# FCC SAR TEST REPORT

**Report No: STS1501039H01**

Issued for

**UNNECTO HOLDING LIMITED**

**ROOM 1501(445),15/F.,SPA CENTRE,53-55 LOCKHART ROAD,WANCHAI,HONGKONG**

| | |
|---|---|
| **Product Name:** | 3G MOBILE PHONE |
| **Brand Name:** | unnecto ™ |
| **Model No.:** | U905 |
| **Series Model:** | N/A |
| **FCC ID:** | 2ADR3U905 |
| **Test Standard:** | ANSI/IEEE Std. C95.1 |
| | FCC 47 CFR Part 2 ( 2.1093) |
| | IEEE 1528: 2013 |
| **Max. SAR (1g):** | Head:0.262 W/kg |
| | Body: 1.481 W/kg |



Shenzhen STS Test Services Co., Ltd.
1/F, Building B, Zhuoke Science Park, Chongqing Road, Fuyong, Baoan District, Shenzhen, China
TEL: +86-755 3688 6288 FAX: +86-755 3688 6277 E-mail:sts@stsapp.com

# Test Report Certification

| | | |
|---|---|---|
| **Applicant's name** | : | UNNECTO HOLDING LIMITED |
| Address | : | ROOM 1501(445),15/F., SPA CENTRE,53-55 LOCKHART ROAD, WANCHAI, HONGKONG |
| **Manufacture's Name** | : | SHENZHEN UNI-ONE ELECTRONIC CO.,LTD |
| Address | : | 5/F, Bldg A2,Kexing Science Park, Keyuan Rd., Hi-Tech Park Shenzhen, P.R. China |

**Product description**

| | | |
|---|---|---|
| Product name | : | 3G MOBILE PHONE |
| Trademark | : | unnecto ™ |
| Model and/or type reference | : | U905 |
| Serial Model： | | N/A |
| **Standards** | : | ANSI/IEEE Std. C95.1-1992<br>FCC 47 CFR Part 2 ( 2.1093)<br>IEEE 1528: 2013 |

The device was tested by Shenzhen STS Test Services Co., Ltd. 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.

| | | |
|---|---|---|
| **Date of Test** | : | |
| Date (s) of performance of tests | : | 23 Jan.. 2015 |
| Date of Issue | : | 26 Jan.. 2015 |
| Test Result | : | **Pass** |

Testing Engineer **:** (Tony Liu)

Technical Manager **:** (Vita Li)

Authorized Signatory **:** (Bovey Yang)

# TABLE OF CONTENS

# 1. General Information

## 1.1 EUT Description

| | | | |
|---|---|---|---|
| Equipment | 3G MOBILE PHONE | | |
| Brand Name | unnecto ™ | | |
| Model No. | U905 | | |
| Serial Model | N/A | | |
| FCC ID | 2ADR3U905 | | |
| Model Difference | N/A | | |
| Adapter | Input: AC100-240V, 0.18A, 50/60 Hz<br>Output: DC 5V, 1000mA | | |
| Battery | Rated Voltage: 3.8V<br>Capacity: 2500mAh | | |
| Hardware Version | UH09_MB_V0.1 2014-11-11 | | |
| Software Version | ALPS.KK1.MP1.V2.10 | | |
| Frequency Range | GSM 850: 824.2 ~ 848.8 MHz<br>PCS1900: 1850.2 ~ 1909.8 MHz<br>WCDMA II: 1852.4~1907.6 MHz<br>WCDMA V: 826.4~846.6 MHz<br>WLAN 802.11 b/g/n(HT20):2412-2462 MHz<br>WLAN 802.11 n(HT40):2422-2452 MHz<br>Bluetooth：2402~2480MHz | | |
| Transmit Power(MAX): | GSM 850: 30.70dBm<br>GSM 1900: 28.88dBm<br>WCDMA II: 21.51dBm<br>WCDMA V: 22.84dBm | 802.11b: 15.87dBm<br>802.11g: 12.26 dBm<br>802.11 n(HT20): 12.54dBm<br>802.11 n(HT40): 9.31dBm<br>Bluetooth: 5.115dBm | |
| Max. Reported SAR(1g): | Head:<br>GSM 850: 0.100 W/kg<br>GSM 1900: 0.103 W/kg<br>WCDMA II: 0.216 W/kg<br>WCDMA V: 0.262 W/kg<br>WIFI: 0.180 W/kg | Body:<br>GSM 850: 0.146 W/kg<br>GSM 1900: 0.741 W/kg<br>WCDMA II: 1.477 W/kg<br>WCDMA V: 0.228 W/kg<br>WIFI: 0.074 W/kg | Hotspot:<br>GSM 850: 0.355 W/kg<br>GSM 1900: 1.481 W/kg<br>WCDMA II: 1.477 W/kg<br>WCDMA V: 0.228 W/kg<br>WIFI: 0.074 W/kg |
| Operating Mode: | GSM: GSM Voice/GPRS/EGPRS Class 12;<br>WCDMA: RMC/HSDPA/HSUPA Release 6;<br>WLAN: 802.11 b/g/n;<br>Bluetooth: V4.0 + EDR (GFSK + $\pi$/4DQPSK+8DPSK) | | |
| Antenna Specification: | GSM/WCDMA: PIFA Antenna<br>BT/WIFI: PIFA Antenna | | |
| SIM Card | Support dual-SIM, dual standby, the multiple SIM card with two lines cannot transmitting at the same time | | |
| Hotspot Mode: | Support | | |
| DTM Mode: | Not Support | | |

## 1.2 Test Environment

Ambient conditions in the SAR laboratory:

| Items | Required | Actual |
|---|---|---|
| Temperature (℃) | 18-25 | 22~23 |
| Humidity (%RH) | 30-70 | 55~65 |

## 1.3 Test Facility

Shenzhen STS Test Services Co., Ltd.
Add. : 1/F, Building 2, Zhuoke Science Park, Chongqing Road, Fuyong, Baoan District, Shenzhen, China
FCC Registration No.: 842334;IC Registration No.: 12108A-1

# 2. Test Standards And Limits

| No. | Identity | Document Title |
|---|---|---|
| 1 | 47 CFR Part 2 | Frequency Allocations and Radio Treaty Matters; General Rules and Regulations |
| 2 | ANSI/IEEE Std. C95.1-1992 | IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz |
| 3 | IEEE Std. 1528-2013 | Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques |
| 4 | FCC KDB 447498 D01 v05r02 | Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies |
| 5 | FCC KDB 865664 D01 v01r03 | SAR Measurement 100 MHz to 6 GHz |
| 6 | FCC KDB 865664 D01 v01r03 | SAR Measurement 100 MHz to 6 GHz |
| 7 | FCC KDB 941225 D01 | SAR Measurement Procedures for 3G Devices |
| 8 | FCC KDB 248227 D01 | SAR Measurement Procedures for 802.11 a/b/g Transmitters |

This device belongs to portable device category because its radiating structure is allowed to be used within 20 centimeters of the body of the user. According to EN 50360 and 1999/519/EC the limit for General Population/Uncontrolled exposure should be applied for this device, it is 2.0 W/kg as averaged over any 10 gram of tissue.

(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 10 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**

# 3. SAR Measurement System

## 3.1 Definition Of Specific Absorption Rate (SAR)

SAR is related to the rate at which energy is absorbed per unit mass in an object exposed to a radio field. The SAR distribution in a biological body is complicated and is usually carried out by experimental techniques or numerical modeling. The standard recommends limits for two tiers of groups, occupational/controlled and general population/uncontrolled, based on a person's awareness and ability to exercise control over his or her exposure. In general, occupational/controlled exposure limits are higher than the limits for general population/uncontrolled.

The SAR definition is the time derivative (rate) of the incremental energy (dW) absorbed by (dissipated in) an incremental mass (dm) contained in a volume element (dv) of a given density (ρ). The equation description is as below:

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

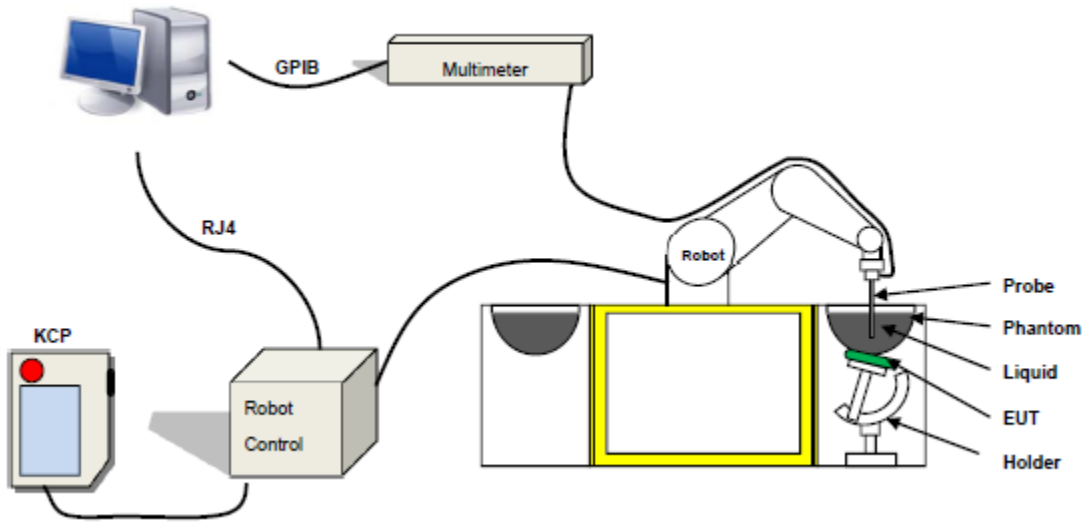
SAR is expressed in units of Watts per kilogram (W/kg) SAR measurement can be related to the electrical field in the tissue by

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

Where: σ is the conductivity of the tissue,
ρ is the mass density of the tissue and E is the RMS electrical field strength.

## 3.2 SAR System

SATIMO SAR System Diagram:




Comosar is a system that is able to determine the SAR distribution inside a phantom of human being according to different standards. The Comosar system consists of the following items:

- Main computer to control all the system
- 6 axis robot
- Data acquisition system
- Miniature E-field probe
- Phone holder
- Head simulating tissue

The following figure shows the system.


The EUT under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The OpenSAR software computes the results to give a SAR value in a 1g or 10g mass.

### 3.2.1 Probe

For the measurements the Specific Dosimetric E-Field Probe SN 17/14 EP221 with following specifications is used

- Dynamic range: 0.01-100 W/kg
- Tip Diameter :5 mm
- Distance between probe tip and sensor center: 2.7mm
- Distance between sensor center and the inner phantom surface: 4 mm (repeatability better than +/- 1mm)
- Probe linearity: ＜0.25 dB
- Axial Isotropy: ＜0.25 dB
- Spherical Isotropy: ＜0.25 dB
- Calibration range: 450MHz to 2600MHz for head & body simulating liquid.

Angle between probe axis (evaluation axis) and suface normal line:less than 30°

**Figure 1** – *Satimo COMOSAR Dosimetric E field Dipole*

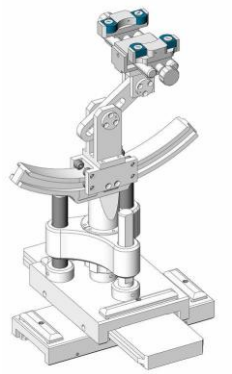
3.2.2 Phantom

For the measurements the Specific Anthropomorphic Mannequin (SAM) defined by the IEEE SCC-34/SC2 group is used. The phantom is a polyurethane shell integrated in a wooden table. The thickness of the phantom amounts to 2mm +/- 0.2mm. It enables the dosimetric evaluation of left and right phone usage and includes an additional flat phantom part for the simplified performance check. The phantom set-up includes a cover, which prevents the evaporation of the liquid.

SN 32/14 SAM115

SN 32/14 SAM116

3.2.3 Device Holder



The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5 mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of ± 20 %. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.

# 4. Tissue Simulating Liquids

## 4.1 Simulating Liquids Parameter Check

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

**LIQUID MEASUREMENT RESULTS**

**Date:** Jan.23, 2015 **Ambient condition:** Temperature 22.7°C **Relative humidity:** 49%

| Head Simulating Liquid | | Parameters | Target | Measured | Deviation[%] | Limited[%] |
|---|---|---|---|---|---|---|
| Frequency | Temp. [°C] | | | | | |
| 835 MHz | 22.30 | Permitivity: | 41.50 | 41.27 | -0.55 | ±5 |
| | | Conductivity: | 0.90 | 0.91 | 1.11 | ± 5 |
| 1900 MHz | 22.30 | Permitivity: | 40.00 | 39.57 | -1.07 | ± 5 |
| | | Conductivity: | 1.40 | 1.403 | 0.21 | ± 5 |
| 2450 MHz | 22.30 | Permitivity: | 39.2 | 37.8 | -3.5 | ± 5 |
| | | Conductivity: | 1.80 | 1.86 | 3.3 | ± 5 |

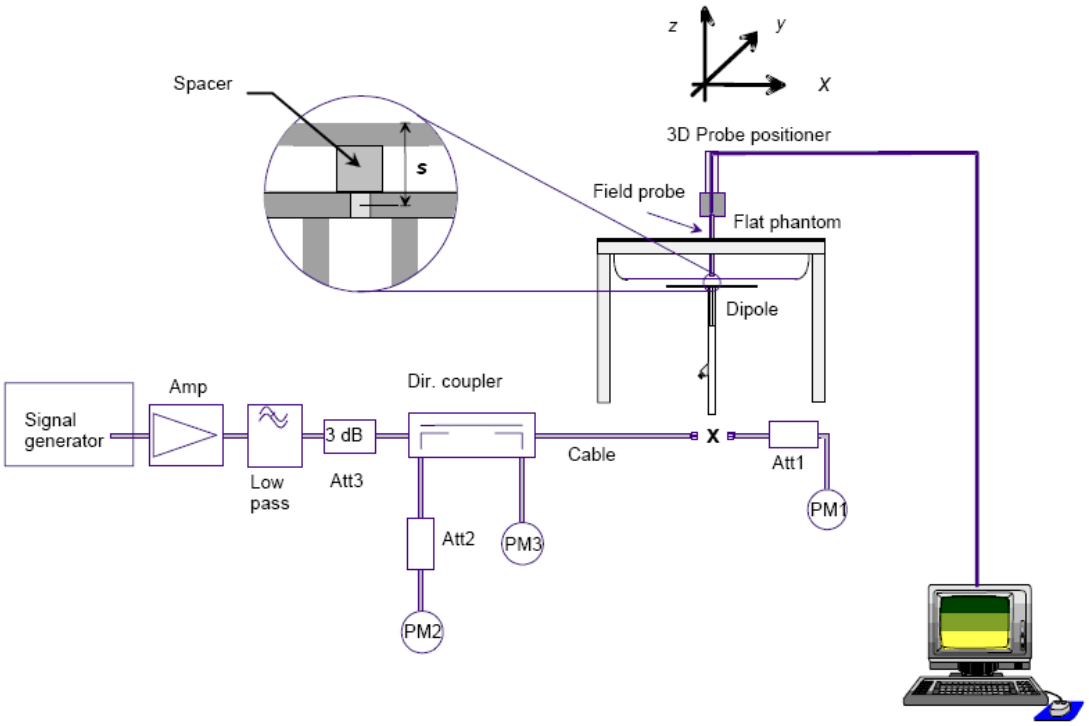
| Body Simulating Liquid | | Parameters | Target | Measured | Deviation[%] | Limited[%] |
|---|---|---|---|---|---|---|
| Frequency | Temp. [°C] | | | | | |
| 835 MHz | 22.30 | Permitivity: | 55.20 | 55.50 | 0.54 | ± 5 |
| | | Conductivity: | 0.97 | 0.96 | -1.03 | ± 5 |
| 1900 MHz | 22.30 | Permitivity: | 53.30 | 51.68 | -3.04 | ± 5 |
| | | Conductivity: | 1.52 | 1.51 | 0.66 | ± 5 |
| 2450 MHz | 22.30 | Permitivity: | 52.7 | 51.2 | -2.9 | ± 5 |
| | | Conductivity: | 1.95 | 1.95 | 0.0 | ± 5 |

# 5. SAR System Validation

## 5.1 Validation System

Each SATIMO system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the SATIMO software, enable the user to conduct the system performance check and system validation. System kit includes a dipole, and dipole device holder.

