SGS-CSTC Standards Technical Services Co., Ltd.

No. 1 Workshop, M-10, Middle section, Science & Technology Park,
Nanshan District, Shenzhen, Guangdong, China 518057
Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

FCC SAR TEST REPORT

Application No:	SZEM1411006372HR
Applicant:	BAK USA LLC
Manufacturer/ Factory:	BAK USA LLC
Product Name:	Tablet PC
Model No.(EUT):	BAK BOARD 3G
Trade Mark:	BAK
FCC ID:	2AEY7-BBG001
Standards:	FCC 47CFR §2.1093
Date of Receipt:	2014-11-25
Date of Test:	2015-02-02 to 2015-02-06
Date of Issue:	2015-08-03
Test Result :	**PASS ***

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.

Authorized Signature:

Jack Zhang
EMC Laboratory Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report.
If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.
The report must not be used by the client to claim product certification, approval, or endorsement by NVLAP, NIST, or any agency of the federal government. All test results in this report can be traceable to National or International Standards.

REVISION HISTORY

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
00		*2015-08-03*		Original

Test Summary

Test Summary					
Frequency Band	**Test position**	**Test mode**	**Max Report SAR (W/kg)**	**SAR limit (W/kg)**	**Verdict**
GSM850	Head	GSM	0.28	1.6	PASS
	Body Support	GPRS 4TS	0.53	1.6	PASS
GSM1900	Head	GSM	0.284	1.6	PASS
	Body Support	GPRS 4TS	0.761	1.6	PASS
WCDMA850	Head	RMC	0.198	1.6	PASS
	Body Support	RMC	0.241	1.6	PASS
WCDMA1900	Head	RMC	0.272	1.6	PASS
	Body Support	RMC	0.504	1.6	PASS
WI-FI (2.4GHz)	Head	802.11b	0.158	1.6	PASS
	Body Support	802.11b	0.996	1.6	PASS
Maximum Simultaneous SAR			1.04	1.6	PASS

Approved & Released by

Evan Mi

Evan Mi

SAR Supervisor

Tested by

Eason Wang

Eason Wang

SAR Engineer

Contents

1 General Information

1.1 Details of Client

Applicant	BAK USA LLC
Address:	425 Michigan Avenue, Buffalo, New York 14203, USA
Manufacturer	BAK USA LLC
Address:	425 Michigan Avenue, Buffalo, New York 14203, USA
Factory	BAK USA LLC
Address:	425 Michigan Avenue, Buffalo, New York 14203, USA

1.2 Test Location

Company:	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab
Address:	No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China
Post code:	518057
Telephone:	+86 (0) 755 2601 2053
Fax:	+86 (0) 755 2671 0594
E-mail:	ee.shenzhen@sgs.com

1.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **CNAS (No. CNAS L2929)**

  CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

- **VCCI**

  The 10m Semi-anechoic chamber and Shielded Room (7.5m x 4.0m x 3.0m) of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-823, R-4188, T-1153 and C-2383 respectively.

- **FCC – Registration No.: 556682**

  SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration No.: 556682.

- **Industry Canada (IC)**

  Two 3m Semi-anechoic chambers of SGS-CSTC Standards Technical Services Co., Ltd. have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1 & 4620C-2.

1.4 General Description of EUT

Product Name:	Tablet PC		
Model No.(EUT):	BAK BOARD 3G		
Trade Mark:	BAK		
Product Phase:	production unit		
Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
FCC ID:	2AEY7-BBG001		
IMEI:	359778028114530		
Hardware Version:	E2115_V1.1		
Software Version:	Android 4.0		
Antenna Type:	Inner Antenna		
Device Operating Configurations :			
Modulation Mode:	GSM:GMSK WCDMA: QPSK WIFI:IEEE for 802.11b: DSSS(CCK,DQPSK,DBPSK) IEEE for 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE for 802.11n(T20 and T40) : OFDM (64QAM, 16QAM, QPSK,BPSK)		
Device Class:	B		
GPRS Multi-slots Class:	12	EGPRS Multi-slots Class:	12
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	GSM850	824-849	869-894
	GSM1900	1850-1910	1930-1990
	WCDMA850	824-849	869-894
	WCDMA1900	1850-1910	1930-1990
	WIFI	2412-2462	2412-2462
	Bluetooth	2402-2480	2402-2480
Battery Information	Model: JZ 0372136P		
	Charging Voltage :DC 5V ⎓ 2000mAh		
	Rated capacity :3600mAh		
	Battery Type :Rechargeable Li-ion Battery		

1.5 Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
IEEE Std C95.1 – 1991	IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE 1528-2003	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB941225 D01 v03	3G SAR Procedures
KDB447498 D01 v05r02	General RF Exposure Guidance
KDB 648474 D04	Handset SAR v01r02
KDB 616217 D04 v01r01	SAR Evaluation Considerations for Laptop, Notebook, Netbook and Tablet Computers
KDB447498 D03 v01	Supplement C Cross-Reference
KDB 248227 D01 v02r01	SAR Guidance For IEEE 802.11(Wi-Fi) Transmitters
KDB 865664 D01 v01r03	SAR Measurement 100 MHz to 6 GHz
KDB 865664 D02 v01r01	RF Exposure Reporting

1.6 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain)	**1.60 mW/g**	8.00 mW/g
Spatial Average SAR** (Whole Body)	0.08 mW/g	0.40 mW/g
Spatial Peak SAR*** (Hands/Feet/Ankle/Wrist)	4.00 mW/g	20.00 mW/g

Notes:
* The Spatial Peak value of the SAR averaged over any 1 gram of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time
** The Spatial Average value of the SAR averaged over the whole body.
*** The Spatial Peak value of the SAR averaged over any 10 grams of tissue (defined as a tissue volume in the shape of a cube) and over the appropriate averaging time.
Uncontrolled Environments are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.
Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation.)

2 SAR Measurements System Configuration

2.1 The SAR Measurement System

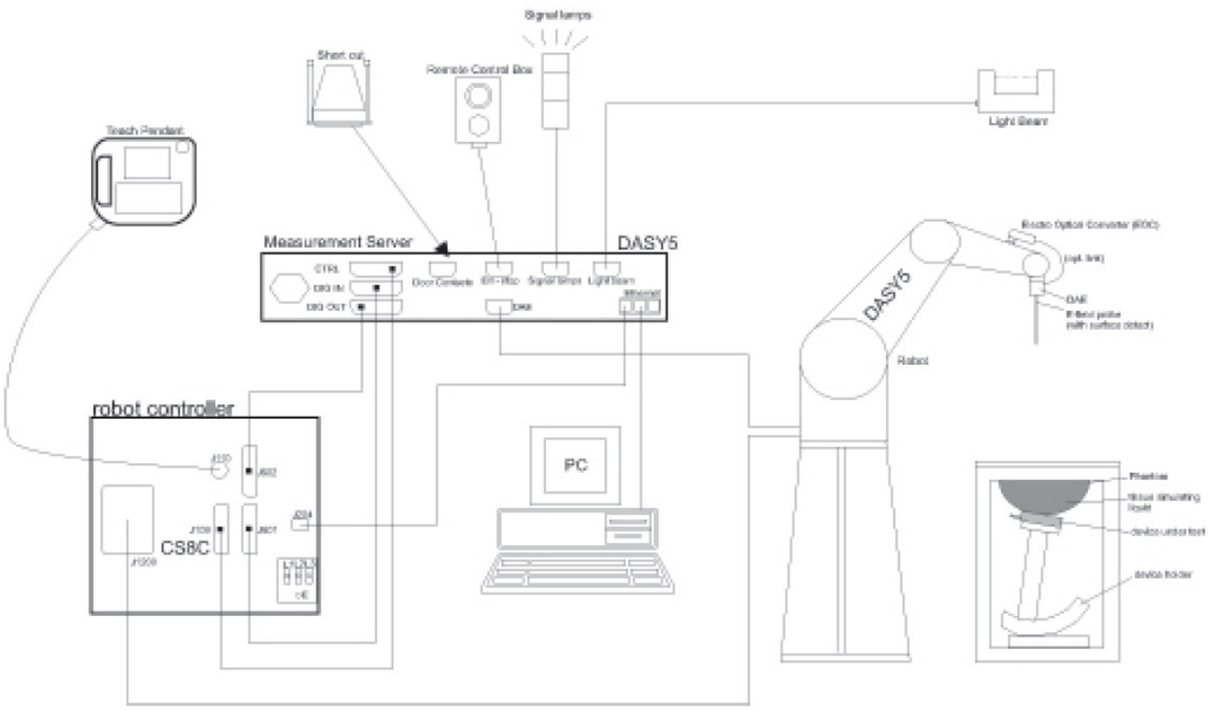
This SAR Measurement System uses a Computer-controlled 3-D stepper motor system (SPEAG DASY5 professional system). A E-field probe is used to determine the internal electric fields. The SAR can be obtained from the equation SAR= σ (|Ei|2)/ ρ where σ and ρ are the conductivity and mass density of the tissue-Simulate.

The DASY5 system for performing compliance tests consists of the following items:
A standard high precision 6-axis robot (Stabile RX family) with controller, teach pendant and software .An arm extension for accommodation the data acquisition electronics (DAE).

A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

A data acquisition electronics (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to DAE and for the analog signal from the optical surface detection. The EOC is connected to the measurement server.



F-1. SAR Measurement System Configuration

- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- A probe alignment unit which improves the (absolute) accuracy of the probe positioning.
- A computer operating Windows 7.
- DASY5 software.
- Remote control with teach pendant and additional circuitry for robot safety such as warning lamps, etc.
- The SAM twin phantom enabling testing left-hand, right-hand and Body Worn usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- Validation dipole kits allowing to validating the proper functioning of the system.

2.2 Isotropic E-field Probe EX3DV4

	Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	ISO/IEC 17025 calibration service available.
Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

2.3 Data Acquisition Electronics (DAE)

Model	DAE3,DAE4
Construction	Signal amplifier, multiplexer, A/D converter and control logic. Serial optical link for communication with DASY4/5 embedded system (fully remote controlled). Two step probe touch detector for mechanical surface detection and emergency robot stop.
Measurement Range	-100 to +300 mV (16 bit resolution and two range settings: 4mV,400mV)
Input Offset Voltage	< 5μV (with auto zero)
Input Bias Current	< 50 f A
Dimensions	60 x 60 x 68 mm

2.4 SAM Twin Phantom

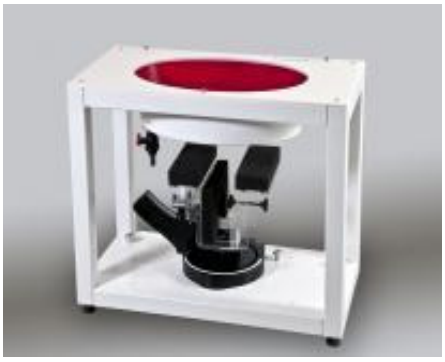
Material	Vinylester, glass fiber reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
Shell Thickness	2 ± 0.2 mm (6 ± 0.2 mm at ear point)
Dimensions (incl. Wooden Support)	Length: 1000 mm Width: 500 mm Height: adjustable feet
Filling Volume	approx. 25 liters
Wooden Support	SPEAG standard phantom table

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528 and IEC 62209-1. It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by teaching three points with the robot.

Twin SAM V5.0 has the same shell geometry and is manufactured from the same material as Twin SAM V4.0, but has reinforced top structure.

2.5 ELI Phantom

Material	Vinylester, glass fiber reinforced (VE-GF)
Liquid Compatibility	Compatible with all SPEAG tissue simulating liquids (incl. DGBE type)
Shell Thickness	2.0 ± 0.2 mm (bottom plate)
Dimensions	Major axis: 600 mm Minor axis: 400 mm
Filling Volume	approx. 30 liters
Wooden Support	SPEAG standard phantom table



Phantom for compliance testing of handheld and body-mounted wireless devices in the frequency range of 30 MHz to 6 GHz. ELI is fully compatible with the IEC 62209-2 standard and all known tissue simulating liquids. ELI has been optimized regarding its performance and can be integrated into our standard phantom tables. A cover prevents evaporation of the liquid. Reference markings on the phantom allow installation of the complete setup, including all predefined phantom positions and measurement grids, by teaching three points. The phantom is compatible with all SPEAG dosimetric probes and dipoles.

