SAR EVALUATION REPORT

For

Hangzhou iReadyGo Intelligence Technology Co., Ltd.

RM 1503, Tianheng Builing, No.1509 Binsheng RD, Xixing Street, Binjiang District, Hangzhou, China

FCC ID: 2AFXQ-W3D

Report Type:	**Product Type:**
Original Report	Smart phone

Test Engineer: Rocky Xiao

Rocky Xiao

Report Number: RDG150828003-20B

Report Date: 2015-10-16

Reviewed By: Sula Huang
RF Leader

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<table>
<tr><th colspan="4">Attestation of Test Results</th></tr>
<tr><td rowspan="7">EUT Information</td><td>Company Name</td><td colspan="2">Hangzhou iReadyGo Intelligence Technology Co., Ltd.</td></tr>
<tr><td>EUT Description</td><td colspan="2">Smart phone</td></tr>
<tr><td>Product Type</td><td colspan="2">W3D</td></tr>
<tr><td>FCC ID</td><td colspan="2">2AFXQ-W3D</td></tr>
<tr><td>Model Number</td><td colspan="2">W3D</td></tr>
<tr><td>Serial Number</td><td colspan="2">150828003</td></tr>
<tr><td>Test Date</td><td colspan="2">2015-09-25,2015-09-28</td></tr>
<tr><th colspan="2">MODE</th><th>Max. SAR Level(s) Reported(W/Kg)</th><th>Limit(W/Kg)</th></tr>
<tr><td rowspan="2">GSM 850</td><td>1g Head SAR</td><td>0.184</td><td rowspan="15">1. 6</td></tr>
<tr><td>1g Body SAR</td><td>0.768</td></tr>
<tr><td rowspan="2">PCS 1900</td><td>1g Head SAR</td><td>0.166</td></tr>
<tr><td>1g Body SAR</td><td>0.514</td></tr>
<tr><td rowspan="2">WCDMA Band 5</td><td>1g Head SAR</td><td>0.094</td></tr>
<tr><td>1g Body SAR</td><td>0.432</td></tr>
<tr><td rowspan="2">WCDMA Band 2</td><td>1g Head SAR</td><td>0.231</td></tr>
<tr><td>1g Body SAR</td><td>0.445</td></tr>
<tr><td rowspan="2">LTE Band 7</td><td>1g Head SAR</td><td>0.198</td></tr>
<tr><td>1g Body SAR</td><td>0.721</td></tr>
<tr><td rowspan="2">LTE Band 17</td><td>1g Head SAR</td><td>0.108</td></tr>
<tr><td>1g Body SAR</td><td>0.289</td></tr>
<tr><td rowspan="2">Simultaneous</td><td>1g Head SAR</td><td>0.624</td></tr>
<tr><td>1g Body SAR</td><td>0.968</td></tr>
<tr><td>Hotspot</td><td>1g Body SAR</td><td>0.968</td></tr>
<tr><td rowspan="6">Applicable Standards</td><td colspan="3">ANSI / IEEE C95.1 : 2005
IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fileds,3 kHz to 300 GHz.</td></tr>
<tr><td colspan="3">ANSI / IEEE C95.3 : 2002
IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to SuchFields,100 kHz—300 GHz.</td></tr>
<tr><td colspan="3">FCC 47 CFR part 2.1093
Radiofrequency radiation exposure evaluation: portable devices</td></tr>
<tr><td colspan="3">IEEE1528:2013
IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques</td></tr>
<tr><td colspan="3">IEC 62209-2:2010
Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices-Human models, instrumentation, and procedures-Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)</td></tr>
<tr><td colspan="3">KDB procedures
KDB 447498 D01 General RF Exposure Guidance v05r02.
KDB 648474 D04 Handset SAR v01r02.
KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03
KDB 865664 D02 RF Exposure Reporting v01r01
KDB 941225 D01 3G SAR Procedures v03
KDB 941225 D05 SAR for LTE Devices v02r03
KDB 941225 D06 Hotspot Mode v02</td></tr>
<tr><td colspan="4">Note: This wireless device has been shown to be capable of compliance for localized specific absorption rate (SAR) for General Population/Uncontrolled Exposure limits specified in ANSI/IEEE Standards and has been tested in accordance with the measurement procedures specified in IEEE 1528-2013 and RF exposure KDB procedures.
The results and statements contained in this report pertain only to the device(s) evaluated.</td></tr>
</table>

Note: For LTE band 17 SAR, please refer to the SAR report: RDG150828003-20A, which was issued by Bay Area Compliance Laboratories Corp. (Shenzhen)

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RDG150828003-20B	Original Report	2015-10-16

EUT DESCRIPTION

This report has been prepared on behalf of *Hangzhou iReadyGo Intelligence Technology Co., Ltd.* and their product *Smart phone (named W3D by applicant)*, Model: *W3D*, FCC ID: 2AFXQ-W3D or the EUT (Equipment under Test) as referred to in the rest of this report.

Technical Specification

Exposure Category:	Population / Uncontrolled
Antenna Type(s):	Internal Antenna
Body-Worn Accessories:	Headset
Face-Head Accessories:	None
Operation Mode :	GSM Voice, GPRS/EGPRS class 12, WCDMA R99 (Voice+Data),HSUPA Rel 6,HSDPA Rel 7, DC-HSDPA Rel 8, HSPA+ Rel 6 FDD-LTE WLAN Bluetooth
Frequency Band:	GSM 850 : 824-849 MHz(TX) ; 869-894 MHz(RX) PCS 1900: 1850-1910 MHz(TX) ; 1930-1990 MHz(RX) WCDMA Band 5: 824-849 MHz(TX) ; 869-894 MHz(RX) WCDMA Band 2: 1850-1910 MHz(TX) ; 1930-1990 MHz(RX) LTE Band 7: 2500-2570 MHz(TX) ; 2620-2690 MHz(RX) LTE Band 17: 704-716 MHz(TX) ; 734-746 MHz(RX) WLAN(2.4G): 2412MHz-2462 MHz WLAN(5G): 5150MHz-5250MHz Bluetooth : 2402MHz-2480 MHz
Conducted RF Power:	GSM 850 : 32.49 dBm PCS 1900: 28.16 dBm WCDMA Band 5: 22.59 dBm WCDMA Band 2: 22.82 dBm LTE Band 7:22.67 dBm LTE Band 17:22.6 dBm WLAN(2.4G): 9.49 dBm WLAN(5G): 8.02 dBm Bluetooth: 7.67 dBm BLE:-4.7 dBm
Dimensions (L*W*H):	190.1 mm (L) × 76.5 mm (W) × 12.3 mm (H)
Power Source:	3.8 VDC Rechargeable Battery
Normal Operation:	Head and Body-worn

REFERENCE, STANDARDS, AND GUILDELINES

FCC:

The Report and Order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g as recommended by the ANSI/IEEE standard C95.1-1992 [6] for an uncontrolled environment (Paragraph 65). According to the Supplement C of OET Bulletin 65 “Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields", released on Jun 29, 2001 by the FCC, the device should be evaluated at maximum output power (radiated from the antenna) under “worst-case” conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

This report describes the methodology and results of experiments performed on wireless data terminal. The objective was to determine if there is RF radiation and if radiation is found, what is the extent of radiation with respect to safety limits. SAR (Specific Absorption Rate) is the measure of RF exposure determined by the amount of RF energy absorbed by human body (or its parts) – to determine how the RF energy couples to the body or head which is a primary health concern for body worn devices. The limit below which the exposure to RF is considered safe by regulatory bodies in North America is 1.6 mW/g average over 1 gram of tissue mass.

CE:

The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 2 mW/g as recommended by EN62209-1 for an uncontrolled environment. According to the Standard, the device should be evaluated at maximum output power (radiated from the antenna) under “worst-case” conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

This report describes the methodology and results of experiments performed on wireless data terminal. The objective was to determine if there is RF radiation and if radiation is found, what is the extent of radiation with respect to safety limits. SAR (Specific Absorption Rate) is the measure of RF exposure determined by the amount of RF energy absorbed by human body (or its parts) – to determine how the RF energy couples to the body or head which is a primary health concern for body worn devices. The limit below which the exposure to RF is considered safe by regulatory bodies in Europe is 2 mW/g average over 10 gram of tissue mass.

The test configurations were laid out on a specially designed test fixture to ensure the reproducibility of measurements. Each configuration was scanned for SAR. Analysis of each scan was carried out to characterize the above effects in the device.

SAR Limits

FCC Limit

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

CE Limit

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 10 g of tissue)	2.0	10
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

Population/Uncontrolled Environments are defined as locations where there is the exposure of individual who have no knowledge or control of their exposure.

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

General Population/Uncontrolled environments Spatial Peak limit 1.6W/kg (FCC) & 2 W/kg (CE) applied to the EUT.

FACILITIES

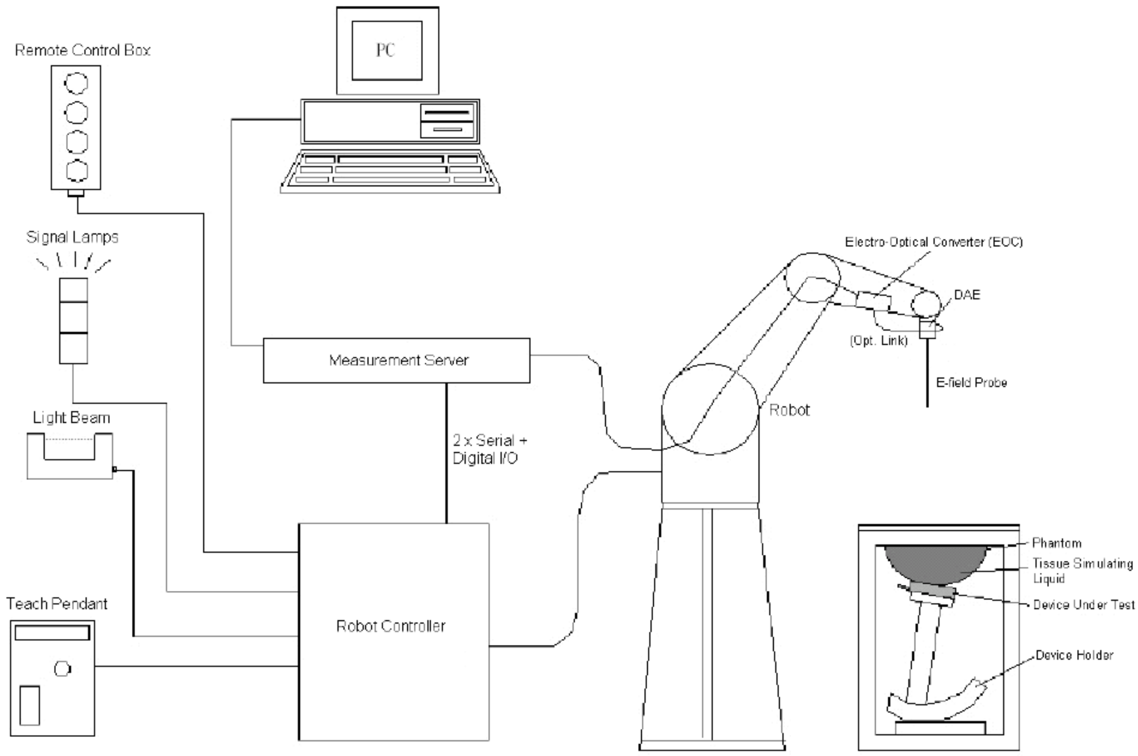
The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

DESCRIPTION OF TEST SYSTEM

These measurements were performed with the automated near-field scanning system DASY5 from Schmid & Partner Engineering AG (SPEAG) which is the Fifth generation of the system shown in the figure hereinafter:

DASY5 System Description

The DASY5 system for performing compliance tests consists of the following items:



- A standard high precision 6-axis robot (Staubli TX=RX family) with controller, teach pendant and software. An arm extension for accommodating the data acquisition electronics (DAE).
- An isotropic field probe optimized and calibrated for the targeted measurement.
- A data acquisition electronics (DAE) which performs the signal application, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- The Electro-optical converter (EOC) performs the conversion from optical to electrical signals for the digital communication to the DAE. To use optical surface detection, a special version of the EOC is required. The EOC signal is transmitted to the measurement server.
- The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.
- The Light Beam used is for probe alignment. This improves the (absolute) accuracy of the probe positioning.
- A computer running Win7 professional operating system and the DASY52 software.
- Remote control and teach pendant as well as additional circuitry for robot safety such as warning lamps, etc.
- The phantom, the device holder and other accessories according to the targeted measurement.

DASY5 Measurement Server

The DASY5 measurement server is based on a PC/104 CPU board with a 400MHz Intel ULV Celeron, 128MB chip-disk and 128MB RAM. The necessary circuits for communication with the DAE4 (or DAE3) electronics box, as well as the 16 bit AD-converter system for optical detection and digital I/O interface are contained on the DASY5 I/O board, which is directly connected to the PC/104 bus of the CPU board.

The measurement server performs all real-time data evaluation of field measurements and surface detection, controls robot movements and handles safety operation. The PC operating system cannot interfere with these time critical processes. All connections are supervised by a watchdog, and disconnection of any of the cables to the measurement server will automatically disarm the robot and disable all program-controlled robot movements. Furthermore, the measurement server is equipped with an expansion port which is reserved for future applications. Please note that this expansion port does not have a standardized point out, and therefore only devices provided by SPEAG can be connected. Devices from any other supplier could seriously damage the measurement server.

Data Acquisition Electronics

The data acquisition electronics (DAE4) consist of a highly sensitive electrometer-grade preamplifier with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

The mechanical probe mounting device includes two different sensor systems for frontal and sideways probe contacts. They are used for mechanical surface detection and probe collision detection.

The input impedance of both the DAE4 as well as of the DAE3 box is 200MOhm; the inputs are symmetrical and floating. Common mode rejection is above 80 dB.

EX3DV4 E-Field Probes

Frequency	10 MHz to > 6 GHz Linearity: ± 0.2 dB (30 MHz to 6 GHz)
Directivity	± 0.3 dB in TSL (rotation around probe axis) ± 0.5 dB in TSL (rotation normal to probe axis)
Dynamic Range	10 µW/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 µW/g)
Dimensions	Overall length: 337 mm (Tip: 20 mm) Tip diameter: 2.5 mm (Body: 12 mm) Typical distance from probe tip to dipole centers: 1 mm
Application	High precision dosimetric measurements in any exposure scenario (e.g., very strong gradient fields); the only probe that enables compliance testing for frequencies up to 6 GHz with precision of better 30%.
Compatibility	DASY3, DASY4, DASY52 SAR and higher, EASY4/MRI

SAM Twin Phantom

The SAM twin phantom is a fiberglass shell phantom with 2mm shell thickness (except the ear region, where shell thickness increases to 6 mm). The phantom has three measurement areas:

_ Left hand
_ Right hand
_ Flat phantom

The phantom table for the DASY systems based on the TX90XL and RX160L robots have the size of 100 x 50 x 85 cm (L x W x H).
The phantom table for the compact DASY systems based on the RX60L robot have the size of 100 x 75 x 91 cm (L x W x H); these tables are reinforced for mounting of the robot onto the table.
For easy dislocation these tables have fork lift cut outs at the bottom.
The bottom plate contains three pairs of bolts for locking the device holder. The device holder positions are adjusted to the standard measurement positions in the three sections. Only one device holder is necessary if two phantoms are used (e.g., for different liquids)

A white cover is provided to cover the phantom during off-periods to prevent water evaporation and changes in the liquid parameters. Free space scans of devices on top of this phantom cover are possible. Three reference marks are provided on the phantom counter. These reference marks are used to teach the absolute phantom position relative to the robot.

Robots

The DASY5 system uses the high precision industrial robots TX90XL from Staubli SA (France). The TX robot family is the successor of the well known RX robot family and offers the same features important for our application:

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

The above mentioned robots are controlled by the Staubli CS8c robot controllers. All information regarding the use and maintenance of the robot arm and the robot controller is contained on the CDs delivered along with the robot. Paper manuals are available upon request direct from Staubli.

Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 15mm 2 step integral, with 1.5mm interpolation used to locate the peak SAR area used for zoom scan assessments.

Where the system identifies multiple SAR peaks (which are within 25% of peak value) the system will provide the user with the option of assessing each peak location individually for zoom scan averaging.

Zoom Scan (Cube Scan Averaging)

The averaging zoom scan volume utilized in the DASY5 software is in the shape of a cube and the side dimension of a 1 g or 10 g mass is dependent on the density of the liquid representing the simulated tissue. A density of 1000 kg/m^3 is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1g cube is 10mm,with the side length of the 10g cube is 21.5mm.

When the cube intersects with the surface of the phantom, it is oriented so that 3 vertices touch the surface of the shell or the center of a face is tangent to the surface. The face of the cube closest to the surface is modified in order to conform to the tangent surface.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications (including FCC) utilize a physical step of 7 x7 x 7 (5mmx5mmx5mm) providing a volume of 30 mm in the X & Y & Z axis.

Tissue Dielectric Parameters for Head and Body Phantoms

The head tissue dielectric parameters recommended by the IEEE SCC-34/SC-2 in P1528 have been incorporated in the following table. These head parameters are derived from planar layer models simulating the highest expected SAR for the dielectric properties and tissue thickness variations in a human head. Other head and body tissue parameters that have not been specified in P1528 are derived from the tissue dielectric parameters computed from the 4-Cole-Cole equations described in Reference [12] and extrapolated according to the head parameters specified in P1528.

Recommended Tissue Dielectric Parameters for Head and Body

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

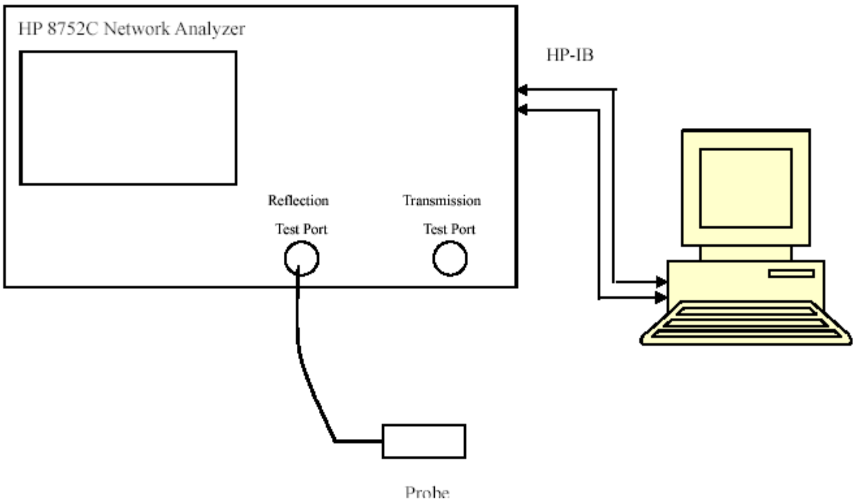
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Information

Equipment	Model	S/N	Calibration Date	Calibration Due Date
Robot	RX90	D03636	N/A	N/A
DASY5 Test Software	DASY52.8	N/A	N/A	N/A
DASY5 Measurement Server	DASY5 4.5.12	1470	N/A	N/A
Data Acquisition Electronics	DAE4	1459	2015/9/18	2016/9/18
E-Field Probe	EX3DV4	7329	2015/2/5	2016/2/5
Dipole, 835MHz	D835V1	453	2015/8/17	2018/8/17
Dipole,1900MHz	D1900V2	5d206	2015/7/14	2018/7/14
Dipole,2450MHz	D2450V3	971	2015/7/8	2018/7/8
R&S, universal Radio Communication Tester	CMU200	105047	2014/11/20	2015/11/20
8960 Series 10 Wireless Communication Test Set	E5515C	MY50266471	2015-01-13	2016-01-13
Wideband Radio Communication Tester	CMW500	1201.0002K50-146520-wh	2014/11/19	2015/11/19
Mounting Device	MD4HHTV5	SD 000 H01 KA	N/A	N/A
Twin SAM	Twin SAM V5.0	1874	N/A	N/A
Simulated Tissue 835 MHz Head	TS-835-H	201504	Each Time	/
Simulated Tissue 835 MHz Body	TS-835-B	201505	Each Time	/
Simulated Tissue 1900 MHz Head	TS-1900-H	201506	Each Time	/
Simulated Tissue 1900 MHz Body	TS-1900-B	201507	Each Time	/
Simulated Tissue 2450 MHz Head	TS-2450-H	201512	Each Time	/
Simulated Tissue 2450 MHz Body	TS-2450-B	201513	Each Time	/
Network Analyzer	8752C	3140A02356	2015/6/3	2016/6/3
Dielectric probe kit	85070B	US33020324	2015/6/13	2016/6/13
Signal Generator	E4422B	MY41000355	2014/10/27	2015/10/27
Power Meter	EPM-441A	GB37481494	2014/11/3	2015/11/3
Power Meter Sensor	8481A	T-03-EM-127	2014/11/3	2015/11/3
Power Amplifier	5205PE	1015	N/A	N/A
Directional Coupler	488Z	N/A	N/A	N/A
Attenuator	20dB, 100W	N/A	N/A	N/A

SAR MEASUREMENT SYSTEM VERIFICATION

Liquid Verification



Liquid Verification Setup Block Diagram

Liquid Verification Results

Frequency	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	Ơ (S/m)	ε_r	Ơ (S/m)	$\Delta\varepsilon_r$	ΔƠ (S/m)	
824.2	Head	42.924	0.877	41.5	0.9	3.43	-2.56	±5
	Body	55.167	0.963	55.2	0.97	-0.06	-0.72	±5
826.4	Head	42.893	0.88	41.5	0.9	3.36	-2.22	±5
	Body	55.143	0.967	55.2	0.97	-0.1	-0.31	±5
836.6	Head	42.873	0.891	41.5	0.9	3.31	-1	±5
	Body	55.113	0.976	55.2	0.97	-0.16	0.62	±5
846.6	Head	42.816	0.896	41.5	0.9	3.17	-0.44	±5
	Body	55.01	0.984	55.2	0.97	-0.34	1.44	±5
848.8	Head	42.723	0.896	41.5	0.9	2.95	-0.44	±5
	Body	54.992	0.988	55.2	0.97	-0.38	1.86	±5

**Liquid Verification above was performed on 2015/9/25.*

Frequency	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	Ơ (S/m)	ε_r	Ơ (S/m)	$\Delta\varepsilon_r$	ΔƠ (S/m)	
1850.2	Head	39.833	1.358	40	1.4	-0.42	-3	±5
	Body	55.267	1.478	53.3	1.52	3.69	-2.76	±5
1852.4	Head	39.857	1.356	40	1.4	-0.36	-3.14	±5
	Body	55.222	1.475	53.3	1.52	3.61	-2.96	±5
1880	Head	39.736	1.386	40	1.4	-0.66	-1	±5
	Body	53.758	1.544	53.3	1.52	0.86	1.58	±5
1907.6	Head	39.576	1.412	40	1.4	-1.06	0.86	±5
	Body	53.601	1.493	53.3	1.52	0.56	-1.78	±5
1909.8	Head	39.577	1.414	40	1.4	-1.06	1	±5
	Body	53.375	1.494	53.3	1.52	0.14	-1.71	±5
2450	Head	39.097	1.825	39.2	1.8	-0.26	1.39	±5
	Body	52.246	2.028	52.7	1.95	-0.86	4	±5
2510	Head	39.354	1.813	39.12	1.87	0.6	-3.05	±5
	Body	52.871	1.948	52.62	2.04	0.48	-4.51	±5
2535	Head	39.186	1.843	39.09	1.89	0.25	-2.49	±5
	Body	52.679	1.987	52.59	2.07	0.17	-4.01	±5
2560	Head	39.01	1.863	39.06	1.92	-0.13	-2.97	±5
	Body	52.454	2.006	52.56	2.11	-0.2	-4.93	±5

**Liquid Verification above was performed on 2015/9/28.*

Please refer to the following tables.

