

SAR TEST REPORT

LG Electronics, MobileComm U.S.A., Inc.
1000 Sylvan Avenue, Englewood Cliffs NJ 07632

Date of Issue: November 24, 2015
Test Report No.: HCT-A-1510-F001-2
Test Site: HCT CO., LTD.

FCC ID:

ZNFH815PX

Equipment Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE
Phone with Bluetooth, WLAN, NFC
Model Name: LG-H815PX
Additional Model Name: LGH815PX, H815PX, LG-H815Px, LGH815Px, H815Px, LG-H815pX, LGH815pX, H815pX, LG-H815px, LGH815px, H815px
Testing has been carried out in accordance with: 47CFR §2.1093
ANSI/ IEEE C95.1 – 1992
IEEE 1528-2003
Date of Test: March 31, 2015 ~ April 11, 2015, October 13, 2015

This device has been shown to be capable of compliance for localized specific absorption rate (SAR) for uncontrolled environment/general population exposure limits specified in FCC KDB procedures and had been tested in accordance with the measurement procedures specified in FCC KDB procedures.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

Tested By;



Hee-Woo Noh
Test Engineer / SAR Team
Certification Division

Reviewer



Yun-Jeang Heo
Technical Manager / SAR Team
Certification Division

This report only responds to the tested sample and may not be reproduced, except in full, without written approval of the HCT Co., Ltd.

Revision History

Rev.	Issue DATE	DESCRIPTION
HCT-A-1510-F001	Oct. 23, 2015	Initial Issue
HCT-A-1510-F001-1	Oct. 28, 2015	1. Body Worn distance is revised. 2. Page 73 Typo is revised.
HCT-A-1510-F001-2	Nov. 24, 2015	Sec. 11.1 was revised.(Typo correction WCDMA 1900 tune-up tile)

Table of Contents

1. INTRODUCTION	4
2. TEST METHODOLOGY	5
3. DESCRIPTION OF DEVICE	6
4. DESCRIPTION OF TEST EQUIPMENT	9
5. SAR MEASUREMENT PROCEDURE	17
6. DESCRIPTION OF TEST POSITION	19
7. MEASUREMENT UNCERTAINTY	22
8. ANSI/ IEEE C95.1 - 1992 RF EXPOSURE LIMITS	24
9. SAR SYSTEM VALIDATION	25
10. SYSTEM VERIFICATION	26
11. RF CONDUCTED POWER MEASUREMENT	29
11.5 Test Exclusions Applied	52
12. SAR Test configuration	54
13. SAR TEST DATA SUMMARY	55
13.1-1 Measurement Results (GSM850 Head SAR)	55
13.1-2 Measurement Results (GSM1900 Head SAR)	56
13.1-3 Measurement Results (WCDMA850 Head SAR)	56
13.1-4 Measurement Results (WCDMA1900 Head SAR)	57
13.1-5 Measurement Results (LTE Band 2 20MHz Head SAR)	58
13.1-6 Measurement Results (LTE Band 4 20MHz Head SAR)	58
13.1-7 Measurement Results (LTE Band 5 10MHz Head SAR)	59
13.1-8 Measurement Results (LTE Band 7 20MHz Head SAR)	59
13.1-9 Measurement Results (LTE Band 17 10MHz Head SAR)	60
13.1-10 Measurement Results (DTS Head SAR)	60
13.1-11 Measurement Results (NII Head SAR)	61
13.2-1 Measurement Results (GSM850 Hotspot SAR)	62
13.2-2 Measurement Results (GSM1900 Hotspot SAR)	62
13.2-3 Measurement Results (WCDMA850 Hotspot SAR)	63
13.2-4 Measurement Results (WCDMA1900 Hotspot SAR)	64
13.2-5 Measurement Results (LTE Band 2 20MHz Hotspot SAR)	64
13.2-6 Measurement Results (LTE Band 4 20MHz Hotspot SAR)	65
13.2-7 Measurement Results (LTE Band 5 10MHz Hotspot SAR)	65
13.2-8 Measurement Results (LTE Band 7 20MHz Hotspot SAR)	66
13.2-9 Measurement Results (LTE Band 17 10MHz Hotspot SAR)	67
13.2-10 Measurement Results (WLAN Hotspot SAR)	67
13.2-11 Measurement Results (5GHzWLAN Hotspot SAR)	68
13.3-1 Measurement Results (WLAN Body-worn SAR)	68
13.3-2 Measurement Results (NII Body-worn SAR)	68
13.3-3 Measurement Results (Body-worn SAR)	69
13.3-4 Measurement Results (NII Hand SAR)	70
13.5 SAR Test Notes	71
14. SAR Measurement Variability and Uncertainty	74
15. Simultaneous Transmission Scenarios	75
16. CONCLUSION	80
17. REFERENCES	81
Attachment 1. – SAR Test Plots	82
Attachment 2. – Dipole Verification Plots	126
Attachment 3. – Probe Calibration Data	150
Attachment 4. – Dipole Calibration Data	217

1. INTRODUCTION

The FCC has adopted the guidelines for evaluating the environmental effects of radio frequency radiation in ET Docket 93-62 on Aug. 6, 1996 to protect the public and workers from the potential hazards of RF emissions due to FCC-regulated portable devices.

The safety limits used for the environmental evaluation measurements are based on the criteria published by the American National Standards Institute (ANSI) for localized specific absorption rate (SAR) in IEEE/ANSI C95.1-1992 Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz. 1992 by the Institute of Electrical and Electronics Engineers, Inc., New York, New York 10017. The measurement procedure described in IEEE/ANSI C95.3-1992 Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave is used for guidance in measuring SAR due to the RF radiation exposure from the Equipment Under Test (EUT). These criteria for SAR evaluation are similar to those recommended by the National Council on Radiation Protection and Measurements (NCRP) in Biological Effects and Exposure Criteria for Radio frequency Electromagnetic Fields," NCRP Report No. 86 NCRP, 1986, Bethesda, MD 20814. SAR is a measure of the rate of energy absorption due to exposure to an RF transmitting source. SAR values have been related to threshold levels for potential biological hazards.

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative of the incremental electromagnetic energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ). It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body.

$$SAR = \frac{d}{dt} \left(\frac{dU}{dm} \right) = \frac{d}{dt} \left(\frac{dU}{\rho dV} \right)$$

Figure 1. SAR Mathematical Equation

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

$$SAR = \sigma E^2 / \rho$$

Where:

σ = conductivity of the tissue-simulant material (S/m)

ρ = mass density of the tissue-simulant material (kg/m³)

E = Total RMS electric field strength (V/m)

NOTE: The primary factors that control rate of energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

2. TEST METHODOLOGY

The tests documented in this report were performed in accordance with FCC KDB Procedure, IEEE Standard 1528-2003 & IEEE 1528a-2005 and the following published KDB procedures.

- FCC KDB Publication 941225 D01 3G SAR Procedures v03
- FCC KDB Publication 941225 D06 Hot Spot SAR v02
- FCC KDB Publication 941225 D05 SAR for LTE Devices v02r03
- FCC KDB Publication 941225 D05A LTE Rel.10 KDB Inquiry sheet v01r01
- FCC KDB Publication 248227 D01 802.11 Wi-Fi SAR v02r01
- FCC KDB Publication 447498 D01 General SAR Guidance v05r02
- FCC KDB Publication 648474 D03 Handset Wireless Chargers Battery Covers v01r02
- FCC KDB Publication 648474 D04 Handset SAR v01r02
- FCC KDB Publication 865664 D01 SAR measurement 100 MHz to 6 GHz v01r04
- FCC KDB Publication 865664 D02 SAR Reporting v01r01
- October 2013 TCB Workshop Notes (GPRS testing criteria)
- April 2015 TCB Workshop Notes (Simultaneous transmission summation clarified)

3. DESCRIPTION OF DEVICE

Environmental evaluation measurements of specific absorption rate (SAR) distributions in emulated human head and body tissues exposed to radio frequency (RF) radiation from wireless portable devices for compliance with the rules and regulations of the U.S. Federal Communications Commission (FCC).

EUT Type	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone with Bluetooth, WLAN, NFC					
FCC ID:	ZNFH815PX					
Model:	LG-H815PX					
Additional Model Name:	LGH815PX, H815PX, LG-H815Px, LGH815Px, H815Px, LG-H815pX, LGH815pX, H815pX, LG-H815px, LGH815px, H815px					
Trade Name:	LG Electronics, Mobile Comm U.S.A., Inc.					
Application Type:	Certification					
Production Unit or Identical Prototype:			Prototype			
Band& Mode	Tx. Frequency	Equipment Class	Reported SAR (W/Kg)			
	(MHz)		1 g Head	1 g Body-Worn	1g Hotspot	10 g Extremity
GSM/GPRS/EDGE 850	824.2 - 848.8	PCE	0.24	0.23	0.37	-
GSM/GPRS/EDGE 1900	1 850.2 - 1 909.8	PCE	0.71	0.40	0.56	-
WCDMA 850	826.4 - 846.6	PCE	0.27	0.28	0.43	-
WCDMA 1700	1 712.4 - 1 752.6	PCE	0.65	0.61	0.61	-
WCDMA 1900	1 852.4 - 1 907.6	PCE	0.61	0.43	0.53	-
LTE 2	1 850.7 - 1 909.3	PCE	0.72	0.56	0.55	-
LTE 4	1 710.7 - 1 754.3	PCE	0.64	0.75	0.61	-
LTE 5	824.7 - 843	PCE	0.49	0.29	0.37	-
LTE 7	2 502.5 - 2 567.5	PCE	0.22	0.75	1.18	-
LTE 17	706.5 - 713.5	PCE	0.24	0.40	0.60	-
2.4 GHz WLAN	2 412.0 - 2 462.0	DTS	0.52	0.26	0.26	-
U-NII-1	5 180 - 5 240	NII	-	-	-	-
U-NII-2A	5 260 - 5 320	NII	0.34	0.18	-	0.30
U-NII-2C<5.65GHz	5 500 - 5 580	NII	0.47	0.17	-	0.49
U-NII-2C>5.65GHz +U-NII-3	5660 - 5 825	NII	0.31	0.10	0.21	-
Bluetooth	2 402 - 2 480	DSS/DTS	-	*0.21	-	-
Simultaneous SAR per KDB 690783 D01v01r03			1.24	1.01	1.43	0.49
Date(s) of Tests:	March 31, 2015 ~ April 11, 2015, October 13, 2015					
Antenna Type:	Integral Antenna					
GPRS/EGPRS:	Multi-slot Class 33, Mode Class B					
Key Feature(s)	BT 4.1(LE) ,WIFI Hotspot, FM Radio, GPS, NFC, Wireless charging cover					

* Note :

1. There is no differences between model names.
2. BT Body-worn SAR value is estimated SAR value that should not be reported standalone SAR on grants of equipment approval.
3. The EUT, LG-H815PX is electrically identical LG-H815 (FCCID: ZNFH815) except WCDMA Band 4 with software unlock. Except WCDMA Band 4, all data is imported form ZNFH815.

3.1 KDB 941225 LTE information

Item.				Description							
Frequency Range:				Band 2: 1 850.7 MHz ~ 1 909.3 MHz							
				Band 4: 1 710.7 MHz – 1 754.3 MHz							
				Band 5: 824.7 MHz ~ 848.3 MHz							
				Band 7: 2 502.5 MHz ~ 2 567.5 MHz							
				Band 17: 706.5 MHz ~ 713.5 MHz							
Channel Bandwidth:				Band 2: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz							
				Band 4: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz, 15 MHz, 20 MHz							
				Band 5: 1.4 MHz, 3 MHz, 5 MHz, 10 MHz							
				Band 7: 5 MHz, 10 MHz, 15MHz, 20MHz							
				Band 17: 5 MHz, 10 MHz							
Channel Number & Frequency:											
Band 2											
1.4 MHz		3 MHz		5 MHz		10 MHz		15 MHz		20 MHz	
Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)
18607	1850.7	18615	1851.5	18625	1852.5	18650	1855	18675	1857.5	18700	1860
18900	1880.0	18900	1880.0	18900	1880.0	18900	1880	18900	1880.0	18900	1880
19193	1909.3	19185	1908.5	19175	1907.5	19150	1905	19125	1902.5	19100	1900
Band 4											
1.4 MHz		3 MHz		5 MHz		10 MHz		15 MHz		20 MHz	
Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)
19957	1 710.7	19965	1 711.5	19975	1 712.5	20000	1 715	20025	1 717.5	20050	1 720
20175	1 732.5	20175	1 732.5	20175	1 732.5	20175	1 732.5	20175	1 732.5	20175	1 732.5
20393	1 754.3	20385	1 753.5	20375	1 752.5	20350	1 750	20325	1 747.5	20300	1 745
Band 5											
1.4 MHz		3 MHz		5 MHz		10 MHz					
Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)
20407	824.7	20415	825.5	20425	826.5	20450	829.0	20450	829.0	20450	829.0
20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5	20525	836.5
20643	848.3	20635	847.5	20625	846.5	20600	844.0	20600	844.0	20600	844.0
Band 7											
5 MHz		10 MHz		15 MHz		20 MHz					
Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)	Ch.	Freq. (MHz)
20775	2 502.5	20800	2 505	20825	2 507.5	20850	2 510	20850	2 510	20850	2 510
21100	2 535.0	21100	2 535	21100	2 535.0	21100	2 535	21100	2 535	21100	2 535
21425	2 567.5	21400	2 565	21375	2 562.5	21350	2 560	21350	2 560	21350	2 560
Band 17											
5 MHz				10 MHz							
Ch.		Freq. (MHz)		Ch.		Freq. (MHz)		Ch.		Freq. (MHz)	
23755		706.5		23780		709		23780		709	
23790		710.0		23790		710		23790		710	
23825		713.5		23800		711		23800		711	

Item.	Description
UE Category & Uplink Modulation	UE Category 3, QPSK, 16QAM
LTE Carrier Aggregation combination	This device dose not support CA in the U.S.
LTE Carrier Aggregation information	This device does not support full LTE Release 10 operations in U.S. The following LTE Release 10 features are not supported in the U.S. : Carrier Aggregation, Replay, HetNet, Enhanced MIMO, eICI, WIFI offloading, MDH, eMBHA, Cross-Carrier Scheduling, Enhanced SC-FDMA.
Description of the LTE Transmitter & antenna	This model has two Tx. paths.
	One is for GSM and WCDMA and LTE. It can not transmit simultaneously.
	The other is for BT & WLAN. It can not transmit simultaneously.
	Please find the section 12
LTE voice/data requirements	Data Only,
	LTE voice is available via VoIP. Considering the users may install 3rd party software to enable VoIP, LTE Head SAR is also evaluated.
Identify if MPR is optional or mandatory optional or mandatory	The EUT incorporates MPR as per 3GPP TS 36.101 sec. 6.2.3 ~ 6.2.5
	The MPR is permanently built-in by design as a mandatory.
	A-MPR is not implemented in the EUT.
	See section 11.4 RF output power measurements in the SAR report.
Maximum average conducted output power(dBm) Identify all other U.S. wireless operating modes, device exposure configurations and frequency bands.	GSM850/ GSM1900, WCDMA850/1700/1900, LTE Band 2, LTE Band 4, LTE Band 5, LTE Band 7 and LTE Band 17
	Head & Body SAR are required.
Maximum average conducted output power for other Wireless mode and frequency	See section 11 RF output power measurements in the SAR report.
Simultaneous Transmission condition	This device supports simultaneous transmission. Please find the section 15.
Power reduction explanation	This device doesn't implements power reduction.
Description of the test equipment, software, etc.	LTE SAR Testing was performed using a CMW500. UE transmits with maximum output power during SAR testing.

4. DESCRIPTION OF TEST EQUIPMENT

4.1 SAR MEASUREMENT SETUP

These measurements are performed using the DASY4 automated dosimetric assessment system. It is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland. It consists of high precision robotics system (Staubli), robot controller, Pentium III computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Figure.2).

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and remote control, is used to drive the robot motors. The PC consists of the HP Pentium IV 3.0 GHz computer with Windows XP system and SAR Measurement Software DASY4, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

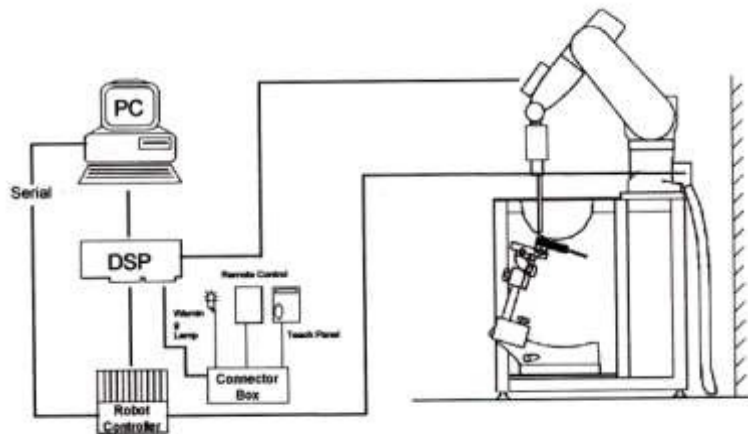


Figure 2. HCT SAR Lab. Test Measurement Set-up

The DAE4 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 PC-card is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer. The system is described in detail in.

4.2 DASY E-FIELD PROBE SYSTEM

4.1 ET3DV6 Probe Specification

Construction	Symmetrical design with triangular core Built-in optical fiber for surface detection System Built-in shielding against static charges
Calibration	In air from 10 MHz to 2.5 GHz In brain and muscle simulating tissue at Frequencies of 450 MHz, 900 MHz and 1.8 GHz (accuracy: 8 %)
Frequency	10 MHz to > 3 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)
Directivity	± 0.2 dB in brain tissue (rotation around probe axis) ± 0.4 dB in brain tissue (rotation normal probe axis)
Dynamic	5 μ W/g to > 100 mW/g;
Range Linearity:	± 0.2 dB
Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces.
Dimensions	Overall length: 330 mm Tip length: 16 mm Body diameter: 12 mm Tip diameter: 6.8 mm Distance from probe tip to dipole centers: 2.7 mm
Application	General dissymmetry up to 3 GHz Compliance tests of WCDMA/LTE Phones Fast automatic scanning in arbitrary phantoms



Figure 3. Photograph of the probe and the Phantom

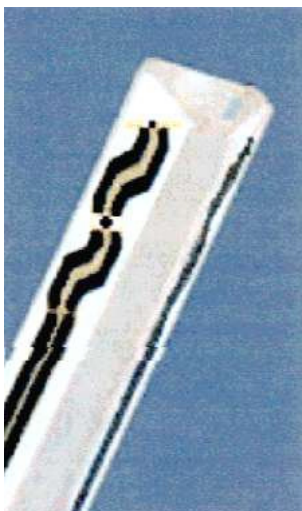


Figure 4. ET3DV6 E-field Probe

The SAR measurements were conducted with the dosimetric probe ET3DV6, designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches a maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach is stopped at reaching the maximum.

4.2.1 EX3DV4 Probe Specification

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Basic Broad Band Calibration in air Conversion Factors (CF) for HSL 900 and HSL 1810 Additional CF for other liquids and frequencies upon request
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Directivity	± 0.2 dB in HSL (rotation around probe axis) ± 0.3 dB in tissue material (rotation normal to probe axis)
Dynamic Range	5 μ W/g to > 100 mW/g; Linearity: ± 0.2 dB
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones



Figure 5. Photograph of the probe and the Phantom



Figure 6. EX3DV4 E-field Probe

The SAR measurements were conducted with the dosimetric probe EX3DV4, designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches a maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach is stopped at reaching the maximum.

4.3 PROBE CALIBRATION PROCESS

4.3.1 E-Probe Calibration

Each probe is calibrated according to a dosimetric assessment procedure with an accuracy better than $\pm 10\%$. The spherical isotropy was evaluated with the proper procedure and found to be better than ± 0.25 dB. The sensitivity parameters (NormX, NormY, NormZ), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe is tested.

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies below 1 GHz, and in a waveguide above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees.

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The measured free space E-field in the medium correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

$$SAR = C \frac{\Delta T}{\Delta t}$$

where:

Δt = exposure time (30 seconds),

C = heat capacity of tissue (brain or muscle),

ΔT = temperature increase due to RF exposure.

SAR is proportional to $\Delta T/\Delta t$, the initial rate of tissue heating, before thermal diffusion takes place.

Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E-field;

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

where:

σ = simulated tissue conductivity,

ρ = Tissue density (1.25 g/cm³ for brain tissue)

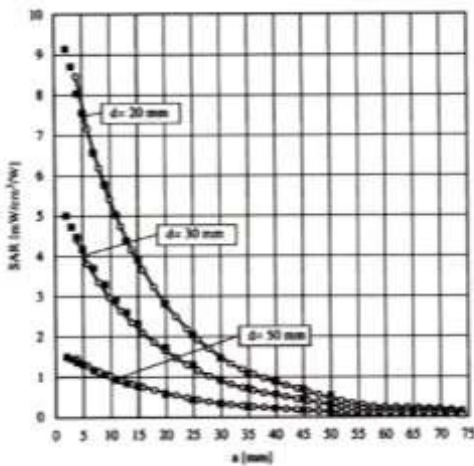


Figure 7. E-Field and Temperature measurements at 900 MHz

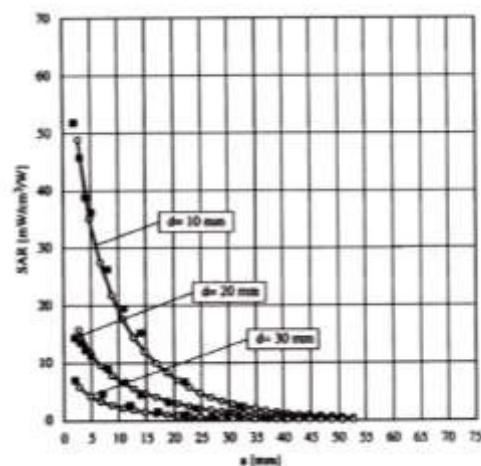


Figure 8. E-Field and temperature measurements at 1.8 GHz

4.3.2 Data Extrapolation

The DASY4 software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. 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 like below;

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i} \quad \text{with} \quad \begin{array}{ll} V_i & = \text{compensated signal of channel } i \quad (i=x,y,z) \\ U_i & = \text{input signal of channel } i \quad (i=x,y,z) \\ cf & = \text{crest factor of exciting field} \quad (\text{DASY parameter}) \\ dcp_i & = \text{diode compression poing} \quad (\text{DASY parameter}) \end{array}$$

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

$$E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}} \quad \text{with} \quad \begin{array}{ll} V_i & = \text{compensated signal of channel } i \quad (i=x,y,z) \\ Norm_i & = \text{sensor sensitivity of channel } i \quad (i=x,y,z) \\ & \quad \mu V/(V/m)^2 \text{ for E-field probes} \\ ConvF & = \text{sensitivity of enhancement in solution} \\ E_i & = \text{electric field strength of channel } i \text{ in V/m} \end{array}$$

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

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

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

$$SAR = E_{tot}^2 \cdot \frac{\sigma}{\rho \cdot 1000} \quad \text{with} \quad \begin{array}{ll} SAR & = \text{local specific absorption rate in W/g} \\ E_{tot} & = \text{total field strength in V/m} \\ \sigma & = \text{conductivity in [mho/m] or [Siemens/m]} \\ \rho & = \text{equivalent tissue density in g/cm}^3 \end{array}$$

The power flow density is calculated assuming the excitation field to be a free space field.

$$P_{pwe} = \frac{E_{tot}^2}{3770} \quad \text{with} \quad \begin{array}{ll} P_{pwe} & = \text{equivalent power density of a plane wave in w/cm}^2 \\ E_{tot} & = \text{total electric field strength in V/m} \end{array}$$

4.4 SAM Phantom

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.



Figure 9. SAM Phantom

Shell Thickness	2.0 mm $\pm$ 0.2 mm (6 $\pm$ 0.2 mm at ear point)
Filling Volume	about 25 L
Dimensions	810 mm x 1 000 mm x 500 mm (H x L x W)

Triple Modular Phantom consists of three identical modules which can be installed and removed separately without emptying the liquid. It includes three reference points for phantom installation. Covers prevent evaporation of the liquid. Phantom material is resistant to DGBE based tissue simulating liquids. The MFP V5.1 will be delivered including wooden support only (non-standard SPEAG support).

Applicable for system performance check from 700 MHz to 6 GHz (MFP V5.1C) or 800 MHz - 6 GHz (MFP V5.1A) as well as dosimetric evaluations for body-worn operation.

Shell Thickness	2.0 mm $\pm$ 0.2 mm
Filling Volume	approx. 9.2 L
Dimensions	830 mm x 500 mm (L x W)



Figure 10. MFP V5.1 Triple Modular Phantom

4.5 Device Holder for Transmitters

In combination with the SAM Phantom V 4.0, the Mounting Device (POM) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeatably positioned according to the FCC and CENELEC specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produce infinite number of configurations. To produce the Worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.



Figure 11. Device Holder

4.6 Tissue Simulating Mixture Characterization

The mixture is characterized to obtain proper dielectric constant (permittivity) and conductivity of the tissue of interest. The tissue dielectric parameters recommended in IEEE 1528 and IEC 62209 have been used as targets for the compositions, and are to match within 5%, per the FCC recommendations.

Ingredients (% by weight)	Frequency (MHz)							
	835		1 900		2 450 ~ 2 700		5 200 - 5 800	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body
Water	40.45	53.06	54.9	70.17	71.88	73.2	65.52	78.66
Salt (NaCl)	1.45	0.94	0.18	0.39	0.16	0.1	0.0	0.0
Sugar	57.0	44.9	0.0	0	0.0	0.0	0.0	0.0
HEC	1.0	1.0	0.0	0	0.0	0.0	0.0	0.0
Bactericide	0.1	0.1	0.0	0	0.0	0.0	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	19.97	0.0	17.24	10.67
DGBE	0.0	0.0	44.92	29.44	7.99	26.7	0.0	0.0
Diethylene glycol hexyl ether	-	-	-	-	-	-	17.24	10.67

Salt:	99 % Pure Sodium Chloride	Sugar:	98 % Pure Sucrose
Water:	De-ionized, 16M resistivity	HEC:	Hydroxyethyl Cellulose
DGBE:	99 % Di(ethylene glycol) butyl ether,[2-(2-butoxyethoxy) ethanol]		
Triton X-100(ultra pure):	Polyethylene glycol mono[4-(1,1,3,3-tetramethylbutyl)phenyl] ether		

Table 4.1 Composition of the Tissue Equivalent Matter

4.7 SAR TEST EQUIPMENT

Manufacturer	Type / Model	S/N	Calib. Date	alib.Interval	Calib.Due
SPEAG	SAM Phantom	-	N/A	N/A	N/A
SPEAG	Triple Modular Phantom	-	N/A	N/A	N/A
Staubli	Robot RX90B L	F01/5K09A1/A/01	N/A	N/A	N/A
Staubli	Robot TX90 Lspeag	F13/5R4XF1/A/01	N/A	N/A	N/A
Staubli	Robot ControllerCS7MB	3403-91935	N/A	N/A	N/A
Staubli	Robot Controller CS8Cspeag-TX90	F13/5R4XF1/C/01	N/A	N/A	N/A
HP	Pavilion t000_puffer	KRJ51201TV	N/A	N/A	N/A
SPEAG	Light Alignment Sensor	265	N/A	N/A	N/A
SPEAG	Light Alignment Sensor	SE UKS 030 AA	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	D221340.01	N/A	N/A	N/A
Staubli	Teach Pendant (Joystick)	D21142605	N/A	N/A	N/A
SPEAG	DAE3	466	Feb. 24, 2015	Annual	Feb. 24, 2016
SPEAG	DAE4	652	Mar. 18, 2015	Annual	Mar. 18, 2016
SPEAG	DAE4	869	Sep. 18, 2014	Annual	Sep. 18, 2015
SPEAG	DAE4	648	Apr. 23, 2014	Annual	Apr. 23, 2015
SPEAG	DAE4	1225	Mar. 18, 2015	Annual	Mar. 18, 2016
SPEAG	DAE4	1417	Jan. 27, 2015	Annual	Jan. 27, 2016
SPEAG	E-Field Probe ET3DV6	1631	Jan. 28, 2015	Annual	Jan. 28, 2016
SPEAG	E-Field Probe EX3DV4	3863	Jul. 24, 2014	Annual	Jul. 24, 2015
SPEAG	E-Field Probe EX3DV4	3863	Aug. 27, 2015	Annual	Aug. 27, 2016
SPEAG	E-Field Probe EX3DV4	3967	Dec. 22, 2014	Annual	Dec. 22, 2015
SPEAG	E-Field Probe EX3DV4	3797	Nov. 19, 2014	Annual	Nov. 19, 2015
SPEAG	E-Field Probe EX3DV4	3903	Aug. 28, 2014	Annual	Aug. 28, 2015
SPEAG	Dipole D750V3	1014	Jul. 24, 2014	Annual	Jul. 24, 2015
SPEAG	Dipole D835V2	441	Jan. 23, 2015	Annual	Jan. 23, 2016
SPEAG	Dipole D1800V2	2d007	Feb. 19, 2015	Annual	Feb. 19, 2016
SPEAG	Dipole D1900V2	5d061	Jul. 23, 2014	Annual	Jul. 23, 2015
SPEAG	Dipole D2450V2	743	Jul. 24, 2014	Annual	Jul. 24, 2015
SPEAG	Dipole D2600V2	1015	Mar. 25, 2015	Annual	Mar. 25, 2016
SPEAG	Dipole D5GHzV2	1107	Jan. 28, 2015	Annual	Jan. 28, 2016
Agilent	Power Meter(F) E4419B	MY41291386	Oct. 27, 2014	Annual	Oct. 27, 2015
Agilent	Power Sensor(G) 8481	MY41090680	Oct. 27, 2014	Annual	Oct. 27, 2015
SPEAG	DAKS 3.5	1038	May.26, 2015	Annual	May.26, 2016
HP	Dielectric Probe Kit 85070C	00721521	CBT		
HP	Dual Directional Coupler 778D	16072	Oct. 27, 2014	Annual	Oct. 27, 2015
Agilent	Base Station E5515C	GB44400269	Feb. 09, 2015	Annual	Feb. 09, 2016
HP	Signal Generator 8664A	3744A02069	Oct. 27, 2014	Annual	Oct. 27, 2015
Hewlett Packard	11636B/Power Divider	58698	Mar. 02, 2015	Annual	Mar. 02, 2016
Agilent	N9020A/ SIGNAL ANALYZER	MY50510407	Mar. 23, 2015	Annual	Mar. 23, 2016
HP	Network Analyzer 8753ES	JP39240221	Mar. 23, 2015	Annual	Mar. 23, 2016
R&S	Base Station CMW500	100990	Dec. 05, 2014	Annual	Dec. 05, 2015

NOTE:

1. The E-field probe was calibrated by SPEAG, by the waveguide technique procedure. Dipole Verification measurement is performed by HCT Lab. before each test. The brain/body simulating material is calibrated by HCT using the DAKS 3.5 to determine the conductivity and permittivity. (dielectric constant) of the brain/body-equivalent material.

2. CBT(Calibrating Before Testing). Prior to testing, the dielectric probe kit was calibrated via the network analyzer, with the specified procedure(calibrated in pure water) and calibration kit(standard) short circuit, before the dielectric measurement. The specific procedure and calibration kit are provided by Agilent

5. SAR MEASUREMENT PROCEDURE

The evaluation was performed with the following procedure:

1. The SAR value at a fixed location above the ear point was measured and was used as a reference value for assessing the power drop.
2. The SAR distribution at the exposed side of the head was measured at a distance of 3.9 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15 mm x 15 mm. Based on this data, the area of the maximum absorption was determined by spline interpolation.
3. Around this point, a volume of 32 mm x 32 mm x 30 mm was assessed by measuring 5 x 5 x 7 points. On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:
 - a. The data at the surface were extrapolated, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.
 - b. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed using the 3D-Spline interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions. The volume was integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.
 - c. All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.
4. The SAR value, at the same location as procedure #1, was re-measured. If the value changed by more than 5 %, the evaluation is repeated.

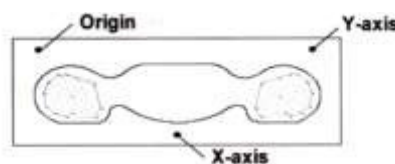


Figure 12. SAR Measurement Point in Area Scan

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 extend, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SASR-distribution over 10g.

Area scan and zoom scan resolution setting follow KDB 865664 D01v01r03 quoted below

			≤ 3 GHz	> 3 GHz
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface			5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm
Maximum probe angle from probe axis to phantom surface normal at the measurement location			$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}			≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm
			When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.	
Maximum zoom scan spatial resolution: Δx_{Zoom} , Δy_{Zoom}			≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$		≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm
	graded grid	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z		≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm
Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.				
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.				

6. DESCRIPTION OF TEST POSITION

6.1 HEAD POSITION

The device was placed in a normal operating position with the Point A on the device, as illustrated in following drawing, aligned with the location of the RE(ERP) on the phantom. With the ear-piece pressed against the head, the vertical center line of the body of the handset was aligned with an imaginary plane consisting of the RE, LE and M. While maintaining these alignments, the body of the handset was gradually moved towards the cheek until any point on the mouth-piece or keypad contacted the cheek. This is a cheek/touch position. For ear/tilt position, while maintain the device aligned with the BM and FN lines, the device was pivot against ERP back for 15° or until the device antenna touch the phantom. Please refer to IEEE 1528-2003 illustration below.

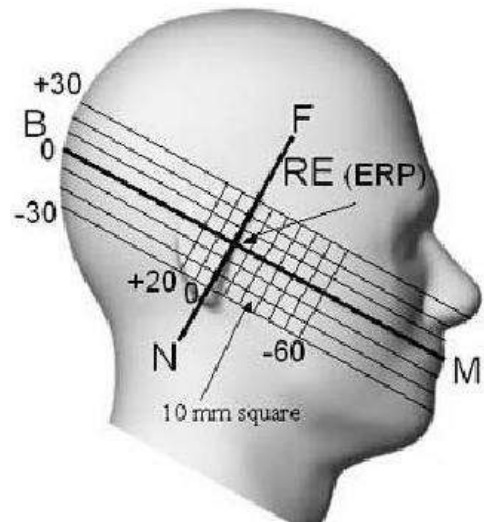


Figure 13. Side view of the phantom

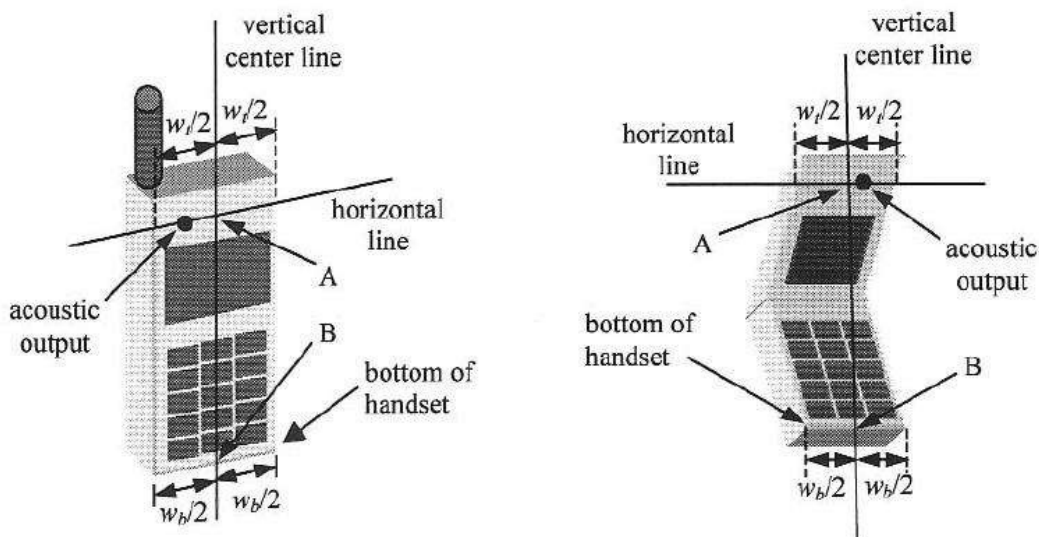


Figure 14. Handset vertical and horizontal reference lines

6.2 Body Holster/Belt Clip Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. A device with a headset output is tested with a headset connected to the device. Body dielectric parameters are used.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with each accessory. If multiple accessory share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some Devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used.

Since this EUT does not supply any body worn accessory to the end user a distance of 1.0 cm from the EUT back surface to the liquid interface is configured for the generic test.

"See the Test SET-UP Photo"

Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessory(ies), Including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

In all cases SAR measurements are performed to investigate the worst-case positioning. Worstcase positioning is then documented and used to perform Body SAR testing.

6.3 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1-g body and 10-g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01v05 should be applied to determine SAR test requirements.

For smart phones with a display diagonal dimension > 15.0 cm or an overall diagonal dimension > 16.0 cm that provide similar mobile web access and multimedia support found in mini-tablets or UMPC mini-tablets that support voice calls next to the ear, the phablets procedures outlined in KDB Publication 648474 D04 v01r02 should be applied to evaluate SAR compliance. A device marketed as phablets, regardless of form factors and operating characteristics must be tested as a phablet to determine SAR compliance. In addition to the normally required head and body-worn accessory SAR test procedures required for handsets, the UMPC mini-tablet procedures must also be applied to test the SAR of all surfaces and edges with an antenna ≥ 25 mm from that surface or edge, in direct contact with the phantom, for 10-g SAR. The UMPC mini-tablet 1-g SAR at 5 mm is not required. When hotspot mode applies, 10-g SAR is required only for the surfaces and edges with hotspot mode 1-g SAR > 1.2W/kg.

6.4 Wireless Charging Battery Covers.

Initially, the handset must be tested according to all applicable SAR test procedures using the normal battery cover (without the wireless charging hardware). The highest SAR measured for each wireless technology (1xRTT, EVDO, WCDMA, GSM, Wi-Fi etc.), frequency band, operating mode (different modes/configurations within each wireless technology) and exposure condition (head, body-worn accessory, hotspot mode etc.) must be repeated using the wireless charging battery cover. In addition, for test cases where the measured SAR for a handset with normal battery cover is greater than 1.2 W/kg, these tests should be repeated with the wireless charging battery cover.

If there are noticeable changes in SAR distribution between the normal and wireless charging covers, explanations for such changes should be included in the SAR report to support the test results. Additional Head and extremity tests using the wireless charging cover were performed with the cover extension both open and closed. Additional body-worn and hotspot tests were performed with the cover extension closed because operations near the body with the cover extension open are not expected.

