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SAR TEST REPORT

LG Electronics, MobileComm U.S.A., Inc. 1000 Sylvan Avenue, Englewood Cliffs NJ 07632	**Date of Issue: Jun 23, 2015** **Test Report No.: HCT-A-1506-F011** **Test Site: HCT CO., LTD.**

FCC ID: ZNFH736P

Equipment Type:	**Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC**
Model Name:	**LG-H736P**
Additional Model Name:	**LGH736P, LG-H735P, LGH735P, LG-H735MT, LGH735MT, LG-H735AR, LGH735AR**
Testing has been carried out in accordance with:	**47CFR §2.1093** **ANSI/ IEEE C95.1 – 1992** **IEEE 1528-2003**
Date of Test:	**May 12, 2015 ~ May 22, 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;	**Reviewer**
Hee-Woo Noh **Test Engineer / SAR Team** **Certification Division**	**Dong-Seob Kim** **Technical Manager / SAR Team** **Certification Division**

Revision History

Rev.	Issue DATE	DESCRIPTION
HCT-A-1506-F011	Jun. 23, 2015	Initial Issue

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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 (d*W*) absorbed by (dissipated in) an incremental mass (d*m*) contained in a volume element (d*V*) of a given density (*r*). 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/m^3)

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 Hotspot SAR v02
- FCC KDB Publication 941225 D05 SAR for LTE Devices v02r03
- FCC KDB Publication 248227 D01 802.11 Wi-Fi SAR v02
- 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 v01r03
- 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 and LTE Phone with Bluetooth, Wi-Fi and NFC				
FCC ID:	ZNFH736P				
Model:	LG-H736P				
Additional Model Name::	LGH736P, LG-H735P, LGH735P, LG-H735MT, LGH735MT, LG-H735AR, LGH735AR				
Trade Name:	LG Electronics, MobileComm U.S.A., Inc.				
Application Type:	Certification				
Production Unit or Identical Prototype:		Prototype			
Band& Mode	Tx. Frequency (MHz)	Equipment Class	Reported 1g SAR (W/Kg)		
			Head	Body-Worn	Hotspot
GSM/GPRS /EDGE 850	824.2 - 848.8	PCE	0.36	0.40	0.37
GSM/GPRS/ EDGE 1900	1 850.2 -1 909.8	PCE	0.36	0.24	0.30
WCDMA 850	826.4 - 846.6	PCE	0.29	0.36	0.36
WCDMA 1900	1 852.4 – 1 907.6	PCE	0.96	0.65	0.68
LTE 2	1 850.7 ~ 1 909.3	PCE	1.03	0.75	0.99
LTE 4	1 710.7 – 1 754.3	PCE	0.70	0.68	0.68
LTE 7	2 502.5 – 2 567.5	PCE	0.34	0.54	0.54
LTE 17	706.5 ~ 713.5	PCE	0.25	0.36	0.36
2.4 GHz WLAN	2 412.0 - 2 462.0	DTS	0.65	0.13	0.14
Bluetooth	2 402 – 2 480	DSS/DTS	-	0.23*	-
Simultaneous SAR per KDB 690783 D01v01r03			1.35	0.98	1.12
Date(s) of Tests:	May 12, 2015 ~ May 22, 2015				
Antenna Type:	Integral Antenna				
GPRS/EGPRS:	Multi-slot Class 33, Mode Class B				
Key Feature(s)	BT 4.0(LE) ,WIFI Hotspot, NFC				

* 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.

3.1 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 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 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 7

5 MHz		10 MHz		15 MHz		20 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
21100	2 535.0	21100	2 535	21100	2 535.0	21100	2 535
21425	2 567.5	21400	2 565	21375	2 562.5	21350	2 560

Band 17

5 MHz		10 MHz	
Ch.	Freq. (MHz)	Ch.	Freq. (MHz)
23755	706.5	23780	709
23790	710	23790	710
23825	713.5	23800	711

Item.	Description
UE Category & Uplink Modulation	UE Category 3, QPSK, 16QAM
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, WCDMA850/1900, LTE Band 2, LTE Band 4, 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.

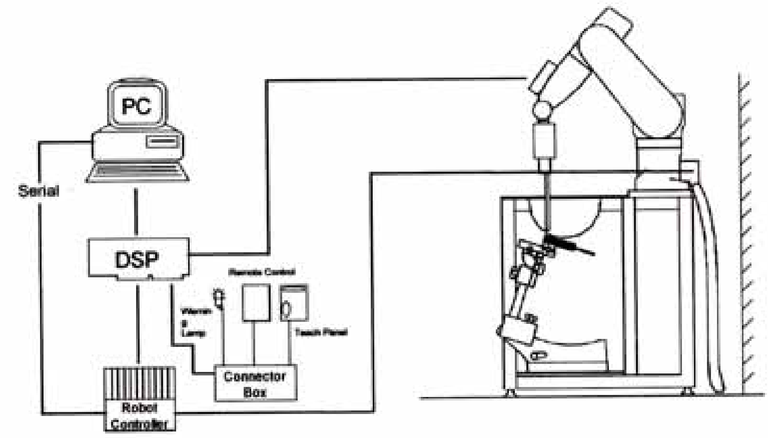

Figure 2. HCT SAR Lab. Test Measurement Set-up

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 μW/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

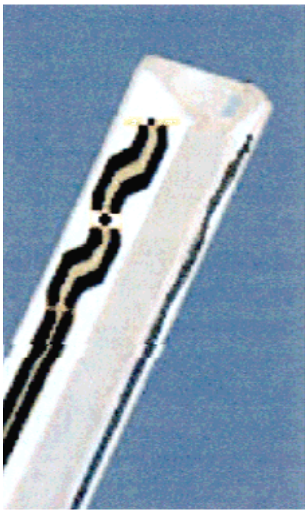

Figure 4. ET3DV6 E-field Probe

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 6 GHz; Linearity: ± 0.2 dB (30 MHz to 6 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 μW/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

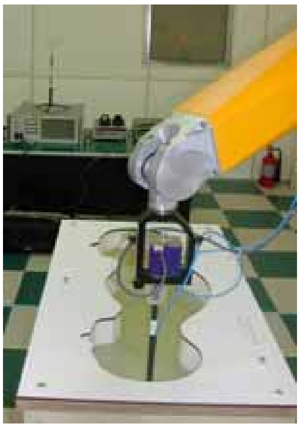

Figure 5. Photograph of the probe and the Phantom

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 ± 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 bellow 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)

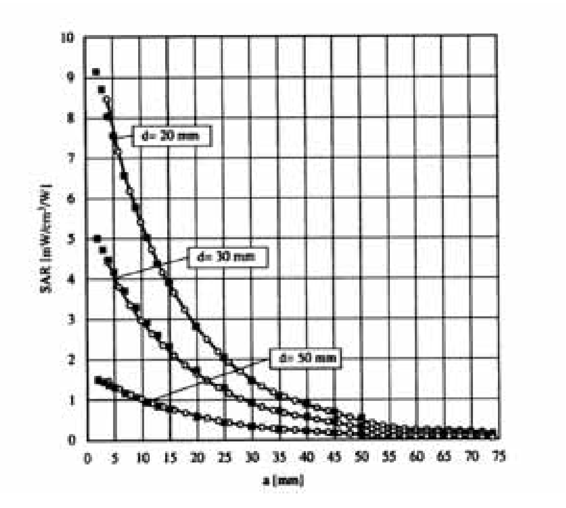

Figure 7. E-Field and Temperature measurements at 900 MHz

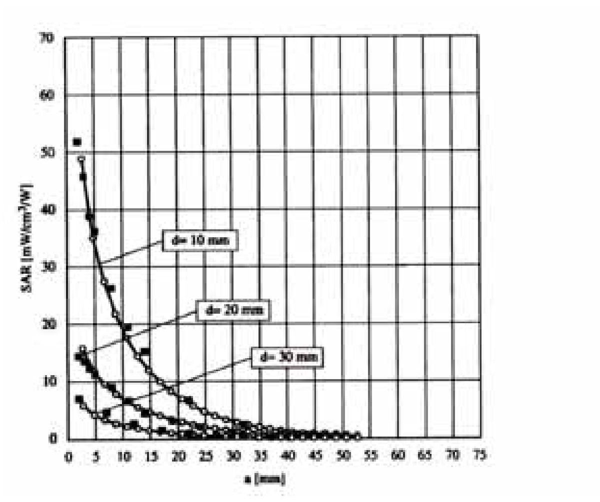

Figure 8. E-Field and temperature measurements at 1.8 GHz

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;

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

with

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

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

E-field probes:

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

with

V_i = compensated signal of channel i (i=x,y,z)
$Norm_i$ = sensor sensitivity of channel i (i=x,y,z) $\mu V/(V/m)^2$ for E-field probes
$ConvF$ = sensitivity of enhancement in solution
E_i = electric field strength of channel i in V/m

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.

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

with

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

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

$$P_{pwe} = \frac{E_{tot}^2}{3770}$$

with

P_{pwe} = equivalent power density of a plane wave in w/cm^2
E_{tot} = total electric field strength in V/m

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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 ± 0.2 mm (6 ± 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 tree 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 ± 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 repeatable 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 produced 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 mach 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	446	Jan. 21, 2015	Annual	Jan. 21, 2016
SPEAG	DAE4	1417	Jan. 27, 2015	Annual	Jan. 27, 2016
SPEAG	DAE4	1225	Mar. 18, 2015	Annual	Mar. 18, 2016
SPEAG	E-Field Probe ET3DV6	1605	Apr. 27, 2015	Annual	Apr. 27, 2016
SPEAG	E-Field Probe ET3DV6	1609	Jan. 27, 2015	Annual	Jan. 27, 2016
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
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	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.

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.

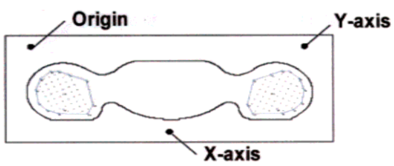


Figure 12. SAR Measurement Point in Area Scan

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 hightest E-field value to determine the averaged SASR-distribution over 10g.
Area scan and zoom scan resolution setting follow KDB 865664 D01v01r03 quoted below

<table>
<tr><td colspan="3"></td><td>$\leq$ 3 GHz</td><td>> 3 GHz</td></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>$\leq$ 2 GHz: $\leq$ 15 mm
2 – 3 GHz: $\leq$ 12 mm</td><td>3 – 4 GHz: $\leq$ 12 mm
4 – 6 GHz: $\leq$ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be $\leq$ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>$\leq$ 2 GHz: $\leq$ 8 mm
2 – 3 GHz: $\leq$ 5 mm*</td><td>3 – 4 GHz: $\leq$ 5 mm*
4 – 6 GHz: $\leq$ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>$\leq$ 5 mm</td><td>3 – 4 GHz: $\leq$ 4 mm
4 – 5 GHz: $\leq$ 3 mm
5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>$\leq$ 4 mm</td><td>3 – 4 GHz: $\leq$ 3 mm
4 – 5 GHz: $\leq$ 2.5 mm
5 – 6 GHz: $\leq$ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>$\geq$ 30 mm</td><td>3 – 4 GHz: $\geq$ 28 mm
4 – 5 GHz: $\geq$ 25 mm
5 – 6 GHz: $\geq$ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is $\leq$ 1.4 W/kg, $\leq$ 8 mm, $\leq$ 7 mm and $\leq$ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

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 15º or until the device antenna touch the phantom. Please refer to IEEE 1528-2003 illustration below.

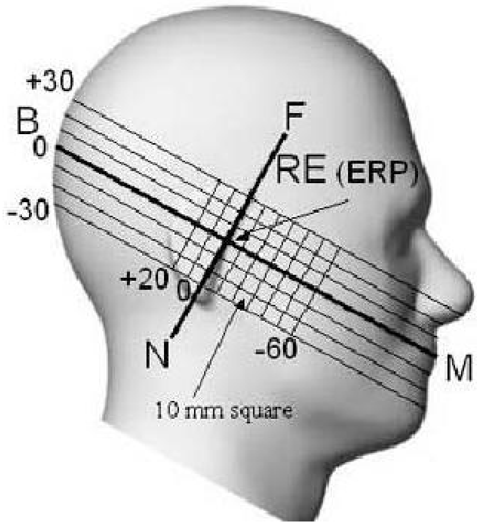


Figure 13. Side view of the phantom

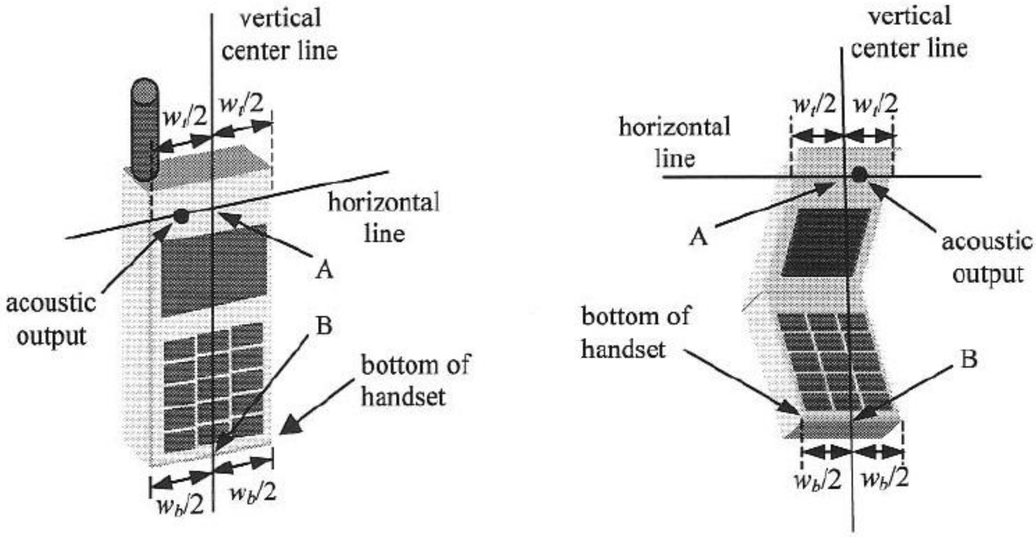


Figure 14. Handset vertical and horizontal reference lines

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.

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 Permitivity(target)	5.00	R	1.73	0.6	1.73	∞
Liquid Permitivity(meas.)	5.02	N	1	0.6	1.50	9
Combind Standard Uncertainty					10.85	
Coverage Factor for 95 %					k=2	
Expanded STD Uncertainty					21.70	

Table 7.1 Uncertainty (750 MHz- 2 600 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	Date	Dielectric Parameters		CW Validation			Modulation Validation		
							Measured Permittivity	Measured Conductivity	Sensitivity	Probe Linearity	Probe Isotropy	MOD. Type	Duty Factor	PAR
4	1605	ET3DV6	Head	750	1014	May 11,2015	42.1	0.9	PASS	PASS	PASS	N/A	N/A	N/A
4	1605	ET3DV6	Body	750	1014	May 11,2015	55.7	0.98	PASS	PASS	PASS	N/A	N/A	N/A
2	1609	ET3DV6	Head	835	441	Feb. 06,2015	41.6	0.89	PASS	PASS	PASS	GMSK	PASS	N/A
2	1609	ET3DV6	Body	835	441	Feb. 06,2015	55.4	0.97	PASS	PASS	PASS	GMSK	PASS	N/A
4	1605	ET3DV6	Head	1800	2d007	May 11,2015	40.2	1.41	PASS	PASS	PASS	N/A	N/A	N/A
4	1605	ET3DV6	Body	1800	2d007	May 11,2015	53.1	1.54	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Head	1900	5d061	Sep.11,2014	39.8	1.4	PASS	PASS	PASS	GMSK	PASS	N/A
2	1609	ET3DV6	Body	1900	5d061	Feb.06,2015	52.1	1.52	PASS	PASS	PASS	GMSK	PASS	N/A
5	3903	EX3DV4	Head	1900	5d061	Sep.11,2014	39.8	1.4	PASS	PASS	PASS	NA	N/A	NA
2	1609	ET3DV6	Body	1900	5d061	Feb. 06,2015	52.1	1.52	PASS	PASS	PASS	N/A	N/A	N/A
5	3903	EX3DV4	Head	2450	743	Sep.11,2014	38.2	1.79	PASS	PASS	PASS	OFDM	N/A	PASS
5	3903	EX3DV4	Body	2450	743	Sep.12,2014	53.2	1.95	PASS	PASS	PASS	OFDM	N/A	PASS
5	3903	EX3DV4	Head	2600	1015	Mar.24,2015	39.2	1.98	PASS	PASS	PASS	NA	N/A	NA
5	3903	EX3DV4	Body	2600	1015	Mar.24,2015	52.7	2.14	PASS	PASS	PASS	NA	N/A	NA

Note;

All measurement were performed using probes calibrated for CW signal only. Modulations in the table bove 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]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
700	May 14, 2015	1605	1014	Head	20.2	ε r	42.200	43.5	+ 3.08	± 5
						σ	0.889	0.865	- 2.70	± 5
725						ε r	42.071	43.23	+ 2.75	± 5
						σ	0.891	0.887	- 0.45	± 5
750						ε r	41.940	42.8	+ 2.05	± 5
						σ	0.893	0.909	+ 1.79	± 5
700	May 14, 2015	1605	1014	Body	20.2	ε r	55.730	54.900	- 1.49	± 5
						σ	0.959	0.929	- 3.13	± 5
725						ε r	55.629	54.600	- 1.85	± 5
						σ	0.961	0.953	- 0.83	± 5
750						ε r	55.530	54.4	- 2.03	± 5
						σ	0.963	0.974	+ 1.14	± 5
820	May 12, 2015	1609	441	Head	19.6	ε r	41.578	42.800	+ 2.94	± 5
						σ	0.899	0.883	- 1.78	± 5
835						ε r	41.5	42.6	+ 2.65	± 5
						σ	0.90	0.903	+ 0.33	± 5
850						ε r	41.500	42.400	+ 2.17	± 5
						σ	0.916	0.918	+ 0.22	± 5
820	May 13, 2015	1609	441	Body	19.8	ε r	55.258	54.300	- 1.73	± 5
						σ	0.969	0.965	- 0.41	± 5
835						ε r	55.2	54.3	- 1.63	± 5
						σ	0.97	0.976	+ 0.62	± 5
850						ε r	55.154	54.200	- 1.73	± 5
						σ	0.988	0.987	- 0.10	± 5
1 710	May 15, 2015	1605	2d007	Head	19.7	ε r	40.142	40.300	+ 0.39	± 5
						σ	1.348	1.340	- 0.59	± 5
1 750						ε r	40.079	40.100	+ 0.05	± 5
						σ	1.371	1.370	- 0.07	± 5
1 800						ε r	40.0	39.9	- 0.25	± 5
						σ	1.40	1.43	+ 2.14	± 5
1 710	May 15, 2015	1605	2d007	Body	19.7	ε r	53.537	52.800	- 1.38	± 5
						σ	1.463	1.460	- 0.21	± 5
1 750						ε r	53.432	52.700	- 1.37	± 5
						σ	1.488	1.490	+ 0.13	± 5
1 800						ε r	53.3	52.5	- 1.50	± 5
						σ	1.52	1.54	+ 1.32	± 5

Freq. [MHz]	Date	Probe	Dipole	Liquid	Liquid Temp. [°C]	Parameters	Target Value	Measured Value	Deviation [%]	Limit [%]
1850	May 18, 2015	3903	5d061	Head	21.6	ε r	40.000	39.047	- 2.38	± 5
						σ	1.400	1.387	- 0.93	± 5
1 900						ε r	40.0	38.867	- 2.83	± 5
						σ	1.40	1.437	+ 2.64	± 5
1910						ε r	40.000	38.837	- 2.91	± 5
						σ	1.400	1.447	+ 3.36	± 5
1850	May 19, 2015	1609	5d061	Body	22.0	ε r	53.300	52.491	- 1.52	± 5
						σ	1.520	1.454	- 4.34	± 5
1 900						ε r	53.3	52.303	- 1.87	± 5
						σ	1.52	1.505	- 0.99	± 5
1910						ε r	53.300	52.254	- 1.96	± 5
						σ	1.520	1.514	- 0.39	± 5
1850	May 20, 2015	3903	5d061	Head	21.7	ε r	40.000	39.067	- 2.33	± 5
						σ	1.400	1.388	- 0.86	± 5
1 900						ε r	40.0	38.877	- 2.81	± 5
						σ	1.40	1.438	+ 2.71	± 5
1910						ε r	40.000	38.823	- 2.94	± 5
						σ	1.400	1.446	+ 3.29	± 5
1850	May 20, 2015	1609	5d061	Body	21.7	ε r	53.300	53.481	+ 0.34	± 5
						σ	1.520	1.455	- 4.28	± 5
1 900						ε r	53.3	53.291	- 0.02	± 5
						σ	1.52	1.505	- 0.99	± 5
1910						ε r	53.300	53.254	- 0.09	± 5
						σ	1.520	1.514	- 0.39	± 5
2 400	May 21, 2015	3903	743	Head	22.2	ε r	39.290	39.949	+ 1.68	± 5
						σ	1.756	1.754	- 0.11	± 5
2 450						ε r	39.2	39.772	+ 1.46	± 5
						σ	1.80	1.806	+ 0.33	± 5
2 500						ε r	39.140	39.654	+ 1.31	± 5
						σ	1.855	1.864	+ 0.49	± 5
2 400	May 22, 2015	3903	743	Body	20.0	ε r	52.770	52.900	+ 0.25	± 5
						σ	1.902	1.880	- 1.16	± 5
2 450						ε r	52.7	52.7	+ 0.00	± 5
						σ	1.95	1.94	- 0.51	± 5
2 500						ε r	52.640	52.600	- 0.08	± 5
						σ	2.021	2.000	- 1.04	± 5
2 500	May 21, 2015	3903	1015	Head	22.2	ε r	39.140	39.357	+ 0.55	± 5
						σ	1.855	1.910	+ 2.96	± 5
2 550						ε r	39.070	39.186	+ 0.30	± 5
						σ	1.909	1.965	+ 2.93	± 5
2600						ε r	39.010	39.014	+ 0.01	± 5
						σ	1.964	2.021	+ 2.90	± 5
2 500	May 22, 2015	3903	1015	Body	20.0	ε r	52.640	54.600	+ 3.72	± 5
						σ	2.021	2.070	+ 2.42	± 5
2 550						ε r	52.570	54.500	+ 3.67	± 5
						σ	2.092	2.130	+ 1.82	± 5
2600						ε r	52.510	54.300	+ 3.41	± 5
						σ	2.163	2.200	+ 1.71	± 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 ± 10 % of the specifications at 750 MHz/ 835 MHz / 1800 MHz/ 1 900 MHz / 2 450 MHz / 2 600 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	May 14, 2015	1605	1014	Head	20.4	20.2	8.31	0.861	8.61	+ 3.61	± 10
750	May 14, 2015	1605		Body	20.4	20.2	8.63	0.886	8.86	+ 2.67	± 10
835	May 12, 2015	1609	441	Head	19.8	19.6	9.21	1.00	10.0	+ 8.58	± 10
835	May 13, 2015	1609		Body	20.0	19.8	9.34	0.990	9.9	+ 6.00	± 10
1 800	May 15, 2015	1605	2d007	Head	19.9	19.7	38.3	3.89	38.9	+ 1.57	± 10
1 800	May 15, 2015	1605		Body	19.9	19.7	38.3	3.96	39.6	+ 3.39	± 10
1 900	May 18, 2015	3903	5d061	Head	21.8	21.6	40.6	3.98	39.8	- 1.97	± 10
1 900	May 19, 2015	1609		Body	22.2	22.0	40.8	3.91	39.1	- 4.17	± 10
1 900	May 20, 2015	3903	5d061	Head	21.9	21.7	40.6	3.93	39.3	- 3.20	± 10
1 900	May 20, 2015	1609		Body	21.9	21.7	40.8	3.83	38.3	- 6.13	± 10
2 450	May 21, 2015	3903	743	Head	22.4	22.2	53.2	5.29	52.9	- 0.56	± 10
2 450	May 22, 2015	3903		Body	20.2	20.0	51.3	5.07	50.7	- 1.17	± 10
2 600	May 21, 2015	3903	1015	Head	22.4	22.2	56.5	5.84	58.4	+ 3.36	± 10
2 600	May 22, 2015	3903		Body	20.2	20.0	55.4	5.72	57.2	+ 3.25	± 10

10.3 System Verification Procedure

SAR measurement was prior to assessment, the system is verified to the ± 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 then 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 : 33.2 dBm	Target Power : 29.7 dBm
GPRS850	PCS1900
GPRS 1tx : 33.2 dBm / EGPRS 1tx : 26.2 dBm	GPRS 1tx : 29.7 dBm / EGPRS 1tx : 24.7 dBm
GPRS 2tx : 29.2 dBm / EGPRS 2tx : 23.2 dBm	GPRS 2tx : 25.7 dBm / EGPRS 2tx : 22.7 dBm
GPRS 3tx : 27.2 dBm / EGPRS 3tx : 22.2 dBm	GPRS 3tx : 24.7 dBm / EGPRS 3tx : 20.7 dBm
GPRS 4tx : 26.2 dBm / EGPRS 4tx : 20.2 dBm	GPRS 4tx : 22.7 dBm / EGPRS 4tx : 19.7 dBm
Tune-up Tolerance : -1.5 dB/ +0.5 dB	

WCDMA

WCDMA850	
Target Power : 23.7 dBm	
HSUPA Sub-test 1 :23.0 dBm	HSDPA / DC-HSDPA Sub-test 1 :23.7 dBm
HSUPA Sub-test 2: 21.5 dBm	HSDPA / DC-HSDPA Sub-test 2: 23.7 dBm
HSUPA Sub-test 3: 21.5 dBm	HSDPA / DC-HSDPA Sub-test 3: 23.2 dBm
HSUPA Sub-test 4: 21.5 dBm	HSDPA / DC-HSDPA Sub-test 4: 23.2 dBm
HSUPA Sub-test 5: 23.0 dBm	
WCDMA1900	
Target Power : 23.2 dBm	
HSUPA Sub-test 1: 23.0 dBm	HSDPA / DC-HSDPA Sub-test 2: 23.2 dBm
HSUPA Sub-test 2: 22.0 dBm	HSDPA / DC-HSDPA Sub-test 3: 23.2 dBm
HSUPA Sub-test 3: 22.0 dBm	HSDPA / DC-HSDPA Sub-test 4: 22.7 dBm
HSUPA Sub-test 4: 22.0 dBm	HSDPA / DC-HSDPA Sub-test 5: 22.7 dBm
HSUPA Sub-test 5: 23.0 dBm	
Tune-up Tolerance : -1.5 dB/ +0.5 dB	

* The HSUPA, HSDPA and 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 7	LTE Band 17
Target Power	23.2 dBm	23.7 dBm	23.2 dBm	23.7 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

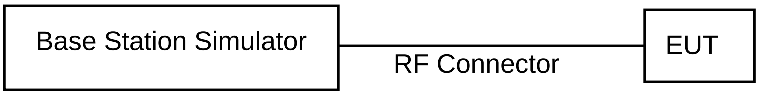
2.4 GHz WIFI	Mode / Band	802.11b	802.11g	802.11n
	Maximum	17.5	12.5	12.5
	Nominal	16.5	11.5	11.5

BT.

Bluetooth (Average Power)	(in dBm)	1Mbps(GFSK)	2Mbps(DPSK)	3Mbps(8DPSK)	LE
	Maximum	10.5	8	8	1
	Nominal	9.5	7	7	0

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	33.00	33.01	29.35	27.64	26.04	26.16	23.64	22.06	20.42
	190	33.08	33.11	29.33	27.61	26.14	26.19	23.67	22.11	20.57
	251	33.10	33.13	29.22	27.68	26.08	26.18	23.63	22.13	20.48
GSM 1900	512	29.93	29.91	25.88	24.41	22.85	24.60	22.11	20.59	19.18
	661	30.18	30.18	26.02	24.49	22.97	24.78	22.21	20.67	19.34
	810	29.94	29.95	25.97	24.44	22.68	24.69	22.18	20.60	19.40

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	23.97	23.98	23.33	23.38	23.03	17.13	17.62	17.80	17.41
	190	24.05	24.08	23.31	23.35	23.13	17.16	17.65	17.85	17.56
	251	24.07	24.10	23.20	23.42	23.07	17.15	17.61	17.87	17.47
GSM 1900	512	20.90	20.88	19.86	20.15	19.84	15.57	16.09	16.33	16.17
	661	21.15	21.15	20.00	20.23	19.96	15.75	16.19	16.41	16.33
	810	20.91	20.92	19.95	20.18	19.67	15.66	16.16	16.34	16.39

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 ≤ 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 ≤ 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	β_{hs} (1)	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 β_c/β_d =12/15, β_{hs}/β_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 β_c = 11/15 and β_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 ≤ 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	β_{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	β_{ed1}: 47/15 β_{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 Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ ⇔ $\beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_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.

