# FCC SAR TEST REPORT

## No. 140604-R2

**for**

**Canales Electronicos De Ventas SAS**

**Mobile Phone**

**Model Name: Kingo T5**

**FCC ID: 2ACHQ-KINGOT5**

**Issued Date: 2014-06-18**

**TESTING**
**CNAS L4992**

**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 GCCT.

**Test Laboratory:**

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## GENERAL SUMMARY

| | |
|---|---|
| **Product Name** | Mobile Phone |
| **Model Name** | Kingo T5 |
| **Applicant** | Canales Electronicos De Ventas SAS |
| **Manufacturer** | Canales Electronicos De Ventas SAS |
| **Test laboratory** | GCCT, Guangdong Telecommunications Terminal Products Quality Supervision and Testing Center |
| **Reference Standards** | **IEEE Std C95.1, 1999:** IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz<br>**IEEE 1528-2003:** Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques<br>**FCC KDB 447498 D01 v05r02:** Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies<br>**FCC KDB 865664 D01 v01r03:** SAR Measurement Requirements for 100 MHz to 6 GHz<br>**FCC KDB 941225 D06 Hotspot Mode SAR v01r01:** SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities<br>**FCC KDB 648474 D04 Handset SAR v01r02:** SAR Evaluation Considerations for Wireless Handsets<br>**FCC KDB 248227 D01 v01r02:** SAR measurement Procedures for 802.11a/b/g Transmitters<br>**IEC 62209-1: 2005:** Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures, Part 1: Procedure to determine the specific absorption rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)<br>**IEC 62209-2: 2010:** Human exposure to radio frequency fields from handheld and body-mounted wireless communication devices - Human models, instrumentation, and procedures, Part 2: Procedure to determine the specific absorption rate (SAR) for mobile wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz) |
| **Test Conclusion** | This portable wireless equipment has been measured in all cases requested by the relevant standards. Test results in Chapter 8 of this test report are below limits specified in the relevant standards.<br><br>General Judgment: **Pass**<br><br>**Date of issue:2014.06.17** |
| **Comment:** | The test results in this report apply only to the tested sample of the stated device/equipment. |

| *Approved by:* | *Reviewed by:* | *Tested by:* |
|---|---|---|
| Luo Jian | Dong Xiaobo | Li Linqiang |
| Manager | Manager | Test Engineer |

# 1. Test Laboratory

## 1.1 Testing Location

| | |
|---|---|
| Company Name: | GCCT, Guangdong Telecommunications Terminal Products Quality Supervision and Testing Center |
| CNAS Registration No. | CNAS L4992 |
| Address: | Technology Road, High-tech Zone, Heyuan, Guangdong Province, PR.China |
| Postal Code: | 517001 |
| Telephone: | +86-762-3607181 |
| Fax: | +86-762-3603336 |

## 1.2 Testing Environment

| | |
|---|---|
| Temperature | Min. = 20°C, Max. = 25 °C |
| Relative humidity | Min. = 30%, Max. = 70% |
| Ground system resistance | < 0.5 Ω |
| Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards. | |

## 1.3 Project Data

| | |
|---|---|
| Project Leader: | Dong Xiaobo |
| Project Engineer | Li Linqiang |
| Testing Start Date: | 2014-06-06 |
| Testing End Date: | 2014-06-09 |

# 2. Client Information

## 2.1 Applicant Information

| | |
|---|---|
| Company Name: | Canales Electronicos De Ventas SAS |
| Address: | Cra 51 # 9C Sur-85 Bodega 403 Medellin, Colombia |
| City: | / |
| Postal Code: | / |
| Country: | / |
| Telephone: | / |
| Fax: | / |

## 2.2 Manufacturer Information

| | |
|---|---|
| Company Name: | Canales Electronicos De Ventas SAS |
| Address: | Cra 51 # 9C Sur-85 Bodega 403 Medellin, Colombia |
| City: | / |
| Postal Code: | / |
| Country: | / |
| Telephone: | / |
| Fax: | / |

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

## 3.1 About EUT

| | | | | |
|---|---|---|---|---|
| Product Name | Mobile Phone | | | |
| Model Name | Kingo T5 | | | |
| Exposure Category | Uncontrolled Environment / General Population | | | |
| Device Type | Portable Device | | | |
| Supporting modes | GSM850 (tested) DCS1900 (tested)<br>WCDMA Band II(tested) WCDMA Band V(tested)<br>WIFI (tested) Bluetooth | | | |
| GPRS Class | Class 12 | | | |
| Hotspot | Supported | | | |
| Max. SAR (1g) | Mode | 1g SAR(W/Kg) | | |
| | | Head | Body-worn | Hotspot |
| | GSM850 | 0.109 | 0.717 | 0.717 |
| | GSM1900 | 0.089 | 0.758 | 0.758 |
| | WCDMA Band II | 0.234 | 1.38 | 1.38 |
| | WCDMA Band V | 0.115 | 0.381 | 0.381 |
| | WiFi | 0.070 | 0.141 | 0.141 |
| Antenna Type | Fixed Internal Antenna | | | |
| Form factor | 13.6cm*6.9cm | | | |
| Comment | The above EUT's information was declared by manufacture. | | | |

Note: Photographs of EUT are shown in ANNEX A of this test report.

## 3.2 Internal Identification of EUT

| EUT ID* | IMEI | HW Version | SW Version |
|---|---|---|---|
| M01 | / | / | / |

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

## 3.3 Internal Identification of AE

| AE ID* | Description | Type | SN | Manufacture |
|---|---|---|---|---|
| B01 | Battery | / | / | / |
| CH01 | Charger | Kingo | / | / |
| H01 | Headset | / | / | / |

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

# 4. EUT Operational Conditions during Test

## 4.1 General Description of Test Procedures

A communication link is set up with a System Simulator (SS) by air link, and a call is established. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 128, 190 and 251 in the case of GSM850, allocated to 512, 661 and 810 in the case of PCS1900, allocated to 4132, 4183 and 4233 in the case of WCDMA Band V, allocated to 9262, 9400 and 9538 in the case of WCDMA Band II, allocated to 1, 6 and 11 respectively in the case of WIFI. The EUT is commanded to operate at maximum transmitting power by MT8820C

When we test, the EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. The antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the EUT. The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the EUT by at least 30 dB.

## 4.2 GSM Test Configuration

For the SAR tests for GSM850 and DCS1900, a communication link is set up with a System Simulator (SS) by air link. Using MT8820C the power lever is set to “5” of GSM850, set to “0” of PCS1900. The EUT is commanded to operate at maximum transmitting power. The GPRS class is 12 for this EUT. It has at most 4 timeslots in uplink and at most 4 timeslots in downlink, the maximum total timeslots is 5.

## 4.3 WCDMA Test Configuration

For the SAR body tests for WCDMA Band V and WCDMA Band II, a communication link is set up with a System Simulator (SS) by air link. We established the radio link with 12.2kbps RMC and the power control “all bits up” in test loop mode 1.

HSDPA:

SAR for body exposure configurations is measured according to the “Body SAR Measurements” procedures of 3G device. In addition, body SAR is also measured for HSDPA when the maximum average output of each RF channel with HSDPA active is at least 0.25 dB higher than that measured without HSDPA using 12.2kbps RMC or the maximum SAR 12.2kbps RMC is above 75% of the SAR limit. Body SAR for HSDPA is measured using an FRC with H-Set 1 in Sub-test 1 and a 12.2kbps RMC configured in Test Loop Mode 1, using the highest body SAR configuration in 12.2kbps RMC without HSDPA.

HSPA:

Body SAR is also measured for HSPA when the maximum average output of each RF channel with HSPA active is at least 0.25 dB higher than that measured without HSPA using 12.2 kbps RMC or the maximum SAR for 12.2 kbps RMC is above 75% of the SAR limit. Body SAR for HSPA is measured with E-DCH

Sub-test 5, using H-Set 1 and QPSK for FRC and a 12.2 kbps RMC configured in Test Loop Mode 1 with power control algorithm 2, according to the highest body SAR configuration in 12.2 kbps RMC without HSPA.

### 4.4 WIFI Test Configuration

For the 802.11b/g/n SAR tests, a communication link is set up with the test mode software for WIFI mode test. The Absolute Radio Frequency Channel Number (ARFCN) is allocated to 1, 6 and 11 respectively in the case of 2450 MHz. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate.

802.11b/g operating modes are tested independently according to the service requirements in each frequency band. 802.11b/g modes are tested on channels1,6,11;however,if output power reduction is necessary for channels 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels must be tested instead.

SAR is not required for 802.11g/n channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels.

### 4.5 Hotspot Test Configuration

Standalone personal wireless routers and handsets with hotspot mode capabilities must address hand-held and other near-body exposure conditions to show SAR compliance. SAR must be measured for all sides and surfaces with a transmitting antenna located within 25 mm from that surface or edge, for the data modes, wireless technologies and frequency bands supporting hotspot mode. A test separation of 10 mm is required. The standalone SAR results in each device test orientation must be analyzed for the applicable hotspot mode simultaneous transmission configurations to determine SAR test exclusion and volume scan requirements. The simultaneous transmission configurations must be clearly described in the SAR report to support the analyses or test results

## 5. SAR Measurements System Configuration

These measurements were performed with the automated near-field scanning system DASY5 from SPEAG. The system is based on a high precision robot, which positions the probes with a positional repeatability of better than ± 0.02 mm. Special E-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines to the data acquisition unit. The SAR measurements were conducted with the dosimetric probe manufactured by SPEAG, designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe has been calibrated according to the procedure described in with accuracy of better than ±10%. The spherical isotropy was evaluated and found to be better than ±0.3 dB. The phantom used was the SAM Twin Phantom and ELI4 Phantom as described in IEC 62209-1, IEEE1528 and EN 62209-1.

### 5.1 Measurement System Diagram

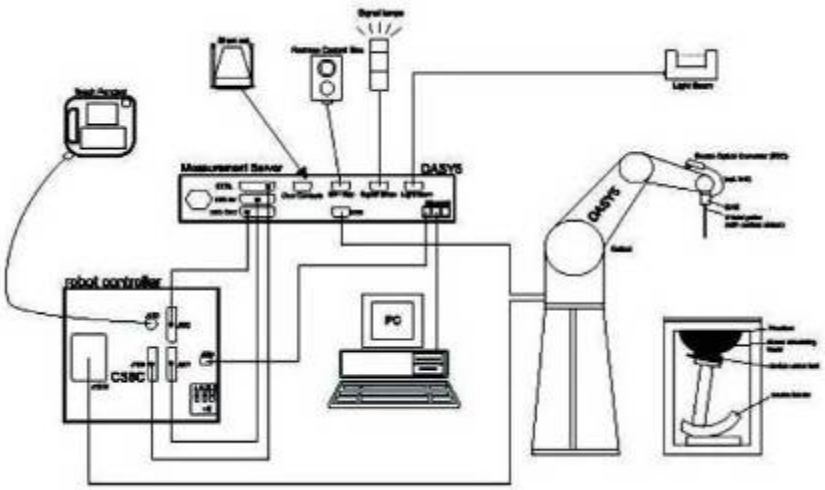



**Figure 1 System Diagram**

**The DASY5 system consists of the following items:**

1. A standard high precision 6-axis robot (TX90XL) with St¨aubli CS8c robot controllers.
2. DASY5 Measurement Server.
3. Data Acquisition Electronics.
4. A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.
5. Light Beam Unit.
6. The SAM phantom enabling testing left-hand right-hand and the ELI4 phantom for body usage.
7. The Position device for handheld EUT.
8. Tissue simulating liquid mixed according to the given recipes.
9. System validation dipoles to validate the proper functioning of the system.
10. A computer operating Windows XP.

## 5.2 System Components

The mobile phone under test operating at the maximum power level is placed in the phone holder, under the phantom, which is filled with head simulating liquid. The E-Field probe measures the electric field inside the phantom. The DASY5 software computes the results to give a SAR value in a 1g or 10 g mass.

### 5.2.1 TX90XL

The TX90XL robot has six axes. The six axes are controlled by the St¨aubli CS8c robot controllers. It offers the features 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 synchrony motors; no stepper motors)
• Low ELF

### 5.2.2 DASY5 Measurement Server

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

Figure 2 TX90XL


Figure 3 Measurement Server

### 5.2.3 Probe

For the measurements the specific dosimetric E-Field Probe ES3DV3 and EX3DV4 with following specifications is used.

Frequency: 10 MHz to 3 GHz; Linearity: ± 0.2 dB

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

± 0.5 dB in tissue material (rotation normal to probe axis)

Dynamic Range: 10 μW/g to > 100 mW/g; Linearity: ± 0.2 dB

Tip Diameter: 5 mm; Distance between probe tip and sensor center: 2.5 mm

Probe linearity: ±0.3 dB
Calibration range: 835 to 2500 MHz for head & body simulating liquid

### 5.2.4 Device holder

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 are 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 =3 and loss tangent =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.

**Figure 4 Probe**

**Figure 5 Device Holder**

### 5.2.5 Phontom

The SAM Twin Phantom and the ELI4 Phantom are constructed of a fiberglass shell integrated in a wooden table. The shape of the shell is in compliance with the specification set in IEEE P1528 and CENELEC EN62209-1. The SAM Twin phantom enables the dosimetric evaluation of left and right hand phone usage and the ELI4 phantom enables the dosimetric evaluation of body mounted usage. A cover prevents the evaporation of the liquid. Reference markings on the Phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points in the robot.
Shell thickness: 2 mm +/-0.2 mm
Filling Volume: Approx. 25 liters
Dimensions (H x L x W): 850 x 1000 x 500 mm

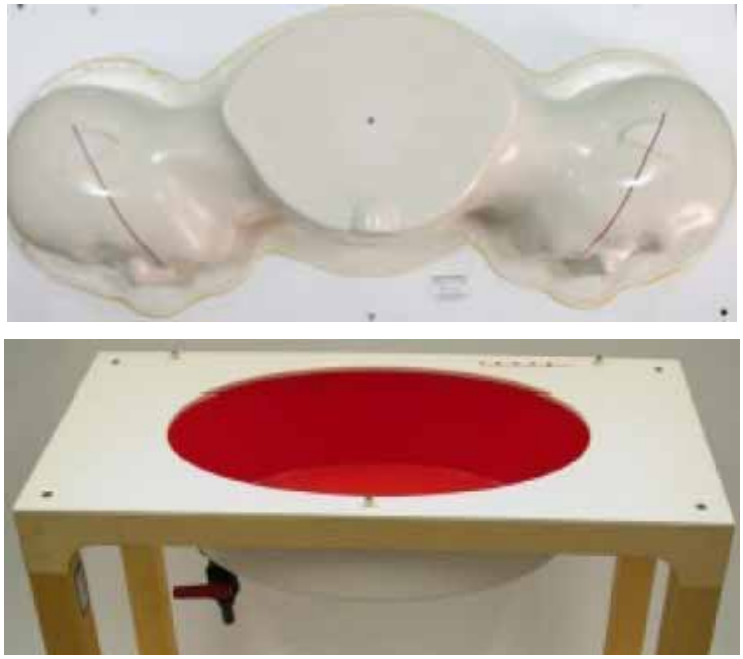


**Figure 6 SAM Twin Phantom and ELI Phantom**

### 5.2.6 Data Acquisition Electronics

DAE4 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.
Input impedance: 200MOhm, symmetrical and floating.
Common mode rejection: > 80 dB.

### 5.2.7 Validation dipoles

SPEAG has a full range of dipoles corresponding to the frequencies defines by the standards: 835, 900, 1800, 1900, 2000, 2450MHz
Maximum input Power: 100W
Connectors: SMA
Dimensions: (depends on the dipole frequency)

**Figure 7 DAE4**

**Figure 8 Validation Dipoles**

## 5.3 Equivalent Tissues

The relative permittivity and conductivity of the tissue material should be within ±5% of the values given in the table below recommended by the FCC KDB 865664 D01 v01r03.

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

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

# 6. Evaluation Procedures

## 6.1 Data Evaluation

The DASY5 software automatically executes the following procedures to calculate the field units from the microvolt readings at the probe connector. The parameters used in the evaluation are stored in the configuration modules of the software:

Probe parameters: - Sensitivity Normi, ai0, ai1, ai2
- Conversion factor ConvFi
- Diode compression point dcpi

Device parameters: - Frequency f
- Crest factor cf

Media parameters: - Conductivity σ
- Density ρ

These parameters must be set correctly in the software. They can be found in the component documents or be imported into the software from the configuration files issued for the DASY5 components. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics. If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power. The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \bullet \frac{cf}{dcpi}$$

with Vi = Compensated signal of channel i (i = x, y, z)

Ui = Input signal of channel i (i = x, y, z)

cf = Crest factor of exciting field (DASY5 parameter)

dcpi = Diode compression point (DASY5 parameter)

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

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

H-field probes: $$H_i = \sqrt{V_i} \cdot \frac{a_{i0} + a_{i1} f + a_{i2} f^2}{f}$$

With Vi = Compensated signal of channel i (i = x, y, z)

Normi = Sensor sensitivity of channel i (i = x, y, z)

ConvF= Sensitivity enhancement in solution

aij = Sensor sensitivity factors for H-field probes

f = Carrier frequency (GHz)

Ei = Electric field strength of channel i in V/m

Hi = Magnetic field strength of channel i in A/m

The RSS value of the field components give the total field strength:

$$E_{\text{tot}}=\sqrt{E_{\text{x}}^2+E_{\text{y}}^2+E_{\text{z}}^2}$$

The primary field data are used to calculate the derived field units.

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

With SAR = local specific absorption rate in mW/g

Etot = total field strength in V/m

σ= conductivity in [mho/m] or [Siemens/m]

ρ= equivalent tissue density in g/$cm^3$

Note that the density is normally set to 1 (or 1.06), to account for actual brain density rather than the density of the simulation liquid. The power flow density is calculated assuming the excitation field as a free space field.

$$P_{\text{pwe}}=E_{\text{tot}}^2/3770 \quad \text{Or} \quad P_{\text{pwe}}=\text{H}_{\text{tot}}^2\cdot 37.7$$

With $P_{\text{pwe}}$ = Equivalent power density of a plane wave in mW/$cm^2$

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

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

## 6.2 SAR Evaluation Procedures

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

**• Power Reference Measurement**

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

**• Area Scan**

The area scan is used as a fast scan in two dimensions to find the area of high field values, before doing a finer measurement around the hot spot. The sophisticated interpolation routines implemented in DASY5 software can find the maximum locations even in relatively coarse grids. The scan area is defined by an editable grid. This grid is anchored at the grid reference point of the

selected section in the phantom. When the area scan's property sheet is brought-up, grid was at to 15 mm by 15 mm and can be edited by a user.

- **Zoom Scan**

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

- **Power Drift Measurement**

  The drift job measures the field at the same location as the most recent reference job within the same procedure, and with the same settings. The drift measurement gives the field difference in dB from the reading conducted within the last reference measurement. Several drift measurements are possible for one reference measurement. This allows a user to monitor the power drift of the device under test within a batch process. In the properties of the Drift job, the user can specify a limit for the drift and have DASY5 software stop the measurements if this limit is exceeded.

## 6.3 Spatial Peak SAR Evaluation

The procedure for spatial peak SAR evaluation has been implemented according to the IEC62209-1 standard. It can be conducted for 1 g and 10 g. The DASY5 system allows evaluations that combine measured data and robot positions, such as:

maximum search
extrapolation
boundary correction

**Peak search for averaged SAR**

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

**Extrapolation**

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

Extrapolation routines require at least 10 measurement points in 3-D space. They are used in the Cube Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation. For a grid using 7x7x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1 g and 10 g cubes.

**Boundary effect**

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

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

Since the decay of the boundary effect dominates for small probes (a<<λ), the cos-term can be omitted. Factors Sb (parameter Alpha in the DASY5 software) and a (parameter Delta in the DASY5 software) are assessed during probe calibration and used for numerical compensation of the boundary effect.
Several simulations and measurements have confirmed that the compensation is valid for different field and boundary configurations.
This simple compensation procedure can largely reduce the probe uncertainty near boundaries. It works well as long as:

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

Since all of these requirements are fulfilled in a DASY5 system, the correction of the probe boundary effect in the vicinity of the phantom surface is performed in a fully automated manner via the measurement data extraction during post processing.

## 7. Conducted Output Power Measurement

The following procedures had been used to prepare the EUT for the SAR test. To setup the desire channel frequency and the maximum output power. A Radio Communication Tester MT8820C was used to program the EUT.

| GSM 850 | | Power (dBm) | | | | Average power (dBm) | | |
|---|---|---|---|---|---|---|---|---|
| | | Channel | Channel | Channel | | Channel | Channel | Channel |
| | | 128 | 190 | 251 | | 128 | 190 | 251 |
| GSM | | **32.70** | 32.69 | 32.68 | | | | |
| GPRS | 1TXslot | 32.68 | 32.67 | 32.65 | -9.03 | 23.65 | 23.64 | 23.62 |
| | 2TXslots | 31.90 | 31.93 | 31.89 | -6.02 | 25.88 | 25.91 | 25.87 |
| | 3TXslots | 30.17 | 30.15 | 30.12 | -4.26 | 25.91 | 25.89 | 25.86 |
| | 4TXslots | 29.03 | 29.01 | 29.01 | -3.01 | **26.02** | **26.00** | **26.00** |
| **GSM 1900** | | **Power (dBm)** | | | | **Average power (dBm)** | | |
| | | Channel | Channel | Channel | | Channel | Channel | Channel |
| | | 512 | 661 | 810 | | 512 | 661 | 810 |
| GSM | | **30.12** | 29.98 | 29.99 | | | | |
| GPRS | 1TXslot | 30.12 | 29.98 | 29.99 | -9.03 | 21.09 | 20.95 | 20.96 |
| | 2TXslots | 29.27 | 29.17 | 29.19 | -6.02 | 23.25 | 23.15 | 23.17 |
| | 3TXslots | 27.46 | 27.37 | 27.42 | -4.26 | 23.20 | 23.11 | 23.16 |
| | 4TXslots | 26.32 | 26.24 | 26.32 | -3.01 | **23.31** | **23.23** | **23.31** |

Note:

1) Division Factors

To average the power, the division factor is as follows:

1 TX-slot = 1 transmit time slot out of 8 time slots

=>Conducted power divided by (8/1) => -9.03 dB

2 TX-slots = 2 transmit time slots out of 8 time slots

=> Conducted power divided by (8/2) => -6.02 dB

3TX-slots = 3 transmit time slots out of 8 time slots

=> Conducted power divided by (8/3) => -4.26 dB

4 TX-slots = 4 transmit time slots out of 8 time slots

=> Conducted power divided by (8/4) => -3.01 dB

2) Average power

The maximum power are marks in bold. According to the conducted power as above, the body measurements are performed with 4Txslots for GPRS.

**WCDMA Band**

| Band II | | Power (dBm) | | |
|---|---|---|---|---|
| | | Channel | Channel | Channel |
| | | 9262 | 9400 | 9538 |
| RMC | 12.2kbps RMC | 22.66 | **22.69** | 22.10 |
| HSDPA | Sub - Test 1 | 21.61 | 21.71 | 21.25 |
| | Sub - Test 2 | 21.25 | 21.25 | 20.83 |
| | Sub - Test 3 | 19.69 | 19.69 | 19.18 |
| | Sub - Test 4 | 19.60 | 19.61 | 19.19 |
| HSUPA | Sub - Test 1 | 21.56 | 21.71 | 21.19 |
| | Sub - Test 2 | 21.67 | 21.74 | 21.22 |
| | Sub - Test 3 | 19.47 | 19.76 | 19.15 |
| | Sub - Test 4 | 21.63 | 21.70 | 21.13 |
| | Sub - Test 5 | 20.47 | 20.66 | 20.40 |
| **Band V** | | **Power (dBm)** | | |
| | | Channel | Channel | Channel |
| | | 4132 | 4183 | 4233 |
| RMC | 12.2kbps RMC | 23.20 | **23.29** | 23.07 |
| HSDPA | Sub - Test 1 | 22.26 | 22.34 | 22.09 |
| | Sub - Test 2 | 21.61 | 21.91 | 21.52 |
| | Sub - Test 3 | 20.30 | 20.14 | 19.99 |
| | Sub - Test 4 | 19.99 | 20.13 | 19.80 |
| HSUPA | Sub - Test 1 | 22.00 | 22.15 | 21.85 |
| | Sub - Test 2 | 22.25 | 22.30 | 22.10 |
| | Sub - Test 3 | 20.16 | 20.13 | 19.58 |
| | Sub - Test 4 | 22.31 | 22.38 | 22.12 |
| | Sub - Test 5 | 20.97 | 21.32 | 21.81 |

# 8. SAR Measurement Results

## 8.1 Liquid Measurement Results

The simulating liquids should be checked at the beginning of a series of SAR measurements to determine of the dielectric parameters are within the tolerances of the specified target values.

| Freq. [MHz] | Date | Liquid Type | Liquid Temp. [°C] | Ambient Temp. [°C] | Relative Humidity | Para. | Target Value | Measured Value | Deviation [%] | Limit [%] |
|---|---|---|---|---|---|---|---|---|---|---|
| 835 | June 06, 2014 | Head | 21.4 | 21 | 56% | εr | 41.5 | 40.5 | -2.41 | ±5 |
| | | | | | | σ | 0.90 | 0.89 | -1.11 | ±5 |
| 835 | June 06, 2014 | Body | 21.4 | 21 | 56% | εr | 55.2 | 53.88 | -2.39 | ±5 |
| | | | | | | σ | 0.97 | 0.974 | 0.41 | ±5 |
| 1900 | June 07, 2014 | Head | 21.5 | 21 | 56% | εr | 40 | 39.75 | -0.63 | ±5 |
| | | | | | | σ | 1.40 | 1.45 | 3.57 | ±5 |
| 1900 | June 07, 2014 | Body | 21.5 | 21 | 56% | εr | 53.3 | 50.72 | -4.84 | ±5 |
| | | | | | | σ | 1.52 | 1.58 | 3.95 | ±5 |
| 2450 | June 08, 2014 | Head | 21.5 | 21 | 56% | εr | 39.2 | 37.97 | -3.14 | ±5 |
| | | | | | | σ | 1.80 | 1.88 | 4.44 | ±5 |
| 2450 | June 08, 2014 | Body | 21.5 | 21 | 56% | εr | 52.7 | 50.71 | -3.78 | ±5 |
| | | | | | | σ | 1.95 | 2.02 | 3.59 | ±5 |

## 8.2 System Performance Check

**System Performance Check Measurement conditions**

- The measurements were performed in the flat section of the SAM twin phantom filled with head and body simulating liquid of the following parameters.
- The DASY5 system with an E-field probe was used for the measurements.
- The dipole was mounted on the small tripod so that the dipole feed point was positioned below the center marking of the flat phantom section and the dipole was oriented parallel to the body axis (the long side of the phantom). The standard measuring distance was 15 mm (below 1 GHz) and 10 mm (above 1 GHz) from dipole center to the simulating liquid surface.
- The coarse grid with a grid spacing of 10mm was aligned with the dipole.
- Special 5x5x7 fine cube was chosen for cube integration (dx= 8 mm, dy= 8 mm, dz= 5 mm).
- Distance between probe sensors and phantom surface was set to 2.5 mm.

The depth of Liquid must above 15cm

**System Performance Check Results**

| Freq. [MHz] | Date | Liquid Type | Liquid Temp. [°C] | Amb. Temp. [°C] | Input Power (mW) | Measured SAR_1g (W/Kg) | 250mW Target SAR_1g (W/Kg) | Dev. [%] | Limit [%] |
|---|---|---|---|---|---|---|---|---|---|
| 835 | June 06, 2014 | Head | 21.4 | 21 | 250 | 2.35 | 2.47 | -4.86 | ±10 |
| | June 06, 2014 | Body | 21.4 | 21 | 250 | 2.59 | 2.52 | 2.78 | ±10 |
| 1900 | June 07, 2014 | Head | 21.5 | 21 | 250 | 9.42 | 9.89 | -4.75 | ±10 |
| | June 07, 2014 | Body | 21.5 | 21 | 250 | 10.1 | 10.3 | -1.94 | ±10 |
| 2450 | June 08, 2014 | Head | 21.5 | 21 | 250 | 13.2 | 13.4 | -1.49 | ±10 |
| | June 08, 2014 | Body | 21.5 | 21 | 250 | 14.1 | 13.0 | 8.46 | ±10 |

### 8.3 Measurement Results

| Band | Test configuration | | Mode | Ch#. | Freq. [MHz] | Power (dBm) | | 1g SAR (W/Kg) | | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tune-up limit | Measured | Measured | Scaled | |
| GSM 850 | Head | Left Cheek | voice | 128 | 824.2 | 33 | 32.70 | 0.096 | 0.103 | -0.18 |
| | Head | Left Tilted | voice | 128 | 824.2 | 33 | 32.70 | 0.067 | 0.072 | 0.15 |
| | Head | Right Cheek | voice | 128 | 824.2 | 33 | 32.70 | 0.102 | **0.109** | -0.12 |
| | Head | Right Tilted | voice | 128 | 824.2 | 33 | 32.70 | 0.061 | 0.065 | 0.05 |
| | Body | Back | GPRS 4 slots | 128 | 824.2 | 29.5 | 29.03 | 0.643 | **0.717** | -0.14 |
| | Body | Front | GPRS 4 slots | 128 | 824.2 | 29.5 | 29.03 | 0.203 | 0.226 | -0.07 |
| | Body | Left | GPRS 4 slots | 128 | 824.2 | 29.5 | 29.03 | 0.187 | 0.208 | 0.05 |
| | Body | Right | GPRS 4 slots | 128 | 824.2 | 29.5 | 29.03 | 0.256 | 0.285 | -0.04 |
| | Body | Bottom | GPRS 4 slots | 128 | 824.2 | 29.5 | 29.03 | 0.055 | 0.061 | 0.09 |
| GSM 1900 | Head | Left Cheek | voice | 512 | 1850.2 | 31 | 30.12 | 0.073 | **0.089** | -0.10 |
| | Head | Left Tilted | voice | 512 | 1850.2 | 31 | 30.12 | 0.033 | 0.040 | 0.17 |
| | Head | Right Cheek | voice | 512 | 1850.2 | 31 | 30.12 | 0.036 | 0.044 | -0.10 |
| | Head | Right Tilted | voice | 512 | 1850.2 | 31 | 30.12 | 0.032 | 0.039 | 0.13 |
| | Body | Back | GPRS 4 slots | 512 | 1850.2 | 26.5 | 26.32 | 0.727 | **0.758** | -0.18 |
| | Body | Front | GPRS 4 slots | 512 | 1850.2 | 26.5 | 26.32 | 0.109 | 0.114 | 0.17 |
| | Body | Left | GPRS 4 slots | 512 | 1850.2 | 26.5 | 26.32 | 0.144 | 0.150 | -0.08 |
| | Body | Right | GPRS 4 slots | 512 | 1850.2 | 26.5 | 26.32 | 0.025 | 0.026 | 0.03 |
| | Body | Bottom | GPRS 4 slots | 512 | 1850.2 | 26.5 | 26.32 | 0.258 | 0.269 | -0.13 |
| WCDMA Band II | Head | Left Cheek | RMC 12.2 kbps | 9400 | 1880 | 23 | 22.69 | 0.218 | **0.234** | 0.20 |
| | Head | Left Tilted | RMC 12.2 kbps | 9400 | 1880 | 23 | 22.69 | 0.090 | 0.097 | 0.12 |
| | Head | Right Cheek | RMC 12.2 kbps | 9400 | 1880 | 23 | 22.69 | 0.103 | 0.111 | -0.11 |

| Band | Test configuration | | Mode | Ch#. | Freq. [MHz] | Power (dBm) | | 1g SAR (W/Kg) | | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Tune-up limit | Measured | Measured | Scaled | |
| | Head | Right Tilted | RMC 12.2 kbps | 9400 | 1880 | 23 | 22.69 | 0.093 | 0.100 | 0.13 |
| | Body | Back | RMC 12.2 kbps | 9538 | 1907.6 | 23 | 22.10 | 1.12 | 1.38 | 0.03 |
| | Body | Back | RMC 12.2 kbps | 9538 | 1907.6 | 23 | 22.10 | 1.12 | **1.38** | -0.05 |
| | Body | Back | RMC 12.2 kbps | 9400 | 1880 | 23 | 22.69 | 1.03 | 1.11 | 0.18 |
| | Body | Back | RMC 12.2 kbps | 9262 | 1852.4 | 23 | 22.66 | 0.809 | 0.875 | -0.03 |
| | Body | Front | RMC 12.2 kbps | 9400 | 1880 | 23 | 22.69 | 0.156 | 0.168 | 0.21 |
| | Body | Left | RMC 12.2 kbps | 9400 | 1880 | 23 | 22.69 | 0.184 | 0.198 | 0.08 |
| | Body | Right | RMC 12.2 kbps | 9400 | 1880 | 23 | 22.69 | 0.033 | 0.035 | -0.09 |
| | Body | Bottom | RMC 12.2 kbps | 9400 | 1880 | 23 | 22.69 | 0.062 | 0.067 | 0.03 |
| WCDMA Band V | Head | Left Cheek | RMC 12.2 kbps | 4183 | 836.6 | 23.5 | 23.29 | 0.089 | 0.093 | -0.13 |
| | Head | Left Tilted | RMC 12.2 kbps | 4183 | 836.6 | 24 | 23.29 | 0.064 | 0.075 | 0.21 |
| | Head | Right Cheek | RMC 12.2 kbps | 4183 | 836.6 | 24 | 23.29 | 0.098 | **0.115** | 0.20 |
| | Head | Right Tilted | RMC 12.2 kbps | 4183 | 836.6 | 24 | 23.29 | 0.059 | 0.070 | 0.08 |
| | Body | Back | RMC 12.2 kbps | 4183 | 836.6 | 24 | 23.29 | 0.323 | **0.381** | 0.06 |
| | Body | Front | RMC 12.2 kbps | 4183 | 836.6 | 24 | 23.29 | 0.091 | 0.107 | 0.06 |
| | Body | Left | RMC 12.2 kbps | 4183 | 836.6 | 24 | 23.29 | 0.146 | 0.172 | 0.06 |
| | Body | Right | RMC 12.2 kbps | 4183 | 836.6 | 24 | 23.29 | 0.158 | 0.186 | 0.05 |
| | Body | Bottom | RMC 12.2 kbps | 4183 | 836.6 | 24 | 23.29 | 0.036 | 0.042 | 0.16 |

Note:

1) The body SAR was tested with separation distance 10mm.

