



SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen,
Guangdong, China 518057

Telephone: +86 (0) 755 2601 2053
Fax: +86 (0) 755 2671 0594
Email: ee.shenzhen@sgs.com

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Rev.01
Page : 1 of 65

FCC SAR TEST REPORT

Application No: SZEM1801000719RG
Applicant: TCL Communication Ltd.
Manufacturer: TCL Communication Ltd.
Factory: TCL Mobile Communication Co.,LTD.Huizhou
 Product Name: mobile phone
 Model No.(EUT): 5044Y
 Trade Mark: alcatel
FCC ID: 2ACCJH088
Standards: FCC 47CFR §2.1093
Date of Receipt: 2018-01-22
Date of Test: 2018-01-23 to 2018-02-04
Date of Issue: 2018-02-07
Test Result: **PASS ***

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

Authorized Signature:

Derek Yang

Wireless 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.

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REVISION HISTORY

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-02-07		Original



TEST SUMMARY

Frequency Band	Maximum Reported SAR(W/kg)			
	Head	Body-worn	Hotspot	Limbs
GSM850	0.22	0.29	0.35	N/A
GSM1900	0.24	0.17	0.34	N/A
WCDMA Band II	0.65	0.44	1.19	N/A
WCDMA Band V	0.60	0.69	0.80	N/A
LTE Band 7	0.41	0.62	1.29	N/A
WI-FI (2.4GHz)	0.53	0.11	0.26	N/A
SAR Limited(W/kg)	1.6			4
Maximum Simultaneous Transmission SAR (W/kg)				
Scenario	Head	Body-worn	Hotspot	Limbs
Sum SAR	1.18	0.80	1.45	N/A
SPLSR	N/A	N/A	N/A	N/A
SPLSR Limited	0.04			0.1

Approved & Released by

Simon Ling

SAR Manager

Tested by

Gavin Gao

SAR Engineer



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1 General Information

1.1 Details of Client

Applicant:	TCL Communication Ltd.
Address:	7/F, Block F4, TCL Communication Technology Building, TCL International E City, Zhong Shan Yuan Road, Nanshan District, Shenzhen, Guangdong, P.R. China 518052
Manufacturer:	TCL Communication Ltd.
Address:	7/F, Block F4, TCL Communication Technology Building, TCL International E City, Zhong Shan Yuan Road, Nanshan District, Shenzhen, Guangdong, P.R. China 518052
Factory:	TCL Mobile Communication Co.,LTD.Huizhou
Address:	No.86, Hechang 7th West Road, ZhongKai Hi-tech Development District,Huizhou,Guangdong

1.2 Test Location

Company: SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch
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.

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 10m Semi-anechoic chamber and Shielded Room 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 –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Industry Canada (IC)**

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.



1.4 General Description of EUT

Product Name:	mobile phone		
Model No.(EUT):	5044Y		
Trade Mark:	alcatel		
Product Phase:	production unit		
Device Type :	portable device		
Exposure Category:	uncontrolled environment / general population		
FCC ID:	2ACCJH088		
Serial number:	MFPRNBZTZD79JBGM / EEYSRWHEUOJBUGZS		
Hardware Version:	PIO		
Software Version:	v4HA7		
Antenna Type:	Inner Antenna		
Device Operating Configurations :			
Modulation Mode:	GSM: GMSK, 8PSK; WCDMA: QPSK; LTE: QPSK,16QAM WIFI: DSSS,OFDM; BT: GFSK, $\pi/4$ DQPSK,8DPSK		
Device Class:	B		
GPRS Multi-slots Class:	12	EGPRS Multi-slots Class:	12
HSDPA UE Category:	24	HSUPA UE Category	7
Frequency Bands:	Band	Tx (MHz)	Rx (MHz)
	GSM850	824-849	869-894
	GSM1900	1850-1910	1930-1990
	WCDMA V	824-849	869-894
	WCDMA II	1850-1910	1930-1990
	LTE Band 7	2500-2570	2620- 2690
	WIFI	2412-2462	2412-2462
	BT	2402-2480	2402-2480
Battery Information:	Model: CAB2000070C1		
	Normal Voltage: 3.8V		
	Rated capacity: 2000mAh		
	Manufacturer: BYD		



1.5 Test Specification

Identity	Document Title
FCC 47CFR §2.1093	Radiofrequency Radiation Exposure Evaluation: Portable Devices
ANSI/IEEE Std C95.1 – 1992	Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.
IEEE 1528-2013	Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
KDB 941225 D01 3G SAR Procedures v03r01	3G SAR Measurement Procedures
KDB 941225 D05 SAR for LTE Devices v02r05	SAR EVALUATION CONSIDERATIONS FOR LTE DEVICES
KDB 248227 D01 802.11 Wi-Fi SAR v02r02	SAR GUIDANCE FOR IEEE 802.11 (Wi-Fi) TRANSMITTERS
KDB 941225 D06 Hotspot Mode SAR v02r01	SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities
KDB 648474 D04 Handset SAR v01r03	SAR Evaluation Considerations for Wireless Handsets
KDB447498 D01 General RF Exposure Guidance v06	Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies
KDB447498 D03 Supplement C Cross-Reference v01	OET Bulletin 65, Supplement C Cross-Reference
KDB 865664 D01 SAR Measurement 100 MHz to 6 GHz v01r04	SAR Measurement Requirements for 100 MHz to 6 GHz
KDB 865664 D02 RF Exposure Reporting v01r02	RF Exposure Compliance Reporting and Documentation Considerations

1.6 RF exposure limits

Human Exposure	Uncontrolled Environment General Population	Controlled Environment Occupational
Spatial Peak SAR* (Brain*Trunk)	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.

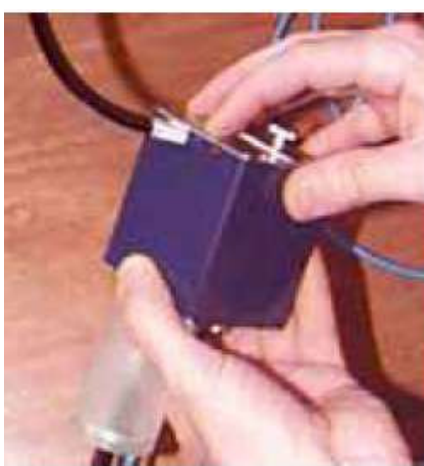
Controlled Environments are defined as locations where there is exposure that may be incurred by persons who are aware of the potential for exposure, (i.e. as a result of employment or occupation.)

- 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

	<p>Symmetrical design with triangular core Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)</p>
<p>Calibration</p>	<p>ISO/IEC 17025 calibration service available.</p>
<p>Frequency</p>	<p>10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)</p>
<p>Directivity</p>	<p>± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)</p>
<p>Dynamic Range</p>	<p>10 μW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μW/g)</p>
<p>Dimensions</p>	<p>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</p>
<p>Application</p>	<p>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%.</p>
<p>Compatibility</p>	<p>DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI</p>

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 $\epsilon=3$ and loss tangent $\delta=0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.



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 (≤ 2 GHz) and 7x7x7 points (≥ 2 GHz). 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-axis. 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. 1528-2013.



		≤ 3 GHz	> 3 GHz	
Maximum distance from closest measurement point (geometric center of probe sensors) to phantom surface		5 ± 1 mm	$\frac{1}{2} \cdot \delta \cdot \ln(2) \pm 0.5$ mm	
Maximum probe angle from probe axis to phantom surface normal at the measurement location		$30^\circ \pm 1^\circ$	$20^\circ \pm 1^\circ$	
Maximum area scan spatial resolution: Δx_{Area} , Δy_{Area}		≤ 2 GHz: ≤ 15 mm 2 – 3 GHz: ≤ 12 mm	3 – 4 GHz: ≤ 12 mm 4 – 6 GHz: ≤ 10 mm	
		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 \leq the corresponding x or y dimension of the test device with at least one measurement point on the test device.		
Maximum zoom scan spatial resolution: Δx_{Zoom} , Δy_{Zoom}		≤ 2 GHz: ≤ 8 mm 2 – 3 GHz: ≤ 5 mm*	3 – 4 GHz: ≤ 5 mm* 4 – 6 GHz: ≤ 4 mm*	
Maximum zoom scan spatial resolution, normal to phantom surface	uniform grid: $\Delta z_{Zoom}(n)$	≤ 5 mm	3 – 4 GHz: ≤ 4 mm 4 – 5 GHz: ≤ 3 mm 5 – 6 GHz: ≤ 2 mm	
	graded grid	$\Delta z_{Zoom}(1)$: between 1 st two points closest to phantom surface	≤ 4 mm	3 – 4 GHz: ≤ 3 mm 4 – 5 GHz: ≤ 2.5 mm 5 – 6 GHz: ≤ 2 mm
		$\Delta z_{Zoom}(n>1)$: between subsequent points	$\leq 1.5 \cdot \Delta z_{Zoom}(n-1)$	
Minimum zoom scan volume	x, y, z	≥ 30 mm	3 – 4 GHz: ≥ 28 mm 4 – 5 GHz: ≥ 25 mm 5 – 6 GHz: ≥ 22 mm	
<p>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.</p> <p>* When zoom scan is required and the <u>reported</u> SAR from the <u>area scan based 1-g SAR estimation</u> 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.</p>				

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. $\pm 5\%$



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:

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

With V_i = compensated signal of channel i ($i = x, y, z$)

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

cf = crest factor of exciting field (DASY parameter)

dcpi = 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 V_i = compensated signal of channel i ($i = x, y, z$)

Norm i = sensor sensitivity of channel i ($i = x, y, z$)

[mV/(V/m)²] for E-field Probes

ConvF = sensitivity enhancement in solution

a_{ij} = sensor sensitivity factors for H-field probes

f = carrier frequency [GHz]

E_i = electric field strength of channel i in V/m

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

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

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

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

$$SAR = (E_{tot}^2 \cdot \sigma) / (\epsilon \cdot 1000)$$

with SAR = local specific absorption rate in mW/g

E_{tot} = 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.

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

with P_{pwe} = equivalent power density of a plane wave in mW/cm²

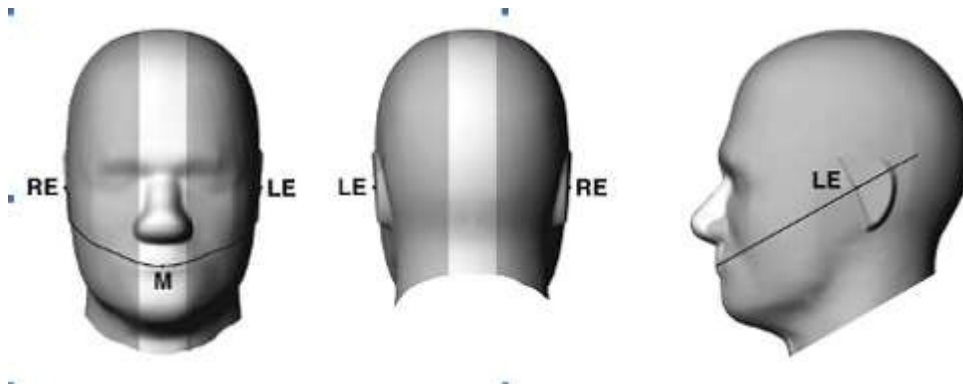
E_{tot} = total electric field strength in V/m

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

3 Description of Test Position

3.1 The Head Test Position

3.1.1 SAM Phantom Shape

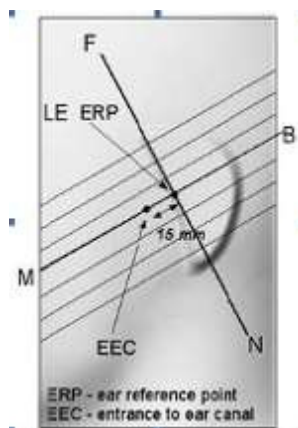


F-3. Front, back, and side views of SAM (model for the phantom shell). Full-head model is for illustration purposes only-procedures in this recommended practice are intended primarily for the phantom setup.

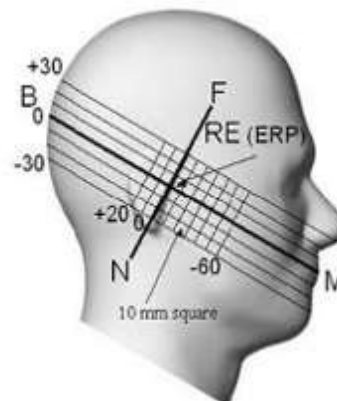
Note: The centre strip including the nose region has a different thickness tolerance.



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

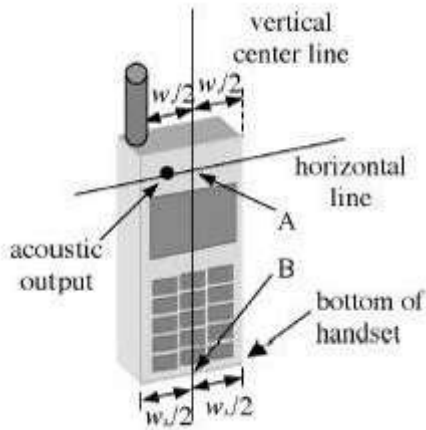


F-5. Close-up side view of phantom, showing the ear region, N-F and B-M lines, and seven cross-sectional plane locations

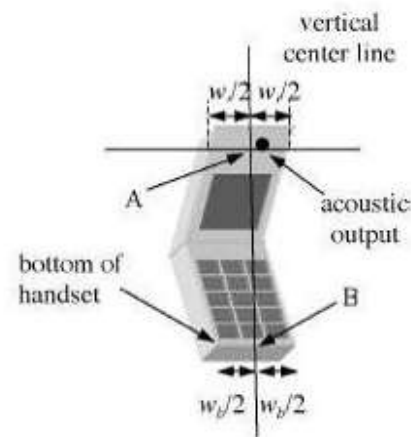


F-6. Side view of the phantom showing relevant markings and seven cross-sectional plane locations

3.1.2 EUT constructions



F-7. Handset vertical and horizontal reference lines—"fixed case"



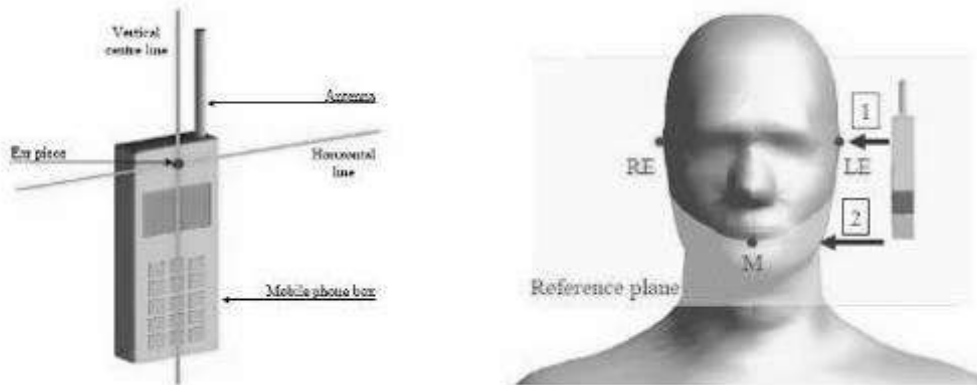
F-8. Handset vertical and horizontal reference lines—"clam-shell case"

3.1.3 Definition of the "cheek" position

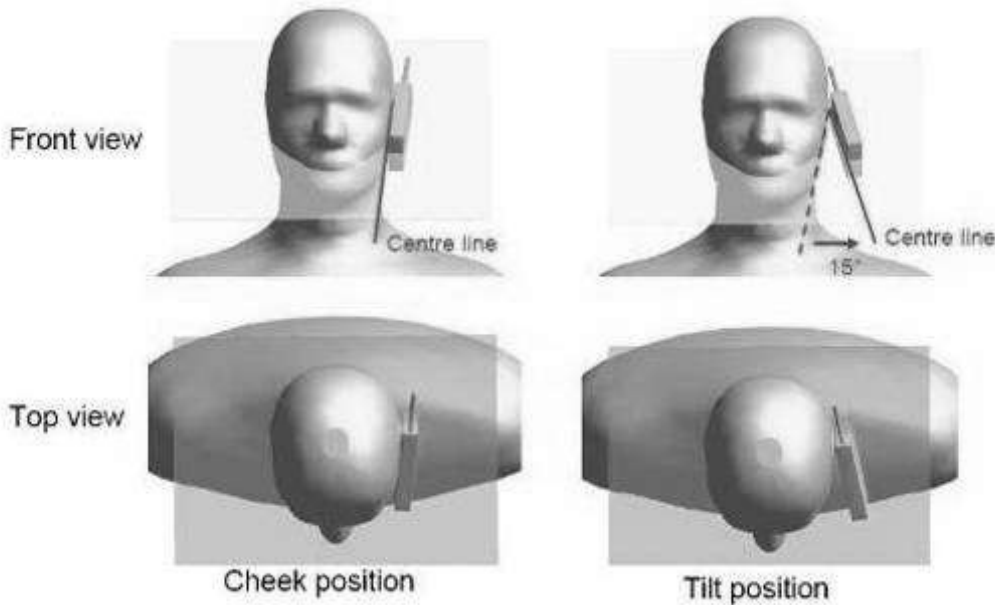
- a) Position the device with the vertical centre line of the body of the device and the horizontal line crossing the centre of the ear piece in a plane parallel to the sagittal plane of the phantom ("initial position"). While maintaining the device in this plane, align the vertical centre line with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

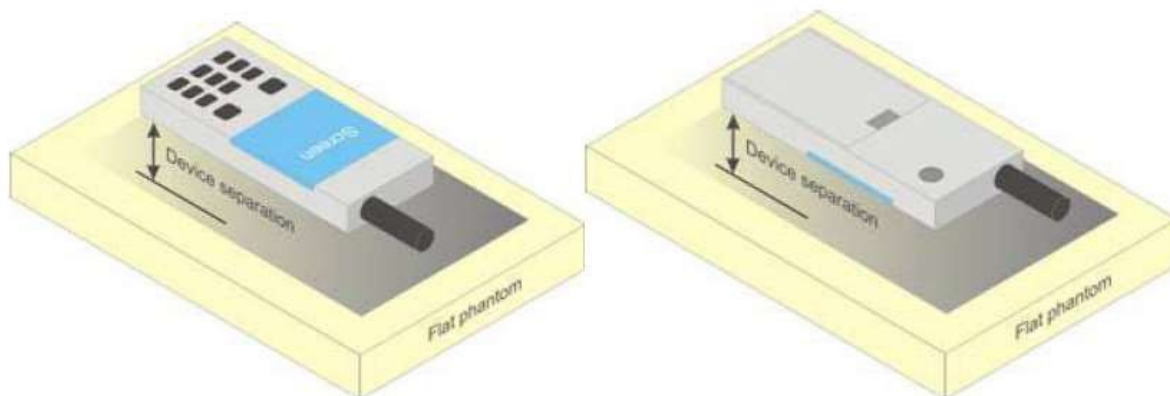
3.2.1 Body-worn accessory exposure conditions

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 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 ($L \times W \geq 9 \text{ cm} \times 5 \text{ cm}$) 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 $9 \text{ cm} \times 5 \text{ cm}$, 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 following tables give the recipes for tissue simulating liquids to be used in different frequency bands:

Ingredients (% by weight)	Frequency (MHz)							
	450		835		1800-2000		2300-2700	
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 MΩ ⁺ resistivity				HEC: Hydroxyethyl Cellulose				
Tween: Polyoxyethylene (20) sorbitan monolaurate								

Table 1 : Recipe of Tissue Simulate Liquid



4.1.2 Measurement for Tissue Simulate Liquid

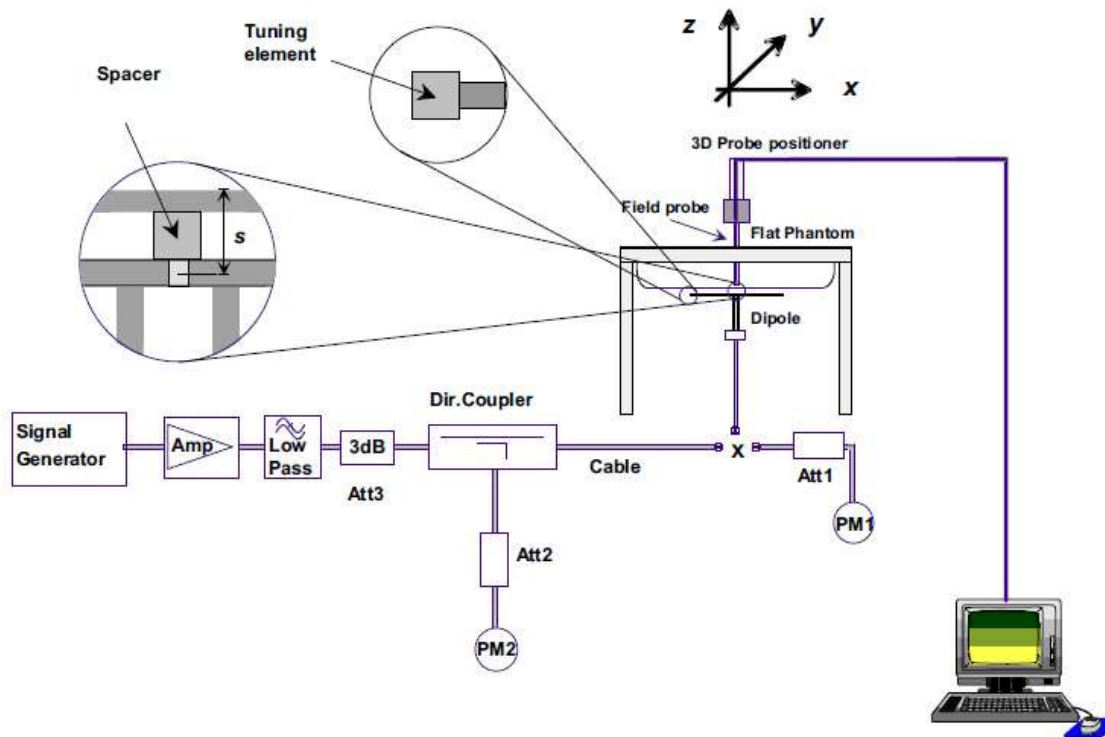
The dielectric properties for this Tissue Simulate Liquids were measured by using the Agilent Model 85070E Dielectric Probe in conjunction with Agilent E5071C Network Analyzer (300 KHz-8500 MHz). The Conductivity (σ) and Permittivity (ρ) are listed in Table 2. For the SAR measurement given in this report. The temperature variation of the Tissue Simulate Liquids was $22\pm 2^{\circ}\text{C}$.

