# SAR TEST REPORT

| | | |
|---|---|---|
| **Reference No.** ..... | : | WTS16S0857820E V3 |
| **FCC ID**..... | : | N2GSL452 |
| **Applicant** ..... | : | DOPPIO MOBILE INTERNATIONAL LIMITED |
| **Address** ..... | : | ROOM 1708,17/f HART AVENUE PLAZA,5-9 HART AVENUE TISM SHA TSUI, Kowloon, Hongkong |
| **Manufacturer** ..... | : | TEM MOBILE LIMITED |
| **Address** ..... | : | No 1708, Cangsong Building, Tairan 6 Road, Futian ShenZhen, China. |
| **Product Name** ..... | : | Mobile Phone |
| **Model No**. ..... | : | SL452 |
| **Brand**. ..... | : | doppio |
| **Standards** ..... | : | FCC 47 CFR Part2(2.1093)<br>ANSI/IEEE C95.1-2006<br>IEEE 1528-2013 & Published RF Exposure KDB Procedures |
| **Date of Receipt sample**.... | : | Aug. 09, 2016 |
| **Date of Test** ..... | : | Aug. 13, 2016 - Aug. 19, 2016 |
| **Date of Issue** ..... | : | Sep. 08, 2016 |
| **Test Result** ..... | : | Pass |

Remarks:
The results shown in this test report refer only to the sample(s) tested, this test report cannot be reproduced, except in full, without prior written permission of the company. The report would be invalid without specific stamp of test institute and the signatures of compiler and approver.


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# 1 Laboratory Introduction

Waltek Service Co., Ltd. is a professional third-party testing and certification organization with multi-year product testing and certification experience， Established strictly in accordance with ISO/IEC Guide 65 and ISO/IEC 17025，our company has got recognition from CNAS (China National Accreditation Service for Conformity Assessment) and International Laboratory Accreditation Cooperation (ILAC)。 At the same time, our company has been approved by some authoritative organizations， such as EMSD of Hongkong、UL、Intertek-ETL SEMKO、CSA、MET、TÜV Rheinland、TÜV SÜD、SGS、Nemko、FCC 、IC of Canada、CPSC、TMICO and California Energy Commission (CEC)。Since the set-up of our company, we sincerely help our customers to improve their products to achieve relative international standards. We are accepted by various clients in international market and well-known in the same industry.

There are several laboratories in our company which are equipped with advanced equipments for fully testing. It can provide testing and certification services for products exported around the world, also it can ensure that the products reach international standards in aspects of safety, electromagnetic compatibility, virulence, energy efficiency, reliability and so on. To enable our customers can get local services more directly and conveniently, and to realize our promise to provide more high quality services. Our company has set up product testing labs in South China and East China (Shenzhen, Dongguan, Foshan, Suzhou and Ningbo). We can provide our clients with accurate test and technical support services in good faith, and actively follow customer demand. These can fully demonstrate Waltek Services concept -- “One-stop Services”.

Our company has many experienced engineers and customer service representatives to meet our customer’s demand for a number of tests and provide superb technical guidance and modification service; At the same time we can provide global certification services by our global partners to help our customer’s products to successfully extend to the global market.

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# 3 Report Revision History

| Report No. | Report Version | Description | Issue Date |
|---|---|---|---|
| WTS16S0857820E | NONE | Original | Aug. 30, 2016 |
| WTS16S0857820E | V1 | Version 1 | Sep. 02, 2016 |
| WTS16S0857820E | V2 | Version 2 | Sep. 06, 2016 |
| WTS16S0857820E | V3 | Version 3 | Sep. 08, 2016 |

# 4 General Information

## 4.1 General Description of E.U.T.

| | |
|---|---|
| Product Name: | Mobile Phone |
| Model No.: | SL452 |
| Model Description: | N/A |
| GSM Band(s): | GSM 850/900/1800/1900MHz |
| GPRS/EGPRS Class: | 12 |
| WCDMA Band(s): | FDD Band II/V |
| LTE Bnad(s) | LTE Band 2/4 |
| Wi-Fi Specification: | 802.11b/g/n HT20/n HT40 |
| Bluetooth Version: | Bluetooth v4.0 with BLE |
| GPS: | Support |
| NFC: | N/A |
| Hardware Version | FD533MB |
| Software Version | full_tem6737m_65_m0-eng 6.0 MRA58K |

## 4.2 Details of E.U.T.

| | |
|---|---|
| Operation Frequency | GSM/GPRS/EGPRS 850: 824~849MHz<br>PCS/GPRS/EGPRS 1900: 1850~1910MHz<br>WCDMA Band II: 1850~1910MHz<br>WCDMA Band V: 824~849MHz<br>LTE Band 2: 1850~1910MHz<br>LTE Band 4: 1710~1755MHz<br>WiFi:<br>802.11b/g/n HT20: 2412~2462MHz<br>802.11n HT40: 2422~2452MHz<br>Bluetooth: 2402~2480MHz |
| Max. RF output power | GSM 850: 32.71dBm<br>PCS1900: 29.82dBm<br>WCDMA Band II: 22.76dBm<br>WCDMA Band V: 22.56dBm<br>LTE Band 2: 22.95dBm<br>LTE Band 4: 22.99dBm<br>WiFi(2.4G): 9.48dBm<br>Bluetooth: 5.53dBm |
| Max.SAR: | 0.45 W/Kg 1g Head Tissue<br>0.80 W/Kg 1g Body-worn Tissue |
| Max Simultaneous SAR | 0.97 W/Kg 1g Hotspot Tissue |

| | |
|---|---|
| Type of Modulation: | GSM,GPRS: GMSK<br>EDGE: GMSK, 8PSK<br>WCDMA: BPSK<br>LTE: QPSK, 16QAM<br>WiFi: CCK, OFDM<br>Bluetooth: GFSK, Pi/4 DQPSK,8DPSK |
| Antenna installation | GSM/WCDMA/LTE: internal permanent antenna<br>WiFi/Bluetooth: internal permanent antenna |
| Antenna Gain | GSM 850: 1.2dBi<br>PCS1900: 1.4dBi<br>WCDMA Band II: 1.4dBi<br>WCDMA Band V: 1.2dBi<br>LTE Band 2: 1.4dBi<br>LTE Band 4: 1.4dBi<br>WiFi(2.4G): 1.8dBi<br>Bluetooth: 1.8dBi |
| Technical Data | Battery DC 3.7V, 1800mAh<br>DC 5V, 1.0A, charging from adapter<br>(Adapter Input: 100-240V~50/60Hz 0.2A) |
| Adapter | Manufacture: SHENZHEN EAST SUN ELECTRONIC CO.,LTD.<br>Model No.: DCS38-0501000 |

# 5 INTRODUCTION

## Introduction

This measurement report shows compliance of the EUT with ANSI/IEEE C95.1-2006 and FCC 47 CFR Part2 (2.1093)

.

The test procedures, as described in IEEE 1528-2013 Standard for IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques(300MHz~6GHz) and Published RF Exposure KDB Procedures

## SAR Definition

- SAR : Specific Absorption Rate
- The SAR characterize the absorption of energy by a quantity of tissue
- This is related to a increase of the temperature of these tissues during a time period.

$$\mathrm{DAS} = \frac{\mathrm{d}}{\mathrm{d}t}\left(\frac{\mathrm{d}W}{\mathrm{d}m}\right) = \frac{\mathrm{d}}{\mathrm{d}t}\left(\frac{\mathrm{d}W}{\rho \mathrm{d}V}\right)$$

$$\mathrm{DAS} = \frac{\sigma E^2}{\rho}$$

$$\mathrm{DAS} = c_{\mathrm{h}} \left.\frac{\mathrm{d}T}{\mathrm{d}t}\right|_{t=0}$$

SAR definition

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

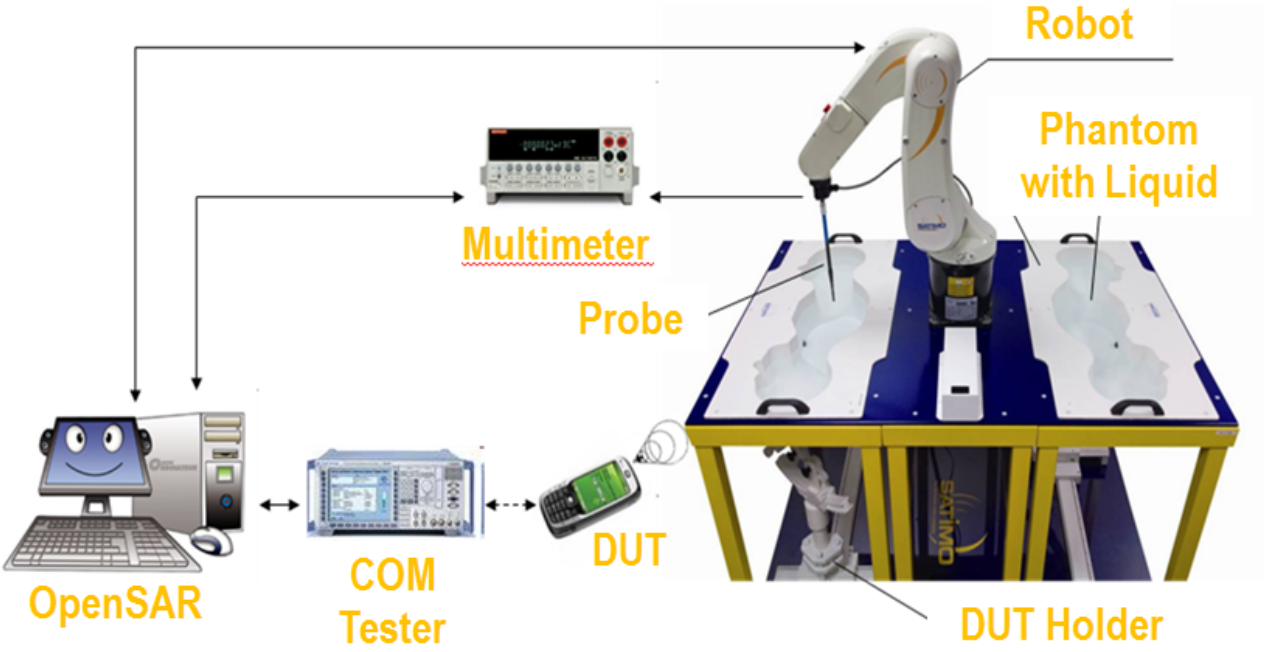
- SAR : Specific Absorption Rate
  - σ : Liquid conductivity
    - $\varepsilon_r = \varepsilon' - j\varepsilon''$ (complex permittivity of liquid)
    - $\sigma = \frac{\varepsilon'' \omega}{\varepsilon_0}$
  - ρ: Liquid density
    - ρ = 1000 g/L = 1000Kg/m³

where:

σ = conductivity of the tissue (S/m)
ρ = mass density of the tissue (kg/m3)
E = rms electric field strength (V/m)

# 6 SAR MEASUREMENT SETUP

## SAR bench sub-systems




## Scanning System (robot)

- It must be able to scan all the volume of the phantom to evaluate the tridimensional distribution of SAR.
- Must be able to set the probe orthogonal of the surface of the phantom (±30°).
- Detects stresses on the probe and stop itself if necessary to keep the integrity of the probe.

## SAM Phantom (Specific Anthropomorphic Mannequin)

- The probe scanning of the E-Field is done in the 2 half of the normalized head.
- The normalized shape of the phantom corresponds to the dimensions of 90% of an adult head size.
- The materials for the phantom should not affect the radiation of the device under test (DUT)
  - Permittivity < 5
- The head is filled with tissue simulating liquid.
- The hand holding the DUT does not have to be modeled.

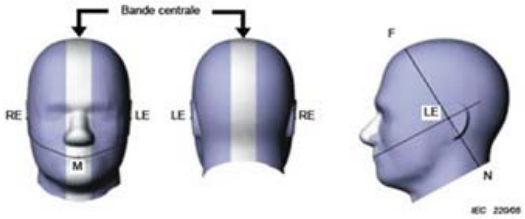
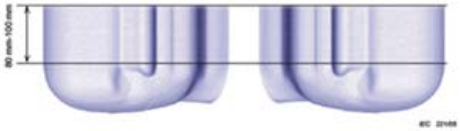
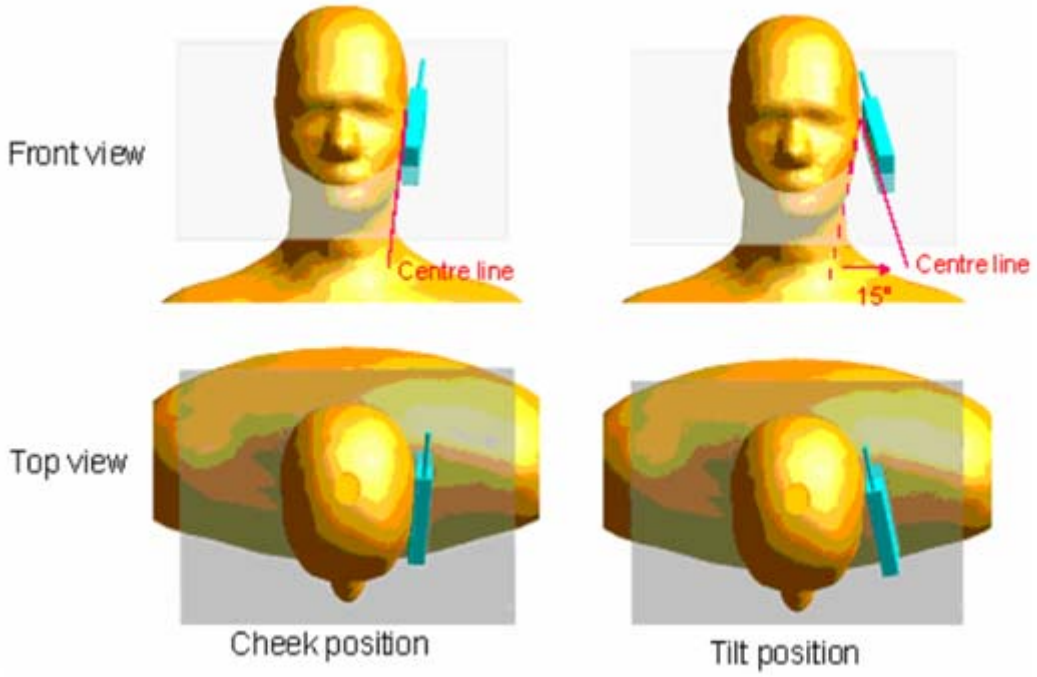



Illustration du fantôme donnant les points de référence des oreilles, RE et LE, le point de référence de la bouche, M, la ligne de référence N-F et la bande centrale



Bi-section sagittale du fantôme avec périmètre étendu (montrée sur le côté comme lors des essais de DAS de l'appareil)



**The OPENSAR system for performing compliance tests consist of the following items:**

1. A standard high precision 6-axis robot (KUKA) with controller and software.
2. KUKA Control Panel (KCP).
3. 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.
4. The functions of the PC plug-in card are to perform the time critical task such as signal filtering, surveillance of the robot operation fast movement interrupts.
5. A computer operating Windows 7.
6. OPENSAR software.
7. Remote control with teaches pendant and additional circuitry for robot safety such as warning lamps, etc.
8. The SAM phantom enabling testing left-hand right-hand and body usage.
9. The Position device for handheld EUT.
10. Tissue simulating liquid mixed according to the given recipes (see Application Note).
11. System validation dipoles to validate the proper functioning of the system.

## Data Evaluation

The OPENSAR software automatically executes the following procedure to calculate the field units from the microvolt readings at the probe connector. The parameters used in the valuation are stored in the configuration modules of the software:

| | | |
|---|---|---|
| Probe Parameters | - Sensitivity | $Norm_i$ |
| | - Conversion factor | ConvFi |
| | - Diode compression point Dcpi | |
| Device Parameter | - Frequency | f |
| | - Crest factor | cf |
| Media Parametrs | - Conductivity | σ |
| | - Density | ρ |

These parameters must be set correctly in the software. They can either be found in the component documents or be imported into the software from the configuration files issued for the OPENSAR components.

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

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

*Where* $V_i$ = *Compensated signal of channel i (i = x, y, z)*

$U_i$ = *Input signal of channel i (i = x, y, z)*

$cf$ = *Crest factor of exciting field (DASY parameter)*

$dcp_i$ = *Diode compression point (DASY parameter)*

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

*E-field probes:* $E_i = \sqrt{\frac{V_i}{Norm_i \cdot ConvF}}$

*H-field probes:* $H_i = \sqrt{Vi} \cdot \frac{a_{i10} + a_{i11} f + a_{i12} f^2}{f}$

*Where* $V_i$ = *Compensated signal of channel i (i = x, y, z)*
$Norm_i$ = *Sensor sensitivity of channel i (i = x, y, z)*
*μV/(V/m)2 for E0field Probes*
*ConvF= Sensitivity enhancement in solution*
$a_{ij}$ = *Sensor sensitivity factors for H-field probes*

$f$ = *Carrier frequency (GHz)*
$E_i$ = *Electric field strength of channel i in V/m*
$H_i$ = *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.

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

*where* $SAR$ = *local specific absorption rate in mW/g*
$E_{tot}$ = *total field strength in V/m*
$\sigma$ = *conductivity in [mho/m] or [siemens/m]*
$\rho$ = *equivalent tissue density in g/cm3*

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.

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

*where* $P_{pwe}$ = *Equivalent power density of a plane wave in mW/cm2*
$E_{tot}$ = *total electric field strength in V/m*
$H_{tot}$ = *total magnetic field strength in A/m*

## SAR Evaluation – Peak Spatial - Average

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 OPENSAR 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 OPENSAR software stop the measurements if this limit is exceeded.

## SAR Evaluation – Peak SAR

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 OPENSAR 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.
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 fourth order least square polynomial 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.

## Definition of Reference Points

**Ear Reference Point**

Figure 6.2 shows the front, back and side views of the SAM Phantom. The point "M" is the reference point for the center of the mouth, "LE" is the left ear reference point (ERP), and "RE" is the right ERP. The ERPs are 15mm posterior to the entrance to the ear canal (EEC) along the B-M line (Back-Mouth), as shown in Figure 6.1. The plane passing through the two ear canals and M is defined as the Reference Plane. The line N-F (Neck-Front) is perpendicular to the reference plane and passing through the RE (or LE) is called the Reference Pivoting Line (see Figure 6.1). Line B-M is perpendicular to the N-F line. Both N-F and B-M lines are marked on the external phantom shell to facilitate handset positioning [5].

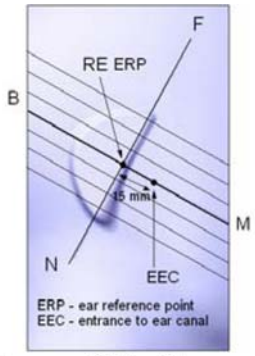



**Figure 6.1 Close-up side view of ERP's**

**Figure 6.2 Front, back and side view of SAM**

## Device Reference Points

Two imaginary lines on the device need to be established: the vertical centerline and the horizontal line. The test device is placed in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point" (See Fig. 6.3). The "test device reference point" is than located at the same level as the center of the ear reference point. The test device is positioned so that the "vertical centerline" is bisecting the front surface of the device at it's top and bottom edges, positioning the "ear reference point" on the outer surface of both the left and right head phantoms on the ear reference point [5].

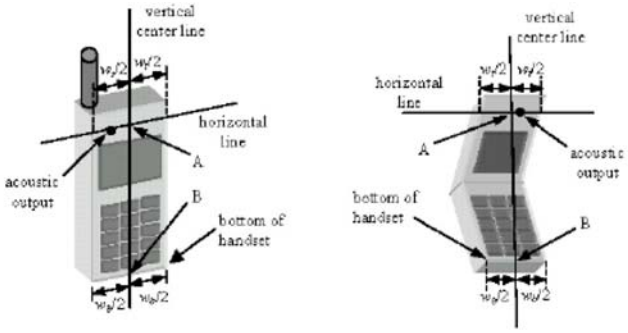



**Figure 6.3 Handset Vertical Center & Horizontal Line Reference Points**

# Test Configuration – Positioning for Cheek / Touch

1. Position the device close to the surface of the phantom such that point A is on the (virtual) extension of the line passing through points RE and LE on the phantom (see Figure below), such that the plane defined by the vertical center line and the horizontal line of the device is approximately parallel to the sagittal plane of the phantom

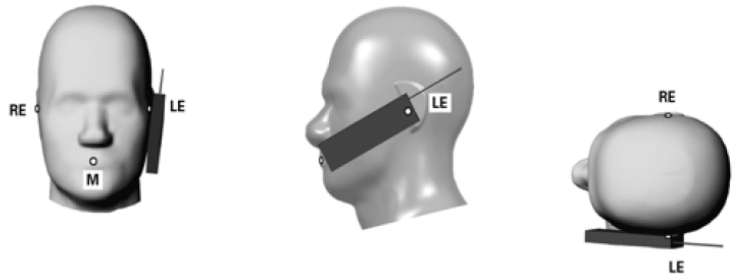



**Figure 7.1 Front, Side and Top View of Cheek/Touch Position**

2. Translate the device towards the phantom along the line passing through RE and LE until the device touches the ear.

3. While maintaining the device in this plane, rotate it around the LE-RE line until the vertical centerline is in the plane normal to MB-NF including the line MB (called the reference plane).
4. Rotate the device around the vertical centerline until the device (horizontal line) is symmetrical with respect to the line NF.

5. While maintaining the vertical centerline in the reference plane, keeping point A on the line passing through RE and LE and maintaining the device contact with the ear, rotate the device about the line NF until any point on the device is in contact with a phantom point below the ear (cheek). See Figure below.

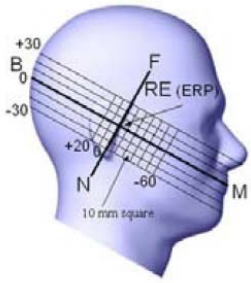



**Figure 7.2 Side view w/ relevant markings**

## Test Configuration – Positioning for Ear / 15° Tilt

With the test device aligned in the Cheek/Touch Position":

1. While maintaining the orientation of the device, retracted the device parallel to the reference plane far enough to enable a rotation of the device by 15 degrees.

2. Rotate the device around the horizontal line by 15 degrees.

3. While maintaining the orientation of the device, move the device parallel to the reference plane until any part of the device touches the head. (In this position, point A is located on the line RE-LE). The tilted position is obtained when the contact is on the pinna. If the contact is at any location other than the pinna, the angle of the device shall be reduced. The tilted position is obtained when any part of the device is in contact with the ear as well as a second part of the device is in contact with the head (see Figure below).

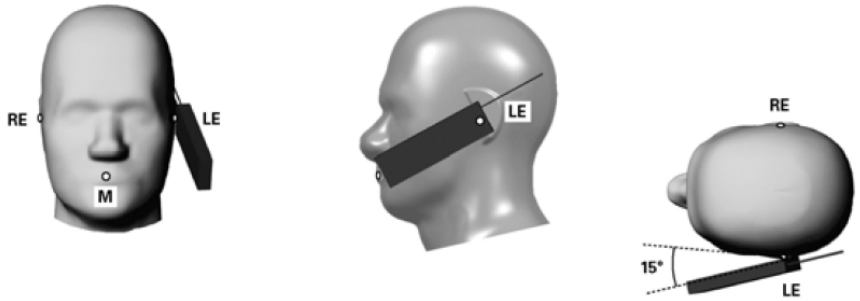
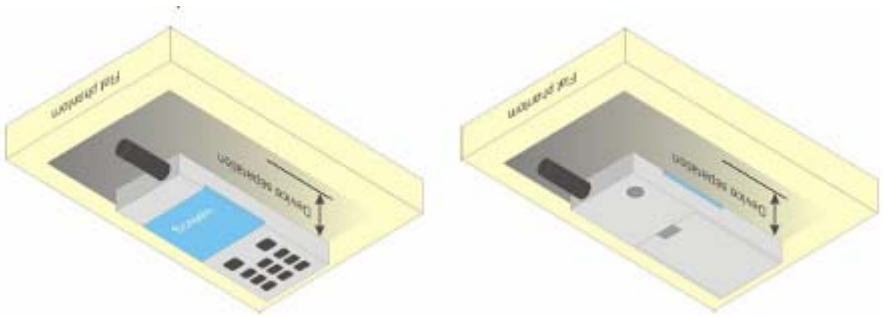



**Figure 7.3 Front, Side and Top View of Ear/15˚ Tilt Position**

## Test Position – Body Configurations

Body Worn Position
(a) To position the device parallel to the phantom surface with either keypad up or down.
(b) To adjust the device parallel to the flat phantom.
(c) To adjust the distance between the device surface and the flat phantom to 1.0 cm or holster surface and the flat phantom
to 0 cm.



# 7 EXPOSURE LIMIT

In order for users to be aware of the body-worn operating requirements for meeting RF exposure compliance, operating instructions and cautions statements are included in the user's manual.

## Uncontrolled Environment

Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure. The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity.

## Controlled Environment

Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation). In general, occupational/controlled exposure limits are applicable to situations in which persons are exposed as a consequence of their employment, who have been made fully aware of the potential for exposure and can exercise control over their exposure. This exposure category is also applicable when the exposure is of a transient nature due to incidental passage through a location where the exposure levels may be higher than the general population/uncontrolled limits, but the exposed person is fully aware of the potential for exposure and can exercise control over his or her exposure by leaving the area or by some other appropriate means.

**Table 8.1 Human Exposure Limits**

| | UNCONTROLLED ENVIRONMENT General Population (W/kg) or (mW/g) | CONTROLLED ENVIROMENT Professional Population (W/kg) or (mW/g) |
|---|---|---|
| SPATIAL PEAK SAR[1] Brain | 1.60 | 8.00 |
| SPATIAL AVERAGE SAR[2] Whole Body | 0.08 | 0.40 |
| SPATIAL PEAK SAR[3] Hands, Feet, Ankles, Wrists | 4.00 | 20.00 |

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

# 8 SYSTEM AND LIQUID VALIDATION

## System Validation

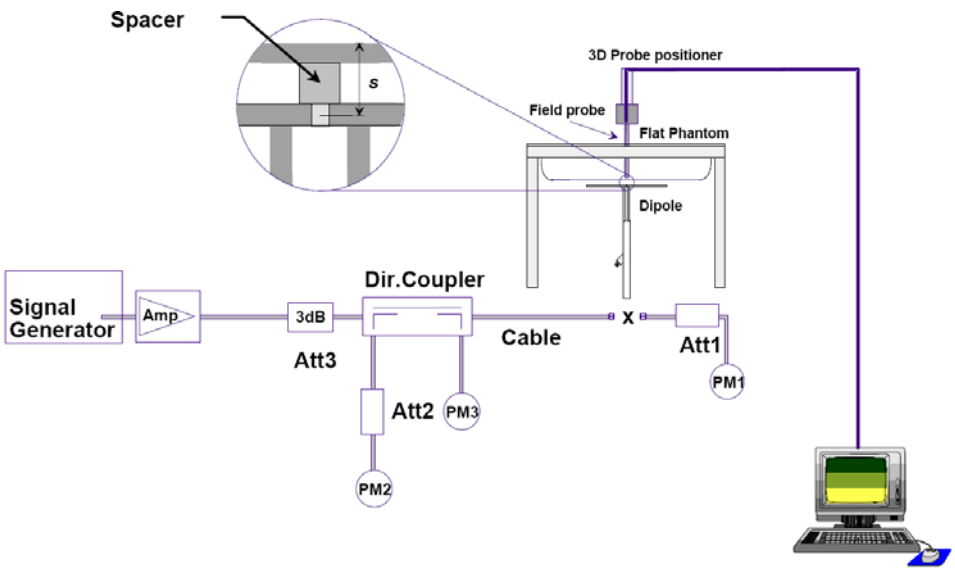



Fig 8.1 System Setup for System Evaluation

The system performance check verifies that the system operates within its specifications. System and operator errors can be detected and corrected. It is recommended that the system performance check be performed prior to any usage of the system in order to guarantee reproducible results. The system performance check uses normal SAR measurements in a simplified setup with a well characterized source. This setup was selected to give a high sensitivity to all parameters that might fail or vary over time. The system check does not intend to replace the calibration of the components, but indicates situations where the system uncertainty is exceeded due to drift or failure.

In the simplified setup for system evaluation, the DUT is replaced by a calibrated dipole and the power source is replaced by a continuous wave that comes from a signal generator. The calibrated dipole must be placed beneath the flat phantom section of the SAM twin phantom with the correct distance holder. The distance holder should touch the phantom surface with a light pressure at the reference marking and be oriented parallel to the long side of the phantom. The equipment setup is shown below:

1. Signal Generator
2. Amplifier
3. Directional Coupler
4. Power Meter
5. Calibrated Dipole

The output power on dipole port must be calibrated to 30 dBm (1000 mW) before dipole is connected.

