

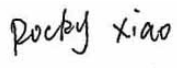
SAR EVALUATION REPORT

For

Dynamics Hong Kong Limited

Room F, 16/F, Block1, Golden Dragon Industrial Center, 152-160 Tai Lin Pai Road, Kwai Chung,
N.T.

FCC ID: C89-G8LTE

Report Type: Original Report	Product Type: MID
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Report Number: RDG150731005-20	
Report Date: 2015-09-29	
Reviewed By: RF Leader	
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Attestation of Test Results				
EUT Information	Company Name	Dynamics Hong Kong Limited		
	EUT Description	MID		
	Product Name	MID		
	FCC ID	C89-G8LTE		
	Model Number	G8 LTE		
	Serial Number	150731005		
	Test Date	2015-09-15、2015-09-16、2015-09-17		
MODE		Max. SAR Level(s) Reported(W/Kg)	Limit(W/Kg)	
GSM 850	1g Head SAR	0.025	1.6	
	1g Body SAR	1.272		
PCS 1900	1g Head SAR	0.029		
	1g Body SAR	0.700		
WCDMA 850	1g Head SAR	0.029		
	1g Body SAR	0.716		
WCDMA 1700	1g Head SAR	0.033		
	1g Body SAR	0.761		
WCDMA 1900	1g Head SAR	0.052		
	1g Body SAR	0.801		
LTE Band 2	1g Head SAR	0.055		
	1g Body SAR	0.839		
LTE Band 4	1g Head SAR	0.022		
	1g Body SAR	1.080		
LTE Band 17	1g Head SAR	0.055		
	1g Body SAR	0.539		
WLAN	1g Head SAR	0.333		
	1g Body SAR	0.657		
Simultaneous	1g Head SAR	0.388		
	1g Body SAR	1.354		
Hotspot	1g Body SAR	1.286		
Applicable Standards	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.			
	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.			
	FCC 47 CFR part 2.1093 Radiofrequency radiation exposure evaluation: portable devices			
	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			
	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)			
	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			

	KDB 248227 D01 802.11 Wi-Fi SAR v02r01
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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.

Note: for the LTE Band 17 SAR test, please refer to the report: RDG150731006-20, which was issued by Bay Area Compliance Laboratories Corp. (Shenzhen)

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RDG150731005-20	Original Report	2015-09-29

EUT DESCRIPTION

This report has been prepared on behalf of *DYNAMICS HONG KONG LIMITED* and their product, Model: G8 LTE, FCC ID: C89-G8LTE 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/EDGE multi-slot 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) WCDMA850: 824-849 MHz(TX) ; 869-894 MHz(RX) WCDMA1700: 1710-1755 MHz(TX) ; 2110-2155 MHz(RX) WCDMA1900: 1850-1910 MHz(TX) ; 1930-1990 MHz(RX) LTE Band 2: 1850-1910 MHz(TX) ; 1930-1990 MHz(RX) LTE Band 4: 1710-1755 MHz(TX) ; 2110-2155 MHz(RX) LTE Band 17: 704-716 MHz(TX) ; 734-746 MHz(RX) WLAN: 2412MHz-2462 MHz Bluetooth : 2402MHz-2480 MHz
Conducted RF Power:	GSM 850 : 33.04 dBm PCS 1900: 29.91 dBm WCDMA 850: 22.74 dBm WCDMA 1700: 22.55 dBm WCDMA 1900: 22.74 dBm LTE Band 2:22.98 dBm LTE Band 4:23.72 dBm LTE Band 17:23.11 dBm WLAN: 15.01 dBm Bluetooth: 2.82 dBm BLE:-4.41 dBm
Dimensions (L*W*H):	188 mm (L) × 108 mm (W) × 10 mm (H)
Power Source:	3.7 VDC Rechargeable Battery
Normal Operation:	Head and Body-worn

REFERENCE, STANDARDS, AND GUIDELINES

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

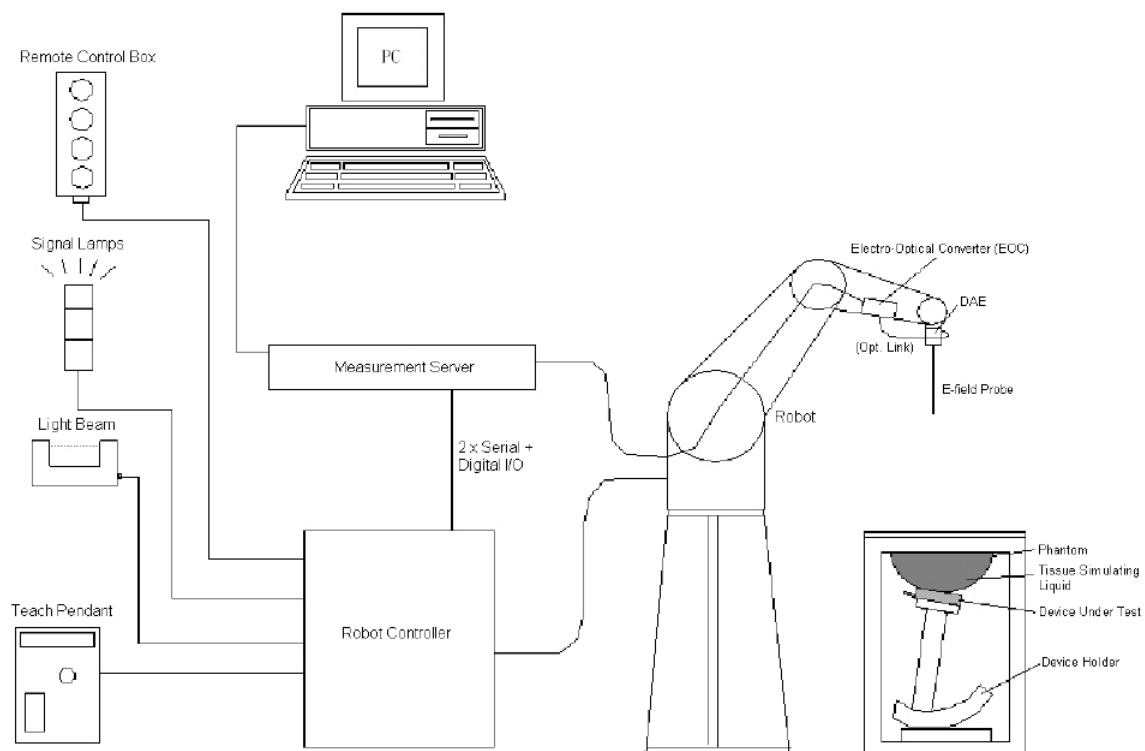
DESCRIPTION OF TEST SYSTEM

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 μ W/g to > 100 mW/g Linearity: ± 0.2 dB (noise: typically < 1 μ W/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.

Device Holder for SAM Twin Phantom

The SAR in the phantom is approximately inversely proportional to the square of the distance between the source and the liquid surface. For a source in 5mm distance, a positioning uncertainty of ± 0.5 mm would produce a SAR uncertainty of $\pm 20\%$. An accurate device positioning is therefore crucial for accurate and repeatable measurements. The positions, in which the devices must be measured, are defined by the standards.

The DASY device holder is designed to cope with different positions given in the standard. It has two scales for the device rotation (with respect to the body axis) and the device inclination (with respect to the line between the ear reference points). The rotation centers for both scales are the ear reference point ERP). Thus the device needs no repositioning when changing the angles.



The DASY device holder has been made out of low-loss POM material having the following dielectric parameters: relative permittivity $\epsilon_r=3$ and loss tangent $\tan \delta=0.02$. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

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 10mm² step integral, with 1mm 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/m³ 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 1 g cube is 10mm, with the side length of the 10 g cube 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 5x5x8 (8mmx8mmx5mm) providing a volume of 32mm in the X & Y axis, and 35mm in the Z axis.

Recommended Tissue Dielectric Parameters for Head and Body

Frequency (MHz)	Head Tissue		Body Tissue	
	ϵ_r	σ (S/m)	ϵ_r	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

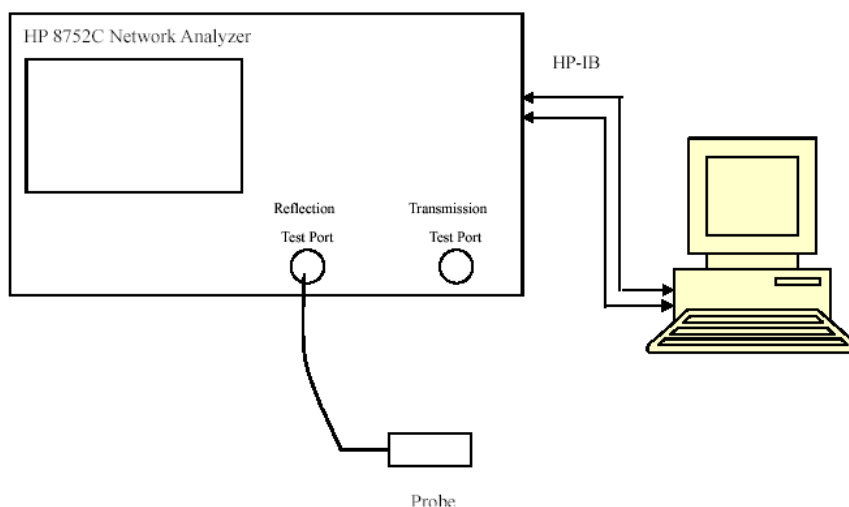
EQUIPMENT LIST AND CALIBRATION

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	2015-01-26	2016-01-26
E-Field Probe	EX3DV4	7329	2015-02-05	2016-02-05
Dipole, 835MHz	D835V1	453	2015-08-17	2018-08-17
Dipole, 1750MHz	D1750V2	1141	2015-07-09	2018-07-09
Dipole, 1900MHz	D1900V2	5d206	2015-07-14	2018-07-14
Dipole, 2450MHz	D2450V3	971	2015-07-08	2018-07-08
R&S, universal Radio Communication Tester	CMU200	105047	2014-11-20	2015-11-20
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 1750 MHz Head	TS-1750-H	201508	Each Time	/
Simulated Tissue 1750 MHz Body	TS-1750-B	201509	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	2015-06-03	2016-06-03
Dielectric probe kit	85070B	US33020324	2015-06-13	2016-06-13
Signal Generator	E4422B	MY41000355	2014-10-27	2015-10-27
Power Meter	EPM-441A	GB37481494	2014-11-03	2015-11-03
Power Meter Sensor	8481A	T-03-EM-127	2014-11-03	2015-11-03
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 (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ϵ_r	σ (S/m)	ϵ_r	σ (S/m)	$\Delta\epsilon_r$	$\Delta\sigma$ (S/m)	
824.2	Head	42.912	0.878	41.5	0.9	3.4	-2.44	± 5
	Body	55.164	0.962	55.2	0.97	-0.07	-0.82	± 5
826.4	Head	42.895	0.879	41.5	0.9	3.36	-2.33	± 5
	Body	55.131	0.966	55.2	0.97	-0.13	-0.41	± 5
836.6	Head	42.878	0.892	41.5	0.9	3.32	-0.89	± 5
	Body	55.114	0.977	55.2	0.97	-0.16	0.72	± 5
846.6	Head	42.831	0.896	41.5	0.9	3.21	-0.44	± 5
	Body	55.035	0.985	55.2	0.97	-0.3	1.55	± 5
848.8	Head	42.723	0.896	41.5	0.9	2.95	-0.44	± 5
	Body	55.006	0.987	55.2	0.97	-0.35	1.75	± 5

*Liquid Verification above was performed on 2015-09-15.

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ϵ_r	σ (S/m)	ϵ_r	σ (S/m)	$\Delta\epsilon_r$	$\Delta\sigma$ (S/m)	
1711.5	Head	39.85	1.37	40.8	1.37	-2.33	0	±5
	Body	53.501	1.471	53.43	1.49	0.13	-1.28	±5
1712.4	Head	40.411	1.377	40.8	1.37	-0.95	0.51	±5
	Body	53.442	1.481	53.43	1.49	0.02	-0.6	±5
1732.5	Head	39.71	1.38	40.8	1.37	-2.67	0.73	±5
	Body	53.337	1.487	53.43	1.49	-0.17	-0.2	±5
1732.6	Head	39.85	1.37	40.8	1.37	-2.33	0	±5
	Body	53.501	1.471	53.43	1.49	0.13	-1.28	±5
1752.6	Head	40.411	1.377	40.8	1.37	-0.95	0.51	±5
	Body	53.442	1.481	53.43	1.49	0.02	-0.6	±5
1753.5	Head	39.71	1.38	40.8	1.37	-2.67	0.73	±5
	Body	53.337	1.487	53.43	1.49	-0.17	-0.2	±5
1850.2	Head	39.822	1.359	40	1.4	-0.44	-2.93	±5
	Body	55.266	1.477	53.3	1.52	3.69	-2.83	±5
1852.4	Head	39.848	1.354	40	1.4	-0.38	-3.29	±5
	Body	55.206	1.475	53.3	1.52	3.58	-2.96	±5
1860	Head	39.772	1.384	40	1.4	-0.57	-1.14	±5
	Body	53.726	1.542	53.3	1.52	0.8	1.45	±5
1880	Head	39.772	1.384	40	1.4	-0.57	-1.14	±5
	Body	53.726	1.542	53.3	1.52	0.8	1.45	±5
1900	Head	39.587	1.413	40	1.4	-1.03	0.93	±5
	Body	53.614	1.492	53.3	1.52	0.59	-1.84	±5
1907.6	Head	39.609	1.415	40	1.4	-0.98	1.07	±5
	Body	53.38	1.494	53.3	1.52	0.15	-1.71	±5
1909.8	Head	39.609	1.415	40	1.4	-0.98	1.07	±5
	Body	53.38	1.494	53.3	1.52	0.15	-1.71	±5

*Liquid Verification above was performed on 2015-09-16.

Frequency (MHz)	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ϵ_r	σ (S/m)	ϵ_r	σ (S/m)	$\Delta\epsilon_r$	$\Delta\sigma$ (S/m)	
2412	Head	39.326	1.794	39.2	1.8	0.32	-0.33	±5
	Body	53.229	1.945	52.7	1.95	1	-0.26	±5
2437	Head	39.162	1.823	39.2	1.8	-0.1	1.28	±5
	Body	51.632	1.977	52.7	1.95	-2.03	1.38	±5
2450	Head	39.162	1.823	39.2	1.8	-0.1	1.28	±5
	Body	52.232	2.028	52.7	1.95	-0.89	4	±5
2462	Head	38.997	1.842	39.2	1.8	-0.52	2.33	±5
	Body	52.206	1.981	52.7	1.95	-0.94	1.59	±5

*Liquid Verification above was performed on 2015-09-17.

Please refer to the following tables.

835 MHz Head			835 MHz Body		
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
824	42.8799	19.1756	824	55.161	21.032
824.5	42.9598	19.1239	824.5	55.1676	20.9414
825	42.9773	19.1544	825	55.1441	21.0218
825.5	42.9089	19.1842	825.5	55.2051	20.9849
826	42.9077	19.1392	826	55.1294	21.031
826.5	42.8922	19.1317	826.5	55.1318	21.0228
827	42.8905	19.1488	827	55.0107	21.001
827.5	42.8937	19.1742	827.5	55.1706	20.9904
828	42.9833	19.2157	828	55.1496	20.9747
828.5	42.8978	19.1799	828.5	55.1802	20.9927
829	42.9247	19.2471	829	55.1077	20.9262
829.5	42.9354	19.158	829.5	55.0924	20.9289
830	42.9904	19.2064	830	55.1067	20.9329
830.5	42.9597	19.2304	830.5	55.1066	20.9766
831	42.9239	19.2029	831	55.1029	20.9462
831.5	42.8976	19.1948	831.5	55.1299	20.9858
832	42.9802	19.1956	832	55.2048	20.9324
832.5	42.9201	19.2507	832.5	55.1187	20.9317
833	42.9879	19.2179	833	55.1362	20.916
833.5	42.8967	19.2068	833.5	55.1027	20.9671
834	42.8802	19.2371	834	55.157	21.0411
834.5	42.8959	19.2224	834.5	55.0985	20.9401
835	42.9828	19.2431	835	55.1045	20.9703
835.5	42.9228	19.1848	835.5	55.0783	20.9703
836	42.9065	19.1439	836	55.1033	21.0239
836.5	42.8908	19.1849	836.5	55.1164	21.0021
837	42.828	19.1719	837	55.1053	20.9716
837.5	42.8827	19.1698	837.5	55.0121	20.9052
838	42.8532	19.2233	838	55.1175	20.9766
838.5	42.8998	19.1871	838.5	55.1416	21.0139
839	42.9188	19.1933	839	55.1	20.9743
839.5	42.9103	19.1553	839.5	55.0717	21.0088
840	42.9372	19.1249	840	55.0586	20.9873
840.5	42.8977	19.0955	840.5	55.1781	20.9849
841	42.8999	19.2072	841	55.0681	21.0279
841.5	42.8805	19.1203	841.5	55.0539	20.9781
842	42.8903	19.0788	842	55.1073	20.9441
842.5	42.8366	19.1211	842.5	54.9755	20.972
843	42.8372	19.0573	843	55.0711	20.9756
843.5	42.7884	19.0643	843.5	55.0173	20.9598
844	42.795	19.094	844	55.074	20.9388
844.5	42.8667	19.0296	844.5	55.061	21.0153
845	42.7738	19.0966	845	55.118	20.9748
845.5	42.8271	19.0816	845.5	55.0358	20.9342
846	42.8629	19.0341	846	55.0459	20.9582
846.5	42.8473	19.0134	846.5	55.0393	20.8963
847	42.7641	19.1041	847	55.019	20.9883
847.5	42.7319	18.9595	847.5	55.0509	21.0039
848	42.7893	19.0138	848	55.0231	20.9851
848.5	42.7182	19.0316	848.5	55.0082	20.896
849	42.7266	18.9377	849	55.0051	20.9296

1750 MHz Head					
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
1710	40.4263	14.2944	1748	40.2483	14.2075
1711	40.4323	14.3131	1749	40.2599	14.2429
1712	40.4163	14.3167	1750	40.3464	14.2711
1713	40.432	14.2992	1751	40.3679	14.2512
1714	40.4131	14.2851	1752	40.3251	14.2782
1715	40.3617	14.2781	1753	40.3407	14.2380
1716	40.4504	14.3225	1754	40.3281	14.2565
1717	40.3956	14.2957	1755	40.3385	14.2018
1718	40.4154	14.3084	1756	40.3304	14.2828
1719	40.3752	14.3277	1757	40.2865	14.2356
1720	40.4224	14.2990	1758	40.2468	14.2104
1721	40.6087	14.2447	1759	40.2147	14.1938
1722	40.5328	14.2487	1760	40.2478	14.1829
1723	40.5226	14.2618	1761	40.2625	14.2958
1724	40.5595	14.2520	1762	40.3255	14.3030
1725	40.5338	14.2378	1763	40.2171	14.2595
1726	40.5399	14.2471	1764	40.2121	14.2724
1727	40.4367	14.3080	1765	40.1897	14.3030
1728	40.4943	14.2996	1766	40.2139	14.3430
1729	40.4702	14.2493	1767	40.2092	14.2469
1730	40.476	14.3044	1768	40.169	14.2526
1731	40.4069	14.3543	1769	40.3455	14.2621
1732	40.4228	14.2899	1770	40.3412	14.2332
1733	40.3997	14.2936	1771	40.3511	14.2635
1734	40.3496	14.2602	1772	40.3414	14.2625
1735	40.3586	14.3240	1773	40.3253	14.2807
1736	40.426	14.2726	1774	40.2884	14.2420
1737	40.3644	14.2730	1775	40.3147	14.2400
1738	40.3151	14.3439	1776	40.2625	14.2367
1739	40.3418	14.3388	1777	40.2283	14.1924
1740	40.3247	14.3074	1778	40.2415	14.2970
1741	40.3143	14.2599	1779	40.2376	14.2159
1742	40.3451	14.2539	1780	40.3568	14.2638
1743	40.3203	14.3000	1781	40.358	14.1809
1744	40.3431	14.3001	1782	40.3609	14.2741
1745	40.3054	14.2936	1783	40.289	14.2277
1746	40.2613	14.2209	1784	40.2827	14.1891
1747	40.22	14.2865	1785	40.3252	14.2086

1750 MHz Body					
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
1710	53.4887	15.3642	1748	53.2173	15.272
1711	53.5121	15.3723	1749	53.2557	15.3234
1712	53.4919	15.4071	1750	53.3371	15.345
1713	53.4371	15.3416	1751	53.3813	15.3164
1714	53.4401	15.3507	1752	53.3461	15.3154
1715	53.3804	15.3573	1753	53.3172	15.2663
1716	53.4911	15.4013	1754	53.3208	15.3435
1717	53.43	15.3516	1755	53.3536	15.2573
1718	53.4712	15.3582	1756	53.3067	15.3512
1719	53.3792	15.4104	1757	53.2421	15.2745
1720	53.5008	15.3842	1758	53.1977	15.238
1721	53.6839	15.3049	1759	53.2154	15.2566
1722	53.5991	15.3585	1760	53.2647	15.28
1723	53.5681	15.3043	1761	53.2624	15.3903
1724	53.6502	15.2945	1762	53.3072	15.341
1725	53.6126	15.3467	1763	53.2186	15.3326
1726	53.6183	15.2967	1764	53.1535	15.3622
1727	53.5177	15.3523	1765	53.1582	15.35
1728	53.5448	15.3636	1766	53.1876	15.3963
1729	53.5356	15.3387	1767	53.1715	15.326
1730	53.501	15.3855	1768	53.1345	15.3277
1731	53.4491	15.4483	1769	53.3948	15.3399
1732	53.46	15.3921	1770	53.3449	15.2872
1733	53.4246	15.3644	1771	53.3413	15.3028
1734	53.4049	15.3617	1772	53.3123	15.3316
1735	53.4121	15.4065	1773	53.3084	15.316
1736	53.4553	15.3372	1774	53.297	15.3179
1737	53.3888	15.3648	1775	53.3335	15.3008
1738	53.3322	15.4137	1776	53.254	15.3465
1739	53.3743	15.3915	1777	53.1865	15.2572
1740	53.3333	15.3648	1778	53.1871	15.3784
1741	53.3521	15.3161	1779	53.2325	15.2913
1742	53.3516	15.3422	1780	53.3859	15.3406
1743	53.2848	15.3671	1781	53.3623	15.2515
1744	53.3224	15.3848	1782	53.376	15.3548
1745	53.3374	15.33	1783	53.3193	15.3142
1746	53.2371	15.3065	1784	53.2828	15.2684
1747	53.1762	15.3645	1785	53.3179	15.2711

1900 MHz Head			1900 MHz Body		
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
1850	39.8099	13.2099	1850	55.2407	14.3563
1851	39.8689	13.2214	1851	55.3696	14.3673
1852	39.8424	13.1423	1852	55.2255	14.3564
1853	39.8559	13.1507	1853	55.1764	14.2714
1854	39.8638	13.1447	1854	55.081	14.1941
1855	39.8922	13.2024	1855	55.0366	14.2675
1856	39.873	13.1711	1856	54.9303	14.2518
1857	39.892	13.2091	1857	54.7311	14.1673
1858	39.8354	13.1889	1858	54.6179	14.1287
1859	39.8194	13.1991	1859	54.5848	14.0664
1860	39.8028	13.2445	1860	54.4353	14.1968
1861	39.8655	13.2211	1861	54.5162	14.107
1862	39.883	13.2131	1862	54.3454	14.0988
1863	39.8371	13.1378	1863	54.1743	14.1217
1864	39.8126	13.1603	1864	54.1325	14.1437
1865	39.8497	13.2078	1865	54.0676	14.1491
1866	39.7904	13.1968	1866	53.9722	14.1566
1867	39.8026	13.221	1867	53.8973	14.1606
1868	39.8074	13.2476	1868	53.8137	14.2442
1869	39.8395	13.321	1869	53.7455	14.2049
1870	39.8288	13.2634	1870	53.6807	14.2997
1871	39.8192	13.2092	1871	53.6408	14.2875
1872	39.8028	13.1821	1872	53.6846	14.3511
1873	39.8253	13.2106	1873	53.6431	14.4254
1874	39.7458	13.2482	1874	53.5969	14.4312
1875	39.8031	13.2322	1875	53.6158	14.496
1876	39.7345	13.2339	1876	53.645	14.5483
1877	39.7973	13.2618	1877	53.6768	14.6473
1878	39.7538	13.2137	1878	53.6317	14.7091
1879	39.7266	13.2426	1879	53.6644	14.6384
1880	39.7716	13.237	1880	53.7257	14.75
1881	39.7498	13.2438	1881	53.7424	14.7762
1882	39.7312	13.2633	1882	53.7536	14.7822
1883	39.7143	13.2992	1883	53.8169	14.7863
1884	39.7735	13.2516	1884	53.8703	14.7865
1885	39.7247	13.3193	1885	53.941	14.8273
1886	39.7134	13.2985	1886	54.1289	14.7809
1887	39.6722	13.2616	1887	54.1458	14.7961
1888	39.6841	13.2717	1888	54.2434	14.8418
1889	39.6747	13.3009	1889	54.2326	14.7279
1890	39.6938	13.3265	1890	54.2881	14.7508
1891	39.6679	13.3162	1891	54.3543	14.7546
1892	39.6789	13.2849	1892	54.3639	14.6976
1893	39.6829	13.3177	1893	54.3505	14.6565
1894	39.6748	13.282	1894	54.3504	14.6455
1895	39.6373	13.3029	1895	54.3354	14.6273
1896	39.6916	13.3054	1896	54.4674	14.5068
1897	39.6568	13.2749	1897	54.4073	14.4741
1898	39.642	13.2835	1898	54.3972	14.4297
1899	39.6258	13.257	1899	54.2545	14.369
1900	39.6647	13.3667	1900	54.1774	14.35