The system check verifies that the system operates within its specifications. It's performed daily or before every SAR measurement. The system check uses normal SAR measurement in the flat section of the phantom with a matched dipole at a specified distance. The system validation setup is shown as below.




## 5.2 Validation Result

Comparing to the original SAR value provided by SATIMO, the validation data should be within its specification of 10 %.

**Ambient condition:** Temperature 22.7°C **Relative humidity:** 49%

| Freq.(MHz) | Power(mW) | Tested Value (W/Kg) | Normalized SAR (W/kg) | Target(W/Kg) | Tolerance(%) | Date |
|---|---|---|---|---|---|---|
| 835 Head | 100 | 0.937 | 9.37 | 9.71 | -3.50 | 2015-01-23 |
| 835 Body | 100 | 0.968 | 9.68 | 10.19 | -5.00 | 2015-01-23 |
| 1900 Head | 100 | 3.840 | 38.4 | 40.01 | -4.02 | 2015-01-23 |
| 1900 Body | 100 | 4.142 | 41.42 | 40.32 | 2.73 | 2015-01-23 |
| 2450 Head | 100 | 3.922 | 39.22 | 39.20 | 2.91 | 2015-01-23 |
| 2450 Body | 100 | 5.123 | 51.23 | 52.37 | -2.18 | 2015-01-23 |

Note: The tolerance limit of System validation ±10%.

# 6. SAR Evaluation Procedures

The procedure for assessing the average SAR value consists of the following steps:
The following steps are used for each test position

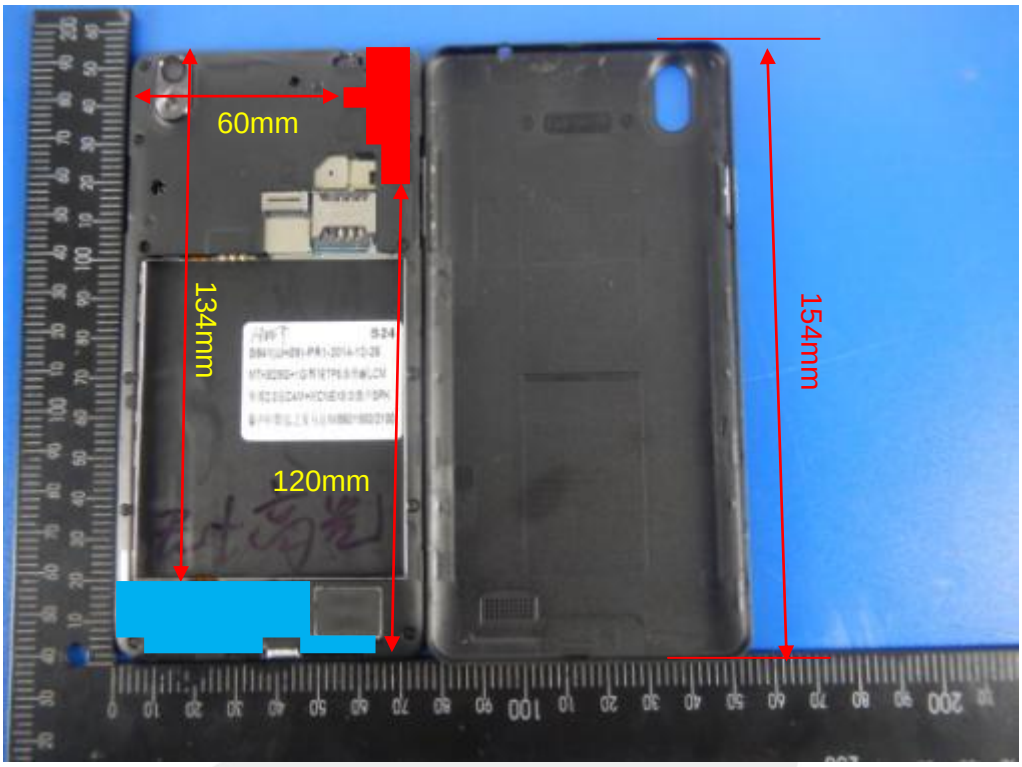
- Establish a call with the maximum output power with a base station simulator. The connection between the mobile and the base station simulator is established via air interface
- Measurement of the local E-field value at a fixed location. This value serves as a reference value for calculating a possible power drift.
- Measurement of the SAR distribution with a grid of 8 to 16mm * 8 to16 mm and a constant distance to the inner surface of the phantom. Since the sensors cannot directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With these values the area of the maximum SAR is calculated by an interpolation scheme.
- Around this point, a cube of 30 * 30 * 30 mm or 32 * 32 * 32 mm is assessed by measuring 5 or 8 * 5 or 8*4 or 5 mm. With these data, the peak spatial-average SAR value can be calculated.

➢ Area Scan& Zoom Scan

First Area Scan is used to locate the approximate location(s) of the local peak SAR value(s). The measurement grid within an Area Scan is defined by the grid extent, grid step size and grid offset. Next, in order to determine the EM field distribution in a three-dimensional spatial extension, Zoom Scan is required. The Zoom Scan is performed around the highest E-field value to determine the averaged SAR-distribution over 10 g. Area scan and zoom scan resolution setting follows KDB 865664 D01v01r01 quoted below.
When the 1-g SAR of the highest peak is within 2 dB of the SAR limit, additional zoom scans are required for other peaks within 2 dB of the highest peak that have not been included in any zoom scan to ensure there is no increase in SAR.

# 7. EUT Antenna Location Sketch

It is a 3G MOBILE PHONE, support GSM mode and WCDMA mode.




WWAN Antenna

WIFI/BT Antenna

## 7.1 SAR TEST EXCLUSION CONSIDER TABLE

According with FCC KDB 447498 D01v05r02，appendix A，<SAR test exclusion thresholds for 100MHz~6GHz and≤50mm＞table，this device SAR test configurations consider as following：

| Band | Test position configurations | | | | | |
|---|---|---|---|---|---|---|
| | Front | Back | Left edge | Right edge | Top edge | Bottom edge |
| GSM850 | ＜5mm | ＜5mm | ＜5mm | ＜5mm | 134mm | ＜5mm |
| | Yes | Yes | Yes | Yes | No | Yes |
| GSM1900 | ＜5mm | ＜5mm | ＜5mm | ＜5mm | 134mm | ＜5mm |
| | Yes | Yes | Yes | Yes | No | Yes |
| WCDMA Band2 | ＜5mm | ＜5mm | ＜5mm | ＜5mm | 134mm | ＜5mm |
| | Yes | Yes | Yes | Yes | No | Yes |
| WCDMA Band5 | ＜5mm | ＜5mm | ＜5mm | ＜5mm | 134mm | ＜5mm |
| | Yes | Yes | Yes | Yes | No | Yes |
| WLAN | ＜5mm | ＜5mm | 60mm | ＜5mm | ＜5mm | 120mm |
| | Yes | Yes | No | Yes | Yes | No |
| Bluetooth | ＜5mm | ＜5mm | 60mm | ＜5mm | ＜5mm | 120mm |
| | Yes | Yes | No | Yes | Yes | No |

**Note：**

1. maximum power is the source-based time-average power and represents the maximum RF output power among production units.
2. per KDB 447498 D01v05r02, for larger devices, the test separation distance of adjacent edge configuration is determined by the closest separation between the antenna and the user.
3. per KDB 447498 D01v05r02, standalone SAR test exclusion threshold is applied; if the distance of the antenna to the user is <5mm, 5mm is user to determine SAR exclusion threshold
4. per KDB 447498 D01v05r02, the 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distance ≤50mm are determined by:
   [(max.power of channel, including tune-up tolerance, Mw)/( min. test separation distance, mm)]*[√f(GHZ)]≤3.0 for 1-g SAR and≤7.5 for10-g extremity SAR
   f(GHz) is the RF channel transmit frequency in GHz
   Power and distance are rounded to the nearest mW and mm before calculation
   The result is rounded to one decimal place for comparison
   For <50mm distance, we just calculate mW of the exclusion threshold value(3.0)to do compare
5. per KDB 447498 D01v05r02, at 100 MHz to 6GHz and for test separation distances >50mm, the SAR test exclusion threshold is determined according to the following

a)[threshold at 50mm in step 1]+(test separation distance -50mm)*(f (MHz)/150)]Mw, at 100 MHz to 1500 MHz

b) [threshold at 50mm in step1]+( test separation distance -50mm) *10]mW at＞1500MHz and≤6GHz

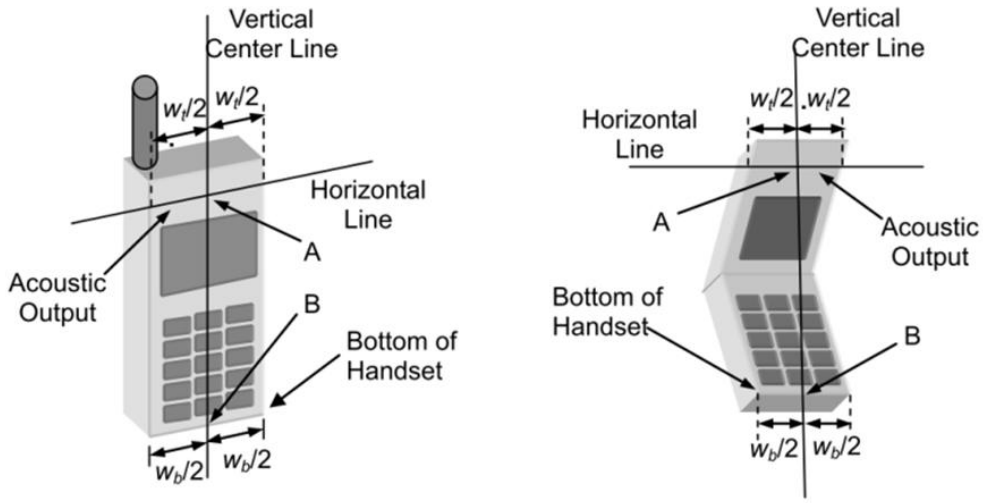
6. Per KDB 447498 D02v02r02,RMC 12.2kbps setting is used to evaluate SAR. If HSDPA/HSUPA/DC-HSDPA output power is<0.25db higher than RMC 12.2Kbps,or reported SAR with RMC 12.2kbps setting is ≤1.2W/Kg, HSDPA/HSUPA/DC-HSDPA SAR evaluation can be excluded.
7. Per KDB 248227 D01v01r02,choose the highest output power channel to test SAR and determine futher SAR exclusion 8.for each frequency band ,testing at higher data rates and higher order modulations is not required when the maximum average output power for each of each of these configurations is less than 1/4db higher than those measured at the lower data rate than 11b mode ,thus the SAR can be excluded.

# 8. EUT Test Position

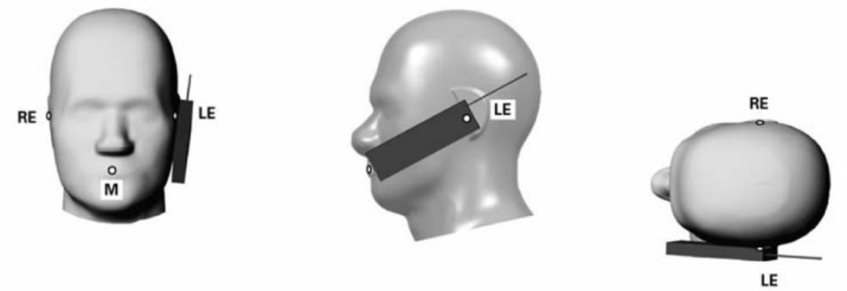
This EUT was tested in Right Cheek, Right Titled, Left Cheek, Left Titled, Front Face and Rear Face.

## 8.1 Define Two Imaginary Lines On The Handset

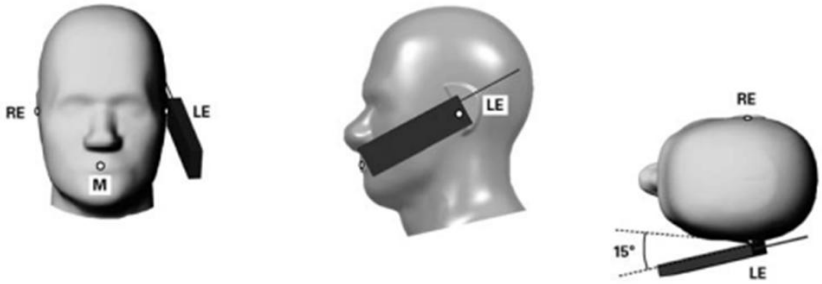
(1)The vertical centerline passes through two points on the front side of the handset the midpoint of the width wt of the handset at the level of the acoustic output, and the midpoint of the width wb of the handset.
(2)The horizontal line is perpendicular to the vertical centerline and passes through the center of the acoustic output. The horizontal line is also tangential to the face of the handset at point A.
(3)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 to the front face of the handset, especially for clamshell handsets, handsets with flip covers, and other irregularly shaped handsets.



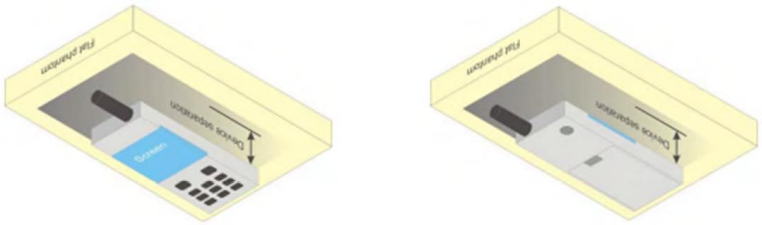

Cheek Position
1)To position the device with the vertical center line of the body of the device and the horizontal line crossing the center piece in a plane parallel to the sagittal plane of the phantom. While maintaining the device in this plane, align the vertical center line with the reference plane containing the ear and mouth reference point (M: Mouth, RE: Right Ear, and LE: Left Ear) and align the center of the ear piece with the line RE-LE.
2)To move the device towards the phantom with the ear piece aligned with the the line LE-RE until the phone touched the ear. While maintaining the device in the reference plane and maintaining the phone contact with ear, move the bottom of the phone until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost




Title Position
(1)To position the device in the “cheek” position described above.
(2) While maintaining the device in the reference plane described above and pivoting against the ear, moves it outward away from the mouth by an angle of 15 degrees or until with the ear is lost.