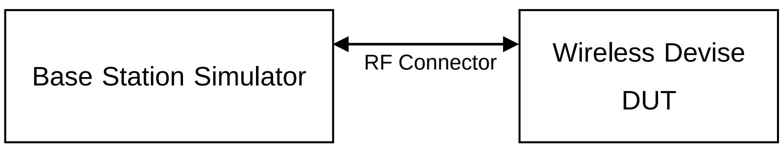
11.3.6 DC-HSDPA

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 Release Version	Mode	3GPP 34.121 Subtest	Cellular Band [dBm]		
			UL 4132 DL 4357	UL 4183 DL 4408	UL 4233 DL 4458
99	WCDMA	12.2 kbps RMC	23.18	23.25	23.27
99	WCDMA	12.2 kbps AMR	23.21	23.23	23.27
5	HSDPA	Subtest 1	23.07	23.24	23.17
5		Subtest 2	23.09	23.17	23.16
5		Subtest 3	22.55	22.65	22.71
5		Subtest 4	22.63	22.61	22.72
6	HSUPA	Subtest 1	22.87	23.15	22.68
6		Subtest 2	21.03	21.14	21.51
6		Subtest 3	22.25	22.29	22.13
6		Subtest 4	21.49	21.55	21.85
6		Subtest 5	23.14	23.19	22.60
8	DC-HSDPA	Subtest 1	23.03	23.20	23.19
8		Subtest 2	22.99	23.15	23.22
8		Subtest 3	22.47	22.63	22.65
8		Subtest 4	22.46	22.63	22.66

WCDMA Average Conducted output powers

WCDMA1900

3GPP Release Version	Mode	3GPP 34.121 Subtest	PCS Band [dBm]		
			UL 9262 DL 9662	UL 9400 DL 9800	UL 9538 DL 9938
99	WCDMA	12.2 kbps RMC	23.36	23.38	23.38
99	WCDMA	12.2 kbps AMR	23.34	23.37	23.38
5	HSDPA	Subtest 1	23.34	23.34	23.32
5		Subtest 2	23.28	23.37	23.31
5		Subtest 3	22.82	22.82	22.88
5		Subtest 4	22.82	22.84	22.87
6	HSUPA	Subtest 1	22.58	22.53	23.21
6		Subtest 2	21.67	21.69	21.15
6		Subtest 3	22.14	22.00	22.46
6		Subtest 4	21.82	21.70	21.78
6		Subtest 5	22.67	22.52	23.32
8	DC-HSDPA	Subtest 1	23.26	23.60	23.59
8		Subtest 2	23.25	23.59	23.60
8		Subtest 3	22.85	23.00	23.07
8		Subtest 4	22.85	23.13	23.09

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)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				18607	18900	19193		
1.4 MHz	QPSK	1	0	23.20	22.99	23.03	0	0
		1	3	23.12	23.03	23.39	0	0
		1	5	23.17	22.82	23.16	0	0
		3	0	23.11	22.95	23.08	0	0
		3	1	23.06	23.27	23.01	0	0
		3	3	23.02	23.05	22.94	0	0
		6	0	22.18	22.00	22.00	0-1	1
	16QAM	1	0	22.57	22.55	22.04	0-1	1
		1	3	22.61	22.37	21.95	0-1	1
		1	5	22.64	22.28	22.13	0-1	1
		3	0	22.36	21.99	22.35	0-1	1
		3	1	22.32	22.02	22.29	0-1	1
		3	3	22.21	21.98	22.30	0-1	1
		6	0	21.12	20.71	21.15	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				18615	18900	19185		
3 MHz	QPSK	1	0	23.16	23.20	23.08	0	0
		1	7	23.22	23.41	23.33	0	0
		1	14	23.17	23.04	23.08	0	0
		8	0	22.17	22.08	21.99	0-1	1
		8	3	22.15	22.11	22.01	0-1	1
		8	7	22.14	22.23	21.97	0-1	1
		15	0	22.16	22.11	22.02	0-1	1
	16QAM	1	0	22.59	22.56	22.11	0-1	1
		1	7	22.60	22.57	22.28	0-1	1
		1	14	22.58	22.48	22.04	0-1	1
		8	0	21.19	21.48	21.10	0-2	2
		8	3	21.02	21.09	20.91	0-2	2
		8	7	21.12	21.23	21.06	0-2	2
		15	0	21.06	21.18	21.11	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				18625	18900	19175		
5 MHz	QPSK	1	0	23.20	23.10	22.99	0	0
		1	12	23.47	23.41	22.91	0	0
		1	24	23.16	22.98	22.98	0	0
		12	0	22.19	22.10	22.02	0-1	1
		12	6	22.13	22.11	22.06	0-1	1
		12	11	22.21	22.10	22.08	0-1	1
		25	0	22.16	22.06	22.02	0-1	1
	16QAM	1	0	22.31	22.23	22.45	0-1	1
		1	12	22.35	22.10	22.48	0-1	1
		1	24	22.24	22.00	22.37	0-1	1
		12	0	21.08	20.84	20.96	0-2	2
		12	6	21.11	20.83	21.04	0-2	2
		12	11	21.28	21.07	21.08	0-2	2
		25	0	21.13	21.16	20.88	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				18650	18900	19150		
10 MHz	QPSK	1	0	23.29	23.43	23.42	0	0
		1	24	23.37	23.16	23.16	0	0
		1	49	23.35	23.03	23.04	0	0
		25	0	22.16	22.08	21.98	0-1	1
		25	12	22.15	22.08	21.99	0-1	1
		25	24	22.11	21.93	21.99	0-1	1
		50	0	22.14	21.89	21.94	0-1	1
	16QAM	1	0	22.27	22.33	22.19	0-1	1
		1	24	22.66	22.20	22.59	0-1	1
		1	49	22.64	22.11	22.58	0-1	1
		25	0	21.14	21.07	20.98	0-2	2
		25	12	21.00	21.26	20.80	0-2	2
		25	24	20.95	21.05	20.85	0-2	2
		50	0	21.18	20.88	20.91	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				18675	18900	19125		
15 MHz	QPSK	1	0	23.28	23.12	22.93	0	0
		1	36	23.19	23.34	22.71	0	0
		1	74	23.14	23.02	22.66	0	0
		36	0	22.25	22.04	22.02	0-1	1
		36	18	22.16	21.97	22.02	0-1	1
		36	38	22.09	21.98	21.94	0-1	1
		75	0	22.15	21.91	21.91	0-1	1
	16QAM	1	0	22.28	22.62	22.24	0-1	1
		1	36	22.61	22.54	22.47	0-1	1
		1	74	22.69	22.47	22.39	0-1	1
		36	0	21.06	21.17	20.99	0-2	2
		36	18	20.97	21.06	20.92	0-2	2
		36	38	21.11	21.08	20.87	0-2	2
		75	0	21.05	20.80	20.77	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				18700	18900	19100		
20 MHz	QPSK	1	0	23.29	23.14	23.21	0	0
		1	49	23.05	23.33	23.16	0	0
		1	99	22.93	22.92	23.00	0	0
		50	0	22.38	22.19	22.10	0-1	1
		50	25	22.18	22.02	22.09	0-1	1
		50	49	22.23	22.01	22.00	0-1	1
		100	0	22.25	22.00	22.04	0-1	1
	16QAM	1	0	22.63	22.33	22.45	0-1	1
		1	49	22.09	22.04	22.41	0-1	1
		1	99	22.08	21.62	22.28	0-1	1
		50	0	21.25	21.05	21.01	0-2	2
		50	25	21.26	20.97	21.00	0-2	2
		50	49	21.21	20.96	20.89	0-2	2
		100	0	21.25	20.87	20.97	0-2	2

- LTE Band 4

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19957	20175	20393		
1.4 MHz	QPSK	1	0	23.54	23.52	23.45	0	0
		1	3	23.64	23.75	23.64	0	0
		1	5	23.60	23.50	23.49	0	0
		3	0	23.49	23.51	23.46	0	0
		3	1	23.62	23.44	23.49	0	0
		3	3	23.59	23.43	23.52	0	0
		6	0	22.65	22.37	22.61	0-1	1
	16QAM	1	0	23.03	22.67	23.14	0-1	1
		1	3	23.11	22.57	23.05	0-1	1
		1	5	23.03	22.56	23.15	0-1	1
		3	0	22.38	22.62	22.70	0-1	1
		3	1	22.44	22.85	22.77	0-1	1
		3	3	22.35	22.84	22.88	0-1	1
		6	0	21.19	21.45	21.46	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19965	20175	20385		
3 MHz	QPSK	1	0	23.85	23.46	23.53	0	0
		1	7	23.91	23.72	23.94	0	0
		1	14	23.70	23.47	23.73	0	0
		8	0	22.54	22.48	22.49	0-1	1
		8	3	22.61	22.37	22.48	0-1	1
		8	7	22.51	22.49	22.66	0-1	1
		15	0	22.60	22.45	22.59	0-1	1
	16QAM	1	0	23.08	22.60	23.12	0-1	1
		1	7	23.02	22.75	23.01	0-1	1
		1	14	22.99	22.62	23.00	0-1	1
		8	0	21.69	21.50	21.78	0-2	2
		8	3	21.76	21.24	21.53	0-2	2
		8	7	21.81	21.28	21.50	0-2	2
		15	0	21.73	21.33	21.53	0-2	2

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Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				19975	20175	20375		
5 MHz	QPSK	1	0	23.54	23.38	23.44	0	0
		1	12	23.88	23.52	23.66	0	0
		1	24	23.48	23.34	23.53	0	0
		12	0	22.60	22.48	22.61	0-1	1
		12	6	22.47	22.47	22.59	0-1	1
		12	11	22.48	22.44	22.57	0-1	1
		25	0	22.63	22.38	22.51	0-1	1
	16QAM	1	0	22.73	22.40	22.86	0-1	1
		1	12	22.81	22.85	23.06	0-1	1
		1	24	22.49	22.49	23.03	0-1	1
		12	0	21.62	21.23	21.57	0-2	2
		12	6	21.46	21.15	21.62	0-2	2
		12	11	21.51	21.16	21.67	0-2	2
		25	0	21.51	21.12	21.44	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20000	20175	20350		
10 MHz	QPSK	1	0	23.76	23.81	23.74	0	0
		1	24	23.56	23.87	23.67	0	0
		1	49	23.68	23.44	23.85	0	0
		25	0	22.56	22.45	22.50	0-1	1
		25	12	22.52	22.51	22.54	0-1	1
		25	24	22.49	22.35	22.53	0-1	1
		50	0	22.56	22.50	22.57	0-1	1
	16QAM	1	0	22.74	23.02	22.76	0-1	1
		1	24	23.10	22.78	22.78	0-1	1
		1	49	23.18	22.93	22.81	0-1	1
		25	0	22.60	22.39	22.63	0-2	2
		25	12	22.51	22.40	22.59	0-2	2
		25	24	22.56	22.52	22.59	0-2	2
		50	0	21.56	21.51	21.67	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20025	20175	20325		
15 MHz	QPSK	1	0	23.79	23.97	23.21	0	0
		1	36	23.54	23.67	23.26	0	0
		1	74	23.73	23.68	23.43	0	0
		36	0	22.56	22.50	22.45	0-1	1
		36	18	22.49	22.40	22.62	0-1	1
		36	38	22.47	22.36	22.49	0-1	1
		75	0	22.56	22.44	22.52	0-1	1
	16QAM	1	0	23.17	23.15	22.56	0-1	1
		1	36	22.97	22.92	22.94	0-1	1
		1	74	22.96	22.92	23.16	0-1	1
		36	0	21.67	21.71	21.52	0-2	2
		36	18	21.40	21.56	21.60	0-2	2
		36	38	21.32	21.52	21.58	0-2	2
		75	0	21.57	21.48	21.42	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)	MPR Allowed Per 3GPP [dB]	MPR [dB]
				20175		
20 MHz	QPSK	1	0	23.71	0	0
		1	49	23.44	0	0
		1	99	23.38	0	0
		50	0	22.58	0-1	1
		50	25	22.51	0-1	1
		50	49	22.39	0-1	1
		100	0	22.52	0-1	1
	16QAM	1	0	22.64	0-1	1
		1	49	22.45	0-1	1
		1	99	22.32	0-1	1
		50	0	21.53	0-2	2
		50	25	21.43	0-2	2
		50	49	21.33	0-2	2
		100	0	21.49	0-2	2

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 7

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20775	21100	21425		
5 MHz	QPSK	1	0	23.24	22.81	23.03	0	0
		1	12	23.26	23.40	23.06	0	0
		1	24	22.90	22.98	23.04	0	0
		12	0	22.13	22.18	22.15	0-1	1
		12	6	22.05	22.13	22.20	0-1	1
		12	11	22.04	22.06	22.19	0-1	1
		25	0	21.95	22.06	22.17	0-1	1
	16QAM	1	0	22.16	22.43	22.49	0-1	1
		1	12	22.37	22.24	22.56	0-1	1
		1	24	22.08	22.07	22.46	0-1	1
		12	0	21.03	21.29	21.14	0-2	2
		12	6	20.96	21.27	21.29	0-2	2
		12	11	20.91	21.23	21.02	0-2	2
		25	0	21.05	21.07	20.99	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20800	21100	21400		
10 MHz	QPSK	1	0	22.99	23.26	23.34	0	0
		1	24	23.00	23.10	23.17	0	0
		1	49	22.84	23.22	23.20	0	0
		25	0	22.14	22.22	22.18	0-1	1
		25	12	22.07	22.05	22.25	0-1	1
		25	24	22.03	22.11	22.16	0-1	1
		50	0	22.13	22.09	22.19	0-1	1
	16QAM	1	0	22.60	22.32	22.44	0-1	1
		1	24	22.49	22.33	22.39	0-1	1
		1	49	22.46	22.27	22.25	0-1	1
		25	0	21.04	21.35	21.25	0-2	2
		25	12	21.02	21.14	21.13	0-2	2
		25	24	21.08	21.06	21.10	0-2	2
		50	0	21.00	21.03	21.08	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20825	21100	21375		
15 MHz	QPSK	1	0	23.41	23.41	22.97	0	0
		1	36	23.14	23.27	23.00	0	0
		1	74	22.88	23.25	22.99	0	0
		36	0	22.19	22.21	22.21	0-1	1
		36	18	22.10	22.17	22.27	0-1	1
		36	38	22.04	22.16	22.18	0-1	1
		75	0	22.03	22.13	22.10	0-1	1
	16QAM	1	0	22.19	22.45	22.58	0-1	1
		1	36	21.93	22.22	22.60	0-1	1
		1	74	22.14	22.19	22.61	0-1	1
		36	0	21.13	21.28	21.22	0-2	2
		36	18	21.09	21.24	21.37	0-2	2
		36	38	20.94	21.26	21.29	0-2	2
		75	0	20.99	21.14	21.02	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm)			MPR Allowed Per 3GPP [dB]	MPR [dB]
				20850	21100	21350		
20 MHz	QPSK	1	0	23.10	23.00	22.87	0	0
		1	49	22.85	23.27	23.00	0	0
		1	99	22.74	22.94	23.03	0	0
		50	0	22.31	22.29	22.22	0-1	1
		50	25	22.04	22.21	22.20	0-1	1
		50	49	21.99	22.16	22.26	0-1	1
		100	0	22.20	22.15	22.16	0-1	1
	16QAM	1	0	22.31	22.51	22.32	0-1	1
		1	49	21.91	22.16	22.35	0-1	1
		1	99	21.85	22.01	22.49	0-1	1
		50	0	21.17	21.20	21.16	0-2	2
		50	25	21.14	21.22	21.14	0-2	2
		50	49	21.06	21.29	21.15	0-2	2
		100	0	21.09	21.03	21.05	0-2	2

- LTE Band 17

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm) 23790 710 MHz	MPR Allowed Per 3GPP [dB]	MPR [dB]
5MHz	QPSK	1	0	23.71	0	0
		1	12	23.77	0	0
		1	24	23.69	0	0
		12	0	22.51	0-1	1
		12	6	22.51	0-1	1
		12	11	22.49	0-1	1
		25	0	22.50	0-1	1
	16QAM	1	0	22.74	0-1	1
		1	12	22.81	0-1	1
		1	24	22.60	0-1	1
		12	0	21.36	0-2	2
		12	6	21.31	0-2	2
		12	11	21.37	0-2	2
		25	0	21.41	0-2	2

Bandwidth	Modulation	RB Size	RB Offset	Max.Average Power (dBm) 23790 710 MHz	MPR Allowed Per 3GPP [dB]	MPR [dB]
10MHz	QPSK	1	0	23.81	0	0
		1	24	23.58	0	0
		1	49	23.73	0	0
		25	0	22.61	0-1	1
		25	12	22.52	0-1	1
		25	24	22.58	0-1	1
		50	0	22.61	0-1	1
	16QAM	1	0	22.84	0-1	1
		1	24	22.77	0-1	1
		1	49	22.86	0-1	1
		25	0	21.59	0-2	2
		25	12	21.39	0-2	2
		25	24	21.59	0-2	2
		50	0	21.52	0-2	2

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 overlapping channel assignment in a channel bandwidth configuration, the mid channel of the group of overlapping channels should be selected for testing.

11.5 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 rage 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 D01v02. 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.	Channel	802.11b (2.4 GHz) Conducted Power
	[MHz]		[dBm]
802.11b	2412	1	16.76
	2437	6	16.47
	2462	11	17.37
802.11g	2412	1	11.66
	2437	6	11.35
	2462	11	11.95
802.11n	2412	1	11.64
	2437	6	11.36
	2462	11	11.91

Justification for test configurations for WLAN per KDB Publication 248227 D01v02:

▪ 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

11.6 Test Exclusions Applied

11.6.1 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.

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

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

[0.960* (224/234)] = 0.952 W/kg ≤ 1.2 W/kg

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

11.6.2 BT / BT LE

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

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

Mode	Frequency	Maximum Allowed Power	Separation Distance	≤ 3.0
	[MHz]	[mW]	[mm]	
Bluetooth	2 480	11	10	1.73
Bluetooth LE	2 480	1	10	0.16

Based on the maximum conducted power of Bluetooth and antenna to use separation distance, Bluetooth SAR was not required [(11/10)*√2.480] = 1.73 < 3.0.

Based on the maximum conducted power of Bluetooth and antenna to use separation distance, Bluetooth LE SAR was not required [(1/10)*√2.480] = 0.16 < 3.0.

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.

$$Estimated\ 1g\ SAR = \frac{\sqrt{f(GHZ)}}{7.5} * \frac{(Max\ Power\ of\ channel\ mW)}{Min\ Seperation\ Distance}.$$

Mode	Frequency	Maximum Allowed Power	Separation Distance (Body)	Estimated 1gSAR (Body)
	[MHz]	[mW]	[mm]	[W/kg]
Bluetooth	2 480	11	10	0.23
Bluetooth LE	2 480	1	10	0.02

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 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 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

*** Note;**

All test configurations are based on front view.

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	33.7	33.08	-0.132	Standard	Left Ear	0.235	1.153	0.271	-
836.6	190		33.7	33.08	-0.168	Standard	Left Tilt	0.156	1.153	0.180	-
836.6	190		33.7	33.08	-0.177	Standard	Right Ear	0.316	1.153	**0.364**	1
836.6	190		33.7	33.08	-0.108	Standard	Right Tilt	0.158	1.153	0.182	-
836.6	190	GPRS 1Tx	33.7	33.11	-0.01	Standard	Left Ear	0.209	1.146	0.239	-
836.6	190		33.7	33.11	-0.051	Standard	Left Tilt	0.135	1.146	0.155	-
836.6	190		33.7	33.11	-0.054	Standard	Right Ear	0.293	1.146	0.336	-
836.6	190		33.7	33.11	-0.143	Standard	Right Tilt	0.144	1.146	0.165	-
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	30.2	30.18	0.14	Standard	Left Ear	0.316	1.005	0.317	-
1 880.0	661		30.2	30.18	-0.03	Standard	Left Tilt	0.239	1.005	0.240	-
1 880.0	661		30.2	30.18	0.01	Standard	Right Ear	0.225	1.005	0.226	-
1 880.0	661		30.2	30.18	-0.06	Standard	Right Tilt	0.239	1.005	0.240	-
1 880.0	661	GPRS 1Tx	30.2	30.18	-0.08	Standard	Left Ear	0.360	1.005	**0.362**	2
1 880.0	661		30.2	30.18	-0.03	Standard	Left Tilt	0.240	1.005	0.241	-
1 880.0	661		30.2	30.18	-0.02	Standard	Right Ear	0.225	1.005	0.226	-
1 880.0	661		30.2	30.18	-0.05	Standard	Right Tilt	0.240	1.005	0.241	-
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	24.2	23.25	-0.130	Standard	Left Ear	0.182	1.245	0.227	
836.6	4183		24.2	23.25	-0.007	Standard	Left Tilt	0.123	1.245	0.153	-
836.6	4183		24.2	23.25	-0.010	Standard	Right Ear	0.233	1.245	**0.290**	3
836.6	4183		24.2	23.25	-0.008	Standard	Right Tilt	0.135	1.245	0.168	-
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 (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							
1 852.4	9262	WCDMA 1900	23.7	23.36	0.02	Standard	Left Ear	0.888	1.081	**0.960**	4
1 880.0	9400		23.7	23.38	-0.15	Standard	Left Ear	0.787	1.076	0.847	-
1 907.6	9538		23.7	23.38	0.10	Standard	Left Ear	0.788	1.076	0.848	-
1 880.0	9400		23.7	23.38	0.01	Standard	Left Tilt	0.537	1.076	0.578	-
1 880.0	9400		23.7	23.38	-0.02	Standard	Right Ear	0.515	1.076	0.554	-
1 880.0	9400		23.7	23.38	0.11	Standard	Right Tilt	0.553	1.076	0.595	-
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 (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									
1 860	18700	QPSK	23.7	23.29	-0.08	Standard	Left Ear	1	0	0.940	1.099	**1.033**	5
1 880	18900		23.7	23.33	0.10	Standard	Left Ear	1	49	0.862	1.089	0.939	-
1 900	19100		23.7	23.21	0.02	Standard	Left Ear	1	0	0.807	1.119	0.903	-
1 860	18700		22.7	22.38	0.14	Standard	Left Ear	50	0	0.772	1.076	0.831	-
1 880	18900		22.7	22.19	0.00	Standard	Left Ear	50	0	0.698	1.125	0.785	-
1 900	19100		22.7	22.10	-0.04	Standard	Left Ear	50	0	0.645	1.148	0.741	-
1 860	18700		22.7	22.25	-0.18	Standard	Left Ear	100	0	0.608	1.109	0.674	-
1 880	18900		23.7	23.33	0.02	Standard	Left Tilt	1	49	0.560	1.089	0.610	-
1 860	18700		22.7	22.38	0.01	Standard	Left Tilt	50	0	0.487	1.076	0.524	-
1 880	18900		23.7	23.33	0.14	Standard	Right Ear	1	49	0.542	1.089	0.590	-
1 860	18700		22.7	22.38	0.12	Standard	Right Ear	50	0	0.445	1.076	0.479	-
1 880	18900		23.7	23.33	0.11	Standard	Right Tilt	1	49	0.589	1.089	0.641	-
1 860	18700		22.7	22.38	0.07	Standard	Right Tilt	50	0	0.509	1.076	0.548	-
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 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	24.2	23.71	-0.156	Standard	Left Ear	1	0	0.626	1.119	**0.701**	6
1 732.5	20175		23.2	22.58	0.040	Standard	Left Ear	50	0	0.456	1.153	0.526	-
1 732.5	20175		24.2	23.71	-0.057	Standard	Left Tilt	1	0	0.313	1.119	0.350	-
1 732.5	20175		23.2	22.58	0.061	Standard	Left Tilt	50	0	0.248	1.153	0.286	-
1 732.5	20175		24.2	23.71	-0.053	Standard	Right Ear	1	0	0.345	1.119	0.386	-
1 732.5	20175		23.2	22.58	-0.013	Standard	Right Ear	50	0	0.274	1.153	0.316	-
1 732.5	20175		24.2	23.71	0.094	Standard	Right Tilt	1	0	0.282	1.119	0.316	-
1 732.5	20175		23.2	22.58	-0.051	Standard	Right Tilt	50	0	0.224	1.153	0.258	-
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 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									
2 535	21100	QPSK	23.7	23.27	0.13	Standard	Left Ear	1	49	0.295	1.104	0.326	-
2 510	20850		22.7	22.31	0.13	Standard	Left Ear	50	0	0.195	1.094	0.213	-
2 535	21100		23.7	23.27	0.14	Standard	Left Tilt	1	49	0.171	1.104	0.189	-
2 510	20850		22.7	22.31	0.15	Standard	Left Tilt	50	0	0.115	1.094	0.126	-
2 535	21100		23.7	23.27	-0.15	Standard	Right Ear	1	49	0.306	1.104	**0.338**	7
2 510	20850		22.7	22.31	-0.19	Standard	Right Ear	50	0	0.225	1.094	0.246	-
2 535	21100		23.7	23.27	0.14	Standard	Right Tilt	1	49	0.099	1.104	0.109	-
2 510	20850		22.7	22.31	-0.12	Standard	Right Tilt	50	0	0.068	1.094	0.074	-
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 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	24.2	23.81	-0.179	Standard	Left Ear	1	0	0.171	1.094	0.187	-
710	23790		23.2	22.61	-0.180	Standard	Left Ear	25	0	0.133	1.146	0.152	-
710	23790		24.2	23.81	-0.038	Standard	Left Tilt	1	0	0.120	1.094	0.131	-
710	23790		23.2	22.61	0.037	Standard	Left Tilt	25	0	0.102	1.146	0.117	-
710	23790		24.2	23.81	-0.118	Standard	Right Ear	1	0	0.224	1.094	**0.245**	8
710	23790		23.2	22.61	-0.123	Standard	Right Ear	25	0	0.174	1.146	0.199	-
710	23790		24.2	23.81	-0.123	Standard	Right Tilt	1	0	0.137	1.094	0.150	-
710	23790		23.2	22.61	-0.173	Standard	Right Tilt	25	0	0.108	1.146	0.124	-
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 (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)	17.5	17.37	0.04	Left Ear	Standard	99.03	0.457	0.305	1.030	1.010	0.317	-
			17.5	17.37	-0.18	Left Tilt	Standard	99.03	0.534	0.333	1.030	1.010	0.346	-
			17.5	17.37	0.15	Right Ear	Standard	99.03	0.990	0.621	1.030	1.010	**0.646**	9
			17.5	17.37	-0.14	Right Tilt	Standard	99.03	0.587	0.391	1.030	1.010	0.407	-
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 1Tx	33.7	33.11	-0.072	Rear	1.0 cm	0.320	1.146	**0.367**	10
836.6	190		33.7	33.11	-0.027	Front	1.0 cm	0.255	1.146	0.292	-
836.6	190		33.7	33.11	0.026	Left	1.0 cm	0.150	1.146	0.172	-
836.6	190		33.7	33.11	0.172	Right	1.0 cm	0.213	1.146	0.244	-
836.6	190		33.7	33.11	-0.042	Bottom	1.0 cm	0.147	1.146	0.168	-
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 1Tx	30.2	30.18	-0.12	Rear	1.0 cm	0.214	1.005	0.215	11
1 880.0	661		30.2	30.18	0.12	Front	1.0 cm	0.300	1.005	**0.301**	12
1 880.0	661		30.2	30.18	0.03	Left	1.0 cm	0.269	1.005	0.270	-
1 880.0	661		30.2	30.18	0.09	Right	1.0 cm	0.088	1.005	0.088	-
1 880.0	661		30.2	30.18	0.08	Bottom	1.0 cm	0.236	1.005	0.237	-
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	24.2	23.25	-0.143	Rear	1.0 cm	0.286	1.245	**0.356**	13
836.6	4183		24.2	23.25	-0.009	Front	1.0 cm	0.227	1.245	0.283	-
836.6	4183		24.2	23.25	0.116	Left	1.0 cm	0.143	1.245	0.178	-
836.6	4183		24.2	23.25	-0.010	Right	1.0 cm	0.245	1.245	0.305	-
836.6	4183		24.2	23.25	0.113	Bottom	1.0 cm	0.157	1.245	0.195	-
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 (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	23.38	-0.00	Rear	1.0 cm	0.599	1.076	0.645	14
1 880.0	9400		23.7	23.38	0.00	Front	1.0 cm	0.470	1.076	0.506	-
1 880.0	9400		23.7	23.38	0.03	Left	1.0 cm	0.530	1.076	0.571	-
1 880.0	9400		23.7	23.38	-0.06	Right	1.0 cm	0.160	1.076	0.172	-
1 880.0	9400		23.7	23.38	0.10	Bottom	1.0 cm	0.629	1.076	**0.677**	15
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 (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	23.33	0.05	Rear	1	49	1.0 cm	0.691	1.089	0.752	16
1 860	18700		22.7	22.38	0.11	Rear	50	0	1.0 cm	0.544	1.076	0.586	-
1 860	18700		23.7	23.29	0.09	Front	1	0	1.0 cm	0.898	1.099	**0.987**	17
1 880	18900		23.7	23.33	0.09	Front	1	49	1.0 cm	0.875	1.089	0.953	-
1 900	19100		23.7	23.21	0.16	Front	1	0	1.0 cm	0.784	1.119	0.878	-
1 860	18700		22.7	22.38	-0.01	Front	50	0	1.0 cm	0.685	1.076	0.737	-
1 860	18700		22.7	22.25	0.10	Front	100	0	1.0 cm	0.620	1.109	0.688	-
1 880	18900		23.7	23.33	0.06	Left	1	49	1.0 cm	0.651	1.089	0.709	-
1 860	18700		22.7	22.38	-0.04	Left	50	0	1.0 cm	0.515	1.076	0.554	-
1 880	18900		23.7	23.33	0.09	Right	1	49	1.0 cm	0.204	1.089	0.222	-
1 860	18700		22.7	22.38	0.10	Right	50	0	1.0 cm	0.169	1.076	0.182	-
1 880	18900		23.7	23.33	-0.01	Bottom	1	49	1.0 cm	0.575	1.089	0.626	-
1 860	18700		22.7	22.38	0.11	Bottom	50	0	1.0 cm	0.466	1.076	0.502	-
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 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	24.2	23.71	0.063	Rear	1	0	1.0 cm	0.604	1.119	0.676	18
1 732.5	20175		23.2	22.58	0.109	Rear	50	0	1.0 cm	0.456	1.153	0.526	-
1 732.5	20175		24.2	23.71	-0.113	Front	1	0	1.0 cm	0.606	1.119	**0.678**	19
1 732.5	20175		23.2	22.58	-0.004	Front	50	0	1.0 cm	0.468	1.153	0.540	-
1 732.5	20175		24.2	23.71	0.022	Left	1	0	1.0 cm	0.399	1.119	0.447	-
1 732.5	20175		23.2	22.58	0.015	Left	50	0	1.0 cm	0.301	1.153	0.347	-
1 732.5	20175		24.2	23.71	-0.120	Right	1	0	1.0 cm	0.117	1.119	0.131	-
1 732.5	20175		23.2	22.58	0.058	Right	50	0	1.0 cm	0.086	1.153	0.099	-
1 732.5	20175		24.2	23.71	0.087	Bottom	1	0	1.0 cm	0.302	1.119	0.338	-
1 732.5	20175		23.2	22.58	-0.050	Bottom	50	0	1.0 cm	0.233	1.153	0.269	-
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 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									
2 535	21100	QPSK	23.7	23.27	0.169	Rear	1	49	1.0 cm	0.487	1.104	**0.538**	20
2 510	20850		22.7	22.31	-0.04	Rear	50	0	1.0 cm	0.403	1.094	0.441	-
2 535	21100		23.7	23.27	0.161	Front	1	49	1.0 cm	0.346	1.104	0.382	-
2 510	20850		22.7	22.31	0.024	Front	50	0	1.0 cm	0.312	1.094	0.341	-
2 535	21100		23.7	23.27	-0.031	Left	1	49	1.0 cm	0.140	1.104	0.155	-
2 510	20850		22.7	22.31	-0.104	Left	50	0	1.0 cm	0.103	1.094	0.113	-
2 535	21100		23.7	23.27	-0.160	Right	1	49	1.0 cm	0.150	1.104	0.166	-
2 510	20850		22.7	22.31	0.067	Right	50	0	1.0 cm	0.134	1.094	0.147	-
2 535	21100		23.7	23.27	0.023	Bottom	1	49	1.0 cm	0.479	1.104	0.529	-
2 510	20850		22.7	22.31	0.14	Bottom	50	0	1.0 cm	0.452	1.094	0.494	-
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 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	24.2	23.81	0.057	Rear	1	0	1.0 cm	0.333	1.094	**0.364**	21
710	23790		23.2	22.61	-0.079	Rear	25	0	1.0 cm	0.231	1.146	0.265	-
710	23790		24.2	23.81	-0.175	Front	1	0	1.0 cm	0.224	1.094	0.245	-
710	23790		23.2	22.61	0.095	Front	25	0	1.0 cm	0.215	1.146	0.246	-
710	23790		24.2	23.81	-0.030	Left	1	0	1.0 cm	0.122	1.094	0.133	-
710	23790		23.2	22.61	-0.027	Left	25	0	1.0 cm	0.090	1.146	0.103	-
710	23790		24.2	23.81	0.165	Right	1	0	1.0 cm	0.173	1.094	0.189	-
710	23790		23.2	22.61	0.140	Right	25	0	1.0 cm	0.124	1.146	0.142	-
710	23790		24.2	23.81	0.114	Bottom	1	0	1.0 cm	0.093	1.094	0.102	-
710	23790		23.2	22.61	0.007	Bottom	25	0	1.0 cm	0.073	1.146	0.084	-
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 (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	Conducted Power											
2462	11	802.11b	17.5	17.37	-0.009	Rear	1Mbps	1.0 cm	99.03	0.179	0.123	1.030	1.010	0.128	22
			17.5	17.37	-0.094	Front	1Mbps	1.0 cm	99.03	0.198	0.131	1.030	1.010	**0.136**	23
			17.5	17.37	-0.049	Left	1Mbps	1.0 cm	99.03	0.148	0.092	1.030	1.010	0.096	-
			17.5	17.37	0.19	Right	1Mbps	1.0 cm	99.03	0.0284	0.018	1.030	1.010	0.019	-
			17.5	17.37	0.097	Top	1Mbps	1.0 cm	99.03	0.179	0.121	1.030	1.010	0.126	-
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	Conducted Power											
2462	11	802.11b	17.5	17.37	-0.009	Rear	1Mbps	1.0 cm	99.03	0.179	0.123	1.030	1.010	0.128	22
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 (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	33.7	33.08	-0.006	Rear	1.0 cm	0.343	1.153	**0.396**	24
836.6	190	GPRS 1Tx	33.7	33.11	-0.072	Rear	1.0 cm	0.320	1.146	0.367	10
1 880.0	661	GSM 1900	30.2	30.18	-0.02	Rear	1.0 cm	0.236	1.005	**0.237**	25
1 880.0	661	GPRS 1Tx	30.2	30.18	-0.12	Rear	1.0 cm	0.214	1.005	0.215	11
836.6	4183	WCDMA850	24.2	23.25	-0.143	Rear	1.0 cm	0.286	1.245	0.356	13
1 880.0	9400	WCDMA1900	23.7	23.38	-0.00	Rear	1.0 cm	0.599	1.076	0.645	14
1 880.0	18900	LTE Band 2	23.7	23.33	0.05	Rear (1RB, 49offset)	1.0 cm	0.691	1.089	0.752	16
1 732.5	20175	LTE Band 4	24.2	23.71	0.063	Rear (1RB, 0offset)	1.0 cm	0.604	1.119	0.676	18
2 535	21100	LTE Band 7	23.7	23.27	0.169	Rear (1RB, 49offset)	1.0 cm	0.487	1.104	0.538	20
710	23790	LTE Band 17	24.2	23.81	0.057	Rear (1RB, 0offset)	1.0 cm	0.333	1.094	0.364	21
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 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.

