SAR TEST REPORT

Test item	:	Handheld Terminal(Industrial PDA)
Model No.	:	Smart-P300U, SM-P300U
Order No.	:	DEMC1307-02124
Date of receipt	:	2013-07-09
Test duration	:	2013-08-29 ~ 2013-09-11
Date of issue	:	2013-09-12
Use of report	:	FCC Original Grant

Applicant : Sammi Information Systems Co, Ltd
11F Kolon Aston Bldg, 505-14, Gasan-dong,Guemcheon-Gu, Seoul, Korea

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

Test rule part	:	47CFR §2.1093	
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
DRTFCC1309-0873	Sep. 12, 2013	Final version for approval

1. DESCRIPTION OF DEVICE

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

General Information:

Equipment type	Handheld Terminal(Industrial PDA)
FCC ID	RQK-SMART-P300U
Equipment model name	Smart-P300U
Equipment add model name	SM-P300U ➢ Two models are same mechanical, electrical and functional. ➢ The only difference is the model name, which are changed for marketing purpose.
Equipment serial no.	Identical prototype
Mode(s) of Operation	GSM 850, PCS 1900, WCDMA 850, WCDMA 1900, W-LAN(802.11b/g/n HT20), RFID
TX Frequency Range	824.2 ~ 848.8 MHz (Cellular Band) / 1850.2 ~ 1909.8 MHz (PCS Band) 826.4 ~ 846.6 MHz (WCDMA FDD V) / 1852.4 ~ 1907.6 MHz (WCDMA FDD II) 2412 ~ 2462 MHz (802.11b) / 902.75 ~ 927.25 MHz (RFID)
RX Frequency Range	869.2 ~ 893.8 MHz (Cellular Band) / 1930.2 ~ 1989.8 MHz (PCS Band) 871.4 ~ 891.6 MHz (WCDMA FDD V) / 1932.4 ~ 1987.6 MHz (WCDMA FDD II) 2412 ~ 2462 MHz (802.11b) / 902.75 ~ 927.25 MHz (RFID)

Equipment Class	Band	Measured Conducted Power [dBm]	Reported SAR			
			1g SAR (W/kg)			10g SAR (W/kg)
			Head	Body-worn	Body	Extremity
PCE	GSM 850	33.0	0.12	0.10	0.34	0.18
PCE	PCS 1900	30.0	0.14	0.11	0.61	0.31
PCE	WCDMA 850	23.99	0.14	0.12	0.36	0.20
PCE	WCDMA 1900	23.50	0.33	0.23	**1.17**	0.65
DTS	2.4 GHz W-LAN	10.56	0.28	< 0.1	1.11	0.55
DSS	RFID	26.89	-	-	-	0.81
DSS/DTS	Bluetooth	-4.821	N/A			
Simultaneous SAR per KDB 690783 D01v01r02			0.51	0.32	1.26	**1.35**

FCC Equipment Class	Licensed Portable Transmitter Held to Ear (PCE)
Date(s) of Tests	2013-08-29 ~ 2013-09-11
Antenna Type	Internal Type Antenna
Functions	● GSM/GPRS(GPRS Class: 12) / EDGE(EDGE Class: 12) supported * DTM not supported ● BT(2.4GHz) / WLAN(2.4GHz 802.11b/g/n(HT20)) supported * No simultaneous transmission between BT & WLAN ● Simultaneous transmission between GSM, WCDMA voice & WLAN / GPRS, WCDMA & WLAN ● VoIP is not supported. ● Mobile Hotspot is not supported. ● RFID is supported.

1.1 Guidance Applied

- IEEE 1528-2003
- FCC KDB Publication 941225 D01-D07 (2G/3G)
- FCC KDB Publication 248227 D01v01r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01v05r01 (General SAR Guidance)
- FCC KDB Publication 865664 D01-D02 (SAR Measurements up to 6 GHz)
- FCC KDB Publication 648474 D03-D04

1.2 Device Overview

Band & Mode	Operating Modes	Tx Frequency
GSM/GPRS 850	Voice/Data	824.2 ~ 848.8 MHz
GSM/GPRS 1900	Voice/Data	1850.2 ~ 1909.8 MHz
WCDMA 850	Voice/Data	826.4 ~ 846.6 MHz
WCDMA1900	Voice/Data	1852.4 ~ 1907.6 MHz
2.4 GHz WLAN	Data	2412 ~ 2462 MHz
Bluetooth	Data	2402 ~ 2480 MHz
RFID	Data	902.75 ~ 927.25 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 D01v05r01.

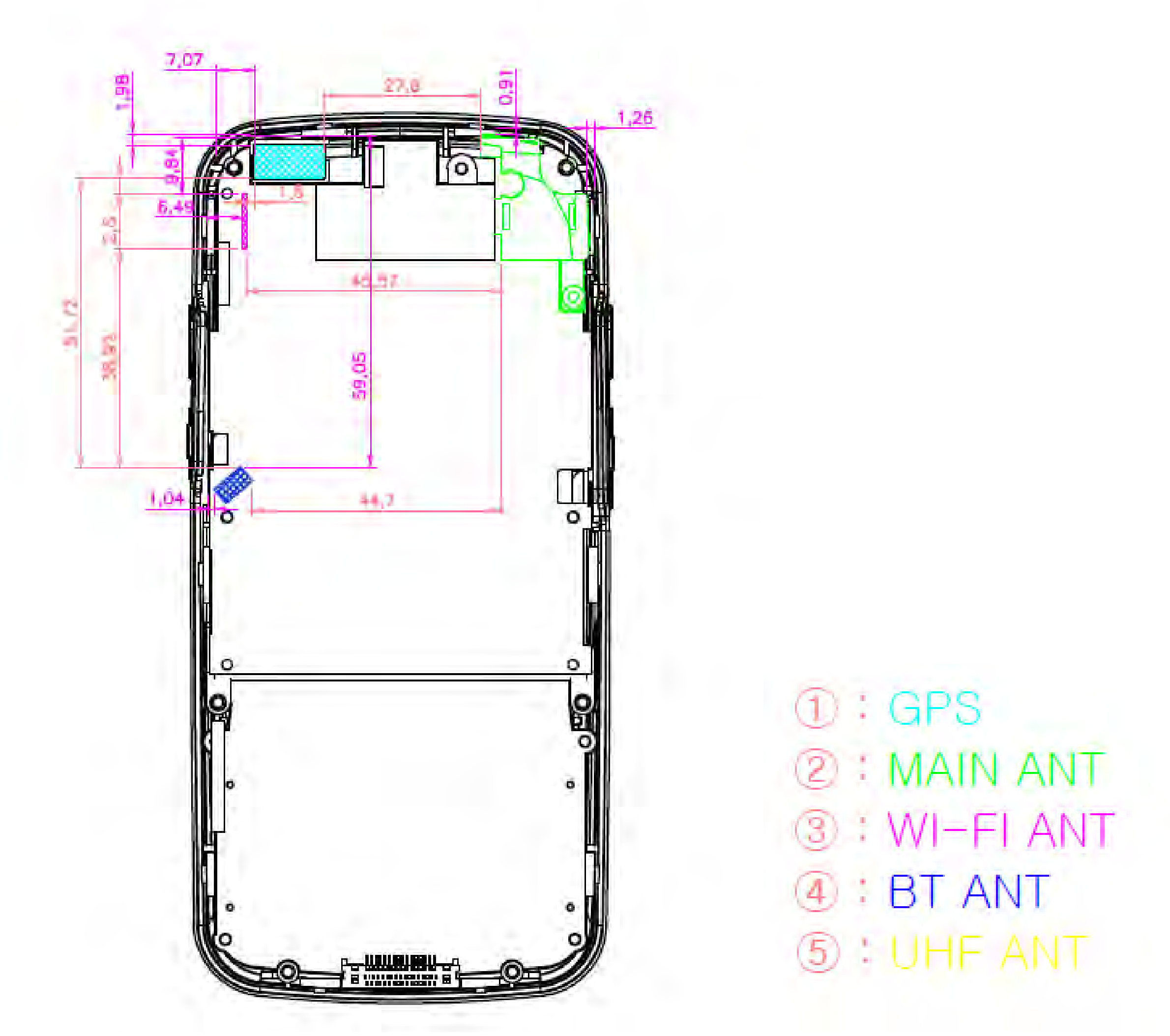
Band & Mode		Voice [dBm]	Burst Average GMSK [dBm]				Burst Average 8PSK [dBm]			
		1 TX Slot	1 TX Slot	2 TX Slot	3 TX Slot	4 TX Slot	1 TX Slot	2 TX Slot	3 TX Slot	4 TX Slot
GSM/GPRS/ EDGE 850	Maximum	33.0	33.0	30.0	27.9	26.5	27.0	23.9	22.2	21.2
	Nominal	32.5	32.5	29.5	27.4	26.0	26.5	23.4	21.7	20.7
GSM/GPRS/ EDGE 1900	Maximum	30.0	30.0	26.9	24.5	23.5	25.5	22.5	20.5	19.1
	Nominal	29.5	29.5	26.4	24.0	23.0	25.0	22.0	20.0	18.6

Band & Mode		Modulated Average [dBm]		
		3GPP RMC	3GPP HSDPA	3GPP HSUPA
WCDMA 850	Maximum	24.0	24.0	24.0
	Nominal	23.5	23.5	23.5
WCDMA 1900	Maximum	23.5	23.5	23.5
	Nominal	23.0	23.0	23.0

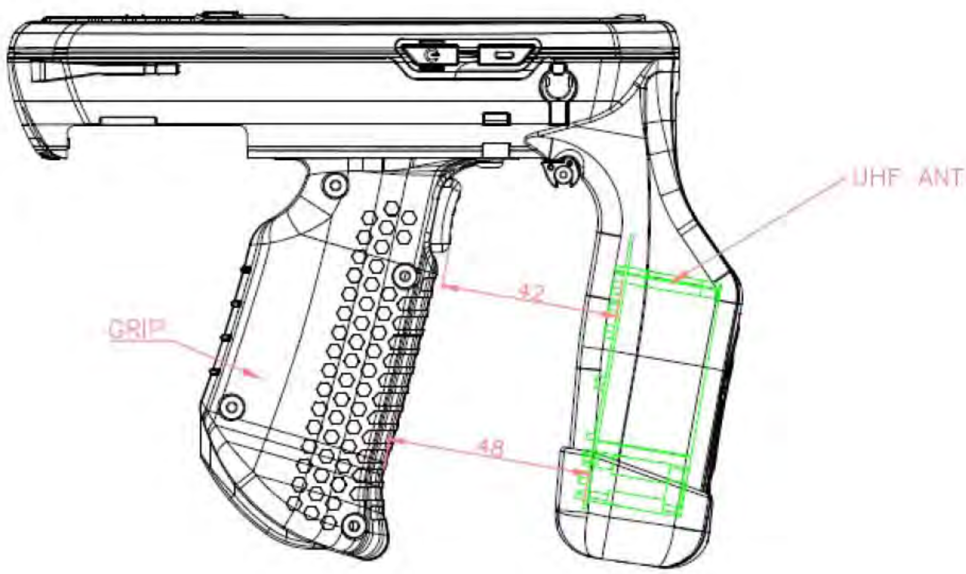
Band & Mode		Modulated Average [dBm]
IEEE 802.11b (2.4 GHz)	Maximum	10.6
	Nominal	9.1
IEEE 802.11g (2.4 GHz)	Maximum	9.4
	Nominal	7.9
IEEE 802.11n (2.4 GHz)	Maximum	9.6
	Nominal	8.1
Bluetooth 1 Mbps	Maximum	-4.5
	Nominal	-6.0
RFID	Maximum	28.5
	Nominal	26.5

1.4 DUT Antenna Locations & SAR Test Configurations

DUT Antenna Locations (Rear Side View):



DUT Antenna Locations (Left Side View):



Note: Exact antenna dimensions and separation distances are shown in the Technical Descriptions in the FCC Filing.

1.5 SAR Test Exclusions Applied

(A) WIFI & BT

Per FCC KDB 447498 D01v05r01, 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** (rounded to the nearest mW) and the antenna to user separation distance, **Bluetooth SAR was not required**; [(0.4/5)* √2.402] = **0.1** < 3.0.

Based on the maximum conducted power of **2.4 GHz WIFI** (rounded to the nearest mW) and the antenna to user separation distance, **2.4 GHz WIFI SAR was required**; [(11/5)* √2.462] = **3.6** > 3.0.

Per FCC KDB 447498 D01v05r01, the SAR exclusion threshold for 10g Extremity SAR for distances < 50 mm is defined by the following equation:

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

Based on the maximum conducted power of **Bluetooth** (rounded to the nearest mW) and the antenna to user separation distance, **Bluetooth 10g Extremity SAR was not required**; [(0.4/5)* √2.402] = **0.1** < 7.5.

Based on the maximum conducted power of **2.4 GHz WIFI** (rounded to the nearest mW) and the antenna to user separation distance, **2.4 GHz WIFI 10g Extremity SAR was not required**; [(11/5)* √2.462] = **3.6** < 7.5.

Per KDB Publication 447498 D01v05r01, the maximum power of the channel was rounded to the nearest mW before calculation.

(C) RFID

Per FCC KDB 447498 D01v05r01, the SAR exclusion threshold for 10g Extremity SAR for distances < 50 mm is defined by the following equation:

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

Based on the maximum conducted Power of **RFID** (rounded to the nearest mW) and the antenna to user separation distance, **RFID 10g Extremity SAR was required**; [(708/42)* √0.91475] = **<u>16.1</u>** > 7.5.

