4	QPSK 1-2	23.90	23.82	23.61		0.04	0.06	0.02
1.4	QPSK 1-5	23.81	23.76	23.57		0.13	0.12	0.06
1.4	QPSK 3-0	23.86	23.87	23.62		0.08	0.01	0.01
1.4	QPSK 3-1	23.94	23.88	23.61		0.00	0.00	0.02
1.4	QPSK 3-2	23.81	23.79	23.60		0.13	0.09	0.03
1.4	QPSK 6-0	23.05	23.21	23.22	≤ 1	0.89	0.67	0.41
1.4	16QAM 1-0	22.90	22.89	22.85	≤ 1	1.04	0.99	0.78
1.4	16QAM 1-2	22.86	22.76	22.73		1.08	1.12	0.90
1.4	16QAM 1-5	22.84	22.92	22.66		1.10	0.96	0.97
1.4	16QAM 3-0	22.99	23.00	22.75		0.95	0.88	0.88
1.4	16QAM 3-1	22.98	22.86	22.66		0.96	1.02	0.97
1.4	16QAM 3-2	22.88	22.96	22.84		1.06	0.92	0.79
1.4	16QAM 6-0	21.75	21.80	21.49	≤ 2	2.19	2.08	2.14

Note:

1. Per KDB 941225 D05v02, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and *required test channel* combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each *required test channel*.
2. Per KDB 941225 D05v02, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure
3. 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK
4. Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth

<LTE Band 5 Conducted Power >

BW [MHz]	Mod / RB (Size - Offset)	Average Power. (dBm)			3GPP MPR	MPR Result (dB)		
		Low Ch	Mid Ch	High Ch		Low Ch	Mid Ch	High Ch
	Channel	20450	20525	20600		20450	20525	20600
	Frequency (MHz)	829	836.5	844		829	836.5	844
10	QPSK 1-0	23.35	23.37	23.23	0	0.18	0.21	0.29
10	QPSK 1-24	23.53	23.36	23.52		0.00	0.22	0.00
10	QPSK 1-49	23.35	23.58	23.51		0.18	0.00	0.01
10	QPSK 25-0	22.52	22.44	22.53	≤ 1	1.01	1.14	0.99
10	QPSK 25-12	22.50	22.61	22.36		1.03	0.97	1.16
10	QPSK 25-24	22.49	22.38	22.52		1.04	1.20	1.00
10	QPSK 50-0	22.42	22.40	22.39		1.11	1.18	1.13
10	16QAM 1-0	22.34	22.41	22.41	≤ 1	1.19	1.17	1.11
10	16QAM 1-24	22.75	22.53	22.44		0.78	1.05	1.08
10	16QAM 1-49	22.48	22.48	22.67		1.05	1.10	0.85
10	16QAM 25-0	21.53	21.57	21.47	≤ 2	2.00	2.01	2.05
10	16QAM 25-12	21.65	21.52	21.62		1.88	2.06	1.90
10	16QAM 25-24	21.60	21.55	21.64		1.93	2.03	1.88
10	16QAM 50-0	21.50	21.44	21.46		2.03	2.14	2.06
	Channel	20425	20525	20625		20425	20525	20625
	Frequency (MHz)	826.5	836.5	846.5		826.5	836.5	846.5
5	QPSK 1-0	23.23	23.22	23.52	0	0.28	0.22	0.00
5	QPSK 1-12	23.51	23.44	23.50		0.00	0.00	0.02
5	QPSK 1-24	23.50	23.42	23.48		0.01	0.02	0.04
5	QPSK 12-0	22.63	22.46	22.78	≤ 1	0.88	0.98	0.74
5	QPSK 12-6	22.49	22.43	22.55		1.02	1.01	0.97
5	QPSK 12-11	22.71	22.61	22.48		0.80	0.83	1.04
5	QPSK 25-0	22.55	22.53	22.50		0.96	0.91	1.02
5	16QAM 1-0	22.48	22.43	22.72	≤ 1	1.03	1.01	0.80
5	16QAM 1-12	22.73	22.56	22.93		0.78	0.88	0.59
5	16QAM 1-24	22.87	22.82	22.73		0.64	0.62	0.79
5	16QAM 12-0	21.52	21.58	21.70	≤ 2	1.99	1.86	1.82
5	16QAM 12-6	21.69	21.69	21.97		1.82	1.75	1.55
5	16QAM 12-11	21.97	21.66	21.77		1.54	1.78	1.75
5	16QAM 25-0	21.50	21.43	21.52		2.01	2.01	2.00
	Channel	20415	20525	20635		20415	20525	20635
	Frequency (MHz)	825.5	836.5	847.5		825.5	836.5	847.5
3	QPSK 1-0	23.32	23.46	23.57	0	0.25	0.04	0.00
3	QPSK 1-7	23.57	23.18	23.49		0.00	0.32	0.08
3	QPSK 1-14	23.57	23.50	23.43		0.00	0.00	0.14
3	QPSK 8-0	22.70	22.46	22.71	≤ 1	0.87	1.04	0.86
3	QPSK 8-4	22.58	22.50	22.57		0.99	1.00	1.00
3	QPSK 8-7	22.50	22.53	22.72		1.07	0.97	0.85
3	QPSK 15-0	22.49	22.40	22.64		1.08	1.10	0.93
3	16QAM 1-0	22.39	22.50	22.49	≤ 1	1.18	1.00	1.08
3	16QAM 1-7	22.96	22.61	22.72		0.61	0.89	0.85
3	16QAM 1-14	22.88	22.41	22.44		0.69	1.09	1.13
3	16QAM 8-0	21.78	21.32	21.72	≤ 2	1.79	2.18	1.85
3	16QAM 8-4	21.38	21.62	21.85		2.19	1.88	1.72
3	16QAM 8-7	21.57	21.31	21.81		2.00	2.19	1.76
3	16QAM 15-0	21.71	21.45	21.81		1.86	2.05	1.76
	Channel	20407	20525	20643		20407	20525	20643
	Frequency (MHz)	824.7	836.5	848.3		824.7	836.5	848.3
1.4	QPSK 1-0	23.53	23.44	23.50	0	0.00	0.13	0.06
1.4	QPSK 1-2	23.45	23.41	23.48		0.08	0.16	0.08
1.4	QPSK 1-5	23.45	23.57	23.56		0.08	0.00	0.00
1.4	QPSK 3-0	23.32	23.47	23.49		0.21	0.10	0.07
1.4	QPSK 3-1	23.37	23.53	23.55		0.16	0.04	0.01
1.4	QPSK 3-2	23.52	23.52	23.55		0.01	0.05	0.01
1.4	QPSK 6-0	22.59	22.50	22.66	≤ 1	0.94	1.07	0.90
1.4	16QAM 1-0	22.67	22.40	22.75	≤ 1	0.86	1.17	0.81
1.4	16QAM 1-2	22.43	22.43	22.61		1.10	1.14	0.95
1.4	16QAM 1-5	22.41	22.39	22.72		1.12	1.18	0.84
1.4	16QAM 3-0	22.59	22.59	22.62		0.94	0.98	0.94
1.4	16QAM 3-1	22.45	22.37	22.82		1.08	1.20	0.74
1.4	16QAM 3-2	22.47	22.59	22.60		1.06	0.98	0.96
1.4	16QAM 6-0	21.46	21.51	21.57	≤ 2	2.07	2.06	1.99

Note:
1. Per KDB 941225 D05v02, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and *required test channel* combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each *required test channel*.
2. Per KDB 941225 D05v02, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure
3. 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK
4. Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth

<LTE Band 17 Conducted Power >

BW [MHz]	Mod / RB (Size - Offset)	Average Power. (dBm)			3GPP MPR	MPR Result (dB)		
		Low Ch	Mid Ch	High Ch		Low Ch	Mid Ch	High Ch
	Channel	23780	23790	23800		23780	23790	23800
	Frequency (MHz)	709	710	711		709	710	711
10	QPSK 1-0	23.42	23.48	23.43		0.27	0.23	0.24
10	QPSK 1-24	23.61	23.67	23.67	0	0.08	0.04	0.00
10	QPSK 1-49	23.69	**23.71**	23.59		0.00	0.00	0.08
10	QPSK 25-0	22.61	22.57	22.50		1.08	1.14	1.17
10	QPSK 25-12	22.54	22.51	22.52	≤ 1	1.15	1.20	1.15
10	QPSK 25-24	22.60	22.55	22.51		1.09	1.16	1.16
10	QPSK 50-0	22.53	22.53	22.61		1.16	1.18	1.06
10	16QAM 1-0	22.57	22.56	22.73		1.12	1.15	0.94
10	16QAM 1-24	22.86	22.98	22.92	≤ 1	0.83	0.73	0.75
10	16QAM 1-49	22.95	22.60	22.82		0.74	1.11	0.85
10	16QAM 25-0	21.50	21.54	21.68		2.19	2.17	1.99
10	16QAM 25-12	21.57	21.67	21.63	≤ 2	2.12	2.04	2.04
10	16QAM 25-24	21.68	21.77	21.67		2.01	1.94	2.00
10	16QAM 50-0	21.59	21.53	21.50		2.10	2.18	2.17
	Channel	23755	23790	23825		23755	23790	23825
	Frequency (MHz)	706.5	710	713.5		706.5	710	713.5
5	QPSK 1-0	23.55	23.50	23.45		0.07	0.16	0.08
5	QPSK 1-12	23.48	23.59	23.53	0	0.14	0.07	0.00
5	QPSK 1-24	23.62	23.66	23.44		0.00	0.00	0.09
5	QPSK 12-0	22.78	22.53	22.60		0.84	1.13	0.93
5	QPSK 12-6	22.43	22.49	22.60	≤ 1	1.19	1.17	0.93
5	QPSK 12-11	22.58	22.61	22.62		1.04	1.05	0.91
5	QPSK 25-0	22.48	22.46	22.38		1.14	1.20	1.15
5	16QAM 1-0	22.54	22.52	22.39		1.08	1.14	1.14
5	16QAM 1-12	22.92	22.86	22.56	≤ 1	0.70	0.80	0.97
5	16QAM 1-24	22.44	22.57	22.76		1.18	1.09	0.77
5	16QAM 12-0	21.70	21.59	21.68		1.92	2.07	1.85
5	16QAM 12-6	21.54	21.66	21.58	≤ 2	2.08	2.00	1.95
5	16QAM 12-11	21.56	21.73	21.49		2.06	1.93	2.04
5	16QAM 25-0	21.57	21.49	21.35		2.05	2.17	2.18

Note:
1. Per KDB 941225 D05v02, start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and *required test channel* combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each *required test channel*.
2. Per KDB 941225 D05v02, 50% RB allocation for QPSK SAR testing follows 1RB QPSK allocation procedure
3. 16QAM output power for each RB allocation configuration is > not ½ dB higher than the same configuration in QPSK
4. Smaller bandwidth output power for each RB allocation configuration is > not ½ dB higher than the same configuration in the largest supported bandwidth

<WLAN 2.4GHz Conducted Power>

WLAN 2.4G 802.11b Average Power (dBm)						
Power vs. Channel			Power vs. Data Rate			
Channel	Frequency (MHz)	Data Rate (bps) 1M	Channel	Data Rate (bps) 2M	5.5M	11M
CH 01	2412	16.82	CH 06	16.87	17.08	17.09
CH 06	2437	16.90				
CH 11	2462	16.58				

WLAN 2.4G 802.11g Average Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	Data Rate (bps) 6M	Channel	Data Rate (bps) 9M	12M	18M	24M	36M	48M	54M
CH 01	2412	13.28	CH 6	13.33	13.36	13.37	13.35	13.36	13.35	13.34
CH 06	2437	13.38								
CH 11	2462	12.45								

WLAN 2.4G 802.11n (BW 20MHz) Average Power (dBm)										
Power vs. Channel			Power vs. Data Rate							
Channel	Frequency (MHz)	MCS Index MCS0	Channel	MCS Index MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
CH 01	2412	11.38	CH 6	11.45	11.43	11.42	11.41	11.42	11.43	11.43
CH 06	2437	11.46								
CH 11	2462	10.95								

Note:
1. Per KDB 248227, choose the highest output power channel to test SAR and determine further SAR exclusion
2. Per KDB 248227, 11g and 11n-HT20 output power is less than 0.25dB higher than 11b mode, thus the SAR can be excluded.
3. 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 0.25dB higher than those measured at the lowest data rate.

<Bluetooth Conducted Power>

Channel	Frequency (MHz)	Average power (dBm)		
		Mode		
		GFSK	π/4-DQPSK	8-DPSK
CH 0	2402	1.80	2.55	2.93
CH 39	2441	1.75	2.47	2.86
CH 78	2480	1.46	2.25	2.61

Channel	Frequency (MHz)	Average power (dBm)
		Mode
		BT v4.0 LE, GFSK
CH 0	2402	0.37
CH 19	2440	0.23
CH 39	2480	-0.23

11. SAR Test Results

11.1 Test Records for Head SAR Test

<General Note>

1. Per KDB 447498 D01v05, for each exposure position, if the highest output channel reported SAR <0.8W/kg, other channels SAR testing are not necessary.