Tissue Type	Measured Frequency (MHz)	Target Tissue ($\pm 5\%$)		Measured Tissue		Liquid Temp. ($^{\circ}\text{C}$)	Measured Date
		ϵ_r	$\sigma(\text{S/m})$	ϵ_r	$\sigma(\text{S/m})$		
835 Head	835	41.5 (39.43~43.58)	0.90 (0.86~0.95)	40.668	0.863	22.1	2018/1/24
835 Body	835	55.2 (52.44~57.96)	0.97 (0.92~1.02)	54.389	0.986	22.1	2018/1/24
1900 Head	1900	40.0 (38.00~42.00)	1.40 (1.33~1.47)	38.564	1.451	22.3	2018/1/23
1900 Body	1900	53.3 (50.64~55.97)	1.52 (1.44~1.60)	53.025	1.476	22.3	2018/1/26
2450 Head	2450	39.20 (37.24~41.16)	1.80 (1.71~1.89)	39.924	1.819	22	2018/2/4
2450 Body	2450	52.70 (50.07~55.34)	1.95 (1.85~2.05)	50.708	1.998	22	2018/2/4
2600 Head	2600	39.0 (37.05~40.95)	1.96 (1.86~2.06)	37.439	2.028	22.1	2018/1/27
2600 Body	2600	52.50 (49.88~55.13)	2.16 (2.05~2.27)	50.237	2.187	22.1	2018/1/27

Table 2 : Measurement result of Tissue electric parameters

4.2 SAR System Check

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 3 (A power level of 250mw was input to the dipole antenna). During the tests, the ambient temperature of the laboratory was in the range $22 \pm 2^\circ\text{C}$, 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 Check Result(s)

Validation Kit		Measured SAR 250mW	Measured SAR 250mW	Measured SAR (normalized to 1w)	Measured SAR (normalized to 1w)	Target SAR (normalized to 1w) (±10%)	Target SAR (normalized to 1w) (±10%)	Liquid Temp. (°C)	Measured Date
		1g (W/kg)	10g (W/kg)	1g (W/kg)	10g (W/kg)	1-g(W/kg)	10-g(W/kg)		
D835V2	Head	2.34	1.51	9.36	6.04	9.59 (8.63~10.55)	6.29 (5.66~6.92)	22.1	2018/1/24
	Body	2.49	1.65	9.96	6.6	9.65 (8.69~10.62)	6.46 (5.81~7.11)	22.1	2018/1/24
D1900V2	Head	10.9	5.57	43.6	22.28	40.7 (36.63~44.77)	21.1 (18.99~23.21)	22.3	2018/1/23
	Body	10.1	5.34	40.4	21.36	41.6 (37.44~45.76)	21.4 (19.26~23.54)	22.3	2018/1/26
D2450V2	Head	13.2	6.19	52.8	24.76	53.1 (47.79~58.41)	24.9 (22.41~27.39)	22	2018/2/4
	Body	12.4	5.97	49.6	23.88	51.0 (45.9~56.1)	23.5 (21.15~25.85)	22	2018/2/4
D2600V2	Head	14.2	6.31	56.8	25.24	56.6 (50.94~62.26)	25.4 (22.86~27.94)	22.1	2018/1/27
	Body	13.76	6.12	55.04	24.48	54.2 (48.78~59.62)	24.3 (21.87~26.73)	22.1	2018/1/27

Table 3 : SAR System Check Result

4.2.3 Detailed System Check Results

Please see the Appendix A



5 Test results and Measurement Data

5.1 3G SAR Test Reduction Procedure

According to KDB 941225D01 v03R01, in the following procedures, the mode tested for SAR is referred to as the primary mode. The equivalent modes considered for SAR test reduction are denoted as secondary modes. Both primary and secondary modes must be in the same frequency band. When the maximum output power and tune-up tolerance specified for production units in a secondary mode is $\leq \frac{1}{4}$ dB higher than the primary mode or when the highest reported SAR of the primary mode is scaled by the ratio of specified maximum output power and tune-up tolerance of secondary to primary mode and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for the secondary mode. This is referred to as the 3G SAR test reduction procedure in the following SAR test guidance, where the primary mode is identified in the applicable wireless mode test procedures and the secondary mode is wireless mode being considered for SAR test reduction by that procedure. When the 3G SAR test reduction procedure is not satisfied, it is identified as “otherwise” in the applicable procedures; SAR measurement is required for the secondary mode.

5.2 Operation Configurations

5.2.1 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.

SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance. The data mode with highest specified time-averaged output power should be tested for SAR compliance in the applicable exposure conditions. For modes with the same specified maximum output power and tolerance, the higher number time-slot configuration should be tested.

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.

The 3G SAR test reduction procedure is applied to 8-PSK EDGE with GMSK GPRS/EDGE as the primary mode.



5.2.2 WCDMA Test Configuration

1) . Output Power Verification

Maximum output power is verified on the high, middle and low channels according to procedures described in section 5.2 of 3GPP TS 34.121, using the appropriate RMC or AMR with TPC (transmit power control) set to all "1's" for WCDMA/HSDPA or by applying the required inner loop power control procedures to maintain maximum output power while HSUPA is active. Results for all applicable physical channel configurations (DPCCH, DPDCHn and spreading codes, HSDPA, HSPA) are required in the SAR report. All configurations that are not supported by the handset or cannot be measured due to technical or equipment limitations must be clearly identified.

2) . Head SAR

SAR for next to the ear head exposure is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to AMR configurations with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured for 12.2 kbps AMR in 3.4 kbps SRB (signaling radio bearer) using the highest reported SAR configuration in 12.2 kbps RMC for head exposure

3) . Body SAR

SAR for body configurations is measured using a 12.2 kbps RMC with TPC bits configured to all "1's". The 3G SAR test reduction procedure is applied to other spreading codes and multiple DPDCHn configurations supported by the handset with 12.2 kbps RMC as the primary mode. Otherwise, SAR is measured using an applicable RMC configuration with the corresponding spreading code or DPDCHn, for the highest reported body-worn accessory exposure SAR configuration in 12.2 kbps RMC. When more than 2 DPDCHn are supported by the handset, it may be necessary to configure additional DPDCHn using FTM (Factory Test Mode) or other chipset based test approaches with parameters similar to those used in 384 kbps and 768 kbps RMC.

4) . HSDPA / HSUPA / DC-HSDPA

According to KDB 941225 D01v03, RMC 12.2kbps setting is used to evaluate SAR. If the maximum output power and tune-up tolerance specified for production units in HSDPA / HSUPA / DC-HSDPA is $\leq \frac{1}{4}$ dB higher than RMC 12.2Kbps or when the highest reported SAR of the RMC12.2Kbps is scaled by the ratio of specified maximum output power and tune-up tolerance of HSDPA / HSUPA / DC-HSDPA to RMC12.2Kbps and the adjusted SAR is ≤ 1.2 W/kg, SAR measurement is not required for HSDPA / HSUPA / DC-HSDPA

a) HSDPA

HSDPA is configured according to the applicable UE category of a test device. The number of HS-DSCH/HS-PDSCHs, HARQ 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 conditions, QPSK is used in the H-set for SAR testing. HS-DPCCH should be configured with a CQI feedback cycle of 4 ms and a CQI repetition factor of 2 to maintain a constant rate of active CQI slots. DPCCH and DPDCH gain factors (β_c , β_d), and HS-DPCCH power offset parameters (Δ_{ACK} , Δ_{NACK} , Δ_{CQI}) are set according to values indicated in the following table. The CQI value is determined by the UE category, transport block size, number of HS-PDSCHs and modulation used in the H-set.



Sub-test	β_c	Bd	$\beta_d(SF)$	β_c/β_d	β_{hs}	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: ΔACK , $\Delta NACK$ and $\Delta CQI= 8$ $A_{hs} = \beta_{hs}/\beta_c=30/15$ $\beta_{hs}=30/15*\beta_c$
 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, ΔACK and $\Delta NACK= 8$ ($A_{hs}=30/15$) with $\beta_{hs}=30/15*\beta_c$,and $\Delta CQI= 7$ ($A_{hs}=24/15$) with $\beta_{hs}=24/15*\beta_c$.
 Note3: CM=1 for $\beta_c/\beta_d =12/15$, $\beta_{hs}/\beta_c=24/15$. 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

b) 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 ^⓪	β_c ^⓪	β_d ^⓪	β_d (SF) ^⓪	β_c/β_d ^⓪	β_{hs} ⁽¹⁾	β_{ec} ^⓪	β_{ed} ^⓪	β_c ⁽²⁾ (SF) ^⓪	β_{ed} ⁽³⁾ (codes) ^⓪	CM ⁽²⁾ (dB) ^⓪	MP R ⁽⁴⁾ (dB) ^⓪	AG ⁽⁴⁾ Inde ^x	E-TFC I ^⓪
1 ^⓪	11/15 ⁽³⁾	15/15 ⁽³⁾	64 ^⓪	11/15 ⁽³⁾	22/15 ^⓪	209/225 ^⓪	1039/225 ^⓪	4 ^⓪	1 ^⓪	1.0 ^⓪	0.0 ^⓪	20 ^⓪	75 ^⓪
2 ^⓪	6/15 ^⓪	15/15 ^⓪	64 ^⓪	6/15 ^⓪	12/15 ^⓪	12/15 ^⓪	94/75 ^⓪	4 ^⓪	1 ^⓪	3.0 ^⓪	2.0 ^⓪	12 ^⓪	67 ^⓪
3 ^⓪	15/15 ^⓪	9/15 ^⓪	64 ^⓪	15/9 ^⓪	30/15 ^⓪	30/15 ^⓪	$\beta_{ed1}:47/15$ $\beta_{ed2}:47/15$	4 ^⓪	2 ^⓪	2.0 ^⓪	1.0 ^⓪	15 ^⓪	92 ^⓪
4 ^⓪	2/15 ^⓪	15/15 ^⓪	64 ^⓪	2/15 ^⓪	4/15 ^⓪	2/15 ^⓪	56/75 ^⓪	4 ^⓪	1 ^⓪	3.0 ^⓪	2.0 ^⓪	17 ^⓪	71 ^⓪
5 ^⓪	15/15 ⁽⁴⁾	15/15 ⁽⁴⁾	64 ^⓪	15/15 ⁽⁴⁾	30/15 ^⓪	24/15 ^⓪	134/15 ^⓪	4 ^⓪	1 ^⓪	1.0 ^⓪	0.0 ^⓪	21 ^⓪	81 ^⓪

Note 1: ΔACK , $\Delta NACK$ and $\Delta CQI=8$ $A_{hs} = \beta_{hs}/\beta_c = 30/15$ $\beta_{hs} = 30/15 * \beta_c$
 Note 2: CM = 1 for $\beta_c/\beta_d = 12/15$, $\beta_{hs}/\beta_c = 24/15$. For all other combinations of DPDCH, DPCCH, HS-DPCCH, E-DPDCH and E-DPCCH the MPR is based on the relative CM difference^⓪
 Note 3 : For subtest 1 the β_c/β_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 $\beta_c = 10/15$ and $\beta_d = 15/15$ ^⓪
 Note 4 : For subtest 5 the β_c/β_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 $\beta_c = 14/15$ and $\beta_d = 15/15$ ^⓪
 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^⓪
 Note 6: β_{ed} can not be set directly; it is set by Absolute Grant Value.^⓪

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 Spreading 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
	4	8	10	2SF2&2SF	11484	5.76
6 (No DPDCH)	4	4	2	4	20000	2.00
	4	4	10	4	20000	2.00
7 (No DPDCH)	4	8	2	2SF2&2SF	22996	?
	4	4	10	4	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 and 16QAM. (TS25.306-7.3.0).

Table 7 : HSUPA UE category



c) DC-HSDPA

SAR is required for Rel. 8 DC-HSDPA when SAR is required for Rel. 5 HSDPA; otherwise, the 3G SAR test reduction procedure is applied to DC-HSDPA with 12.2 kbps RMC as the primary mode. Power is measured for DC-HSDPA according to the H-Set 12, FRC configuration in Table C.8.1.12 of 3GPP TS 34.121-1 to determine SAR test reduction. A primary and a secondary serving HS-DSCH Cell are required to perform the power measurement and for the results to be acceptable

A call was established between EUT and Base Station with following setting:

- i. Set RMC 12.2Kbps + HSDPA mode.
- ii. Set Cell Power = -25 dBm
- iii. Set HS-DSCH Configuration Type to FRC (H-set 12, QPSK)
- iv. Select HSDPA Uplink Parameters
- v. Set Gain Factors (β_c and β_d) and parameters were set according to each Specific sub-test in the following table C10.1.4, quoted from the TS 34.121
 - a). Subtest 1: $\beta_c/\beta_d=2/15$
 - b). Subtest 2: $\beta_c/\beta_d=12/15$
 - c). Subtest 3: $\beta_c/\beta_d=15/8$
 - d). Subtest 4: $\beta_c/\beta_d=15/4$
- vi. Set Delta ACK, Delta NACK and Delta CQI = 8
- vii. Set Ack-Nack Repetition Factor to 3
- viii. Set CQI Feedback Cycle (k) to 4 ms
- ix. Set CQI Repetition Factor to 2
- x. Power Ctrl Mode = All Up bits

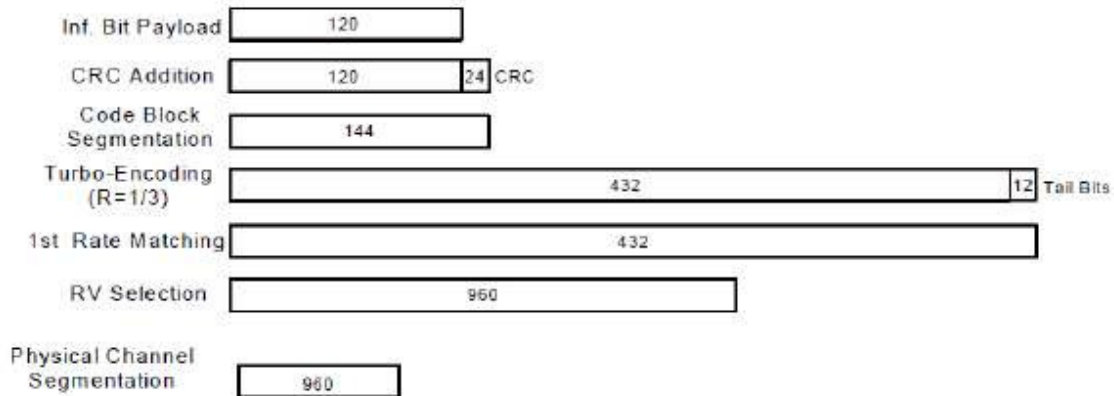


The following tests were conducted according to the test requirements outlines in 3GPP TS 34.121 specification.

A summary of these settings are illustrated below:

Table C.8.1.12: Fixed Reference Channel H-Set 12

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{TB})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK
Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table. Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.		





5.2.3 WiFi Test Configuration

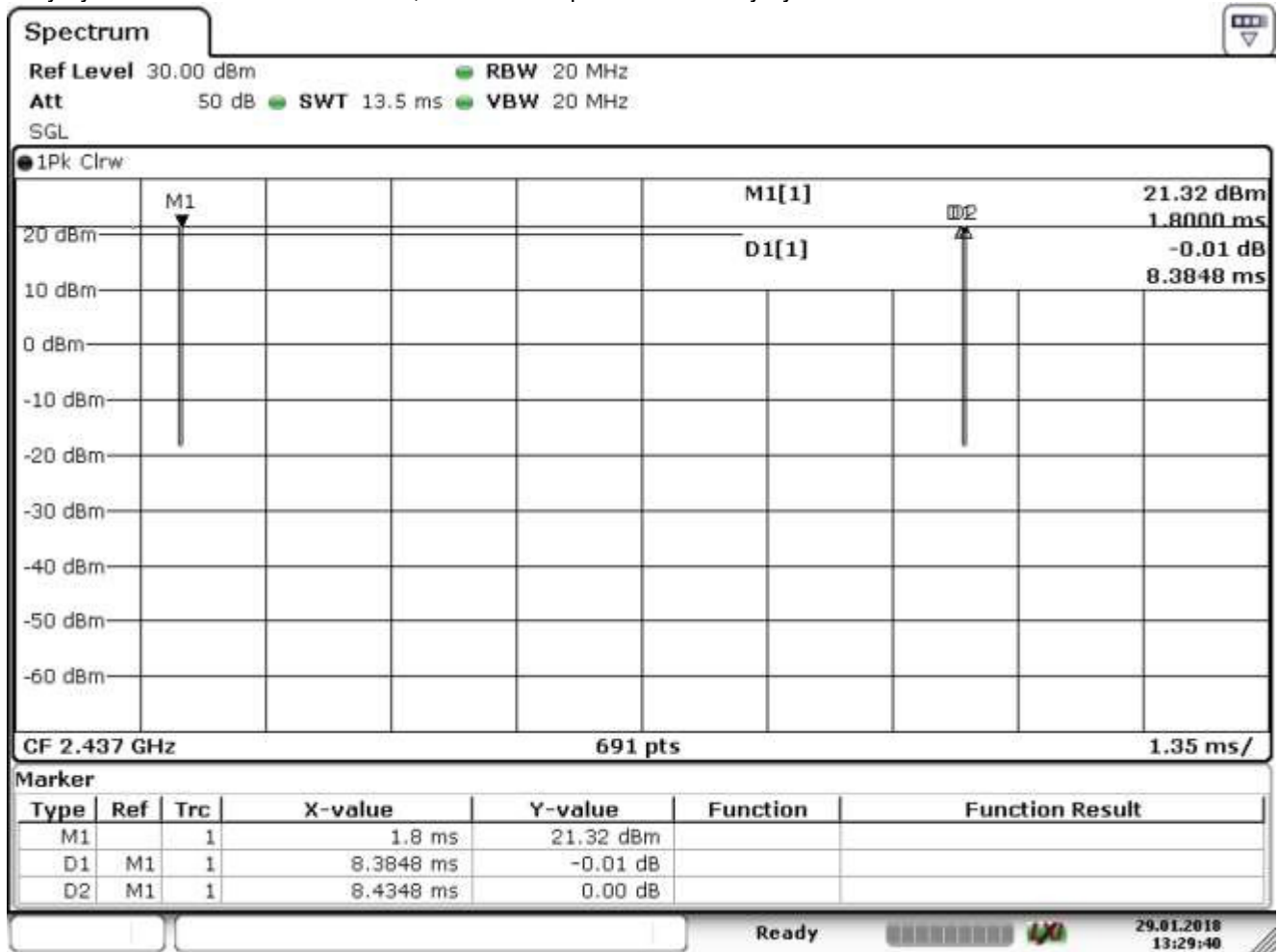
The normal network operating configurations of 802.11 transmitters are not suitable for SAR measurements. Unpredictable fluctuations in network traffic and antenna diversity conditions can introduce undesirable variations in SAR results. The SAR for these devices should be measured using chipset based test mode software to ensure the results are consistent and reliable. See KDB Publication 248227 D01v02r02 for more details.