Per KDB Publication 447498 D01v05r01, the maximum power of the channel was rounded to the nearest mW before calculation.

(C) Licensed Transmitter(s)

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

WCDMA 850 and WCDMA 1900 support HSDPA and HSUPA.

1.6 Device Serial Numbers

Band & Mode	Head Serial Number	Body-Worn Serial Number	Body Serial Number	Hand Serial Number
GSM/GPRS 850	FCC #1	FCC #1	FCC #1	FCC #1
GSM/GPRS 1900	FCC #1	FCC #1	FCC #1	FCC #1
WCDMA 850	FCC #1	FCC #1	FCC #1	FCC #1
WCDMA 1900	FCC #1	FCC #1	FCC #1	FCC #1
2.4 GHz WLAN	FCC #1	FCC #1	FCC #1	FCC #1
RFID	FCC #1	FCC #1	FCC #1	FCC #1

2. INTROCUCTION

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

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. 2.1)

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

Fig. 2.1 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 the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

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, Switzerland and consists of high precision robotics system (Staubli), robot controller, desktop computer, near-field probe, probe alignment sensor, and the generic twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Fig. 3.1).

A cell controller system contains the power supply, robot controller teach pendant (Joystick), and a remote control used to drive the robot motors. The PC consists of the Intel Core i5-3570 3.40GHz desktop computer with Windows NT system and SAR Measurement Software DASY4, A/D interface card, monitor, mouse, and keyboard. The Staubli Robot is connected to the cell controller to allow software manipulation of the robot. A data acquisition electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. is connected to the Electro-optical coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the PC plug-in card.

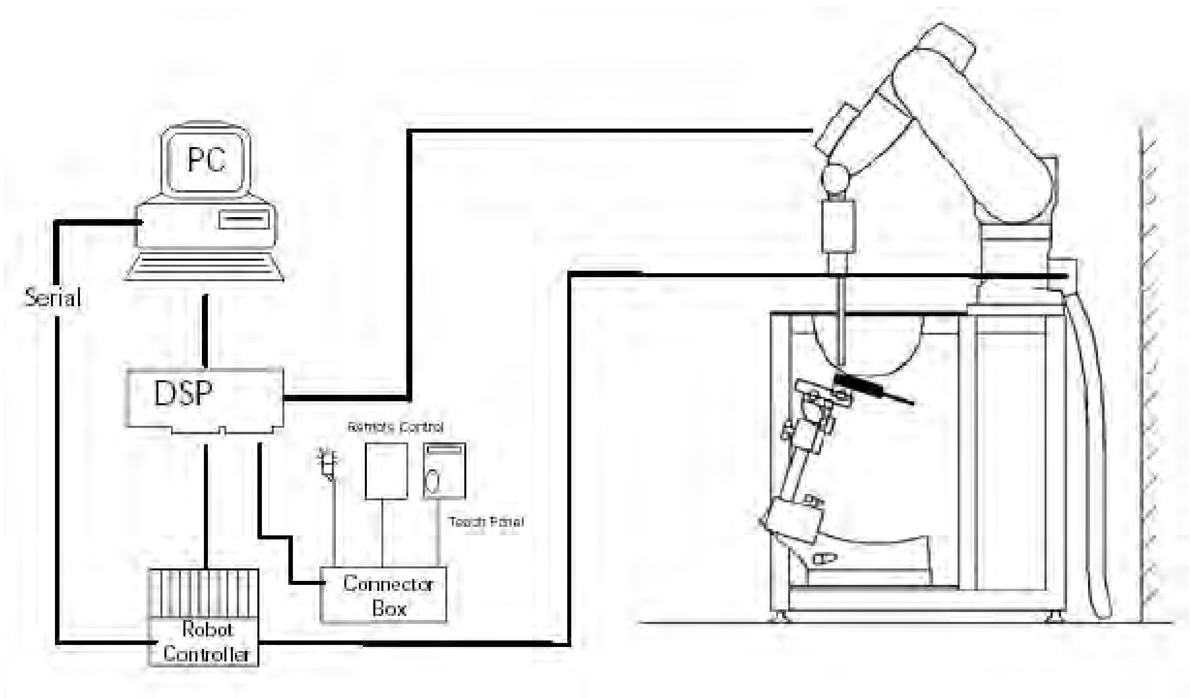


Figure 3.1 SAR Measurement System Setup

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

3.2 ET3DV6R Probe Specification

Calibration	In air from 10 MHz to 3 GHz In brain and muscle simulating tissue at Frequencies of 835 MHz, 900 MHz, 1750 MHz, 1900 MHz, 2450 MHz	
Frequency	10 MHz to 3 GHz	
Linearity	± 0.2 dB (30 MHz to 3 GHz)	
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces	
Dynamic	5 μW/g to > 100 mW/g	
Range	Linearity :	±0.2dB
Dimensions	Overall length :	330 mm
Tip length	16 mm	
Body diameter	12 mm	
Tip diameter	6.8 mm	
Distance from probe tip to sensor center	2.7 mm	
Application	General dosimetric measurements up to 3 GHz Compliance tests of mobile phones Fast automatic scanning in arbitrary phantoms	

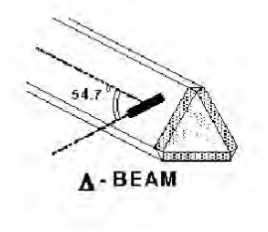


Figure 3.2 Triangular Probe Configurations

Figure 3.3 Probe Thick-Film Technique

DAE System

The SAR measurements were conducted with the dosimetric probe ET3DV6R, designed in the classical triangular configuration(see Fig. 3.2) and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multitier line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting. The approach is stopped at reaching the maximum.

3.3 Probe Calibration Process

3.3.1 E-Probe Calibration

Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedure with accuracy 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), the diode compression parameter (DCP) and the conversion factor (ConvF) of the probe is tested.

Free Space Assessment

The free space E-field from amplified probe outputs is determined in a test chamber. This is performed in a TEM cell for frequencies below 1 GHz, and in a waveguide above 1GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the 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 appropriate simulated brain tissue. The measured free space E-field in the medium, correlates to temperature rise in a dielectric medium. For temperature correlation calibration a RF transparent the remits or based temperature probe is used in conjunction with the E-field probe.

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

where:

Δt = exposure time (30 seconds),

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

ΔT = temperature increase due to RF exposure.

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

where:

σ = simulated tissue conductivity,

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

SAR is proportional to $\Delta T / \Delta t$, the initial rate of tissue heating, before thermal diffusion takes place. Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E- field;

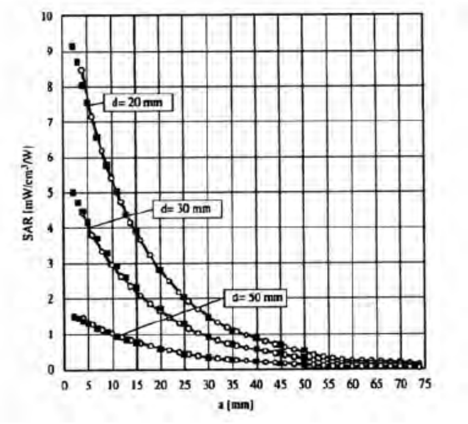


Figure 3.4 E-Field and Temperature Measurements at 900MHz

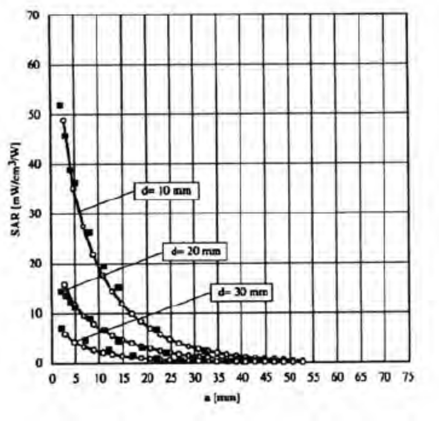


Figure 3.5 E-Field and Temperature Measurements at 1800MHz

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 Twin PHANTOM

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users. 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 the evaporation of the liquid.

Reference markings on the Phantom allow the complete setup of all predefined phantom positions and 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 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot. 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

Specific Anthropomorphic Mannequin (SAM) Specifications:

The phantom for handset SAR assessment testing is a low-loss dielectric shell, with shape and dimensions derived from the anthropometric data of the 90th percentile adult male head dimensions as tabulated by the US Army. The SAM Twin Phantom shell is bisected alongthemid-sagittal plane into right and left halves (see Fig. 3.7). The perimeter sidewalls of each phantom halves are extended to allow filling with liquid to a depth that is sufficient to minimized reflections from the upper surface. The liquid depth is maintained at a minimum depth of 15cm to minimize reflections from the upper surface.

Figure 3.7 Sam Twin Phantom shell

3.6 Device 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 and geometrical structure of the hand that may produce infinite number of configurations. To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

Figure 3.8 Mounting Device

3.7 Brain & Muscle Simulation Mixture Characterization

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

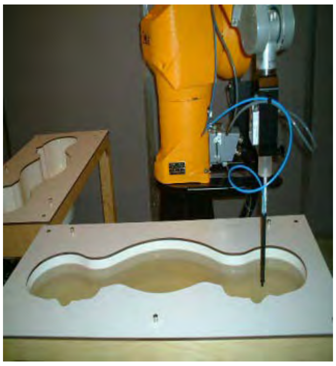


Figure 3.9 Simulated Tissue

Table 3.1 Composition of the Tissue Equivalent Matter

Ingredients (% by weight)	Frequency (MHz)									
	835		900		1900		2450		5200 ~ 5800	
Tissue Type	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**
Water	40.19	50.75	41.45	52.50	55.24	70.23	71.88	73.40	65.52	80.00
Salt (NaCl)	1.480	0.940	1.450	1.400	0.310	0.290	0.160	0.060	-	-
Sugar	57.90	48.21	56.00	45.00	-	-	-	-	-	-
HEC	0.250	-	1.000	1.000	-	-	-	-	-	-
Bactericide	0.180	0.100	0.100	0.100	-	-	-	-	-	-
Triton X-100	-	-	-	-	-	-	19.97	-	17.24	-
DGBE	-	-	-	-	44.45	29.48	7.990	26.54	-	-
Diethylene glycol hexyl ether	-	-	-	-	-	-	-	-	17.24	-
Polysorbate (Tween) 80	-	-	-	-	-	-	-	-	-	20.00
Target for Dielectric Constant	41.5	55.2	41.5	55.0	40.0	53.3	39.2	52.7	-	-
Target for Conductivity (S/m)	0.90	0.97	0.97	1.05	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] ether

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	F02/5Q86A1/A/01
☒	Robot Controller	SCHMID	CS7MB	N/A	N/A	F01/5N19A1/C/01
☒	Joystick	SCHMID	N/A	N/A	N/A	D22134006
☒	Intel Core i5-3570 3,40 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	240
☒	Mounting Device	SCHMID	SD000H01HA	N/A	N/A	N/A
☐	Twin SAM Phantom	SCHMID	TP1220	N/A	N/A	N/A
☒	Twin SAM Phantom	SCHMID	TP1221	N/A	N/A	N/A
☒	Head/Body Equivalent Matter(835MHz)	N/A	N/A	2013-01-01	2014-01-01	N/A
☒	Head/Body Equivalent Matter(900MHz)	N/A	N/A	2013-01-01	2014-01-01	N/A
☒	Head/Body Equivalent Matter(1900MHz)	N/A	N/A	2013-01-01	2014-01-01	N/A
☒	Head/Body Equivalent Matter(2450MHz)	N/A	N/A	2013-01-01	2014-01-01	N/A
☒	DataAcquisition Electronics	SCHMID	DAE3V1	2013-07-30	2014-07-30	520
☒	Dosimetric E-Field Probe	SCHMID	ET3DV6R	2013-07-29	2014-07-29	1703
☐	Dummy Probe	N/A	N/A	N/A	N/A	N/A
☒	835MHz SAR Dipole	SCHMID	D835V2	2012-03-14	2014-03-14	464
☒	900MHz SAR Dipole	SCHMID	D900V2	2012-12-13	2014-12-13	1d146
☒	1900MHz SAR Dipole	SCHMID	D1900V2	2012-03-16	2014-03-16	5d029
☒	2450MHz SAR Dipole	SCHMID	D2450V2	2012-03-15	2014-03-15	726
☐	5000MHz SAR 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 2013-09-12	2013-09-18 2014-09-12	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 Meter	Anritsu	ML2495A	2013-03-06	2014-03-06	1306007
☒	Wide Bandwidth Power Sensor	Anritsu	MA2490A	2013-03-06	2014-03-06	1249001
☒	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	2013-06-27	2014-06-27	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 2013-09-12	2013-09-17 2014-09-12	N/A
☐	Low Pass Filter 6,0GHz	Micro LAB	LA-60N	2013-03-12	2014-03-12	03942
☒	Attenuators(3 dB)	Agilent	8491B	2013-06-27	2014-06-27	MY39260700
☒	Attenuators(10 dB)	WEINSCHEL	23-10-34	2013-01-08	2014-01-08	BP4387
☐	Step Attenuator	HP	8494A	2012-09-17 2013-09-12	2013-09-17 2014-09-12	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 Validation measurement is performed by Digital EMC before each test. The brain and muscle simulating material are calibrated by Digital EMC using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain-equivalent material.

3.8.1 Extended Dipole Calibrations

Referring to FCC KDB 865664 D01v01r01 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 3.3.