2) According to KDB 941225 D06 Hotspot Mode SAR v01r01, body SAR for top configuration measurement was not required for WWAN mode because the top side of the EUT with WWAN antenna further than 25 mm from the surface.

3)HSDPA and HSUPA body SAR are not required, because maximum average output power of each RF channel with HSDPA and HSUPA active is not 1/4 dB higher than that measured without HSDPA and HSUPA using 12.2kbps RMC and the maximum SAR 12.2kbps RMC is not above 75% of the SAR limit.

4) Blue entries represent repeated test.

## Measurement variability consideration

According to KDB 865664 D01v01r03 section 2.8.1, repeated measurements are required following the procedures as below:

1) Repeated measurement is not required when the original highest measured SAR is < 0.80 W/kg; steps 2) through 4) do not apply.

2) When the original highest measured SAR is ≥ 0.80 W/kg, repeat that measurement once.

3) Perform a second repeated measurement only if the ratio of largest to smallest SAR for the original and first repeated measurements is > 1.20 or when the original or repeated measurement is ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).

4) Perform a third repeated measurement only if the original, first or second repeated measurement is ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20.

| Band | Test configuration | | Mode | Ch#. | Freq. (MHz) | Measured SAR (W/Kg) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Original | 1st Repeated | | 2nd Repeated | |
| | | | | | | | Value | Ratio | Value | Ratio |
| WCDMA Band II | Body | Back | RMC 12.2 kbps | 9538 | 1907.6 | 1.12 | 1.12 | 1.00 | NA | NA |

**SAR consideration for unlicensed transmitters:**

The EUT support WIFI and Bluetooth functions, the output power of WIFI and Bluetooth and the antenna layout are as follow:


WIFI (802.11b/g/n)

| | Power（dBm） | | | |
|---|---|---|---|---|
| | 802.11b | 802.11g | 802.11n(H20) | 802.11n(H40) |
| Lowest | 16.95 | 12.51 | 12.53 | 10.80 |
| Middle | 16.58 | 14.55 | 14.65 | 12.87 |
| Highest | 16.59 | 12.71 | 12.66 | 10.82 |
| Tune-up limit | 17.00 | 16.00 | 16.00 | 13.00 |

Bluetooth:

| | Conducted power（dBm） | | |
|---|---|---|---|
| | GFSK | Pi/4DQPSK | 8QPSK |
| Lowest | 5.90 | 5.26 | 5.26 |
| Middle | 6.76 | 6.14 | 6.14 |
| Highest | 6.75 | 6.03 | 6.14 |
| Tune-up limit | 7.0 | 7.0 | 7.0 |

According to KDB 447498 section 4.3.1, the 1-g SAR test exclusion thresholds at test separation distances≤ 50 mm are determined by:

$$\frac{Max\ power\ of\ Channel(mW)}{Test\ Separation\ Dis\tan ce(mm)} * \sqrt{Frequency(GHz)} \le 3.0$$

1) WIFI maximum tune-up limit power is 17dBm=50.12mW.

For the head and Body SAR, use 5mm and 10mm as the conservative minimum test separation distance respectively.

| Mode | Frequency(MHz) | maximum Tune-up limit power(mW) | Separation Distance(mm) | ≤3.0 |
|---|---|---|---|---|
| WiFi(Head) | 2462 | 50.12 | 5 | 15.73 |
| WiFi(Body) | 2462 | 50.12 | 10 | 7.86 |

So WIFI standalone SAR measurements are required for both head and body.

**The standalone SAR of WIFI is follow:**

| Test configuration | | Mode | Ch#. | Freq. [MHz] | Power (dBm) | | 1g SAR (W/Kg) | | Power Drift (dB) |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Tune-up limit | Measured | Measured | Scaled | |
| Head | Left Cheek | 802.11b | 1 | 2412 | 17 | 16.95 | 0.069 | **0.070** | 0.18 |
| Head | Left Tilted | 802.11b | 1 | 2412 | 17 | 16.95 | 0.051 | 0.052 | -0.16 |
| Head | Right Cheek | 802.11b | 1 | 2412 | 17 | 16.95 | 0.029 | 0.029 | -0.11 |
| Head | Right Tilted | 802.11b | 1 | 2412 | 17 | 16.95 | 0.035 | 0.035 | 0.09 |
| Body | Back | 802.11b | 1 | 2412 | 17 | 16.95 | 0.139 | **0.141** | -0.11 |
| Body | Front | 802.11b | 1 | 2412 | 17 | 16.95 | 0.029 | 0.029 | -0.17 |
| Body | Right | 802.11b | 1 | 2412 | 17 | 16.95 | 0.024 | 0.024 | -0.08 |
| Body | Top | 802.11b | 1 | 2412 | 17 | 16.95 | 0.039 | 0.039 | 0.01 |

Note: 1) The body SAR was tested with separation distance 10mm.

2) According to KDB 941225 D06 Hotspot Mode SAR v01r01, body SAR for bottom and left configuration measurements were not required for WIFI mode because the bottom and left side of the EUT with WIFI antenna further than 25 mm from these surfaces.

3) SAR is not required for 802.11g/n channels because the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels.

2) Bluetooth maximum tune-up limit power is 7dBm=5.0mW.

For the head and Body SAR, use 5mm and 10mm as the conservative minimum test separation distance respectively.

| Mode | Frequency(MHz) | maximum Tune-up limit power(mW) | Separation Distance(mm) | ≤3.0 |
|---|---|---|---|---|
| Bluetooth (Head) | 2480 | 5 | 5 | 1.57 |
| Bluetooth (Body) | 2480 | 5 | 10 | 0.79 |

So Bluetooth standalone SAR measurements are not required for both head and body.

3) According to KDB 447498 section 4.3.2.2, when standalone SAR test exclusion applies, the standalone SAR must be estimated according to following formula:

$$Estimated\ SAR = \frac{\sqrt{f(GHz)}}{7.5} * \frac{Max\ power\ of\ Channel(mW)}{Min\ Test\ Separation\ Dis\tan ce(mm)}$$

| Mode | Frequency(MHz) | maximum Tune-up limit power(mW) | Separation Distance(mm) | Estimated SAR(W/Kg) |
|---|---|---|---|---|
| Bluetooth (Head) | 2480 | 5 | 5 | 0.21 |
| Bluetooth (Body) | 2480 | 5 | 10 | 0.11 |

So the estimated Bluetooth head SAR is 0.21 W/kg and the body SAR is 0.11 W/kg.

## Result Summary:

**Head SAR configuration**

| Mode | Channel | Position | 1g SAR (W/Kg) |
|---|---|---|---|
| GSM850 | 128 | Right ,Cheek | 0.109 |
| GSM1900 | 512 | Left ,Cheek | 0.089 |
| WCDMA Band II | 9400 | Left ,Cheek | 0.234 |
| WCDMA Band V | 4183 | Right ,Cheek | 0.115 |
| WIFI(802.11g) | 1 | Left ,Cheek | 0.070 |
| Bluetooth | / | / | 0.21 |

**Body Worn configuration**

| Mode | Channel | Position | 1g SAR (W/Kg) |
|---|---|---|---|
| 4Tx slots GPRS850 | 128 | Back side | 0.717 |
| 4Tx slots GPRS1900 | 512 | Back side | 0.758 |
| WCDMA Band II | 9538 | Back side | 1.38 |
| WCDMA Band V | 4183 | Back side | 0.381 |
| WIFI(802.11b) | 1 | Back side | 0.141 |
| Bluetooth | / | / | 0.11 |

**Hotspot SAR configuration**

| Mode | Channel | Position | 1g SAR (W/Kg) |
|---|---|---|---|
| 4Tx slots GPRS850 | 128 | Back side | 0.717 |
| 4Tx slots GPRS1900 | 512 | Back side | 0.758 |
| WCDMA Band II | 9538 | Back side | 1.38 |
| WCDMA Band V | 4183 | Back side | 0.381 |
| WIFI(802.11b) | 1 | Back side | 0.141 |

## Simultaneous SAR Consideration

The simultaneous SAR scenarios are as follow.

| No | Simultaneous Configuration | Sum. SAR (W/kg) |
|---|---|---|
| 1 | Cellular head + WiFi head | 0.304 |
| 2 | Cellular body + WiFi body | 1.521 |
| 3 | Cellular head + BT head | 0.444 |
| 4 | Cellular body + BT body | 1.49 |
| 5 | Cellular Hotspot +WiFi Hotspot | 1.521 |

The maximum evaluation SAR of the simultaneous scenarios is 1.521 W/kg that less than 1.6 W/kg, so the simultaneous SAR measurement is not required.

## 9. Equipment List & Calibration Status

| Name of Equipment | Manufacturer | Type/Model | Serial Number | Last Cal. Date | Calibration Due |
|---|---|---|---|---|---|
| PC | HP | d7900eC | CZC9312JJ4 | N/A | N/A |
| E-field Probe | SPEAG | ES3DV3 | SN 3221 | 2014-1-9 | 2015-1-9 |
| DAE | SPEAG | DAE4-SD 000 D04 BJ | SN 893 | 2013-12-25 | 2014-12-24 |
| Device Holder | Stäubli | N/A | N/A | N/A | N/A |
| SAM Phantom | SPEAG | SAM Twin Phantom | TP-1545/TP-1548 | N/A | N/A |
| 6 Axis Robot | Stäubli | Robot TX90XL | F09/5B9UA1/A/01 | N/A | N/A |
| Dipole 835MHz | SPEAG | D835V2 | 4d150 | 2013-3-18 | 2016-3-17 |
| Dipole 1900MHz | SPEAG | D1900V2 | 5d070 | 2012-10-1 | 2015-9-30 |
| Dipole 2450MHz | SPEAG | D2450V2 | 815 | 2012-9-26 | 2015-9-25 |
| Wireless Communication Test Set | Anritsu | MT8820C | 6201060976 | 2013-8-16 | 2014-8-15 |
| Signal Generator | Agilent | 5183A | MY49060563 | 2013-8-16 | 2014-8-15 |
| Power Meter | Agilent | E4419B | MY45104719 | 2013-8-16 | 2014-8-15 |
| Power Sensor | Agilent | N8481H | MY48100148 | 2013-8-16 | 2014-8-15 |
| Directional couplers | Agilent | 778D | MY48220223 | N/A | N/A |
| Power amplifier | mini-circuits | ZHL-42W | QA0940002 | N/A | N/A |
| Power supply | Topward | 3303d | 796708 | 2013-7-31 | 2014-7-30 |
| Network Analyzer | Agilent | E5071C | MY46108263 | 2013-8-16 | 2014-8-15 |
| Liquid Calibration Kit | Agilent | 85070E | N/A | N/A | N/A |

Note: Per KDB 450824 Dipole SAR Validation Verification, GCCT Lab has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;
3. Return-loss is within 20% of calibrated measurement;
4. Impedance is within 5Ω of calibrated measurement.

## 10. Measurement Uncertainty

| Uncertainty Component | Sec. | Tol (+-%) | Prob. Dist. | Div. | Ci (1g) | Ci (10g) | 1g Ui (+-%) | 10g Ui (+-%) | Vi |
|---|---|---|---|---|---|---|---|---|---|
| **Measurement System** | | | | | | | | | |
| Probe calibration | E.2.1 | 6.55 | N | 1.0 | 1.0 | 1.0 | 6.55 | 6.55 | ∞ |
| Axial Isotropy | E.2.2 | 0.5 | R | $\sqrt{3}$ | 1.0 | 1.0 | 0.29 | 0.29 | ∞ |
| Hemispherical Isotropy | E.2.2 | 2.6 | R | $\sqrt{3}$ | 1.0 | 1.0 | 1.5 | 1.5 | ∞ |
| Boundary effect | E.2.3 | 0.8 | R | $\sqrt{3}$ | 1.0 | 1.0 | 0.46 | 0.46 | ∞ |
| Linearity | E.2.4 | 0.6 | R | $\sqrt{3}$ | 1.0 | 1.0 | 0.35 | 0.35 | ∞ |
| System detection limits | E.2.5 | 0.25 | R | $\sqrt{3}$ | 1.0 | 1.0 | 0.14 | 0.14 | ∞ |
| Readout Electronics | E.2.6 | 0.35 | N | 1 | 1.0 | 1.0 | 0.35 | 0.35 | ∞ |
| Reponse Time | E.2.7 | 0 | R | $\sqrt{3}$ | 1.0 | 1.0 | 0 | 0 | ∞ |
| Integration Time | E.2.8 | 2.6 | R | $\sqrt{3}$ | 1.0 | 1.0 | 1.5 | 1.5 | ∞ |
| RF ambient Conditions-Noise | E.6.1 | 0 | R | $\sqrt{3}$ | 1.0 | 1.0 | 0 | 0 | ∞ |
| RF ambient Conditions-Reflections | E.6.1 | 3.0 | R | $\sqrt{3}$ | 1.0 | 1.0 | 1.7 | 1.7 | ∞ |
| Probe positioner Mechanical Tolerance | E.6.2 | 1.5 | R | $\sqrt{3}$ | 1.0 | 1.0 | 0.87 | 0.87 | ∞ |
| Probe positioning with respect to Phantom Shell | E.6.3 | 2.9 | R | $\sqrt{3}$ | 1.0 | 1.0 | 1.67 | 1.67 | ∞ |
| Extrapolation, interpolation and integration Algoritms for Max. SAR | E.5 | 1.0 | R | $\sqrt{3}$ | 1.0 | 1.0 | 0.58 | 0.58 | ∞ |
| **Test sample Related** | | | | | | | | | |
| Test Sample Positioning | E.4.2 | 4.6 | N | 1.0 | 1.0 | 1.0 | 4.6 | 4.6 | N-1 |
| Device Holder Uncertainty | E.4.1 | 5.2 | N | 1.0 | 1.0 | 1.0 | 5.2 | 5.2 | N-1 |
| Output Power Variation - SAR drift measurement | 6.6.2 | 5 | R | $\sqrt{3}$ | 1.0 | 1.0 | 2.89 | 2.89 | ∞ |
| **Phantom and Tissue Parameters** | | | | | | | | | |
| Phantom Uncertainty (Shape and thickness tolerances) | E.3.1 | 4.0 | R | $\sqrt{3}$ | 1.0 | 1.0 | 2.31 | 2.31 | ∞ |
| Liquid conductivity - deviation from target value | E.3.2 | 5.0 | R | $\sqrt{3}$ | 0.64 | 0.43 | 1.85 | 1.24 | ∞ |
| Liquid conductivity - measurement uncertainty | E.3.3 | 2.5 | N | 1.0 | 0.64 | 0.43 | 1.60 | 1.08 | M |
| Liquid permitivity - deviation from target value | E.3.2 | 5.0 | R | $\sqrt{3}$ | 0.6 | 0.49 | 1.73 | 1.42 | ∞ |
| Liquid permitivity - measurement uncertainty | E.3.3 | 2.5 | N | 1.0 | 0.6 | 0.49 | 1.5 | 1.23 | M |
| **Combined Standard Uncertainty** | | | RSS | | | | 11.3 | 11.0 | |
| **Expanded Uncertainty** (95% Confidence interval) | | | K | | | | 23 | 22 | |

# ANNEX A: EUT Photos and Test Positions

**EUT Photos:**

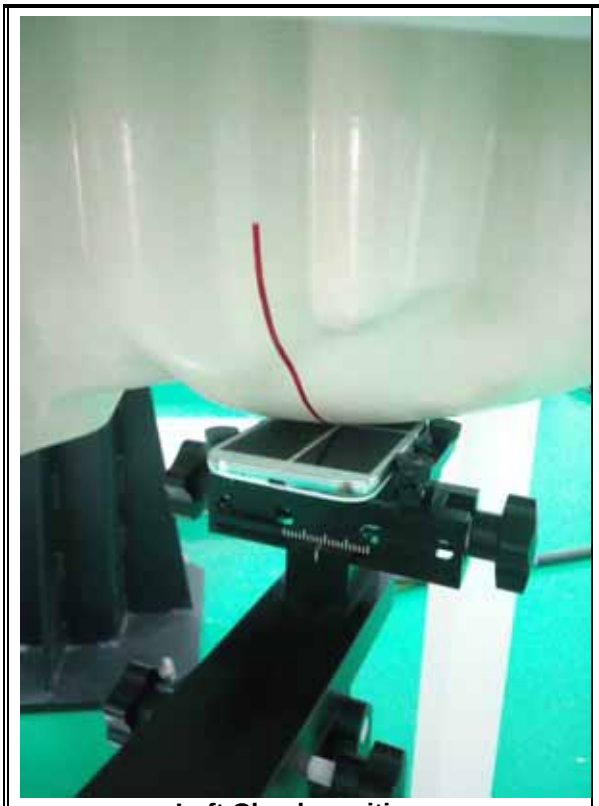
**Mobile Phone**

**Mobile Phone**

**Mobile Phone**

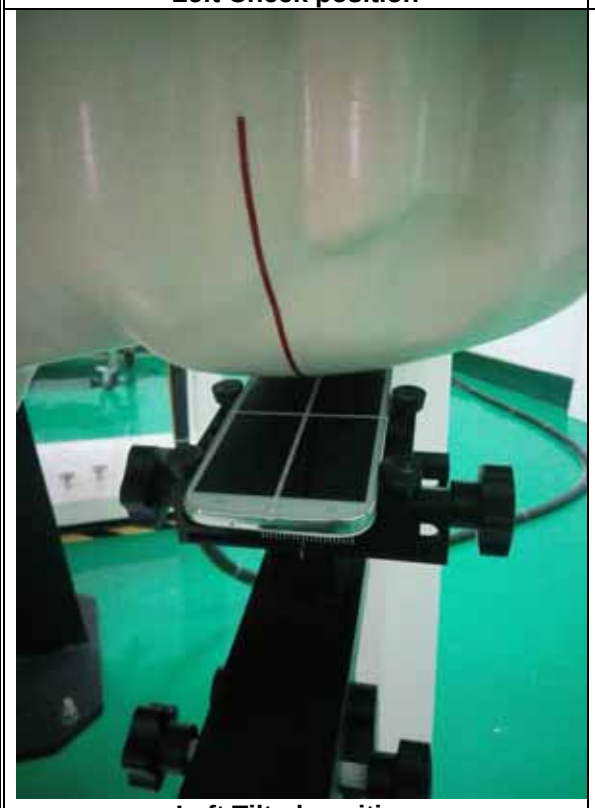
**Mobile Phone**

**Test Positions:**

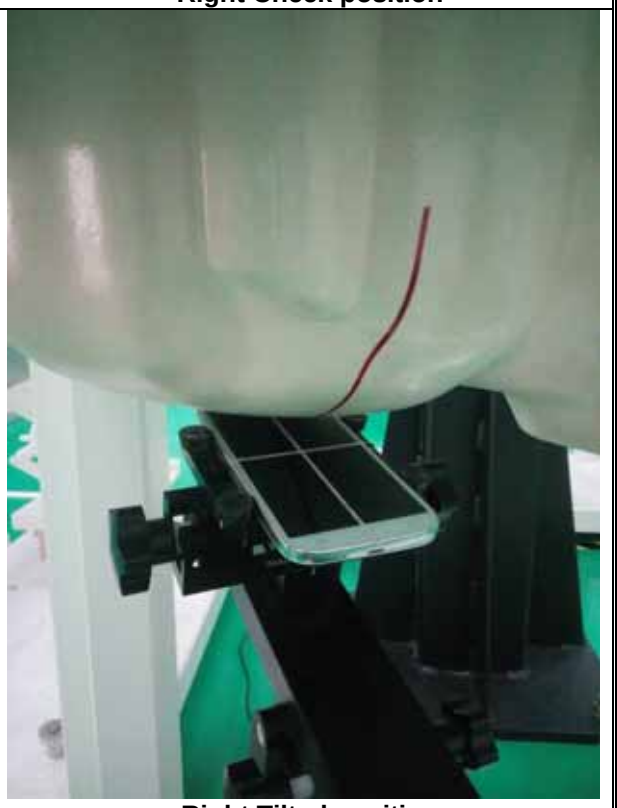


**Left Cheek position**

**Right Cheek position**

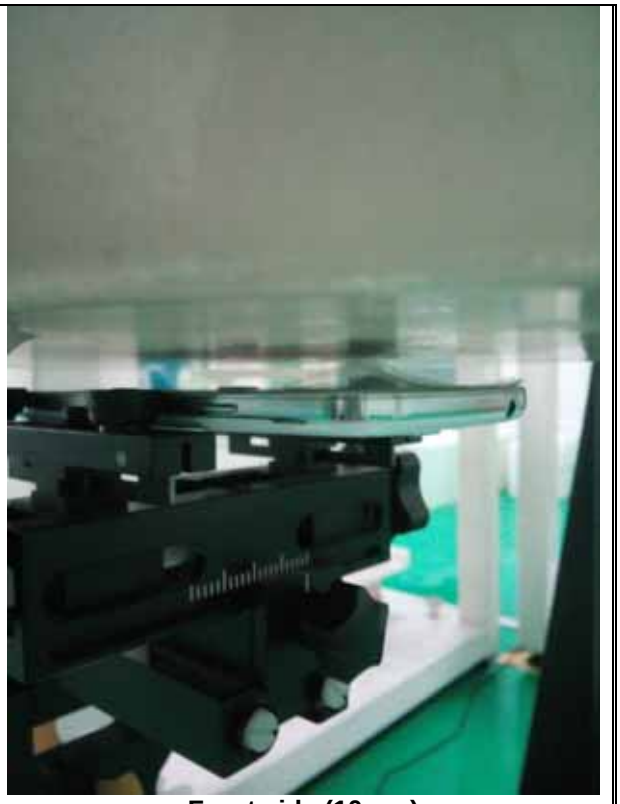


**Left Tilted position**



**Right Tilted position**

Back side (10mm)



Front side (10mm)

Right side (10mm)

Left side(10mm)

| | |
|---|---|
|  |  |
| **Bottom side(10mm)** | **Top side(10mm)** |

# ANNEX B: System Performance Check Plots

Test Laboratory: GCCT Test Date: June.06, 2014

**System 835 MHz dipole (Head)**

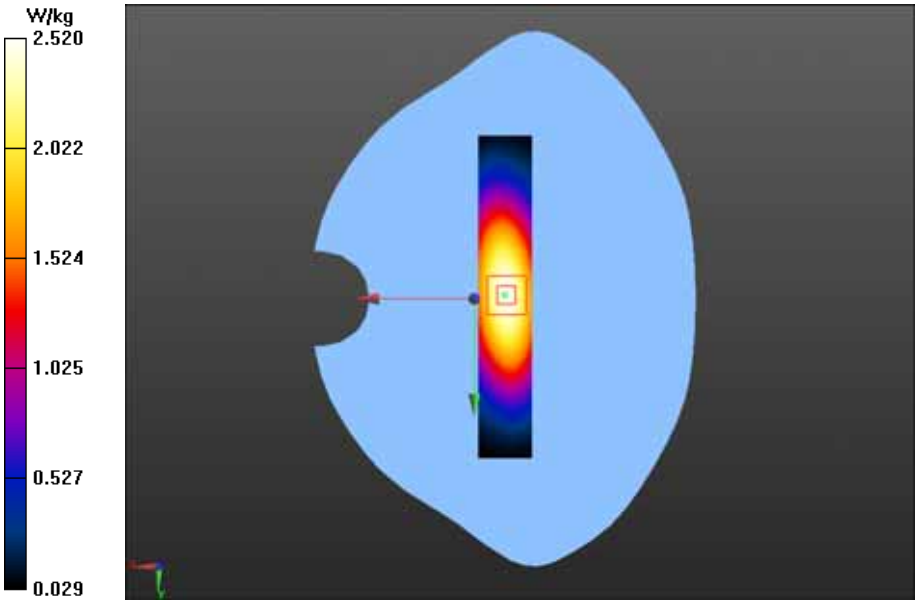
**DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2**

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz;
Communication System PAR: 0 dB
Medium parameters used: f = 835 MHz; $\sigma$ = 0.89 mho/m; $\varepsilon_r$ = 40.5; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.23, 6.23, 6.23); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**835Head/System/Area Scan (31x181x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 87.272 V/m; Power Drift = -0.16 dB
Maximum value of SAR (interpolated) = 2.52 W/kg
**835Head/System/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 87.272 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 3.432 mW/g
**SAR(1 g) = 2.35 mW/g; SAR(10 g) = 1.55 mW/g**
Maximum value of SAR (measured) = 2.53 W/kg



Test Laboratory: GCCT Test Date: June.06, 2014

**System 835 MHz dipole (Body)**

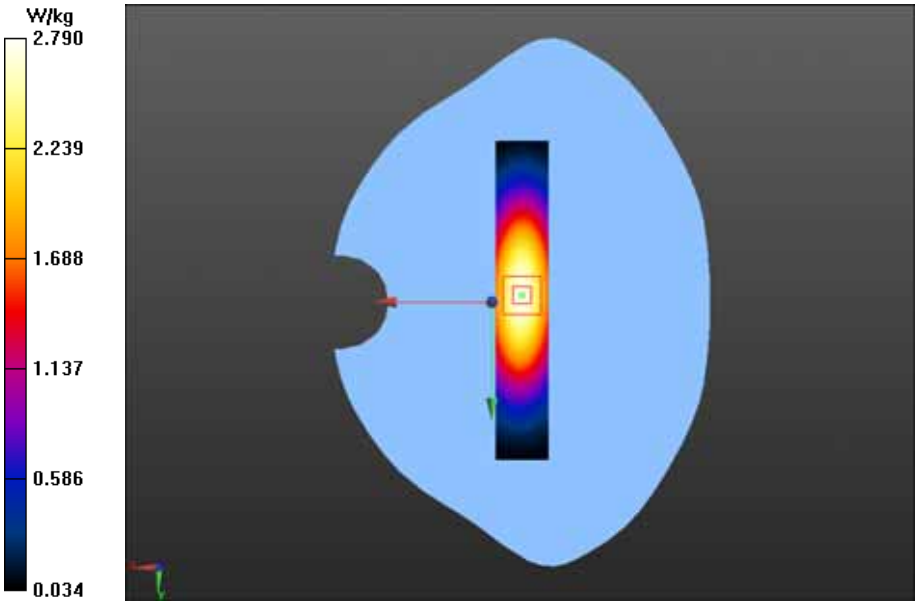
**DUT: Dipole 835 MHz D835V2; Type: D835V2; Serial: D835V2**

Communication System: CW; Communication System Band: D835 (835.0 MHz); Frequency: 835 MHz;
Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 835 MHz; $\sigma$ = 0.974 mho/m; $\varepsilon_r$ = 53.879; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.2, 6.2, 6.2); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**835Body/System/Area Scan (31x181x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 54.162 V/m; Power Drift = 0.01 dB
Maximum value of SAR (interpolated) = 2.79 W/kg
**835Body/System/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 54.162 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.776 mW/g
**SAR(1 g) = 2.59 mW/g; SAR(10 g) = 1.72 mW/g**
Maximum value of SAR (measured) = 2.81 W/kg



Test Laboratory: GCCT Test Date: June.07, 2014

**System 1900 MHz dipole (Head)**

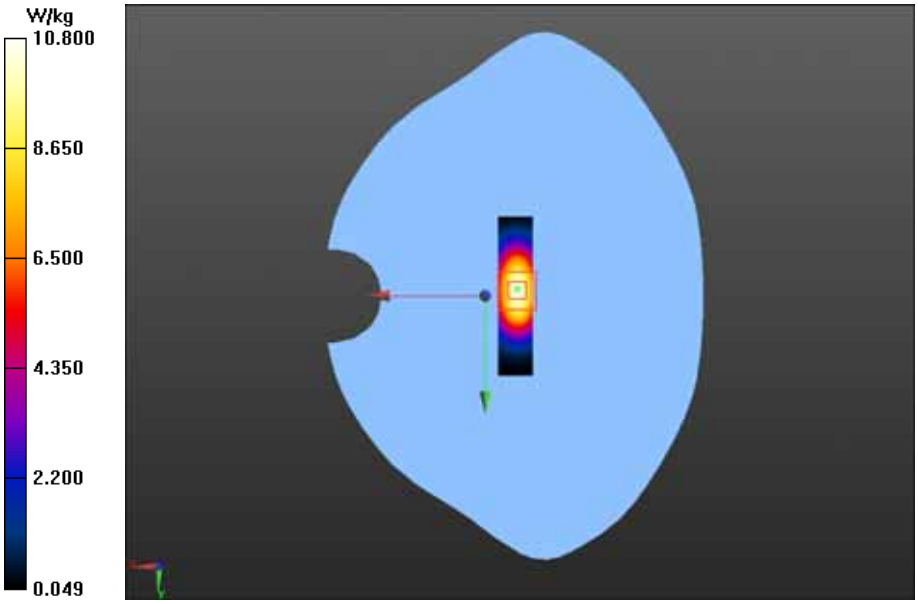
**DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2**

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.45 mho/m; $\varepsilon_r$ = 39.75; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(5.4, 5.4, 5.4); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**1900Head/System/Area Scan (21x91x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 87.272 V/m; Power Drift = -0.16 dB
Maximum value of SAR (interpolated) = 10.8 W/kg
**1900Head/System/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 87.272 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 17.216 mW/g
**SAR(1 g) = 9.42 mW/g; SAR(10 g) = 4.93 mW/g**
Maximum value of SAR (measured) = 10.6 W/kg



Test Laboratory: GCCT Test Date: June.07, 2014

**System 1900 MHz dipole (Body)**

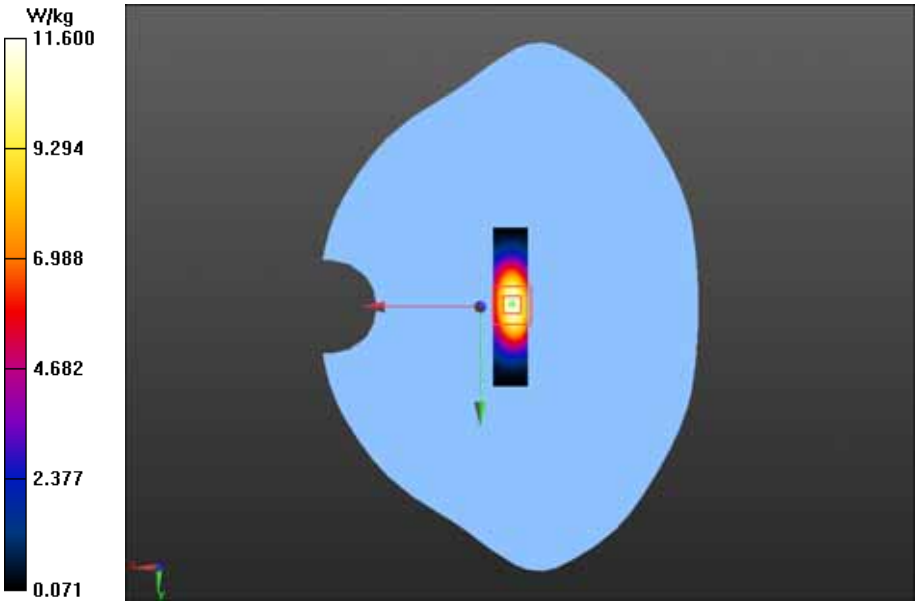
**DUT: Dipole 1900 MHz D1900V2; Type: D1900V2; Serial: D1900V2**

Communication System: CW; Communication System Band: D1900 (1900.0 MHz); Frequency: 1900 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.578 mho/m; $\varepsilon_r$ = 50.718; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**1900Body/System/Area Scan (21x91x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 87.272 V/m; Power Drift = -0.16 dB
Maximum value of SAR (interpolated) = 11.6 W/kg
**1900Body/System/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 87.272 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 17.958 mW/g
**SAR(1 g) = 10.1 mW/g; SAR(10 g) = 5.34 mW/g**
Maximum value of SAR (measured) = 11.4 W/kg



Test Laboratory: GCCT Test Date: June.08, 2014

**System 2450 MHz dipole (Head)**

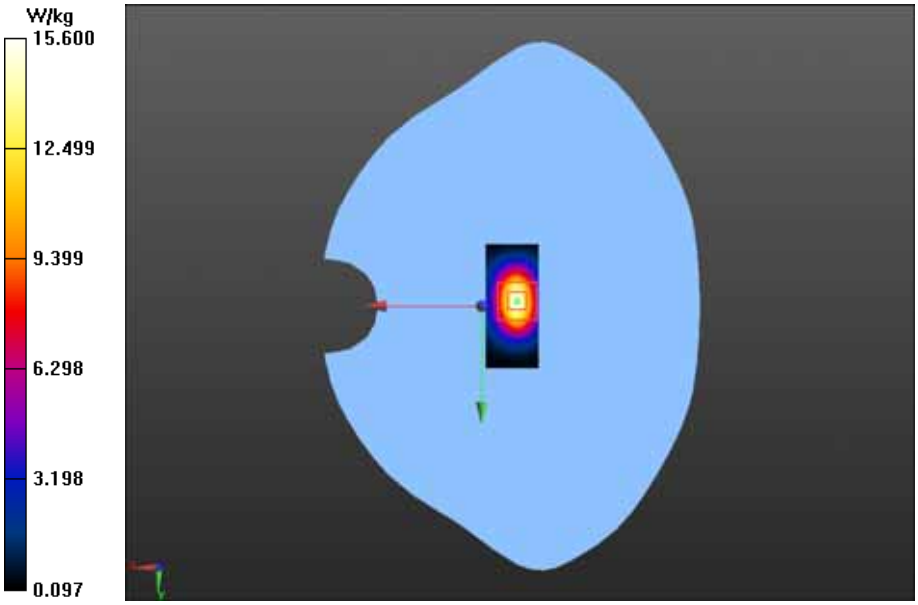
**DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2**