7. MEASUREMENT UNCERTAINTY

Error Description	Tol (± %)	Prob. dist.	Div.	c_i	Standard Uncertainty (± %)	v_{eff}
1. Measurement System						
Probe Calibration	6.00	N	1	1	6.00	∞
Axial Isotropy	4.70	R	1.73	0.7	1.90	∞
Hemispherical Isotropy	9.60	R	1.73	0.7	3.88	∞
Boundary Effects	1.00	R	1.73	1	0.58	∞
Linearity	4.70	R	1.73	1	2.71	∞
System Detection Limits	1.00	R	1.73	1	0.58	∞
Readout Electronics	0.30	N	1.00	1	0.30	∞
Response Time	0.8	R	1.73	1	0.46	∞
Integration Time	2.6	R	1.73	1	1.50	∞
RF Ambient Conditions	3.00	R	1.73	1	1.73	∞
Probe Positioner	0.40	R	1.73	1	0.23	∞
Probe Positioning	2.90	R	1.73	1	1.67	∞
Max SAR Eval	1.00	R	1.73	1	0.58	∞
2. Test Sample Related						
Device Positioning	2.90	N	1.00	1	2.90	145
Device Holder	3.60	N	1.00	1	3.60	5
Power Drift	5.00	R	1.73	1	2.89	∞
3. Phantom and Setup						
Phantom Uncertainty	4.00	R	1.73	1	2.31	∞
Liquid Conductivity(target)	5.00	R	1.73	0.64	1.85	∞
Liquid Conductivity(meas.)	2.07	N	1	0.64	1.60	9
Liquid Permittivity(target)	5.00	R	1.73	0.6	1.73	∞
Liquid Permittivity(meas.)	5.02	N	1	0.6	1.50	9
Combine Standard Uncertainty					10.85	
Coverage Factor for 95 %					$k=2$	
Expanded STD Uncertainty					21.70	

Table 7.1 Uncertainty (800 MHz- 2 600 MHz)

Error Description	Tol (± %)	Prob. dist.	Div.	C _i	Standard Uncertainty (± %)	V _{eff}
1. Measurement System						
Probe Calibration	6.55	N	1	1	6.00	∞
Axial Isotropy	4.70	R	1.73	0.7	1.90	∞
Hemispherical Isotropy	9.60	R	1.73	0.7	3.88	∞
Boundary Effects	1.00	R	1.73	1	0.58	∞
Linearity	4.70	R	1.73	1	2.71	∞
System Detection Limits	1.00	R	1.73	1	0.58	∞
Readout Electronics	0.30	N	1.00	1	0.30	∞
Response Time	0.8	R	1.73	1	0.46	∞
Integration Time	2.6	R	1.73	1	1.50	∞
RF Ambient Conditions	3.00	R	1.73	1	1.73	∞
Probe Positioner	0.40	R	1.73	1	0.23	∞
Probe Positioning	2.90	R	1.73	1	1.67	∞
Max SAR Eval	1.00	R	1.73	1	0.58	∞
2. Test Sample Related						
Device Positioning	2.90	N	1.00	1	2.90	145
Device Holder	3.60	N	1.00	1	3.60	5
Power Drift	5.00	R	1.73	1	2.89	∞
3. Phantom and Setup						
Phantom Uncertainty	4.00	R	1.73	1	2.31	∞
Liquid Conductivity(target)	5.00	R	1.73	0.64	1.85	∞
Liquid Conductivity(meas.)	2.07	N	1	0.64	1.32	9
Liquid Permittivity(target)	5.00	R	1.73	0.6	1.73	∞
Liquid Permittivity(meas.)	5.02	N	1	0.6	3.01	9
Combine Standard Uncertainty					11.43	
Coverage Factor for 95 %					k=2	
Expanded STD Uncertainty					22.86	

Table 7.2 Uncertainty (5 000 - 5 900 MHz)

8. ANSI/ IEEE C95.1 - 1992 RF EXPOSURE LIMITS

HUMAN EXPOSURE	UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g)	CONTROLLED ENVIRONMENT Occupational (W/kg) or (mW/g)
SPATIAL PEAK SAR * (Brain)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.00

Table 8.1 Safety Limits for Partial Body Exposure

NOTES:

* The Spatial Peak value of the SAR averaged over any 1 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

** The Spatial Average value of the SAR averaged over the whole-body.

*** The Spatial Peak value of the SAR averaged over any 10 g of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e.as a result of employment or occupation).

9. SAR SYSTEM VALIDATION

Per FCC KCB 865664 D02v01r01, SAR system validation status should be document to confirm measurement accuracy. The SAR systems (including SAR probes, system components and software versions) used for this device were validated against its performance specifications prior to the SAR measurements. Reference dipoles were used with the required tissue- equivalent media for system validation, according to the procedures outlined in IEEE 1528-2003 and FCC KDB 865664 D01v01r03. Since SAR probe calibrations are frequency dependent, each probe calibration point was validated at a frequency within the valid frequency range of the probe calibration point, using the system that normally operates with the probe for routine SAR measurements and according to the required tissue-equivalent media.

A tabulated summary of the system validation status including the validation date(s), measurement frequencies, SAR probes and tissue dielectric parameters has been included.

SAR System #	Probe	Probe Type	Probe Calibration Point		Dipole	Dielectric Parameters		CW Validation			Modulation Validation		
						Measured Permittivity	Measured Conductivity	Sensitivity	Probe Linearity	Probe Isotropy	MOD. Type	Duty Factor	PAR
10	1631	ET3DV6	Head	750	1014	42.1	0.91	PASS	PASS	PASS	N/A	N/A	N/A
10	1631	ET3DV6	Head	835	441	41.6	0.88	PASS	PASS	PASS	GMSK	PASS	N/A
1	3863	EX3DV4	Head	1800	2d007	39.8	1.41	PASS	PASS	PASS	N/A	N/A	N/A
1	3863	EX3DV4	Head	1800	2d007	40.3	1.39	PASS	PASS	PASS	GMSK	PASS	N/A
1	3863	EX3DV4	Head	1900	5d061	39.8	1.4	PASS	PASS	PASS	GMSK	PASS	N/A
8	3967	EX3DV4	Head	2450	743	38.2	1.79	PASS	PASS	PASS	OFDM	N/A	PASS
3	3797	EX3DV4	Head	2600	1015	38.8	1.97	PASS	PASS	PASS	N/A	N/A	N/A
8	3967	EX3DV4	Head	5200	1107	35.8	4.57	PASS	PASS	PASS	OFDM	N/A	PASS
8	3967	EX3DV4	Head	5300	1107	35.7	4.75	PASS	PASS	PASS	OFDM	N/A	PASS
8	3967	EX3DV4	Head	5500	1107	35.4	4.92	PASS	PASS	PASS	OFDM	N/A	PASS
8	3967	EX3DV4	Head	5600	1107	35.2	4.99	PASS	PASS	PASS	OFDM	N/A	PASS
8	3967	EX3DV4	Head	5800	1107	35.1	5.29	PASS	PASS	PASS	OFDM	N/A	PASS
10	1631	ET3DV6	Body	750	1014	55.7	0.97	PASS	PASS	PASS	N/A	N/A	N/A
10	1631	ET3DV6	Body	835	441	55.1	0.98	PASS	PASS	PASS	GMSK	PASS	N/A
1	3863	EX3DV4	Body	1800	2d007	53.4	1.53	PASS	PASS	PASS	N/A	N/A	N/A
1	3863	EX3DV4	Body	1800	2d007	53.6	1.52	PASS	PASS	PASS	GMSK	PASS	N/A
10	1631	ET3DV6	Body	1900	5d061	52.1	1.52	PASS	PASS	PASS	GMSK	PASS	N/A
1	3863	EX3DV4	Body	1900	5d061	52.1	1.52	PASS	PASS	PASS	N/A	N/A	N/A
8	3967	EX3DV4	Body	2450	743	53.2	1.95	PASS	PASS	PASS	OFDM	N/A	PASS
3	3797	EX3DV4	Body	2600	1015	52.9	2.13	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Body	5200	1107	49.5	5.29	PASS	PASS	PASS	OFDM	N/A	PASS
5	3903	EX3DV4	Body	5300	1107	49.2	5.37	PASS	PASS	PASS	OFDM	N/A	PASS
5	3903	EX3DV4	Body	5500	1107	48.3	5.59	PASS	PASS	PASS	OFDM	N/A	PASS
5	3903	EX3DV4	Body	5600	1107	48.2	5.68	PASS	PASS	PASS	OFDM	N/A	PASS
5	3903	EX3DV4	Body	5800	1107	47.8	6.1	PASS	PASS	PASS	OFDM	N/A	PASS

SAR System Validation Summary 1g

SAR System #	Probe	Probe Type	Probe Calibration Point		Dipole	Dielectric Parameters		CW Validation			Modulation Validation		
						Measured Permittivity	Measured Conductivity	Sensitivity	Probe Linearity	Probe Isotropy	MOD. Type	Duty Factor	PAR
5	3903	EX3DV4	Body	5300	1107	49.2	5.37	PASS	PASS	PASS	OFDM	N/A	PASS
5	3903	EX3DV4	Body	5600	1107	48.2	5.68	PASS	PASS	PASS	OFDM	N/A	PASS
5	3903	EX3DV4	Body	5800	1107	47.8	6.1	PASS	PASS	PASS	OFDM	N/A	PASS

SAR System Validation Summary – Extremity SAR Considerations

Note;

All measurement were performed using probes calibrated for CW signal only. Modulations in the table above represent test configurations for which the measurement system has been validated per FCC KDB Publication 865664 D01v01r03. SAR system were validated for modulated signals with a periodic duty cycle, such as GMSK, or with a high peak to average ratio (>5 dB), such as OFDM according to KDB 865664 D01v01r03.

10. SYSTEM VERIFICATION

10.1 Tissue Verification

Freq. [MHz]	Date	Probe	Dipole	Liquid	Liquid Temp. [°C]	Parameter s	Target Value	Measured Value	Deviation [%]	Limit [%]
750	Apr. 11, 2015	1631	1014	Head	22.1	ϵ_r	41.9	42.783	+ 2.11	± 5
						σ	0.89	0.91	+ 2.25	± 5
750	Apr. 11, 2015	1631	1014	Body	22.1	ϵ_r	55.5	54.355	- 2.06	± 5
						σ	0.96	0.975	+ 1.56	± 5
835	Apr. 06, 2015	1631	441	Head	21.8	ϵ_r	41.5	42.731	+ 2.97	± 5
						σ	0.90	0.906	+ 0.67	± 5
835	Apr. 07, 2015	1631	441	Body	22.0	ϵ_r	55.2	54.885	- 0.57	± 5
						σ	0.97	1.01	+ 4.12	± 5
835	Apr. 08, 2015	1631	441	Head	22.1	ϵ_r	41.5	41.863	+ 0.87	± 5
						σ	0.90	0.873	- 3.00	± 5
835	Apr. 09, 2015	1631	441	Body	21.9	ϵ_r	55.2	54.165	- 1.88	± 5
						σ	0.97	0.971	+ 0.10	± 5
1 800	Oct. 13, 2015	3863	2d007	Head	21.6	ϵ_r	40.0	39.482	- 1.30	± 5
						σ	1.40	1.411	+ 0.79	± 5
1 800	Oct. 13, 2015	3863	2d007	Body	21.6	ϵ_r	53.3	55.06	+ 3.30	± 5
						σ	1.52	1.505	- 0.99	± 5
1 800	Apr. 08, 2015	3863	2d007	Head	22.1	ϵ_r	40.0	39.663	- 0.84	± 5
						σ	1.40	1.391	- 0.64	± 5
1 800	Apr. 08, 2015	3863	2d007	Body	22.1	ϵ_r	53.3	55.06	+ 3.30	± 5
						σ	1.52	1.506	- 0.92	± 5
1 900	Apr. 06, 2015	3863	5d061	Head	21.8	ϵ_r	40.0	38.946	- 2.64	± 5
						σ	1.40	1.387	- 0.93	± 5
1 900	Apr. 10, 2015	1631	5d061	Body	22.1	ϵ_r	53.3	52.492	- 1.52	± 5
						σ	1.52	1.475	- 2.96	± 5
1 900	Apr. 06, 2015	3863	5d061	Body	21.8	ϵ_r	53.3	52.305	- 1.87	± 5
						σ	1.52	1.472	- 3.16	± 5
2 450	Mar. 31, 2015	3967	743	Head	21.3	ϵ_r	39.2	39.4	+ 0.51	± 5
						σ	1.80	1.81	+ 0.56	± 5
2 450	Mar. 31, 2015	3967	743	Body	21.8	ϵ_r	52.7	52.6	- 0.19	± 5
						σ	1.95	1.94	- 0.51	± 5
2 600	Apr. 09, 2015	3797	1015	Head	22.0	ϵ_r	39.0	38.3	- 1.79	± 5
						σ	1.96	1.9	- 3.06	± 5
2 600	Apr. 10, 2015	3797	1015	Body	22.1	ϵ_r	52.5	52.6	+ 0.19	± 5
						σ	2.16	2.11	- 2.31	± 5
5 300	Apr. 01, 2015	3967	1107	Head	22.0	ϵ_r	35.9	36.47	+ 1.59	± 5
						σ	4.76	4.638	- 2.56	± 5
5 300	Apr. 02, 2015	3903	1107	Body	22.1	ϵ_r	48.9	47.948	- 1.95	± 5
						σ	5.42	5.321	- 1.83	± 5
5 600	Apr. 01, 2015	3967	1107	Head	22.0	ϵ_r	35.5	35.761	+ 0.74	± 5
						σ	5.07	5.003	- 1.32	± 5
5 600	Apr. 02, 2015	3903	1107	Body	22.1	ϵ_r	48.5	47.127	- 2.83	± 5
						σ	5.77	5.813	+ 0.75	± 5
5 800	Apr. 01, 2015	3967	1107	Head	22.0	ϵ_r	35.3	35.179	- 0.34	± 5
						σ	5.27	5.254	- 0.30	± 5
5 800	Apr. 02, 2015	3903	1107	Body	22.1	ϵ_r	48.2	46.632	- 3.25	± 5
						σ	6.00	6.141	+ 2.35	± 5

The Tissue dielectronic parameters were measured prior to the SAR evaluation using an Agilent 85070C Dielectronic Probe Kit and Agilent Network Analyzer.

10.2 System Verification

Prior to assessment, the system is verified to the $\pm 10\%$ of the specifications at 750 MHz/ 835 MHz / 1800 MHz/ 1 900 MHz / 2 450 MHz / 2 600 MHz / 5 300 MHz / 5 600 MHz / 5 800 MHz by using the system Verification kit. (Graphic Plots Attached)

System Verification Results

Freq.	Date	Probe (S/N)	Dipole (S/N)	Liquid	Amb. Temp.	Liquid Temp.	1 W Target SAR _{1g} (SPEAG)	Measured SAR _{1g}	1 W Normalized SAR _{1g}	Deviation	Limit [%]
[MHz]					[°C]	[°C]	[mW/g]	[mW/g]	[mW/g]	[%]	[%]
750	Apr. 11, 2015	1631	1014	Head	22.3	22.1	8.31	0.823	8.23	- 0.96	± 10
750	Apr. 11, 2015	1631		Body	22.3	22.1	8.63	0.852	8.52	- 1.27	± 10
835	Apr. 06, 2015	1631	441	Head	22.0	21.8	9.21	0.940	9.4	+ 2.06	± 10
835	Apr. 07, 2015	1631		Body	22.2	22.0	9.34	0.933	9.33	- 0.11	± 10
835	Apr. 08, 2015	1631	441	Head	22.3	22.1	9.21	0.914	9.14	- 0.76	± 10
835	Apr. 09, 2015	1631		Body	22.1	21.9	9.34	0.936	9.36	+ 0.21	± 10
1 800	Oct. 13, 2015	3863	2d007	Head	21.8	21.6	38.3	3.61	36.1	- 5.74	± 10
1 800	Oct. 13, 2015	3863		Body	21.8	21.6	38.3	3.82	38.2	- 0.26	± 10
1 800	Apr. 08, 2015	3863	2d007	Head	22.3	22.1	38.3	3.66	36.6	- 4.44	± 10
1 800	Apr. 08, 2015	3863		Body	22.3	22.1	38.3	3.95	39.5	+ 3.13	± 10
1 900	Apr. 06, 2015	3863	5d061	Head	22.0	21.8	40.6	4.17	41.7	+ 2.71	± 10
1 900	Apr. 10, 2015	1631		Body	22.3	22.1	40.8	3.94	39.4	- 3.43	± 10
1 900	Apr. 06, 2015	3863		Body	22.0	21.8	40.8	4.02	40.2	- 1.47	± 10
2 450	Mar. 31, 2015	3967	743	Head	21.5	21.3	53.2	5.27	52.7	- 0.94	± 10
2 450	Mar. 31, 2015	3967		Body	22.0	21.8	51.3	5.03	50.3	- 1.95	± 10
2 600	Apr. 09, 2015	3797	1015	Head	22.2	22.0	56.5	5.72	57.2	+ 1.24	± 10
2 600	Apr. 10, 2015	3797		Body	22.3	22.1	55.4	5.62	56.2	+ 1.44	± 10
5 300	Apr. 01, 2015	3967	1107	Head	22.2	22.0	80.8	8.16	81.6	+ 0.99	± 10
5 300	Apr. 02, 2015	3903		Body	22.3	22.1	73.5	7.06	70.6	- 3.95	± 10
5 600	Apr. 01, 2015	3967	1107	Head	22.2	22.0	81.5	8.11	81.1	- 0.49	± 10
5 600	Apr. 02, 2015	3903		Body	22.3	22.1	77.7	7.36	73.6	- 5.28	± 10
5 800	Apr. 01, 2015	3967	1107	Head	22.2	22.0	77.8	7.9	79	+ 1.54	± 10
5 800	Apr. 02, 2015	3903		Body	22.3	22.1	75.3	7.15	71.5	- 5.05	± 10

System Verification Results – Extremity SAR

Freq.	Date	Probe (SN)	Dipole (SN)	Liquid	Amb. Temp.	Liquid Temp.	1 W Target SAR _{10g} (SPEAG)	Measured SAR _{10g}	1 W Normalized SAR _{10g}	Deviation	Limit
[MHz]					[°C]	[°C]	[mW/g]	[mW/g]	[mW/g]	[%]	[%]
5 300	Apr. 02, 2015	3903	1107	Body	22.3	22.1	20.6	1.98	19.8	- 3.88	± 10
5 600	Apr. 02, 2015	3903	1107	Body	22.3	22.1	21.6	2.07	20.7	- 4.17	± 10
5 800	Apr. 02, 2015	3903	1107	Body	22.3	22.1	20.7	2.02	20.2	- 2.42	± 10

10.3 System Verification Procedure

SAR measurement was prior to assessment, the system is verified to the $\pm 10\%$ of the specifications at each frequency band by using the system Verification kit. (Graphic Plots Attached)

- Cabling the system, using the Verification kit equipment.
- Generate about 100 mW Input Level from the Signal generator to the Dipole Antenna.
- Dipole Antenna was placed below the Flat phantom.
- The measured one-gram SAR at the surface of the phantom above the dipole feed-point should be within 10 % of the target reference value.
- The results are normalized to 1 W input power.

Note;

SAR Verification was performed according to the FCC KDB 865664 D01v01r03.

11. RF CONDUCTED POWER MEASUREMENT

Power measurements were performed using a base station simulator under digital average power. The handset was placed into a simulated call using a base station simulator in a shielded chamber. Such test signals offer a consistent means for testing SAR and are recommended for evaluation SAR. SAR measurements were taken with a fully charged battery. In order to verify that the device was tested and maintained at full power, this was configured with the base station simulator. The SAR measurement Software calculates a reference point at the start and end of the test to check for power drifts. If conducted Power deviations of more than 5 % occurred, the tests were repeated.

11.1 Output Power Specifications.

This device operates using the following maximum output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB publication 447498 D01v05r02.

GSM

GSM850	GSM1900
Target Power : 32.2 dBm	Target Power : 30.2 dBm
GPRS850	PCS1900
GPRS 1tx : 32.2 dBm / EGPRS 1tx : 27.7 dBm	GPRS 1tx : 30.2 dBm / EGPRS 1tx : 25.2 dBm
GPRS 2tx : 31.2 dBm / EGPRS 2tx : 25.2 dBm	GPRS 2tx : 28.2 dBm / EGPRS 2tx : 24.2 dBm
GPRS 3tx : 29.2 dBm / EGPRS 3tx : 23.2 dBm	GPRS 3tx : 26.2 dBm / EGPRS 3tx : 23.2 dBm
GPRS 4tx : 27.2 dBm / EGPRS 4tx : 22.2 dBm	GPRS 4tx : 24.2 dBm / EGPRS 4tx : 22.2 dBm
Tune-up Tolerance : -1.5 dB/ +0.5 dB	

WCDMA

WCDMA850	WCDMA1700
Target Power : 24.2 dBm	Target Power : 21.7 dBm
HSDPA Sub-test 1 :23.2 dBm	HSDPA Sub-test 1 :21.7 dBm
HSDPA Sub-test 2: 23.2 dBm	HSDPA Sub-test 2: 21.7 dBm
HSDPA Sub-test 3: 22.7 dBm	HSDPA Sub-test 3: 21.2 dBm
HSDPA Sub-test 4: 22.7 dBm	HSDPA Sub-test 4: 21.2 dBm
WCDMA1900	
Target Power : 23.2 dBm	
HSDPA Sub-test 1 :23.2 dBm	
HSDPA Sub-test 2: 23.2 dBm	
HSDPA Sub-test 3: 22.7 dBm	
HSDPA Sub-test 4: 22.7 dBm	
Tune-up Tolerance : -1.5 dB/ +0.5 dB	

* The HSUPA, DC-HSDPA transmitter power will not exceed the R99 maximum transmit power in devices based on Qualcomm's HSPA chipset solutions

LTE

Mode/Band	LTE Band 2	LTE Band 4	LTE Band 5	LTE Band 7	LTE Band 17
Target Power	23.2dBm	22.2 dBm	24.2dBm	23.2 dBm	24.2 dBm
Tune-up Tolerance : -1.5 dB/ +0.5 dB					

* MPR condition (1.4MHz, 3MHz, 5MHz, 10MHz, 15MHz, 20MHz)

RB Size	1	50%	100%	1	50%	100%
Mode	QPSK	QPSK	QPSK	16-QAM	16-QAM	16-QAM
MPR	0	1	1	1	2	2
MPR (1.4 MHz case)	0	0	1	1	1	2
Tune-up Tolerance : -0.5 dB/ +0.5 dB						

Wifi

IEEE 802.11 (in dBm)							
2.4 GHz WIFI	Mode / Band	802.11a	802.11b	802.11g	802.11n (20MHz)	802.11n (40MHz)	802.11ac
	Maximum	N/A	17	14	13	N/A	13
	Nominal	N/A	16	13	12	N/A	12
5 GHz WIFI	Mode / Band	802.11a	802.11n (20MHz)	802.11n (40MHz)	802.11ac (20MHz)	802.11ac (40MHz)	802.11ac (80MHz)
	Maximum	13	13	10.5	13	10.5	12
	Nominal	12	12	9.5	12	9.5	11

BT.

Bluetooth (Average Power)	(in dBm)	1Mbps(GFSK)	2Mbps(DPSK)	3Mbps(8DPSK)	LE
	Maximum	10	6.5	6.5	6
	Nominal	9	5.5	5.5	5

11.2 GSM

Conducted output power measurements were performed using a base station simulator under digital average power.



SAR Test for WWAN were performed with a base station simulator Agilent E5515C. Communication between the device and the emulator was established by air link. Set base station emulator to allow DUT to radiate maximum output power during all tests. Please refer to the below worst case SAR operation setup.

- GSM voice: Head SAR, Body SAR
- GPRS Multi-slots : Body SAR with GPRS/EDGE Multi-slot Class 33 with CS 1 (GMSK)

Note;

This EUT'S GSM, GPRS and EDGE device class is B, DTM Multislot class :N/A

Per KDB 941225 D01v03, GMSK GPRS and EDGE mode is the primary mode.

CS1/MCS7 coding scheme was used in GPRS/EDGE output power measurements and SAR Testing, as a condition where GMSK modulation was ensured. Investigation has shown that CS1 - CS4/ MCS5 – MCS9 settings do not have any impact on the output levels in the GPRS/EDGE modes.

GSM Conducted output powers (Burst-Average)

Band	Channel	Voice	GPRS(GMSK) Data – CS1				EDGE Data			
		GSM (dBm)	GPRS 1 TX Slot (dBm)	GPRS 2 TX Slot (dBm)	GPRS 3 TX Slot (dBm)	GPRS 4 TX Slot (dBm)	EDGE 1 TX Slot (dBm)	EDGE 2 TX Slot (dBm)	EDGE 3 TX Slot (dBm)	EDGE 4 TX Slot (dBm)
GSM 850	128	32.37	32.37	31.12	28.43	26.60	26.64	25.17	23.33	22.24
	190	32.58	32.58	31.34	28.17	26.70	26.65	25.20	23.40	22.25
	251	32.27	32.26	31.50	28.26	26.72	26.68	25.13	23.21	22.07
GSM 1900	512	30.60	30.68	28.08	25.97	23.77	25.63	24.35	23.54	22.57
	661	30.41	30.52	27.85	25.88	23.68	25.57	24.51	23.46	22.58
	810	30.53	30.54	27.78	25.78	23.61	25.57	24.28	23.38	22.50

GSM Conducted output powers (Frame-Average)

Band	Channel	Voice	GPRS(GMSK) Data – CS1				EDGE Data			
		GSM (dBm)	GPRS 1 TX Slot (dBm)	GPRS 2 TX Slot (dBm)	GPRS 3 TX Slot (dBm)	GPRS 4 TX Slot (dBm)	EDGE 1 TX Slot (dBm)	EDGE 2 TX Slot (dBm)	EDGE 3 TX Slot (dBm)	EDGE 4 TX Slot (dBm)
GSM 850	128	23.34	23.34	25.10	24.17	23.59	17.61	19.15	19.07	19.23
	190	23.55	23.55	25.32	23.91	23.69	17.62	19.18	19.14	19.24
	251	23.24	23.23	25.48	24.00	23.71	17.65	19.11	18.95	19.06
GSM 1900	512	21.57	21.65	22.06	21.71	20.76	16.60	18.33	19.28	19.56
	661	21.38	21.49	21.83	21.62	20.67	16.54	18.49	19.20	19.57
	810	21.50	21.51	21.76	21.52	20.60	16.54	18.26	19.12	19.49

Note:

Time slot average factor is as follows:

1 Tx slot = 9.03 dB, Frame-Average output power = Burst-Average output power – 9.03 dB

2 Tx slot = 6.02 dB, Frame-Average output power = Burst-Average output power – 6.02 dB

3 Tx slot = 4.26 dB, Frame-Average output power = Burst-Average output power – 4.26 dB

4 Tx slot = 3.01 dB, Frame-Average output power = Burst-Average output power – 3.01 dB

11.3 WCDMA

Body SAR is not required for handsets with HSDPA/HSUPA capabilities when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is $\leq 75\%$ of the SAR limit. Otherwise, SAR is Measured for HSDPA, using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that results in the highest SAR in 12.2 kbps RMC for that RF channel.

11.3.1 Output Power Verification

Maximum output power is verified on the High, Middle and Low channels according to the general descriptions in section 5.2 of 3 GPP TS 34.121, using the appropriate RMC or AMR with TPC(transmit power control) set to all “1s”.

11.3.2 Head SAR Measurements

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all “1s”. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than ¼ dB higher than that measured in 12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signaling radio bearer) using the exposure configuration that results in the highest SAR for that RF channel in 12.2 RMC.

11.3.3 Body SAR Measurement

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits all “1s”.

11.3.4 Handsets with Release 5 HSDPA

Body SAR is not required for handsets with HSDPA capabilities when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than that measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is $\leq 75\%$ of the SAR limit. Otherwise, SAR is Measured for HSDPA, using an FRC with H-Set 1 in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2 kbps RMC without HSDPA, on the maximum output channel with the body exposure configuration that results in the highest SAR in 12.2 kbps RMC for that RF channel.

Sub-Test 1 Setup for Release 5 HSDPA

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(2)}$	CM (dB) ⁽²⁾
1	2/15	15/15	64	2/15	4/15	0.0
2	12/15 ⁽³⁾	15/15 ⁽³⁾	64	12/15 ⁽³⁾	24/15	1.0
3	15/15	8/15	64	15/8	30/15	1.5
4	15/15	4/15	64	15/4	30/15	1.5

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Leftrightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Leftrightarrow \beta_{hs} = 30/15 * \beta_c$
 Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$.
 Note 3: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 11/15$ and $\beta_d = 15/15$.

11.3.5 Handsets with Release 6 HSPA (HSDPA/HSUPA)

Body SAR is not required for handsets with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than ¼ dB higher than that measured without HSUPA/HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is $\leq 75\%$ of the SAR limit. Body SAR for HSPA is measured with E-DCH Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.1 kbps RMC without HSPA. When VOIP is applicable for head exposure, SAR is not required when the maximum output of each RF channel with HSPA is less than ¼ dB higher than that measured using 12.2 kbps RMC; otherwise, the same HSPA configuration used for body measurement should be used to test for head exposure.

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	$\beta_{hs}^{(1)}$	β_{ec}	β_{ed}	β_{ed} (SF)	β_{ed} (codes)	CM ⁽²⁾ (dB)	MPR (dB)	AG ⁽⁴⁾ Index	E-TFCI
1	11/15 ⁽³⁾	15/15 ⁽³⁾	64	11/15 ⁽³⁾	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	$\beta_{ed1}: 47/15$ $\beta_{ed2}: 47/15$	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64	15/15 ⁽⁴⁾	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ_{ACK} , Δ_{NACK} and $\Delta_{CQI} = 8 \Rightarrow A_{hs} = \beta_{hs}/\beta_c = 30/15 \Rightarrow \beta_{hs} = 30/15 * \beta_c$.

Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.

Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 10/15$ and $\beta_d = 15/15$.

Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to $\beta_c = 14/15$ and $\beta_d = 15/15$.

Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.

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

Note : Per KDB 941225 D01v03, the 12.2kbps RMC is the primary mode.

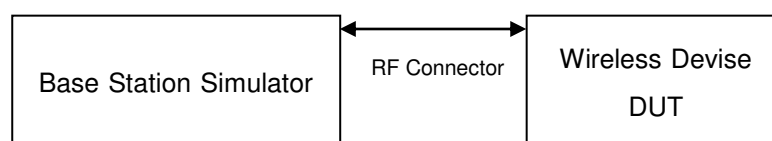
11.3.6 DC-HSDPA

UMTS SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB publication 941225 D01v02. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

DC-HSDPA Considerations:

- 3GPP Specification 34.121-1 Release 8 Ver 8.10.0 was used for DC-HSDPA guidance
- H-Set 12(QPSK) was confirmed to be used during DC-HSDPA measurements
- Measured maximum output powers for DC-HSDPA were not greater than 1/4 dB higher than the WCDMA 12.2 kbps RMC maximum output and as a result, SAR is not required for DC-HSDPA
- The DUT supports UE category 24 for HSDPA

It is expected by the manufacturer that MPR for some HSUPA subtests may be up to 1 dB more than specified by 3GPP, but also as low as 0 dB according to the chipset implementation in this model.



WCDMA850

3GPP	Mode	3GPP 34.121	Cellular Band [dBm]		
Release		Subtest			
Version			UL 4132 DL 4357	UL 4183 DL 4408	UL 4233 DL 4458
99	WCDMA	12.2 kbps RMC	24.18	24.12	24.08
99	WCDMA	12.2 kbps AMR	24.16	24.08	24.05
5	HSDPA	Subtest 1	23.05	23.01	23.05
5		Subtest 2	23.02	22.98	23.03
5		Subtest 3	22.54	22.48	22.51
5		Subtest 4	22.51	22.47	22.48
6	HSUPA	Subtest 1	21.81	21.81	21.82
6		Subtest 2	21.08	21.05	21.03
6		Subtest 3	21.11	21.03	21.03
6		Subtest 4	21.64	21.62	21.67
6		Subtest 5	21.69	21.62	21.63
8	DC-HSDPA	Subtest 1	23.02	22.99	22.91
8		Subtest 2	23.00	22.94	22.80
8		Subtest 3	22.47	22.49	22.37
8		Subtest 4	22.46	22.53	22.41

WCDMA Average Conducted output powers

WCDMA1700

3GPP	Mode	3GPP 34.121	AWS Band [dBm]		
Release		Subtest			
Version			UL 1312 DL 1537	UL 1412 DL 1638	UL 1512 DL 1738
99	WCDMA	12.2 kbps RMC	21.79	21.88	21.75
99	WCDMA	12.2 kbps AMR	21.79	21.87	21.74
5	HSDPA	Subtest 1	21.00	21.09	20.98
5		Subtest 2	21.00	21.20	21.00
5		Subtest 3	20.68	20.79	20.67
5		Subtest 4	20.70	20.77	20.68
6	HSUPA	Subtest 1	20.53	20.63	20.54
6		Subtest 2	19.97	20.05	19.94
6		Subtest 3	20.17	20.26	20.15
6		Subtest 4	20.22	20.32	20.20
6		Subtest 5	20.32	20.41	20.31
8	DC-HSDPA	Subtest 1	21.22	21.06	21.03
8		Subtest 2	21.21	21.09	21.03
8		Subtest 3	20.91	20.74	20.71
8		Subtest 4	20.91	20.75	20.59

WCDMA Average Conducted output powers

WCDMA1900

3GPP	Mode	3GPP 34.121	PCS Band [dBm]		
Release		Subtest			
Version			UL 9262 DL 9662	UL 9400 DL 9800	UL 9538 DL 9938
99	WCDMA	12.2 kbps RMC	23.27	23.23	23.64
99	WCDMA	12.2 kbps AMR	23.27	23.18	23.62
5	HSDPA	Subtest 1	22.12	22.53	22.75
5		Subtest 2	22.15	22.56	22.62
5		Subtest 3	21.62	22.13	22.12
5		Subtest 4	21.61	22.10	22.11
6	HSUPA	Subtest 1	21.40	21.89	22.02
6		Subtest 2	20.94	20.68	21.47
6		Subtest 3	20.74	20.44	21.21
6		Subtest 4	21.31	21.03	21.79
6		Subtest 5	21.32	21.05	21.79
8	DC-HSDPA	Subtest 1	22.23	22.23	22.68
8		Subtest 2	22.28	22.20	22.67
8		Subtest 3	21.70	21.70	22.22
8		Subtest 4	21.70	21.70	22.23

WCDMA Average Conducted output powers

11.4 LTE

SAR testing was performed according to the FCC KDB 941225 D05v02r03 publication.

This DUT is developed base on MPR. The MPR is mandatory.

The device will not operate with any other MPR setting than that stated in the table as indicated.

SAR Testing was performed using a CMW500. UE transmits with Maximum output power during SAR testing.

A-MPR has been disabled for all SAR tests by setting NS=01 on the R&S CMW500.

