SAR TEST REPORT

Test item	:	Mobile Phone
Model No.	:	KYY21
Order No.	:	DEMC1303-01111
Date of receipt	:	2013-03-26
Test duration	:	2013-05-07 ~ 2013-05-13
Date of issue	:	2013-05-14
Use of report	:	FCC Original Grant

Applicant : KYOCERA Corporation
2-1-1 Kagahara, Tsuzuki-ku, Yokohama-Shi, Kanagawa 224-8502, Japan

Test laboratory : Digital EMC Co., Ltd.
683-3, Yubang-Dong, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, 449-080, Korea

Test specification	:	§2.1093, FCC/OET Bulletin 65 Supplement C[July 2001]
Test environment	:	See appended test report
Test result	:	☒ Pass ☐ Fail

Tested by:	Witnessed by:	Reviewed by:
Engineer NoKyun, Im	Engineer N/A	Technical Director Harvey Sung

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Test Report Version

Test Report No.	Date	Description
DRTFCC1305-0496	May 14, 2013	Final version for approval

1. DESCRIPTION OF DEVICE

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

General Information

Equipment type	Mobile Phone				
FCC ID	JOYKYY21				
Equipment model name	KYY21				
Equipment add model name	N/A				
Equipment serial no.	Identical prototype				
Mode(s) of Operation	GSM850, PCS1900, WCDMA850, CDMA Cellular,W-LAN(802.11a/b)				
TX Frequency Range	824.2 ~ 848.8 MHz(Cellular Band) / 826.4 ~ 846.6 MHz(WCDMA FDD V) 824.7 ~ 848.31 MHz(CDMA Cellular) / 1850.2 ~ 1909.8 MHz(PCS Band) 2412 ~ 2462 MHz(802.11b) / 5180 ~ 5240 MHz(802.11a - 5.2 GHz Band) 5260 ~ 5320 MHz(802.11a - 5.3 GHz Band) / 5500 ~ 5700 MHz(802.11a - 5.5 GHz Band)				
RX Frequency Range	869.2 ~ 893.8 MHz(Cellular Band) / 871.4 ~ 891.6 MHz(WCDMA FDD V) 869.7 ~ 893.31 MHz(CDMA Cellular) / 1930.2 ~ 1989.8 MHz(PCS Band) 2412 ~ 2462 MHz(802.11b) / 5180 ~ 5240 MHz(802.11a - 5.2 GHz Band) 5260 ~ 5320 MHz(802.11a - 5.3 GHz Band) / 5500 ~ 5700 MHz(802.11a - 5.5 GHz Band)				
Equipment Class	**Band**	**Measured Conducted Power [dBm]**	**Reported SAR**		
			1g SAR (W/kg)		
			Head	**Body-worn**	**Hotspot**
PCE	GSM850	32.90	0.28	0.57	0.64
PCE	WCDMA850	23.52	0.32	0.62	0.62
PCE	Cell. CDMA	23.48	0.32	0.59	0.59
PCE	PCS1900	29.70	0.35	0.32	0.34
DTS	2.4 GHz W-LAN	15.49	0.55	0.23	0.25
UNII	5.2 GHz W-LAN	12.42	<0.10	<0.10	-
UNII	5.3 GHz W-LAN	13.64	0.12	<0.10	-
UNII	5.5 GHz W-LAN	13.46	0.20	0.14	-
Simultaneous SAR per KDB 690783 D01v01r02			0.90	0.84	0.87
FCC Equipment Class	Licensed Portable Transmitter Held to Ear (PCE)				
Date(s) of Tests	2013-05-07 ~ 2013-05-13				
Antenna Type	Internal Type Antenna				
Functions	● GSM/GPRS(GPRS Class: 12) / EDGE(RX Only) supported * DTM is not supported ● BT(2.4GHz) / WLAN(2.4GHz 802.11b/g/n(HT20), 5 GHz 802.11a/n(HT20, HT40) supported * No simultaneous transmission between BT & WLAN * 5.8 GHz W-LAN (DTS Band) is not supported. ● Simultaneous transmission between GSM, CDMA, WCDMA voice & WLAN / GPRS, WCDMA, CDMA& WLAN ● VoIP is not supported. ● Mobile Hotspot is supported.				

1.1 Guidance Applied

- FCC OET Bulletin 65 Supplement C [June 2001]
- IEEE 1528-2003
- FCC KDB Publication 941225 D01-D06 (2G/3G and Hotspot)
- FCC KDB Publication 248227 D01v01r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01 v05 (General SAR Guidance)
- FCC KDB Publication 865664 D01-D02 (SAR Measurements up to 6 GHz)
- October 2012 TCB Workshop Notes

1.2Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS/EDGE Rx Only 850	Voice/Data	824.2 ~ 848.8 MHz
Cell. CDMA	Voice/Data	824.70 ~ 848.31 MHz
WCDMA850	Voice/Data	826.4 ~ 846.6 MHz
GSM/GPRS/EDGE Rx Only 1900	Voice/Data	1850.2 ~ 1909.8 MHz
2.4 GHz WLAN	Data	2412 ~ 2462 MHz
5.2 GHz WLAN	Data	5180 ~ 5240 MHz
5.3 GHz WLAN	Data	5260 ~ 5320 MHz
5.5 GHz WLAN	Data	5500 ~ 5700 MHz
Bluetooth	Data	2402 ~ 2480 MHz

1.3 Nominal and Maximum Output Power Specifications

This device operates using the following maximum and nominal output power specifications. SAR values were scaled to the maximum allowed power to determine compliance per KDB Publication 447498 D01v05.

Band & Mode		Voice [dBm]	Burst Average GMSK [dBm]			
		1 TX Slot	1 TX Slot	2 TX Slot	3 TX Slot	4 TX Slot
GSM/GPRS 850	Maximum	33.0	33.0	30.0	28.3	27.0
	Nominal	32.5	32.5	29.5	27.8	26.5
GSM/GPRS 1900	Maximum	30.0	30.0	27.0	25.0	24.0
	Nominal	29.5	29.5	26.5	24.5	23.5

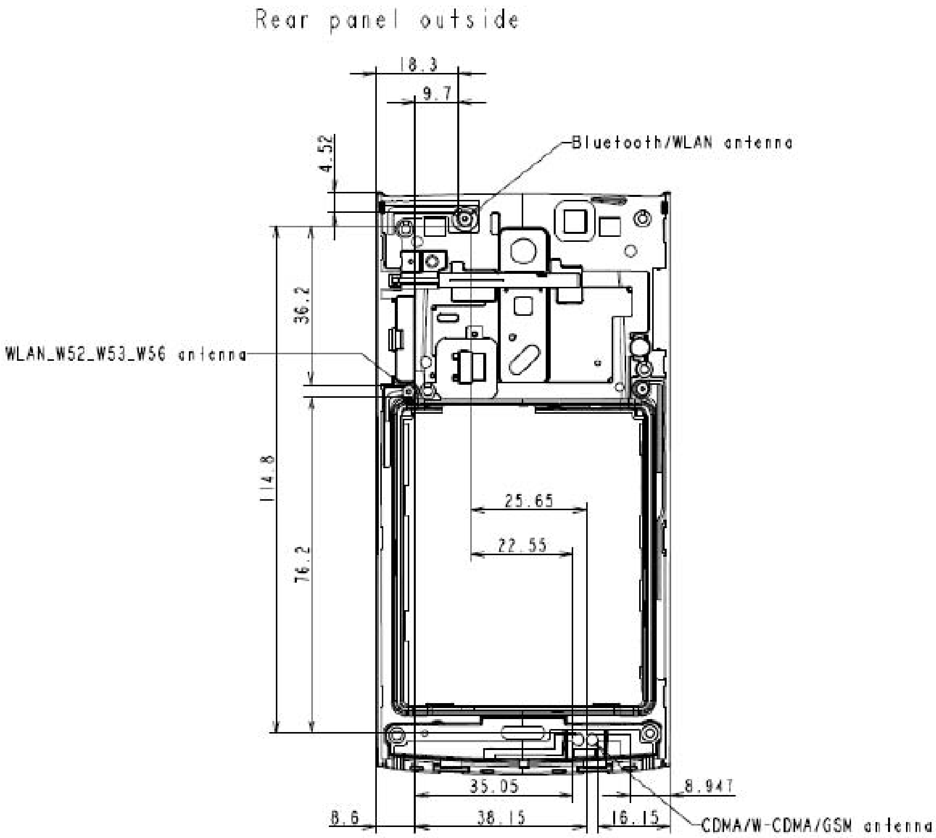
Band & Mode		Modulated Average[dBm]		
		3GPP RMC	3GPP HSDPA	3GPP HSUPA
WCDMA 850	Maximum	23.6	23.6	N/A
	Nominal	23.1	23.1	N/A

Band & Mode		Modulated Average [dBm]
Cell. CDMA	Maximum	23.5
	Nominal	23.0

Band & Mode		Modulated Average [dBm]
IEEE 802.11b (2.4 GHz)	Maximum	15.7
	Nominal	14.5
IEEE 802.11g (2.4 GHz)	Maximum	12.0
	Nominal	10.8
IEEE 802.11n (2.4 GHz)	Maximum	11.4
	Nominal	10.2
IEEE 802.11a (5.2, 5.3, 5.5 GHz)	Maximum	13.9
	Nominal	12.7
IEEE 802.11n - HT20 (5.2, 5.3, 5.5 GHz)	Maximum	13.9
	Nominal	12.7
IEEE 802.11n - HT40 (5.2, 5.3, 5.5 GHz)	Maximum	11.6
	Nominal	10.4
Bluetooth	Maximum	6.2
	Nominal	5.0
Bluetooth LE	Maximum	1.2
	Nominal	0.0

1.4 DUT Antenna Locations&SAR Test Configurations

DUT Antenna Locations (Rear Side View)



Note: Specific antenna dimensions and separation distances are shown in the antenna distance document.

SAR Test Configurations

Mode	Mobile Hotspot Sides for SAR Testing					
	Top	Bottom	Front	Rear	Right	Left
GSM850	X	O	O	O	O	O
Cell. CDMA	X	O	O	O	O	O
WCDMA 850	X	O	O	O	O	O
PCS1900	X	O	O	O	O	O
2.4G W-LAN(802.11b/g/n)	O	X	O	O	O	X

Table 1.1 Mobile Hotspot Sides for SAR Testing

Note: Particular DUT edges were not required to be evaluated for Wireless Router SAR if the edges weregreater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v01guidance, page 2. The antenna document shows the distances between the transmit antennas and theedges of the device. When the wireless router mode is enabled, all 5 GHz bands are disabled. Therefore 5 GHz WIFI is not considered in this section.

1.5 SAR Test Exclusions Applied

(A) WIFI & BT

Since Wireless Router operations are not allowed by the chipset firmware using 5 GHz WIFI, only 2.4 GHz WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v01.

Per FCC KDB 447498 D01v05, **Bluetooth SAR was not required and 2.4 GHz / 5 GHz WIFI SAR was required** based on the maximum conducted power and the Bluetooth/WIFI antenna to user separation distance as followings.

Per FCC KDB 447498 D01v05, the SAR exclusion threshold for distances < 50 mm is defined by the following equation:

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

Based on the maximum conducted power of Bluetooth and the antenna to use separation distance, **Bluetooth SAR was not required; (4.169 / 10) * $\sqrt{2.480}$ = 0.7< 3.0.**

Based on the maximum conducted power of WIFI and the antenna to use separation distance, **2.4 GHzWIFI SAR was required; (37.154 / 10) * $\sqrt{2.412}$ = 5.8> 3.0**.

Based on the maximum conducted power of WIFI and the antenna to use separation distance, **5 GHzWIFI SAR was required; (24.547 / 10) * $\sqrt{5.280}$ = 5.6 > 3.0**.

This device supports 20 MHz and 40 MHz Bandwidths for IEEE 802.11n for 5 GHz WIFI only. IEEE 802.11n was not evaluated for SAR since the average output power of 20 MHz and 40 MHz bandwidths was not more than 0.25 dB higher than the average output power of IEEE 802.11a.

(B) Licensed Transmitter(s)

GSM/GPRS DTM is not supported for US bands. Therefore, the GSM Voice modes in this report donot transmit simultaneously with GPRS Data.

1.6 Device Serial Numbers

Band & Mode	Head Serial Number	Body-Worn Serial Number	Hotspot Serial Number
GSM/GPRS/EDGE Rx Only 850	FCC #1	FCC #1	FCC #1
Cell. CDMA	FCC #1	FCC #1	FCC #1
WCDMA 850	FCC #1	FCC #1	FCC #1
GSM/GPRS/EDGE Rx Only 1900	FCC #1	FCC #1	FCC #1
2.4 GHz WLAN	FCC #1	FCC #1	FCC #1
5 GHz WLAN	FCC #1	FCC #1	FCC #1

2. INTROCUCTION

The FCC and Industry Canada have adopted the guidelines for evaluating the environmental effects ofradio frequency (RF) radiation in ET Docket 93-62 on Aug. 6, 1996 and Health Canada Safety Code 6 toprotect the public and workers from the potential hazards of RF emissions due to FCC-regulated portabledevices.

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*.1-2005 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 (rate) of the incremental energy (dU)absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dV) of a given density (ρ) It is also defined as the rate of RF energy absorption per unit mass at a point in an absorbing body (see Fig. 1.1)

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

Fig. 1.1 SAR Mathematical Equation

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

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

where:

- σ = conductivity of the tissue-simulating material (S/m)
- ρ = mass density of the tissue-simulating 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 theincident field in relations to the dimensions and geometry of the irradiated organism, the orientation of theorganism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whetherconductive contact is made by the organism with a ground plane.

3. DESCRIPTION OF TEST EQUIPMENT

3.1 SAR MEASUREMENT SETUP

Measurements are performed using the DASY4 automated dosimetric assessment system.The DASY4 is made by Schmid& Partner Engineering AG (SPEAG) in Zurich, Switzerlandand consists of high precision robotics system (Staubli), robot controller, desktop computer, near-field probe, probe alignment sensor, and the generic twin phantomcontaining the brain equivalent material. The robot is a six-axis industrial robotperforming precise movements to position the probe to the location (points) of maximumelectromagnetic field (EMF) (see Fig. 3.1).

A cellcontroller system contains thepower supply, robotcontrollerteach pendant (Joystick), and a remote control used to drive the robot motors. The PC consists of theIntel Core i5-2500 3.31GHz desktop computer with Windows NT system and SAR MeasurementSoftware DASY4, A/D interface card, monitor, mouse, and keyboard. The Staubli Robotis connected to the cell controller to allow software manipulation of the robot. A dataacquisition electronic (DAE) circuit that performs the signal amplification, signalmultiplexing, AD-conversion, offset measurements, mechanical surface detection,collision detection, etc. is connected to the Electro-optical coupler (EOC). TheEOCperforms the conversion from the optical intodigitalelectric signal of theDAEandtransfers data to the PC plug-in card.

