FCC SAR Test Report

APPLICANT : **ASUSTek COMPUTER INC.**

EQUIPMENT : **ASUS Transformer Pad**

BRAND NAME : **ASUS**

MODEL NAME : **TF300TL**

MARKETING NAME : **ASUS Transformer Pad**

FCC ID : **MSQTF300TL**

STANDARD : **FCC 47 CFR Part 2 (2.1093)**
IEEE C95.1-1991
IEEE 1528-2003
FCC OET Bulletin 65 Supplement C (Edition 01-01)

The product was received on Mar. 02, 2012 and completely tested on May. 21, 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

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.

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Revision History

REPORT NO.	VERSION	DESCRIPTION	ISSUED DATE
FA211844	Rev. 01	Initial issue of report	Apr. 20, 2012
FA211844	Rev. 02	Power reduction target modification retest of GSM 850, WCDMA band 2&5.	May. 22, 2012

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1. *Statement of Compliance*

The maximum results of Specific Absorption Rate (SAR) found during testing for **ASUSTek COMPUTER INC. ASUS Transformer Pad TF300TL** are as follows.

<Tablet Mode>
Highest 0 cm 1-g SAR Summary

Band	Position	SAR_{1g} (W/kg)
GSM850	Body (Bottom Face_0 cm Gap)	1.26
GSM1900	Body (Bottom Face_0 cm Gap)	1.27
WCDMA Band V	Body (Secondary Landscape_0 cm Gap)	1.19
WCDMA Band IV	Body (Secondary Landscape_0 cm Gap)	1.33
WCDMA Band II	Body (Bottom Face_0 cm Gap)	1.33
LTE Band 4	Body (Secondary Landscape_0 cm Gap)	1.41
LTE Band 17	Body (Bottom Face_0 cm Gap)	1.15
802.11 b/g/n	Body (Bottom Face_0 cm Gap)	0.134

Verification of SAR compliance

Band	Position	SAR_{1g} (W/kg)
GSM850	Body (Bottom Face_1 cm Gap)	0.707
GSM1900	Body (Secondary Landscape_1.1 cm Gap)	1.39
WCDMA Band V	Body (Bottom Face_1 cm Gap)	0.565
WCDMA Band IV	Body (Secondary Landscape_1.1 cm Gap)	1.25
WCDMA Band II	Body (Bottom Face_1 cm Gap)	0.937
LTE Band 4	Body (Secondary Landscape_1.1 cm Gap)	1.03
LTE Band 17	Body (Bottom Face_1 cm Gap)	0.476

Note: The test records with distance 1cm and 1.1cm to the phantom are provided for verifying the SAR compliance when user is away from EUT and proximity sensor deactivated. 1cm & 1.1cm test results are for confirming operation of the power reduction scheme, and are not applicable for compliance demonstration for the FCC tablet PC SAR test procedures.

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<NB Mode>
Highest 0 cm 1-g SAR Summary

Band	Position	SAR$_{1g}$ (W/kg)
GSM850	**Body (Bottom_0 cm Gap)**	**0.038**
GSM1900	**Body (Bottom_0 cm Gap)**	**0.012**
WCDMA Band V	**Body (Bottom_0 cm Gap)**	**0.014**
WCDMA Band IV	**Body (Bottom_0 cm Gap)**	**0.00392**
WCDMA Band II	**Body (Bottom_0 cm Gap)**	**0.00615**
LTE Band 4	**Body (Bottom_0 cm Gap)**	**0.00407**
LTE Band 17	**Body (Bottom_0 cm Gap)**	**0.052**
802.11 b/g/n	**Body (Bottom_0 cm Gap)**	**0.0082**

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 C95.1-1991, 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).

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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	ASUSTek COMPUTER INC.
Address	No. 15, Li-Te Rd., Peitou, Taipei, Taiwan

2.3 *Manufacturer*

Company Name	WISTRON INFOCOMM (KUNSHAN) CO., LTD.
Address	FIRST AVE., KUNSHAN INTEGRATED FREE TRADE ZONE, KUNSHAN, JIANGSU

2.4 *Application Details*

Date of Receipt of Application	Mar. 02, 2012
Date of Start during the Test	Mar. 02, 2012
Date of End during the Test	May. 21, 2012

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3. *General Information*

3.1 *Description of Equipment Under Test (EUT)*

Product Feature & Specification	
EUT	ASUS Transformer Pad
Brand Name	ASUS
Model Name	TF300TL
Marketing Name	ASUS Transformer Pad
FCC ID	MSQTF300TL
Tx Frequency	GSM850: 824.2 MHz ~ 848.8 MHz GSM1900: 1850.2 MHz ~ 1909.8MHz WCDMA Band V: 826.4 MHz ~ 846.6 MHz WCDMA Band II: 1852.4 MHz ~ 1907.6 MHz WCDMA Band IV : 1712.4 MHz ~ 1752.6 MHz LTE Band 17: 704 MHz ~ 716 MHz LTE Band 4: 1710MHz ~ 1755 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Rx Frequency	GSM850: 869.2 MHz ~ 893.8 MHz GSM1900: 1930.2 MHz ~ 1989.8 MHz WCDMA Band V: 871.4 MHz ~ 891.6 MHz WCDMA Band II: 1932.4 MHz ~ 1987.6 MHz WCDMA Band IV : 2112.4 MHz ~ 2152.6 MHz LTE Band 17: 734 MHz ~ 746 MHz LTE Band 4: 2100 MHz ~ 2155 MHz 802.11b/g/n: 2412 MHz ~ 2462 MHz Bluetooth: 2402 MHz ~ 2480 MHz
Maximum Average Output Power to Antenna	GSM850: 32.90 dBm GSM1900: 30.03 dBm WCDMA Band V: 24.35 dBm WCDMA Band II: 24.23 dBm WCDMA Band IV: 23.26 dBm LTE Band 17: 23.55 dBm LTE Band 4: 23.23 dBm 802.11b: 14.55 dBm 802.11g: 13.77 dBm 802.11n (2.4GHz): 13.31 dBm (BW 20MHz) Bluetooth: 9.52 dBm
Antenna Type	WWAN: PIFA Antenna WLAN: Chip Antenna Bluetooth: Chip Antenna LTE: PIFA Antenna
HW Version	R1.0
SW Version	V9.4.4.8

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Product Feature & Specification	
Type of Modulation	GPRS: GMSK EDGE: GMSK / 8PSK WCDMA: QPSK (uplink) HSDPA: QPSK (uplink) HSUPA: QPSK (uplink) LTE: QPSK / 16QAM (uplink) 802.11b: DSSS (BPSK / QPSK / CCK) 802.11g/n : OFDM (BPSK / QPSK / 16QAM / 64QAM) Bluetooth (1Mbps) : GFSK Bluetooth EDR (2Mbps) : π/4-DQPSK Bluetooth EDR (3Mbps) : 8-DPSK
EUT Stage	Production Unit
Remark: 1. The above EUT's information was declared by manufacturer. Please refer to the specifications or user's manual for more detailed description. 2. Voice call is not supported. DTM not supported.	

The table below summarized necessary items addressed in KDB 941225 D05 v01.

FCC ID	MSQTF300TL
EUT	ASUS TRANSFORMER PAD
Operating Frequency Range of each LTE transmission band	Band 4: TX: 1712.5 MHz ~ 1752.5 MHz, RX: 2112.5 MHz ~ 2152.5 MHz Band 17: TX: 706.5 MHz ~ 713.5 MHz, RX: 736.5 MHz ~ 743.5 MHz
Channel Bandwidth	Band 4: 5MHz, 10MHz Band 17: 5MHz, 10MHz

Transmission (H, M, L) channel numbers and frequencies in each LTE band				
Band 4				
	Bandwidth 5 MHz		Bandwidth 10 MHz	
	Ch. #	Freq. (MHz)	Ch. #	Freq. (MHz)
L	19975	1712.5	20000	1715
M	20175	1732.5	20175	1732.5
H	20375	1752.5	20350	1750
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

UE category, uplink modulations used	Category 3, QPSK, and 16QAM		
LTE transmitter and antenna implementation (standalone or sharing hardware components / antennas)	WWAN Antenna: LTE share the antenna with GPRS/EDGE/UMTS.		
LTE Voice / Data requirements	Data only		
LTE MPR permanently built-in by design	Yes		
LTE A-MPR	Disabled during SAR testing. With CMW500, set NS value to NS_01 to disable A-MPR.		
LTE maximum averaged conducted output power	LTE Band 17: 23.55 dBm LTE Band 4: 23.23 dBm		
Other U.S. wireless operating modes / bands	GPRS/EDGE	GSM850: UL:824.2~848.8MHz; DL:869.2~893.8MHz PCS : UL:1850.2~1909.8MHz; DL:1930.2~1989.8MHz	
	WCDMA HSDPA / HSUPA	Band V: UL: 826.4~846.6MHz; DL: 871.4~891.6MHz Band II: UL: 1852.4~1907.6MHz; DL: 1932.4~1987.6MHz Band IV: UL: 1712.4~1752.6MHz; DL: 2112.4~2152.6MHz	
	WLAN	2.4G: 2412~2462 MHz 5G: 5180 MHz ~ 5240 MHz; 5260 MHz ~ 5320 MHz; 5500 MHz ~ 5700 MHz; 5745 MHz ~ 5825 MHz	
	Bluetooth	2402~2480 MHz	
Simultaneous transmission configurations	In Section 11.3		
Power reduction applied to satisfy SAR compliance	Yes, proximity sensor.		

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3.2 *Product Photos*

Please refer to Appendix D

3.3 *Applied Standard*

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

- FCC 47 CFR Part 2 (2.1093)
- IEEE C95.1-1991
- IEEE 1528-2003
- FCC OET Bulletin 65 Supplement C (Edition 01-01)
- FCC KDB 447498 D01 v04
- FCC KDB 616217 D03 v01
- FCC KDB 941225 D01 v02
- FCC KDB 941225 D03 v01
- FCC KDB 941225 D05 v01
- FCC KDB 248227 D01 v01r02

3.4 *Device Category and SAR Limits*

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

3.5 *Test Conditions*

3.5.1 Ambient Condition

Ambient Temperature	20 to 24 ℃
Humidity	< 60 %

3.5.2 Test Configuration

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

For WLAN SAR testing, WLAN engineering testing software installed on the EUT can provide continuous transmitting RF signal. This RF signal utilized in SAR measurement has over 99% duty cycle and is treated as 1.

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The EUT implements power reduction scheme for SAR compliance, for specific device configuration and orientations, as described below. The complete description of the implementation and functionality is provided in the "Technical Description" exhibit.

Power reduction applied for each wireless mode and orientation

Exposure Position / wireless mode	GPRS/EDGE 850	GPRS/EDGE 1900	UMTS Band 5	UMTS Band 2	UMTS Band 4	LTE Band 17	LTE Band 4
Bottom Face	#	#	#	#	#	#	#
Primary Landscape	##	##	##	##	##	##	##
Secondary Landscape	#	#	#	#	#	#	#
Primary Portrait	##	##	##	##	##	##	##
Secondary Portrait	##	##	##	##	##	##	##
#: Reduced maximum limit applied by activation of proximity sensor. ##: Normal output power without reduction							

Remark: WLAN, BT output power is not reduced for SAR compliance.

Target Power reduction specifications:

Mode(s) of Operation	GPRS/EDGE 850	GPRS/EDGE 1900	UMTS Band 5	UMTS Band 2	UMTS Band 4	LTE Band 17	LTE Band 4
Reduction levels	6dB	8dB	4dB	6.5dB	5dB	3dB	4dB

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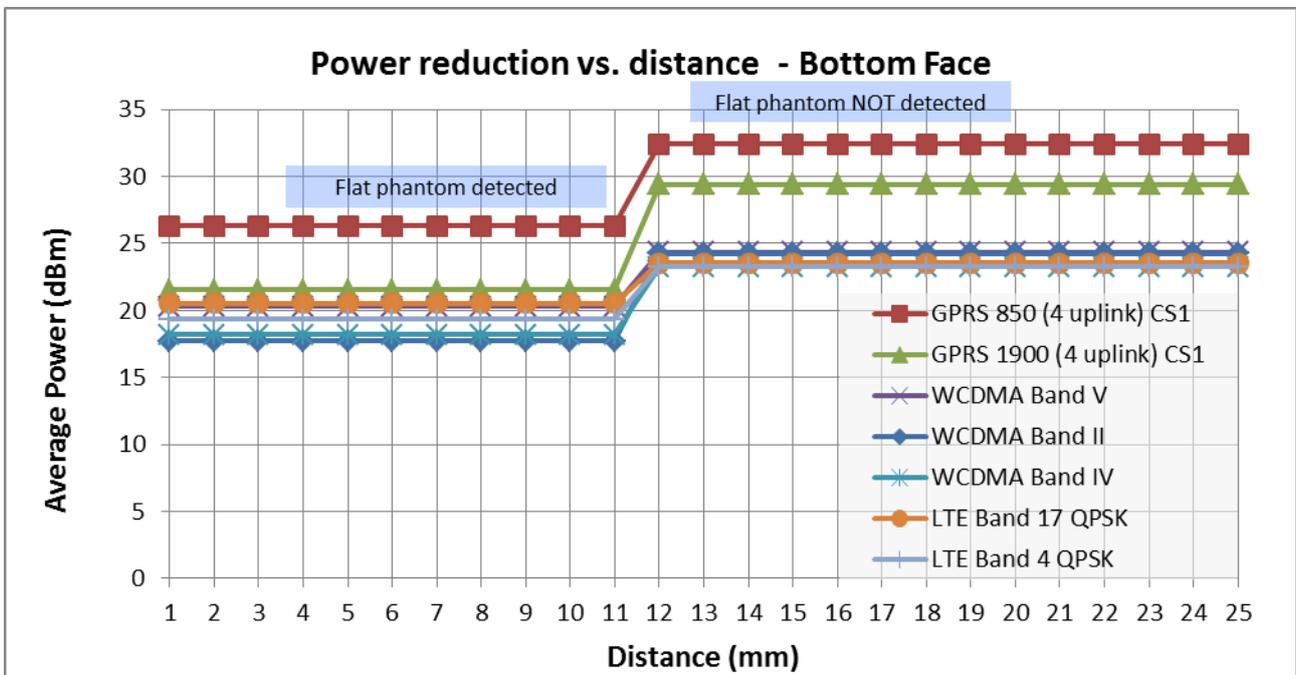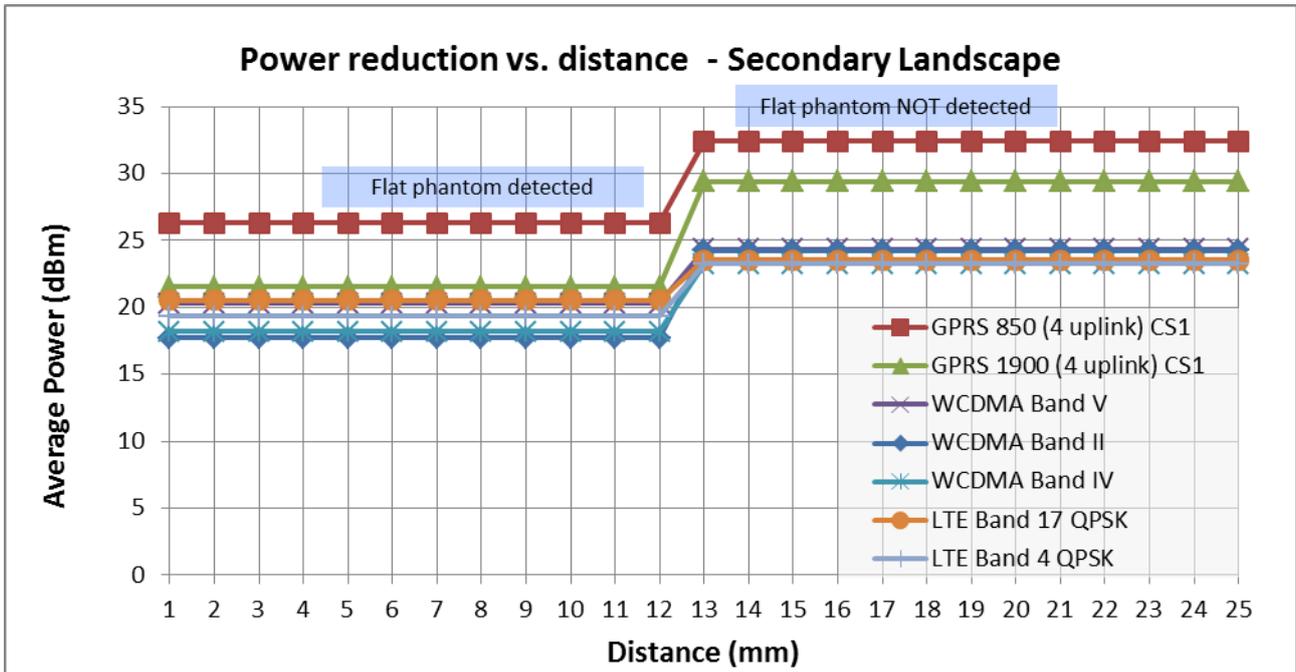
Remark:

1. GPRS 850 class 12, CH128. Full power: 32.42dBm, Reduced power: 26.31dBm. The power reduction level is 6.11dB.

2. GPRS 1900 class 12, CH810. Full power: 29.40dBm, Reduced power: 21.53dBm. The power reduction level is 7.87dB.

3. WCDMA Band V Ch4132. Full power: 24.35dBm, Reduced power: 20.27dBm. The power reduction level is 4.08dB.

4. WCDMA Band II Ch9400. Full power: 24.23dBm, Reduced power: 17.72dBm. The power reduction level is 6.51dB.

5. WCDMA Band IV Ch1513. Full power: 23.26dBm, Reduced power: 18.18dBm. The power reduction level is 5.08dB.

6. LTE Band 17 QPSK Ch23780. Full power: 23.55dBm, Reduced power: 20.55dBm. The power reduction level is 3.00dB.

7. LTE Band 4 QPSK Ch20175. Full power: 23.23dBm, Reduced power: 19.34dBm. The power reduction level is 3.89dB.

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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:

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

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

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

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

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

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

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

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

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5. *SAR Measurement System*
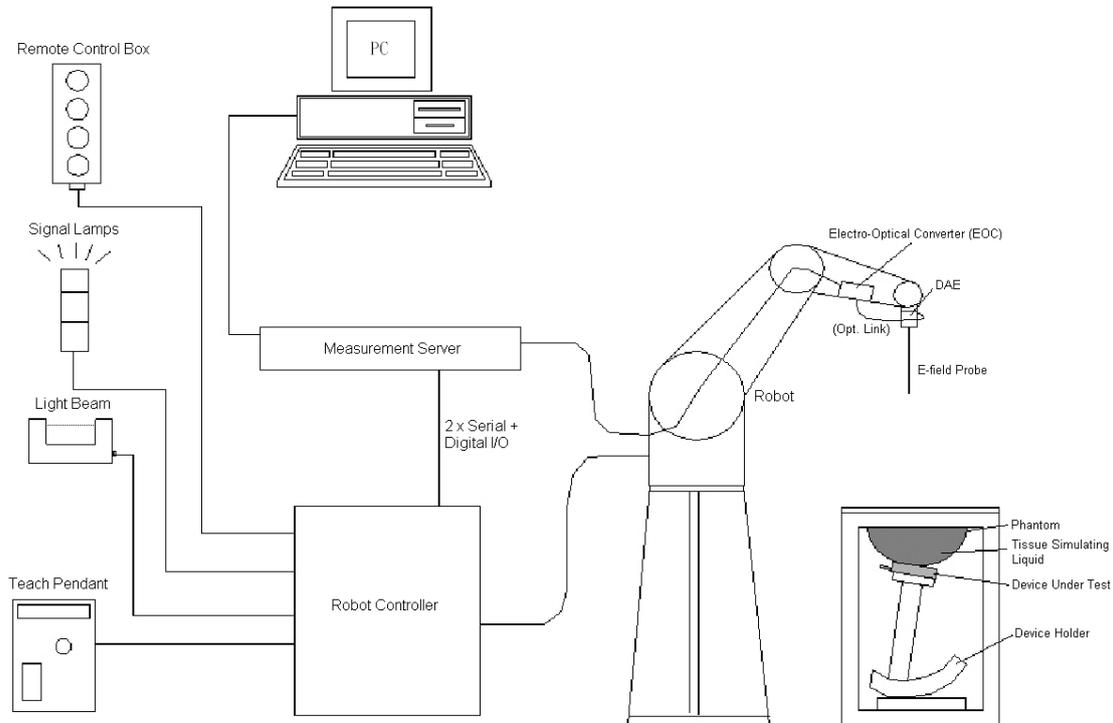
Fig 5.1 SPEAG DASY System Configurations

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 (ECO) 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

Some of the components are described in details 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)	
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	**Fig 5.2 Photo of ET3DV6/ET3DV6R**

<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)	
Frequency	10 MHz to 6 GHz; Linearity: ± 0.2 dB	
Directivity	± 0.3 dB in HSL (rotation around probe axis) ± 0.5 dB in tissue material (rotation normal to probe axis)	
Dynamic Range	10 µW/g to 100 mW/g; Linearity: ± 0.2 dB (noise: typically < 1 µW/g)	
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm	**Fig 5.3 Photo of EX3DV4/ES3DV4**

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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 ± 0.25 dB. 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 5.1   Photo of DASY4

Fig 5.2   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 5.1   Photo of Server for DASY4   **Fig 5.2   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 5.3 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.

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<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 5.4 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 (EPR). 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 5.5   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.
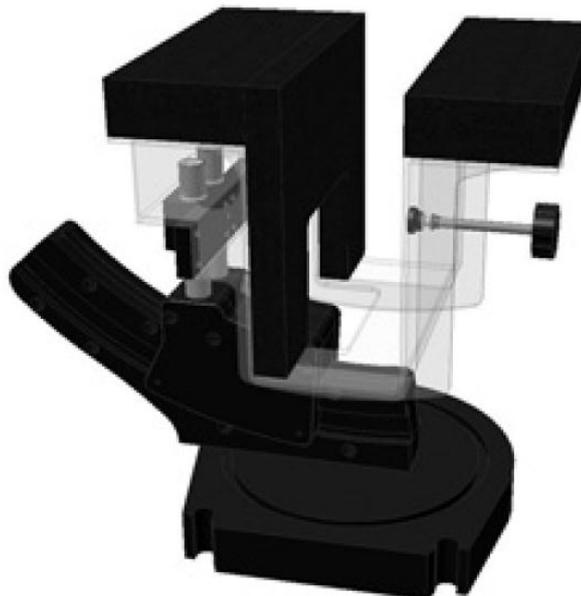
Fig 5.6   Laptop Extension Kit

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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：

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

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

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

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

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

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

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

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

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

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

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

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5.8 Test Equipment List

Manufacturer	Name of Equipment	Type/Model	Serial Number	Calibration	
				Last Cal.	Due Date
SPEAG	Dosimetric E-Field Probe	ET3DV6	1787	May 20, 2011	May 19, 2012
SPEAG	Dosimetric E-Field Probe	ET3DV6R	1788	Jan. 26, 2012	Jan. 25, 2013
SPEAG	Dosimetric E-Field Probe	EX3DV4	3820	Dec. 16, 2011	Dec. 15, 2012
SPEAG	750MHz System Validation Kit	D750V3	1012	Jun. 11, 2010	Jun. 10, 2012
SPEAG	835MHz System Validation Kit	D835V2	499	Mar. 22, 2010	Mar. 21, 2013
SPEAG	1750MHz System Validation Kit	D1750V2	1023	Jun. 16, 2011	Jun. 15, 2012
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, 2012
SPEAG	Data Acquisition Electronics	DAE4	778	Nov. 22, 2011	Nov. 21, 2012
SPEAG	Data Acquisition Electronics	DAE3	495	Apr. 28, 2011	Apr. 27, 2012
SPEAG	Device Holder	N/A	N/A	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1303	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1383	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1446	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 C	TP-1478	NCR	NCR
SPEAG	SAM Phantom	QD 000 P41 C	TP-1150	NCR	NCR
SPEAG	SAM Phantom	QD 000 P40 CD	TP-1644	NCR	NCR
SPEAG	SAM Phantom	SM 000 T01 DA	TP-1542	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 001 BB	1026	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 001 BA	1029	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 002 AA	TP-1127	NCR	NCR
SPEAG	ELI4 Phantom	QD 0VA 002 AA	TP-1131	NCR	NCR
Agilent	ENA Series Network Analyzer	E5071C	MY46100746	Jun. 10, 2011	Jun. 09, 2012
Agilent	ESG Vector Series Signal Generator	E4438C	MY49070755	Oct. 17, 2011	Oct. 16, 2012
Anritsu	Power Meter	ML2495A	0932001	Sep. 21, 2011	Sep. 20, 2012
Anritsu	Radio Communication Analyzer	MT8820C	6201074414	Dec. 21, 2011	Dec. 20, 2012
Agilent	Wireless Communication Test Set	E5515C	MY48360820	Jan. 05, 2012	Jan. 04, 2014
Agilent	Wireless Communication Test Set	E5515C	GB46311322	Mar. 23, 2011	Mar. 22, 2013
Agilent	Wireless Communication Test Set	E5515C	MY50264370	Apr. 19, 2011	Apr. 18, 2013
Agilent	Wireless Communication Test Set	E5515C	MY50266977	Nov. 13, 2011	Nov. 12, 2013
R&S	Universal Digital Radiocommunication Tester	CMU200	117995	Jul. 28, 2011	Jul. 27, 2012
R&S	Spectrum Analyzer	FSP7	101131	Jul. 29, 2011	Jul. 28, 2012
R&S	Spectrum Analyzer	FSP30	101329	May 03, 2011	May 02, 2012

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 KDB 450824 D02, 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, 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.
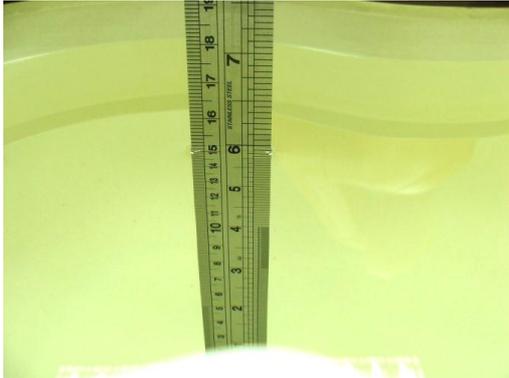
Fig 6.1 Photo of Liquid Height for Head SAR

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

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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 (εr)	Conductivity Target (σ)	Permittivity Target (εr)	Delta (σ) (%)	Delta (εr) (%)	Limit (%)	Date
750	Body	21.4	0.961	53.931	0.96	55.5	0.10	-2.83	±5	Mar. 07, 2012
750	Body	21.8	0.963	54.224	0.96	55.5	0.31	-2.30	±5	Mar. 20, 2012
835	Body	21.4	0.985	54.535	0.97	55.2	1.55	-1.20	±5	Mar. 06, 2012
835	Body	21.8	0.963	54.498	0.97	55.2	-0.72	-1.27	±5	Mar. 20, 2012
835	Body	21.5	0.961	54.5	0.97	55.2	-0.93	-1.27	±5	May. 21, 2012
1750	Body	21.6	1.518	52.076	1.52	53.3	-0.13	-2.30	±5	Mar. 03, 2012
1750	Body	21.4	1.546	51.742	1.52	53.3	1.71	-2.92	±5	Mar. 05, 2012
1750	Body	21.5	1.523	51.635	1.52	53.3	0.20	-3.12	±5	Mar. 20, 2012
1900	Body	21.6	1.548	52.971	1.52	53.3	1.84	-0.62	±5	Mar. 02, 2012
1900	Body	21.5	1.503	53.023	1.52	53.3	-1.12	-0.52	±5	Mar. 03, 2012
1900	Body	21.5	1.534	51.986	1.52	53.3	0.92	-2.47	±5	Mar. 20, 2012
1900	Body	21.5	1.52	54.6	1.52	53.3	0.00	2.44	±5	May. 21, 2012
2450	Body	21.6	1.963	52.895	1.95	52.7	0.67	0.37	±5	Mar. 08, 2012
2450	Body	21.4	1.973	52.342	1.95	52.7	1.18	-0.68	±5	Mar. 20, 2012

Table 6.2 Measuring Results for Simulating Liquid

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7. <u>SAR Measurement Evaluation</u>

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 <u>Purpose of System Performance check</u>

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 <u>System Setup</u>

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:
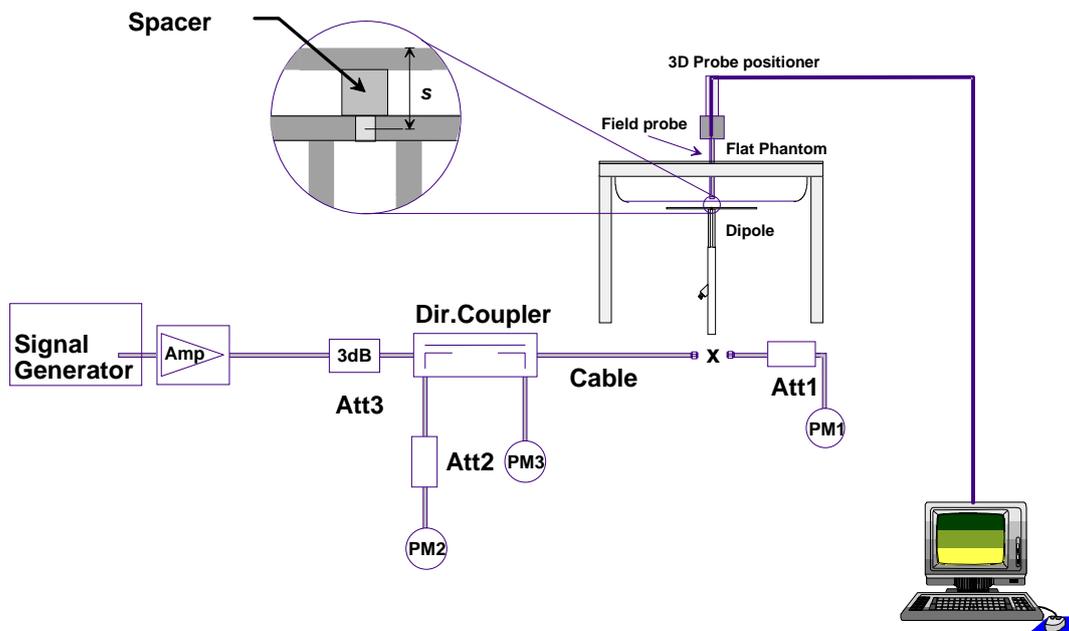
Fig 8.1 System Setup for System Evaluation