<GSM SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
124	**GSM850**	**GSM Voice**	**Right Cheek**	**128**	**824.2**	**33.20**	**33.50**	**1.072**	**-0.02**	**0.452**	**0.484**
125	GSM850	GSM Voice	Right Tilted	128	824.2	33.20	33.50	1.072	0.03	0.306	0.328
126	GSM850	GSM Voice	Left Cheek	128	824.2	33.20	33.50	1.072	0.04	0.423	0.453
127	GSM850	GSM Voice	Left Tilted	128	824.2	33.20	33.50	1.072	-0.05	0.29	0.311
120	GSM1900	GSM Voice	Right Cheek	512	1850.2	30.06	30.50	1.107	-0.01	0.219	0.242
121	GSM1900	GSM Voice	Right Tilted	512	1850.2	30.06	30.50	1.107	-0.001	0.123	0.136
122	**GSM1900**	**GSM Voice**	**Left Cheek**	**512**	**1850.2**	**30.06**	**30.50**	**1.107**	**-0.01**	**0.399**	**0.442**
123	GSM1900	GSM Voice	Left Tilted	512	1850.2	30.06	30.50	1.107	-0.02	0.132	0.146

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
128	**WCDMA V**	**RMC12.2K**	**Right Cheek**	**4233**	**846.6**	**23.61**	**24.00**	**1.094**	**-0.05**	**0.464**	**0.508**
129	WCDMA V	RMC12.2K	Right Tilted	4233	846.6	23.61	24.00	1.094	-0.01	0.29	0.317
130	WCDMA V	RMC12.2K	Left Cheek	4233	846.6	23.61	24.00	1.094	0.02	0.435	0.476
131	WCDMA V	RMC12.2K	Left Tilted	4233	846.6	23.61	24.00	1.094	-0.04	0.273	0.299
114	WCDMA II	RMC12.2K	Right Cheek	9400	1880	23.30	24.00	1.175	-0.19	0.401	0.471
115	WCDMA II	RMC12.2K	Right Tilted	9400	1880	23.30	24.00	1.175	-0.01	0.245	0.288
116	WCDMA II	RMC12.2K	Left Cheek	9400	1880	23.30	24.00	1.175	0.07	0.77	0.905
117	**WCDMA II**	**RMC12.2K**	**Left Cheek**	**9262**	**1852.4**	**23.1**	**24.00**	**1.230**	**0.06**	**0.782**	**0.962**
118	WCDMA II	RMC12.2K	Left Cheek	9538	1907.6	22.68	24.00	1.355	0.01	0.638	0.865
119	WCDMA II	RMC12.2K	Left Tilted	9400	1880	23.30	24.00	1.175	-0.02	0.252	0.296

<LTE SAR>

Plot No.	Band	BW (MHZ)	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
201	LTE Band 17	10M	QPSK 1RB 49offset	Right Cheek	23790	710	23.71	24	1.069	0.09	0.383	0.409
202	LTE Band 17	10M	QPSK 25RB 0offset	Right Cheek	23780	709	22.61	23.5	1.227	-0.11	0.258	0.317
203	LTE Band 17	10M	QPSK 1RB 49offset	Right Tilted	23790	710	23.71	24	1.069	-0.02	0.213	0.228
204	LTE Band 17	10M	QPSK 25RB 0offset	Right Tilted	23780	709	22.61	23.5	1.227	0.01	0.146	0.179
205	**LTE Band 17**	**10M**	**QPSK 1RB 49offset**	**Left Cheek**	**23790**	**710**	**23.71**	**24**	**1.069**	**-0.16**	**0.414**	**0.443**
206	LTE Band 17	10M	QPSK 25RB 0offset	Left Cheek	23780	709	22.61	23.5	1.227	-0.06	0.278	0.341
207	LTE Band 17	10M	QPSK 1RB 49offset	Left Tilted	23790	710	23.71	24	1.069	0.03	0.214	0.229
208	LTE Band 17	10M	QPSK 25RB 0offset	Left Tilted	23780	709	22.61	23.5	1.227	0.02	0.149	0.183
193	LTE Band 5	10M	QPSK 1RB 49offset	Right Cheek	20525	836.5	23.58	24	1.102	-0.12	0.514	0.566
194	LTE Band 5	10M	QPSK 25RB 12offset	Right Cheek	20525	836.5	22.61	23.5	1.227	0.04	0.388	0.476
195	LTE Band 5	10M	QPSK 1RB 49offset	Right Tilted	20525	836.5	23.58	24	1.102	0.11	0.377	0.415
196	LTE Band 5	10M	QPSK 25RB 12offset	Right Tilted	20525	836.5	22.61	23.5	1.227	0.01	0.236	0.290
197	**LTE Band 5**	**10M**	**QPSK 1RB 49offset**	**Left Cheek**	**20525**	**836.5**	**23.58**	**24**	**1.102**	**-0.05**	**0.585**	**0.644**
198	LTE Band 5	10M	QPSK 25RB 12offset	Left Cheek	20525	836.5	22.61	23.5	1.227	-0.04	0.368	0.452
199	LTE Band 5	10M	QPSK 1RB 49offset	Left Tilted	20525	836.5	23.58	24	1.102	-0.03	0.353	0.389
200	LTE Band 5	10M	QPSK 25RB 12offse	Left Tilted	20525	836.5	22.61	23.5	1.227	0.02	0.214	0.263
143	LTE Band 4	20M	QPSK 1RB 0offset	Right Cheek	20175	1732.5	23.99	24	1.002	-0.154	0.376	0.377
144	LTE Band 4	20M	QPSK 50RB 0offset	Right Cheek	20300	1745	23.18	23.5	1.076	-0.01	0.324	0.349
145	LTE Band 4	20M	QPSK 1RB 0offset	Right Tilted	20175	1732.5	23.99	24	1.002	-0.132	0.168	0.168
146	LTE Band 4	20M	QPSK 50RB 0offset	Right Tilted	20300	1745	23.18	23.5	1.076	-0.02	0.155	0.167
147	**LTE Band 4**	**20M**	**QPSK 1RB 0offset**	**Left Cheek**	**20175**	**1732.5**	**23.99**	**24**	**1.002**	**0.18**	**0.638**	**0.639**
148	LTE Band 4	20M	QPSK 50RB 0offset	Left Cheek	20300	1745	23.18	23.5	1.076	0	0.563	0.606
149	LTE Band 4	20M	QPSK 1RB 0offset	Left Tilted	20175	1732.5	23.99	24	1.002	0.12	0.178	0.178
150	LTE Band 4	20M	QPSK 50RB 0offset	Left Tilted	20300	1745	23.18	23.5	1.076	0.04	0.17	0.183
132	LTE Band 2	20M	QPSK 1RB 0offset	Right Cheek	18900	1880	23.96	24	1.009	-0.08	0.499	0.504
133	LTE Band 2	20M	QPSK 50RB 0offset	Right Cheek	18900	1880	22.89	23.5	1.151	0.02	0.356	0.410
134	LTE Band 2	20M	QPSK 1RB 0offset	Right Tilted	18900	1880	23.96	24	1.009	0.18	0.31	0.313
135	LTE Band 2	20M	QPSK 50RB 0offset	Right Tilted	18900	1880	22.89	23.5	1.151	-0.02	0.229	0.264
136	LTE Band 2	20M	QPSK 1RB 0offset	Left Cheek	18900	1880	23.96	24	1.009	0.12	0.979	0.988
137	LTE Band 2	20M	QPSK 1RB 0offset	Left Cheek	18700	1860	23.74	24	1.062	-0.12	0.928	0.985
138	**LTE Band 2**	**20M**	**QPSK 1RB 0offset**	**Left Cheek**	**19100**	**1900**	**23.66**	**24**	**1.081**	**0.01**	**0.924**	**0.999**
139	LTE Band 2	20M	QPSK 50RB 0offset	Left Cheek	18900	1880	22.89	23.5	1.151	-0.17	0.66	0.760
140	LTE Band 2	20M	QPSK 100RB 0offset	Left Cheek	18900	1880	22.83	23.5	1.167	-0.07	0.654	0.763
141	LTE Band 2	20M	QPSK 1RB 0offset	Left Tilted	18900	1880	23.96	24	1.009	-0.09	0.33	0.333
142	LTE Band 2	20M	QPSK 50RB 0offset	Left Tilted	18900	1880	22.89	23.5	1.151	-0.05	0.248	0.285

Note:

1. Per KDB 941225 D05v02, 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.
2. Per KDB 941225 D05v02, 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.
3. 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.
4. 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 D05v02, 16QAM SAR testing is not required.

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
108	WLAN2.4G	802.11b	Right Cheek	6	2437	16.9	17.5	1.148	0.05	0.321	0.369
109	WLAN2.4G	802.11b	Right Tilted	6	2437	16.9	17.5	1.148	0.07	0.191	0.219
110	**WLAN2.4G**	**802.11b**	**Left Cheek**	**6**	**2437**	**16.9**	**17.5**	**1.148**	**-0.01**	**0.686**	**0.788**
111	WLAN2.4G	802.11b	Left Tilted	6	2437	16.9	17.5	1.148	-0.01	0.338	0.388

11.2 Test Records for Hotspot SAR Test

<General Note>

1. Per KDB 941225 D06, for EUT dimension ≥ 9cm*5cm, the test distance is 1cm. SAR must be measured for all surfaces and sides with a transmitting antenna located within 2.5cm from that surface or edge.

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
1	**GSM850**	**GPRS (2 Tx slots)**	**Front**	**1cm**	**128**	**824.2**	**33.05**	**33.50**	**1.109**	**-0.1**	**0.942**	**1.045**
2	GSM850	GPRS (2 Tx slots)	Front	1cm	189	836.4	32.81	33.50	1.172	0	0.851	0.998
3	GSM850	GPRS (2 Tx slots)	Front	1cm	251	848.8	32.95	33.50	1.135	-0.01	0.737	0.837
4	GSM850	GPRS (2 Tx slots)	Back	1cm	128	824.2	33.05	33.50	1.109	-0.03	0.842	0.934
5	GSM850	GPRS (2 Tx slots)	Back	1cm	189	836.4	32.81	33.50	1.172	-0.04	0.714	0.837
6	GSM850	GPRS (2 Tx slots)	Back	1cm	251	848.8	32.95	33.50	1.135	0	0.606	0.688
8	GSM850	GPRS (2 Tx slots)	Left Side	1cm	128	824.2	33.05	33.50	1.109	0.125	0.715	0.793
9	GSM850	GPRS (2 Tx slots)	Right Side	1cm	128	824.2	33.05	33.50	1.109	-0.08	0.79	0.876
33	GSM850	GPRS (2 Tx slots)	Right Side	1cm	189	836.4	32.81	33.50	1.172	-0.01	0.831	0.974
34	GSM850	GPRS (2 Tx slots)	Right Side	1cm	251	848.8	32.95	33.50	1.135	-0.03	0.691	0.784
11	GSM850	GPRS (2 Tx slots)	Bottom Side	1cm	128	824.2	33.05	33.50	1.109	0.01	0.143	0.159
26	GSM1900	GPRS (2 Tx slots)	Front	1cm	512	1850.2	29.89	30.50	1.151	-0.04	0.544	0.626
27	**GSM1900**	**GPRS (2 Tx slots)**	**Back**	**1cm**	**512**	**1850.2**	**29.89**	**30.50**	**1.151**	**-0.03**	**0.612**	**0.704**
28	GSM1900	GPRS (2 Tx slots)	Left Side	1cm	512	1850.2	29.89	30.50	1.151	-0.11	0.285	0.328
29	GSM1900	GPRS (2 Tx slots)	Right Side	1cm	512	1850.2	29.89	30.50	1.151	0.03	0.079	0.091
31	GSM1900	GPRS (2 Tx slots)	Bottom Side	1cm	512	1850.2	29.89	30.50	1.151	0.04	0.278	0.320

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
12	**WCDMA V**	**RMC12.2K**	**Front**	**1cm**	**4233**	**846.6**	**23.61**	**24.00**	**1.094**	**0**	**0.519**	**0.568**
13	WCDMA V	RMC12.2K	Back	1cm	4233	846.6	23.61	24.00	1.094	-0.08	0.434	0.475
15	WCDMA V	RMC12.2K	Left Side	1cm	4233	846.6	23.61	24.00	1.094	0.04	0.337	0.369
16	WCDMA V	RMC12.2K	Right Side	1cm	4233	846.6	23.61	24.00	1.094	-0.133	0.405	0.443
18	WCDMA V	RMC12.2K	Bottom Side	1cm	4233	846.6	23.61	24.00	1.094	0.05	0.088	0.096
19	**WCDMA II**	**RMC12.2K**	**Front**	**1cm**	**9400**	**1880**	**23.30**	**24.00**	**1.175**	**-0.131**	**0.617**	**0.725**
20	WCDMA II	RMC12.2K	Back	1cm	9400	1880	23.30	24.00	1.175	0.09	0.574	0.674
21	WCDMA II	RMC12.2K	Left Side	1cm	9400	1880	23.30	24.00	1.175	-0.01	0.256	0.301
22	WCDMA II	RMC12.2K	Right Side	1cm	9400	1880	23.30	24.00	1.175	0	0.086	0.101
24	WCDMA II	RMC12.2K	Right Side	1cm	9400	1880	23.30	24.00	1.175	0.122	0.297	0.349

<LTE SAR>

Plot No.	Band	BW (MHZ)	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
209	LTE Band 17	10M	QPSK 1RB 49offset	Front	1cm	23790	710	23.71	24	1.069	0.07	0.388	0.415
210	LTE Band 17	10M	QPSK 25RB 0offset	Front	1cm	23780	709	22.61	23.5	1.227	-0.03	0.27	0.331
211	**LTE Band 17**	**10M**	**QPSK 1RB 49offset**	**Back**	**1cm**	**23790**	**710**	**23.71**	**24**	**1.069**	**0.02**	**0.419**	**0.448**
212	LTE Band 17	10M	QPSK 25RB 0offset	Back	1cm	23780	709	22.61	23.5	1.227	-0.03	0.311	0.382
213	LTE Band 17	10M	QPSK 1RB 49offset	Left Side	1cm	23790	710	23.71	24	1.069	0.09	0.289	0.309
214	LTE Band 17	10M	QPSK 25RB 0offset	Left Side	1cm	23780	709	22.61	23.5	1.227	0.02	0.202	0.248
215	LTE Band 17	10M	QPSK 1RB 49offset	Right Side	1cm	23790	710	23.71	24	1.069	-0.08	0.223	0.238
216	LTE Band 17	10M	QPSK 25RB 0offset	Right Side	1cm	23780	709	22.61	23.5	1.227	-0.1	0.156	0.191
217	LTE Band 17	10M	QPSK 1RB 49offset	Bottom Side	1cm	23790	710	23.71	24	1.069	0.14	0.056	0.060
218	LTE Band 17	10M	QPSK 25RB 0offset	Bottom Side	1cm	23780	709	22.61	23.5	1.227	0.16	0.036	0.044
179	**LTE Band 5**	**10M**	**QPSK 1RB 49offset**	**Front**	**1cm**	**20525**	**836.5**	**23.58**	**24**	**1.102**	**-0.04**	**0.602**	**0.663**
180	LTE Band 5	10M	QPSK 25RB 12offset	Front	1cm	20525	836.5	22.61	23.5	1.227	0.14	0.414	0.508
181	LTE Band 5	10M	QPSK 1RB 49offset	Back	1cm	20525	836.5	23.58	24	1.102	0.08	0.517	0.569
182	LTE Band 5	10M	QPSK 25RB 12offset	Back	1cm	20525	836.5	22.61	23.5	1.227	0.15	0.368	0.452
183	LTE Band 5	10M	QPSK 1RB 49offset	Left Side	1cm	20525	836.5	23.58	24	1.102	-0.19	0.42	0.463
184	LTE Band 5	10M	QPSK 25RB 12offset	Left Side	1cm	20525	836.5	22.61	23.5	1.227	-0.01	0.285	0.350
185	LTE Band 5	10M	QPSK 1RB 49offset	Right Side	1cm	20525	836.5	23.58	24	1.102	-0.07	0.48	0.529
186	LTE Band 5	10M	QPSK 25RB 12offset	Right Side	1cm	20525	836.5	22.61	23.5	1.227	-0.14	0.322	0.395
189	LTE Band 5	10M	QPSK 1RB 49offset	Bottom Side	1cm	20525	836.5	23.58	24	1.102	-0.08	0.098	0.108
190	LTE Band 5	10M	QPSK 25RB 12offset	Bottom Side	1cm	20525	836.5	22.61	23.5	1.227	-0.11	0.056	0.069