ELI V5.0 has the same shell geometry and is manufactured from the same material as ELI4, but has reinforced top structure.

2.6 Device Holder for Transmitters

F-2. **Device Holder for Transmitters**

- The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centres for both scales are the ear reference point (ERP). Thus the device needs no repositioning when changing the angles.
- The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity ε=3 and loss tangent δ=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.

2.7 Measurement procedure

2.7.1 Scanning procedure

Step 1: Power reference measurement

The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over the complete procedure.

Step 2: *Area scan*

The SAR distribution at the exposed side of the head was measured at a distance of 4mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 15mm*15mm or 12mm*12mm or 10mm*10mm.Based on the area scan data, the area of the maximum absorption was determined by spline interpolation.

Step 3: *Zoom scan*

Around this point, a volume of 30mm*30mm*30mm (fine resolution volume scan, zoom scan) was assessed by measuring 5x5x7 points (≤2GHz)and 7x7x7 points (≥2GHz). On this basis of this data set, the spatial peak SAR value was evaluated with the following procedure:

The data at the surface was extrapolated, since the centre of the dipoles is 2.0mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.2mm. (This can be variable. Refer to the probe specification).The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip. The maximum interpolated value was searched with a straight-forward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) were computed using the 3D-Spline interpolation algorithm. The volume was integrated with the trapezoidal algorithm. One thousand points were interpolated to calculate the average. All neighbouring volumes were evaluated until no neighboring volume with a higher average value was found.

The area and zoom scan resolutions specified in the table below must be applied to the SAR measurements Probe boundary effect error compensation is required for measurements with the probe tip closer than half a probe tip diameter to the phantom surface. Both the probe tip diameter and sensor offset distance must satisfy measurement protocols; to ensure probe boundary effect errors are minimized and the higher fields closest to the phantom surface can be correctly measured and extrapolated to the phantom surface for computing 1-g SAR. Tolerances of the post-processing algorithms must be verified by the test laboratory for the scan resolutions used in the SAR measurements, according to the reference distribution functions specified in IEEE Std. 1528-2003.

<table>
<tr><th colspan="3"></th><th>≤ 3 GHz</th><th>> 3 GHz</th></tr>
<tr><td colspan="3">Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface</td><td>5 ± 1 mm</td><td>½·δ·ln(2) ± 0.5 mm</td></tr>
<tr><td colspan="3">Maximum probe angle from probe axis to phantom surface normal at the measurement location</td><td>30° ± 1°</td><td>20° ± 1°</td></tr>
<tr><td colspan="3" rowspan="2">Maximum area scan spatial resolution: Δx_{Area}, Δy_{Area}</td><td>≤ 2 GHz: ≤ 15 mm
2 – 3 GHz: ≤ 12 mm</td><td>3 – 4 GHz: ≤ 12 mm
4 – 6 GHz: ≤ 10 mm</td></tr>
<tr><td colspan="2">When the x or y dimension of the test device, in the measurement plane orientation, is smaller than the above, the measurement resolution must be ≤ the corresponding x or y dimension of the test device with at least one measurement point on the test device.</td></tr>
<tr><td colspan="3">Maximum zoom scan spatial resolution: Δx_{Zoom}, Δy_{Zoom}</td><td>≤ 2 GHz: ≤ 8 mm
2 – 3 GHz: ≤ 5 mm*</td><td>3 – 4 GHz: ≤ 5 mm*
4 – 6 GHz: ≤ 4 mm*</td></tr>
<tr><td rowspan="3">Maximum zoom scan spatial resolution, normal to phantom surface</td><td colspan="2">uniform grid: $\Delta z_{Zoom}(n)$</td><td>≤ 5 mm</td><td>3 – 4 GHz: ≤ 4 mm
4 – 5 GHz: ≤ 3 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td rowspan="2">graded grid</td><td>$\Delta z_{Zoom}(1)$: between 1st two points closest to phantom surface</td><td>≤ 4 mm</td><td>3 – 4 GHz: ≤ 3 mm
4 – 5 GHz: ≤ 2.5 mm
5 – 6 GHz: ≤ 2 mm</td></tr>
<tr><td>$\Delta z_{Zoom}(n>1)$: between subsequent points</td><td colspan="2">≤ 1.5·$\Delta z_{Zoom}(n-1)$</td></tr>
<tr><td>Minimum zoom scan volume</td><td colspan="2">x, y, z</td><td>≥ 30 mm</td><td>3 – 4 GHz: ≥ 28 mm
4 – 5 GHz: ≥ 25 mm
5 – 6 GHz: ≥ 22 mm</td></tr>
<tr><td colspan="5">Note: δ is the penetration depth of a plane-wave at normal incidence to the tissue medium; see draft standard IEEE P1528-2011 for details.
* When zoom scan is required and the <u>reported</u> SAR from the area scan based 1-g SAR estimation procedures of KDB 447498 is ≤ 1.4 W/kg, ≤ 8 mm, ≤ 7 mm and ≤ 5 mm zoom scan resolution may be applied, respectively, for 2 GHz to 3 GHz, 3 GHz to 4 GHz and 4 GHz to 6 GHz.</td></tr>
</table>

Step 4: Power reference measurement (drift)

The Power Drift Measurement job measures the field at the same location as the most recent power reference measurement job within the same procedure, and with the same settings. The indicated drift is mainly the variation of the DUT's output power and should vary max. ± 5 %

2.7.2 Data Storage

The DASY software stores the acquired data from the data acquisition electronics as raw data (in microvolt readings from the probe sensors), together with all necessary software parameters for the data evaluation (probe calibration data, liquid parameters and device frequency and modulation data) in measurement files with the extension ".DAE3". The software evaluates the desired unit and format for output each time the data is visualized or exported. This allows verification of the complete software setup even after the measurement and allows correction of incorrect parameter settings. For example, if a measurement has been performed with a wrong crest factor parameter in the device setup, the parameter can be corrected afterwards and the data can be re-evaluated. The measured data can be visualized or exported in different units or formats, depending on the selected probe type ([V/m], [A/m], [°C], [m W/g], [m W/cm²], [dBrel], etc.). Some of these units are not available in certain situations or show meaningless results, e.g., a SAR output in a lossless media will always be zero. Raw data can also be exported to perform the evaluation with other software packages.

2.7.3 Data Evaluation by SEMCAD

The SEMCAD 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 ε
- Density ρ

These parameters must be set correctly in the software. They can be found in the component documents or they can be imported into the software from the configuration files issued for the DASY components. In the direct measuring mode of the multimeter option, the parameters of the actual system setup are used. In the scan visualization and export modes, the parameters stored in the corresponding document files are used.

The first step of the evaluation is a linearization of the filtered input signal to account for the compression characteristics of the detector diode. The compensation depends on the input signal, the diode type and the DC-transmission factor from the diode to the evaluation electronics.

If the exciting field is pulsed, the crest factor of the signal must be known to correctly compensate for peak power.

The formula for each channel can be given as:

$$V_i = U_i + U_i^2 \cdot cf / dcp_i$$

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 (DASY parameter)

dcp i = diode compression point (DASY parameter)

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

E-field probes:

$$E_i = (V_i / Norm_i \cdot ConvF)^{1/2}$$

H-field probes:

$$H_i = (V_i)^{1/2} \cdot (a_{i0} + a_{i1} f + a_{i2} f^2) / f$$

With Vi = compensated signal of channel i (i = x, y, z)
Normi = sensor sensitivity of channel I (i = x, y, z)
[mV/(V/m)2] for E-field Probes
ConvF = sensitivity enhancement in solution
aij = sensor sensitivity factors for H-field probes
f = carrier frequency [GHz]
Ei = electric field strength of channel i in V/m

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

The RSS value of the field components gives the total field strength (Hermitian magnitude):

$$E_{tot} = (E_x^2 + E_Y^2 + E_z^2)^{1/2}$$

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

$$SAR = (Etot^2 \cdot \sigma) / (\varepsilon \cdot 1000)$$

with SAR = local specific absorption rate in mW/g

Etot = total field strength in V/m

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

ε= equivalent tissue density in g/cm3

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

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

with Ppwe = equivalent power density of a plane wave in mW/cm2
Etot = total electric field strength in V/m

Htot = total magnetic field strength in A/m

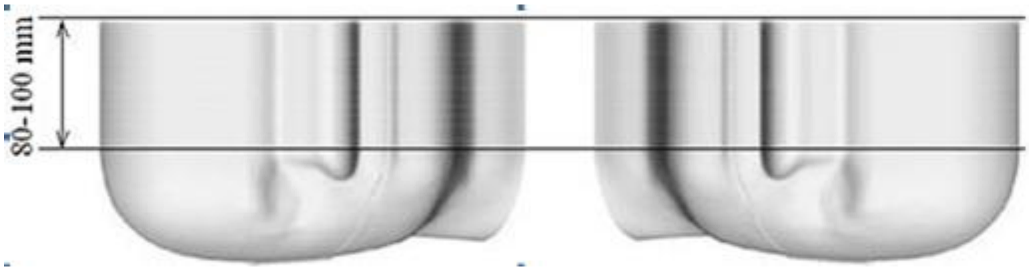
3 Description of Test Position

3.1 The Head Test Position

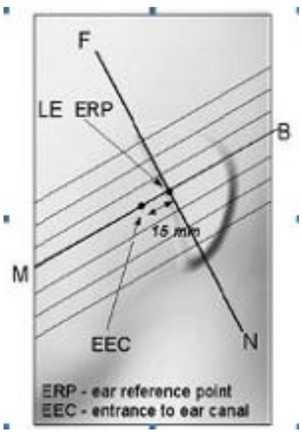
3.1.1 SAM Phantom Shape

F-3. Front, back, and side views of SAM (model for the phantom shell). Full-head model is for illustration purposes only-procedures in this recommended practice are intended primarily for the phantom setup.

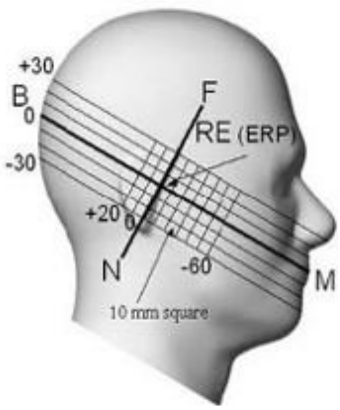
Note: The centre strip including the nose region has a different thickness tolerance.



F-4. Sagittally bisected phantom with extended perimeter (shown placed on its side as used for SAR measurements)

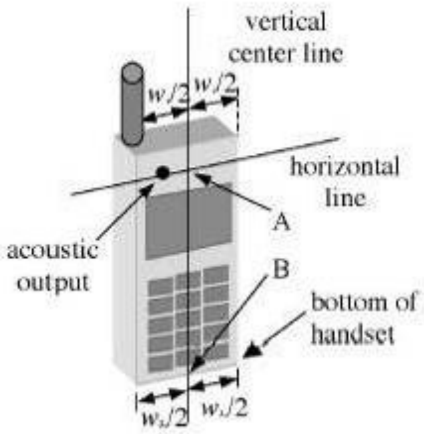


F-5. Close-up side view of phantom, showing the ear region, N-F and B-M lines, and seven cross-sectional plane locations

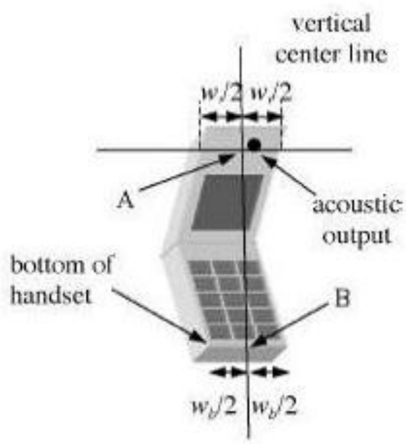


F-6. Side view of the phantom showing relevant markings and seven cross-sectional plane locations

3.1.2 EUT constructions



F-7. Handset vertical and horizontal reference lines-“fixed case”



F-8. Handset vertical and horizontal reference lines-“clam-shell case”

3.1.3 Definition of the “cheek” position

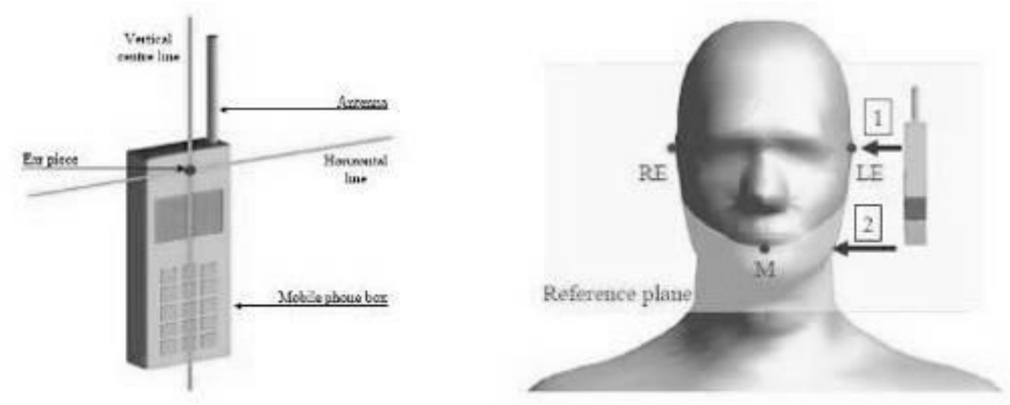
a) Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagittal plane of the phantom ("initial position"). While maintaining the device in this plane, align the vertical centre line with the reference plane containing the three ear and mouth reference points (M, RE and LE) and align the centre of the ear piece with the line RE-LE.

b) Translate the mobile phone box towards the phantom with the ear piece aligned with the line LE-RE until telephone touches the ear. While maintaining the device in the reference plane and maintaining the phone contact with the ear, move the bottom of the box until any point on the front side is in contact with the cheek of the phantom or until contact with the ear is lost.