835 MHz Head			835 MHz Body		
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
824	42.9116	19.1572	824	55.1598	21.0626
824.5	42.9431	19.1165	824.5	55.1788	20.9389
825	42.9573	19.1411	825	55.1368	20.9908
825.5	42.9073	19.1831	825.5	55.2178	20.9463
826	42.923	19.1154	826	55.0969	21.057
826.5	42.886	19.17	826.5	55.1543	21.0338
827	42.9302	19.1518	827	55.0387	20.9874
827.5	42.9143	19.1707	827.5	55.1407	20.9875
828	42.9898	19.2272	828	55.1237	20.9664
828.5	42.9143	19.2049	828.5	55.1613	20.9931
829	42.9537	19.2575	829	55.0992	20.9207
829.5	42.9485	19.1432	829.5	55.0698	20.9373
830	43.0245	19.205	830	55.1212	20.9344
830.5	42.9567	19.1998	830.5	55.0931	20.9501
831	42.949	19.2049	831	55.1295	20.9678
831.5	42.9038	19.1671	831.5	55.1317	20.9637
832	42.9482	19.2115	832	55.2195	20.9333
832.5	42.92	19.2461	832.5	55.095	20.9235
833	42.9623	19.2055	833	55.1195	20.938
833.5	42.9153	19.2515	833.5	55.1263	20.9421
834	42.9051	19.2194	834	55.1615	21.0496
834.5	42.9029	19.2208	834.5	55.1172	20.9417
835	42.9392	19.2319	835	55.1094	20.9573
835.5	42.9465	19.1583	835.5	55.0853	20.9751
836	42.9471	19.1474	836	55.1284	21.034
836.5	42.8779	19.1535	836.5	55.1223	20.982
837	42.8534	19.1896	837	55.0741	20.9928
837.5	42.8819	19.1812	837.5	55.005	20.924
838	42.8681	19.208	838	55.0929	20.9986
838.5	42.8771	19.1943	838.5	55.1647	21.0078
839	42.9072	19.1953	839	55.0795	20.9924
839.5	42.9078	19.1455	839.5	55.1046	21.043
840	42.904	19.1419	840	55.0245	21.0125
840.5	42.8954	19.0696	840.5	55.1654	20.9848
841	42.9212	19.1795	841	55.0765	20.9832
841.5	42.9046	19.1516	841.5	55.012	20.9691
842	42.8806	19.1088	842	55.1052	20.949
842.5	42.7915	19.1273	842.5	55.0173	20.9461
843	42.8368	19.0522	843	55.0385	20.971
843.5	42.8302	19.1	843.5	55.007	20.9646
844	42.8155	19.0752	844	55.0588	20.9316
844.5	42.8811	19.0382	844.5	55.0949	21.0124
845	42.755	19.0939	845	55.1064	20.9516
845.5	42.8252	19.0756	845.5	55.0312	20.9207
846	42.8633	19.0084	846	55.0115	20.973
846.5	42.8354	19.0223	846.5	55.0068	20.8977
847	42.7408	19.1121	847	55.0241	20.9509
847.5	42.7238	18.9829	847.5	55.0544	20.9599
848	42.7771	19.0305	848	55.0223	21.0165
848.5	42.7163	19.0032	848.5	55.0015	20.9177
849	42.7279	18.9725	849	54.9859	20.9454

1900 MHz Head			1900 MHz Body		
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
1850	39.8255	13.2013	1850	55.2414	14.3716
1851	39.8642	13.2194	1851	55.367	14.3472
1852	39.8481	13.1805	1852	55.2448	14.3599
1853	39.8701	13.1455	1853	55.1879	14.2647
1854	39.8724	13.1726	1854	55.0781	14.1545
1855	39.8736	13.2262	1855	55.0795	14.2575
1856	39.8532	13.202	1856	54.9137	14.2955
1857	39.9204	13.1986	1857	54.7608	14.1631
1858	39.8384	13.1807	1858	54.6368	14.1143
1859	39.7963	13.1925	1859	54.5755	14.0781
1860	39.8401	13.2482	1860	54.4642	14.1989
1861	39.8741	13.2454	1861	54.5074	14.117
1862	39.9	13.2076	1862	54.374	14.119
1863	39.8406	13.1667	1863	54.2138	14.1467
1864	39.8377	13.1774	1864	54.151	14.1376
1865	39.8511	13.2327	1865	54.0672	14.1644
1866	39.8209	13.229	1866	53.9624	14.1254
1867	39.8047	13.2147	1867	53.8815	14.1811
1868	39.7965	13.2205	1868	53.8378	14.2405
1869	39.8313	13.2816	1869	53.7355	14.2219
1870	39.8515	13.2636	1870	53.6947	14.2612
1871	39.8272	13.2092	1871	53.6448	14.3168
1872	39.8108	13.223	1872	53.6685	14.3409
1873	39.8208	13.2102	1873	53.6537	14.4275
1874	39.7414	13.2718	1874	53.6203	14.4224
1875	39.7592	13.2409	1875	53.5995	14.4555
1876	39.7302	13.2479	1876	53.6422	14.5634
1877	39.792	13.2603	1877	53.6773	14.6345
1878	39.7493	13.2091	1878	53.6043	14.6957
1879	39.7351	13.2414	1879	53.6821	14.6531
1880	39.7359	13.2612	1880	53.7579	14.7669
1881	39.7359	13.241	1881	53.7621	14.734
1882	39.7401	13.279	1882	53.7623	14.7946
1883	39.7383	13.2816	1883	53.8059	14.8112
1884	39.7564	13.2387	1884	53.8896	14.7836
1885	39.7292	13.3018	1885	53.9359	14.8203
1886	39.7103	13.3133	1886	54.1101	14.8077
1887	39.6579	13.27	1887	54.1814	14.753
1888	39.6763	13.2878	1888	54.2523	14.804
1889	39.7068	13.3264	1889	54.2568	14.7116
1890	39.6992	13.2983	1890	54.2934	14.7405
1891	39.6744	13.2852	1891	54.328	14.7512
1892	39.6737	13.2987	1892	54.3698	14.7296
1893	39.6531	13.3173	1893	54.3771	14.6644
1894	39.6784	13.3102	1894	54.311	14.6717
1895	39.6402	13.2819	1895	54.3506	14.6181
1896	39.6705	13.3031	1896	54.4444	14.4902
1897	39.6599	13.3146	1897	54.4237	14.4853
1898	39.6565	13.2899	1898	54.4113	14.4085
1899	39.6256	13.2869	1899	54.2623	14.3679
1900	39.6797	13.3348	1900	54.1987	14.3151

1900 MHz Head			1900 MHz Body		
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
1901	39.6852	13.2941	1901	54.1176	14.2881
1902	39.6113	13.3421	1902	54.0692	14.2423
1903	39.6146	13.2562	1903	53.9452	14.2014
1904	39.6689	13.3176	1904	53.901	14.1373
1905	39.6533	13.3466	1905	53.7641	14.117
1906	39.572	13.3658	1906	53.6924	14.1363
1907	39.5631	13.2898	1907	53.6531	14.1258
1908	39.5839	13.3256	1908	53.5668	14.0476
1909	39.5692	13.3368	1909	53.4698	14.0296
1910	39.5784	13.3095	1910	53.351	14.0777

2450 MHz Head					
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
2412	39.3421	13.3618	2443	39.1649	13.4507
2413	39.3112	13.3508	2444	39.1838	13.4491
2414	39.3241	13.3484	2445	39.1841	13.4561
2415	39.3001	13.3724	2446	39.1575	13.4256
2416	39.318	13.3651	2447	39.1248	13.4357
2417	39.3718	13.396	2448	39.1151	13.418
2418	39.3023	13.351	2449	39.1199	13.4415
2419	39.3551	13.347	2450	39.0967	13.397
2420	39.3638	13.4117	2451	39.1082	13.4639
2421	39.2603	13.4943	2452	39.131	13.395
2422	39.2321	13.4701	2453	39.0909	13.4048
2423	39.203	13.5109	2454	39.0997	13.4102
2424	39.2252	13.4634	2455	39.0981	13.4181
2425	39.1879	13.477	2456	39.079	13.4466
2426	39.2047	13.4468	2457	39.0915	13.4134
2427	39.1933	13.4937	2458	39.05	13.4142
2428	39.1531	13.4874	2459	39.0242	13.4094
2429	39.1581	13.4543	2460	39.0179	13.4828
2430	39.1933	13.43	2461	39.0572	13.4426
2431	39.1995	13.4918	2462	39.0045	13.4225
2432	39.2546	13.4616	2463	39.0314	13.4805
2433	39.2476	13.4985	2464	39.0249	13.4641
2434	39.2321	13.513	2465	39.0465	13.4889
2435	39.1785	13.4934	2466	39.0037	13.4926
2436	39.1827	13.4596	2467	38.9704	13.483
2437	39.1889	13.4343	2468	39.0231	13.4944
2438	39.1826	13.489	2469	39.0031	13.4894
2439	39.1796	13.4613	2470	38.9955	13.5392
2440	39.2089	13.4583	2471	39.0369	13.5158
2441	39.1983	13.4192	2472	38.9714	13.5531
2442	39.182	13.4509	/	/	/

2450 MHz Body					
Frequency (MHz)	**e'**	**e''**	**Frequency (MHz)**	**e'**	**e''**
2412	53.2337	14.4959	2443	51.7372	14.8633
2413	53.3981	14.4824	2444	51.7997	14.8848
2414	53.2601	14.4393	2445	51.8435	14.9257
2415	53.1537	14.4147	2446	51.863	14.899
2416	53.057	14.3057	2447	51.9864	14.928
2417	53.0482	14.3709	2448	52.0898	14.8871
2418	52.9529	14.4147	2449	52.1248	14.8595
2419	52.776	14.3047	2450	52.2461	14.8869
2420	52.6449	14.2843	2451	52.2229	14.8528
2421	52.5777	14.185	2452	52.2905	14.8479
2422	52.4757	14.3003	2453	52.3326	14.8328
2423	52.4974	14.2576	2454	52.3384	14.8156
2424	52.349	14.2696	2455	52.3514	14.7633
2425	52.1744	14.2756	2456	52.3128	14.7595
2426	52.1561	14.2739	2457	52.3392	14.7652
2427	52.0782	14.3066	2458	52.4426	14.5935
2428	51.9518	14.2443	2459	52.3534	14.6327
2429	51.9103	14.3061	2460	52.4046	14.5486
2430	51.8439	14.3629	2461	52.2553	14.5386
2431	51.7161	14.3173	2462	52.1785	14.4779
2432	51.6816	14.3716	2463	52.1222	14.3998
2433	51.6408	14.432	2464	52.0383	14.3815
2434	51.693	14.4585	2465	51.9889	14.3387
2435	51.6384	14.5425	2466	51.8916	14.2503
2436	51.6087	14.5652	2467	51.8067	14.2803
2437	51.661	14.5904	2468	51.7203	14.2227
2438	51.6256	14.6368	2469	51.6488	14.2312
2439	51.6474	14.6926	2470	51.5453	14.2029
2440	51.5959	14.7925	2471	51.4757	14.157
2441	51.6335	14.7625	2472	51.3523	14.1829
2442	51.7384	14.8529	/	/	/

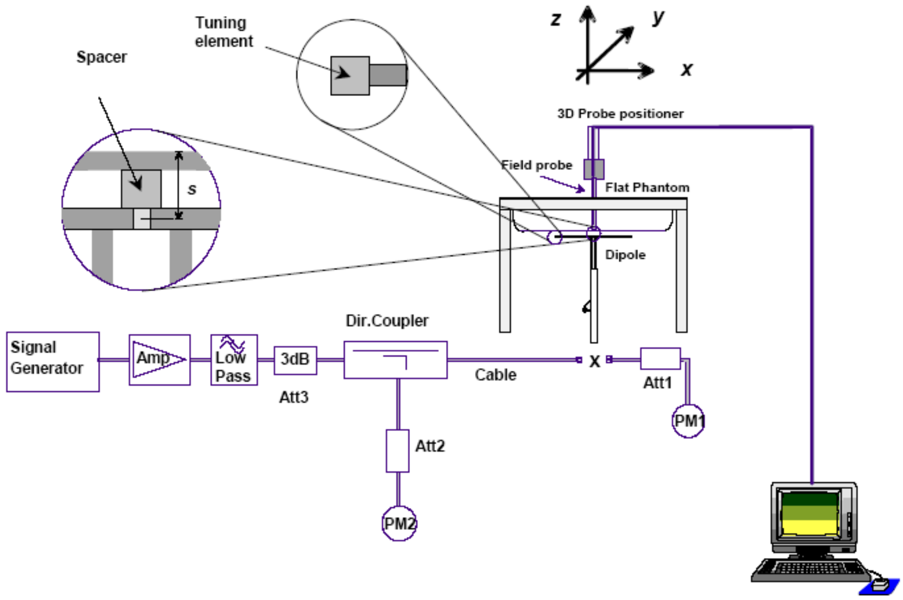
2450 MHz Head			2450 MHz Body		
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
2500	39.3861	13.0532	2500	52.9421	14.0735
2501	39.3877	13.0449	2501	52.9163	14.0284
2502	39.3673	13.0424	2502	52.9252	14.0462
2503	39.3735	13.0579	2503	52.9314	14.0361
2504	39.3614	13.0424	2504	52.925	14.0656
2505	39.3694	13.0270	2505	52.8943	14.0736
2506	39.3458	13.0621	2506	52.9237	14.0724
2507	39.3533	13.0479	2507	52.8888	14.0400
2508	39.3383	13.0760	2508	52.9022	14.0772
2509	39.3537	13.0654	2509	52.8929	14.0492
2510	39.3544	12.9929	2510	52.871	13.9544
2511	39.2901	13.0119	2511	52.8091	13.9929
2512	39.3344	12.9801	2512	52.878	13.9870
2513	39.3232	12.9724	2513	52.8642	13.9752
2514	39.3306	12.9697	2514	52.8778	13.9893
2515	39.3419	12.9818	2515	52.9379	13.9724
2516	39.3065	12.9879	2516	52.8588	14.0251
2517	39.3211	12.9981	2517	52.8781	13.9861
2518	39.3269	13.0089	2518	52.871	14.0465
2519	39.2676	13.1179	2519	52.7548	14.1254
2520	39.2115	13.1171	2520	52.7695	14.1158
2521	39.21	13.1187	2521	52.733	14.1005
2522	39.2017	13.1137	2522	52.7211	14.1469
2523	39.1907	13.1155	2523	52.7148	14.1139
2524	39.2032	13.1227	2524	52.716	14.1408
2525	39.2052	13.1187	2525	52.7081	14.1293
2526	39.164	13.1153	2526	52.6869	14.1159
2527	39.18	13.1232	2527	52.6216	14.1086
2528	39.1996	13.0858	2528	52.7131	14.0991
2529	39.2127	13.1400	2529	52.7151	14.1270
2530	39.2251	13.1042	2530	52.7472	14.1372
2531	39.2191	13.1037	2531	52.7393	14.1459
2532	39.2344	13.0961	2532	52.7451	14.1077
2533	39.2146	13.1152	2533	52.7178	14.1084
2534	39.17	13.0848	2534	52.6689	14.1022
2535	39.1856	13.0719	2535	52.6786	14.1002
2536	39.1661	13.0842	2536	52.6916	14.1028
2537	39.1913	13.1114	2537	52.6808	14.0868
2538	39.1744	13.0871	2538	52.68	14.0820
2539	39.1566	13.0913	2539	52.6774	14.0638
2540	39.1782	13.0876	2540	52.6743	14.0843
2541	39.1866	13.0649	2541	52.6748	14.1070
2542	39.1994	13.0563	2542	52.6589	14.0315
2543	39.1601	13.1093	2543	52.6319	14.1041
2544	39.1771	13.0915	2544	52.6607	14.0567
2545	39.1554	13.0584	2545	52.6512	14.0579
2546	39.1256	13.0837	2546	52.6139	14.0905
2547	39.1527	13.0554	2547	52.6399	14.0751
2548	39.1246	13.0790	2548	52.5824	14.0535
2549	39.1162	13.0748	2549	52.5974	14.0419
2550	39.1288	13.0757	2550	52.6005	14.0296

2450 MHz Head			2450 MHz Body		
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
2551	39.0973	13.0285	2551	52.5438	14.0688
2552	39.1001	13.0313	2552	52.582	14.0271
2553	39.0939	13.0562	2553	52.5565	14.0485
2554	39.0756	13.0516	2554	52.5536	14.0535
2555	39.0993	13.0429	2555	52.5118	14.0588
2556	39.0431	13.0529	2556	52.4951	14.0331
2557	39.037	13.0493	2557	52.4796	14.0631
2558	39.0225	13.0659	2558	52.4714	14.0860
2559	39.0428	13.0717	2559	52.4983	14.0866
2560	39.0104	13.0872	2560	52.4544	14.0893
2561	39.0352	13.0739	2561	52.4682	14.0830
2562	39.0296	13.0907	2562	52.4509	14.1195
2563	39.0162	13.0961	2563	52.4788	14.0970
2564	38.9878	13.0963	2564	52.4601	14.0949
2565	38.9675	13.1221	2565	52.4409	14.0660
2566	38.9801	13.0958	2566	52.4272	14.0664
2567	38.9561	13.0962	2567	52.4358	14.0983
2568	38.964	13.0965	2568	52.4557	14.0846
2569	38.9372	13.1026	2569	52.4113	14.0792
2570	38.9287	13.1365	2570	52.4071	14.0886

System Accuracy Verification

Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of ±10%. The validation results are tabulated below. And also the corresponding SAR plot is attached as well in the SAR plots files.

System Verification Setup Block Diagram



System Accuracy Check Results

Date	Frequency Band	Liquid Type	Measured SAR (W/Kg)		Target Value (W/Kg)	Delta (%)	Tolerance (%)
2015/9/25	835	Head	1g	9.57	9.43	1.48	±10
		Body	1g	9.37	9.55	-1.88	±10
2015/9/28	1900	Head	1g	40.3	40.7	-0.98	±10
		Body	1g	41.4	40.8	1.47	±10
	2450	Head	1g	54.3	53.3	1.88	±10
		Body	1g	52.7	50.6	4.15	±10

*All SAR values are normalized to 1 Watt forward power.

SAR SYSTEM VALIDATION DATA

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

System Performance 835 MHz Head

DUT:D835V1; Type: 835 MHz; Serial:453

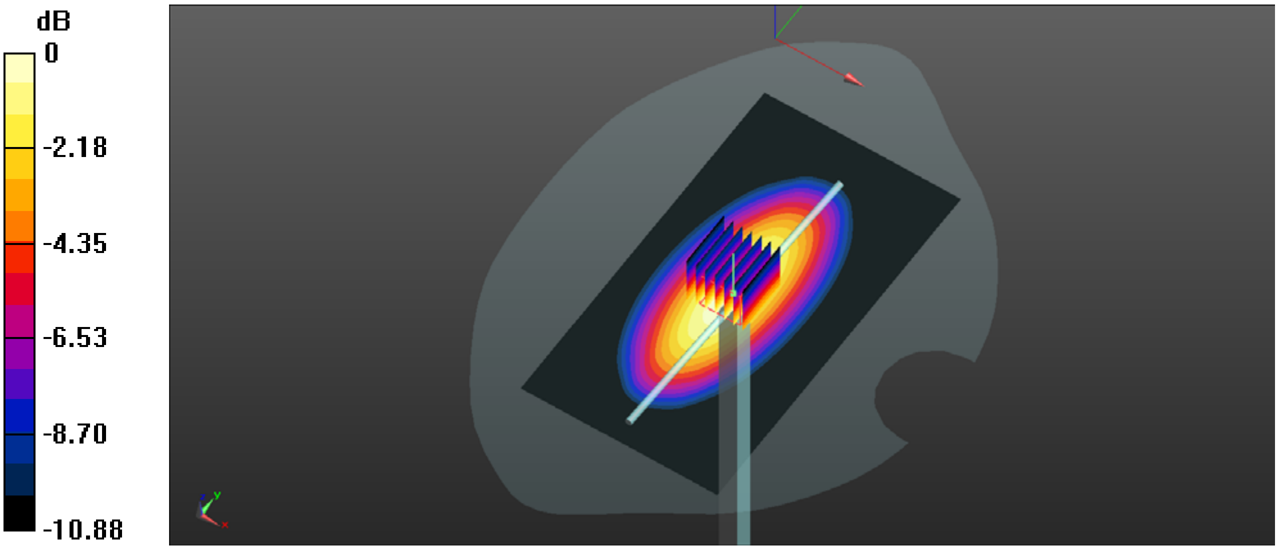
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.893 S/m; ε_r = 42.939; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.52, 9.52, 9.52); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 835 MHz Head /Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 10.7 W/kg

System Performance 835 MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 109.1 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 15.9 W/kg
SAR(1 g) = 9.57 W/kg; SAR(10 g) = 6.31 W/kg
Maximum value of SAR (measured) = 11.3 W/kg



0 dB = 11.3 W/kg = 10.53 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

System Performance 835 MHz Body

DUT:D835V1; Type: 835 MHz; Serial:453

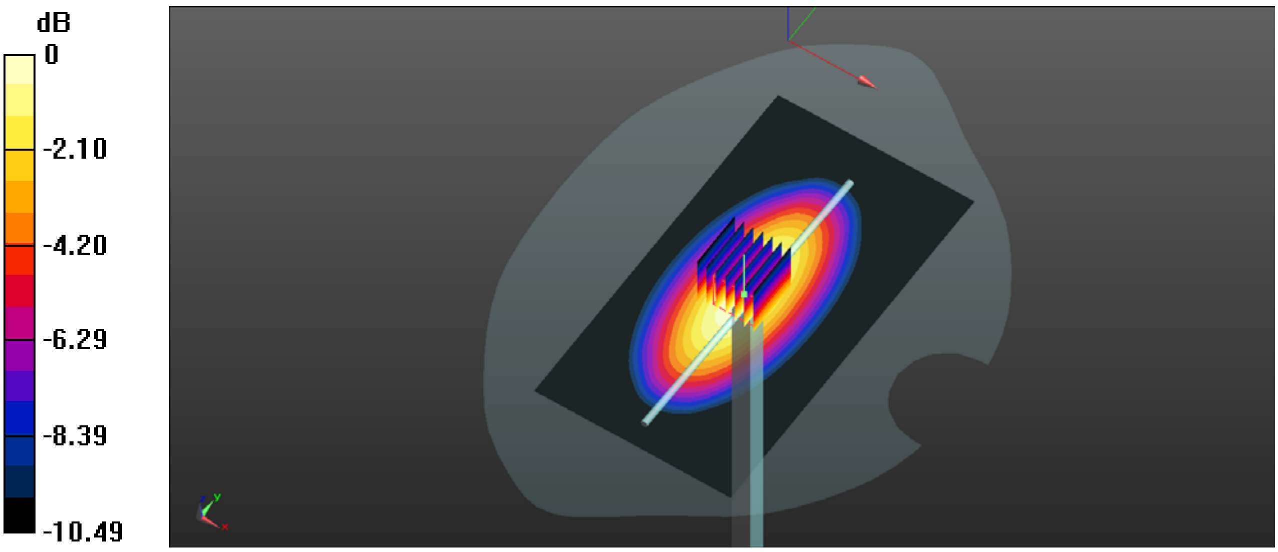
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.973 S/m; ε_r = 55.109; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.17, 9.17, 9.17); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 835 MHz Body /Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 10.5 W/kg

System Performance 835 MHz Body /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 107.7 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 15.1 W/kg
SAR(1 g) = 9.37 W/kg; SAR(10 g) = 6.24 W/kg
Maximum value of SAR (measured) = 10.9 W/kg



0 dB = 10.9 W/kg = 10.37 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

System Performance 1900 MHz Head

DUT: D1900V2; Type: 1900 MHz; Serial: 5d206

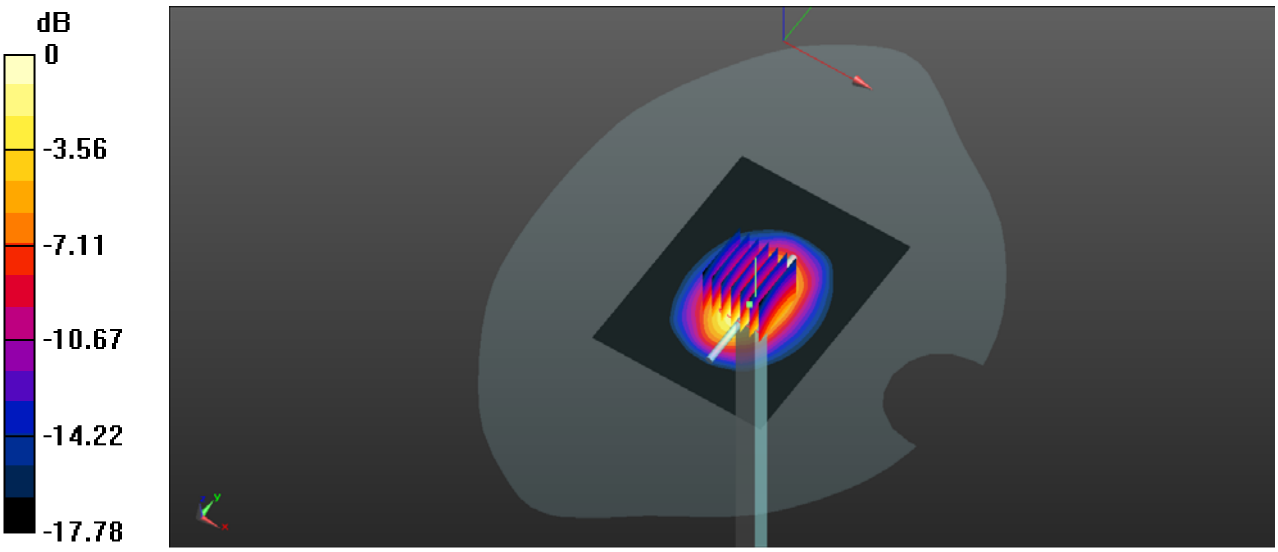
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.409 S/m; ε_r = 39.68; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.88, 7.88, 7.88); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 1900 MHz Head /Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 46.6 W/kg