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 D01v01r01 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 3.3 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	Stäubli Unimation Corp. Robot Model: RX90L
Repeatability	0.02 mm
No. of axis	6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor	Intel Core i5-3570
Clock Speed	3.40 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	ET3DV6R S/N: 1703
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 3 GHz
Linearity	± 0.2 dB (30 MHz to 3 GHz)

Phantom

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

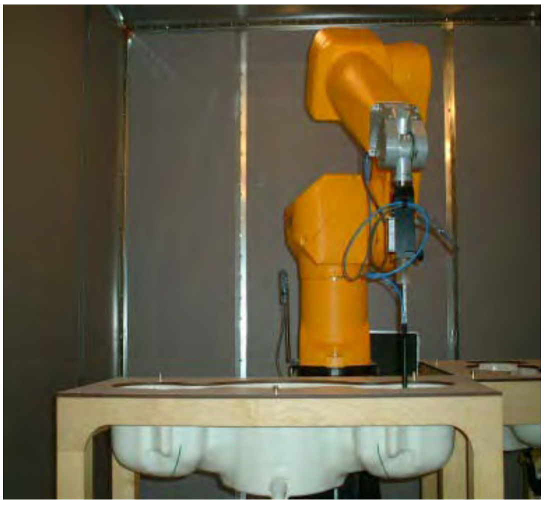


Figure 2.2 DASY4 Test System

5. SAR MEASUREMENT PROCEDURE

5.1 Measurement Procedure

The evaluation was performed using the following procedure:

1. The SAR distribution at the exposed side of the head or body was measured at a distance no greater than 5.0 mm from the inner surface of the shell. The area covered the entire dimension of the device-head and body interface and the horizontal grid resolution was determined per FCC KDB Publication 865664D01v01(See Table 5.1).

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

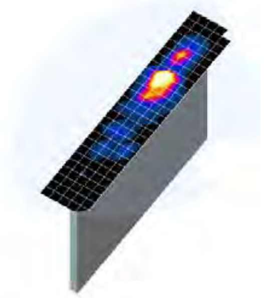


Figure 5.1
Sample SAR Area Scan

3. Based on the area scan data, the peak of the region with maximum SAR was determined by spline interpolation. Around this point, a volume was assessed according to the measurement resolution and volume size requirements of FCC KDB Publication 865664 D01v01r01 (See Table 5.1). On the basis of this data set, the spatial peak SAR value was evaluated with the following procedure (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. The combined 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 the lowest measuring point. The extrapolation was based on a least-squares algorithm. A polynomial of 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 interpolation algorithm. The 3D-spline is composed of three one-dimensional splines with the "Not a knot" condition (in x, y, and z directions). The volume was then integrated with the trapezoidal algorithm. One thousand points (10 x 10 x 10) were obtained through interpolation, in order to calculate the averaged SAR.

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

4. The SAR reference value, at the same location as step 2, was re-measured after the zoom scan was complete to calculate the SAR drift. If the drift deviated by more than 5%, the SAR test and drift 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)			Minimum Zoom Scan Volume (mm) (x,y,z)
			Uniform Grid	Graded Grid		
			$\Delta z_{zoom}(n)$	$\Delta z_{zoom}(1)$*	$\Delta z_{zoom}(n>1)$*	
≤ 2 GHz	≤ 15	≤ 8	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
2-3 GHz	≤ 12	≤ 5	≤ 5	≤ 4	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 30
3-4 GHz	≤ 12	≤ 5	≤ 4	≤ 3	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 28
4-5 GHz	≤ 10	≤ 4	≤ 3	≤ 2.5	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 25
5-6 GHz	≤ 10	≤ 4	≤ 2	≤ 2	≤ 1.5*$\Delta z_{zoom}(n-1)$	≥ 22

Table 5.1 Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01r01

6. DEFINITION OF REFERENCE POINTS

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 Ear canal (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 called the Reference Pivoting Line (see Figure 6.1). 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 handset positioning.

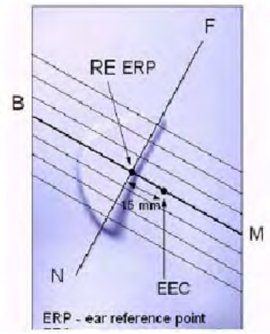


Figure 6.1 Close-up side view of ERP

6.2 Handset Reference Points

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

Figure 6.2 Front, back and side view SAM Twin Phantom

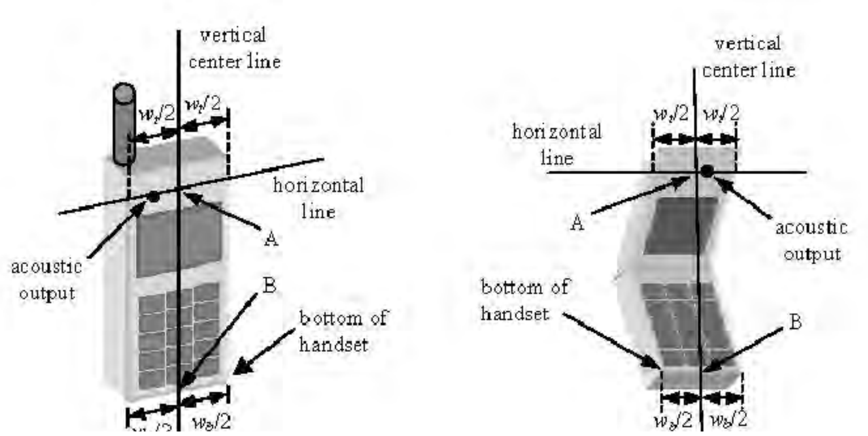


Figure 6.3 Handset Vertical Center & Horizontal Line Reference Points

7. TEST CONFIGURATION POSITIONS FOR HANDSETS

7.1 Device 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.

7.2 Positioning 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 7.1), 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 7.1 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 7.2)

7.3 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 plane until 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 7.3).

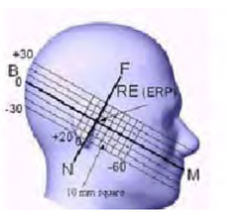


Figure 7.2 Side view w/relevant markings

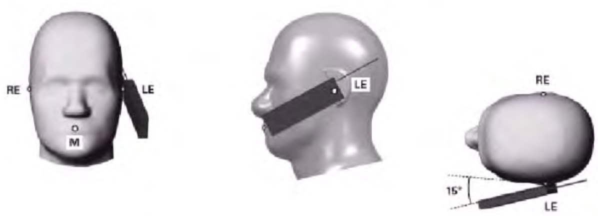


Figure 7.3 Front, Side and Top View of Ear/15^{o}Position

7.4 Body-Worn Accessory Configurations

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration (see Figure 6.7). Per FCC KDB Publication 648474 D04v01r01, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01v05r01 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 compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

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

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented.
Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.

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

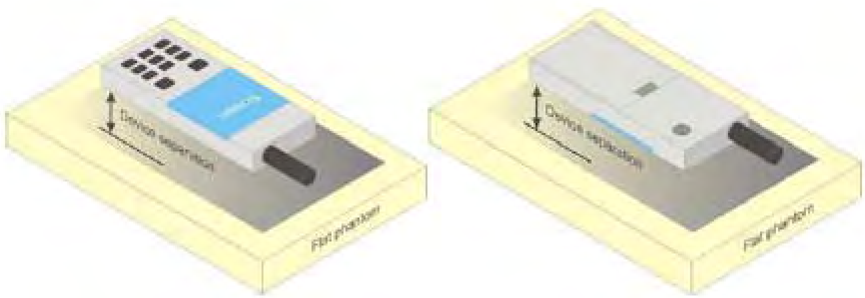


Figure 6.7 Sample Body-Worn Diagram

7.5 Extremity Exposure Configurations

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required. The 1-g body and 10-g extremity SAR Exclusion Thresholds found in KDB Publication 447498 D01v05r01 should be applied to determine SAR test requirements.

RFID operation of this device can be used only in the hand. So, RFID SAR test be applied to the 10-g extremity SAR.

7.6 Wireless Router Configurations

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06v01r01 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, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. Since the hotspot SAR results may overlap with the 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 include simultaneous transmission of both the WIFI transmitter and another licensed transmitter. Both transmitters often do not transmit at the same transmitting frequency and thus cannot be evaluated for SAR under actual use conditions due to the limitations of the SAR assessment probes.

Therefore, SAR must be evaluated for each frequency transmission and mode separately and spatially summed with the WIFI transmitter according to FCC KDB Publication 447498 D01v05r01 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.

This device does not support Wireless Router operation.

8. RF EXPOSURE LIMITS

Uncontrolled Environment:

UNCONTROLLED ENVIRONMENTS are defined as locations where there is the exposure of individuals who have no knowledge 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 for exposure or cannot exercise control over their exposure. Members of the general public would come under this category 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

1. The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
2. The Spatial Average value of the SAR averaged over the whole body.
3. The Spatial Peak value of the SAR averaged over any 10 grams 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. FCC MEASUREMENT PROCEDURES

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

9.1 Measured and Reported SAR

Per FCC KDB Publication 447498 D01v05r01, When SAR is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance. For simultaneous transmission, the measured aggregate SAR must be scaled according to the sum of the differences between the maximum tune-up tolerance and actual power used to test each transmitter. When SAR is measured 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 according to procedures in KDB 690783 D01v01r02.

9.2 Procedures Used to Establish RF Signal for SAR

The following procedures are according to FCC KDB Publication 941225 D01v02r02 “SAR Measurement Procedures 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 are recommended for evaluating SAR [4]. Devices under test were evaluated prior to testing, with a fully charged battery and were configured to operate at maximum output power. In order to verify that the device was tested throughout the SAR test at maximum output power, the SAR measurement system measures 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 SAR test and drift measurements were repeated.

9.3 SAR Measurement Conditions for WCDMA (UMTS)

9.3.1 Output Power Verification

Maximum output power is measured on the High, Middle and Low channels for each applicable transmission band according to the general descriptions in section 5.2 of 3GPP TS 34.121, using the 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 general descriptions 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 control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HS-DPCCH etc) are tabulated in this test report. All configurations that are not supported by the DUT or cannot be measured due to technical or equipment limitations are identified.

9.3.2 Head SAR Measurements for Handsets

SAR for head exposure configurations is measured using the 12.2 kbps RMC with TPC bits configured to all “1s”. SAR in AMR configurations is not required when the maximum average output of each RF channel for 12.2 kbps AMR is less than 0.25 dB higher than that measured in 2.2 kbps RMC. Otherwise, SAR is measured on the maximum output channel in 12.2 AMR with a 3.4 kbps SRB (signaling radio bearer) using the exposure configuration that resulted in the highest SAR for that RF channel in the 12.2 kbps RMC mode.

9.3.3 Body SAR Measurements

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

9.3.4 SAR Measurements for Handsets with Rel 5 HSDPA

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

The H-set used in FRC for HSDPA should be configured according to the UE category of a test device. 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 a consistent test configuration and stable transmission conditions, QPSK is used in the FRC for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 2 ms to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors of βc=9 and βd=15, and power offset parameters of ∆ACK= ∆NACK =5 and ∆CQI=2 is used. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the FRC.

Sub-Test	β_c	β_d	β_d *(SF)*	β_c/β_d	β_{HS} *(Note1, Note 2)*	CM (dB) *(Note 3)*	MPR (dB) *(Note 3)*
1	2/15	15/15	64	2/15	4/15	0.0	0.0
2	12/15 *(Note 4)*	15/15 *(Note 4)*	64	12/15 *(Note 4)*	24/15	1.0	0.0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ ⇔ $\beta_{hs} = 30/15 * \beta_c$.
Note 2: For the HS-DPCCH power mask requirement test in clause 5.2C, 5.7A, and the Error Vector Magnitude (EVM) with HS-DPCCH test in clause 5.13.1A, and HSDPA EVM with phase discontinuity in clause 5.13.1AA, Δ_{ACK} and Δ_{NACK} = 8 (A_{hs} = 30/15) with $\beta_{hs} = 30/15 * \beta_c$, and Δ_{CQI} = 7 (A_{hs} = 24/15) with $\beta_{hs} = 24/15 * \beta_c$.
Note 3: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

Figure 9.1 Table C.10.1.4 of TS 234.121-1

9.3.4 SAR Measurements for Handsets with Rel 6 HSUPA

Body SAR for HSUPA is not required when the maximum average output of each RF channel with HSUPA/HSDPA active is less than 0.25 dB higher than as measured without HSUPA/HSDPA using 12.2 kbps RMC and maximum SAR for 12.2 kbps RMC is ≤ 75 % of the SAR limit. Otherwise SAR is measured on the maximum output channel for the body exposure configuration produced highest SAR in 12.2 kbps RMC for that RF channel, using the additional procedures under “Release 6 HSPA data devices”

Head SAR for VOIP operations under HSPA is not required when maximum average output of each RF channel with HSPA is less than 0.25 dB higher than as measured using 12.2 kbps RMC. Otherwise SAR is measured using same HSPA configuration as used for body SAR.

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

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 8 ⇔ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ ⇔ $\beta_{hs} = 30/15 * \beta_c$.
Note 2: CM = 1 for β_c/β_d =12/15, β_{hs}/β_c=24/15. For all other combinations of DPDCH, DPCCH, HS- DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference.
Note 3: For subtest 1 the β_c/β_d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
Note 4: For subtest 5 the β_c/β_d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
Note 5: Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g.
Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.