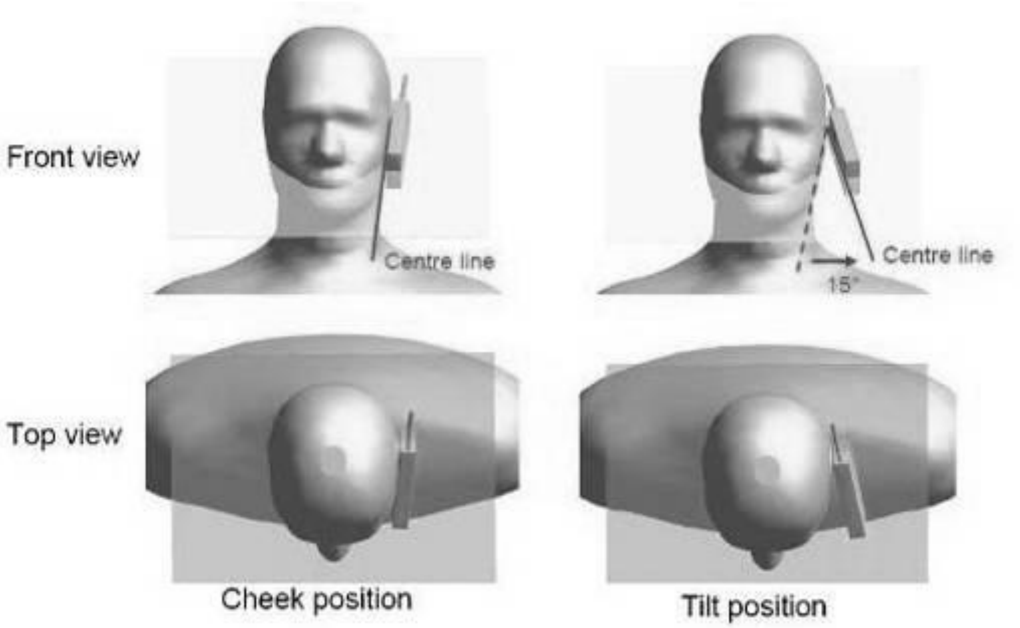
3.1.4 Definition of the “tilted” position

a) Position the device in the “cheek” position described above;

b) While maintaining the device in the reference plane described above and pivoting against the ear, move it outward away from the mouth by an angle of 15 degrees or until contact with the ear is lost.



F-9. **Definition of the reference lines and points, on the phone and on the phantom and initial position**



F-10. **“Cheek” and “tilt” positions of the mobile phone on the left side**

3.2 The Body Test Position

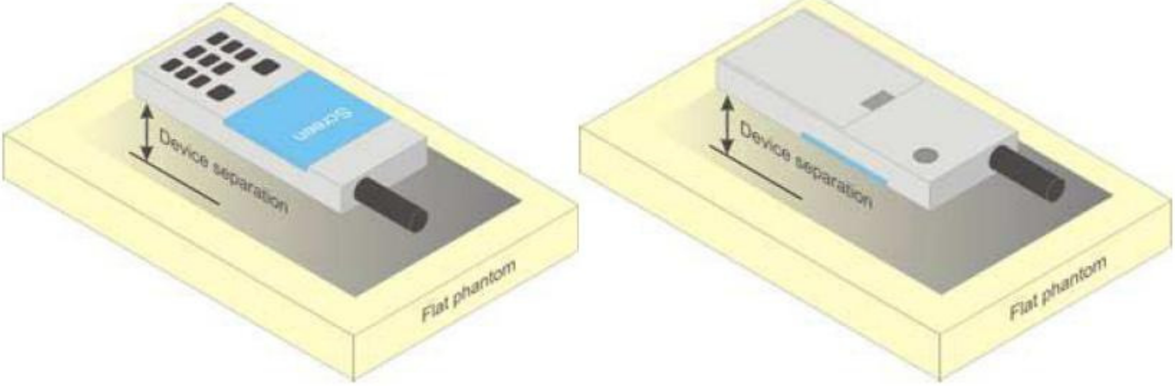
3.2.1 Body-worn accessory exposure conditions

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations.

Body-worn operating configurations are tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in a normal use configuration. Per FCC KDB Publication 648474 D04, Body-worn accessory exposure is typically related to voice mode operations when handsets are carried in body-worn accessories. The body-worn accessory procedures in FCC KDB Publication 447498 D01 should be used to test for body-worn accessory SAR compliance, without a headset connected to it. This enables the test results for such configuration to be compatible with that required for hotspot mode when the body-worn accessory test separation distance is greater than or equal to that required for hotspot mode, when applicable. When the reported SAR for a body-worn accessory, measured without a headset connected to the handset, is > 1.2 W/kg, the highest reported SAR configuration for that wireless mode and frequency band should be repeated for that body-worn accessory with a headset attached to the handset.

Accessories for Body-worn operation configurations are divided into two categories: those that do not contain metallic components and those that do contain metallic components. When multiple accessories that do not contain metallic components are supplied with the device, the device is tested with only the accessory that dictates the closest spacing to the body. Then multiple accessories that contain metallic components are tested with the device with each accessory. If multiple accessories share an identical metallic component (i.e. the same metallic belt-clip used with different holsters with no other metallic components) only the accessory that dictates the closest spacing to the body is tested.

Body-worn accessories may not always be supplied or available as options for some devices intended to be authorized for body-worn use. In this case, a test configuration with a separation distance between the back of the device and the flat phantom is used. Test position spacing was documented. Transmitters that are designed to operate in front of a person's face, as in push-to-talk configurations, are tested for SAR compliance with the front of the device positioned to face the flat phantom in head fluid. For devices that are carried next to the body such as a shoulder, waist or chest-worn transmitters, SAR compliance is tested with the accessories, including headsets and microphones, attached to the device and positioned against a flat phantom in a normal use configuration.



F-11. **Test positions for body-worn devices**

3.2.2 Extremity exposure conditions

Devices that are designed or intended for use on extremities or mainly operated in extremity only exposure conditions; i.e., hands, wrists, feet and ankles, may require extremity SAR evaluation. When the device also operates in close proximity to the user's body, SAR compliance for the body is also required.

When extremity SAR testing is required, a flat phantom must be used if the exposure condition is more conservative than the actual use conditions; otherwise, a KDB inquiry is required to determine the phantom and test requirements.

3.2.3 Wireless Router exposure conditions

Some battery-operated handsets have the capability to transmit and receive user data through simultaneous transmission of WIFI simultaneously with a separate licensed transmitter. The FCC has provided guidance in FCC KDB Publication 941225 D06 where SAR test considerations for handsets(L x W ≥ 9 cm x 5 cm) are based on a composite test separation distance of 10 mm from the front, back and edges of the device containing transmitting antennas within 2.5 cm of their edges, determined from general mixed use conditions for this type of devices. For devices with form factors smaller than 9 cm x 5 cm, a test separation distance of 5 mm is required.

4 SAR System Verification Procedure

4.1 Tissue Simulate Liquid

4.1.1 Recipes for Tissue Simulate Liquid

The bellowing tables give the recipes for tissue simulating liquids to be used in different frequency bands：

Ingredients (% by weight)	Frequency (MHz)							
	450		835		1800-2000		2450	
Tissue Type	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**	**Head**	**Body**
Water	38.56	51.16	40.30	50.75	55.24	70.17	55.00	68.53
Salt (NaCl)	3.95	1.49	1.38	0.94	0.31	0.39	0.2	0.1
Sucrose	56.32	46.78	57.90	48.21	0	0	0	0
HEC	0.98	0.52	0.24	0	0	0	0	0
Bactericide	0.19	0.05	0.18	0.10	0	0	0	0
Tween	0	0	0	0	44.45	29.44	44.80	31.37

Salt: 99^+% Pure Sodium Chloride

Sucrose: 98^+% Pure Sucrose

Water: De-ionized, 16 $M\Omega^+$ resistivity

HEC: Hydroxyethyl Cellulose

Tween: Polyoxyethylene (20) sorbitan monolaurate

Table 1： Recipe of Tissue Simulate Liquid

4.1.2 Measurement for Tissue Simulate Liquid

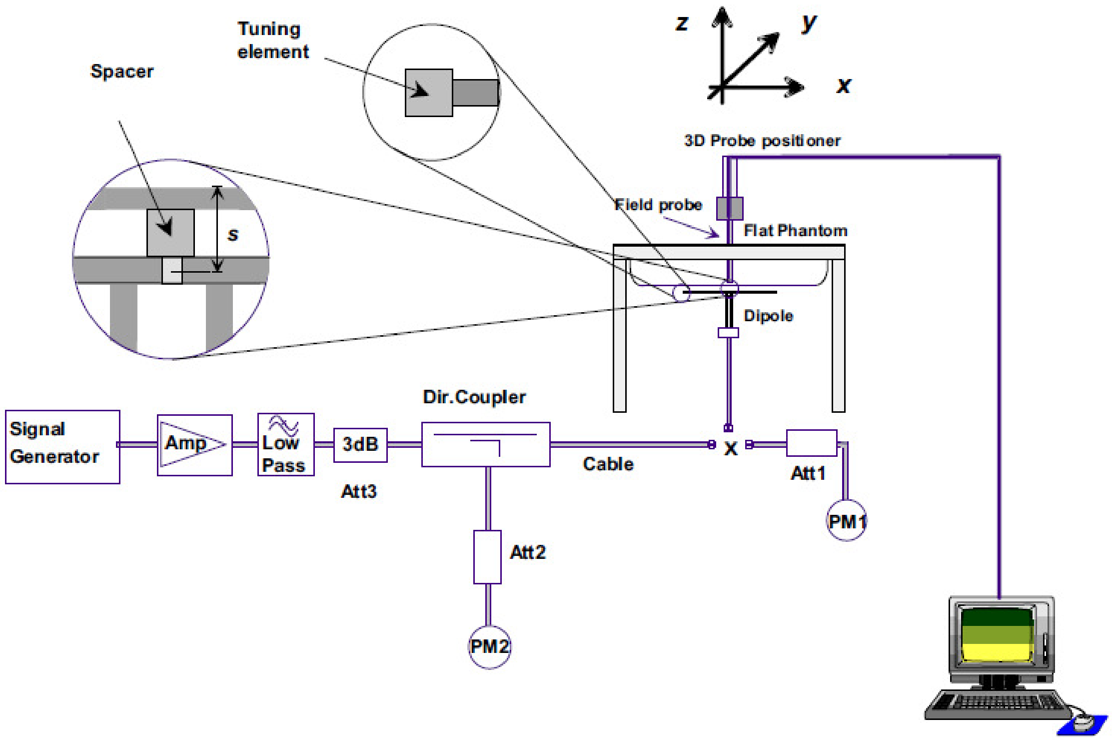
The dielectric properties for this Tissue Simulate Liquids were measured by using the Agilent Model 85070E Dielectric Probe in conjunction with Agilent E5071C Network Analyzer (300 KHz-8500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in Table 1.For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was 22±1°C.

