SAR EVALUATION REPORT

For

QBEX AMERICA LLC

11142 NW 71 Terrace. Doral, FL 33178, United States

FCC ID: 2AEZN-QBA769PLUS

Report Type:	**Product Type:**
Original Report	Smart Phone

Test Engineer:	Rocky Xiao
Report Number:	RDG15061005-20
Report Date:	2015-06-25
Reviewed By:	Sula Huang RF Leader
Test Laboratory:	Bay Area Compliance Laboratories Corp. (Dongguan) No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China Tel: +86-769-86858888 Fax: +86-769-86858891 www.baclcorp.com.cn

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Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

Attestation of Test Results			
EUT Information	**Company Name**	QBEX AMERICA LLC	
	EUT Description	Smart phone	
	FCC ID	2AEZN-QBA769PLUS	
	Model Number	QBA769PLUS	
	Serial Number	150610005	
	Test Date	2015-06-23	
MODE		**Max. SAR Level(s) Reported(W/Kg)**	**Limit(W/Kg)**
GSM 850	1g Head SAR	0.134	**1. 6**
	1g Body SAR	0.426	
PCS 1900	1g Head SAR	0.229	
	1g Body SAR	0.688	
WCDMA 850	1g Head SAR	0.133	
	1g Body SAR	0.248	
WCDMA 1900	1g Head SAR	0.274	
	1g Body SAR	0.526	
LTE Band 2	1g Head SAR	0.266	
	1g Body SAR	0.701	
LTE Band 4	1g Head SAR	0.177	
	1g Body SAR	0.317	
LTE Band 7	1g Head SAR	0.011	
	1g Body SAR	0.08	
LTE Band 17	1g Head SAR	0.084	
	1g Body SAR	0.195	
Simultaneous	1g Head SAR	0.646	
	1g Body SAR	0.923	
Hotspot	1g Body SAR	0.923	
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 D06 Hotspot Mode v02 KDB 914225 D05 SAR for LTE Devices v02r03		

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.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RDG150610005-20	Original Report	2015-06-25

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EUT DESCRIPTION

This report has been prepared on behalf of QBEX AMERICA LLC and their product, Model: QBA769PLUS, FCC ID: 2AEZN-QBA769PLUS or the EUT (Equipment under Test) as referred to in the rest of this report.

Technical Specification

Product Type	Smart phone
Exposure Category:	Population / Uncontrolled
Antenna Type(s):	Internal Antenna
Body-Worn Accessories:	Portable
Face-Head Accessories:	None
Multi-slot Class:	Class12
Operation Mode :	GSM Voice, GPRS/EGPRS Data, 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) WCDMA1900: 1850-1910 MHz(TX) ; 1930-1990 MHz(RX) LTE Band 2: 1850-1910 MHz(TX) ; 1930-1990 MHz(RX) LTE Band 4: 1710-1755MHz(TX) ; 2110-2155MHz(RX) LTE Band 7: 2500-2570 MHz(TX) ; 2620-2690 MHz(RX) LTE Band 17: 704-716MHz(TX) ; 734-746MHz(RX) WLAN: 2412MHz-2462MHz Bluetooth : 2402MHz-2480MHz
Conducted RF Power:	GSM 850 : 32.9dBm PCS 1900: 29.7 dBm WCDMA 850: 22.25 dBm WCDMA 1900: 22.02 dBm LTE Band 2: 23.16 LTE Band 4:22.83 LTE Band 7: 22.93 LTE Band 17: 22.86 dBm WLAN: 9.79 dBm Bluetooth: 5.52dBm
Dimensions (L*W*H):	157mm (L) × 77 mm (W) × 9 mm (H)
Power Source:	3.7 VDC Rechargeable Battery
Normal Operation:	Head and Body-worn

Note: For LTE Band 17, the test results please refer to the report number: RDG150610005-20A, which issued by Bay Area Compliance Laboratories Corp. (Shenzhen).

REFERENCE, STANDARDS, AND GUILDELINES

FCC:

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

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

CE:

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

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

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

SAR Limits

FCC Limit (1g Tissue)

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 (10g Tissue)

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

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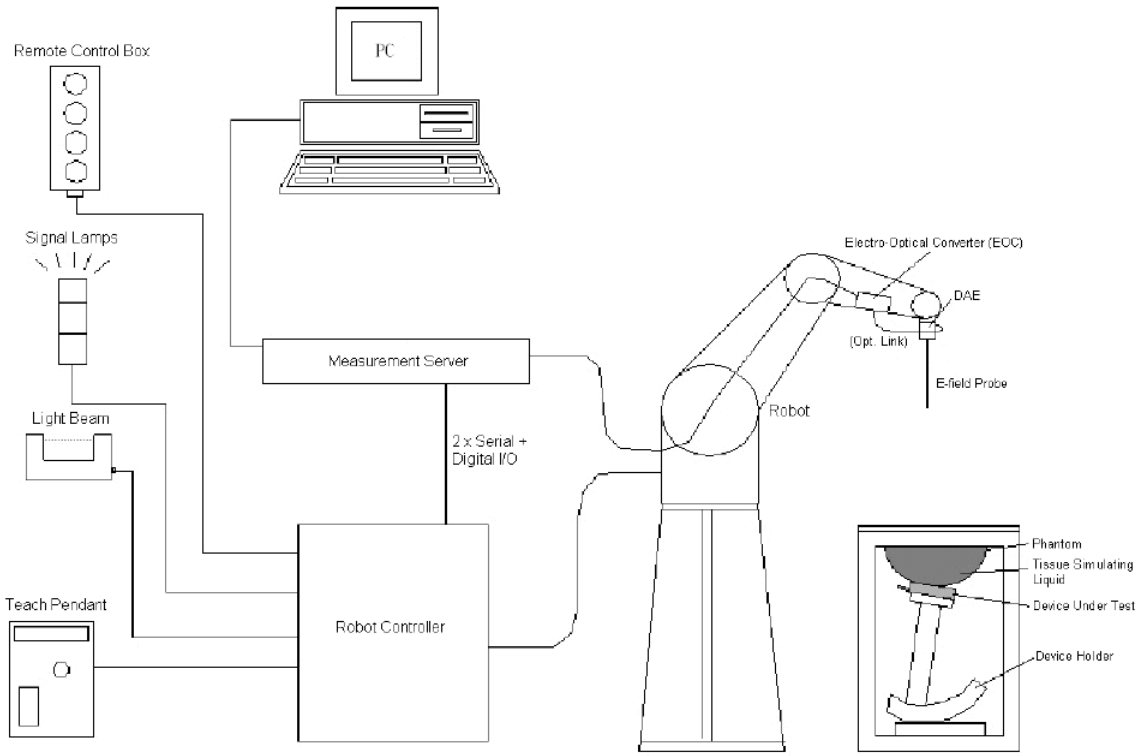
DESCRIPTION OF TEST SYSTEM

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 amplication, 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 profesional 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 preamplifer with auto-zeroing, a channel and gain-switching multiplexer, a fast 16 bit AD-converter and a command decoder with a control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information, as well as an optical uplink for commands and the clock.

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

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

EX3DV4 E-Field Probes

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

SAM Twin Phantom

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

_ Left hand
_ Right hand
_ Flat phantom

The phantom table for the DASY systems based on the TX90XL and RX160L robots have the size of 100 x 50 x 85 cm (L xWx 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 xWx 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 o_-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 ±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 "=3 and loss tangent _=0.02. The amount of dielectric material has been reduced in the closest vicinity of the device, since measurements have suggested that the influence of the clamp on the test results could thus be lowered.

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

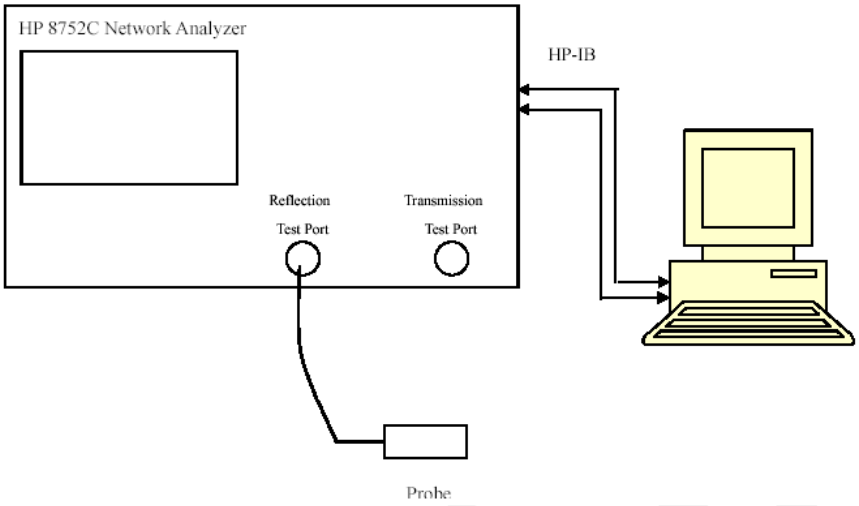
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Information

Equipment	Model	S/N	Calibration Date	Calibration Due Date
Robot	RX90	D03636	N/A	N/A
DASY5 Test Software	DASY52.8	N/A	N/A	N/A
DASY5 Measurement Server	DASY5 4.5.12	1470	N/A	N/A
Data Acquistion Electronics	DAE4	1459	2015-01-26	2016-01-26
E-Field Probe	EX3DV4	7329	2015-02-05	2016-02-05
Dipole, 835MHz	ALS-D-835-S-2	180-00558	2014-10-08	2017-10-08
Dipole, 1750MHz	ALS-D-1750-S-2	198-00304	2013-10-08	2017-10-08
Dipole,1900MHz	ALS-D-1900-S-2	210-00710	2013-10-09	2016-10-09
Dipole,2450MHz	ALS-D-2450-S-2	220-00758	2013-10-09	2016-10-09
R&S, universal Radio Communication Tester	CMU200	105047	2014-11-20	2015-11-20
8960 Series 10 Wireless Communication Test Set	E5515C	MY50266471	2015-01-13	2016-01-13
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	2014-06-03	2015-06-03
Dielectric probe kit	85070B	US33020324	N/A	N/A
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	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	$\Delta\sigma$ (S/m)	
824.2	Head	42.93	0.88	41.5	0.9	3.45	-2.22	±5
	Body	55.16	0.96	55.2	0.97	-0.07	-1.03	±5
826.4	Head	42.89	0.88	41.5	0.9	3.35	-2.22	±5
	Body	55.15	0.97	55.2	0.97	-0.09	0	±5
836.6	Head	42.85	0.89	41.5	0.9	3.25	-1.11	±5
	Body	55.11	0.98	55.2	0.97	-0.16	1.03	±5
846.6	Head	42.83	0.9	41.5	0.9	3.2	0	±5
	Body	55.01	0.99	55.2	0.97	-0.34	2.06	±5
848.8	Head	42.71	0.9	41.5	0.9	2.92	0	±5
	Body	55	0.99	55.2	0.97	-0.36	2.06	±5
1720	Head	39.85	1.37	40.8	1.37	-2.33	0	±5
	Body	53.45	1.47	53.43	1.49	0.04	-1.34	±5
1732.5	Head	40.41	1.38	40.8	1.37	-0.96	0.73	±5
	Body	53.45	1.48	53.43	1.49	0.04	-0.67	±5
1745	Head	39.71	1.38	40.8	1.37	-2.67	0.73	±5
	Body	53.31	1.49	53.43	1.49	-0.22	0	±5
1850.2	Head	39.82	1.36	40	1.4	-0.45	-2.86	±5
	Body	55.29	1.48	53.3	1.52	3.73	-2.63	±5
1852.4	Head	39.86	1.36	40	1.4	-0.35	-2.86	±5
	Body	55.2	1.48	53.3	1.52	3.56	-2.63	±5
1880	Head	39.77	1.39	40	1.4	-0.57	-0.71	±5
	Body	53.73	1.55	53.3	1.52	0.81	1.97	±5

1907.6	Head	39.56	1.41	40	1.4	-1.1	0.71	±5
	Body	53.62	1.49	53.3	1.52	0.6	-1.97	±5
1909.8	Head	39.58	1.41	40	1.4	-1.05	0.71	±5
	Body	53.38	1.49	53.3	1.52	0.15	-1.97	±5
2510	Head	39.35	1.77	40.08	1.8	-1.82	-1.67	±5
	Body	52.86	1.91	53.43	1.95	-1.07	-2.05	±5
2535	Head	39.19	1.81	40.08	1.8	-2.22	0.56	±5
	Body	52.66	1.94	53.43	1.95	-1.44	-0.51	±5
2560	Head	39.01	1.83	40.08	1.8	-2.67	1.67	±5
	Body	52.46	1.96	53.43	1.95	-1.82	0.51	±5

**Liquid Verification was performed on 2015-06-23.*

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Please refer to the following tables.

835 MHz Head			835 MHz Body		
Frequency (MHz)	**e'**	**e''**	**Frequency (MHz)**	**e'**	**e''**
824	42.9062	19.1695	824	55.1502	21.0347
824.5	42.9773	19.1536	824.5	55.1795	20.9584
825	42.9666	19.1429	825	55.1604	20.9868
825.5	42.9109	19.2001	825.5	55.2044	20.9933
826	42.9295	19.1275	826	55.1013	21.0602
826.5	42.8839	19.1416	826.5	55.1596	21.0358
827	42.8961	19.1899	827	55.0082	21.0095
827.5	42.871	19.1626	827.5	55.1391	20.956
828	42.9638	19.2344	828	55.1248	21.0128
828.5	42.9068	19.1923	828.5	55.1919	21.0221
829	42.9368	19.2399	829	55.1135	20.9469
829.5	42.9221	19.1309	829.5	55.0656	20.8936
830	43.0231	19.1913	830	55.1335	20.9538
830.5	42.9418	19.1978	830.5	55.1242	20.9766
831	42.9142	19.2051	831	55.0868	20.9768
831.5	42.8657	19.1982	831.5	55.142	20.9631
832	42.951	19.2045	832	55.2038	20.9718
832.5	42.9104	19.255	832.5	55.1051	20.9286
833	42.964	19.2182	833	55.1299	20.9284
833.5	42.8983	19.244	833.5	55.1457	20.9583
834	42.9126	19.2178	834	55.1629	21.0102
834.5	42.8639	19.184	834.5	55.099	20.9453
835	42.9583	19.226	835	55.1197	20.9332
835.5	42.9457	19.16	835.5	55.0852	21.0195
836	42.9093	19.1771	836	55.0961	21.0371
836.5	42.8564	19.1807	836.5	55.112	20.9613
837	42.8443	19.1681	837	55.0994	20.97
837.5	42.8595	19.2078	837.5	55.0107	20.9171
838	42.8793	19.2089	838	55.0953	20.9776
838.5	42.8938	19.2003	838.5	55.1503	20.9857
839	42.9153	19.2111	839	55.0875	20.9514
839.5	42.8909	19.1636	839.5	55.081	21.0104
840	42.8971	19.108	840	55.051	20.9857
840.5	42.8662	19.0989	840.5	55.1537	20.9673
841	42.9161	19.1911	841	55.0589	20.9796
841.5	42.8796	19.1113	841.5	55.0331	20.9563
842	42.8919	19.0833	842	55.0669	20.9812
842.5	42.7991	19.1259	842.5	54.9906	20.9796
843	42.7992	19.0846	843	55.0481	20.9907
843.5	42.8154	19.0615	843.5	55.0086	20.9635
844	42.7758	19.0571	844	55.0911	20.9353
844.5	42.8621	19.0397	844.5	55.0871	21.0031
845	42.7487	19.0613	845	55.0806	20.9426
845.5	42.8253	19.0615	845.5	55.0424	20.9083
846	42.8321	19.0396	846	55.0161	20.967
846.5	42.8442	18.9935	846.5	55.0191	20.9162
847	42.7662	19.1059	847	54.9977	20.987
847.5	42.7494	18.9664	847.5	55.0763	20.9957
848	42.8108	19.0294	848	55.0211	21.0039
848.5	42.7182	19.0299	848.5	55.0017	20.9324
849	42.7093	18.9538	849	55.0064	20.946

1750 MHz Head					
Frequency (MHz)	**e'**	**e''**	**Frequency (MHz)**	**e'**	**e''**
1710	40.4695	14.3067	1748	40.2222	14.1950
1711	40.4523	14.2814	1749	40.2395	14.2654
1712	40.4146	14.3456	1750	40.363	14.2478
1713	40.4264	14.2937	1751	40.3491	14.2558
1714	40.4283	14.2913	1752	40.3353	14.2533
1715	40.3866	14.2992	1753	40.3006	14.1989
1716	40.4559	14.2972	1754	40.3114	14.2567
1717	40.4154	14.2945	1755	40.3462	14.2209
1718	40.4456	14.2991	1756	40.2944	14.2859
1719	40.3753	14.3143	1757	40.2831	14.2214
1720	40.4463	14.2939	1758	40.2362	14.1730
1721	40.5758	14.2303	1759	40.2118	14.2111
1722	40.4936	14.2535	1760	40.2717	14.2065
1723	40.519	14.2676	1761	40.2763	14.2926
1724	40.5918	14.2143	1762	40.3017	14.2966
1725	40.5209	14.2564	1763	40.2194	14.2553
1726	40.5394	14.2330	1764	40.2156	14.2856
1727	40.4665	14.2966	1765	40.1668	14.2862
1728	40.5014	14.3150	1766	40.2122	14.3166
1729	40.465	14.2473	1767	40.2287	14.2509
1730	40.4418	14.3321	1768	40.1728	14.2527
1731	40.4171	14.3415	1769	40.3478	14.2563
1732	40.4253	14.2829	1770	40.3274	14.1902
1733	40.3912	14.3231	1771	40.3284	14.2253
1734	40.392	14.2613	1772	40.3087	14.2739
1735	40.3623	14.2977	1773	40.3	14.2888
1736	40.4036	14.2576	1774	40.3113	14.2405
1737	40.3823	14.2577	1775	40.3216	14.2278
1738	40.317	14.2948	1776	40.285	14.2695
1739	40.35	14.3345	1777	40.2086	14.2002
1740	40.3371	14.3122	1778	40.2308	14.2711
1741	40.3278	14.2556	1779	40.2358	14.2287
1742	40.3443	14.2878	1780	40.362	14.2496
1743	40.2988	14.2706	1781	40.3731	14.2172
1744	40.3127	14.3359	1782	40.3476	14.2851
1745	40.3254	14.2770	1783	40.3251	14.2471
1746	40.2524	14.2588	1784	40.3258	14.1978
1747	40.2109	14.2802	1785	40.3118	14.1957

1750 MHz Body					
Frequency (MHz)	**e'**	**e''**	**Frequency (MHz)**	**e'**	**e''**
1710	53.4947	15.3724	1748	53.199	15.3078
1711	53.5103	15.397	1749	53.2473	15.316
1712	53.4764	15.4098	1750	53.3508	15.3088
1713	53.4396	15.3371	1751	53.3557	15.3345
1714	53.4278	15.3794	1752	53.3444	15.338
1715	53.3801	15.3639	1753	53.3362	15.2919
1716	53.5112	15.4023	1754	53.3227	15.3052
1717	53.4327	15.3756	1755	53.3107	15.2408
1718	53.4551	15.3801	1756	53.3232	15.3443
1719	53.3758	15.4137	1757	53.2386	15.2918
1720	53.4541	15.4151	1758	53.1904	15.2577
1721	53.6751	15.2867	1759	53.2243	15.256
1722	53.5644	15.356	1760	53.2328	15.2571
1723	53.5735	15.3463	1761	53.2422	15.3973
1724	53.6702	15.2781	1762	53.3188	15.3242
1725	53.611	15.3236	1763	53.1896	15.3154
1726	53.6246	15.3096	1764	53.154	15.3457
1727	53.4732	15.362	1765	53.1312	15.3423
1728	53.5358	15.3688	1766	53.1739	15.3963
1729	53.5212	15.3378	1767	53.1642	15.3539
1730	53.4861	15.4166	1768	53.1273	15.3072
1731	53.4192	15.4107	1769	53.3647	15.3715
1732	53.4825	15.3519	1770	53.3695	15.2892
1733	53.4115	15.3603	1771	53.3243	15.31
1734	53.4136	15.3241	1772	53.3324	15.331
1735	53.4097	15.3981	1773	53.3205	15.3139
1736	53.4383	15.3243	1774	53.3114	15.3526
1737	53.3572	15.3288	1775	53.3299	15.3095
1738	53.3077	15.4024	1776	53.271	15.3099
1739	53.3776	15.4162	1777	53.217	15.2356
1740	53.3372	15.3486	1778	53.2066	15.3712
1741	53.3266	15.3268	1779	53.2225	15.2856
1742	53.31	15.3292	1780	53.3918	15.3055
1743	53.3034	15.3411	1781	53.3568	15.2455
1744	53.3193	15.4183	1782	53.3436	15.3599
1745	53.3094	15.3276	1783	53.3357	15.2965
1746	53.2382	15.3127	1784	53.3043	15.2286
1747	53.1971	15.3496	1785	53.3418	15.2439

1900 MHz Head			1900 MHz Body		
Frequency (MHz)	**e'**	**e''**	**Frequency (MHz)**	**e'**	**e''**
1850	39.808	13.2227	1850	55.2783	14.3582
1851	39.8548	13.1929	1851	55.3512	14.3632
1852	39.8486	13.1659	1852	55.2324	14.3559
1853	39.8661	13.1658	1853	55.1616	14.2805
1854	39.8892	13.18	1854	55.0648	14.1746
1855	39.8853	13.2169	1855	55.0659	14.2625
1856	39.8425	13.1587	1856	54.9171	14.2486
1857	39.8775	13.2015	1857	54.7573	14.208
1858	39.8404	13.1816	1858	54.6499	14.1323
1859	39.7937	13.1831	1859	54.6108	14.0631
1860	39.8143	13.2346	1860	54.4616	14.1741
1861	39.8475	13.2429	1861	54.4856	14.1049
1862	39.9158	13.2066	1862	54.3534	14.0844
1863	39.8138	13.1373	1863	54.1847	14.1217
1864	39.8459	13.1798	1864	54.1418	14.1544
1865	39.8516	13.2053	1865	54.0972	14.1688
1866	39.8003	13.2102	1866	53.9671	14.124
1867	39.7908	13.2106	1867	53.9112	14.1812
1868	39.822	13.2422	1868	53.8456	14.2508
1869	39.8675	13.3036	1869	53.7157	14.2127
1870	39.8641	13.2199	1870	53.6993	14.3006
1871	39.8456	13.1854	1871	53.6347	14.2887
1872	39.7754	13.1924	1872	53.6931	14.3338
1873	39.8147	13.2071	1873	53.6663	14.4546
1874	39.7381	13.2383	1874	53.595	14.417
1875	39.7666	13.1984	1875	53.605	14.4574
1876	39.7705	13.2438	1876	53.6455	14.5721
1877	39.7832	13.2569	1877	53.6645	14.6304
1878	39.7747	13.2458	1878	53.5989	14.7055
1879	39.7413	13.2432	1879	53.6968	14.6518
1880	39.7697	13.258	1880	53.7255	14.7799
1881	39.7587	13.2306	1881	53.7375	14.7336
1882	39.7461	13.2484	1882	53.7687	14.7919
1883	39.7317	13.2853	1883	53.8258	14.7843
1884	39.7803	13.2319	1884	53.8743	14.814
1885	39.7079	13.3057	1885	53.9804	14.8345
1886	39.6789	13.283	1886	54.0968	14.7748
1887	39.6714	13.2735	1887	54.1701	14.7541
1888	39.687	13.2617	1888	54.2326	14.7949
1889	39.6653	13.3001	1889	54.2449	14.7046
1890	39.6556	13.3382	1890	54.2564	14.7503
1891	39.7032	13.3151	1891	54.3106	14.7421
1892	39.6797	13.2907	1892	54.3608	14.706
1893	39.6787	13.2838	1893	54.3731	14.6804
1894	39.6515	13.2756	1894	54.3474	14.6723
1895	39.6435	13.288	1895	54.3504	14.6102
1896	39.652	13.303	1896	54.4307	14.5155
1897	39.6776	13.2748	1897	54.4128	14.4737
1898	39.6485	13.3263	1898	54.4373	14.4117
1899	39.6429	13.2649	1899	54.271	14.3652
1900	39.6708	13.3591	1900	54.1875	14.3494

1900 MHz Head			1900 MHz Body		
Frequency (MHz)	**e'**	**e''**	**Frequency (MHz)**	**e'**	**e''**
1901	39.6735	13.3178	1901	54.1449	14.2864
1902	39.5965	13.354	1902	54.0974	14.2604
1903	39.5982	13.2875	1903	53.9889	14.2333
1904	39.6333	13.3202	1904	53.8705	14.1497
1905	39.6499	13.3434	1905	53.7724	14.1258
1906	39.6011	13.3593	1906	53.7217	14.1229
1907	39.5405	13.3272	1907	53.6581	14.0983
1908	39.5709	13.3195	1908	53.5884	14.0362
1909	39.5925	13.3604	1909	53.4287	14.0584
1910	39.5725	13.2859	1910	53.3734	14.0562

FINAL

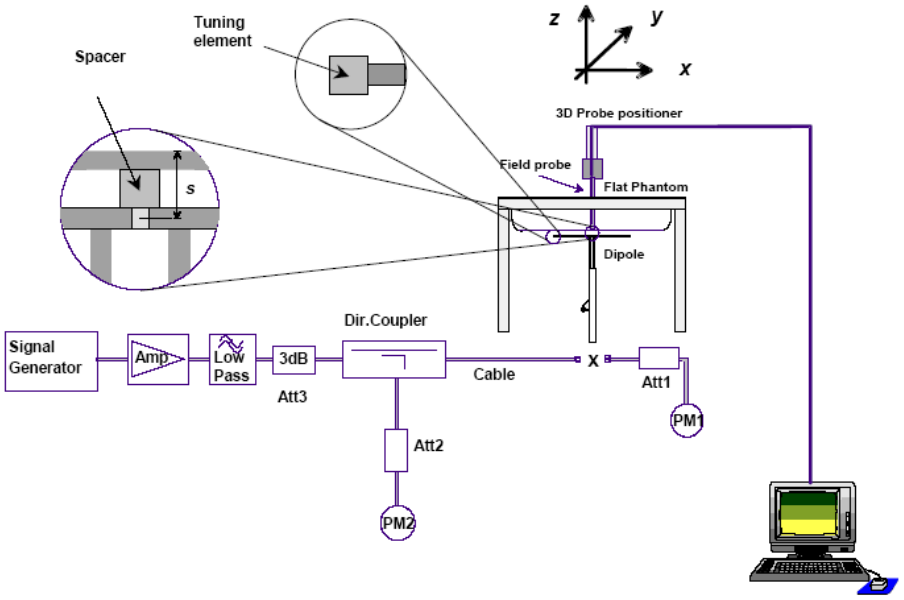
2450MHz Head			2450 MHz Body		
Frequency (MHz)	**e'**	**e''**	**Frequency (MHz)**	**e'**	**e''**
2450	39.3134	12.6813	2450	53.2555	13.7859
2451	39.2965	12.6680	2451	53.4079	13.7688
2452	39.3518	12.6501	2452	53.2644	13.7521
2453	39.3134	12.6883	2453	53.1757	13.7213
2454	39.3087	12.6883	2454	53.0375	13.6386
2455	39.3829	12.7190	2455	53.0551	13.6748
2456	39.293	12.6764	2456	52.9247	13.6925
2457	39.3352	12.6810	2457	52.7468	13.6151
2458	39.3617	12.7341	2458	52.6511	13.5831
2459	39.2426	12.7643	2459	52.5952	13.5201
2460	39.215	12.7881	2460	52.4706	13.6043
2461	39.2042	12.8057	2461	52.5225	13.5302
2462	39.2057	12.7698	2462	52.3287	13.5884
2463	39.2257	12.7502	2463	52.2115	13.5628
2464	39.2209	12.7473	2464	52.1317	13.5777
2465	39.2144	12.7909	2465	52.073	13.6086
2466	39.1935	12.7945	2466	51.9727	13.5815
2467	39.1439	12.7575	2467	51.8764	13.6270
2468	39.2426	12.7436	2468	51.8325	13.6603
2469	39.1988	12.7784	2469	51.741	13.6178
2470	39.2577	12.7858	2470	51.6812	13.6613
2471	39.2365	12.8188	2471	51.64	13.7370
2472	39.2299	12.7907	2472	51.7028	13.7784
2473	39.2087	12.7991	2473	51.6466	13.8516
2474	39.1856	12.7589	2474	51.6074	13.8460
2475	39.1833	12.7687	2475	51.655	13.9045
2476	39.1851	12.7633	2476	51.6117	13.9502
2477	39.1883	12.7875	2477	51.6589	13.9713
2478	39.2063	12.7324	2478	51.625	14.0714
2479	39.1724	12.7206	2479	51.6518	14.0747
2480	39.1716	12.7542	2480	51.7158	14.0952
2481	39.1483	12.7503	2481	51.735	14.1295
2482	39.1742	12.7150	2482	51.7754	14.1758
2483	39.1806	12.7412	2483	51.8156	14.1666
2484	39.15	12.7424	2484	51.8494	14.1967
2485	39.1521	12.7796	2485	51.951	14.2107
2486	39.132	12.7463	2486	52.0896	14.1753
2487	39.123	12.7630	2487	52.1418	14.1648
2488	39.0876	12.7359	2488	52.211	14.1650
2489	39.0992	12.7381	2489	52.2252	14.1419
2490	39.1251	12.7113	2490	52.2672	14.1359
2491	39.0865	12.7311	2491	52.3393	14.1156
2492	39.083	12.7140	2492	52.3774	14.1007
2493	39.0769	12.7208	2493	52.3531	14.0374
2494	39.0686	12.7305	2494	52.3254	14.0502
2495	39.0561	12.7046	2495	52.3558	14.0012
2496	39.0744	12.7290	2496	52.4218	13.8684
2497	39.0407	12.7200	2497	52.3546	13.9174
2498	39.0112	12.7713	2498	52.4047	13.8058
2499	39.033	12.7507	2499	52.2244	13.7918
2500	39.0322	12.7250	2500	52.1949	13.7634
2501	39.0109	12.7915	2501	52.1252	13.6825
2502	39.0004	12.8032	2502	52.0722	13.6812
2503	39.015	12.8027	2503	51.9762	13.6686
2504	38.9853	12.8139	2504	51.9093	13.5497
2505	38.9851	12.8021	2505	51.8129	13.5814