1900 MHz Head			1900 MHz Body		
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
1901	39.6464	13.2983	1901	54.1062	14.2767
1902	39.5885	13.3338	1902	54.0484	14.2496
1903	39.6063	13.2694	1903	53.9507	14.2386
1904	39.6448	13.321	1904	53.859	14.1432
1905	39.6599	13.3425	1905	53.783	14.1453
1906	39.5717	13.3718	1906	53.7147	14.0997
1907	39.576	13.3255	1907	53.6403	14.1311
1908	39.5935	13.3194	1908	53.5965	14.0223
1909	39.5866	13.3318	1909	53.451	14.0208
1910	39.6141	13.3205	1910	53.3617	14.0796

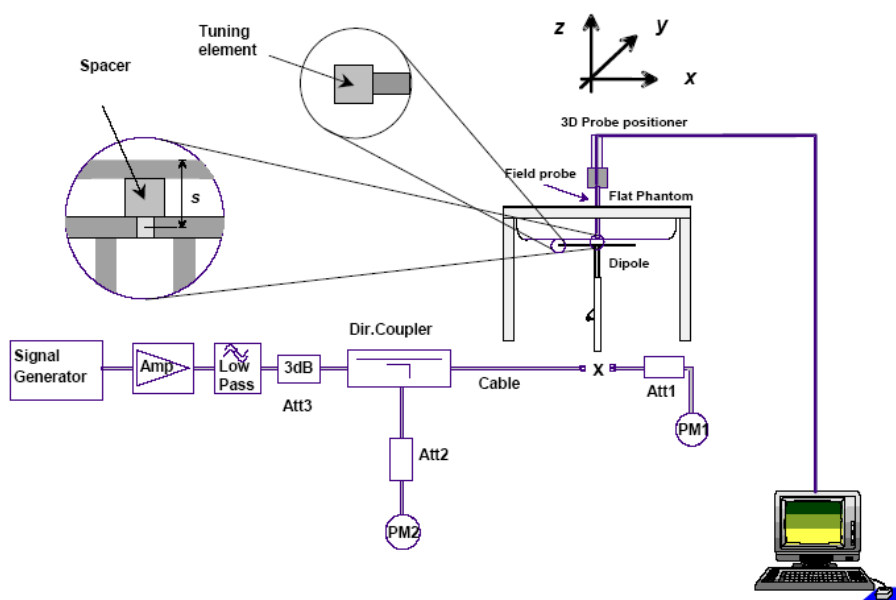
2450 MHz Head					
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
2412	39.3258	13.3744	2443	39.1633	13.462
2413	39.307	13.3678	2444	39.1648	13.4101
2414	39.3495	13.3344	2445	39.1441	13.4543
2415	39.3063	13.3801	2446	39.1361	13.4378
2416	39.3033	13.3791	2447	39.1235	13.4545
2417	39.3434	13.3813	2448	39.1517	13.4372
2418	39.2923	13.3633	2449	39.1357	13.4649
2419	39.3466	13.3761	2450	39.1215	13.4093
2420	39.361	13.4347	2451	39.0946	13.4551
2421	39.2379	13.4593	2452	39.1036	13.4242
2422	39.2286	13.4763	2453	39.1008	13.4256
2423	39.2101	13.4895	2454	39.1141	13.3983
2424	39.2205	13.4626	2455	39.0726	13.3903
2425	39.2111	13.4591	2456	39.0888	13.4392
2426	39.1842	13.4859	2457	39.0827	13.4231
2427	39.2269	13.4989	2458	39.0709	13.4231
2428	39.1752	13.503	2459	39.0712	13.4363
2429	39.1802	13.4465	2460	39.0491	13.46
2430	39.2131	13.4688	2461	39.0662	13.4661
2431	39.2303	13.4914	2462	38.9968	13.4589
2432	39.2519	13.4668	2463	39.0472	13.486
2433	39.2159	13.4971	2464	39.0103	13.4815
2434	39.2173	13.5242	2465	39.0569	13.5028
2435	39.1811	13.4961	2466	38.9666	13.4952
2436	39.1761	13.4807	2467	38.9934	13.4852
2437	39.1622	13.4505	2468	38.9931	13.5018
2438	39.1763	13.4583	2469	38.9794	13.5204
2439	39.192	13.4458	2470	39.0029	13.5419
2440	39.1995	13.4584	2471	39.0041	13.5317
2441	39.1911	13.4416	2472	38.9764	13.5514
2442	39.1956	13.4564	/	/	/

2450 MHz Body					
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
2412	53.2294	14.5062	2443	51.7275	14.8646
2413	53.3886	14.4953	2444	51.7917	14.8668
2414	53.2544	14.4453	2445	51.8119	14.8998
2415	53.2007	14.3968	2446	51.8727	14.886
2416	53.0306	14.3214	2447	51.9736	14.9389
2417	53.0491	14.383	2448	52.0893	14.8726
2418	52.9358	14.4127	2449	52.1421	14.8511
2419	52.7658	14.2752	2450	52.2316	14.8883
2420	52.651	14.2549	2451	52.2623	14.8235
2421	52.575	14.1905	2452	52.2907	14.8665
2422	52.4649	14.3163	2453	52.3319	14.8213
2423	52.5089	14.256	2454	52.3403	14.7974
2424	52.3274	14.2523	2455	52.3589	14.7887
2425	52.2017	14.2812	2456	52.3068	14.7472
2426	52.1691	14.269	2457	52.351	14.7437
2427	52.048	14.3099	2458	52.4433	14.6186
2428	51.9731	14.2564	2459	52.3617	14.6316
2429	51.8872	14.3388	2460	52.4229	14.52
2430	51.8235	14.3531	2461	52.2489	14.5031
2431	51.7157	14.3229	2462	52.2062	14.4742
2432	51.6861	14.3609	2463	52.0967	14.3868
2433	51.6555	14.439	2464	52.0656	14.4033
2434	51.6877	14.4781	2465	51.9643	14.3597
2435	51.6788	14.5658	2466	51.8725	14.2785
2436	51.6073	14.5784	2467	51.7979	14.2714
2437	51.6321	14.5883	2468	51.7521	14.2543
2438	51.6204	14.6367	2469	51.6436	14.211
2439	51.6908	14.7258	2470	51.586	14.1818
2440	51.6111	14.7499	2471	51.4748	14.1707
2441	51.6637	14.7923	2472	51.3624	14.2038
2442	51.7328	14.8544	/	/	/

System Accuracy Verification

Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of $\pm 10\%$. 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 (%)
2015-09-15	835	Head	1g	8.91	9.43	-5.51	± 10
		Body	1g	9.83	9.55	2.93	± 10
2015-09-16	1750	Head	1g	38.4	36.8	4.35	± 10
		Body	1g	36.7	37.4	-1.87	± 10
	1900	Head	1g	39.5	40.7	-2.95	± 10
		Body	1g	38.9	40.8	-4.66	± 10
2015-09-17	2450	Head	1g	51.6	53.3	-3.19	± 10
		Body	1g	53.8	50.6	6.32	± 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: $f = 835 \text{ MHz}$; $\sigma = 0.894 \text{ S/m}$; $\epsilon_r = 42.983$; $\rho = 1000 \text{ kg/m}^3$

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: 2015/1/26
- 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: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$

Maximum value of SAR (interpolated) = 10.4 W/kg

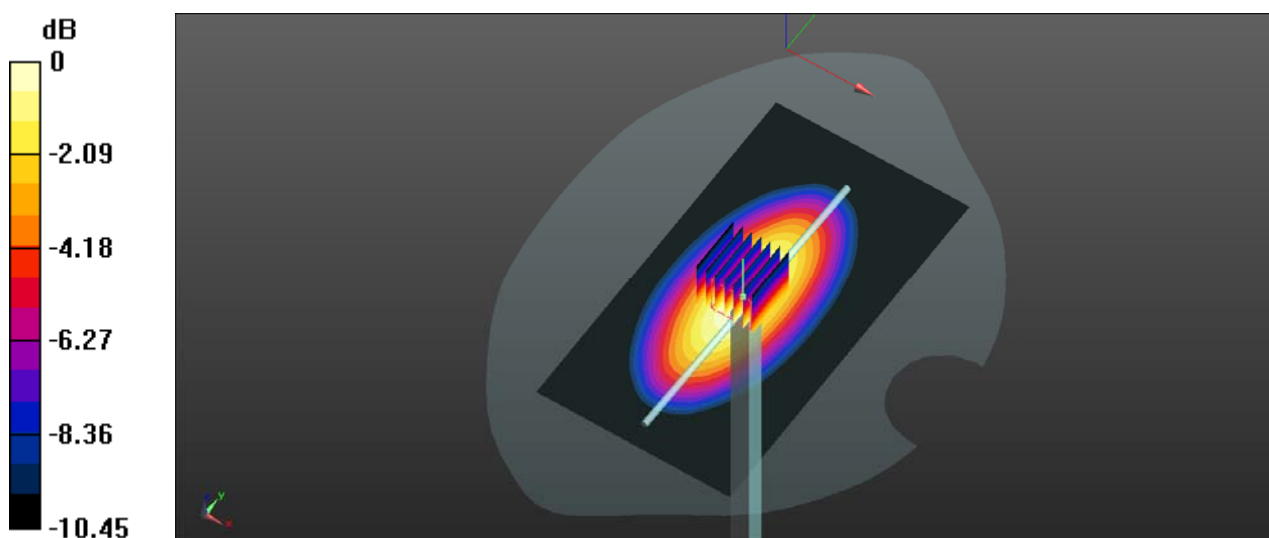
System Performance 835 MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$

Reference Value = 107.3 V/m ; Power Drift = 0.07 dB

Peak SAR (extrapolated) = 13.3 W/kg

SAR(1 g) = 8.91 W/kg ; SAR(10 g) = 5.84 W/kg

Maximum value of SAR (measured) = 9.60 W/kg



0 dB = 9.60 W/kg = 9.82 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)**System Performance 835 MHz Body****DUT:D835V1; Type: 835 MHz; Serial:453**

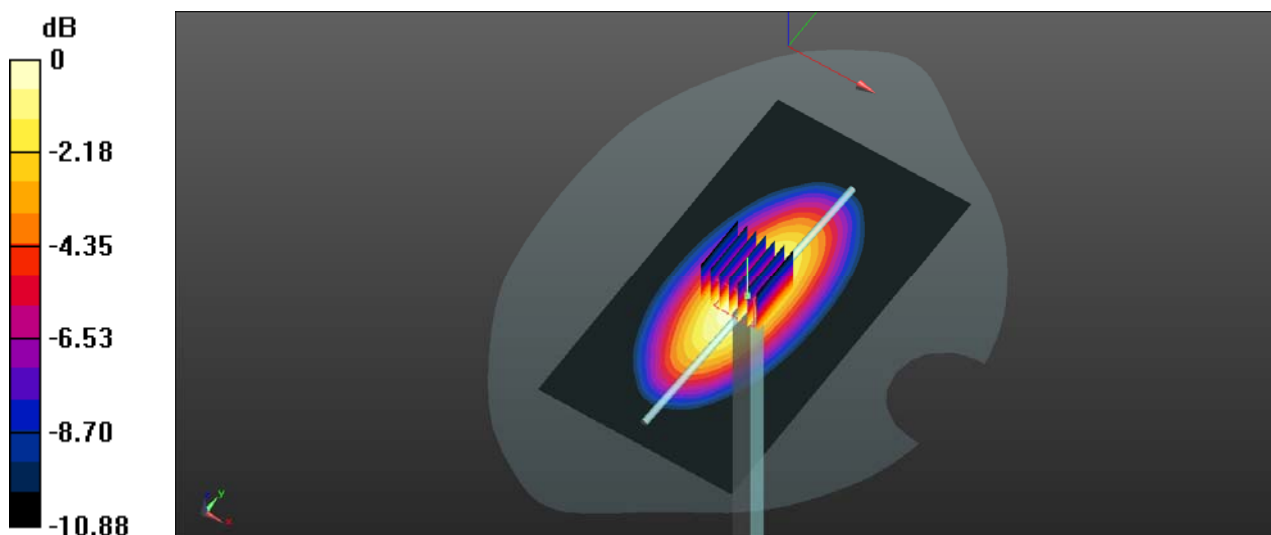
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 835 \text{ MHz}$; $\sigma = 0.974 \text{ S/m}$; $\epsilon_r = 55.105$; $\rho = 1000 \text{ kg/m}^3$

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: 2015/1/26
- 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: $dx=1.500 \text{ mm}$, $dy=1.500 \text{ mm}$ Maximum value of SAR (interpolated) = 9.61 W/kg **System Performance 835 MHz Body /Zoom Scan (7x7x7)/Cube 0:** Measurement grid: $dx=5\text{mm}$, $dy=5\text{mm}$, $dz=5\text{mm}$ Reference Value = 97.67 V/m ; Power Drift = 0.06 dB Peak SAR (extrapolated) = 15.3 W/kg **SAR(1 g) = 9.83 W/kg ; SAR(10 g) = 6.29 W/kg** Maximum value of SAR (measured) = 10.7 W/kg  $0 \text{ dB} = 10.7 \text{ W/kg} = 10.29 \text{ dBW/kg}$

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)**System Performance 1750 MHz Head****DUT: D1750V2; Type: 1750 MHz; Serial: 1141**

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.389$ S/m; $\epsilon_r = 40.346$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(8.12, 8.12, 8.12); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 1750 MHz Head /Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 46.8 W/kg

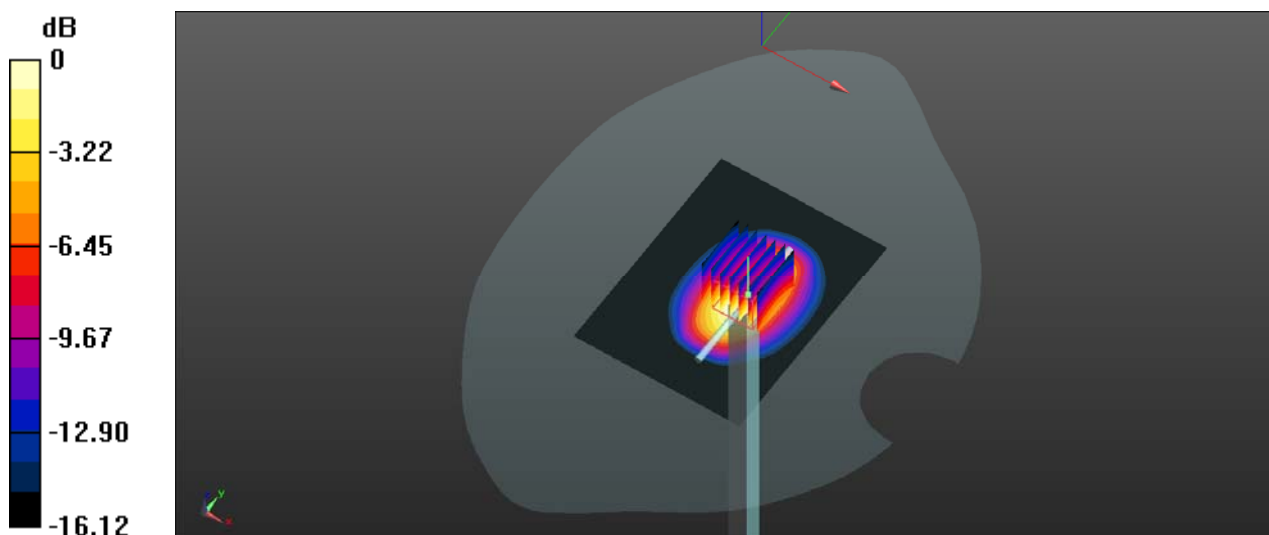
System Performance 1750 MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 153.0 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 73.8 W/kg

SAR(1 g) = 38.4 W/kg; SAR(10 g) = 19.5 W/kg

Maximum value of SAR (measured) = 45.3 W/kg



0 dB = 45.3 W/kg = 16.56 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)**System Performance 1750 MHz Body****DUT: D1750V2; Type: 1750 MHz; Serial: 1141**

Communication System: CW; Frequency: 1750 MHz; Duty Cycle: 1:1

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.494$ S/m; $\epsilon_r = 53.337$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.85, 7.85, 7.85); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 1750 MHz Body /Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 43.0 W/kg

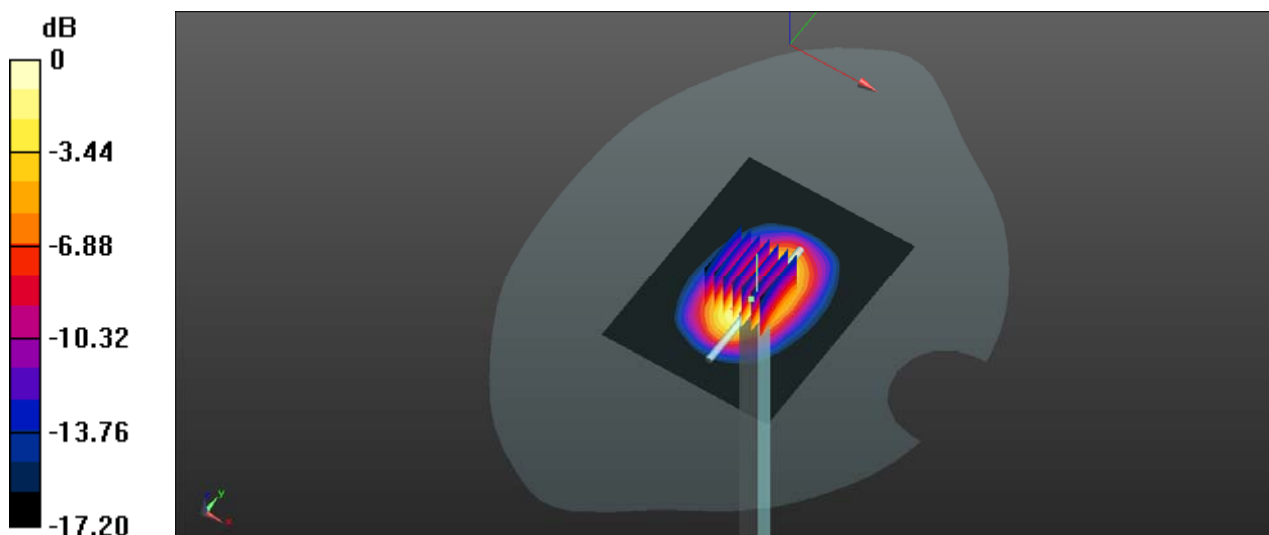
System Performance 1750 MHz Body /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 165.2 V/m; Power Drift = -0.00 dB

Peak SAR (extrapolated) = 68.5 W/kg

SAR(1 g) = 36.7 W/kg; SAR(10 g) = 19.4 W/kg

Maximum value of SAR (measured) = 41.0 W/kg



0 dB = 41.0 W/kg = 16.13 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; $\sigma = 1.413$ S/m; $\epsilon_r = 39.665$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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) = 47.0 W/kg

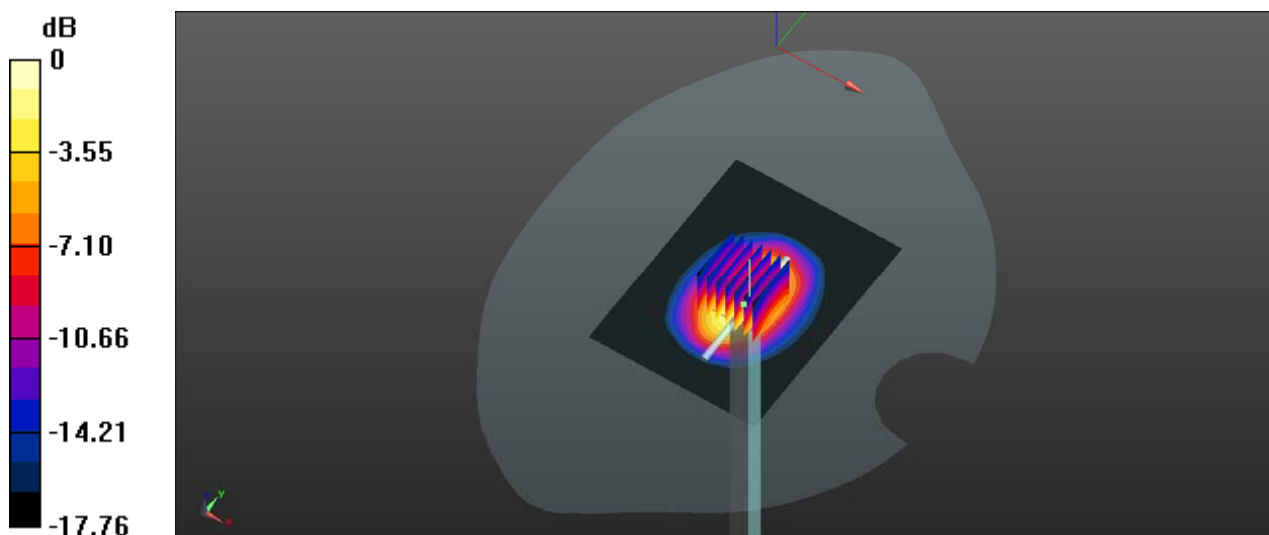
System Performance 1900 MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 174.5 V/m; Power Drift = -0.15 dB

Peak SAR (extrapolated) = 74.1 W/kg

SAR(1 g) = 39.5 W/kg; SAR(10 g) = 20.5 W/kg

Maximum value of SAR (measured) = 44.5 W/kg



0 dB = 44.5 W/kg = 16.48 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; $\sigma = 1.515$ S/m; $\epsilon_r = 54.189$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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) = 47.2 W/kg

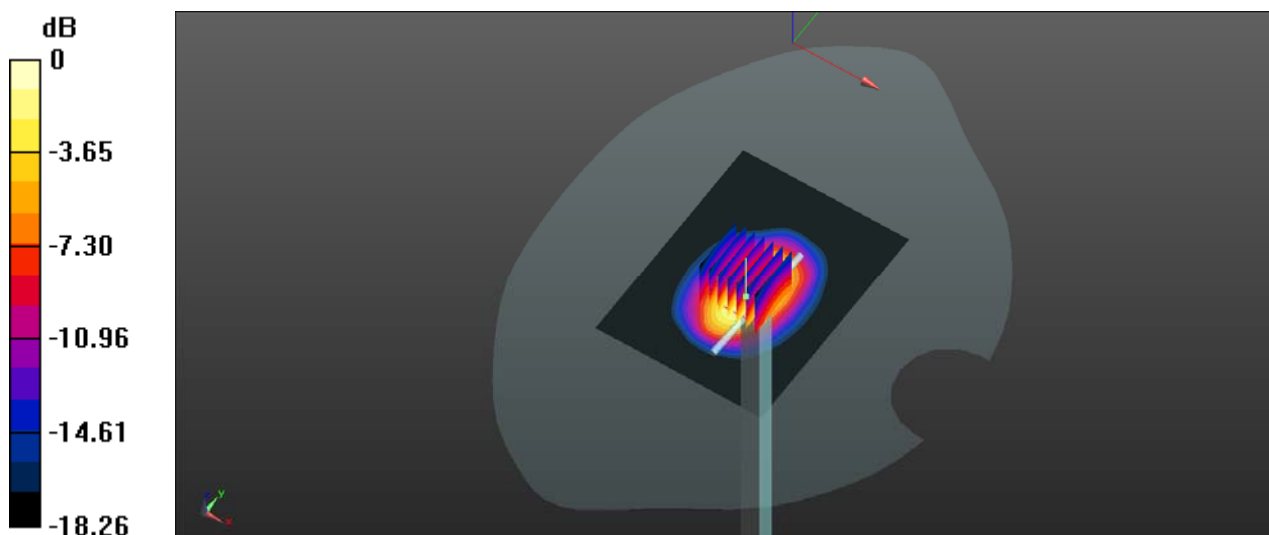
System Performance 1900 MHz Body /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 163.5 V/m; Power Drift = 0.04 dB

Peak SAR (extrapolated) = 73.8 W/kg

SAR(1 g) = 38.9 W/kg; SAR(10 g) = 19.7 W/kg

Maximum value of SAR (measured) = 43.7 W/kg



0 dB = 43.7 W/kg = 16.40 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; $\sigma = 1.828$ S/m; $\epsilon_r = 39.121$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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) = 62.0 W/kg