Measurement for Tissue Simulate Liquid							
Tissue Type	Measured Frequency （MHz）	Target Tissue (±5%)		Measured Tissue		Liquid Temp.	Measured Date
		ε_r	σ(S/m)	ε_r	σ(S/m)	(℃)	
835 Head	835	41.5 (39.43~43.58)	0.9 0.86~0.95)	41.047	0.926	21.3	2015/2/2
835 Body	835	55.2 (52.44~57.96)	0.97 0.92~1.02)	55.255	0.975	21.5	2015/2/3
1900 Head	1900	40 (38.00~42.00)	1.4 1.33~1.47)	40.66	1.446	21.3	2015/2/4
1900 Body	1900	53.3 (50.64~55.97)	1.52 (1.44~1.60)	52.205	1.523	21.7	2015/2/5
2450 Head	2450	39.20 (37.24~41.15)	1.80 (1.71~1.88)	38.574	1.778	21.7	2015/2/6
2450 Body	2450	52.70 (50.07~55.34)	1.95 (1.85~2.05)	51.68	1.951	21.7	2015/2/6

Table 2： Measurement result of Tissue electric parameters

4.2 SAR System Validation

The microwave circuit arrangement for system verification is sketched in F-12. The daily system accuracy verification occurs within the flat section of the SAM phantom. A SAR measurement was performed to see if the measured SAR was within +/- 10% from the target SAR values. The tests were conducted on the same days as the measurement of the EUT. The obtained results from the system accuracy verification are displayed in the table 5 (A power level of 250mw was input to the dipole antenna). During the tests, the ambient temperature of the laboratory was in the range 22±1°C, the relative humidity was in the range 60% and the liquid depth above the ear reference points was above 15 cm in all the cases. It is seen that the system is operating within its specification, as the results are within acceptable tolerance of the reference values.



F-12. the microwave circuit arrangement used for SAR system verification

4.2.1 Justification for Extended SAR Dipole Calibrations

1) Referring to KDB865664 D01 requirements for dipole calibration, instead of the typical annual calibration recommended by measurement standards, longer calibration intervals of up to three years may be considered when it is demonstrated that the SAR target, impedance and return loss of a dipole have remain stable according to the following requirements. Each measured dipole is expected to evaluate with the following criteria at least on annual interval in Appendix C.

a) There is no physical damage on the dipole;

b) System check with specific dipole is within 10% of calibrated value;

c) Return-loss is within 10% of calibrated measurement;

d) Impedance is within 5Ω from the previous measurement.

2) Network analyzer probe calibration against air, distilled water and a shorting block performed before measuring liquid parameters.

4.2.2 Summary System Validation Result(s)

SAR System Validation Result(s)							
Validation Kit		Measured SAR 250mW	Measured SAR (normalized to 1w)	Target SAR (normalized to 1w) (±10%)	Liquid Temp. (℃)	Measured Date
		1g (W/kg)	1g (W/kg)	1-g(W/kg)		
D835V2	Head	2.35	9.4	9.44 (8.496~10.384)	21.3	2015/2/2
	Body	2.29	9.16	9.64 (8.676`10.604)	21.5	2015/2/3
D1900V2	Head	10.1	40.4	39.3 (35.37~43.23)	21.3	2015/2/4
	Body	10.8	43.2	40.5 (36.45~44.55)	21.7	2015/2/5
D2450V2	Head	12.6	50.4	52.4 (47.16~57.64)	2.15	2015/2/6
	Body	11.8	47.2	51.3 (46.17~56.43)	2.15	2015/2/6

Table 3： SAR System Validation Result

4.2.3 Detailed System Validation Results

Please see the Appendix A

5 Test results and Measurement Data

5.1 Operation Configurations

5.1.1 GSM Test Configuration

SAR tests for GSM 850 and GSM 1900, a communication link is set up with a base station by air link. Using CMU200 the power lever is set to “5”and “0” in SAR of GSM 850 and GSM 1900. The tests in the band of GSM 850 and GSM 1900 are performed in the mode of GPRS/EGPRS function. Since 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 timeslot is 5. The EGPRS class is 12 for this EUT, it has at most 4 timeslots in uplink, and at most 4 timeslots in downlink, the maximum total timeslot is 5.

When SAR tests for EGPRS mode is necessary, GMSK modulation should be used to minimize SAR measurement error due to higher peak-to-average power (PAR) ratios inherent in 8-PSK.

5.1.2 WCDMA Test Configuration

1) RMC

As the SAR body tests for WCDMA Band II and Band V, we established the radio link through call processing. The maximum output power were verified on high, middle and low channels for each test band according to 3GPP TS 34.121 with the following configuration:

⑴ 12.2kbps RMC, 64,144,384 kbps RMC with TPC set to“all 1”.

⑵Test loop Mode 1.

For the output power, the configurations for the DPCCH and DPDCH1 are as followed (EUT do not support the DPDCH2-n)

	ChannelBit Rate (kbps)	Channel SymbolRate (ksps)	Spreading Factor	Spreading Code Number	Bits/Slot
DPCCH	15	15	256	0	10
DPDCH1	15	15	256	64	10
	30	30	128	32	20
	60	60	64	16	40
	120	120	32	8	80
	240	240	16	4	160
	480	480	8	2	320
	960	960	4	1	640
DPDCHn	960	960	4	1, 2, 3	640

SAR for body exposure configurations is measured using the 12.2 kbps RMC with the TPC bits configured to all “1s”. SAR for other spreading codes and multiple DPDCHn, when supported by the EUT, are not required when the maximum average outputs of each RF channel, for each spreading code and DPDCHn configuration, are less than ¼ dB higher than those measured in 12.2 kbps RMC.

2) 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 outputs of each RF channel with HSDPA active is at ¼ 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 12.2 kbps RMC without HSDPA.

HSDPA should be configured according to UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HAPRQ processes, minimum inter-TTI interval, transport block sizes and RV coding sequence are defined by the H-set. To maintain a consistent test configuration and stable transmission condition, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4ms with a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. The c and d gain factors for DPCCH and DPDCH were set according to the values in the below table, hs for HS-DPCCH is set automatically to the correct value when ΔACK, ΔNACK, ΔCQI = 8. The variation of the βc /βd ratio causes a power reduction at sub-tests 2 - 4.

Sub-test	βc	Bd	βd(SF)	βc/βd	βhs	CM(dB)	MPR (dB)
1	2/15	15/15	64	2/15	4/15	0.0	0
2	12/15(3)	15/15(3)	64	12/15(3)	24/15	1.0	0
3	15/15	8/15	64	15/8	30/15	1.5	0.5
4	15/15	4/15	64	15/4	30/15	1.5	0.5

Note1: △ACK, △NACK and △CQI= 8 Ahs = βhs/βc=30/15 βhs=30/15*βc

Note2:For the HS-DPCCH power mask requirement test in clause 5.2C,5.7A,and the Error Vector Magnitude(EVM) with HS-DPCCH test in clause 5.13.1.A,and HSDPA EVM with phase discontinuity in clause 5.13.1AA, △ACK and △NACK= 8 (Ahs=30/15) with βhs=30/15*βc,and △CQI= 7 (Ahs=24/15) with βhs=24/15*βc.

Note3: CM=1 forβc/βd =12/15, βhs/βc=24/15. For all other combinations of DPDCH, DPCCH and HS-DPCCH the MPR is based on the relative CM difference. This is applicable for only UEs that support HSDPA in release 6 and later releases.

The measurements were performed with a Fixed Reference Channel (FRC) and H-Set 1 QPSK.

Parameter	Value
Nominal average inf. bit rate	534 kbit/s
Inter-TTI Distance	3 TTI‟s
Number of HARQ Processes	2 Processes
Information Bit Payload	3202 Bits
MAC-d PDU size	336 Bits
Number Code Blocks	1 Block
Binary Channel Bits Per TTI	4800 Bits
Total Available SMLs in UE	19200 SMLs
Number of SMLs per HARQ Process	9600 SMLs
Coding Rate	0.67
Number of Physical Channel Codes	5

Table 4： settings of required H-Set 1 QPSK acc. to 3GPP 34.121

HS-DSCH Category	Maximum HS-DSCH Codes Received	Minimum Inter-TTI Interval	MaximumH S-DSCH Transport BlockBits/HS-DSCH TTI	Total Soft Channel Bits
1	5	3	7298	19200
2	5	3	7298	28800
3	5	2	7298	28800
4	5	2	7298	38400
5	5	1	7298	57600
6	5	1	7298	67200
7	10	1	14411	115200
8	10	1	14411	134400
9	15	1	25251	172800
10	15	1	27952	172800
11	5	2	3630	14400
12	5	1	3630	28800
13	15	1	34800	259200
14	15	1	42196	259200
15	15	1	23370	345600
16	15	1	27952	345600

Table 5： HSDPA UE category

3) HSUPA

Body SAR is also measured for HSUPA when the maximum average outputs of each RF channel with HSUPA active is at ¼ dB higher than that measured without HSUPA using 12.2kbps RMC or the maximum SAR 12.2kbps RMC is above 75% of the SAR limit. Body SAR for HSUPA is measured with E-DCH Sub-test 5, using H-set 1 and QPSK for FRC and 12.2kbps 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 HSUPA.

Due to inner loop power control requirements in HSUPA, a commercial communication test set should be used for the output power and SAR tests. The 12.2 kbps RMC, FRC H-set 1 and E-DCH configurations for HSUPA should be configured according to the values indicated below as well as other applicable procedures described in the „WCDMA Handset" and „Release 5 HSUPA Data Device" sections of 3G device.

Sub - test	c	d	d (SF)	c/ d	hs(1)	ec	ed	ec (SF)	ed (code)	CM (2) (dB)	MPR (dB)	AG(4) Index	E-TFCI
1	11/15(3)	15/15(3)	64	11/15(3)	22/15	209/225	1039/225	4	1	1.0	0.0	20	75
2	6/15	15/15	64	6/15	12/15	12/15	94/75	4	1	3.0	2.0	12	67
3	15/15	9/15	64	15/9	30/15	30/15	ed1:47/15 ed2:47/15	4	2	2.0	1.0	15	92
4	2/15	15/15	64	2/15	4/15	2/15	56/75	4	1	3.0	2.0	17	71
5	15/15(4)	15/15(4)	64	15/15(4)	30/15	24/15	134/15	4	1	1.0	0.0	21	81

Note 1: Δ ACK, Δ NACK and Δ CQI = 8 Ahs = hs/ c = 30/15 hs = 30/15 * c
Note 2: CM = 1 for c/ d = 12/15, hs/ c = 24/15. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference
Note 3 : For subtest 1 the c/ d ratio of 11/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to c = 10/15 and d = 15/15
Note 4 : For subtest 5 the c/ d ratio of 15/15 for the TFC during the measurement period (TF1, TF0) is achieved by setting the signalled gain factors for the reference TFC (TF1,TF1) to c = 14/15 and d = 15/15
Note 5 : Testing UE using E-DPDCH Physical Layer category 1 Sub-test 3 is not required according to TS 25.306 Table 5.1g
Note 6: ed can not be set directly; it is set by Absolute Grant Value.

Table 6： Subtests for UMTS Release 6 HSUPA

UE E-DCH Category	Maximum E-DCH Codes Transmitted	Number of HARQ Processes	E-DCH TTI(ms)	Minimum Speading Factor	Maximum E-DCH Transport Block Bits	Max Rate (Mbps)
1	1	4	10	4	7110	0.7296
2	2	8	2	4	2798	1.4592
	2	4	10	4	14484	
3	2	4	10	4	14484	1.4592
4	2	8	2	2	5772	2.9185
	2	4	10	2	20000	2.00
5	2	4	10	2	20000	2.00
6 (No DPDCH)	4	8	10	2SF2&2SF4	11484	5.76
	4	4	2		20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF4	22996	?
	4	4	10		20000	?

NOTE: When 4 codes are transmitted in parallel, two codes shall be transmitted with SF2 and two with SF4.UE categories 1 to 6 support QPSK only.UE category 7 supports QPSK.(TS25.306-7.3.0).