System Performance 1900 MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 168.6 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 72.7 W/kg
SAR(1 g) = 40.3 W/kg; SAR(10 g) = 20.9 W/kg
Maximum value of SAR (measured) = 45.1 W/kg



0 dB = 45.1 W/kg = 16.54 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

System Performance 1900 MHz Body

DUT: D1900V2; Type: 1900 MHz; Serial: 5d206

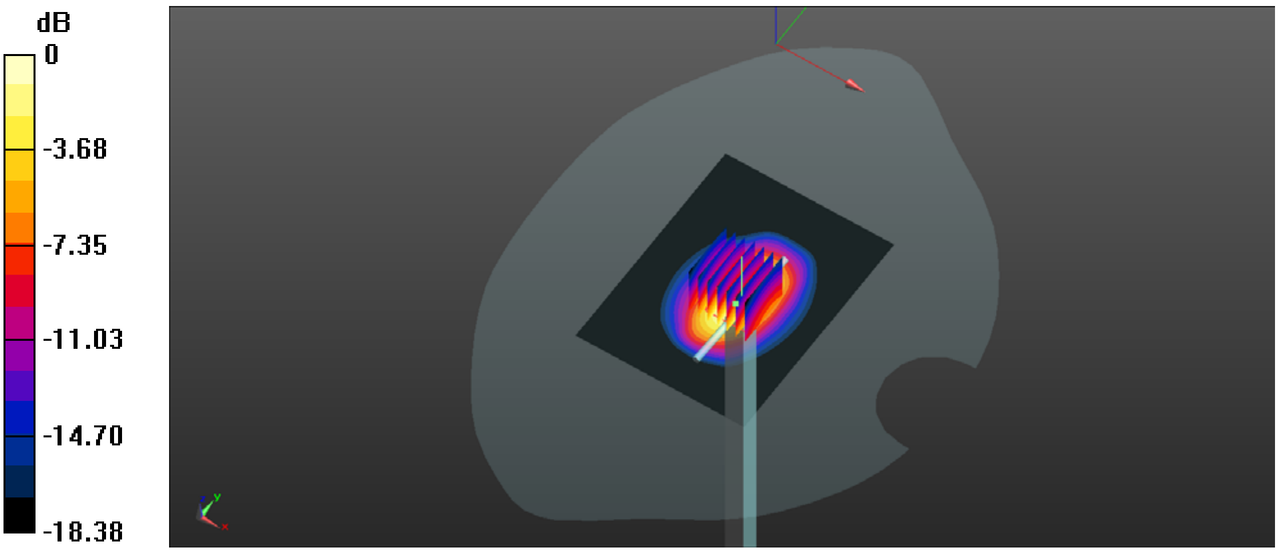
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.512 S/m; ε_r = 54.199; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.56, 7.56, 7.56); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 1900 MHz Body /Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 49.2 W/kg

System Performance 1900 MHz Body /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 173.8 V/m; Power Drift = 0.06 dB
Peak SAR (extrapolated) = 78.7 W/kg
SAR(1 g) = 41.4 W/kg; SAR(10 g) = 21.0 W/kg
Maximum value of SAR (measured) = 47.1 W/kg



0 dB = 47.1 W/kg = 16.73 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

System Performance 2450 MHz Head

DUT: D2450V3; Type: 2450 MHz; Serial: 971

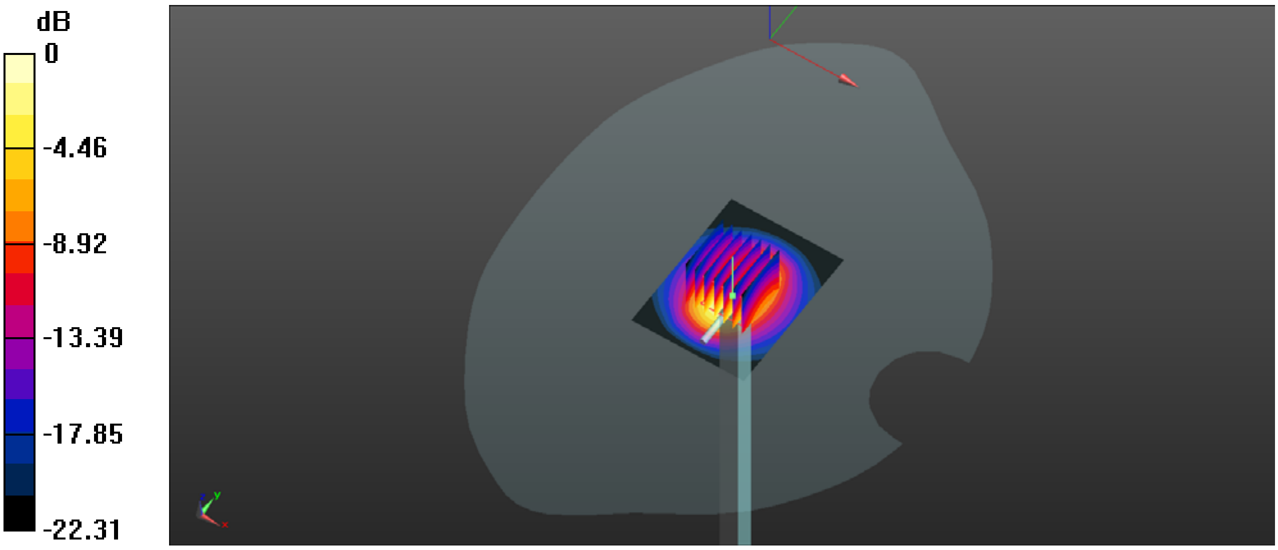
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.825 S/m; ε_r = 39.097; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.06, 7.06, 7.06); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 2450 MHz Head /Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 64.8 W/kg

System Performance 2450 MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 189.1 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 111 W/kg
SAR(1 g) = 54.3 W/kg; SAR(10 g) = 24.7 W/kg
Maximum value of SAR (measured) = 61.9 W/kg



0 dB = 61.9 W/kg = 17.92 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

System Performance 2450 MHz Body

DUT: D2450V3; Type: 2450 MHz; Serial: 971

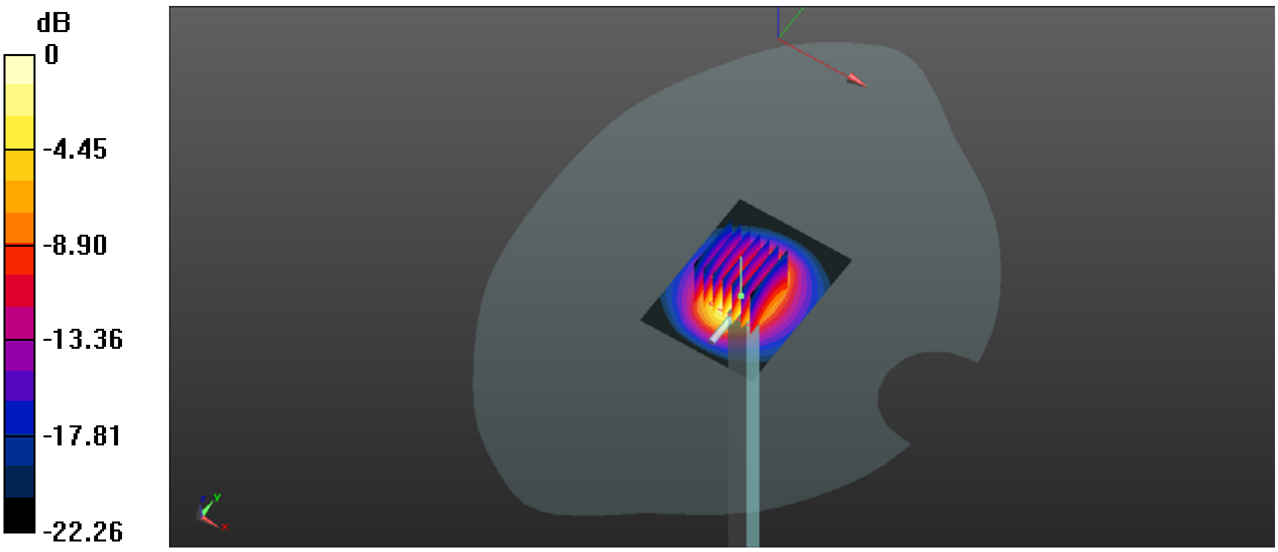
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 2.028 S/m; ε_r = 52.246; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.2, 7.2, 7.2); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 2450 MHz Body /Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 63.9 W/kg

System Performance 2450 MHz Body /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 182.7 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 108 W/kg
SAR(1 g) = 52.7 W/kg; SAR(10 g) = 24.1W/kg
Maximum value of SAR (measured) = 60.2 W/kg



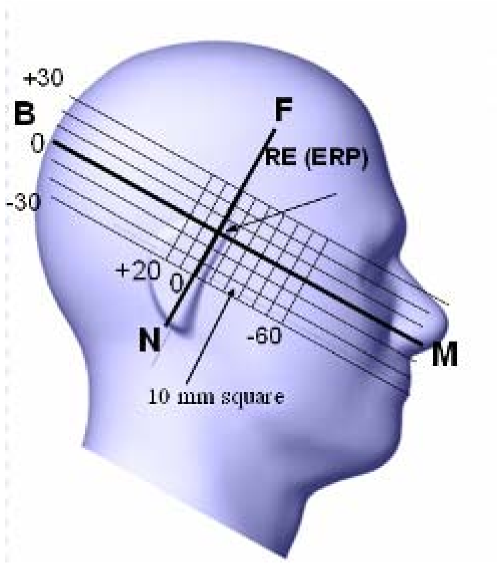
0 dB = 60.2 W/kg = 17.80 dBW/kg

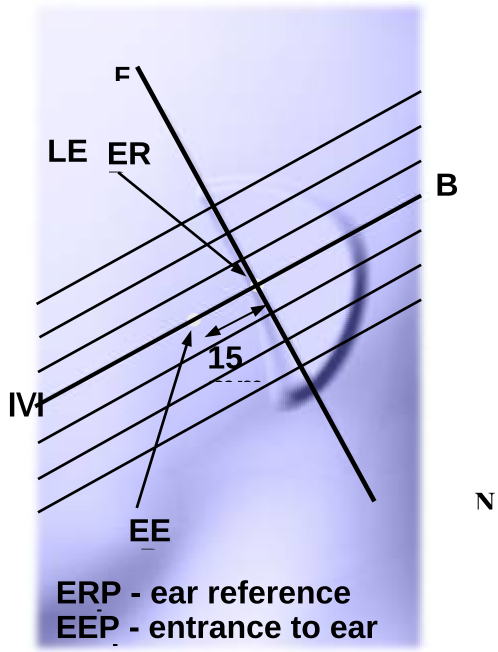
EUT TEST STRATEGY AND METHODOLOGY

Test Positions for Device Operating Next to a Person's Ear

This category includes most wireless handsets with fixed, retractable or internal antennas located toward the top half of the device, with or without a foldout, sliding or similar keypad cover. The handset should have its earpiece located within the upper ¼ of the device, either along the centerline or off-centered, as perceived by its users. This type of handset should be positioned in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point". The "test device reference point" should be located at the same level as the center of the earpiece region. The "vertical centerline" should bisect the front surface of the handset at its top and bottom edges. A "ear reference point" is located on the outer surface of the head phantom on each ear spacer. It is located 1.5 cm above the center of the ear canal entrance in the "phantom reference plane" defined by the three lines joining the center of each "ear reference point" (left and right) and the tip of the mouth.

A handset should be initially positioned with the earpiece region pressed against the ear spacer of a head phantom. For the SCC-34/SC-2 head phantom, the device should be positioned parallel to the "N-F" line defined along the base of the ear spacer that contains the "ear reference point". For interim head phantoms, the device should be positioned parallel to the cheek for maximum RF energy coupling. The "test device reference point" is aligned to the "ear reference point" on the head phantom and the "vertical centerline" is aligned to the "phantom reference plane". This is called the "initial ear position". While maintaining these three alignments, the body of the handset is gradually adjusted to each of the following positions for evaluating SAR:





Cheek/Touch Position

The device is brought toward the mouth of the head phantom by pivoting against the “ear reference point” or along the “N-F” line for the SCC-34/SC-2 head phantom.

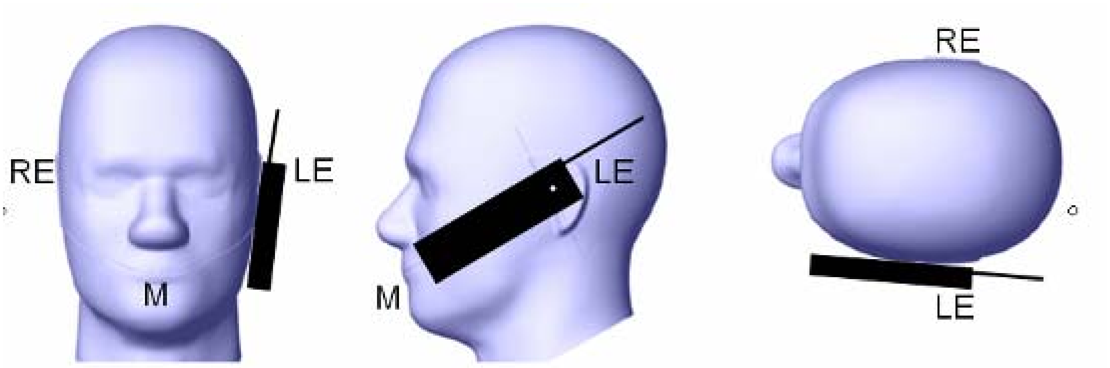
This test position is established:

When any point on the display, keypad or mouthpiece portions of the handset is in contact with the phantom.

(or) When any portion of a foldout, sliding or similar keypad cover opened to its intended self-adjusting normal use position is in contact with the cheek or mouth of the phantom.

For existing head phantoms – when the handset loses contact with the phantom at the pivoting point, rotation should continue until the device touches the cheek of the phantom or breaks its last contact from the ear spacer.

Cheek /Touch Position



Ear/Tilt Position

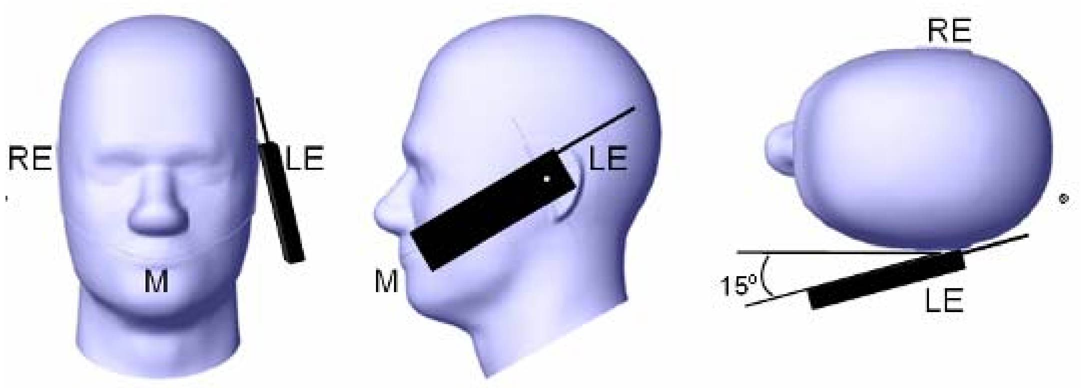
With the handset aligned in the “Cheek/Touch Position”:

1) If the earpiece of the handset is not in full contact with the phantom’s ear spacer (in the “Cheek/Touch position”) and the peak SAR location for the “Cheek/Touch” position is located at the ear spacer region or corresponds to the earpiece region of the handset, the device should be returned to the “initial ear position” by rotating it away from the mouth until the earpiece is in full contact with the ear spacer.

2) (otherwise) The handset should be moved (translated) away from the cheek perpendicular to the line passes through both “ear reference points” (note: one of these ear reference points may not physically exist on a split head model) for approximate 2-3 cm. While it is in this position, the device handset is tilted away from the mouth with respect to the “test device reference point” until the inside angle between the vertical centerline on the front surface of the phone and the horizontal line passing through the ear reference point is by 15 80°. After the tilt, it is then moved (translated) back toward the head perpendicular to the line passes through both “ear reference points” until the device touches the phantom or the ear spacer. If the antenna touches the head first, the positioning process should be repeated with a tilt angle less than 15° so that the device and its antenna would touch the phantom simultaneously. This test position may require a device holder or positioner to achieve the translation and tilting with acceptable positioning repeatability.

If a device is also designed to transmit with its keypad cover closed for operating in the head position, such positions should also be considered in the SAR evaluation. The device should be tested on the left and right side of the head phantom in the “Cheek/Touch” and “Ear/Tilt” positions. When applicable, each configuration should be tested with the antenna in its fully extended and fully retracted positions. These test configurations should be tested at the high, middle and low frequency channels of each operating mode; for example, AMPS, CDMA, and TDMA. If the SAR measured at the middle channel for each test configuration (left, right, Cheek/Touch, Tilt/Ear, extended and retracted) is at least 2.0 dB lower than the SAR limit, testing at the high and low channels is optional for such test configuration(s). If the transmission band of the test device is less than 10 MHz, testing at the high and low frequency channels is optional.

Ear /Tilt 15° Position



Test positions for body-worn and other configurations

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. Devices with a headset output should be tested with a headset connected to the device. When multiple accessories that do not contain metallic components are supplied with the device, the device may be tested with only the accessory that dictates the closest spacing to the body. When multiple accessories that contain metallic components are supplied with the device, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (e.g., 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 must be tested.

Body-worn accessories may not always be supplied or available as options for some devices that are intended to be authorized for body-worn use. A separation distance of 1.5 cm between the back of the device and a flat phantom is recommended for testing body-worn SAR compliance under such circumstances. Other separation distances may be used, but they should not exceed 2.5 cm. In these cases, the device may use body-worn accessories that provide a separation distance greater than that tested for the device provided however that the accessory contains no metallic components.

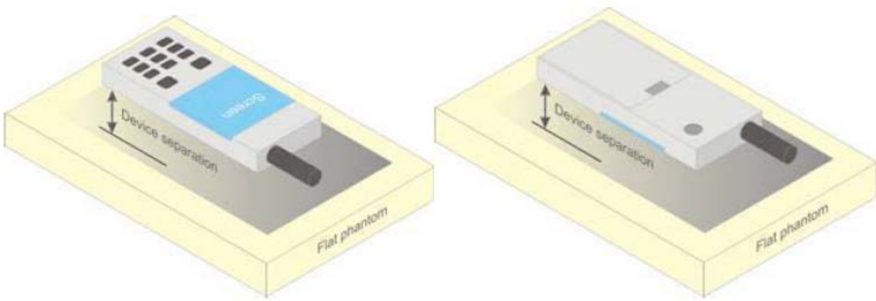


Figure 5 – Test positions for body-worn devices

SAR Evaluation Procedure

The evaluation was performed with the following procedure:

Step 1: Measurement of the SAR value at a fixed location above the ear point or central position was used as a reference value for assessing the power drop. The SAR at this point is measured at the start of the test and then again at the end of the testing.

Step 2: The SAR distribution at the exposed side of the head was measured at a distance of 4 mm from the inner surface of the shell. The area covered the entire dimension of the head or radiating structures of the EUT, the horizontal grid spacing was 15 mm x 15 mm, and the SAR distribution was determined by integrated grid of 1.5mm x 1.5mm. Based on these data, the area of the maximum absorption was determined by spline interpolation. The first Area Scan covers the entire dimension of the EUT to ensure that the hotspot was correctly identified.

Step 3: Around this point, a volume of 30 mm x 30 mm x 30 mm was assessed by measuring 7x 7 x 7 points. On the basis of this data set, the spatial peak SAR value was evaluated under the following procedure:

1) The data at the surface were extrapolated, since the center of the dipoles is 1.2 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

2) The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed by the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one dimensional splines with the “Not a knot"-condition (in x, y and z-directions). The volume was integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the averages.

All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement of the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation was repeated.

Test methodology

KDB 447498 D01 General RF Exposure Guidance v05r02.
KDB 648474 D04 Handset SAR v01r02.
KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03
KDB 865664 D02 RF Exposure Reporting v01r01
KDB 941225 D01 3G SAR Procedures v03
KDB 941225 D05 SAR for LTE Devices v02r03
KDB 941225 D06 Hotspot Mode v02

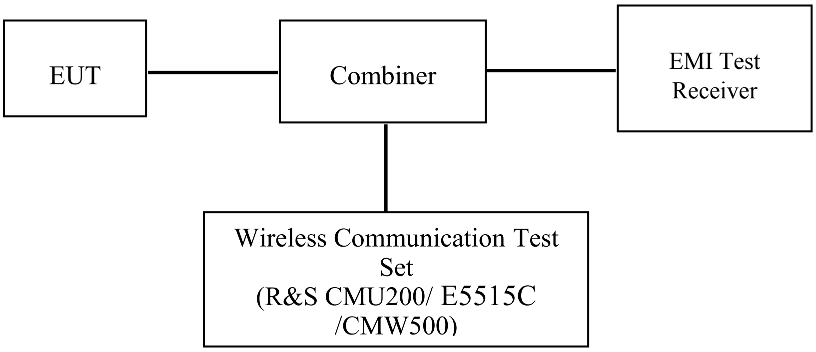
CONDUCTED OUTPUT POWER MEASUREMENT

Provision Applicable

The measured peak output power should be greater and within 5% than EMI measurement.

Test Procedure

The RF output of the transmitter was connected to the input of the EMI Test Receiver through sufficient attenuation.



GSM/WCDMA/LTE

Radio Configuration

The power measurement was configured by the Wireless Communication Test Set.

GSM

Function: Menu select > GSM Mobile Station > GSM 850/1900
Press Connection control to choose the different menus
Press RESET > choose all the reset all settings
Connection: Press Signal Off to turn off the signal and change settings
Network Support > GSM + only
MS Signal
    > 33 dBm for GSM 850
    > 30 dBm for PCS 1900
BS Signal: Enter the same channel number for TCH channel (test channel) and BCCH channel
Frequency Offset >+ 0 Hz
Mode > BCCH and TCH
BCCH Level > -85 dBm (May need to adjust if link is not stable)
BCCH Channel >choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]
Channel Type > Off
P0 > 4 dB
TCH > choose desired test channel
Hopping >Off
AF/RF: Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
Connection: Press Signal on to turn on the signal and change settings

GPRS

Function: Menu select > GSM Mobile Station > GSM 850/1900
Press Connection control to choose the different menus
Press RESET > choose all the reset all settings
Connection: Press Signal Off to turn off the signal and change settings
Network Support > GSM + GPRS or GSM + EGSM
Main Service > Packet Data

Service selection > Test Mode A – Auto Slot Config. off
MS Signal: Press Slot Config Bottom on the right twice to select and change the number of time slots and power setting
> Slot configuration > Uplink/Gamma
> 33 dBm for GPRS 850
> 30 dBm for GPRS 1900
BS Signal: Enter the same channel number for TCH channel (test channel) and BCCH channel
Frequency Offset >+ 0 Hz
Mode >BCCH and TCH
BCCH Level >-85 dBm (May need to adjust if link is not stable)
BCCH Channel > choose desire test channel [Enter the same channel number for TCH channel (test channel) and BCCH channel]

Channel Type > Off
P0 > 4 dB
Slot Config > Unchanged (if already set under MS signal)
TCH > choose desired test channel
Hopping >Off
Main Timeslot >3
Network: Coding Scheme >CS4 (GPRS)
Bit Stream >2E9-1 PSR Bit Stream
AF/RF: Enter appropriate offsets for Ext. Att. Output and Ext. Att. Input
Connection: Press Signal on to turn on the signal and change settings

WCDMA Release 99

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification. The EUT has a nominal maximum output power of 24dBm (+1.7/-3.7).