- LTE Band 2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				18607 1850.7 MHz	18900 1880.0 MHz	19193 1909.3 MHz
1.4 MHz	QPSK	1	0	23.67	23.30	23.70
		1	3	23.70	23.31	23.69
		1	5	23.67	23.35	23.70
		3	0	23.52	23.20	23.15
		3	1	23.50	23.43	23.17
		3	3	23.40	23.23	23.19
		6	0	22.49	22.18	22.21
	16QAM	1	0	22.70	22.63	22.47
		1	3	22.67	22.64	22.65
		1	5	22.61	22.68	22.55
		3	0	22.64	22.52	22.46
		3	1	22.62	22.55	22.57
		3	3	22.57	22.55	22.55
		6	0	21.66	21.07	21.39

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				18615 1851.5 MHz	18900 1880.0 MHz	19185 1908.5 MHz
3 MHz	QPSK	1	0	23.65	23.44	23.30
		1	7	23.47	23.25	23.04
		1	14	23.57	23.42	23.29
		8	0	22.62	22.35	22.34
		8	3	22.54	22.33	22.31
		8	7	22.56	22.24	22.33
		15	0	22.55	22.27	22.32
	16QAM	1	0	22.69	22.67	22.70
		1	7	22.48	22.68	22.37
		1	14	22.61	22.68	22.63
		8	0	21.66	21.38	21.45
		8	3	21.68	21.37	21.37
		8	7	21.64	21.36	21.51
		15	0	21.61	21.31	21.27

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				18625 1852.5MHz	18900 1880MHz	19175 1907.5MHz
5MHz	QPSK	1	0	23.67	23.29	23.37
		1	12	23.51	23.15	22.95
		1	24	23.61	23.41	23.17
		12	0	22.51	22.28	22.23
		12	6	22.63	22.30	22.28
		12	11	22.53	22.22	22.23
		25	0	22.57	22.20	22.20
	16QAM	1	0	22.67	22.55	22.68
		1	12	22.61	22.69	22.70
		1	24	22.65	22.61	22.70
		12	0	21.50	21.35	21.30
		12	6	21.60	21.34	21.31
		12	11	21.49	21.28	21.28
		25	0	21.67	21.28	21.16

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				18650 1855MHz	18900 1880MHz	19150 1905MHz
10MHz	QPSK	1	0	23.70	23.33	23.40
		1	24	23.69	23.28	23.24
		1	49	23.66	23.22	23.30
		25	0	22.55	22.23	22.35
		25	12	22.46	22.28	22.29
		25	24	22.52	22.30	22.36
		50	0	22.51	22.24	22.34
	16QAM	1	0	22.70	22.63	22.65
		1	24	22.69	22.32	22.69
		1	49	22.69	22.62	22.70
		25	0	21.59	21.32	21.30
		25	12	21.52	21.34	21.28
		25	24	21.55	21.34	21.28
		50	0	21.52	21.24	21.27

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				18675 1857.5MHz	18900 1880MHz	19125 1902.5MHz
15MHz	QPSK	1	0	23.70	23.70	23.70
		1	36	23.69	23.51	23.45
		1	74	23.68	23.68	23.60
		36	0	22.70	22.51	22.62
		36	18	22.67	22.36	22.49
		36	39	22.57	22.36	22.33
		75	0	22.70	22.45	22.47
	16QAM	1	0	22.70	22.70	22.70
		1	36	22.67	22.65	22.68
		1	74	22.70	22.68	22.69
		36	0	21.69	21.67	21.59
		36	18	21.69	21.38	21.42
		36	39	21.53	21.40	21.34
		75	0	21.68	21.46	21.48

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				18700 1860MHz	18900 1880MHz	19100 1900MHz
20MHz	QPSK	1	0	23.70	23.70	23.70
		1	49	23.68	23.49	23.56
		1	99	23.69	23.70	23.70
		50	0	22.70	22.70	22.68
		50	25	22.59	22.36	22.51
		50	49	22.64	22.48	22.40
		100	0	22.70	22.57	22.70
	16QAM	1	0	22.70	22.70	22.70
		1	49	22.70	22.70	22.65
		1	99	22.70	22.64	22.68
		50	0	21.64	21.70	21.68
		50	25	21.61	21.42	21.44
		50	49	21.70	21.45	21.61
		100	0	21.68	21.60	21.59

- LTE Band 4

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				19957 1710.7 MHz	20175 1732.5 MHz	20393 1754.3 MHz
1.4 MHz	QPSK	1	0	22.66	22.65	22.57
		1	3	22.68	22.70	22.63
		1	5	22.70	22.68	22.57
		3	0	22.51	22.52	22.32
		3	1	22.60	22.68	22.40
		3	3	22.54	22.55	22.37
		6	0	21.67	21.49	21.35
	16QAM	1	0	21.70	21.70	21.55
		1	3	21.69	21.70	21.59
		1	5	21.70	21.70	21.57
		3	0	21.70	21.67	21.57
		3	1	21.67	21.70	21.61
		3	3	21.65	21.69	21.56
		6	0	20.65	20.40	20.57

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				19965 1711.5 MHz	20175 1732.5 MHz	20385 1753.5 MHz
3MHz	QPSK	1	0	22.70	22.68	22.38
		1	7	22.63	22.52	22.57
		1	14	22.68	22.67	22.44
		8	0	21.70	21.48	21.37
		8	3	21.70	21.55	21.36
		8	7	21.69	21.54	21.45
		15	0	21.70	21.53	21.45
	16QAM	1	0	21.70	21.70	21.55
		1	7	21.68	21.70	21.39
		1	14	21.55	21.67	21.57
		8	0	20.70	20.51	20.48
		8	3	20.70	20.58	20.52
		8	7	20.70	20.61	20.59
		15	0	20.70	20.50	20.53

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				19975 1712.5 MHz	20175 1732.5 MHz	20375 1752.5 MHz
5MHz	QPSK	1	0	22.70	22.67	22.31
		1	12	22.68	22.48	22.14
		1	24	22.70	22.70	22.34
		12	0	21.66	21.56	21.26
		12	6	21.70	21.56	21.31
		12	11	21.69	21.48	21.24
		25	0	21.67	21.48	21.25
	16QAM	1	0	21.70	21.70	21.66
		1	12	21.68	21.70	21.64
		1	24	21.69	21.66	21.62
		12	0	20.66	20.59	20.35
		12	6	20.70	20.62	20.36
		12	11	20.70	20.56	20.33
		25	0	20.70	20.53	20.21

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20000 1715 MHz	20175 1732.5 MHz	20350 1750 MHz
10MHz	QPSK	1	0	22.64	22.70	22.35
		1	24	22.65	22.67	22.31
		1	49	22.70	22.63	22.38
		25	0	21.65	21.70	21.70
		25	12	21.67	21.68	21.61
		25	24	21.62	21.70	21.70
		50	0	21.64	21.69	21.70
	16QAM	1	0	21.67	21.70	21.70
		1	24	21.69	21.62	21.68
		1	49	21.68	21.62	21.54
		25	0	20.59	21.53	21.39
		25	12	20.51	20.60	20.40
		25	24	20.61	20.60	20.45
		50	0	20.26	21.06	20.64

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20025 1717.5 MHz	20175 1732.5 MHz	20325 1747.5 MHz
15MHz	QPSK	1	0	22.70	22.61	22.51
		1	36	22.56	22.56	22.43
		1	74	22.59	22.66	22.44
		36	0	21.62	21.40	21.42
		36	18	21.59	21.43	21.47
		36	39	21.59	21.37	21.42
		75	0	21.68	21.37	21.42
	16QAM	1	0	21.70	21.61	21.70
		1	36	21.61	21.62	21.67
		1	74	21.58	21.55	21.68
		36	0	20.64	20.40	20.40
		36	18	20.58	20.42	20.44
		36	39	20.53	20.43	20.45
		75	0	20.65	20.38	20.44

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)
				20175 1732.5 MHz
20MHz	QPSK	1	0	22.70
		1	49	22.49
		1	99	22.50
		50	0	21.44
		50	25	21.42
		50	49	21.45
		100	0	21.49
	16QAM	1	0	21.64
		1	49	21.65
		1	99	21.66
		50	0	20.47
		50	25	20.44
		50	49	20.47
		100	0	20.51

Note: LTE Band 4 (AWS) at 20 MHz Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r03, when a device supports overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

- LTE Band 5

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20407 824.7 MHz	20525 836.5 MHz	20643 848.3 MHz
1.4 MHz	QPSK	1	0	24.08	24.09	24.53
		1	3	24.06	24.09	24.41
		1	5	24.20	24.22	24.18
		3	0	24.03	24.01	24.36
		3	1	24.20	24.31	24.30
		3	3	24.05	24.03	24.20
		6	0	23.50	23.51	23.68
	16QAM	1	0	23.61	23.63	23.41
		1	3	23.70	23.65	23.53
		1	5	23.47	23.52	23.28
		3	0	23.38	23.40	23.64
		3	1	23.41	23.43	23.69
		3	3	23.59	23.45	23.68
		6	0	22.35	22.32	22.70

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20415 825.5 MHz	20525 836.5 MHz	20635 847.5 MHz
3 MHz	QPSK	1	0	24.21	24.25	24.13
		1	7	24.20	24.16	23.89
		1	14	24.34	24.33	23.94
		8	0	23.70	23.66	23.70
		8	3	23.64	23.70	23.69
		8	7	23.70	23.70	23.70
		15	0	23.68	23.72	23.65
	16QAM	1	0	23.63	23.64	23.43
		1	7	23.27	23.39	23.06
		1	14	23.62	23.70	23.20
		8	0	22.62	22.70	22.70
		8	3	22.69	22.67	22.70
		8	7	22.69	22.62	22.70
		15	0	22.62	22.68	22.70

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20425 826.5 MHz	20525 836.5 MHz	20625 846.5 MHz
5 MHz	QPSK	1	0	24.17	24.14	24.12
		1	12	24.18	24.08	24.20
		1	24	24.16	24.26	24.09
		12	0	23.63	23.65	23.70
		12	6	23.67	23.63	23.70
		12	11	23.70	23.67	23.70
		25	0	23.55	23.68	23.70
	16QAM	1	0	23.38	23.62	23.70
		1	12	23.65	23.70	23.70
		1	24	23.40	23.68	23.70
		12	0	22.70	22.70	22.69
		12	6	22.62	22.70	22.68
		12	11	22.67	22.70	22.70
		25	0	22.64	22.70	22.65

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20450 829 MHz	20525 836.5 MHz	20600 844 MHz
10 MHz	QPSK	1	0	24.05	24.36	24.23
		1	24	23.98	24.45	23.89
		1	49	23.89	24.59	23.96
		25	0	23.60	23.62	23.68
		25	12	23.59	23.66	23.68
		25	24	23.53	23.69	23.68
		50	0	23.66	23.69	23.70
	16QAM	1	0	23.54	23.58	23.67
		1	24	23.70	23.70	23.70
		1	49	23.54	23.68	23.61
		25	0	22.70	22.70	22.70
		25	12	22.70	22.70	22.70
		25	24	22.70	22.69	22.70
		50	0	22.62	22.69	22.64

- LTE Band 7

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20775 2502.5MHz	21100 2535MHz	21425 2567.5MHz
5MHz	QPSK	1	0	23.42	23.42	23.66
		1	12	23.33	23.37	23.68
		1	24	23.32	23.40	23.65
		12	0	22.46	22.45	22.70
		12	6	22.40	22.44	22.70
		12	11	22.34	22.42	22.70
		25	0	22.29	22.39	22.70
	16QAM	1	0	22.21	22.61	22.24
		1	12	22.22	22.64	22.32
		1	24	22.24	22.65	22.31
		12	0	21.57	21.50	21.70
		12	6	21.52	21.43	21.64
		12	11	21.43	21.44	21.62
		25	0	21.40	21.29	21.68

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20800 2505MHz	21100 2535MHz	21400 2565MHz
10MHz	QPSK	1	0	23.32	23.60	23.68
		1	24	23.44	23.54	23.68
		1	49	23.47	23.48	23.70
		25	0	22.43	22.52	22.60
		25	12	22.40	22.42	22.70
		25	24	22.36	22.43	22.67
		50	0	22.39	22.47	22.65
	16QAM	1	0	22.17	22.32	22.47
		1	24	22.13	22.19	22.61
		1	49	22.18	22.28	22.50
		25	0	21.43	21.53	21.70
		25	12	21.42	21.46	21.64
		25	24	21.35	21.43	21.68
		50	0	21.30	21.49	21.70

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20825 2507.5MHz	21100 2535MHz	21375 2562.5MHz
15MHz	QPSK	1	0	23.70	23.68	23.67
		1	36	23.67	23.68	23.70
		1	74	23.64	23.70	23.68
		36	0	22.59	22.33	22.63
		36	18	22.70	22.37	22.68
		36	38	22.64	22.47	22.70
		75	0	22.62	22.40	22.65
	16QAM	1	0	22.65	22.39	22.51
		1	36	22.68	22.14	22.59
		1	74	22.29	22.31	22.53
		36	0	21.33	21.34	21.70
		36	18	21.39	21.35	21.68
		36	38	21.33	21.50	21.70
		75	0	21.36	21.42	21.70

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)		
				20850 2510MHz	21100 2535MHz	21350 2560MHz
20MHz	QPSK	1	0	23.44	23.45	23.70
		1	49	23.37	23.47	23.69
		1	99	23.31	23.38	23.62
		50	0	22.36	22.40	22.59
		50	25	22.32	22.54	22.62
		50	49	22.38	22.54	22.70
		100	0	22.36	22.43	22.70
	16QAM	1	0	22.66	22.62	22.65
		1	49	22.46	22.45	22.68
		1	99	22.34	22.39	22.67
		50	0	21.39	21.40	21.64
		50	25	21.31	21.50	21.69
		50	49	21.39	21.51	21.70
		100	0	21.51	21.41	21.70

- LTE Band 17

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)
				23790 710 MHz
5MHz	QPSK	1	0	24.62
		1	12	24.58
		1	24	24.47
		12	0	23.70
		12	6	23.69
		12	11	23.67
		25	0	23.70
	16QAM	1	0	23.47
		1	12	23.70
		1	24	23.34
		12	0	22.70
		12	6	22.68
		12	11	22.70
		25	0	22.68

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)
				23790 710 MHz
10MHz	QPSK	1	0	24.53
		1	24	24.43
		1	49	24.42
		25	0	23.69
		25	12	23.68
		25	24	23.69
		50	0	23.66
	16QAM	1	0	23.70
		1	24	23.67
		1	49	23.47
		25	0	22.64
		25	12	22.69
		25	24	22.70
		50	0	22.67

Note: LTE Band 17 at 5 MHz & 10 MHz Bandwidth does not support three non-overlapping channels. Per KDB 941225 D05v02r03, when a device supports overripping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlaapping channels should be selected for testing.

11.3 WiFi

SAR Testing for 802.11 Transmitters

General Device Setup

Normal Network operating configurations are not suitable for measuring the SAR of 802.11 transmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable.

Chipset based test mode software is hardware dependent and generally varies among manufacturers. The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.

A periodic duty factor is required for current generation SAR systems to measure SAR. When 802.11 frame gaps are accounted for in the transmission, a maximum transmission duty factor of 92 – 96% is typically achievable in most test mode configurations. A minimum transmission duty factor 85 % is required to avoid certain hardware and device implementation issues related to wide range SAR scaling. The reported SAR is scaled to 100% transmission duty factor to determine compliance at the maximum tune-up tolerance limit.

U-NII-1 and U-NII-2A

For devices that operate in both U-NOO-1 and U-NII-2A bands, when the same maximum output power is specified for both bands, SAR measurement using OFDM SAR test procedures is not required for U-NII-1 unless the highest reported SAR for U-NII-2A is > 1.2 W/kg according to KDB 248227 D01v0201. When different maximum output powers are specified for the bands, SAR measurement for the U-NII band with the lower maximum output power is not required unless the highest reported SAR for the U-NII band with the higher maximum output power, adjusted by the ration of lower to higher specified maximum output power for the two bands, is >1.2 W/kg.

U-NII-2C and U-NII-3

The frequency range covered by U-NII-2C and U-NII-3 is 380 MHz (5.47 – 5.85 GHz), which requires a minimum of at least two SAR probe calibration frequency points to support SAR measurements. To maintain SAR measurement accuracy and to facilitate test reduction, the channels in U-NII-2C band above 5.65 GHz are grouped with the 5.8 GHz channels in U-NII-3 band or 15.247 5.8 GHz band to enable tow SAR probe calibration frequency points to cover the bands, including the band gap channel. When band gap channels are disabled, each band is tested independently according to the normally required OFDM SAR measurement and probe calibration frequency points requirements.

Initial Test Position Procedure

For exposure conditions with multiple test positions, such as handset operating next to the ear, devices with hotspot mode or UMPC mini-tablet, procedures for initial position can be applied. Using the transmission mode determined by the DSSS procedure or initial test configuration, area scans are measured for all positions in an exposure condition. The test position with the highest extrapolated (peak) SAR is used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test positions is required. Otherwise, SAR is evaluated at the subsequent highest peak SAR positions until the reported SAR result is ≤ 0.8 W/kg or all test positions are measured.

2.4 GHz SAR Test Requirements

SAR is measured for 2.4 GHz 802.11b DSSS using either the fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

- 1) When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS is that exposure configuration.
- 2) When the reported SAR is > 0.8 W/kg, SAR is required for that position using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

2.4 GHz 802.11 g/n OFDM are additionally evaluated for SAR if the highest reported SAR for 802.11b, adjusted by the ratio of the OFDM to DSSS specified maximum output power, is > 1.2 W/kg. When SAR is required for OFDM modes in 2.4 GHz band, the Initial Test Configuration Procedures should be followed.

OFDM Transmission Mode and SAR Test Channel Selection

For the 2.4 GHz and 5 GHz bands, when the same maximum output power was specified for multiple OFDM transmission mode configurations in a frequency band or aggregated bands, SAR is measured using the configuration with the largest channel bandwidth, lowest order modulation and lowest data rate. When the maximum output power of a channel is the same for equivalent OFDM configurations; for example, 802.11a, 802.11n and 802.11 ac or 802.11 g and 802.11 n with the same channel bandwidth, modulation and data rate etc., the lower order 802.11 mode i.e., 802.11a, then 802.11n and 802.11 ac or 802.11g then 802.11n, is used for SAR measurement. When the maximum output power are the same for multiple test channels, either according to the default or additional power measurement requirements, SAR is measured using the channel closest to the middle of the frequency band or aggregated band. When there are multiple channels with the same maximum output power, SAR is measured using the higher number channel.

Initial Test configuration procedure

For OFDM, in both 2.4 GHz and 5 GHz bands, an initial test configuration is determined for each frequency band and aggregated band, according to the transmission mode with the highest maximum output power specified for SAR measurements. When the same maximum output power is specified for multiple OFDM transmission mode configurations in a frequency band or aggregated band, SAR is measured using the configuration(s) with the largest channel bandwidth, lowest order modulation, and lowest data rate. If the average RF output powers of the highest identical transmission modes are within 0.25 dB of each other, mid channel of the transmission mode with highest average RF output power is the initial test channel. Otherwise, the channel of the transmission mode with the highest average RF output conducted power will be the initial test configuration.

When the reported SAR is ≤ 0.8 W/kg, no additional measurements on other test channels are required. Otherwise, SAR is evaluated using the subsequent highest average RF output channel until the reported SAR result is 1.2 W/kg or all channels are measured. When there are multiple untested channels having the same subsequent highest average RF output power, the channel with higher frequency from the lowest 802.11 mode is considered for SAR measurements.

Subsequent Test configuration Procedures

For OFDM configurations in each frequency band and aggregated band, SAR is evaluated for initial test configuration using the fixed test position or the initial test position procedure. When the highest reported SAR (for the initial test configuration), adjusted by the ratio of the specified maximum output power of the subsequent test configuration to initial test configuration, is ≤ 1.2 W/kg, no additional SAR test for the subsequent test configurations are required.

IEEE 802.11b Average RF Power

Mode	Freq. [MHz]	Channel	802.11b (2.4 GHz) Conducted Power [dBm]
802.11b	2412	1	15.70
	2437	6	16.32
	2462	11	16.63
802.11g	2412	1	13.27
	2437	6	13.31
	2462	11	12.70
802.11n	2412	1	12.33
	2437	6	12.48
	2462	11	11.14
802.11ac	2412	1	11.12
	2437	6	11.75
	2462	11	11.39

IEEE 802.11a Average RF Power– 20 MHz Bandwidth

Mode	Freq. [MHz]	Channel	802.11a (5 GHz) Conducted Power [dBm]
			Data Rate (6Mbps)
802.11a	5180	36	12.28
	5200	40	12.30
	5220	44	12.01
	5240	48	12.11
	5260	52	12.24
	5280	56	12.12
	5300	60	12.22
	5320	64	12.15
	5500	100	12.25
	5540	108	12.15
	5580	116	12.26
	5660	132	12.21
	5745	149	12.25
	5825	165	12.10

IEEE 802.11n Average RF Power– 20 MHz Bandwidth

Mode	Freq. [MHz]	Channel	802.11n (5 GHz) Conducted Power [dBm]
			Data Rate (6Mbps)
802.11n	5180	36	11.12
	5200	40	12.12
	5220	44	11.74
	5240	48	11.81
	5260	52	12.03
	5280	56	11.81
	5300	60	11.95
	5320	64	12.06
	5500	100	11.03
	5580	116	12.02
	5620	124	11.01
	5720	144	11.77
	5745	149	12.06
	5785	157	11.96
	5825	165	11.83

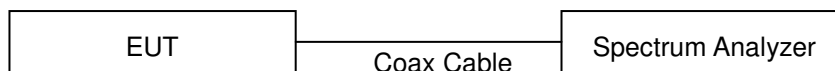
IEEE 802.11ac Average RF Power– 20 MHz Bandwidth

Mode	Freq. [MHz]	Channel	802.11ac (5 GHz) Conducted Power [dBm]
			Data Rate (6Mbps)
802.11ac	5180	36	11.15
	5200	40	11.98
	5220	44	11.51
	5240	48	11.96
	5260	52	12.06
	5280	56	11.91
	5300	60	12.07
	5320	64	12.01
	5500	100	11.05
	5580	116	12.03
	5620	124	11.11
	5720	144	11.43
	5745	149	11.86
	5785	157	11.80
	5825	165	11.77

Justification for test configurations for WLAN per KDB Publication 248227 D01v0201:

- Power measurements were performed for the transmission mode configuration with the highest maximum output power specified for production units.
- For transmission mode with the same maximum output power specification, powers were measured for the largest channel bandwidth, lowest order modulation and lowest data rate.
- For transmission modes with identical maximum specified output power, channel bandwidth, modulation and data rates, power measurements were required for all identical configurations.
- For each transmission mode configuration, powers were measured for the highest and lowest channels; and at the mid-band channel(s) when there were at least 3 channels supported. For configurations with multiple mid-band channels, due to an even number of channels, both channels were measured.

Test Configuration



11.5 Test Exclusions Applied

11.5.1 WCDMA

Per FCC KDB 941225 D01V03, 12.2 kbps RMC is the primary mode and HSPA (HSUPA/HSDPA with RMC) is the secondary mode.

Per KDB 941225 D01v03, The SAR test exclusion is applied to the secondary mode by the following equation.

$$\text{Adjusted SAR} = \text{Highest Reported SAR} * \frac{\text{Secondary Max tune - up (mW)}}{\text{Primary Max tune tune - up(mW)}} \leq 1.2 \text{ W/kg.}$$

Based on the highest Reported SAR, the secondary mode is not required.

And the maximum output power and tune-up tolerance in secondary mode is ≤ 0.25 dB higher than the primary mode.

11.5.2 BT

Per FCC KDB 447498 D01v05r02, The 1g SAR exclusion threshold for distance < 50 mm is defined by the following equation:

$$\frac{\text{Max Power of Channel(mW)}}{\text{Test Separation Distance (mm)}} * \sqrt{\text{Frequency(GHz)}} \leq 3.0$$

Mode	Frequency	Maximum Allowed Power	Separation Distance	≤ 3.0
	[MHz]	[mW]	[mm]	
Bluetooth	2 480	10	10	1.57

Based on the maximum conducted power of Bluetooth and antenna to use separation distance, Bluetooth SAR was not required $[(10/10)*\sqrt{2.480}] = 1.57 < 3.0$.

Per FCC KDB 447498 D01v05r02, The 10g SAR exclusion threshold for distance < 50 mm is defined by the following equation:

$$\frac{\text{Max Power of Channel(mW)}}{\text{Test Separation Distance (mm)}} * \sqrt{\text{Frequency(GHz)}} \leq 7.5$$

Mode	Frequency	Maximum Allowed Power	Separation Distance	≤ 7.5
	[MHz]	[mW]	[mm]	
Bluetooth	2 480	10	5	3.15

Based on the maximum conducted power of Bluetooth and antenna to use separation distance, Extremity Bluetooth SAR was not required $[(10/5)*\sqrt{2.480}] = 3.15 < 7.5$

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05r02 IV.C.1iii, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6W/kg. When standalone SAR is not required to be measured per FCC KDB 447498 D01v05r02 4.3.22, the following equation must be used to estimate the standalone 1-g and 10g SAR for simultaneous transmission assessment involving that transmitter.

$$\text{Estimated 1g SAR} = \frac{\sqrt{f(\text{GHz})}}{7.5} * \frac{(\text{Max Power of channel mW})}{\text{Min Separation Distance}}$$

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated 1gSAR (Body)
	[MHz]	[mW]	[mm]	[W/kg]
Bluetooth	2 480	10	10	0.21

$$\text{Estimated 10g SAR} = \frac{\sqrt{f(\text{GHz})}}{18.75} * \frac{(\text{Max Power of channel mW})}{\text{Min Separation Distance}}$$

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated10g SAR (Body)
	[MHz]	[mW]	[mm]	[W/kg]
Bluetooth	2 480	10	5	0.17

Note :

1) Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission. The Estimated 1g and 10g SAR results were determined according to FCC KDB447498 D01v05r02.

2) The frequency of Bluetooth using for estimated SAR was selected highest channel of Bluetooth for highest estimated SAR.

12. SAR Test configuration

12.1 Sides for SAR Testing Configurations

Mode	Rear	Front	Left	Right	Bottom	Top
GSM/GPRS 850	Yes	Yes	Yes	Yes	Yes	No
GSM/GPRS 1900	Yes	Yes	Yes	Yes	Yes	No
WCDMA 850	Yes	Yes	Yes	Yes	Yes	No
WCDMA 1700	Yes	Yes	Yes	Yes	Yes	No
WCDMA 1900	Yes	Yes	Yes	Yes	Yes	No
LTE Band 2	Yes	Yes	Yes	Yes	Yes	No
LTE Band 4	Yes	Yes	Yes	Yes	Yes	No
LTE Band 5	Yes	Yes	Yes	Yes	Yes	No
LTE Band 7	Yes	Yes	Yes	Yes	Yes	No
LTE Band 17	Yes	Yes	Yes	Yes	Yes	No
2.4 GHz WLAN	Yes	Yes	Yes	Yes	No	Yes
5 GHz WLAN	Yes	Yes	Yes	Yes	No	Yes

*** Note;**

All test configurations are based on front view.

The overall diagram dimension of this device is >160 mm and < 200 mm, it is considered a “phablet”.
Particular DUT edges were not required to be evaluated for Wireless Router SAR or Extremity SAR.
If the edges were greater than 2.5cm from the transmitting antenna according to FCC KDB 941225 D06v02.

The distances between the transmit antennas and edges of the device are included in the filing.

13. SAR TEST DATA SUMMARY

13.1-1 Measurement Results (GSM850 Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Cover Type	Phantom Position	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
836.6	190	GSM 850	32.7	32.58	0.02	Standard	Left Ear	0.131	1.028	0.135	-
836.6	190		32.7	32.58	0.198	Standard	Left Tilt	0.075	1.028	0.077	-
836.6	190		32.7	32.58	-0.13	Standard	Right Ear	0.189	1.028	0.194	-
836.6	190		32.7	32.58	0.03	Standard	Right Tilt	0.080	1.028	0.082	-
836.6	190		32.7	32.58	-0.10	Wireless cover (Close)	Right Ear	0.135	1.028	0.139	-
836.6	190		32.7	32.58	-0.12	Wireless cover(Open)	Right Ear	0.132	1.028	0.136	-
836.6	190	GPRS 2Tx	31.7	31.34	-0.02	Standard	Left Ear	0.150	1.086	0.163	-
836.6	190		31.7	31.34	-0.04	Standard	Left Tilt	0.088	1.086	0.096	-
836.6	190		31.7	31.34	0.076	Standard	Right Ear	0.206	1.086	0.224	-
836.6	190		31.7	31.34	-0.07	Standard	Right Tilt	0.095	1.086	0.103	-
836.6	190		31.7	31.34	-0.14	Wireless cover (Close)	Right Ear	0.219	1.086	0.238	1
836.6	190		31.7	31.34	-0.09	Wireless cover(Open)	Right Ear	0.175	1.086	0.190	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg (mW/g) Averaged over 1 gram				

13.1-2 Measurement Results (GSM1900 Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Cover Type	Phantom Position	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
1 880.0	661	GSM 1900	30.7	30.41	-0.07	Standard	Left Ear	0.407	1.069	0.435	-
1 880.0	661		30.7	30.41	0.18	Standard	Left Tilt	0.173	1.069	0.185	-
1 880.0	661		30.7	30.41	0.04	Standard	Right Ear	0.237	1.069	0.253	-
1 880.0	661		30.7	30.41	0.10	Standard	Right Tilt	0.150	1.069	0.160	-
1 880.0	661		30.7	30.41	-0.17	Wireless cover (Close)	Right Ear	0.361	1.069	0.386	-
1 880.0	661		30.7	30.41	-0.17	Wireless cover(Open)	Right Ear	0.469	1.069	0.501	-
1 880.0	661	GPRS 2Tx	28.7	27.85	0.13	Standard	Left Ear	0.460	1.216	0.559	-
1 880.0	661		28.7	27.85	0.12	Standard	Left Tilt	0.211	1.216	0.257	-
1 880.0	661		28.7	27.85	0.11	Standard	Right Ear	0.288	1.216	0.350	-
1 880.0	661		28.7	27.85	0.07	Standard	Right Tilt	0.186	1.216	0.226	-
1 880.0	661		28.7	27.85	0.15	Wireless cover (Close)	Left Ear	0.580	1.216	0.705	2
1 880.0	661		28.7	27.85	-0.15	Wireless cover(Open)	Left Ear	0.356	1.216	0.433	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg (mW/g) Averaged over 1 gram				

13.1-3 Measurement Results (WCDMA850 Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Cover Type	Phantom Position	Measured SAR(mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
836.6	4183	WCDMA 850	24.7	24.12	0.15	Standard	Left Ear	0.164	1.143	0.187	-
836.6	4183		24.7	24.12	-0.04	Standard	Left Tilt	0.101	1.143	0.115	-
836.6	4183		24.7	24.12	0.03	Standard	Right Ear	0.215	1.143	0.246	-
836.6	4183		24.7	24.12	-0.15	Standard	Right Tilt	0.099	1.143	0.113	-
836.6	4183		24.7	24.12	0.04	Wireless cover (Close)	Right Ear	0.183	1.143	0.209	-
836.6	4183		24.7	24.12	0.13	Wireless cover(Open)	Right Ear	0.235	1.143	0.269	3
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg (mW/g) Averaged over 1 gram				

13.1-4 Measurement Results (WCDMA1700 Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Cover Type	Phantom Position	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
1 732.4	1412	WCDMA 1700	22.2	21.88	0.16	Standard	Left Ear	0.515	1.076	0.554	-
1 732.4	1412		22.2	21.88	-0.02	Standard	Left Tilt	0.197	1.076	0.212	-
1 732.4	1412		22.2	21.88	0.11	Standard	Right Ear	0.349	1.076	0.376	-
1 732.4	1412		22.2	21.88	0.14	Standard	Right Tilt	0.225	1.076	0.242	-
1 732.4	1412		22.2	21.88	0.15	Wireless cover (Close)	Left Ear	0.399	1.076	0.430	-
1 732.4	1412		22.2	21.88	-0.18	Wireless cover(Open)	Left Ear	0.603	1.076	0.649	4
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg (mW/g) Averaged over 1 gram				

13.1-5 Measurement Results (WCDMA1900 Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Cover Type	Phantom Position	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
1 880	9400	WCDMA 1900	23.7	23.23	0.17	Standard	Left Ear	0.549	1.114	0.612	5
1 880	9400		23.7	23.23	0.16	Standard	Left Tilt	0.214	1.114	0.238	-
1 880	9400		23.7	23.23	-0.15	Standard	Right Ear	0.295	1.114	0.329	-
1 880	9400		23.7	23.23	0.15	Standard	Right Tilt	0.172	1.114	0.192	-
1 880	9400		23.7	23.23	0.19	Wireless cover (Close)	Left Ear	0.538	1.114	0.599	-
1 880	9400		23.7	23.23	-0.13	Wireless cover(Open)	Left Ear	0.477	1.114	0.532	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg (mW/g) Averaged over 1 gram				

13.1-6 Measurement Results (LTE Band 2 20MHz Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Cover Type	Phantom Position	RB Size	RB Offset	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No
MHz	Ch.		Tune-Up Limit	Conducted Power									
1 880	18900	QPSK	23.7	23.70	-0.05	Standard	Left Ear	1	0	0.600	1.000	0.600	-
1 880	18900		22.7	22.70	-0.02	Standard	Left Ear	50	0	0.411	1.000	0.411	-
1 880	18900		23.7	23.70	0.14	Standard	Left Tilt	1	0	0.269	1.000	0.269	-
1 880	18900		22.7	22.70	-0.14	Standard	Left Tilt	50	0	0.198	1.000	0.198	-
1 880	18900		23.7	23.70	-0.087	Standard	Right Ear	1	0	0.310	1.000	0.310	-
1 880	18900		22.7	22.70	0.09	Standard	Right Ear	50	0	0.232	1.000	0.232	-
1 880	18900		23.7	23.70	-0.02	Standard	Right Tilt	1	0	0.251	1.000	0.251	-
1 880	18900		22.7	22.70	0.05	Standard	Right Tilt	50	0	0.179	1.000	0.179	-
1 880	18900		23.7	23.70	0.17	Wireless cover(Open)	Left Ear	1	0	0.720	1.000	0.720	6
1 880	18900		23.7	23.70	-0.01	Wireless cover (Close)	Left Ear	1	0	0.666	1.000	0.666	-
ANSI/ IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg (mW/g) Averaged over 1 gram					

13.1-7 Measurement Results (LTE Band 4 20MHz Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Cover Type	Phantom Position	RB Size	RB Offset	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No
MHz	Ch.		Tune-Up Limit	Conducted Power									
1 732.5	20175	QPSK	22.7	22.70	-0.05	Standard	Left Ear	1	0	0.537	1.000	0.537	-
1 732.5	20175		21.7	21.45	-0.17	Standard	Left Ear	50	49	0.396	1.059	0.419	-
1 732.5	20175		22.7	22.70	-0.00	Standard	Left Tilt	1	0	0.231	1.000	0.231	-
1 732.5	20175		21.7	21.45	0.03	Standard	Left Tilt	50	49	0.169	1.059	0.179	-
1 732.5	20175		22.7	22.70	-0.15	Standard	Right Ear	1	0	0.216	1.000	0.216	-
1 732.5	20175		21.7	21.45	-0.17	Standard	Right Ear	50	49	0.169	1.059	0.179	-
1 732.5	20175		22.7	22.70	0.16	Standard	Right Tilt	1	0	0.240	1.000	0.240	-
1 732.5	20175		21.7	21.45	0.08	Standard	Right Tilt	50	49	0.188	1.059	0.199	-
1 732.5	20175		22.7	22.70	-0.05	Wireless cover(Open)	Left Ear	1	0	0.603	1.000	0.603	-
1 732.5	20175		22.7	22.70	-0.15	Wireless cover (Close)	Left Ear	1	0	0.636	1.000	0.636	7
ANSI/ IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg (mW/g) Averaged over 1 gram					

13.1-8 Measurement Results (LTE Band 5 10MHz Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Cover Type	Phantom Position	RB Size	RB Offset	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No
MHz	Ch.		Tune-Up Limit	Conducted Power									
836.5	20525	QPSK	24.7	24.59	0.10	Standard	Left Ear	1	49	0.288	1.026	0.295	-
836.5	20525		23.7	23.69	-0.01	Standard	Left Ear	25	24	0.235	1.002	0.236	-
836.5	20525		24.7	24.59	-0.16	Standard	Left Tilt	1	49	0.171	1.026	0.175	-
836.5	20525		23.7	23.69	0.12	Standard	Left Tilt	25	24	0.140	1.002	0.140	-
836.5	20525		24.7	24.59	0.06	Standard	Right Ear	1	49	0.480	1.026	0.492	8
836.5	20525		23.7	23.69	-0.03	Standard	Right Ear	25	24	0.363	1.002	0.364	-
836.5	20525		24.7	24.59	-0.12	Standard	Right Tilt	1	49	0.200	1.026	0.205	-
836.5	20525		23.7	23.69	0.06	Standard	Right Tilt	25	24	0.152	1.002	0.152	-
836.5	20525		24.7	24.59	0.01	Wireless cover (Close)	Right Ear	1	49	0.430	1.026	0.441	-
836.5	20525		24.7	24.59	-0.15	Wireless cover(Open)	Right Ear	1	49	0.284	1.026	0.291	-
ANSI/ IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg (mW/g) Averaged over 1 gram					

13.1-9 Measurement Results (LTE Band 7 20MHz Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Cover Type	Phantom Position	RB Size	RB Offset	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No
MHz	Ch.		Tune-Up Limit	Conducted Power									
2 560	21350	QPSK	23.7	23.70	-0.136	Standard	Left Ear	1	0	0.074	1.000	0.074	-
2 560	21350		22.7	22.70	0.04	Standard	Left Ear	50	49	0.046	1.000	0.046	-
2 560	21350		23.7	23.70	0.135	Standard	Left Tilt	1	0	0.072	1.000	0.072	-
2 560	21350		22.7	22.70	0.155	Standard	Left Tilt	50	49	0.055	1.000	0.055	-
2 560	21350		23.7	23.70	0.177	Standard	Right Ear	1	0	0.183	1.000	0.183	-
2 560	21350		22.7	22.70	-0.02	Standard	Right Ear	50	49	0.145	1.000	0.145	-
2 560	21350		23.7	23.70	0.001	Standard	Right Tilt	1	0	0.050	1.000	0.050	-
2 560	21350		22.7	22.70	0.07	Standard	Right Tilt	50	49	0.041	1.000	0.041	-
2 560	21350		23.7	23.70	0.137	Wireless cover (Close)	Right Ear	1	0	0.215	1.000	0.215	9
2 560	21350		23.7	23.70	0.153	Wireless cover(Open)	Right Ear	1	0	0.185	1.000	0.185	-
ANSI/ IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg (mW/g) Averaged over 1 gram					

13.1-10 Measurement Results (LTE Band 17 10MHz Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Cover Type	Phantom Position	RB Size	RB Offset	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No
MHz	Ch.		Tune-Up Limit	Conducted Power									
710	23790	QPSK	24.7	24.53	0.14	Standard	Left Ear	1	0	0.169	1.040	0.176	-
710	23790		23.7	23.69	0.09	Standard	Left Ear	25	0	0.130	1.002	0.130	-
710	23790		24.7	24.53	-0.09	Standard	Left Tilt	1	0	0.099	1.040	0.103	-
710	23790		23.7	23.69	0.01	Standard	Left Tilt	25	0	0.080	1.002	0.080	-
710	23790		24.7	24.53	0.05	Standard	Right Ear	1	0	0.229	1.040	0.238	10
710	23790		23.7	23.69	0.04	Standard	Right Ear	25	0	0.181	1.002	0.181	-
710	23790		24.7	24.53	-0.12	Standard	Right Tilt	1	0	0.105	1.040	0.109	-
710	23790		23.7	23.69	0.03	Standard	Right Tilt	25	0	0.087	1.002	0.087	-
710	23790		24.7	24.53	0.07	Wireless cover(Close)	Right Ear	1	0	0.211	1.040	0.219	-
710	23790		24.7	24.53	0.12	Wireless cover(Open)	Right Ear	1	0	0.188	1.040	0.196	-
ANSI/ IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Head 1.6 W/kg (mW/g) Averaged over 1 gram					

13.1-11 Measurement Results (DTS Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Phantom Position	Cover Type	Duty Cycle (%)	Peak SAR of Area Scan (W/kg)	Measured SAR (mW/g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power										
2 462	11	802.11b (1Mbps)	17	16.63	0.158	Left Ear	Standard	98.8	0.682	0.408	1.089	1.012	0.450	-
			17	16.63	0.128	Left Tilt	Standard	98.8	0.683	0.407	1.089	1.012	0.449	-
			17	16.63	-	Right Ear	Standard	98.8	0.352	-	1.089	1.012	-	-
			17	16.63	-	Right Tilt	Standard	98.8	0.331	-	1.089	1.012	-	-
			17	16.63	0.169	Left Ear	Wireless cover (Close)	98.8	0.461	0.299	1.089	1.012	0.329	-
			17	16.63	-0.065	Left Ear	Wireless cover(Open)	98.8	0.765	0.472	1.089	1.012	0.520	11
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Head 1.6 W/kg (mW/g) Averaged over 1 gram							

13.1-12 Measurement Results (NII Head SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Cover Type	Phantom Position	Data Rate	Duty Cycle (%)	Peak SAR of Area Scan (W/kg)	Measured SAR (mW/g)	Scaling Factor (Power)	Scaling Factor (Duty Cycle)	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducte Power											
5 260	52	802.11a	13	12.24	-	Standard	Left Ear	6Mbps	94.97	0.533	-	1.191	1.050	-	-
			13	12.24	0.17	Standard	Left Tilt	6Mbps	94.97	0.653	0.287	1.191	1.050	0.342	-
			13	12.24	-	Standard	Right Ear	6Mbps	94.97	0.475	-	1.191	1.050	-	-
			13	12.24	-	Standard	Right Tilt	6Mbps	94.97	0.539	-	1.191	1.050	-	-
5 580	116	802.11a	13	12.26	0.10	Standard	Left Ear	6Mbps	94.97	0.791	0.336	1.186	1.050	0.398	-
			13	12.26	0.17	Standard	Left Tilt	6Mbps	94.97	0.857	0.394	1.186	1.050	0.467	12
			13	12.26	-	Standard	Right Ear	6Mbps	94.97	0.653	-	1.186	1.050	-	-
			13	12.26	-	Standard	Right Tilt	6Mbps	94.97	0.683	-	1.186	1.050	-	-
			13	12.26	-0.12	Wireless cover(Close)	Left Tilt	6Mbps	94.97	0.512	0.194	1.186	1.050	0.230	-
			13	12.26	-0.18	Wireless cover(Open)	Left Tilt	6Mbps	94.97	0.978	0.371	1.186	1.050	0.440	-
5 745	149	802.11a	13	12.25	-	Standard	Left Ear	6Mbps	94.97	0.669	-	1.189	1.050	-	-
			13	12.25	-0.04	Standard	Left Tilt	6Mbps	94.97	0.811	0.258	1.189	1.050	0.307	-
			13	12.25	-	Standard	Right Ear	6Mbps	94.97	0.603	-	1.189	1.050	-	-
			13	12.25	-	Standard	Right Tilt	6Mbps	94.97	0.592	-	1.189	1.050	-	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population									Head 1.6 W/kg (mW/g) Averaged over 1 gram						