Table 7： HSUPA UE category

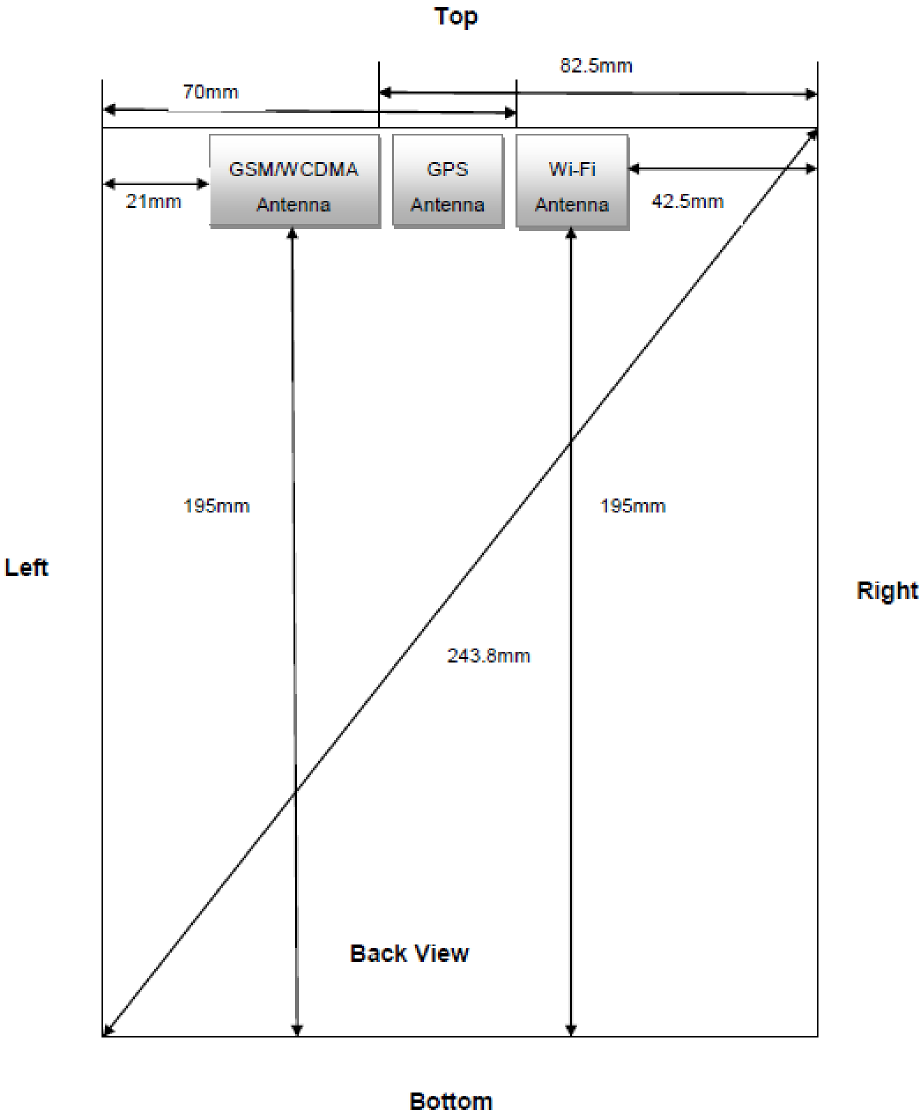
5.1.3 WiFi Test Configuration

For the 802.11b/g/n SAR tests, a communication link is set up with the test mode software for Wi-Fi 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 rate.802.11b/g/n operating modes are tested independently according to the service requirements in each frequency band. 802.11b/g/n modes are tested on channel 1, 6, 11; however if output power reduction is necessary for channels 1 and/or 11 to meet restricted band requirements the highest output channel 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.

Mode	GHz	Channel	Turbo Channel	"Default Test Channels"			
				§15.247		UNII	
				802.11b	802.11g		
802.11 b/g	2.412	1#		√	∇		
	2.437	6	6	√	∇		
	2.462	11#		√	∇		

5.1.4 DUT Antenna Locations



5.1.5 EUT side for SAR Testing

Per KDB 447498 D01v05r02, According to the distance between WCDAM/GSM&WIFI antennas and the sides of the EUT we can draw the conclusion that:

EUT Sides for SAR Testing						
Mode	Front	Back	Left	Right	Top	Bottom
GSM	No	Yes	Yes	No	Yes	No
WCDMA	No	Yes	Yes	No	Yes	No
Wi-Fi（2.4GHz）	No	Yes	No	No	Yes	No

Table 8： EUT Sides for SAR Testing

5.1.6 Stand-alone SAR test evaluation

Unless specifically required by the published RF exposure KDB procedures, standalone 1-g head or body and 10-g extremity SAR evaluation for general population exposure conditions, by measurement or numerical simulation, is not required when the corresponding SAR Test Exclusion Threshold condition is satisfied. These test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

Freq. Band	Frequency (GHz)	Position	Average Power		Test Separation (mm)	Calculate Value	Exclusion Threshold	Exclusion (Y/N)
			dBm	mW				
WiFi	2462	Head	15.5	35.48	0	11.1	3.0	N
WiFi	2462	Back	15.5	35.48	0	11.1	3.0	N
WiFi	2462	Left	15.5	35.48	69.9	\	294.54mW	Y
WiFi	2462	Right	15.5	35.48	42.5	1.3	3.0	Y
WiFi	2462	Bottom	15.5	35.48	195	\	1545.54mW	Y
WiFi	2462	Top	15.5	35.48	0	11.1	3.0	N
Bluetooth	2480	Head	5.0	3.16	0	1.0	3.0	Y
Bluetooth	2480	Body	5.0	3.16	0	1.0	3.0	Y

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

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

• f(GHz) is the RF channel transmit frequency in GHz

• Power and distance are rounded to the nearest mW and mm before calculation

• The result is rounded to one decimal place for comparison

At 100 MHz to 6 GHz and for test separation distances > 50 mm, the SAR test exclusion threshold is determined according to the following :

a) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·(f(MHz)/150)] mW, at 100 MHz to 1500 MHz

b) [Power allowed at numeric threshold for 50 mm in step 1) + (test separation distance - 50 mm)·10] mW at > 1500 MHz and ≤ 6 GHz

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

5.2 Measurement of RF conducted Power

GSM 850								
Burst Output Power(dBm)					Division Factors	Frame-Average Output Power(dBm)		
Channel		128	190	251		128	190	251
GSM(GMSK)	GSM	32.14	32.03	32.21	-9.19	22.95	22.84	23.02
GPRS(GMSK)	1 TX Slot	32.16	32.01	32.24	-9.19	22.97	22.82	23.05
	2 TX Slots	31.16	31.06	31.3	-6.18	24.98	24.88	25.12
	3 TX Slots	29.47	29.34	29.58	-4.42	25.05	24.92	25.16
	4 TX Slots	28.61	28.49	28.7	-3.17	**25.44**	**25.32**	**25.53**
EGPRS(GMSK)	1 TX Slot	32.08	31.99	32.19	-9.19	22.89	22.8	23
	2 TX Slots	31.2	31.09	31.3	-6.18	25.02	24.91	25.12
	3 TX Slots	29.47	29.33	29.57	-4.42	25.05	24.91	25.15
	4 TX Slots	28.63	28.52	28.65	-3.17	25.46	25.35	25.48

GSM 1900								
Burst Output Power(dBm)					Division Factors	Frame-Average Output Power(dBm)		
Channel		512	661	810		512	661	810
GSM(GMSK)	GSM	28.86	28.96	28.91	-9.19	19.67	19.77	19.72
GPRS(GMSK)	1 TX Slot	28.87	28.92	28.9	-9.19	19.68	19.73	19.71
	2 TX Slots	27.92	28.02	28.04	-6.18	21.74	21.84	21.86
	3 TX Slots	26.19	26.35	26.38	-4.42	21.77	21.93	21.96
	4 TX Slots	25.41	25.52	25.57	-3.17	**22.24**	**22.35**	**22.4**
EGPRS(GMSK)	1 TX Slot	28.87	28.9	28.92	-9.19	19.68	19.71	19.73
	2 TX Slots	27.9	28.02	28.04	-6.18	21.72	21.84	21.86
	3 TX Slots	26.18	26.34	26.39	-4.42	21.76	21.92	21.97
	4 TX Slots	25.36	25.49	25.57	-3.17	22.19	22.32	22.4

Table 9： Conducted Power Of GSM

Note:

1) CMU200 measures GSM peak and average output power for active timeslots. For SAR the time based average power is relevant. The difference in between depends on the duty cycle of the TDMA signal:

No. of timeslots	1	2	3	4
Duty Cycle	1:8.3	1:4.15	1:2.77	1:2.075
Time based avg. power compared to slotted avg. power	-9.19	-6.18	-4.42	-3.17

2) The frame-averaged power is linearly proportion to the slot number configured and it is linearly scaled the maximum burst-averaged power based on time slots. The calculated method is shown as below:

Frame-averaged power = 10 x log (Burst-averaged power mW x Slot used / 8

3) Per KDB 447498 D01v05r02,When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used

5.2.1 Conducted Power Of WCDMA

WCDMA850					WCDMA1900				
Average Conducted Power(dBm)					Average Conducted Power(dBm)				
Channel		4132	4182	4233	Channel		9262	9400	9538
WCDMA	12.2kbps RMC	**23.46**	23.33	23.22	WCDMA	12.2kbps RMC	21.35	21.51	21.2
	64kbps RMC	23.4	23.34	23.23		64kbps RMC	21.34	21.46	21.36
	144kbps RMC	23.35	23.46	23.32		144kbps RMC	21.36	21.48	21.23
	384kbps RMC	23.32	23.41	23.35		384kbps RMC	21.4	**21.52**	21.21
HSDPA	Subtest 1	22.51	22.34	22.31	HSDPA	Subtest 1	20.4	20.61	20.31
	Subtest 2	22.49	22.33	22.32		Subtest 2	20.42	20.6	20.3
	Subtest 3	22.05	21.91	21.87		Subtest 3	19.99	20.17	19.86
	Subtest 4	22.04	21.9	21.83		Subtest 4	19.97	20.17	19.84
HSUPA	Subtest 1	20.5	20.32	20.22	HSUPA	Subtest 1	18.49	18.37	18.48
	Subtest 2	20.48	20.34	20.24		Subtest 2	18.49	18.37	18.46
	Subtest 3	21.49	21.33	21.23		Subtest 3	19.5	19.37	19.46
	Subtest 4	20	19.85	19.75		Subtest 4	17.96	17.9	17.92
	Subtest 5	21.96	21.8	21.67		Subtest 5	20.31	20.32	20.35

Table 10：Conducted Power Of WCDMA

1) Per KDB 447498 D01v05r02, when the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.

5.2.2 Conducted Power Of WIFI

Wi-Fi	Average Power (dBm) for Data Rates (Mbps)								
2450MHz	Channel	1	2	5.5	11	/	/	/	/
802.11b	1	15.21	14.92	13.02	12.79	/	/	/	/
	6	15.26	15.14	13.28	13.09	/	/	/	/
	11	**15.49**	15.37	13.46	13.27	/	/	/	/
802.11g	Channel	6	9	12	18	24	36	48	54
	1	12.86	12.73	12.62	12.52	12.26	12.15	11.88	11.8
	6	13.02	12.94	12.85	12.77	12.51	12.4	12.14	12.08
	11	13.41	13.27	13.14	13.05	12.78	12.65	12.38	12.31
802.11n HT20	Channel	6.5	13	19.5	26	39	52	58.5	65
	1	10.97	10.88	10.75	10.71	10.64	10.21	10.17	9.87
	6	11.1	10.95	10.83	10.78	10.72	10.35	10.29	10.13
	11	11.35	11.23	11.12	11.05	10.98	10.62	10.55	10.39
802.11n HT40	Channel	13.5	27	40.5	54	81	108	121.5	135
	3	10.89	10.8	10.66	10.61	10.55	10.14	10.09	9.78
	6	11.02	10.87	10.72	10.68	10.61	10.24	10.2	10.02
	9	11.26	11.08	10.95	10.92	10.85	10.49	10.46	10.28

Table 11：Conducted Power Of WIFI

BT		Average Conducted Power(dBm)		
Band	Channel	GFSK	π/4DQPSK	8DPSK
BT	0	4.33	3.49	3.51
	39	4.56	3.83	3.87
	78	**4.66**	3.88	3.89
BLE	0	-3.37	/	/
	19	-2.89	/	/
	39	**-2.94**	/	/

Table 12：Conducted Power Of BT

Note：

1) Indicates default channels per KDB Publication 248227 D01v01r02. When the adjacent channels are higher in power then the default channels, these "required channels" are considered for SAR testing instead of the default channels.