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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.
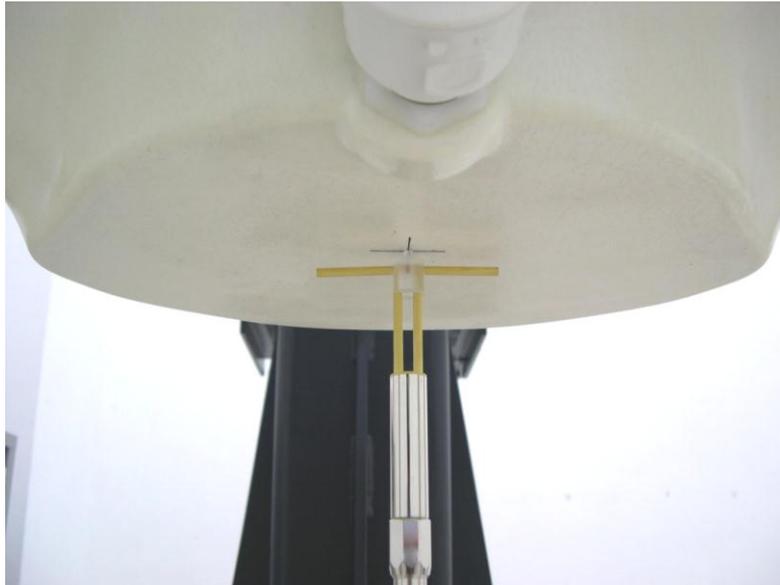
Fig 8.2 Photo of Dipole Setup

7.3 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	Targeted SAR_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	Normalized SAR_{1g} (W/kg)	Deviation (%)
Mar. 07, 2012	750	Body	8.86	2.14	8.56	-3.39
Mar. 20, 2012	750	Body	8.86	2.18	8.72	-1.58
Mar. 06, 2012	835	Body	9.82	2.57	10.28	4.68
Mar. 20, 2012	835	Body	9.82	2.65	10.60	7.94
May. 21, 2012	835	Body	9.82	2.42	9.68	-1.43
Mar. 03, 2012	1750	Body	36.8	8.65	34.60	-5.98
Mar. 05, 2012	1750	Body	36.8	9.28	37.12	0.87
Mar. 20, 2012	1750	Body	36.8	9.65	38.60	4.89
Mar. 02, 2012	1900	Body	40	9.73	38.92	-2.70
Mar. 03, 2012	1900	Body	40	9.45	37.80	-5.50
Mar. 20, 2012	1900	Body	40	10.5	42.00	5.00
May. 21, 2012	1900	Body	40	9.57	38.28	-4.30
Mar. 08, 2012	2450	Body	52.3	13.7	54.80	4.78
Mar. 20, 2012	2450	Body	52.3	13.9	55.60	6.31

Table 7.1 Target and Measurement SAR after Normalized

8. EUT Testing Position

This EUT was tested in seven different positions. They are bottom face of tablet PC with phantom 0cm and 1cm gap, Secondary Landscape with phantom 0cm and 1.1cm gap, Primary Portrait with phantom 0 cm gap, Secondary Portrait with phantom 0 cm gap, and keypad-bottom directly touched the phantom. Please refer to Appendix E for the test setup photos.

9. _Measurement Procedures_

The measurement procedures are as follows:

(a) Use base station simulator (if applicable) or engineering software to transmit RF power continuously (continuous Tx) in the highest power channel.
(b) Keep EUT to radiate maximum output power or 100% duty factor (if applicable)
(c) Measure output power through RF cable and power meter.
(d) Place the EUT in the positions as Appendix E demonstrates.
(e) Set scan area, grid size and other setting on the DASY software.
(f) Measure SAR results for the highest power channel on each testing position.
(g) Find out the largest SAR result on these testing positions of each band
(h) Measure SAR results for other channels in worst SAR testing position if the 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 measures 5x5x7 points with step size 8, 8 and 5 mm for 300 MHz to 3 GHz, and 8x8x8 points with step size 4, 4 and 2.5 mm for 3 GHz to 6 GHz. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g.

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 (step-size is 4, 4 and 2.5 mm). 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 drift more than 5%, the SAR will be retested.

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10. <u>SAR Test Configurations</u>

10.1 <u>Conducted Power (Unit: dBm)</u>

<GPRS / EDGE without Power Reduction>

Burst Average Power						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency (MHz)	**824.2**	**836.4**	**848.8**	**1850.2**	**1880.0**	**1909.8**
GPRS 8 (1 Uplink) CS1	32.90	32.75	32.70	29.58	29.63	30.03
GPRS 10 (2 Uplink) CS1	32.74	32.63	32.61	29.40	29.45	29.89
GPRS 11 (3 Uplink) CS1	32.60	32.46	32.42	29.25	29.23	29.59
GPRS 12 (4 Uplink) CS1	32.42	32.32	32.29	28.93	28.94	29.40
EDGE 8 (GMSK, 1 Uplink) MCS1	32.78	32.65	32.60	29.54	29.60	29.99
EDGE 10 (GMSK, 2 Uplink) MCS1	32.65	32.53	32.52	29.35	29.42	29.85
EDGE 11 (GMSK, 3 Uplink) MCS1	32.52	32.38	32.32	29.21	29.13	29.53
EDGE 12 (GMSK, 4 Uplink) MCS1	32.35	32.23	32.22	28.88	28.88	29.34
EDGE 8 (8PSK, 1 Uplink) MCS9	26.17	26.26	26.27	26.29	26.35	26.62
EDGE 10 (8PSK, 2 Uplink) MCS9	26.15	26.20	26.19	26.12	26.17	26.46
EDGE 11 (8PSK, 3 Uplink) MCS9	26.00	26.06	26.07	25.95	25.96	26.19
EDGE 12 (8PSK, 4 Uplink) MCS9	25.89	25.91	25.89	25.68	25.71	25.99

Source-Based Time-Averaged Power						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency (MHz)	**824.2**	**836.4**	**848.8**	**1850.2**	**1880.0**	**1909.8**
GPRS 8 (1 Uplink) CS1	23.90	23.75	23.70	20.58	20.63	21.03
GPRS 10 (2 Uplink) CS1	26.74	26.63	26.61	23.40	23.45	23.89
GPRS 11 (3 Uplink) CS1	28.34	28.20	28.16	24.99	24.97	25.33
GPRS 12 (4 Uplink) CS1	**29.42**	29.32	29.29	25.93	25.94	**26.40**
EDGE 8 (GMSK, 1 Uplink) MCS1	23.78	23.65	23.60	20.54	20.60	20.99
EDGE 10 (GMSK, 2 Uplink) MCS1	26.65	26.53	26.52	23.35	23.42	23.85
EDGE 11 (GMSK, 3 Uplink) MCS1	28.26	28.12	28.06	24.95	24.87	25.27
EDGE 12 (GMSK, 4 Uplink) MCS1	29.35	29.23	29.22	25.88	25.88	26.34
EDGE 8 (8PSK, 1 Uplink) MCS9	17.17	17.26	17.27	17.29	17.35	17.62
EDGE 10 (8PSK, 2 Uplink) MCS9	20.15	20.20	20.19	20.12	20.17	20.46
EDGE 11 (8PSK, 3 Uplink) MCS9	21.74	21.80	21.81	21.69	21.70	21.93
EDGE 12 (8PSK, 4 Uplink) MCS9	22.89	22.91	22.89	22.68	22.71	22.99

Remark: The source-based time-averaged power is linearly scaled the maximum burst averaged power based on time slots. The calculated method are shown as below:
Source based time averaged power = Maximum burst averaged power (1 Uplink) - 9 dB
Source based time averaged power = Maximum burst averaged power (2 Uplink) - 6 dB
Source based time averaged power = Maximum burst averaged power (3 Uplink) - 4.26 dB
Source based time averaged power = Maximum burst averaged power (4 Uplink) - 3 dB

Note:

1. Following KDB 941225 D03, for Body SAR testing, the EUT was set in GPRS 12 for GSM850 and set in GPRS 12 for GSM1900 due to its highest source-based time-average power.

2. Per KDB 447498, the maximum output power channel is used for SAR testing and for further SAR test reduction.

3. EDGE tests with MCS1 setting, GMSK modulation. Burst average power with MCS9 setting 8 PSK modulation, is provided voluntary for reference.

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<GPRS / EDGE with Power Reduction>

Burst Average Power						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency (MHz)	**824.2**	**836.4**	**848.8**	**1850.2**	**1880.0**	**1909.8**
GPRS 8 (1 Uplink) CS1	26.71	<mark>26.87</mark>	26.71	21.75	21.95	<mark>22.01</mark>
GPRS 10 (2 Uplink) CS1	26.56	26.78	26.61	21.50	21.73	21.81
GPRS 11 (3 Uplink) CS1	26.48	26.69	26.49	21.34	21.49	21.66
GPRS 12 (4 Uplink) CS1	26.31	26.39	26.32	20.95	20.99	21.53
EDGE 8 (GMSK, 1 Uplink) MCS1	26.59	26.82	26.65	21.58	21.79	21.85
EDGE 10 (GMSK, 2 Uplink) MCS1	26.51	26.71	26.56	21.42	21.64	21.71
EDGE 11 (GMSK, 3 Uplink) MCS1	26.39	26.60	26.38	21.25	21.43	21.44
EDGE 12 (GMSK, 4 Uplink) MCS1	26.23	26.45	26.22	20.96	21.16	21.20
EDGE 8 (8PSK, 1 Uplink) MCS9	20.24	20.36	20.14	18.38	18.46	18.54
EDGE 10 (8PSK, 2 Uplink) MCS9	20.20	20.28	20.09	18.26	18.37	18.49
EDGE 11 (8PSK, 3 Uplink) MCS9	19.94	20.00	19.88	17.79	17.72	18.02
EDGE 12 (8PSK, 4 Uplink) MCS9	19.72	19.75	19.67	17.49	17.69	17.73

<GPRS / EDGE with Power Reduction>

Source-Based Time-Averaged Power						
Band	**GSM850**			**GSM1900**		
Channel	**128**	**189**	**251**	**512**	**661**	**810**
Frequency (MHz)	**824.2**	**836.4**	**848.8**	**1850.2**	**1880.0**	**1909.8**
GPRS 8 (1 Uplink) CS1	17.71	17.87	17.71	12.75	12.95	13.01
GPRS 10 (2 Uplink) CS1	20.56	20.78	20.61	15.50	15.73	15.81
GPRS 11 (3 Uplink) CS1	22.22	22.43	22.23	17.08	17.23	17.40
GPRS 12 (4 Uplink) CS1	23.31	<mark style="background:#0f0">23.39</mark>	23.32	17.95	17.99	<mark style="background:#0f0">18.53</mark>
EDGE 8 (GMSK, 1 Uplink) MCS1	17.59	17.82	17.65	12.58	12.79	12.85
EDGE 10 (GMSK, 2 Uplink) MCS1	20.51	20.71	20.56	15.42	15.64	15.71
EDGE 11 (GMSK, 3 Uplink) MCS1	22.13	22.34	22.12	16.99	17.17	17.18
EDGE 12 (GMSK, 4 Uplink) MCS1	23.23	23.45	23.22	17.96	18.16	18.20
EDGE 8 (8PSK, 1 Uplink) MCS9	11.24	11.36	11.14	9.38	9.46	9.54
EDGE 10 (8PSK, 2 Uplink) MCS9	14.20	14.28	14.09	12.26	12.37	12.49
EDGE 11 (8PSK, 3 Uplink) MCS9	15.68	15.74	15.62	13.53	13.46	13.76
EDGE 12 (8PSK, 4 Uplink) MCS9	16.72	16.75	16.67	14.49	14.69	14.73

Remark: The source-based time-averaged power is linearly scaled the maximum burst averaged power based on time slots. The calculated method are shown as below:
Source based time averaged power = Maximum burst averaged power (1 Uplink) - 9 dB
Source based time averaged power = Maximum burst averaged power (2 Uplink) - 6 dB
Source based time averaged power = Maximum burst averaged power (3 Uplink) - 4.26 dB
Source based time averaged power = Maximum burst averaged power (4 Uplink) - 3 dB

Note:

1. Following KDB 941225 D03, for Body SAR testing, the EUT was set in GPRS 12 for GSM850 and set in GPRS 12 for GSM1900 due to its highest source-based time-average power.

2. Per KDB 447498, the maximum output power channel is used for SAR testing and for further SAR test reduction.

3. EDGE tests with MCS1 setting, GMSK modulation. Burst average power with MCS9 setting 8 PSK modulation, is provided voluntary for reference.

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Power Reduction Delta Level – Full power and reduction power level

Band	GSM850			Target (dB)	GSM1900			Target (dB)
Channel	128	189	251		512	661	810	
Frequency (MHz)	824.2	836.4	848.8		1850.2	1880	1909.8	
GPRS 8 (1 Uplink) – CS1	6.19	5.88	5.99	6	7.83	7.68	8.02	8
GPRS 10 (2 Uplink) – CS1	6.18	5.85	6.00	6	7.90	7.72	8.08	8
GPRS 11 (3 Uplink) – CS1	6.12	5.77	5.93	6	7.91	7.74	7.93	8
GPRS 12 (4 Uplink) – CS1	6.11	5.83	5.97	6	7.98	7.95	7.87	8
EDGE 8 (1 Uplink) – MCS1	6.19	5.83	5.95	6	7.96	7.81	8.14	8
EDGE 10 (2 Uplink) – MCS1	6.14	5.82	5.96	6	7.93	7.78	8.14	8
EDGE 11 (3 Uplink) – MCS1	6.13	5.78	5.94	6	7.96	7.70	8.09	8
EDGE 12 (4 Uplink) – MCS1	6.12	5.78	6.00	6	7.92	7.72	8.14	8
EDGE 8 (1 Uplink) – MCS9	5.93	5.90	6.13	6	7.91	7.89	8.08	8
EDGE 10 (2 Uplink) – MCS9	5.95	5.92	6.10	6	7.86	7.80	7.97	8
EDGE 11 (3 Uplink) – MCS9	6.06	6.06	6.19	6	8.16	8.24	8.17	8
EDGE 12 (4 Uplink) – MCS9	6.17	6.16	6.22	6	8.19	8.02	8.26	8

Note:
1. Burst average output power here.
2. The target power reduction value is listed in sec. 3.4.2. The deviation from the specification is due to the tolerance in the measurement.

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<WCDMA without Power Reduction>

Band		WCDMA Band V			WCDMA Band II			WCDMA Band IV		
Channel		4132	4182	4233	9262	9400	9538	1312	1413	1513
Frequency (MHz)		826.4	836.4	846.6	1852.4	1880.0	1907.6	1712.4	1732.6	1752.6
RMC 12.2K		24.35	24.14	24.18	24.15	24.23	24.19	23.06	23.22	23.26
HSDPA Subtest-1		24.28	24.03	24.00	24.17	24.16	24.09	22.99	23.17	23.05
HSDPA Subtest-2		23.82	23.48	23.55	23.72	23.85	23.71	22.57	22.87	22.67
HSDPA Subtest-3		23.92	23.55	23.60	23.68	23.90	23.66	22.59	22.69	22.66
HSDPA Subtest-4		23.91	23.56	23.67	23.70	23.70	23.82	22.50	22.79	22.69
HSUPA Subtest-1		23.31	23.01	23.36	23.61	23.45	23.74	22.54	22.63	22.24
HSUPA Subtest-2		22.45	22.67	22.47	22.48	22.46	22.74	21.82	21.62	21.45
HSUPA Subtest-3		22.63	22.31	22.48	22.72	22.82	22.94	21.61	21.96	21.83
HSUPA Subtest-4		22.56	22.93	22.63	22.88	22.80	22.94	21.66	21.83	21.72
HSUPA Subtest-5		23.84	23.44	23.65	23.80	23.90	23.85	22.31	22.35	22.40
MPR										
0	HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	HSDPA Subtest-2	0.46	0.55	0.45	0.45	0.31	0.38	0.42	0.30	0.38
0.5	HSDPA Subtest-3	0.36	0.48	0.40	0.49	0.26	0.43	0.40	0.48	0.39
0.5	HSDPA Subtest-4	0.37	0.47	0.33	0.47	0.46	0.27	0.49	0.38	0.36
0	HSUPA Subtest-1	0.53	0.43	0.29	0.19	0.45	0.11	-0.23	-0.28	0.16
1	HSUPA Subtest-2	1.39	0.77	1.18	1.32	1.44	1.11	0.49	0.73	0.95
1	HSUPA Subtest-3	1.21	1.13	1.17	1.08	1.08	0.91	0.70	0.39	0.57
1	HSUPA Subtest-4	1.28	0.51	1.02	0.92	1.10	0.91	0.65	0.52	0.68
0	HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note:

1. For Body SAR, per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA subset-1 and HSUPA subset-5 output power is < 1/4 dB higher than RMC, or SAR with RMC 12.2kbps setting is ≦1.2W/kg, HSDPA and HSUPA SAR evaluation can be excluded.