## Numerical reference SAR values (W/kg) for reference dipole and flat phantom

| Frequency (MHz) | 1 g SAR | 10 g SAR | Local SAR at surface (above feed-point) | Local SAR at surface (y = 2 cm offset from feed-point)[a] |
|---|---|---|---|---|
| 300 | 3.0 | 2.0 | 4.4 | 2.1 |
| 450 | 4.9 | 3.3 | 7.2 | 3.2 |
| 835 | 9.5 | 6.2 | 4.1 | 4.9 |
| 900 | 10.8 | 6.9 | 16.4 | 5.4 |
| 1450 | 29.0 | 16.0 | 50.2 | 6.5 |
| 1800 | 38.1 | 19.8 | 69.5 | 6.8 |
| 1900 | 39.7 | 20.5 | 72.1 | 6.6 |
| 2000 | 41.1 | 21.1 | 74.6 | 6.5 |
| 2450 | 52.4 | 24.0 | 104.2 | 7.7 |
| 3000 | 63.8 | 25.7 | 140.2 | 9.5 |

**Table 1: system validation (1g)**

| Measurement Date | Frequency (MHz) | Liquid Type (head/body) | Target SAR1g (W/kg) | Measured SAR1g (W/kg) | Normalized SAR1g (W/kg) | Deviation (%) |
|---|---|---|---|---|---|---|
| Aug 13,2016 | 835 | head | 9.53 | 0.0960 | 9.60 | 0.7 |
| Aug 13,2016 | 835 | body | 9.44 | 0.0915 | 9.15 | -3.1 |
| Aug 17,2016 | 1800 | head | 37.56 | 0.3743 | 37.43 | -0.3 |
| Aug 17,2016 | 1800 | body | 37.91 | 0.3960 | 39.60 | 4.5 |
| Aug 19,2016 | 1900 | head | 39.37 | 0.3895 | 38.95 | -2.2 |
| Aug 19,2016 | 1900 | body | 38.58 | 0.3652 | 36.52 | -5.3 |

Note: system check input power: 10mW

## Liquid Validation

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

## KDB 865664 recommended Tissue Dielectric Parameters

The head and body tissue parameters given in this below table should be used to measure the SAR of transmitters operating in 100 MHz to 6 GHz frequency range. The tissue dielectric parameters of the tissue medium at the test frequency should be within the tolerance required in this document. The dielectric parameters should be linearly interpolated between the closest pair of target frequencies to determine the applicable dielectric parameters corresponding to the device test frequency.

The head tissue dielectric parameters recommended by IEEE Std 1528-2013 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 1528 are derived from tissue dielectric parameters computed from the 4-Cole-Cole equations described above and extrapolated according to the head parameters specified in 1528.

| Target Frequency | Head Tissue | | Body Tissue | |
|---|---|---|---|---|
| MHz | εr | σ (S/m) | εr | 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 |

## Tissue Dielectric Parameters for Head and Body Phantoms

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 Power drifts 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.

**Table 2: Recommended Dielectric Performance of Tissue**

| Recommended Dielectric Performance of Tissue | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Ingredients (% by weight ) | Frequency (MHz) | | | | | | | | | |
| | 750 | | 835 | | 1800 | | 1900 | | 2450 | |
| Tissue Type | Head | Body | Head | Body | Head | Body | Head | Body | Head | Body |
| Water | 40.52 | 51.83 | 41.46 | 52.4 | 55.2 | 70.2 | 54.9 | 40.4 | 62.7 | 73.2 |
| Salt (Nacl) | 1.61 | 1.52 | 1.45 | 1.4 | 0.3 | 0.4 | 0.18 | 0.5 | 0.5 | 0.04 |
| Sugar | 57.67 | 46.45 | 56.0 | 45.0 | 0.0 | 0.0 | 0.0 | 58.0 | 0.0 | 0.0 |
| HEC | 0.1 | 0.1 | 1.0 | 1.0 | 0.0 | 0.0 | 0.0 | 1.0 | 0.0 | 0.0 |
| Bactericide | 0.1 | 0.1 | 0.1 | 0.1 | 0.0 | 0.0 | 0.0 | 0.1 | 0.0 | 0.0 |
| Triton x-100 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 36.8 | 0.0 |
| DGBE | 0.0 | 0.0 | 0.0 | 0.0 | 44.5 | 29.4 | 44.92 | 0.0 | 0.0 | 26.4 |
| Dielectric | 40.93 | 54.32 | 42.54 | 56.1 | 40.0 | 53.3 | 39.9 | 54.0 | 39.8 | 52.5 |
| Conductivity | 0.87 | 0.95 | 0.91 | 0.95 | 1.40 | 1.52 | 1.42 | 1.45 | 1.88 | 1.78 |

## Table 3: Dielectric Performance of Head Tissue Simulating Liquid

| Temperature: 21°C , Relative humidity: 57% | | | | |
|---|---|---|---|---|
| Frequency(MHz) | Measured Date | Description | Dielectric Parameters | |
| | | | εr | σ(s/m) |
| 835 | Aug 13,2016 | Target Value ±5% window | 41.50 39.43 — 43.58 | 0.90 0.855 — 0.945 |
| | | Measurement Value | 41.33 | 0.91 |
| 1700 | Aug 17,2016 | Target Value ±5% window | 40.00 38.00 — 42.00 | 1.40 1.33 — 1.47 |
| | | Measurement Value | 40.51 | 1.39 |
| 1800 | Aug 17,2016 | Target Value ±5% window | 40.00 38.00 — 42.00 | 1.40 1.33 — 1.47 |
| | | Measurement Value | 40.59 | 1.39 |
| 1900 | Aug 19,2016 | Target Value ±5% window | 40.00 38.00 — 42.00 | 1.40 1.33 — 1.47 |
| | | Measurement Value | 41.04 | 1.41 |

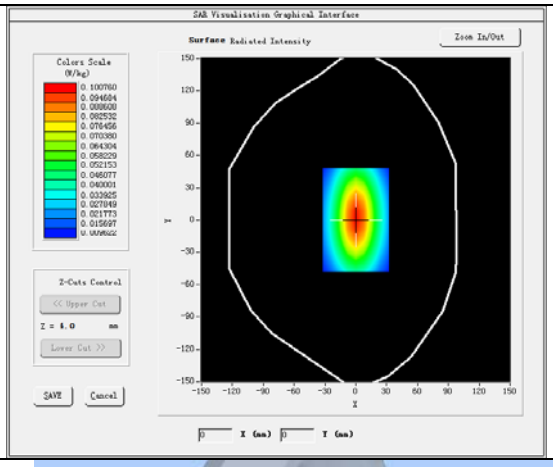
## Table 4: Dielectric Performance of Body Tissue Simulating Liquid

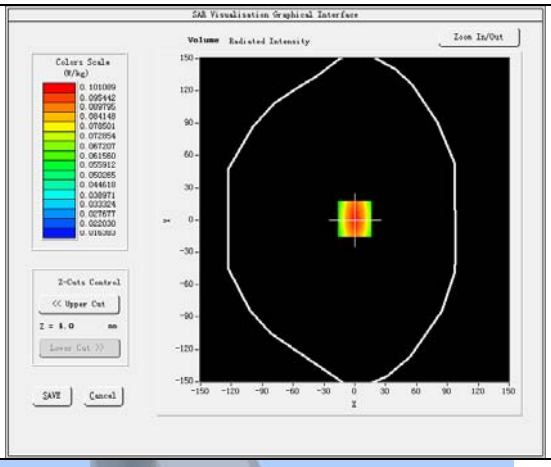
| Temperature: 21°C , Relative humidity: 57% , Measured Date: Aug 17,2016 | | | | |
|---|---|---|---|---|
| Frequency(MHz) | Measured Date | Description | Dielectric Parameters | |
| | | | εr | σ(s/m) |
| 835 | Aug 13,2016 | Target Value ±5% window | 55.2 52.25 — 57.75 | 0.97 0.922 — 1.018 |
| | | Measurement Value | 55.44 | 0.98 |
| 1700 | Aug 17,2016 | Target Value ±5% window | 53.30 50.64 — 55.97 | 1.52 1.44 — 1.60 |
| | | Measurement Value | 53.85 | 1.50 |
| 1800 | Aug 17,2016 | Target Value ±5% window | 53.30 50.64 — 55.97 | 1.52 1.44 — 1.60 |
| | | Measurement Value | 53.71 | 1.50 |
| 1900 | Aug 19,2016 | Target Value ±5% window | 53.30 50.64 — 55.97 | 1.52 1.44 — 1.60 |
| | | Measurement Value | 53.51 | 1.50 |

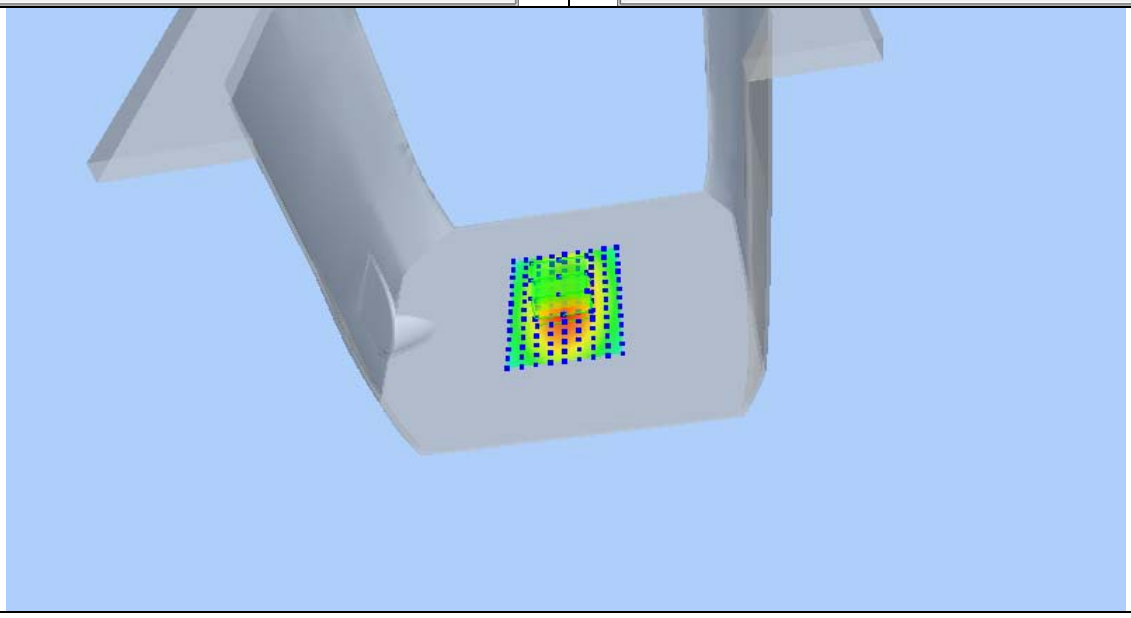
# System Verification Plots

**Product Description: Dipole**
**Model: SID835**
**Test Date: Aug 13,2016**

| | |
|---|---|
| Medium(liquid type) | HSL_835 |
| Frequency (MHz) | 835.000000 |
| Relative permittivity (real part) | 41.33 |
| Conductivity (S/m) | 0.91 |
| Input power | 10mW |
| E-Field Probe | SN 07/15 EP249 |
| Duty cycle | 1:1 |
| Conversion Factor | 5.26 |
| Sensor-surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -0.32 |
| SAR 10g (W/Kg) | 0.062053 |
| SAR 1g (W/Kg) | 0.096027 |
| **SURFACE SAR** | **VOLUME SAR** |

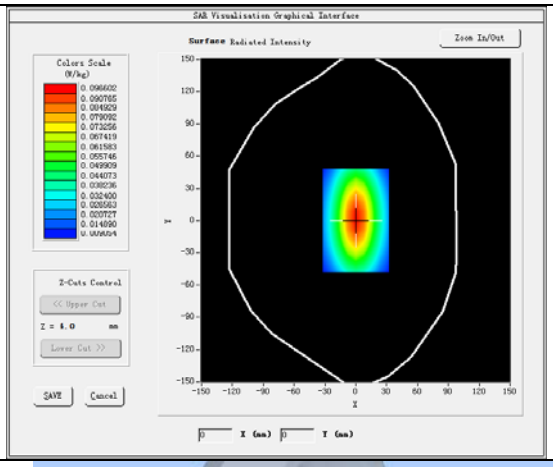


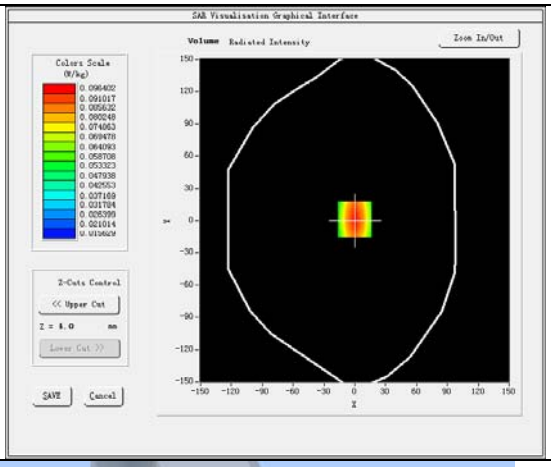



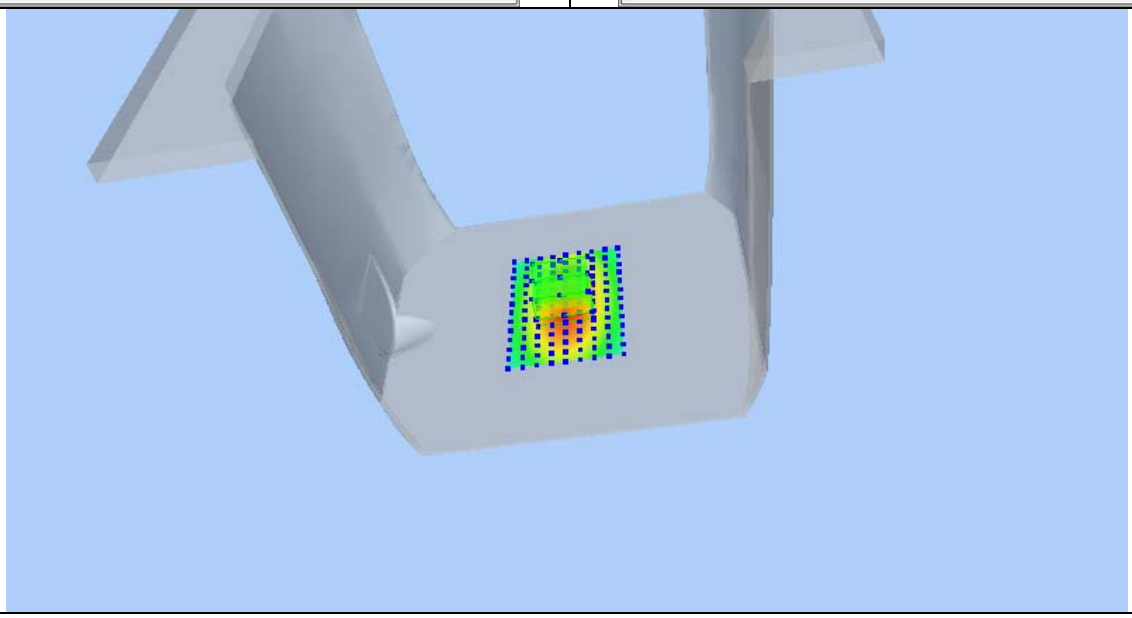



**Product Description: Dipole**
**Model: SID835**
**Test Date: Aug 13,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_835 |
| Frequency (MHz) | 835.000000 |
| Relative permittivity (real part) | 55.44 |
| Conductivity (S/m) | 0.98 |
| Input power | 10mW |
| E-Field Probe | SN 07/15 EP249 |
| Duty cycle | 1:1 |
| Conversion Factor | 5.46 |
| Sensor-surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -0.48 |
| SAR 10g (W/Kg) | 0.059353 |
| SAR 1g (W/Kg) | 0.091587 |
| **SURFACE SAR** | **VOLUME SAR** |

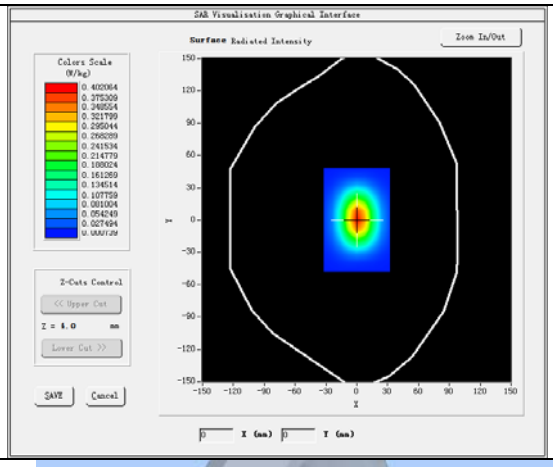


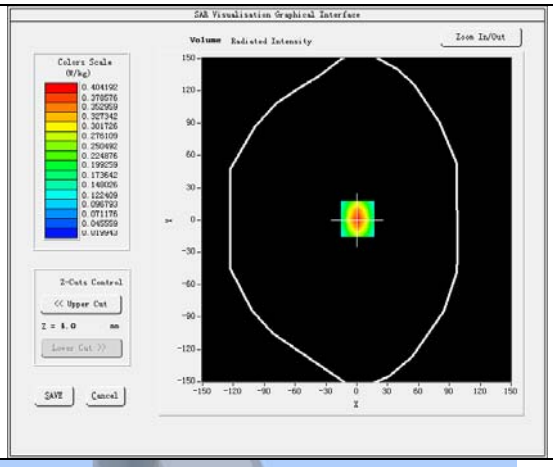



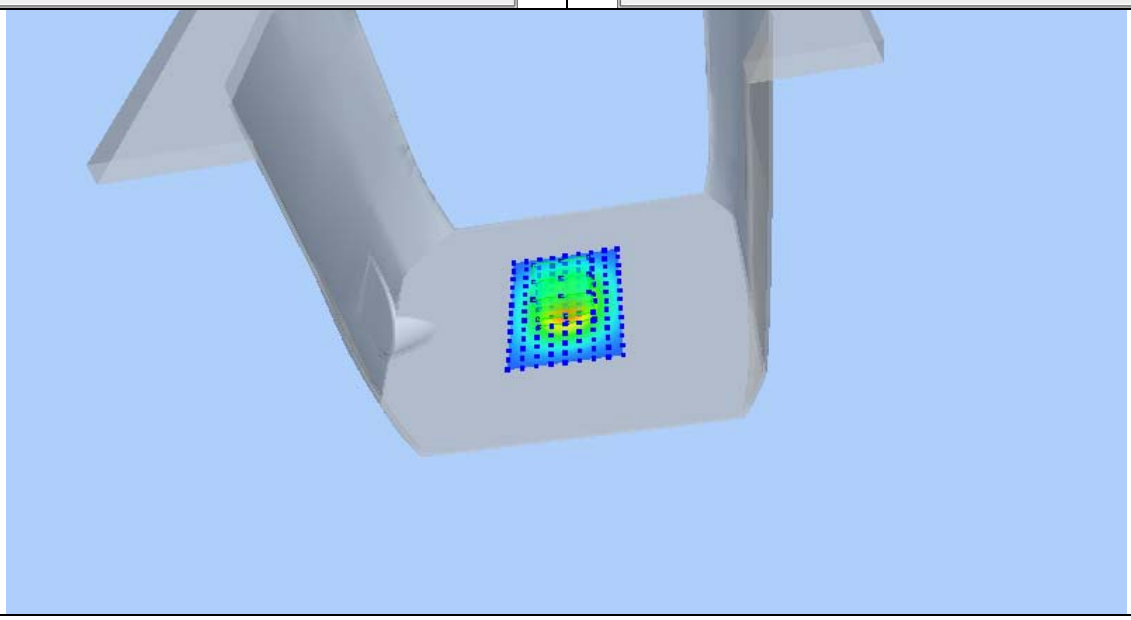



**Product Description: Dipole**
**Model: SID1800**
**Test Date: Aug 17,2016**

| | |
|---|---|
| Medium(liquid type) | HSL_1800 |
| Frequency (MHz) | 1800.000 |
| Relative permittivity (real part) | 40.59 |
| Conductivity (S/m) | 1.39 |
| Input power | 10mW |
| E-Field Probe | SN 07/15 EP249 |
| Duty cycle | 1:1 |
| Conversion Factor | 4.23 |
| Sensor-Surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -0.60 |
| SAR 10g (W/Kg) | 0.198695 |
| SAR 1g (W/Kg) | 0.374253 |
| **SURFACE SAR** | **VOLUME SAR** |

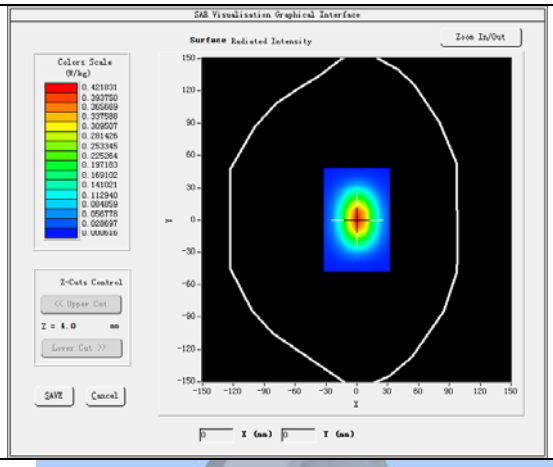


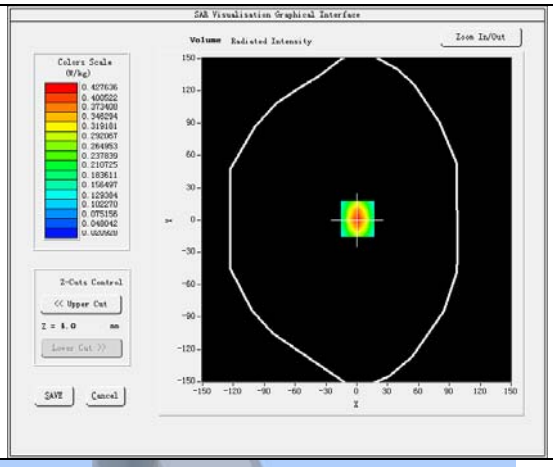



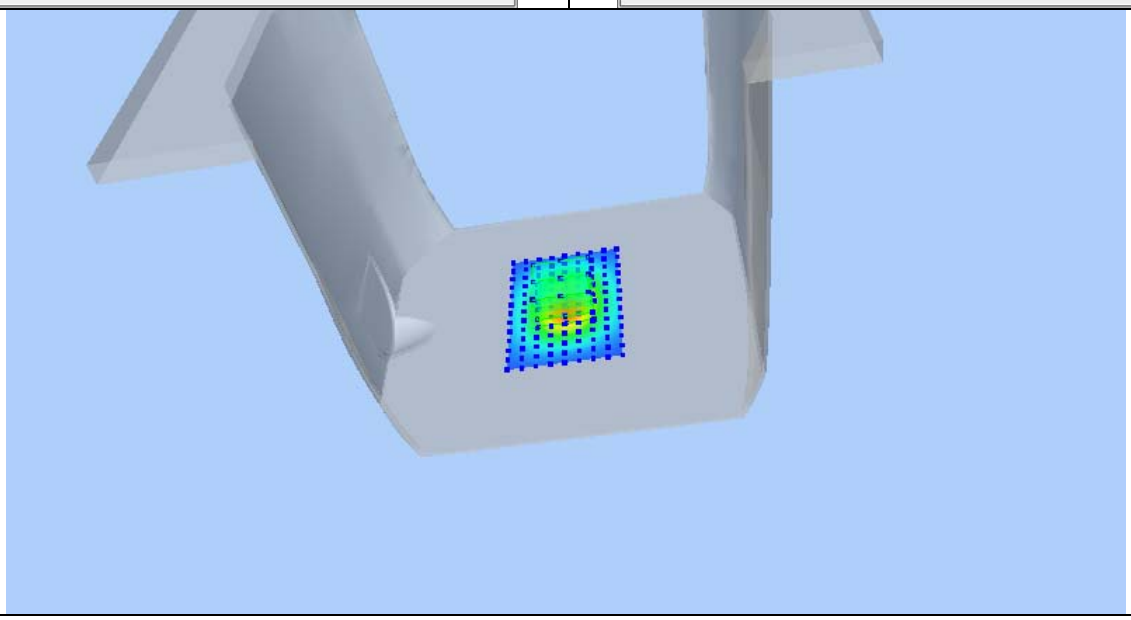



**Product Description: Dipole**
**Model: SID1800**
**Test Date: Aug 17,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_1800 |
| Frequency (MHz) | 1800.000 |
| Relative permittivity (real part) | 53.71 |
| Conductivity (S/m) | 1.50 |
| Input power | 10mW |
| E-Field Probe | SN 07/15 EP249 |
| Duty cycle | 1:1 |
| Conversion Factor | 4.37 |
| Sensor-Surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | 0.18 |
| SAR 10g (W/Kg) | 0.209895 |
| SAR 1g (W/Kg) | 0.396029 |
| **SURFACE SAR** | **VOLUME SAR** |

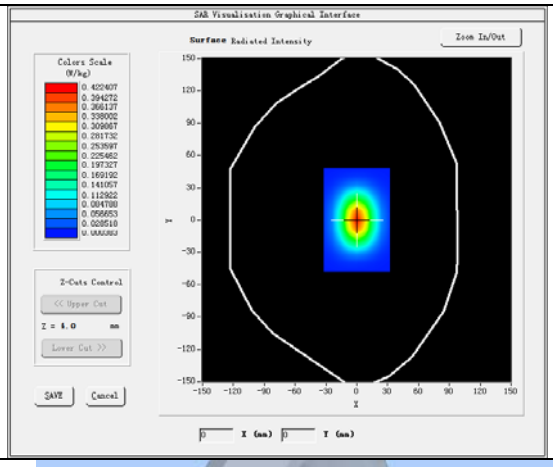


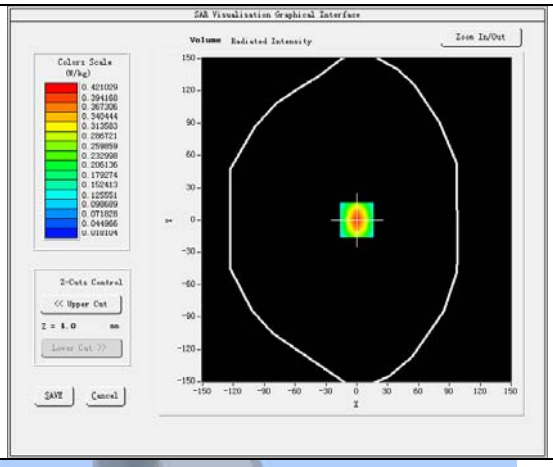



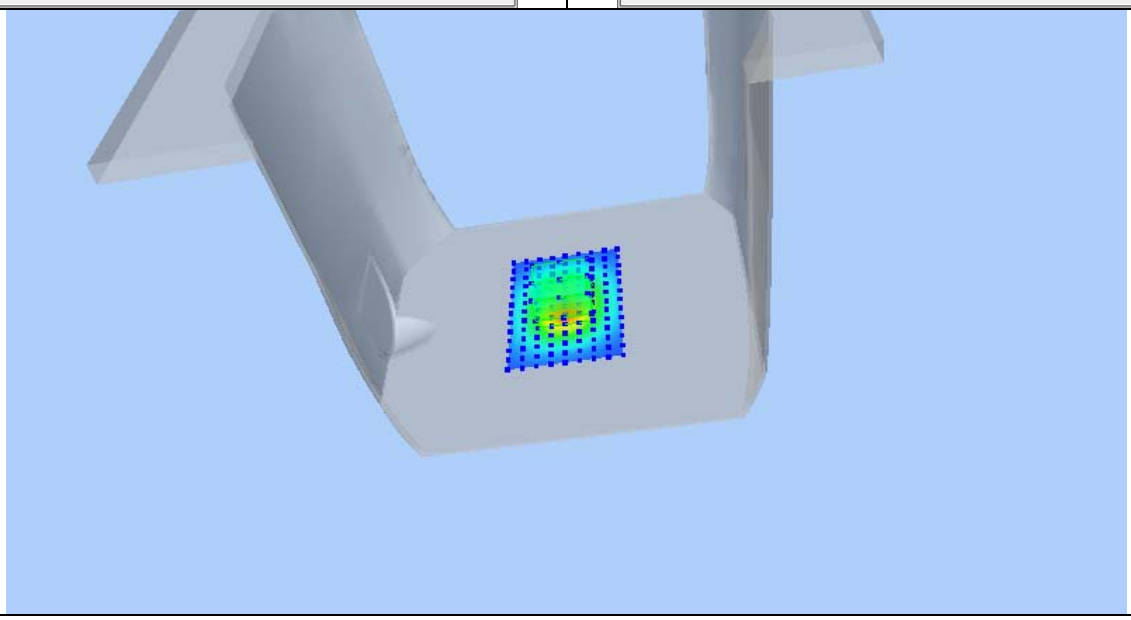



**Product Description: Dipole**
**Model: SID1900**
**Test Date: Aug 19,2016**

| | |
|---|---|
| Medium(liquid type) | HSL_1900 |
| Frequency (MHz) | 1900.000 |
| Relative permittivity (real part) | 41.04 |
| Conductivity (S/m) | 1.41 |
| Input power | 10mW |
| E-Field Probe | SN 07/15 EP249 |
| Duty cycle | 1:1 |
| Conversion Factor | 4.95 |
| Sensor-Surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -0.14 |
| SAR 10g (W/Kg) | 0.202880 |
| SAR 1g (W/Kg) | 0.389457 |
| **SURFACE SAR** | **VOLUME SAR** |

