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TEST REPORT

Report number : Z101C-14108

Issue date : December 4, 2014

The device, as described herewith, was tested pursuant to applicable test procedure and complies with the requirements of;

FCC 47CFR §2. 1093

The test results are traceable to the international or national standards.

Applicant	:	KYOCERA Corporation
Equipment under test (EUT)	:	Mobile Phone
Model number	:	KYV32
FCC ID	:	JOYKYV32

Date of test	:	November 7, 10-14, 2014
Test place	:	TÜV SÜD Zacta Ltd. Yonezawa Testing Center 4149-7 Hachimanpara 5-chome Yonezawa-shi Yamagata 992-1128 Japan Phone: +81-238-28-2880 Fax: +81-238-28-2888
Test results	:	Complied

The results in this report are applicable only to the equipment tested.
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This test report must not be used by client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government.

Tested by : Kazunori Saito   Chiaki Kanno

Authorized by : Hiroaki Suzuki
Manager of EMC Technical Department

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1. Summary of Test

1.1 Purpose of test

It is the original test in order to verify conformance to standards listed in section 1.2.

1.2 Standards

FCC 47CFR §2. 1093

1.2.1 Guidance applied

- FCC OET Bulletin 65 Supplement C [June 2001]
- IEEE 1528-2003
- FCC KDB Publication 941225 D01-D06 (2G/3G and Hotspot)
- FCC KDB Publication 248227 D01v01r02 (SAR Considerations for 802.11 Devices)
- FCC KDB Publication 447498 D01 v05r02 (General SAR Guidance)
- FCC KDB Publication 865664 D01-D02 (SAR Measurements up to 6 GHz)
- October 2012 TCB Workshop Notes (IEEE 802.11ac)

1.2.2 Deviation from standards

None

1.3 Modification to the EUT by laboratory

None

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2. Equipment Under Test

2.1 General description of equipment

EUT is the Mobile Phone.

2.2 EUT information

Applicant	:	KYOCERA Corporation Yokohama Office 2-1-1 Kagahara, Tsuzuki-ku Yokohama-shi, Kanagawa, Japan Phone: +81-45-943-6253 Fax: +81-45-943-6314
Equipment under test	:	Mobile Phone
Trade name	:	Kyocera
Model number	:	KYV32
Serial number	:	N/A
EUT condition	:	Pre-Production
Power ratings	:	Battery: DC 3.8V
Size	:	(W) 70.4 × (D) 10.4 × (H) 141.9 mm
Environment	:	Indoor and Outdoor use
Terminal limitation	:	-20˚C to 60˚C
RF Specification		
Equipment type	:	Transceiver
Mode(s) of operation	:	GSM850, PCS1900, WCDMA850, WCDMA1900, 2.4GHz W-LAN(802.11b, 802.11g, 802.11n HT20), 5GHz W-LAN(802.11a, 802.11n HT20, HT40, 802.11ac VHT20, VHT40, VHT80)
Antenna type	:	Internal antenna
Antenna gain	:	GSM 850: -1.2dBi PCS 1900: -1.2dBi WCDMA 850: -1.2dBi WCDMA 1900: -1.2dBi 2.4GHz W-LAN: -0.9dBi 5.2, 5.3GHz W-LAN: -1.2dBi 5.6GHz W-LAN: -0.1dBi

Frequency of operation : Up Link
GSM 850: 824.2-848.8MHz(Cellular Band)
PCS 1900: 1850.2-1909.8MHz(PCS Band)
WCDMA 850: 826.4-846.6MHz(WCDMA FDD V)
WCDMA 1900: 1852.4-1907.6MHz(WCDMA FDD II)
802.11b: 2412-2462MHz
802.11a: 5180-5240MHz(5.2GHz Band) / 5260-5320MHz(5.3GHz Band)
5500-5700MHz(5.5GHz Band)

Down Link
GSM 850: 869.2-893.8MHz(Cellular Band)
PCS 1900: 1930.2-1989.8MHz(PCS Band)
WCDMA 850: 871.4-891.6MHz(WCDMA FDD V)
WCDMA 1900: 1932.4-1987.6MHz(WCDMA FDD II)
802.11b: 2412-2462MHz
802.11a: 5180-5240MHz(5.2GHz Band) / 5260-5320MHz(5.3GHz Band)
5500-5700MHz(5.5GHz Band)

2.3 Variation of the family model(s)

Not applicable

2.4 Description of test modes

The EUT had been tested under operating condition.
There are three channels have been tested as following:

Band	Channel	Test mode
GSM 850	128, 190, 251	Voice/Data
PCS 1900	512, 661, 810	Voice/ Data
WCDMA 850	4132, 4183, 4233	Voice/ Data
WCDMA 1900	9262, 9400, 9538	Voice/ Data
2.4GHz W-LAN	1, 6, 11	Data
5.2GHz W-LAN	36, 40, 48	Data
5.3GHz W-LAN	52, 56, 64	Data
5.5GHz W-LAN	100, 116, 140	Data
Bluetooth	0, 39, 78	Data

The 5 GHz W-LAN (802.11n (HT40), 802.11ac (VHT20, VHT40, VHT80)) and Bluetooth average power of this DUT is lower than 20 mW. According to EN62479:2010, 5 GHz W-LAN (802.11n (HT40), 802.11ac (VHT20, VHT40, VHT80)) and Bluetooth test configuration was omitted. 5.8 GHz Band is not supported for this device.
For the second mode, and test it against RF exposure of the best at each position of the channel in the worst case.

2.5 Test Results

Equipment Class	Band	Measured Conducted Power [dBm]	Reported SAR 1g SAR [W/kg]		
			Head	Body-worn	Hotspot
PCE	GSM 850	32.96	0.286	0.569	-
	GPRS 850	32.42	0.714	1.545	1.545
	PCS 1900	29.65	0.238	0.503	-
	GPRS 1900	26.86	0.576	0.999	0.999
	WCDMA 850	23.03	0.250	0.474	0.474
	WCDMA 1900	22.98	0.367	0.697	0.757
DTS	2.4GHz W-LAN	15.90	0.170	0.271	0.271
NII	5.2GHz W-LAN	13.46	<0.10	<0.10	-
	5.3GHz W-LAN	15.03	<0.10	0.127	-
	5.5GHz W-LAN	15.39	<0.10	0.210	-
DSS/DTS	Bluetooth	6.89	N/A	N/A	N/A
Simultaneous SAR per KDB 690783 D01v01r03			0.816	1.270	1.270

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2.6 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 D01v05r02.

Band & Mode		Voice [dBm]	Burst Average GMSK [dBm]			
		1TX Slot	1TX Slot	2TX Slot	3TX Slot	4TX Slot
GSM/GPRS 850	Maximum	33.0	33.0	32.5	30.0	29.5
	Nominal	32.0	32.0	31.5	29.0	28.5
GSM/GPRS 1900	Maximum	30.0	30.0	29.5	27.5	26.5
	Nominal	29.0	29.0	28.5	26.5	25.5

Band & Mode		Modulated Average [dBm]		
		3GPP RMC	3GPP HSDPA	3GPP HSUPA
WCDMA 850	Maximum	23.5	23.5	23.5
	Nominal	22.0	22.0	22.0
WCDMA 1900	Maximum	23.5	23.5	23.5
	Nominal	22.0	22.0	22.0

Band & Mode		Modulated Average [dBm]
IEEE 802.11b (2.4 GHz)	Maximum	16.0
	Nominal	15.0
IEEE 802.11g (2.4 GHz)	Maximum	12.0
	Nominal	11.0
IEEE 802.11n (2.4 GHz)	Maximum	12.0
	Nominal	11.0
IEEE 802.11a (5.2 GHz)	Maximum	13.9
	Nominal	13.0
IEEE 802.11a (5.3 / 5.6 GHz)	Maximum	15.9
	Nominal	15.0
IEEE 802.11n (5.2 GHz 20MHz BW)	Maximum	13.9
	Nominal	13.0
IEEE 802.11n (5.3 / 5.6 GHz 20MHz BW)	Maximum	15.9
	Nominal	15.0
IEEE 802.11n (5.2 /5.3 /5.6 GHz 40MHz BW)	Maximum	13.9
	Nominal	13.0
IEEE 802.11ac (5.2 GHz 20MHz BW)	Maximum	15.6
	Nominal	14.5
IEEE 802.11ac (5.3 / 5.6 GHz 20MHz BW)	Maximum	15.9
	Nominal	15.0
IEEE 802.11ac (5 GHz 40MHz BW)	Maximum	13.9
	Nominal	13.0
IEEE 802.11ac (5 GHz 80MHz BW)	Maximum	13.9
	Nominal	13.0
Bluetooth	Maximum	6.9
	Nominal	6.0
Bluetooth LE	Maximum	0.9
	Nominal	0.0