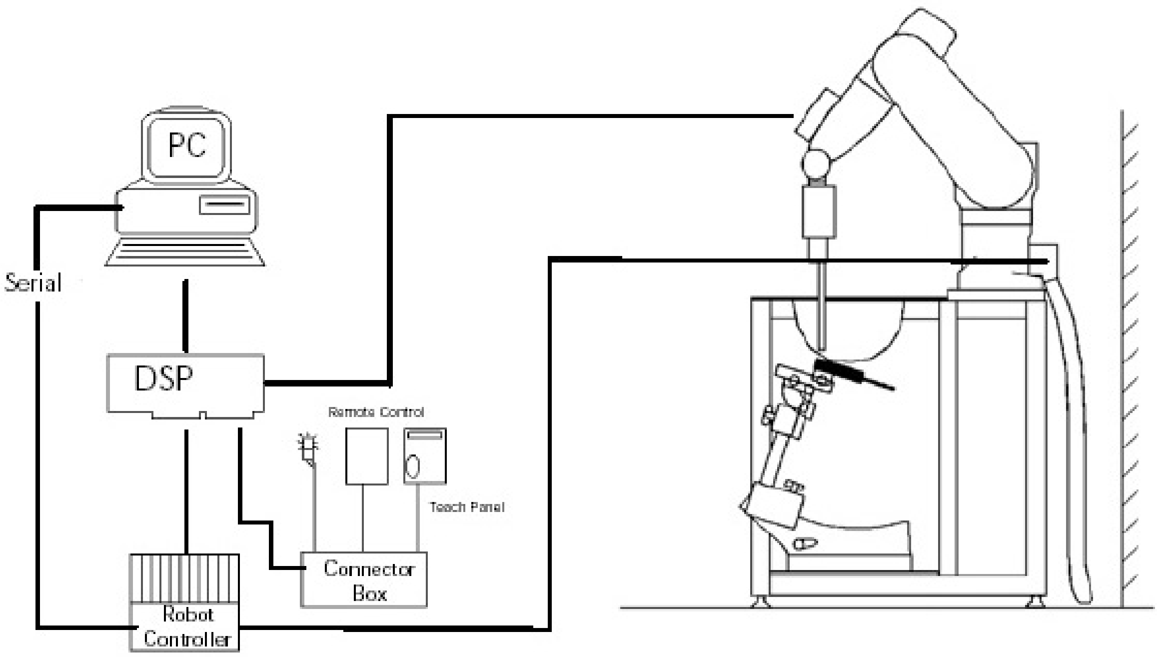


Figure 3.1 SAR Measurement System Setup

The DAE3 consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and acommand decoder and control logic unit. Transmission to the PC-card is accomplishedthrough an opticaldownlink for data and statusinformation and an optical uplink forcommands and clock lines. The mechanicalprobe mounting device includestwodifferent sensor systems for frontal and sidewise probe contacts. They are also used formechanical surface detection and probe collision detection. The robotuses its owncontroller with a built in VME-bus computer. The system is described in detail.

3.2 EX3DV4Probe Specification

Calibration In air from 10 MHz to 6 GHz
In brain and muscle simulating tissue atFrequencies of
450 MHz, 750 MHz, 835 MHz, 900 MHz, 1750 MHz, 1900 MHz, 2300 MHz, 2450 MHz
2600 MHz, 3500 MHz, 5200 MHz, 5300 MHz, 5500 MHz, 5600 MHz, 5800 MHz

Frequency 10 MHz to 6 GHz

Linearity ± 0.2 dB(30 MHz to 6 GHz)

Dynamic 5 μW/g to > 100 mW/g

Range Linearity : ±0.2dB

Dimensions Overall length : 330 mm

Tip length 20 mm

Body diameter 12 mm

Tip diameter 2.5 mm

Distance from probe tip to sensor center 1.0 mm

Application SAR Dosimetry Testing
Compliance tests of mobile phones

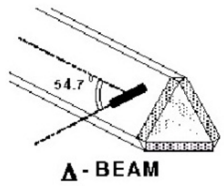


Figure 3.2 Triangular Probe Configurations

Figure 3.3 Probe Thick-Film Technique

DAE System

The SAR measurementswereconducted withthedosimetric probe EX3DV4, designed in the classical triangular configuration(see Fig. 3.2) and optimizedfor dosimetric evaluation. The probe is constructed using the thick film technique;with printed resistive lines onceramic substrates. The probe is equipped with anopticalmultifiber line ending at the front of theprobe tip (see Fig. 3.3). It isconnected to the EOC box on the robot arm and provides anautomatic detectionof the phantomsurface. Half of the fibers are connected to a pulsed infraredtransmitter, the other half to a synchronized receiver. As the probe approaches thesurface, the reflection from the surface produces a coupling from the transmitting tothe receiving fibers. This reflection increases first during the approach, reachesmaximum and then decreases. Iftheprobe is flatlytouching the surface,thecoupling is zero. The distance of the couplingmaximumto the surface isindependent of the surfacereflectivity andlargely independent of the surface toprobe angle. The DASY4 software reads the reflectionduring a software approachand looks for the maximum using a 2nd order fitting. The approach isstopped at reaching the maximum.

3.3 Probe Calibration Process

3.3.1E-Probe Calibration

Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedurewithaccuracy better than +/- 10%. The spherical isotropy was evaluated with the procedure and found to be better than +/-0.25dB. The sensitivity parameters (NormX, NormY, NormZ), thediode compression parameter (DCP) and the conversion factor (ConvF) of the probe is tested.

Free Space Assessment

The free space E-field fromamplified probe outputs is determined in a testchamber. This isperformed in a TEM cell for frequenciesbelow 1 GHz, and in a waveguide above 1GHz for free space. For the free space calibration, the probe is placed in the volumetric center ofthe cavity at the proper orientation with the field. The probe is then rotated 360 degrees.

Temperature Assessment *

E-field temperature correlation calibration is performed in a flat phantom filled with the appropriatesimulated brain tissue. The measured free space E-field in the medium, correlates to temperature risein a dielectric medium. For temperature correlation calibration a RF transparent thermistorbasedtemperature probe is used in conjunction with the E-field probe.

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

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

where:

Δt = exposure time (30 seconds),

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

ΔT = temperature increase due to RF exposure.

where:

σ = simulated tissue conductivity,

ρ = Tissue density (1.25 g/cm^3 for brain tissue)

SAR is proportional toΔT / Δt , 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;

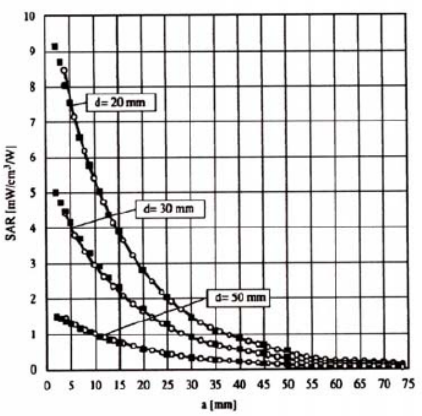


Figure 3.4E-Field and Temperature Measurements at 900MHz

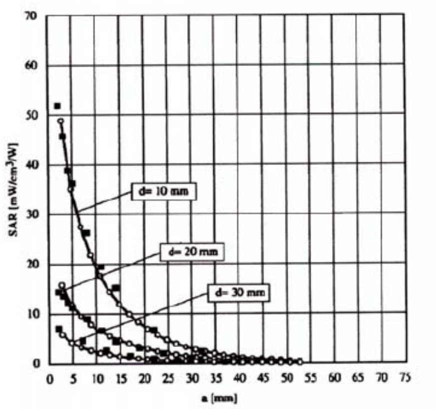


Figure 3.5 E-Field and Temperature Measurements at 1800MHz

3.4 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 point (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):

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

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

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

with SAR = local specific absorption rate in 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

3.5 SAM TwinPHANTOM

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a woodentable. The shape of the shell is based on data from an anatomical study designed todetermine the maximum exposure in at least 90% of all users. Itenables thedosimetric evaluation of left and right hand phone usage as well as body mounted usageat the flat phantom region. A cover preventstheevaporation of the liquid.
Referencemarkings on thePhantom allow thecomplete setup of all predefined phantom positionsand measurement grids by manually teaching three points in the robot. (see Fig. 3.6)

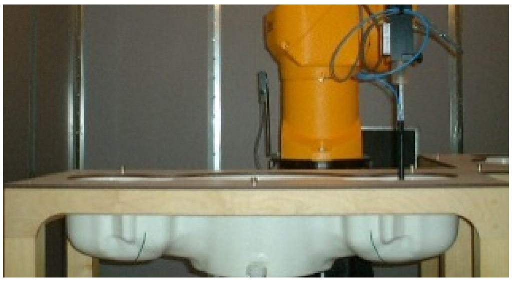


Figure 3.6 SAM Twin Phantom

SAM Twin Phantom Specification

Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209. 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. Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.
Shell Thickness	2 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet

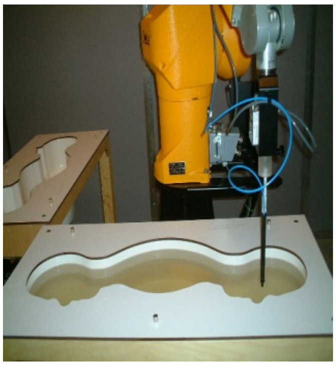
3.6Device Holder for Transmitters

In combination with the Twin SAM Phantom V4.0/V4.0c or ELI4, the Mounting Device enables the rotation of the mounted transmitter device in spherical coordinates. Rotation point is the ear opening point. Transmitter devices can be easily and accurately positioned according to IEC, IEEE, FCC or other specifications. The device holder can be locked for positioning at different phantom sections (left head, right head, flat).

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

Figure 3.7 Mounting Device

3.7 Brain & Muscle Simulation Mixture Characterization



The brain and muscle mixtures consist of a viscous gel using hydrox-ethylcellulose (HEC) gellingagent and saline solution (see Table 3.1). Preservation with a bactericide is added and visualinspection is made to make sure air bubbles are not trapped during the mixing process. Themixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue. The mixture characterizations used for the brain and muscle tissuesimulating liquids are according to the data by C. Gabriel and G. Hartsgrove.

Figure 3.8SimulatedTissue

Table3.1 Composition of the Tissue Equivalent Matter

INGREDIENTS		SIMULATING TISSUE							
		835 MHz Brain	835 MHz Muscle	1900 MHz Brain	1900 MHz Muscle	2450 MHz Brain	2450 MHz Muscle	5200 ~ 5800 MHz Brain	5200 ~ 5800 MHz Muscle
Mixture Percentage									
WATER		40.19	50.75	55.24	70.23	71.88	73.40	65.52	80.00
DGBE		-	-	44.45	29.48	7.990	26.54	-	-
SUGAR		57.90	48.21	-	-	-	-	-	-
SALT		1.480	0.940	0.310	0.290	0.160	0.060	-	-
BACTERICIDE		0.180	0.100	-	-	-	-	-	-
HEC		0.250	-	-	-	-	-	-	-
Triton X-100		-	-	-	-	19.97	-	17.24	-
Diethylenglycolmonohexylether		-	-	-	-	-	-	17.24	-
Polysorbate(Tween) 80		-	-	-	-	-	-	-	20.00
Dielectric Constant	Target	**41.5**	**55.2**	**40.0**	**53.3**	**39.2**	**52.7**	**-**	**-**
Conductivity (S/m)	Target	**0.90**	**0.97**	**1.40**	**1.52**	**1.80**	**1.95**	**-**	**-**

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]

3.8 SAR TEST EQUIPMENT

Table 3.2 Test Equipment Calibration

	Type	Manufacturer	Model	Cal.Date	Next.Cal.Date	S/N
☒	SEMITEC Engineering	SEMITEC	N/A	N/A	N/A	Shield Room
☒	Robot	SCHMID	RX90BL	N/A	N/A	F02/5Q85A1/A/01
☒	Robot Controller	SCHMID	CS7MB	N/A	N/A	F02/5Q85A1/C/01
☒	Joystick	SCHMID	N/A	N/A	N/A	D221340031
☒	Intel Core i5-2500 3,31 GHz Windows XP Professional	N/A	N/A	N/A	N/A	N/A
☒	Probe Alignment Unit LB	N/A	N/A	N/A	N/A	SE UKS 030 AA
☒	Mounting Device	SCHMID	SD000H01HA	N/A	N/A	N/A
☒	Twin SAM Phantom	SCHMID	TP1223	N/A	N/A	N/A
☒	Twin SAM Phantom	SCHMID	TP1224	N/A	N/A	N/A
☐	Twin SAM Phantom	SCHMID	QD000P40CD	N/A	N/A	1679
☒	Head/BodyEquivalent Matter(835MHz)	N/A	N/A	2013-01-01	2014-01-01	N/A
☒	Head/BodyEquivalent Matter(1900MHz)	N/A	N/A	2013-01-01	2014-01-01	N/A
☒	Head/BodyEquivalent Matter(2450MHz)	N/A	N/A	2013-01-01	2014-01-01	N/A
☒	Head/BodyEquivalent Matter(5000MHz)	N/A	N/A	2013-01-01	2014-01-01	N/A
☒	DataAcquisition Electronics	SCHMID	DAE3V1	2013-01-23	2014-01-23	519
☒	Dosimetric E-Field Probe	SCHMID	EX3DV4	2013-01-24	2014-01-24	3643
☐	Dummy Probe	N/A	N/A	N/A	N/A	N/A
☒	835MHz System Validation Dipole	SCHMID	D835V2	2012-03-14	2014-03-14	464
☒	1900MHz System Validation Dipole	SCHMID	D1900V2	2012-03-16	2014-03-16	5d029
☒	2450MHz System Validation Dipole	SCHMID	D2450V2	2012-03-15	2014-03-15	726
☒	5000MHz System Validation Dipole	SCHMID	D5GHzV2	2013-03-15	2015-03-15	1103
☒	Network Analyzer	Agilent	E5071C	2012-11-02	2013-11-02	MY46106970
☒	Signal Generator	Rohde Schwarz	SMR20	2013-02-28	2014-02-28	101251
☒	Amplifier	EMPOWER	BBS3Q7ELU	2012-09-18	2013-09-18	1020
☒	High Power RF Amplifier	EMPOWER	BBS3Q8CCJ	2012-11-02	2013-11-02	1005
☒	Power Meter	HP	EPM-442A	2013-02-28	2014-02-28	GB37170267
☒	Power Sensor	HP	8481A	2013-02-28	2014-02-28	3318A96566
☒	Power Sensor	HP	8481A	2013-02-14	2014-02-14	3318A96030
☒	Dual Directional Coupler	Agilent	778D-012	2013-01-08	2014-01-08	50228
☒	Directional Coupler	HP	773D	2012-07-01	2013-07-01	2389A00640
☒	Low Pass Filter 1,5GHz	Micro LAB	LA-15N	2013-01-08	2014-01-08	N/A
☒	Low Pass Filter 3,0GHz	Micro LAB	LA-30N	2012-09-17	2013-09-17	N/A
☒	Low Pass Filter 6,0GHz	Micro LAB	LA-60N	2013-03-12	2014-03-12	03942
☒	Attenuators(3 dB)	Agilent	8491B	2012-07-02	2013-07-02	MY39260700
☒	Attenuators(10 dB)	WEINSCHEL	23-10-34	2013-01-08	2014-01-08	BP4387
☐	Step Attenuator	HP	8494A	2012-09-17	2013-09-17	3308A33341
☒	Dielectric Probe kit	SCHMID	DAK-3.5	2012-12-11	2013-12-11	1092
☒	8960 Series 10 Wireless Comms. Test Set	Agilent	E5515C	2013-02-28	2014-02-28	GB43461134

NOTE: The E-field probe was calibrated by SPEAG, by temperature measurement procedure. Dipole Validationmeasurement isperformed by Digital EMC before each test. The brain and muscle simulating material are calibratedby Digital EMC using the dielectric probe system and network analyzer to determine the conductivity andpermittivity (dielectric constant) of the brain-equivalent material.