13.2-1 Measurement Results (GSM850 Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Separation Distance	Measured SAR(mW/g)	Scaling Factor	Scaled SAR(mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
836.6	190	GPRS 2Tx	31.7	31.34	-0.02	Rear	1.0 cm	0.207	1.086	0.225	13
836.6	190		31.7	31.34	-0.13	Front	1.0 cm	0.339	1.086	0.368	14
836.6	190		31.7	31.34	0.08	Left	1.0 cm	0.085	1.086	0.092	-
836.6	190		31.7	31.34	0.01	Right	1.0 cm	0.123	1.086	0.134	-
836.6	190		31.7	31.34	0.04	Bottom	1.0 cm	0.211	1.086	0.229	-
836.6	190		31.7	31.34	-0.10	Front (Wireless cover (Close))	1.0 cm	0.221	1.086	0.240	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram				

13. 2-2 Measurement Results (GSM1900 Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Separation Distance	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
1 880.0	661	GPRS 2Tx	28.7	27.85	-0.06	Rear	1.0 cm	0.327	1.216	0.398	15
1 880.0	661		28.7	27.85	0.12	Front	1.0 cm	0.456	1.216	0.555	16
1 880.0	661		28.7	27.85	0.10	Left	1.0 cm	0.324	1.216	0.394	-
1 880.0	661		28.7	27.85	0.05	Right	1.0 cm	0.061	1.216	0.074	-
1 880.0	661		28.7	27.85	0.04	Bottom	1.0 cm	0.232	1.216	0.282	-
1 880.0	661		28.7	27.85	-0.16	Front (Wireless cover (Close))	1.0 cm	0.251	1.216	0.305	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram				

13.2-3 Measurement Results (WCDMA850 Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Separation Distance	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
836.6	4183	WCDMA 850	24.7	24.12	-0.03	Rear	1.0 cm	0.234	1.143	0.267	17
836.6	4183		24.7	24.12	-0.02	Front	1.0 cm	0.378	1.143	0.432	18
836.6	4183		24.7	24.12	0.03	Left	1.0 cm	0.100	1.143	0.114	-
836.6	4183		24.7	24.12	-0.04	Right	1.0 cm	0.119	1.143	0.136	-
836.6	4183		24.7	24.12	-0.03	Bottom	1.0 cm	0.246	1.143	0.281	-
836.6	4183		24.7	24.12	-0.05	Front (Wireless cover (Close))	1.0 cm	0.269	1.143	0.307	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram				

13. 2-4 Measurement Results (WCDMA1700 Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Separation Distance	Measured SAR(mW/g)	Scaling Factor	Scaled SAR(mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
1 732.4	1412	WCDMA 1700	22.2	21.88	-0.16	Rear	1.0 cm	0.487	1.076	0.524	19
1 732.4	1412		22.2	21.88	0.05	Front	1.0 cm	0.353	1.076	0.380	
1 732.4	1412		22.2	21.88	-0.01	Left	1.0 cm	0.378	1.076	0.407	
1 732.4	1412		22.2	21.88	0.02	Right	1.0 cm	0.051	1.076	0.055	-
1 732.4	1412		22.2	21.88	0.02	Bottom	1.0 cm	0.304	1.076	0.327	-
1 732.4	1412		22.2	21.88	0.07	Rear (Wireless cover (Close))	1.0 cm	0.569	1.076	0.613	20
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram				

13. 2-5 Measurement Results (WCDMA1900 Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Separation Distance	Measured SAR(mW/g)	Scaling Factor	Scaled SAR(mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
1 880.0	9400	WCDMA 1900	23.7	23.23	-0.17	Rear	1.0 cm	0.384	1.114	0.428	21
1 880.0	9400		23.7	23.23	-0.03	Front	1.0 cm	0.374	1.114	0.417	-
1 880.0	9400		23.7	23.23	-0.03	Left	1.0 cm	0.473	1.114	0.527	22
1 880.0	9400		23.7	23.23	-0.04	Right	1.0 cm	0.069	1.114	0.077	-
1 880.0	9400		23.7	23.23	0.14	Bottom	1.0 cm	0.250	1.114	0.279	-
1 880.0	9400		23.7	23.23	-0.09	Left (Wireless cover (Close))	1.0 cm	0.441	1.114	0.491	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram				

13.2-6 Measurement Results (LTE Band 2 20MHz Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	RB Size	RB Offset	Separation Distance	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power									
1 880	18900	QPSK	23.7	23.70	-0.18	Rear	1	0	1.0 cm	0.476	1.000	0.476	23
1 880	18900		22.7	22.70	0.02	Rear	50	0	1.0 cm	0.346	1.000	0.346	-
1 880	18900		23.7	23.70	-0.07	Front	1	0	1.0 cm	0.330	1.000	0.330	-
1 880	18900		22.7	22.70	-0.02	Front	50	0	1.0 cm	0.237	1.000	0.237	-
1 880	18900		23.7	23.70	-0.13	Left	1	0	1.0 cm	0.547	1.000	0.547	24
1 880	18900		22.7	22.70	-0.03	Left	50	0	1.0 cm	0.407	1.000	0.407	-
1 880	18900		23.7	23.70	0.12	Right	1	0	1.0 cm	0.093	1.000	0.093	-
1 880	18900		22.7	22.70	0.10	Right	50	0	1.0 cm	0.069	1.000	0.069	-
1 880	18900		23.7	23.70	0.04	Bottom	1	0	1.0 cm	0.420	1.000	0.420	-
1 880	18900		22.7	22.70	0.03	Bottom	50	0	1.0 cm	0.295	1.000	0.295	-
1 880	18900		23.7	23.70	0.04	Left (Wireless cover(Close))	1	0	1.0 cm	0.528	1.000	0.528	-
ANSI/ IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram						

13.2-7 Measurement Results (LTE Band 4 20MHz Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	RB Size	RB Offset	Separation Distance	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power									
1 732.5	20175	QPSK	22.7	22.70	-0.03	Rear	1	0	1.0 cm	0.501	1.000	0.501	25
1 732.5	20175		21.7	21.45	0.05	Rear	50	49	1.0 cm	0.369	1.059	0.391	-
1 732.5	20175		22.7	22.70	-0.06	Front	1	0	1.0 cm	0.610	1.000	0.610	26
1 732.5	20175		21.7	21.45	0.04	Front	50	49	1.0 cm	0.453	1.059	0.480	-
1 732.5	20175		22.7	22.70	-0.02	Left	1	0	1.0 cm	0.480	1.000	0.480	-
1 732.5	20175		21.7	21.45	-0.01	Left	50	49	1.0 cm	0.382	1.059	0.405	-
1 732.5	20175		22.7	22.70	0.19	Right	1	0	1.0 cm	0.097	1.000	0.097	-
1 732.5	20175		21.7	21.45	-0.03	Right	50	49	1.0 cm	0.075	1.059	0.079	-
1 732.5	20175		22.7	22.70	0.12	Bottom	1	0	1.0 cm	0.526	1.000	0.526	-
1 732.5	20175		21.7	21.45	0.10	Bottom	50	49	1.0 cm	0.400	1.059	0.424	-
1 732.5	20175		22.7	22.70	-0.05	Front (Wireless cover (Close))	1	0	1.0 cm	0.608	1.000	0.608	-
ANSI/ IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram						

13.2-8 Measurement Results (LTE Band 5 10MHz Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	RB Size	RB Offset	Separation Distance	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power									
836.5	20525	QPSK	24.7	24.59	-0.07	Rear	1	49	1.0 cm	0.287	1.026	0.294	27
836.5	20525		23.7	23.69	-0.03	Rear	25	24	1.0 cm	0.212	1.002	0.212	-
836.5	20525		24.7	24.59	-0.12	Front	1	49	1.0 cm	0.365	1.026	0.374	28
836.5	20525		23.7	23.69	-0.03	Front	25	24	1.0 cm	0.277	1.002	0.278	-
836.5	20525		24.7	24.59	-0.18	Left	1	49	1.0 cm	0.131	1.026	0.134	-
836.5	20525		23.7	23.69	-0.08	Left	25	24	1.0 cm	0.093	1.002	0.093	-
836.5	20525		24.7	24.59	0.19	Right	1	49	1.0 cm	0.170	1.026	0.174	-
836.5	20525		23.7	23.69	-0.04	Right	25	24	1.0 cm	0.133	1.002	0.133	-
836.5	20525		24.7	24.59	-0.19	Bottom	1	49	1.0 cm	0.277	1.026	0.284	-
836.5	20525		23.7	23.69	0.05	Bottom	25	24	1.0 cm	0.202	1.002	0.202	-
836.5	20525		24.7	24.59	0.17	Front (Wireless cover (Close))	1	49	1.0 cm	0.316	1.026	0.324	-
ANSI/ IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram						

13.2-9 Measurement Results (LTE Band 7 20MHz Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	RB Size	RB Offset	Separation Distance	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power									
2 560	21350	QPSK	23.7	23.70	-0.104	Rear	1	0	1.0 cm	0.752	1.000	0.752	29
2 560	21350		22.7	22.70	-0.099	Rear	50	49	1.0 cm	0.570	1.000	0.570	-
2 560	21350		23.7	23.70	-0.013	Front	1	0	1.0 cm	0.309	1.000	0.309	-
2 560	21350		22.7	22.70	0.129	Front	50	49	1.0 cm	0.220	1.000	0.220	-
2 560	21350		23.7	23.70	0.109	Left	1	0	1.0 cm	0.162	1.000	0.162	-
2 560	21350		22.7	22.70	0.142	Left	50	49	1.0 cm	0.114	1.000	0.114	-
2 560	21350		23.7	23.70	0.047	Right	1	0	1.0 cm	0.242	1.000	0.242	-
2 560	21350		22.7	22.70	0.113	Right	50	49	1.0 cm	0.167	1.000	0.167	-
2 510	20850		23.7	23.44	0.023	Bottom	1	0	1.0 cm	1.11	1.062	1.178	30
2 535	21100		23.7	23.47	-0.110	Bottom	1	49	1.0 cm	1.03	1.054	1.086	-
2 560	21350		23.7	23.70	0.174	Bottom	1	0	1.0 cm	1.05	1.000	1.050	-
2 560	21350		22.7	22.70	-0.030	Bottom	50	49	1.0 cm	0.787	1.000	0.787	-
2 560	21350		22.7	22.70	0.053	Bottom	100	0	1.0 cm	0.806	1.000	0.806	-
2 510	20850		23.7	23.44	0.054	Bottom (Wireless cover (Close))	1	0	1.0 cm	0.948	1.062	1.006	-
ANSI/ IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram						

13.2-10 Measurement Results (LTE Band 17 10MHz Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	RB Size	RB Offset	Separation Distance	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power									
710	23790	QPSK	24.7	24.53	-0.08	Rear	1	0	1.0 cm	0.388	1.040	0.403	31
710	23790		23.7	23.69	0.06	Rear	25	0	1.0 cm	0.304	1.002	0.305	-
710	23790		24.7	24.53	-0.15	Front	1	0	1.0 cm	0.580	1.040	0.603	32
710	23790		23.7	23.69	0.02	Front	25	0	1.0 cm	0.458	1.002	0.459	-
710	23790		24.7	24.53	0.03	Left	1	0	1.0 cm	0.171	1.040	0.178	-
710	23790		23.7	23.69	-0.01	Left	25	0	1.0 cm	0.144	1.002	0.144	-
710	23790		24.7	24.53	0.11	Right	1	0	1.0 cm	0.230	1.040	0.239	-
710	23790		23.7	23.69	-0.01	Right	25	0	1.0 cm	0.180	1.002	0.180	-
710	23790		24.7	24.53	-0.09	Bottom	1	0	1.0 cm	0.221	1.040	0.230	-
710	23790		23.7	23.69	0.01	Bottom	25	0	1.0 cm	0.166	1.002	0.166	-
710	23790		24.7	24.53	0.01	Front (Wireless cover (Close))	1	0	1.0 cm	0.262	1.040	0.272	-
ANSI/ IEEE C95.1 1992 – Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram						

13. 2-11 Measurement Results (WLAN Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Data Rate	Separation Distance	Duty Cycle (%)	Peak SAR of Area Scan (W/kg)	Measured SAR (mW/g)	Scaling Factor	Scaling Factor (Duty Cycle)	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducte Power											
2462	11	802.11b	17	16.63	-0.170	Rear	1Mbps	1.0 cm	98.8	0.357	0.232	1.089	1.012	0.256	33
			17	16.63	-	Front	1Mbps	1.0 cm	98.8	0.123	-	1.089	1.012	-	-
			17	16.63	-	Left	1Mbps	1.0 cm	98.8	0.017	-	1.089	1.012	-	-
			17	16.63	-	Right	1Mbps	1.0 cm	98.8	0.039	-	1.089	1.012	-	
			17	16.63	-	Top	1Mbps	1.0 cm	98.8	0.220	-	1.089	1.012	-	-
			17	16.63	0.129	Rear (Wireless cover (Close))	1Mbps	1.0 cm	98.8	0.355	0.230	1.089	1.012	0.253	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram								

13. 2-12 Measurement Results (5GHzWLAN Hotspot SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Data Rate	Separation Distance	Duty Cycle (%)	Peak SAR of Area Scan (W/kg)	Measured SAR (mW/g)	Scaling Factor	Scaling Factor (Duty Cycle)	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducte Power											
5 745	149	802.11a	13	12.25	-0.144	Rear	6Mbps	1.0 cm	94.97	0.228	0.083	1.189	1.050	0.104	34
			13	12.25	-	Front	6Mbps	1.0 cm	94.97	0.150	-	1.189	1.050	-	-
			13	12.25	-	Left	6Mbps	1.0 cm	94.97	0.00128	-	1.189	1.050	-	-
			13	12.25	-	Right	6Mbps	1.0 cm	94.97	0.00583	-	1.189	1.050	-	-
			13	12.25	0.03	Top	6Mbps	1.0 cm	94.97	0.410	0.160	1.189	1.050	0.200	-
			13	12.25	0.05	Top (Wireless cover (Close))	6Mbps	1.0 cm	94.97	0.418	0.167	1.189	1.050	0.208	35
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg (mW/g) Averaged over 1 gram							

13.3-1 Measurement Results (WLAN Body-worn SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Data Rate	Separation Distance	Duty Cycle (%)	Peak SAR of Area Scan (W/kg)	Measured SAR (mW/g)	Scaling Factor	Scaling Factor (Duty Cycle)	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducte Power											
2462	11	802.11b	17	16.63	-0.170	Rear	1Mbps	1.0 cm	98.8	0.357	0.232	1.089	1.012	0.256	33
			17	16.63	0.129	Rear (Wireless cover (Close))	1Mbps	1.0 cm	98.8	0.355	0.230	1.089	1.012	0.253	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population							Body 1.6 W/kg (mW/g) Averaged over 1 gram								

13.3-2 Measurement Results (NII Body-worn SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Data Rate	Separation Distance	Duty Cycle (%)	Peak SAR of Area Scan (W/kg)	Measured SAR (mW/g)	Scaling Factor	Scaling Factor (Duty Cycle)	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conduct Power											
5 260	52	802.11a	13	12.24	-0.122	Rear	6Mbps	1.0 cm	94.97	0.372	0.147	1.191	1.050	0.184	36
5 260	52	802.11a	13	12.24	0.07	Rear (Wireless cover (Close))	6Mbps	1.0 cm	94.97	0.306	0.120	1.191	1.050	0.150	-
5 580	116	802.11a	13	12.26	-0.09	Rear	6Mbps	1.0 cm	94.97	0.332	0.135	1.186	1.050	0.168	-
5 745	149	802.11a	13	12.25	-0.144	Rear	6Mbps	1.0 cm	94.97	0.228	0.083	1.189	1.050	0.104	34
ANSI/ IEEE C95.1 - 1992- Safety Limit Spatial Peak Uncontrolled Exposure/ General Population									Body 1.6 W/kg (mW/g) Averaged over 1 gram						

13.3-3 Measurement Results (Body-worn SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Separation Distance	Measured SAR (mW/g)	Scaling Factor	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power							
836.6	190	GSM 850	32.7	32.58	0.12	Rear	1.0 cm	0.188	1.028	0.193	37
836.6	190	GSM 850	32.7	32.58	0.01	Rear (Wireless cover Close)	1.0 cm	0.161	1.028	0.166	-
836.6	190	GPRS 2Tx	31.7	31.34	-0.02	Rear	1.0 cm	0.207	1.086	0.225	13
836.6	190	GPRS 2Tx	31.7	31.34	-0.11	Rear (Wireless cover(Close))	1.0 cm	0.205	1.086	0.223	-
1 880.0	661	GSM 1900	30.7	30.41	0.13	Rear	1.0 cm	0.246	1.069	0.263	38
1 880.0	661	GSM 1900	30.7	30.41	-0.07	Rear (Wireless cover Close)	1.0 cm	0.222	1.069	0.263	-
1 880.0	661	GPRS 2Tx	28.7	27.85	-0.06	Rear	1.0 cm	0.327	1.216	0.398	15
1 880.0	661	GPRS 2Tx	28.7	27.85	0.10	Rear (Wireless cover(Close))	1.0 cm	0.302	1.216	0.367	-
836.6	4183	WCDMA850	24.7	24.12	-0.03	Rear	1.0 cm	0.234	1.143	0.267	17
836.6	4183	WCDMA850	24.7	24.12	-0.18	Rear (Wireless cover Close)	1.0 cm	0.247	1.143	0.282	39
1 732.4	1412	WCDMA1700	22.2	21.88	-0.16	Rear	1.0 cm	0.487	1.076	0.524	19
1 732.4	1412	WCDMA1700	22.2	21.88	0.07	Rear (Wireless cover Close)	1.0 cm	0.569	1.076	0.613	20
1 880.0	9400	WCDMA1900	23.7	23.23	-0.17	Rear	1.0 cm	0.384	1.114	0.428	21
1 880.0	9400	WCDMA1900	23.7	23.23	-0.11	Rear (Wireless cover Close)	1.0 cm	0.347	1.114	0.387	-
1 880	18900	LTE Band 2	23.7	23.70	-0.18	Rear (1RB, 0offset)	1.0 cm	0.476	1.000	0.476	23
1 880	18900	LTE Band 2	23.7	23.70	-0.18	Rear (1RB, 0offset) (Wireless cover Close)	1.0 cm	0.560	1.000	0.560	40
1 732.5	20175	LTE Band 4	22.7	22.70	-0.03	Rear (1RB, 0offset)	1.0 cm	0.501	1.000	0.501	25
1 732.5	20175	LTE Band 4	22.7	22.70	0.05	Rear (1RB, 0offset) (Wireless cover Close)	1.0 cm	0.753	1.000	0.753	41
836.5	20525	LTE Band 5	24.7	24.59	-0.07	Rear (1RB, 49offset)	1.0 cm	0.287	1.026	0.294	27
836.5	20525	LTE Band 5	24.7	24.59	0.07	Rear(1RB, 49offset) (Wireless cover Close)	1.0 cm	0.277	1.026	0.284	-
2 560	21350	LTE Band 7	23.7	23.70	-0.104	Rear (1RB, 0offset)	1.0 cm	0.752	1.000	0.752	29
2 560	21350	LTE Band 7	23.7	23.70	-0.177	Rear (1RB, 0offset) (Wireless cover Close)	1.0 cm	0.703	1.000	0.703	-
710	23790	LTE Band 17	24.7	24.53	-0.08	Rear (1RB, 0offset)	1.0 cm	0.388	1.040	0.403	31
710	23790	LTE Band 17	24.7	24.53	0.01	Rear (1RB, 0offset) (Wireless cover Close)	1.0 cm	0.247	1.040	0.257	-
ANSI/ IEEE C95.1 - 1992- Safety Limit Spatial Peak Uncontrolled Exposure/ General Population								Body 1.6 W/kg (mW/g) Averaged over 1 gram			

13.3-4 Measurement Results (NII Hand SAR)

Frequency		Mode	Power (dBm)		Power Drift (dB)	Configuration	Data Rate	Separation Distance	Duty Cycle (%)	Peak SAR of Area Scan (W/kg)	Measured SAR (mW/g)	Scaling Factor	Scaling Factor (Duty Cycle)	Scaled SAR (mW/g)	Plot No.
MHz	Ch.		Tune-Up Limit	Conducted Power											
5 260	52	802.11a	13	12.24	-	Rear	6Mbps	0 cm	94.97	3.47	-	1.191	1.050	-	-
5 260	52		13	12.24	-	Front	6Mbps	0 cm	94.97	0.977	-	1.191	1.050	-	-
5 260	52		13	12.24	-	Left	6Mbps	0 cm	94.97	0.0367	-	1.191	1.050	-	-
5 260	52		13	12.24	-	Right	6Mbps	0 cm	94.97	0.138	-	1.191	1.050	-	-
5 260	52		13	12.24	0.19	Top	6Mbps	0 cm	94.97	4.26	0.252	1.191	1.050	0.300	-
5 580	116	802.11a	13	12.26	-	Rear	6Mbps	0 cm	94.97	4.37	-	1.186	1.050	-	-
5 580	116		13	12.26	-	Front	6Mbps	0 cm	94.97	1.85	-	1.186	1.050	-	-
5 580	116		13	12.26	-	Left	6Mbps	0 cm	94.97	0.0491	-	1.186	1.050	-	-
5 580	116		13	12.26	-	Right	6Mbps	0 cm	94.97	0.102	-	1.186	1.050	-	-
5 580	116		13	12.26	0.07	Top	6Mbps	0 cm	94.97	6.55	0.409	1.186	1.050	0.485	42
5 580	116		13	12.26	0.16	Wireless cover (Close)	6Mbps	0 cm	94.97	4.47	0.347	1.186	1.050	0.411	-
5 580	116		13	12.26	0.16	Wireless cover(Open)	6Mbps	0 cm	94.97	4.54	0.316	1.186	1.050	0.375	-
ANSI/ IEEE C95.1 - 1992– Safety Limit Spatial Peak Uncontrolled Exposure/ General Population									Hand 4.0 W/kg (mW/g) Averaged over 10 gram						

13.5 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2003, FCC KDB Procedure.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units.
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB 447498 D01v05r02.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 10 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB 648474 D04v01r02, SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was ≤ 1.2 W/kg, no additional SAR evaluation using a headset cable were required.
8. Per FCC KDB Publication 648474 D04v01r02, this is considered a "Phablet" since the diagonal dimension is greater than 160mm and less than 200mm. therefore, extremity SAR tests are required when wireless router mode dose not apply or if wireless router 1g SAR >1.2 W/kg. Extremity SAR was not evaluated for 2.4GHz WIFI and GSM/GPRS/EDGE/UMTS since Hotspot 1g SAR for these band s was <1.2 W/kg
9. There is a wireless charging cover on this EUT accessory. Per FCC KDB 648474 D4v01r02, EUT was confirmed on the worst case of each modulation for wireless charging cover.

GSM/GPRS Test Notes:

1. This EUT'S GSM and GPRS device class is B.
2. This device supports GSM VOIP in the head and the body-worn configurations therefore GPRS was additionally evaluated for head and body-worn compliance.
3. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
4. Justification for reduced test configurations per KDB 941225 D01v03: The source-based time-averaged output power was evaluated for all multi-slot operations. The multi-slot configuration with the highest frame averaged output power was evaluated for SAR.
5. Per FCC KDB 447498 D01v05r02, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is 1/2 dB, instead of the middle channel, the highest output power channel must be used.
6. Justification for reduced test configurations per KDB Publication 941225 D01v03 and October 2013 TCB Workshop Notes: The source-based frame-averaged output power was evaluated for all GPRS/EDGE slot configurations. The configuration with the highest target frame averaged output power was evaluated for hotspot SAR. When the maximum frame-averaged powers are equivalent across two or more slots (within 0.25 dB), the configuration with the most number of time slots was tested.

UMTS Notes:

1. The 12.2 kbps RMC mode is the primary mode.
2. UMTS mode in Body SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB 941225 D01v03. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and Adjusted SAR value was less than 1.2 W/kg.
3. Per FCC KDB 447498 D01v05r02, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the channel highest output power channel was used.
4. UMTS SAR was tested under RMC 12.2 kbps with HSPA inactive per KDB publication 941225 D01v03. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

LTE Notes:

1. LTE Considerations: LTE test configurations are determined according to SAR Evaluation Consideration for LTE Devices in FCC KDB 941225 D05v02r03.
2. According to FCC KDB 941225 D05v02r01:
When the reported SAR is ≤ 0.8 W/kg, testing of the 100%RB allocation and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the 1RB, 50%RB and 100%RB allocation with highest output power for that channel.
Only one channel, and as reported SAR values for 1RB allocation and 50%RB allocation were less than 1.45W/Kg only the highest power RB offset for each allocation was required.
3. MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to target MPR is indicated alongside the SAR results.
4. A-MPR was dialed for all SAR tests by setting NS=01 on the base station simulator.
5. Pre-installed VOIP applications are considered.
6. SAR test reduction is applied using the following criteria:
7. Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB, and 50% RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel.
When the reported SAR is >0.8 W/kg, testing for other Channels is performed at the highest output power level for 1RB, and 50% RB configuration for that channel.
Testing for 100% RB configuration is performed at the highest output power level for 100% RB configuration across the Low, Mid and High Channel when the highest reported SAR for 1 RB and 50% RB are >0.8 W/kg, Testing for the remaining required channels is not needed because the reported SAR for 100% RB Allocation <1.45 W/kg.
Testing for 16-QAM modulation is not required because the reported SAR for QPSK is <1.45 W/kg and its output power is not more than 0.5 dB higher than that a QPSK.
Testing for the other channel bandwidths is not required because the reported SAR for the highest channel bandwidth is <1.45 W/kg and its

WLAN Notes:

1. For held-to-ear and hotspot operations, the initial test position procedures were applied. The test position with the highest extrapolated peak SAR will be used as the initial test position. When reported SAR for the initial test position is ≤ 0.4 W/kg, no additional testing for the remaining test position was required. Otherwise, SAR is evaluated at the subsequent highest peak SAR position until the reported SAR results is ≤ 0.8 W/kg or all test positions are measured.
2. Justification for test configurations for WLAN per KDB 248227 D01v0201 for 2.4 GHz WiFi single transmission chain operations, the highest measured maximum output power channel for DSSS was selected for SAR measurement. SAR for OFDM modes (2.4 GHz 802.11 g/n) was not required due to the maximum allowed powers and the highest reported DSSS SAR.
3. Justification for test configurations for WLAN per KDB 248227 D01v0201 for 5 GHz WIFI single transmission chain operations, the initial test configuration was selected according to the transmission mode with the highest maximum allowed powers. Other transmission mode were not investigated since the highest reported SAR for initial test configuration adjusted by the ratio of maximum output powers is less than 1.2 W/kg.
4. When the maximum reported 1g averaged SAR is ≤ 0.8 W/kg, SAR testing on additional channels was not required. Otherwise, SAR for the next highest output power channel was required until the reported SAR result was ≤ 1.20 W/kg or all test channels were measured.
5. The device was configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools. The reported SAR was scaled to the 100% transmission duty factor to determine compliance. Procedures used to measure the duty factor are identical to that in the associated WLAN test reports.
6. Only channels in the U-NII-2C (> 5.65 GHz WIFI) & U-NII-3 aggregate band that support wireless router were considered for hotspot SAR tests.
7. Per FCC KDB Publication 648474 D04v01r02, this device is considered a "Phablet" since its diagonal distance, 160.0 mm, is equal as 160 mm. Therefore hand SAR tests are required. Because wireless router operations are not supported for 5 GHz NII WIFI and Bluetooth, hand SAR was evaluated for 5 GHz NII WIFI and Bluetooth. However, hand SAR was not evaluated for 2.4 GHz WIFI and 5 GHz DTS WIFI since Hotspot SAR for 2.4 GHz WIFI and 5 GHz DTS WIFI were < 1.2 W/kg."

14. SAR Measurement Variability and Uncertainty

In accordance with published RF Exposure KDB procedure 865664 D01v01r04 SAR measurement 100 MHz to 6 GHz. These additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

- 1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.
- 2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
- 3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg ($\sim 10\%$ from the 1-g SAR limit).
- 4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .

Frequency		Modulation	Battery	Configuration	Original SAR (mW/g)	Repeated SAR (mW/g)	Largest to Smallest SAR Ratio	Plot No.
MHz	Channel							
2 560	21350	LTE 7	Standard	Bottom (1RB, 0offset)	1.11	0.997	1.11	43

15. Simultaneous Transmission Scenarios

Applicable Combination	Head	Body-Worn	Wireless Router	Extremity	Note
GSM Voice + 2.4 GHz WiFi	Yes	Yes	N/A	Yes	
GSM Voice + 5 GHz WiFi	Yes	Yes	N/A	Yes	
GSM Voice + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
GPR/EDGE + 2.4 GHz WiFi	Yes	Yes	Yes	Yes	Pre-installed VOIP applications are considered.
GPR/EDGE + 5 GHz WiFi	Yes	Yes	Yes	Yes	
GPR/EDGE + 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
UMTS+ 2.4 GHz WiFi	Yes	Yes	Yes	Yes	
UMTS+ 5 GHz WiFi	Yes	Yes	Yes	Yes	
UMTS+ 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	
LTE+ 2.4 GHz WiFi	Yes	Yes	Yes	Yes	
LTE+ 5 GHz WiFi	Yes	Yes	Yes	Yes	
LTE+ 2.4 GHz Bluetooth	N/A	Yes	N/A	Yes	

- 2.4 GHz WLAN, 5GHz WLAN, and 2.4GHz Bluetooth share antenna path and cannot transmit simultaneously
- All licensed modes share the same antenna path and cannot transmit simultaneously.
- UMTS +WLAN scenario also represents the UMTS Voice/DATA + WLAN hotspot scenario.
- Wireless Router is only supported for 5GHz WLAN Band U-NII-3 and 2.4GHz WLAN, GC only in U-NII B1
- 5 GHz WiFi SAR value for simultaneous condition used highest SAR value in a same position.
- Per Apr. 2015 TCB Workshop, the worst case WiFi reported SAR for each configurations were considered for simultaneous SAR exclusion via summation of standalone SAR, regardless of whether the WiFi channels has WiFi Hotspot capability, for simplicity to determine compliance. The actual simultaneous transmission SAR will not exceed the summed SAR values

15.1 Simultaneous Transmission Summation for Head

Simultaneous Transmission Summation with 2.4 GHz WIFI

Band	Scaled SAR	2.4 GHz WIFI Scaled SAR	Σ 1-g SAR
	(W/kg)	(W/kg)	(W/kg)
GSM 850	0.194	0.520	0.714
GPRS 850	0.238	0.520	0.758
GSM 1900	0.501	0.520	1.021
GPRS 1900	0.705	0.520	1.225
WCDMA 850	0.269	0.520	0.789
WCDMA1700	0.649	0.520	1.169
WCDMA1900	0.612	0.520	1.132
LTE Band 2	0.720	0.520	1.240
LTE Band 4	0.636	0.520	1.156
LTE Band 5	0.492	0.520	1.012
LTE Band 7	0.215	0.520	0.735
LTE Band 17	0.238	0.520	0.758

Simultaneous Transmission Summation with 5 GHz WIFI

Band	Scaled SAR	5 GHz WIFI Scaled SAR	Σ 1-g SAR
	(W/kg)	(W/kg)	(W/kg)
GSM 850	0.194	0.467	0.661
GPRS 850	0.238	0.467	0.705
GSM 1900	0.501	0.467	0.968
GPRS 1900	0.705	0.467	1.172
WCDMA 850	0.269	0.467	0.736
WCDMA1700	0.649	0.467	1.116
WCDMA1900	0.612	0.467	1.079
LTE Band 2	0.720	0.467	1.187
LTE Band 4	0.636	0.467	1.103
LTE Band 5	0.492	0.467	0.959
LTE Band 7	0.215	0.467	0.682
LTE Band 17	0.238	0.467	0.705

15.2 Simultaneous Transmission Summation for Body-Worn

Simultaneous Transmission Summation with 2.4 GHz WLAN (1.0cm)

Band	Scaled SAR	2.4 GHz WIFI Scaled SAR	Σ 1-g SAR
	(W/kg)	(W/kg)	(W/kg)
GSM 850	0.193	0.256	0.449
GPRS 850	0.225	0.256	0.481
GSM 1900	0.263	0.256	0.519
GPRS 1900	0.398	0.256	0.654
WCDMA 850	0.282	0.256	0.538
WCDMA1700	0.613	0.256	0.869
WCDMA1900	0.428	0.256	0.684
LTE Band 2	0.560	0.256	0.816
LTE Band 4	0.753	0.256	1.009
LTE Band 5	0.294	0.256	0.550
LTE Band 7	0.752	0.256	1.008
LTE Band 17	0.403	0.256	0.659

Simultaneous Transmission Summation with 5 GHz WIFI (1.0 cm)

Band	Scaled SAR	5 GHz WIFI Scaled SAR	Σ 1-g SAR
	(W/kg)	(W/kg)	(W/kg)
GSM 850	0.193	0.184	0.377
GPRS 850	0.225	0.184	0.409
GSM 1900	0.263	0.184	0.447
GPRS 1900	0.398	0.184	0.582
WCDMA 850	0.282	0.184	0.466
WCDMA1700	0.613	0.184	0.797
WCDMA1900	0.428	0.184	0.612
LTE Band 2	0.560	0.184	0.744
LTE Band 4	0.753	0.184	0.937
LTE Band 5	0.294	0.184	0.478
LTE Band 7	0.752	0.184	0.936
LTE Band 17	0.403	0.184	0.587

Simultaneous Transmission Summation with Bluetooth (1.0 cm)

Band	Scaled SAR	Estimated SAR BT SAR	Σ 1-g SAR
	(W/kg)	(W/kg)	(W/kg)
GSM 850	0.193	0.21	0.403
GPRS 850	0.225	0.21	0.435
GSM 1900	0.263	0.21	0.473
GPRS 1900	0.398	0.21	0.608
WCDMA 850	0.282	0.21	0.492
WCDMA1700	0.613	0.21	0.823
WCDMA1900	0.428	0.21	0.638
LTE Band 2	0.560	0.21	0.770
LTE Band 4	0.753	0.21	0.963
LTE Band 5	0.294	0.21	0.504
LTE Band 7	0.752	0.21	0.962
LTE Band 17	0.403	0.21	0.613

Note:

1. For SAR summation body-worn back side at 10 mm
2. Bluetooth SAR was not required to be measured per FCC KDB 447498. Estimated SAR results were used for SAR summation for body-worn back side at 10 mm to determine simultaneous transmission SAR test exclusion.

15.3 Simultaneous Transmission Summation for Hotspot

Simultaneous Transmission Summation with 2.4 GHz WIFI (1.0 cm)

Band	Scaled SAR	2.4 GHz WIFI Scaled SAR	Σ 1-g SAR
	(W/kg)	(W/kg)	(W/kg)
GSM 850	0.368	0.256	0.624
GSM 1900	0.555	0.256	0.811
WCDMA 850	0.432	0.256	0.688
WCDMA1700	0.613	0.256	0.869
WCDMA1900	0.527	0.256	0.783
LTE Band 2	0.547	0.256	0.803
LTE Band 4	0.610	0.256	0.866
LTE Band 5	0.374	0.256	0.630
LTE Band 7	1.178	0.256	1.434
LTE Band 17	0.603	0.256	0.859

Simultaneous Transmission Summation with 5GHz WIFI (1.0 cm)

Band	Scaled SAR	5 GHz WIFI Scaled SAR	Σ 1-g SAR
	(W/kg)	(W/kg)	(W/kg)
GSM 850	0.368	0.208	0.576
GSM 1900	0.555	0.208	0.763
WCDMA 850	0.432	0.208	0.640
WCDMA1700	0.613	0.208	0.821
WCDMA1900	0.527	0.208	0.735
LTE Band 2	0.547	0.208	0.755
LTE Band 4	0.610	0.208	0.818
LTE Band 5	0.374	0.208	0.582
LTE Band 7	1.178	0.208	1.386
LTE Band 17	0.603	0.208	0.811

15.4 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit. And therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v05r02.

16. CONCLUSION

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the ANSI/IEEE C95.1 1992.

These measurements are taken to simulate the RF effects exposure under worst-case conditions. Precise laboratory measures were taken to assure repeatability of the tests.

17. REFERENCES

- [1] Federal Communications Commission, OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01), Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields, July 2001.
- [2] IEEE Standards Coordinating Committee 34 – IEEE Std. 1528-2003, IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body from Wireless Communications Devices.
- [3] Federal Communications Commission, ET Docket 93-62, Guidelines for Evaluating the Environmental Effects of Radio frequency Radiation, Aug. 1996.
- [4] ANSI/IEEE C95.1 - 1991, American National Standard safety levels with respect to human exposure to radio frequency electromagnetic fields, 300 kHz to 100 GHz, New York: IEEE, Aug. 1992
- [5] ANSI/IEEE C95.3 - 1991, IEEE Recommended Practice for the Measurement of Potentially Hazardous Electromagnetic Fields - RF and Microwave, New York: IEEE, 1992.
- [6] NCRP, National Council on Radiation Protection and Measurements, Biological Effects and Exposure Criteria for Radio Frequency Electromagnetic Fields, NCRP Report No. 86, 1986. Reprinted Feb. 1995.
- [7] T. Schmid, O. Egger, N. Kuster, Automated E-field scanning system for dosimetric assessments, IEEE Transaction on Microwave Theory and Techniques, vol. 44, Jan. 1996, pp. 105-113.
- [8] K. Pokovic, T. Schmid, N. Kuster, Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies, ICECOM97, Oct. 1997, pp. 120-124.
- [9] K. Pokovic, T. Schmid, and N. Kuster, E-field Probe with improved isotropy in brain simulating liquids, Proceedings of the ELMAR, Zadar, Croatia, June 23-25, 1996, pp. 172-175.
- [10] Schmid & Partner Engineering AG, Application Note: Data Storage and Evaluation, June 1998, p2.
- [11] V. Hombach, K. Meier, M. Burkhardt, E. Kuhn, N. Kuster, The Dependence of EM Energy Absorption upon Human Head Modeling at 900 MHz, IEEE Transaction on Microwave Theory and Techniques, vol. 44 no. 10, Oct. 1996, pp. 1865-1873.
- [12] N. Kuster and Q. Balzano, Energy absorption mechanism by biological bodies in the near field of dipole antennas above 300 MHz, IEEE Transaction on Vehicular Technology, vol. 41, no. 1, Feb. 1992, pp. 17-23.
- [13] G. Hartsgrrove, A. Kraszewski, A. Surowiec, Simulated Biological Materials for Electromagnetic Radiation Absorption Studies, University of Ottawa, Bioelectromagnetics, Canada: 1987, pp. 29-36.
- [14] Q. Balzano, O. Garay, T. Manning Jr., Electromagnetic Energy Exposure of Simulated Users of Portable Cellular Telephones, IEEE Transactions on Vehicular Technology, vol. 44, no.3, Aug. 1995.
- [15] W. Gander, Computer mathematic, Birkhaeuser, Basel, 1992.
- [16] W.H. Press, S.A. Teukolsky, W.T. Vetterling, and B.P. Flannery, Numerical Recipes in C, The Art of Scientific Computing, Second edition, Cambridge University Press, 1992.
- [17] Federal Communications Commission, OET Bulletin 65, Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields. Supplement C, Dec. 1997.
- [18] N. Kuster, R. Kastle, T. Schmid, Dosimetric evaluation of mobile communications equipment with known precision, IEEE Transaction on Communications, vol. E80-B, no. 5, May 1997, pp. 645-652.
- [19] CENELEC CLC/SC111B, European Prestandard (prENV 50166-2), Human Exposure to Electromagnetic Fields High-frequency: 10 kHz-300 GHz, Jan. 1995.
- [20] Prof. Dr. Niels Kuster, ETH, Eidgenössische Technische Hochschule Zürich, Dosimetric Evaluation of the Cellular Phone.
- [21] SAR Evaluation of Handsets with Multiple Transmitters and Antennas #648474.
- [22] SAR Measurement Procedure for 802.11 a/b/g Transmitters #KDB 248227.