2506	38.9986	12.8199	2506	51.7183	13.5309
2507	38.9847	12.8014	2507	51.639	13.5543
2508	38.982	12.8006	2508	51.5602	13.4938
2509	39.0349	12.8375	2509	51.4643	13.4662
2510	39.3501	12.7162	2510	52.8634	13.6952
2511	39.2908	12.7496	2511	52.8351	13.7352
2512	39.3461	12.7497	2512	52.8561	13.7197
2513	39.3094	12.7177	2513	52.8783	13.712
2514	39.335	12.748	2514	52.8446	13.707
2515	39.3632	12.7266	2515	52.8997	13.7203
2516	39.2998	12.7505	2516	52.8425	13.7156
2517	39.3303	12.7576	2517	52.8742	13.715
2518	39.3307	12.7675	2518	52.892	13.7619
2519	39.2565	12.8435	2519	52.7877	13.8543
2520	39.2462	12.8352	2520	52.7681	13.8068
2521	39.2273	12.8561	2521	52.7401	13.8263
2522	39.2224	12.8529	2522	52.6982	13.8206
2523	39.1976	12.8211	2523	52.7274	13.8193
2524	39.2099	12.8479	2524	52.7143	13.8386
2525	39.227	12.8787	2525	52.7165	13.8575
2526	39.1923	12.8717	2526	52.6547	13.8419
2527	39.1571	12.827	2527	52.6296	13.85
2528	39.225	12.8348	2528	52.7137	13.824
2529	39.2179	12.869	2529	52.7263	13.8365
2530	39.2395	12.8643	2530	52.7855	13.8281
2531	39.2282	12.8507	2531	52.7772	13.8629
2532	39.2122	12.8616	2532	52.7462	13.8113
2533	39.1927	12.8513	2533	52.6801	13.8471
2534	39.1655	12.8685	2534	52.7001	13.8301
2535	39.1873	12.8227	2535	52.6587	13.7951
2536	39.1733	12.8625	2536	52.654	13.8431
2537	39.2205	12.8719	2537	52.6894	13.8518
2538	39.1742	12.7888	2538	52.6786	13.7771
2539	39.2029	12.802	2539	52.6862	13.8276
2540	39.1952	12.8013	2540	52.6659	13.8013
2541	39.1513	12.8163	2541	52.642	13.7984
2542	39.1801	12.7964	2542	52.6434	13.7713
2543	39.1765	12.8428	2543	52.6471	13.8228
2544	39.1531	12.8316	2544	52.6363	13.8112
2545	39.1689	12.8143	2545	52.613	13.7935
2546	39.1325	12.796	2546	52.6243	13.7932
2547	39.1546	12.7806	2547	52.6012	13.7563
2548	39.1144	12.8208	2548	52.5746	13.7676
2549	39.0956	12.8303	2549	52.6031	13.7757
2550	39.1092	12.7925	2550	52.5777	13.762
2551	39.071	12.7743	2551	52.5767	13.7739
2552	39.0908	12.777	2552	52.5828	13.7558
2553	39.1035	12.7781	2553	52.5373	13.7644
2554	39.102	12.8191	2554	52.52	13.7844
2555	39.0508	12.7888	2555	52.5153	13.7516
2556	39.0481	12.8152	2556	52.4851	13.8052
2557	39.0517	12.7755	2557	52.5163	13.7958
2558	39.0481	12.8245	2558	52.4566	13.7934
2559	39.0612	12.7958	2559	52.4984	13.8085
2560	39.0126	12.8269	2560	52.4649	13.8028
2561	38.9996	12.8023	2561	52.4871	13.8151
2562	39.0299	12.8678	2562	52.4553	13.8501

System Accuracy Verification

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

System Verification Setup Block Diagram



System Accuracy Check Results

Date	Frequency Band	Liquid Type	Measured SAR (W/Kg)		Target Value (W/Kg)	Delta (%)	Tolerance (%)
2015/6/23	835	Head	1g	10.1	9.773	3.35	±10
		Body	1g	9.25	9.736	-4.99	±10
	1750	Head	1g	39.7	37.02	7.24	±10
		Body	1g	36.6	36.65	-0.14	±10
	1900	Head	1g	41	39.481	3.85	±10
		Body	1g	38.9	39.715	-2.05	±10
	2450	Head	1g	53.9	52.4	2.86	±10
		Body	1g	52.1	52.4	-0.57	±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 835MHz Head

DUT: ALS-D-835-S-2; Type: 835 MHz; Serial: 180-00558

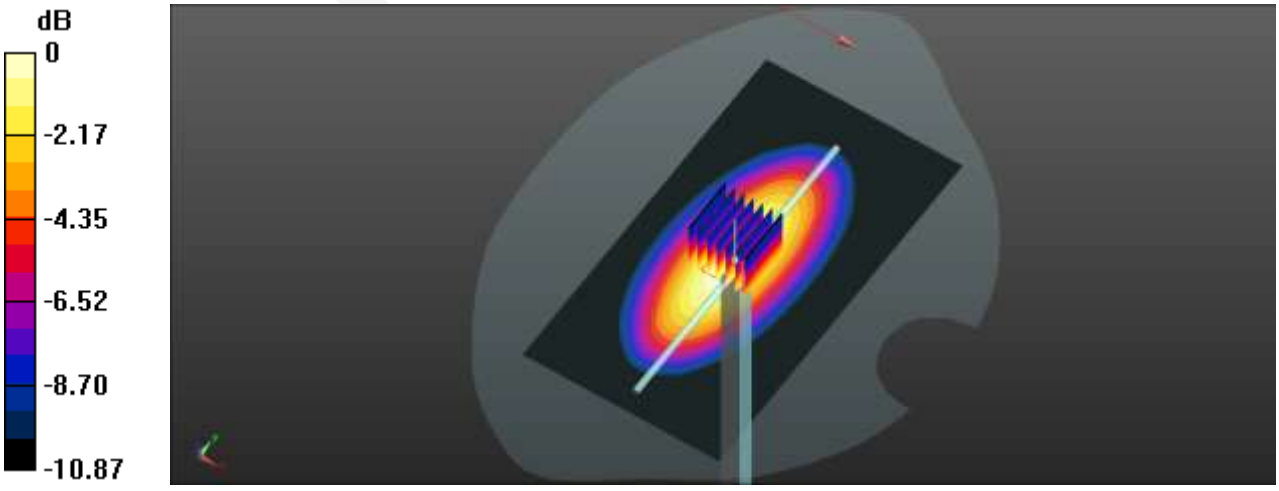
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.893 S/m; ε_r = 42.958; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.52, 9.52, 9.52); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 835MHz Head /Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 11.1 W/kg

System Performance 835MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 111.3 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 16.2 W/kg
SAR(1 g) = 10.1 W/kg; SAR(10 g) = 6.68 W/kg
Maximum value of SAR (measured) = 11.3 W/kg



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

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

System Performance 835MHz Body

DUT: ALS-D-835-S-2; Type: 835 MHz; Serial: 180-00558

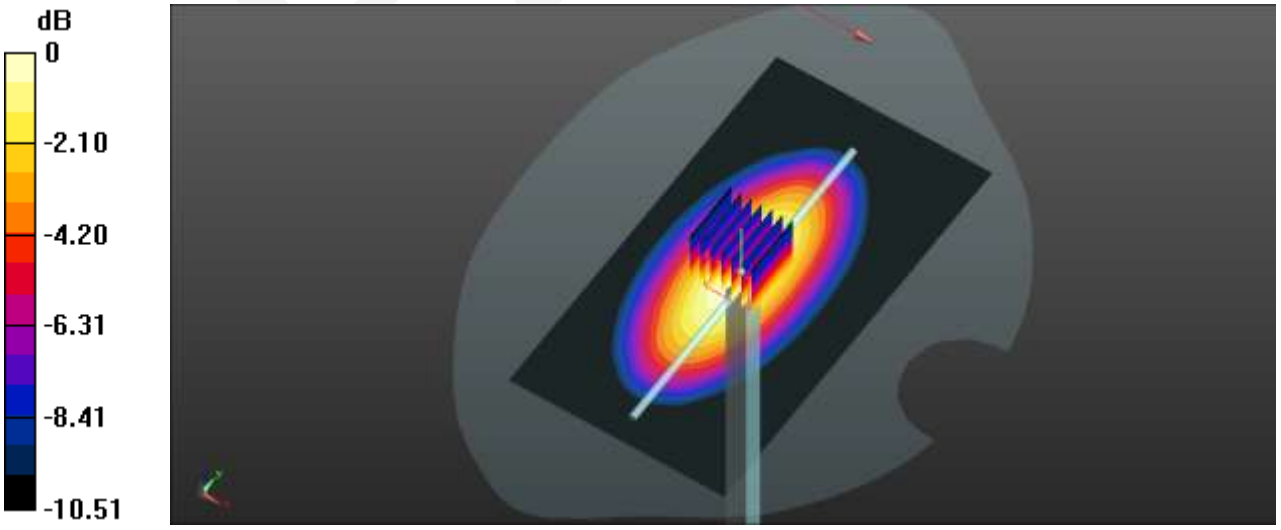
Communication System: CW; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.972 S/m; ε_r = 55.12; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.17, 9.17, 9.17); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 835MHz Body /Area Scan (71x131x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 9.76 W/kg

System Performance 835MHz Body /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.66 V/m; Power Drift = 0.04 dB
Peak SAR (extrapolated) = 13.6 W/kg
SAR(1 g) = 9.25 W/kg; SAR(10 g) = 5.96 W/kg
Maximum value of SAR (measured) = 9.76 W/kg



0 dB = 9.76 W/kg = 9.89 dBW/kg

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

System Performance 1750MHz Head

DUT: ALS-D-1750-S-2; Type: 1750 MHz; Serial: 198-00304

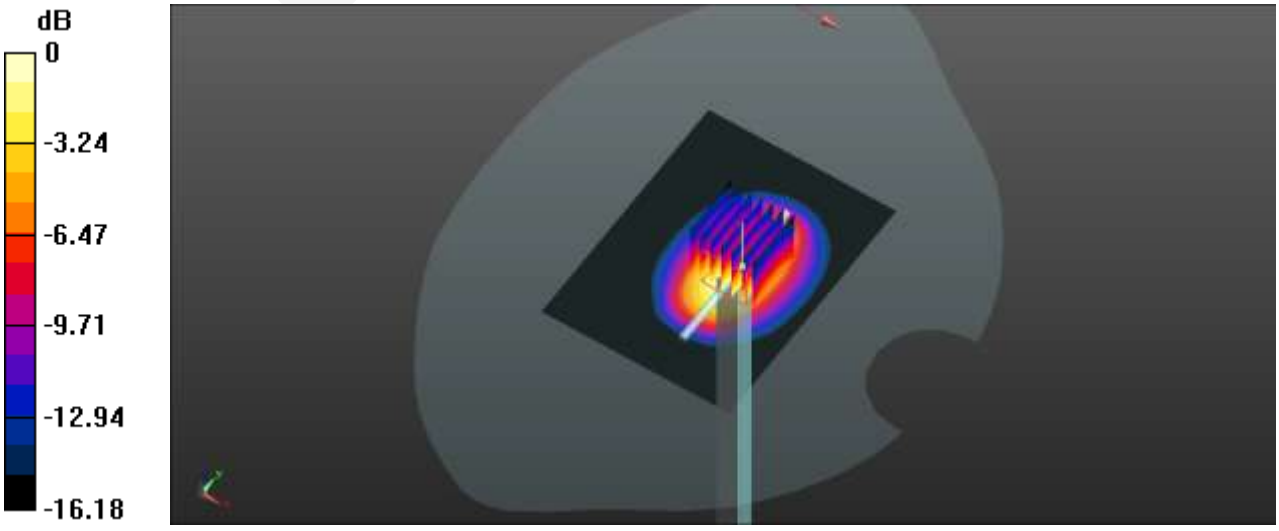
Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1750 MHz; σ = 1.387 S/m; ε_r = 40.363; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 1750MHz Head /Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 45.8 W/kg

System Performance 1750MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 145.5 V/m; Power Drift = -0.27 dB
Peak SAR (extrapolated) = 72.7 W/kg
SAR(1 g) = 39.7 W/kg; SAR(10 g) = 21.1 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 1750MHz Body

DUT: ALS-D-1750-S-2; Type: 1750 MHz; Serial: 198-00304

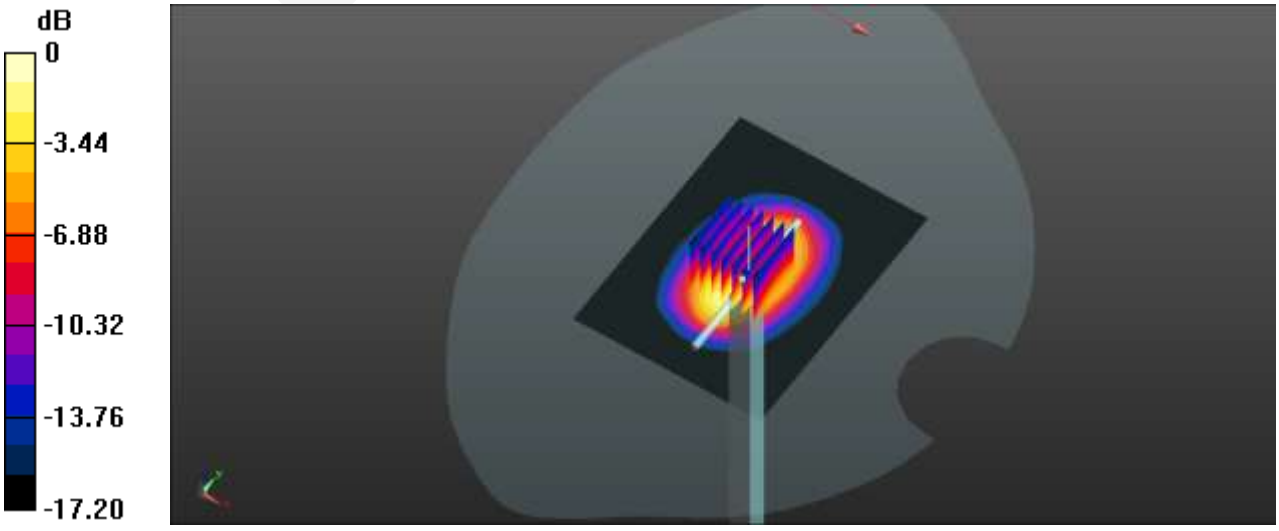
Communication System: CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1750 MHz; σ = 1.49 S/m; ε_r = 53.351; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 1750MHz Body /Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 42.9 W/kg

System Performance 1750MHz 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) = 68.3 W/kg
SAR(1 g) = 36.6 W/kg; SAR(10 g) = 19.3 W/kg
Maximum value of SAR (measured) = 40.9 W/kg



0 dB = 40.9 W/kg = 16.12 dBW/kg

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

System Performance 1900MHz Head

DUT: ALS-D-1900-S-2; Type: 1900 MHz; Serial: 210-00710

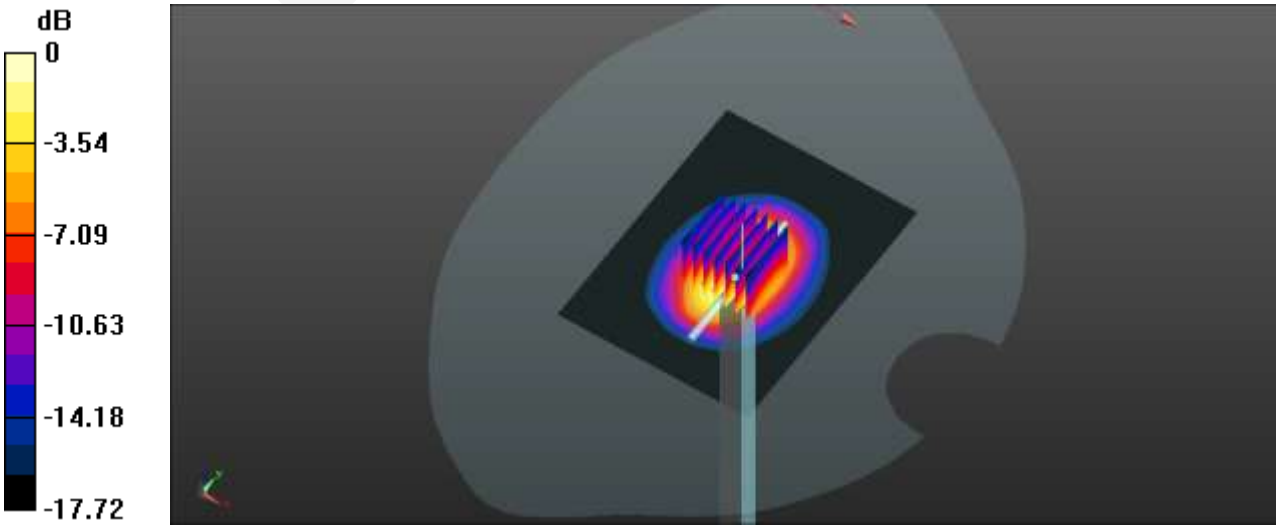
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.412 S/m; ε_r = 39.671; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.88, 7.88, 7.88); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 1900MHz Head /Area Scan (61x81x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 48.3 W/kg

System Performance 1900MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 174.6 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 77.0 W/kg
SAR(1 g) = 41 W/kg; SAR(10 g) = 21.2 W/kg
Maximum value of SAR (measured) = 45.9 W/kg



0 dB = 45.9 W/kg = 16.62 dBW/kg

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

System Performance 1900MHz Body

DUT: ALS-D-1900-S-2; Type: 1900 MHz; Serial: 210-00710

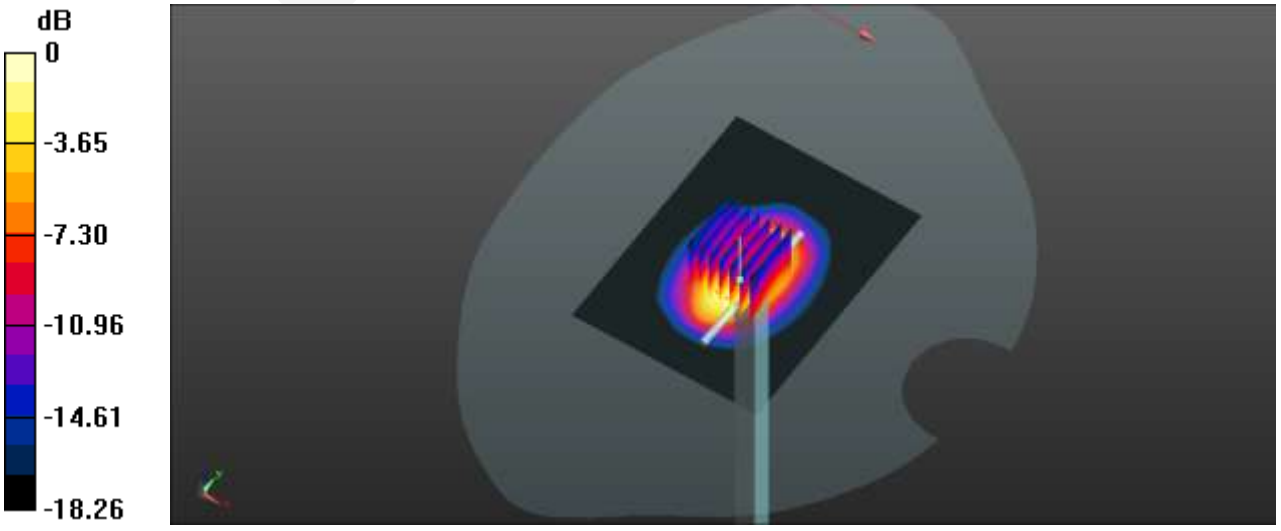
Communication System: CW; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.515 S/m; ε_r = 54.189; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.56, 7.56, 7.56); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 1900MHz 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 1900MHz 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 2450MHz Head

DUT: ALS-D-2450-S-2; Type: 2450 MHz; Serial: 220-00759

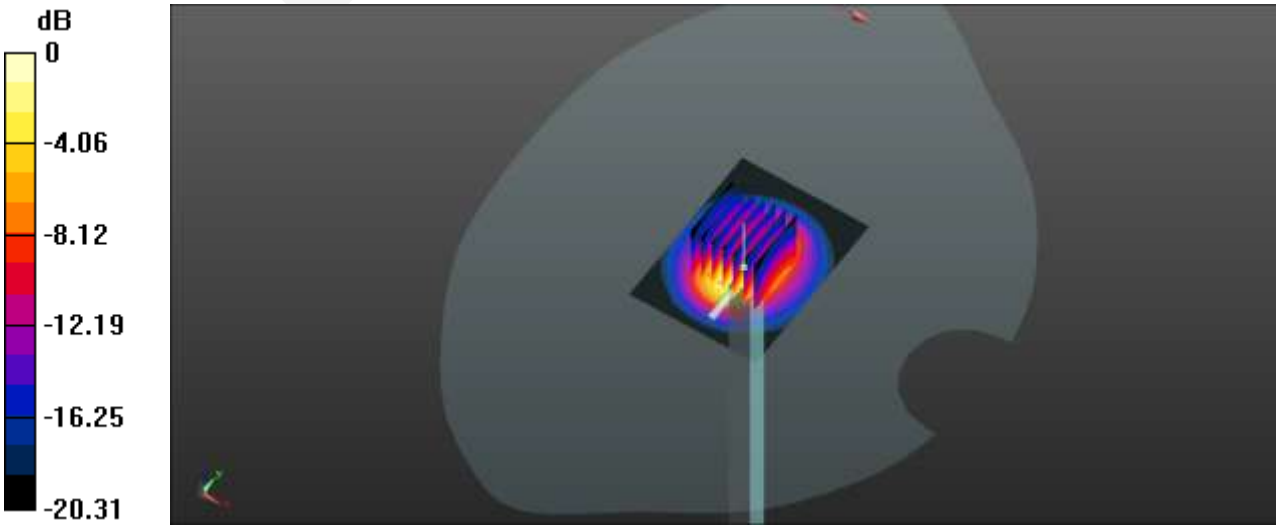
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.728 S/m; ε_r = 39.313; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.06, 7.06, 7.06); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 2450MHz Head /Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 64.2 W/kg

System Performance 2450MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 187.6 V/m; Power Drift = -0.08 dB
Peak SAR (extrapolated) = 111 W/kg
SAR(1 g) = 53.9 W/kg; SAR(10 g) = 24.5 W/kg
Maximum value of SAR (measured) = 61.7 W/kg



0 dB = 61.7 W/kg = 17.90 dBW/kg

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

System Performance 2450MHz Body

DUT: ALS-D-2450-S-2; Type: 2450 MHz; Serial: 220-00759

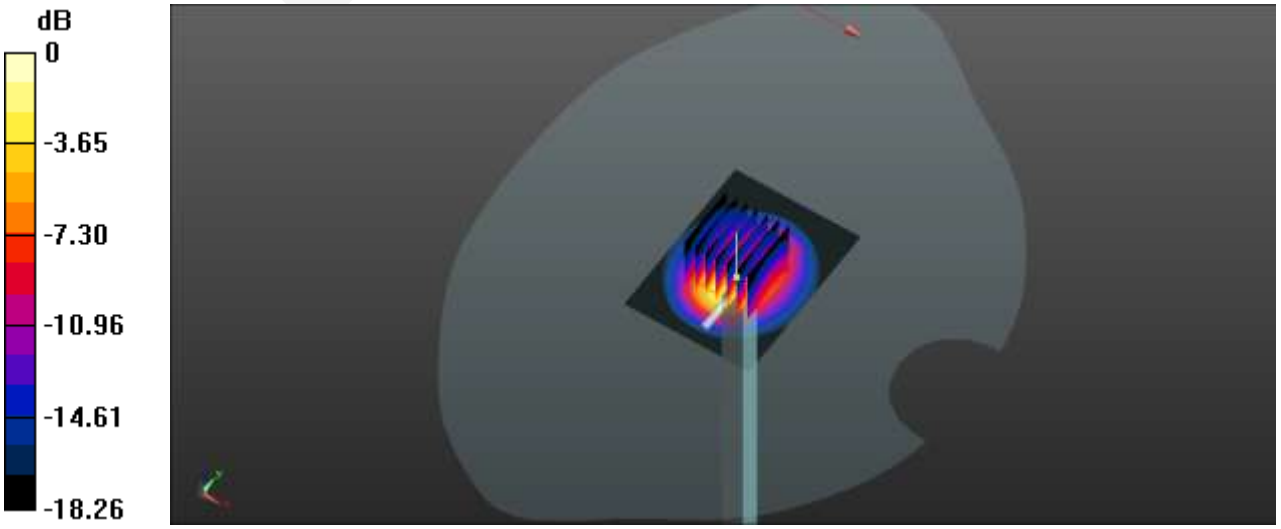
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.878 S/m; ε_r = 53.256; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.2, 7.2, 7.2); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- Phantom: SAM (30deg probe tilt) with CRP v5.0_20150321; Type: QD000P40CD; Serial: TP:1874
- Measurement SW: DASY52, Version 52.8 (8);

System Performance 2450MHz Body /Area Scan (61x81x1): Interpolated grid: dx=1.000 mm, dy=1.000 mm
Maximum value of SAR (interpolated) = 63.4 W/kg

System Performance 2450MHz Body /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 182.2 V/m; Power Drift = -0.28 dB
Peak SAR (extrapolated) = 107 W/kg
SAR(1 g) = 52.1 W/kg; SAR(10 g) = 23.7 W/kg
Maximum value of SAR (measured) = 59.6 W/kg



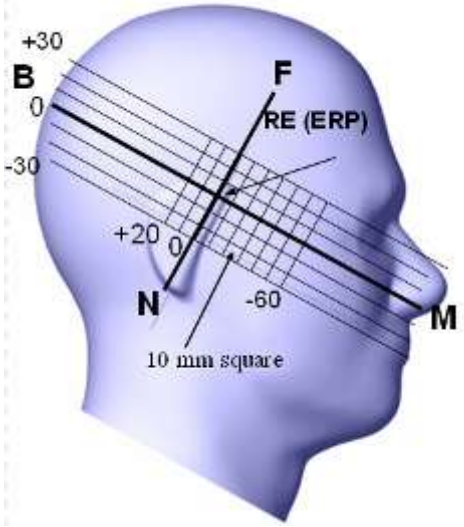
0 dB = 59.6 W/kg = 17.75 dBW/kg

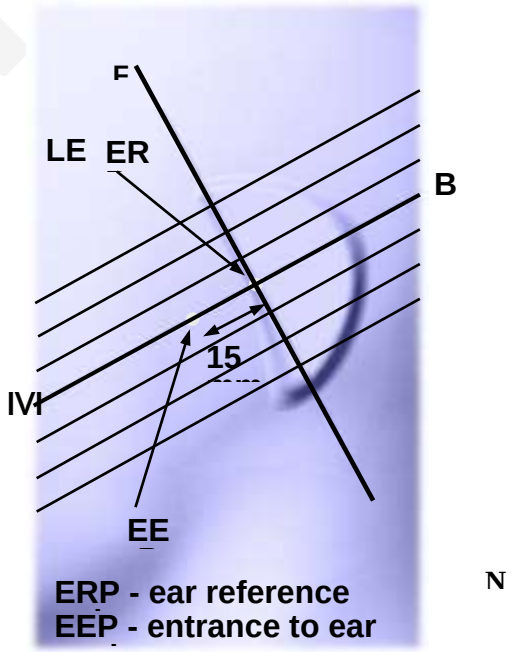
EUT TEST STRATEGY AND METHODOLOGY

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

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

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





Cheek/Touch Position

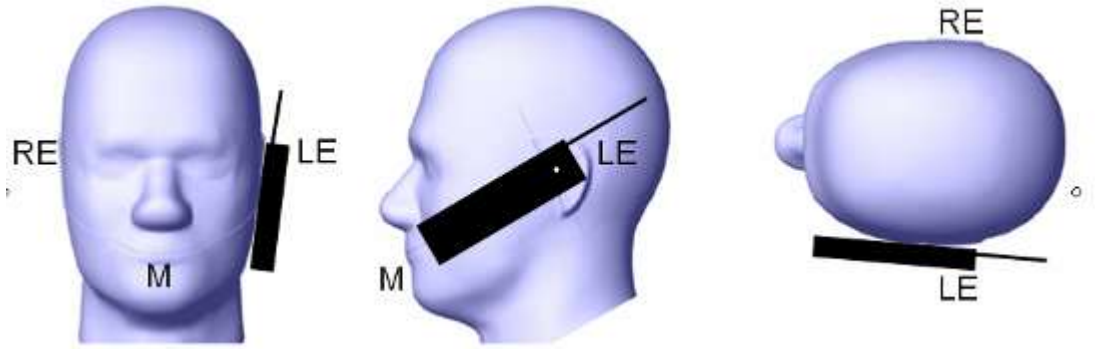
The device is brought toward the mouth of the head phantom by pivoting against the "ear reference point" or along the "N-F" line for the SCC-34/SC-2 head phantom.