3.8.1 Extended Dipole Calibrations

Referring to FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01, the dipole calibration interval can be extended to 3 years with justification. The dipoles are also not physically damaged, or repaired during the interval.
The Justification data of dipole D835V2, SN: 464 / D1900V2, SN: 5d029 / D2450V2, SN: 726 can be found in Table 3.2.

Justification Procedure of Dipole Calibration

1. Setup a Network Analyzer (Agilent E5071C) and set the start frequency and stop frequency to Network Analyzer according to the dipole frequency, at least +/- 200 MHz around the calibration point.
2. Using calibration kit to perform Network Analyzer Open, Short and Load calibration.
3. Connect the dipole with the calibrated Network Analyzer.
4. Set the Network Analyzer frequency by the dipole calibration frequency. Monitor the return-loss and impedance results with Log Magnitude format and Smith Chart, respectively.
5. Record the result and compare with the prior calibration.

Referring to FCC KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01, if dipoles are verified in return loss (< -20 dB, within 20 % of prior calibration), and in impedance (with 5 ohm of prior calibration), the annual calibration is not necessary and the calibration interval can be extended.

Table 3.2 Justification of the extended calibration Result

D835V2 – Serial No. 464												
Date of Measurement	835 MHz Head						835 MHz Body					
	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2012-03-14 (Calibration)	-32.137		51.215		-2.1855		-25.168		46.469		-3.9863	
2013-03-14 (Measured)	-32.864	**-2.26**	51.758	**-0.543**	-2.2259	**0.040**	-25.295	**-0.50**	46.591	**-0.122**	-3.8298	**-0.1565**
D1900V2 – Serial No. 5d029												
Date of Measurement	1900 MHz Head						1900 MHz Body					
	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2012-03-16 (Calibration)	-30.838		52.887		-0.61914		-25.415		45.633		-2.6895	
2013-03-16 (Measured)	-30.585	**0.82**	52.599	**0.288**	-0.94326	**0.324**	-25.672	**-1.01**	45.569	**0.064**	-2.6244	**-0.0651**
D2450V2 – Serial No. 726												
Date of Measurement	2450 MHz Head						2450 MHz Body					
	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)	Return-Loss (dB)	Delta (%)	Real Impedance (ohm)	Delta (ohm)	Imaginary Impedance (ohm)	Delta (ohm)
2012-03-15 (Calibration)	-26.011		54.014		3.3145		-26.035		50.006		4.9922	
2013-03-15 (Measured)	-26.244	**-0.90**	54.099	**-0.085**	3.4914	**-0.177**	-26.060	**-0.10**	50.305	**-0.299**	4.9089	**0.0833**

4. TEST SYSTEM SPECIFICATIONS

Automated TEST SYSTEM SPECIFICATIONS

Positioner

Robot	StäubliUnimation Corp. Robot Model: RX90BL
Repeatability	0.02 mm
No. of axis	6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor	Intel Core i5-2500
Clock Speed	3.31 GHz
Operating System	Windows XP Professional
Data Card	DASY4 PC-Board

Data Converter

Features	Signal, multiplexer, A/D converter. & control logic
Software	DASY4
Connecting Lines	Optical downlink for data and status info Optical uplink for commands and clock

PC Interface Card

Function	24 bit (64 MHz) DSP for real time processing Link to DAE 3 16 bit A/D converter for surface detection system serial link to robot direct emergency stop output for robot

E-Field Probes

Model	EX3DV4 S/N: 3643
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	± 0.2 dB (30 MHz to 6 GHz)

Phantom

Phantom	SAM Twin Phantom (V4.0)
Shell Material	Composite
Thickness	2.0 ± 0.2 mm

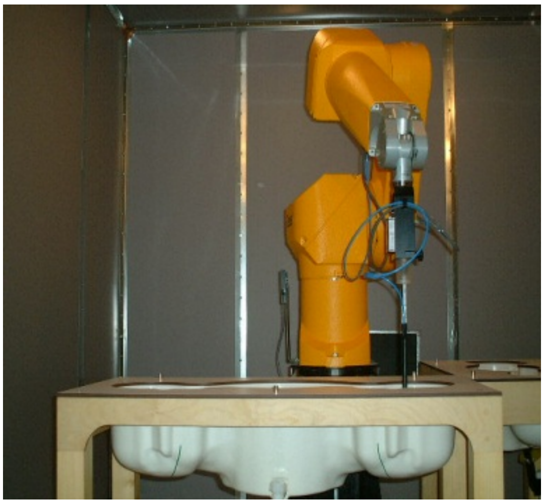
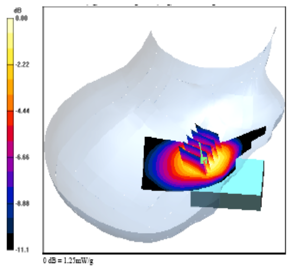


Figure 2.2 DASY4 Test System

5. SAR MEASUREMENT PROCEDURE



Sample SAR Area Scan

The evaluation was performed using the following procedure:

1. The SAR distribution at the exposed side of the head or bodywas measured at a distance no greater than 5.0 mm from theinner surface of the shell. The area covered the entire dimensionof the device-head and body interface and the horizontal gridresolution was determined per FCC KDB Publication 865664D01v01.

2. The point SAR measurement was taken at the maximum SARregion determined from Step 1 to enable the monitoring of SARfluctuations/drifts during the 1g/10g cube evaluation. SAR at thisfixed point was measured and used as a reference value.

3. Based on the area scan data, the peak of the region with maximum SAR was determined byspline interpolation. Around this point, a volume was assessed according to the measurementresolution and volume size requirements of FCC KDB Publication 865664 D01v01 (See Table5.1). On the basis of this data set, the spatial peak SAR value was evaluated with the followingprocedure (see references or the DASY manual online for more details):

   a. The data was extrapolated to the surface of the outer-shell of the phantom. Thecombined distance extrapolated was the combined distance from the center of the dipoles 2.7mmaway from the tip of the probe housing plus the 1.2 mm distance between the surface and thelowest measuring point. The extrapolation was based on a least-squares algorithm. A polynomialof the fourth order was calculated through the points in the z-axis (normal to the phantom shell).

   b. After the maximum interpolated values were calculated between the points in the cube,the SAR was averaged over the spatial volume (1g or 10g) using a 3D-Spline interpolationalgorithm. 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 then integrated with the trapezoidalalgorithm. One thousand points (10 x 10 x 10) were obtained throughinterpolation, in order tocalculate the averaged SAR.

   c. All neighboring volumes were evaluated until no neighboring volume with a higheraverage value was found.

4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scanwas complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test anddrift measurements were repeated.

Frequency	Maximum Area Scan Resolution (mm) (Δx_{area}, Δy_{area})	Maximum Zoom Scan Resolution (mm) (Δx_{zoom}, Δy_{zoom})	Maximum Zoom Scan Spatial Resolution (mm) $\Delta z_{zoom}(n)$	Minimum Zoom Scan Volume (mm) (x,y,z)
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≥ 22

Table 5.1 Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01

Specific Anthropomorphic Mannequin (SAM) Specifications

The phantom for handset SAR assessment testing is a low-loss dielectric shell, with shapeand dimensions derived from theanthropometricdata of the 90th percentile adult malehead dimensions as tabulated by the US Army. The SAM Twin Phantom shell is bisectedalongthemid-sagittalplane into right and left halves (see Fig. 5.1). The perimetersidewalls of each phantom halves are extended to allow filling withliquid to a depth thatissufficient tominimizedreflections from the upper surface. The liquiddepth ismaintained at a minimum depth of 15cm to minimize reflections from the upper surface.

Figure 5.1 Sam Twin Phantom shell

6. DESCRIPTION OF TEST POSITION

6.1 Ear Reference Point

Figure 6.1 shows the front,back and side views of the SAM Twin Phantom. The point"M" is the reference point for the center of the mouth, "LE" is the left ear reference point(ERP), and "RE" is the right ERP. The ERPs are 15mm posterior to the entrance to the Earcanal (EEC) along the B-M line (Back-Mouth), as shown in Figure 6.5. The plane Passing, through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck- Front) is perpendicular to the reference plane and passing through the RE (or LE) is calledthe Reference Pivoting Line (see Figure 6.2). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handsetpositioning.

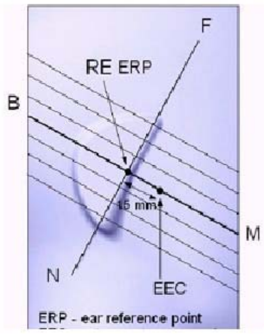


Figure 6.2
Close-up side view of ERP

6.2Handset Reference Points

Two imaginary lines on the handset were established: the vertical centerline and thehorizontal line. The test device was placed in a normal operating position with the "testdevice reference point" located along the "vertical centerline" on the front of the devicealigned to the "ear reference point" (See Fig. 6.3). The "test device reference point" wasthan located at the same level as the center of the ear reference point. The test devicewas positioned so that the "vertical centerline" was bisecting the front surface of thehandset at it's top and bottom edges, positioning the "ear reference point" on the outersurface of the both the left and right head phantoms on the ear reference point.

Figure 6.1 Front, back and side view SAM Twin Phantom

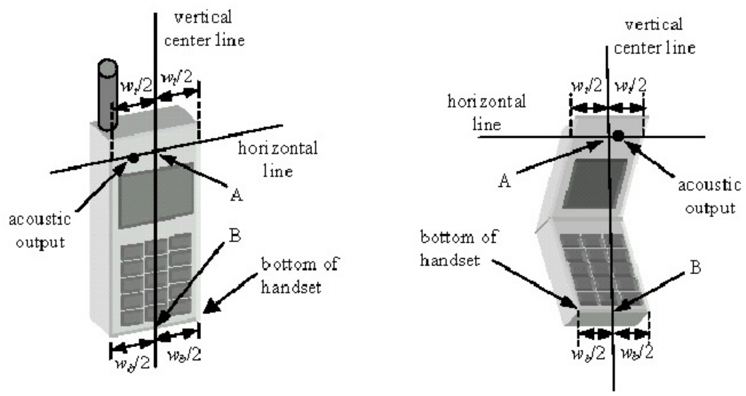


Figure 6.3 Handset Vertical Center & Horizontal Line Reference Points

6.3Device Holder

The device holder is made out of low-loss POM material having the following dielectric parameters:relative permittivity ε = 3 and loss tangent δ = 0.02.

6.4Positioning for Cheek/Touch

1. The test device was positioned with the handset close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure 6.4), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.

Figure 6.4 Front, Side and Top View of Cheek/Touch Position

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).
4. The phone was hen rotated around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, the handset was rotated about the line NF until any point on the handset made contact with a phantom point below the ear (cheek). (See Figure 6.5)

6.5 Positioning for Ear / 15 ° Tilt

With the test device aligned in the "Cheek/Touch Position":

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15degree.
2. The phone was then rotated around the horizontal line by 15 degree.
3. While maintaining the orientation of the phone, the phone was moved parallel to the reference planeuntil any part of the phone touches the head. (In this position, point A was located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact was at any location other than the pinna, the angle of the phone would then be reduced. The tilted position was obtained when any part of the phone was in contact of the ear as well as a second part of the phone was in contact with the head (see Figure 6.6).

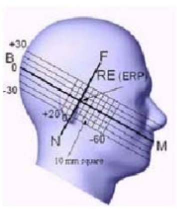


Figure 6.5Side view w/relevant markings

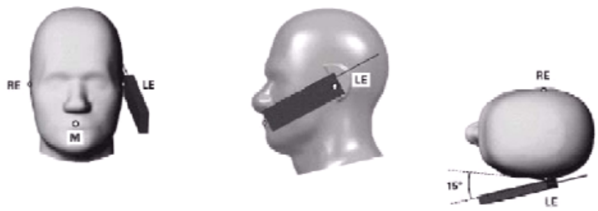


Figure 6.6 Front, Side and Top View of Ear/15°Position

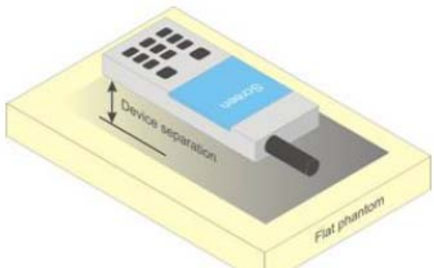


Figure 6.7 Sample Body-Worn Diagram

6.6Body-Worn Accessory Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device andpositioned against a flat phantom in a normal use configuration (see Figure 6.7). Per FCC KDBPublication 648474 D04_v01, Body-worn accessory exposure is typically related to voice modeoperations when handsets are carried in body-worn accessories. The body-worn accessory procedures inFCC KDB Publication 447498 D01_v05 should be used to test for body-worn accessory SAR compliance,without a headset connected to it. This enables the test results for such configuration to be compatiblewith that required for hotspot mode when the body-worn accessory test separation distance is greaterthan or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-wornaccessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highestreported SAR configuration for that wireless mode and frequency band should be repeated for that body-wornaccessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do notcontain metallic components and those that do contain metallic components. When multiple accessoriesthat do not contain metallic components are supplied with the device, the device is tested with only theaccessory that dictates the closest spacing to the body. Then multiple accessories that contain metalliccomponents are tested with the device with each accessory. If multiple accessories share an identicalmetallic component (i.e. the same metallic belt-clip used with different holsters with no other metalliccomponents) 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 tobe authorized for body-worn use. In this case, a test configuration with a separation distance betweenthe back of the device and the flat phantom is used. Test position spacing was documented.
Transmitters that are designed to operate in front of a person’s face, as in push-to-talk configurations, aretested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid.For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SARcompliance is tested with the accessories, including headsets and microphones, attached to the deviceand positioned against a flat phantom in a normal use configuration.

6.7Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data throughsimultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC hasprovided guidance in FCC KDB Publication 941225 D06 v01 where SAR test considerations for handsets(L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, backand edges of the device containing transmitting antennas within 2.5 cm of their edges, determined fromgeneral mixed use conditions for this type of devices. Since the hotspot SAR results may overlap withthe body-worn accessory SAR requirements, the more conservative configurations can be considered,thus excluding some body-worn accessory SAR tests.