The device operating parameters established in test mode for SAR measurements must be identical to those programmed in production units, including output power levels, amplifier gain settings and other RF performance tuning parameters.

A Wi-Fi device must be configured to transmit continuously at the required data rate, channel bandwidth and signal modulation, using the highest transmission duty factor supported by the test mode tools for SAR measurement.

802.11b

Duty cycle = $8.3848/8.4348=99.41\%$, below is the photo of the duty cycle:



Date: 29.JAN.2018 13:29:40



5.2.3.1 Initial Test Position SAR Test Reduction Procedure

DSSS and OFDM configurations are considered separately according to the required SAR procedures. SAR is measured in the initial test position using the 802.11 transmission mode configuration required by the DSSS procedure or initial test configuration and subsequent test configuration(s) according to the OFDM procedures. The initial test position procedure is described in the following:

- 1) . When the reported SAR of the initial test position is ≤ 0.4 W/kg, further SAR measurement is not required for the other (remaining) test positions in that exposure configuration and 802.11 transmission mode combinations within the frequency band or aggregated band. SAR is also not required for that exposure configuration in the subsequent test configuration(s).
- 2) . When the reported SAR of the initial test position is > 0.4 W/kg, SAR is repeated for the 802.11 transmission mode configuration tested in the initial test position using subsequent highest extrapolated or estimated 1-g SAR conditions determined by area scans or next closest/smallest test separation distance and maximum RF coupling test positions based on manufacturer justification, on the highest maximum output power channel, until the reported SAR is ≤ 0.8 W/kg or all required test positions (left, right, touch, tilt or subsequent surfaces and edges) are tested.
- 3) . For all positions/configurations tested using the initial test position and subsequent test positions, when the reported SAR is > 0.8 W/kg, SAR is measured for these test positions/configurations on the subsequent next highest measured output power channel(s) until the reported SAR is ≤ 1.2 W/kg or all required channels are tested. a) Additional power measurements may be required for this step, which should be limited to those necessary for identifying the subsequent highest output power channels.



5.2.3.2 Initial Test Configuration Procedures

An initial test configuration is determined for OFDM transmission modes according to the channel bandwidth, modulation and data rate combination(s) with the highest maximum output power specified for production units in each standalone and aggregated frequency band. SAR is measured using the highest measured maximum output power channel. For configurations with the same specified or measured maximum output power, additional transmission mode and test channel selection procedures are required. SAR test reduction for subsequent highest output test channels is determined according to *reported* SAR of the initial test configuration.

For next to the ear, hotspot mode and UMC mini-tablet exposure configurations where multiple test positions are required, the initial test position procedure is applied to minimize the number of test positions required for SAR measurement using the initial test configuration transmission mode. For fixed exposure conditions that do not have multiple SAR test positions, SAR is measured in the transmission mode determined by the initial test configuration.

When the *reported* SAR of the initial test configuration is > 0.8 W/kg, SAR measurement is required for subsequent next highest measured output power channel(s) in the initial test configuration until *reported* SAR is ≤ 1.2 W/kg or all required channels are tested.

5.2.3.3 Subsequent Test Configuration Procedures

SAR measurement requirements for the remaining 802.11 transmission mode configurations that have not been tested in the initial test configuration are determined separately for each standalone and aggregated frequency band, in each exposure condition, according to the maximum output power specified for production units. The initial test position procedure is applied to next to the ear, UMPC mini-tablet and hotspot mode configurations. When the same maximum output power is specified for multiple transmission modes, additional power measurements may be required to determine if SAR measurements are required for subsequent highest output power channels in a subsequent test configuration. The subsequent test configuration and SAR measurement procedures are described in the following.

- 1) . When SAR test exclusion provisions of KDB Publication 447498 are applicable and SAR measurement is not required for the initial test configuration, SAR is also not required for the next highest maximum output power transmission mode subsequent test configuration(s) in that frequency band or aggregated band and exposure configuration.
- 2) . When the highest *reported* SAR for the initial test configuration (when applicable, include subsequent highest output channels), according to the initial test position or fixed exposure position requirements, is adjusted by the ratio of the subsequent test configuration to initial test configuration specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, SAR is not required for that subsequent test configuration.
- 3) . The number of channels in the initial test configuration and subsequent test configuration can be different due to differences in channel bandwidth. When SAR measurement is required for a subsequent test configuration and the channel bandwidth is smaller than that in the initial test configuration, all channels in the subsequent test configuration that overlap with the larger bandwidth channel tested in the initial test configuration should be used to determine the highest maximum output power channel. This step requires additional power measurement to identify the highest maximum output power channel in the subsequent test configuration to determine SAR test reduction.
 - a) SAR should first be measured for the channel with highest measured output power in the subsequent test configuration.
 - b) SAR for subsequent highest measured maximum output power channels in the subsequent test configuration is required only when the *reported* SAR of the preceding higher maximum output power channel(s) in the subsequent test configuration is > 1.2 W/kg or until all required channels are tested. i) For channels with the same measured maximum output power, SAR should be measured using the channel closest to the center frequency of the larger channel bandwidth channel in the initial test configuration.
- 4) . SAR measurements for the remaining highest specified maximum output power OFDM transmission mode configurations that have not been tested in the initial test configuration (highest maximum output) or subsequent test configuration(s) (subsequent next highest maximum output power) is determined by recursively applying the subsequent test configuration procedures in this section to the remaining configurations according to the following:
 - a) replace "subsequent test configuration" with "next subsequent test configuration" (i.e., subsequent next highest specified maximum output power configuration)
 - b) replace "initial test configuration" with "all tested higher output power configurations"



5.2.3.4 2.4 GHz SAR Procedures

Separate SAR procedures are applied to DSSS and OFDM configurations in the 2.4 GHz band to simplify DSSS test requirements. For 802.11b DSSS SAR measurements, DSSS SAR procedure applies to fixed exposure test position and initial test position procedure applies to multiple exposure test positions. When SAR measurement is required for an OFDM configuration, the initial test configuration, subsequent test configuration and initial test position procedures are applied. The SAR test exclusion requirements for 802.11g/n OFDM configurations are described in following.

- **802.11b DSSS SAR Test Requirements**

SAR is measured for 2.4 GHz 802.11b DSSS using either a fixed test position or, when applicable, the initial test position procedure. SAR test reduction is determined according to the following:

- 1) . When the reported SAR of the highest measured maximum output power channel for the exposure configuration is ≤ 0.8 W/kg, no further SAR testing is required for 802.11b DSSS in that exposure configuration.
- 2) . When the reported SAR is > 0.8 W/kg, SAR is required for that exposure configuration using the next highest measured output power channel. When any reported SAR is > 1.2 W/kg, SAR is required for the third channel; i.e., all channels require testing.

- **2.4 GHz 802.11g/n OFDM SAR Test Exclusion Requirements**

When SAR measurement is required for 2.4 GHz 802.11g/n OFDM configurations, the measurement and test reduction procedures for OFDM are applied (section 5.3, including sub-sections). SAR is not required for the following 2.4 GHz OFDM conditions.

- 1) . When KDB Publication 447498 SAR test exclusion applies to the OFDM configuration.
- 2) . When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg.

5.2.4 LTE Test Configuration

LTE modes were tested according to FCC KDB 941225 D05 publication. Please see notes after the tabulated SAR data for required test configurations. Establishing connections with base station simulators ensure a consistent means for testing SAR and are recommended for evaluating SAR. The R&S CMW500 was used for LTE output power measurements and SAR testing. Max power control was used so the UE transmits with maximum output power during SAR testing. SAR must be measured with the maximum TTI (transmit time interval) supported by the device in each LTE configuration.

A) Spectrum Plots for RB Configurations

A properly configured base station simulator was used for SAR tests and power measurements. Therefore, spectrum plots for RB configurations were not required to be included in this report.

B) MPR

MPR is permanently implemented for this device by the manufacturer. The specific manufacturer target MPR is indicated alongside the SAR results. MPR is enabled for this device, according to 3GPP TS36.101 Section 6.2.3 – 6.2.5 under Table 6.2.3-1.

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

C) A-MPR

A-MPR (Additional MPR) has been disabled for all SAR tests by setting NS=01 on the base station simulator.

D) Largest channel bandwidth standalone SAR test requirements

1) QPSK with 1 RB allocation

Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power for RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

2) QPSK with 50% RB allocation

The procedures required for 1 RB allocation in 1) are applied to measure the SAR for QPSK with 50% RB allocation.

3) QPSK with 100% RB allocation

For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation in 1) and 2) are ≤ 0.8 W/kg. Otherwise, SAR is measured for the highest output power channel and if the reported SAR is > 1.45 W/kg, the remaining required test channels must also be tested.

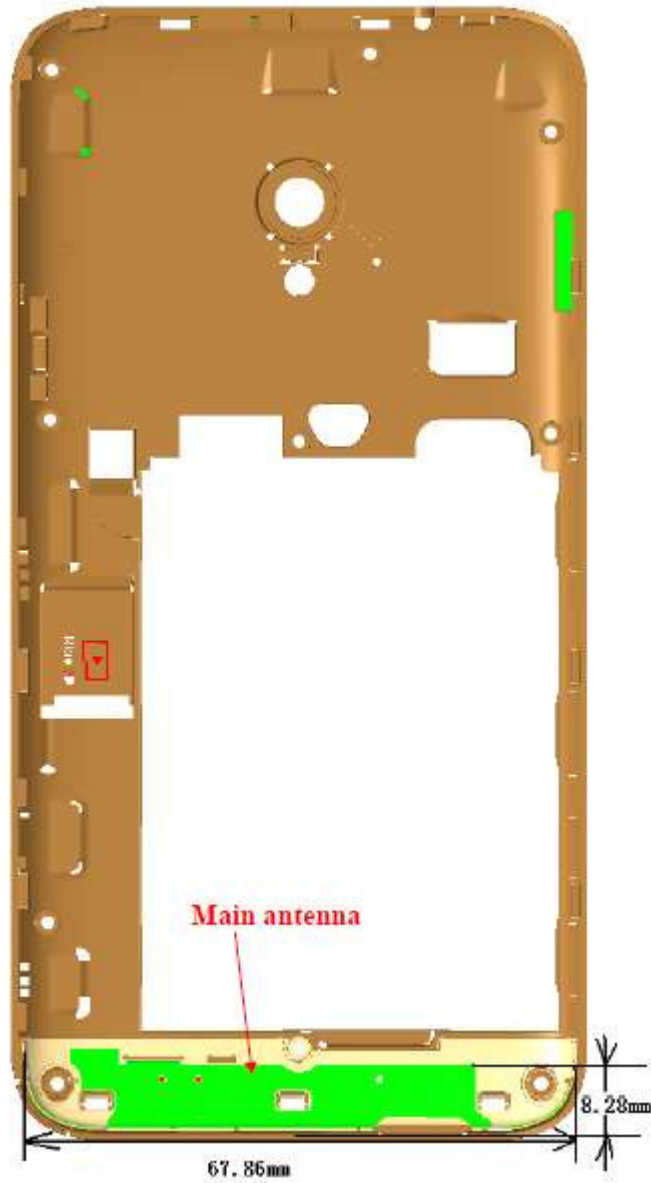
4) Higher order modulations

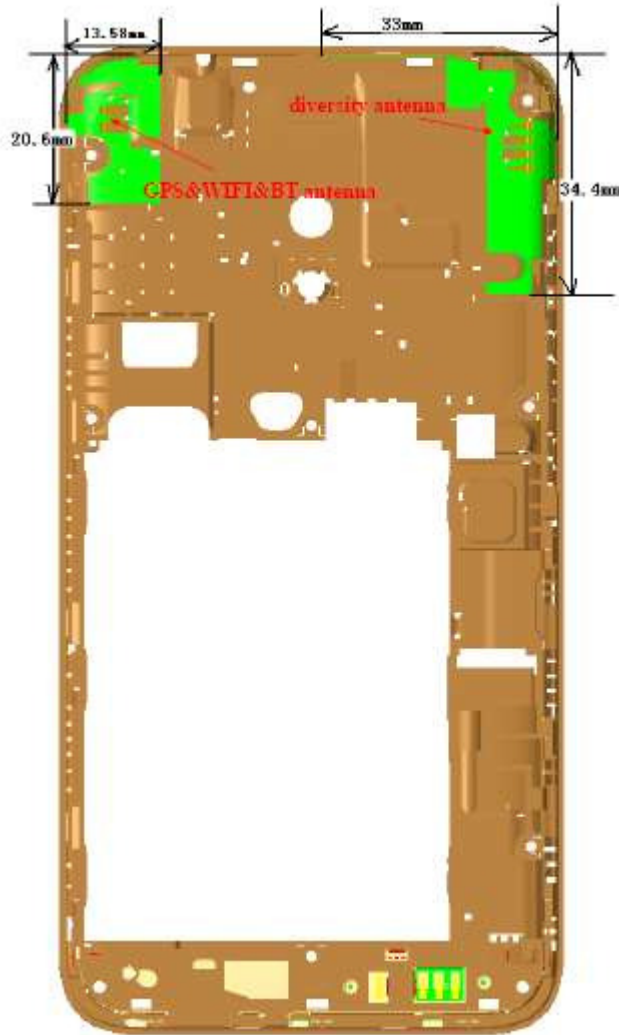
For each modulation besides QPSK; e.g., 16-QAM, 64-QAM, apply the QPSK procedures in above sections to determine the QAM configurations that may need SAR measurement. For each configuration identified as required for testing, SAR is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg.

E) Other channel bandwidth standalone SAR test requirements

For the other channel bandwidths used by the device in a frequency band, apply all the procedures required for the largest channel bandwidth in section A) to determine the channels and RB configurations that need SAR testing and only measure SAR when the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.

5.2.5 DUT Antenna Locations





Note: The Diversity antenna does not have transmit function.

The test device is a mobile phone. The display diagonal dimension is 15.1 cm.

According to the distance between LTE/WCDMA/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	Yes	Yes	Yes	Yes	No	Yes
WCDMA	Yes	Yes	Yes	Yes	No	Yes
LTE	Yes	Yes	Yes	Yes	No	Yes
Wi-Fi (2.4GHz)	Yes	Yes	Yes	No	Yes	No

Table 8: EUT Sides for SAR Testing

Note: When the antenna-to-edge distance is greater than 2.5cm, such position does not need to be tested.



5.2.6 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				
Wi-Fi	2.45	Head	18	63.1	0	19.8	3	N
		Body-worn	18	63.1	15	6.6	3	N
		hotspot	18	63.1	10	9.9	3	N
Bluetooth	2.48	Head	8.5	7.1	0	2.2	3	Y
		Body-worn	8.5	7.1	15	0.7	3	Y
		hotspot	8.5	7.1	10	1.1	3	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:

$$\left[\frac{\text{max. power of channel, including tune-up tolerance, mW}}{\text{min. test separation distance, mm}} \right] \cdot \sqrt{f(\text{GHz})} \leq 3.0$$
 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

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.



5.3 Measurement of RF Conducted Power

5.3.1 Conducted Power of GSM

GSM 850										
Burst Output Power(dBm)					Tune up	Division Factors	Frame-Average Output Power(dBm)			Tune up
Channel		128	190	251			128	190	251	
GSM(GMSK)	GSM	32.57	32.59	32.52	33.3	-9.19	23.38	23.4	23.33	24.11
GPRS/EGPRS (GMSK)	1 TX Slot	32.54	32.59	32.52	33.3	-9.19	23.35	23.4	23.33	24.11
	2 TX Slots	29.51	29.49	29.41	30.5	-6.18	23.33	23.31	23.23	24.32
	3 TX Slots	27.51	27.47	27.36	28.5	-4.42	23.09	23.05	22.94	24.08
	4 TX Slots	26.65	26.58	26.45	27.5	-3.17	23.48	23.41	23.28	24.33
EGPRS(8PSK)	1 TX Slot	26.82	26.85	26.91	27.5	-9.19	17.63	17.66	17.72	18.31
	2 TX Slots	25.03	25.14	25.18	26	-6.18	18.85	18.96	19	19.82
	3 TX Slots	23.68	23.69	23.71	24	-4.42	19.26	19.27	19.29	19.58
	4 TX Slots	22.39	22.48	22.51	23	-3.17	19.22	19.31	19.34	19.83
GSM 1900										
Burst Output Power(dBm)					Tune up	Division Factors	Frame-Average Output Power(dBm)			Tune up
Channel		512	661	810			512	661	810	
GSM(GMSK)	GSM	29.44	29.4	29.3	30.3	-9.19	20.25	20.21	20.11	21.11
GPRS/EGPRS (GMSK)	1 TX Slot	29.43	29.39	29.29	30.3	-9.19	20.24	20.2	20.1	21.11
	2 TX Slots	26.21	26.09	26.18	28	-6.18	20.03	19.91	20	21.82
	3 TX Slots	24.44	24.06	24.15	26	-4.42	20.02	19.64	19.73	21.58
	4 TX Slots	23.49	23.43	23.38	25	-3.17	20.32	20.26	20.21	21.83
EGPRS(8PSK)	1 TX Slot	26.02	26.06	26.21	27	-9.19	16.83	16.87	17.02	17.81
	2 TX Slots	23.69	23.83	24.19	25	-6.18	17.51	17.65	18.01	18.82
	3 TX Slots	22.3	22.39	22.68	24	-4.42	17.88	17.97	18.26	19.58
	4 TX Slots	20.86	21.03	21.29	22	-3.17	17.69	17.86	18.12	18.83

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:

$$\text{Frame-averaged power} = 10 \times \log (\text{Burst-averaged power mW} \times \text{Slot used} / 8)$$

- 3) . When the maximum output power variation across the required test channels is $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel must be used
- 4) . SAR test reduction for GPRS and EDGE modes is determined by the source-based time-averaged output power specified for production units, including tune-up tolerance.



5.3.2 Conducted Power of WCDMA

WCDMA Band II					
Average Conducted Power(dBm)					
Channel		9262	9400	9538	Tune up
WCDMA	12.2kbps RMC	23.63	23.89	23.92	24
	12.2kbps AMR	23.61	23.85	23.87	24
HSDPA	Subtest 1	22.76	22.92	22.95	23
	Subtest 2	22.66	22.89	22.93	23
	Subtest 3	22.12	22.38	22.41	23
	Subtest 4	22.34	22.65	22.79	23
HSUPA	Subtest 1	20.13	20.42	20.56	21
	Subtest 2	20.18	20.45	20.66	21
	Subtest 3	21.17	21.46	21.83	22
	Subtest 4	20.14	20.39	20.31	20.5
	Subtest 5	22.16	22.46	22.65	23
DC-HSDPA	Subtest 1	22.57	22.76	22.78	23
	Subtest 2	22.63	22.82	22.85	23
	Subtest 3	22.13	22.31	22.36	23
	Subtest 4	22.21	22.56	22.62	23
HSPA+	16QAM	22.49	22.72	22.65	23

WCDMA Band V					
Average Conducted Power(dBm)					
Channel		4132	4182	4233	Tune up
WCDMA	12.2kbps RMC	22.95	22.85	22.87	24
	12.2kbps AMR	22.92	22.81	22.83	24
HSDPA	Subtest 1	22.36	22.35	22.52	23
	Subtest 2	22.37	22.33	22.58	23
	Subtest 3	22.78	22.85	22.91	23
	Subtest 4	22.74	22.77	22.94	23
HSUPA	Subtest 1	20.47	20.54	20.68	21
	Subtest 2	20.13	20.14	20.29	21
	Subtest 3	21.12	21.14	21.31	22
	Subtest 4	20.11	20.17	20.32	21
	Subtest 5	22.16	22.15	22.34	23
DC-HSDPA	Subtest 1	22.28	22.31	22.43	23
	Subtest 2	22.33	22.27	22.51	23
	Subtest 3	22.63	22.69	22.76	23
	Subtest 4	22.71	22.72	22.83	23
HSPA+	16QAM	22.19	22.26	22.32	23

Table 10: Conducted Power of WCDMA

- 1) When the maximum output power variation across the required test channels is $> \frac{1}{2}$ dB, instead of the middle channel, the highest output power channel must be used.