Plot No.	Band	BW (MHZ)	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
151	LTE Band 4	20M	QPSK 1RB 0offset	Front	1cm	20175	1732.5	23.99	24	1.002	-0.11	0.545	0.546
152	LTE Band 4	20M	QPSK 50RB 0offset	Front	1cm	20300	1745	23.18	23.5	1.076	0.08	0.499	0.537
153	**LTE Band 4**	**20M**	**QPSK 1RB 0offset**	**Back**	**1cm**	**20175**	**1732.5**	**23.99**	**24**	**1.002**	**-0.1**	**0.649**	**0.650**
154	LTE Band 4	20M	QPSK 50RB 0offset	Back	1cm	20300	1745	23.18	23.5	1.076	-0.04	0.568	0.611
155	LTE Band 4	20M	QPSK 1RB 0offset	Left Side	1cm	20175	1732.5	23.99	24	1.002	0.16	0.339	0.340
156	LTE Band 4	20M	QPSK 50RB 0offset	Left Side	1cm	20300	1745	23.18	23.5	1.076	0.01	0.292	0.314
157	LTE Band 4	20M	QPSK 1RB 0offset	Right Side	1cm	20175	1732.5	23.99	24	1.002	0.09	0.092	0.092
158	LTE Band 4	20M	QPSK 50RB 0offset	Right Side	1cm	20300	1745	23.18	23.5	1.076	-0.05	0.082	0.088
161	LTE Band 4	20M	QPSK 1RB 0offset	Bottom Side	1cm	20175	1732.5	23.99	24	1.002	0.09	0.324	0.325
162	LTE Band 4	20M	QPSK 50RB 0offset	Bottom Side	1cm	20300	1745	23.18	23.5	1.076	-0.07	0.272	0.293
165	**LTE Band 2**	**20M**	**QPSK 1RB 0offset**	**Front**	**1cm**	**18900**	**1880**	**23.96**	**24**	**1.009**	**0.04**	**0.789**	**0.796**
166	LTE Band 2	20M	QPSK 50RB 0offset	Front	1cm	18900	1880	22.89	23.5	1.151	0.14	0.567	0.653
167	LTE Band 2	20M	QPSK 1RB 0offset	Back	1cm	18900	1880	23.96	24	1.009	0.15	0.694	0.700
168	LTE Band 2	20M	QPSK 50RB 0offset	Back	1cm	18900	1880	22.89	23.5	1.151	-0.04	0.498	0.573
169	LTE Band 2	20M	QPSK 1RB 0offset	Left Side	1cm	18900	1880	23.96	24	1.009	0.11	0.391	0.395
170	LTE Band 2	20M	QPSK 50RB 0offset	Left Side	1cm	18900	1880	22.89	23.5	1.151	-0.08	0.283	0.326
171	LTE Band 2	20M	QPSK 1RB 0offset	Right Side	1cm	18900	1880	23.96	24	1.009	-0.12	0.09	0.091
172	LTE Band 2	20M	QPSK 50RB 0offset	Right Side	1cm	18900	1880	22.89	23.5	1.151	0	0.073	0.084
175	LTE Band 2	20M	QPSK 1RB 0offset	Bottom Side	1cm	18900	1880	23.96	24	1.009	0.18	0.309	0.312
176	LTE Band 2	20M	QPSK 50RB 0offset	Bottom Side	1cm	18900	1880	22.89	23.5	1.151	-0.01	0.229	0.264

Note:

1. Per KDB 941225 D05v02, 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.
2. Per KDB 941225 D05v02, 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.
3. 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.
4. 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 D05v02, 16QAM SAR testing is not required.

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
101	WLAN2.4G	802.11b	Front	1cm	6	2437	16.9	17.5	1.148	0.01	0.133	0.153
102	WLAN2.4G	802.11b	Back	1cm	6	2437	16.9	17.5	1.148	-0.04	0.098	0.113
104	**WLAN2.4G**	**802.11b**	**Right Side**	**1cm**	**6**	**2437**	**16.9**	**17.5**	**1.148**	**-0.04**	**0.146**	**0.168**
105	WLAN2.4G	802.11b	Top Side	1cm	6	2437	16.9	17.5	1.148	0.14	0.018	0.021

11.3 Test Records for Body-worn SAR Test

<GSM SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Headset	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
1	**GSM850**	**GPRS (2 Tx slots)**	**Front**	**1cm**		**128**	**824.2**	**33.05**	**33.50**	**1.109**	**-0.1**	**0.942**	**1.045**
2	GSM850	GPRS (2 Tx slots)	Front	1cm		189	836.4	32.81	33.50	1.172	0	0.851	0.998
3	GSM850	GPRS (2 Tx slots)	Front	1cm		251	848.8	32.95	33.50	1.135	-0.01	0.737	0.837
4	GSM850	GPRS (2 Tx slots)	Back	1cm		128	824.2	33.05	33.50	1.109	-0.03	0.842	0.934
5	GSM850	GPRS (2 Tx slots)	Back	1cm		189	836.4	32.81	33.50	1.172	-0.04	0.714	0.837
6	GSM850	GPRS (2 Tx slots)	Back	1cm		251	848.8	32.95	33.50	1.135	0	0.606	0.688
7	GSM850	GSM Voice	Front	1cm	v	128	824.2	33.20	33.50	1.072	-0.01	0.447	0.479
26	GSM1900	GPRS (2 Tx slots)	Front	1cm		512	1850.2	29.89	30.50	1.151	-0.04	0.544	0.626
27	**GSM1900**	**GPRS (2 Tx slots)**	**Back**	**1cm**		**512**	**1850.2**	**29.89**	**30.50**	**1.151**	**-0.03**	**0.612**	**0.704**
32	GSM1900	GSM Voice	Back	1cm	v	512	1850.2	30.06	30.50	1.107	0.07	0.338	0.374

Note:
1. Between the front and back without headset mode and pick up worst position to test with headset mode.
2. “V” in the Headset column means the Headset is plugged during SAR testing.

<WCDMA SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Headset	Ch.	Freq. (MHz)	Burst Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
12	**WCDMA V**	**RMC12.2K**	**Front**	**1cm**		**4233**	**846.6**	**23.61**	**24.00**	**1.094**	**0**	**0.519**	**0.568**
13	WCDMA V	RMC12.2K	Back	1cm		4233	846.6	23.61	24.00	1.094	-0.08	0.434	0.475
14	WCDMA V	RMC12.2K	Front	1cm	v	4233	846.6	23.61	24.00	1.094	0.08	0.42	0.459
19	**WCDMA II**	**RMC12.2K**	**Front**	**1cm**		**9400**	**1880**	**23.30**	**24.00**	**1.175**	**-0.131**	**0.617**	**0.725**
20	WCDMA II	RMC12.2K	Back	1cm		9400	1880	23.30	24.00	1.175	0.09	0.574	0.674
25	WCDMA II	RMC12.2K	Front	1cm	v	9400	1880	23.30	24.00	1.175	-0.03	0.582	0.684

Note:
1. Between the front and back without headset mode and pick up worst position to test with headset mode.
2. “V” in the Headset column means the Headset is plugged during SAR testing.

<LTE SAR>

Plot No.	Band	BW (MHZ)	Mode	Test Position	Gap (cm)	Headset	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
209	LTE Band 17	10M	QPSK 1RB 49offset	Front	1cm		23790	710	23.71	24	1.069	0.07	0.388	0.415
210	LTE Band 17	10M	QPSK 25RB 0offset	Front	1cm		23780	709	22.61	23.5	1.227	-0.03	0.27	0.331
211	**LTE Band 17**	**10M**	**QPSK 1RB 49offset**	**Back**	**1cm**		**23790**	**710**	**23.71**	**24**	**1.069**	**0.02**	**0.419**	**0.448**
212	LTE Band 17	10M	QPSK 25RB 0offset	Back	1cm		23780	709	22.61	23.5	1.227	-0.03	0.311	0.382
219	LTE Band 17	10M	QPSK 1RB 49offset	Back	1cm	v	23790	710	23.71	24	1.069	0	0.315	0.337
220	LTE Band 17	10M	QPSK 25RB 0offset	Back	1cm	v	23780	709	22.61	23.5	1.227	-0.01	0.212	0.260
179	**LTE Band 5**	**10M**	**QPSK 1RB 49offset**	**Front**	**1cm**		**20525**	**836.5**	**23.58**	**24**	**1.102**	**-0.04**	**0.602**	**0.663**
180	LTE Band 5	10M	QPSK 25RB 12offset	Front	1cm		20525	836.5	22.61	23.5	1.227	0.14	0.414	0.508
181	LTE Band 5	10M	QPSK 1RB 49offset	Back	1cm		20525	836.5	23.58	24	1.102	0.08	0.517	0.569
182	LTE Band 5	10M	QPSK 25RB 12offset	Back	1cm		20525	836.5	22.61	23.5	1.227	0.15	0.368	0.452
191	LTE Band 5	10M	QPSK 1RB 49offset	Front	1cm	v	20525	836.5	23.58	24	1.102	-0.05	0.544	0.599
192	LTE Band 5	10M	QPSK 25RB 12offset	Front	1cm	v	20525	836.5	22.61	23.5	1.227	0.01	0.331	0.406
151	LTE Band 4	20M	QPSK 1RB 0offset	Front	1cm		20175	1732.5	23.99	24	1.002	-0.11	0.545	0.546
152	LTE Band 4	20M	QPSK 50RB 0offset	Front	1cm		20300	1745	23.18	23.5	1.076	0.08	0.499	0.537
153	**LTE Band 4**	**20M**	**QPSK 1RB 0offset**	**Back**	**1cm**		**20175**	**1732.5**	**23.99**	**24**	**1.002**	**-0.1**	**0.649**	**0.650**
154	LTE Band 4	20M	QPSK 50RB 0offset	Back	1cm		20300	1745	23.18	23.5	1.076	-0.04	0.568	0.611
163	LTE Band 4	20M	QPSK 1RB 0offset	Back	1cm	v	20175	1732.5	23.99	24	1.002	-0.08	0.644	0.645
164	LTE Band 4	20M	QPSK 50RB 0offset	Back	1cm	v	20300	1745	23.18	23.5	1.076	-0.15	0.561	0.604
165	**LTE Band 2**	**20M**	**QPSK 1RB 0offset**	**Front**	**1cm**		**18900**	**1880**	**23.96**	**24**	**1.009**	**0.04**	**0.789**	**0.796**
166	LTE Band 2	20M	QPSK 50RB 0offset	Front	1cm		18900	1880	22.89	23.5	1.151	0.14	0.567	0.653
167	LTE Band 2	20M	QPSK 1RB 0offset	Back	1cm		18900	1880	23.96	24	1.009	0.15	0.694	0.700
168	LTE Band 2	20M	QPSK 50RB 0offset	Back	1cm		18900	1880	22.89	23.5	1.151	-0.04	0.498	0.573
177	LTE Band 2	20M	QPSK 1RB 0offset	Front	1cm	v	18900	1880	23.96	24	1.009	0.01	0.745	0.752
178	LTE Band 2	20M	QPSK 50RB 0offset	Front	1cm	v	18900	1880	22.89	23.5	1.151	0.08	0.547	0.629

Note:

1. Per KDB 941225 D05v02, 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.
2. Per KDB 941225 D05v02, 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.
3. 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.
4. 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 D05v02, 16QAM SAR testing is not required.
5. Between the front and back without headset mode and pick up worst position to test with headset mode.
6. “V” in the Headset column means the Headset is plugged during SAR testing.

<WLAN SAR>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Freq. (MHz)	Average Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Headset	Power Drift (dB)	SAR_{1g} (W/kg)	Scaled SAR_{1g} (W/kg)
101	**WLAN2.4G**	**802.11b**	**Front**	**1cm**		**6**	**2437**	**16.9**	**17.5**	**1.148**	**0.01**	**0.133**	**0.153**
102	WLAN2.4G	802.11b	Back	1cm		6	2437	16.9	17.5	1.148	-0.04	0.098	0.113
107	WLAN2.4G	802.11b	Front	1cm	v	6	2437	16.9	17.5	1.148	-0.06	0.114	0.131

Note:

1. Between the front and back without headset mode and pick up worst position to test with headset mode.
2. “V” in the Headset column means the Headset is plugged during SAR testing.

11.4 Repeated SAR Measurement

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)	SAR_{1g} (W/kg)	Tune-up Scaled 1g SAR
136	LTE Band 2	QPSK 1RB 0offset	Left Cheek	-	18900	1880	23.96	24	1.009	0.12	0.979	0.988
221	LTE Band 2	QPSK 1RB 0offset	Left Cheek	-	18900	1880	23.96	24	1.009	0.03	0.898	0.906
1	GSM850	GPRS (2 Tx slots)	Front	1cm	128	824.2	33.05	33.50	1.109	-0.1	0.942	1.045
222	GSM850	GPRS (2 Tx slots)	Front	1cm	128	824.2	33.05	33.50	1.109	-0.1	0.934	1.036

Note:

1. Per KDB 865664 D01v01, for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥0.8W/kg
2. Per KDB 865664 D01v01, if the deviation among the repeated measurement is ≤20% and the measured SAR <1.45W/kg, only one repeated measurement is required.
3. The deviation is the difference in percentage between original and repeated *measured SAR*.
4. All measurement SAR result is scaled-up to account for tune-up tolerance and is compliant.