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. Justification for test configurations for WLAN per KDB 248227 D01v02 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.
2. 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.
3. The device was configured to transmit continuously at the required data rated, 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.
4. According to KDB 248227 D01v02 Sec. 5.2 2.4GHz SAR procedures, for 802.11b DSSS SAR measurement of this device, SAR test procedures was applied to fixed exposure test position.

14. SAR Measurement Variability and Uncertainty

In accordance with published RF Exposure KDB procedure 865664 D01v01r03 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 (~ 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							
1 852.4	9262	WCDMA1900	Standard	Left	0.888	0.867	1.02	26
1 860	18700	LTE 2	Standard	Left (1RB, 0offset)	0.940	0.904	1.04	27

15.Simultaneous Transmission Scenarios

According to FCC KDB 447498 D01v05r02, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the EUT are shown below paths and are mode in same rectangle to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

Simultaneous transmission paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB 447498 D01v05r02.

Applicable Combination	Head	Body-Worn	Hotspot
GSM Voice + 2.4 GHz WiFi	Yes	Yes	N/A
GSM Voice + 2.4 GHz Bluetooth	N/A	Yes	N/A
GPRS/EDGE + 2.4 GHz WiFi	Yes	Yes	Yes
GPRS/EDGE + 2.4 GHz Bluetooth	N/A	Yes	N/A
UMTS+ 2.4 GHz WiFi	Yes	Yes	Yes
UMTS+ 2.4 GHz Bluetooth	N/A	Yes	N/A
LTE+ 2.4 GHz WiFi	Yes	Yes	Yes
LTE+ 2.4 GHz Bluetooth	N/A	Yes	N/A

1. 2.4 GHz WLAN and 2.4GHz Bluetooth share antenna path and cannot transmit simultaneously
2. All licensed modes share the same antenna path and cannot transmit simultaneously.
3. UMTS +WLAN scenario also represents the UMTS Voice/DATA + WLAN hotspot scenario.
4. Per the manufacturer, WiFi Direct is not expected to be used in conjunction with a held-to-ear or body-worn accessory voice call. Therefore, there are no simultaneous transmission scenarios involving WiFi direct beyond that listed in the above table.
5. This device does not support VoLTE.
6. LTE is considered pre-installed VOIP applications.

15.1 Simultaneous Transmission Summation for Head

Simultaneous Transmission Summation with 2.4 GHz WIFI

Band	Configuration	Scaled SAR	2.4 GHz WIFI Scaled SAR	∑ 1-g SAR
		(W/kg)	(W/kg)	(W/kg)
GSM 850	Left Cheek	0.271	0.317	0.588
	Left Tilt	0.180	0.346	0.526
	Right Cheek	0.364	0.646	1.010
	Right Tilt	0.182	0.407	0.589
GPRS 850	Left Cheek	0.239	0.317	0.556
	Left Tilt	0.155	0.346	0.501
	Right Cheek	0.336	0.646	0.982
	Right Tilt	0.165	0.407	0.572
GSM 1900	Left Cheek	0.317	0.317	0.634
	Left Tilt	0.240	0.346	0.586
	Right Cheek	0.226	0.646	0.872
	Right Tilt	0.240	0.407	0.647
GPRS 1900	Left Cheek	0.362	0.317	0.679
	Left Tilt	0.241	0.346	0.587
	Right Cheek	0.226	0.646	0.872
	Right Tilt	0.241	0.407	0.648
UMTS 850	Left Cheek	0.227	0.317	0.544
	Left Tilt	0.153	0.346	0.499
	Right Cheek	0.290	0.646	0.936
	Right Tilt	0.168	0.407	0.575
UMTS 1900	Left Cheek	0.960	0.317	1.277
	Left Tilt	0.578	0.346	0.924
	Right Cheek	0.554	0.646	1.200
	Right Tilt	0.595	0.407	1.002
LTE Band 2	Left Cheek	1.033	0.317	**1.350**
	Left Tilt	0.610	0.346	0.956
	Right Cheek	0.590	0.646	1.236
	Right Tilt	0.641	0.407	1.048
LTE Band 4	Left Cheek	0.701	0.317	1.018
	Left Tilt	0.350	0.346	0.696
	Right Cheek	0.386	0.646	1.032
	Right Tilt	0.316	0.407	0.723
LTE Band 7	Left Cheek	0.326	0.317	0.643
	Left Tilt	0.189	0.346	0.535
	Right Cheek	0.338	0.646	0.984
	Right Tilt	0.109	0.407	0.516
LTE Band 17	Left Cheek	0.187	0.317	0.504
	Left Tilt	0.131	0.346	0.477
	Right Cheek	0.245	0.646	0.891
	Right Tilt	0.150	0.407	0.557

15.2 Simultaneous Transmission Summation for Body-Worn

Simultaneous Transmission Summation with 2.4 GHz WLAN(1.0 cm)

Band	Scaled SAR	2.4 GHz WIFI Scaled SAR	∑ 1-g SAR
	(W/kg)	(W/kg)	(W/kg)
GSM 850	0.396	0.128	0.524
GPRS 850	0.367	0.128	0.495
GSM 1900	0.237	0.128	0.365
GPRS 1900	0.215	0.128	0.343
UMTS 850	0.356	0.128	0.484
UMTS 1900	0.645	0.128	0.773
LTE Band 2	0.752	0.128	0.880
LTE Band 4	0.676	0.128	0.804
LTE Band 7	0.538	0.128	0.666
LTE Band 17	0.364	0.128	0.492

Simultaneous Transmission Summation with Bluetooth (1.0 cm)

Band	Scaled SAR	Estimated SAR BT SAR	∑ 1-g SAR
	(W/kg)	(W/kg)	(W/kg)
GSM 850	0.396	0.23	0.626
GPRS 850	0.367	0.23	0.597
GSM 1900	0.237	0.23	0.467
GPRS 1900	0.215	0.23	0.445
UMTS 850	0.356	0.23	0.586
UMTS 1900	0.645	0.23	0.875
LTE Band 2	0.752	0.23	**0.982**
LTE Band 4	0.676	0.23	0.906
LTE Band 7	0.538	0.23	0.768
LTE Band 17	0.364	0.23	0.594

Note:

* 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	Configuration	Scaled SAR(W/kg)	2.4 GHz WIFI Scaled SAR(W/kg)	∑ 1-g SAR(W/kg)
GPRS 850	Rear	0.367	0.128	0.495
	Front	0.292	0.136	0.428
	Left	0.172	0.096	0.268
	Right	0.244	0.019	0.263
	Bottom	0.168		0.168
	Top		0.126	0.126
GPRS 1900	Rear	0.215	0.128	0.343
	Front	0.301	0.136	0.437
	Left	0.270	0.096	0.366
	Right	0.088	0.019	0.107
	Bottom	0.237		0.237
	Top		0.126	0.126
UMTS 850	Rear	0.356	0.128	0.484
	Front	0.283	0.136	0.419
	Left	0.178	0.096	0.274
	Right	0.305	0.019	0.324
	Bottom	0.195		0.195
	Top		0.126	0.126
UMTS 1900	Rear	0.645	0.128	0.773
	Front	0.506	0.136	0.642
	Left	0.571	0.096	0.667
	Right	0.172	0.019	0.191
	Bottom	0.677		0.677
	Top		0.126	0.126
LTE Band 2	Rear	0.752	0.128	0.880
	Front	0.987	0.136	**1.123**
	Left	0.709	0.096	0.805
	Right	0.222	0.019	0.241
	Bottom	0.626		0.626
	Top		0.126	0.126
LTE Band 4	Rear	0.676	0.128	0.804
	Front	0.678	0.136	0.814
	Left	0.447	0.096	0.543
	Right	0.131	0.019	0.150
	Bottom	0.338		0.338
	Top		0.126	0.126
LTE Band 7	Rear	0.538	0.128	0.666
	Front	0.382	0.136	0.518
	Left	0.155	0.096	0.251
	Right	0.166	0.019	0.185
	Bottom	0.529		0.529
	Top		0.126	0.126
LTE Band 17	Rear	0.364	0.128	0.492
	Front	0.246	0.136	0.382
	Left	0.133	0.096	0.229
	Right	0.189	0.019	0.208
	Bottom	0.102		0.102
	Top		0.126	0.126

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.

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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.

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Attachment 1. – SAR Test Plots

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	19.6 ℃
Ambient Temperature:	19.8 ℃
Test Date:	May 12, 2015
Plot No.	1

DUT: LG-H736P; Type: Bar

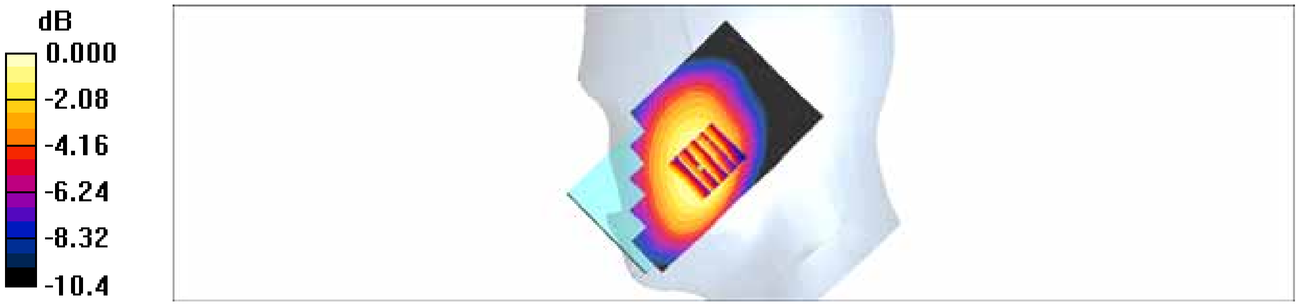
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.904 mho/m; ε_r = 42.6; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.45, 6.45, 6.45); Calibrated: 2015-01-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: 1800/1900 Phantom; Type: SAM
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

GSM850 Right touch 190ch/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.354 mW/g

GSM850 Right touch 190ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.71 V/m; Power Drift = -0.177 dB
Peak SAR (extrapolated) = 0.421 W/kg
SAR(1 g) = 0.316 mW/g; SAR(10 g) = 0.238 mW/g
Maximum value of SAR (measured) = 0.326 mW/g



0 dB = 0.326mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	21.6 ℃
Ambient Temperature:	21.8 ℃
Test Date:	May 18, 2015
Plot No.	2

DUT: LG-H736P; Type: Bar

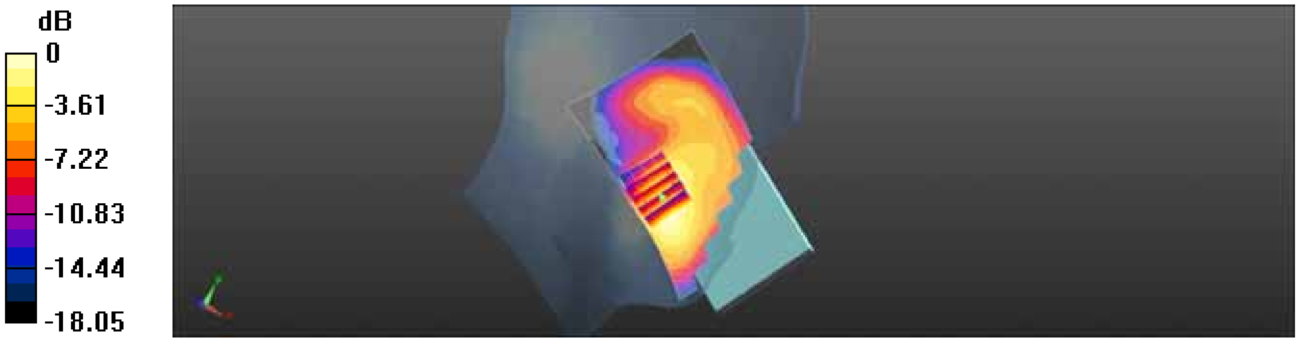
Communication System: UID 0, GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.417 S/m; ε_r = 38.961; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.11, 8.11, 8.11); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: SAM with CRP v5.0_R
- Measurement SW: DASY52, Version 52.8 (0);

LG-H736P/GSM1900 Head Left Touch GPRS 1Tx 661ch/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.491 W/kg

LG-H736P/GSM1900 Head Left Touch GPRS 1Tx 661ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.523 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.580 W/kg
SAR(1 g) = 0.360 W/kg; SAR(10 g) = 0.219 W/kg
Maximum value of SAR (measured) = 0.466 W/kg



0 dB = 0.466 W/kg = -3.32 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	19.6 ℃
Ambient Temperature:	19.8 ℃
Test Date:	May 12, 2015
Plot No.	3

DUT: LG-H736P; Type: Bar

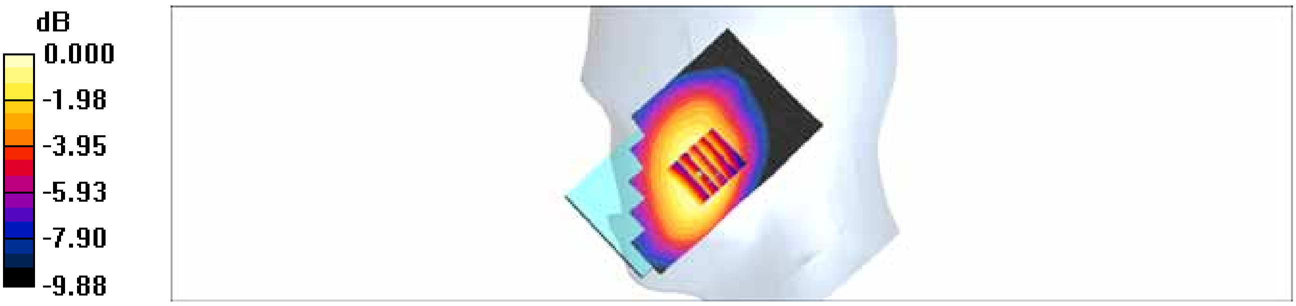
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.904 mho/m; ε_r = 42.6; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.45, 6.45, 6.45); Calibrated: 2015-01-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: 1800/1900 Phantom; Type: SAM
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

WCDMA850 Head Right Touch 4183ch/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.256 mW/g

WCDMA850 Head Right Touch 4183ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.43 V/m; Power Drift = -0.010 dB
Peak SAR (extrapolated) = 0.299 W/kg
SAR(1 g) = 0.233 mW/g; SAR(10 g) = 0.178 mW/g
Maximum value of SAR (measured) = 0.243 mW/g



0 dB = 0.243mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	21.6 ℃
Ambient Temperature:	21.8 ℃
Test Date:	May 18, 2015
Plot No.	4

DUT: LG-H736P; Type: Bar

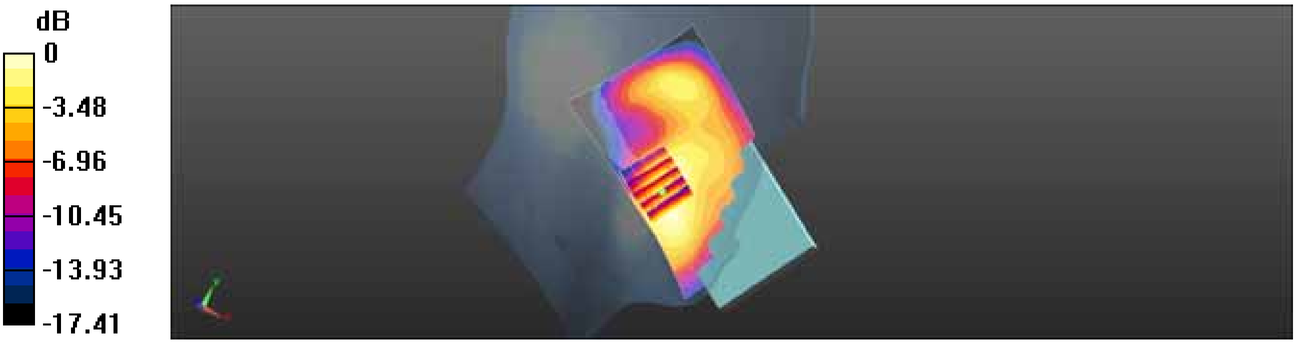
Communication System: UID 0, WCDMA1900; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.389 S/m; ε_r = 39.04; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.11, 8.11, 8.11); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: SAM with CRP v5.0_R
- Measurement SW: DASY52, Version 52.8 (0);

LG-H736P/WCDMA1900 Head Left Touch 9262ch/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.25 W/kg

LG-H736P/WCDMA1900 Head Left Touch 9262ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.64 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.42 W/kg
SAR(1 g) = 0.888 W/kg; SAR(10 g) = 0.559 W/kg
Maximum value of SAR (measured) = 1.12 W/kg



0 dB = 1.12 W/kg = 0.49 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	21.7 ℃
Ambient Temperature:	21.9 ℃
Test Date:	May 20, 2015
Plot No.	5

DUT: LG-H736P; Type: Bar

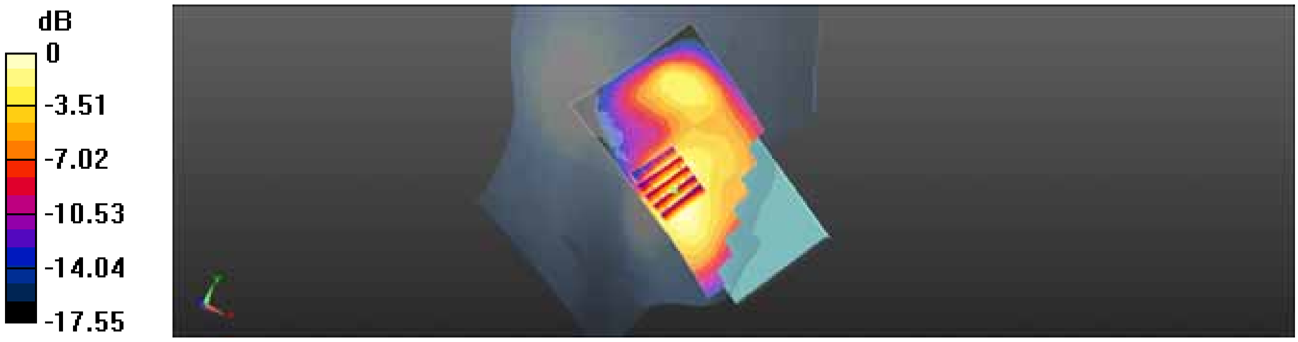
Communication System: UID 0, LTE Band 2; Frequency: 1860 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1860 MHz; σ = 1.398 S/m; ε_r = 39.009; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.11, 8.11, 8.11); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: SAM with CRP v5.0_R
- Measurement SW: DASY52, Version 52.8 (0);

LG-H736P/LTE Band 2 Head Left Touch 20MHz 1RB 0 offest 18700ch/Area Scan (61x111x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.31 W/kg

LG-H736P/LTE Band 2 Head Left Touch 20MHz 1RB 0 offest 18700ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.10 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 1.45 W/kg
SAR(1 g) = 0.940 W/kg; SAR(10 g) = 0.591 W/kg
Maximum value of SAR (measured) = 1.20 W/kg



0 dB = 1.20 W/kg = 0.79 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	19.7 ℃
Ambient Temperature:	19.9 ℃
Test Date:	May 15, 2015
Plot No.	6

DUT: LG-H736P; Type: Bar

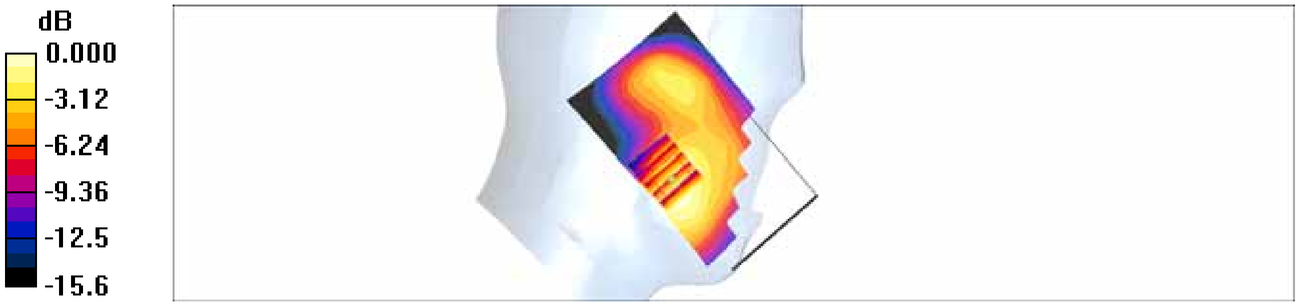
Communication System: LTE Band 4; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.36 mho/m; ε_r = 40.2; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1605; ConvF(5.2, 5.2, 5.2); Calibrated: 2015-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: 835/900 Phamtom ; Type: SAM
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

LTE Band 4 Head Left Touch QPSK 20MHz 1RB 0offset 20175ch/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.699 mW/g

LTE Band 4 Head Left Touch QPSK 20MHz 1RB 0offset 20175ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.0 V/m; Power Drift = -0.156 dB
Peak SAR (extrapolated) = 0.809 W/kg
SAR(1 g) = 0.626 mW/g; SAR(10 g) = 0.430 mW/g
Maximum value of SAR (measured) = 0.658 mW/g



0 dB = 0.658mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	22.2 ℃
Ambient Temperature:	22.4 ℃
Test Date:	May 21, 2015
Plot No.	7

DUT: LG-H736P; Type: Bar

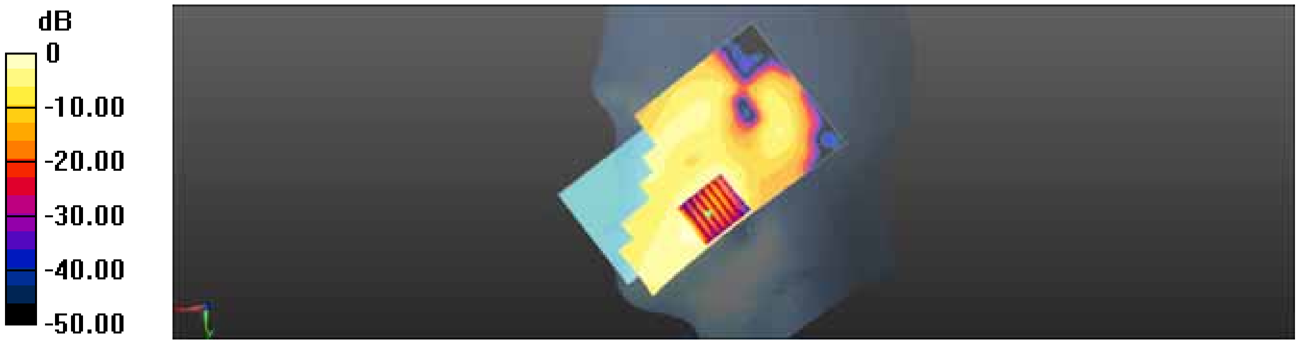
Communication System: UID 0, LTE Band 7 (0); Frequency: 2535 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2535 MHz; σ = 1.95 S/m; ε_r = 39.242; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.22, 7.22, 7.22); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: SAM with CRP v5.0_F
- Measurement SW: DASY52, Version 52.8 (8);

LG-H736P/LTE Band 7 Head Right Touch QPSK 20MHz 1RB 49offset 21100ch/Area Scan (81x141x1):
Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.429 W/kg

LG-H736P/LTE Band 7 Head Right Touch QPSK 20MHz 1RB 49offset 21100ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.953 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.524 W/kg
SAR(1 g) = 0.306 W/kg; SAR(10 g) = 0.165 W/kg
Maximum value of SAR (measured) = 0.419 W/kg



0 dB = 0.429 W/kg = −3.67 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	20.2 ℃
Ambient Temperature:	20.4 ℃
Test Date:	May 14, 2015
Plot No.	8

DUT: LG-H736P; Type: Bar

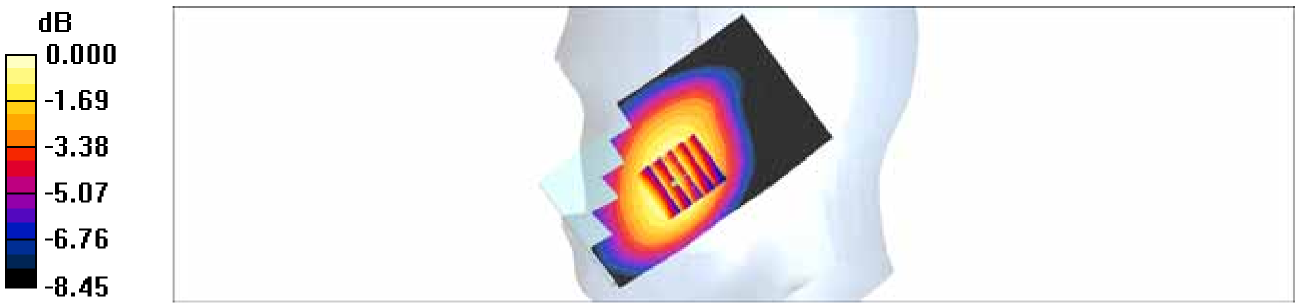
Communication System: LTE 17; Frequency: 710 MHz;Duty Cycle: 1:1
Medium parameters used: f = 710 MHz; σ = 0.874 mho/m; ε_r = 43.4; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1605; ConvF(6.64, 6.64, 6.64); Calibrated: 2015-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: 1800/1900 Phantom; Type: SAM
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

LTE Band 17 Head Right Touch QPSK 10MHz 1RB 0offset 23790ch/Area Scan (61x111x1):
Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.232 mW/g

LTE Band 17 Head Right Touch QPSK 10MHz 1RB 0offset 23790ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.87 V/m; Power Drift = -0.118 dB
Peak SAR (extrapolated) = 0.282 W/kg
SAR(1 g) = 0.224 mW/g; SAR(10 g) = 0.175 mW/g
Maximum value of SAR (measured) = 0.236 mW/g



0 dB = 0.236mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	22.2 ℃
Ambient Temperature:	22.4 ℃
Test Date:	May 21, 2015
Plot No.	9