This test position is established:

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

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

Cheek /Touch Position



Ear/Tilt Position

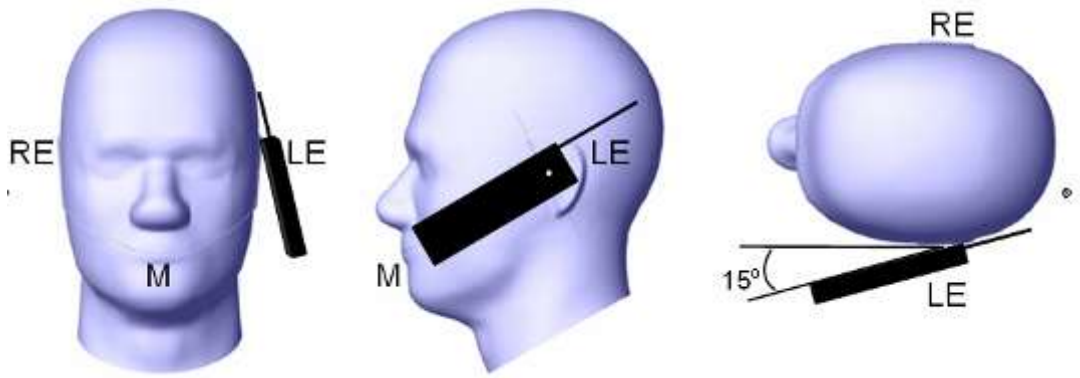
With the handset aligned in the "Cheek/Touch Position":

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

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

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

Ear /Tilt 15° Position



Test positions for body-worn and other configurations

Body-worn operating configurations should be tested with the belt-clips and holsters attached to the device and positioned against a flat phantom in normal use configurations. Devices with a headset output should be tested with a headset connected to the device. When multiple accessories that do not contain metallic components are supplied with the device, the device may be tested with only the accessory that dictates the closest spacing to the body. When multiple accessories that contain metallic components are supplied with the device, the device must be tested with each accessory that contains a unique metallic component. If multiple accessories share an identical metallic component (e.g., the same metallic belt-clip used with different holsters with no other metallic components), only the accessory that dictates the closest spacing to the body must be tested.

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

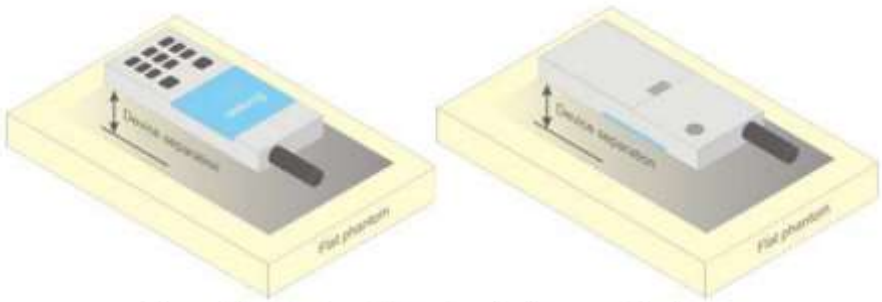


Figure 5 – Test positions for body-worn devices

SAR Evaluation Procedure

The evaluation was performed with the following procedure:

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

Step 2: The SAR distribution at the exposed side of the head was measured at a distance of 4 mm from the inner surface of the shell. The area covered the entire dimension of the head or 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 D06 Hotspot Mode v02
KDB 914225 D05 SAR for LTE Devices v02r03

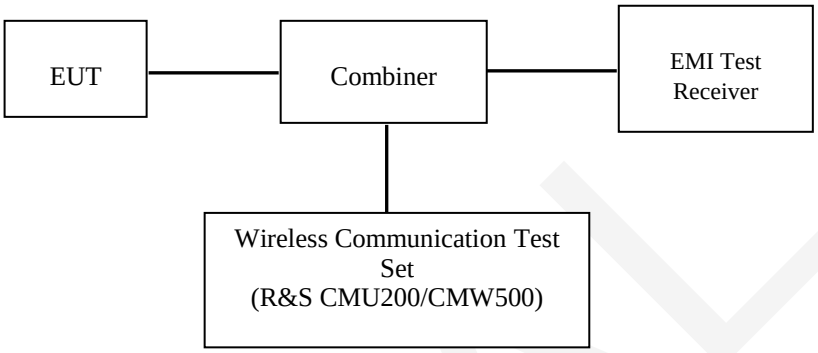
CONDUCTED OUTPUT POWER MEASUREMENT

Provision Applicable

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

Test Procedure

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



GSM/WCDMA

Radio Configuration

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

GSM

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

GPRS

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

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

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

WCDMA Release 99

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

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

HSDPA

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

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

FINAL

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 General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/ βd	11/15	6/15	15/9	2/15	-
	βhs	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				
	Ahs=βhs/ βc	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_FCIs	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 (Note3)	β_d	β_{HS} (Note1)	β_{ec}	β_{ed} (2xSF2) (Note 4)	β_{ed} (2xSF4) (Note 4)	CM (dB) (Note 2)	MPR (dB) (Note 2)	AG Index (Note 4)	E-TFCI (Note 5)	E-TFCI (boost)
1	1	0	30/15	30/15	β_{ed}1: 30/15 β_{ed}2: 30/15	β_{ed}3: 24/15 β_{ed}4: 24/15	3.5	2.5	14	105	105

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

DC-HSDPA

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

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

Parameter	Unit	Value
Nominal Avg. Inf. Bit Rate	kbps	60
Inter-TTI Distance	TTI's	1
Number of HARQ Processes	Processes	6
Information Bit Payload (N_{INF})	Bits	120
Number Code Blocks	Blocks	1
Binary Channel Bits Per TTI	Bits	960
Total Available SML's in UE	SML's	19200
Number of SML's per HARQ Proc.	SML's	3200
Coding Rate		0.15
Number of Physical Channel Codes	Codes	1
Modulation		QPSK

Note 1: The RMC is intended to be used for DC-HSDPA mode and both cells shall transmit with identical parameters as listed in the table.
Note 2: Maximum number of transmission is limited to 1, i.e., retransmission is not allowed. The redundancy and constellation version 0 shall be used.

LTE

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

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

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

For UE Power Class 1 and 3 the specific requirements and identified 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
			10, 15, 20	Table 6.2.4-4	
NS_05	6.6.3.3.1	1	10,15,20	≥ 50	≤ 1
NS_06	6.6.2.2.3	12, 13, 14, 17	1.4, 3, 5, 10	Table 5.6-1	N/A
NS_07	6.6.2.2.3 6.6.3.3.2	13	10	Table 6.2.4-2	
NS_08	6.6.3.3.3	19	10, 15	> 44	≤ 3
NS_09	6.6.3.3.4	21	10, 15	> 40	≤ 1
				> 55	≤ 2
NS_10		20	15, 20	Table 6.2.4-3	
NS_11	6.6.2.2.1	23	1.4, 3, 5, 10, 15, 20	Table 6.2.4-5	
NS_12	6.6.3.3.5	26	1.4, 3, 5	Table 6.2.4-6	
NS_13	6.6.3.3.6	26	5	Table 6.2.4-7	
NS_14	6.6.3.3.7	26	10, 15	Table 6.2.4-8	
NS_15	6.6.3.3.8	26	1.4, 3, 5, 10, 15	Table 6.2.4-9 Table 6.2.4-10	
NS_16	6.6.3.3.9	27	3, 5, 10	Table 6.2.4-11, Table 6.2.4-12, Table 6.2.4-13	
NS_17	6.6.3.3.10	28	5, 10	Table 5.6-1	N/A
NS_18	6.6.3.3.11	28	5	≥ 2	≤ 1
			10, 15, 20	≥ 1	≤ 4
NS_19	6.6.3.3.12	44	10, 15, 20	Table 6.2.4-14	
NS_20	6.2.2 6.6.2.2.1 6.6.3.2	23	5, 10, 15, 20	Table 6.2.4-15	
...					
NS_32	-	-	-	-	-

Maximum Target Output Power

Max Target Power (dBm)			
Mode/Band	Channel		
	Low	Middle	High
GSM 850	33.00	33.00	33.00
GPRS 1 TX Slot	32.70	32.70	32.70
GPRS 2 TX Slot	31.70	31.70	31.70
GPRS 3 TX Slot	30.30	30.30	30.30
GPRS 4 TX Slot	29.20	29.20	29.20
EDGE 1 TX Slot	26.20	26.20	26.20
EDGE 2 TX Slot	25.20	25.20	25.20
EDGE 3 TX Slot	22.80	22.80	22.80
EDGE 4 TX Slot	21.60	21.60	21.60
PCS 1900	29.80	29.80	29.80
GPRS 1 TX Slot	29.30	29.30	29.30
GPRS 2 TX Slot	28.20	28.20	28.20
GPRS 3 TX Slot	27.60	27.60	27.60
GPRS 4 TX Slot	27.10	27.10	27.10
EDGE 1 TX Slot	25.20	25.20	25.20
EDGE 2 TX Slot	24.00	24.00	24.00
EDGE 3 TX Slot	22.60	22.60	22.60
EDGE 4 TX Slot	21.40	21.40	21.40
WCDMA850	22.30	22.30	22.30
HSDPA	21.40	21.40	21.40
HSUPA	21.30	21.30	21.30
DC-HSDPA	21.30	21.30	21.30
HSPA+	21.30	21.30	21.30
WCDMA1900	22.10	22.10	22.10
HSDPA	21.10	21.10	21.10
HSUPA	21.10	21.10	21.10
DC-HSDPA	21.0	21.0	21.0
HSPA+	21.0	21.0	21.0
LTE-FDD Band 2	23.20	23.20	23.20
LTE-FDD Band 4	22.90	22.90	22.90
LTE-FDD Band 7	23.00	23.00	23.00
LTE-FDD Band 17	22.90	22.90	22.90
WLAN	9.80	9.80	9.80
Bluetooth	4.80 (2413MHz)	4.40 (2441 MHz)	5.60 (2448MHz)

Test Results:

GSM:

Band	Channel No.	Frequency (MHz)	Time Based Average Power (dBm)
GSM 850	128	824.2	**32.9**
	190	836.6	32.8
	251	848.8	32.6
PCS 1900	512	1850.2	29.6
	661	1880	29.6
	810	1909.8	**29.7**

GPRS:

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			1 slot	2 slots	3 slots	4 slots
GSM 850	128	824.2	32.68	31.69	30.22	29.15
	190	836.6	32.57	31.56	30.13	29.08
	251	848.8	32.43	31.41	30.01	29.03
PCS 1900	512	1850.2	28.71	27.59	27.53	26.49
	661	1880	28.96	27.75	26.79	26.65
	810	1909.8	29.22	28.1	27.07	27.01

EGPRS:

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			1 slot	2 slots	3 slots	4 slots
GSM 850	128	824.2	26.08	24.92	22.58	21.34
	190	836.6	26.15	25.01	22.69	21.47
	251	848.8	26.19	25.17	22.73	21.53
PCS 1900	512	1850.2	25.04	23.89	22.58	21.29
	661	1880	24.63	23.41	22.04	20.86
	810	1909.8	25.16	23.94	22.71	21.38

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	23.68	25.69	25.97	**26.15**
	190	836.6	23.57	25.56	25.88	26.08
	251	848.8	23.43	25.41	25.76	26.03
PCS 1900	512	1850.2	19.71	21.59	23.28	23.49
	661	1880	19.96	21.75	22.54	23.65
	810	1909.8	20.22	22.1	22.82	**24.01**

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	17.08	18.92	18.33	18.34
	190	836.6	17.15	19.01	18.44	18.47
	251	848.8	17.19	**19.17**	18.48	18.53
PCS 1900	512	1850.2	16.04	17.89	18.33	18.29
	661	1880	15.63	17.41	17.79	17.86
	810	1909.8	16.16	17.94	**18.46**	18.38

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	22.09
	4183	836.6	**22.25**
	4233	846.6	22.18
WCDMA 1900	9262	1852.4	21.87
	9400	1880	21.97
	9538	1907.6	**22.02**

Results (HSDPA)

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			Subset 1	Subset 2	Subset 3	Subset 4
WCDMA 850	4132	826.4	20.97	20.92	20.98	20.95
	4183	836.6	21.22	**21.26**	21.2	21.24
	4233	846.6	21.1	21.06	21.09	21
WCDMA 1900	9262	1852.4	20.81	20.78	20.75	20.8
	9400	1880	20.88	20.82	20.89	20.85
	9538	1907.6	20.93	**20.98**	20.84	20.91

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	20.97	20.92	20.98	20.95	21.01
	4183	836.6	21.22	**21.26**	21.2	21.24	21.16
	4233	846.6	21.1	21.06	21.09	21	21.02
WCDMA 1900	9262	1852.4	20.74	20.71	20.77	20.69	20.64
	9400	1880	20.84	20.81	20.86	20.79	20.73
	9538	1907.6	20.96	20.89	20.87	**20.99**	20.9

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	21.05	21	21.07	20.99
	4183	836.6	**21.15**	21.1	21.14	21.11
	4233	846.6	21.14	21.11	21.15	21.08
WCDMA 1900	9262	1852.4	20.7	20.73	20.65	20.72
	9400	1880	20.77	20.8	20.83	20.74
	9538	1907.6	20.86	20.82	20.82	**20.94**

Results (HSPA+)

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)
WCDMA 850	4132	826.4	20.96
	4183	836.6	**21.17**
	4233	846.6	21.05
WCDMA 1900	9262	1852.4	20.66
	9400	1880	20.78
	9538	1907.6	**20.88**

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	22.79	22.98	22.65
		1#3	22.93	23.07	22.72
		1#5	22.81	23.03	22.69
		3#0	22.21	22.37	22.01
		3#1	22.09	22.30	22.00
		3#3	22.13	22.34	22.01
		6#0	21.77	21.99	21.61
	16-QAM	1#0	22.17	22.39	22.04
		1#3	22.32	22.50	22.19
		1#5	22.23	22.37	22.03
		3#0	21.49	21.69	21.29
		3#1	21.30	21.51	21.18
		3#3	21.39	21.60	21.30
		6#0	20.90	21.04	20.70
3M	QPSK	1#0	22.78	22.94	22.56
		1#7	22.86	23.02	22.62
		1#14	22.86	22.99	22.66
		8#0	22.39	22.53	22.11
		8#4	22.39	22.60	22.34
		8#7	22.28	22.47	22.17
		15#0	21.94	22.09	21.75
	16-QAM	1#0	22.42	22.56	22.17
		1#7	22.48	22.61	22.23
		1#14	22.34	22.51	22.14
		8#0	21.04	21.23	20.91
		8#4	21.23	21.39	21.13
		8#7	21.07	21.28	20.96
		15#0	20.91	21.08	20.77

5M	QPSK	1#0	22.90	23.06	22.74
		1#12	22.91	23.10	22.75
		1#24	22.81	23.01	22.62
		12#0	22.35	22.49	22.16
		12#6	22.29	22.51	22.12
		12#11	22.30	22.43	22.03
		25#0	21.79	21.97	21.64
	16-QAM	1#0	22.38	22.57	22.21
		1#12	22.42	22.59	22.25
		1#24	22.37	22.51	22.25
		12#0	21.45	21.60	21.34
		12#6	21.58	21.79	21.41
		12#11	21.52	21.71	21.40
		25#0	20.82	21.01	20.65
10M	QPSK	1#0	22.58	22.71	22.35
		1#24	22.62	22.83	22.51
		1#49	22.60	22.80	22.48
		25#0	22.05	22.26	21.90
		25#12	22.13	22.31	21.94
		25#24	22.07	22.23	21.88
		50#0	21.67	21.83	21.40
	16-QAM	1#0	22.02	22.19	21.90
		1#24	22.09	22.30	21.93
		1#49	22.13	22.25	21.91
		25#0	21.41	21.58	21.19
		25#12	21.42	21.63	21.28
		25#24	21.39	21.51	21.15
		50#0	20.77	20.92	20.61
15M	QPSK	1#0	22.91	23.04	22.73
		1#37	23.00	**23.16**	22.86
		1#74	22.84	23.01	22.74
		36#0	22.19	22.38	22.12
		36#17	22.32	22.45	22.10
		36#35	22.20	22.36	22.04
		75#0	21.58	21.78	21.47
	16-QAM	1#0	22.18	22.37	22.10
		1#37	22.26	22.42	22.06
		1#74	22.12	22.30	21.96
		36#0	21.37	21.49	21.24
		36#17	21.38	21.58	21.26
		36#35	21.26	21.40	21.04
		75#0	20.72	20.93	20.63

20M	QPSK	1#0	**22.65**	**22.80**	**22.47**
		1#49	22.57	22.73	22.47
		1#99	22.66	22.87	22.50
		50#0	21.91	22.09	21.72
		50#24	21.86	22.07	21.73
		50#49	21.80	22.02	21.70
		100#0	21.44	21.64	21.32
	16-QAM	1#0	21.88	22.02	21.62
		1#49	21.95	22.14	21.87
		1#99	21.94	22.07	21.77
		50#0	21.13	21.29	21.04
		50#24	21.12	21.31	20.99
		50#49	21.03	21.23	20.90
		100#0	20.66	20.80	20.41

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	22.76	22.56	22.32
		1#3	22.58	22.37	22.23
		1#5	22.77	22.51	22.31
		3#0	22.68	22.49	22.31
		3#1	22.55	22.34	22.19
		3#3	22.58	22.45	22.28
		6#0	21.76	21.47	21.28
	16-QAM	1#0	21.86	21.63	21.46
		1#3	21.71	21.49	21.29
		1#5	21.90	21.60	21.48
		3#0	21.81	21.56	21.39
		3#1	21.65	21.53	21.29
		3#3	21.82	21.59	21.51
		6#0	20.88	20.62	20.55

3M	QPSK	1#0	22.62	22.37	22.17
		1#7	22.34	22.16	22.01
		1#14	22.57	22.30	22.07
		8#0	22.45	22.17	21.97
		8#4	22.33	22.11	21.88
		8#7	22.31	22.13	21.97
		15#0	21.61	21.42	21.30
	16-QAM	1#0	22.20	21.97	21.78
		1#7	21.97	21.85	21.65
		1#14	22.02	21.90	21.74
		8#0	21.60	21.37	21.22
		8#4	21.49	21.31	21.16
		8#7	21.48	21.33	21.19
		15#0	20.76	20.55	20.41
5M	QPSK	1#0	22.58	22.46	22.37
		1#12	22.60	22.40	22.30
		1#24	**22.83**	**22.57**	**22.41**
		12#0	22.08	21.97	21.88
		12#6	22.08	21.91	21.67
		12#11	22.16	21.98	21.83
		25#0	21.51	21.40	21.26
	16-QAM	1#0	21.73	21.52	21.35
		1#12	21.47	21.32	21.11
		1#24	21.58	21.46	21.27
		12#0	21.26	21.15	21.07
		12#6	21.31	21.07	20.89
		12#11	21.23	21.11	21.04
		25#0	20.85	20.66	20.41
10M	QPSK	1#0	22.16	22.05	21.94
		1#24	22.27	22.02	21.82
		1#49	22.37	22.14	22.00
		25#0	21.92	21.73	21.54
		25#12	22.04	21.79	21.53
		25#24	22.04	21.87	21.66
		50#0	21.34	21.19	21.03
	16-QAM	1#0	21.71	21.53	21.36
		1#24	21.56	21.39	21.24
		1#49	21.68	21.48	21.39
		25#0	21.11	21.01	20.87
		25#12	21.09	20.94	20.78
		25#24	21.27	21.08	20.96
		50#0	20.47	20.26	20.12

15M	QPSK	1#0	22.13	21.94	21.68
		1#37	22.18	21.98	21.72
		1#74	22.07	21.90	21.81
		36#0	21.78	21.57	21.33
		36#17	21.63	21.52	21.36
		36#35	21.74	21.63	21.53
		75#0	21.10	20.90	20.78
	16-QAM	1#0	21.53	21.27	21.09
		1#37	21.38	21.23	21.13
		1#74	21.55	21.36	21.22
		36#0	20.98	20.87	20.64
		36#17	20.95	20.80	20.57
		36#35	21.08	20.93	20.80
		75#0	20.23	20.02	19.81
20M	QPSK	1#0	21.95	21.79	21.64
		1#49	22.04	21.84	21.72
		1#99	22.10	21.91	21.69
		50#0	21.55	21.35	21.22
		50#24	21.39	21.26	21.06
		50#49	21.57	21.41	21.20
		100#0	20.90	20.66	20.48
	16-QAM	1#0	21.24	21.04	20.78
		1#49	21.37	21.15	21.05
		1#99	21.20	21.09	20.90
		50#0	20.91	20.67	20.48
		50#24	21.74	21.55	21.31
		50#49	21.81	21.61	21.53
		100#0	19.97	19.83	19.63

LTE Band 7:

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
5M	QPSK	1#0	22.61	22.83	22.40
		1#12	22.57	22.85	22.35
		1#24	22.55	22.79	22.25
		12#0	21.90	22.16	21.71
		12#6	21.96	22.23	21.71
		12#11	21.89	22.10	21.62
		25#0	21.52	21.78	21.28
	16-QAM	1#0	21.43	21.69	21.17
		1#12	21.42	21.63	21.18
		1#24	21.44	21.67	21.22
		12#0	20.98	21.19	20.66
		12#6	20.91	21.10	20.68
		12#11	21.02	21.24	20.79
		25#0	20.61	20.84	20.35
10M	QPSK	1#0	22.65	22.86	22.43
		1#24	22.74	22.93	22.42
		1#49	22.56	22.79	22.29
		25#0	21.85	22.05	21.52
		25#12	21.90	22.13	21.72
		25#24	21.90	22.09	21.65
		50#0	21.64	21.84	21.44
	16-QAM	1#0	21.93	22.19	21.82
		1#24	21.98	22.24	21.70
		1#49	21.91	22.13	21.65
		25#0	21.15	21.34	20.80
		25#12	21.09	21.30	20.82
		25#24	21.16	21.39	20.97
		50#0	20.59	20.82	20.37

15M	QPSK	1#0	22.70	**22.93**	22.52
		1#37	22.65	22.90	22.49
		1#74	22.63	22.87	22.36
		36#0	21.77	22.03	21.58
		36#17	21.73	21.99	21.50
		36#35	21.82	22.07	21.64
		75#0	21.52	21.80	21.27
	16-QAM	1#0	21.99	22.19	21.76
		1#37	21.99	22.23	21.81
		1#74	21.92	22.14	21.72
		36#0	21.25	21.49	21.05
		36#17	21.38	21.58	21.12
		36#35	21.20	21.43	20.90
		75#0	20.70	20.92	20.47
20M	QPSK	1#0	22.62	22.83	22.32
		1#49	**22.67**	**22.90**	**22.46**
		1#99	22.58	22.79	22.26
		50#0	21.54	21.74	21.24
		50#24	21.60	21.83	21.37
		50#49	21.55	21.80	21.33
		100#0	21.75	21.95	21.52
	16-QAM	1#0	21.84	22.03	21.61
		1#49	21.83	22.10	21.70
		1#99	21.79	22.02	21.59
		50#0	21.01	21.29	20.83
		50#24	21.16	21.36	20.89
		50#49	21.12	21.40	20.89
		100#0	20.65	20.89	20.39

Note:
1.SAR for LTE band exposure configurations is measured according to the procedures of KDB 941225 D05 SAR for LTE Devices v02.
2.The CMW500 Wideband Radio Communication tester is used for LTE output power measurements and SAR testing. Closed loop power control is used to keep the radio transmitters the max output power during the test.
3.KDB941225D05v02- SAR for higher order modulation is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg

Bluetooth

Mode	Channel No.	Channel frequency (MHz)	RF Output Power (dBm)
BDR(GFSK)	0	2402	3.07
	39	2441	4.37
	78	2480	0.05
	1	2413	4.72
	46	2448	**5.52**
EDR(4-DQPSK)	0	2402	1.72
	39	2441	2.87
	78	2480	-1.06
	14	2416	3.19
	47	2449	4
EDR-8DPSK	0	2402	1.84
	39	2441	2.98
	78	2480	-0.97
	11	2413	3.4
	46	2448	4.12
BLE	0	2402	-3.91
	19	2440	-3.22
	39	2480	-6.4
	6	2414	-2.64
	24	2450	2.04

WLAN

Mode	Channel No.	Channel frequency (MHz)	RF Output Power (dBm)
802.11b	1	2412	9.50
	6	2437	9.63
	11	2462	9.79
802.11g	1	2412	9.62
	6	2437	**9.79**
	11	2462	9.57
802.11n HT20	1	2412	9.35
	6	2437	9.67
	11	2462	9.72
802.11n HT40	3	2422	9.31
	6	2437	9.62
	9	2452	9.68

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

SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

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

SAR Test Data

Environmental Conditions

Temperature:	22-23 ℃
Relative Humidity:	36-35 %
ATM Pressure:	997 mbar

Testing was performed by Rocky Xiao on 2015-06-23

Note: For LTE Band 17, the test results please refer to the report number: RDG150610005-20A, which issued by Bay Area Compliance Laboratories Corp. (Shenzhen).