11.5 Highest SAR Plot

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)	SAR_{1g} (W/kg)	Tune-up Scaled 1g SAR
124	GSM850	GSM Voice	Right Cheek	-	128	824.2	33.20	33.50	1.072	-0.02	0.452	0.484
122	GSM1900	GSM Voice	Left Cheek	-	512	1850.2	30.06	30.50	1.107	-0.01	0.399	0.442
128	WCDMA V	RMC12.2K	Right Cheek	-	4233	846.6	23.61	24.00	1.094	-0.05	0.464	0.508
117	WCDMA II	RMC12.2K	Left Cheek	-	9262	1852.4	23.1	24.00	1.230	0.06	0.782	0.962
205	LTE Band 17	QPSK 1RB 49offset	Left Cheek	-	23790	710	23.71	24	1.069	-0.16	0.414	0.443
197	LTE Band 5	QPSK 1RB 49offset	Left Cheek	-	20525	836.5	23.58	24	1.102	-0.05	0.585	0.644
147	LTE Band 4	QPSK 1RB 0offset	Left Cheek	-	20175	1732.5	23.99	24	1.002	0.18	0.638	0.639
138	LTE Band 2	QPSK 1RB 0offset	Left Cheek	-	19100	1900	23.66	24	1.081	0.01	0.924	0.999
110	WLAN2.4G	802.11b	Left Cheek	-	6	2437	16.9	17.5	1.148	-0.01	0.686	0.788
1	GSM850	GPRS (2 Tx slots)	Front	1cm	128	824.2	33.05	33.50	1.109	-0.1	0.942	1.045
27	GSM1900	GPRS (2 Tx slots)	Back	1cm	512	1850.2	29.89	30.50	1.151	-0.03	0.612	0.704
12	WCDMA V	RMC12.2K	Front	1cm	4233	846.6	23.61	24.00	1.094	0	0.519	0.568
19	WCDMA II	RMC12.2K	Front	1cm	9400	1880	23.30	24.00	1.175	-0.131	0.617	0.725
211	LTE Band 17	QPSK 1RB 49offset	Back	1cm	23790	710	23.71	24	1.069	0.02	0.419	0.448
179	LTE Band 5	QPSK 1RB 49offset	Front	1cm	20525	836.5	23.58	24	1.102	-0.04	0.602	0.663
153	LTE Band 4	QPSK 1RB 0offset	Back	1cm	20175	1732.5	23.99	24	1.002	-0.1	0.649	0.650
165	LTE Band 2	QPSK 1RB 0offset	Front	1cm	18900	1880	23.96	24	1.009	0.04	0.789	0.796
104	WLAN2.4G	802.11b	Right Side	1cm	6	2437	16.9	17.5	1.148	-0.04	0.146	0.168

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/11/29

#124_GSM850_GSM Voice_Right Cheek_Ch128

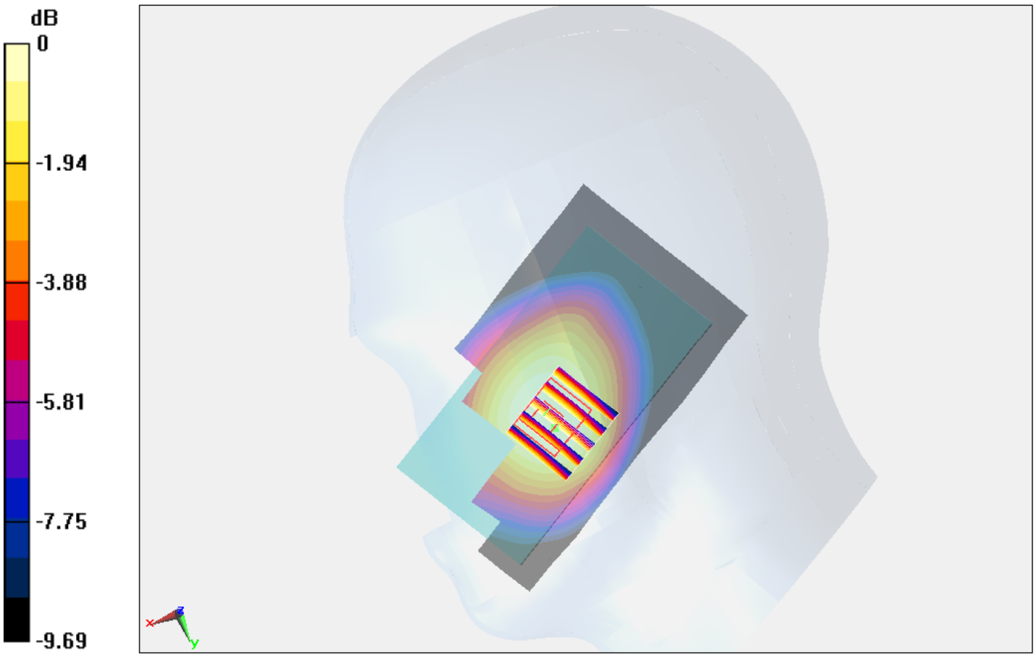
DUT: 2O3103

Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:8.3
Medium: HSL_850_121129 Medium parameters used: f = 824.2 MHz; σ = 0.883 mho/m; ε_r = 41.775; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.12, 6.12, 6.12); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Configuration/Ch128/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.502 W/kg

Configuration/Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.731 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.534 W/kg
SAR(1 g) = 0.452 W/kg; SAR(10 g) = 0.343 W/kg
Maximum value of SAR (measured) = 0.473 W/kg



0 dB = 0.473 W/kg = -3.25 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/11/29

#122_GSM1900_GSM Voice_Left Cheek_Ch512

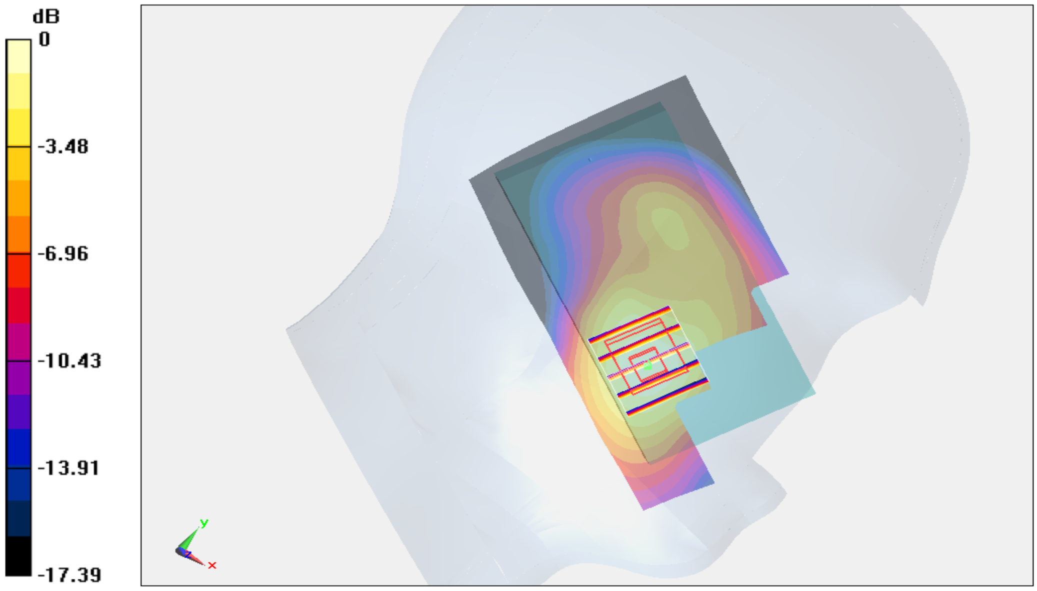
DUT: 2O3103

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:8.3
Medium: HSL_1900_121129 Medium parameters used : f = 1850.2 MHz; σ = 1.402 mho/m; ε_r = 38.79; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(5.06, 5.06, 5.06); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Configuration/Ch512/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.446 W/kg

Configuration/Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.799 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 0.603 W/kg
SAR(1 g) = 0.399 W/kg; SAR(10 g) = 0.239 W/kg
Maximum value of SAR (measured) = 0.438 W/kg



0 dB = 0.438 W/kg = -3.59 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/11/29

#128_WCDMA V_RMC12.2K_Right Cheek_Ch4233

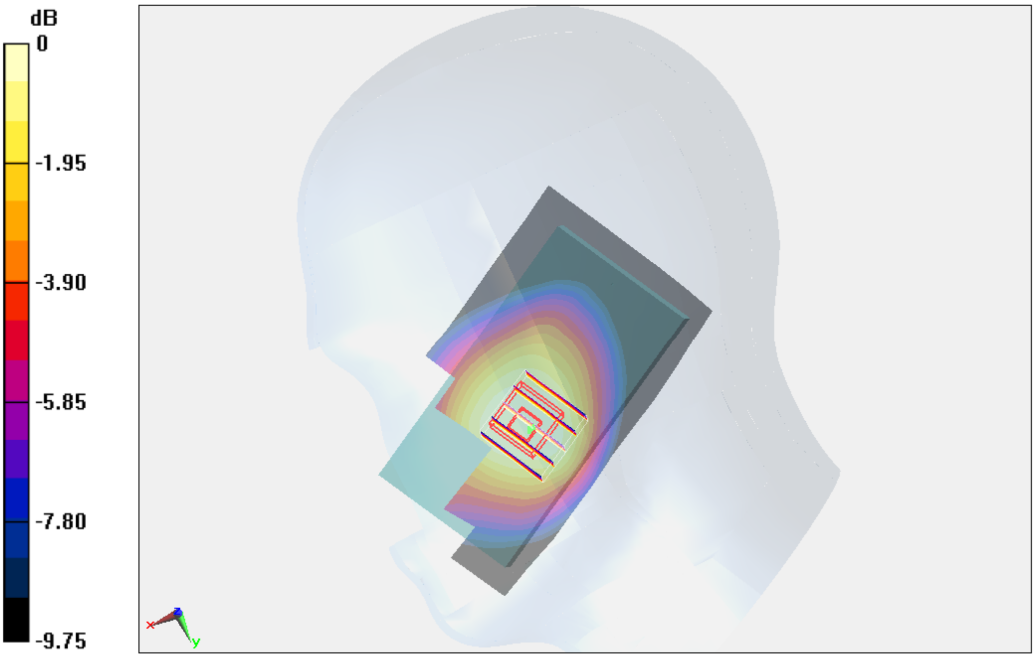
DUT: 2O3103

Communication System: WCDMA; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: HSL_850_121129 Medium parameters used: f = 847 MHz; σ = 0.906 mho/m; ε_r = 41.51; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.12, 6.12, 6.12); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Configuration/Ch4233/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.529 W/kg

Configuration/Ch4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.936 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.559 W/kg
SAR(1 g) = 0.464 W/kg; SAR(10 g) = 0.350 W/kg
Maximum value of SAR (measured) = 0.484 W/kg



0 dB = 0.484 W/kg = -3.15 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/11/29

#117_WCDMA II_RMC12.2K_Left Cheek_Ch9262

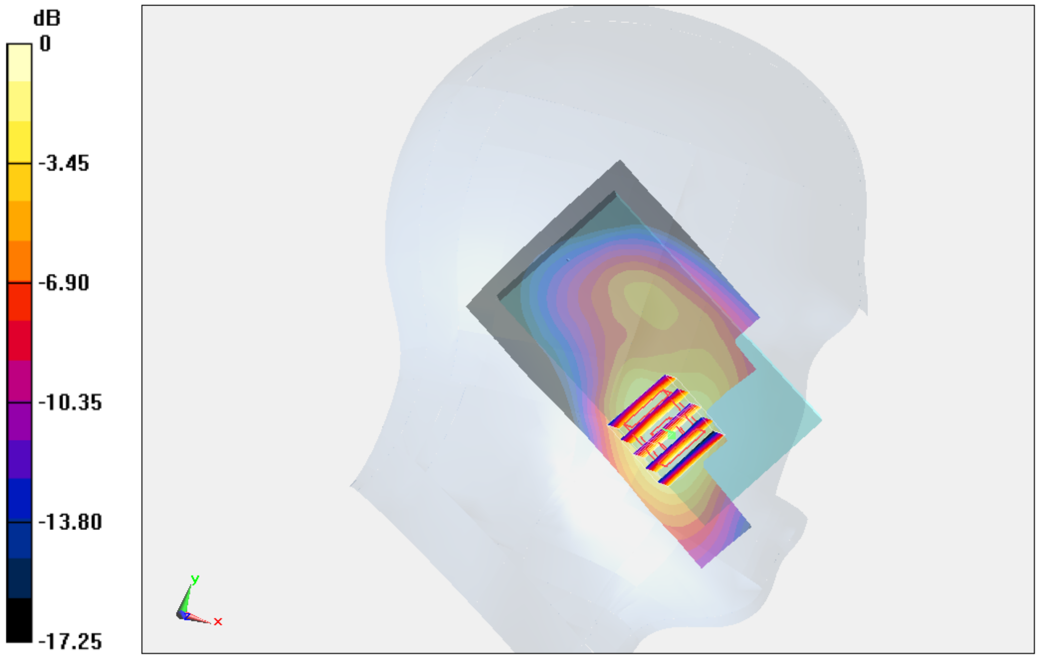
DUT: 2O3103

Communication System: WCDMA; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium: HSL_1900_121129 Medium parameters used: f = 1852.4 MHz; σ = 1.404 mho/m; ε_r = 38.781; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(5.06, 5.06, 5.06); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Configuration/Ch9262/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.873 W/kg

Configuration/Ch9262/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.946 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 1.19 W/kg
SAR(1 g) = 0.782 W/kg; SAR(10 g) = 0.465 W/kg
Maximum value of SAR (measured) = 0.850 W/kg



0 dB = 0.850 W/kg = -0.71 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/8