2) For each frequency band, testing at higher data rates and higher order modulations is not required when the maximum average output power for each of these configurations is less than 0.25dB higher than those measured at the lowest data rate.

3) 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.

5.3 Measurement of SAR Data

5.3.1 SAR Result Of GSM850

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.	SAR limit (W/kg)
Head Test data with SIM1											
Left touch cheek	GSM	190/836.6	1:8.3	0.101	-0.18	32.03	32.05	1.005	0.101	21.3	1.6
Left tilted 15 degree	GSM	190/836.6	1:8.3	0.086	0.11	32.03	32.05	1.005	0.086	21.3	1.6
Right touch cheek	GSM	190/836.6	1:8.3	0.209	0.11	32.03	32.05	1.005	0.210	21.3	1.6
Right tilted 15 degree	GSM	190/836.6	1:8.3	0.274	0.12	32.03	32.05	1.005	0.275	21.3	1.6
Head Test data with SIM2											
Right tilted 15 degree	GSM	190/836.6	1:8.3	0.279	0.07	32.03	32.05	1.005	**0.280**	21.3	1.6
Body Test data with SIM1(Separate 0mm)											
Back side	GPRS 4TS	190/836.6	1:2.075	0.471	0.01	28.49	29	1.125	**0.530**	21.5	1.6
Left side	GPRS 4TS	190/836.6	1:2.075	0.0455	-0.08	28.49	29	1.125	0.051	21.5	1.6
Top side	GPRS 4TS	190/836.6	1:2.075	0.178	-0.19	28.49	29	1.125	0.200	21.5	1.6
Body Test data with SIM2 (Separate 0mm)											
Back side	GPRS 4TS	190/836.6	1:2.075	0.465	0.11	28.49	29	1.125	0.523	21.5	1.6

Table 13：SAR of GSM850 for Head and Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

3) SAR Measurement Variability Results [GSM 850(GSM/GPRS/EGPRS)]

5.3.2 SAR Result Of GSM1900

Test position	Test mode	Test Ch. /Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.	SAR limit (W/kg)
Head Test data with SIM1											
Left touch cheek	GSM	661/1880	1:8.3	0.0528	0.09	28.96	29	1.009	0.053	2015/2/4	1.6
Left tilted 15 degree	GSM	661/1880	1:8.3	0.0887	0.06	28.96	29	1.009	0.090	2015/2/4	1.6
Right touch cheek	GSM	661/1880	1:8.3	0.281	0.06	28.96	29	1.009	**0.284**	2015/2/4	1.6
Right tilted 15 degree	GSM	661/1880	1:8.3	0.208	0.04	28.96	29	1.009	0.210	2015/2/4	1.6
Head Test data with SIM2											
Right touch cheek	GSM	661/1880	1:8.3	0.274	0.16	28.96	29	1.009	0.277	2015/2/4	1.6
Body Test data with SIM1(Separate 0mm)											
Back side	GPRS 4TS	661/1880	1:2.075	0.681	0.12	25.52	26	1.117	**0.761**	2015/2/5	1.6
Left side	GPRS 4TS	661/1880	1:2.075	0.0827	0.15	25.52	26	1.117	0.092	2015/2/5	1.6
Top side	GPRS 4TS	661/1880	1:2.075	0.665	-0.18	25.52	26	1.117	0.743	2015/2/5	1.6
Body Test data with SIM2(Separate 0mm)											
Back side	GPRS 4TS	661/1880	1:2.075	0.674	0.01	25.52	26	1.117	0.753	2015/2/5	1.6

Table 14：SAR of GSM1900 for Head and Body.

Note:

1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B

2) Per FCC KDB Publication 447498 D01, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

5.3.3 SAR Result Of WCDMA850

Test position	Test mode	Test Ch./ Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.	SAR limit (W/kg)
Head Test data with SIM1											
Left touch cheek	RMC	4182/836.6	1:1	0.0759	0.04	23.33	23.5	1.040	0.079	2015/2/2	1.6
Left tilted 15 degree	RMC	4182/836.6	1:1	0.0706	0.19	23.33	23.5	1.040	0.073	2015/2/2	1.6
Right touch cheek	RMC	4182/836.6	1:1	0.129	-0.12	23.33	23.5	1.040	0.134	2015/2/2	1.6
Right tilted 15 degree	RMC	4182/836.6	1:1	0.19	0.15	23.33	23.5	1.040	**0.198**	2015/2/2	1.6
Head Test data with SIM2											
Right tilted 15 degree	RMC	4182/836.6	1:1	0.19	0	23.33	23.5	1.040	0.198	2015/2/2	1.6
Body Test data with SIM1(Separate 0mm)											
Back side	RMC	4182/836.6	1:1	0.232	-0.09	23.33	23.5	1.040	**0.241**	2015/2/3	1.6
Left side	RMC	4182/836.6	1:1	0.0035	-0.01	23.33	23.5	1.040	0.004	2015/2/3	1.6
Top side	RMC	4182/836.6	1:1	0.161	0.17	23.33	23.5	1.040	0.167	2015/2/3	1.6
Body Test data with SIM2(Separate 0mm)											
Back side	RMC	4182/836.6	1:1	0.225	-0.12	23.33	23.5	1.040	0.234	2015/2/3	1.6

Table 15： SAR of WCDMA850 for Head and Body.

Note:

1) Test positions of EUT(the distance between the EUT and the phantom is 0mm for all sides)
2) The maximum Scaled SAR value is marked in bold. Graph Results refer to Appendix B
3) Per FCC KDB Publication 447498 D01v05r02, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

5.3.4 SAR Result Of WCDMA1900

Test position	Test mode	Test Ch./ Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.	SAR limit (W/kg)
Head Test data with SIM1											
Left touch cheek	RMC	9400/1880	1:1	0.089	-0.15	21.51	22	1.119	0.100	2015/2/4	1.6
Left tilted 15 degree	RMC	9400/1880	1:1	0.061	0.09	21.51	22	1.119	0.068	2015/2/4	1.6
Right touch cheek	RMC	9400/1880	1:1	0.243	0.16	21.51	22	1.119	**0.272**	2015/2/4	1.6
Right tilted 15 degree	RMC	9400/1880	1:1	0.22	0.07	21.51	22	1.119	0.246	2015/2/4	1.6
Head Test data with SIM2											
Right touch cheek	RMC	9400/1880	1:1	0.235	-0.12	21.51	22	1.119	0.263	2015/2/4	1.6
Body Test data with SIM1(Separate 0mm)											
Back side	RMC	9400/1880	1:1	0.45	0.06	21.51	22	1.119	**0.504**	2015/2/5	1.6
Left side	RMC	9400/1880	1:1	0.0747	-0.18	21.51	22	1.119	0.084	2015/2/5	1.6
Top side	RMC	9400/1880	1:1	0.419	-0.11	21.51	22	1.119	0.469	2015/2/5	1.6
Body Test data with SIM2(Separate 0mm)											
Back side	RMC	9400/1880	1:1	0.441	-0.15	21.51	22	1.119	0.494	2015/2/5	1.6

Table 16：SAR of WCDMA1900 for Head and Body.

Note:

1) Test positions of EUT(the distance between the EUT and the phantom is 0mm for all sides)
2) The maximum Scaled SAR value is marked in bold. Graph Results refer to Appendix B
3) Per FCC KDB Publication 447498 D01v05r02, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).

5.3.5 SAR Result Of WIFI

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	Power drift (dB)	Conducted power (dBm)	Tune up Limit (dBm)	Scaled factor	Scaled SAR (W/kg)	Liquid Temp.	SAR limit (W/kg)
Head Test data											
Left touch cheek	802.11b	11/2462	1:1	0.158	0.08	15.49	15.5	1.002	**0.158**	21.7	1.6
Left tilted 15 degree	802.11b	11/2462	1:1	0.107	-0.04	15.49	15.5	1.002	0.107	21.7	1.6
Right touch cheek	802.11b	11/2462	1:1	0.117	-0.05	15.49	15.5	1.002	0.117	21.7	1.6
Right tilted 15 degree	802.11b	11/2462	1:1	0.0819	0.15	15.49	15.5	1.002	0.082	21.7	1.6
Body Test data											
Back side	802.11b	11/2462	1:1	0.994	-0.05	15.49	15.5	1.002	**0.996**	21.7	1.6
Back side	802.11b	1/2412	1:1	0.589	0.14	15.21	15.5	1.069	0.630	21.7	1.6
Back side	802.11b	6/2437	1:1	0.888	-0.1	15.26	15.5	1.057	0.938	21.7	1.6
Top side	802.11b	11/2462	1:1	0.116	0.12	15.49	15.5	1.002	0.116	21.7	1.6
Back side-Repeat	802.11b	11/2462	1:1	0.96	-0.09	15.49	15.5	1.002	0.962	21.7	1.6

Table 17：SAR of WIFI for Body

Note:

1) Test positions of EUT(the distance between the EUT and the phantom is 0mm for all sides)
2) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B
3) Per FCC KDB Publication 447498 D01v05r02, if the reported (scaled) SAR measured at the middle channel or highest output power channel for each test configuration is ≤ 0.8 W/kg then testing at the other channels is not required for such test configuration(s).
4) Each channel was tested at the lowest data rate.

5.4 Multiple Transmitter Evaluation

5.4.1 Simultaneous SAR SAR test evaluation

1) Simultaneous Transmission

NO.	Simultaneous Transmission Configuration	Head	Body Support
1	GSM(Voice) + WiFi	Yes	Yes
2	GSM(Voice) + BT	Yes	Yes
3	WCDMA(Voice) + WiFi	Yes	Yes
4	WCDMA(Voice) + BT	Yes	Yes
5	GPRS / EDGE(Data) + WiFi	-	Yes
6	GPRS / EDGE(Data) + BT	-	Yes
7	WCDMA(Data) + WiFi	-	Yes
8	WCDMA(Data) + BT	-	Yes
9	BT+WIFI (They share the same antenna and cannot transmit at the same time by design.)	No	No

5.4.2 Estimated SAR

When the standalone SAR test exclusion is applied to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to the following to determine simultaneous transmission SAR test exclusion:

• (max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)]·[$\sqrt{f(GHz)}/x$] W/kg for test separation distances ≤ 50 mm;

Where x = 7.5 for 1-g SAR, and x = 18.75 for 10-g SAR.

• 0.4 W/kg for 1-g SAR and 1.0 W/kg for 10-g SAR, when the test separation distances is > 50 mm.