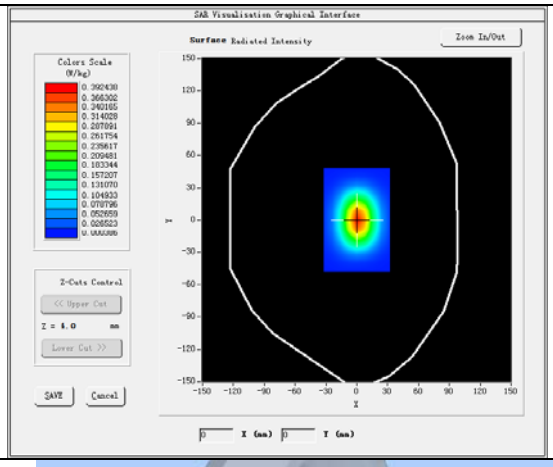


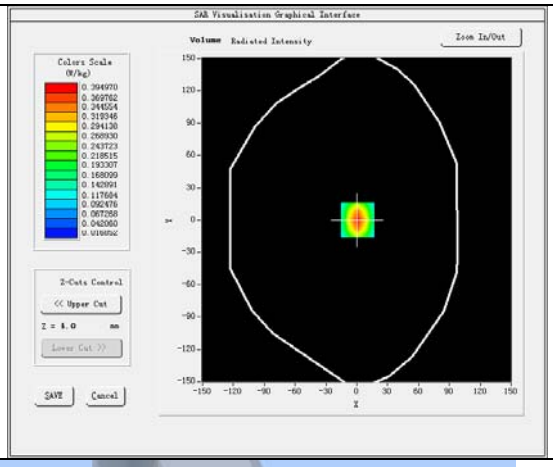



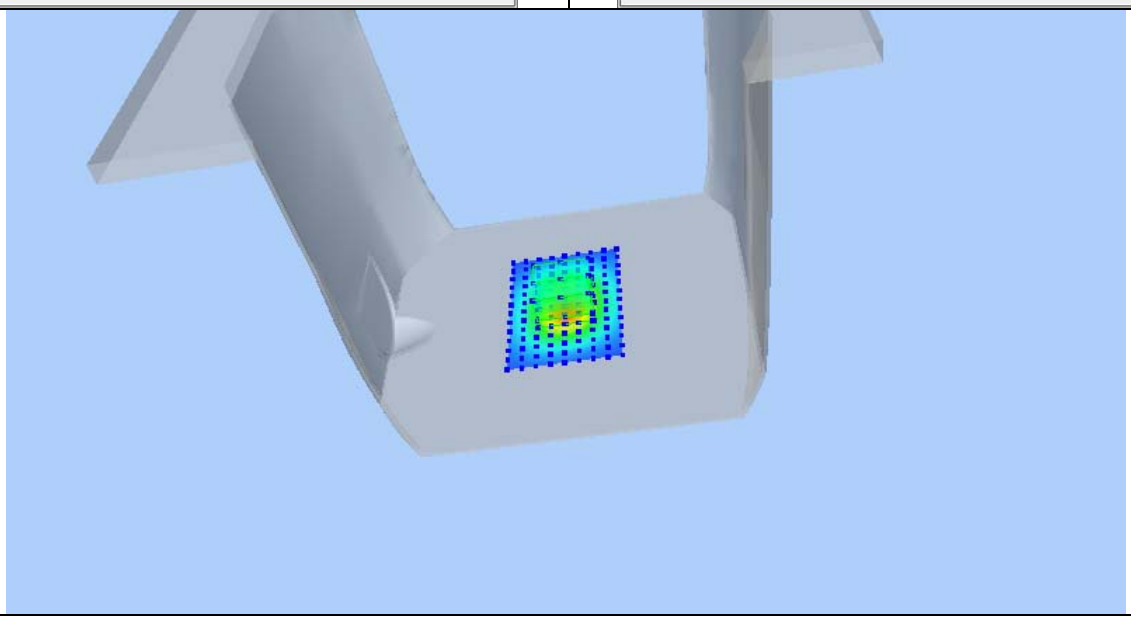



**Product Description: Dipole**
**Model: SID1900**
**Test Date: Aug 19,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_1900 |
| Frequency (MHz) | 1900.000 |
| Relative permittivity (real part) | 53.51 |
| Conductivity (S/m) | 1.50 |
| Input power | 10mW |
| E-Field Probe | SN 07/15 EP249 |
| Duty cycle | 1:1 |
| Conversion Factor | 5.05 |
| Sensor-Surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -0.49 |
| SAR 10g (W/Kg) | 0.190576 |
| SAR 1g (W/Kg) | 0.365181 |
| **SURFACE SAR** | **VOLUME SAR** |



# 9 TYPE A MEASUREMENT UNCERTAINTY

*The component of uncertainly may generally be categorized according to the methods used to evaluate them. The evaluation of uncertainly by the statistical analysis of a series of observations is termed a Type An evaluation of uncertainty. The evaluation of uncertainty by means other than the statistical analysis of a series of observation is termed a Type B evaluation of uncertainty. Each component of uncertainty, however evaluated, is represented by an estimated standard deviation, termed standard uncertainty, which is determined by the positive square root of the estimated variance*

*A Type A evaluation of standard uncertainty may be based on any valid statistical method for treating data. This includes calculating the standard deviation of the mean of a series of independent observations; using the method of least squares to fit a curve to the data in order to estimate the parameter of the curve and their standard deviations; or carrying out an analysis of variance in order to identify and quantify random effects in certain kinds of measurement.*

*A type B evaluation of standard uncertainty is typically based on scientific judgment using all of the relevant information available. These may include previous measurement data, experience and specification, data provided in calibration reports and uncertainties assigned to reference data taken from handbooks. Broadly speaking, the uncertainty is either obtained from an outdoor source or obtained from an assumed distribution, such as the normal distribution, rectangular or triangular distributions indicated in Table below :*

| *Uncertainty Distribution* | *Normal* | *Rectangle* | *Triangular* | *U Shape* |
|---|---|---|---|---|
| *Multi-plying Factor[(a)]* | *1/k[(b)]* | *1 / √3* | *1 / √6* | *1 / √2* |

*(a) standard uncertainty is determined as the product of the multiplying factor and the estimated range of variations in the measured quantity*
*(b) κ is the coverage factor*

*Standard Uncertainty for Assumed Distribution*

*The combined standard uncertainty of the measurement result represents the estimated standard deviation of the result. It is obtained by combining the individual standard uncertainties of both Type A and Type -sum- by taking the positive square root of the estimated variances.*

*Expanded uncertainty is a measure of uncertainty that defines an interval about the measurement result within which the measured value is confidently believed to lie. It is obtained by multiplying the combined standard uncertainty by a coverage factor. Typically, the coverage factor ranges from 2 to 3. Using a coverage factor allows the true value of a measured quantity to be specified with a defined probability within the specified uncertainty range. For purpose of this document, a coverage factor two is used, which corresponds to confidence interval of about 95 %.*

*The COMOSAR Uncertainty Budget is show in below table:*

# UNCERTAINTY FOR SYSTEM PERFORMANCE CHECK

| Uncertainty Component | Tol. (± %) | Prob. Dist. | Div. | ci (1 g) | ci (10 g) | 1 g ui (± %) | 10 g ui (± %) | vi |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe Calibration | 5,8 | N | 1 | 1 | 1 | 5,8 | 5,8 | ∞ |
| Axial Isotropy | 3,5 | R | √3 | (1-cp)1/2 | (1-cp)1/2 | 1,42887 | 1,42887 | ∞ |
| Hemispherical Isotropy | 5,9 | R | √3 | √Cp | √Cp | 2,40866 | 2,40866 | ∞ |
| Boundary Effect | 1 | R | √3 | 1 | 1 | 0,57735 | 0,57735 | ∞ |
| Linearity | 4,7 | R | √3 | 1 | 1 | 2,71355 | 2,71355 | ∞ |
| System Detection Limits | 1 | R | √3 | 1 | 1 | 0,57735 | 0,57735 | ∞ |
| Readout Electronics | 0,5 | N | 1 | 1 | 1 | 0,5 | 0,5 | ∞ |
| Response Time | 0 | R | √3 | 1 | 1 | 0 | 0 | ∞ |
| Integration Time | 1,4 | R | √3 | 1 | 1 | 0,80829 | 0,80829 | ∞ |
| RF Ambient Conditions | 3 | R | √3 | 1 | 1 | 1,73205 | 1,73205 | ∞ |
| Probe Positioner Mechanical Tolerance | 1,4 | R | √3 | 1 | 1 | 0,80829 | 0,80829 | ∞ |
| Probe Positioning with respect to Phantom Shell | 1,4 | R | √3 | 1 | 1 | 0,80829 | 0,80829 | ∞ |
| Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation | 2,3 | R | √3 | 1 | 1 | 1,32791 | 1,32791 | ∞ |
| **Dipole** | | | | | | | | |
| Dipole Axis to Liquid Distance | 2 | N | √3 | 1 | 1 | 1,1547 | 1,1547 | N-1 |
| Input Power and SAR drift measurement | 5 | R | √3 | 1 | 1 | 2,88675 | 2,88675 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | |
| Phantom Uncertainty (shape and thickness tolerances) | 4 | R | √3 | 1 | 1 | 2,3094 | 2,3094 | ∞ |
| Liquid Conductivity - deviation from target values | 5 | R | √3 | 0,64 | 0,43 | 1,84752 | 1,2413 | ∞ |
| Liquid Conductivity - measurement uncertainty | 4 | N | 1 | 0,64 | 0,43 | 2,56 | 1,72 | M |
| Liquid Permittivity - deviation from target values | 5 | R | √3 | 0,6 | 0,49 | 1,73205 | 1,41451 | ∞ |
| Liquid Permittivity - measurement uncertainty | 5 | N | 1 | 0,6 | 0,49 | 3 | 2,45 | M |
| Combined Standard Uncertainty | | RSS | | | | 9.6671 | 9.1646 | |
| Expanded Uncertainty (95% CONFIDENCE INTERVAL) | | k | | | | 19.3342 | 18.3292 | |

# UNCERTAINTY EVALUATION FOR HANDSET SAR TEST

| Uncertainty Component | Tol. (± %) | Prob. Dist. | Div. | $c_i$ (1 g) | $c_i$ (10 g) | 1 g $u_i$ (± %) | 10 g $u_i$ (± %) | $v_i$ |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe Calibration | 5,8 | N | 1 | 1 | 1 | 5,8 | 5,8 | ∞ |
| Axial Isotropy | 3,5 | R | √3 | $(1-c_p)^{1/2}$ | $(1-c_p)^{1/2}$ | 1,43 | 1,43 | ∞ |
| Hemispherical Isotropy | 5,9 | R | √3 | $\sqrt{C_p}$ | $\sqrt{C_p}$ | 2,41 | 2,41 | ∞ |
| Boundary Effect | 1 | R | √3 | 1 | 1 | 0,58 | 0,58 | ∞ |
| Linearity | 4,7 | R | √3 | 1 | 1 | 2,71 | 2,71 | ∞ |
| System Detection Limits | 1 | R | √3 | 1 | 1 | 0,58 | 0,58 | ∞ |
| Readout Electronics | 0,5 | N | 1 | 1 | 1 | 0,50 | 0,50 | ∞ |
| Response Time | 0 | R | √3 | 1 | 1 | 0,00 | 0,00 | ∞ |
| Integration Time | 1,4 | R | √3 | 1 | 1 | 0,81 | 0,81 | ∞ |
| RF Ambient Conditions | 3 | R | √3 | 1 | 1 | 1,73 | 1,73 | ∞ |
| Probe Positioner Mechanical Tolerance | 1,4 | R | √3 | 1 | 1 | 0,81 | 0,81 | ∞ |
| Probe Positioning with respect to Phantom Shell | 1,4 | R | √3 | 1 | 1 | 0,81 | 0,81 | ∞ |
| Extrapolation, interpolation and Integration Algorithms for Max. SAR Evaluation | 2,3 | R | √3 | 1 | 1 | 1,33 | 1,33 | ∞ |
| **Test sample Related** | | | | | | | | |
| Test Sample Positioning | 2,6 | N | 1 | 1 | 1 | 2,60 | 2,60 | N-1 |
| Device Holder Uncertainty | 3 | N | 1 | 1 | 1 | 3,00 | 3,00 | N-1 |
| Output Power Variation - SAR drift measurement | 5 | R | √3 | 1 | 1 | 2,89 | 2,89 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | |
| Phantom Uncertainty (shape and thickness tolerances) | 4 | R | √3 | 1 | 1 | 2,31 | 2,31 | ∞ |
| Liquid Conductivity - deviation from target values | 5 | R | √3 | 0,64 | 0,43 | 1,85 | 1,24 | ∞ |
| Liquid Conductivity - measurement uncertainty | 4 | N | 1 | 0,64 | 0,43 | 2,56 | 1,72 | M |
| Liquid Permittivity - deviation from target values | 5 | R | √3 | 0,6 | 0,49 | 1,73 | 1,41 | ∞ |
| Liquid Permittivity - measurement uncertainty | 5 | N | 1 | 0,6 | 0,49 | 3,00 | 2,45 | M |
| Combined Standard Uncertainty | | RSS | | | | 10.39 | 9.92 | |
| Expanded Uncertainty (95% CONFIDENCE INTERVAL) | | k | | | | 20.78 | 19.84 | |

# 10 TEST INSTRUMENT

| Name of Equipment | Manufacturer | Type/Model | Serial Number | Calibration Date | Calibration Due |
|---|---|---|---|---|---|
| 6 AXIS ROBOT | KUKA | KR6 R900 SIXX | 502635 | N/A | N/A |
| SATIMO Test Software | MVG | OPENSAR | OPENSAR V_4_02_27 | N/A | N/A |
| PHANTOM TABLE | MVG | N/A | SAR_1215_01 | N/A | N/A |
| SAM PHANTOM | MVG | SAM118 | SN 11/15 SAM118 | N/A | N/A |
| MultiMeter | Keithley | MiltiMeter 2000 | 4073942 | 2016-03-16 | 2017-03-15 |
| Data Acquisition Electronics | MVG | DAE4 | 915 | 2016-03-16 | 2017-03-15 |
| S-Parameter Network Analyzer | Agilent | 8753E | JP38160684 | 2016-04-02 | 2017-04-01 |
| Universal Radio Communication Tester | ROHDE&SCH W ARZ | CMU200 | 112461 | 2016-03-23 | 2017-03-22 |
| Wideband Radio Communication Tester | ROHDE&SCH W ARZ | CMW500 | / | 2015-10-19 | 2016-10-18 |
| E-Field Probe | MVG | SSE5 | SN 07/15 EP249 | 2015-10-19 | 2016-10-18 |
| DIPOLE 835 | MVG | SID835 | SN 09/15 DIP 0G835-358 | 2015-03-16 | 2017-03-15 |
| DIPOLE 1800 | MVG | SID1800 | SN 09/15 DIP 1G800-360 | 2015-03-16 | 2017-03-15 |
| DIPOLE 1900 | MVG | SID1900 | SN 09/15 DIP 1G900-361 | 2015-03-16 | 2017-03-15 |
| Limesar Dielectric Probe | MVG | SCLMP | SN 11/15 OCPG 69 | 2016-03-16 | 2017-03-15 |
| Power Amplifier | BONN | BLWA 0830 -160/100/40D | 128740 | 2015-09-14 | 2016-09-14 |
| Signal Generator | R&S | SMB100A | 105942 | 2015-09-14 | 2016-09-14 |
| Power Meter | R&S | NRP2 | 102031 | 2015-09-14 | 2016-09-14 |

# 11 OUTPUT POWER VERIFICATION

**Test Condition:**

1. Conducted Measurement
   EUT was set for low, mid, high channel with modulated mode and highest RF output power.
   The base station simulator was connected to the antenna terminal.
2. Conducted Emissions Measurement Uncertainty
   All test measurements carried out are traceable to national standards. The uncertainty of the measurement at a confidence level of approximately 95% (in the case where distributions are normal), with a coverage factor of 2, in the range 30MHz – 40GHz is ±1.5dB.
3. Environmental Conditions

| | |
|---|---|
| Temperature | 23°C |
| Relative Humidity | 53% |
| Atmospheric Pressure | 1019mbar |

4. Test Date : Aug 13,2016
   Tested By : Damon Wang

## Test Procedures:

**Mobile Phone radio output power measurement**

1. The transmitter output port was connected to base station emulator.
2. Establish communication link between emulator and EUT and set EUT to operate at maximum output power all the time.
3. Select lowest, middle, and highest channels for each band and different possible test mode.
4. Measure the conducted peak burst power and conducted average burst power from EUT antenna port.

### Other radio output power measurement

The output power was measured using power meter at low, mid, and hi channels.

## Source-based Time Averaged Burst Power Calculation:

For TDMA, the following duty cycle factor was used to calculate the source-based time average power

| Number of Time slot | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| Duty Cycle | 1:8 | 1:4 | 1:2.66 | 1:2 |
| Duty cycle factor | -9.03 dB | -6.02 dB | -4.26 dB | -3.01 dB |
| Crest Factor | 8 | 4 | 2.66 | 2 |

**Remark:** *Time slot duty cycle factor = 10 * log (1 / Time Slot Duty Cycle)*

*Source based time averaged power = Maximum burst averaged power (1 Uplink) – 9.03 dB*
*Source based time averaged power = Maximum burst averaged power (2 Uplink) – 6.02 dB*
*Source based time averaged power = Maximum burst averaged power (3 Uplink) – 4.26 dB*
*Source based time averaged power = Maximum burst averaged power (4 Uplink) – 3.01 dB*

## Test Result:

| Burst Average Power (dBm); | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Band** | **GSM850** | | | | **PCS1900** | | | |
| Channel | 128 | 190 | 251 | Tune up Power tolerant | 512 | 661 | 810 | Tune up Power tolerant |
| Frequency (MHz) | 824.2 | 836.6 | 848.8 | / | 1850.2 | 1880 | 1909.8 | / |
| GSM Voice | 32.82 | 32.71 | 32.68 | 32±1 | 29.68 | 29.66 | 29.71 | 29±1 |
| GPRS 1 slots | 32.87 | 32.77 | 32.72 | 32±1 | 29.49 | 29.52 | 29.49 | 29±1 |
| GPRS 2 slots | 32.45 | 32.34 | 32.23 | 32±1 | 28.99 | 28.96 | 28.63 | 28±1 |
| GPRS 3 slots | 31.37 | 31.22 | 31.12 | 31±1 | 27.10 | 27.04 | 26.79 | 27±1 |
| GPRS 4 slots | 28.43 | 28.29 | 28.20 | 28±1 | 25.98 | 25.88 | 25.64 | 25±1 |
| EGPRS 1 slots | 26.79 | 26.60 | 26.19 | 26±1 | 25.85 | 25.71 | 25.37 | 25±1 |
| EGPRS 2 slots | 25.69 | 25.80 | 25.68 | 25±1 | 24.15 | 23.70 | 22.93 | 23.5±1 |
| EGPRS 3 slots | 25.54 | 25.66 | 25.44 | 25±1 | 22.89 | 22.78 | 22.56 | 22±1 |
| EGPRS 4 slots | 25.41 | 25.46 | 25.32 | 25±1 | 22.36 | 22.34 | 22.12 | 22±1 |
| Remark :<br>GPRS, CS1 coding scheme.<br>EGPRS, MCS5 coding scheme.<br>Multi 1 Slot , Support Max 4 downlink, 1 uplink , 5 working link<br>Multi 2 Slots , Support Max 4 downlink, 2 uplink , 5 working link<br>Multi 3 Slots , Support Max 4 downlink, 3 uplink , 5 working link<br>Multi 4 Slots , Support Max 4 downlink, 4 uplink , 5 working link | | | | | | | | |

| Source Based time Average Power (dBm) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Band** | **GSM850** | | | | **PCS1900** | | | |
| Channel | 128 | 190 | 251 | Time Average factor | 512 | 661 | 810 | Time Average factor |
| Frequency (MHz) | 824.2 | 836.6 | 848.8 | / | 1850.2 | 1880 | 1909.8 | / |
| GSM Voice | 23.79 | 23.68 | 23.65 | -9.03 | 20.65 | 20.63 | 20.68 | -9.03 |
| GPRS 1 slots | 23.84 | 23.74 | 23.69 | -9.03 | 20.46 | 20.49 | 20.46 | -9.03 |
| GPRS 2 slots | 26.43 | 26.32 | 26.20 | -6.02 | 22.97 | 22.94 | 22.61 | -6.02 |
| GPRS 3 slots | 27.11 | 26.96 | 26.86 | -4.26 | 22.84 | 22.78 | 22.53 | -4.26 |
| GPRS 4 slots | 25.42 | 25.28 | 25.19 | -3.01 | 22.97 | 22.87 | 22.63 | -3.01 |
| EGPRS 1 slots | 17.76 | 17.57 | 17.16 | -9.03 | 16.82 | 16.68 | 16.34 | -9.03 |
| EGPRS 2 slots | 19.67 | 19.78 | 19.66 | -6.02 | 18.13 | 17.68 | 16.91 | -6.02 |
| EGPRS 3 slots | 21.28 | 21.40 | 21.18 | -4.26 | 18.63 | 18.52 | 18.30 | -4.26 |
| EGPRS 4 slots | 22.40 | 22.45 | 22.31 | -3.01 | 19.35 | 19.33 | 19.11 | -3.01 |
| Remark :<br>Time average factor = 1 uplink , 10*log(1/8)=-9.03dB , 2 uplink , 10*log(2/8)=-6.02dB , 3 uplink , 10*log(3/8)=-4.26dB ,4 uplink , 10*log(4/8)=-3.01dB<br>Source based time average power = Burst Average power + Time Average factor | | | | | | | | |

Note: 1. For EGSM850, DUT was set in GPRS(3Tx slots) due to the Maximum source-base time average output power for body SAR.

1. For PCS1900, DUT was set in GPRS(4Tx slots) due to the Maximum source-base time average output power for body SAR.

| WCDMA - Average Power (dBm) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Band** | **WCDMA Band II** | | | | | **WCDMA Band V** | | | | |
| **Channel** | **9262** | **9400** | **9538** | **Tune up Power tolerant** | **MPR (dB)** | **4132** | **4183** | **4233** | **Tune up Power tolerant** | **MPR (dB)** |
| **Frequency (MHz)** | **1852.4** | **1880** | **1907.6** | / | / | **826.4** | **836.6** | **846.6** | / | / |
| RMC 12.2k | 22.49 | 22.64 | 22.76 | 22±1 | 0 | 22.56 | 22.56 | 22.14 | 22±1 | 0 |
| HSDPA Subtest-1 | 21.25 | 21.39 | 21.97 | 21±1 | 1 | 21.81 | 21.67 | 21.58 | 21±1 | 1 |
| HSDPA Subtest-2 | 21.42 | 21.55 | 21.58 | 21±1 | 1 | 21.36 | 21.17 | 21.47 | 21±1 | 1 |
| HSDPA Subtest-3 | 21.40 | 21.47 | 21.57 | 21±1 | 1 | 21.32 | 21.16 | 21.45 | 21±1 | 1 |
| HSDPA Subtest-4 | 21.39 | 21.36 | 21.52 | 21±1 | 1 | 21.28 | 21.22 | 21.43 | 21±1 | 1 |
| HSUPA Subtest-1 | 21.55 | 21.24 | 21.80 | 21±1 | 1 | 21.78 | 21.64 | 21.51 | 21±1 | 1 |
| HSUPA Subtest-2 | 21.45 | 21.62 | 21.55 | 21±1 | 1 | 21.40 | 21.38 | 21.47 | 21±1 | 1 |
| HSUPA Subtest-3 | 21.42 | 21.58 | 21.49 | 21±1 | 1 | 21.36 | 21.20 | 21.45 | 21±1 | 1 |
| HSUPA Subtest-4 | 21.38 | 21.42 | 21.46 | 21±1 | 1 | 21.33 | 21.19 | 21.36 | 21±1 | 1 |
| HSUPA Subtest-5 | 21.19 | 21.20 | 21.11 | 21±1 | 1 | 21.16 | 21.17 | 21.09 | 21±1 | 1 |

## LTE Power Reduction

The following tests were conducted according to the test requirements outlined in section 6.2 of the 3GPP TS36.101 specification.

The allowed Maximum Power Reduction (MPR) for the maximum output power due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1 of the 3GPP TS36.101.

**Table 6.2.3-1: Maximum Power Reduction (MPR) for Power Class 3**

| Modulation | Channel bandwidth / Transmission bandwidth (RB) | | | | | | MPR (dB) |
|---|---|---|---|---|---|---|---|
| | 1.4 MHz | 3.0 MHz | 5 MHz | 10 MHz | 15 MHz | 20 MHz | |
| QPSK | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 1 |
| 16 QAM | ≤ 5 | ≤ 4 | ≤ 8 | ≤ 12 | ≤ 16 | ≤ 18 | ≤ 1 |
| 16 QAM | > 5 | > 4 | > 8 | > 12 | > 16 | > 18 | ≤ 2 |

The allowed A-MPR values specified below in Table 6.2.4.-1 of 3GPP TS36.101 are in addition to the allowed MPR requirements. All the measurements below were performed with A-MPR disabled, by using Network Signalling Value of "NS_01".