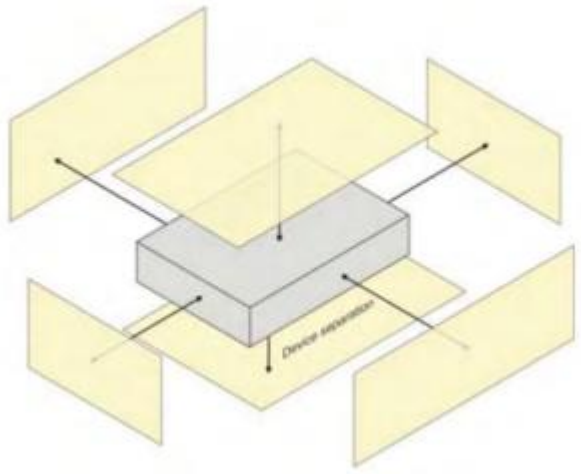



Body-worn Position Conditions
(1) To position the EUT parallel to the phantom surface.
(2) To adjust the EUT parallel to the flat phantom.
(3) To adjust the distance between the EUT surface and the flat phantom to 5mm.



## 8.2 Hotspot mode exposure position condition

For handsets that support hotspot mode operations, with wireless router capabilities and various web browsing function, the relevant hand and body exposure condition are tested according to the hotspot SAR procedures in KDB 941225. A test separation distance of 10 mm is required between the phantom and all surface and edges with a transmitting antenna located within 25 mm form that surface or edge. When form factor of a handset is smaller than 9cm x 5cm, a test separation distance of 5mm(instead of 10mm)is required for testing hotspot mode. When the separate distance required for body-worn accessory testing is larger than or equal to that tested for hotspot mode, in the same wireless mode and for the same surface of the phone, the hotspot mode SAR data may be used to support body-worn accessory SAR compliance for that particular configuration(surface).



# 9. Measurement Uncertainty

The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in IEEE 1528: 2003.This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

| NO | Source | Tol(%) | Prob. Dist. | Div. k | ci (1g) | ci (10g) | 1gUi | 10gUi | Veff |
|---|---|---|---|---|---|---|---|---|---|
| Measurement System | | | | | | | | | |
| 1 | Probe calibration | 5.8 | N | 1 | 1 | 1 | 5.8 | 5.8 | ∞ |
| 2 | Axial isotropy | 3.5 | R | √3 | $(1\text{-cp})^{1/2}$ | $(1\text{-cp})^{1/2}$ | 1.43 | 1.43 | ∞ |
| 3 | Hemispherical isotropy | 5.9 | R | √3 | $\sqrt{C_p}$ | $\sqrt{C_p}$ | 2.41 | 2.41 | ∞ |
| 4 | Boundary effect | 1.0 | R | √3 | 1 | 1 | 0.58 | 0.58 | ∞ |
| 5 | Linearity | 4.7 | R | √3 | 1 | 1 | 2.71 | 2.71 | ∞ |
| 6 | System Detection limits | 1.0 | R | √3 | 1 | 1 | 0.58 | 0.58 | ∞ |
| 7 | Readout electronics | 0.5 | N | 1 | 1 | 1 | 0.50 | 0.50 | ∞ |
| 8 | Response time | 0 | R | √3 | 1 | 1 | 0 | 0 | ∞ |
| 9 | Integration time | 1.4 | R | √3 | 1 | 1 | 0.81 | 0.81 | ∞ |
| 10 | Ambient noise | 3.0 | R | √3 | 1 | 1 | 1.73 | 1.73 | ∞ |
| 11 | Ambient reflections | 3.0 | R | √3 | 1 | 1 | 1.73 | 1.73 | ∞ |
| 12 | Probe positioner mech. restrictions | 1.4 | R | √3 | 1 | 1 | 0.81 | 0.81 | ∞ |
| 13 | Probe positioning with respect to phantom shell | 1.4 | R | √3 | 1 | 1 | 0.81 | 0.81 | ∞ |
| 14 | Max.SAR evaluation | 1.0 | R | √3 | 1 | 1 | 0.6 | 0.6 | ∞ |
| Test sample related | | | | | | | | | |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| 15 | Device positioning | 2.6 | N | 1 | 1 | 1 | 2.6 | 2.6 | 11 |
| 16 | Device holder | 3 | N | 1 | 1 | 1 | 3.0 | 3.0 | 7 |
| 17 | Drift of output power | 5.0 | R | √3 | 1 | 1 | 2.89 | 2.89 | ∞ |
| Phantom and set-up | | | | | | | | | |
| 18 | Phantom uncertainty | 4.0 | R | √3 | 1 | 1 | 2.31 | 2.31 | ∞ |
| 19 | Liquid conductivity (target) | 2.5 | N | 1 | 0.78 | 0.71 | 1.95 | 1.78 | 5 |
| 20 | Liquid conductivity (meas) | 4 | N | 1 | 0.23 | 0.26 | 0.92 | 1.04 | 5 |
| 21 | Liquid Permittivity (target) | 2.5 | N | 1 | 0.78 | 0.71 | 1.95 | 1.78 | ∞ |
| 22 | Liquid Permittivity (meas) | 5.0 | N | 1 | 0.23 | 0.26 | 1.15 | 1.30 | ∞ |
| Combined standard | | | RSS | $U_C = \sqrt{\sum_{i=1}^{n} C_i^2 U_i^2}$ | | | 10.63% | 10.54% | |
| Expanded uncertainty (P=95%) | | $U = k\, U_C$ ,k=2 | | | | | 21.26% | 21.08% | |

## 10. Conducted Power Measurement

## Test Result:

| Burst Average Power (dBm) | | | | | | |
|---|---|---|---|---|---|---|
| Band | GSM 850 | | | PCS 1900 | | |
| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
| Frequency (MHz) | 824.2 | 836.6 | 848.8 | 1850.2 | 1880.0 | 1909.8 |
| GSM(GMSK, 1-Slot) | 30.68 | 30.70 | 30.61 | 28.88 | 28.56 | 28.64 |
| GPRS (GMSK, 1-Slot) | 30.66 | 30.66 | 30.57 | 28.86 | 28.55 | 28.63 |
| GPRS (GMSK, 2-Slot) | 29.51 | 29.56 | 29.43 | 27.75 | 27.48 | 27.57 |
| GPRS (GMSK, 3-Slot) | 27.33 | 27.43 | 27.26 | 25.68 | 25.45 | 25.41 |
| GPRS (GMSK, 4-Slot) | 26.18 | 26.42 | 26.25 | 24.61 | 24.34 | 24.28 |
| EGPRS(8PSK, 1-Slot) | 30.62 | 30.62 | 30.53 | 28.83 | 28.52 | 28.61 |
| EGPRS(8PSK, 2-Slot) | 29.52 | 29.53 | 29.45 | 27.72 | 27.48 | 27.41 |
| EGPRS(8PSK, 3-Slot) | 27.39 | 27.39 | 27.32 | 25.70 | 25.36 | 25.40 |
| EGPRS(8PSK, 4-Slot) | 26.31 | 26.27 | 26.29 | 24.53 | 24.29 | 24.21 |
| Remark: GPRS, CS4 coding scheme. EGPRS, MCS9 coding scheme.<br>Multi-Slot Class 8 , Support Max 4 downlink, 1 uplink , 5 working link<br>Multi-Slot Class 10 , Support Max 4 downlink, 2 uplink , 5 working link<br>Multi-Slot Class 12 , Support Max 4 downlink, 4 uplink , 5 working link | | | | | | |

| Fram- Average Power(dBm) | | | | | | |
|---|---|---|---|---|---|---|
| Band | GSM 850 | | | PCS 1900 | | |
| Channel | 128 | 190 | 251 | 512 | 661 | 810 |
| Frequency (MHz) | 824.2 | 836.6 | 848.8 | 1850.2 | 1880.0 | 1909.8 |
| GSM(GMSK, 1-Slot) | 21.68 | 21.7 | 21.61 | 19.88 | 19.56 | 19.64 |
| GPRS (GMSK, 1-Slot) | 21.66 | 21.66 | 21.57 | 19.86 | 19.55 | 19.63 |
| GPRS (GMSK, 2-Slot) | 23.51 | 23.56 | 23.43 | 21.75 | 21.48 | 21.57 |
| GPRS (GMSK, 3-Slot) | 23.07 | 23.17 | 23.00 | 21.42 | 21.19 | 21.15 |
| GPRS (GMSK, 4-Slot) | 23.18 | 23.42 | 23.25 | 21.61 | 21.34 | 21.28 |
| EGPRS(8PSK, 1-Slot) | 21.62 | 21.62 | 21.53 | 19.83 | 19.52 | 19.61 |
| EGPRS(8PSK, 2-Slot) | 23.52 | 23.53 | 23.45 | 21.72 | 21.48 | 21.41 |
| EGPRS(8PSK, 3-Slot) | 23.13 | 23.13 | 23.06 | 21.44 | 21.10 | 21.14 |
| EGPRS(8PSK, 4-Slot) | 23.31 | 23.27 | 23.29 | 21.53 | 21.29 | 21.21 |
| Remark :<br>1. SAR testing was performed on the maximum frame-averaged power mode.<br>2. The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum<br>burst-averaged power based on time slots. The calculated method is shown as below:<br>Frame-averaged power = Burst averaged power (1 Tx Slot) - 9 dB<br>Frame-averaged power = Burst averaged power (2 Tx Slots) - 6 dB<br>Frame-averaged power = Burst averaged power (3 Tx Slots) - 4.26 dB<br>Frame-averaged power = Burst averaged power (4 Tx Slots) - 3 dB | | | | | | |

| Band | WCDMA Band V | | | WCDMA Band II | | |
|---|---|---|---|---|---|---|
| Channel | 4132 | 4182 | 4233 | 9263 | 9400 | 9537 |
| Frequency (MHz) | 826.4 | 836.6 | 846.6 | 1852.4 | 1880.0 | 1907.6 |
| RMC 12.2Kbps | 22.64 | 22.48 | 22.84 | 21.51 | 21.36 | 21.24 |
| HSDPA Subtest-1 | 22.60 | 22.45 | 22.79 | 21.42 | 21.33 | 21.18 |
| HSDPA Subtest-2 | 21.48 | 21.41 | 21.64 | 20.27 | 20.25 | 20.10 |
| HSDPA Subtest-3 | 20.96 | 20.82 | 21.11 | 19.77 | 19.74 | 19.55 |
| HSDPA Subtest-4 | 20.26 | 20.28 | 20.44 | 19.20 | 19.18 | 18.93 |
| HSUPA Subtest-1 | 22.53 | 22.41 | 22.76 | 21.36 | 21.29 | 21.14 |
| HSUPA Subtest-2 | 21.47 | 21.22 | 21.76 | 20.24 | 20.23 | 20.12 |
| HSUPA Subtest-3 | 20.47 | 20.36 | 20.25 | 19.65 | 19.59 | 19.45 |
| HSUPA Subtest-4 | 20.29 | 20.10 | 20.45 | 19.10 | 19.05 | 18.94 |
| HSUPA Subtest-5 | 19.69 | 19.47 | 19.84 | 18.41 | 18.37 | 18.34 |

According to 3GPP 25.101 sub-clause 6.2.2 , the maximum output power is allowed to be reduced by following the table.

Table 6.1A: UE maximum output power with HS-DPCCH and E-DCH

| UE Transmit Channel Configuration | CM(db) | MPR(db) |
|---|---|---|
| For all combinations of ,DPDCH,DPCCH HS-DPDCH,E-DPDCH and E-DPCCH | 0≤ CM≤3.5 | MAX(CM-1,0) |
| Note: CM=1 for βc/βd=12/15, βhs/ βc=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. | | |

The device supports MPR to solve linearity issues (ACLR or SEM) due to the higher peak-to average ratios (PAR) of the HSUPA signal. This prevents saturating the full range of the TX DAC inside of device and provides a reduced power output to the RF transceiver chip according to the Cubic Metric (a function of the combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH).

When E-DPDCH channels are present the beta gains on those channels are reduced firsts to try to get the power under the allowed limit. If the beta gains are lowered as far as possible, then a hard limiting is applied at the maximum allowed level.

The SW currently recalculates the cubic metric every time the beta gains on the E-DPDCH are reduced. The cubic metric will likely get lower each time this is done .However, there is no reported reduction of maximum output power in the HSUPA mode since the device also provides a compensation for the power back-off by increasing the gain of TX_AGC in the transceiver (PA) device.

The end effect is that the DUT output power is identical to the case where there is no MPR in the device.

**WIFI**

| Mode | Channel Number | Frequency (MHz) | PEAK Power (dBm) |
|---|---|---|---|
| 802.11b | 1 | 2412 | 15.21 |
| | 6 | 2437 | 15.30 |
| | 11 | 2462 | 15.87 |
| 802.11g | 1 | 2412 | 11.30 |
| | 6 | 2437 | 12.21 |
| | 11 | 2462 | 12.26 |
| 802.11n(HT-20) | 1 | 2412 | 11.23 |
| | 6 | 2437 | 12.54 |
| | 11 | 2462 | 11.72 |
| 802.11n(HT-40) | 3 | 2422 | 8.56 |
| | 6 | 2437 | 9.31 |
| | 9 | 2452 | 9.17 |

**BT 3.0**

| Mode | Channel Number | Frequency (MHz) | PEAK Power (dBm) |
|---|---|---|---|
| GFSK(1M) | 0 | 2402 | 4.329 |
| | 39 | 2441 | 4.857 |
| | 78 | 2480 | 5.115 |
| π/4-DQPSK(2Mbps) | 0 | 2402 | 3.668 |
| | 39 | 2441 | 4.218 |
| | 78 | 2480 | 4.370 |
| 8-DPSK(3Mbps) | 0 | 2402 | 3.762 |
| | 39 | 2441 | 4.298 |
| | 78 | 2480 | 4.882 |

