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

FCC SAR TEST REPORT

For

Product Name: GPS tracking
Brand Name: ESKY
Model No.: ES320
Series Model: N/A
Test Report Number: C170228R01-SF

Issued for

eSKy Wireless Inc.
22-303,#328 street xinghu, Suzhou, china

Issued by

Compliance Certification Services Inc.
Kun Shan Laboratory
No.10 Weiye Rd., Innovation park, Eco&Tec, Development Zone, Kunshan City, Jiangsu, China
TEL: 86-512-57355888
FAX: 86-512-57370818

ilac-MRA

ACCREDITED
TESTING CERT #2541.01

Revision History

Revision	REPORT NO.	Date	Page Revised	Contents
Original	C170228R01-SF	April 11, 2017	N/A	N/A
01	C170228R01-SF	April 14, 2017	37	Update EQUIPMENT LIST & CALIBRATION STATUS.
02	C170228R01-SF	April 20, 2017	All Report	Retest the EUT with the separation distance of 5mm.

TABLE OF CONTENTS

1. CERTIFICATE OF COMPLIANCE (SAR EVALUATION)

Product Name:	GPS tracking
Brand Name:	ESKY
Model Name.:	ES320
Series Model:	N/A
Devices supporting GPRS/EDGE：	Not support
Device Category:	Protable DEVICES
Exposure Category:	GENERAL POPULATION/UNCONTROLLED EXPOSURE
Date of Test:	April 20, 2017
Applicant: **Address:**	**eSKy Wireless Inc.** 22-303,#328 street xinghu, Suzhou, china
Manufacturer: **Address:**	**eSKy Wireless Inc.** 22-303,#328 street xinghu, Suzhou, china
Application Type:	Certification

APPLICABLE STANDARDS AND TEST PROCEDURES	
STANDARDS AND TEST PROCEDURES	**TEST RESULT**
KDB 865664	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:	GPS tracking
Brand Name:	ESKY
Model Name.:	ES320
Series Model:	N/A
Model Discrepancy:	N/A
FCC ID:	YR8ES320
IMEI:	012813003454776
Hardware Version	ES320-MB-H104
Software Version	Apr_05_201721-35-43ES320
Power reduction:	NO
DTM Description:	N/A
Device Category:	Production unit
Frequency Range:	WCDMA Band II:1852.4~1907.6MHz WCDMA Band V:826.4~846.6 MHz
Max. Reported SAR(1g):	Body: WCDMA Band II: 0.972 W/kg WCDMA Band V: 1.192 W/kg
Modulation Technique:	RMC/AMR: QPSK WCDMA: QPSK Release version: WCDMA:R99 HSDPA:Rel.7
Wireless Router (Hotspot)	N/A
Accessories:	Battery(rating): Capacitance: 1000 mAh Rated Voltage: 3.7V
Antenna Specification:	WCDMA: PIFA Antenna
Operating Mode:	Maximum continuous output
Remark：The product details information please refer to the product specification	

3. REQUIREMENTS FOR COMPLIANCE TESTING DEFINED BY THE FCC

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 FCC 47 CFR Part 2 (2.1093).

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)
☒ ANSI/IEEE C95.1-1992
☒ IEEE 1528:2013
☒ IEC 62209-2:2010
☒ 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
☒ KDB 941225 D06v02r01 HotSpot SAR

5. TEST CONFIGURATION

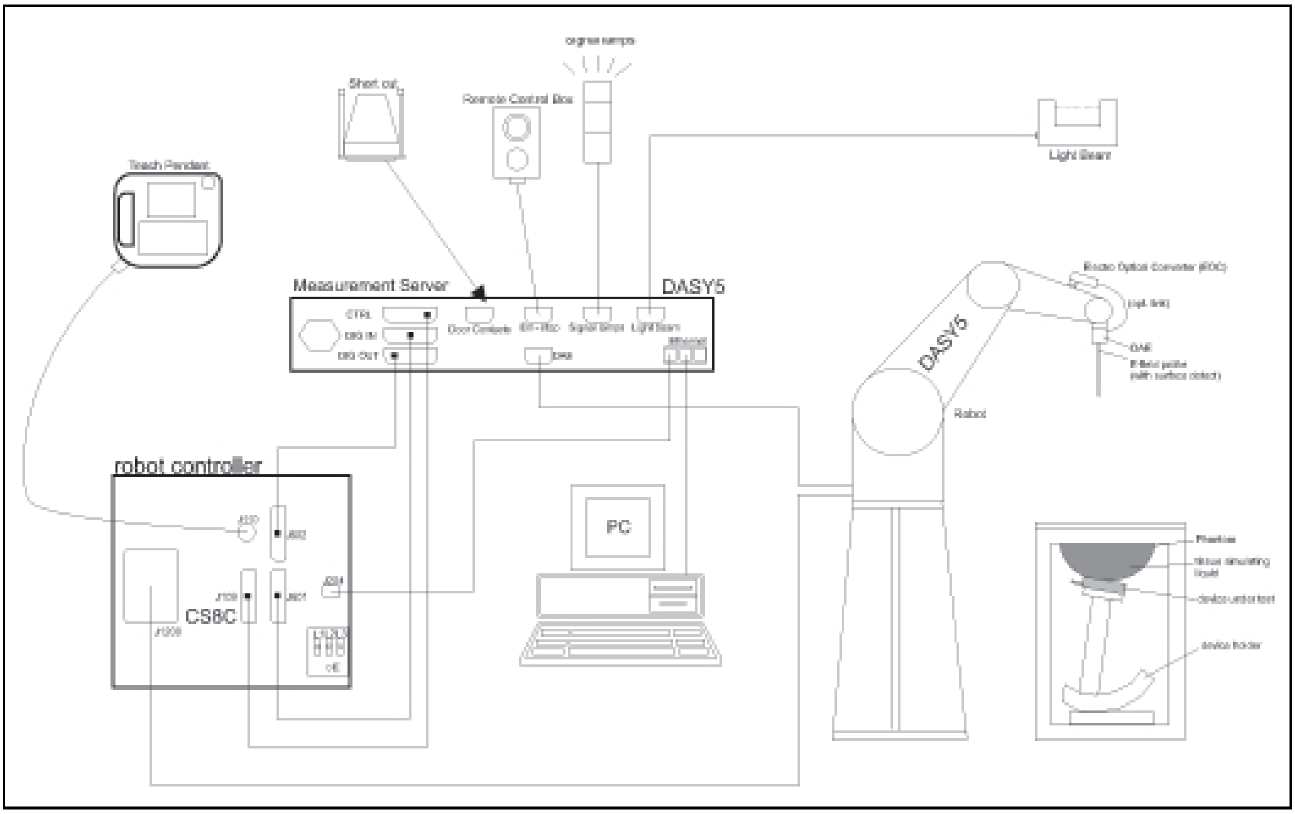
For WWAN SAR testing The device was controlled by using a base station emulator R&S CMU200. Communication between the device and the emulator was established by air link. The distance between the DUT and the antenna of the emulator is larger than 50 cm and the output power radiated from the emulator 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 WWAN SAR testing EUT is configured with the WWAN continuous TX tool, and the transmission duty factor was monitored on the spectrum analyzer with zero-span setting
For WWAN SAR testing, WWAN engineering test software installed on the EUT can provide continuous transmitting RF signal and duty cycle is 100%.

