# TEST REPORT

**REPORT NUMBER：B19W50551-SAR_REV3**

**ON**

| | |
|---|---|
| **Type of Equipment:** | Smart POS System |
| **Type of Designation:** | T6800 |
| **Manufacturer:** | Shanghai Sunmi Technology Co.,Ltd. |
| **FCC ID:** | 2AH25T6800 |

**ACCORDING TO**

**IEEE C95.1-2005**
**IEEE 1528–2013**

**Chongqing Academy of Information and Communication Technology**

***Month date, year***

*Nov, 18, 2019*

***Signature***

**Zhang Yan**

***Director***

**Note:**
The test results in this test report relate only to the devices specified in this report. This report shall not be reproduced except in full without the written approval of Chongqing Academy of Information and Communications Technology.

**Revision Version**

| Report Number | Revision | Date | Memo |
|---|---|---|---|
| B19W50551-SAR | 00 | 2019-10-25 | Initial creation of test report |
| B19W50551-SAR_REV1 | 01 | 2019-11-11 | Modify operation model(s) |
| B19W50551-SAR_REV2 | 02 | 2019-11-14 | Modify Simultaneous TX SAR Considerations |
| B19W50551-SAR_REV3 | 03 | 2019-11-18 | Modify Sensor Power SAR results |

# CONTENTS

# 1. Test Laboratory

## 1.1. Testing Location

| | |
|---|---|
| Company Name: | Chongqing Academy of Information andCommunications Technology |
| Address: | No. 8, Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China |
| Postal Code: | 401336 |
| Telephone: | 0086-23-88069965 |
| Fax: | 0086-23-88608777 |
| FCC Registration Number: | CN1239 |

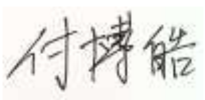
## 1.2. Testing Environment

| | |
|---|---|
| Normal Temperature: | 15-35℃ |
| Relative Humidity: | 20-75% |
| Ambient noise & Reflection: | < 0.012 W/kg |

## 1.3. Project Data

| | |
|---|---|
| Testing Start Date: | 2019-10-15 |
| Testing End Date: | 2019-10-21 |

## 1.4. Signature



2019-11-18

**Fu Bohao**
**(Prepared this test report)**

**Date**

2019-11-18

**Wang Lili**
**(Reviewed this test report)**

**Date**

2019-11-18

**Zhang Yan**
**Director of the laboratory**
**(Approved this test report)**

**Date**

# 2. Statement of Compliance

The maximum results of Specific Absorption Rate(SAR) found during testing for **T6800** are as follows ( with expanded uncertainty 22.4%)

**Table 2.1: Max. SAR Reported (1g)**

| Band | Position | SAR 1g (W/Kg) |
|---|---|---|
| CDMA 2000 | Body(5mm) | 1.215 |
| WCDMA Band 2 | Body(5mm) | 1.189 |
| WCDMA Band 4 | Body(5mm) | 0.542 |
| LTE Band 7 | Body(5mm) | 0.763 |
| LTE Band 25 | Body(5mm) | 1.105 |
| LTE Band 41 | Body(5mm) | 0.657 |
| LTE Band 66 | Body(5mm) | 0.868 |

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1g tissue according to the IEEE C95.1–2005.

The maximum SAR value is obtained at the case of **(Table 2.1),** and the values are**: 1.215 W/Kg (1g)**.

**Table 2.2: Max. SAR Reported (1g)**

| Band | Position | SAR 1g (W/Kg) |
|---|---|---|
| CDMA 2000 | Body(0mm) | 0.829 |
| WCDMA Band 2 | Body(0mm) | 0.518 |
| WCDMA Band 4 | Body(0mm) | 0.449 |
| LTE Band 7 | Body(0mm) | 1.209 |
| LTE Band 25 | Body(0mm) | 0.622 |
| LTE Band 41 | Body(0mm) | 0.881 |
| LTE Band 66 | Body(0mm) | 0.617 |

The SAR values found for the Mobile Phone are below the maximum recommended levels of 1.6 W/Kg as averaged over any 1g tissue according to the IEEE C95.1–2005.

The maximum SAR value is obtained at the case of **(Table 2.2),** and the values are**: 1.209 W/Kg (1g)**.

**Note: LTE Band4 not tested due to testing of LTE Band 66.**

**LTE Band2 not tested due to testing of LTE Band 25.**

# 3. Client Information

## 3.1. Applicant Information

| | |
|---|---|
| Company Name: | Shanghai Sunmi Technology Co.,Ltd. |
| Address /Post: | Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China |
| Telephone: | 18721763396 |
| Fax: | -- |
| Email: | zhangwentang@sunmi.com |
| Contact Person: | zhangwentang |

## 3.2. Manufacturer Information

| | |
|---|---|
| Company Name: | Shanghai Sunmi Technology Co.,Ltd. |
| Address /Post: | Room 505, KIC Plaza, No.388 Song Hu Road, Yang Pu District, Shanghai, China |
| Telephone: | 18721763396 |
| Fax: | -- |
| Email: | zhangwentang@sunmi.com |
| Contact Person: | zhangwentang |

# 4. Equipment Under Test (EUT) and Ancillary Equipment (AE)

## 4.1. About EUT

| | |
|---|---|
| Description: | Smart POS System |
| Model name: | T6800 |
| GSM Frequency Band | GSM850/ GSM900/ GSM1800/ GSM1900 |
| CDMA 2000 Frequency Band | BC0/BC1 |
| UTMS Frequency Band | Band 1/2/4/5/6/8 |
| LTE Frequency Band | Band 1/2/3/4/5/7/9/12/17/18/19/25/26/38/41/66 |
| BLE/BT | BT4.2/BLE |
| WiFi | 2.4G/5G |
| Test device Production information: | Production unit |
| Voice mode | Not Support |
| Device type: | Portable device |
| Antenna type: | Inner antenna |
| Accessories/Body-worn configurations: | N/A |
| Hotspot mode: | N/A |
| Dimensions: | 15.8cm×7.5cmx2.3cm |



**Picture 4-1: EUT Photo**

## 4.2. Internal Identification of EUT used during the test

| EUT ID* | SN or IMEI | HW Version | SW Version | **Date of receipt** |
|---|---|---|---|---|
| S2 | 1D98VCLGAA00085 | V1 | SP2186_769__P2LITELA_patchbuild_20190808165756_DCC | 2019-10-15 |
| S3 | 1D98VCLGAA004BV | V1 | SP2186_769__P2LITELA_patchbuild_20190808165756_DCC | 2019-10-15 |

*EUT ID: is used to identify the test sample in the lab internally.

## 4.3. Internal Identification of AE used during the test

| AE ID* | Description | Model | SN | Manufacturer |
|---|---|---|---|---|
| B1 | N/A | N/A | N/A | N/A |

*AE ID: is used to identify the test sample in the lab internally.

# 5. Reference Documents

## 5.1. Applicable Limit Regulations

**IEEE C95.1–2005:** IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

It specifies the maximum exposure limit of **1.6 W/kg** as averaged over any 1 gram of tissue , 4.0 W/Kg as averaged over any 10g tissue for portable devices.

## 5.2. Applicable Measurement Standards

**IEEE 1528–2013:** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques.

**KDB447498 D01: General RF Exposure Guidance v06:** Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies.

**KDB941225 D06 Hotspot Mode SAR v02r01:** SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities

**KDB865664 D01SAR measurement 100 MHz to 6 GHz v01r04:** SAR Measurement Requirements for 100 MHz to 6 GHz.

**KDB865664 D02 RF Exposure Reporting v01r02:** RF Exposure Compliance Reporting and Documentation Considerations

NOTE: KDB is not in A2LA Scope List.

# 6. Specific Absorption Rate (SAR)

## 6.1. Introduction

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

## 6.2. SAR Definition

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

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

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

$$SAR = c\left(\frac{\delta T}{\delta t}\right)$$

Where: C is the specific head capacity, $\delta T$ is the temperature rise and $\delta t$ is the exposure duration, or related to the electrical field in the tissue by

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

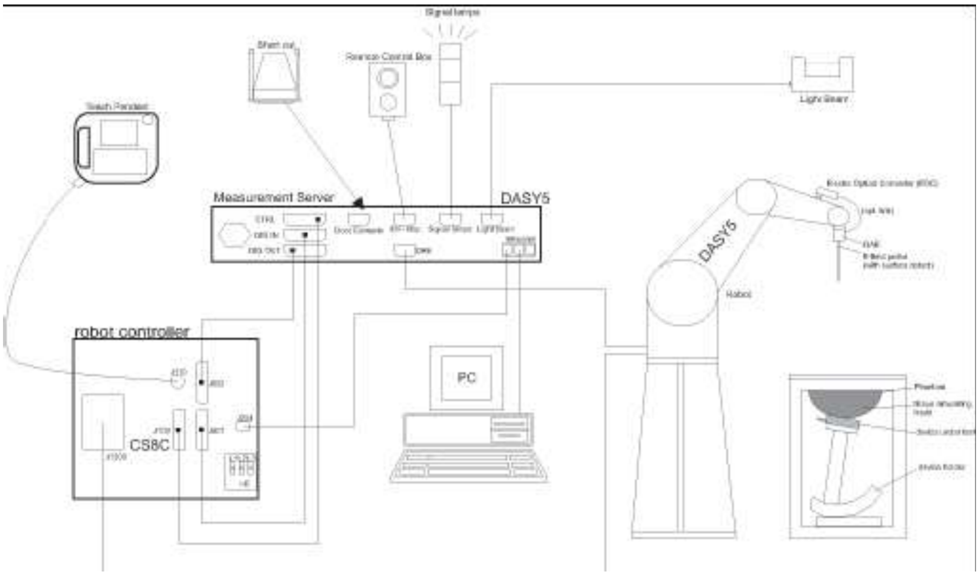
Where: $\sigma$ is the conductivity of the tissue, $\rho$ is the mass density of tissue and $E$ is the RMS electrical field strength.

However for evaluating SAR of low power transmitter, electrical field measurement is typically applied.

# 7. SAR MEASUREMENT SETUP

## 7.1. Measurement Set-up

The DASY5 system for performing compliance tests is illustrated above graphically. This system consists of the following items:




**Picture 7-1 SAR Lab Test Measurement Set-up**

- A standard high precision 6-axis robot (Stäubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running WinXP and theDASY5 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as
- warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

## 7.2. DASY5 E-field Probe System

The SAR measurements were conducted with the dosimetric probe designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates. The probe is equipped with an optical multifiber line ending at the front of the probe tip. It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface. Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero. The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY5 software reads the reflection durning a software approach and looks for the maximum using 2$^{nd}$ord curve fitting. The approach is stopped at reaching the maximum.

**Probe Specifications:**

**Model:** EX3DV4

**Frequency** 750MHz — 6GHz

**Calibration:** In head and body simulating tissue at Frequencies from 835 up to 5800MHz

**Linearity:** ±0.2 dB

**Dynamic Range:** 10 mW/kg — 100W/kg

**Probe Length:** 330 mm

**Probe Tip**

**Length:** 20 mm

**Body Diameter:** 12 mm

**Tip Diameter:** 2.5mm

**Tip-Center:** 1 mm

**Application:** SAR Dosimetry Testing
Compliance tests of mobile phones
Dosimetry in strong gradient fields

**Picture 7-2 Near-field Probe**

**Picture 7-3 E-field Probe**

## 7.3. E-field Probe Calibration

Each E-Probe/Probe Amplifier combination has unique calibration parameters. A TEM cell calibration procedure is conducted to determine the proper amplifier settings to enter in the probe parameters. The amplifier settings are determined for a given frequency by subjecting the probe to a known E-field density (1 mW/cm$^2$) using an RF Signal generator, TEM cell, and RF Power Meter.

The free space E-field from amplified probe outputs is determined in a test chamber. This calibration can be performed in a TEM cell if thefrequency is below 1 GHz and inn a waveguide or other methodologies above 1 GHz for free space. For the free space calibration, the probe is placed in the volumetric center of the cavity and at the proper orientation with the field. The probe is then rotated 360 degrees until the three channels show the maximum reading. The power density readings equates to 1 mW/ cm$^2$..
E-field temperature correlation calibration is performed in a flat phantom filled with the appropriate simulated brain tissue. The E-field in the medium correlates with the temperature rise in the dielectric medium. For temperature correlation calibration a RF transparent thermistor-based temperature probe is used in conjunction with the E-field probe.

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

Where:
$\Delta t$ = Exposure time (30 seconds),
C = Heat capacity of tissue (brain or muscle),
$\Delta T$ = Temperature increase due to RF exposure.

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

Where:
$\sigma$ = Simulated tissue conductivity,
$\rho$ = Tissue density (kg/m$^3$).

## 7.4. Other Test Equipment

### 7.4.1. Data Acquisition Electronics(DAE)

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

**Picture7-4: DAE**

### 7.4.2. Robot

The SPEAG DASY system uses the high precision robots (DASY5: TX90) type from Stäubli SA (France). For the 6-axis controller system, the robot controller version from Stäubli is used. The Stäubli robot series have many features that are important for our application:

- High precision (repeatability 0.02mm)
- High reliability (industrial design)
- Low maintenance costs (virtually maintenance free due to direct drive gears; no belt drives)
- Jerk-free straight movements (brushless synchron motors; no stepper motors)
- Low ELF interference (motor control fields shielded via the closed metallic construction shields)

**Picture7-5: DASY 5**

### 7.4.3. Measurement Server

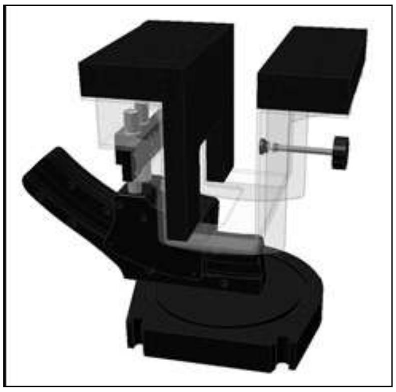
The Measurement server is based on a PC/104 CPU broad with CPU (DASY5: 400 MHz, Intel Celeron), chipdisk (DASY5: 128MB), RAM (DASY5: 128MB). The necessary circuits for communication with the DAE electronic box, as well as the 16 bit AD converter system for optical detection and digital I/O interface are contained on the DASY I/O broad, which is directly connected to the PC/104 bus of the CPU broad.
The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized pinout, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.


**Picture 7-6: Server for DASY 5**

### 7.4.4. Device Holder for Phantom

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source at 5mm distance, a positioning uncertainty of ±0.5mm would produce a SAR uncertainty of ±20%. Accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions in which the devices must be measured are defined by the standards.
The DASY device holder is designed to cope with the different positions given in the standard. It has two scales for device rotation (with respect to the body axis) and device inclination (with respect to the line between the ear reference points). The rotation centers for both scales is the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.
The DASY device holder is constructed of low-loss POM material having the following dielectric parameters: relative permittivity $\varepsilon$ =3 and loss tangent $\delta$ =0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.
<Laptop Extension Kit>
The extension is lightweight and made of POM, acrylic glass and foam. It fits easily on the upper part of the Mounting Device in place of the phone positioner. The extension is fully compatible with the Twin-SAM and ELI phantoms.

Picture7-7: Device Holder



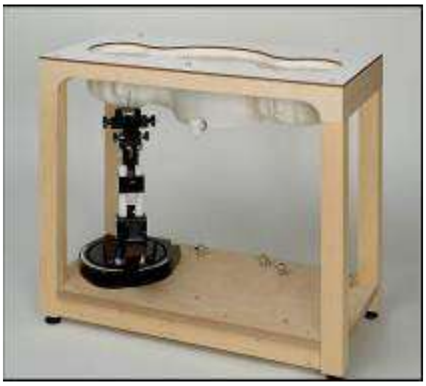
Picture 7-8: Laptop Extension Kit

### 7.4.5. Phantom

The SAM Twin Phantom V4.0 is constructed of a fiberglass shell integrated in a table. The shape of the shell is based on data from an anatomical study designed to

Represent the 90th percentile of the population. The phantom enables the dissymmetric evaluation of SAR for both left and right handed handset usage, as well as body-worn usage using the flat phantom region. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot. The shell phantom has a 2mm shell thickness (except the ear region where shell thickness increases to 6 mm).

Shell Thickness: 2 ±0. 2 mm
Filling Volume: Approx. 25 liters
Dimensions: 810 x l000 x 500 mm (H x L x W)
Available: Special



Picture 7-9: SAM Twin Phantom

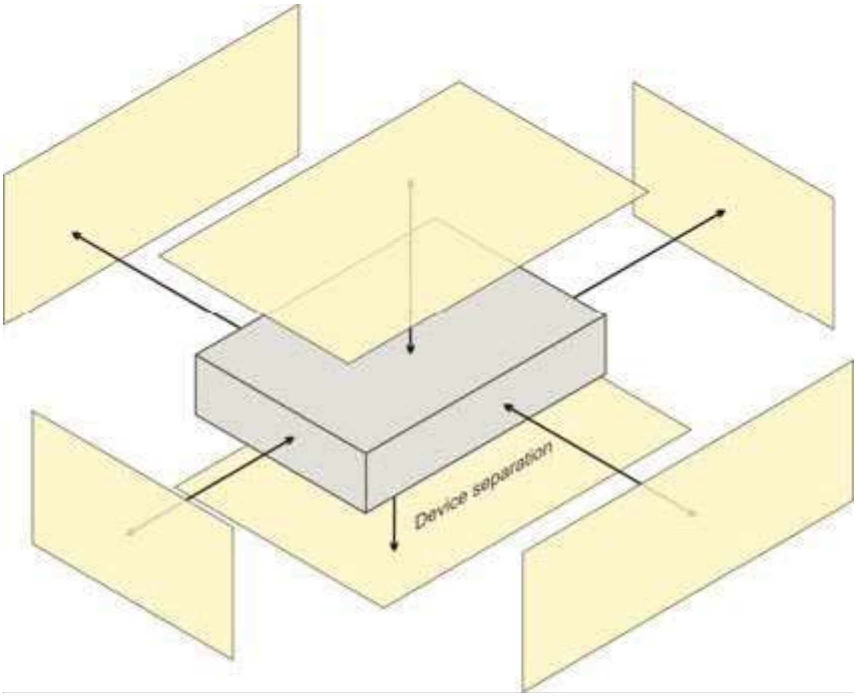
# 8. Position of the wireless device in relation to the phantom

## 8.1. Generic device

For a device that can not be categorized as any of the other specific device types, it shall be considered to be a generic device;

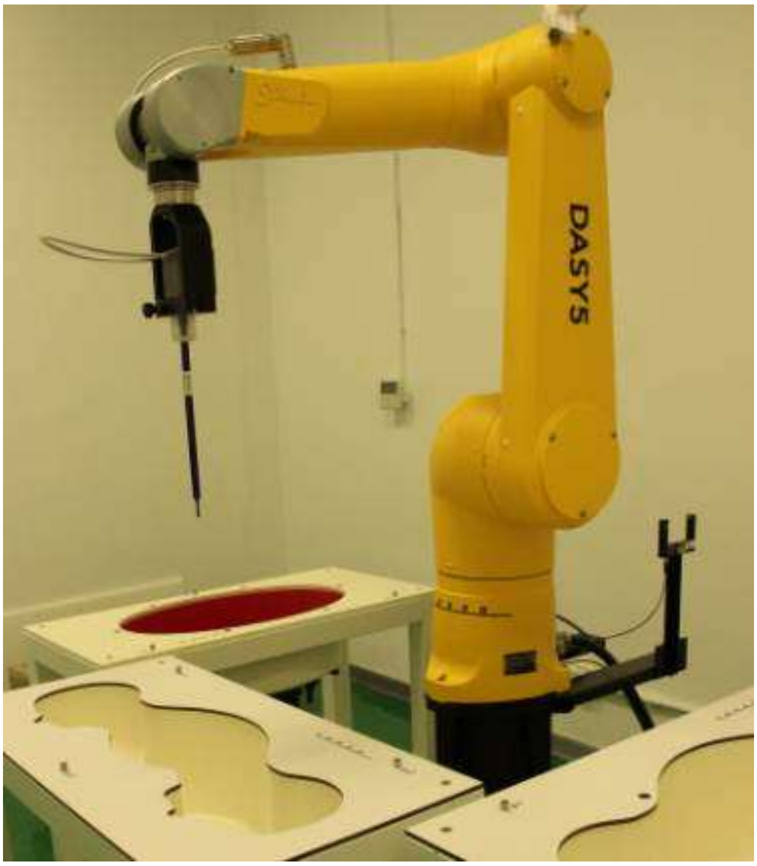
The SAR evaluation shall be performed for all surfaces of the DUT that are accessible during intended use, as indicated in Picture 8-1. The separation distance in testing shall correspond to the intended use distance as specified in the user instructions provided by the manufacturer. If the intended use is not specified, all surfaces of the DUT shall be tested directly against the flat phantom.

The surface of the generic device (or the surface of the carry accessory holding the DUT) pointing towards the flat phantom shall be parallel to the surface of the phantom.




**Picture 8-1 Test positions for Generic device**

## 8.2. DUT Setup Photos

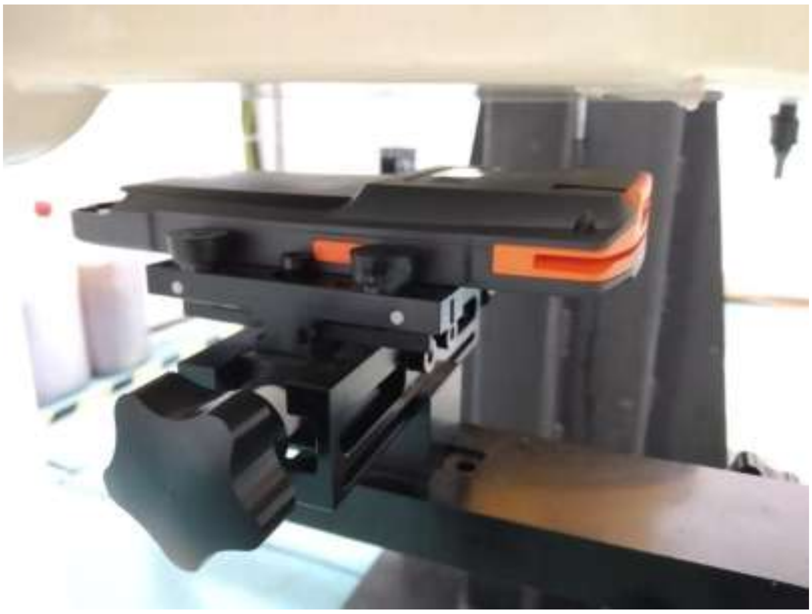



**Picture 8-2: Specific Absorption Rate Test Layout**

**Test positions for body:**

According to the antenna position, the Body SAR is tested at the following 5 test positions all with same distance between the EUT and the phantom bottom:

**Picture 8-3: Toward Phantom (17mm)**



**Picture 8-4: Toward Ground (34mm)**

Picture 8-5: Toward Left (5mm)


Picture 8-6: Toward Right (9mm)

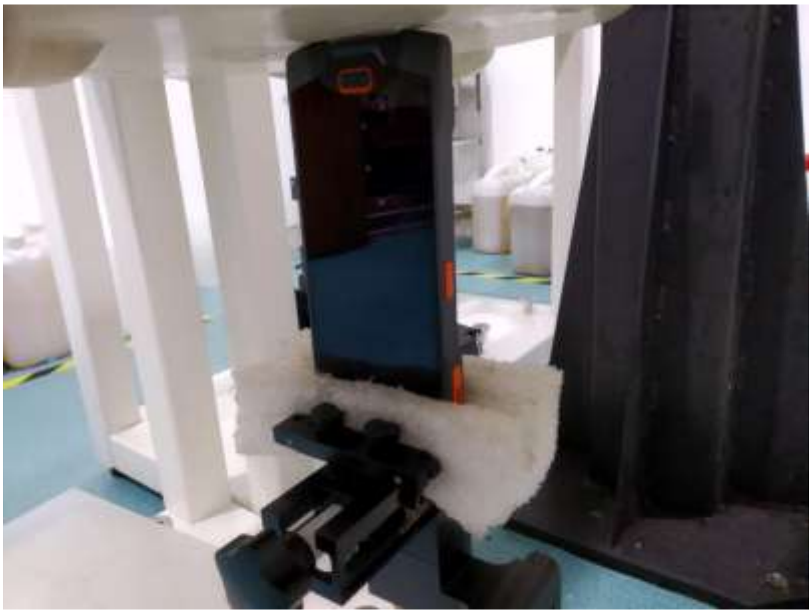
Picture 8-8: Toward Bottom (24mm)

Picture 8-9: Toward Phantom (0mm)

Picture 8-10: Toward Ground (0mm)

Picture 8-11: Toward Left (0mm)

**Picture 8-12: Toward Right (0mm)**



**Picture 8-13: Toward Bottom (0mm)**

# 9. Tissue Simulating Liquids

## 9.1. Equivalent Tissues

The liquid used for the frequency range of 800-3000 MHz consisted of water, sugar, salt and Cellulose. The liquid has been previously proven to be suited for worst-case. The Table 3 and 4 shows the detail solution. The following tissue formulations are provided for reference only as some of the parameters have not been thoroughly verified. The composition of ingredients may be modified accordingly to achieve the desired target tissue parameters required for routine SAR evaluation.

**Table 9.1. Composition of the Head Tissue Equivalent Matter**

| Frequency (MHz) | 1750 | 1900 | 2600 |
|---|---|---|---|
| Ingredients (% by weight) | | | |
| Water | 55.242 | 54.89 | 58.23 |
| Sugar | / | / | / |
| Salt | 0.306 | 0.18 | 0.07 |
| Preventol | / | / | / |
| Cellulose | / | / | / |
| ClycolMonobutyl | 44.452 | 44.93 | 41.7 |
| Dielectric Parameters Target Value | f=1750MHz<br>ε=40.8<br>σ=1.37 | f=1950 MHz<br>ε=40.0<br>σ=1.40 | f=2600 MHz<br>ε=39.0<br>σ=1.96 |

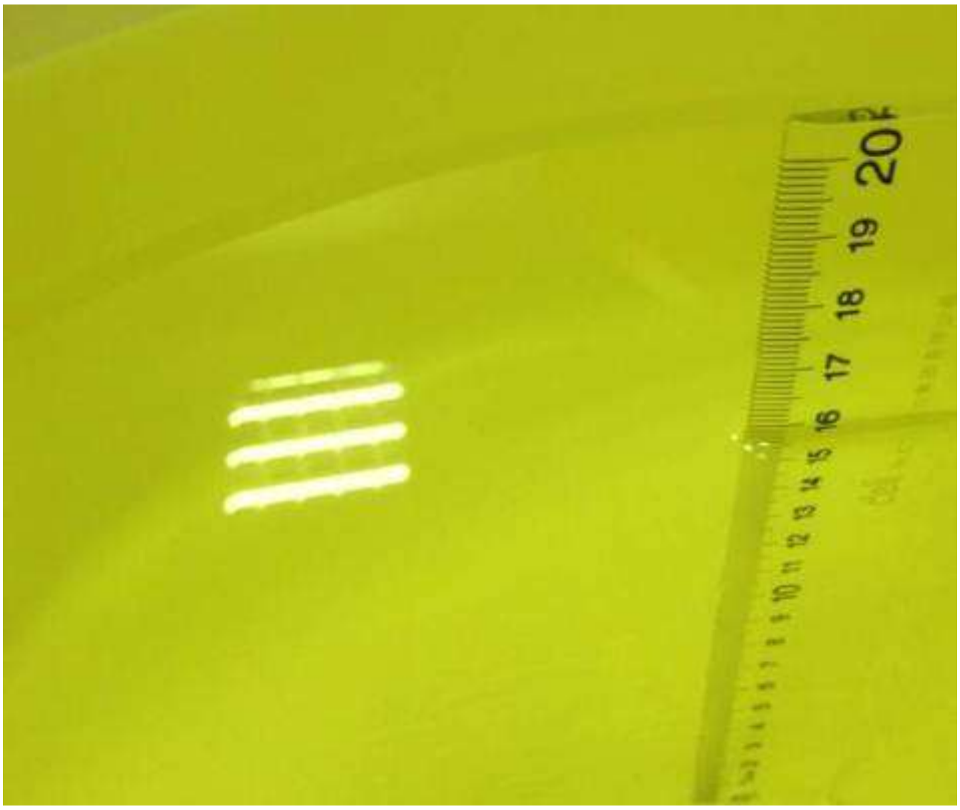
**Table 9.2. Targets for tissue simulating liquid**

| Frequency (MHz) | Liquid Type | Conductivity (σ) | ±5% Range | Permittivity (ε) | ±5% Range |
|---|---|---|---|---|---|
| 1750 | Head | 1.37 | 1.30～1.44 | 40.8 | 38.1～42.1 |
| 1900 | Head | 1.40 | 1.33～1.47 | 40.0 | 38.0～42.0 |
| 2600 | Head | 1.96 | 1.86～2.06 | 39.0 | 37.05～40.95 |

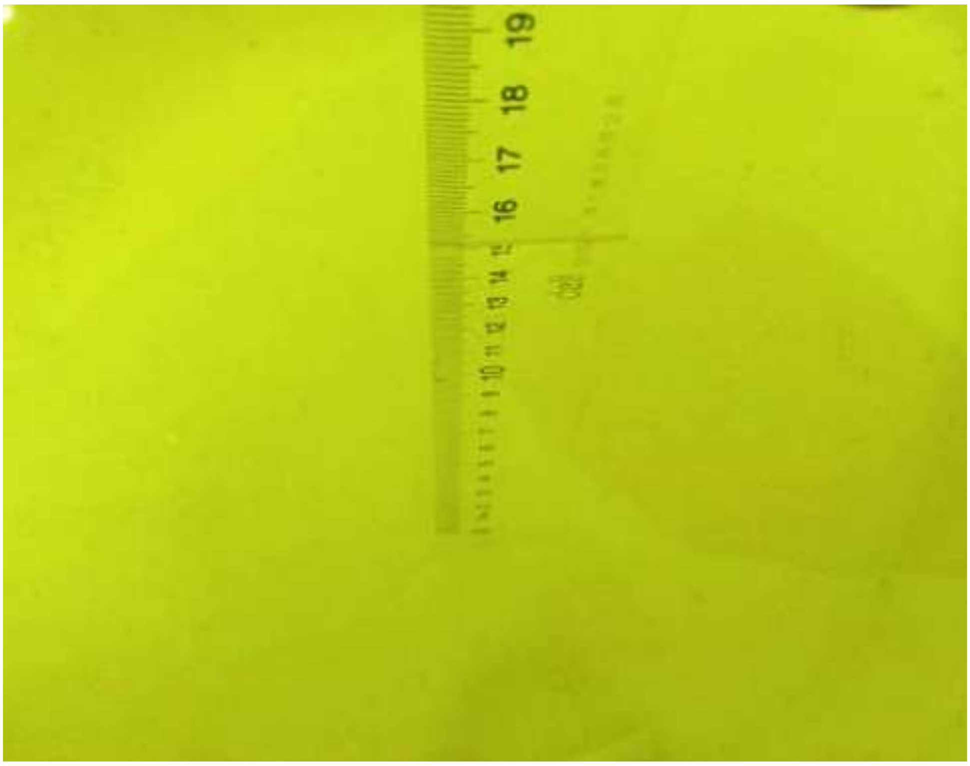
## 9.2. Dielectric Performance

**Table 9.3: Dielectric Performance of Head Tissue Simulating Liquid**

| Measurement Value | | | | | | |
|---|---|---|---|---|---|---|
| Liquid Temperature: 22.5°C | | | | | | |
| **Type** | **Frequency** | **Permittivity ε** | **Drift (%)** | **Conductivity σ** | **Drift (%)** | **Test Date** |
| Head | 1750 | 41.61 | 1.99% | 1.362 | -0.58% | 2019-10-15 |
| Head | 1900 | 38.57 | -3.58% | 1.445 | 3.21% | 2019-10-17 |
| Head | 2600 | 39.67 | 1.72% | 1.996 | 1.84% | 2019-10-21 |




**Picture9-1:Liquid depth in the Flat Phantom (1800/1900 MHz Head)**



**Picture 9-2: Liquid depth in the Flat Phantom (2600 MHz Head)**

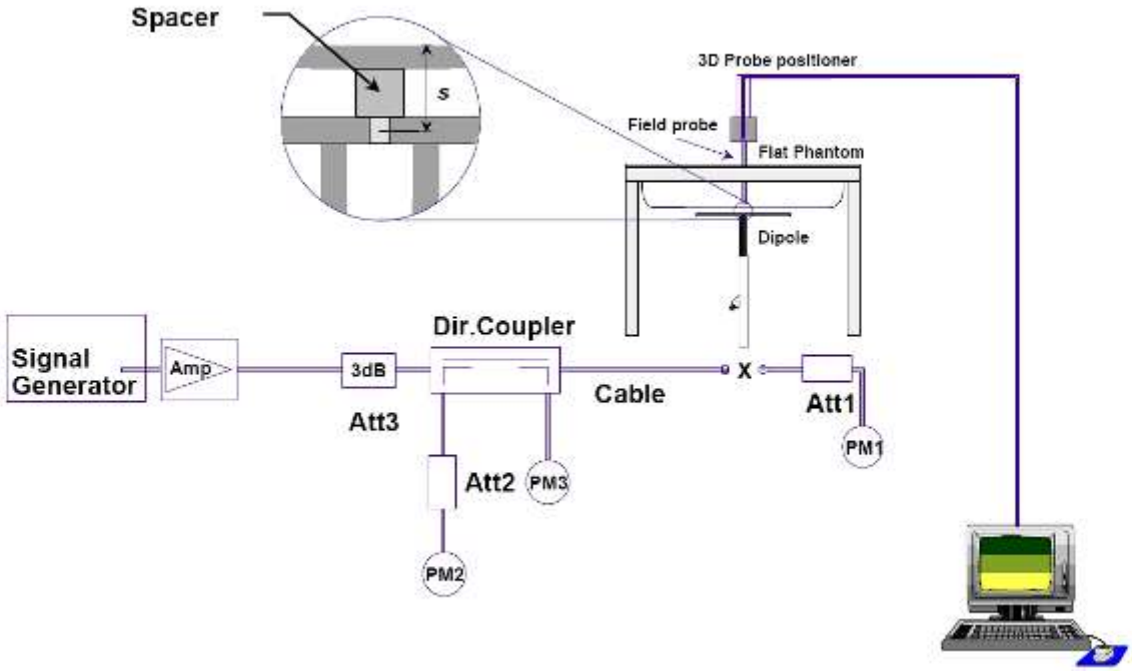
# 10. System Validation

## 10.1. System Validation

Each DASY system is equipped with one or more system validation kits. These units, together with the predefined measurement procedures within the DASY software, enable the user to conduct the system performace check and system validation. System validation kit includes a dipole, tripod holder to fix it underneath the flat phantom and a corresponding distance holder.

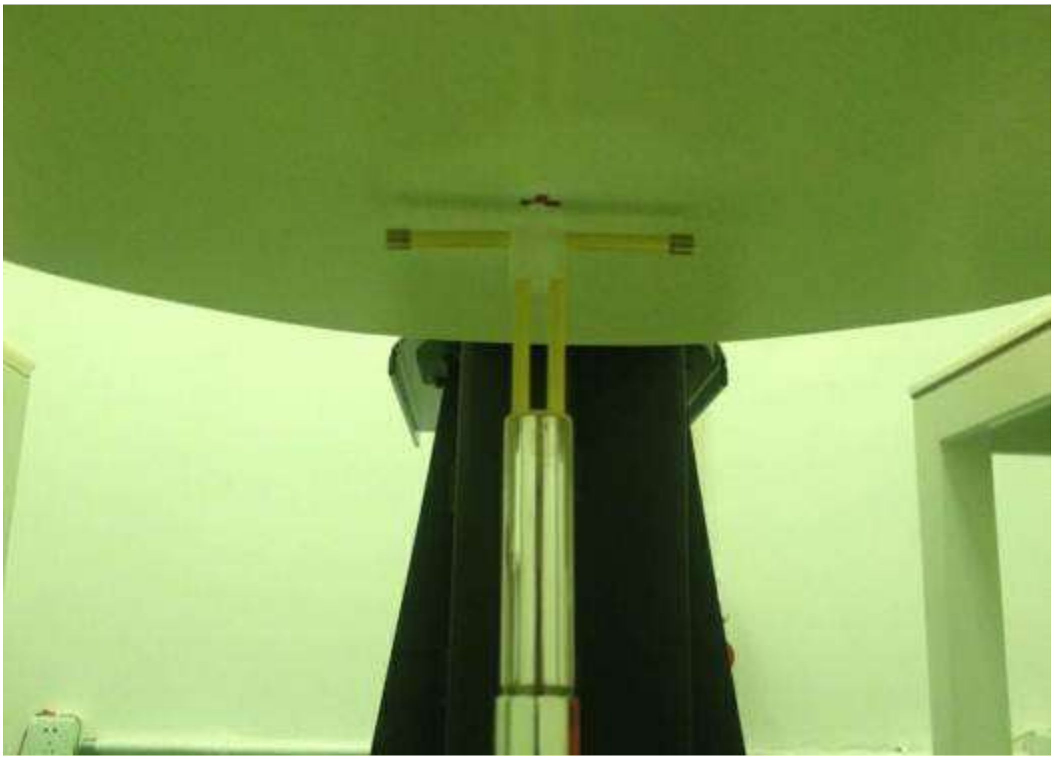
## 10.2. System Setup

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:




**Picture 10-1 System Setup for System Evaluation**

The output power on dipole port must be calibrated to 24 dBm (250mW) before dipole is connected.
The results are normalized to 1 W input power.