FINAL

GSM 850:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	824.2	GSM	1.625	**32.9**	33	1.023	0.131	0.134	**1#**
	836.6	GSM	2.937	32.8	33	1.047	0.123	0.129	/
	848.8	GSM	-1.254	32.6	33	1.096	0.119	0.13	/
Left Head Tilt	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	1.966	32.8	33	1.047	0.098	0.103	/
	848.8	GSM	/	/	/	/	/	/	/
Right Head Cheek	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	0.748	32.8	33	1.047	0.12	0.126	/
	848.8	GSM	/	/	/	/	/	/	/
Right Head Tilt	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	-0.874	32.8	33	1.047	0.107	0.112	/
	848.8	GSM	/	/	/	/	/	/	/
Body-Back-Headset (10mm)	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	-3.315	32.8	33	1.047	0.341	0.357	/
	848.8	GSM	/	/	/	/	/	/	/
Body-Back (10mm)	824.2	GPRS	-2.725	29.15	29.2	1.012	0.421	0.426	**2#**
	836.6	GPRS	-2.189	29.08	29.2	1.028	0.392	0.403	/
	848.8	GPRS	-0.842	29.03	29.2	1.04	0.395	0.411	/
Body-Left (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	2.522	29.08	29.2	1.028	0.261	0.268	/
	848.8	GPRS	/	/	/	/	/	/	/
Body-Right (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	-1.537	29.08	29.2	1.028	0.385	0.396	/
	848.8	GPRS	/	/	/	/	/	/	/
Body-Bottom (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	1.144	29.08	29.2	1.028	0.224	0.23	/
	848.8	GPRS	/	/	/	/	/	/	/

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

PCS Band:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	1850.2	GSM	0.48	29.6	29.8	1.047	0.205	0.215	/
	1880	GSM	-3.794	29.6	29.8	1.047	0.213	0.223	/
	1909.8	GSM	4.232	**29.7**	29.8	1.023	0.224	0.229	3#
Left Head Tilt	1850.2	GSM	/	/	/	/	/	/	/
	1880	GSM	3.127	29.6	29.8	1.047	0.177	0.185	/
	1909.8	GSM	/	/	/	/	/	/	/
Right Head Cheek	1850.2	GSM	/	/	/	/	/	/	/
	1880	GSM	2.621	29.6	29.8	1.047	0.202	0.211	/
	1909.8	GSM	/	/	/	/	/	/	/
Right Head Tilt	1850.2	GSM	/	/	/	/	/	/	/
	1880	GSM	2.914	29.6	29.8	1.047	0.165	0.173	/
	1909.8	GSM	/	/	/	/	/	/	/
Body-Back-Headset (10mm)	1850.2	GSM	/	/	/	/	/	/	/
	1880	GSM	-2.895	29.6	29.8	1.047	0.512	0.536	/
	1909.8	GSM	/	/	/	/	/	/	/
Body-Back (10mm)	1850.2	GPRS	-2.343	26.49	27.1	1.151	0.52	0.599	/
	1880.0	GPRS	2.22	26.65	27.1	1.109	0.523	0.58	/
	1909.8	GPRS	-0.23	27.01	27.1	1.021	0.674	0.688	**4#**
Body-Left (10mm)	1850.2	GPRS	/	/	/	/	/	/	/
	1880.0	GPRS	-2.276	26.65	27.1	1.109	0.223	0.247	/
	1909.8	GPRS	/	/	/	/	/	/	/
Body-Right (10mm)	1850.2	GPRS	/	/	/	/	/	/	/
	1880.0	GPRS	3.45	26.65	27.1	1.109	0.084	0.093	/
	1909.8	GPRS	/	/	/	/	/	/	/
Body-Bottom (10mm)	1850.2	GPRS	/	/	/	/	/	/	/
	1880.0	GPRS	-2.444	26.65	27.1	1.109	0.102	0.113	/
	1909.8	GPRS	/	/	/	/	/	/	/

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

WCDMA 850 Band:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	826.4	WCDMA	3.818	22.09	22.3	1.05	0.102	0.107	/
	836.6	WCDMA	3.276	22.25	22.3	1.012	0.131	0.133	**5#**
	846.6	WCDMA	-0.052	22.18	22.3	1.028	0.114	0.117	/
Left Head Tilt	826.4	WCDMA	/	/	/	/	/	/	/
	836.6	WCDMA	-3.211	22.25	22.3	1.012	0.078	0.079	/
	846.6	WCDMA	/	/	/	/	/	/	/
Right Head Cheek	826.4	WCDMA	/	/	/	/	/	/	/
	836.6	WCDMA	1.303	22.25	22.3	1.012	0.116	0.117	/
	846.6	WCDMA	/	/	/	/	/	/	/
Right Head Tilt	826.4	WCDMA	/	/	/	/	/	/	/
	836.6	WCDMA	-1.378	22.25	22.3	1.012	0.072	0.073	/
	846.6	WCDMA	/	/	/	/	/	/	/
Body-Back (10mm)	826.4	WCDMA	-0.166	22.09	22.3	1.05	0.221	0.232	/
	836.6	WCDMA	-3.395	22.25	22.3	1.012	0.245	0.248	**6#**
	846.6	WCDMA	2.535	22.18	22.3	1.028	0.235	0.242	/
Body-Left (10mm)	826.4	WCDMA	/	/	/	/	/	/	/
	836.6	WCDMA	3.179	22.25	22.3	1.012	0.132	0.134	/
	846.6	WCDMA	/	/	/	/	/	/	/
Body-Right (10mm)	826.4	WCDMA	/	/	/	/	/	/	/
	836.6	WCDMA	2.246	22.25	22.3	1.012	0.056	0.057	/
	846.6	WCDMA	/	/	/	/	/	/	/
Body-Bottom (10mm)	826.4	WCDMA	/	/	/	/	/	/	/
	836.6	WCDMA	-1.16	22.25	22.3	1.012	0.062	0.063	/
	846.6	WCDMA	/	/	/	/	/	/	/

Note:

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

WCDMA 1900 Band:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	1852.4	WCDMA	2.426	21.87	22.1	1.054	0.242	0.255	/
	1880	WCDMA	2.13	21.97	22.1	1.03	0.258	0.266	/
	1907.6	WCDMA	0	22.02	22.1	1.019	0.269	0.274	**7#**
Left Head Tilt	1852.4	WCDMA	/	/	/	/	/	/	/
	1880	WCDMA	-0.684	21.97	22.1	1.03	0.132	0.136	/
	1907.6	WCDMA	/	/	/	/	/	/	/
Right Head Cheek	1852.4	WCDMA	/	/	/	/	/	/	/
	1880	WCDMA	-3.314	21.97	22.1	1.03	0.241	0.248	/
	1907.6	WCDMA	/	/	/	/	/	/	/
Right Head Tilt	1852.4	WCDMA	/	/	/	/	/	/	/
	1880	WCDMA	3.753	21.97	22.1	1.03	0.126	0.13	/
	1907.6	WCDMA	/	/	/	/	/	/	/
Body-Back (10mm)	1852.4	WCDMA	-3.814	21.87	22.1	1.054	0.492	0.519	/
	1880.0	WCDMA	2.771	21.97	22.1	1.03	0.498	0.513	
	1907.6	WCDMA	-0.917	22.02	22.1	1.019	0.516	0.526	**8#**
Body-Left (10mm)	1852.4	WCDMA	/	/	/	/	/	/	/
	1880.0	WCDMA	-2.833	21.97	22.1	1.03	0.243	0.25	/
	1907.6	WCDMA	/	/	/	/	/	/	/
Body-Right (10mm)	1852.4	WCDMA	/	/	/	/	/	/	/
	1880.0	WCDMA	2.522	21.97	22.1	1.03	0.126	0.13	/
	1907.6	WCDMA	/	/	/	/	/	/	/
Body-Bottom (10mm)	1852.4	WCDMA	/	/	/	/	/	/	/
	1880.0	WCDMA	2.145	21.97	22.1	1.03	0.137	0.141	/
	1907.6	WCDMA	/	/	/	/	/	/	/

Note:

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

LTE Band 2:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	1850	1RB	-0.275	22.65	23.2	1.135	0.229	0.26	/
	1880	1RB	2.802	22.8	23.2	1.096	0.243	0.266	**9#**
	1909.9	1RB	3.876	22.47	23.2	1.183	0.213	0.252	/
	1880	50%RB	3.273	22.09	23.2	1.291	0.182	0.235	/
Left Head Tilt	1850	1RB	/	/	/	/	/	/	/
	1880	1RB	3.084	22.8	23.2	1.096	0.092	0.101	/
	1909.9	1RB	/	/	/	/	/	/	/
	1880	50%RB	-3.865	22.09	23.2	1.291	0.071	0.092	/
Right Head Cheek	1850	1RB	/	/	/	/	/	/	/
	1880	1RB	3.79	22.8	23.2	1.096	0.203	0.222	/
	1909.9	1RB	/	/	/	/	/	/	/
	1880	50%RB	-0.757	22.09	23.2	1.291	0.153	0.198	/
Right Head Tilt	1850	1RB	/	/	/	/	/	/	/
	1880	1RB	-3.808	22.8	23.2	1.096	0.078	0.085	/
	1909.9	1RB	/	/	/	/	/	/	/
	1880	50%RB	3.873	22.09	23.2	1.291	0.064	0.083	/
Body-Back (10mm)	1850	1RB	2.265	22.65	23.2	1.135	0.612	0.695	/
	1880	1RB	-2.949	22.8	23.2	1.096	0.64	0.701	**10#**
	1909.9	1RB	2.544	22.47	23.2	1.183	0.582	0.689	/
	1880	50%RB	3.315	22.09	23.2	1.291	0.535	0.691	/
Body-Left (10mm)	1850	1RB	/	/	/	/	/	/	/
	1880	1RB	-0.286	22.8	23.2	1.096	0.303	0.332	/
	1909.9	1RB	/	/	/	/	/	/	/
	1880	50%RB	2.498	22.09	23.2	1.291	0.224	0.289	/
Body-Right (10mm)	1850	1RB	/	/	/	/	/	/	/
	1880	1RB	2.062	22.8	23.2	1.096	0.104	0.114	/
	1909.9	1RB	/	/	/	/	/	/	/
	1880	50%RB	-2.585	22.09	23.2	1.291	0.082	0.106	/
Body-Bottom (10mm)	1850	1RB	/	/	/	/	/	/	/
	1880	1RB	-2.787	22.8	23.2	1.096	0.12	0.132	/
	1909.9	1RB	/	/	/	/	/	/	/
	1880	50%RB	-0.432	22.09	23.2	1.291	0.096	0.124	/

LTE Band 4:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	1710	1RB	3.514	22.83	22.9	1.016	0.174	0.177	**11#**
	1732.5	1RB	1.841	22.57	22.9	1.079	0.162	0.175	/
	1754.9	1RB	-2.639	22.41	22.9	1.119	0.149	0.167	/
	1710	50%RB	-1.382	22.16	22.9	1.186	0.142	0.168	/
Left Head Tilt	1710	1RB	0.554	22.57	22.9	1.079	0.076	0.082	/
	1732.5	1RB	/	/	/	/	/	/	/
	1754.9	1RB	/	/	/	/	/	/	/
	1710	50%RB	3.518	22.16	22.9	1.186	0.063	0.075	/
Right Head Cheek	1710	1RB	0.328	22.57	22.9	1.079	0.152	0.164	/
	1732.5	1RB	/	/	/	/	/	/	/
	1754.9	1RB	/	/	/	/	/	/	/
	1710	50%RB	3.55	22.16	22.9	1.186	0.135	0.16	/
Right Head Tilt	1710	1RB	-2.675	22.57	22.9	1.079	0.072	0.078	/
	1732.5	1RB	/	/	/	/	/	/	/
	1754.9	1RB	/	/	/	/	/	/	/
	1710	50%RB	-2.217	22.16	22.9	1.186	0.062	0.074	/
Body-Back (10mm)	1710	1RB	-4.06	22.83	22.9	1.016	0.312	0.317	**12#**
	1732.5	1RB	3.688	22.57	22.9	1.079	0.282	0.304	/
	1754.9	1RB	-3.994	22.41	22.9	1.119	0.273	0.305	/
	1710	50%RB	3.35	22.16	22.9	1.186	0.256	0.304	/
Body-Left (10mm)	1710	1RB	-1.723	22.57	22.9	1.079	0.106	0.114	/
	1732.5	1RB	/	/	/	/	/	/	/
	1754.9	1RB	/	/	/	/	/	/	/
	1710	50%RB	1.121	22.16	22.9	1.186	0.092	0.109	/
Body-Right (10mm)	1710	1RB	0.89	22.57	22.9	1.079	0.054	0.058	/
	1732.5	1RB	/	/	/	/	/	/	/
	1754.9	1RB	/	/	/	/	/	/	/
	1710	50%RB	3.51	22.16	22.9	1.186	0.043	0.051	/
Body-Bottom (10mm)	1710	1RB	-3.199	22.57	22.9	1.079	0.061	0.066	/
	1732.5	1RB	/	/	/	/	/	/	/
	1754.9	1RB	/	/	/	/	/	/	/
	1710	50%RB	2.944	22.16	22.9	1.186	0.055	0.065	/

LTE Band 7:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	2500	1RB	0.901	22.7	23	1.072	0.0103	0.011	
	2535	1RB	0	22.93	23	1.016	0.011	0.011	**13#**
	2569.9	1RB	2.441	22.52	23	1.117	0.0101	0.011	/
	2535	50%RB	1.588	21.83	23	1.309	0.008	0.01	/
Left Head Tilt	2500	1RB	/	/	/	/	/	/	/
	2535	1RB	0.087	22.93	23	1.016	0.008	0.008	/
	2569.9	1RB	/	/	/	/	/	/	/
	2535	50%RB	-3.725	21.83	23	1.309	0.007	0.009	/
Right Head Cheek	2500	1RB	/	/	/	/	/	/	/
	2535	1RB	-1.687	22.93	23	1.016	0.01	0.01	/
	2569.9	1RB	/	/	/	/	/	/	/
	2535	50%RB	-1.586	21.83	23	1.309	0.007	0.009	/
Right Head Tilt	2500	1RB	/	/	/	/	/	/	/
	2535	1RB	3.702	22.93	23	1.016	0.008	0.008	/
	2569.9	1RB	/	/	/	/	/	/	/
	2535	50%RB	-1.703	21.83	23	1.309	0.007	0.009	/
Body-Back (10mm)	2500	1RB	-1.377	22.7	23	1.072	0.072	0.077	/
	2535	1RB	3.276	22.93	23	1.016	0.0787	0.08	**14#**
	2569.9	1RB	-2.477	22.52	23	1.117	0.062	0.069	/
	2535	50%RB	2.977	21.83	23	1.309	0.056	0.073	/
Body-Left (10mm)	2500	1RB	/	/	/	/	/	/	/
	2535	1RB	-2.342	22.93	23	1.016	0.054	0.055	/
	2569.9	1RB	/	/	/	/	/	/	/
	2535	50%RB	0.572	21.83	23	1.309	0.033	0.043	/
Body-Right (10mm)	2500	1RB	/	/	/	/	/	/	/
	2535	1RB	3.056	22.93	23	1.016	0.033	0.034	/
	2569.9	1RB	/	/	/	/	/	/	/
	2535	50%RB	0.301	21.83	23	1.309	0.03	0.039	/
Body-Bottom (10mm)	2500	1RB	/	/	/	/	/	/	/
	2535	1RB	-2.171	22.93	23	1.016	0.042	0.043	/
	2569.9	1RB	/	/	/	/	/	/	/
	2535	50%RB	1.745	21.83	23	1.309	0.035	0.046	/

Note:
1. When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. SAR for LTE band exposure configurations is measured according to the procedures of KDB 941225 D05 SAR for LTE Devices v02.

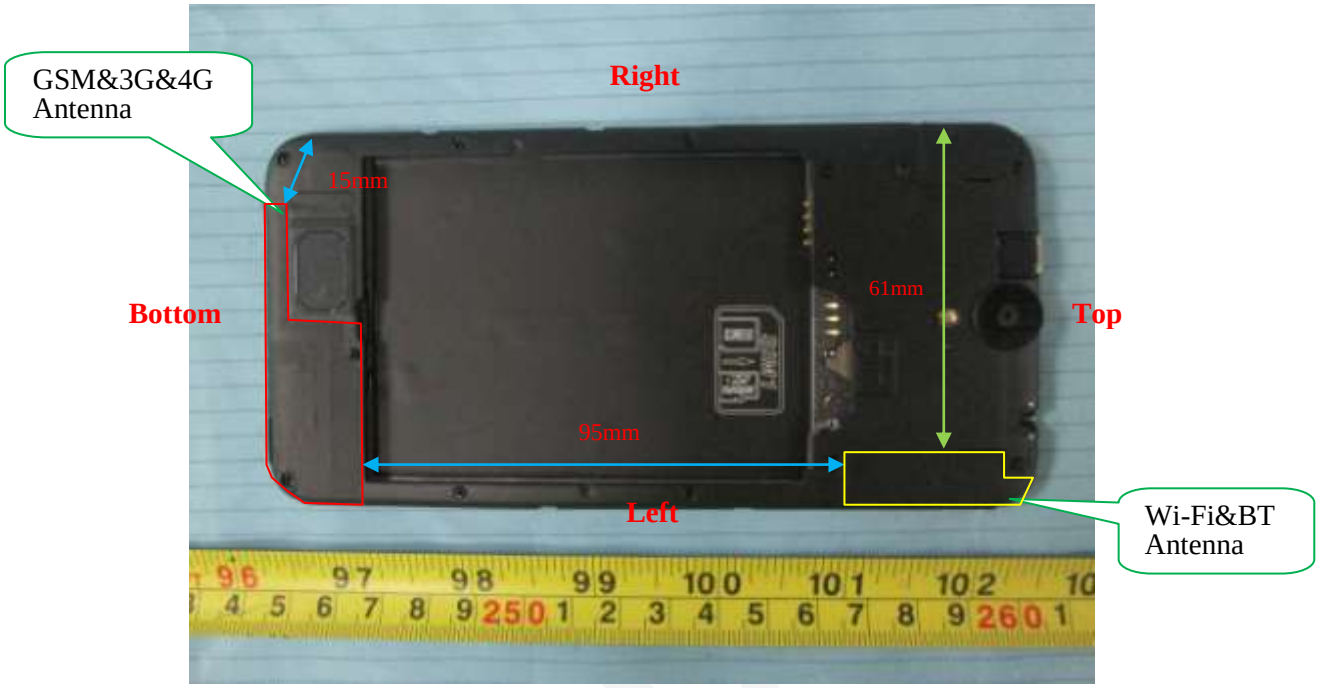
3. KDB941225D05- SAR for higher order modulation is required only when the highest maximum output power for the configuration in the higher order modulation is > ½ dB higher than the same configuration in QPSK or when the reported SAR for the QPSK configuration is > 1.45 W/kg
4. KDB941225D05- For QPSK with 100% RB allocation, when the reported SAR measured for the Highest output power channel is <1.45 W/kg, tests for the remaining required test channels are optional.
5.KDB941225D05- For QPSK with 100% RB allocation, SAR is not required when the highest maximum output power for 100 % RB allocation is less than the highest maximum output power in 50% and 1 RB allocations and the highest reported SAR for 1 RB and 50% RB allocation are ≤ 0.8 W/kg.

6. KDB941225D05- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offset the upper edge, middle and lower edge of each required test channel.
7. KDB941225D05- SAR for the other channel bandwidth is not necessary except the highest maximum output power of a configuration requiring testing in the smaller channel bandwidth is > ½ dB higher than the equivalent channel configurations in the largest channel bandwidth configuration or the reported SAR of a configuration for the largest channel bandwidth is > 1.45 W/kg.
8. Worst case SAR for 50% RB allocation is selected to be tested.

FINAL

SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

BT& Wi-Fi and GSM&3G&4G Antennas Location:



Simultaneous Transmission:

Description of Simultaneous Transmit Capabilities			Antennas Distance (mm)
Transmitter Combination	**Simultaneous?**	**Hotspot?**	
GSM + WCDMA	×	×	0
GSM+LTE	×	×	0
GSM + Bluetooth	√	×	95
GSM + WLAN	√	√	95
WCDMA+LTE	×	×	0
WCDMA + Bluetooth	√	×	95
WCDMA + WLAN	√	√	95
LTE + Bluetooth	√	×	95
LTE + WLAN	√	√	95

Note： For Band 17 stand-alone SAR, please refer to the report number: RDG150610005-20A, which issued by Bay Area Compliance Laboratories Corp. (Shenzhen).

Standalone SAR test exclusion considerations

Mode	Frequency (MHz)	Pavg (dBm)	Pavg (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
WLAN	2450	9.79	9.53	0	2.98	3	YES
Bluetooth	2450	5.6	3.63	0	1.14	3	YES

NOTE:

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

Standalone SAR estimation:

Mode	Frequency (GHz)	Pavg (dBm)	Pavg (mW)	Distance (mm)	Estimated 1-g (W/kg)
WLAN Head	2450	9.79	9.53	0	0.397
WLAN Body	2450	9.79	9.53	10	0.199
BT Head	2450	5.6	3.63	0	0.152
BT Body	2450	5.6	3.63	10	0.076

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

Simultaneous and Hotspot SAR test exclusion considerations:

Mode (SAR1+SAR2)	Position	Reported SAR (W/kg)		ΣSAR
		SAR1	SAR2	< 1.6W/kg
GSM 850+BT	Left Head Cheek	0.134	0.152	0.286
	Left Head Tilt	0.103	0.152	0.255
	Right Head Cheek	0.126	0.152	0.278
	Right Head Tilt	0.112	0.152	0.264
	Body-Back-Headset	0.357	0.076	0.433
GPRS 850 +BT	Body-Back	0.426	0.076	0.502
	Body-Right	0.268	0.076	0.344
	Body-Left	0.396	0.076	0.472
	Body-Bottom	0.23	0.076	0.306
PCS 1900+BT	Left Head Cheek	0.229	0.152	0.381
	Left Head Tilt	0.185	0.152	0.337
	Right Head Cheek	0.211	0.152	0.363
	Right Head Tilt	0.173	0.152	0.325
	Body-Back-Headset	0.536	0.076	0.612
GPRS 1900 +BT	Body-Back	0.688	0.076	0.764
	Body-Right	0.247	0.076	0.323
	Body-Left	0.093	0.076	0.169
	Body-Bottom	0.113	0.076	0.189
GSM 850 +WLAN	Left Head Cheek	0.134	0.397	0.531
	Left Head Tilt	0.103	0.397	0.5
	Right Head Cheek	0.126	0.397	0.523
	Right Head Tilt	0.112	0.397	0.509
	Body-Back-Headset	0.357	0.199	0.556
GSM 850 +WLAN (Hotspot)	Body-Back	0.426	0.199	0.625
	Body-Right	0.268	0.199	0.467
	Body-Left	0.396	0.199	0.595
	Body-Bottom	0.23	0.199	0.429
PCS 1900 +WLAN	Left Head Cheek	0.229	0.397	0.626
	Left Head Tilt	0.185	0.397	0.582
	Right Head Cheek	0.211	0.397	0.608
	Right Head Tilt	0.173	0.397	0.57
	Body-Back-Headset	0.536	0.199	0.735
PCS 1900 +WLAN (Hotspot)	Body-Back	0.688	0.199	0.887
	Body-Right	0.247	0.199	0.446
	Body-Left	0.093	0.199	0.292
	Body-Bottom	0.113	0.199	0.312

Mode (SAR1+SAR2)	Position	Reported SAR (W/kg)		ΣSAR
		SAR1	SAR2	< 1.6W/kg
WCDMA 850 +BT	Left Head Cheek	0.133	0.152	0.285
	Left Head Tilt	0.079	0.152	0.231
	Right Head Cheek	0.117	0.152	0.269
	Right Head Tilt	0.073	0.152	0.225
	Body-Back	0.248	0.076	0.324
	Body-Right	0.134	0.076	0.21
	Body-Left	0.057	0.076	0.133
	Body-Bottom	0.063	0.076	0.139
WCDMA 1900 +BT	Left Head Cheek	0.274	0.076	0.35
	Left Head Tilt	0.136	0.152	0.288
	Right Head Cheek	0.248	0.152	0.4
	Right Head Tilt	0.13	0.152	0.282
	Body-Back	0.526	0.152	0.678
	Body-Right	0.25	0.076	0.326
	Body-Left	0.13	0.076	0.206
	Body-Bottom	0.141	0.076	0.217
WCDMA 850 +WLAN	Left Head Cheek	0.133	0.076	0.209
	Left Head Tilt	0.079	0.076	0.155
	Right Head Cheek	0.117	0.397	0.514
	Right Head Tilt	0.073	0.397	0.47
WCDMA 850 +WLAN (Hotspot)	Body-Back	0.248	0.397	0.645
	Body-Right	0.134	0.397	0.531
	Body-Left	0.057	0.199	0.256
	Body-Bottom	0.063	0.199	0.262
WCDMA 1900 +WLAN	Left Head Cheek	0.274	0.199	0.473
	Left Head Tilt	0.136	0.199	0.335
	Right Head Cheek	0.248	0.199	0.447
	Right Head Tilt	0.13	0.397	0.527
WCDMA 1900 +WLAN (Hotspot)	Body-Back	0.526	0.397	**0.923**
	Body-Right	0.25	0.397	0.647
	Body-Left	0.13	0.397	0.527
	Body-Bottom	0.141	0.199	0.34

Mode (SAR1+SAR2)	Position	Reported SAR (W/kg)		ΣSAR < 1.6W/kg
		SAR1	SAR2	
LTE Band 2 +BT	Left Head Cheek	0.249	0.152	0.401
	Left Head Tilt	0.094	0.152	0.246
	Right Head Cheek	0.208	0.152	0.36
	Right Head Tilt	0.08	0.152	0.232
	Body-Back	0.655	0.076	0.731
	Body-Right	0.31	0.076	0.386
	Body-Left	0.106	0.076	0.182
	Body-Bottom	0.123	0.076	0.199
LTE Band 4+BT	Left Head Cheek	0.178	0.152	0.33
	Left Head Tilt	0.081	0.152	0.233
	Right Head Cheek	0.162	0.152	0.314
	Right Head Tilt	0.077	0.152	0.229
	Body-Back	0.319	0.076	0.395
	Body-Right	0.113	0.076	0.189
	Body-Left	0.058	0.076	0.134
	Body-Bottom	0.065	0.076	0.141
LTE Band 7+BT	Left Head Cheek	0.011	0.152	0.163
	Left Head Tilt	0.008	0.152	0.16
	Right Head Cheek	0.01	0.152	0.162
	Right Head Tilt	0.008	0.152	0.16
	Body-Back	0.08	0.076	0.156
	Body-Right	0.055	0.076	0.131
	Body-Left	0.034	0.076	0.11
	Body-Bottom	0.043	0.076	0.119
LTE Band 17+BT	Left Head Cheek	0.084	0.152	0.236
	Left Head Tilt	0.041	0.152	0.193
	Right Head Cheek	0.081	0.152	0.233
	Right Head Tilt	0.036	0.152	0.188
	Body-Back	0.195	0.076	0.271
	Body-Right	0.090	0.076	0.166
	Body-Left	0.116	0.076	0.192
	Body-Bottom	0.036	0.076	0.112
	Right Head Tilt	0.008	0.397	0.405

Mode (SAR1+SAR2)	Position	Reported SAR (W/kg)		ΣSAR < 1.6W/kg
		SAR1	SAR2	
LTE Band 2+WLAN	Left Head Cheek	0.249	0.397	**0.646**
	Left Head Tilt	0.094	0.397	0.491
	Right Head Cheek	0.208	0.397	0.605
	Right Head Tilt	0.08	0.397	0.477
LTE Band 2 +WLAN (Hotspot)	Body-Back	0.655	0.199	0.854
	Body-Right	0.31	0.199	0.509
	Body-Left	0.106	0.199	0.305
	Body-Bottom	0.123	0.199	0.322
LTE Band 4 +WLAN	Left Head Cheek	0.178	0.397	0.575
	Left Head Tilt	0.081	0.397	0.478
	Right Head Cheek	0.162	0.397	0.559
	Right Head Tilt	0.077	0.397	0.474
LTE Band 4 +WLAN (Hotspot)	Body-Back	0.319	0.199	0.518
	Body-Right	0.113	0.199	0.312
	Body-Left	0.058	0.199	0.257
	Body-Bottom	0.065	0.199	0.264
LTE Band 7 +WLAN	Left Head Cheek	0.011	0.397	0.408
	Left Head Tilt	0.008	0.397	0.405
	Right Head Cheek	0.01	0.397	0.407
	Right Head Tilt	0.008	0.397	0.405
LTE Band 7 +WLAN (Hotspot)	Body-Back	0.08	0.199	0.279
	Body-Right	0.055	0.199	0.254
	Body-Left	0.034	0.199	0.233
	Body-Bottom	0.043	0.199	0.242
LTE Band 17 +WLAN	Left Head Cheek	0.084	0.152	0.236
	Left Head Tilt	0.041	0.152	0.193
	Right Head Cheek	0.081	0.152	0.233
	Right Head Tilt	0.036	0.152	0.188
LTE Band 17 +WLAN (Hotspot)	Body-Back	0.195	0.076	0.271
	Body-Right	0.09	0.076	0.166
	Body-Left	0.116	0.076	0.192
	Body-Bottom	0.036	0.076	0.112