When the user enables the personal wireless router functions for the handset, actual operations includesimultaneous transmission of both the WIFI transmitter and another licensed transmitter. Bothtransmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated forSAR under actual use conditions due to the limitations of the SAR assessment probes. Therefore, SARmust be evaluated for each frequency transmission and mode separately and spatially summed with theWIFI transmitter according to FCC KDB Publication 447498 D01v05 publication procedures. The“Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the
SAR measurements were evaluated for a single transmission frequency RF signal at a time.

7. IEEE P1528 –MEASUREMENT UNCERTAINTIES

835 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.3	Normal	1	0.64	± 4.3 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.5	Normal	1	0.6	± 4.5 %	∞
CombinedStandard Uncertainty					**± 12.2 %**	330
Expanded Uncertainty (k=2)					**± 24.4 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

835 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.1	Normal	1	0.64	± 4.1 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.3	Normal	1	0.6	± 4.3 %	∞
CombinedStandard Uncertainty					**± 12.1 %**	330
Expanded Uncertainty (k=2)					**± 24.2 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

1900 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.1	Normal	1	0.64	± 4.1 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.3	Normal	1	0.6	± 4.3 %	∞
CombinedStandard Uncertainty					**± 12.1 %**	330
Expanded Uncertainty (k=2)					**± 24.2 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

1900 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.5	Normal	1	0.64	± 4.5 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.8	Normal	1	0.6	± 4.8 %	∞
CombinedStandard Uncertainty					**± 12.2 %**	330
Expanded Uncertainty (k=2)					**± 24.4 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

2450 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.8	Normal	1	0.64	± 4.8 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.7	Normal	1	0.6	± 4.7 %	∞
CombinedStandard Uncertainty					**± 12.3 %**	330
Expanded Uncertainty (k=2)					**± 24.6 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

2450 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.0	Normal	1	1	± 6.0 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.8	Normal	1	0.64	± 4.8 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.9	Normal	1	0.6	± 4.9 %	∞
CombinedStandard Uncertainty					**± 12.3 %**	330
Expanded Uncertainty (k=2)					**± 24.6 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5200 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.8	Normal	1	0.64	± 4.8 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.9	Normal	1	0.6	± 4.9 %	∞
CombinedStandard Uncertainty					**± 12.6 %**	330
Expanded Uncertainty (k=2)					**± 25.2 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5200 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.5	Normal	1	0.64	± 4.5 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.9	Normal	1	0.6	± 4.9 %	∞
CombinedStandard Uncertainty					**± 12.5 %**	330
Expanded Uncertainty (k=2)					**± 25.0 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5300 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.8	Normal	1	0.64	± 4.8 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.7	Normal	1	0.6	± 4.7 %	∞
CombinedStandard Uncertainty					**± 12.5 %**	330
Expanded Uncertainty (k=2)					**± 25.0 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5300 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.9	Normal	1	0.64	± 4.9 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.9	Normal	1	0.6	± 4.9 %	∞
CombinedStandard Uncertainty					**± 12.6 %**	330
Expanded Uncertainty (k=2)					**± 25.2 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5500 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.9	Normal	1	0.64	± 4.9 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.3	Normal	1	0.6	± 4.3 %	∞
CombinedStandard Uncertainty					**± 12.5 %**	330
Expanded Uncertainty (k=2)					**± 25.0 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5500 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.8	Normal	1	0.64	± 4.8 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.9	Normal	1	0.6	± 4.9 %	∞
CombinedStandard Uncertainty					**± 12.6 %**	330
Expanded Uncertainty (k=2)					**± 25.2 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5600 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.8	Normal	1	0.64	± 4.8 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.0	Normal	1	0.6	± 4.0 %	∞
CombinedStandard Uncertainty					**± 12.4 %**	330
Expanded Uncertainty (k=2)					**± 24.8 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5600 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.3	Normal	1	0.64	± 4.3 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.4	Normal	1	0.6	± 4.4 %	∞
CombinedStandard Uncertainty					**± 12.4 %**	330
Expanded Uncertainty (k=2)					**± 24.8 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5800 MHz Head

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.9	Normal	1	0.64	± 4.9 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.9	Normal	1	0.6	± 4.9 %	∞
CombinedStandard Uncertainty					**± 12.6 %**	330
Expanded Uncertainty (k=2)					**± 25.2 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

5800 MHz Body

Error Description	Uncertaint value ±%	Probability Distribution	Divisor	(Ci) 1g	Standard (1g)	vi 2 or Veff
Measurement System						
Probe calibration	± 6.55	Normal	1	1	± 6.55 %	∞
Axial isotropy	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Hemispherical isotropy	± 9.6	Rectangular	√3	1	± 5.543 %	∞
Boundary Effects	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Probe Linearity	± 4.7	Rectangular	√3	1	± 2.714 %	∞
Detection limits	± 0.25	Rectangular	√3	1	± 0.144 %	∞
Readout Electronics	± 1.0	Normal	1	1	± 1.0 %	∞
Response time	± 0.8	Rectangular	√3	1	± 0.462 %	∞
Integration time	± 2.6	Rectangular	√3	1	± 1.501 %	∞
RF Ambient Conditions	± 3.0	Rectangular	√3	1	± 1.732 %	∞
Probe Positioner	± 0.4	Rectangular	√3	1	± 0.231 %	∞
Probe Positioning	± 2.9	Rectangular	√3	1	± 1.674 %	∞
Algorithms for Max. SAR Eval.	± 1.0	Rectangular	√3	1	± 0.577 %	∞
Test Sample Related						
Device Positioning	± 2.9	Normal	1	1	± 2.9 %	145
Device Holder	± 3.6	Normal	1	1	± 3.6 %	5
Power Drift	± 5.0	Rectangular	√3	1	± 2.887 %	∞
Physical Parameters						
Phantom Shell	± 4.0	Rectangular	√3	1	± 2.309 %	∞
Liquid conductivity (Target)	± 5.0	Rectangular	√3	0.64	± 2.887 %	∞
Liquid conductivity (Meas.)	± 4.5	Normal	1	0.64	± 4.5 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.8	Normal	1	0.6	± 4.8 %	∞
CombinedStandard Uncertainty					**± 12.5 %**	330
Expanded Uncertainty (k=2)					**± 25.0 %**	

The above measurement uncertainties are according to IEEE P1528 (2003)

8. ANSI / IEEE C95.1-2005 RF EXPOSURE LIMITS

Uncontrolled Environment

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals whohave noknowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential forexposure or cannot exercise control over their exposure. Members of the general public would come under thiscategory when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

Controlled Environment

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). In general, occupational/controlled exposure limits are employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

Table 8.1.SAR Human Exposure Specified in ANSI/IEEE C95.1-2005

	HUMAN EXPOSURE LIMITS	
	General Public Exposure (W/kg) or (mW/g)	Occupational Exposure (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	20.0

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. SYSTEM VERIFICATION

9.1 Tissue Verification

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp.[°C]	Liquid Temp.[°C]	Measured Frequency [MHz]	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	εrDeviation [%]	σ Deviation [%]
May. 07. 2013	835 Head	22.0	22.6	824.2	41.551	0.899	43.1	0.873	3.73	-2.89
				835.0	41.500	0.900	43.0	0.882	3.61	-2.00
				836.6	41.500	0.902	43.0	0.883	3.61	-2.11
				848.8	41.500	0.915	42.8	0.894	3.13	-2.30
May. 07. 2013	835 Body	22.0	22.6	824.2	55.240	0.969	54.0	0.950	-2.24	-1.96
				835.0	55.200	0.970	54.0	0.961	-2.17	-0.93
				836.6	55.195	0.972	53.9	0.962	-2.35	-1.03
				848.8	55.158	0.987	53.8	0.974	-2.46	-1.32
May. 09. 2013	835 Head	21.9	22.3	826.4	41.540	0.899	43.1	0.868	3.76	-3.45
				835.0	41.500	0.900	43.0	0.876	3.61	-2.67
				836.6	41.500	0.902	43.0	0.878	3.61	-2.66
				846.6	41.500	0.912	42.9	0.887	3.37	-2.74
May. 09. 2013	835 Body	21.9	22.3	826.4	55.230	0.969	54.0	0.952	-2.23	-1.75
				835.0	55.200	0.970	54.0	0.960	-2.17	-1.03
				836.6	55.195	0.972	54.0	0.961	-2.17	-1.13
				846.6	55.160	0.984	53.9	0.971	-2.28	-1.32
May. 10. 2013	835 Head	22.4	22.6	824.70	41.549	0.899	42.9	0.869	3.25	-3.34
				835.00	41.500	0.900	42.8	0.877	3.13	-2.56
				836.52	41.500	0.902	42.8	0.879	3.13	-2.55
				848.31	41.500	0.914	42.6	0.888	2.65	-2.84
May. 10. 2013	835 Body	22.4	22.6	824.70	55.240	0.969	54.1	0.948	-2.06	-2.17
				835.00	55.200	0.970	54.0	0.959	-2.17	-1.13
				836.52	55.195	0.972	54.0	0.960	-2.17	-1.23
				848.31	55.159	0.986	53.9	0.972	-2.28	-1.42
May. 08. 2013	1900 Head	22.2	22.5	1850.2	40.000	1.400	39.9	1.370	-0.25	-2.14
				1880.0	40.000	1.400	39.8	1.400	-0.50	0.00
				1900.0	40.000	1.400	39.8	1.410	-0.50	0.71
				1909.8	40.000	1.400	39.7	1.421	-0.75	1.50
May. 08. 2013	1900 Body	22.2	22.5	1850.2	53.300	1.520	53.9	1.476	1.13	-2.89
				1880.0	53.300	1.520	53.8	1.510	0.94	-0.66
				1900.0	53.300	1.520	53.7	1.520	0.75	0.00
				1909.8	53.300	1.520	53.7	1.534	0.75	0.92
May. 11. 2013	2450 Head	22.2	22.7	2412	39.268	1.766	37.8	1.760	-3.74	-0.34
				2437	39.223	1.788	37.7	1.780	-3.88	-0.45
				2450	39.200	1.800	37.7	1.790	-3.83	-0.56
				2462	39.184	1.813	37.7	1.803	-3.79	-0.55
May. 11. 2013	2450 Body	22.2	22.7	2412	52.751	1.914	54.2	1.880	2.75	-1.78
				2437	52.717	1.938	54.1	1.915	2.62	-1.19
				2450	52.700	1.950	54.0	1.930	2.47	-1.03
				2462	52.685	1.967	54.0	1.951	2.50	-0.81

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp.[°C]	Liquid Temp.[°C]	Measured Frequency [MHz]	Target Dielectric Constant, εr	Target Conductivity, σ (S/m)	Measured Dielectric Constant, εr	Measured Conductivity, σ (S/m)	εr Deviation [%]	σ Deviation [%]
May. 12. 2013	5 GHz Head	21.8	22.3	5200	36.00	4.660	36.10	4.750	0.28	1.93
				5240	35.95	4.700	36.10	4.800	0.42	2.13
				5280	35.89	4.740	36.00	4.840	0.31	2.11
				5300	35.87	4.760	35.90	4.870	0.08	2.31
				5500	35.60	4.960	35.60	5.110	0.00	3.02
				5580	35.52	5.048	35.40	5.210	-0.34	3.21
				5600	35.00	5.068	35.40	5.220	1.14	3.00
				5800	35.30	5.270	35.00	5.460	-0.85	3.61
May. 13. 2013	5 GHz Body	22.1	22.6	5200	49.00	5.300	47.70	5.240	-2.65	-1.13
				5240	48.95	5.347	47.60	5.300	-2.76	-0.88
				5280	48.89	5.393	47.60	5.350	-2.64	-0.80
				5300	48.87	5.417	47.50	5.380	-2.80	-0.68
				5500	48.60	5.650	47.20	5.650	-2.88	0.00
				5580	48.52	5.746	47.00	5.750	-3.13	0.07
				5600	48.49	5.769	47.00	5.780	-3.07	0.19
				5800	48.20	6.000	46.60	6.040	-3.32	0.67

Tissue Verification Note

Note: The above measured tissue parameters were used in the DASY software. The DASY software was usedto perform interpolation to determine the dielectric parameters at the SAR test device frequencies (perIEEE 1528 6.6.1.2). The tissue parameters listed in the SAR test plots may slightly differ from the tableabove due to significant digit rounding in the software.

Measurement Procedure for Tissue verification

1) The network analyzer and probe system was configured and calibrated.
2) The probe was immersed in the sample which was placed in a nonmetallic container. Trapped air bubbles beneath the flange were minimized by placing the probe at a slight angle.
3) The complex admittance with respect to the probe aperture was measured
4) The complex relative permittivity , for example from the below equation (Pournaropoulos and Misra):

$$Y = \frac{j2\omega\varepsilon_r\varepsilon_0}{[\ln(b/a)]^2}\int_a^b\int_a^b\int_0^\pi \cos\phi' \frac{\exp\left[-j\omega r(\mu_0\varepsilon_r'\varepsilon_0)^{1/2}\right]}{r} d\phi' d\rho' d\rho$$

where Y is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively, $r^2 = \rho^2 + \rho'^2 - 2\rho\rho'\cos\phi'$, ω is the angular frequency, and $j = \sqrt{-1}$.