**Picture 10-2 Photo of Dipole Setup**

**Table 10.1: System Validation of Head**

| **Verification Results** | | | | | | | |
|---|---|---|---|---|---|---|---|
| Input power level: 1W | | | | | | | |
| **Frequency** | **Target value (W/kg)** | | **Measured value (W/kg)** | | **Deviation** | | **Test date** |
| | **1 g Average** | **10 g Average** | **1 g Average** | **10 g Average** | **1 g Average** | **10 g Average** | |
| 1750MHz | 37.6 | 20.1 | 36.88 | 19.6 | -1.91% | -2.49% | 2019-10-15 |
| 1900 MHz | 39.8 | 20.7 | 40.4 | 20.72 | 1.51% | 0.10% | 2019-10-17 |
| 2600 MHz | 52.5 | 24.8 | 56 | 24.56 | 6.67% | -0.97% | 2019-10-21 |

# 11. Measurement Procedures

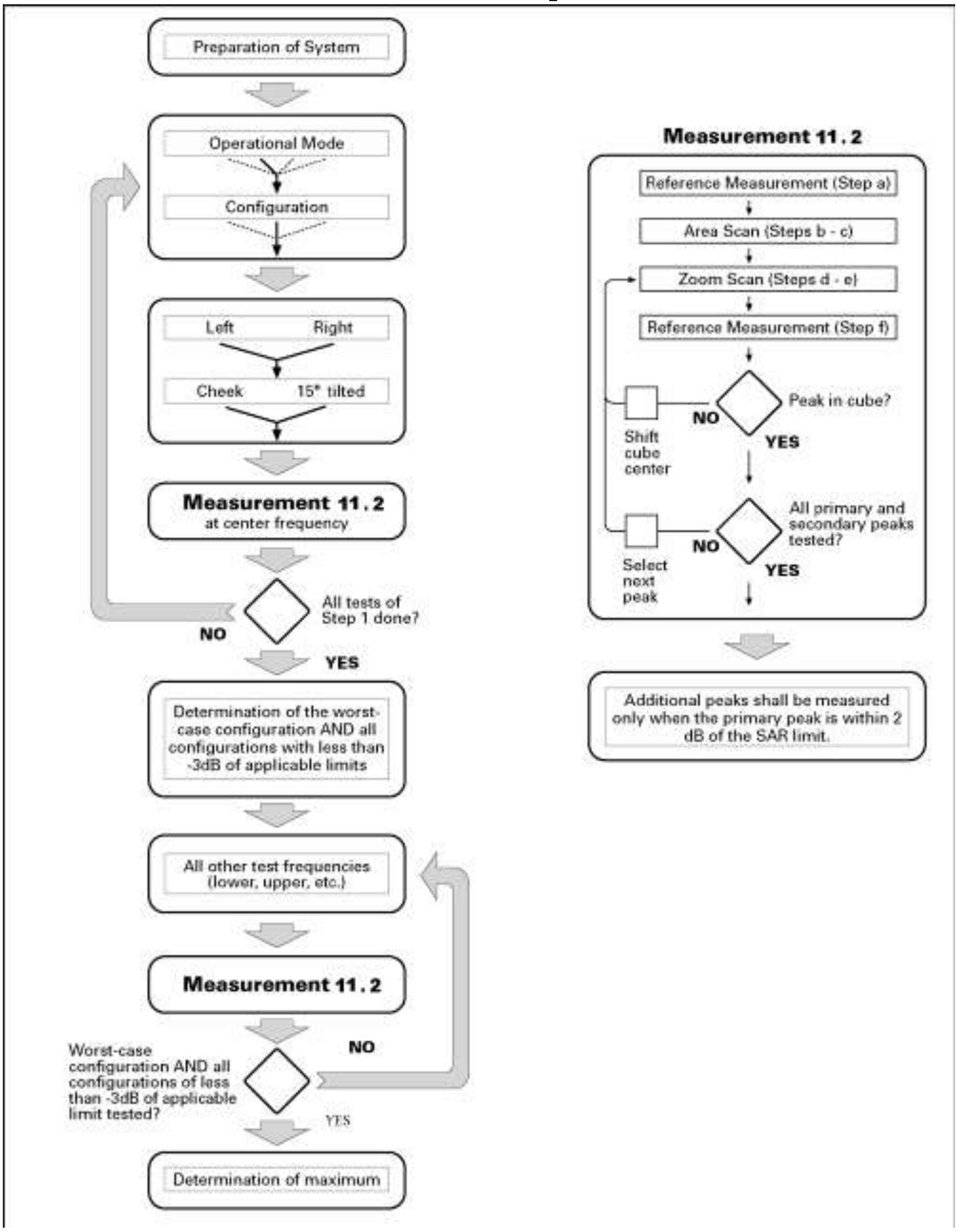
## 11.1. Tests to be performed

In order to determine the highest value of the peak spatial-average SAR of a handset, all device positions, configurations and operational modes shall be tested for each frequency band according to steps 1 to 3 below. A flowchart of the test process is shown in Picture 19

**Step 1**: The tests described in 11.2 shall be performed at the channel that is closest to the centre of the transmit frequency band ( $f_c$ ) for:

a) all device positions (cheek and tilt, for both left and right sides of the SAM phantom, as described in Chapter 8),
b) all configurations for each device position in a), e.g., antenna extended and retracted, and
c) all operational modes, e.g., analogue and digital, for each device position in a) and configuration in b) in each frequency band.

If more than three frequencies need to be tested according to 11.1 (i.e., $N_c$ > 3), then all frequencies, configurations and modes shall be tested for all of the above test conditions.
**Step 2**: For the condition providing highest peak spatial-average SAR determined in Step 1, perform all tests described in 11.2 at all other test frequencies, i.e., lowest and highest frequencies. In addition, for all other conditions (device position, configuration and operational mode) where the peak spatial-average SAR value determined in Step 1 is within 3 dB of the applicable SAR limit, it is recommended that all other test frequencies shall be tested as well.
**Step 3**: Examine all data to determine the highest value of the peak spatial-average SAR found in Steps 1 to 2.




**Picture 11-1Block diagram of the tests to be performed**

## 11.2. Measurement procedure

The following procedure shall be performed for each of the test conditions (see Picture 19) described in 11.1:

a) Measure the local SAR at a test point within 8 mm or less in the normal direction from the inner surface of the phantom.

b) Measure the two-dimensional SAR distribution within the phantom (area scan procedure). The boundary of the measurement area shall not be closer than 20 mm from the phantom side walls. The distance between the measurement points should enable the detection of the location of local maximum with an accuracy of better than half the linear dimension of the tissue cube after interpolation. A maximum grip spacing of 20

mm for frequencies below 3 GHz and (60/f [GHz]) mm for frequencies of 3GHz and greater is recommended. The maximum distance between the geometrical centre of the probe detectors and the inner surface of the phantom shall be 5 mm for frequencies below 3 GHz andδIn(2)/2 mm for frequencies of 3 GHz and greater, whereδis the plane wave skin depth and In(x) is the natural logarithm. The maximum variation of the sensor-phantom surface shall be ±1 mm for frequencies below 3 GHz and ±0.5 mm for frequencies of 3 GHz and greater. At all measurement points the angle of the probe with respect to the line normal to the surface should be less than 5 °. If this cannot be achieved for a measurement distance to the phantom inner surface shorter than the probe diameter, additional uncertainty evaluation is needed.
c) From the scanned SAR distribution, identify the position of the maximum SAR value, in addition identify the positions of any local maxima with SAR values within 2 dB of the maximum value that are not within the zoom-scan volume; additional peaks shall be measured only when the primary peak is within 2 dB of the SAR limit. This is consistent with the 2 dB threshold already stated;
d) Measure the three-dimensional SAR distribution at the local maxima locations identified in step c). The horizontal grid step shall be (24 / f[GHz] ) mm or less but not more than 8 mm. The minimum zoom size of 30 mm by 30 mm and 30 mm for frequencies below 3 GHz. For higher frequencies, the minimum zoom size of 22 mm by 22 mm and 22 mm. The grip step in the vertical direction shall be ( 8-f[GHz] ) mm or less but not more than 5 mm, if uniform spacing is used. If variable spacing is used in the vertical direction, the maximum spacing between the two closest measured points to the phantom shell shall be (12 / f[GHz]) mm or less but not more than 4 mm, and the spacing between father points shall increase by an incremental factor not exceeding 1.5. When variable spacing is used, extrapolation routines shall be tested with the same spacing as used in measurements. The maximum distance between the geometrical centre of the probe detectors and the inner surface of the phantom shall be 5 mm for frequencies below 3 GHz andδIn(2)/2 mm for frequencies of 3 GHz and greater, where δis the plane wave skin depth and In(x) is the natural logarithm. Separate grids shall be centered on each of the local SAR maxima found in step c). Uncertainties due to field distortion between the media boundary and the dielectric enclosure of the probe should also be minimized, which is achieved is the distance between the phantom surface and physical tip of the probe is larger than probe tip diameter. Other methods may utilize correction procedures for these boundary effects that enable high precision measurements closer than half the probe diameter. For all measurement points, the angle of the probe with respect to the flat phantom surface shall be less than 5 °. If this cannot be achieved an additional uncertainty evaluation is needed.
e) Use post processing( e.g. interpolation and extrapolation ) procedures to determine the local SAR values at the spatial resolution needed for mass averaging.

## 11.3. SAR Measurement for WCDMA

SAR tests for WCDMA are performed with a base station simulator, CMW 500. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. All powers were measured with the CMW 500.

## 11.4. SAR Measurement for LTE

SAR tests for LTE are performed with a base station simulator, CMW 500. Closed loop power control was used so the UE transmits with maximum output power during SAR testing. All powers were measured with the CMW 500.

## 11.5. Power Drift

To control the output power stability during the SAR test, DASY5 system calculates the power drift by measuring the E-field at the same location at the beginning and at the end of the measurement for each test position. These drift values can be found in Section 15 labeled as: (Power Drift [dB]). This ensures that the power drift during one measurement is within 5%.

# 12. Area Scan Based 1-g SAR

## 12.1. Requirement of KDB

According to the KDB447498D01v05,when the implementation is based the specific polynomial it algorithm as presented at the 29th Bioelectromagnetics Society meeting (2007)and the estimated 1-g SARis≤1.2W/kg, a zoom scan measurement is not required provided it is also not needed For any other purpose ;for example, if the peak SAR location required for simultaneous transmission SAR test exclusion can be determined accurately by the SAR system or manually to discriminate between is tinctive peak sand scattered noisy SAR distributions from area scans.

There must not be any warning or alert messages due to various measurement concerns identified by the SAR system; for example, noise in measurements ,peaks too close to scan boundary, peaks are too sharp, spatial resolution and uncertainty issues etc. The SAR system verification must also demonstrate that the area scan estimated 1-gSAR is within 3%of the zoom scan 1-g SAR (See Annex A).When all the SAR results for each exposure condition in a frequency band and wireless mode are based on estimated 1-g SAR, the 1-g SAR for the highest SAR configuration must be determined by a zoom scan.

## 12.2. Fast SAR Algorithms

The approach is based on the area scan measurement applying a frequency dependent attenuation parameter. This attenuation parameter was empiri call determined by analyzing a large number of phones. The MOTOROLAFASTSAR was developed and validated by the MOTOROLA Research Group in Ft .Lauderdale.

In the initial study, an approximation algorithm based on Linearf it was developed. The accuracy of the algorithm has been demonstrated across abroad frequency range(136-2450 MHz)andforboth1-gand 10-g averaged SAR using a sample of 264SARmeasurementsfrom55 wireless handsets. For the sample size studied, the root-mean-squared errors of the algorithmare1.2%and 5.8%for1-g and 10-g averaged SAR, respectively. The paper describing the algorith min detail is expected to be published inAugust2004 within the Special Issue of Transactions on MTT.

In the second step, the same research group optimized the fitting algorithm to an Polynomia lf it where by the frequency validity was extended to cover the range 30-6000MHz.Detailsof this study can be found in the BEMS2007 Proceedings.

Both algorithms are implemented in DASY software.

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# 13. Conducted Output Power

## 13.1. CDMA Measurement result

**Table 13.1: The conducted Power for CDMA 2000 Sensor close**

| | CDMA 2000 | | | | | |
|---|---|---|---|---|---|---|
| Band | Model | Radio Config | Data Rate | Turn up | Channel | CDMA 2000 result(dBm) |
| BC1 | 1xRTT | RC1 | SO55 | 23.0±1 | 25 | 23.48 |
| | | | | | 600 | **23.49** |
| | | | | | 1175 | 23.42 |

**Table 13.2: The conducted Power for CDMA 2000 Sensor Open**

| | CDMA 2000 | | | | | |
|---|---|---|---|---|---|---|
| Band | Model | Radio Config | Data Rate | Turn up | Channel | CDMA 2000 result(dBm) |
| BC1 | 1xRTT | RC1 | SO55 | 8.0±1 | 25 | 8.39 |
| | | | | | 600 | **8.53** |
| | | | | | 1175 | 8.42 |

## 13.2. WCDMA Measurement result

**Table 13.3: The conducted Power for WCDMA Sensor close**

| Item | band | Turn up | WCDMA BAND II result(dBm) | | |
|---|---|---|---|---|---|
| | ARFCN | | 9262 (1852.4MHz) | 9400 (1880MHz) | 9538 (1907.6MHz) |
| WCDMA | \ | 23.5±1 | 23.97 | 23.87 | 23.75 |
| HSDPA | 1 | 22.0±1 | 22.74 | 22.53 | 22.33 |
| | 2 | 22.0±1 | 22.54 | 22.49 | 22.5 |
| | 3 | 22.0±1 | 22.20 | 22.04 | 21.94 |
| | 4 | 22.0±1 | 22.32 | 22.14 | 22.01 |
| HSUPA | 1 | 22.0±1 | 22.10 | 22.14 | 22.1 |
| | 2 | 22.0±1 | 21.65 | 21.48 | 21.44 |
| | 3 | 22.0±1 | 21.64 | 21.62 | 21.37 |
| | 4 | 22.0±1 | 22.45 | 22.32 | 22.28 |
| | 5 | 22.0±1 | 22.25 | 22.22 | 22.17 |
| Item | band | Turn up | WCDMA BAND IV result(dBm) | | |
| | ARFCN | | 1312 (1712.4MHz) | 1413 (1732.6MHz) | 1513 (1752.6MHz) |
| WCDMA | \ | 23.0±1 | 23.57 | 23.72 | 23.55 |
| HSDPA | 1 | 22.0±1 | 22.32 | 22.48 | 22.23 |
| | 2 | 22.0±1 | 22.12 | 22.40 | 22.29 |
| | 3 | 22.0±1 | 21.85 | 21.99 | 21.84 |
| | 4 | 22.0±1 | 21.95 | 22.02 | 21.84 |
| HSUPA | 1 | 22.0±1 | 21.75 | 21.99 | 21.87 |
| | 2 | 22.0±1 | 21.22 | 21.40 | 21.18 |
| | 3 | 22.0±1 | 21.22 | 21.45 | 21.22 |
| | 4 | 22.0±1 | 22.15 | 22.22 | 22.1 |
| | 5 | 22.0±1 | 21.86 | 22.05 | 21.93 |

**Table 13.4: The conducted Power for WCDMA Sensor open**

| Item | band | Turn up | WCDMA BAND II result(dBm) | | |
|---|---|---|---|---|---|
| | ARFCN | | 9262 (1852.4MHz) | 9400 (1880MHz) | 9538 (1907.6MHz) |
| WCDMA | \ | 12.5±1 | 13.20 | 13.09 | 12.85 |
| HSDPA | 1 | 12.0±1 | 12.32 | 12.48 | 12.23 |
| | 2 | 12.0±1 | 12.12 | 12.40 | 12.29 |
| | 3 | 12.0±1 | 11.85 | 11.99 | 11.84 |
| | 4 | 12.0±1 | 11.95 | 12.02 | 11.84 |
| HSUPA | 1 | 12.0±1 | 11.75 | 11.99 | 11.87 |
| | 2 | 12.0±1 | 11.22 | 11.40 | 11.18 |
| | 3 | 12.0±1 | 11.22 | 11.45 | 11.22 |
| | 4 | 12.0±1 | 12.15 | 12.22 | 12.10 |
| | 5 | 12.0±1 | 11.86 | 12.05 | 11.93 |
| Item | band | Turn up | WCDMA BAND IV result(dBm) | | |
| | ARFCN | | 1312 (1712.4MHz) | 1413 (1732.6MHz) | 1513 (1752.6MHz) |
| WCDMA | \ | 12.5±1 | 12.69 | 13.16 | 13.11 |
| HSDPA | 1 | 12.0±1 | 12.74 | 12.53 | 12.33 |
| | 2 | 12.0±1 | 12.54 | 12.49 | 12.5 |
| | 3 | 12.0±1 | 12.20 | 12.04 | 11.94 |
| | 4 | 12.0±1 | 12.32 | 12.14 | 12.01 |
| HSUPA | 1 | 12.0±1 | 12.10 | 12.14 | 12.1 |
| | 2 | 12.0±1 | 11.65 | 11.48 | 11.44 |
| | 3 | 12.0±1 | 11.64 | 11.62 | 11.37 |
| | 4 | 12.0±1 | 12.45 | 12.32 | 12.28 |
| | 5 | 12.0±1 | 12.25 | 12.22 | 12.17 |

### 13.3. LTE Measurement result

**Table 13.5: The conducted Power for LTE Sensor close**

| Band 7 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 20775 2502.5MHz | Channel 21100 2535MHz | Channel 21425 2567.5MHz |
| 5MHz | QPSK | 1 | 0 | 22.5±1 | 22.79 | 22.63 | 22.68 |
| | | 1 | 13 | 22.5±1 | 22.81 | 22.89 | 22.66 |
| | | 1 | 24 | 22.5±1 | 22.67 | 22.61 | 22.58 |
| | | 12 | 0 | 22.0±1 | 21.92 | 21.77 | 21.78 |
| | | 12 | 6 | 22.0±1 | 21.79 | 21.75 | 21.77 |
| | | 12 | 13 | 22.0±1 | 21.86 | 21.79 | 21.74 |
| | | 25 | 0 | 22.0±1 | 21.88 | 21.80 | 21.72 |
| | 16QAM | 1 | 0 | 22.0±1 | 21.52 | 21.34 | 21.16 |
| | | 1 | 13 | 22.0±1 | 21.49 | 21.43 | 21.61 |
| | | 1 | 24 | 22.0±1 | 21.34 | 21.27 | 21.42 |
| | | 12 | 0 | 20.0±1 | 20.68 | 20.68 | 20.68 |
| | | 12 | 6 | 20.0±1 | 20.81 | 20.82 | 20.88 |
| | | 12 | 13 | 20.0±1 | 20.80 | 20.60 | 20.76 |
| | | 25 | 0 | 20.0±1 | 20.75 | 20.80 | 20.82 |
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 20800 2505MHz | Channel 21100 2535MHz | Channel 21400 2565MHz |
| 10MHz | QPSK | 1 | 0 | 22.5±1 | 22.94 | 22.88 | 22.75 |
| | | 1 | 25 | 22.5±1 | 22.79 | 22.87 | 22.98 |
| | | 1 | 49 | 22.5±1 | 22.89 | 22.89 | 22.99 |
| | | 25 | 0 | 22.0±1 | 21.93 | 21.93 | 21.83 |
| | | 25 | 13 | 22.0±1 | 21.92 | 21.96 | 21.98 |
| | | 25 | 25 | 22.0±1 | 21.94 | 21.94 | 21.94 |
| | | 50 | 0 | 22.0±1 | 21.84 | 21.95 | 21.82 |
| | 16QAM | 1 | 0 | 22.0±1 | 21.70 | 21.51 | 21.54 |
| | | 1 | 25 | 22.0±1 | 21.64 | 21.64 | 21.74 |
| | | 1 | 49 | 22.0±1 | 21.65 | 21.64 | 21.75 |
| | | 25 | 0 | 20.0±1 | 20.85 | 20.82 | 20.75 |
| | | 25 | 13 | 20.0±1 | 20.84 | 20.84 | 21.01 |
| | | 25 | 25 | 20.0±1 | 20.70 | 20.83 | 20.96 |
| | | 50 | 0 | 20.0±1 | 20.87 | 20.82 | 20.87 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 20825 2507.5MHz | Channel 21100 2535MHz | Channel 21375 2562.5MHz |
| 15MHz | QPSK | 1 | 0 | 22.5±1 | 22.76 | 22.89 | 22.63 |
| | | 1 | 38 | 22.5±1 | 22.67 | 22.93 | 22.52 |
| | | 1 | 74 | 22.5±1 | 22.74 | 22.94 | 22.70 |
| | | 36 | 0 | 22.0±1 | 21.92 | 21.83 | 21.94 |
| | | 36 | 18 | 22.0±1 | 21.86 | 21.98 | 21.89 |
| | | 36 | 39 | 22.0±1 | 21.92 | 21.99 | 22.00 |
| | | 75 | 0 | 22.0±1 | 21.82 | 21.87 | 21.86 |
| | 16QAM | 1 | 0 | 22.0±1 | 21.68 | 21.36 | 21.60 |
| | | 1 | 38 | 22.0±1 | 21.60 | 21.05 | 21.52 |
| | | 1 | 74 | 22.0±1 | 21.68 | 21.03 | 21.58 |
| | | 36 | 0 | 20.0±1 | 20.67 | 20.72 | 20.73 |
| | | 36 | 18 | 20.0±1 | 20.80 | 20.75 | 20.78 |
| | | 36 | 39 | 20.0±1 | 20.92 | 20.78 | 20.90 |
| | | 75 | 0 | 20.0±1 | 20.85 | 20.86 | 20.79 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 20850 2510MHz | Channel 21100 2535MHz | Channel 21350 2560MHz |
| 20MHz | QPSK | 1 | 0 | 22.5±1 | 23.02 | 22.80 | 22.94 |
| | | 1 | 50 | 22.5±1 | 23.05 | **23.07** | 22.92 |
| | | 1 | 99 | 22.5±1 | 22.91 | 22.90 | 22.94 |
| | | 50 | 0 | 21.5±1 | 21.94 | 21.88 | 21.97 |
| | | 50 | 25 | 21.5±1 | **22.04** | 21.95 | 21.93 |
| | | 50 | 50 | 21.5±1 | 21.99 | 22.01 | 21.98 |
| | | 100 | 0 | 21.5±1 | 21.94 | 21.91 | **21.98** |
| | 16QAM | 1 | 0 | 22.0±1 | 21.73 | 21.41 | 21.56 |
| | | 1 | 50 | 22.0±1 | 21.84 | 21.54 | 21.72 |
| | | 1 | 99 | 22.0±1 | 21.55 | 21.69 | 21.65 |
| | | 50 | 0 | 20.0±1 | 20.87 | 20.88 | 20.79 |
| | | 50 | 25 | 20.0±1 | 20.82 | 20.97 | 20.73 |
| | | 50 | 50 | 20.0±1 | 20.79 | 21.04 | 20.70 |
| | | 100 | 0 | 20.0±1 | 20.94 | 20.90 | 20.80 |

| Band 25 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 26047 1850.7MHz | Channel 26365 1882.5MHz | Channel 26683 1914.3MHz |
| 1.4MHz | QPSK | 1 | 0 | 22.0±1 | 21.83 | 22.19 | 22.17 |
| | | 1 | 2 | 22.0±1 | 21.93 | 22.35 | 21.99 |
| | | 1 | 5 | 22.0±1 | 21.91 | 22.23 | 21.92 |
| | | 3 | 0 | 22.0±1 | 22.09 | 22.32 | 22.40 |
| | | 3 | 1 | 22.0±1 | 22.07 | 22.24 | 22.40 |
| | | 3 | 2 | 22.0±1 | 22.00 | 22.40 | 22.18 |
| | | 6 | 0 | 21.0±1 | 20.97 | 21.22 | 21.21 |
| | 16QAM | 1 | 0 | 21.0±1 | 20.23 | 20.95 | 20.69 |
| | | 1 | 2 | 21.0±1 | 20.54 | 21.08 | 20.74 |
| | | 1 | 5 | 21.0±1 | 21.04 | 20.78 | 20.63 |
| | | 3 | 0 | 21.0±1 | 20.76 | 21.03 | 21.46 |
| | | 3 | 1 | 21.0±1 | 20.80 | 21.03 | 21.32 |
| | | 3 | 2 | 21.0±1 | 20.77 | 21.10 | 20.99 |
| | | 6 | 0 | 20.0±1 | 19.32 | 20.00 | 20.06 |
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 26055 1851.5MHz | Channel 26365 1882.5MHz | Channel 26675 1913.5MHz |
| 3MHz | QPSK | 1 | 0 | 22.0±1 | 21.86 | 22.19 | 22.25 |
| | | 1 | 8 | 22.0±1 | 21.88 | 22.31 | 22.52 |
| | | 1 | 14 | 22.0±1 | 22.05 | 22.16 | 22.42 |
| | | 8 | 0 | 22.0±1 | 21.08 | 21.26 | 21.44 |
| | | 8 | 4 | 22.0±1 | 21.03 | 21.25 | 21.43 |
| | | 8 | 7 | 22.0±1 | 21.15 | 21.36 | 21.31 |
| | | 15 | 0 | 21.0±1 | 20.96 | 21.22 | 21.37 |
| | 16QAM | 1 | 0 | 21.0±1 | 20.44 | 20.83 | 20.70 |
| | | 1 | 8 | 21.0±1 | 20.73 | 20.89 | 21.06 |
| | | 1 | 15 | 21.0±1 | 21.12 | 20.69 | 20.78 |
| | | 8 | 0 | 20.0±1 | 19.99 | 20.41 | 20.35 |
| | | 8 | 4 | 20.0±1 | 19.95 | 20.29 | 20.48 |
| | | 8 | 7 | 20.0±1 | 20.06 | 20.31 | 20.44 |
| | | 15 | 0 | 20.0±1 | 19.85 | 20.32 | 20.42 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 26065 1852.5MHz | Channel 26365 1882.5MHz | Channel 26665 1912.5MHz |
| 5MHz | QPSK | 1 | 0 | 22.0±1 | 21.78 | 21.98 | 22.18 |
| | | 1 | 13 | 22.0±1 | 21.82 | 22.16 | 22.44 |
| | | 1 | 24 | 22.0±1 | 21.84 | 22.04 | 22.32 |
| | | 12 | 0 | 21.0±1 | 21.02 | 21.30 | 21.35 |
| | | 12 | 6 | 21.0±1 | 21.07 | 21.25 | 21.30 |
| | | 12 | 13 | 21.0±1 | 20.99 | 21.30 | 21.21 |
| | | 25 | 0 | 20.0±1 | 20.99 | 21.24 | 21.22 |
| | 16QAM | 1 | 0 | 20.0±1 | 20.54 | 20.87 | 21.34 |
| | | 1 | 13 | 20.0±1 | 20.59 | 20.84 | 21.12 |
| | | 1 | 24 | 20.0±1 | 20.64 | 20.85 | 20.68 |
| | | 12 | 0 | 20.0±1 | 19.76 | 20.01 | 20.17 |
| | | 12 | 6 | 20.0±1 | 19.74 | 20.06 | 20.16 |
| | | 12 | 13 | 20.0±1 | 19.61 | 20.03 | 20.06 |
| | | 25 | 0 | 20.0±1 | 20.01 | 20.25 | 20.21 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 26090 1855MHz | Channel 26365 1882.5MHz | Channel 26640 1910MHz |
| 10MHz | QPSK | 1 | 0 | 22.0±1 | 22.08 | 22.31 | 22.25 |
| | | 1 | 25 | 22.0±1 | 22.07 | 22.22 | 22.40 |
| | | 1 | 49 | 22.0±1 | 22.07 | 22.34 | 22.38 |
| | | 25 | 0 | 21.0±1 | 21.12 | 21.24 | 21.35 |
| | | 25 | 13 | 21.0±1 | 21.13 | 21.27 | 21.39 |
| | | 25 | 25 | 21.0±1 | 21.11 | 21.24 | 21.24 |
| | | 50 | 0 | 21.0±1 | 21.05 | 21.17 | 21.25 |
| | 16QAM | 1 | 0 | 20.0±1 | 20.76 | 20.93 | 20.74 |
| | | 1 | 25 | 20.0±1 | 20.90 | 20.97 | 20.74 |
| | | 1 | 49 | 20.0±1 | 20.83 | 21.05 | 21.00 |
| | | 25 | 0 | 20.0±1 | 19.95 | 20.23 | 20.36 |
| | | 25 | 13 | 20.0±1 | 20.09 | 20.23 | 20.33 |
| | | 25 | 25 | 20.0±1 | 20.05 | 20.25 | 20.27 |
| | | 50 | 0 | 20.0±1 | 19.89 | 20.06 | 20.19 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 26115 1857.5MHz | Channel 26365 1882.5MHz | Channel 26615 1907.5MHz |
| 15MHz | QPSK | 1 | 0 | 22.0±1 | 22.14 | 22.22 | 22.49 |
| | | 1 | 38 | 22.0±1 | 22.05 | 22.34 | 22.46 |
| | | 1 | 74 | 22.0±1 | 21.82 | 22.24 | 22.15 |
| | | 36 | 0 | 21.0±1 | 21.17 | 21.25 | 21.43 |
| | | 36 | 18 | 21.0±1 | 21.18 | 21.24 | 21.40 |
| | | 36 | 39 | 21.0±1 | 21.15 | 21.29 | 21.29 |
| | | 75 | 0 | 21.0±1 | 21.16 | 21.23 | 21.17 |
| | 16QAM | 1 | 0 | 21.0±1 | 20.76 | 20.84 | 21.01 |
| | | 1 | 38 | 21.0±1 | 21.29 | 20.94 | 20.53 |
| | | 1 | 74 | 21.0±1 | 21.24 | 20.87 | 20.46 |
| | | 36 | 0 | 20.0±1 | 20.02 | 20.16 | 20.44 |
| | | 36 | 18 | 20.0±1 | 20.01 | 20.16 | 20.32 |
| | | 36 | 39 | 20.0±1 | 19.98 | 20.22 | 20.26 |
| | | 75 | 0 | 20.0±1 | 20.09 | 20.14 | 20.19 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 26140 1860MHz | Channel 26365 1882.5MHz | Channel 26590 1905MHz |
| 20MHz | QPSK | 1 | 0 | 22.0±1 | 21.86 | 22.20 | 22.19 |
| | | 1 | 50 | 22.0±1 | 22.32 | 22.35 | **22.43** |
| | | 1 | 99 | 22.0±1 | 22.24 | 22.33 | 22.31 |
| | | 50 | 0 | 22.0±1 | 21.22 | 21.24 | 21.37 |
| | | 50 | 25 | 22.0±1 | 21.14 | **21.39** | 21.37 |
| | | 50 | 50 | 22.0±1 | 21.10 | 21.29 | 21.27 |
| | | 100 | 0 | 22.0±1 | 21.17 | 21.23 | **21.30** |
| | 16QAM | 1 | 0 | 21.0±1 | 20.66 | 20.97 | 21.06 |
| | | 1 | 50 | 21.0±1 | 20.77 | 20.89 | 21.01 |
| | | 1 | 99 | 21.0±1 | 21.39 | 20.73 | 20.96 |
| | | 50 | 0 | 20.0±1 | 20.05 | 20.18 | 20.41 |
| | | 50 | 25 | 20.0±1 | 20.07 | 20.19 | 20.41 |
| | | 50 | 50 | 20.0±1 | 20.05 | 20.14 | 20.22 |
| | | 100 | 0 | 20.0±1 | 20.10 | 20.15 | 20.22 |

| Band 41 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Band width | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | | | |
| | | | | | Channel 39675 2498.5MHz | Channel 40148 2545.8MHz | Channel 40620 2593MHz | Channel 41093 2640.3MHz | Channel 41565 2687.5MHz |
| 5MHz | QPSK | 1 | 0 | 22.5±1 | 22.45 | 22.48 | 22.73 | 22.76 | 22.18 |
| | | 1 | 13 | 22.5±1 | 22.55 | 22.36 | 22.80 | 22.53 | 22.42 |
| | | 1 | 24 | 22.5±1 | 22.47 | 22.53 | 22.76 | 22.72 | 22.34 |
| | | 12 | 0 | 21.0±1 | 21.56 | 21.47 | 21.85 | 21.70 | 21.31 |
| | | 12 | 6 | 21.0±1 | 21.70 | 21.38 | 21.85 | 21.87 | 21.47 |
| | | 12 | 13 | 21.0±1 | 21.61 | 21.73 | 21.83 | 21.96 | 21.17 |
| | | 25 | 0 | 21.0±1 | 21.55 | 21.70 | 21.87 | 21.78 | 21.47 |
| | 16QAM | 1 | 0 | 21.0±1 | 21.26 | 21.25 | 21.39 | 21.55 | 21.02 |
| | | 1 | 13 | 21.0±1 | 21.35 | 21.35 | 21.56 | 21.45 | 20.98 |
| | | 1 | 24 | 21.0±1 | 21.19 | 21.03 | 21.49 | 21.51 | 20.80 |
| | | 12 | 0 | 20.0±1 | 20.72 | 20.89 | 20.63 | 20.76 | 20.36 |
| | | 12 | 6 | 20.0±1 | 20.59 | 20.94 | 20.88 | 20.60 | 20.24 |
| | | 12 | 13 | 20.0±1 | 20.68 | 20.95 | 21.06 | 20.81 | 20.39 |
| | | 25 | 0 | 20.0±1 | 20.83 | 20.74 | 20.65 | 20.88 | 20.37 |
| Band width | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | | | |
| | | | | | Channel 39700 2501MHz | Channel 40160 2547MHz | Channel 40620 2593MHz | Channel 41080 2639MHz | Channel 41540 2685MHz |
| 10MHz | QPSK | 1 | 0 | 22.5±1 | 22.55 | 22.49 | 22.84 | 22.91 | 22.48 |
| | | 1 | 13 | 22.5±1 | 22.65 | 22.34 | 22.89 | 22.88 | 22.36 |
| | | 1 | 24 | 22.5±1 | 22.56 | 22.48 | **23.02** | 22.93 | 22.53 |
| | | 12 | 0 | 21.0±1 | 21.64 | 21.47 | 21.60 | 21.55 | 21.47 |
| | | 12 | 6 | 21.0±1 | 21.56 | 21.53 | 21.75 | 21.69 | 21.38 |
| | | 12 | 13 | 21.0±1 | 21.73 | 21.49 | 21.80 | 21.87 | 21.41 |
| | | 25 | 0 | 21.0±1 | 21.70 | 21.47 | 21.85 | 21.39 | 21.43 |
| | 16QAM | 1 | 0 | 21.0±1 | 21.25 | 20.87 | 21.48 | 21.56 | 21.21 |
| | | 1 | 13 | 21.0±1 | 21.35 | 21.30 | 21.64 | 21.49 | 21.06 |
| | | 1 | 24 | 21.0±1 | 21.19 | 21.06 | 21.46 | 20.63 | 21.44 |
| | | 12 | 0 | 20.0±1 | 20.49 | 20.55 | 20.89 | 20.88 | 20.61 |
| | | 12 | 6 | 20.0±1 | 20.45 | 20.51 | 20.94 | 21.06 | 20.26 |
| | | 12 | 13 | 20.0±1 | 20.78 | 20.51 | 20.95 | 20.65 | 20.64 |
| | | 25 | 0 | 20.0±1 | 20.45 | 20.44 | 20.74 | 20.22 | 20.26 |