9.4 SAR Testing with 802.11 Transmitters

Normal network operating configurations are not suitable for measuring the SAR of 802.11 a/b/g/n /ac transmitters. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v01r02 for more details.

9.4.1 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 used for all measurements.

9.4.2 Frequency Channel Configurations

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

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

10. RF CONDUCTED POWERS

10.1 GSM Conducted Powers

Band	Channel	Maximum Burst-Averaged Output Power (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 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot
GSM 850	128	33.0	33.0	30.0	27.9	26.5	27.0	23.9	22.1	21.2
	190	33.0	33.0	30.0	27.9	26.5	27.0	23.8	22.2	21.1
	251	32.9	32.9	29.9	27.8	26.4	27.0	23.9	22.2	21.1
PCS 1900	512	30.0	29.9	26.8	24.5	23.5	25.5	22.5	20.5	19.1
	661	30.0	30.0	26.9	24.5	23.5	25.5	22.5	20.4	19.1
	810	30.0	30.0	26.9	24.4	23.4	25.4	22.5	20.4	19.0
Band	**Channel**	**Calculated Maximum Frame-Averaged Output Power (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 1 TX Slot	EDGE 2 TX Slot	EDGE 3 TX Slot	EDGE 4 TX Slot
GSM 850	128	23.97	23.97	**23.98**	23.64	23.49	17.97	17.88	17.84	18.19
	190	23.97	23.97	**23.98**	23.64	23.49	17.97	17.78	17.94	18.09
	251	23.87	23.87	**23.88**	23.54	23.39	17.97	17.88	17.94	18.09
PCS 1900	512	20.97	**20.87**	20.78	20.24	20.49	16.47	16.48	16.24	16.09
	661	20.97	**20.97**	20.88	20.24	20.49	16.47	16.48	16.14	16.09
	810	20.97	**20.97**	20.88	20.14	20.39	16.37	16.48	16.14	15.99

Table 10.1 The power was measured by E5515C

Note:

1. Both burst-averaged and calculated frame-averaged powers are included. Frame-averaged power was calculated from the measured burst-averaged power by converting the slot powers into linear units and calculating the energy over 8 timeslots.
2. The bolded GPRS modes were selected according to the highest frame-averaged output power table according to KDB 941225 D03v01.
3. GPRS/EDGE (GMSK) output powers were measured with coding scheme setting of 1 (CS1) on the base station simulator. CS1 was configured to measure GPRS output power measurements and SAR to ensure GMSK modulation in the signal. Our Investigation has shown that CS1 - CS4 settings do not have any impact on the output levels or modulation in the GPRS modes.
4. EDGE (8-PSK) output powers were measured with MCS7 in the base station simulator. MCS7 coding scheme was used to measure the output power for EDGE since investigation has shown that choosing MCS7 coding scheme will ensure 8-PSK modulation. It has been shown the MCS levels that produce 8-PSK modulation do not have an impact on output power.

GSM Class: B
GPRS Multislot class: 12 (Max 4 Tx uplink slots)
EDGE Multislot class: 12 (Max 4 Tx uplink slots)
DTM Multislot Class: N/A

Figure 10.1 Power Measurement Setup

10.2 WCDMA Conducted Powers

3GPP Release Version	Mode	3GPP 34.121 Subtest	Cellular Band (dBm)			PCS Band (dBm)			3GPP MPR (dB)
			4132	4183	4233	9262	9400	9538	
99	WCDMA	12.2 kbps RMC	23.91	23.99	23.92	23.48	23.50	23.45	-
99		12.2 kbps AMR	23.88	23.95	23.91	23.41	23.45	23.38	-
5	HSDPA	Subtest 1	23.85	23.89	23.81	23.38	23.39	23.31	0
5		Subtest 2	23.80	23.85	23.80	23.30	23.31	23.27	0
5		Subtest 3	23.38	23.45	23.40	22.89	22.95	22.91	0.5
5		Subtest 4	23.37	23.45	23.38	22.89	22.91	22.85	0.5
6	HSUPA	Subtest 1	23.80	23.85	23.79	23.35	23.35	23.29	0
6		Subtest 2	21.75	21.77	21.70	21.29	21.24	21.19	2
6		Subtest 3	22.83	22.88	22.80	22.34	22.39	22.36	1
6		Subtest 4	21.71	21.75	21.65	21.27	21.21	21.20	2
6		Subtest 5	23.75	23.77	23.70	23.31	23.34	23.25	0

Table 10.2 The power was measured by E5515C

WCDMA SAR was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02r02. HSPA SAR was not required since the average output power of the HSPA subtests was not more than 0.25 dB higher than the RMC level and SAR was less than 1.2 W/kg.

This device does not support DC-HSDPA.

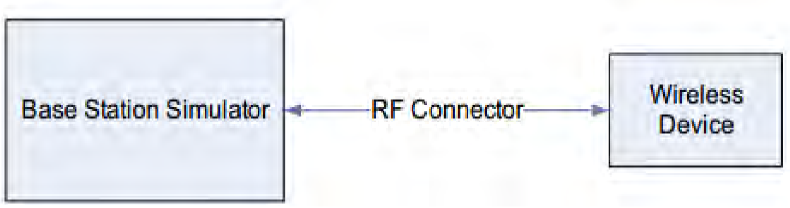


Figure 10.2 Power Measurement Setup

10.3 WLAN Conducted Powers

Band	Freq. (MHz)	Channel	802.11b (2.4 GHz) Conducted Power (dBm) Data Rate (Mbps)			
			1	2	5.5	11
802.11b	2412	1	10.31	10.13	10.10	9.77
	2437	6	10.44	10.19	10.12	9.79
	2462	11	10.56	10.36	10.30	9.97

Table 10.3 IEEE 802.11b Average RF Power

Band	Freq. (MHz)	Channel	802.11g (2.4 GHz) Conducted Power (dBm) Data Rate (Mbps)							
			6	9	12	18	24	36	48	54
802.11g	2412	1	9.03	8.96	8.71	8.65	8.62	7.86	7.51	7.07
	2437	6	9.36	9.32	9.25	9.15	8.89	7.58	7.32	7.10
	2462	11	8.30	8.09	7.98	7.73	7.60	7.14	6.92	6.87

Table 10.4 IEEE 802.11g Average RF Power

Band	Freq. (MHz)	Channel	802.11n (2.4 GHz) Conducted Power (dBm) Data Rate (Mbps)							
			6.5	13	19.5	26	39	52	58.5	65
802.11n (HT-20)	2412	1	9.03	8.60	8.41	8.23	7.43	7.12	7.09	7.05
	2437	6	9.54	9.04	8.97	8.67	7.25	7.38	7.24	7.00
	2462	11	8.16	7.64	7.59	7.30	7.02	6.98	6.81	6.71

Table 10.5 IEEE 802.11n Average RF Power

Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 / April 2013 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.

- When 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.

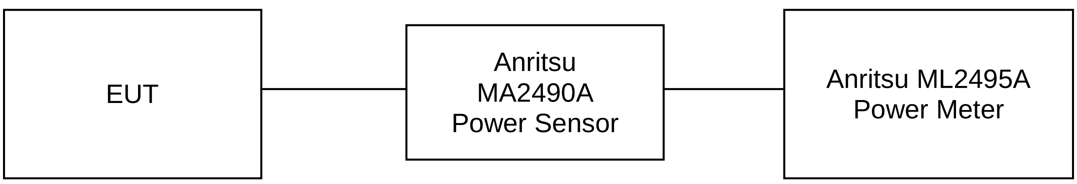


Figure 10.3 Power Measurement Setup for Bandwidths < 50 MHz

10.4 Bluetooth Conducted Powers

Channel	Frequency	Output Power (1Mbps)	
	(MHz)	(dBm)	(mW)
Low	**2402**	**-4.821**	0.330
Mid	2441	-5.713	0.268
High	2480	-7.386	0.183

Table 10.6 Bluetooth Average RF Power

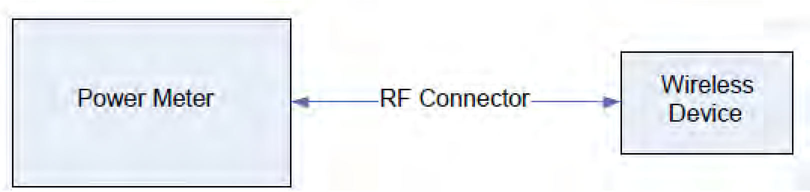


Figure 10.4 Power Measurement Setup

10.5 RFID Conducted Powers

Band	Frequency (MHz)	Channel	RFID Conducted Power (dBm)
RFID	902.75	1	26.89
	914.75	25	**26.95**
	927.25	50	26.94

Table 10.7 RFID Average RF Power

11. SYSTEM VERIFICATION

11.1 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)	Er Deviation [%]	σ Deviation [%]
Sep. 09. 2013	835 Head	21.7	22.3	824.2	41.551	0.899	40.3	0.915	-3.01	1.78
				835.0	41.500	0.900	40.3	0.920	-2.89	2.22
				836.6	41.500	0.902	40.3	0.921	-2.89	2.11
				848.8	41.500	0.915	40.2	0.925	-3.13	1.09
Aug. 30. 2013	835 Body	22.5	22.9	824.2	55.240	0.969	53.7	0.942	-2.79	-2.79
				835.0	55.200	0.970	53.6	0.952	-2.90	-1.86
				836.6	55.195	0.972	53.6	0.953	-2.89	-1.95
				848.8	55.158	0.987	53.5	0.964	-3.01	-2.33
Sep. 02. 2013	835 Head	22.2	22.6	826.4	41.540	0.899	40.3	0.922	-2.99	2.56
				835.0	41.500	0.900	40.3	0.925	-2.89	2.78
				836.6	41.500	0.902	40.2	0.926	-3.13	2.66
				846.6	41.500	0.912	40.2	0.929	-3.13	1.86
Sep. 02. 2013	835 Body	22.2	22.6	826.4	55.230	0.969	53.6	0.942	-2.95	-2.79
				835.0	55.200	0.970	53.5	0.950	-3.08	-2.06
				836.6	55.195	0.972	53.5	0.952	-3.07	-2.06
				846.6	55.160	0.984	53.5	0.961	-3.01	-2.34
Sep. 11. 2013	900 Body	22.0	22.2	900.0	55.000	1.050	54.3	1.060	-1.27	0.95
				902.75	55.000	1.052	54.2	1.060	-1.45	0.76
				914.75	55.000	1.060	54.1	1.070	-1.64	0.94
				927.25	54.980	1.065	54.0	1.080	-1.78	1.41
Sep. 10. 2013	1900 Head	22.1	22.5	1850.2	40.000	1.400	40.4	1.384	1.00	-1.14
				1880.0	40.000	1.400	40.3	1.410	0.75	0.71
				1900.0	40.000	1.400	40.3	1.430	0.75	2.14
				1909.8	40.000	1.400	40.3	1.434	0.75	2.43
Sep. 03. 2013	1900 Body	22.5	22.7	1850.2	53.300	1.520	54.4	1.462	2.06	-3.82
				1880.0	53.300	1.520	54.3	1.490	1.88	-1.97
				1900.0	53.300	1.520	54.2	1.510	1.69	-0.66
				1909.8	53.300	1.520	54.2	1.519	1.69	-0.07
Aug. 28. 2013	1900 Head	22.1	22.7	1852.4	40.000	1.400	40.7	1.387	1.75	-0.93
				1880.0	40.000	1.400	40.6	1.410	1.50	0.71
				1900.0	40.000	1.400	40.5	1.430	1.25	2.14
				1907.6	40.000	1.400	40.5	1.433	1.25	2.36
Aug. 28. 2013	1900 Body	22.1	22.7	1852.4	53.300	1.520	54.7	1.470	2.63	-3.29
				1880.0	53.300	1.520	54.6	1.490	2.44	-1.97
				1900.0	53.300	1.520	54.6	1.510	2.44	-0.66
				1907.6	53.300	1.520	54.5	1.510	2.25	-0.66
Aug. 29. 2013	2450 Head	22.3	22.8	2412	39.268	1.766	38.9	1.762	-0.94	-0.23
				2437	39.223	1.788	38.8	1.786	-1.08	-0.11
				2450	39.200	1.800	38.8	1.800	-1.02	0.00
				2462	39.184	1.813	38.8	1.810	-0.98	-0.17
Aug. 29. 2013	2450 Body	22.3	22.8	2412	52.751	1.914	54.7	1.887	3.69	-1.41
				2437	52.717	1.938	54.6	1.922	3.57	-0.83
				2450	52.700	1.950	54.6	1.940	3.61	-0.51
				2462	52.685	1.967	54.5	1.960	3.45	-0.36

Tissue Verification Note:

Note: The above measured tissue parameters were used in the DASY software. The DASY software was used to perform interpolation to determine the dielectric parameters at the SAR test device frequencies (per IEEE 1528 6.6.1.2). The tissue parameters listed in the SAR test plots may slightly differ from the table above 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 $j = \sqrt{-1}$.