DUT: LG-H736P; Type: Bar

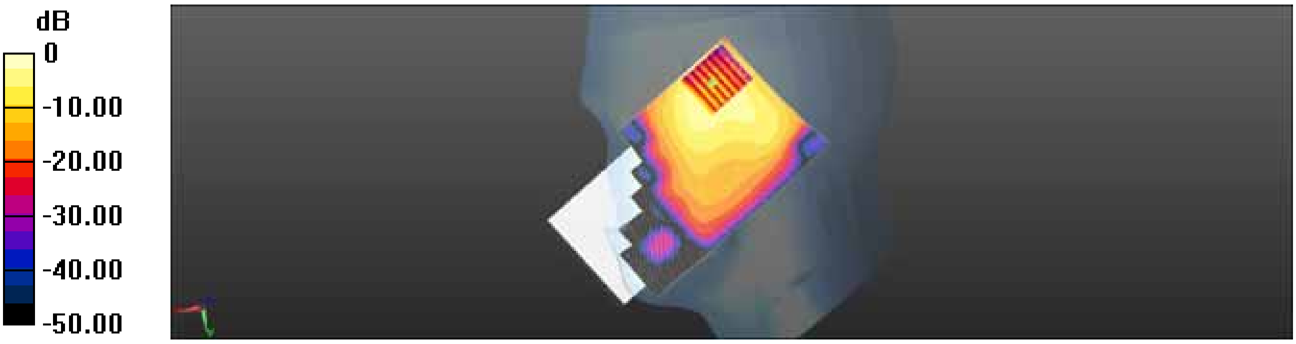
Communication System: UID 0, 2450MHz FCC (0); Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.825 S/m; ε_r = 39.735; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.39, 7.39, 7.39); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: SAM with CRP v5.0_F
- Measurement SW: DASY52, Version 52.8 (8);

LG-H736P/802.11b Head Right Touch 11ch 1Mbps/Area Scan (81x141x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 0.990 W/kg

LG-H736P/802.11b Head Right Touch 11ch 1Mbps/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.86 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 1.30 W/kg
SAR(1 g) = 0.621 W/kg; SAR(10 g) = 0.293 W/kg
Maximum value of SAR (measured) = 0.951 W/kg



0 dB = 0.990 W/kg = −0.04 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	19.8 ℃
Ambient Temperature:	20.0 ℃
Test Date:	May 13, 2015
Plot No.	10

DUT: LG-H736P; Type: Bar

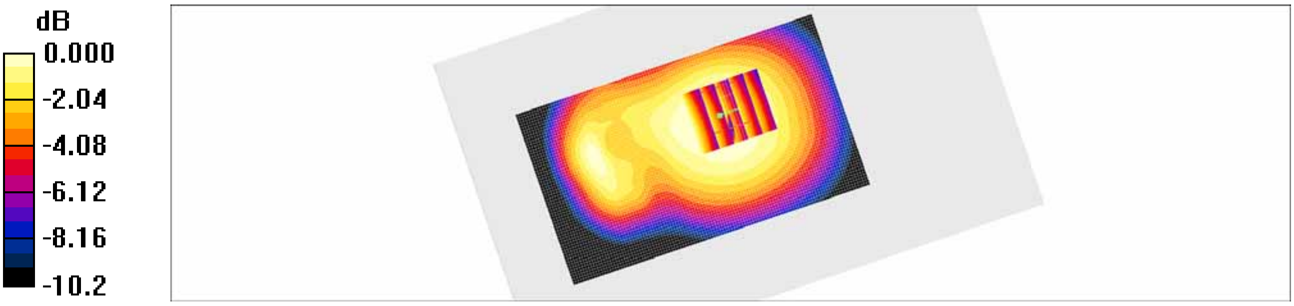
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.35, 6.35, 6.35); Calibrated: 2015-01-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- 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

GSM850 Body Rear 1Tx 190ch/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.350 mW/g

GSM850 Body Rear 1Tx 190ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.9 V/m; Power Drift = -0.072 dB
Peak SAR (extrapolated) = 0.386 W/kg
SAR(1 g) = 0.320 mW/g; SAR(10 g) = 0.238 mW/g
Maximum value of SAR (measured) = 0.343 mW/g



0 dB = 0.343mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature: 22.0 ℃
Ambient Temperature: 22.2 ℃
Test Date: May 19, 2015
Plot No. 11

DUT: LG-H736P; Type: Bar

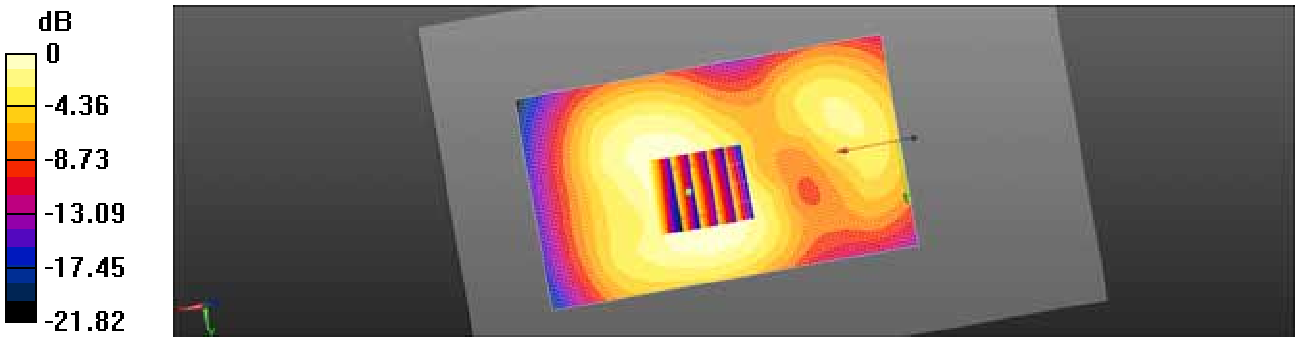
Communication System: UID 0, GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.485 S/m; ε_r = 52.364; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2015-01-27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2015-01-21
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LG-H736P/GSM1900 Body Rear 1Tx 661ch/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.241 W/kg

LG-H736P/GSM1900 Body Rear 1Tx 661ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.485 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.303 W/kg
SAR(1 g) = 0.214 W/kg; SAR(10 g) = 0.146 W/kg
Maximum value of SAR (measured) = 0.228 W/kg



0 dB = 0.241 W/kg = -6.17 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	22.0 ℃
Ambient Temperature:	22.2 ℃
Test Date:	May 19, 2015
Plot No.	12

DUT: LG-H736P; Type: Bar

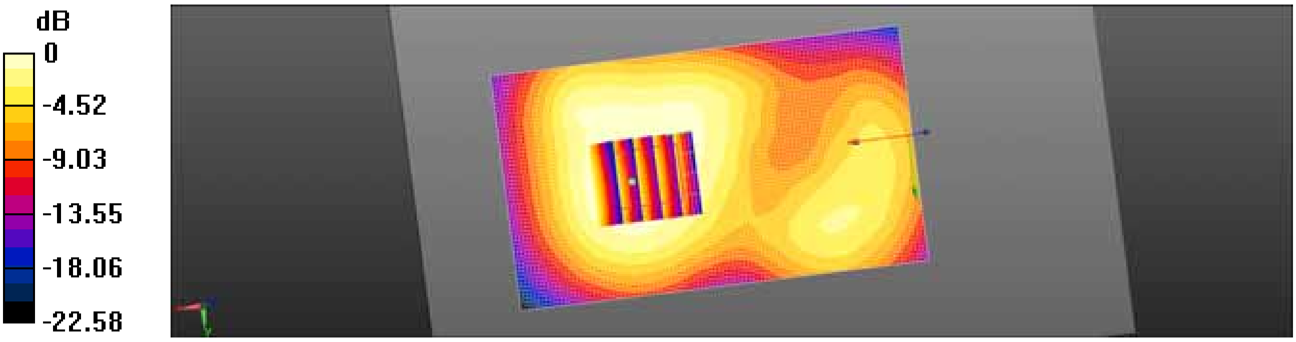
Communication System: UID 0, GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.485 S/m; ε_r = 52.364; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2015-01-27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2015-01-21
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LG-H736P/GSM1900 Body Front 1Tx 661ch/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.316 W/kg

LG-H736P/GSM1900 Body Front 1Tx 661ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.672 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.419 W/kg
SAR(1 g) = 0.300 W/kg; SAR(10 g) = 0.206 W/kg
Maximum value of SAR (measured) = 0.318 W/kg



0 dB = 0.316 W/kg = -5.00 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	19.8 ℃
Ambient Temperature:	20.0 ℃
Test Date:	May 13, 2015
Plot No.	13

DUT: LG-H736P; Type: Bar

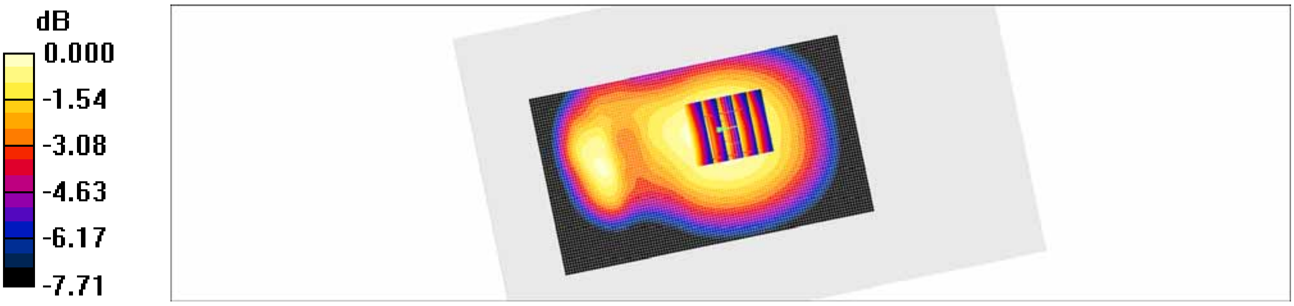
Communication System: WCDMA850; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.35, 6.35, 6.35); Calibrated: 2015-01-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- 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

WCDMA850 Body Rear 4183ch Quick case Closed/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.300 mW/g

WCDMA850 Body Rear 4183ch Quick case Closed/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.2 V/m; Power Drift = -0.143 dB
Peak SAR (extrapolated) = 0.349 W/kg
SAR(1 g) = 0.286 mW/g; SAR(10 g) = 0.220 mW/g
Maximum value of SAR (measured) = 0.301 mW/g



0 dB = 0.301mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	22.0 ℃
Ambient Temperature:	22.2 ℃
Test Date:	May 19, 2015
Plot No.	14

DUT: LG-H736P; Type: Bar

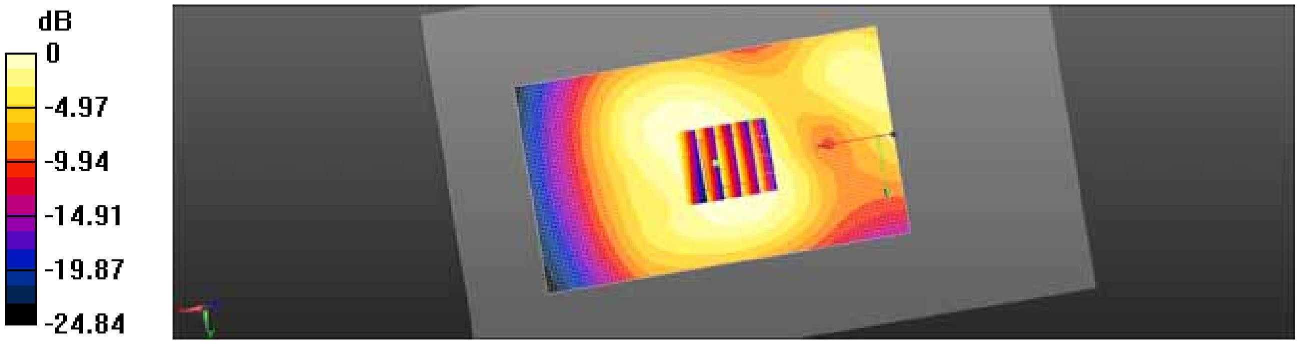
Communication System: UID 0, WCDMA1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.485 S/m; ε_r = 52.364; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2015-01-27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2015-01-21
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LG-H736P/WCDMA1900 Body Rear 9400ch/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.635 W/kg

LG-H736P/WCDMA1900 Body Rear 9400ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.15 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.852 W/kg
SAR(1 g) = 0.599 W/kg; SAR(10 g) = 0.409 W/kg
Maximum value of SAR (measured) = 0.636 W/kg



0 dB = 0.635 W/kg = -1.97 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	22.0 ℃
Ambient Temperature:	22.2 ℃
Test Date:	May 19, 2015
Plot No.	15

DUT: LG-H736P; Type: Bar

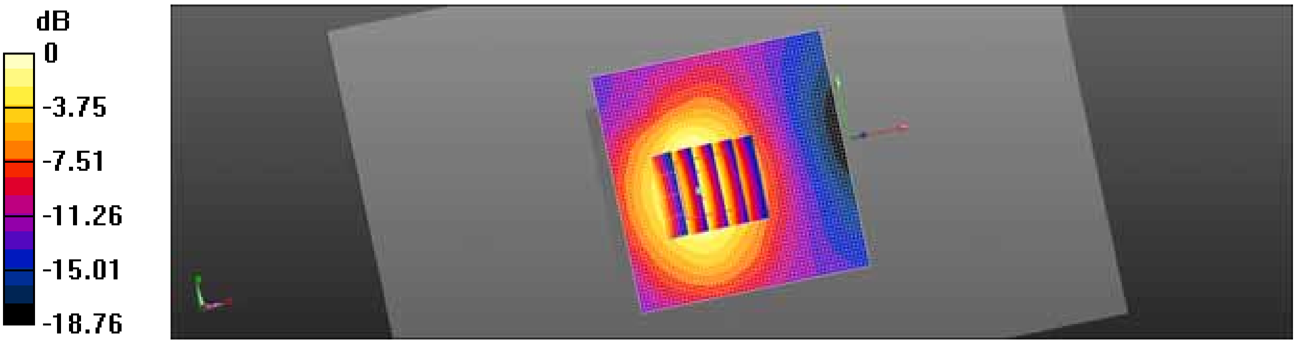
Communication System: UID 0, WCDMA1900 (0); Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.485 S/m; ε_r = 52.364; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2015-01-27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2015-01-21
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LG-H736P/WCDMA1900 Body Bottom 9400ch/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.710 W/kg

LG-H736P/WCDMA1900 Body Bottom 9400ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.39 V/m; Power Drift = 0.10 dB
Peak SAR (extrapolated) = 0.969 W/kg
SAR(1 g) = 0.629 W/kg; SAR(10 g) = 0.383 W/kg
Maximum value of SAR (measured) = 0.686 W/kg



0 dB = 0.710 W/kg = -1.49 dBW/kg

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	21.7 ℃
Ambient Temperature:	21.9 ℃
Test Date:	May 20, 2015
Plot No.	16

DUT: LG-H736P; Type: Bar

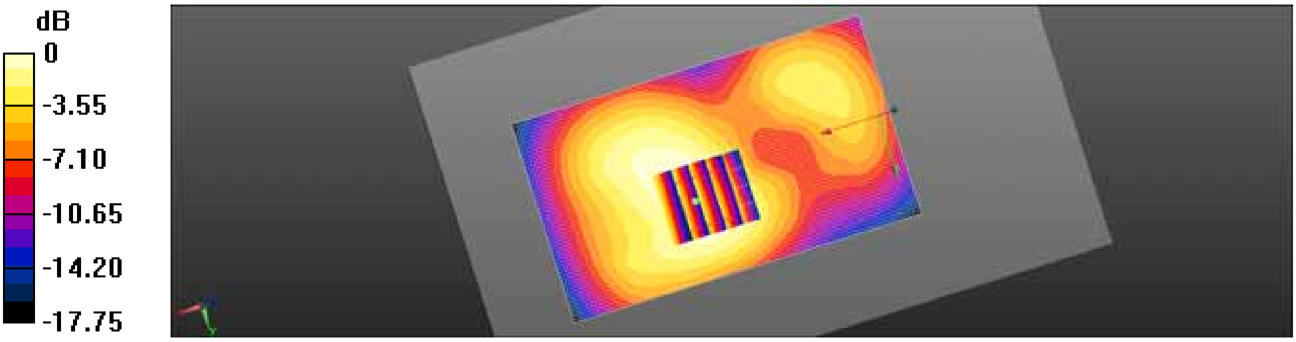
Communication System: UID 0, LTE Band 2; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.485 S/m; ε_r = 53.372; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2015-01-27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2015-01-21
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LG-H736P/LTE Band 2 Body Rear QPSK 20MHz 1RB 49offset 18900ch/Area Scan (61x111x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.696 W/kg

LG-H736P/LTE Band 2 Body Rear QPSK 20MHz 1RB 49offset 18900ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.728 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.979 W/kg
SAR(1 g) = 0.691 W/kg; SAR(10 g) = 0.465 W/kg
Maximum value of SAR (measured) = 0.738 W/kg



0 dB = 0.696 W/kg = -1.58 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature: 21.7 ℃
Ambient Temperature: 21.9 ℃
Test Date: May 20, 2015
Plot No. 17

DUT: LG-H736P; Type: Bar

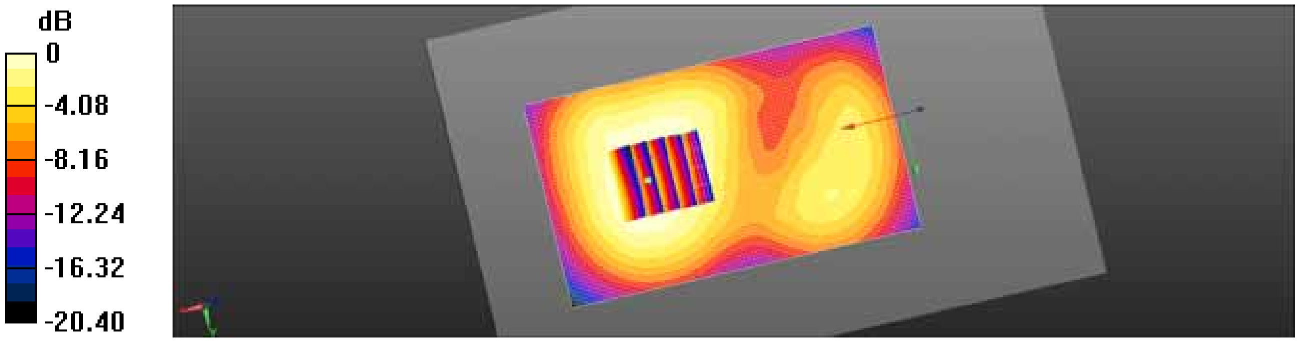
Communication System: UID 0, LTE Band 2; Frequency: 1860 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1860 MHz; σ = 1.464 S/m; ε_r = 53.441; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2015-01-27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2015-01-21
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LG-H736P/LTE Band 2 Body Front QPSK 20MHz 1RB 0offset 18700ch/Area Scan (61x111x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.953 W/kg

LG-H736P/LTE Band 2 Body Front QPSK 20MHz 1RB 0offset 18700ch/Zoom Scan (5x5x7)/Cube 0:
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.05 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 1.26 W/kg
SAR(1 g) = 0.898 W/kg; SAR(10 g) = 0.615 W/kg
Maximum value of SAR (measured) = 0.953 W/kg



0 dB = 0.953 W/kg = -0.21 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature: 19.7 ℃
Ambient Temperature: 19.9 ℃
Test Date: May 15, 2015
Plot No. 18

DUT: LG-H736P; Type: Bar

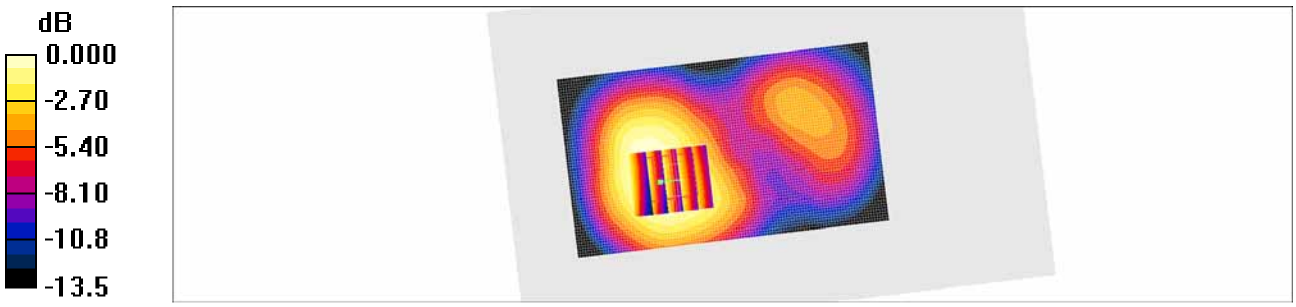
Communication System: LTE Band 4; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.48 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1605; ConvF(4.66, 4.66, 4.66); Calibrated: 2015-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- 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 4 Body Rear QPSK 20MHz 1RB Ooffset 20175ch/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.635 mW/g

LTE Band 4 Body Rear QPSK 20MHz 1RB Ooffset 20175ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 10.2 V/m; Power Drift = 0.063 dB
Peak SAR (extrapolated) = 0.724 W/kg
SAR(1 g) = 0.604 mW/g; SAR(10 g) = 0.432 mW/g
Maximum value of SAR (measured) = 0.641 mW/g



0 dB = 0.641mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	19.7 ℃
Ambient Temperature:	19.9 ℃
Test Date:	May 15, 2015
Plot No.	19

DUT: LG-H736P; Type: Bar

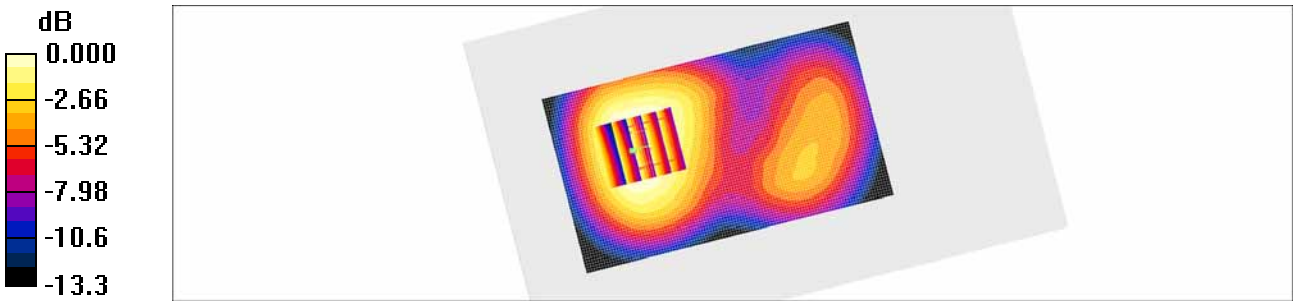
Communication System: LTE Band 4; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1732.5 MHz; σ = 1.48 mho/m; ε_r = 52.8; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1605; ConvF(4.66, 4.66, 4.66); Calibrated: 2015-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- 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 4 Body Front QPSK 20MHz 1RB Ooffset 20175ch/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.655 mW/g

LTE Band 4 Body Front QPSK 20MHz 1RB Ooffset 20175ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 11.0 V/m; Power Drift = -0.113 dB
Peak SAR (extrapolated) = 0.752 W/kg
SAR(1 g) = 0.606 mW/g; SAR(10 g) = 0.437 mW/g
Maximum value of SAR (measured) = 0.636 mW/g



0 dB = 0.636mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	20.0 ℃
Ambient Temperature:	20.2 ℃
Test Date:	May 22, 2015
Plot No.	20

DUT: LG-H736P; Type: Bar

Communication System: LTE Band 7; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2535 MHz; σ = 2.12 mho/m; ε_r = 54.5; ρ = 1000 kg/m^3
Phantom section: Center Section

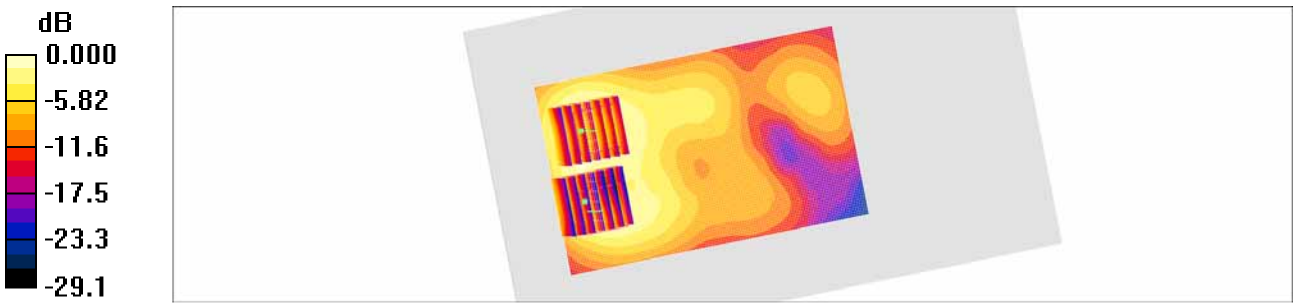
DASY4 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.21, 7.21, 7.21); Calibrated: 2014-08-28
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- 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 49offset 21100ch/Area Scan (81x131x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.697 mW/g

LTE Band 7 Body Rear QPSK 20MHz 1RB 49offset 21100ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.03 V/m; Power Drift = 0.169 dB
Peak SAR (extrapolated) = 0.948 W/kg
SAR(1 g) = 0.487 mW/g; SAR(10 g) = 0.256 mW/g
Maximum value of SAR (measured) = 0.702 mW/g

LTE Band 7 Body Rear QPSK 20MHz 1RB 49offset 21100ch/Zoom Scan (7x7x7)/Cube 1: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.03 V/m; Power Drift = 0.169 dB
Peak SAR (extrapolated) = 0.920 W/kg
SAR(1 g) = 0.396 mW/g; SAR(10 g) = 0.180 mW/g
Maximum value of SAR (measured) = 0.628 mW/g



0 dB = 0.628mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	20.2 ℃
Ambient Temperature:	20.4 ℃
Test Date:	May 14, 2015
Plot No.	21

DUT: LG-H736P; Type: Bar

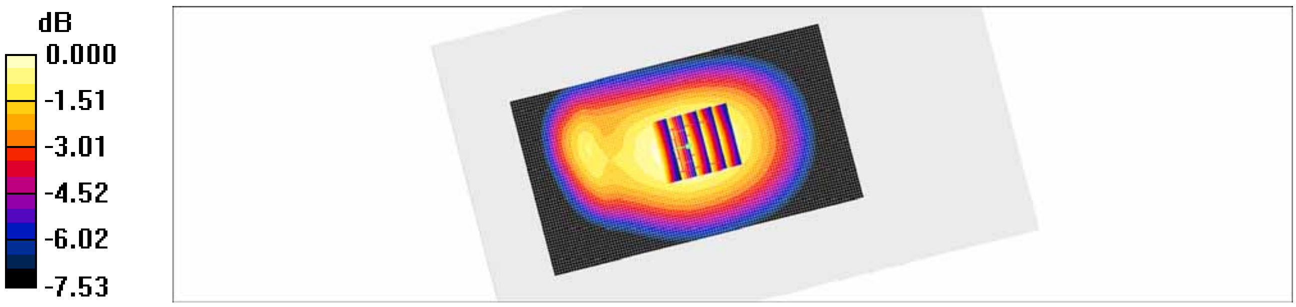
Communication System: LTE 17; Frequency: 710 MHz;Duty Cycle: 1:1
Medium parameters used: f = 710 MHz; σ = 0.938 mho/m; ε_r = 54.8; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1605; ConvF(6.21, 6.21, 6.21); Calibrated: 2015-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- 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 17 Body Rear QPSK 10MHz 1RB Ooffset 23790ch/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.353 mW/g

LTE Band 17 Body Rear QPSK 10MHz 1RB Ooffset 23790ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.9 V/m; Power Drift = 0.057 dB
Peak SAR (extrapolated) = 0.406 W/kg
SAR(1 g) = 0.333 mW/g; SAR(10 g) = 0.260 mW/g
Maximum value of SAR (measured) = 0.348 mW/g



0 dB = 0.348mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature: 20.0 ℃
Ambient Temperature: 20.2 ℃
Test Date: May 22, 2015
Plot No. 22

DUT: LG-H736P; Type: Bar

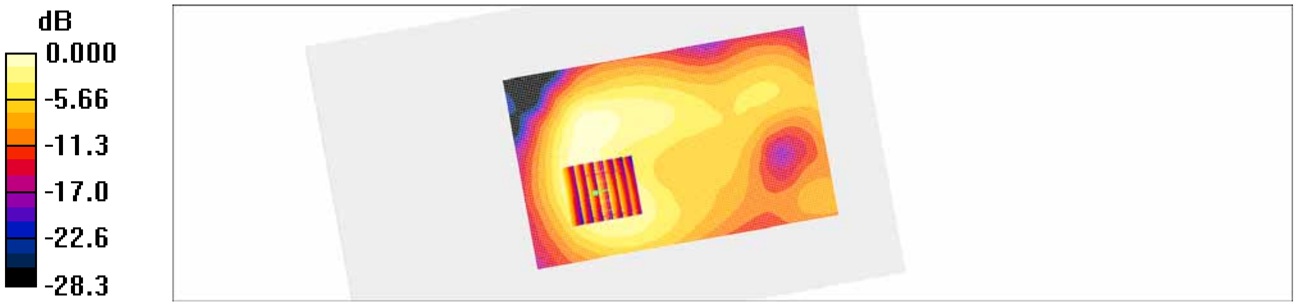
Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.96 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.29, 7.29, 7.29); Calibrated: 2014-08-28
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- 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 (81x131x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.179 mW/g

802.11b Body rear 1Mbps 11ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.09 V/m; Power Drift = -0.009 dB
Peak SAR (extrapolated) = 0.235 W/kg
SAR(1 g) = 0.123 mW/g; SAR(10 g) = 0.065 mW/g
Maximum value of SAR (measured) = 0.179 mW/g



0 dB = 0.179mW/g

Test Laboratory:	HCT CO., LTD
EUT Type:	Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature:	20.0 ℃
Ambient Temperature:	20.2 ℃
Test Date:	May 22, 2015
Plot No.	23