**Table 6.2.4-1: Additional Maximum Power Reduction (A-MPR)**

| Network Signalling value | Requirements (sub-clause) | E-UTRA Band | Channel bandwidth (MHz) | Resources Blocks ($N_{RB}$) | A-MPR (dB) |
|---|---|---|---|---|---|
| NS_01 | 6.6.2.1.1 | Table 5.5-1 | 1.4, 3, 5, 10, 15, 20 | Table 5.6-1 | NA |
| NS_03 | 6.6.2.2.1 | 2, 4,10, 23, 25, 35, 36 | 3 | >5 | ≤ 1 |
| | | | 5 | >6 | ≤ 1 |
| | | | 10 | >6 | ≤ 1 |
| | | | 15 | >8 | ≤ 1 |
| | | | 20 | >10 | ≤ 1 |
| NS_04 | 6.6.2.2.2 | 41 | 5 | >6 | ≤ 1 |
| | | | 10, 15, 20 | See Table 6.2.4-4 | |
| NS_05 | 6.6.3.3.1 | 1 | 10,15,20 | ≥ 50 | ≤ 1 |
| NS_06 | 6.6.2.2.3 | 12, 13, 14, 17 | 1.4, 3, 5, 10 | Table 5.6-1 | n/a |
| NS_07 | 6.6.2.2.3<br>6.6.3.3.2 | 13 | 10 | Table 6.2.4-2 | Table 6.2.4-2 |
| NS_08 | 6.6.3.3.3 | 19 | 10, 15 | > 44 | ≤ 3 |
| NS_09 | 6.6.3.3.4 | 21 | 10, 15 | > 40 | ≤ 1 |
| | | | | > 55 | ≤ 2 |
| NS_10 | | 20 | 15, 20 | Table 6.2.4-3 | Table 6.2.4-3 |
| NS_11 | 6.6.2.2.1 | 23[1] | 1.4, 3, 5, 10 | Table 6.2.4-5 | Table 6.2.4-5 |
| .. | | | | | |
| NS_32 | - | - | - | - | - |
| Note 1: Applies to the lower block of Band 23, i.e. a carrier placed in the 2000-2010 MHz region. | | | | | |

**LTE Band 2:**

| BW(MHz) | Ch | Freq(MHz) | Mode | UL RB Allocation | UL RB Offset | Average Power (dbm) | Tune up limited(dBm) | MPR (dB) |
|---|---|---|---|---|---|---|---|---|
| 1.4MHz | 18607 | 1850.7 | QPSK | 1 | 0 | 22.62 | 22.0±1 | 0 |
| | | | | 1 | 2 | 22.81 | 22.0±1 | 0 |
| | | | | 1 | 5 | 22.79 | 22.0±1 | 0 |
| | | | | 3 | 0 | 22.95 | 22.0±1 | 0 |
| | | | | 3 | 1 | 22.91 | 22.0±1 | 0 |
| | | | | 3 | 2 | 22.91 | 22.0±1 | 0 |
| | | | | 6 | 0 | 21.72 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 21.83 | 21.0±1 | 1.0 |
| | | | | 1 | 2 | 21.87 | 21.0±1 | 1.0 |
| | | | | 1 | 5 | 21.81 | 21.0±1 | 1.0 |
| | | | | 3 | 0 | 21.92 | 21.0±1 | 1.0 |
| | | | | 3 | 1 | 21.9 | 21.0±1 | 1.0 |
| | | | | 3 | 2 | 21.96 | 21.0±1 | 1.0 |
| | | | | 6 | 0 | 20.83 | 21.0±1 | 1.0 |
| | 18900 | 1880 | QPSK | 1 | 0 | 22.79 | 22.0±1 | 0 |
| | | | | 1 | 2 | 22.68 | 22.0±1 | 0 |
| | | | | 1 | 5 | 22.14 | 22.0±1 | 0 |
| | | | | 3 | 0 | 22.17 | 22.0±1 | 0 |
| | | | | **3** | 1 | 22.17 | 22.0±1 | 0 |
| | | | | 3 | 2 | 22.2 | 22.0±1 | 0 |
| | | | | 6 | 0 | 21.98 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.49 | 22.0±1 | 0 |
| | | | | 1 | 2 | 22.49 | 22.0±1 | 0 |
| | | | | 1 | 5 | 22.48 | 22.0±1 | 0 |
| | | | | 3 | 0 | 22.47 | 22.0±1 | 0 |
| | | | | 3 | 1 | 22.4 | 22.0±1 | 0 |
| | | | | 3 | 2 | 22.43 | 22.0±1 | 0 |
| | | | | 6 | 0 | 21.03 | 22.0±1 | 0 |
| | 19193 | 1909.3 | QPSK | 1 | 0 | 22.75 | 22.0±1 | 0 |
| | | | | 1 | 2 | 22.66 | 22.0±1 | 0 |
| | | | | 1 | 5 | 22.78 | 22.0±1 | 0 |
| | | | | 3 | 0 | 22.93 | 22.0±1 | 0 |
| | | | | 3 | 1 | 22.81 | 22.0±1 | 0 |
| | | | | 3 | 2 | 22.75 | 22.0±1 | 0 |
| | | | | 6 | 0 | 21.83 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 21.79 | 21.0±1 | 1.0 |
| | | | | 1 | 2 | 21.6 | 21.0±1 | 1.0 |
| | | | | 1 | 5 | 21.64 | 21.0±1 | 1.0 |
| | | | | 3 | 0 | 21.96 | 21.0±1 | 1.0 |
| | | | | 3 | 1 | 21.85 | 21.0±1 | 1.0 |
| | | | | 3 | 2 | 21.81 | 21.0±1 | 1.0 |
| | | | | 6 | 0 | 21.05 | 21.0±1 | 1.0 |

| BW(MHz) | Ch | Freq(MHz) | Mode | UL RB Allocation | UL RB Offset | Average Power (dbm) | Tune up limited(dBm) | MPR (dB) |
|---|---|---|---|---|---|---|---|---|
| 3MHz | 18615 | 1851.5 | QPSK | 1 | 0 | 22.91 | 22.0±1 | 0 |
| | | | | 1 | 8 | 22.8 | 22.0±1 | 0 |
| | | | | 1 | 14 | 22.78 | 22.0±1 | 0 |
| | | | | 6 | 0 | 21.76 | 22.0±1 | 0 |
| | | | | 6 | 4 | 21.58 | 22.0±1 | 0 |
| | | | | 6 | 9 | 21.63 | 22.0±1 | 0 |
| | | | | 15 | 0 | 21.63 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 21.68 | 21.0±1 | 1.0 |
| | | | | 1 | 8 | 21.38 | 21.0±1 | 1.0 |
| | | | | 1 | 14 | 21.4 | 21.0±1 | 1.0 |
| | | | | 6 | 0 | 20.73 | 21.0±1 | 1.0 |
| | | | | 6 | 4 | 20.59 | 21.0±1 | 1.0 |
| | | | | 6 | 9 | 20.63 | 21.0±1 | 1.0 |
| | | | | 15 | 0 | 20.56 | 21.0±1 | 1.0 |
| | 18900 | 1880 | QPSK | 1 | 0 | 22.87 | 22.0±1 | 0 |
| | | | | 1 | 8 | 22.69 | 22.0±1 | 0 |
| | | | | 1 | 14 | 22.64 | 22.0±1 | 0 |
| | | | | 6 | 0 | 22.14 | 22.0±1 | 0 |
| | | | | 6 | 4 | 22.1 | 22.0±1 | 0 |
| | | | | 6 | 9 | 22.06 | 22.0±1 | 0 |
| | | | | 15 | 0 | 22.07 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.44 | 22.0±1 | 0 |
| | | | | 1 | 8 | 22.46 | 22.0±1 | 0 |
| | | | | 1 | 14 | 22.55 | 22.0±1 | 0 |
| | | | | 6 | 0 | 21.4 | 22.0±1 | 0 |
| | | | | 6 | 4 | 21.41 | 22.0±1 | 0 |
| | | | | 6 | 9 | 21.37 | 22.0±1 | 0 |
| | | | | 15 | 0 | 21.36 | 22.0±1 | 0 |
| | 19185 | 1908.5 | QPSK | 1 | 0 | 22.83 | 22.0±1 | 0 |
| | | | | 1 | 8 | 22.34 | 22.0±1 | 0 |
| | | | | 1 | 14 | 22.18 | 22.0±1 | 0 |
| | | | | 6 | 0 | 21.65 | 22.0±1 | 0 |
| | | | | 6 | 4 | 21.45 | 22.0±1 | 0 |
| | | | | 6 | 9 | 21.35 | 22.0±1 | 0 |
| | | | | 15 | 0 | 21.45 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 21.68 | 21.0±1 | 2.0 |
| | | | | 1 | 8 | 21.17 | 21.0±1 | 2.0 |
| | | | | 1 | 14 | 21.08 | 21.0±1 | 2.0 |
| | | | | 6 | 0 | 20.65 | 21.0±1 | 2.0 |
| | | | | 6 | 4 | 20.49 | 21.0±1 | 2.0 |
| | | | | 6 | 9 | 20.38 | 21.0±1 | 2.0 |
| | | | | 15 | 0 | 20.43 | 21.0±1 | 2.0 |

| BW(MHz) | Ch | Freq(MHz) | Mode | UL RB Allocation | UL RB Offset | Average Power (dbm) | Tune up limited(dBm) | MPR (dB) |
|---|---|---|---|---|---|---|---|---|
| 5MHz | 18625 | 1852.5 | QPSK | 1 | 0 | 22.43 | 21.5±1 | 0.5 |
| | | | | 1 | 12 | 21.83 | 21.5±1 | 0.5 |
| | | | | 1 | 24 | 22.15 | 21.5±1 | 0.5 |
| | | | | 12 | 0 | 20.76 | 21.5±1 | 0.5 |
| | | | | 12 | 6 | 20.64 | 21.5±1 | 0.5 |
| | | | | 12 | 11 | 20.72 | 21.5±1 | 0.5 |
| | | | | 25 | 0 | 20.64 | 21.5±1 | 0.5 |
| | | | 16QAM | 1 | 0 | 21.24 | 21.0±1 | 2.0 |
| | | | | 1 | 12 | 20.74 | 21.0±1 | 2.0 |
| | | | | 1 | 24 | 21.11 | 21.0±1 | 2.0 |
| | | | | 12 | 0 | 20.12 | 21.0±1 | 2.0 |
| | | | | 12 | 6 | 20.06 | 21.0±1 | 2.0 |
| | | | | 12 | 11 | 20.15 | 21.0±1 | 2.0 |
| | | | | 25 | 0 | 20.03 | 21.0±1 | 2.0 |
| | 18900 | 1880 | QPSK | 1 | 0 | 22.75 | 22.0±1 | 0 |
| | | | | 1 | 12 | 22.69 | 22.0±1 | 0 |
| | | | | 1 | 24 | 22.89 | 22.0±1 | 0 |
| | | | | 12 | 0 | 21.78 | 22.0±1 | 0 |
| | | | | 12 | 6 | 21.63 | 22.0±1 | 0 |
| | | | | 12 | 11 | 21.63 | 22.0±1 | 0 |
| | | | | 25 | 0 | 21.65 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.7 | 22.0±1 | 0 |
| | | | | 1 | 12 | 22.15 | 22.0±1 | 0 |
| | | | | 1 | 24 | 22.37 | 22.0±1 | 0 |
| | | | | 12 | 0 | 21.98 | 22.0±1 | 0 |
| | | | | 12 | 6 | 21.82 | 22.0±1 | 0 |
| | | | | 12 | 11 | 21.87 | 22.0±1 | 0 |
| | | | | 25 | 0 | 21.8 | 22.0±1 | 0 |
| | 19175 | 1907.5 | QPSK | 1 | 0 | 22.45 | 21.5±1 | 0.5 |
| | | | | 1 | 12 | 21.82 | 21.5±1 | 0.5 |
| | | | | 1 | 24 | 21.72 | 21.5±1 | 0.5 |
| | | | | 12 | 0 | 21.06 | 21.5±1 | 0.5 |
| | | | | 12 | 6 | 20.78 | 21.5±1 | 0.5 |
| | | | | 12 | 11 | 20.62 | 21.5±1 | 0.5 |
| | | | | 25 | 0 | 20.74 | 21.5±1 | 0.5 |
| | | | 16QAM | 1 | 0 | 21.5 | 21.0±1 | 1.0 |
| | | | | 1 | 12 | 20.81 | 21.0±1 | 1.0 |
| | | | | 1 | 24 | 20.8 | 21.0±1 | 1.0 |
| | | | | 12 | 0 | 20.35 | 21.0±1 | 1.0 |
| | | | | 12 | 6 | 20.02 | 21.0±1 | 1.0 |
| | | | | 12 | 11 | 20.14 | 21.0±1 | 1.0 |
| | | | | 25 | 0 | 20.12 | 21.0±1 | 1.0 |

| BW(MHz) | Ch | Freq(MHz) | Mode | UL RB Allocation | UL RB Offset | Average Power (dbm) | Tune up limited(dBm) | MPR (dB) |
|---|---|---|---|---|---|---|---|---|
| 10MHz | 18650 | 1855 | QPSK | 1 | 0 | 21.61 | 21.0±1 | 1.0 |
| | | | | 1 | 24 | 21.65 | 21.0±1 | 1.0 |
| | | | | 1 | 49 | 21.79 | 21.0±1 | 1.0 |
| | | | | 25 | 0 | 20.51 | 21.0±1 | 1.0 |
| | | | | 25 | 12 | 20.57 | 21.0±1 | 1.0 |
| | | | | 25 | 24 | 20.71 | 21.0±1 | 1.0 |
| | | | | 50 | 0 | 20.63 | 21.0±1 | 1.0 |
| | | | 16QAM | 1 | 0 | 20.28 | 20.0±1 | 2.0 |
| | | | | 1 | 24 | 20.46 | 20.0±1 | 2.0 |
| | | | | 1 | 49 | 20.65 | 20.0±1 | 2.0 |
| | | | | 25 | 0 | 19.52 | 20.0±1 | 2.0 |
| | | | | 25 | 12 | 19.56 | 20.0±1 | 2.0 |
| | | | | 25 | 24 | 19.78 | 20.0±1 | 2.0 |
| | | | | 50 | 0 | 19.59 | 20.0±1 | 2.0 |
| | 18900 | 1880 | QPSK | 1 | 0 | 22.75 | 22.0±1 | 0 |
| | | | | 1 | 24 | 22.56 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.11 | 22.0±1 | 0 |
| | | | | 25 | 0 | 21.59 | 22.0±1 | 0 |
| | | | | 25 | 12 | 21.49 | 22.0±1 | 0 |
| | | | | 25 | 24 | 21.34 | 22.0±1 | 0 |
| | | | | 50 | 0 | 21.5 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 21.96 | 21.0±1 | 1.0 |
| | | | | 1 | 24 | 21.86 | 21.0±1 | 1.0 |
| | | | | 1 | 49 | 21.45 | 21.0±1 | 1.0 |
| | | | | 25 | 0 | 20.72 | 21.0±1 | 1.0 |
| | | | | 25 | 12 | 20.62 | 21.0±1 | 1.0 |
| | | | | 25 | 24 | 20.49 | 21.0±1 | 1.0 |
| | | | | 50 | 0 | 20.62 | 21.0±1 | 1.0 |
| | 19150 | 1905 | QPSK | 1 | 0 | 22.09 | 21.5±1 | 0.5 |
| | | | | 1 | 24 | 21.81 | 21.5±1 | 0.5 |
| | | | | 1 | 49 | 20.97 | 21.5±1 | 0.5 |
| | | | | 25 | 0 | 21.03 | 21.5±1 | 0.5 |
| | | | | 25 | 12 | 20.84 | 21.5±1 | 0.5 |
| | | | | 25 | 24 | 20.56 | 21.5±1 | 0.5 |
| | | | | 50 | 0 | 20.82 | 21.5±1 | 0.5 |
| | | | 16QAM | 1 | 0 | 20.98 | 20.0±1 | 2.0 |
| | | | | 1 | 24 | 20.82 | 20.0±1 | 2.0 |
| | | | | 1 | 49 | 19.99 | 20.0±1 | 2.0 |
| | | | | 25 | 0 | 20.19 | 20.0±1 | 2.0 |
| | | | | 25 | 12 | 20.02 | 20.0±1 | 2.0 |
| | | | | 25 | 24 | 19.75 | 20.0±1 | 2.0 |
| | | | | 50 | 0 | 19.95 | 20.0±1 | 2.0 |

| BW(MHz) | Ch | Freq(MHz) | Mode | UL RB Allocation | UL RB Offset | Average Power (dbm) | Tune up limited(dBm) | MPR (dB) |
|---|---|---|---|---|---|---|---|---|
| 15MHz | 18675 | 1857.5 | QPSK | 1 | 0 | 21.62 | 21.5±1 | 0.5 |
| | | | | 1 | 37 | 21.72 | 21.5±1 | 0.5 |
| | | | | 1 | 74 | 22.47 | 21.5±1 | 0.5 |
| | | | | 36 | 0 | 20.52 | 21.5±1 | 0.5 |
| | | | | 36 | 16 | 20.71 | 21.5±1 | 0.5 |
| | | | | 36 | 35 | 21.09 | 21.5±1 | 0.5 |
| | | | | 75 | 0 | 20.82 | 21.5±1 | 0.5 |
| | | | 16QAM | 1 | 0 | 20.31 | 20.0±1 | 2.0 |
| | | | | 1 | 37 | 20.55 | 20.0±1 | 2.0 |
| | | | | 1 | 74 | 21.29 | 20.0±1 | 2.0 |
| | | | | 36 | 0 | 19.48 | 20.0±1 | 2.0 |
| | | | | 36 | 16 | 19.78 | 20.0±1 | 2.0 |
| | | | | 36 | 35 | 20.15 | 20.0±1 | 2.0 |
| | | | | 75 | 0 | 19.9 | 20.0±1 | 2.0 |
| | 18900 | 1880 | QPSK | 1 | 0 | 22.83 | 22.0±1 | 0 |
| | | | | 1 | 37 | 22.39 | 22.0±1 | 0 |
| | | | | 1 | 74 | 22.22 | 22.0±1 | 0 |
| | | | | 36 | 0 | 21.48 | 22.0±1 | 0 |
| | | | | 36 | 16 | 21.27 | 22.0±1 | 0 |
| | | | | 36 | 35 | 21.17 | 22.0±1 | 0 |
| | | | | 75 | 0 | 21.32 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 21.98 | 21.0±1 | 1.0 |
| | | | | 1 | 37 | 21.64 | 21.0±1 | 1.0 |
| | | | | 1 | 74 | 21.51 | 21.0±1 | 1.0 |
| | | | | 36 | 0 | 20.6 | 21.0±1 | 1.0 |
| | | | | 36 | 16 | 20.49 | 21.0±1 | 1.0 |
| | | | | 36 | 35 | 20.38 | 21.0±1 | 1.0 |
| | | | | 75 | 0 | 20.49 | 21.0±1 | 1.0 |
| | 19125 | 1902.5 | QPSK | 1 | 0 | 22.23 | 21.5±1 | 0.5 |
| | | | | 1 | 37 | 21.83 | 21.5±1 | 0.5 |
| | | | | 1 | 74 | 21.11 | 21.5±1 | 0.5 |
| | | | | 36 | 0 | 21 | 21.5±1 | 0.5 |
| | | | | 36 | 16 | 20.74 | 21.5±1 | 0.5 |
| | | | | 36 | 35 | 20.5 | 21.5±1 | 0.5 |
| | | | | 75 | 0 | 20.76 | 21.5±1 | 0.5 |
| | | | 16QAM | 1 | 0 | 21.42 | 20.5±1 | 1.5 |
| | | | | 1 | 37 | 21.07 | 20.5±1 | 1.5 |
| | | | | 1 | 74 | 20.42 | 20.5±1 | 1.5 |
| | | | | 36 | 0 | 20.04 | 20.5±1 | 1.5 |
| | | | | 36 | 16 | 19.84 | 20.5±1 | 1.5 |
| | | | | 36 | 35 | 19.55 | 20.5±1 | 1.5 |
| | | | | 75 | 0 | 19.83 | 20.5±1 | 1.5 |

| BW(MHz) | Ch | Freq(MHz) | Mode | UL RB Allocation | UL RB Offset | Average Power (dbm) | Tune up limited(dBm) | MPR (dB) |
|---|---|---|---|---|---|---|---|---|
| 20MHz | 18700 | 1860 | QPSK | 1 | 0 | 22.45 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.79 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.44 | 22.0±1 | 0 |
| | | | | 50 | 0 | 21.42 | 22.0±1 | 0 |
| | | | | 50 | 24 | 21.76 | 22.0±1 | 0 |
| | | | | 50 | 49 | 21.69 | 22.0±1 | 0 |
| | | | | 100 | 0 | 21.45 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 21.69 | 21.0±1 | 1.0 |
| | | | | 1 | 49 | 21.21 | 21.0±1 | 1.0 |
| | | | | 1 | 99 | 21.83 | 21.0±1 | 1.0 |
| | | | | 50 | 0 | 20.45 | 21.0±1 | 1.0 |
| | | | | 50 | 24 | 20.36 | 21.0±1 | 1.0 |
| | | | | 50 | 49 | 20.25 | 21.0±1 | 1.0 |
| | | | | 100 | 0 | 19.97 | 21.0±1 | 1.0 |
| | 18900 | 1880 | QPSK | 1 | 0 | 22.8 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.79 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.64 | 22.0±1 | 0 |
| | | | | 50 | 0 | 21.4 | 22.0±1 | 0 |
| | | | | 50 | 24 | 21.54 | 22.0±1 | 0 |
| | | | | 50 | 49 | 21.76 | 22.0±1 | 0 |
| | | | | 100 | 0 | 21.18 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.31 | 22.0±1 | 1.0 |
| | | | | 1 | 49 | 22.47 | 22.0±1 | 1.0 |
| | | | | 1 | 99 | 22.45 | 22.0±1 | 1.0 |
| | | | | 50 | 0 | 21.39 | 22.0±1 | 1.0 |
| | | | | 50 | 24 | 21.15 | 22.0±1 | 1.0 |
| | | | | 50 | 49 | 21.36 | 22.0±1 | 1.0 |
| | | | | 100 | 0 | 21.25 | 22.0±1 | 1.0 |
| | 19100 | 1900 | QPSK | 1 | 0 | 22.11 | 21.5±1 | 0.5 |
| | | | | 1 | 49 | 21.69 | 21.5±1 | 0.5 |
| | | | | 1 | 99 | 20.77 | 21.5±1 | 0.5 |
| | | | | 50 | 0 | 20.84 | 21.5±1 | 0.5 |
| | | | | 50 | 24 | 20.67 | 21.5±1 | 0.5 |
| | | | | 50 | 49 | 20.59 | 21.5±1 | 0.5 |
| | | | | 100 | 0 | 20.65 | 21.5±1 | 0.5 |
| | | | 16QAM | 1 | 0 | 21.39 | 20.5±1 | 1.5 |
| | | | | 1 | 49 | 20.99 | 20.5±1 | 1.5 |
| | | | | 1 | 99 | 20.09 | 20.5±1 | 1.5 |
| | | | | 50 | 0 | 19.78 | 20.5±1 | 1.5 |
| | | | | 50 | 24 | 19.67 | 20.5±1 | 1.5 |
| | | | | 50 | 49 | 19.65 | 20.5±1 | 1.5 |
| | | | | 100 | 0 | 19.71 | 20.5±1 | 1.5 |

**LTE Band 4:**

| BW(MHz) | Ch | Freq(MHz) | Mode | UL RB Allocation | UL RB Offset | Average Power (dbm) | Tune up limited(dBm) | MPR (dB) |
|---|---|---|---|---|---|---|---|---|
| 1.4MHz | 19957 | 1710.7 | QPSK | 1 | 0 | 22.31 | 22.0±1 | 0 |
| | | | | 1 | 2 | 22.38 | 22.0±1 | 0 |
| | | | | 1 | 5 | 22.39 | 22.0±1 | 0 |
| | | | | 3 | 0 | 22.41 | 22.0±1 | 0 |
| | | | | 3 | 1 | 22.43 | 22.0±1 | 0 |
| | | | | 3 | 2 | 22.44 | 22.0±1 | 0 |
| | | | | 6 | 0 | 22.34 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.43 | 22.0±1 | 0 |
| | | | | 1 | 2 | 22.53 | 22.0±1 | 0 |
| | | | | 1 | 5 | 22.52 | 22.0±1 | 0 |
| | | | | 3 | 0 | 22.45 | 22.0±1 | 0 |
| | | | | 3 | 1 | 22.44 | 22.0±1 | 0 |
| | | | | 3 | 2 | 22.52 | 22.0±1 | 0 |
| | | | | 6 | 0 | 22.44 | 22.0±1 | 0 |
| | 20175 | 1732.5 | QPSK | 1 | 0 | 22.77 | 22.0±1 | 0 |
| | | | | 1 | 2 | 22.8 | 22.0±1 | 0 |
| | | | | 1 | 5 | 22.79 | 22.0±1 | 0 |
| | | | | 3 | 0 | 22.83 | 22.0±1 | 0 |
| | | | | 3 | 1 | 22.84 | 22.0±1 | 0 |
| | | | | 3 | 2 | 22.86 | 22.0±1 | 0 |
| | | | | 6 | 0 | 22.68 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.74 | 22.0±1 | 0 |
| | | | | 1 | 2 | 22.77 | 22.0±1 | 0 |
| | | | | 1 | 5 | 22.86 | 22.0±1 | 0 |
| | | | | 3 | 0 | 22.47 | 22.0±1 | 0 |
| | | | | 3 | 1 | 22.56 | 22.0±1 | 0 |
| | | | | 3 | 2 | 22.51 | 22.0±1 | 0 |
| | | | | 6 | 0 | 22.64 | 22.0±1 | 0 |
| | 20393 | 1754.3 | QPSK | 1 | 0 | 22.65 | 22.0±1 | 0 |
| | | | | 1 | 2 | 22.66 | 22.0±1 | 0 |
| | | | | 1 | 5 | 22.61 | 22.0±1 | 0 |
| | | | | 3 | 0 | 22.82 | 22.0±1 | 0 |
| | | | | 3 | 1 | 22.78 | 22.0±1 | 0 |
| | | | | 3 | 2 | 22.78 | 22.0±1 | 0 |
| | | | | 6 | 0 | 22.64 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.77 | 22.0±1 | 0 |
| | | | | 1 | 2 | 22.76 | 22.0±1 | 0 |
| | | | | 1 | 5 | 22.75 | 22.0±1 | 0 |
| | | | | 3 | 0 | 22.96 | 22.0±1 | 0 |
| | | | | 3 | 1 | 22.99 | 22.0±1 | 0 |
| | | | | 3 | 2 | 22.98 | 22.0±1 | 0 |
| | | | | 6 | 0 | 22.86 | 22.0±1 | 0 |

| BW(MHz) | Ch | Freq(MHz) | Mode | UL RB Allocation | UL RB Offset | Average Power (dbm) | Tune up limited(dBm) | MPR (dB) |
|---|---|---|---|---|---|---|---|---|
| 3MHz | 19965 | 1711.5 | QPSK | 1 | 0 | 22.26 | 22.0±1 | 0 |
| | | | | 1 | 8 | 22.42 | 22.0±1 | 0 |
| | | | | 1 | 14 | 22.42 | 22.0±1 | 0 |
| | | | | 6 | 0 | 22.39 | 22.0±1 | 0 |
| | | | | 6 | 4 | 22.48 | 22.0±1 | 0 |
| | | | | 6 | 9 | 22.5 | 22.0±1 | 0 |
| | | | | 15 | 0 | 22.44 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.26 | 22.0±1 | 0 |
| | | | | 1 | 8 | 22.41 | 22.0±1 | 0 |
| | | | | 1 | 14 | 22.43 | 22.0±1 | 0 |
| | | | | 8 | 0 | 22.54 | 22.0±1 | 0 |
| | | | | 8 | 4 | 22.61 | 22.0±1 | 0 |
| | | | | 8 | 9 | 22.65 | 22.0±1 | 0 |
| | | | | 15 | 0 | 22.5 | 22.0±1 | 0 |
| | 20175 | 1732.5 | QPSK | 1 | 0 | 22.77 | 22.0±1 | 0 |
| | | | | 1 | 8 | 22.83 | 22.0±1 | 0 |
| | | | | 1 | 14 | 22.8 | 22.0±1 | 0 |
| | | | | 6 | 0 | 22.82 | 22.0±1 | 0 |
| | | | | 6 | 4 | 22.85 | 22.0±1 | 0 |
| | | | | 6 | 9 | 22.86 | 22.0±1 | 0 |
| | | | | 15 | 0 | 22.84 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.87 | 22.0±1 | 0 |
| | | | | 1 | 8 | 22.82 | 22.0±1 | 0 |
| | | | | 1 | 14 | 22.77 | 22.0±1 | 0 |
| | | | | 6 | 0 | 22.65 | 22.0±1 | 0 |
| | | | | 6 | 4 | 22.57 | 22.0±1 | 0 |
| | | | | 6 | 9 | 22.59 | 22.0±1 | 0 |
| | | | | 15 | 0 | 22.82 | 22.0±1 | 0 |
| | 20385 | 1753.5 | QPSK | 1 | 0 | 22.8 | 22.0±1 | 0 |
| | | | | 1 | 8 | 22.7 | 22.0±1 | 0 |
| | | | | 1 | 14 | 22.56 | 22.0±1 | 0 |
| | | | | 6 | 0 | 22.83 | 22.0±1 | 0 |
| | | | | 6 | 4 | 22.78 | 22.0±1 | 0 |
| | | | | 6 | 9 | 22.69 | 22.0±1 | 0 |
| | | | | 15 | 0 | 22.77 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.9 | 22.0±1 | 0 |
| | | | | 1 | 8 | 22.78 | 22.0±1 | 0 |
| | | | | 1 | 14 | 22.62 | 22.0±1 | 0 |
| | | | | 8 | 0 | 22.91 | 22.0±1 | 0 |
| | | | | 8 | 4 | 22.84 | 22.0±1 | 0 |
| | | | | 8 | 9 | 22.76 | 22.0±1 | 0 |
| | | | | 15 | 0 | 22.74 | 22.0±1 | 0 |

| BW(MHz) | Ch | Freq(MHz) | Mode | UL RB Allocation | UL RB Offset | Average Power (dbm) | Tune up limited(dBm) | MPR (dB) |
|---|---|---|---|---|---|---|---|---|
| 5MHz | 19975 | 1712.5 | QPSK | 1 | 0 | 22.37 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.57 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.69 | 22.0±1 | 0 |
| | | | | 12 | 0 | 22.46 | 22.0±1 | 0 |
| | | | | 12 | 24 | 22.54 | 22.0±1 | 0 |
| | | | | 12 | 49 | 22.65 | 22.0±1 | 0 |
| | | | | 25 | 0 | 22.53 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.58 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.76 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.9 | 22.0±1 | 0 |
| | | | | 12 | 0 | 22.61 | 22.0±1 | 0 |
| | | | | 12 | 24 | 22.67 | 22.0±1 | 0 |
| | | | | 12 | 49 | 22.78 | 22.0±1 | 0 |
| | | | | 25 | 0 | 22.58 | 22.0±1 | 0 |
| | 20175 | 1732.5 | QPSK | 1 | 0 | 22.85 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.76 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.87 | 22.0±1 | 0 |
| | | | | 12 | 0 | 22.76 | 22.0±1 | 0 |
| | | | | 12 | 24 | 22.66 | 22.0±1 | 0 |
| | | | | 12 | 49 | 22.76 | 22.0±1 | 0 |
| | | | | 25 | 0 | 22.65 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.87 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.97 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.97 | 22.0±1 | 0 |
| | | | | 12 | 0 | 22.95 | 22.0±1 | 0 |
| | | | | 12 | 24 | 22.65 | 22.0±1 | 0 |
| | | | | 12 | 49 | 22.79 | 22.0±1 | 0 |
| | | | | 25 | 0 | 22.62 | 22.0±1 | 0 |
| | 20375 | 1752.5 | QPSK | 1 | 0 | 22.88 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.93 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.72 | 22.0±1 | 0 |
| | | | | 12 | 0 | 22.91 | 22.0±1 | 0 |
| | | | | 12 | 24 | 22.93 | 22.0±1 | 0 |
| | | | | 12 | 49 | 22.84 | 22.0±1 | 0 |
| | | | | 25 | 0 | 22.88 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.96 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.91 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.81 | 22.0±1 | 0 |
| | | | | 12 | 0 | 22.87 | 22.0±1 | 0 |
| | | | | 12 | 24 | 22.99 | 22.0±1 | 0 |
| | | | | 12 | 49 | 22.9 | 22.0±1 | 0 |
| | | | | 25 | 0 | 22.86 | 22.0±1 | 0 |