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 Left-Cheek Low Channel

DUT: Smart phone; Type: QBA769PLUS

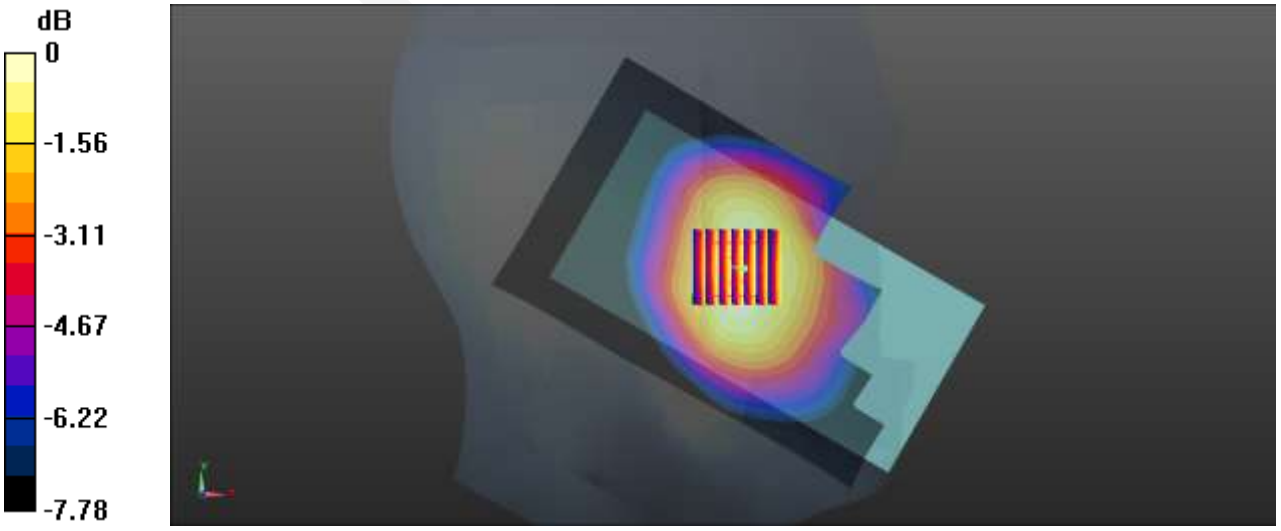
Communication System: Generic GSM; Frequency: 824.2 MHz;Duty Cycle: 1:8
Medium parameters used: f = 824.2 MHz; σ = 0.879 S/m; ε_r = 42.906; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.52, 9.52, 9.52); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- 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 Left Cheek/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.137 W/kg

Head/GSM 850 Left Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.869 V/m; Power Drift = 0.07 dB
Peak SAR (extrapolated) = 0.160 W/kg
SAR(1 g) = 0.131 W/kg; SAR(10 g) = 0.102 W/kg
Maximum value of SAR (measured) = 0.138 W/kg



0 dB = 0.138 W/kg = -8.60 dBW/kg

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

Test Plot 2#:GSM 850 Back Low Channel

DUT: Smart phone; Type: QBA769PLUS

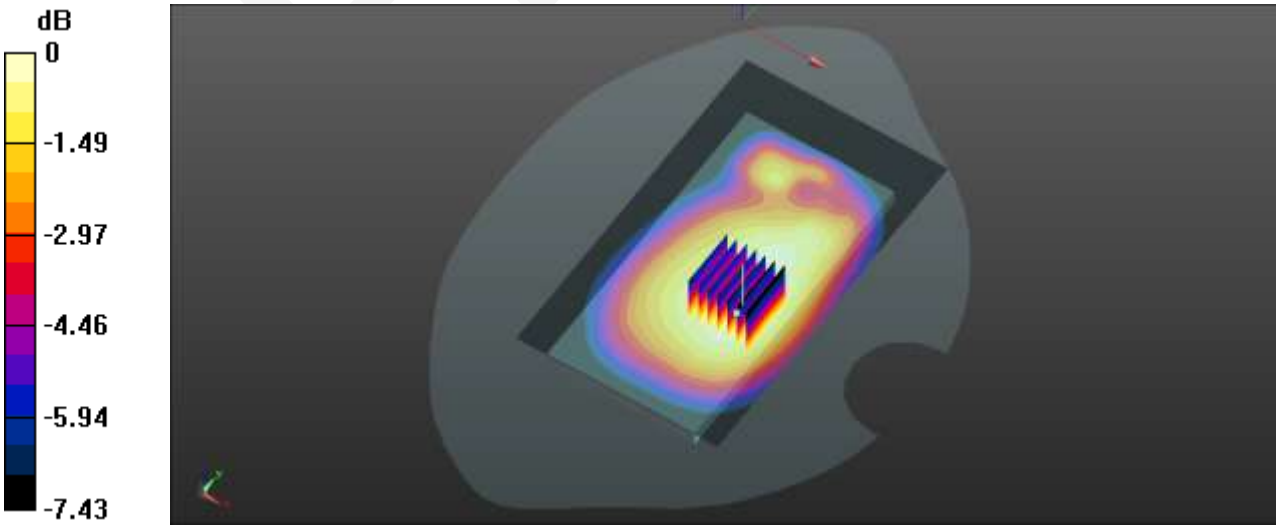
Communication System: Generic GPRS-4 SLOT; Frequency: 824.2 MHz;Duty Cycle: 1:2
Medium parameters used: f = 824.2 MHz; σ = 0.964 S/m; ε_r = 55.15; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.17, 9.17, 9.17); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- 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 Back/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.450 W/kg

Body/GSM 850 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 20.29 V/m; Power Drift = -0.12 dB
Peak SAR (extrapolated) = 0.545 W/kg
SAR(1 g) = 0.421 W/kg; SAR(10 g) = 0.320 W/kg
Maximum value of SAR (measured) = 0.442 W/kg



0 dB = 0.442 W/kg = -3.55 dBW/kg

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

Test Plot 3#:PCS 1900Left Cheek High Channel

DUT: Smart phone; Type: QBA769PLUS

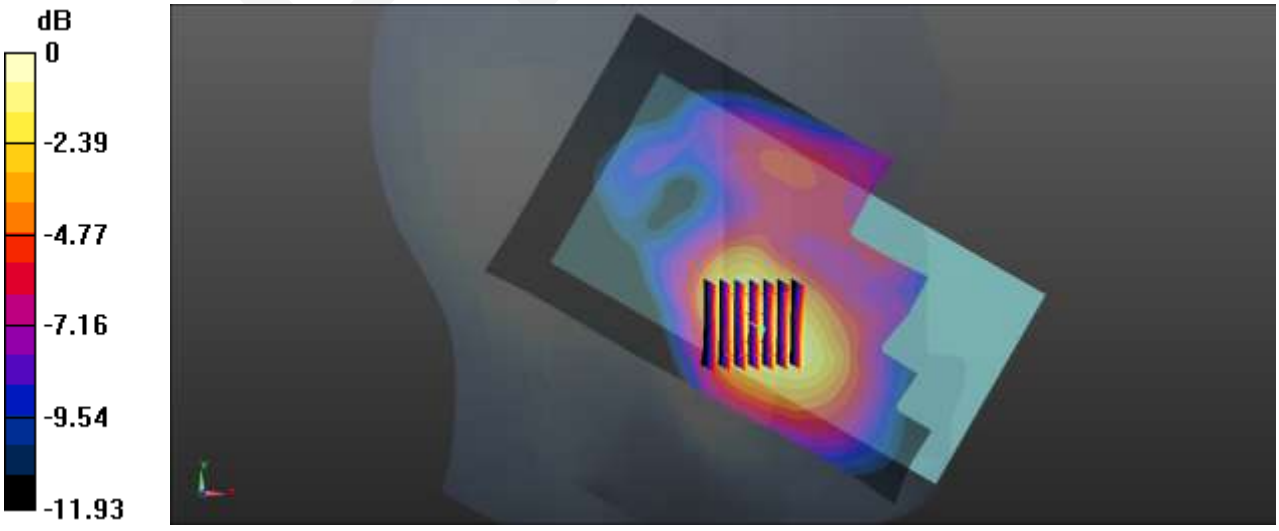
Communication System: Generic GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:8
Medium parameters used: f = 1909.8 MHz; σ = 1.412 S/m; ε_r = 39.572; ρ = 1000 kg/m^3
Phantom section: Left Section

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 Left Cheek/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.248 W/kg

Head/PCS 1900 Left Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 4.691 V/m; Power Drift = 0.18 dB
Peak SAR (extrapolated) = 0.363 W/kg
SAR(1 g) = 0.224 W/kg; SAR(10 g) = 0.134 W/kg
Maximum value of SAR (measured) = 0.246 W/kg



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

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

Test Plot 4#:PCS 1900 Back High Channel

DUT: Smart phone; Type: QBA769PLUS

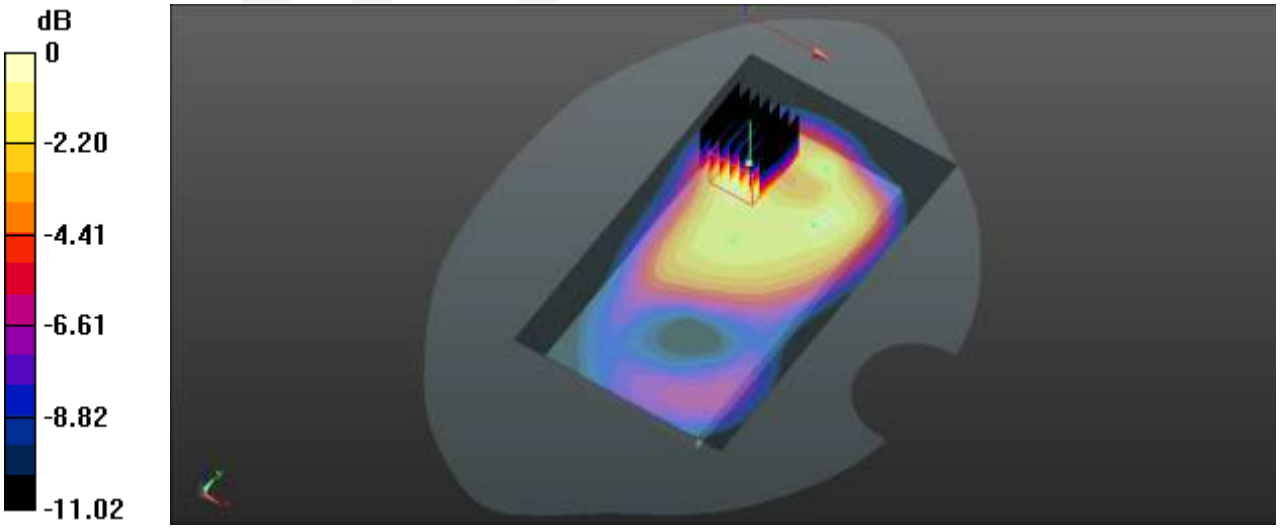
Communication System: Generic GSM; Frequency: 1909.8 MHz;Duty Cycle: 1:2
Medium parameters used: f = 1909.8 MHz; σ = 1.494 S/m; ε_r = 53.368; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.56, 7.56, 7.56); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- 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 Back/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.742 W/kg

Body/PCS 1900 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.35 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.21 W/kg
SAR(1 g) = 0.674 W/kg; SAR(10 g) = 0.362 W/kg
Maximum value of SAR (measured) = 0.746 W/kg



0 dB = 0.746 W/kg = -1.27 dBW/kg

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

Test Plot 5#:WCDMA 850 Left-Cheek Middle Channel

DUT: Smart phone; Type: QBA769PLUS

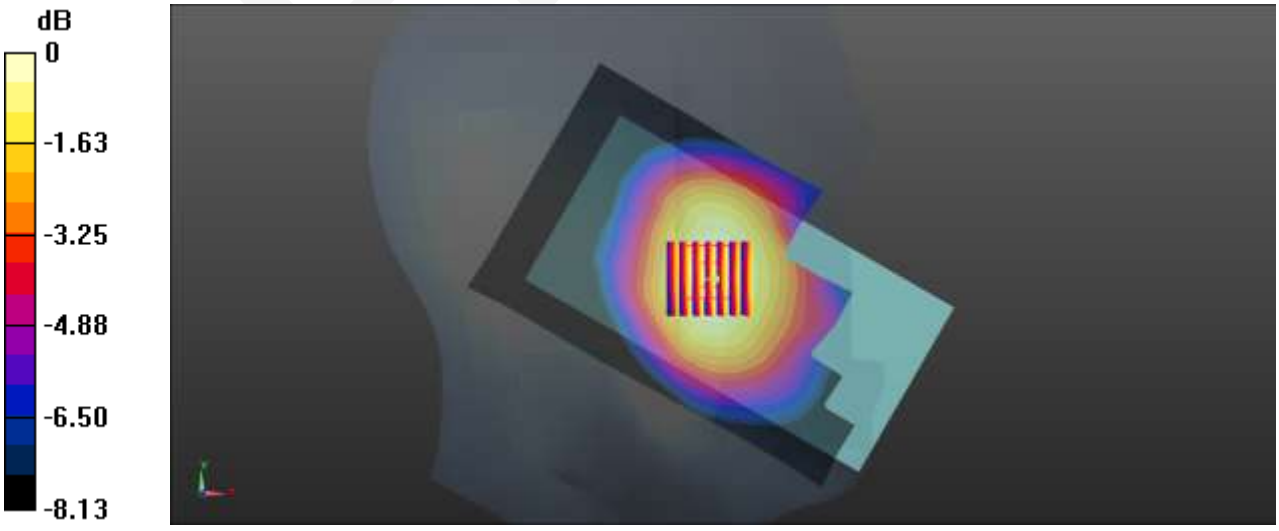
Communication System: BAND V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.893 S/m; ε_r = 42.856; ρ = 1000 kg/m^3
Phantom section: Left Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.52, 9.52, 9.52); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- 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 Left Cheek/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.137 W/kg

Head/WCDMA 850 Left Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.532 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.162 W/kg
SAR(1 g) = 0.131 W/kg; SAR(10 g) = 0.102 W/kg
Maximum value of SAR (measured) = 0.137 W/kg



0 dB = 0.137 W/kg = -8.63 dBW/kg

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

Test Plot 6#:WCDMA 850 Back Middle Channel

DUT: Smart phone; Type: QBA769PLUS

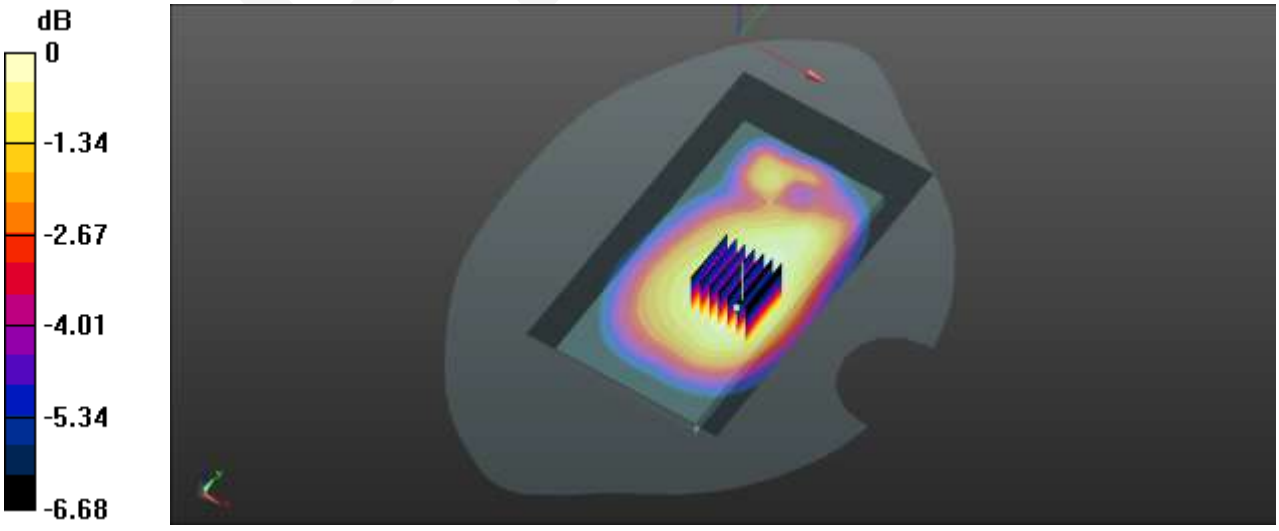
Communication System: BAND V; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.975 S/m; ε_r = 55.112; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(9.17, 9.17, 9.17); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- 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 Back/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.258 W/kg

Body/WCDMA 850 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 15.83 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.315 W/kg
SAR(1 g) = 0.245 W/kg; SAR(10 g) = 0.186 W/kg
Maximum value of SAR (measured) = 0.257 W/kg



0 dB = 0.257 W/kg = -5.90 dBW/kg

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

Test Plot 7#:WCDMA 1900 Left Cheek High Channel

DUT: Smart phone; Type: QBA769PLUS

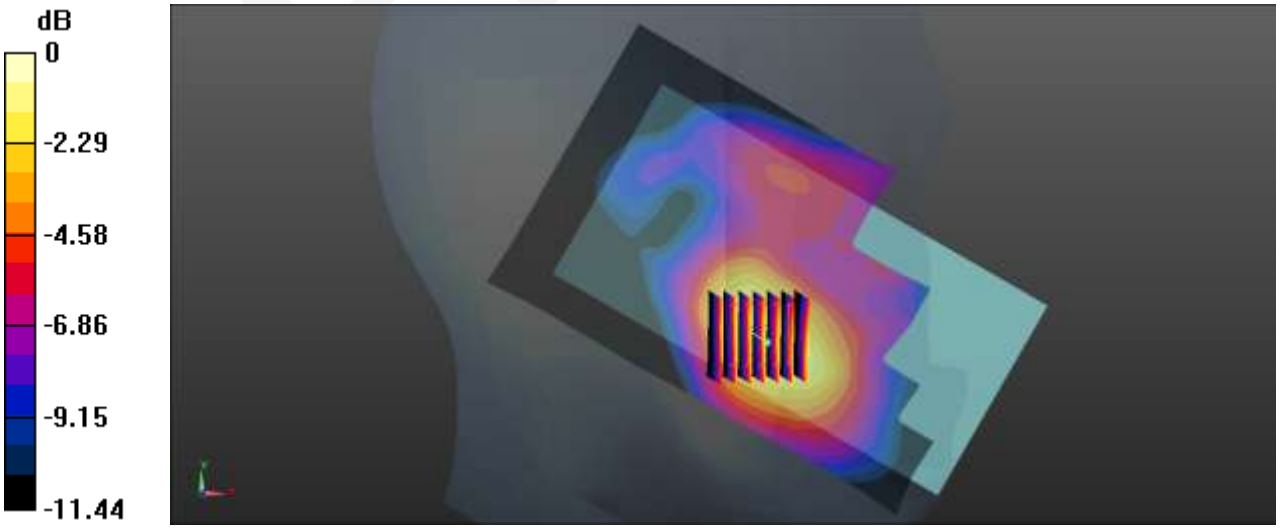
Communication System: BAND II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1907.6 MHz; σ = 1.414 S/m; ε_r = 39.571; ρ = 1000 kg/m^3
Phantom section: Left Section

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 Left Cheek/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.289 W/kg

Head/WCDMA 1900 Left Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.453 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.421 W/kg
SAR(1 g) = 0.269 W/kg; SAR(10 g) = 0.159 W/kg
Maximum value of SAR (measured) = 0.286 W/kg



0 dB = 0.286 W/kg = -5.44 dBW/kg

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

Test Plot 8#:WCDMA 1900 Back High Channel

DUT: Smart phone; Type: QBA769PLUS

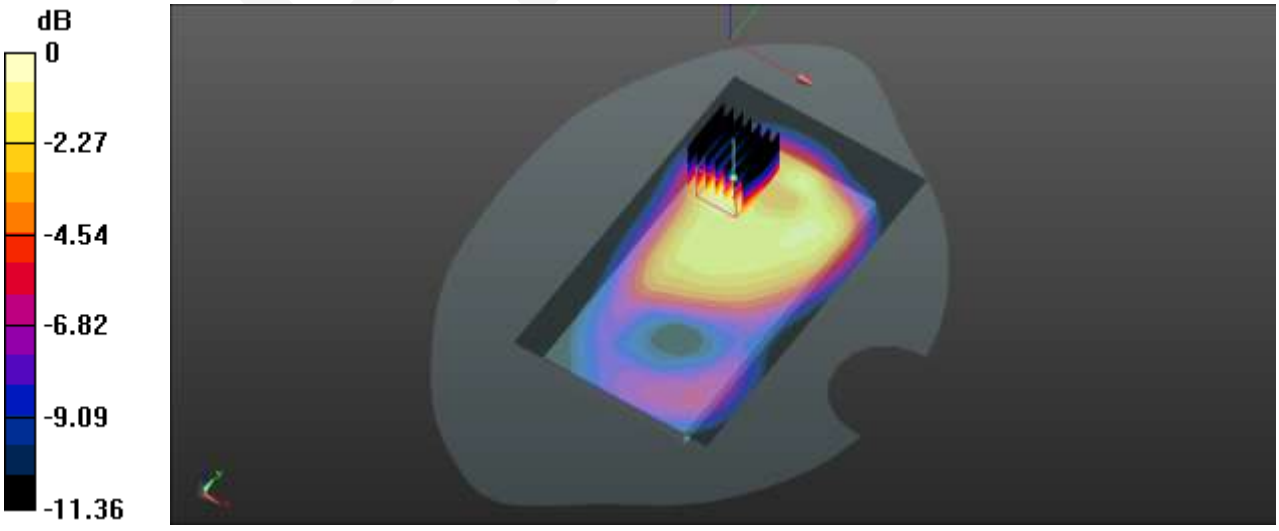
Communication System: BAND II; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1907.6 MHz; σ = 1.49 S/m; ε_r = 53.573; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.56, 7.56, 7.56); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- 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 Back/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.571 W/kg

Body/WCDMA 1900 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 13.53 V/m; Power Drift = -0.04 dB
Peak SAR (extrapolated) = 0.903 W/kg
SAR(1 g) = 0.516 W/kg; SAR(10 g) = 0.281 W/kg
Maximum value of SAR (measured) = 0.572 W/kg



0 dB = 0.572 W/kg = -2.43 dBW/kg

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

Test Plot 9#:LTE Band 2 Left Cheek Middle Channel

DUT: Smart phone; Type: QBA769PLUS

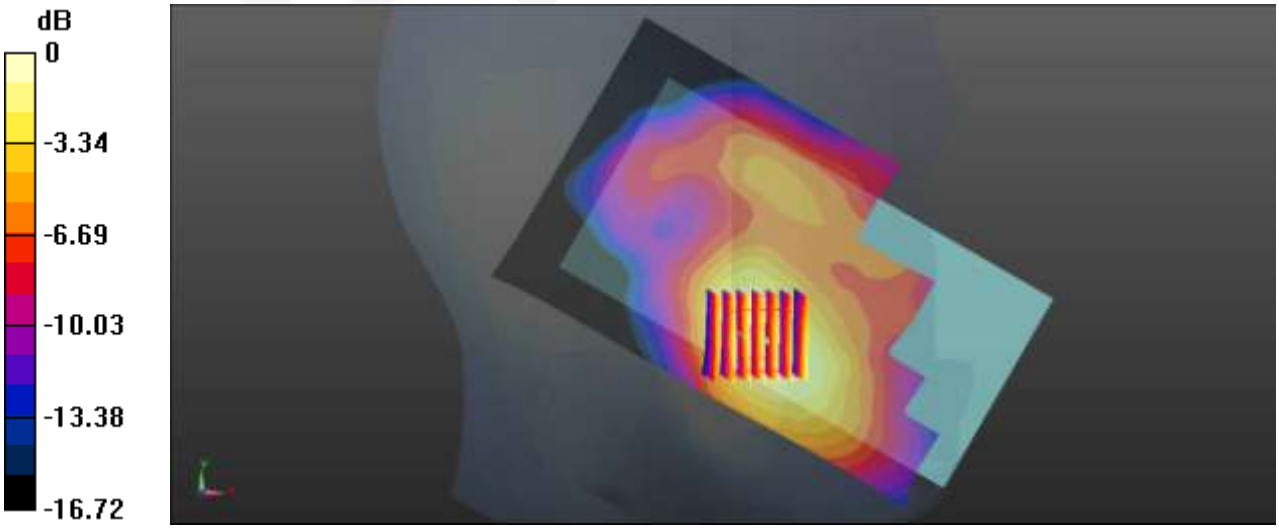
Communication System: Generic LTE; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.387 S/m; ε_r = 39.77; ρ = 1000 kg/m^3
Phantom section: Left Section

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 Left Cheek/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.264 W/kg

Head/LTE Band 2 Left Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.241 V/m; Power Drift = 0.12 dB
Peak SAR (extrapolated) = 0.380 W/kg
SAR(1 g) = 0.243 W/kg; SAR(10 g) = 0.150 W/kg
Maximum value of SAR (measured) = 0.259 W/kg



0 dB = 0.259 W/kg = -5.87 dBW/kg

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

Test Plot 10#:LTE Band 2 Back Middle Channel

DUT: Smart phone; Type: QBA769PLUS

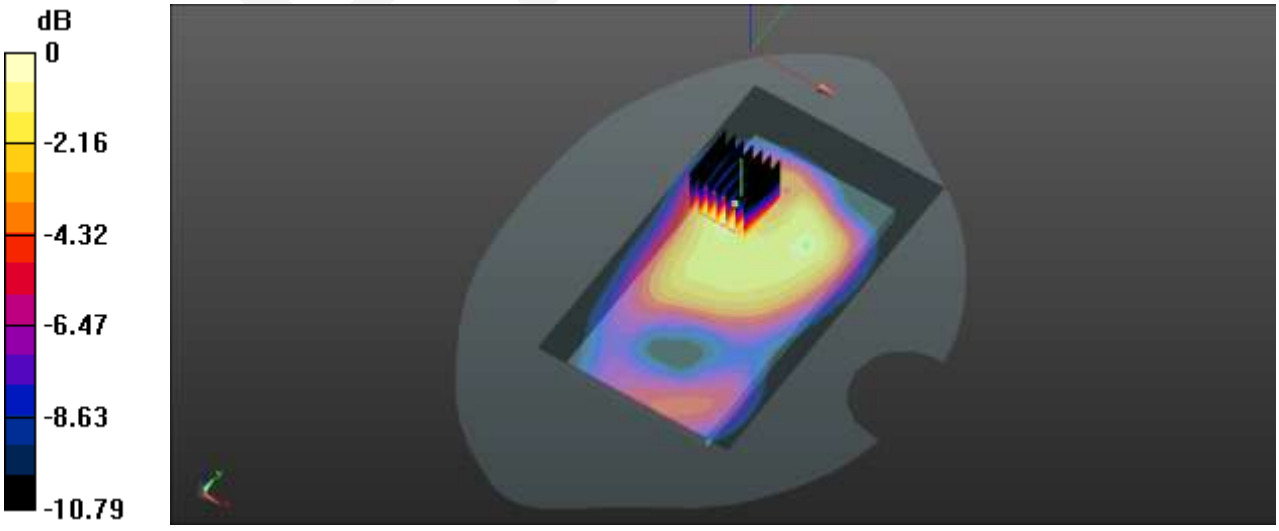
Communication System: Generic LTE; Frequency: 1880 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1880 MHz; σ = 1.543 S/m; ε_r = 53.738; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.56, 7.56, 7.56); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- 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 Back/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.705 W/kg

Body/LTE Band 2 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.56 V/m; Power Drift = -0.13 dB
Peak SAR (extrapolated) = 1.13 W/kg
SAR(1 g) = 0.640 W/kg; SAR(10 g) = 0.349 W/kg
Maximum value of SAR (measured) = 0.698 W/kg