| Band width | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Channel 39725 2503.5MHz | Channel 40173 2548.3MHz | Channel 40620 2593MHz | Channel 41068 2637.8MHz | Channel 41515 2682.5 MHz |
| 15MHz | QPSK | 1 | 0 | 22.5±1 | 22.31 | 22.14 | 22.76 | 22.47 | 22.43 |
| | | 1 | 13 | 22.5±1 | 22.45 | 22.57 | 22.53 | 22.18 | 22.13 |
| | | 1 | 24 | 22.5±1 | 22.40 | 22.76 | 22.72 | 22.22 | 22.36 |
| | | 12 | 0 | 21.0±1 | 21.48 | 21.85 | 21.70 | 21.55 | 21.46 |
| | | 12 | 6 | 21.0±1 | 21.44 | 21.85 | 21.87 | 21.33 | 21.36 |
| | | 12 | 13 | 21.0±1 | 21.46 | 21.83 | 21.96 | 21.39 | 21.42 |
| | | 25 | 0 | 21.0±1 | 21.55 | 21.87 | 21.78 | 21.30 | 21.36 |
| | 16QAM | 1 | 0 | 21.0±1 | 21.33 | 21.39 | 21.55 | 20.95 | 21.08 |
| | | 1 | 13 | 21.0±1 | 21.06 | 21.56 | 21.45 | 21.25 | 20.97 |
| | | 1 | 24 | 21.0±1 | 21.09 | 21.49 | 21.51 | 21.08 | 21.17 |
| | | 12 | 0 | 20.0±1 | 20.41 | 20.63 | 20.76 | 20.29 | 20.37 |
| | | 12 | 6 | 20.0±1 | 20.36 | 20.88 | 20.60 | 20.15 | 20.26 |
| | | 12 | 13 | 20.0±1 | 20.46 | 21.06 | 20.81 | 20.30 | 20.24 |
| | | 25 | 0 | 20.0±1 | 20.52 | 20.65 | 20.88 | 20.30 | 20.41 |
| Band width | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | | | |
| | | | | | Channel 39750 2506MHz | Channel 40185 2549.5MHz | Channel 40620 2593MHz | Channel 41055 2636.5MHz | Channel 41490 2680MHz |
| 20MHz | QPSK | 1 | 0 | 22.5±1 | 22.49 | 22.14 | 22.59 | 22.76 | 22.47 |
| | | 1 | 13 | 22.5±1 | 22.34 | 22.57 | **22.81** | 22.53 | 22.18 |
| | | 1 | 24 | 22.5±1 | 22.48 | 22.76 | 22.69 | 22.72 | 22.22 |
| | | 12 | 0 | 21.5±1 | 21.47 | 21.85 | 21.62 | 21.70 | 21.55 |
| | | 12 | 6 | 21.5±1 | 21.53 | 21.85 | 21.79 | 21.87 | 21.33 |
| | | 12 | 13 | 21.5±1 | 21.49 | 21.36 | **21.96** | 21.96 | 21.39 |
| | | 25 | 0 | 21.5±1 | 21.47 | 21.08 | **21.67** | 21.78 | 21.30 |
| | 16QAM | 1 | 0 | 21.0±1 | 20.87 | 20.97 | 21.42 | 21.55 | 20.95 |
| | | 1 | 13 | 21.0±1 | 21.30 | 21.17 | 21.61 | 21.45 | 21.25 |
| | | 1 | 24 | 21.0±1 | 21.06 | 20.37 | 21.49 | 21.51 | 21.08 |
| | | 12 | 0 | 20.0±1 | 20.55 | 20.26 | 20.72 | 20.76 | 20.29 |
| | | 12 | 6 | 20.0±1 | 20.51 | 20.24 | 20.67 | 20.60 | 20.15 |
| | | 12 | 13 | 20.0±1 | 20.51 | 20.41 | 20.69 | 20.81 | 20.30 |
| | | 25 | 0 | 20.0±1 | 20.44 | 20.32 | 20.76 | 20.88 | 20.30 |

| Band 66 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 131979 1850.7MHz | Channel 132322 1882.5MHz | Channel 132665 1914.3MHz |
| 1.4MHz | QPSK | 1 | 0 | 22.0±1 | 22.71 | 22.63 | 21.39 |
| | | 1 | 2 | 22.0±1 | 22.78 | 22.55 | 21.94 |
| | | 1 | 5 | 22.0±1 | 22.68 | 22.50 | 21.70 |
| | | 3 | 0 | 22.0±1 | 22.58 | 22.61 | 21.88 |
| | | 3 | 1 | 22.0±1 | 22.72 | 22.83 | 22.06 |
| | | 3 | 2 | 22.0±1 | 22.78 | 22.64 | 21.90 |
| | | 6 | 0 | 21.0±1 | 21.83 | 21.53 | 20.60 |
| | 16QAM | 1 | 0 | 21.0±1 | 21.38 | 20.80 | 20.73 |
| | | 1 | 2 | 21.0±1 | 21.29 | 21.04 | 20.53 |
| | | 1 | 5 | 21.0±1 | 21.06 | 20.58 | 20.01 |
| | | 3 | 0 | 21.0±1 | 21.81 | 21.65 | 20.57 |
| | | 3 | 1 | 21.0±1 | 21.87 | 21.70 | 20.47 |
| | | 3 | 2 | 21.0±1 | 21.84 | 21.73 | 21.03 |
| | | 6 | 0 | 21.0±1 | 20.52 | 20.61 | 19.91 |
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 131987 1851.5MHz | Channel 132322 1882.5MHz | Channel 132657 1913.5MHz |
| 3MHz | QPSK | 1 | 0 | 22.0±1 | 22.96 | 22.62 | 21.88 |
| | | 1 | 8 | 22.0±1 | 22.60 | 22.54 | 21.86 |
| | | 1 | 14 | 22.0±1 | 22.44 | 22.78 | 21.67 |
| | | 8 | 0 | 21.0±1 | 21.82 | 21.89 | 20.71 |
| | | 8 | 4 | 21.0±1 | 21.89 | 21.68 | 20.82 |
| | | 8 | 7 | 21.0±1 | 21.85 | 21.65 | 20.77 |
| | | 15 | 0 | 21.0±1 | 21.84 | 21.69 | 20.76 |
| | 16QAM | 1 | 0 | 21.0±1 | 21.56 | 21.45 | 20.26 |
| | | 1 | 8 | 21.0±1 | 21.77 | 21.66 | 20.73 |
| | | 1 | 15 | 21.0±1 | 21.95 | 21.32 | 19.67 |
| | | 8 | 0 | 20.5±1 | 21.00 | 20.60 | 19.99 |
| | | 8 | 4 | 20.0±1 | 20.68 | 20.55 | 19.58 |
| | | 8 | 7 | 20.0±1 | 20.84 | 20.53 | 19.52 |
| | | 15 | 0 | 20.0±1 | 20.86 | 20.77 | 19.77 |

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| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 131997 1852.5MHz | Channel 132322 1882.5MHz | Channel 132647 1912.5MHz |
| 5MHz | QPSK | 1 | 0 | 22.0±1 | 22.63 | 22.57 | 21.42 |
| | | 1 | 13 | 22.0±1 | 22.78 | 22.65 | 21.94 |
| | | 1 | 24 | 22.0±1 | 22.67 | 22.50 | 21.70 |
| | | 12 | 0 | 22.0±1 | 22.58 | 22.61 | 21.88 |
| | | 12 | 6 | 22.0±1 | 22.72 | 22.82 | 22.07 |
| | | 12 | 13 | 22.0±1 | 22.74 | 22.63 | 21.90 |
| | | 25 | 0 | 21.0±1 | 21.80 | 21.51 | 20.64 |
| | 16QAM | 1 | 0 | 21.0±1 | 21.67 | 21.53 | 20.44 |
| | | 1 | 13 | 21.0±1 | 21.76 | 21.71 | 20.82 |
| | | 1 | 24 | 21.0±1 | 21.66 | 21.43 | 20.52 |
| | | 12 | 0 | 21.0±1 | 21.64 | 21.54 | 20.64 |
| | | 12 | 6 | 21.0±1 | 21.65 | 21.89 | 21.12 |
| | | 12 | 13 | 21.0±1 | 21.66 | 21.65 | 20.82 |
| | | 25 | 0 | 20.0±1 | 20.70 | 20.46 | 19.61 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 132022 1855MHz | Channel 132322 1882.5MHz | Channel 132622 1910MHz |
| 10MHz | QPSK | 1 | 0 | 22.0±1 | 22.66 | 22.81 | 22.22 |
| | | 1 | 25 | 22.0±1 | 22.82 | 22.75 | 22.05 |
| | | 1 | 49 | 22.0±1 | 22.72 | 22.41 | 21.66 |
| | | 25 | 0 | 21.0±1 | 21.83 | 21.80 | 21.14 |
| | | 25 | 13 | 21.0±1 | 21.71 | 21.83 | 20.87 |
| | | 25 | 25 | 21.0±1 | 21.77 | 21.10 | 20.68 |
| | | 50 | 0 | 21.0±1 | 21.90 | 21.54 | 20.88 |
| | 16QAM | 1 | 0 | 21.0±1 | 21.62 | 21.80 | 21.24 |
| | | 1 | 25 | 21.0±1 | 21.80 | 21.76 | 21.03 |
| | | 1 | 49 | 21.0±1 | 21.61 | 21.34 | 20.53 |
| | | 25 | 0 | 20.0±1 | 20.79 | 20.72 | 20.15 |
| | | 25 | 13 | 20.0±1 | 20.64 | 20.80 | 19.94 |
| | | 25 | 25 | 20.0±1 | 20.79 | 20.12 | 19.56 |
| | | 50 | 0 | 20.0±1 | 20.80 | 20.50 | 19.86 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 132047 1857.5MHz | Channel 132322 1882.5MHz | Channel 132597 1907.5MHz |
| 15MHz | QPSK | 1 | 0 | 22.0±1 | 22.77 | 22.64 | 21.79 |
| | | 1 | 38 | 22.0±1 | 22.63 | 22.84 | 21.87 |
| | | 1 | 74 | 22.0±1 | 22.45 | 22.75 | 21.69 |
| | | 36 | 0 | 21.0±1 | 21.85 | 21.79 | 20.76 |
| | | 36 | 18 | 21.0±1 | 21.88 | 21.68 | 20.82 |
| | | 36 | 39 | 21.0±1 | 21.87 | 21.67 | 20.77 |
| | | 75 | 0 | 21.0±1 | 21.84 | 21.68 | 20.79 |
| | 16QAM | 1 | 0 | 21.0±1 | 21.57 | 21.53 | 20.70 |
| | | 1 | 38 | 21.0±1 | 21.61 | 21.85 | 20.79 |
| | | 1 | 74 | 21.0±1 | 21.34 | 21.79 | 20.56 |
| | | 36 | 0 | 20.0±1 | 20.91 | 20.71 | 19.71 |
| | | 36 | 18 | 20.0±1 | 20.83 | 20.65 | 19.89 |
| | | 36 | 39 | 20.0±1 | 20.89 | 20.57 | 19.65 |
| | | 75 | 0 | 20.0±1 | 20.74 | 20.64 | 19.57 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 132072 1860MHz | Channel 132322 1882.5MHz | Channel 132572 1905MHz |
| 20MHz | QPSK | 1 | 0 | 22.0±1 | 22.75 | 22.77 | 22.16 |
| | | 1 | 50 | 22.0±1 | 22.84 | **22.85** | 22.01 |
| | | 1 | 99 | 22.0±1 | 22.76 | 22.38 | 21.65 |
| | | 50 | 0 | 22.0±1 | 21.82 | 21.82 | 21.15 |
| | | 50 | 25 | 22.0±1 | 21.70 | **21.85** | 20.88 |
| | | 50 | 50 | 22.0±1 | 21.73 | 21.60 | 20.69 |
| | | 100 | 0 | 22.0±1 | **21.90** | 21.55 | 20.90 |
| | 16QAM | 1 | 0 | 21.0±1 | 21.55 | 21.66 | 21.07 |
| | | 1 | 50 | 21.0±1 | 21.82 | 21.86 | 20.93 |
| | | 1 | 99 | 21.0±1 | 21.65 | 21.42 | 20.52 |
| | | 50 | 0 | 20.0±1 | 20.88 | 20.74 | 20.10 |
| | | 50 | 25 | 20.0±1 | 20.65 | 20.82 | 19.95 |
| | | 50 | 50 | 20.0±1 | 20.75 | 20.50 | 19.57 |
| | | 100 | 0 | 20.0±1 | 20.80 | 20.51 | 19.68 |

**Table 13.6: The conducted Power for LTE Sensor open**

| Band 7 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bandwidth | Mode | RB Size | RB Offset | Actual output power(dBm) | | | |
| | | | | Turn up | Channel 20775 2502.5MHz | Channel 21100 2535MHz | Channel 21425 2567.5MHz |
| 5MHz | QPSK | 1 | 0 | 5.7±1 | 7.35 | 6.93 | 5.73 |
| | | 1 | 13 | 5.8±1 | 7.63 | 7.23 | 5.80 |
| | | 1 | 24 | 7.0±1 | 7.54 | 7.35 | 6.21 |
| | | 12 | 0 | 6.7±1 | 7.65 | 7.13 | 5.73 |
| | | 12 | 6 | 6.6±1 | 7.38 | 7.05 | 5.69 |
| | | 12 | 13 | 7.0±1 | 7.89 | 7.26 | 6.05 |
| | | 25 | 0 | 6.9±1 | 7.43 | 7.32 | 5.92 |
| | 16QAM | 1 | 0 | 7.0±1 | 7.12 | 7.09 | 6.54 |
| | | 1 | 13 | 7.0±1 | 7.21 | 7.15 | 6.48 |
| | | 1 | 24 | 7.0±1 | 7.32 | 7.42 | 6.83 |
| | | 12 | 0 | 6.0±1 | 6.97 | 6.59 | 5.05 |
| | | 12 | 6 | 6.4±1 | 7.22 | 6.88 | 5.41 |
| | | 12 | 13 | 6.3±1 | 7.24 | 6.79 | 5.32 |
| | | 25 | 0 | 6.3±1 | 7.06 | 6.82 | 5.35 |
| Bandwidth | Mode | RB Size | RB Offset | Actual output power(dBm) | | | |
| | | | | Turn up | Channel 20800 2505MHz | Channel 21100 2535MHz | Channel 21400 2565MHz |
| 10MHz | QPSK | 1 | 0 | 6.9±1 | 7.15 | 6.73 | 5.94 |
| | | 1 | 25 | 7.0±1 | 7.17 | 7.10 | 6.13 |
| | | 1 | 49 | 7.0±1 | 6.83 | 7.05 | 6.25 |
| | | 25 | 0 | 6.0±1.0 | 6.34 | 6.52 | 5.05 |
| | | 25 | 13 | 6.0±1.0 | 6.42 | 6.64 | 5.06 |
| | | 25 | 25 | 5.3±1 | 6.83 | 7.17 | 5.34 |
| | | 50 | 0 | 6.0±1 | 6.96 | 6.70 | 5.12 |
| | 16QAM | 1 | 0 | 6.5±1 | 7.23 | 5.63 | 5.98 |
| | | 1 | 25 | 7.0±1 | 7.31 | 6.71 | 6.03 |
| | | 1 | 49 | 6.0±1 | 6.43 | 6.23 | 6.06 |
| | | 25 | 0 | 6.6±1 | 7.41 | 6.32 | 5.81 |
| | | 25 | 13 | 6.6±1 | 7.58 | 6.73 | 5.92 |
| | | 25 | 25 | 6.6±1 | 7.53 | 6.56 | 5.95 |
| | | 50 | 0 | 6.5±1 | 7.44 | 6.62 | 5.97 |

| Bandwidth | Mode | RB Size | RB Offset | Actual output power(dBm) | | | |
|---|---|---|---|---|---|---|---|
| | | | | Turn up | Channel 20825 2507.5MHz | Channel 21100 2535MHz | Channel 21375 2562.5MHz |
| 15MHz | QPSK | 1 | 0 | 7.0±1 | 7.35 | 6.83 | 6.05 |
| | | 1 | 38 | 7.0±1 | 7.33 | 6.93 | 6.03 |
| | | 1 | 74 | 6.0±1 | 6.82 | 6.71 | 5.93 |
| | | 36 | 0 | 6.3±1 | 7.23 | 6.68 | 5.73 |
| | | 36 | 18 | 6.4±1 | 7.33 | 6.49 | 5.58 |
| | | 36 | 39 | 6.1±1 | 6.42 | 7.05 | 5.21 |
| | | 75 | 0 | 6.1±1 | 6.39 | 7.05 | 5.24 |
| | 16QAM | 1 | 0 | 6.5±1 | 7.21 | 7.05 | 5.51 |
| | | 1 | 38 | 6.2±1 | 6.55 | 7.12 | 5.43 |
| | | 1 | 74 | 6.0±1 | 5.72 | 6.81 | 5.25 |
| | | 36 | 0 | 6.2±1 | 7.15 | 6.21 | 5.98 |
| | | 36 | 18 | 6.0±1 | 6.99 | 6.92 | 5.05 |
| | | 36 | 39 | 6.2±1 | 7.02 | 6.93 | 5.36 |
| | | 75 | 0 | 6.0±1 | 6.89 | 6.88 | 5.06 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 20850 2510MHz | Channel 21100 2535MHz | Channel 21350 2560MHz |
| | | 1 | 0 | 7.0±1 | 6.83 | 7.51 | 6.92 |
| | | 1 | 50 | 7.0±1 | 6.61 | 7.06 | 6.58 |
| | | 1 | 99 | 7.0±1 | 6.50 | 6.75 | 6.49 |
| | | 50 | 0 | 6.0±1 | 6.83 | 6.89 | 5.27 |
| | | 50 | 25 | 6.0±1 | 6.87 | 6.32 | 5.35 |
| | | 50 | 50 | 6.0±1 | 6.72 | 6.79 | 5.49 |
| | | 100 | 0 | 6.0±1 | 5.89 | 6.82 | 5.01 |
| | 16QAM | 1 | 0 | 6.0±1 | 6.78 | 6.21 | 6.22 |
| | | 1 | 50 | 6.0±1 | 6.29 | 6.81 | 5.78 |
| | | 1 | 99 | 6.0±1 | 5.85 | 6.32 | 5.92 |
| | | 50 | 0 | 6.0±1 | 6.79 | 5.99 | 5.03 |
| | | 50 | 25 | 5.2±1 | 6.13 | 6.72 | 4.68 |
| | | 50 | 50 | 5.7±1 | 6.25 | 6.61 | 4.71 |
| | | 100 | 0 | 5.7±1 | 6.35 | 6.64 | 5.03 |

| Band 25 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 26047 1850.7MHz | Channel 26365 1882.5MHz | Channel 26683 1914.3MHz |
| 1.4MHz | QPSK | 1 | 0 | 13.5±1 | 13.53 | 13.47 | 13.07 |
| | | 1 | 2 | 13.5±1 | 13.70 | 13.61 | 13.21 |
| | | 1 | 5 | 13.5±1 | 13.53 | 13.51 | 12.95 |
| | | 3 | 0 | 13.5±1 | 13.54 | 13.57 | 13.25 |
| | | 3 | 1 | 13.5±1 | 13.59 | 13.62 | 13.33 |
| | | 3 | 2 | 13.5±1 | 13.66 | 13.51 | 13.23 |
| | | 6 | 0 | 12.5±1 | 12.68 | 12.64 | 12.32 |
| | 16QAM | 1 | 0 | 12.5±1 | 12.57 | 12.38 | 12.49 |
| | | 1 | 2 | 12.5±1 | 12.76 | 12.45 | 12.48 |
| | | 1 | 5 | 12.5±1 | 12.77 | 12.38 | 12.28 |
| | | 3 | 0 | 12.5±1 | 12.66 | 12.48 | 12.32 |
| | | 3 | 1 | 12.5±1 | 12.77 | 12.79 | 12.44 |
| | | 3 | 2 | 12.5±1 | 12.82 | 12.56 | 12.24 |
| | | 6 | 0 | 12.0±1 | 12.51 | 11.86 | 11.80 |
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 26055 1851.5MHz | Channel 26365 1882.5MHz | Channel 26675 1913.5MHz |
| 3MHz | QPSK | 1 | 0 | 13.5±1 | 13.76 | 13.61 | 13.75 |
| | | 1 | 8 | 13.5±1 | 13.82 | 13.58 | 13.51 |
| | | 1 | 14 | 13.5±1 | 13.92 | 13.48 | 13.24 |
| | | 8 | 0 | 12.5±1 | 12.66 | 12.63 | 12.27 |
| | | 8 | 4 | 12.5±1 | 12.75 | 12.67 | 12.26 |
| | | 8 | 7 | 12.5±1 | 12.83 | 12.58 | 12.13 |
| | | 15 | 0 | 12.5±1 | 12.84 | 12.62 | 12.17 |
| | 16QAM | 1 | 0 | 12.5±1 | 12.66 | 12.65 | 12.88 |
| | | 1 | 8 | 12.5±1 | 12.58 | 12.61 | 12.56 |
| | | 1 | 15 | 12.5±1 | 12.89 | 12.70 | 12.67 |
| | | 8 | 0 | 12.5±1 | 12.33 | 12.22 | 12.32 |
| | | 8 | 4 | 12.5±1 | 11.92 | 12.02 | 12.26 |
| | | 8 | 7 | 12.5±1 | 12.53 | 12.54 | 12.09 |
| | | 15 | 0 | 12.0±1 | 12.56 | 12.28 | 11.35 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 26065 1852.5MHz | Channel 26365 1882.5MHz | Channel 26665 1912.5MHz |
| 5MHz | QPSK | 1 | 0 | 13.5±1 | 13.95 | 13.81 | 13.45 |
| | | 1 | 13 | 13.5±1 | 14.13 | 13.81 | 13.16 |
| | | 1 | 24 | 13.5±1 | 14.21 | 14.06 | 13.18 |
| | | 12 | 0 | 12.5±1 | 12.86 | 12.65 | 12.28 |
| | | 12 | 6 | 12.5±1 | 12.88 | 12.73 | 12.16 |
| | | 12 | 13 | 12.5±1 | 12.94 | 12.54 | 12.09 |
| | | 25 | 0 | 12.5±1 | 12.78 | 12.64 | 12.15 |
| | 16QAM | 1 | 0 | 12.5±1 | 12.99 | 12.94 | 13.31 |
| | | 1 | 13 | 12.5±1 | 13.26 | 12.82 | 12.68 |
| | | 1 | 24 | 12.5±1 | 13.25 | 13.06 | 12.61 |
| | | 12 | 0 | 12.0±1 | 12.75 | 11.79 | 12.26 |
| | | 12 | 6 | 12.0±1 | 12.78 | 11.85 | 11.34 |
| | | 12 | 13 | 12.0±1 | 12.93 | 11.74 | 11.25 |
| | | 25 | 0 | 12.0±1 | 12.80 | 12.54 | 11.37 |
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 26090 1855MHz | Channel 26365 1882.5MHz | Channel 26640 1910MHz |
| 10MHz | QPSK | 1 | 0 | 13.5±1 | 13.13 | 13.23 | 12.48 |
| | | 1 | 25 | 13.5±1 | 13.43 | 13.41 | 13.65 |
| | | 1 | 49 | 13.5±1 | 13.43 | 13.44 | 12.68 |
| | | 25 | 0 | 13.0±1 | 12.68 | 12.54 | 12.77 |
| | | 25 | 13 | 13.0±1 | 12.84 | 12.68 | 12.50 |
| | | 25 | 25 | 13.0±1 | 12.72 | 12.64 | 12.38 |
| | | 50 | 0 | 12.5±1 | 12.56 | 12.36 | 12.54 |
| | 16QAM | 1 | 0 | 12.5±1 | 12.23 | 12.08 | 13.17 |
| | | 1 | 25 | 12.5±1 | 12.82 | 12.59 | 13.22 |
| | | 1 | 49 | 12.5±1 | 12.38 | 12.68 | 12.18 |
| | | 25 | 0 | 12.0±1 | 12.63 | 12.41 | 12.64 |
| | | 25 | 13 | 12.0±1 | 12.39 | 12.45 | 12.51 |
| | | 25 | 25 | 12.0±1 | 12.32 | 11.58 | 11.36 |
| | | 50 | 0 | 12.0±1 | 12.06 | 12.35 | 12.39 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 26115 1857.5MHz | Channel 26365 1882.5MHz | Channel 26615 1907.5MHz |
| 15MHz | QPSK | 1 | 0 | 13.5±1 | 13.35 | 12.34 | 14.25 |
| | | 1 | 38 | 13.5±1 | 13.77 | 12.38 | 14.12 |
| | | 1 | 74 | 13.5±1 | 13.46 | 12.37 | 13.26 |
| | | 36 | 0 | 12.5±1 | 12.58 | 12.26 | 12.92 |
| | | 36 | 18 | 12.5±1 | 12.53 | 12.34 | 13.02 |
| | | 36 | 39 | 12.5±1 | 12.46 | 12.35 | 12.48 |
| | | 75 | 0 | 12.5±1 | 12.50 | 12.28 | 12.59 |
| | 16QAM | 1 | 0 | 12.5±1 | 12.87 | 12.25 | 13.81 |
| | | 1 | 38 | 12.5±1 | 12.68 | 12.29 | 13.21 |
| | | 1 | 74 | 12.5±1 | 12.58 | 12.35 | 12.36 |
| | | 36 | 0 | 12.0±1 | 11.82 | 12.37 | 12.31 |
| | | 36 | 18 | 12.0±1 | 12.39 | 12.39 | 12.16 |
| | | 36 | 39 | 12.0±1 | 12.38 | 12.34 | 12.25 |
| | | 75 | 0 | 12.0±1 | 12.41 | 12.35 | 12.20 |
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 26140 1860MHz | Channel 26365 1882.5MHz | Channel 26590 1905MHz |
| 20MHz | QPSK | 1 | 0 | 13.5±1 | 12.64 | 12.62 | 12.96 |
| | | 1 | 50 | 13.5±1 | 12.79 | 12.51 | 12.71 |
| | | 1 | 99 | 13.5±1 | 12.68 | 12.43 | 13.15 |
| | | 50 | 0 | 13.0±1 | 12.76 | 12.51 | 12.72 |
| | | 50 | 25 | 13.0±1 | 12.79 | 12.42 | 12.83 |
| | | 50 | 50 | 13.0±1 | 12.70 | 12.75 | 12.82 |
| | | 100 | 0 | 12.5±1 | 12.79 | 12.43 | 12.76 |
| | 16QAM | 1 | 0 | 12.5±1 | 12.59 | 12.54 | 12.85 |
| | | 1 | 50 | 12.0±1 | 12.77 | 12.32 | 13.00 |
| | | 1 | 99 | 12.0±1 | 12.67 | 12.40 | 12.92 |
| | | 50 | 0 | 12.5±1 | 13.42 | 13.30 | 13.43 |
| | | 50 | 25 | 12.5±1 | 13.49 | 13.31 | 13.16 |
| | | 50 | 50 | 12.5±1 | 13.54 | 13.35 | 13.05 |
| | | 100 | 0 | 12.5±1 | 13.47 | 13.28 | 12.89 |

| Band 41 | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| Bandwidth | Mode | RB Size | RB Offset | Turn up | | Actual output power(dBm) | | | | |
| | | | | Channel First/second | Channel Third/fourth/fifth | Channel 39675 2498.5 MHz | Channel 40148 2545.8 MHz | Channel 40620 2593 MHz | Channel 41093 2640.3 MHz | Channel 41565 2687.5 MHz |
| 5MHz | QPSK | 1 | 0 | 7.0±1 | 4.5±1 | 7.77 | 7.01 | 5.33 | 4.06 | 4.48 |
| | | 1 | 13 | 7.0±1 | 4.5±1 | 6.67 | 7.08 | 5.41 | 4.32 | 4.44 |
| | | 1 | 24 | 7.0±1 | 4.5±1 | 6.99 | 6.90 | 5.32 | 3.99 | 4.16 |
| | | 12 | 0 | 7.0±1 | 4.5±1 | 7.32 | 7.03 | 5.37 | 4.21 | 4.17 |
| | | 12 | 6 | 6.5±1 | 4.5±1 | 5.85 | 7.09 | 5.31 | 4.19 | 3.97 |
| | | 12 | 13 | 7.0±1 | 4.5±1 | 5.74 | 6.96 | 5.12 | 4.05 | 4.14 |
| | | 25 | 0 | 6.5±1 | 4.5±1 | 5.88 | 6.97 | 5.20 | 4.06 | 4.04 |
| | 16QAM | 1 | 0 | 7.0±1 | 4.2±1 | 7.04 | 6.44 | 4.61 | 3.29 | 4.95 |
| | | 1 | 13 | 7.0±1 | 4.3±1 | 6.85 | 6.33 | 4.41 | 3.33 | 4.77 |
| | | 1 | 24 | 7.0±1 | 4.0±1 | 6.23 | 6.31 | 4.40 | 3.01 | 4.03 |
| | | 12 | 0 | 7.0±1 | 4.6±1 | 6.32 | 7.43 | 5.37 | 3.67 | 4.11 |
| | | 12 | 6 | 6.5±1 | 4.8±1 | 6.49 | 7.17 | 4.99 | 3.82 | 4.14 |
| | | 12 | 13 | 6.6±1 | 4.8±1 | 5.93 | 7.52 | 5.21 | 3.83 | 4.10 |
| | | 25 | 0 | 6.5±1 | 4.8±1 | 6.09 | 7.48 | 4.71 | 3.99 | 4.04 |
| Bandwidth | Mode | RB Size | RB Offset | Turn up | | Actual output power(dBm) | | | | |
| | | | | Channel First/second | Channel Third/fourth/fifth | Channel 39700 2501MHz | Channel 40160 2547MHz | Channel 40620 2593MHz | Channel 41080 2639MHz | Channel 41540 2685MHz |
| 10MHz | QPSK | 1 | 0 | 7.0±1 | 5.0±1 | 7.74 | 6.40 | 5.47 | 4.59 | 4.20 |
| | | 1 | 13 | 7.0±1 | 5.0±1 | 7.04 | 6.83 | 5.07 | 4.05 | 4.25 |
| | | 1 | 24 | 7.0±1 | 3.7±1 | 6.88 | 6.16 | 5.15 | 4.25 | 3.72 |
| | | 12 | 0 | 6.5±1 | 5.0±1 | 5.93 | 7.41 | 5.01 | 4.06 | 4.39 |
| | | 12 | 6 | 7.0±1 | 5.0±1 | 6.02 | 7.51 | 5.14 | 4.05 | 4.28 |
| | | 12 | 13 | 6.5±1 | 5.0±1 | 5.85 | 6.75 | 5.12 | 4.34 | 4.18 |
| | | 25 | 0 | 6.5±1 | 5.0±1 | 5.54 | 6.88 | 5.13 | 4.21 | 4.08 |
| | 16QAM | 1 | 0 | 7.0±1 | 5.0±1 | 6.30 | 7.61 | 5.43 | 4.20 | 4.32 |
| | | 1 | 13 | 7.0±1 | 5.0±1 | 6.21 | 7.52 | 5.64 | 4.89 | 4.37 |
| | | 1 | 24 | 7.0±1 | 4.9±1 | 6.06 | 8.21 | 5.53 | 3.91 | 4.02 |
| | | 12 | 0 | 7.0±1 | 5.0±1 | 7.34 | 6.78 | 5.33 | 4.18 | 4.25 |
| | | 12 | 6 | 7.0±1 | 5.0±1 | 6.04 | 7.32 | 5.05 | 4.12 | 4.01 |
| | | 12 | 13 | 6.5±1 | 4.8±1 | 5.57 | 7.29 | 5.06 | 3.84 | 4.52 |
| | | 25 | 0 | 6.5±1 | 4.7±1 | 5.53 | 7.41 | 5.25 | 3.78 | 4.10 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | | Actual output power(dBm) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Channel First/second | Channel Third/fourth/fifth | Channel 39725 2503.5 MHz | Channel 40173 2548.3 MHz | Channel 40620 2593MHz | Channel 41068 2637.8 MHz | Channel 41515 2682.5 MHz |
| 15MHz | QPSK | 1 | 0 | 7.0±1 | 5.0±1 | 6.91 | 6.47 | 5.40 | 4.39 | 4.41 |
| | | 1 | 13 | 7.0±1 | 5.0±1 | 6.95 | 7.03 | 5.02 | 4.32 | 4.23 |
| | | 1 | 24 | 7.0±1 | 5.0±1 | 6.65 | 5.99 | 5.38 | 4.22 | 4.01 |
| | | 12 | 0 | 7.0±1 | 5.0±1 | 7.22 | 6.77 | 5.46 | 4.31 | 4.48 |
| | | 12 | 6 | 6.8±1 | 5.0±1 | 5.83 | 7.38 | 5.10 | 4.09 | 4.40 |
| | | 12 | 13 | 6.7±1 | 5.0±1 | 5.72 | 6.46 | 4.92 | 4.33 | 4.35 |
| | | 25 | 0 | 6..5±1 | 5.0±1 | 5.66 | 6.32 | 4.82 | 4.44 | 4.31 |
| | 16QAM | 1 | 0 | 6.0±1 | 5.0±1 | 6.70 | 5.87 | 4.15 | 4.73 | 4.98 |
| | | 1 | 13 | 6.0±1 | 4.0±1 | 5.60 | 6.41 | 4.72 | 3.45 | 4.25 |
| | | 1 | 24 | 6.0±1 | 5.0±1 | 6.16 | 5.57 | 5.23 | 4.02 | 4.18 |
| | | 12 | 0 | 7.0±1 | 4.8±1 | 6.03 | 7.49 | 5.07 | 3.84 | 4.23 |
| | | 12 | 6 | 6.6±1 | 4.9±1 | 5.62 | 7.51 | 5.08 | 3.98 | 4.09 |
| | | 12 | 13 | 6.4±1 | 4.9±1 | 5.44 | 7.32 | 5.28 | 3.99 | 4.30 |
| | | 25 | 0 | 6.2±1 | 4.9±1 | 5.28 | 7.03 | 5.12 | 4.01 | 4.24 |
| Bandwidth | Mode | RB Size | RB Offset | Turn up | | Actual output power(dBm) | | | | |
| | | | | Channel First/second | Channel Third/fourth/fifth | Channel 39750 2506MHz | Channel 40185 2549.5 MHz | Channel 40620 2593MHz | Channel 41055 2636.5 MHz | Channel 41490 2680MHz |
| 20MHz | QPSK | 1 | 0 | 7.0±1 | 5.0±1 | 6.84 | 6.63 | 5.25 | 4.16 | 4.04 |
| | | 1 | 13 | 7.0±1 | 5.0±1 | 7.06 | 6.77 | 5.07 | 4.21 | 4.19 |
| | | 1 | 24 | 7.0±1 | 4.2±1 | 6.17 | **7.49** | 5.10 | 3.96 | 3.70 |
| | | 12 | 0 | 7.0±1 | 5.0±1 | **7.22** | 7.19 | 5.45 | 4.52 | 4.28 |
| | | 12 | 6 | 6.0±1 | 5.0±1 | 5.74 | 6.86 | 5.15 | 4.05 | 4.42 |
| | | 12 | 13 | 6.0±1 | 5.7±1 | 5.64 | 6.35 | 4.73 | 6.59 | 4.06 |
| | | 25 | 0 | 6.0±1 | 5.3±1 | 5.46 | 5.89 | 4.32 | 6.03 | 4.01 |
| | 16QAM | 1 | 0 | 6.0±1 | 4.0±1 | 6.59 | 5.86 | 4.25 | 4.77 | 4.89 |
| | | 1 | 13 | 6.0±1 | 4.0±1 | 5.49 | 6.38 | 4.72 | 4.01 | 4.33 |
| | | 1 | 24 | 6.0±1 | 4.0±1 | 6.21 | 5.48 | 5.19 | 4.05 | 4.08 |
| | | 12 | 0 | 7.0±1 | 3.9±1 | 6.01 | 7.33 | 5.11 | 3.98 | 4.25 |
| | | 12 | 6 | 6.0±1 | 3.9±1 | 5.23 | 6.99 | 5.08 | 3.98 | 4.11 |
| | | 12 | 13 | 6.0±1 | 4.0±1 | 5.44 | 6.27 | 5.29 | 4.09 | 4.27 |
| | | 25 | 0 | 6.3±1 | 4.0±1 | 5.32 | 7.01 | 5.23 | 4.11 | 4.25 |