5.3.3 Conducted Power of LTE

LTE Band 7				Conducted Power(dBm)			
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20775	21100	21425	
5MHz	QPSK	1	0	22.83	22.42	21.79	23
		1	13	22.83	22.44	21.81	23
		1	24	22.71	22.31	21.67	23
		12	0	21.96	21.6	20.92	22
		12	6	21.89	21.56	20.89	22
		12	13	21.83	21.52	20.84	22
	16QAM	25	0	21.86	21.53	20.83	22
		1	0	21.89	21.35	21.33	22
		1	13	21.93	21.67	21.25	22
		1	24	21.74	21.39	20.78	22
		12	0	20.91	20.5	19.95	21
		12	6	20.91	20.46	19.91	21
		12	13	20.9	20.48	19.87	21
		25	0	20.76	20.46	19.81	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20800	21100	21400	
10MHz	QPSK	1	0	22.72	22.38	22.09	23
		1	25	22.72	22.38	21.9	23
		1	49	22.74	22.36	21.58	23
		25	0	21.83	21.58	21.01	22
		25	13	21.88	21.54	20.96	22
		25	25	21.81	21.53	20.85	22
	16QAM	50	0	21.95	21.58	20.95	22
		1	0	21.82	21.91	20.95	22
		1	25	21.85	21.53	20.82	22
		1	49	21.89	21.7	20.73	22
		25	0	20.86	20.49	20.05	21
		25	13	20.85	20.51	19.92	21
		25	25	20.84	20.51	19.98	21
		50	0	20.86	20.5	19.95	21
Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
				20825	21100	21375	
15MHz	QPSK	1	0	22.85	22.53	21.97	23
		1	38	22.68	22.47	22.01	23

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		1	74	22.47	22.43	21.7	23	
		36	0	21.87	21.65	21.21	22	
		36	18	21.85	21.59	21.08	22	
		36	39	21.79	21.57	20.98	22	
		75	0	21.85	21.6	21.04	22	
	16QAM	1	0	21.58	21.7	20.9	22	
		1	38	21.92	21.78	21.55	22	
		1	74	21.91	21.95	20.69	22	
		36	0	20.83	20.53	20.06	21	
		36	18	20.85	20.53	20.1	21	
		36	39	20.66	20.5	20.01	21	
		75	0	20.87	20.51	20.07	21	
	Bandwidth	Modulation	RB size	RB offset	Channel	Channel	Channel	Tune up
					20850	21100	21350	
20MHz	QPSK	1	0	22.83	22.54	22.15	23	
		1	50	22.06	22.54	22.07	23	
		1	99	21.69	22.51	21.7	23	
		50	0	21.96	21.67	21.32	22	
		50	25	21.25	21.72	21.2	22	
		50	50	20.76	21.67	21.04	22	
		100	0	21.59	21.57	21.14	22	
	16QAM	1	0	21.82	21.65	20.47	22	
		1	50	21.59	21.69	21.27	22	
		1	99	21.21	21.63	21.34	22	
		50	0	20.88	20.71	19.36	21	
		50	25	20.35	20.6	20.17	21	
		50	50	19.81	20.6	20.05	21	
		100	0	20.61	20.6	20.16	21	

Table 11: Conducted Power of LTE



5.3.4 Conducted Power of WIFI and BT

Mode	Channel	Frequency(MHz)	Data Rate(Mbps)	Tune up	Average Power (dBm)	SAR Test
802.11b	1	2412	1	18	16.95	No
	6	2437		18	17.48	Yes
	11	2462		18	17.15	No
802.11g	1	2412	6	17	15.82	No
	6	2437		17	16.24	No
	11	2462		17	15.97	No
802.11n HT20	1	2412	6.5	16	14.86	No
	6	2437		16	15.36	No
	11	2462		16	15.06	No
802.11n HT40	3	2422	13.5	15	14.17	No
	6	2437		15	14.21	No
	9	2452		15	14.2	No

Table 12: Conducted Power Of WIFI

BT			Tune up (dBm)	Average Conducted Power(dBm)
Modulation	Channel	Frequency(MHz)		
GFSK	0	2402	8.5	6.43
	39	2441	8.5	8.05
	78	2480	8.5	7.17
$\pi/4$ DQPSK	0	2402	6	4.36
	39	2441	7	5.96
	78	2480	6	4.87
8DPSK	0	2402	6	4.32
	39	2441	7	6
	78	2480	6	4.76
BLE			Tune up (dBm)	Average Conducted Power(dBm)
Modulation	Channel	Frequency(MHz)		
GFSK	0	2402	0	-2.96
	19	2440	0	-1.6
	39	2480	0	-3.16

Table 13: Conducted Power of BT



5.4 Measurement of SAR Data

5.4.1 SAR Result of GSM850

Test position	Test mode	Test Ch./Frequency	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift(dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)1-g	Scaled SAR(W/kg) 10-g	Liquid Temp.(°C)
Head Test data												
Left cheek	GSM	190/83 6.6	1:8.3	0.189	0.146	0.09	32.59	33.3	1.178	0.223	0.172	22.1
Left tilted	GSM	190/83 6.6	1:8.3	0.0975	0.0755	0.11	32.59	33.3	1.178	0.115	0.089	22.1
Right cheek	GSM	190/83 6.6	1:8.3	0.18	0.14	0.18	32.59	33.3	1.178	0.212	0.165	22.1
Right tilted	GSM	190/83 6.6	1:8.3	0.101	0.0782	0.08	32.59	33.3	1.178	0.119	0.092	22.1
Body worn Test data(Separate 15mm)												
Front side	GSM	190/83 6.6	1:8.3	0.222	0.173	0.1	32.59	33.3	1.178	0.261	0.204	22.1
Back side	GSM	190/83 6.6	1:8.3	0.249	0.194	0.03	32.59	33.3	1.178	0.293	0.228	22.1
Hotspot Test data(Separate 10mm)												
Front side	GPRS 4TS	128/82 4.2	1:2.0 75	0.236	0.186	0.03	26.65	27.5	1.216	0.287	0.226	22.1
Back side	GPRS 4TS	128/82 4.3	1:2.0 75	0.288	0.227	0.06	26.65	27.5	1.216	0.350	0.276	22.1
Left side	GPRS 4TS	128/82 4.4	1:2.0 75	0.203	0.144	-0.06	26.65	27.5	1.216	0.247	0.175	22.1
Right side	GPRS 4TS	128/82 4.5	1:2.0 75	0.144	0.101	0.11	26.65	27.5	1.216	0.175	0.123	22.1
Bottom side	GPRS 4TS	128/82 4.6	1:2.0 75	0.0373	0.0213	0.07	26.65	27.5	1.216	0.045	0.026	22.1

Table 14: 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) 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).



5.4.2 SAR Result of GSM1900

Test position	Test mode	Test Ch./Frequency	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift(dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scal ed factor	Scaled SAR(W/kg)1-g	Scaled SAR(W/kg)10-g	Liquid Temp.(°C)
Head Test data												
Left cheek	GSM	512/185 0.2	1:8.3	0.0967	0.0594	0.13	29.44	30.3	1.219	0.118	0.072	22.3
Left tilted	GSM	512/185 0.2	1:8.3	0.103	0.055	0.13	29.44	30.3	1.219	0.126	0.067	22.3
Right cheek	GSM	512/185 0.2	1:8.3	0.198	0.118	0.05	29.44	30.3	1.219	0.241	0.144	22.3
Right tilted	GSM	512/185 0.2	1:8.3	0.0902	0.0484	0.05	29.44	30.3	1.219	0.110	0.059	22.3
Body worn Test data(Separate 15mm)												
Front side	GSM	512/185 0.2	1:8.3	0.14	0.0895	-0.02	29.44	30.3	1.219	0.171	0.109	22.3
Back side	GSM	512/185 0.2	1:8.3	0.132	0.0774	0.14	29.44	30.3	1.219	0.161	0.094	22.3
Hotspot Test data(Separate 10mm)												
Front side	GPRS 4TS	512/185 0.2	1:2.0 75	0.24	0.144	0.02	23.49	25	1.416	0.340	0.204	22.3
Back side	GPRS 4TS	512/185 0.2	1:2.0 75	0.239	0.134	0.18	23.49	25	1.416	0.338	0.190	22.3
Left side	GPRS 4TS	512/185 0.2	1:2.0 75	0.0655	0.0401	0.17	23.49	25	1.416	0.093	0.057	22.3
Right side	GPRS 4TS	512/185 0.2	1:2.0 75	0.124	0.0744	0.11	23.49	25	1.416	0.176	0.105	22.3
Bottom side	GPRS 4TS	512/185 0.2	1:2.0 75	0.187	0.103	-0.02	23.49	25	1.416	0.265	0.146	22.3

Table 15: 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) 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).



5.4.3 SAR Result of WCDMA II

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift(dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)1-g	Scaled SAR(W/kg)10-g	Liquid Temp.(°C)
Head Test data												
Left cheek	RM C	9538/1907.6	1:1	0.392	0.237	0.03	23.92	24	1.019	0.399	0.241	22.3
Left tilted	RM C	9538/1907.6	1:1	0.308	0.166	0.05	23.92	24	1.019	0.314	0.169	22.3
Right cheek	RM C	9538/1907.6	1:1	0.635	0.385	0.09	23.92	24	1.019	0.647	0.392	22.3
Right tilted	RM C	9538/1907.6	1:1	0.296	0.161	0.11	23.92	24	1.019	0.302	0.164	22.3
Body worn Test data(Separate 15mm)												
Front side	RM C	9538/1907.6	1:1	0.41	0.25	-0.03	23.92	24	1.019	0.418	0.255	22.3
Back side	RM C	9538/1907.6	1:1	0.427	0.238	0.02	23.92	24	1.019	0.435	0.242	22.3
Hotspot Test data(Separate 10mm)												
Front side	RM C	9538/1907.6	1:1	0.818	0.478	-0.02	23.92	24	1.019	0.833	0.487	22.3
Back side	RM C	9538/1907.6	1:1	0.927	0.48	0.11	23.92	24	1.019	0.944	0.489	22.3
Left side	RM C	9538/1907.6	1:1	0.27	0.164	0.03	23.92	24	1.019	0.275	0.167	22.3
Right side	RM C	9538/1907.6	1:1	0.371	0.222	0.02	23.92	24	1.019	0.378	0.226	22.3
Bottom side	RM C	9538/1907.6	1:1	0.685	0.363	-0.09	23.92	24	1.019	0.698	0.370	22.3
Front side	RM C	9262/1852.4	1:1	0.959	0.58	-0.1	23.63	24	1.089	1.044	0.632	22.3
Front side	RM C	9400/1880	1:1	0.966	0.57	0.07	23.89	24	1.026	0.991	0.585	22.3
Back side	RM C	9262/1852.4	1:1	1.02	0.577	0.1	23.63	24	1.089	1.111	0.628	22.3
Back side	RM C	9400/1880	1:1	1.16	0.618	-0.01	23.89	24	1.026	1.190	0.634	22.3
Back side-repeat	RM C	9400/1880	1:1	1.07	0.576	0.06	23.89	24	1.026	1.097	0.591	22.3

Test Position	Channel/Frequency	Measured SAR (1g)	1 st Repeated	Ratio	2 nd Repeated	3 rd Repeated
	(MHz)		SAR (1g)		SAR (1g)	SAR (1g)
Back Side	9400/1880	1.16	1.07	1.084112	N/A	N/A

- Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.
 2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).
 3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .
 4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg

Table 16: SAR of WCDMA II for Head and Body.

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph Results refer to Appendix B
- 2) 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).



5.4.4 SAR Result of WCDMA V

Test position	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg) 1-g	SAR (W/kg) 10-g	Power Drift(dB)	Conducted Power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg) 1-g	Scaled SAR(W/kg) 10-g	Liquid Temp.(°C)
Head Test data												
Left cheek	RM C	4132/826.4	1:1	0.471	0.364	0.07	22.95	24	1.274	0.600	0.464	22.1
Left tilted	RM C	4132/826.5	1:1	0.253	0.197	-0.03	22.95	24	1.274	0.322	0.251	22.1
Right cheek	RM C	4132/826.6	1:1	0.429	0.335	0.02	22.95	24	1.274	0.546	0.427	22.1
Right tilted	RM C	4132/826.7	1:1	0.241	0.189	0.1	22.95	24	1.274	0.307	0.241	22.1
Body worn Test data(Separate 15mm)												
Front side	RM C	4132/826.7	1:1	0.503	0.391	-0.06	22.95	24	1.274	0.641	0.498	22.1
Back side	RM C	4132/826.7	1:1	0.539	0.419	0.02	22.95	24	1.274	0.686	0.534	22.1
Hotspot Test data(Separate 10mm)												
Front side	RM C	4132/826.7	1:1	0.54	0.425	0.05	22.95	24	1.274	0.688	0.541	22.1
Back side	RM C	4132/826.8	1:1	0.625	0.491	-0.04	22.95	24	1.274	0.796	0.625	22.1
Left side	RM C	4132/826.9	1:1	0.494	0.346	-0.01	22.95	24	1.274	0.629	0.441	22.1
Right side	RM C	4132/826.10	1:1	0.391	0.273	0.15	22.95	24	1.274	0.498	0.348	22.1
Bottom side	RM C	4132/826.11	1:1	0.0759	0.0421	0.05	22.95	24	1.274	0.097	0.054	22.1

Table 17: SAR of WCDMA V for Head and Body.

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph Results refer to Appendix B
- 2) 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).



5.4.5 SAR Result of LTE Band 7

Test position	B W.	Test mode	Test Ch./Freq.	Duty Cycle	SAR (W/kg)1-g	SAR (W/kg)10-g	Power Drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)1-g	Scaled SAR(W/kg)10-g	Liquid Temp.(°C)
Head Test data(1RB_0 offset)													
Left cheek	20	QPSK	20850/2510	1:1	0.352	0.183	-0.11	22.83	23	1.040	0.366	0.190	22.1
Left tilted	20	QPSK	20850/2510	1:1	0.296	0.137	0.05	22.83	23	1.040	0.308	0.142	22.1
Right cheek	20	QPSK	20850/2510	1:1	0.394	0.207	-0.06	22.83	23	1.040	0.410	0.215	22.1
Right tilted	20	QPSK	20850/2510	1:1	0.218	0.0393	0.12	22.83	23	1.040	0.227	0.041	22.1
Head Test data(50%RB_0)													
Left cheek	20	QPSK	20850/2510	1:1	0.303	0.156	-0.09	21.96	22	1.009	0.306	0.157	22.1
Left tilted	20	QPSK	20850/2510	1:1	0.242	0.109	0.03	21.96	22	1.009	0.244	0.110	22.1
Right cheek	20	QPSK	20850/2510	1:1	0.289	0.152	0.05	21.96	22	1.009	0.292	0.153	22.1
Right tilted	20	QPSK	20850/2510	1:1	0.176	0.0758	0.19	21.96	22	1.009	0.178	0.077	22.1
Body worn Test data(Separate 15mm 1RB_0 offset)													
Front side	20	QPSK	20850/2510	1:1	0.257	0.138	0.03	22.83	23	1.040	0.267	0.144	22.1
Back side	20	QPSK	20850/2510	1:1	0.594	0.305	0.07	22.83	23	1.040	0.618	0.317	22.1
Body worn Test data (Separate 15mm 50%RB_0)													
Front side	20	QPSK	20850/2510	1:1	0.199	0.106	0.13	21.96	22	1.009	0.201	0.107	22.1
Back side	20	QPSK	20850/2510	1:1	0.479	0.243	0.08	21.96	22	1.009	0.483	0.245	22.1
Hotspot Test data(Separate 10mm 1RB_0 offset)													
Front side	20	QPSK	20850/2510	1:1	0.49	0.252	0.18	22.83	23	1.040	0.510	0.262	22.1
Back side	20	QPSK	20850/2510	1:1	1.07	0.512	0.04	22.83	23	1.040	1.113	0.532	22.1
Left side	20	QPSK	20850/2510	1:1	0.286	0.158	0.09	22.83	23	1.040	0.297	0.164	22.1
Right side	20	QPSK	20850/2510	1:1	0.282	0.152	0.02	22.83	23	1.040	0.293	0.158	22.1
Bottom side	20	QPSK	20850/2510	1:1	1.24	0.591	0.08	22.83	23	1.040	1.290	0.615	22.1
Back side	20	QPSK	21100/2535.5	1:1	0.709	0.318	-0.04	22.54	23	1.112	0.788	0.354	22.1
Back side	20	QPSK	21350/2560	1:1	0.657	0.315	-0.06	22.15	23	1.216	0.799	0.383	22.1
Bottom side	20	QPSK	21100/2535.5	1:1	0.939	0.423	0.11	22.54	23	1.112	1.044	0.470	22.1
Bottom side	20	QPSK	21350/2560	1:1	0.733	0.327	0.04	22.15	23	1.216	0.891	0.398	22.1
Bottom side-repeat	20	QPSK	20850/2510	1:1	1.17	0.552	-0.01	22.83	23	1.040	1.217	0.574	22.1
Hotspot Test data (Separate 10mm 50%RB_0)													
Front side	20	QPSK	20850/2510	1:1	0.397	0.197	0.09	21.96	22	1.009	0.401	0.199	22.1
Back side	20	QPSK	20850/2510	1:1	0.873	0.411	0.07	21.96	22	1.009	0.881	0.415	22.1
Left side	20	QPSK	20850/2510	1:1	0.241	0.133	0.11	21.96	22	1.009	0.243	0.134	22.1
Right side	20	QPSK	20850/2510	1:1	0.237	0.127	0.17	21.96	22	1.009	0.239	0.128	22.1
Bottom side	20	QPSK	20850/2510	1:1	0.996	0.467	0.13	21.96	22	1.009	1.005	0.471	22.1



Back side	20	QP SK	21100/25 35.5	1:1	0.624	0.282	0.02	21.67	22	1.07 9	0.673	0.304	22.1
Back side	20	QP SK	21350/25 60	1:1	0.538	0.256	-0.09	21.32	22	1.16 9	0.629	0.299	22.1
Bottom side	20	QP SK	21100/25 35.5	1:1	0.806	0.362	0.02	21.67	22	1.07 9	0.870	0.391	22.1
Bottom side	20	QP SK	21350/25 60	1:1	0.529	0.237	0.02	21.32	22	1.16 9	0.619	0.277	22.1
Hotspot Test data (Separate 10mm 100%RB)													
Back side	20	QP SK	20850/25 10	1:1	0.857	0.381	0.19	21.59	22	1.09 9	0.942	0.419	22.1
Bottom side	20	QP SK	20850/25 10	1:1	0.969	0.44	0.02	21.59	22	1.09 9	1.065	0.484	22.1

Test Position	Channel/ Frequency		Measured SAR (1g)	1 st Repeated	Ratio	2 nd Repeated	3 rd Repeated
	(MHz)			SAR (1g)		SAR (1g)	SAR (1g)
Bottom side	20850/2510		1.24	1.17	1.0598291	N/A	N/A
Note: 1) When the original highest measured SAR is ≥ 0.80 W/kg, the measurement was repeated once.							
2) A second repeated measurement was performed only if the ratio of largest to smallest SAR for the original and first repeated measurements was > 1.20 or when the original or repeated measurement was ≥ 1.45 W/kg (~ 10% from the 1-g SAR limit).							
3) A third repeated measurement was performed only if the original, first or second repeated measurement was ≥ 1.5 W/kg and the ratio of largest to smallest SAR for the original, first and second repeated measurements is > 1.20 .							
4) Repeated measurements are not required when the original highest measured SAR is < 0.80 W/kg							

Table 18: SAR of LTE Band 7 for Head and Body.

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B
- 2) 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).



5.4.6 SAR Result of WIFI2.4G

Test position	Test mode	Test Ch./Freq.	Duty Cycle	Duty Cycle Scaled factor	SAR (W/kg)1-g	SAR (W/kg)10-g	Power drift(dB)	Conducted power(dBm)	Tune up Limit(dBm)	Scaled factor	Scaled SAR(W/kg)1-g	Scaled SAR(W/kg)10-g	Liquid Temp.(°C)
Head Test data													
Left cheek	802.11b	6/2437	99.41%	1.006	0.218	0.117	0.07	17.48	18	1.127	0.247	0.133	22
Left tilted	802.11b	6/2437	99.41%	1.006	0.216	0.111	-0.02	17.48	18	1.127	0.245	0.126	22
Right cheek	802.11b	6/2437	99.41%	1.006	0.469	0.204	0.03	17.48	18	1.127	0.532	0.231	22
Right tilted	802.11b	6/2437	99.41%	1.006	0.358	0.156	0.08	17.48	18	1.127	0.406	0.177	22
Body worn Test data(Separate 15mm)													
Front side	802.11b	6/2437	99.41%	1.006	0.0579	0.0326	-0.07	17.48	18	1.127	0.066	0.037	22
Back side	802.11b	6/2437	99.41%	1.006	0.097	0.045	0.06	17.48	18	1.127	0.110	0.051	22
Hotspot Test data (Separate 10mm)													
Front side	802.11b	6/2437	99.41%	1.006	0.106	0.0566	-0.09	17.48	18	1.127	0.120	0.064	22
Back side	802.11b	6/2437	99.41%	1.006	0.233	0.107	0.08	17.48	18	1.127	0.264	0.121	22
Left side	802.11b	6/2437	99.41%	1.006	0.0954	0.047	-0.06	17.48	18	1.127	0.108	0.053	22
Top side	802.11b	6/2437	99.41%	1.006	0.0821	0.0453	-0.05	17.48	18	1.127	0.093	0.051	22

Table 19: SAR of WIFI2.4G for Head and Body

Note:

- 1) The maximum Scaled SAR value is marked in bold. Graph results refer to Appendix B
- 2) 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) Each channel was tested at the lowest data rate.
- 4) When the highest reported SAR for DSSS is adjusted by the ratio of OFDM to DSSS specified maximum output power and the adjusted SAR is ≤ 1.2 W/kg, 802.11g/n OFDM SAR Test is not required.