0 dB = 0.698 W/kg = -1.56 dBW/kg

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

Test Plot 11#:LTE Band 4 Left-Cheek Low Channel

DUT: Smart phone; Type: QBA769PLUS

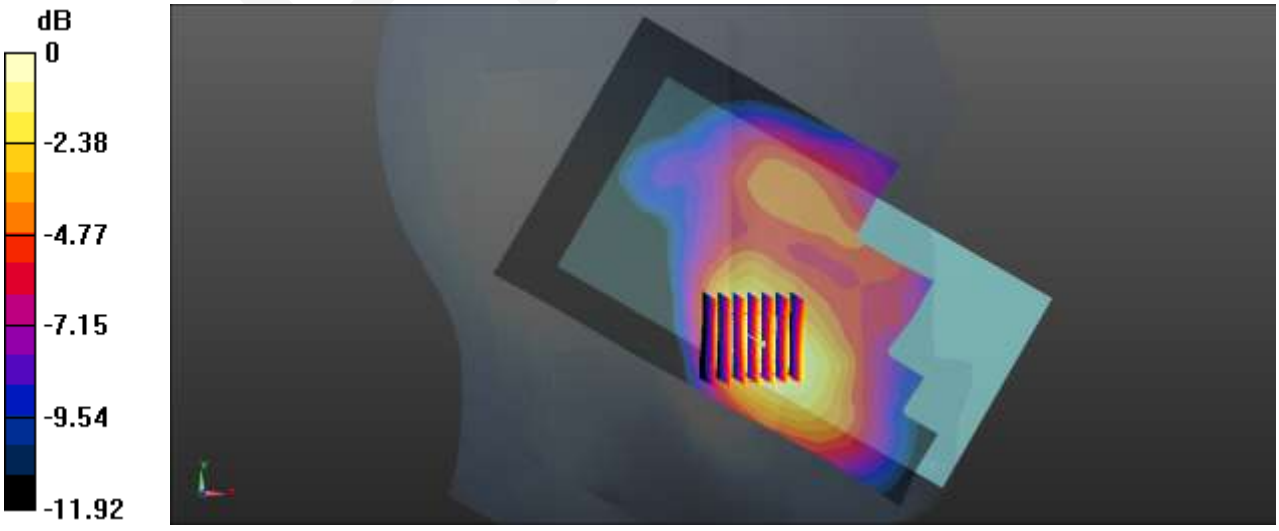
Communication System: Generic LTE; Frequency: 1710 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1710 MHz; σ = 1.361 S/m; ε_r = 40.469; ρ = 1000 kg/m^3
Phantom section: Left Section

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 Left Cheek/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.186 W/kg

Head/LTE Band 4 Left Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 3.881 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.259 W/kg
SAR(1 g) = 0.174 W/kg; SAR(10 g) = 0.110 W/kg
Maximum value of SAR (measured) = 0.188 W/kg



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

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

Test Plot 12#:LTE Band 4 Back Low Channel

DUT: Smart phone; Type: QBA769PLUS

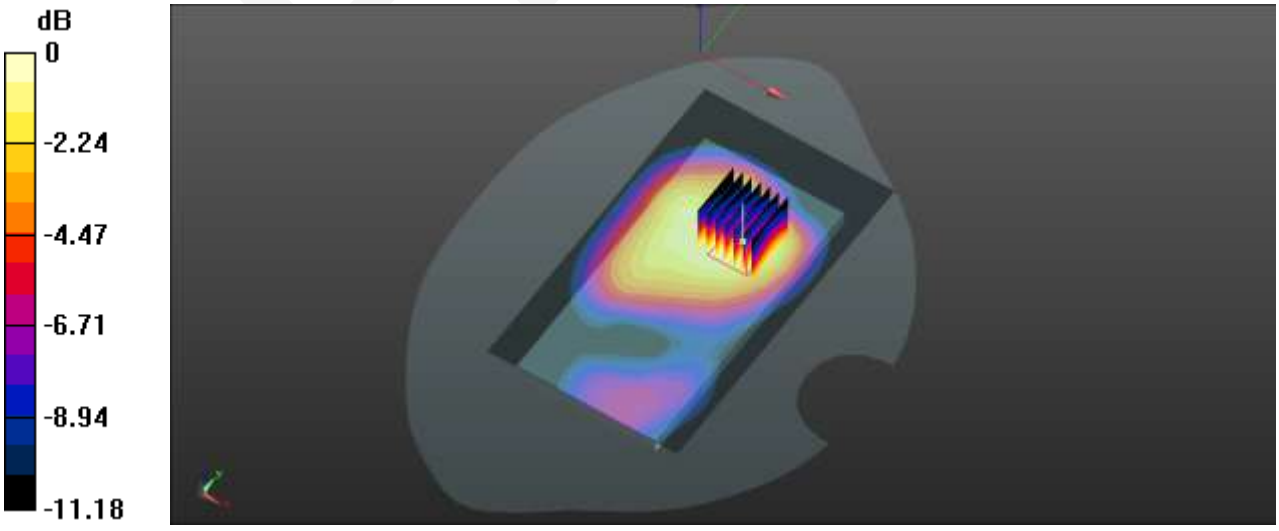
Communication System: Generic LTE; Frequency: 1710 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1710 MHz; σ = 1.462 S/m; ε_r = 53.513; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 Back/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.352 W/kg

Body/LTE Band 4 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 10.14 V/m; Power Drift = -0.18 dB
Peak SAR (extrapolated) = 0.458 W/kg
SAR(1 g) = 0.312 W/kg; SAR(10 g) = 0.198 W/kg
Maximum value of SAR (measured) = 0.338 W/kg



0 dB = 0.338 W/kg = -4.71 dBW/kg

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

Test Plot 13#:LTE Band 7 Left-Cheek Middle Channel

DUT: Smart phone; Type: QBA769PLUS

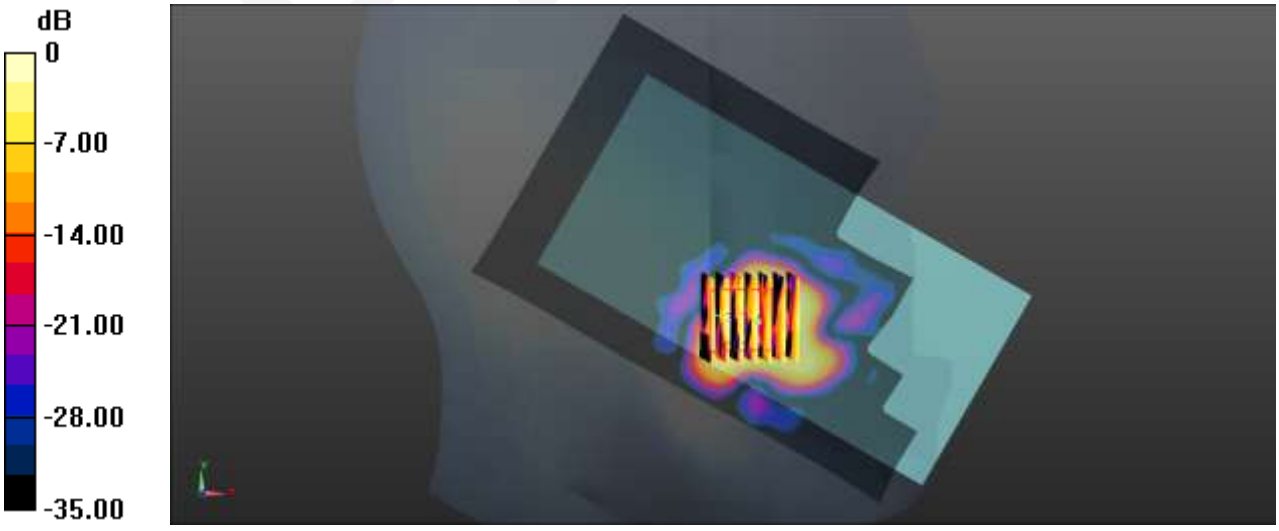
Communication System: Generic LTE; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2535 MHz; σ = 1.947 S/m; ε_r = 52.658; ρ = 1000 kg/m^3
Phantom section: Left Section

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/LTE Band 7/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.0127 W/kg

Head/LTE Band 7/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.12 V/m; Power Drift = 0.00 dB
Peak SAR (extrapolated) = 0.0420 W/kg
SAR(1 g) = 0.011 W/kg; SAR(10 g) = 0.00463 W/kg
Maximum value of SAR (measured) = 0.0124 W/kg



0 dB = 0.0124 W/kg = -19.07 dBW/kg

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

Test Plot 14#:LTE Band 7 Left-Cheek Middle Channel

DUT: Smart phone; Type: QBA769PLUS

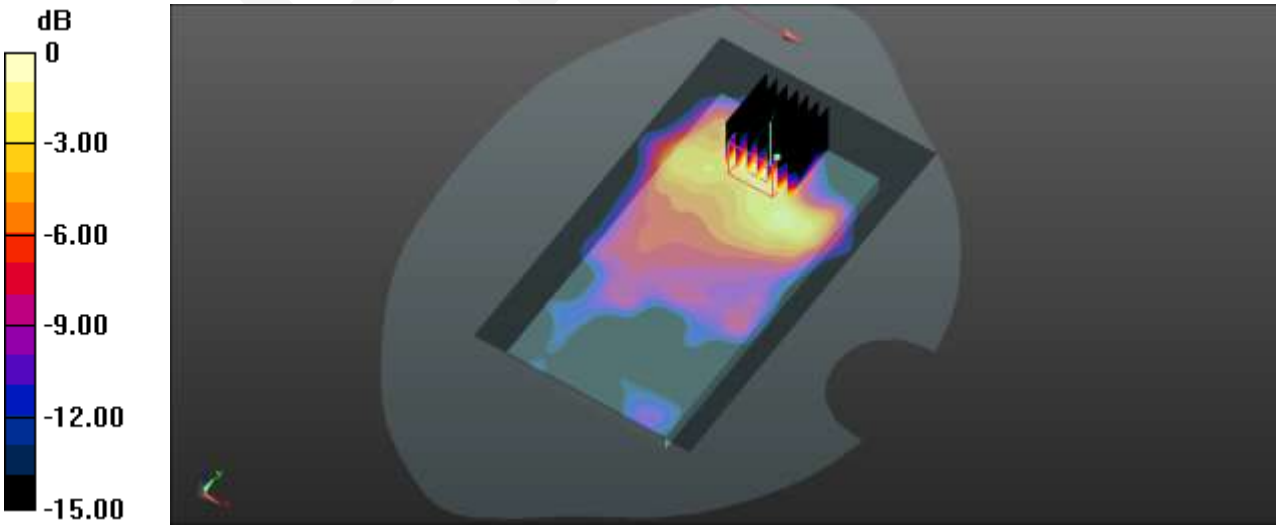
Communication System: Generic LTE; Frequency: 2535 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2535 MHz; σ = 1.947 S/m; ε_r = 52.658; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY5 Configuration:

- Probe: EX3DV4 - SN7329; ConvF(7.2, 7.2, 7.2); Calibrated: 2015/2/5;
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn1459; Calibrated: 2015/1/26
- 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 7/Area Scan (71x121x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.104 W/kg

Body/LTE Band 7/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 2.415 V/m; Power Drift = 0.14 dB
Peak SAR (extrapolated) = 0.161 W/kg
SAR(1 g) = 0.0787 W/kg; SAR(10 g) = 0.033 W/kg
Maximum value of SAR (measured) = 0.0915 W/kg



0 dB = 0.0915 W/kg = -10.39 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	√3	1	1	2.7	2.7
Hemispherical Isotropy	9.6	R	√3	0	0	0.0	0.0
Boundary effect	1.0	R	√3	1	1	0.6	0.6
Linearity	4.7	R	√3	1	1	2.7	2.7
Detection limits	1.0	R	√3	1	1	0.6	0.6
Readout electronics	0.3	N	1	1	1	0.3	0.3
Response time	0.0	R	√3	1	1	0.0	0.0
Integration time	0.0	R	√3	1	1	0.0	0.0
RF ambientconditions – noise	1.0	R	√3	1	1	0.6	0.6
RF ambient conditions–reflections	1.0	R	√3	1	1	0.6	0.6
Probe positioner mech. Restrictions	0.8	R	√3	1	1	0.5	0.5
Probe positioning with respect to phantom shell	6.7	R	√3	1	1	3.9	3.9
Post-processing	2.0	R	√3	1	1	1.2	1.2
Test sample related							
Test sample positioning	2.8	N	1	1	1	2.8	2.8
Device holder uncertainty	6.3	N	1	1	1	6.3	6.3
Drift of output power	5.0	R	√3	1	1	2.9	2.9
Phantom and set-up							
Phantom uncertainty (shape and thickness tolerances)	4.0	R	√3	1	1	2.3	2.3
Liquid conductivity target)	5.0	R	√3	0.64	0.43	1.8	1.2
Liquid conductivity meas.)	2.5	N	1	0.64	0.43	1.6	1.1
Liquid permittivity target)	5.0	R	√3	0.6	0.49	1.7	1.4
Liquid permittivity meas.)	2.5	N	1	0.6	0.49	1.5	1.2
Combined standard uncertainty		RSS				12.2	12.0
Expanded uncertainty 95 % confidence interval)						24.3	23.9

Measurement uncertainty evaluation for IEC62209-2 SAR test

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

APPENDIX B – 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 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

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

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

Issued: February 9, 2015

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: EX3-7329_Feb15 Page 1 of 11

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

S Schweizerischer Kalibrierdienst
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S Swiss Calibration Service

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

Accreditation No.: SCS 0108

Glossary:

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

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

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

Probe EX3DV4

SN:7329

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

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

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

Basic Calibration Parameters

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

Modulation Calibration Parameters

UID	Communication System Name		A dB	B dB√μV	C	D dB	VR mV	Unc^E (k=2)
0	CW	X	0.0	0.0	1.0	0.00	137.9	±3.0 %
		Y	0.0	0.0	1.0		147.0	
		Z	0.0	0.0	1.0		150.5	

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

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

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

Calibration Parameter Determined in Head Tissue Simulating Media

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

[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

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

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

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

Calibration Parameter Determined in Body Tissue Simulating Media

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

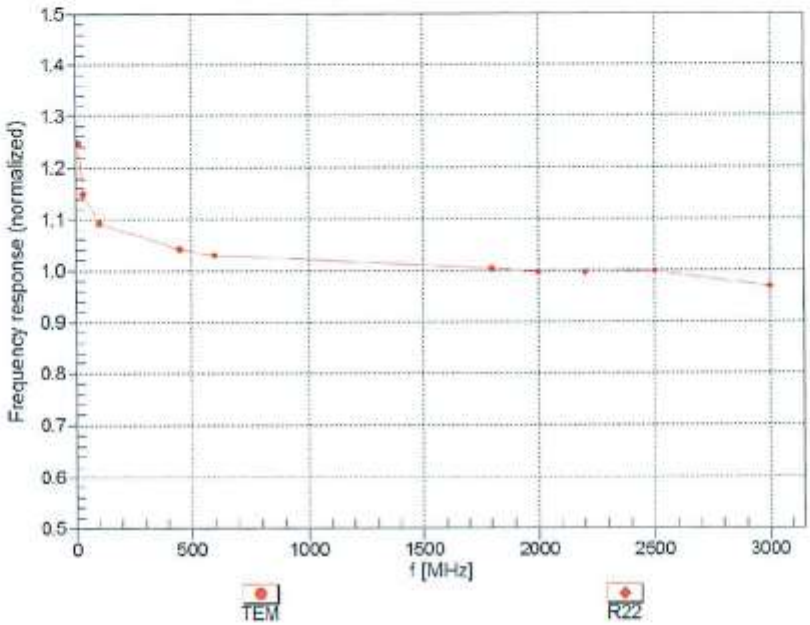
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz is ± 10, 25, 40, 50 and 70 MHz for ConvF assessments at 30, 64, 128, 150 and 220 MHz respectively. Above 5 GHz frequency validity can be extended to ± 110 MHz.

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

[G] Alpha/Depth are determined during calibration. SPEAG warrants that the remaining deviation due to the boundary effect after compensation is always less than ± 1% for frequencies below 3 GHz and below ± 2% for frequencies between 3-6 GHz at any distance larger than half the probe tip diameter from the boundary.

EX3DV4– SN:7329 February 5, 2015

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

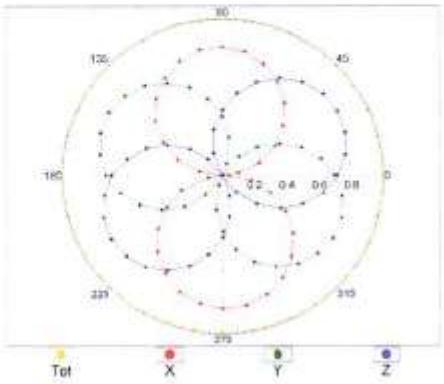


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

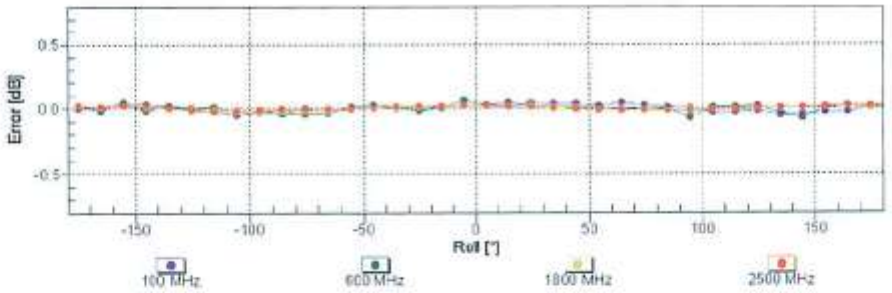
EX3DV4– SN:7329 February 5, 2015

Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



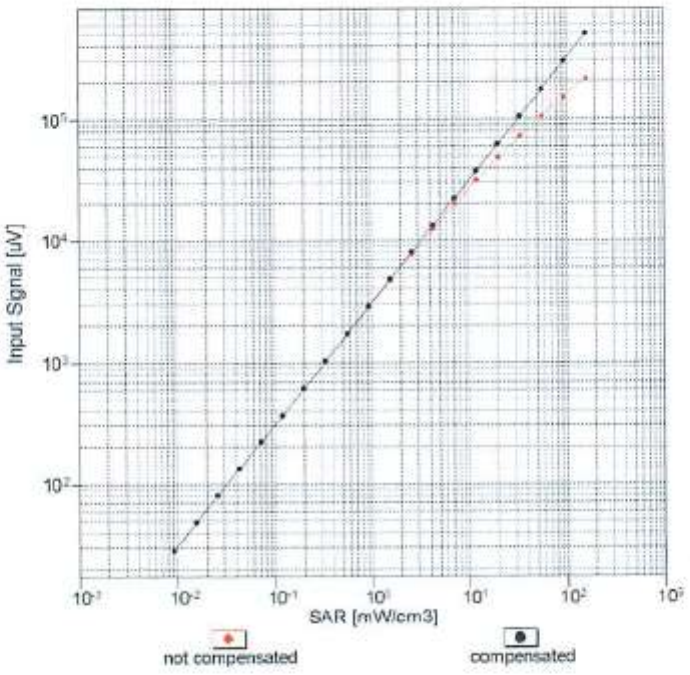
f=1800 MHz,R22

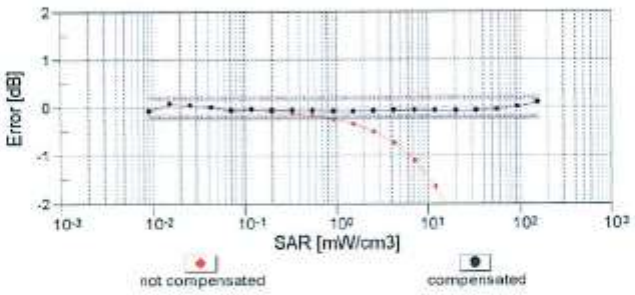


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

EX3DV4– SN:7329 February 5, 2015

Dynamic Range f(SAR_{head})
(TEM cell , f_{eval}= 1900 MHz)

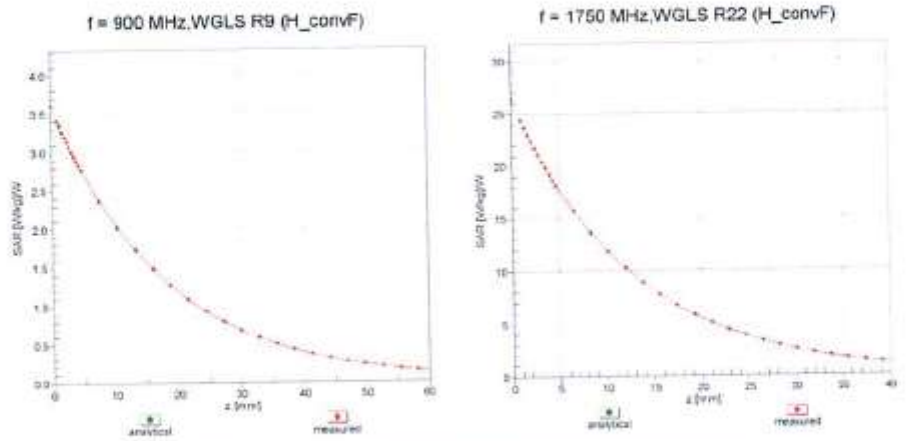




Uncertainty of Linearity Assessment: ± 0.6% (k=2)

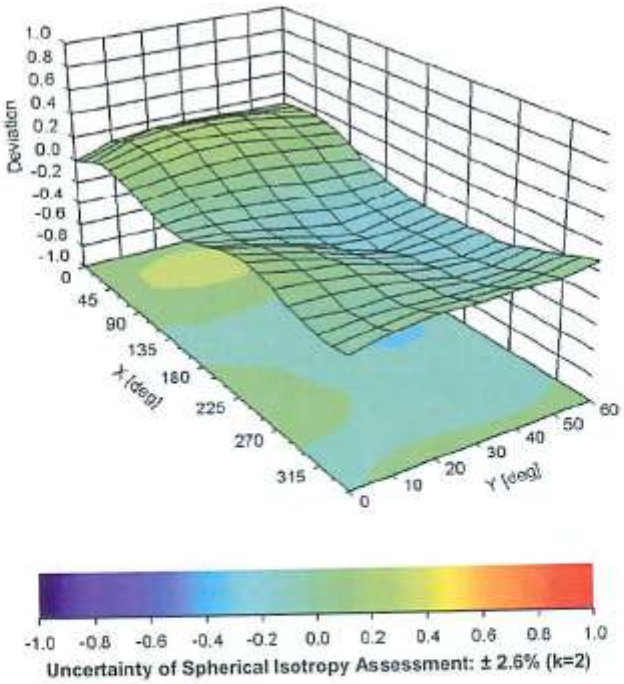
EX3DV4- SN:7329 February 5, 2015

Conversion Factor Assessment



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

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

Other Probe Parameters

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

APPENDIX C DIPOLE CALIBRATION CERTIFICATES

NCL CALIBRATION LABORATORIES

Calibration File No: DC-1599
Project Number: BAC-dipole-cal-5779

CERTIFICATE OF CALIBRATION

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

Validation Dipole(Head and Body)

Manufacturer: APREL Laboratories
Part number: ALS-D-835-S-2
Frequency: 835 MHz
Serial No: 160-00558

Customer: Bay Area Compliance Laboratory (China)

Calibrated: 8th October 2014
Released on: 8th October 2014

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary

Released By: _____
Art Brennan, Quality Manager

NCL CALIBRATION LABORATORIES

Suite 102, 303 Terry Fox Dr.
Kanata, ONTARIO
CANADA K2K 3J1

Division of APREL Lab.
TEL: (613) 435-8300
FAX: (613)435-8306

NCL Calibration Laboratories
Division of APREL Laboratories.

Conditions

Dipole 180-00558 was received with a damaged connection for a re-calibration.

Ambient Temperature of the Laboratory:	22 °C +/- 0.5°C
Temperature of the Tissue:	21 °C +/- 0.5°C

Attestation

The below named signatories have conducted the calibration and review of the data which is presented in this calibration report.

We the undersigned attest that to the best of our knowledge the calibration of this subject has been accurately conducted and that all information contained within the results pages have been reviewed for accuracy.

Art Brennan, Quality Manager

Maryna Nesterova Calibration Engineer

Primary Measurement Standards

Instrument	**Serial Number**	**Cal due date**
Tektronix USB Power Meter	11C940	May 14, 2015
Network Analyzer Anritsu 37347C	002106	Feb. 20, 2015

This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Calibration Results Summary

The following results relate the Calibrated Dipole and should be used as a quick reference for the user.

Mechanical Dimensions

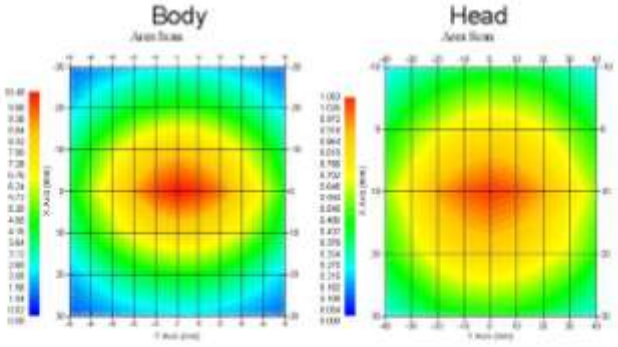
Length: 162.2 mm
Height: 89.4 mm

Electrical Specification

Tissue	Frequency	SWR:	Return Loss	Impedance
Head	835 MHz	1.066 U	-30.344 dB	49.001 Ω
Body	835 MHz	1.089 U	-28.118 dB	53.117 Ω

System Validation Results

Tissue	Frequency	1 Gram	10 Gram	Peak
Head	835 MHz	9.773	6.174	14.713
Body	835 MHz	9.736	6.297	14.513



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NCL Calibration Laboratories
Division of APREL Laboratories.

Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018-ALSAS. The results contained within this report are for Validation Dipole 180-00558. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-020 30 MHz to 6 GHz E-Field Probe Serial Number 225.

References

- IEC-62209 "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 hand-held devices used in close proximity of the ear (frequency range of 30 MHz to 6 GHz)"
- TP-D01-032-E020-V2 E-Field probe calibration procedure
- D22-012-Tissue dielectric tissue calibration procedure
- D28-002-Dipole procedure for validation of SAR system using a dipole
- IEEE 1309 Draft Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9kHz to 40GHz

Conditions

Dipole 180-00558 was repaired prior to this calibration. The repair reliability depends upon correct usage of the dipole.

Ambient Temperature of the Laboratory:	22 °C +/- 0.5°C
Temperature of the Tissue:	20 °C +/- 0.5°C

Dipole Calibration uncertainty

The calibration uncertainty for the dipole is made up of various parameters presented below.

Mechanical	1%
Positioning Error	1.22%
Electrical	1.7%
Tissue	2.2%
Dipole Validation	2.2%
TOTAL	**8.32% (16.64% K=2)**

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Division of APREL Laboratories.