Estimated SAR Result

Freq. Band	Frequency (MHz)	Test Position	Test Separation (mm)	Estimated 1g SAR (W/kg)
Bluetooth	2480	Head	5	0.133
Bluetooth	2480	Body	5	0.133

2) Simultaneous Transmission SAR Summation Scenario for head

WWAN Band	Exposure position	①MAX.WWAN SAR(W/kg)	②MAX.WLAN SAR(W/kg)	③MAX.BT SAR(W/kg)	Summed SAR①+②	Summed SAR①+③	Case NO.
GSM850	Left Touch	0.101	0.158	0.133	0.260	0.234	NO
	Left Tilt	0.086	0.107	0.133	0.194	0.219	NO
	Right Touch	0.210	0.117	0.133	0.327	0.343	NO
	Right Tilt	0.280	0.082	0.133	0.362	0.413	NO
GSM1900	Left Touch	0.053	0.158	0.133	0.212	0.186	NO
	Left Tilt	0.090	0.107	0.133	0.197	0.223	NO
	Right Touch	0.284	0.117	0.133	0.401	0.417	NO
	Right Tilt	0.210	0.082	0.133	0.292	0.343	NO
WCDMA 850	Left Touch	0.079	0.158	0.133	0.237	0.212	NO
	Left Tilt	0.073	0.107	0.133	0.181	0.206	NO
	Right Touch	0.134	0.117	0.133	0.251	0.267	NO
	Right Tilt	0.198	0.082	0.133	0.280	0.331	NO
WCDMA 1900	Left Touch	0.100	0.158	0.133	0.258	0.233	NO
	Left Tilt	0.068	0.107	0.133	0.176	0.201	NO
	Right Touch	0.272	0.117	0.133	0.389	0.405	NO
	Right Tilt	0.246	0.082	0.133	0.328	0.379	NO

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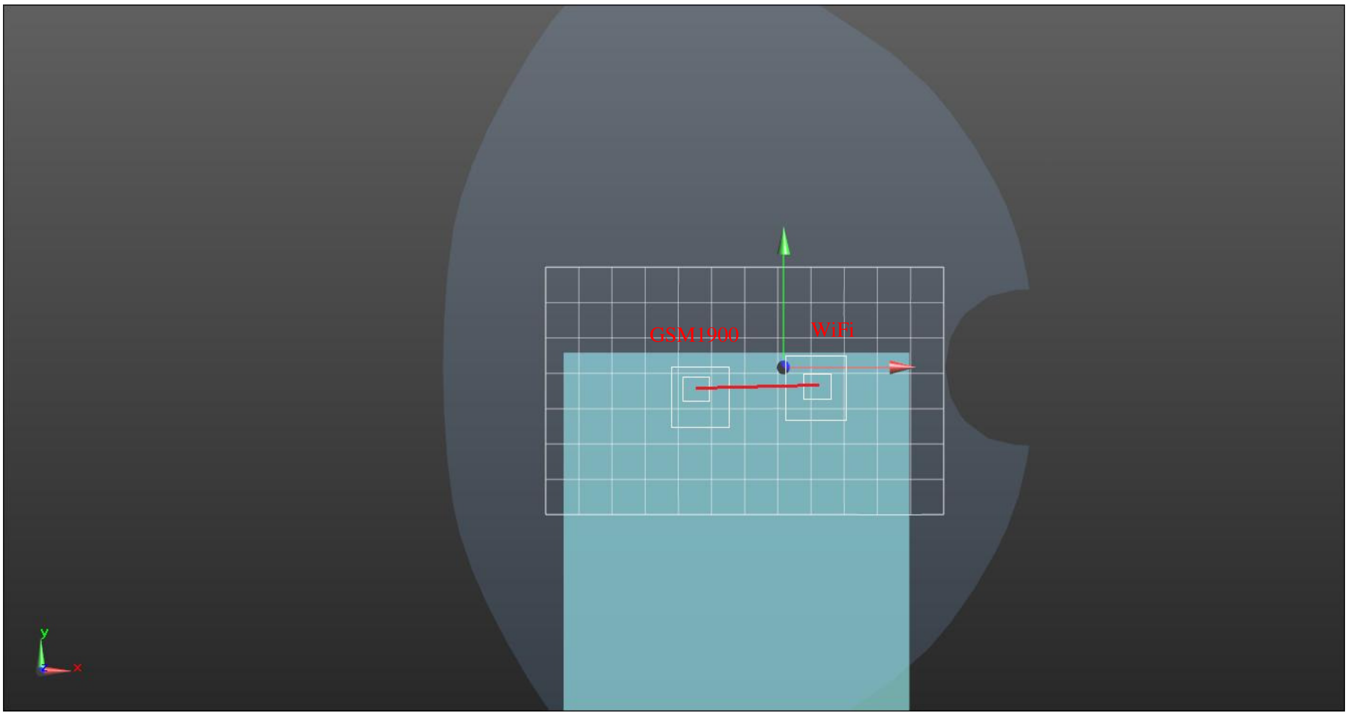
3) Simultaneous Transmission SAR Summation Scenario for body worn

WWAN Band	Exposure position	①MAX.WWAN SAR(W/kg)	②MAX.WLAN SAR(W/kg)	③MAX.BT SAR(W/kg)	Summed SAR①+②	Summed SAR①+③	Case NO.
GSM 850	Back	0.530	0.996	0.133	1.526	0.663	NO
	Left	0.051	N/A	0.133	N/A	0.184	NO
	Top	0.200	0.116	0.133	0.316	0.333	NO
GSM 1900	Back	0.761	0.996	0.133	**1.757**	0.894	1#
	Left	0.092	N/A	0.133	N/A	0.225	NO
	Top	0.743	0.116	0.133	0.859	0.876	NO
WCDMA 850	Back	0.241	0.996	0.133	1.237	0.374	NO
	Left	0.004	N/A	0.133	N/A	0.137	NO
	Top	0.167	0.116	0.133	0.283	0.300	NO
WCDMA 1900	Back	0.504	0.996	0.133	1.500	0.637	NO
	Left	0.084	N/A	0.133	N/A	0.217	NO
	Top	0.469	0.116	0.133	0.585	0.602	NO

4) SPLSR Evaluation

Case NO.	Band	SAR (W/kg)	SAR peak location（mm）			Distance（mm）	Summed SAR(W/kg)	SPLSR	Simultaneous SAR
1#			X	Y	Z				
Back	GSM1900	0.761	9.533	-6.5	-205	39.14	**1.757**	0.06	Required
	WIFI	0.996	-29.58	-6.794	-203.6				



Note：

1) When the sum of SAR is larger than the limit, SAR test exclusion is determined by the SAR to peak location separation ratio. The simultaneous transmitting antennas in each operating mode and exposure condition combination must be considered one pair at a time to determine the SAR to peak location separation ratio to qualify for test exclusion. The ratio is determined by $(SAR_1 + SAR_2)^{1.5}/R_i$, rounded to two decimal digits, and must be ≤ 0.04 for all antenna pairs in the configuration to qualify for 1-g SAR test exclusion.

5) Volume Scan Post-processing Procedures

Case NO.	Exposure Position	Band	SPLSR	Volume Scan (W/kg)	Aggregate SAR (W/kg)	Limit (W/kg)
1#	Back	GSM1900	0.06	0.723	1.040	1.6
		WiFi		1.020		

Note:
1) The antennas in all antenna pairs that do not qualify for simultaneous transmission SAR test exclusion must be tested for SAR compliance according to the enlarged zoom scan and volume scan post-processing procedures in KDB 865664.
2) All other transmitters and antennas in the device that operate in different frequency bands, requiring different probe calibration points or tissue-equivalent media, or in a single frequency band due to measurement constraints, such as duty factor and test setup issues, must be tested in separate enlarged zoom scans.
3) All the enlarged zoom scans are processed, by means of superposition, using the volume scan post-processing procedures to determine the 1-g SAR for the aggregate SAR distribution.

6 Equipment list

Test Platform	SPEAG DASY5 Professional				
Location	SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch E&E Lab				
Description	SAR Test System (Frequency range 300MHz-6GHz)				
Software Reference	DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)				
Hardware Reference					
	Equipment	Model	Serial Number	Calibration Date	Due date of calibration
☒	Robot	RX90L	F03/5V32A1/A01	NA	NA
☒	Twin Phantom	SAM 1	TP-1283	NA	NA
☐	Flat Phantom	ELI 5.0	1128	NA	NA
☒	DAE	DAE3	569	2014-10-01	2015-09-30
☒	E-Field Probe	EX3DV4	3962	2014-11-24	2015-11-23
☒	Validation Kits	D835V2	4d015	2013-11-25	2016-11-24
☒	Validation Kits	D1900V2	184	2013-11-27	2016-11-26
☒	Validation Kits	D2450V2	733	2013-11-26	2016-11-25
☒	Agilent Network Analyzer	E5071B	MY42100549	2015-03-02	2016-03-01
☒	Dielectric Probe Kit	85070D	US01440210	NA	NA
☒	R&S Universal Radio Communication Tester	CMU200	103633	2015-04-25	2016-04-25
☒	RF Bi-Directional Coupler	ZABDC20-252H-N+	N989900825	2015-04-25	2016-04-25
☒	Agilent Signal Generator	E4438C	MY42082326	2015-04-25	2016-04-25
☒	Mini-Circuits Preamplifier	ZHL-42	QA0827002	2015-04-25	2016-04-25
☒	Agilent Power Meter	E4416A	GB41292095	2015-04-25	2016-04-25
☒	Agilent Power Sensor	8481H	MY41091234	2015-04-25	2016-04-25
☒	R&S Power Sensor	NRP-Z92	100025	2015-04-25	2016-04-25
☒	Attenuator	TS2-3dB	30704	2015-04-25	2016-04-25
☒	Coaxial low pass filter	VLF-2500(+)	NA	2015-04-25	2016-04-25
☒	50 Ω coaxial load	KARN-50+	00850	2015-04-25	2016-04-25
☒	DC POWER SUPPLY	SK1730SL5A	NA	2015-04-25	2016-04-25

7 Measurement Uncertainty

Measurements and results are all in compliance with the standards listed in section 12 of this report. All measurements and results are recorded and maintained at the laboratory performing the tests and measurement uncertainties are taken into account when comparing measurements to pass/ fail criteria. The Expanded uncertainty (95% CONFIDENCE INTERVAL) is **21.36%**.

A	b1	c	d	e = f(d,k)	g	i = C*g/e	k
Uncertainty Component	Section in P1528	Tol (%)	Prob . Dist.	Div.	Ci (1g)	1g ui (%)	Vi (Veff)
Probe calibration	E.2.1	6.3	N	1	1	6.30	∞
Axial isotropy	E.2.2	0.5	R	$\sqrt{3}$	$(1 - Cp)1/2$	0.20	∞
hemispherical isotropy	E.2.2	2.6	R	$\sqrt{3}$	$\sqrt{Cp}$	1.06	∞
Boundary effect	E.2.3	1.0	R	$\sqrt{3}$	1	0.58	∞
Linearity	E.2.4	0.6	R	$\sqrt{3}$	1	0.35	∞
System detection limit	E.2.5	0.25	R	$\sqrt{3}$	1	0.14	∞
Readout electronics	E.2.6	0.3	N	1	1	0.30	∞
Response time	E.2.7	0	R	$\sqrt{3}$	1	0.00	∞
Integration time	E.2.8	2.6	R	$\sqrt{3}$	1	1.50	∞
RF ambient Condition –Noise	E.6.1	3	R	$\sqrt{3}$	1	1.73	∞
RF ambient Condition - reflections	E.6.1	3	R	$\sqrt{3}$	1	1.73	∞
Probe positioning- mechanical tolerance	E.6.2	1.5	R	$\sqrt{3}$	1	0.87	∞
Probe positioning- with respect to phantom	E.6.3	2.9	R	$\sqrt{3}$	1	1.67	∞
Max. SAR evaluation	E.5.2	1	R	$\sqrt{3}$	1	0.58	∞
Test sample positioning	E.4.2	3.7	N	1	1	3.70	9
Device holder uncertainty	E.4.1	3.6	N	1	1	3.60	∞
Output power variation –SAR drift measurement	6.6.2	5	R	$\sqrt{3}$	1	2.89	∞
Phantom uncertainty (shape and thickness tolerances)	E.3.1	4	R	$\sqrt{3}$	1	2.31	∞
Liquid conductivity - deviation from target values	E.3.2	5	R	$\sqrt{3}$	0.64	1.85	∞
Liquid conductivity - measurement uncertainty	E.3.2	5.78	N	1	0.64	3.68	5
Liquid permittivity - deviation from target values	E.3.3	5	R	$\sqrt{3}$	0.6	1.73	∞

Liquid permittivity - measurement uncertainty	E.3.3	0.62	N	1	0.6	0.372	5
Combined standard uncertainty				RSS		10.68	430
Expanded uncertainty (95% CONFIDENCE INTERVAL)				K=2		**21.36**	

Table 18：Measurement Uncertainty

8 Calibration certificate

Please see the Appendix C

9 Photographs

Please see the Appendix D

Appendix A : Detailed System Validation Results

Appendix B: Detailed Test Results

Appendix C Calibration certificate

Appendix D: Photographs

---END---

Appendix A

Detailed System Validation Results

System Performance Check 835 MHz Head
System Performance Check 835 MHz Body
System Performance Check 1900 MHz Head
System Performance Check 1900 MHz Body
System Performance Check 2450 MHz Head
System Performance Check 2450 MHz Body