**BT 4.0**

| Mode | Channel Number | Frequency (MHz) | PEAK Power (dBm) |
|---|---|---|---|
| GFSK | 0 | 2402 | -3.396 |
| | 20 | 2441 | -3.091 |
| | 40 | 2480 | -2.996 |

| Mode | GSM850 | GSM1900 |
|---|---|---|
| GSM/PCS | 30±1dBm | 28±1dBm |
| GPRS (1 Slot) | 30±1dBm | 28±1dBm |
| GPRS (2 Slot) | 29±1dBm | 27±1dBm |
| GPRS (3 Slot) | 27±1dBm | 25±1dBm |
| GPRS (4 Slot) | 26±1dBm | 24±1dBm |
| EDGE (1 Slot) | 30±1dBm | 28±1dBm |
| EDGE (2 Slot) | 29±1dBm | 27±1dBm |
| EDGE (3 Slot) | 27±1dBm | 25±1dBm |
| EDGE (4 Slot) | 26±1dBm | 24±1dBm |

| Mode | WCDMA Band V | WCDMA Band II |
|---|---|---|
| AMR | 22±1dBm | 21.1±0.5dBm |
| HSDPA Subtest-1 | 22±1dBm | 21±0.5dBm |
| HSDPA Subtest-2 | 21±1dBm | 20±0.5dBm |
| HSDPA Subtest-3 | 20±1dBm | 19±1dBm |
| HSDPA Subtest-4 | 20±1dBm | 19±1dBm |
| HSUPA Subtest-1 | 22±1dBm | 21±0.5dBm |
| HSUPA Subtest-2 | 21±1dBm | 20±0.5dBm |
| HSUPA Subtest-3 | 20±1dBm | 19±1dBm |
| HSUPA Subtest-4 | 20±1dBm | 19±0.5dBm |
| HSUPA Subtest-5 | 19±1dBm | 18±0.5dBm |

| Mode | WIFI |
|---|---|
| IEEE 802.11b | 15±1dBm |
| IEEE 802.11g | 12±1dBm |
| IEEE 802.11n HT20 | 12±1dBm |
| IEEE 802.11n HT40 | 9±1dBm |

| Mode | BT 3.0 |
|---|---|
| GFSK | 5±1dBm |
| π/4-DQPSK | 4±1dBm |
| 8DPSK | 4±1dBm |

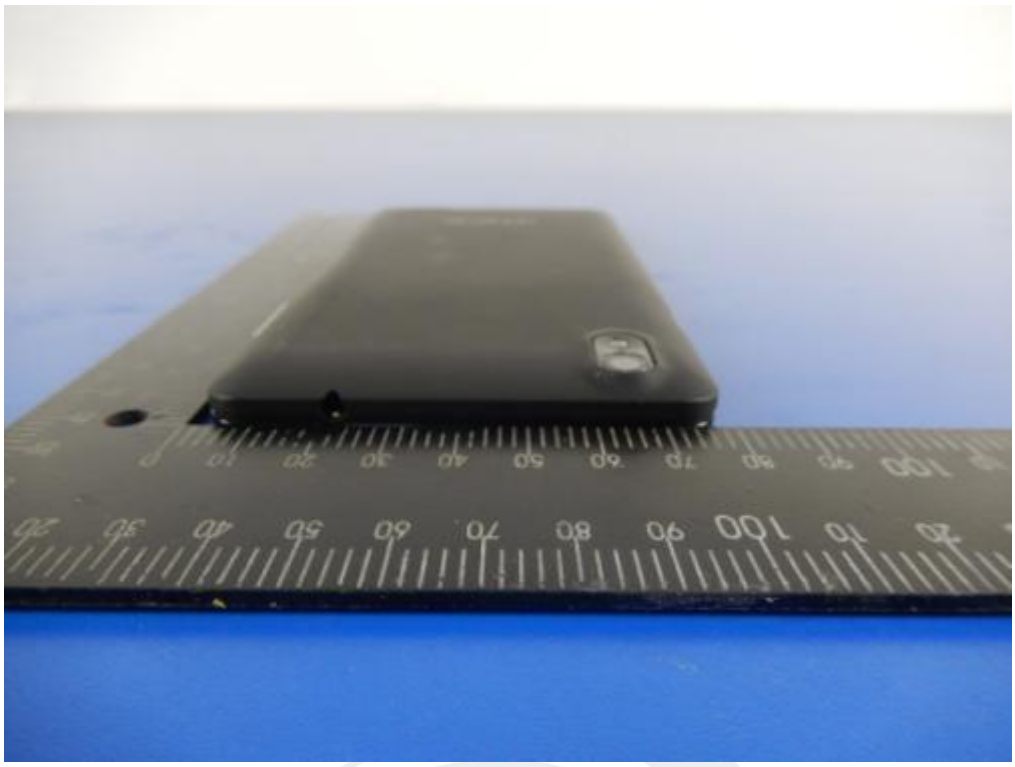
| Mode | BT 4.0 |
|---|---|
| GFSK | -3±1dBm |