#205_LTE Band 17_10M_QPSK 1RB 49offset_Left Cheek_Ch23790

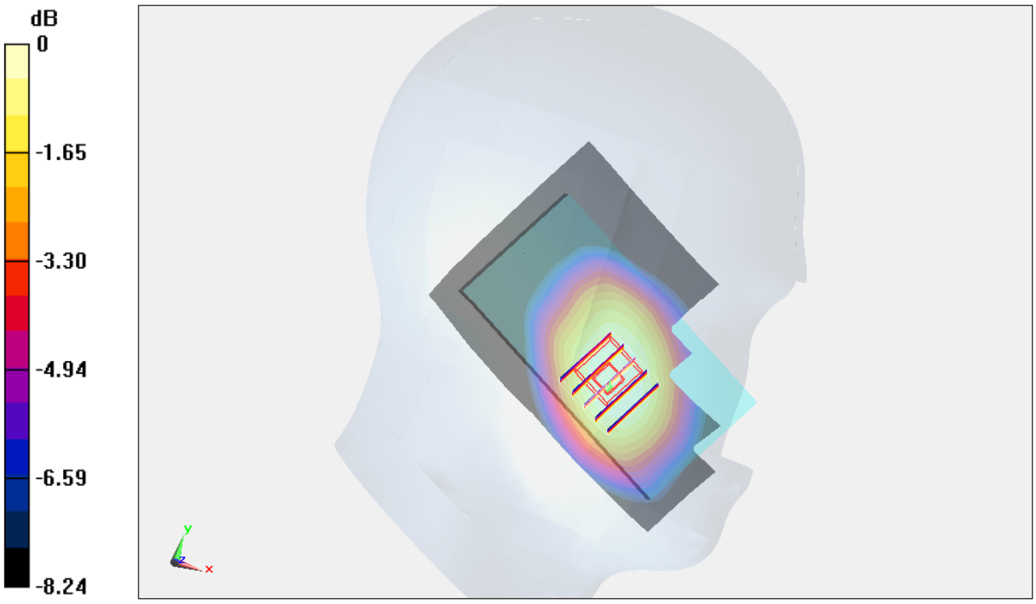
DUT: 2O3103

Communication System: LTE; Frequency: 710 MHz;Duty Cycle: 1:1
Medium: HSL_750_121208 Medium parameters used: f = 710 MHz; σ = 0.869 mho/m; ε_r = 41.783; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.46, 6.46, 6.46); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch23790/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.462 mW/g

Configuration/Ch23790/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.283 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.524 mW/g
SAR(1 g) = 0.414 mW/g; SAR(10 g) = 0.313 mW/g
Maximum value of SAR (measured) = 0.435 mW/g



0 dB = 0.435 mW/g = -7.23 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/8

#197_LTE Band 5_10M_QPSK 1RB 49offset_Left Cheek_Ch20525

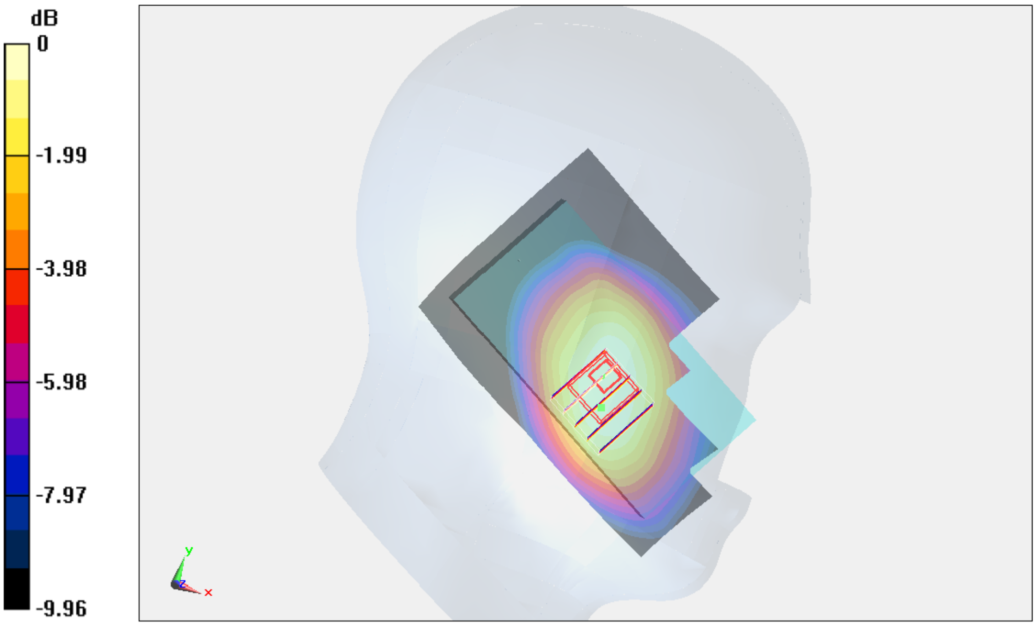
DUT: 2O3103

Communication System: LTE; Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium: HSL_850_121208 Medium parameters used: f = 836.5 MHz; σ = 0.9 mho/m; ε_r = 40.561; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.12, 6.12, 6.12); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch20525/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.653 mW/g

Configuration/Ch20525/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.370 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 0.705 mW/g
SAR(1 g) = 0.585 mW/g; SAR(10 g) = 0.437 mW/g
Maximum value of SAR (measured) = 0.620 mW/g



0 dB = 0.620 mW/g = -4.15 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/6

#147_LTE Band 4_20M_QPSK 1RB 0offset_Left Cheek_Ch20175

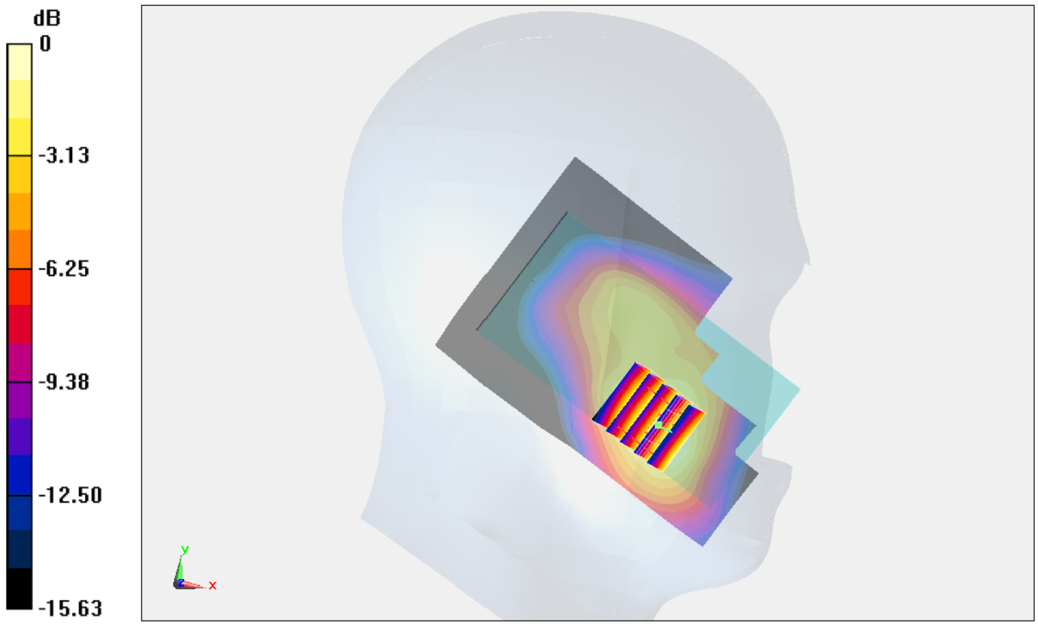
DUT: 2O3103

Communication System: LTE; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: HSL1750_121206 Medium parameters used : f = 1732.5 MHz; σ = 1.362 mho/m; ε_r = 40.098; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.5 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(5.27, 5.27, 5.27); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch20175/Area Scan (71x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.749 mW/g

Configuration/Ch20175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.117 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 1.003 mW/g
SAR(1 g) = 0.638 mW/g; SAR(10 g) = 0.378 mW/g
Maximum value of SAR (measured) = 0.684 mW/g



0 dB = 0.684 mW/g = -3.30 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/4

#138_LTE Band 2_20M_QPSK 1RB 0offset_Left Cheek_Ch19100

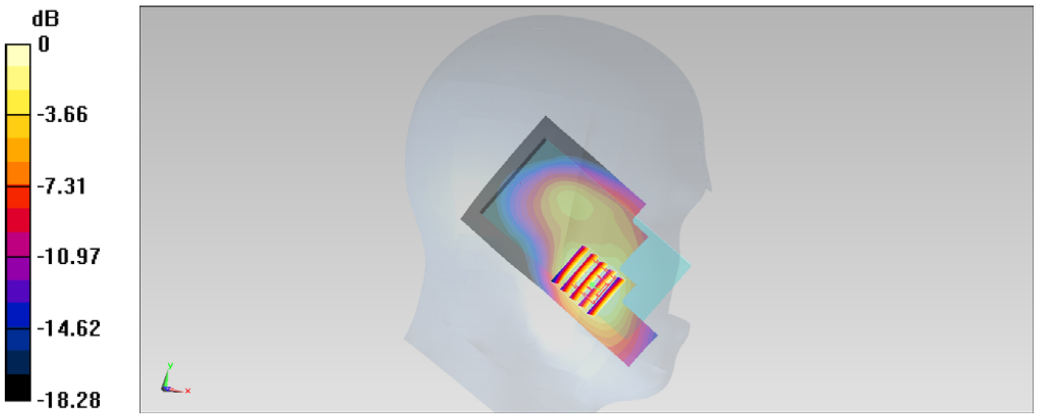
DUT: 2O3103

Communication System: LTE; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium: HSL_1900_121204 Medium parameters used: f = 1900 MHz; σ = 1.438 mho/m; ε_r = 39.21; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: ES3DV3 - SN3270; ConvF(5.05, 5.05, 5.05); Calibrated: 2012/9/28;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn778; Calibrated: 2012/8/27
- Phantom: SAM-Right; Type: QD 000 P40 C; Serial: TP-1383
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6477)

Configuration/Ch19100/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.11 mW/g

Configuration/Ch19100/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.754 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.399 mW/g
SAR(1 g) = 0.924 mW/g; SAR(10 g) = 0.568 mW/g
Maximum value of SAR (measured) = 1.07 mW/g



0 dB = 1.07 mW/g = 0.59 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/11/27

#110_WLAN2.4G_802.11b_Left Cheek_Ch6

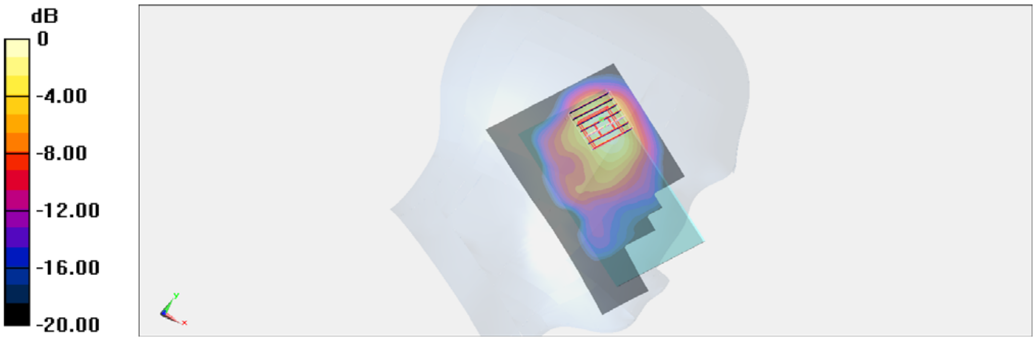
DUT: 2O3103

Communication System: 802.11b ; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: HSL_2450_121127 Medium parameters used: f = 2437 MHz; σ = 1.821 mho/m; ε_r = 39.368; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(6.58, 6.58, 6.58); Calibrated: 2012/9/28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1279; Calibrated: 2012/5/3
- Phantom: SAM LEFT; Type: QD000P40CD; Serial: TP:1718
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch6/Area Scan (81x131x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.04 mW/g

Configuration/Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 23.272 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.258 mW/g
SAR(1 g) = 0.686 mW/g; SAR(10 g) = 0.343 mW/g
Maximum value of SAR (measured) = 0.984 mW/g



0 dB = 0.984 mW/g = -0.14 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/11/24

#01_GSM850_GPRS (2 Tx slots)_Front_1cm_Ch128

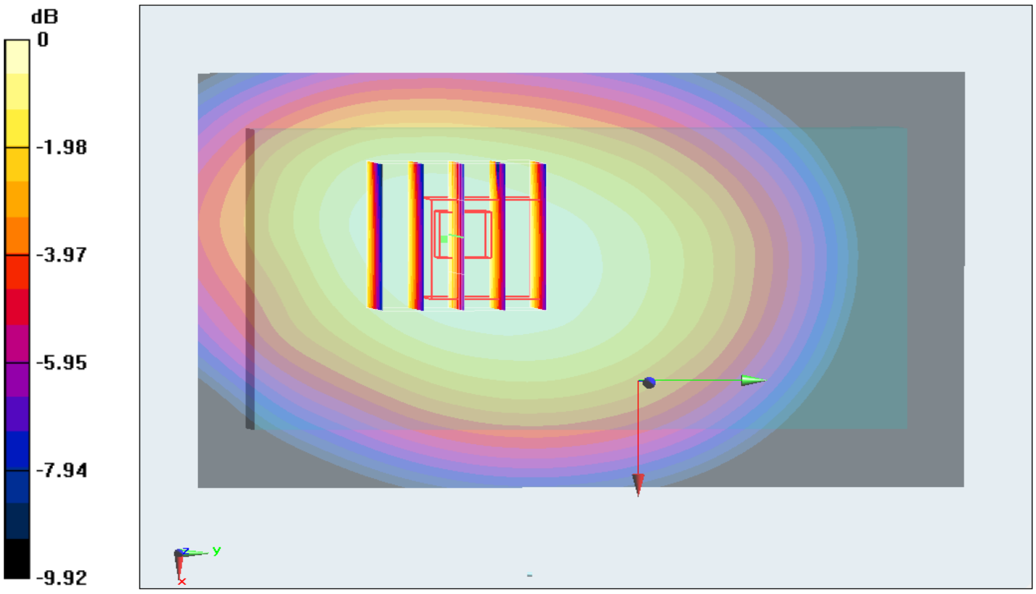
DUT: 2O3103

Communication System: GSM850; Frequency: 824.2 MHz;Duty Cycle: 1:4
Medium: MSL_850_121124 Medium parameters used : f = 824.2 MHz; σ = 0.953 mho/m; ε_r = 53.726; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.08, 6.08, 6.08); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Configuration/Ch128/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.04 W/kg

Configuration/Ch128/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.597 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 1.17 W/kg
SAR(1 g) = 0.942 W/kg; SAR(10 g) = 0.715 W/kg
Maximum value of SAR (measured) = 0.989 W/kg



0 dB = 0.989 W/kg = -0.05 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/11/27