11.2 Test System Verification

Prior to assessment, the system is verified to the± 10 % of the specifications at 835 MHz, 900 MHz, 1900 MHz and 2450 MHz by using the SAR Dipole kit(s). (Graphic Plots Attached)

Table 11.1 System Verification Results - 1g SAR Value

SYSTEM DIPOLE VERIFICATION TARGET & MEASURED												
SAR System #	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 [%]
D	835	D835V2, SN:464	Sep. 09. 2013	Head	21.7	22.3	1703	250	9.40	2.36	9.44	0.43
D	835	D835V2, SN:464	Aug. 30. 2013	Body	22.5	22.9	1703	250	9.53	2.44	9.76	2.41
D	835	D835V2, SN:464	Sep. 02. 2013	Head	22.2	22.6	1703	250	9.40	2.40	9.60	2.13
D	835	D835V2, SN:464	Sep. 02. 2013	Body	22.2	22.6	1703	250	9.53	2.44	9.76	2.41
D	900	D900V2, SN: 1d146	Sep. 11. 2013	Body	22.0	22.2	1703	250	10.6	2.74	10.96	3.40
D	1900	D1900V2, SN:5d029	Sep. 10. 2013	Head	22.1	22.5	1703	250	38.4	9.96	39.84	3.75
D	1900	D1900V2, SN:5d029	Sep. 03. 2013	Body	22.5	22.7	1703	250	39.6	9.34	37.36	-5.66
D	1900	D1900V2, SN:5d029	Aug. 28. 2013	Head	22.1	22.7	1703	250	38.4	9.64	38.56	0.42
D	1900	D1900V2, SN:5d029	Aug. 28. 2013	Body	22.1	22.7	1703	250	39.6	9.64	38.56	-2.63
D	2450	D2450V2, SN:726	Aug. 29. 2013	Head	22.3	22.8	1703	250	52.0	13.5	54.00	3.85
D	2450	D2450V2, SN:726	Aug. 29. 2013	Body	22.3	22.8	1703	250	50.2	12.4	49.60	-1.20

Note1 : System Verification was measured with input 250 mW and normalized to 1W.

Note2 : To confirm the proper SAR liquid depth, the z-axis plots from the system verifications were included since the system verifications were performed using the 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.

Table 11.1 System Verification Results - 10g SAR Value

SYSTEM DIPOLE VERIFICATION TARGET & MEASURED												
SAR System #	Freq. [MHz]	SAR Dipole kits	Date(s)	Liquid	Ambient Temp.[°C]	Liquid Temp.[°C]	Probe S/N	Input Power (mW)	1 W Target SAR_{10g} (W/kg)	Measured SAR_{10g} (W/kg)	1 W Normalized SAR_{10g} (W/kg)	Deviation [%]
D	835	D835V2, SN:464	Aug. 30. 2013	Body	22.5	22.9	1703	250	6.32	1.57	6.28	-0.63
D	835	D835V2, SN:464	Sep. 02. 2013	Body	22.2	22.6	1703	250	6.32	1.57	6.28	-0.63
D	900	D900V2, SN: 1d146	Sep. 11. 2013	Body	22.0	22.2	1703	250	6.82	1.77	7.08	3.81
D	1900	D1900V2, SN:5d029	Sep. 03. 2013	Body	22.5	22.7	1703	250	20.9	4.97	19.88	-4.88
D	1900	D1900V2, SN:5d029	Aug. 28. 2013	Body	22.1	22.7	1703	250	20.9	5.16	20.64	-1.24
D	2450	D2450V2, SN:726	Aug. 29. 2013	Body	22.3	22.8	1703	250	23.5	5.64	22.56	-4.00

Note1 : System Verification was measured with input 250 mW and normalized to 1W.

Note2 : To confirm the proper SAR liquid depth, the z-axis plots from the system verifications were included since the system verifications were performed using the 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.

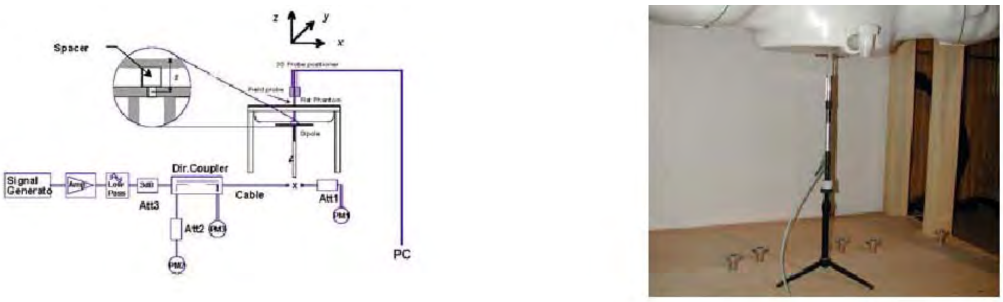


Figure 11.1 Dipole Verification Test Setup

12. SAR TEST RESULTS

12.1 Head SAR Results

Table 12.1 GSM 850 Head SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	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	33.0	0.064	Left Touch	FCC #1	1	1:8.3	0.080	1.000	0.080
836.6	190	GSM850	GSM	33.0	33.0	-0.041	Right Touch	FCC #1	1	1:8.3	0.119	1.000	**0.119**
836.6	190	GSM850	GSM	33.0	33.0	-0.085	Left Tilt	FCC #1	1	1:8.3	0.070	1.000	0.070
836.6	190	GSM850	GSM	33.0	33.0	0.171	Right Tilt	FCC #1	1	1:8.3	0.103	1.000	0.103
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 12.2 PCS 1900 Head SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	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	PCS	30.0	30.0	-0.114	Left Touch	FCC #1	1	1:8.3	0.091	1.000	0.091
1880.0	661	PCS1900	PCS	30.0	30.0	-0.011	Right Touch	FCC #1	1	1:8.3	0.141	1.000	**0.141**
1880.0	661	PCS1900	PCS	30.0	30.0	-0.122	Left Tilt	FCC #1	1	1:8.3	0.079	1.000	0.079
1880.0	661	PCS1900	PCS	30.0	30.0	-0.086	Right Tilt	FCC #1	1	1:8.3	0.129	1.000	0.129
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 12.3 WCDMA 850 Head SAR

MEASUREMENT RESULTS												
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	WCDMA 850	RMC	24.0	23.99	0.019	Left Touch	FCC #1	1:1	0.122	1.002	0.122
836.6	4183	WCDMA 850	RMC	24.0	23.99	0.082	Right Touch	FCC #1	1:1	0.141	1.002	**0.141**
836.6	4183	WCDMA 850	RMC	24.0	23.99	0.067	Left Tilt	FCC #1	1:1	0.094	1.002	0.094
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.079	Right Tilt	FCC #1	1:1	0.112	1.002	0.112
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 12.4 WCDMA 1900 Head SAR

MEASUREMENT RESULTS												
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	9400	WCDMA 1900	RMC	23.5	23.50	-0.085	Left Touch	FCC #1	1:1	0.231	1.000	0.231
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	-0.090	Right Touch	FCC #1	1:1	0.328	1.000	**0.328**
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.007	Left Tilt	FCC #1	1:1	0.208	1.000	0.208
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	-0.116	Right Tilt	FCC #1	1:1	0.277	1.000	0.277
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 12.5 DTS Head SAR

MEASUREMENT RESULTS													
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												
2462	11	802.11b	DSSS	10.6	10.56	-0.046	Left Touch	FCC #1	1	1:1	0.278	1.009	**0.281**
2462	11	802.11b	DSSS	10.6	10.56	0.052	Right Touch	FCC #1	1	1:1	0.179	1.009	0.181
2462	11	802.11b	DSSS	10.6	10.56	0.067	Left Tilt	FCC #1	1	1:1	0.047	1.009	0.047
2462	11	802.11b	DSSS	10.6	10.56	0.086	Right Tilt	FCC #1	1	1:1	0.064	1.009	0.065
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					

12.2 Standalone Body-Worn SAR Results

Table 12.6 GSM/PCS/WCDMA Body-Worn SAR

MEASUREMENT RESULTS													
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	33.0	0.159	0 mm [Front]	FCC #1	1	1:8.3	0.096	1.000	**0.096**
836.6	190	GSM850	GSM	33.0	33.0	-0.139	0 mm [Rear #1]	FCC #1	1	1:8.3	0.00279	1.000	0.003
836.6	190	GSM850	GSM	33.0	33.0	0.160	0 mm [Rear #2]	FCC #1	1	1:8.3	0.00432	1.000	0.004
1880.0	661	PCS1900	PCS	30.0	30.0	-0.050	0 mm [Front]	FCC #1	1	1:8.3	0.109	1.000	**0.109**
1880.0	661	PCS1900	PCS	30.0	30.0	0.127	0 mm [Rear #1]	FCC #1	1	1:8.3	0.00337	1.000	0.003
1880.0	661	PCS1900	PCS	30.0	30.0	-0.185	0 mm [Rear #2]	FCC #1	1	1:8.3	0.00372	1.000	0.004
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.098	0 mm [Front]	FCC #1	N/A	1:1	0.121	1.002	**0.121**
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.170	0 mm [Rear #1]	FCC #1	N/A	1:1	0.00317	1.002	0.003
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.111	0 mm [Rear #2]	FCC #1	N/A	1:1	0.00333	1.002	0.003
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.051	0 mm [Front]	FCC #1	N/A	1:1	0.230	1.000	**0.230**
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.170	0 mm [Rear #1]	FCC #1	N/A	1:1	0.017	1.000	0.017
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	-0.174	0 mm [Rear #2]	FCC #1	N/A	1:1	0.030	1.000	0.030
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 12.7 DTS Body-Worn SAR

MEASUREMENT RESULTS													
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												
2462	11	802.11b	DSSS	10.6	10.56	0.115	0 mm [Front]	FCC #1	1	1:1	0.087	1.009	**0.088**
2462	11	802.11b	DSSS	10.6	10.56	0.009	0 mm [Rear #1]	FCC #1	1	1:1	0.052	1.009	0.052
2462	11	802.11b	DSSS	10.6	10.56	-0.098	0 mm [Rear #2]	FCC #1	1	1:1	0.031	1.009	0.031
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					

12.3 Standalone Body SAR Results

Table 12.7 GSM/PCS Body SAR

MEASUREMENT RESULTS													
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	GSM 850	GPRS	30.0	30.0	0.119	0 mm [Top #1]	FCC #1	2	1:4.15	0.045	1.000	0.045
836.6	190	GSM 850	GPRS	30.0	30.0	-0.197	0 mm [Top #2]	FCC #1	2	1:4.15	0.156	1.000	0.156
836.6	190	GSM 850	GPRS	30.0	30.0	0.067	0 mm [Bottom]	FCC #1	2	1:4.15	0.021	1.000	0.021
836.6	190	GSM 850	GPRS	30.0	30.0	-0.184	0 mm [Front]	FCC #1	2	1:4.15	0.107	1.000	0.107
836.6	190	GSM 850	GPRS	30.0	30.0	0.180	0 mm [Rear #1]	FCC #1	2	1:4.15	0.00322	1.000	0.003
836.6	190	GSM 850	GPRS	30.0	30.0	-0.128	0 mm [Rear #2]	FCC #1	2	1:4.15	0.00475	1.000	0.005
836.6	190	GSM 850	GPRS	30.0	30.0	-0.092	0 mm [Right]	FCC #1	2	1:4.15	0.050	1.000	0.050
836.6	190	GSM 850	GSM	33.0	33.0	-0.013	0 mm [Left]	FCC #1	1	1:8.3	0.317	1.000	0.317
836.6	190	GSM 850	GPRS	33.0	33.0	-0.061	0 mm [Left]	FCC #1	1	1:8.3	0.336	1.000	0.336
836.6	190	GSM 850	GPRS	30.0	30.0	-0.036	0 mm [Left]	FCC #1	2	1:4.15	0.338	1.000	**0.338**
836.6	190	GSM 850	GPRS	27.9	27.9	-0.018	0 mm [Left]	FCC #1	3	1:2.77	0.290	1.000	0.290
836.6	190	GSM 850	GPRS	26.5	26.5	0.104	0 mm [Left]	FCC #1	4	1:2.075	0.307	1.000	0.307
1880.0	661	PCS1900	GPRS	30.0	30.0	0.107	0 mm [Top #1]	FCC #1	1	1:8.3	0.041	1.000	0.041
1880.0	661	PCS1900	GPRS	30.0	30.0	-0.082	0 mm [Top #2]	FCC #1	1	1:8.3	0.253	1.000	0.253
1880.0	661	PCS1900	GPRS	30.0	30.0	-0.025	0 mm [Bottom]	FCC #1	1	1:8.3	0.020	1.000	0.020
1880.0	661	PCS1900	GPRS	30.0	30.0	0.187	0 mm [Front]	FCC #1	1	1:8.3	0.111	1.000	0.111
1880.0	661	PCS1900	GPRS	30.0	30.0	0.175	0 mm [Rear #1]	FCC #1	1	1:8.3	0.00671	1.000	0.007
1880.0	661	PCS1900	GPRS	30.0	30.0	-0.173	0 mm [Rear #2]	FCC #1	1	1:8.3	0.00749	1.000	0.007
1880.0	661	PCS1900	GPRS	30.0	30.0	-0.067	0 mm [Right]	FCC #1	1	1:8.3	0.068	1.000	0.068
1880.0	661	PCS1900	GPRS	30.0	30.0	0.142	0 mm [Left]	FCC #1	1	1:8.3	0.593	1.000	0.593
1880.0	661	PCS1900	GPRS	30.0	30.0	0.089	0 mm [Left]	FCC #1	1	1:8.3	0.606	1.000	**0.606**
1880.0	661	PCS1900	GPRS	26.9	26.9	0.127	0 mm [Left]	FCC #1	2	1:4.15	0.570	1.000	0.570
1880.0	661	PCS1900	GPRS	24.5	24.5	0.111	0 mm [Left]	FCC #1	3	1:2.77	0.506	1.000	0.506
1880.0	661	PCS1900	GPRS	23.5	23.5	0.148	0 mm [Left]	FCC #1	4	1:2.075	0.496	1.000	0.496
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 12.7 WCDMA Body SAR