| BW(MHz) | Ch | Freq(MHz) | Mode | UL RB Allocation | UL RB Offset | Average Power (dbm) | Tune up limited(dBm) | MPR (dB) |
|---|---|---|---|---|---|---|---|---|
| 10MHz | 20000 | 1715 | QPSK | 1 | 0 | 22.41 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.79 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.24 | 22.0±1 | 0 |
| | | | | 25 | 0 | 22.6 | 22.0±1 | 0 |
| | | | | 25 | 24 | 22.75 | 22.0±1 | 0 |
| | | | | 25 | 49 | 22.68 | 22.0±1 | 0 |
| | | | | 50 | 0 | 22.74 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.39 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.7 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.14 | 22.0±1 | 0 |
| | | | | 25 | 0 | 22.65 | 22.0±1 | 0 |
| | | | | 25 | 24 | 22.79 | 22.0±1 | 0 |
| | | | | 25 | 49 | 22.71 | 22.0±1 | 0 |
| | | | | 50 | 0 | 22.74 | 22.0±1 | 0 |
| | 20175 | 1732.5 | QPSK | 1 | 0 | 22.34 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.57 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.6 | 22.0±1 | 0 |
| | | | | 25 | 0 | 22.39 | 22.0±1 | 0 |
| | | | | 25 | 24 | 22.49 | 22.0±1 | 0 |
| | | | | 25 | 49 | 22.54 | 22.0±1 | 0 |
| | | | | 50 | 0 | 22.45 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.39 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.69 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.8 | 22.0±1 | 0 |
| | | | | 25 | 0 | 22.32 | 22.0±1 | 0 |
| | | | | 25 | 24 | 22.43 | 22.0±1 | 0 |
| | | | | 25 | 49 | 22.51 | 22.0±1 | 0 |
| | | | | 50 | 0 | 22.39 | 22.0±1 | 0 |
| | 20350 | 1750 | QPSK | 1 | 0 | 22.37 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.7 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.52 | 22.0±1 | 0 |
| | | | | 25 | 0 | 22.72 | 22.0±1 | 0 |
| | | | | 25 | 24 | 22.79 | 22.0±1 | 0 |
| | | | | 25 | 49 | 22.81 | 22.0±1 | 0 |
| | | | | 50 | 0 | 22.76 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.4 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.71 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.53 | 22.0±1 | 0 |
| | | | | 25 | 0 | 22.83 | 22.0±1 | 0 |
| | | | | 25 | 24 | 22.91 | 22.0±1 | 0 |
| | | | | 25 | 49 | 22.92 | 22.0±1 | 0 |
| | | | | 50 | 0 | 22.83 | 22.0±1 | 0 |

| BW(MHz) | Ch | Freq(MHz) | Mode | UL RB Allocation | UL RB Offset | Average Power (dbm) | Tune up limited(dBm) | MPR (dB) |
|---|---|---|---|---|---|---|---|---|
| 15MHz | 20025 | 1717.5 | QPSK | 1 | 0 | 22.4 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.55 | 22.0±1 | 0 |
| | | | | 1 | 99 | 21.96 | 22.0±1 | 0 |
| | | | | 36 | 0 | 22.71 | 22.0±1 | 0 |
| | | | | 36 | 24 | 22.48 | 22.0±1 | 0 |
| | | | | 36 | 49 | 22.18 | 22.0±1 | 0 |
| | | | | 75 | 0 | 22.55 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.42 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.42 | 22.0±1 | 0 |
| | | | | 1 | 99 | 21.87 | 22.0±1 | 0 |
| | | | | 36 | 0 | 22.74 | 22.0±1 | 0 |
| | | | | 36 | 24 | 22.46 | 22.0±1 | 0 |
| | | | | 36 | 49 | 22.17 | 22.0±1 | 0 |
| | | | | 75 | 0 | 22.55 | 22.0±1 | 0 |
| | 20175 | 1732.5 | QPSK | 1 | 0 | 22.12 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.32 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.47 | 22.0±1 | 0 |
| | | | | 36 | 0 | 22.11 | 22.0±1 | 0 |
| | | | | 36 | 24 | 22.26 | 22.0±1 | 0 |
| | | | | 36 | 49 | 22.38 | 22.0±1 | 0 |
| | | | | 75 | 0 | 22.21 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.15 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.45 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.68 | 22.0±1 | 0 |
| | | | | 36 | 0 | 22.05 | 22.0±1 | 0 |
| | | | | 36 | 24 | 22.22 | 22.0±1 | 0 |
| | | | | 36 | 49 | 22.37 | 22.0±1 | 0 |
| | | | | 75 | 0 | 22.15 | 22.0±1 | 0 |
| | 20325 | 1747.5 | QPSK | 1 | 0 | 22.6 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.41 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.49 | 22.0±1 | 0 |
| | | | | 36 | 0 | 22.44 | 22.0±1 | 0 |
| | | | | 36 | 24 | 22.37 | 22.0±1 | 0 |
| | | | | 36 | 49 | 22.46 | 22.0±1 | 0 |
| | | | | 75 | 0 | 22.44 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.82 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.75 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.77 | 22.0±1 | 0 |
| | | | | 36 | 0 | 22.37 | 22.0±1 | 0 |
| | | | | 36 | 24 | 22.36 | 22.0±1 | 0 |
| | | | | 36 | 49 | 22.46 | 22.0±1 | 0 |
| | | | | 75 | 0 | 22.49 | 22.0±1 | 0 |

| BW(MHz) | Ch | Freq(MHz) | Mode | UL RB Allocation | UL RB Offset | Average Power (dbm) | Tune up limited(dBm) | MPR (dB) |
|---|---|---|---|---|---|---|---|---|
| 20MHz | 20050 | 1720 | QPSK | 1 | 0 | 22.43 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.93 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.84 | 22.0±1 | 0 |
| | | | | 50 | 0 | 22.52 | 22.0±1 | 0 |
| | | | | 50 | 24 | 22.81 | 22.0±1 | 0 |
| | | | | 50 | 49 | 22.77 | 22.0±1 | 0 |
| | | | | 100 | 0 | 22.23 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.96 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.4 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.33 | 22.0±1 | 0 |
| | | | | 50 | 0 | 22.53 | 22.0±1 | 0 |
| | | | | 50 | 24 | 22.03 | 22.0±1 | 0 |
| | | | | 50 | 49 | 22.81 | 22.0±1 | 0 |
| | | | | 100 | 0 | 22.27 | 22.0±1 | 0 |
| | 20175 | 1732.5 | QPSK | 1 | 0 | 22.81 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.92 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.88 | 22.0±1 | 0 |
| | | | | 50 | 0 | 21.76 | 22.0±1 | 0 |
| | | | | 50 | 24 | 22.69 | 22.0±1 | 0 |
| | | | | 50 | 49 | 22.72 | 22.0±1 | 0 |
| | | | | 100 | 0 | 22.42 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.22 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.64 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.59 | 22.0±1 | 0 |
| | | | | 50 | 0 | 22.67 | 22.0±1 | 0 |
| | | | | 50 | 24 | 22.44 | 22.0±1 | 0 |
| | | | | 50 | 49 | 22.27 | 22.0±1 | 0 |
| | | | | 100 | 0 | 22.31 | 22.0±1 | 0 |
| | 20300 | 1745 | QPSK | 1 | 0 | 22.52 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.47 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.34 | 22.0±1 | 0 |
| | | | | 50 | 0 | 22.37 | 22.0±1 | 0 |
| | | | | 50 | 24 | 22.3 | 22.0±1 | 0 |
| | | | | 50 | 49 | 22.35 | 22.0±1 | 0 |
| | | | | 100 | 0 | 22.39 | 22.0±1 | 0 |
| | | | 16QAM | 1 | 0 | 22.82 | 22.0±1 | 0 |
| | | | | 1 | 49 | 22.47 | 22.0±1 | 0 |
| | | | | 1 | 99 | 22.71 | 22.0±1 | 0 |
| | | | | 50 | 0 | 22.38 | 22.0±1 | 0 |
| | | | | 50 | 24 | 22.32 | 22.0±1 | 0 |
| | | | | 50 | 49 | 22.36 | 22.0±1 | 0 |
| | | | | 100 | 0 | 22.43 | 22.0±1 | 0 |

## WIFI Mode (2.4G)

| Mode | Channel number | Frequency (MHz) | Data rate(Mbps) | Average Output Power(dBm) | Average Tune up limited(dBm) |
|---|---|---|---|---|---|
| 802.11b | 1 | 2412 | 1 | 8.85 | 8.0±1 |
| | 6 | 2437 | 1 | 8.51 | 8.0±1 |
| | 11 | 2462 | 1 | 8.90 | 8.0±1 |
| 802.11g | 1 | 2412 | 6 | 4.82 | 5.0±1 |
| | 6 | 2437 | 6 | 4.79 | 5.0±1 |
| | 11 | 2462 | 6 | 5.17 | 5.0±1 |
| 802.11n(HT20) | 1 | 2412 | MCS0 | 4.97 | 5.0±1 |
| | 6 | 2437 | MCS0 | 4.89 | 5.0±1 |
| | 11 | 2462 | MCS0 | 5.11 | 5.0±1 |
| 802.11n(HT40) | 3 | 2422 | MCS0 | 4.95 | 5.0±1 |
| | 6 | 2437 | MCS0 | 5.14 | 5.0±1 |
| | 9 | 2452 | MCS0 | 5.26 | 5.0±1 |

## Bluetooth Measurement Result

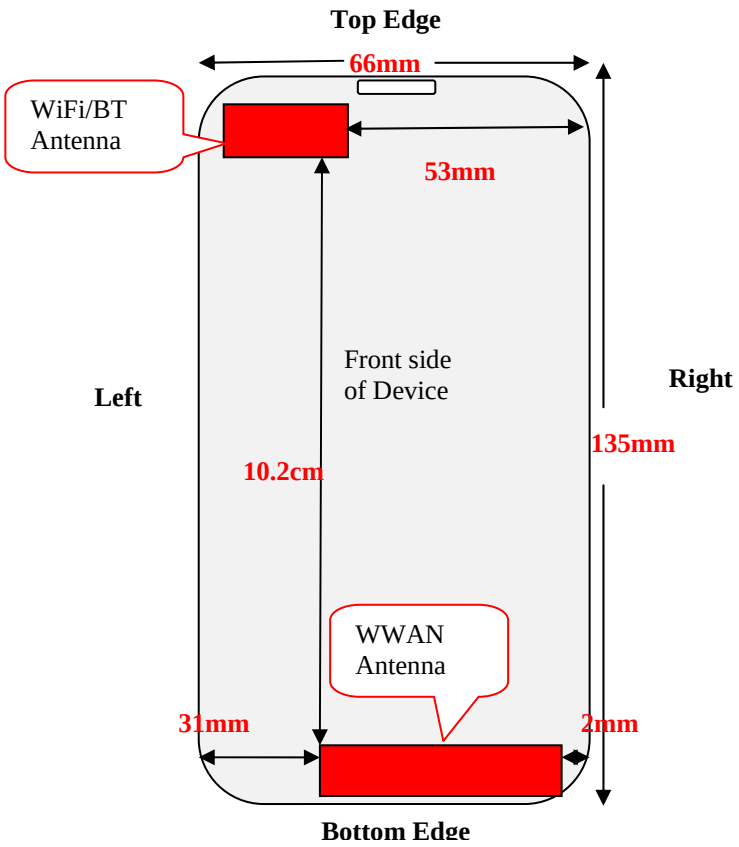
| Mode | Frequency (MHz) | Output Power(dBm) | Tune up limited(dBm) |
|---|---|---|---|
| GFSK | 2402 | 3.23 | 2.5±1 |
| | 2441 | 5.53 | 5.0±1 |
| | 2480 | 2.81 | 2.5±1 |
| π/4DQPSK | 2402 | 1.91 | 2.5±1 |
| | 2441 | 4.62 | 5.0±1 |
| | 2480 | 2.00 | 2.5±1 |
| 8DPSK | 2402 | 3.02 | 2.5±1 |
| | 2441 | 5.29 | 5.0±1 |
| | 2480 | 2.24 | 2.5±1 |

## BLE Measurement Result

| Channel number | Frequency (MHz) | Output Power(dBm) | Tune up limited(dBm) |
|---|---|---|---|
| 0 | 2402 | -3.67 | -3.0±1 |
| 19 | 2440 | -1.88 | -1.0±1 |
| 39 | 2480 | -4.21 | -4.0±1 |

# 12 EXPOSURE CONDITIONS CONSIDERATION

## EUT antenna location:




## Test position consideration:

| Distance of EUT antenna-to-edge/surface(mm), Test distance:10mm | | | | | | |
|---|---|---|---|---|---|---|
| Antennas | Back side | Front side | Left Edge | Right Edge | Top Edge | Bottom Edge |
| WWAN | 1 | 6 | 31 | 2 | 126 | 1 |
| WLAN | 1 | 6 | 2 | 53 | 2 | 112 |
| Bluetooth | 1 | 6 | 2 | 53 | 2 | 112 |

| Test distance:10mm | | | | | | |
|---|---|---|---|---|---|---|
| Antennas | Back side | Front side | Left Edge | Right Edge | Top Edge | Bottom Edge |
| WWAN | YES | YES | NO | YES | NO | YES |
| WLAN | NO | NO | NO | NO | NO | NO |
| Bluetooth | NO | NO | NO | NO | NO | NO |

Note:
1. Head/Body-worn/Hotspot mode SAR assessments are required.
2. Referring to KDB 941225 D06v02r01, when the overall device length and width are ≥ 9cm * 5cm, the test distance is 10mm. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25mm from that surface or edge.
3. Per KDB 447498 D01v06, for handsets the test separation distance is determined by the smallest distance between the outer surface of the device and the user, which is 0 mm for head SAR, 10 mm for Hotspot SAR, and 10 mm for body-worn SAR.

## RF Exposure

**Mobile Phone-SL452, FCC ID: N2GSL452**
**Standard Requirement:**
According to §15.247 (i) and §1.1307(b)(1), systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

[(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] · [$\sqrt{f_{(GHz)}}$] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR,[16] where

- $f_{(GHz)}$ is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation[17]
- The result is rounded to one decimal place for comparison

The test exclusions are applicable only when the minimum *test separation distance* is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz. When the minimum *test separation distance* is < 5 mm, a distance of 5 mm is applied to determine SAR test exclusion.

Routine SAR evaluation refers to that specifically required by § 2.1093, using measurements or computer simulation. When routine SAR evaluation is not required, portable transmitters with output power greater than the applicable low threshold require SAR evaluation to qualify for TCB approval.

**Exclusion Thresholds =** $P\sqrt{F}/D$
P= Maximum turn-up power in mW
F= Channel frequency in GHz
D= Minimum test separation distance in mm

## Test Distance (5mm)

| Mode | MAX Power (dBm) | Tune Up Power (dBm) | Max Tune Up Power (dBm) | Max Tune Up Power (mW) | Exclusion Thresholds | Limit |
|---|---|---|---|---|---|---|
| WIF | 8.90 | 8.0±1 | 9.0 | 7.94 | 2.492 | 3 |
| Bluetooth | 5.53 | 5.0±1 | 6.0 | 3.98 | 1.244 | 3 |
| BLE | -1.88 | -1.0±1 | 0 | 1 | 0.312 | 3 |

## Test Distance (10mm)

| Mode | MAX Power (dBm) | Tune Up Power (dBm) | Max Tune Up Power (dBm) | Max Tune Up Power (mW) | Exclusion Thresholds | Limit |
|---|---|---|---|---|---|---|
| WIF | 8.90 | 8.0±1 | 9.0 | 7.94 | 1.246 | 3 |
| Bluetooth | 5.53 | 5.0±1 | 6.0 | 3.98 | 0.622 | 3 |
| BLE | -1.88 | -1.0±1 | 0 | 1 | 0.156 | 3 |

**Result:** Compliance
No SAR measurement is required.

# 13 SAR TEST RESULTS

## Test Condition:

1. SAR Measurement
   The distance between the EUT and the antenna of the emulator is more than 50 cm and the output power radiated from the emulator antenna is at least 30 dB less than the output power of EUT.

| | | | |
|---|---|---|---|
| 2 | Environmental Conditions | Temperature | 23°C |
| | | Relative Humidity | 57% |
| | | Atmospheric Pressure | 1019mbar |

3 Test Date : Aug 13,2016-Aug 19,2016
Tested By : Damon Wang

## Generally Test Procedures:

1. Establish communication link between EUT and base station emulation by air link.
2. Place the EUT in the selected test position. (Cheek, tilt or flat)
3. Perform SAR testing at middle or highest output power channel under the selected test mode. If the measured 1-g SAR is ≤ 0.8 W/kg, then testing for the other channel will not be performed.
4. When SAR is<0.8W/kg, no repeated SAR measurement is required

**For WCDMA test:**

1. KDB941225 D01-Body SAR is not required for HSDPA when the average output of each RF channel with HSDPA active is less than 0.25dB higher than measured without HSDPA using 12.2kbps RMC or the maximum SAR for 12.2kbps RMC<75% of the SAR limit.
2. KDB941225 D01-Body SAR is not required for handset with HSPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than 0.25dB higher than that measure without HSUPA/HSDPA using 12.2kbps RMC AND THE maximum SAR for 12.2kbps RMC is<75% of the SAR limit

**For LTE test:**

1. According to FCC KDB 941225 D05v02r05:
   a. Per Section 5.2.1, SAR is required for QPSK 1 RB Allocation for the largest bandwidth
      i. The required channel and offset combination with the highest maximum output power is required for SAR.
      ii. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required. Otherwise, SAR is required for the remaining required test channels using the RB offset configuration with highest output power for that channel.
      iii. When the reported SAR for a required test channel is > 1.45 W/kg, SAR is required for all RB offset configurations for that channel.
   b. Per Section 5.2.2, SAR is required for 50% RB allocation using the largest bandwidth following the same procedures outlined in Section 5.2.1.
   c. Per Section 5.2.3, QPSK SAR is not required for the 100% allocation when the highest maximum output power for the 100% allocation is less than the highest maximum output power of the 1 RB and 50% RB allocations and the reported SAR for the 1 RB and 50% RB allocations is < 0.8 W/kg.
   d. Per Section 5.2.4 and 5.3, SAR tests for higher order modulations and lower bandwidths configurations are not required when the conducted power of the required test configurations determined by Sections 5.2.1 through 5.2.3 is less than or equal to ½ dB higher than the equivalent configuration using QPSK modulation and when the QPSK SAR for those configurations is <1.45 W/kg.
   e. A-MPR was disabled for all SAR tests by setting NS=01 on the base station simulator. SAR tests were performed with the same number of RB and RB offsets transmitting on all TTI frames (maximum TTI).

# SAR Summary Test Result:

## Table 5: SAR Values of GSM 850MHz Band

| Test Positions | | Channel | | Test Mode | Power(dBm) | | SAR 1g(W/Kg), Limit(1.6W/kg) | | Plot No. |
|---|---|---|---|---|---|---|---|---|---|
| | | CH. | MHz | | Maximum Turn-up Power(dBm) | Measured output power(dBm) | Measured SAR 1g(W/kg) | Scaled SAR 1g(W/kg) | |
| Right Head | Cheek | 190 | 836.6 | Voice call | 33 | 32.71 | 0.397 | 0.42 | -- |
| | Tilt | 190 | 836.6 | Voice call | 33 | 32.71 | 0.275 | 0.29 | -- |
| Left Head | Cheek | 190 | 836.6 | Voice call | 33 | 32.71 | **0.424** | **0.45** | **1** |
| | Tilt | 190 | 836.6 | Voice call | 33 | 32.71 | 0.326 | 0.35 | -- |
| Body-worn (10mm Separation) | Front side | 190 | 836.6 | Voice call | 33 | 32.71 | 0.294 | 0.31 | -- |
| | Back side | 190 | 836.6 | Voice call | 33 | 32.71 | **0.405** | **0.43** | **2** |
| Data Mode (10mm Separation) | Front side | 190 | 836.6 | GPRS 3 slots | 32 | 31.22 | 0.113 | 0.14 | -- |
| | Back side | 190 | 836.6 | GPRS 3 slots | 32 | 31.22 | **0.209** | **0.25** | **3** |
| | Right EDGE | 190 | 836.6 | GPRS 3 slots | 32 | 31.22 | 0.075 | 0.09 | -- |
| | Bottom EDGE | 190 | 836.6 | GPRS 3 slots | 32 | 31.22 | 0.065 | 0.08 | -- |

## Table 6: SAR Values of GSM 1900MHz Band

| Test Positions | | Channel | | Test Mode | Power(dBm) | | SAR 1g(W/Kg), Limit(1.6W/kg) | | Plot No. |
|---|---|---|---|---|---|---|---|---|---|
| | | CH. | MHz | | Maximum Turn-up Power(dBm) | Measured output power(dBm) | Measured SAR 1g(W/kg) | Scaled SAR 1g(W/kg) | |
| Right Head | Cheek | 661 | 1880 | Voice call | 30 | 29.66 | **0.339** | **0.37** | **4** |
| | Tilt | 661 | 1880 | Voice call | 30 | 29.66 | 0.271 | 0.29 | -- |
| Left Head | Cheek | 661 | 1880 | Voice call | 30 | 29.66 | 0.301 | 0.33 | -- |
| | Tilt | 661 | 1880 | Voice call | 30 | 29.66 | 0.233 | 0.25 | -- |
| Body-worn (10mm Separation) | Front side | 661 | 1880 | Voice call | 30 | 29.66 | 0.378 | 0.41 | -- |
| | Back side | 661 | 1880 | Voice call | 30 | 29.66 | **0.468** | **0.51** | **5** |
| Data Mode (10mm Separation) | Front side | 661 | 1880 | GPRS 4 slots | 26 | 25.88 | 0.554 | 0.57 | -- |
| | Back side | 661 | 1880 | GPRS 4 slots | 26 | 25.88 | **0.775** | **0.80** | **6** |
| | Right EDGE | 661 | 1880 | GPRS 4 slots | 26 | 25.88 | 0.176 | 0.18 | -- |
| | Bottom EDGE | 661 | 1880 | GPRS 4 slots | 26 | 25.88 | 0.743 | 0.76 | -- |

## Table 7: SAR Values of WCDMA BAND V

| Test Positions | | Channel | | Test Mode | Power(dBm) | | SAR 1g(W/Kg), Limit(1.6W/kg) | | Plot No. |
|---|---|---|---|---|---|---|---|---|---|
| | | CH. | MHz | | Maximum Turn-up Power(dBm) | Measured output power(dBm) | Measured SAR 1g(W/kg) | Scaled SAR 1g(W/kg) | |
| Right Head | Cheek | 4183 | 836.6 | RMC 12.2kbps | 23 | 22.56 | **0.362** | **0.40** | **7** |
| | Tilt | 4183 | 836.6 | RMC 12.2kbps | 23 | 22.56 | 0.303 | 0.34 | -- |
| Left Head | Cheek | 4183 | 836.6 | RMC 12.2kbps | 23 | 22.56 | 0.341 | 0.38 | -- |
| | Tilt | 4183 | 836.6 | RMC 12.2kbps | 23 | 22.56 | 0.284 | 0.31 | -- |
| Body-worn (10mm Separation) | Front side | 4183 | 836.6 | RMC 12.2kbps | 23 | 22.56 | 0.325 | 0.36 | -- |
| | Back side | 4183 | 836.6 | RMC 12.2kbps | 23 | 22.56 | **0.419** | **0.46** | **8** |
| Data Mode (10mm Separation) | Front side | 4183 | 836.6 | RMC 12.2kbps | 23 | 22.56 | 0.325 | 0.36 | -- |
| | Back side | 4183 | 836.6 | RMC 12.2kbps | 23 | 22.56 | **0.419** | **0.46** | **8** |
| | Right EDGE | 4183 | 836.6 | RMC 12.2kbps | 23 | 22.56 | 0.074 | 0.08 | -- |
| | Bottom EDGE | 4183 | 836.6 | RMC 12.2kbps | 23 | 22.56 | 0.114 | 0.13 | -- |

## Table 8: SAR Values of WCDMA BAND Ⅱ

| Test Positions | | Channel | | Test Mode | Power(dBm) | | SAR 1g(W/Kg), Limit(1.6W/kg) | | Plot No. |
|---|---|---|---|---|---|---|---|---|---|
| | | CH. | MHz | | Maximum Turn-up Power(dBm) | Measured output power(dBm) | Measured SAR 1g(W/kg) | Scaled SAR 1g(W/kg) | |
| Right Head | Cheek | 9400 | 1880 | RMC 12.2kbps | 23 | 22.64 | **0.405** | **0.44** | **9** |
| | Tilt | 9400 | 1880 | RMC 12.2kbps | 23 | 22.64 | 0.318 | 0.35 | -- |
| Left Head | Cheek | 9400 | 1880 | RMC 12.2kbps | 23 | 22.64 | 0.324 | 0.35 | -- |
| | Tilt | 9400 | 1880 | RMC 12.2kbps | 23 | 22.64 | 0.256 | 0.28 | -- |
| Body-worn (10mm Separation) | Front side | 9400 | 1880 | RMC 12.2kbps | 23 | 22.64 | 0.473 | 0.51 | -- |
| | Back side | 9400 | 1880 | RMC 12.2kbps | 23 | 22.64 | **0.653** | **0.71** | **10** |
| Data Mode (10mm Separation) | Front side | 9400 | 1880 | RMC 12.2kbps | 23 | 22.64 | 0.473 | 0.51 | -- |
| | Back side | 9400 | 1880 | RMC 12.2kbps | 23 | 22.64 | 0.653 | 0.71 | -- |
| | Right EDGE | 9400 | 1880 | RMC 12.2kbps | 23 | 22.64 | 0.162 | 0.18 | -- |
| | Bottom EDGE | 9400 | 1880 | RMC 12.2kbps | 23 | 22.64 | **0.694** | **0.75** | **11** |

## Table 9: SAR Values of LTE BAND 2 , 20MHz ,QPSK

| Test Mode | Test Positions | | Channel | | Power(dBm) | | MPR (dB) | SAR 1g(W/Kg), Limit(1.6W/kg) | | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | CH. | MHz | Maximum Turn-up Power(dBm) | Measured output power(dBm) | | Measured SAR 1g(W/kg) | Scaled SAR 1g(W/kg) | |
| 1RB #49 | Right Head | Cheek | 18900 | 1880 | 23 | 22.79 | 0 | **0.395** | **0.41** | **12** |
| | | Tilt | 18900 | 1880 | 23 | 22.79 | 0 | 0.324 | 0.34 | -- |
| | Left Head | Cheek | 18900 | 1880 | 23 | 22.79 | 0 | 0.179 | 0.19 | -- |
| | | Tilt | 18900 | 1880 | 23 | 22.79 | 0 | 0.143 | 0.15 | -- |
| | Body-worn (10mm Separation) | Front side | 18900 | 1880 | 23 | 22.79 | 0 | 0.486 | 0.51 | -- |
| | | Back side | 18900 | 1880 | 23 | 22.79 | 0 | **0.634** | **0.67** | **13** |
| | Data Mode (10mm Separation) | Front side | 18900 | 1880 | 23 | 22.79 | 0 | 0.486 | 0.51 | -- |
| | | Back side | 18900 | 1880 | 23 | 22.79 | 0 | **0.634** | **0.67** | **13** |
| | | Right EDGE | 18900 | 1880 | 23 | 22.79 | 0 | 0.126 | 0.13 | -- |
| | | Bottom EDGE | 18900 | 1880 | 23 | 22.79 | 0 | 0.627 | 0.66 | -- |
| 50%RB #24 | Right Head | Cheek | 18900 | 1880 | 23 | 22.47 | 0 | 0.318 | 0.36 | -- |
| | | Tilt | 18900 | 1880 | 23 | 22.47 | 0 | 0.243 | 0.27 | -- |
| | Left Head | Cheek | 18900 | 1880 | 23 | 22.47 | 0 | 0.182 | 0.21 | -- |
| | | Tilt | 18900 | 1880 | 23 | 22.47 | 0 | 0.141 | 0.16 | -- |
| | Body-worn (10mm Separation) | Front side | 18900 | 1880 | 23 | 22.47 | 0 | 0.421 | 0.48 | -- |
| | | Back side | 18900 | 1880 | 23 | 22.47 | 0 | 0.574 | 0.65 | -- |
| | Data Mode (10mm Separation) | Front side | 18900 | 1880 | 23 | 22.47 | 0 | 0.421 | 0.48 | -- |
| | | Back side | 18900 | 1880 | 23 | 22.47 | 0 | 0.574 | 0.65 | -- |
| | | Right EDGE | 18900 | 1880 | 23 | 22.47 | 0 | 0.115 | 0.13 | -- |
| | | Bottom EDGE | 18900 | 1880 | 23 | 22.47 | 0 | 0.546 | 0.62 | -- |

## Table 10: SAR Values of LTE BAND 4 , 20MHz ,QPSK

| Test Mode | Test Positions | | Channel | | Power(dBm) | | MPR (dB) | SAR 1g(W/Kg), Limit(1.6W/kg) | | Plot No. |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | CH. | MHz | Maximum Turn-up Power(dBm) | Measured output power(dBm) | | Measured SAR 1g(W/kg) | Scaled SAR 1g(W/kg) | |
| 1RB #49 | Right Head | Cheek | 20175 | 1732.5 | 23 | 22.92 | 0 | **0.189** | **0.19** | **14** |
| | | Tilt | 20175 | 1732.5 | 23 | 22.92 | 0 | 0.145 | 0.15 | -- |
| | Left Head | Cheek | 20175 | 1732.5 | 23 | 22.92 | 0 | 0.182 | 0.19 | -- |
| | | Tilt | 20175 | 1732.5 | 23 | 22.92 | 0 | 0.138 | 0.14 | -- |
| | Body-worn (10mm Separation) | Front side | 20175 | 1732.5 | 23 | 22.92 | 0 | 0.382 | 0.39 | -- |
| | | Back side | 20175 | 1732.5 | 23 | 22.92 | 0 | **0.506** | **0.52** | **15** |
| | Data Mode (10mm Separation) | Front side | 20175 | 1732.5 | 23 | 22.92 | 0 | 0.382 | 0.39 | -- |
| | | Back side | 20175 | 1732.5 | 23 | 22.92 | 0 | 0.506 | 0.52 | -- |
| | | Right EDGE | 20175 | 1732.5 | 23 | 22.92 | 0 | 0.147 | 0.15 | -- |
| | | Bottom EDGE | 20175 | 1732.5 | 23 | 22.92 | 0 | **0.514** | 0.52 | **16** |
| 50%RB #24 | Right Head | Cheek | 20175 | 1732.5 | 23 | 22.64 | 0 | 0.165 | 0.18 | -- |
| | | Tilt | 20175 | 1732.5 | 23 | 22.64 | 0 | 0.122 | 0.13 | -- |
| | Left Head | Cheek | 20175 | 1732.5 | 23 | 22.64 | 0 | 0.154 | 0.17 | -- |
| | | Tilt | 20175 | 1732.5 | 23 | 22.64 | 0 | 0.107 | 0.12 | -- |
| | Body-worn (10mm Separation) | Front side | 20175 | 1732.5 | 23 | 22.64 | 0 | 0.347 | 0.38 | -- |
| | | Back side | 20175 | 1732.5 | 23 | 22.64 | 0 | 0.483 | 0.52 | -- |
| | Data Mode (10mm Separation) | Front side | 20175 | 1732.5 | 23 | 22.64 | 0 | 0.347 | 0.38 | -- |
| | | Back side | 20175 | 1732.5 | 23 | 22.64 | 0 | 0.483 | 0.52 | -- |
| | | Right EDGE | 20175 | 1732.5 | 23 | 22.64 | 0 | 0.118 | 0.13 | -- |
| | | Bottom EDGE | 20175 | 1732.5 | 23 | 22.64 | 0 | 0.488 | **0.53** | -- |

**Note:** 1. KDB941225 D01-Body SAR is not required for HSDPA when the average output of each RF channel with HSDPA active is less than 0.25dB higher than measured without HSDPA using 12.2kbps RMC or the maximum SAR for 12.2kbps RMC<75% of the SAR limit.