#27_GSM1900_GPRS (2 Tx slots)_Back_1cm_Ch512

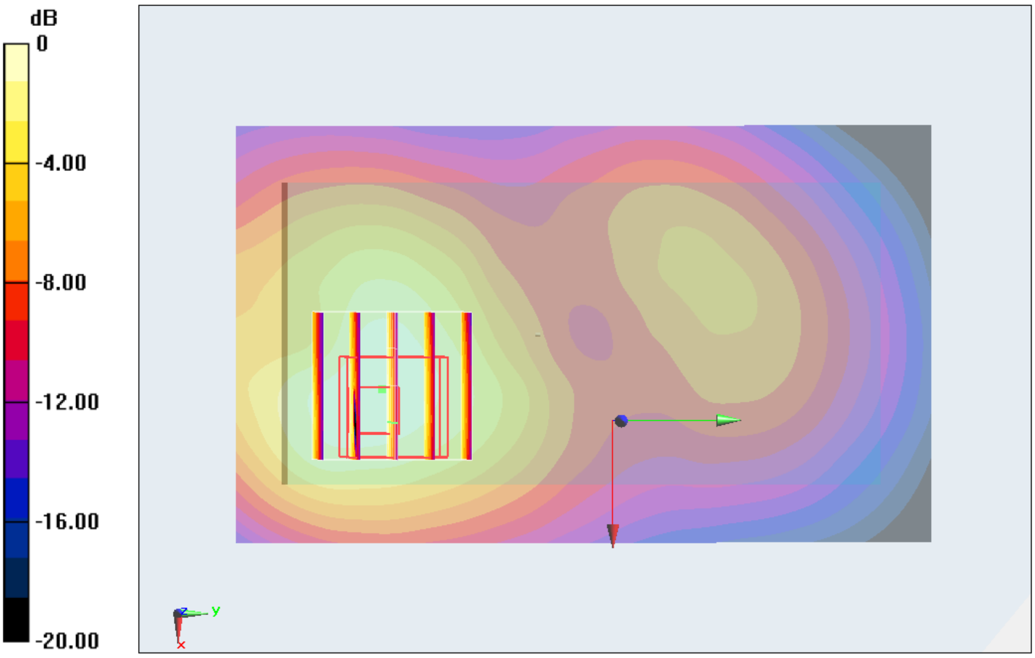
DUT: 2O3103

Communication System: PCS; Frequency: 1850.2 MHz;Duty Cycle: 1:4
Medium: MSL_1900_121127 Medium parameters used : f = 1850.2 MHz; σ = 1.464 mho/m; ε_r = 54.933; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.58, 4.58, 4.58); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Configuration/Ch512/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.626 W/kg

Configuration/Ch512/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.114 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 0.920 W/kg
SAR(1 g) = 0.612 W/kg; SAR(10 g) = 0.359 W/kg
Maximum value of SAR (measured) = 0.643 W/kg



0 dB = 0.643 W/kg = -1.92 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/11/24

#12_WCDMA V_RMC12.2K_Front_1cm_Ch4233

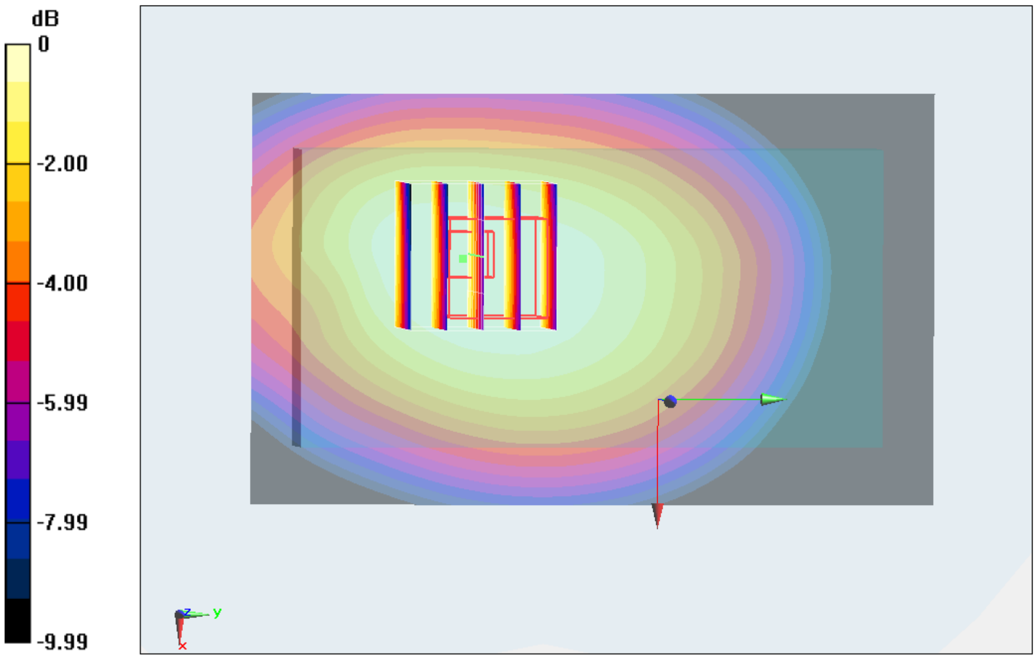
DUT: 2O3103

Communication System: WCDMA; Frequency: 846.6 MHz;Duty Cycle: 1:1
Medium: MSL_850_121124 Medium parameters used: f = 847 MHz; σ = 0.975 mho/m; ε_r = 53.502; ρ = 1000 kg/m^3
Ambient Temperature：22.6 ℃; Liquid Temperature：21.6 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.08, 6.08, 6.08); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Configuration/Ch4233/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.574 W/kg

Configuration/Ch4233/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 24.495 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.668 W/kg
SAR(1 g) = 0.519 W/kg; SAR(10 g) = 0.389 W/kg
Maximum value of SAR (measured) = 0.546 W/kg



0 dB = 0.546 W/kg = -2.63 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/11/27

#19_WCDMA II_RMC12.2K_Front_1cm_Ch9400

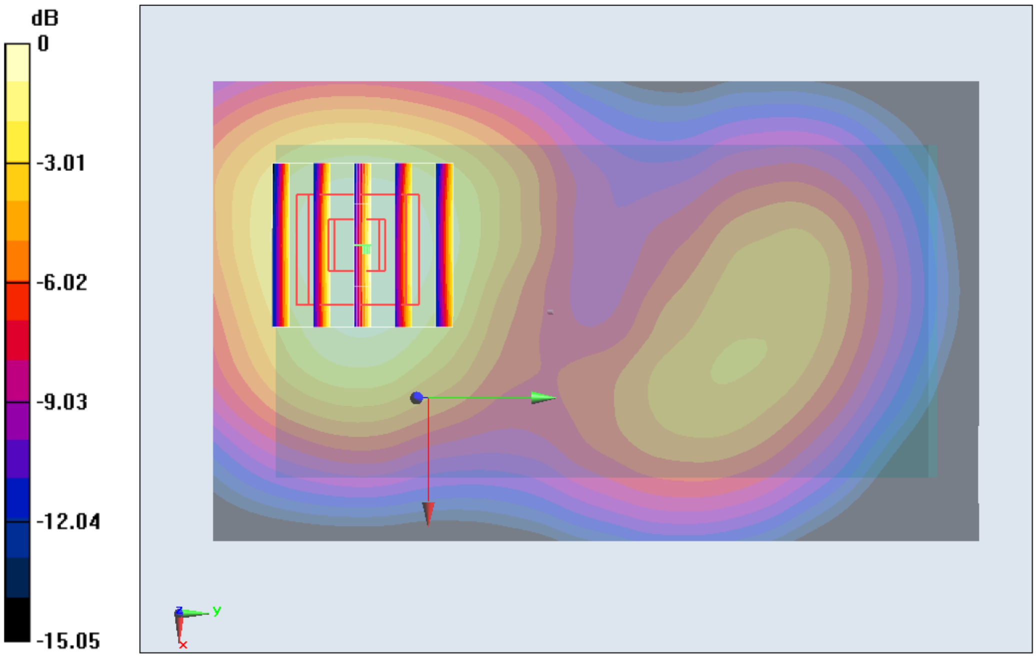
DUT: 2O3103

Communication System: WCDMA; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_121127 Medium parameters used: f = 1880 MHz; σ = 1.499 mho/m; ε_r = 54.819; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.58, 4.58, 4.58); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.7 (6848)

Configuration/Ch9400/Area Scan (61x101x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.725 W/kg

Configuration/Ch9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.076 V/m; Power Drift = -0.131 dB
Peak SAR (extrapolated) = 0.870 W/kg
SAR(1 g) = 0.617 W/kg; SAR(10 g) = 0.393 W/kg
Maximum value of SAR (measured) = 0.658 W/kg



0 dB = 0.658 W/kg = -1.82 dBW/kg

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/8

#211_LTE Band 17_10M_QPSK 1RB 49offset_Back_1cm_Ch23790

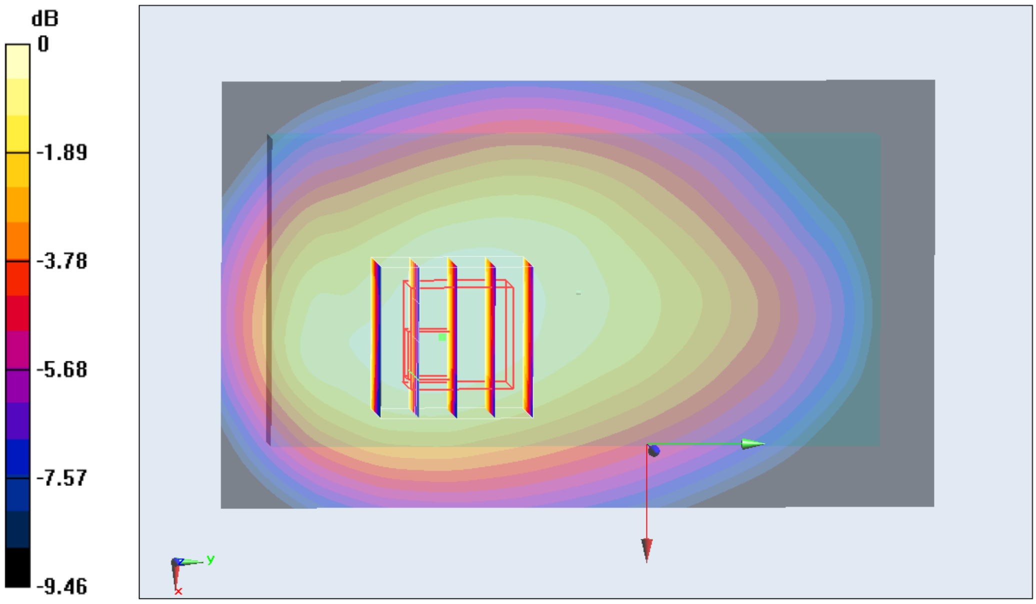
DUT: 2O3103

Communication System: LTE; Frequency: 710 MHz;Duty Cycle: 1:1
Medium: MSL_750_121208 Medium parameters used: f = 710 MHz; σ = 0.934 mho/m; ε_r = 54.844; ρ = 1000 kg/m^3
Ambient Temperature：22.3 ℃; Liquid Temperature：21.3 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.2, 6.2, 6.2); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch23790/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.455 mW/g

Configuration/Ch23790/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.589 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 0.566 mW/g
SAR(1 g) = 0.419 mW/g; SAR(10 g) = 0.310 mW/g
Maximum value of SAR (measured) = 0.440 mW/g



0 dB = 0.440 mW/g = -7.13 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/7

#179_LTE Band 5_10M_QPSK 1RB 49offset_Front_1cm_Ch20525

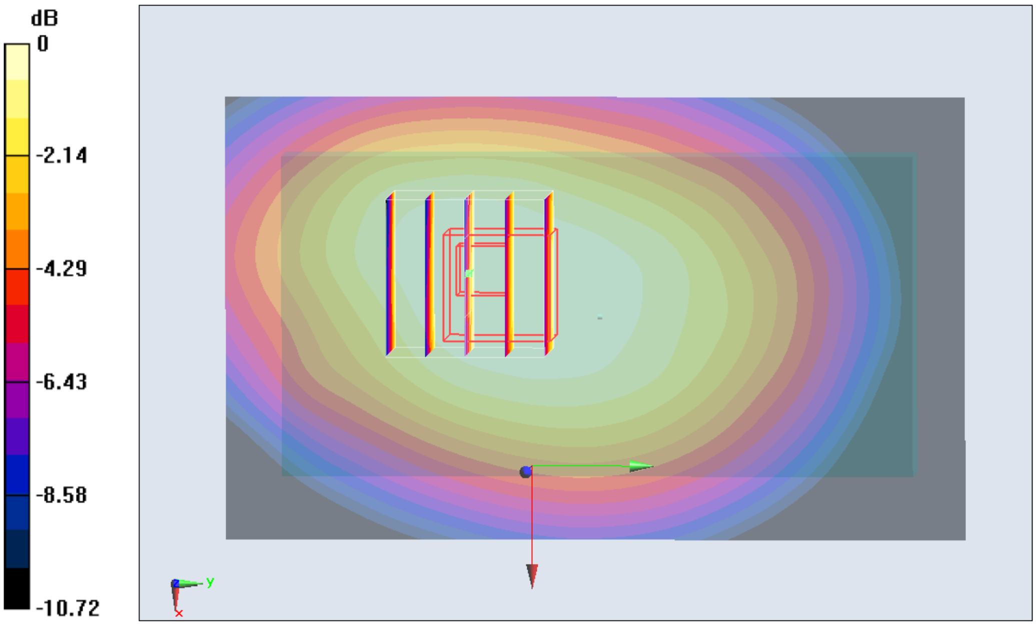
DUT: 2O3103

Communication System: LTE; Frequency: 836.5 MHz;Duty Cycle: 1:1
Medium: MSL_850_121207 Medium parameters used: f = 836.5 MHz; σ = 0.965 mho/m; ε_r = 54.552; ρ = 1000 kg/m^3
Ambient Temperature：22.4 ℃; Liquid Temperature：21.4 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(6.08, 6.08, 6.08); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch20525/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.671 mW/g

Configuration/Ch20525/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.059 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.793 mW/g
SAR(1 g) = 0.602 mW/g; SAR(10 g) = 0.451 mW/g
Maximum value of SAR (measured) = 0.640 mW/g



0 dB = 0.640 mW/g = -3.88 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/7