WCDMA General Settings	Loopback Mode	Test Mode 1
	Rel99 RMC	12.2kbps RMC
	Power Control Algorithm	Algorithm2
	β_c/β_d	8/15

HSDPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subset	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d(SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{hs}	4/15	24/15	30/15	30/15
	MPR(dB)	0	0	0.5	0.5
HSDPA Specific Settings	DACK	8			
	DNAK	8			
	DCQI	8			
	Ack-Nack repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs=βhs/ βc	30/15			

HSUPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

<table>
<tr><th rowspan="2"></th><th>Mode</th><th>HSUPA</th><th>HSUPA</th><th>HSUPA</th><th>HSUPA</th><th>HSUPA</th></tr>
<tr><th>Subset</th><th>1</th><th>2</th><th>3</th><th>4</th><th>5</th></tr>
<tr><td rowspan="12">WCDMA General Settings</td><td>Loopback Mode</td><td colspan="5">Test Mode 1</td></tr>
<tr><td>Rel99 RMC</td><td colspan="5">12.2kbps RMC</td></tr>
<tr><td>HSDPA FRC</td><td colspan="5">H-Set1</td></tr>
<tr><td>HSUPA Test</td><td colspan="5">HSUPA Loopback</td></tr>
<tr><td>Power Control Algorithm</td><td colspan="5">Algorithm2</td></tr>
<tr><td>β_c</td><td>11/15</td><td>6/15</td><td>15/15</td><td>2/15</td><td>15/15</td></tr>
<tr><td>β_d</td><td>15/15</td><td>15/15</td><td>9/15</td><td>15/15</td><td>0</td></tr>
<tr><td>β_{ec}</td><td>209/225</td><td>12/15</td><td>30/15</td><td>2/15</td><td>5/15</td></tr>
<tr><td>β_c/β_d</td><td>11/15</td><td>6/15</td><td>15/9</td><td>2/15</td><td>-</td></tr>
<tr><td>β_{hs}</td><td>22/15</td><td>12/15</td><td>30/15</td><td>4/15</td><td>5/15</td></tr>
<tr><td>CM(dB)</td><td>1.0</td><td>3.0</td><td>2.0</td><td>3.0</td><td>1.0</td></tr>
<tr><td>MPR(dB)</td><td>0</td><td>2</td><td>1</td><td>2</td><td>0</td></tr>
<tr><td rowspan="7">HSDPA Specific Settings</td><td>DACK</td><td colspan="5">8</td></tr>
<tr><td>DNAK</td><td colspan="5">8</td></tr>
<tr><td>DCQI</td><td colspan="5">8</td></tr>
<tr><td>Ack-Nack repetition factor</td><td colspan="5">3</td></tr>
<tr><td>CQI Feedback</td><td colspan="5">4ms</td></tr>
<tr><td>CQI Repetition Factor</td><td colspan="5">2</td></tr>
<tr><td>$Ahs=\beta_{hs}/\beta_c$</td><td colspan="5">30/15</td></tr>
<tr><td rowspan="6">HSUPA Specific Settings</td><td>DE-DPCCH</td><td>6</td><td>8</td><td>8</td><td>5</td><td>7</td></tr>
<tr><td>DHARQ</td><td>0</td><td>0</td><td>0</td><td>0</td><td>0</td></tr>
<tr><td>AG Index</td><td>20</td><td>12</td><td>15</td><td>17</td><td>21</td></tr>
<tr><td>ETFCI</td><td>75</td><td>67</td><td>92</td><td>71</td><td>81</td></tr>
<tr><td>Associated Max UL Data Rate kbps</td><td>242.1</td><td>174.9</td><td>482.8</td><td>205.8</td><td>308.9</td></tr>
<tr><td>Reference E_FCls</td><td colspan="2">E-TFCI 11 E
E-TFCI PO 4
E-TFCI 67
E-TFCI PO 18
E-TFCI 71
E-TFCI PO23
E-TFCI 75
E-TFCI PO26
E-TFCI 81
E-TFCI PO 27</td><td>E-TFCI
11
E-TFCI
PO4
E-TFCI
92
E-TFCI
PO 18</td><td colspan="2">E-TFCI 11 E
E-TFCI PO 4
E-TFCI 67
E-TFCI PO 18
E-TFCI 71
E-TFCI PO23
E-TFCI 75
E-TFCI PO26
E-TFCI 81
E-TFCI PO 27</td></tr>
</table>

HSPA+

Sub-test	β_c (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

Note 1: Δ_{ACK}, Δ_{NACK} and Δ_{CQI} = 30/15 with β_{hs} = 30/15 * β_c .
Note 2: CM = 3.5 and the MPR is based on the relative CM difference, MPR = MAX(CM-1,0).
Note 3: DPDCH is not configured, therefore the β_c is set to 1 and β_d = 0 by default.
Note 4: β_{ed} can not be set directly; it is set by Absolute Grant Value.
Note 5: All the sub-tests require the UE to transmit 2SF2+2SF4 16QAM EDCH and they apply for UE using E-DPDCH category 7. E-DCH TTI is set to 2ms TTI and E-DCH table index = 2. To support these E-DCH configurations DPDCH is not allocated. The UE is signalled to use the extrapolation algorithm.

The following tests were conducted according to the test requirements in Table C.11.1.4 of 3GPP TS 34.121-1

DC-HSDPA

The following tests were conducted according to the test requirements in Table C.8.1.12 of 3GPP TS 34.121-1

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	Proces ses	6
Information Bit Payload (N_{INF})	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.

LTE

For UE Power Class 1 and 3, the allowed Maximum Power Reduction (MPR) for the maximum output power in Table 6.2.2-1due to higher order modulation and transmit bandwidth configuration (resource blocks) is specified in Table 6.2.3-1.

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

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

For UE Power Class 1 and 3 the specific requirements and identified sub clauses are specified in Table 6.2.4-1 along with the allowed A-MPR values that may be used to meet these requirements. The allowed A-MPR values specified below in Table 6.2.4.-1 to 6.2.4-15 are in addition to the allowed MPR requirements specified in sub clause 6.2.3.

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

Network Signalling value	Requirements (subclause)	E-UTRA Band	Channel bandwidth (MHz)	Resources Blocks (N_{RB})	A-MPR (dB)
NS_01	6.6.2.1.1	Table 5.5-1	1.4, 3, 5, 10, 15, 20	Table 5.6-1	N/A
NS_03	6.6.2.2.1	2, 4,10, 23, 25, 35, 36	3	>5	≤ 1
			5	>6	≤ 1
			10	>6	≤ 1
			15	>8	≤ 1
			20	>10	≤ 1
NS_04	6.6.2.2.2	41	5	>6	≤ 1
			10, 15, 20	Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	N/A
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	
NS_11	6.6.2.2.1	23	1.4, 3, 5, 10, 15, 20	Table 6.2.4-5	
NS_12	6.6.3.3.5	26	1.4, 3, 5	Table 6.2.4-6	
NS_13	6.6.3.3.6	26	5	Table 6.2.4-7	
NS_14	6.6.3.3.7	26	10, 15	Table 6.2.4-8	
NS_15	6.6.3.3.8	26	1.4, 3, 5, 10, 15	Table 6.2.4-9 Table 6.2.4-10	
NS_16	6.6.3.3.9	27	3, 5, 10	Table 6.2.4-11, Table 6.2.4-12, Table 6.2.4-13	
NS_17	6.6.3.3.10	28	5, 10	Table 5.6-1	N/A
NS_18	6.6.3.3.11	28	5	≥ 2	≤ 1
			10, 15, 20	≥ 1	≤ 4
NS_19	6.6.3.3.12	44	10, 15, 20	Table 6.2.4-14	
NS_20	6.2.2 6.6.2.2.1 6.6.3.2	23	5, 10, 15, 20	Table 6.2.4-15	
...					
NS_32	-	-	-	-	-

Maximum Target Output Power

Max Target Power(dBm)			
Mode/Band	Channel		
	Low	Middle	High
GSM 850	32.6	32.6	32.6
GPRS 1 TX Slot	32.5	32.5	32.5
GPRS 2 TX Slot	32	32	32
GPRS 3 TX Slot	30.2	30.2	30.2
GPRS 4 TX Slot	29.2	29.2	29.2
EDGE 1 TX Slot	26.8	26.8	26.8
EDGE 2 TX Slot	25	25	25
EDGE 3 TX Slot	22.9	22.9	22.9
EDGE 4 TX Slot	21.9	21.9	21.9
PCS 1900	28.3	28.3	28.3
GPRS 1 TX Slot	28.2	28.2	28.2
GPRS 2 TX Slot	27.6	27.6	27.6
GPRS 3 TX Slot	25.7	25.7	25.7
GPRS 4 TX Slot	24.6	24.6	24.6
EDGE 1 TX Slot	25.3	25.3	25.3
EDGE 2 TX Slot	24	24	24
EDGE 3 TX Slot	22.1	22.1	22.1
EDGE 4 TX Slot	20.9	20.9	20.9
WCDMA Band 5	22.7	22.7	22.7
HSDPA	22	22	22
HSUPA	21.9	21.9	21.9
DC-HSDPA	21.3	21.3	21.3
HSPA+	21.3	21.3	21.3
WCDMA Band 2	22.9	22.9	22.9
HSDPA	22.2	22.2	22.2
HSUPA	22.3	22.3	22.3
DC-HSDPA	21.7	21.7	21.7
HSPA+	21.7	21.7	21.7
LTE Band 7	22.8	22.8	22.8
LTE Band 17	22.7	22.7	22.7
WLAN(2.4G)	9.6	9.6	9.6
WLAN(5G)	8.1	8.1	8.1
Bluetooth BDR/EDR	7.8	7.8	7.8
Bluetooth LE	-4.6	-4.6	-4.6

Test Results:

GSM:

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)
GSM 850	128	824.2	**32.49**
	190	836.6	32.43
	251	848.8	32.22
PCS 1900	512	1850.2	**28.16**
	661	1880	28.07
	810	1909.8	28.15

GPRS:

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			1 slot	2 slots	3 slots	4 slots
GSM 850	128	824.2	32.37	31.9	30.13	28.94
	190	836.6	32.33	31.73	30.11	29.08
	251	848.8	32.15	31.72	30	28.92
PCS 1900	512	1850.2	28.09	27.21	25.51	24.31
	661	1880	28.01	27.33	25.53	24.43
	810	1909.8	28.07	27.45	25.56	24.53

EGPRS:

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			1 slot	2 slots	3 slots	4 slots
GSM 850	128	824.2	26.66	24.62	22.73	21.81
	190	836.6	26.64	24.82	22.75	21.55
	251	848.8	26.58	24.9	22.56	21.6
PCS 1900	512	1850.2	25.23	23.6	21.52	20.67
	661	1880	25.24	23.85	22.03	20.54
	810	1909.8	25.09	23.67	21.79	20.79

For SAR, the time based average power is relevant, the difference in between depends on the duty cycle of the TDMA signal.

Number of Time slot	1	2	3	4
Duty Cycle	1:8	1:4	1:2.66	1:2
Time based Ave. power compared to slotted Ave. power	-9 dB	-6 dB	-4.25 dB	-3 dB
Crest Factor	8	4	2.66	2

The time based average power for GPRS

Band	Channel No.	Frequency (MHz)	Time based average Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	23.37	25.9	25.88	25.94
	190	836.6	23.33	25.73	25.86	**26.08**
	251	848.8	23.15	25.72	25.75	25.92
PCS 1900	512	1850.2	19.09	21.21	21.26	21.31
	661	1880	19.01	21.33	21.28	21.43
	810	1909.8	19.07	21.45	21.31	**21.53**

The time based average power for EGPRS

Band	Channel No.	Frequency (MHz)	Time based average Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	17.66	18.62	18.48	18.81
	190	836.6	17.64	18.82	18.5	18.55
	251	848.8	17.58	18.9	18.31	18.6
PCS 1900	512	1850.2	16.23	17.6	17.27	17.67
	661	1880	16.24	17.85	17.78	17.54
	810	1909.8	16.09	17.67	17.54	17.79

Note:

1. Rohde & Schwarz Radio Communication Tester (CMU200) was used for the measurement of GSM peak and average output power for active timeslots.
2. For GSM voice, 1 timeslot has been activated with power level 5 (850 MHz band) and 0 (1900 MHz band).
3. For GPRS, 1, 2, 3 and 4 timeslots has been activated separately with power level 3(850 MHz band) and 3(1900 MHz band).

WCDMA:

Results (12.2kbps RMC)

Band	Frequency (MHz)	RF Output Power (dBm)
WCDMA Band 5	826.4	**22.59**
	836.6	22.05
	846.6	22.46
WCDMA Band 2	1852.4	22.32
	1880	22.66
	1907.6	**22.82**

Results (HSDPA)

Band	Frequency (MHz)	RF Output Power (dBm)			
		Subset 1	Subset 2	Subset 3	Subset 4
WCDMA Band 5	826.4	21.72	21.88	21.54	21.81
	836.6	21.06	21.17	20.92	20.83
	846.6	21.59	21.71	21.7	21.65
WCDMA Band 2	1852.4	21.65	21.5	21.6	21.56
	1880	21.88	22.02	21.96	21.98
	1907.6	22.01	21.99	22.03	22.11

Results (HSUPA)

Band	Frequency (MHz)	RF Output Power (dBm)				
		Subset 1	Subset 2	Subset 3	Subset 4	Subset 5
WCDMA Band 5	826.4	21.57	21.76	21.58	21.6	21.62
	836.6	21	20.86	20.87	20.88	21.18
	846.6	21.47	21.56	21.74	21.49	21.67
WCDMA Band 2	1852.4	21.57	21.59	21.62	21.55	21.53
	1880	21.95	21.89	21.83	21.92	21.92
	1907.6	22.02	22.15	22.03	22.06	22.15

Results (DC-HSDPA):

Band	Frequency (MHz)	RF Output Power (dBm)			
		Subset 1	Subset 2	Subset 3	Subset 4
WCDMA Band 5	826.4	21.11	21.1	21.07	21.14
	836.6	20.58	20.57	20.66	20.64
	846.6	21.03	21.08	21.17	21.07
WCDMA Band 2	1852.4	21.05	21.02	20.98	21.07
	1880	21.43	21.33	21.47	21.45
	1907.6	21.45	21.55	21.49	21.5

Results (HSPA+)

Band	Frequency (MHz)	RF Output Power (dBm)
WCDMA Band 5	826.4	21.04
	836.6	20.61
	846.6	21.17
WCDMA Band 2	1852.4	21.01
	1880	21.44
	1907.6	21.59

Note:
1. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement Channel) Configured in Test Loop Model 1.
2. KDB 941225 D01-Body SAR is not required for HSDPA/HSUPA/HSPA+/DC-HSDPA when the maximum average output of each RF channel is less than ¼ dB higher than measured 12.2kbps RMC or the maximum SAR for 12.2kbps RMC is < 75% of SAR limit.

LTE Band 7:

Test Bandwidth	Test Modulation	Resource Block & RB offset	Target MPR	Meas MPR	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	0	0	22.35	22.59	22.14
		1#12	0	0	22.35	22.56	22.13
		1#24	0	0	22.27	22.53	21.97
		12#0	1	1	21.67	21.88	21.48
		12#6	1	1	21.76	21.96	21.51
		12#11	1	1	21.65	21.88	21.38
		25#0	1	1	21.28	21.57	21.04
	16-QAM	1#0	1	1	21.14	21.49	20.88
		1#12	1	1	21.15	21.34	20.91
		1#24	1	1	21.15	21.42	20.93
		12#0	2	2	20.72	20.97	20.40
		12#6	2	2	20.66	20.83	20.43
		12#11	2	2	20.74	20.94	20.51
		25#0	2	2	20.36	20.56	20.10
10M	QPSK	1#0	0	0	22.39	22.58	22.17
		1#24	0	0	22.51	22.67	22.19
		1#49	0	0	22.36	22.58	22.09
		25#0	1	1	21.63	21.84	21.30
		25#12	1	1	21.67	21.89	21.49
		25#24	1	1	21.62	21.88	21.37
		50#0	1	1	21.34	21.56	21.14
	16-QAM	1#0	1	1	21.67	21.95	21.56
		1#24	1	1	21.70	22.01	21.42
		1#49	1	1	21.71	21.87	21.45
		25#0	2	2	20.88	21.04	20.53
		25#12	2	2	20.88	21.09	20.61
		25#24	2	2	20.93	21.15	20.74
		50#0	2	2	20.36	20.60	20.14
15M	QPSK	1#0	0	0	22.46	**22.67**	22.28
		1#37	0	0	22.44	22.62	22.28
		1#74	0	0	22.35	22.60	22.08
		36#0	1	1	21.48	21.77	21.29
		36#17	1	1	21.45	21.74	21.22
		36#35	1	1	21.53	21.85	21.35
		75#0	1	1	21.26	21.57	21.01
	16-QAM	1#0	1	1	21.70	21.97	21.47
		1#37	1	1	21.70	21.94	21.52
		1#74	1	1	21.64	21.85	21.44
		36#0	2	2	21.04	21.20	20.84
		36#17	2	2	21.11	21.33	20.85
		36#35	2	2	20.97	21.17	20.67
		75#0	2	2	20.45	20.70	20.22

20M	QPSK	1#0	0	0	**22.39**	**22.60**	**22.09**
		1#49	0	0	22.44	22.61	22.23
		1#99	0	0	22.33	22.57	22.01
		50#0	1	1	21.26	21.49	20.96
		50#24	1	1	21.35	21.55	21.12
		50#49	1	1	21.31	21.53	21.09
		100#0	1	1	21.51	21.67	21.28
	16-QAM	1#0	1	1	21.55	21.74	21.32
		1#49	1	1	21.61	21.87	21.48
		1#99	1	1	21.54	21.72	21.34
		50#0	2	2	20.71	21.00	20.53
		50#24	2	2	20.87	21.11	20.60
		50#49	2	2	20.90	21.14	20.67
		100#0	2	2	20.40	20.66	20.14

LTE Band 17:

Test Bandwidth	Test Modulation	Resource Block & RB offset	Target MPR	Meas MPR	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	0	0	22.21	22.46	22.10
		1#12	0	0	22.33	22.53	22.23
		1#24	0	0	22.37	22.59	22.23
		12#0	1	1	21.75	21.95	21.70
		12#6	1	1	21.68	21.94	21.53
		12#11	1	1	21.67	21.88	21.58
		25#0	1	1	21.16	21.37	21.02
	16-QAM	1#0	1	1	21.32	21.57	21.19
		1#12	1	1	21.18	21.46	21.18
		1#24	1	1	21.21	21.45	21.22
		12#0	2	2	20.50	20.78	20.54
		12#6	2	2	20.71	20.92	20.57
		12#11	2	2	20.51	20.76	20.47
		25#0	2	2	20.37	20.61	20.27
10M	QPSK	1#0	0	0	22.35	**22.60**	22.33
		1#24	0	0	22.23	22.50	22.23
		1#49	0	0	22.40	22.59	22.34
		25#0	1	1	21.54	21.79	21.49
		25#12	1	1	21.66	21.87	21.52
		25#24	1	1	21.61	21.89	21.61
		50#0	1	1	21.26	21.44	21.17
	16-QAM	1#0	1	1	21.61	21.81	21.50
		1#24	1	1	21.49	21.75	21.45
		1#49	1	1	21.52	21.71	21.36
		25#0	2	2	21.13	21.35	20.97
		25#12	2	2	21.11	21.33	21.00
		25#24	2	2	21.03	21.28	20.96
		50#0	2	2	20.47	20.68	20.29

Note:
1.SAR for LTE band exposure configurations is measured according to the procedures of KDB 941225 D05 SAR for LTE Devices v02.
2.The CMW500 Wideband Radio Communication tester is used for LTE output power measurements and SAR testing. Closed loop power control is used to keep the radio transmitters the max output power during the test.
3.KDB941225D05v02- SAR for higher order modulation 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

Bluetooth:

Mode	Channel frequency (MHz)	RF Output Power (dBm)
BDR(GFSK)	2402	4.70
	2425	7.06
	2441	4.57
	2457	**7.67**
	2480	4.95
EDR(4-DQPSK)	2402	3.80
	2425	6.33
	2441	3.80
	2458	6.69
	2480	4.05
EDR(8-DPSK)	2402	3.68
	2425	5.26
	2441	3.68
Bluetooth LE	2458	5.66
	2480	3.80
	2402	4.70
	2425	7.06
	2441	4.57

WLAN(2.4G):

Mode	Channel No.	frequency (MHz)	RF Output Power (dBm)
802.11b	1	2412	9.27
	6	2437	**9.49**
	11	2462	8.80
802.11g	1	2412	8.89
	6	2437	9.18
	11	2462	9.04
802.11n HT20	1	2412	8.91
	6	2437	8.63
	11	2462	9.06
802.11n HT40	3	2422	9.14
	6	2437	9.24
	9	2452	9.10

WLAN(5G):

UNII Band	Mode	Channel	Frequency(MHz)	RF Output Power (dBm)
5150-5250MHz	802.11 a	Low	5180	**8.02**
		Middle	5200	7.93
		High	5240	7.5
	5G 802.11 n20	Low	5180	7.48
		Middle	5200	7.38
		High	5240	6.91
	5G 802.11 n40	Low	5190	7.53
		High	5230	7.47

Note:

1. The output power was tested under data rate 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n HT20, 13.5Mbps for 802.11n HT40.

SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

The EUT is capable of function as a WLAN to cellular mobile hotspot. Additional SAR test was performed according to KDB941225 D06. Test was performed with a separation of 1cm between the EUT and the flat phantom. The EUT was positioned for SAR tests with the front and back surfaces facing the edge. Each transmit band was utilized for SAR testing. The tested mode has been selected within each band that exhibits the highest time average output power.

SAR Test Data

Environmental Conditions

Temperature:	23-24 ℃	22-23 ℃
Relative Humidity:	30 %	30 %
ATM Pressure:	1002 mbar	998 mbar
Test Date:	2015/9/25	2015/9/28

Testing was performed by Rocky Xiao

GSM 850:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (dB)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Flat	824.2	GSM	-0.08	32.49	32.6	1.026	0.179	0.184	**1#**
	836.6	GSM	0.13	32.43	32.6	1.04	0.173	0.18	/
	848.8	GSM	0.12	32.22	32.6	1.091	0.162	0.177	/
Body-Back-Headset (10mm)	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	0.08	32.43	32.6	1.04	0.608	0.632	/
	848.8	GSM	/	/	/	/	/	/	/
Body-Back (10mm)	824.2	GPRS	-0.05	28.94	29.2	1.062	0.723	0.768	**2#**
	836.6	GPRS	0.12	29.08	29.2	1.028	0.732	0.752	/
	848.8	GPRS	0.11	28.92	29.2	1.067	0.705	0.752	/
Body-Left (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	0.09	29.08	29.2	1.028	0.211	0.217	/
	848.8	GPRS	/	/	/	/	/	/	/
Body-Right (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	0.16	29.08	29.2	1.028	0.13	0.134	/
	848.8	GPRS	/	/	/	/	/	/	/
Body-Bottom (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	-0.19	29.08	29.2	1.028	0.351	0.349	/
	848.8	GPRS	/	/	/	/	/	/	/

Note:
1. When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. The EUT transmit and receive through the same GSM antenna while testing SAR.
3. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
4. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.
5. The Multi-slot Classes of EUT is Class 12 which has maximum 4 Downlink slots and 4 Uplink slots, the maximum active slots is 5, when perform the multiple slots scan, 1DL+4UL is the worst case.

PCS Band:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (dB)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Flat	1850.2	GSM	0.2	28.16	28.3	1.033	0.161	0.166	**3#**
	1880	GSM	0.18	28.07	28.3	1.054	0.151	0.159	/
	1909.8	GSM	0.08	28.15	28.3	1.035	0.156	0.161	/
Body-Back-Headset (10mm)	1850.2	GSM	/	/	/	/	/	/	/
	1880	GSM	0.06	28.07	28.3	1.054	0.408	0.43	/
	1909.8	GSM	/	/	/	/	/	/	/
Body-Back (10mm)	1850.2	GPRS	0.11	24.31	24.6	1.069	0.466	0.498	/
	1880.0	GPRS	0.17	24.43	24.6	1.04	0.471	0.49	/
	1909.8	GPRS	-0.09	24.53	24.6	1.016	0.506	0.514	**4#**
Body-Left (10mm)	1850.2	GPRS	/	/	/	/	/	/	/
	1880.0	GPRS	-0.01	24.43	24.6	1.04	0.151	0.157	/
	1909.8	GPRS	/	/	/	/	/	/	/
Body-Right (10mm)	1850.2	GPRS	/	/	/	/	/	/	/
	1880.0	GPRS	0.19	24.43	24.6	1.04	0.108	0.112	/
	1909.8	GPRS	/	/	/	/	/	/	/
Body-Bottom (10mm)	1850.2	GPRS	/	/	/	/	/	/	/
	1880.0	GPRS	0.15	24.43	24.6	1.04	0.225	0.239	/
	1909.8	GPRS	/	/	/	/	/	/	/

Note:
1. When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. The EUT transmit and receive through the same GSM antenna while testing SAR.
3. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
4. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.
5. The Multi-slot Classes of EUT is Class 12 which has maximum 4 Downlink slots and 4 Uplink slots, the maximum active slots is 5, when perform the multiple slots scan, 1DL+4UL is the worst case.