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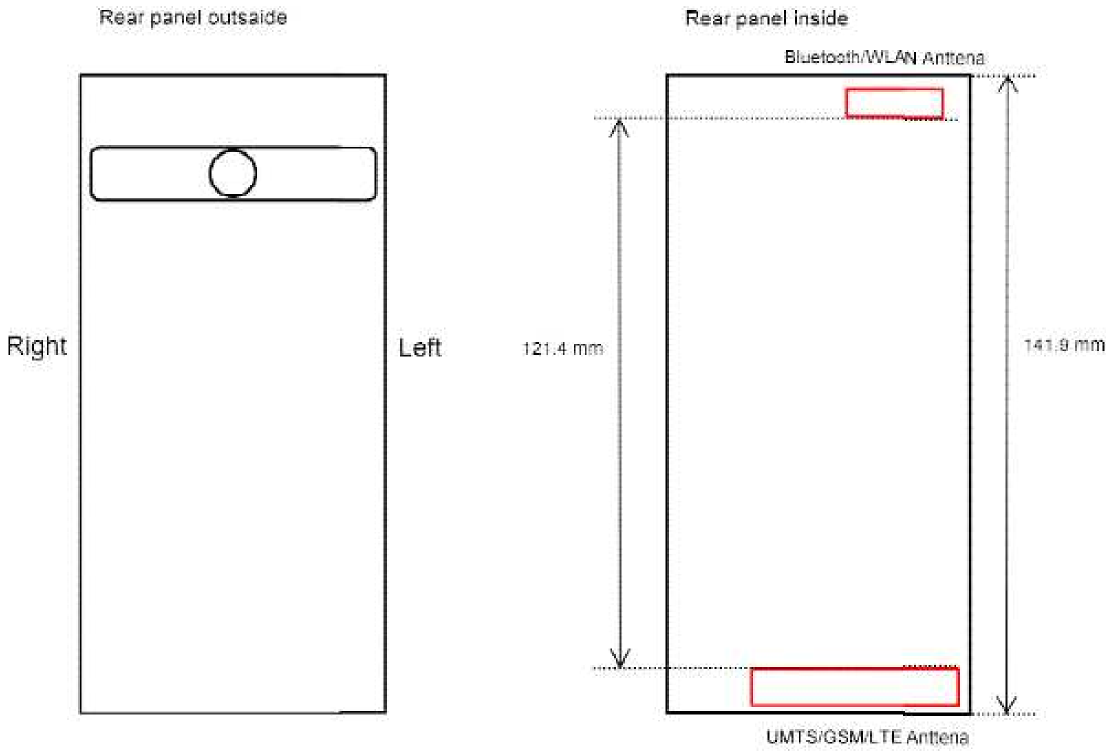
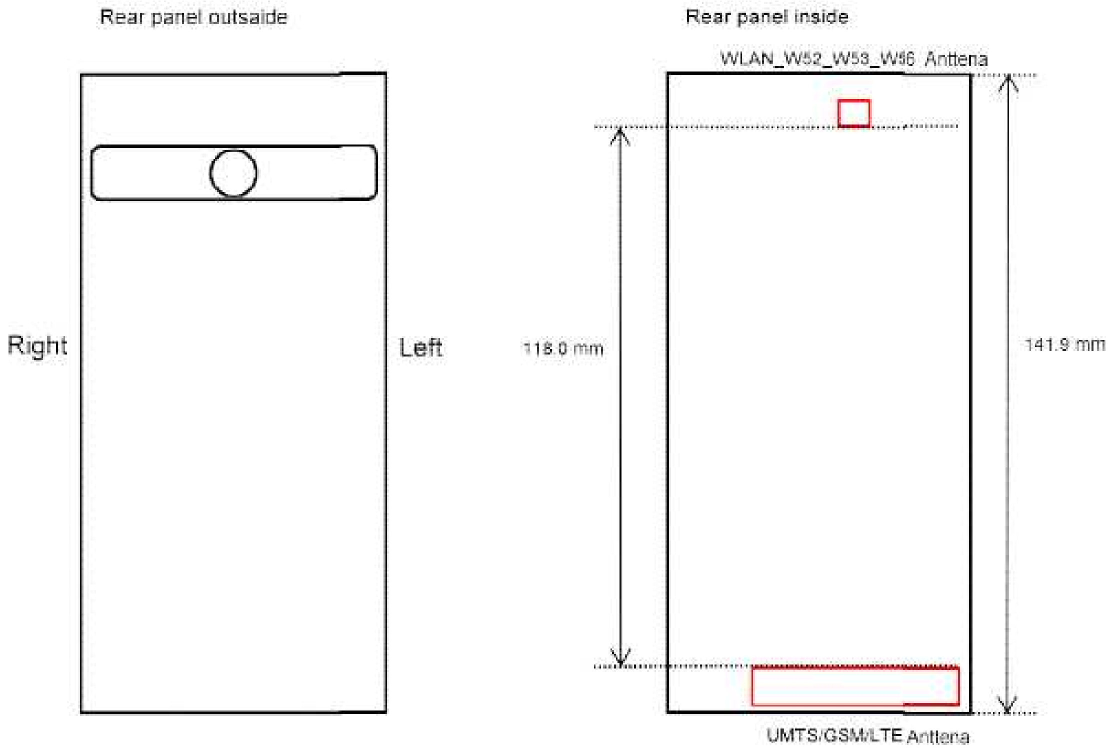
2.7 DUT Antenna Locations & SAR Test Configurations

DUT Antenna Locations(Rear side view)

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





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SAR Test Configurations

Mode	Mobile Hotspot Sides for SAR Testing					
	Top	Bottom	Front	Rear	Right	Left
GSM 850	X	O	O	O	O	O
GSM 1900	X	O	O	O	O	O
WCDMA 850	X	O	O	O	O	O
WCDMA 1900	X	O	O	O	O	O
2.4GHz W-LAN(802.11b/g/n)I	O	X	O	O	O	X

Table 2.1 Mobile Hotspot Sides for SAR Testing

Note:

1. Particular DUT edges were not required to be evaluated for Wireless Router SAR if the edges were greater than 2.5 cm from the transmitting antenna according to FCC KDB Publication 941225 D06v01r01 guidance, page 2. The antenna document shows the distances between the transmit antennas and the edges of the device. When the wireless router mode is enabled, all 5 GHz bands are disabled. Therefore 5 GHz WIFI Wireless Router SAR is not considered in this section.
2. 5 GHz WIFI Direct GO is not supported in the 5 GHz band for this device. WIFI Direct GO is supported in the 2.4 GHz band only. The manufacturer expects 2.4 GHz WIFI Direct GO may be used in a similar manner to wireless router usage. Therefore, 2.4 GHz WIFI Direct GO was evaluated for SAR similarly to wireless router SAR procedures in FCC KDB Publication 941225.

2.8 SAR Test Exclusions Applied

(A) WIFI & BT

Since Wireless Router operations are not allowed by the chipset firmware using 5 GHz WIFI, only 2.4 GHz WIFI Hotspot SAR tests and combinations are considered for SAR with respect to Wireless Router configurations according to FCC KDB 941225 D06v01r01.

Per FCC KDB 447498 D01v05r02, 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; [(6/10)* $\sqrt{2.480}$] = 1.0 < 3.0.

Based on the maximum conducted power of Bluetooth LE (rounded to the nearest mW) and the antenna to user separation distance, Bluetooth LE SAR was not required; [(1/10)* $\sqrt{2.480}$] = 0.2 < 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; [(50/10)* $\sqrt{2.437}$] = 7.8 > 3.0.

Based on the maximum conducted power of 5 GHz WIFI (rounded to the nearest mW) and the antenna to user separation distance, 5 GHz WIFI SAR was required; [(28/10)* $\sqrt{5.700}$] = 6.7 > 3.0.

Per KDB Publication 447498 D01v05r02, the maximum power of the channel was rounded to the nearest mW before calculation.

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

This device supports IEEE 802.11ac with the following features:

a) Up to 80 MHz Bandwidth only
b) No aggregate channel configurations
c) 1 Tx antenna output
d) 256 QAM is supported
e) No new 5 GHz channels

Per April 2013 TCB workshop notes, full SAR tests for all IEEE 802.11ac configurations were not required because the average output power was not more than 0.25 dB higher than IEEE 802.11a mode.
IEEE 802.11ac was evaluated for the highest IEEE 802.11a position in each 5 GHz band and exposure condition.

(B) Licensed Transmitter(s)

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

WCDMA 850 and WCDMA 1900 support HSDPA and HSUPA.

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2.9 Power Reduction for SAR

There is no power reduction used for any band/mode implemented in this device for SAR purposes.

2.10 Device Serial Numbers

Band & Mode	Head Serial Number		Body-Worn Serial Number		Hotspot Serial Number	
	SAR Sample No.10	SAR Sample No.11	SAR Sample No.10	SAR Sample No.11	SAR Sample No.10	SAR Sample No.11
GSM 850	FCC #1	FCC #2	FCC #1	FCC #2	FCC #1	FCC #2
GSM 1900						
WCDMA 850						
WCDMA 1900						
2.4GHz W-LAN						
5GHz W-LAN						

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3. Introduction

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.

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

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/m³)
E = Total RMS electric field strength (V/m)

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

4. Description of test equipment

4.1 SAR Measurement Setup

Measurements are performed using the DASY5 automated dosimetric assessment system. The DASY5 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. 4.1).

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 i7-3770 3,40 GHz desktop computer with Windows NT system and SAR Measurement Software DASY5, 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.

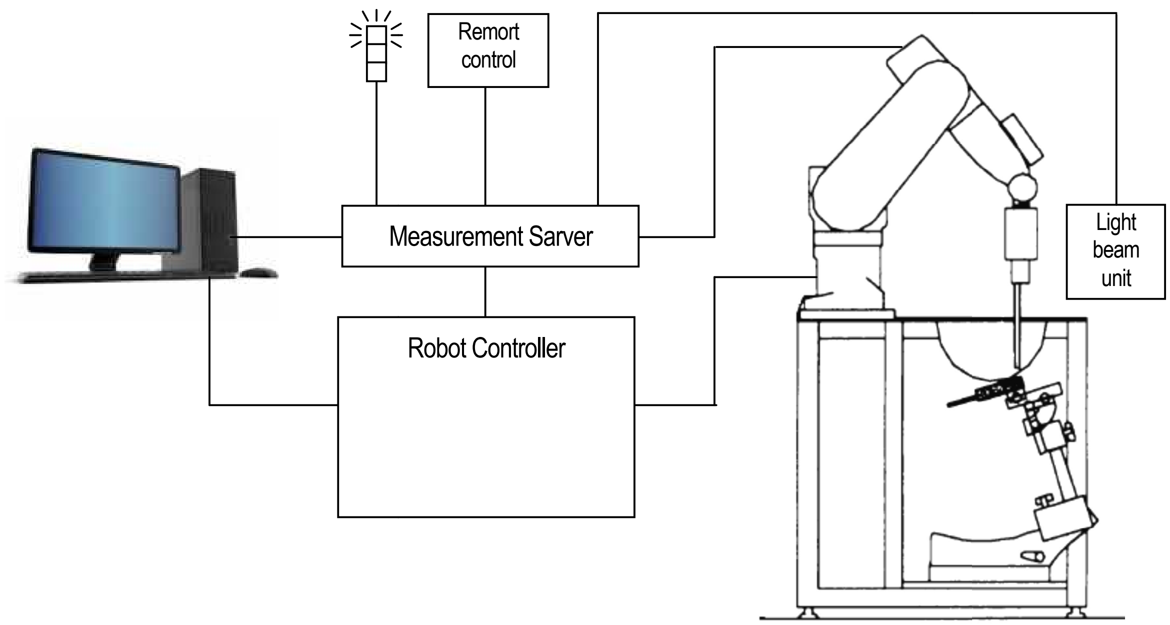

Figure 4.1 SAR Measurement system setup

The DAE consists of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder and control logic unit.
Transmission to the 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.

4.2 Probe measurement system

The SAR measurements were conducted with the dosimetric probe EX3DV4, designed in the classical triangular configuration (see Fig. 4.2) 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 multi fiber 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 DASY5 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.