5.5 Multiple Transmitter Evaluation

5.5.1 Simultaneous SAR test evaluation

1) 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:

- $(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm}) \cdot [\sqrt{f(\text{GHz})} / x]$
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 (GHz)	Test Position	max. power(dBm)	Test Separation (mm)	Estimated
					1g SAR (W/kg)
Bluetooth	2.48	Head	8.5	0	0.297
		Body-worn	8.5	15	0.099
		hotspot	8.5	10	0.149

2) Simultaneous Transmission

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

Note:

1) The device does not support DTM function.



3) Simultaneous Transmission SAR Summation Scenario for head

WWAN Band	Exposure position	① MAX.WWAN SAR(W/kg)	②MAX.WLAN SAR(W/kg)	③ MAX.BT SAR(W/kg)	Summed SAR①+ ②	Summed SAR①+ ③	Case NO.
GSM850	Left Touch	0.223	0.247	0.297	0.470	0.520	No
	Left Tilt	0.115	0.245	0.297	0.360	0.412	No
	Right Touch	0.212	0.532	0.297	0.744	0.509	No
	Right Tilt	0.119	0.406	0.297	0.525	0.416	No
GSM1900	Left Touch	0.118	0.247	0.297	0.365	0.415	No
	Left Tilt	0.126	0.245	0.297	0.371	0.423	No
	Right Touch	0.241	0.532	0.297	0.773	0.538	No
	Right Tilt	0.110	0.406	0.297	0.516	0.407	No
WCDMA Band II	Left Touch	0.399	0.247	0.297	0.646	0.696	No
	Left Tilt	0.314	0.245	0.297	0.559	0.611	No
	Right Touch	0.647	0.532	0.297	1.179	0.944	No
	Right Tilt	0.302	0.406	0.297	0.708	0.599	No
WCDMA Band V	Left Touch	0.600	0.247	0.297	0.847	0.897	No
	Left Tilt	0.322	0.245	0.297	0.567	0.619	No
	Right Touch	0.546	0.532	0.297	1.078	0.843	No
	Right Tilt	0.307	0.406	0.297	0.713	0.604	No
LTE Band 7	Left Touch	0.366	0.247	0.297	0.613	0.663	No
	Left Tilt	0.308	0.245	0.297	0.553	0.605	No
	Right Touch	0.410	0.532	0.297	0.942	0.707	No
	Right Tilt	0.227	0.406	0.297	0.633	0.524	No



4) Simultaneous Transmission SAR Summation Scenario for body worn

WWAN Band	Exposure position	① MAX.WWAN SAR(W/kg)	② MAX.WLAN SAR(W/kg)	③ MAX.BT SAR(W/kg)	Summed SAR①+②	Summed SAR①+③	Case NO.
GSM850	Front	0.261	0.066	0.099	0.327	0.360	No
	Back	0.293	0.110	0.099	0.403	0.392	No
GSM1900	Front	0.171	0.066	0.099	0.237	0.270	No
	Back	0.161	0.110	0.099	0.271	0.260	No
WCDMA Band II	Front	0.418	0.066	0.099	0.484	0.517	No
	Back	0.435	0.110	0.099	0.545	0.534	No
WCDMA Band V	Front	0.641	0.066	0.099	0.707	0.740	No
	Back	0.686	0.110	0.099	0.796	0.785	No
LTE Band 7	Front	0.267	0.066	0.099	0.333	0.366	No
	Back	0.618	0.110	0.099	0.728	0.717	No



5) Simultaneous Transmission SAR Summation Scenario for hotspot

WWAN Band	Exposure position	① MAX.WWAN SAR(W/kg)	②MAX.WLAN SAR(W/kg)	③MAX.BT SAR(W/kg)	Summed SAR①+②	Summed SAR①+③	Case NO.
GSM850	Front	0.287	0.120	0.149	0.407	0.436	No
	Back	0.350	0.264	0.149	0.614	0.499	No
	Left	0.247	0.108	0.149	0.355	0.396	No
	Right	0.175	0.000	0.149	0.175	0.324	No
	Top	0.000	0.093	0.149	0.093	0.149	No
	Bottom	0.045	0.000	0.149	0.045	0.194	No
GSM1900	Front	0.340	0.120	0.149	0.460	0.489	No
	Back	0.338	0.264	0.149	0.602	0.487	No
	Left	0.093	0.108	0.149	0.201	0.242	No
	Right	0.176	0.000	0.149	0.176	0.325	No
	Top	0.000	0.093	0.149	0.093	0.149	No
	Bottom	0.265	0.000	0.149	0.265	0.414	No
WCDMA Band II	Front	1.044	0.120	0.149	1.164	1.193	No
	Back	1.190	0.264	0.149	1.454	1.339	No
	Left	0.275	0.108	0.149	0.383	0.424	No
	Right	0.378	0.000	0.149	0.378	0.527	No
	Top	0.000	0.093	0.149	0.093	0.149	No
	Bottom	0.698	0.000	0.149	0.698	0.847	No
WCDMA Band V	Front	0.688	0.120	0.149	0.808	0.837	No
	Back	0.796	0.264	0.149	1.060	0.945	No
	Left	0.629	0.108	0.149	0.737	0.778	No
	Right	0.498	0.000	0.149	0.498	0.647	No
	Top	0.000	0.093	0.149	0.093	0.149	No
	Bottom	0.097	0.000	0.149	0.097	0.246	No
LTE Band 7	Front	0.510	0.120	0.149	0.630	0.659	No
	Back	1.113	0.264	0.149	1.377	1.262	No
	Left	0.297	0.108	0.149	0.405	0.446	No
	Right	0.293	0.000	0.149	0.293	0.442	No
	Top	0.000	0.093	0.149	0.093	0.149	No
	Bottom	1.290	0.000	0.149	1.290	1.439	No



6 Equipment list

Test Platform		SPEAG DASY5 Professional				
Location		SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch				
Description		SAR Test System (Frequency range 300MHz-6GHz)				
Software Reference		DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)				
Hardware Reference						
Equipment		Manufacturer	Model	Serial Number	Calibration Date	Due date of calibration
<input checked="" type="checkbox"/>	Robot	Staubli	RX90L	F03/5V32A1/A01	NCR	NCR
<input checked="" type="checkbox"/>	Twin Phantom	SPEAG	SAM 1	1141	NCR	NCR
<input checked="" type="checkbox"/>	Phantom: ELI5	SPEAG	ELI5	1143	NCR	NCR
<input checked="" type="checkbox"/>	DAE	SPEAG	DAE4	1267	2017-11-28	2018-11-27
<input checked="" type="checkbox"/>	E-Field Probe	SPEAG	EX3DV4	3923	2017-08-24	2018-08-23
<input type="checkbox"/>	Validation Kits	SPEAG	D750V3	1160	2016-06-22	2019-06-21
<input checked="" type="checkbox"/>	Validation Kits	SPEAG	D835V2	4d105	2016-12-08	2019-12-07
<input type="checkbox"/>	Validation Kits	SPEAG	D1750V2	1149	2016-06-23	2019-06-22
<input checked="" type="checkbox"/>	Validation Kits	SPEAG	D1900V2	5d028	2016-12-07	2019-12-06
<input type="checkbox"/>	Validation Kits	SPEAG	D2300V2	1072	2016-06-21	2019-06-20
<input checked="" type="checkbox"/>	Validation Kits	SPEAG	D2450V2	733	2016-12-07	2019-12-06
<input checked="" type="checkbox"/>	Validation Kits	SPEAG	D2600V2	1125	2016-06-22	2019-06-21
<input checked="" type="checkbox"/>	Agilent Network Analyzer	Agilent	E5071C	MY46523590	2017-03-06	2018-03-05
<input checked="" type="checkbox"/>	Dielectric Probe Kit	Agilent	85070E	US01440210	NCR	NCR
<input checked="" type="checkbox"/>	Radio Communication Analyzer	Anritsu Corporation	MT8820C	6201465414	2017-04-14	2018-04-13
<input checked="" type="checkbox"/>	RF Bi-Directional Coupler	Agilent	86205-60001	MY31400031	NCR	NCR
<input checked="" type="checkbox"/>	Signal Generator	Agilent	N5171B	MY53050736	2017-03-06	2018-03-05
<input checked="" type="checkbox"/>	Preamplifier	Mini-Circuits	ZHL-42W	15542	NCR	NCR
<input checked="" type="checkbox"/>	Power Meter	Agilent	E4416A	GB41292095	2017-03-06	2018-03-05
<input checked="" type="checkbox"/>	Power Sensor	Agilent	8481H	MY41091234	2017-03-05	2018-03-04
<input checked="" type="checkbox"/>	Power Sensor	R&S	NRP-Z92	100025	2017-03-06	2018-03-05
<input checked="" type="checkbox"/>	Attenuator	SHX	TS2-3dB	30704	NCR	NCR
<input checked="" type="checkbox"/>	Coaxial low pass filter	Mini-Circuits	VLF-2500(+)	NA	NCR	NCR
<input type="checkbox"/>	Coaxial low pass filter	Microlab Fxr	LA-F13	NA	NCR	NCR
<input checked="" type="checkbox"/>	50 Ω coaxial load	Mini-Circuits	KARN-50+	00850	NCR	NCR
<input checked="" type="checkbox"/>	DC POWER SUPPLY	SAKO	SK1730SL5A	NA	NCR	NCR
<input checked="" type="checkbox"/>	Speed reading thermometer	MingGao	T809	NA	2017-03-08	2018-03-07
<input checked="" type="checkbox"/>	Humidity and Temperature Indicator	KIMTOKA	KIMTOKA	NA	2017-03-08	2018-03-07



7 SAR Measurement variability and uncertainty

7.1 SAR measurement variability

Per KDB865664 D01 SAR measurement 100 MHz to 6 GHz v01r04, SAR measurement variability must be assessed for each frequency band, which is determined by the SAR probe calibration point and tissue-equivalent medium used for the device measurements. The additional measurements are repeated after the completion of all measurements requiring the same head or body tissue-equivalent medium in a frequency band. The test device should be returned to ambient conditions (normal room temperature) with the battery fully charged before it is re-mounted on the device holder for the repeated measurement(s) to minimize any unexpected variations in the repeated results.

- 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 .

The same procedures should be adapted for measurements according to extremity and occupational exposure limits by applying a factor of 2.5 for extremity exposure and a factor of 5 for occupational exposure to the corresponding SAR thresholds.



7.2 SAR measurement uncertainty

Measurements and results are all in compliance with the standards listed in 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	$\sqrt{3}$	$(1 - C_p)1/2$	0.20	∞
hemispherical isotropy	E.2.2	2.6	R	$\sqrt{3}$	$\sqrt{C_p}$	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 20 : 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

1. System Performance Check for Head
System Performance Check 835 MHz Head
System Performance Check 1900 MHz Head
System Performance Check 2450 MHz Head
System Performance Check 2600 MHz Head
2. System Performance Check for Body
System Performance Check 835 MHz Body
System Performance Check 1900 MHz Body
System Performance Check 2450 MHz Body
System Performance Check 2600 MHz Body

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; $\sigma = 0.863$ S/m; $\epsilon_r = 40.668$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(10.58, 10.58, 10.58); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Body/d=15mm, Pin=250mW/Area Scan (61x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 2.95 W/kg

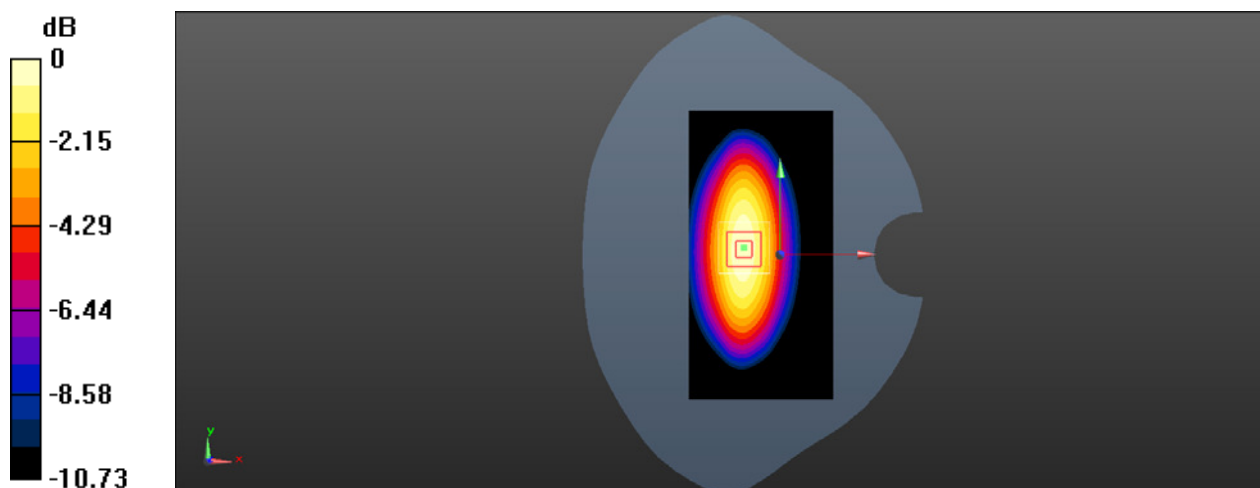
Body/d=15mm, Pin=250mW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 52.01 V/m; Power Drift = 0.16 dB

Peak SAR (extrapolated) = 3.57 W/kg

SAR(1 g) = 2.34 W/kg; SAR(10 g) = 1.51 W/kg

Maximum value of SAR (measured) = 3.01 W/kg



0 dB = 3.01 W/kg = 4.78 dBW/kg

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; $\sigma = 1.451$ S/m; $\epsilon_r = 38.564$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(8.75, 8.75, 8.75); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Body/d=10mm, Pin=250mW/Area Scan (61x101x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 12.4 W/kg

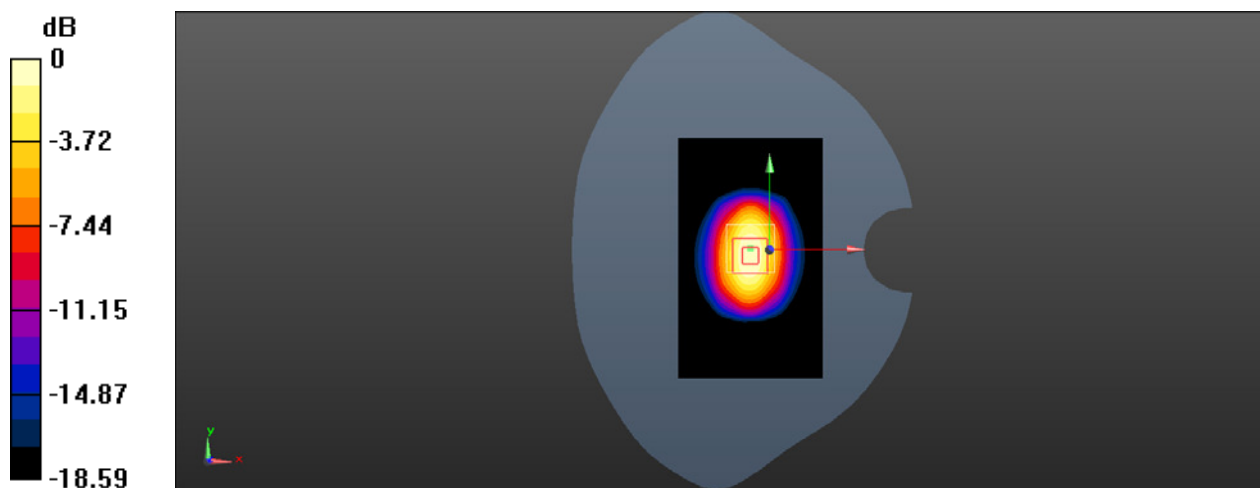
Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 84.22 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 20.5 W/kg

SAR(1 g) = 10.9 W/kg; SAR(10 g) = 5.57 W/kg

Maximum value of SAR (measured) = 12.2 W/kg



0 dB = 12.2 W/kg = 10.82 dBW/kg

Test Laboratory: SGS-SAR Lab

System Performance Check 2450MHz Head

DUT: D2450V2; Type: D2450V2; Serial: 733

Communication System: UID 0, CW; Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: HSL2450; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.819$ S/m; $\epsilon_r = 39.924$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.81, 7.81, 7.81); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Body/d=10mm, Pin=250mW/Area Scan (81x131x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm

Maximum value of SAR (interpolated) = 15.6 W/kg

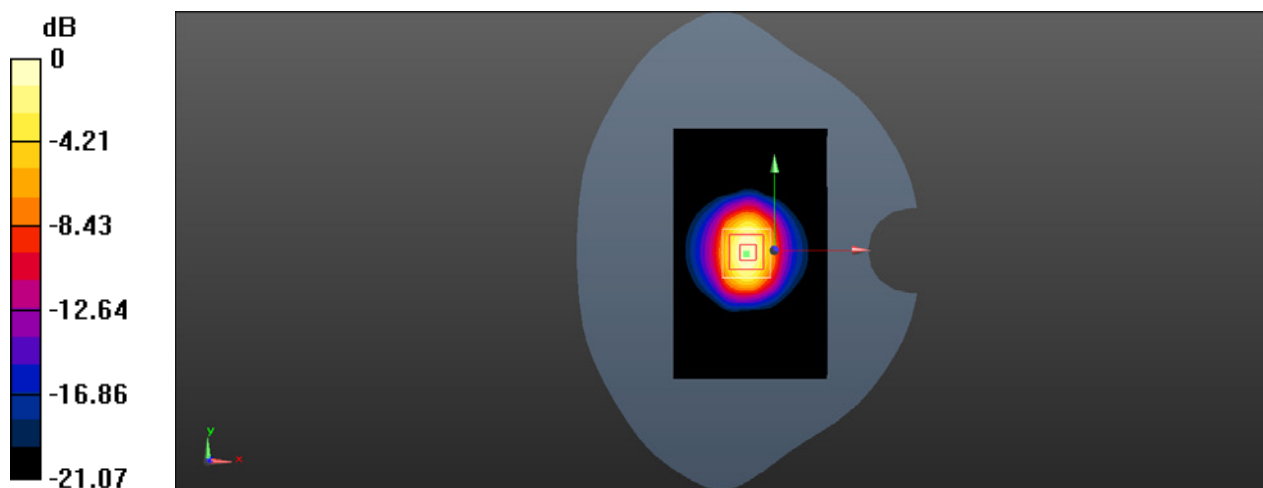
Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 90.68 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 25.9 W/kg

SAR(1 g) = 13.2 W/kg; SAR(10 g) = 6.19 W/kg

Maximum value of SAR (measured) = 15.1 W/kg



0 dB = 15.1 W/kg = 11.73 dBW/kg

Test Laboratory: SGS-SAR Lab

System Performance Check 2600MHz Head

DUT: Dipole D2600V2; Type: D2600V2; Serial: 1125

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

Medium: HSL2600; Medium parameters used: $f = 2600$ MHz; $\sigma = 2.028$ S/m; $\epsilon_r = 37.439$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.64, 7.64, 7.64); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Body/d=10mm, Pin=250mW/Area Scan (91x121x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 16.2 W/kg