| Band 66 | | | | | | | |
|---|---|---|---|---|---|---|---|
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 131979 1850.7MHz | Channel 132322 1882.5MHz | Channel 132665 1914.3MHz |
| 1.4MHz | QPSK | 1 | 0 | 13.0±1 | 12.93 | 13.51 | 12.80 |
| | | 1 | 2 | 13.0±1 | 13.15 | 13.37 | 12.88 |
| | | 1 | 5 | 13.0±1 | 13.05 | 13.46 | 12.71 |
| | | 3 | 0 | 13.0±1 | 12.95 | 13.33 | 12.88 |
| | | 3 | 1 | 13.0±1 | 13.05 | 13.34 | 12.84 |
| | | 3 | 2 | 13.0±1 | 13.02 | 13.35 | 12.86 |
| | | 6 | 0 | 13.0±1 | 12.3 | 13.40 | 12.63 |
| | 16QAM | 1 | 0 | 13.0±1 | 12.25 | 13.27 | 12.66 |
| | | 1 | 2 | 13.0±1 | 12.57 | 13.51 | 12.64 |
| | | 1 | 5 | 13.0±1 | 12.39 | 13.38 | 12.58 |
| | | 3 | 0 | 13.0±1 | 12.33 | 13.27 | 12.73 |
| | | 3 | 1 | 13.0±1 | 12.34 | 13.22 | 12.70 |
| | | 3 | 2 | 13.0±1 | 12.25 | 13.36 | 12.65 |
| | | 6 | 0 | 13.0±1 | 12.32 | 13.41 | 12.53 |
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 131987 1851.5MHz | Channel 132322 1882.5MHz | Channel 132657 1913.5MHz |
| 3MHz | QPSK | 1 | 0 | 13.0±1 | 13.15 | 13.33 | 12.93 |
| | | 1 | 8 | 13.0±1 | 13.12 | 13.25 | 12.80 |
| | | 1 | 14 | 13.0±1 | 13.05 | 13.43 | 12.83 |
| | | 8 | 0 | 13.0±1 | 12.35 | 13.25 | 12.88 |
| | | 8 | 4 | 13.0±1 | 12.60 | 13.38 | 12.69 |
| | | 8 | 7 | 13.0±1 | 12.55 | 13.41 | 12.70 |
| | | 15 | 0 | 13.0±1 | 12.49 | 13.33 | 12.76 |
| | 16QAM | 1 | 0 | 13.0±1 | 12.73 | 13.68 | 13.59 |
| | | 1 | 8 | 13.0±1 | 12.74 | 13.75 | 13.40 |
| | | 1 | 15 | 13.0±1 | 12.61 | 13.88 | 13.27 |
| | | 8 | 0 | 13.0±1 | 12.37 | 13.39 | 12.98 |
| | | 8 | 4 | 13.0±1 | 12.40 | 13.45 | 12.75 |
| | | 8 | 7 | 13.0±1 | 12.50 | 13.47 | 12.92 |
| | | 15 | 0 | 13.0±1 | 12.42 | 13.44 | 12.80 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 131997 1852.5MHz | Channel 132322 1882.5MHz | Channel 132647 1912.5MHz |
| 5MHz | QPSK | 1 | 0 | 13.0±1 | 13.01 | 13.16 | 12.99 |
| | | 1 | 13 | 13.0±1 | 13.09 | 13.23 | 13.05 |
| | | 1 | 24 | 13.0±1 | 13.05 | 13.34 | 12.87 |
| | | 12 | 0 | 13.0±1 | 12.53 | 13.21 | 12.75 |
| | | 12 | 6 | 13.0±1 | 12.46 | 13.17 | 12.78 |
| | | 12 | 13 | 13.0±1 | 12.71 | 13.29 | 12.76 |
| | | 25 | 0 | 13.0±1 | 12.56 | 13.33 | 12.81 |
| | 16QAM | 1 | 0 | 13.0±1 | 12.88 | 13.72 | 12.99 |
| | | 1 | 13 | 13.0±1 | 13.13 | 13.63 | 12.78 |
| | | 1 | 24 | 13.0±1 | 13.16 | 13.56 | 12.85 |
| | | 12 | 0 | 13.0±1 | 12.45 | 13.29 | 12.73 |
| | | 12 | 6 | 13.0±1 | 12.71 | 13.36 | 12.76 |
| | | 12 | 13 | 13.0±1 | 12.64 | 13.35 | 12.79 |
| | | 25 | 0 | 13.0±1 | 12.41 | 13.31 | 12.83 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 132022 1855MHz | Channel 132322 1882.5MHz | Channel 132622 1910MHz |
| 10MHz | QPSK | 1 | 0 | 13.0±1 | 12.91 | 13.15 | 12.87 |
| | | 1 | 25 | 13.0±1 | 13.15 | 13.22 | 13.12 |
| | | 1 | 49 | 13.0±1 | 12.84 | 13.37 | 13.02 |
| | | 25 | 0 | 13.0±1 | 12.60 | 12.88 | 12.63 |
| | | 25 | 13 | 13.0±1 | 12.70 | 12.95 | 12.66 |
| | | 25 | 25 | 13.0±1 | 12.85 | 13.20 | 12.60 |
| | | 50 | 0 | 13.0±1 | 12.60 | 13.10 | 12.59 |
| | 16QAM | 1 | 0 | 13.0±1 | 12.01 | 13.08 | 13.03 |
| | | 1 | 25 | 13.0±1 | 12.78 | 13.85 | 13.45 |
| | | 1 | 49 | 13.0±1 | 12.87 | 13.77 | 12.78 |
| | | 25 | 0 | 13.0±1 | 12.63 | 12.93 | 12.70 |
| | | 25 | 13 | 13.0±1 | 12.54 | 13.14 | 12.64 |
| | | 25 | 25 | 13.0±1 | 12.91 | 13.29 | 12.62 |
| | | 50 | 0 | 13.0±1 | 12.65 | 13.11 | 12.59 |

| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
|---|---|---|---|---|---|---|---|
| | | | | | Channel 132047 1857.5MHz | Channel 132322 1882.5MHz | Channel 132597 1907.5MHz |
| 15MHz | QPSK | 1 | 0 | 13.0±1 | 13.07 | 13.40 | 13.02 |
| | | 1 | 38 | 13.0±1 | 13.03 | 13.46 | 12.93 |
| | | 1 | 74 | 13.0±1 | 12.94 | 13.38 | 12.62 |
| | | 36 | 0 | 13.0±1 | 12.73 | 12.71 | 12.72 |
| | | 36 | 18 | 13.0±1 | 12.72 | 13.01 | 12.75 |
| | | 36 | 39 | 13.0±1 | 12.88 | 13.36 | 12.67 |
| | | 75 | 0 | 13.0±1 | 12.85 | 13.20 | 12.62 |
| | 16QAM | 1 | 0 | 13.0±1 | 12.77 | 13.36 | 13.28 |
| | | 1 | 38 | 13.0±1 | 12.83 | 13.92 | 13.07 |
| | | 1 | 74 | 13.0±1 | 12.66 | 13.75 | 12.93 |
| | | 36 | 0 | 13.0±1 | 12.87 | 12.88 | 12.67 |
| | | 36 | 18 | 13.0±1 | 12.83 | 13.31 | 12.51 |
| | | 36 | 39 | 13.0±1 | 12.75 | 13.26 | 12.62 |
| | | 75 | 0 | 13.0±1 | 12.60 | 13.11 | 12.66 |
| Bandwidth | Mode | RB Size | RB Offset | Turn up | Actual output power(dBm) | | |
| | | | | | Channel 132072 1860MHz | Channel 132322 1882.5MHz | Channel 132572 1905MHz |
| 20MHz | QPSK | 1 | 0 | 13.5±1 | 12.88 | 13.20 | 12.95 |
| | | 1 | 50 | 13.5±1 | 13.05 | 13.45 | 12.88 |
| | | 1 | 99 | 13.5±1 | 12.89 | 13.58 | 12.75 |
| | | 50 | 0 | 13.0±1 | 12.56 | 12.76 | 12.69 |
| | | 50 | 25 | 13.0±1 | 12.53 | 12.95 | 12.67 |
| | | 50 | 50 | 13.0±1 | 12.48 | 13.13 | 12.53 |
| | | 100 | 0 | 13.0±1 | 12.45 | 13.06 | 12.46 |
| | 16QAM | 1 | 0 | 13.0±1 | 13.05 | 12.25 | 13.13 |
| | | 1 | 50 | 13.0±1 | 13.21 | 13.49 | 12.79 |
| | | 1 | 99 | 13.0±1 | 12.83 | 13.23 | 12.73 |
| | | 50 | 0 | 13.0±1 | 12.49 | 12.59 | 12.51 |
| | | 50 | 25 | 13.0±1 | 12.53 | 12.95 | 12.45 |
| | | 50 | 50 | 13.0±1 | 12.57 | 12.93 | 12.47 |
| | | 100 | 0 | 13.0±1 | 12.52 | 12.91 | 12.56 |

## 13.4. BT Measurement result

| Mode | Tune-up (dBm) | Conducted Power(dBm) |
|---|---|---|
| DH1 | 8.0 | 7.05 |
| 2DH1 | 6.0 | 5.35 |
| 3DH1 | 6.0 | 5.35 |

BLE

| Mode | Tune-up (dBm) | Conducted Power(dBm) | | |
|---|---|---|---|---|
| | | Channel 0(2402MHz) | Channel 19(2440MHz) | Channel 39(2480MHz) |
| BLE | 3.0 | -2.64 | -2.92 | -3.97 |

# 14. Simultaneous TX SAR Considerations

## 14.1.Standalone SAR Test Exclusion Considerations

Standalone 1-g head or body SAR evaluation by measurement or numerical simulation is not required when the corresponding SAR Exclusion Threshold condition, listed below, is satisfied.

The 1-g SAR test exclusion threshold 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)] ·[√f(GHz)] ≤ 3.0 for 1-g SAR, where

- f(GHz) is the RF channel transmit frequency in GHz
- Power and distance are rounded to the nearest mW and mm before calculation
- The result is rounded to one decimal place for comparison

According to the KDB447498 appendix A, the SAR test exclusion threshold for 2450MHz at 5mm test separation distances is 10mW.

$$\text{Estimated SAR}=\frac{\sqrt{f(GHz)}}{7.5}\cdot\frac{(\text{Max Power of chananel,mW})}{\text{Min.Separation Distance,mm}}$$

| Mode | Frequency(MHz) | Max.Tune-up Power (dBm) | Separation Distance(mm) | Estimated SAR 1g(W/kg) |
|---|---|---|---|---|
| Bluetooth-Body | 2480 | 8.0 | 10 | 0.208 |

### 14.2. Simultaneous multi-band transmission

For the DUT, LTE, WCDMA,CDMA 2000 and GSM modules sharing a single antenna, so these four modules can’t transmit signal simultaneously.

So we can get following combination that can transmit signal simultaneously.

GSM and BT;

WCDMA and BT;

CDMA 2000 and BT;

LTE and BT;

LTE, WCDMA,CDMA 2000

According to full power the value of SAR, The maximum LTE/WCDMA/CDMA 2000 value is 1.215 W/Kg, The maximum BT value is 0.208 W/Kg, 1.215W/Kg+0.208W/Kg=1.423W/Kg are less than 1.6W/Kg. So no simultaneous multi-band transmission test is required.

According to sensor power the value of SAR, The maximum LTE/WCDMA/CDMA 2000 value is 1.209 W/Kg, The maximum BT value is 0.208 W/Kg, 1.209W/Kg+0.208W/Kg=1.417W/Kg are less than 1.6W/Kg. So no simultaneous multi-band transmission test is required.

# 15. SAR Test Result

## 15.1. Full Power SAR results

Table 15.1: SAR Values(CDMA 2000-Body)

| Frequency | | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | | | | | |
| 1880 | 600 | CDMA | BC1 | Phantom | 17 | 23.49 | 24 | 1.125 | 0.535 | 0.602 | -0.12 |
| 1880 | 600 | CDMA | BC1 | Ground | 34 | 23.49 | 24 | 1.125 | 0.164 | 0.184 | 0.07 |
| 1880 | 600 | CDMA | BC1 | Left | 5 | 23.49 | 24 | 1.125 | 1.02 | 1.147 | 0.00 |
| 1880 | 600 | CDMA | BC1 | Right | 9 | 23.49 | 24 | 1.125 | 0.174 | 0.196 | 0.19 |
| 1880 | 600 | CDMA | BC1 | Bottom | 24 | 23.49 | 24 | 1.125 | 0.284 | 0.319 | -0.18 |
| 1908.8 | 1175 | CDMA | BC1 | Left | 5 | 23.42 | 24 | 1.143 | 0.870 | 0.994 | 0.01 |
| 1851.3 | 25 | CDMA | BC1 | Left | 5 | 23.48 | 24 | 1.127 | 0.798 | 0.900 | 0.00 |
| Retest | | | | | | | | | | | |
| 1880 | 600 | CDMA | BC1 | Left | 5 | 23.49 | 24 | 1.125 | 1.08 | 1.215 | -0.05 |

Table 15.2: SAR Values(WCDMA Band 2-Body)

| Frequency | | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | | | | | |
| 1880 | 9400 | Band 2 | RMC | Phantom | 17 | 23.87 | 24.5 | 1.156 | 0.334 | 0.386 | -0.17 |
| 1880 | 9400 | Band 2 | RMC | Ground | 34 | 23.87 | 24.5 | 1.156 | 0.130 | 0.150 | 0.00 |
| 1880 | 9400 | Band 2 | RMC | Left | 5 | 23.87 | 24.5 | 1.156 | 0.934 | 1.080 | -0.16 |
| 1880 | 9400 | Band 2 | RMC | Right | 9 | 23.87 | 24.5 | 1.156 | 0.175 | 0.202 | 0.01 |
| 1880 | 9400 | Band 2 | RMC | Bottom | 24 | 23.87 | 24.5 | 1.156 | 0.274 | 0.317 | 0.07 |
| 1907.6 | 9538 | Band 2 | RMC | Left | 5 | 23.75 | 24.5 | 1.188 | 1.000 | 1.189 | -0.03 |
| 1852.4 | 9262 | Band 2 | RMC | Left | 5 | 23.97 | 24.5 | 1.129 | 0.962 | 1.087 | 0.16 |
| Retest | | | | | | | | | | | |
| 1907.6 | 9538 | Band 2 | RMC | Left | 5 | 23.75 | 24.5 | 1.188 | 0.998 | 1.186 | 0.13 |

Table 15.3: SAR Values (WCDMA Band 4-Body)

| Frequency | | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | | | | | |
| 1732.6 | 1413 | Band 4 | RMC | Phantom | 17 | 23.72 | 24 | 1.066 | 0.288 | 0.307 | 0.05 |
| 1732.6 | 1413 | Band 4 | RMC | Ground | 34 | 23.72 | 24 | 1.066 | 0.0641 | 0.068 | -0.1 |
| 1732.6 | 1413 | Band 4 | RMC | Left | 5 | 23.72 | 24 | 1.066 | 0.375 | 0.400 | 0.09 |
| 1732.6 | 1413 | Band 4 | RMC | Right | 9 | 23.72 | 24 | 1.066 | 0.116 | 0.124 | 0.02 |
| 1732.6 | 1413 | Band 4 | RMC | Bottom | 24 | 23.72 | 24 | 1.066 | 0.277 | 0.295 | 0.15 |
| 1752.6 | 1513 | Band 4 | RMC | Left | 5 | 23.55 | 24 | 1.109 | 0.489 | 0.542 | 0.01 |
| 1712.4 | 1312 | Band 4 | RMC | Left | 5 | 23.57 | 24 | 1.104 | 0.344 | 0.380 | 0.16 |

Table 15.4: SAR Values (LTE Band 7-Body)

| Frequency | | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | | | | | |
| 2535 | 21100 | Band 7 | 1RB 50offset | Phantom | 17 | 23.07 | 23.5 | 1.104 | 0.320 | 0.353 | -0.08 |
| 2535 | 21100 | Band 7 | 1RB 50offset | Ground | 34 | 23.07 | 23.5 | 1.104 | 0.112 | 0.124 | 0.04 |
| 2535 | 21100 | Band 7 | 1RB 50offset | Left | 5 | 23.07 | 23.5 | 1.104 | 0.671 | 0.741 | -0.09 |
| 2535 | 21100 | Band 7 | 1RB 50offset | Right | 9 | 23.07 | 23.5 | 1.104 | 0.383 | 0.423 | -0.05 |
| 2535 | 21100 | Band 7 | 1RB 50offset | Bottom | 24 | 23.07 | 23.5 | 1.104 | 0.205 | 0.226 | 0.14 |
| 2560 | 21350 | Band 7 | 1RB 50offset | Left | 5 | 22.92 | 23.5 | 1.142 | 0.635 | 0.726 | -0.07 |
| 2510 | 20850 | Band 7 | 1RB 50offset | Left | 5 | 23.05 | 23.5 | 1.109 | 0.604 | 0.670 | -0.12 |
| 2510 | 20850 | Band 7 | 50RB 25offset | Phantom | 17 | 22.04 | 22.5 | 1.111 | 0.247 | 0.275 | 0.02 |
| 2510 | 20850 | Band 7 | 50RB 25offset | Ground | 34 | 22.04 | 22.5 | 1.111 | 0.0871 | 0.097 | -0.05 |
| 2510 | 20850 | Band 7 | 50RB 25offset | Left | 5 | 22.04 | 22.5 | 1.111 | 0.610 | 0.678 | -0.14 |
| 2510 | 20850 | Band 7 | 50RB 25offset | Right | 9 | 22.04 | 22.5 | 1.111 | 0.249 | 0.277 | -0.05 |
| 2510 | 20850 | Band 7 | 50RB 25offset | Bottom | 24 | 22.04 | 22.5 | 1.111 | 0.148 | 0.165 | 0.06 |
| 2535 | 21100 | Band 7 | 50RB 25offset | Left | 5 | 21.95 | 22.5 | 1.135 | 0.663 | 0.753 | 0.09 |
| 2560 | 21350 | Band 7 | 50RB 25offset | Left | 5 | 21.93 | 22.5 | 1.140 | 0.669 | 0.763 | 0.14 |

Table 15.5: SAR Values (LTE Band 25-Body)

| Frequency | | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | | | | | |
| 1905 | 26590 | Band 25 | 1RB 50offset | Phantom | 17 | 22.43 | 23 | 1.14 | 0.322 | 0.367 | 0.12 |
| 1905 | 26590 | Band 25 | 1RB 50offset | Ground | 34 | 22.43 | 23 | 1.14 | 0.100 | 0.114 | -0.17 |
| 1905 | 26590 | Band 25 | 1RB 50offset | Left | 5 | 22.43 | 23 | 1.14 | 0.790 | 0.901 | 0.17 |
| 1905 | 26590 | Band 25 | 1RB 50offset | Right | 9 | 22.43 | 23 | 1.14 | 0.137 | 0.156 | -0.1 |
| 1905 | 26590 | Band 25 | 1RB 50offset | Bottom | 24 | 22.43 | 23 | 1.14 | 0.167 | 0.190 | 0.02 |
| 1882.5 | 26365 | Band 25 | 1RB 50offset | Left | 5 | 22.35 | 23 | 1.161 | 0.747 | 0.868 | 0.07 |
| 1860 | 26140 | Band 25 | 1RB 50offset | Left | 5 | 22.32 | 23 | 1.169 | 0.730 | 0.854 | 0.06 |
| 1882.5 | 26365 | Band 25 | 50RB 25offset | Phantom | 17 | 21.39 | 23 | 1.448 | 0.328 | 0.475 | 0.01 |
| 1882.5 | 26365 | Band 25 | 50RB 25offset | Ground | 34 | 21.39 | 23 | 1.448 | 0.0933 | 0.135 | 0.05 |
| 1882.5 | 26365 | Band 25 | 50RB 25offset | Left | 5 | 21.39 | 23 | 1.448 | 0.732 | 1.061 | 0.16 |
| 1882.5 | 26365 | Band 25 | 50RB 25offset | Right | 9 | 21.39 | 23 | 1.448 | 0.125 | 0.181 | 0.04 |
| 1882.5 | 26365 | Band 25 | 50RB 25offset | Bottom | 24 | 21.39 | 23 | 1.448 | 0.168 | 0.243 | 0.02 |
| 1905 | 26590 | Band 25 | 50RB 25offset | Left | 5 | 21.37 | 23 | 1.455 | 0.759 | 1.105 | 0.17 |
| 1860 | 26140 | Band 25 | 50RB 25offset | Left | 5 | 21.14 | 23 | 1.534 | 0.702 | 1.077 | 0.09 |

Table 15.6: SAR Values (LTE Band 41-Body)

| Frequency | | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | | | | | |
| 2593 | 40620 | Band 41 | 1RB 50offset | Phantom | 17 | 22.81 | 23.5 | 1.172 | 0.0991 | 0.116 | 0.15 |
| 2593 | 40620 | Band 41 | 1RB 50offset | Ground | 34 | 22.81 | 23.5 | 1.172 | 0.0497 | 0.058 | 0.01 |
| 2593 | 40620 | Band 41 | 1RB 50offset | Left | 5 | 22.81 | 23.5 | 1.172 | 0.309 | 0.362 | 0.03 |
| 2593 | 40620 | Band 41 | 1RB 50offset | Right | 9 | 22.81 | 23.5 | 1.172 | 0.112 | 0.131 | -0.18 |
| 2593 | 40620 | Band 41 | 1RB 50offset | Bottom | 24 | 22.81 | 23.5 | 1.172 | 0.0941 | 0.110 | 0.12 |
| 2506 | 39750 | Band 41 | 1RB 50offset | Left | 5 | 22.34 | 23.5 | 1.306 | 0.232 | 0.303 | -0.17 |
| 2680 | 41490 | Band 41 | 1RB 50offset | Left | 5 | 22.18 | 23.5 | 1.355 | 0.485 | 0.657 | -0.13 |
| 2549.5 | 40185 | Band 41 | 1RB 50offset | Left | 5 | 22.57 | 23.5 | 1.239 | 0.333 | 0.413 | -0.03 |
| 2636.5 | 41055 | Band 41 | 1RB 50offset | Left | 5 | 22.53 | 23.5 | 1.250 | 0.377 | 0.471 | -0.19 |
| 2593 | 40620 | Band 41 | 50RB 50offset | Phantom | 17 | 21.96 | 22.5 | 1.132 | 0.0764 | 0.087 | 0.08 |
| 2593 | 40620 | Band 41 | 50RB 50offset | Ground | 34 | 21.96 | 22.5 | 1.132 | 0.0379 | 0.043 | -0.06 |
| 2593 | 40620 | Band 41 | 50RB 50offset | Left | 5 | 21.96 | 22.5 | 1.132 | 0.255 | 0.289 | -0.06 |
| 2593 | 40620 | Band 41 | 50RB 50offset | Right | 9 | 21.96 | 22.5 | 1.132 | 0.0931 | 0.105 | 0.02 |
| 2593 | 40620 | Band 41 | 50RB 50offset | Bottom | 24 | 21.96 | 22.5 | 1.132 | 0.0742 | 0.084 | 0.06 |
| 2506 | 39750 | Band 41 | 50RB 50offset | Left | 5 | 21.49 | 22.5 | 1.261 | 0.253 | 0.319 | 0.07 |
| 2680 | 41490 | Band 41 | 50RB 50offset | Left | 5 | 21.39 | 22.5 | 1.291 | 0.366 | 0.473 | 0.10 |
| 2549.5 | 40185 | Band 41 | 50RB 50offset | Left | 5 | 21.36 | 22.5 | 1.300 | 0.266 | 0.346 | -0.02 |
| 2636.5 | 41055 | Band 41 | 50RB 50offset | Left | 5 | 21.93 | 22.5 | 1.140 | 0.306 | 0.349 | -0.02 |

Table 15.7: SAR Values (LTE Band 66-Body)

| Frequency | | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | | | | | |
| 1745 | 132322 | Band 66 | 1RB 50offset | Phantom | 17 | 22.85 | 23 | 1.035 | 0.297 | 0.307 | 0.01 |
| 1745 | 132322 | Band 66 | 1RB 50offset | Ground | 34 | 22.85 | 23 | 1.035 | 0.0869 | 0.090 | 0.17 |
| 1745 | 132322 | Band 66 | 1RB 50offset | Left | 5 | 22.85 | 23 | 1.035 | 0.408 | 0.422 | 0.01 |
| 1745 | 132322 | Band 66 | 1RB 50offset | Right | 9 | 22.85 | 23 | 1.035 | 0.131 | 0.136 | -0.04 |
| 1745 | 132322 | Band 66 | 1RB 50offset | Bottom | 24 | 22.85 | 23 | 1.035 | 0.175 | 0.181 | 0.07 |
| 1770 | 132572 | Band 66 | 1RB 50offset | Left | 5 | 22.01 | 23 | 1.256 | 0.691 | 0.868 | -0.05 |
| 1720 | 132072 | Band 66 | 1RB 50offset | Left | 5 | 22.84 | 23 | 1.038 | 0.386 | 0.400 | -0.01 |
| 1745 | 132322 | Band 66 | 50RB 25offset | Phantom | 17 | 21.85 | 23 | 1.303 | 0.294 | 0.383 | -0.03 |
| 1745 | 132322 | Band 66 | 50RB 25offset | Ground | 34 | 21.85 | 23 | 1.303 | 0.0793 | 0.103 | 0.14 |
| 1745 | 132322 | Band 66 | 50RB 25offset | Left | 5 | 21.85 | 23 | 1.303 | 0.444 | 0.579 | 0.03 |
| 1745 | 132322 | Band 66 | 50RB 25offset | Right | 9 | 21.85 | 23 | 1.303 | 0.0993 | 0.129 | 0.01 |
| 1745 | 132322 | Band 66 | 50RB 25offset | Bottom | 24 | 21.85 | 23 | 1.303 | 0.169 | 0.220 | 0.11 |
| 1770 | 132572 | Band 66 | 50RB 25offset | Left | 5 | 20.88 | 23 | 1.629 | 0.528 | 0.860 | -0.00 |
| 1720 | 132072 | Band 66 | 50RB 25offset | Left | 5 | 21.70 | 23 | 1.349 | 0.306 | 0.413 | 0.02 |
| 1745 | 132322 | Band 66 | 12RB 6offset | Left | 5 | 22.82 | 23 | 1.042 | 0.376 | 0.392 | -0.10 |

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## 15.2. Sensor Power SAR results

Table 15.8: SAR Values (CDMA 2000-Body)

| Frequency MHz | Frequency Ch. | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1880 | 600 | CDMA | BC1 | Phantom | 0 | 8.53 | 9 | 1.114 | 0.562 | 0.626 | 0.12 |
| 1880 | 600 | CDMA | BC1 | Ground | 0 | 8.53 | 9 | 1.114 | 0.706 | 0.787 | 0.16 |
| 1880 | 600 | CDMA | BC1 | Left | 0 | 8.53 | 9 | 1.114 | 0.439 | 0.489 | -0.03 |
| 1880 | 600 | CDMA | BC1 | Right | 0 | 8.53 | 9 | 1.114 | 0.108 | 0.120 | -0.00 |
| 1880 | 600 | CDMA | BC1 | Bottom | 0 | 8.53 | 9 | 1.114 | 0.508 | 0.566 | -0.11 |
| 1908.8 | 1175 | CDMA | BC1 | Ground | 0 | 8.42 | 9 | 1.143 | 0.725 | 0.829 | 0.12 |
| 1851.3 | 25 | CDMA | BC1 | Ground | 0 | 8.39 | 9 | 1.151 | 0.656 | 0.755 | 0.07 |

Table 15.9: SAR Values (WCDMA Band2-Body)

| Frequency MHz | Frequency Ch. | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1880 | 9400 | Band 2 | RMC | Phantom | 0 | 13.09 | 13.5 | 1.099 | 0.305 | 0.335 | 0.19 |
| 1880 | 9400 | Band 2 | RMC | Ground | 0 | 13.09 | 13.5 | 1.099 | 0.430 | 0.473 | -0.03 |
| 1880 | 9400 | Band 2 | RMC | Left | 0 | 13.09 | 13.5 | 1.099 | 0.066 | 0.073 | 0.13 |
| 1880 | 9400 | Band 2 | RMC | Right | 0 | 13.09 | 13.5 | 1.099 | 0.249 | 0.274 | 0.10 |
| 1880 | 9400 | Band 2 | RMC | Bottom | 0 | 13.09 | 13.5 | 1.099 | 0.425 | 0.467 | 0.17 |
| 1907.6 | 9538 | Band 2 | RMC | Ground | 0 | 12.85 | 13.5 | 1.161 | 0.446 | 0.518 | 0.18 |
| 1852.4 | 9262 | Band 2 | RMC | Ground | 0 | 13.2 | 13.5 | 1.071 | 0.409 | 0.438 | -0.00 |

Table 15.10: SAR Values (WCDMA Band4-Body)

| Frequency | | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | | | | | |
| 1732.6 | 1413 | Band 4 | RMC | Phantom | 0 | 13.16 | 13.5 | 1.081 | 0.238 | 0.257 | 0.19 |
| 1732.6 | 1413 | Band 4 | RMC | Ground | 0 | 13.16 | 13.5 | 1.081 | 0.402 | 0.435 | 0.10 |
| 1732.6 | 1413 | Band 4 | RMC | Left | 0 | 13.16 | 13.5 | 1.081 | 0.036 | 0.039 | 0.10 |
| 1732.6 | 1413 | Band 4 | RMC | Right | 0 | 13.16 | 13.5 | 1.081 | 0.212 | 0.229 | 0.11 |
| 1732.6 | 1413 | Band 4 | RMC | Bottom | 0 | 13.16 | 13.5 | 1.081 | 0.401 | 0.434 | 0.13 |
| 1752.6 | 1513 | Band 4 | RMC | Ground | 0 | 13.11 | 13.5 | 1.205 | 0.410 | 0.449 | -0.00 |
| 1712.4 | 1312 | Band 4 | RMC | Ground | 0 | 12.69 | 13.5 | 1.093 | 0.305 | 0.368 | 0.10 |

Table 15.11: SAR Values (LTE Band7-Body)

| Frequency | | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | | | | | |
| 2535 | 21100 | Band 7 | 1RB 0offset | Phantom | 0 | 7.51 | 8.0 | 1.119 | 0.366 | 0.410 | -0.07 |
| 2535 | 21100 | Band 7 | 1RB 0offset | Ground | 0 | 7.51 | 8.0 | 1.119 | 1.080 | 1.209 | -0.12 |
| 2535 | 21100 | Band 7 | 1RB 0offset | Left | 0 | 7.51 | 8.0 | 1.119 | 0.186 | 0.208 | 0.11 |
| 2535 | 21100 | Band 7 | 1RB 0offset | Right | 0 | 7.51 | 8.0 | 1.119 | 0.181 | 0.203 | 0.11 |
| 2535 | 21100 | Band 7 | 1RB 0offset | Bottom | 0 | 7.51 | 8.0 | 1.119 | 0.379 | 0.424 | 0.14 |
| 2560 | 21350 | Band 7 | 1RB 0offset | Ground | 0 | 6.92 | 8.0 | 1.282 | 0.943 | 1.209 | 0.13 |
| 2510 | 20850 | Band 7 | 1RB 0offset | Ground | 0 | 6.83 | 8.0 | 1.309 | 0.791 | 1.036 | 0.15 |
| 2535 | 21100 | Band 7 | 50RB 0offset | Phantom | 0 | 6.89 | 7.0 | 1.026 | 0.279 | 0.286 | 0.05 |
| 2535 | 21100 | Band 7 | 50RB 0offset | Ground | 0 | 6.89 | 7.0 | 1.026 | 0.748 | 0.767 | -0.14 |
| 2535 | 21100 | Band 7 | 50RB 0offset | Left | 0 | 6.89 | 7.0 | 1.026 | 0.147 | 0.151 | 0.12 |
| 2535 | 21100 | Band 7 | 50RB 0offset | Right | 0 | 6.89 | 7.0 | 1.026 | 0.139 | 0.143 | 0.19 |
| 2535 | 21100 | Band 7 | 50RB 0offset | Bottom | 0 | 6.89 | 7.0 | 1.026 | 0.308 | 0.316 | 0.17 |
| 2560 | 21350 | Band 7 | 50RB 0offset | Ground | 0 | 5.27 | 7.0 | 1.489 | 0.708 | 1.054 | -0.17 |
| 2510 | 20850 | Band 7 | 50RB 0offset | Ground | 0 | 6.83 | 7.0 | 1.040 | 0.828 | 0.861 | -0.05 |

Table 15.12: SAR Values (LTE Band25-Body)

| Frequency | | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | | | | | |
| 1905 | 26590 | Band 25 | 1RB 99offset | Phantom | 0 | 13.15 | 14.5 | 1.365 | 0.323 | 0.441 | 0.19 |
| 1905 | 26590 | Band 25 | 1RB 99offset | Ground | 0 | 13.15 | 14.5 | 1.365 | 0.369 | 0.504 | 0.01 |
| 1905 | 26590 | Band 25 | 1RB 99offset | Left | 0 | 13.15 | 14.5 | 1.365 | 0.237 | 0.323 | -0.08 |
| 1905 | 26590 | Band 25 | 1RB 99offset | Right | 0 | 13.15 | 14.5 | 1.365 | 0.054 | 0.074 | 0.12 |
| 1905 | 26590 | Band 25 | 1RB 99offset | Bottom | 0 | 13.15 | 14.5 | 1.365 | 0.253 | 0.345 | 0.02 |
| 1882.5 | 26365 | Band 25 | 1RB 99offset | Ground | 0 | 12.43 | 14.5 | 1.611 | 0.386 | 0.622 | 0.14 |
| 1860 | 26140 | Band 25 | 1RB 99offset | Ground | 0 | 12.68 | 14.5 | 1.521 | 0.361 | 0.549 | -0.15 |
| 1907.5 | 26615 | Band 25 | 1RB 0offset | Ground | 0 | 14.25 | 14.5 | 1.059 | 0.420 | 0.445 | 0.13 |
| 1905 | 26590 | Band 25 | 50RB 25offset | Phantom | 0 | 12.83 | 14 | 1.309 | 0.363 | 0.475 | 0.15 |
| 1905 | 26590 | Band 25 | 50RB 25offset | Ground | 0 | 12.83 | 14 | 1.309 | 0.395 | 0.517 | 0.13 |
| 1905 | 26590 | Band 25 | 50RB 25offset | Left | 0 | 12.83 | 14 | 1.309 | 0.264 | 0.346 | 0.13 |
| 1905 | 26590 | Band 25 | 50RB 25offset | Right | 0 | 12.83 | 14 | 1.309 | 0.055 | 0.072 | -0.10 |
| 1905 | 26590 | Band 25 | 50RB 25offset | Bottom | 0 | 12.83 | 14 | 1.309 | 0.235 | 0.308 | 0.10 |
| 1882.5 | 26365 | Band 25 | 50RB 25offset | Ground | 0 | 12.42 | 14 | 1.439 | 0.322 | 0.463 | 0.15 |
| 1860 | 26140 | Band 25 | 50RB 25offset | Ground | 0 | 12.79 | 14 | 1.321 | 0.319 | 0.421 | 0.17 |
| 1850.7 | 26047 | Band 25 | 3RB 2offset | Ground | 0 | 13.66 | 14 | 1.081 | 0.339 | 0.367 | -0.06 |

Table 15.13: SAR Values (LTE Band41-Body)

| Frequency | | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | | | | | |
| 2549.5 | 40185 | Band 41 | 1RB 99offset | Toward Phantom | 0 | 7.49 | 8 | 1.124 | 0.142 | 0.160 | 0.11 |
| 2549.5 | 40185 | Band 41 | 1RB 99offset | Toward Ground | 0 | 7.49 | 8 | 1.124 | 0.406 | 0.457 | 0.10 |
| 2549.5 | 40185 | Band 41 | 1RB 99offset | Toward Left | 0 | 7.49 | 8 | 1.124 | 0.084 | 0.094 | 0.19 |
| 2549.5 | 40185 | Band 41 | 1RB 99offset | Toward Right | 0 | 7.49 | 8 | 1.124 | 0.064 | 0.072 | 0.15 |
| 2549.5 | 40185 | Band 41 | 1RB 99offset | Bottom | 0 | 7.49 | 8 | 1.124 | 0.180 | 0.202 | 0.14 |
| 2506 | 39750 | Band 41 | 1RB 99offset | Toward Ground | 0 | 6.17 | 8 | 1.524 | 0.360 | 0.549 | 0.06 |
| 2593 | 40620 | Band 41 | 1RB 99offset | Toward Ground | 0 | 5.10 | 5.2 | 1.023 | 0.388 | 0.397 | 0.18 |
| 2636.5 | 41055 | Band 41 | 1RB 99offset | Toward Ground | 0 | 3.96 | 5.2 | 1.330 | 0.434 | 0.577 | -0.18 |
| 2680 | 41490 | Band 41 | 1RB 99offset | Toward Ground | 0 | 3.70 | 5.2 | 1.412 | 0.610 | 0.862 | 0.13 |
| 2506 | 39750 | Band 41 | 50RB 0offset | Toward Phantom | 0 | 7.22 | 8 | 1.197 | 0.128 | 0.153 | 0.13 |
| 2506 | 39750 | Band 41 | 50RB 0offset | Toward Ground | 0 | 7.22 | 8 | 1.197 | 0.274 | 0.328 | 0.10 |
| 2506 | 39750 | Band 41 | 50RB 0offset | Toward Left | 0 | 7.22 | 8 | 1.197 | 0.066 | 0.079 | 0.10 |
| 2506 | 39750 | Band 41 | 50RB 0offset | Toward Right | 0 | 7.22 | 8 | 1.197 | 0.071 | 0.085 | 0.11 |
| 2506 | 39750 | Band 41 | 50RB 0offset | Bottom | 0 | 7.22 | 8 | 1.197 | 0.121 | 0.145 | 0.17 |
| 2549.5 | 40185 | Band 41 | 50RB 0offset | Toward Ground | 0 | 7.19 | 8 | 1.205 | 0.405 | 0.488 | 0.13 |
| 2593 | 40620 | Band 41 | 50RB 0offset | Toward Ground | 0 | 5.45 | 6 | 1.135 | 0.408 | 0.463 | 0.01 |
| 2636.5 | 41055 | Band 41 | 50RB 0offset | Toward Ground | 0 | 4.52 | 6 | 1.406 | 0.455 | 0.640 | 0.16 |
| 2680 | 41490 | Band 41 | 50RB 0offset | Toward Ground | 0 | 4.28 | 6 | 1.486 | 0.593 | 0.881 | -0.13 |

Table 15.14: SAR Values (LTE Band66-Body)

| Frequency | | Mode /Band | Service /Headset | Test Position | Spacing (mm) | Measured average power (dBm) | Maximum allowed Power (dBm) | Scaling factor | Measured SAR(1g) (W/kg) | Reported SAR(1g) (W/kg) | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | | | | | |
| 1745 | 132322 | Band 66 | 1RB 99offset | Toward Phantom | 0 | 13.58 | 14.5 | 1.236 | 0.276 | 0.314 | 0.18 |
| 1745 | 132322 | Band 66 | 1RB 99offset | Toward Ground | 0 | 13.58 | 14.5 | 1.236 | 0.371 | 0.459 | -0.10 |
| 1745 | 132322 | Band 66 | 1RB 99offset | Toward Left | 0 | 13.58 | 14.5 | 1.236 | 0.231 | 0.286 | -0.14 |
| 1745 | 132322 | Band 66 | 1RB 99offset | Toward Right | 0 | 13.58 | 14.5 | 1.236 | 0.040 | 0.049 | 0.15 |
| 1745 | 132322 | Band 66 | 1RB 99offset | Bottom | 0 | 13.58 | 14.5 | 1.236 | 0.445 | 0.55 | -0.15 |
| 1720 | 132072 | Band 66 | 1RB 99offset | Bottom | 0 | 12.89 | 14.5 | 1.449 | 0.349 | 0.506 | 0.10 |
| 1770 | 132572 | Band 66 | 1RB 99offset | Bottom | 0 | 12.75 | 14.5 | 1.496 | 0.381 | 0.570 | 0.10 |
| 1745 | 132322 | Band 66 | 50RB 50offset | Toward Phantom | 0 | 13.13 | 14 | 1.222 | 0.246 | 0.301 | 0.13 |
| 1745 | 132322 | Band 66 | 50RB 50offset | Toward Ground | 0 | 13.13 | 14 | 1.222 | 0.391 | 0.478 | 0.12 |
| 1745 | 132322 | Band 66 | 50RB 50offset | Toward Left | 0 | 13.13 | 14 | 1.222 | 0.225 | 0.275 | -0.03 |
| 1745 | 132322 | Band 66 | 50RB 50offset | Toward Right | 0 | 13.13 | 14 | 1.222 | 0.036 | 0.044 | 0.17 |
| 1745 | 132322 | Band 66 | 50RB 50offset | Bottom | 0 | 13.13 | 14 | 1.222 | 0.439 | 0.536 | -0.13 |
| 1720 | 132072 | Band 66 | 50RB 50offset | Bottom | 0 | 12.48 | 14 | 1.419 | 0.319 | 0.453 | 0.19 |
| 1770 | 132572 | Band 66 | 50RB 50offset | Bottom | 0 | 12.53 | 14 | 1.403 | 0.440 | 0.617 | 0.18 |

## 15.3. SAR Measurement Variability

SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. When both head and body tissue-equivalent media are required for SAR measurements in a frequency band, the variability measurement procedures should be applied to the tissue medium with the highest measured SAR, using the highest measured SAR configuration for that tissue-equivalent medium.