9.2 Test System Verification

Prior to assessment, the system is verified to the± 10 % of the specifications at 835 MHz, 1900 MHz, 2450 MHz and 5 GHz by using the SAR Dipole kit(s). (Graphic Plots Attached)

SYSTEM DIPOLE VERIFICATION TARGET & MEASURED											
Freq. [MHz]	SAR Dipole kits	Date(s)	Liquid	Ambient Temp.[°C]	Liquid Temp.[°C]	Probe S/N	Input Power (mW)	1 W Target SAR_{1g} (W/kg)	Measured SAR_{1g} (W/kg)	1 W Normalized SAR_{1g} (W/kg)	Deviation [%]
835	D835V2, SN:464	May. 07. 2013	Head	22.0	22.6	3643	250	9.40	2.22	8.88	-5.53
835	D835V2, SN:464	May. 07. 2013	Body	22.0	22.6	3643	250	9.53	2.38	9.52	-0.10
835	D835V2, SN:464	May. 09. 2013	Head	21.9	22.3	3643	250	9.40	2.19	8.76	-6.81
835	D835V2, SN:464	May. 09. 2013	Body	21.9	22.3	3643	250	9.53	2.38	9.52	-0.10
835	D835V2, SN:464	May. 10. 2013	Head	22.4	22.6	3643	250	9.40	2.23	8.92	-5.11
835	D835V2, SN:464	May. 10. 2013	Body	22.4	22.6	3643	250	9.53	2.55	10.20	7.03
1900	D1900V2, SN:5d029	May. 08. 2013	Head	22.2	22.5	3643	250	38.4	9.79	39.16	1.98
1900	D1900V2, SN:5d029	May. 08. 2013	Body	22.2	22.5	3643	250	39.6	10.1	40.40	2.02
2450	D2450V2, SN:726	May. 11. 2013	Head	22.2	22.7	3643	250	52.0	12.9	51.60	-0.77
2450	D2450V2, SN:726	May. 11. 2013	Body	22.2	22.7	3643	250	50.2	12.2	48.80	-2.79
5200	D5GHzV2 SN: 1103	May. 12. 2013	Head	21.8	22.3	3643	100	81.1	8.02	80.20	-1.11
5300	D5GHzV2 SN: 1103	May. 12. 2013	Head	21.8	22.3	3643	100	82.5	8.51	85.10	3.15
5500	D5GHzV2 SN: 1103	May. 12. 2013	Head	21.8	22.3	3643	100	85.3	8.84	88.40	3.63
5600	D5GHzV2 SN: 1103	May. 12. 2013	Head	21.8	22.3	3643	100	84.5	7.89	78.90	-6.63
5800	D5GHzV2 SN: 1103	May. 12. 2013	Head	21.8	22.3	3643	100	80.5	7.96	79.60	-1.12
5200	D5GHzV2 SN: 1103	May. 13. 2013	Body	22.1	22.6	3643	100	74.7	7.35	73.50	-1.61
5300	D5GHzV2 SN: 1103	May. 13. 2013	Body	22.1	22.6	3643	100	76.0	7.78	77.80	2.37
5500	D5GHzV2 SN: 1103	May. 13. 2013	Body	22.1	22.6	3643	100	80.0	7.87	78.70	-1.63
5600	D5GHzV2 SN: 1103	May. 13. 2013	Body	22.1	22.6	3643	100	81.3	8.33	83.30	2.46
5800	D5GHzV2 SN: 1103	May. 13. 2013	Body	22.1	22.6	3643	100	75.5	7.11	71.10	-5.83

Note1 : Validation was measured with input 250 mW, 100 mW and normalized to 1W.

Note2 : To confirm the proper SAR liquid depth, the z-axis plotsfrom the system verifications were included since thesystem verifications were performed usingthe same liquid, probe and DAE as the SAR tests in the same time period.

Note3: Full system validation status and results can be found in Attachment 3.

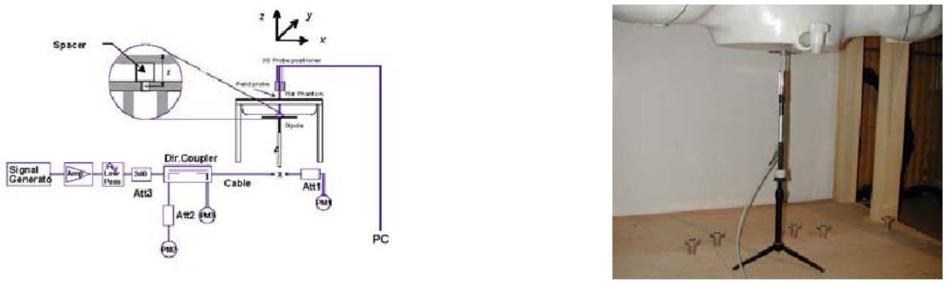


Figure 9.1 Dipole Validation Test Setup

10. FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

10.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05 are applicable to handsetswith built-in unlicensed transmitters such as 802.11b/g/n and Bluetooth devices which maysimultaneously transmit with the licensed transmitter.

10.2Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmissionanalysis is required. Per FCC KDB 447498 D01v05 IV.C.1.iii, simultaneous transmission SAR testexclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas ina specific a physical test configuration is ≤1.6 W/kg. When standalone SAR is not required to bemeasured, per FCC KDB 447498 D01v05 4.3.2 2), the following equation must be used to estimate thestandalone 1g SAR for simultaneous transmission assessment involving that transmitter.

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

Table 10.1 Estimated SAR

Mode	Frequency	Maximum Allowed Power		Separation Distance (Body)	Estimated SAR (Body)
	[MHz]	[dBm]	[mW]	[mm]	[W/kg]
Bluetooth	2480	6.2	4.169	10	0.088

Note1: Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission.

10.3Simultaneous Transmission Capabilities

Ref.	Simultaneous Transmit Configurations	Head	Body-Worn Accessory	Hot Spot	Note
		IEEE1528, Supp C	Supple-ment C	FCC KDB 941225 D06 Edges/sides	
1	GSM850 Voice + 2.4 GHz WIFI	Yes	Yes	N/A	
2	1x CDMA Voice + 2.4 GHz WIFI	Yes	Yes	N/A	
3	WCDMA850 + 2.4 GHz WIFI	Yes	Yes	N/A	
4	PCS1900 Voice + 2.4 GHz WIFI	Yes	Yes	N/A	
5	GSM850 Voice + 5 GHz WIFI	Yes	Yes	N/A	
6	1x CDMA Voice + 5 GHz WIFI	Yes	Yes	N/A	
7	WCDMA850 + 5 GHz WIFI	Yes	Yes	N/A	
8	PCS1900 Voice + 5 GHz WIFI	Yes	Yes	N/A	
9	GSM850 GPRS + 2.4 GHz WIFI	N/A	N/A	Yes	
10	1x CDMA + 2.4 GHz WIFI	N/A	N/A	Yes	
11	WCDMA850 + 2.4 GHz WIFI	N/A	N/A	Yes	WCDMA + WIFI Hotspot
12	GPRS1900 GPRS + 2.4 GHz WIFI	N/A	N/A	Yes	
13	GSM850 GPRS + 5 GHz WIFI	N/A	N/A	N/A	
14	GPRS1900 GPRS + 5 GHz WIFI	N/A	N/A	N/A	
15	GSM850 Voice + Bluetooth	N/A	Yes	N/A	
16	1x CDMA Voice+ Bluetooth	N/A	Yes	N/A	
17	WCDMA850 + Bluetooth	N/A	Yes	N/A	
18	PCS1900 Voice + Bluetooth	N/A	Yes	N/A	

Notes:

1. WCDMA data and GPRS supports Hotspot.
2. Bluetooth and WIFI cannot transmit simultaneously since they share the same chip.
3. GSM and WCDMA cannot transmit simultaneously since they share the same chip.
4. This device do not supports VoIP.

10.4 Head SAR Simultaneous Transmission Analysis

Table 10.2 Simultaneous Transmission Scenario with 2.4 GHz W-LAN (Held to Ear)

Simult TX	Configuration	GSM850 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	PCS1900 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.283	0.554	0.837	Head SAR	Left Touch	0.347	0.554	0.901
	Right Touch	0.214	0.234	0.448		Right Touch	0.199	0.234	0.433
	Left Tilt	0.206	0.446	0.652		Left Tilt	0.113	0.446	0.559
	Right Tilt	0.104	0.175	0.279		Right Tilt	0.084	0.175	0.259

Table 10.3 Simultaneous Transmission Scenario with 2.4 GHz W-LAN (Held to Ear)

Simult TX	Configuration	WCDMA 850 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	Cell. CDMA SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.316	0.554	0.870	Head SAR	Left Touch	0.247	0.554	0.801
	Right Touch	0.241	0.234	0.475		Right Touch	0.320	0.234	0.554
	Left Tilt	0.212	0.446	0.658		Left Tilt	0.260	0.446	0.706
	Right Tilt	0.105	0.175	0.280		Right Tilt	0.303	0.175	0.478

Table 10.4 Simultaneous Transmission Scenario with 5.2 GHz W-LAN (Held to Ear)

Simult TX	Configuration	GSM850 SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	PCS1900 SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.283	0.094	0.377	Head SAR	Left Touch	0.347	0.094	0.441
	Right Touch	0.214	0.059	0.273		Right Touch	0.199	0.059	0.258
	Left Tilt	0.206	0.041	0.247		Left Tilt	0.113	0.041	0.154
	Right Tilt	0.104	0.021	0.125		Right Tilt	0.084	0.021	0.105

Table 10.5 Simultaneous Transmission Scenario with 5.2 GHz W-LAN (Held to Ear)

Simult TX	Configuration	WCDMA 850 SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	Cell. CDMA SAR (W/kg)	5.2G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.316	0.094	0.410	Head SAR	Left Touch	0.247	0.094	0.341
	Right Touch	0.241	0.059	0.300		Right Touch	0.320	0.059	0.379
	Left Tilt	0.212	0.041	0.253		Left Tilt	0.260	0.041	0.301
	Right Tilt	0.105	0.021	0.126		Right Tilt	0.303	0.021	0.324

Table 10.6 Simultaneous Transmission Scenario with 5.3 GHz W-LAN (Held to Ear)

Simult TX	Configuration	GSM850 SAR (W/kg)	5.3G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	PCS1900 SAR (W/kg)	5.3G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.283	0.121	0.404	Head SAR	Left Touch	0.347	0.121	0.468
	Right Touch	0.214	0.062	0.276		Right Touch	0.199	0.062	0.261
	Left Tilt	0.206	0.050	0.256		Left Tilt	0.113	0.050	0.163
	Right Tilt	0.104	0.024	0.128		Right Tilt	0.084	0.024	0.108

Table 10.7 Simultaneous Transmission Scenario with 5.3 GHz W-LAN (Held to Ear)

Simult TX	Configuration	WCDMA 850 SAR (W/kg)	5.3G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	Cell. CDMA SAR (W/kg)	5.3G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.316	0.121	0.437	Head SAR	Left Touch	0.247	0.121	0.368
	Right Touch	0.241	0.062	0.303		Right Touch	0.320	0.062	0.382
	Left Tilt	0.212	0.050	0.262		Left Tilt	0.260	0.050	0.310
	Right Tilt	0.105	0.024	0.129		Right Tilt	0.303	0.024	0.327

Table 10.8 Simultaneous Transmission Scenario with 5.5 GHz W-LAN (Held to Ear)

Simult TX	Configuration	GSM850 SAR (W/kg)	5.5G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	PCS1900 SAR (W/kg)	5.5G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.283	0.195	0.478	Head SAR	Left Touch	0.347	0.195	0.542
	Right Touch	0.214	0.093	0.307		Right Touch	0.199	0.093	0.292
	Left Tilt	0.206	0.125	0.331		Left Tilt	0.113	0.125	0.238
	Right Tilt	0.104	0.101	0.205		Right Tilt	0.084	0.101	0.185

Table 10.9 Simultaneous Transmission Scenario with 5.5 GHz W-LAN (Held to Ear)

Simult TX	Configuration	WCDMA 850 SAR (W/kg)	5.5G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	Cell. CDMA SAR (W/kg)	5.5G W-LAN (802.11a) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.316	0.195	0.511	Head SAR	Left Touch	0.247	0.195	0.442
	Right Touch	0.241	0.093	0.334		Right Touch	0.320	0.093	0.413
	Left Tilt	0.212	0.125	0.337		Left Tilt	0.260	0.125	0.385
	Right Tilt	0.105	0.101	0.206		Right Tilt	0.303	0.101	0.404

10.5 Body-Worn Simultaneous Transmission Analysis

Table 10.10 Simultaneous Transmission Scenario with 2.4 GHz W-LAN (Body-Worn at 10 mm)

Configuration	Mode	2G/3G SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Rear Side	GSM850	0.565	0.227	0.792
Rear Side	WCDMA850	0.616	0.227	0.843
Rear Side	Cell. CDMA	0.592	0.227	0.819
Rear Side	PCS1900	0.315	0.227	0.542

Table 10.11 Simultaneous Transmission Scenario with 5.2 GHz W-LAN (Body-Worn at 10 mm)

Configuration	Mode	2G/3G SAR (W/kg)	5.2G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Rear Side	GSM850	0.565	0.066	0.631
Rear Side	WCDMA850	0.616	0.066	0.682
Rear Side	Cell. CDMA	0.592	0.066	0.658
Rear Side	PCS1900	0.315	0.066	0.381

Table 10.12 Simultaneous Transmission Scenario with 5.3 GHz W-LAN (Body-Worn at 10 mm)

Configuration	Mode	2G/3G SAR (W/kg)	5.3G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Rear Side	GSM850	0.565	0.070	0.635
Rear Side	WCDMA850	0.616	0.070	0.686
Rear Side	Cell. CDMA	0.592	0.070	0.662
Rear Side	PCS1900	0.315	0.070	0.385

Table 10.13 Simultaneous Transmission Scenario with 5.5 GHz W-LAN (Body-Worn at 10 mm)

Configuration	Mode	2G/3G SAR (W/kg)	5.5G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Rear Side	GSM850	0.565	0.135	0.700
Rear Side	WCDMA850	0.616	0.135	0.751
Rear Side	Cell. CDMA	0.592	0.135	0.727
Rear Side	PCS1900	0.315	0.135	0.45

Table 10.14 Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 10 mm)

Configuration	Mode	2G/3G SAR (W/kg)	Bluetooth SAR (W/kg)	ΣSAR (W/kg)
Rear Side	GSM850	0.565	0.088	0.653
Rear Side	WCDMA850	0.616	0.088	0.704
Rear Side	Cell. CDMA	0.592	0.088	0.680
Rear Side	PCS1900	0.315	0.088	0.403

Note: Bluetooth SAR was not required to be measured per FCC KDB 447498. Estimated SAR resultswere used in the above table to determine simultaneous transmission SAR test exclusion.

10.6 Hotspot SAR Simultaneous Transmission Analysis

Per FCC KDB Publication 941225 D06v01, the device edges with antennas more than 2.5 cm from edgeare not required to be evaluated for SAR ("-").

Table 10.15 Simultaneous Transmission Scenario (Hotspot at 10 mm)

Simult TX	Configuration	GSM850 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	PCS1900 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	-	0.189	0.189	Body SAR	Top	-	0.189	0.189
	Bottom	0.064	-	0.064		Bottom	0.161	-	0.161
	Front	0.420	0.194	0.614		Front	0.265	0.194	0.459
	Rear	0.642	0.227	0.869		Rear	0.341	0.227	0.568
	Right	0.598	0.249	0.847		Right	0.166	0.249	0.415
	Left	0.353	-	0.353		Left	0.150	-	0.150

Table 10.16 Simultaneous Transmission Scenario (Hotspot at 10 mm)

Simult TX	Configuration	WCDMA 850 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	Cell. CDMA SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	-	0.189	0.189	Body SAR	Top	-	0.189	0.189
	Bottom	0.061	-	0.061		Bottom	0.057	-	0.057
	Front	0.412	0.194	0.606		Front	0.391	0.194	0.585
	Rear	0.616	0.227	0.843		Rear	0.592	0.227	0.819
	Right	0.512	0.249	0.761		Right	0.500	0.249	0.749
	Left	0.322	-	0.322		Left	0.308	-	0.308

Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditionswere below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneoustransmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneousSAR summation is required per FCC KDB Publication 447498 D01_v05.