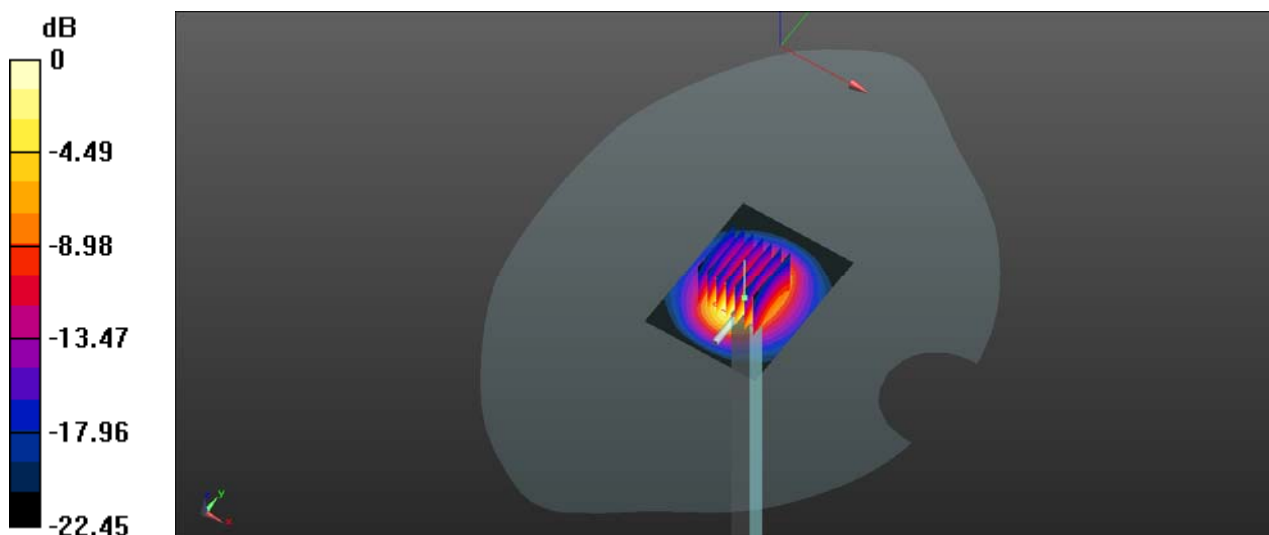
System Performance 2450 MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 180.5 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 107 W/kg

SAR(1 g) = 51.6 W/kg; SAR(10 g) = 23.4 W/kg

Maximum value of SAR (measured) = 58.8 W/kg



0 dB = 58.8 W/kg = 17.69 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; $\sigma = 2.029$ S/m; $\epsilon_r = 52.232$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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) = 68.7 W/kg

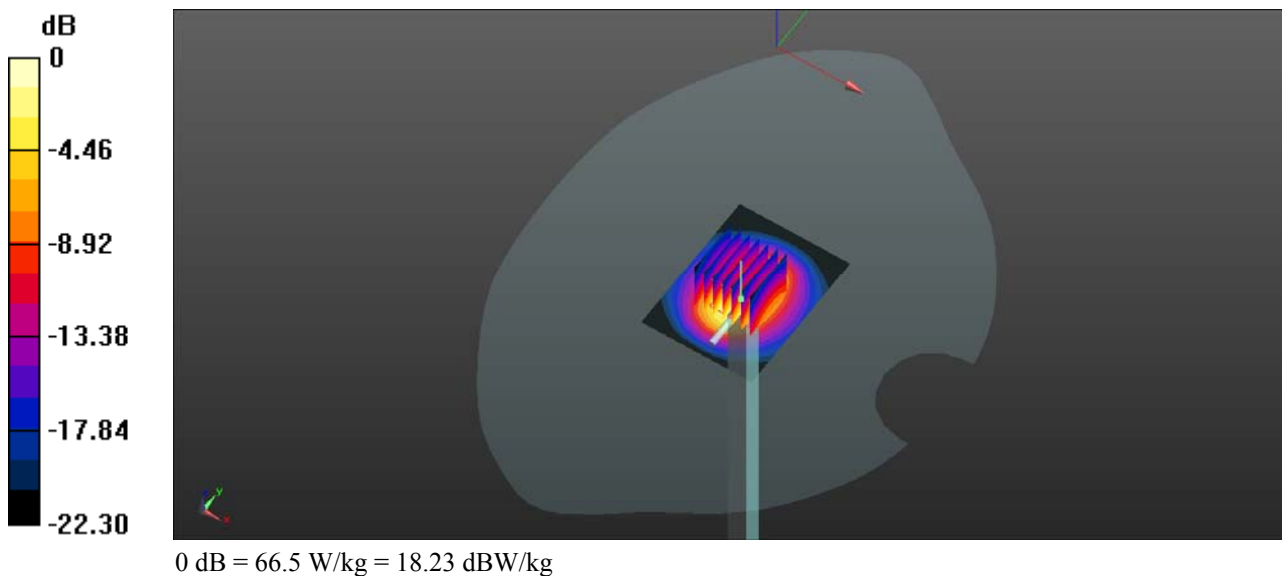
System Performance 2450 MHz Body /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 180.2 V/m; Power Drift = 0.01 dB

Peak SAR (extrapolated) = 120 W/kg

SAR(1 g) = 53.8 W/kg; SAR(10 g) = 26.3 W/kg

Maximum value of SAR (measured) = 66.5 W/kg

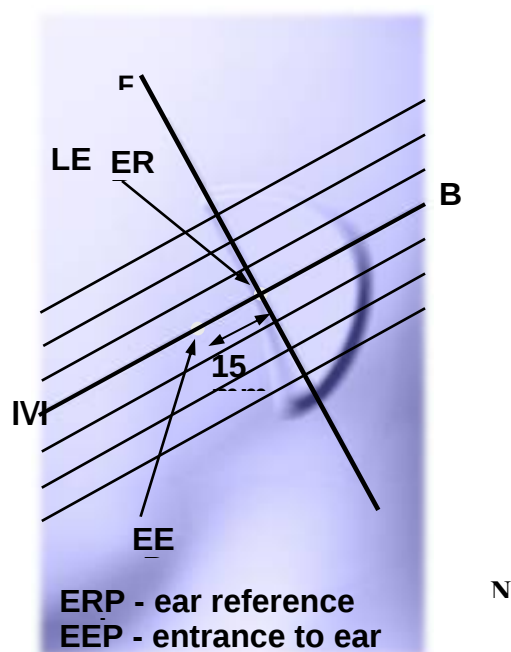
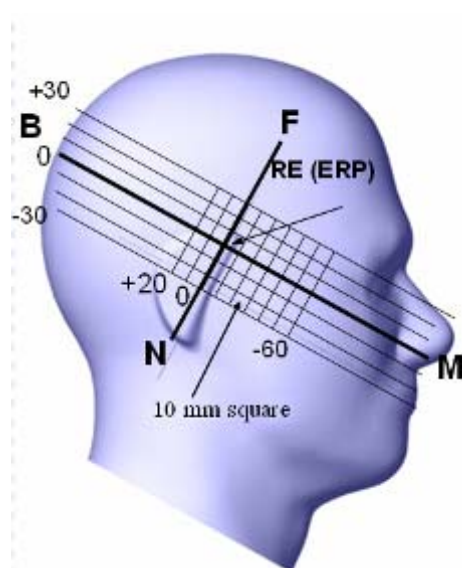


EUT TEST STRATEGY AND METHODOLOGY

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 $\frac{1}{4}$ 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.

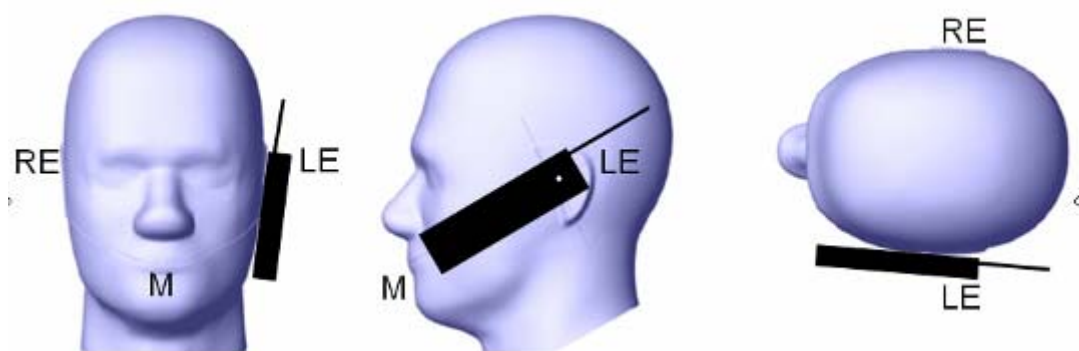
This test position is established:

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

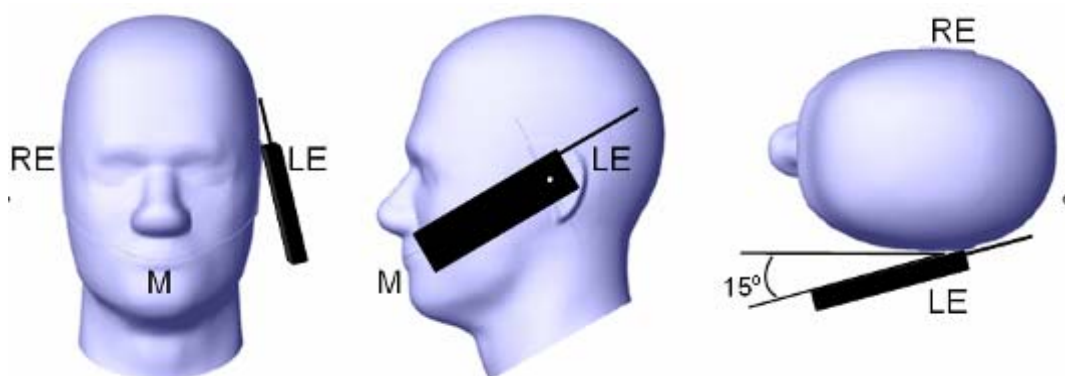
With the handset aligned in the “Cheek/Touch Position”:

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° to 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.

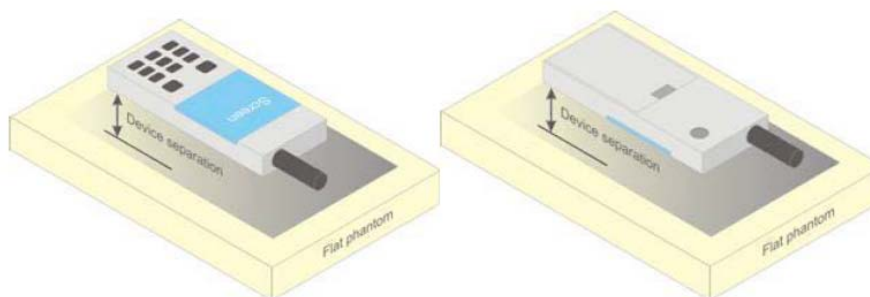


Figure 5 – Test positions for body-worn devices

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 EUT and the horizontal grid spacing was 10 mm x 10 mm. 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 35 mm x 35 mm x 35 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
KDB 248227 D01 802.11 Wi-Fi SAR v02r01

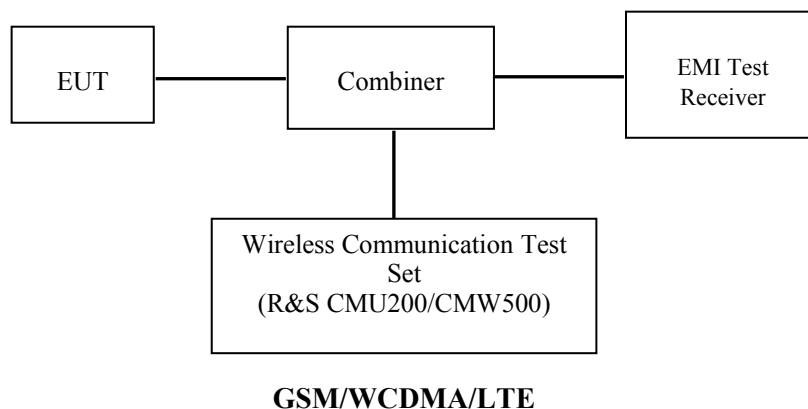
CONDUCTED OUTPUT POWER MEASUREMENT

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.



Radio Configuration

The power measurement was configured by the Wireless Communication Test Set CMU200 for all Radio configurations except the HSPA+/DC-HSDPA configured by E5515C.

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 desired 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 desired 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 Subset	HSDPA 1	HSDPA 2	HSDPA 3	HSDPA 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			
	$A_{hs} = \beta_{hs} / \beta_c$	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.

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

HSPA+

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

Sub-test	β_c (Note 3)	β_d	β_{HS} (Note 1)	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_{ed1} : 30/15 β_{ed2} : 30/15	β_{ed3} : 24/15 β_{ed4} : 24/15	3.5	2.5	14	105	105
Note 1: Δ_{ACK}, Δ_{NACK} and $\Delta_{CQI} = 30/15$ with $\beta_{hs} = 30/15 * \beta_c$. 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 $\beta_d = 0$ 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.											

DC-HSDPA

The following tests were conducted according to the test requirements in Table 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	Processes	6
Information Bit Payload (N_{BF})	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 6.2.2-1 due 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 subclauses 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 subclause 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
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

Mode/Band	Max Target Power(dBm)		
	Channel		
	Low	Middle	High
GSM 850	33.1	33.1	33.1
GPRS 1 TX Slot	32.9	32.9	32.9
GPRS 2 TX Slot	31.9	31.9	31.9
GPRS 3 TX Slot	30.5	30.5	30.5
GPRS 4 TX Slot	29.4	29.4	29.4
EDGE 1 TX Slot	26.5	26.5	26.5
EDGE 2 TX Slot	25.4	25.4	25.4
EDGE 3 TX Slot	23.1	23.1	23.1
EDGE 4 TX Slot	21.4	21.4	21.4
PCS 1900	30	30	30
GPRS 1 TX Slot	29.6	29.6	29.6
GPRS 2 TX Slot	28.2	28.2	28.2
GPRS 3 TX Slot	26.6	26.6	26.6
GPRS 4 TX Slot	25.2	25.2	25.2
EDGE 1 TX Slot	25.6	25.6	25.6
EDGE 2 TX Slot	24	24	24
EDGE 3 TX Slot	22.6	22.6	22.6
EDGE 4 TX Slot	21.2	21.2	21.2
WCDMA850	22.8	22.8	22.8
HSDPA	21.9	21.9	21.9
HSUPA	21.7	21.7	21.7
DC-HSDPA	21.7	21.7	21.7
HSPA+	21.5	21.5	21.5
WCDMA1700	22.7	22.7	22.7
HSDPA	21.6	21.6	21.6
HSUPA	21.6	21.6	21.6
DC-HSDPA	21.6	21.6	21.6
HSPA+	21.4	21.4	21.4
WCDMA1900	22.8	22.8	22.8
HSDPA	21.7	21.7	21.7
HSUPA	21.8	21.8	21.8
DC-HSDPA	21.6	21.6	21.6
HSPA+	21.4	21.4	21.4
LTE Band 2	23	23	23
LTE Band 4	23.8	23.8	23.8
LTE Band 17	23.2	23.2	23.2
WLAN	15.1	15.1	15.1
Bluetooth BDR/EDR	2.9	2.9	2.9
Bluetooth LE	-4.3	-4.3	-4.3

Note: for the LTE Band 17 SAR test, please refer to the report: RDG150731006-20, which was issued by Bay Area Compliance Laboratories Corp. (Shenzhen)

Test Results:**GSM:**

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)
GSM 850	128	824.2	32.9
	190	836.6	33.04
	251	848.8	32.81
PCS 1900	512	1850.2	29.51
	661	1880	29.63
	810	1909.8	29.91

GPRS:

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			1 slot	2 slots	3 slots	4 slots
GSM 850	128	824.2	32.81	31.81	30.35	29.29
	190	836.6	32.33	31.32	29.77	28.78
	251	848.8	32.62	31.57	29.93	29.01
PCS 1900	512	1850.2	28.97	27.63	26.23	24.49
	661	1880	28.94	27.71	26.16	24.53
	810	1909.8	29.45	28.07	26.51	25.09

EGPRS:

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			1 slot	2 slots	3 slots	4 slots
GSM 850	128	824.2	26.38	24.98	22.52	21.07
	190	836.6	25.88	25.31	22.97	21.31
	251	848.8	26.33	24.95	22.64	21.23
PCS 1900	512	1850.2	25.34	23.86	22.3	21
	661	1880	24.79	23.36	21.95	20.63
	810	1909.8	25.47	23.91	22.47	21.08

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	23.81	25.81	26.1	26.29
	190	836.6	23.33	25.32	25.52	25.78
	251	848.8	23.62	25.57	25.68	26.01
PCS 1900	512	1850.2	19.97	21.63	21.98	21.49
	661	1880	19.94	21.71	21.91	21.53
	810	1909.8	20.45	22.07	22.26	22.09

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	17.38	18.98	18.27	18.07
	190	836.6	16.88	19.31	18.72	18.31
	251	848.8	17.33	18.95	18.39	18.23
PCS 1900	512	1850.2	16.34	17.86	18.05	18
	661	1880	15.79	17.36	17.7	17.63
	810	1909.8	16.47	17.91	18.22	18.08

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).
4. According to KDB941225D06-SAR for EGPRS mode are not required when the source-based time-averaged output power for data mode is lower than that in the normal GPRS mode

WCDMA:**Results (12.2kbps RMC)**

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)
WCDMA 850	4132	826.4	22.7
	4183	836.6	22.74
	4233	846.6	22.67
WCDMA 1700	1313	1712.6	22.28
	1450	1740	22.4
	1512	1752.4	22.55
WCDMA 1900	9262	1852.4	22.53
	9400	1880	22.74
	9538	1907.6	22.56

Results (HSDPA)

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			Subset 1	Subset 2	Subset 3	Subset 4
WCDMA 850	4132	826.4	21.57	21.5	21.54	21.47
	4183	836.6	21.78	21.7	21.75	21.69
	4233	846.6	21.63	21.6	21.53	21.55
WCDMA 1700	1313	1712.6	21.23	21.2	21.29	21.28
	1450	1740	21.49	21.51	21.43	21.46
	1512	1752.4	21.34	21.3	21.38	21.4
WCDMA 1900	9262	1852.4	21.29	21.24	21.3	21.37
	9400	1880	21.59	21.53	21.5	21.57
	9538	1907.6	21.41	21.45	21.43	21.52

Results (HSUPA)

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)				
			Subset 1	Subset 2	Subset 3	Subset 4	Subset 5
WCDMA 850	4132	826.4	21.41	21.45	21.4	21.36	21.31
	4183	836.6	21.56	21.63	21.6	21.54	21.57
	4233	846.6	21.49	21.43	21.4	21.48	21.46
WCDMA1700	1313	1712.6	21.35	21.3	21.29	21.22	21.19
	1450	1740	21.53	21.5	21.41	21.48	21.43
	1512	1752.4	21.47	21.43	21.39	21.31	21.35
WCDMA1900	9262	1852.4	21.42	21.35	21.39	21.31	21.33
	9400	1880	21.69	21.63	21.6	21.64	21.58
	9538	1907.6	21.56	21.5	21.49	21.4	21.46

Results (DC-HSDPA):

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			Subset 1	Subset 2	Subset 3	Subset 4
WCDMA 850	4132	826.4	21.33	21.28	21.24	21.29
	4183	836.6	21.5	21.52	21.55	21.48
	4233	846.6	21.41	21.36	21.32	21.37
WCDMA 1700	1313	1712.6	21.24	21.16	21.1	21.13
	1450	1740	21.45	21.4	21.37	21.34
	1512	1752.4	21.28	21.21	21.26	21.2
WCDMA 1900	9262	1852.4	21.27	21.23	21.29	21.24
	9400	1880	21.5	21.44	21.47	21.43
	9538	1907.6	21.37	21.39	21.33	21.35

Results (HSPA+)

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)
WCDMA 850	4132	826.4	21.1
	4183	836.6	21.35
	4233	846.6	21.24
WCDMA 1700	1313	1712.6	21.06
	1450	1740	21.29
	1512	1752.4	21.14
WCDMA 1900	9262	1852.4	21.17
	9400	1880	21.31
	9538	1907.6	21.29

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 2:

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	22.73	22.54	22.59
		1#3	22.96	22.34	22.61
		1#5	22.88	22.46	22.57
		3#0	22.37	22.12	22.03
		3#1	22.28	22.39	22.11
		3#3	22.15	22.21	22.06
		6#0	21.37	21.18	21.31
	16-QAM	1#0	22.50	21.99	22.19
		1#3	22.59	22.15	21.97
		1#5	22.47	21.99	21.91
		3#0	21.88	21.48	21.61
		3#1	21.72	21.56	21.76
		3#3	21.84	21.69	21.70
		6#0	21.09	21.05	21.07
3M	QPSK	1#0	22.59	22.32	22.69
		1#7	22.62	22.57	22.41
		1#14	22.40	22.48	22.23
		8#0	22.07	22.17	22.07
		8#4	22.05	22.06	22.05
		8#7	22.00	21.99	21.97
		15#0	21.19	21.22	21.14
	16-QAM	1#0	22.48	22.09	21.91
		1#7	22.56	21.94	21.80
		1#14	22.49	21.97	21.96
		8#0	21.80	21.58	21.62
		8#4	21.99	21.43	21.53
		8#7	21.84	21.69	21.65
		15#0	20.98	20.95	20.83
5M	QPSK	1#0	22.98	22.37	22.62
		1#12	22.81	22.11	22.10
		1#24	22.61	20.23	22.25
		12#0	21.71	21.74	21.58
		12#6	21.88	21.57	21.86
		12#11	21.57	21.50	21.68
		25#0	21.03	21.06	21.02
	16-QAM	1#0	21.90	21.63	21.96
		1#12	22.03	21.39	21.82
		1#24	21.26	21.36	21.86
		12#0	21.65	21.40	21.17
		12#6	21.54	21.63	21.39
		12#11	21.49	21.14	21.24
		25#0	20.70	20.76	20.70
10M	QPSK	1#0	22.64	22.27	22.18
		1#24	22.79	22.09	22.20
		1#49	22.53	22.24	22.34

			25#0	21.90	21.57	21.65
			25#12	22.04	21.65	21.76
			25#24	22.01	21.56	21.70
			50#0	21.42	20.91	21.05
		16-QAM	1#0	22.41	22.01	21.90
			1#24	22.33	21.99	21.86
			1#49	21.27	21.86	21.74
			25#0	21.81	21.54	21.17
			25#12	21.60	21.63	21.29
			25#24	20.73	20.84	21.11
			50#0	20.65	20.57	20.20
	15M	QPSK	1#0	22.38	22.37	22.44
			1#37	22.41	22.43	22.37
			1#74	22.16	22.42	22.71
			36#0	21.83	21.94	21.95
			36#17	21.78	22.01	21.86
			36#35	21.65	22.09	22.09
			75#0	21.64	20.87	21.00
		16-QAM	1#0	22.26	21.68	21.86
			1#37	22.31	21.51	21.67
			1#74	22.20	21.53	21.75
			36#0	21.53	20.64	20.94
			36#17	21.65	20.96	21.07
			36#35	21.49	20.71	20.93
			75#0	20.74	20.26	20.23
	20M	QPSK	1#0	22.46	21.96	22.13
			1#49	22.58	22.11	22.58
			1#99	22.42	22.27	22.30
			50#0	21.85	21.42	21.96
			50#24	21.61	21.52	22.00
			50#49	22.76	21.63	21.83
			100#0	21.50	20.89	21.06
		16-QAM	1#0	22.05	21.88	21.93
			1#49	22.11	21.74	21.80
			1#99	22.09	21.79	21.99
			50#0	21.41	20.99	21.13
			50#24	21.30	21.13	21.21
			50#49	21.24	21.15	21.09
			100#0	20.47	20.58	20.46

LTE Band 4:

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	23.61	23.25	23.01
		1#3	23.35	23.28	23.03
		1#5	23.12	23.30	22.96
		3#0	22.51	22.30	22.47
		3#1	22.59	22.56	22.16

			3#3	22.40	22.44	22.30
			6#0	21.92	21.99	21.76
		16-QAM	1#0	22.50	22.26	22.47
			1#3	22.63	22.44	22.20
			1#5	22.42	22.73	22.29
			3#0	21.75	21.63	21.59
			3#1	21.36	21.37	21.42
			3#3	21.48	21.71	21.38
			6#0	21.98	20.87	20.88
	3M	QPSK	1#0	23.64	23.13	22.88
			1#7	23.70	23.50	22.71
			1#14	23.52	23.23	23.03
			8#0	22.99	22.64	22.10
			8#4	22.68	22.53	22.31
			8#7	22.74	22.48	22.24
			15#0	22.09	22.08	21.62
		16-QAM	1#0	22.59	22.46	22.41
			1#7	22.33	22.63	22.55
			1#14	22.47	22.57	22.29
			8#0	21.53	21.70	21.33
			8#4	21.60	21.46	21.24
			8#7	21.67	21.53	21.19
			15#0	20.75	20.93	20.68
	5M	QPSK	1#0	23.10	23.03	22.89
			1#12	23.34	22.94	22.70
			1#24	23.21	22.96	22.97
			12#0	22.46	22.56	22.26
			12#6	22.74	22.39	22.38
			12#11	22.53	22.46	22.13
			25#0	22.03	21.84	21.59
		16-QAM	1#0	22.54	22.54	22.23
			1#12	22.73	22.37	22.43
			1#24	22.59	22.85	22.18
			12#0	21.71	21.55	21.21
			12#6	21.39	21.72	21.39
			12#11	21.45	21.76	21.16
			25#0	20.87	21.04	20.87
	10M	QPSK	1#0	23.40	22.90	22.24
			1#24	23.13	23.13	22.51
			1#49	23.04	23.01	22.29
			25#0	22.36	22.51	21.83
			25#12	22.55	22.66	22.06
			25#24	22.40	22.64	22.01
			50#0	22.00	21.95	21.38
		16-QAM	1#0	22.75	22.27	22.16
			1#24	22.54	22.15	22.13
			1#49	22.42	22.37	22.20
			25#0	21.65	21.92	21.39
			25#12	21.83	21.90	21.63
			25#24	21.88	21.98	21.70