The following procedures are applied to determine if repeated measurements are required.

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps2) 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 ≥1.45W/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.

**Table 15.15 SAR Measurement Variability for Body (1g)**

| Frequency | | Mode /band | Test Position | Spacing (mm) | Original SAR (W/kg) | First Repeated SAR (W/kg) | The Ratio |
|---|---|---|---|---|---|---|---|
| MHz | Ch. | | | | | | |
| 1880 | 600 | CDMA BC1 | Toward Left | 5 | 1.02 | 1.08 | 1.06 |
| 1907.6 | 9538 | Band 2 | Toward Left | 5 | 1.00 | 0.998 | 1.002 |

# 16. SAR Reduction Function Validation Procedure

## 16.1. Power Reduction for Proximity Sensor

### 16.1.1. Reference Document

A proximity sensor for power reduction is implemented in this device to address RF exposure compliance when the cellular antenna is positioned close to the user’s body. The sensor’s mechanical structure is designed to fit within the enclosure design used in this device and also extended around the edge and top of the antenna element in order to optimize sensitivity in these orientations. This design combines the antenna printed directly on a plastic part and proximity sensor FPC (Flexible Printed Circuit) bonded together into one piece. According to KDB 616217 D04 SAR for laptop and tablets v01r02

### 16.1.2. Procedures for Determining Proximity Sensor Triggering Distances

The following procedures should be applied to determine proximity sensor triggering distances for the back surface and individual edges of a tablet. Conducted power is monitored qualitatively to identify the general triggering characteristics and recorded quantitatively, versus spacing, as required by the procedures. Unless there is built-in test software that reports the triggering conditions and enables the power levels to be confirmed separately, monitoring of conducted power during the triggering tests typically requires internal access to the antenna ports inside the tablet, which may interfere with the triggering tests.

(1) The relevant transmitter should be set to operate at its normal maximum output power.
(2) The entire back surface or edge of the tablet is positioned below a flat phantom filled with the required tissue-equivalent medium, and positioned at least 20 mm further than the distance that triggers power reduction.
(3) It should be ensured that the cables required for power measurements are not interfering with the proximity sensor. Cable losses should be properly compensated to report the measured power results.
(4) The back surface or edge is moved toward the phantom in 3 mm steps until the sensor triggers.
(5) The back surface or edge is then moved back (further away) from the phantom by at least 5 mm or until maximum output power is returned to the normal maximum level.
(6) The back surface or edge is again moved toward the phantom, but in 1 mm steps, until it is at least 5 mm past the triggering point or touching the phantom. If 1 mm resolution is not suitable for the sensor triggering sensitivity, a KDB inquiry should be submitted to determine alternative test configurations.
(7) If the tablet is not touching the phantom, it is moved in 3 mm steps until it touches the phantom to confirm that the sensor remains triggered and the maximum power stays reduced.
(8) The process is then reversed by moving the tablet away from the phantom according to steps 4) to 7), to determine triggering release, until it is at least 10 mm beyond the point that triggers the return of normal maximum power.

(9) The measured output power within ± 5 mm of the triggering points, or until the tablet is touching the phantom, for movements to and from the phantom should be tabulated in the SAR report.

(10) If the sensor design and implementation allow additional variations for triggering distance tolerances, multiple samples should be tested to determine the most conservative distance required for SAR evaluation.

(11) To ensure all production units are compliant, it is generally necessary to reduce the triggering distance determined from the triggering tests by 1 mm, or more if it is necessary, and use the smallest distance for movements to and from the phantom, minus 1 mm, as the sensor triggering distance for determining the SAR measurement distance.

### 16.1.3. Procedures for Determining Antenna and Proximity Sensor Coverage

The sensing regions are usually limited to areas near the sensor element. If a sensor is spatially offset from the antenna(s), it is necessary to verify sensor triggering for conditions where the antenna is next to the user but the sensor is laterally further away to ensure sensor coverage is sufficient for reducing the power to maintain compliance. The following are used to determine if additional SAR measurements may be necessary due to sensor and antenna offset. 25 These procedures do not apply and are not required for configurations where the antenna and sensor are collocated and the peak SAR location is overlapping with the sensor.

(1) The back surface or edge of the tablet is positioned at a test separation distance less than or equal to the distance required for back surface or edge triggering, with both the antenna and sensor pad located at least 20 mm laterally outside the edge (boundary) of the phantom, along the direction of maximum antenna and sensor offset. For the back surface, if the direction of maximum offset is not aligned with the tablet coordinates (physical edges) the tablet test position would not be aligned with the phantom coordinates (orientations). Each applicable tablet edge should be positioned perpendicularly to the phantom to determine sensor coverage. For antennas and/or sensors located near the corner of a tablet, both adjacent edges must be considered.

(2) The similar sequence of steps applied to determine sensor triggering distance in section 6.2 are used to verify back surface and edge sensor coverage by moving the tablet (sensor and antenna) horizontally toward the phantom while maintaining the same vertical separation between the back surface or edge and the phantom.

(3) After the exact location where triggering of power reduction is determined, with respect to the sensor and antenna, the tablet movement should be continued, in 3 mm increments, until both the sensor and antenna(s) are fully under the phantom and at least 20 mm inside the phantom edge.

(4) The process is then repeated from the opposite direction, starting at the other end of the maximum antenna and sensor offset, by rotating the tablet 180° along the vertical axis.

(5) The triggering points should be documented graphically, with the antenna and sensor clearly identified, along with all relevant dimensions.

(6) If the subsequently measured peak SAR location for the antenna is not between the triggering

points, established by the sensor coverage tests from opposite ends of the antenna and sensor, additional SAR tests may be required for conditions where only part of the back surface or edge of a tablet corresponding to the antenna is in proximity to the user and the sensor may not be triggering as desired. A KDB inquiry must be submitted by the test lab to determine if additional tests are required and the proper test configurations to use for testing. This may include situations where the sensor coverage region is too small for the antenna, the sensor is located too far away from the antenna, the sensor location is insufficient to cover multiple antennas or the antenna is at the corner of a tablet etc.

### 16.1.4. Proximity Sensor Status Table of Trigger Distance

As per the KDB 616217 D04 SAR for laptop and tablets v01r02, section 6.2, the following procedure is used to determine the triggering distances.

Proximity Sensor Status Table when DUT is moving towards the phantom

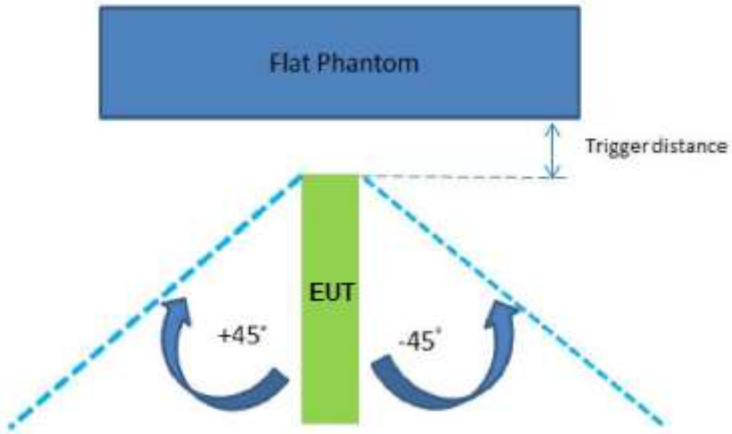
| Distance to the DUT(mm) | Proximity Sensor Status -Phantom | Proximity Sensor Status | Proximity Sensor Status | Proximity Sensor Status | Proximity Sensor Status |
|---|---|---|---|---|---|
| 40 | OFF | OFF | OFF | OFF | OFF |
| 39 | OFF | OFF | OFF | OFF | OFF |
| 38 | OFF | OFF | OFF | OFF | OFF |
| 37 | OFF | OFF | OFF | OFF | OFF |
| 36 | OFF | OFF | OFF | OFF | OFF |
| 35 | OFF | ON | OFF | OFF | OFF |
| 34 | OFF | ON | OFF | OFF | OFF |
| 33 | OFF | ON | OFF | OFF | OFF |
| 32 | OFF | ON | OFF | OFF | OFF |
| 31 | OFF | ON | OFF | OFF | OFF |
| 30 | OFF | ON | OFF | OFF | OFF |
| 29 | OFF | ON | OFF | OFF | OFF |
| 28 | OFF | ON | OFF | OFF | OFF |
| 27 | OFF | ON | OFF | OFF | OFF |
| 26 | OFF | ON | OFF | OFF | OFF |
| 25 | OFF | ON | OFF | OFF | ON |
| 24 | OFF | ON | OFF | OFF | ON |
| 23 | OFF | ON | OFF | OFF | ON |
| 22 | OFF | ON | OFF | OFF | ON |
| 21 | OFF | ON | OFF | OFF | ON |
| 20 | OFF | ON | OFF | OFF | ON |
| 19 | OFF | ON | OFF | OFF | ON |
| 18 | ON | ON | OFF | OFF | ON |
| 17 | ON | ON | OFF | OFF | ON |
| 16 | ON | ON | OFF | OFF | ON |
| 15 | ON | ON | OFF | OFF | ON |
| 14 | ON | ON | OFF | OFF | ON |
| 13 | ON | ON | OFF | OFF | ON |
| 12 | ON | ON | OFF | OFF | ON |
| 11 | ON | ON | OFF | OFF | ON |
| 10 | ON | ON | OFF | ON | ON |
| 9 | ON | ON | OFF | ON | ON |
| 8 | ON | ON | OFF | ON | ON |
| 7 | ON | ON | OFF | ON | ON |
| 6 | ON | ON | ON | ON | ON |
| 5 | ON | ON | ON | ON | ON |
| 4 | ON | ON | ON | ON | ON |
| 3 | ON | ON | ON | ON | ON |
| 2 | ON | ON | ON | ON | ON |
| 1 | ON | ON | ON | ON | ON |
| 0 | ON | ON | ON | ON | ON |

Proximity Sensor Status Table when DUT is moving away the phantom

| Distance to the DUT(mm) | Proximity Sensor Status -Phantom | Proximity Sensor Status | Proximity Sensor Status | Proximity Sensor Status | Proximity Sensor Status |
|---|---|---|---|---|---|
| 40 | OFF | OFF | OFF | OFF | OFF |
| 39 | OFF | OFF | OFF | OFF | OFF |
| 38 | OFF | OFF | OFF | OFF | OFF |
| 37 | OFF | OFF | OFF | OFF | OFF |
| 36 | OFF | OFF | OFF | OFF | OFF |
| 35 | OFF | ON | OFF | OFF | OFF |
| 34 | OFF | ON | OFF | OFF | OFF |
| 33 | OFF | ON | OFF | OFF | OFF |
| 32 | OFF | ON | OFF | OFF | OFF |
| 31 | OFF | ON | OFF | OFF | OFF |
| 30 | OFF | ON | OFF | OFF | OFF |
| 29 | OFF | ON | OFF | OFF | OFF |
| 28 | OFF | ON | OFF | OFF | OFF |
| 27 | OFF | ON | OFF | OFF | OFF |
| 26 | OFF | ON | OFF | OFF | OFF |
| 25 | OFF | ON | OFF | OFF | ON |
| 24 | OFF | ON | OFF | OFF | ON |
| 23 | OFF | ON | OFF | OFF | ON |
| 22 | OFF | ON | OFF | OFF | ON |
| 21 | OFF | ON | OFF | OFF | ON |
| 20 | OFF | ON | OFF | OFF | ON |
| 19 | OFF | ON | OFF | OFF | ON |
| 18 | ON | ON | OFF | OFF | ON |
| 17 | ON | ON | OFF | OFF | ON |
| 16 | ON | ON | OFF | OFF | ON |
| 15 | ON | ON | OFF | OFF | ON |
| 14 | ON | ON | OFF | OFF | ON |
| 13 | ON | ON | OFF | OFF | ON |
| 12 | ON | ON | OFF | OFF | ON |
| 11 | ON | ON | OFF | OFF | ON |
| 10 | ON | ON | OFF | ON | ON |
| 9 | ON | ON | OFF | ON | ON |
| 8 | ON | ON | OFF | ON | ON |
| 7 | ON | ON | OFF | ON | ON |
| 6 | ON | ON | ON | ON | ON |
| 5 | ON | ON | ON | ON | ON |
| 4 | ON | ON | ON | ON | ON |
| 3 | ON | ON | ON | ON | ON |
| 2 | ON | ON | ON | ON | ON |
| 1 | ON | ON | ON | ON | ON |
| 0 | ON | ON | ON | ON | ON |

### 16.1.5. Tilt Angle Influences to Proximity Sensor Triggering

As per the KDB 616217 D04 SAR for laptop and tablets v01r02, section 6.4, the following procedure is used to determine the tilt angle influences to proximity sensor triggering.

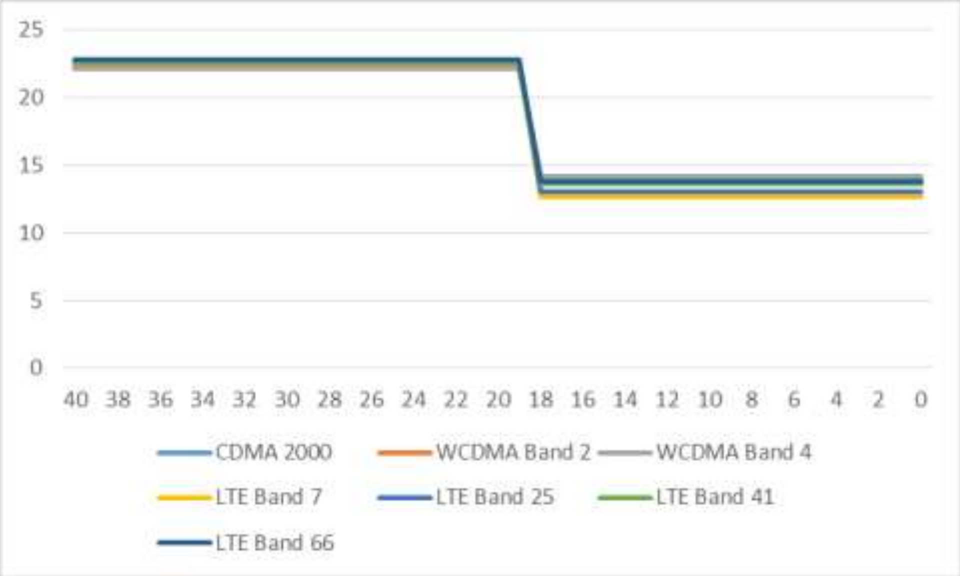



| Distance to the DUT (mm) | Proximity Sensor Status 0° to +45° | Proximity Sensor Status 0° to -45° |
|---|---|---|
| 15 | ON | ON |
| 14 | ON | ON |
| 13 | ON | ON |
| 12 | ON | ON |
| 11 | ON | ON |
| 10 | ON | ON |
| 9 | ON | ON |
| 8 | ON | ON |
| 7 | ON | ON |
| 6 | ON | ON |
| 5 | ON | ON |
| 4 | ON | ON |
| 3 | ON | ON |
| 2 | ON | ON |
| 1 | ON | ON |
| 0 | ON | ON |

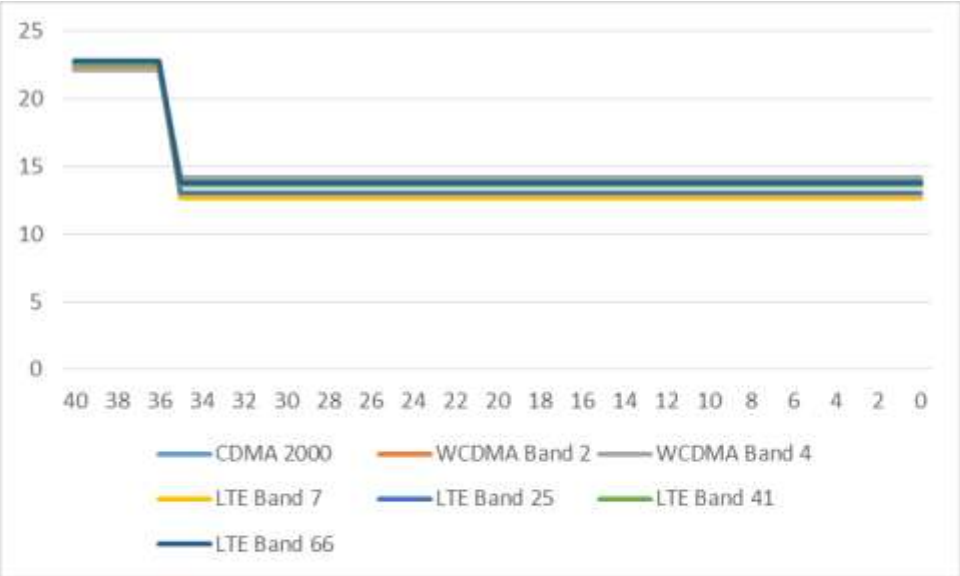
### 16.1.6. Power Reduction per Air-interface

The following graphs show the power level and the distance from the DUT to the flat phantom for the Phantom,Ground,Left,Right,Bottom.

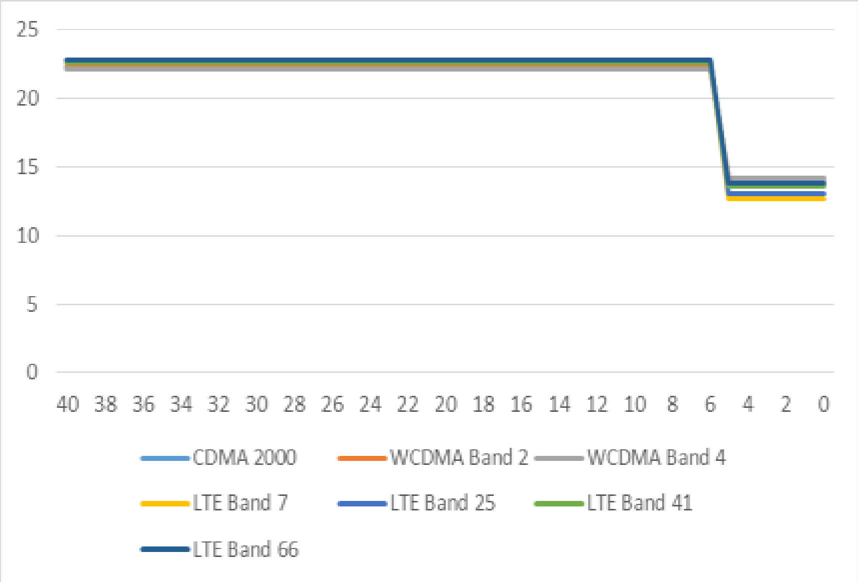
**Phantom**



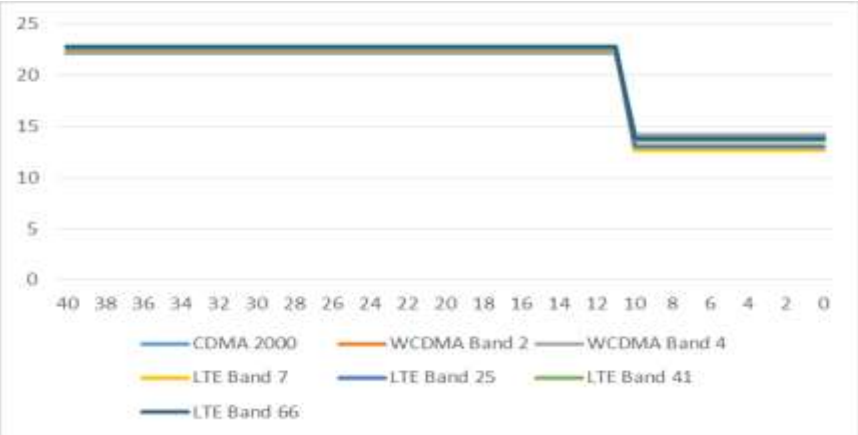

**Ground**



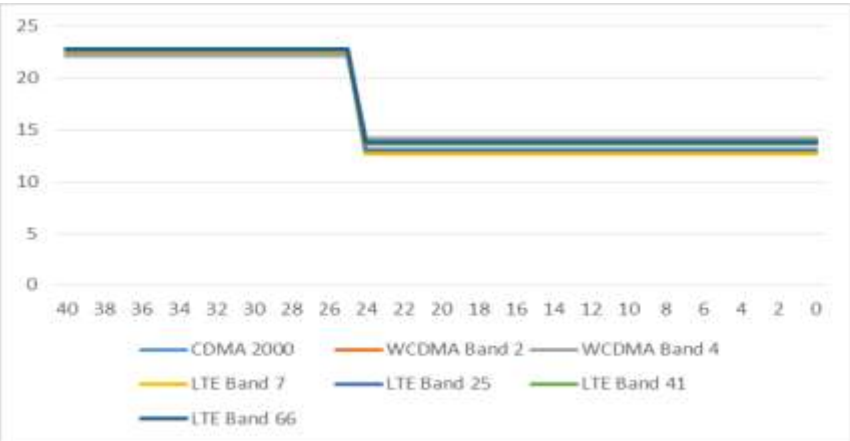
**Left**




**Right**




**Bottom**



### 16.1.7. Proximity Sensor Coverage Area

According to KDB 616217 D04, Proximity Sensor Coverage Area of not request when the antenna and sensor are collocated and the peak SAR location is overlapping with the sensor.

# 16.Measurement Uncertainty

**Measurement uncertainty evaluation for SAR test**

| Error Description | Unc. value, ±% | Prob. Dist. | Div. | $c_i$ 1g | $c_i$ 10g | Std.Unc. ±%,1g | Std.Unc. ±%,10g | $V_i$ $v_{eff}$ |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe Calibration | 6.0 | N | 1 | 1 | 1 | 6.0 | 6.0 | ∞ |
| Axial Isotropy | 0.5 | R | $\sqrt{3}$ | 0.7 | 0.7 | 0.2 | 0.2 | ∞ |
| Hemispherical Isotropy | 2.6 | R | $\sqrt{3}$ | 0.7 | 0.7 | 1.1 | 1.1 | ∞ |
| Boundary Effects | 0.8 | R | $\sqrt{3}$ | 1 | 1 | 0.5 | 0.5 | ∞ |
| Linearity | 0.6 | R | $\sqrt{3}$ | 1 | 1 | 0.3 | 0.3 | ∞ |
| System Detection Limits | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| Readout Electronics | 0.7 | N | 1 | 1 | 1 | 0.7 | 0.7 | ∞ |
| Response Time | 0 | R | $\sqrt{3}$ | 1 | 1 | 0 | 0 | ∞ |
| Integration Time | 2.6 | R | $\sqrt{3}$ | 1 | 1 | 1.5 | 1.5 | ∞ |
| RF Ambient Noise | 3.0 | R | $\sqrt{3}$ | 1 | 1 | 1.7 | 1.7 | ∞ |
| RF Ambient Reflections | 3.0 | R | $\sqrt{3}$ | 1 | 1 | 1.7 | 1.7 | ∞ |
| Probe Positioner | 1.5 | R | $\sqrt{3}$ | 1 | 1 | 0.9 | 0.9 | ∞ |
| Probe Positioning | 2.9 | R | $\sqrt{3}$ | 1 | 1 | 1.7 | 1.7 | ∞ |
| Max. SAR Eval. | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| **Test Sample Related** | | | | | | | | |
| Device Positioning | 2.9 | N | 1 | 1 | 1 | 2.9 | 2.9 | 145 |
| Device Holder | 3.6 | N | 1 | 1 | 1 | 3.6 | 3.6 | 5 |
| **Phantom and Setup** | | | | | | | | |
| Phantom Uncertainty | 4.0 | R | $\sqrt{3}$ | 1 | 1 | 2.3 | 2.3 | ∞ |
| Liquid Conductivity (target) | 5.0 | R | $\sqrt{3}$ | 0.64 | 0.43 | 1.8 | 1.2 | ∞ |
| Liquid Conductivity (meas.) | 2.5 | N | 1 | 0.64 | 0.43 | 1.6 | 1.1 | ∞ |
| Liquid Permittivity (target) | 5.0 | R | $\sqrt{3}$ | 0.6 | 0.49 | 1.7 | 1.4 | ∞ |
| Liquid Permittivity (meas.) | 2.5 | N | 1 | 0.6 | 0.49 | 1.5 | 1.2 | ∞ |

**Measurement uncertainty evaluation for system validation**

| Error Description | Unc. value, ±% | Prob. Dist. | Div. | $c_i$ 1g | $c_i$ 10g | Std.Unc. ±%,1g | Std.Unc. ±%,10g | $V_i$ $v_{eff}$ |
|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | |
| Probe Calibration | 6.0 | N | 1 | 1 | 1 | 6.0 | 6.0 | ∞ |
| Axial Isotropy | 0.5 | R | $\sqrt{3}$ | 0.7 | 0.7 | 0.2 | 0.2 | ∞ |
| Hemispherical Isotropy | 2.6 | R | $\sqrt{3}$ | 0.7 | 0.7 | 1.1 | 1.1 | ∞ |
| Boundary Effects | 0.8 | R | $\sqrt{3}$ | 1 | 1 | 0.5 | 0.5 | ∞ |
| Linearity | 0.6 | R | $\sqrt{3}$ | 1 | 1 | 0.3 | 0.3 | ∞ |
| System Detection Limits | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| Readout Electronics | 0.7 | N | 1 | 1 | 1 | 0.7 | 0.7 | ∞ |
| Response Time | 0 | R | $\sqrt{3}$ | 1 | 1 | 0 | 0 | ∞ |
| Integration Time | 2.6 | R | $\sqrt{3}$ | 1 | 1 | 1.5 | 1.5 | ∞ |
| RF Ambient Noise | 3.0 | R | $\sqrt{3}$ | 1 | 1 | 1.7 | 1.7 | ∞ |
| RF Ambient Reflections | 3.0 | R | $\sqrt{3}$ | 1 | 1 | 1.7 | 1.7 | ∞ |
| Probe Positioner | 1.5 | R | $\sqrt{3}$ | 1 | 1 | 0.9 | 0.9 | ∞ |
| Probe Positioning | 2.9 | R | $\sqrt{3}$ | 1 | 1 | 1.7 | 1.7 | ∞ |
| Max. SAR Eval. | 1.0 | R | $\sqrt{3}$ | 1 | 1 | 0.6 | 0.6 | ∞ |
| **Diople** | | | | | | | | |
| Power Drift | 5.0 | R | $\sqrt{3}$ | 1 | 1 | 2.9 | 2.9 | ∞ |
| Dipole Positioning | 2.0 | N | 1 | 1 | 1 | 2.0 | 2.0 | ∞ |
| Dipole Input Power | 5.0 | N | 1 | 1 | 1 | 5.0 | 5.0 | ∞ |
| **Phantom and Setup** | | | | | | | | |
| Phantom Uncertainty | 4.0 | R | $\sqrt{3}$ | 1 | 1 | 2.3 | 2.3 | ∞ |
| Liquid Conductivity (target) | 5.0 | R | $\sqrt{3}$ | 0.64 | 0.43 | 1.8 | 1.2 | ∞ |
| Liquid Conductivity (meas.) | 2.5 | N | 1 | 0.64 | 0.43 | 1.6 | 1.1 | ∞ |
| Liquid Permittivity (target) | 5.0 | R | $\sqrt{3}$ | 0.6 | 0.49 | 1.7 | 1.4 | ∞ |
| Liquid Permittivity (meas.) | 2.5 | N | 1 | 0.6 | 0.49 | 1.5 | 1.2 | ∞ |
| | | | | | | | | |
| **Combined Std Uncertainty** | | | | | | ±11.2% | ±10.9% | 387 |
| **Expanded Std Uncertainty** | | | | | | **±22.4%** | **±21.8%** | |

# 17.MAIN TEST INSTRUMENTS

**Table 16.1: List of Main Instruments**

| No. | Name | Type | Serial Number | Calibration Date | Valid Period |
|---|---|---|---|---|---|
| 01 | Probe | EX3DV4 | 3844 | 2019-05-25 | 2020-05-24 |
| 02 | DAE | DAE4 | 797 | 2019-08-22 | 2020-08-21 |
| 03 | Power Meter | N1914A | MY50001660 | 2019-03-02 | 2020-03-01 |
| 04 | Radio Communication Analyzer | CMW500 | 164483 | 2019-03-02 | 2020-03-01 |
| 05 | Signal Generator | N5181A | MY50143363 | 2019-03-02 | 2020-03-01 |
| 06 | Power Sensor | E8481H | MY51020011 | 2019-03-02 | 2020-03-01 |
| 07 | Power Amplifier | ZHL | QA1202003 | 2019-03-02 | 2020-03-01 |
| 08 | Attenuator | 8491A | MY39267989 | 2019-03-02 | 2020-03-01 |
| 09 | Probe kit | 85070E | 3G-S-00139 | NA | NA |
| 10 | Network Analyzer | E5071C | US39175666 | c | 2020-03-01 |
| 11 | D1750V2 | dipole | 1063 | 2019-01-18 | 2020-01-17 |
| 12 | D1900V2 | dipole | 5d153 | 2019-01-18 | 2020-01-17 |
| 13 | D2600V2 | dipole | 1045 | 2019-01-17 | 2020-01-16 |

***END OF REPORT BODY***

# ANNEX A. ANNEX A.GRAPH RESULTS

## CDMA 2000 Body Toward Left Middle

Date/Time: 2019/10/17
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used: f = 1880 MHz; σ = 1.425 S/m; εr = 38.664; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: CDMA 2000; Frequency: 1880 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(8.07, 8.07, 8.07)
**Middle Left CDMA BC1 5mm/Area Scan (4x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.07 W/kg
**Middle Left CDMA BC1 5mm/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 22.52 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 2.04 W/kg
SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.572 W/kg
Maximum value of SAR (measured) = 1.20 W/kg

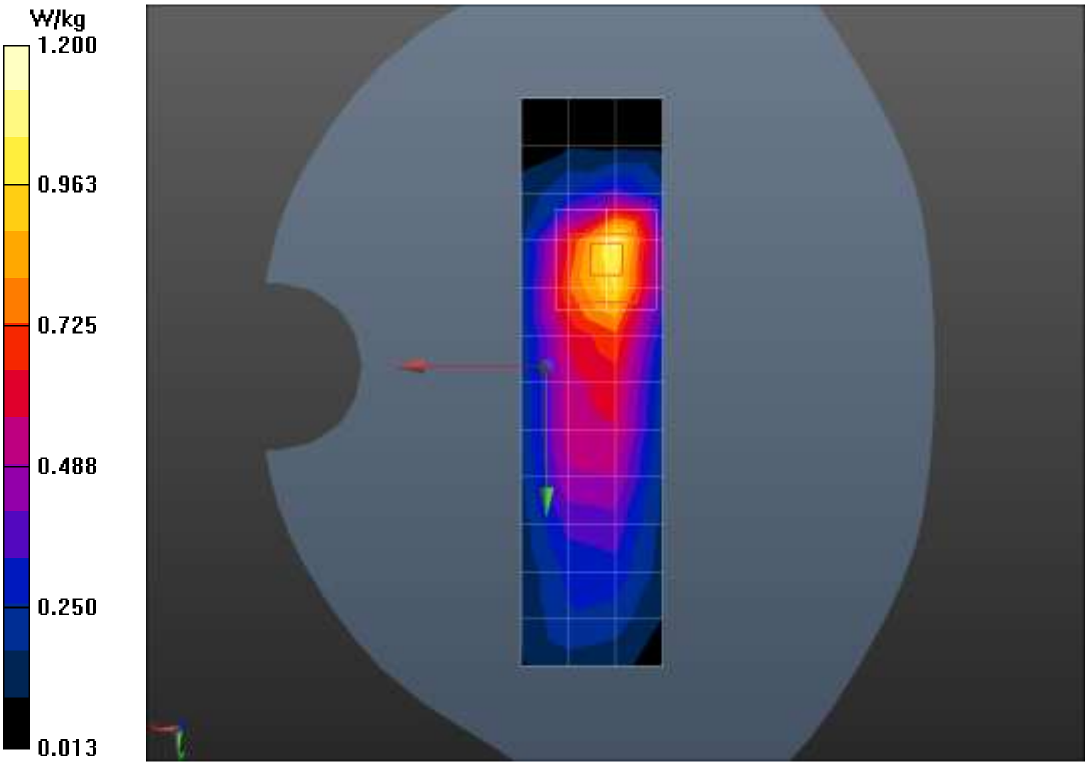



**Fig.1 CDMA BC1 Left Mode Middle**

## WCDMA Band 2 Body Toward Left High

Date/Time: 2019/10/17
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used: f = 1908 MHz; σ = 1.453 S/m; εr = 38.532; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: WCDMA Band2; Frequency: 1907.6 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(8.07, 8.07, 8.07)
**High Left WCDMA Band II/Area Scan (4x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 1.07 W/kg
**High Left WCDMA Band II/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.47 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.93 W/kg
SAR(1 g) = 1 W/kg; SAR(10 g) = 0.534 W/kg
Maximum value of SAR (measured) = 1.11 W/kg