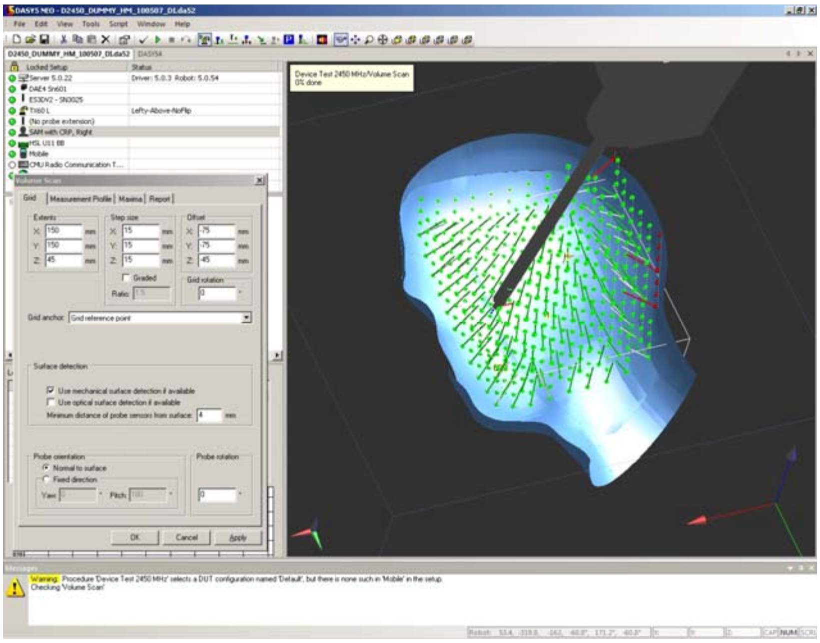
10.7 Description of Volume Scan

In order to determine the EM field distribution in a three-dimensional spatial extension, volumescans are required.
In free space, these assessments can help to gain more information on the performance of the DUT(e.g., to determine the degree of symmetry of the filed radiated from a horn antenna).

For dosimetric application, it is necessary to assess the peak spatial SAR value averaged over avolume. For this purpose, fine resolution volume scans need to be performed at the peak SARlocation(s) determined during the Area Scan. In DASY4 software these scans are called Zoom Scanjobs. The default Zoom Scan measures 7 x 7 x 7 points witha step size of 5 mm. Faster evaluations can be achieved with a reduced number of measurementpoints. For example, a Zoom Scan with a grid step size in x- and y-directions of 7.5 mm (5 x 5 x 7cube configuration) reduces the measurement time to almost half with only 1-2% difference in SARreading compared to the fine-resolution 7 x 7 x 7 scan.

For SAR evaluations with larger spatial extensions (e.g., within a complete phantom head section)a Volume Scan job should be used.

The Volume Scan job is compatible with DASY4 SAR, PRO and NEO system levels. Volume Scansare used to assess peak SAR and averaged SAR measurement in largely extended 3-dimensionalvolumes within any phantom. This measurement does not need any previous area scan. The gridcan be anchored to a user specific point or to the current probe locationWith an Administrator access mode, the grid can be optionally graded in Z-direction, wherebythe smallest grid step and the grading ratio can be defined. Chosen grading ratio is automaticallyadjusted so that the desired extent in Z-direction is fully covered.



Under the Report page, the quantity to be evaluated for an instant report may be selected. Thisquantity can be: field magnitude, SAR, interpolated SAR or averaged SAR.

10.8 SAR Assessment

Alternative1

- Evaluation Method
  - Maximum summed SAR Value
- Description
  - Easiest and most conservative method to determine the upper limit of multi-band SAR
  - Example
    - F1's SAR Value is 0.9
    - F2's SAR Value is 1.3
    - Multi-band SAR Value is 0.9 + 1.3 = 2.2

Alternative2

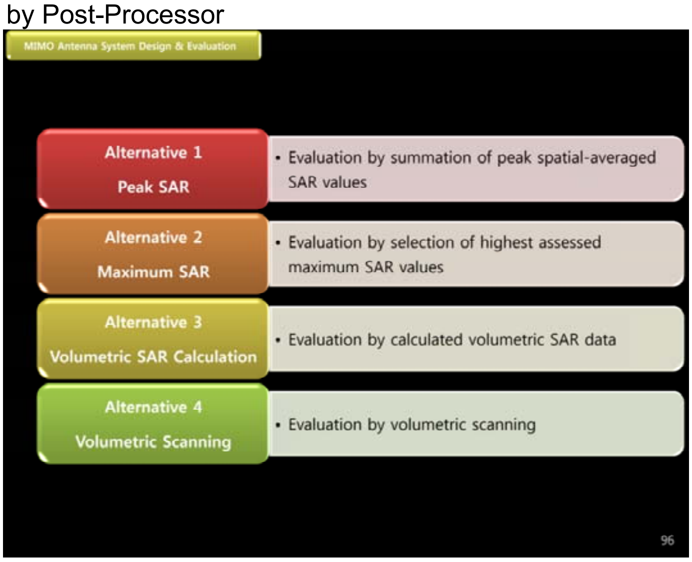
- Evaluation Method
  - Selection of highest assessed maximum SAR Value
- Description
  - Accurate estimate of the multi-band SAR
  - Example
    - F1's SAR Value is 0.9
    - F2's SAR Value is 1.3
    - Multi-band SAR Value is 1.3

Alternative3

- Evaluation Method
  - Combining existing Area and Zoom Scan results by Post-Processor
- Description
  - Rapid way of obtaining the multi-band SAR. It is always applicable.
  - Example
    - F1's SAR Value is 0.9
    - F2's SAR Value is 1.3
    - Combining results by Post-Processor

Alternative4

- Evaluation Method
  - Combining existing Area and Zoom Scan results by Post-Processor
- Description
  - The most accurate way of assessing the multi-band SAR and always applicable.
  - Example
    - F1's SAR Value is 0.9
    - F2's SAR Value is 1.3
    - Combining results by Post-Processor



11. FCC MEASUREMENT PROCEDURES

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

11.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v05, When SAR is not measured at the maximum power levelallowed for production units; the results must be scaled to the maximum tune-up tolerance limit accordingto the power applied to the individual channels tested to determine compliance. For simultaneoustransmission, the measured aggregate SAR must be scaled according to the sum of the differencesbetween the maximum tune-up tolerance and actual power used to test each transmitter. When SAR ismeasured at or scaled to the maximum tune-up tolerance limit, the results are referred to as *reported*SAR. The highest *reported* SAR results are identified on the grant of equipment authorization accordingto procedures in KDB 690783 D01v01r02.

11.2 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01 “SAR MeasurementProcedures for 3G Devices” v02, October 2007.

The device was placed into a simulated call using a base station simulator in a RF shielded chamber.Establishing connections in this manner ensure a consistent means for testing SAR and arerecommended for evaluating SAR. Devices under test were evaluated prior to testing, with a fullycharged battery and were configured to operate at maximum output power. In order to verify that thedevice was tested throughout the SAR test at maximum output power, the SAR measurement systemmeasures a “point SAR” at an arbitrary reference point at the start and end of the 1 gram SAR evaluation,to assess for any power drifts during the evaluation. If the power drift deviated by more than 5%, the SARtest and drift measurements were repeated.

11.2.1SAR Measurement Conditions for UMTS

Output Power Verification

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

Maximum output power is verified on the High, Middle and Low channels according to the generaldescriptions in section 5.2 of 3GPP TS 34.121 (release 5), using the appropriate RMC with TPC(transmit power control) set to all “1s” or applying the required inner loop power controlprocedures to maintain maximum output power while HSUPA is active. Results for all applicablephysical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) aretabulated in this test report. All configurations that are not supported by the DUT or cannot bemeasured due to technical or equipment limitations are identified.

Head SAR Measurements for Handsets

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bitsconfigured to all “1s”. SAR in AMR configurations is not required when the maximum averageoutput of each RF channel for 12.2 kbps AMR is less than 0.25 dB higher than that measured in12.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a3.4 kbps SRB (signaling radio bearer) using the exposure configuration that resulted in the highestSAR for that RF channel in the 12.2 kbps RMC mode.

Body SAR Measurements

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

SAR Measurements for Handsets with Rel 5 HSDPA

Body SAR for HSDPA is not required for handsets with HSDPA capabilities when the maximumaverage output power of each RF channel with HSDPA active is less than 0.25 dB higher thanthat measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMCis ≤75% of the SAR limit. Otherwise, SAR is measured for HSDPA, using an FRC with H-Set 1in Sub-test 1 and a 12.2 kbps RMC configured in Test Loop Mode 1, using the highest body SARconfiguration measured in 12.2 kbps RMC without HSDPA, on the maximum output channel withthe body exposure configuration that resulted in the highest SAR in 12.2 kbps RMC mode for thatRF channel.

The H-set used in FRC for HSDPA should be configured according to the UE category of a testdevice. The number of HS-DSCH/HSPDSCHs, HARQ processes, minimum inter-TTI interval,transport block sizes and RV coding sequence are defined by the applicable H-set. To maintain aconsistent test configuration and stable transmission conditions, QPSK is used in the FRC forSAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 2 ms to maintain aconstant rate of active CQI slots. DPCCH and DPDCH gain factors of βc=9 and βd=15, andpower offset parameters of ΔACK= ΔNACK =5 and ΔCQI=2 is used. The CQI value is determinedby the UE category, transport block size, number of HS-PDSCHs and modulation used in theFRC.

11.2.2SAR Measurement Conditions for CDMA2000

The following procedures were performed according to FCC KDB Publication 941225 D01 “SARMeasurement Procedures for 3G Devices” v02, October 2007.

Output Power Verification

See 3GPP2 C.S0011/TIA-98-E as recommended by “SAR Measurement Procedures for 3GDevices” v02, October 2007. Maximum output power is verified on the High, Middle and Lowchannels according to procedures in section 4.4.5.2 of 3GPP2 C.S0011/TIA-98-E. SO55 testswere measured with power control bits in the “All Up” condition.

1. If the mobile station (MS) supports Reverse TCH RC 1 and Forward TCH RC 1, set up a callusing Fundamental Channel Test Mode 1 (RC=1/1) with 9600 bps data rate only.
2. Under RC1, C.S0011 Table 4.4.5.2-1, Table 11-1 parameters were applied.
3. If the MS supports the RC 3 Reverse FCH, RC3 Reverse SCH0 and demodulation of RC 3,4,or 5, set up a call using Supplemental Channel Test Mode 3 (RC 3/3) with 9600 bpsFundamental Channel and 9600 bps SCH0 data rate.
4. Under RC3, C.S0011 Table 4.4.5.2-2, Table 11-2 was applied.

Parameters for Max. Power for RC1

Parameter	Units	Value
I_{or}	dBm/1.23 MHz	-104
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

Table 11-1

Parameters for Max. Power for RC3

Parameter	Units	Value
I_{or}	dBm/1.23 MHz	-86
$\frac{\text{Pilot } E_c}{I_{or}}$	dB	-7
$\frac{\text{Traffic } E_c}{I_{or}}$	dB	-7.4

Table 11-2

5. FCHs were configured at full rate for maximum SAR with “All Up” power control bits.

CDMA 2000 1x Advanced

This device additionally supports 1x Advanced. Conducted powers were measured using SO75 withRC8 on the uplink and RC11 on the downlink per Oct 2012 TCB Workshop notes. Smart blanking wasdisabled for all measurements. The EUT was configured with forward power control Mode 000 andreverse power control at 400 bps. Conducted powers were measured on an Agilent 8960 Series 10Wireless Communications Test Set, Model E5515C using the CDMA2000 1x Advanced application,Option E1962B-410.

Based on the maximum output power measured for 1x Advanced, SAR is required for 1x advancedwhen if the maximum output for 1x Advanced is more than 0.25 dB higher than the maximummeasured for 1x. Also, if the measured SAR in any 1x mode exposure conditions (head, body etc.) islarger than 1.2 W/kg, the highest of those configurations above 1.2 W/kg for each exposure conditionin 1x Advanced has to be repeated. All measured SAR in 1x mode higher than 1.5 W/kg must berepeated for 1x Advanced.

Head SAR Measurements

SAR for head exposure configurations is measured in RC3 with the DUT configured to transmit atfull rate using Loopback Service Option SO55. SAR for RC1 is not required when the maximumaverage output of each channel is less than ¼ dB higher than that measured in RC3. Otherwise,SAR is measured on the maximum output channel in RC1 using the exposure configuration thatresults in the highest SAR for that channel in RC3.

Body SAR Measurements

SAR for body exposure configurations is measured in RC3 with the DUT configured to transmit atfull rate on FCH with all other code channels disabled using TDSO / SO32. SAR for multiplecode channels (FCH + SCHn) is not required when the maximum average output of each RFchannel is less than ¼ dB higher than that measured with FCH only. Otherwise, SAR ismeasured on the maximum output channel (FCH + SCHn) with FCH at full rate and SCH0 enabledat 9600 bps using the exposure configuration that results in the highest SAR for that channel withFCH only. When multiple code channels are enabled, the DUT output may shift by more than0.5 dB and lead to higher SAR drifts and SCH dropouts. Body SAR was measured using TDSO /SO32 with power control bits in the “All Up”.

Body SAR in RC1 is not required when the maximum average output of each channel is less than¼ dB higher than that measured in RC3. Otherwise, SAR is measured on the maximum outputchannel in RC1; with Loopback Service Option SO55, at full rate, using the body exposureconfiguration that results in the highest SAR for that channel in RC3.

11.2.3SAR Testing with 802.11 Transmitters

SAR Testing with IEEE 802.11 a/b/g Transmitters

Per KDB publication 248227, normal network operating configurations are not suitable for measuring theSAR of 802.11 a/b/g/n transmitters. Unpredictable fluctuations in network traffic and antenna diversityconditions can introduce undesirable variations in SAR results. The SAR for these devices should bemeasured using chipset based test mode software to ensure the results are consistent and reliable. SeeKDB Publication 248227 for more details.

General Device Setup

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. The test frequencies should correspond to actual channel frequencies defined for domestic use. SAR for devices with switched diversity should be measured with only one antenna transmitting at a time during each SAR measurement, according to a fixed modulation and data rate. The same data pattern should be sued for all measurements.

Frequency Channel Configurations

For 2.4 GHz, the highest average RF output power channel between the low, mid and high channel atthe lowest data rate was selected for SAR evaluation in 802.11b mode. 802.11g/n modes and higherdata rates for 802.11b were additionally evaluated for SAR if the output power of the respective modewas 0.25 dB or higher than the powers of the SAR configurations tested in the 802.11b mode.

For 5 GHz, the highest average RF output power channel across the default test cannels at the lowest data rate was selected for SAR evaluation in 802.11a. When the adjacent channels are higher in power then the default channels, these “required channels” were considered instead of the default channels for SAR testing. 802.11n modes and higher data rates for 802.11a/n were evaluated only if the respective mode was 0.25 dB or higher than the 802.11a mode.

If the maximum extrapolated peak SAR of the zoom scan for the highest output channel was lessthan 1.6 W/kg or if the 1g averaged SAR was less than 0.8 W/kg, SAR testing was not required forthe other test channels in the band.

