In accordance with the requirements of FCC Report and Order:
FCC 47 CFR Part 2 (2.1093) ;IEEE1528 :2013

FCC SAR TEST REPORT

For

Product Name: Smart Watch

Brand Name: N/A

Model No.: X01,X02,X03,X04,X05,X06,X07,X08,X09; X01(S),X02(S),X03(S),X04(S),X05(S), X06(S),X07(S),X08(S),X09(S), X(Series)

Series Model: N/A

Test Report Number: C160520S02-SF

Issued for

SHENZHEN XINYI DIGITAL TECHNOLOGY CO.,LTD
4th Floor, 2nd Building,BaiShiXia Xintang Industry Park,Fuyong Street,Bao'an District, Shenzhen, Guangdong, China

Issued by

Compliance Certification Services Inc.

Kun Shan Laboratory

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TESTING CERT #2541.01

Revision History

Revision	REPORT NO.	Date	Page Revised	Contents
Original	C160520S02-SF	June 3, 2016	N/A	N/A
01	C160520S02-SF	June 15, 2016	All Report	Update GSM850 and WCDMA Band V wrist-worn mode test data.

TABLE OF CONTENTS

1. CERTIFICATE OF COMPLIANCE (SAR EVALUATION)

Product Name:	Smart Watch
Brand Name:	N/A
Model Name.:	X01,X02,X03,X04,X05,X06,X07,X08,X09; X01(S),X02(S),X03(S),X04(S),X05(S),X06(S),X07(S),X08(S),X09(S), X(Series)
Series Model:	N/A
Devices supporting GPRS：	Class B
Description Test Modes(worst case):	The product has two SIM, SIM 1 and SIM 2 sharing a chipset does not support simultaneous work, only supports a single transmitter SIM1 or SIM 2, using SIM 1, SIM 2 will be suspended until select SIM 2, stop using the SIM 1, SIM 2 only would working. SIM1 is the worst case.
Device Category:	PORTABLE DEVICES
Exposure Category:	GENERAL POPULATION/UNCONTROLLED EXPOSURE
Date of Test:	June 2, 2016 & June 14, 2016
Applicant:	**SHENZHEN XINYI DIGITAL TECHNOLOGY CO.,LTD** 4th Floor, 2nd Building,BaiShiXia Xintang Industry Park,Fuyong Street, Bao'an District, Shenzhen, Guangdong, China
Manufacturer:	**SHENZHEN XINYI DIGITAL TECHNOLOGY CO.,LTD** 4th Floor, 2nd Building,BaiShiXia Xintang Industry Park,Fuyong Street, Bao'an District, Shenzhen, Guangdong, China
Application Type:	Certification

APPLICABLE STANDARDS AND TEST PROCEDURES	
STANDARDS AND TEST PROCEDURES	**TEST RESULT**
ANSI/IEEE C95.1-1992	No non-compliance noted
Deviation from Applicable Standard	
None	

The device was tested by Compliance Certification Services Inc. in accordance with the measurement methods and procedures specified in KDB 865664 The test results in this report apply only to the tested sample of the stated device/equipment. Other similar device/equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Approved by:	***Tested by:***
Jeff fang	Sam. ye.
Jeff.fang RF Manager Compliance Certification Services Inc.	Sam.ye Test Engineer Compliance Certification Services Inc.

2. EUT DESCRIPTION

Product Name:	Smart Watch
Brand Name:	N/A
Model Name.:	X01,X02,X03,X04,X05,X06,X07,X08,X09; X01(S),X02(S),X03(S),X04(S),X05(S),X06(S),X07(S),X08(S),X09(S) X(Series)
Series Model:	N/A
Model Discrepancy:	N/A
FCC ID:	2AIFM-X01
Software version	Android 4.4
Hardware version	V1.3
IMEI:	860157026224144
Power reduction:	NO
DTM Description:	N/A
Device Category:	Production unit
Frequency Range:	GSM 850: 824.2 ~ 848.8 MHz GSM1900: 1850.2 ~ 1909.8 MHz WCDMA Band V:826.4~846.6 MHz WLAN 2.4G: 2412 ~ 2462 MHz Bluetooth: 2402 ~ 2480 MHz
Max. Reported SAR(1g):	GSM 850: 0.535 W/kg GSM1900: 0.070 W/kg WCDMA Band V: 0.709 W/kg 802.11b: 0.019 W/kg
Extremity SAR SAR(10g):	GSM 850:0.879 W/kg GSM1900: 0.455 W/kg WCDMA Band V: 1.170 W/kg 802.11b: 0.248 W/kg
Modulation Technique:	GSM/GPRS/EDGE: GMSK RMC/AMR: QPSK HSDPA: QPSK HSUPA: QPSK IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: DSSS (CCK, DQPSK,DBPSK)+OFDM (QPSK, BPSK, 16-QAM, 64-QAM) IEEE 802.11n: OFDM(MCS 0-7) Bluetooth EDR: GFSK + π/4DQPSK+8DPSK BLE 4.0: GFSK
Accessories:	Battery（rating）: Capacitance: 600mAh 3.7v
Antenna Specification:	GSM&WCDMA: PIFA Antenna Wifi&Bluetooth: PIFA Antenna
Operating Mode:	Maximum continuous output

2.1 NOMINAL AND MAXIMUM OUTPUT POWER

Mode	The Tune-up Maximum Power(Customer Declared)(dBm)
GSM 850	33
GSM1900	29
WCDMA Band V	24
IEEE 802.11b	16
IEEE 802.11g	14
IEEE 802.11n(20M)	12
IEEE 802.11n(40M)	10.5
Bluetooth	3.5
BLE4.0	-5

3. REQUIREMENTS FOR COMPLIANCE TESTING DEFINED BY THE FCC

The US Federal Communications Commission has released the report and order “Guidelines for Evaluating the Environmental Effects of RF Radiation", ET Docket No. 93-62 in August 1996. The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 W/Kg for an uncontrolled environment and 8.0 W/Kg for an occupational/controlled environment as recommended by the ANSI/IEEE standard C95.1-1992.

4. TEST METHODOLOGY

The Specific Absorption Rate (SAR) testing specification, method and procedure for this device is in accordance with the following standards:

☒ FCC 47 CFR Part 2 (2.1093)
☒ KDB 248227 D01 v02r02 SAR meas for 802.11
☒ KDB 447498 D01v06 General RF Exposure Guidance
☒ KDB 648474 D04v01r03 Handset SAR
☒ KDB 865664 D01v01r04 SAR Measurement 100 MHz to 6 GHz
☒ KDB 865664 D02v01r02 RF Exposure Reporting
☒ KDB 941225 D01v03r01 3G SAR Procedures

5. TEST CONFIGURATION

For WWAN SAR testing The device was controlled by using a base station emulator R&S CMU200. Communication between the device and the emulator was established by air link. The distance between the DUT and the antenna of the emulator is larger than 50 cm and the output power radiated from the emulator antenna is at least 30 dB smaller than the output power of DUT. The DUT was set from the emulator to radiate maximum output power during all tests.

During WLAN SAR testing EUT is configured with the WLAN continuous TX tool, and the transmission duty factor was monitored on the spectrum analyzer with zero-span setting
For WLAN SAR testing, WLAN engineering test software installed on the EUT can provide continuous transmitting RF signal. For WLAN SAR testing, WLAN engineering test software installed on the EUT can provide continuous transmitting RF signal and the duty cycle is approximate 100%.

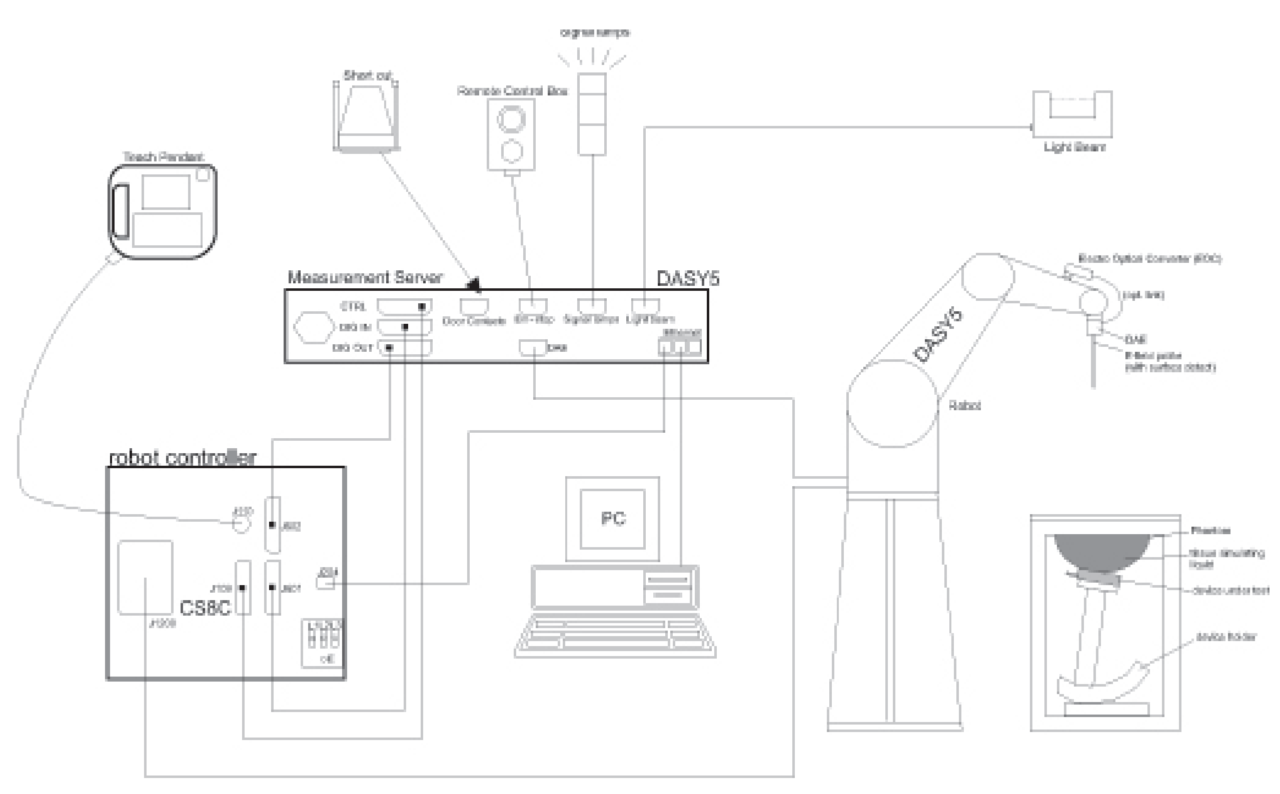
6. DOSIMETRIC ASSESSMENT SETUP

These measurements were performed with the automated near-field scanning system DASY 5 from ATTENNESSA. The system is based on a high precision robot (working range greater than 0.9 m), which positions the probes with a positional repeatability of better than ± 0.02 mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines to the data acquisition unit. The SAR measurements were conducted with the E-field PROBE EX3DV4 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe has been calibrated according to the procedure described in [7] with accuracy of better than ±10%. The spherical isotropy was evaluated with the procedure described in [8] and found to be better than ±0.25 dB. The phantom used was the SAM Twin Phantom as described in FCC supplement C, IEE P1528 and CENELEC EN 62209.

The following table gives the recipes for tissue simulating liquids.

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (NaCl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton X-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (S/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

6.1 MEASUREMENT SYSTEM DIAGRAM



The DASY5 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (St¨aubli RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing validating the proper functioning of the system.

6.2 SYSTEM COMPONENTS

The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz intel ULV celeron, 128MB chip-disk and 128 MB RAM. The necessary circuits for communication with either the DAE4(or DAE3) electronic box as well as the 16-bit AD-converter system for optical detection and digital I/O interface are contained on the DASY5 I/O-board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation.

The PC-operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with two expansion slots which are reserved for future applications. Please note that the expansion slots do not have a standardized pinout and therefore only the expansion cards provided by SPEAG can be inserted. Expansion cards from any other supplier could seriously damage the measurement server. Calibration: No calibration required.

Data Acquisition Electronics (DAE)

The data acquisition electronics (DAE4) consists of a highly sensitive electrometer grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information as well as an optical uplink for commands and the clock. The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection. The input impedance of the DAE4 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

EX3DV4 Isotropic E-Field Probe for Dosimetric Measurements

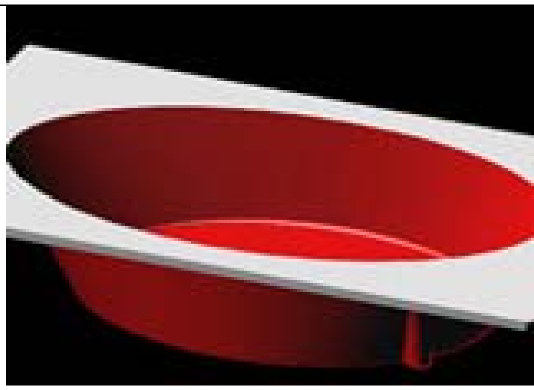
Construction: Symmetrical design with triangular core
Built-in shielding against static charges
PEEK enclosure material (resistant to organic solvents, e.g., DGBE)

Calibration: Basic Broad Band Calibration in air: 10-3000 MHz.
Conversion Factors (CF) for HSL 900 and HSL 1800
CF-Calibration for other liquids and frequencies upon request.