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 2450 MHz; $\sigma$ = 1.88 mho/m; $\varepsilon_r$ = 37.97; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.76, 4.76, 4.76); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**2450 Head/System/Area Scan (31x71x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 90.023 V/m; Power Drift = -0.13 dB
Maximum value of SAR (interpolated) = 15.6 W/kg
**2450 Head/System/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 90.023 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 27.198 mW/g
**SAR(1 g) = 13.2 mW/g; SAR(10 g) = 6.23 mW/g**
Maximum value of SAR (measured) = 15.1 W/kg



Test Laboratory: GCCT Test Date: June.08, 2014

**System 2450 MHz dipole (Body)**

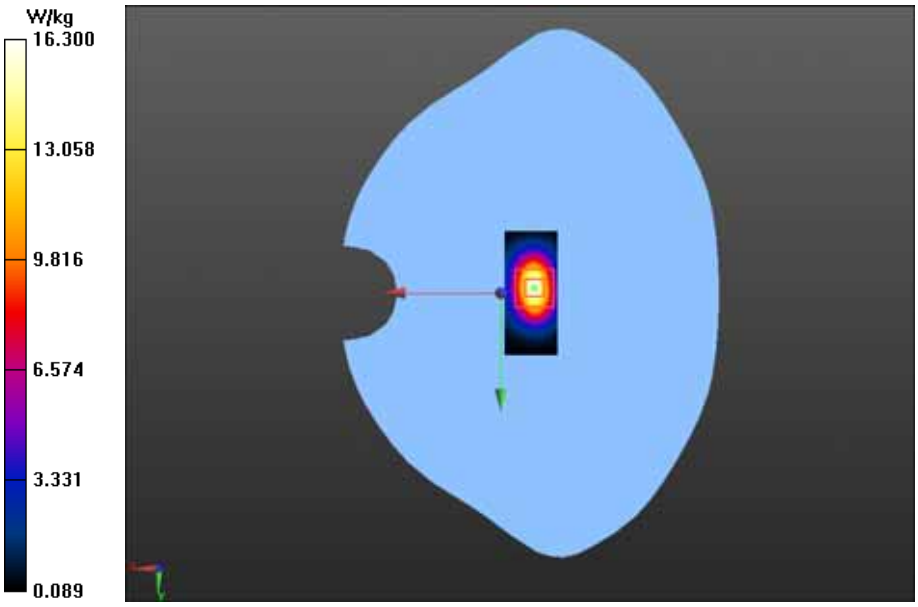
**DUT: Dipole 2450 MHz D2450V2; Type: D2450V2; Serial: D2450V2**

Communication System: CW; Communication System Band: D2450 (2450.0 MHz); Frequency: 2450 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 2450 MHz; $\sigma$ = 2.02 mho/m; $\varepsilon_r$ = 50.71; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.48, 4.48, 4.48); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**2450 Body/System check/Area Scan (31x71x1):** Interpolated grid: dx=1.000 mm, dy=1.000 mm
Reference Value = 87.861 V/m; Power Drift = -0.03 dB
Maximum value of SAR (interpolated) = 16.3 W/kg
**2450 Body/System check/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 87.861 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 29.252 mW/g
**SAR(1 g) = 14.1 mW/g; SAR(10 g) = 6.56 mW/g**
Maximum value of SAR (measured) = 16.0 W/kg



# ANNEX C: SAR Test Plots

Test Laboratory: GCCT Test Date: June.06, 2014

**GSM850 LEFT/CHEEK-Low**

**DUT: Kingo T5; Type: Kingo T5**

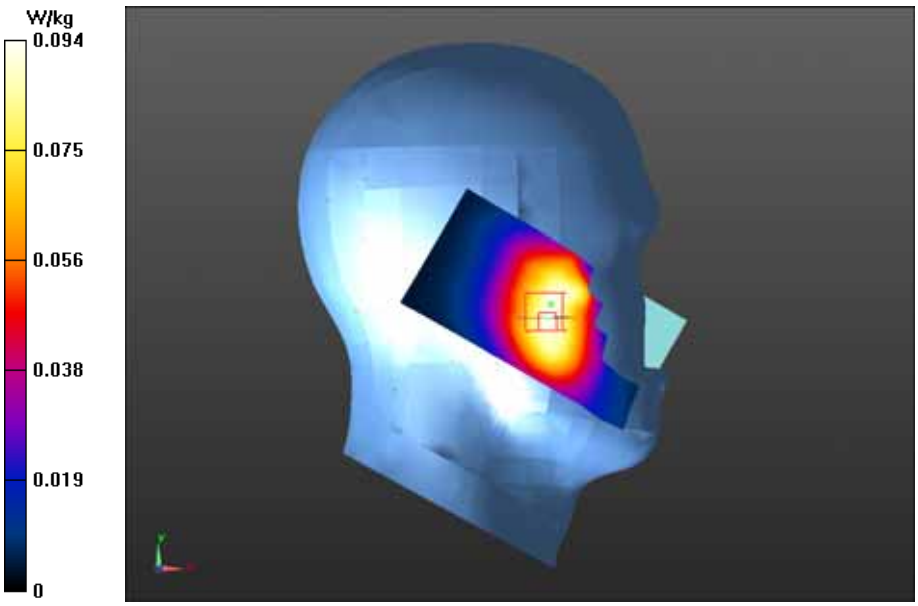
Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 824.2 MHz; Communication System PAR: 9.191 dB
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.88 mho/m; $\varepsilon_r$ = 41.628; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.23, 6.23, 6.23); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GSM850 LEFT/CHEEK-Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 2.993 V/m; Power Drift = -0.18 dB
Maximum value of SAR (interpolated) = 0.0939 W/kg

**GSM850 LEFT/CHEEK-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.993 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.121 mW/g
**SAR(1 g) = 0.096 mW/g; SAR(10 g) = 0.074 mW/g**
Maximum value of SAR (measured) = 0.100 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014

**GSM850 LEFT/TILT-Low**

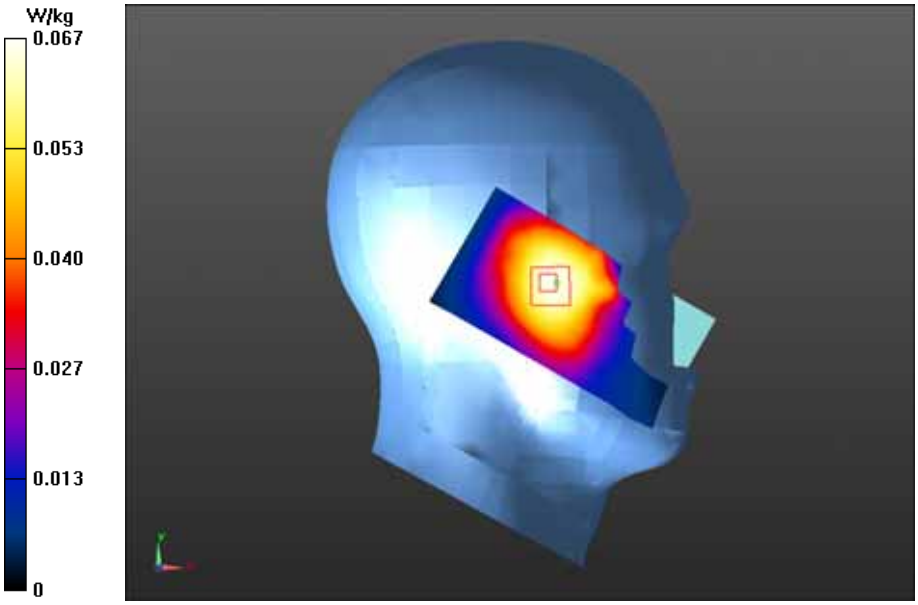
**DUT: Kingo T5; Type: Kingo T5**

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 824.2 MHz; Communication System PAR: 9.191 dB
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.88 mho/m; $\varepsilon_r$ = 41.628; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.23, 6.23, 6.23); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GSM850 LEFT/TILT-Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 5.199 V/m; Power Drift = 0.15 dB
Maximum value of SAR (interpolated) = 0.0667 W/kg
**GSM850 LEFT/TILT-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.199 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.081 mW/g
**SAR(1 g) = 0.067 mW/g; SAR(10 g) = 0.052 mW/g**
Maximum value of SAR (measured) = 0.0696 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014

**GSM850 RIGHT/CHEEK-Low**

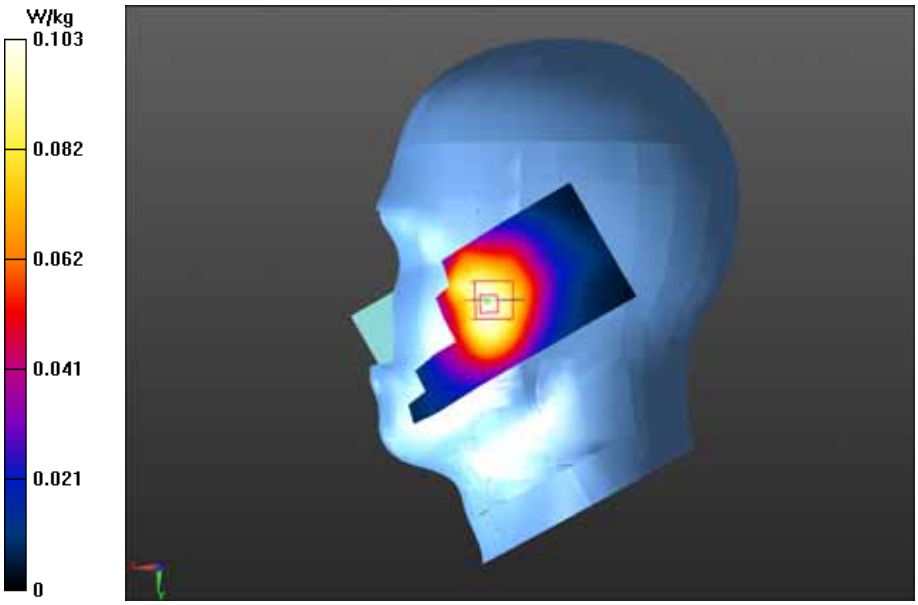
**DUT: Kingo T5; Type: Kingo T5**

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz); Frequency: 824.2 MHz; Communication System PAR: 9.191 dB
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.88 mho/m; $\varepsilon_r$ = 41.628; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

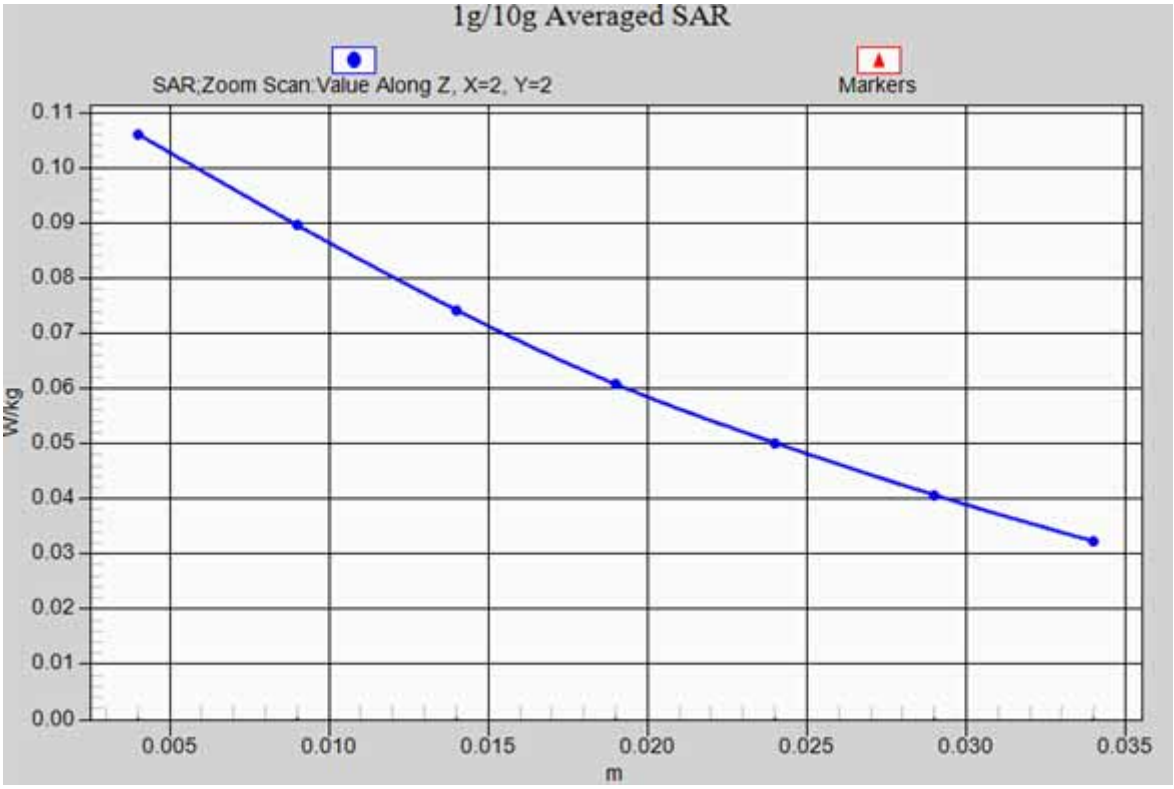
- Probe: ES3DV3 - SN3221; ConvF(6.23, 6.23, 6.23); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GSM850 RIGHT/CHEEK-Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 3.352 V/m; Power Drift = -0.12 dB
Maximum value of SAR (interpolated) = 0.103 W/kg
**GSM850 RIGHT/CHEEK-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.352 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.122 mW/g
**SAR(1 g) = 0.102 mW/g; SAR(10 g) = 0.079 mW/g**
Maximum value of SAR (measured) = 0.106 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014




**GSM850 RIGHT/CHEEK-Low -axis scan**

Test Laboratory: GCCT

Test Date: June.06, 2014

**GSM850 RIGHT/TILT-Low**

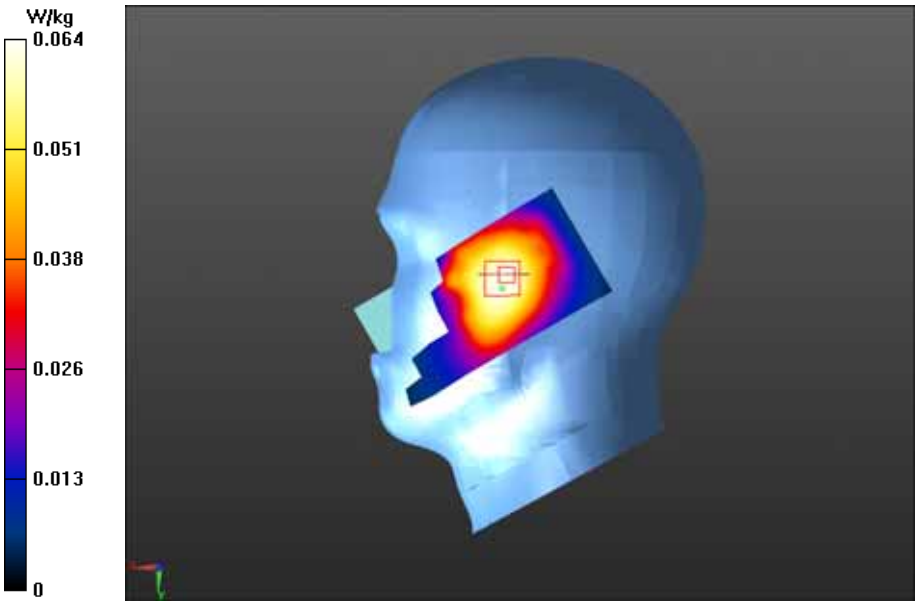
**DUT: Kingo T5; Type: Kingo T5**

Communication System: Generic GSM; Communication System Band: GSM 850 (824.0 - 849.0 MHz);
Frequency: 824.2 MHz; Communication System PAR: 9.191 dB
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.88 mho/m; $\varepsilon_r$ = 41.628; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.23, 6.23, 6.23); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GSM850 RIGHT/TILT-Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 5.256 V/m; Power Drift = 0.05 dB
Maximum value of SAR (interpolated) = 0.0641 W/kg
**GSM850 RIGHT/TILT-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.256 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.074 mW/g
**SAR(1 g) = 0.061 mW/g; SAR(10 g) = 0.048 mW/g**
Maximum value of SAR (measured) = 0.0634 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014

**GPRS 850/Back side Low**

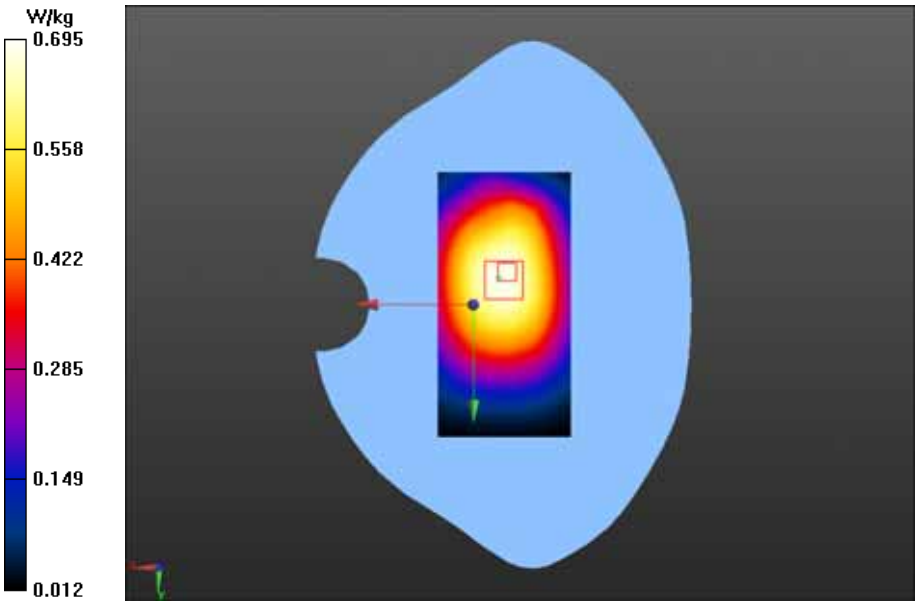
**DUT: Kingo T5; Type: Kingo T5**

Communication System: GPRS(4slots); Communication System Band: GSM850; Frequency: 824.2 MHz;
Communication System PAR: 3.181 dB
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.927 mho/m; $\varepsilon_r$ = 53.832; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

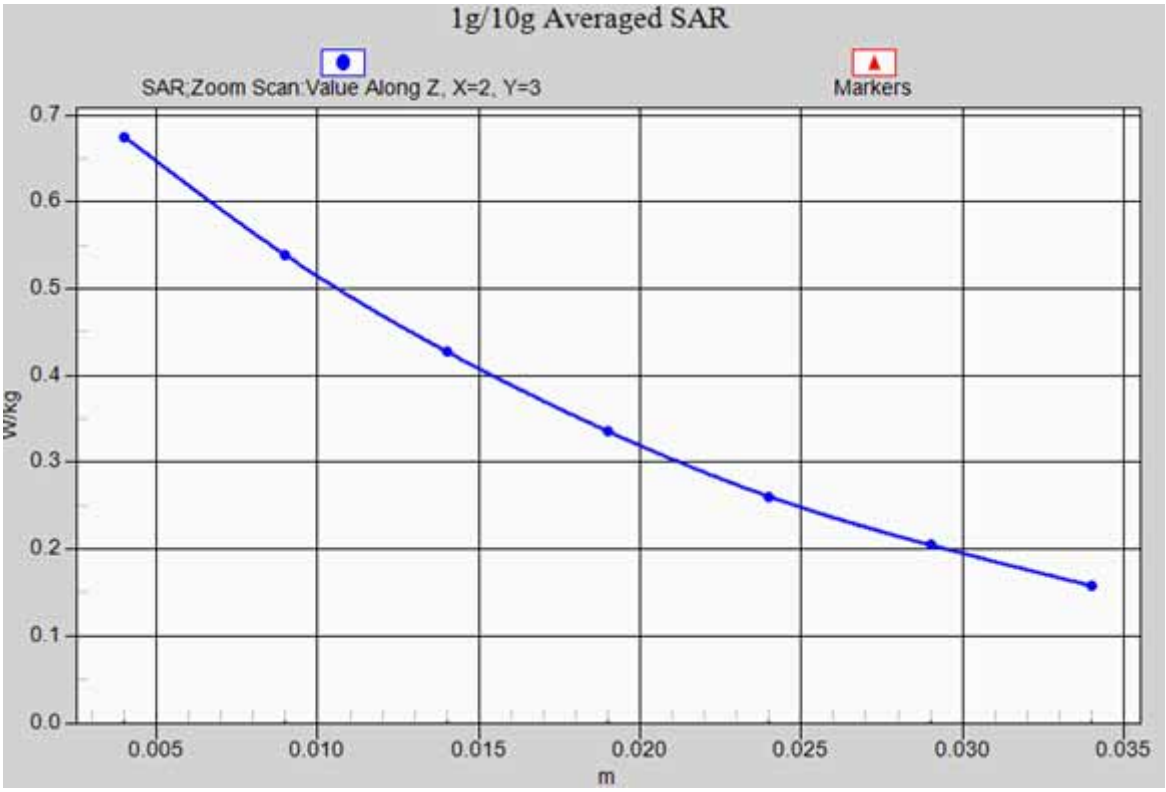
- Probe: ES3DV3 - SN3221; ConvF(6.2, 6.2, 6.2); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GPRS 850/Back side Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 27.691 V/m; Power Drift = -0.14 dB
Maximum value of SAR (interpolated) = 0.695 W/kg
**GPRS 850/Back side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.691 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.788 mW/g
**SAR(1 g) = 0.643 mW/g; SAR(10 g) = 0.501 mW/g**
Maximum value of SAR (measured) = 0.675 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014




**GPRS 850/Back side Low -axis scan**

Test Laboratory: GCCT

Test Date: June.06, 2014

**GPRS 850/Front side Low**

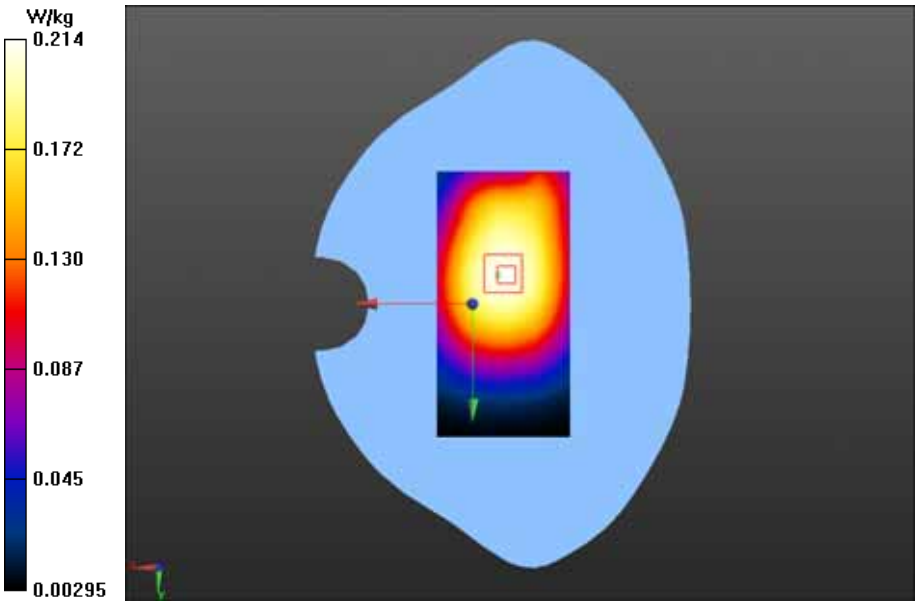
**DUT: Kingo T5; Type: Kingo T5**

Communication System: GPRS(4slots); Communication System Band: GSM850; Frequency: 824.2 MHz;
Communication System PAR: 3.181 dB
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.927 mho/m; $\varepsilon_r$ = 53.832; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.2, 6.2, 6.2); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GPRS 850/Front side Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 14.883 V/m; Power Drift = -0.07 dB
Maximum value of SAR (interpolated) = 0.214 W/kg
**GPRS 850/Front side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.883 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 0.247 mW/g
**SAR(1 g) = 0.203 mW/g; SAR(10 g) = 0.159 mW/g**
Maximum value of SAR (measured) = 0.212 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014

**GPRS850 -Left side-Mid**

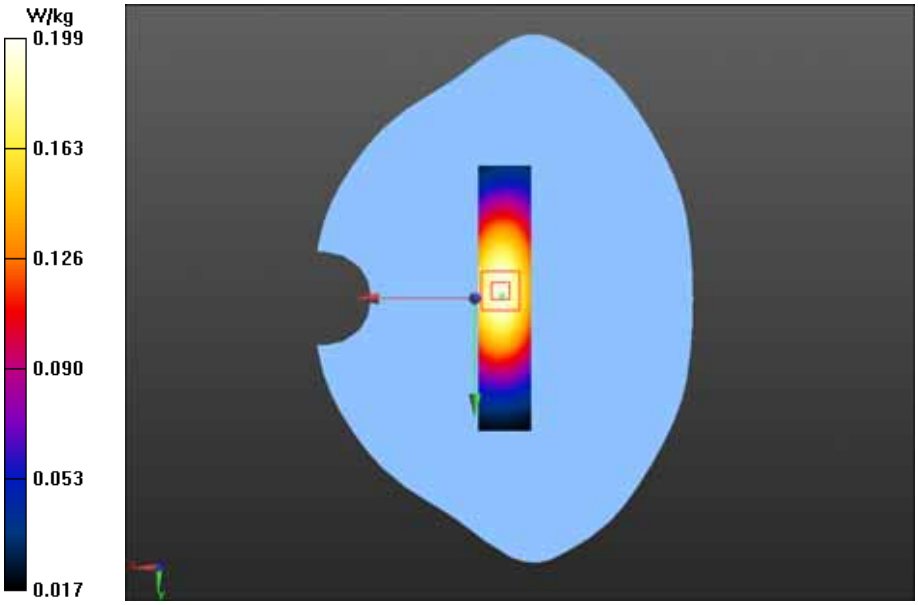
**DUT: Kingo T5; Type: Kingo T5**

Communication System: GPRS(4slots); Communication System Band: GSM850; Frequency: 824.2 MHz;
Communication System PAR: 3.181 dB
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.927 mho/m; $\varepsilon_r$ = 53.832; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.2, 6.2, 6.2); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GPRS850 -Left side-Mid/Area Scan (21x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 14.695 V/m; Power Drift = 0.04 dB
Maximum value of SAR (interpolated) = 0.199 W/kg
**GPRS850 -Left side-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.695 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.253 mW/g
**SAR(1 g) = 0.187 mW/g; SAR(10 g) = 0.133 mW/g**
Maximum value of SAR (measured) = 0.199 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014

**GPRS850 -Right side-Mid**

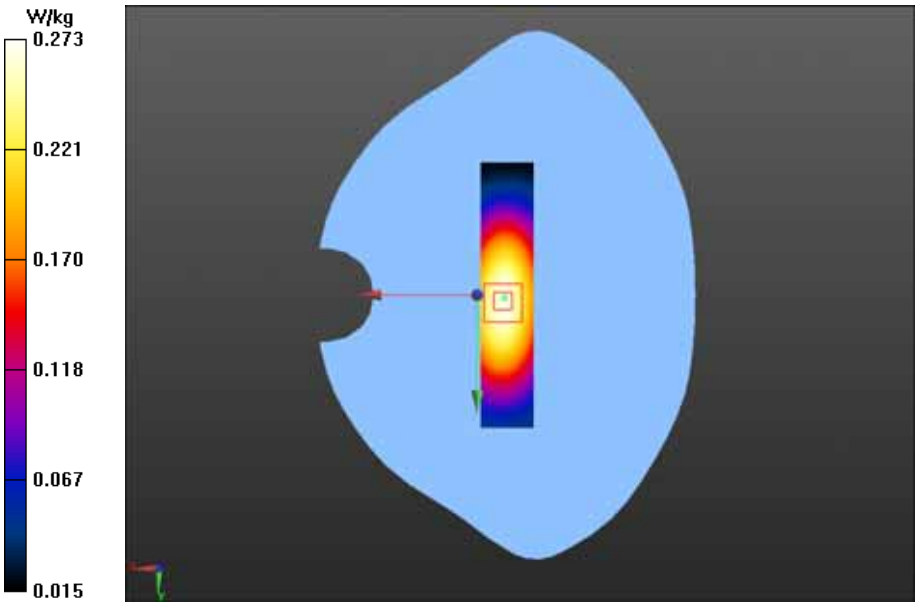
**DUT: Kingo T5; Type: Kingo T5**

Communication System: GPRS(4slots); Communication System Band: GSM850; Frequency: 824.2 MHz;
Communication System PAR: 3.181 dB
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.927 mho/m; $\varepsilon_r$ = 53.832; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.2, 6.2, 6.2); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GPRS850 -Right side-Mid/Area Scan (21x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 17.472 V/m; Power Drift = -0.04 dB
Maximum value of SAR (interpolated) = 0.273 W/kg
**GPRS850 -Right side-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 17.472 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.348 mW/g
**SAR(1 g) = 0.256 mW/g; SAR(10 g) = 0.180 mW/g**
Maximum value of SAR (measured) = 0.275 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014

**GPRS850 -Bottom side-Mid**

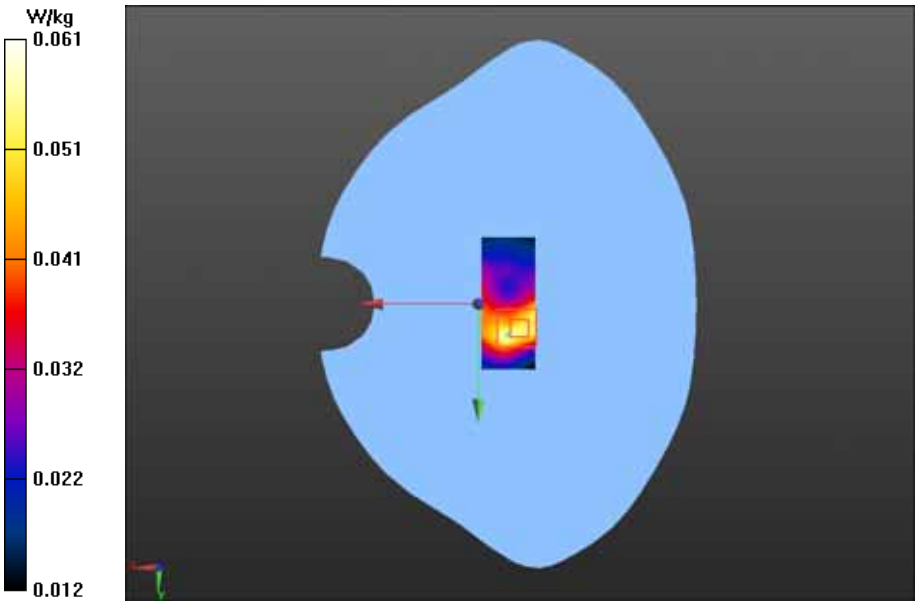
**DUT: Kingo T5; Type: Kingo T5**

Communication System: GPRS(4slots); Communication System Band: GSM850; Frequency: 824.2 MHz;
Communication System PAR: 3.181 dB
Medium parameters used (interpolated): f = 824.2 MHz; $\sigma$ = 0.927 mho/m; $\varepsilon_r$ = 53.832; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.2, 6.2, 6.2); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GPRS850 -Bottom side-Mid/Area Scan (21x51x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 5.503 V/m; Power Drift = 0.09 dB
Maximum value of SAR (interpolated) = 0.0608 W/kg
**GPRS850 -Bottom side-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.503 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.100 mW/g
**SAR(1 g) = 0.055 mW/g; SAR(10 g) = 0.032 mW/g**
Maximum value of SAR (measured) = 0.0579 W/kg



Test Laboratory: GCCT

Test Date: June.07, 2014

**PCS1900 LEFT/CHEEK-Low**

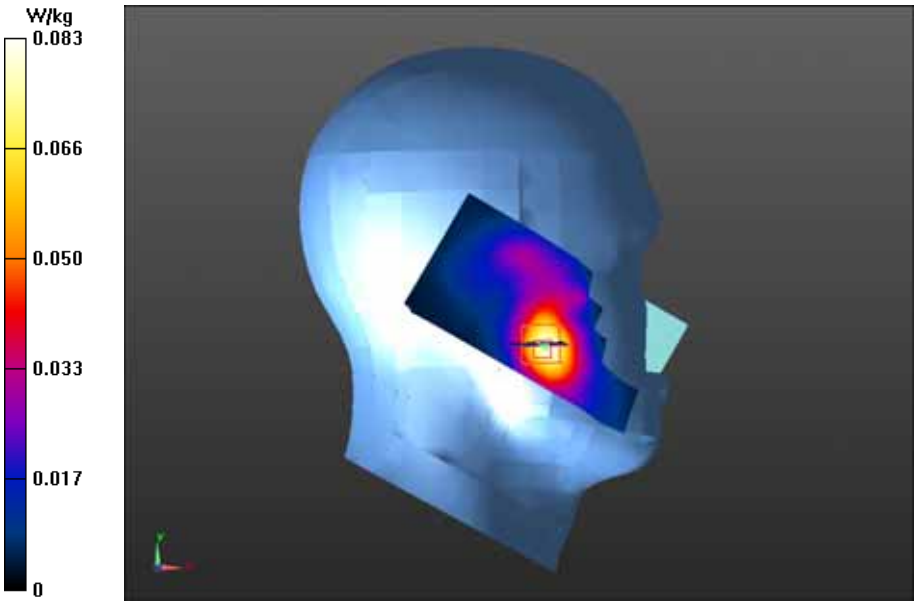
**DUT: Kingo T5; Type: Kingo T5**

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1850.2 MHz; Communication System PAR: 9.191 dB
Medium parameters used: f = 1850.2 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 39.87; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