Attachment 1. – SAR Test Plots

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 21.8 °C
 Ambient Temperature: 22.0 °C
 Test Date: Apr. 06, 2015
 Plot No. 1

Communication System: UID 0, GSM850 GPRS 2TX (0); Frequency: 836.6 MHz; Duty Cycle: 1:4.14954
 Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.908 \text{ S/m}$; $\epsilon_r = 42.706$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Right Section

DASY5 Configuration:

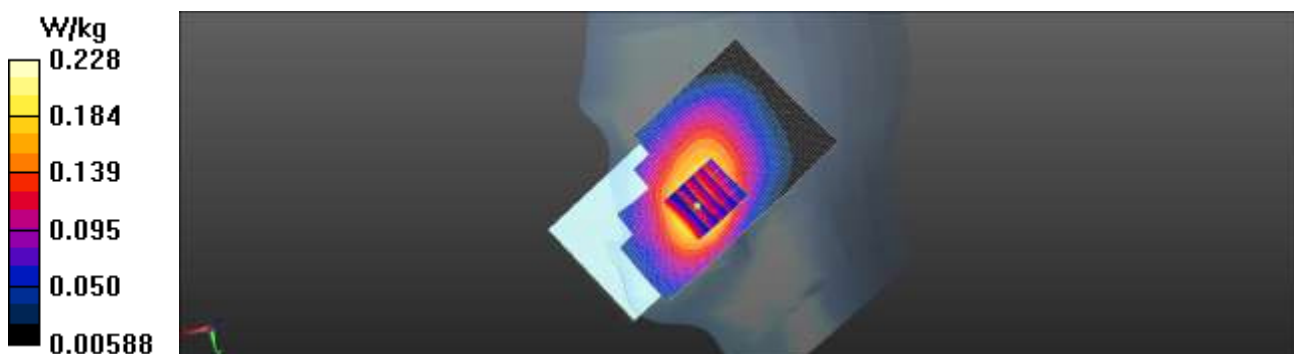
- Probe: ET3DV6 - SN1631; ConvF(6.37, 6.37, 6.37); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: SAM with CRP v5.0_L
- Measurement SW: DASY52, Version 52.8 (0);

GSM850 GPRS 2Tx Head Right Touch Wireless charger cover close 190ch/Area Scan (61x111x1):

Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.227 W/kg

GSM850 GPRS 2Tx Head Right Touch Wireless charger cover close 190ch/Zoom Scan (5x5x7)/Cube 0:

Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 7.036 V/m; Power Drift = -0.14 dB
 Peak SAR (extrapolated) = 0.272 W/kg
SAR(1 g) = 0.219 W/kg; SAR(10 g) = 0.169 W/kg
 Maximum value of SAR (measured) = 0.228 W/kg



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 21.8 °C
Ambient Temperature: 22.0 °C
Test Date: Apr. 06, 2015
Plot No. 2

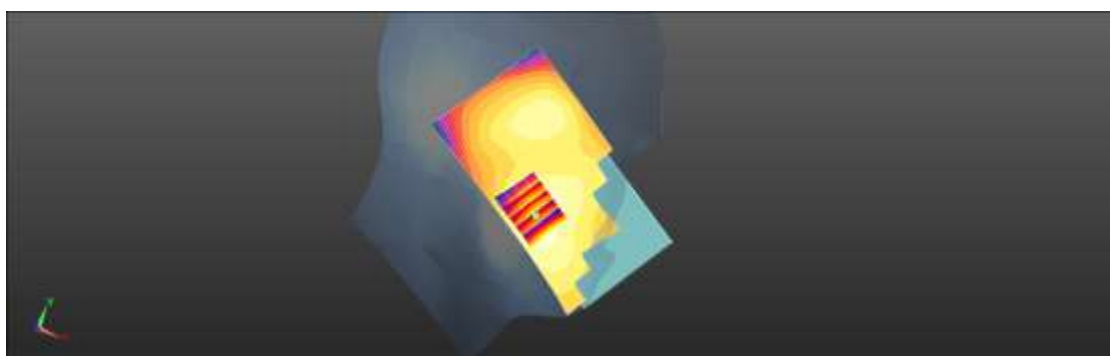
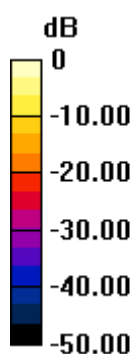
Communication System: UID 0, GSM 1900 2TX (0); Frequency: 1880 MHz; Duty Cycle: 1:4.14954
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.368$ S/m; $\epsilon_r = 39.022$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(8.02, 8.02, 8.02); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: SAM with CRP v5.0_R
- Measurement SW: DASY52, Version 52.8 (8);

GSM1900 Head Left Touch GPRS 2TX 661ch Cover/Area Scan (61x111x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.749 W/kg

GSM1900 Head Left Touch GPRS 2TX 661ch Cover/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm
Reference Value = 8.421 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.871 W/kg
SAR(1 g) = 0.580 W/kg; SAR(10 g) = 0.356 W/kg
Maximum value of SAR (measured) = 0.719 W/kg



0 dB = 0.749 W/kg = -1.25 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 21.8 °C
Ambient Temperature: 22.0 °C
Test Date: Apr. 06, 2015
Plot No. 3

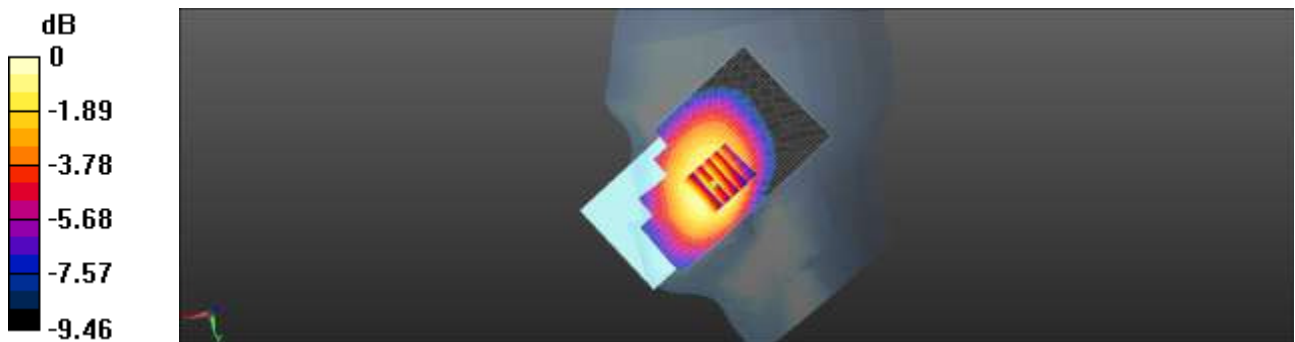
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 0.908 \text{ S/m}$; $\epsilon_r = 42.706$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.37, 6.37, 6.37); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: SAM with CRP v5.0_L
- Measurement SW: DASY52, Version 52.8 (0);

WCDMA850 Head Right Touch Wireless charger cover open 4183ch/Area Scan (61x111x1): Interpolated
grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 0.251 W/kg

WCDMA850 Head Right Touch Wireless charger cover open 4183ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 5.381 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.296 W/kg
SAR(1 g) = 0.235 W/kg; SAR(10 g) = 0.182 W/kg
Maximum value of SAR (measured) = 0.245 W/kg



0 dB = 0.245 W/kg = -6.11 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 21.6 °C
 Ambient Temperature: 21.8 °C
 Test Date: Oct. 13, 2015
 Plot No. 4

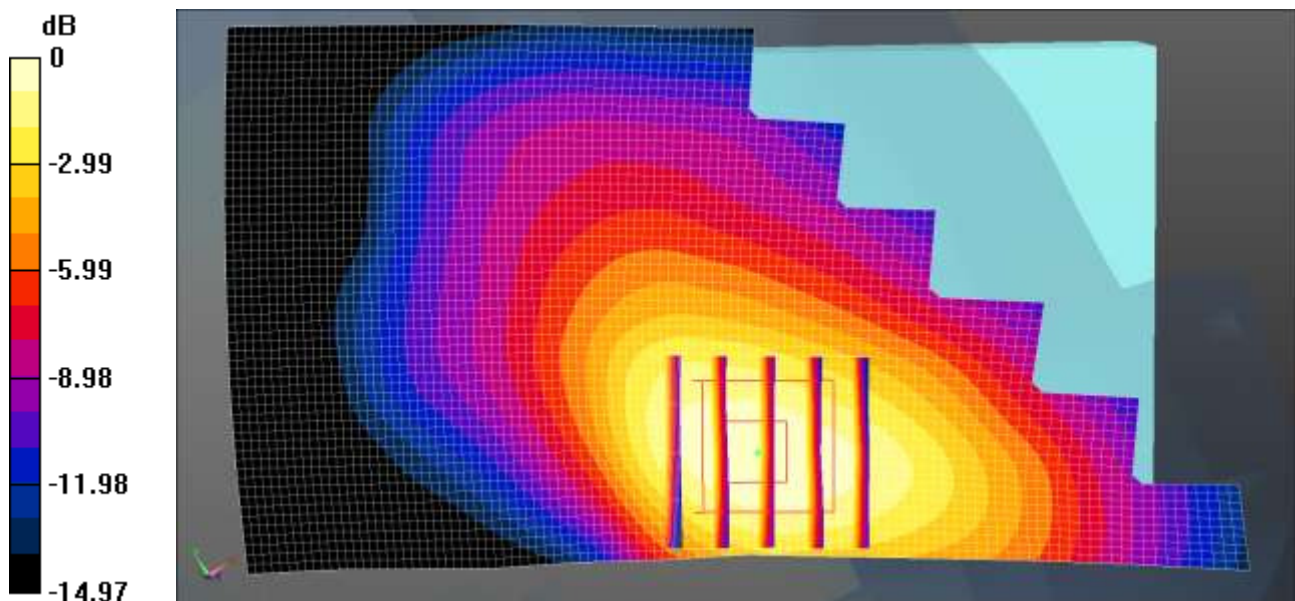
Communication System: UID 0, WCDMA IV (0); Frequency: 1732.4 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 1732.4 \text{ MHz}$; $\sigma = 1.349 \text{ S/m}$; $\epsilon_r = 39.763$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(8.18, 8.18, 8.18); Calibrated: 2015-08-27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: SAM
- Measurement SW: DASY52, Version 52.8 (8);

WCDMA4 Head Left Touch 1412ch Cover Open/Area Scan (61x121x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.796 W/kg

WCDMA4 Head Left Touch 1412ch Cover Open/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 8.700 V/m; Power Drift = -0.18 dB
 Peak SAR (extrapolated) = 0.892 W/kg
SAR(1 g) = 0.603 W/kg; SAR(10 g) = 0.385 W/kg
 Maximum value of SAR (measured) = 0.761 W/kg



0 dB = 0.761 W/kg = -1.19 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 21.8 °C
Ambient Temperature: 22.0 °C
Test Date: Apr. 06, 2015
Plot No. 5

Communication System: UID 0, WCDMA1900 (0); Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.368$ S/m; $\epsilon_r = 39.022$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(8.02, 8.02, 8.02); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: SAM with CRP v5.0_R
- Measurement SW: DASY52, Version 52.8 (8);

WCDMA1900 Head Left Touch 9400ch/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.740 W/kg

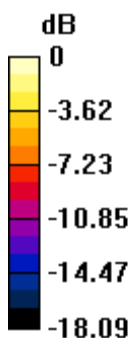
WCDMA1900 Head Left Touch 9400ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 7.373 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.824 W/kg

SAR(1 g) = 0.549 W/kg; SAR(10 g) = 0.345 W/kg

Maximum value of SAR (measured) = 0.692 W/kg



0 dB = 0.692 W/kg = -1.60 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 21.8 °C
Ambient Temperature: 22.0 °C
Test Date: Apr. 06, 2015
Plot No. 6

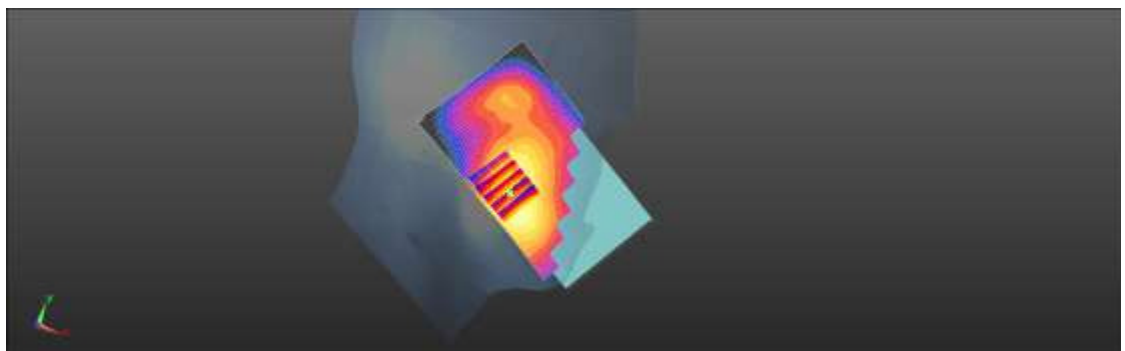
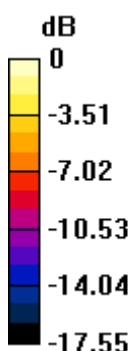
Communication System: UID 0, LTE Band 2; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.368$ S/m; $\epsilon_r = 39.022$; $\rho = 1000$ kg/m³
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(8.02, 8.02, 8.02); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: SAM with CRP v5.0_R
- Measurement SW: DASY52, Version 52.8 (0);

LTE Band 2 Head Left Touch Wireless charger Cover Open 20MHz QPSK 1RB 0offsetch/Area Scan (61x111x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.930 W/kg

LTE Band 2 Head Left Touch Wireless charger Cover Open 20MHz QPSK 1RB 0offsetch 18900ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm
Reference Value = 9.973 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.720 W/kg; SAR(10 g) = 0.444 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.905 W/kg



0 dB = 0.905 W/kg = -0.43 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 08, 2015
 Plot No. 7

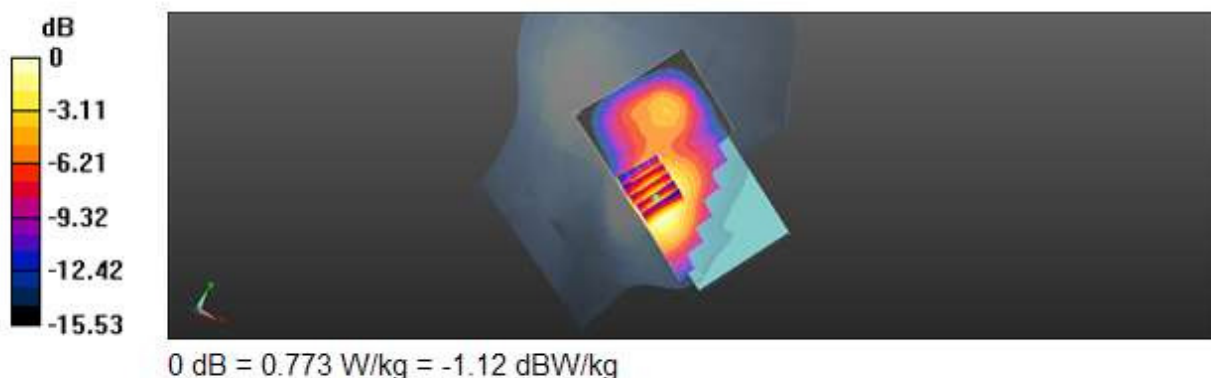
Communication System: UID 0, LTE Band 4; Frequency: 1732.5 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 1732.5 \text{ MHz}$; $\sigma = 1.328 \text{ S/m}$; $\epsilon_r = 39.958$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(8.38, 8.38, 8.38); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: SAM with CRP v5.0_R
- Measurement SW: DASY52, Version 52.8 (0);

LTE Band 4 Head Left Touch Wireless charger Cover Close 20MHz QPSK 1RB 0offsetch/Area Scan (61x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.821 W/kg

LTE Band 4 Head Left Touch Wireless charger Cover Close 20MHz QPSK 1RB 0offsetch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 10.02 V/m; Power Drift = -0.15 dB
 Peak SAR (extrapolated) = 0.912 W/kg
SAR(1 g) = 0.636 W/kg; SAR(10 g) = 0.418 W/kg
 Maximum value of SAR (measured) = 0.773 W/kg



Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 08, 2015
 Plot No. 8

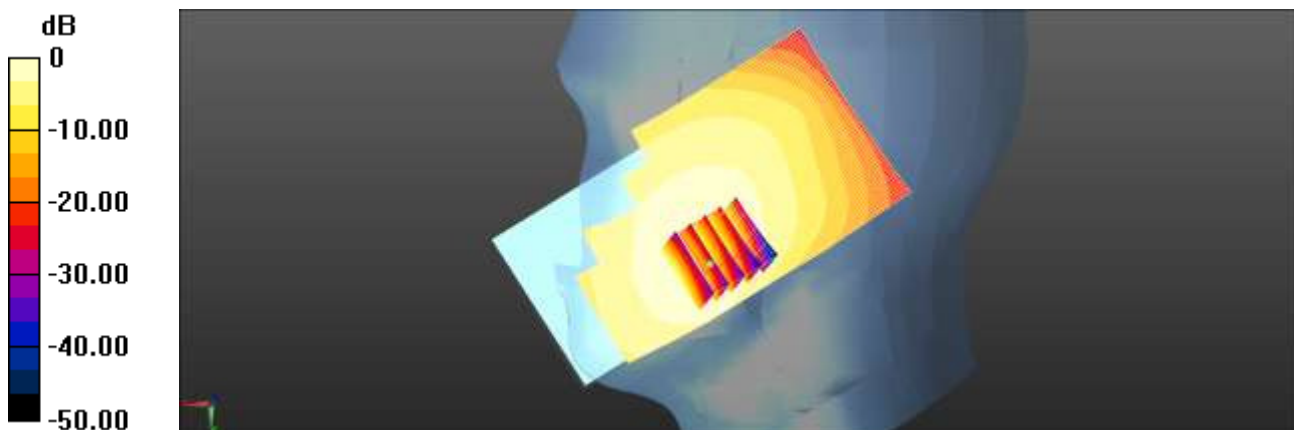
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 836.5 \text{ MHz}$; $\sigma = 0.874 \text{ S/m}$; $\epsilon_r = 41.844$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Right Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.37, 6.37, 6.37); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: SAM with CRP v5.0_L
- Measurement SW: DASY52, Version 52.8 (0);

LTE5 Head Right Touch QPSK 10MHz 1RB 49offset 20525ch/Area Scan (61x111x1): Interpolated grid:
 $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.492 W/kg

LTE5 Head Right Touch QPSK 10MHz 1RB 49offset 20525ch/Zoom Scan (5x5x7)/Cube 0: Measurement
 grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 7.728 V/m; Power Drift = 0.06 dB
 Peak SAR (extrapolated) = 0.606 W/kg
SAR(1 g) = 0.480 W/kg; SAR(10 g) = 0.365 W/kg
 Maximum value of SAR (measured) = 0.495 W/kg



0 dB = 0.492 W/kg = -3.08 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Apr. 09, 2015
Plot No. 9

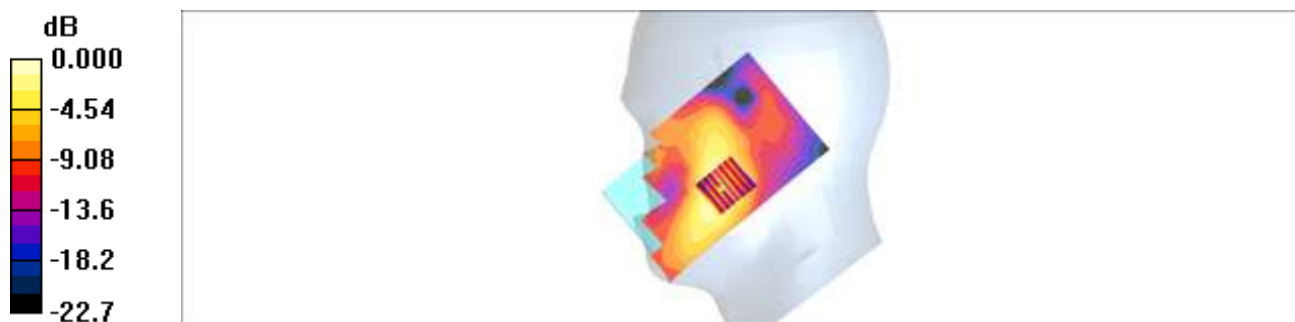
Communication System: LTE Band 7; Frequency: 2560 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2560$ MHz; $\sigma = 1.86$ mho/m; $\epsilon_r = 38.5$; $\rho = 1000$ kg/m³
Phantom section: Right Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.7, 6.7, 6.7); Calibrated: 2014-11-19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2014-09-18
- Phantom: SAM 835/900 MHz; Type: SAM
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

LTE Band 7 Head Right touch QPSK 20MHz 1RB 0offset 21350ch/Area Scan (81x141x1): Measurement
grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.320 mW/g

LTE Band 7 Head Right touch QPSK 20MHz 1RB 0offset 21350ch/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.76 V/m; Power Drift = 0.137 dB
Peak SAR (extrapolated) = 0.379 W/kg
SAR(1 g) = 0.215 mW/g; SAR(10 g) = 0.118 mW/g
Maximum value of SAR (measured) = 0.295 mW/g



0 dB = 0.295mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 22.1 °C
Ambient Temperature: 22.3 °C
Test Date: Apr. 11, 2015
Plot No. 10

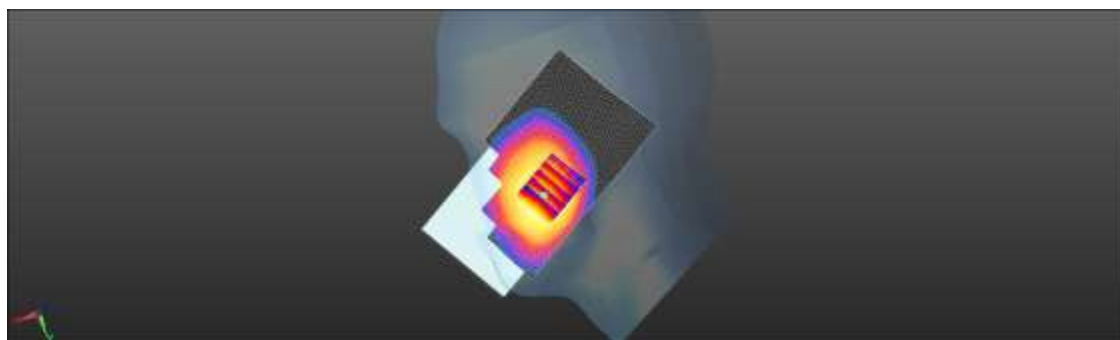
Communication System: UID 0, LTE Band 17 (0); Frequency: 710 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 710 \text{ MHz}$; $\sigma = 0.875 \text{ S/m}$; $\epsilon_r = 43.392$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Right Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.65, 6.65, 6.65); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: SAM with CRP v5.0_L
- Measurement SW: DASY52, Version 52.8 (8);

LTE17 Head Right Touch QPSK 10MHz 1RB 0offset 23790ch/Area Scan (61x111x1): Interpolated grid:
 $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 0.247 W/kg

LTE17 Head Right Touch QPSK 10MHz 1RB 0offset 23790ch/Zoom Scan (5x5x7)/Cube 0: Measurement
grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 5.089 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.284 W/kg
SAR(1 g) = 0.229 W/kg; SAR(10 g) = 0.185 W/kg
Maximum value of SAR (measured) = 0.239 W/kg



0 dB = 0.239 W/kg = -6.22 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 21.3 °C
 Ambient Temperature: 21.5 °C
 Test Date: Mar. 31, 2015
 Plot No. 11

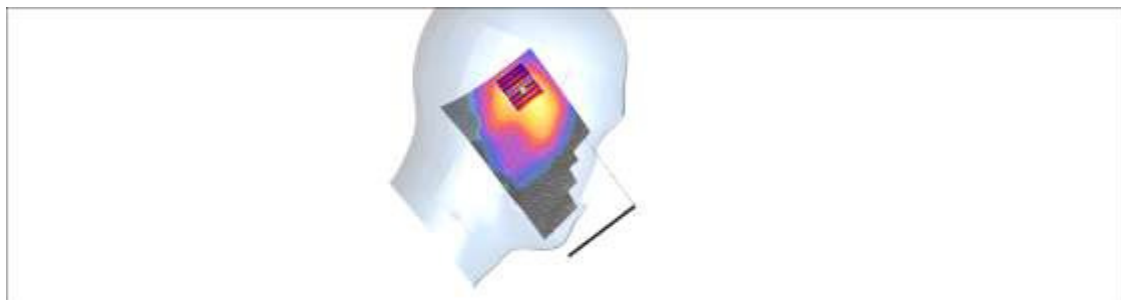
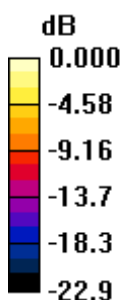
Communication System: 2450MHz FCC; Frequency: 2462 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.82$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³
 Phantom section: Left Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3967; ConvF(7.16, 7.16, 7.16); Calibrated: 2014-12-22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2014-04-23
- Phantom: 800/900 Phantom; Type: SAM
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

802.11b Left Touch 1Mbps 11ch Cover Open/Area Scan (81x141x1): Measurement grid: dx=12mm, dy=12mm
 Maximum value of SAR (interpolated) = 0.765 mW/g

802.11b Left Touch 1Mbps 11ch Cover Open/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 9.31 V/m; Power Drift = -0.065 dB
 Peak SAR (extrapolated) = 1.06 W/kg
SAR(1 g) = 0.472 mW/g; SAR(10 g) = 0.215 mW/g
 Maximum value of SAR (measured) = 0.752 mW/g



0 dB = 0.752mW/g

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.0 °C
 Ambient Temperature: 22.2 °C
 Test Date: Apr. 01, 2015
 Plot No. 12

Communication System: UID 0, WIFI 5GHz (0); Frequency: 5580 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 5580 \text{ MHz}$; $\sigma = 4.981 \text{ S/m}$; $\epsilon_r = 35.795$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3967; ConvF(4.7, 4.7, 4.7); Calibrated: 2014-12-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2014-04-23
- Phantom: SAM_Front_2014_03_03
- Measurement SW: DASY52, Version 52.8 (8);

802.11a Head Left Tilt 6Mbps 116ch/Area Scan (101x161x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$

Maximum value of SAR (interpolated) = 0.857 W/kg

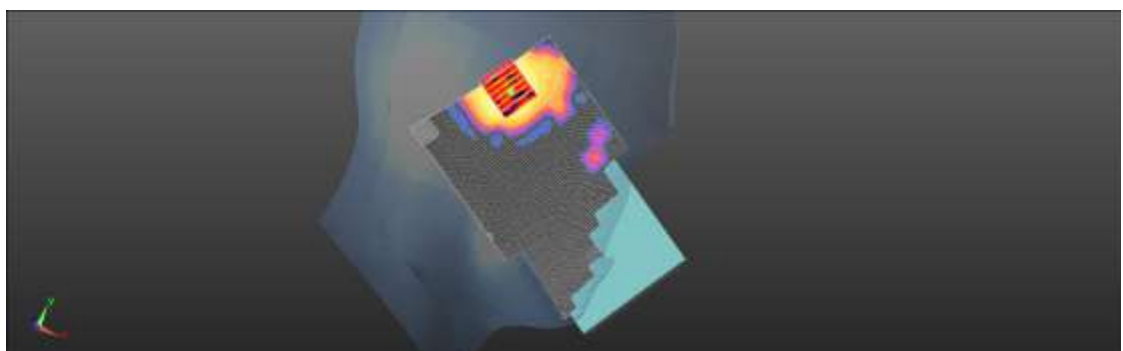
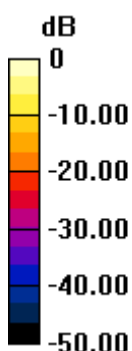
802.11a Head Left Tilt 6Mbps 116ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 7.041 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 1.53 W/kg

SAR(1 g) = 0.394 W/kg; SAR(10 g) = 0.119 W/kg

Maximum value of SAR (measured) = 0.975 W/kg



0 dB = 0.857 W/kg = -0.67 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.0 °C
 Ambient Temperature: 22.2 °C
 Test Date: Apr. 07, 2015
 Plot No. 13

Communication System: UID 0, GSM850 GPRS 2TX (0); Frequency: 836.6 MHz; Duty Cycle: 1:4.14954
 Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 1.012 \text{ S/m}$; $\epsilon_r = 54.865$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.22, 6.22, 6.22); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

GSM850 Body Rear 2Tx 190ch/Area Scan (71x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.218 W/kg

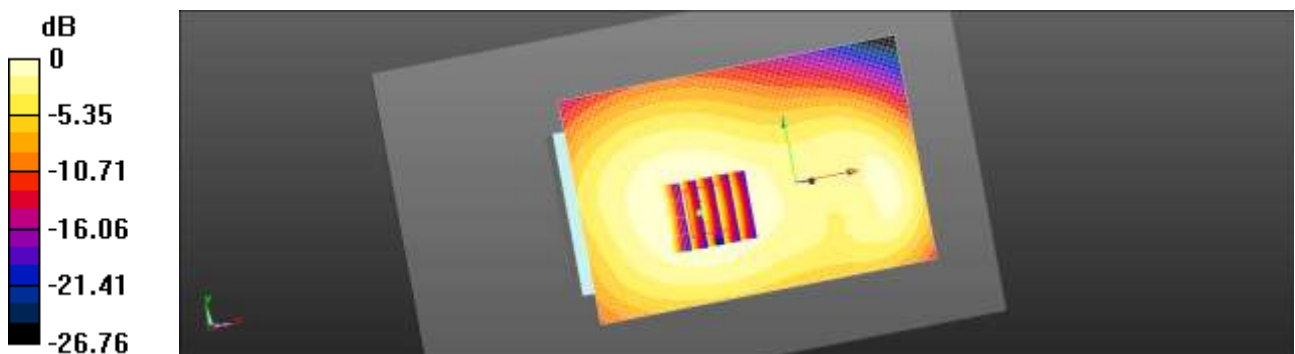
GSM850 Body Rear 2Tx 190ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 14.85 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.250 W/kg

SAR(1 g) = 0.207 W/kg; SAR(10 g) = 0.159 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.217 W/kg



0 dB = 0.218 W/kg = -6.62 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.0 °C
 Ambient Temperature: 22.2 °C
 Test Date: Apr. 07, 2015
 Plot No. 14

Communication System: UID 0, GSM 850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.30042
 Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 1.012 \text{ S/m}$; $\epsilon_r = 54.865$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.22, 6.22, 6.22); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

GSM850 Body Front GPRS 2Tx 190ch/Area Scan (71x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 0.383 W/kg

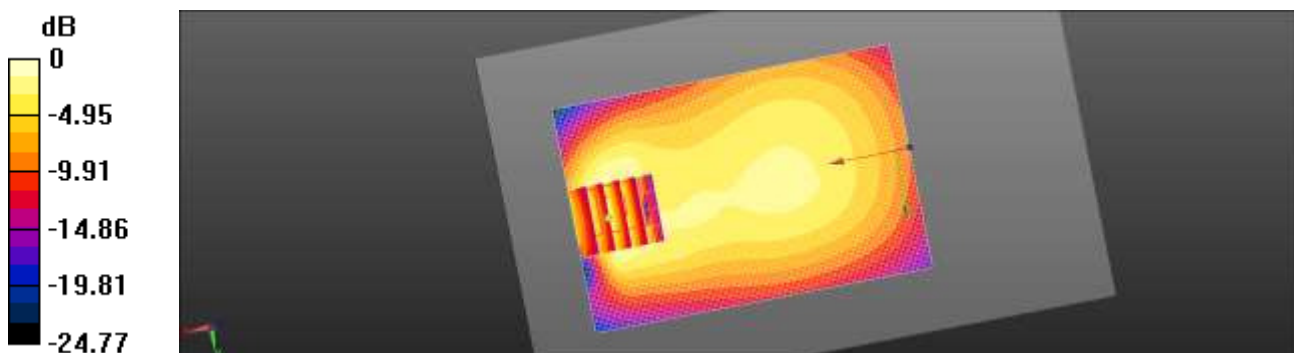
GSM850 Body Front GPRS 2Tx 190ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 14.55 V/m; Power Drift = -0.13 dB

Peak SAR (extrapolated) = 0.532 W/kg

SAR(1 g) = 0.339 W/kg; SAR(10 g) = 0.188 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.365 W/kg



0 dB = 0.383 W/kg = -4.17 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 22.1 °C
Ambient Temperature: 22.3 °C
Test Date: Apr. 10, 2015
Plot No. 15

Communication System: UID 0, GSM 1900 2TX; Frequency: 1880 MHz; Duty Cycle: 1:4.14954
Medium parameters used: $f = 1880$ MHz; $\sigma = 1.446$ S/m; $\epsilon_r = 52.336$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

GSM1900 Body Rear GPRS 2Tx 661/Area Scan (71x111x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.348 W/kg

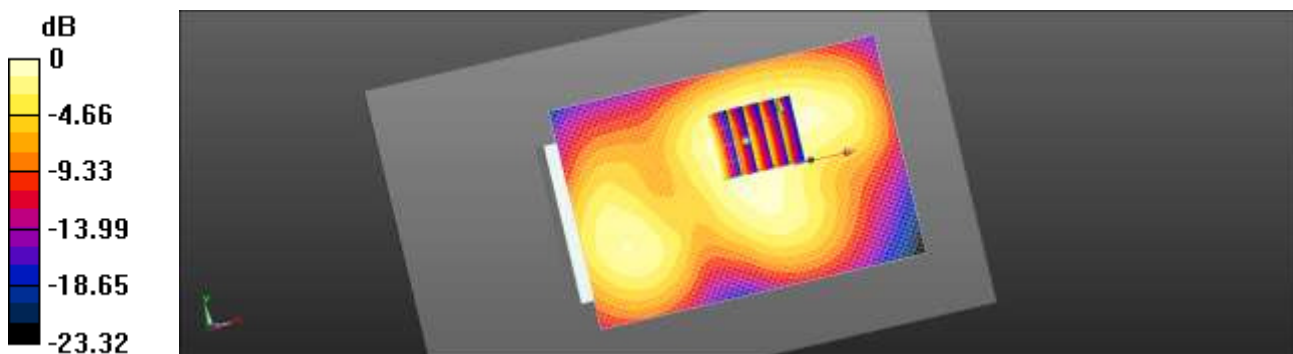
GSM1900 Body Rear GPRS 2Tx 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 8.244 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.435 W/kg

SAR(1 g) = 0.327 W/kg; SAR(10 g) = 0.223 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.340 W/kg



0 dB = 0.348 W/kg = -4.59 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 10, 2015
 Plot No. 16

Communication System: UID 0, GSM 1900 2TX; Frequency: 1880 MHz; Duty Cycle: 1:4.14954
 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.446 \text{ S/m}$; $\epsilon_r = 52.336$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

GSM1900 Body Front GPRS 2Tx 661/Area Scan (71x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 0.533 W/kg

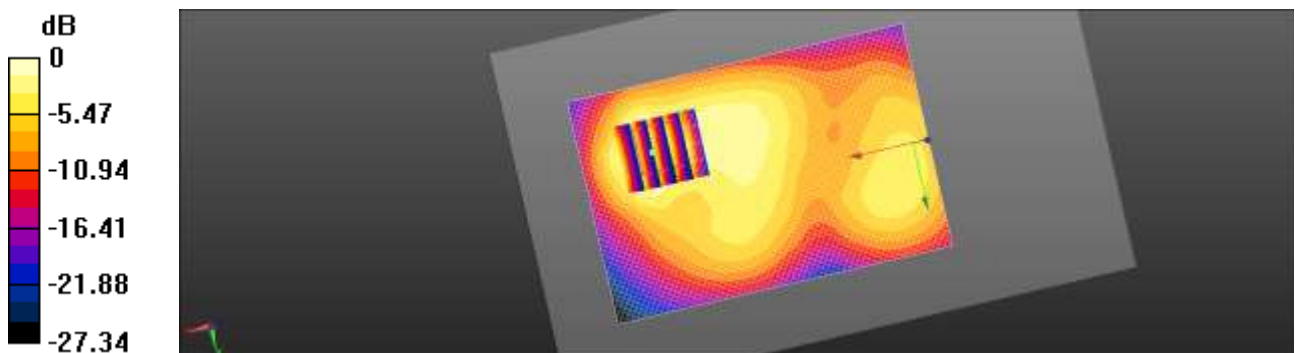
GSM1900 Body Front GPRS 2Tx 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 7.150 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 1.02 W/kg

SAR(1 g) = 0.456 W/kg; SAR(10 g) = 0.261 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.508 W/kg



0 dB = 0.533 W/kg = -2.73 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.0 °C
 Ambient Temperature: 22.2 °C
 Test Date: Apr. 07, 2015
 Plot No. 17

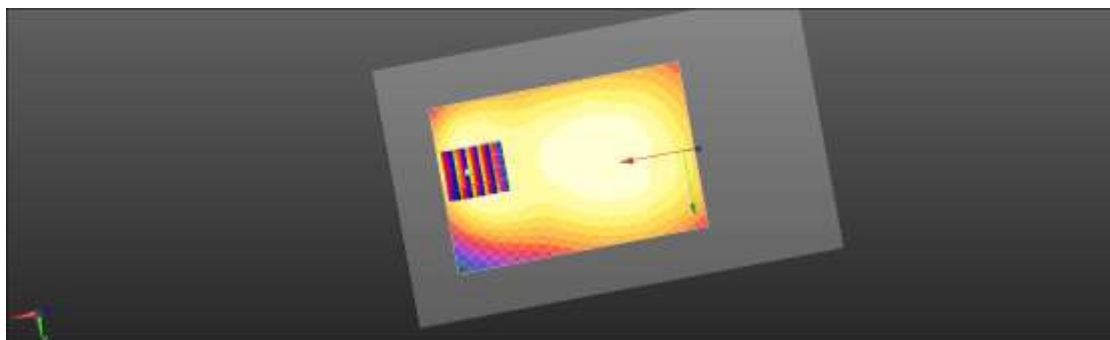
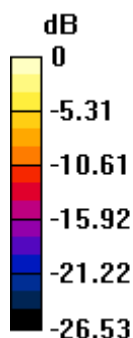
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 1.012 \text{ S/m}$; $\epsilon_r = 54.865$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.22, 6.22, 6.22); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