Dipole Calibration Results

Mechanical Verification

APREL Length	APREL Height	Measured Length	Measured Height
161.0 mm	89.8 mm	162.2 mm	89.4 mm

Electrical Verification

Tissue Type	Return Loss:	SWR:	Impedance:
Head	-30.344 dB	1.066 U	49.001Ω
Body	-28.118 dB	1.089 U	53.117 Ω □

Tissue Validation

	Dielectric constant, ε_r	Conductivity, σ [S/m]
Head Tissue 835MHz	43.42	0.94
Body Tissue 835MHz	55.77	1.01

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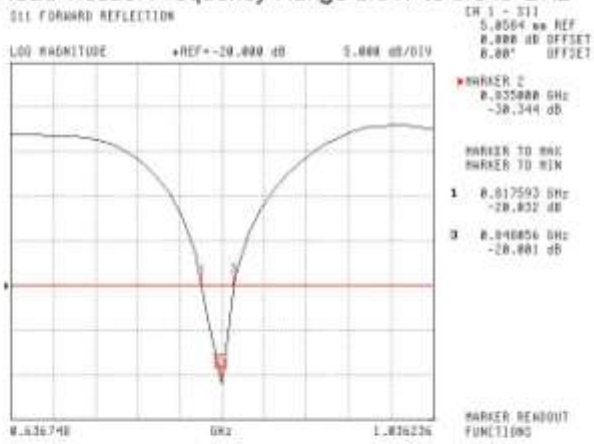
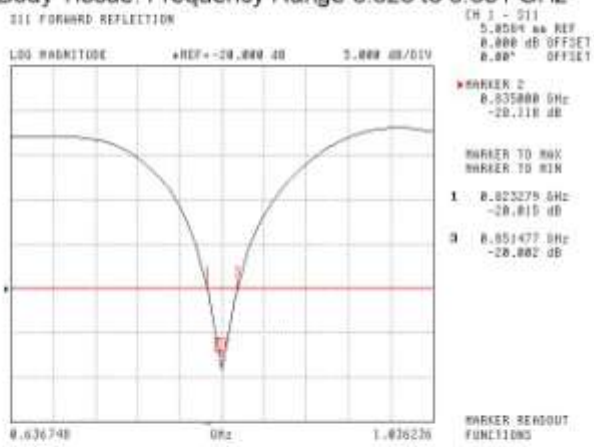
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

Head Tissue: Frequency Range 0.817 to 0.848 GHz



Body Tissue: Frequency Range 0.823 to 0.851 GHz



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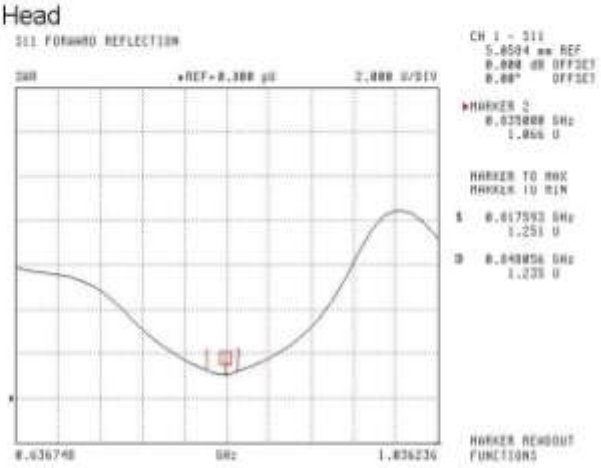
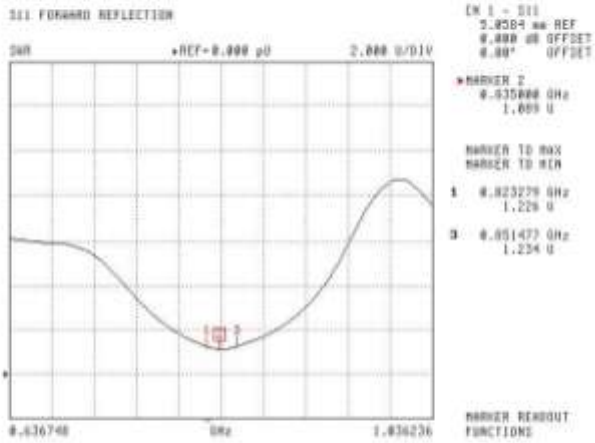
SWR

Head



Body



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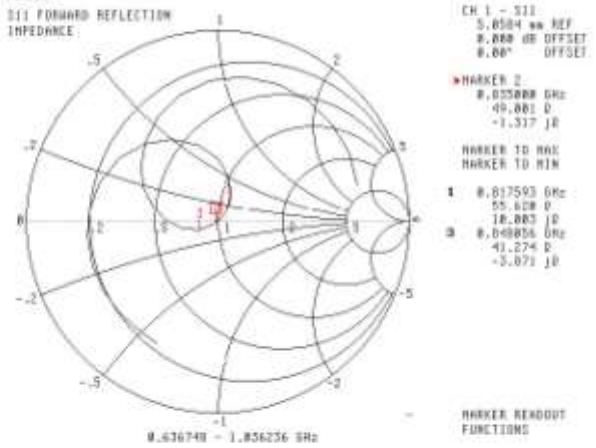
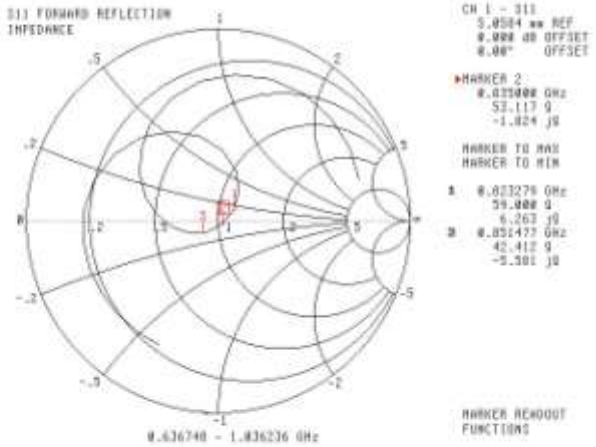
Smith Chart Dipole Impedance

Head



Body



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NCL Calibration Laboratories
Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List 2014.

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NCL CALIBRATION LABORATORIES

Calibration File No: DC-1531
Project Number: BACL-5745

CERTIFICATE OF CALIBRATION

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

BACL Head & Body Validation Dipole

Manufacturer: APREL Laboratories
Part number: ALS-D-1750-S-2
Frequency: 1750 MHz
Serial No: 198-00304

Customer: ISL

Calibrated: 8th October, 2013
Released on: 8th October, 2013

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary

Released By: 

Art Brennan, Quality Manager

NCL CALIBRATION LABORATORIES

Suite 102, 303 Terry Fox Dr.
OTTAWA, ONTARIO
CANADA K2K 3J1

Division of APREL Lab.
TEL: (613) 435-8300
FAX: (613) 435-8306

NCL Calibration Laboratories
Division of APREL Laboratories.

Conditions

Dipole 198-00304 was an original calibration.

Ambient Temperature of the Laboratory:	22 °C +/- 0.5°C
Temperature of the Tissue:	21 °C +/- 0.5°C

We the undersigned attest that to the best of our knowledge the calibration of this subject has been accurately conducted and that all information contained within the results pages have been reviewed for accuracy.

Art Brennan, Quality Manager

Constantin Teodorian, Test Engineer

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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Calibration Results Summary

The following results relate the Calibrated Dipole and should be used as a quick reference for the user.

Mechanical Dimensions

Length: 75 mm
Height: 42 mm

Electrical Calibration

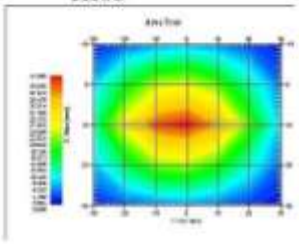
Test	Result Head	Result Body
S11 R/L	-25.567	-20.548 dB
SWR	1.111U	1.207 U
Impedance	53.637Ω	55.929 Ω

System Validation Results, 1750 MHz

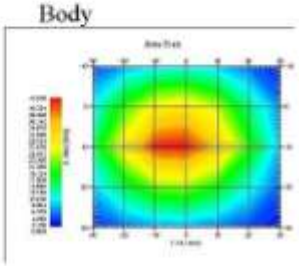
	1g	10g
Head	37.02	18.99
Body	36.65	18.85

Type	Epsilon	Sigma
Head	38.51	1.36
Body	51.79	1.53

Head



Body



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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018-ALSAS. The results contained within this report are for Validation Dipole. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-030 130 MHz to 26 GHz E-Field Probe Serial Number 215.

References

SSI-TP-018-ALSAS Dipole Calibration Procedure
SSI-TP-016 Tissue Calibration Procedure
IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"
IEC-62209 "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures"
Part 1: "Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity of the ear (frequency range of 300 MHz to 3 GHz)"
IEC-62209 "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures"
Part 2 *Draft*: "Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity of the ear (frequency range of 30 MHz to 6 GHz)"

Conditions

Ambient Temperature of the Laboratory:	22 °C +/- 0.5°C
Temperature of the Tissue:	20 °C +/- 0.5°C

This was an original calibration taken from stock.

Dipole Calibration uncertainty

The calibration uncertainty for the dipole is made up of various parameters presented below.

Mechanical	1%
Positioning Error	1.22%
Electrical	1.7%
Tissue	2.2%
Dipole Validation	2.2%
TOTAL	**8.32% (16.64% K=2)**

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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Dipole Calibration Results

Mechanical Verification

Measured Length	Measured Height
75 mm	42 mm

Tissue Validation

Frequency	Permittivity ε	Conductivity σ
1750 Head	38.23	1.38
1750 Body	52.86	1.54

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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

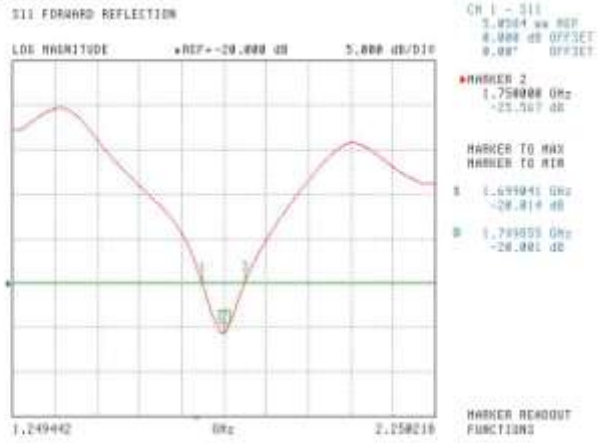
Electrical Calibration

Test	Result Head	Result Body
S11 R/L	-25.567	-20.548 dB
SWR	1.111U	1.207 U
Impedance	53.637Ω	55.929 Ω

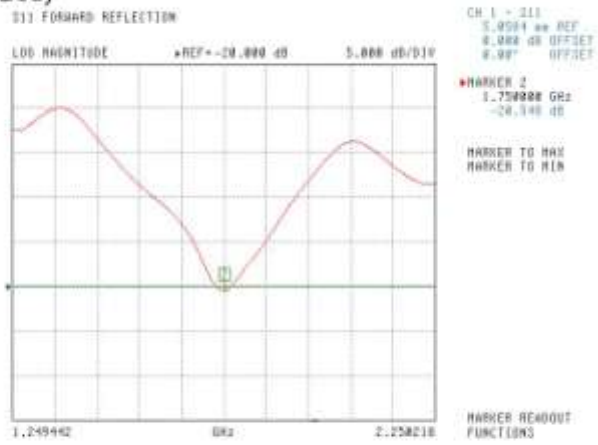
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

Head



Body



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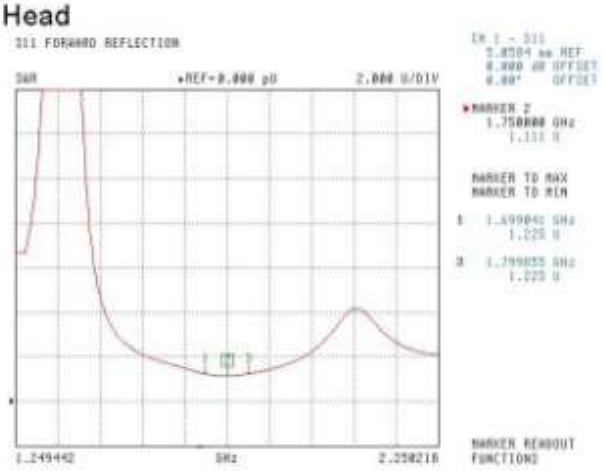
This page has been reviewed for content and attested to by signature within this document.

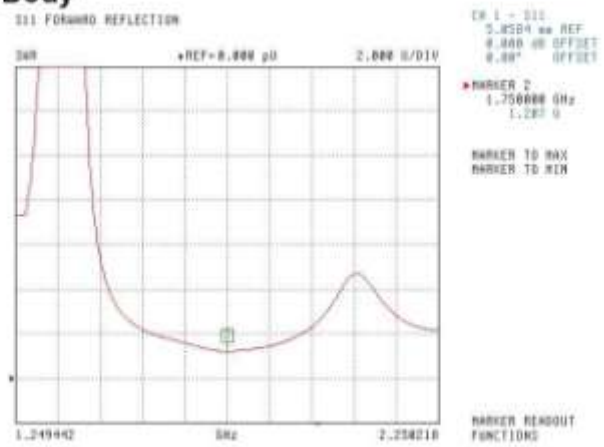
NCL Calibration Laboratories
Division of APREL Laboratories.

SWR

Head



Body



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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Smith Chart Dipole Impedance

Head

NCL Calibration Laboratories
Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2013

This page has been reviewed for content and attested to by signature within this document.

NCL CALIBRATION LABORATORIES

Calibration File No: DC-1601
Project Number: BAC-dipole –cal-5779

CERTIFICATE OF CALIBRATION

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

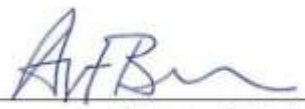
Validation Dipole (Head & Body)

Manufacturer: APREL Laboratories
Part number: ALS-D-1900-S-2
Frequency: 1900 MHz
Serial No: 210-00710

Customer: Bay Area Compliance Laboratory (China)

Calibrated: 9th October, 2014
Released on: 9th October, 2014

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary

Released By: 

Art Brennan, Quality Manager

NCL CALIBRATION LABORATORIES
Suite 102, 303 Terry Fox Dr. Division of APREL Lab.
Kanata, ONTARIO TEL: (613) 435-8300
CANADA K2K 3J1 FAX: (613)435-8306

NCL Calibration Laboratories
Division of APREL Laboratories.

Conditions

Dipole 210-00710 was received in good condition and was a re-calibration.

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C
Temperature of the Tissue: 21 °C +/- 0.5°C

Attestation

The below named signatories have conducted the calibration and review of the data which is presented in this calibration report.

We the undersigned attest that to the best of our knowledge the calibration of this subject has been accurately conducted and that all information contained within the results pages have been reviewed for accuracy.

Art Brennan, Quality Manager

Maryna Nesterova Calibration Engineer

Primary Measurement Standards

Instrument	Serial Number	Cal due date
Tektronix USB Power Meter	11C940	May 14, 2015
Network Analyzer Anritsu 37347C	002106	Feb. 20, 2015

This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Calibration Results Summary

The following results relate the Calibrated Dipole and should be used as a quick reference for the user.

Mechanical Dimensions

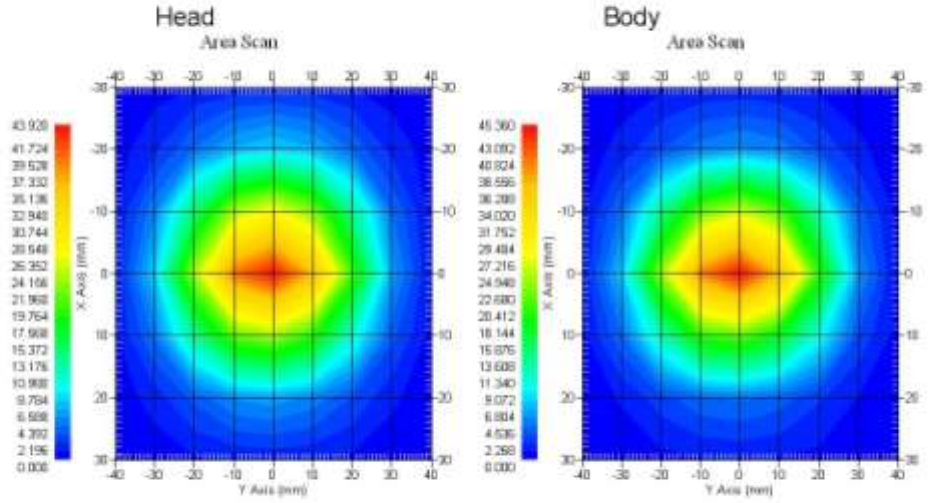
Length: 67.1 mm
Height: 38.9 mm

Electrical Specification

Tissue	Frequency	SWR:	Return Loss	Impedance
Head	1900MHz	1.084 U	-27.92 dB	52.247 Ω
Body	1900MHz	1.128 U	-24.40 dB	52.618 Ω

System Validation Results

Tissue	Frequency	1 Gram	10 Gram	Peak
Head	1900 MHz	39.481	20.44	73.364
Body	1900 MHz	39.715	20.552	73.565



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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018-ALSAS. The results contained within this report are for Validation Dipole 210-00710. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-020 30 MHz to 6 GHz E-Field Probe Serial Number 225.

References

- IEC-62209 "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 hand-held devices used in close proximity of the ear (frequency range of 30 MHz to 6 GHz)"
- TP-D01-032-E020-V2 E-Field probe calibration procedure
- D22-012-Tissue dielectric tissue calibration procedure
- D28-002-Dipole procedure for validation of SAR system using a dipole
- IEEE 1309 Draft Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9kHz to 40GHz

Conditions

Dipole 210-00710 was a recalibration.

Ambient Temperature of the Laboratory:	22 °C +/- 0.5°C
Temperature of the Tissue:	20 °C +/- 0.5°C

Dipole Calibration uncertainty

The calibration uncertainty for the dipole is made up of various parameters presented below.

Mechanical	1%
Positioning Error	1.22%
Electrical	1.7%
Tissue	2.2%
Dipole Validation	2.2%
TOTAL	**8.32% (16.64% K=2)**

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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Dipole Calibration Results

Mechanical Verification

APREL Length	APREL Height	Measured Length	Measured Height
68.0 mm	39.5 mm	67.1mm	38.9 mm

Electrical Validation

Tissue	Frequency	SWR:	Return Loss	Impedance
Head	1900MHz	1.084 U	-27.92 dB	52.247 Ω
Body	1900MHz	1.128 U	-24.40 dB	52.618 Ω

Tissue Validation

	Dielectric constant, ε_r	Conductivity, σ [S/m]
Head Tissue 1900MHz	40.20	1.38
Body Tissue 1900MHz	52.63	1.46

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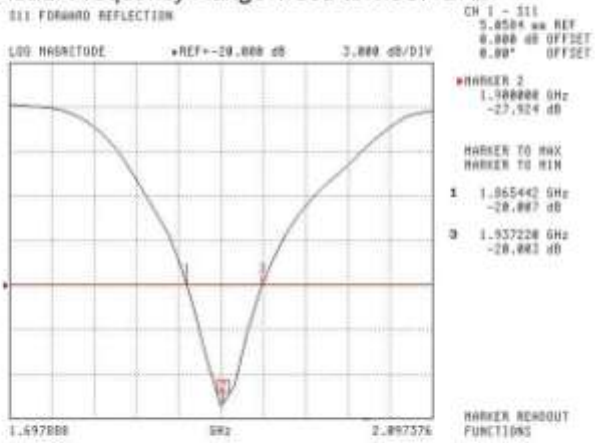
NCL Calibration Laboratories
Division of APREL Laboratories.

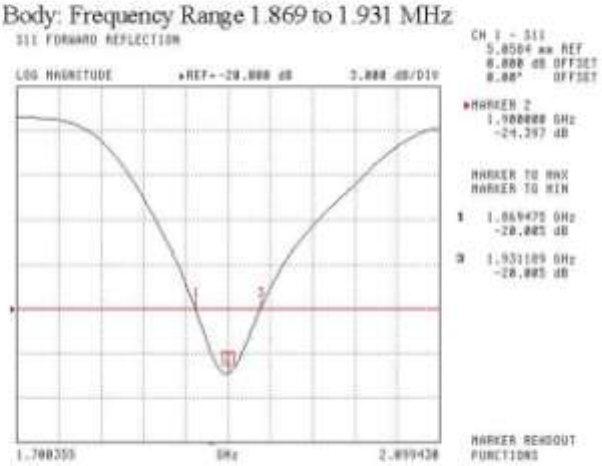
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

Head: Frequency Range 1.865 to 1.937 GHz



Body: Frequency Range 1.869 to 1.931 MHz



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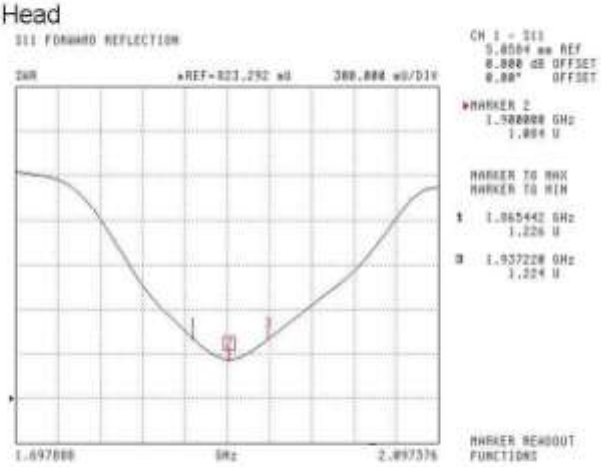
This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

SWR

Head



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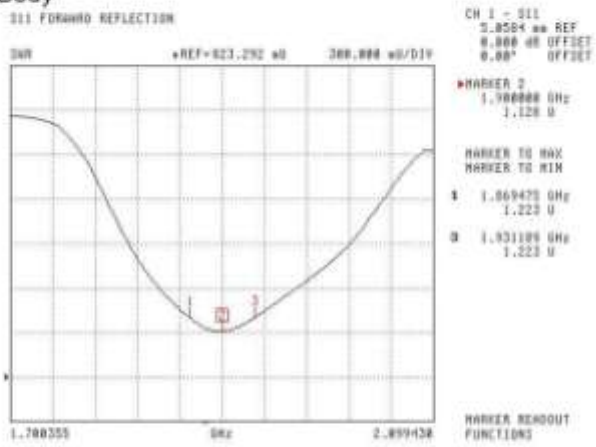

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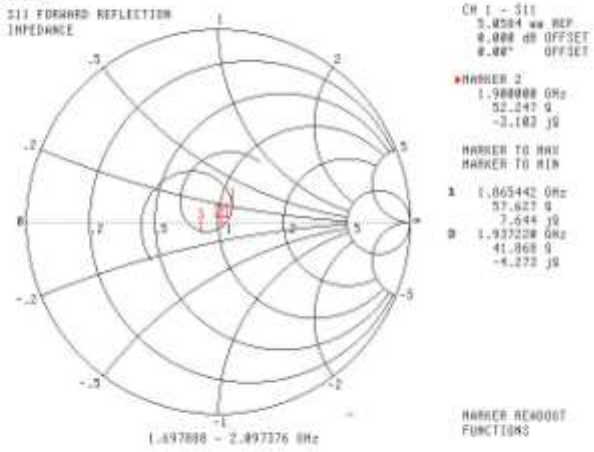
This page has been reviewed for content and attested to by signature within this document.

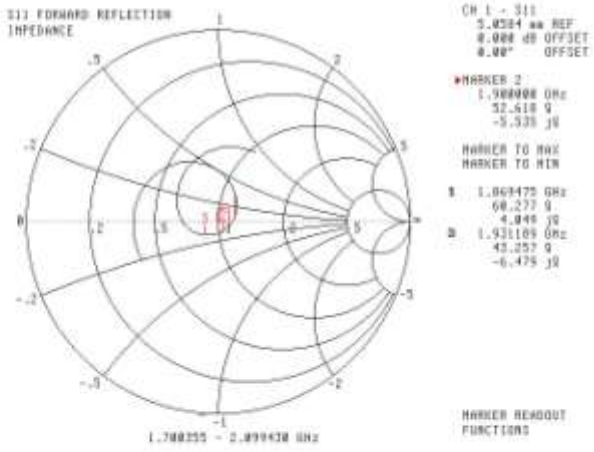
NCL Calibration Laboratories
Division of APREL Laboratories.

Smith Chart Dipole Impedance

Head



Body



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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List 2014

This page has been reviewed for content and attested to by signature within this document.

NCL CALIBRATION LABORATORIES

Calibration File No: DC-1602
Project Number: BAC-dipole-cal-5779

CERTIFICATE OF CALIBRATION

It is certified that the equipment identified below has been calibrated in the **NCL CALIBRATION LABORATORIES** by qualified personnel following recognized procedures and using transfer standards traceable to NRC/NIST.

Validation Dipole (Head & Body)

Manufacturer: APREL Laboratories
Part number: ALS-D-2450-S-2
Frequency: 2450 MHz
Serial No: 220-00758

Customer: Bay Area Compliance Laboratory

Calibrated: 9th October, 2014
Released on: 9th October, 2014

This Calibration Certificate is Incomplete Unless Accompanied with the Calibration Results Summary

Released By: 

Art Brennan, Quality Manager

NCL CALIBRATION LABORATORIES

Suite 102, 303 Terry Fox Dr.
Kanata, ONTARIO
CANADA K2K 3J1

Division of APREL Lab.
TEL: (613) 435-8300
FAX: (613)435-8308

NCL Calibration Laboratories
Division of APREL Laboratories.

Conditions

Dipole 220-00758 was received in good condition and was a re-calibration.

Ambient Temperature of the Laboratory:	22 °C +/- 0.5°C
Temperature of the Tissue:	21 °C +/- 0.5°C

Attestation

The below named signatories have conducted the calibration and review of the data which is presented in this calibration report.

We the undersigned attest that to the best of our knowledge the calibration of this subject has been accurately conducted and that all information contained within the results pages have been reviewed for accuracy.

Art Brennan, Quality Manager

Maryna Nesterova Calibration Engineer

Primary Measurement Standards

Instrument	Serial Number	Cal due date
Tektronix USB Power Meter	11C940	May 14, 2015
Network Analyzer Anritsu 37347C	002106	Feb. 20, 2015

This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Calibration Results Summary

The following results relate the Calibrated Dipole and should be used as a quick reference for the user.

Mechanical Dimensions

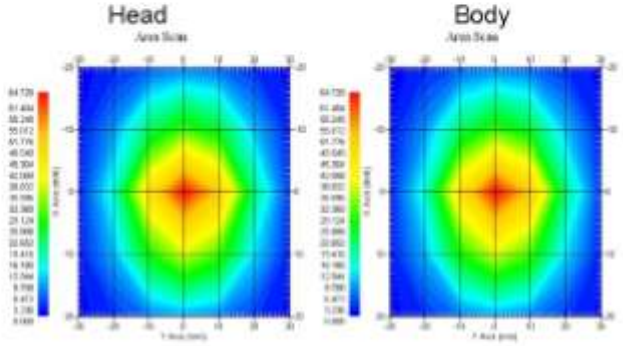
Length: 52.4 mm
Height: 30.3 mm

Electrical Specification

Tissue	Frequency	SWR:	Return Loss	Impedance
Head	2450 MHz	1.014 U	-45.184 dB	50.006Ω
Body	2450 MHz	1.070 U	-29.453 dB	50.672 Ω

System Validation Results

Tissue	Frequency	1 Gram	10 Gram	Peak
Head	2450 MHz	54.916	25.327	111.97
Body	2450 MHz	52.418	24.691	103.91



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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018-ALSAS. The results contained within this report are for Validation Dipole 220-00758. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-020 30 MHz to 6 GHz E-Field Probe Serial Number 225.

References

SSI-TP-018-ALSAS Dipole Calibration Procedure
SSI-TP-016 Tissue Calibration Procedure
IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"
IEC-62209 "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures"
Part 1: "Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity of the ear (frequency range of 300 MHz to 3 GHz)"
IEC-62209 "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures"
Part 2 *Draft*: "Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity of the ear (frequency range of 30 MHz to 6 GHz)"

Conditions

Dipole 220-00758 was a re-calibration.

Ambient Temperature of the Laboratory:	22 °C +/- 0.5°C
Temperature of the Tissue:	20 °C +/- 0.5°C

Dipole Calibration uncertainty

The calibration uncertainty for the dipole is made up of various parameters presented below.

Mechanical	1%
Positioning Error	1.22%
Electrical	1.7%
Tissue	2.2%
Dipole Validation	2.2%
TOTAL	**8.32% (16.64% K=2)**

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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Dipole Calibration Results

Mechanical Verification

APREL Length	APREL Height	Measured Length	Measured Height
51.5 mm	30.4 mm	52.4 mm	30.3 mm

Electrical Specification

Tissue	Frequency	SWR:	Return Loss	Impedance
Head	2450 MHz	1.014 U	-45.184 dB	50.006Ω
Body	2450 MHz	1.070 U	-29.453 dB	50.672 Ω

Tissue Validation

	Dielectric constant, ε_r	Conductivity, σ [S/m]
Head Tissue 2450MHz	37.26	1.84
Body Tissue 2450MHz	53.61	1.90

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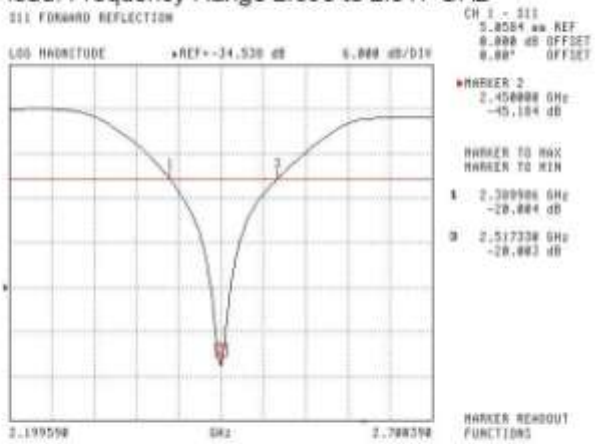
This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

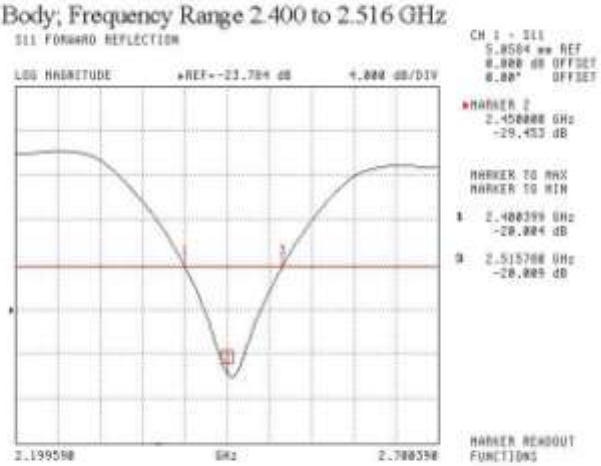
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

Head: Frequency Range 2.390 to 2.517 GHz



Body; Frequency Range 2.400 to 2.516 GHz



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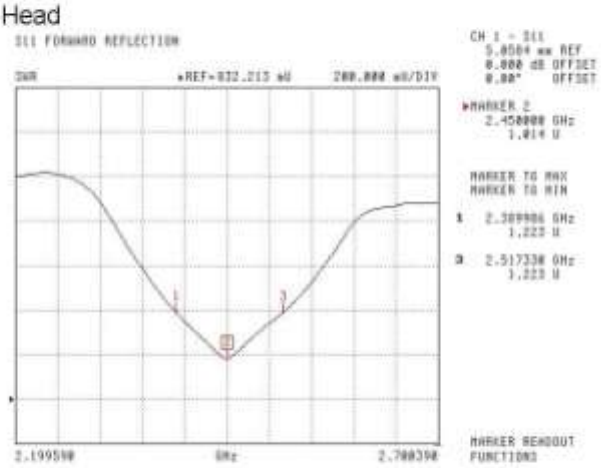
This page has been reviewed for content and attested to by signature within this document.