# 11. EUT And Test Setup Photo

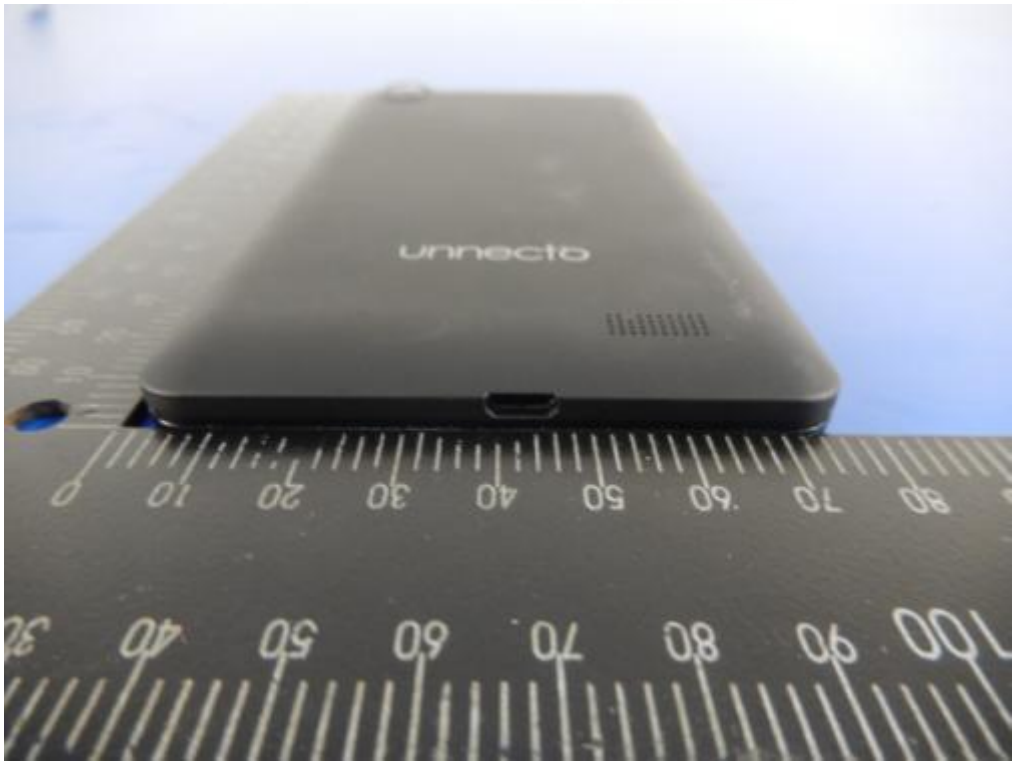
## 11.1 EUT Photo

Front side

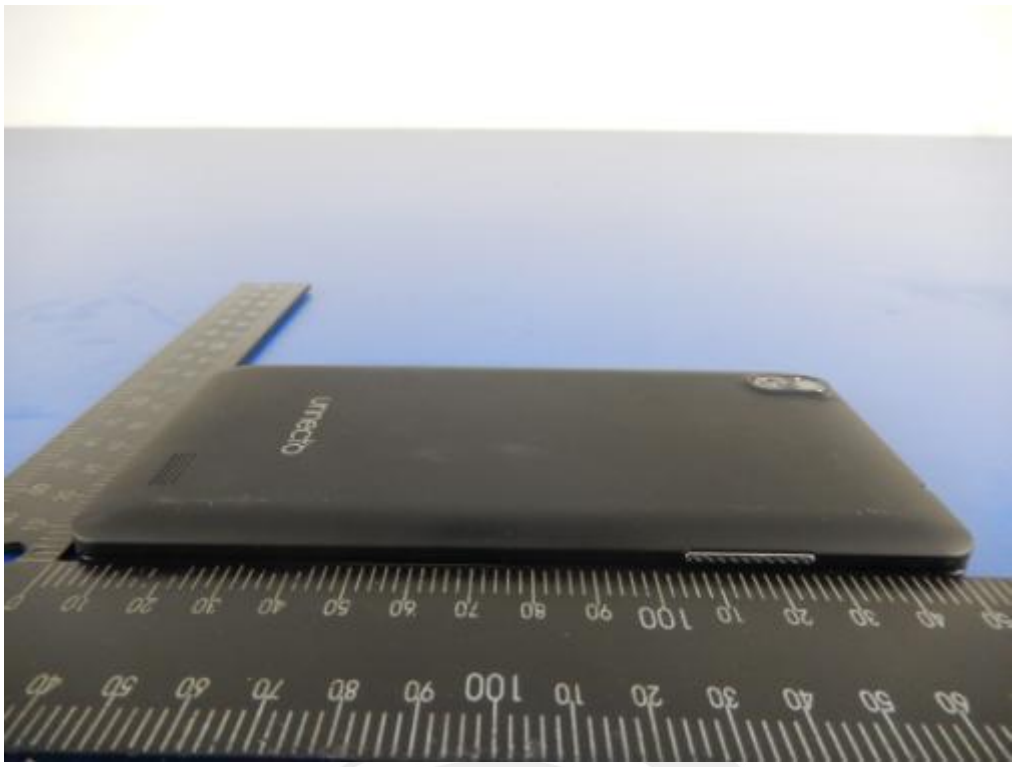

Back side



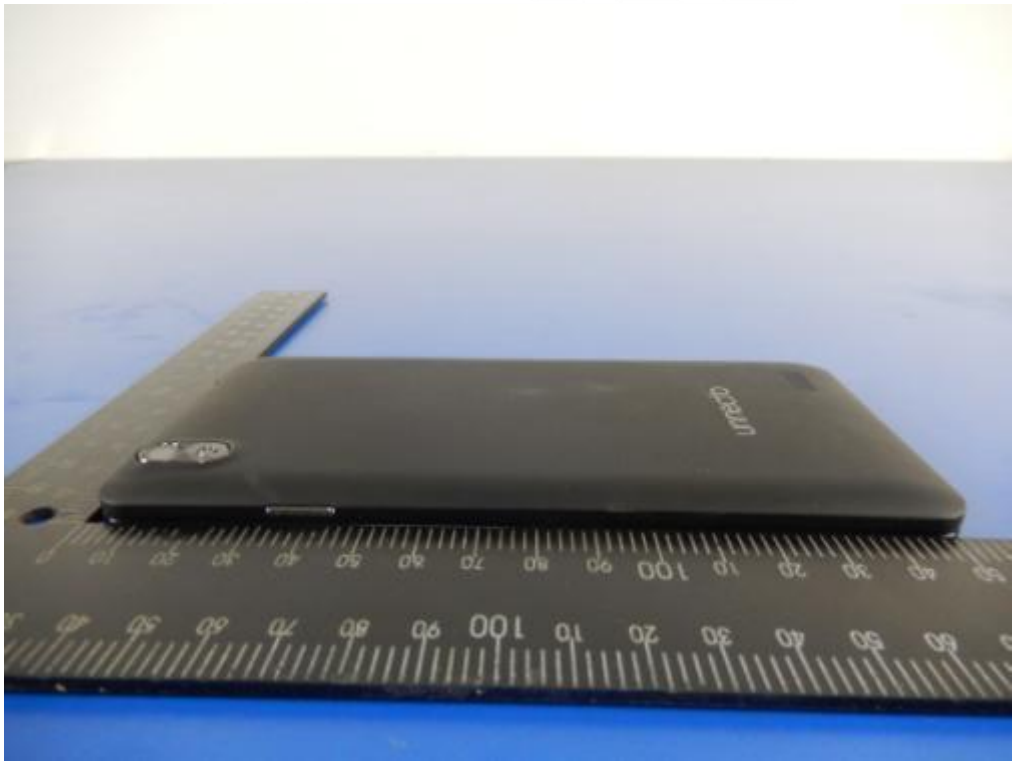
Top side




Bottom side

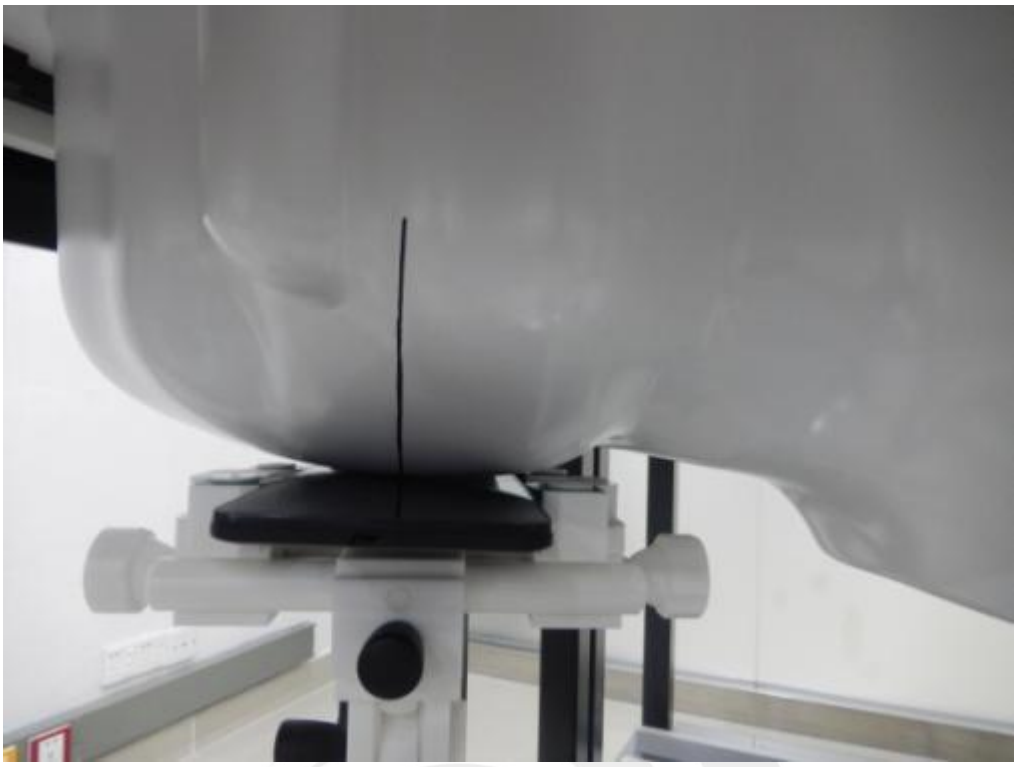


Left side

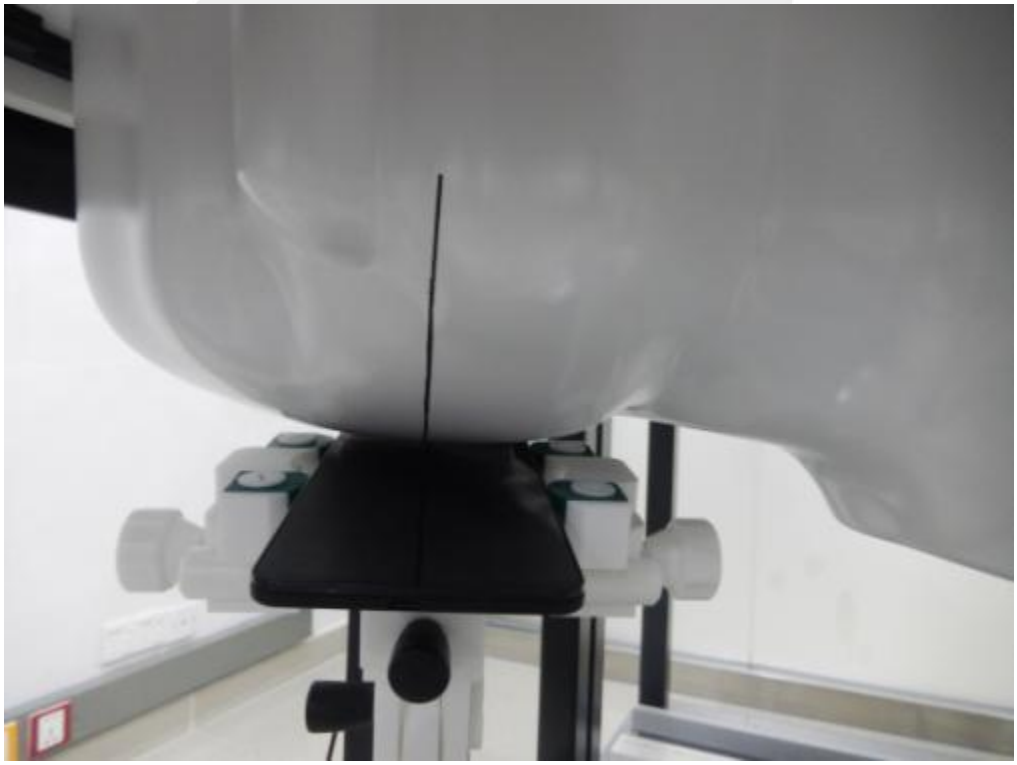


Right side

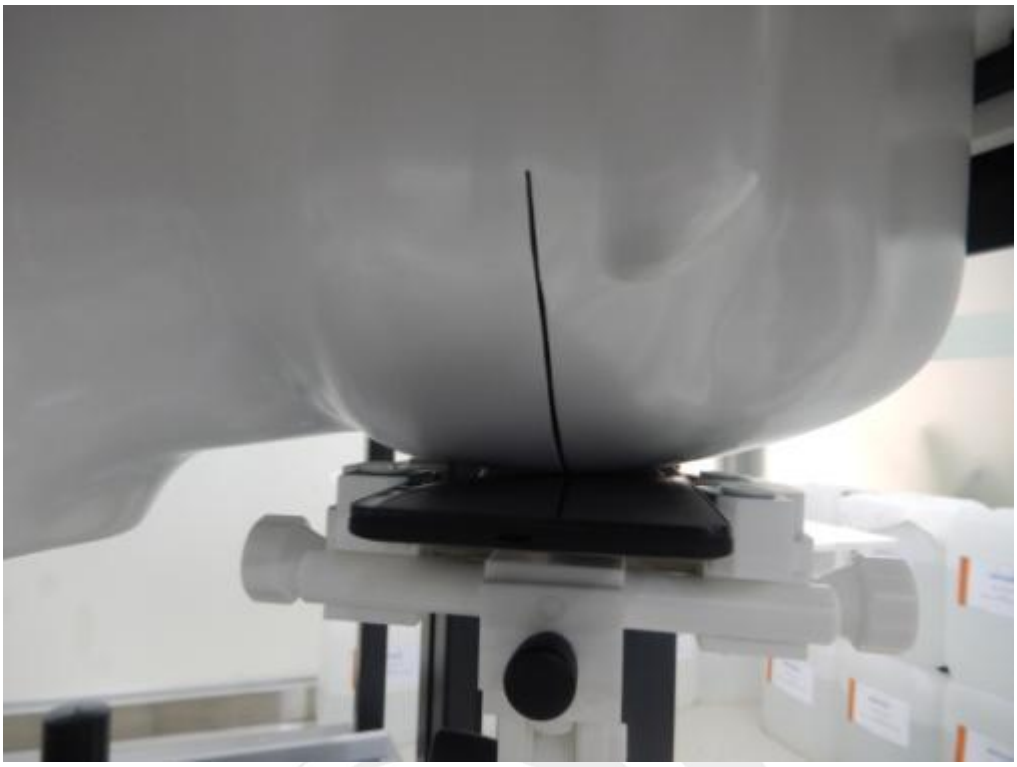
## 11.2 Setup Photo



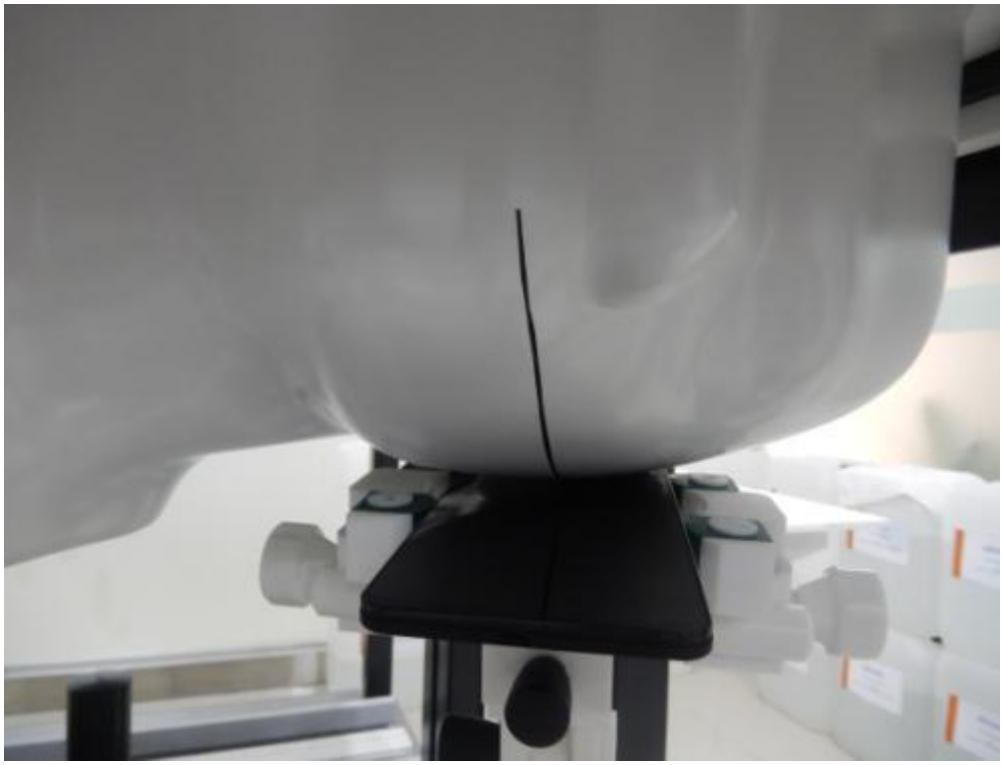
Right Touch



Right Tilt



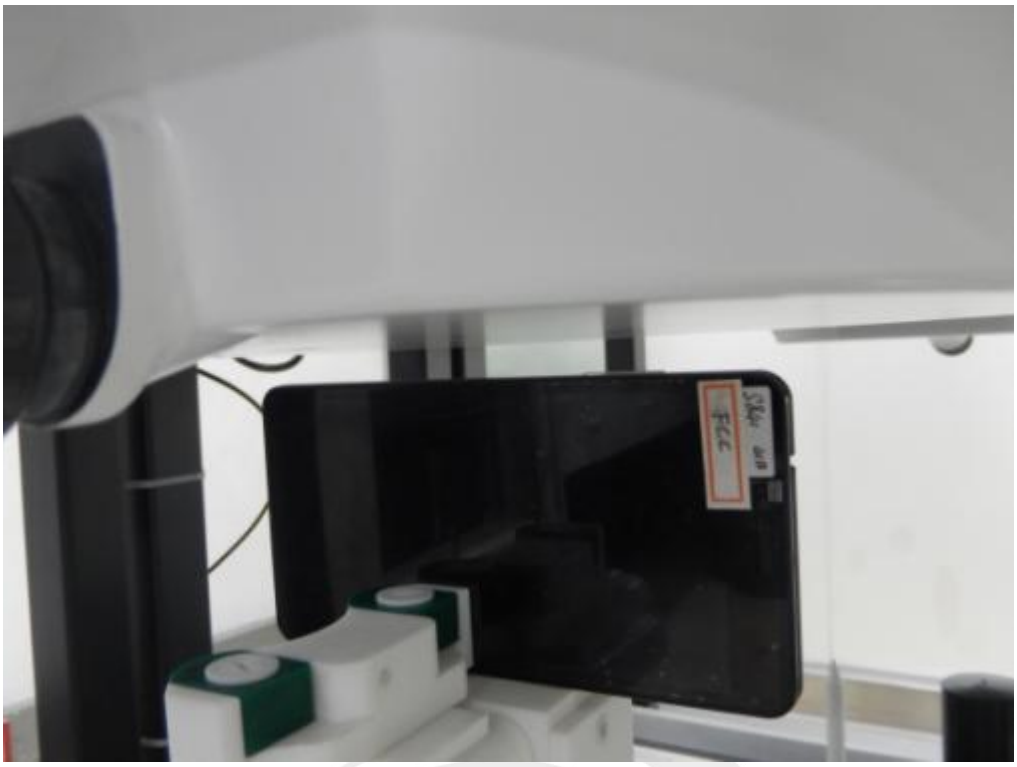
Left Touch



Left Tilt

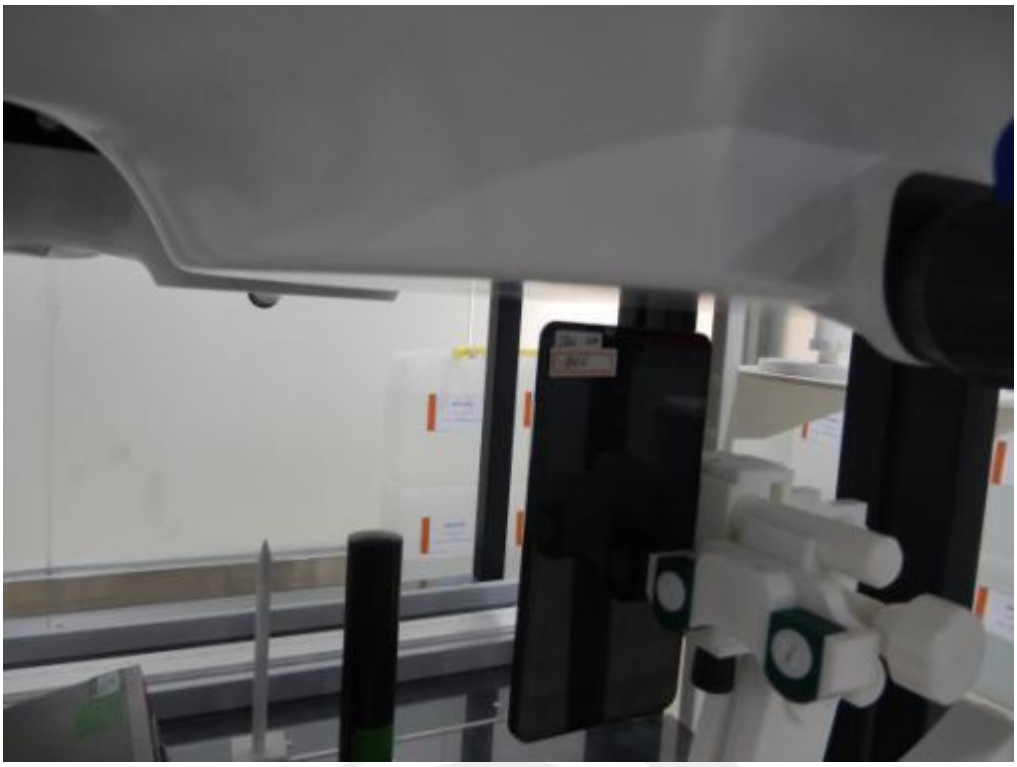

Body Front side

Body Back side

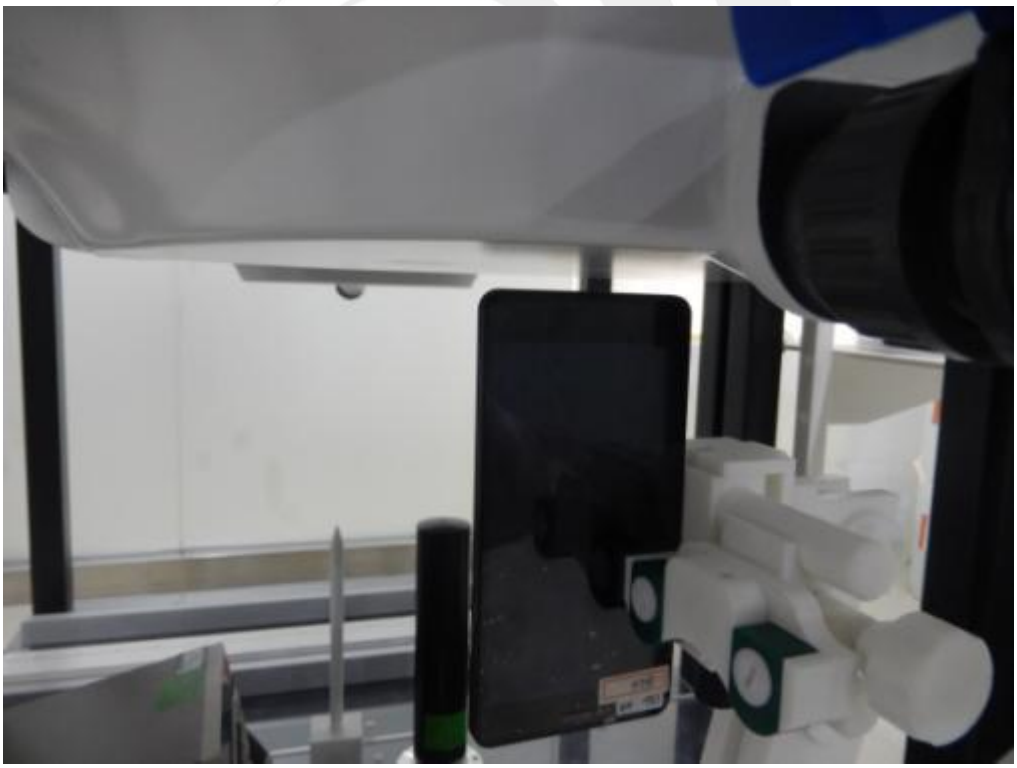


Body left side

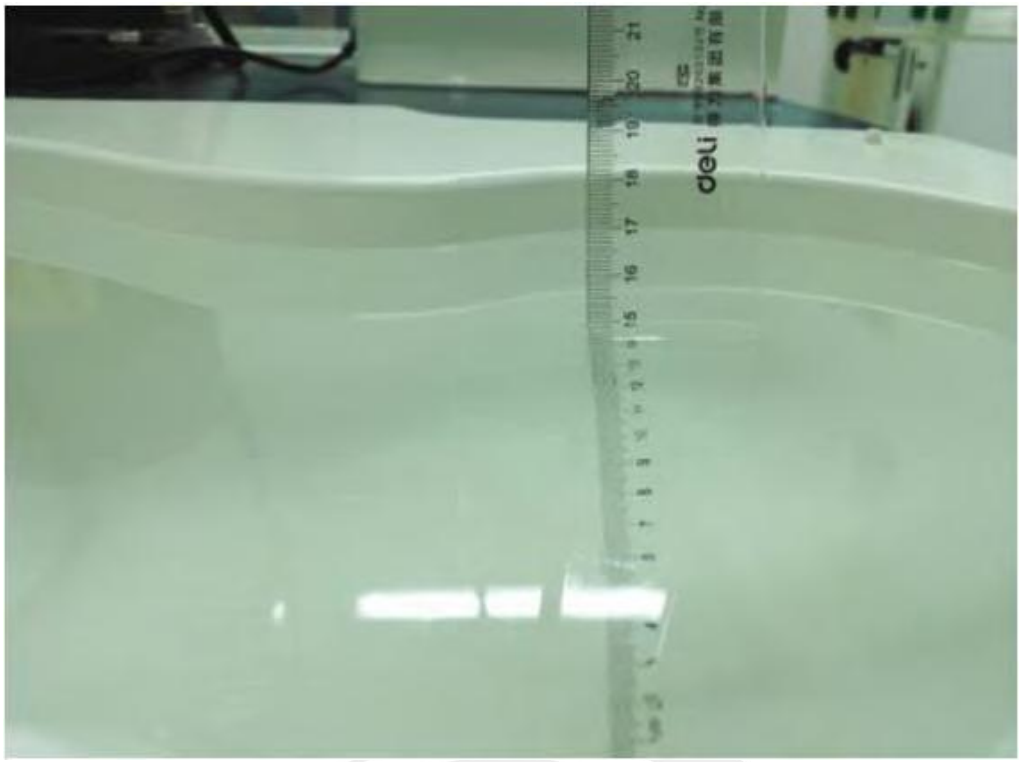
Body right side



Body top side



Body bottom side




Liquid depth (15 cm)