MEASUREMENT RESULTS														
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	4183	WCDMA 850	RMC	24.0	23.99	-0.157	0 mm [Top #1]	FCC #1	N/A	1:1	0.029	1.002	0.029
836.6	4183	WCDMA 850	RMC	24.0	23.99	0.096	0 mm [Top #2]	FCC #1	N/A	1:1	0.217	1.002	0.218
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.133	0 mm [Bottom]	FCC #1	N/A	1:1	0.024	1.002	0.024
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.098	0 mm [Front]	FCC #1	N/A	1:1	0.121	1.002	0.121
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.170	0 mm [Rear #1]	FCC #1	N/A	1:1	0.00317	1.002	0.003
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.111	0 mm [Rear #2]	FCC #1	N/A	1:1	0.00333	1.002	0.003
836.6	4183	WCDMA 850	RMC	24.0	23.99	0.080	0 mm [Right]	FCC #1	N/A	1:1	0.055	1.002	0.055
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.016	0 mm [Left]	FCC #1	N/A	1:1	0.361	1.002	**0.362**
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.162	0 mm [Top #1]	FCC #1	N/A	1:1	0.098	1.000	0.098
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.018	0 mm [Top #2]	FCC #1	N/A	1:1	0.477	1.000	0.477
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.069	0 mm [Bottom]	FCC #1	N/A	1:1	0.050	1.000	0.050
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.051	0 mm [Front]	FCC #1	N/A	1:1	0.230	1.000	0.230
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.170	0 mm [Rear #1]	FCC #1	N/A	1:1	0.017	1.000	0.017
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	-0.174	0 mm [Rear #2]	FCC #1	N/A	1:1	0.030	1.000	0.030
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	-0.086	0 mm [Right]	FCC #1	N/A	1:1	0.129	1.000	0.129
1852.4	9262	WCDMA 1900	RMC	23.5	23.48	-0.192	0 mm [Left]	FCC #1	N/A	1:1	1.160	1.005	**1.165**
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.168	0 mm [Left]	FCC #1	N/A	1:1	1.130	1.000	1.130
1907.6	9538	WCDMA 1900	RMC	23.5	23.45	-0.107	0 mm [Left]	FCC #1	N/A	1:1	1.070	1.012	1.082
1852.4	9262	WCDMA 1900	RMC	23.5	23.48	0.053	0 mm [Left]	FCC #1	N/A	1:1	1.140	1.000	1.145
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					

Note: Blue entries represent repeatability measurements.

Table 12.8 W-LAN Body SAR

MEASUREMENT RESULTS													
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												
2462	11	802.11b	DSSS	10.6	10.56	0.057	0 mm [Top #1]	FCC #1	1	1:1	0.234	1.009	0.236
2462	11	802.11b	DSSS	10.6	10.56	0.153	0 mm [Top #2]	FCC #1	1	1:1	0.580	1.009	0.585
2462	11	802.11b	DSSS	10.6	10.56	0.084	0 mm [Bottom]	FCC #1	1	1:1	0.027	1.009	0.027
2462	11	802.11b	DSSS	10.6	10.56	0.115	0 mm [Front]	FCC #1	1	1:1	0.087	1.009	0.088
2462	11	802.11b	DSSS	10.6	10.56	0.009	0 mm [Rear #1]	FCC #1	1	1:1	0.052	1.009	0.052
2462	11	802.11b	DSSS	10.6	10.56	-0.098	0 mm [Rear #2]	FCC #1	1	1:1	0.031	1.009	0.031
2412	1	802.11b	DSSS	10.6	10.31	0.069	0 mm [Right]	FCC #1	1	1:1	0.875	1.069	0.935
2437	6	802.11b	DSSS	10.6	10.44	0.156	0 mm [Right]	FCC #1	1	1:1	0.966	1.038	1.002
2462	11	802.11b	DSSS	10.6	10.56	0.052	0 mm [Right]	FCC #1	1	1:1	1.100	1.009	**1.110**
2462	11	802.11b	DSSS	10.6	10.56	0.154	0 mm [Left]	FCC #1	1	1:1	0.095	1.009	0.096
2462	11	802.11b	DSSS	10.6	10.56	-0.152	0 mm [Right]	FCC #1	1	1:1	1.040	1.009	1.049
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					

Note: Blue entries represent repeatability measurements.

12.4 Standalone Extremity Body SAR Results

Table 12.9 GSM/PCS Hand SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time Slots	Duty Cycle	10g SAR (W/kg)	Scaling Factor	10g Scaled SAR (W/kg)
MHz	Ch												
836.6	190	GSM 850	GPRS	30.0	30.0	0.119	0 mm [Top #1]	FCC #1	2	1:4.15	0.030	1.000	0.030
836.6	190	GSM 850	GPRS	30.0	30.0	-0.197	0 mm [Top #2]	FCC #1	2	1:4.15	0.096	1.000	0.096
836.6	190	GSM 850	GPRS	30.0	30.0	0.067	0 mm [Bottom]	FCC #1	2	1:4.15	0.010	1.000	0.010
836.6	190	GSM 850	GPRS	30.0	30.0	-0.184	0 mm [Front]	FCC #1	2	1:4.15	0.071	1.000	0.071
836.6	190	GSM 850	GPRS	30.0	30.0	0.180	0 mm [Rear #1]	FCC #1	2	1:4.15	0.00227	1.000	0.002
836.6	190	GSM 850	GPRS	30.0	30.0	-0.128	0 mm [Rear #2]	FCC #1	2	1:4.15	0.00336	1.000	0.003
836.6	190	GSM 850	GPRS	30.0	30.0	-0.092	0 mm [Right]	FCC #1	2	1:4.15	0.033	1.000	0.033
836.6	190	GSM 850	GSM	33.0	33.0	-0.013	0 mm [Left]	FCC #1	1	1:8.3	0.173	1.000	0.173
836.6	190	GSM 850	GPRS	33.0	33.0	-0.061	0 mm [Left]	FCC #1	1	1:8.3	0.182	1.000	0.182
836.6	190	GSM 850	GPRS	30.0	30.0	-0.036	0 mm [Left]	FCC #1	2	1:4.15	0.183	1.000	**0.183**
836.6	190	GSM 850	GPRS	27.9	27.9	-0.018	0 mm [Left]	FCC #1	3	1:2.77	0.160	1.000	0.160
836.6	190	GSM 850	GPRS	26.5	26.5	0.104	0 mm [Left]	FCC #1	4	1:2.075	0.166	1.000	0.166
1880.0	661	PCS1900	GPRS	30.0	30.0	0.107	0 mm [Top #1]	FCC #1	1	1:8.3	0.023	1.000	0.023
1880.0	661	PCS1900	GPRS	30.0	30.0	-0.082	0 mm [Top #2]	FCC #1	1	1:8.3	0.140	1.000	0.140
1880.0	661	PCS1900	GPRS	30.0	30.0	-0.025	0 mm [Bottom]	FCC #1	1	1:8.3	0.011	1.000	0.011
1880.0	661	PCS1900	GPRS	30.0	30.0	0.187	0 mm [Front]	FCC #1	1	1:8.3	0.065	1.000	0.065
1880.0	661	PCS1900	GPRS	30.0	30.0	0.175	0 mm [Rear #1]	FCC #1	1	1:8.3	0.00392	1.000	0.004
1880.0	661	PCS1900	GPRS	30.0	30.0	-0.173	0 mm [Rear #2]	FCC #1	1	1:8.3	0.00488	1.000	0.005
1880.0	661	PCS1900	GPRS	30.0	30.0	-0.067	0 mm [Right]	FCC #1	1	1:8.3	0.038	1.000	0.038
1880.0	661	PCS1900	GPRS	30.0	30.0	0.142	0 mm [Left]	FCC #1	1	1:8.3	0.301	1.000	0.301
1880.0	661	PCS1900	GPRS	30.0	30.0	0.089	0 mm [Left]	FCC #1	1	1:8.3	0.308	1.000	**0.308**
1880.0	661	PCS1900	GPRS	26.9	26.9	0.127	0 mm [Left]	FCC #1	2	1:4.15	0.289	1.000	0.289
1880.0	661	PCS1900	GPRS	24.5	24.5	0.111	0 mm [Left]	FCC #1	3	1:2.77	0.246	1.000	0.246
1880.0	661	PCS1900	GPRS	23.5	23.5	0.148	0 mm [Left]	FCC #1	4	1:2.075	0.252	1.000	0.252
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Hand 4.0 W/kg (mW/g)** averaged over 10 gram					

Table 12.10 WCDMA Hand SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time Slots	Duty Cycle	10g SAR (W/kg)	Scaling Factor	10g Scaled SAR (W/kg)
MHz	Ch												
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.157	0 mm [Top #1]	FCC #1	N/A	1:1	0.021	1.002	0.021
836.6	4183	WCDMA 850	RMC	24.0	23.99	0.096	0 mm [Top #2]	FCC #1	N/A	1:1	0.126	1.002	0.126
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.133	0 mm [Bottom]	FCC #1	N/A	1:1	0.012	1.002	0.012
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.098	0 mm [Front]	FCC #1	N/A	1:1	0.081	1.002	0.081
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.170	0 mm [Rear #1]	FCC #1	N/A	1:1	0.00229	1.002	0.002
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.111	0 mm [Rear #2]	FCC #1	N/A	1:1	0.00235	1.002	0.002
836.6	4183	WCDMA 850	RMC	24.0	23.99	0.080	0 mm [Right]	FCC #1	N/A	1:1	0.036	1.002	0.036
836.6	4183	WCDMA 850	RMC	24.0	23.99	-0.016	0 mm [Left]	FCC #1	N/A	1:1	0.197	1.002	**0.197**
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.162	0 mm [Top #1]	FCC #1	N/A	1:1	0.055	1.000	0.055
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.018	0 mm [Top #2]	FCC #1	N/A	1:1	0.265	1.000	0.265
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.069	0 mm [Bottom]	FCC #1	N/A	1:1	0.030	1.000	0.030
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.051	0 mm [Front]	FCC #1	N/A	1:1	0.142	1.000	0.142
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.170	0 mm [Rear #1]	FCC #1	N/A	1:1	0.011	1.000	0.011
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	-0.174	0 mm [Rear #2]	FCC #1	N/A	1:1	0.019	1.000	0.019
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	-0.086	0 mm [Right]	FCC #1	N/A	1:1	0.075	1.000	0.075
1852.4	9262	WCDMA 1900	RMC	23.5	23.48	-0.192	0 mm [Left]	FCC #1	N/A	1:1	0.645	1.005	**0.648**
1880.0	9400	WCDMA 1900	RMC	23.5	23.50	0.168	0 mm [Left]	FCC #1	N/A	1:1	0.575	1.000	0.575
1907.6	9538	WCDMA 1900	RMC	23.5	23.45	-0.107	0 mm [Left]	FCC #1	N/A	1:1	0.547	1.012	0.553
ANSI / IEEE C95.1-2005– SAFETY LIMIT Spatial Peak Uncontrolled Exposure/General Population Exposure								**Hand 4.0 W/kg (mW/g)** averaged over 10 gram					

Table 12.11 W-LAN Hand SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	Data Rate [Mbps]	Duty Cycle	10g SAR (W/kg)	Scaling Factor	10g Scaled SAR (W/kg)
MHz	Ch												
2462	11	802.11b	DSSS	10.6	10.56	0.057	0 mm [Top #1]	FCC #1	1	1:1	0.112	1.009	0.113
2462	11	802.11b	DSSS	10.6	10.56	0.153	0 mm [Top #2]	FCC #1	1	1:1	0.285	1.009	0.288
2462	11	802.11b	DSSS	10.6	10.56	0.084	0 mm [Bottom]	FCC #1	1	1:1	0.013	1.009	0.013
2462	11	802.11b	DSSS	10.6	10.56	0.115	0 mm [Front]	FCC #1	1	1:1	0.039	1.009	0.039
2462	11	802.11b	DSSS	10.6	10.56	0.009	0 mm [Rear #1]	FCC #1	1	1:1	0.029	1.009	0.029
2462	11	802.11b	DSSS	10.6	10.56	-0.098	0 mm [Rear #2]	FCC #1	1	1:1	0.017	1.009	0.017
2412	1	802.11b	DSSS	10.6	10.31	0.069	0 mm [Right]	FCC #1	1	1:1	0.393	1.069	0.420
2437	6	802.11b	DSSS	10.6	10.44	0.156	0 mm [Right]	FCC #1	1	1:1	0.464	1.038	0.481
2462	11	802.11b	DSSS	10.6	10.56	0.052	0 mm [Right]	FCC #1	1	1:1	0.540	1.009	**0.545**
2462	11	802.11b	DSSS	10.6	10.56	0.154	0 mm [Left]	FCC #1	1	1:1	0.046	1.009	0.046
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**								**Hand** **4.0 W/kg (mW/g)** averaged over 10 gram					