6. DOSIMETRIC ASSESSMENT SETUP

These measurements were performed with the automated near-field scanning system DASY 5 from SPEAG. 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.

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:

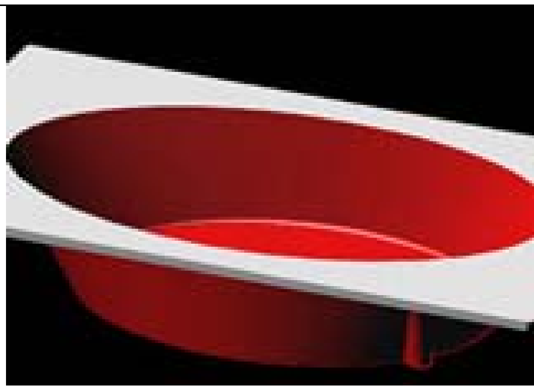
Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI4 is fully compatible with the latest draft of the standard IEC 62209 Part II and all known tissue simulating liquids. ELI4 has been optimized regarding its performance and can be 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)
$\mu V/(V/m)^2$ 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

Per KDB865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04,when the highest measured 1-g SAR within a frequency band is < 1.5 W/kg, the extensive SAR measurement uncertainty analysis described in IEEE Std 1528-2013 is not required in SAR reports submitted for equipment approval. The equivalent ratio (1.5/1.6) is applied to extremity and occupational exposure conditions.

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

10. EUT ARRANGEMENT

Please refer to IEC 62209 illustration below.

10.1 GENERIC DEVICE

For a device that can not be categorized as any of the other specific device types, it shall be considered to be a generic device; i.e. represented by a closed box incorporating at least one internal RF transmitter and antenna.
The SAR evaluation shall be performed for all surfaces of the DUT that are accessible during intended use, as indicated in Figure . The separation distance in testing shall correspond to the intended use distance as specified in the user instructions provided by the manufacturer.
If the intended use is not specified, all surfaces of the DUT shall be tested with the separation of ≤5mm.

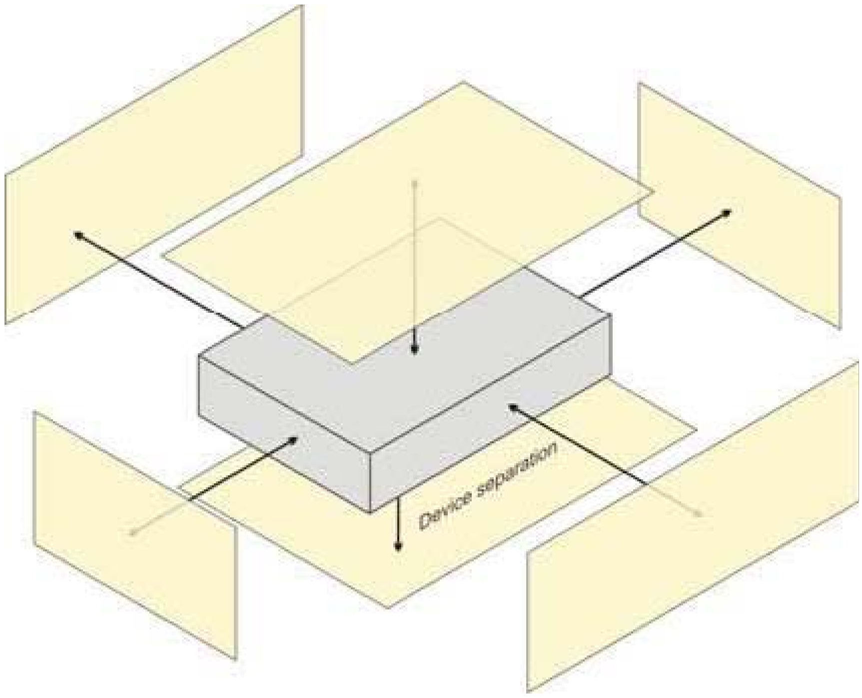


Figure – Test positions for a generic device

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)

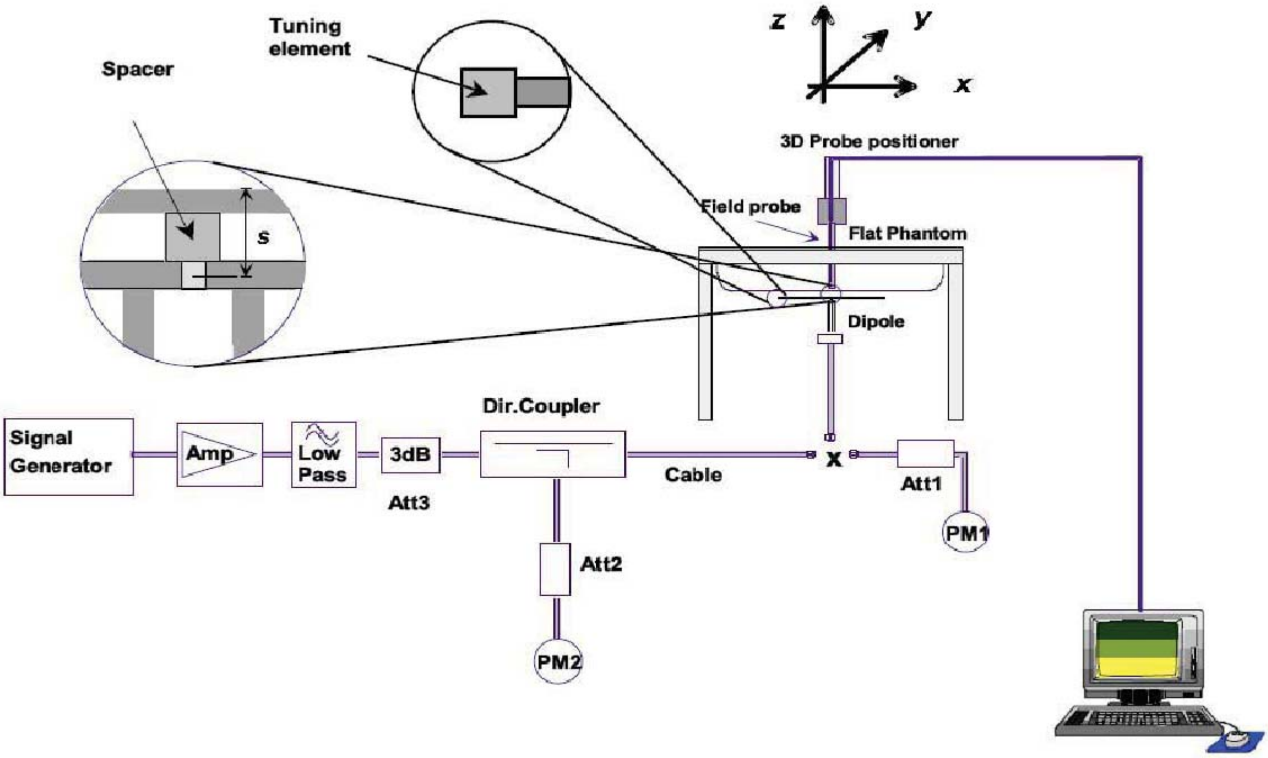
11.2 LIQUID MEASUREMENT RESULTS

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	52.91	-4.15	± 5	2017-4-20
		Conductivity(σ)	0.97	0.95	-1.65	± 5	
Body1900	21.5	Permitivity(ε)	53.30	53.65	0.66	± 5	2017-4-20
		Conductivity(σ)	1.52	1.58	4.08	± 5	