Frequency: 10 MHz to > 6 GHz; Linearity: ± 0.2 dB (30 MHz to 3 GHz)

Directivity: ± 0.3 dB in HSL (rotation around probe axis)
± 0.5 dB in HSL (rotation normal to probe axis)

Dynamic Range: 10 μW/g to > 100 mW/g; Linearity: ± 0.2 dB
(noise: typically < 1 μW/g)

Dimensions: Overall length: 337 mm (Tip: 9 mm) Tip diameter: 2.5 mm (Body: 10 mm) Distance from probe tip to dipole centers: 1 mm **Application:** High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields). Only probe which enables compliance testing for frequencies up to 6 GHz with precision of better 30%.	 Interior of probe
SAM Twin Phantom	
Construction: The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-200X, CENELEC 50360 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 manually teaching three points with the robot. **Shell Thickness:** 2 ±0.2 mm **Filling Volume:** Approx. 25 liters **Dimensions:** Height: 850mm; Length: 1000mm; Width: 750mm	
SAM Phantom (ELI4 v4.0)	
Description Construction: Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with the latest draft of the standard IEC 62209 Part II and all known tissue simulating liquids. ELI4 has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is supported by software version DASY4/DASY5.5 and higher and is compatible with all SPEAG dosimetric probes and dipoles **Shell Thickness:** 2.0 ± 0.2 mm (sagging: <1%) **Filling Volume:** Approx. 25 liters **Dimensions:** Major ellipse axis: 600 mm **Minor axis:** 400 mm 500mm	

Device Holder for SAM Twin Phantom

Construction: In combination with the Twin SAM Phantom, the Mounting Device (made from POM) enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening. The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, and flat phantom).

System Validation Kits for SAM Twin Phantom

Construction: Symmetrical dipole with l/4 balun Enables measurement of feedpoint impedance with NWA Matched for use near flat phantoms filled with brain simulating solutions Includes distance holder and tripod adaptor.

Frequency: 900,1800,2450,5800 MHz

ReTune loss: > 20 dB at specified validation position

Power capability: > 100 W (f < 1GHz); > 40 W (f > 1GHz)

Dimensions:

D835V2: dipole length: 161 mm; overall height: 340 mm
D1800V2: dipole length: 72.5 mm; overall height: 300 mm
D1900V2: dipole length: 67.7 mm; overall height: 300 mm
D2450V2: dipole length: 51.5 mm; overall height: 290 mm
D5GHzV2: dipole length: 20.6 mm; overall height: 300mm

System Validation Kits for ELI4 phantom

Construction: Symmetrical dipole with l/4 balun Enables measurement of feedpoint impedance with NWA Matched for use near flat phantoms filled with brain simulating solutions Includes distance holder and tripod adaptor.

Frequency: 900, 1800, 2450, 5800 MHz

ReTune loss: > 20 dB at specified validation position

Power capability: > 100 W (f < 1GHz); > 40 W (f > 1GHz)

Dimensions:

D835V2: dipole length: 161 mm; overall height: 340 mm
D1800V2: dipole length: 72.5 mm; overall height: 300 mm
D1900V2: dipole length: 67.7 mm; overall height: 300 mm
D2450V2: dipole length: 51.5 mm; overall height: 290 mm
D5GHzV2: dipole length: 20.6 mm; overall height: 300 mm

7. EVALUATION PROCEDURES

DATA EVALUATION

The DASY 5 post processing software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters:	- Sensitivity	$Norm_i$, a_{i0}, a_{i1}, a_{i2}
	- Conversion factor	$ConvF_i$
	- Diode compression point	dcp_i
Device parameters:	- Frequency	f
	- Crest factor	cf
Media parameters:	- Conductivity	σ
	- Density	ρ

These parameters must be set correctly in the software. They can be found in the component documents or be imported into the software from the configuration files issued for the DASY 5 components. In the direct measuring mode of the multi-meter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

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 as:

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

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 5 parameter)
dcp_i = Diode compression point (DASY 5 parameter)

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

E-field probes:

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

H-field probes:

$$H_i = \sqrt{Vi} \cdot \frac{a_{i10} + a_{i11} f + a_{i12} f^2}{f}$$

with V_i = Compensated signal of channel i (i = x, y, z)
$Norm_i$ = Sensor sensitivity of channel i (i = x, y, z)
μV/(V/m)^2 for E0field Probes
$ConvF$ = Sensitivity enhancement in solution
aij = Sensor sensitivity factors for H-field probes
f = Carrier frequency (GHz)
Ei = Electric field strength of channel i in V/m
Hi = Magnetic field strength of channel i in A/m

The RSS 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.

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

with SAR = local specific absorption rate in mW/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

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid.

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

$$P_{pwe} = \frac{E_{tot}^2}{3770} \quad \text{or} \quad P_{pwe} = H_{tot}^2 \cdot 37.7$$

with P_{pwe} = Equivalent power density of a plane wave in mW/cm^2

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

H_{tot} = total magnetic field strength in A/m

SAR EVALUATION PROCEDURES

The procedure for assessing the peak spatial-average SAR value consists of the following steps:

- **Power Reference Measurement**

  The reference and drift jobs are useful jobs for monitoring the power drift of the device under test in the batch process. Both jobs measure the field at a specified reference position, at a selectable distance from the phantom surface. The reference position can be either the selected section's grid reference point or a user point in this section. The reference job projects the selected point onto the phantom surface, orients the probe perpendicularly to the surface, and approaches the surface using the selected detection method.

- **Area Scan**

  The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a finer measurement around the hot spot. The sophisticated interpolation routines implemented in DASY 5 software can find the maximum locations even in relatively coarse grids. The scan area is defined by an editable grid. This grid is anchored at the grid reference point of the selected section in the phantom. When the area scan's property sheet is brought-up, grid was at to 15 mm by 15 mm and can be edited by a user.

- **Zoom Scan**

  Zoom scans are used to assess the peak spatial SAR values within a cubic averaging volume containing 1 g and 10 g of simulated tissue. The default zoom scan measures 5 x 5 x 7 points within a cube whose base faces are centered around the maximum found in a preceding area scan job within the same procedure. If the preceding Area Scan job indicates more then one maximum, the number of Zoom Scans has to be enlarged accordingly (The default number inserted is 1).

- **Power Drift measurement**

  The drift job measures the field at the same location as the most recent reference job within the same procedure, and with the same settings. The drift measurement gives the field difference in dB from the reading conducted within the last reference measurement. Several drift measurements are possible for one reference measurement. This allows a user to monitor the power drift of the device under test within a batch process. In the properties of the Drift job, the user can specify a limit for the drift and have DASY 5 software stop the measurements if this limit is exceeded.

- **Z-Scan**

  The Z Scan job measures points along a vertical straight line. The line runs along the Z-axis of a one-dimensional grid. A user can anchor the grid to the current probe location. As with any other grids, the local Z-axis of the anchor location establishes the Z-axis of the grid.

SPATIAL PEAK SAR EVALUATION

The procedure for spatial peak SAR evaluation has been implemented according to the IEEE1529 standard. It can be conducted for 1 g and 10 g.

The DASY 5 system allows evaluations that combine measured data and robot positions, such as:

- maximum search
- extrapolation
- boundary correction
- peak search for averaged SAR

During a maximum search, global and local maximum searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.

Extrapolation

Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation.

Extrapolation routines require at least 10 measurement points in 3-D space. They are used in the Cube Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation. For a grid using 5x5x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1 g and 10 g cubes.

Boundary effect

For measurements in the immediate vicinity of a phantom surface, the field coupling effects between the probe and the boundary influence the probe characteristics. Boundary effect errors of different dosimetric probe types have been analyzed by measurements and using a numerical probe model. As expected, both methods showed an enhanced sensitivity in the immediate vicinity of the boundary. The effect strongly depends on the probe dimensions and disappears with increasing distance from the boundary. The sensitivity can be approximately given as:

$$S \approx S_o + S_b exp(-\frac{z}{a})cos(\pi\frac{z}{\lambda})$$

Since the decay of the boundary effect dominates for small probes (a<<λ), the cos-term can be omitted. Factors *Sb* (parameter Alpha in the DASY 5 software) and *a* (parameter Delta in the DASY 5 software) are assessed during probe calibration and used for numerical compensation of the boundary effect. Several simulations and measurements have confirmed that the compensation is valid for different field and boundary configurations.

This simple compensation procedure can largely reduce the probe uncertainty near boundaries. It works well as long as:

- the boundary curvature is small
- the probe axis is angled less than 30_ to the boundary normal
- the distance between probe and boundary is larger than 25% of the probe diameter
- the probe is symmetric (all sensors have the same offset from the probe tip)

Since all of these requirements are fulfilled in a DASY 5 system, the correction of the probe boundary effect in the vicinity of the phantom surface is performed in a fully automated manner via the measurement data extraction during post processing.

8. MEASUREMENT UNCERTAINTY

Measurement uncertainty for 30 MHz to 3 GHz averaged over 1 gram						
Uncertainty Component	Uncertainty	Prob.	Div.	$c_{i\,(1g)}$	Std. Unc. (1-g)	v_i or Veff
Measurement System						
Probe Calibration (*k*=1)	6.00	Normal	1	1	6.00	∞
Probe Isotropy	4.70	Rectangular	√3	0.7	1.90	∞
Modulation Response	2.40	Rectangular	√3	1	1.39	∞
Hemispherical Isotropy	9.60	Rectangular	√3	0.7	3.88	∞
Boundary Effect	2.00	Rectangular	√3	1	1.15	∞
Linearity	4.70	Rectangular	√3	1	2.71	∞
System Detection Limit	1.00	Rectangular	√3	1	0.58	∞
Readout Electronics	0.30	Normal	1	1	0.30	∞
Response Time	0.80	Rectangular	√3	1	0.46	∞
Integration Time	2.60	Rectangular	√3	1	1.50	∞
RF Ambient Noise	3.00	Rectangular	√3	1	1.73	∞
RF Ambient Reflections	3.00	Rectangular	√3	1	1.73	∞
Probe Positioner	0.40	Rectangular	√3	1	0.23	∞
Probe Positioning	2.90	Rectangular	√3	1	1.67	∞
Max. SAR Evaluation	2.00	Rectangular	√3	1	1.15	∞
Test sample Related						
Test sample Positioning	2.9	Normal	1	1	2.9	145
Device Holder Uncertainty	3.6	Normal	1	1	3.6	5
Power drift	5	Rectangular	√3	1	2.89	∞
Power Scaling	0	Rectangular	√3	1	0.00	∞
Phantom and Tissue Parameters						
Phantom Uncertainty	6.1	Rectangular	√3	1	3.52	∞
SAR correction	1.9	Rectangular	√3	1	1.10	∞
Liquid Conductivity (target)	5	Rectangular	√3	0.64	1.85	∞
Liquid Conductivity (meas)	3.92	Rectangular	√3	0.78	1.77	∞
Liquid Permittivity (target)	5	Rectangular	√3	0.6	1.73	∞
Liquid Permittivity (meas)	2.72	Rectangular	√3	0.26	0.41	∞
Temp. unc. - Conductivity	3.4	Rectangular	√3	0.78	1.53	∞
Temp. unc. - Permittivity	0.4	Rectangular	√3	0.23	0.05	∞
Combined Std. Uncertainty		RSS			11.56	361
Expanded STD Uncertainty		*k*=2			23.13%	
Expanded STD Uncertainty		*k*=2			1.81dB	