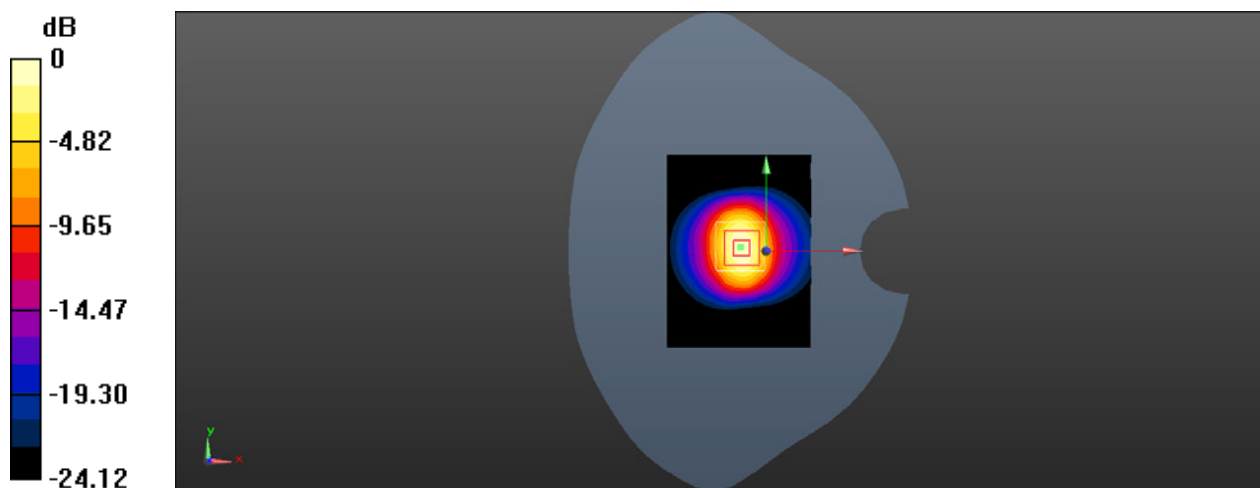
Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 88.23 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 32.2 W/kg

SAR(1 g) = 14.2 W/kg; SAR(10 g) = 6.31 W/kg

Maximum value of SAR (measured) = 16.2 W/kg



0 dB = 16.2 W/kg = 12.13 dBW/kg

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; $\sigma = 0.986$ S/m; $\epsilon_r = 54.389$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(10.58, 10.58, 10.58); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Body/d=15mm, Pin=250mW/Area Scan (61x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 3.15 W/kg

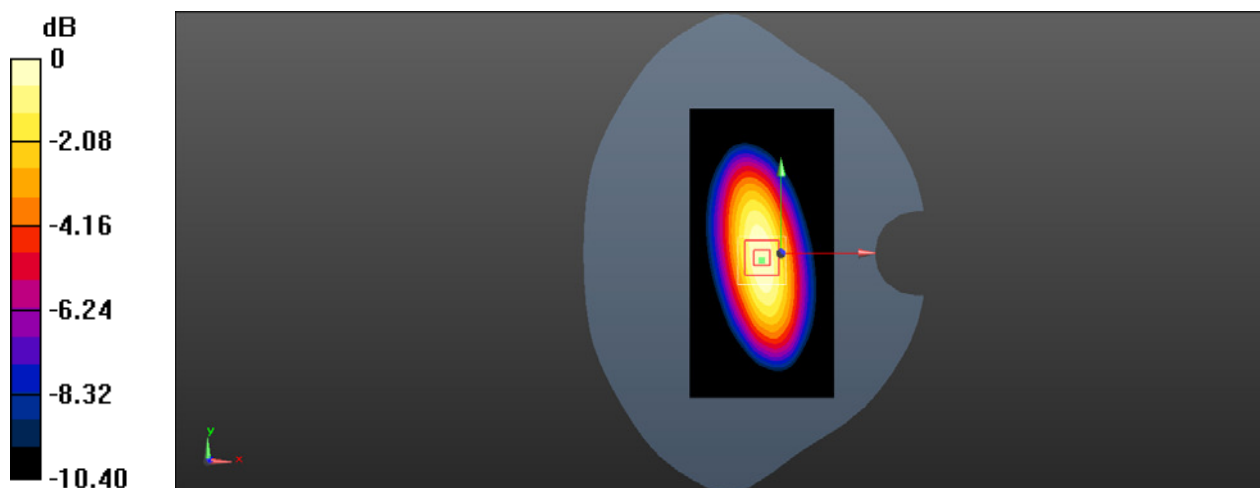
Body/d=15mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 50.81 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 3.66 W/kg

SAR(1 g) = 2.49 W/kg; SAR(10 g) = 1.65 W/kg

Maximum value of SAR (measured) = 3.14 W/kg



0 dB = 3.14 W/kg = 4.95 dBW/kg

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; $\sigma = 1.476$ S/m; $\epsilon_r = 53.025$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(8.44, 8.44, 8.44); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Body/d=10mm, Pin=250mW/Area Scan (61x101x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm

Maximum value of SAR (interpolated) = 14.3 W/kg

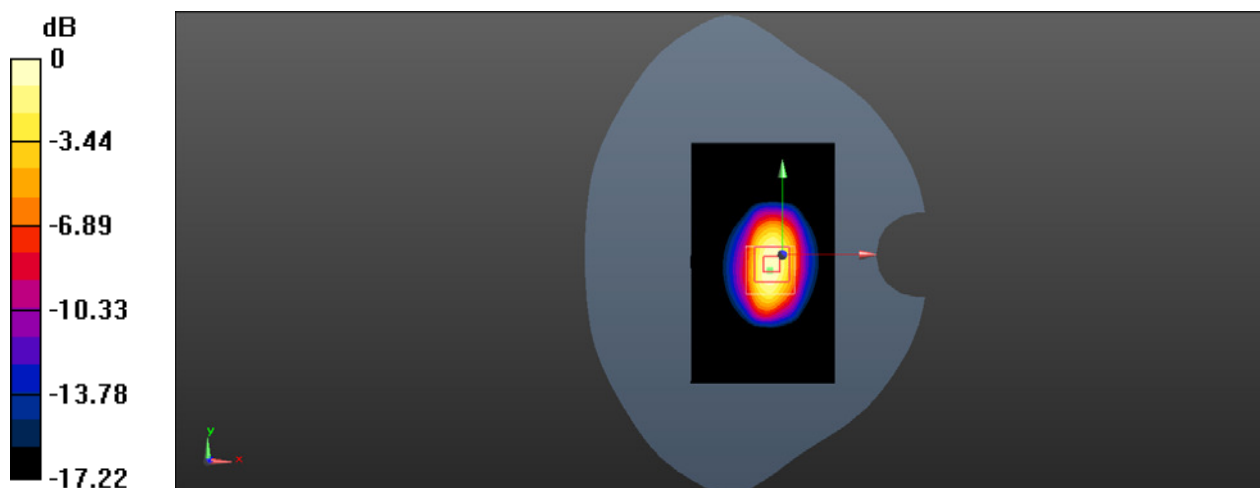
Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 60.19 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 18.1 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.34 W/kg

Maximum value of SAR (measured) = 14.2 W/kg



0 dB = 14.2 W/kg = 11.52 dBW/kg

Test Laboratory: SGS-SAR Lab

System Performance Check 2450MHz Body

DUT: D2450V2; Type: D2450V2; Serial: 733

Communication System: UID 0, CW (0); Frequency: 2450 MHz; Duty Cycle: 1:1

Medium: MSL2450; Medium parameters used: $f = 2450$ MHz; $\sigma = 1.998$ S/m; $\epsilon_r = 50.708$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.93, 7.93, 7.93); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Body/d=10mm, Pin=250mW/Area Scan (91x131x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm

Maximum value of SAR (interpolated) = 14.5 W/kg

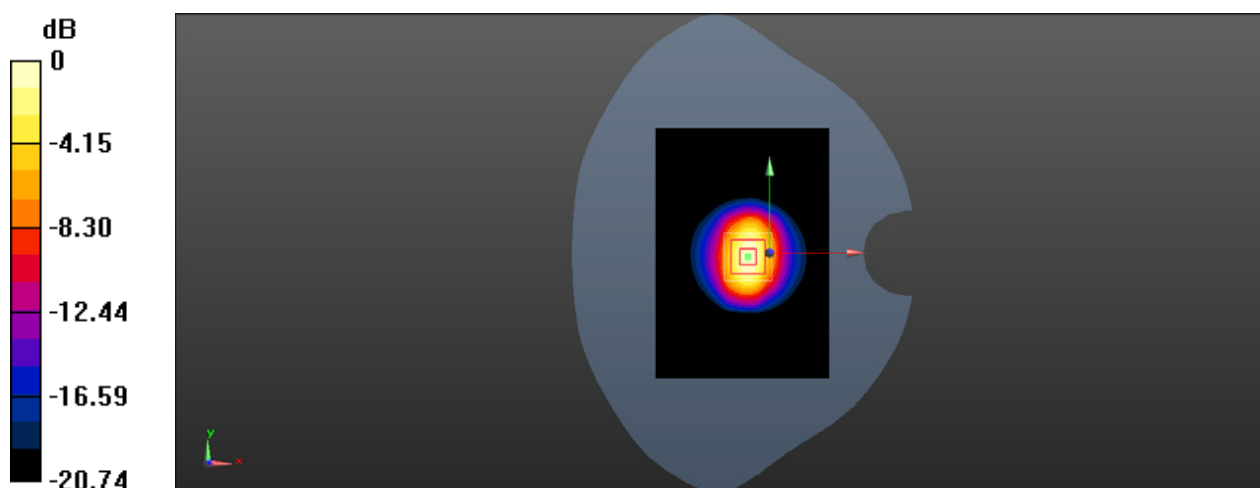
Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 79.24 V/m; Power Drift = 0.12 dB

Peak SAR (extrapolated) = 25.2 W/kg

SAR(1 g) = 12.4 W/kg; SAR(10 g) = 5.97 W/kg

Maximum value of SAR (measured) = 14.3 W/kg



0 dB = 14.3 W/kg = 11.46 dBW/kg

Test Laboratory: SGS-SAR Lab

System Performance Check 2600MHz Body

DUT: D2600V2; Type: D2600V2; Serial: 1125

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

Medium: MSL2600; Medium parameters used: $f = 2600$ MHz; $\sigma = 2.187$ S/m; $\epsilon_r = 50.237$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.78, 7.78, 7.78); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: ELI5; Type: ELI5; Serial: 1143
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Body/d=10mm, Pin=250mW/Area Scan (91x121x1): Interpolated grid: $dx=1.000$ mm, $dy=1.000$ mm

Maximum value of SAR (interpolated) = 21.3 W/kg

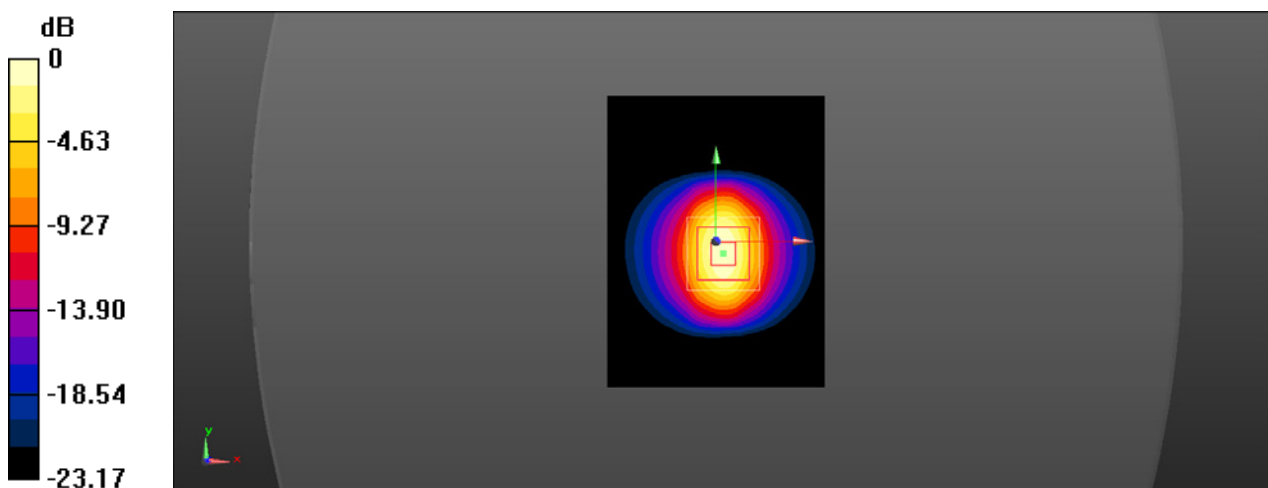
Body/d=10mm, Pin=250mW/Zoom Scan (7x7x7) (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 80.65 V/m; Power Drift = -0.03 dB

Peak SAR (extrapolated) = 28.1 W/kg

SAR(1 g) = 13.76 W/kg; SAR(10 g) = 6.12 W/kg

Maximum value of SAR (measured) = 21.1 W/kg



0 dB = 21.1 W/kg = 13.26 dBW/kg



Appendix B

Detailed Test Results

1. GSM
GSM850 for Head &Body
GSM1900 for Head &Body
2. WCDMA
WCDMA Band II for Head &Body
WCDMA Band V for Head &Body
3. LTE
LTE Band 7 for Head &Body
4. WIFI
WIFI2.4G for Head &Body

Test Laboratory: SGS-SAR Lab

TCL 5044Y GSM850 190CH Left cheek

DUT: TCL-5044Y; Type: Mobile Handset; Serial: EEYSRWHEUOJBUGZS

Communication System: UID 0, GSM Only Communication System (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium: HSL835; Medium parameters used: $f = 837$ MHz; $\sigma = 0.893$ S/m; $\epsilon_r = 42.469$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(10.58, 10.58, 10.58); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.196 W/kg

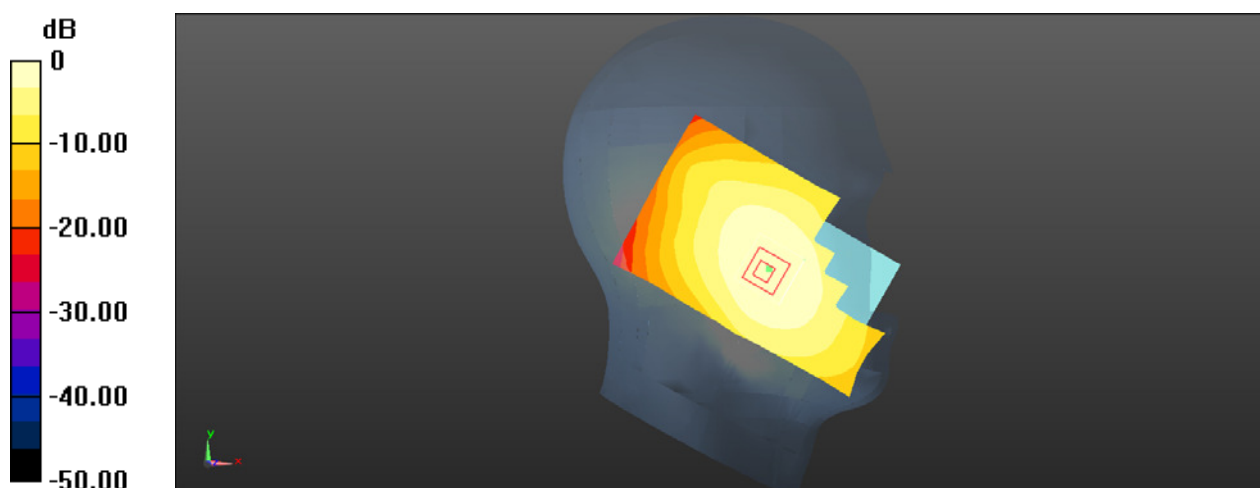
Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 5.973 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 0.228 W/kg

SAR(1 g) = 0.189 W/kg; SAR(10 g) = 0.146 W/kg

Maximum value of SAR (measured) = 0.195 W/kg



0 dB = 0.196 W/kg = -7.08 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y GSM850 190CH Back side 15mm

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, GSM Only Communication System (0); Frequency: 836.6 MHz; Duty Cycle: 1:8.30042

Medium: MSL835; Medium parameters used: $f = 837$ MHz; $\sigma = 1.005$ S/m; $\epsilon_r = 56.452$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(10.58, 10.58, 10.58); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.284 W/kg

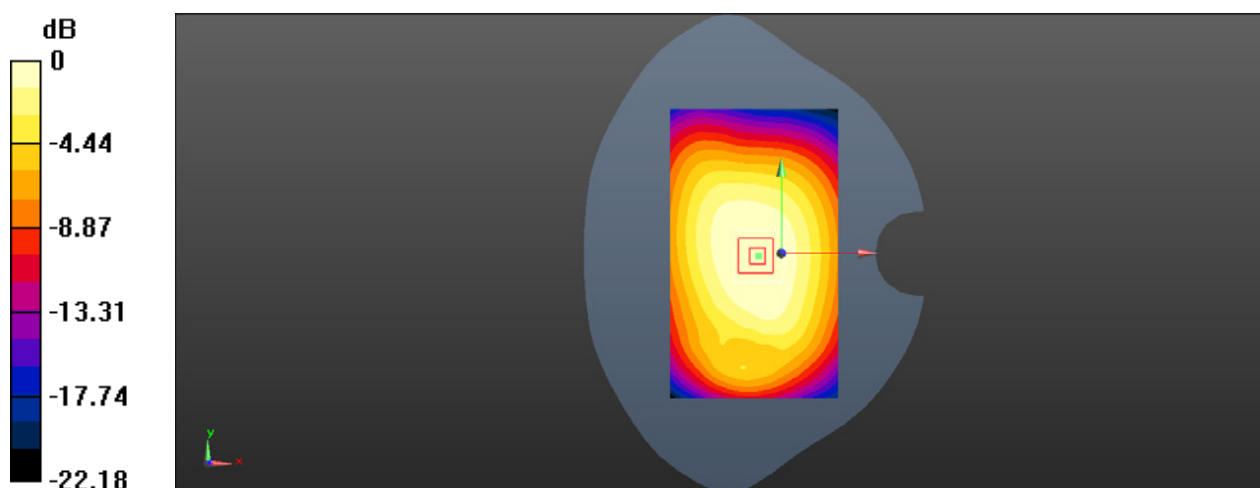
Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 16.04 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.312 W/kg

SAR(1 g) = 0.249 W/kg; SAR(10 g) = 0.194 W/kg

Maximum value of SAR (measured) = 0.286 W/kg



0 dB = 0.284 W/kg = -5.47 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y GSM850 GPRS 4TS 128CH Back side 10mm

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, GPRS/EGPRS Mode(4up) Communication System (0); Frequency: 824.2 MHz; Duty Cycle: 1:2.0797

Medium: MSL835; Medium parameters used (interpolated): $f = 824.2$ MHz; $\sigma = 0.983$ S/m; $\epsilon_r = 56.465$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(10.58, 10.58, 10.58); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.328 W/kg

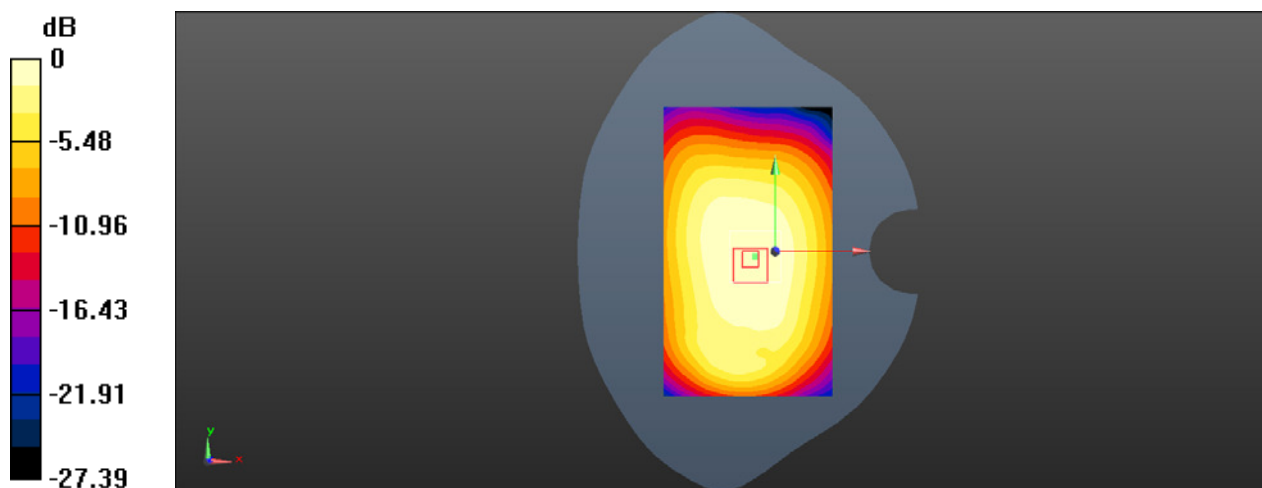
Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 17.43 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.360 W/kg

SAR(1 g) = 0.288 W/kg; SAR(10 g) = 0.227 W/kg

Maximum value of SAR (measured) = 0.330 W/kg



0 dB = 0.328 W/kg = -4.84 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y GSM1900 512CH Right cheek