WCDMA 850 Band:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (dB)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Flat	826.4	RMC	-0.11	22.59	22.7	1.026	0.092	0.094	**5#**
	836.6	RMC	0.16	22.05	22.7	1.161	0.078	0.091	/
	846.6	RMC	0.02	22.46	22.7	1.057	0.085	0.09	/
Body-Back (10mm)	826.4	RMC	-0.1	22.59	22.7	1.026	0.421	0.432	**6#**
	836.6	RMC	0.06	22.05	22.7	1.161	0.359	0.417	/
	846.6	RMC	0.19	22.46	22.7	1.057	0.392	0.414	/
Body-Left (10mm)	826.4	RMC	-0.11	22.05	22.7	1.161	0.098	0.114	/
	836.6	RMC	/	/	/	/	/	/	/
	846.6	RMC	/	/	/	/	/	/	/
Body-Right (10mm)	826.4	RMC	-0.09	22.05	22.7	1.161	0.089	0.103	/
	836.6	RMC	/	/	/	/	/	/	/
	846.6	RMC	/	/	/	/	/	/	/
Body-Bottom (10mm)	826.4	RMC	0.13	22.05	22.7	1.161	0.176	0.206	/
	836.6	RMC	/	/	/	/	/	/	/
	846.6	RMC	/	/	/	/	/	/	/

Note:

1. When the 1-g SAR is≤ 0.8W/Kg, testing for other channels are optional.
2. The EUT transmit and receive through the same antenna while testing SAR.
3. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement Channel) Configured in Test Loop Model.
4. KDB 941225 D01-Body SAR is not required for HSDPA/HSUPA/HSPA+/DC-HSDPA when the maximum average output of each RF channel is less than ¼ dB higher than measured 12.2kbps RMC or the maximum SAR for 12.2kbps RMC is < 75% of SAR limit.
5. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.

WCDMA 1900 Band:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (dB)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Flat	1852.4	RMC	0.03	22.32	22.9	1.143	0.196	0.224	/
	1880	RMC	0.12	22.66	22.9	1.057	0.212	0.224	/
	1907.6	RMC	0.04	22.82	22.9	1.019	0.227	0.231	**7#**
Body-Back (10mm)	1852.4	RMC	0.15	22.32	22.9	1.143	0.381	0.435	/
	1880.0	RMC	0.1	22.66	22.9	1.057	0.401	0.424	/
	1907.6	RMC	0.01	22.82	22.9	1.019	0.437	0.445	**8#**
Body-Left (10mm)	1852.4	RMC	/	/	/	/	/	/	/
	1880.0	RMC	/	/	/	/	/	/	/
	1907.6	RMC	-0.02	22.66	22.9	1.057	0.114	0.12	/
Body-Right (10mm)	1852.4	RMC	/	/	/	/	/	/	/
	1880.0	RMC	/	/	/	/	/	/	/
	1907.6	RMC	-0.02	22.66	22.9	1.057	0.094	0.099	/
Body-Bottom (10mm)	1852.4	RMC	/	/	/	/	/	/	/
	1880.0	RMC	/	/	/	/	/	/	/
	1907.6	RMC	0.07	22.66	22.9	1.057	0.2	0.199	/

Note:
1. When the 1-g SAR is≤ 0.8W/Kg, testing for other channels are optional.
2. The EUT transmit and receive through the same antenna while testing SAR.
3. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement Channel) Configured in Test Loop Model.
4. KDB 941225 D01-Body SAR is not required for HSDPA/HSUPA/HSPA+/DC-HSDPA when the maximum average output of each RF channel is less than ¼ dB higher than measured 12.2kbps RMC or the maximum SAR for 12.2kbps RMC is < 75% of SAR limit.
5. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.

LTE Band 7:

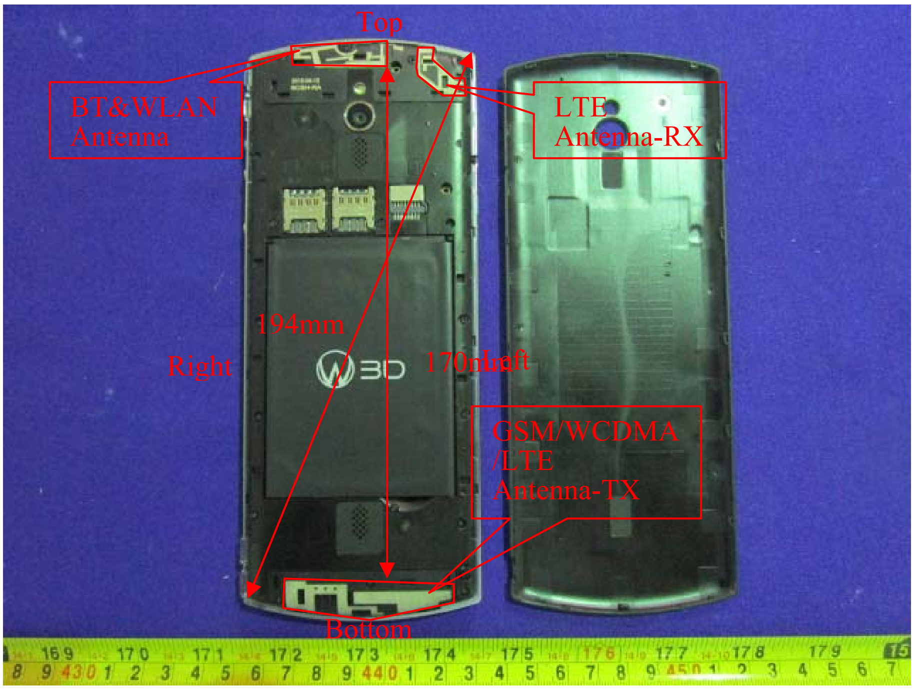
EUT Position	Frequency (MHz)	Bandwidth (MHz)	Test Mode	Power Drift (dB)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
							Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Flat	2510	20	1RB	0.18	22.39	22.8	1.099	0.175	0.192	/
	2535	20	1RB	-0.12	22.6	22.8	1.047	0.189	0.198	**9#**
	2560	20	1RB	0.09	22.09	22.8	1.178	0.164	0.193	/
	2535	20	50%RB	0.01	21.5	22.8	1.349	0.14	0.189	/
Body-Back (10mm)	2510	20	1RB	0.02	22.39	22.8	1.099	0.636	0.699	/
	2535	20	1RB	-0.03	22.6	22.8	1.047	0.689	0.721	**10#**
	2560	20	1RB	0.07	22.09	22.8	1.178	0.589	0.694	
	2535	20	50%RB	0.08	21.5	22.8	1.349	0.482	0.65	/
Body-Left (10mm)	2510	20	1RB	/	/	/	/	/	/	/
	2535	20	1RB	0.07	22.6	22.8	1.047	0.205	0.215	/
	2560	20	1RB	/	/	/	/	/	/	/
	2535	20	50%RB	0.14	21.5	22.8	1.349	0.158	0.213	/
Body-Right (10mm)	2510	20	1RB	/	/	/	/	/	/	/
	2535	20	1RB	0.14	22.6	22.8	1.047	0.148	0.155	/
	2560	20	1RB	/	/	/	/	/	/	/
	2535	20	50%RB	0.07	21.5	22.8	1.349	0.11	0.148	/
Body-Bottom (10mm)	2510	20	1RB	/	/	/	/	/	/	/
	2535	20	1RB	-0.17	22.6	22.8	1.047	0.331	0.33	/
	2560	20	1RB	/	/	/	/	/	/	/
	2535	20	50%RB	0.12	21.5	22.8	1.349	0.223	0.301	/

Note:

1. When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. SAR for LTE band exposure configurations is measured according to the procedures of KDB 941225 D05 SAR for LTE Devices v02.
3. KDB941225D05- SAR for higher order modulation 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
4. KDB941225D05- For QPSK with 100% RB allocation, when the reported SAR measured for the Highest output power channel is <1.45 W/kg, tests for the remaining required test channels are optional.
5. KDB941225D05- 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 are ≤ 0.8 W/kg.
6. KDB941225D05- 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 among RB offset the upper edge, middle and lower edge of each required test channel.
7. KDB941225D05- other channel bandwidths SAR test is required 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.
8. Worst case SAR for 50% RB allocation is selected to be tested.

SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

BT&WLAN and GSM&3G&4G Antennas Location:



Note:
The diagonal length of the Smart phone is 194 mm, less then 200 mm.

Simultaneous Transmission:

Description of Simultaneous Transmit Capabilities			Antennas Distance (mm)
Transmitter Combination	Simultaneous?	Hotspot?	
GSM + WCDMA	×	×	0
GSM+LTE	×	×	0
GSM + Bluetooth	√	×	170
GSM + WLAN(2.4G)	√	√	170
GSM + WLAN(5G)	√	√	170
WCDMA+LTE	×	×	0
WCDMA + Bluetooth	√	×	170
WCDMA + WLAN(2.4G)	√	√	170
WCDMA + WLAN(5G)	√	√	170
LTE + Bluetooth	√	×	170
LTE + WLAN(2.4G)	√	√	170
LTE + WLAN(5G)	√	√	170

Standalone SAR test exclusion considerations

Mode	Frequency (MHz)	Pavg (dBm)	Pavg (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
Bluetooth	2480	7.8	6.03	0	1.9	3	YES
WLAN(2.4G)	2462	9.6	9.12	0	2.9	3	YES
WLAN(5G)	5240	8.1	6.46	0	3	3	YES

NOTE:
The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:
[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤7.5 for 10-g extremity SAR, where
1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

Standalone SAR estimation:

Mode	Frequency (GHz)	Pavg (dBm)	Pavg (mW)	Distance (mm)	Estimated 1-g (W/kg)
BT Head	2480	7.8	6.03	0	0.253
BT Body	2480	7.8	6.03	10	0.127
WLAN(2.4G) Head	2462	9.6	9.12	0	0.387
WLAN(2.4G) Body	2462	9.6	9.12	10	0.187
WLAN(5G)	5240	8.1	6.46	0	0.4
WLAN(5G)	5240	8.1	6.46	10	0.2

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
[(max. power of channel, including tune-up tolerance , mW)/(min. test separation distance,mm)] · [√f(GHz)/x]
W/kg for test separation distances ≤50 mm;
where x = 7.5 for 1-g SAR.
When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion

Simultaneous and Hotspot SAR test exclusion considerations:

Mode (SAR1+SAR2)	Position	Reported SAR (W/kg)		ΣSAR
		SAR1	SAR2	< 1.6W/kg
GSM 850+BT	Head Flat	0.184	0.253	0.437
	Body-Back-Headset	0.632	0.127	0.759
	Body-Back	0.768	0.127	0.895
	Body-Left	0.217	0.127	0.344
	Body-Right	0.134	0.127	0.261
	Body-Bottom	0.349	0.127	0.476
PCS 1900+BT	Head Flat	0.166	0.253	0.419
	Body-Back-Headset	0.43	0.127	0.557
	Body-Back	0.514	0.127	0.641
	Body-Left	0.157	0.127	0.284
	Body-Right	0.112	0.127	0.239
	Body-Bottom	0.239	0.127	0.366
GSM 850 +WLAN(2.4G)	Head Flat	0.184	0.387	0.571
	Body-Back-Headset	0.632	0.187	0.819
GSM 850 +WLAN(2.4G) (Hotspot)	Body-Back	0.768	0.187	0.955
	Body-Left	0.217	0.187	0.404
	Body-Right	0.134	0.187	0.321
	Body-Bottom	0.349	0.187	0.536
PCS 1900 +WLAN(2.4G)	Head Flat	0.166	0.387	0.553
	Body-Back-Headset	0.43	0.187	0.617
PCS 1900 +WLAN(2.4G) (Hotspot)	Body-Back	0.514	0.187	0.701
	Body-Left	0.157	0.187	0.344
	Body-Right	0.112	0.187	0.299
	Body-Bottom	0.239	0.187	0.426
GSM 850 +WLAN(5G)	Head Flat	0.184	0.4	0.584
	Body-Back-Headset	0.632	0.2	0.832
GSM 850 +WLAN(5G) (Hotspot)	Body-Back	0.768	0.2	**0.968**
	Body-Left	0.217	0.2	0.417
	Body-Right	0.134	0.2	0.334
	Body-Bottom	0.349	0.2	0.549
PCS 1900 +WLAN(5G)	Head Flat	0.166	0.4	0.566
	Body-Back-Headset	0.43	0.2	0.63
PCS 1900 +WLAN(5G) (Hotspot)	Body-Back	0.514	0.2	0.714
	Body-Left	0.157	0.2	0.357
	Body-Right	0.112	0.2	0.312
	Body-Bottom	0.239	0.2	0.439

Mode (SAR1+SAR2)	Position	Reported SAR (W/kg)		ΣSAR < 1.6W/kg
		SAR1	SAR2	
WCDMA 850 +BT	Head Flat	0.094	0.253	0.347
	Body-Back	0.432	0.127	0.559
	Body-Left	0.114	0.127	0.241
	Body-Right	0.103	0.127	0.23
	Body-Bottom	0.206	0.127	0.333
WCDMA 1900 +BT	Head Flat	0.231	0.253	0.484
	Body-Back	0.445	0.127	0.572
	Body-Left	0.12	0.127	0.247
	Body-Right	0.099	0.127	0.226
	Body-Bottom	0.199	0.127	0.326
WCDMA 850 +WLAN(2.4G)	Head Flat	0.094	0.387	0.481
WCDMA 850 +WLAN(2.4G) (Hotspot)	Body-Back	0.432	0.187	0.619
	Body-Left	0.114	0.187	0.301
	Body-Right	0.103	0.187	0.29
	Body-Bottom	0.206	0.187	0.393
WCDMA 1900 +WLAN(2.4G)	Head Flat	0.231	0.387	0.618
WCDMA 1900+WLAN(2.4G) (Hotspot)	Body-Back	0.445	0.187	0.632
	Body-Left	0.12	0.187	0.307
	Body-Right	0.099	0.187	0.286
	Body-Bottom	0.199	0.187	0.386
WCDMA 850 +WLAN(5G)	Head Flat	0.094	0.4	0.494
WCDMA 850 +WLAN(5G) (Hotspot)	Body-Back	0.432	0.2	0.632
	Body-Left	0.114	0.2	0.314
	Body-Right	0.103	0.2	0.303
	Body-Bottom	0.206	0.2	0.406
WCDMA 1900 +WLAN(5G)	Head Flat	0.231	0.4	0.631
WCDMA 1900+WLAN(5G) (Hotspot)	Body-Back	0.445	0.2	0.645
	Body-Left	0.12	0.2	0.32
	Body-Right	0.099	0.2	0.299
	Body-Bottom	0.199	0.2	0.399

Mode(SAR1+SAR2)	Position	Reported SAR (W/kg)		ΣSAR < 1.6W/kg
		SAR1	SAR2	
LTE Band 7+BT	Head Flat	0.198	0.253	0.451
	Body-Back	0.721	0.127	0.848
	Body- Left	0.215	0.127	0.342
	Body- Right	0.155	0.127	0.282
	Body-Bottom	0.33	0.127	0.457
LTE Band 17+BT	Head Flat	0.108	0.253	0.361
	Body-Back	0.289	0.127	0.416
	Body- Left	0.138	0.127	0.265
	Body- Right	0.157	0.127	0.284
	Body-Bottom	0.078	0.127	0.205
LTE Band 7 +WLAN(2.4G)	Head Flat	0.198	0.387	0.585
LTE Band 7+WLAN(2.4G) (Hotspot)	Body-Back	0.721	0.187	0.908
	Body- Left	0.215	0.187	0.402
	Body- Right	0.155	0.187	0.342
	Body-Bottom	0.33	0.187	0.517
LTE Band 7 +WLAN(5G)	Head Flat	0.198	0.4	0.598
LTE Band 7+WLAN(5G) (Hotspot)	Body-Back	0.721	0.2	0.921
	Body- Left	0.215	0.2	0.415
	Body- Right	0.155	0.2	0.355
	Body-Bottom	0.33	0.2	0.53
LTE Band 17 +WLAN(2.4G)	Head Flat	0.108	0.387	0.495
LTE Band 17+WLAN(2.4G) (Hotspot)	Body-Back	0.289	0.187	0.476
	Body- Left	0.138	0.187	0.325
	Body- Right	0.157	0.187	0.344
	Body-Bottom	0.078	0.187	0.265
LTE Band 17 +WLAN(5G)	Head Flat	0.108	0.4	0.508
LTE Band 17+WLAN(5G) (Hotspot)	Body-Back	0.289	0.2	0.489
	Body- Left	0.138	0.2	0.338
	Body- Right	0.157	0.2	0.357
	Body-Bottom	0.078	0.2	0.278

Note:
Hotspot mode SAR is only required for the edges within 25mm from the transmitting antenna located.

Conclusion:
ΣSAR < 1.6 W/kg therefore simultaneous transmission SAR with Volume Scans is **not** required.

SAR Plots (Summary of the Highest SAR Values)

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

Test Plot 1#:GSM 850 Head Flat Low Channel

DUT: Smart Phone; Type: W3D

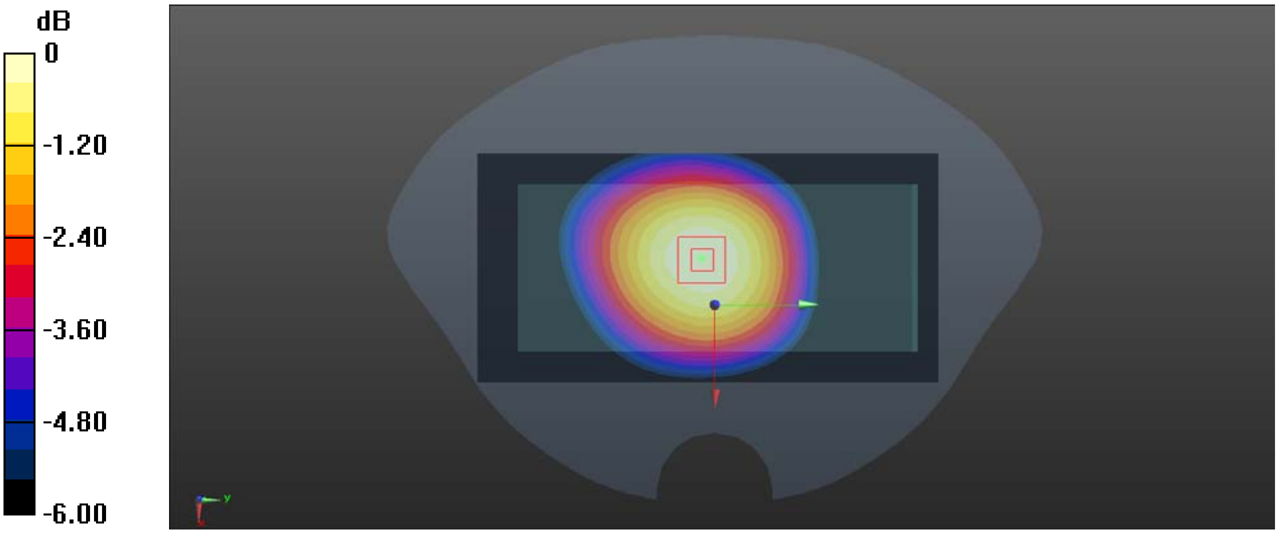
Communication System: Generic GSM; Frequency: 824.2 MHz;Duty Cycle: 1: 8
Medium parameters used: f = 824.2 MHz; σ = 0.877 S/m; ε_r = 42.924; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.52, 9.52, 9.52); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Head/GSM 850 Flat /Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.203 W/kg

Head/GSM 850 Flat /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.500 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 0.235 W/kg
SAR(1 g) = 0.179 W/kg; SAR(10 g) = 0.135 W/kg
Maximum value of SAR (measured) = 0.188 W/kg



0 dB = 0.188 W/kg = -7.26 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

Test Plot 2#:GSM 850 Back Low Channel

DUT: Smart Phone; Type: W3D

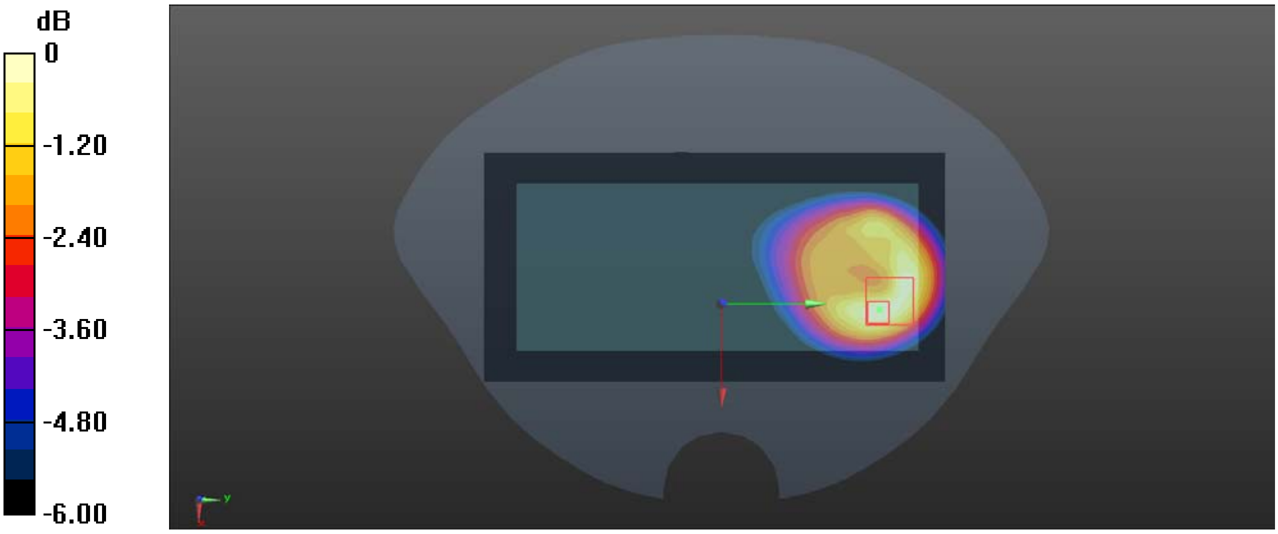
Communication System: Generic GPRS-4 SLOTS; Frequency: 824.2 MHz;Duty Cycle: 1:2
Medium parameters used: f = 824.2 MHz; σ = 0.963 S/m; ε_r = 55.167; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.17, 9.17, 9.17); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Body/GSM 850 Back/Area Scan (71x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.757 W/kg

Body/GSM 850 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 12.61 V/m; Power Drift = -0.05 dB
Peak SAR (extrapolated) = 1.30 W/kg
SAR(1 g) = 0.723 W/kg; SAR(10 g) = 0.415 W/kg
Maximum value of SAR (measured) = 0.791 W/kg



0 dB = 0.791 W/kg = -1.02 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

Test Plot 3#: PCS 1900 Head Flat Low Channel

DUT: Smart Phone; Type: W3D

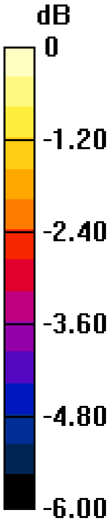
Communication System: Generic GSM; Frequency: 1850.2 MHz;Duty Cycle: 1: 8
Medium parameters used: f = 1850.2 MHz; σ = 1.358 S/m; ε_r = 39.833; ρ = 1000 kg/m^3
Phantom section: Right Section

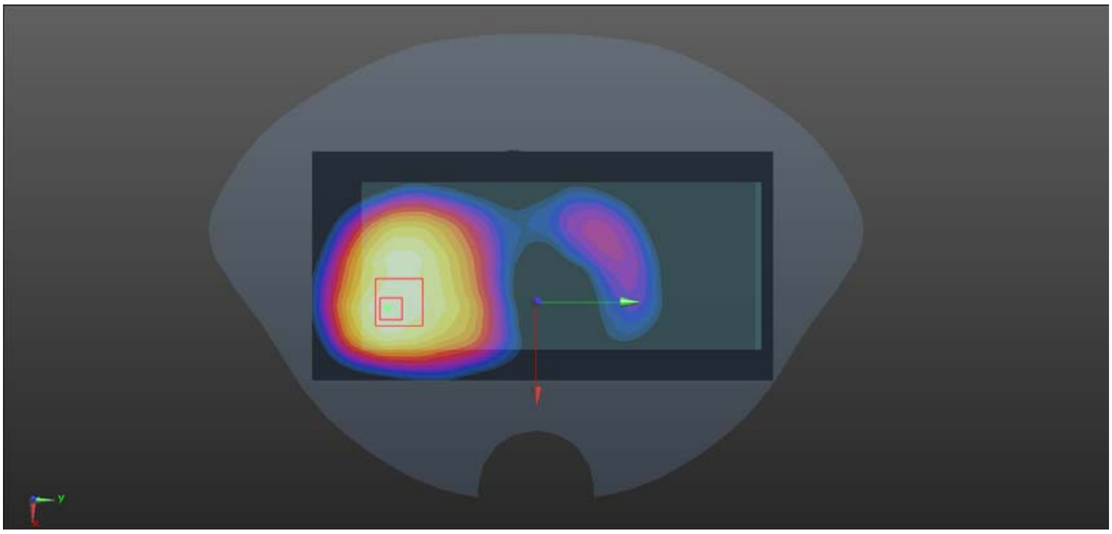
DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.88, 7.88, 7.88); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Head/PCS 1900 Flat /Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.174 W/kg