		50#0	20.57	21.09	20.78
15M	QPSK	1#0	23.58	23.36	22.55
		1#37	23.55	23.37	22.72
		1#74	23.47	23.24	22.80
		36#0	22.49	22.69	21.62
		36#17	22.60	22.49	21.58
		36#35	22.73	22.58	21.76
		75#0	22.03	21.95	21.16
	16-QAM	1#0	22.54	22.24	22.43
		1#37	22.70	22.43	22.15
		1#74	22.53	22.12	21.96
		36#0	21.61	21.75	21.68
		36#17	21.50	21.80	21.51
		36#35	21.44	21.73	21.48
		75#0	20.63	21.10	20.90
20M	QPSK	1#0	23.72	23.51	22.75
		1#49	23.03	23.23	22.40
		1#99	23.22	23.35	22.57
		50#0	22.74	22.59	21.89
		50#24	22.39	22.21	22.03
		50#49	22.52	21.89	21.99
		100#0	21.90	21.10	21.02
	16-QAM	1#0	22.54	22.13	21.92
		1#49	22.45	22.30	22.14
		1#99	22.33	22.33	22.32
		50#0	21.63	21.49	21.15
		50#24	21.60	21.35	21.16
		50#49	21.58	21.38	21.43
		100#0	20.98	21.09	20.50

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 $> \frac{1}{2}$ 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 No.	Channel frequency (MHz)	RF Output Power (dBm)
BDR(GFSK)	0	2402	1.1
	39	2441	2.82
	78	2480	-0.55
EDR(4-DQPSK)	0	2402	-0.09
	39	2441	1.57
	78	2480	-1.58
EDR(8-DPSK)	0	2402	0.07
	39	2441	1.69
	78	2480	-1.53
Bluetooth LE	0	2402	-5.59
	19	2440	-4.41
	39	2480	-7.2

WLAN

Mode	Channel No.	Channel frequency (MHz)	RF Output Power (dBm)
802.11b	1	2412	14.86
	6	2437	15.01
	11	2462	14.74
802.11g	1	2412	12.02
	6	2437	11.40
	11	2462	11.84
802.11n HT20	1	2412	11.74
	6	2437	11.89
	11	2462	11.65
802.11n HT40	3	2422	11.46
	6	2437	11.52
	9	2452	11.41

Note:

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 0cm 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:	22.5-23 °C	21.5-22.5 °C	22-23.5 °C
Relative Humidity:	32-33 %	30-31 %	30 %
ATM Pressure:	1003 mbar	1004 mbar	1007 mbar
Test Date:	2015-09-15	2015-09-16	2015-09-17

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	-0.13	32.9	33.1	1.047	0.023	0.024	/
	836.6	GSM	0.14	33.04	33.1	1.014	0.025	0.025	1#
	848.8	GSM	-0.12	32.81	33.1	1.069	0.022	0.024	/
Body-Back-Headset (0mm)	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	0.02	33.04	33.1	1.014	0.512	0.519	/
	848.8	GSM	/	/	/	/	/	/	/
Body-Back (0mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	0.07	29.29	29.4	1.026	0.613	0.629	/
	848.8	GPRS	/	/	/	/	/	/	/
Body-Left (0mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	-0.18	29.29	29.4	1.026	0.211	0.216	/
	848.8	GPRS	/	/	/	/	/	/	/
Body-Right (0mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	0.18	29.29	29.4	1.026	0.106	0.109	/
	848.8	GPRS	/	/	/	/	/	/	/
Body-Bottom (0mm)	824.2	GPRS	-0.05	29.29	29.4	1.026	1.24	1.272	2#
	836.6	GPRS	0.05	28.78	29.4	1.153	1.03	1.188	/
	848.8	GPRS	0.00	29.01	29.4	1.094	1.01	1.105	/

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, 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 $> \frac{1}{2}$ 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	0.04	29.51	30	1.119	0.0235	0.026	/
	1880	GSM	0.03	29.63	30	1.089	0.024	0.026	/
	1909.8	GSM	-0.12	29.91	30	1.021	0.028	0.029	4#
Body-Back-Headset (0mm)	1850.2	GSM	/	/	/	/	/	/	
	1880	GSM	-0.07	29.63	30	1.089	0.223	0.243	/
	1909.8	GSM	/	/	/	/	/	/	/
Body-Back (0mm)	1850.2	GPRS	/	/	/	/	/	/	/
	1880.0	GPRS	0.01	26.16	26.6	1.107	0.279	0.309	/
	1909.8	GPRS	/	/	/	/	/	/	/
Body-Left (0mm)	1850.2	GPRS	/	/	/	/	/	/	/
	1880.0	GPRS	-0.01	26.16	26.6	1.107	0.162	0.179	/
	1909.8	GPRS	/	/	/	/	/	/	/
Body-Right (0mm)	1850.2	GPRS	/	/	/	/	/	/	/
	1880.0	GPRS	-0.07	26.16	26.6	1.107	0.087	0.096	/
	1909.8	GPRS	/	/	/	/	/	/	/
Body-Bottom (0mm)	1850.2	GPRS	-0.03	26.23	26.6	1.089	0.643	0.7	/
	1880.0	GPRS	-0.08	26.16	26.6	1.107	0.625	0.692	/
	1909.8	GPRS	0.03	26.51	26.6	1.021	0.686	0.7	4#

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, 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 $> \frac{1}{2}$ 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, 2DL+3UL 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	0.17	22.7	22.8	1.023	0.0275	0.028	/
	836.6	RMC	0.05	22.74	22.8	1.014	0.029	0.029	5#
	846.6	RMC	0.01	22.67	22.8	1.03	0.0262	0.027	/
Body-Back (0mm)	826.4	RMC	/	/	/	/	/	/	/
	836.6	RMC	0.04	22.74	22.8	1.014	0.256	0.26	/
	846.6	RMC	/	/	/	/	/	/	/
Body-Left (0mm)	826.4	RMC	/	/	/	/	/	/	/
	836.6	RMC	0.09	22.74	22.8	1.014	0.123	0.125	/
	846.6	RMC	/	/	/	/	/	/	/
Body-Right (0mm)	826.4	RMC	/	/	/	/	/	/	/
	836.6	RMC	-0.17	22.74	22.8	1.014	0.0752	0.076	/
	846.6	RMC	/	/	/	/	/	/	/
Body-Bottom (0mm)	826.4	RMC	-0.12	22.7	22.8	1.023	0.682	0.698	/
	836.6	RMC	0.14	22.74	22.8	1.014	0.706	0.716	6#
	846.6	RMC	-0.01	22.67	22.8	1.03	0.664	0.684	/

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, 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 $\frac{1}{4}$ 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 1700 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	1712.6	RMC	-0.18	22.28	22.7	1.102	0.0284	0.031	/
	1732.6	RMC	0.12	22.4	22.7	1.072	0.03	0.032	/
	1752.4	RMC	-0.2	22.55	22.7	1.035	0.0315	0.033	7#
Body-Back (0mm)	1712.6	RMC	/	/	/	/	/	/	/
	1732.6	RMC	/	/	/	/	/	/	/
	1752.4	RMC	0.05	22.55	22.7	1.035	0.332	0.344	/
Body-Left (0mm)	1712.6	RMC	/	/	/	/	/	/	/
	1732.6	RMC	/	/	/	/	/	/	/
	1752.4	RMC	0.02	22.55	22.7	1.035	0.214	0.221	/
Body-Right (0mm)	1712.6	RMC	/	/	/	/	/	/	/
	1732.6	RMC	/	/	/	/	/	/	/
	1752.4	RMC	0.05	22.55	22.7	1.035	0.065	0.067	/
Body-Bottom (0mm)	1712.6	RMC	0.04	22.28	22.7	1.102	0.689	0.759	/
	1732.6	RMC	0.06	22.4	22.7	1.072	0.704	0.755	/
	1752.4	RMC	0.06	22.55	22.7	1.035	0.735	0.761	8#

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, 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 $\frac{1}{4}$ 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	-0.01	22.53	22.8	1.064	0.0483	0.051	/
	1880	RMC	0.11	22.74	22.8	1.014	0.051	0.052	9#
	1907.6	RMC	0.15	22.56	22.8	1.057	0.049	0.052	/
Body-Back (0mm)	1852.4	RMC	/	/	/	/	/	/	/
	1880.0	RMC	0.14	22.74	22.8	1.014	0.288	0.292	/
	1907.6	RMC	/	/	/	/	/	/	/
Body-Left (0mm)	1852.4	RMC	/	/	/	/	/	/	/
	1880.0	RMC	0.14	22.74	22.8	1.014	0.192	0.195	/
	1907.6	RMC	/	/	/	/	/	/	/
Body-Right (0mm)	1852.4	RMC	/	/	/	/	/	/	/
	1880.0	RMC	-0.11	22.74	22.8	1.014	0.103	0.104	/
	1907.6	RMC	/	/	/	/	/	/	/
Body-Bottom (0mm)	1852.4	RMC	0.01	22.53	22.8	1.064	0.72	0.766	/
	1880.0	RMC	0.1	22.74	22.8	1.014	0.79	0.801	10#
	1907.6	RMC	0	22.56	22.8	1.057	0.732	0.774	/

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, 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 $\frac{1}{4}$ 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 2:

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	1860	20	1RB	0.11	22.58	23	1.102	0.0451	0.05	/
	1880	20	1RB	-0.02	22.11	23	1.227	0.036	0.044	/
	1900	20	1RB	0.17	22.58	23	1.102	0.05	0.055	11#
	1900	20	50%RB	-0.06	21.83	23	1.309	0.38	0.497	/
Body-Back (0mm)	1860	20	1RB	/	/	/	/	/	/	/
	1880	20	1RB	/	/	/	/	/	/	/
	1900	20	1RB	-0.1	22.58	23	1.102	0.223	0.246	/
	1900	20	50%RB	0.02	21.83	23	1.309	0.174	0.228	/
Body-Left (0mm)	1860	20	1RB	/	/	/	/	/	/	/
	1880	20	1RB	/	/	/	/	/	/	/
	1900	20	1RB	0.12	22.58	23	1.102	0.115	0.127	/
	1900	20	50%RB	-0.06	21.83	23	1.309	0.0945	0.124	/
Body-Right (0mm)	1860	20	1RB	/	/	/	/	/	/	/
	1880	20	1RB	/	/	/	/	/	/	/
	1900	20	1RB	-0.03	22.58	23	1.102	0.076	0.084	/
	1900	20	50%RB	-0.14	21.83	23	1.309	0.0612	0.08	/
Body-Bottom (0mm)	1860	20	1RB	0.04	22.58	23	1.102	0.715	0.788	/
	1880	20	1RB	0.18	22.11	23	1.227	0.633	0.777	/
	1900	20	1RB	-0.01	22.58	23	1.102	0.761	0.839	12#
	1900	20	50%RB	-0.18	21.83	23	1.309	0.564	0.738	/

LTE Band 4:

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	1720	20	1RB	0.03	23.72	23.8	1.019	0.022	0.022	13#
	1732.5	20	1RB	-0.1	23.51	23.8	1.069	0.0203	0.022	/
	1745	20	1RB	-0.15	22.75	23.8	1.274	0.0132	0.017	/
	1720	20	50%RB	0.04	22.99	23.8	1.205	0.015	0.018	/
Body-Back (0mm)	1720	20	1RB	0.03	23.72	23.8	1.019	0.593	0.604	/
	1732.5	20	1RB	/	/	/	/	/	/	/
	1745	20	1RB	/	/	/	/	/	/	/
	1720	20	50%RB	-0.12	22.99	23.8	1.205	0.487	0.587	/
Body-Left (0mm)	1720	20	1RB	-0.09	23.72	23.8	1.019	0.314	0.32	/
	1732.5	20	1RB	/	/	/	/	/	/	/
	1745	20	1RB	/	/	/	/	/	/	/
	1720	20	50%RB	-0.14	22.99	23.8	1.205	0.245	0.295	/
Body-Right (0mm)	1720	20	1RB	-0.12	23.72	23.8	1.019	0.111	0.113	/
	1732.5	20	1RB	/	/	/	/	/	/	/
	1745	20	1RB	/	/	/	/	/	/	/
	1720	20	50%RB	0.14	22.99	23.8	1.205	0.0862	0.104	/
Body-Bottom (0mm)	1720	20	1RB	-0.16	23.72	23.8	1.019	1.06	1.08	14#
	1732.5	20	1RB	0.14	23.51	23.8	1.069	0.862	0.921	/
	1745	20	1RB	-0.14	22.75	23.8	1.274	0.676	0.861	/
	1720	20	50%RB	-0.16	22.99	23.8	1.205	0.855	1.03	/

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, 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 $> \frac{1}{2}$ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is $> 1.45\text{ W/kg}$
4. KDB941225D05- For QPSK with 100% RB allocation, when the reported SAR measured for the Highest output power channel is $< 1.45\text{ W/kg}$, 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 $\leq 0.8\text{ W/kg}$.
6. KDB941225D05- Start with the largest channel bandwidth (20M) 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. Worst case SAR for 50% RB allocation is selected to be tested.

WLAN:

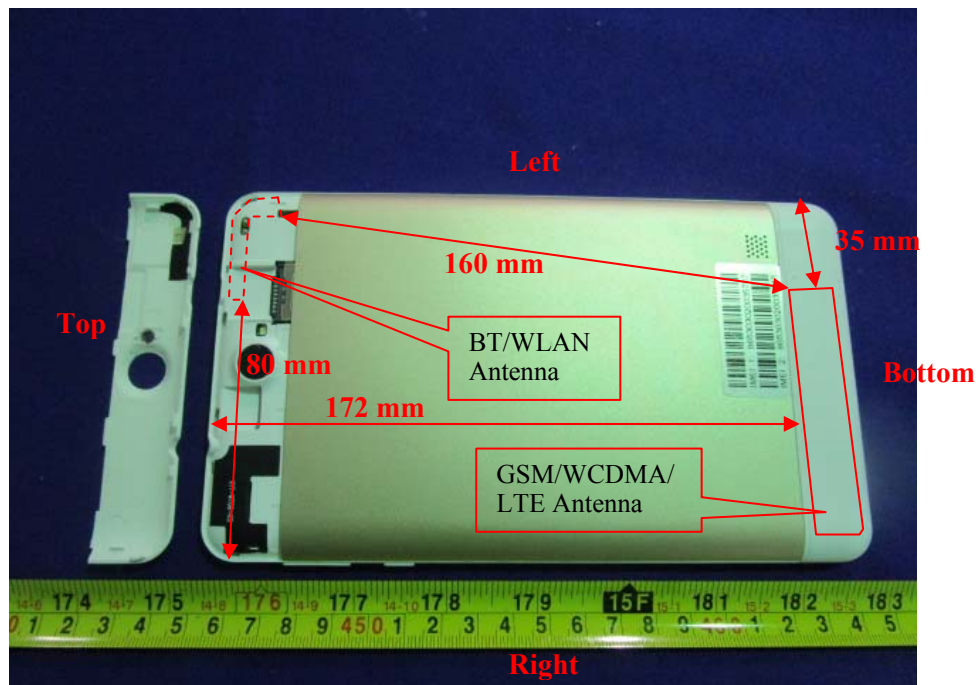
EUT Position	Frequency (MHz)	Test Mode	Power Drift (dB)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Head Flat	2412	802.11b	0.05	14.86	15.1	1.057	0.303	0.32	/
	2437	802.11b	-0.19	15.01	15.1	1.021	0.326	0.333	15#
	2462	802.11b	-0.03	14.74	15.1	1.086	0.292	0.317	/
Body-Back (0mm)	2412	802.11b	-0.05	14.86	15.1	1.057	0.613	0.648	/
	2437	802.11b	-0.14	15.01	15.1	1.021	0.643	0.657	16#
	2462	802.11b	0.13	14.74	15.1	1.086	0.588	0.639	/
Body-Left (0mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	0.17	15.01	15.1	1.021	0.323	0.33	/
	2462	802.11b	/	/	/	/	/	/	/
Body-Top (0mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	0.17	15.01	15.1	1.021	0.219	0.224	
	2462	802.11b	/	/	/	/	/	/	/

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, testing for other channels are optional.
2. 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.

SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

BT/WLAN and GSM/WCDMA/LTE Antennas Location:



Simultaneous Transmission:

Description of Simultaneous Transmit Capabilities			Antennas Distance (mm)
Transmitter Combination	Simultaneous?	Hotspot?	
GSM + WCDMA	×	×	0
GSM+LTE	×	×	0
GSM + Bluetooth	√	×	160
GSM + WLAN	√	√	160
WCDMA + LTE	×	×	0
WCDMA + Bluetooth	√	×	160
WCDMA + WLAN	√	√	160
LTE + Bluetooth	√	×	160
LTE + WLAN	√	√	160

Standalone SAR test exclusion considerations

Mode	Frequency (MHz)	Pavg (dBm)	Pavg (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
Bluetooth	2480	2.9	1.95	0	0.61	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:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot$

$[\sqrt{f(\text{GHz})}] \leq 3.0$ for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

1. $f(\text{GHz})$ 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 (MHz)	Pavg (dBm)	Pavg (mW)	Distance (mm)	Estimated 1-g (W/kg)
BT Head	2480	2.9	1.95	0	0.082
BT Body	2480	2.9	1.95	0	0.082

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:

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

W/kg for test separation distances ≤ 50 mm;

where $x = 7.5$ for 1-g SAR.

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)		Σ SAR < 1.6W/kg
		SAR1	SAR2	
GSM 850+BT	Head Flat	0.025	0.082	0.107
	Body-Back-Headset	0.519	0.082	0.601
	Body-Back	0.629	0.082	0.711
	Body-Left	0.216	0.082	0.298
	Body-Right	0.109	0.082	0.191
	Body-Bottom	1.272	0.082	1.354
PCS 1900+BT	Head Flat	0.029	0.082	0.111
	Body-Back-Headset	0.243	0.082	0.325
	Body-Back	0.309	0.082	0.391
	Body-Left	0.179	0.082	0.261
	Body-Right	0.096	0.082	0.178
	Body-Bottom	0.700	0.082	0.782
WCDMA 850+BT	Head Flat	0.029	0.082	0.111
	Body-Back	0.260	0.082	0.342
	Body-Left	0.125	0.082	0.207
	Body-Right	0.076	0.082	0.158
	Body-Bottom	0.716	0.082	0.798
WCDMA 1700+BT	Head Flat	0.033	0.082	0.115
	Body-Back	0.344	0.082	0.426
	Body-Left	0.221	0.082	0.303
	Body-Right	0.067	0.082	0.149
	Body-Bottom	0.761	0.082	0.843
WCDMA 1900+BT	Head Flat	0.052	0.082	0.134
	Body-Back	0.292	0.082	0.374
	Body-Left	0.195	0.082	0.277
	Body-Right	0.104	0.082	0.186
	Body-Bottom	0.801	0.082	0.883
LTE Band 2 +BT	Head Flat	0.055	0.082	0.137
	Body-Back	0.246	0.082	0.328
	Body-Left	0.127	0.082	0.209
	Body-Right	0.084	0.082	0.166
	Body-Bottom	0.839	0.082	0.921
LTE Band 4 +BT	Head Flat	0.022	0.082	0.104
	Body-Back	0.604	0.082	0.686
	Body-Left	0.320	0.082	0.402
	Body-Right	0.113	0.082	0.195
	Body-Bottom	1.080	0.082	1.162
LTE Band 17 +BT	Head Flat	0.055	0.082	0.137
	Body-Back	0.539	0.082	0.621
	Body-Left	0.097	0.082	0.179
	Body-Right	0.291	0.082	0.373
	Body-Bottom	0.319	0.082	0.401

Mode(SAR1+SAR2)	Position	Reported SAR (W/kg)		Σ SAR < 1.6W/kg
		SAR1	SAR2	
GSM 850+WLAN	Head Flat	0.025	0.333	0.358
GSM 850+WLAN(Hotspot)	Body-Back	0.629	0.657	1.286
	Body-Left	0.216	0.330	0.546
PCS 1900+WLAN	Head Flat	0.029	0.333	0.362
PCS 1900+WLAN(Hotspot)	Body-Back	0.309	0.657	0.966
	Body-Left	0.179	0.330	0.509
WCDMA 850+WLAN	Head Flat	0.029	0.333	0.362
WCDMA 850+WLAN(Hotspot)	Body-Back	0.260	0.657	0.917
	Body-Left	0.125	0.330	0.455
WCDMA 1700+WLAN	Head Flat	0.033	0.333	0.366
WCDMA 1700+WLAN(Hotspot)	Body-Back	0.344	0.657	1.001
	Body-Left	0.221	0.330	0.551
WCDMA 1900+WLAN	Head Flat	0.052	0.333	0.385
WCDMA 1900+WLAN(Hotspot)	Body-Back	0.292	0.657	0.949
	Body-Left	0.195	0.330	0.525
LTE Band 2 +WLAN	Head Flat	0.055	0.333	0.388
LTE Band 2 +WLAN(Hotspot)	Body-Back	0.246	0.657	0.903
	Body-Left	0.127	0.330	0.457
LTE Band 4 +WLAN	Head Flat	0.022	0.333	0.355
LTE Band 4 +WLAN(Hotspot)	Body-Back	0.604	0.657	1.261
	Body-Left	0.320	0.330	0.650
LTE Band 17 +WLAN	Head Flat	0.055	0.333	0.388
LTE Band 17 +WLAN(Hotspot)	Body-Back	0.539	0.657	1.196
	Body-Left	0.097	0.330	0.427

Note:

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

Conclusion:

Σ SAR < 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 Middle Channel

DUT: Dynamics; G8 LTE

Communication System: Generic GSM; Frequency: 836.6 MHz; Duty Cycle: 1: 8

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.892$ S/m; $\epsilon_r = 42.878$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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 Head Flat/Area Scan (81x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0284 W/kg

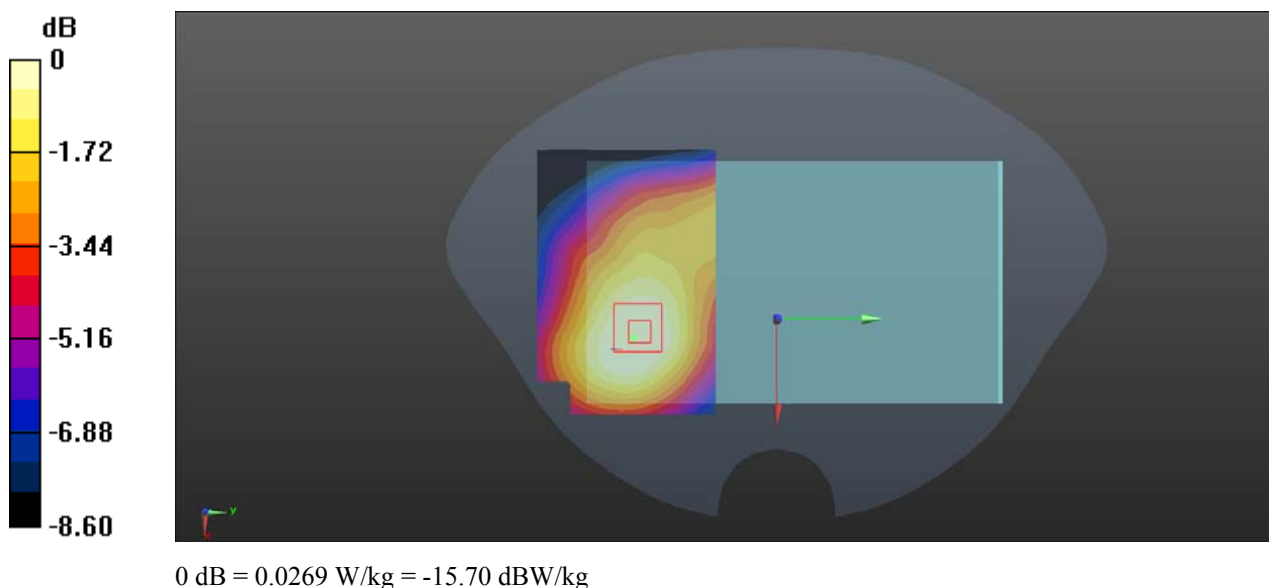
Head/GSM 850 Head Flat/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.463 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 0.0340 W/kg

SAR(1 g) = 0.025 W/kg; SAR(10 g) = 0.018 W/kg

Maximum value of SAR (measured) = 0.0269 W/kg



Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)**Test Plot 2#:GSM 850 Bottom Low Channel****DUT: Dynamics; G8 LTE**