# 12. SAR Result Summary

## 12.1 Head SAR

| Band | Mode | Test Position | Channel | Result 1g (W/Kg) | Power Drift(%) | Max.Turn-up Power(dBm) | Meas.Output Power(dBm) | Scaled SAR (W/Kg) | Meas. No. |
|---|---|---|---|---|---|---|---|---|---|
| GSM 850 | Voice | Right Cheek | CH 190 | 0.083 | 4.80 | 31 | 30.70 | 0.089 | 1 |
| | | Right Tilt | CH 190 | 0.074 | -0.75 | 31 | 30.70 | 0.079 | 2 |
| | | Left Cheek | CH 190 | 0.093 | 3.34 | 31 | 30.70 | 0.100 | 3 |
| | | Left Tilt | CH 190 | 0.076 | 2.01 | 31 | 30.70 | 0.081 | 4 |
| GSM1900 | Voice | Right Cheek | CH 512 | 0.082 | -2.37 | 29 | 28.88 | 0.084 | 15 |
| | | Right Tilt | CH 512 | 0.042 | -3.73 | 29 | 28.88 | 0.043 | 16 |
| | | Left Cheek | CH 512 | 0.100 | -1.64 | 29 | 28.88 | 0.103 | 17 |
| | | Left Tilt | CH 512 | 0.058 | -0.15 | 29 | 28.88 | 0.060 | 18 |
| WCDMA II | RMC | Right Cheek | CH9263 | 0.192 | -0.28 | 21.6 | 21.51 | 0.196 | 38 |
| | | Right Tilt | CH9263 | 0.120 | 0.22 | 21.6 | 21.51 | 0.123 | 39 |
| | | Left Cheek | CH9263 | 0.212 | -0.36 | 21.6 | 21.51 | 0.216 | 40 |
| | | Left Tilt | CH9263 | 0.139 | 0.55 | 21.6 | 21.51 | 0.142 | 41 |
| WCDMA V | RMC | Right Cheek | CH4233 | 0.243 | 0.66 | 23 | 22.84 | 0.252 | 56 |
| | | Right Tilt | CH4233 | 0.212 | -0.03 | 23 | 22.84 | 0.220 | 57 |
| | | Left Cheek | CH4233 | 0.253 | 0.34 | 23 | 22.84 | 0.262 | 58 |
| | | Left Tilt | CH4233 | 0.204 | 0.12 | 23 | 22.84 | 0.212 | 59 |
| WIFI | DATA | Right Cheek | CH 11 | 0.175 | 0.12 | 16 | 15.87 | 0.180 | 65 |
| | | Right Tilt | CH 11 | 0.148 | 0.22 | 16 | 15.87 | 0.152 | 66 |
| | | Left Cheek | CH 11 | 0.096 | -0.07 | 16 | 15.87 | 0.099 | 67 |
| | | Left Tilt | CH 11 | 0.094 | -0.06 | 16 | 15.87 | 0.097 | 68 |

## 12.2 Body SAR And Hotspot

| Band | Mode | Test Position | Channel | Result 1g (W/Kg) | Power Drift(%) | Max.Turn-up Power(dBm) | Meas.Output Power(dBm) | Scaled SAR (W/Kg) | Meas. No. |
|---|---|---|---|---|---|---|---|---|---|
| GSM 850 | Voice（body-worn） | Front side | CH 190 | 0.075 | 4.19 | 31 | 30.70 | 0.080 | 5 |
| | | Back side | CH 190 | 0.136 | 1.21 | 31 | 30.70 | 0.146 | 6 |
| | | Left side | CH 190 | 0.065 | 0.75 | 31 | 30.70 | 0.070 | 7 |
| | | Right side | CH 190 | 0.053 | -2.36 | 31 | 30.70 | 0.057 | 8 |
| | | Bottom side | CH 190 | 0.057 | -0.26 | 31 | 30.70 | 0.061 | 9 |
| | GPRS Data-2 Slot（hotspot） | Front side | CH 190 | 0.227 | 1.29 | 30 | 29.56 | 0.251 | 10 |
| | | Back side | CH 190 | 0.321 | -0.69 | 30 | 29.56 | 0.355 | 11 |
| | | Left side | CH 190 | 0.246 | -0.10 | 30 | 29.56 | 0.272 | 12 |
| | | Right side | CH 190 | 0.235 | 1.26 | 30 | 29.56 | 0.260 | 13 |
| | | Bottom side | CH 190 | 0.280 | -1.88 | 30 | 29.56 | 0.310 | 14 |
| GSM1900 | Voice | Front side | CH 512 | 0.488 | -2.54 | 29 | 28.88 | 0.502 | 19 |
| | | Back side | CH 512 | 0.721 | 1.85 | 29 | 28.88 | 0.741 | 20 |
| | | Left side | CH 512 | 0.131 | -1.07 | 29 | 28.88 | 0.135 | 21 |
| | | Right side | CH 512 | 0.125 | 0.43 | 29 | 28.88 | 0.129 | 22 |
| | | Bottom side | CH 512 | 0.536 | 1.36 | 29 | 28.88 | 0.551 | 23 |
| | GPRS Data-2 Slot（hotspot） | Front side | CH 512 | 0.808 | -0.59 | 28 | 27.76 | 0.854 | 24 |
| | | Front side | CH 661 | 0.691 | -0.12 | 28 | 27.76 | 0.730 | 26 |
| | | Front side | CH 810 | 0.997 | 1.61 | 28 | 27.76 | 1.054 | 27 |
| | | Back side | CH 512 | 1.127 | -0.99 | 28 | 27.76 | 1.191 | 28 |
| | | Back side | CH 661 | 0.989 | -0.15 | 28 | 27.76 | 1.045 | 30 |
| | | Back side | CH 810 | 1.401 | -4.02 | 28 | 27.76 | 1.481 | 31 |
| | | Left side | CH 512 | 0.794 | 1.02 | 28 | 27.76 | 0.839 | 32 |
| | | Right side | CH 512 | 0.216 | 2.09 | 28 | 27.76 | 0.228 | 33 |
| | | Bottom side | CH 512 | 0.943 | 0.23 | 28 | 27.76 | 0.997 | 34 |
| | | Bottom side | CH 661 | 0.859 | 0.13 | 28 | 27.76 | 0.908 | 36 |
| | | Bottom side | CH 810 | 1.237 | 2.69 | 28 | 27.76 | 1.307 | 37 |
| WCDMA II | RMC（body-worn and hotspot） | Front side | CH9263 | 0.870 | -0.11 | 21.6 | 21.51 | 0.888 | 42 |
| | | Front side | CH9400 | 0.978 | 0.26 | 21.6 | 21.51 | 0.998 | 44 |
| | | Front side | CH9537 | 1.081 | 0.03 | 21.6 | 21.51 | 1.104 | 45 |
| | | Back side | CH9263 | 1.131 | -0.73 | 21.6 | 21.51 | 1.155 | 46 |
| | | Back side | CH9400 | 1.358 | 0.12 | 21.6 | 21.51 | 1.386 | 48 |
| | | Back side | CH9537 | 1.437 | -0.08 | 21.6 | 21.51 | 1.467 | 49 |
| | | Left side | CH9263 | 0.246 | -0.35 | 21.6 | 21.51 | 0.251 | 50 |
| | | Right side | CH9263 | 0.262 | -0.48 | 21.6 | 21.51 | 0.267 | 51 |
| | | Bottom side | CH9263 | 1.084 | -0.55 | 21.6 | 21.51 | 1.107 | 52 |
| | | Bottom side | CH9400 | 1.286 | -0.26 | 21.6 | 21.51 | 1.313 | 54 |
| | | Bottom side | CH9537 | 1.350 | -0.18 | 21.6 | 21.51 | 1.378 | 55 |

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| WCDMA V | RMC（body-worn and hotspot） | Front side | CH4233 | 0.189 | -1.05 | 23 | 22.84 | 0.196 | 60 |
| | | Back side | CH4233 | 0.220 | -0.08 | 23 | 22.84 | 0.228 | 61 |
| | | Left side | CH4233 | 0.179 | -0.11 | 23 | 22.84 | 0.186 | 62 |
| | | Right side | CH4233 | 0.173 | 0.21 | 23 | 22.84 | 0.179 | 63 |
| | | Bottom side | CH4233 | 0.174 | 0.15 | 23 | 22.84 | 0.181 | 64 |
| WIFI | DATA（body-worn and hotspot） | Front side | CH 11 | 0.062 | 0.60 | 16 | 15.87 | 0.064 | 69 |
| | | Back side | CH 11 | 0.072 | 0.57 | 16 | 15.87 | 0.074 | 70 |
| | | Right side | CH 11 | 0.070 | 0.18 | 16 | 15.87 | 0.072 | 71 |
| | | Top side | CH 11 | 0.063 | 0.63 | 16 | 15.87 | 0.065 | 72 |

Note:
Two card slot can’t work at the same time.
The test separation of all above table is 10mm.

**Repeated SAR**

| Band | Mode | Test Position | Channel | Result 1g (W/Kg) | Power Drift(%) | Max.Turn-up Power(dBm) | Meas.Output Power(dBm) | Scaled SAR (W/Kg) | Meas. No. |
|---|---|---|---|---|---|---|---|---|---|
| GSM 1900 | GPRS Data-2 Slot（hotspot） | Front side | CH 512 | 0.855 | -0.77 | 28 | 27.75 | 0.904 | 25 |
| | | Back side | CH 512 | 1.240 | -0.10 | 28 | 27.75 | 1.310 | 29 |
| | | | CH 810 | 1.385 | -3.26 | 28 | 27.75 | 1.464 | 73 |
| | | Bottom side | CH 512 | 1.082 | 0.17 | 28 | 27.75 | 1.143 | 35 |
| WCDMA II | RMC（body-worn and hotspot） | Front side | CH 9263 | 0.940 | 0.14 | 21.6 | 21.51 | 0.960 | 43 |
| | | Back side | CH 9263 | 1.294 | -0.61 | 21.6 | 21.51 | 1.321 | 47 |
| | | | CH 9537 | 1.447 | -1.45 | 21.6 | 21.51 | 1.477 | 74 |
| | | Bottom side | CH 9263 | 1.166 | -0.17 | 21.6 | 21.51 | 1.190 | 53 |

## 12.3 repeated SAR measurement

| Band | Mode | Test Position | Channel | Original Measured SAR 1g(mW/g) | 1 st Repeated SAR 1g | Ratio | Original Measured SAR 1g(mW/g) | 2nd Repeated SAR 1g | Ratio |
|---|---|---|---|---|---|---|---|---|---|
| GSM 1900 | GPRS Data-2 Slot（hotspot） | Front side | CH 512 | 0.808 | 0.855 | 0.95 | - | - | - |
| | | Back side | CH 512 | 1.127 | 1.240 | 0.91 | | | |
| | | | CH 810 | 1.401 | 1.385 | 1.01 | | | |
| | | Bottom side | CH 512 | 0.943 | 1.082 | 0.87 | | | |
| WCDMA II | RMC（body-worn and hotspot） | Front side | CH 9263 | 0.870 | 0.940 | 0.93 | | | |
| | | Back side | CH 9263 | 1.131 | 1.294 | 0.87 | | | |
| | | | CH 9537 | 1.437 | 1.447 | 0.99 | | | |
| | | Bottom side | CH 9263 | 1.084 | 1.166 | 0.93 | | | |

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≤1.2and 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 ≥ 1.45W/Kg
4. Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original，first and second repeated measurement is ＞1.20W/kg
5. The ratio is the difference in percentage between original and repeated measured SAR.

**Simultaneous Multi-band Transmission Evaluation:**

Application Simultaneous Transmission information:

| Position | Simultaneous state |
|---|---|
| Head | 1. GSM + WIFI |
| | 2. GSM + Bluetooth |
| | 3. WCDMA + WIFI |
| | 4. WCDMA + Bluetooth |
| Body | 1. GSM + WIFI |
| | 2. GSM + Bluetooth |
| | 3. WCDMA + WIFI |
| | 4. WCDMA + Bluetooth |

NOTE:

1. Bluetooth and WIFI can't simultaneous transmission at the same time.
2. For simultaneous transmission at head and body exposure position, 2 transmitters simultaneous transmission was the worst state.
3. Based upon KDB 447498 D01 v05, BT SAR is excluded as below table.
4. If the test separation distance is <5mm, 5mm is used for excluded SAR calculation.
5. For minimum test separation distance≦50mm,Bluetooth standalone SAR is excluded according to [(max. power of channel, including tune-up tolerance, mW)/ (min. test separation distance, mm) ·[√f (GHz) /x] ≦3.0 for 1-g SAR and ≦7.5 for 10-g extremity SAR
6. The reported SAR summation is calculated based on the same configuration and test position.
7. KDB 447498 / 4.3.2 (2) when standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:

a) (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.
b) 0.4W/Kg for 1-g SAR and 1.0W/Kg for 10-g SAR, when the separation distance is >50mm.

| Estimated SAR | | Maximum Average Power | | Antenna to user(mm) | Frequency(GHz) | Stand alone SAR(1g) [W/kg] |
|---|---|---|---|---|---|---|
| | | dBm | mW | | | |
| BT | Head | 6 | 3.981 | 5 | 2.480 | 0.167 |
| | Body | | | 10 | 2.480 | 0.084 |

| Simultaneous Mode | Position | Mode | Max. 1-g SAR (W/kg) | 1-g Sum SAR (W/kg) |
|---|---|---|---|---|
| GSM + WIFI | Head | GSM Voice | 0.103 | 0.283 |
| | | WIFI | 0.180 | |
| | Body-worn | GSM Voice | 0.741 | 0.815 |
| | | WIFI | 0.074 | |
| | Hotspot | GSM DATA | 1.481 | 1.555 |
| | | WIFI | 0.074 | |
| GSM + Bluetooth | Head | GSM Voice | 0.103 | 0.270 |
| | | Bluetooth | 0.167 | |
| | Body-worn | GSM Voice | 0.741 | 0.825 |
| | | Bluetooth | 0.084 | |
| | Hotspot | GSM DATA | 1.481 | 1.565 |
| | | Bluetooth | 0.084 | |
| WCDMA RMC+ WIFI | Head | WCDMA RMC | 0.262 | 0.442 |
| | | WIFI | 0.180 | |
| | Body-worn Hotspot | WCDMA RMC | 1.477 | 1.551 |
| | | WIFI | 0.074 | |
| WCDMA RMC+ Bluetooth | Head | WCDMA RMC | 0.262 | 0.429 |
| | | Bluetooth | 0.167 | |
| | Body-worn Hotspot | WCDMA RMC | 1.477 | 1.561 |
| | | Bluetooth | 0.084 | |

Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneous transmitting antenna.