Head/PCS 1900 Flat /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.664 V/m; Power Drift = 0.20 dB
Peak SAR (extrapolated) = 0.254 W/kg
SAR(1 g) = 0.161 W/kg; SAR(10 g) = 0.100 W/kg
Maximum value of SAR (measured) = 0.174 W/kg





0 dB = 0.174 W/kg = -7.59 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

Test Plot 4#:PCS 1900 Back High Channel

DUT: Smart Phone; Type: W3D

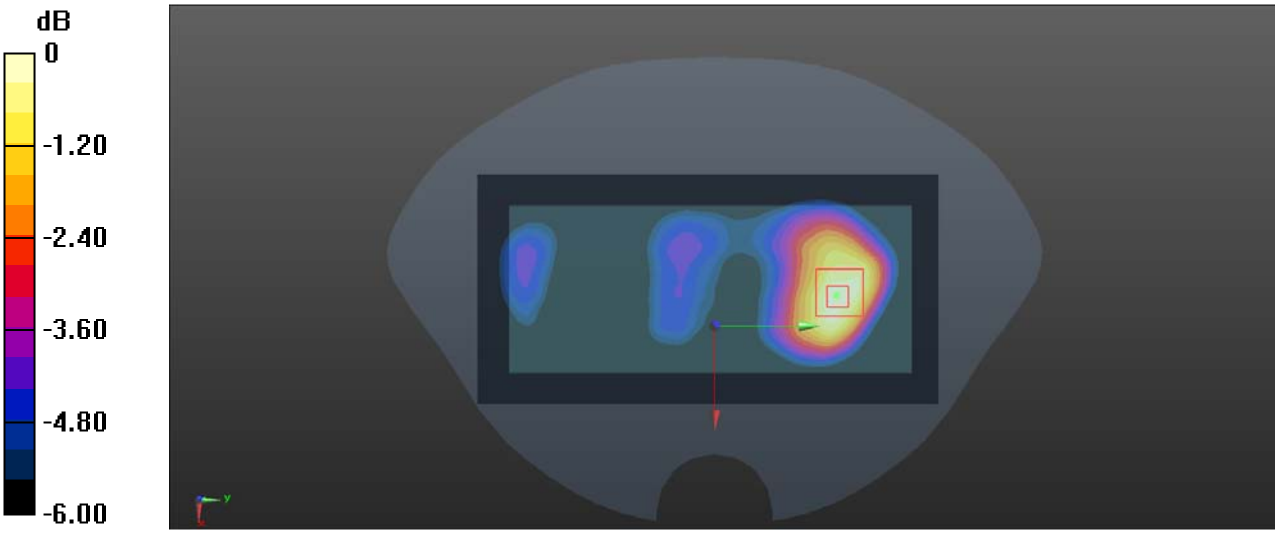
Communication System: Generic GPRS-4 SLOTS; Frequency: 1909.8 MHz;Duty Cycle: 1:2
Medium parameters used: f = 1909.8 MHz; σ = 1.493 S/m; ε_r = 53.375; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.56, 7.56, 7.56); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Body/PCS 1900 Back/Area Scan (71x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.580 W/kg

Body/PCS 1900 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.13 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 0.873 W/kg
SAR(1 g) = 0.506 W/kg; SAR(10 g) = 0.310 W/kg
Maximum value of SAR (measured) = 0.548 W/kg



0 dB = 0.548 W/kg = -2.61 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

Test Plot 5#:WCDMA 850 Head Flat Low Channel

DUT: Smart Phone; Type: W3D

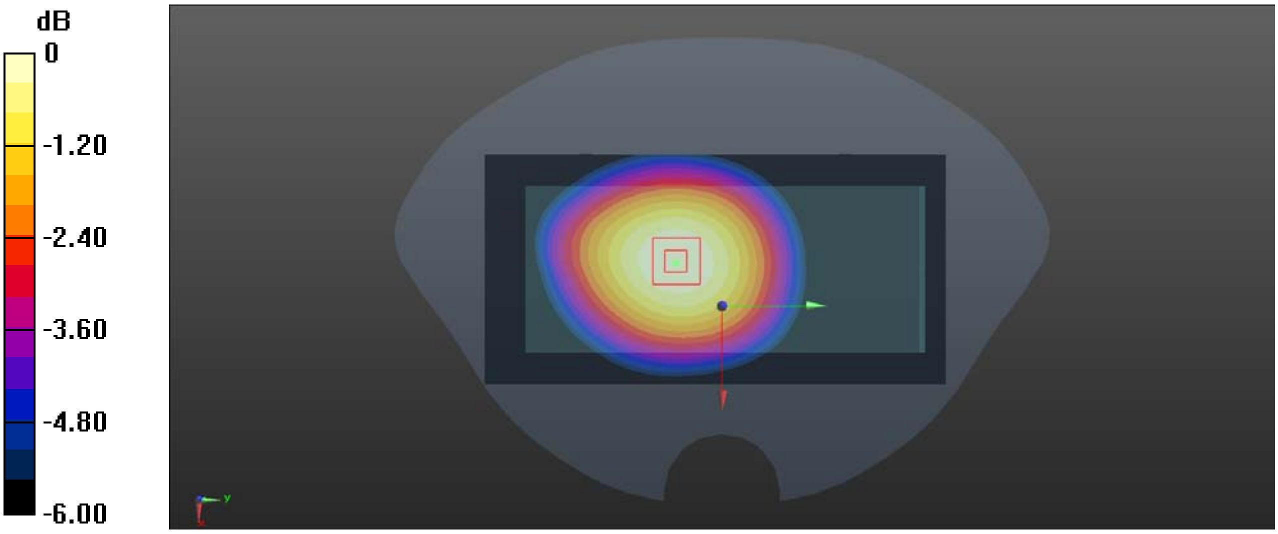
Communication System: BAND V; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 826.4 MHz; σ = 0.88 S/m; ε_r = 42.893; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.52, 9.52, 9.52); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Head/WCDMA 850 Flat /Area Scan (71x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0974 W/kg

Head/WCDMA 850 Flat /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.787 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 0.120 W/kg
SAR(1 g) = 0.092 W/kg; SAR(10 g) = 0.070 W/kg
Maximum value of SAR (measured) = 0.0964 W/kg



0 dB = 0.0964 W/kg = -10.16 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

Test Plot 6#:WCDMA 850 Back Low Channel

DUT: Smart Phone; Type: W3D

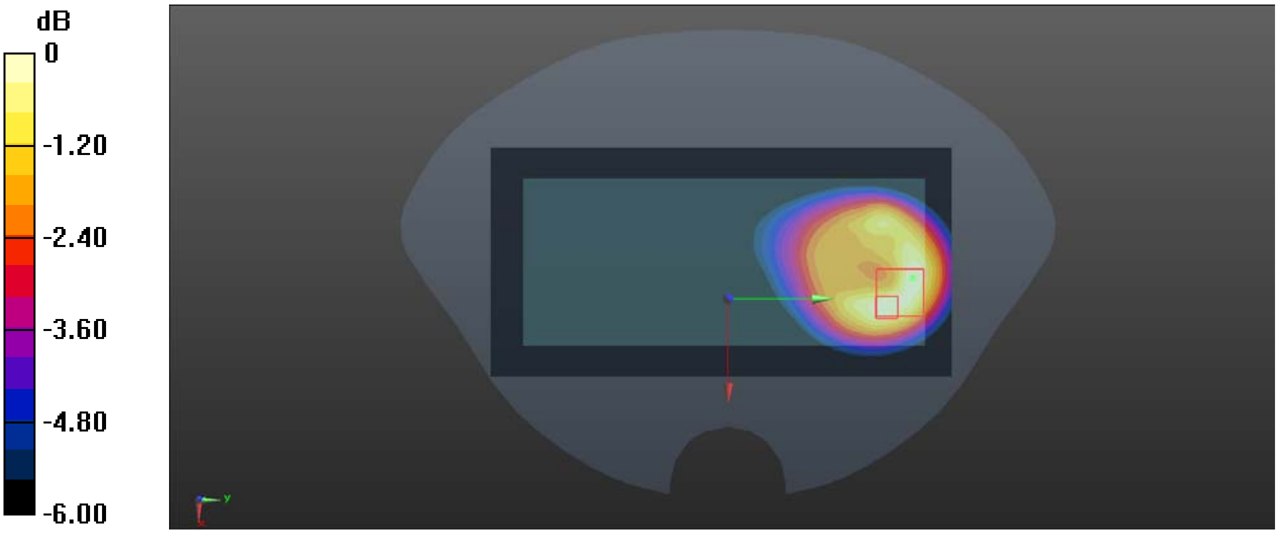
Communication System: BAND V; Frequency: 826.4 MHz;Duty Cycle: 1:1
Medium parameters used: f = 826.4 MHz; σ = 0.967 S/m; ε_r = 55.143; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.17, 9.17, 9.17); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Body/WCDMA 850 Back/Area Scan (71x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.430 W/kg

Body/WCDMA 850 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.917 V/m; Power Drift = -0.10 dB
Peak SAR (extrapolated) = 0.766 W/kg
SAR(1 g) = 0.421 W/kg; SAR(10 g) = 0.236 W/kg
Maximum value of SAR (measured) = 0.459 W/kg



0 dB = 0.459 W/kg = -3.38 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

Test Plot 7#:WCDMA 1900 Right High Channel

DUT: Smart Phone; Type: W3D

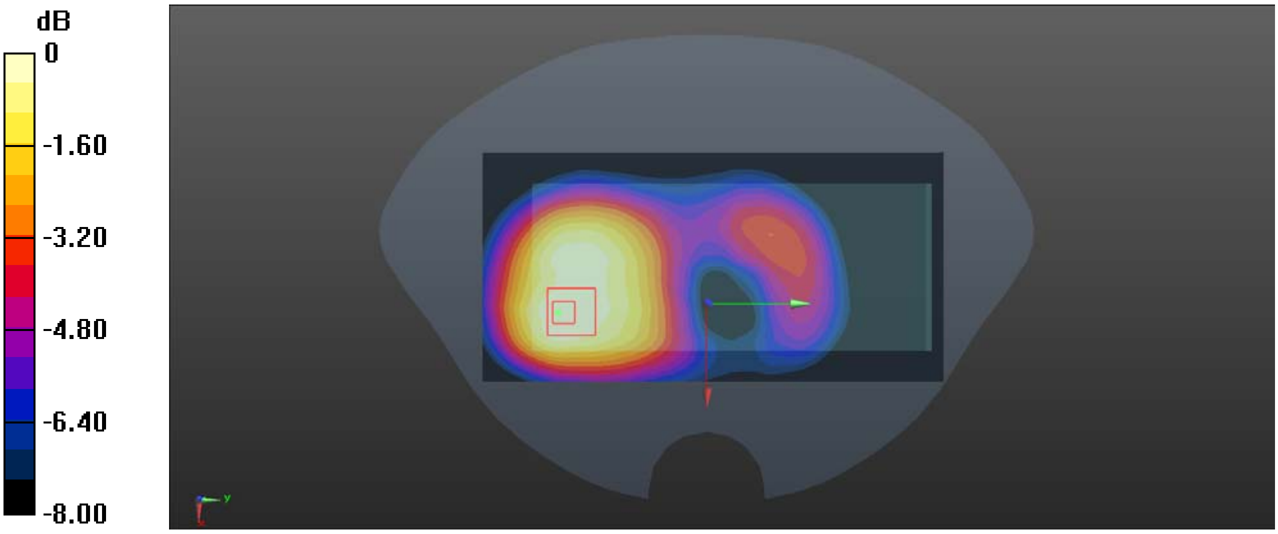
Communication System: BAND II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1907.6 MHz; σ = 1.412 S/m; ε_r = 39.576; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.88, 7.88, 7.88); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Head/WCDMA 1900 Flat /Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.252 W/kg

Head/WCDMA 1900 Flat /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.127 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 0.360 W/kg
SAR(1 g) = 0.227 W/kg; SAR(10 g) = 0.141 W/kg
Maximum value of SAR (measured) = 0.246 W/kg



0 dB = 0.246 W/kg = -6.09 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

Test Plot 8#:WCDMA 1900 Back High Channel

DUT: Smart Phone; Type: W3D

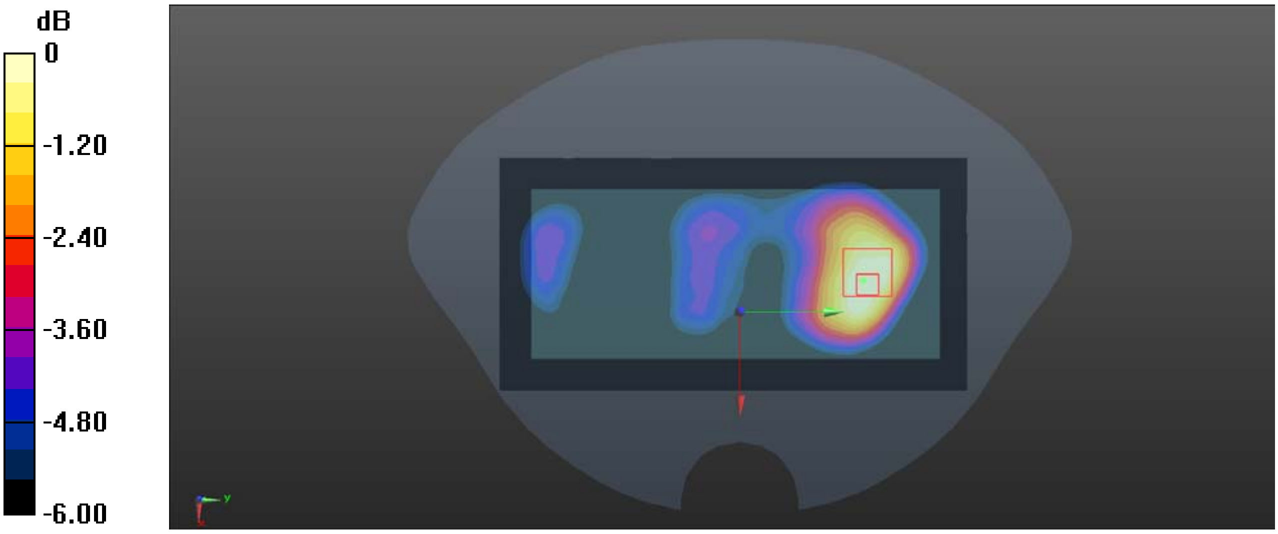
Communication System: BAND II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1907.6 MHz; σ = 1.493 S/m; ε_r = 53.601; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.56, 7.56, 7.56); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Body/WCDMA 1900 Back/Area Scan (71x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.491 W/kg

Body/WCDMA 1900 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.359 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 0.775 W/kg
SAR(1 g) = 0.437 W/kg; SAR(10 g) = 0.266 W/kg
Maximum value of SAR (measured) = 0.469 W/kg



0 dB = 0.469 W/kg = -3.29 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

Test Plot 9#:LTE Band 7 Head Flat Middle Channel

DUT: Smart Phone; Type: W3D

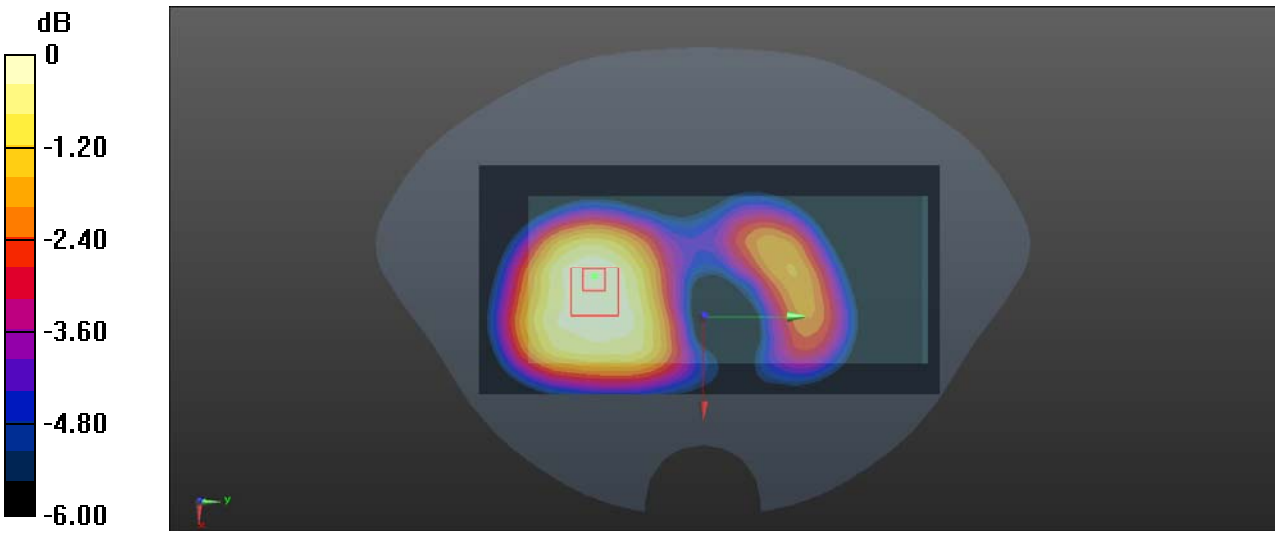
Communication System: Generic LTE; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2535 MHz; σ = 1.806 S/m; ε_r = 39.186; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.06, 7.06, 7.06); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Head/LTE Band 7 Flat /Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.220 W/kg

Head/LTE Band 7 Flat /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.442 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.377 W/kg
SAR(1 g) = 0.189 W/kg; SAR(10 g) = 0.097 W/kg
Maximum value of SAR (measured) = 0.206 W/kg



0 dB = 0.206 W/kg = -6.86 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)

Test Plot 10#:LTE Band 7 Back Middle Channel

DUT: Smart Phone; Type: W3D

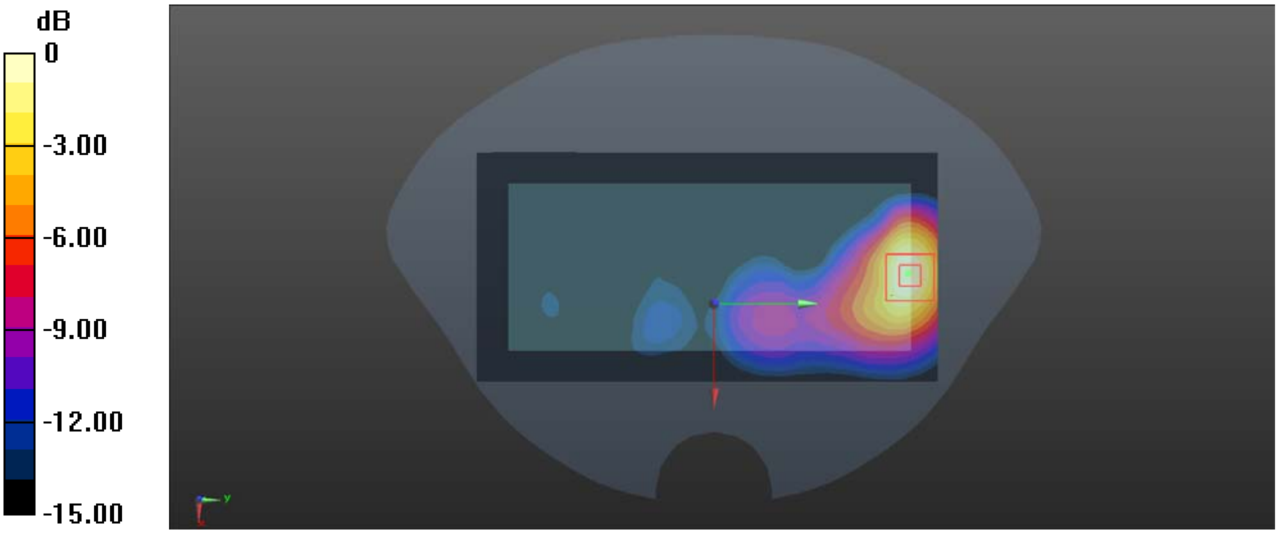
Communication System: Generic LTE; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2535 MHz; σ = 1.949 S/m; ε_r = 52.679; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.2, 7.2, 7.2); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/9/18
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Body/LTE Band 7 Back/Area Scan (71x141x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.757 W/kg

Body/LTE Band 7 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.694 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 1.43 W/kg
SAR(1 g) = 0.689 W/kg; SAR(10 g) = 0.323 W/kg
Maximum value of SAR (measured) = 0.771 W/kg



0 dB = 0.771 W/kg = -1.13 dBW/kg

APPENDIX A MEASUREMENT UNCERTAINTY

The uncertainty budget has been determined for the measurement system and is given in the following Table.