Communication System: Generic GPRS-4 SLOTS; Frequency: 824.2 MHz;Duty Cycle: 1:2

Medium parameters used: $f = 824.2$ MHz; $\sigma = 0.977$ S/m; $\epsilon_r = 55.114$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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 Bottom/Area Scan (81x31x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.62 W/kg

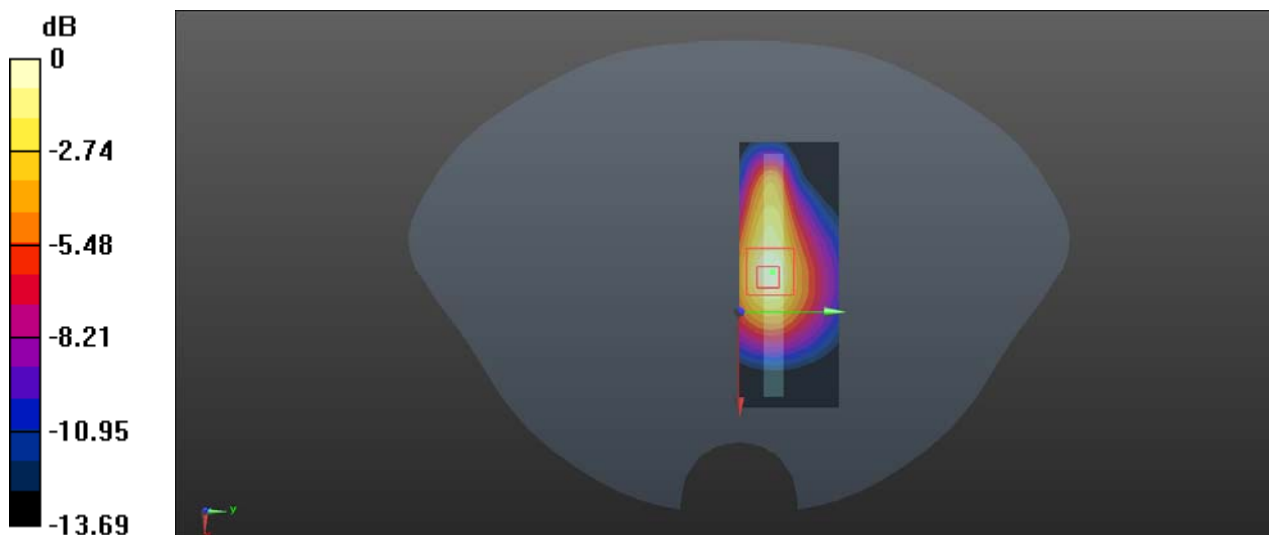
Body/GSM 850 Bottom/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.86 V/m; Power Drift = -0.05 dB

Peak SAR (extrapolated) = 3.26 W/kg

SAR(1 g) = 1.24 W/kg; SAR(10 g) = 0.732 W/kg

Maximum value of SAR (measured) = 1.61 W/kg



0 dB = 1.61 W/kg = 2.07 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)**Test Plot 3#:PCS 1900 Head Flat High Channel****DUT: Dynamics; G8 LTE**

Communication System: Generic GSM; Frequency: 1909.8 MHz;Duty Cycle: 1: 8

Medium parameters used: $f = 1909.8$ MHz; $\sigma = 1.415$ S/m; $\epsilon_r = 39.609$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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 Head Flat/Area Scan (81x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0293 W/kg

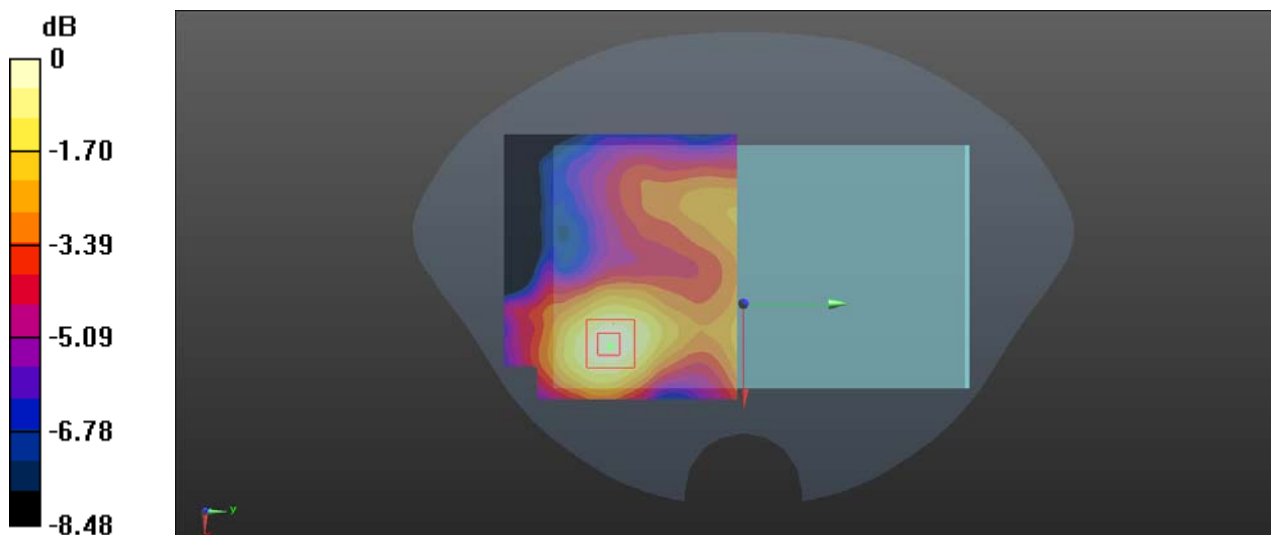
Head/PCS 1900 Head Flat/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.374 V/m; Power Drift = -0.12 dB

Peak SAR (extrapolated) = 0.0460 W/kg

SAR(1 g) = 0.028 W/kg; SAR(10 g) = 0.017 W/kg

Maximum value of SAR (measured) = 0.0304 W/kg



0 dB = 0.0304 W/kg = -15.17 dBW/kg

Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)**Test Plot 4#:PCS 1900 Bottom High Channel****DUT: Dynamics; G8 LTE**

Communication System: Generic GPRS-3 SLOTS; Frequency: 1909.8 MHz;Duty Cycle: 1:2.67

Medium parameters used: $f = 1909.8$ MHz; $\sigma = 1.494$ S/m; $\epsilon_r = 53.38$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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 Bottom/Area Scan (81x31x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.787 W/kg

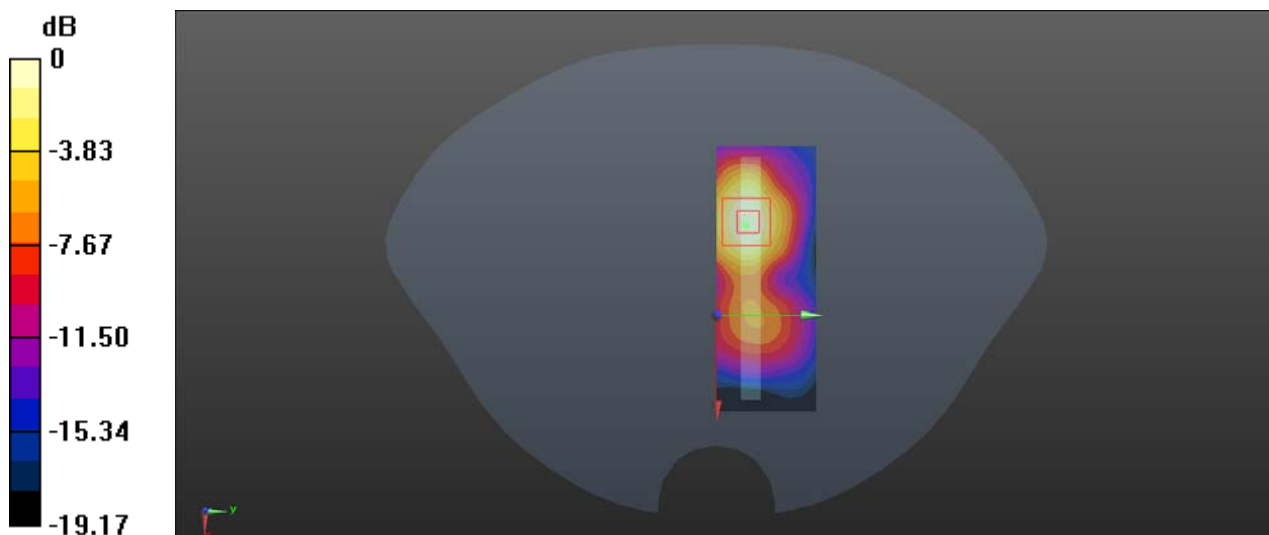
Body/PCS 1900 Bottom/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.397 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 1.33 W/kg

SAR(1 g) = 0.686 W/kg; SAR(10 g) = 0.350 W/kg

Maximum value of SAR (measured) = 0.760 W/kg



0 dB = 0.760 W/kg = -1.19 dBW/kg

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

Test Plot 5#:WCDMA 850 Head Flat Middle Channel

DUT: Dynamics; G8 LTE

Communication System: BAND V; Frequency: 836.6 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.892$ S/m; $\epsilon_r = 42.878$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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 Head Flat/Area Scan (81x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0305 W/kg

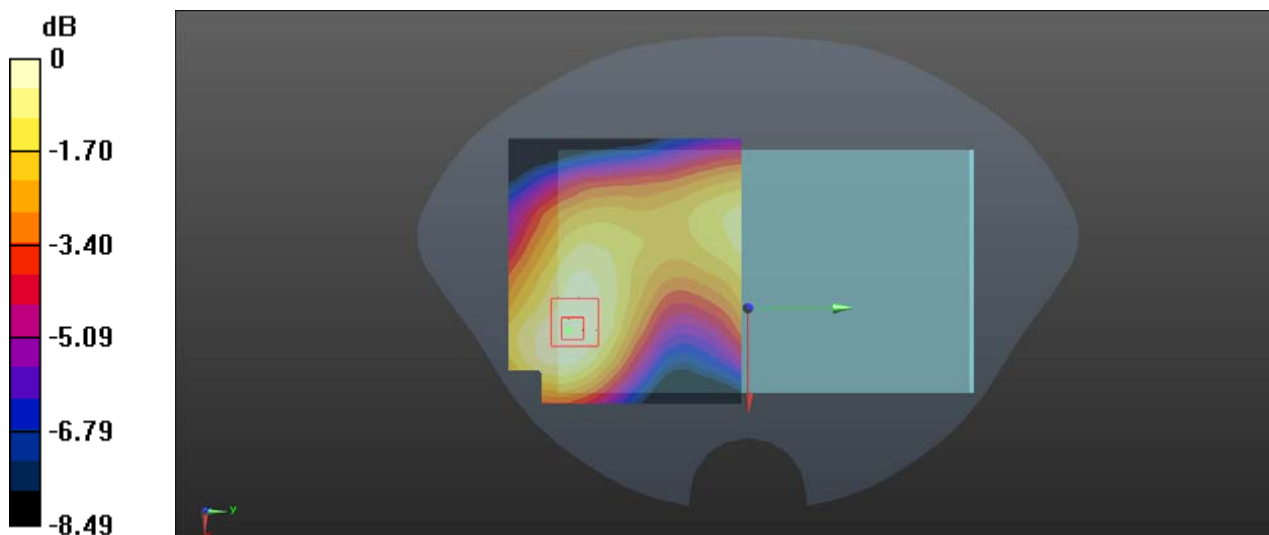
Head/WCDMA 850 Head Flat/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 5.032 V/m; Power Drift = 0.05 dB

Peak SAR (extrapolated) = 0.0400 W/kg

SAR(1 g) = 0.029 W/kg; SAR(10 g) = 0.021 W/kg

Maximum value of SAR (measured) = 0.0309 W/kg



0 dB = 0.0309 W/kg = -15.10 dBW/kg

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

Test Plot 6#:WCDMA 850 Bottom Middle Channel

DUT: Dynamics; G8 LTE

Communication System: BAND V; Frequency: 836.6 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 836.6$ MHz; $\sigma = 0.977$ S/m; $\epsilon_r = 55.114$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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 Bottom/Area Scan (81x31x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.651 W/kg

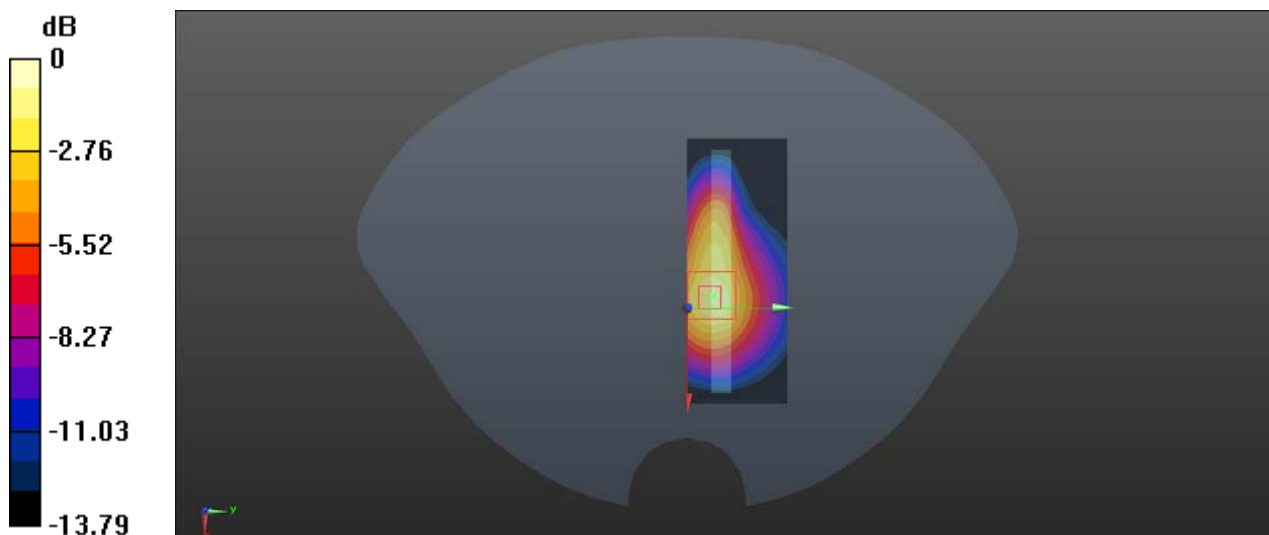
Body/WCDMA 850 Bottom/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 17.42 V/m; Power Drift = 0.14 dB

Peak SAR (extrapolated) = 1.50 W/kg

SAR(1 g) = 0.706 W/kg; SAR(10 g) = 0.368 W/kg

Maximum value of SAR (measured) = 0.795 W/kg



0 dB = 0.795 W/kg = -1.00 dBW/kg

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

Test Plot 7#:WCDMA 1700 Head Flat High Channel

DUT: Dynamics; G8 LTE

Communication System: BAND IV; Frequency: 1752.6 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1752.6$ MHz; $\sigma = 1.377$ S/m; $\epsilon_r = 40.411$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(8.12, 8.12, 8.12); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Head/WCDMA 1700 Head Flat/Area Scan (81x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0378 W/kg

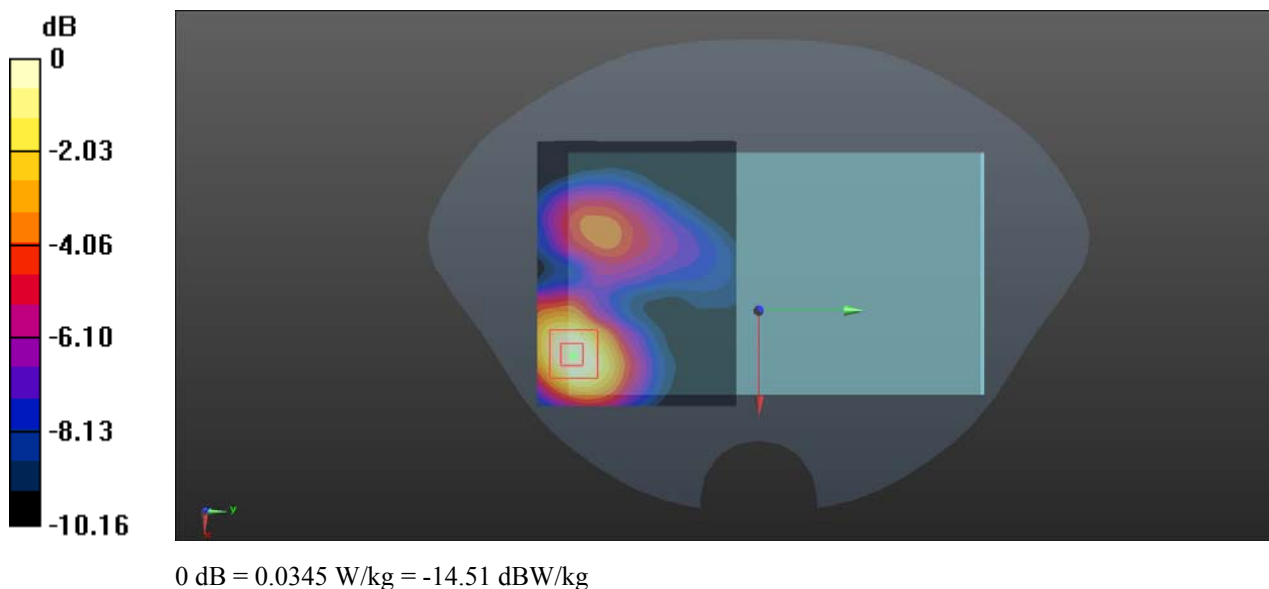
Head/WCDMA 1700 Head Flat/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 2.091 V/m; Power Drift = -0.20 dB

Peak SAR (extrapolated) = 0.0523 W/kg

SAR(1 g) = 0.0315 W/kg; SAR(10 g) = 0.0179 W/kg

Maximum value of SAR (measured) = 0.0345 W/kg



Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)**Test Plot 8#:WCDMA 1700 Bottom High Channel****DUT: Dynamics; G8 LTE**

Communication System: BAND IV; Frequency: 1752.6 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1752.6$ MHz; $\sigma = 1.481$ S/m; $\epsilon_r = 53.442$; $\rho = 1000$ kg/m³

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: 2015/1/26
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Body/ WCDMA 1700 Bottom /Area Scan (81x31x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.11 W/kg

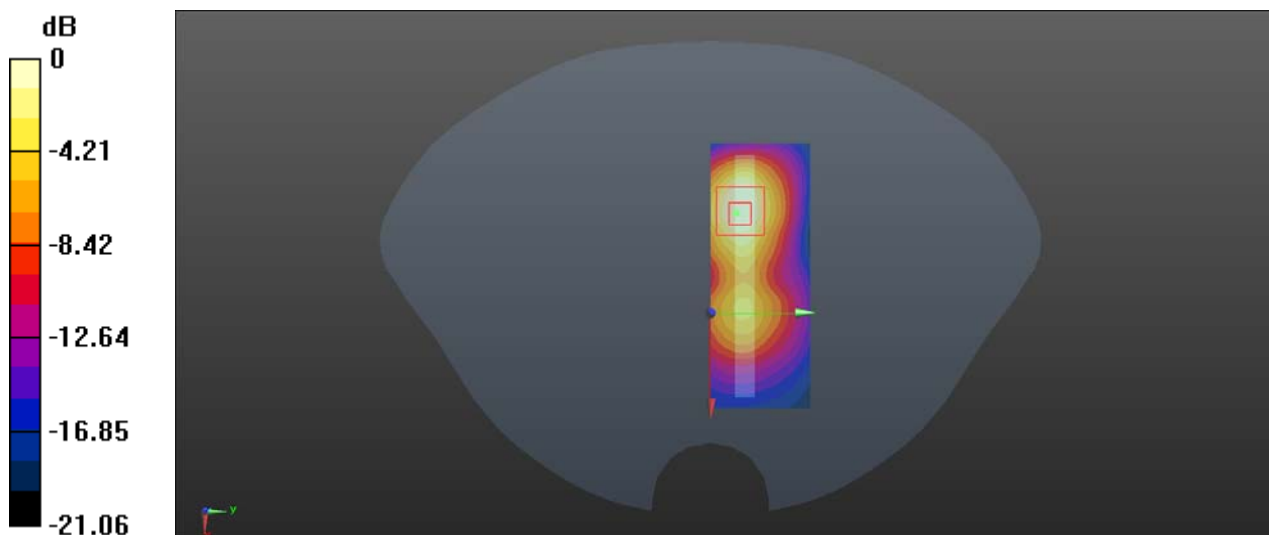
Body/ WCDMA 1700 Bottom /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 1.104 V/m; Power Drift = 0.06 dB

Peak SAR (extrapolated) = 1.50 W/kg

SAR(1 g) = 0.735 W/kg; SAR(10 g) = 0.377 W/kg

Maximum value of SAR (measured) = 0.833 W/kg



0 dB = 0.833 W/kg = -0.79 dBW/kg

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

Test Plot 9#:WCDMA 1900 Head Flat Middle Channel

DUT: Dynamics; G8 LTE

Communication System: BAND II; Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.384$ S/m; $\epsilon_r = 39.772$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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 Head Flat/Area Scan (81x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0557 W/kg

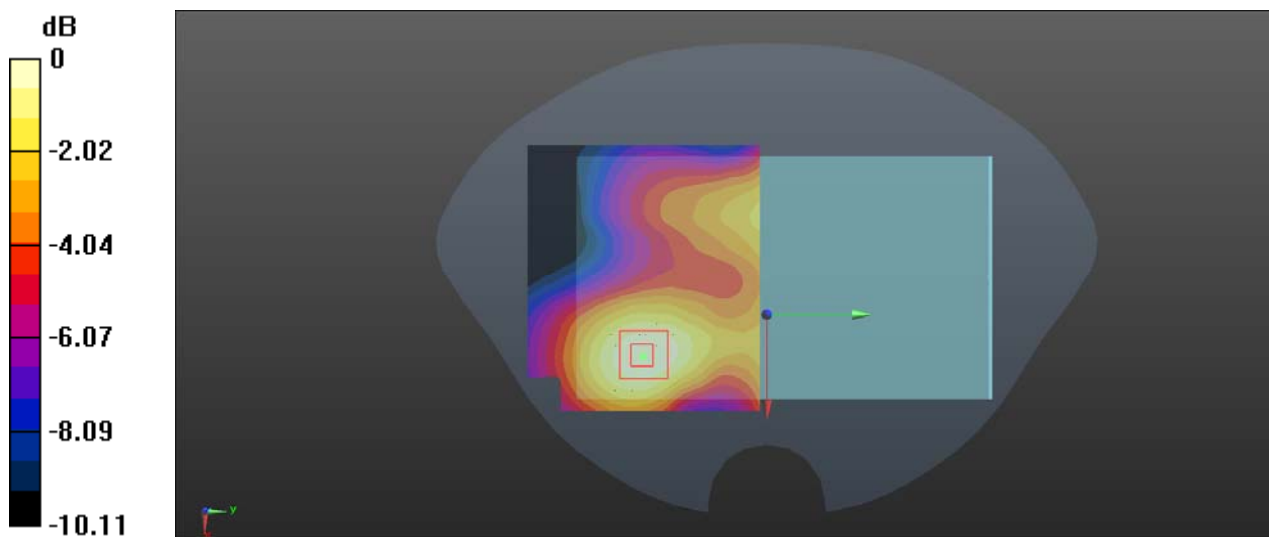
Head/WCDMA 1900 Head Flat/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.406 V/m; Power Drift = 0.11 dB

Peak SAR (extrapolated) = 0.0830 W/kg

SAR(1 g) = 0.051 W/kg; SAR(10 g) = 0.032 W/kg

Maximum value of SAR (measured) = 0.0553 W/kg



0 dB = 0.0553 W/kg = -12.57 dBW/kg

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

Test Plot 10#:WCDMA 1900 Bottom Middle Channel

DUT: Dynamics; G8 LTE

Communication System: BAND II; Frequency: 1880 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1880$ MHz; $\sigma = 1.542$ S/m; $\epsilon_r = 53.726$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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 Bottom/Area Scan (81x31x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.909 W/kg

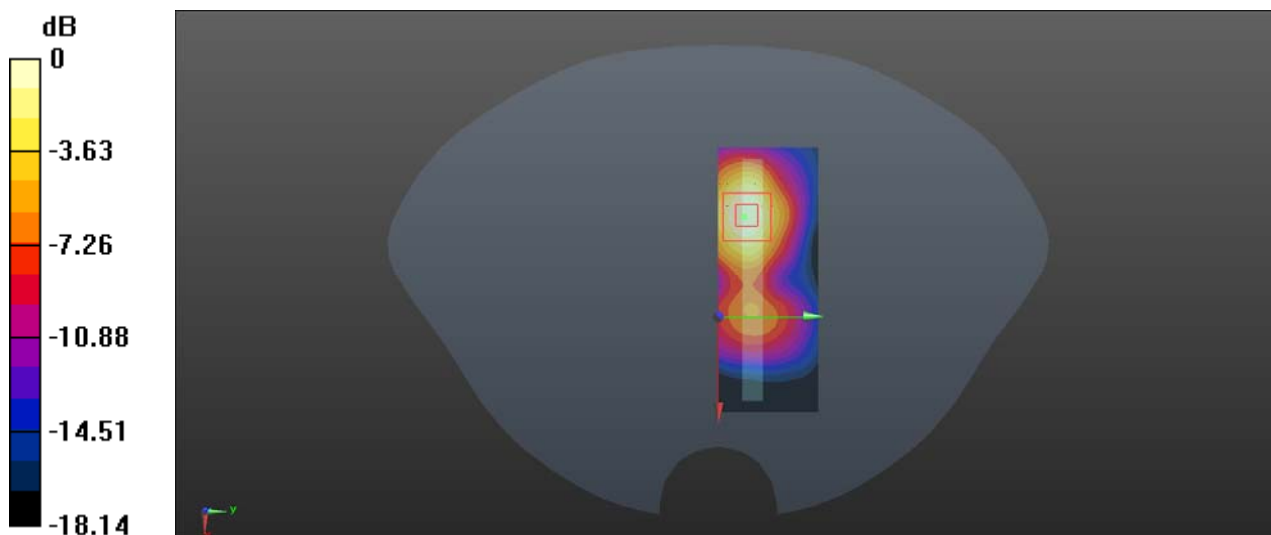
Body/WCDMA 1900 Bottom/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.613 V/m; Power Drift = 0.10 dB