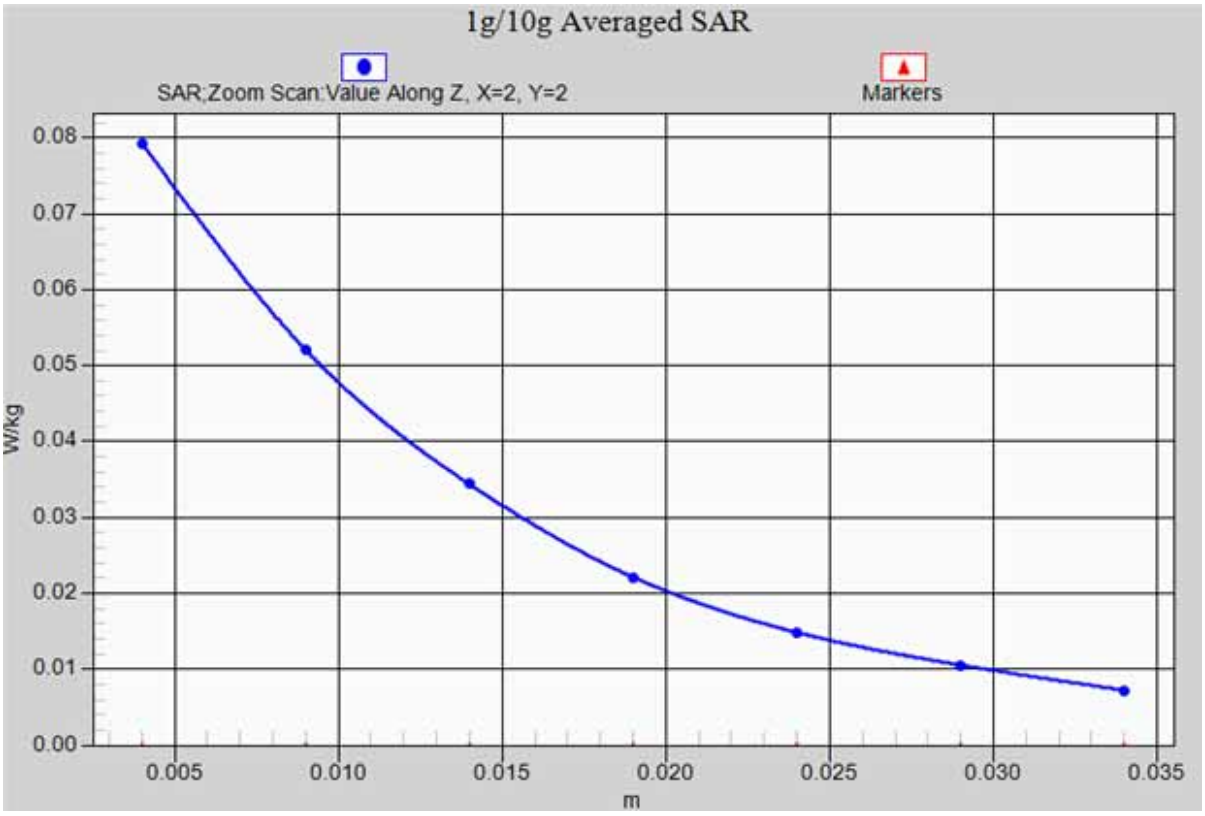
- Probe: ES3DV3 - SN3221; ConvF(5.4, 5.4, 5.4); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**PCS1900 LEFT/CHEEK-Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 2.945 V/m; Power Drift = -0.10 dB
Maximum value of SAR (interpolated) = 0.0827 W/kg
**PCS1900 LEFT/CHEEK-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.945 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.116 mW/g
**SAR(1 g) = 0.073 mW/g; SAR(10 g) = 0.044 mW/g**
Maximum value of SAR (measured) = 0.0793 W/kg



Test Laboratory: GCCT

Test Date: June.07, 2014




**PCS1900 LEFT/CHEEK-Low -axis scan**

Test Laboratory: GCCT

Test Date: June.07, 2014

**PCS1900 LEFT/TILT-Low**

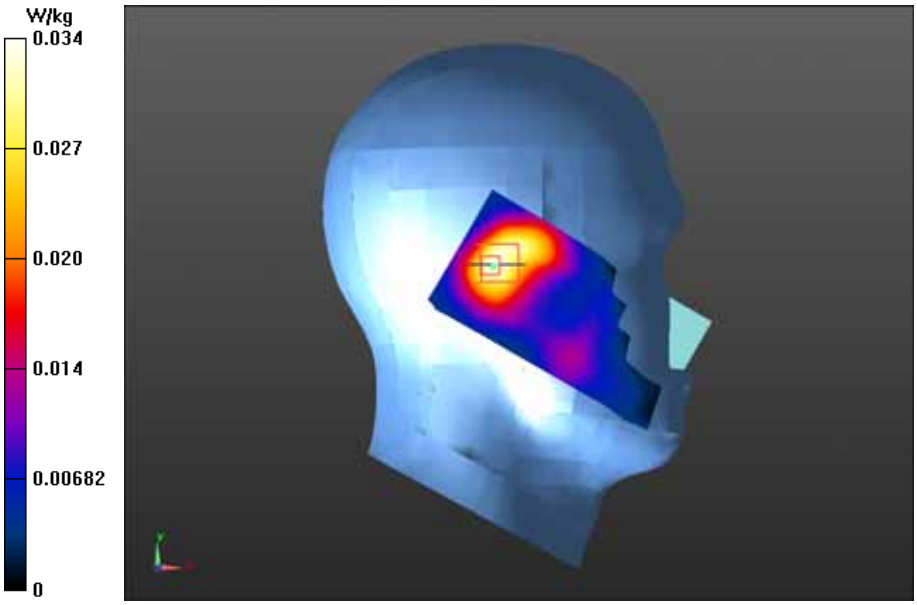
**DUT: Kingo T5; Type: Kingo T5**

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1850.2 MHz; Communication System PAR: 9.191 dB
Medium parameters used: f = 1850.2 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 39.87; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(5.4, 5.4, 5.4); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**PCS1900 LEFT/TILT-Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 4.547 V/m; Power Drift = 0.17 dB
Maximum value of SAR (interpolated) = 0.0341 W/kg
**PCS1900 LEFT/TILT-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.547 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.060 mW/g
**SAR(1 g) = 0.033 mW/g; SAR(10 g) = 0.021 mW/g**
Maximum value of SAR (measured) = 0.0357 W/kg



Test Laboratory: GCCT

Test Date: June.07, 2014

**PCS1900 RIGHT/CHEEK-Low**

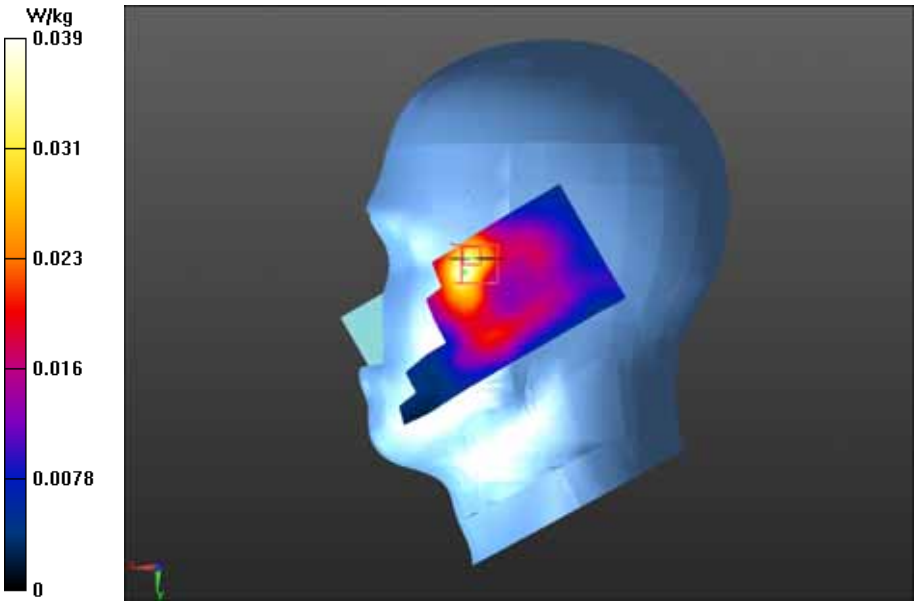
**DUT: Kingo T5; Type: Kingo T5**

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1850.2 MHz; Communication System PAR: 9.191 dB
Medium parameters used: f = 1850.2 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 39.87; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(5.4, 5.4, 5.4); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**PCS1900 RIGHT/CHEEK-Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 2.805 V/m; Power Drift = -0.10 dB
Maximum value of SAR (interpolated) = 0.0390 W/kg
**PCS1900 RIGHT/CHEEK-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.805 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.064 mW/g
**SAR(1 g) = 0.036 mW/g; SAR(10 g) = 0.020 mW/g**
Maximum value of SAR (measured) = 0.0389 W/kg



Test Laboratory: GCCT

Test Date: June.07, 2014

**PCS1900 RIGHT/TILT-Low**

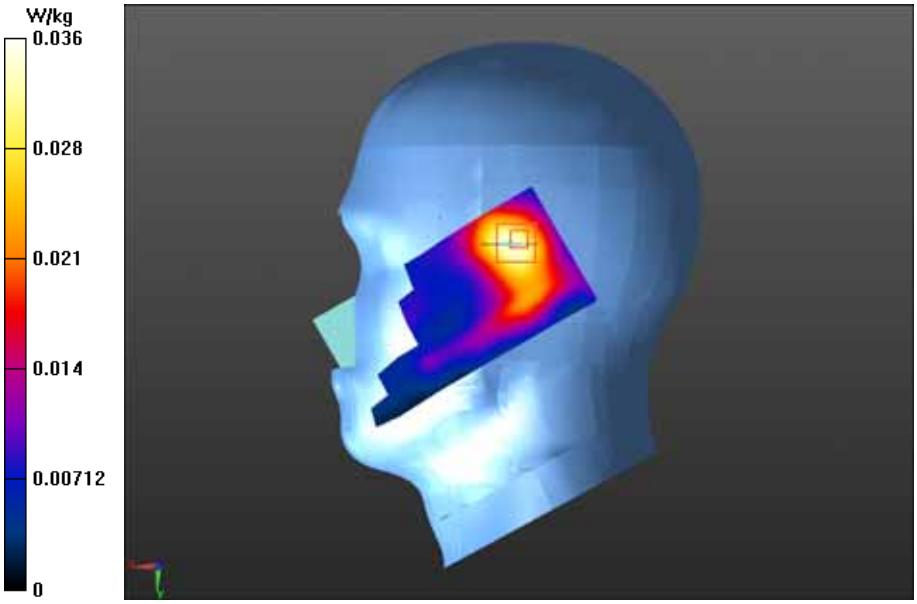
**DUT: Kingo T5; Type: Kingo T5**

Communication System: Generic GSM; Communication System Band: PCS 1900 (1850.0 - 1910.0 MHz); Frequency: 1850.2 MHz; Communication System PAR: 9.191 dB
Medium parameters used: f = 1850.2 MHz; $\sigma$ = 1.42 mho/m; $\varepsilon_r$ = 39.87; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(5.4, 5.4, 5.4); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**PCS1900 RIGHT/TILT-Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 3.970 V/m; Power Drift = 0.13 dB
Maximum value of SAR (interpolated) = 0.0356 W/kg
**PCS1900 RIGHT/TILT-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.970 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.056 mW/g
**SAR(1 g) = 0.032 mW/g; SAR(10 g) = 0.020 mW/g**
Maximum value of SAR (measured) = 0.0342 W/kg



Test Laboratory: GCCT

Test Date: June.07, 2014

**GPRS 1900/Back side Low**

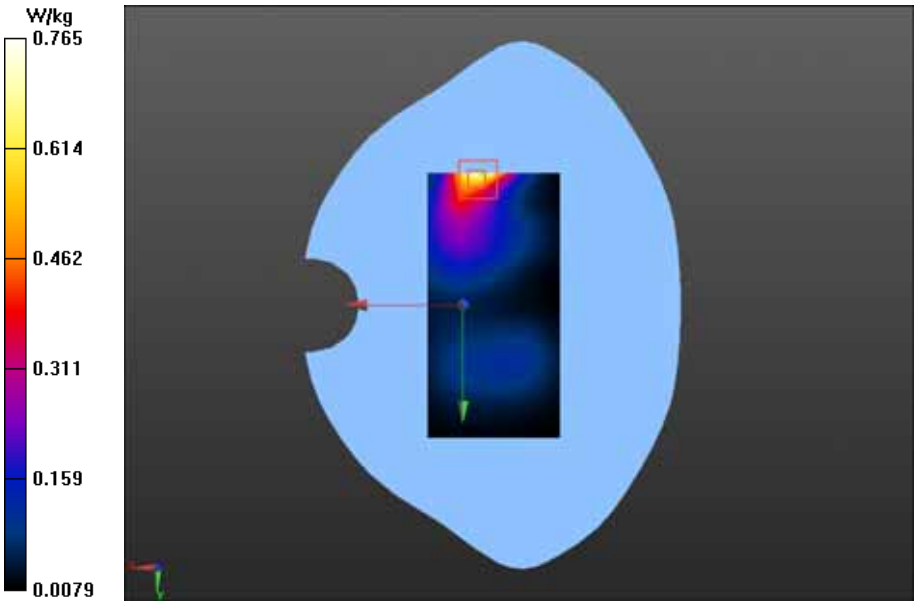
**DUT: Kingo T5; Type: Kingo T5**

Communication System: GPRS(4slots); Communication System Band: PCS1900; Frequency: 1850.2 MHz; Communication System PAR: 3.181 dB
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.525 mho/m; $\varepsilon_r$ = 50.831; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

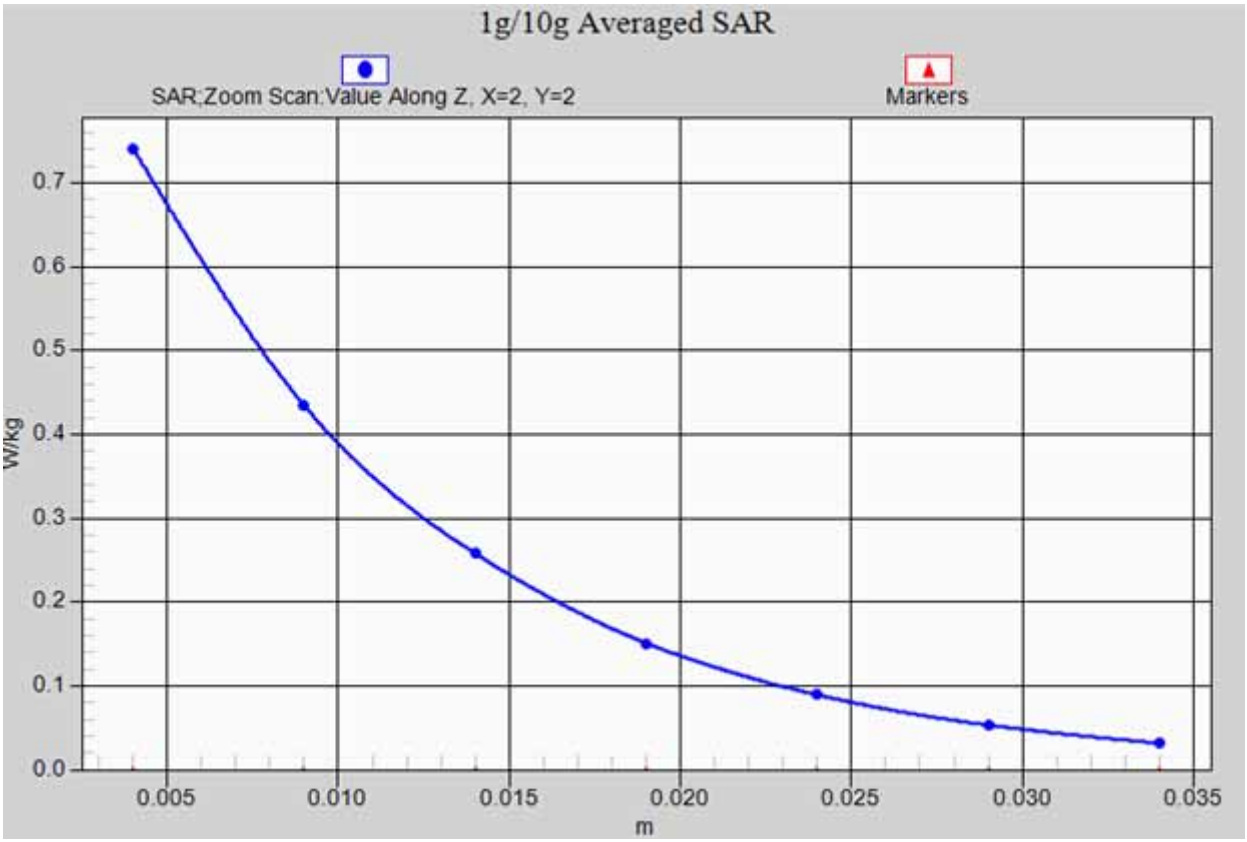
- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GPRS 1900/Back side Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 27.691 V/m; Power Drift = -0.18 dB
Maximum value of SAR (interpolated) = 0.765 W/kg
**GPRS 1900/Back side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 27.691 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 1.347 mW/g
**SAR(1 g) = 0.727 mW/g; SAR(10 g) = 0.359 mW/g**
Maximum value of SAR (measured) = 0.741 W/kg



Test Laboratory: GCCT

Test Date: June.07, 2014




**GPRS 1900/Back side Low-axis scan**

Test Laboratory: GCCT Test Date: June.07, 2014

**GPRS 1900/Front side Low**

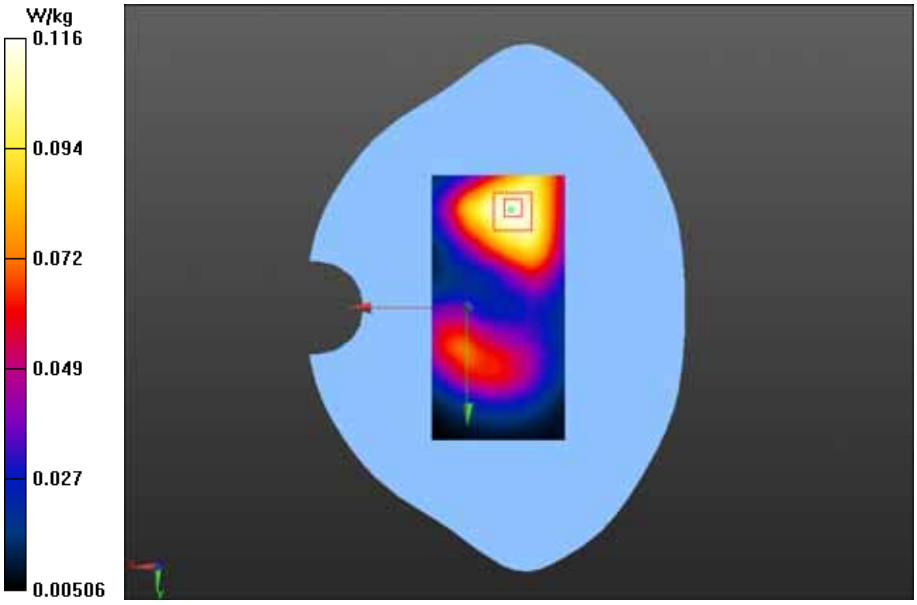
**DUT: Kingo T5; Type: Kingo T5**

Communication System: GPRS(4slots); Communication System Band: PCS1900; Frequency: 1850.2 MHz; Communication System PAR: 3.181 dB
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.525 mho/m; $\varepsilon_r$ = 50.831; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GPRS 1900/Front side Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 3.950 V/m; Power Drift = 0.17 dB
Maximum value of SAR (interpolated) = 0.116 W/kg
**GPRS 1900/Front side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.950 V/m; Power Drift = 0.17 dB
Peak SAR (extrapolated) = 0.162 mW/g
**SAR(1 g) = 0.109 mW/g; SAR(10 g) = 0.072 mW/g**
Maximum value of SAR (measured) = 0.116 W/kg



Test Laboratory: GCCT

Test Date: June.07, 2014

**GPRS1900 -Left side-Low**

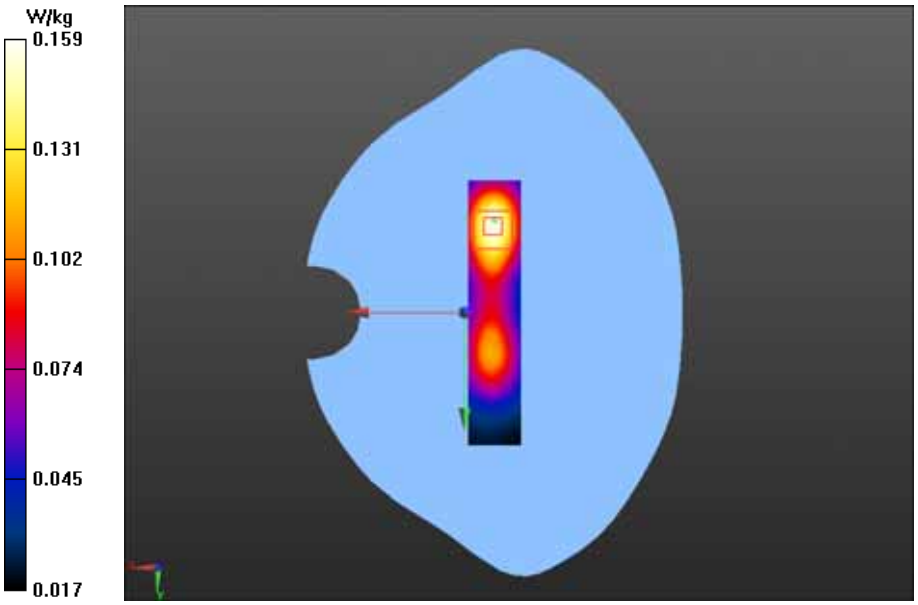
**DUT: Kingo T5; Type: Kingo T5**

Communication System: GPRS(4slots); Communication System Band: PCS1900; Frequency: 1850.2 MHz; Communication System PAR: 3.181 dB
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.525 mho/m; $\varepsilon_r$ = 50.831; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GPRS1900 -Left side-Low/Area Scan (21x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 7.681 V/m; Power Drift = -0.08 dB
Maximum value of SAR (interpolated) = 0.159 W/kg
**GPRS1900 -Left side-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.681 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.246 mW/g
**SAR(1 g) = 0.144 mW/g; SAR(10 g) = 0.084 mW/g**
Maximum value of SAR (measured) = 0.156 W/kg



Test Laboratory: GCCT

Test Date: June.07, 2014

**GPRS1900 -Right side-Low**

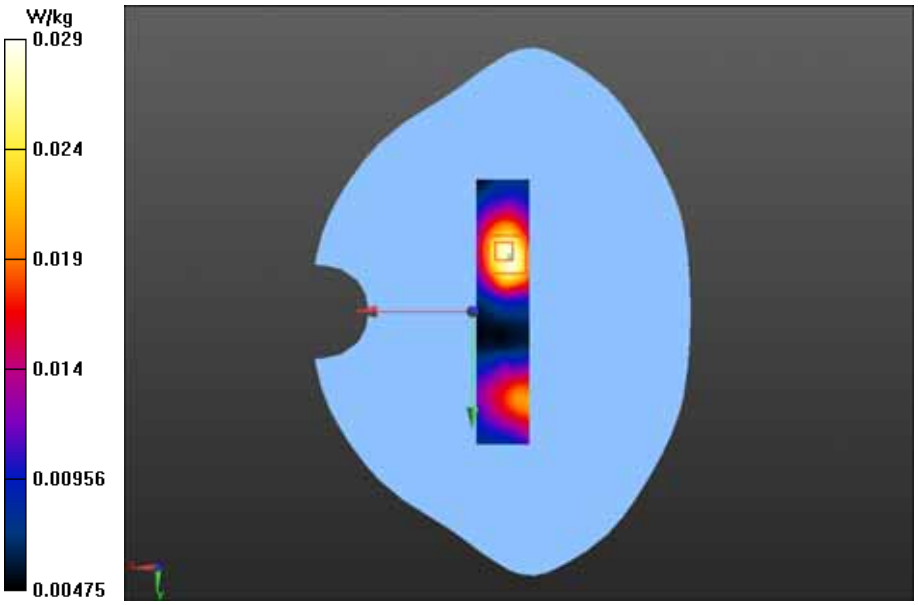
**DUT: Kingo T5; Type: Kingo T5**

Communication System: GPRS(4slots); Communication System Band: PCS1900; Frequency: 1850.2 MHz; Communication System PAR: 3.181 dB
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.525 mho/m; $\varepsilon_r$ = 50.831; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GPRS1900 -Right side-Low/Area Scan (21x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 2.097 V/m; Power Drift = 0.03 dB
Maximum value of SAR (interpolated) = 0.0288 W/kg
**GPRS1900 -Right side-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.097 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.044 mW/g
**SAR(1 g) = 0.025 mW/g; SAR(10 g) = 0.015 mW/g**
Maximum value of SAR (measured) = 0.0260 W/kg



Test Laboratory: GCCT

Test Date: June.07, 2014

**GPRS1900 -Bottom side-Mid**

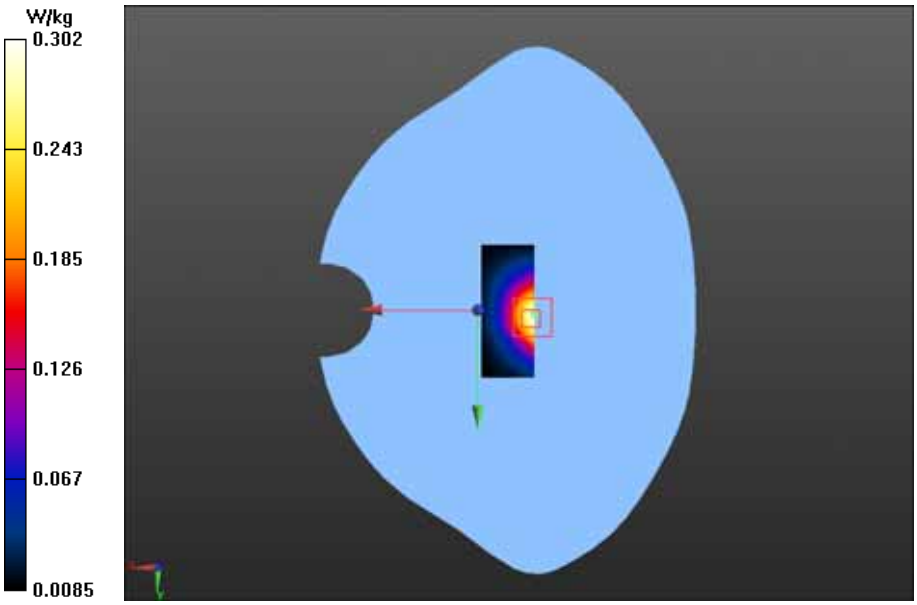
**DUT: Kingo T5; Type: Kingo T5**

Communication System: GPRS(4slots); Communication System Band: PCS1900; Frequency: 1850.2 MHz; Communication System PAR: 3.181 dB
Medium parameters used (interpolated): f = 1850.2 MHz; $\sigma$ = 1.525 mho/m; $\varepsilon_r$ = 50.831; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**GPRS1900 -Bottom side-Mid/Area Scan (21x51x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 9.458 V/m; Power Drift = -0.13 dB
Maximum value of SAR (interpolated) = 0.302 W/kg
**GPRS1900 -Bottom side-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.458 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.456 mW/g
**SAR(1 g) = 0.258 mW/g; SAR(10 g) = 0.137 mW/g**
Maximum value of SAR (measured) = 0.278 W/kg



Test Laboratory: GCCT Test Date: June.07, 2014

**WCDMA Band II LEFT/CHEEK-Mid**

**DUT: Kingo T5; Type: Kingo T5**

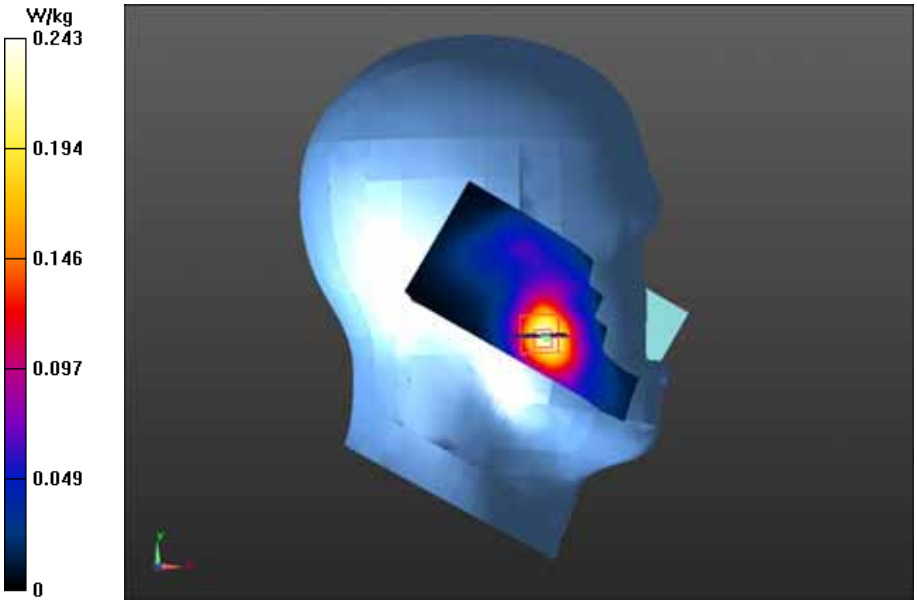
Communication System: UMTS-FDD(WCDMA); Communication System Band: Band2; Frequency: 1880 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.45 mho/m; $\varepsilon_r$ = 39.74; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(5.4, 5.4, 5.4); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band II LEFT/CHEEK-Mid/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 3.053 V/m; Power Drift = 0.20 dB
Maximum value of SAR (interpolated) = 0.243 W/kg

**WCDMA Band II LEFT/CHEEK-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.053 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.346 mW/g
**SAR(1 g) = 0.218 mW/g; SAR(10 g) = 0.129 mW/g**
Maximum value of SAR (measured) = 0.238 W/kg



Test Laboratory: GCCT

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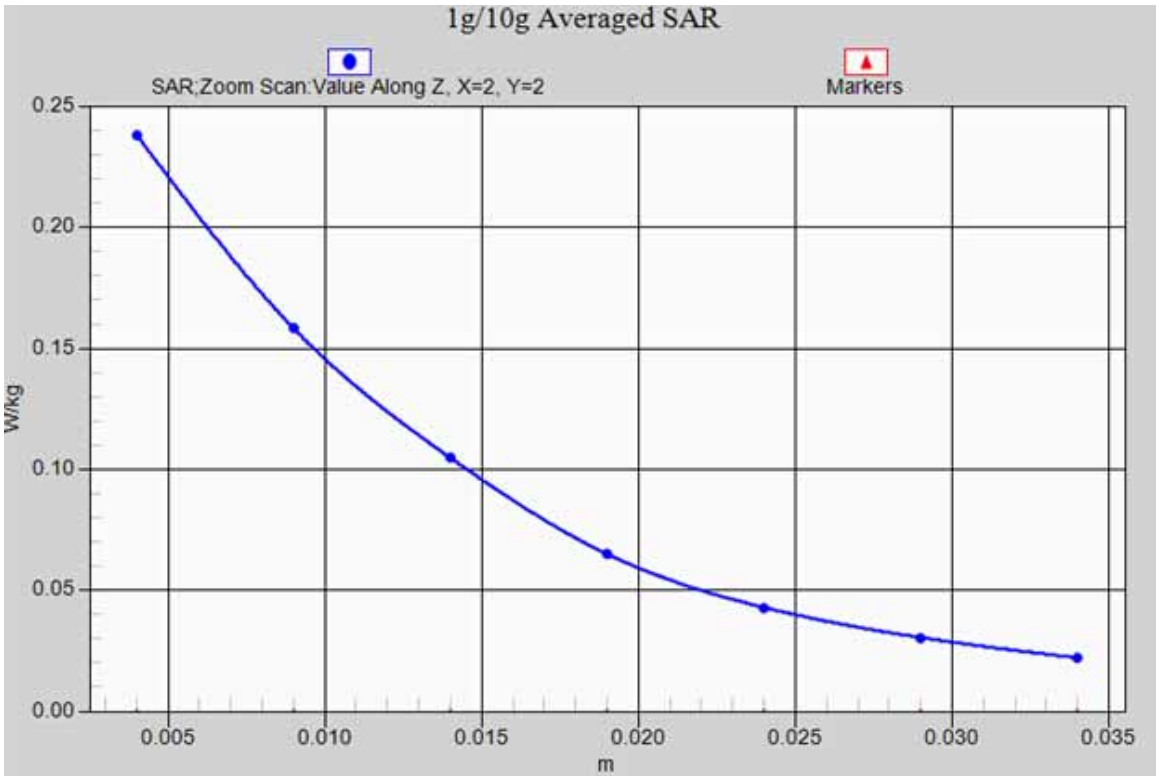