Measurement uncertainty evaluation for IEEE1528-2013 SAR test

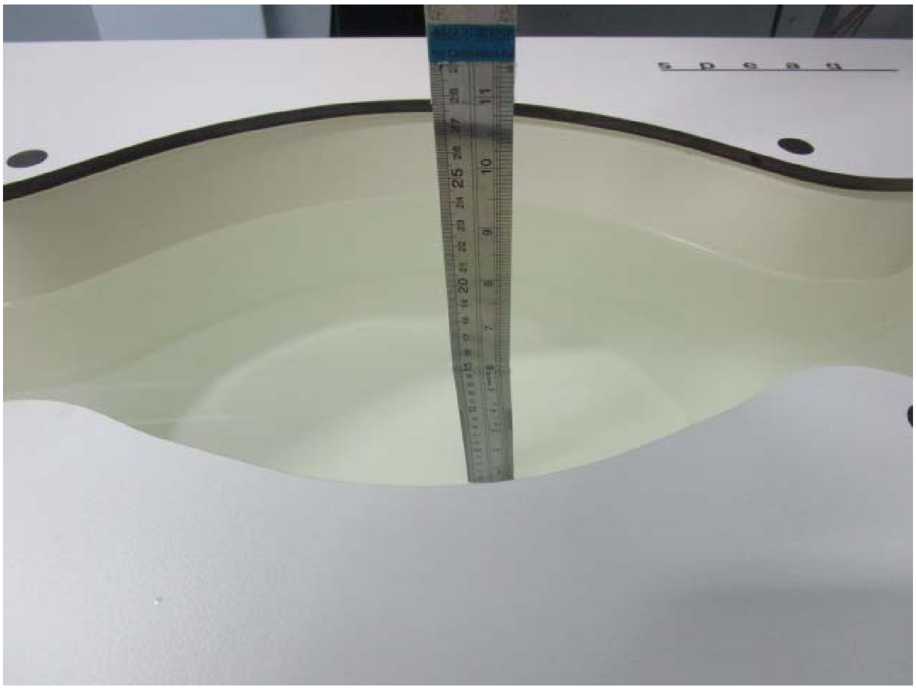
Source of uncertainty	Tolerance/ uncertainty ± %	Probability distribution	Divisor	ci (1 g)	ci (10 g)	Standard uncertainty ± %, (1 g)	Standard uncertainty ± %, (10 g)
Measurement system							
Probe calibration	6.55	N	1	1	1	6.6	6.6
Axial Isotropy	4.7	R	√3	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	√3	0	0	0.0	0.0
Boundary effect	1.0	R	√3	1	1	0.6	0.6
Linearity	4.7	R	√3	1	1	2.7	2.7
Detection limits	1.0	R	√3	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	√3	1	1	0.0	0.0
Integration time	0.0	R	√3	1	1	0.0	0.0
RF ambient conditions – noise	1.0	R	√3	1	1	0.6	0.6
RF ambient conditions–reflections	1.0	R	√3	1	1	0.6	0.6
Probe positioner mech. Restrictions	0.8	R	√3	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	√3	1	1	3.9	3.9
Post-processing	2.0	R	√3	1	1	1.2	1.2
Test sample related							
Test sample positioning	2.8	N	1	1	1	2.8	2.8
Device holder uncertainty	6.3	N	1	1	1	6.3	6.3
Drift of output power	5.0	R	√3	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	√3	1	1	2.3	2.3
Liquid conductivity target)	5.0	R	√3	0.64	0.43	1.8	1.2
Liquid conductivity meas.)	2.5	N	1	0.64	0.43	1.6	1.1
Liquid permittivity target)	5.0	R	√3	0.6	0.49	1.7	1.4
Liquid permittivity meas.)	2.5	N	1	0.6	0.49	1.5	1.2
Combined standard uncertainty		RSS				12.2	12.0
Expanded uncertainty 95 % confidence interval)						24.3	23.9

Measurement uncertainty evaluation for IEC62209-2 SAR test

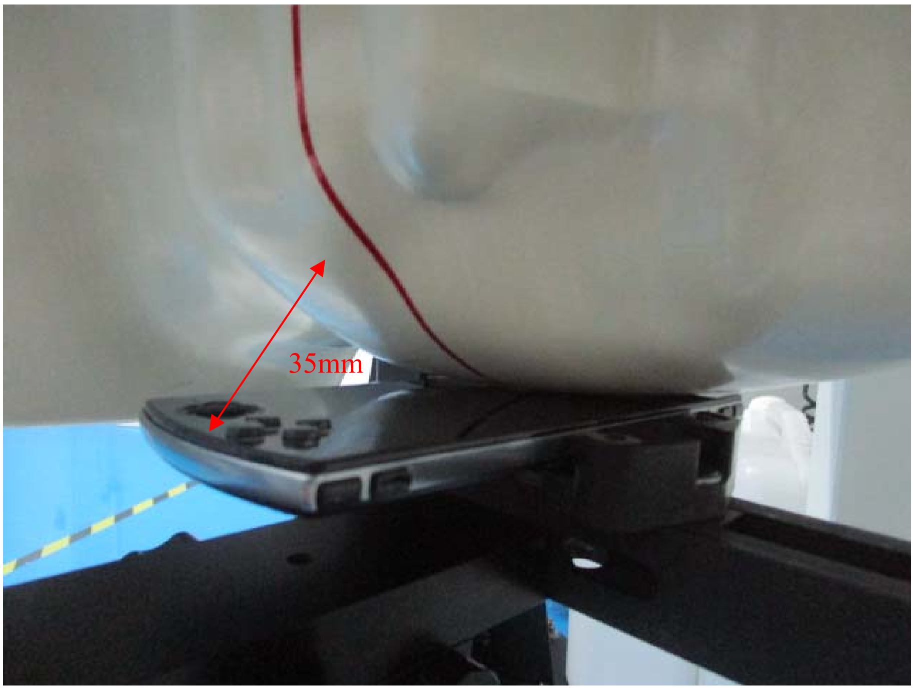
Source of uncertainty	Tolerance/ uncertainty ± %	Probability distribution	Divisor	ci (1 g)	ci (10 g)	Standard uncertainty ± %, (1 g)	Standard uncertainty ± %, (10 g)
Measurement system							
Probe calibration	6.55	N	1	1	1	6.6	6.6
Axial Isotropy	4.7	R	√3	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	√3	0	0	0.0	0.0
Linearity	4.7	R	√3	1	1	2.7	2.7
Modulation Response	0.0	R	√3	1	1	0.0	0.0
Detection limits	1.0	R	√3	1	1	0.6	0.6
Boundary effect	1.0	R	√3	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	√3	1	1	0.0	0.0
Integration time	0.0	R	√3	1	1	0.0	0.0
RF ambient conditions – noise	1.0	R	√3	1	1	0.6	0.6
RF ambient conditions–reflections	1.0	R	√3	1	1	0.6	0.6
Probe positioner mech. Restrictions	0.8	R	√3	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	√3	1	1	3.9	3.9
Post-processing	2.0	R	√3	1	1	1.2	1.2
Test sample related							
Device holder Uncertainty	6.3	N	1	1	1	6.3	6.3
Test sample positioning	2.8	N	1	1	1	2.8	2.8
Power scaling	4.5	R	√3	1	1	2.6	2.6
Drift of output power	5.0	R	√3	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	√3	1	1	2.3	2.3
Algorithm for correcting SAR for deviations in permittivity and conductivity	1.9	N	1	1	0.84	1.1	0.9
Liquid conductivity (meas.)	2.5	N	1	0.64	0.43	1.6	1.1
Liquid permittivity (meas.)	2.5	N	1	0.6	0.49	1.5	1.2
Temp. unc. - Conductivity	1.7	R	√3	0.78	0.71	0.8	0.7
Temp. unc. - Permittivity	0.3	R	√3	0.23	0.26	0.0	0.0
Combined standard uncertainty		RSS				12.2	12.1
Expanded uncertainty 95 % confidence interval)						24.5	24.2

APPENDIX B EUT TEST POSITION PHOTOS

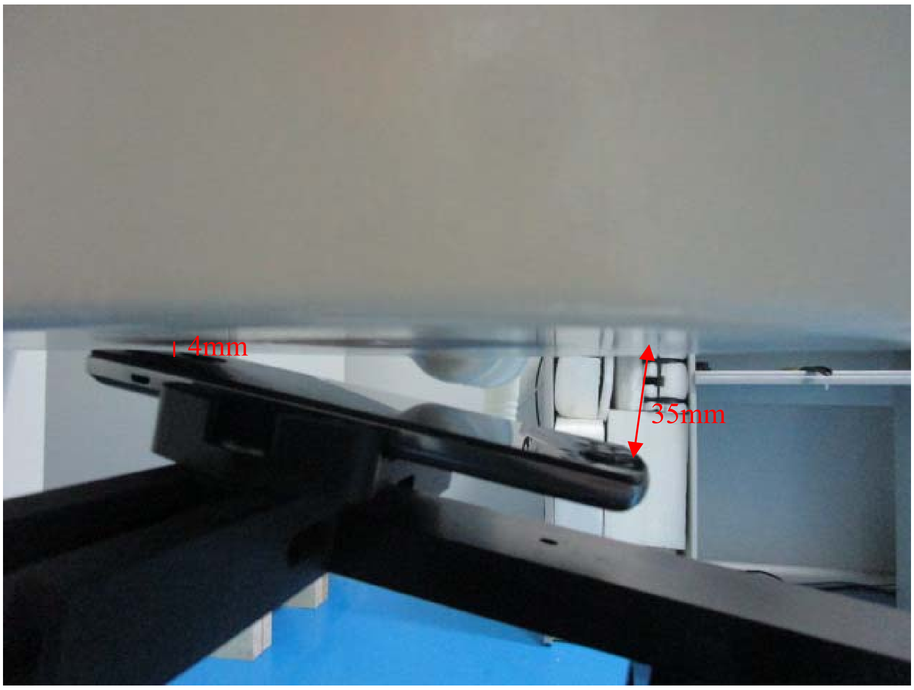
Liquid depth ≥ 15cm



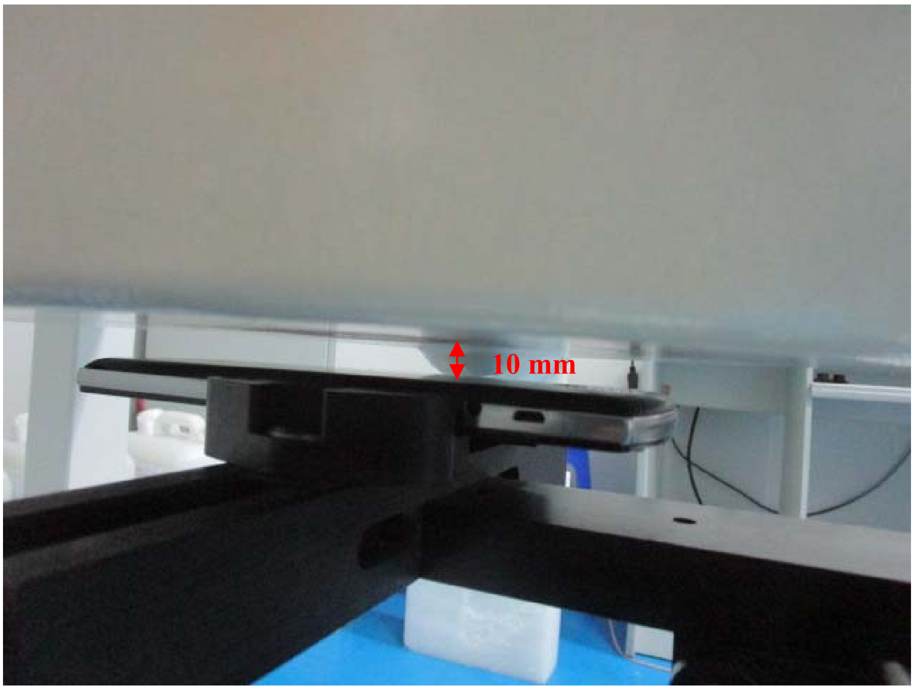
Left Head Cheek



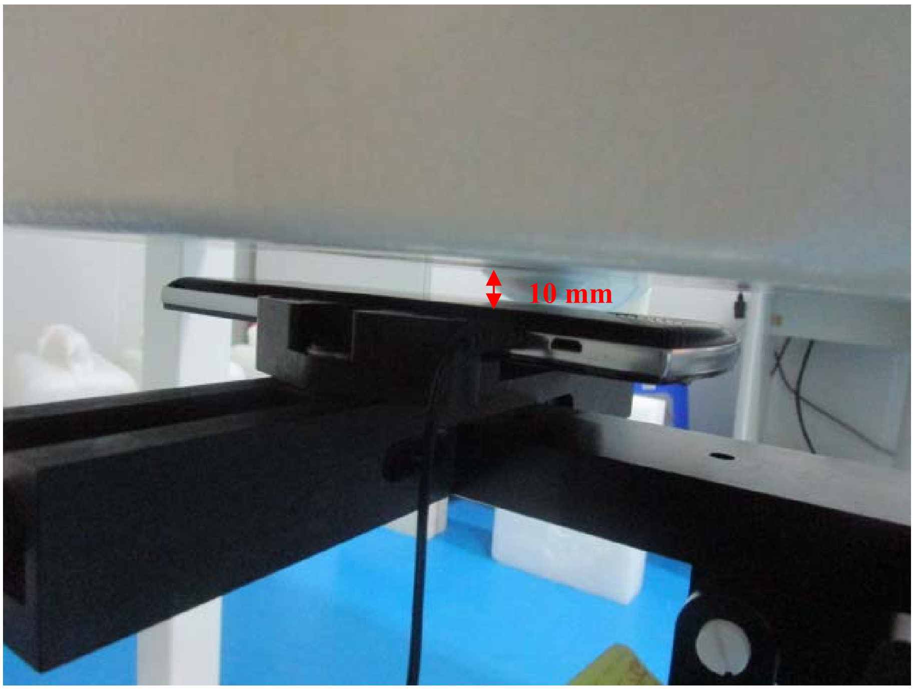
Head Flat



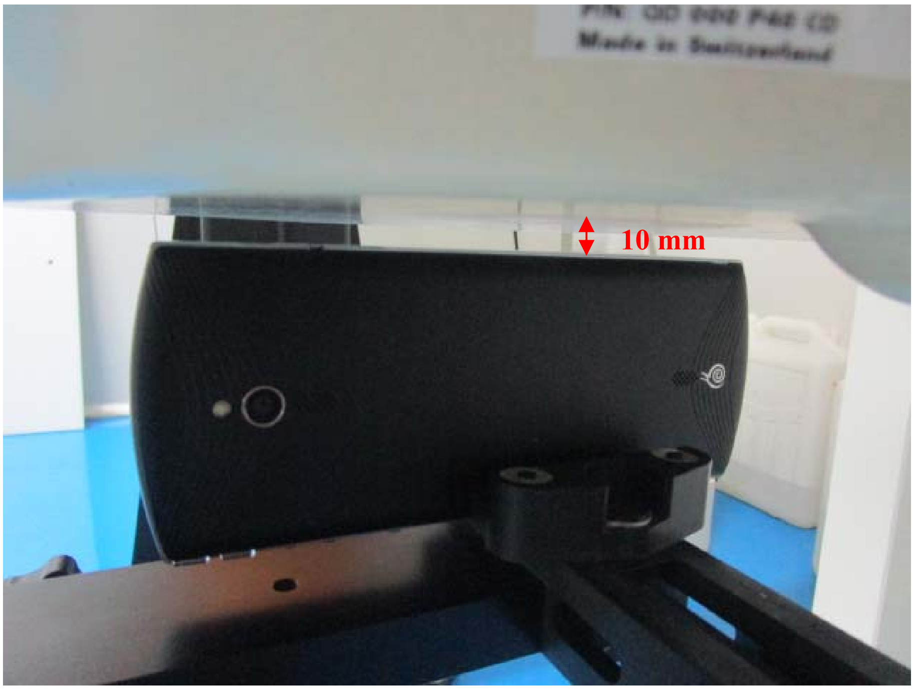
Body -Worn-Back (10mm)



Body -Headset-Back (10mm)



Body -Worn-Left (10mm)



Body -Worn-Right (10mm)

Body -Worn-Bottom(10mm)

APPENDIX C EUT PHOTOS

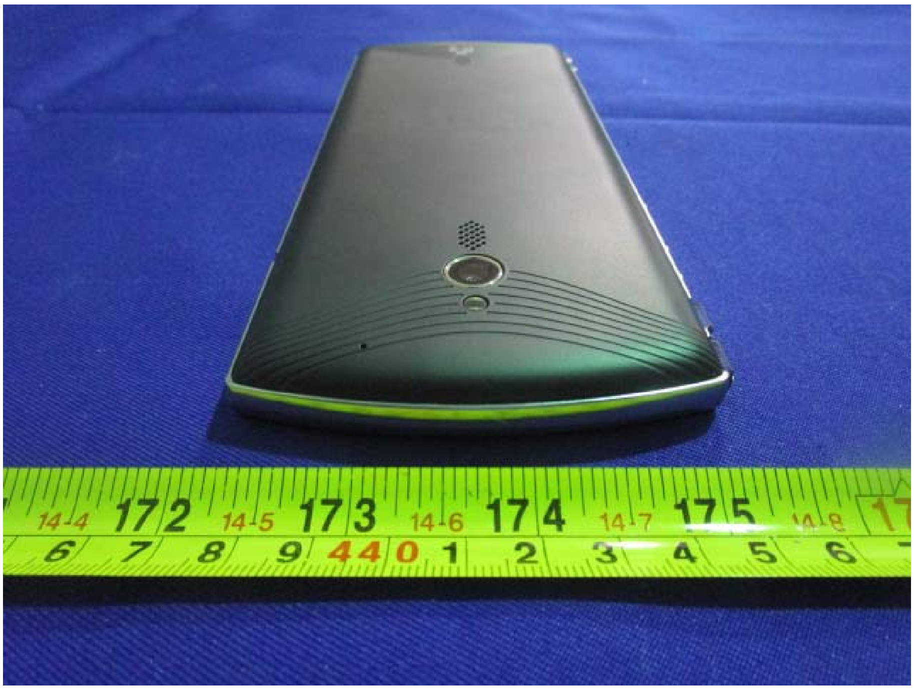
EUT – Front View

EUT – Back View

EUT – Side View-1

EUT – Side View-2

EUT – Side View-3



EUT – Side View-4

EUT – Uncover View

APPENDIX D CALIBRATION CERTIFICATES

Please Refer to the Attachment.

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

PROBE CALIBRATION CERTIFICATES

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

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

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

Accreditation No.: SCS 0108

Client BACL China (Vitec)

Certificate No: EX3-7329_Feb15

CALIBRATION CERTIFICATE

Object: EX3DV4 - SN:7329

Calibration procedure(s): QA CAL-01.v9, QA CAL-23.v5, QA CAL-25.v6
Calibration procedure for dosimetric E-field probes

Calibration date: February 5, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	03-Apr-14 (No. 217-01911)	Apr-15
Power sensor E4412A	MY41498087	03-Apr-14 (No. 217-01911)	Apr-15
Reference 3 dB Attenuator	SN: S5054 (3c)	03-Apr-14 (No. 217-01915)	Apr-15
Reference 20 dB Attenuator	SN: S5277 (20x)	03-Apr-14 (No. 217-01919)	Apr-15
Reference 30 dB Attenuator	SN: S5129 (30b)	03-Apr-14 (No. 217-01920)	Apr-15
Reference Probe ES3DV2	SN: 3013	30-Dec-14 (No. ES3-3013_Dec14)	Dec-15
DAE4	SN: 660	14-Jan-15 (No. DAE4-660_Jan15)	Jan-16
Secondary Standards	ID	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Apr-13)	In house check: Apr-16
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: February 9, 2015

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

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not affect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *PAR:* PAR is the Peak to Average Ratio that is not calibrated but determined based on the signal characteristics
- *Ax,y,z; Bx,y,z; Cx,y,z; Dx,y,z; VRx,y,z: A, B, C, D* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset:* The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.
- *Connector Angle:* The angle is assessed using the information gained by determining the *NORMx* (no uncertainty required).

Probe EX3DV4

SN:7329

Manufactured: December 11, 2014
Calibrated: February 5, 2015

Calibrated for DASY/EASY Systems
(Note: non-compatible with DASY2 system!)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7329

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	0.48	0.43	0.46	± 10.1 %
DCP (mV)[B]	96.7	97.6	94.2	

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB$\sqrt{\mu V}$	C	D dB	VR mV	Unc[E] (k=2)
0	CW	X	0.0	0.0	1.0	0.00	137.9	±3.0 %
		Y	0.0	0.0	1.0		147.0	
		Z	0.0	0.0	1.0		150.5	

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

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

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7329

Calibration Parameter Determined in Head Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
900	41.5	0.97	9.52	9.52	9.52	0.40	0.86	± 12.0 %
1750	40.1	1.37	8.12	8.12	8.12	0.29	0.90	± 12.0 %
1900	40.0	1.40	7.88	7.88	7.88	0.68	0.61	± 12.0 %
2450	39.2	1.80	7.06	7.06	7.06	0.33	0.84	± 12.0 %

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

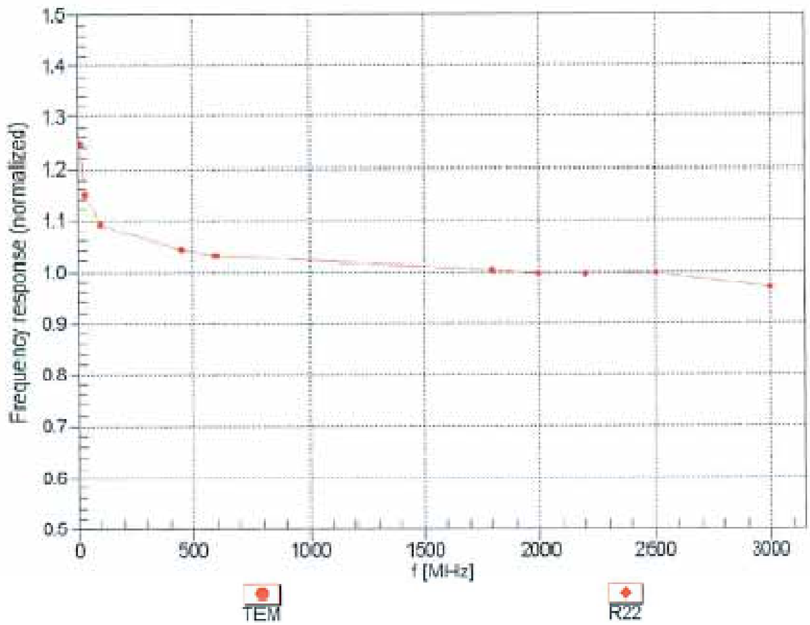
DASY/EASY - Parameters of Probe: EX3DV4 - SN:7329

Calibration Parameter Determined in Body Tissue Simulating Media

f (MHz) [C]	Relative Permittivity [F]	Conductivity (S/m) [F]	ConvF X	ConvF Y	ConvF Z	Alpha [G]	Depth [G] (mm)	Unct. (k=2)
900	55.0	1.05	9.17	9.17	9.17	0.41	0.90	± 12.0 %
1750	53.4	1.49	7.85	7.85	7.85	0.70	0.64	± 12.0 %
1900	53.3	1.52	7.56	7.56	7.56	0.56	0.70	± 12.0 %
2450	52.7	1.95	7.20	7.20	7.20	0.78	0.59	± 12.0 %

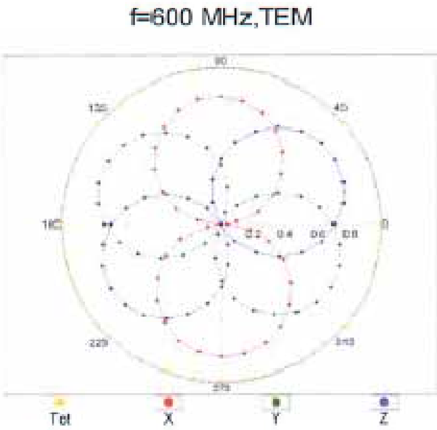
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.
[F] At frequencies below 3 GHz, the validity of tissue parameters (ε and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ε and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty for indicated target tissue parameters.
[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

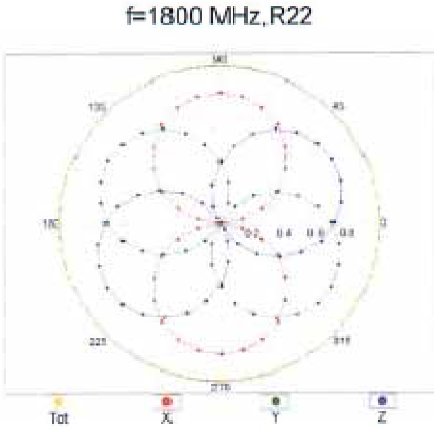
Frequency Response of E-Field
(TEM-Cell:ifi110 EXX, Waveguide: R22)

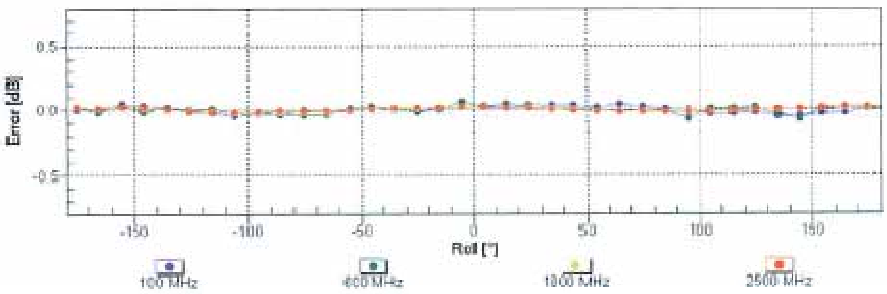


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Receiving Pattern (ϕ), $\vartheta = 0°$



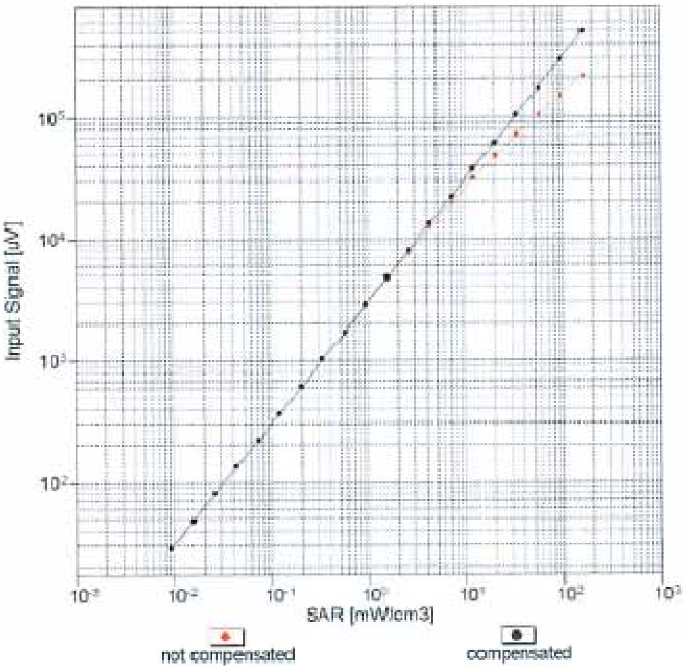


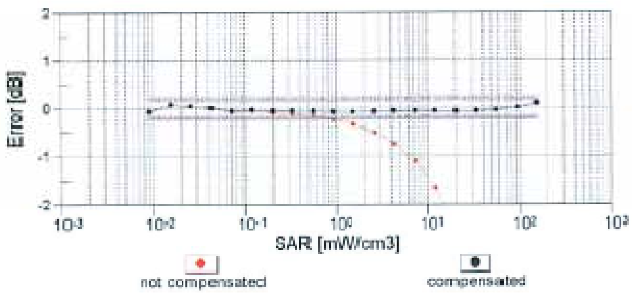


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

Dynamic Range f(SAR$_{head}$)