2. KDB941225 D01-Body SAR is not required for handset with HSUPA/HSDPA capabilities when the maximum average output of each RF channel with HSUPA/HSDPA active is less than 0.25dB higher than that measure without HSUPA/HSDPA using 12.2kbps RMC and The maximum SAR for 12.2kbps RMC is<75% of the SAR limit

## Measurement variability consideration

According to KDB 865664 D01v01r04 section 2.8.1, repeated measurements are required following the procedures as below:

1. Repeated measurement is not required when the original highest measured SAR is < 0.80W/kg; steps 2) through 4) do not apply.
2. When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.
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 (~ 10% from the 1-g SAR limit).
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 measurements is > 1.20.

## No Repeated SAR

# Simultaneous Transmission SAR Analysis.

**List of Mode for Simultaneous Multi-band Transmission:**

| No. | Configurations | Head SAR | Body-worn SAR | Hotspot SAR |
|---|---|---|---|---|
| 1 | GSM(Voice) + WLAN 2.4GHz(Data) | Yes | Yes | - |
| 2 | GPRS (Data) + WLAN 2.4GHz(Data) | - | - | Yes |
| 3 | GSM(Voice) + Bluetooth(Data) | Yes | Yes | - |
| 4 | GPRS (Data) + Bluetooth(Data) | - | - | Yes |
| 5 | WCDMA (Voice) + WLAN 2.4GHz(Data) | Yes | Yes | - |
| 6 | WCDMA (Data) + WLAN 2.4GHz(Data) | - | - | Yes |
| 7 | WCDMA (Voice) + Bluetooth(Data) | Yes | Yes | - |
| 8 | WCDMA (Data) + Bluetooth(Data) | - | - | Yes |
| 9 | LTE (Data) + WLAN 2.4GHz(Data) | Yes | Yes | Yes |
| 10 | LTE (Data) + Bluetooth(Data) | Yes | Yes | Yes |

**Remark:**

1. GSM and WCDMA share the same antenna, and cannot transmit simultaneously.
2. WLAN and Bluetooth share the same antenna, and cannot transmit simultaneously.
3. According to the KDB 447498 D01 v06, 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:
(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.
For simultaneous transmission analysis, WIFI/Bluetooth SAR is estimated per KDB 447498 D01 v06 as below:

**WIFI:**

| Tune-Up Power (dBm) | Max. Power (mW) | Distance (mm | Frequency (GHz) | X | SAR(1g) 5mm | SAR(1g) 10mm |
|---|---|---|---|---|---|---|
| 9.0 | 7.94 | 5/10 | 2.462 | 7.5 | 0.33 | 0.17 |

**Bluetooth:**

| Tune-Up Power (dBm) | Max. Power (mW) | Distance (mm | Frequency (GHz) | X | SAR(1g) 5mm | SAR(1g) 10mm |
|---|---|---|---|---|---|---|
| 6.0 | 3.98 | 5/10 | 2.441 | 7.5 | 0.17 | 0.08 |

4. The maximum SAR summation is calculated based onthe same configuration and test position

## Head SAR

### WWAN and WLAN（2.4GHz）

| | WWAN（maximum） | | WLAN(5mm) | Summed SAR (W/kg) |
|---|---|---|---|---|
| Position | Band | Scaled SAR (W/kg) | Scaled SAR (W/kg) | |
| Left Cheek | GSM850 | **0.45** | 0.33 | **0.78** |
| Right Cheek | GSM1900 | 0.37 | 0.33 | 0.70 |
| Right Cheek | WCDMA Band V | 0.40 | 0.33 | 0.73 |
| Right Cheek | WCDMA Band II | 0.44 | 0.33 | 0.77 |
| Right Cheek | LTE BAND 2(1RB) | 0.41 | 0.33 | 0.74 |
| Right Cheek | LTE BAND 4(1RB) | 0.19 | 0.33 | 0.52 |

### WWAN and BT

| | WWAN（maximum） | | WLAN(5mm) | Summed SAR (W/kg) |
|---|---|---|---|---|
| Position | Band | Scaled SAR (W/kg) | Scaled SAR (W/kg) | |
| Left Cheek | GSM850 | **0.45** | 0.17 | **0.62** |
| Right Cheek | GSM1900 | 0.37 | 0.17 | 0.54 |
| Right Cheek | WCDMA Band V | 0.40 | 0.17 | 0.47 |
| Right Cheek | WCDMA Band II | 0.44 | 0.17 | 0.61 |
| Right Cheek | LTE BAND 2(1RB) | 0.41 | 0.17 | 0.58 |
| Right Cheek | LTE BAND 4(1RB) | 0.19 | 0.17 | 0.36 |

**Remark:** WIFI/BT the 1g SAR value is not being captured by the measurement system, the 1g-SAR value is conservatively used for simultaneous transmission analysis.

## Body-worn SAR

### WWAN and WLAN（2.4GHz）

| | WWAN（maximum） | | WLAN(10mm) | Summed SAR (W/kg) |
|---|---|---|---|---|
| Position | Band | Scaled SAR (W/kg) | Scaled SAR (W/kg) | |
| Back | GSM850 | 0.43 | 0.17 | 0.60 |
| Back | GSM1900 | 0.51 | 0.17 | 0.68 |
| Back | WCDMA Band V | 0.46 | 0.17 | 0.63 |
| Back | WCDMA Band II | **0.71** | 0.17 | **0.88** |
| Back | LTE BAND 2(1RB) | 0.67 | 0.17 | 0.84 |
| Back | LTE BAND 4(50RB) | 0.53 | 0.17 | 0.70 |

### WWAN and BT

| | WWAN（maximum） | | WLAN(10mm) | Summed SAR (W/kg) |
|---|---|---|---|---|
| Position | Band | Scaled SAR (W/kg) | Scaled SAR (W/kg) | |
| Back | GSM850 | 0.43 | 0.08 | 0.51 |
| Back | GSM1900 | 0.51 | 0.08 | 0.59 |
| Back | WCDMA Band V | 0.46 | 0.08 | 0.54 |
| Back | WCDMA Band II | **0.71** | 0.08 | **0.79** |
| Back | LTE BAND 2(1RB) | 0.67 | 0.08 | 0.75 |
| Back | LTE BAND 4(50RB) | 0.53 | 0.08 | 0.61 |

**Remark:** WIFI/BT the 1g SAR value is not being captured by the measurement system, the 1g-SAR value is conservatively used for simultaneous transmission analysis.

## Hotspot SAR

**WWAN and WLAN（2.4GHz）**

| | WWAN（maximum） | | WLAN(10mm) | Summed SAR (W/kg) |
|---|---|---|---|---|
| Position | Band | Scaled SAR (W/kg) | Scaled SAR (W/kg) | |
| Back | GSM850 | 0.25 | 0.17 | 0.42 |
| Back | GSM1900 | **0.80** | 0.17 | **0.97** |
| Back | WCDMA Band V | 0.46 | 0.17 | 0.63 |
| Bottom side | WCDMA Band II | 0.75 | 0.17 | 0.92 |
| Back | LTE BAND 2(1RB) | 0.67 | 0.17 | 0.84 |
| Bottom side | LTE BAND 4(50RB) | 0.53 | 0.17 | 0.70 |

**WWAN and BT**

| | WWAN（maximum） | | WLAN(10mm) | Summed SAR (W/kg) |
|---|---|---|---|---|
| Position | Band | Scaled SAR (W/kg) | Scaled SAR (W/kg) | |
| Back | GSM850 | 0.25 | 0.08 | 0.33 |
| Back | GSM1900 | **0.80** | 0.08 | **0.88** |
| Back | WCDMA Band V | 0.46 | 0.08 | 0.54 |
| Bottom side | WCDMA Band II | 0.75 | 0.08 | 0.83 |
| Back | LTE BAND 2(1RB) | 0.67 | 0.08 | 0.75 |
| Bottom side | LTE BAND 4(50RB) | 0.53 | 0.08 | 0.61 |

**Remark:** WIFI/BT the 1g SAR value is not being captured by the measurement system, the 1g-SAR value is conservatively used for simultaneous transmission analysis.

# 14 SAR MEASUREMENT REFERENCES

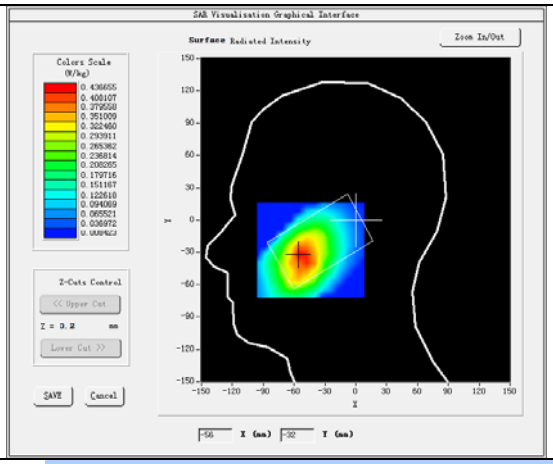
## References

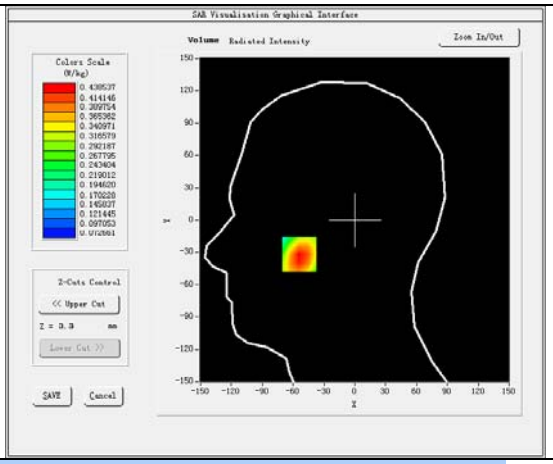

1. **FCC 47 CFR Part 2 "Frequency Allocations and Radio Treaty Matters; General Rules and Regulations"**
2. **IEEE Std. C95.1-2005, "IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3kHz to 300GHz", 2005**
3. **IEEE Std. 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices:Measurement Techniques", June 2013**
4. **IEC 62209-2, "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices—Human models, instrumentation, and procedures – Part 2: Procedure to determine the specific absorption rate(SAR) for wireless communication devices used in close proximity to the human body(frequency range of 30MHz to 6GHz)", April 2010**
5. **FCC KDB 447498 D01 v06, "Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies", Oct 23th, 2015**
6. **FCC KDB 941225 D01 v03r01, "3G SAR Measurement Procedures", Oct 23th, 2015**
7. **FCC KDB 941225 D05 v02r05, "SAR Evaluation Considerations for LTE Devices", Dec 16th, 2015**
8. **FCC KDB 941225 D06 v02r01, "SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities", Oct 23th, 2015**
9. **FCC KDB865664 D01 v01r04, "SAR Measurement Requirements 100MHz to 6GHz", Aug 7th, 2015**
10. **FCC KDB865664 D02 v01r02, "RF Exposure Compliance Reporting and Documentation Considerations ", Oct 23th", 2015**
11. **FCC KDB648474 D04 v01r03, "SAR Evaluation Considerations for Wireless Handsets", Oct 23th", 2015**
12. **FCC KDB 248227 D01 v01r02, SAR Guidance for IEEE 802.11 (Wi-Fi) Transmitters, Oct 23th, 2015.**

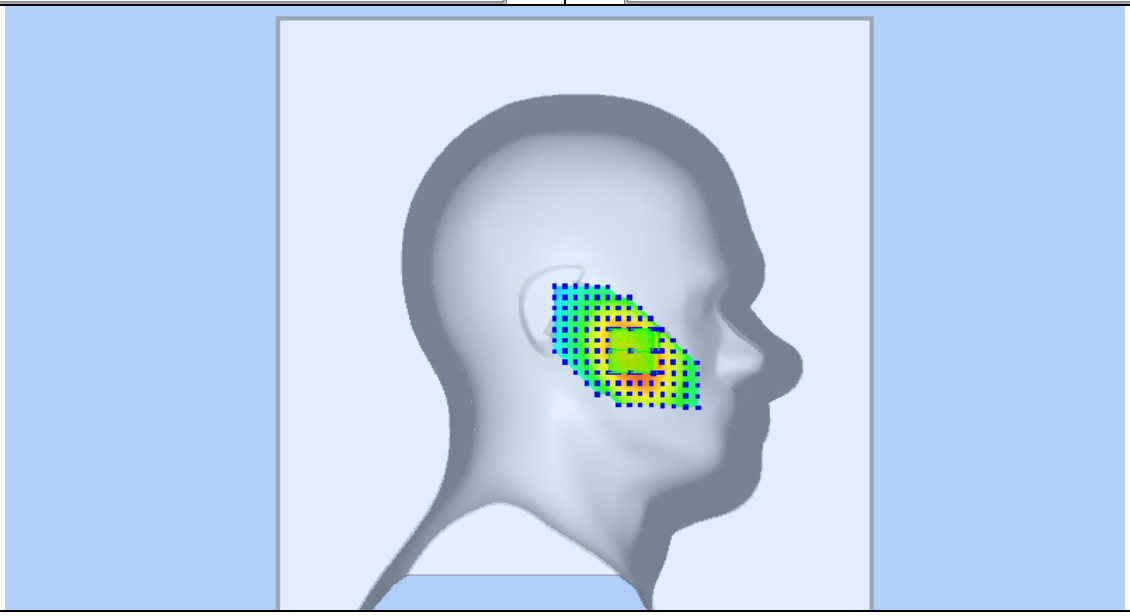
# Maximum SAR measurement Plots

**Plot 1: GSM850MHz, Middle channel (Left Head , Cheek)**
**Product Description:Mobile Phone**
**Model:SL452**
**Test Date:Aug 13,2016**

| | |
|---|---|
| Medium(liquid type) | HSL_850 |
| Frequency (MHz) | 836.60000 |
| Relative permittivity (real part) | 41.33 |
| Conductivity (S/m) | 0.91 |
| Signal | GSM (Duty cycle: 1:8) |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 5.26 |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -0.30 |
| SAR 10g (W/Kg) | 0.304340 |
| SAR 1g (W/Kg) | 0.423736 |
| **SURFACE SAR** | **VOLUME SAR** |

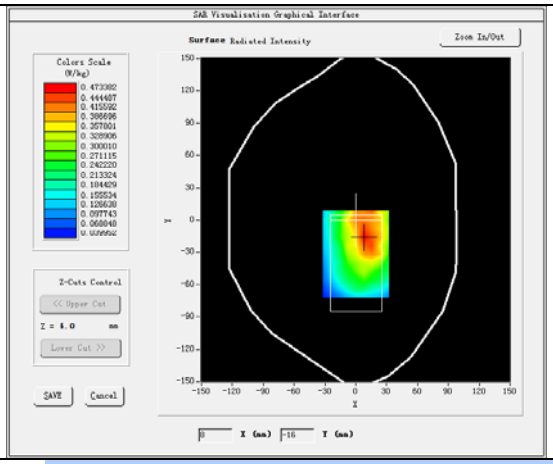


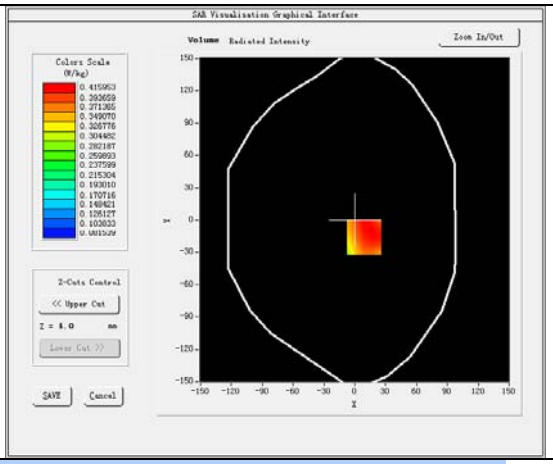



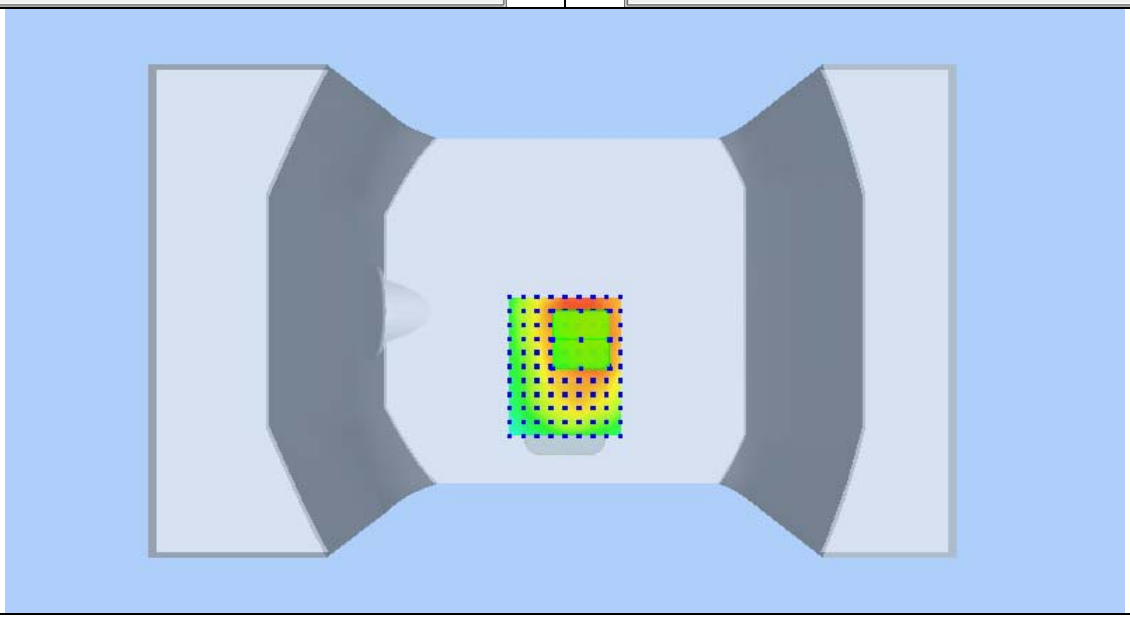



**Plot 2: GSM850MHz, Middle channel (Body-worn, Back Surface)**
**Product Description:Mobile Phone**
**Model:SL452**
**Test Date: Aug 13,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_850 |
| Frequency (MHz) | 836.60000 |
| Relative permittivity (real part) | 55.44 |
| Conductivity (S/m) | 0.98 |
| Signal | GSM (Duty cycle: 1:8) |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 5.46 |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -1.52 |
| SAR 10g (W/Kg) | 0.301481 |
| SAR 1g (W/Kg) | 0.405229 |
| **SURFACE SAR** | **VOLUME SAR** |

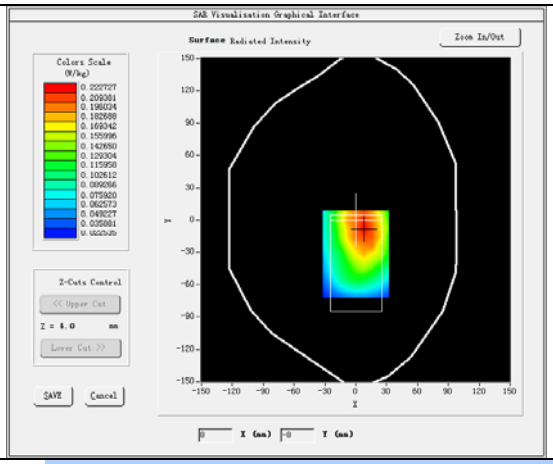


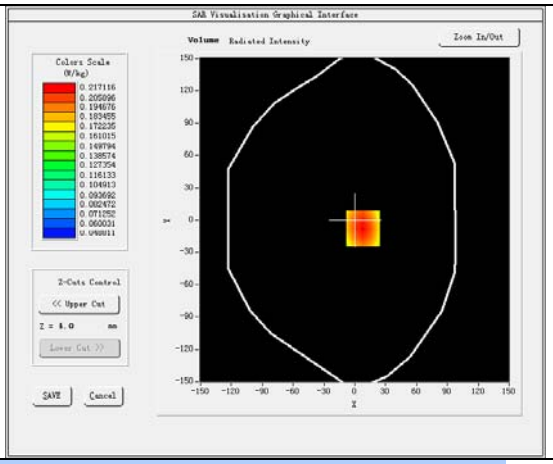



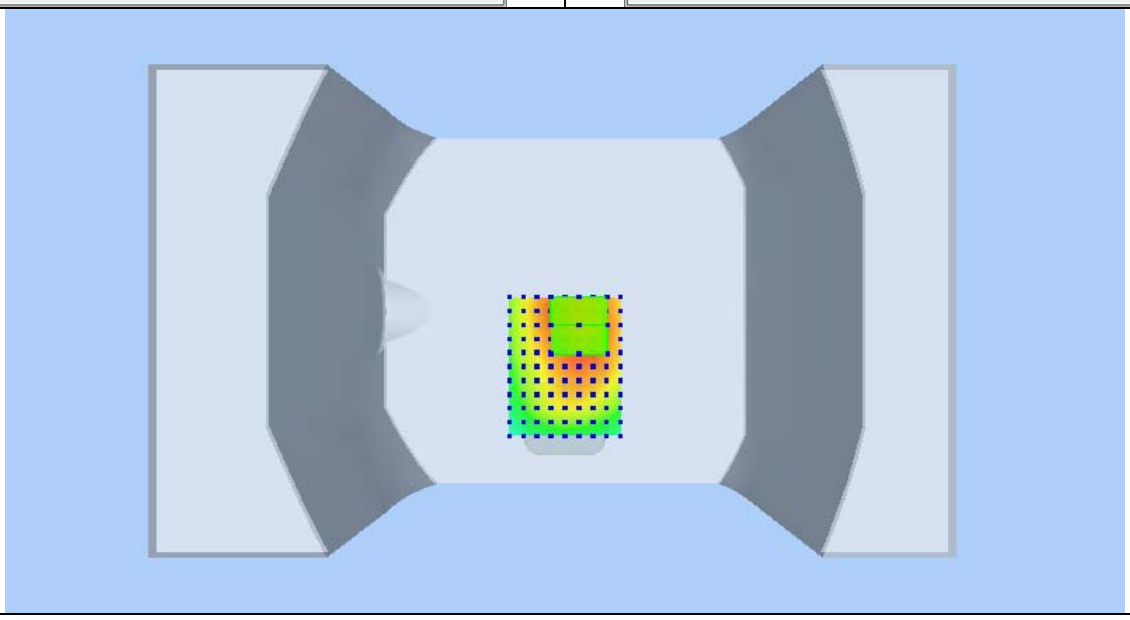



**Plot 3: GPRS850MHz, Middle channel (Data Mode, Back Surface)**
**Product Description:Mobile Phone**
**Model:SL452**
**Test Date: Aug 13,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_850 |
| Frequency (MHz) | 836.60000 |
| Relative permittivity (real part) | 55.44 |
| Conductivity (S/m) | 0.98 |
| Signal | GPRS (Duty cycle: 1:2.66) |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 5.46 |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -2.22 |
| SAR 10g (W/Kg) | 0.153616 |
| SAR 1g (W/Kg) | 0.209234 |
| **SURFACE SAR** | **VOLUME SAR** |