12. RF CONDUCTED POWERS

GSM Conducted Powers for KYY21 (Burst-Averaged)

Band	Channel	Test Result(dBm)								
		Voice	GPRS/EDGE (GMSK) Data				EDGE(8-PSK) Data			
		GSM CS 1 Slot	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1TX Slot	EDGE 2TX Slot	EDGE 3TX Slot	EDGE 4TX Slot
GSM 850	128	32.8	32.8	29.7	28.1	26.8	N/A	N/A	N/A	N/A
	190	32.9	32.8	29.7	28.2	26.9	N/A	N/A	N/A	N/A
	251	32.9	32.9	29.8	28.2	26.9	N/A	N/A	N/A	N/A
PCS 1900	512	29.7	29.6	26.6	24.8	23.6	N/A	N/A	N/A	N/A
	661	29.7	29.7	26.6	24.8	23.7	N/A	N/A	N/A	N/A
	810	29.7	29.6	26.7	24.9	23.7	N/A	N/A	N/A	N/A

Table 12.1 The power was measured by E5515C

GSM Conducted Powers for KYY21 (Calculated Frame-Averaged)

Band	Channel	Test Result(dBm)								
		Voice	GPRS/EDGE (GMSK) Data				EDGE(8-PSK) Data			
		GSM CS 1 Slot	GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot	EDGE 1TX Slot	EDGE 2TX Slot	EDGE 3TX Slot	EDGE 4TX Slot
GSM 850	128	23.77	23.77	23.68	23.84	23.79	N/A	N/A	N/A	N/A
	190	23.87	23.77	23.68	23.94	23.89	N/A	N/A	N/A	N/A
	251	23.87	23.87	23.78	23.94	23.89	N/A	N/A	N/A	N/A
PCS 1900	512	20.67	20.57	20.58	20.54	20.59	N/A	N/A	N/A	N/A
	661	20.67	20.67	20.58	20.54	20.69	N/A	N/A	N/A	N/A
	810	20.67	20.57	20.68	20.64	20.69	N/A	N/A	N/A	N/A

Note:

- Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged powerwas calculated from the measured burst-averaged power by converting the slot powers into linear unitsand calculating the energy over 8 timeslots.
- The bolded GPRS modes were selected according to the highest frame-averaged output power table according to KDB 941225 D03v01.
- GPRS (GMSK) output powers were measured with CS1.

This device does not support evolved EDGE (eEDGE).

GSM Class: B
GPRS Multislot class: 12 (max 4 TX Uplink slots)
EDGE Multislot class: Rx Only
DTM Multislot Class: N/A

WCDMA (HSDPA) Conducted Powers for KYY21

3GPP Release Version	Mode		Power (dBm)			MPR	B_c	β_d	B_c/β_d	Sub-Test
	Channel		4132	4183	4233					
99	WCDMA	RMC	23.42	23.52	23.58	-	-	-	-	-
		ARM	23.38	23.51	23.57	-	-	-	-	-
5	HSDPA (Cellular)		23.38	23.50	23.55	0	2/15	15/15	2/15	1
5			23.35	23.46	23.53	0	12/15	15/15	12/15	2
5			22.98	23.01	23.02	0.5	15/15	8/15	15/8	3
5			22.95	22.99	23.01	0.5	15/15	4/15	15/4	4
-	Channel		9262	9400	9538	-	-	-	-	-
99	WCDMA	RMC	N/A	N/A	N/A	-	-	-	-	-
		ARM	N/A	N/A	N/A	-	-	-	-	
5	HSDPA (PCS)		N/A	N/A	N/A	0	2/15	15/15	2/15	1
5			N/A	N/A	N/A	0	12/15	15/15	12/15	2
5			N/A	N/A	N/A	0.5	15/15	8/15	15/8	3
5			N/A	N/A	N/A	0.5	15/15	4/15	15/4	4

Table 12.2The power was measured E5515C

Body SAR for HSDPA is not required for handsets with HSDPA capabilities when the maximumaverage output power of each RF channel with HSDPA active is less than 0.25 dB higher thanthat measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMCis ≤ 75% of the SAR limit.

CDMA Conducted Powers for KYY21

Band	Channel	Loopback				Data	
		Frequency	SO55 [dBm]	SO55 [dBm]	SO75 [dBm]	TDSO SO32 [dBm]	TDSO SO32 [dBm]
	F-RC	MHz	RC1	RC3	RC8	FCH+SCH	FCH
Cellular	1013	824.70	23.42	23.43	[Note2]N/A	23.40	23.42
	384	836.52	23.45	23.48	[Note2]N/A	23.44	23.47
	777	848.31	23.38	23.41	[Note2]N/A	23.39	23.41

Table 12.3The power was measured by E5515C

Note1: RC1 is only applicable for IS-95 compatibility.
Note2: This device does not support 1xAdvanced (SO75) and EVDO.

Per KDB Publication 941225 D01v02:

1. Head SAR was tested with SO55 RC3. SO55 RC1 was not required since the average output powerwas not more than 0.25 dB than the SO55 RC3 powers.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. TDSO / SO32FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dBhigher than the TDSO / SO32 FCH only powers.

GSM, WCDMA and CDMA Power Measurement Setup

WLAN Conducted Powers for KYY21

Band	Channel	Conducted Power (dBm)			
		Data Rate (Mbps)			
		1	2	5.5	11
802.11b	1	**15.49**	15.43	15.48	15.40
	6	15.10	15.04	15.09	15.02
	11	14.99	14.93	14.98	14.91

Table 12.4 IEEE 802.11b Average RF Power

Band	Channel	Conducted Power (dBm)							
		Data Rate (Mbps)							
		6	9	12	18	24	36	48	54
802.11g	1	11.06	11.02	11.01	10.99	10.88	10.85	9.55	9.34
	6	10.75	11.72	11.70	11.67	11.55	10.51	9.20	8.94
	11	10.68	11.66	11.63	11.59	11.46	11.41	10.14	9.83

Table 12.5 IEEE 802.11g Average RF Power

Band	Channel	Conducted Power (dBm)							
		Data Rate (Mbps)							
		6.5	13	19.5	26	39	52	58.5	65
802.11n (HT-20)	1	11.10	11.07	10.93	10.85	10.94	9.39	9.37	9.33
	6	10.73	10.68	10.55	10.48	10.56	9.02	8.99	8.94
	11	10.62	10.57	10.43	10.36	10.47	8.93	8.87	8.81

Table 12.6 IEEE 802.11n Average RF Power

Mode	Freq [MHz]	Channel	conducted Power [dBm]							
			Data Rate [Mbps]							
			6	9	12	18	24	36	48	54
802.11a	5180	36	12.22	12.19	12.17	12.14	12.10	12.03	11.83	11.78
	5200	40	12.21	12.18	12.18	12.14	12.09	12.02	11.81	11.79
	5240	48	**12.42**	12.39	12.38	12.35	12.29	12.24	12.02	11.99
	5260	52	13.63	13.59	13.58	13.54	13.48	13.45	13.24	13.20
	5280	56	**13.64**	13.60	13.59	13.52	13.47	13.44	13.22	13.18
	5320	64	13.30	13.28	13.26	13.19	13.14	13.12	12.93	12.88
	5500	100	13.23	13.17	13.16	13.08	13.05	13.01	12.81	12.77
	5580	116	**13.46**	13.39	13.35	13.30	13.27	13.23	13.04	12.98
	5700	140	13.06	13.01	12.98	12.93	12.88	12.80	12.62	12.57

Table 12.7 IEEE 802.11a Average RF Power

Mode	Freq [MHz]	Channel	conducted Power [dBm] 20M Bandwidth							
			Data Rate [Mbps]							
			6.5	13	19.5	26	39	52	58.5	65
802.11n	5180	36	12.16	12.03	11.96	11.86	11.75	11.64	11.50	11.42
	5200	40	12.13	12.00	11.93	11.84	11.73	11.60	11.47	11.39
	5240	48	12.30	12.19	12.10	12.02	11.90	11.78	11.66	11.53
	5260	52	13.62	13.52	13.45	13.37	13.27	13.14	12.98	12.92
	5280	56	13.22	13.09	13.01	12.93	12.84	12.70	12.57	12.55
	5320	64	13.28	13.17	13.10	13.01	12.91	12.77	12.64	12.54
	5500	100	13.21	13.13	13.06	12.98	12.96	12.76	12.54	12.50
	5580	116	13.43	13.31	13.25	13.16	13.08	12.93	12.85	12.73
	5700	140	13.04	12.98	12.90	12.82	12.71	12.61	12.39	12.35

Table 12.8 IEEE 802.11n Average RF Power – 20 MHz Bandwidth

Mode	Freq [MHz]	Channel	conducted Power [dBm] 40MHz Bandwidth							
			Data Rate [Mbps]							
			13.5/15	27/30	40.5/45	54/60	81/90	108/120	121.5 /135	135/150
802.11n	5190	38	11.31	10.36	10.33	9.08	9.04	9.01	8.88	8.16
	5230	46	11.05	10.04	10.02	8.79	8.74	8.71	8.59	7.82
	5270	54	11.36	10.41	10.39	9.12	9.08	9.05	8.92	8.20
	5310	62	11.00	10.01	9.96	8.74	8.69	8.66	8.55	7.76
	5510	102	11.31	10.34	10.31	9.03	9.01	8.98	8.86	8.13
	5550	110	11.33	10.37	10.34	9.06	9.03	8.99	8.84	8.11
	5670	134	11.21	10.23	10.20	8.94	8.91	8.90	8.75	8.05

Table 12.9 IEEE 802.11n Average RF Power – 40 MHz Bandwidth

Bluetooth Conducted Powers for KKY21

Channel	Frequency	Output Power(1Mbps)		Output power (2Mbps)		Output power (3Mbps)		Output power (LE)	
	(MHz)	(dBm)	(mW)	(dBm)	(mW)	(dBm)	(mW)	(dBm)	(mW)
Low	2402	4.82	3.034	3.33	2.153	3.39	2.183	0.34	1.082
Mid	2441	5.38	3.449	3.93	2.472	3.96	2.489	0.48	1.117
High	**2480**	**6.11**	**4.083**	4.67	2.931	4.70	2.951	0.57	1.141

Table 12.10 Bluetooth Average RF Power

W-LAN Notes

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02and October 2012 FCC/TCB Meeting Notes:

- For 2.4 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11b were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11b mode.
- For 5 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. Other IEEE 802.11 modes (including 802.11n 20 MHz and 40 MHz) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
- Since the maximum extrapolated peak SAR of the zoom scan for the maximum output channel is <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other channels is not required. Otherwise, the other default (or corresponding required) test channels were additionally tested using the lowest data rate.
- The underlined data rate and channel above were tested for SAR.
- This device does not support 5.8 GHz W-LAN.

W-LAN and Bluetooth Power Measurement Setup

13. SAR TEST RESULTS

13.1 Head SAR Results

Table 13.1 GSM850 Head SAR

FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch											
836.6	190	GSM850	GSM	33.0	32.9	0.091	Left Touch	FCC #1	1:8.3	0.277	1.023	**0.283**
836.6	190	GSM850	GSM	33.0	32.9	-0.087	Right Touch	FCC #1	1:8.3	0.209	1.023	0.214
836.6	190	GSM850	GSM	33.0	32.9	0.016	Left Tilt	FCC #1	1:8.3	0.201	1.023	0.206
836.6	190	GSM850	GSM	33.0	32.9	0.125	Right Tilt	FCC #1	1:8.3	0.102	1.023	0.104
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Head 1.6 W/kg (mW/g)** averaged over 1 gram				

Table 13.2 WCDMA850 Head SAR

FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch											
836.6	4183	WCDMA850	RMC	23.6	23.52	-0.037	Left Touch	FCC #1	1:1	0.310	1.019	**0.316**
836.6	4183	WCDMA850	RMC	23.6	23.52	0.154	Right Touch	FCC #1	1:1	0.237	1.019	0.241
836.6	4183	WCDMA850	RMC	23.6	23.52	0.007	Left Tilt	FCC #1	1:1	0.208	1.019	0.212
836.6	4183	WCDMA850	RMC	23.6	23.52	0.195	Right Tilt	FCC #1	1:1	0.103	1.019	0.105
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Head 1.6 W/kg (mW/g)** averaged over 1 gram				

Table 13.3 Cell. CDMA Head SAR

FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch											
836.52	384	Cell. CDMA	RC3/SO55	23.5	23.48	0.026	Left Touch	FCC #1	1:1	0.246	1.005	0.247
836.52	384	Cell. CDMA	RC3/SO55	23.5	23.48	0.060	Right Touch	FCC #1	1:1	0.319	1.005	**0.320**
836.52	384	Cell. CDMA	RC3/SO55	23.5	23.48	-0.071	Left Tilt	FCC #1	1:1	0.259	1.005	0.260
836.52	384	Cell. CDMA	RC3/SO55	23.5	23.48	0.042	Right Tilt	FCC #1	1:1	0.302	1.005	0.303
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Head 1.6 W/kg (mW/g)** averaged over 1 gram				

Table 13.4 PCS1900 Head SAR

FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch											
1880.0	661	PCS1900	PCS	30.0	29.7	-0.138	Left Touch	FCC #1	1:8.3	0.324	1.072	**0.347**
1880.0	661	PCS1900	PCS	30.0	29.7	0.195	Right Touch	FCC #1	1:8.3	0.186	1.072	0.199
1880.0	661	PCS1900	PCS	30.0	29.7	0.083	Left Tilt	FCC #1	1:8.3	0.105	1.072	0.113
1880.0	661	PCS1900	PCS	30.0	29.7	0.121	Right Tilt	FCC #1	1:8.3	0.078	1.072	0.084
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Head 1.6 W/kg (mW/g)** averaged over 1 gram				

Table 13.5 DTS Head SAR

FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
2412	1	802.11b	DSSS	15.7	15.49	-0.073	Left Touch	FCC #1	1	1:1	0.528	1.050	**0.554**
2412	1	802.11b	DSSS	15.7	15.49	0.178	Right Touch	FCC #1	1	1:1	0.223	1.050	0.234
2412	1	802.11b	DSSS	15.7	15.49	-0.122	Left Tilt	FCC #1	1	1:1	0.425	1.050	0.446
2412	1	802.11b	DSSS	15.7	15.49	-0.057	Right Tilt	FCC #1	1	1:1	0.167	1.050	0.175
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Head 1.6 W/kg (mW/g)** averaged over 1 gram					