(TEM cell , f_{eval}= 1900 MHz)

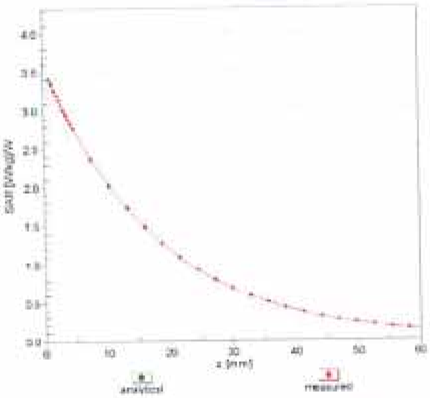




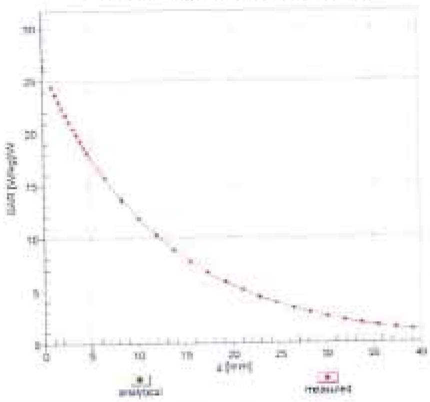
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

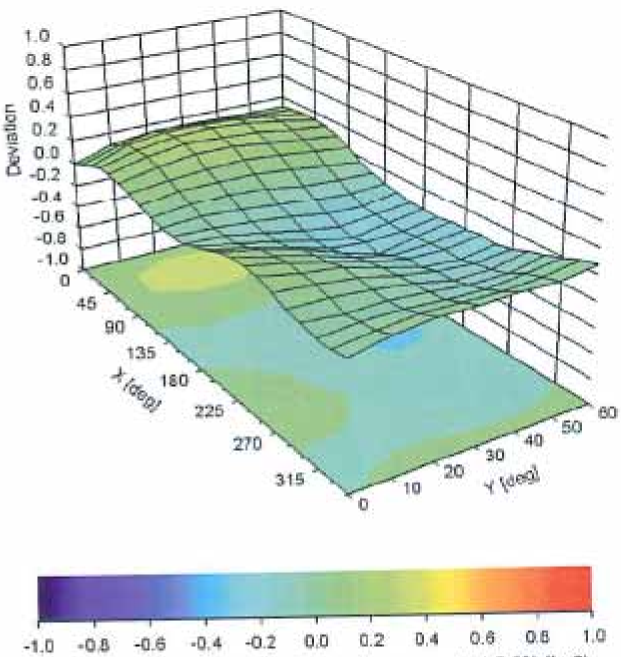


f = 1750 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7329

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	24.5
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	9 mm
Tip Diameter	2.5 mm
Probe Tip to Sensor X Calibration Point	1 mm
Probe Tip to Sensor Y Calibration Point	1 mm
Probe Tip to Sensor Z Calibration Point	1 mm
Recommended Measurement Distance from Surface	1.4 mm

DIPOLE CALIBRATION CERTIFICATES

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

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

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

Accreditation No.: **SCS 0108**

Client **BACL**

Certificate No: **D835V2-453_Aug15**

CALIBRATION CERTIFICATE

Object	D835V2 - SN: 453
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	August 17, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 654	08-Jul-15 (No. DAE4-654_Jul15)	Jul-16

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 18, 2015

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

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, “IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques”, June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, “SAR Measurement Requirements for 100 MHz to 6 GHz”

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	15 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	835 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	41.5	0.90 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	41.9 ± 6 %	0.93 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**9.43 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	1.56 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**6.13 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	55.2	0.97 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	56.1 ± 6 %	1.02 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.47 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**9.55 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	1.61 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**6.27 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.7 Ω - 4.6 jΩ
Return Loss	- 26.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.8 Ω - 6.0 jΩ
Return Loss	- 23.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.392 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	January 31, 2002

DASY5 Validation Report for Head TSL

Date: 17.08.2015

Test Laboratory: SPEAG, Zurich, Switzerland

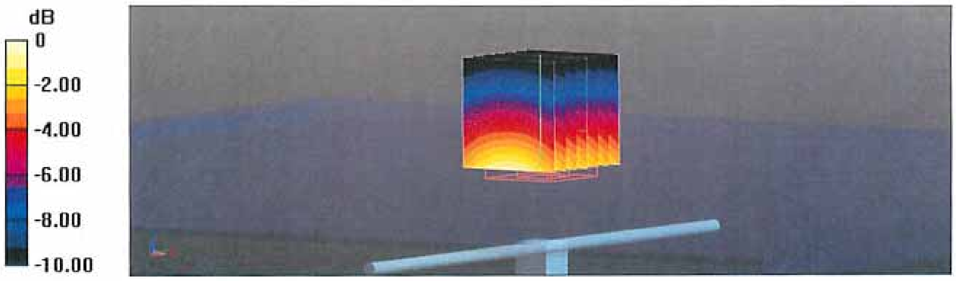
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 453

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 0.93 S/m; ε_r = 41.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

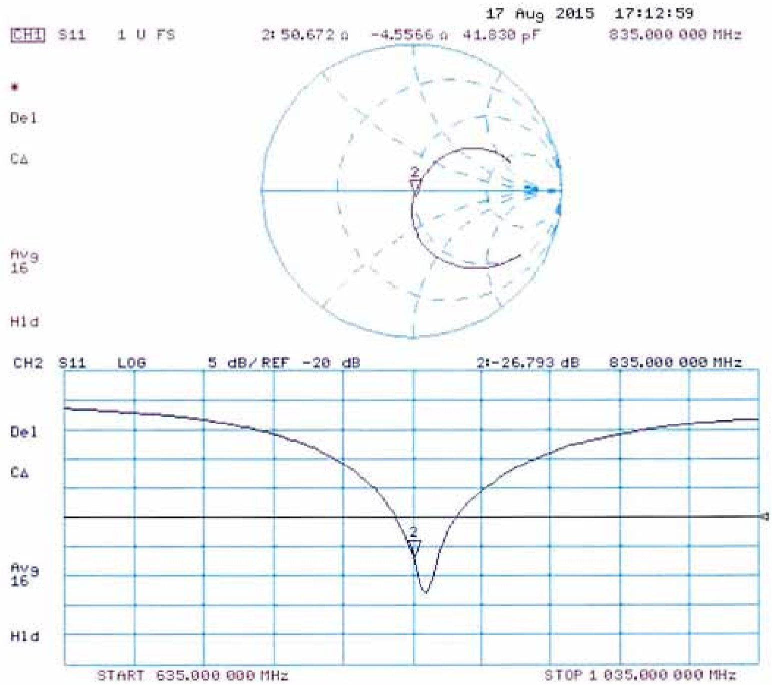
- Probe: ES3DV3 - SN3205; ConvF(6.2, 6.2, 6.2); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 08.07.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 58.20 V/m; Power Drift = -0.06 dB
Peak SAR (extrapolated) = 3.65 W/kg
SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.56 W/kg
Maximum value of SAR (measured) = 2.84 W/kg



0 dB = 2.84 W/kg = 4.53 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 17.08.2015

Test Laboratory: SPEAG, Zurich, Switzerland

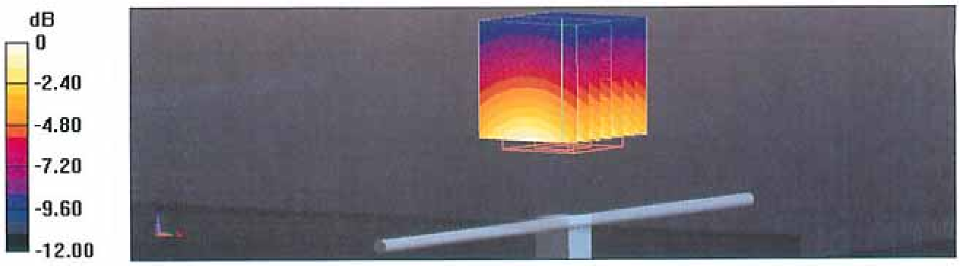
DUT: Dipole 835 MHz; Type: D835V2; Serial: D835V2 - SN: 453

Communication System: UID 0 - CW; Frequency: 835 MHz
Medium parameters used: f = 835 MHz; σ = 1.02 S/m; ε_r = 56.1; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

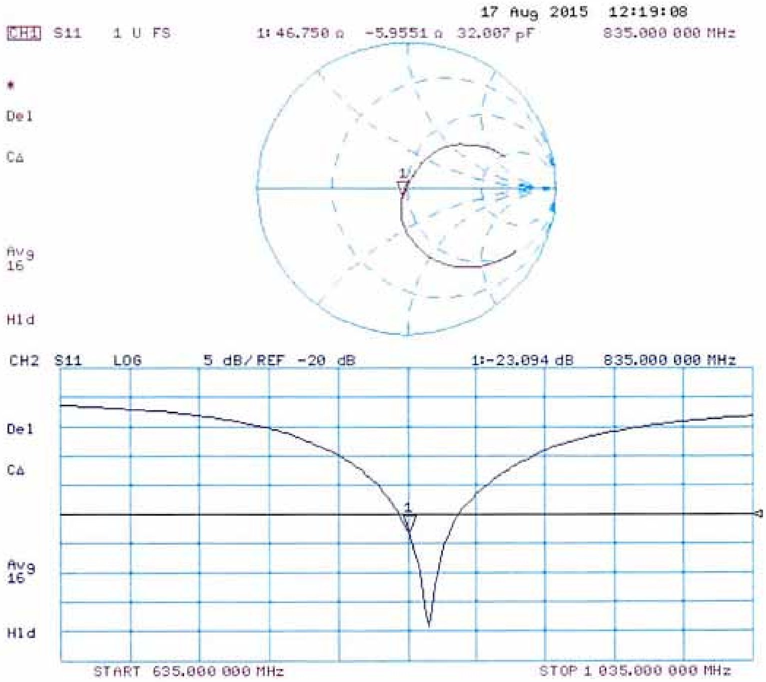
- Probe: ES3DV3 - SN3205; ConvF(6.17, 6.17, 6.17); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn654; Calibrated: 08.07.2015
- Phantom: Flat Phantom 4.9L; Type: QD000P49AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=15mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 55.00 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 3.69 W/kg
SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.61 W/kg
Maximum value of SAR (measured) = 2.89 W/kg



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

Impedance Measurement Plot for Body TSL



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

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

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

Accreditation No.: **SCS 0108**

Client **BACL**

Certificate No: **D1900V2-5d206_Jul15**

CALIBRATION CERTIFICATE

Object	D1900V2 - SN:5d206
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 14, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

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

Issued: July 14, 2015

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

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	1900 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	40.0	1.40 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.7 ± 6 %	1.38 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**40.7 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	5.35 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**21.5 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	53.3	1.52 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.7 ± 6 %	1.54 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.3 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**40.8 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.51 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**21.9 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	52.5 Ω + 6.5 jΩ
Return Loss	- 23.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	48.6 Ω + 7.1 jΩ
Return Loss	- 22.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.203 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	October 21, 2014

DASY5 Validation Report for Head TSL

Date: 14.07.2015

Test Laboratory: SPEAG, Zurich, Switzerland

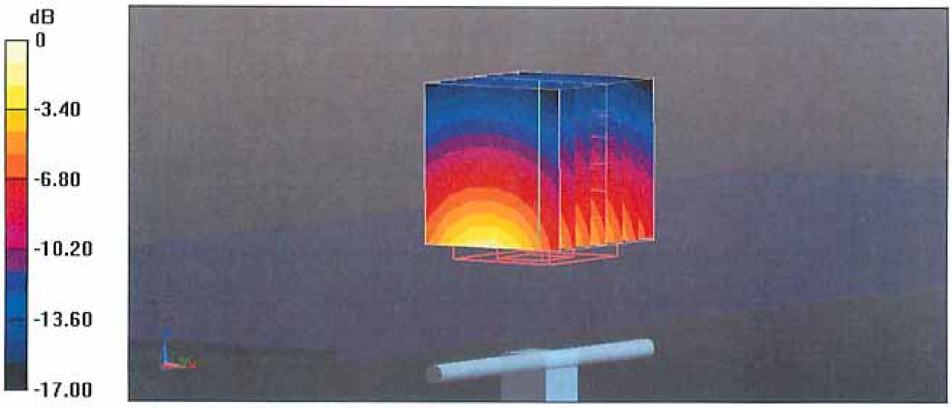
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d206

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.38 S/m; ε_r = 39.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

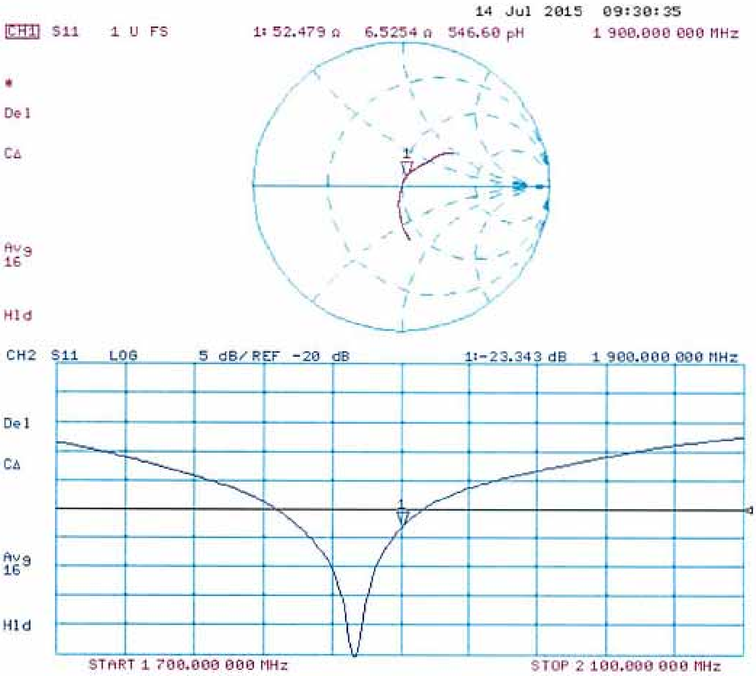
- Probe: ES3DV3 - SN3205; ConvF(5, 5, 5); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.02 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 18.4 W/kg
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.35 W/kg
Maximum value of SAR (measured) = 12.8 W/kg



0 dB = 12.8 W/kg = 11.07 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 14.07.2015

Test Laboratory: SPEAG, Zurich, Switzerland

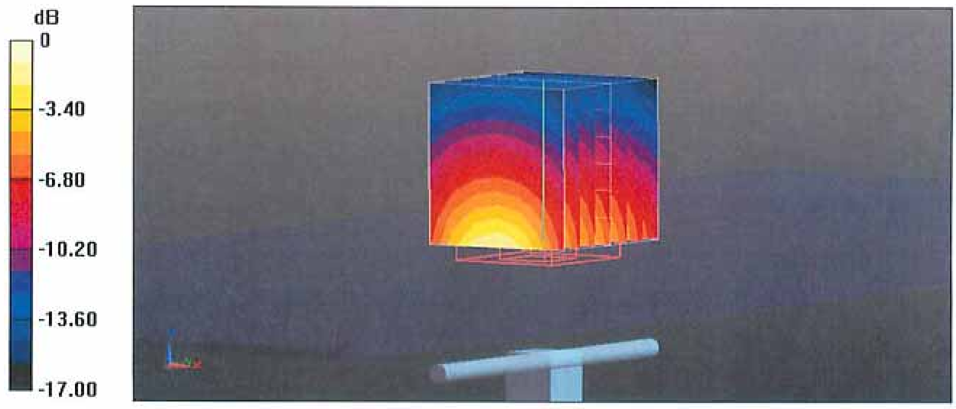
DUT: Dipole 1900 MHz; Type: D1900V2; Serial: D1900V2 - SN:5d206

Communication System: UID 0 - CW; Frequency: 1900 MHz
Medium parameters used: f = 1900 MHz; σ = 1.54 S/m; ε_r = 52.7; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

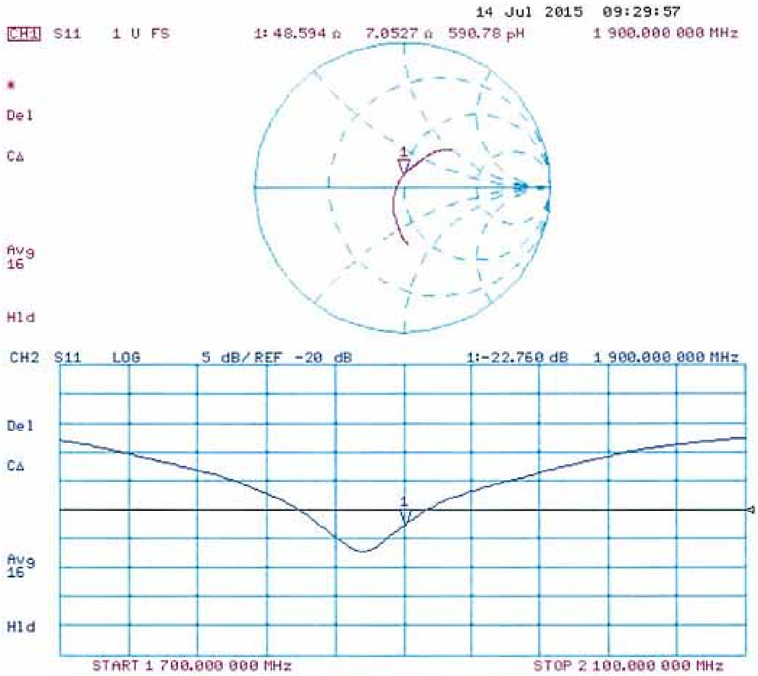
- Probe: ES3DV3 - SN3205; ConvF(4.65, 4.65, 4.65); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 95.62 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 17.3 W/kg
SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.51 W/kg
Maximum value of SAR (measured) = 12.9 W/kg



0 dB = 12.9 W/kg = 11.11 dBW/kg

Impedance Measurement Plot for Body TSL



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

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

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

Accreditation No.: **SCS 0108**

Client **BACL**

Certificate No: **D2450V2-971_Jul15**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN:971
Calibration procedure(s)	QA CAL-05.v9 Calibration procedure for dipole validation kits above 700 MHz
Calibration date:	July 08, 2015

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

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

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	US37292783	07-Oct-14 (No. 217-02020)	Oct-15
Power sensor HP 8481A	MY41092317	07-Oct-14 (No. 217-02021)	Oct-15
Reference 20 dB Attenuator	SN: 5058 (20k)	01-Apr-15 (No. 217-02131)	Mar-16
Type-N mismatch combination	SN: 5047.2 / 06327	01-Apr-15 (No. 217-02134)	Mar-16
Reference Probe ES3DV3	SN: 3205	30-Dec-14 (No. ES3-3205_Dec14)	Dec-15
DAE4	SN: 601	18-Aug-14 (No. DAE4-601_Aug14)	Aug-15

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator R&S SMT-06	100005	04-Aug-99 (in house check Oct-13)	In house check: Oct-16
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-14)	In house check: Oct-15

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: July 9, 2015

Glossary:

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

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2013, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", June 2013
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) IEC 62209-2, "Procedure to determine the Specific Absorption Rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)", March 2010
d) KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

e) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

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

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

Measurement Conditions

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

DASY Version	DASY5	V52.8.8
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.9 ± 6 %	1.88 mho/m ± 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.7 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**53.3 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.40 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	**25.2 W/kg ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.4 ± 6 %	2.03 mho/m ± 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	12.9 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**50.6 W/kg ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.05 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	**23.9 W/kg ± 16.5 % (k=2)**

Appendix (Additional assessments outside the scope of SCS 0108)

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.5 Ω + 1.9 jΩ
Return Loss	- 28.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	50.5 Ω + 3.6 jΩ
Return Loss	- 28.8 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.155 ns

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

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

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	December 30, 2014

DASY5 Validation Report for Head TSL

Date: 08.07.2015

Test Laboratory: SPEAG, Zurich, Switzerland

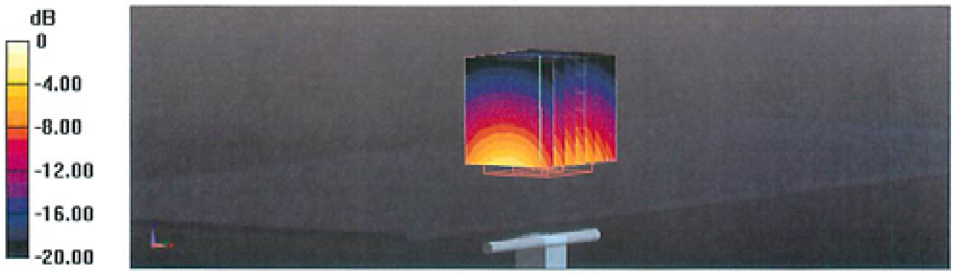
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:971

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 1.88 S/m; ε_r = 37.9; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

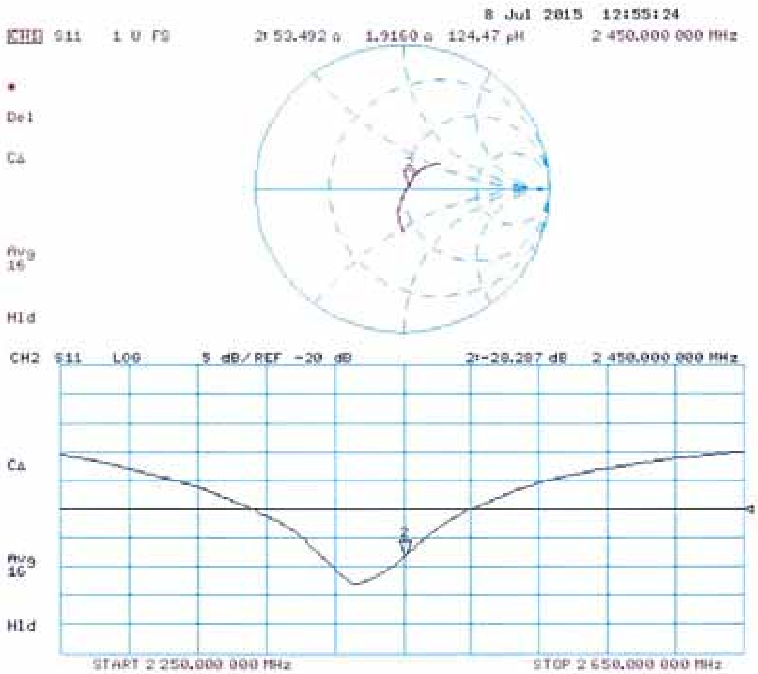
- Probe: ES3DV3 - SN3205; ConvF(4.54, 4.54, 4.54); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Head Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 101.3 V/m; Power Drift = 0.03 dB
Peak SAR (extrapolated) = 28.1 W/kg
SAR(1 g) = 13.7 W/kg; SAR(10 g) = 6.4 W/kg
Maximum value of SAR (measured) = 18.0 W/kg



0 dB = 18.0 W/kg = 12.55 dBW/kg

Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 08.07.2015

Test Laboratory: SPEAG, Zurich, Switzerland

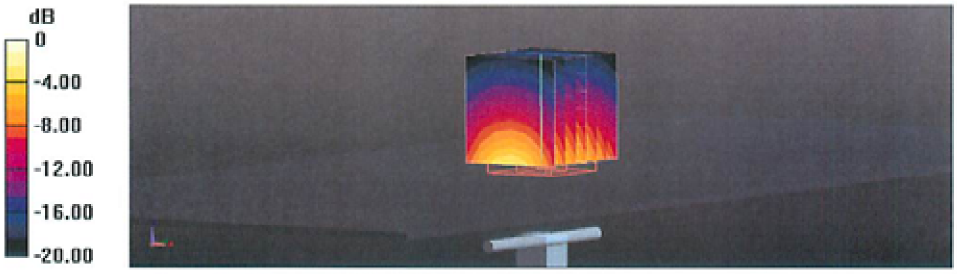
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:971

Communication System: UID 0 - CW; Frequency: 2450 MHz
Medium parameters used: f = 2450 MHz; σ = 2.03 S/m; ε_r = 52.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.32, 4.32, 4.32); Calibrated: 30.12.2014;
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 18.08.2014
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- DASY52 52.8.8(1222); SEMCAD X 14.6.10(7331)

Dipole Calibration for Body Tissue/Pin=250 mW, d=10mm/Zoom Scan (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 94.67 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 26.4 W/kg
SAR(1 g) = 12.9 W/kg; SAR(10 g) = 6.05 W/kg
Maximum value of SAR (measured) = 17.0 W/kg



0 dB = 17.0 W/kg = 12.30 dBW/kg

Impedance Measurement Plot for Body TSL