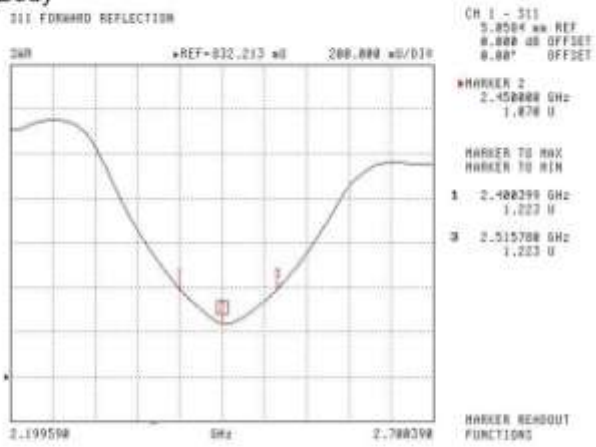
NCL Calibration Laboratories
Division of APREL Laboratories.

SWR

Head



Body



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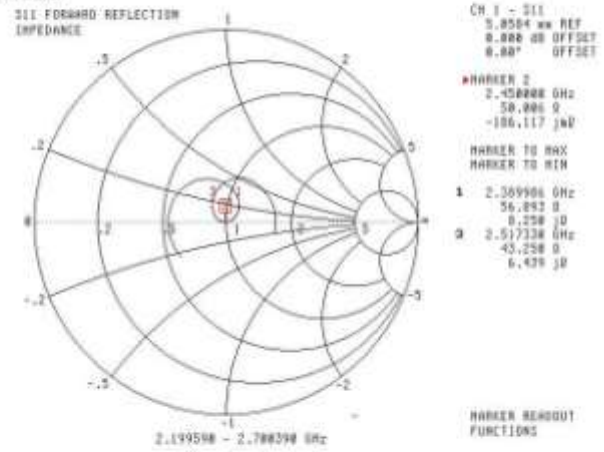
This page has been reviewed for content and attested to by signature within this document.

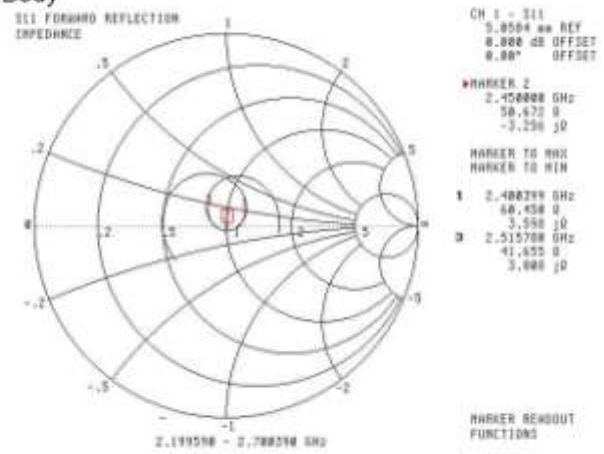
NCL Calibration Laboratories
Division of APREL Laboratories.

Smith Chart Dipole Impedance

Head



Body



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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2014.

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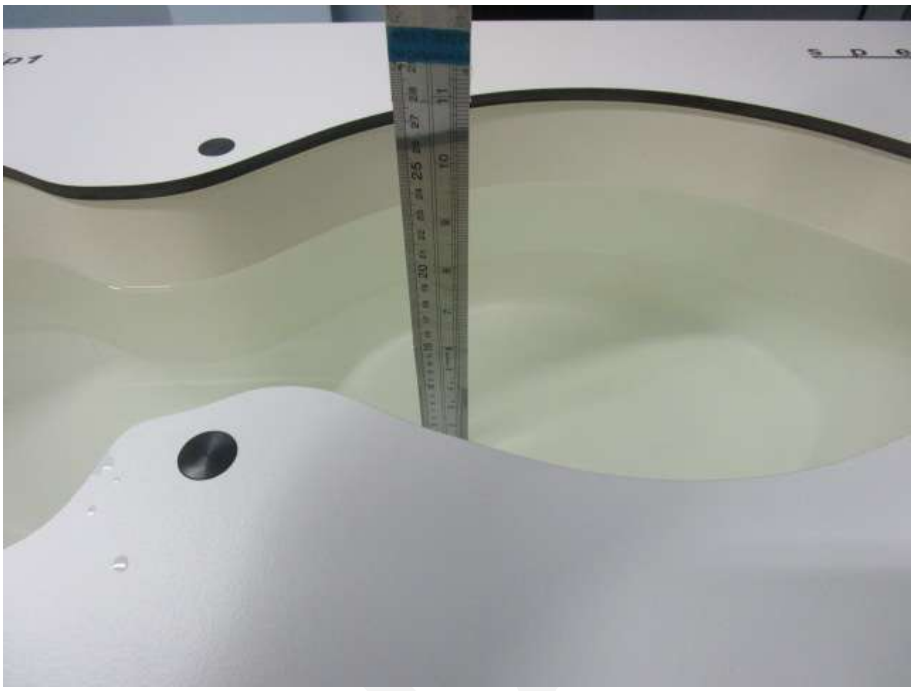
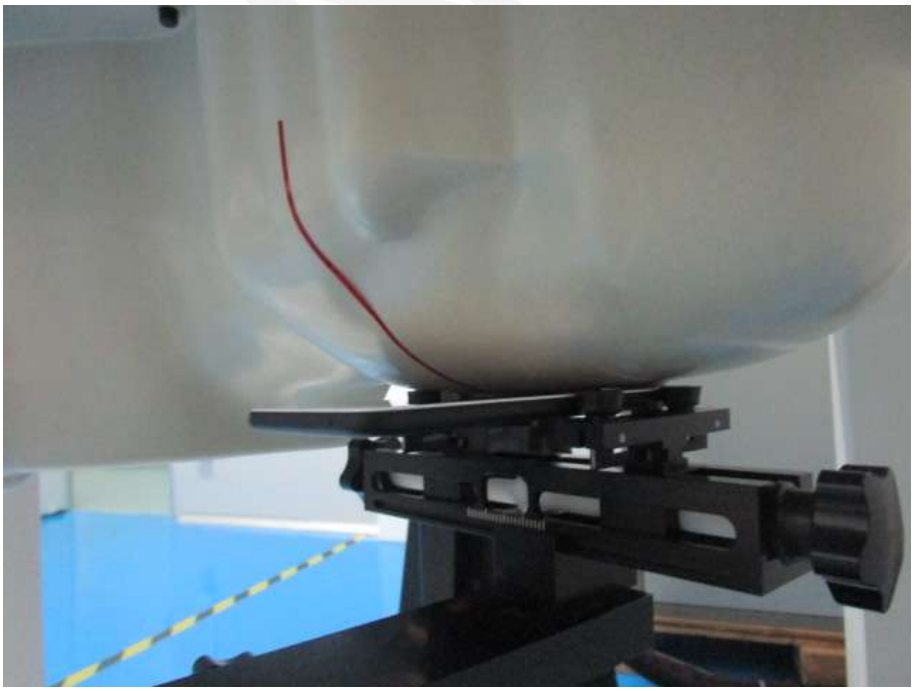
APPENDIX D EUT TEST POSITION PHOTOS

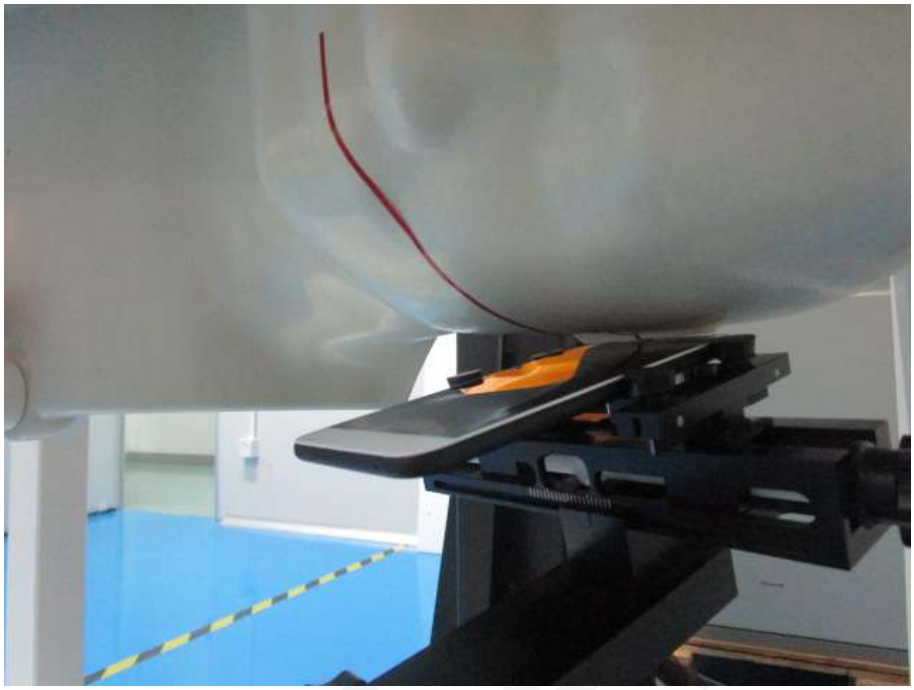
Liquid depth ≥ 15cm



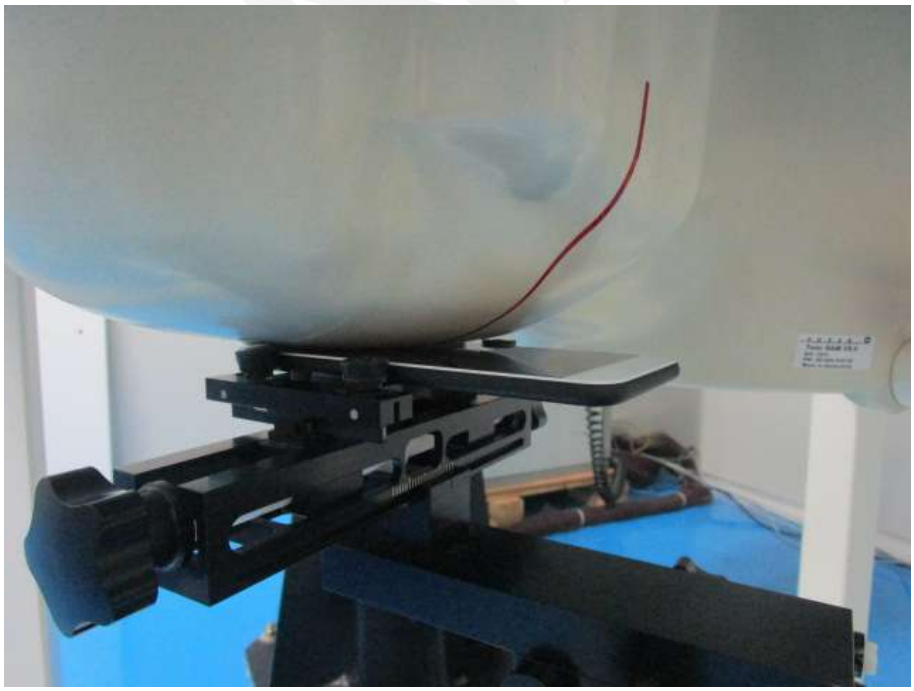
Left Head Cheek



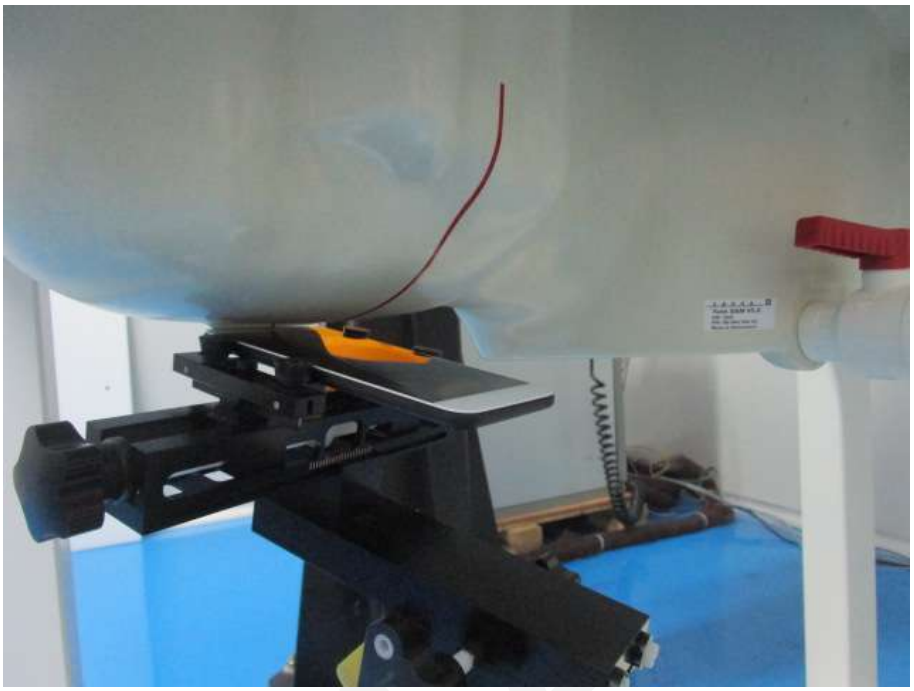
Left Head Tilt



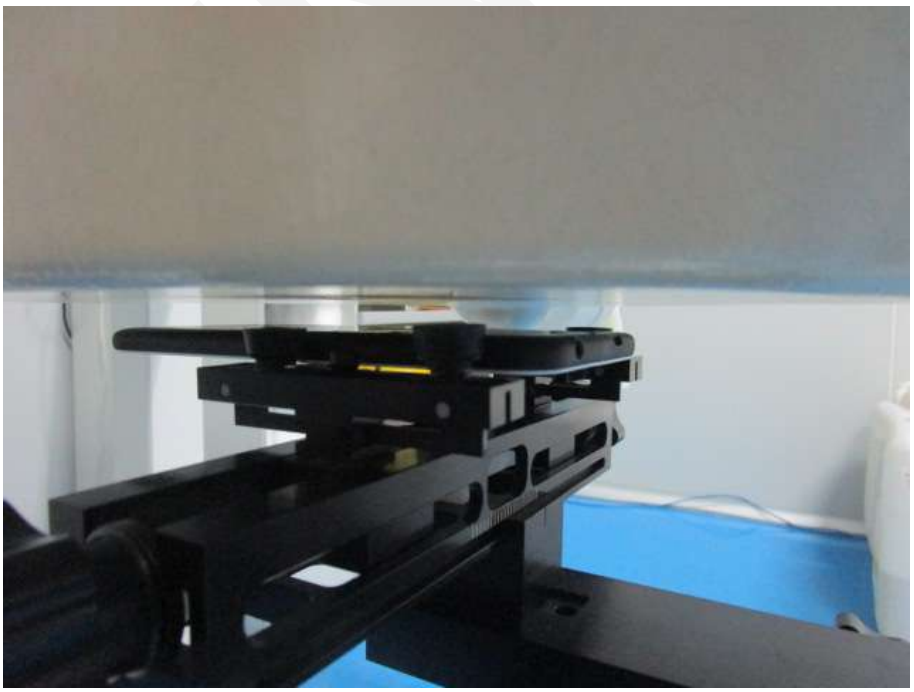
Right Head Cheek



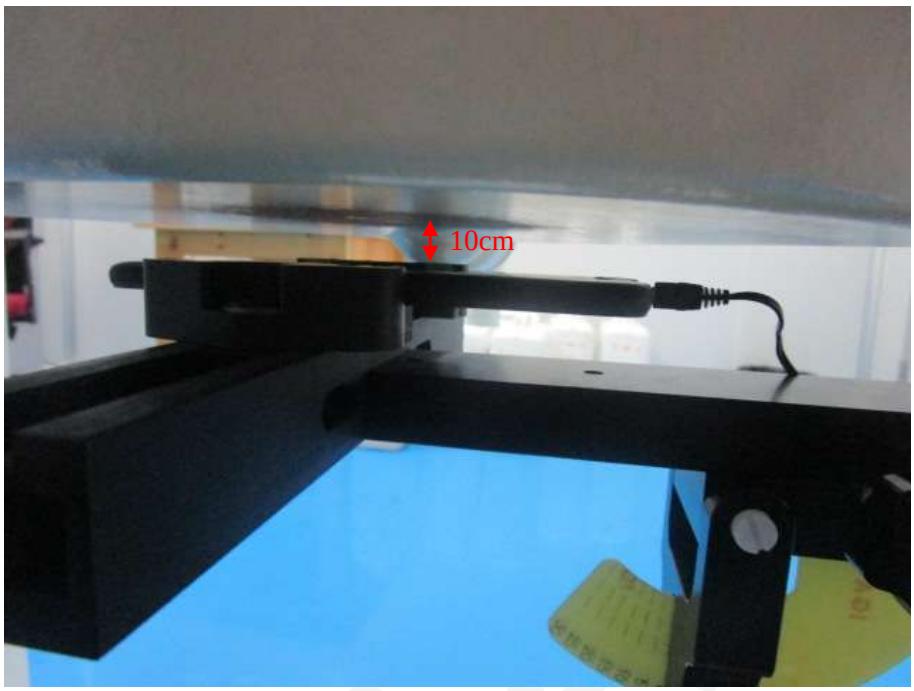
Right Head Tilt



Body -Worn-Back (10mm)

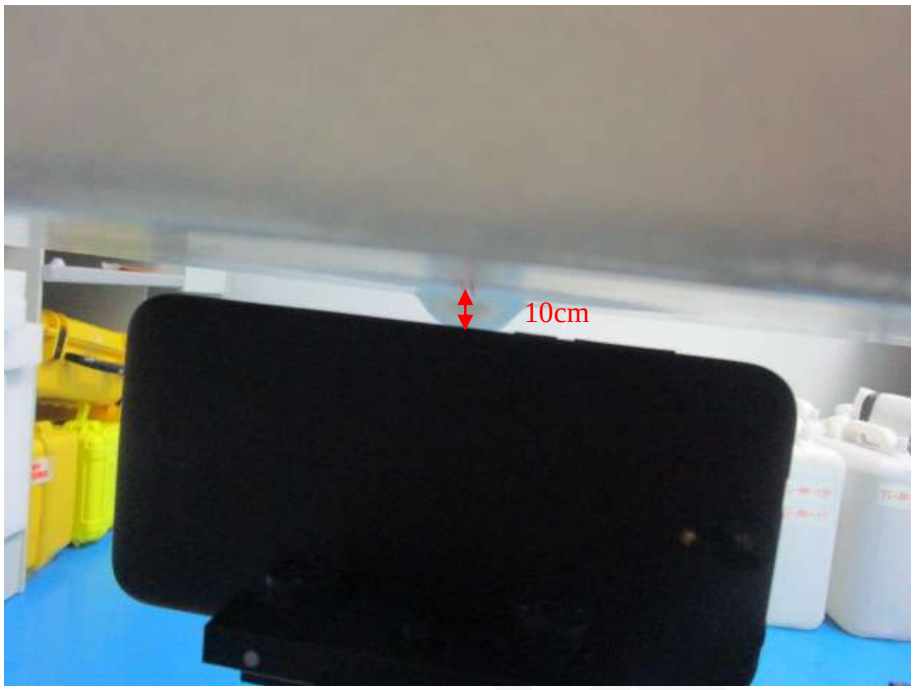


Body -Headset-Back (10mm)



Body -Worn-Left (10mm)

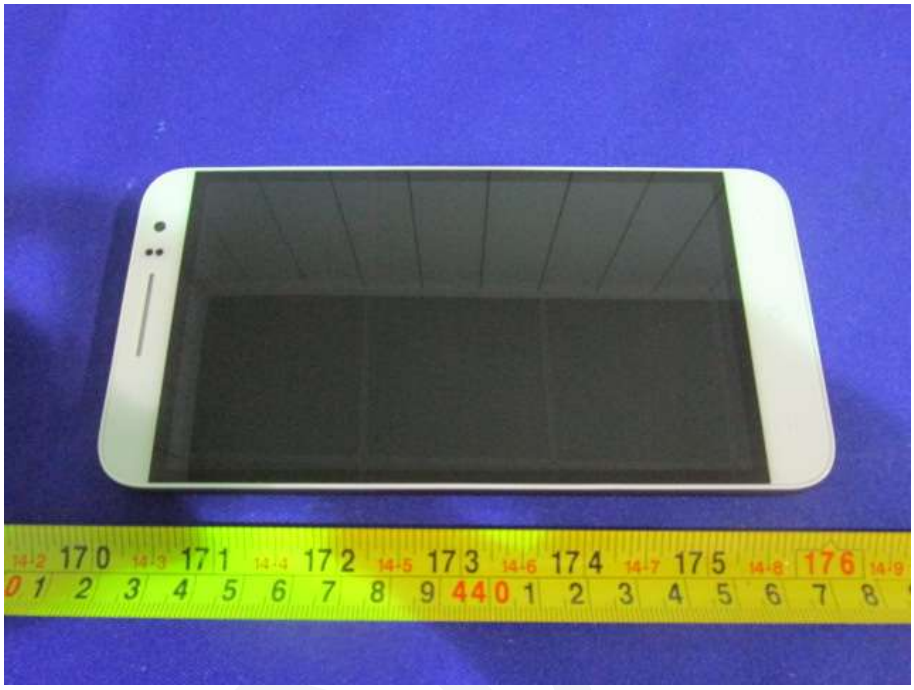
Body -Worn-Right (10mm)



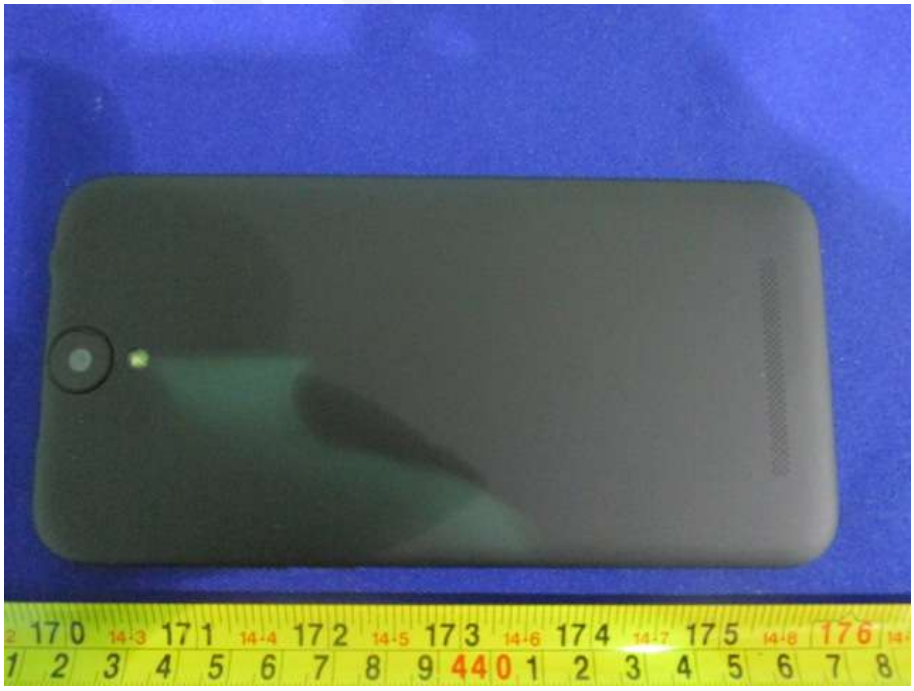
Body -Worn-Bottom(10mm)

APPENDIX E EUT PHOTOS

EUT – Front View



EUT – Back View

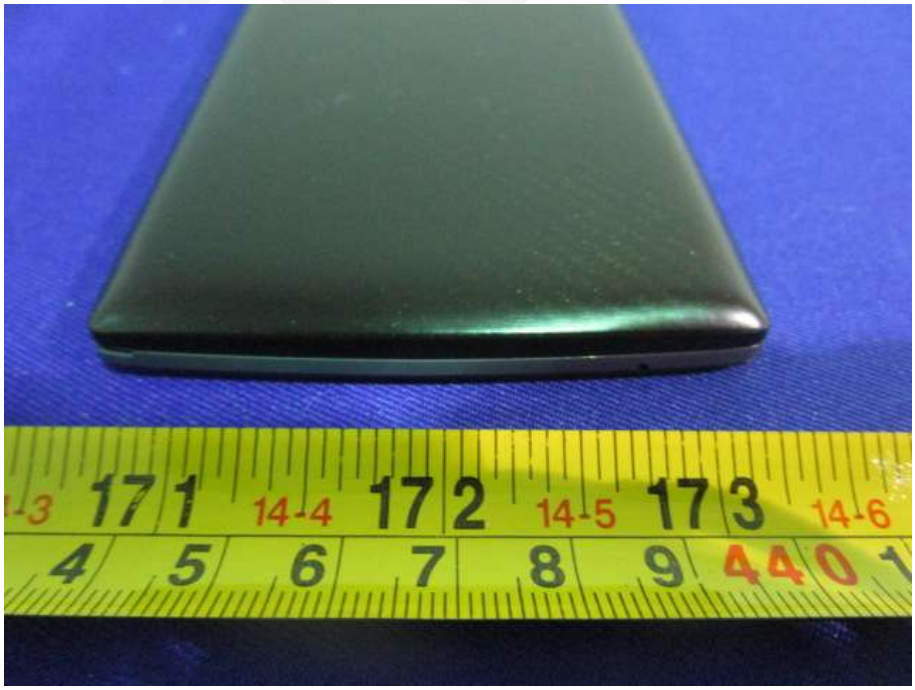


EUT –Left Side View

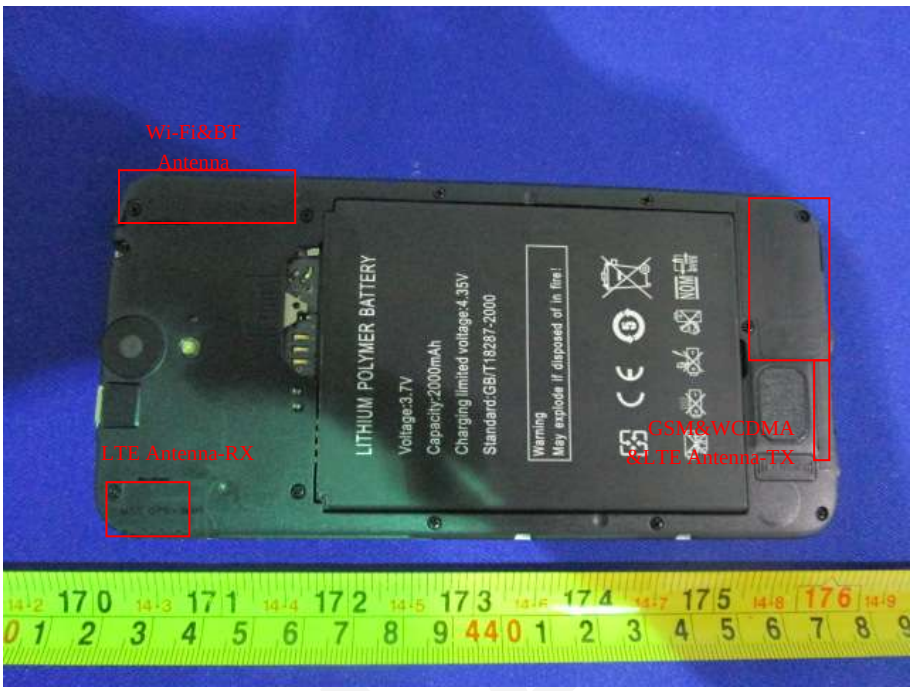
EUT – Right Side View

EUT –Top View

EUT – Bottom View



EUT – Uncover View



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