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, GSM Only Communication System (0); Frequency: 1850.2 MHz; Duty Cycle: 1:8.30042

Medium: HSL1900; Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.353$ S/m; $\epsilon_r = 40.778$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(8.75, 8.75, 8.75); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.250 W/kg

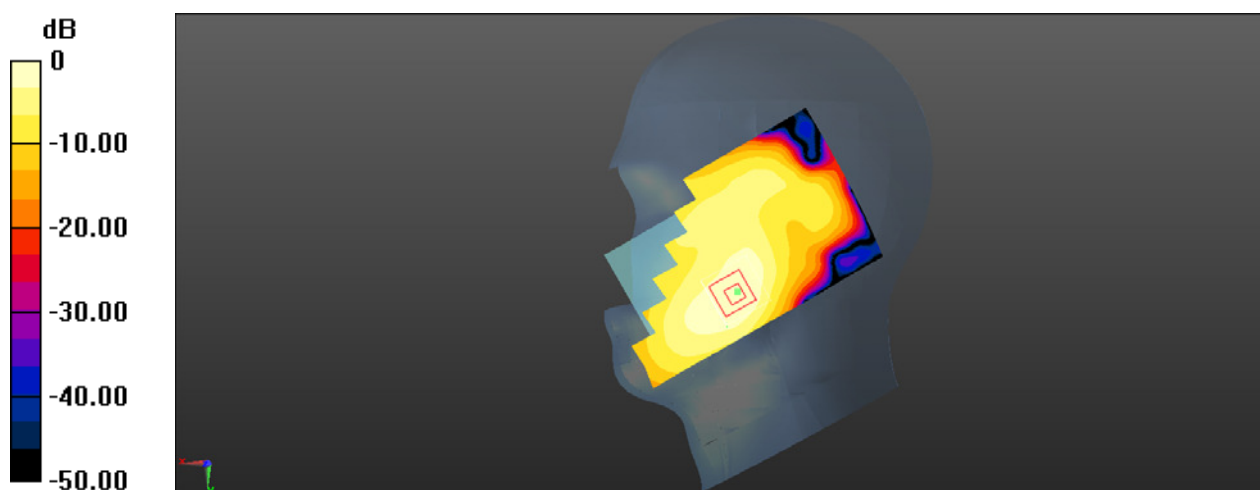
Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 5.456 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.319 W/kg

SAR(1 g) = 0.198 W/kg; SAR(10 g) = 0.118 W/kg

Maximum value of SAR (measured) = 0.260 W/kg



0 dB = 0.250 W/kg = -6.02 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y GSM1900 512CH Front side 15mm

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, GSM Only Communication System (0); Frequency: 1850.2 MHz; Duty Cycle: 1:8.30042

Medium: MSL1900; Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.48$ S/m; $\epsilon_r = 53.609$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(8.44, 8.44, 8.44); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.182 W/kg

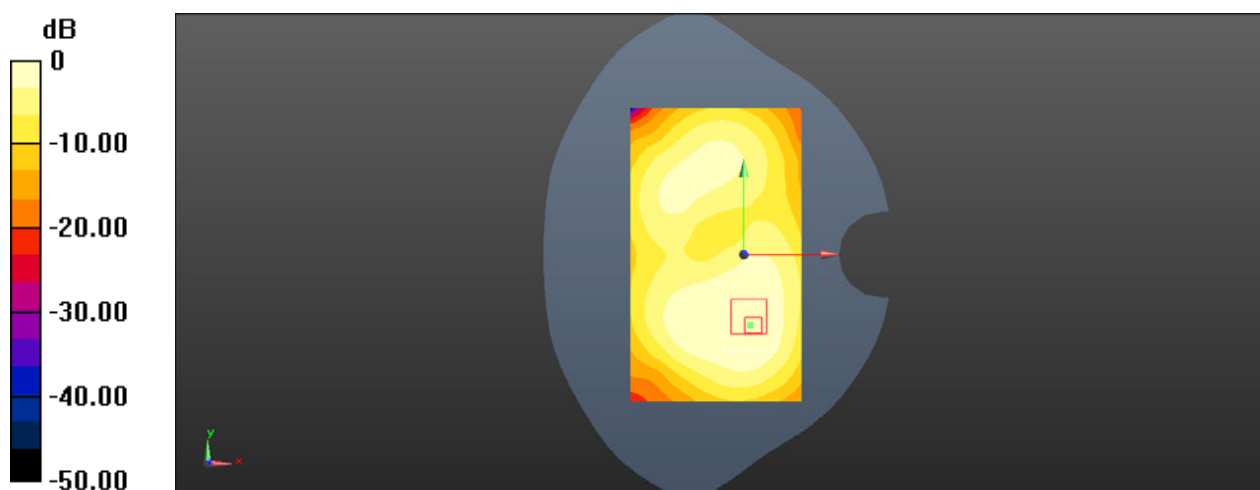
Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 4.710 V/m; Power Drift = -0.02 dB

Peak SAR (extrapolated) = 0.218 W/kg

SAR(1 g) = 0.140 W/kg; SAR(10 g) = 0.089 W/kg

Maximum value of SAR (measured) = 0.179 W/kg



0 dB = 0.182 W/kg = -7.40 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y GSM1900 GPRS 4TS 512CH Front side 10mm

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, GPRS/EGPRS Mode(4up) Communication System (0); Frequency: 1850.2 MHz; Duty Cycle: 1:2.0797

Medium: MSL1900; Medium parameters used (interpolated): $f = 1850.2$ MHz; $\sigma = 1.48$ S/m; $\epsilon_r = 53.609$; $\rho = 1000$ kg/m³
Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(8.44, 8.44, 8.44); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.329 W/kg

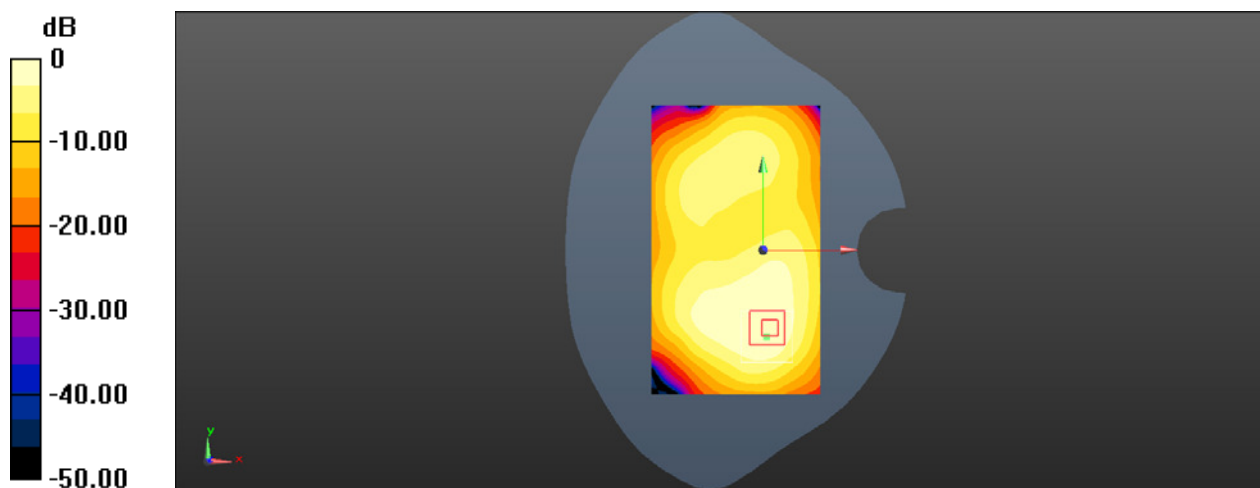
Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 5.934 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.383 W/kg

SAR(1 g) = 0.240 W/kg; SAR(10 g) = 0.144 W/kg

Maximum value of SAR (measured) = 0.312 W/kg



0 dB = 0.329 W/kg = -4.83 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y WCDMA Band II RMC 9538CH Right cheek

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, WCDMA (0); Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: HSL1900; Medium parameters used: $f = 1908$ MHz; $\sigma = 1.381$ S/m; $\epsilon_r = 40.629$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(8.75, 8.75, 8.75); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.808 W/kg

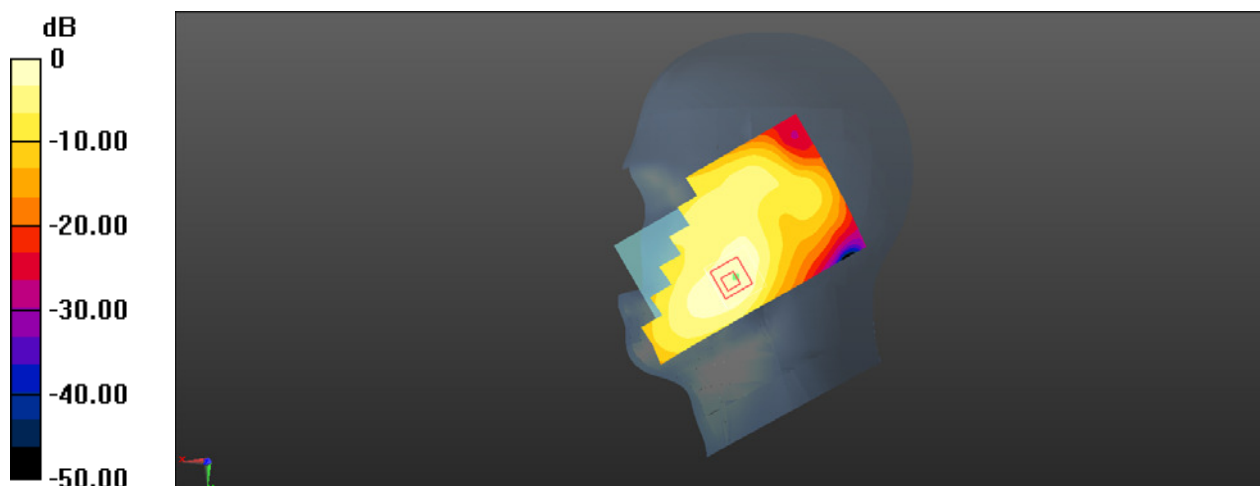
Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 10.02 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 1.01 W/kg

SAR(1 g) = 0.635 W/kg; SAR(10 g) = 0.385 W/kg

Maximum value of SAR (measured) = 0.813 W/kg



0 dB = 0.808 W/kg = -0.93 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y WCDMA Band II RMC 9538CH Back side 15mm

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, WCDMA (0); Frequency: 1907.6 MHz; Duty Cycle: 1:1

Medium: MSL1900; Medium parameters used: $f = 1908$ MHz; $\sigma = 1.518$ S/m; $\epsilon_r = 53.063$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(8.44, 8.44, 8.44); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Body/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.539 W/kg

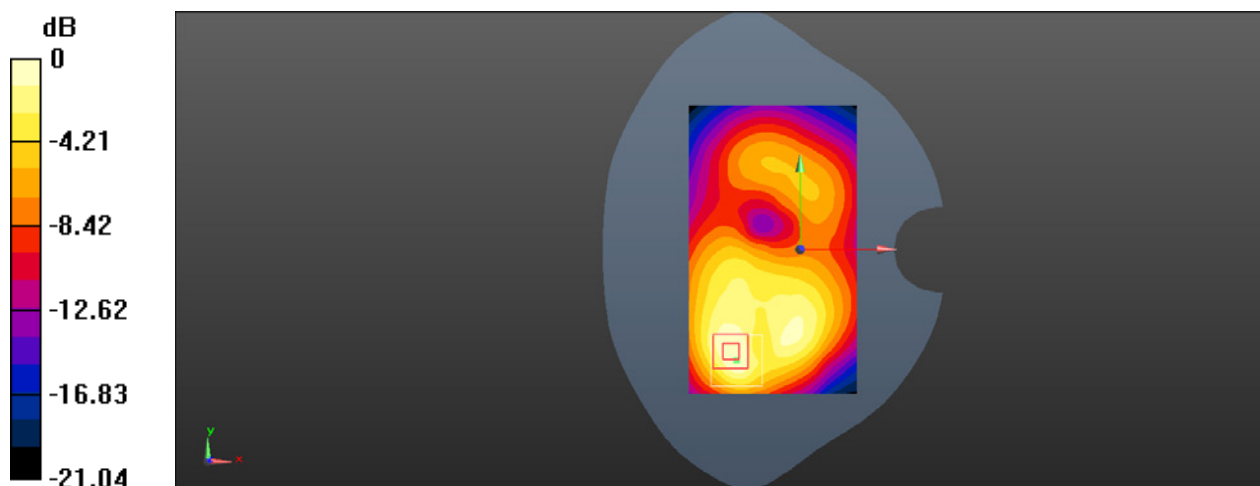
Configuration/Body/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 7.086 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.721 W/kg

SAR(1 g) = 0.427 W/kg; SAR(10 g) = 0.238 W/kg

Maximum value of SAR (measured) = 0.549 W/kg



0 dB = 0.539 W/kg = -2.68 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y WCDMA Band II RMC 9400CH Back side 10mm

DUT: TCL-5044Y; Type: Mobile Handset; Serial: EEYSRWHEUOJBUGZS

Communication System: UID 0, WCDMA (0); Frequency: 1880 MHz; Duty Cycle: 1:1

Medium: MSL1900; Medium parameters used: $f = 1880$ MHz; $\sigma = 1.503$ S/m; $\epsilon_r = 53.465$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(8.75, 8.75, 8.75); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 1.28 W/kg

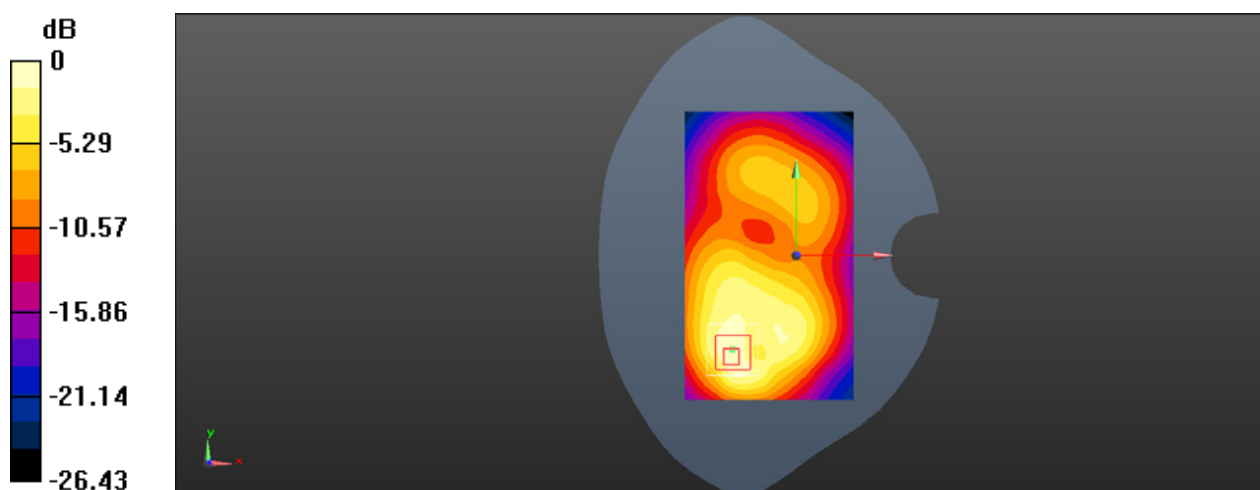
Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 10.79 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 2.24 W/kg

SAR(1 g) = 1.16 W/kg; SAR(10 g) = 0.618 W/kg

Maximum value of SAR (measured) = 1.29 W/kg



0 dB = 1.28 W/kg = 1.07 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y WCDMA Band V RMC 4132CH Left cheek

DUT: TCL-5044Y; Type: Mobile Handset; Serial: EEYSRWHEUOJBUGZS

Communication System: UID 0, WCDMA (0); Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium: HSL835; Medium parameters used (interpolated): $f = 826.4$ MHz; $\sigma = 0.895$ S/m; $\epsilon_r = 42.126$; $\rho = 1000$ kg/m³

Phantom section: Left Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(8.75, 8.75, 8.75); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.492 W/kg

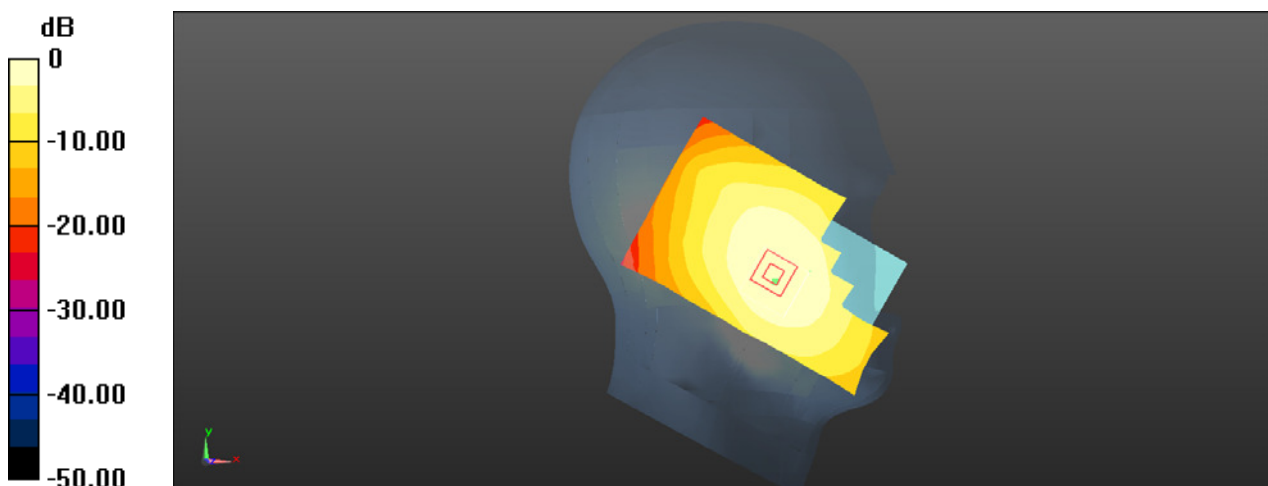
Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 8.757 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 0.563 W/kg

SAR(1 g) = 0.471 W/kg; SAR(10 g) = 0.364 W/kg

Maximum value of SAR (measured) = 0.489 W/kg



0 dB = 0.492 W/kg = -3.08 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y WCDMA Band V RMC 4132CH Back side 15mm

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, WCDMA (0); Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium: MSL835; Medium parameters used (interpolated): $f = 826.4$ MHz; $\sigma = 0.996$ S/m; $\epsilon_r = 56.407$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(10.58, 10.58, 10.58); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.615 W/kg

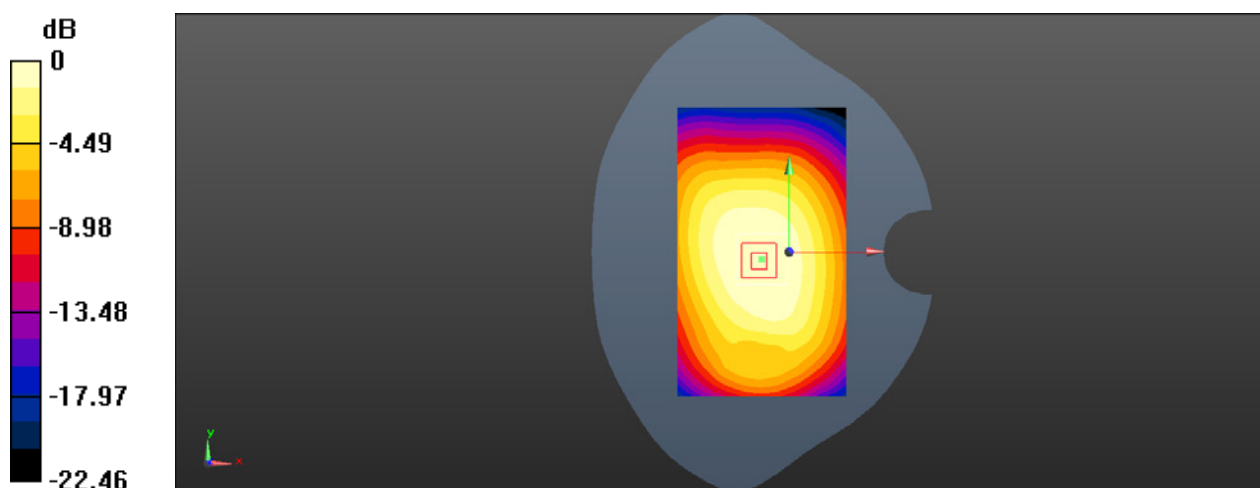
Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 23.70 V/m; Power Drift = 0.02 dB