2. According to KDB 941225 D02 v02, 1)b), the MPR implementation information is provided here.

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<WCDMA with Power Reduction>

Band		WCDMA Band V			WCDMA Band II			WCDMA Band IV		
Channel		4132	4182	4233	9262	9400	9538	1312	1413	1513
Frequency (MHz)		826.4	836.4	846.6	1852.4	1880.0	1907.6	1712.4	1732.6	1752.6
RMC 12.2K		20.27	19.81	20.15	17.70	17.72	17.79	17.76	**18.18**	17.66
HSDPA Subtest-1		20.18	19.80	20.04	17.89	17.95	17.87	17.40	17.87	17.27
HSDPA Subtest-2		19.70	19.31	19.56	17.91	18.00	17.93	17.51	17.92	17.40
HSDPA Subtest-3		19.75	19.34	19.66	17.53	17.63	17.64	17.25	17.71	17.15
HSDPA Subtest-4		19.81	19.45	19.68	17.65	17.73	17.70	17.30	17.81	17.11
HSUPA Subtest-1		19.53	19.11	19.42	17.52	17.41	17.46	17.33	17.53	17.20
HSUPA Subtest-2		18.70	18.37	18.66	16.08	16.20	16.31	16.61	16.48	16.54
HSUPA Subtest-3		18.94	18.58	18.89	16.63	16.48	16.70	16.88	16.96	16.99
HSUPA Subtest-4		18.94	18.57	18.91	16.22	16.35	16.42	16.57	16.78	16.40
HSUPA Subtest-5		19.73	20.01	20.20	17.42	17.84	17.75	17.17	17.20	17.00
MPR										
0	HSDPA Subtest-1	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
0	HSDPA Subtest-2	0.48	0.49	0.48	-0.02	-0.05	-0.06	-0.11	-0.05	-0.13
0.5	HSDPA Subtest-3	0.43	0.46	0.38	0.36	0.32	0.23	0.15	0.16	0.12
0.5	HSDPA Subtest-4	0.37	0.35	0.36	0.24	0.22	0.17	0.10	0.06	0.16
0	HSUPA Subtest-1	0.20	0.90	0.78	-0.10	0.43	0.29	-0.16	-0.33	-0.20
1	HSUPA Subtest-2	1.03	1.64	1.54	1.34	1.64	1.44	0.56	0.72	0.46
1	HSUPA Subtest-3	0.79	1.43	1.31	0.79	1.36	1.05	0.29	0.24	0.01
1	HSUPA Subtest-4	0.79	1.44	1.29	1.20	1.49	1.33	0.60	0.42	0.60
0	HSUPA Subtest-5	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note:

1. For Body SAR, per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA subset-1 and HSUPA subset-5 output power is < 1/4 dB higher than RMC, or SAR with RMC 12.2kbps setting is $\leqq$1.2W/kg, HSDPA and HSUPA SAR evaluation can be excluded.
2. According to KDB 941225 D02 v02, 1)b), the MPR implementation information is provided here.

Power Reduction Delta Level – Full power and reduction power level

Band	WCDMA Band V				WCDMA Band II				WCDMA Band IV			
Channel	4132	4182	4233	Target Reduction (dB)	9262	9400	9538	Target Reduction (dB)	1312	1413	1513	Target Reduction (dB)
Frequency (MHz)	826.4	836.4	846.6		1852.4	1880	1907.6		1712.4	1732.6	1752.6	
RMC 12.2K	4.08	4.33	4.03	4	6.45	6.51	6.40	6.5	5.30	5.04	5.60	5
HSDPA Subtest-1	4.10	4.23	3.96	4	6.28	6.21	6.22	6.5	5.59	5.30	5.78	5
HSDPA Subtest-2	4.12	4.17	3.99	4	5.81	5.85	5.78	6.5	5.06	4.95	5.27	5
HSDPA Subtest-3	4.17	4.21	3.94	4	6.15	6.27	6.02	6.5	5.34	4.98	5.51	5
HSDPA Subtest-4	4.10	4.11	3.99	4	6.05	5.97	6.12	6.5	5.20	4.98	5.58	5
HSUPA Subtest-1	3.78	3.90	3.94	4	6.09	6.04	6.28	6.5	5.21	5.10	5.04	5
HSUPA Subtest-2	3.75	4.30	3.81	4	6.40	6.26	6.43	6.5	5.21	5.14	4.91	5
HSUPA Subtest-3	3.69	3.73	3.59	4	6.09	6.34	6.24	6.5	4.73	5.00	4.84	5
HSUPA Subtest-4	3.62	4.36	3.72	4	6.66	6.45	6.52	6.5	5.09	5.05	5.32	5
HSUPA Subtest-5	4.11	3.43	3.45	4	6.38	6.06	6.10	6.5	5.14	5.15	5.40	5

Note: The target power reduction value is listed in sec. 3.4.2. The deviation from the specification is due to the tolerance in the measurement.

<Without Power Reduction: LTE band 17>

Frequency [MHz]	Uplink Channel Number	BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power (dBm)	3GPP MPR (dB)	MPR Result (dB)
709	23780	10	1	0	QPSK	23.55	0	0.00
709	23780	10	1	49	QPSK	23.49	0	0.06
709	23780	10	25	13	QPSK	23.23	≤ 1	0.32
709	23780	10	50	0	QPSK	23.11	≤ 1	0.44
709	23780	10	1	0	16-QAM	22.73	≤ 1	0.82
709	23780	10	1	49	16-QAM	23.09	≤ 1	0.46
709	23780	10	25	13	16-QAM	22.29	≤ 2	1.26
709	23780	10	50	0	16-QAM	22.23	≤ 2	1.32
706.5	23755	5	1	0	QPSK	23.50	0	0.00
706.5	23755	5	1	24	QPSK	23.48	0	0.02
706.5	23755	5	12	6	QPSK	23.06	≤ 1	0.44
706.5	23755	5	25	0	QPSK	23.48	≤ 1	0.02
706.5	23755	5	1	0	16-QAM	22.91	≤ 1	0.59
706.5	23755	5	1	24	16-QAM	22.71	≤ 1	0.79
706.5	23755	5	12	6	16-QAM	22.31	≤ 2	1.19
706.5	23755	5	25	0	16-QAM	22.96	≤ 2	0.54
710	23790	10	1	0	QPSK	23.50	0	0.00
710	23790	10	1	49	QPSK	23.43	0	0.07
710	23790	10	25	13	QPSK	23.13	≤ 1	0.37
710	23790	10	50	0	QPSK	22.89	≤ 1	0.61
710	23790	10	1	0	16-QAM	22.68	≤ 1	0.82
710	23790	10	1	49	16-QAM	22.96	≤ 1	0.54
710	23790	10	25	13	16-QAM	22.37	≤ 2	1.13
710	23790	10	50	0	16-QAM	22.06	≤ 2	1.44
710	23790	5	1	0	QPSK	23.45	0	0.00
710	23790	5	1	24	QPSK	23.38	0	0.07
710	23790	5	12	6	QPSK	23.10	≤ 1	0.35
710	23790	5	25	0	QPSK	23.24	≤ 1	0.21
710	23790	5	1	0	16-QAM	22.96	≤ 1	0.49
710	23790	5	1	24	16-QAM	22.87	≤ 1	0.58
710	23790	5	12	6	16-QAM	22.56	≤ 2	0.89
710	23790	5	25	0	16-QAM	22.66	≤ 2	0.79
711	23800	10	1	0	QPSK	23.51	0	0.00
711	23800	10	1	49	QPSK	23.46	0	0.05
711	23800	10	25	13	QPSK	23.22	≤ 1	0.29
711	23800	10	50	0	QPSK	23.09	≤ 1	0.42
711	23800	10	1	0	16-QAM	22.70	≤ 1	0.81
711	23800	10	1	49	16-QAM	22.96	≤ 1	0.55
711	23800	10	25	13	16-QAM	22.33	≤ 2	1.18
711	23800	10	50	0	16-QAM	22.47	≤ 2	1.04
713.5	23825	5	1	0	QPSK	23.46	0	0.00
713.5	23825	5	1	24	QPSK	23.33	0	0.13
713.5	23825	5	12	6	QPSK	23.12	≤ 1	0.34
713.5	23825	5	25	0	QPSK	23.34	≤ 1	0.12
713.5	23825	5	1	0	16-QAM	22.67	≤ 1	0.79
713.5	23825	5	1	24	16-QAM	22.83	≤ 1	0.63
713.5	23825	5	12	6	16-QAM	22.30	≤ 2	1.16
713.5	23825	5	25	0	16-QAM	22.92	≤ 2	0.54

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<With Power Reduction: LTE band 17>

Frequency [MHz]	Uplink Channel Number	BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power (dBm)	3GPP MPR (dB)	MPR Result (dB)	Power Reduction (dB)
709	23780	10	1	0	QPSK	20.55	0	0.00	3.00
709	23780	10	1	49	QPSK	20.46	0	0.09	3.03
709	23780	10	25	13	QPSK	20.41	≤ 1	0.14	2.82
709	23780	10	50	0	QPSK	20.26	≤ 1	0.29	2.85
709	23780	10	1	0	16-QAM	19.83	≤ 1	0.72	2.90
709	23780	10	1	49	16-QAM	19.77	≤ 1	0.78	3.32
709	23780	10	25	13	16-QAM	19.19	≤ 2	1.36	3.10
709	23780	10	50	0	16-QAM	19.10	≤ 2	1.45	3.13
706.5	23755	5	1	0	QPSK	20.48	0	0.00	3.02
706.5	23755	5	1	24	QPSK	20.29	0	0.19	3.19
706.5	23755	5	12	6	QPSK	20.30	≤ 1	0.18	2.76
706.5	23755	5	25	0	QPSK	20.33	≤ 1	0.15	3.15
706.5	23755	5	1	0	16-QAM	20.12	≤ 1	0.36	2.79
706.5	23755	5	1	24	16-QAM	19.68	≤ 1	0.80	3.03
706.5	23755	5	12	6	16-QAM	19.44	≤ 2	1.04	2.87
706.5	23755	5	25	0	16-QAM	19.81	≤ 2	0.67	3.15
710	23790	10	1	0	QPSK	20.59	0	0.00	2.91
710	23790	10	1	49	QPSK	20.39	0	0.20	3.04
710	23790	10	25	13	QPSK	19.97	≤ 1	0.62	3.16
710	23790	10	50	0	QPSK	20.05	≤ 1	0.54	2.84
710	23790	10	1	0	16-QAM	19.78	≤ 1	0.81	2.90
710	23790	10	1	49	16-QAM	20.19	≤ 1	0.40	2.77
710	23790	10	25	13	16-QAM	19.43	≤ 2	1.16	2.94
710	23790	10	50	0	16-QAM	18.96	≤ 2	1.63	3.10
710	23790	5	1	0	QPSK	20.40	0	0.00	3.05
710	23790	5	1	24	QPSK	20.31	0	0.09	3.07
710	23790	5	12	6	QPSK	20.18	≤ 1	0.22	2.92
710	23790	5	25	0	QPSK	20.19	≤ 1	0.21	3.05
710	23790	5	1	0	16-QAM	20.23	≤ 1	0.17	2.73
710	23790	5	1	24	16-QAM	20.00	≤ 1	0.40	2.87
710	23790	5	12	6	16-QAM	19.64	≤ 2	0.76	2.92
710	23790	5	25	0	16-QAM	19.59	≤ 2	0.81	3.07
711	23800	10	1	0	QPSK	`20.69`	0	0.00	2.82
711	23800	10	1	49	QPSK	20.37	0	0.32	3.09
711	23800	10	25	13	QPSK	20.06	≤ 1	0.63	3.16
711	23800	10	50	0	QPSK	20.36	≤ 1	0.33	2.73
711	23800	10	1	0	16-QAM	19.84	≤ 1	0.85	2.86
711	23800	10	1	49	16-QAM	19.78	≤ 1	0.91	3.18
711	23800	10	25	13	16-QAM	19.36	≤ 2	1.33	2.97
711	23800	10	50	0	16-QAM	19.29	≤ 2	1.40	3.18
713.5	23825	5	1	0	QPSK	20.40	0	0.00	3.06
713.5	23825	5	1	24	QPSK	20.16	0	0.24	3.17
713.5	23825	5	12	6	QPSK	20.12	≤ 1	0.28	3.00
713.5	23825	5	25	0	QPSK	19.96	≤ 1	0.44	3.38
713.5	23825	5	1	0	16-QAM	19.93	≤ 1	0.47	2.74
713.5	23825	5	1	24	16-QAM	19.92	≤ 1	0.48	2.91
713.5	23825	5	12	6	16-QAM	19.33	≤ 2	1.07	2.97
713.5	23825	5	25	0	16-QAM	19.80	≤ 2	0.60	3.12