DAE System

Probe specifications

Calibration	In air from 10 MHz to 6 GHz In brain and muscle simulating tissue at Frequencies of 750MHz, 835MHz, 900MHz, 1750MHz, 1900MHz, 2000MHz 2300MHz, 2450MHz, 2600MHz, 3500MHz, 5200MHz, 5300MHz, 5500MHz, 5600MHz, 5800MHz
Frequency	10 MHz to 6 GHz
Linearity	± 0.2 dB(30 MHz to 6 GHz)
Dynamic	10 μW/g to > 100 mW/g
Range linearity	± 0.2 dB
Dimensions Overall length	337 mm(Tip: 20 mm)
Tip diameter	2.5 mm(Body: 12 mm)
Typical distance from probe tip to dipole centers: 1 mm	
Application	Dosimetry testing Compliance tests of mobile phones

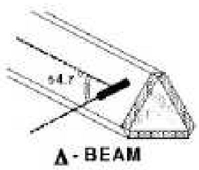

Figure 4.2 Triangular Probe Configurations

Figure 4.3 Probe Thick-Film Technique

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4.3 Probe calibration process

Dosimetric Assessment Procedure

Each probe is calibrated according to a dosimetric assessment procedure described in with accuracy better than +/-10%. The spherical isotropy was evaluated with the procedure described in and found to be better than +/-0.25dB. The sensitivity parameters (Norm X, Norm Y, Norm Z), the diode compression parameter (DCP) and the conversion factor (Conv F) 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.

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

Where:

Δt = exposure time (30 seconds),

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

ΔT = temperature increase due to RF exposure.

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

Where:

σ = simulated tissue conductivity,

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

SAR is proportional to ΔT / Δt , the initial rate of tissue heating, before thermal diffusion takes place.
Now it's possible to quantify the electric field in the simulated tissue by equating the thermally derived SAR to the E- field;

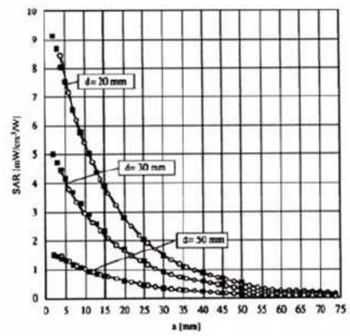

Figure 4.4 E-Field and Temperature Measurements at 900MHz

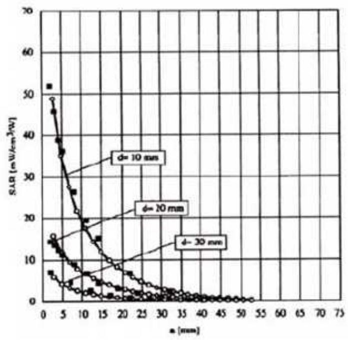

Figure 4.5 E-Field and Temperature Measurements at 1800MHz

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Data Extrapolation

The DASY 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 = linearized voltage of channel i (uV) (i = x,y,z)
U_i = measured voltage of channel i (uV) (i = x,y,z)
cf = crest factor of exciting field (DASY parameter)
dcp_i = diode compression point of channel i (uV) (Probe parameter, i = x,y,z)

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

E – fieldprobes :

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

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

The RMS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = \sqrt{E_X^2 + E_Y^2 + E_Z^2}$$

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

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

with ***SAR*** = local specific absorption rate in mW/g
Etot = total field strength in V/m
σ = conductivity in [mho/m] or [Siemens/m]
ρ = equivalent tissue density in g/cm³

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 mW/cm²
E_{tot} = total electric field strength in V/m

4.4 SAM Twin phantom

The SAM Twin Phantom V5.0 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. 4.6)

Figure 4.6 SAM Twin phantom

SAM Twin Phantom Specification

Construction	The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot. Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.
Shell Thickness	2 ± 0.2 mm
Filling Volume	Approx. 25 liters
Dimensions	Length: 1000 mm Width: 500 mm Height: adjustable feet

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 along the mid-sagittal plane into right and left halves (see Fig. 4.7). The perimeter side walls 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 4.7 Sam Twin Phantom shell

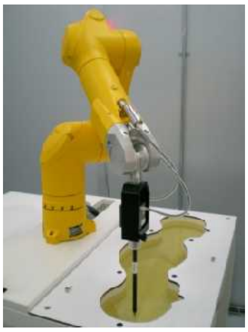
4.5 Device Holder for Transmitters

In combination with the Twin SAM Phantom V5.0 or ELI5, 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 4.8 Mounting Device

4.6 Brain & Muscle Simulating Mixture Characterization



Simulated Tissue

The brain and muscle mixtures consist of a viscous gel using hydrox-ethyl cellulose (HEC) gelling agent and saline solution. (see Table 4.1)
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.

Table 4.1 Composition of the Equivalent Matter

Ingredients [% by weight]	Frequency [MHz]									
	750		835		1900		2450		5200 - 5800	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	42.10	50.00	40.19	50.75	55.24	70.23	71.88	73.40	65.52	80.00
Salt(NaCl)	1.500	0.800	1.480	0.940	0.310	0.290	0.160	0.060	-	-
Sugar	56.00	48.80	57.90	48.21	-	-	-	-	-	-
HEC	0.200	0.200	0.250	-	-	-	-	-	-	-
Bactericide	0.200	0.200	0.180	0.100	-	-	-	-	-	-
Triton X-100	-	-	-	-	-	-	19.97	-	17.24	-
DGBE	-	-	-	-	48.45	29.48	7.990	26.54	-	-
Diethylenglycol monohexylether	-	-	-	-	-	-	-	-	17.24	-
Polysorbate (Tween) 80	-	-	-	-	-	-	-	-	-	20.00
Target for Dielectric Constant	**41.9**	**55.5**	**41.5**	**55.2**	**40.0**	**53.3**	**39.2**	**52.7**	**-**	**-**
Target for Conductivity (S/m)	**0.89**	**0.96**	**0.90**	**0.97**	**1.40**	**1.52**	**1.80**	**1.95**	**-**	**-**

Salt: 99 % Pure Sodium Chloride Sugar: 98 % Pure Sucrose

Water: De-ionized, 16M resistivity HEC: Hydroxyethyl Cellulose

DGBE: 99 % Di(ethylene glycol) butyl ether,[2-(2-butoxyethoxy) ethanol]

Triton X-100(ultra pure): Polyethylene glycol mono [4-(1, 1, 3, 3-tetramethylbutyl)phenyl]

4.7 SAR Test equipment

Table 4.2 Test Equipment Calibration

USE	Equipment	Company	Model No.	Serial No.	Cal. Due	Cal. Date
X	SAR Test Room	TOKIN	N/A	N/A	N/A	N/A
X	Robot Arm	s p e a g	TX60L	F13/5SC6C1/A/01	N/A	N/A
X	Robot Controller	s p e a g	CS8c	F13/5SC6C1/A/01	N/A	N/A
X	Probe Alignment Unit LB	s p e a g	N/A	N/A	N/A	N/A
X	Mounting Device	s p e a g	SD000H01KA	N/A	N/A	N/A
X	Laptop Holder	s p e a g	SMLH1001CD	N/A	N/A	N/A
X	SAM Twin Phantom	s p e a g	QD000P40CD	1799	N/A	N/A
X	SAM Flat Phantom	s p e a g	QDOVA001BB	1230	N/A	N/A
X	Data Acquisition Electronics	s p e a g	DAE4	1409	Nov. 30, 2014	Nov. 22, 2013
X	Dosimetric E-Field Probe	s p e a g	EX3DV4	3957	Dec. 31, 2014	Dec. 3, 2013
X	750MHz SAR Dipole	s p e a g	D750V3	1100	Dec .31,,2014	Dec. 4, 2013
X	835MHz SAR Dipole	s p e a g	D835V2	4d163	Dec. 31, 2014	Dec. 4, 2013
	900MHz SAR Dipole	s p e a g	D900V2	1d161	Dec. 31,2014	Dec. 4, 2013
	1450MHz SAR Dipole	s p e a g	D1450V2	1048	Dec. 31,2014	Dec. 3, 2013
	1750MHz SAR Dipole	s p e a g	D1750V2	1106	Dec. 31,2014	Dec. 4, 2013
X	1900MHz SAR Dipole	s p e a g	D1900V2	5d183	Dec. 31,2014	Dec. 2, 2013
	1950MHz SAR Dipole	s p e a g	D1950V3	1150	Dec. 31,2014	Dec. 2, 2013
X	2450MHz SAR Dipole	s p e a g	D2450V2	925	Dec. 31,2014	Dec. 3, 2013
	2600MHz SAR Dipole	s p e a g	D2600V2	1072	Dec. 31,2014	Dec. 3, 2013
X	5000MHz SAR Dipole	s p e a g	D5GHzV2	1166	Dec. 31,2014	Dec. 3, 2013
X	Dielectric Assessment Kit	s p e a g	DAK-3.5	1141	Nov. 30,2014	Nov. 26, 2013
X	Network Analyzer	Agilent	8720ES	US39172791	Nov. 30,2014	Nov. 8, 2013
X	Signal generator	ROHDE	SMB100A	177525	Feb. 28,2015	Feb. 19, 2014
X	Power Amplifier	R&K	CGA020M602-2633R	B40240	Mar. 31,2015	Mar. 7, 2014
X	Power meter	ROHDE	NRP2	103269	Dec. 31,2014	Dec. 19, 2013
X	Power sensor	ROHDE	NRP-Z81	102459	Dec. 31,2014	Dec. 19, 2013
X	Power sensor	ROHDE	NRP-Z81	102467	Dec. 31,2014	Dec. 19, 2013
X	Directional Coupler	Narda	4226-20	09886	Feb. 28,2015	Feb. 14, 2014
X	Attenuator(3dB)	AEROFLEX	26A-03	081217-07	Nov. 30,2014	Nov. 5, 2013
X	Attenuator(10dB)	SUHNER	6810.19A	10005430	Nov. 30,2014	Nov. 5, 2013
X	Microwave cable(1m)	SUHNER	SUCOFLEX104	199120/4	Nov. 30,2014	Nov. 12, 2013
X	Microwave cable(1.5m)	SUHNER	SUCOFLEX104	199121/4	Nov. 30,2015	Nov. 1, 2014
X	Wideband Radio Frequency Tester	ROHDE	CMW500	126079	Aug. 31, 2015	Aug. 28, 2014
X	PC	HP	HP Compaq Elite 8300	CZC3234D1P	N/A	N/A
X	Software	s p e a g	DAK	Ver 1.10.321.11	N/A	N/A
X	Software	s p e a g	DASY5	Ver 52.8.8.1222	N/A	N/A

NOTE: The E-field probe was calibrated by SPEAG, by temperature measurement procedure. Dipole Verification measurement is performed by TÜV SÜD Zacta before each test. The brain simulating material is calibrated by TÜV SÜD Zacta using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain-equivalent material.