Peak SAR (extrapolated) = 1.54 W/kg

SAR(1 g) = 0.790 W/kg; SAR(10 g) = 0.402 W/kg

Maximum value of SAR (measured) = 0.890 W/kg



0 dB = 0.890 W/kg = -0.51 dBW/kg

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

Test Plot 11#:LTE Band 2 Head Flat High Channel

DUT: Dynamics; G8 LTE

Communication System: Generic LTE; Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.413$ S/m; $\epsilon_r = 39.587$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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 2 Head Flat/Area Scan (81x71x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0538 W/kg

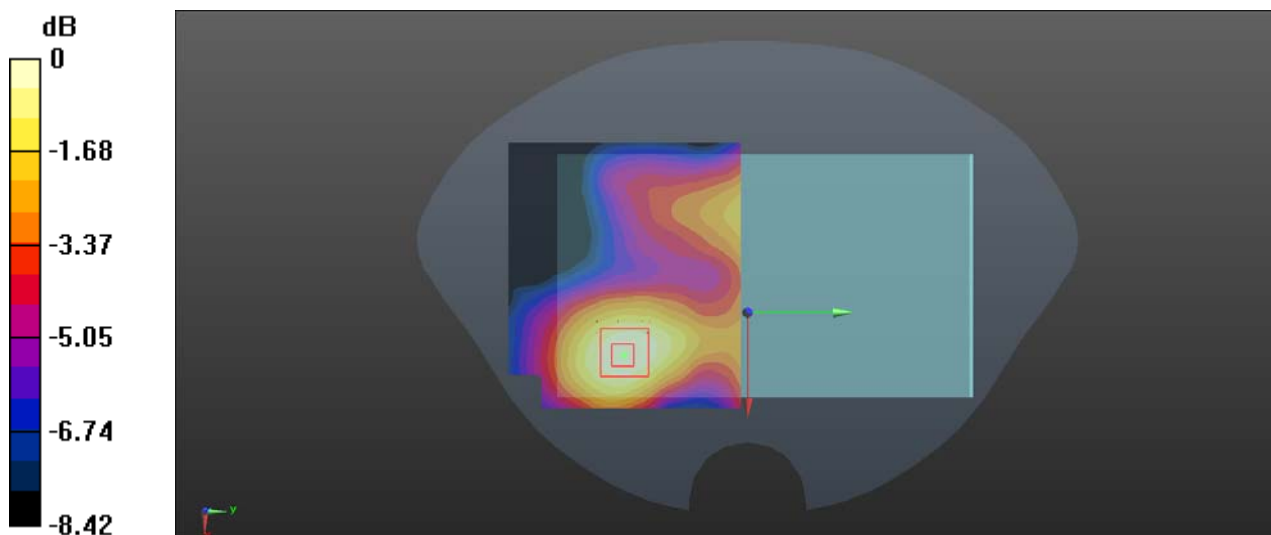
Head/LTE Band 2 Head Flat/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 4.341 V/m; Power Drift = 0.17 dB

Peak SAR (extrapolated) = 0.0820 W/kg

SAR(1 g) = 0.050 W/kg; SAR(10 g) = 0.031 W/kg

Maximum value of SAR (measured) = 0.0534 W/kg



0 dB = 0.0534 W/kg = -12.72 dBW/kg

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

Test Plot 12#:LTE Band 2 Bottom High Channel

DUT: Dynamics; G8 LTE

Communication System: Generic LTE; Frequency: 1900 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1900$ MHz; $\sigma = 1.492$ S/m; $\epsilon_r = 53.614$; $\rho = 1000$ kg/m³

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: 2015/1/26
- 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 2 Bottom/Area Scan (81x31x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.873 W/kg

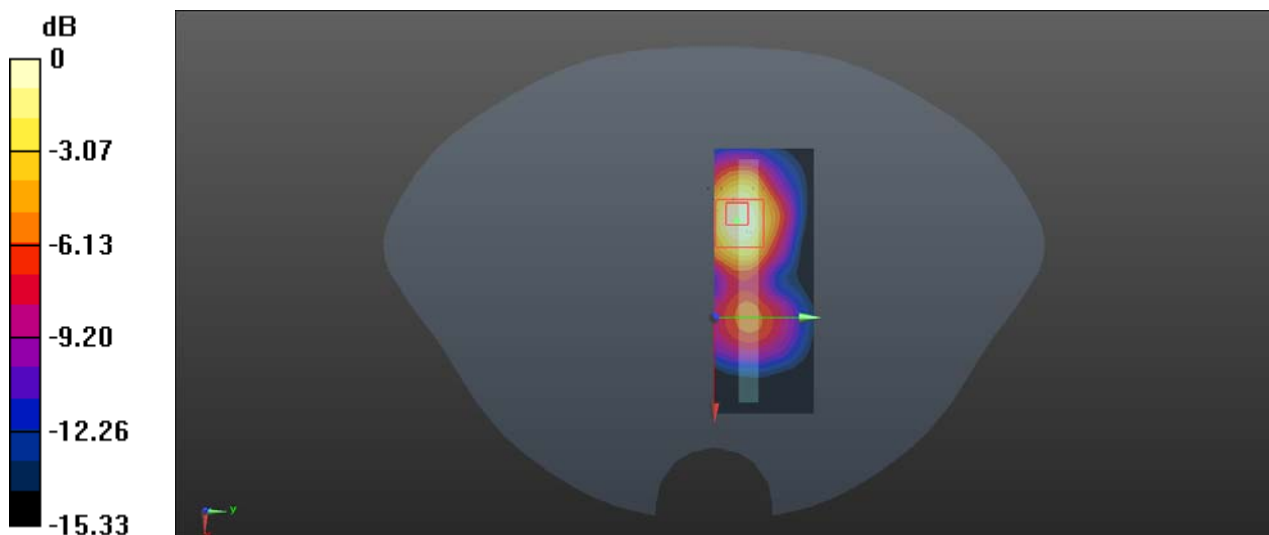
Body/LTE Band 2 Bottom/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 6.674 V/m; Power Drift = -0.01 dB

Peak SAR (extrapolated) = 1.36 W/kg

SAR(1 g) = 0.761 W/kg; SAR(10 g) = 0.373 W/kg

Maximum value of SAR (measured) = 0.845 W/kg



Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)**Test Plot 13#:LTE Band 4 Head Flat Low Channel****DUT: Dynamics; G8 LTE**

Communication System: Generic LTE; Frequency: 1720 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1720$ MHz; $\sigma = 1.37$ S/m; $\epsilon_r = 39.85$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(8.12, 8.12, 8.12); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- 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 4 Head Flat/Area Scan (81x61x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.0232 W/kg

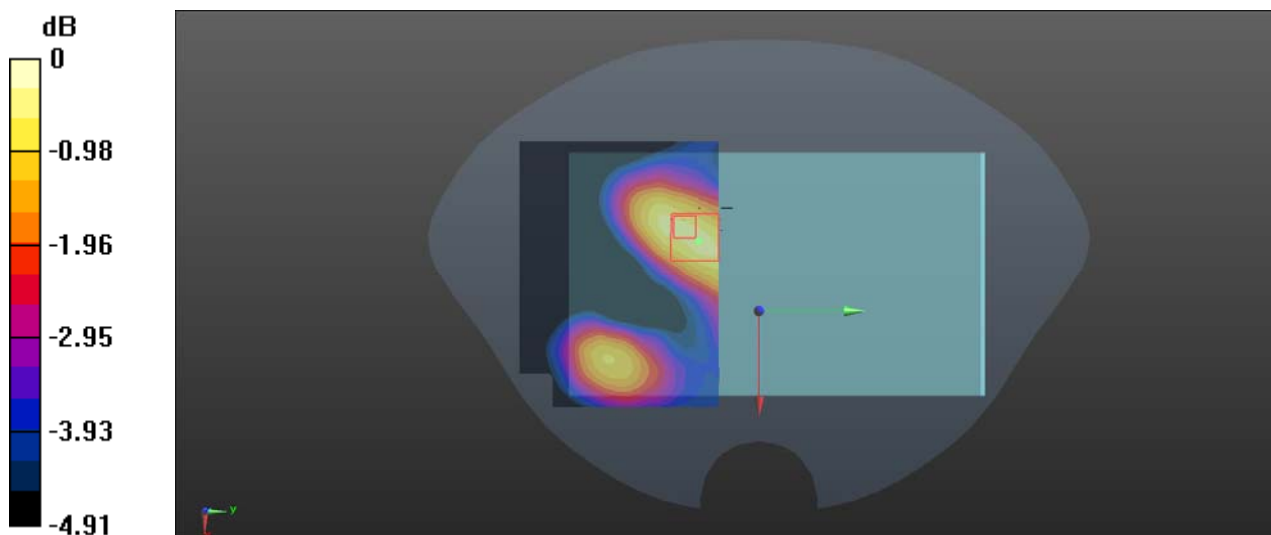
Head/LTE Band 4 Head Flat/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.908 V/m; Power Drift = 0.03 dB

Peak SAR (extrapolated) = 0.0390 W/kg

SAR(1 g) = 0.022 W/kg; SAR(10 g) = 0.014 W/kg

Maximum value of SAR (measured) = 0.0261 W/kg



0 dB = 0.0261 W/kg = -15.83 dBW/kg

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

Test Plot 14#:LTE Band 4 Bottom Low Channel

DUT: Dynamics; G8 LTE

Communication System: Generic LTE; Frequency: 1720 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 1720$ MHz; $\sigma = 1.471$ S/m; $\epsilon_r = 53.501$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.85, 7.85, 7.85); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- 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 4 Bottom/Area Scan (81x31x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 1.26 W/kg

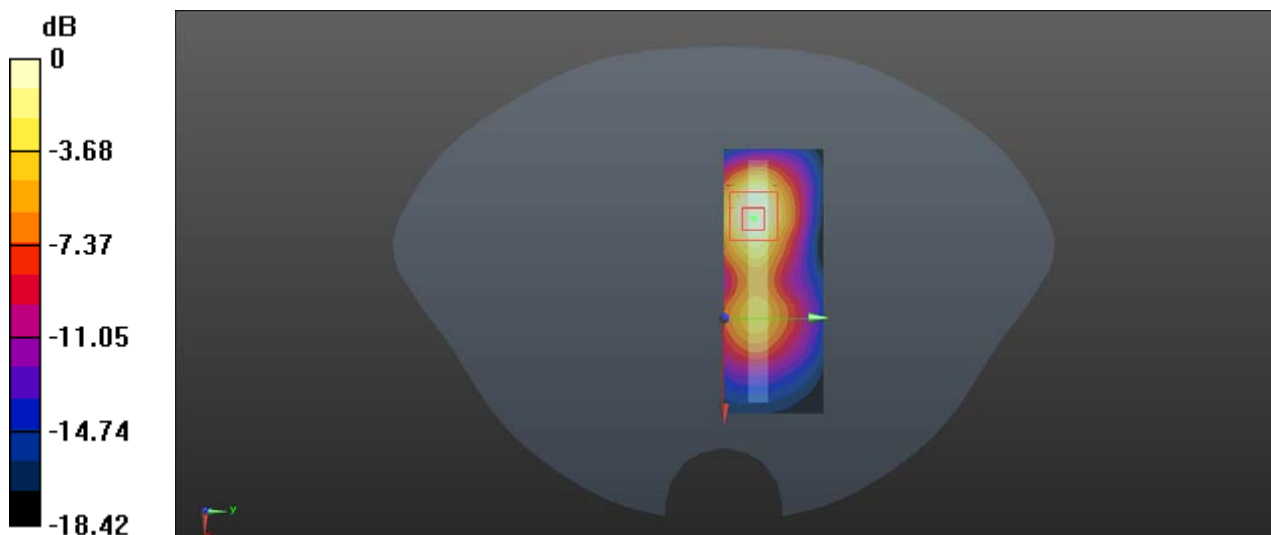
Body/LTE Band 4 Bottom/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 8.222 V/m; Power Drift = -0.16 dB

Peak SAR (extrapolated) = 2.04 W/kg

SAR(1 g) = 1.06 W/kg; SAR(10 g) = 0.535 W/kg

Maximum value of SAR (measured) = 1.20 W/kg



0 dB = 1.20 W/kg = 0.79 dBW/kg

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

Test Plot 15#:WLAN Head Flat Middle Channel

DUT: Dynamics; G8 LTE

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.823$ S/m; $\epsilon_r = 39.162$; $\rho = 1000$ kg/m³

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: 2015/1/26
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Head/ WLAN Head Flat/Area Scan (81x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.318 W/kg

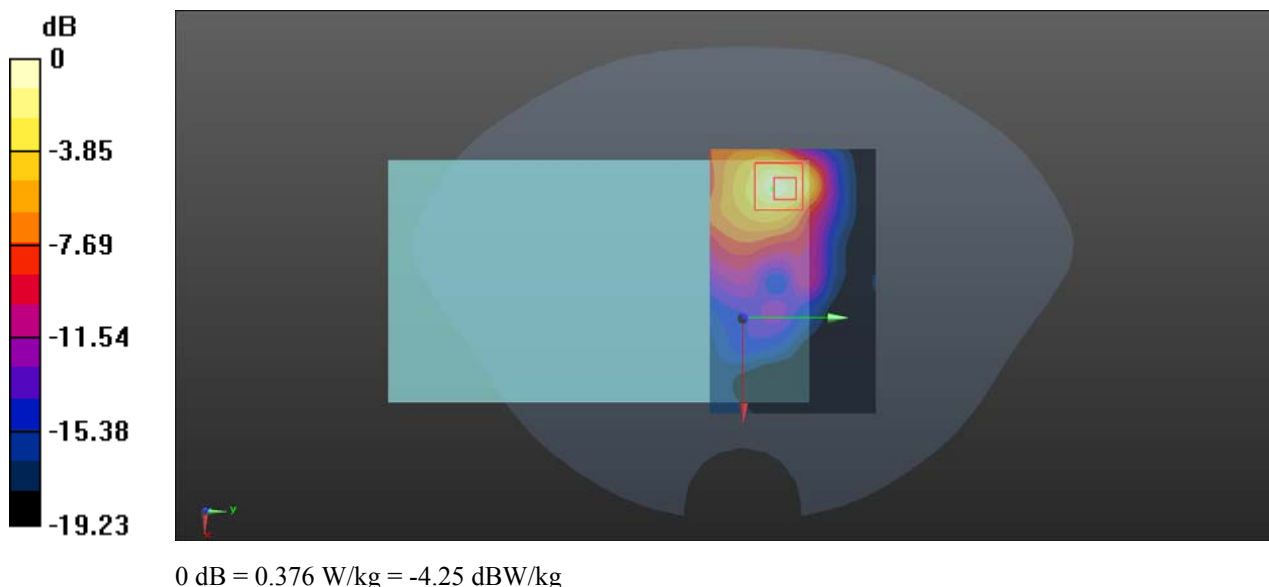
Head/ WLAN Head Flat /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.748 V/m; Power Drift = -0.19 dB

Peak SAR (extrapolated) = 0.884 W/kg

SAR(1 g) = 0.326 W/kg; SAR(10 g) = 0.134 W/kg

Maximum value of SAR (measured) = 0.376 W/kg



Test Laboratory: Bay Area Compliance Labs Corp.(Dongguan)**Test Plot 16#:WLAN back Middle Channel****DUT: Dynamics; G8 LTE**

Communication System: 802.11b; Frequency: 2437 MHz;Duty Cycle: 1:1

Medium parameters used: $f = 2437$ MHz; $\sigma = 1.977$ S/m; $\epsilon_r = 51.632$; $\rho = 1000$ kg/m³

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: 2015/1/26
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

Back/WLAN back/Area Scan (81x51x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm

Maximum value of SAR (interpolated) = 0.496 W/kg

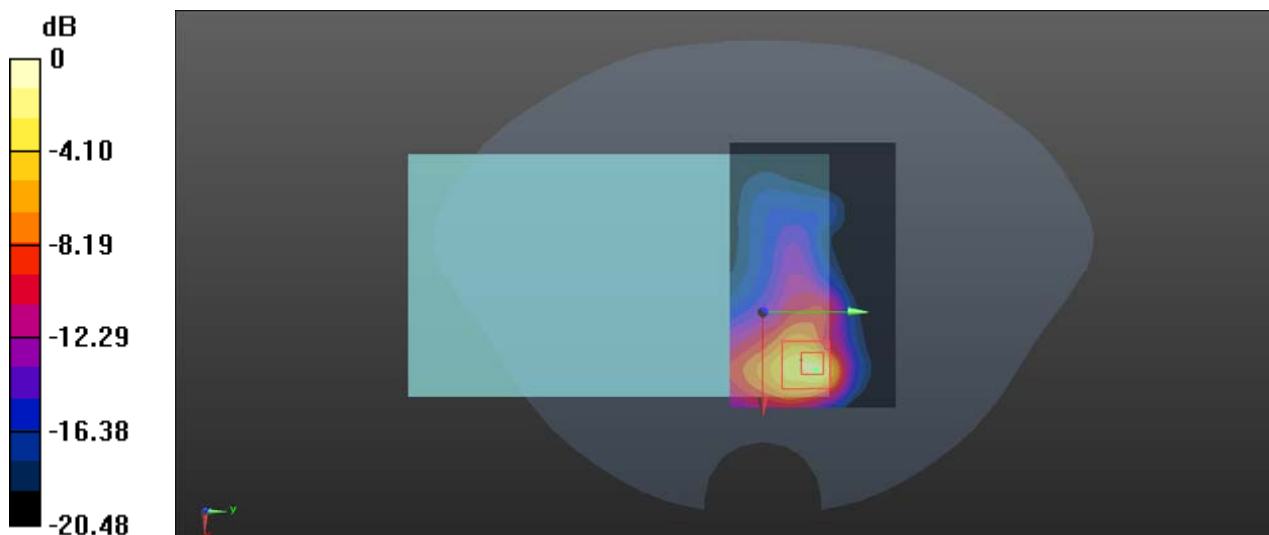
Back/ WLAN back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 3.569 V/m; Power Drift = -0.14 dB

Peak SAR (extrapolated) = 2.16 W/kg

SAR(1 g) = 0.643 W/kg; SAR(10 g) = 0.217 W/kg

Maximum value of SAR (measured) = 0.828 W/kg



0 dB = 0.828 W/kg = -0.82 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	Disisor	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	$\sqrt{3}$	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	$\sqrt{3}$	0	0	0.0	0.0
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
Detection limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
Integration time	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
RF ambientconditions – noise	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
RF ambient conditions–reflections	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Probe positioner mech. Restrictions	0.8	R	$\sqrt{3}$	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	$\sqrt{3}$	1	1	3.9	3.9
Post-processing	2.0	R	$\sqrt{3}$	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	$\sqrt{3}$	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	$\sqrt{3}$	1	1	2.3	2.3
Liquid conductivity target)	5.0	R	$\sqrt{3}$	0.64	0.43	1.8	1.2
Liquid conductivity meas.)	2.5	N	1	0.64	0.43	1.6	1.1
Liquid permittivity target)	5.0	R	$\sqrt{3}$	0.6	0.49	1.7	1.4
Liquid permittivity meas.)	2.5	N	1	0.6	0.49	1.5	1.2
Combined 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	Disisor	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	$\sqrt{3}$	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	$\sqrt{3}$	0	0	0.0	0.0
Linearity	4.7	R	$\sqrt{3}$	1	1	2.7	2.7
Modulation Response	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
Detection limits	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Boundary effect	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
Integration time	0.0	R	$\sqrt{3}$	1	1	0.0	0.0
RF ambient conditions – noise	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
RF ambient conditions–reflections	1.0	R	$\sqrt{3}$	1	1	0.6	0.6
Probe positioner mech. Restrictions	0.8	R	$\sqrt{3}$	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	$\sqrt{3}$	1	1	3.9	3.9
Post-processing	2.0	R	$\sqrt{3}$	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	$\sqrt{3}$	1	1	2.6	2.6
Drift of output power	5.0	R	$\sqrt{3}$	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	$\sqrt{3}$	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	$\sqrt{3}$	0.78	0.71	0.8	0.7
Temp. unc. - Permittivity	0.3	R	$\sqrt{3}$	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 – 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
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 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 $(22 \pm 3)^{\circ}\text{C}$ 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	
This calibration certificate shall not be reproduced except in full without written approval of the laboratory.			

Issued: February 9, 2015

Certificate No: EX3-7329_Feb15

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**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
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**

Glossary:

TSL	tissue simulating liquid
NORM _{x,y,z}	sensitivity in free space
ConvF	sensitivity in TSL / NORM _{x,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., $\theta = 0$ 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:

- 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
- 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:

- NORM_{x,y,z}**: Assessed for E-field polarization $\theta = 0$ ($f \leq 900$ MHz in TEM-cell; $f > 1800$ MHz: R22 waveguide). NORM_{x,y,z} are only intermediate values, i.e., the uncertainties of NORM_{x,y,z} does not affect the E²-field uncertainty inside TSL (see below ConvF).
- NORM(f)_{x,y,z}** = NORM_{x,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
- A_{x,y,z}; B_{x,y,z}; C_{x,y,z}; D_{x,y,z}; VR_{x,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 $f \leq 800$ 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 NORM_{x,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 NORM_x (no uncertainty required).

EX3DV4 – SN:7329

February 5, 2015

Probe EX3DV4

SN:7329

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

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

Certificate No: EX3-7329_Feb15

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EX3DV4- SN:7329

February 5, 2015

DASY/EASY - Parameters of Probe: EX3DV4 - SN:7329**Basic Calibration Parameters**

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

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB $\sqrt{\mu\text{V}}$	C	D dB	VR mV	Unc ^C (k=2)
0	CW	X	0.0	0.0	1.0	0.00	137.9	$\pm 3.0 \%$
		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.

^C Uncertainty is determined using the max. deviation from linear response applying rectangular distribution and is expressed for the square of the field value.

EX3DV4- SN:7329

February 5, 2015

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.

EX3DV4- SN:7329

February 5, 2015

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.