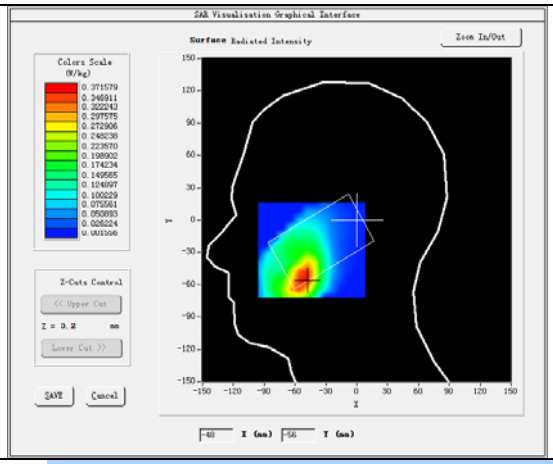


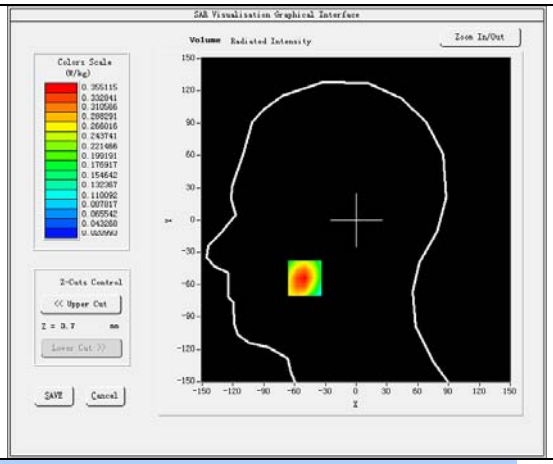



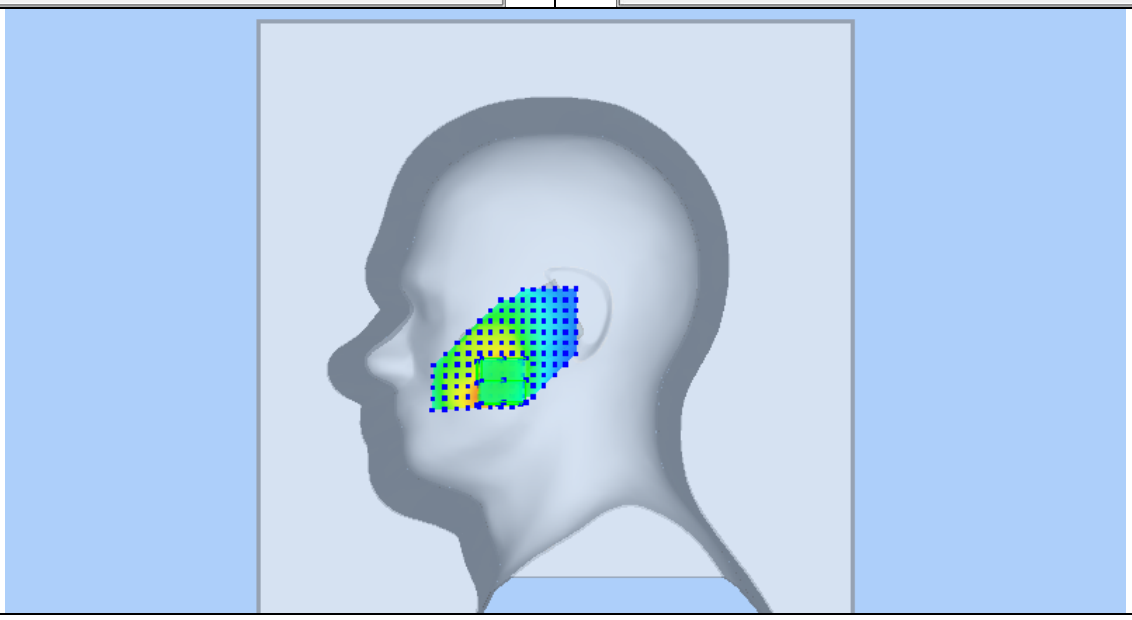



**Plot 4: GSM1900, Middle channel (Right Head Cheek)**
**Product Description: Mobile Phone**
**Model: SL452**
**Test Date: Aug 19,2016**

| | |
|---|---|
| Medium(liquid type) | HSL_1900 |
| Frequency (MHz) | 1880.0000 |
| Relative permittivity (real part) | 41.04 |
| Conductivity (S/m) | 1.41 |
| Signal | GSM (Duty cycle: 1:8) |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 4.95 |
| Sensor-Surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | 0.44 |
| SAR 10g (W/Kg) | 0.188878 |
| SAR 1g (W/Kg) | 0.339162 |
| **SURFACE SAR** | **VOLUME SAR** |

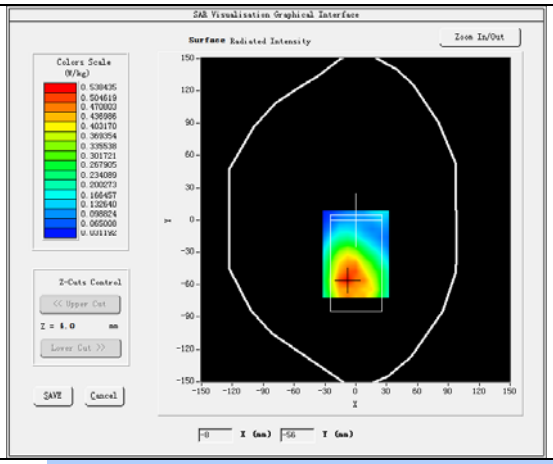


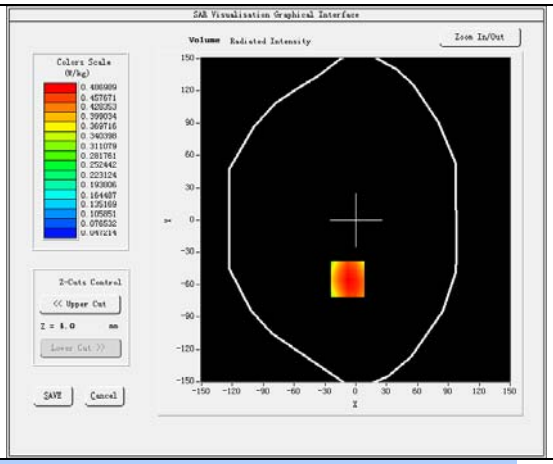



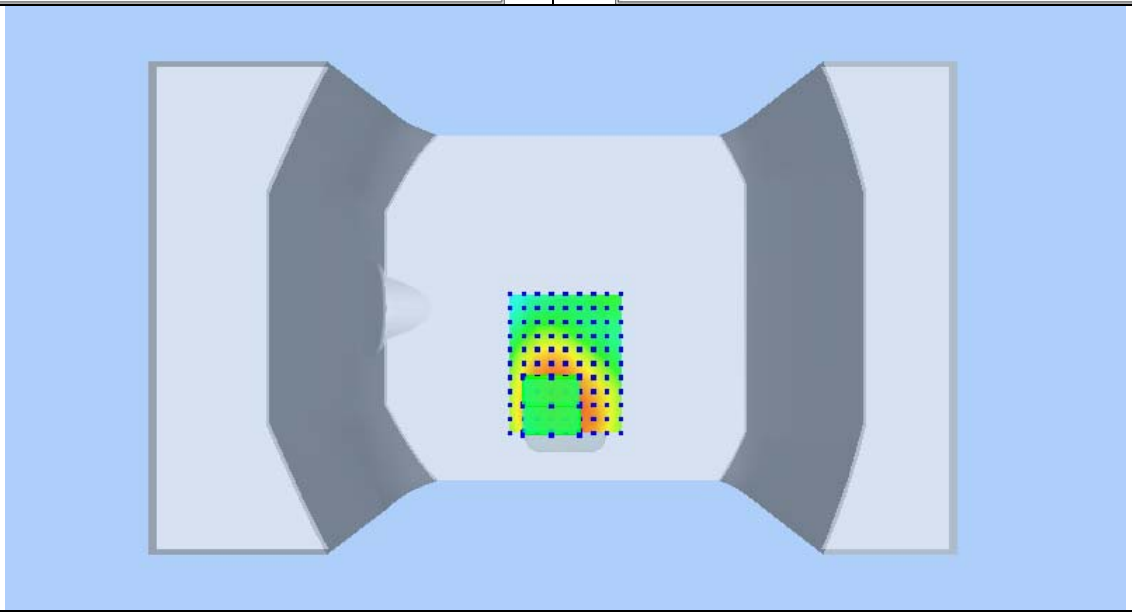



**Plot 5: GSM1900, Middle channel (Body-worn, Back Surface)**
**Product Description: Mobile Phone**
**Model: SL452**
**Test Date: Aug 19,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_1900 |
| Frequency (MHz) | 1880.0000 |
| Relative permittivity (real part) | 53.51 |
| Conductivity (S/m) | 1.50 |
| Signal | GSM (Duty cycle: 1:8) |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 5.05 |
| Sensor-Surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | 4.64 |
| SAR 10g (W/Kg) | 0.297705 |
| SAR 1g (W/Kg) | 0.468426 |
| **SURFACE SAR** | **VOLUME SAR** |

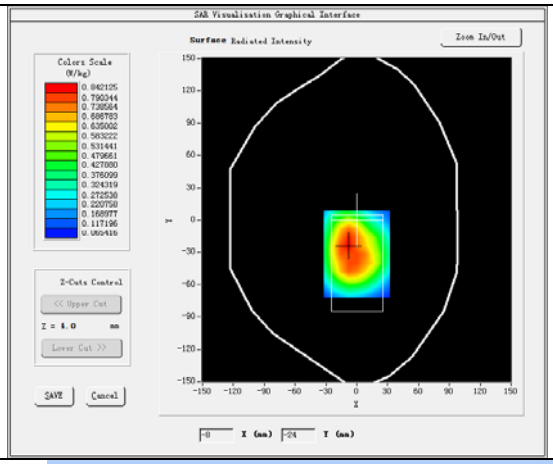


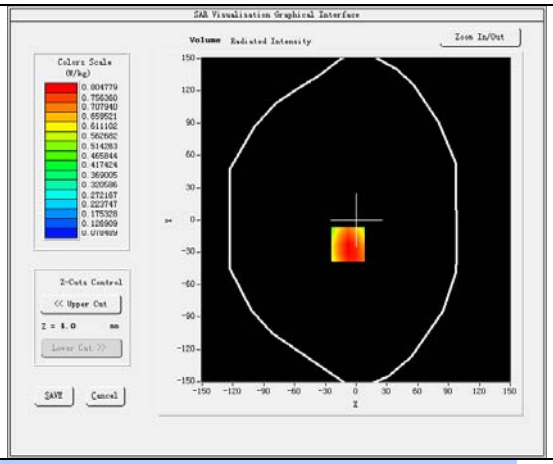



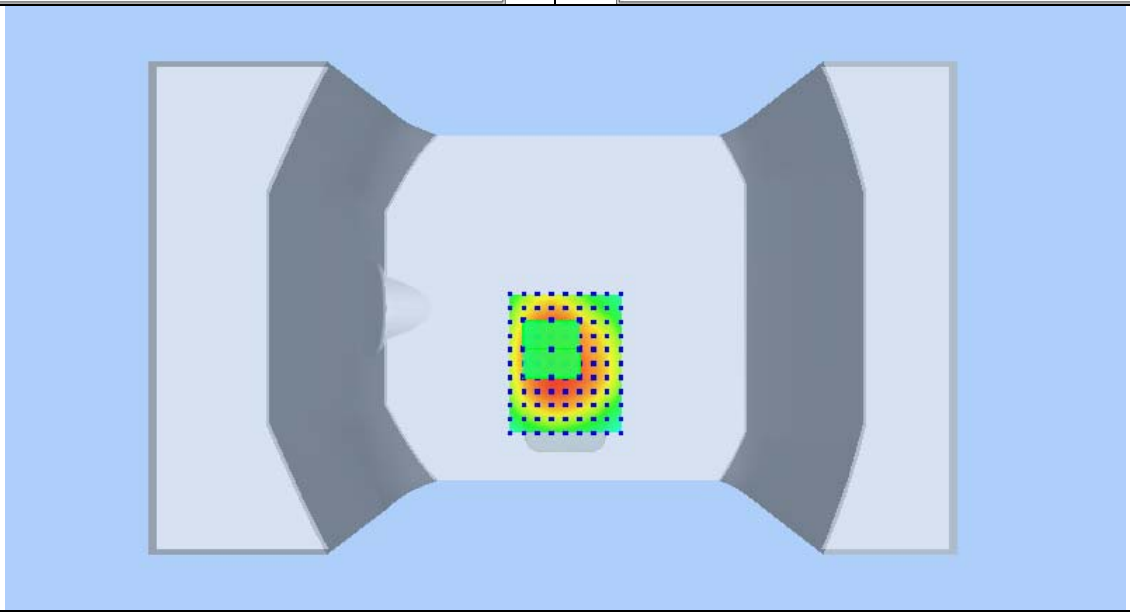



**Plot 6: GPRS1900, Middle channel (Data Mode, Back Surface)**
**Product Description: Mobile Phone**
**Model: SL452**
**Test Date: Aug 19,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_1900 |
| Frequency (MHz) | 1880.0000 |
| Relative permittivity (real part) | 53.51 |
| Conductivity (S/m) | 1.50 |
| Signal | GPRS (Duty cycle: 1:2) |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 5.05 |
| Sensor-Surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -3.65 |
| SAR 10g (W/Kg) | 0.477062 |
| SAR 1g (W/Kg) | 0.775275 |
| **SURFACE SAR** | **VOLUME SAR** |

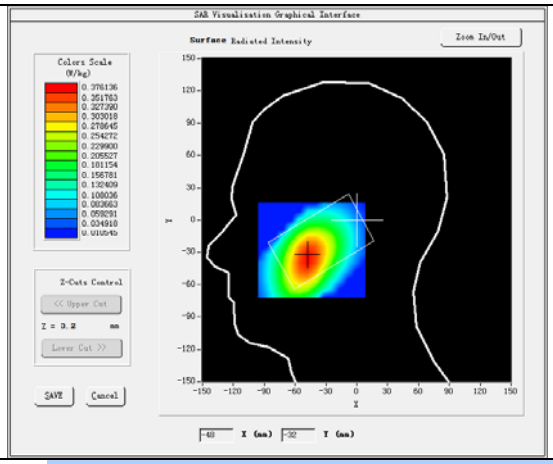


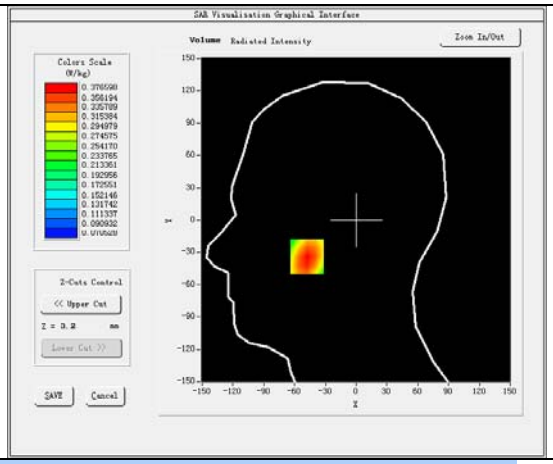



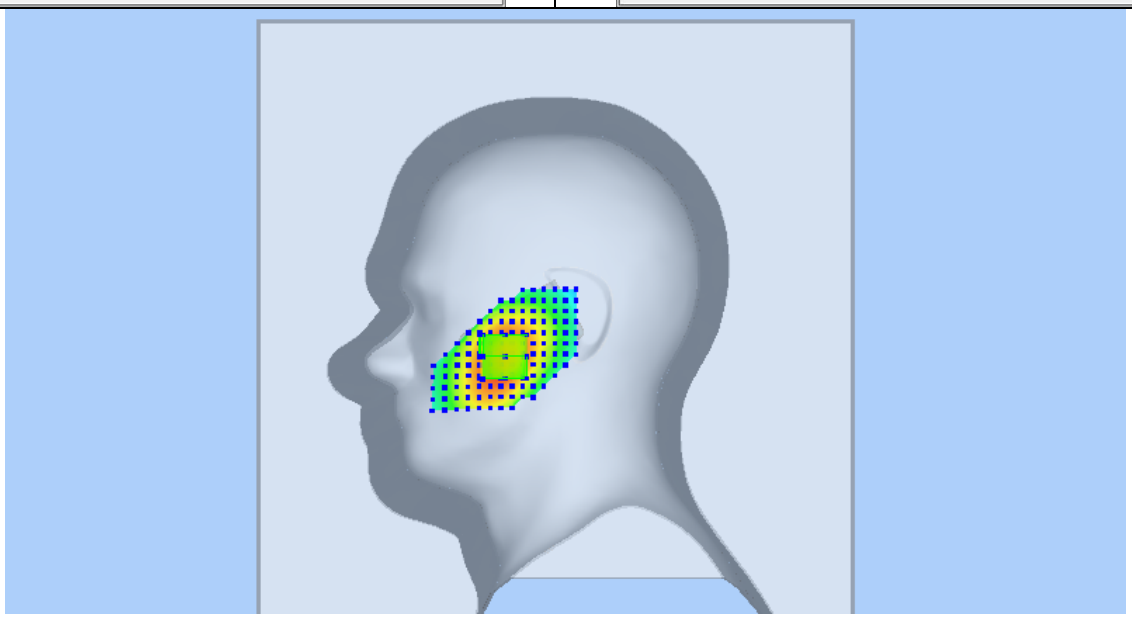



**Plot 7: WCDMA BAND V, Middle channel (Right Head Cheek)**
**Product Description: Mobile Phone**
**Model: SL452**
**Test Date: Aug 13,2016**

| | |
|---|---|
| Medium(liquid type) | HSL_850 |
| Frequency (MHz) | 836.6000 |
| Relative permittivity (real part) | 41.33 |
| Conductivity (S/m) | 0.91 |
| Signal | WCDMA (Duty cycle: 1:1) |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 5.26 |
| Sensor-Surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -1.10 |
| SAR 10g (W/Kg) | 0.265425 |
| SAR 1g (W/Kg) | 0.362438 |
| **SURFACE SAR** | **VOLUME SAR** |

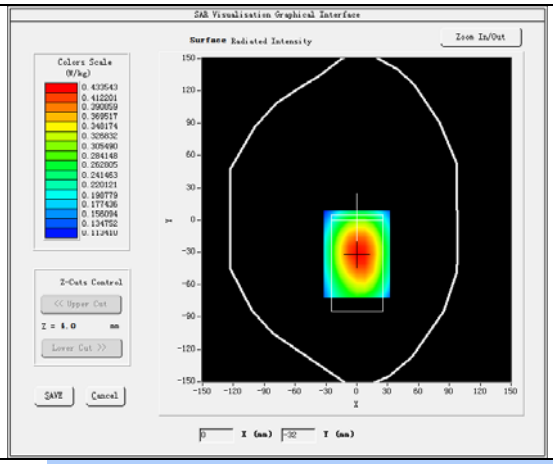


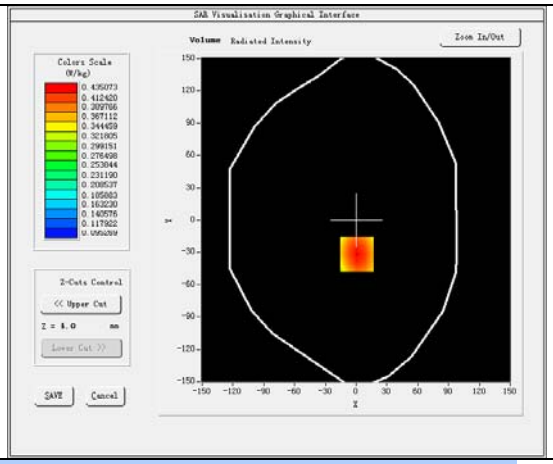



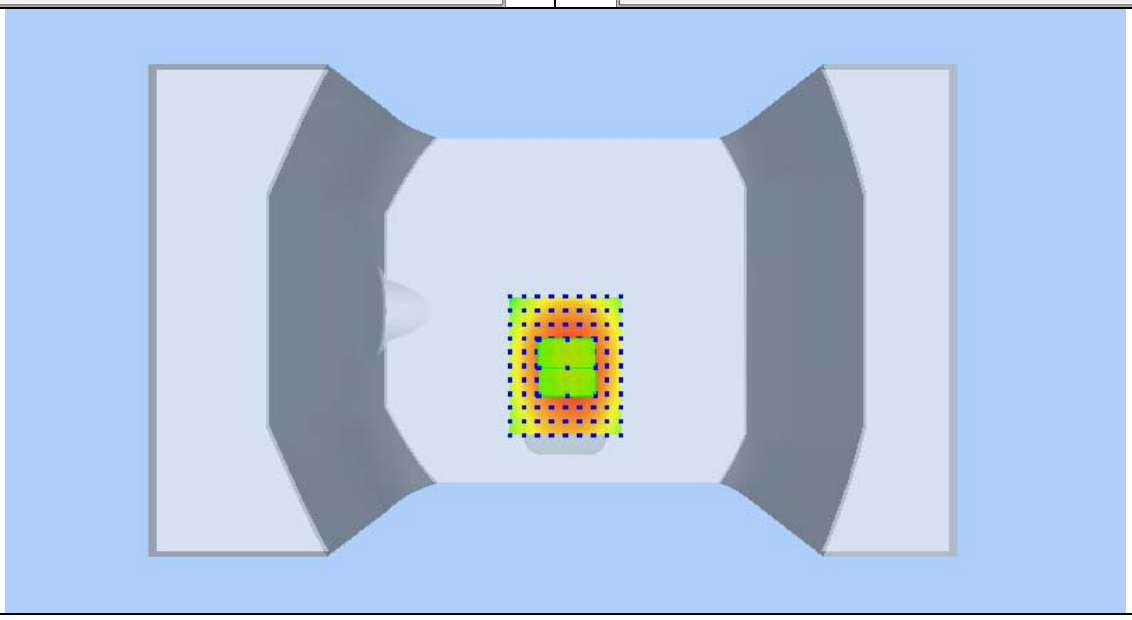



**Plot 8: WCDMA BAND V, Middle channel (Body-worn/Data Mode, Back Surface)**
**Product Description: Mobile Phone**
**Model: SL452**
**Test Date: Aug 13,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_850 |
| Frequency (MHz) | 836.6000 |
| Relative permittivity (real part) | 55.44 |
| Conductivity (S/m) | 0.98 |
| Signal | WCDMA (Duty cycle: 1:1) |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 5.46 |
| Sensor-Surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -0.49 |
| SAR 10g (W/Kg) | 0.305661 |
| SAR 1g (W/Kg) | 0.418916 |
| **SURFACE SAR** | **VOLUME SAR** |

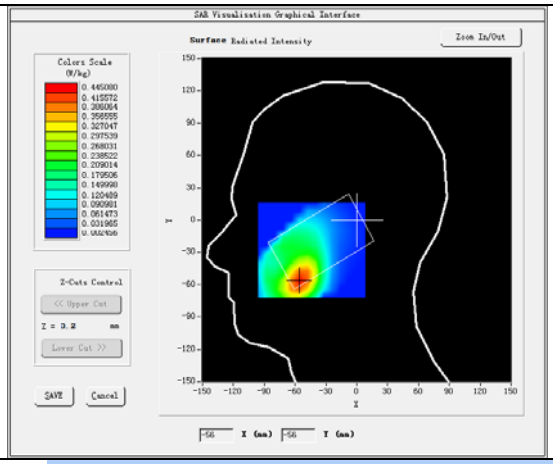


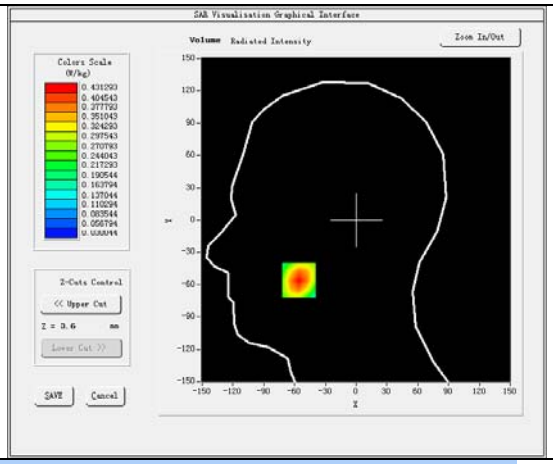



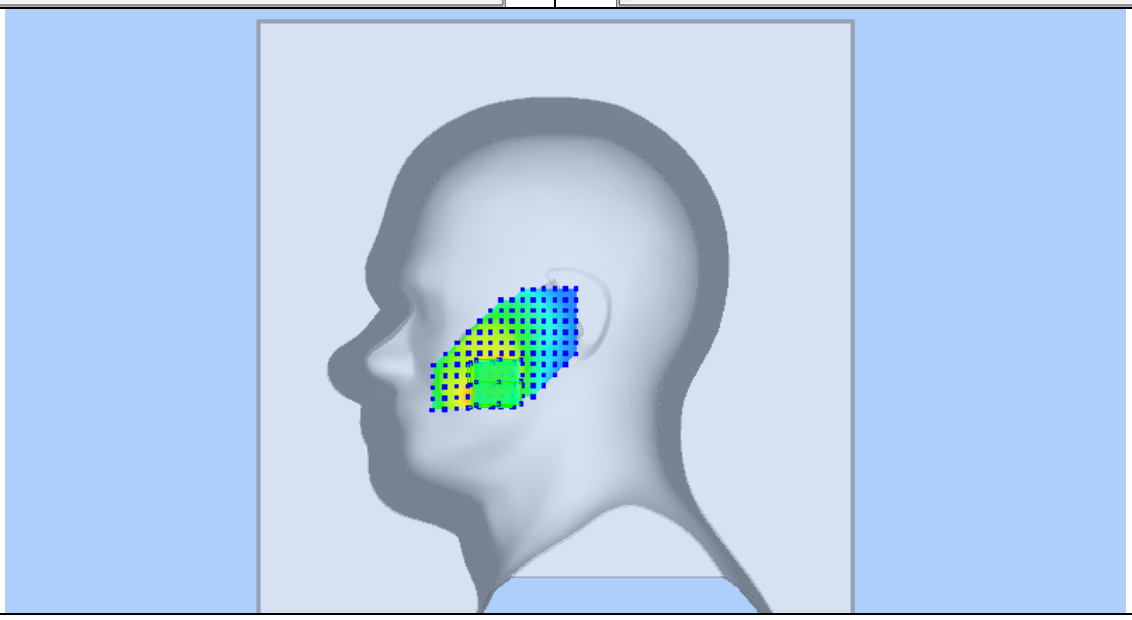



**Plot 9: WCDMA BANDⅡ, Middle channel (Right Head Cheek)**
**Product Description: Mobile Phone**
**Model: SL452**
**Test Date: Aug 19,2016**

| | |
|---|---|
| Medium(liquid type) | HSL_1900 |
| Frequency (MHz) | 1880.0000 |
| Relative permittivity (real part) | 41.04 |
| Conductivity (S/m) | 1.41 |
| Signal | WCDMA(Duty cycle: 1:1) |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 4.95 |
| Sensor-Surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -4.61 |
| SAR 10g (W/Kg) | 0.235046 |
| SAR 1g (W/Kg) | 0.404501 |
| **SURFACE SAR** | **VOLUME SAR** |

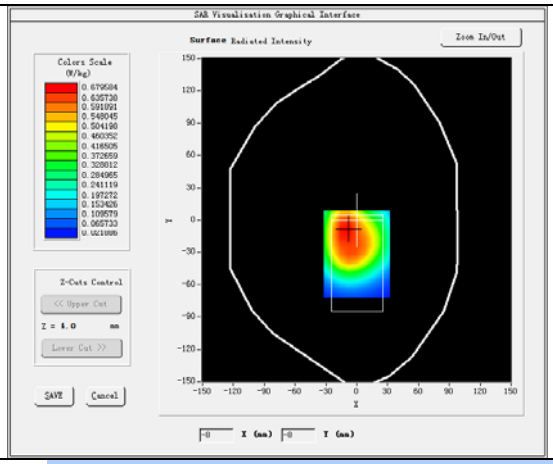


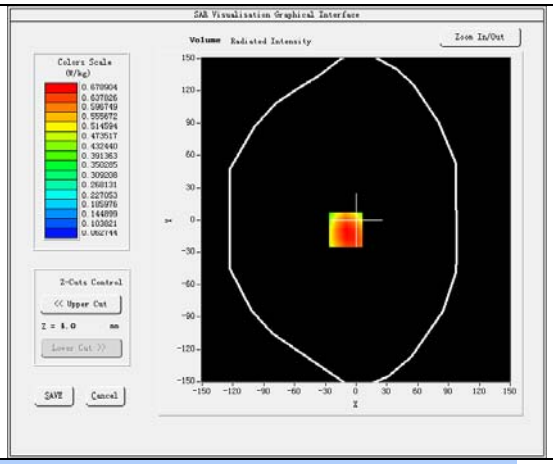



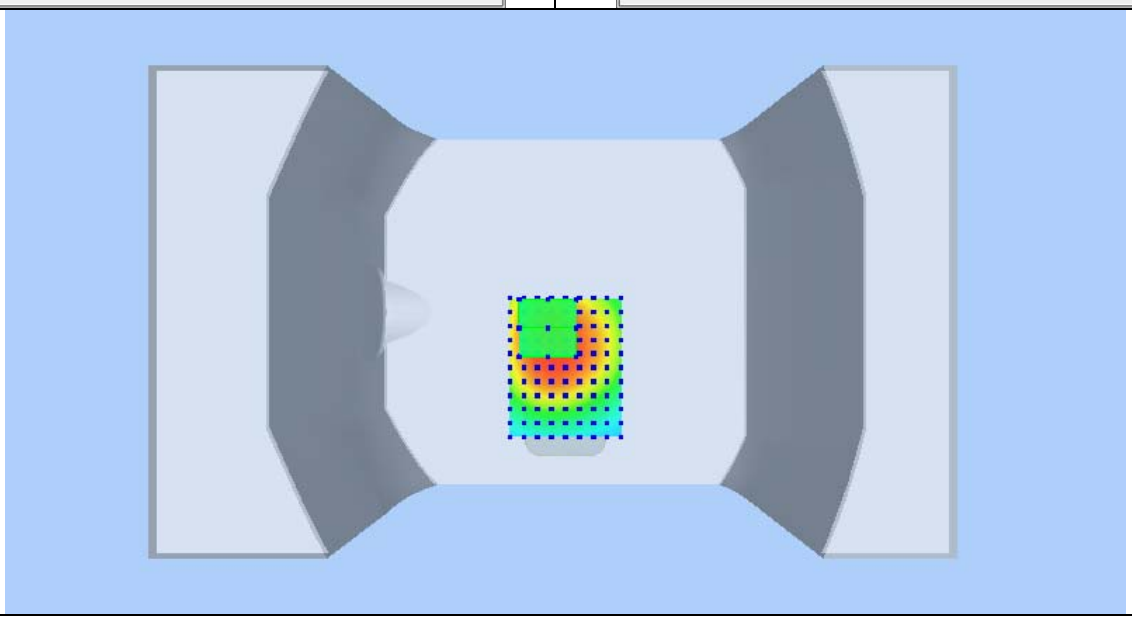



**Plot 10: WCDMA BANDⅡ, Middle channel (Body-worn, Back Surface)**
**Product Description: Mobile Phone**
**Model: SL452**
**Test Date: Aug 19,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_1900 |
| Frequency (MHz) | 1880.0000 |
| Relative permittivity (real part) | 53.51 |
| Conductivity (S/m) | 1.50 |
| Signal | WCDMA(Duty cycle: 1:1) |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 5.05 |
| Sensor-Surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -1.26 |
| SAR 10g (W/Kg) | 0.398146 |
| SAR 1g (W/Kg) | 0.652973 |
| **SURFACE SAR** | **VOLUME SAR** |