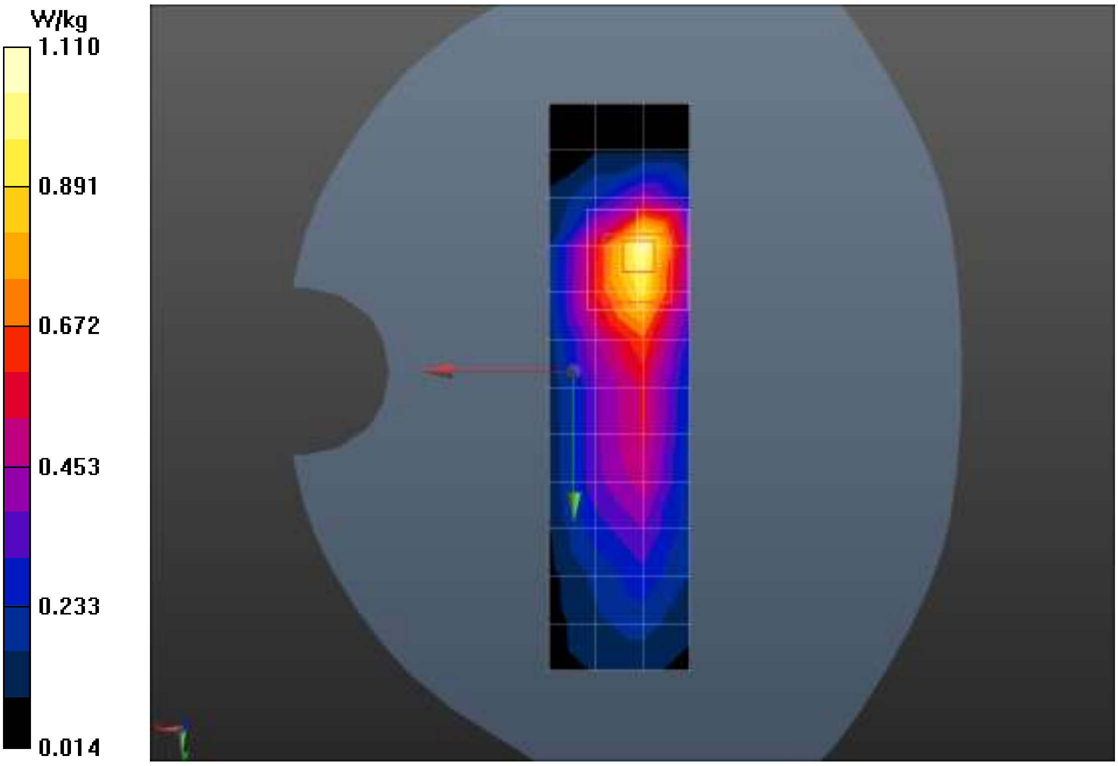



**Fig.2 WCDMA Band 2 Left Mode High**

## WCDMA Band 4 Body Toward Left High

Date/Time: 2019/10/15
Electronics: DAE4 Sn797
Medium: Head 1750MHz
Medium parameters used: f = 1753 MHz; σ = 1.364 S/m; εr = 41.596; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃　　Liquid Temperature:22.5 ℃
Communication System: WCDMA Band 4; Frequency: 1752.6 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(8.5, 8.5, 8.5)
**High Left WCDMA Band 4 5mm/Area Scan (4x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.550 W/kg
**High Left WCDMA Band 4 5mm/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 19.01 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.895 W/kg
SAR(1 g) = 0.489 W/kg; SAR(10 g) = 0.289 W/kg
Maximum value of SAR (measured) = 0.539 W/kg

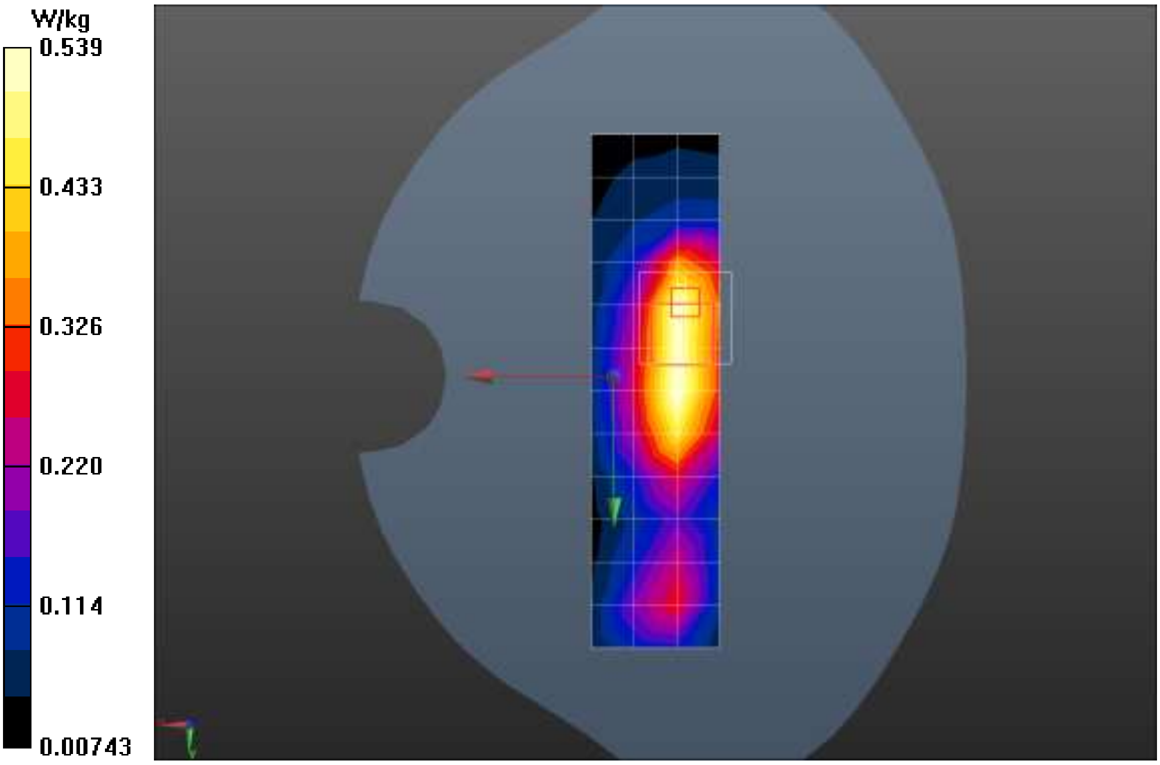



**Fig.3 WCDMA Band 4 Left Mode High**

## LTE Band 7 Body Toward Left High

Date/Time: 2019/10/21
Electronics: DAE4 Sn797
Medium: Head 2600MHz
Medium parameters used: f = 2560 MHz; σ = 1.95 S/m; εr = 39.796; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃  Liquid Temperature:22.5 ℃
Communication System: LTE Band 7; Frequency: 2560 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(7.4, 7.4, 7.4)
**High Left LTE Band 7 50RB@25 5mm/Area Scan (5x16x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.641 W/kg
**High Left LTE Band 7 50RB@25 5mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.78 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 1.39 W/kg
SAR(1 g) = 0.669 W/kg; SAR(10 g) = 0.325 W/kg
Maximum value of SAR (measured) = 0.746 W/kg

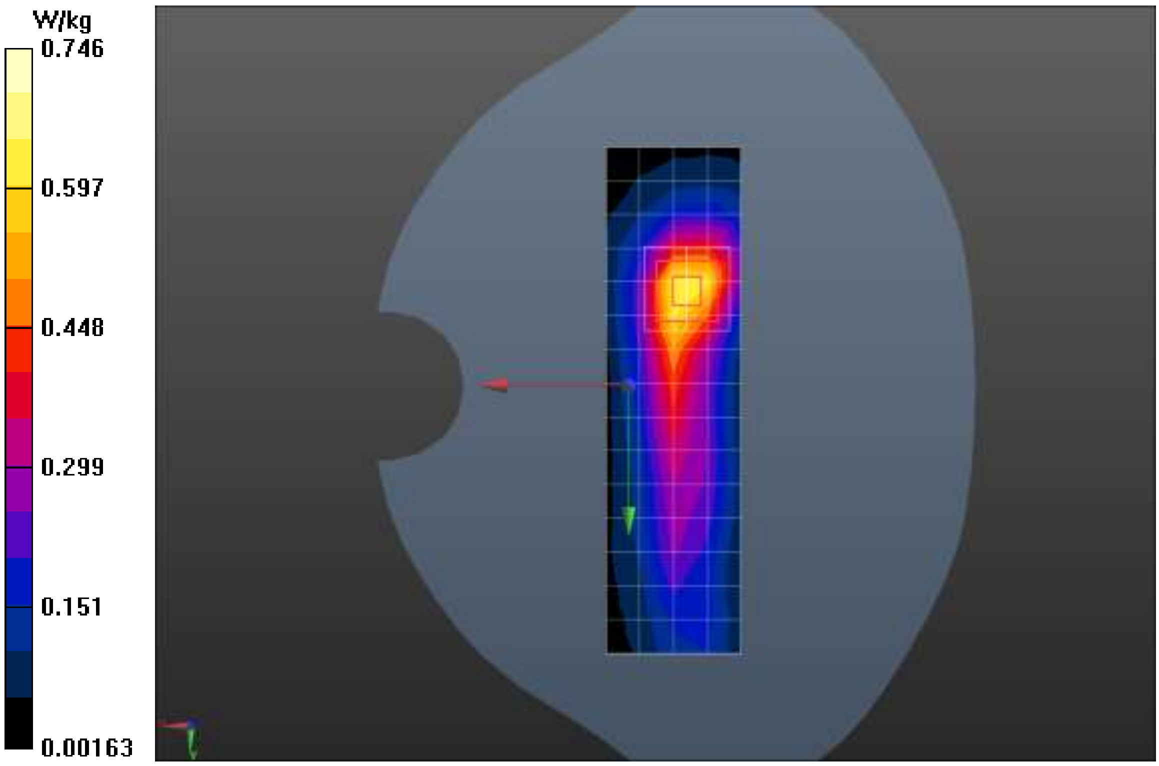



**Fig.4 LTE Band 7 Left Mode High**

## LTE Band 25 Body Toward Left High

Date/Time: 2019/10/17
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used: f = 1905 MHz; σ = 1.45 S/m; εr = 38.544; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: LTE Band 25; Frequency: 1905 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(8.07, 8.07, 8.07)
**High Left LTE Band 25 50RB@25 5mm 2/Area Scan (4x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.763 W/kg
**High Left LTE Band 25 50RB@25 5mm 2/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.19 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.759 W/kg; SAR(10 g) = 0.406 W/kg
Maximum value of SAR (measured) = 0.839 W/kg

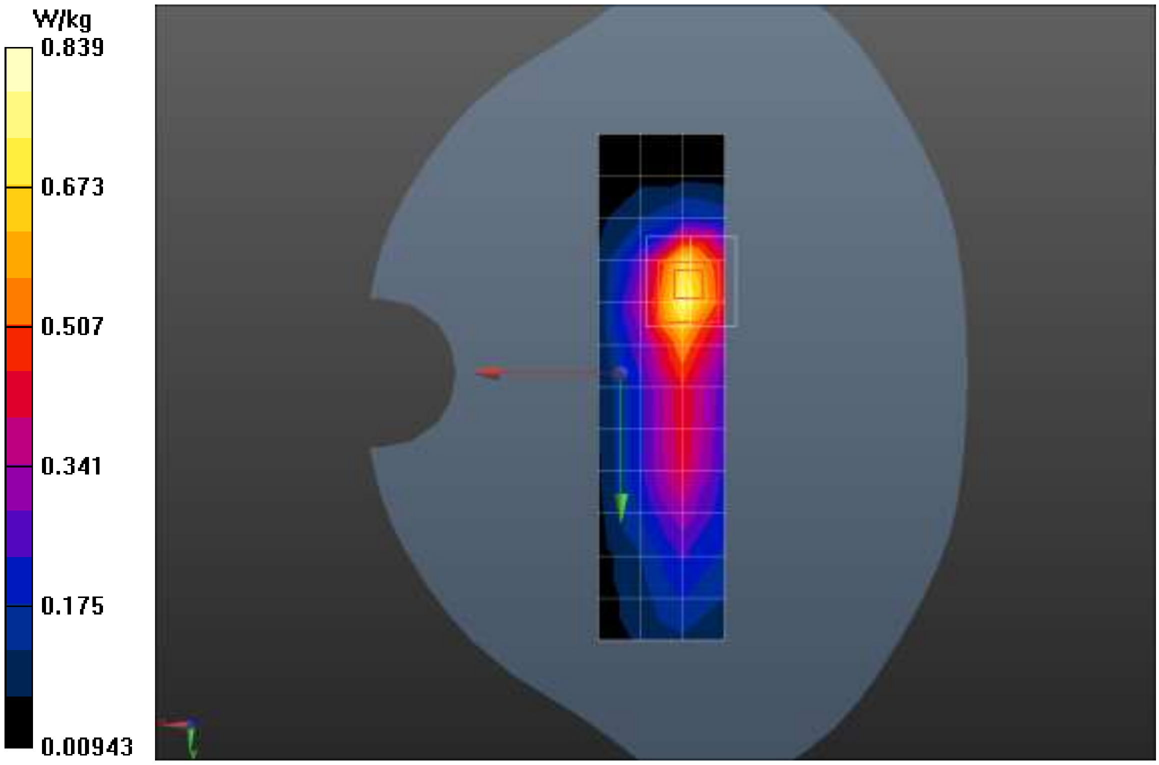



**Fig.5 LTE Band 25 Left Mode High**

## LTE Band 41 Body Toward Left High

Date/Time: 2019/10/21
Electronics: DAE4 Sn797
Medium: Head 2600MHz
Medium parameters used: f = 2680 MHz; σ = 2.086 S/m; εr = 39.42; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃　　Liquid Temperature:22.5 ℃
Communication System:LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(7.4, 7.4, 7.4)
**High Left LTE Band 41 1RB@50 5mm/Area Scan (5x16x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.500 W/kg
**High Left LTE Band 41 1RB@50 5mm/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.63 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.09 W/kg
SAR(1 g) = 0.485 W/kg; SAR(10 g) = 0.234 W/kg
Maximum value of SAR (measured) = 0.545 W/kg

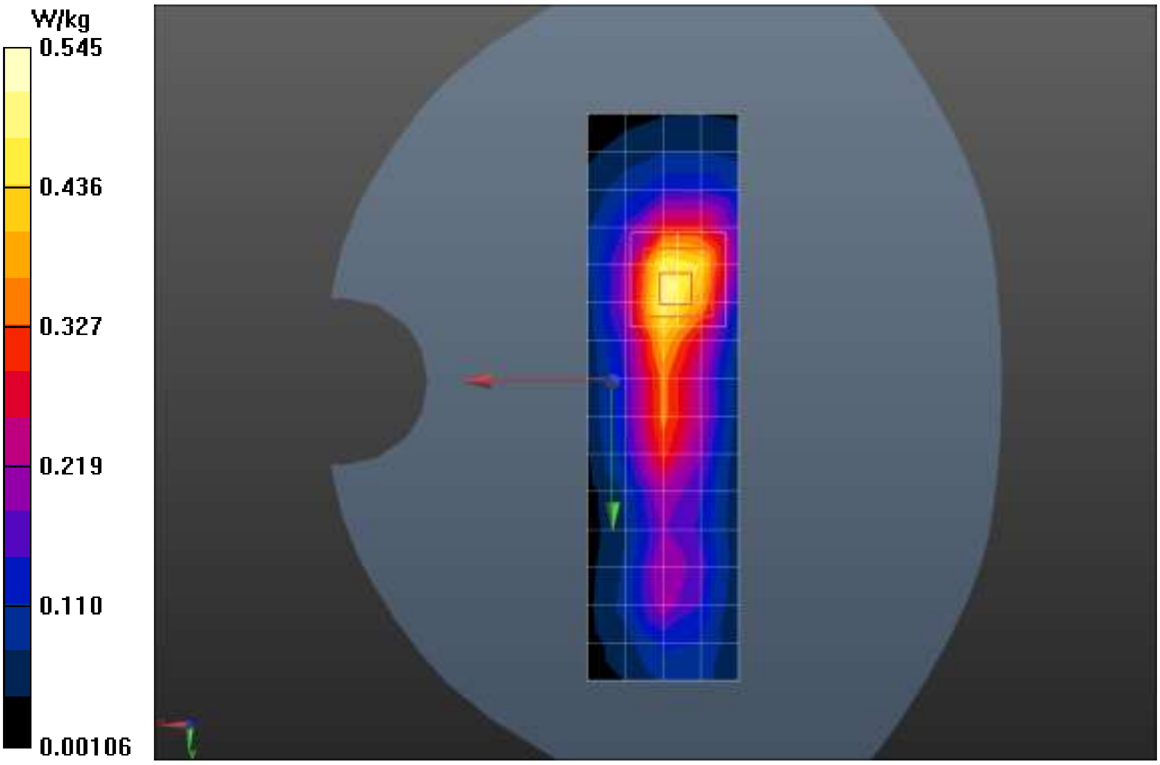



**Fig.6 LTE Band 41 Left Mode High**

## LTE Band 66 Body Toward Left High

Date/Time: 2019/10/15
Electronics: DAE4 Sn797
Medium: Head 1750MHz
Medium parameters used: f = 1770 MHz; σ = 1.38 S/m; εr = 41.507; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃        Liquid Temperature:22.5 ℃
Communication System: LTE Band 66; Frequency: 1770 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(8.5, 8.5, 8.5)
**High Left LTE Band 66 1RB@50/Area Scan (4x13x1): Measurement grid:** dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.749 W/kg
**High Left LTE Band 66 1RB@50/Zoom Scan (5x5x7)/Cube 0: Measurement grid:** dx=8mm, dy=8mm, dz=5mm
Reference Value = 20.26 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.30 W/kg
SAR(1 g) = 0.691 W/kg; SAR(10 g) = 0.384 W/kg
Maximum value of SAR (measured) = 0.754 W/kg

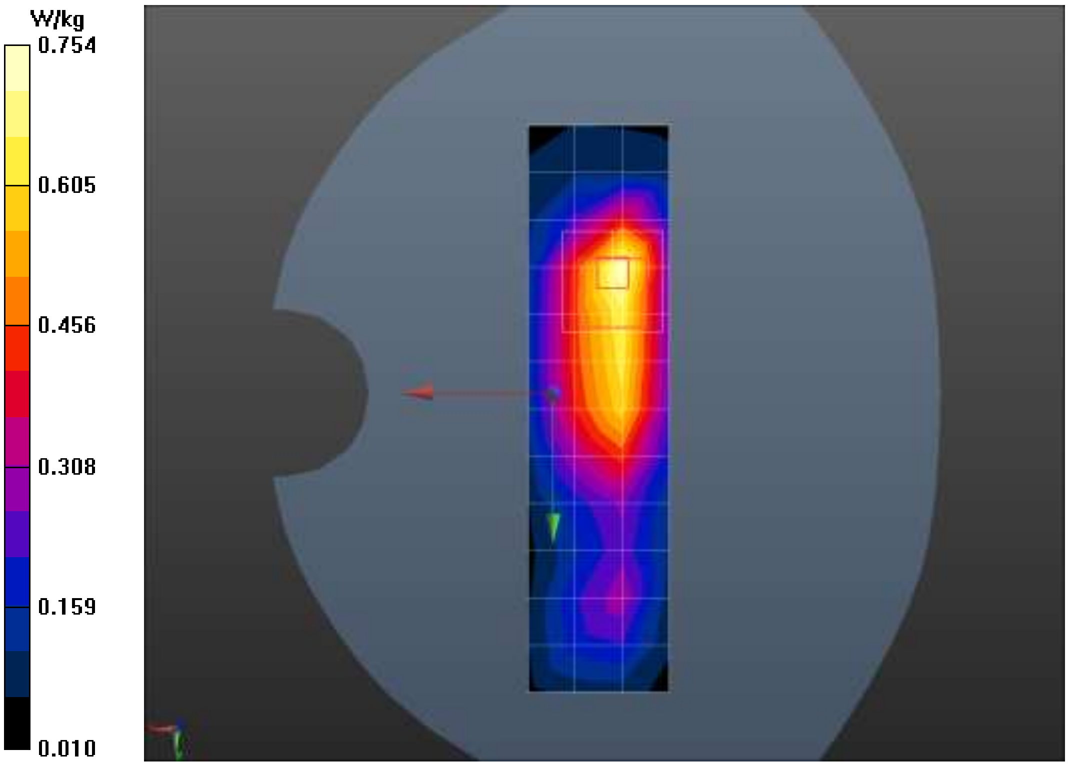



**Fig.7 LTE Band 66 Left Mode High**

## CDMA 2000 Body Toward Ground High

Date/Time: 2019/10/17
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used: f = 1909 MHz; σ = 1.455 S/m; εr = 38.527; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃　　Liquid Temperature:22.5 ℃
Communication System: CDMA 2000; Frequency: 1908.8 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(8.07, 8.07, 8.07)
**High Toward Ground CDMA BC1/Area Scan (8x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.757 W/kg
**High Toward Ground CDMA BC1/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.627 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 1.49 W/kg
SAR(1 g) = 0.725 W/kg; SAR(10 g) = 0.408 W/kg
Maximum value of SAR (measured) = 0.760 W/kg

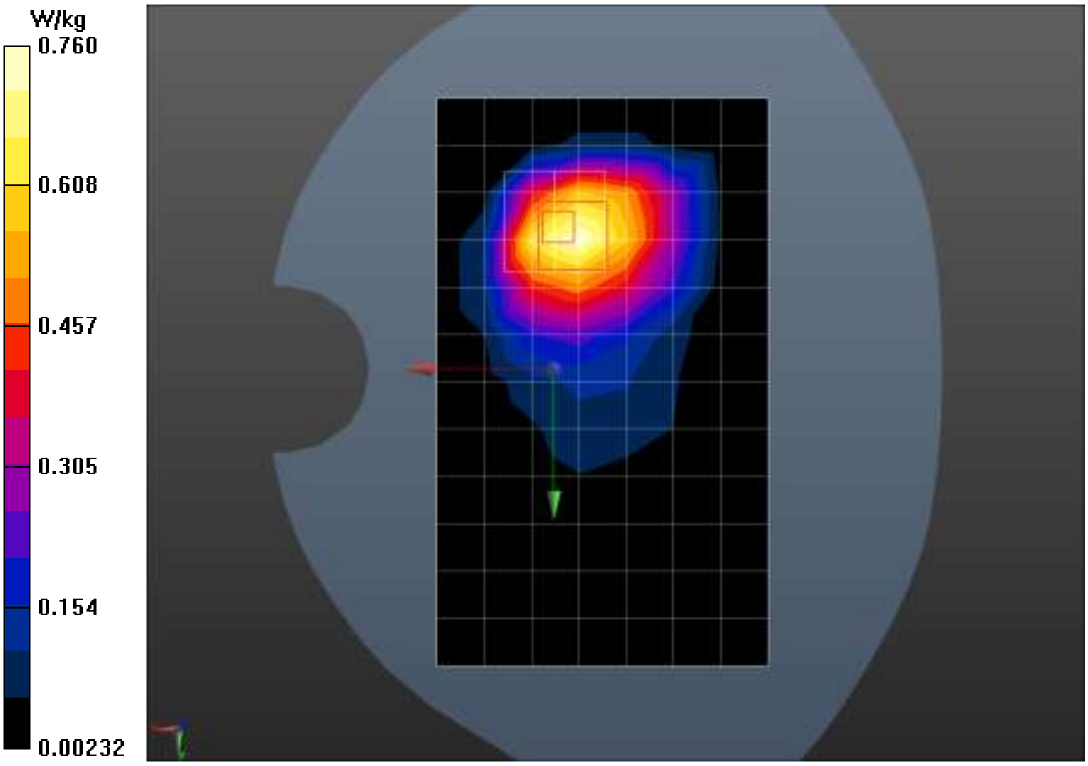



**Fig.8 CDMA BC1 Ground Mode High**

## WCDMA Band 2 Body Toward Ground High

Date/Time: 2019/10/17
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used: f = 1908 MHz; σ = 1.453 S/m; εr = 38.532; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃  Liquid Temperature:22.5 ℃
Communication System: WCDMA Band2; Frequency: 1907.6 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(8.07, 8.07, 8.07)
**High Toward Ground WCDMA Band II/Area Scan (8x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.462 W/kg
**High Toward Ground WCDMA Band II/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.515 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.883 W/kg
SAR(1 g) = 0.446 W/kg; SAR(10 g) = 0.250 W/kg
Maximum value of SAR (measured) = 0.472 W/kg

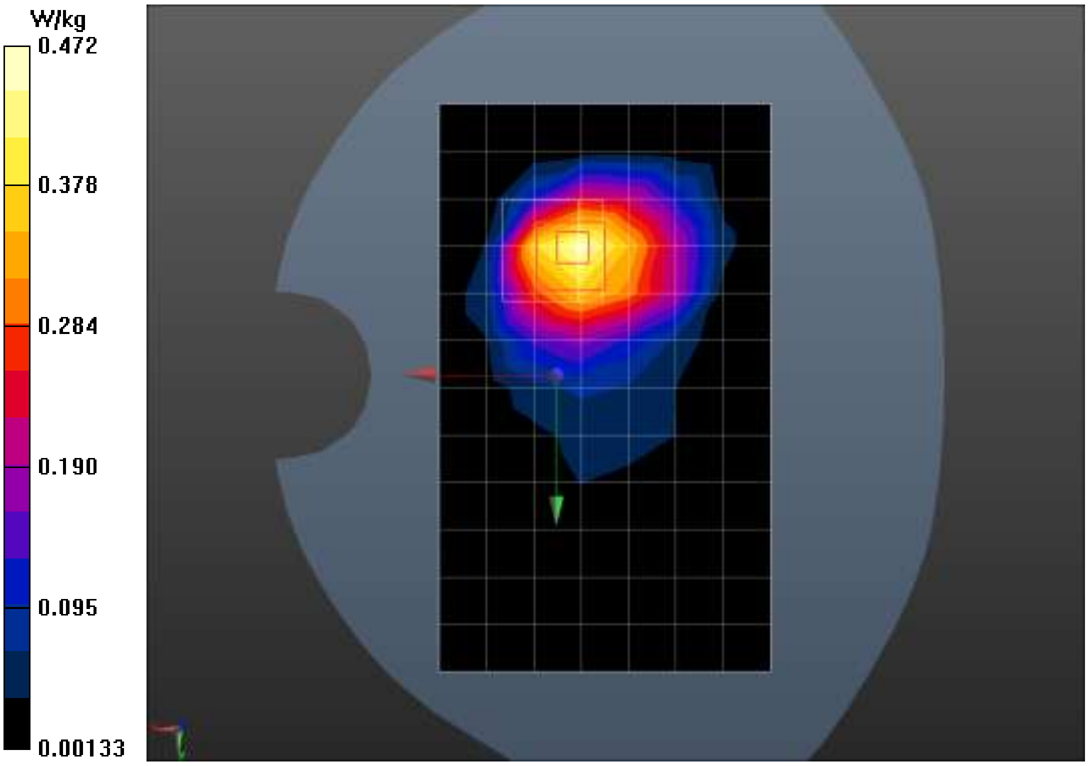



**Fig.9 WCDMA Band 2 Ground Mode High**

## WCDMA Band 4 Body Toward Ground High

Date/Time: 2019/10/15
Electronics: DAE4 Sn797
Medium: Head 1750MHz
Medium parameters used: f = 1753 MHz; σ = 1.364 S/m; εr = 41.596; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System:WCDMA Band4; Frequency: 1752.6 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(8.5, 8.5, 8.5)
**High Toward Ground WCDMA Band 4/Area Scan (8x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.387 W/kg
**High Toward Ground WCDMA Band 4/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.403 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 0.788 W/kg
SAR(1 g) = 0.410 W/kg; SAR(10 g) = 0.234 W/kg
Maximum value of SAR (measured) = 0.445 W/kg

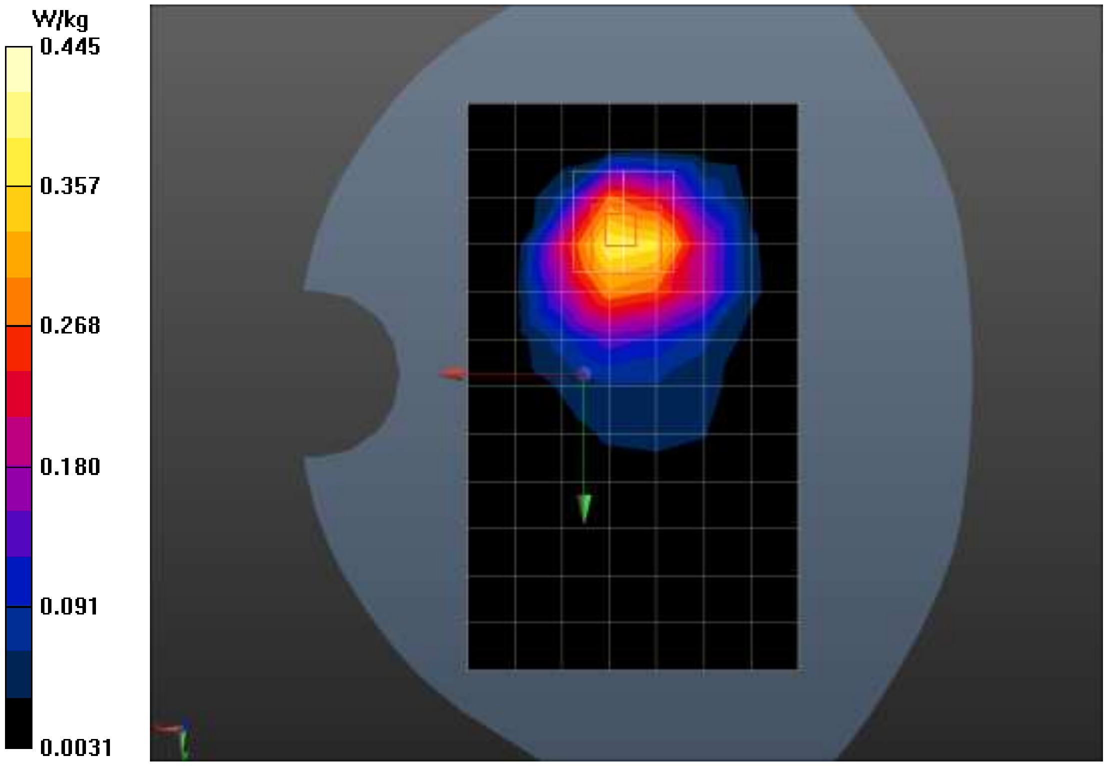



**Fig.10 WCDMA Band 4 Ground Mode High**

## LTE Band 7 Body Toward Ground Middle

Date/Time: 2019/10/21
Electronics: DAE4 Sn797
Medium: Head 2600MHz
Medium parameters used: f = 2535 MHz; σ = 1.921 S/m; εr = 39.894; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: LTE Band 7; Frequency: 2535 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(7.48, 7.48, 7.48)
**Middle Toward Ground LTE Band 7 1RB@0/Area Scan (10x16x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 1.09 W/kg
**Middle Toward Ground LTE Band 7 1RB@0/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.373 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 2.99 W/kg
SAR(1 g) = 1.08 W/kg; SAR(10 g) = 0.407 W/kg
Maximum value of SAR (measured) = 1.09 W/kg

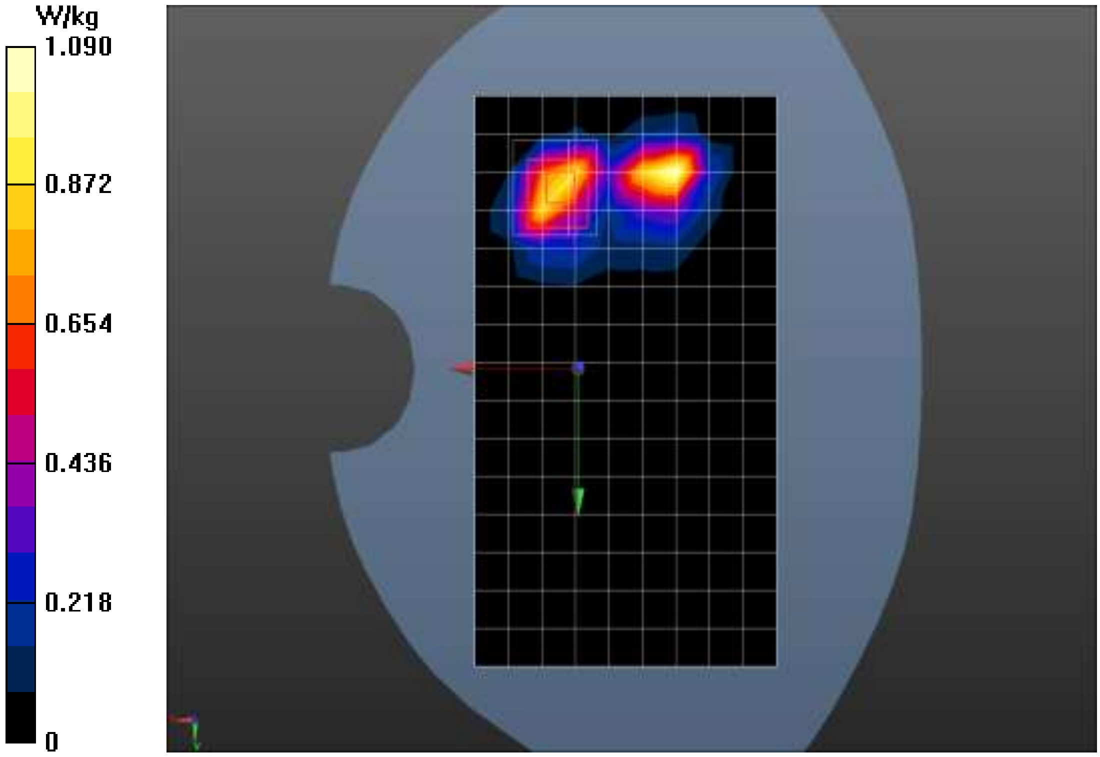



**Fig.11 LTE Band 7 Ground Mode High**

## LTE Band 25 Body Toward Ground Middle

Date/Time: 2019/10/17
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used (interpolated): f = 1882.5 MHz; σ = 1.427 S/m; εr = 38.651; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: LTE Band 25 ; Frequency: 1882.5 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(8.07, 8.07, 8.07)
**Middle Toward Ground LTE Band 25 1RB@99/Area Scan (8x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.408 W/kg
**Middle Toward Ground LTE Band 25 1RB@99/Zoom Scan (5x5x7)/Cube 0:**
Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.964 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.752 W/kg
SAR(1 g) = 0.386 W/kg; SAR(10 g) = 0.221 W/kg
Maximum value of SAR (measured) = 0.415 W/kg

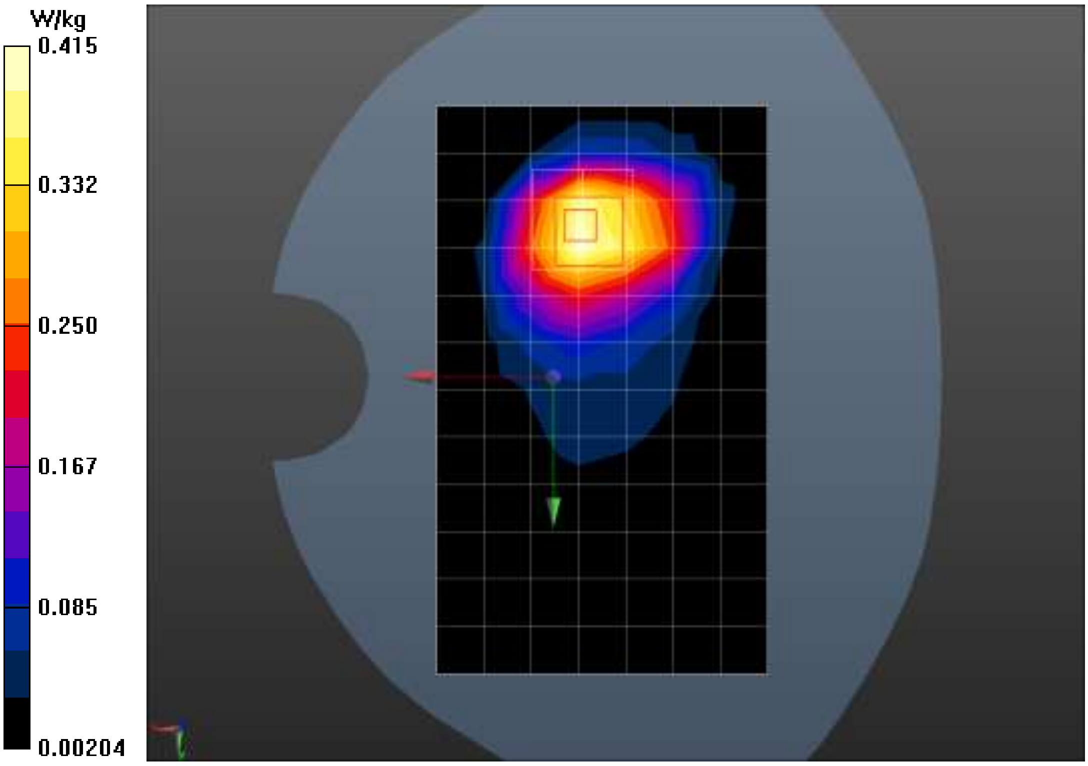



**Fig.12 LTE Band 25 Ground Mode Middle**

## LTE Band 41 Body Toward Ground High

Date/Time: 2019/10/21
Electronics: DAE4 Sn797
Medium: Head 2600MHz
Medium parameters used: f = 2680 MHz; σ = 2.086 S/m; εr = 39.42; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃　　Liquid Temperature:22.5 ℃
Communication System: LTE Band 41; Frequency: 2680 MHz; Duty Cycle: 1:1.59
Probe: EX3DV4 - SN3844ConvF(7.4, 7.4, 7.4)
**High Toward Ground LTE Band 41 50RB@0/Area Scan (10x16x1):** Measurement grid: dx=12mm, dy=12mm
Maximum value of SAR (measured) = 0.504 W/kg
**High Toward Ground LTE Band 41 50RB@0/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.394 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.72 W/kg
SAR(1 g) = 0.593 W/kg; SAR(10 g) = 0.209 W/kg
Maximum value of SAR (measured) = 0.708 W/kg