WCDMA850 Body Rear 4183/Area Scan (71x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.259 W/kg

WCDMA850 Body Rear 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 16.56 V/m; Power Drift = -0.03 dB
 Peak SAR (extrapolated) = 0.365 W/kg
SAR(1 g) = 0.234 W/kg; SAR(10 g) = 0.142 W/kg (SAR corrected for target medium)
 Maximum value of SAR (measured) = 0.254 W/kg



0 dB = 0.259 W/kg = -5.87 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.0 °C
 Ambient Temperature: 22.2 °C
 Test Date: Apr. 07, 2015
 Plot No. 18

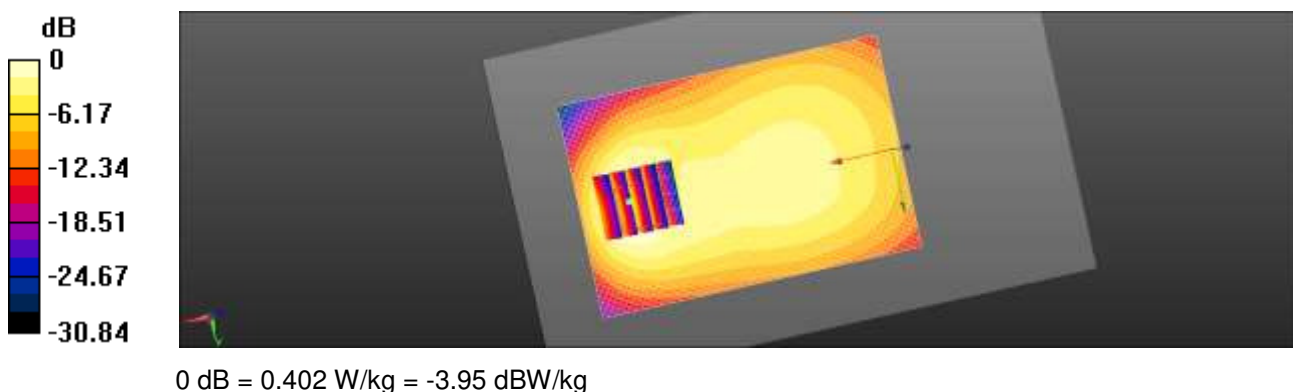
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 1.012 \text{ S/m}$; $\epsilon_r = 54.865$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.22, 6.22, 6.22); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

WCDMA850 Body Front 4183/Area Scan (71x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.402 W/kg

WCDMA850 Body Front 4183/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 14.27 V/m; Power Drift = -0.02 dB
 Peak SAR (extrapolated) = 0.660 W/kg
SAR(1 g) = 0.378 W/kg; SAR(10 g) = 0.211 W/kg (SAR corrected for target medium)
 Maximum value of SAR (measured) = 0.425 W/kg



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 21.6 °C
Ambient Temperature: 21.8 °C
Test Date: Oct. 13, 2015
Plot No. 19

Communication System: UID 0, WCDMA IV (0); Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1732.4$ MHz; $\sigma = 1.455$ S/m; $\epsilon_r = 55.108$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.73, 7.73, 7.73); Calibrated: 2015-08-27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom
- Measurement SW: DASY52, Version 52.8 (8);

/WCDMA4 Body Rear 1412ch/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.628 W/kg

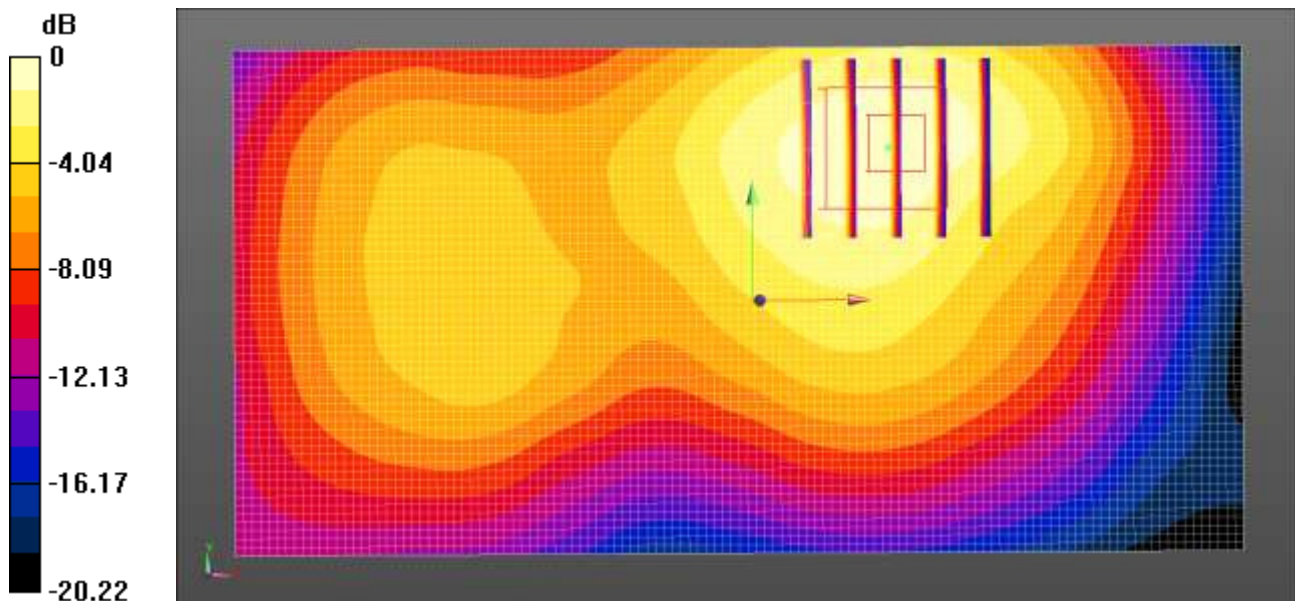
WCDMA4 Body Rear 1412ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 11.72 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 0.716 W/kg

SAR(1 g) = 0.487 W/kg; SAR(10 g) = 0.318 W/kg

Maximum value of SAR (measured) = 0.607 W/kg



0 dB = 0.628 W/kg = -2.02 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 21.6 °C
Ambient Temperature: 21.8 °C
Test Date: Oct. 13, 2015
Plot No. 20

Communication System: UID 0, WCDMA IV (0); Frequency: 1732.4 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 1732.4$ MHz; $\sigma = 1.455$ S/m; $\epsilon_r = 55.108$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.73, 7.73, 7.73); Calibrated: 2015-08-27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom
- Measurement SW: DASY52, Version 52.8 (8);

WCDMA4 Body Rear 1412ch Cover Close/Area Scan (61x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.708 W/kg

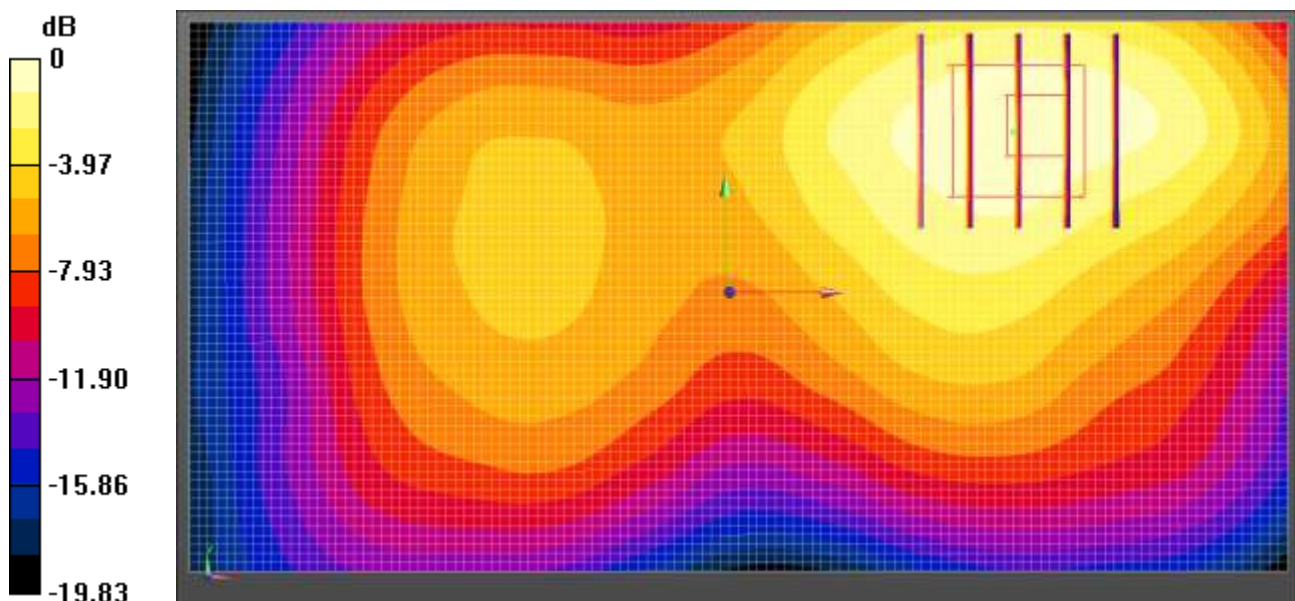
WCDMA4 Body Rear 1412ch Cover Close/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 10.66 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.848 W/kg

SAR(1 g) = 0.569 W/kg; SAR(10 g) = 0.366 W/kg

Maximum value of SAR (measured) = 0.708 W/kg



0 dB = 0.708 W/kg = -1.50 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 10, 2015
 Plot No. 21

Communication System: UID 0, WCDMA1900; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.446 \text{ S/m}$; $\epsilon_r = 52.336$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

WCDMA1900 Body Rear 9400/Area Scan (71x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.401 W/kg

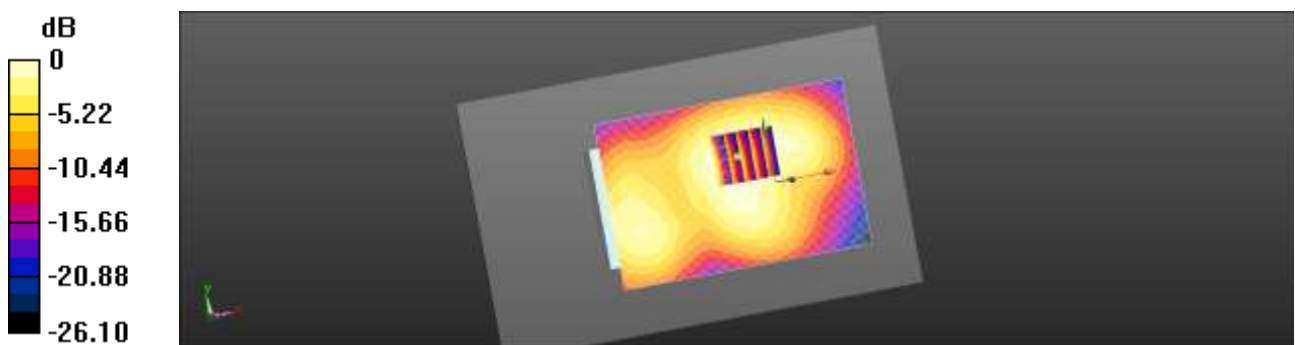
WCDMA1900 Body Rear 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.46 V/m; Power Drift = -0.17 dB

Peak SAR (extrapolated) = 0.510 W/kg

SAR(1 g) = 0.384 W/kg; SAR(10 g) = 0.262 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.397 W/kg



0 dB = 0.401 W/kg = -3.96 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 10, 2015
 Plot No. 22

Communication System: UID 0, WCDMA1900; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.446 \text{ S/m}$; $\epsilon_r = 52.336$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

WCDMA1900 Body Left Side 9400/Area Scan (41x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.507 W/kg

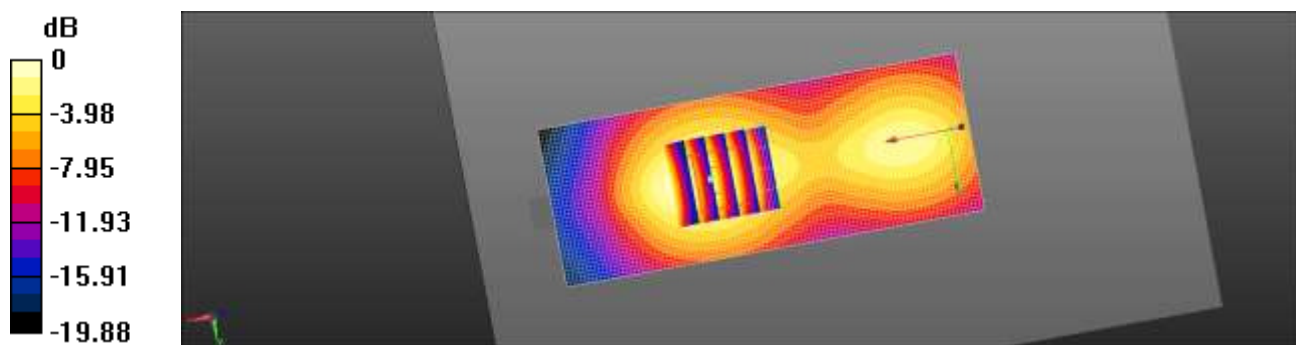
WCDMA1900 Body Left Side 9400/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 12.39 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.691 W/kg

SAR(1 g) = 0.473 W/kg; SAR(10 g) = 0.290 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.502 W/kg



0 dB = 0.507 W/kg = -2.95 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.0 °C
 Ambient Temperature: 22.2 °C
 Test Date: Apr. 07, 2015
 Plot No. 23

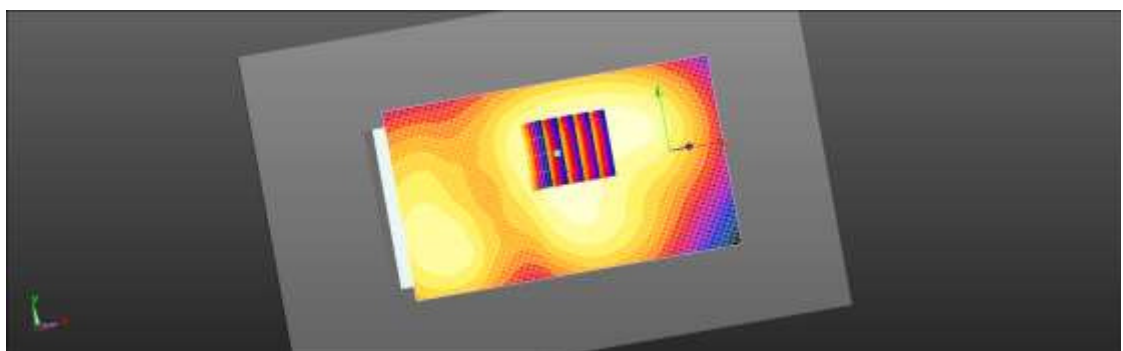
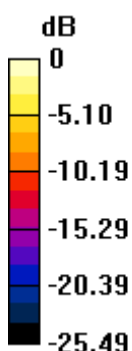
Communication System: UID 0, LTE Band 2; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.441 \text{ S/m}$; $\epsilon_r = 52.193$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.36, 7.36, 7.36); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LTE Band 2 Body Rear QPSK 20MHz 1RB 0offset 18900ch/Area Scan (61x111x1): Interpolated grid:
 $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.605 W/kg

LTE Band 2 Body Rear QPSK 20MHz 1RB 0offset 18900ch/Zoom Scan (5x5x7)/Cube 0: Measurement
 grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 18.90 V/m; Power Drift = -0.18 dB
 Peak SAR (extrapolated) = 0.676 W/kg
SAR(1 g) = 0.476 W/kg; SAR(10 g) = 0.323 W/kg
 Maximum value of SAR (measured) = 0.578 W/kg



0 dB = 0.605 W/kg = -2.18 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Apr. 07, 2015
Plot No. 24

Communication System: UID 0, LTE Band 2; Frequency: 1880 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.441 \text{ S/m}$; $\epsilon_r = 52.193$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section

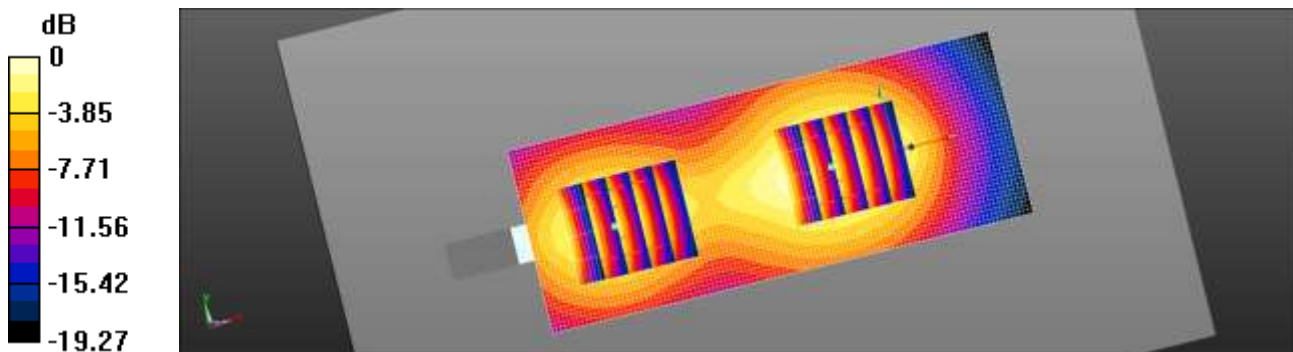
DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.36, 7.36, 7.36); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LTE Band 2 Body Left side QPSK 20MHz 1RB 0offset 18900ch/Area Scan (41x111x1): Interpolated grid:
 $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 0.707 W/kg

LTE Band 2 Body Left side QPSK 20MHz 1RB 0offset 18900ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 16.98 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.834 W/kg
SAR(1 g) = 0.547 W/kg; SAR(10 g) = 0.336 W/kg
Maximum value of SAR (measured) = 0.707 W/kg

LTE Band 2 Body Left side QPSK 20MHz 1RB 0offset 18900ch/Zoom Scan (5x5x7)/Cube 1:
Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 16.98 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.650 W/kg
SAR(1 g) = 0.421 W/kg; SAR(10 g) = 0.254 W/kg
Maximum value of SAR (measured) = 0.547 W/kg



0 dB = 0.707 W/kg = -1.51 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 08, 2015
 Plot No. 25

Communication System: UID 0, LTE Band 4; Frequency: 1732.5 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 1732.5 \text{ MHz}$; $\sigma = 1.455 \text{ S/m}$; $\epsilon_r = 55.114$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.8, 7.8, 7.8); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LTE Band 4 Body Rear QPSK 20MHz 1RB 0offset 20175ch/Area Scan (61x111x1): Interpolated grid:

$dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 0.625 W/kg

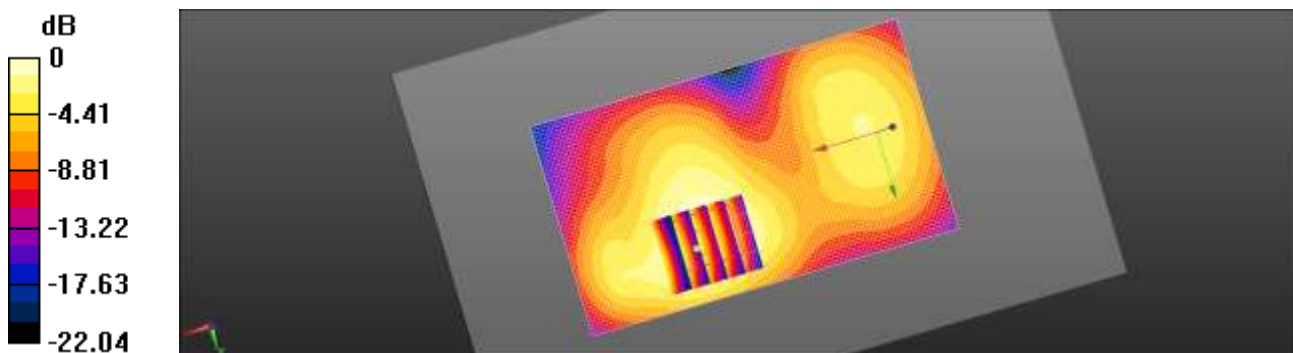
LTE Band 4 Body Rear QPSK 20MHz 1RB 0offset 20175ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 10.50 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 0.718 W/kg

SAR(1 g) = 0.501 W/kg; SAR(10 g) = 0.333 W/kg

Maximum value of SAR (measured) = 0.617 W/kg



0 dB = 0.625 W/kg = -2.04 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 08, 2015
 Plot No. 26

Communication System: UID 0, LTE Band 4; Frequency: 1732.5 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 1732.5$ MHz; $\sigma = 1.455$ S/m; $\epsilon_r = 55.114$; $\rho = 1000$ kg/m³
 Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.8, 7.8, 7.8); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LTE Band 4 Body Front QPSK 20MHz 1RB 0offset 20175ch/Area Scan (61x111x1): Interpolated grid:
 $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 0.966 W/kg

LTE Band 4 Body Front QPSK 20MHz 1RB 0offset 20175ch/Zoom Scan (5x5x7)/Cube 0: Measurement
 grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 7.773 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 1.07 W/kg

SAR(1 g) = 0.559 W/kg; SAR(10 g) = 0.314 W/kg

Maximum value of SAR (measured) = 0.784 W/kg

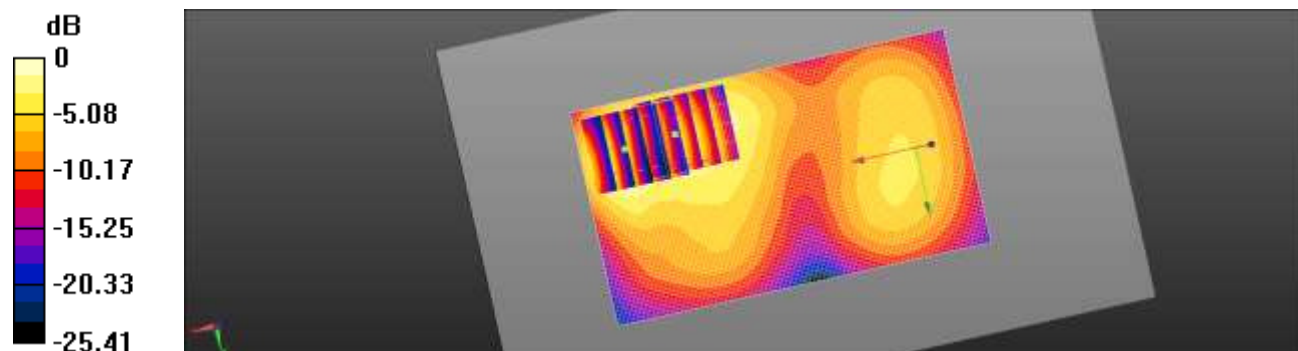
LTE Band 4 Body Front QPSK 20MHz 1RB 0offset 20175ch/Zoom Scan (5x5x7)/Cube 1: Measurement
 grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 7.773 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.889 W/kg

SAR(1 g) = 0.610 W/kg; SAR(10 g) = 0.387 W/kg

Maximum value of SAR (measured) = 0.749 W/kg



0 dB = 0.966 W/kg = -0.15 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 21.9 °C
 Ambient Temperature: 22.1 °C
 Test Date: Apr. 09, 2015
 Plot No. 27

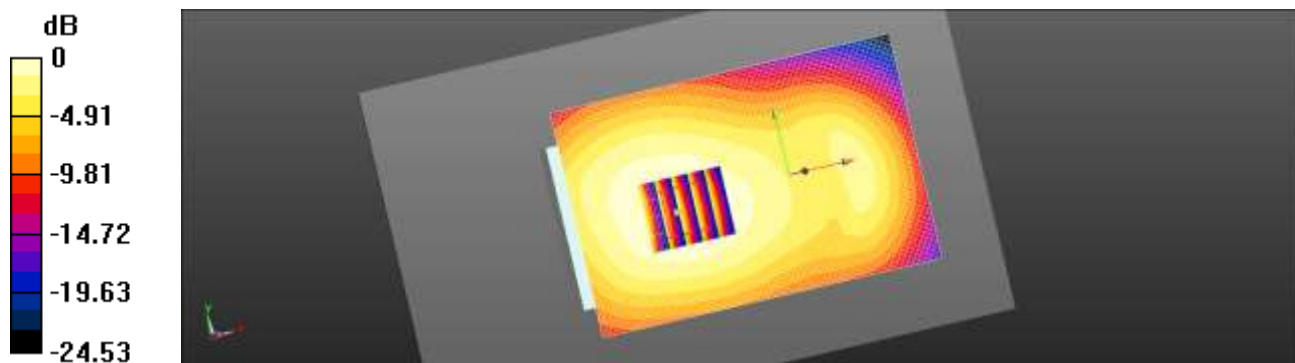
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 836.5 \text{ MHz}$; $\sigma = 0.972 \text{ S/m}$; $\epsilon_r = 54.167$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.22, 6.22, 6.22); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LTE5 Head Body Rear QPSK 10MHz 1RB 49offset 20525ch/Area Scan (71x111x1): Interpolated grid:
 $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.299 W/kg

LTE5 Head Body Rear QPSK 10MHz 1RB 49offset 20525ch/Zoom Scan (5x5x7)/Cube 0: Measurement
 grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 17.79 V/m; Power Drift = -0.07 dB
 Peak SAR (extrapolated) = 0.370 W/kg
SAR(1 g) = 0.287 W/kg; SAR(10 g) = 0.220 W/kg
 Maximum value of SAR (measured) = 0.306 W/kg



0 dB = 0.299 W/kg = -5.24 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 21.9 °C
 Ambient Temperature: 22.1 °C
 Test Date: Apr. 09, 2015
 Plot No. 28

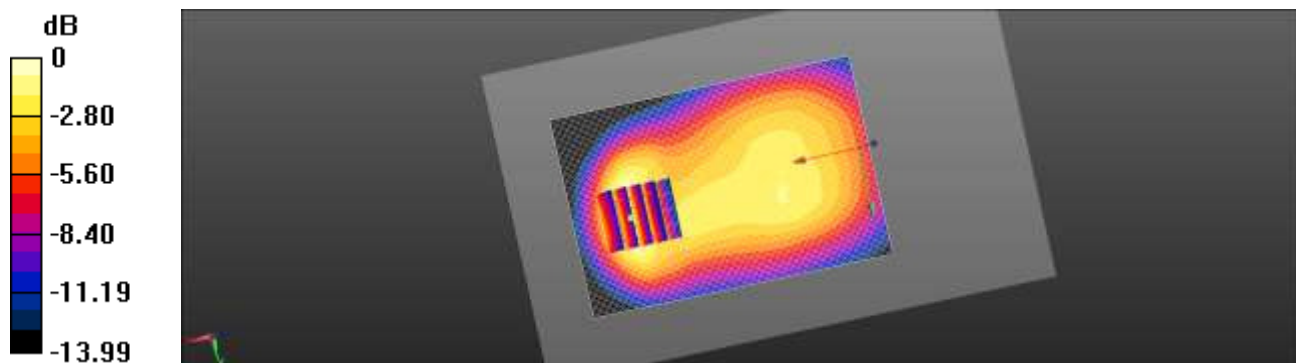
Communication System: UID 0, LTE Band 5; Frequency: 836.5 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 836.5 \text{ MHz}$; $\sigma = 0.972 \text{ S/m}$; $\epsilon_r = 54.167$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.22, 6.22, 6.22); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LTE5 Head Body Front QPSK 10MHz 1RB 49offset 20525ch/Area Scan (71x111x1): Interpolated grid:
 $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.407 W/kg

LTE5 Head Body Front QPSK 10MHz 1RB 49offset 20525ch/Zoom Scan (5x5x7)/Cube 0: Measurement
 grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 17.00 V/m; Power Drift = -0.12 dB
 Peak SAR (extrapolated) = 0.612 W/kg
SAR(1 g) = 0.365 W/kg; SAR(10 g) = 0.211 W/kg
 Maximum value of SAR (measured) = 0.409 W/kg



0 dB = 0.409 W/kg = -3.88 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 22.1 °C
Ambient Temperature: 22.3 °C
Test Date: Apr. 10, 2015
Plot No. 29

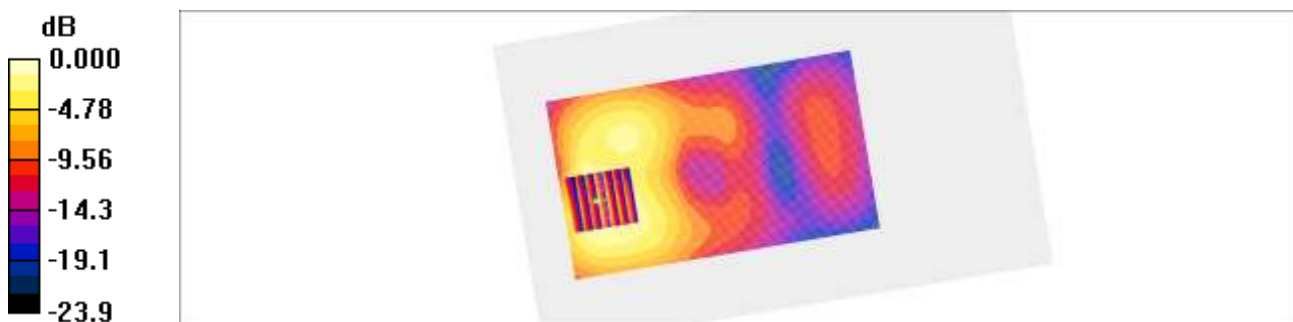
Communication System: LTE Band 7; Frequency: 2560 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2560$ MHz; $\sigma = 2.07$ mho/m; $\epsilon_r = 52.9$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.68, 6.68, 6.68); Calibrated: 2014-11-19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2014-09-18
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

LTE Band 7 Body Rear QPSK 20MHz 1RB 0offset 21350ch/Area Scan (81x141x1): Measurement grid:
dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 1.08 mW/g

LTE Band 7 Body Rear QPSK 20MHz 1RB 0offset 21350ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.77 V/m; Power Drift = -0.104 dB
Peak SAR (extrapolated) = 1.53 W/kg
SAR(1 g) = 0.752 mW/g; SAR(10 g) = 0.389 mW/g
Maximum value of SAR (measured) = 1.10 mW/g



0 dB = 1.10mW/g

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 10, 2015
 Plot No. 30

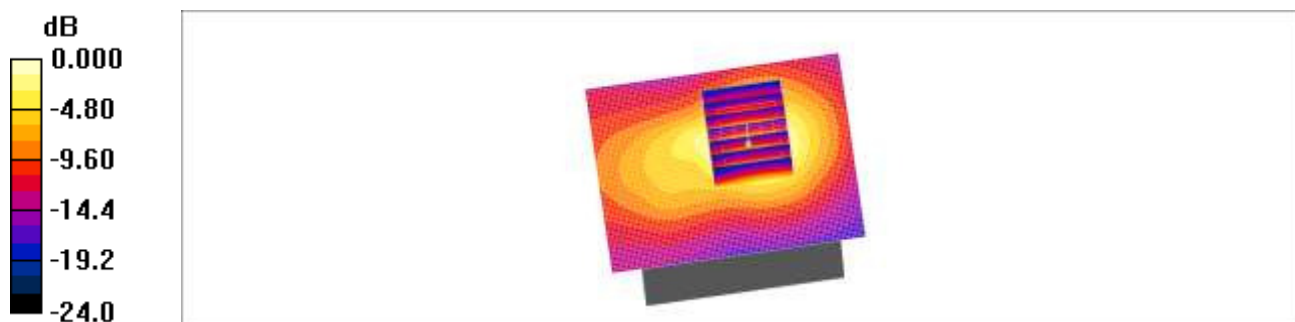
Communication System: LTE Band 7; Frequency: 2510 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 2510$ MHz; $\sigma = 1.98$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³
 Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.68, 6.68, 6.68); Calibrated: 2014-11-19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2014-09-18
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

LTE Band 7 Body Bottom QPSK 20MHz 1RB 0offset 20850ch/Area Scan (81x61x1): Measurement grid:
 dx=12mm, dy=12mm
 Maximum value of SAR (interpolated) = 1.71 mW/g

LTE Band 7 Body Bottom QPSK 20MHz 1RB 0offset 20850ch/Zoom Scan (7x7x7)/Cube 0: Measurement
 grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 22.8 V/m; Power Drift = 0.023 dB
 Peak SAR (extrapolated) = 2.27 W/kg
SAR(1 g) = 1.11 mW/g; SAR(10 g) = 0.543 mW/g
 Maximum value of SAR (measured) = 1.66 mW/g



0 dB = 1.66mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 22.1 °C
Ambient Temperature: 22.3 °C
Test Date: Apr. 11, 2015
Plot No. 31

Communication System: UID 0, LTE Band 17 (0); Frequency: 710 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 710 \text{ MHz}$; $\sigma = 0.938 \text{ S/m}$; $\epsilon_r = 54.798$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.26, 6.26, 6.26); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE17 Body Rear QPSK 10MHz 1RB 0offset 23790ch/Area Scan (71x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 0.413 W/kg

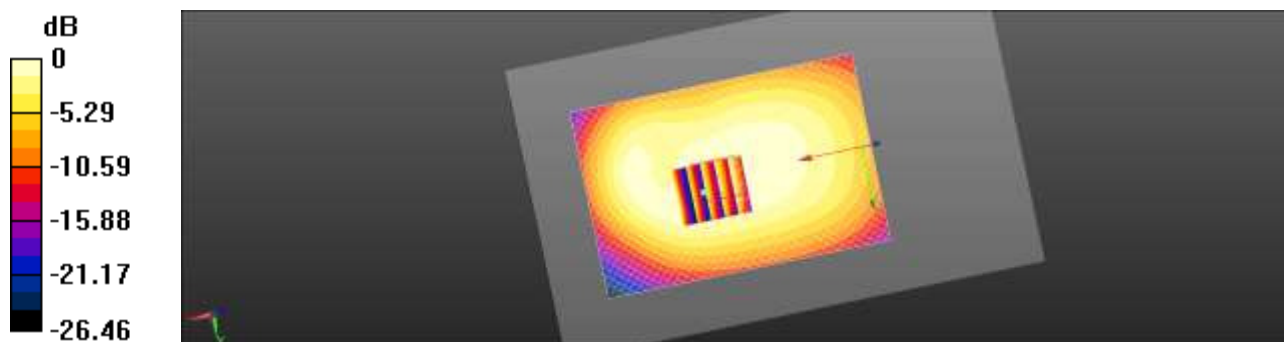
LTE17 Body Rear QPSK 10MHz 1RB 0offset 23790ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 19.85 V/m; Power Drift = -0.08 dB

Peak SAR (extrapolated) = 0.526 W/kg

SAR(1 g) = 0.388 W/kg; SAR(10 g) = 0.293 W/kg

Maximum value of SAR (measured) = 0.405 W/kg



0 dB = 0.413 W/kg = -3.84 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 11, 2015
 Plot No. 32

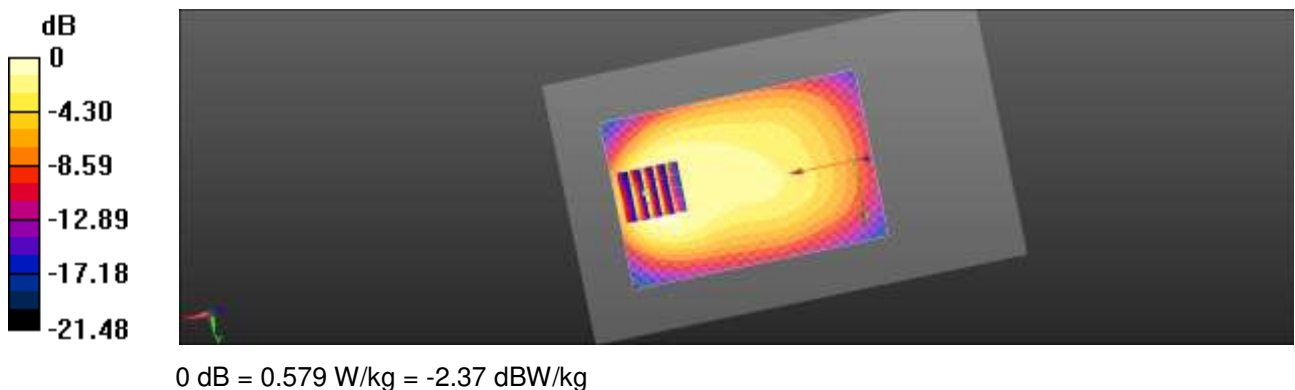
Communication System: UID 0, LTE Band 17 (0); Frequency: 710 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 710 \text{ MHz}$; $\sigma = 0.938 \text{ S/m}$; $\epsilon_r = 54.798$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.26, 6.26, 6.26); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

LTE17 Head Body Front QPSK 10MHz 1RB 0offset 23790ch/Area Scan (71x111x1): Interpolated grid:
 $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.579 W/kg

LTE17 Head Body Front QPSK 10MHz 1RB 0offset 23790ch/Zoom Scan (5x5x7)/Cube 0: Measurement
 grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 18.41 V/m; Power Drift = -0.15 dB
 Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.580 W/kg; SAR(10 g) = 0.326 W/kg
 Maximum value of SAR (measured) = 0.650 W/kg



Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 21.8 °C
Ambient Temperature: 22.0 °C
Test Date: Mar. 31, 2015
Plot No. 33

Communication System: 2450MHz FCC; Frequency: 2462 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 2462$ MHz; $\sigma = 1.96$ mho/m; $\epsilon_r = 52.6$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3967; ConvF(7.1, 7.1, 7.1); Calibrated: 2014-12-22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2014-04-23
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

802.11b Body Rear 1Mbps 11ch/Area Scan (81x141x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.357 mW/g

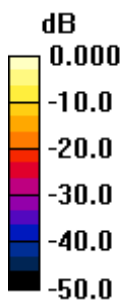
802.11b Body Rear 1Mbps 11ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.91 V/m; Power Drift = -0.170 dB