Measurement uncertainty for 30 MHz to 3 GHz averaged over 1 gram						
Uncertainty Component	Uncertainty	Prob.	Div.	$c_{i\ (1g)}$	Std. Unc. (1-g)	v_i or Veff
Measurement System						
Probe Calibration (*k*=1)	6.00	Normal	1	1	6.0	∞
Axial Isotropy	4.70	Rectangular	√3	0.7	1.9	∞
Hemispherical Isotropy	9.60	Rectangular	√3	0.7	3.9	∞
Boundary Effect	1.00	Rectangular	√3	1	0.6	∞
Linearity	4.70	Rectangular	√3	1	2.7	∞
System Detection Limit	1.00	Rectangular	√3	1	0.6	∞
Readout Electronics	0.30	Normal	1	1	0.3	∞
Response Time	0.80	Rectangular	√3	0	0.0	∞
Integration Time	2.60	Rectangular	√3	0	0.0	∞
RF Ambient Noise	3.00	Rectangular	√3	1	1.7	∞
RF Ambient Reflections	3.00	Rectangular	√3	1	1.7	∞
Probe Positioner	0.40	Rectangular	√3	1	0.2	∞
Probe Positioning	2.90	Rectangular	√3	1	1.7	∞
Max. SAR Evaluation	1.00	Rectangular	√3	1	0.6	∞
System validation source (dipole)						
Deviation of experimental dipole from numerical dipole	5	Normal	1	1	5.0	∞
Dipole axis to liquid distance	2	Rectangular	√3	1	1.2	∞
Input power and SAR drift	4.7	Rectangular	√3	1	2.7	∞
Phantom and Tissue Parameters						
Phantom Uncertainty	4	Rectangular	√3	1	2.3	∞
SAR correction	1.9	Rectangular	1	1	1.9	∞
Liquid Conductivity (meas)	3.92	Rectangular	1	0.78	3.06	∞
Liquid Permittivity (meas)	2.72	Rectangular	1	0.23	0.63	∞
Temp. unc. - Conductivity	1.7	Rectangular	√3	0.78	0.77	∞
Temp. unc. - Permittivity	0.3	Rectangular	√3	0.23	0.04	∞
Combined Std. Uncertainty		RSS			11.2	361
Expanded STD Uncertainty		*k*=2			22.36%	
Expanded STD Uncertainty		*k*=2			1.75dB	

Measurement uncertainty for 30 MHz to 3 GHz averaged over 10 gram						
Uncertainty Component	**Uncertainty**	**Prob.**	**Div.**	**$c_{i\ (10g)}$**	**Std. Unc.(10-g)**	**v_i or Veff**
Measurement System						
Probe Calibration (*k*=1)	6.00	Normal	1	1	6.00	∞
Probe Isotropy	4.70	Rectangular	√3	0.7	1.90	∞
Modulation Response	2.40	Rectangular	√3	1	1.39	∞
Hemispherical Isotropy	9.60	Rectangular	√3	0.7	3.88	∞
Boundary Effect	2.00	Rectangular	√3	1	1.15	∞
Linearity	4.70	Rectangular	√3	1	2.71	∞
System Detection Limit	1.00	Rectangular	√3	1	0.58	∞
Readout Electronics	0.30	Normal	1	1	0.30	∞
Response Time	0.80	Rectangular	√3	1	0.46	∞
Integration Time	2.60	Rectangular	√3	1	1.50	∞
RF Ambient Noise	3.00	Rectangular	√3	1	1.73	∞
RF Ambient Reflections	3.00	Rectangular	√3	1	1.73	∞
Probe Positioner	0.40	Rectangular	√3	1	0.23	∞
Probe Positioning	2.90	Rectangular	√3	1	1.67	∞
Max. SAR Evaluation	2.00	Rectangular	√3	1	1.15	∞
Test sample Related						
Test sample Positioning	2.9	Normal	1	1	2.9	145
Device Holder Uncertainty	3.6	Normal	1	1	3.6	5
Power drift	5	Rectangular	√3	1	2.89	∞
Power Scaling	0	Rectangular	√3	1	0.00	∞
Phantom and Tissue Parameters						
Phantom Uncertainty	6.1	Rectangular	√3	1	3.52	∞
SAR correction	1.9	Rectangular	√3	0.84	0.92	∞
Liquid Conductivity (target)	5	Rectangular	√3	0.43	1.24	∞
Liquid Conductivity (meas)	1.24	Rectangular	√3	0.71	0.51	∞
Liquid Permittivity (target)	5	Rectangular	√3	0.49	1.41	∞
Liquid Permittivity (meas)	-3.17	Rectangular	√3	0.26	-0.48	∞
Temp. unc. - Conductivity	3.4	Rectangular	√3	0.71	1.39	∞
Temp. unc. - Permittivity	0.4	Rectangular	√3	0.26	0.06	∞
Combined Std. Uncertainty		RSS			11.28	361
Expanded STD Uncertainty		*k*=2			22.56%	
Expanded STD Uncertainty		*k*=2			1.77dB	

Measurement uncertainty for 30 MHz to 3 GHz averaged over 10 gram						
Uncertainty Component	Uncertainty	Prob.	Div.	$c_{i\,(1g)}$	Std. Unc. (10-g)	v_i or Veff
Measurement System						
Probe Calibration (*k*=1)	6.00	Normal	1	1	6.0	∞
Axial Isotropy	4.70	Rectangular	√3	0.7	1.9	∞
Hemispherical Isotropy	9.60	Rectangular	√3	0.7	3.9	∞
Boundary Effect	1.00	Rectangular	√3	1	0.6	∞
Linearity	4.70	Rectangular	√3	1	2.7	∞
System Detection Limit	1.00	Rectangular	√3	1	0.6	∞
Readout Electronics	0.30	Normal	1	1	0.3	∞
Response Time	0.80	Rectangular	√3	0	0.0	∞
Integration Time	2.60	Rectangular	√3	0	0.0	∞
RF Ambient Noise	3.00	Rectangular	√3	1	1.7	∞
RF Ambient Reflections	3.00	Rectangular	√3	1	1.7	∞
Probe Positioner	0.40	Rectangular	√3	1	0.2	∞
Probe Positioning	2.90	Rectangular	√3	1	1.7	∞
Max. SAR Evaluation	1.00	Rectangular	√3	1	0.6	∞
System validation source (dipole)						
Deviation of experimental dipole from numerical dipole	5	Normal	1	1	5.0	∞
Dipole axis to liquid distance	2	Rectangular	√3	1	1.2	∞
Input power and SAR drift	4.7	Rectangular	√3	1	2.7	∞
Phantom and Tissue Parameters						
Phantom Uncertainty	4	Rectangular	√3	1	2.3	∞
SAR correction	1.9	Rectangular	1	0.84	1.6	∞
Liquid Conductivity (meas)	1.24	Rectangular	1	0.71	0.88	∞
Liquid Permittivity (meas)	-3.17	Rectangular	1	0.26	-0.82	∞
Temp. unc. - Conductivity	1.7	Rectangular	√3	0.71	0.70	∞
Temp. unc. - Permittivity	0.3	Rectangular	√3	0.26	0.05	∞
Combined Std. Uncertainty		RSS			10.7	361
Expanded STD Uncertainty		*k*=2			21.49%	
Expanded STD Uncertainty		*k*=2			1.69dB	

Table: Worst-case uncertainty for DASY5 assessed according to IEEE1528-2013.
The budge is valid for the frequency range 300 MHz to 6G Hz and represents a worst-case analysis.

9. EXPOSURE LIMIT

(A). Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

(B). Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	1.6	4.0

Note: Whole-Body SAR is averaged over the entire body, **partial-body SAR** is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. **SAR for hands, wrists, feet and ankles** is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

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

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

NOTE
GENERAL POPULATION/UNCONTROLLED EXPOSURE
PARTIAL BODY LIMIT
1.6 W/kg

NOTE
GENERAL POPULATION/UNCONTROLLED EXPOSURE
Hands, Wrists, Feet and Ankles
4.0 W/kg

10. EUT ARRANGEMENT

Please refer to IEEE1528-2003 illustration below.

10.1 ANTHROPOMORPHIC HEAD PHANTOM

Figure 7-1a shows the front, back and side views of SAM. The point "M" is the reference point for the center of mouth, "LE" is the left ear reference point (ERP), and "RE" is the right ERP. The ERPs are 15 mm posterior to the entrance to ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 7-1b. The plane passing through the two ear reference points and M is defined as the Reference Plane. The line N-F (Neck-Front) perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 7-1c). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines should be marked on the external phantom shell to facilitate handset positioning. Posterior to the N-F line, the thickness of the phantom shell with the shape of an ear is a flat surface 6 mm thick at the ERPs. Anterior to the N-F line, the ear is truncated as illustrated in Figure 7-1b. The ear truncation is introduced to avoid the handset from touching the ear lobe, which can cause unstable handset positioning at the cheek.

Figure 7-1a
Front, back and side view of SAM (model for the phantom shell)

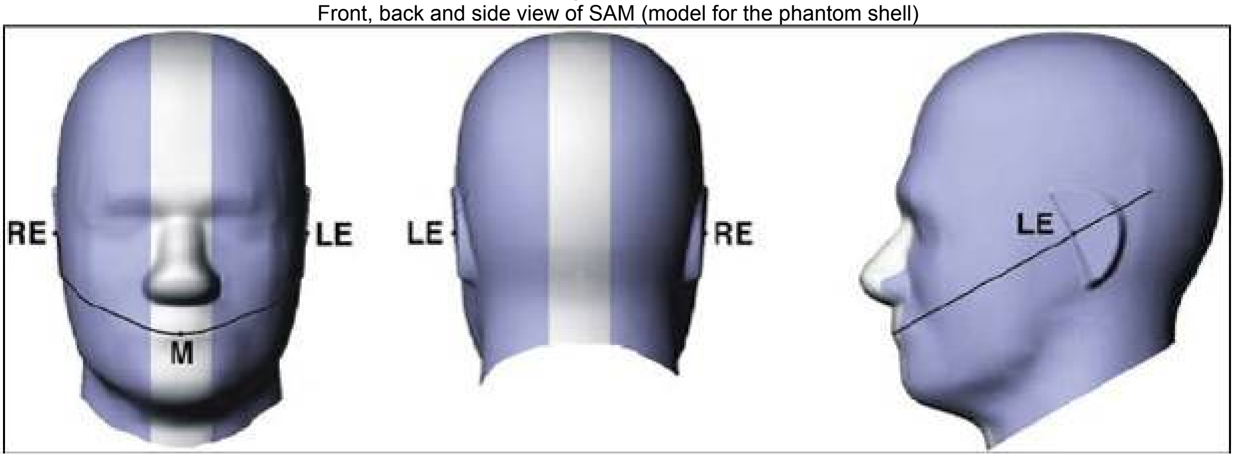
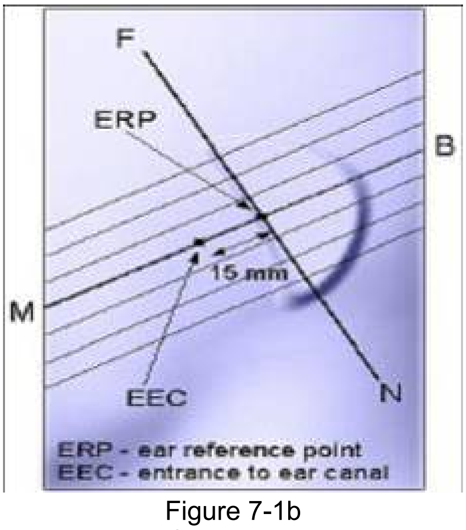


Figure 7-1b
Close up side view of phantom showing the ear region

Figure 7-1c
Side view of the phantom showing relevant markings and the 7 cross sectional plane locations



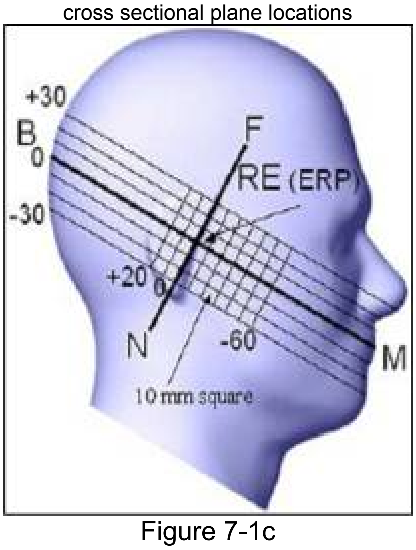


Figure 7-1b
Close up side view of phantom showing the ear region

Figure 7-1c
Side view of the phantom showing relevant markings and the 7 cross sectional plane locations

10.2 DEFINITION OF THE “CHEEK/TOUCH” POSITION

The “cheek” or “touch” position is defined as follows:

a. Ready the handset for talk operation, if necessary. For example, for handsets with a cover piece, open the cover. (If the handset can also be used with the cover closed both configurations must be tested.)

b. Define two imaginary lines on the handset: the vertical centerline and the horizontal line. The vertical centerline passes through two points on the front side of the handset: the midpoint of the width wt of the handset at the level of the acoustic output (point A on Figures 7-2a and 7-2b), and the midpoint of the width wb of the bottom of the handset (point B). The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output (see Figure 7-2a). The two lines intersect at point A. Note that for many handsets, point A coincides with the center of the acoustic output. However, the acoustic output may be located elsewhere on the horizontal line. Also note that the vertical centerline is not necessarily parallel to the front face of the handset (see Figure 7-2b), especially for clamshell handsets, handsets with flip pieces, and other irregularly-shaped handsets.

c. Position 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 7-2c), such that the plane defined by the vertical center line and the horizontal line of the handset is approximately parallel to the sagittal plane of the phantom.

d. Translate the handset towards the phantom along the line passing through RE and LE until the handset touches the pinna.

e. e) While maintaining the handset in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to MB-NF including the line MB (called the reference plane).

f. Rotate the handset around the vertical centerline until the handset (horizontal line) is symmetrical with respect to the line NF.

g. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE and maintaining the handset contact with the pinna, rotate the handset about the line NF until any point on the handset is in contact with a phantom point below the pinna (cheek). See Figure 7-2c. The physical angles of rotation should be noted.