When the sum of SAR 1g of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit (SAR-1g 1.6 W/kg), the simultaneous transmission SAR is not required. When the sum of SAR 1g is greater than the SAR limit (SAR-1g 1.6 W/kg), SAR test exclusion is determined by the SPLSR.

# 13. Equipment List

| NO. | Instrument | Manufacturer | Model | S/N | Cal. Date | Cal. Due Date |
|---|---|---|---|---|---|---|
| 1 | 835MHz Dipole | SATIMO | SID835 | SN 30/14 DIP0G835-332 | 2014.09.01 | 2015.08.31 |
| 2 | 1900MHz Dipole | SATIMO | SID1900 | SN 30/14 DIP1G900-333 | 2014.09.01 | 2015.08.31 |
| 3 | 2450MHzDipole | SATIMO | SID2450 | SN 30/14 DIP2G450-335 | 2014.09.01 | 2015.08.31 |
| 4 | E-Field Probe | SATIMO | SSE5 | SN 17/14 EP221 | 2014.09.01 | 2015.08.31 |
| 5 | Antenna | SATIMO | ANTA3 | SN 07/13 ZNTA52 | 2014.09.01 | 2015.08.31 |
| 6 | Waveguide | SATIMO | SWG5500 | SN 13/14 WGA32 | 2014.09.01 | 2015.08.31 |
| 7 | Phantom1 | SATIMO | SAM | SN 32/14 SAM115 | 2014.09.01 | 2015.08.31 |
| 8 | Phantom2 | SATIMO | SAM | SN 32/14 SAM116 | 2014.09.01 | 2015.08.31 |
| 9 | SAR TEST BENCH | SATIMO | 3G MOBILE PHONE POSITIONNING SYSTEM | SN 32/14 MSH97 | 2014.09.01 | 2015.08.31 |
| 10 | SAR TEST BENCH | SATIMO | LAPTOP POSITIONNING SYSTEM | SN 32/14 LSH29 | 2014.09.01 | 2015.08.31 |
| 11 | Dielectric Probe Kit | SATIMO | SCLMP | SN 32/14 OCPG52 | 2014.09.01 | 2015.08.31 |
| 12 | Multi Meter | Keithley | Multi Meter 2000 | 4050073 | 2014.11.20 | 2015.11.19 |
| 13 | Signal Generator | R&S | SMF100A | 104260 | 2014.10.27 | 2015.10.26 |
| 14 | Power Meter | R&S | NRP | 100510 | 2014.10.25 | 2015.10.24 |
| 15 | Power Sensor | R&S | NRP-Z11 | 101919 | 2014.10.25 | 2015.10.24 |
| 16 | Network Analyzer | R&S | 5071C | EMY46103472 | 2014.12.12 | 2015.12.11 |

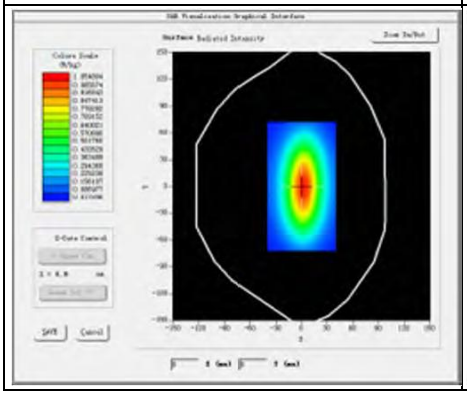
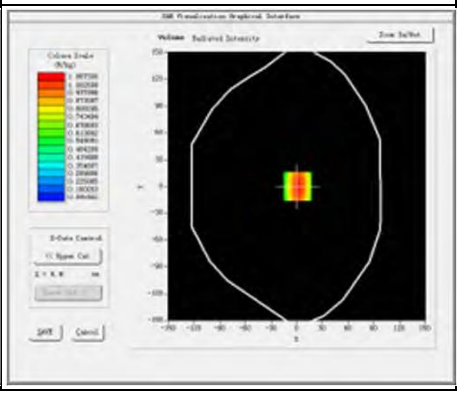
# Appendix A. System Validation Plots

## System Performance Check Data (835MHz Head)

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.01.23
Measurement duration: 13 minutes 27 seconds

## Experimental conditions

| Phantom | Validation plane |
|---|---|
| Device Position | - |
| Band | 835MHz |
| Channels | - |
| Signal | CW |
| Frequency (MHz) | 835MHz |
| Relative permittivity (real part) | 41.27 |
| Relative permittivity | 18.72 |
| Conductivity (S/m) | 0.91 |
| Power drift (%) | 0.45 |
| Ambient Temperature: | 22.7°C |
| Liquid Temperature: | 22.3°C |
| ConvF: | 4.83 |
| Crest factor: | 1:1 |

| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |

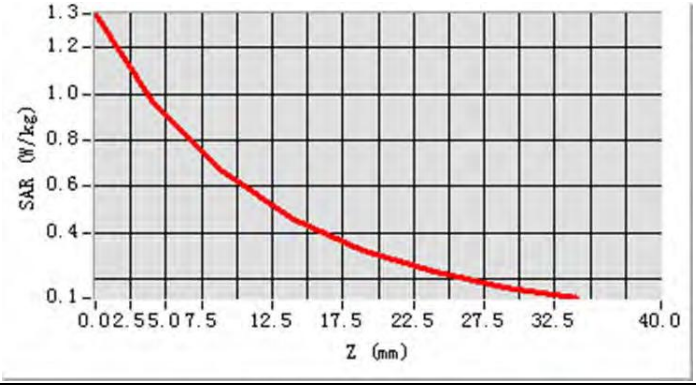
**Maximum location: X=1.00, Y=0.00**

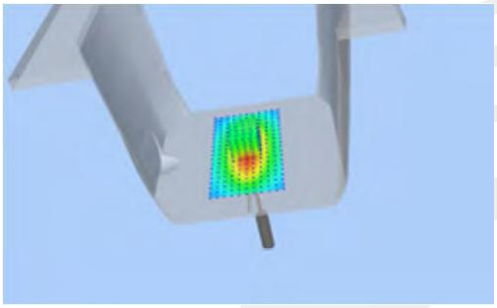
**SAR Peak: 1.46 W/kg**

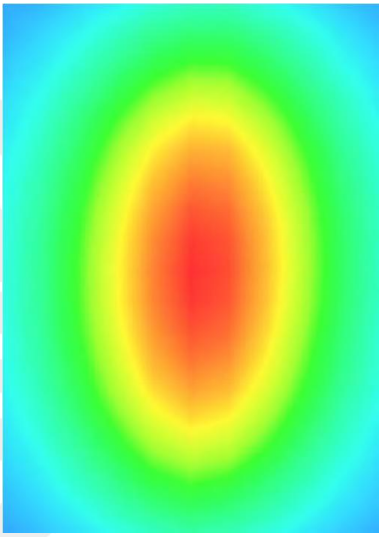
| | |
|---|---|
| SAR 10g (W/Kg) | 0.608155 |
| SAR 1g (W/Kg) | 0.93716 |

# Z Axis Scan

| Z (mm) | 0 | 4 | 9 | 14 | 19 | 24 | 29 |
|---|---|---|---|---|---|---|---|
| SAR(W/Kg) | 1.3472 | 0.97891 | 0.66265 | 0.5042 | 0.3512 | 0.2505 | 0.11794 |



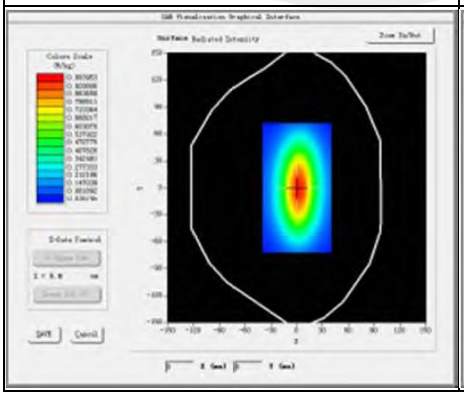
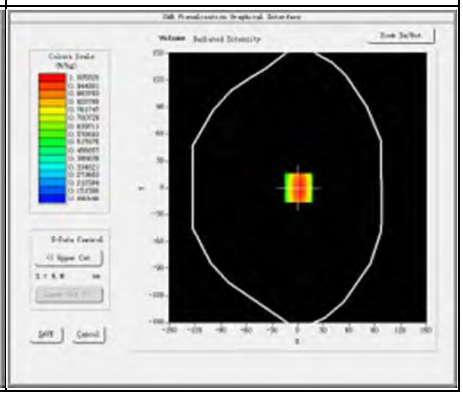


**System Performance Check Data (835MHz Body)**

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.01.23
Measurement duration: 14 minutes 13 seconds

**Experimental conditions.**

| | |
|---|---|
| Probe | |
| Phantom | Validation plane |
| Device Position | - |
| Band | 835MHz |
| Channels | - |
| Signal | CW |
| Frequency (MHz) | 835MHz |
| Relative permittivity (real part) | 55.50 |
| Relative permittivity | 21.408187 |
| Conductivity (S/m) | 0.96 |
| Power drift (%) | 0.090000 |
| Ambient Temperature: | 22.7°C |
| Liquid Temperature: | 22.3°C |
| ConvF: | 5.02 |
| Crest factor: | 1:1 |

| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |

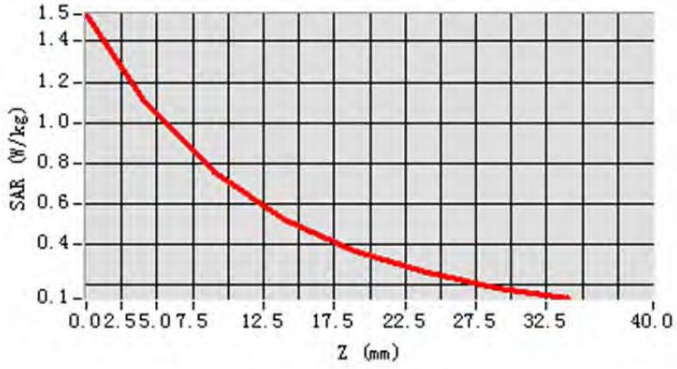
**Maximum location: X=1.00, Y=0.00**

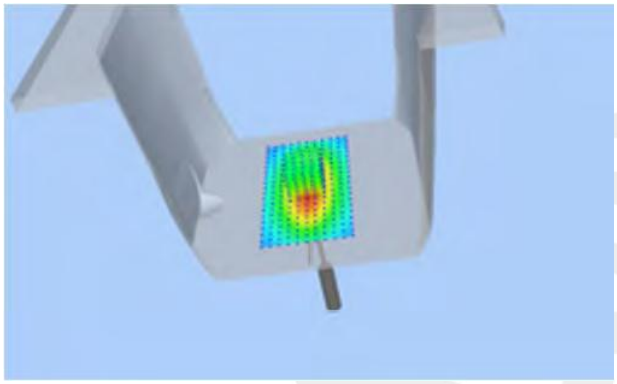
**SAR Peak: 1.48 W/kg**

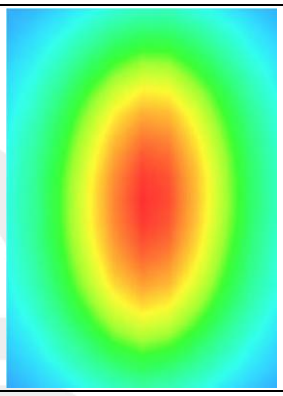
| | |
|---|---|
| SAR 10g (W/Kg) | 0.693221 |
| SAR 1g (W/Kg) | 0.967939 |

# Z Axis Scan

| Z (mm) | 0 | 4 | 9 | 14 | 19 | 24 | 29 |
|---|---|---|---|---|---|---|---|
| SAR(W/Kg) | 1.3725 | 1.0058 | 0.6838 | 0.4755 | 0.3314 | 0.2365 | 0.1688 |



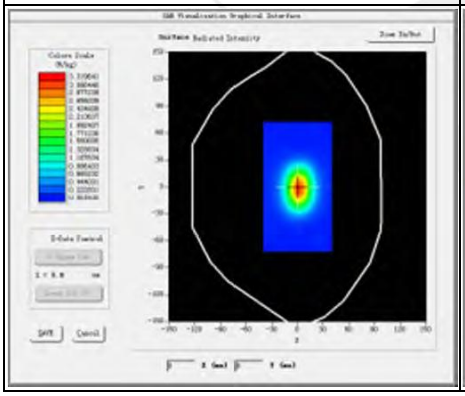
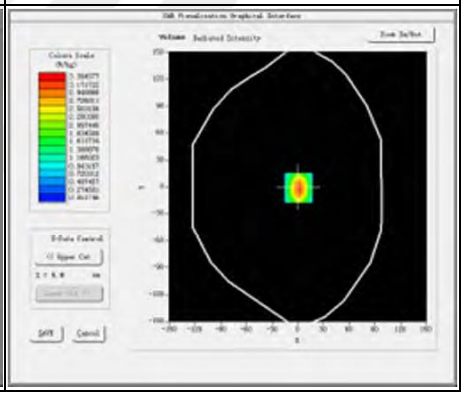


**System Performance Check Data (1900MHz Head)**

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.01.23
Measurement duration: 14 minutes 12 seconds