11.3 SYSTEM PERFORMANCE CHECK

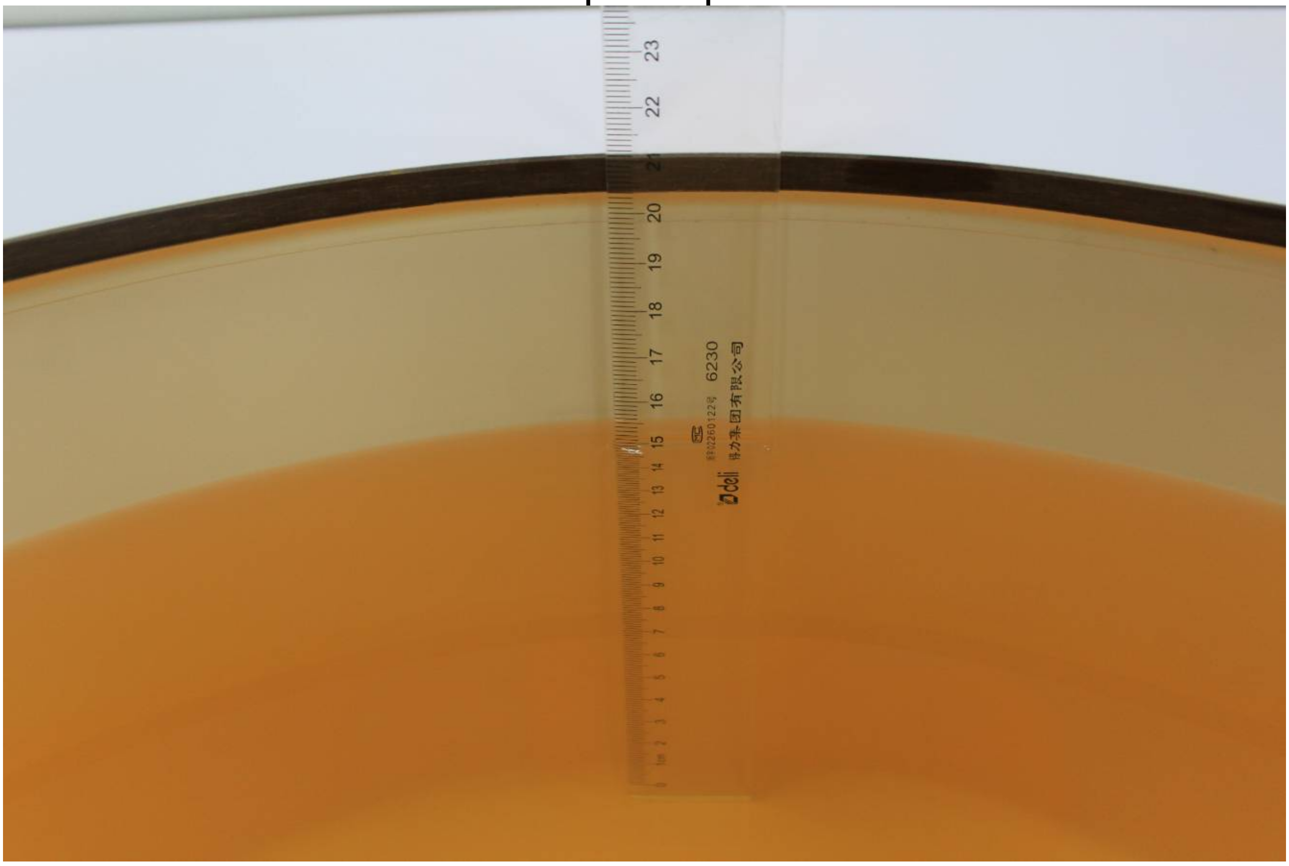
The system performance check is performed prior to any usage of the system in order to guarantee reproducible results. The system performance check verifies that the system operates within its specifications of ±10%. The system performance check results are tabulated below. And also the corresponding SAR plot is attached as well in the SAR plots files.
System check is performed regularly on all frequency bands where tests are performed with the DASY5 system .



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 EX3DV4：3798 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

The following table gives the recipes for tissue simulating liquids.

The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

Frequency	water	sugar	cellulose	Salt	bactericide	DGBE	conductivity	permittivity
For Head								
835	40.3	57.9	0.2	1.4	0.2	0	0.90	41.5
1800,1900,2000	55.2	0	0	0.3	0	44.5	1.40	40.0
2450	55.0	0	0	0	0	45.0	1.80	39.2
For Body								
835	50.6	48.2	0.2	0.9	0.1	0	0.97	55.2
1800,1900,2000	70.2	0	0	0.4	0	29.4	1.52	53.3
2450	68.6	0	0	0	0	31.4	1.95	52.7

alt: 99+% Pure Sodium Chloride Sugar: 98+% Pure Sucrose
DGBE: 99+% Di(ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]

<Tissue Dielectric Parameter Check Results>

Liquid Type	Ambient Temp. (°C)	Liquid Temp. (°C)	Input Power (W)	Measured SAR1g (W/Kg)	1W Target SAR1g(W/Kg)	1W Normalized SAR1g(W/Kg)	Deviation (%)	Limited (%)	Date
Body835	22	21.5	0.25	2.48	9.59	9.92	3.44	± 10	2017-4-20
Body1900	22	21.5	0.25	10.10	40.70	40.40	-0.74	± 10	2017-4-20

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.

WCDMA Conducted output power(dBm):
As the SAR body tests for WCDMA **Band II and Band V** , we established the radio link through call processing. The Maximum Burst-Averaged 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.

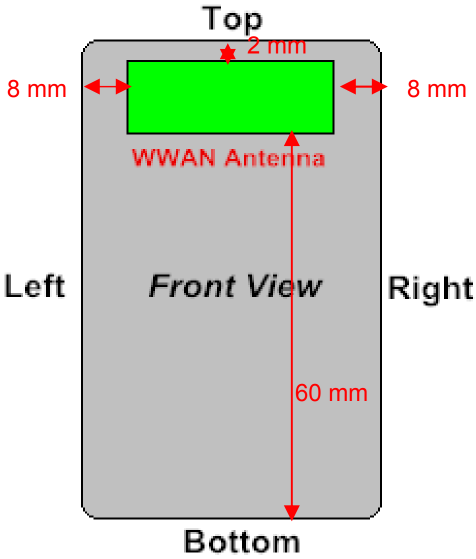
Band	WCDMA Band II			WCDMA Band V		
Channel	9262	9400	9538	4132	4182	4233
Frequency(MHz)	1852.4	1880	1907.6	826.4	836.4	846.6
Maximum Burst-Averaged Output Power						
AMR	22.37	22.51	22.48	22.31	22.19	22.45
RMC12.2K	23.24	23.09	**23.41**	22.95	22.99	**23.15**
HSDPA Subtest-1	22.82	22.66	22.59	22.42	22.36	22.30
HSDPA Subtest-2	22.42	22.22	22.48	22.23	22.24	22.31
HSDPA Subtest-3	22.09	21.58	22.03	21.82	21.75	21.68
HSDPA Subtest-4	21.36	20.51	20.71	20.78	20.82	20.72

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.