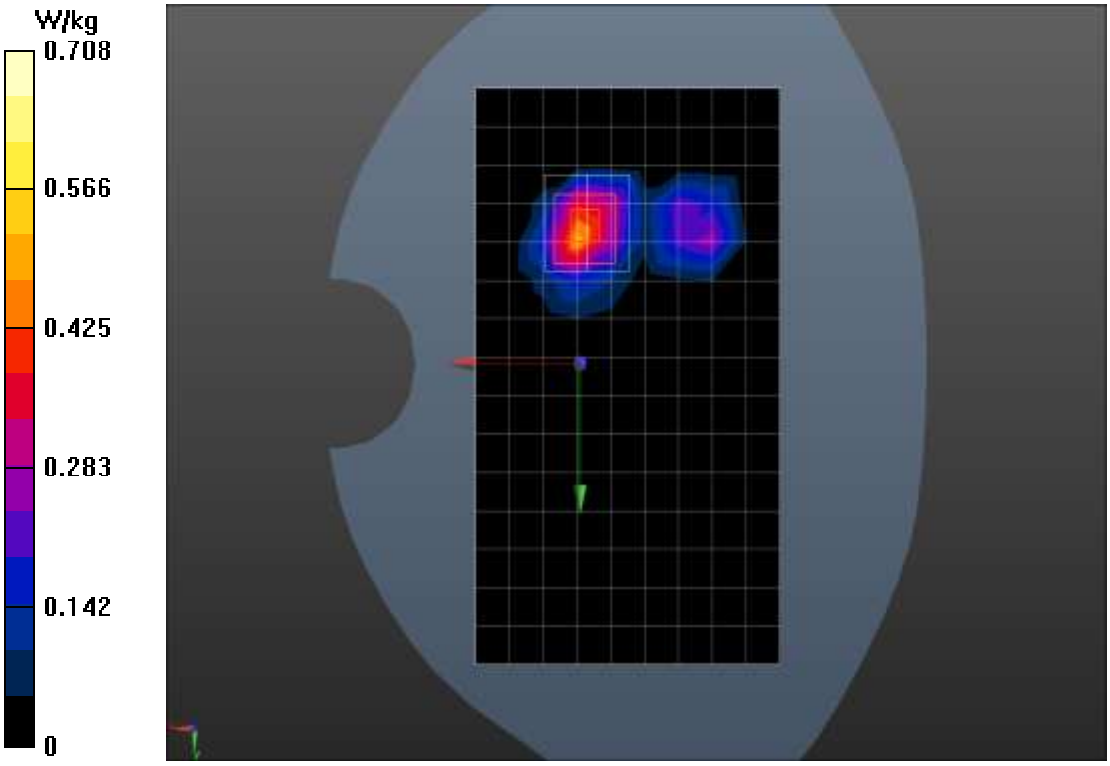



**Fig.13 LTE Band 41 Ground Mode High**

## LTE Band 66 Body Toward Bottom Middle

Date/Time: 2019/10/15
Electronics: DAE4 Sn797
Medium: Head 1750MHz
Medium parameters used: f = 1770 MHz; σ = 1.38 S/m; εr = 41.507; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: LTE Band 66 ; Frequency: 1770 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(8.5, 8.5, 8.5);
**Middle Bottom nd 66 50RB@50/Area Scan (8x13x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 0.352 W/kg
**Middle Bottom LTE Band 66 50RB@50/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.353 V/m; Power Drift = 0.19 dB
Peak SAR (extrapolated) = 0.856 W/kg
SAR(1 g) = 0.440 W/kg; SAR(10 g) = 0.221 W/kg
Maximum value of SAR (measured) = 0.505 W/kg

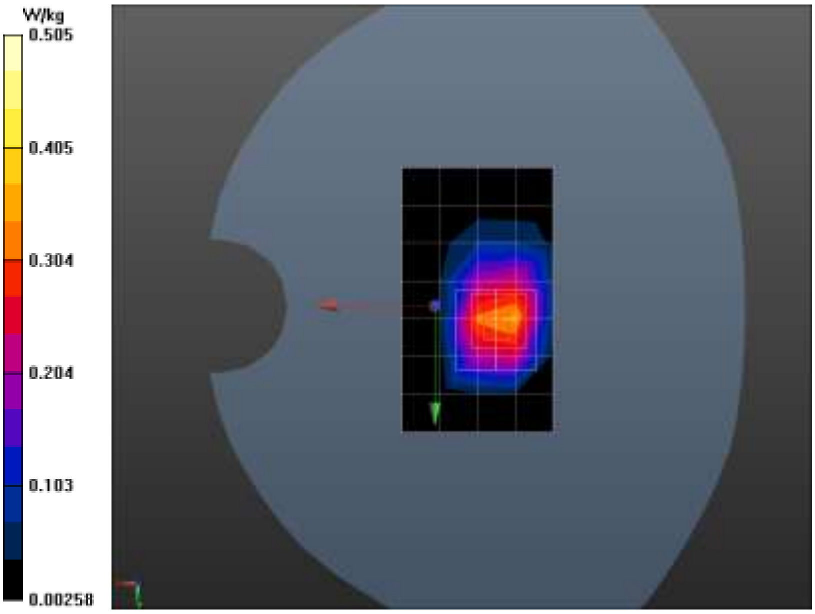
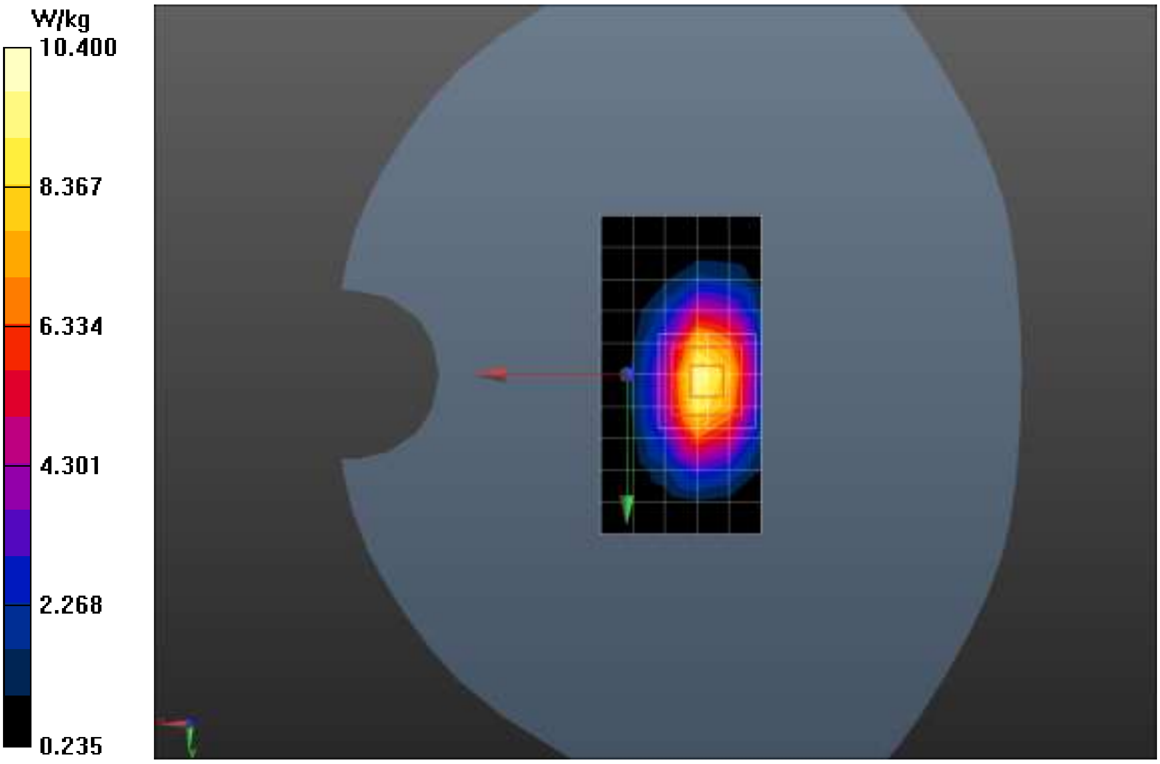



**Fig.14 LTE Band 66 Ground Mode Middle**

## ANNEX B. SYSTEM VALIDATION RESULTS

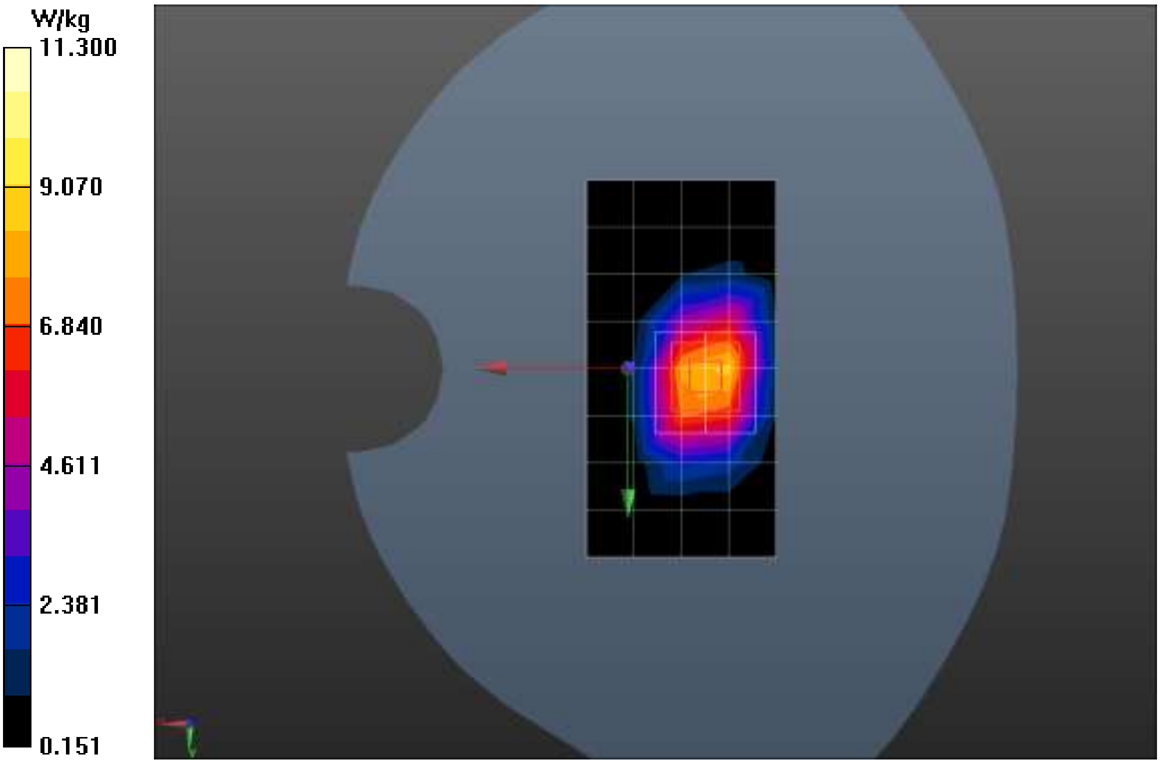
### System 1750MHz

Date/Time: 2019/10/15
Electronics: DAE4 Sn797
Medium: Head 1750MHz
Medium parameters used: f = 1750 MHz; σ = 1.362 S/m; εr = 41.611; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: CW ; Frequency: 1750 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(8.5, 8.5, 8.5); Calibrated: 2019/5/25
**System Head 1750MHz/Area Scan (6x11x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 9.80 W/kg
**System Head 1750MHz/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 72.89 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 16.9 W/kg
SAR(1 g) = 9.22 W/kg; SAR(10 g) = 4.9 W/kg
Maximum value of SAR (measured) = 10.4 W/kg



## System 1900MHz

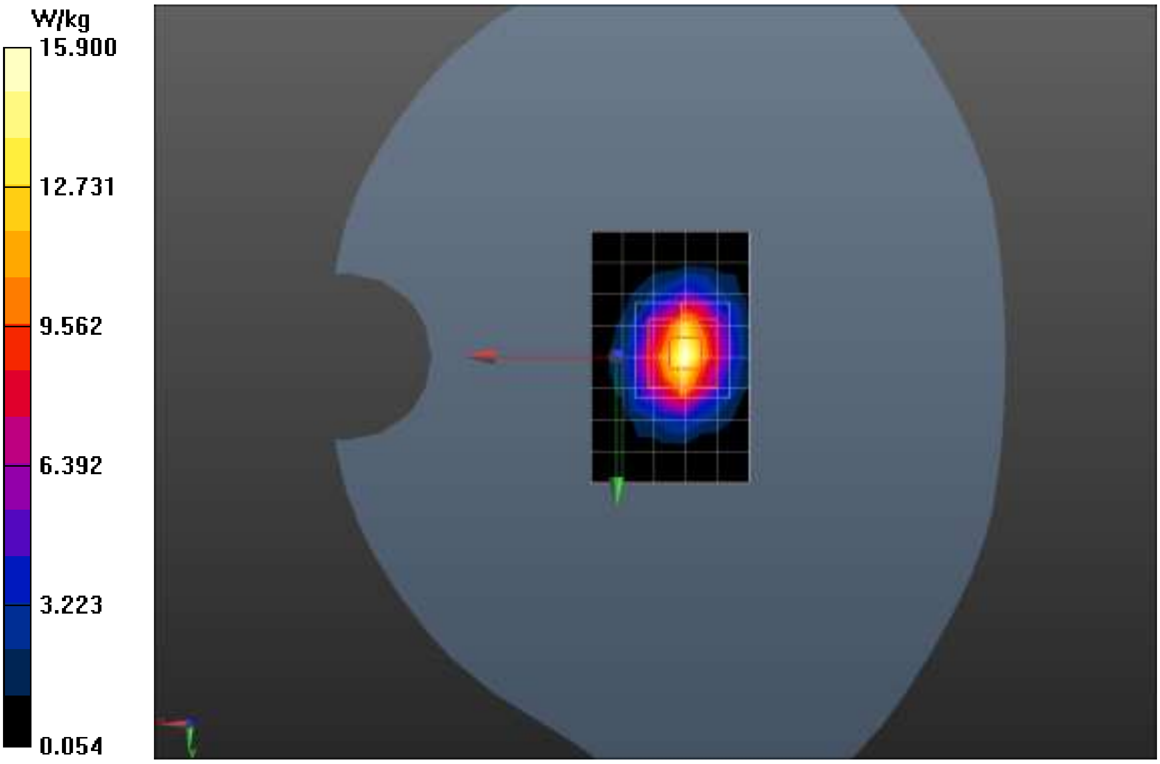
Date/Time: 2019/10/17
Electronics: DAE4 Sn797
Medium: Head 1900MHz
Medium parameters used: f = 1900 MHz; σ = 1.445 S/m; εr = 38.569; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(8.07, 8.07, 8.07); Calibrated: 2019/5/25
**System Head 1900MHz/Area Scan (5x9x1):** Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 8.61 W/kg
**System Head 1900MHz/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 73.66 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 19.1 W/kg
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.18 W/kg
Maximum value of SAR (measured) = 11.3 W/kg




Address: No. 8,Yuma Road, Chayuan New City, Nan'an District, Chongqing, P. R. China,401336 Tel: 0086-23-88069965
FAX:0086-23-88608777

## System 2600MHz

Date/Time: 2019/10/21
Electronics: DAE4 Sn797
Medium: Head 2600MHz
Medium parameters used: f = 2600 MHz; σ = 1.996 S/m; εr = 39.673; ρ = 1000 kg/m3
Ambient Temperature:22.5 ℃ Liquid Temperature:22.5 ℃
Communication System: CW; Frequency: 2600 MHz; Duty Cycle: 1:1
Probe: EX3DV4 - SN3844ConvF(7.4, 7.4, 7.4); Calibrated: 2019/5/25
**System Head 2600MHz/Area Scan (6x9x1):** Measurement grid: dx=10mm, dy=10mm
Maximum value of SAR (measured) = 16.0 W/kg
**System Head 2600MHz/Zoom Scan (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 84.15 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 31.3 W/kg
SAR(1 g) = 14 W/kg; SAR(10 g) = 6.14 W/kg
Maximum value of SAR (measured) = 15.9 W/kg



# ANNEX C. SYSTEM VALIDATION RESULTS

In Collaboration with
speag
CALIBRATION LABORATORY

Add: No.51 Xueyuan Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2512 Fax: +86-10-62304633-2504
E-mail: cttl@chinattl.com Http://www.chinattl.cn

中国认可
国际互认
校准
CALIBRATION
CNAS L0570

Client : CATR(Chongqing) Certificate No: Z19-60274

## CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | DAE4 - SN: 797 |
| Calibration Procedure(s) | FF-Z11-002-01<br>Calibration Procedure for the Data Acquisition Electronics (DAEx) |
| Calibration date: | August 22, 2019 |

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Process Calibrator 753 | 1971018 | 24-Jun-19 (CTTL, No.J19X05126) | Jun-20 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Yu Zongying | SAR Test Engineer | |
| Reviewed by: | Lin Hao | SAR Test Engineer | |
| Approved by: | Qi Dianyuan | SAR Project Leader | |

Issued: August 24, 2019

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CALIBRATION LABORATORY

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E-mail: cttl@chinattl.com Http://www.chinattl.cn

**Glossary:**

| | |
|---|---|
| DAE | data acquisition electronics |
| Connector angle | information used in DASY system to align probe sensor X to the robot coordinate system. |

**Methods Applied and Interpretation of Parameters:**

- *DC Voltage Measurement*: Calibration Factor assessed for use in DASY system by comparison with a calibrated instrument traceable to national standards. The figure given corresponds to the full scale range of the voltmeter in the respective range.
- *Connector angle*: The angle of the connector is assessed measuring the angle mechanically by a tool inserted. Uncertainty is not required.
- The report provide only calibration results for DAE, it does not contain other performance test results.

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E-mail: cttl@chinattl.com Http://www.chinattl.cn

## DC Voltage Measurement

A/D - Converter Resolution nominal

High Range: 1LSB = 6.1μV , full range = -100...+300 mV
Low Range: 1LSB = 61nV , full range = -1.......+3mV

DASY measurement parameters: Auto Zero Time: 3 sec; Measuring time: 3 sec

| Calibration Factors | X | Y | Z |
|---|---|---|---|
| High Range | 403.879 ± 0.15% (k=2) | 404.134 ± 0.15% (k=2) | 403.854 ± 0.15% (k=2) |
| Low Range | 3.95921 ± 0.7% (k=2) | 3.96839 ± 0.7% (k=2) | 3.97981 ± 0.7% (k=2) |

## Connector Angle

| | |
|---|---|
| Connector Angle to be used in DASY system | 43.5° ± 1 ° |

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Client CATR(Chongqing) **Certificate No: Z19-60145**

## CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | EX3DV4 - SN:3844 |
| Calibration Procedure(s) | FF-Z11-004-01<br>Calibration Procedures for Dosimetric E-field Probes |
| Calibration date: | May 25, 2019 |

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power Meter NRP2 | 101919 | 20-Jun-18 (CTTL, No.J18X05032) | Jun-19 |
| Power sensor NRP-Z91 | 101547 | 20-Jun-18 (CTTL, No.J18X05032) | Jun-19 |
| Power sensor NRP-Z91 | 101548 | 20-Jun-18 (CTTL, No.J18X05032) | Jun-19 |
| Reference10dBAttenuator | 18N50W-10dB | 09-Feb-18(CTTL, No.J18X01133) | Feb-20 |
| Reference20dBAttenuator | 18N50W-20dB | 09-Feb-18(CTTL, No.J18X01132) | Feb-20 |
| Reference Probe EX3DV4 | SN 7514 | 27-Aug-18(SPEAG,No.EX3-7514_Aug18/2) | Aug-19 |
| DAE4 | SN 1555 | 20-Aug-18(SPEAG, No.DAE4-1555_Aug18) | Aug -19 |
| | | | |
| Secondary Standards | ID # | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
| SignalGeneratorMG3700A | 6201052605 | 21-Jun-18 (CTTL, No.J18X05033) | Jun-19 |
| Network Analyzer E5071C | MY46110673 | 24-Jan-19 (CTTL, No.J19X00547) | Jan -20 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Yu Zongying | SAR Test Engineer | |
| Reviewed by: | Lin Hao | SAR Test Engineer | |
| Approved by: | Qi Dianyuan | SAR Project Leader | |

Issued: May 27, 2019

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**Glossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| NORMx,y,z | sensitivity in free space |
| ConvF | sensitivity in TSL / NORMx,y,z |
| DCP | diode compression point |
| CF | crest factor (1/duty_cycle) of the RF signal |
| A,B,C,D | modulation dependent linearization parameters |
| Polarization Φ | Φ rotation around probe axis |
| Polarization θ | θ rotation around an axis that is in the plane normal to probe axis (at measurement center), i θ=0 is normal to probe axis |
| Connector Angle | information used in DASY system to align probe sensor X to the robot coordinate system |

**Calibration is Performed According to the Following Standards:**

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for the assessment of Specific Absorption Rate (SAR) from hand-held and body-mounted devices used next to the ear (frequency range of 300 MHz to 6 GHz)", July 2016
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

**Methods Applied and Interpretation of Parameters:**

- *NORMx,y,z:* Assessed for E-field polarization θ=0 (f≤900MHz in TEM-cell; f>1800MHz: waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the $E^2$-field uncertainty inside TSL (see below ConvF).
- *NORM(f)x,y,z = NORMx,y,z* frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of ConvF.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep (no uncertainty required). DCP does not depend on frequency nor media.
- PAR: PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics.
- *Ax,y,z; Bx,y,z; Cx,y,z; VRx,y,z:*A,B,C are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. VR is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f≤800MHz) and inside waveguide using analytical field distributions based on power measurements for f >800MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty valued are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to NORMx,y,z* ConvF whereby the uncertainty corresponds to that given for ConvF. A frequency dependent ConvF is used in DASY version 4.4 and higher which allows extending the validity from±50MHz to±100MHz.
- *Spherical isotropy (3D deviation from isotropy):* in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Certificate No: Z19-60145 Page 2 of 11

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# Probe EX3DV4

# SN: 3844

Calibrated: May 25, 2019

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

Certificate No: Z19-60145 Page 3 of 11

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# DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3844

## Basic Calibration Parameters

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm($\mu V/(V/m)^2$)[A] | 0.48 | 0.41 | 0.19 | ±10.0% |
| DCP(mV)[B] | 103.8 | 103.4 | 98.6 | |

## Modulation Calibration Parameters

| UID | Communication System Name | | A dB | B dB√μV | C | D dB | VR mV | Unc[E] (k=2) |
|---|---|---|---|---|---|---|---|---|
| 0 | CW | X | 0.0 | 0.0 | 1.0 | 0.00 | 166.2 | ±2.4% |
| | | Y | 0.0 | 0.0 | 1.0 | | 147.6 | |
| | | Z | 0.0 | 0.0 | 1.0 | | 86.9 | |

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of Norm X, Y, Z do not affect the $E^2$-field uncertainty inside TSL (see Page 5 and Page 6).
[B] Numerical linearization parameter: uncertainty not required.
[E] Uncertainly is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

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# DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3844

## Calibration Parameter Determined in Head Tissue Simulating Media

| f [MHz][C] | Relative Permittivity[F] | Conductivity (S/m)[F] | ConvF X | ConvF Y | ConvF Z | Alpha[G] | Depth[G] (mm) | Unct. (k=2) |
|---|---|---|---|---|---|---|---|---|
| 750 | 41.9 | 0.89 | 9.75 | 9.75 | 9.75 | 0.24 | 0.89 | ±12.1% |
| 835 | 41.5 | 0.90 | 9.35 | 9.35 | 9.35 | 0.12 | 1.43 | ±12.1% |
| 900 | 41.5 | 0.97 | 9.32 | 9.32 | 9.32 | 0.21 | 1.05 | ±12.1% |
| 1750 | 40.1 | 1.37 | 8.50 | 8.50 | 8.50 | 0.24 | 1.01 | ±12.1% |
| 1900 | 40.0 | 1.40 | 8.07 | 8.07 | 8.07 | 0.23 | 1.04 | ±12.1% |
| 2000 | 40.0 | 1.40 | 8.01 | 8.01 | 8.01 | 0.24 | 1.10 | ±12.1% |
| 2300 | 39.5 | 1.67 | 7.80 | 7.80 | 7.80 | 0.49 | 0.77 | ±12.1% |
| 2450 | 39.2 | 1.80 | 7.48 | 7.48 | 7.48 | 0.63 | 0.69 | ±12.1% |
| 2600 | 39.0 | 1.96 | 7.40 | 7.40 | 7.40 | 0.67 | 0.68 | ±12.1% |

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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# DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3844

## Calibration Parameter Determined in Body Tissue Simulating Media

| f [MHz][C] | Relative Permittivity [F] | Conductivity (S/m) [F] | ConvF X | ConvF Y | ConvF Z | Alpha[G] | Depth[G] (mm) | Unct. (k=2) |
|---|---|---|---|---|---|---|---|---|
| 750 | 55.5 | 0.96 | 9.92 | 9.92 | 9.92 | 0.40 | 0.80 | ±12.1% |
| 835 | 55.2 | 0.97 | 9.51 | 9.51 | 9.51 | 0.19 | 1.38 | ±12.1% |
| 900 | 55.0 | 1.05 | 9.51 | 9.51 | 9.51 | 0.24 | 1.11 | ±12.1% |
| 1750 | 53.4 | 1.49 | 8.16 | 8.16 | 8.16 | 0.22 | 1.15 | ±12.1% |
| 1900 | 53.3 | 1.52 | 7.91 | 7.91 | 7.91 | 0.23 | 1.13 | ±12.1% |
| 2000 | 53.3 | 1.52 | 7.85 | 7.85 | 7.85 | 0.21 | 1.20 | ±12.1% |
| 2300 | 52.9 | 1.81 | 7.71 | 7.71 | 7.71 | 0.55 | 0.83 | ±12.1% |
| 2450 | 52.7 | 1.95 | 7.63 | 7.63 | 7.63 | 0.67 | 0.73 | ±12.1% |
| 2600 | 52.5 | 2.16 | 7.48 | 7.48 | 7.48 | 0.68 | 0.71 | ±12.1% |

[C] Frequency validity above 300 MHz of ±100MHz only applies for DASY v4.4 and higher (Page 2), else it is restricted to ±50MHz. The uncertainty is the RSS of ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

[F] At frequency below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ±10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ±5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for the frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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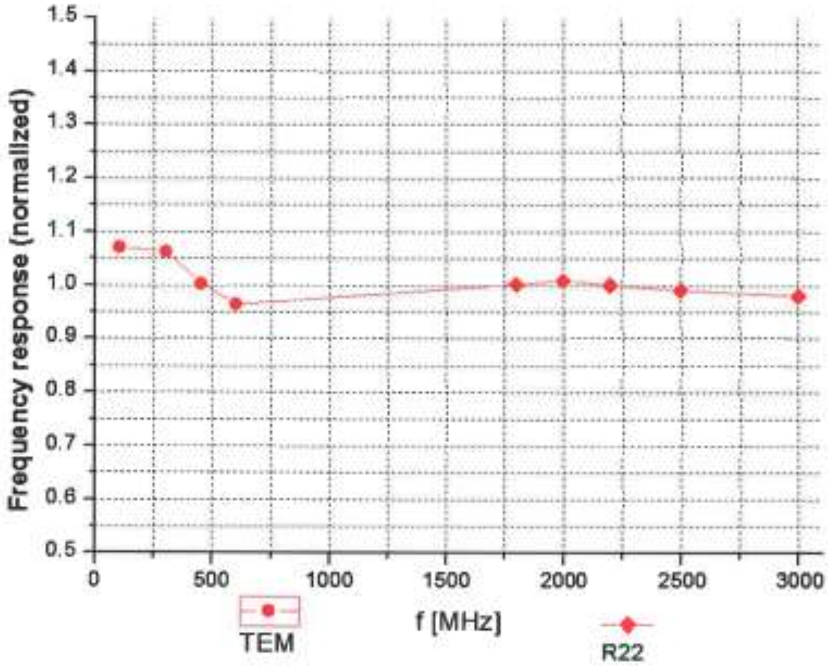
# Frequency Response of E-Field
## (TEM-Cell: ifi110 EXX, Waveguide: R22)




**Uncertainty of Frequency Response of E-field: ±7.4% (k=2)**

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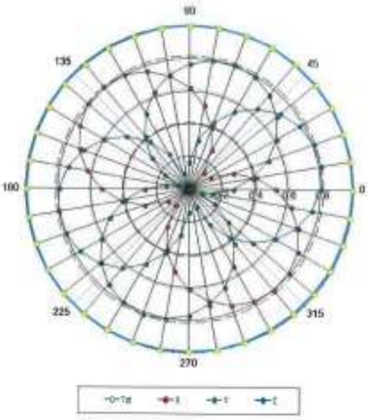
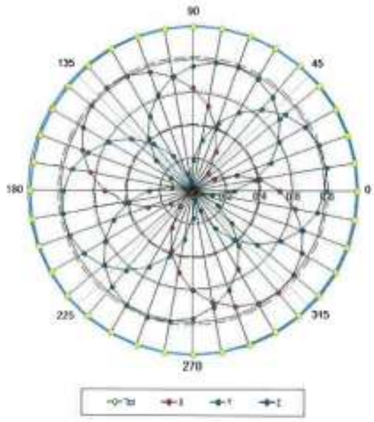
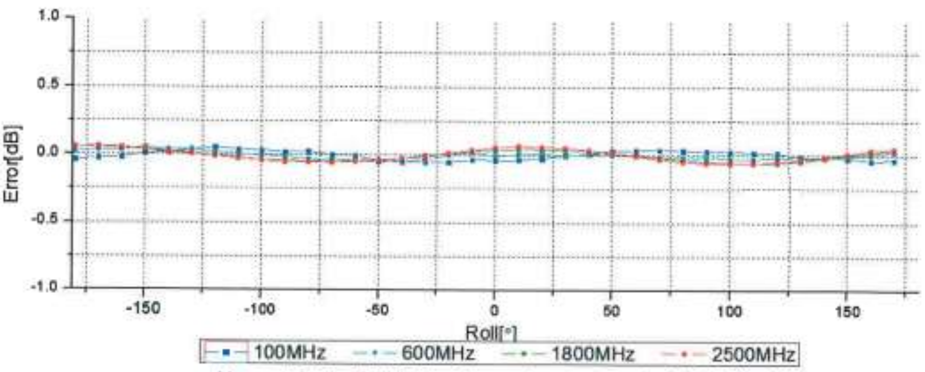
# Receiving Pattern (Φ), θ=0°

f=600 MHz, TEM




f=1800 MHz, R22




Uncertainty of Axial Isotropy Assessment: ±1.2% (k=2)

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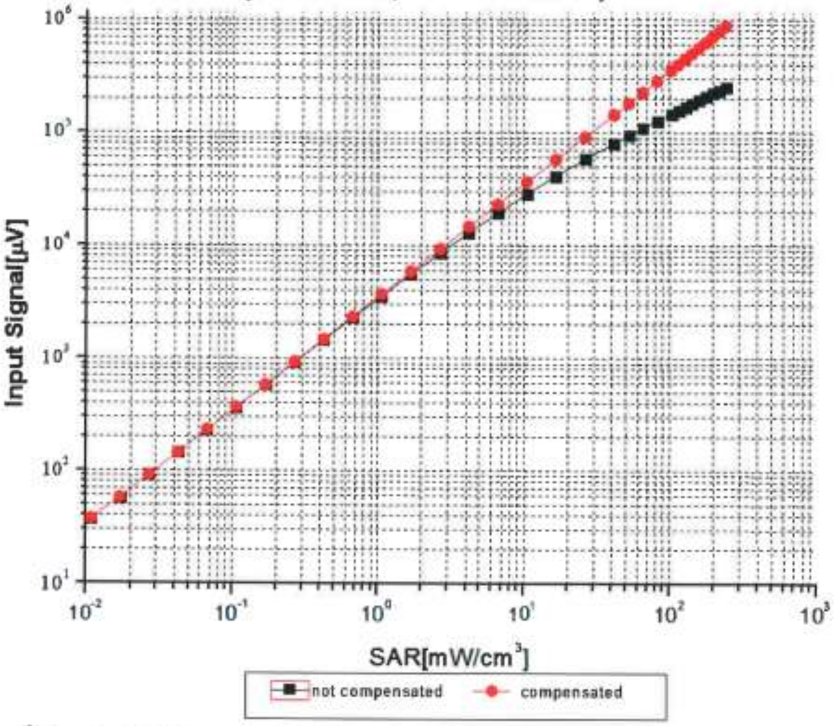
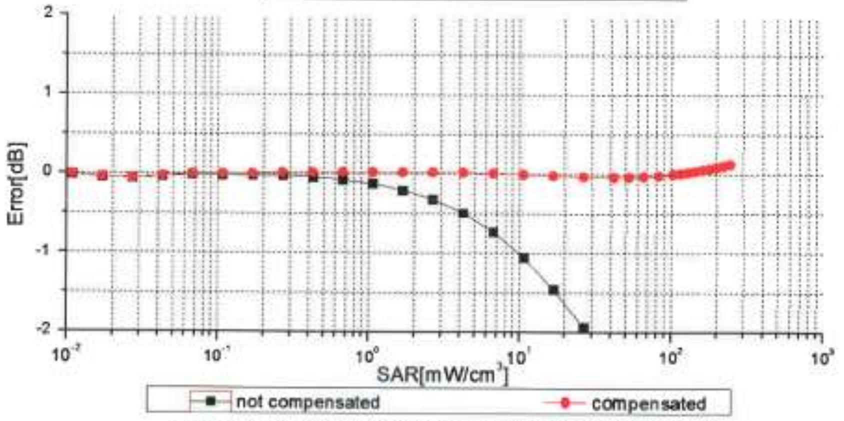
## Dynamic Range f(SAR$_{head}$)
## (TEM cell, f = 900 MHz)




**Uncertainty of Linearity Assessment: ±0.9% (k=2)**

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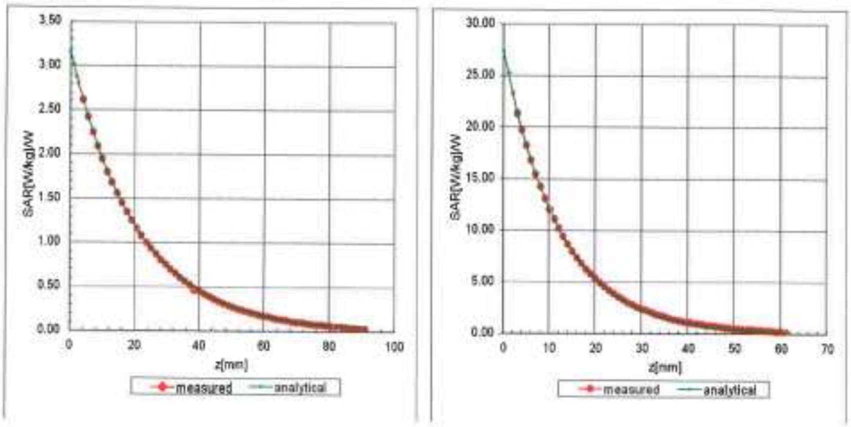
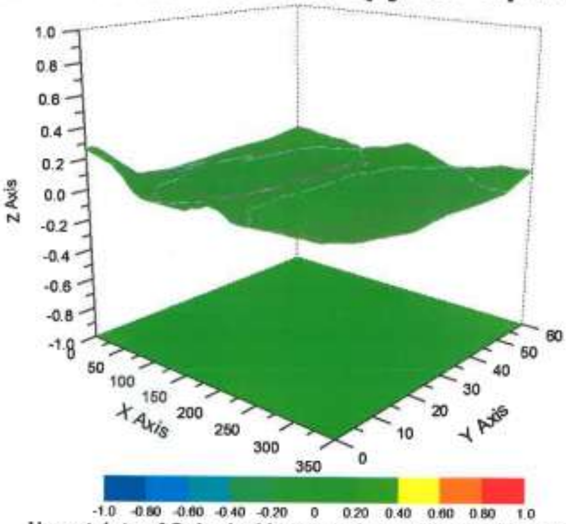
## Conversion Factor Assessment