**WCDMA Band II LEFT/CHEEK-Mid- axis scan**

Test Laboratory: GCCT Test Date: June.07, 2014

**WCDMA Band II LEFT/TILT-Mid**

**DUT: Kingo T5; Type: Kingo T5**

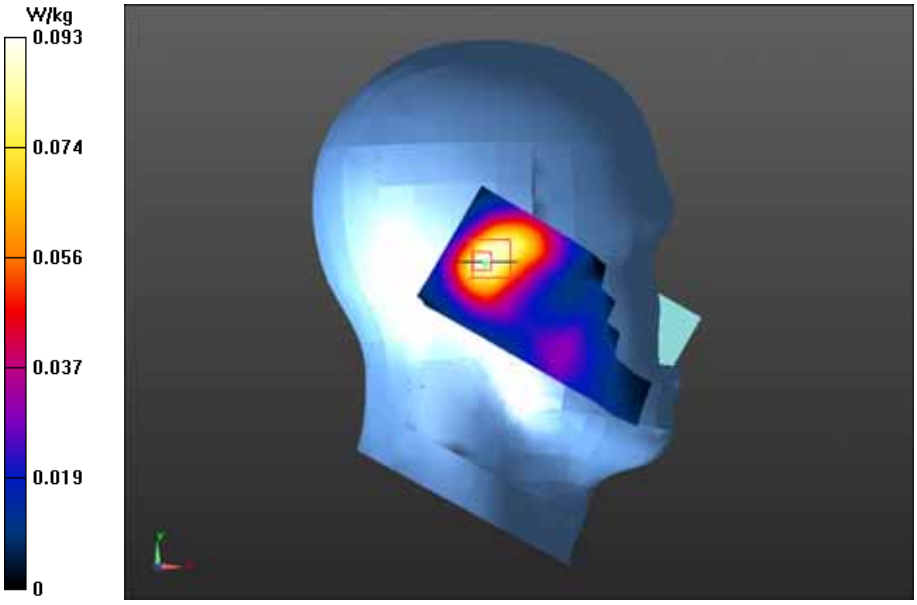
Communication System: UMTS-FDD(WCDMA); Communication System Band: Band2; Frequency: 1880 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.45 mho/m; $\varepsilon_r$ = 39.74; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(5.4, 5.4, 5.4); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band II LEFT/TILT-Mid/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 7.708 V/m; Power Drift = 0.12 dB
Maximum value of SAR (interpolated) = 0.0931 W/kg

**WCDMA Band II LEFT/TILT-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.708 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.147 mW/g
**SAR(1 g) = 0.090 mW/g; SAR(10 g) = 0.055 mW/g**
Maximum value of SAR (measured) = 0.0952 W/kg



Test Laboratory: GCCT Test Date: June.07, 2014

**WCDMA Band II RIGHT/CHEEK-Mid**

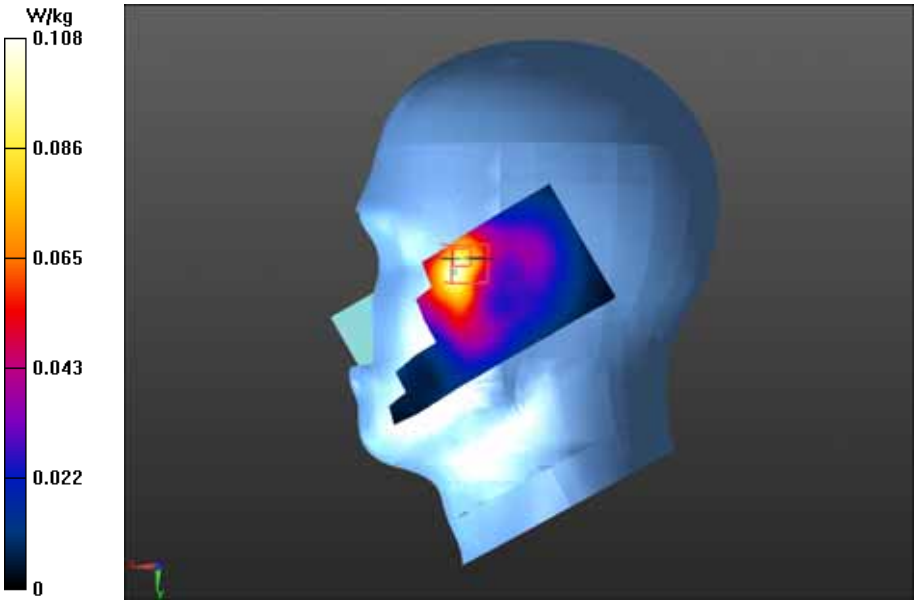
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band2; Frequency: 1880 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.45 mho/m; $\varepsilon_r$ = 39.74; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(5.4, 5.4, 5.4); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band II RIGHT/CHEEK-Mid/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 4.399 V/m; Power Drift = -0.11 dB
Maximum value of SAR (interpolated) = 0.108 W/kg
**WCDMA Band II RIGHT/CHEEK-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.399 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.173 mW/g
**SAR(1 g) = 0.103 mW/g; SAR(10 g) = 0.058 mW/g**
Maximum value of SAR (measured) = 0.114 W/kg



Test Laboratory: GCCT Test Date: June.07, 2014

**WCDMA Band II RIGHT/TILT-Mid/**

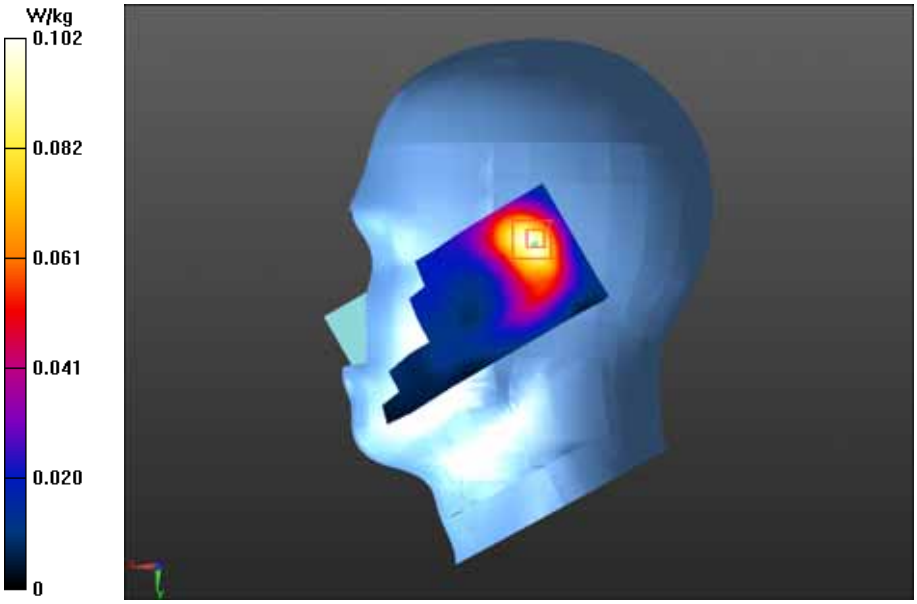
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band2; Frequency: 1880 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.45 mho/m; $\varepsilon_r$ = 39.74; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(5.4, 5.4, 5.4); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band II RIGHT/TILT-Mid/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 7.142 V/m; Power Drift = 0.13 dB
Maximum value of SAR (interpolated) = 0.102 W/kg
**WCDMA Band II RIGHT/TILT-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 7.142 V/m; Power Drift = 0.13 dB
Peak SAR (extrapolated) = 0.154 mW/g
**SAR(1 g) = 0.093 mW/g; SAR(10 g) = 0.054 mW/g**
Maximum value of SAR (measured) = 0.0984 W/kg



Test Laboratory: GCCT Test Date: June.07, 2014

**WCDMA Band II Body/Back side High**

**DUT: Kingo T5; Type: Kingo T5**

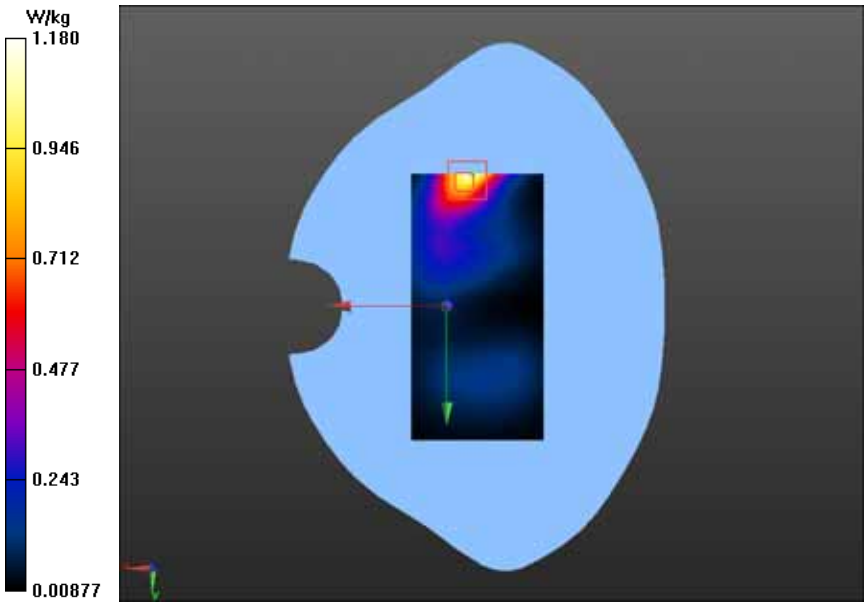
Communication System: UMTS-FDD(WCDMA); Communication System Band: Band2; Frequency: 1907.6 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1908 MHz; $\sigma$ = 1.586 mho/m; $\varepsilon_r$ = 50.699; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band II Body/Back side High/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 5.306 V/m; Power Drift = 0.03 dB
Maximum value of SAR (interpolated) = 1.18 W/kg

**WCDMA Band II Body/Back side High/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.306 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 1.994 mW/g
**SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.556 mW/g**
Maximum value of SAR (measured) = 1.19 W/kg



Test Laboratory: GCCT Test Date: June.07, 2014

**WCDMA Band II Body/Back side High**

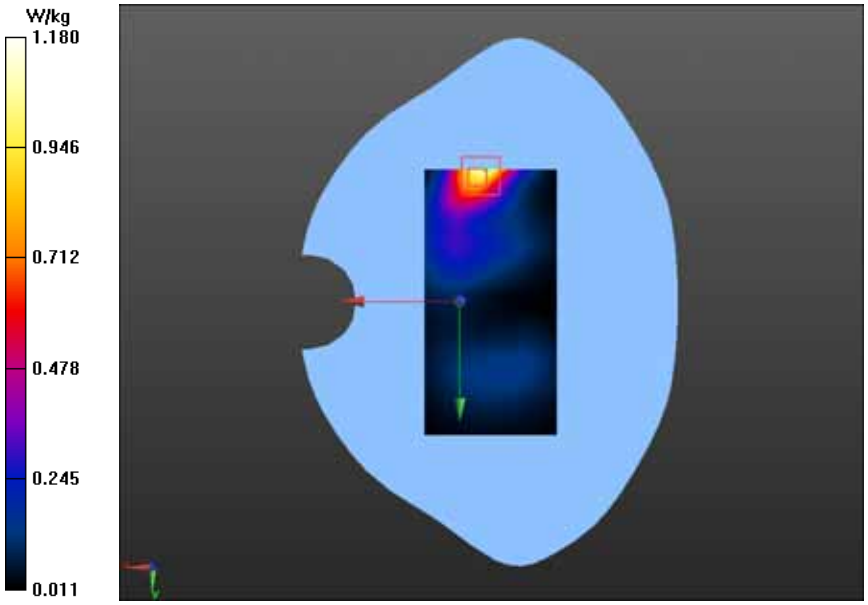
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band2; Frequency: 1907.6 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1908 MHz; $\sigma$ = 1.586 mho/m; $\varepsilon_r$ = 50.699; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band II Body/Back side High 2/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 5.327 V/m; Power Drift = -0.05 dB
Maximum value of SAR (interpolated) = 1.18 W/kg
**WCDMA Band II Body/Back side High 2/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.327 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.991 mW/g
**SAR(1 g) = 1.12 mW/g; SAR(10 g) = 0.555 mW/g**
Maximum value of SAR (measured) = 1.19 W/kg



Test Laboratory: GCCT

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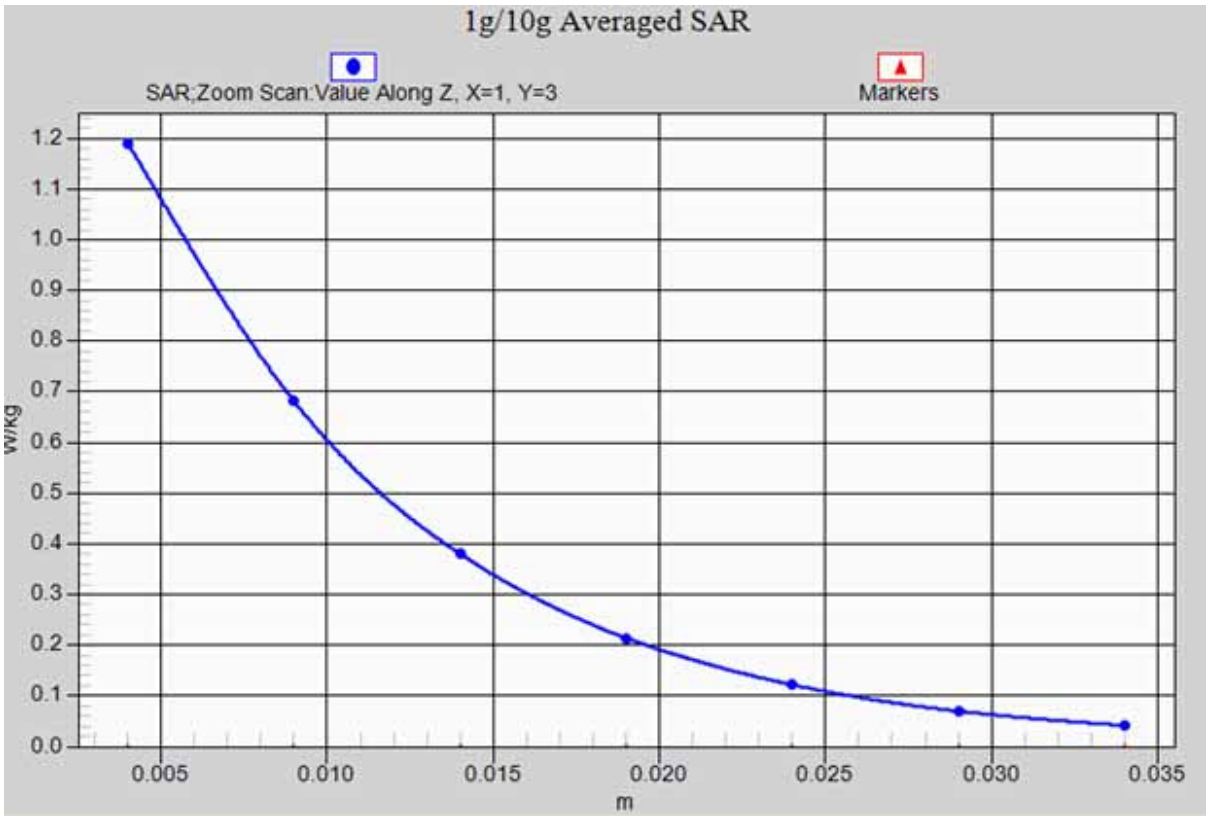



**WCDMA Band II Body/Back side High -axis scan**

Test Laboratory: GCCT

Test Date: June.07, 2014

**WCDMA Band II Body/Back side Mid**

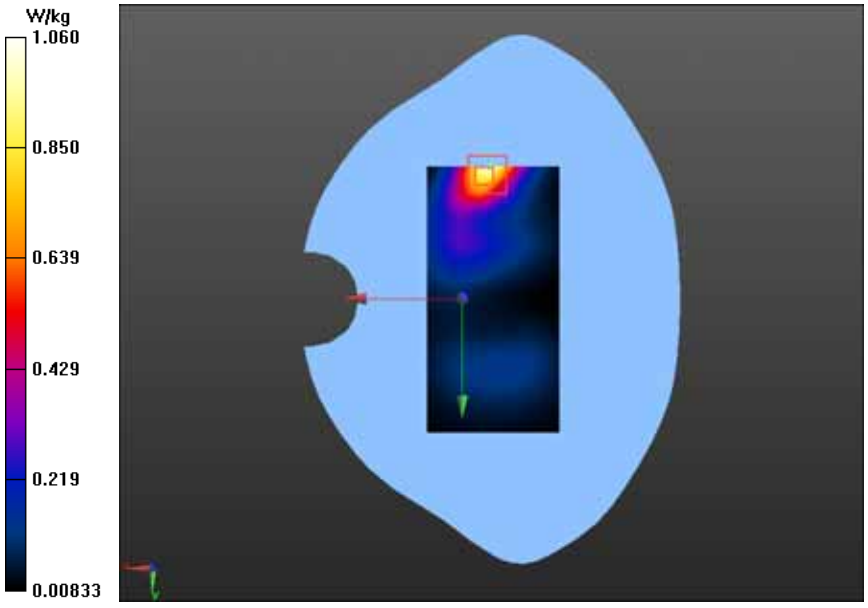
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band2; Frequency: 1880 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.557 mho/m; $\varepsilon_r$ = 50.765; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band II Body/Back side Mid/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 5.203 V/m; Power Drift = 0.18 dB
Maximum value of SAR (interpolated) = 1.06 W/kg
**WCDMA Band II Body/Back side Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.203 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 1.908 mW/g
**SAR(1 g) = 1.03 mW/g; SAR(10 g) = 0.511 mW/g**
Maximum value of SAR (measured) = 1.10 W/kg



Test Laboratory: GCCT Test Date: June.07, 2014

**WCDMA Band II Body/Back side Low**

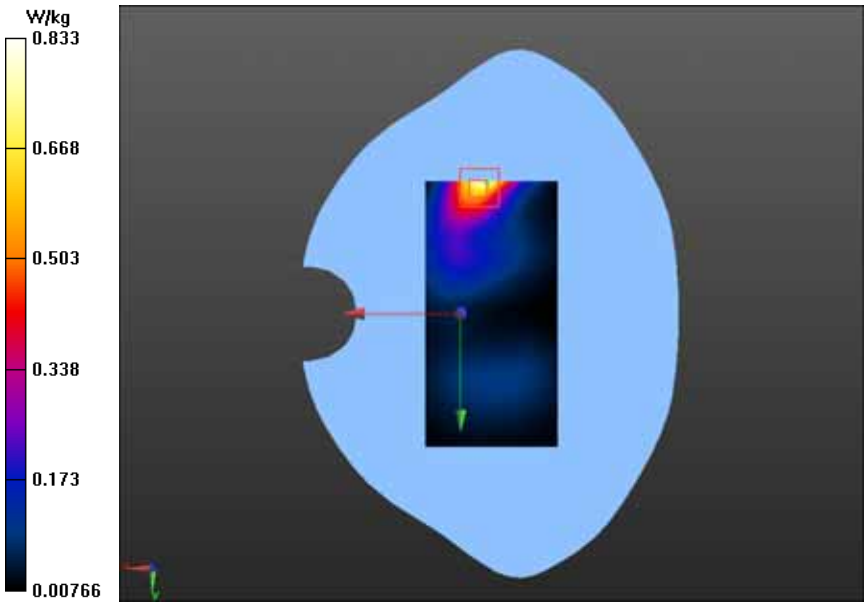
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band2; Frequency: 1852.4 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 1852.4 MHz; $\sigma$ = 1.528 mho/m; $\varepsilon_r$ = 50.825; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band II Body/Back side Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 4.357 V/m; Power Drift = -0.03 dB
Maximum value of SAR (interpolated) = 0.833 W/kg
**WCDMA Band II Body/Back side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.357 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.500 mW/g
**SAR(1 g) = 0.809 mW/g; SAR(10 g) = 0.398 mW/g**
Maximum value of SAR (measured) = 0.854 W/kg



Test Laboratory: GCCT Test Date: June.07, 2014

**WCDMA Band II Body/Front side Mid**

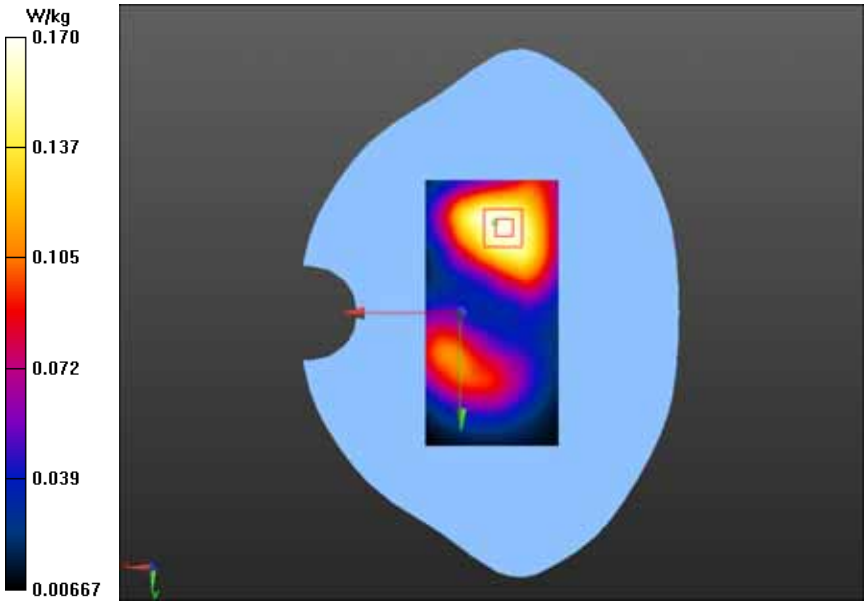
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band2; Frequency: 1880 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.557 mho/m; $\varepsilon_r$ = 50.765; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band II Body/Front side Mid/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 4.313 V/m; Power Drift = 0.21 dB
Maximum value of SAR (interpolated) = 0.170 W/kg
**WCDMA Band II Body/Front side Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.313 V/m; Power Drift = 0.21 dB
Peak SAR (extrapolated) = 0.233 mW/g
**SAR(1 g) = 0.156 mW/g; SAR(10 g) = 0.103 mW/g**
Maximum value of SAR (measured) = 0.165 W/kg



Test Laboratory: GCCT

Test Date: June.07, 2014

**WCDMA Band II-Left side-Mid**

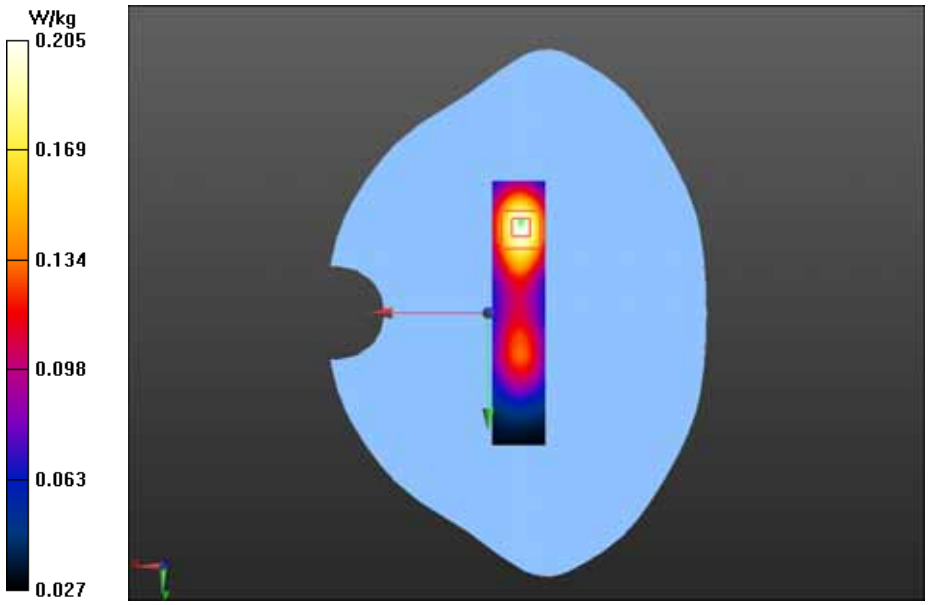
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band2; Frequency: 1880 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.557 mho/m; $\varepsilon_r$ = 50.765; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band II-Left side-Mid/Area Scan (21x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 8.399 V/m; Power Drift = 0.08 dB
Maximum value of SAR (interpolated) = 0.205 W/kg
**WCDMA Band II-Left side-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.399 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.310 mW/g
**SAR(1 g) = 0.184 mW/g; SAR(10 g) = 0.108 mW/g**
Maximum value of SAR (measured) = 0.199 W/kg



Test Laboratory: GCCT

Test Date: June.07, 2014

**WCDMA Band II-Right side-Mid**

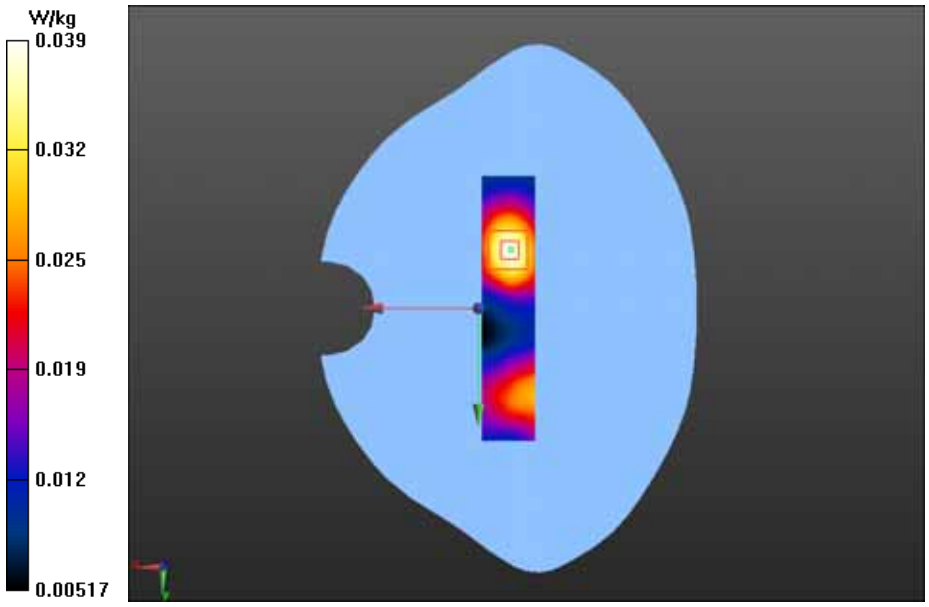
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band2; Frequency: 1880 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.557 mho/m; $\varepsilon_r$ = 50.765; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band II-Right side-Mid/Area Scan (21x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 2.646 V/m; Power Drift = -0.09 dB
Maximum value of SAR (interpolated) = 0.0390 W/kg
**WCDMA Band II-Right side-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.646 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.060 mW/g
**SAR(1 g) = 0.033 mW/g; SAR(10 g) = 0.021 mW/g**
Maximum value of SAR (measured) = 0.0357 W/kg



Test Laboratory: GCCT

Test Date: June.07, 2014

**WCDMA Band II-Bottom side-Mid**

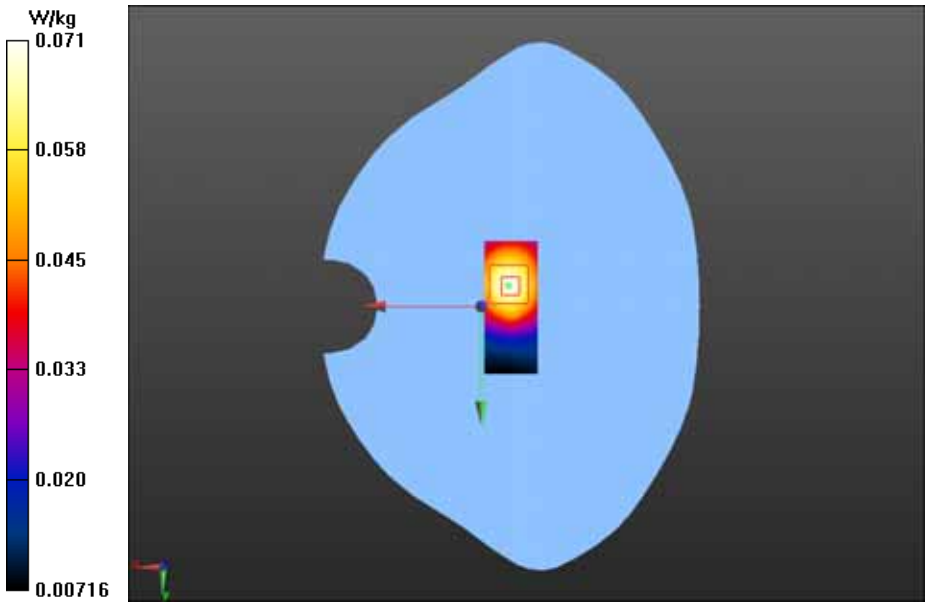
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band2; Frequency: 1880 MHz; Communication System PAR: 0 dB
Medium parameters used: f = 1880 MHz; $\sigma$ = 1.557 mho/m; $\varepsilon_r$ = 50.765; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.91, 4.91, 4.91); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band II-Bottom side-Mid/Area Scan (21x51x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 6.162 V/m; Power Drift = 0.03 dB
Maximum value of SAR (interpolated) = 0.0707 W/kg
**WCDMA Band II-Bottom side-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 6.162 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 0.100 mW/g
**SAR(1 g) = 0.062 mW/g; SAR(10 g) = 0.039 mW/g**
Maximum value of SAR (measured) = 0.0669 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014

**WCDMA Band V- LEFT/CHEEK-Mid**

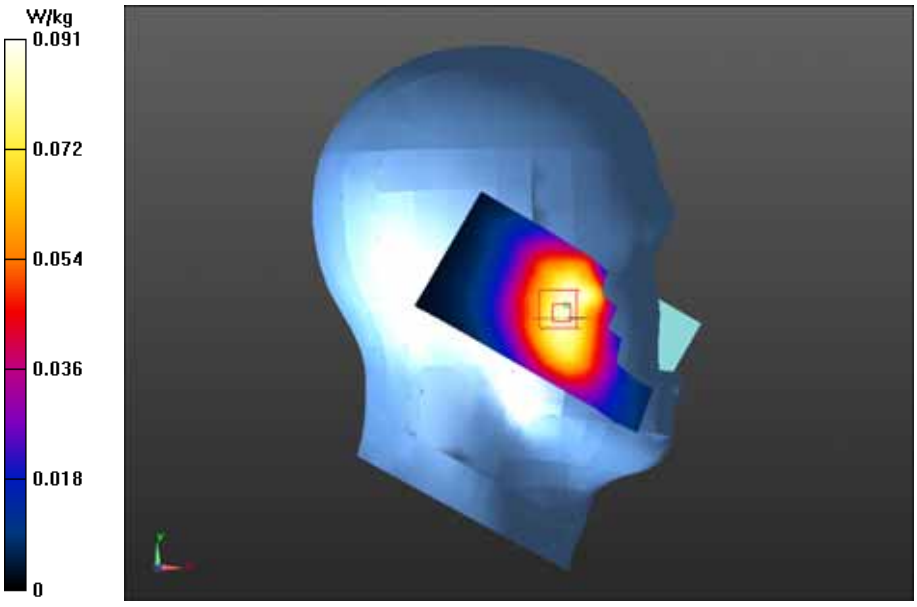
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band5; Frequency: 836.6 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.89 mho/m; $\varepsilon_r$ = 41.478; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.23, 6.23, 6.23); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band V- LEFT/CHEEK-Mid/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 3.036 V/m; Power Drift = -0.13 dB
Maximum value of SAR (interpolated) = 0.0906 W/kg
**WCDMA Band V- LEFT/CHEEK-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.036 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 0.110 mW/g
**SAR(1 g) = 0.089 mW/g; SAR(10 g) = 0.069 mW/g**
Maximum value of SAR (measured) = 0.0930 W/kg



Test Laboratory: GCCT Test Date: June.06, 2014

**WCDMA Band V- LEFT/TILT-Mid**

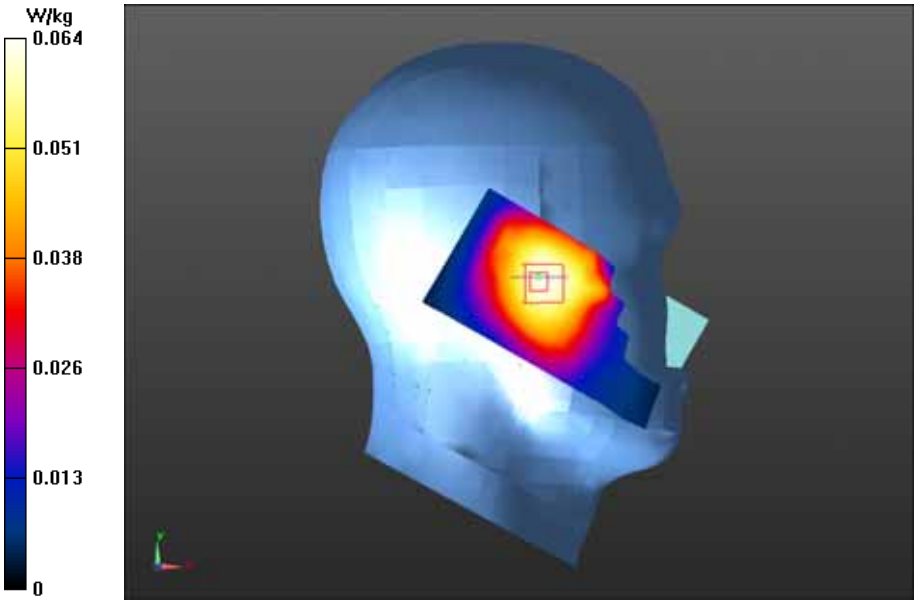
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band5; Frequency: 836.6 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.89 mho/m; $\varepsilon_r$ = 41.478; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.23, 6.23, 6.23); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band V- LEFT/TILT-Mid/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 5.217 V/m; Power Drift = 0.21 dB
Maximum value of SAR (interpolated) = 0.0638 W/kg
**WCDMA Band V- LEFT/TILT-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.217 V/m; Power Drift = 0.21 dB
Peak SAR (extrapolated) = 0.080 mW/g
**SAR(1 g) = 0.064 mW/g; SAR(10 g) = 0.050 mW/g**
Maximum value of SAR (measured) = 0.0675 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014