Maximum Burst-Averaged output power for Product unit

Mode	The Tune-up Maximum Power(Customer Declared)(dBm)	Tune up limit	Measured Conduct Maximum Power(dBm)
WCDMA Band II RMC 12.2K	22.5+/-1	23.5	23.41
WCDMA Band II AMR	22+/-1	23	22.51
HSDPA Band II Subtest-1	22+/-1	23	22.82
HSDPA Band II Subtest-2	22+/-1	23	22.48
HSDPA Band II Subtest-3	22+/-1	23	22.09
HSDPA Band II Subtest-4	21+/-1	22	21.36
WCDMA Band V RMC 12.2K	22.5+/-1	23.5	23.15
WCDMA Band V AMR	22+/-1	23	22.45
HSDPA Band V Subtest-1	22+/-1	23	22.42
HSDPA Band V Subtest-2	22+/-1	23	22.31
HSDPA Band V Subtest-3	21+/-1	22	21.82
HSDPA Band V Subtest-4	20+/-1	21	20.82

11.5 ANTENNA POSITION



Device dimensions (H x W): 74 x 42 mm

Antenna	Wireless Interface
WWAN Antenna	WCDMA Band II WCDMA Band V

Test Mode

WCDMA Band II WCDMA Band V	Data transmission mode(12.2k RMC)

Body Exposure Condition

Distance of the Antenna to the EUT surface/edge Test distance: 5 mm						
Antenna	Front（mm）	Rear（mm）	Right side（mm）	Left side（mm）	Top side（mm）	Bottom side（mm）
WWAN	9<25	2<25	8<25	8<25	2<25	60>25

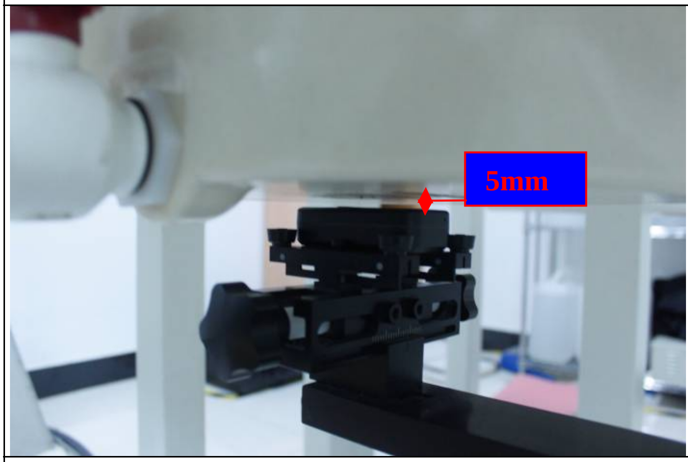
Body test position

Distance of the Antenna to the EUT surface/edge Test distance: 5 mm						
Antenna	Front	Rear	Right side	Left side	Top side	Bottom side
WWAN	Yes	Yes	Yes	Yes	Yes	No