<Without Power Reduction: LTE band 4>

Frequency [MHz]	Uplink Channel Number	BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power (dBm)	3GPP MPR (dB)	MPR Result (dB)
1715	20000	10	1	0	QPSK	23.20	0	0.00
1715	20000	10	1	49	QPSK	23.11	0	0.09
1715	20000	10	25	13	QPSK	22.87	≤ 1	0.33
1715	20000	10	50	0	QPSK	22.69	≤ 1	0.51
1715	20000	10	1	0	16-QAM	22.18	≤ 1	1.02
1715	20000	10	1	49	16-QAM	22.01	≤ 1	1.19
1715	20000	10	25	13	16-QAM	21.86	≤ 2	1.34
1715	20000	10	50	0	16-QAM	21.92	≤ 2	1.28
1712.5	19975	5	1	0	QPSK	23.16	0	0.00
1712.5	19975	5	1	24	QPSK	23.03	0	0.13
1712.5	19975	5	12	6	QPSK	22.84	≤ 1	0.32
1712.5	19975	5	25	0	QPSK	22.76	≤ 1	0.40
1712.5	19975	5	1	0	16-QAM	22.11	≤ 1	1.05
1712.5	19975	5	1	24	16-QAM	22.32	≤ 1	0.84
1712.5	19975	5	12	6	16-QAM	21.79	≤ 2	1.37
1712.5	19975	5	25	0	16-QAM	21.83	≤ 2	1.33
1732.5	20175	10	1	0	QPSK	23.23	0	0.00
1732.5	20175	10	1	49	QPSK	23.16	0	0.07
1732.5	20175	10	25	13	QPSK	22.94	≤ 1	0.29
1732.5	20175	10	50	0	QPSK	22.86	≤ 1	0.37
1732.5	20175	10	1	0	16-QAM	22.26	≤ 1	0.97
1732.5	20175	10	1	49	16-QAM	22.30	≤ 1	0.93
1732.5	20175	10	25	13	16-QAM	21.77	≤ 2	1.46
1732.5	20175	10	50	0	16-QAM	21.82	≤ 2	1.41
1732.5	20175	5	1	0	QPSK	23.17	0	0.00
1732.5	20175	5	1	24	QPSK	23.09	0	0.08
1732.5	20175	5	12	6	QPSK	22.97	≤ 1	0.20
1732.5	20175	5	25	0	QPSK	22.77	≤ 1	0.40
1732.5	20175	5	1	0	16-QAM	22.38	≤ 1	0.79
1732.5	20175	5	1	24	16-QAM	22.40	≤ 1	0.77
1732.5	20175	5	12	6	16-QAM	21.87	≤ 2	1.30
1732.5	20175	5	25	0	16-QAM	21.67	≤ 2	1.50
1750	20350	10	1	0	QPSK	23.19	0	0.00
1750	20350	10	1	49	QPSK	23.12	0	0.07
1750	20350	10	25	13	QPSK	23.06	≤ 1	0.13
1750	20350	10	50	0	QPSK	22.88	≤ 1	0.31
1750	20350	10	1	0	16-QAM	22.40	≤ 1	0.79
1750	20350	10	1	49	16-QAM	22.34	≤ 1	0.85
1750	20350	10	25	13	16-QAM	21.86	≤ 2	1.33
1750	20350	10	50	0	16-QAM	21.92	≤ 2	1.27
1752.5	20375	5	1	0	QPSK	23.15	0	0.00
1752.5	20375	5	1	24	QPSK	23.07	0	0.08
1752.5	20375	5	12	6	QPSK	22.99	≤ 1	0.16
1752.5	20375	5	25	0	QPSK	22.74	≤ 1	0.41
1752.5	20375	5	1	0	16-QAM	22.40	≤ 1	0.75
1752.5	20375	5	1	24	16-QAM	22.37	≤ 1	0.78
1752.5	20375	5	12	6	16-QAM	21.76	≤ 2	1.39
1752.5	20375	5	25	0	16-QAM	21.69	≤ 2	1.46

\<With Power Reduction: LTE band 4\>

Frequency [MHz]	Uplink Channel Number	BW [MHz]	RB Size	RB Offset	Mod	Maximum Average Power (dBm)	3GPP MPR (dB)	MPR Result (dB)	Power Reduction (dB)
1715	20000	10	1	0	QPSK	<mark>19.35</mark>	0	0.00	3.85
1715	20000	10	1	49	QPSK	19.26	0	0.09	3.85
1715	20000	10	25	13	QPSK	19.12	≤ 1	0.23	3.75
1715	20000	10	50	0	QPSK	18.68	≤ 1	0.67	4.01
1715	20000	10	1	0	16-QAM	18.80	≤ 1	0.55	3.38
1715	20000	10	1	49	16-QAM	18.17	≤ 1	1.18	3.84
1715	20000	10	25	13	16-QAM	17.87	≤ 2	1.48	3.99
1715	20000	10	50	0	16-QAM	17.54	≤ 2	1.81	4.38
1712.5	19975	5	1	0	QPSK	19.23	0	0.00	3.93
1712.5	19975	5	1	24	QPSK	19.19	0	0.04	3.84
1712.5	19975	5	12	6	QPSK	18.59	≤ 1	0.64	4.25
1712.5	19975	5	25	0	QPSK	18.42	≤ 1	0.81	4.34
1712.5	19975	5	1	0	16-QAM	18.25	≤ 1	0.98	3.86
1712.5	19975	5	1	24	16-QAM	18.64	≤ 1	0.59	3.68
1712.5	19975	5	12	6	16-QAM	17.37	≤ 2	1.86	4.42
1712.5	19975	5	25	0	16-QAM	17.27	≤ 2	1.96	4.56
1732.5	20175	10	1	0	QPSK	19.34	0	0.00	3.89
1732.5	20175	10	1	49	QPSK	19.24	0	0.10	3.92
1732.5	20175	10	25	13	QPSK	18.75	≤ 1	0.59	4.19
1732.5	20175	10	50	0	QPSK	18.63	≤ 1	0.71	4.23
1732.5	20175	10	1	0	16-QAM	18.79	≤ 1	0.55	3.47
1732.5	20175	10	1	49	16-QAM	18.90	≤ 1	0.44	3.40
1732.5	20175	10	25	13	16-QAM	17.68	≤ 2	1.66	4.09
1732.5	20175	10	50	0	16-QAM	17.55	≤ 2	1.79	4.27
1732.5	20175	5	1	0	QPSK	18.97	0	0.20	4.20
1732.5	20175	5	1	24	QPSK	19.17	0	0.00	3.92
1732.5	20175	5	12	6	QPSK	18.52	≤ 1	0.65	4.45
1732.5	20175	5	25	0	QPSK	18.44	≤ 1	0.73	4.33
1732.5	20175	5	1	0	16-QAM	18.38	≤ 1	0.79	4.00
1732.5	20175	5	1	24	16-QAM	18.61	≤ 1	0.56	3.79
1732.5	20175	5	12	6	16-QAM	17.32	≤ 2	1.85	4.55
1732.5	20175	5	25	0	16-QAM	17.17	≤ 2	2.00	4.50
1750	20350	10	1	0	QPSK	19.26	0	0.00	3.93
1750	20350	10	1	49	QPSK	19.17	0	0.09	3.95
1750	20350	10	25	13	QPSK	19.12	≤ 1	0.14	3.94
1750	20350	10	50	0	QPSK	19.06	≤ 1	0.20	3.82
1750	20350	10	1	0	16-QAM	18.83	≤ 1	0.43	3.57
1750	20350	10	1	49	16-QAM	18.35	≤ 1	0.91	3.99
1750	20350	10	25	13	16-QAM	18.03	≤ 2	1.23	3.83
1750	20350	10	50	0	16-QAM	17.97	≤ 2	1.29	3.95
1752.5	20375	5	1	0	QPSK	19.14	0	0.00	4.01
1752.5	20375	5	1	24	QPSK	19.10	0	0.04	3.97
1752.5	20375	5	12	6	QPSK	18.81	≤ 1	0.33	4.18
1752.5	20375	5	25	0	QPSK	18.66	≤ 1	0.48	4.08
1752.5	20375	5	1	0	16-QAM	18.55	≤ 1	0.59	3.85
1752.5	20375	5	1	24	16-QAM	18.94	≤ 1	0.20	3.43
1752.5	20375	5	12	6	16-QAM	17.67	≤ 2	1.47	4.09
1752.5	20375	5	25	0	16-QAM	17.58	≤ 2	1.56	4.11

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Note:
1. Per KDB 941225, if the output power variation across the band < 0.5dB, test middle channel SAR first and determine further test reduction based on the SAR results.
2. During proximity sensor activated and power reduction enabled, the LTE output is reduced to certain level, while MPR for different RB configurations is disabled. The power reduction is based on the normal maximum output power.

LTE Target MPR level

The device implements maximum power reduction per 3GPP 36.101 requirements where the MPR target is as below table. The MPR settings are implemented configured into firmware and cannot be disabled by the end user or LTE carrier network.

For Band 17 <Maximum Power>:

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]		MPR Target (dB)		3GPP MPR (dB)
	5MHz	10MHz	5MHz	10MHz	
QPSK	> 8	> 12	0	0	≤ 1
16 QAM	≤ 8	≤ 12	0.5	0.5	≤ 1
16 QAM	> 8	> 12	0.5	1	≤ 2

For Band 17 <Reduction Power>:

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]		MPR Target (dB)		3GPP MPR (dB)
	5MHz	10MHz	5MHz	10MHz	
QPSK	> 8	> 12	0	0	≤ 1
16 QAM	≤ 8	≤ 12	0.5	0.5	≤ 1
16 QAM	> 8	> 12	0.5	1	≤ 2

For Band 4 <Maximum Power>:

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]		MPR Target (dB)		3GPP MPR (dB)
	5MHz	10MHz	5MHz	10MHz	
QPSK	> 8	> 12	0	0	≤ 1
16 QAM	≤ 8	≤ 12	0.5	0.5	≤ 1
16 QAM	> 8	> 12	1.5	1	≤ 2

For Band 4 <Reduction Power>:

Modulation	Channel bandwidth / Transmission bandwidth configuration [RB]		MPR Target (dB)		3GPP MPR (dB)
	5MHz	10MHz	5MHz	10MHz	
QPSK	> 8	> 12	0	0	≤ 1
16 QAM	≤ 8	≤ 12	0.5	0.5	≤ 1
16 QAM	> 8	> 12	1.5	1	≤ 2

Note: The measurement result showed some difference from the target MPR level, due to expected measurement tolerance

<WLAN 2.4G>

Mode	Channel	Frequency (MHz)	Average power (dBm)			
			Data Rate (bps)			
			1M	**2M**	**5.5M**	**11M**
802.11b	CH 01	2412 MHz	<mark>14.55</mark>	14.38	13.63	13.27
	CH 06	2437 MHz	12.80	13.05	12.40	11.88
	CH 11	2462 MHz	12.15	12.35	11.99	11.57

Mode	Channel	Frequency (MHz)	Average power (dBm)							
			Data Rate (bps)							
			6M	**9M**	**12M**	**18M**	**24M**	**36M**	**48M**	**54M**
802.11g	CH 01	2412 MHz	<mark>13.77</mark>	13.11	12.79	12.43	11.96	11.33	10.65	10.44
	CH 06	2437 MHz	12.52	12.10	11.66	11.21	10.76	10.10	9.53	9.11
	CH 11	2462 MHz	11.75	11.62	11.44	11.09	10.45	9.88	9.14	8.98

Mode	Channel	Frequency (MHz)	Average power (dBm)							
			Data Rate (bps)							
			MCS0	**MCS1**	**MCS2**	**MCS3**	**MCS4**	**MCS5**	**MCS6**	**MCS7**
802.11n 20M	CH 01	2412 MHz	<mark>13.31</mark>	12.62	12.44	11.89	11.51	10.97	10.7	10.56
	CH 06	2437 MHz	12.07	11.46	11.02	10.78	10.23	9.66	9.55	9.38
	CH 11	2462 MHz	12.01	11.38	10.94	10.46	9.88	9.66	9.42	9.08

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 output power is less than 1/4 dB higher than 11b mode, thus the SAR can be excluded.

<Bluetooth>

Band	Bluetooth		
Channel	0	39	78
Frequency	2402	2441	2480
Average Power	8.16	<mark>9.52</mark>	8.93

Note: Bluetooth standalone SAR is not required since the highest average output power (9.52 dBm) is less than 60/f.

10.2 Exposure Positions Consideration

Secondary Landscape

0.4 cm   **WLAN/BT**

0.7 cm

2.6cm

5 cm

WWAN_Main

11 cm

Primary Portrait   **Secondary Portrait**

17cm   **17.4 cm**

Primary Landscape

Rear View
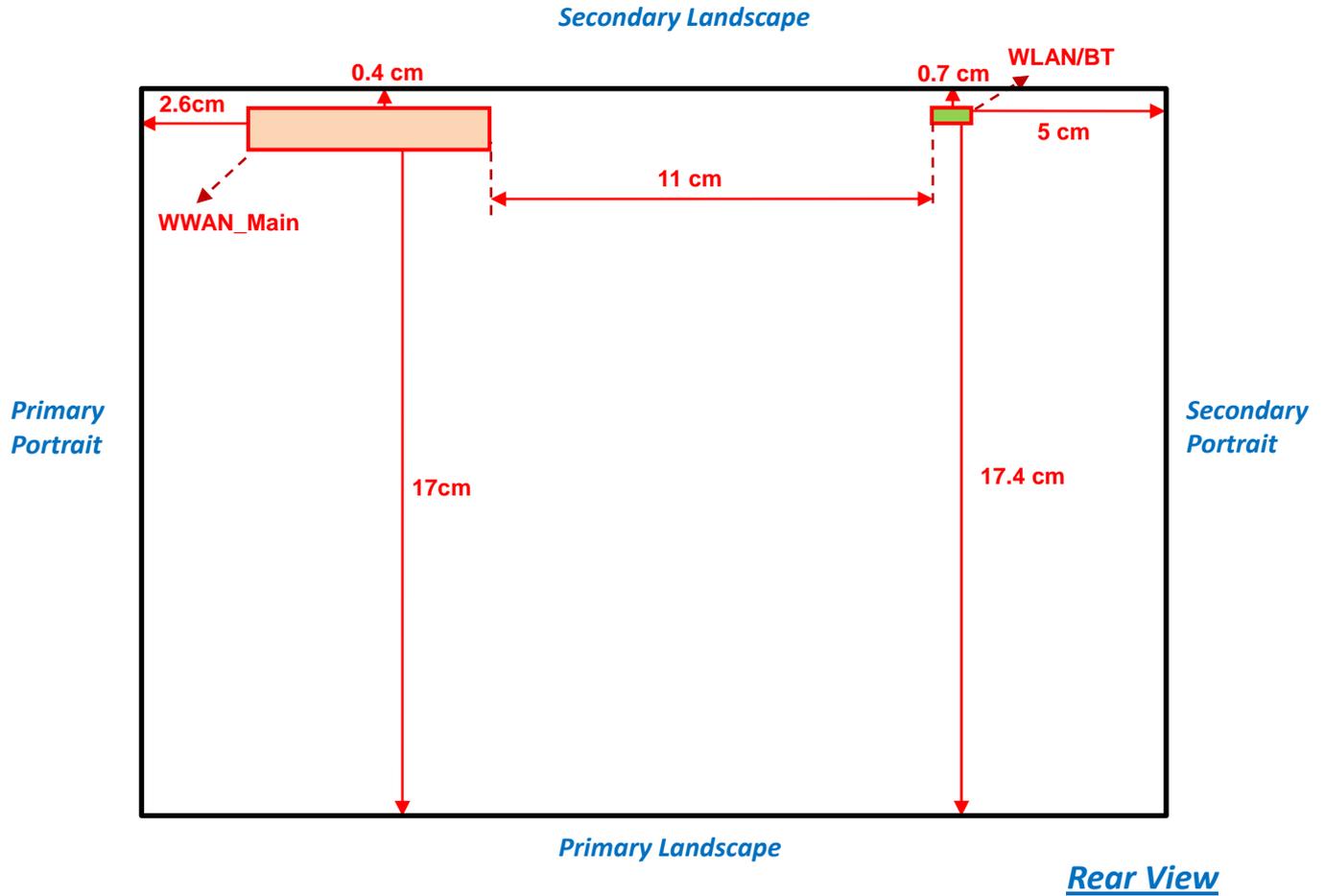
WWAN Antenna <Tx / Rx>	GSM850 GSM1900 WCDMA Band 2 WCDMA Band 4 WCDMA Band 5 LTE Band 4 LTE Band 17
WLAN/BT antenna <Tx / Rx>	2.4GHz 802.11 b/g/n Bluetooth

Sides for SAR tests; Tablet mode						
	Bottom Face	**Front Face**	**Secondary Landscape**	**Primary Landscape**	**Secondary Portrait**	**Primary Portrait**
GPRS/EDGE	✓ (0, 10mm)	x	✓ (0, 11mm)	x	x	✓ (0 mm)
UMTS	✓ (0, 10mm)	x	✓ (0, 11mm)	x	x	✓ (0 mm)
LTE	✓ (0, 10mm)	x	✓ (0, 11mm)	x	X	✓ (0 mm)
WLAN	✓ (0 mm)	x	✓ (0 mm)	x	✓ (0 mm)	x

Note:

1. Per KDB 941225 D07, the EUT diagonal > 20 cm and Mini-Tablet procedure is not applied. Therefore, SAR tests follow the Tablet Mode in KDB 447498.
2. There is no screen orientation limitation in EUT; that is 4 orientations are supported.
3. As in (1), the test distance is 0 mm to the flat phantom; SAR evaluation is required for Bottom Face and each applicable Edge with the antenna within 5 cm to the user.
4. The test distance 10 mm at Bottom Face and 11mm at Secondary Landscape are for verifying the conservative condition, whichever EUT proximity sensor maximum activated distance is 11 mm at Bottom Face and 12 mm at Secondary Landscape. The EUT is set in full-power mode at 10 mm and 11mm test distance to the phantom.
5. The proximity sensor is designed to be triggered for Bottom Face and Secondary-Landscape exposure positions. During SAR tests for EUT other edges, the sensor is disabled via software setting.
6. EUT does not support voice call function; therefore GSM SAR is not required.
7. Per KDB 447498 D01, the distance from WWAN Main antenna to the Secondary Portrait / Primary Landscape edge > 5 cm, therefore the stand-alone in these configurations SAR are not required.
8. Per KDB 447498 D01, the distance from WLAN antenna to the Primary Portrait / Primary Landscape edge > 5 cm, therefore the stand-alone SAR in these configurations are not required.
9. Per KDB 447498 D01, Bluetooth output power ≤ 60/f, thus standalone SAR is not required.