Peak SAR (extrapolated) = 0.674 W/kg

SAR(1 g) = 0.539 W/kg; SAR(10 g) = 0.419 W/kg

Maximum value of SAR (measured) = 0.613 W/kg



0 dB = 0.615 W/kg = -2.11 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y WCDMA Band V RMC 4132CH Back side 10mm

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, WCDMA (0); Frequency: 826.4 MHz; Duty Cycle: 1:1

Medium: MSL835; Medium parameters used (interpolated): $f = 826.4$ MHz; $\sigma = 0.996$ S/m; $\epsilon_r = 56.407$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(10.58, 10.58, 10.58); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (71x121x1): Interpolated grid: $dx=1.500$ mm, $dy=1.500$ mm
Maximum value of SAR (interpolated) = 0.712 W/kg

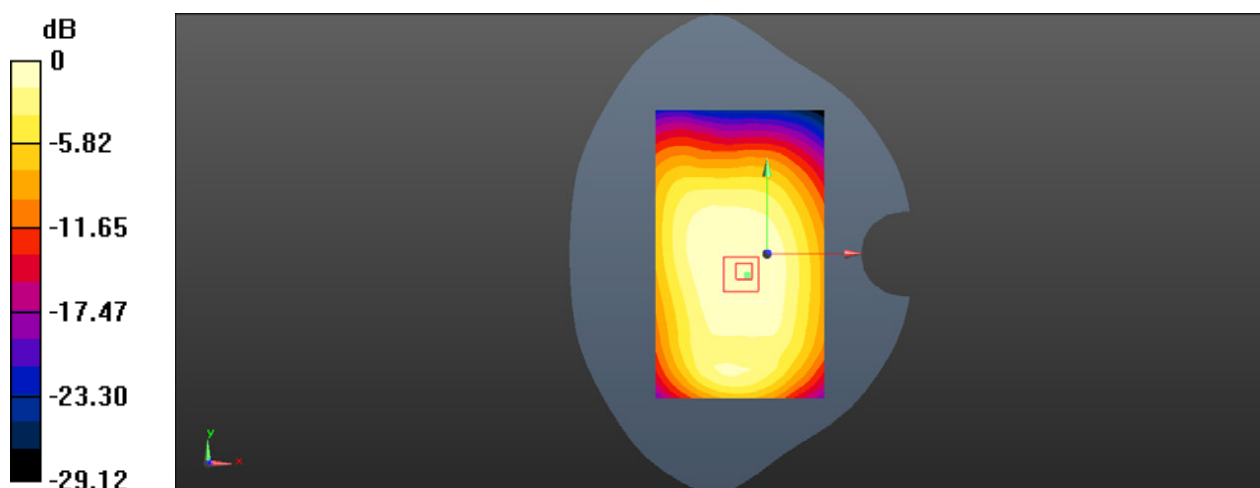
Configuration/Head/Zoom Scan (5x5x7)/Cube 0: Measurement grid: $dx=8$ mm, $dy=8$ mm, $dz=5$ mm

Reference Value = 27.37 V/m; Power Drift = -0.04 dB

Peak SAR (extrapolated) = 0.780 W/kg

SAR(1 g) = 0.625 W/kg; SAR(10 g) = 0.491 W/kg

Maximum value of SAR (measured) = 0.713 W/kg



0 dB = 0.712 W/kg = -1.48 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y LTE Band 7 20MHz bandwidth QPSK 1RB0 Offset 20850CH Right cheek

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, LTE-FDD BW 20MHz (0); Frequency: 2510 MHz; Duty Cycle: 1:1

Medium: HSL2600; Medium parameters used: $f = 2510$ MHz; $\sigma = 1.862$ S/m; $\epsilon_r = 38.108$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.64, 7.64, 7.64); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (91x151x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm
Maximum value of SAR (interpolated) = 0.584 W/kg

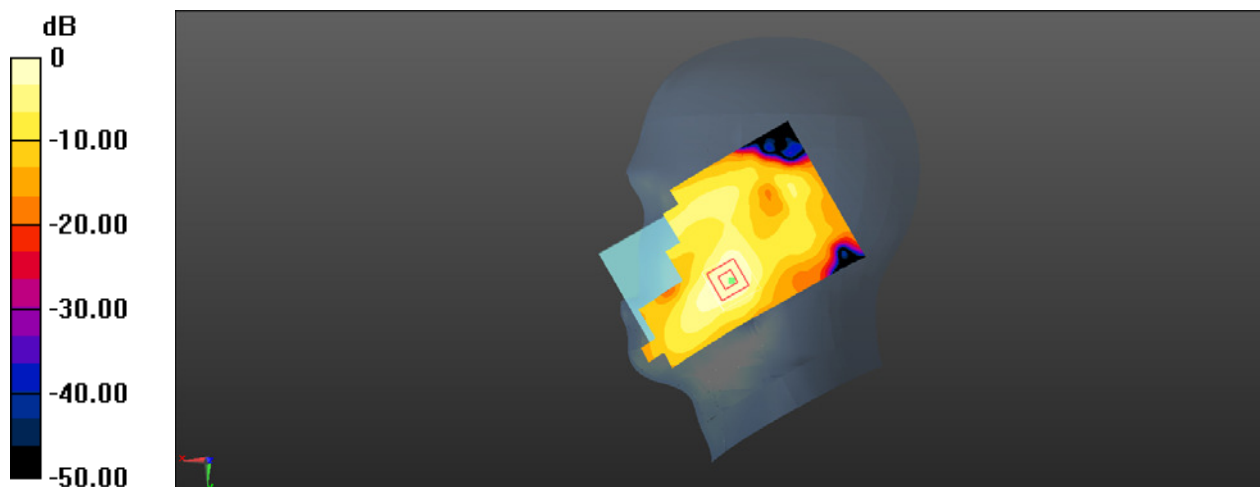
Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 5.344 V/m; Power Drift = -0.06 dB

Peak SAR (extrapolated) = 0.721 W/kg

SAR(1 g) = 0.394 W/kg; SAR(10 g) = 0.207 W/kg

Maximum value of SAR (measured) = 0.552 W/kg



0 dB = 0.584 W/kg = -2.34 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y LTE Band 7 20MHz bandwidth QPSK 1RB0 Offset 20850CH Back side 15mm

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, LTE-FDD BW 20MHz (0); Frequency: 2510 MHz; Duty Cycle: 1:1

Medium: MSL2600; Medium parameters used: $f = 2510$ MHz; $\sigma = 2.058$ S/m; $\epsilon_r = 52.262$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.78, 7.78, 7.78); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: ELI5; Type: ELI5; Serial: 1143
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Body/Area Scan (91x151x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm
Maximum value of SAR (interpolated) = 0.947 W/kg

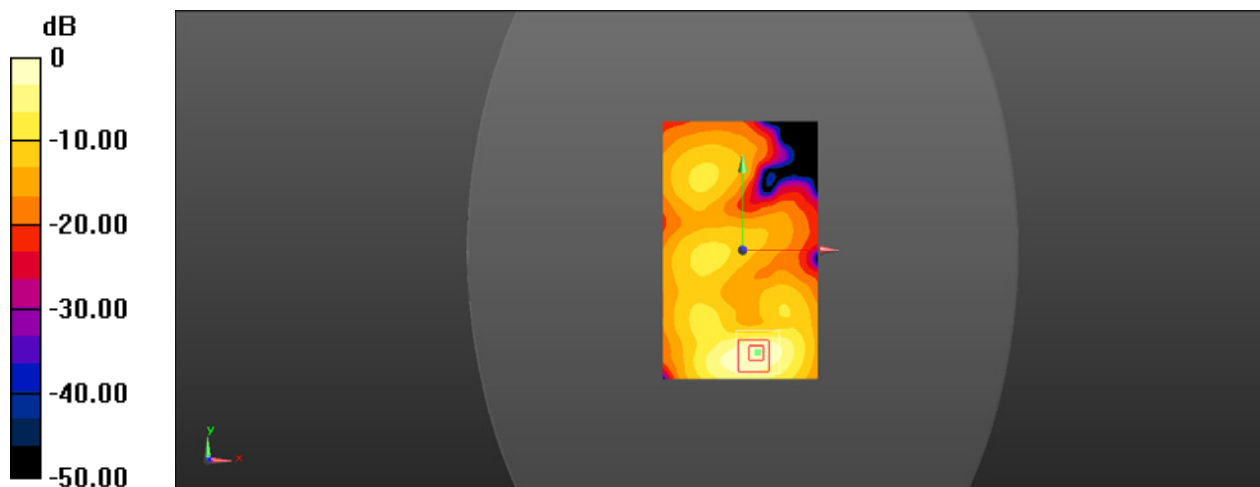
Configuration/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 5.323 V/m; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 1.11 W/kg

SAR(1 g) = 0.594 W/kg; SAR(10 g) = 0.305 W/kg

Maximum value of SAR (measured) = 0.852 W/kg



0 dB = 0.947 W/kg = -0.24 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y LTE Band 7 20MHz bandwidth QPSK 1RB0 Offset 20850CH Bottom side 10mm

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, LTE-FDD BW 20MHz (0); Frequency: 2510 MHz; Duty Cycle: 1:1

Medium: MSL2600; Medium parameters used: $f = 2510$ MHz; $\sigma = 2.058$ S/m; $\epsilon_r = 52.262$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.78, 7.78, 7.78); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: ELI5; Type: ELI5; Serial: 1143
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Body/Area Scan (51x101x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm
Maximum value of SAR (interpolated) = 1.88 W/kg

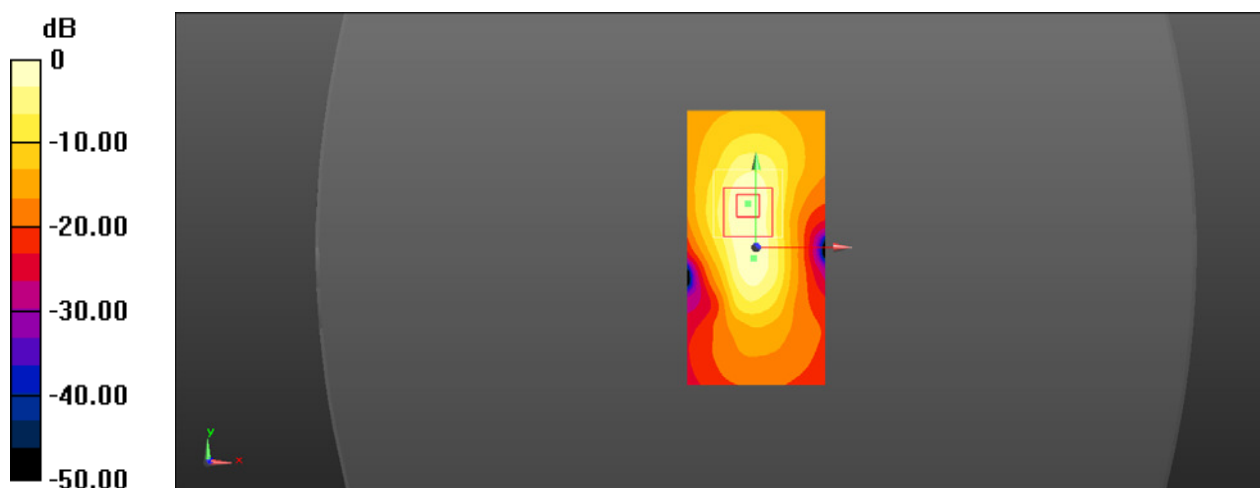
Configuration/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 23.53 V/m; Power Drift = 0.09 dB

Peak SAR (extrapolated) = 2.43 W/kg

SAR(1 g) = 1.24 W/kg; SAR(10 g) = 0.591 W/kg

Maximum value of SAR (measured) = 1.85 W/kg



0 dB = 1.88 W/kg = 2.74 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y WiFi 2.4G 802.11b 6CH Right cheek

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, WI-FI(2.4GHz) (0); Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: HSL2450; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.791$ S/m; $\epsilon_r = 38.225$; $\rho = 1000$ kg/m³

Phantom section: Right Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.81, 7.81, 7.81); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: Twin phantom; Type: SAM1; Serial: 1141
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Head/Area Scan (91x151x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm
Maximum value of SAR (interpolated) = 0.733 W/kg

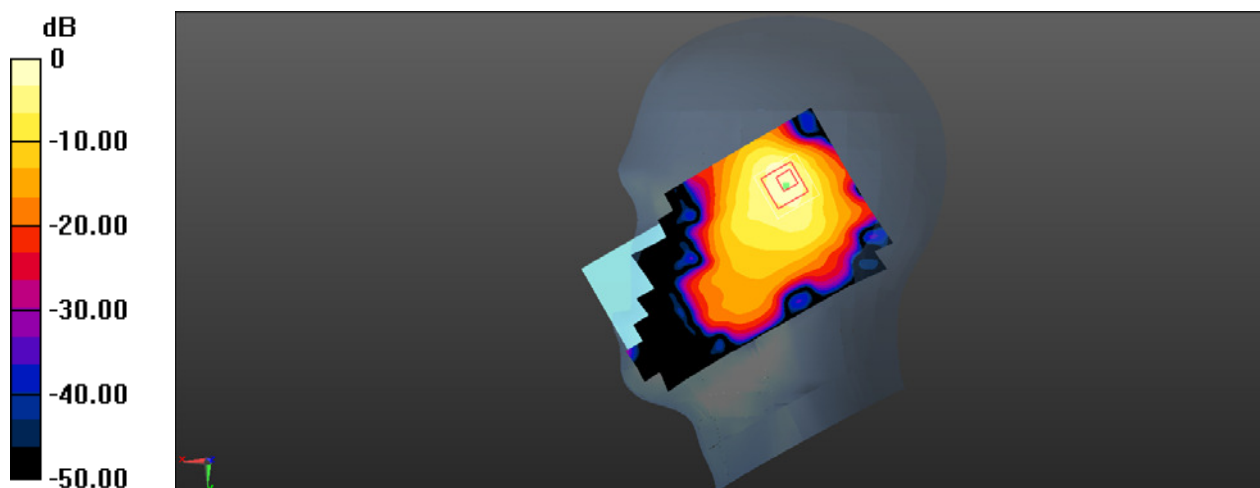
Configuration/Head/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 11.73 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.14 W/kg

SAR(1 g) = 0.469 W/kg; SAR(10 g) = 0.204 W/kg

Maximum value of SAR (measured) = 0.731 W/kg



0 dB = 0.733 W/kg = -1.35 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y WiFi 2.4G 802.11b 6CH Back side 10mm

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, WI-FI(2.4GHz) (0); Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: MSL2450; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.997$ S/m; $\epsilon_r = 52.393$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.93, 7.93, 7.93); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: ELI5; Type: ELI5; Serial: 1143
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Body/Area Scan (91x151x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm
Maximum value of SAR (interpolated) = 0.354 W/kg

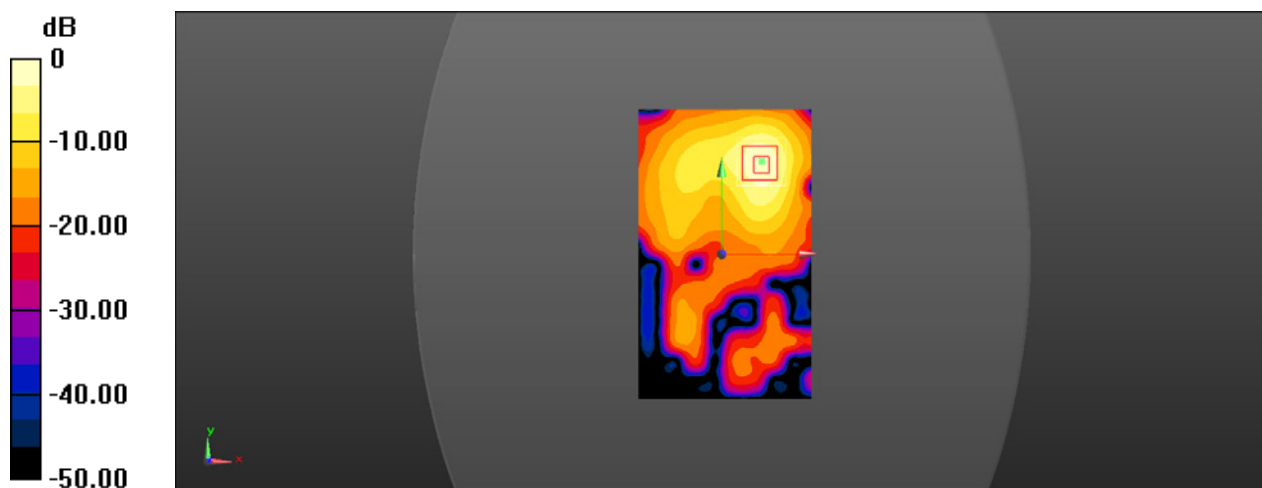
Configuration/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 0.7790 V/m; Power Drift = 0.08 dB

Peak SAR (extrapolated) = 0.473 W/kg

SAR(1 g) = 0.233 W/kg; SAR(10 g) = 0.107 W/kg

Maximum value of SAR (measured) = 0.352 W/kg



0 dB = 0.354 W/kg = -4.51 dBW/kg

Test Laboratory: SGS-SAR Lab

TCL 5044Y WiFi 2.4G 802.11b 6CH Back side 15mm

DUT: TCL-5044Y; Type: Mobile Handset; Serial: MFPRNBZTZD79JBGM

Communication System: UID 0, WI-FI(2.4GHz) (0); Frequency: 2437 MHz; Duty Cycle: 1:1

Medium: MSL2450; Medium parameters used: $f = 2437$ MHz; $\sigma = 1.997$ S/m; $\epsilon_r = 52.393$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY 5 Configuration:

- Probe: EX3DV4 - SN3923; ConvF(7.93, 7.93, 7.93); Calibrated: 2017/8/24;
- Sensor-Surface: 2mm (Mechanical Surface Detection), $z = -2.0, 31.0$
- Electronics: DAE4 Sn1267; Calibrated: 2017/11/28
- Phantom: ELI5; Type: ELI5; Serial: 1143
- DASY52 52.8.8(1258); SEMCAD X 14.6.10(7373)

Configuration/Body/Area Scan (91x151x1): Interpolated grid: $dx=1.200$ mm, $dy=1.200$ mm
Maximum value of SAR (interpolated) = 0.170 W/kg

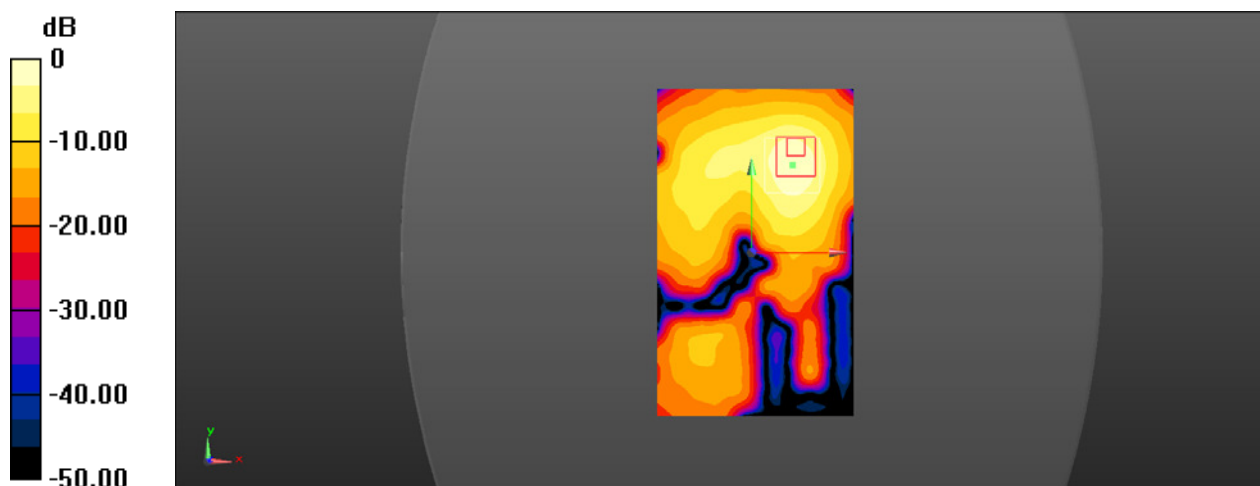
Configuration/Body/Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5$ mm, $dy=5$ mm, $dz=5$ mm

Reference Value = 0.9750 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 0.191 W/kg

SAR(1 g) = 0.097 W/kg; SAR(10 g) = 0.045 W/kg

Maximum value of SAR (measured) = 0.140 W/kg



0 dB = 0.170 W/kg = -6.38 dBW/kg