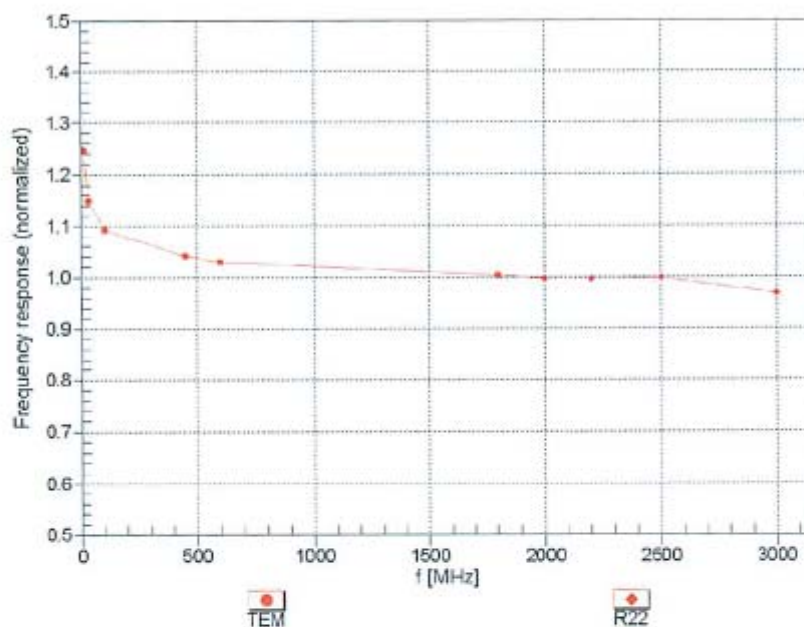
^F At frequencies below 3 GHz, the validity of tissue parameters (ϵ and σ) can be relaxed to ± 10% if liquid compensation formula is applied to measured SAR values. At frequencies above 3 GHz, the validity of tissue parameters (ϵ and σ) is restricted to ± 5%. The uncertainty is the RSS of the ConvF uncertainty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

EX3DV4- SN:7329

February 5, 2015

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

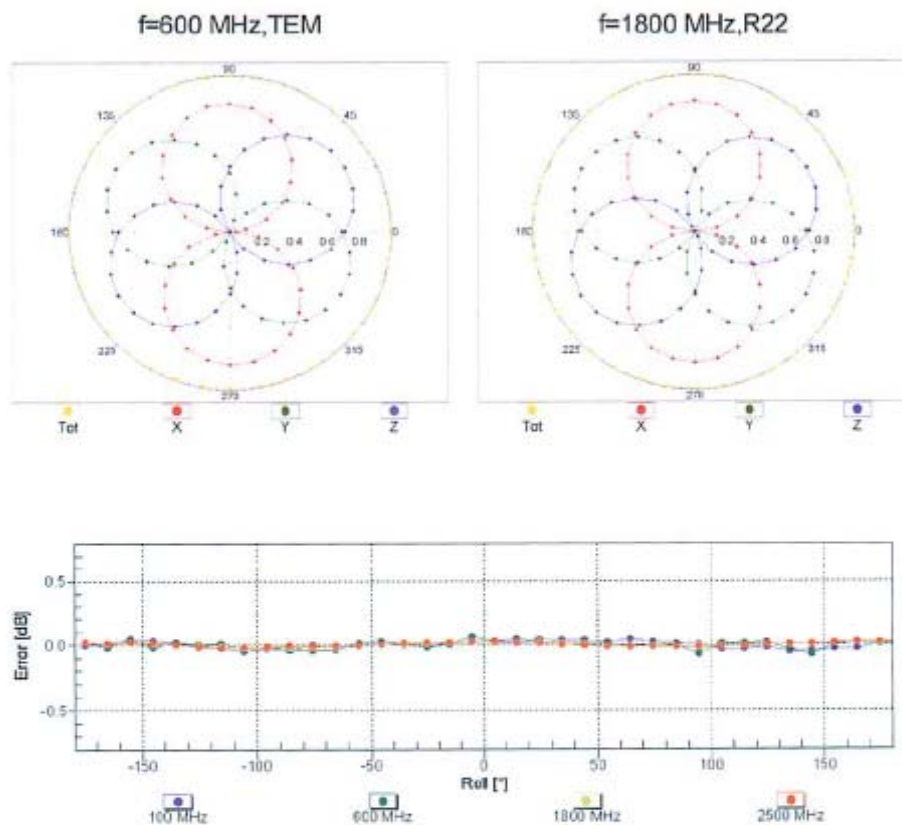


Uncertainty of Frequency Response of E-field: $\pm 6.3\%$ ($k=2$)

EX3DV4- SN:7329

February 5, 2015

Receiving Pattern (ϕ), $\theta = 0^\circ$

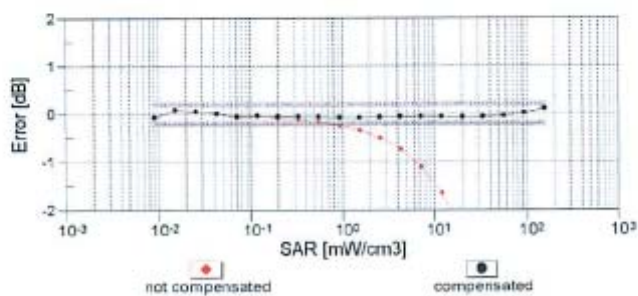
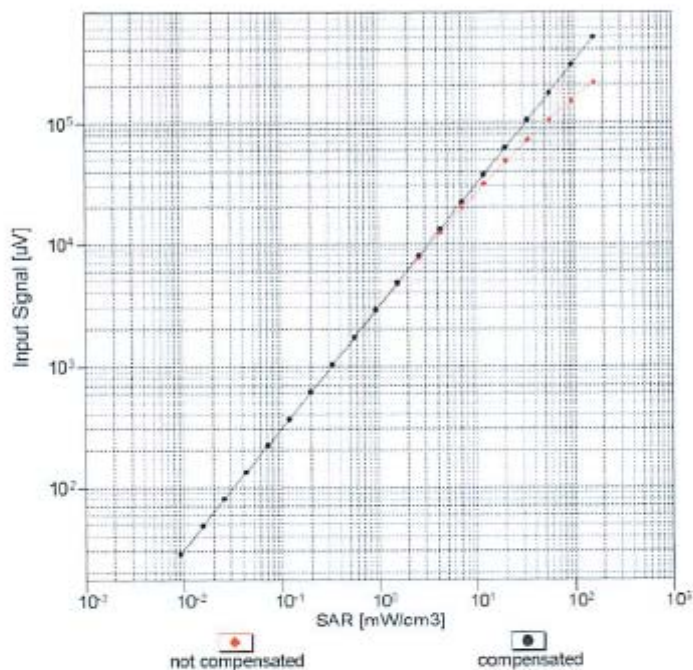


Uncertainty of Axial Isotropy Assessment: $\pm 0.5\%$ ($k=2$)

EX3DV4- SN:7329

February 5, 2015

Dynamic Range $f(\text{SAR}_{\text{head}})$ (TEM cell, $f_{\text{eval}} = 1900 \text{ MHz}$)

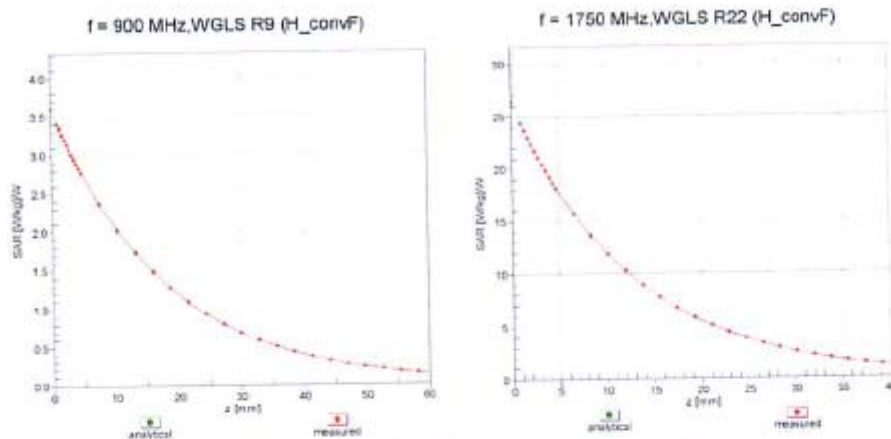


Uncertainty of Linearity Assessment: $\pm 0.6\%$ ($k=2$)

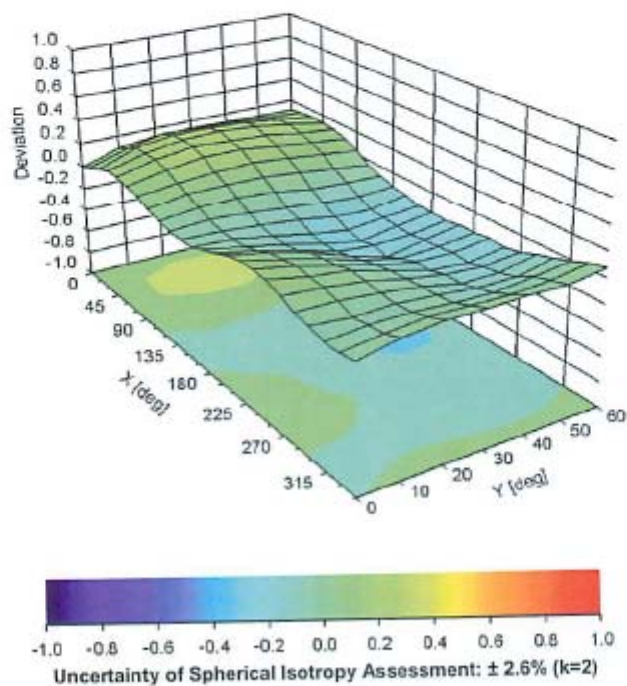
EX3DV4- SN:7329

February 5, 2015

Conversion Factor Assessment



Deviation from Isotropy in Liquid Error (ϕ, θ), f = 900 MHz



EX3DV4- SN:7329

February 5, 2015

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

APPENDIX C DIPOLE CALIBRATION CERTIFICATES

Calibration Laboratory of
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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

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

Issued: August 18, 2015

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Certificate No: D835V2-453_Aug15

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Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 0108**

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:

- 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
- 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
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- 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 $\pm$ 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 $\pm$ 0.2) °C	41.9 $\pm$ 6 %	0.93 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	2.41 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	9.43 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (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 $\pm$ 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 $\pm$ 0.2) °C	56.1 $\pm$ 6 %	1.02 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	2.47 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	9.55 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (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 $\pm$ 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 j Ω
Return Loss	- 26.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.8 Ω - 6.0 j Ω
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; $\sigma = 0.93$ S/m; $\epsilon_r = 41.9$; $\rho = 1000$ kg/m³

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:

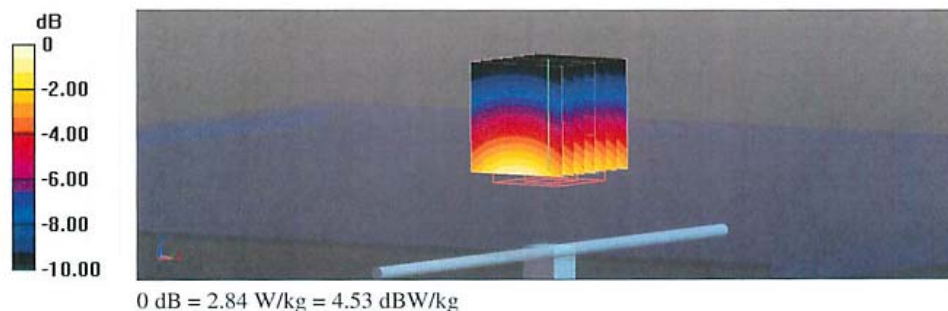
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 58.20 V/m; Power Drift = -0.06 dB

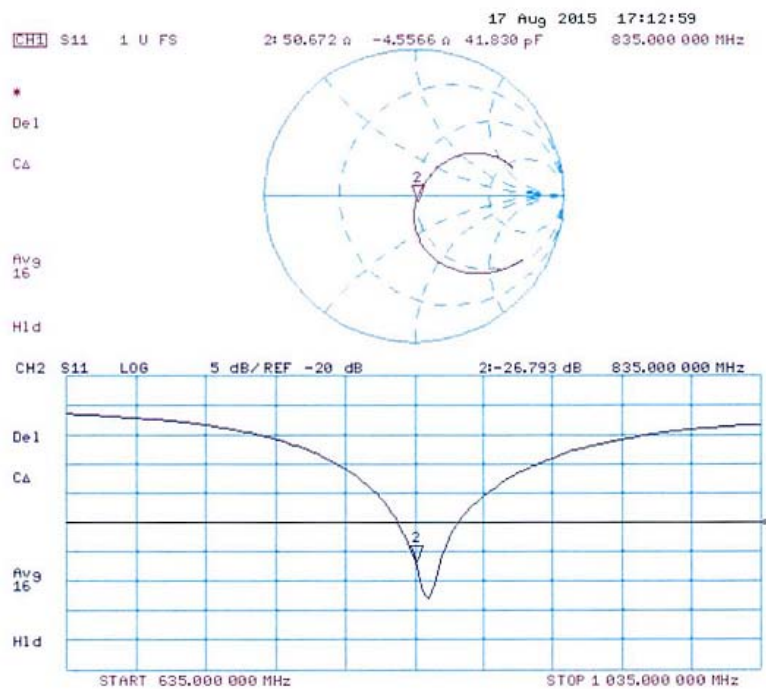
Peak SAR (extrapolated) = 3.65 W/kg

SAR(1 g) = 2.41 W/kg; SAR(10 g) = 1.56 W/kg

Maximum value of SAR (measured) = 2.84 W/kg



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; $\sigma = 1.02$ S/m; $\epsilon_r = 56.1$; $\rho = 1000$ kg/m³

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:

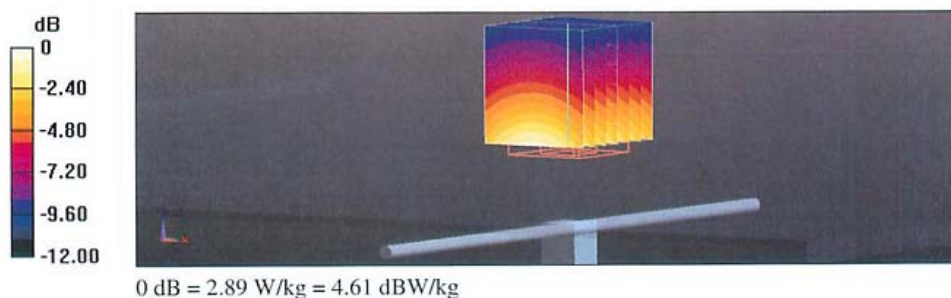
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 55.00 V/m; Power Drift = 0.01 dB

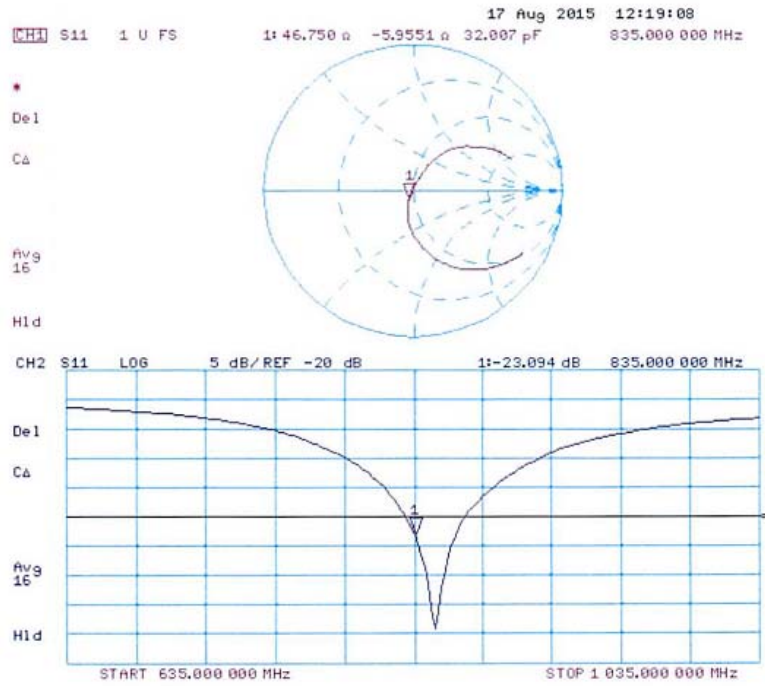
Peak SAR (extrapolated) = 3.69 W/kg

SAR(1 g) = 2.47 W/kg; SAR(10 g) = 1.61 W/kg

Maximum value of SAR (measured) = 2.89 W/kg



Impedance Measurement Plot for Body TSL



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Accreditation No.: **SCS 0108**

Client **BACL**

Certificate No: **D1750V2-1141_Jul15**

CALIBRATION CERTIFICATE

Object **D1750V2 - SN:1141**

Calibration procedure(s) **QA CAL-05.v9**
 Calibration procedure for dipole validation kits above 700 MHz

Calibration date: **July 09, 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 $(22 \pm 3)^{\circ}\text{C}$ 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

Calibrated by: **Claudio Leubler** **Laboratory Technician**

Approved by: **Katja Pokovic** **Technical Manager**

Issued: July 14, 2015

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Certificate No: D1750V2-1141_Jul15

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Accreditation No.: **SCS 0108**

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:

- 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
- 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
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- 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	1750 MHz $\pm$ 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	40.1	1.37 mho/m
Measured Head TSL parameters	(22.0 $\pm$ 0.2) °C	38.8 $\pm$ 6 %	1.38 mho/m $\pm$ 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	9.31 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	36.8 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	4.97 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	19.7 W/kg $\pm$ 16.5 % (k=2)

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	53.4	1.49 mho/m
Measured Body TSL parameters	(22.0 $\pm$ 0.2) °C	52.2 $\pm$ 6 %	1.48 mho/m $\pm$ 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	9.37 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	37.4 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm ³ (10 g) of Body TSL	condition	
SAR measured	250 mW input power	5.07 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	20.3 W/kg $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	51.1 Ω - 0.1 j Ω
Return Loss	- 39.5 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	46.6 Ω + 0.3 j Ω
Return Loss	- 29.0 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.225 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	September 30, 2014

DASY5 Validation Report for Head TSL

Date: 09.07.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1141

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.38$ S/m; $\epsilon_r = 38.8$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(5.2, 5.2, 5.2); 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:

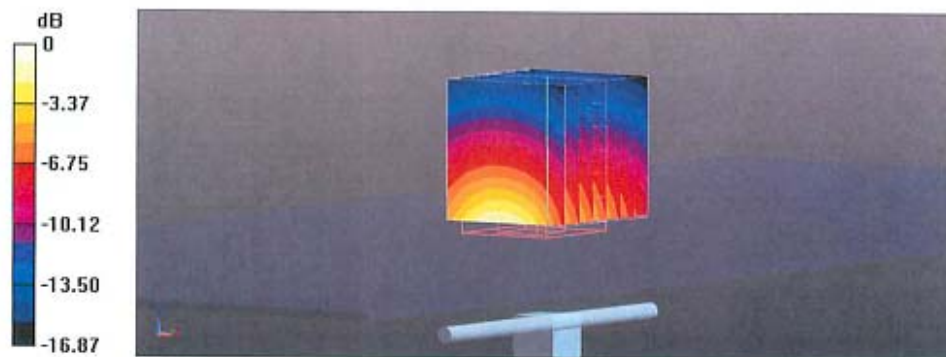
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 93.34 V/m; Power Drift = 0.04 dB

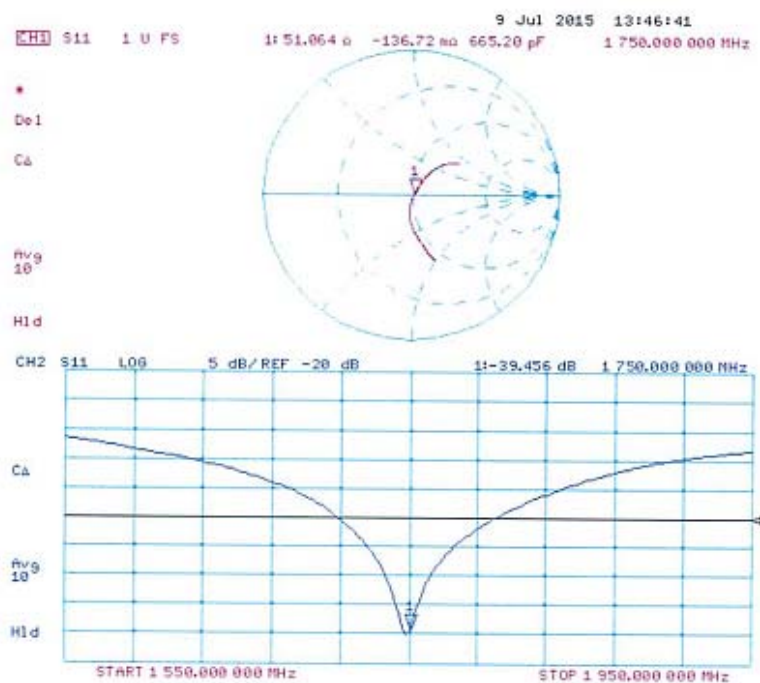
Peak SAR (extrapolated) = 16.6 W/kg

SAR(1 g) = 9.31 W/kg; SAR(10 g) = 4.97 W/kg

Maximum value of SAR (measured) = 11.3 W/kg



Impedance Measurement Plot for Head TSL



DASY5 Validation Report for Body TSL

Date: 09.07.2015

Test Laboratory: SPEAG, Zurich, Switzerland

DUT: Dipole 1750 MHz; Type: D1750V2; Serial: D1750V2 - SN:1141

Communication System: UID 0 - CW; Frequency: 1750 MHz

Medium parameters used: $f = 1750$ MHz; $\sigma = 1.48$ S/m; $\epsilon_r = 52.2$; $\rho = 1000$ kg/m³

Phantom section: Flat Section

Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2011)

DASY52 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.88, 4.88, 4.88); 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:

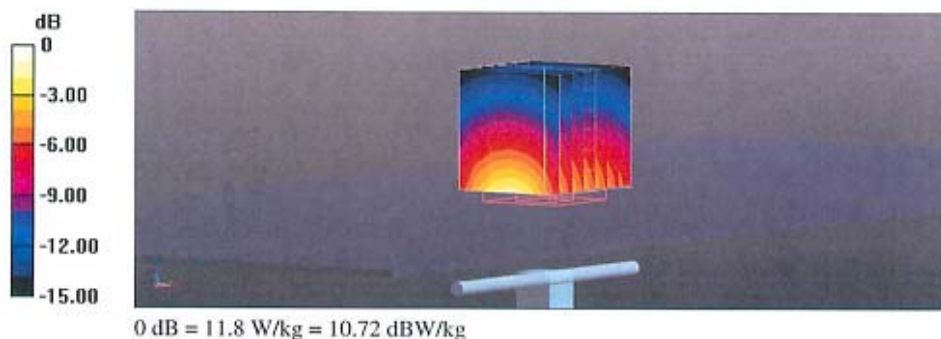
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 92.95 V/m; Power Drift = 0.02 dB

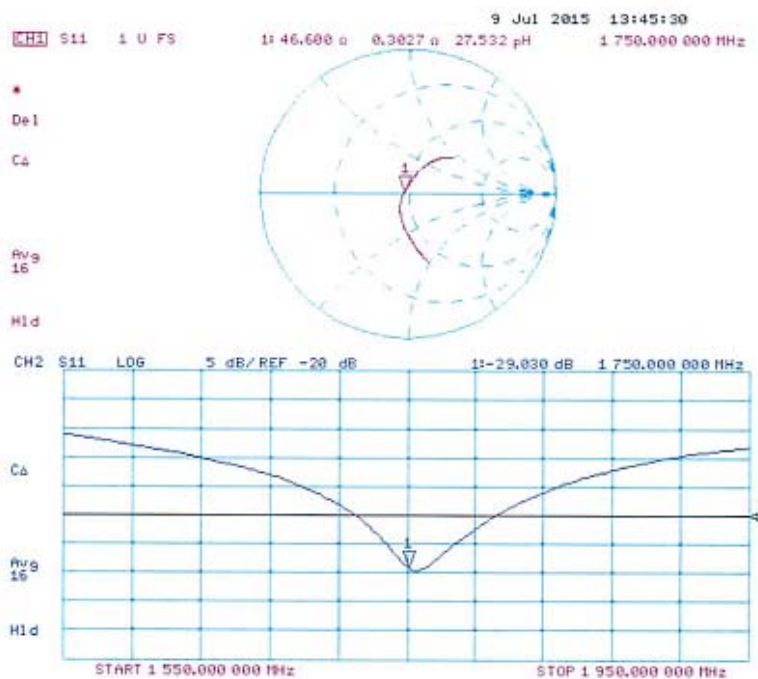
Peak SAR (extrapolated) = 15.9 W/kg

SAR(1 g) = 9.37 W/kg; SAR(10 g) = 5.07 W/kg

Maximum value of SAR (measured) = 11.8 W/kg



Impedance Measurement Plot for Body TSL



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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

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

Issued: July 14, 2015

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Certificate No: D1900V2-5d206_Jul15

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S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)

Accreditation No.: **SCS 0108**

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

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:

- 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
- 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
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- 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 $\pm$ 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 $\pm$ 0.2) °C	39.7 $\pm$ 6 %	1.38 mho/m $\pm$ 6 %
Head TSL temperature change during test	< 0.5 °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	10.1 W/kg
SAR for nominal Head TSL parameters	normalized to 1W	40.7 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (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 $\pm$ 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 $\pm$ 0.2) °C	52.7 $\pm$ 6 %	1.54 mho/m $\pm$ 6 %
Body TSL temperature change during test	< 0.5 °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm³ (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	10.3 W/kg
SAR for nominal Body TSL parameters	normalized to 1W	40.8 W/kg $\pm$ 17.0 % (k=2)

SAR averaged over 10 cm³ (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 $\pm$ 16.5 % (k=2)

Appendix (Additional assessments outside the scope of SCS 0108)**Antenna Parameters with Head TSL**

Impedance, transformed to feed point	$52.5 \Omega + 6.5 j\Omega$
Return Loss	- 23.3 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	$48.6 \Omega + 7.1 j\Omega$
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; $\sigma = 1.38$ S/m; $\epsilon_r = 39.7$; $\rho = 1000$ kg/m³

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:

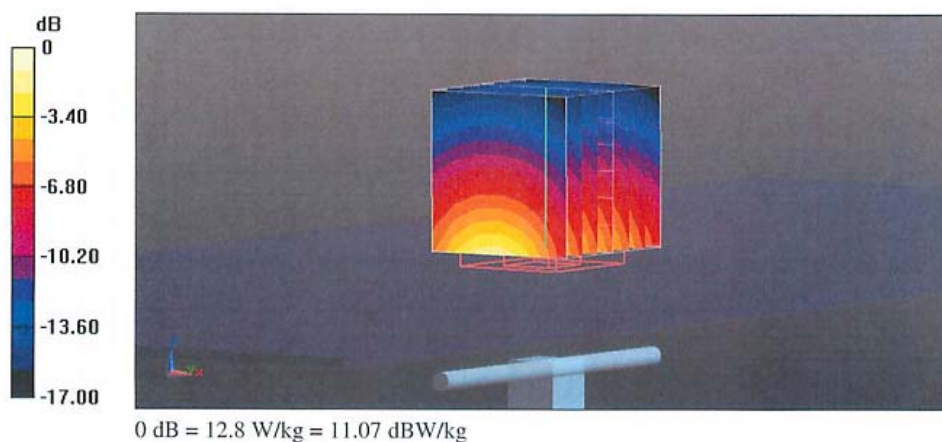
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 99.02 V/m; Power Drift = 0.02 dB