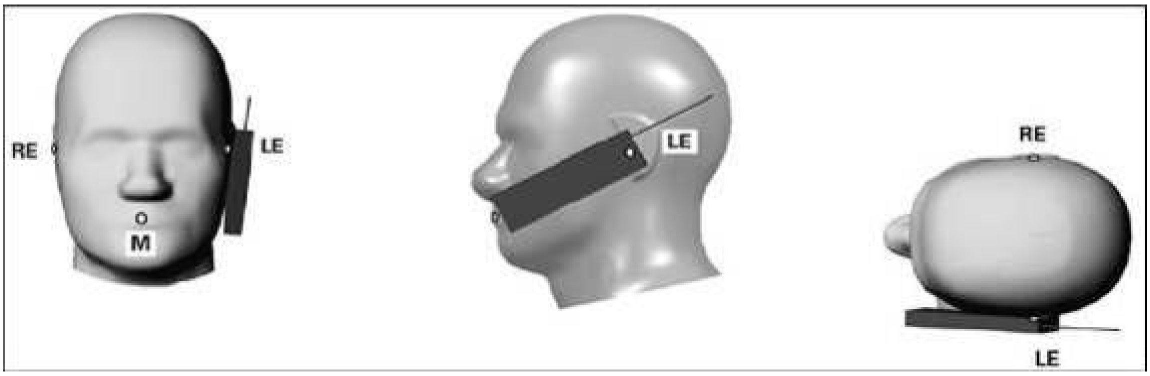


Figure 7.2c
Phone “cheek” or “touch” position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for handset positioning, are indicated.

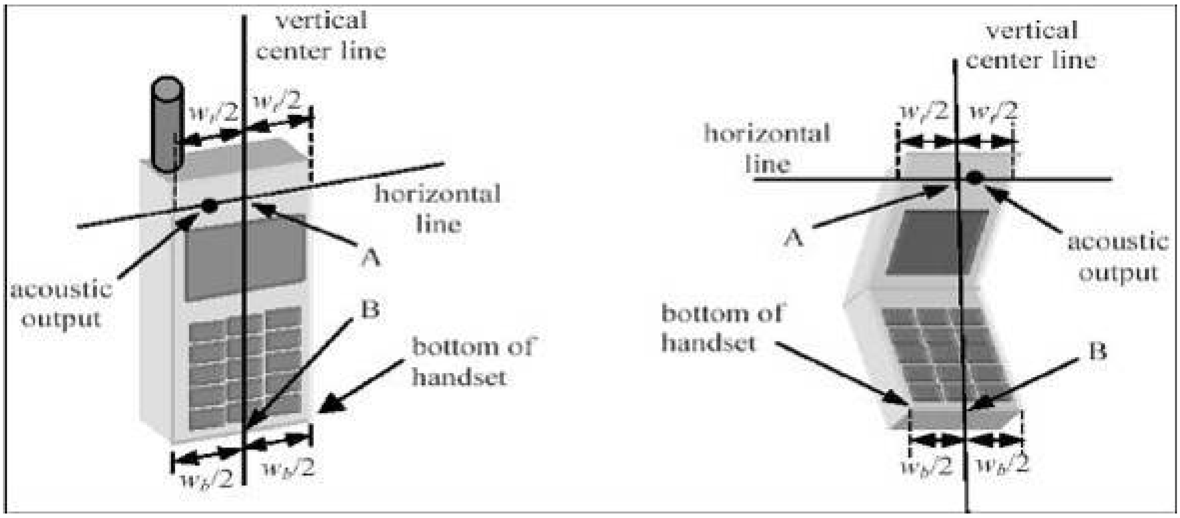


Figure 7.2a Figure 7.2b

10.3 DEFINITION OF THE "TILTED" POSITION

The "tilted" position is defined as follows:

a. Repeat steps (a) – (g) of 7.2 to place the device in the "cheek position."

b. While maintaining the orientation of the handset move the handset away from the pinna along the line passing through RE and LE in order to enable a rotation of the handset by 15 degrees.

c. Rotate the handset around the horizontal line by 15 degrees.

d. While maintaining the orientation of the handset, move the handset towards the phantom on a line passing through RE and LE until any part of the handset touches the ear. The tilted position is obtained when the contact is on the pinna. If the contact is at any location other than the pinna (e.g., the antenna with the back of the phantom head), the angle of the handset should be reduced. In this case, the tilted position is obtained if any part of the handset is in contact with the pinna as well as a second part of the handset is contact with the phantom (e.g., the antenna with the back of the head).

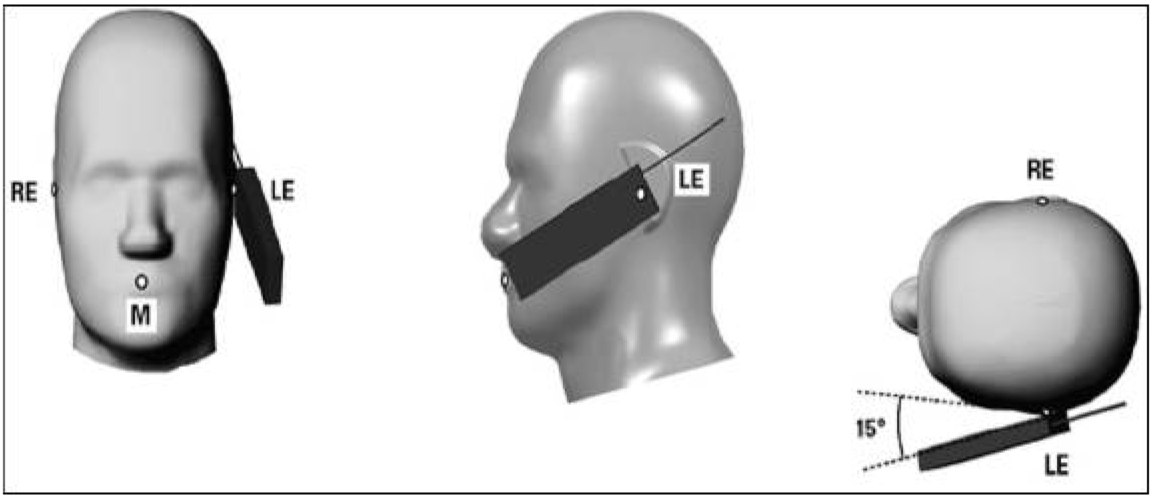


Figure 7-3
Phone "tilted" position. The reference points for the right ear (RE), left ear (LE) and mouth (M), which define the reference plane for handset positioning, are indicated.

11. MEASUREMENT RESULTS

11.1 TEST LIQUIDS CONFIRMATION

SIMULATED TISSUE LIQUID PARAMETER CONFIRMATION

The dielectric parameters were checked prior to assessment using the HP85070C dielectric probe kit. The dielectric parameters measured are reported in each correspondent section.

KDB865664 D01 RECOMMENDED TISSUE DIELECTRIC PARAMETERS

The head and Body tissue dielectric parameters recommended by the KDB865664 D01 have been incorporated in the following table.

Target Frequency (MHz)	Head		Body	
	ε_r	σ (S/m)	ε_r	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800-2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

(ε_r = relative permittivity, σ = conductivity and ρ = 1000 kg/m^3)

11.2 LIQUID MEASUREMENT RESULTS

The following table show the measuring results for simulating liquid:

Liquid Type	Liquid Temp. (°C)	Parameters	Target	Measured	Deviation (%)	Limited (%)	Measured Date
Body835	21.5	Permitivity(ε)	55.20	55.14	-0.11	± 5	2016-6-14
		Conductivity(σ)	0.97	0.96	-0.62	± 5	
Body1900	21.5	Permitivity(ε)	53.30	51.61	-3.17	± 5	2016-6-2
		Conductivity(σ)	1.52	1.54	1.24	± 5	
Body2450	21.5	Permitivity(ε)	52.70	51.83	-1.65	± 5	2016-6-2
		Conductivity(σ)	1.95	1.96	0.31	± 5	
Head 835	21.5	Permitivity(ε)	41.50	42.63	2.72	± 5	2016-6-2
		Conductivity(σ)	0.90	0.91	0.98	± 5	
Head1900	21.5	Permitivity(ε)	40.00	39.06	-2.35	± 5	2016-6-2
		Conductivity(σ)	1.40	1.43	2.24	± 5	
Head2450	21.5	Permitivity(ε)	39.20	39.42	0.55	± 5	2016-6-2
		Conductivity(σ)	1.80	1.87	3.92	± 5	

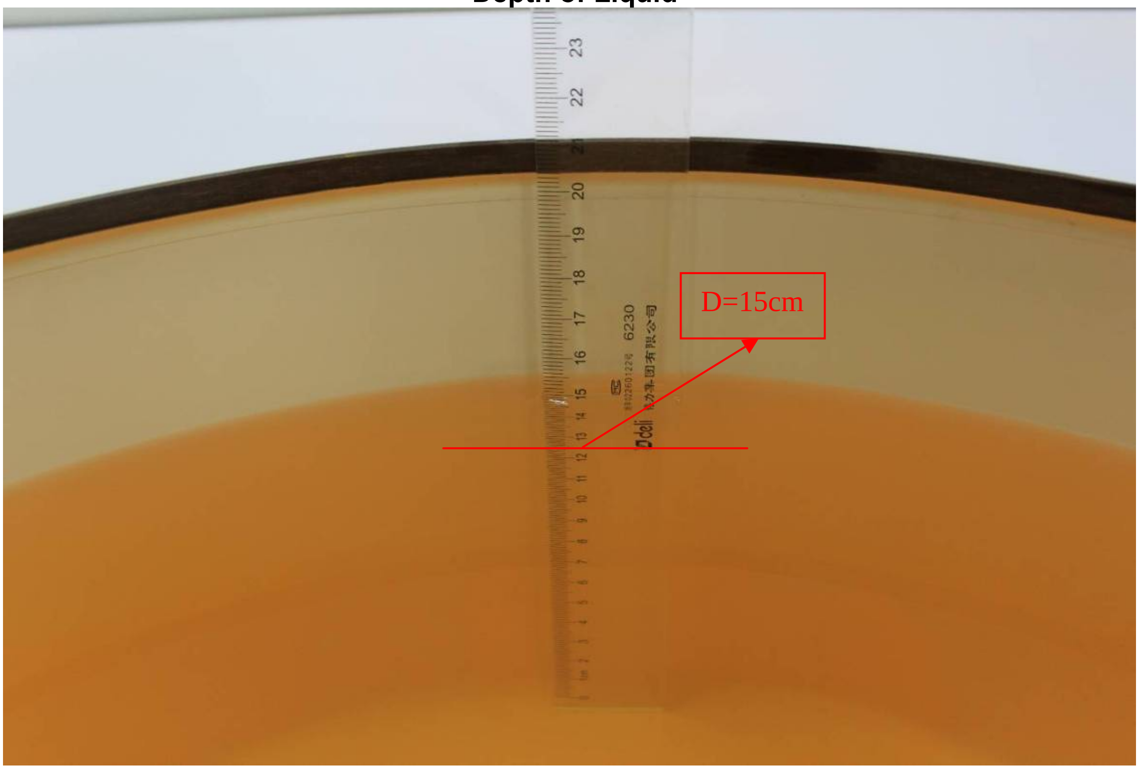
11.3 SYSTEM PERFORMANCE CHECK

The system performance check is performed prior to any usage of the system in order to guarantee reproducible results. The system performance check verifies that the system operates within its specifications of ±10%. The system performance check results are tabulated below. And also the corresponding SAR plot is attached as well in the SAR plots files.

SYSTEM PERFORMANCE CHECK MEASUREMENT CONDITIONS

- The measurements were performed in the flat section of the SAM twin phantom filled with head and body simulating liquid of the following parameters.
- The DASY5 system withan E-fileld probe EX3DV4 SN: 3798 was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15 mm (below 1 GHz) and 10 mm (above 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 10mm was aligned with the dipole.
- Special 7x7x7 fine cube was chosen for cube integration (dx= 5 mm, dy= 5 mm, dz= 5 mm).
- Distance between probe sensors and phantom surface was set to 2 mm.
- The dipole input power was 250mW±3%.
- The results are normalized to 1 W input power.