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11. SAR Test Results

11.1 Test Records for Body SAR Test <Tablet Mode>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Power Back-off	Output Power (dBm)	Power Drift	SAR$_{1g}$ (W/kg)
88	GSM850	GPRS12	Bottom Face	1	128	-	32.42	-0.11	0.707
89	GSM850	GPRS12	Bottom Face	1	189	-	32.32	0.1	0.635
90	GSM850	GPRS12	Bottom Face	1	251	-	32.29	0.04	0.586
91	GSM850	GPRS12	Secondary Landscape	1.1	128	-	32.42	-0.14	0.566
92	GSM850	GPRS12	Secondary Landscape	1.1	189	-	32.32	-0.13	0.507
93	GSM850	GPRS12	Secondary Landscape	1.1	251	-	32.29	-0.04	0.46
94	GSM850	GPRS12	Primary Portrait	0	128	-	32.42	-0.08	0.208
95	GSM850	GPRS12	Primary Portrait	0	189	-	32.32	-0.03	0.185
96	GSM850	GPRS12	Primary Portrait	0	251	-	32.29	0.165	0.16
167	GSM850	GPRS12	Bottom Face	0	128	v	26.31	-0.019	1.26
168	GSM850	GPRS12	Bottom Face	0	189	v	26.39	0.06	1.19
169	GSM850	GPRS12	Bottom Face	0	251	v	26.32	0.07	0.974
170	GSM850	GPRS12	Secondary Landscape	0	128	v	26.31	-0.057	1.25
171	GSM850	GPRS12	Secondary Landscape	0	189	v	26.39	0.031	1.19
172	GSM850	GPRS12	Secondary Landscape	0	251	v	26.32	-0.035	1.03
19	GSM1900	GPRS12	Bottom Face	1	512	-	28.93	-0.03	1.31
20	GSM1900	GPRS12	Bottom Face	1	661	-	28.94	0.04	1.21
21	GSM1900	GPRS12	Bottom Face	1	810	-	29.40	-0.07	1.3
16	GSM1900	GPRS12	Secondary Landscape	1.1	512	-	28.93	0.13	1.27
17	GSM1900	GPRS12	Secondary Landscape	1.1	661	-	28.94	-0.01	1.18
18	GSM1900	GPRS12	Secondary Landscape	1.1	810	-	29.40	0.01	1.39
22	GSM1900	GPRS12	Primary Portrait	0	512	-	28.93	0.04	0.519
23	GSM1900	GPRS12	Primary Portrait	0	661	-	28.94	-0.1	0.569
24	GSM1900	GPRS12	Primary Portrait	0	810	-	29.40	-0.09	0.648
7	GSM1900	GPRS12	Bottom Face	0	512	v	20.95	0.173	1.27
8	GSM1900	GPRS12	Bottom Face	0	661	v	20.99	-0.127	1.25
9	GSM1900	GPRS12	Bottom Face	0	810	v	21.53	-0.17	1.18
4	GSM1900	GPRS12	Secondary Landscape	0	512	v	20.95	0.08	1.11
5	GSM1900	GPRS12	Secondary Landscape	0	661	v	20.99	0.16	1.13
6	GSM1900	GPRS12	Secondary Landscape	0	810	v	21.53	-0.11	1

Note: Per KDB 447498, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary, and is provided voluntary here.

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Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Power Back-off	Output Power (dBm)	Power Drift	SAR$_{1g}$ (W/kg)
97	WCDMA V	RMC12.2K	Bottom Face	1	4132	-	24.35	0.03	0.299
98	WCDMA V	RMC12.2K	Bottom Face	1	4182	-	24.14	-0.14	**0.565**
99	WCDMA V	RMC12.2K	Bottom Face	1	4233	-	24.18	0.0006	0.312
100	WCDMA V	RMC12.2K	Secondary Landscape	1.1	4132	-	24.35	-0.06	0.265
101	WCDMA V	RMC12.2K	Secondary Landscape	1.1	4182	-	24.14	0.09	0.459
102	WCDMA V	RMC12.2K	Secondary Landscape	1.1	4233	-	24.18	-0.08	0.254
103	WCDMA V	RMC12.2K	Primary Portrait	0	4132	-	24.35	-0.04	0.091
104	WCDMA V	RMC12.2K	Primary Portrait	0	4182	-	24.14	0.06	0.181
105	WCDMA V	RMC12.2K	Primary Portrait	0	4233	-	24.18	-0.0069	0.087
173	WCDMA V	RMC12.2K	Bottom Face	0	4132	v	20.27	0.025	0.564
174	WCDMA V	RMC12.2K	Bottom Face	0	4182	v	19.81	-0.087	0.961
175	WCDMA V	RMC12.2K	Bottom Face	0	4233	v	20.15	0.052	0.558
176	WCDMA V	RMC12.2K	Secondary Landscape	0	4132	v	20.27	0.083	0.748
177	WCDMA V	RMC12.2K	Secondary Landscape	0	4182	v	19.81	-0.056	**1.19**
178	WCDMA V	RMC12.2K	Secondary Landscape	0	4233	v	20.15	-0.041	0.752
25	WCDMA IV	RMC12.2K	Bottom Face	1	1312	-	23.06	-0.01	1.02
26	WCDMA IV	RMC12.2K	Bottom Face	1	1413	-	23.22	-0.09	1.01
27	WCDMA IV	RMC12.2K	Bottom Face	1	1513	-	23.26	-0.1	1.21
28	WCDMA IV	RMC12.2K	Secondary Landscape	1.1	1312	-	23.06	-0.169	**1.25**
29	WCDMA IV	RMC12.2K	Secondary Landscape	1.1	1413	-	23.22	-0.12	1.2
30	WCDMA IV	RMC12.2K	Secondary Landscape	1.1	1513	-	23.26	0.124	1.22
40	WCDMA IV	RMC12.2K	Primary Portrait	0	1312	-	23.06	-0.01	0.148
41	WCDMA IV	RMC12.2K	Primary Portrait	0	1413	-	23.22	0.11	0.15
42	WCDMA IV	RMC12.2K	Primary Portrait	0	1513	-	23.26	-0.14	0.17
13	WCDMA IV	RMC12.2K	Bottom Face	0	1312	v	17.76	-0.19	1.07
14	WCDMA IV	RMC12.2K	Bottom Face	0	1413	v	18.18	-0.1	1.2
15	WCDMA IV	RMC12.2K	Bottom Face	0	1513	v	17.66	-0.16	1.31
46	WCDMA IV	RMC12.2K	Secondary Landscape	0	1312	v	17.76	-0.04	1.17
47	WCDMA IV	RMC12.2K	Secondary Landscape	0	1413	v	18.18	0.12	**1.33**
48	WCDMA IV	RMC12.2K	Secondary Landscape	0	1513	v	17.66	0.11	1.23

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Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Power Back-off	Output Power (dBm)	Power Drift	SAR$_{1g}$ (W/kg)
43	WCDMA II	RMC12.2K	Bottom Face	1	9262	-	24.15	-0.18	0.876
44	WCDMA II	RMC12.2K	Bottom Face	1	9400	-	24.23	-0.1	0.937
45	WCDMA II	RMC12.2K	Bottom Face	1	9538	-	24.19	-0.0061	0.875
34	WCDMA II	RMC12.2K	Secondary Landscape	1.1	9262	-	24.15	-0.06	0.718
35	WCDMA II	RMC12.2K	Secondary Landscape	1.1	9400	-	24.23	0.1	0.741
36	WCDMA II	RMC12.2K	Secondary Landscape	1.1	9538	-	24.19	0.04	0.732
37	WCDMA II	RMC12.2K	Primary Portrait	0	9262	-	24.15	-0.0038	0.357
38	WCDMA II	RMC12.2K	Primary Portrait	0	9400	-	24.23	-0.143	0.436
39	WCDMA II	RMC12.2K	Primary Portrait	0	9538	-	24.19	-0.08	0.441
179	WCDMA II	RMC12.2K	Bottom Face	0	9262	v	17.7	-0.08	1.08
180	WCDMA II	RMC12.2K	Bottom Face	0	9400	v	17.72	-0.15	0.838
181	WCDMA II	RMC12.2K	Bottom Face	0	9538	v	17.79	0.027	1.33
182	WCDMA II	RMC12.2K	Secondary Landscape	0	9262	v	17.7	-0.073	0.963
183	WCDMA II	RMC12.2K	Secondary Landscape	0	9400	v	17.72	-0.198	0.96
184	WCDMA II	RMC12.2K	Secondary Landscape	0	9538	v	17.79	-0.043	0.895

Note: Per KDB 447498, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary, and is provided voluntary here.

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49	LTE Band 4	QPSK	10M	25	13	Bottom Face	1	20175	-	22.94	-0.12	0.505
50	LTE Band 4	QPSK	10M	1	0	Bottom Face	1	20175	-	23.23	-0.06	0.542
51	LTE Band 4	QPSK	10M	1	49	Bottom Face	1	20175	-	23.16	-0.15	0.576
55	LTE Band 4	QPSK	10M	25	13	Secondary Landscape	1.1	20175	-	22.94	-0.05	0.847
56	LTE Band 4	QPSK	10M	25	13	Secondary Landscape	1.1	20000	-	22.87	0.15	0.792
57	LTE Band 4	QPSK	10M	25	13	Secondary Landscape	1.1	20350	-	23.06	-0.04	0.936
58	LTE Band 4	QPSK	10M	1	0	Secondary Landscape	1.1	20350	-	23.19	-0.04	**1.03**
59	LTE Band 4	QPSK	10M	1	49	Secondary Landscape	1.1	20350	-	23.12	-0.01	0.95
63	LTE Band 4	QPSK	10M	25	13	Primary Portrait	0	20175	-	22.94	-0.04	0.099
64	LTE Band 4	QPSK	10M	1	0	Primary Portrait	0	20175	-	23.23	-0.06	0.107
65	LTE Band 4	QPSK	10M	1	49	Primary Portrait	0	20175	-	23.16	-0.02	0.117
52	LTE Band 4	16QAM	10M	25	13	Bottom Face	1	20175	-	21.77	0.11	0.403
53	LTE Band 4	16QAM	10M	1	0	Bottom Face	1	20175	-	22.26	-0.04	0.462
54	LTE Band 4	16QAM	10M	1	49	Bottom Face	1	20175	-	22.3	-0.02	0.502
60	LTE Band 4	16QAM	10M	25	13	Secondary Landscape	1.1	20350	-	21.86	0.02	0.762
61	LTE Band 4	16QAM	10M	1	0	Secondary Landscape	1.1	20350	-	22.40	-0.02	0.891
62	LTE Band 4	16QAM	10M	1	49	Secondary Landscape	1.1	20350	-	22.34	-0.02	0.821
66	LTE Band 4	16QAM	10M	25	13	Primary Portrait	0	20175	-	21.77	-0.04	0.081
67	LTE Band 4	16QAM	10M	1	0	Primary Portrait	0	20175	-	22.26	-0.02	0.093
68	LTE Band 4	16QAM	10M	1	49	Primary Portrait	0	20175	-	22.3	-0.08	0.094
77	LTE Band 4	QPSK	10M	25	13	Bottom Face	0	20175	v	19.12	-0.13	1.1
78	LTE Band 4	QPSK	10M	25	13	Bottom Face	0	20000	v	18.75	0.15	0.968
79	LTE Band 4	QPSK	10M	25	13	Bottom Face	0	20350	v	19.12	0.06	1.25
80	LTE Band 4	QPSK	10M	1	0	Bottom Face	0	20350	v	19.26	0.07	1.4
81	LTE Band 4	QPSK	10M	1	49	Bottom Face	0	20350	v	19.17	0.07	1.39
69	LTE Band 4	QPSK	10M	25	13	Secondary Landscape	0	20175	v	19.12	-0.18	1.19
70	LTE Band 4	QPSK	10M	25	13	Secondary Landscape	0	20000	v	18.75	0.08	1.11
71	LTE Band 4	QPSK	10M	25	13	Secondary Landscape	0	20350	v	19.12	0.07	1.19
72	LTE Band 4	QPSK	10M	1	0	Secondary Landscape	0	20175	v	19.34	0.02	1.3
73	LTE Band 4	QPSK	10M	1	49	Secondary Landscape	0	20175	v	19.24	0.064	**1.41**
82	LTE Band 4	16QAM	10M	25	13	Bottom Face	0	20350	v	18.03	-0.09	1.02
83	LTE Band 4	16QAM	10M	1	0	Bottom Face	0	20350	v	18.83	-0.07	1.2
84	LTE Band 4	16QAM	10M	1	49	Bottom Face	0	20350	v	18.35	0.08	1.19
74	LTE Band 4	16QAM	10M	25	13	Secondary Landscape	0	20175	v	17.68	0.1	0.959
75	LTE Band 4	16QAM	10M	1	0	Secondary Landscape	0	20175	v	18.79	0.05	1.11
76	LTE Band 4	16QAM	10M	1	49	Secondary Landscape	0	20175	v	18.9	0.08	1.21