11.6 EUT SETUP PHOTOS

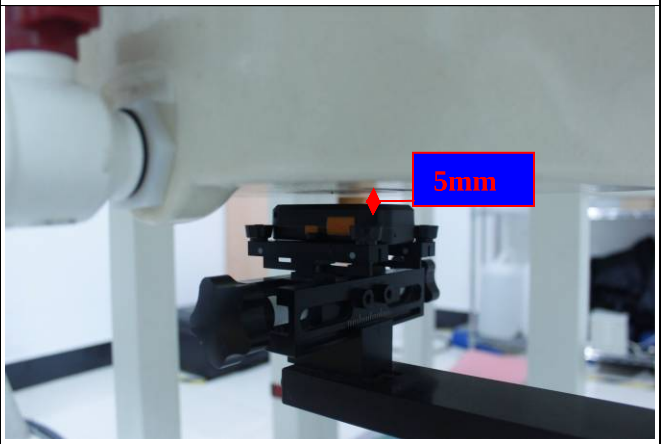
Body Support test position

Front in body position



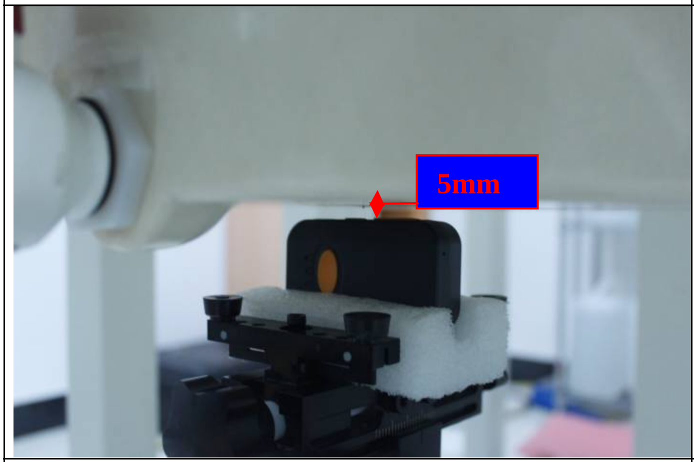
EUT Setup Configuration 1

Rear in body position



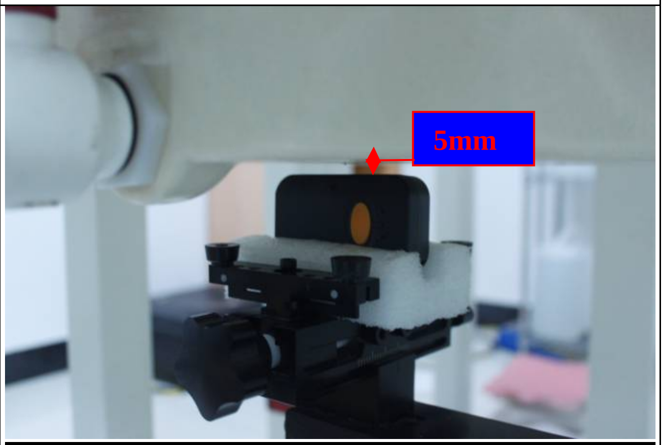
EUT Setup Configuration 2

Right in body position



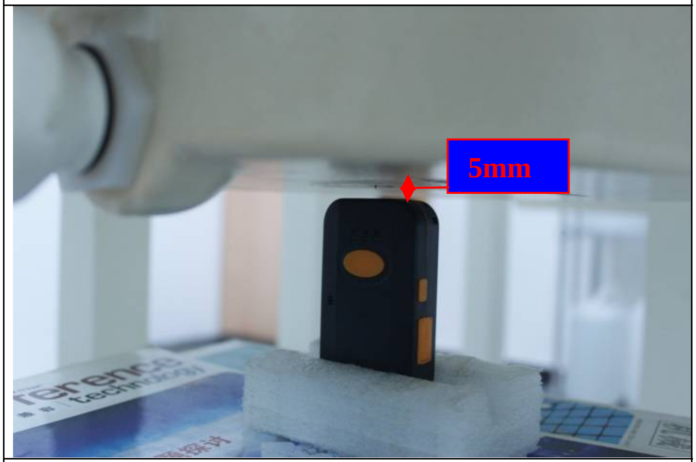
EUT Setup Configuration 3

Left in body position



EUT Setup Configuration 4

Top in body position



EUT Setup Configuration 5

11.7 SAR MEASUREMENT RESULTS

SAR for Body Support Test Records

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)
WCDMA II	RMC 12.2k	Front	5	9538	1907.6	23.41	23.5	1.021	0.05	0.455	0.465
WCDMA II	RMC 12.2k	Rear	5	9262	1852.4	23.24	23.5	1.062	0.04	0.732	0.777
WCDMA II	RMC 12.2k	Rear	5	9400	1880	23.09	23.5	1.099	0.12	0.884	0.972
WCDMA II	RMC 12.2k	Rear	5	9538	1907.6	23.41	23.5	1.021	-0.02	0.899	0.918
WCDMA II	RMC 12.2k	Top	5	9538	1907.6	23.41	23.5	1.021	0.05	0.716	0.731
WCDMA II	RMC 12.2k	Right	5	9538	1907.6	23.41	23.5	1.021	-0.06	0.255	0.260
WCDMA II	RMC 12.2k	Left	5	9538	1907.6	23.41	23.5	1.021	-0.04	0.564	0.576
WCDMA V	RMC 12.2k	Front	5	4233	846.6	23.15	23.5	1.084	0.08	0.642	0.696
WCDMA V	RMC 12.2k	Rear	5	4132	826.4	22.95	23.5	1.135	0.07	0.783	0.889
WCDMA V	RMC 12.2k	Rear	5	4182	836.4	22.99	23.5	1.125	-0.02	1.06	1.192
WCDMA V	RMC 12.2k	Rear	5	4233	846.6	23.15	23.5	1.084	0.10	1.03	1.116
WCDMA V	RMC 12.2k	Top	5	4233	846.6	23.15	23.5	1.084	-0.06	0.369	0.400
WCDMA V	RMC 12.2k	Right	5	4233	846.6	23.15	23.5	1.084	-0.07	0.410	0.444
WCDMA V	RMC 12.2k	Left	5	4233	846.6	23.15	23.5	1.084	0.06	0.366	0.397

Repeated SAR Test Records

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)
WCDMA II	RMC 12.2k	Rear	5	9538	1907.6	23.41	23.5	1.021	0.05	0.881	0.899
WCDMA V	RMC 12.2k	Rear	5	4182	836.4	22.99	23.5	1.125	0.05	1.04	1.170

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
WCDMA II	RMC 12.2k	Rear	5	9538	0.899	0.881	1.020	--	--	--
WCDMA V	RMC 12.2k	Rear	5	4182	1.06	1.04	1.019			

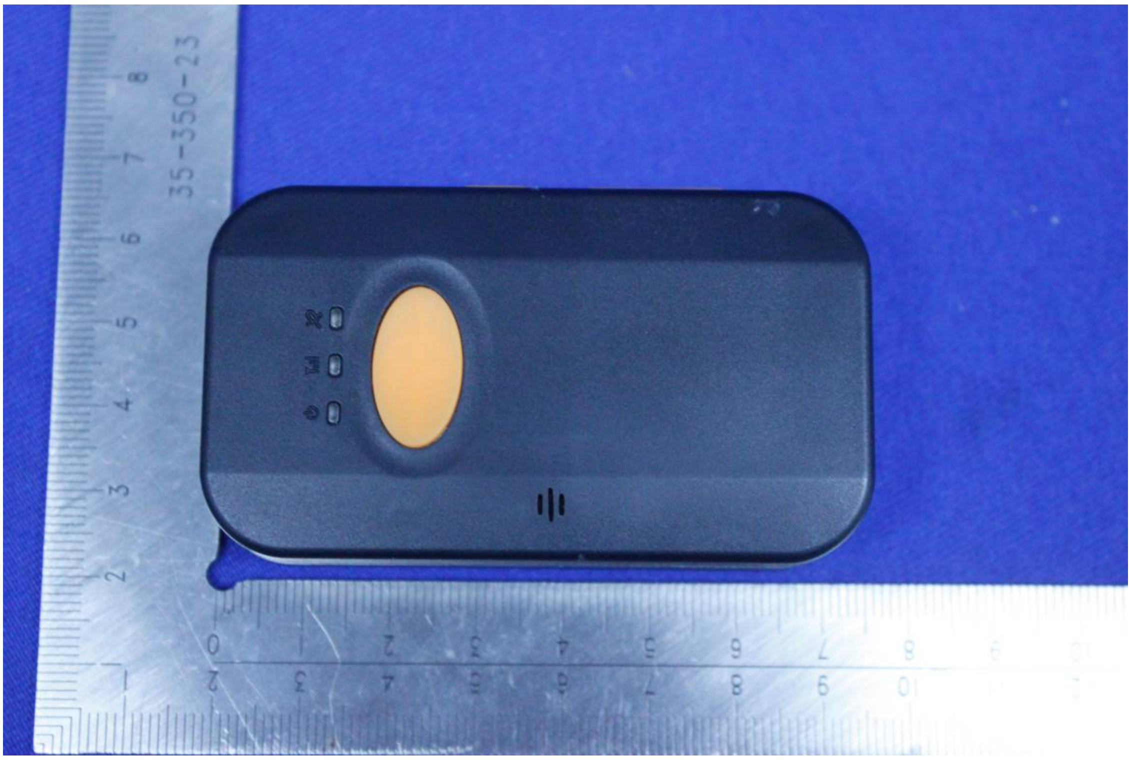
Note:

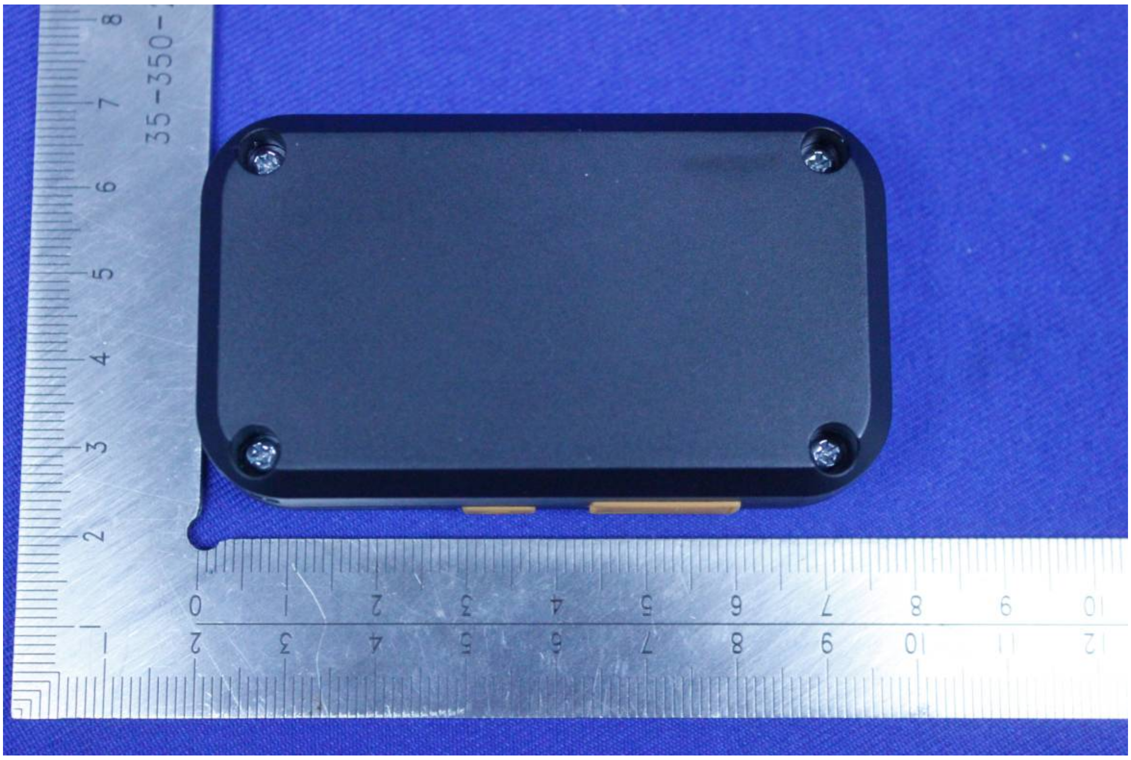
1. Per KDB 865664 D01v01,for each frequency band, repeated SAR measurement is required only when the measured SAR is ≥ 0.8W/Kg
2. Per KDB 865664 D01v01,if the ratio of largest to smallest SAR for the original and first repeated measurement is ≤1.2 and the measured SAR ＜1.45W/Kg,only one repeated measurement 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.

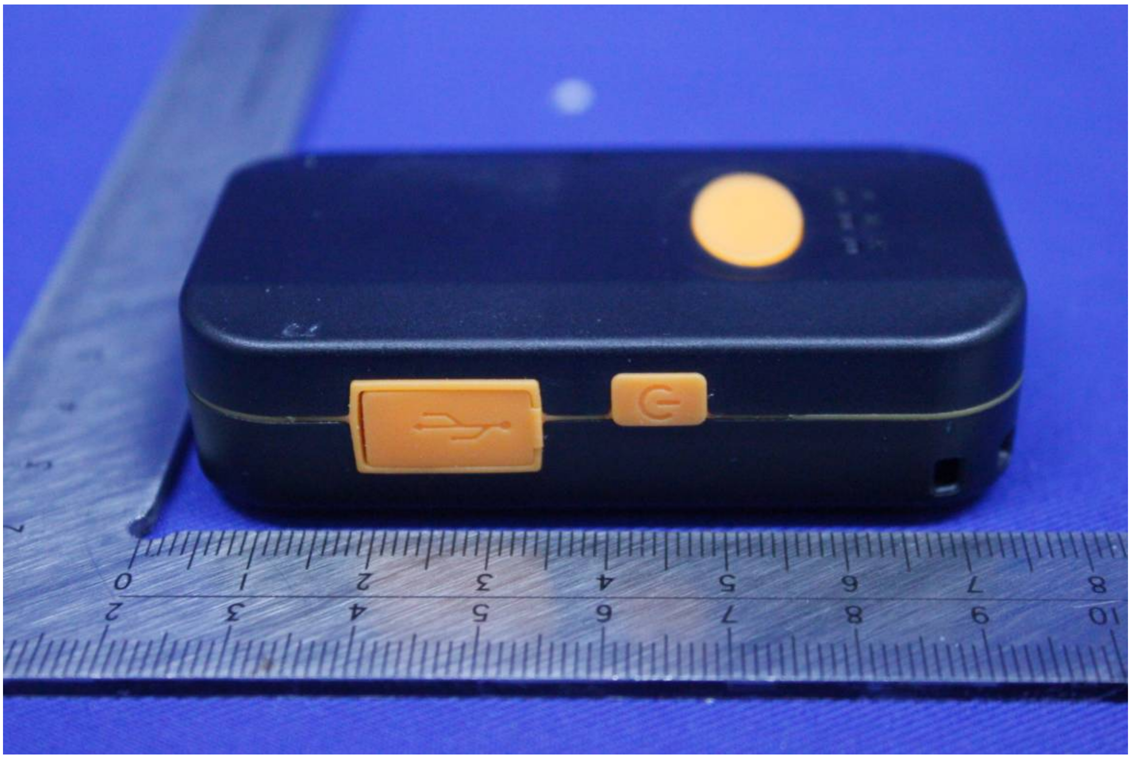
12. SAR HANDSETS MULTI XMITER ASSESSMENT

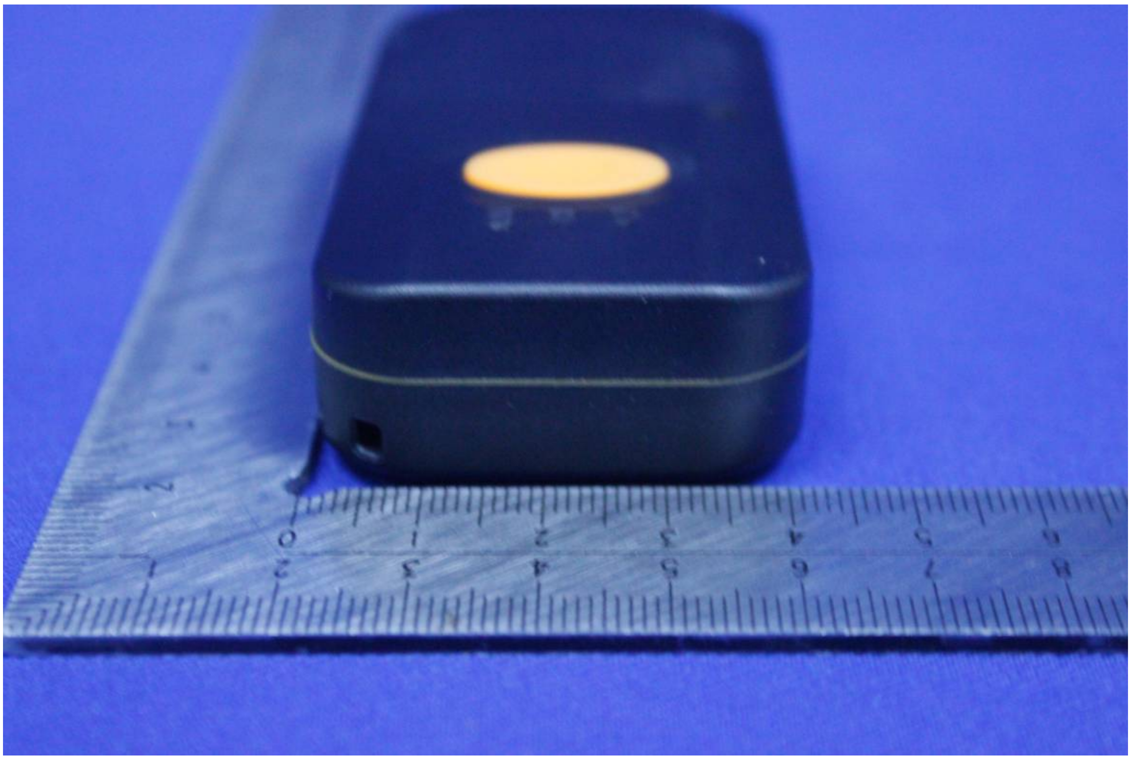
	Position	Applicable Combination
Simultaneous Transmission	**Body**	N/A