**f=750 MHz, WGLS R9(H_convF)** **f=1900 MHz, WGLS R22(H_convF)**




## Deviation from Isotropy in Liquid




**Uncertainty of Spherical Isotropy Assessment: ±3.2% (K=2)**

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# DASY/EASY – Parameters of Probe: EX3DV4 – SN: 3844

## Other Probe Parameters

| | |
|---|---|
| Sensor Arrangement | Triangular |
| Connector Angle (°) | 26.7 |
| Mechanical Surface Detection Mode | enabled |
| Optical Surface Detection Mode | disable |
| Probe Overall Length | 337mm |
| Probe Body Diameter | 10mm |
| Tip Length | 9mm |
| Tip Diameter | 2.5mm |
| Probe Tip to Sensor X Calibration Point | 1mm |
| Probe Tip to Sensor Y Calibration Point | 1mm |
| Probe Tip to Sensor Z Calibration Point | 1mm |
| Recommended Measurement Distance from Surface | 1.4mm |

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Client **CATR(Chongqing)** **Certificate No: Z19-60003**

## CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D1750V2 - SN: 1063 |
| Calibration Procedure(s) | FF-Z11-003-01<br>Calibration Procedures for dipole validation kits |
| Calibration date: | January 18, 2019 |

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power Meter NRVD | 102196 | 07-Mar-18 (CTTL, No.J18X01510) | Mar-19 |
| Power sensor NRV-Z5 | 100596 | 07-Mar-18 (CTTL, No.J18X01510) | Mar-19 |
| Reference Probe EX3DV4 | SN 7433 | 12-Nov-18(CTTL-SPEAG,No.Z18-60401) | Nov-19 |
| DAE4 | SN 1556 | 20-Aug-18(SPEAG,No.DAE4-1556_Aug18) | Aug-19 |
| **Secondary Standards** | **ID #** | **Cal Date(Calibrated by, Certificate No.)** | **Scheduled Calibration** |
| Signal Generator E4438C | MY49071430 | 23-Jan-18 (CTTL, No.J18X00560) | Jan-19 |
| NetworkAnalyzer E5071C | MY46110673 | 24-Jan-18 (CTTL, No.J18X00561) | Jan-19 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Zhao Jing | SAR Test Engineer | 赵静 |
| Reviewed by: | Lin Hao | SAR Test Engineer | 林浩 |
| Approved by: | Qi Dianyuan | SAR Project Leader | |

Issued: January 20, 2019

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**Glossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORMx,y,z |
| N/A | not applicable or not measured |

**Calibration is Performed According to the Following Standards:**

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

**Additional Documentation:**

e) DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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## Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|---|---|---|
| **DASY Version** | DASY52 | 52.10.2.1495 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Triple Flat Phantom 5.1C | |
| **Distance Dipole Center - TSL** | 10 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy, dz = 5 mm | |
| **Frequency** | 1750 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 40.1 | 1.37 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 41.3 ± 6 % | 1.33 mho/m ± 6 % |
| **Head TSL temperature change during test** | <1.0 °C | ---- | ---- |

## SAR result with Head TSL

| **SAR averaged over 1 $cm^3$ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 9.17 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **37.6 W/kg ± 18.8 % (k=2)** |
| **SAR averaged over 10 $cm^3$ (10 g) of Head TSL** | Condition | |
| SAR measured | 250 mW input power | 4.95 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **20.1 W/kg ± 18.7 % (k=2)** |

## Body TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---|---|---|
| **Nominal Body TSL parameters** | 22.0 °C | 53.4 | 1.49 mho/m |
| **Measured Body TSL parameters** | (22.0 ± 0.2) °C | 54.3 ± 6 % | 1.45 mho/m ± 6 % |
| **Body TSL temperature change during test** | <1.0 °C | ---- | ---- |

## SAR result with Body TSL

| **SAR averaged over 1 $cm^3$ (1 g) of Body TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 9.41 W/kg |
| SAR for nominal Body TSL parameters | normalized to 1W | **38.5 W/kg ± 18.8 % (k=2)** |
| **SAR averaged over 10 $cm^3$ (10 g) of Body TSL** | Condition | |
| SAR measured | 250 mW input power | 4.95 W/kg |
| SAR for nominal Body TSL parameters | normalized to 1W | **20.1 W/kg ± 18.7 % (k=2)** |

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## Appendix (Additional assessments outside the scope of CNAS L0570)

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 48.9Ω- 0.73 jΩ |
| Return Loss | - 37.4 dB |

### Antenna Parameters with Body TSL

| | |
|---|---|
| Impedance, transformed to feed point | 46.4Ω+ 1.52 jΩ |
| Return Loss | - 27.8 dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.088 ns |

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

| | |
|---|---|
| Manufactured by | SPEAG |

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**DASY5 Validation Report for Head TSL** Date: 01.17.2019

Test Laboratory: CTTL, Beijing, China

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1063**

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1750 MHz; σ = 1.33 S/m; $\varepsilon_r$ = 41.28; ρ = 1000 kg/m3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(8.06, 8.06, 8.06) @ 1750 MHz; Calibrated: 11/12/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

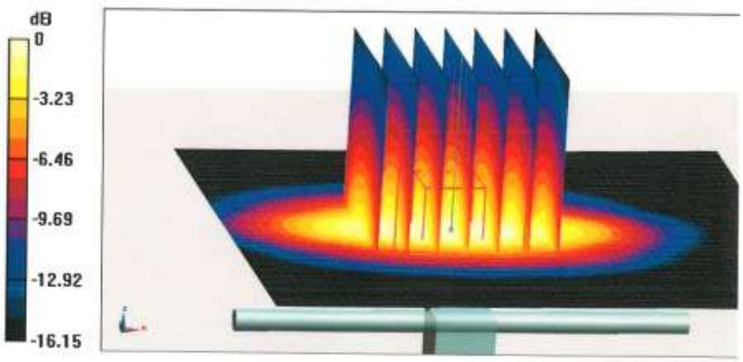
**System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.63 V/m; Power Drift = 0.00 dB

Peak SAR (extrapolated) = 16.7 W/kg

**SAR(1 g) = 9.17 W/kg; SAR(10 g) = 4.95 W/kg**

Maximum value of SAR (measured) = 14.0 W/kg




**0 dB = 14.0 W/kg = 11.46 dBW/kg**

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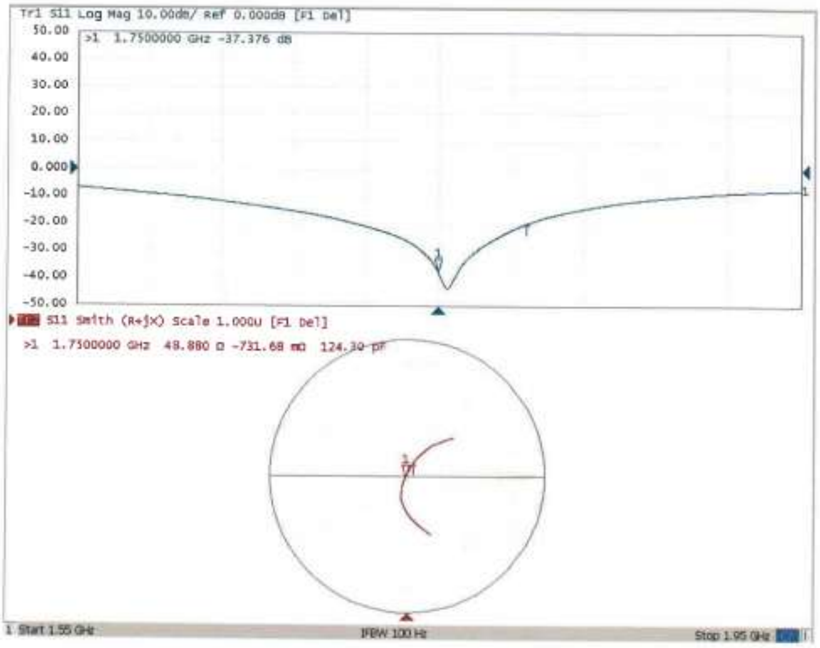
**Impedance Measurement Plot for Head TSL**



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**DASY5 Validation Report for Body TSL** Date: 01.17.2019

Test Laboratory: CTTL, Beijing, China

**DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN: 1063**

Communication System: UID 0, CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1750 MHz; $\sigma$ = 1.447 S/m; $\varepsilon_r$ = 54.29; $\rho$ = 1000 kg/m3

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.8, 7.8, 7.8) @ 1750 MHz; Calibrated: 11/12/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

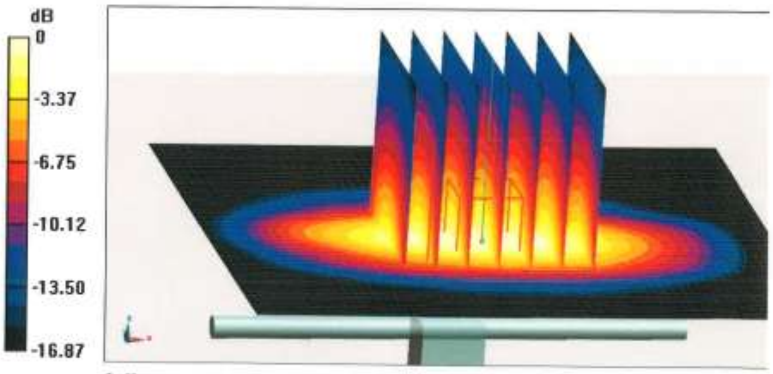
**System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 89.38 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 17.6 W/kg

**SAR(1 g) = 9.41 W/kg; SAR(10 g) = 4.95 W/kg**

Maximum value of SAR (measured) = 14.7 W/kg




**0 dB = 14.7 W/kg = 11.67 dBW/kg**

Certificate No: Z19-60003 Page 7 of 8

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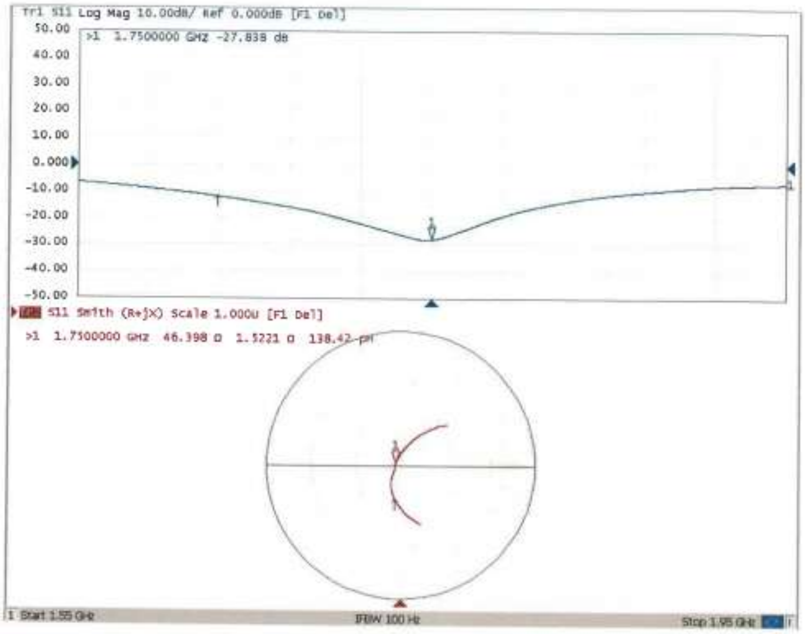
Impedance Measurement Plot for Body TSL



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CNAS L0570

Client **CATR(Chongqing)** **Certificate No: Z19-60004**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D1900V2 - SN: 5d153 |
| Calibration Procedure(s) | FF-Z11-003-01<br>Calibration Procedures for dipole validation kits |
| Calibration date: | January 18, 2019 |

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power Meter NRVD | 102196 | 07-Mar-18 (CTTL, No.J18X01510) | Mar-19 |
| Power sensor NRV-Z5 | 100596 | 07-Mar-18 (CTTL, No.J18X01510) | Mar-19 |
| Reference Probe EX3DV4 | SN 7433 | 12-Nov-18(CTTL-SPEAG,No.Z18-60401) | Nov-19 |
| DAE4 | SN 1556 | 20-Aug-18(SPEAG,No.DAE4-1556_Aug18) | Aug-19 |
| **Secondary Standards** | **ID #** | **Cal Date(Calibrated by, Certificate No.)** | **Scheduled Calibration** |
| Signal Generator E4438C | MY49071430 | 23-Jan-18 (CTTL, No.J18X00560) | Jan-19 |
| NetworkAnalyzer E5071C | MY46110673 | 24-Jan-18 (CTTL, No.J18X00561) | Jan-19 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Zhao Jing | SAR Test Engineer | 赵靖 |
| Reviewed by: | Lin Hao | SAR Test Engineer | 林浩 |
| Approved by: | Qi Dianyuan | SAR Project Leader | |

Issued: January 20, 2019

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**lossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORMx,y,z |
| N/A | not applicable or not measured |

**Calibration is Performed According to the Following Standards:**

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016
c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010
d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

**Additional Documentation:**

e) DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

Certificate No: Z19-60004 Page 2 of 8

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## Measurement Conditions

DASY system configuration, as far as not given on page 1.

| | | |
|---|---|---|
| **DASY Version** | DASY52 | 52.10.2.1495 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Triple Flat Phantom 5.1C | |
| **Distance Dipole Center - TSL** | 10 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy, dz = 5 mm | |
| **Frequency** | 1900 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 40.0 | 1.40 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 41.2 ± 6 % | 1.43 mho/m ± 6 % |
| **Head TSL temperature change during test** | <1.0 °C | ---- | ---- |

## SAR result with Head TSL

| **SAR averaged over 1 $cm^3$ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 9.98 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **39.8 W/kg ± 18.8 % (k=2)** |

| **SAR averaged over 10 $cm^3$ (10 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 5.19 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **20.7 W/kg ± 18.7 % (k=2)** |

## Body TSL parameters

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Body TSL parameters** | 22.0 °C | 53.3 | 1.52 mho/m |
| **Measured Body TSL parameters** | (22.0 ± 0.2) °C | 53.9 ± 6 % | 1.52 mho/m ± 6 % |
| **Body TSL temperature change during test** | <1.0 °C | ---- | ---- |

## SAR result with Body TSL

| **SAR averaged over 1 $cm^3$ (1 g) of Body TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 10.1 W/kg |
| SAR for nominal Body TSL parameters | normalized to 1W | **40.5 W/kg ± 18.8 % (k=2)** |

| **SAR averaged over 10 $cm^3$ (10 g) of Body TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 5.20 W/kg |
| SAR for nominal Body TSL parameters | normalized to 1W | **20.8 W/kg ± 18.7 % (k=2)** |

Certificate No: Z19-60004 Page 3 of 8

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## Appendix (Additional assessments outside the scope of CNAS L0570)

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 53.8Ω+ 3.60jΩ |
| Return Loss | - 26.0dB |

### Antenna Parameters with Body TSL

| | |
|---|---|
| Impedance, transformed to feed point | 51.2Ω+ 5.71jΩ |
| Return Loss | - 24.8dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.062 ns |

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

| | |
|---|---|
| Manufactured by | SPEAG |

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**DASY5 Validation Report for Head TSL** Date: 01.17.2019

Test Laboratory: CTTL, Beijing, China

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d153**

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; $\sigma$ = 1.425 S/m; $\varepsilon_r$ = 41.19; $\rho$ = 1000 kg/m3

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.76, 7.76, 7.76) @ 1900 MHz; Calibrated: 11/12/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

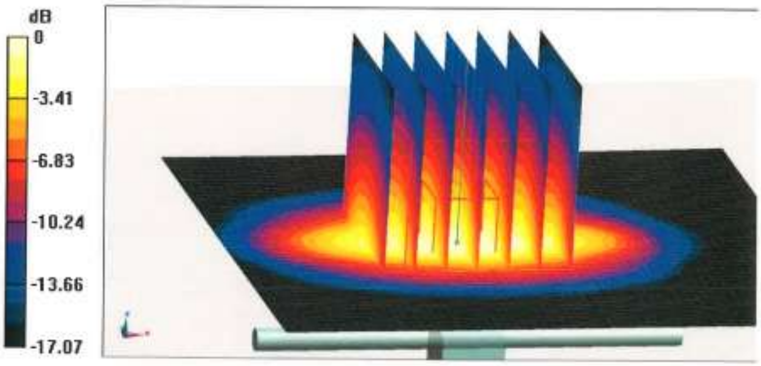
**System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 100.8 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 18.7 W/kg

**SAR(1 g) = 9.98 W/kg; SAR(10 g) = 5.19 W/kg**

Maximum value of SAR (measured) = 15.7 W/kg




**0 dB = 15.7 W/kg = 11.96 dBW/kg**

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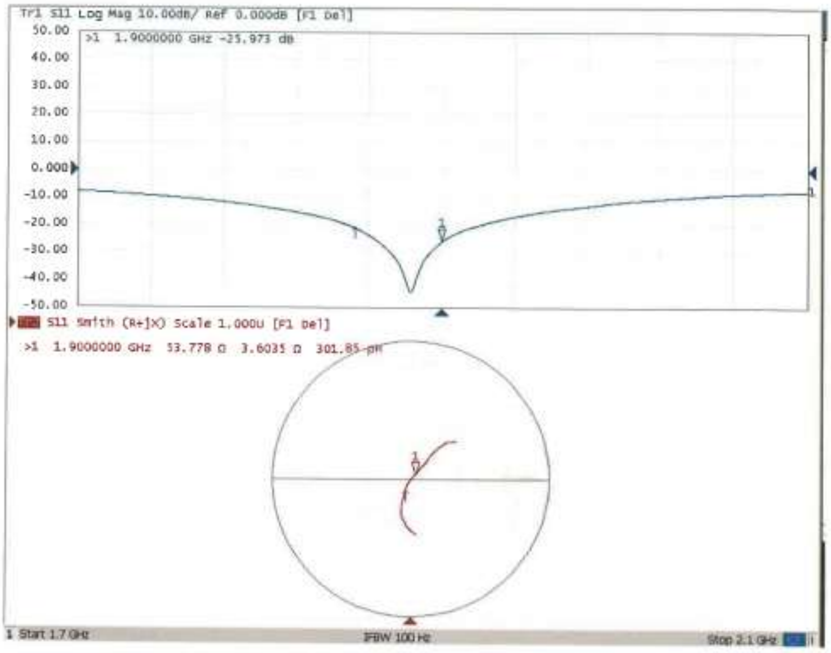
**Impedance Measurement Plot for Head TSL**



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**DASY5 Validation Report for Body TSL** Date: 01.17.2019

Test Laboratory: CTTL, Beijing, China

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d153**

Communication System: UID 0, CW; Frequency: 1900 MHz; Duty Cycle: 1:1

Medium parameters used: f = 1900 MHz; $\sigma$ = 1.523 S/m; $\varepsilon_r$ = 53.88; $\rho$ = 1000 kg/m3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.6, 7.6, 7.6) @ 1900 MHz; Calibrated: 11/12/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

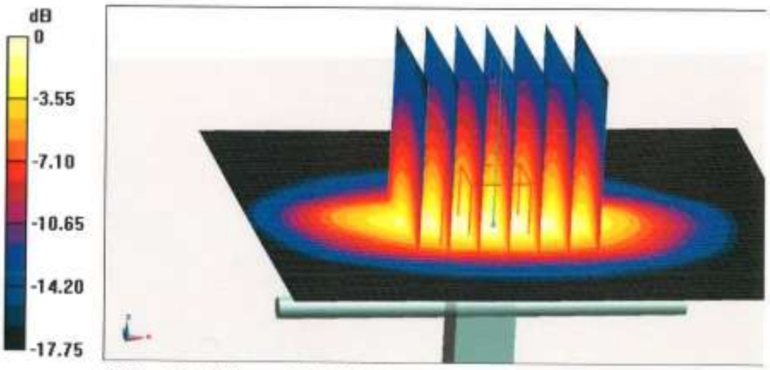
**System Performance Check/Zoom Scan (7x7x7) (7x7x7)/Cube 0:** Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.12 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 19.2 W/kg

**SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.2 W/kg**

Maximum value of SAR (measured) = 16.0 W/kg




**0 dB = 16.0 W/kg = 12.04 dBW/kg**

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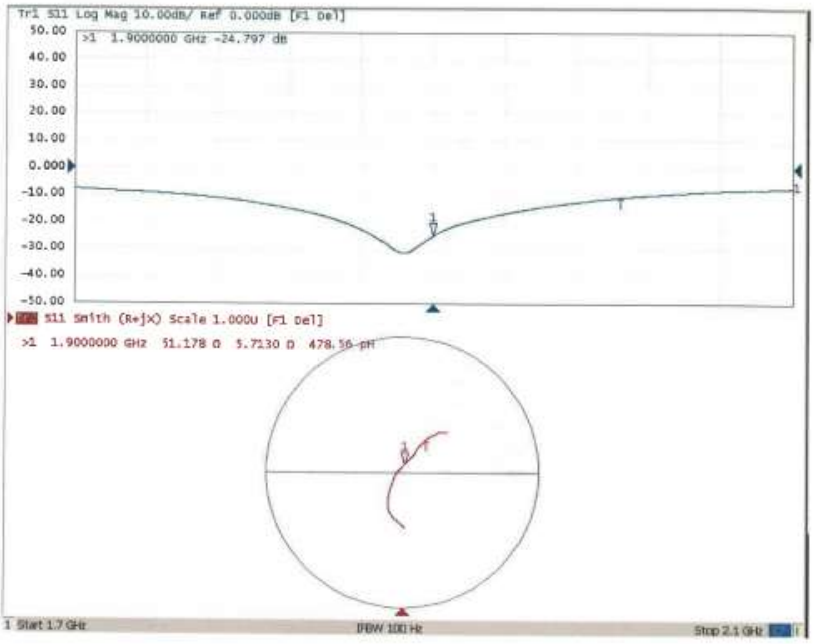
**Impedance Measurement Plot for Body TSL**



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Client CATR(Chongqing) Certificate No: Z19-60008

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D2600V2 - SN: 1045 |
| Calibration Procedure(s) | FF-Z11-003-01<br>Calibration Procedures for dipole validation kits |
| Calibration date: | January 17, 2019 |

This calibration Certificate documents the traceability to national standards, which realize the physical units of measurements(SI). The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature(22±3)℃ and humidity<70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power Meter NRVD | 102196 | 07-Mar-18 (CTTL, No.J18X01510) | Mar-19 |
| Power sensor NRV-Z5 | 100596 | 07-Mar-18 (CTTL, No.J18X01510) | Mar-19 |
| Reference Probe EX3DV4 | SN 7433 | 12-Nov-18(CTTL-SPEAG,No.Z18-60401) | Nov-19 |
| DAE4 | SN 1556 | 20-Aug-18(SPEAG,No.DAE4-1556_Aug18) | Aug-19 |
| **Secondary Standards** | **ID #** | **Cal Date(Calibrated by, Certificate No.)** | **Scheduled Calibration** |
| Signal Generator E4438C | MY49071430 | 23-Jan-18 (CTTL, No.J18X00560) | Jan-19 |
| Network Analyzer E5071C | MY46110673 | 24-Jan-18 (CTTL, No.J18X00561) | Jan-19 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Zhao Jing | SAR Test Engineer | 赵靖 |
| Reviewed by: | Lin Hao | SAR Test Engineer | 林浩 |
| Approved by: | Qi Dianyuan | SAR Project Leader | |

Issued: January 19, 2019

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**Glossary:**

| | |
|---|---|
| TSL | tissue simulating liquid |
| ConvF | sensitivity in TSL / NORMx,y,z |
| N/A | not applicable or not measured |

**Calibration is Performed According to the Following Standards:**

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013

b) IEC 62209-1, "Measurement procedure for assessment of specific absorption rate of human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices- Part 1: Device used next to the ear (Frequency range of 300MHz to 6GHz)", July 2016

c) IEC 62209-2, "Procedure to measure the Specific Absorption Rate (SAR) For wireless communication devices used in close proximity to the human body (frequency range of 30MHz to 6GHz)", March 2010

d) KDB865664, SAR Measurement Requirements for 100 MHz to 6 GHz

**Additional Documentation:**

e) DASY4/5 System Handbook

**Methods Applied and Interpretation of Parameters:**

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

The reported uncertainty of measurement is stated as the standard uncertainty of Measurement multiplied by the coverage factor k=2, which for a normal distribution Corresponds to a coverage probability of approximately 95%.

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**Measurement Conditions**

DASY system configuration, as far as not given on page 1.

| | | |
|---|---|---|
| **DASY Version** | DASY52 | 52.10.2.1495 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Triple Flat Phantom 5.1C | |
| **Distance Dipole Center - TSL** | 10 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy, dz = 5 mm | |
| **Frequency** | 2600 MHz ± 1 MHz | |

**Head TSL parameters**

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 39.0 | 1.96 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 40.2 ± 6 % | 1.98 mho/m ± 6 % |
| **Head TSL temperature change during test** | <1.0 °C | ---- | ---- |

**SAR result with Head TSL**

| | | |
|---|---|---|
| **SAR averaged over 1 $cm^3$ (1 g) of Head TSL** | Condition | |
| SAR measured | 250 mW input power | 14.2 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **56.9 W/kg ± 18.8 % (k=2)** |
| **SAR averaged over 10 $cm^3$ (10 g) of Head TSL** | Condition | |
| SAR measured | 250 mW input power | 6.48 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **26.0 W/kg ± 18.7 % (k=2)** |

**Body TSL parameters**

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Body TSL parameters** | 22.0 °C | 52.5 | 2.16 mho/m |
| **Measured Body TSL parameters** | (22.0 ± 0.2) °C | 52.9 ± 6 % | 2.14 mho/m ± 6 % |
| **Body TSL temperature change during test** | <1.0 °C | ---- | ---- |

**SAR result with Body TSL**

| | | |
|---|---|---|
| **SAR averaged over 1 $cm^3$ (1 g) of Body TSL** | Condition | |
| SAR measured | 250 mW input power | 13.5 W/kg |
| SAR for nominal Body TSL parameters | normalized to 1W | **54.4 W/kg ± 18.8 % (k=2)** |
| **SAR averaged over 10 $cm^3$ (10 g) of Body TSL** | Condition | |
| SAR measured | 250 mW input power | 5.99 W/kg |
| SAR for nominal Body TSL parameters | normalized to 1W | **24.1 W/kg ± 18.7 % (k=2)** |

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## Appendix(Additional assessments outside the scope of CNAS L0570)

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 46.8Ω- 6.63jΩ |
| Return Loss | - 22.4dB |

### Antenna Parameters with Body TSL

| | |
|---|---|
| Impedance, transformed to feed point | 45.6Ω- 5.15jΩ |
| Return Loss | - 23.0dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.017 ns |

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals. On some of the dipoles, small end caps are added to the dipole arms in order to improve matching when loaded according to the position as explained in the "Measurement Conditions" paragraph. The SAR data are not affected by this change. The overall dipole length is still according to the Standard.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

### Additional EUT Data

| | |
|---|---|
| Manufactured by | SPEAG |

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**DASY5 Validation Report for Head TSL** Date: 01.16.2019

Test Laboratory: CTTL, Beijing, China

**DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1045**

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2600 MHz; $\sigma$ = 1.982 S/m; $\varepsilon_r$ = 40.16; $\rho$ = 1000 kg/m3

Phantom section: Center Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.03, 7.03, 7.03) @ 2600 MHz; Calibrated: 11/12/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

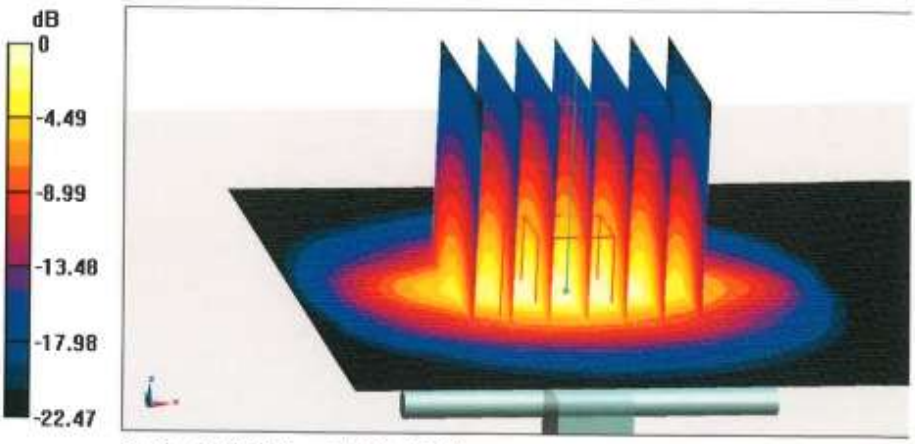
**Dipole Calibration**/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 104.5 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 29.5 W/kg

**SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.48 W/kg**

Maximum value of SAR (measured) = 24.0 W/kg




**0 dB = 24.0 W/kg = 13.80 dBW/kg**

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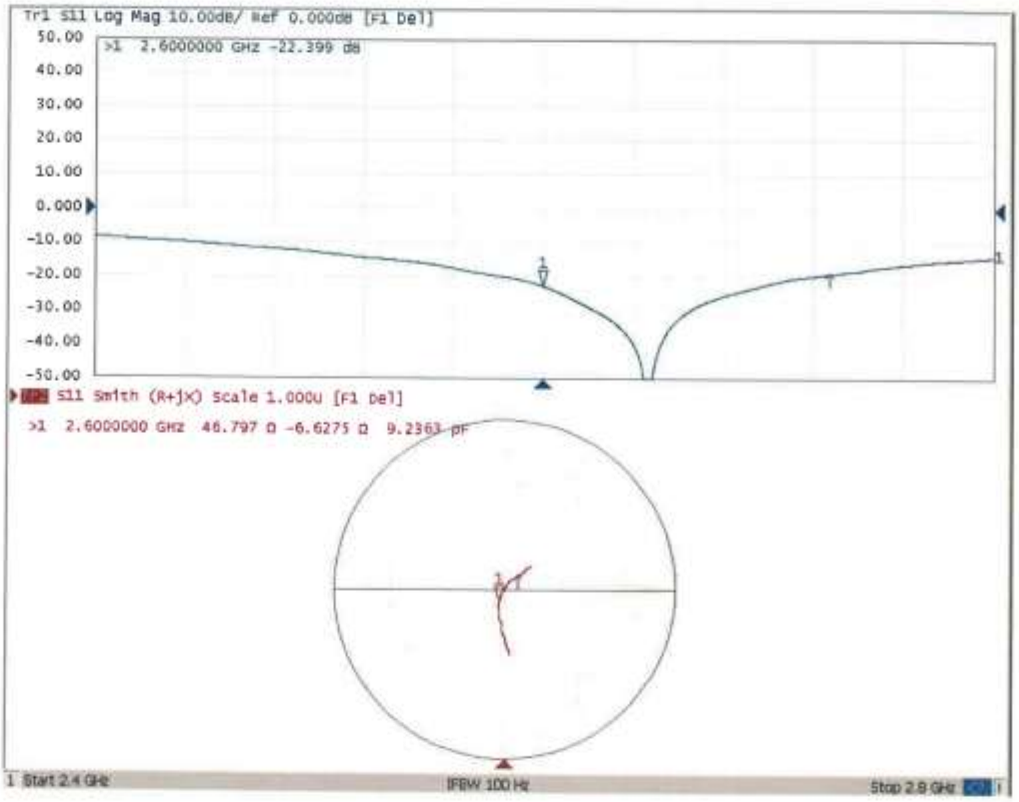
## Impedance Measurement Plot for Head TSL



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**DASY5 Validation Report for Body TSL** Date: 01.16.2019

Test Laboratory: CTTL, Beijing, China

**DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN: 1045**

Communication System: UID 0, CW; Frequency: 2600 MHz; Duty Cycle: 1:1

Medium parameters used: f = 2600 MHz; $\sigma$ = 2.136 S/m; $\varepsilon_r$ = 52.85; $\rho$ = 1000 kg/m3

Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7433; ConvF(7.08, 7.08, 7.08) @ 2600 MHz; Calibrated: 11/12/2018
- Sensor-Surface: 1.4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1556; Calibrated: 8/20/2018
- Phantom: MFP_V5.1C ; Type: QD 000 P51CA; Serial: 1062
- Measurement SW: DASY52, Version 52.10 (2); SEMCAD X Version 14.6.12 (7450)

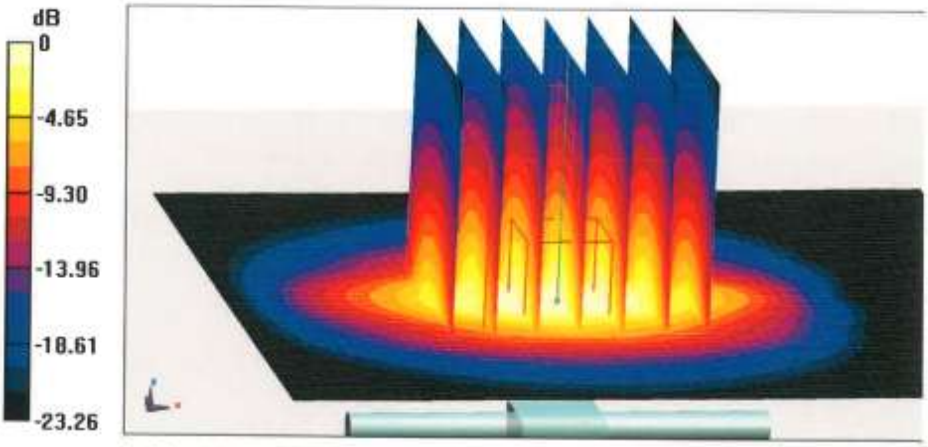
**Dipole Calibration**/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 98.66 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 28.4 W/kg

**SAR(1 g) = 13.5 W/kg; SAR(10 g) = 5.99 W/kg**

Maximum value of SAR (measured) = 22.9 W/kg




**0 dB = 22.9 W/kg = 13.60 dBW/kg**

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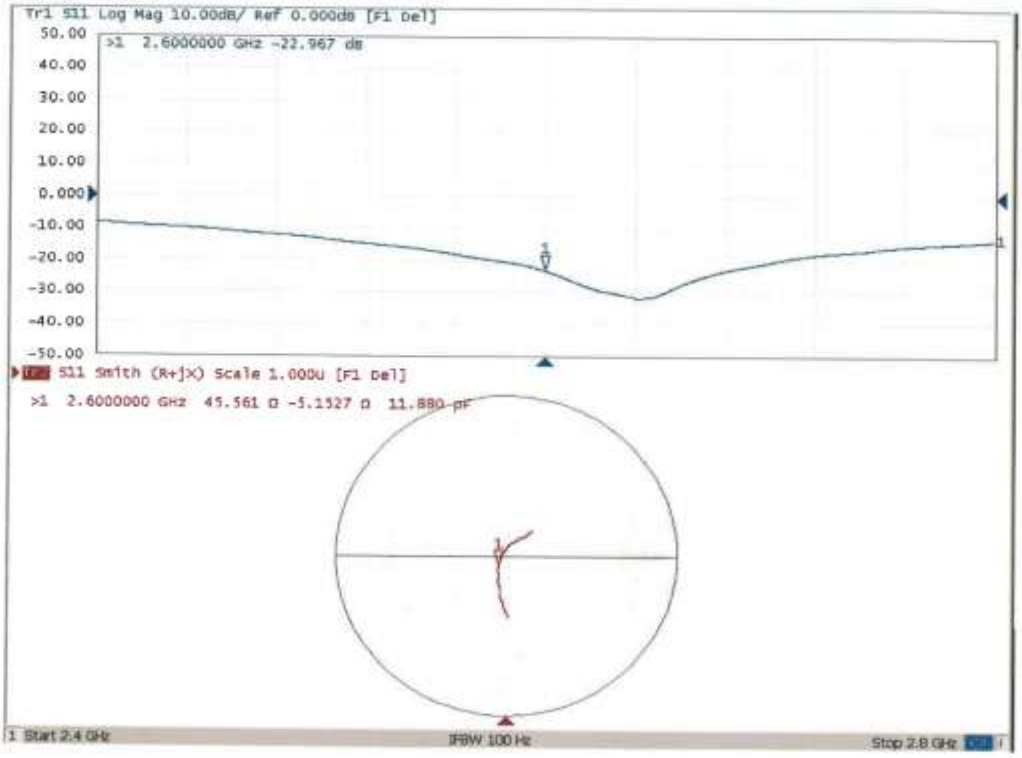
**Impedance Measurement Plot for Body TSL**






*****END OF REPORT*****