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112	LTE Band 17	QPSK	10M	25	13	Bottom Face	1	23790	-	23.13	0.00094	0.348
113	LTE Band 17	QPSK	10M	1	0	Bottom Face	1	23790	-	23.5	0.05	0.476
114	LTE Band 17	QPSK	10M	1	49	Bottom Face	1	23790	-	23.43	-0.08	0.473
118	LTE Band 17	QPSK	10M	25	13	Secondary Landscape	1.1	23790	-	23.13	0.07	0.211
119	LTE Band 17	QPSK	10M	1	0	Secondary Landscape	1.1	23790	-	23.5	-0.09	0.308
120	LTE Band 17	QPSK	10M	1	49	Secondary Landscape	1.1	23790	-	23.43	0.03	0.335
124	LTE Band 17	QPSK	10M	25	13	Primary Portrait	0	23790	-	23.13	0.05	0.158
125	LTE Band 17	QPSK	10M	1	0	Primary Portrait	0	23790	-	23.5	0.02	0.262
126	LTE Band 17	QPSK	10M	1	49	Primary Portrait	0	23790	-	23.43	0.09	0.248
115	LTE Band 17	16QAM	10M	25	13	Bottom Face	1	23790	-	22.37	0.08	0.311
116	LTE Band 17	16QAM	10M	1	0	Bottom Face	1	23790	-	22.68	-0.07	0.46
117	LTE Band 17	16QAM	10M	1	49	Bottom Face	1	23790	-	22.96	-0.16	0.437
121	LTE Band 17	16QAM	10M	25	13	Secondary Landscape	1.1	23790	-	22.37	0.09	0.22
122	LTE Band 17	16QAM	10M	1	0	Secondary Landscape	1.1	23790	-	22.68	-0.02	0.292
123	LTE Band 17	16QAM	10M	1	49	Secondary Landscape	1.1	23790	-	22.96	-0.08	0.272
127	LTE Band 17	16QAM	10M	25	13	Primary Portrait	0	23790	-	22.37	-0.05	0.142
128	LTE Band 17	16QAM	10M	1	0	Primary Portrait	0	23790	-	22.68	0.11	0.222
129	LTE Band 17	16QAM	10M	1	49	Primary Portrait	0	23790	-	22.96	0.04	0.206
130	LTE Band 17	QPSK	10M	25	13	Bottom Face	0	23790	v	19.97	0.18	0.932
131	LTE Band 17	QPSK	10M	25	13	Bottom Face	0	23780	v	20.41	0.02	0.925
132	LTE Band 17	QPSK	10M	25	13	Bottom Face	0	23800	v	20.06	0.137	0.965
133	LTE Band 17	QPSK	10M	1	0	Bottom Face	0	23800	v	20.69	0.03	1.09
134	LTE Band 17	QPSK	10M	1	49	Bottom Face	0	23800	v	19.78	0.12	1.15
135	LTE Band 17	QPSK	10M	25	13	Secondary Landscape	0	23790	v	19.97	-0.04	0.831
136	LTE Band 17	QPSK	10M	25	13	Secondary Landscape	0	23780	v	20.41	-0.02	0.783
137	LTE Band 17	QPSK	10M	25	13	Secondary Landscape	0	23800	v	20.06	-0.03	0.868
141	LTE Band 17	QPSK	10M	1	0	Secondary Landscape	0	23800	v	20.69	-0.09	0.792
142	LTE Band 17	QPSK	10M	1	49	Secondary Landscape	0	23800	v	19.78	-0.04	0.87
138	LTE Band 17	16QAM	10M	25	13	Bottom Face	0	23800	v	19.36	0.14	0.845
139	LTE Band 17	16QAM	10M	1	0	Bottom Face	0	23800	v	19.84	0.135	0.953
140	LTE Band 17	16QAM	10M	1	49	Bottom Face	0	23800	v	19.78	-0.082	1.06
143	LTE Band 17	16QAM	10M	25	13	Secondary Landscape	0	23800	v	19.36	0.03	0.756
144	LTE Band 17	16QAM	10M	1	0	Secondary Landscape	0	23800	v	19.84	0.06	0.727
145	LTE Band 17	16QAM	10M	1	49	Secondary Landscape	0	23800	v	19.78	0.12	0.78

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Note:

1. Per KDB 941225 D05, for LTE, if the smaller bandwidth output power is within +/- 0.5dB of the largest bandwidth, and the maximum SAR of the largest bandwidth is < 1.45 W/kg, SAR for smaller bandwidth can be excluded. Therefore LTE 5MHz bandwidth SAR tests are excluded.
2. If 50%-RB QPSK highest output channel SAR for each exposure position is ≤ 0.8 W/kg, other channels SAR tests are not necessary referring to KDB 941225.
3. Per KDB 941225 D05, for LTE, if 50%-RB QPSK/16QAM SAR < 1.45 W/kg, 100%-RB SAR can be excluded.
4. During proximity sensor activated and power reduction enabled, MPR for different RB configurations is applicable.

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Power Back-off	Output Power (dBm)	Power Drift	SAR$_{1g}$ (W/kg)
146	802.11b	-	Bottom Face	0	1	N/A	14.55	0.123	0.134
147	802.11b	-	Secondary Landscape	0	1	N/A	14.55	-0.09	0.126
148	802.11b	-	Secondary Portrait	0	1	N/A	14.55	0.13	0.00677

Note: Per KDB 447498, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

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11.2 Test Records for Body SAR Test <NB Mode>

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Output Power (dBm)	Power Drift	SAR₁g (W/kg)
150	GSM850	GPRS12	Bottom	0	128	32.42	-0.142	**0.038**
164	GSM1900	GPRS12	Bottom	0	810	29.4	0.155	**0.012**
151	WCDMA V	RMC12.2K	Bottom	0	4132	24.35	-0.13	**0.014**
166	WCDMA IV	RMC12.2K	Bottom	0	1513	23.26	0.148	**0.00392**
165	WCDMA II	RMC12.2K	Bottom	0	9400	24.23	0.135	**0.00615**

Note: Per KDB 447498, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

Plot No.	Band	Mode	BW (MHz)	RB Size	RB Offset	Test Position	Gap (cm)	Ch.	Output Power (dBm)	Power Drift	SAR₁g (W/kg)
158	LTE Band 4	QPSK	10M	25	13	Bottom	0	20175	22.94	-0.152	0.00378
159	LTE Band 4	QPSK	10M	1	0	Bottom	0	20175	23.23	-0.188	0.00399
160	LTE Band 4	QPSK	10M	1	49	Bottom	0	20175	23.16	0.1	**0.00407**
161	LTE Band 4	16QAM	10M	25	13	Bottom	0	20175	21.77	-0.192	0.00237
162	LTE Band 4	16QAM	10M	1	0	Bottom	0	20175	22.26	-0.109	0.00261
163	LTE Band 4	16QAM	10M	1	49	Bottom	0	20175	22.3	0.191	0.00316
152	LTE Band 17	QPSK	10M	25	13	Bottom	0	23790	23.13	0.1	0.03
153	LTE Band 17	QPSK	10M	1	0	Bottom	0	23790	23.5	0.14	0.045
154	LTE Band 17	QPSK	10M	1	49	Bottom	0	23790	23.43	-0.18	0.042
155	LTE Band 17	16QAM	10M	25	13	Bottom	0	23790	22.37	-0.0042	0.026
156	LTE Band 17	16QAM	10M	1	0	Bottom	0	23790	22.68	0.02	**0.052**
157	LTE Band 17	16QAM	10M	1	49	Bottom	0	23790	22.96	0.01	0.046

Note:
1. Per KDB 941225 D05, for LTE, if the smaller bandwidth output power is within +/- 0.5dB of the largest bandwidth, and the maximum SAR of the largest bandwidth is < 1.45 W/kg, SAR for smaller bandwidth can be excluded. Therefore LTE 5MHz bandwidth SAR tests are excluded.
2. If 50%-RB QPSK highest output channel SAR for each exposure position is ≤ 0.8 W/kg, other channels SAR tests are not necessary referring to KDB 941225.
3. Per KDB 941225 D05, for LTE, if 50%-RB QPSK/16QAM SAR < 1.45 W/kg, 100%-RB SAR can be excluded.

Plot No.	Band	Mode	Test Position	Gap (cm)	Ch.	Output Power (dBm)	Power Drift	SAR₁g (W/kg)
149	802.11b	-	Bottom	0	1	14.55	-0.138	**0.0082**

Note: Per KDB 447498, if the highest output channel SAR for each exposure position ≤ 0.8 W/kg other channels SAR tests are not necessary.

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11.3 *Simultaneous Transmission SAR Analysis and Measurements*

	Applicable Combination
Simultaneous Transmission	GPRS/EDGE + WLAN
	UMTS + WLAN
	LTE + WLAN
	WLAN + BT
	GPRS/EDGE + BT
	LTE + BT

Note:
1. EUT will choose either LTE or GPRS/EDGE/UMTS according to the network signal condition, LTE network is with higher priority for data connection; therefore, LTE transmission will not exist with GPRS/EDGE or UMTS at the same time.
2. Per KDB 447498 D01, Bluetooth output power ≤ 60/f (GHz) mW, which stand-alone SAR evaluation is not required, and is considered zero in the 1-g SAR summation.
3. When standalone 1-g SAR is not required for atransmitter or antenna, its SAR is considered zero in the 1-g SAR summing process to determine simultaneous transmission SAR evaluation requirement.

<Test distance 0 mm to the phantom – Tablet Mode>
Summation table of the measured SAR

Position	WWAN (W/kg)		WLAN 2.4G (W/kg)	Max. SAR Summation (W/kg)
Bottom Face	GSM850	1.26	0.134	**1.39**
	GSM1900	1.27	0.134	**1.40**
	WCDMA V	0.961	0.134	**1.10**
	WCDMA IV	1.31	0.134	**1.44**
	WCDMA II	1.33	0.134	**1.46**
	LTE Band 4	1.4	0.134	**1.53**
	LTE Band 17	1.15	0.134	**1.28**
Secondary Landscape	GSM850	1.25	0.126	**1.38**
	GSM1900	1.13	0.126	**1.26**
	WCDMA V	1.19	0.126	**1.32**
	WCDMA IV	1.33	0.126	**1.46**
	WCDMA II	0.963	0.126	**1.09**
	LTE Band 4	1.41	0.126	**1.54**
	LTE Band 17	0.87	0.126	**1.00**
Primary Portrait	GSM850	0.208	0	**0.21**
	GSM1900	0.648	0	**0.65**
	WCDMA V	0.181	0	**0.18**
	WCDMA IV	0.17	0	**0.17**
	WCDMA II	0.441	0	**0.44**
	LTE Band 4	0.117	0	**0.12**
	LTE Band 17	0.262	0	**0.26**
Secondary Portrait	GSM850	0	0.00677	**0.01**
	GSM1900	0	0.00677	**0.01**
	WCDMA V	0	0.00677	**0.01**
	WCDMA IV	0	0.00677	**0.01**
	WCDMA II	0	0.00677	**0.01**
	LTE Band 4	0	0.00677	**0.01**
	LTE Band 17	0	0.00677	**0.01**

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<Test distance 0 mm to the phantom – Tablet Mode>
Summation of the scaled SAR

Position	WWAN (W/kg)		Output Power (dBm)	Max. Tolerance Power (dBm)	WWAN Scaling Factor	Scaled WWAN (W/kg)	WLAN 2.4G (W/kg)	Max. SAR Summation (W/kg)
Bottom Face	GSM850	1.26	26.31	26.5	1.04	1.316	0.134	**1.45**
	GSM1900	1.27	20.95	21.7	1.19	1.509	0.134	**1.64**
	WCDMA V	0.961	19.81	20.7	1.23	1.180	0.134	**1.31**
	WCDMA IV	1.31	17.66	18.4	1.19	1.553	0.134	**1.69**
	WCDMA II	1.33	17.79	18.2	1.10	1.462	0.134	**1.60**
	LTE Band 4	1.4	19.17	19.5	1.08	1.500	0.134	**1.63**
	LTE Band 17	1.15	19.78	20.8	1.26	1.454	0.134	**1.59**
Secondary Landscape	GSM850	1.25	26.31	26.5	1.04	1.306	0.126	**1.43**
	GSM1900	1.13	20.99	21.7	1.18	1.331	0.126	**1.31**
	WCDMA V	1.19	19.81	20.7	1.23	1.461	0.126	**1.59**
	WCDMA IV	1.33	18.18	18.4	1.05	1.399	0.126	**1.53**
	WCDMA II	0.963	17.72	18.2	1.12	1.072	0.126	**1.59**
	LTE Band 4	1.41	19.24	19.5	1.06	1.497	0.126	**1.62**
	LTE Band 17	0.87	19.78	20.8	1.26	1.100	0.126	**1.23**
Primary Portrait	GSM850	0.208	32.42	32.5	1.02	0.212	0	**0.21**
	GSM1900	0.648	29.4	29.7	1.07	0.694	0	**0.69**
	WCDMA V	0.181	24.14	24.7	1.14	0.206	0	**0.21**
	WCDMA IV	0.17	23.26	23.4	1.03	0.176	0	**0.18**
	WCDMA II	0.441	24.19	24.7	1.12	0.496	0	**0.50**
	LTE Band 4	0.117	23.16	23.5	1.08	0.127	0	**0.13**
	LTE Band 17	0.262	23.5	23.8	1.07	0.281	0	**0.28**

Note:

1. If 1g-SAR scalar summation < 1.6W/kg, simultaneous SAR measurement is not necessary.

2. For 1g-SAR scalar summation > 1.6W/kg, SPLSR calculation is required.

3. The WWAN scaling factor is also calculated according to the difference between measured output power and maximum tolerance power on this device.

\<Test distance 10 mm to the phantom – Tablet Mode\>
Summation table of the measured SAR

Position	WWAN (W/kg)		WLAN 2.4G (W/kg)	Max. SAR Summation (W/kg)
Bottom Face	GSM850	0.707	0.134	**0.84**
	GSM1900	1.31	0.134	**1.44**
	WCDMA V	0.565	0.134	**0.70**
	WCDMA IV	1.21	0.134	**1.34**
	WCDMA II	0.937	0.134	**1.07**
	LTE Band 4	0.576	0.134	**0.71**
	LTE Band 17	0.476	0.134	**0.61**

Summation of the scaled SAR

Position	WWAN (W/kg)		Output Power (dBm)	Max. Tolerance Power (dBm)	WWAN Scaling Factor	Scaled WWAN (W/kg)	WLAN 2.4G (W/kg)	Max. SAR Summation (W/kg)
Bottom Face	GSM850	0.707	32.42	32.5	1.02	0.720	0.134	**0.85**
	GSM1900	1.31	28.93	29.7	1.19	1.564	0.134	**1.70**
	WCDMA V	0.565	24.14	24.7	1.14	0.643	0.134	**0.76**
	WCDMA IV	1.21	23.26	23.4	1.03	1.250	0.134	**1.38**
	WCDMA II	0.937	24.23	24.7	1.11	1.044	0.134	**1.18**
	LTE Band 4	0.576	23.16	23.5	1.08	0.623	0.134	**0.76**
	LTE Band 17	0.476	23.43	23.8	1.09	0.515	0.134	**0.65**

Note:

1. WLAN SAR data at 0mm is applied here, and it will represent more conservative situation than WLAN SAR data at 10mm.
2. If 1g-SAR scalar summation < 1.6W/kg, simultaneous SAR measurement is not necessary.
3. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device.

<Test distance 11 mm to the phantom – Tablet Mode>
Summation table of the measured SAR

| Position	WWAN (W/kg)		WLAN 2.4G (W/kg)	Max. SAR Summation (W/kg)
	GSM850	0.566	0.126	**0.69**
	GSM1900	1.39	0.126	**1.52**
	WCDMA V	0.459	0.126	**0.59**
Secondary Landscape	WCDMA IV	1.25	0.126	**1.38**
	WCDMA II	0.741	0.126	**0.87**
	LTE Band 4	1.03	0.126	**1.16**
	LTE Band 17	0.335	0.126	**0.46**

Summation of the scaled SAR

Position	WWAN (W/kg)		Output Power (dBm)	Max. Tolerance Power (dBm)	WWAN Scaling Factor	Scaled WWAN (W/kg)	WLAN 2.4G (W/kg)	Max. SAR Summation (W/kg)
	GSM850	0.566	32.42	32.5	1.02	0.577	0.126	**0.70**
	GSM1900	1.39	29.4	29.7	1.07	1.489	0.126	**1.62**
	WCDMA V	0.459	24.14	24.7	1.14	0.522	0.126	**0.65**
Secondary Landscape	WCDMA IV	1.25	23.06	23.4	1.08	1.352	0.126	**1.48**
	WCDMA II	0.741	24.23	24.7	1.11	0.826	0.126	**0.95**
	LTE Band 4	1.03	23.19	23.5	1.07	1.106	0.126	**1.23**
	LTE Band 17	0.335	23.43	23.8	1.09	0.365	0.126	**0.49**

Note:

1. WLAN SAR data at 0mm is applied here, and it will represent more conservative situation than WLAN SAR data at 11mm.
2. If 1g-SAR scalar summation < 1.6W/kg, simultaneous SAR measurement is not necessary.
3. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device.