Peak SAR (extrapolated) = 0.477 W/kg

SAR(1 g) = 0.232 mW/g; SAR(10 g) = 0.108 mW/g

Maximum value of SAR (measured) = 0.354 mW/g



0 dB = 0.354mW/g

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 02, 2015
 Plot No. 34

Communication System: UID 0, WIFI 5GHz (0); Frequency: 5745 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 5745 \text{ MHz}$; $\sigma = 6.059 \text{ S/m}$; $\epsilon_r = 46.752$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(4.29, 4.29, 4.29); Calibrated: 2014-08-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: Triple Flat Phantom 5.1C-2014-02-21
- Measurement SW: DASY52, Version 52.8 (8);

802.11a Body Rear 6Mbps 149ch/Area Scan (101x161x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.228 W/kg

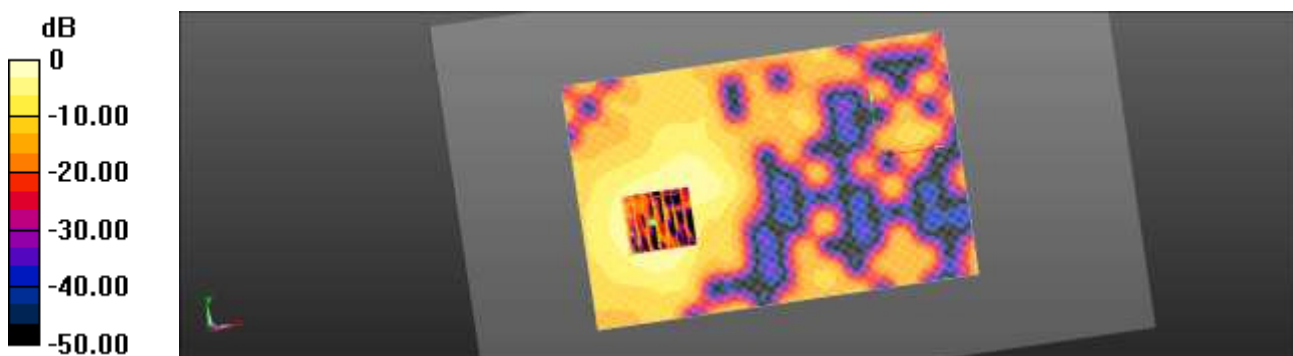
802.11a Body Rear 6Mbps 149ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 0.7030 V/m; Power Drift = -0.144 dB

Peak SAR (extrapolated) = 0.368 W/kg

SAR(1 g) = 0.083 W/kg; SAR(10 g) = 0.027 W/kg

Maximum value of SAR (measured) = 0.217 W/kg



0 dB = 0.228 W/kg = -6.42 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 02, 2015
 Plot No. 35

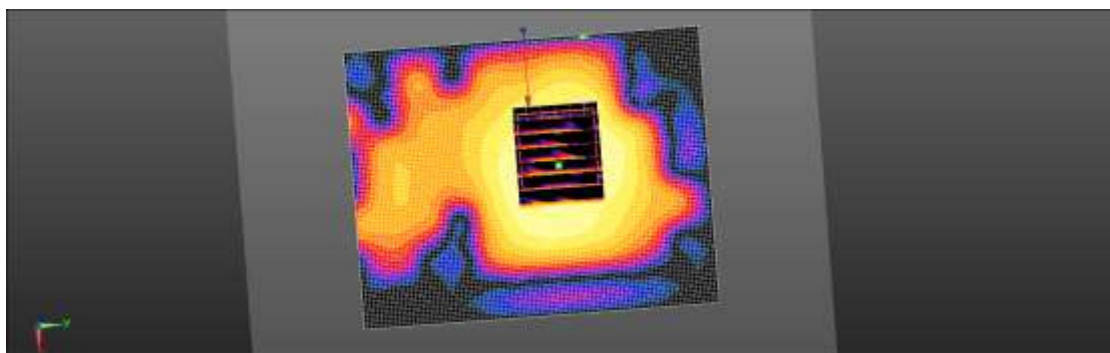
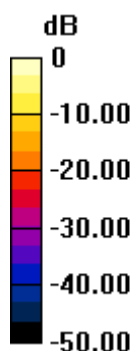
Communication System: UID 0, WIFI 5GHz (0); Frequency: 5745 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 5745 \text{ MHz}$; $\sigma = 6.059 \text{ S/m}$; $\epsilon_r = 46.752$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(4.29, 4.29, 4.29); Calibrated: 2014-08-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: Triple Flat Phantom 5.1C-2014-02-21
- Measurement SW: DASY52, Version 52.8 (8);

802.11a Body Top 6Mbps 149ch Cover Closed/Area Scan (101x81x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.418 W/kg

802.11a Body Top 6Mbps 149ch Cover Closed/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$
 Reference Value = 8.072 V/m; Power Drift = 0.05 dB
 Peak SAR (extrapolated) = 0.713 W/kg
SAR(1 g) = 0.167 W/kg; SAR(10 g) = 0.056 W/kg
 Maximum value of SAR (measured) = 0.419 W/kg



0 dB = 0.418 W/kg = -3.79 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 02, 2015
 Plot No. 36

Communication System: UID 0, WIFI 5GHz (0); Frequency: 5260 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 5260 \text{ MHz}$; $\sigma = 5.259 \text{ S/m}$; $\epsilon_r = 48.047$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(4.53, 4.53, 4.53); Calibrated: 2014-08-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: Triple Flat Phantom 5.1C-2014-02-21
- Measurement SW: DASY52, Version 52.8 (8);

802.11a Body Rear 6Mbps 52ch/Area Scan (101x161x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.372 W/kg

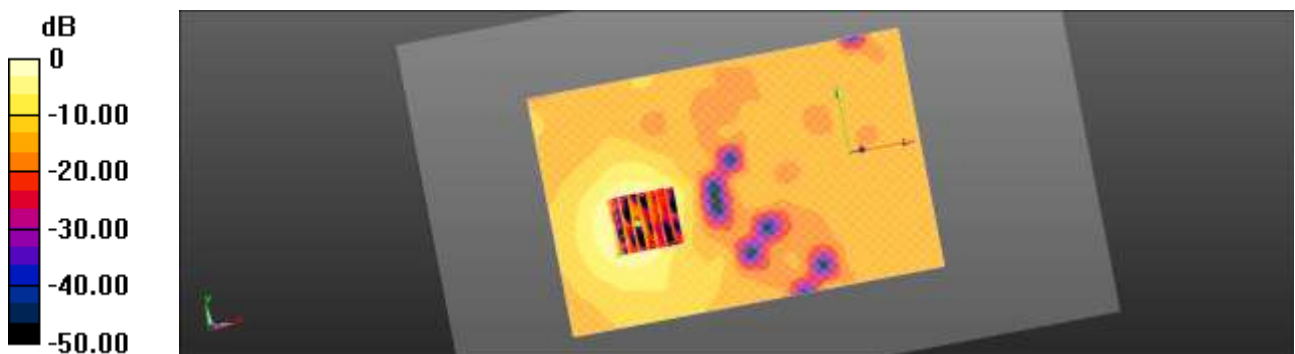
802.11a Body Rear 6Mbps 52ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 1.691 V/m; Power Drift = -0.122 dB

Peak SAR (extrapolated) = 0.580 W/kg

SAR(1 g) = 0.147 W/kg; SAR(10 g) = 0.049 W/kg

Maximum value of SAR (measured) = 0.354 W/kg



0 dB = 0.372 W/kg = -4.30 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.0 °C
 Ambient Temperature: 22.2 °C
 Test Date: Apr. 07, 2015
 Plot No. 37

Communication System: UID 0, GSM 850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.30042
 Medium parameters used (interpolated): $f = 836.6 \text{ MHz}$; $\sigma = 1.012 \text{ S/m}$; $\epsilon_r = 54.865$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.22, 6.22, 6.22); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (8);

GSM850 Body worn Voice Rear 190ch/Area Scan (71x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 0.198 W/kg

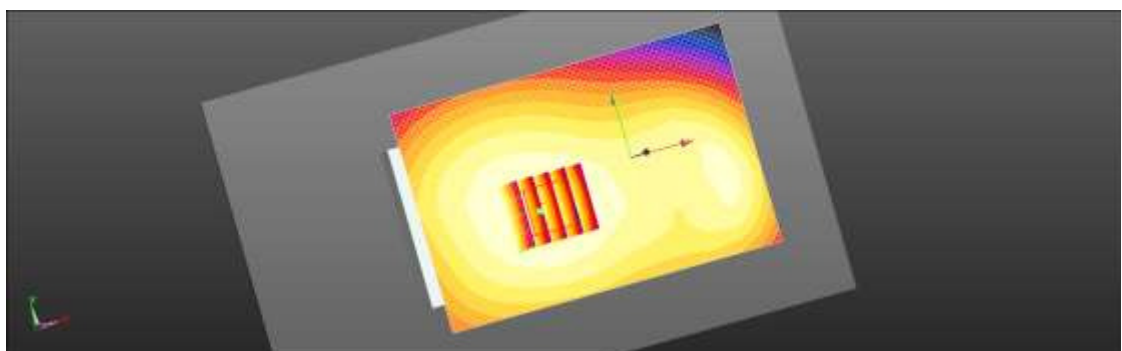
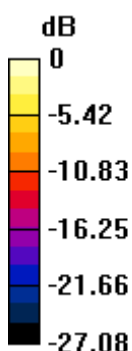
GSM850 Body worn Voice Rear 190ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 13.97 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 0.228 W/kg

SAR(1 g) = 0.188 W/kg; SAR(10 g) = 0.145 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.196 W/kg



0 dB = 0.198 W/kg = -7.04 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 10, 2015
 Plot No. 38

Communication System: UID 0, GSM 1900 2TX; Frequency: 1880 MHz; Duty Cycle: 1:8.3
 Medium parameters used: $f = 1880 \text{ MHz}$; $\sigma = 1.446 \text{ S/m}$; $\epsilon_r = 52.336$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

GSM1900 Body Worn Voice Rear 661/Area Scan (71x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 0.261 W/kg

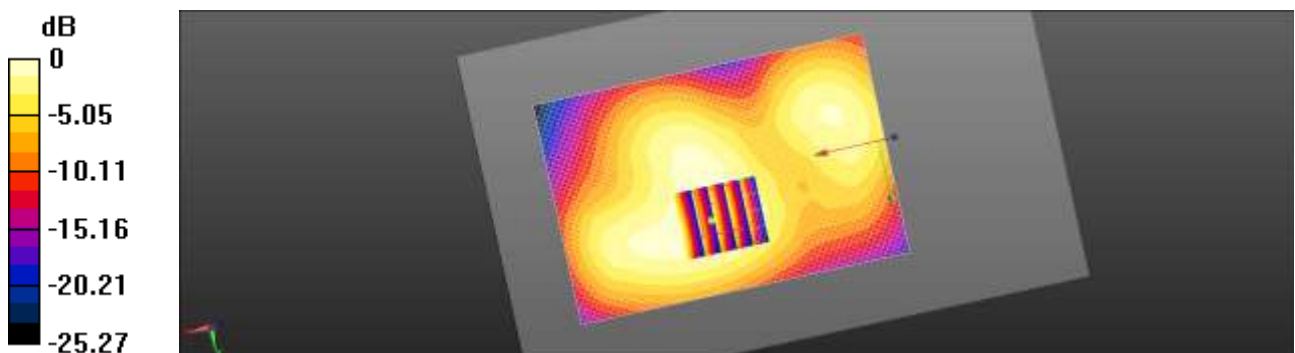
GSM1900 Body Worn Voice Rear 661/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 7.065 V/m; Power Drift = 0.13 dB

Peak SAR (extrapolated) = 0.320 W/kg

SAR(1 g) = 0.246 W/kg; SAR(10 g) = 0.169 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.256 W/kg



0 dB = 0.261 W/kg = -5.84 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
Bluetooth, WLAN, NFC
Liquid Temperature: 22.0 °C
Ambient Temperature: 22.2 °C
Test Date: Apr. 07, 2015
Plot No. 39

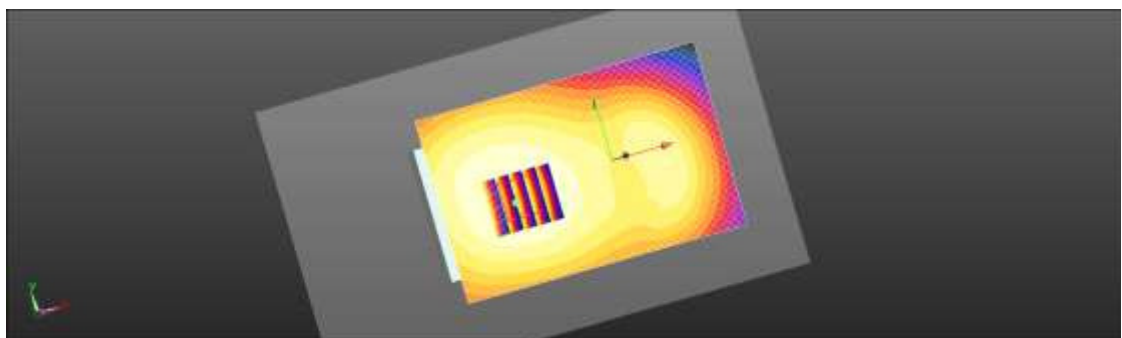
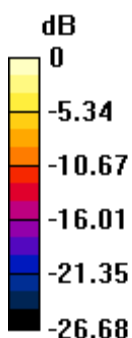
Communication System: UID 0, WCDMA850 (0); Frequency: 836.6 MHz; Duty Cycle: 1:1
Medium parameters used (interpolated): $f = 836.6$ MHz; $\sigma = 1.012$ S/m; $\epsilon_r = 54.865$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.22, 6.22, 6.22); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

WCDMA850 Body Rear Wireless charger cover close 4183/Area Scan (71x111x1): Interpolated grid:
 $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.276 W/kg

WCDMA850 Body Rear Wireless charger cover close 4183/Zoom Scan (5x5x7)/Cube 0: Measurement
grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm
Reference Value = 16.35 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.304 W/kg
SAR(1 g) = 0.247 W/kg; SAR(10 g) = 0.191 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 0.259 W/kg



0 dB = 0.276 W/kg = -5.59 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.0 °C
 Ambient Temperature: 22.2 °C
 Test Date: Apr.07, 2015
 Plot No. 40

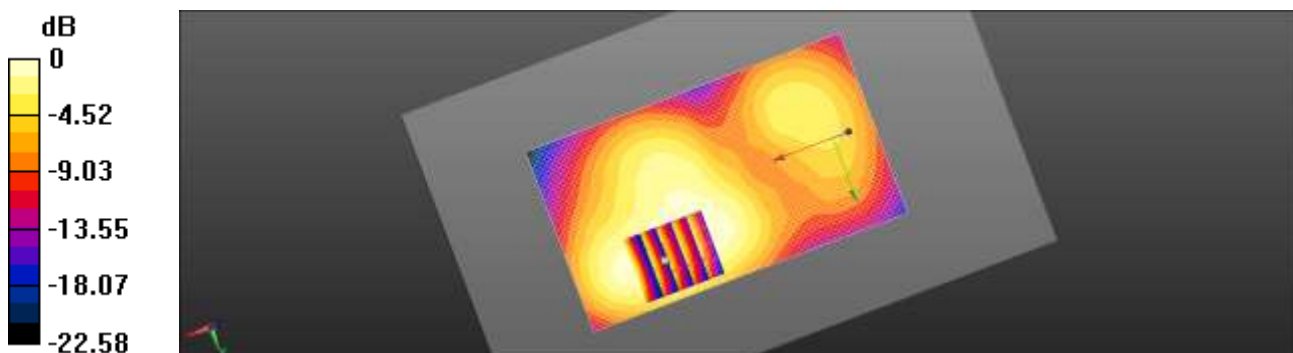
Communication System: UID 0, LTE Band 2; Frequency: 1880 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 1880$ MHz; $\sigma = 1.441$ S/m; $\epsilon_r = 52.193$; $\rho = 1000$ kg/m³
 Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.36, 7.36, 7.36); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LTE Band 2 Body Rear Wireless charger cover close QPSK 20MHz 1RB 0offset 18900ch/Area Scan (61x111x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
 Maximum value of SAR (interpolated) = 0.717 W/kg

LTE Band 2 Body Rear Wireless charger cover close QPSK 20MHz 1RB 0offset 18900ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm
 Reference Value = 13.28 V/m; Power Drift = -0.18 dB
 Peak SAR (extrapolated) = 0.863 W/kg
SAR(1 g) = 0.560 W/kg; SAR(10 g) = 0.357 W/kg
 Maximum value of SAR (measured) = 0.716 W/kg



0 dB = 0.717 W/kg = -1.45 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 08, 2015
 Plot No. 41

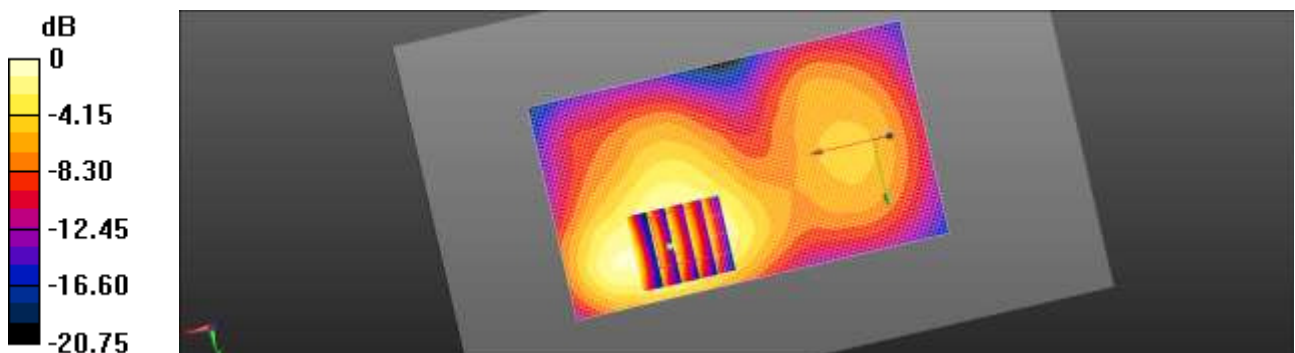
Communication System: UID 0, LTE Band 4; Frequency: 1732.5 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 1732.5 \text{ MHz}$; $\sigma = 1.455 \text{ S/m}$; $\epsilon_r = 55.114$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.8, 7.8, 7.8); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LTE Band 4 Body Rear Wireless charger cover close QPSK 20MHz 1RB 0offset 20175ch/Area Scan (61x111x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
 Maximum value of SAR (interpolated) = 0.916 W/kg

LTE Band 4 Body Rear Wireless charger cover close QPSK 20MHz 1RB 0offset 20175ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
 Reference Value = 10.43 V/m; Power Drift = 0.05 dB
 Peak SAR (extrapolated) = 1.12 W/kg
SAR(1 g) = 0.753 W/kg; SAR(10 g) = 0.485 W/kg
 Maximum value of SAR (measured) = 0.950 W/kg



0 dB = 0.916 W/kg = -0.38 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 02, 2015
 Plot No. 42

Communication System: UID 0, WIFI 5GHz (0); Frequency: 5580 MHz; Duty Cycle: 1:1
 Medium parameters used (interpolated): $f = 5580 \text{ MHz}$; $\sigma = 5.784 \text{ S/m}$; $\epsilon_r = 47.188$; $\rho = 1000 \text{ kg/m}^3$
 Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(4.01, 4.01, 4.01); Calibrated: 2014-08-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: Triple Flat Phantom 5.1C-2014-02-21
- Measurement SW: DASY52, Version 52.8 (8);

802.11a Body Top 6Mbps 116ch/Area Scan (101x81x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$
 Maximum value of SAR (interpolated) = 6.55 W/kg

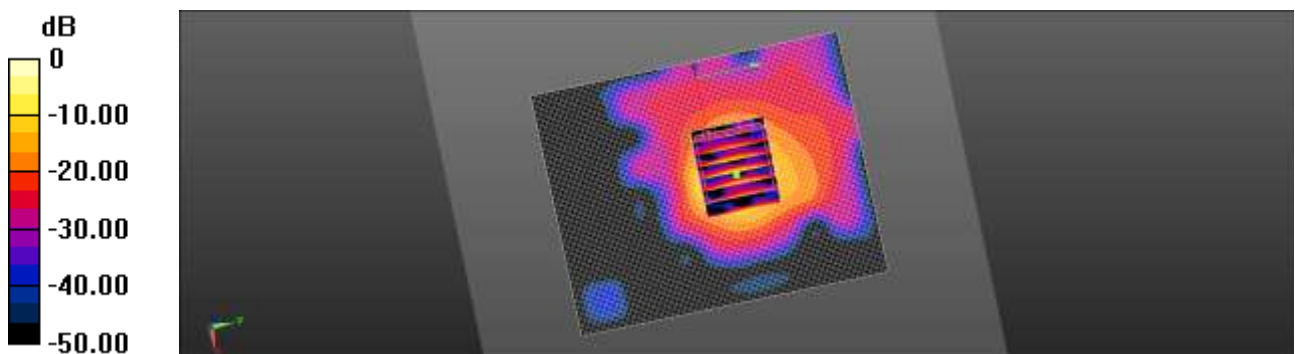
802.11a Body Top 6Mbps 116ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 21.51 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 13.6 W/kg

SAR(1 g) = 2.12 W/kg; SAR(10 g) = 0.409 W/kg

Maximum value of SAR (measured) = 7.07 W/kg



0 dB = 6.55 W/kg = 8.16 dBW/kg

Test Laboratory: HCT CO., LTD
 EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA/LTE Phone
 Bluetooth, WLAN, NFC
 Liquid Temperature: 22.1 °C
 Ambient Temperature: 22.3 °C
 Test Date: Apr. 10, 2015
 Plot No. 43

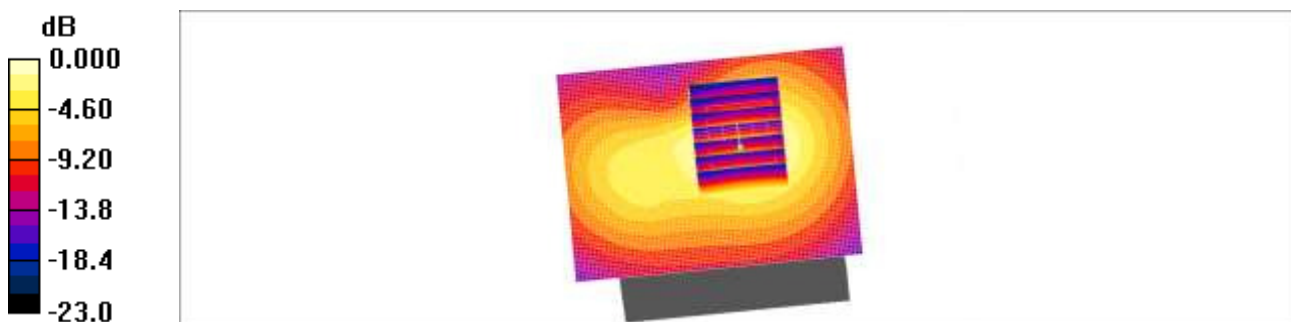
Communication System: LTE Band 7; Frequency: 2510 MHz; Duty Cycle: 1:1
 Medium parameters used: $f = 2510$ MHz; $\sigma = 1.98$ mho/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³
 Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.68, 6.68, 6.68); Calibrated: 2014-11-19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2014-09-18
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

LTE Band 7 Body Bottom QPSK 20MHz 1RB 0offset 20850ch/Area Scan (81x61x1): Measurement grid:
 dx=12mm, dy=12mm
 Maximum value of SAR (interpolated) = 1.47 mW/g

LTE Band 7 Body Bottom QPSK 20MHz 1RB 0offset 20850ch/Zoom Scan (7x7x7)/Cube 0: Measurement
 grid: dx=5mm, dy=5mm, dz=5mm
 Reference Value = 22.8 V/m; Power Drift = 0.001 dB
 Peak SAR (extrapolated) = 1.98 W/kg
SAR(1 g) = 0.997 mW/g; SAR(10 g) = 0.510 mW/g
 Maximum value of SAR (measured) = 1.45 mW/g



0 dB = 1.45mW/g

Attachment 2. – Dipole Verification Plots

■ Verification Data (750 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.1 °C
Test Date: Apr. 11, 2015

DUT: Dipole 750 MHz D750V3; Type: D750V3

Communication System: UID 0, CW; Frequency: 750 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.91 \text{ S/m}$; $\epsilon_r = 42.783$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.65, 6.65, 6.65); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: SAM with CRP v5.0_L
- Measurement SW: DASY52, Version 52.8 (0);

Verification 750MHz Head/Area Scan (61x121x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 0.888 W/kg

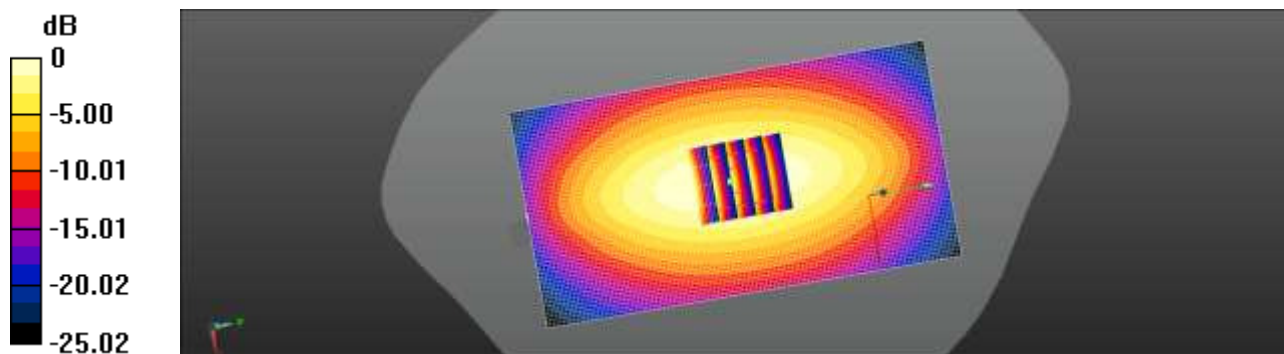
Verification 750MHz Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 32.41 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.823 W/kg; SAR(10 g) = 0.542 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.887 W/kg



0 dB = 0.888 W/kg = -0.52 dBW/kg

■ Verification Data (750 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.1 °C
Test Date: Apr. 11, 2015

DUT: Dipole 750 MHz D750V3; Type: D750V3

Communication System: UID 0, CW (0); Frequency: 750 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 750 \text{ MHz}$; $\sigma = 0.975 \text{ S/m}$; $\epsilon_r = 54.355$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.26, 6.26, 6.26); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2014-03-26
- Phantom: Triple Flat Phantom 5.1C-2014-02-21
- Measurement SW: DASY52, Version 52.8 (0);

Verification 750MHz Body/Area Scan (61x121x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 0.898 W/kg

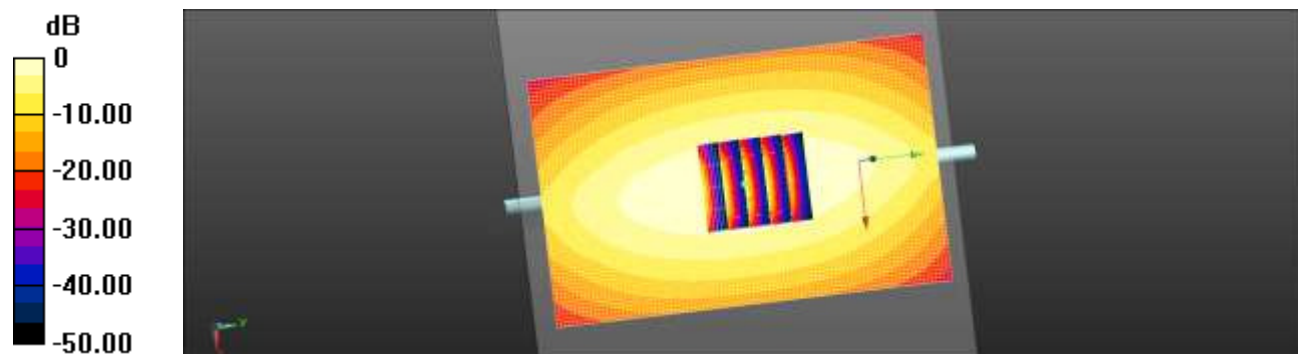
Verification 750MHz Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 31.18 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.852 W/kg; SAR(10 g) = 0.618 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.918 W/kg



$$0 \text{ dB} = 0.898 \text{ W/kg} = -0.47 \text{ dBW/kg}$$

■ Verification Data (835 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 21.8 °C
Test Date: Apr. 06, 2015

DUT: Dipole 835 MHz D835V2; Type: D835V2

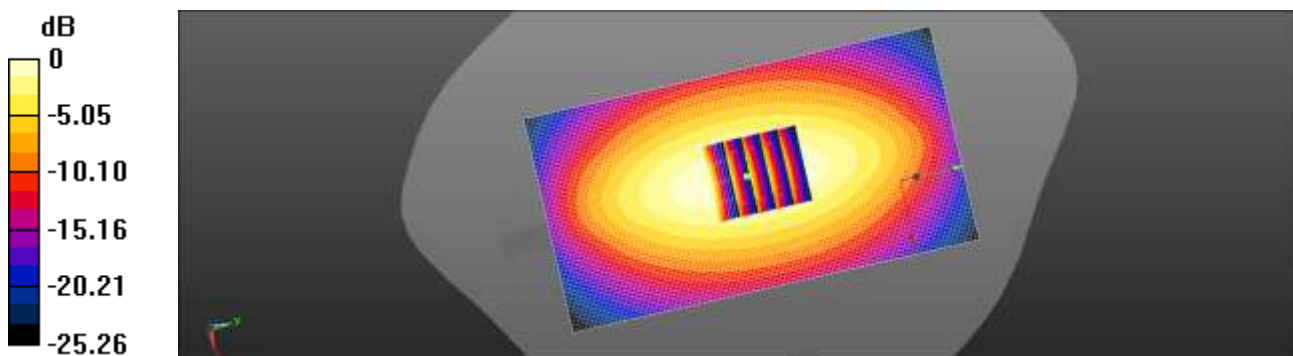
Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.906 \text{ S/m}$; $\epsilon_r = 42.731$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.37, 6.37, 6.37); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: SAM with CRP v5.0_Front_20120517
- Measurement SW: DASY52, Version 52.8 (0);

Verification Head 835MHz/Area Scan (61x121x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 1.01 W/kg

Verification Head 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 34.74 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 1.36 W/kg
SAR(1 g) = 0.940 W/kg; SAR(10 g) = 0.618 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 1.01 W/kg



0 dB = 1.01 W/kg = 0.04 dBW/kg

■ Verification Data (835 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.0 °C
Test Date: Apr. 07, 2015

DUT: Dipole 835 MHz D835V2; Type: D835V2

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 1.01 \text{ S/m}$; $\epsilon_r = 54.885$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.22, 6.22, 6.22); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2014-03-26
- Phantom: Triple Flat Phantom 5.1C-2014-02-21
- Measurement SW: DASY52, Version 52.8 (0);

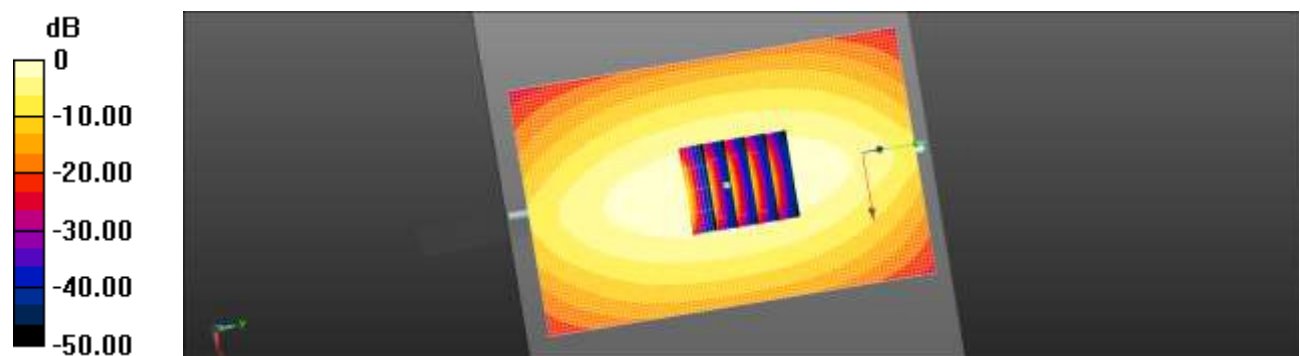
Verification 835MHz/Area Scan (61x121x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 0.996 W/kg

Verification 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 32.44 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.933 W/kg; SAR(10 g) = 0.679 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 1.00 W/kg



0 dB = 0.996 W/kg = -0.02 dBW/kg

■ Verification Data (835 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.1 °C
Test Date: Apr. 08, 2015

DUT: Dipole 835 MHz D835V2; Type: D835V2

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.873 \text{ S/m}$; $\epsilon_r = 41.863$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.37, 6.37, 6.37); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: SAM with CRP v5.0_Front_20120517
- Measurement SW: DASY52, Version 52.8 (0);

Verification 835MHz Head/Area Scan (61x121x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 0.960 W/kg

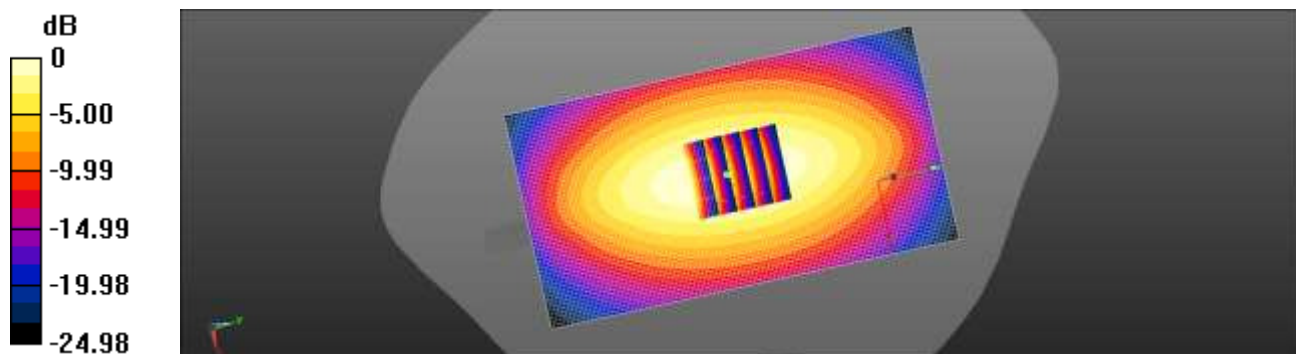
Verification 835MHz Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 34.57 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.28 W/kg

SAR(1 g) = 0.914 W/kg; SAR(10 g) = 0.599 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 0.962 W/kg



0 dB = 0.960 W/kg = -0.18 dBW/kg

■ Verification Data (835 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 21.9 °C
Test Date: Apr. 09, 2015

DUT: Dipole 835 MHz D835V2; Type: D835V2

Communication System: UID 0, CW; Frequency: 835 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.971 \text{ S/m}$; $\epsilon_r = 54.165$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(6.22, 6.22, 6.22); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C-2014-02-21
- Measurement SW: DASY52, Version 52.8 (8);

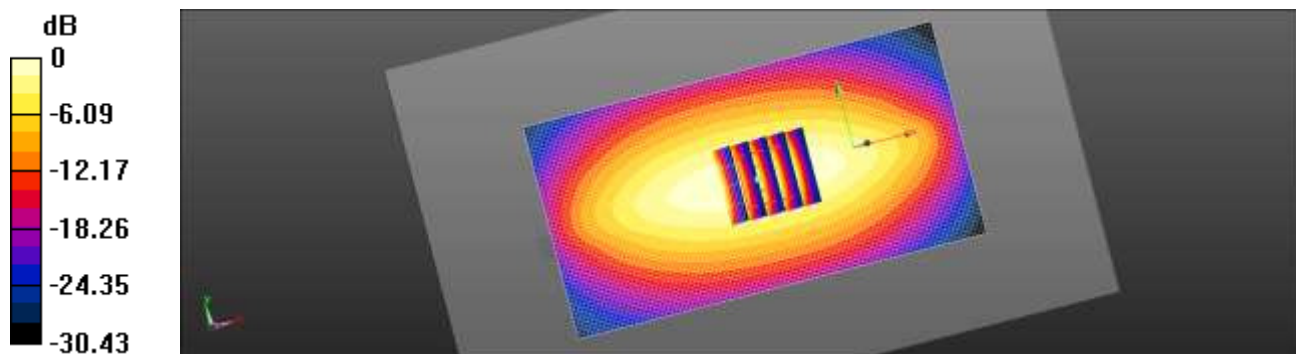
Verification 835MHz/Area Scan (61x121x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 1.03 W/kg

Verification 835MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 32.81 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 1.41 W/kg

SAR(1 g) = 0.936 W/kg; SAR(10 g) = 0.590 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 1.03 W/kg



0 dB = 1.03 W/kg = 0.13 dBW/kg

■ Verification Data (1 800 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 21.6 °C
Test Date: Oct. 13, 2015

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2

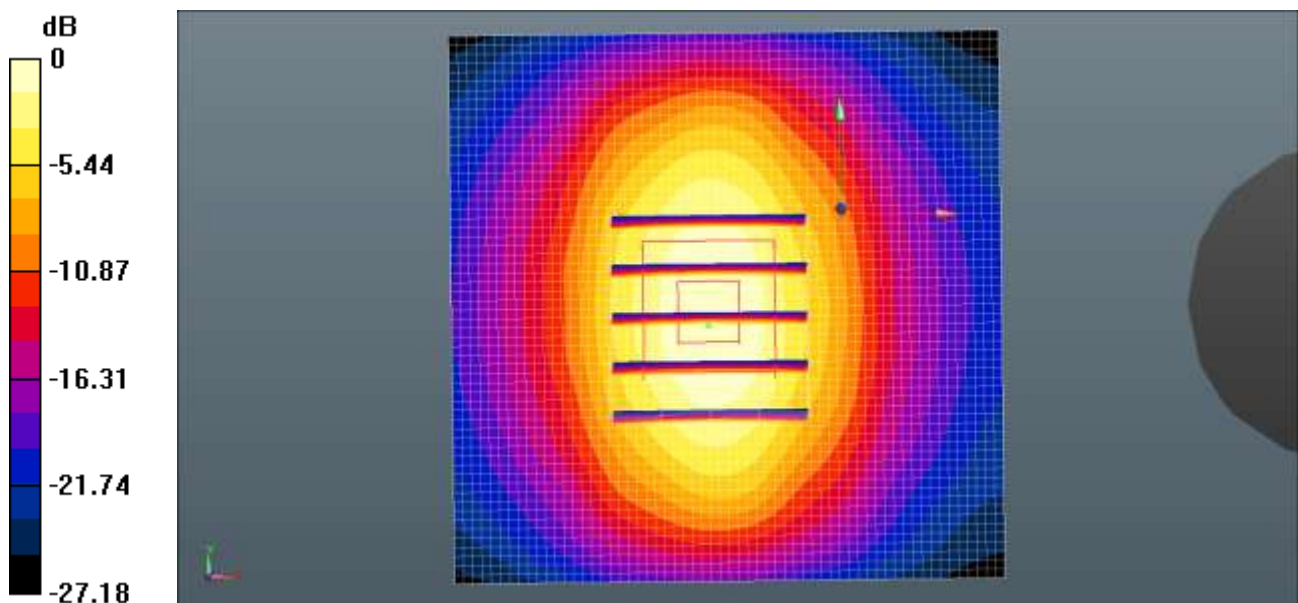
Communication System: UID 0, CW; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1800$ MHz; $\sigma = 1.411$ S/m; $\epsilon_r = 39.482$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(8.18, 8.18, 8.18); Calibrated: 2015-08-27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: SAM
- Measurement SW: DASY52, Version 52.8 (8);