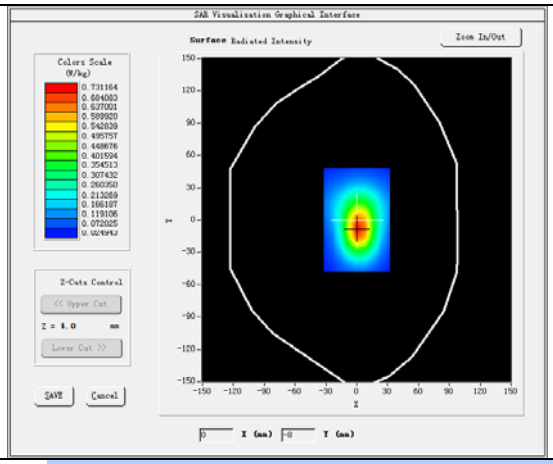


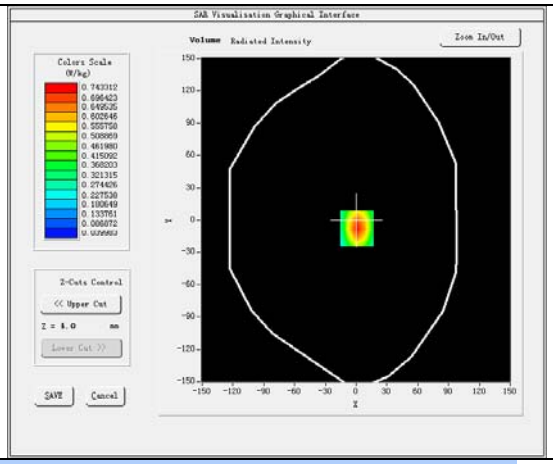



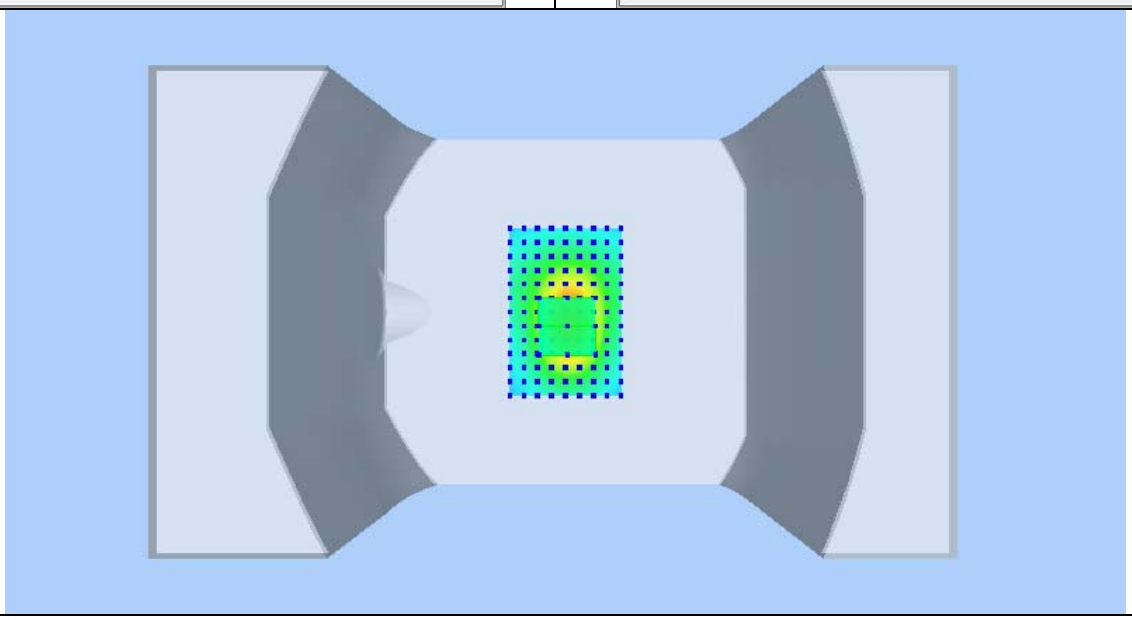



**Plot 11: WCDMA BANDⅡ, Middle channel (Data Mode, Bottom Edge)**
**Product Description: Mobile Phone**
**Model: SL452**
**Test Date: Aug 19,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_1900 |
| Frequency (MHz) | 1880.0000 |
| Relative permittivity (real part) | 53.51 |
| Conductivity (S/m) | 1.50 |
| Signal | WCDMA(Duty cycle: 1:1) |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 5.05 |
| Sensor-Surface | 4mm |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -2.58 |
| SAR 10g (W/Kg) | 0.377880 |
| SAR 1g (W/Kg) | 0.693664 |
| **SURFACE SAR** | **VOLUME SAR** |

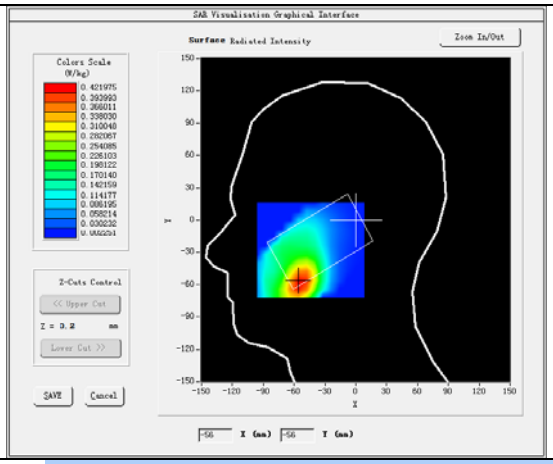


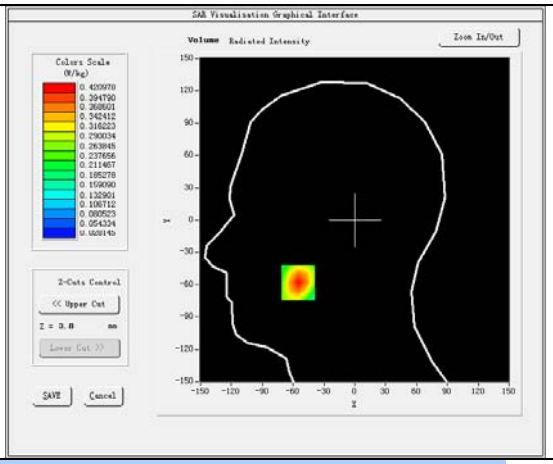



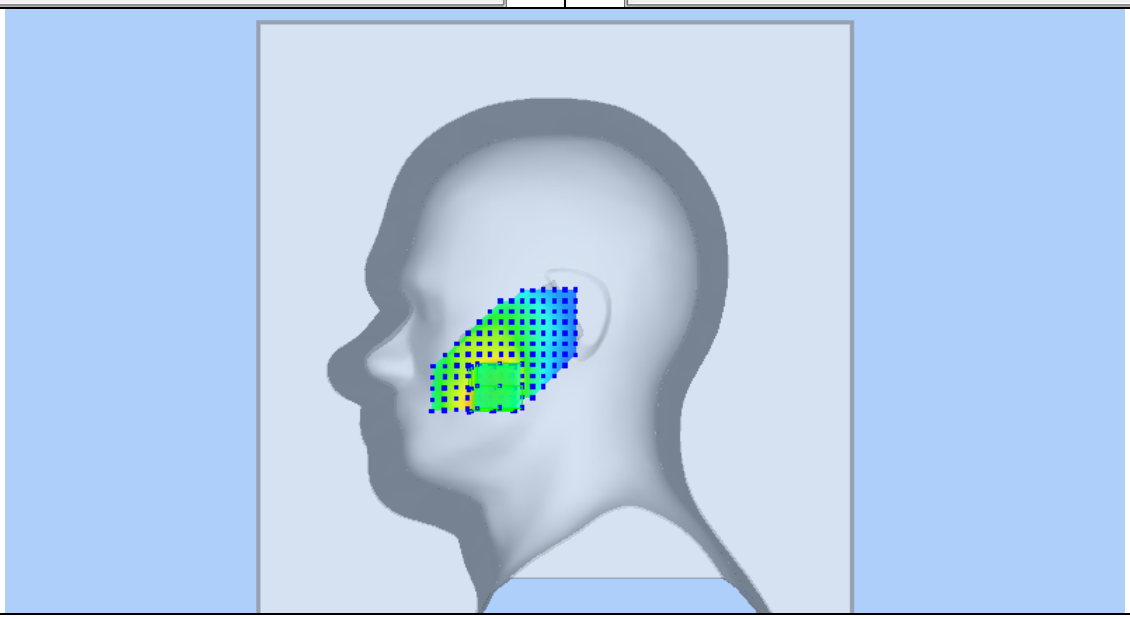



**Plot 12:LTE BAND2, Middle channel (Right Head Cheek)**
**Product Description:Mobile Phone**
**Model: SL452**
**Test Date: Aug 19,2016**

| | |
|---|---|
| Medium(liquid type) | HSL_1900 |
| Frequency (MHz) | 1880.0000 |
| Relative permittivity (real part) | 41.04 |
| Conductivity (S/m) | 1.41 |
| Signal | Duty cycle: 1:1 |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 4.95 |
| Bandwidth(MHz) | 20 |
| RB Allocation | 1 |
| RB Offset | 49 |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -3.94 |
| SAR 10g (W/Kg) | 0.227178 |
| SAR 1g (W/Kg) | 0.394906 |
| **SURFACE SAR** | **VOLUME SAR** |

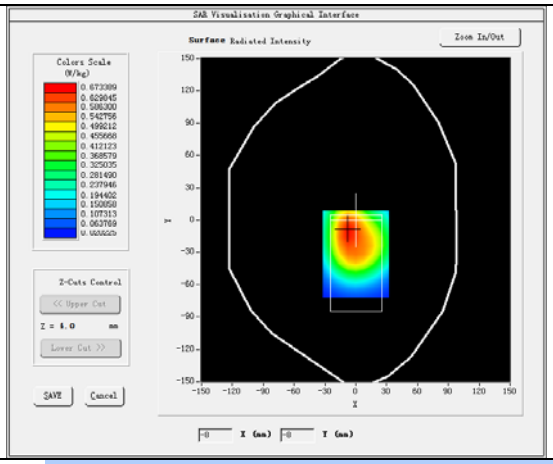


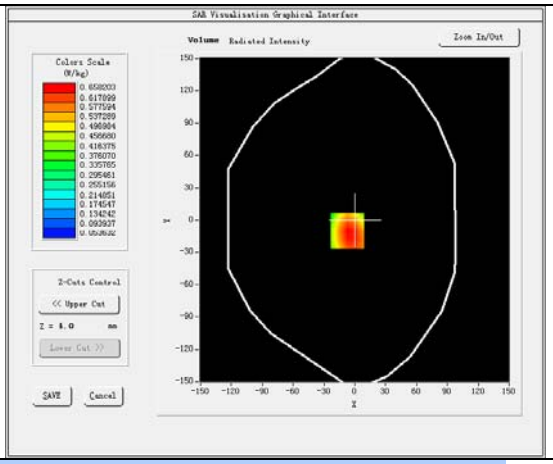



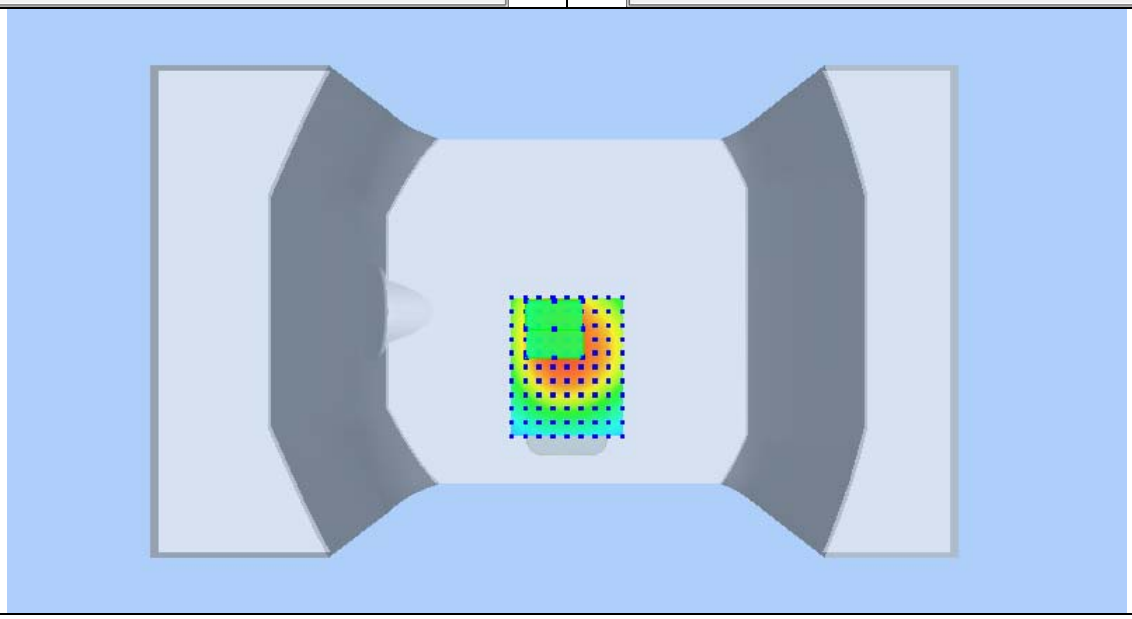



**Plot 13:LTE BAND2, Middle channel (Body-worn/Data Mode, Back Surface)**
**Product Description:Mobile Phone**
**Model: SL452**
**Test Date: Aug 19,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_1900 |
| Frequency (MHz) | 1880.0000 |
| Relative permittivity (real part) | 53.51 |
| Conductivity (S/m) | 1.50 |
| Signal | Duty cycle: 1:1 |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 5.05 |
| Bandwidth(MHz) | 20 |
| RB Allocation | 1 |
| RB Offset | 49 |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -2.25 |
| SAR 10g (W/Kg) | 0.380362 |
| SAR 1g (W/Kg) | 0.634182 |
| **SURFACE SAR** | **VOLUME SAR** |

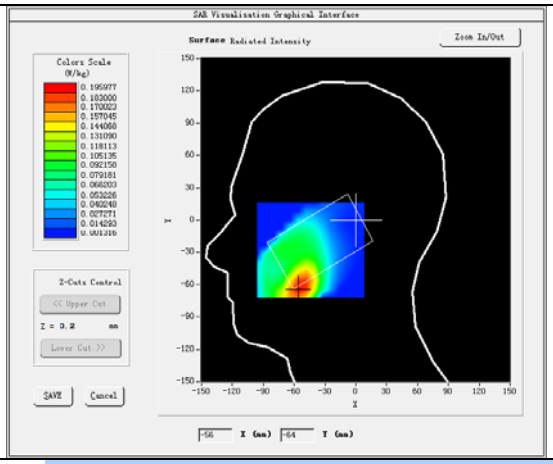


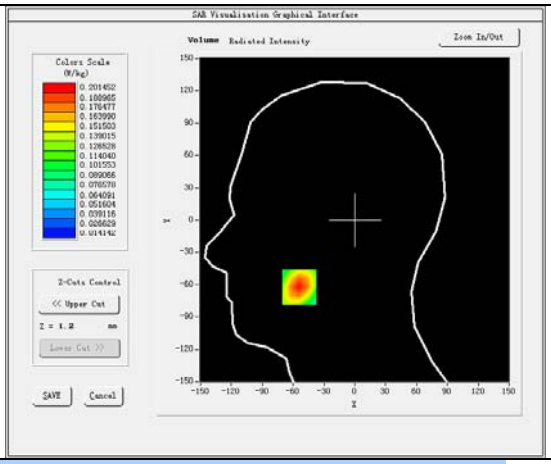



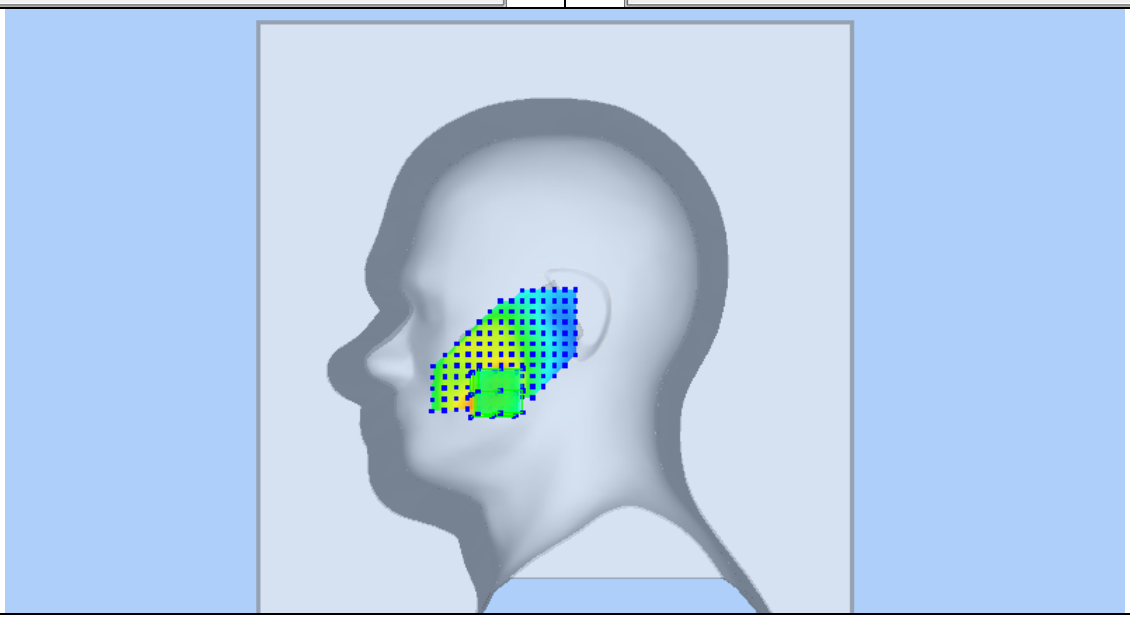



**Plot 14:LTE BAND4, Middle channel (Right Head Cheek)**
**Product Description:Mobile Phone**
**Model: SL452**
**Test Date: Aug 17,2016**

| | |
|---|---|
| Medium(liquid type) | HSL_1800 |
| Frequency (MHz) | 1732.5000 |
| Relative permittivity (real part) | 40.51 |
| Conductivity (S/m) | 1.39 |
| Signal | Duty cycle: 1:1 |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 4.23 |
| Bandwidth(MHz) | 20 |
| RB Allocation | 1 |
| RB Offset | 49 |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | 2.21 |
| SAR 10g (W/Kg) | 0.111408 |
| SAR 1g (W/Kg) | 0.189146 |
| **SURFACE SAR** | **VOLUME SAR** |

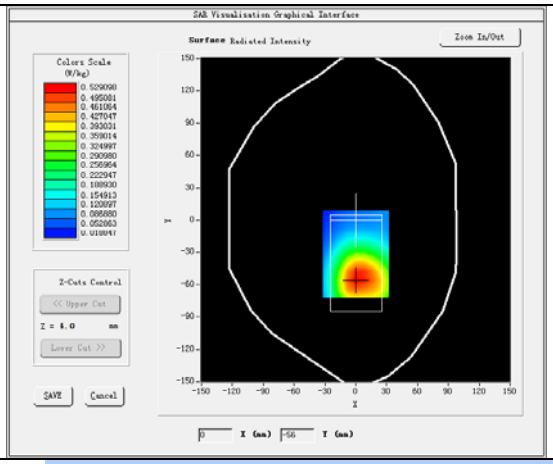


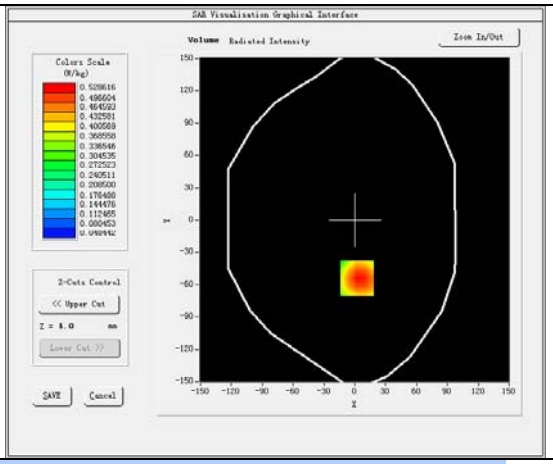



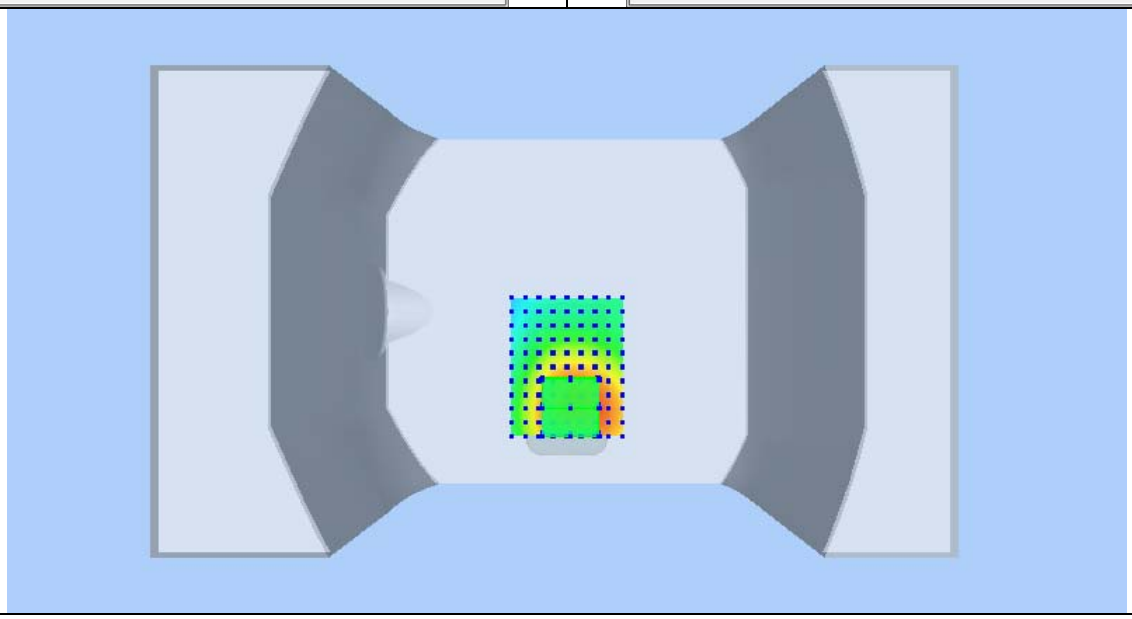



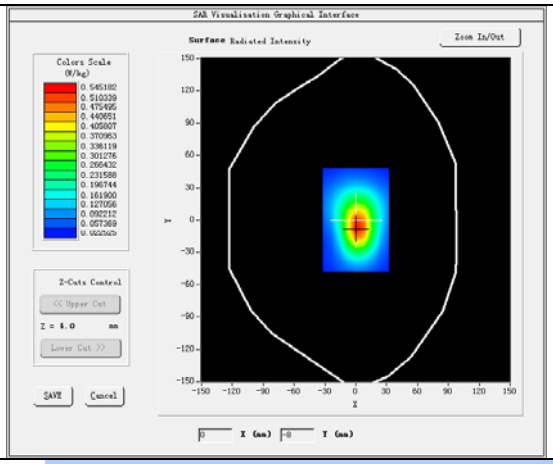
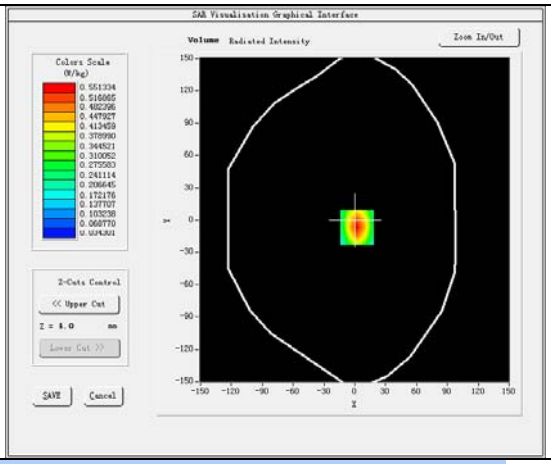
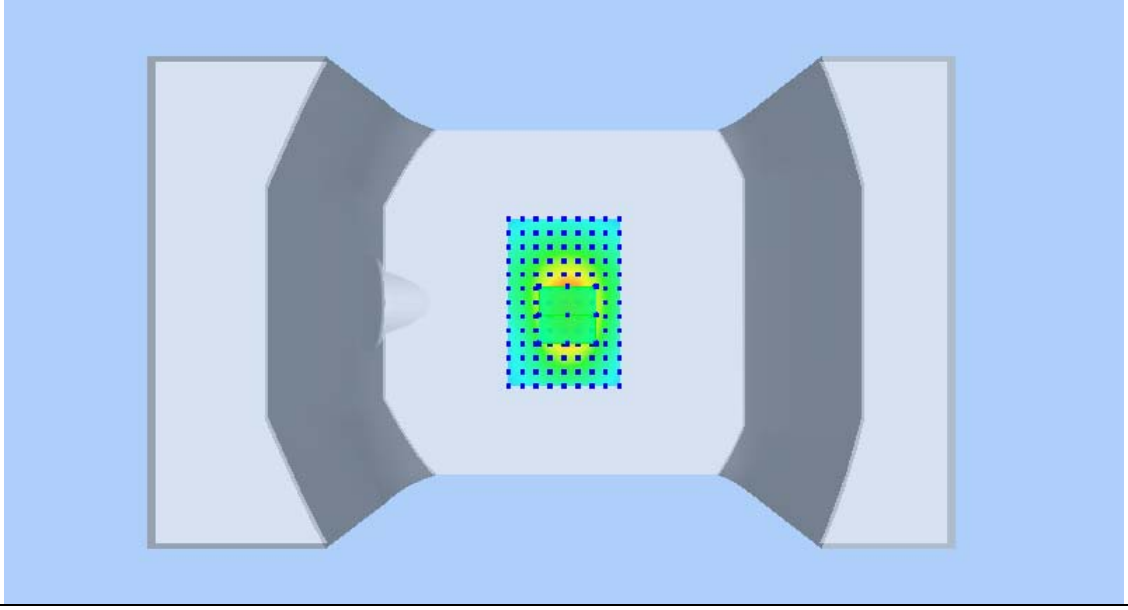
**Plot 15:LTE BAND4, Middle channel (Body-worn, Back Surface)**
**Product Description:Mobile Phone**
**Model: SL452**
**Test Date: Aug 17,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_1800 |
| Frequency (MHz) | 1732.5000 |
| Relative permittivity (real part) | 53.85 |
| Conductivity (S/m) | 1.50 |
| Signal | Duty cycle: 1:1 |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 4.37 |
| Bandwidth(MHz) | 20 |
| RB Allocation | 1 |
| RB Offset | 49 |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -0.87 |
| SAR 10g (W/Kg) | 0.308164 |
| SAR 1g (W/Kg) | 0.505632 |
| **SURFACE SAR** | **VOLUME SAR** |



**Plot 16:LTE BAND4, Middle channel (Data Mode, Bottom Surface)**
**Product Description:Mobile Phone**
**Model: SL452**
**Test Date: Aug 17,2016**

| | |
|---|---|
| Medium(liquid type) | MSL_1800 |
| Frequency (MHz) | 1732.5000 |
| Relative permittivity (real part) | 53.85 |
| Conductivity (S/m) | 1.50 |
| Signal | Duty cycle: 1:1 |
| E-Field Probe | SN 07/15 EP249 |
| Conversion Factor | 4.37 |
| Bandwidth(MHz) | 20 |
| RB Allocation | 1 |
| RB Offset | 49 |
| Area Scan | dx=8mm dy=8mm |
| Zoom Scan | 5x5x7,dx=8mm dy=8mm dz=5mm |
| Variation (%) | -1.10 |
| SAR 10g (W/Kg) | 0.285531 |
| SAR 1g (W/Kg) | 0.514366 |
| **SURFACE SAR** | **VOLUME SAR** |