DUT: LG-H736P; Type: Bar

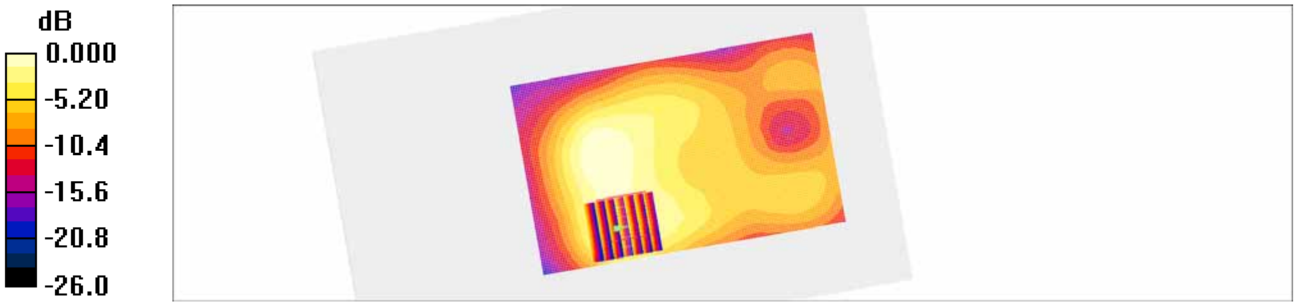
Communication System: 2450MHz FCC; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2462 MHz; σ = 1.96 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.29, 7.29, 7.29); Calibrated: 2014-08-28
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- 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 front 1Mbps 11ch/Area Scan (81x131x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 0.198 mW/g

802.11b Body front 1Mbps 11ch/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.66 V/m; Power Drift = -0.094 dB
Peak SAR (extrapolated) = 0.263 W/kg
SAR(1 g) = 0.131 mW/g; SAR(10 g) = 0.070 mW/g
Maximum value of SAR (measured) = 0.193 mW/g



0 dB = 0.193mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature: 19.8 ℃
Ambient Temperature: 20.0 ℃
Test Date: May 13, 2015
Plot No. 24

DUT: LG-H736P; Type: Bar

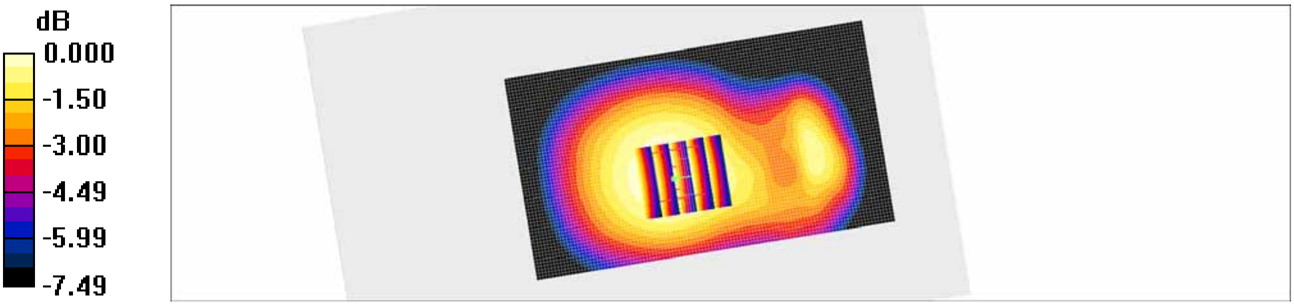
Communication System: GSM 850; Frequency: 836.6 MHz;Duty Cycle: 1:8.3
Medium parameters used (interpolated): f = 836.6 MHz; σ = 0.977 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.35, 6.35, 6.35); Calibrated: 2015-01-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- 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

GSM850 Body Rear 190ch/Area Scan (61x111x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.363 mW/g

GSM850 Body Rear 190ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.1 V/m; Power Drift = -0.006 dB
Peak SAR (extrapolated) = 0.416 W/kg
SAR(1 g) = 0.343 mW/g; SAR(10 g) = 0.265 mW/g
Maximum value of SAR (measured) = 0.360 mW/g



0 dB = 0.360mW/g

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature: 22.0 ℃
Ambient Temperature: 22.2 ℃
Test Date: May 19, 2015
Plot No. 25

DUT: LG-H736P; Type: Bar

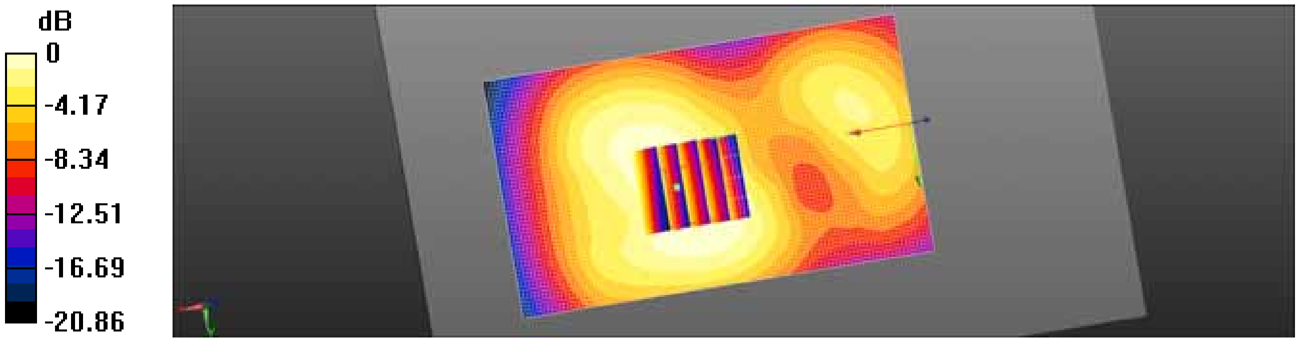
Communication System: UID 0, GSM 1900; Frequency: 1880 MHz;Duty Cycle: 1:8.30042
Medium parameters used: f = 1880 MHz; σ = 1.485 S/m; ε_r = 52.364; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2015-01-27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2015-01-21
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

LG-H736P/GSM1900 Body Rear 661ch/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.253 W/kg

LG-H736P/GSM1900 Body Rear 661ch/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.578 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 0.329 W/kg
SAR(1 g) = 0.236 W/kg; SAR(10 g) = 0.162 W/kg
Maximum value of SAR (measured) = 0.249 W/kg



0 dB = 0.253 W/kg = −5.97 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature: 21.6 ℃
Ambient Temperature: 21.8 ℃
Test Date: May 18, 2015
Plot No. 26

DUT: LG-H736P; Type: Bar

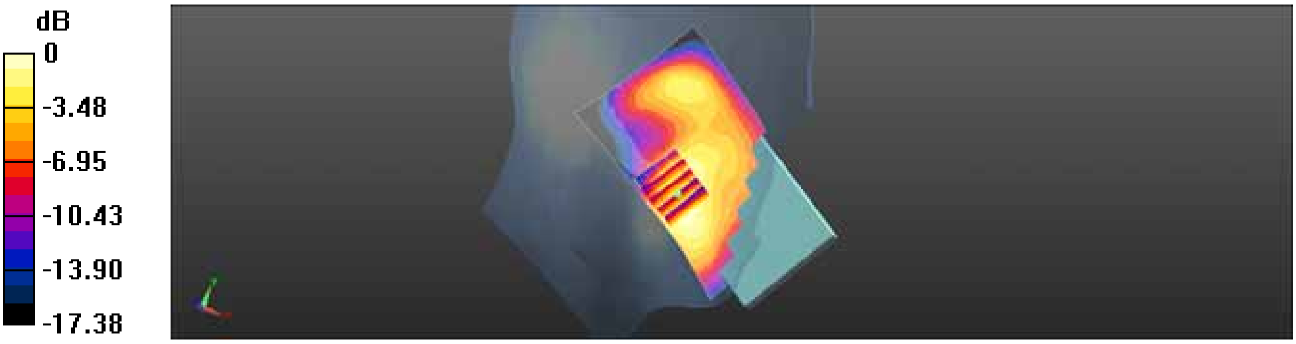
Communication System: UID 0, WCDMA1900; Frequency: 1852.4 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 1852.4 MHz; σ = 1.389 S/m; ε_r = 39.04; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.11, 8.11, 8.11); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: SAM with CRP v5.0_R
- Measurement SW: DASY52, Version 52.8 (0);

LG-H736P/WCDMA1900 Head Left Touch 9262ch Repeat/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.20 W/kg

LG-H736P/WCDMA1900 Head Left Touch 9262ch Repeat/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 16.97 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.867 W/kg; SAR(10 g) = 0.544 W/kg
Maximum value of SAR (measured) = 1.09 W/kg



0 dB = 1.09 W/kg = 0.37 dBW/kg

Test Laboratory: HCT CO., LTD
EUT Type: Cellular/PCS GSM/GPRS/EDGE/WCDMA/HSDPA/HSUPA and LTE Phone with Bluetooth, Wi-Fi and NFC
Liquid Temperature: 21.7 ℃
Ambient Temperature: 21.9 ℃
Test Date: May 20, 2015
Plot No. 27

DUT: LG-H736P; Type: Bar

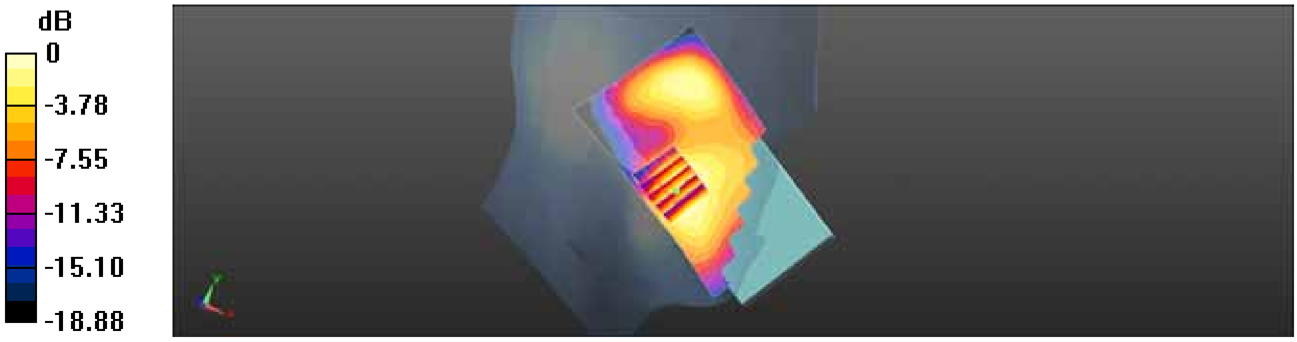
Communication System: UID 0, LTE Band 2; Frequency: 1860 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1860 MHz; σ = 1.398 S/m; ε_r = 39.009; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.11, 8.11, 8.11); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: SAM with CRP v5.0_R
- Measurement SW: DASY52, Version 52.8 (0);

LG-H736P/LTE Band 2 Head Left Touch 20MHz 1RB 0 offest 18700ch Repeat/Area Scan (61x111x1):
Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.32 W/kg

LG-H736P/LTE Band 2 Head Left Touch 20MHz 1RB 0 offest 18700ch Repeat/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.38 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.904 W/kg; SAR(10 g) = 0.565 W/kg
Maximum value of SAR (measured) = 1.14 W/kg



0 dB = 1.14 W/kg = 0.57 dBW/kg

Attachment 2. – Dipole Verification Plots

Verification Data (750 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 20.2 ℃
Test Date: May 14, 2015

DUT: Dipole 750 MHz; Type: D750V3

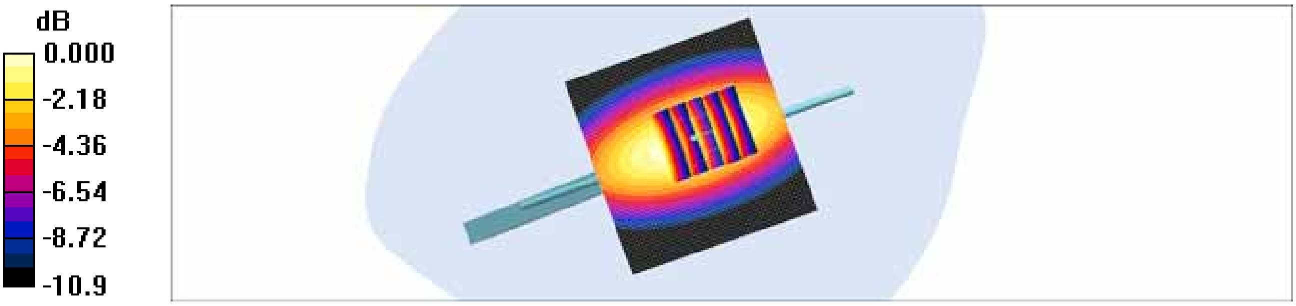
Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.909 mho/m; ε_r = 42.8; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1605; ConvF(6.64, 6.64, 6.64); Calibrated: 2015-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: SAM 1800/1900 MHz; Type: SAM
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

750MHz Head Verification/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.940 mW/g

750MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 33.0 V/m; Power Drift = -0.028 dB
Peak SAR (extrapolated) = 1.29 W/kg
SAR(1 g) = 0.861 mW/g; SAR(10 g) = 0.554 mW/g
Maximum value of SAR (measured) = 0.935 mW/g



0 dB = 0.935mW/g

Verification Data (750 MHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 20.2 ℃

Test Date: May 14, 2015

DUT: Dipole 750 MHz; Type: D750V3

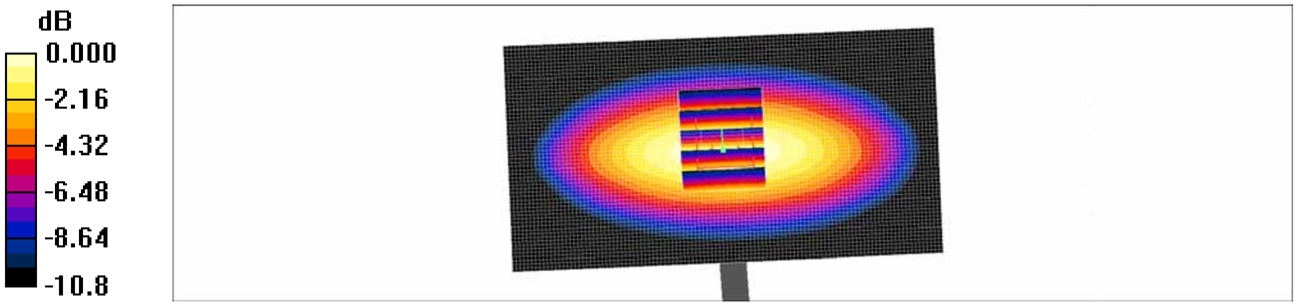
Communication System: CW; Frequency: 750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 750 MHz; σ = 0.974 mho/m; ε_r = 54.4; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1605; ConvF(6.21, 6.21, 6.21); Calibrated: 2015-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- 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

750 MHz Body Verification/Area Scan (111x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 0.956 mW/g

750 MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 32.5 V/m; Power Drift = -0.018 dB
Peak SAR (extrapolated) = 1.32 W/kg
SAR(1 g) = 0.886 mW/g; SAR(10 g) = 0.572 mW/g
Maximum value of SAR (measured) = 0.962 mW/g



0 dB = 0.962mW/g

Verification Data (835 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 19.6 ℃
Test Date: May 12, 2015

DUT: Dipole 835 MHz; Type: D835V2

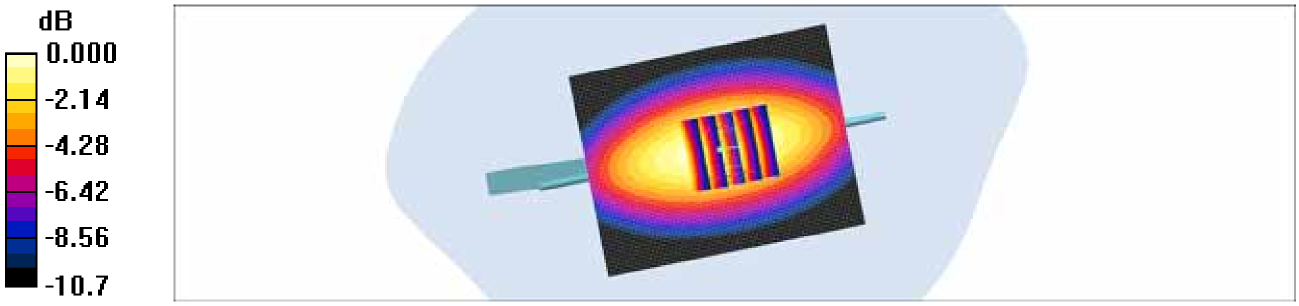
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.903 mho/m; ε_r = 42.6; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.45, 6.45, 6.45); Calibrated: 2015-01-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: SAM 835/900 MHz; Type: SAM
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

835 MHz Head Verification/Area Scan (61x81x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.08 mW/g

835 MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 36.5 V/m; Power Drift = -0.059 dB
Peak SAR (extrapolated) = 1.44 W/kg
SAR(1 g) = 1 mW/g; SAR(10 g) = 0.658 mW/g
Maximum value of SAR (measured) = 1.08 mW/g



0 dB = 1.08mW/g

Verification Data (835 MHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 19.8 ℃

Test Date: May 13, 2015

DUT: Dipole 835 MHz; Type: D835V2

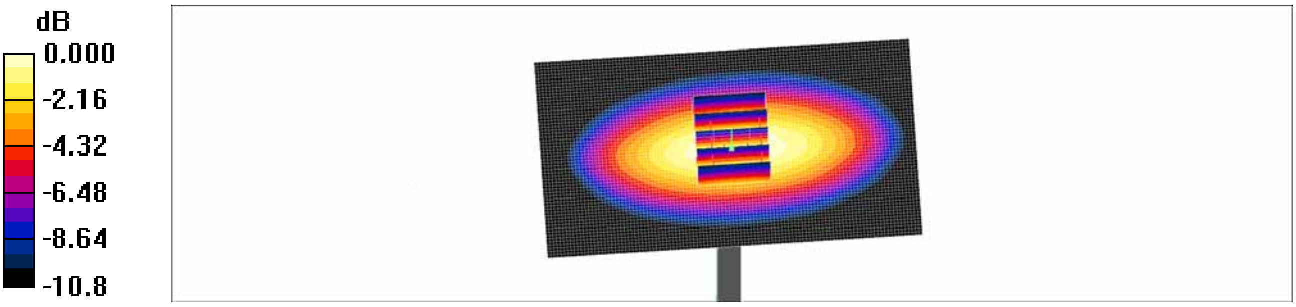
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.976 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(6.35, 6.35, 6.35); Calibrated: 2015-01-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- 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

835 MHz Body Verification/Area Scan (111x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 1.08 mW/g

835 MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 34.3 V/m; Power Drift = -0.013 dB
Peak SAR (extrapolated) = 1.47 W/kg
SAR(1 g) = 0.990 mW/g; SAR(10 g) = 0.640 mW/g
Maximum value of SAR (measured) = 1.07 mW/g



0 dB = 1.07mW/g

Verification Data (1 800 MHz Head)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 19.7 ℃

Test Date: May 15, 2015

DUT: Dipole 1800 MHz; Type: D1800V2

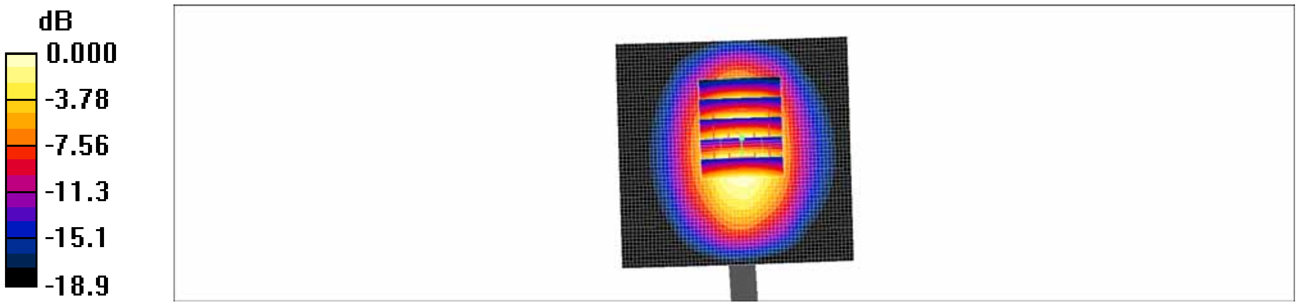
Communication System: CW; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.43 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1605; ConvF(5.2, 5.2, 5.2); Calibrated: 2015-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: SAM 1800/1900 MHz; Type: SAM
- Measurement SW: DASY4, V4.7 Build 80
- Postprocessing SW: SEMCAD, V1.8 Build 186

1800 MHz Head Verification/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.64 mW/g

1800 MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 57.8 V/m; Power Drift = -0.047 dB
Peak SAR (extrapolated) = 6.74 W/kg
SAR(1 g) = 3.89 mW/g; SAR(10 g) = 2.05 mW/g
Maximum value of SAR (measured) = 4.34 mW/g



0 dB = 4.34mW/g

Verification Data (1 800 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 19.7 ℃
Test Date: May 15, 2015

DUT: Dipole 1900 MHz; Type: D1900V2

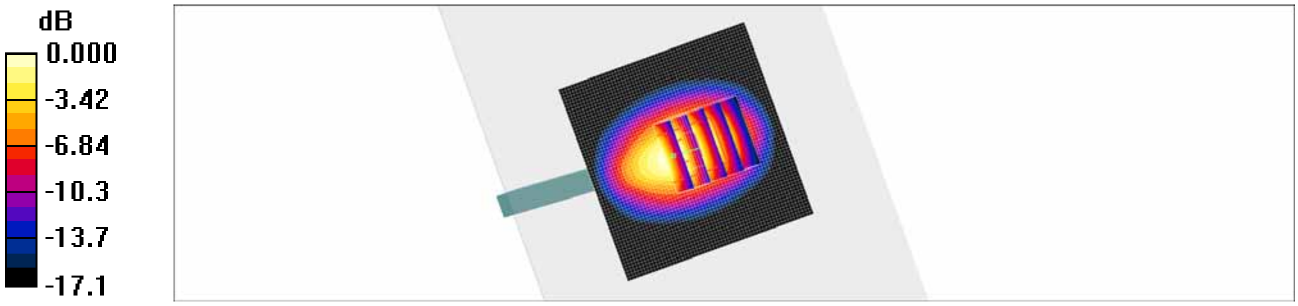
Communication System: CW; Frequency: 1800 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1800 MHz; σ = 1.54 mho/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: ET3DV6 - SN1605; ConvF(4.66, 4.66, 4.66); Calibrated: 2015-04-27
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1225; Calibrated: 2015-03-18
- Phantom: Triple Flat Phantom 5.1C_20120905; Type: QD 000 P51 CA
- Measurement SW: DASY52, V52.8 Build 0
- Postprocessing SW: SEMCAD, V1.8 Build 186

1800 MHz Body Verification/Area Scan (61x61x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 4.60 mW/g

1800 MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 59.3 V/m; Power Drift = -0.016 dB
Peak SAR (extrapolated) = 5.98 W/kg
SAR(1 g) = 3.96 mW/g; SAR(10 g) = 2.21 mW/g
Maximum value of SAR (measured) = 4.46 mW/g



0 dB = 4.46mW/g

Verification Data (1 900 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.6 ℃
Test Date: May 18, 2015

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

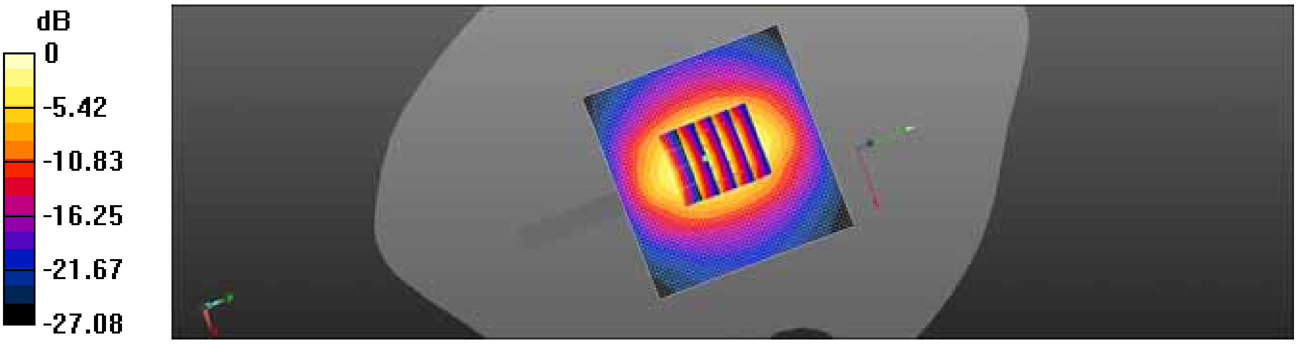
Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.437 S/m; ε_r = 38.867; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.11, 8.11, 8.11); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: SAM with CRP v5.0_Front_20120517
- Measurement SW: DASY52, Version 52.8 (0);

Verification/1900MHz Head Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 4.53 W/kg

Verification/1900MHz Head Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.32 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 7.96 W/kg
SAR(1 g) = 3.98 W/kg; SAR(10 g) = 1.97 W/kg
Maximum value of SAR (measured) = 4.38 W/kg



0 dB = 4.53 W/kg = 6.57 dBW/kg

Verification Data (1 900 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 22.0 ℃
Test Date: May 19, 2015

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

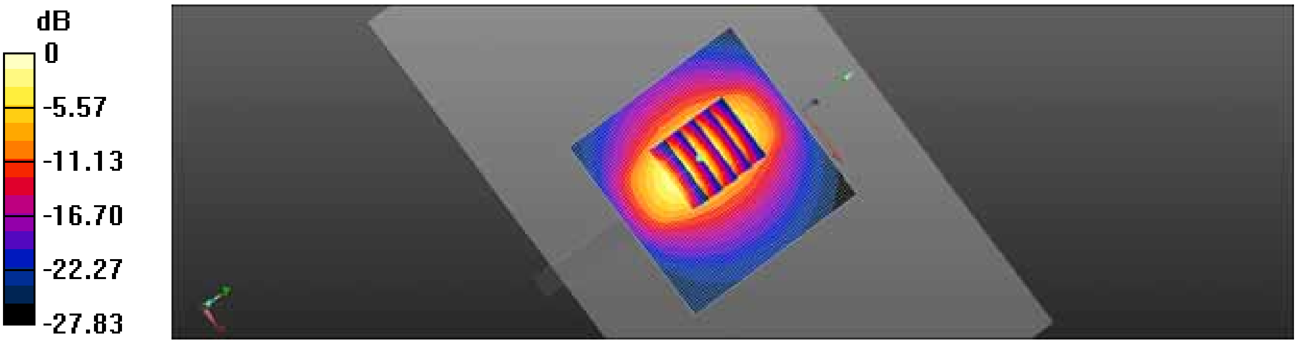
Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.505 S/m; ε_r = 52.303; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2015-01-27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2015-01-21
- Phantom: Triple Flat Phantom 5.1C
- Measurement SW: DASY52, Version 52.8 (0);

SAR Verification/1900MHz Body Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 4.68 W/kg

SAR Verification/1900MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 48.86 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 6.27 W/kg
SAR(1 g) = 3.91 W/kg; SAR(10 g) = 2.12 W/kg (SAR corrected for target medium)
Maximum value of SAR (measured) = 4.40 W/kg



0 dB = 4.68 W/kg = 6.70 dBW/kg

Verification Data (1 900 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.7 ℃
Test Date: May 20, 2015

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

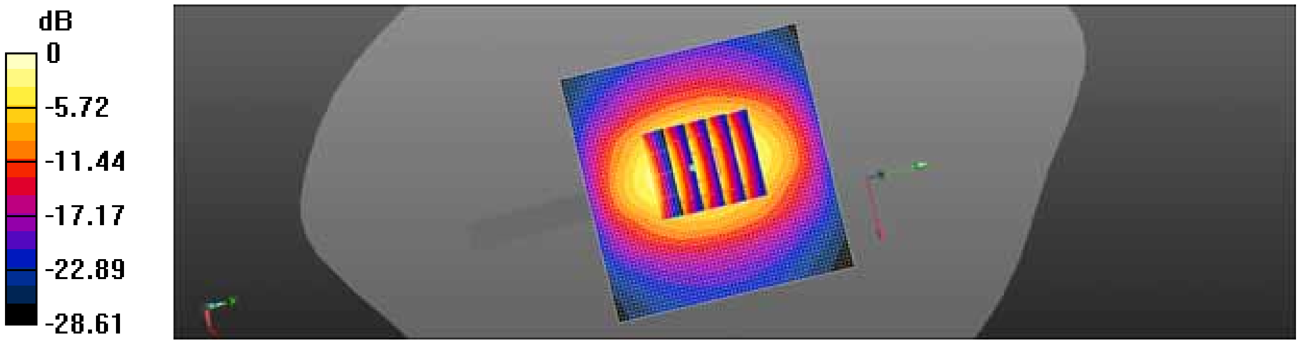
Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.438 S/m; ε_r = 38.877; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(8.11, 8.11, 8.11); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: SAM with CRP v5.0_Front_20120517
- Measurement SW: DASY52, Version 52.8 (0);

Verification/1900MHz Body Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 4.46 W/kg

Verification/1900MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 53.81 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 7.93 W/kg
SAR(1 g) = 3.93 W/kg; SAR(10 g) = 1.94 W/kg
Maximum value of SAR (measured) = 4.34 W/kg



0 dB = 4.46 W/kg = 6.49 dBW/kg

Verification Data (1 900 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 21.7 ℃
Test Date: May 20, 2015

DUT: Dipole 1900 MHz D1900V2; Type: D1900V2

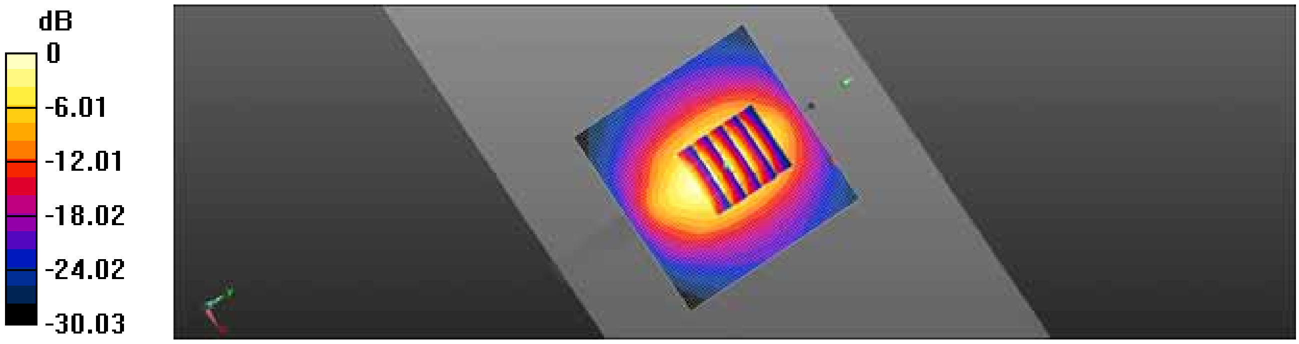
Communication System: UID 0, CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.505 S/m; ε_r = 53.291; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY5 Configuration:

- Probe: ET3DV6 - SN1609; ConvF(4.74, 4.74, 4.74); Calibrated: 2015-01-27;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn446; Calibrated: 2015-01-21
- Phantom: Triple Flat Phantom 5.1C-2014-02-21
- Measurement SW: DASY52, Version 52.8 (0);

Verification/1900MHz Body Verification/Area Scan (61x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 4.44 W/kg

Verification/1900MHz Body Verification/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 57.95 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 6.32 W/kg
SAR(1 g) = 3.83 W/kg; SAR(10 g) = 2.06 W/kg
Maximum value of SAR (measured) = 4.26 W/kg



0 dB = 4.44 W/kg = 6.48 dBW/kg

Verification Data (2 450 MHz Head)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 22.2 ℃

Test Date: May 21, 2015

DUT: Dipole 2450 MHz D2450V2; Type: D2450V2

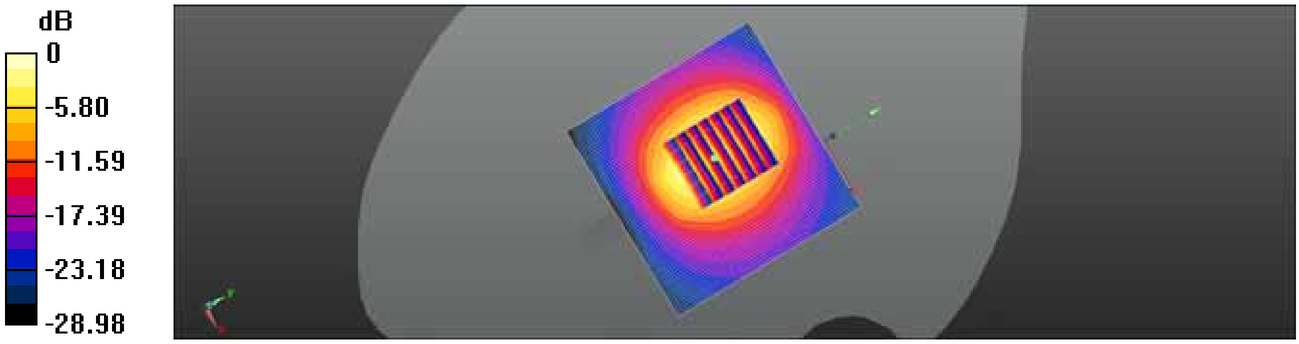
Communication System: UID 0, CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.806 S/m; ε_r = 39.772; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.39, 7.39, 7.39); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: SAM (20deg probe tilt) with CRP v5.0_Left_2014_02_25
- Measurement SW: DASY52, Version 52.8 (0);

Verification/2450MHz Head Verification/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 8.35 W/kg

Verification/2450MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 68.58 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 11.7 W/kg
SAR(1 g) = 5.29 W/kg; SAR(10 g) = 2.42 W/kg
Maximum value of SAR (measured) = 8.27 W/kg



0 dB = 8.35 W/kg = 9.22 dBW/kg

Verification Data (2 450 MHz Body)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 20.0 ℃
Test Date: May 22, 2015

DUT: Dipole 2450 MHz; Type: D2450V2

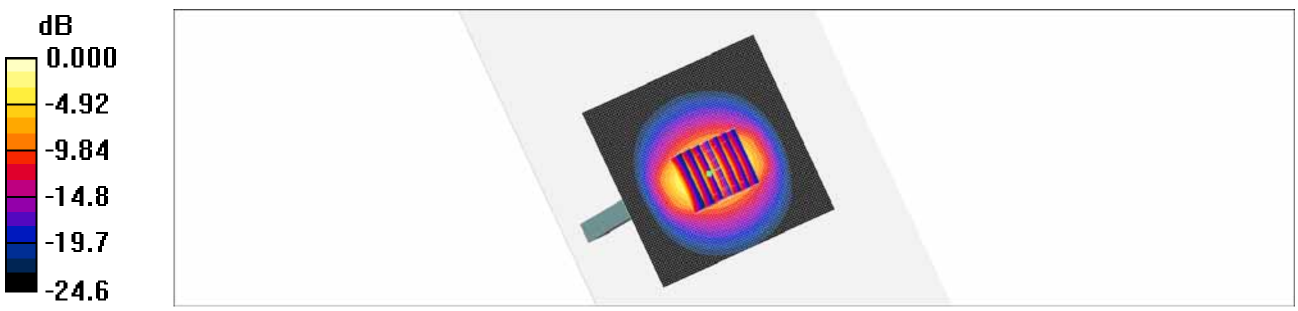
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.94 mho/m; ε_r = 52.7; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.29, 7.29, 7.29); Calibrated: 2014-08-28
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- 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

2450 MHz Body Verification/Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 8.04 mW/g

2450 MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 47.4 V/m; Power Drift = -0.037 dB
Peak SAR (extrapolated) = 11.2 W/kg
SAR(1 g) = 5.07 mW/g; SAR(10 g) = 2.27 mW/g
Maximum value of SAR (measured) = 7.95 mW/g



0 dB = 7.95mW/g

Verification Data (2 600 MHz Head)

Test Laboratory: HCT CO., LTD
Input Power 100 mW (20 dBm)
Liquid Temp: 22.2 ℃
Test Date: May 21, 2015

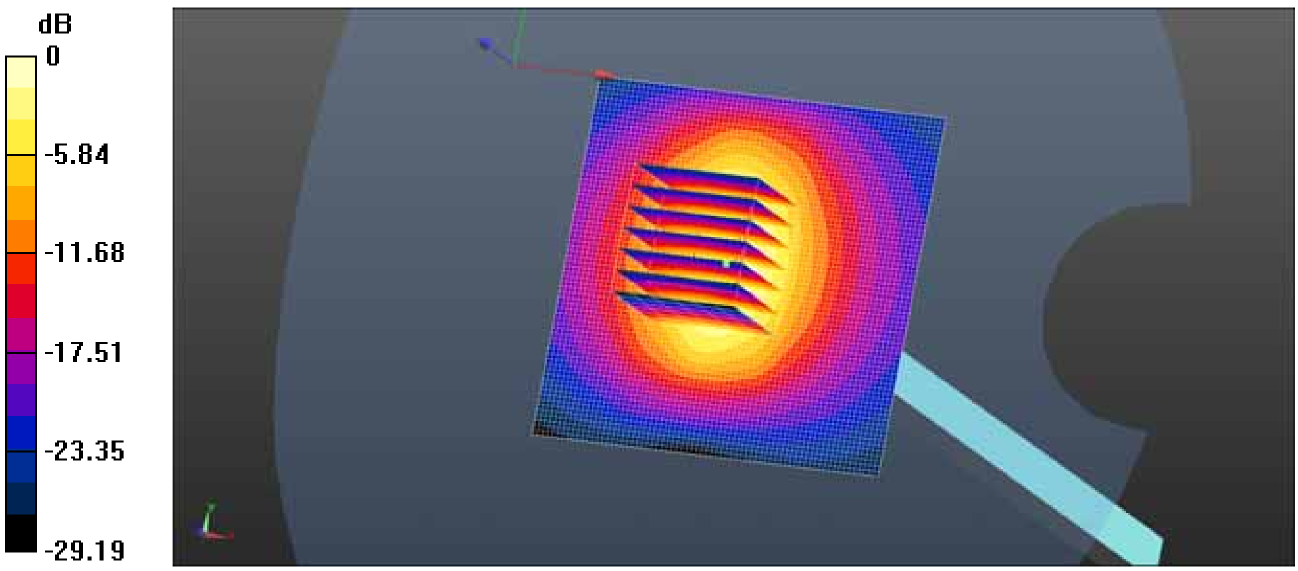
DUT: Dipole 2600 MHz D2600V2; Type: D2600V2

Communication System: UID 0, CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 2.021 S/m; ε_r = 39.014; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.22, 7.22, 7.22); Calibrated: 2014-08-28;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- Phantom: SAM (20deg probe tilt) with CRP v5.0_Left_2014_02_25
- Measurement SW: DASY52, Version 52.8 (8);

Verification/2600MHz Head Verification/Area Scan (71x71x1): Interpolated grid: dx=1.200 mm, dy=1.200 mm
Maximum value of SAR (interpolated) = 9.21 W/kg
Verification/2600MHz Head Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 68.08 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 12.9 W/kg
SAR(1 g) = 5.84 W/kg; SAR(10 g) = 2.67 W/kg
Maximum value of SAR (measured) = 9.16 W/kg



0 dB = 9.21 W/kg = 9.64 dBW/kg

Verification Data (2 600 MHz Body)

Test Laboratory: HCT CO., LTD

Input Power 100 mW (20 dBm)

Liquid Temp: 20.0 ℃

Test Date: May 22, 2015

DUT: Dipole 2600 MHz; Type: D2600V2

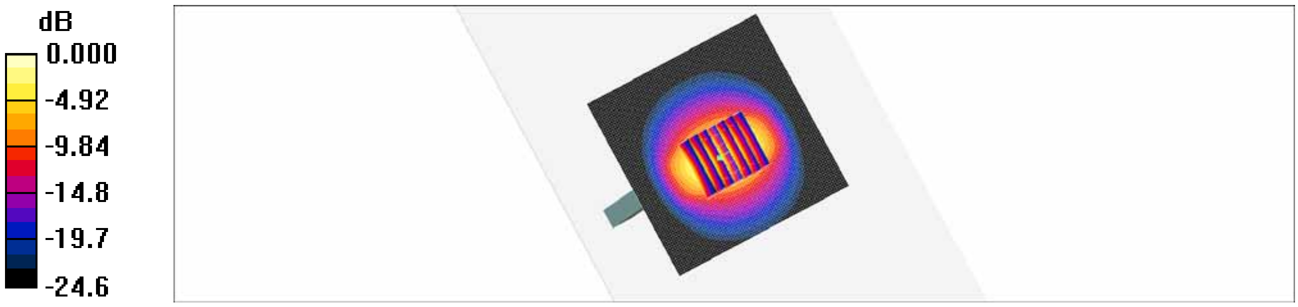
Communication System: CW; Frequency: 2600 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2600 MHz; σ = 2.2 mho/m; ε_r = 54.3; ρ = 1000 kg/m^3
Phantom section: Center Section

DASY4 Configuration:

- Probe: EX3DV4 - SN3903; ConvF(7.21, 7.21, 7.21); Calibrated: 2014-08-28
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1417; Calibrated: 2015-01-27
- 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

2600 MHz Body Verification/Area Scan (81x81x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (interpolated) = 9.16 mW/g

2600 MHz Body Verification/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 46.8 V/m; Power Drift = -0.050 dB
Peak SAR (extrapolated) = 12.7 W/kg
SAR(1 g) = 5.72 mW/g; SAR(10 g) = 2.56 mW/g
Maximum value of SAR (measured) = 8.97 mW/g



0 dB = 8.97mW/g

Attachment 3. – Probe Calibration Data

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)** Certificate No: **ET3-1605_Apr15**

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1605
Calibration procedure(s)	QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	April 27, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	01-Apr-15 (No. 217-02128)	Mar-16
Power sensor E4412A	MY41498087	01-Apr-15 (No. 217-02128)	Mar-16
Reference 3 dB Attenuator	SN: S5054 (3c)	01-Apr-15 (No. 217-02129)	Mar-16
Reference 20 dB Attenuator	SN: S5277 (20x)	01-Apr-15 (No. 217-02132)	Mar-16
Reference 30 dB Attenuator	SN: S5129 (30b)	01-Apr-15 (No. 217-02133)	Mar-16
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: April 29, 2015

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: ET3-1605_Apr15 Page 1 of 11

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Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

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Probe ET3DV6

SN:1605

Manufactured: July 27, 2001
Calibrated: April 27, 2015

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1605

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.49	1.91	1.61	± 10.1 %
DCP (mV)[B]	100.4	99.7	100.3	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	189.6	±3.0 %
		Y	0.0	0.0	1.0		194.2	
		Z	0.0	0.0	1.0		177.7	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1605

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	41.9	0.89	6.64	6.64	6.64	0.26	3.00	± 12.0 %
835	41.5	0.90	6.33	6.33	6.33	0.28	3.00	± 12.0 %
900	41.5	0.97	6.14	6.14	6.14	0.31	3.00	± 12.0 %
1450	40.5	1.20	5.37	5.37	5.37	0.45	2.64	± 12.0 %
1750	40.1	1.37	5.20	5.20	5.20	0.73	2.15	± 12.0 %
1900	40.0	1.40	5.01	5.01	5.01	0.80	2.12	± 12.0 %
1950	40.0	1.40	4.94	4.94	4.94	0.80	2.05	± 12.0 %
2300	39.5	1.67	4.77	4.77	4.77	0.80	1.88	± 12.0 %
2450	39.2	1.80	4.57	4.57	4.57	0.85	1.75	± 12.0 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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DASY/EASY - Parameters of Probe: ET3DV6 - SN:1605

Calibration Parameter Determined in Body Tissue Simulating Media

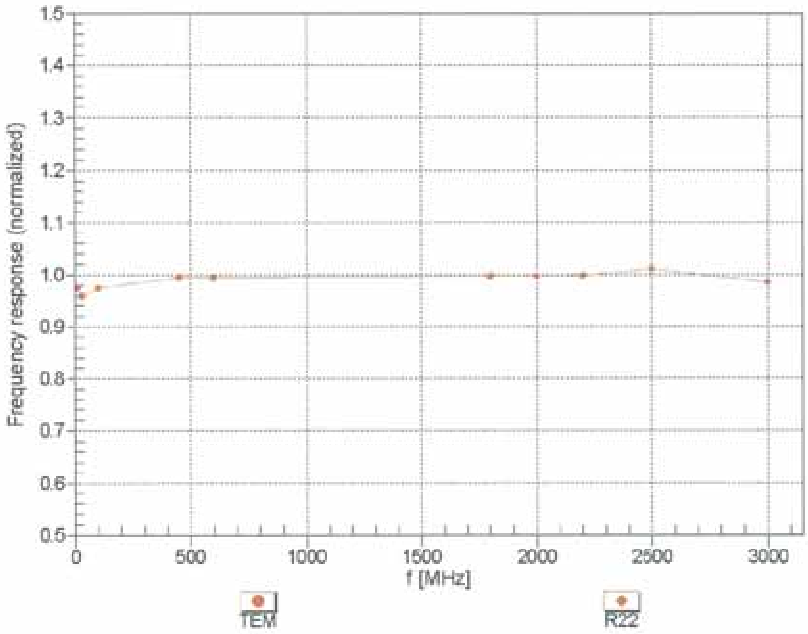
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
750	55.5	0.96	6.21	6.21	6.21	0.30	2.71	± 12.0 %
835	55.2	0.97	6.11	6.11	6.11	0.30	3.00	± 12.0 %
1750	53.4	1.49	4.66	4.66	4.66	0.80	2.52	± 12.0 %
1900	53.3	1.52	4.54	4.54	4.54	0.80	2.32	± 12.0 %
2450	52.7	1.95	4.18	4.18	4.18	0.79	1.80	± 12.0 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

ET3DV6– SN:1605 April 27, 2015

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)



Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

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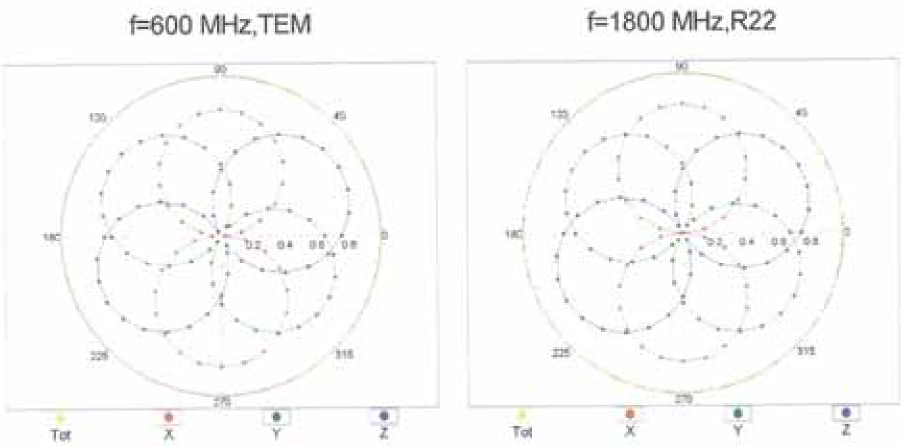
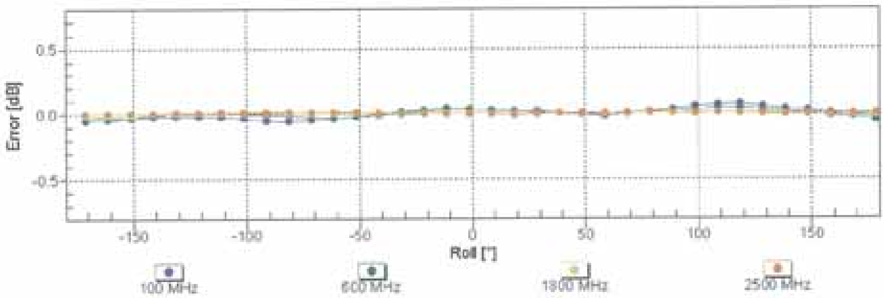
ET3DV6– SN:1605 April 27, 2015

Receiving Pattern (ϕ), ϑ = 0°





Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

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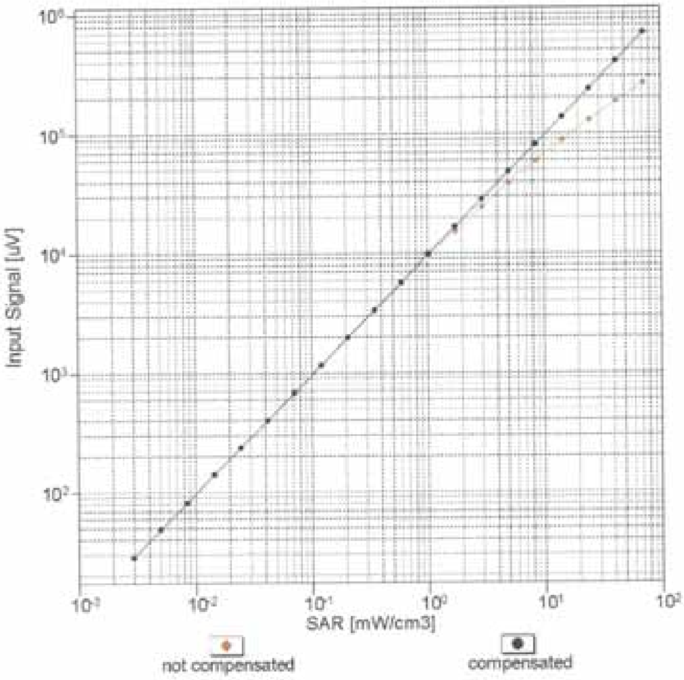
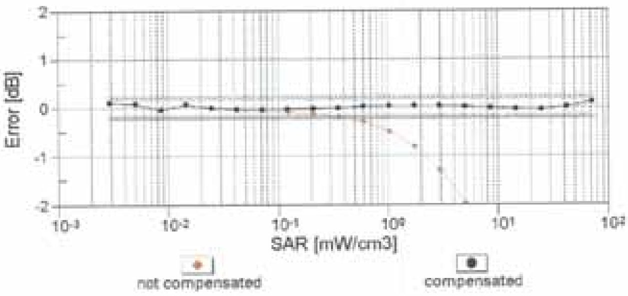
ET3DV6– SN:1605 April 27, 2015

Dynamic Range f(SAR$_{head}$)

(TEM cell , f_{eval}= 1900 MHz)





Uncertainty of Linearity Assessment: ± 0.6% (k=2)

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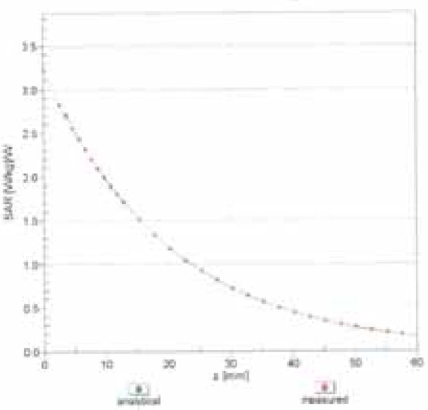
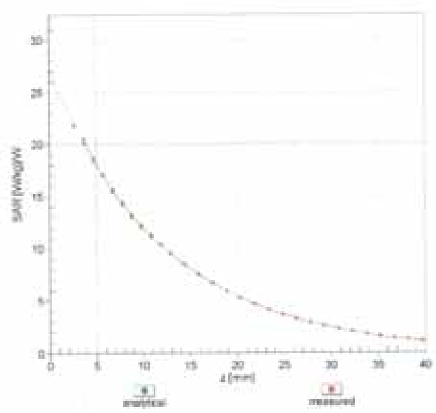
ET3DV6– SN:1605 April 27, 2015

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

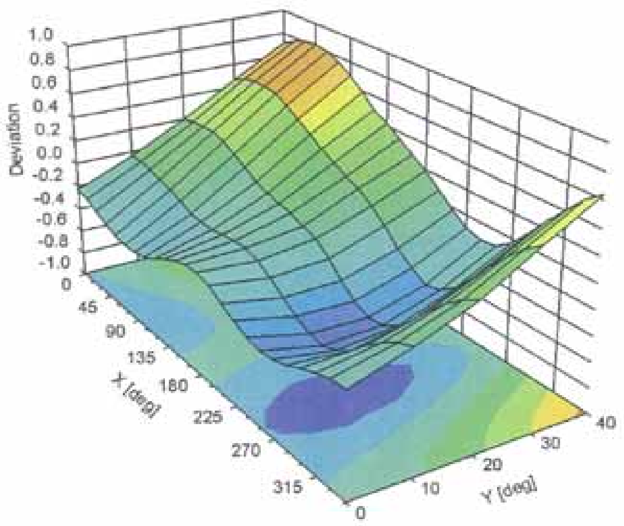


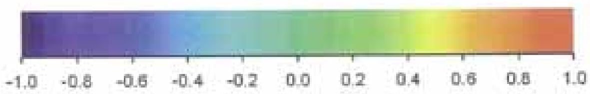
f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz





Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

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DASY/EASY - Parameters of Probe: ET3DV6 - SN:1605

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	58.7
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **ET3-1609_Jan15**

CALIBRATION CERTIFICATE

Object	ET3DV6 - SN:1609
Calibration procedure(s)	QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6 Calibration procedure for dosimetric E-field probes
Calibration date:	January 27, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Israe Elnaouq	Laboratory Technician	[signature]
Approved by:	Katja Pokovic	Technical Manager	[signature]

Issued: January 28, 2015

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Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle*: The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe ET3DV6

SN:1609

Manufactured: July 27, 2001
Calibrated: January 27, 2015

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

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ET3DV6– SN:1609 January 27, 2015

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	2.00	1.80	1.82	± 10.1 %
DCP (mV)[B]	100.6	100.4	101.2	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	266.1	±3.5 %
		Y	0.0	0.0	1.0		272.1	
		Z	0.0	0.0	1.0		268.9	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
835	41.5	0.90	6.45	6.45	6.45	0.29	3.00	± 12.0 %
900	41.5	0.97	6.32	6.32	6.32	0.32	3.00	± 12.0 %
1450	40.5	1.20	5.68	5.68	5.68	0.78	1.88	± 12.0 %
1750	40.1	1.37	5.38	5.38	5.38	0.73	2.10	± 12.0 %
1900	40.0	1.40	5.18	5.18	5.18	0.75	2.17	± 12.0 %
1950	40.0	1.40	5.00	5.00	5.00	0.78	2.22	± 12.0 %
2450	39.2	1.80	4.57	4.57	4.57	0.80	1.73	± 12.0 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Calibration Parameter Determined in Body Tissue Simulating Media

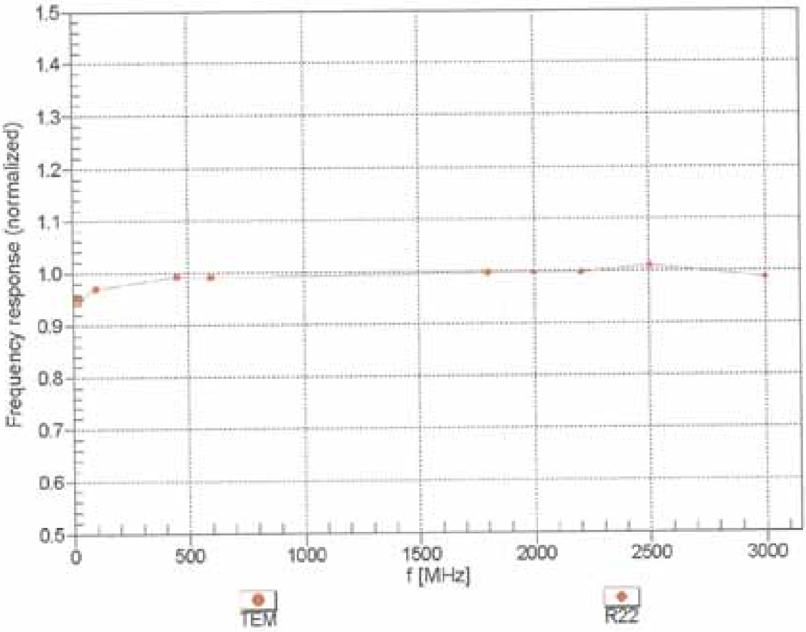
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
835	55.2	0.97	6.35	6.35	6.35	0.47	2.05	± 12.0 %
1750	53.4	1.49	4.95	4.95	4.95	0.80	2.40	± 12.0 %
1900	53.3	1.52	4.74	4.74	4.74	0.80	2.34	± 12.0 %
2450	52.7	1.95	4.33	4.33	4.33	0.80	1.29	± 12.0 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

ET3DV6– SN:1609 January 27, 2015

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)

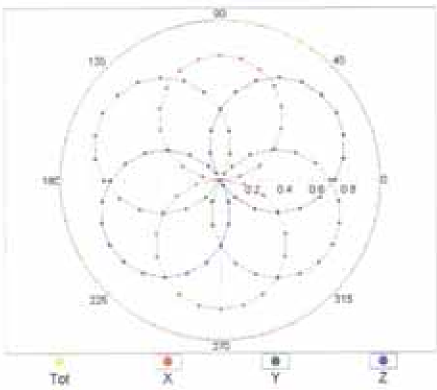


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

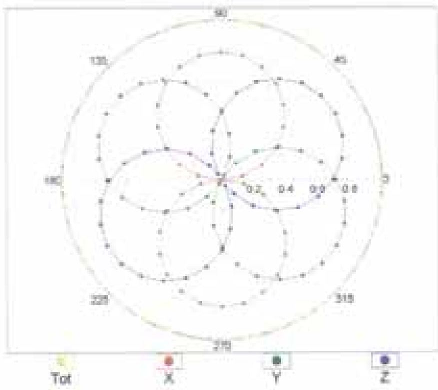
HCT CO., LTD.
74, Seoicheon-ro 578 beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea 467-811
TEL: +82 31 645 6300 FAX: +82 31 645 6401

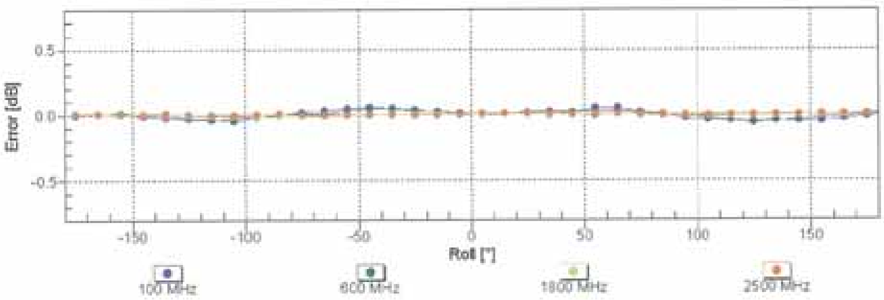
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22





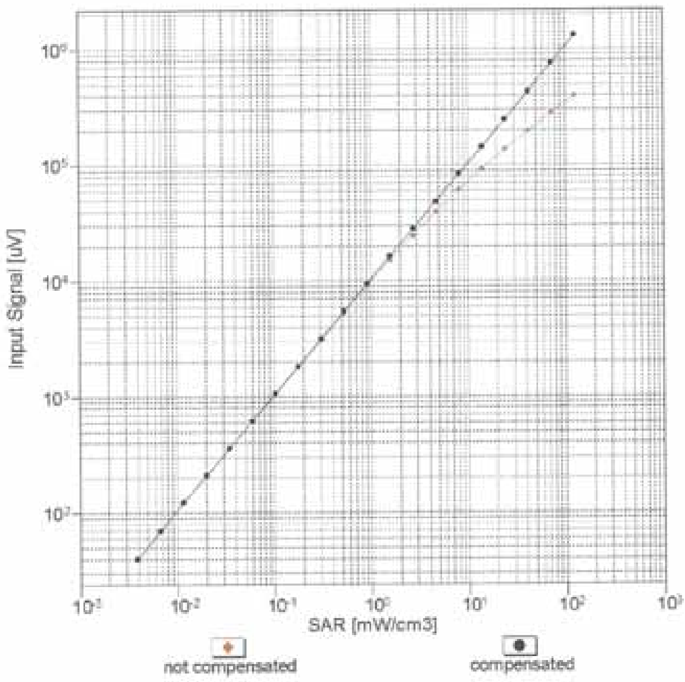
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