**WCDMA Band V- RIGHT/CHEEK-Mid**

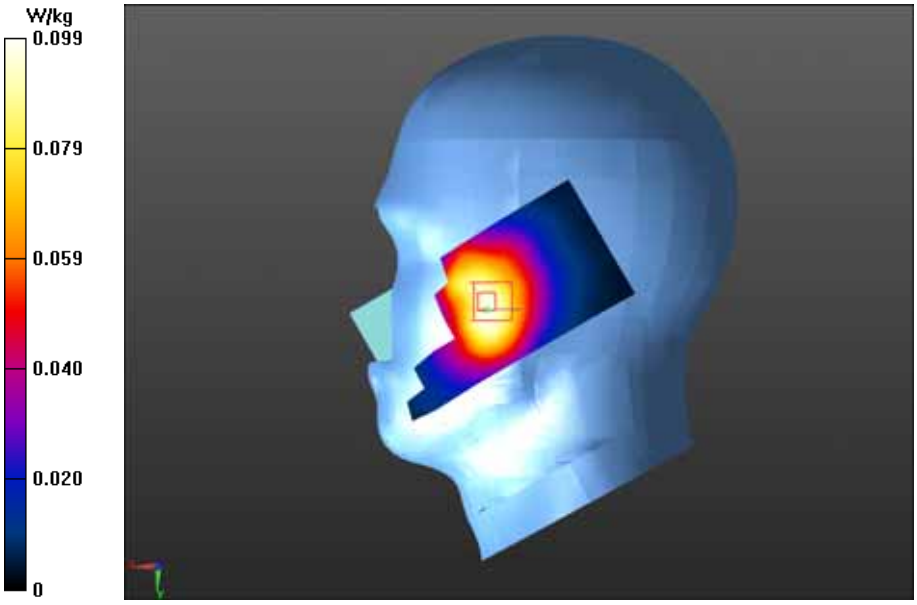
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band5; Frequency: 836.6 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.89 mho/m; $\varepsilon_r$ = 41.478; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.23, 6.23, 6.23); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band V- RIGHT/CHEEK-Mid/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 3.053 V/m; Power Drift = 0.20 dB
Maximum value of SAR (interpolated) = 0.0988 W/kg
**WCDMA Band V- RIGHT/CHEEK-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.053 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.118 mW/g
**SAR(1 g) = 0.098 mW/g; SAR(10 g) = 0.076 mW/g**
Maximum value of SAR (measured) = 0.103 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014


**WCDMA Band V- RIGHT/CHEEK-Mid-axis scan**

Test Laboratory: GCCT Test Date: June.06, 2014

**WCDMA Band V- RIGHT/TILT-Mid**

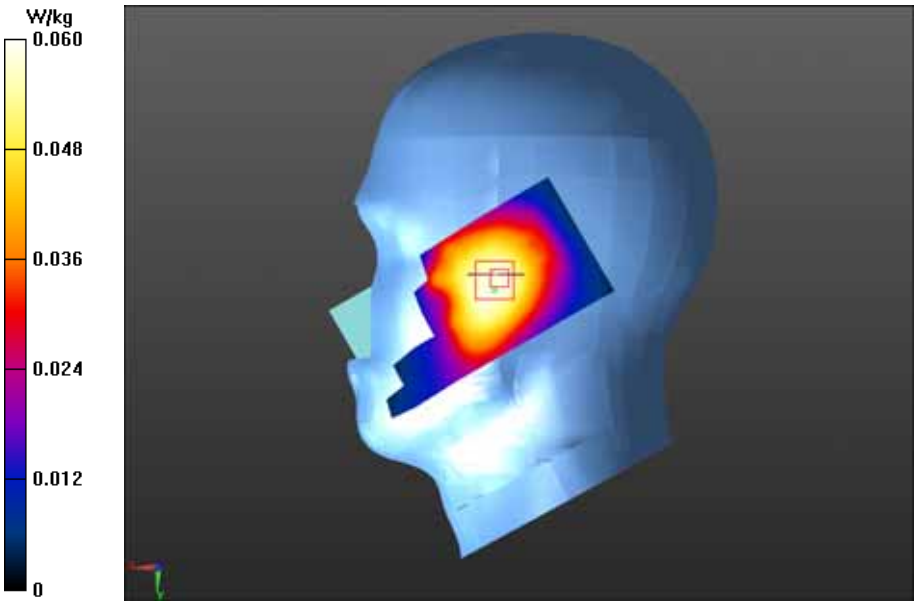
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band5; Frequency: 836.6 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.89 mho/m; $\varepsilon_r$ = 41.478; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.23, 6.23, 6.23); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band V- RIGHT/TILT-Mid/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 5.177 V/m; Power Drift = 0.08 dB
Maximum value of SAR (interpolated) = 0.0601 W/kg
**WCDMA Band V- RIGHT/TILT-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 5.177 V/m; Power Drift = 0.08 dB
Peak SAR (extrapolated) = 0.074 mW/g
**SAR(1 g) = 0.059 mW/g; SAR(10 g) = 0.046 mW/g**
Maximum value of SAR (measured) = 0.0604 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014

**WCDMA Band V(Body)/Back side Mid**

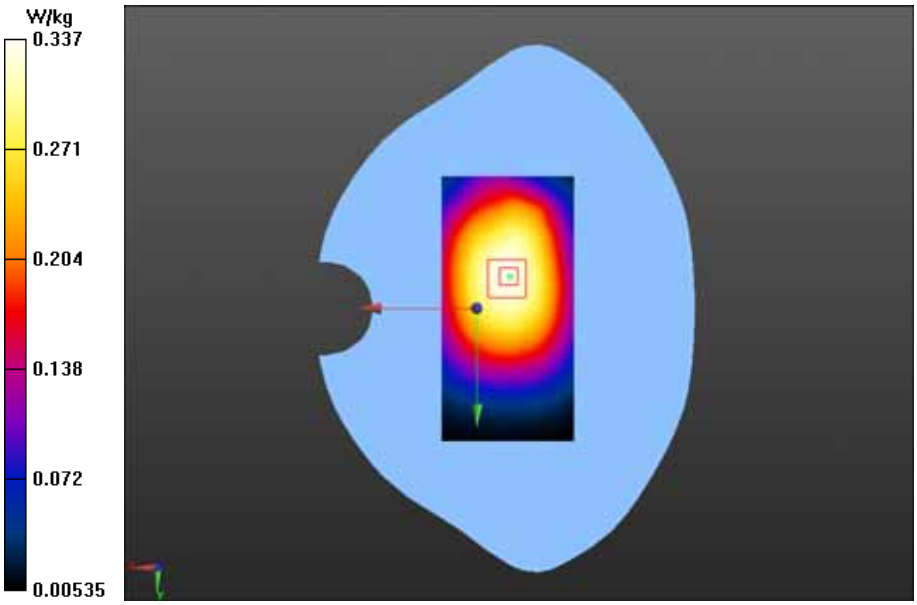
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band5; Frequency: 836.6 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.939 mho/m; $\varepsilon_r$ = 53.719; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

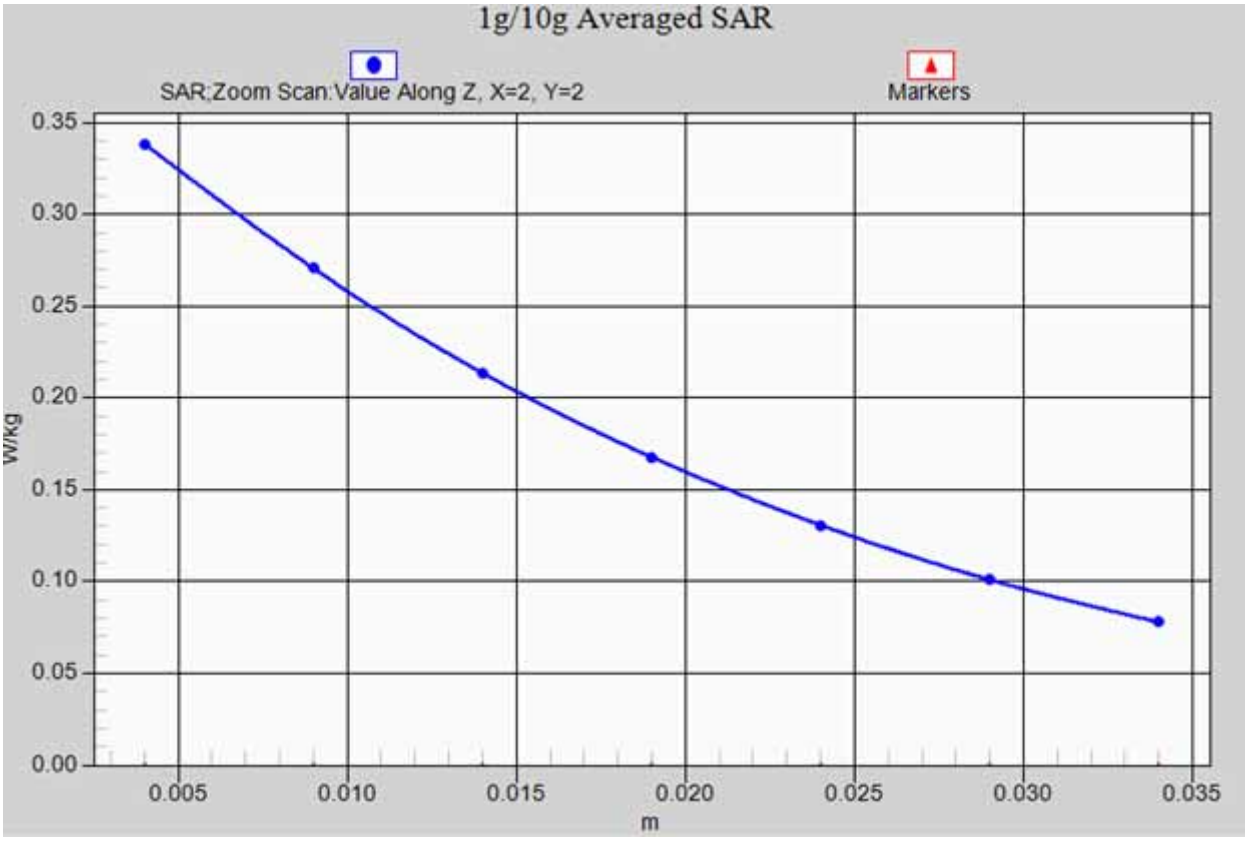
- Probe: ES3DV3 - SN3221; ConvF(6.2, 6.2, 6.2); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band V(Body)/Back side Mid/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 18.297 V/m; Power Drift = 0.06 dB
Maximum value of SAR (interpolated) = 0.337 W/kg
**WCDMA Band V(Body)/Back side Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 18.297 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.395 mW/g
**SAR(1 g) = 0.323 mW/g; SAR(10 g) = 0.249 mW/g**
Maximum value of SAR (measured) = 0.339 W/kg



Test Laboratory: GCCT

Test Date: June.06, 2014




**WCDMA Band V(Body)/Back side Mid -axis scan**

Test Laboratory: GCCT Test Date: June.06, 2014

**WCDMA Band V(Body)/Front side Mid**

**DUT: Kingo T5; Type: Kingo T5**

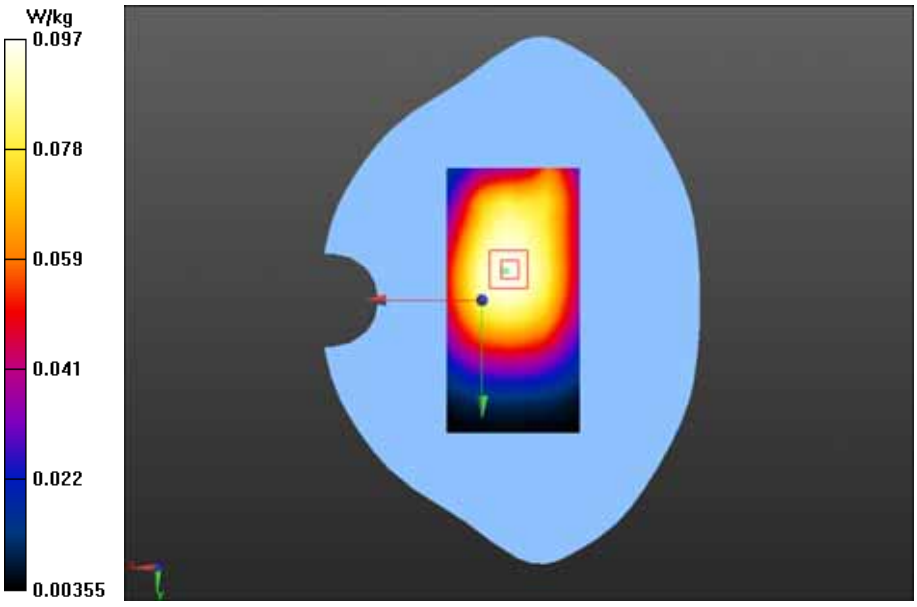
Communication System: UMTS-FDD(WCDMA); Communication System Band: Band5; Frequency: 836.6 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.939 mho/m; $\varepsilon_r$ = 53.719; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.2, 6.2, 6.2); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band V(Body)/Front side Mid/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 9.877 V/m; Power Drift = 0.06 dB
Maximum value of SAR (interpolated) = 0.0965 W/kg

**WCDMA Band V(Body)/Front side Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 9.877 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.110 mW/g
**SAR(1 g) = 0.091 mW/g; SAR(10 g) = 0.071 mW/g**
Maximum value of SAR (measured) = 0.0944 W/kg



Test Laboratory: GCCT Test Date: June.06, 2014

**WCDMA Band V-Left side-Mid**

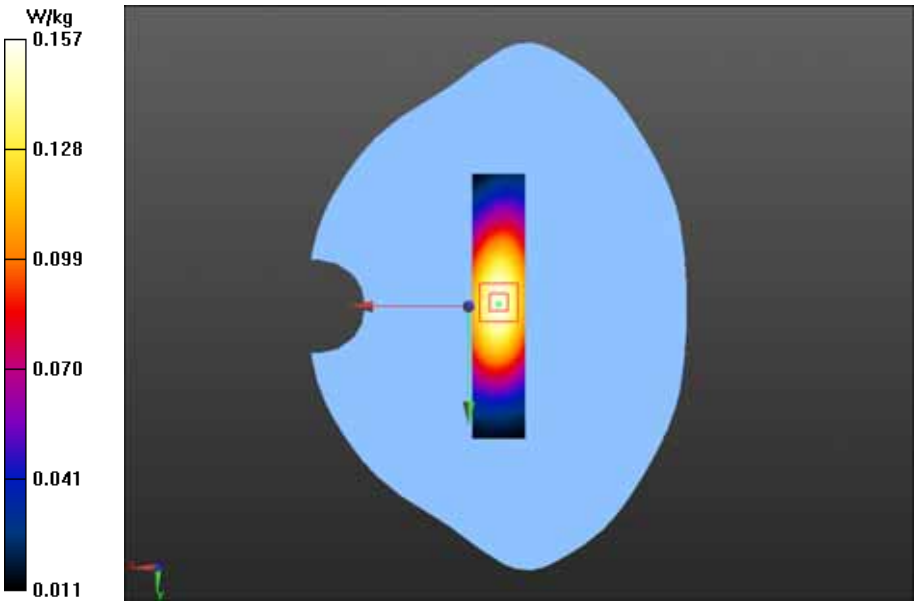
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band5; Frequency: 836.6 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.939 mho/m; $\varepsilon_r$ = 53.719; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.2, 6.2, 6.2); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band V-Left side-Mid/Area Scan (21x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 13.045 V/m; Power Drift = 0.06 dB
Maximum value of SAR (interpolated) = 0.157 W/kg
**WCDMA Band V-Left side-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.045 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 0.201 mW/g
**SAR(1 g) = 0.146 mW/g; SAR(10 g) = 0.102 mW/g**
Maximum value of SAR (measured) = 0.157 W/kg



Test Laboratory: GCCT Test Date: June.06, 2014

**WCDMA Band V-Right side-Mid**

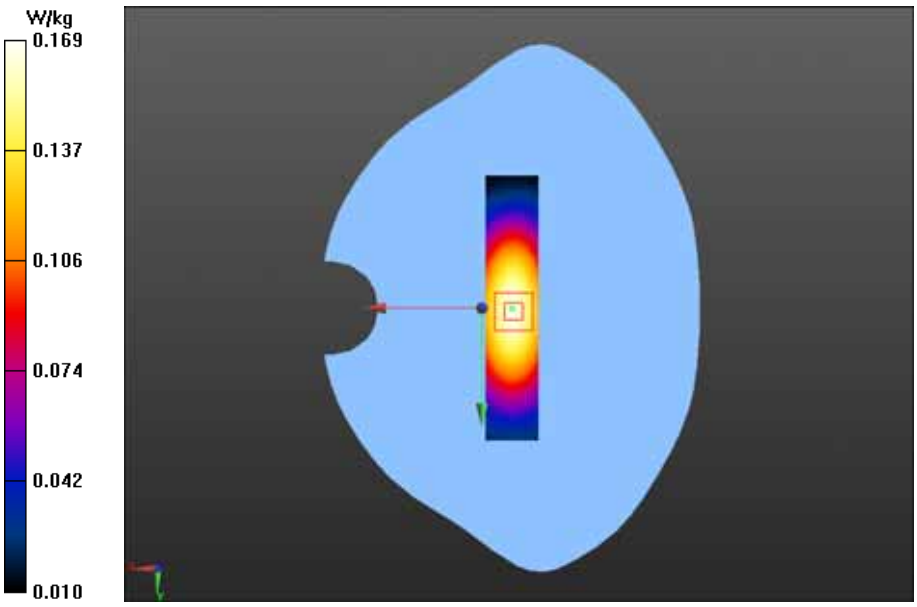
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band5; Frequency: 836.6 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.939 mho/m; $\varepsilon_r$ = 53.719; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.2, 6.2, 6.2); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band V-Right side-Mid/Area Scan (21x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 13.543 V/m; Power Drift = 0.05 dB
Maximum value of SAR (interpolated) = 0.169 W/kg
**WCDMA Band V-Right side-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 13.543 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 0.216 mW/g
**SAR(1 g) = 0.158 mW/g; SAR(10 g) = 0.111 mW/g**
Maximum value of SAR (measured) = 0.169 W/kg



Test Laboratory: GCCT Test Date: June.06, 2014

**WCDMA Band V-Bottom side-Mid**

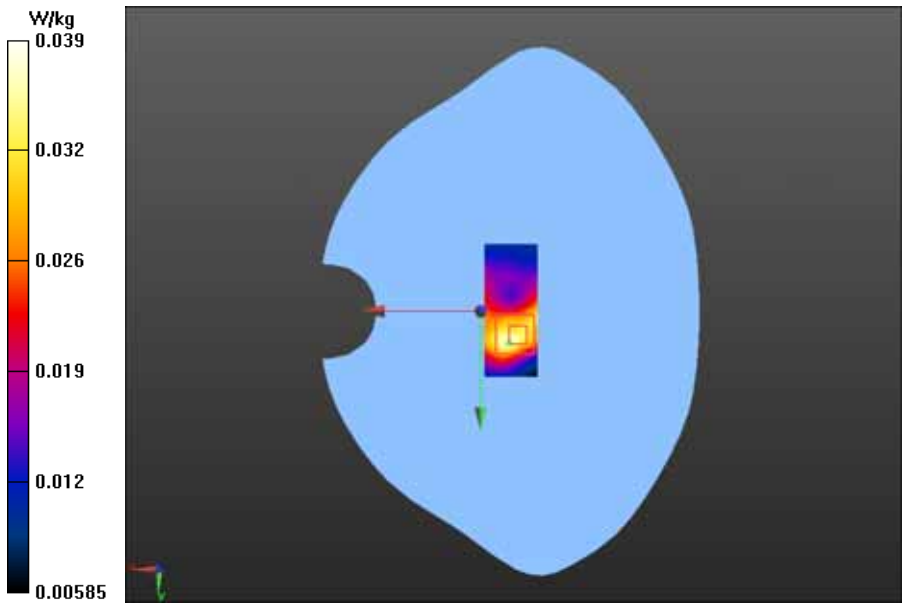
**DUT: Kingo T5; Type: Kingo T5**

Communication System: UMTS-FDD(WCDMA); Communication System Band: Band5; Frequency: 836.6 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 836.6 MHz; $\sigma$ = 0.939 mho/m; $\varepsilon_r$ = 53.719; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(6.2, 6.2, 6.2); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_2with CRP v4.0; Type: QD000P40CC; Serial: TP:1548
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WCDMA Band V-Bottom side-Mid/Area Scan (21x51x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 4.504 V/m; Power Drift = 0.16 dB
Maximum value of SAR (interpolated) = 0.0388 W/kg
**WCDMA Band V-Bottom side-Mid/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 4.504 V/m; Power Drift = 0.16 dB
Peak SAR (extrapolated) = 0.066 mW/g
**SAR(1 g) = 0.036 mW/g; SAR(10 g) = 0.021 mW/g**
Maximum value of SAR (measured) = 0.0385 W/kg



Test Laboratory: GCCT Test Date: June.08, 2014

**WiFi 802.11b LEFT/CHEEK-Low**

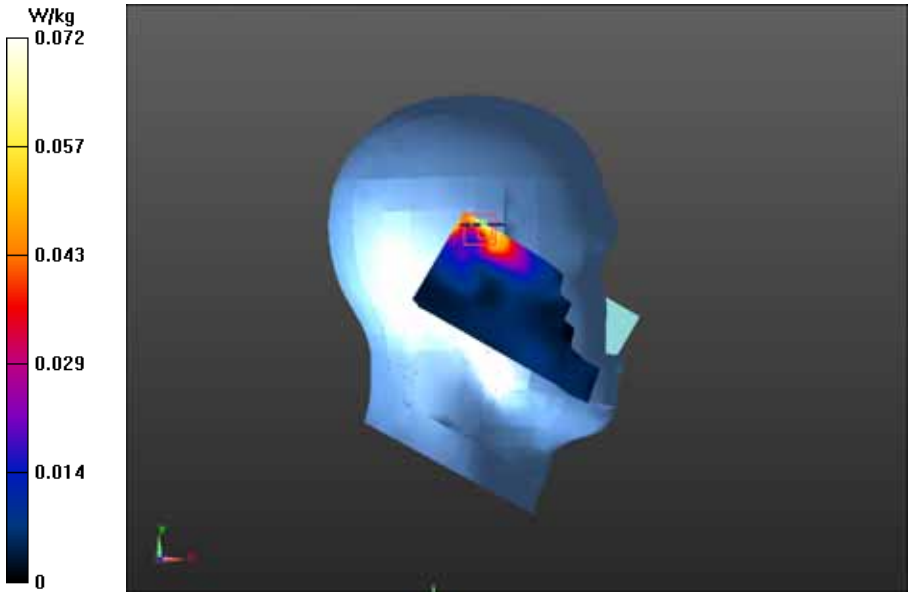
**DUT: Kingo T5; Type: Kingo T5**

Communication System: 802.11b WiFi 2.4 GHz ; Communication System Band: 2450; Frequency: 2412 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 2412 MHz; $\sigma$ = 1.838 mho/m; $\varepsilon_r$ = 38.149; $\rho$ = 1000 kg/m$^3$
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

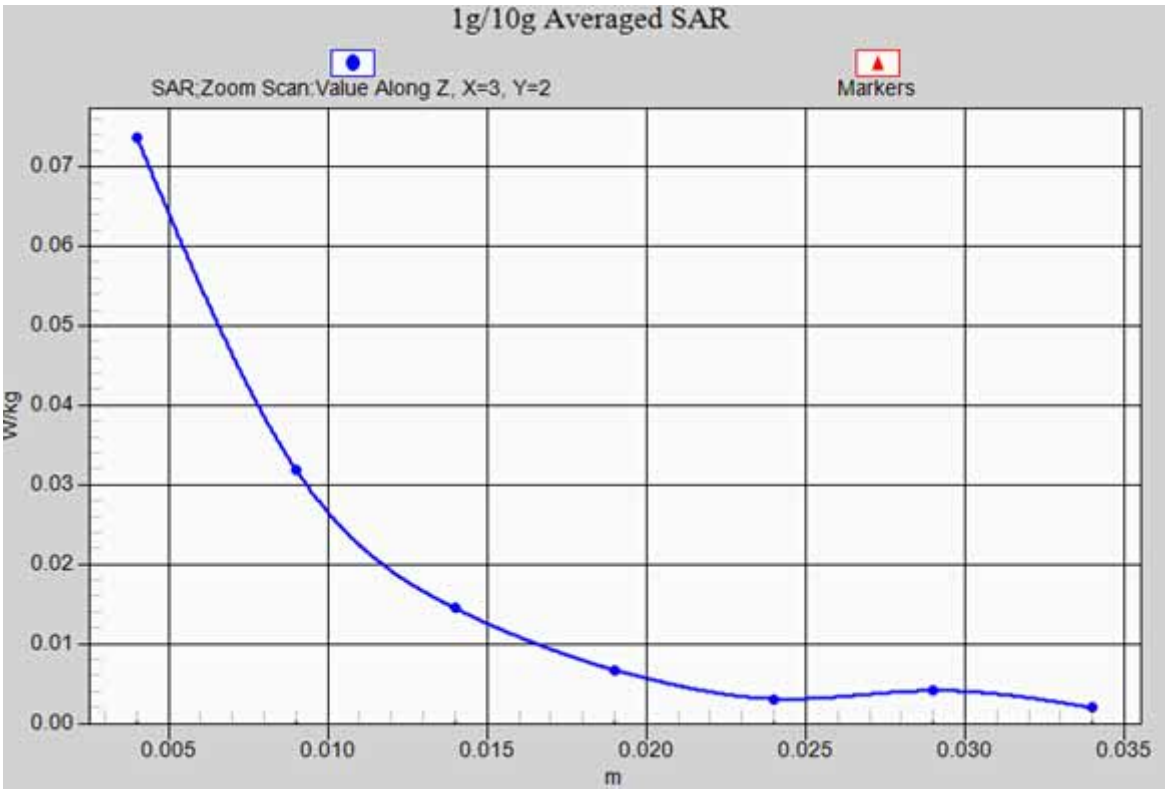
- Probe: ES3DV3 - SN3221; ConvF(4.76, 4.76, 4.76); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WiFi 802.11b LEFT/CHEEK-Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 2.777 V/m; Power Drift = 0.18 dB
Maximum value of SAR (interpolated) = 0.0716 W/kg
**WiFi 802.11b LEFT/CHEEK-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.777 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.179 mW/g
**SAR(1 g) = 0.069 mW/g; SAR(10 g) = 0.030 mW/g**
Maximum value of SAR (measured) = 0.0738 W/kg



Test Laboratory: GCCT

Test Date: June.08, 2014




**WiFi 802.11b LEFT/CHEEK-Low -axis scan**

Test Laboratory: GCCT Test Date: June.08, 2014

**WiFi 802.11b LEFT/TILT-Low**

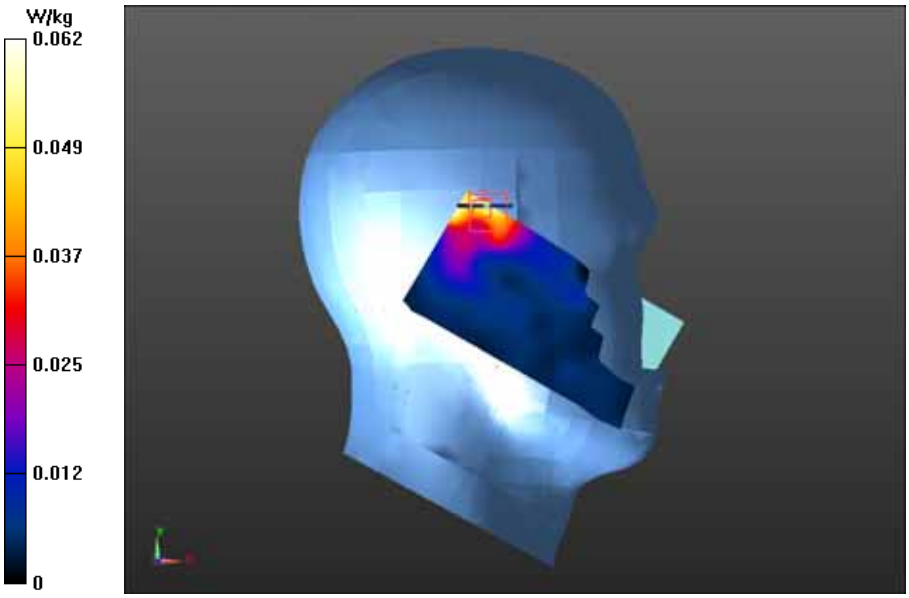
**DUT: Kingo T5; Type: Kingo T5**

Communication System: 802.11b WiFi 2.4 GHz ; Communication System Band: 2450; Frequency: 2412 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 2412 MHz; $\sigma$ = 1.838 mho/m; $\varepsilon_r$ = 38.149; $\rho$ = 1000 kg/$m^3$
Phantom section: Left Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.76, 4.76, 4.76); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WiFi 802.11b LEFT/TILT-Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 3.337 V/m; Power Drift = -0.16 dB
Maximum value of SAR (interpolated) = 0.0615 W/kg
**WiFi 802.11b LEFT/TILT-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.337 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.103 mW/g
**SAR(1 g) = 0.051 mW/g; SAR(10 g) = 0.025 mW/g**
Maximum value of SAR (measured) = 0.0541 W/kg



Test Laboratory: GCCT Test Date: June.08, 2014

**WiFi 802.11b RIGHT/CHEEK-Low**

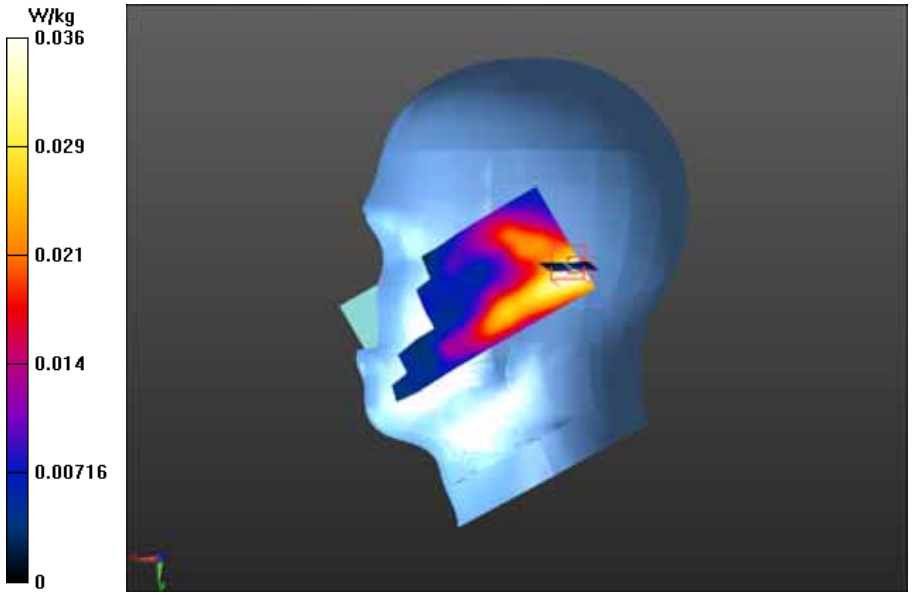
**DUT: Kingo T5; Type: Kingo T5**

Communication System: 802.11b WiFi 2.4 GHz ; Communication System Band: 2450; Frequency: 2412 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 2412 MHz; $\sigma$ = 1.838 mho/m; $\varepsilon_r$ = 38.149; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.76, 4.76, 4.76); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WiFi 802.11b RIGHT/CHEEK-Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 3.656 V/m; Power Drift = -0.11 dB
Maximum value of SAR (interpolated) = 0.0358 W/kg
**WiFi 802.11b RIGHT/CHEEK-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.656 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.075 mW/g
**SAR(1 g) = 0.029 mW/g; SAR(10 g) = 0.015 mW/g**
Maximum value of SAR (measured) = 0.0309 W/kg