Date/Time: 2015-02-02 09:15:23

Test Laboratory: SGS-SAR Lab

System Performance Check 835 MHz Head

DUT: D835V2; Type: D835V2; Serial: 4d105

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1

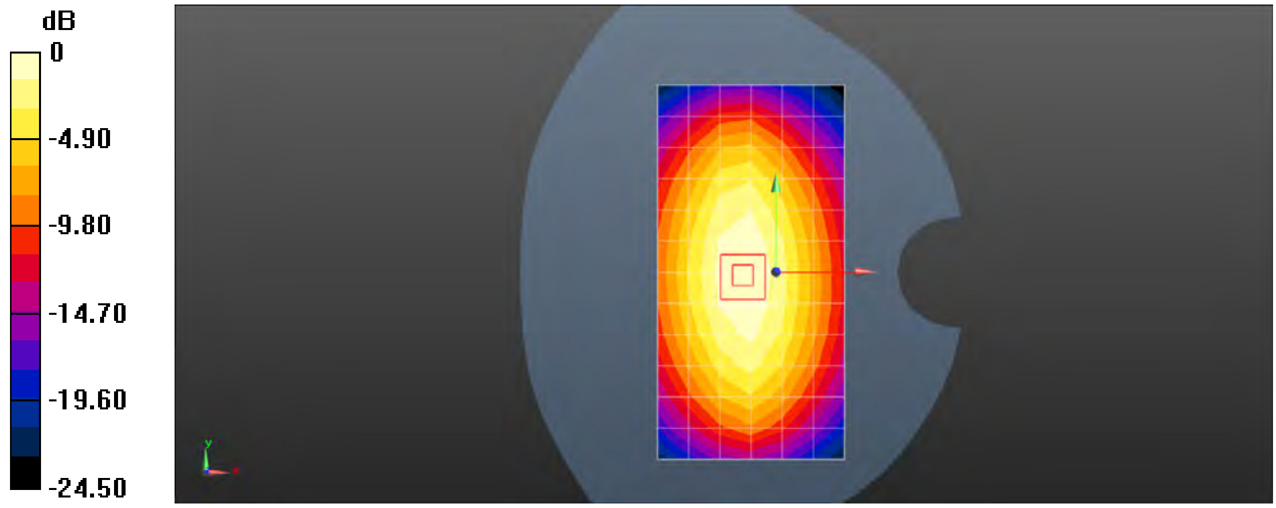
Medium: HSL835;Medium parameters used: f = 835 MHz; σ = 0.926 S/m; ε_r = 41.047; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(9.89, 9.89, 9.89); Calibrated: 2014-11-24;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE3 Sn569; Calibrated: 2014-10-01
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Body/d=15mm, Pin=250mW/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.44 W/kg

Body/d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 53.56 V/m; Power Drift = -0.21 dB
Peak SAR (extrapolated) = 3.43 W/kg
SAR(1 g) = 2.35 W/kg; SAR(10 g) = 1.57 W/kg
Maximum value of SAR (measured) = 2.52 W/kg



0 dB = 2.44 W/kg = 3.88 dBW/kg

Date/Time: 2015-02-03 08:35:14

Test Laboratory: SGS-SAR Lab

System Performance Check 835 MHz Body

DUT: D835V2; Type: D835V2; Serial: 4d105

Communication System: UID 0, CW (0); Frequency: 835 MHz;Duty Cycle: 1:1

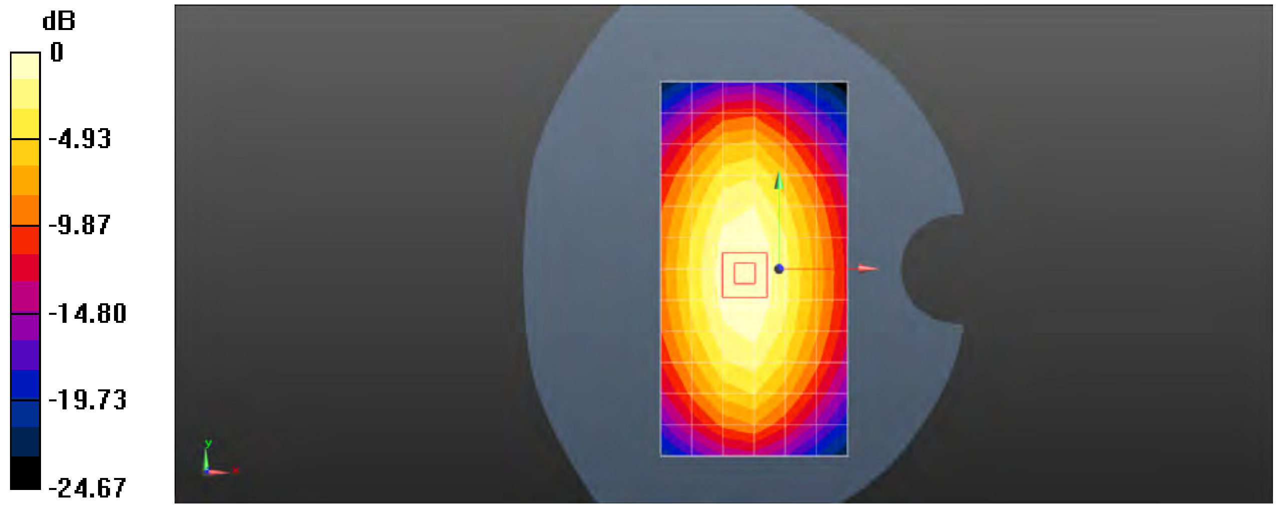
Medium: MSL835;Medium parameters used: f = 835 MHz; σ = 0.975 S/m; ε_r = 55.255; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(10.07, 10.07, 10.07); Calibrated: 2014-11-24;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE3 Sn569; Calibrated: 2014-10-01
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Body/d=15mm, Pin=250mW/Area Scan (7x13x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 2.35 W/kg

Body/d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 50.46 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 3.34 W/kg
SAR(1 g) = 2.29 W/kg; SAR(10 g) = 1.54 W/kg
Maximum value of SAR (measured) = 2.46 W/kg



0 dB = 2.35 W/kg = 3.72 dBW/kg

Date/Time: 2015-02-04 08:57:55

Test Laboratory: SGS-SAR Lab

System Performance Check 1900 MHz Head

DUT: D1900V2; Type: D1900V2; Serial: 5d028

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

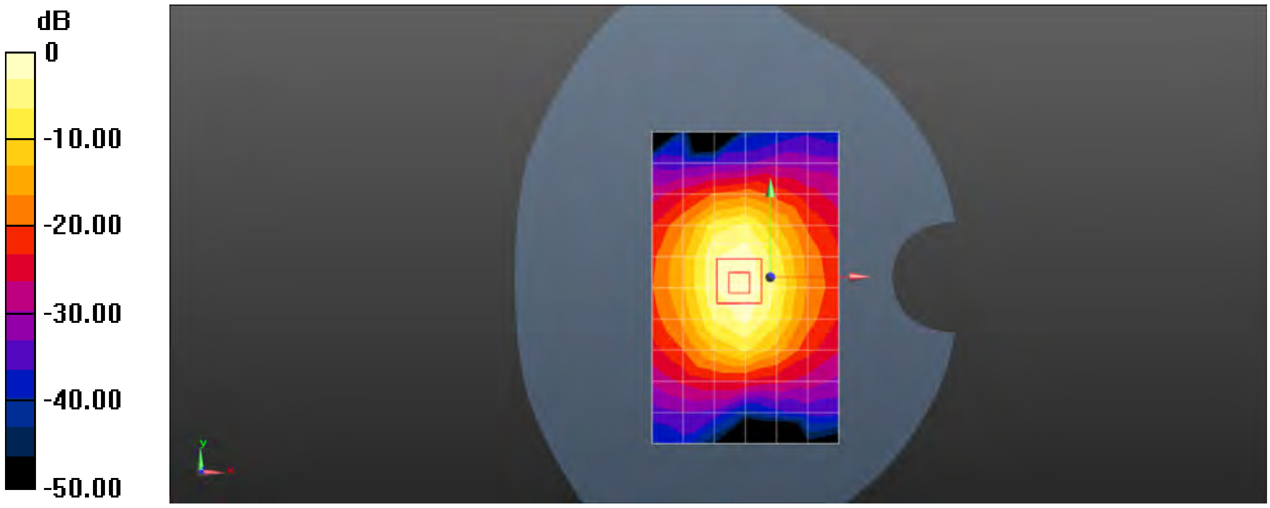
Medium: HSL1900;Medium parameters used: f = 1900 MHz; σ = 1.446 S/m; ε_r = 40.66; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(8.14, 8.14, 8.14); Calibrated: 2014-11-24;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE3 Sn569; Calibrated: 2014-10-01
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Body/d=10mm, Pin=250mW/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 10.7 W/kg

Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 89.47 V/m; Power Drift = -0.17 dB
Peak SAR (extrapolated) = 18.9 W/kg
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.26 W/kg
Maximum value of SAR (measured) = 11.4 W/kg



0 dB = 10.7 W/kg = 10.30 dBW/kg

Date/Time: 2015-02-05 08:51:43

Test Laboratory: SGS-SAR Lab

System Performance Check 1900 MHz Body

DUT: D1900V2; Type: D1900V2; Serial: 5d028

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

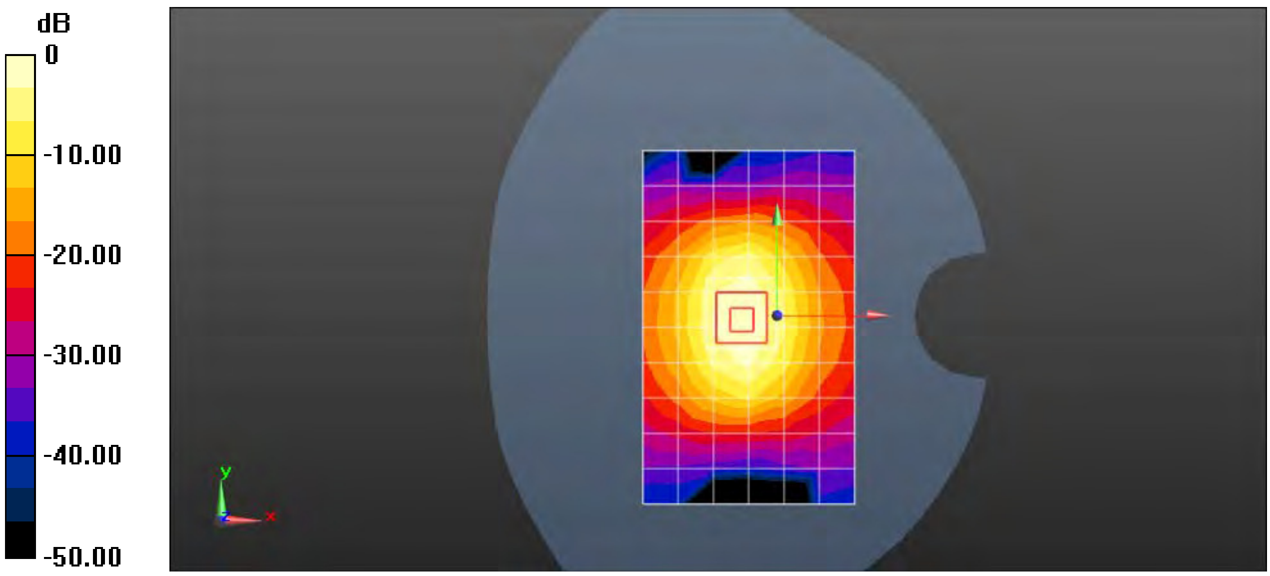
Medium: MSL1900;Medium parameters used: f = 1900 MHz; σ = 1.523 S/m; ε_r = 52.205; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3962; ConvF(8.07, 8.07, 8.07); Calibrated: 2014-11-24;
- Sensor-Surface: 4mm (Mechanical Surface Detection), z = 1.0, 31.0
- Electronics: DAE3 Sn569; Calibrated: 2014-10-01
- Phantom: SAM 1; Type: SAM V4.0; Serial: TP-1283
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Body/d=10mm, Pin=250mW/Area Scan (7x11x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (measured) = 11.3 W/kg

Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 88.33 V/m; Power Drift = -0.07 dB
Peak SAR (extrapolated) = 21.5 W/kg
SAR(1 g) = 10.8 W/kg; SAR(10 g) = 5.45 W/kg
Maximum value of SAR (measured) = 12.0 W/kg



0 dB = 11.3 W/kg = 10.55 dBW/kg