Table 12.12 RFID Hand SAR

MEASUREMENT RESULTS													
FREQUENCY		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	Data Rate [Mbps]	Duty Cycle	10g SAR (W/kg)	Scaling Factor	10g Scaled SAR (W/kg)
MHz	Ch												
914.75	25	RFID	RFID	28.5	26.95	0.195	0 mm [Top #1]	FCC #1	1	1:1	0.167	1.429	0.239
914.75	25	RFID	RFID	28.5	26.95	0.079	0 mm [Top #2]	FCC #1	1	1:1	0.103	1.429	0.147
914.75	25	RFID	RFID	28.5	26.95	-0.088	0 mm [Bottom]	FCC #1	1	1:1	0.010	1.429	0.014
914.75	25	RFID	RFID	28.5	26.95	-0.012	0 mm [Front]	FCC #1	1	1:1	0.035	1.429	0.050
914.75	25	RFID	RFID	28.5	26.95	-0.064	0 mm [Rear #1]	FCC #1	1	1:1	0.182	1.429	0.260
914.75	25	RFID	RFID	28.5	26.95	0.081	0 mm [Rear #2]	FCC #1	1	1:1	0.010	1.429	0.014
902.75	1	RFID	RFID	28.5	26.89	0.010	0 mm [Right]	FCC #1	1	1:1	0.557	1.449	**0.807**
914.75	25	RFID	RFID	28.5	26.95	0.129	0 mm [Right]	FCC #1	1	1:1	0.415	1.429	0.593
927.25	50	RFID	RFID	28.5	26.94	-0.014	0 mm [Right]	FCC #1	1	1:1	0.367	1.432	0.526
914.75	25	RFID	RFID	28.5	26.95	0.002	0 mm [Left]	FCC #1	1	1:1	0.362	1.429	0.517
ANSI / IEEE C95.1-2005– SAFETY LIMIT **Spatial Peak** **Uncontrolled Exposure/General Population Exposure**								**Hand** **4.0 W/kg (mW/g)** averaged over 10 gram					

12.5 SAR Test Notes

General Notes:

1. The test data reported are the worst-case SAR values according to test procedures specified in IEEE 1528-2003, FCC KDB Publication 865664 D01v01r01 and FCC KDB Publication447498 D01v05r01.
2. Batteries are fully charged at the beginning of the SAR measurements. A standard battery was used for all SAR measurements.
3. Liquid tissue depth was at least 15.0 cm for all frequencies.
4. The manufacturer has confirmed that the device(s) tested have the same physical, mechanical and thermal characteristics and are within operational tolerances expected for production units
5. SAR results were scaled to the maximum allowed power to demonstrate compliance per FCC KDB Publication 447498 D01v05r01.
6. Device was tested using a fixed spacing for body-worn accessory testing. A separation distance of 0 mm was considered because the manufacturer has determined that there will be body-worn accessories available in the marketplace for users to support this separation distance.
7. Per FCC KDB Publication 648474 D04v01r01, SAR was evaluated without a headset connected to the device. Since the standalone reported SAR was≤ 1.2 W/kg, no additional SAR evaluations using a headset cable were required.
8. Per FCC KDB 865664 D01v01r01, variability SAR tests were performed when the measured 1 gram SAR results for a frequency band were greater than 0.8 W/kg or when the measured 10 gram SAR results for a frequency band were greater than 2.0 W/kg. Repeated SAR measurements are highlighted in the tables above for clarity. Please see Section 14 for variability analysis.
9. This device do not support Hotspot and VOIP operation.
10. Body device positions(Top #1, Top #2, Bottom, Front, Rear #1, Rear #2, Right, Left) are check the attached file(Test photo(SAR)_RQK-SMART-P300U.pdf).

GSM Notes:

1. This device supports GSM in the head and body-worn configurations, therefore GSM was additionally evaluated for head and body-worn compliance.
2. Body-Worn accessory testing is typically associated with voice operations. Therefore, GSM voice was evaluated for body-worn SAR.
3. Per FCC KDB Publication 447498 D01v05r01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

WCDMA Notes:

1. WCDMA mode was tested under RMC 12.2 kbps with HSPA Inactive per KDB Publication 941225 D01v02r02.
2. Body SAR for HSPA is not required for handsets with HSPA capabilities when the maximum average output power of each RF channel with HSPA active is less than 0.25 dB higher than that measured without HSPA using 12.2 kbps RMC and the maximum SAR for 12.2 kbps RMC is ≤ 75% of the SAR limit.
3. Per FCC KDB Publication 447498 D01v05r01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s). When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel was used.

WLAN Notes:

1. Justification for reduced test configurations for WIFI channels per KDB Publication 248227 D01v01r02 and October 2012 FCC/TCB Meeting Notes for 2.4 GHz WIFI: Highest average RF output power channel for the lowest data rate was selected for SAR evaluation in 802.11b. 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.
2. WIFI transmission was verified using a spectrum analyzer.
3. 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 default channels was not required.

RFID Notes:

1. RFID operation of this device can be used only in the hand. So, RFID SAR test be applied to the 10-g extremity SAR.
2. Only when the button of grip is pressed, RFID operation works.
3. RFID operation do not supported voice call and data transmission.

13. FCC MULTI-TX AND ANTENNA SAR CONSIDERATIONS

13.1 Introduction

The following procedures adopted from FCC KDB Publication 447498 D01v05r01 are applicable to handsets with built-in unlicensed transmitters such as 802.11a/b/g/n/ac and Bluetooth devices which may simultaneously transmit with the licensed transmitter.

13.2 Simultaneous Transmission Procedures

This device contains transmitters that may operate simultaneously. Therefore simultaneous transmission analysis is required. Per FCC KDB 447498 D01v05r01 IV.C.1.iii, simultaneous transmission SAR test exclusion may be applied when the sum of the 1-g SAR for all the simultaneous transmitting antennas in a specific a physical test configuration is ≤ 1.6 W/kg. and when the sum of the 10g SAR for all simultaneous transmitting antennas in a specific physical test configuration is ≤ 4.0 W/kg. When standalone SAR is not required to be measured, per FCC KDB 447498 D01v05r01 4.3.2 2), the following equation must be used to estimate the standalone 1g and 10g SAR for simultaneous transmission assessment involving that transmitter.

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

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

Table 13.1 Estimated SAR

Mode	Frequency	Maximum Allowed Power		Separation Distance (Body)	Estimated 1g SAR (Body)
	[MHz]	[dBm]	[mW]	[mm]	[W/kg]
Bluetooth	2402	-4.5	0.4	5	0.017

Mode	Frequency	Maximum Allowed Power		Separation Distance (Body)	Estimated 10g SAR (Body)
	[MHz]	[dBm]	[mW]	[mm]	[W/kg]
Bluetooth	2402	-4.5	0.4	5	0.007

Note : Held-to ear configurations are not applicable to Bluetooth operations and therefore were not considered for simultaneous transmission. Per KDB Publication 447498 D01v05r01, the maximum power of the channel was rounded to the nearest mW before calculation.

Note : Per FCC KDB Publication 447498 D01v05r01, when the test separation distance is < 5 mm (Touching), a distance of 5 mm is applied to determine estimated SAR.

Note : 802.11b Body SAR was performed with a touch condition, so actual SAR test value is used instead of estimated 10g SAR.

13.3 Simultaneous Transmission Capabilities

According to FCC KDB Publication 447498 D01v05r01, transmitters are considered to be transmitting simultaneously when there is overlapping transmission, with the exception of transmissions during network hand-offs with maximum hand-off duration less than 30 seconds. Possible transmission paths for the DUT are shown in Figure 13.1 and are color-coded to indicate communication modes which share the same path. Modes which share the same transmission path cannot transmit simultaneously with one another.

Path 1	Path 2	Path 3
GSM/GPRS, WCDMA	Bluetooth, WIFI	RFID

Figure 13.1 Simultaneous Transmission Paths

This device contains multiple transmitters that may operate simultaneously, and therefore requires a simultaneous transmission analysis according to FCC KDB Publication 447498 D01v05r01 3) procedures.

Table 13.2 Simultaneous Transmission Scenarios

Ref.	Simultaneous Transmit Configurations	Head	Body-Worn Accessory	Body	Extremity
1	GSM850 Voice + 2.4 GHz WIFI	Yes	Yes	Yes	Yes
2	PCS1900 Voice + 2.4 GHz WIFI	Yes	Yes	Yes	Yes
3	WCDMA 850 + 2.4 GHz WIFI	Yes	Yes	Yes	Yes
4	WCDMA 1900 + 2.4 GHz WIFI	Yes	Yes	Yes	Yes
5	GSM850 Voice + RFID	N/A	N/A	N/A	Yes
6	PCS1900 Voice + RFID	N/A	N/A	N/A	Yes
7	WCDMA 850 + RFID	N/A	N/A	N/A	Yes
8	WCDMA 1900 + RFID	N/A	N/A	N/A	Yes
9	GSM850 GPRS + 2.4 GHz WIFI	N/A	N/A	Yes	Yes
10	GPRS1900 GPRS + 2.4 GHz WIFI	N/A	N/A	Yes	Yes
11	GSM850 GPRS + RFID	N/A	N/A	Yes	Yes
12	GPRS1900 GPRS + RFID	N/A	N/A	Yes	Yes
13	GSM850 Voice + Bluetooth	N/A	Yes	N/A	Yes
14	PCS1900 Voice + Bluetooth	N/A	Yes	N/A	Yes
15	WCDMA 850 + Bluetooth	N/A	Yes	N/A	Yes
16	WCDMA 1900 + Bluetooth	N/A	Yes	N/A	Yes
17	Bluetooth + RFID	N/A	N/A	N/A	Yes
18	2.4 GHz WIFI + RFID	N/A	N/A	N/A	Yes

Notes:

1. 2.4 GHz WIFI is not supported Hotspot.
2. WCDMA, GPRS is not supported Hotspot.
3. Bluetooth and WIFI cannot transmit simultaneously since they share the same chip.
4. GSM and WCDMA cannot transmit simultaneously since they share the same chip.
5. This device not supports VoIP.
6. RFID is not supported Voice call.

13.4 Head SAR Simultaneous Transmission Analysis

Table 13.3 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	0.080	0.281	0.361	Head SAR	Left Touch	0.091	0.281	0.372
	Right Touch	0.119	0.181	0.300		Right Touch	0.141	0.181	0.322
	Left Tilt	0.070	0.047	0.117		Left Tilt	0.079	0.047	0.126
	Right Tilt	0.103	0.065	0.168		Right Tilt	0.129	0.065	0.194

Table 13.4 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	WCDMA 1900 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Head SAR	Left Touch	0.122	0.281	0.403	Head SAR	Left Touch	0.231	0.281	**0.512**
	Right Touch	0.141	0.181	0.322		Right Touch	0.328	0.181	0.509
	Left Tilt	0.094	0.047	0.141		Left Tilt	0.208	0.047	0.255
	Right Tilt	0.112	0.065	0.177		Right Tilt	0.277	0.065	0.342

13.5 Body-Worn Simultaneous Transmission Analysis

Table 13.5 Simultaneous Transmission Scenario with 2.4 GHz W-LAN (Body-Worn at 0 mm)

Configuration	Mode	2G/3G SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Front Side	GSM 850	0.096	0.088	0.184
Rear Side	GSM 850	0.004	0.052	0.056
Front Side	PCS 1900	0.109	0.088	0.197
Rear Side	PCS 1900	0.004	0.052	0.056
Front Side	WCDMA 850	0.121	0.088	0.209
Rear Side	WCDMA 850	0.003	0.052	0.055
Front Side	WCDMA 1900	0.230	0.088	**0.318**
Rear Side	WCDMA 1900	0.030	0.052	0.082

Table 13.6 Simultaneous Transmission Scenario with Bluetooth (Body-Worn at 0 mm)

Configuration	Mode	2G/3G SAR (W/kg)	Bluetooth SAR (W/kg)	ΣSAR (W/kg)
Front Side	GSM 850	0.096	0.017	0.113
Rear Side	GSM 850	0.004	0.017	0.021
Front Side	PCS 1900	0.109	0.017	0.126
Rear Side	PCS 1900	0.004	0.017	0.021
Front Side	WCDMA 850	0.121	0.017	0.138
Rear Side	WCDMA 850	0.003	0.017	0.020
Front Side	WCDMA 1900	0.230	0.017	0.247
Rear Side	WCDMA 1900	0.030	0.017	0.047

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

13.6 Body SAR Simultaneous Transmission Analysis

Table 13.7 Simultaneous Transmission Scenario (Body at 0 mm)

Simult TX	Configuration	GPRS 850 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	GPRS 1900 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.156	0.585	0.741	Body SAR	Top	0.253	0.585	0.838
	Bottom	0.021	0.027	0.048		Bottom	0.020	0.027	0.047
	Front	0.107	0.088	0.195		Front	0.111	0.088	0.199
	Rear	0.005	0.052	0.057		Rear	0.007	0.052	0.059
	Right	0.050	1.110	1.160		Right	0.068	1.110	1.178
	Left	0.338	0.096	0.434		Left	0.606	0.096	0.702

Table 13.8 Simultaneous Transmission Scenario (Body at 0 mm)

Simult TX	Configuration	WCDMA 850 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	WCDMA 1900 SAR (W/kg)	2.4G W-LAN (802.11b) SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.218	0.585	0.803	Body SAR	Top	0.477	0.585	1.062
	Bottom	0.024	0.027	0.051		Bottom	0.050	0.027	0.077
	Front	0.121	0.088	0.209		Front	0.230	0.088	0.318
	Rear	0.003	0.052	0.055		Rear	0.030	0.052	0.082
	Right	0.055	1.110	1.165		Right	0.129	1.110	1.239
	Left	0.362	0.096	0.458		Left	1.165	0.096	**1.261**