1800MHz Head Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 4.13 W/kg

1800MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 52.72 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 6.89 W/kg
SAR(1 g) = 3.61 W/kg; SAR(10 g) = 1.84 W/kg
Maximum value of SAR (measured) = 4.03 W/kg



0 dB = 4.13 W/kg = 6.16 dBW/kg

■ Verification Data (1 800 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 21.6 °C
Test Date: Oct. 13, 2015

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2

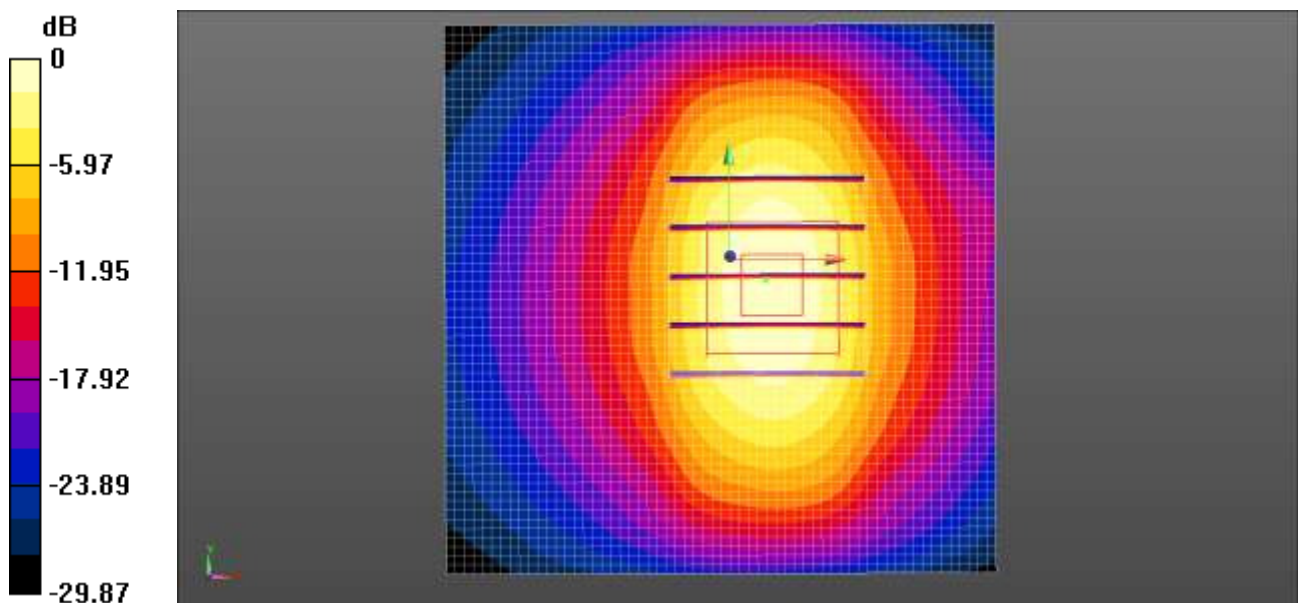
Communication System: UID 0, CW (0); Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1800$ MHz; $\sigma = 1.505$ S/m; $\epsilon_r = 55.06$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.73, 7.73, 7.73); Calibrated: 2015-08-27;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom
- Measurement SW: DASY52, Version 52.8 (8);

1800MHz Body Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 4.46 W/kg

1800MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 42.85 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 6.93 W/kg
SAR(1 g) = 3.82 W/kg; SAR(10 g) = 1.99 W/kg
Maximum value of SAR (measured) = 4.29 W/kg



0 dB = 4.46 W/kg = 6.50 dBW/kg

■ Verification Data (1 800 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.1 °C
Test Date: Apr. 08, 2015

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2

Communication System: UID 0, CW; Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1800 \text{ MHz}$; $\sigma = 1.391 \text{ S/m}$; $\epsilon_r = 39.663$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(8.38, 8.38, 8.38); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: SAM with CRP v5.0_Front_20120517
- Measurement SW: DASY52, Version 52.8 (0);

Verification 1800MHz Head/Area Scan (61x61x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 4.12 W/kg

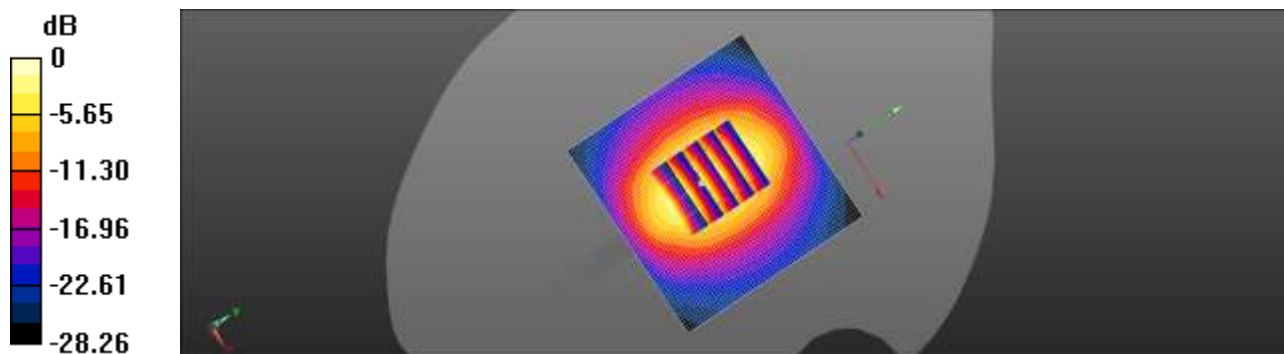
Verification 1800MHz Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$

Reference Value = 52.69 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 7.54 W/kg

SAR(1 g) = 3.66 W/kg; SAR(10 g) = 1.8 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 4.01 W/kg



0 dB = 4.12 W/kg = 6.15 dBW/kg

■ Verification Data (1 800 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.1 °C
Test Date: Apr. 08, 2015

DUT: Dipole 1800 MHz D1800V2; Type: D1800V2

Communication System: UID 0, CW (0); Frequency: 1800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1800$ MHz; $\sigma = 1.506$ S/m; $\epsilon_r = 55.06$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.8, 7.8, 7.8); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: Triple Flat Phantom 5.1C_2014_01_17
- Measurement SW: DASY52, Version 52.8 (8);

Verification 1800MHz/Area Scan (61x61x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 4.40 W/kg

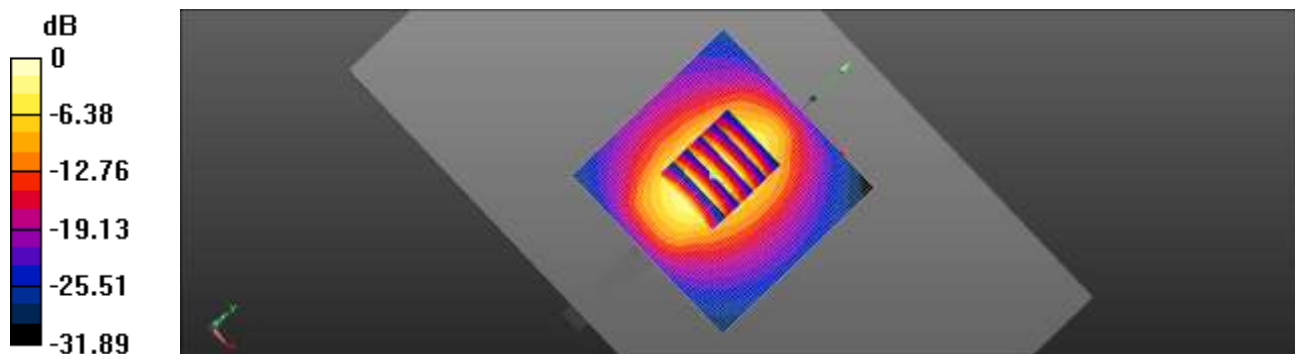
Verification 1800MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 50.20 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 7.41 W/kg

SAR(1 g) = 3.95 W/kg; SAR(10 g) = 1.99 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 4.40 W/kg



0 dB = 4.40 W/kg = 6.43 dBW/kg

■ Verification Data (1 900 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 21.8 °C
Test Date: Apr. 06, 2015

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

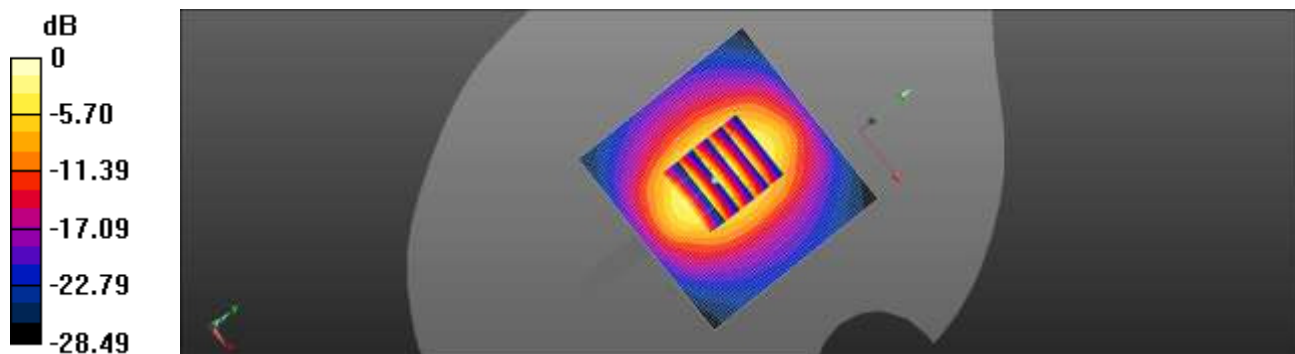
Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900 \text{ MHz}$; $\sigma = 1.387 \text{ S/m}$; $\epsilon_r = 38.946$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(8.02, 8.02, 8.02); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: SAM with CRP v5.0_Front_20120517
- Measurement SW: DASY52, Version 52.8 (0);

Verification 1900MHz Head/Area Scan (61x61x1): Interpolated grid: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$
Maximum value of SAR (interpolated) = 4.73 W/kg

Verification 1900MHz Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8\text{mm}$, $dy=8\text{mm}$, $dz=5\text{mm}$
Reference Value = 56.44 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 8.61 W/kg
SAR(1 g) = 4.17 W/kg; SAR(10 g) = 2.05 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 4.58 W/kg



0 dB = 4.73 W/kg = 6.75 dBW/kg

■ Verification Data (1 900 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.1 °C
Test Date: Apr. 10, 2015

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900$ MHz; $\sigma = 1.475$ S/m; $\epsilon_r = 52.492$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1631; ConvF(4.67, 4.67, 4.67); Calibrated: 2015-01-28;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn652; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C-2014-02-21
- Measurement SW: DASY52, Version 52.8 (0);

Verification 1900MHz/Area Scan (61x61x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 4.51 W/kg

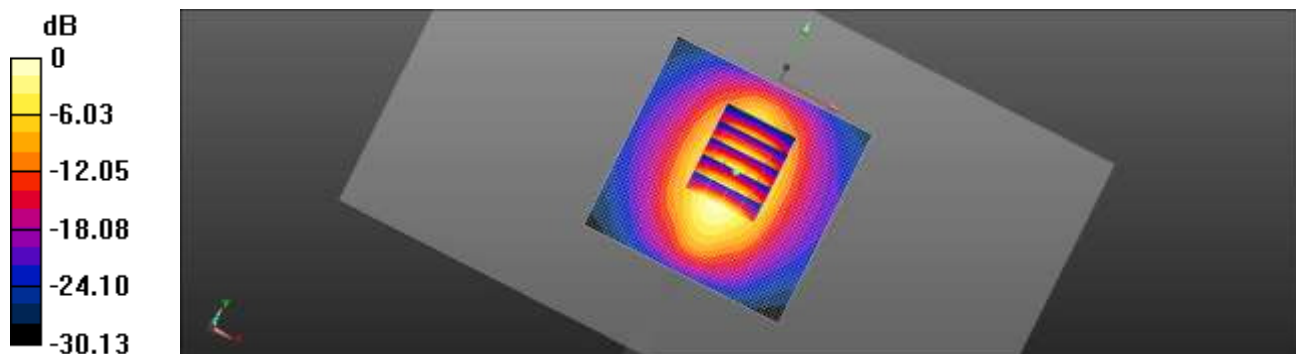
Verification 1900MHz/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 59.12 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 6.30 W/kg

SAR(1 g) = 3.94 W/kg; SAR(10 g) = 2.11 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 4.32 W/kg



0 dB = 4.51 W/kg = 6.54 dBW/kg

■ Verification Data (1 900 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 21.8 °C
Test Date: Apr. 06, 2015

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 1900$ MHz; $\sigma = 1.472$ S/m; $\epsilon_r = 52.305$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3863; ConvF(7.36, 7.36, 7.36); Calibrated: 2014-07-24;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn466; Calibrated: 2015-02-24
- Phantom: Triple Flat Phantom 5.1C_2014_01_17
- Measurement SW: DASY52, Version 52.8 (8);

Verification 1900MHz Body/Area Scan (61x61x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 4.52 W/kg

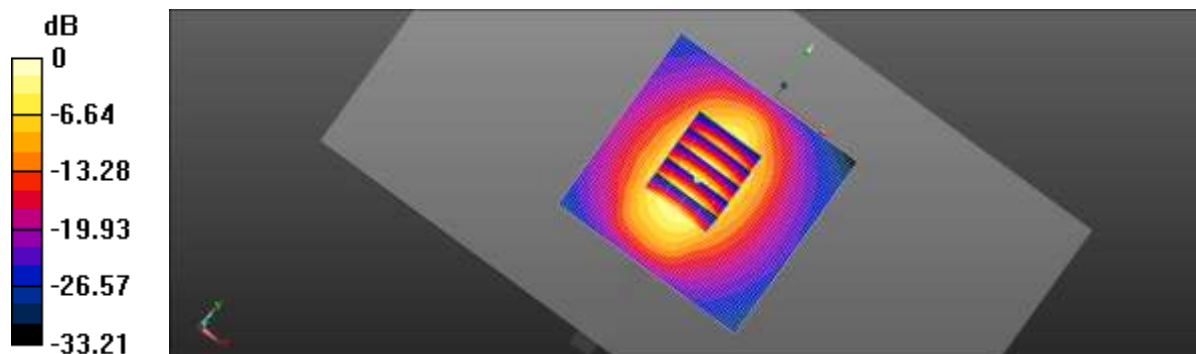
Verification 1900MHz Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 52.23 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 7.44 W/kg

SAR(1 g) = 4.02 W/kg; SAR(10 g) = 2.03 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 4.48 W/kg



0 dB = 4.52 W/kg = 6.55 dBW/kg

■ Verification Data (2 450 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 21.3 °C
Test Date: Mar. 31, 2015

DUT: Dipole 2450 MHz; Type: D2450V2

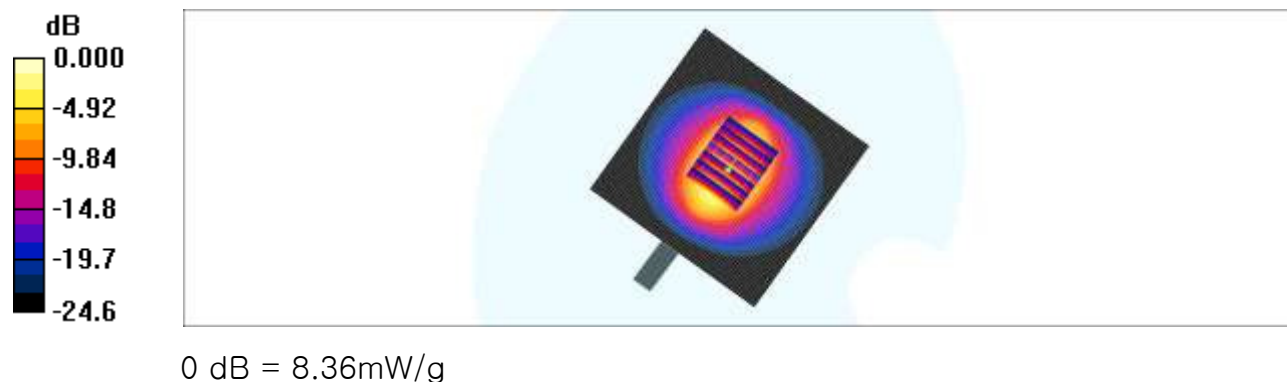
Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2450$ MHz; $\sigma = 1.81$ mho/m; $\epsilon_r = 39.4$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3967; ConvF(7.16, 7.16, 7.16); Calibrated: 2014-12-22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2014-04-23
- Phantom: 835/900 Phantom ; Type: SAM
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

Verification 2450MHz/Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 8.35 mW/g

Verification 2450MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.8 V/m; Power Drift = -0.011 dB
Peak SAR (extrapolated) = 11.8 W/kg
SAR(1 g) = 5.27 mW/g; SAR(10 g) = 2.34 mW/g
Maximum value of SAR (measured) = 8.36 mW/g



■ Verification Data (2 450 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 21.8 °C
Test Date: Mar. 31, 2015

DUT: Dipole 2450 MHz; Type: D2450V2

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2450$ MHz; $\sigma = 1.94$ mho/m; $\epsilon_r = 52.6$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3967; ConvF(7.1, 7.1, 7.1); Calibrated: 2014-12-22
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2014-04-23
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

Verification 2450MHz body/Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 7.77 mW/g

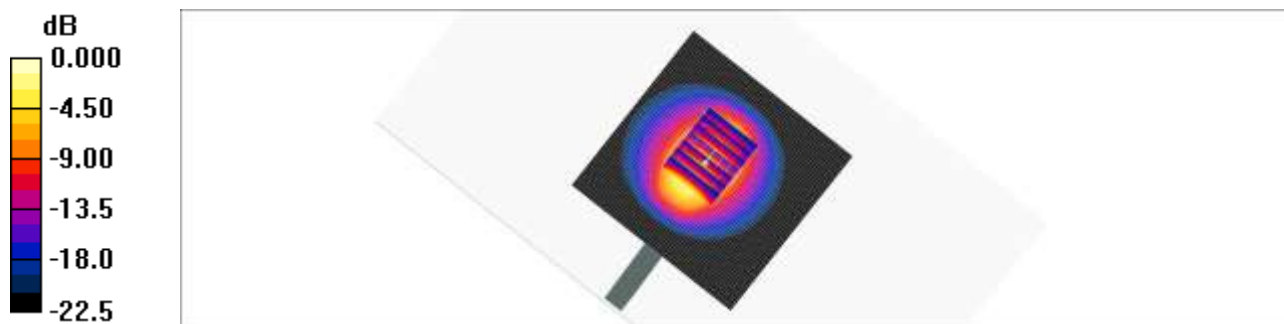
Verification 2450MHz body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 48.9 V/m; Power Drift = 0.001 dB

Peak SAR (extrapolated) = 10.4 W/kg

SAR(1 g) = 5.03 mW/g; SAR(10 g) = 2.32 mW/g

Maximum value of SAR (measured) = 7.71 mW/g



0 dB = 7.71mW/g

■ Verification Data (2 600 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.0 °C
Test Date: Apr. 09, 2015

DUT: Dipole 2600 MHz D2600V2; Type: D2600V2

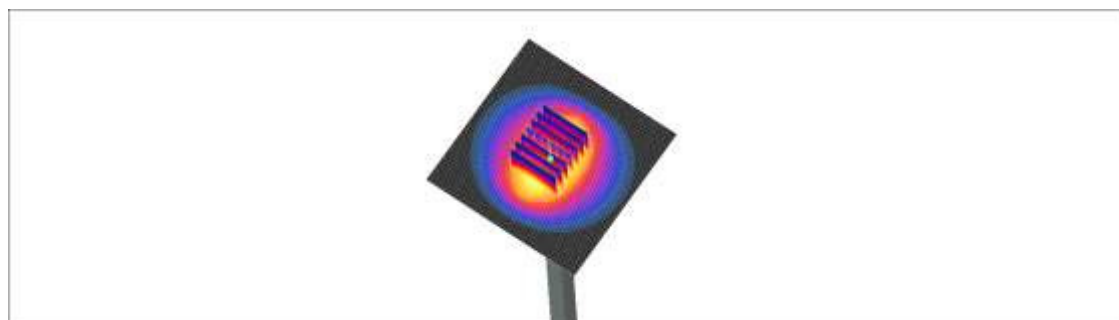
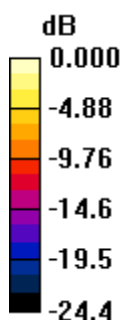
Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2600$ MHz; $\sigma = 1.9$ mho/m; $\epsilon_r = 38.3$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.7, 6.7, 6.7); Calibrated: 2014-11-19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2014-09-18
- Phantom: SAM 1800/1900 MHz; Type: SAM
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

Verification 2600MHz MHz/Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 9.07 mW/g

Verification 2600MHz MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.7 V/m; Power Drift = -0.029 dB
Peak SAR (extrapolated) = 12.8 W/kg
SAR(1 g) = 5.72 mW/g; SAR(10 g) = 2.55 mW/g
Maximum value of SAR (measured) = 9.05 mW/g



0 dB = 9.05mW/g

■ Verification Data (2 600 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.1 °C
Test Date: Apr. 10, 2015

DUT: Dipole 2600 MHz; Type: D2600V2

Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 2600 \text{ MHz}$; $\sigma = 2.11 \text{ mho/m}$; $\epsilon_r = 52.6$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3797; ConvF(6.68, 6.68, 6.68); Calibrated: 2014-11-19
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn869; Calibrated: 2014-09-18
- Phantom: Triple Flat Phantom 5.1C; Type: QD 000 P51 CA
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

Verification 2600MHz/Area Scan (81x81x1): Measurement grid: $dx=12\text{mm}$, $dy=12\text{mm}$
Maximum value of SAR (interpolated) = 9.06 mW/g

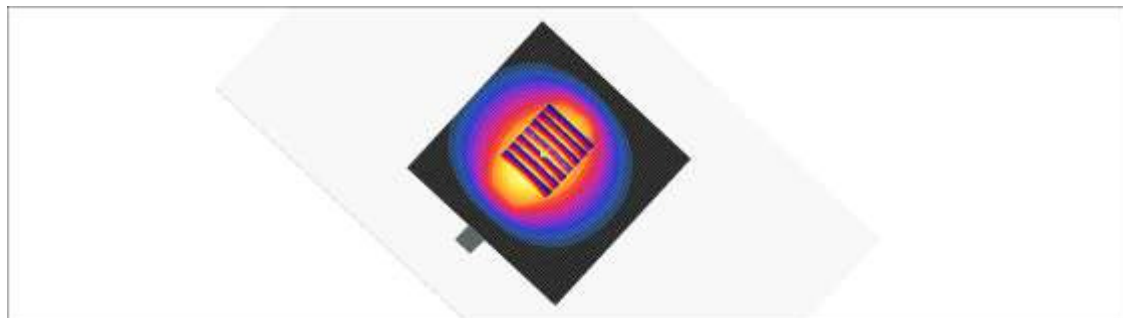
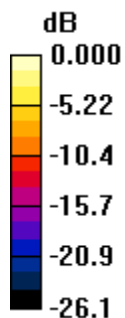
Verification 2600MHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 50.1 V/m; Power Drift = 0.020 dB

Peak SAR (extrapolated) = 13.3 W/kg

SAR(1 g) = 5.62 mW/g; SAR(10 g) = 2.41 mW/g

Maximum value of SAR (measured) = 9.11 mW/g



0 dB = 9.11mW/g

■ Verification Data (5 300 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.0 °C
Test Date: Apr. 01, 2015

DUT: Dipole D5GHzV2; Type: D5GHzV2

Communication System: UID 0, CW (0); Frequency: 5300 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5300 \text{ MHz}$; $\sigma = 4.638 \text{ S/m}$; $\epsilon_r = 36.47$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3967; ConvF(4.88, 4.88, 4.88); Calibrated: 2014-12-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2014-04-23
- Phantom: SAM (20deg probe tilt) with CRP v5.0_Right_2014_02_25
- Measurement SW: DASY52, Version 52.8 (8);

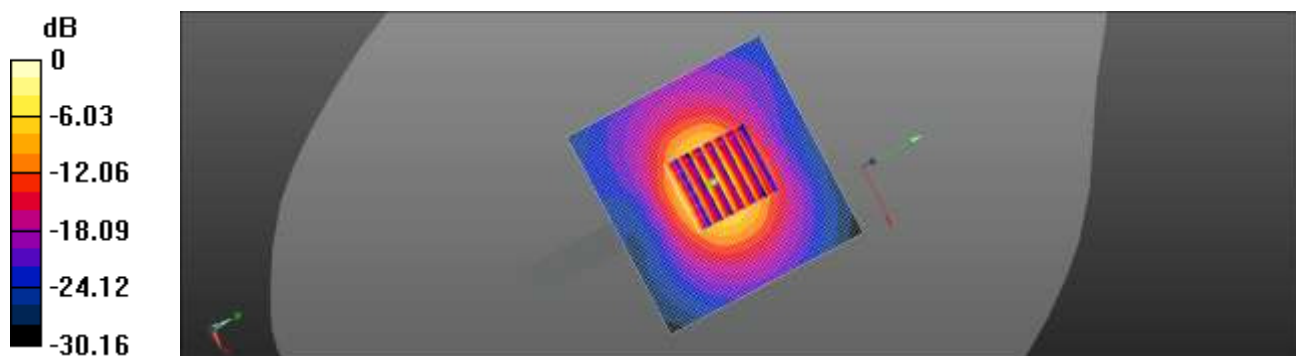
Verification 5.3GHz Head/Area Scan (71x71x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$
Maximum value of SAR (interpolated) = 20.5 W/kg

Verification 5.3GHz Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$
Reference Value = 73.25 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 35.5 W/kg

SAR(1 g) = 8.16 W/kg; SAR(10 g) = 2.31 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 21.2 W/kg



0 dB = 20.5 W/kg = 13.13 dBW/kg

■ Verification Data (5 300 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.1 °C
Test Date: Apr. 02, 2015

DUT: Dipole D5GHzV2; Type: D5GHzV2

Communication System: UID 0, CW (0); Frequency: 5300 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5300$ MHz; $\sigma = 5.321$ S/m; $\epsilon_r = 47.948$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(4.53, 4.53, 4.53); Calibrated: 2014-08-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: Triple Flat Phantom 5.1C-2014-02-21
- Measurement SW: DASY52, Version 52.8 (8);

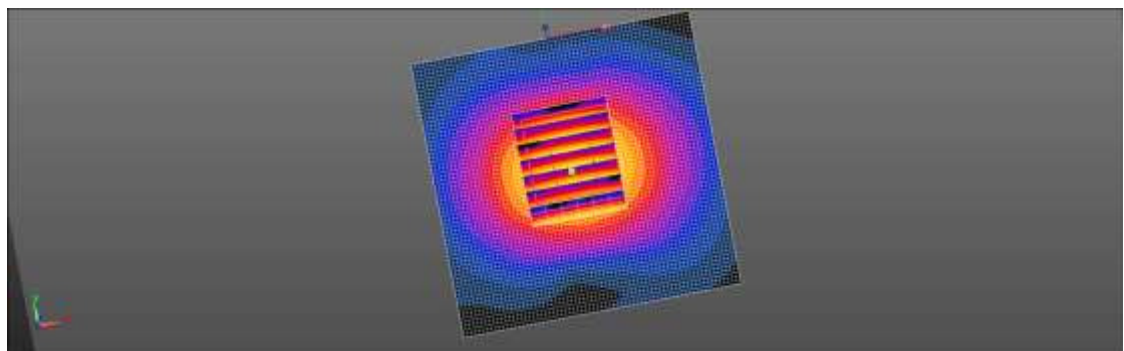
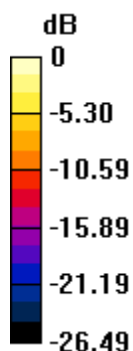
Verification 5.3GHz Body/Area Scan (71x71x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 17.4 W/kg

Verification 5.3GHz Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm
Reference Value = 65.51 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 30.0 W/kg

SAR(1 g) = 7.06 W/kg; SAR(10 g) = 1.98 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 18.3 W/kg



0 dB = 17.4 W/kg = 12.40 dBW/kg

■ Verification Data (5 600 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.0 °C
Test Date: Apr. 01, 2015

DUT: Dipole D5GHzV2; Type: D5GHzV2

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5600$ MHz; $\sigma = 5.003$ S/m; $\epsilon_r = 35.761$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3967; ConvF(4.7, 4.7, 4.7); Calibrated: 2014-12-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2014-04-23
- Phantom: SAM (20deg probe tilt) with CRP v5.0_Right_2014_02_25
- Measurement SW: DASY52, Version 52.8 (8);

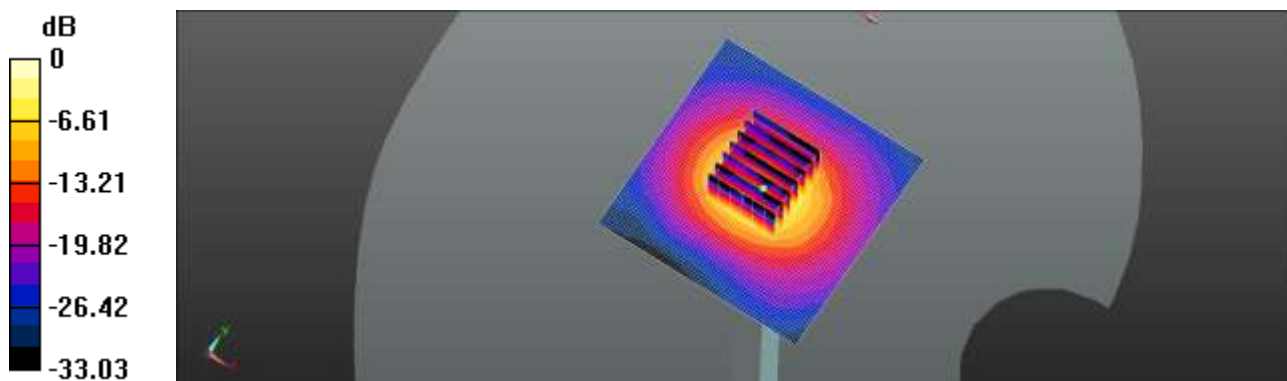
Verification 5.6GHz/Area Scan (71x71x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 20.8 W/kg

Verification 5.6GHz/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm
Reference Value = 72.98 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 37.3 W/kg

SAR(1 g) = 8.11 W/kg; SAR(10 g) = 2.29 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 21.6 W/kg



0 dB = 20.8 W/kg = 13.18 dBW/kg

■ Verification Data (5 600 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.1 °C
Test Date: Apr. 02, 2015

DUT: Dipole D5GHzV2; Type: D5GHzV2

Communication System: UID 0, CW (0); Frequency: 5600 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5600$ MHz; $\sigma = 5.813$ S/m; $\epsilon_r = 47.127$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(4.01, 4.01, 4.01); Calibrated: 2014-08-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: Triple Flat Phantom 5.1C-2014-02-21
- Measurement SW: DASY52, Version 52.8 (8);

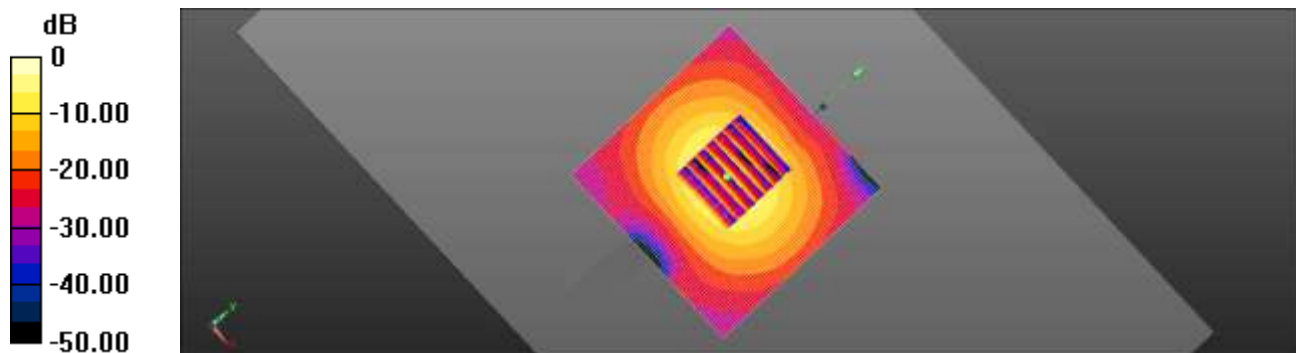
Verification 5.6GHz Body/Area Scan (71x71x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 17.8 W/kg

Verification 5.6GHz Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm
Reference Value = 65.75 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 32.7 W/kg

SAR(1 g) = 7.36 W/kg; SAR(10 g) = 2.07 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 19.5 W/kg



0 dB = 17.8 W/kg = 12.50 dBW/kg

■ Verification Data (5 800 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.0 °C
Test Date: Apr. 01, 2015

DUT: Dipole D5GHzV2; Type: D5GHzV2

Communication System: UID 0, CW (0); Frequency: 5800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5800 \text{ MHz}$; $\sigma = 5.254 \text{ S/m}$; $\epsilon_r = 35.179$; $\rho = 1000 \text{ kg/m}^3$
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3967; ConvF(4.64, 4.64, 4.64); Calibrated: 2014-12-22;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn648; Calibrated: 2014-04-23
- Phantom: SAM (20deg probe tilt) with CRP v5.0_Right_2014_02_25
- Measurement SW: DASY52, Version 52.8 (8);

Verification 5.8GHz Head/Area Scan (71x71x1): Interpolated grid: $dx=1.000 \text{ mm}$, $dy=1.000 \text{ mm}$
Maximum value of SAR (interpolated) = 20.3 W/kg

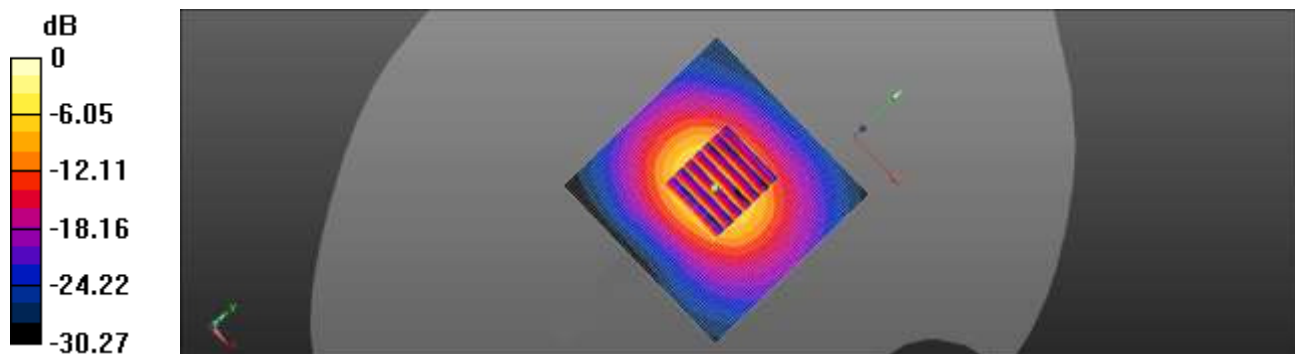
Verification 5.8GHz Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4\text{mm}$, $dy=4\text{mm}$, $dz=1.4\text{mm}$

Reference Value = 70.73 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 39.2 W/kg

SAR(1 g) = 7.9 W/kg; SAR(10 g) = 2.23 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 21.6 W/kg



0 dB = 20.3 W/kg = 13.08 dBW/kg

■ Verification Data (5 800 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power: 100 mW (20 dBm)
Liquid Temp: 22.1 °C
Test Date: Apr. 02, 2015

DUT: Dipole D5GHzV2; Type: D5GHzV2

Communication System: UID 0, CW (0); Frequency: 5800 MHz; Duty Cycle: 1:1
Medium parameters used: $f = 5800$ MHz; $\sigma = 6.141$ S/m; $\epsilon_r = 46.632$; $\rho = 1000$ kg/m³
Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(4.29, 4.29, 4.29); Calibrated: 2014-08-28;
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: Triple Flat Phantom 5.1C-2014-02-21
- Measurement SW: DASY52, Version 52.8 (8);

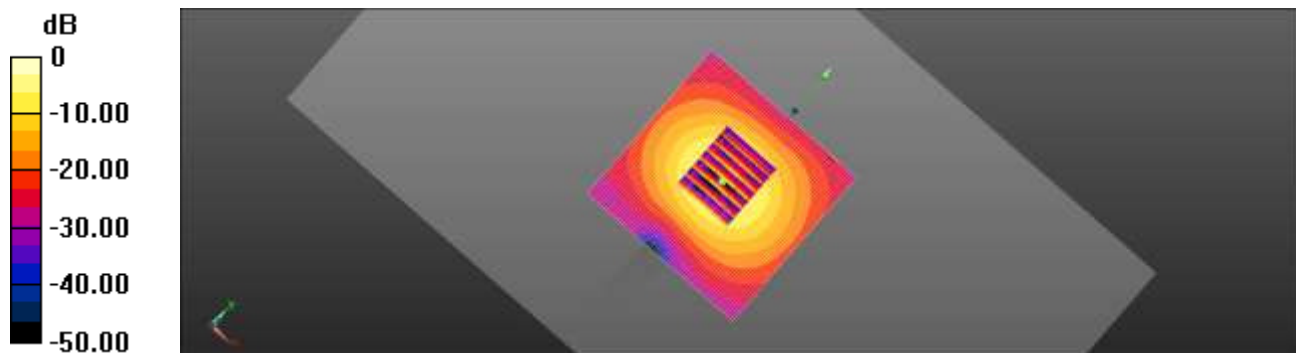
Verification 5.8GHz Body/Area Scan (71x71x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm
Maximum value of SAR (interpolated) = 17.8 W/kg

Verification 5.8GHz Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=4$ mm, $dy=4$ mm, $dz=1.4$ mm
Reference Value = 63.70 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 33.8 W/kg

SAR(1 g) = 7.15 W/kg; SAR(10 g) = 2.02 W/kg (SAR corrected for target medium)

Maximum value of SAR (measured) = 19.3 W/kg



0 dB = 17.8 W/kg = 12.50 dBW/kg