5. Test system specifications

Automated TEST SYSTEM SPECIFICATIONS:

Positioner

Robot	Stäubli Unimation Corp. Robot Model: TX60L
Repeatability	0.02mm
No. of axis	6

Data Acquisition Electronic (DAE) System

Cell Controller

Processor	Intel Core i7-3770
Clock Speed	3.40 GHz
Operating System	Windows 7 Professional
Data Card	DASY5 PC-Board

Data Converter

Features	Signal, multiplexer, A/D converter. & control logic
Software	DASY5
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 4 16 bit A/D converter for surface detection system serial link to robot direct emergency stop output for robot

E-Field Probes

Model	EX3DV4 S/N: 3957
Construction	Triangular core fiber optic detection system
Frequency	10 MHz to 6 GHz
Linearity	± 0.2 dB (30 MHz to 6 GHz)

Phantom

Phantom	SAM Twin Phantom (V5.0)
Shell Material	Composite
Thickness	2.0 ± 0.2 mm

Figure 5.1 DASY5 Test System

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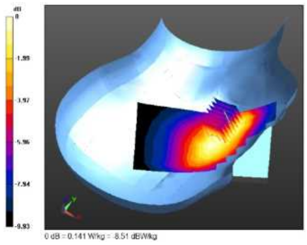
6. SAR Measurement Procedure

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.

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.



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 D01v01 (See Table6.1).
   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 2.7mm away 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.

Table 6.1 Area and Zoom Scan Resolutions per FCC KDB Publication 865664 D01v01

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

7. Definition of reference points

7.1 EAR Reference Point

Figure 7.1 shows the front, back and side views of the SAM Twin Phantom. The point"M" is the reference point for the center of the mouth, "LE" is the left ear reference point(ERP), and "RE" is the right ERP. The ERPs are 15mm posterior to the entrance to the Earcanal (EEC) along the B- M line (Back-Mouth), as shown in Figure 7.1. 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 7.2).

Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning.

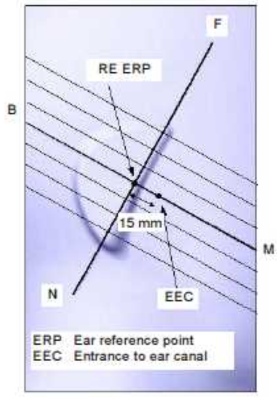


Figure 7.1 Close-up side view of ERPs

7.2 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. 7.3). 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 outersurface of the both the left and right head phantoms on the ear reference point.

Figure 7.2 Front, back and side view of SAM Twin Phantom

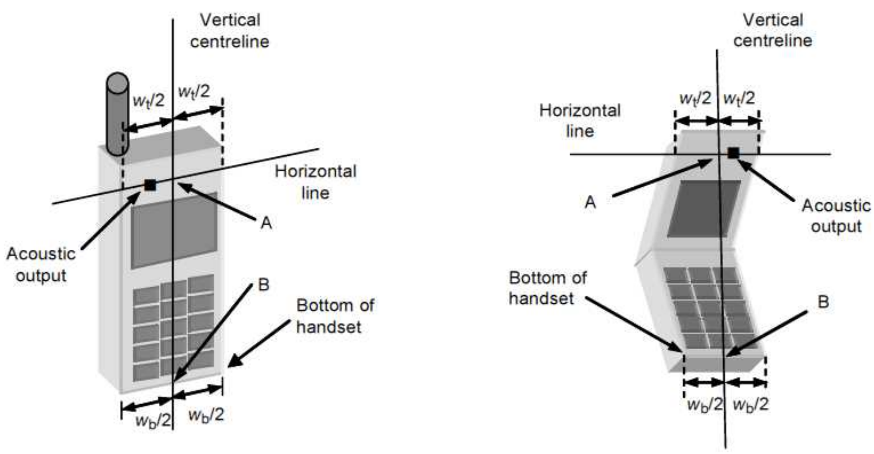


Figure 7.3 Handset Vertical Center & Horizontal Line Reference Points

7.3 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.

7.4 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 Fig. 7.4), such that the plane defined by the vertical center line and the horizontal line of the phone is approximately parallel to the sagittal plane of the phantom.

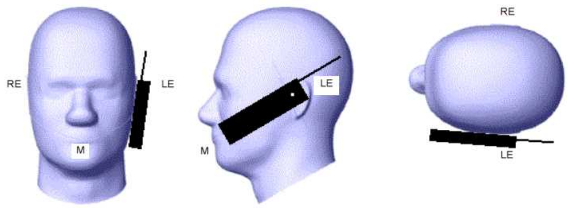


Figure 7.4 Front, Side and Top View of Cheek/Touch Position

2. The handset was translated towards the phantom along the line passing through RE & LE until the handset touches the ear.
3. While maintaining the handset in this plane, the handset was rotated around the LE-RE line until the vertical centerline was in the plane normal to MB-NF including the line MB (reference plane).
4. The phone was hen rotated around the vertical centerline until the phone (horizontal line) was symmetrical was respect to the line NF.
5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE, and maintaining the phone contact with the ear, the handset was rotated about the line NF until any point on the handset made contact with a phantom point below the ear (cheek). (See Fig. 7.5)

7.5 Positioning for Ear / 15 ° Tilt

With the test device aligned in the “Cheek/Touch Position”:

1. While maintaining the orientation of the phone, the phone was retracted parallel to the reference plane far enough to enable a rotation of the phone by 15 degree.
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 7.6).

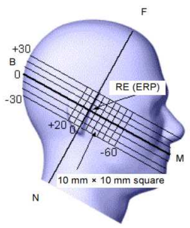


Figure 7.5 Side view/relevant markings

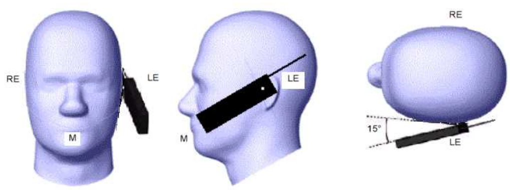


Figure 7.6 Front, Side and Top View of Ear/15° Position

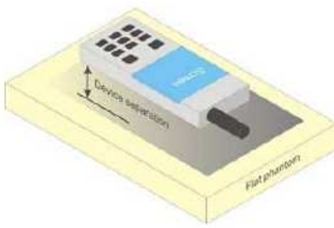


Figure 7.7 Sample Body-Worn Diagram

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7.6 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 Fig. 7.7). Per FCC KDB Publication 648474 D04_v01, 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 D01_v05 should be used to test for body-worn accessory SAR compliance,without a headset connected to it. This enables the test results for such configuration to be 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 betweenthe back of the device and the flat phantom is used. Test position spacing was documented.
Transmitters that are designed to operate in front of a person’s face, as in push-to-talk configurations, 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.

7.7 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 D01v05r02 should be applied to determine SAR test requirements.
Per KDB Publication 447498 D01v05r02, Cell phones (handsets) are not normally designed to be used on extremities or operated in extremity only exposure conditions. The maximum output power levels of handsets generally do not require
extremity SAR testing to show compliance. Therefore, extremity SAR was not evaluated for this device.

7.8 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 D06 v01 where SAR test considerations for handsets(L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, 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 D01v05 publication procedures.
The “Portable Hotspot” feature on the handset was NOT activated during SAR assessments, to ensure the SAR measurements were evaluated for a single transmission frequency RF signal at a time.

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8. ANSI / IEEE C95.1-2005 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 employmentrelated; 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, which have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

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

	HUMAN EXPOSURE LIMITS	
	General Public Exposure (W/kg) or (mW/g)	Occupational Exposure (W/kg) or (mW/g)
SPATIAL PEAK SAR * (Brain)	1.60	8.00
SPATIAL AVERAGE SAR ** (Whole Body)	0.08	0.40
SPATIAL PEAK SAR *** (Hands / Feet / Ankle / Wrist)	4.00	20.0

NOTES:
* The Spatial Peak value of the SAR averaged over any 1 g of tissue
(defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
** The Spatial Average value of the SAR averaged over the whole-body.
*** The Spatial Peak value of the SAR averaged over any 10 g of tissue
(defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.

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

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

9. 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 D01v05r02, 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.

Figure 9.1 Table C.10.1.4 of TS 234.121-1

Subtest	βc	βd	βd *(SF)*	βc / βd	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

Notes:
1. ∆ACK, ∆NACK and ∆CQI = 30/15 with β_{HS} = 30/15 *βc.
2. For clauses 5.2C, 5.7A, 5.13.1A and 5.13.1AA, ∆ACK and ∆NACK = 30/15 with β_{HS} = 30/15 *βc, and ∆CQI = 24/15 with β_{HS} = 24/15 * βc.
3. CM = 1 for βc/βd =12/15, β_{HS}/βc = 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.
4. For Subtest 2, the βc/βd ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signaled gain factors for the reference TFC (TF1, TF1) to βc = 11/15 and βd = 15/15.

9.3.5 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.

Figure 9.2 Table C.11.1.3 of TS 234.121-1

Sub -test	β_c	β_d	β_d *(SF)*	β_c/β_d	β_{HS} *(Note 1)*	β_{ec}	β_{ed} *(Note 5, Note 6)*	β_{ed} *(SF)*	β_{ed} *(Codes)*	CM *(dB)* *(Note 2)*	MPR *(dB)* *(Note 2)*	*AG Index* *(Note 6)*	*E-TFCI*
1	11/15 *(Note 3)*	15/15 *(Note 3)*	64	11/15 *(Note 3)*	22/15	209/ 225	1309/ 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_{ed}1: 47/15 β_{ed}2: 47/15	4 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 *(Note 4)*	15/15 *(Note 4)*	64	15/15 *(Note 4)*	30/15	24/15	134/ 15	4	1	1.0	0.0	21	81

Notes:
1. Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{HS} = 30/15 * β_c.
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.
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 signalled gain factors for the reference TFC (TF1, TF1) to β_c = 10/15 and β_d = 15/15.
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 signalled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.
5. In case of testing by UE using E-DPDCH Physical Layer category 1, Sub-test 3 is omitted according to TS25.306 Table 5.1g.
6. β_{ed} cannot be set directly, it is set by Absolute Grant Value.

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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.