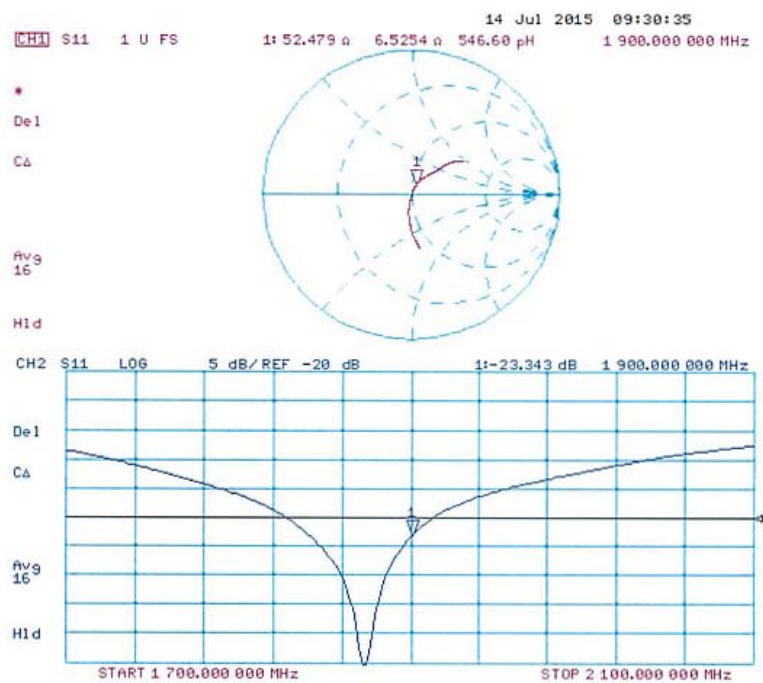
Peak SAR (extrapolated) = 18.4 W/kg

SAR(1 g) = 10.1 W/kg; SAR(10 g) = 5.35 W/kg

Maximum value of SAR (measured) = 12.8 W/kg



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; $\sigma = 1.54$ S/m; $\epsilon_r = 52.7$; $\rho = 1000$ kg/m³

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:

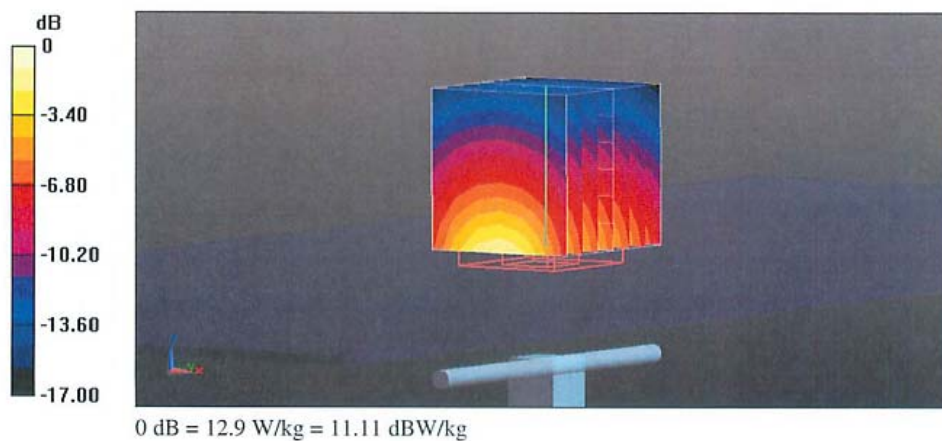
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 95.62 V/m; Power Drift = 0.02 dB

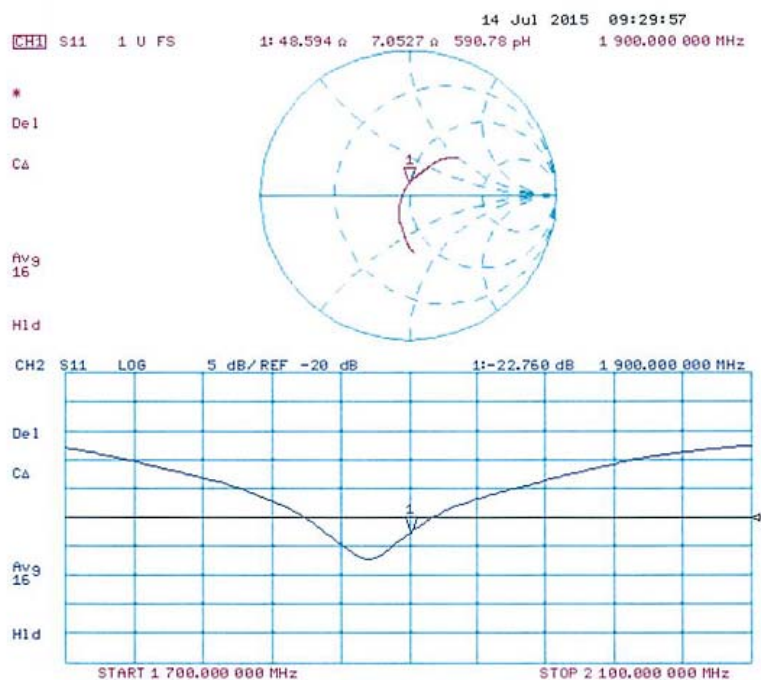
Peak SAR (extrapolated) = 17.3 W/kg

SAR(1 g) = 10.3 W/kg; SAR(10 g) = 5.51 W/kg

Maximum value of SAR (measured) = 12.9 W/kg



Impedance Measurement Plot for Body TSL



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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

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Certificate No: D2450V2-971_Jul15

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Accreditation No.: **SCS 0108**

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:

- 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
- 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
- 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
- KDB 865664, "SAR Measurement Requirements for 100 MHz to 6 GHz"

Additional Documentation:

- 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 $\pm$ 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 $\pm$ 0.2) °C	37.9 $\pm$ 6 %	1.88 mho/m $\pm$ 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 $\pm$ 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 $\pm$ 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 $\pm$ 0.2) °C	52.4 $\pm$ 6 %	2.03 mho/m $\pm$ 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 $\pm$ 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 $\pm$ 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 j Ω
Return Loss	- 28.3 dB

Antenna Parameters with Body TSL

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

General Antenna Parameters and Design

Electrical Delay (one direction)	1.155 ns
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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; $\sigma = 1.88$ S/m; $\epsilon_r = 37.9$; $\rho = 1000$ kg/m³

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:

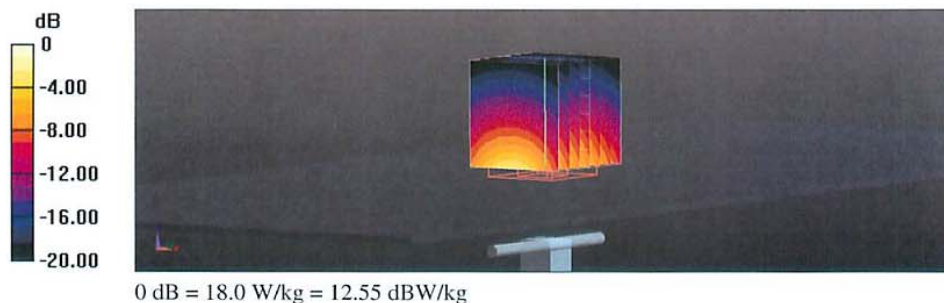
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 101.3 V/m; Power Drift = 0.03 dB

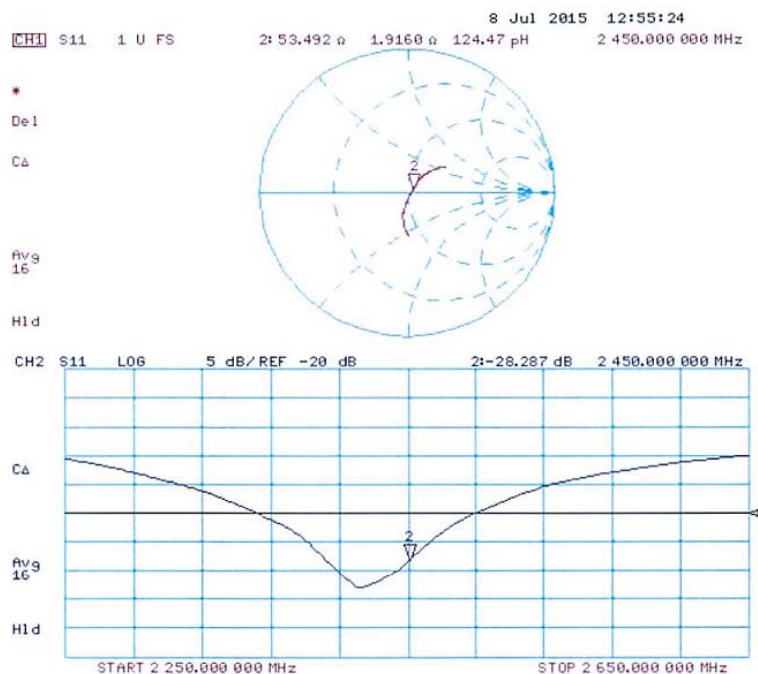
Peak SAR (extrapolated) = 28.1 W/kg

SAR(1 g) = 13.7 W/kg; SAR(10 g) = 6.4 W/kg

Maximum value of SAR (measured) = 18.0 W/kg



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; $\sigma = 2.03$ S/m; $\epsilon_r = 52.4$; $\rho = 1000$ kg/m³

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:

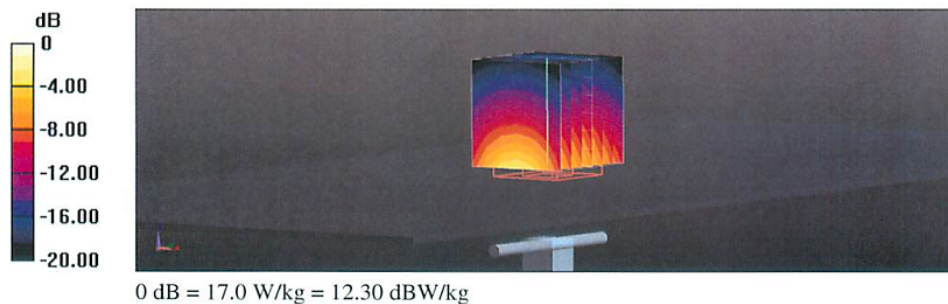
Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 94.67 V/m; Power Drift = -0.01 dB

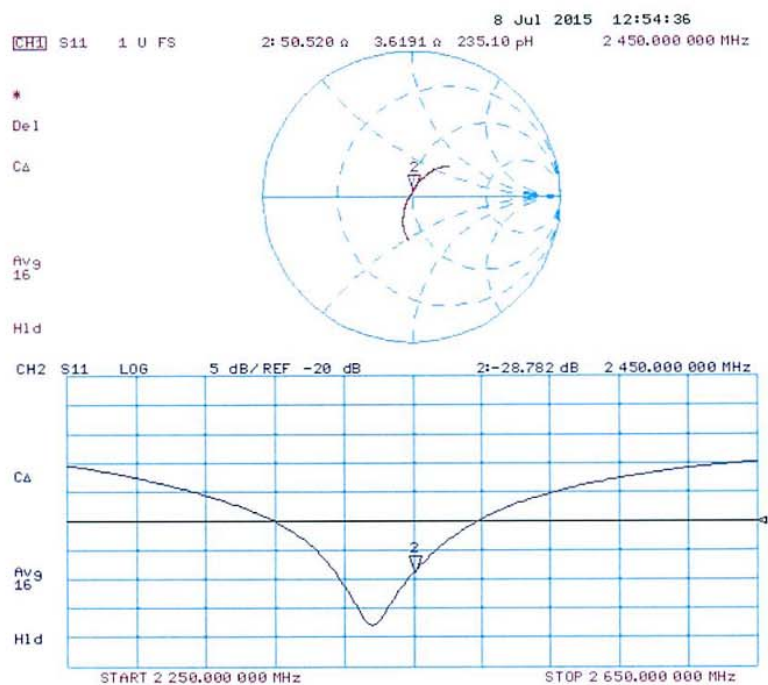
Peak SAR (extrapolated) = 26.4 W/kg

SAR(1 g) = 12.9 W/kg; SAR(10 g) = 6.05 W/kg

Maximum value of SAR (measured) = 17.0 W/kg



Impedance Measurement Plot for Body TSL

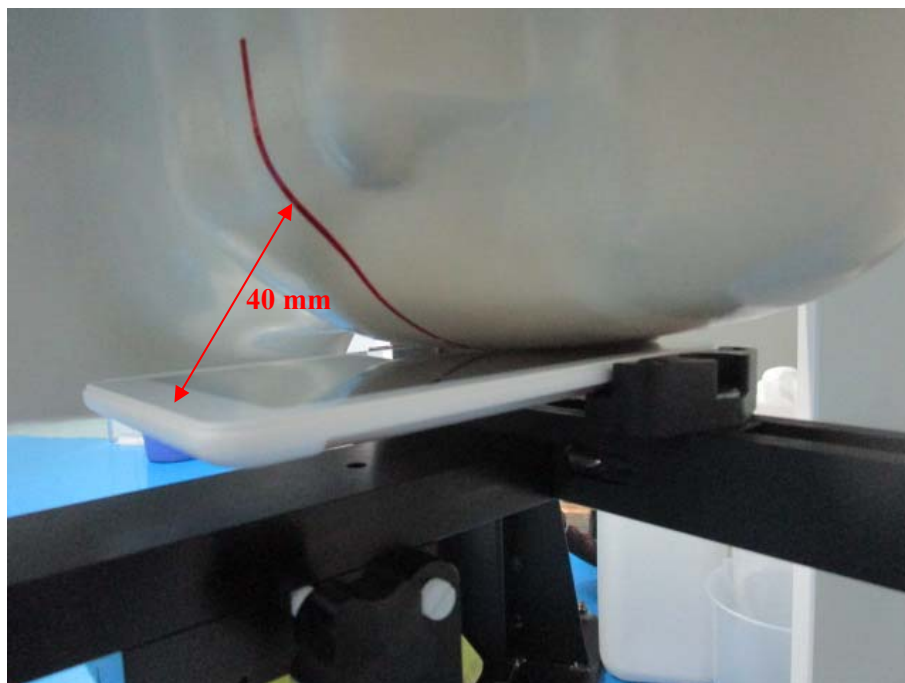


APPENDIX D EUT TEST POSITION PHOTOS

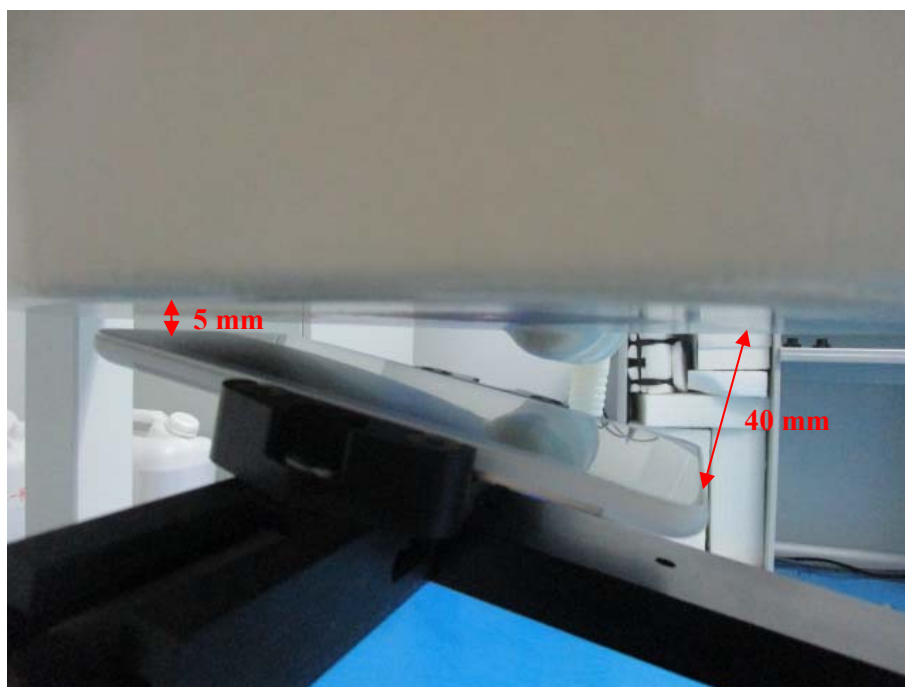
Liquid depth $\geq 15\text{cm}$



Head Cheek



Head Flat



Body Back(0 mm)



Body Back Headset(0 mm)



Body Bottom(0mm)



Body Top(0mm)



Body Left (0mm)



Body Right (0mm)

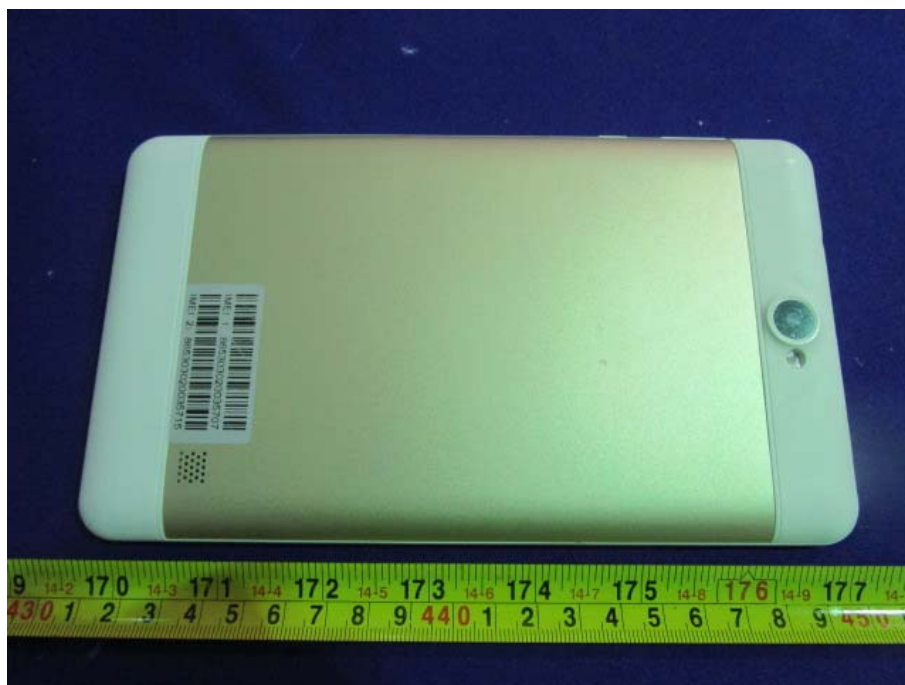


APPENDIX E EUT PHOTOS

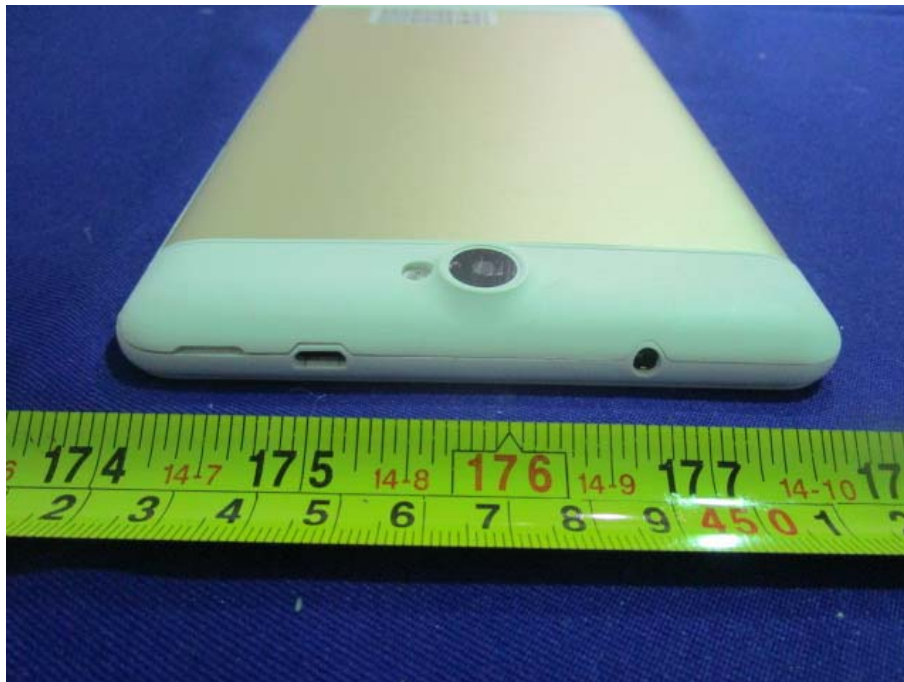
EUT – Front View



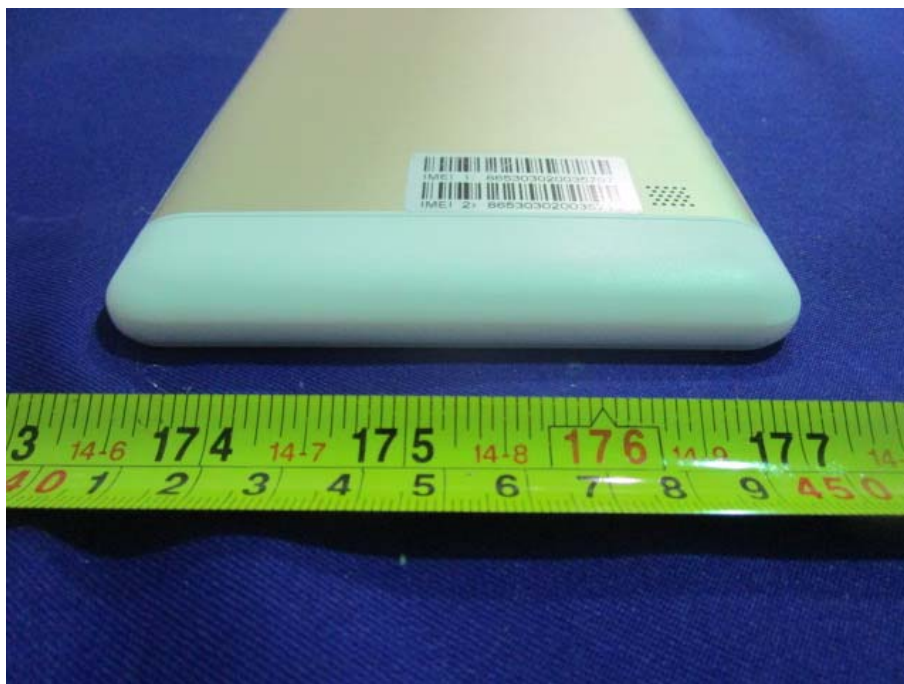
EUT – Back View



EUT – Top View



EUT – Bottom View



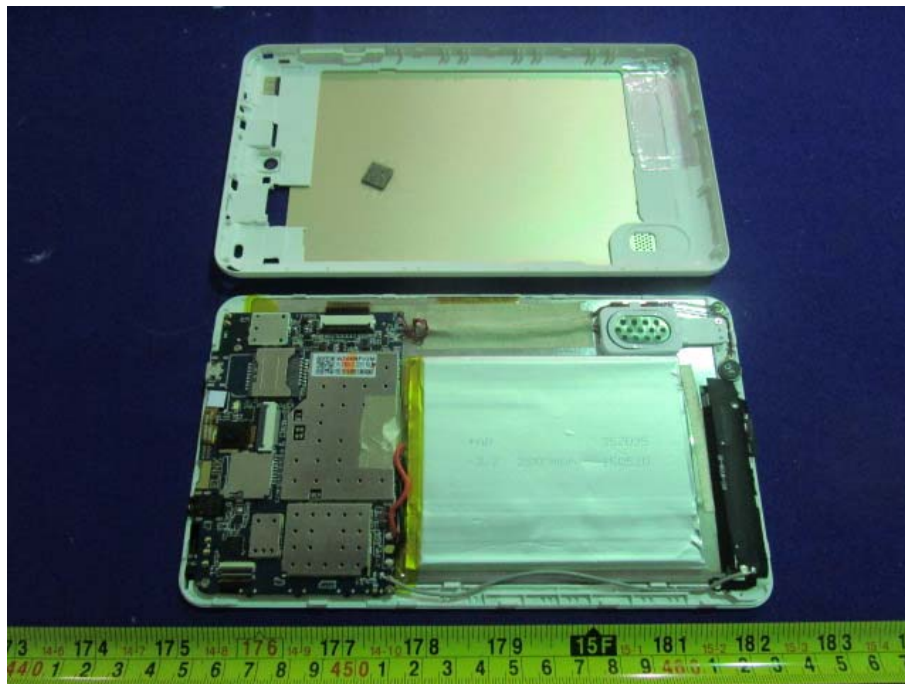
EUT – Left Side View



EUT – Right Side View



EUT – Uncover View



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