Test Laboratory: GCCT Test Date: June.08, 2014

**WiFi 802.11b RIGHT/TILT-Low**

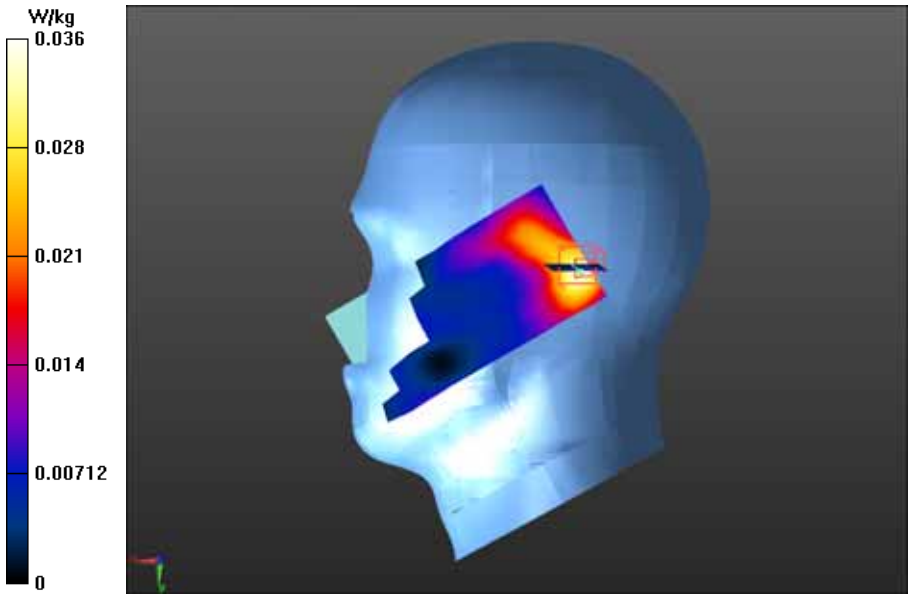
**DUT: Kingo T5; Type: Kingo T5**

Communication System: 802.11b WiFi 2.4 GHz ; Communication System Band: 2450; Frequency: 2412 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 2412 MHz; $\sigma$ = 1.838 mho/m; $\varepsilon_r$ = 38.149; $\rho$ = 1000 kg/m$^3$
Phantom section: Right Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.76, 4.76, 4.76); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WiFi 802.11b RIGHT/TILT-Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 3.495 V/m; Power Drift = 0.09 dB
Maximum value of SAR (interpolated) = 0.0356 W/kg
**WiFi 802.11b RIGHT/TILT-Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.495 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 0.086 mW/g
**SAR(1 g) = 0.035 mW/g; SAR(10 g) = 0.017 mW/g**
Maximum value of SAR (measured) = 0.0368 W/kg



Test Laboratory: GCCT Test Date: June.08, 2014

**WiFi 802.11b(Body)/Back side Low**

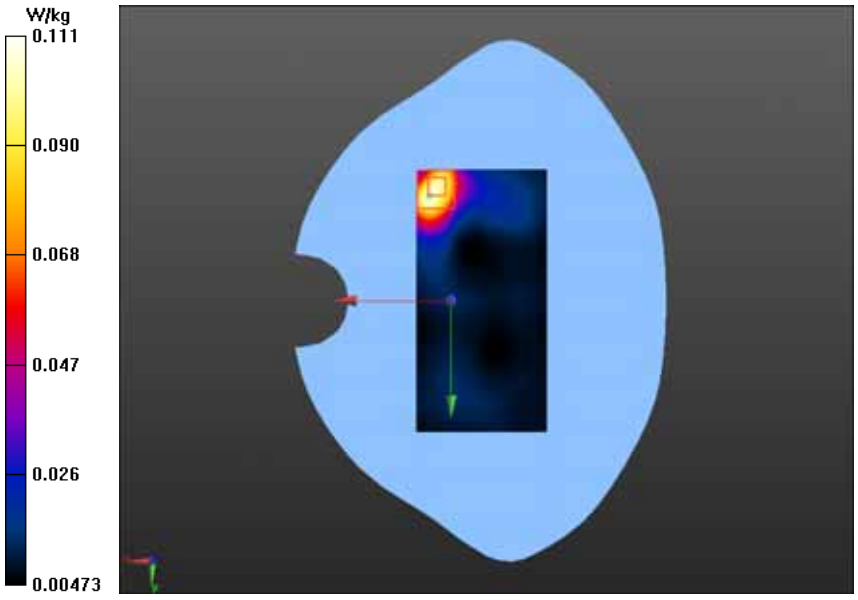
**DUT: Kingo T5; Type: Kingo T5**

Communication System: 802.11b WiFi 2.4 GHz ; Communication System Band: 2450; Frequency: 2412 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 2412 MHz; $\sigma$ = 1.968 mho/m; $\varepsilon_r$ = 50.861; $\rho$ = 1000 kg/$m^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

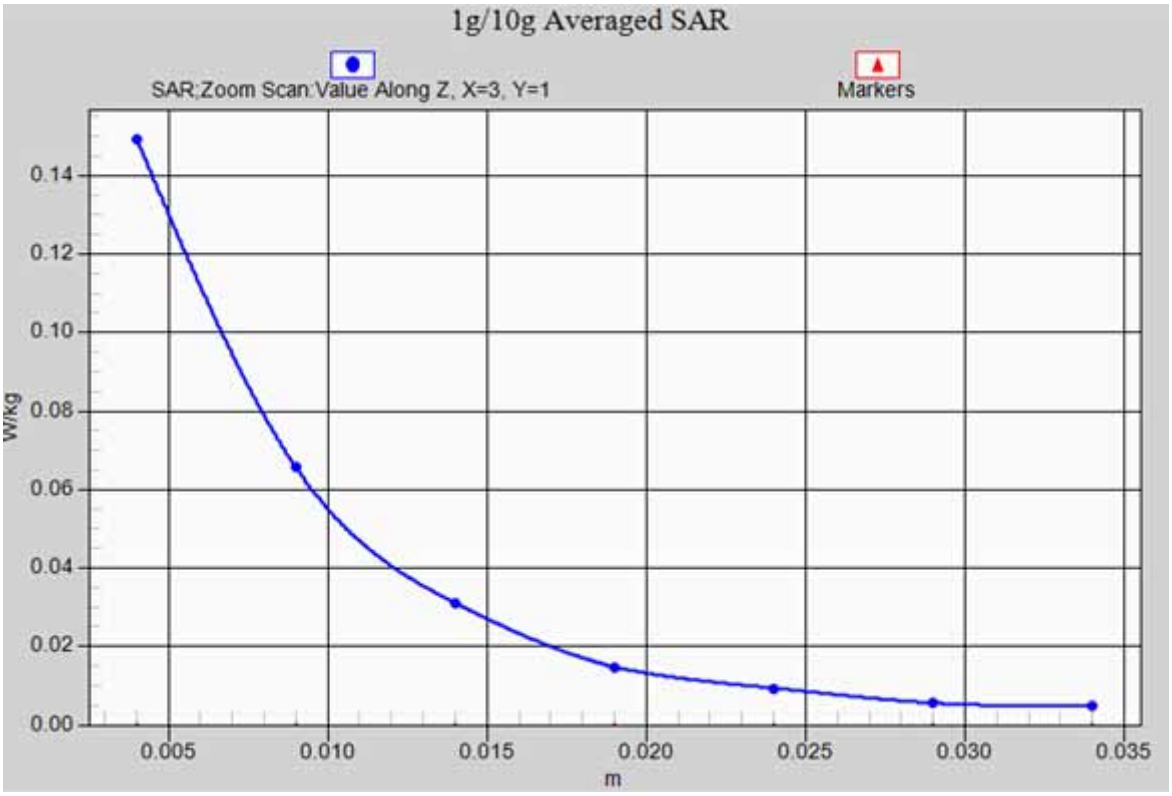
- Probe: ES3DV3 - SN3221; ConvF(4.48, 4.48, 4.48); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WiFi 802.11b(Body)/Back side Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 2.230 V/m; Power Drift = -0.11 dB
Maximum value of SAR (interpolated) = 0.111 W/kg
**WiFi 802.11b(Body)/Back side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.230 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.379 mW/g
**SAR(1 g) = 0.139 mW/g; SAR(10 g) = 0.057 mW/g**
Maximum value of SAR (measured) = 0.149 W/kg



Test Laboratory: GCCT

Test Date: June.08, 2014




**WiFi 802.11b(Body)/Back side Low -axis scan**

Test Laboratory: GCCT Test Date: June.08, 2014

**WiFi 802.11b(Body)/Front side Low**

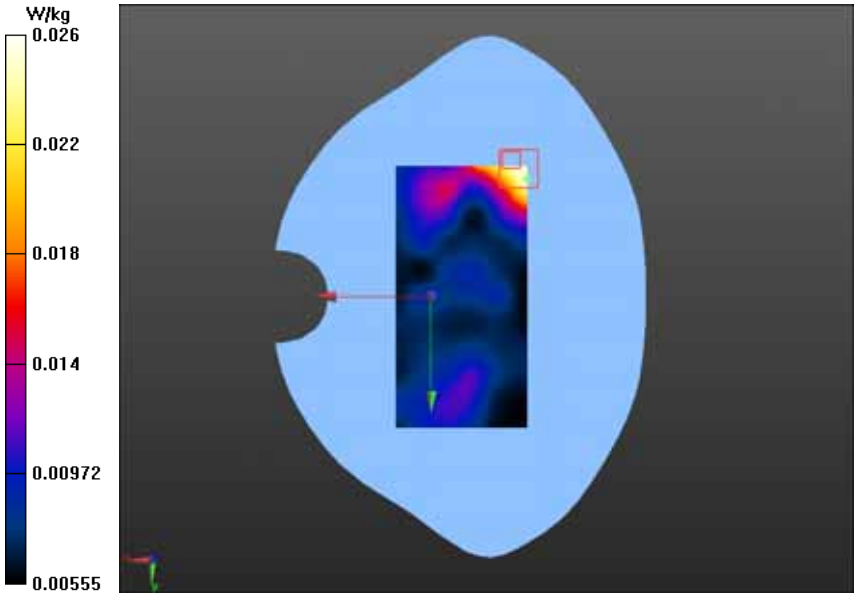
**DUT: Kingo T5; Type: Kingo T5**

Communication System: 802.11b WiFi 2.4 GHz ; Communication System Band: 2450; Frequency: 2412 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 2412 MHz; $\sigma$ = 1.968 mho/m; $\varepsilon_r$ = 50.861; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.48, 4.48, 4.48); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WiFi 802.11b(Body)/Front side Low/Area Scan (51x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 1.694 V/m; Power Drift = -0.17 dB
Maximum value of SAR (interpolated) = 0.0264 W/kg
**WiFi 802.11b(Body)/Front side Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.694 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 0.097 mW/g
**SAR(1 g) = 0.029 mW/g; SAR(10 g) = 0.015 mW/g**
Maximum value of SAR (measured) = 0.0284 W/kg



Test Laboratory: GCCT Test Date: June.08, 2014

**WiFi 802.11b Right side/Low**

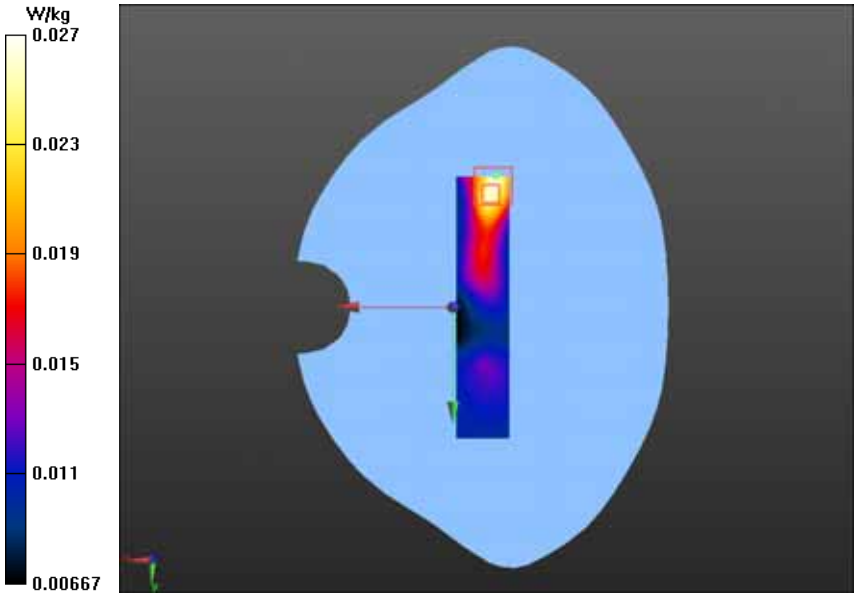
**DUT: Kingo T5; Type: Kingo T5**

Communication System: 802.11b WiFi 2.4 GHz ; Communication System Band: 2450; Frequency: 2412 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 2412 MHz; $\sigma$ = 1.968 mho/m; $\varepsilon_r$ = 50.861; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.48, 4.48, 4.48); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WiFi 802.11b Right side/Low/Area Scan (21x101x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 2.201 V/m; Power Drift = -0.08 dB
Maximum value of SAR (interpolated) = 0.0275 W/kg
**WiFi 802.11b Right side/Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.201 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.066 mW/g
**SAR(1 g) = 0.024 mW/g; SAR(10 g) = 0.013 mW/g**
Maximum value of SAR (measured) = 0.0236 W/kg



Test Laboratory: GCCT Test Date: June.08, 2014

**WiFi 802.11b Top side/Low**

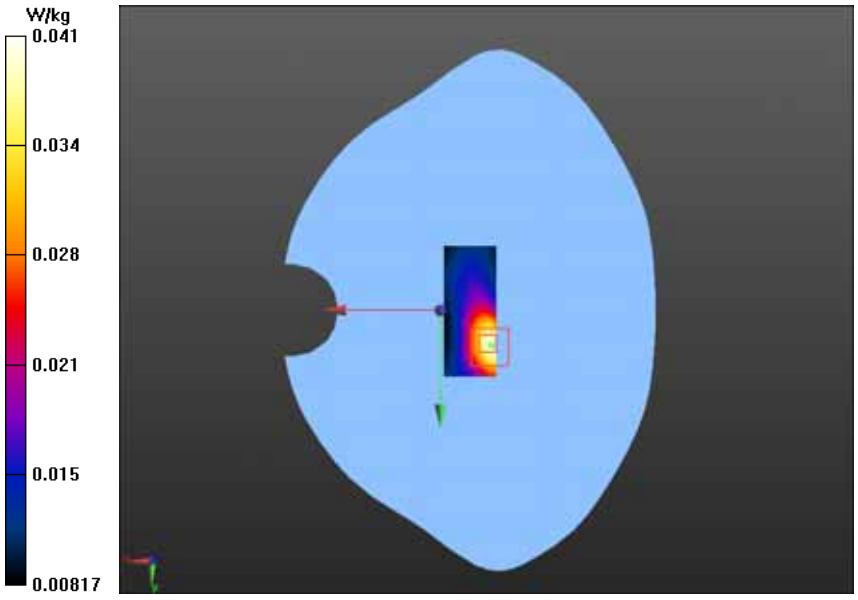
**DUT: Kingo T5; Type: Kingo T5**

Communication System: 802.11b WiFi 2.4 GHz ; Communication System Band: 2450; Frequency: 2412 MHz; Communication System PAR: 0 dB
Medium parameters used (interpolated): f = 2412 MHz; $\sigma$ = 1.968 mho/m; $\varepsilon_r$ = 50.861; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3221; ConvF(4.48, 4.48, 4.48); Calibrated: 1/9/2014;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn893; Calibrated: 12/25/2013
- Phantom: SAM_1 with CRP v4.0; Type: QD000P40CC; Serial: TP:1586
- Measurement SW: DASY52, Version 52.8 (2); SEMCAD X Version 14.6.6 (6824)

**WiFi 802.11b Top side/Low/Area Scan (21x51x1):** Interpolated grid: dx=1.500 mm, dy=1.500 mm
Reference Value = 3.147 V/m; Power Drift = 0.01 dB
Maximum value of SAR (interpolated) = 0.0407 W/kg
**WiFi 802.11b Top side/Low/Zoom Scan (5x5x7)/Cube 0:** Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 3.147 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.095 mW/g
**SAR(1 g) = 0.039 mW/g; SAR(10 g) = 0.020 mW/g**
Maximum value of SAR (measured) = 0.0419 W/kg



# ANNEX D: Probe calibration report

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CNAS 校准 CNAS L0442

Client NCCT Certificate No: J14-2-0002

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | ES3DV3 - SN:3221 |
| Calibration Procedure(s) | TMC-OS-E-02-195<br>Calibration Procedures for Dosimetric E-field Probes |
| Calibration date: | January 09, 2014 |

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 | 01-Jul-13 (TMC, No.JW13-044) | Jun-14 |
| Power sensor NRP-Z91 | 101547 | 01-Jul-13 (TMC, No.JW13-044) | Jun-14 |
| Power sensor NRP-Z91 | 101548 | 01-Jul-13 (TMC, No.JW13-044) | Jun-14 |
| Reference10dBAttenuator | BT0520 | 12-Dec-12(TMC,No.JZ12-867) | Dec-14 |
| Reference20dBAttenuator | BT0267 | 12-Dec-12(TMC,No.JZ12-866) | Dec-14 |
| Reference Probe EX3DV4 | SN 3846 | 03-Sep-13(SPEAG,No.EX3-3846_Sep13) | Sep-14 |
| DAE4 | SN 777 | 22-Feb-13 (SPEAG, DAE4-777_Feb13) | Feb -14 |
| Secondary Standards | ID # | Cal Date(Calibrated by, Certificate No.) | Scheduled Calibration |
| SignalGeneratorMG3700A | 6201052605 | 01-Jul-13 (TMC, No.JW13-045) | Jun-14 |
| Network Analyzer E5071C | MY46110673 | 15-Feb-13 (TMC, No.JZ13-781) | Feb-14 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Yu Zongying | SAR Test Engineer | |
| Reviewed by: | Qi Dianyuan | SAR Project Leader | |
| Approved by: | Lu Bingsong | Deputy Director of the laboratory | |

Issued: January 10, 2014

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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, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300MHz to 3GHz)", February 2005

**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).

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# Probe ES3DV3

## SN: 3221

Calibrated: January 09, 2014

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

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# DASY – Parameters of Probe: ES3DV3 - SN: 3221

## Basic Calibration Parameters

| | Sensor X | Sensor Y | Sensor Z | Unc (k=2) |
|---|---|---|---|---|
| Norm(μV/(V/m)$^2$)[A] | 1.04 | 1.30 | 1.03 | ±10.8% |
| DCP(mV)[B] | 106.8 | 104.0 | 102.7 | |

## 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 | 244.0 | ±2.6% |
| | | Y | 0.0 | 0.0 | 1.0 | | 270.1 | |
| | | Z | 0.0 | 0.0 | 1.0 | | 233.6 | |

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 – Parameters of Probe: ES3DV3 - SN: 3221

## 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) |
|---|---|---|---|---|---|---|---|---|
| 850 | 41.5 | 0.92 | 6.23 | 6.23 | 6.23 | 0.30 | 1.79 | ±12% |
| 900 | 41.5 | 0.97 | 6.37 | 6.37 | 6.37 | 0.38 | 1.60 | ±12% |
| 1750 | 40.1 | 1.37 | 5.44 | 5.44 | 5.44 | 0.52 | 1.46 | ±12% |
| 1900 | 40.0 | 1.40 | 5.40 | 5.40 | 5.40 | 0.53 | 1.46 | ±12% |
| 2000 | 40.0 | 1.40 | 5.32 | 5.32 | 5.32 | 0.52 | 1.52 | ±12% |
| 2450 | 39.2 | 1.80 | 4.76 | 4.76 | 4.76 | 0.80 | 1.18 | ±12% |

[C] Frequency validity 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.

[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 – Parameters of Probe: ES3DV3 - SN: 3221

## 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) |
|---|---|---|---|---|---|---|---|---|
| 850 | 55.2 | 0.99 | 6.20 | 6.20 | 6.20 | 0.45 | 1.51 | ±12% |
| 900 | 55.0 | 1.05 | 6.16 | 6.16 | 6.16 | 0.51 | 1.41 | ±12% |
| 1750 | 53.4 | 1.49 | 5.20 | 5.20 | 5.20 | 0.49 | 1.61 | ±12% |
| 1900 | 53.3 | 1.52 | 4.91 | 4.91 | 4.91 | 0.49 | 1.65 | ±12% |
| 2000 | 53.3 | 1.52 | 4.97 | 4.97 | 4.97 | 0.34 | 2.53 | ±12% |
| 2450 | 52.7 | 1.95 | 4.48 | 4.48 | 4.48 | 0.84 | 1.19 | ±12% |

[C] Frequency validity 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.

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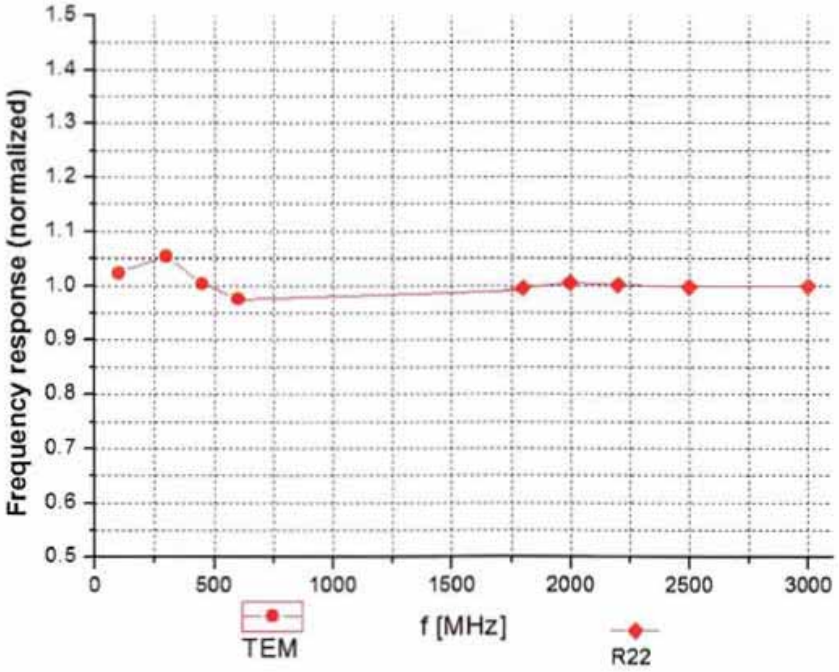
## Frequency Response of E-Field
### (TEM-Cell: ifi110 EXX, Waveguide: R22)




**Uncertainty of Frequency Response of E-field: ±7.5% (k=2)**

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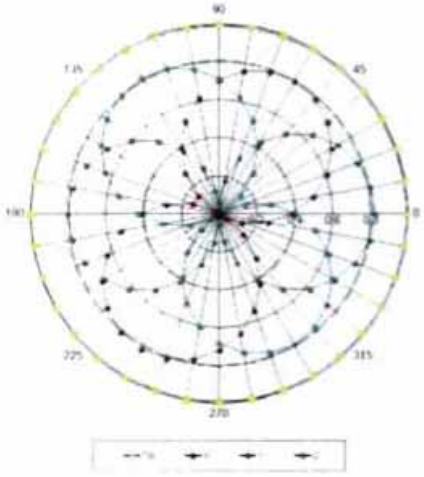
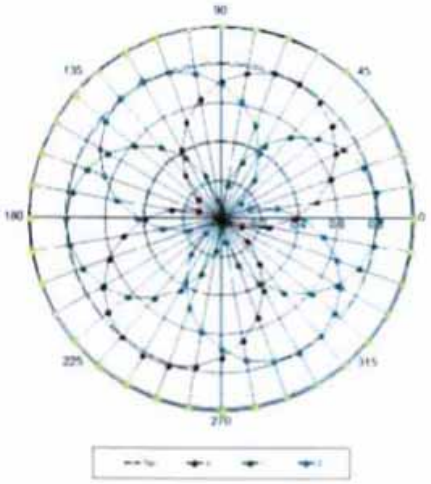
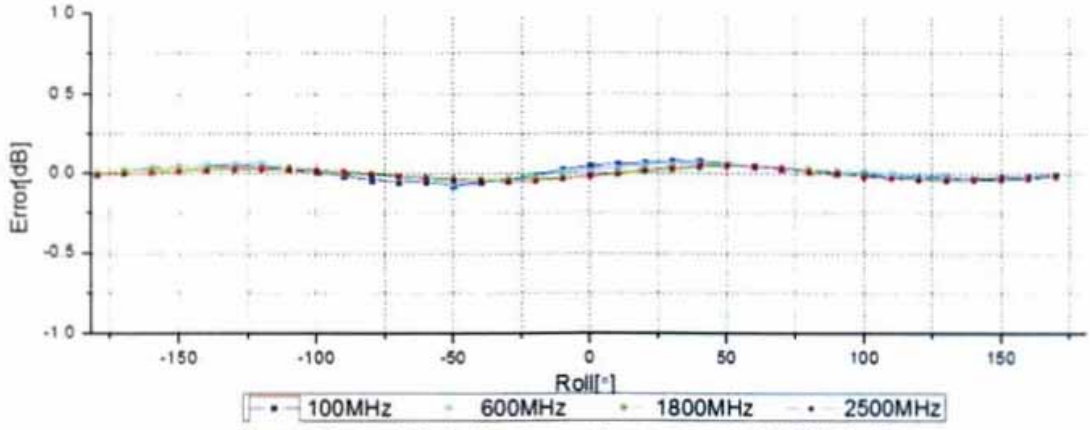
## Receiving Pattern (Φ), θ=0°

**f=600 MHz, TEM**



**f=1800 MHz, R22**






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

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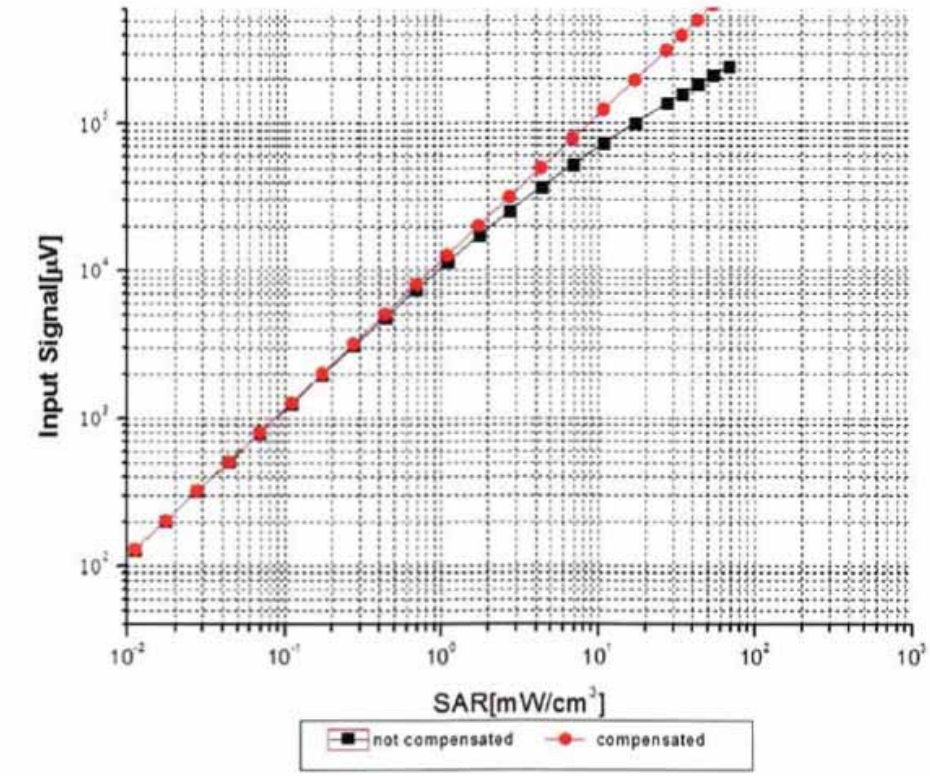
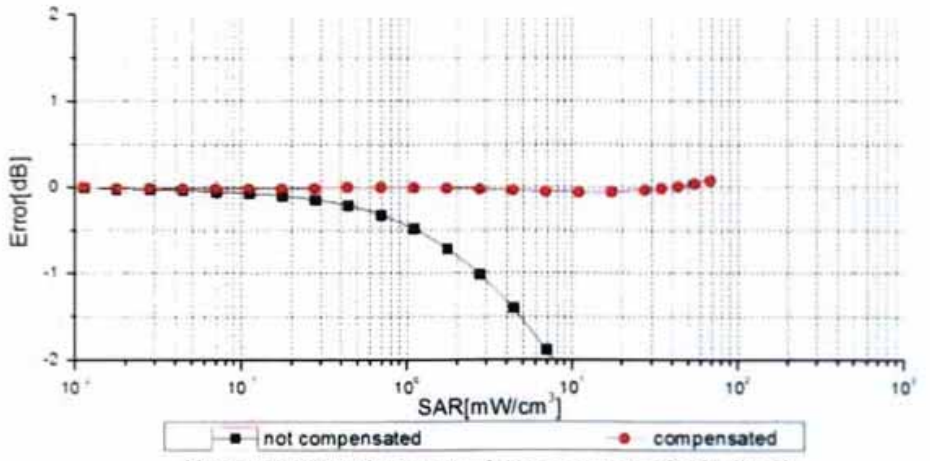
s p e a g
CALIBRATION LABORATORY

Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: Info@emcite.com Http://www.emcite.com

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




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

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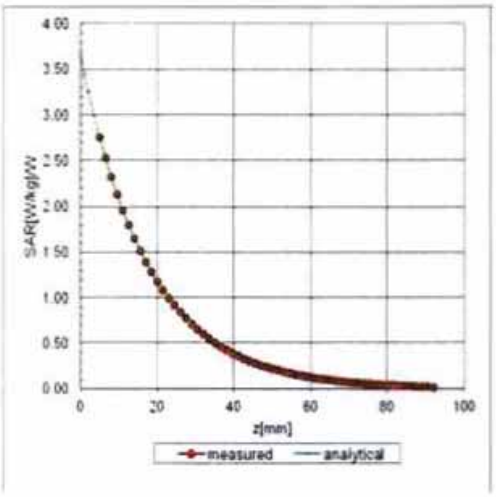
speag
CALIBRATION LABORATORY

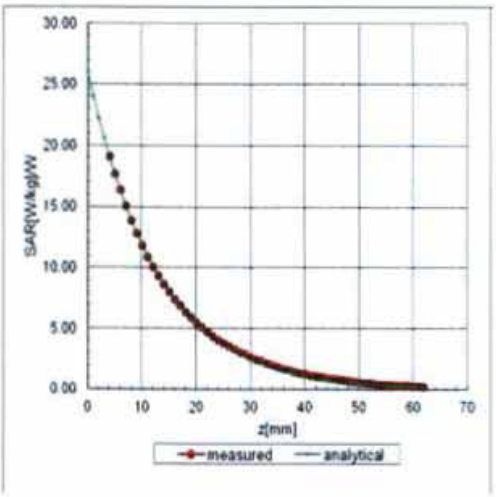
Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: Info@emcite.com Http://www.emcite.com

## Conversion Factor Assessment

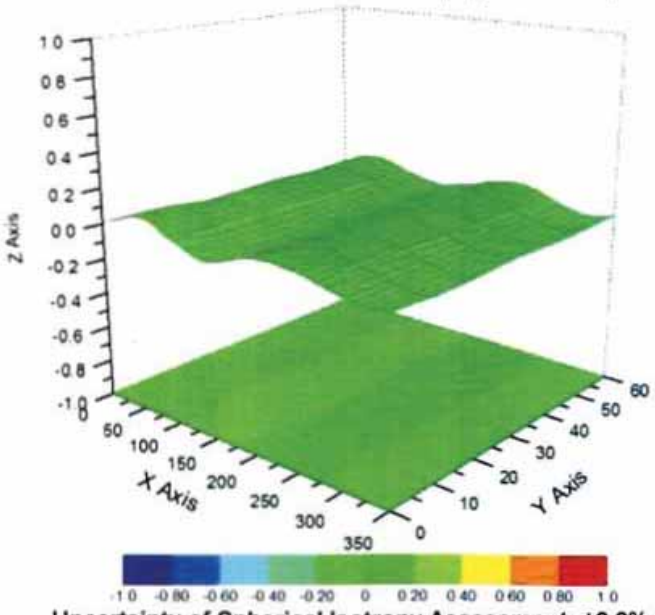
f=900 MHz, WGLS R9(H_convF)




f=1750 MHz, WGLS R22(H_convF)




## Deviation from Isotropy in Liquid




Uncertainty of Spherical Isotropy Assessment: ±2.8% (K=2)

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E-mail: Info@emcite.com Http://www.emcite.com

# DASY - Parameters of Probe: ES3DV3 - SN: 3221

## Other Probe Parameters

| | |
|---|---|
| Sensor Arrangement | Triangular |
| Connector Angle (°) | 36.2 |
| Mechanical Surface Detection Mode | enabled |
| Optical Surface Detection Mode | disable |
| Probe Overall Length | 337mm |
| Probe Body Diameter | 10mm |
| Tip Length | 10mm |
| Tip Diameter | 4mm |
| Probe Tip to Sensor X Calibration Point | 2mm |
| Probe Tip to Sensor Y Calibration Point | 2mm |
| Probe Tip to Sensor Z Calibration Point | 2mm |
| Recommended Measurement Distance from Surface | 3mm |

# ANNEX E: Dipole calibration report

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Swiss Calibration Service

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client GCCT (Auden)

Certificate No: D835V2-4d150_Mar13

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D835V2 - SN: 4d150 |
| Calibration procedure(s) | QA CAL-05.v9<br>Calibration procedure for dipole validation kits above 700 MHz |
| Calibration date: | March 18, 2013 |

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)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter EPM-442A | GB37480704 | 01-Nov-12 (No. 217-01640) | Oct-13 |
| Power sensor HP 8481A | US37292783 | 01-Nov-12 (No. 217-01640) | Oct-13 |
| Reference 20 dB Attenuator | SN: 5058 (20k) | 27-Mar-12 (No. 217-01530) | Apr-13 |
| Type-N mismatch combination | SN: 5047.3 / 06327 | 27-Mar-12 (No. 217-01533) | Apr-13 |
| Reference Probe ES3DV3 | SN: 3205 | 28-Dec-12 (No. ES3-3205_Dec12) | Dec-13 |
| DAE4 | SN: 601 | 27-Jun-12 (No. DAE4-601_Jun12) | Jun-13 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power sensor HP 8481A | MY41092317 | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06 | 100005 | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-12) | In house check: Oct-13 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Leif Klysner | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: March 19, 2013

**Calibration Laboratory of**
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

**Glossary:**

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

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

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

**Additional Documentation:**

d) 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%.