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

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 Power

10.1 GSM Conducted Powers

Band	Channel	Frequency [MHz]	Maximum Burst-Averaged Output Power [dBm]				
			Voice GSM CS 1slot	GPRS/EDGE(GMSK)Data			
				GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot
GSM 850	128	824.2	**32.98**	32.94	32.50	29.98	28.85
	190	836.6	32.96	32.91	32.42	29.97	28.88
	251	848.8	32.90	32.85	32.36	30.00	29.15
GSM 1900	512	1850.2	29.55	29.54	29.10	26.82	25.74
	661	1880.0	29.79	29.78	29.05	26.97	25.89
	810	1909.8	**29.83**	29.82	29.29	27.20	26.07
Band	Channel	Frequency [MHz]	Calculated Maximum Frame-Averaged Output Power [dBm]				
			Voice GSM CS 1slot	GPRS/EDGE(GMSK)Data			
				GPRS 1 TX Slot	GPRS 2 TX Slot	GPRS 3 TX Slot	GPRS 4 TX Slot
GSM 850	128	824.2	23.95	23.91	**26.48**	25.72	25.84
	190	836.6	23.93	23.88	**26.40**	25.71	25.87
	251	848.8	23.87	23.82	**26.34**	25.74	26.14
GSM 1900	512	1850.2	20.52	20.51	**23.08**	22.56	22.73
	661	1880.0	20.76	20.75	**23.03**	22.71	22.88
	810	1909.8	20.80	20.79	**23.27**	22.94	23.06

Table 10.1 The power was measured by CMW500

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. This device does not support EDGE. (EDGE RX only)

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

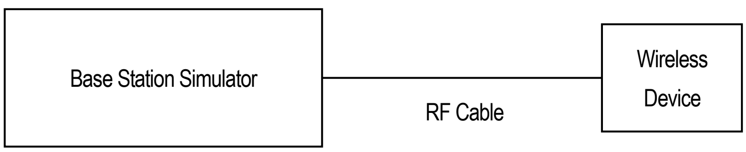

Figure 10.1 Power Measurement Setup

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10.2 WCDMA Conducted Powers

3GPP Release Version	Mode		Sub-Test	Cellular Band [dBm]			PCS Band [dBm]			MPR	Bc	ßd	Bc/ßd
	Channel			4132	4183	4233	9262	9400	9538				
	Frequency [MHz]			826.4	836.6	846.6	1852.4	1880	1907.6				
99	W-CDMA	RMC	-	22.94	**23.03**	22.89	23.18	22.98	**23.42**	-	-	-	-
		AMR		22.98	22.94	22.88	23.13	22.89	23.19				
5	HSDPA		1	21.93	21.93	21.88	22.34	22.07	22.22	0	2/15	15/15	2/15
5			2	21.99	21.92	22.02	22.17	21.84	22.24	0	12/15	15/15	12/15
5			3	21.58	21.63	21.62	21.71	21.46	21.79	0.5	15/15	8/15	15/8
5			4	21.53	21.57	21.60	21.72	21.41	21.77	0.5	15/15	4/15	15/4
6	HSUPA		1	21.90	21.58	21.54	21.90	21.88	22.21	0	11/15	15/15	11/15
6			2	20.60	20.72	20.40	21.01	20.91	21.23	2	6/15	15/15	6/15
6			3	20.17	20.51	20.78	22.30	20.93	20.83	1	15/15	9/15	15/9
6			4	21.11	21.23	21.35	21.27	21.45	21.55	2	2/15	15/15	2/15
6			5	21.99	21.96	21.84	22.23	21.83	22.29	0	15/15	15/15	15/15

Table 10.2 The power was measured by CMW500

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.

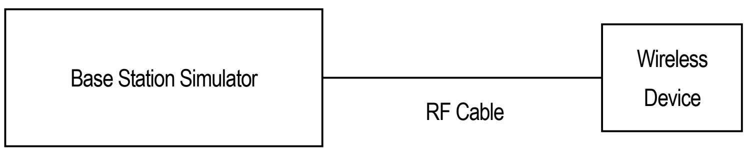

Figure 10.2 Power Measurement Setup

10.3 WLAN Conducted Powers

Mode	Frequency [MHz]	802.11b (2.4 GHz) Conducted Power [dBm]			
		Data Rate [Mbps]			
		1	2	5.5	11
802.11b	2412	15.65	15.47	15.44	15.42
	2437	15.46	15.42	15.37	14.74
	2462	**15.90**	15.82	15.76	15.69

Table 10.3 IEEE 802.11b Average RF Power

Mode	Frequency [MHz]	802.11g (2.4 GHz) Conducted Power [dBm]							
		Data Rate [Mbps]							
		6	9	12	18	24	36	48	54
802.11g	2412	11.65	11.64	11.63	11.62	11.56	11.54	10.47	10.44
	2437	11.60	11.57	11.56	11.54	11.46	11.29	10.50	10.47
	2462	**11.80**	11.79	11.69	11.67	11.53	11.52	10.43	10.43

Table 10.4 IEEE 802.11g Average RF Power

Mode	Frequency [MHz]	802.11n HT20 (2.4 GHz) Conducted Power [dBm]							
		Data Rate [Mbps]							
		0	1	2	3	4	5	6	7
802.11n (HT20)	2412	10.65	10.59	10.51	10.48	10.45	9.37	9.36	9.34
	2437	10.64	10.57	10.46	10.40	10.32	9.34	9.32	9.23
	2462	**10.76**	10.74	10.71	10.66	10.53	9.49	9.47	9.44

Table 10.5 IEEE 802.11n Average RF Power

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Mode	Frequency [MHz]	802.11a (5 GHz) Conducted Power [dBm]							
		Data Rate [Mbps]							
		6	9	12	18	24	36	48	54
802.11a	5180	**13.25**	13.20	13.20	13.17	13.13	13.09	13.06	13.04
	5200	13.18	13.15	13.14	13.11	13.07	13.07	12.98	12.97
	5240	13.18	13.16	13.15	13.13	13.08	13.05	13.00	12.99
	5260	**14.97**	14.92	14.18	14.13	13.02	12.99	12.93	12.91
	5280	14.96	14.95	14.23	14.19	12.90	12.89	12.87	12.86
	5320	14.88	14.86	13.97	13.96	12.92	12.88	12.85	12.84
	5500	15.25	15.16	14.18	14.16	13.26	13.23	13.18	13.17
	5580	**15.39**	15.37	14.36	14.35	13.46	13.43	13.37	13.35
	5700	15.25	15.23	13.98	13.95	12.79	12.77	12.73	12.72

Table 10.6 IEEE 802.11a Average RF Power

Mode	Frequency [MHz]	802.11n HT20 (5 GHz) Conducted Power [dBm]							
		Data Rate [Mbps]							
		6.5	13	19.5	26	39	52	58.5	65
802.11n (HT20)	5180	13.27	13.25	13.22	13.18	13.17	13.15	13.14	13.12
	5200	**13.46**	13.43	13.41	13.39	13.35	13.32	13.27	13.24
	5240	13.29	13.26	13.18	13.15	13.12	13.10	13.07	12.97
	5260	**15.03**	14.22	14.21	13.10	13.06	13.03	12.99	12.98
	5280	14.81	13.98	13.83	12.89	12.80	12.76	12.69	12.62
	5320	14.73	13.95	13.83	12.90	12.88	12.79	12.78	12.76
	5500	**15.26**	14.18	14.14	13.18	13.11	13.05	13.04	13.02
	5580	15.23	14.34	14.30	13.31	13.26	13.23	13.19	13.16
	5700	15.03	14.00	13.99	12.81	12.78	12.74	12.71	12.70

Table 10.7 IEEE 802.11n Average RF Power - 20 MHz Bandwidth

Mode	Frequency [MHz]	802.11n HT40 (5 GHz) Conducted Power [dBm]							
		Data Rate [Mbps]							
		13.5	27	40.5	54	81	108	121.5	135
802.11n (HT40)	5190	11.91	11.89	11.82	11.77	11.75	11.71	11.67	11.60
	5230	11.68	11.66	11.63	11.57	11.50	11.47	11.46	11.37
	5270	11.67	11.64	11.61	11.54	11.37	11.34	11.33	11.32
	5310	11.72	11.68	11.66	11.61	11.54	11.50	11.48	11.47
	5510	12.01	11.99	11.96	11.90	11.71	11.67	11.63	11.58
	5590	12.08	12.04	12.01	11.95	11.89	11.84	11.81	11.79
	5670	11.58	11.54	11.42	11.37	11.60	11.54	11.42	11.30

Table 10.8 IEEE 802.11n Average RF Power - 40 MHz Bandwidth

Mode	Frequency [MHz]	802.11ac VHT20 (5 GHz) Conducted Power [dBm]									
		Data Rate [Mbps]									
		6.5	13	19.5	26	39	52	58.5	65	78	86.5
802.11ac (VHT20)	5180	**13.51**	13.43	13.41	13.32	13.30	13.27	13.24	13.20	11.78	11.91
	5200	13.39	13.38	13.36	13.25	13.23	13.22	13.19	13.14	11.93	12.00
	5240	13.34	13.30	13.25	13.13	13.10	13.07	13.06	13.00	11.64	12.14
	5260	**15.19**	14.19	14.17	13.06	13.00	12.99	12.99	12.95	11.57	12.05
	5300	15.03	14.16	14.08	13.11	13.03	12.94	12.89	12.85	11.54	11.96
	5320	14.93	14.16	14.11	13.03	12.97	12.96	12.95	12.91	11.63	11.85
	5500	15.51	14.37	14.35	13.33	13.29	13.27	13.24	13.23	12.06	12.28
	5580	**15.56**	14.49	14.43	13.57	13.54	13.49	13.44	13.33	12.21	12.42
	5700	15.37	14.12	14.10	12.98	12.87	12.85	12.84	12.79	11.76	12.16

Table 10.9 IEEE 802.11ac Average RF Power - 20 MHz Bandwidth

Mode	Frequency [MHz]	802.11ac VHT40 (5 GHz) Conducted Power [dBm]									
		Data Rate [Mbps]									
		13.5	27	40.5	54	81	108	121.5	135	162	180
802.11ac (VHT40)	5190	11.93	11.91	11.87	11.57	11.54	11.53	11.52	11.49	10.43	10.47
	5230	11.73	11.71	11.67	11.54	11.52	11.48	11.47	11.45	10.23	10.43
	5270	11.66	11.63	11.59	11.45	11.44	11.30	11.28	11.26	10.30	10.34
	5310	11.75	11.74	11.68	11.54	11.51	11.49	11.48	11.44	10.36	10.38
	5510	11.82	11.78	11.75	11.65	11.64	11.59	11.58	11.56	10.39	10.62
	5550	12.01	11.92	11.85	11.66	11.63	11.62	11.62	11.61	10.59	10.63
	5670	11.59	11.57	11.56	11.40	11.34	11.32	11.30	11.24	10.40	10.46

Table 10.10 IEEE 802.11n Average RF Power - 40 MHz Bandwidth

Mode	Frequency [MHz]	802.11ac VHT80 (5 GHz) Conducted Power [dBm]									
		Data Rate [Mbps]									
		29.3	58.5	87.8	117	175.5	234	263.3	292.5	351	390
802.11ac (VHT80)	5210	12.13	11.99	11.91	11.87	11.77	11.66	11.61	11.59	10.49	10.39
	5290	12.09	11.96	11.90	11.84	11.73	11.68	11.67	11.65	10.41	10.47
	5530	12.24	12.10	11.93	11.88	11.83	11.80	11.79	11.73	10.70	10.68

Table 10.11 IEEE 802.11n Average RF Power - 80 MHz Bandwidth

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.
- For 5 GHz, highest average RF output power channel for the lowest data rate for IEEE 802.11a were selected for SAR evaluation. Other IEEE 802.11 modes(including 802.11n 20 MHz and 40 MHz) were not investigated since the average output powers over all channels and data rates were not more than 0.25 dB higher than the tested channel in the lowest data rate of IEEE 802.11a mode.
- Full SAR tests for all IEEE 802.11ac configurations were not required because the average output power was not more than 0.25 dB higher than IEEE 802.11a mode. IEEE 802.11ac was evaluated for the highest IEEE 802.11a position in each 5 GHz band and exposure condition.
- 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 average output powers for 802.11ac - 20MHz (VHT20) and 802.11 ac - 40 MHz (VHT40) modes are equivalent to the 802.11n - 20 MHz (HT20) and 802.11n - 40 MHz (HT40). Therefore, no additional measurements were required for the lower bandwidth for 802.11ac.
- The underlined data rate and channel above were tested for SAR.