Table 13.6NII Head SAR

FREQUENCY		Mode	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
5240	48	802.11a	OFDM	13.9	12.42	0.000	Left Touch	FCC #1	6	1:1	0.067	1.406	**0.094**
5240	48	802.11a	OFDM	13.9	12.42	0.000	Right Touch	FCC #1	6	1:1	0.042	1.406	0.059
5240	48	802.11a	OFDM	13.9	12.42	0.000	Left Tilt	FCC #1	6	1:1	0.029	1.406	0.041
5240	48	802.11a	OFDM	13.9	12.42	0.000	Right Tilt	FCC #1	6	1:1	0.015	1.406	0.021
5280	56	802.11a	OFDM	13.9	13.64	0.000	Left Touch	FCC #1	6	1:1	0.114	1.062	**0.121**
5280	56	802.11a	OFDM	13.9	13.64	0.000	Right Touch	FCC #1	6	1:1	0.058	1.062	0.062
5280	56	802.11a	OFDM	13.9	13.64	0.000	Left Tilt	FCC #1	6	1:1	0.047	1.062	0.050
5280	56	802.11a	OFDM	13.9	13.64	0.000	Right Tilt	FCC #1	6	1:1	0.023	1.062	0.024
5580	116	802.11a	OFDM	13.9	13.46	0.000	Left Touch	FCC #1	6	1:1	0.176	1.107	**0.195**
5580	116	802.11a	OFDM	13.9	13.46	0.000	Right Touch	FCC #1	6	1:1	0.084	1.107	0.093
5580	116	802.11a	OFDM	13.9	13.46	0.000	Left Tilt	FCC #1	6	1:1	0.113	1.107	0.125
5580	116	802.11a	OFDM	13.9	13.46	0.000	Right Tilt	FCC #1	6	1:1	0.091	1.107	0.101
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Head 1.6 W/kg (mW/g)** averaged over 1 gram					

13.2Body-Worn SAR Results

Table 13.7 GSM/WCDMA/Cell. CDMA/PCS Body-Worn SAR

FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
836.6	190	GSM850	GSM	33.0	32.9	0.172	10 mm [Rear]	FCC #1	1	1:8.3	0.552	1.023	0.565
836.6	4183	WCDMA 850	RMC	23.6	23.52	-0.121	10 mm [Rear]	FCC #1	N/A	1:1	0.605	1.019	0.616
836.52	384	Cell. CDMA	TDSO/SO32	23.5	23.48	0.015	10 mm [Rear]	FCC #1	N/A	1:1	0.589	1.005	0.592
1880.0	661	PCS1900	PCS	30.0	29.7	-0.005	10 mm [Rear]	FCC #1	1	1:8.3	0.294	1.072	0.315
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								661					

Table 13.8DTS Body-Worn SAR

FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
2412	1	802.11b	DSSS	15.7	15.49	-0.052	10 mm [Rear]	FCC #1	1	1:1	0.216	1.050	0.227
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Body 1.6 W/kg (mW/g)** averaged over 1 gram					

Table 13.9NII Body-Worn SAR

FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
5240	48	802.11a	OFDM	13.9	12.42	-0.069	10 mm [Rear]	FCC #1	6	1:1	0.047	1.406	0.066
5280	56	802.11a	OFDM	13.9	13.64	-0.188	10 mm [Rear]	FCC #1	6	1:1	0.066	1.062	0.070
5580	116	802.11a	OFDM	13.9	13.46	0.172	10 mm [Rear]	FCC #1	6	1:1	0.122	1.107	0.135
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Body 1.6 W/kg (mW/g)** averaged over 1 gram					

13.3Wireless router SAR Results

Table 13.10 GSM850GPRS Hotspot SAR

FREQUENCY MHz	FREQUENCY Ch	Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
836.6	190	GSM850	GPRS	27.0	26.9	0.031	10 mm [Bottom]	FCC #1	4	1:2.075	0.063	1.023	0.064
836.6	190	GSM850	GPRS	27.0	26.9	0.155	10 mm [Front]	FCC #1	4	1:2.075	0.410	1.023	0.420
836.6	190	GSM850	GPRS	33.0	32.8	0.012	10 mm [Rear]	FCC #1	1	1:8.3	0.558	1.047	0.584
836.6	190	GSM850	GPRS	30.0	29.7	-0.124	10 mm [Rear]	FCC #1	2	1:4.15	0.560	1.072	0.600
836.6	190	GSM850	GPRS	28.3	28.2	-0.002	10 mm [Rear]	FCC #1	3	1:2.77	0.571	1.023	0.584
836.6	190	GSM850	GPRS	27.0	26.9	0.161	10 mm [Rear]	FCC #1	4	1:2.075	0.627	1.023	**0.642**
836.6	190	GSM850	GPRS	27.0	26.9	0.051	10 mm [Right]	FCC #1	4	1:2.075	0.584	1.023	0.598
836.6	190	GSM850	GPRS	27.0	26.9	-0.019	10 mm [Left]	FCC #1	4	1:2.075	0.345	1.023	0.353
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Body 1.6 W/kg (mW/g)** averaged over 1 gram					

Table 13.11WCDMA850 Hotspot SAR

FREQUENCY MHz	FREQUENCY Ch	Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
836.6	4183	WCDMA 850	RMC	23.6	23.52	0.100	10 mm [Bottom]	FCC #1	1:1	0.060	1.019	0.061
836.6	4183	WCDMA 850	RMC	23.6	23.52	0.094	10 mm [Front]	FCC #1	1:1	0.404	1.019	0.412
836.6	4183	WCDMA 850	RMC	23.6	23.52	-0.121	10 mm [Rear]	FCC #1	1:1	0.605	1.019	**0.616**
836.6	4183	WCDMA 850	RMC	23.6	23.52	-0.151	10 mm [Right]	FCC #1	1:1	0.503	1.019	0.512
836.6	4183	WCDMA 850	RMC	23.6	23.52	0.025	10 mm [Left]	FCC #1	1:1	0.316	1.019	0.322
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Body 1.6 W/kg (mW/g)** averaged over 1 gram				

Table 13.12 Cell. CDMA Hotspot SAR

FREQUENCY MHz	FREQUENCY Ch	Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
836.52	384	Cell. CDMA	TDSO/SO32	23.5	23.48	0.004	10 mm [Bottom]	FCC #1	1:1	0.057	1.005	0.057
836.52	384	Cell. CDMA	TDSO/SO32	23.5	23.48	-0.002	10 mm [Front]	FCC #1	1:1	0.389	1.005	0.391
836.52	384	Cell. CDMA	TDSO/SO32	23.5	23.48	0.015	10 mm [Rear]	FCC #1	1:1	0.589	1.005	**0.592**
836.52	384	Cell. CDMA	TDSO/SO32	23.5	23.48	0.031	10 mm [Right]	FCC #1	1:1	0.498	1.005	0.500
836.52	384	Cell. CDMA	TDSO/SO32	23.5	23.48	0.030	10 mm [Left]	FCC #1	1:1	0.307	1.005	0.308
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Body 1.6 W/kg (mW/g)** averaged over 1 gram				

Table 13.13 PCS1900 GPRS Hotspot SAR

FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time Slots	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
1880.0	661	PCS1900	GPRS	24.0	23.7	0.101	10 mm [Bottom]	FCC #1	4	1:2.075	0.150	1.072	0.161
1880.0	661	PCS1900	GPRS	24.0	23.7	0.058	10 mm [Front]	FCC #1	4	1:2.075	0.247	1.072	0.265
1880.0	661	PCS1900	GPRS	30.0	29.7	0.108	10 mm [Rear]	FCC #1	1	1:8.3	0.301	1.072	0.323
1880.0	661	PCS1900	GPRS	27.0	26.6	-0.022	10 mm [Rear]	FCC #1	2	1:4.15	0.281	1.096	0.308
1880.0	661	PCS1900	GPRS	25.0	24.8	0.045	10 mm [Rear]	FCC #1	3	1:2.77	0.298	1.047	0.312
1880.0	661	PCS1900	GPRS	24.0	23.7	-0.100	10 mm [Rear]	FCC #1	4	1:2.075	0.318	1.072	**0.341**
1880.0	661	PCS1900	GPRS	24.0	23.7	-0.144	10 mm [Right]	FCC #1	4	1:2.075	0.155	1.072	0.166
1880.0	661	PCS1900	GPRS	24.0	23.7	0.154	10 mm [Left]	FCC #1	4	1:2.075	0.140	1.072	0.150
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Body 1.6 W/kg (mW/g)** averaged over 1 gram					

Table 13.14 W-LANHotspot SAR

FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	Data Rate [Mbps]	Duty Cycle	1g SAR (W/kg)	Scaling Factor	1g Scaled SAR (W/kg)
MHz	Ch												
2412	1	802.11b	DSSS	15.7	15.49	-0.006	10 mm [Top]	FCC #1	1	1:1	0.180	1.050	0.189
2412	1	802.11b	DSSS	15.7	15.49	0.070	10 mm [Front]	FCC #1	1	1:1	0.185	1.050	0.194
2412	1	802.11b	DSSS	15.7	15.49	-0.052	10 mm [Rear]	FCC #1	1	1:1	0.216	1.050	0.227
2412	1	802.11b	DSSS	15.7	15.49	-0.137	10 mm [Right]	FCC #1	1	1:1	0.237	1.050	**0.249**
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Body 1.6 W/kg (mW/g)** averaged over 1 gram					

13.4SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified inIEEE 1528-2003, FCC/OET Bulletin 65, Supplement C [June 2001] and FCC KDB Publication447498 D01v05.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery wasused 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, mechanicaland 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 FCCKDB Publication 447498 D01v05.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distanceof 10 mm was considered because the manufacturer has determined that there will be body-wornaccessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01, SAR was evaluated without a headset connected tothe device. Since the standalone reported SAR was ≤ 1.2 W/kg, no additional SAR evaluationsusing a headset cable were required.
8. During SAR Testing for the Wireless Router conditions per FCC KDB Publication 941225 D06v01, the actual Portable Hotspot operation (with actual simultaneous transmission of a transmitter with WIFI) was not activated (See Section 6.7 for more details).
9. Per FCC KDB 865664 D01 v01, variability SAR tests were performed when the measured SARresults for a frequency band were greater than 0.8 W/kg. Repeated SAR measurements arehighlighted in the tables above for clarity. Please see Section 14 for variability analysis.

GSM Test Notes:

1. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voicewas evaluated for body-worn SAR.
2. Per FCC KDB Publication 447498 D01v05, since the reported (scaled) SAR measured at the middle channel for each test configuration is ≤0.8 W/kg then testing at the other channels is notperformed for such test configuration(s). Since the maximum output power variation across therequired test channels is < ½ dB, the middle channel is tested.

WCDMA Test Notes:

1. WCDMA mode was tested under RMC 12.2 kbps configured in Test Loop Mode 1.
2. Body SAR for HSDPA is not required for handsets with HSDPA capabilities when the maximumaverage output power of each RF channel with HSDPA active is less than 0.25 dB higher thanthat measured without HSDPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMCis ≤ 75% of the SAR limit.
3. Per FCC KDB Publication 447498 D01v05, since the reported (scaled) SAR measured at themiddle channel for each test configuration is ≤0.8 W/kg then testing at the other channels is notperformed for such test configuration(s). Since the maximum output power variation across therequired test channels is < ½ dB, the middle channel is tested.

CDMA Test Notes:

1. Head SAR for CDMA2000 mode was tested under RC3/SO55 per FCC KDB Publication 941225 D01v02.
2. Body-Worn SAR was tested with 1x RTT with TDSO / SO32 FCH Only. EVDO and TDSO / SO32 FCH+SCH SAR tests were not required since the average output power was not more than 0.25 dB higher than the TDSO / SO32 FCH only powers, per FCC KDB Publication 941225 D01v02.
3. CDMA 1x-RTT SAR was additionally evaluated for Hotspot exposure to support simultaneouscapabilities.
4. Per FCC KDB Publication 447498 D01v05, if the reported (scaled) SAR measured at the middlechannel or highest output power channel for each test configuration is ≤0.8 W/kg then testing atthe other channels is not required for such test configuration(s). When the maximum outputpower variation across the required test channels is > ½ dB, instead of the middle channel, thehighest output power channel must be used.
5. This device does not support 1X Advanced and EVDO.

WLAN Notes:

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227D01v01r02 and October 2012 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RFoutput power channel for the lowest data rate was selected for SAR evaluation in 802.11b. OtherIEEE 802.11 modes (including 802.11g/n) were not investigated since the average output powersover all channels and data rates were not more than 0.25 dB higher than the tested channel inthe lowest data rate of IEEE 802.11b mode.
2. Justification for reduced test configurations for WIFI channels per KDB Publication 248227D01v01r02 and October 2012 FCC/TCB Meeting Notes for 5 GHz WIFI: Highest average RFoutput power channel for the lowest data rate was selected for SAR evaluation in 802.11a. OtherIEEE 802.11 modes (including 802.11n 20 MHz and 40 MHz bandwidths and 802.11ac) were notinvestigated since the average output powers over all channels and data rates were not morethan 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
3. When Hotspot is enabled, all 5 GHz bands are disabled. Therefore no 5 GHz WIFI WirelessRouter SAR Data was required.
4. WIFI transmission was verified using an uncalibrated spectrum analyzer.
5. Because the maximum extrapolated peak SAR of the zoom scan for the maximum output channelwas <1.6 W/kg and the reported 1g averaged SAR is <0.8 W/kg, SAR testing on other defaultchannels was not required.

14. SAR MEASUREMENT VARIABILITY

Measurement Variability

Per FCC KDB Publication 865664 D01v01, SAR measurement variability was assessed for eachfrequency band, which was determined by the SAR probe calibration point and tissue-equivalent mediumused for the device measurements. When both head and body tissue-equivalent media were required forSAR measurements in a frequency band, the variability measurement procedures were applied to thetissue medium with the highest measured SAR, using the highest measured SAR configuration for thattissue-equivalent medium. These additional measurements were repeated after the completion of allmeasurements requiring the same head or body tissue-equivalent medium in a frequency band. The testdevice was returned to ambient conditions (normal room temperature) with the battery fully chargedbefore it was re-mounted on the device holder for the repeated measurement(s) to minimize anyunexpected variations in the repeated results.

SAR Measurement Variability was assessed using the following procedures for each frequency band:

1. When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
2. A second repeated measurement was preformed only if the ratio of largest to smallest SAR for theoriginal and first repeated measurements was > 1.20 or when the original or repeatedmeasurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
3. A third repeated measurement was performed only if the original, first or second repeatedmeasurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first andsecond repeated measurements is > 1.20.
4. Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

Measurement Uncertainty

The measured SAR was <1.5 W/kg for all frequency bands. Therefore, per KDB Publication 865664D01v01, the standard measurement uncertainty analysis per IEEE 1528-2003 was not required.

15.CONCLUSION

Measurement Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposurelimits of the FCC. These measurements are taken to simulate the RF effects exposureunder the worst-case conditions. Precise laboratory measures were taken to assurerepeatability of the tests. The tested device complies with the requirements in respect toall parameters subject to the test. The test results and statements relate only to the item(s)tested.

Please note that the absorption and distribution of electromagnetic energy in the body arevery complex phenomena that depend on the mass, shape, and size of the body, theorientation of the body with respect to the field vectors, and the electrical properties ofboth the body and the environment. Other variables that may play a substantial role impossible biological effect are those that characterize the environment (e.g. ambienttemperature, air velocity, relative humidity, and body insulation) and those thatcharacterize the individual (e.g. age, gender, activity level, debilitation, or disease).

Because innumerable factors may interact to determine the specific biological outcome ofan exposure to electromagnetic fields, any protection guide shall consider maximalamplification of biological effects as a result of field-body interactions, environmentalconditions, and physiological variables.

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