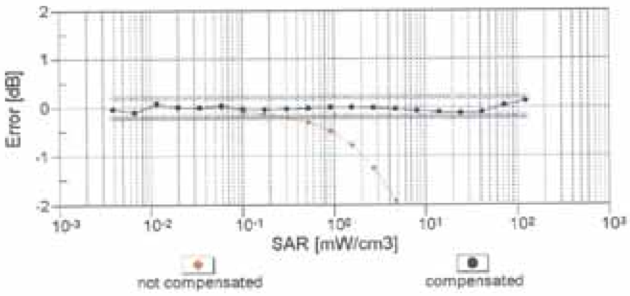
HCT CO., LTD.
74, Seoicheon-ro 578 beon-gil, Majang-myeon, Icheon-si, Gyeonggi-do, Korea 467-811
TEL: +82 31 645 6300 FAX: +82 31 645 6401

ET3DV6– SN:1609 January 27, 2015

Dynamic Range f(SAR$_{head}$)

(TEM cell , f$_{eval}$= 1900 MHz)



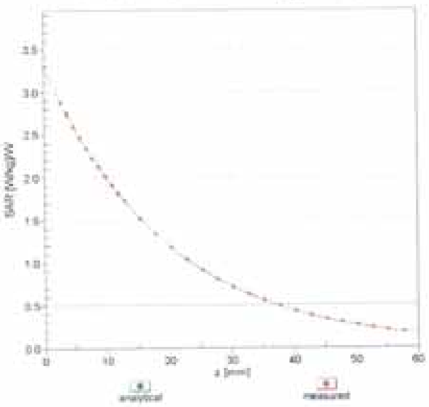


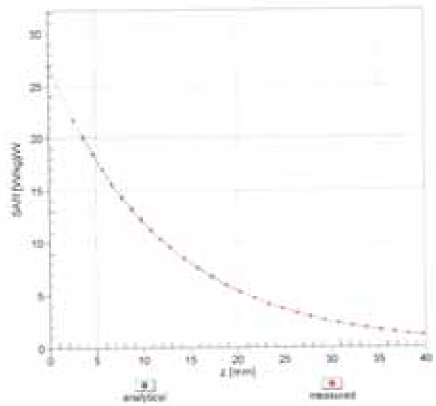
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: ET3-1609_Jan15 Page 9 of 11

ET3DV6– SN:1609 January 27, 2015

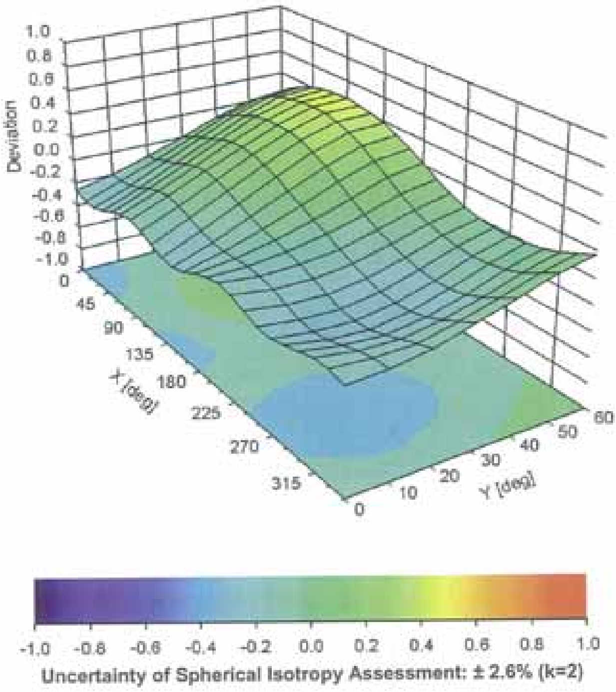
Conversion Factor Assessment





Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: ET3-1609_Jan15 Page 10 of 11

DASY/EASY - Parameters of Probe: ET3DV6 - SN:1609

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-105.1
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	6.8 mm
Probe Tip to Sensor X Calibration Point	2.7 mm
Probe Tip to Sensor Y Calibration Point	2.7 mm
Probe Tip to Sensor Z Calibration Point	2.7 mm
Recommended Measurement Distance from Surface	4 mm

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Engineering AG
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Accreditation No.: **SCS 108**

Client **HCT (Dymstec)**

Certificate No: **EX3-3903_Aug14**

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:3903

Calibration procedure(s): QA CAL-01.v9, QA CAL-14.v4, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: August 28, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-13 (No. ES3-3013_Dec13)	Dec-14
DAE4	SN: 660	13-Dec-13 (No. DAE4-660_Dec13)	Dec-14
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Israe El-Naouq	Laboratory Technician	[signature]
Approved by:	Katja Pokovic	Technical Manager	[signature]

Issued: August 28, 2014

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Certificate No: EX3-3903_Aug14 Page 1 of 11

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C, D	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis
Connector Angle	information used in DASY system to align probe sensor X to the robot coordinate system

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy):* in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe EX3DV4

SN:3903

Manufactured: September 4, 2012
Repaired: August 21, 2014
Calibrated: August 28, 2014

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

EX3DV4– SN:3903 August 28, 2014

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3903

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.41	0.36	0.56	± 10.1 %
DCP (mV)[B]	101.7	103.2	98.1	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	125.2	±2.7 %
		Y	0.0	0.0	1.0		134.1	
		Z	0.0	0.0	1.0		128.7	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

Certificate No: EX3-3903_Aug14 Page 4 of 11

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3903

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
835	41.5	0.90	10.03	10.03	10.03	0.51	0.79	± 12.0 %
900	41.5	0.97	9.87	9.87	9.87	0.50	0.72	± 12.0 %
1450	40.5	1.20	8.69	8.69	8.69	0.27	1.05	± 12.0 %
1750	40.1	1.37	8.33	8.33	8.33	0.55	0.65	± 12.0 %
1900	40.0	1.40	8.11	8.11	8.11	0.76	0.56	± 12.0 %
1950	40.0	1.40	7.83	7.83	7.83	0.80	0.55	± 12.0 %
2300	39.5	1.67	7.70	7.70	7.70	0.53	0.68	± 12.0 %
2450	39.2	1.80	7.39	7.39	7.39	0.42	0.77	± 12.0 %
2600	39.0	1.96	7.22	7.22	7.22	0.46	0.74	± 12.0 %
5200	36.0	4.66	5.55	5.55	5.55	0.30	1.80	± 13.1 %
5300	35.9	4.76	5.32	5.32	5.32	0.30	1.80	± 13.1 %
5500	35.6	4.96	5.05	5.05	5.05	0.35	1.80	± 13.1 %
5600	35.5	5.07	4.85	4.85	4.85	0.35	1.80	± 13.1 %
5800	35.3	5.27	4.74	4.74	4.74	0.40	1.80	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3903

Calibration Parameter Determined in Body Tissue Simulating Media

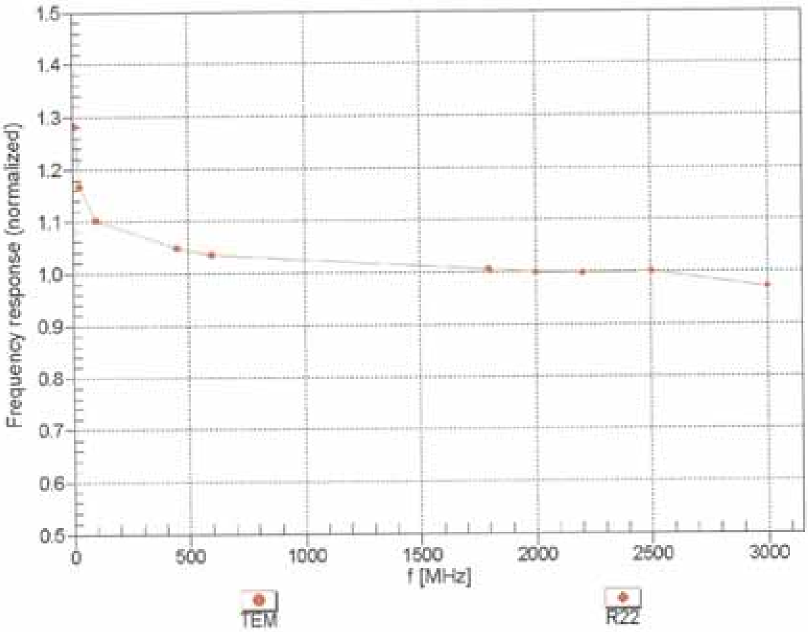
f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
835	55.2	0.97	9.78	9.78	9.78	0.20	1.47	± 12.0 %
1750	53.4	1.49	8.02	8.02	8.02	0.42	0.86	± 12.0 %
1900	53.3	1.52	7.72	7.72	7.72	0.41	0.82	± 12.0 %
2300	52.9	1.81	7.59	7.59	7.59	0.80	0.60	± 12.0 %
2450	52.7	1.95	7.29	7.29	7.29	0.80	0.57	± 12.0 %
2600	52.5	2.16	7.21	7.21	7.21	0.80	0.50	± 12.0 %
5200	49.0	5.30	4.75	4.75	4.75	0.45	1.90	± 13.1 %
5300	48.9	5.42	4.53	4.53	4.53	0.45	1.90	± 13.1 %
5500	48.6	5.65	4.15	4.15	4.15	0.50	1.90	± 13.1 %
5600	48.5	5.77	4.01	4.01	4.01	0.50	1.90	± 13.1 %
5800	48.2	6.00	4.29	4.29	4.29	0.50	1.90	± 13.1 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

EX3DV4– SN:3903 August 28, 2014

Frequency Response of E-Field

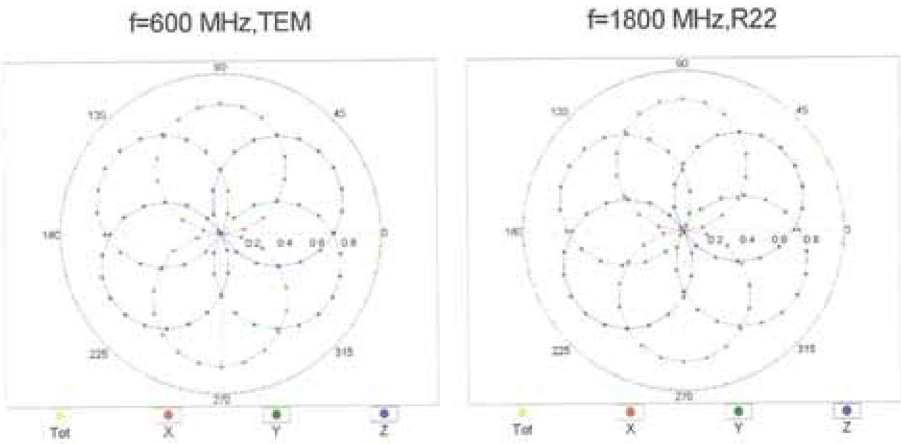
(TEM-Cell:ifi110 EXX, Waveguide: R22)

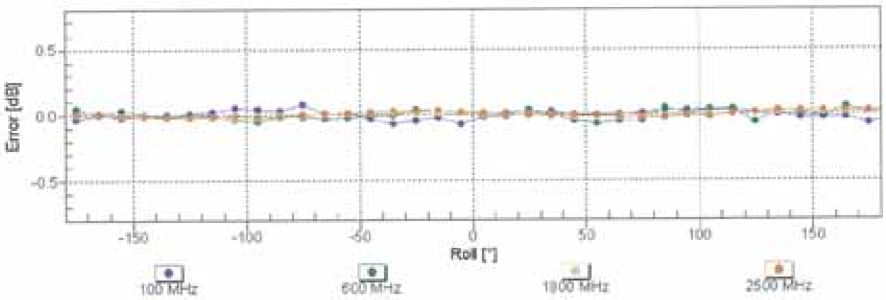


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

EX3DV4– SN:3903 August 28, 2014

Receiving Pattern (ϕ), ϑ = 0°





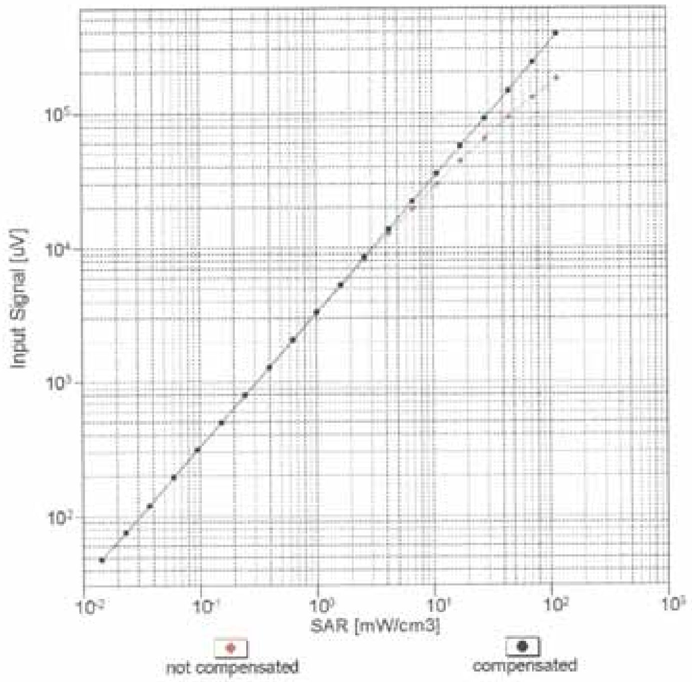
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

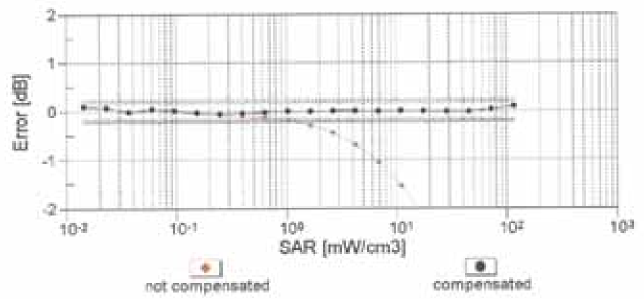
Certificate No: EX3-3903_Aug14 Page 8 of 11

EX3DV4– SN:3903 August 28, 2014

Dynamic Range f(SAR$_{head}$)

(TEM cell , f$_{eval}$= 1900 MHz)



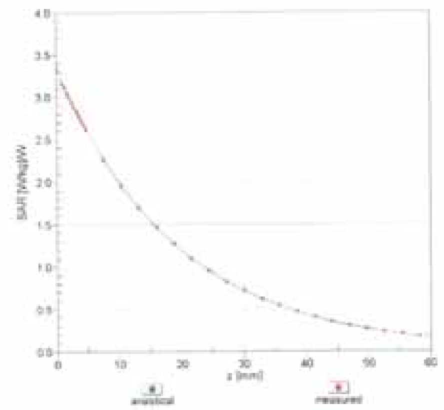


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

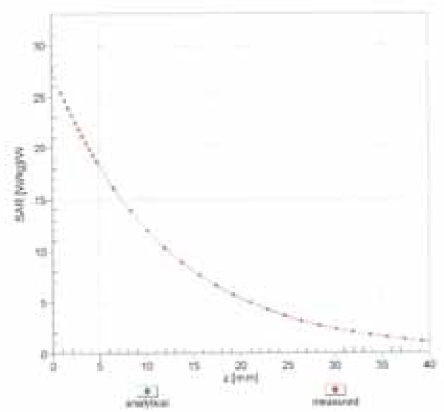
EX3DV4– SN:3903 August 28, 2014

Conversion Factor Assessment

f = 835 MHz,WGLS R9 (H_convF)

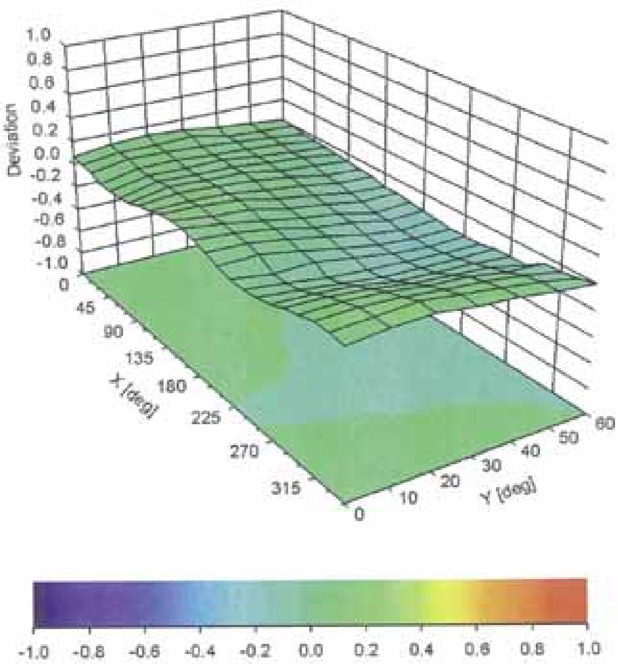


f = 1900 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Certificate No: EX3-3903_Aug14 Page 10 of 11

EX3DV4– SN:3903 August 28, 2014

DASY/EASY - Parameters of Probe: EX3DV4 - SN:3903

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	-35.2
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

Attachment 4. – Dipole Calibration Data

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Accreditation No.: **SCS 108**

Client **HCT (Dymstec)**

Certificate No: **D750V3-1014_Jul14**

CALIBRATION CERTIFICATE

Object	D750V3 - SN: 1014
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 24, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 24, 2014

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Certificate No: D750V3-1014_Jul14 Page 1 of 8

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Accreditation No.: SCS 108

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No: D750V3-1014_Jul14 Page 2 of 8

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	750 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.9	0.89 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.2 ± 6 %	0.92 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.14 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**8.31 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**5.47 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.5	0.96 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	53.9 ± 6 %	1.00 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.24 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**8.63 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.48 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**5.75 W/kg ± 16.5 % (k=2)**

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Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	54.2 Ω + 2.5 jΩ
Return Loss	- 26.6 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.4 Ω + 0.3 jΩ
Return Loss	- 43.4 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.037 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 22, 2010

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DASY5 Validation Report for Head TSL

Date: 24.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

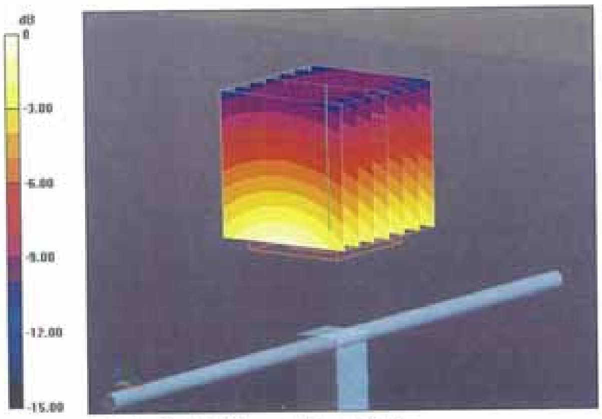
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1014

Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; $\sigma = 0.92$ S/m; $\varepsilon_r = 41.2$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.37, 6.37, 6.37); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

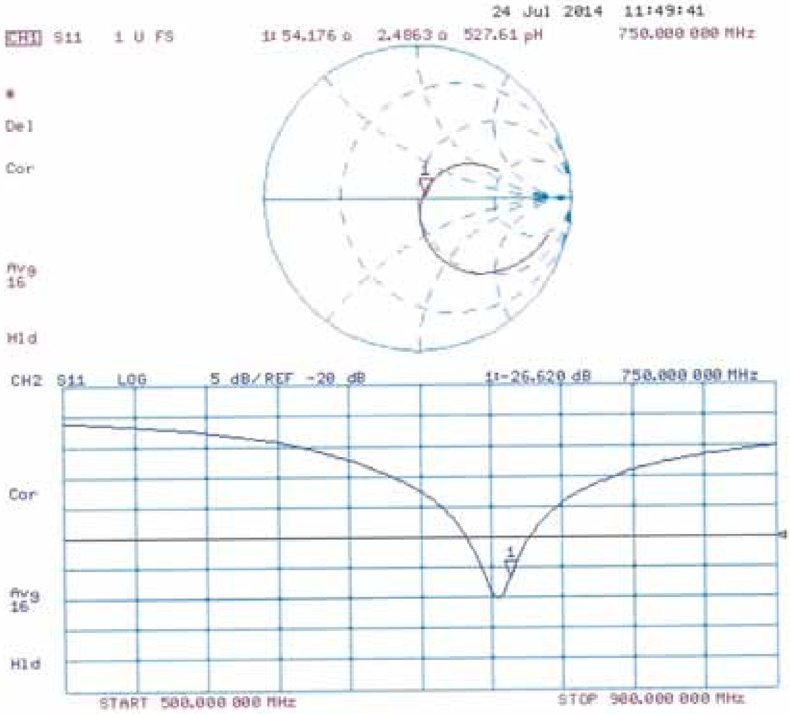
Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.98 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.23 W/kg
SAR(1 g) = 2.14 W/kg; SAR(10 g) = 1.4 W/kg
Maximum value of SAR (measured) = 2.52 W/kg



0 dB = 2.52 W/kg = 4.01 dBW/kg

Certificate No: D750V3-1014_Jul14 Page 5 of 8

Impedance Measurement Plot for Head TSL



Certificate No: D750V3-1014_Jul14 Page 6 of 8

DASY5 Validation Report for Body TSL

Date: 17.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

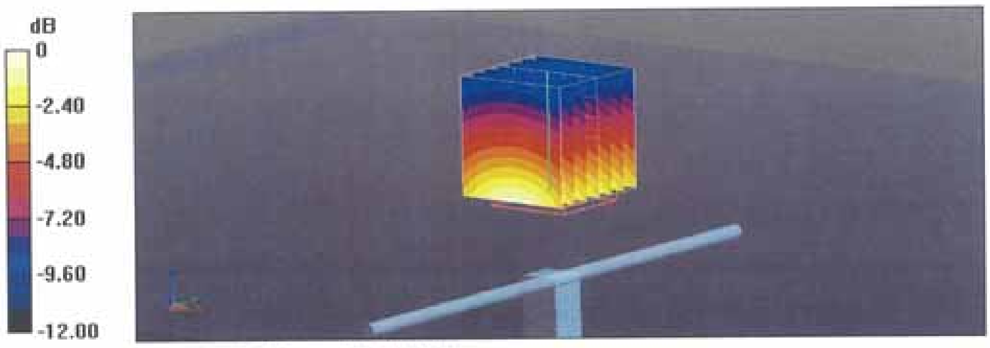
DUT: Dipole 750 MHz; Type: D750V3; Serial: D750V3 - SN: 1014

Communication System: UID 0 - CW; Frequency: 750 MHz
Medium parameters used: f = 750 MHz; $\sigma = 1$ S/m; $\varepsilon_r = 53.9$; $\rho = 1000$ kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.13, 6.13, 6.13); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

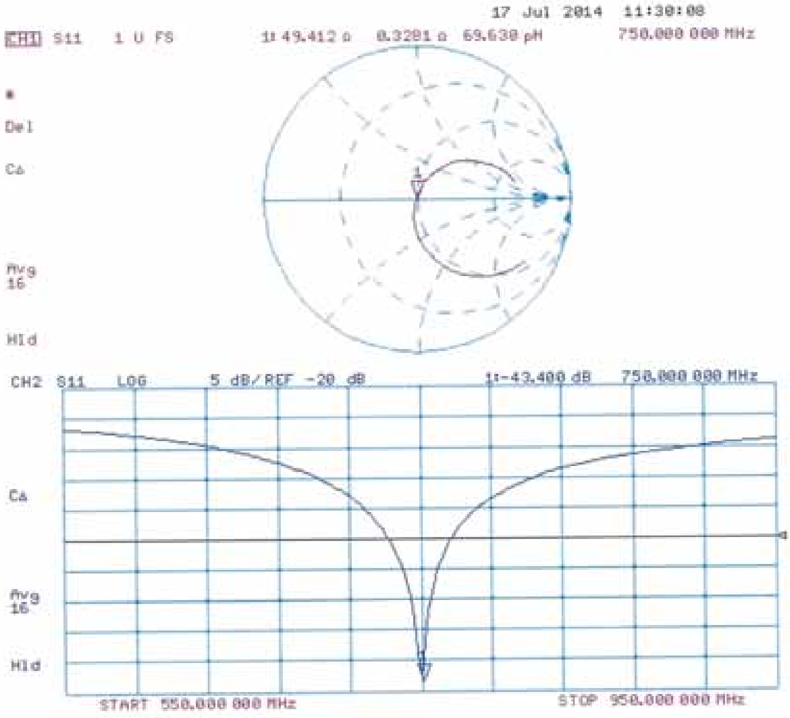
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 52.83 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.28 W/kg
SAR(1 g) = 2.24 W/kg; SAR(10 g) = 1.48 W/kg
Maximum value of SAR (measured) = 2.61 W/kg



0 dB = 2.61 W/kg = 4.17 dBW/kg

Certificate No: D750V3-1014_Jul14 Page 7 of 8

Impedance Measurement Plot for Body TSL



Certificate No: D750V3-1014_Jul14 Page 8 of 8

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Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)** Certificate No: **D835V2-441_Jan15**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 441
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	January 23, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: January 26, 2015

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Accreditation No.: **SCS 0108**

Glossary:

TSL tissue simulating liquid
ConvF sensitivity in TSL / NORM x,y,z
N/A not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Certificate No: D835V2-441_Jan15 Page 2 of 8

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.5 ± 6 %	0.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.36 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.21 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.54 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.04 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	55.8 ± 6 %	1.01 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.40 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.34 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.57 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.14 W/kg ± 16.5 % (k=2)**

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Appendix (Additional assessments outside the scope of SCS0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.7 Ω - 1.0 jΩ
Return Loss	- 34.0 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.2 Ω - 2.7 jΩ
Return Loss	- 27.9 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.369 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	March 09, 2001

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DASY5 Validation Report for Head TSL

Date: 22.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 441

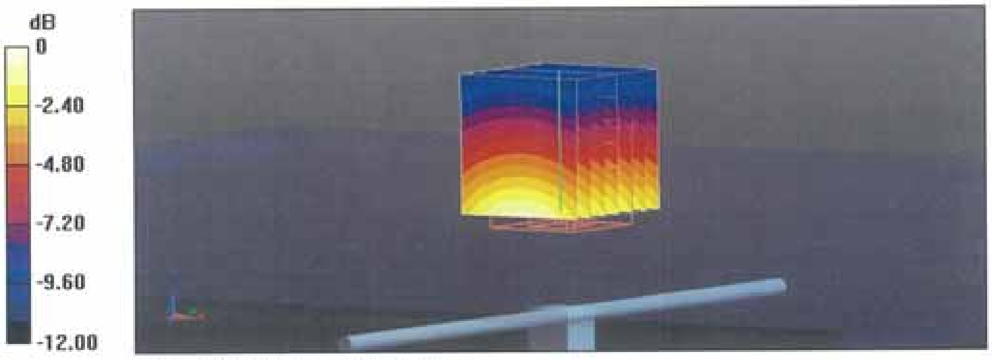
Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.93 S/m; ε_r = 41.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.2, 6.2, 6.2); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

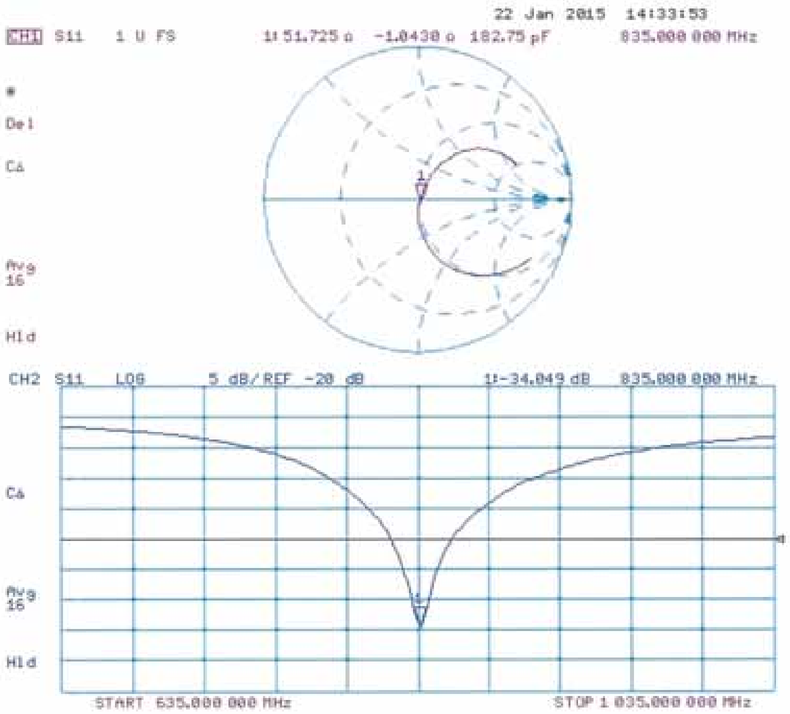
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 56.43 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 3.49 W/kg
SAR(1 g) = 2.36 W/kg; SAR(10 g) = 1.54 W/kg
Maximum value of SAR (measured) = 2.76 W/kg



0 dB = 2.76 W/kg = 4.41 dBW/kg

Certificate No: D835V2-441_Jan15 Page 5 of 8

Impedance Measurement Plot for Head TSL



Certificate No: D835V2-441_Jan15 Page 6 of 8

DASY5 Validation Report for Body TSL

Date: 23.01.2015

Test Laboratory: SPEAG, Zurich, Switzerland

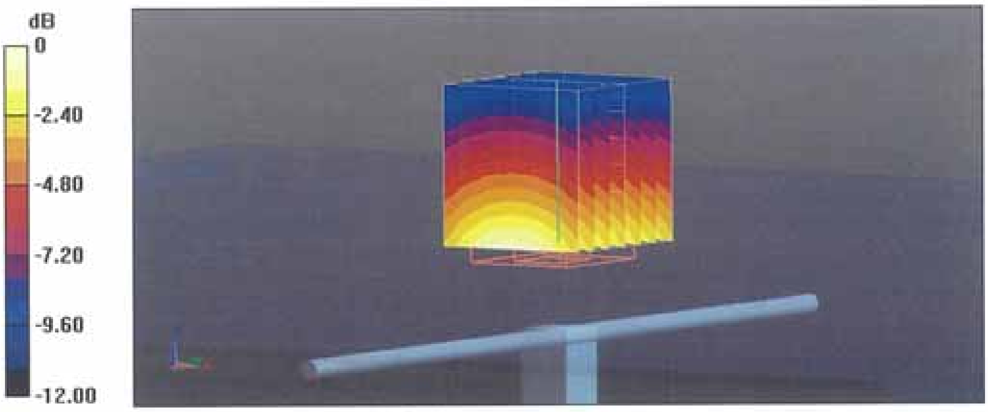
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 441