**Experimental conditions.**

| Phantom | Validation plane |
|---|---|
| Device Position | - |
| Band | 1900MHz |
| Channels | - |
| Signal | CW |
| Frequency (MHz) | 1900MHz |
| Relative permittivity (real part) | 39.57 |
| Relative permittivity | 13.26 |
| Conductivity (S/m) | 1.40 |
| Power drift (%) | 0.47 |
| Ambient Temperature: | 22.7°C |
| Liquid Temperature: | 22.3°C |
| Probe | SN 17/14 EP221 |
| ConvF: | 4.71 |
| Crest factor: | 1:1 |

| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |

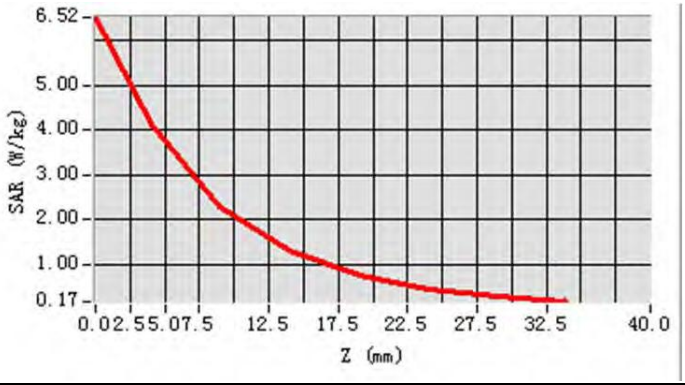
**Maximum location: X=1.00, Y=0.00**

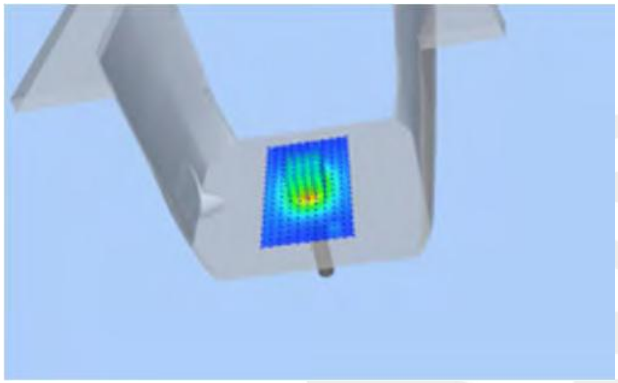
**SAR Peak: 5.39 W/kg**

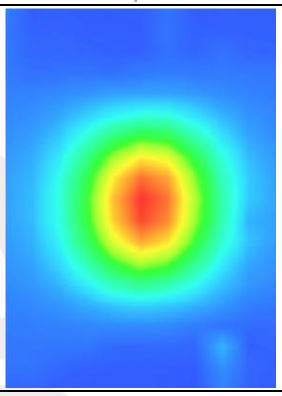
| SAR 10g (W/Kg) | 1.967525 |
|---|---|
| SAR 1g (W/Kg) | 3.840170 |

# Z Axis Scan

| Z (mm) | 0 | 4 | 9 | 14 | 19 | 24 | 29 |
|---|---|---|---|---|---|---|---|
| SAR(W/Kg) | 6.5296 | 4.1946 | 2.3311 | 1.3187 | 0.5733 | 0.3288 | 0.1617 |



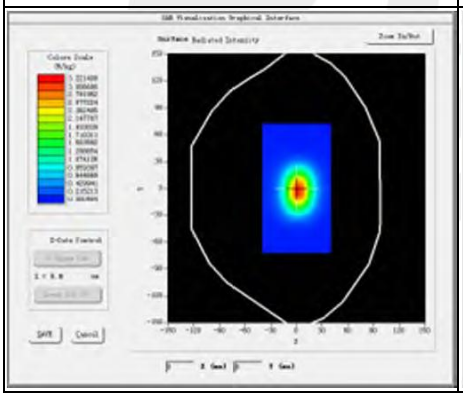
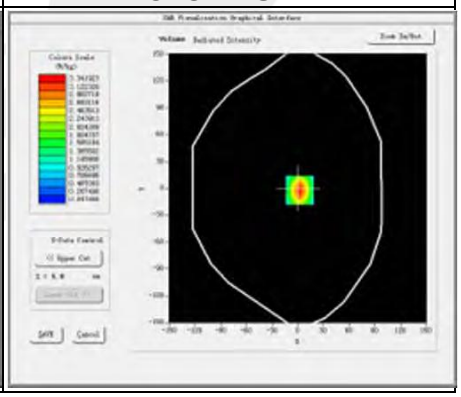


## System Performance Check Data (1900MHz Body)

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.01.23
Measurement duration: 14 minutes 46 seconds

**Experimental conditions.**

| | |
|---|---|
| Device Position | - |
| Band | 1900MHz |
| Channels | - |
| Signal | CW |
| Frequency (MHz) | 1900 |
| Relative permittivity (real part) | 51.68 |
| Relative permittivity | 12.87531 |
| Conductivity (S/m) | 1.51 |
| Power drift (%) | 0.37 |
| Ambient Temperature: | 22.7°C |
| Liquid Temperature: | 22.3°C |
| Probe | SN 17/14 EP221 |
| ConvF: | 4.85 |
| Crest factor: | 1:1 |

| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |

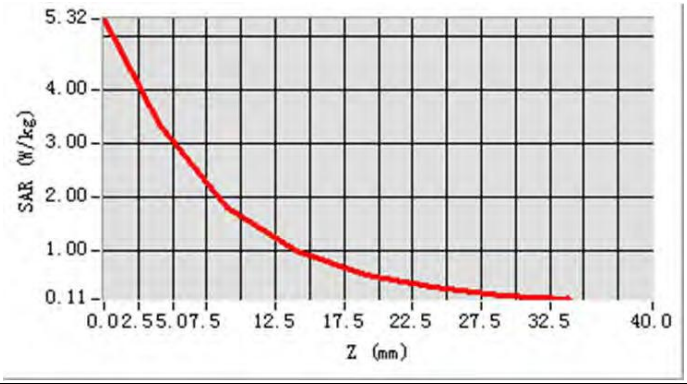
**Maximum location: X=2.00, Y=2.00**

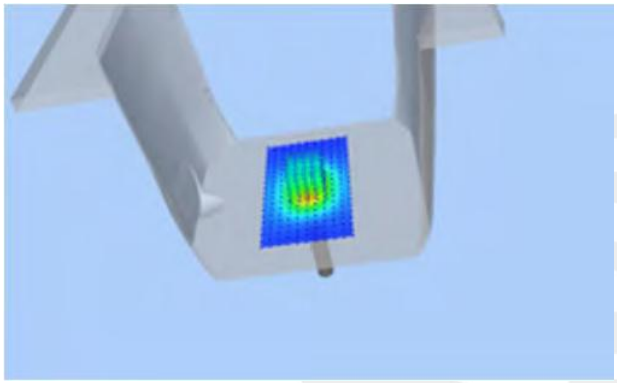
**SAR Peak: 5.27 W/kg**

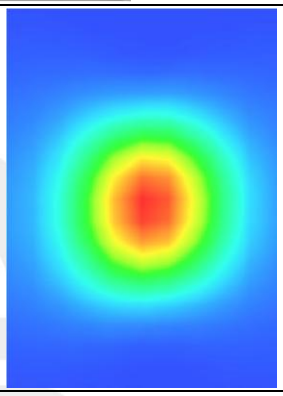
| | |
|---|---|
| SAR 10g (W/Kg) | 2.124122 |
| SAR 1g (W/Kg) | 4.141824 |

# Z Axis Scan

| Z (mm) | 0 | 4 | 9 | 14 | 19 | 24 | 29 |
|---|---|---|---|---|---|---|---|
| SAR(W/Kg) | 5.3196 | 3.3419 | 1.8167 | 1.0186 | 0.5752 | 0.3285 | 0.1898 |



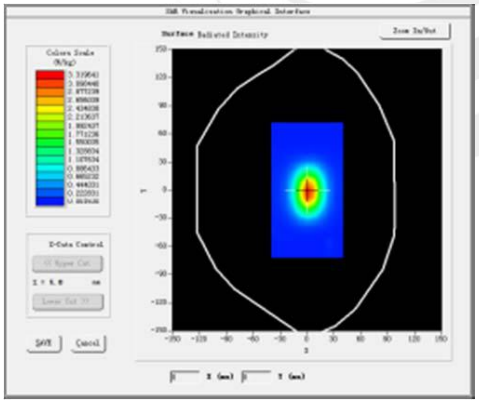
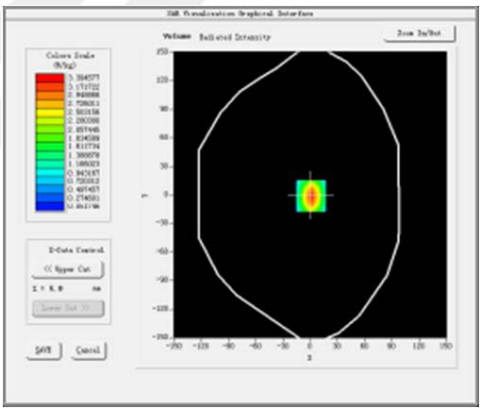


## System Performance Check Data (2450MHz Head)

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.01.23
Measurement duration: 13 minutes 51seconds

**Experimental conditions.**

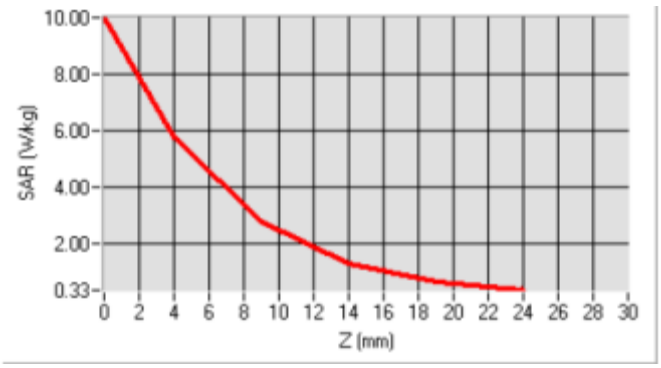
| Device Position | Validation plane |
|---|---|
| Band | 2450 MHz |
| Channels | - |
| Signal | CW |
| Frequency (MHz) | 2450 |
| Relative permittivity (real part) | 39.226002 |
| Relative permittivity | 12.930000 |
| Conductivity (S/m) | 1.78 |
| Power drift (%) | -1.200000 |
| Ambient Temperature | 22.7℃ |
| Liquid Temperature | 22.3℃ |
| Probe | SN 17/14 EP221 |
| ConvF | 4.11 |
| Crest factor: | 1:1 |

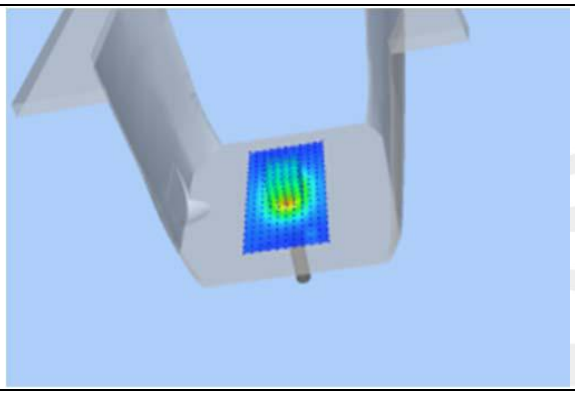
| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |

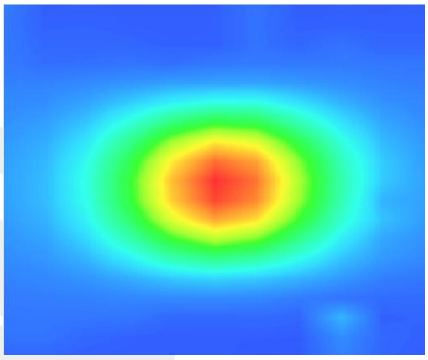
**Maximum location: X=7.00, Y=6.00**

| | |
|---|---|
| SAR 10g (W/Kg) | 2.2649514 |
| SAR 1g (W/Kg) | 4.6249345 |

# Z Axis Scan


10.00
8.00
6.00
4.00
2.00
0.33
SAR (W/kg)
0 2 4 6 8 10 12 14 16 18 20 22 24 26 28 30
Z (mm)



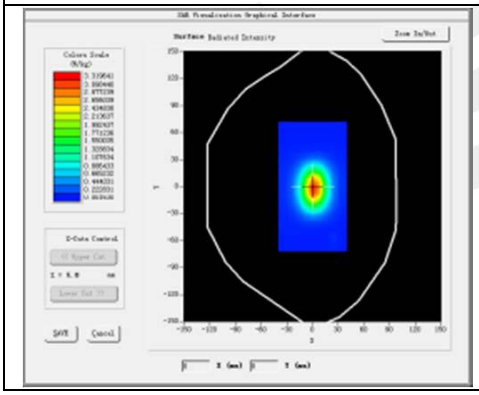
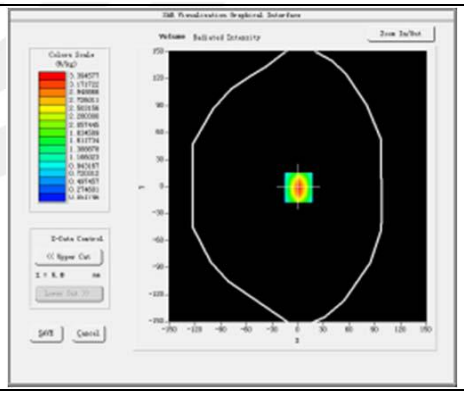


## System Performance Check Data (2450MHz Body)

Type: Phone measurement (Complete)
Area scan resolution: dx=8mm,dy=8mm
Zoom scan resolution: dx=8mm, dy=8mm, dz=5mm
Date of measurement: 2015.01.23
Measurement duration: 14 minutes 23 seconds

**Experimental conditions.**

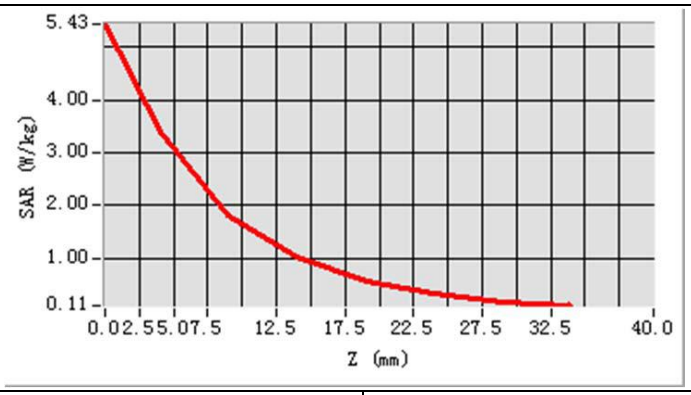
| Device Position | Validation plane |
|---|---|
| Band | 2450 MHz |
| Channels | - |
| Signal | CW |
| Frequency (MHz) | 2450 |
| Relative permittivity (real part) | 39.226002 |
| Relative permittivity | 12.930000 |
| Conductivity (S/m) | 1.95 |
| Power drift (%) | -1.200000 |
| Ambient Temperature | 22.7˚C |
| Liquid Temperature | 22.3˚C |
| Probe | SN 17/14 EP221 |
| ConvF | 4.25 |
| Crest factor: | 1:1 |

| SURFACE SAR | VOLUME SAR |
|---|---|
|  |  |

**Maximum location: X=3.00, Y=1.00**

| | |
|---|---|
| SAR 10g (W/Kg) | 2.1589463 |
| SAR 1g (W/Kg) | 4.7459246 |

# Z Axis Scan


5.43
4.00
3.00
2.00
1.00
0.11
SAR (W/kg)
0.0 2.5 5.0 7.5 12.5 17.5 22.5 27.5 32.5 40.0
Z (mm)