Depth of Liquid



- Note: For SAR testing, the depth is 15cm shown above

SYSTEM PERFORMANCE CHECK RESULTS

Liquid Type	Ambient Temp. (°C)	Liquid Temp. (°C)	Input Power (W)	Measured SAR_{10g} (W/Kg)	1W Target SAR_{10g}(W/Kg)	1W Normalized SAR_{10g}(W/Kg)	Deviation (%)	Limited (%)	Date
Body835	22	21.5	0.25	1.61	6.32	6.44	1.90	± 10	2016-6-14
Body1900	22	21.5	0.25	5.34	21.60	21.36	-1.11	± 10	2016-6-2
Body2450	22	21.5	0.25	5.89	23.10	23.56	1.99	± 10	2016-6-2

Liquid Type	Ambient Temp. (°C)	Liquid Temp. (°C)	Input Power (W)	Measured SAR_{1g} (W/Kg)	1W Target SAR_{1g}(W/Kg)	1W Normalized SAR_{1g}(W/Kg)	Deviation (%)	Limited (%)	Date
Head835	22	21.5	0.25	2.45	9.50	9.8	3.16	± 10	2016-6-2
Head1900	22	21.5	0.25	10.26	40.40	41.04	1.58	± 10	2016-6-2
Head2450	22	21.5	0.25	13.20	52.60	52.80	0.38	± 10	2016-6-2

11.4 EUT TUNE-UP PROCEDURES AND TEST MODE

The following procedure had been used to prepare the EUT for the SAR test.
To setup the desire channel frequency and the maximum output power. A Radio Communication Tester “CMU200 ” was used to program the EUT.

General Note:

1. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.
2. For head SAR testing, the EUT was set in GSM Voice for GSM850 and GSM1900 due to its highest frame-average power.
3. For body worn SAR testing, the EUT was set in GPRS 4 Tx slots for GSM850 and GPRS 4 Tx GSM1900 due to its highest frame-average power..

GSM Conducted output power(dBm):

Band	GSM 850			GSM 1900		
Channel	128	190	251	512	661	810
Frequency(MHz)	824.2	836.6	848.8	1850.2	1880.0	1909.8
Maximum Burst-Averaged Output Power						
GSM(GMSK,1Uplink)	32.49	**32.67**	32.53	28.69	28.77	28.58
GPRS 8 (GMSK,1 Uplink)	32.43	32.65	32.54	28.67	**28.78**	28.54
GPRS 10 (GMSK,2 Uplink)	31.55	31.56	31.46	27.59	27.73	27.44
GPRS 11 (GMSK,3 Uplink)	30.51	30.62	30.47	26.50	26.43	26.58
GPRS 12 (GMSK,4 Uplink)	29.45	29.53	29.44	25.42	25.41	25.47
Maximum Frame-Averaged Output Power						
GSM(GMSK,1Uplink)	23.47	23.65	23.51	19.67	19.75	19.56
GPRS 8 (GMSK,1 Uplink)	23.40	23.62	23.51	19.64	19.75	19.51
GPRS 10 (GMSK,2 Uplink)	25.52	25.53	25.43	21.56	21.70	21.41
GPRS 11 (GMSK,3 Uplink)	26.25	26.36	26.21	22.24	22.17	22.32
GPRS 12 (GMSK,4 Uplink)	26.44	**26.52**	26.43	22.41	22.40	**22.46**

Remark: The frame-averaged power is linearly scaled the maximum burst-averaged power based on time slots. The calculated methods are shown as below:
Frame-averaged power = Burst-averaged power (1 Uplink) – 9.03 dBm
Frame-averaged power = Burst averaged power (2 Uplink) – 6.02 dBm
Frame-averaged power = Burst-averaged power (3 Uplink) – 4.26 dBm
Frame-averaged power = Burst averaged power (4 Uplink) – 3.01 dBm

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. GPRS (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.
3. Per KDB 447498 D01v06, the maximum output power channel is used for SAR testing and for further SAR test reduction.

WCDMA Conducted output power(dBm):
As the SAR body tests for WCDMA **Band V** , we established the radio link through call processing. The maximum output power were verified on high, middle and low channels for each test band according to 3GPP TS 34.121 with the following configuration:a 12.2kbps RMC, 64,144,384 kbps RMC with TPC set to all "all '1's"b Test loop Mode 1
The following procedures had been used to prepare the EUT for the SAR test.

HSDPA Setup Configuration:

Table C.10.1.4: β values for transmitter characteristics tests with HS-DPCCH

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} = 30/15 with β_{hs} = 30/15 * β_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} = 30/15 with β_{hs} = 30/15 * β_c , and Δ_{CQI} = 24/15 with β_{hs} = 24/15 * β_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.

Note 4: For subtest 2 the β_c/β_d ratio of 12/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1, TF1) to β_c = 11/15 and β_d = 15/15.

HSUPA Setup Configuration:

Table C.11.1.3: β values for transmitter characteristics tests with HS-DPCCH and E-DCH

Sub-test	β_c	β_d	β_d (SF)	β_c/β_d	β_{HS} (Note1)	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

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_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 signalled 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 signalled gain factors for the reference TFC (TF1, TF1) to β_c = 14/15 and β_d = 15/15.

Note 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.

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

Band	WCDMA Band V		
Channel	4132	4182	4233
Frequency(MHz)	826.4	836.4	846.6
AMR	23.42	23.51	23.43
RMC12.2K	23.41	**23.49**	23.34
HSDPA Subtest-1	22.33	22.48	22.57
HSDPA Subtest-2	22.15	22.37	22.47
HSDPA Subtest-3	22.08	22.21	22.31
HSDPA Subtest-4	22.01	22.04	22.15
HSUPA Subtest-1	22.45	22.53	22.54
HSUPA Subtest-2	22.42	22.37	22.42
HSUPA Subtest-3	22.21	22.3	22.17
HSUPA Subtest-4	22.15	22.23	22.11
HSUPA Subtest-5	21.89	21.97	22.01

Note:

Per KDB 941225 D01, RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA output power is < 0.25dB higher than RMC, HSDPA/HSUPA SAR evaluation can be excluded.

WLAN 2.4G Conducted output power(dBm):

Mode	Channel	Frequence	Average power(dBm)
802.11 b	1	2412 MHZ	**15.96**
	6	2437 MHZ	14.50
	11	2462 MHZ	15.09
802.11 g	1	2412 MHZ	11.44
	6	2437 MHZ	13.61
	11	2462 MHZ	10.59
802.11 n 20M	1	2412 MHZ	11.14
	6	2437 MHZ	11.60
	11	2462 MHZ	10.55
802.11 n 40M	3	2422 MHZ	8.41
	6	2437 MHZ	10.09
	9	2452 MHZ	7.55

Note:
Per KDB 248227 D01 v02r02: Output Power and SAR is not required for 802.11g/n HT20 channels when the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg for 1g SAR.

Bluetooth 3.0 Conducted output power(dBm):

Channel	Frequency	Average power(dBm) Date Rate 1Mbps	2Mbps	3Mbps
CH00	2402MHZ	1.50	1.17	1.01
CH39	2441MHZ	2.45	2.16	2.08
CH78	2480MHZ	**3.36**	3.14	3.04

BLE 4.0 Conducted output power(dBm):

Channel	Frequency	Average power(dBm) Date Rate(1Mbps)
CH00	2402MHZ	-5.41
CH19	2440MHZ	**-5.40**
CH39	2480MHZ	-5.46

According to KDB447498 D01:The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:
[(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] · [$\sqrt{f_{(GHz)}}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,[24] where

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation[25]
- The result is rounded to one decimal place for comparison
- 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below
- If the test separation distance (antenna-user) is < 5mm, 5mm is used for excluded SAR calculation

	Wireless Interface	Bluetooth
Tune-up Maximum power (dBm)		3.5
Tune-up Maximum rated power (mW)		2.239
Head	Antenna to user (mm)	5
	Frequency(GHz)	2.480
	SAR exclusion threshold	0.705
Body	Antenna to user (mm)	10
	Frequency(GHz)	2.480
	SAR exclusion threshold	0.353

Per KDB 447498 D01v06 exclusion thresholds is[(*max. power of channel, including tune-up tolerance:2.239 mW*)/(*min. test separation distance: 5mm*)] · [√2.480] =0.705< 3, Bluetooth RF exposure evaluation is not required.

Mode	The Tune-up Maximum Power(Customer Declared)(dBm)	Range	Measured Conduct Maximum Power(dBm)
GSM 850	32+/-1	31~33	32.67
GPRS 850-1TS	32+/-1	31~33	32.65
GPRS 850-2TS	31+/-1	30~32	31.56
GPRS 850-3TS	30+/-1	29~31	30.62
GPRS 850-4TS	29+/-1	28~30	29.53
GSM1900	28+/-1	27~29	28.77
GPRS 1900-1TS	28+/-1	27~29	28.78
GPRS 1900-2TS	27+/-1	26~28	27.73
GPRS 1900-3TS	26+/-1	25~27	26.58
GPRS 1900-4TS	25+/-1	24~26	25.47
WCDMA Band V RMC 12.2K	23+/-1	22~24	23.49
HSDPA Band V	22 +/-1	21~23	22.57
HSUPA Band V	22 +/-1	21~23	22.54
IEEE 802.11b	15+/-1	14~16	15.96
IEEE 802.11g	12+/-2	10~14	13.61
IEEE 802.11n(20M)	11+/-1	10~12	11.60
IEEE 802.11n(40M)	9+/-1.5	7.5~10.5	10.09
Bluetooth 1Mbps	2+/-1.5	0.5~3.5	3.36
Bluetooth 2Mbps	2+/-1.5	0.5~3.5	3.14
Bluetooth 3Mbps	2+/-1.5	0.5~3.5	3.04
BLE 4.0	-6+/-1	-7~-5	-5.40

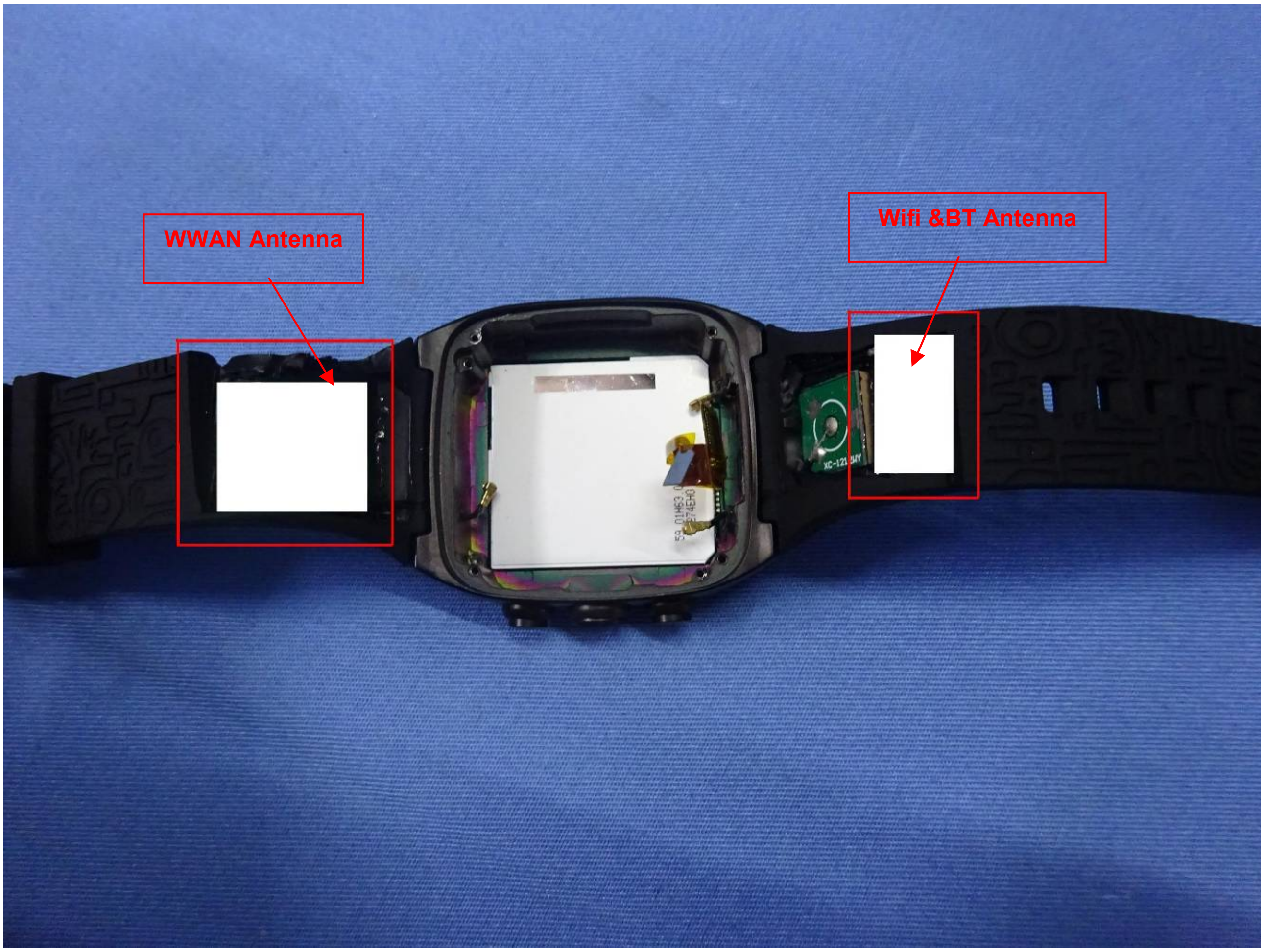
So, they are in tune-up range and complied.