## Measurement Conditions

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

| | | |
|---|---|---|
| **DASY Version** | DASY5 | V52.8.5 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Modular Flat Phantom | |
| **Distance Dipole Center - TSL** | 15 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy, dz = 5 mm | |
| **Frequency** | 835 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 41.5 | 0.90 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 40.9 ± 6 % | 0.94 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Head TSL

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 2.47 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **9.53 W/kg ± 17.0 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 1.60 W/kg |
| SAR for nominal Head TSL parameters | normalized to 1W | **6.22 W/kg ± 16.5 % (k=2)** |

## Body TSL parameters

The following parameters and calculations were applied.

| | **Temperature** | **Permittivity** | **Conductivity** |
|---|---|---|---|
| **Nominal Body TSL parameters** | 22.0 °C | 55.2 | 0.97 mho/m |
| **Measured Body TSL parameters** | (22.0 ± 0.2) °C | 54.1 ± 6 % | 1.02 mho/m ± 6 % |
| **Body TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Body TSL

| **SAR averaged over 1 cm³ (1 g) of Body TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 2.52 W/kg |
| SAR for nominal Body TSL parameters | normalized to 1W | **9.66 W/kg ± 17.0 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Body TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 1.65 W/kg |
| SAR for nominal Body TSL parameters | normalized to 1W | **6.39 W/kg ± 16.5 % (k=2)** |

## Appendix

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 51.6 Ω - 2.8 jΩ |
| Return Loss | - 30.0 dB |

### Antenna Parameters with Body TSL

| | |
|---|---|
| Impedance, transformed to feed point | 47.1 Ω - 5.2 jΩ |
| Return Loss | - 24.2 dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.395 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 |
| Manufactured on | March 27, 2012 |

## DASY5 Validation Report for Head TSL

Date: 18.03.2013

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d150**

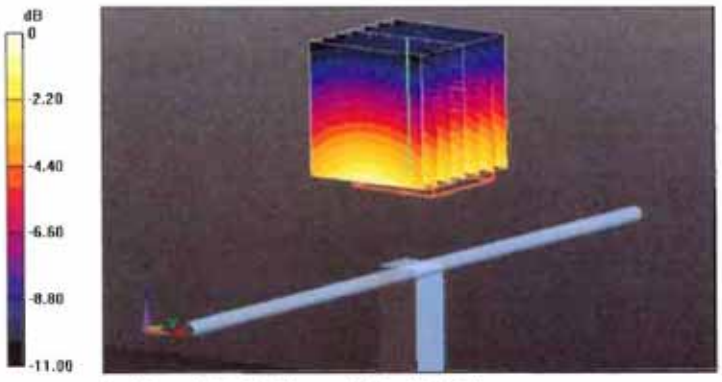
Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; $\sigma$ = 0.94 S/m; $\varepsilon_r$ = 40.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(6.05, 6.05, 6.05); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

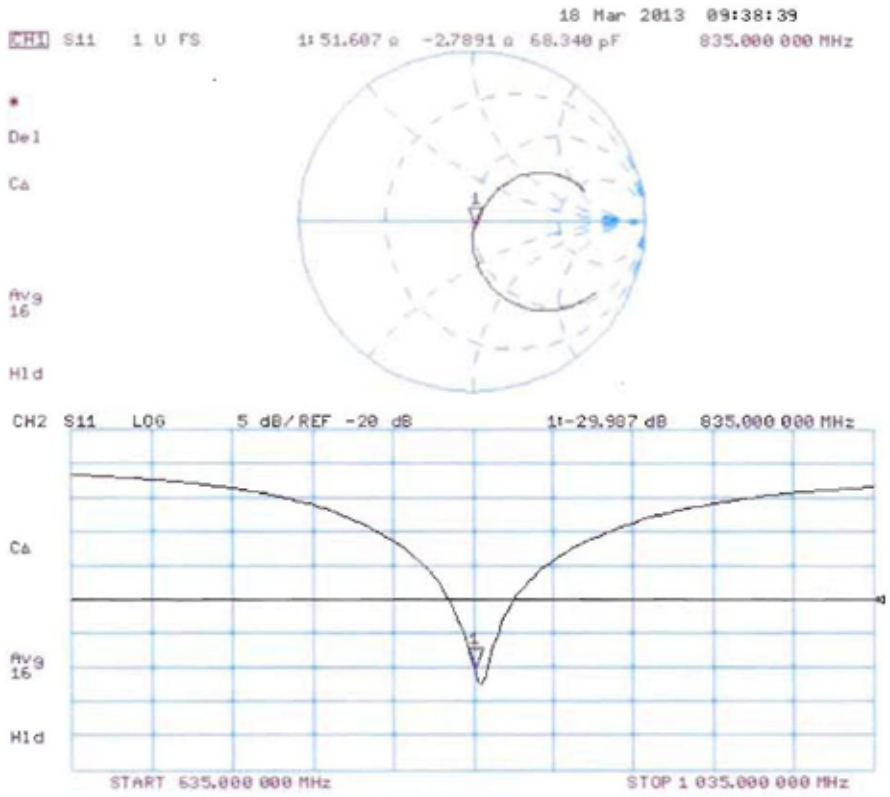
### Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:

Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 57.088 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.72 W/kg
**SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.6 W/kg**
Maximum value of SAR (measured) = 2.89 W/kg




0 dB = 2.89 W/kg = 4.61 dBW/kg

**Impedance Measurement Plot for Head TSL**



**DASY5 Validation Report for Body TSL**

Date: 18.03.2013

Test Laboratory: SPEAG, Zurich, Switzerland

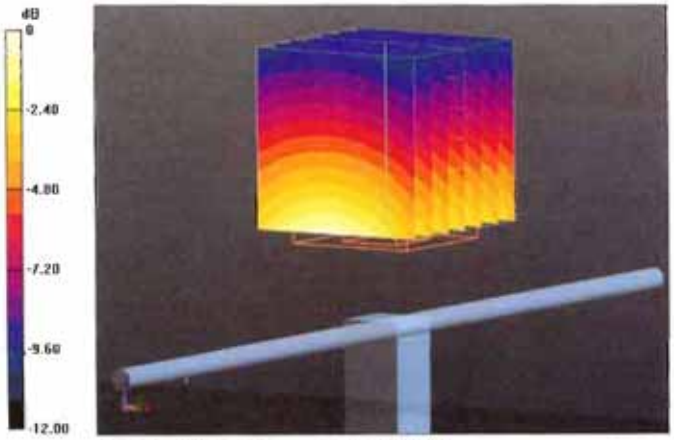
**DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 4d150**

Communication System: CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; $\sigma$ = 1.02 S/m; $\varepsilon_r$ = 54.1; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

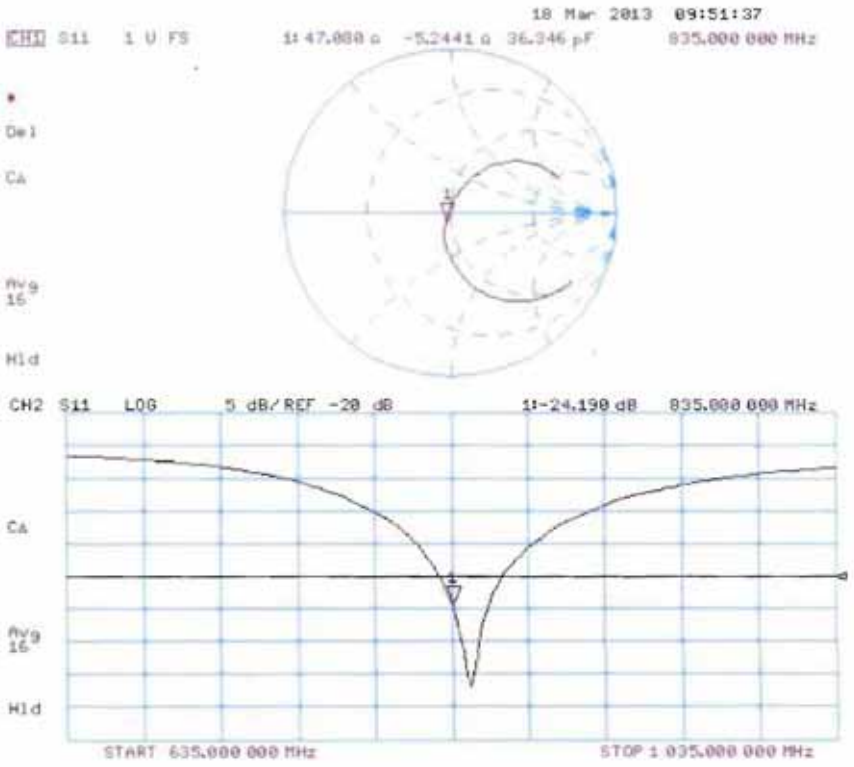
- Probe: ES3DV3 - SN3205; ConvF(6.04, 6.04, 6.04); Calibrated: 28.12.2012;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.5(1059); SEMCAD X 14.6.8(7028)

**Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.351 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 3.71 W/kg
**SAR(1 g) = 2.52 W/kg; SAR(10 g) = 1.65 W/kg**
Maximum value of SAR (measured) = 2.91 W/kg




0 dB = 2.91 W/kg = 4.64 dBW/kg

**Impedance Measurement Plot for Body TSL**



**Calibration Laboratory of**
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**Accreditation No.: SCS 108**

Client **GCCT (Auden)**

**Certificate No: D1900V2-5d070_Oct12**

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D1900V2 - SN: 5d070 |
| Calibration procedure(s) | QA CAL-05.v8<br>Calibration procedure for dipole validation kits above 700 MHz |
| Calibration date: | October 01, 2012 |

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)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter EPM-442A | GB37480704 | 05-Oct-11 (No. 217-01451) | Oct-12 |
| Power sensor HP 8481A | US37292783 | 05-Oct-11 (No. 217-01451) | Oct-12 |
| Reference 20 dB Attenuator | SN: 5058 (20k) | 27-Mar-12 (No. 217-01530) | Apr-13 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 27-Mar-12 (No. 217-01533) | Apr-13 |
| Reference Probe ES3DV3 | SN: 3205 | 30-Dec-11 (No. ES3-3205_Dec11) | Dec-12 |
| DAE4 | SN: 601 | 27-Jun-12 (No. DAE4-601_Jun12) | Jun-13 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power sensor HP 8481A | MY41092317 | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06 | 100005 | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-11) | In house check: Oct-12 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Israe El-Naouq | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: October 2, 2012

**Calibration Laboratory of**
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

**Glossary:**

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

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

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

**Additional Documentation:**

d) 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%.

## Measurement Conditions

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

| | | |
|---|---|---|
| **DASY Version** | DASY5 | V52.8.2 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Modular Flat Phantom | |
| **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 | 40.6 ± 6 % | 1.37 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | --- | --- |

## SAR result with Head TSL

| **SAR averaged over 1 cm³ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 9.89 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | **40.2 mW /g ± 17.0 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 5.22 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | **21.1 mW /g ± 16.5 % (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 | 52.5 ± 6 % | 1.54 mho/m ± 6 % |
| **Body TSL temperature change during test** | < 0.5 °C | --- | --- |

## SAR result with Body TSL

| **SAR averaged over 1 cm³ (1 g) of Body TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 10.3 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | **40.7 mW / g ± 17.0 % (k=2)** |

| **SAR averaged over 10 cm³ (10 g) of Body TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 5.47 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | **21.7 mW / g ± 16.5 % (k=2)** |

## Appendix

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 52.7 Ω + 4.7 jΩ |
| Return Loss | - 25.5 dB |

### Antenna Parameters with Body TSL

| | |
|---|---|
| Impedance, transformed to feed point | 48.5 Ω + 5.8 jΩ |
| Return Loss | - 24.4 dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.196 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 |
| Manufactured on | January 24, 2006 |

**DASY5 Validation Report for Head TSL**

Date: 01.10.2012

Test Laboratory: SPEAG, Zurich, Switzerland

**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d070**

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.37 mho/m; $\varepsilon_r$ = 40.6; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

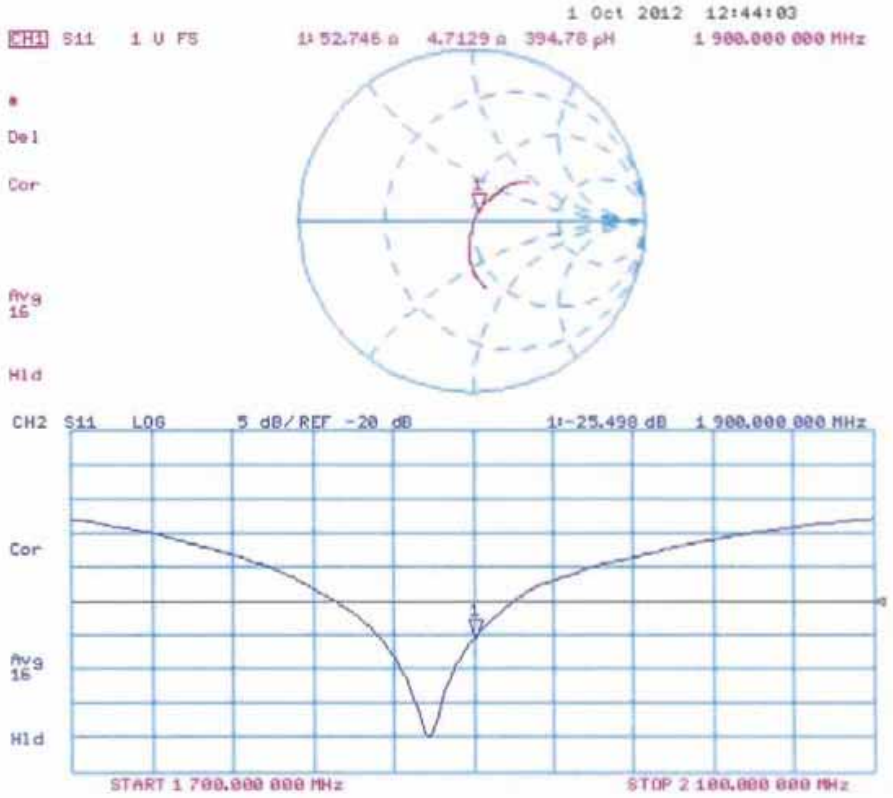
DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.01, 5.01, 5.01); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.678 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 17.559 mW/g
**SAR(1 g) = 9.89 mW/g; SAR(10 g) = 5.22 mW/g**
Maximum value of SAR (measured) = 12.2 W/kg


0 dB = 12.2 W/kg = 21.73 dB W/kg

Impedance Measurement Plot for Head TSL



Date: 01.10.2012

Test Laboratory: SPEAG, Zurich, Switzerland

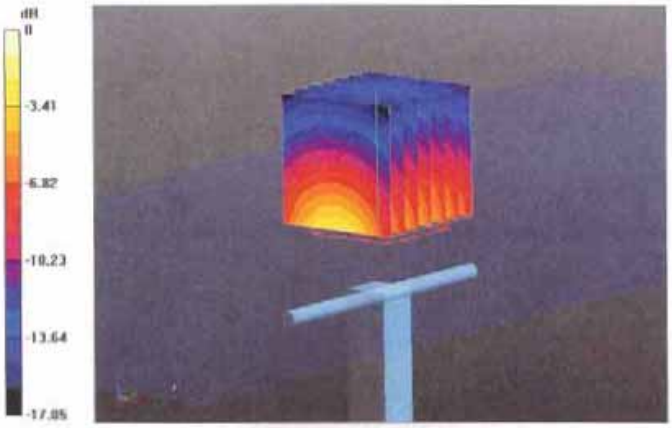
**DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN: 5d070**

Communication System: CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; $\sigma$ = 1.54 mho/m; $\varepsilon_r$ = 52.5; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

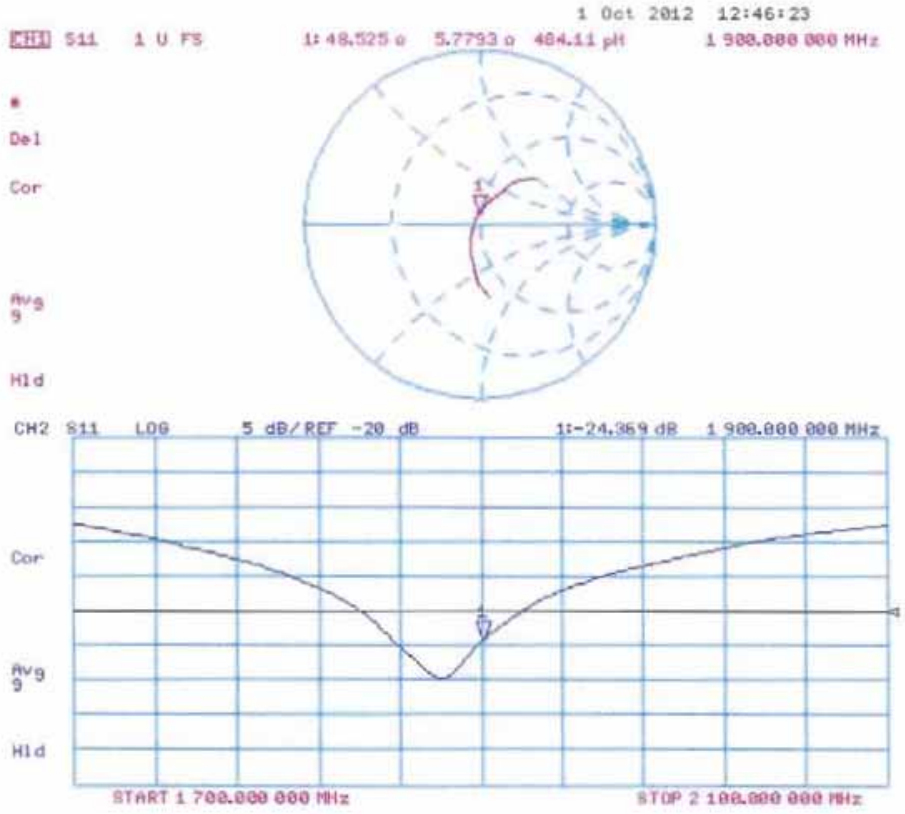
- Probe: ES3DV3 - SN3205; ConvF(4.62, 4.62, 4.62); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

**Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.678 V/m; Power Drift = -0.00 dB
Peak SAR (extrapolated) = 18.097 mW/g
**SAR(1 g) = 10.3 mW/g; SAR(10 g) = 5.47 mW/g**
Maximum value of SAR (measured) = 13.0 W/kg




0 dB = 13.0 W/kg = 22.28 dB W/kg

Impedance Measurement Plot for Body TSL



Calibration Laboratory of
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S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client GCCT (Auden)

Certificate No: D2450V2-815_Sep12

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | D2450V2 - SN: 815 |
| Calibration procedure(s) | QA CAL-05.v8<br>Calibration procedure for dipole validation kits above 700 MHz |
| Calibration date: | September 26, 2012 |

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)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

| Primary Standards | ID # | Cal Date (Certificate No.) | Scheduled Calibration |
|---|---|---|---|
| Power meter EPM-442A | GB37480704 | 05-Oct-11 (No. 217-01451) | Oct-12 |
| Power sensor HP 8481A | US37292783 | 05-Oct-11 (No. 217-01451) | Oct-12 |
| Reference 20 dB Attenuator | SN: 5058 (20k) | 27-Mar-12 (No. 217-01530) | Apr-13 |
| Type-N mismatch combination | SN: 5047.2 / 06327 | 27-Mar-12 (No. 217-01533) | Apr-13 |
| Reference Probe ES3DV3 | SN: 3205 | 30-Dec-11 (No. ES3-3205_Dec11) | Dec-12 |
| DAE4 | SN: 601 | 27-Jun-12 (No. DAE4-601_Jun12) | Jun-13 |

| Secondary Standards | ID # | Check Date (in house) | Scheduled Check |
|---|---|---|---|
| Power sensor HP 8481A | MY41092317 | 18-Oct-02 (in house check Oct-11) | In house check: Oct-13 |
| RF generator R&S SMT-06 | 100005 | 04-Aug-99 (in house check Oct-11) | In house check: Oct-13 |
| Network Analyzer HP 8753E | US37390585 S4206 | 18-Oct-01 (in house check Oct-11) | In house check: Oct-12 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Israe El-Naouq | Laboratory Technician | |
| Approved by: | Katja Pokovic | Technical Manager | |

Issued: September 26, 2012

**Calibration Laboratory of**
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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S Swiss Calibration Service

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The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

**Glossary:**

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

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

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

**Additional Documentation:**

d) 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%.

## Measurement Conditions

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

| | | |
|---|---|---|
| **DASY Version** | DASY5 | V52.8.2 |
| **Extrapolation** | Advanced Extrapolation | |
| **Phantom** | Modular Flat Phantom | |
| **Distance Dipole Center - TSL** | 10 mm | with Spacer |
| **Zoom Scan Resolution** | dx, dy, dz = 5 mm | |
| **Frequency** | 2450 MHz ± 1 MHz | |

## Head TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---|---|---|
| **Nominal Head TSL parameters** | 22.0 °C | 39.2 | 1.80 mho/m |
| **Measured Head TSL parameters** | (22.0 ± 0.2) °C | 39.9 ± 6 % | 1.84 mho/m ± 6 % |
| **Head TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Head TSL

| **SAR averaged over 1 cm$^3$ (1 g) of Head TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 13.4 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | **53.2 mW /g ± 17.0 % (k=2)** |

| **SAR averaged over 10 cm$^3$ (10 g) of Head TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 6.24 mW / g |
| SAR for nominal Head TSL parameters | normalized to 1W | **24.9 mW /g ± 16.5 % (k=2)** |

## Body TSL parameters

The following parameters and calculations were applied.

| | Temperature | Permittivity | Conductivity |
|---|---|---|---|
| **Nominal Body TSL parameters** | 22.0 °C | 52.7 | 1.95 mho/m |
| **Measured Body TSL parameters** | (22.0 ± 0.2) °C | 51.0 ± 6 % | 2.01 mho/m ± 6 % |
| **Body TSL temperature change during test** | < 0.5 °C | ---- | ---- |

## SAR result with Body TSL

| **SAR averaged over 1 cm$^3$ (1 g) of Body TSL** | Condition | |
|---|---|---|
| SAR measured | 250 mW input power | 13.0 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | **50.9 mW / g ± 17.0 % (k=2)** |

| **SAR averaged over 10 cm$^3$ (10 g) of Body TSL** | condition | |
|---|---|---|
| SAR measured | 250 mW input power | 6.06 mW / g |
| SAR for nominal Body TSL parameters | normalized to 1W | **23.9 mW / g ± 16.5 % (k=2)** |

## Appendix

### Antenna Parameters with Head TSL

| | |
|---|---|
| Impedance, transformed to feed point | 51.4 Ω + 3.0 jΩ |
| Return Loss | - 29.7 dB |

### Antenna Parameters with Body TSL

| | |
|---|---|
| Impedance, transformed to feed point | 48.7 Ω + 4.7 jΩ |
| Return Loss | - 26.1 dB |

### General Antenna Parameters and Design

| | |
|---|---|
| Electrical Delay (one direction) | 1.158 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 |
| Manufactured on | October 23, 2007 |

**DASY5 Validation Report for Head TSL**

Date: 26.09.2012

Test Laboratory: SPEAG, Zurich, Switzerland

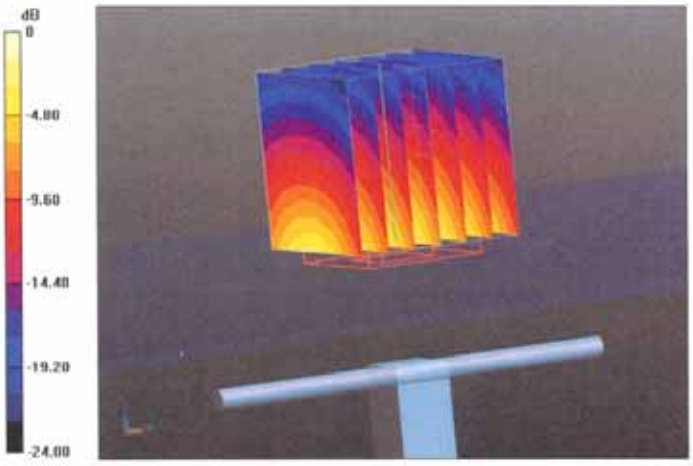
**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 815**

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; $\sigma$ = 1.84 mho/m; $\varepsilon_r$ = 39.9; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

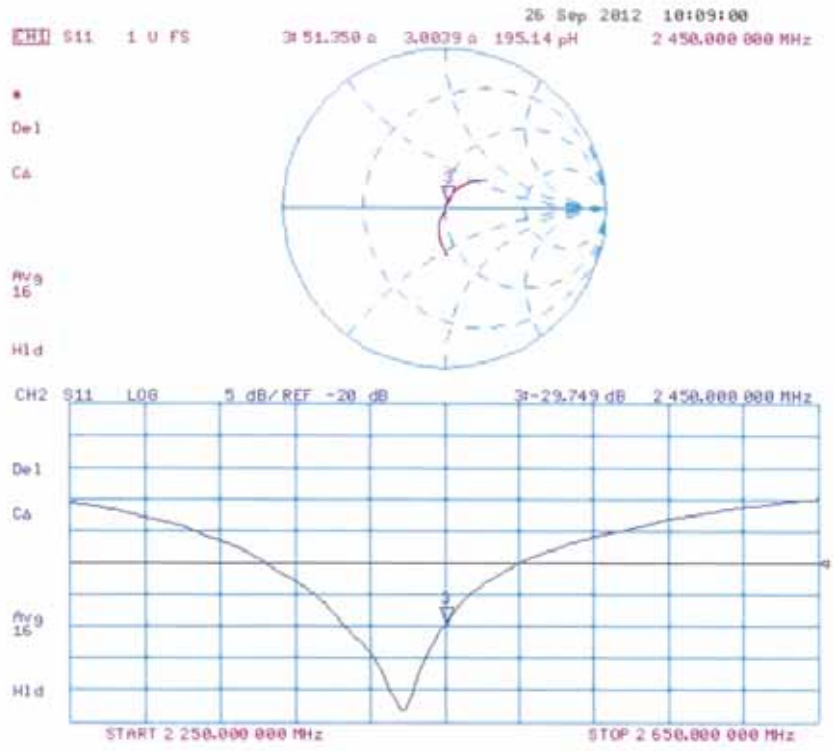
- Probe: ES3DV3 - SN3205; ConvF(4.45, 4.45, 4.45); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

**Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.653 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 27.468 mW/g
**SAR(1 g) = 13.4 mW/g; SAR(10 g) = 6.24 mW/g**
Maximum value of SAR (measured) = 16.9 W/kg




0 dB = 16.9 W/kg = 24.56 dB W/kg

Impedance Measurement Plot for Head TSL



**DASY5 Validation Report for Body TSL**

Date: 26.09.2012

Test Laboratory: SPEAG, Zurich, Switzerland

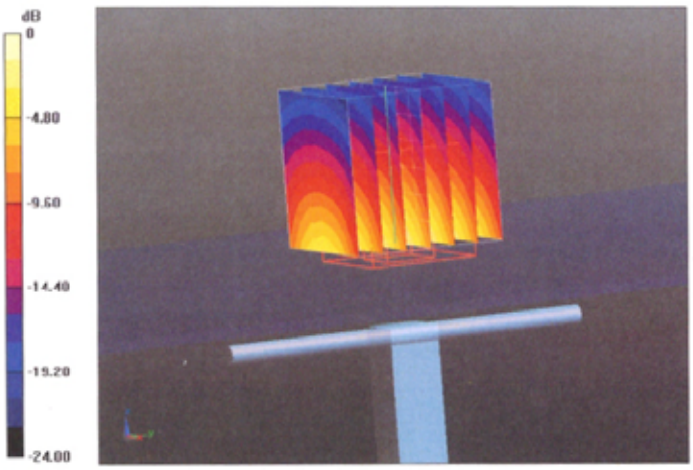
**DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN: 815**

Communication System: CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; $\sigma$ = 2.01 mho/m; $\varepsilon_r$ = 51; $\rho$ = 1000 kg/m$^3$
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY52 Configuration:

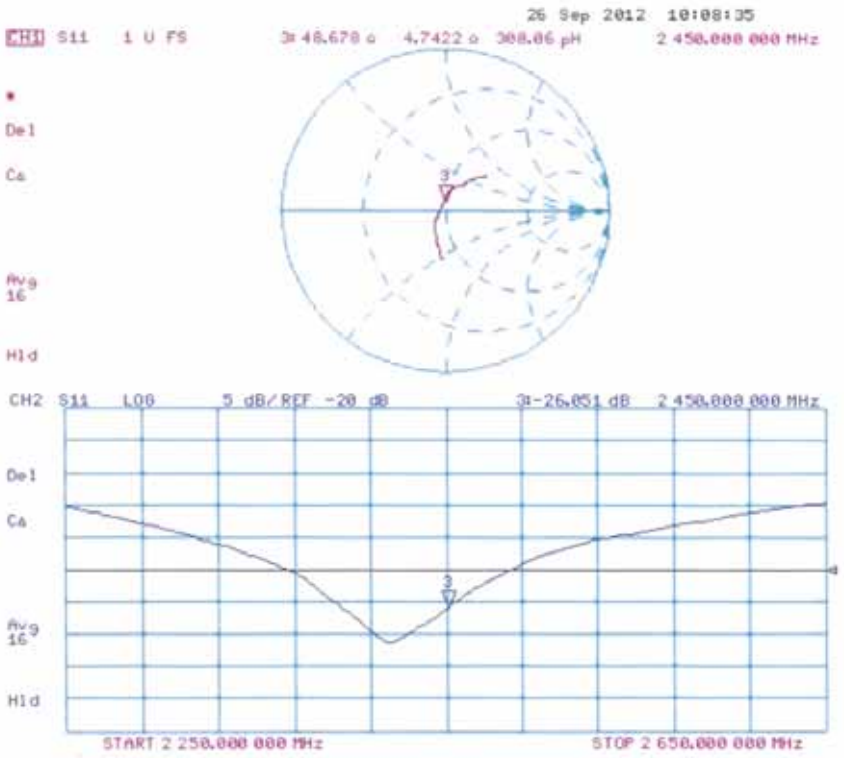
- Probe: ES3DV3 - SN3205; ConvF(4.26, 4.26, 4.26); Calibrated: 30.12.2011;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 27.06.2012
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.2(969); SEMCAD X 14.6.6(6824)

**Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:**
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.205 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 27.024 mW/g
**SAR(1 g) = 13 mW/g; SAR(10 g) = 6.06 mW/g**
Maximum value of SAR (measured) = 17.0 W/kg




0 dB = 17.0 W/kg = 24.61 dB W/kg

Impedance Measurement Plot for Body TSL



# ANNEX F: DAE calibration report

In Collaboration with
s p e a g
CALIBRATION LABORATORY

Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: Info@emcite.com Http://www.emcite.com

CNAS L0442

Client : NCCT Certificate No: J13-2-3532

# CALIBRATION CERTIFICATE

| | |
|---|---|
| Object | DAE4 - SN: 893 |
| Calibration Procedure(s) | TMC-OS-E-01-198<br>Calibration Procedure for the Data Acquisition Electronics (DAEx) |
| Calibration date: | December 25, 2013 |

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 |
|---|---|---|---|
| Documenting Process Calibrator 753 | 1971018 | 01-July-13 (TMC, No:JW13-049) | July-14 |

| | Name | Function | Signature |
|---|---|---|---|
| Calibrated by: | Yu Zongying | SAR Test Engineer | |
| Reviewed by: | Qi Dianyuan | SAR Project Leader | |
| Approved by: | Lu Bingsong | Deputy Director of the laboratory | |

Issued: December 26, 2013

In Collaboration with
speag
CALIBRATION LABORATORY

Add: No.52 Huayuanbei Road, Haidian District, Beijing, 100191, China
Tel: +86-10-62304633-2079 Fax: +86-10-62304633-2504
E-mail: Info@emcite.com Http://www.emcite.com

**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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## 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 | 406.166 ± 0.15% (k=2) | 406.033 ± 0.15% (k=2) | 405.072 ± 0.15% (k=2) |
| Low Range | 4.00811 ± 0.7% (k=2) | 4.02146 ± 0.7% (k=2) | 3.98338 ± 0.7% (k=2) |

## Connector Angle

| | |
|---|---|
| **Connector Angle** to be used in DASY system | 176° ± 1 ° |

# ANNEX G: Dipole Annual Check Result

Per KDB 450824 Dipole SAR Validation Verification, GCCT Lab has adopted 3 years calibration intervals. On annual basis, every measurement dipole has been evaluated and is in compliance with the following criteria:

1. There is no physical damage on the dipole;
2. System validation with specific dipole is within 10% of calibrated value;
3. Return-loss is within 20% of calibrated measurement;
4. Impedance is within 5Ω of calibrated measurement.

Date: June 17, 2014

| Dipole | Liquid Type | Return-loss（dB） | | | Impedance | | |
|---|---|---|---|---|---|---|---|
| | | Target Value | Measured Value | Deviation（%） | Target Value | Measured Value | Deviation（Ω） |
| D835V2 | Head | -30 | -30.72 | 2.40 | 51.6Ω-2.8jΩ | 50.5Ω-3.4 jΩ | 1.1Ω+0.6jΩ |
| | Body | -24.2 | -25.27 | 4.42 | 47.1Ω-5.2jΩ | 46.9Ω-3.5 jΩ | 0.2Ω-1.7jΩ |
| D1900V2 | Head | -25.5 | -22.78 | -10.67 | 52.7Ω+4.7jΩ | 49.9Ω+2.2jΩ | 2.8Ω+2.5jΩ |
| | Body | -24.4 | -26.94 | 10.41 | 48.5Ω+5.8jΩ | 47.3Ω+3.7jΩ | 1.2Ω+2.1jΩ |
| D2450V2 | Head | -29.7 | -28.5 | -4.04 | 51.4Ω+3.0jΩ | 50.6Ω+1.8jΩ | 0.8Ω+1.2jΩ |
| | Body | -26.1 | -25.4 | -2.68 | 48.7Ω+4.7jΩ | 49.2+3.2jΩ | -0.5Ω+1.5Ω |

* END OF REPORT *