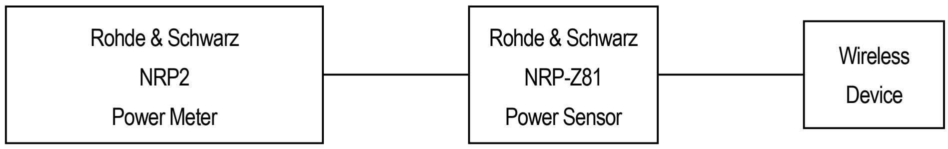

Figure 10.3 Power Measurement Setup for Bandwidths < 50 MHz

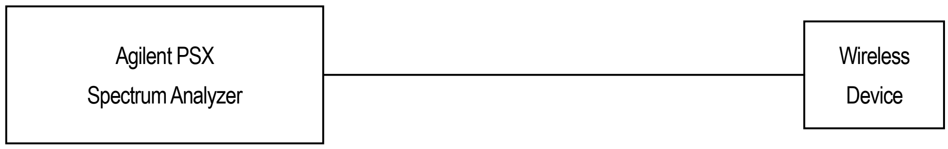

Figure 10.4 Power Measurement Setup for Bandwidths > 50 MHz

10.4 Bluetooth Conducted Powers

Mode	Frequency [MHz]	Output Power [1Mbps]		Output Power [2Mbps]		Output Power [3Mbps]	
		[dBm]	[mW]	[dBm]	[mW]	[dBm]	[mW]
Low	2402	**6.890**	**4.887**	5.390	3.459	5.470	3.524
Mid	2441	6.490	4.457	5.080	3.221	5.020	3.177
High	2480	6.120	4.093	4.750	2.985	4.710	2.958

Table 10.12 Bluetooth Average RF Power

Mode	Frequency [MHz]	Output Power [LE]	
		[dBm]	[mW]
Low	2402	**-0.980**	**0.798**
Mid	2440	-1.970	0.635
High	2480	-1.810	0.659

Table 10.13 Bluetooth Average RF Power

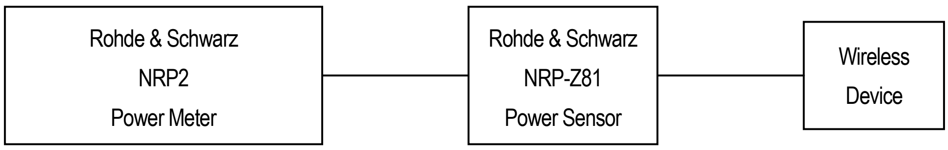

Figure 10.5 Power Measurement Setup

11. System Verification

11.1 Tissue verification

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp. [℃]	Liquid Temp. [℃]	Measured Frequency [MHz]	Target Dielectric constant, ε_r	Target Conductivity, σ[S/m]	Measured Dielectric constant, ε_r	Measured Conductivity, σ[S/m]	ε_r Deviation [%]	σ Deviation [%]
November 7, 2014	835 Head	23.6	22.9	824.2	41.551	0.899	42.00	0.888	1.08	-1.24
				826.4	41.540	0.899	41.99	0.889	1.08	-1.10
				835.0	41.500	0.900	41.74	0.901	0.58	0.14
				836.6	41.500	0.902	41.66	0.902	0.39	0.06
				846.6	41.500	0.912	41.64	0.910	0.34	-0.32
				848.8	41.500	0.915	41.73	0.912	0.55	-0.35
November 7, 2014	835 Body	23.6	23.2	824.2	55.203	0.980	54.51	1.008	-1.26	2.89
				826.4	55.200	0.980	54.47	1.011	-1.32	3.16
				835.0	55.200	0.980	54.41	1.021	-1.43	4.18
				836.6	55.200	0.980	54.39	1.018	-1.47	3.88
				846.6	55.200	0.987	54.26	1.033	-1.70	4.64
				848.8	55.200	0.989	54.27	1.033	-1.68	4.45
November 10, 2014	835 Body	21.1	20.1	824.2	55.203	0.980	55.41	1.001	0.37	2.18
				826.4	55.200	0.980	55.40	1.001	0.36	2.14
				835.0	55.200	0.980	55.36	1.012	0.29	3.27
				836.6	55.200	0.980	55.33	1.015	0.24	3.57
				846.6	55.200	0.987	55.21	1.023	0.02	3.63
				848.8	55.200	0.989	55.23	1.025	0.05	3.64
November 10, 2014	1900 Head	22.8	21.6	1850.2	40.000	1.400	39.93	1.388	-0.18	-0.86
				1852.4	40.000	1.400	39.95	1.389	-0.12	-0.79
				1880.0	40.000	1.400	39.85	1.422	-0.37	1.57
				1900.0	40.000	1.400	39.75	1.434	-0.63	2.43
				1907.6	40.000	1.400	39.72	1.448	-0.70	3.43
				1909.8	40.000	1.400	39.72	1.454	-0.70	3.86
November 11, 2014	1900 Body	22.1	21.4	1850.2	53.300	1.520	51.46	1.475	-3.45	-2.96
				1852.4	53.300	1.520	51.46	1.481	-3.45	-2.57
				1880.0	53.300	1.520	51.37	1.508	-3.62	-0.79
				1900.0	53.300	1.520	51.27	1.536	-3.81	1.05
				1907.6	53.300	1.520	51.25	1.543	-3.85	1.51
				1909.8	53.300	1.520	51.21	1.546	-3.92	1.71
November 14, 2014	2450 Head	22.6	21.8	2412	39.265	1.766	38.26	1.843	-2.56	4.34
				2437	39.222	1.788	38.16	1.872	-2.71	4.67
				2450	39.200	1.800	38.09	1.885	-2.83	4.72
				2462	39.184	1.813	38.04	1.892	-2.92	4.37
November 14, 2014	2450 Body	22.5	22.0	2412	52.752	1.914	52.96	1.902	0.39	-0.65
				2437	52.700	1.940	52.82	1.936	0.23	-0.19
				2450	52.700	1.950	52.81	1.961	0.21	0.56
				2462	52.700	1.969	52.73	1.979	0.06	0.50

MEASURED TISSUE PARAMETERS										
Date(s)	Tissue Type	Ambient Temp. [℃]	Liquid Temp. [℃]	Measured Frequency [MHz]	Target Dielectric constant, ε_r	Target Conductivity, σ[S/m]	Measured Dielectric constant, ε_r	Measured Conductivity, σ[S/m]	ε_r Deviation [%]	σ Deviation [%]
November. 12, 2014	5GHz Head	22.8	22.1	5180	36.000	4.636	37.21	4.508	3.36	-2.76
				5200	36.000	4.660	37.09	4.530	3.03	-2.79
				5210	35.980	4.670	37.15	4.522	3.25	-3.17
				5280	35.900	4.740	37.05	4.602	3.20	-2.91
				5290	35.900	4.750	37.03	4.638	3.15	-2.36
				5300	35.900	4.760	37.07	4.626	3.26	-2.82
				5500	35.600	4.960	36.71	4.821	3.12	-2.80
				5530	35.600	4.990	36.73	4.836	3.17	-3.09
				5580	35.540	5.046	36.67	4.919	3.18	-2.52
				5600	35.500	5.070	36.72	4.943	3.44	-2.50
				5800	35.300	5.270	36.41	5.164	3.14	-2.01
November. 13, 2014	5GHz Body	23.2	21.0	5180	49.040	5.276	46.99	5.456	-4.18	3.41
				5200	49.000	5.300	47.08	5.498	-3.92	3.74
				5210	48.980	5.312	47.08	5.522	-3.88	3.95
				5280	48.890	5.396	46.92	5.588	-4.03	3.56
				5290	48.900	5.408	46.87	5.595	-4.15	3.46
				5300	48.900	5.420	46.75	5.604	-4.40	3.39
				5500	48.600	5.650	46.54	5.867	-4.24	3.84
				5530	48.540	5.686	46.30	5.899	-4.61	3.75
				5580	48.500	5.746	46.23	5.960	-4.68	3.72
				5600	48.500	5.770	46.19	6.046	-4.76	4.78
				5800	48.200	6.000	45.92	6.295	-4.73	4.92

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.