11.5 SAR TEST CONFIGURATIONS

Wrist-worn device Exposure Conditions

(a) Transmitters that are built-in within a wrist watch or similar wrist-worn devices typically operate in speaker mode for voice communication, with the device worn on the wrist and positioned next to the mouth. Next to the mouth exposure requires 1-g SAR, and the wrist-worn condition requires 10-g extremity SAR.
(b) The 10-g extremity and 1-g SAR test exclusions may be applied to the wrist and face exposure conditions. When SAR evaluation is required, next to the mouth use is evaluated with the front of the device positioned at 10 mm from a flat phantom filled with head tissue-equivalent medium.
(c) For wrist-worn condition, 10g SAR value should be measured for the inner wrist band at a separation of 0mm. The design of the hard wrist band prevents opening it to a flat shape to be placed under the flat phantom.
(d) Next to the mouth use is evaluated with the front of the device positioned at 10 mm from a flat phantom filled with head tissue-equivalent medium. SAR for wrist exposure is evaluated with the back of the devices positioned in direct contact against a flat phantom fill with body tissue-equivalent medium. The wrist bands should be unstrapped and touching the phantom. The space introduced by the watch or wrist bands and the phantom must be representative of actual use conditions. The 2G/3G, WIFI/BT antenna is in the watch strap, strap is fixed angle 70 angle with the plane of the Watch, removal of the plastic banding so that the EUT will fit flush against the phantom is acceptable.

Antenna Position



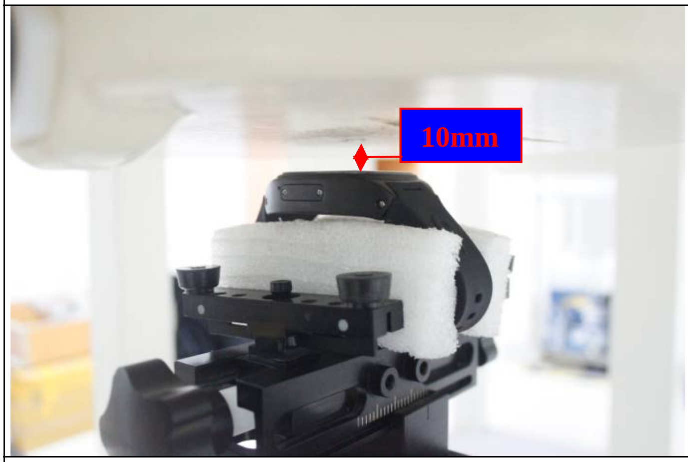
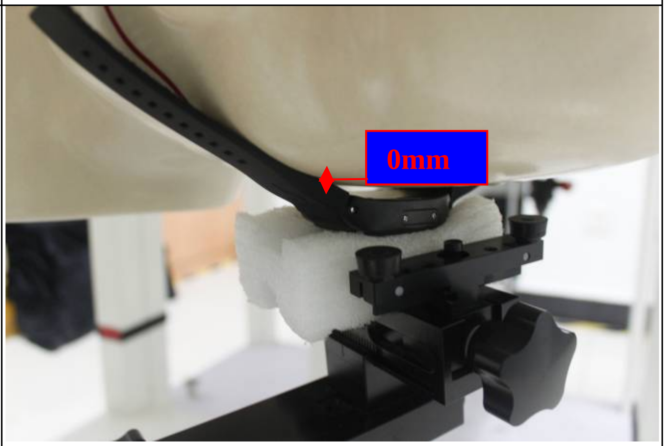
Antenna	Wireless Interface
WWAN Antenna	GSM850/GSM1900 WCDMA Band V
WLAN Antenna	WLAN 2.4G Bluetooth

Test Mode

GSM 850/GSM1900	Data transmission mode(GPRS)
WCDMA Band V	Data transmission mode(12.2k RMC)
IEEE 802.11b	Data transmission mode(802.11b)

11.6 EUT SETUP PHOTOS

Body position

Front in body position(next to the mouth)	wrist-worn condition position
	
EUT Setup Configuration 1	**EUT Setup Configuration 2**

11.7 SAR MEASUREMENT RESULTS

Band	Mode	Test Position	Dist. (mm)	Ch.	Freq. (MHZ)	max Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR1g (mW/g)	Scaled SAR1g (mW/g)
GSM850	GPRS 4slots	Next-to-Mouth	10	190	836.6	29.53	30	1.114	-0.05	0.480	0.535
GSM1900	GPRS 4slots	Next-to-Mouth	10	810	1909.8	25.47	26	1.130	0.07	0.062	0.070
WCDMA Band V	RMC 12.2k	Next-to-Mouth	10	4182	836.4	23.49	24	1.125	0.04	0.630	0.709
WLAN 2.4G	802.11 b	Next-to-Mouth	10	1	2412	15.96	16	1.009	-0.10	0.019	0.019

Band	Mode	Test Position	Dist. (mm)	Ch.	Freq. (MHZ)	max Power (dBm)	Tune-Up Limit (dBm)	Scaling Factor	Power Drift (dB)	SAR10g (mW/g)	Scaled SAR10g (mW/g)
GSM850	GPRS 4slots	Extremity (Wrist)	0	190	836.6	29.53	30	1.114	0.18	0.789	0.879
GSM1900	GPRS 4slots	Extremity (Wrist)	0	810	1909.8	25.47	26	1.130	-0.08	0.403	0.455
WCDMA Band V	RMC 12.2k	Extremity (Wrist)	0	4182	836.4	23.49	24	1.125	-0.03	1.04	1.170
WLAN 2.4G	802.11 b	Extremity (Wrist)	0	1	2412	15.96	16	1.009	0.00	0.246	0.248

Note:
According to October 2013TCB Workshop, For GSM / GPRS, the number of time slots to test for SAR should correspond to the highest source-based time-averaged maximum output power configuration, Considering the possibility of e.g. 3rd party VoIP operation for body-worn SAR testing, the EUT was set in GPRS (4Tx slots) for GSM850/GSM1900 band due to its highest frame-average power.

11.8 REPEATED SAR MEASUREMENT

Band	Mode	Test Position	Dist. (mm)	Ch.	Original Measured SAR1g (mW/g)	1st Repeated SAR1g (mW/g)	Ratio	Original Measured SAR1g (mW/g)	2nd Repeated SAR1g (mW/g)	Ratio
-	-	-	-	-	-	-	-	--	--	--

Note:

1. Per KDB 865664 D01v01,for each frequence band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8W/Kg
2. Per KDB 865664 D01v01,if the ratio of largest to smallest SAR for the original and first repeated measurement is ≤1.2 and the measured SAR ＜1.45W/Kg,only one repeated measurement is required.
3. Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg
4. The ratio is the difference in percentage between original and repeated measured SAR.
5. The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds

12. SAR HANDSETS MULTI XMITER ASSESSMENT

	Position	Applicable Combination
Simultaneous Transmission	Next-to-Mouth	WWAN + WLAN
		WWAN + BT
	Extremity (Wrist)	WWAN + WLAN
		WWAN + BT

Note:

1. 2.4GHz WLAN and BT share the same antenna, and cannot transmit simultaneously.
2. The reported SAR summation is calculated based on the same configuration and test position.
3. For simultaneous transmission analysis, Bluetooth SAR is estimated per KDB 447498 D01v06 based on the formula below.
   (max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] • [√ f(GHz)/x] W/kg for test separation distances ≤ 50 mm; where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.
   0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Bluetooth:

	Max power	Body (10mm distance) W/kg
Estimated SAR (W/kg)	3.5	0.047

	Max power	Body (5mm distance) W/kg
Estimated SAR Extremity (W/kg)	3.5	0.038

4. Per KDB 447498 D01v06, simultaneous transmission SAR is compliant if,
   1) Scalar SAR summation < 1.6W/kg/4.0W/kg
   2) SPLSR = (SAR1 + SAR2)1.5 / (min. separation distance, mm), and the peak separation distance is determined from the square root of [(x1-x2)2 + (y1-y2)2 + (z1-z2)2], where (x1, y1, z1) and (x2, y2, z2) are the coordinates of the extrapolated peak SAR locations in the zoom scan
   If SPLSR ≤ 0.04, simultaneously transmission SAR is compliant
   3) Simultaneously transmission SAR measurement for Partial-Body the reported multi-band SAR < 1.6W/kg
   4) Simultaneously transmission SAR measurement for Extremity (Wrist) the reported multi-band SAR < 4.0W/kg

Result of SUM ∑SAR1g for Body worn

SUM ∑SAR (GSM850+WLAN(2.4G) or Bluetooth)						
Position	Distance	Stand alone SAR(1g) [W/kg]			SUM SAR(1g/1g)[W/kg]	SUM SAR(1g/1g)[W/kg]
	[mm]	GSM850	WLAN 2.4G	Bluetooth	WWAN + WLAN(2.4G)	WWAN + Bluetooth
Next-to-Mouth	10	0.535	0.019	0.047	0.554	0.582

SUM ∑SAR (GSM850+WLAN(2.4G) or Bluetooth)						
Position	Distance	Stand alone SAR(10g) [W/kg]			SUM SAR(1g/10g)[W/kg]	SUM SAR(1g/10g)[W/kg]
	[mm]	GSM850	WLAN 2.4G	Bluetooth	WWAN + WLAN(2.4G)	WWAN + Bluetooth
Extremity (Wrist)	0	0.879	0.248	0.038	1.127	0.917

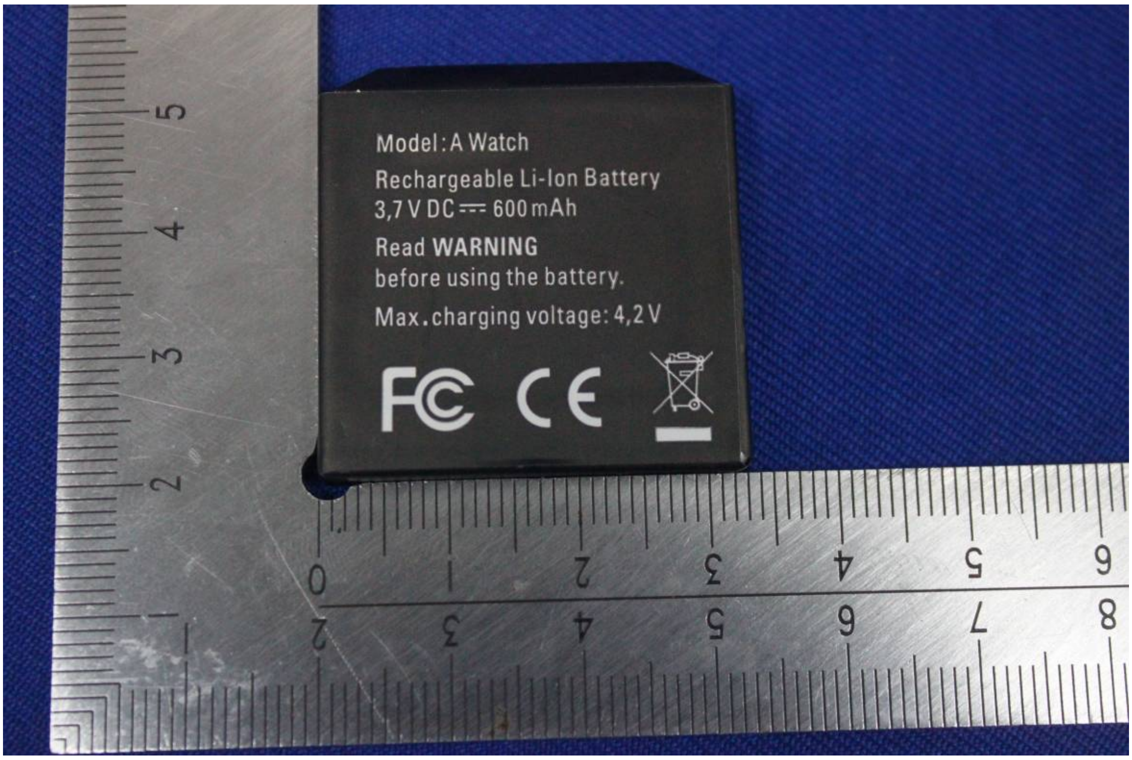
SUM ∑SAR (GSM1900+WLAN(2.4G) or Bluetooth)						
Position	Distance	Stand alone SAR(1g) [W/kg]			SUM SAR(1g)[W/kg]	SUM SAR(1g)[W/kg]
	[mm]	GSM1900	WLAN 2.4G	Bluetooth	WWAN + WLAN(2.4G)	WWAN + Bluetooth
Next-to-Mouth	10	0.070	0.019	0.047	0.089	0.117