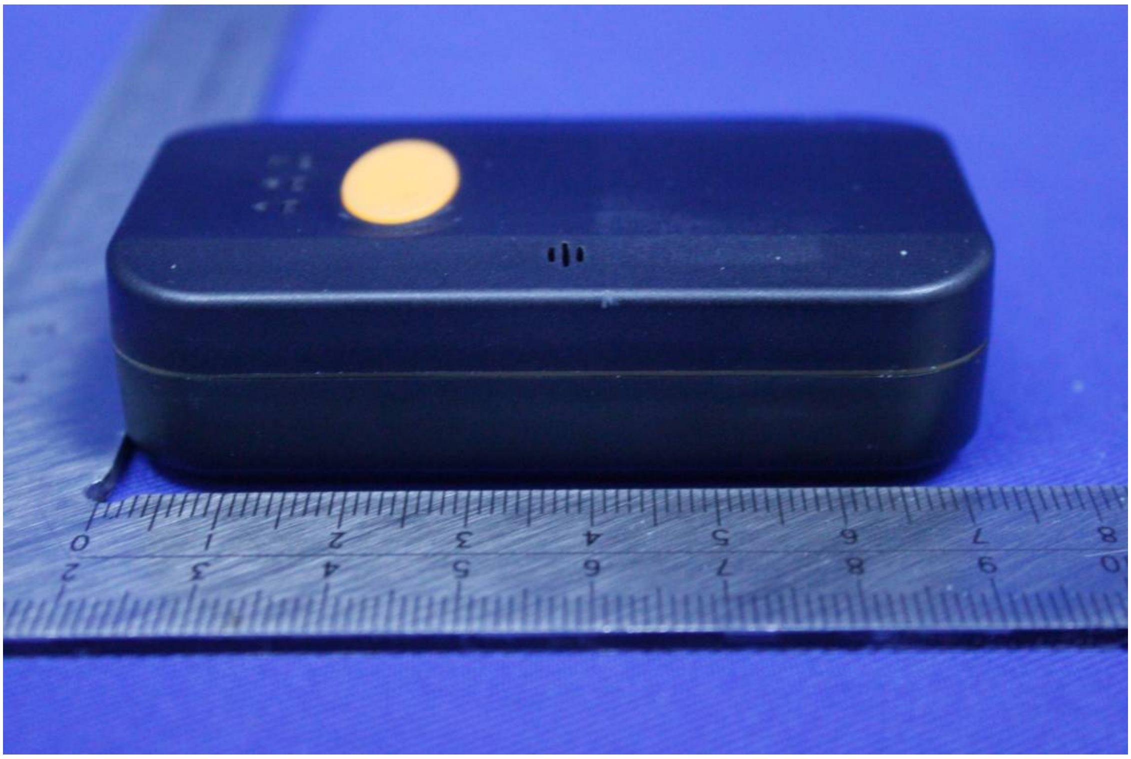
13. EUT PHOTO

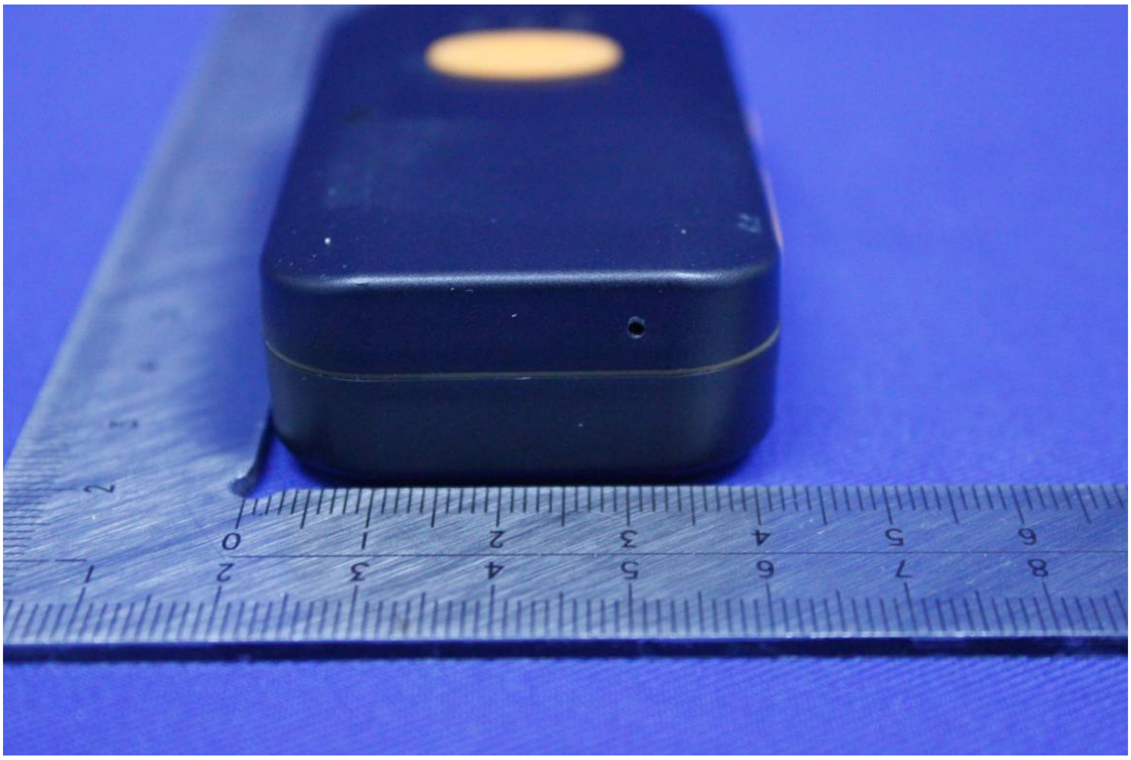













-YL603448 3.7V
+1000mAh 20161224

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	US37101915	2/28/2017	02/27/2018
S-Parameter Network Analyzer	Agilent	E5071B	MY42301382	02/28/2017	02/27/2018
Power Meter	Anritsu	ML2495A	1445010	02/28/2017	02/27/2018
Peak & Average sensor	Anritsu	MA2411B	1339220	02/28/2017	02/27/2018
E-field PROBE	SPEAG	EX3DV4	3798	07/27/2016	07/26/2017
DAE	SPEAG	DEA4	1245	07/26/2016	07/25/2017
Temperature meter	TES	TES 1360	050907372	02/15/2017	02/14/2018
Electro Thermometer	DTM	DTM3000	3030	01/04/2017	01/03/2018
DIPOLE 835MHZ ANTENNA	SPEAG	D835V2	4d114	05/30/2016	05/27/2019
DIPOLE 1900MHZ ANTENNA	SPEAG	D1900V2	5d136	05/25/2016	05/22/2019
Dielectric Probe Kit	SPEAG	DAK 3.5	1102	N/A	N/A
Dual Directional Coupler	Woken	20W couple	DOM2BHW1A1	N/A	N/A
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: 4/20/2017