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<Test distance 0 mm to the phantom – NB Mode>

Summation table of the measured SAR

Position	WWAN (W/kg)		WLAN 2.4G (W/kg)	Max. SAR Summation (W/kg)
Bottom	GSM850	0.038	0.0082	**0.05**
	GSM1900	0.012	0.0082	**0.02**
	WCDMA V	0.014	0.0082	**0.02**
	WCDMA IV	0.00392	0.0082	**0.01**
	WCDMA II	0.00615	0.0082	**0.01**
	LTE Band 4	0.00407	0.0082	**0.01**
	LTE Band 17	0.052	0.0082	**0.06**

Summation of the scaled SAR

Position	WWAN (W/kg)		Output Power (dBm)	Max. Tolerance Power (dBm)	WWAN Scaling Factor	Scaled WWAN (W/kg)	WLAN 2.4G (W/kg)	Max. SAR Summation (W/kg)
Bottom	GSM850	0.038	32.42	32.5	1.02	0.039	0.0082	**0.05**
	GSM1900	0.012	29.4	29.7	1.07	0.013	0.0082	**0.02**
	WCDMA V	0.014	24.35	24.7	1.08	0.015	0.0082	**0.02**
	WCDMA IV	0.00392	23.26	23.4	1.03	0.004	0.0082	**0.01**
	WCDMA II	0.00615	24.23	24.7	1.11	0.007	0.0082	**0.02**
	LTE Band 4	0.00407	23.16	23.5	1.08	0.004	0.0082	**0.01**
	LTE Band 17	0.052	22.68	23.3	1.15	0.060	0.0082	**0.07**

Note:

1. If 1g-SAR scalar summation < 1.6W/kg, simultaneous SAR measurement is not necessary.

2. The WWAN scaling factor is calculated according to the difference between measured output power and maximum tolerance power on this device
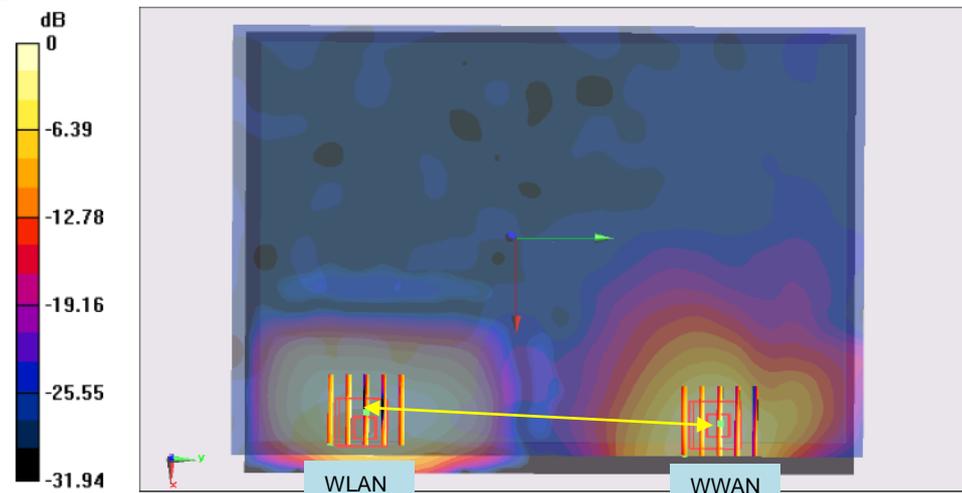
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11.4 *Simultaneous Transmission analysis - SPLSR Calculation*

Position	Plot No	Band Channel	SAR peak location (m) X	Y	Z	SAR (W/kg)	Gap (cm)	Peak distance (cm)	pair SAR sum (W/kg)	SPLSR
Bottom Face	146	802.11b, CH 1	0.0775	-0.082	-0.185	0.134	0	16.0	1.643	0.103
	07	GSM1900, CH 512	0.089	0.077	-0.178	1.509	0			
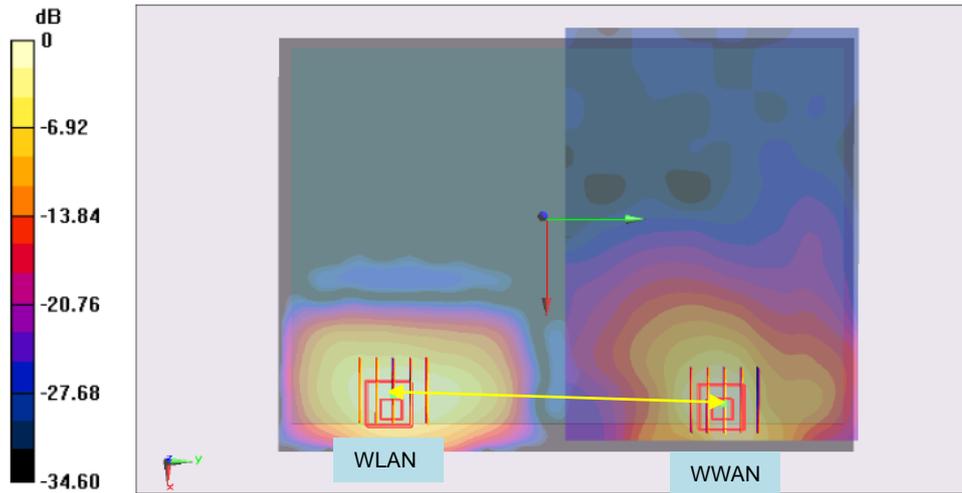
0 dB = 1.18 mW/g = 1.44 dB mW/g

Position	Plot No	Band Channel	SAR peak location (m) X	Y	Z	SAR (W/kg)	Gap (cm)	Peak distance (cm)	pair SAR sum (W/kg)	SPLSR
Bottom Face	146	802.11b, CH 1	0.0775	-0.082	-0.185	0.134	0	16.1	1.687	0.105
	15	WCDMA IV, CH 1513	0.081	0.0785	-0.178	1.553	0			

0 dB = 1.35 mW/g = 2.61 dB mW/g

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Position	Plot No	Band / Channel	SAR peak location (m) X	Y	Z	SAR (W/kg)	Gap (cm)	Peak distance (cm)	pair SAR sum (W/kg)	SPLSR
Bottom Face	146	802.11b, CH 1	0.0775	-0.082	-0.185	0.134	0	16.4	1.596	0.097
	181	WCDMA II CH 9538	0.073	0.082	-0.175	1.462	0			
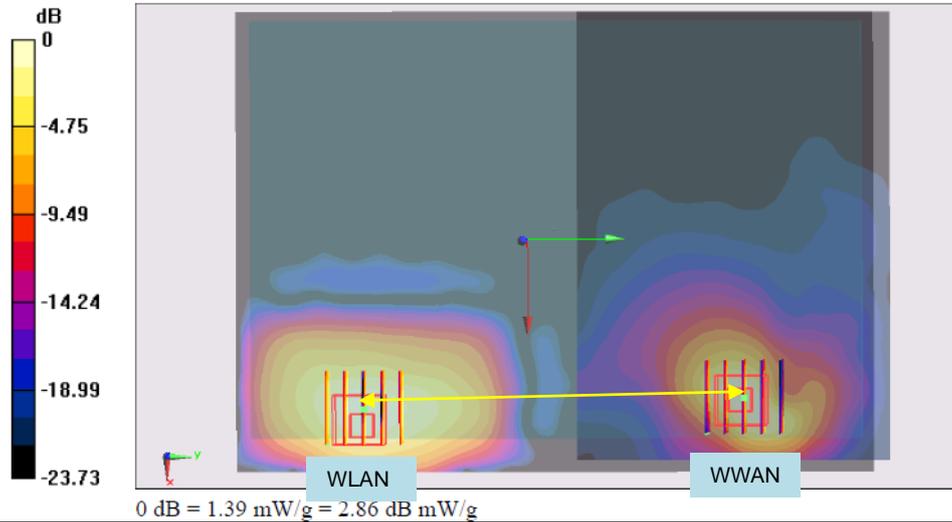
0 dB = 1.39 mW/g = 2.86 dB mW/g

Position	Plot No	Band / Channel	SAR peak location (m) X	Y	Z	SAR (W/kg)	Gap (cm)	Peak distance (cm)	pair SAR sum (W/kg)	SPLSR
Bottom Face	146	802.11b, CH 1	0.0775	-0.082	-0.185	0.134	0	16.1	1.634	0.102
	81	LTE Band 4, CH 20350	0.078	0.0785	-0.178	1.5	0			
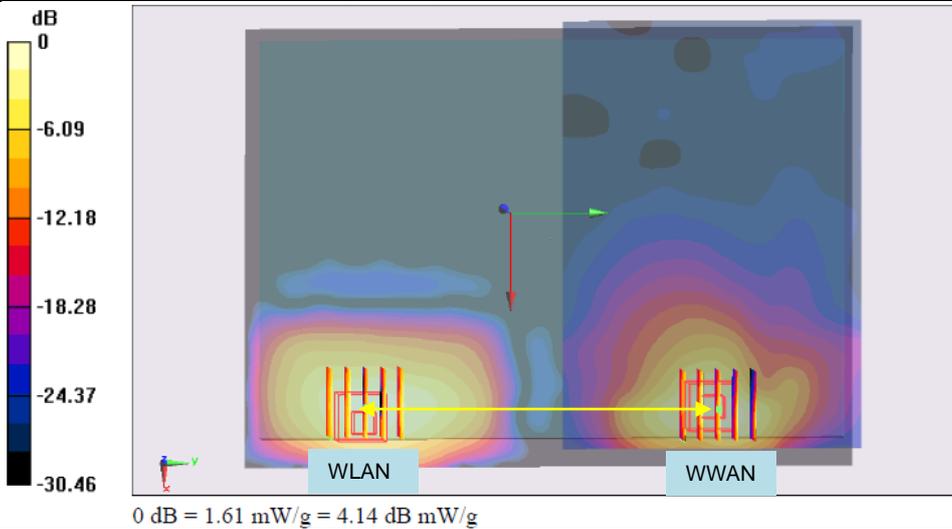
0 dB = 1.61 mW/g = 4.14 dB mW/g

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Position	Plot No	Band Channel	SAR peak location (m)			SAR (W/kg)	Gap (cm)	Peak distance (cm)	pair SAR sum (W/kg)	SPLSR
			X	Y	Z					
Secondary Landscape	147	802.11b, CH 1	0.001	-0.0415	-0.186	0.126	0	12.2	1.623	0.133
	73	LTE Band 4, CH 20175	-0.002	0.08	-0.179	1.497	0			
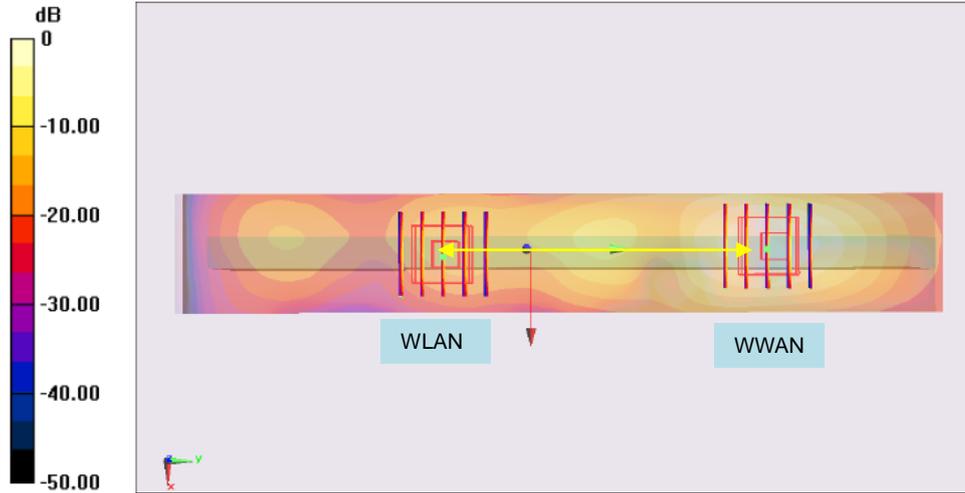
0 dB = 1.65 mW/g = 4.35 dB mW/g

Position	Plot No	Band Channel	SAR peak location (m)			SAR (W/kg)	Gap (cm)	Peak distance (cm)	pair SAR sum (W/kg)	SPLSR
			X	Y	Z					
Bottom Face	146	802.11b, CH 1	0.0775	-0.082	-0.185	0.134	0	15.9	1.698	0.107
	19	LTE Band 4 CH	0.077	0.077	-0.179	1.564	1			

0 dB = 1.40 mW/g = 2.92 dB mW/g

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Position	Plot No	Band Channel	SAR peak location (m)			SAR (W/kg)	Gap (cm)	Peak distance (cm)	pair SAR sum (W/kg)	SPLSR
			X	Y	Z					
Secondary Landscape	147	802.11b, CH 1	0.001	-0.0415	-0.186	0.126	0	12.5	1.615	0.130
	18	GSM1900 CH	-0.001	0.083	-0.18	1.489	1.1			

0 dB = 1.46 mW/g = 3.29 dB mW/g
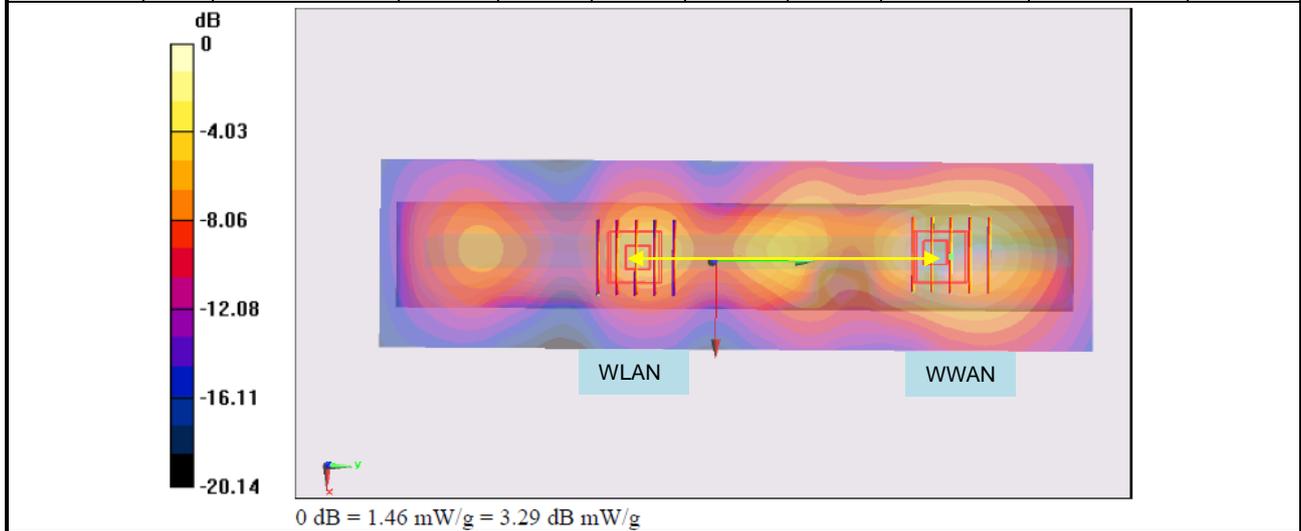
Test Engineer： Ted Sun, San Lin, Angelo Chang, Niels Ouyang, Cona Huang, and Ken Li

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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 showed in Table 12.2.

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

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

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13. *References*

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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.

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