#153_LTE Band 4_20M_QPSK 1RB 0offset_Back_1cm_Ch20175

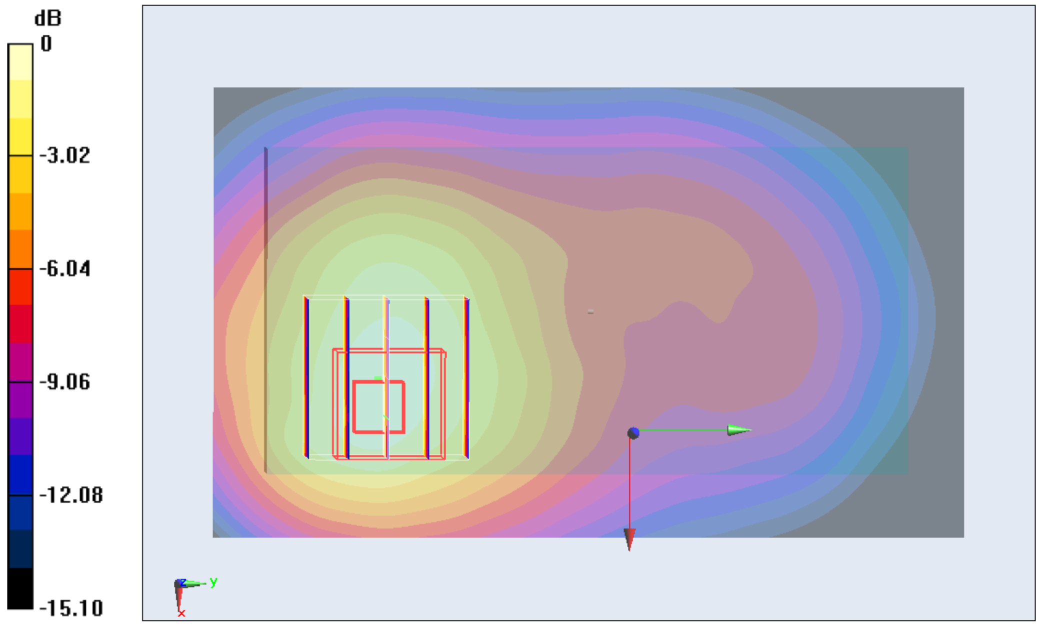
DUT: 2O3103

Communication System: LTE; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium: MSL_1750_121207 Medium parameters used: f = 1732.5 MHz; σ = 1.521 mho/m; ε_r = 51.704; ρ = 1000 kg/m^3
Ambient Temperature : 22.2 ℃; Liquid Temperature : 21.2 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.81, 4.81, 4.81); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch20175/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.678 mW/g

Configuration/Ch20175/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 23.040 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.926 mW/g
SAR(1 g) = 0.649 mW/g; SAR(10 g) = 0.395 mW/g
Maximum value of SAR (measured) = 0.705 mW/g



0 dB = 0.705 mW/g = -3.04 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/12/7

#165_LTE Band 2_20M_QPSK 1RB 0offset_Front_1cm_Ch18900

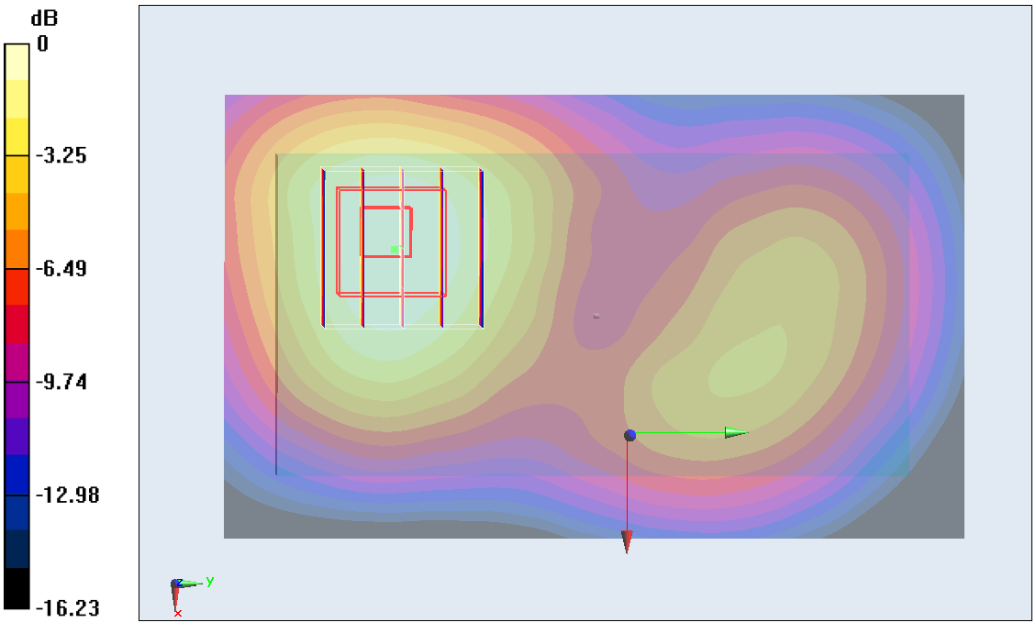
DUT: 2O3103

Communication System: LTE; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium: MSL_1900_121207 Medium parameters used: f = 1880 MHz; σ = 1.513 mho/m; ε_r = 52.954; ρ = 1000 kg/m^3
Ambient Temperature：22.2 ℃; Liquid Temperature：21.2 ℃

DASY5 Configuration:
- Probe: ET3DV6 - SN1787; ConvF(4.58, 4.58, 4.58); Calibrated: 2012/5/29;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn495; Calibrated: 2012/4/23
- Phantom: SAM Right; Type: QD000P40CD; Serial: TP:1644
- Measurement SW: DASY52, Version 52.8 (3); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch18900/Area Scan (61x101x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.888 mW/g

Configuration/Ch18900/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 25.145 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 1.182 mW/g
SAR(1 g) = 0.789 mW/g; SAR(10 g) = 0.479 mW/g
Maximum value of SAR (measured) = 0.843 mW/g



0 dB = 0.843 mW/g = -1.48 dB mW/g

Test Laboratory: Sporton International Inc. SAR/HAC Testing Lab Date: 2012/11/27

#104_WLAN2.4G_802.11b_Right Side_1cm_Ch6

DUT: 2O3103

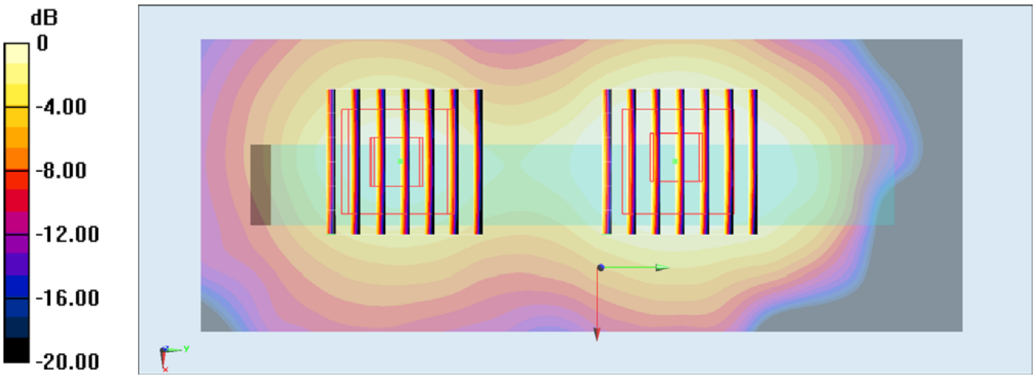
Communication System: 802.11b ; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium: MSL_2450_121127 Medium parameters used: f = 2437 MHz; σ = 1.985 mho/m; ε_r = 53.972; ρ = 1000 kg/m^3
Ambient Temperature：22.5 ℃; Liquid Temperature：21.5 ℃

DASY5 Configuration:
- Probe: EX3DV4 - SN3697; ConvF(6.57, 6.57, 6.57); Calibrated: 2012/9/28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1279; Calibrated: 2012/5/3
- Phantom: SAM RIGHT; Type: SAM; Serial: 1719
- Measurement SW: DASY52, Version 52.8 (1); SEMCAD X Version 14.6.5 (6469)

Configuration/Ch6/Area Scan (51x131x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.211 mW/g

Configuration/Ch6/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.421 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.277 mW/g
SAR(1 g) = 0.146 mW/g; SAR(10 g) = 0.075 mW/g
Maximum value of SAR (measured) = 0.209 mW/g

Configuration/Ch6/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.421 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.172 mW/g
SAR(1 g) = 0.091 mW/g; SAR(10 g) = 0.047 mW/g
Maximum value of SAR (measured) = 0.130 mW/g



0 dB = 0.130 mW/g = -17.72 dB mW/g

11.6 Simultaneous Multi-band Transmission Analysis

	Position	Applicable Combination
Simultaneous Transmission	**Head**	WWAN (voice) + WLAN
		WWAN (voice) + BT
	Hotspot	WWAN (data) + WLAN
		WWAN (data) + BT
	Body-worn	WWAN (voice) + WLAN
		WWAN (voice) + BT

Note:

1. WLAN and BT share the same antenna, and cannot transmit simultaneously.
2. GSM/WCDMA and LTE share the same antenna, and cannot transmit simultaneously.
3. If 1g-SAR summation > 1.6W/kg, SPLSR calculation is necessary.
4. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v05 based on the formula below.
   - (*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)]·[√f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 mm; where *x* = 7.5 for 1-g SAR, and *x* = 18.75 for 10-g SAR.
   - 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.
5. If the test separation distance (antenna-user) is < 5mm, 5mm is used for estimated SAR calculation.

	Head 0cm gap	Body 1cm gap
Estimated SAR (W/kg)	0.63 W/kg	0.31 W/kg

<Head SAR>

	Scaled WWAN			Scaled WLAN2.4G		Scaled WWAN + Scaled WLAN
Position	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Plot No	Max. WLAN SAR (W/kg)	
Right Cheek	GSM850	124	0.484	108	0.369	**0.85**
	GSM1900	120	0.242	108	0.369	**0.61**
	WCDMA V	128	0.508	108	0.369	**0.88**
	WCDMA II	114	0.471	108	0.369	**0.84**
	LTE Band 17	201	0.409	108	0.369	**0.78**
	LTE Band 5	193	0.566	108	0.369	**0.94**
	LTE Band 4	143	0.377	108	0.369	**0.75**
	LTE Band 2	132	0.504	108	0.369	**0.87**
Right Tilted	GSM850	125	0.328	109	0.219	**0.55**
	GSM1900	121	0.136	109	0.219	**0.36**
	WCDMA V	129	0.317	109	0.219	**0.54**
	WCDMA II	115	0.288	109	0.219	**0.51**
	LTE Band 17	203	0.228	109	0.219	**0.45**
	LTE Band 5	195	0.415	109	0.219	**0.63**
	LTE Band 4	145	0.168	109	0.219	**0.39**
	LTE Band 2	134	0.313	109	0.219	**0.53**
Left Cheek	GSM850	126	0.453	110	0.788	**1.24**
	GSM1900	122	0.442	110	0.788	**1.23**
	WCDMA V	130	0.476	110	0.788	**1.26**
	WCDMA II	117	0.962	110	0.788	**1.75**
	LTE Band 17	205	0.443	110	0.788	**1.23**
	LTE Band 5	197	0.644	110	0.788	**1.43**
	LTE Band 4	147	0.639	110	0.788	**1.43**
	LTE Band 2	138	0.999	110	0.788	**1.79**
Left Tilted	GSM850	127	0.311	111	0.388	**0.70**
	GSM1900	123	0.146	111	0.388	**0.53**
	WCDMA V	131	0.299	111	0.388	**0.69**
	WCDMA II	119	0.296	111	0.388	**0.68**
	LTE Band 17	207	0.229	111	0.388	**0.62**
	LTE Band 5	199	0.389	111	0.388	**0.78**
	LTE Band 4	150	0.183	111	0.388	**0.57**
	LTE Band 2	141	0.333	111	0.388	**0.72**

Position	Scaled WWAN			BT	Scaled WWAN + BT
	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Max. WLAN SAR (W/kg)	
Right Cheek	GSM850	124	0.484	0.084	**0.57**
	GSM1900	120	0.242	0.084	**0.33**
	WCDMA V	128	0.508	0.084	**0.59**
	WCDMA II	114	0.471	0.084	**0.56**
	LTE Band 17	201	0.409	0.084	**0.49**
	LTE Band 5	193	0.566	0.084	**0.65**
	LTE Band 4	143	0.377	0.084	**0.46**
	LTE Band 2	132	0.504	0.084	**0.59**
Right Tilted	GSM850	125	0.328	0.084	**0.41**
	GSM1900	121	0.136	0.084	**0.22**
	WCDMA V	129	0.317	0.084	**0.40**
	WCDMA II	115	0.288	0.084	**0.37**
	LTE Band 17	203	0.228	0.084	**0.31**
	LTE Band 5	195	0.415	0.084	**0.50**
	LTE Band 4	145	0.168	0.084	**0.25**
	LTE Band 2	134	0.313	0.084	**0.40**
Left Cheek	GSM850	126	0.453	0.084	**0.54**
	GSM1900	122	0.442	0.084	**0.53**
	WCDMA V	130	0.476	0.084	**0.56**
	WCDMA II	117	0.962	0.084	**1.05**
	LTE Band 17	205	0.443	0.084	**0.53**
	LTE Band 5	197	0.644	0.084	**0.73**
	LTE Band 4	147	0.639	0.084	**0.72**
	LTE Band 2	138	0.999	0.084	**1.08**
Left Tilted	GSM850	127	0.311	0.084	**0.40**
	GSM1900	123	0.146	0.084	**0.23**
	WCDMA V	131	0.299	0.084	**0.38**
	WCDMA II	119	0.296	0.084	**0.38**
	LTE Band 17	207	0.229	0.084	**0.31**
	LTE Band 5	199	0.389	0.084	**0.47**
	LTE Band 4	150	0.183	0.084	**0.27**
	LTE Band 2	141	0.333	0.084	**0.42**