13.7 Extremity Body SAR Simultaneous Transmission Analysis

Table 13.9 Simultaneous Transmission Scenario (Extremity Body at 0 mm)

Simult TX	Configuration	GPRS 850 10g SAR (W/kg)	2.4G W-LAN (802.11b) 10g SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	GPRS 1900 10g SAR (W/kg)	2.4G W-LAN (802.11b) 10g SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.096	0.288	0.384	Body SAR	Top	0.140	0.288	0.428
	Bottom	0.010	0.013	0.023		Bottom	0.011	0.013	0.024
	Front	0.071	0.039	0.110		Front	0.065	0.039	0.104
	Rear	0.003	0.029	0.032		Rear	0.005	0.029	0.034
	Right	0.033	0.545	0.578		Right	0.038	0.545	0.583
	Left	0.183	0.046	0.229		Left	0.308	0.046	0.354

Table 13.10 Simultaneous Transmission Scenario (Extremity Body at 0 mm)

Simult TX	Configuration	WCDMA 850 10g SAR (W/kg)	2.4G W-LAN (802.11b) 10g SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	WCDMA 1900 10g SAR (W/kg)	2.4G W-LAN (802.11b) 10g SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.126	0.288	0.414	Body SAR	Top	0.265	0.288	0.553
	Bottom	0.012	0.013	0.025		Bottom	0.030	0.013	0.043
	Front	0.081	0.039	0.120		Front	0.142	0.039	0.181
	Rear	0.002	0.029	0.031		Rear	0.019	0.029	0.048
	Right	0.036	0.545	0.581		Right	0.075	0.545	0.620
	Left	0.197	0.046	0.243		Left	0.648	0.046	0.694

Table 13.11 Simultaneous Transmission Scenario (Extremity Body at 0 mm)

Simult TX	Configuration	GPRS 850 10g SAR (W/kg)	Bluetooth 10g SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	GPRS 1900 10g SAR (W/kg)	Bluetooth 10g SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.096	0.007	0.103	Body SAR	Top	0.140	0.007	0.147
	Bottom	0.010	0.007	0.017		Bottom	0.011	0.007	0.018
	Front	0.071	0.007	0.078		Front	0.065	0.007	0.072
	Rear	0.003	0.007	0.010		Rear	0.005	0.007	0.012
	Right	0.033	0.007	0.040		Right	0.038	0.007	0.045
	Left	0.183	0.007	0.190		Left	0.308	0.007	0.315

Table 13.12 Simultaneous Transmission Scenario (Extremity Body at 0 mm)

Simult TX	Configuration	WCDMA 850 10g SAR (W/kg)	Bluetooth 10g SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	WCDMA 1900 10g SAR (W/kg)	Bluetooth 10g SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.126	0.007	0.133	Body SAR	Top	0.265	0.007	0.272
	Bottom	0.012	0.007	0.019		Bottom	0.030	0.007	0.037
	Front	0.081	0.007	0.088		Front	0.142	0.007	0.149
	Rear	0.002	0.007	0.009		Rear	0.019	0.007	0.026
	Right	0.036	0.007	0.043		Right	0.075	0.007	0.082
	Left	0.197	0.007	0.204		Left	0.648	0.007	0.655

Table 13.13 Simultaneous Transmission Scenario (Extremity Body at 0 mm)

Simult TX	Configuration	GPRS 850 10g SAR (W/kg)	RFID 10g SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	GPRS 1900 10g SAR (W/kg)	RFID 10g SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.096	0.239	0.335	Body SAR	Top	0.140	0.239	0.379
	Bottom	0.010	0.014	0.024		Bottom	0.011	0.014	0.025
	Front	0.071	0.050	0.121		Front	0.065	0.050	0.115
	Rear	0.003	0.260	0.263		Rear	0.005	0.260	0.265
	Right	0.033	0.807	0.84		Right	0.038	0.807	0.845
	Left	0.183	0.517	0.700		Left	0.308	0.517	0.825

Table 13.14 Simultaneous Transmission Scenario (Extremity Body at 0 mm)

Simult TX	Configuration	WCDMA 850 10g SAR (W/kg)	RFID 10g SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	WCDMA 1900 10g SAR (W/kg)	RFID 10g SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.126	0.239	0.365	Body SAR	Top	0.265	0.239	0.504
	Bottom	0.012	0.014	0.026		Bottom	0.030	0.014	0.044
	Front	0.081	0.050	0.131		Front	0.142	0.050	0.192
	Rear	0.002	0.260	0.262		Rear	0.019	0.260	0.279
	Right	0.036	0.807	0.843		Right	0.075	0.807	0.882
	Left	0.197	0.517	0.714		Left	0.648	0.517	1.165

Table 13.15 Simultaneous Transmission Scenario (Extremity Body at 0 mm)

Simult TX	Configuration	2.4G W-LAN (802.11b) 10g SAR (W/kg)	RFID 10g SAR (W/kg)	ΣSAR (W/kg)	Simult TX	Configuration	RFID 10g SAR (W/kg)	Bluetooth 10g SAR (W/kg)	ΣSAR (W/kg)
Body SAR	Top	0.288	0.239	0.527	Body SAR	Top	0.239	0.007	0.246
	Bottom	0.013	0.014	0.027		Bottom	0.014	0.007	0.021
	Front	0.039	0.050	0.089		Front	0.050	0.007	0.057
	Rear	0.029	0.260	0.289		Rear	0.260	0.007	0.267
	Right	0.545	0.807	**1.352**		Right	0.807	0.007	0.814
	Left	0.046	0.517	0.563		Left	0.517	0.007	0.524

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

13.8 Simultaneous Transmission Conclusion

The above numerical summed SAR results for all the worst-case simultaneous transmission conditions were below the SAR limit. Therefore, the above analysis is sufficient to determine that simultaneous transmission cases will not exceed the SAR limit and therefore no measured volumetric simultaneous SAR summation is required per FCC KDB Publication 447498 D01v05r01.

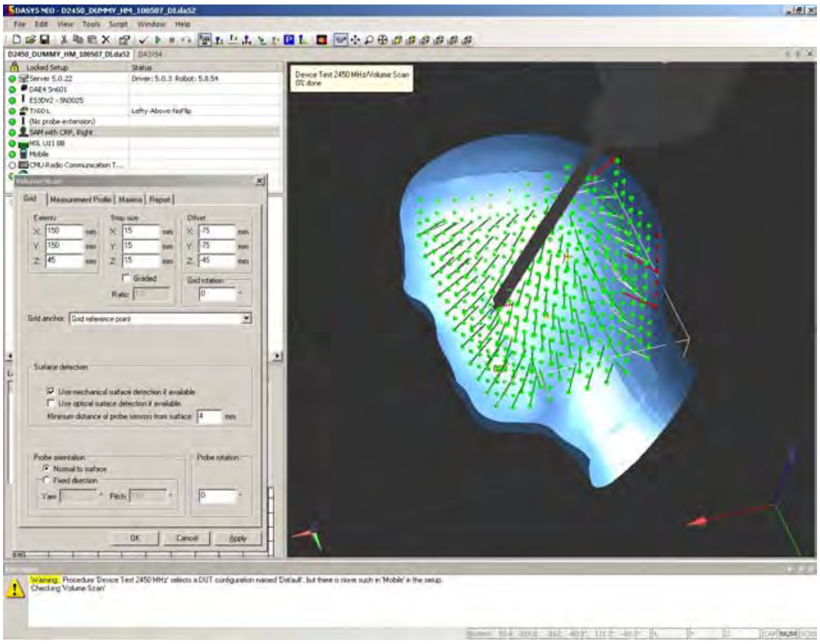
Description of Volume Scan:

In order to determine the EM field distribution in a three-dimensional spatial extension, volume scans 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 a volume. For this purpose, fine resolution volume scans need to be performed at the peak SAR location(s) determined during the Area Scan. In DASY4 software these scans are called Zoom Scan jobs. The default Zoom Scan measures 7 x 7 x 7 points with a step size of 5 mm. Faster evaluations can be achieved with a reduced number of measurement points. 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 SAR reading 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 Scans are 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 grid can be anchored to a user specific point or to the current probe location With an Administrator access mode, the grid can be optionally graded in Z-direction, whereby the smallest grid step and the grading ratio can be defined. Chosen grading ratio is automatically adjusted 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. This quantity can be: field magnitude, SAR, interpolated SAR or averaged SAR.

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

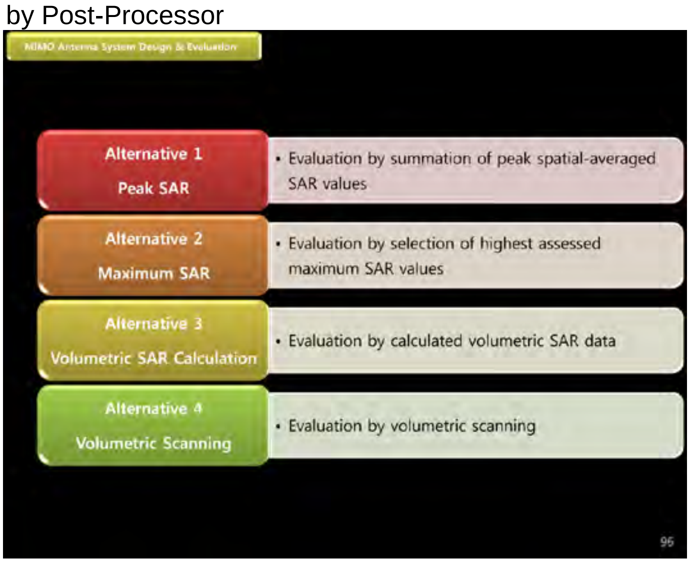
- Evaluation Method
  - Selection of highest assessed maximum SAR Value
- Description
  - Accurate estimate of the multi-band SAR
  - Example
    - F1's SAR Value is 0.9
    - F2's SAR Value is 1.3
    - Multi-band SAR Value is 1.3

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



14. SAR MEASUREMENT VARIABILITY

14.1 Measurement Variability

Per FCC KDB Publication 865664 D01v01r01, SAR measurement variability was assessed for each frequency band, which was determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media were required for SAR measurements in a frequency band, the variability measurement procedures were applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium. These additional measurements were repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device was returned to ambient conditions (normal room temperature) with the battery fully charged before it was re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected 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 the original and first repeated measurements was > 1.20 or when the original or repeated measurement 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 repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.
4. Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg
5. 10g Hand(Extremity) SAR measurement variability analysis applies a factor of 2.5 to the procedures outlines above.

Table 14.1 Body SAR Measurement Variability Results

Frequency		Mode	Service	# of Time Slots	Spacing [Side]	Measured SAR (1g)	1st Repeated SAR(1g)	Ratio	2nd Repeated SAR(1g)	Ratio	3rd Repeated SAR(1g)	Ratio
MHz	Ch.					(W/kg)	(W/kg)		(W/kg)		(W/kg)	
1852.4	9262	WCDMA1900	RMC	N/A	0 mm [Left]	1.160	1.140	1.02	N/A	N/A	N/A	N/A
2462	11	802.11b	DSSS	N/A	0 mm [Right]	1.100	1.040	1.06	N/A	N/A	N/A	N/A
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					

14.2 Measurement Uncertainty

The measured SAR was <1.5 W/kg for all frequency bands. Therefore, per KDB Publication 865664D01v01r01, the standard measurement uncertainty analysis per IEEE 1528-2003 was not required.

15. 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.)	± 4.4	Normal	1	0.64	± 4.4 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.6	Normal	1	0.6	± 4.6 %	∞
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.)	± 4.3	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)

900 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.)	± 4.4	Normal	1	0.64	± 4.4 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.6	Normal	1	0.6	± 4.6 %	∞
CombinedStandard Uncertainty					**± 12.2 %**	330
Expanded Uncertainty (k=2)					**± 24.4 %**	

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.)	± 4.3	Normal	1	0.64	± 4.3 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.7	Normal	1	0.6	± 4.7 %	∞
CombinedStandard Uncertainty					**± 12.2 %**	330
Expanded Uncertainty (k=2)					**± 24.4 %**	

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.)	± 4.1	Normal	1	0.64	± 4.1 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.6	Normal	1	0.6	± 4.6 %	∞
CombinedStandard Uncertainty					**± 12.1 %**	330
Expanded Uncertainty (k=2)					**± 24.2 %**	

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.)	± 4.6	Normal	1	0.64	± 4.6 %	∞
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 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.)	± 4.7	Normal	1	0.64	± 4.7 %	∞
Liquid permittivity (Target)	± 5.0	Rectangular	√3	0.6	± 2.887 %	∞
Liquid permittivity (Meas.)	± 4.6	Normal	1	0.6	± 4.6 %	∞
CombinedStandard Uncertainty					**± 12.2 %**	330
Expanded Uncertainty (k=2)					**± 24.4 %**	

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

16.CONCLUSION

Measurement Conclusion

The SAR measurement indicates that the EUT complies with the RF radiation exposure limits of the FCC. These measurements are taken to simulate the RF effects exposure under the worst-case conditions. Precise laboratory measures were taken to assure repeatability 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 are very complex phenomena that depend on the mass, shape, and size of the body, the orientation of the body with respect to the field vectors, and the electrical properties of both the body and the environment. Other variables that may play a substantial role impossible biological effect are those that characterize the environment (e.g. ambient temperature, air velocity, relative humidity, and body insulation) and those that characterize the individual (e.g. age, gender, activity level, debilitation, or disease).

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

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