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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):

$$Y = \frac{j2\omega\varepsilon'_r\,\varepsilon_0}{[\ln(b/a)]^2}\int_a^b\int_a^b\int_0^\pi \cos\phi' \frac{\exp\left[-j\omega(\propto_0\varepsilon'_r\,\varepsilon_0)^{1/2}r\right]}{r}\,d\phi' d\rho' d\rho$$

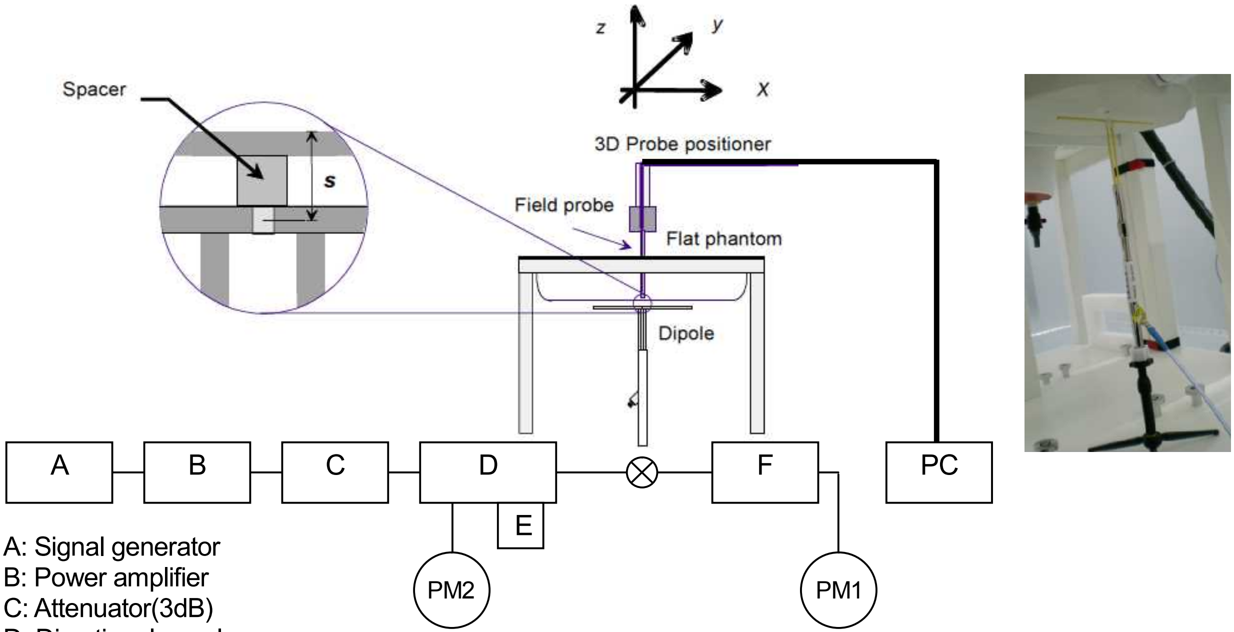
Where Y is the admittance of the probe in contact with the sample, the primed and unprimed coordinates refer to source and observation points, respectively, $r^2=\rho^2+\rho'^2-2\rho\rho'\cos\phi'$, ω is the angular frequency, and $j=\sqrt{-1}$.

11.2 Test system verification

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

SYSTEM DIPOLE VERIFICATION TARGET & MEASURED											
Freq. [MHz]	SAR Dipole Kits	Date(s)	Liquid	Ambient Temp.[℃]	Liquid Temp.[℃]	Probe S/N	Input Power [mW]	1W Targeted SAR 1g [W/kg]	Measured SAR 1g [W/kg]	1W Normalized SAR 1g [W/kg]	Deviation [%]
835	D835V2, S/N: 4d163	November. 7, 2014	Head	23.6	22.9	3957	250	9.45	2.48	9.92	4.97
835	D835V2, S/N: 4d163	November. 7, 2014	Body	23.6	23.2	3957	250	9.43	2.59	10.36	9.86
835	D835V2, S/N: 4d163	November. 10, 2014	Body	21.1	20.1	3957	250	9.43	2.41	9.64	2.23
1900	D1900V2, S/N: 5d183	November. 10, 2014	Head	22.8	21.6	3957	250	40.5	9.70	38.80	-4.20
1900	D1900V2, S/N: 5d183	November. 11, 2014	Body	22.1	21.4	3957	250	40.6	9.64	38.56	-5.02
2450	D2450V2, S/N: 925	November. 14, 2014	Head	22.6	21.8	3957	250	52.8	13.40	53.60	1.52
2450	D2450V2, S/N: 925	November. 14, 2014	Body	22.5	22.0	3957	250	50.6	13.70	54.80	8.30
5200	D5GHzV2, S/N: 1166	November. 12, 2014	Head	22.8	22.1	3957	100	79.9	8.34	83.40	4.38
5500	D5GHzV2, S/N: 1166	November. 12, 2014	Head	22.8	22.1	3957	100	86.1	8.99	89.90	4.41
5800	D5GHzV2, S/N: 1166	November. 12, 2014	Head	22.8	22.1	3957	100	80.6	7.80	78.00	-3.23
5200	D5GHzV2, S/N: 1166	November. 13, 2014	Body	23.2	21.0	3957	100	74.9	8.23	82.30	9.88
5500	D5GHzV2, S/N: 1166	November. 13, 2014	Body	23.2	21.0	3957	100	80.0	7.96	79.60	-0.50
5800	D5GHzV2, S/N: 1166	November. 13, 2014	Body	23.2	21.0	3957	100	75.4	7.28	72.80	-3.45

Note1 : Validation was measured with input 250 mW, 100 mW and normalized to 1W.
Note2 : To confirm the proper SAR liquid depth, the z-axis 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.



A: Signal generator
B: Power amplifier
C: Attenuator(3dB)
D: Directional coupler
E: Terminator(50Ω)
F: Attenuator(10dB)
PM1: Power sensor A
PM2: Power sensor B

Figure10.1 Dipole Verification Test Setup

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12. SAR Test Results

12.1 Head SAR Results

MEASUREMENT RESULTS															
Plot No.	Frequency		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	# of Time slots	Dyty Cycle	1g SAR [W/kg]	Scaling Factor	1g Scaled SAR [W/kg]
	MHz	Ch												
	836.6	190	GSM850	GSM	33.0	32.96	-0.06	Left Touch	FCC#1	1	1:8.3	0.229	1.009	0.231
1	836.6	190	GSM850	GSM	33.0	32.96	-0.08	Right Touch	FCC#1	1	1:8.3	0.283	1.009	**0.286**
	836.6	190	GSM850	GSM	33.0	32.96	0.05	Left Tilt	FCC#1	1	1:8.3	0.234	1.009	0.236
	836.6	190	GSM850	GSM	33.0	32.96	-0.04	Right Tilt	FCC#1	1	1:8.3	0.236	1.009	0.238
	836.6	190	GSM850	GPRS	33.0	32.91	0.19	Right Touch	FCC#1	1	1:8.3	0.261	1.021	0.266
	836.6	190	GSM850	GPRS	32.5	32.42	-0.06	Right Touch	FCC#1	2	1:4.2	0.513	1.019	0.523
	836.6	190	GSM850	GPRS	30.0	29.97	-0.14	Right Touch	FCC#1	3	1:2.8	0.548	1.007	0.552
2	836.6	190	GSM850	GPRS	29.5	28.88	-0.03	Right Touch	FCC#1	4	1:2.1	0.619	1.153	**0.714**
	836.6	190	GSM850	GPRS	32.5	32.42	-0.07	Left Touch	FCC#1	2	1:4.2	0.456	1.019	0.464
	836.6	190	GSM850	GPRS	32.5	32.42	0.00	Left Tilt	FCC#1	2	1:4.2	0.437	1.019	0.445
	836.6	190	GSM850	GPRS	32.5	32.42	0.05	Right Tilt	FCC#1	2	1:4.2	0.441	1.019	0.449
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 12.1 GSM/GPRS 850 Head SAR

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MEASUREMENT RESULTS														
Plot No.	Frequency		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	# of Time slots	Dyty Cycle	1g SAR [W/kg]	Scaling Factor	1g Scaled SAR [W/kg]
	MHz	Ch												
	1880.0	661	PCS1900	PCS	30.0	29.65	-0.12	Left Touch	FCC#1	1	1:8.3	0.148	1.084	0.160
3	1880.0	661	PCS1900	PCS	30.0	29.65	0.19	Right Touch	FCC#1	1	1:8.3	0.220	1.084	**0.238**
	1880.0	661	PCS1900	PCS	30.0	29.65	-0.07	Left Tilt	FCC#1	1	1:8.3	0.0424	1.084	0.0460
	1880.0	661	PCS1900	PCS	30.0	29.65	0.04	Right Tilt	FCC#1	1	1:8.3	0.0431	1.084	0.0467
	1880.0	661	PCS1900	GPRS	30.0	29.65	0.03	Right Touch	FCC#1	1	1:8.3	0.207	1.084	0.224
	1880.0	661	PCS1900	GPRS	30.0	29.62	0.01	Right Touch	FCC#1	2	1:4.2	0.416	1.091	0.454
	1880.0	661	PCS1900	GPRS	28.0	27.54	-0.19	Right Touch	FCC#1	3	1:2.8	0.485	1.112	0.539
4	1880.0	661	PCS1900	GPRS	27.0	26.38	0.10	Right Touch	FCC#1	4	1:2.1	0.499	1.153	**0.576**
	1880.0	661	PCS1900	GPRS	27.0	26.38	-0.13	Left Touch	FCC#1	4	1:2.1	0.339	1.153	0.391
	1880.0	661	PCS1900	GPRS	27.0	26.38	-0.07	Left Tilt	FCC#1	4	1:2.1	0.0906	1.153	0.105
	1880.0	661	PCS1900	GPRS	27.0	26.38	0.03	Right Tilt	FCC#1	4	1:2.1	0.0922	1.153	0.106
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/GPRS 1900 Head SAR