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.01 S/m; ε_r = 55.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.17, 6.17, 6.17); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

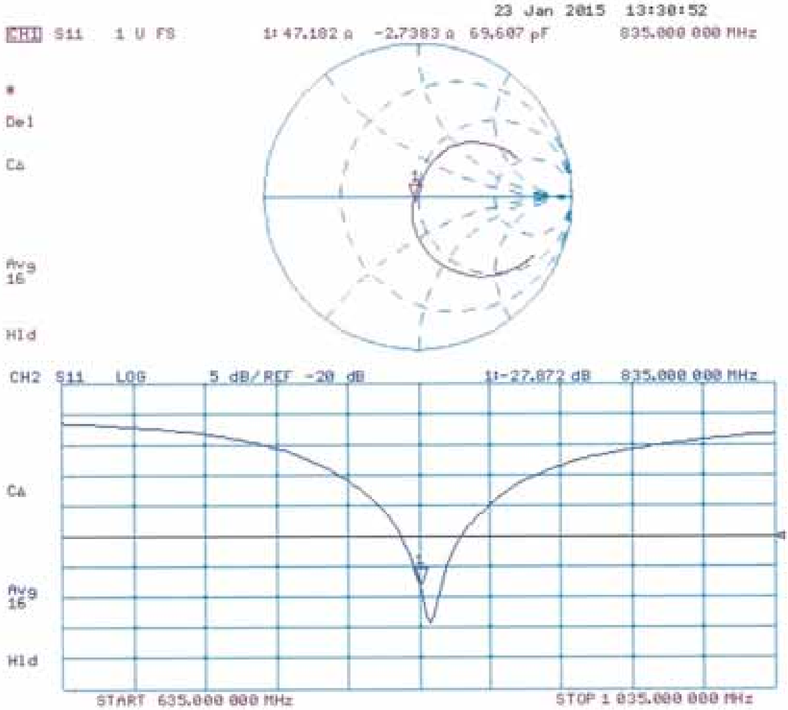
Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 54.59 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 3.53 W/kg
SAR(1 g) = 2.4 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 2.80 W/kg



0 dB = 2.80 W/kg = 4.47 dBW/kg

Certificate No: D835V2-441_Jan15 Page 7 of 8

Impedance Measurement Plot for Body TSL



Certificate No: D835V2-441_Jan15 Page 8 of 8

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Accreditation No.: SCS 0108

Client **HCT (Dymstec)** Certificate No: **D1800V2-2d007_Feb15**

CALIBRATION CERTIFICATE

Object	D1800V2 - SN: 2d007
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	February 19, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Michael Weber	Laboratory Technician	M.Weber
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 20, 2015

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Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1800 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	38.7 ± 6 %	1.44 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	9.82 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**38.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.12 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**20.2 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	51.7 ± 6 %	1.53 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	9.67 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**38.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.10 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**20.3 W/kg ± 16.5 % (k=2)**

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Appendix (Additional assessments outside the scope of SCS0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	47.3 Ω - 6.9 jΩ
Return Loss	- 22.4 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	43.9 Ω - 7.1 jΩ
Return Loss	- 20.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.204 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	July 23, 2001

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DASY5 Validation Report for Head TSL

Date: 19.02.2015

Test Laboratory: SPEAG, Zurich, Switzerland

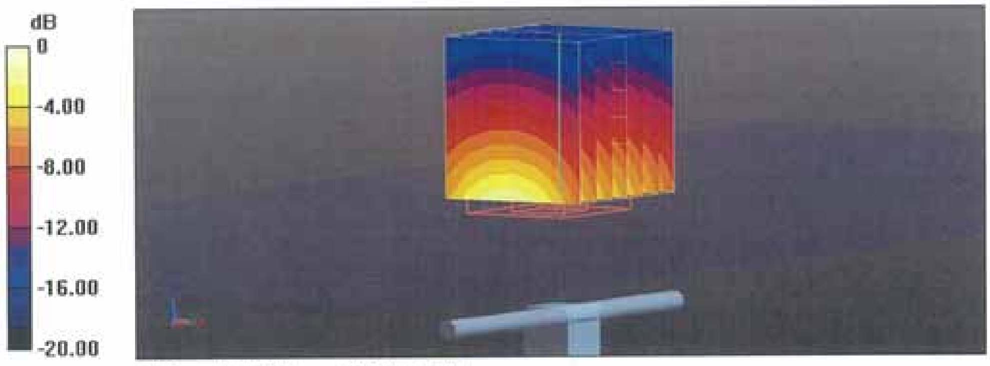
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d007

Communication System: UID 0 - CW; Frequency: 1800 MHz
Medium parameters used: f = 1800 MHz; σ = 1.44 S/m; ε_r = 38.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.06, 5.06, 5.06); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.45 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 18.2 W/kg
SAR(1 g) = 9.82 W/kg; SAR(10 g) = 5.12 W/kg
Maximum value of SAR (measured) = 12.4 W/kg



0 dB = 12.4 W/kg = 10.93 dBW/kg

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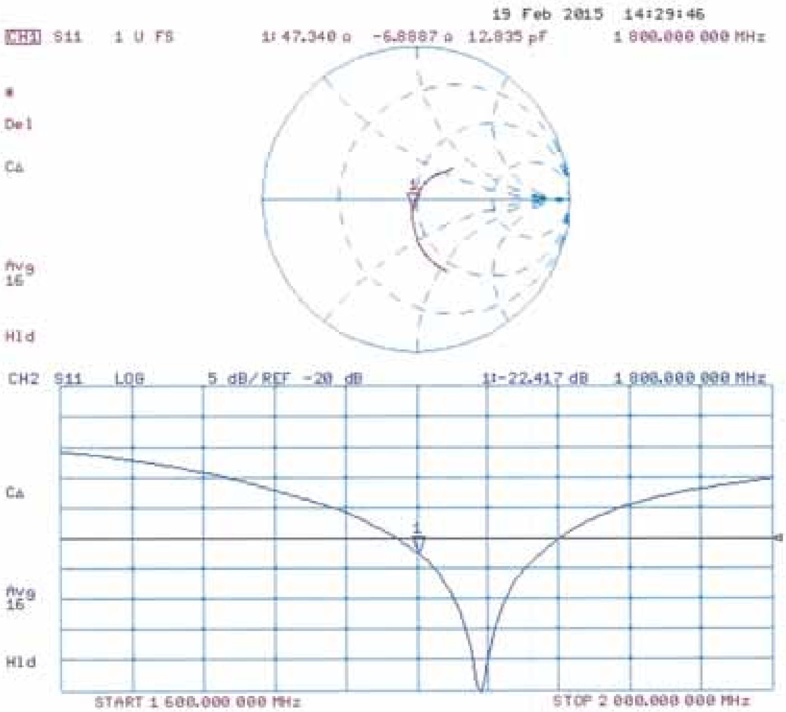
Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 19.02.2015

Test Laboratory: SPEAG, Zurich, Switzerland

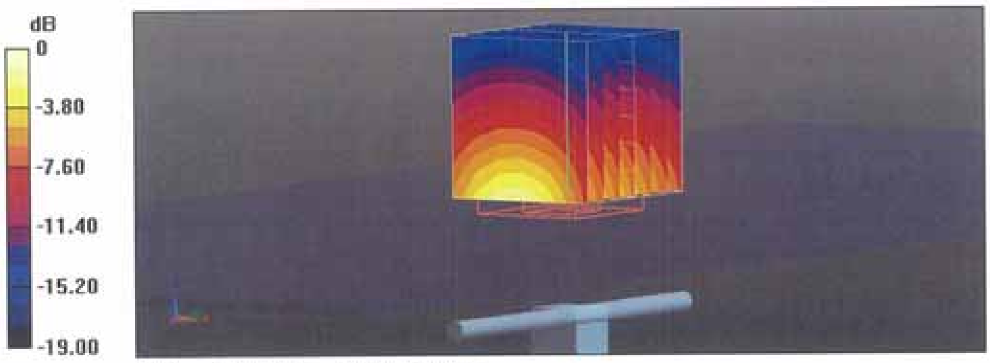
DUT: Dipole 1800 MHz; Type: D1800V2; Serial: D1800V2 - SN: 2d007

Communication System: UID 0 - CW; Frequency: 1800 MHz
Medium parameters used: f = 1800 MHz; σ = 1.53 S/m; ε_r = 51.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.77, 4.77, 4.77); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

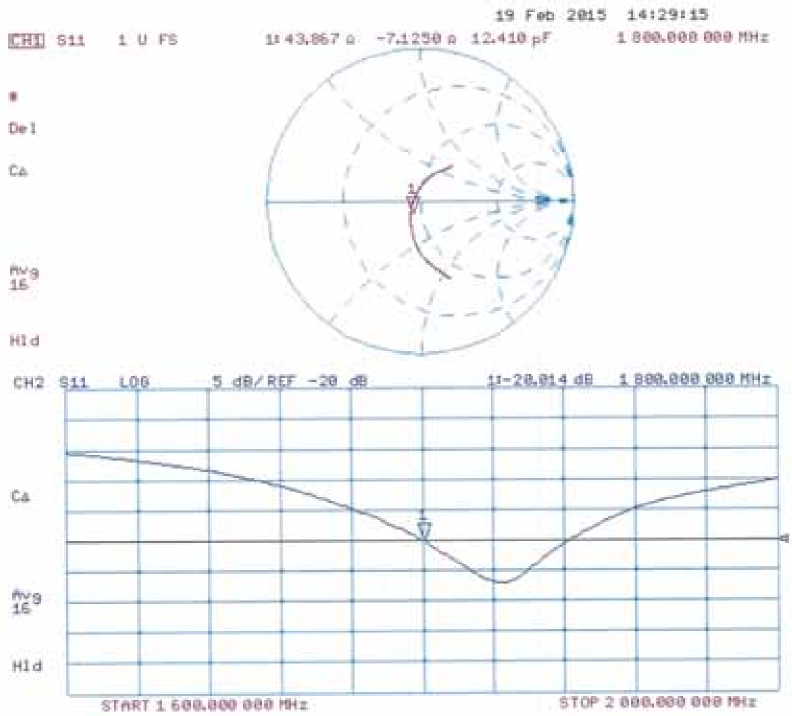
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 93.07 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 16.9 W/kg
SAR(1 g) = 9.67 W/kg; SAR(10 g) = 5.1 W/kg
Maximum value of SAR (measured) = 12.1 W/kg



0 dB = 12.1 W/kg = 10.83 dBW/kg

Certificate No: D1800V2-2d007_Feb15 Page 7 of 8

Impedance Measurement Plot for Body TSL



Certificate No: D1800V2-2d007_Feb15 Page 8 of 8

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Accreditation No.: **SCS 108**

Client **HCT (Dymstec)**

Certificate No: **D1900V2-5d061_Jul14**

CALIBRATION CERTIFICATE

Object: D1900V2 - SN: 5d061

Calibration procedure(s): QA CAL-05.v9
Calibration procedure for dipole validation kits above 700 MHz

Calibration date: July 23, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 23, 2014

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.5 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.29 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.2 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.5 ± 6 %	1.51 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**40.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.39 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.6 W/kg ± 16.5 % (k=2)**

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Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	51.1 Ω + 6.2 jΩ
Return Loss	- 24.2 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	47.2 Ω + 7.0 jΩ
Return Loss	- 22.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.193 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 10, 2004

DASY5 Validation Report for Head TSL

Date: 23.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

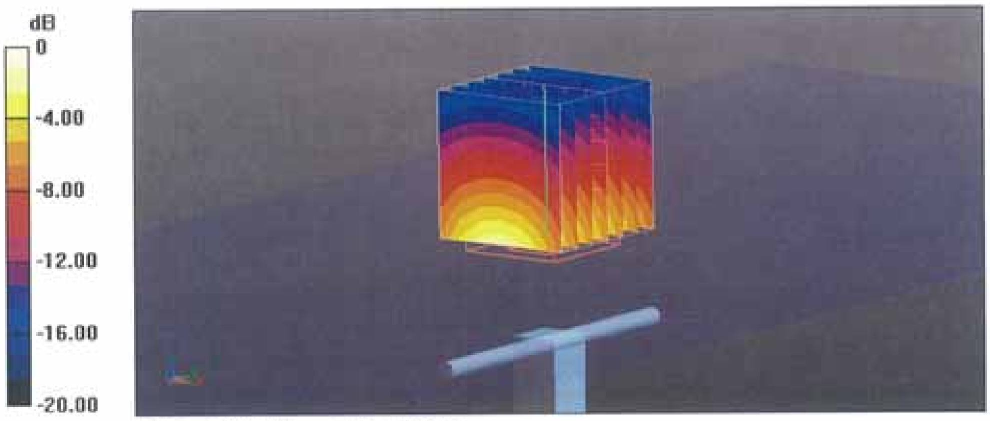
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d061

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.38 S/m; ε_r = 39.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.06, 5.06, 5.06); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

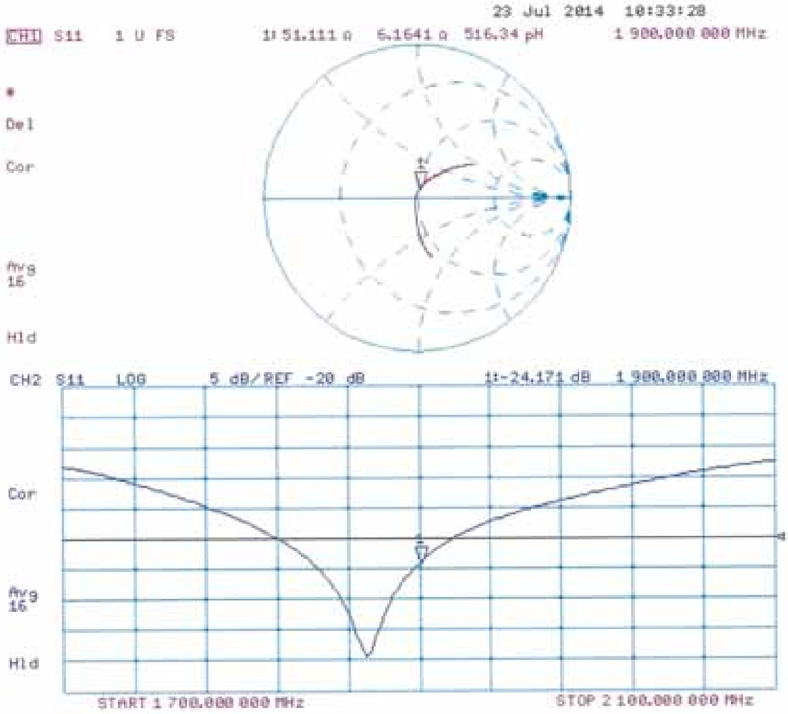
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.40 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 18.6 W/kg
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.29 W/kg
Maximum value of SAR (measured) = 12.9 W/kg



0 dB = 12.9 W/kg = 11.11 dBW/kg

Certificate No: D1900V2-5d061_Jul14 Page 5 of 8

Impedance Measurement Plot for Head TSL



Certificate No: D1900V2-5d061_Jul14 Page 6 of 8

DASY5 Validation Report for Body TSL

Date: 23.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

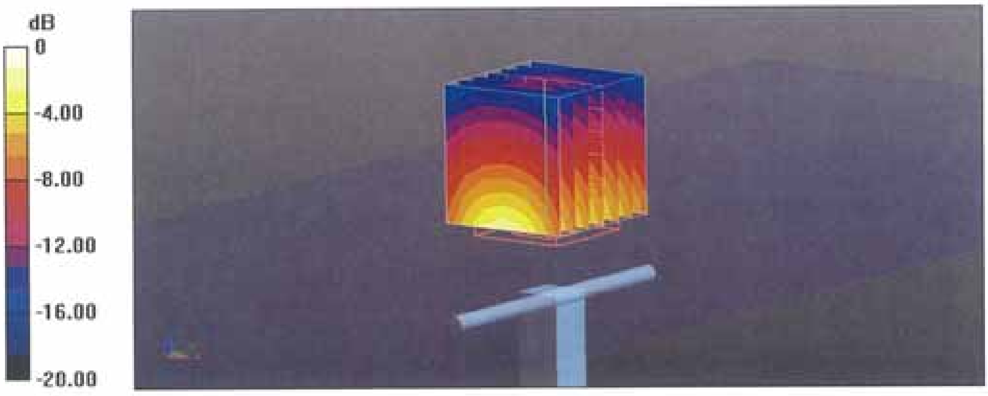
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d061

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.51 S/m; ε_r = 52.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.76, 4.76, 4.76); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

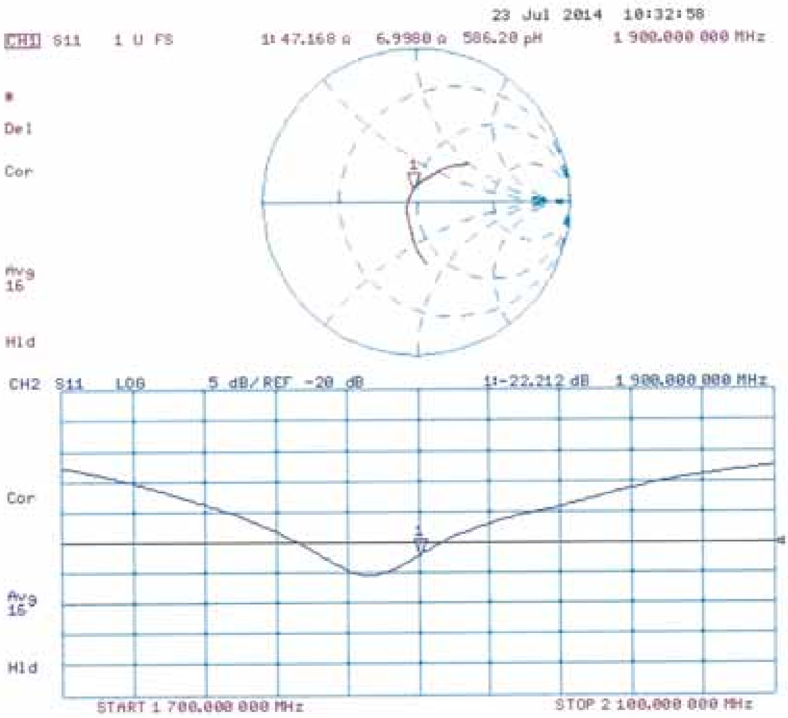
Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.22 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 17.8 W/kg
SAR(1 g) = 10.2 W/kg; SAR(10 g) = 5.39 W/kg
Maximum value of SAR (measured) = 12.9 W/kg



0 dB = 12.9 W/kg = 11.11 dBW/kg

Certificate No: D1900V2-5d061_Jul14 Page 7 of 8

Impedance Measurement Plot for Body TSL



Certificate No: D1900V2-5d061_Jul14 Page 8 of 8

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Accreditation No.: **SCS 108**

Client **HCT (Dymstec)**

Certificate No: **D2450V2-743_Jul14**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 743
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 24, 2014

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	US37292783	09-Oct-13 (No. 217-01827)	Oct-14
Power sensor HP 8481A	MY41092317	09-Oct-13 (No. 217-01828)	Oct-14
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-13 (No. ES3-3205_Dec13)	Dec-14
DAE4	SN: 601	30-Apr-14 (No. DAE4-601_Apr14)	Apr-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-13)	In house check: Oct-14

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 25, 2014

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Certificate No: D2450V2-743_Jul14 Page 1 of 8

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	1.85 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.6 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.2 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.28 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**24.8 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	50.6 ± 6 %	2.03 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.2 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**51.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.07 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.9 W/kg ± 16.5 % (k=2)**

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Appendix (Additional assessments outside the scope of SCS108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.2 Ω + 4.5 jΩ
Return Loss	- 25.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.8 Ω + 6.3 jΩ
Return Loss	- 24.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.160 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 01, 2003

DASY5 Validation Report for Head TSL

Date: 24.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

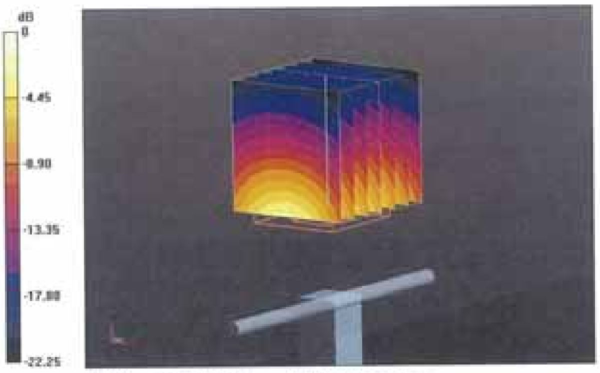
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 743

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.85 S/m; ε_r = 37.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

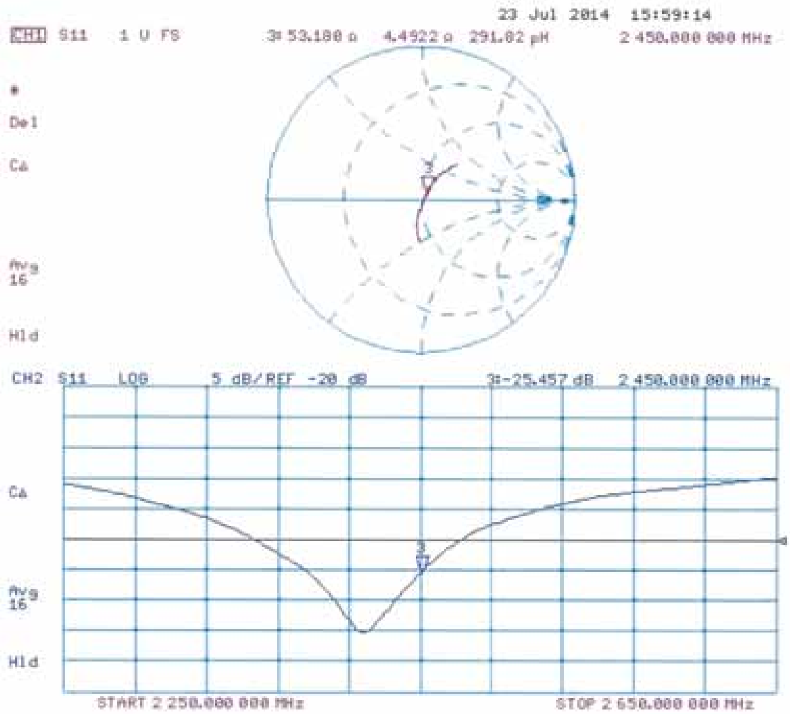
Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.3 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 28.0 W/kg
SAR(1 g) = 13.6 W/kg; SAR(10 g) = 6.28 W/kg
Maximum value of SAR (measured) = 17.8 W/kg



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

Certificate No: D2450V2-743_Jul14 Page 5 of 8

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 16.07.2014

Test Laboratory: SPEAG, Zurich, Switzerland

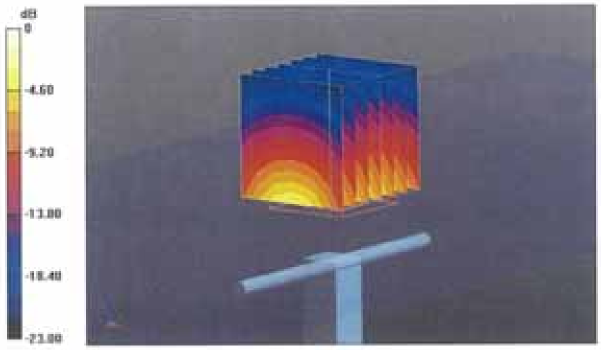
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 743

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.03 S/m; ε_r = 50.6; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

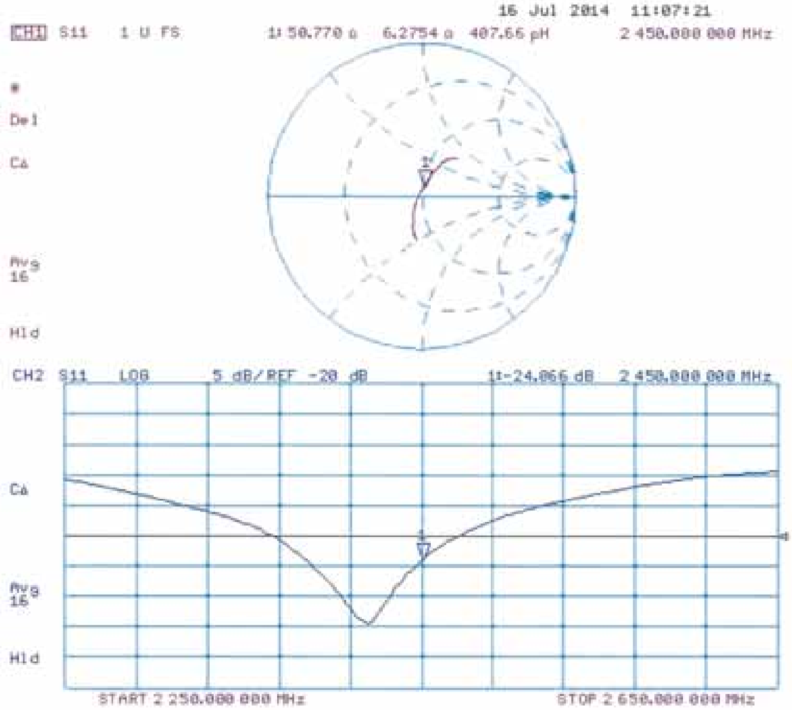
- Probe: ES3DV3 - SN3205; ConvF(4.35, 4.35, 4.35); Calibrated: 30.12.2013;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.04.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.80 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 27.7 W/kg
SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.07 W/kg
Maximum value of SAR (measured) = 17.5 W/kg



0 dB = 17.5 W/kg = 12.43 dBW/kg

Impedance Measurement Plot for Body TSL



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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Client **HCT (Dymstec)**

Certificate No: **D2600V2-1015_Mar15**

CALIBRATION CERTIFICATE

Object	D2600V2 - SN: 1015
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	March 25, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	03-Apr-14 (No. 217-01918)	Apr-15
Type-N mismatch combination	SN: 5047.2 / 06327	03-Apr-14 (No. 217-01921)	Apr-15
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: March 25, 2015

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.2 ± 6 %	2.00 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	14.4 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**56.5 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.3 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.5	2.16 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	50.3 ± 6 %	2.20 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	14.1 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**55.4 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.27 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**24.8 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.0 Ω - 2.1 jΩ
Return Loss	- 33.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6 Ω - 1.9 jΩ
Return Loss	- 27.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.150 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 30, 2007

DASY5 Validation Report for Head TSL

Date: 20.03.2015

Test Laboratory: SPEAG, Zurich, Switzerland

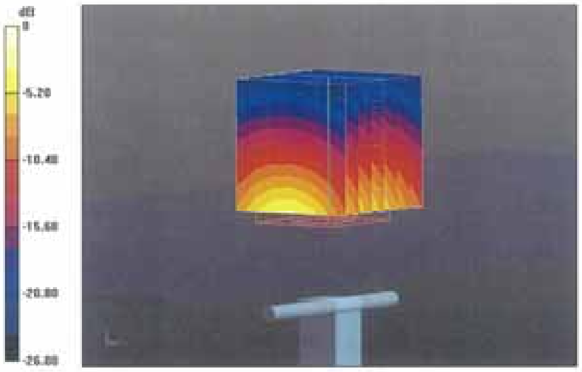
DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1015

Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2 S/m; ε_r = 37.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

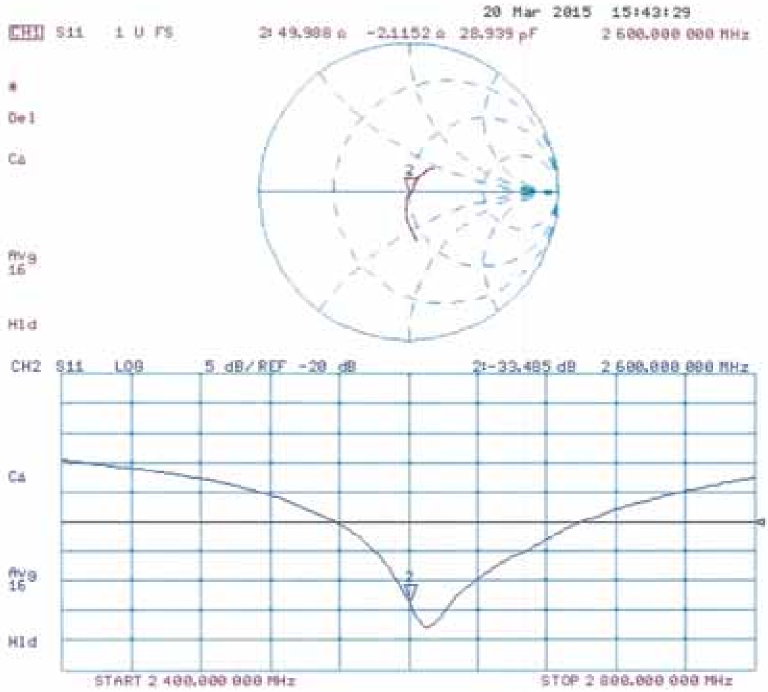
- Probe: ES3DV3 - SN3205; ConvF(4.49, 4.49, 4.49); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.2 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 30.4 W/kg
SAR(1 g) = 14.4 W/kg; SAR(10 g) = 6.4 W/kg
Maximum value of SAR (measured) = 18.9 W/kg



0 dB = 18.9 W/kg = 12.76 dBW/kg

Impedance Measurement Plot for Head TSL



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DASY5 Validation Report for Body TSL

Date: 25.03.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1015

Communication System: UID 0 - CW; Frequency: 2600 MHz
Medium parameters used: f = 2600 MHz; σ = 2.2 S/m; ε_r = 50.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.13, 4.13, 4.13); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 96.03 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 29.2 W/kg
SAR(1 g) = 14.1 W/kg; SAR(10 g) = 6.27 W/kg
Maximum value of SAR (measured) = 18.6 W/kg

0 dB = 18.6 W/kg = 12.70 dBW/kg

Impedance Measurement Plot for Body TSL