SUM ∑SAR (GSM1900+WLAN(2.4G) or Bluetooth)						
Position	Distance	Stand alone SAR(10g) [W/kg]			SUM SAR(10g)[W/kg]	SUM SAR(10g)[W/kg]
	[mm]	GSM1900	WLAN 2.4G	Bluetooth	WWAN + WLAN(2.4G)	WWAN + Bluetooth
Extremity (Wrist)	0	0.455	0.248	0.038	0.703	0.493

SUM ∑SAR (WCDMA Band V+WLAN(2.4G) or Bluetooth)						
Position	Distance	Stand alone SAR(1g) [W/kg]			SUM SAR(1g)[W/kg]	SUM SAR(1g)[W/kg]
	[mm]	WCDMA V	WLAN 2.4G	Bluetooth	WWAN + WLAN(2.4G)	WWAN + Bluetooth
Next-to-Mouth	10	0.709	0.019	0.047	0.728	0.756

SUM ∑SAR (WCDMA Band V+WLAN(2.4G) or Bluetooth)						
Position	Distance	Stand alone SAR(10g) [W/kg]			SUM SAR(10g)[W/kg]	SUM SAR(10g)[W/kg]
	[mm]	WCDMA V	WLAN 2.4G	Bluetooth	WWAN + WLAN(2.4G)	WWAN + Bluetooth
Extremity (Wrist)	0	1.170	0.248	0.038	1.418	1.208

13. EUT PHOTO


Model : A Watch
Rechargeable Li-Ion Battery
3,7 V DC ⎓ 600 mAh
Read WARNING
before using the battery.
Max. charging voltage: 4,2 V


WARNING:
To avoid risk or fire or burns,
• Do not attempt to open, dissamble or service the battery pack.
• Do not crush, puncture, short external contacts or dispose of in fire or water.
• Do not expose to temperatures above 60 °C (140 °F).
• Replace only with the battery pack designated for this product.

14. EQUIPMENT LIST & CALIBRATION STATUS

Name of Equipment	Manufacturer	Type/Model	Serial Number	Last Calibration	Calibration Due
P C	HP	Core(rm)3.16G	CZCO48171H	N/A	N/A
Signal Generator	Agilent	E8257C	MY43321570	11/20/2015	11/19/2016
S-Parameter Network Analyzer	Agilent	E5071B	MY42301382	03/02/2016	03/01/2017
Wireless Communication Test Set	R&S	CMU200	SN:109525	01/06/2016	01/05/2017
Power meter	Anritsu	ML2495A	1445010	03/02/2016	03/01/2017
Power sensor	Anritsu	MA2411B	1339220	03/02/2016	03/01/2017
E-field PROBE	SPEAG	EX3DV4	3798	07/24/2015	07/23/2016
DAE	SPEAG	DEA4	1245	07/22/2015	07/21/2016
DIPOLE 835MHZ ANTENNA	SPEAG	D835V2	4d114	07/30/2013	07/27/2016
DIPOLE 1900MHZ ANTENNA	SPEAG	D1900V2	5d136	07/22/2013	07/19/2016
DIPOLE 2450MHZ ANTENNA	SPEAG	D2450V2	817	07/31/2013	07/28/2016
DUMMY PROBE	SPEAG	DP_2	SPDP2001AA	N/A	N/A
SAM PHANTOM (ELI4 v4.0)	SPEAG	QDOVA001BB	1102	N/A	N/A
Twin SAM Phantom	SPEAG	QD000P40CD	1609	N/A	N/A
ROBOT	SPEAG	TX60	F10/5E6AA1/A101	N/A	N/A
ROBOT KRC	SPEAG	CS8C	F10/5E6AA1/C101	N/A	N/A
LIQUID CALIBRATION KIT	ANTENNESSA	41/05 OCP9	00425167	N/A	N/A

15. FACILITIES

All measurement facilities used to collect the measurement data are located at

☒ No.10, Weiye Rd., Innovation Park, Eco & Tec. Development Part, Kunshan City, Jiangsu Province, China.

16. REFERENCES

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APPENDIX A: PLOTS OF PERFORMANCE CHECK

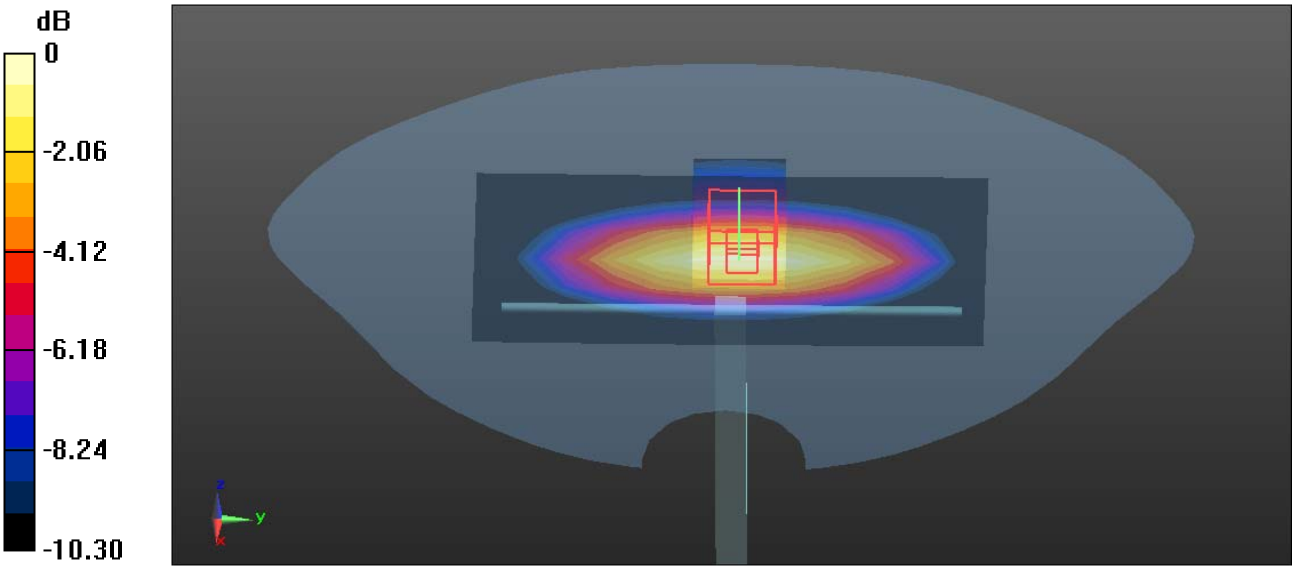
The plots are showing as followings.

Test Laboratory: Compliance Certification Services Inc. Date: 6/14/2016
SystemPerformanceCheck-Body D835
DUT: Dipole 835 MHz ; Type: D835V2; Serial: 4d114
Communication System: UID 0, CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.964 S/m; ε_r = 55.142; ρ = 1000 kg/m^3
Room Ambient Temperature: 22°C; Liquid Temperature: 21.5°C
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Configuration:

- Probe: EX3DV4 - SN3798; ConvF(8.87, 8.87, 8.87); Calibrated: 7/24/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 7/22/2015
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- DASY52 52.8.8(1222);
- SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequencies Low 1 GHz/dist=15mm, Pin=250 mW(EX-Probe)/Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.81 W/kg

System Performance Check at Frequencies Low 1 GHz/dist=15mm, Pin=250 mW(EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.25 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 3.34 W/kg
SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.61 W/kg
Maximum value of SAR (measured) = 2.86 W/kg



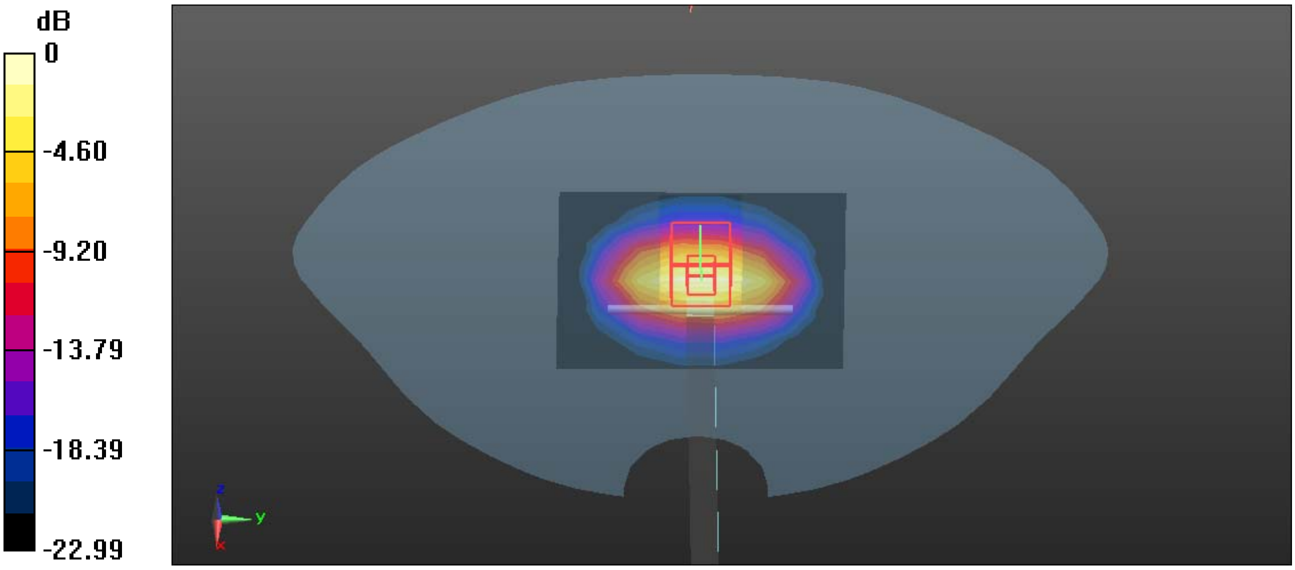
0 dB = 2.86 W/kg = 4.56 dBW/kg

Test Laboratory: Compliance Certification Services Inc. Date: 6/2/2016
SystemPerformanceCheck-Body D1900
DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: 5d136
Communication System: UID 0, CW; Communication System Band: D1900 (1900.0 MHz);
Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.539 S/m; ε_r = 51.612; ρ = 1000 kg/m^3
Room Ambient Temperature: 22°C; Liquid Temperature: 21.5°C
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Configuration:

- Probe: EX3DV4 - SN3798; ConvF(7.29, 7.29, 7.29); Calibrated: 7/24/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 7/22/2015
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- DASY52 52.8.8(1222);
- SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Area Scan (7x8x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 14.7 W/kg

System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 103.7 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 22.6 W/kg
SAR(1 g) = 11.3 W/kg; SAR(10 g) = 5.34W/kg
Maximum value of SAR (measured) = 16.2 W/kg



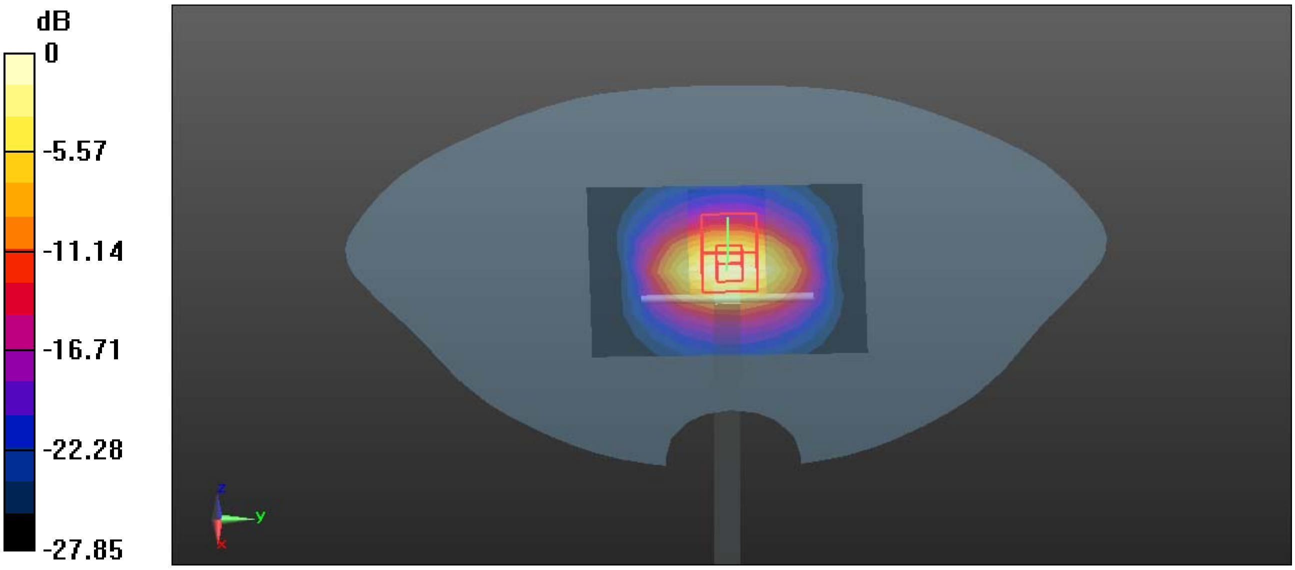
0 dB = 16.2 W/kg = 12.10 dBW/kg

Test Laboratory: Compliance Certification Services Inc. Date: 6/2/2016
SystemPerformanceCheck-Body D2450
DUT: Dipole 2450 MHz ; Type: D24500V2; Serial: 817
Communication System: UID 0, CW; Communication System Band: D2450 (2450.0 MHz);
Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.956 S/m; ε_r = 51.83; ρ = 1000 kg/m^3
Room Ambient Temperature: 22°C; Liquid Temperature: 21.5°C
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Configuration:

- Probe: EX3DV4 - SN3798; ConvF(7.08, 7.08, 7.08); Calibrated: 7/24/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 7/22/2015
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- DASY52 52.8.8(1222);
- SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Area Scan (9x10x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 21.2 W/kg

System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 108.9 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 34.8 W/kg
SAR(1 g) = 13.8 W/kg; SAR(10 g) = 5.89 W/kg
Maximum value of SAR (measured) = 22.8 W/kg



0 dB = 22.8 W/kg = 13.58 dBW/kg

Test Laboratory: Compliance Certification Services Inc. Date: 6/2/2016

SystemPerformanceCheck-Head D835

DUT: Dipole 835 MHz ; Type: D835V2; Serial: 4d114

Communication System: UID 0, CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: f = 835 MHz; σ = 0.909 S/m; ε_r = 42.629; ρ = 1000 kg/m^3

Room Ambient Temperature: 22°C; Liquid Temperature: 21.5°C

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3798; ConvF(9.13, 9.13, 9.13); Calibrated: 7/24/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 7/22/2015
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- DASY52 52.8.8(1222);
- SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequencies Low 1 GHz/Pin=250 mW, dist=15 mm (EX-Probe)/Area Scan (7x12x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 3.08 W/kg

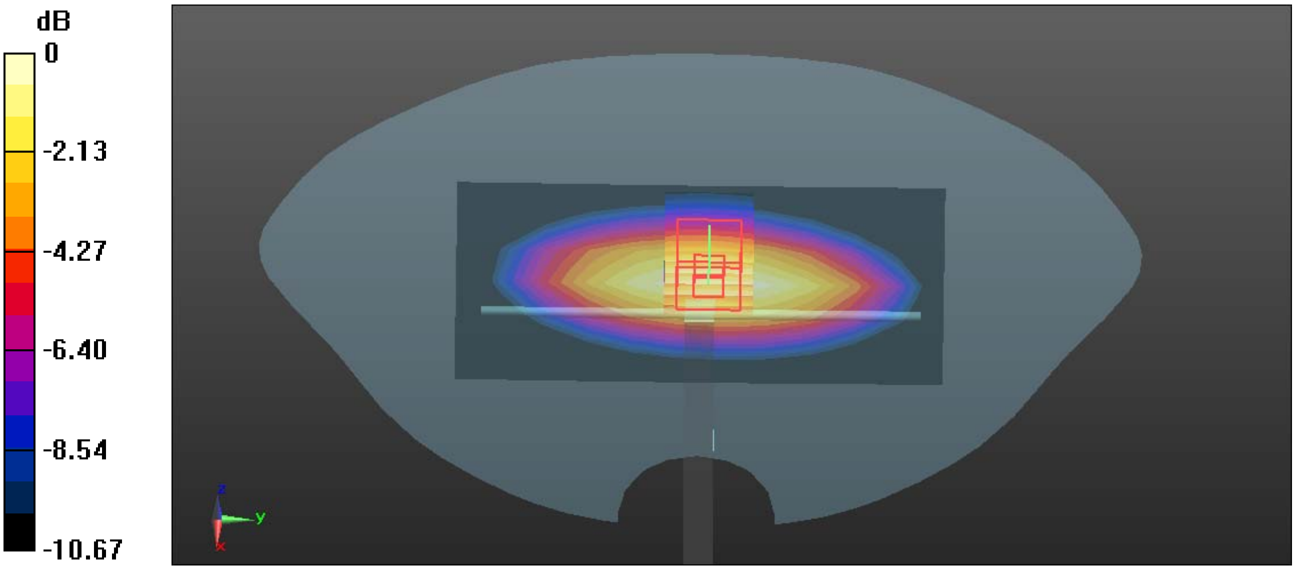
System Performance Check at Frequencies Low 1 GHz/Pin=250 mW, dist=15 mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 60.60 V/m; Power Drift = -0.11 dB

Peak SAR (extrapolated) = 3.65 W/kg

SAR(1 g) = 2.45 W/kg; SAR(10 g) = 1.6 W/kg

Maximum value of SAR (measured) = 3.10 W/kg



0 dB = 3.10 W/kg = 4.91 dBW/kg

Test Laboratory: Compliance Certification Services Inc. Date: 6/2/2016

SystemPerformanceCheck-Head D1900

DUT: Dipole 1900 MHz ; Type: D1900V2; Serial: 5d136

Communication System: UID 0, CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; σ = 1.431 S/m; ε_r = 39.062; ρ = 1000 kg/m^3

Room Ambient Temperature: 22°C; Liquid Temperature: 21.5°C

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY Configuration:

- Probe: EX3DV4 - SN3798; ConvF(7.63, 7.63, 7.63); Calibrated: 7/24/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 7/22/2015
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- DASY52 52.8.8(1222);
- SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Area Scan (7x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 16.8 W/kg

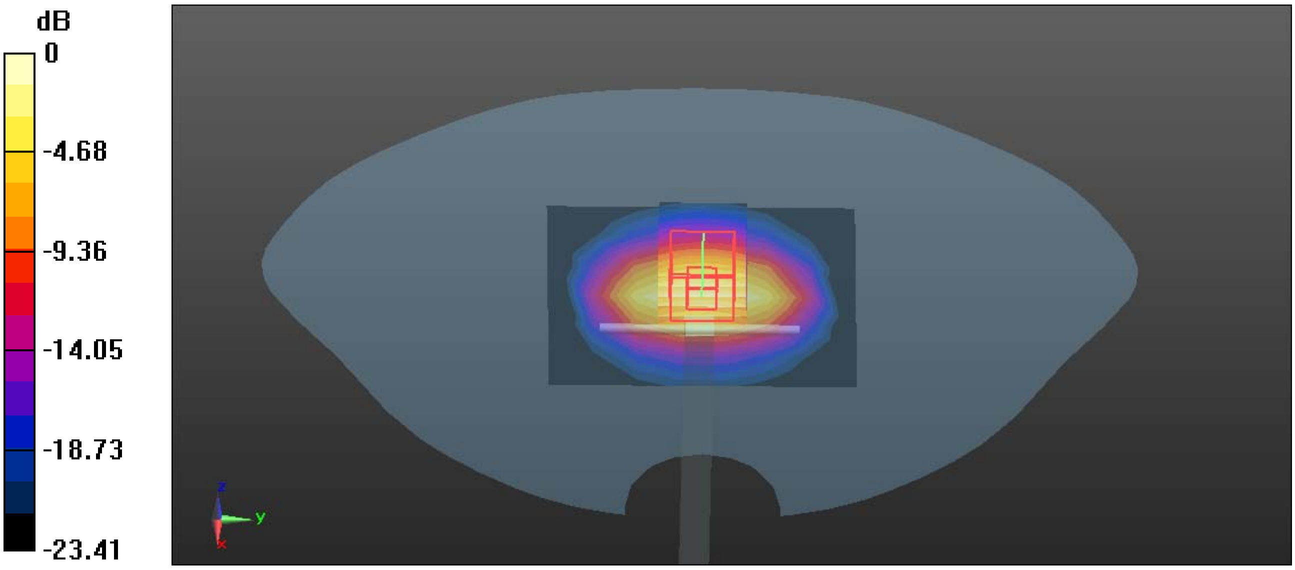
System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 115.4 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 26.0 W/kg

SAR(1 g) = 10.26 W/kg; SAR(10 g) = 5.47 W/kg

Maximum value of SAR (measured) = 18.4 W/kg



0 dB = 18.4 W/kg = 12.65 dBW/kg

Test Laboratory: Compliance Certification Services Inc. Date: 6/2/2016

SystemPerformanceCheck-Head D2450

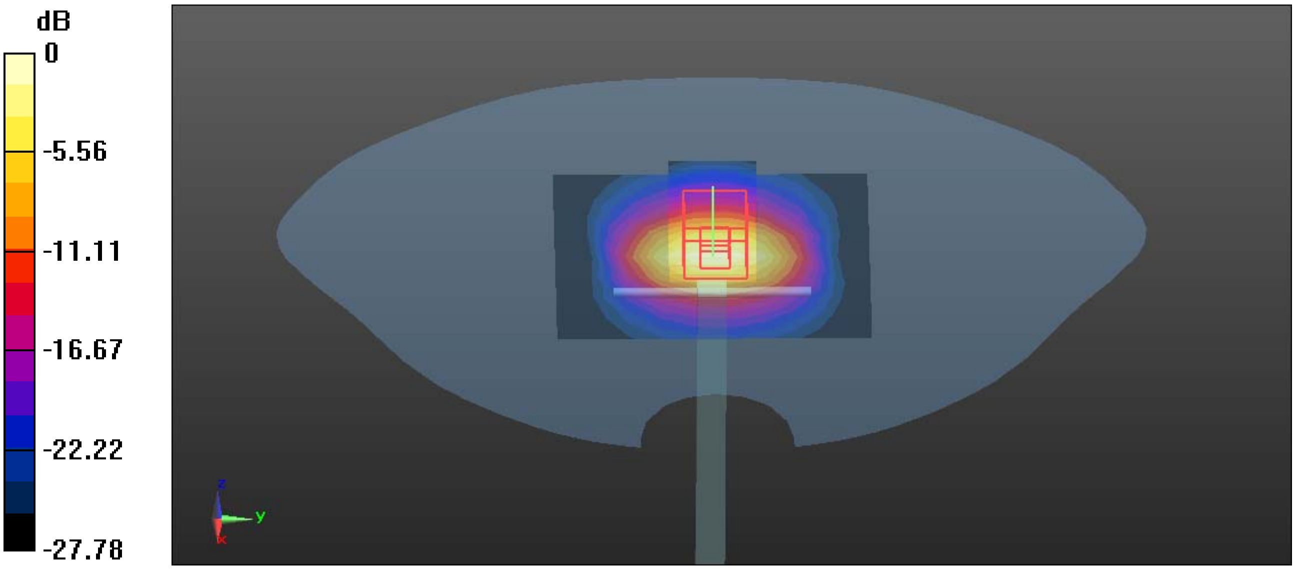
DUT: Dipole 2450 MHz ; Type: D24500V2; Serial: 817

Communication System: UID 0, CW; Communication System Band: D2450 (2450.0 MHz);
Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.871 S/m; ε_r = 39.417; ρ = 1000 kg/m^3
Room Ambient Temperature: 22°C; Liquid Temperature: 21.5°C
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)
DASY Configuration:

- Probe: EX3DV4 - SN3798; ConvF(6.97, 6.97, 6.97); Calibrated: 7/24/2015;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 7/22/2015
- Phantom: Twin SAM Phantom; Type: QD 000 P40 CD; Serial: 1609
- DASY52 52.8.8(1222);
- SEMCAD X Version 14.6.10 (7331)

System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Area Scan (9x10x1): Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 20.3 W/kg

System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 109.7 V/m; Power Drift = -0.02 dB
Peak SAR (extrapolated) = 33.0 W/kg
SAR(1 g) = 13.2 W/kg; SAR(10 g) = 5.68 W/kg
Maximum value of SAR (measured) = 21.8 W/kg



0 dB = 21.8 W/kg = 13.38 dBW/kg

APPENDIX B: DASY CALIBRATION CERTIFICATE

The DASY Calibration Certificates are showing in the file named Appendix B DASY Calibration Certificate.

APPENDIX C: PLOTS OF SAR TEST RESULT

The plots are showing in the file named Appendix C Plots of SAR Test Result

END REPORT