SystemPerformanceCheck-Body D835

DUT: Dipole 835 MHz D835V2; 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 = 0.954 S/m; ε_r = 52.91; 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(9.09, 9.09, 9.09); Calibrated: 7/27/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 7/26/2016
- 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) = 3.22 W/kg

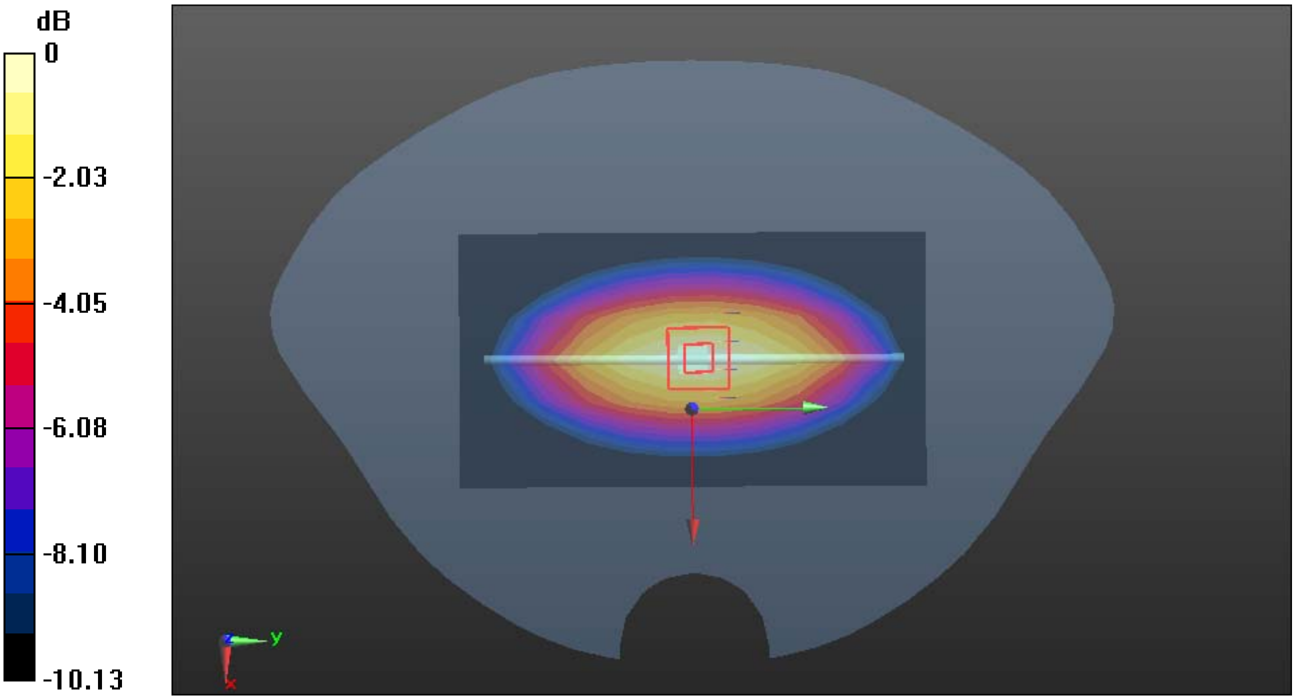
System Performance Check at Frequencies Low 1 GHz/Pin=250 mW, dist=15 mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 59.90 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 3.80 W/kg

SAR(1 g) = 2.48 W/kg; SAR(10 g) = 1.71 W/kg

Maximum value of SAR (measured) = 3.24 W/kg



0 dB = 3.24 W/kg = 5.11 dBW/kg

Test Laboratory: Compliance Certification Services Inc. Date: 4/20/2017

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 = 1.582 S/m; ε_r = 53.654; 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(7.43, 7.43, 7.43); Calibrated: 7/27/2016;
- Sensor-Surface: 2mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1245; Calibrated: 7/26/2016
- 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) = 14.0 W/kg

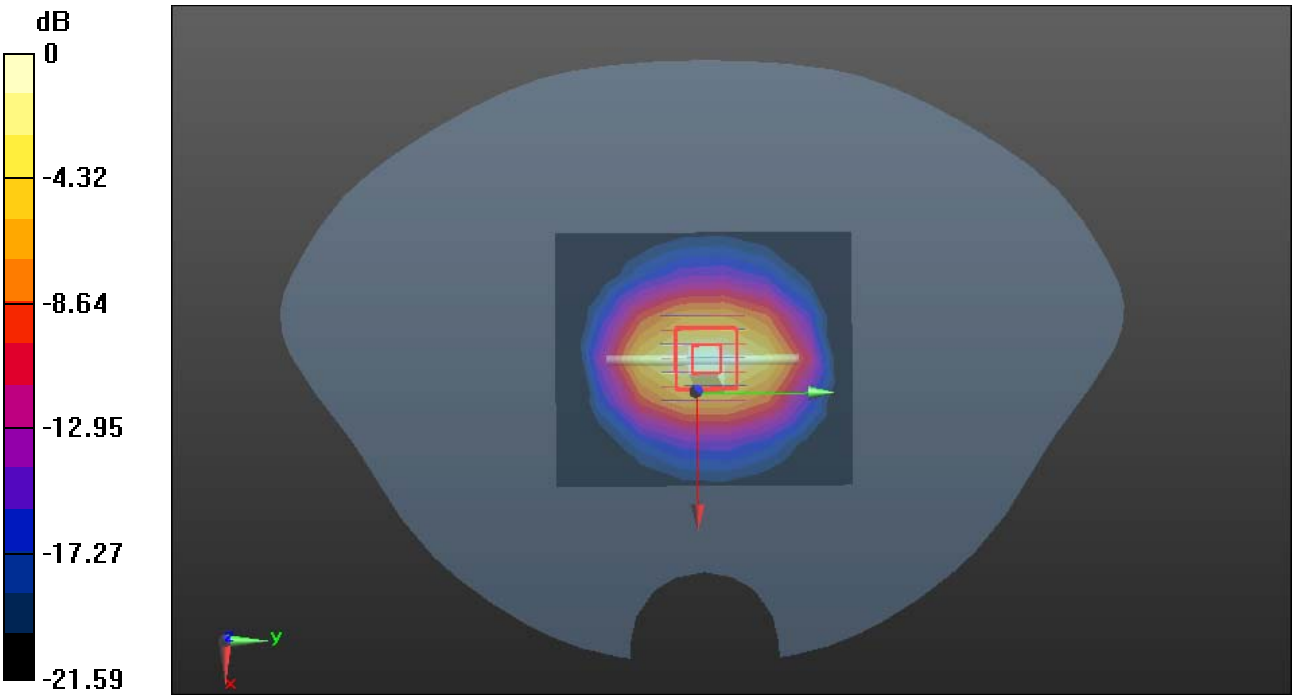
System Performance Check at Frequencies above 1 GHz/Pin=250 mW, dist=10mm (EX-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 99.40 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 20.2 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.25 W/kg

Maximum value of SAR (measured) = 14.9 W/kg



0 dB = 14.9 W/kg = 11.73 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 HIGHEST SAR TEST RESULT

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

END REPORT