MEASUREMENT RESULTS													
Plot No.	Frequency		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	1g SAR [W/kg]	Dyty Cycle	Scaling Factor	1g Scaled SAR [W/kg]
	MHz	Ch											
	836.6	4183	WCDMA850	RMC	23.5	23.03	-0.10	Left Touch	FCC#1	0.206	1:1	1.020	0.210
5	836.6	4183	WCDMA850	RMC	23.5	23.03	-0.19	Right Touch	FCC#1	0.245	1:1	1.020	**0.250**
	836.6	4183	WCDMA850	RMC	23.5	23.03	-0.12	Left Tilt	FCC#1	0.160	1:1	1.020	0.163
	836.6	4183	WCDMA850	RMC	23.5	23.03	-0.09	Right Tilt	FCC#1	0.143	1:1	1.020	0.146
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													
Plot No.	Frequency		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	1g SAR [W/kg]	Dyty Cycle	Scaling Factor	1g Scaled SAR [W/kg]
	MHz	Ch											
	1880.0	9400	WCDMA1900	RMC	23.5	22.98	0.13	Left Touch	FCC#1	0.243	1:1	1.023	0.248
6	1880.0	9400	WCDMA1900	RMC	23.5	22.98	0.19	Right Touch	FCC#1	0.359	1:1	1.023	**0.367**
	1880.0	9400	WCDMA1900	RMC	23.5	22.98	0.18	Left Tilt	FCC#1	0.0688	1:1	1.023	0.0704
	1880.0	9400	WCDMA1900	RMC	23.5	22.98	-0.08	Right Tilt	FCC#1	0.0652	1:1	1.023	0.0667
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														
Plot No.	Frequency		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Data Rate [Mbps]	Dyty Cycle	1g SAR [W/kg]	Scaling Factor	1g Scaled SAR [W/kg]
	MHz	Ch												
	2462	11	802.11b	DSSS	16.0	15.90	-0.19	Left Touch	FCC #1	1	1:1	0.141	1.023	0.144
	2462	11	802.11b	DSSS	16.0	15.90	0.12	Right Touch	FCC #1	1	1:1	0.103	1.023	0.105
7	2462	11	802.11b	DSSS	16.0	15.90	0.19	Left Tilt	FCC #1	1	1:1	0.166	1.023	**0.170**
	2462	11	802.11b	DSSS	16.0	15.90	0.07	Right Tilt	FCC #1	1	1:1	0.150	1.023	0.153
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														
Plot No.	Frequency		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Data Rate [Mbps]	Dyty Cycle	1g SAR [W/kg]	Scaling Factor	1g Scaled SAR [W/kg]
	MHz	Ch												
	5180	36	802.11a	OFDM	13.9	13.25	0.00	Left Touch	FCC#1	6	1:1	0.0189	1.161	0.0220
8	5180	36	802.11a	OFDM	13.9	13.25	0.00	Right Touch	FCC#1	6	1:1	0.0205	1.161	**0.0238**
	5210	42	802.11ac	OFDM	13.9	12.13	0.00	Right Touch	FCC#1	29.3	1:1	0.000	1.505	0.000
	5180	36	802.11a	OFDM	13.9	13.25	0.00	Left Tilt	FCC#1	6	1:1	0.0178	1.161	0.0207
	5180	36	802.11a	OFDM	13.9	13.25	0.00	Right Tilt	FCC#1	6	1:1	0.0188	1.161	0.0218
	5260	52	802.11a	OFDM	15.9	14.97	0.00	Left Touch	FCC#1	6	1:1	0.0242	1.239	0.0300
	5260	52	802.11a	OFDM	15.9	14.97	0.00	Right Touch	FCC#1	6	1:1	0.0263	1.239	0.0326
	5260	52	802.11a	OFDM	15.9	14.97	0.00	Left Tilt	FCC#1	6	1:1	0.0222	1.239	0.0275
9	5260	52	802.11a	OFDM	15.9	14.97	0.00	Right Tilt	FCC#1	6	1:1	0.0279	1.239	**0.0346**
	5290	58	802.11ac	OFDM	13.9	12.09	0.00	Right Tilt	FCC#1	29.3	1:1	0.0069	1.518	0.0105
	5580	116	802.11a	OFDM	15.9	15.39	-0.15	Left Touch	FCC#1	6	1:1	0.0276	1.125	0.0310
	5580	116	802.11a	OFDM	15.9	15.39	0.11	Right Touch	FCC#1	6	1:1	0.0347	1.125	0.0390
	5580	116	802.11a	OFDM	15.9	15.39	-0.15	Left Tilt	FCC#1	6	1:1	0.0366	1.125	0.0412
10	5580	116	802.11a	OFDM	15.9	15.39	0.00	Right Tilt	FCC#1	6	1:1	0.0435	1.125	**0.0489**
	5530	106	802.11ac	OFDM	13.9	12.24	0.00	Right Tilt	FCC#1	29.3	1:1	0.0132	1.466	0.0193
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 12.6 NII Head SAR

MEASUREMENT RESULTS														
Plot No.	Frequency		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Phantom Position	Device Serial Number	Data Rate [Mbps]	Dyty Cycle	1g SAR [W/kg]	Scaling Factor	1g Scaled SAR [W/kg]
	MHz	Ch												
	5200	40	802.11n	OFDM	13.9	13.46	0.13	Left Touch	FCC#1	6.5	1:1	0.0167	1.108	0.0185
11	5200	40	802.11n	OFDM	13.9	13.46	0.00	Right Touch	FCC#1	6.5	1:1	0.0196	1.108	**0.0217**
	5210	42	802.11ac	OFDM	13.9	12.13	0.00	Right Touch	FCC#1	29.3	1:1	0.000	1.505	0.000
	5200	40	802.11n	OFDM	13.9	13.46	0.00	Left Tilt	FCC#1	6.5	1:1	0.0171	1.108	0.0189
	5200	40	802.11n	OFDM	13.9	13.46	0.00	Right Tilt	FCC#1	6.5	1:1	0.0182	1.108	0.0202
	5260	52	802.11n	OFDM	15.9	15.03	-0.11	Left Touch	FCC#1	6.5	1:1	0.0277	1.223	0.0339
12	5260	52	802.11n	OFDM	15.9	15.03	0.00	Right Touch	FCC#1	6.5	1:1	0.0336	1.223	**0.0411**
	5290	58	802.11ac	OFDM	13.9	12.09	0.00	Right Touch	FCC#1	29.3	1:1	0.000	1.518	0.000
	5260	52	802.11n	OFDM	15.9	15.03	-0.04	Left Tilt	FCC#1	6.5	1:1	0.0232	1.223	0.0284
	5260	52	802.11n	OFDM	15.9	15.03	0.00	Right Tilt	FCC#1	6.5	1:1	0.0309	1.223	0.0378
	5500	100	802.11n	OFDM	15.9	15.26	0.00	Left Touch	FCC#1	6.5	1:1	0.0224	1.160	0.0260
	5500	100	802.11n	OFDM	15.9	15.26	-0.19	Right Touch	FCC#1	6.5	1:1	0.0236	1.160	0.0274
	5500	100	802.11n	OFDM	15.9	15.26	-0.09	Left Tilt	FCC#1	6.5	1:1	0.0273	1.160	0.0317
13	5500	100	802.11n	OFDM	15.9	15.26	0.00	Right Tilt	FCC#1	6.5	1:1	0.0331	1.160	**0.0384**
	5530	106	802.11ac	OFDM	13.9	12.24	0.00	Right Tilt	FCC#1	29.3	1:1	0.0132	1.466	0.0193
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 12.7 NII Head SAR

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12.2 Standalone Body-Worn SAR Results

MEASUREMENT RESULTS														
Plot No.	Frequency		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time slots	Dyty Cycle	1g SAR [W/kg]	Scaling Factor	1g Scaled SAR [W/kg]
	MHz	Ch												
	836.6	190	GSM850	GSM	33.0	32.25	-0.13	10mm [Front]	FCC#1	1	1:8.3	0.328	1.189	0.390
14	836.6	190	GSM850	GSM	33.0	32.25	-0.04	10mm [Rear]	FCC#1	1	1:8.3	0.479	1.189	**0.569**
	836.6	190	GSM850	GPRS	32.5	32.42	-0.19	10mm [Front]	FCC#1	2	1:4.2	0.604	1.019	0.615
	824.2	128	GSM850	GPRS	32.5	32.50	0.10	10mm [Rear]	FCC#1	2	1:4.2	0.837	1.000	0.837
15	836.6	190	GSM850	GPRS	32.5	32.42	-0.19	10mm [Rear]	FCC#1	2	1:4.2	0.859	1.019	0.875
	848.8	251	GSM850	GPRS	32.5	32.36	-0.02	10mm [Rear]	FCC#1	2	1:4.2	0.681	1.033	0.703
	824.2	128	GSM850	GPRS	29.5	28.85	0.09	10mm [Rear]	FCC#1	4	1:2.1	1.27	1.161	1.475
	836.6	190	GSM850	GPRS	29.5	28.88	0.04	10mm [Rear]	FCC#1	4	1:2.1	1.17	1.153	1.350
	848.8	251	GSM850	GPRS	29.5	29.15	-0.13	10mm [Rear]	FCC#1	4	1:2.1	0.917	1.084	0.994
27	824.2	128	GSM850	GPRS	29.5	28.85	0.19	10mm [Rear]	FCC#1	4	1:2.1	1.33	1.161	**1.545**
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 12.8 GSM/PCS/WCDMA Body-Worn SAR

Note: Blue entries represent repeatability measurements.

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MEASUREMENT RESULTS														
Plot No.	Frequency		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	# of Time slots	Dyty Cycle	1g SAR [W/kg]	Scaling Factor	1g Scaled SAR [W/kg]
	MHz	Ch												
	1880.0	661	PCS1900	PCS	30.0	29.29	0.14	10mm [Front]	FCC#1	1	1:8.3	0.141	1.178	0.166
16	1880.0	661	PCS1900	PCS	30.0	29.29	-0.05	10mm [Rear]	FCC#1	1	1:8.3	0.427	1.178	**0.503**
	1880.0	661	PCS1900	GPRS	27.5	26.86	0.01	10mm [Front]	FCC#1	2	1:4.2	0.248	1.159	0.287
17	1880.0	661	PCS1900	GPRS	27.5	26.86	0.01	10mm [Rear]	FCC#1	2	1:4.2	0.662	1.159	**0.767**
	1850.2	512	PCS1900	GPRS	27.0	26.47	0.08	10mm [Rear]	FCC#1	4	1:2.1	0.881	1.130	0.995
28	1880.0	661	PCS1900	GPRS	27.0	26.38	0.05	10mm [Rear]	FCC#1	4	1:2.1	0.866	1.153	**0.999**
	1909.8	810	PCS1900	GPRS	27.0	26.54	0.12	10mm [Rear]	FCC#1	4	1:2.1	0.858	1.112	0.954
	1880.0	661	PCS1900	GPRS	27.0	26.38	0.06	10mm [Rear]	FCC#1	4	1:2.1	0.863	1.153	0.995
	836.6	4183	WCDMA850	RMC	23.5	23.03	-0.19	10mm [Front]	FCC#2	N/A	1:1	0.291	1.114	0.324
18	836.6	4183	WCDMA850	RMC	23.5	23.03	0.12	10mm [Rear]	FCC#2	N/A	1:1	0.425	1.114	**0.474**
	1880.0	9400	WCDMA1900	RMC	23.5	22.98	0.16	10mm [Front]	FCC#1	N/A	1:1	0.236	1.127	0.266
19	1880.0	9400	WCDMA1900	RMC	23.5	22.98	0.05	10mm [Rear]	FCC#1	N/A	1:1	0.618	1.127	**0.697**
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 12.9 GSM/PCS/WCDMA Body-Worn SAR

Note: Blue entries represent repeatability measurements.

MEASUREMENT RESULTS														
Plot No.	Frequency		Mode/ Band	Service	Maximum Allowed Power [dBm]	Conducted Power [dBm]	Drift Power [dB]	Spacing [Side]	Device Serial Number	Data Rate [Mbps]	Dyty Cycle	1g SAR [W/kg]	Scaling Factor	1g Scaled SAR [W/kg]
	MHz	Ch												
	2462	11	802.11b	DSSS	16.9	15.90	-0.19	10mm [Front]	FCC#1	1	1:1	0.0416	1.259	0.0524
20	2462	11	802.11b	DSSS	16.9	15.90	-0.02	10mm [Rear]	FCC#1	1	1:1	0.215	1.259	**0.271**
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 12.10 DTS Body-Worn SAR