<Hotspot SAR>

	Scaled WWAN			Scaled WLAN2.4G		Scaled WWAN + Scaled WLAN
Position	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Plot No	Max. WLAN SAR (W/kg)	
Front	GSM850	1	1.045	101	0.153	**1.20**
	GSM1900	26	0.626	101	0.153	**0.78**
	WCDMA V	12	0.568	101	0.153	**0.72**
	WCDMA II	19	0.725	101	0.153	**0.88**
	LTE Band 17	209	0.415	101	0.153	**0.57**
	LTE Band 5	179	0.663	101	0.153	**0.82**
	LTE Band 4	151	0.546	101	0.153	**0.70**
	LTE Band 2	165	0.796	101	0.153	**0.95**
Back	GSM850	4	0.934	102	0.113	**1.05**
	GSM1900	27	0.704	102	0.113	**0.82**
	WCDMA V	13	0.475	102	0.113	**0.59**
	WCDMA II	20	0.674	102	0.113	**0.79**
	LTE Band 17	211	0.448	102	0.113	**0.56**
	LTE Band 5	181	0.569	102	0.113	**0.68**
	LTE Band 4	153	0.65	102	0.113	**0.76**
	LTE Band 2	167	0.7	102	0.113	**0.81**
Left Side	GSM850	8	0.793	-	-	**0.79**
	GSM1900	28	0.328	-	-	**0.33**
	WCDMA V	15	0.369	-	-	**0.37**
	WCDMA II	21	0.301	-	-	**0.30**
	LTE Band 17	213	0.309	-	-	**0.31**
	LTE Band 5	183	0.463	-	-	**0.46**
	LTE Band 4	155	0.34	-	-	**0.34**
	LTE Band 2	169	0.395	-	-	**0.40**
Right Side	GSM850	33	0.974	104	0.168	**1.14**
	GSM1900	29	0.091	104	0.168	**0.26**
	WCDMA V	16	0.443	104	0.168	**0.61**
	WCDMA II	22	0.101	104	0.168	**0.27**
	LTE Band 17	215	0.238	104	0.168	**0.41**
	LTE Band 5	185	0.529	104	0.168	**0.70**
	LTE Band 4	157	0.092	104	0.168	**0.26**
	LTE Band 2	171	0.091	104	0.168	**0.26**
Top Side	GSM850	-	-	105	0.021	**0.02**
	GSM1900	-	-	105	0.021	**0.02**
	WCDMA V	-	-	105	0.021	**0.02**
	WCDMA II	-	-	105	0.021	**0.02**
	LTE Band 17	-	-	105	0.021	**0.02**
	LTE Band 5	-	-	105	0.021	**0.02**
	LTE Band 4	-	-	105	0.021	**0.02**
	LTE Band 2	-	-	105	0.021	**0.02**
Bottom Side	GSM850	11	0.159	-	-	**0.16**
	GSM1900	31	0.32	-	-	**0.32**
	WCDMA V	18	0.096	-	-	**0.10**
	WCDMA II	24	0.349	-	-	**0.35**
	LTE Band 17	217	0.06	-	-	**0.06**
	LTE Band 5	189	0.108	-	-	**0.11**
	LTE Band 4	161	0.325	-	-	**0.33**
	LTE Band 2	175	0.312	-	-	**0.31**

<Hotspot SAR>

Position	Scaled WWAN: WWAN Band	Scaled WWAN: Plot No	Scaled WWAN: Max. WWAN SAR (W/kg)	BT: Max. WLAN SAR (W/kg)	Scaled WWAN + BT
Front	GSM850	1	1.045	0.042	**1.09**
	GSM1900	26	0.626	0.042	**0.67**
	WCDMA V	12	0.568	0.042	**0.61**
	WCDMA II	19	0.725	0.042	**0.77**
	LTE Band 17	209	0.415	0.042	**0.46**
	LTE Band 5	179	0.663	0.042	**0.71**
	LTE Band 4	151	0.546	0.042	**0.59**
	LTE Band 2	165	0.796	0.042	**0.84**
Back	GSM850	4	0.934	0.042	**0.98**
	GSM1900	27	0.704	0.042	**0.75**
	WCDMA V	13	0.475	0.042	**0.52**
	WCDMA II	20	0.674	0.042	**0.72**
	LTE Band 17	211	0.448	0.042	**0.49**
	LTE Band 5	181	0.569	0.042	**0.61**
	LTE Band 4	153	0.65	0.042	**0.69**
	LTE Band 2	167	0.7	0.042	**0.74**
Left Side	GSM850	8	0.793	0.042	**0.84**
	GSM1900	28	0.328	0.042	**0.37**
	WCDMA V	15	0.369	0.042	**0.41**
	WCDMA II	21	0.301	0.042	**0.34**
	LTE Band 17	213	0.309	0.042	**0.35**
	LTE Band 5	183	0.463	0.042	**0.51**
	LTE Band 4	155	0.34	0.042	**0.38**
	LTE Band 2	169	0.395	0.042	**0.44**
Right Side	GSM850	33	0.974	0.042	**1.02**
	GSM1900	29	0.091	0.042	**0.13**
	WCDMA V	16	0.443	0.042	**0.49**
	WCDMA II	22	0.101	0.042	**0.14**
	LTE Band 17	215	0.238	0.042	**0.28**
	LTE Band 5	185	0.529	0.042	**0.57**
	LTE Band 4	157	0.092	0.042	**0.13**
	LTE Band 2	171	0.091	0.042	**0.13**
Top Side	GSM850	-	-	0.042	**0.04**
	GSM1900	-	-	0.042	**0.04**
	WCDMA V	-	-	0.042	**0.04**
	WCDMA II	-	-	0.042	**0.04**
	LTE Band 17	-	-	0.042	**0.04**
	LTE Band 5	-	-	0.042	**0.04**
	LTE Band 4	-	-	0.042	**0.04**
	LTE Band 2	-	-	0.042	**0.04**
Bottom Side	GSM850	11	0.159	0.042	**0.20**
	GSM1900	31	0.32	0.042	**0.36**
	WCDMA V	18	0.096	0.042	**0.14**
	WCDMA II	24	0.349	0.042	**0.39**
	LTE Band 17	217	0.06	0.042	**0.10**
	LTE Band 5	189	0.108	0.042	**0.15**
	LTE Band 4	161	0.325	0.042	**0.37**
	LTE Band 2	175	0.312	0.042	**0.35**

<Body-worn SAR>

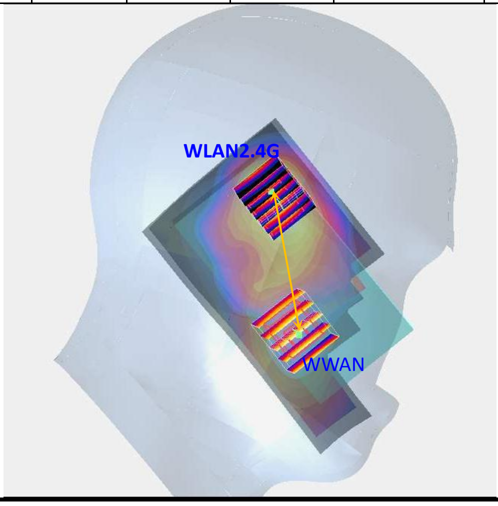
	Scaled WWAN			Scaled WLAN2.4G		Scaled WWAN + Scaled WLAN
Position	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Plot No	Max. WLAN SAR (W/kg)	
Front	GSM850	1	1.045	101	0.153	**1.20**
	GSM1900	26	0.626	101	0.153	**0.78**
	WCDMA V	12	0.568	101	0.153	**0.72**
	WCDMA II	19	0.725	101	0.153	**0.88**
	LTE Band 17	209	0.415	101	0.153	**0.57**
	LTE Band 5	179	0.663	101	0.153	**0.82**
	LTE Band 4	151	0.546	101	0.153	**0.70**
	LTE Band 2	165	0.796	101	0.153	**0.95**
Back	GSM850	4	0.934	102	0.113	**1.05**
	GSM1900	27	0.704	102	0.113	**0.82**
	WCDMA V	13	0.475	102	0.113	**0.59**
	WCDMA II	20	0.674	102	0.113	**0.79**
	LTE Band 17	211	0.448	102	0.113	**0.56**
	LTE Band 5	181	0.569	102	0.113	**0.68**
	LET Band 4	153	0.65	102	0.113	**0.76**
	LET Band 2	167	0.7	102	0.113	**0.81**
Front (with Headset)	GSM850	7	0.479	107	0.131	**0.61**
	GSM1900	-	-	107	0.131	**0.13**
	WCDMA V	14	0.459	107	0.131	**0.59**
	WCDMA II	25	0.684	107	0.131	**0.82**
	LTE Band 17	-	-	107	0.131	**0.13**
	LTE Band 5	191	0.599	107	0.131	**0.73**
	LTE Band 4	-	-	107	0.131	**0.13**
	LTE Band 2	177	0.752	107	0.131	**0.88**
Back (with Headset)	GSM850	-	-	-	-	**0.00**
	GSM1900	32	0.374	-	-	**0.37**
	WCDMA V	-	-	-	-	**0.00**
	WCDMA II	-	-	-	-	**0.00**
	LTE Band 17	219	0.337	-	-	**0.34**
	LTE Band 5	-	-	-	-	**0.00**
	LTE Band 4	163	0.645	-	-	**0.65**
	LTE Band 2	-	-	-	-	**0.00**

<Body-worn SAR>

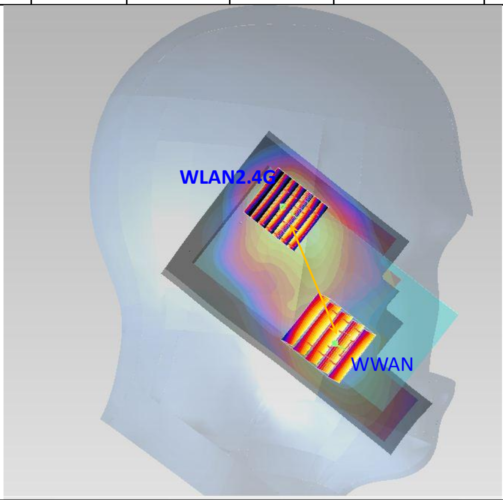
	Scaled WWAN			BT	
Position	WWAN Band	Plot No	Max. WWAN SAR (W/kg)	Max. WLAN SAR (W/kg)	Scaled WWAN + BT
Front	GSM850	1	1.045	0.042	**1.09**
	GSM1900	26	0.626	0.042	**0.67**
	WCDMA V	12	0.568	0.042	**0.61**
	WCDMA II	19	0.725	0.042	**0.77**
	LTE Band 17	209	0.415	0.042	**0.46**
	LTE Band 5	179	0.663	0.042	**0.71**
	LTE Band 4	151	0.546	0.042	**0.59**
	LTE Band 2	165	0.796	0.042	**0.84**
Back	GSM850	4	0.934	0.042	**0.98**
	GSM1900	27	0.704	0.042	**0.75**
	WCDMA V	13	0.475	0.042	**0.52**
	WCDMA II	20	0.674	0.042	**0.72**
	LTE Band 17	211	0.448	0.042	**0.49**
	LTE Band 5	181	0.569	0.042	**0.61**
	LET Band 4	153	0.65	0.042	**0.69**
	LET Band 2	167	0.7	0.042	**0.74**
Front (with Headset)	GSM850	7	0.479	0.042	**0.52**
	GSM1900	-	-	0.042	**0.04**
	WCDMA V	14	0.459	0.042	**0.50**
	WCDMA II	25	0.684	0.042	**0.73**
	LTE Band 17	-	-	0.042	**0.04**
	LTE Band 5	191	0.599	0.042	**0.64**
	LTE Band 4	-	-	0.042	**0.04**
	LTE Band 2	177	0.752	0.042	**0.79**
Back (with Headset)	GSM850	-	-	0.042	**0.04**
	GSM1900	32	0.374	0.042	**0.42**
	WCDMA V	-	-	0.042	**0.04**
	WCDMA II	-	-	0.042	**0.04**
	LTE Band 17	219	0.337	0.042	**0.38**
	LTE Band 5	-	-	0.042	**0.04**
	LTE Band 4	163	0.645	0.042	**0.69**
	LTE Band 2	-	-	0.042	**0.04**

11.7 Simultaneous analysis - SPLSR calculation

Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
					X	Y	Z				
#117	WCDMA II	Left Cheek	0.962	0	0.0772	0.255	-0.166	73.9	1.75	0.03	Not required
#110	WLAN2.4G		0.788	0	0.0393	0.318	-0.173				



Plot No	Band	Position	SAR (W/kg)	Gap (cm)	SAR peak location (m)			3D distance (cm)	Pair SAR sum (W/kg)	SPLSR	Simultaneous SAR
					X	Y	Z				
138	LTE Band 2	Left Cheek	0.999	0	0.079	0.25	-0.167	79.0	1.79	0.03	Not required
110	WLAN2.4G		0.788	0	0.0393	0.318	-0.173				



Note:

1. Per KDB 447498 D01v05, SPLSR = $(SAR_1 + SAR_2)^{1.5}$ / (*min. separation distance, mm*) ≤ 0.04, 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
2. Per KDB 447498 D01v05, if SPLSR ≤ 0.04, simultaneously transmission SAR measurement is not necessary.

Test Engineer： San Lin and Angelo Chang

12. 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 12.1

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 12.1 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 12.2 Uncertainty Budget of DASY for frequency range 300 MHz to 3 GHz

Error Description	Uncertainty Value (±%)	Probability Distribution	Divisor	Ci (1g)	Ci (10g)	Standard Uncertainty (1g)	Standard Uncertainty (10g)
Measurement System							
Probe Calibration	6.55	Normal	1	1	1	± 6.55 %	± 6.55 %
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	2.0	Rectangular	√3	1	1	± 1.2 %	± 1.2 %
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	0.8	Rectangular	√3	1	1	± 0.5 %	± 0.5 %
Probe Positioning	9.9	Rectangular	√3	1	1	± 5.7 %	± 5.7 %
Max. SAR Eval.	4.0	Rectangular	√3	1	1	± 2.3 %	± 2.3 %
Test Sample Related							
Device Positioning	2.9	Normal	1	1	1	± 2.9 %	± 2.9 %
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						± 12.8 %	± 12.6 %
Coverage Factor for 95 %						K=2	
Expanded Uncertainty						**± 25.6 %**	**± 25.2 %**

Table 12.3 Uncertainty Budget of DASY for frequency range 3 GHz to 6 GHz

13. 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] FCC OET Bulletin 65 (Edition 97-01) Supplement C (Edition 01-01), “Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields”, June 2001

[5] SPEAG DASY System Handbook

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

[7] FCC KDB 447498 D01 v05, “Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies”, October 24 2012

[8] FCC KDB 648474 D01 v01r05, “SAR Evaluation Considerations for Handsets with Multiple Transmitters and Antennas”, October 24 2012

[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 D03 v01, “Recommended SAR Test Reduction Procedures for GSM / GPRS / EDGE”, December 2008

[11] FCC KDB 941225 D05 v02, “SAR Test Considerations for LTE Handsets and Data Modems”, October 24 2012

[12] FCC KDB 941225 D06 v01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", April 201

Appendix A. Plots of System Performance Check

The plots are shown as follows.

Appendix B. Plots of SAR Measurement

The plots are shown as follows.

Appendix C. DASY Calibration Certificate

The DASY calibration certificates are shown as follows.