SAR EVALUATION REPORT

For

DOPPIO MOBILE INTERNATIONAL LIMITED

ROOM 1708,17/F HART AVENUE PLAZA,5-9 HART AVENUE TSIM SHA TSUI,KOWLOON, Hong Kong

FCC ID: N2GDPF500

Report Type:	**Product Type:**
Original Report	SIRIUS

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Report Number:	RDG150708001-20
Report Date:	2015-07-16
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Attestation of Test Results			
EUT Information	Company Name	DOPPIO MOBILE INTERNATIONAL LIMITED	
	EUT Description	Mobile Phone	
	Product Name	SIRIUS	
	FCC ID	N2GDPF500	
	Model Number	DPF500	
	Serial Number	150708001	
	Test Date	2015-07-14、2015-07-15	
MODE		Max. SAR Level(s) Reported(W/Kg)	Limit(W/Kg)
GSM 850	1g Head SAR	0.79	1. 6
	1g Body SAR	1.262	
PCS 1900	1g Head SAR	0.53	
	1g Body SAR	0.631	
WCDMA 850	1g Head SAR	0.693	
	1g Body SAR	1.09	
WCDMA 1900	1g Head SAR	0.715	
	1g Body SAR	1.316	
LTE Band 4	1g Head SAR	0.749	
	1g Body SAR	1.19	
WLAN	1g Head SAR	0.207	
	1g Body SAR	0.261	
Simultaneous	1g Head SAR	1.01	
	1g Body SAR	1.577	
Hotspot	1g Body SAR	1.577	
Applicable Standards	**ANSI / IEEE C95.1 : 2005** IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fileds,3 kHz to 300 GHz.		
	ANSI / IEEE C95.3 : 2002 IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to SuchFields,100 kHz—300 GHz.		
	FCC 47 CFR part 2.1093 Radiofrequency radiation exposure evaluation: portable devices		
	IEEE1528:2013 IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques		
	IEC 62209-2:2010 Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices-Human models, instrumentation, and procedures-Part 2: Procedure to determine the specific absorption rate (SAR) for wireless communication devices used in close proximity to the human body (frequency range of 30 MHz to 6 GHz)		
	KDB procedures KDB 447498 D01 General RF Exposure Guidance v05r02. KDB 648474 D04 Handset SAR v01r02. KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03 KDB 865664 D02 RF Exposure Reporting v01r01 KDB 941225 D01 3G SAR Procedures v03 KDB 941225 D05 SAR for LTE Devices v02r03 KDB 941225 D06 Hotspot Mode v02 KDB 248227 D01-SAR Measurement Procedures for 802.11a/b/g Transmitters		

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	RDG150708001-20	Original Report	2015-07-16

EUT DESCRIPTION

This report has been prepared on behalf of DOPPIO MOBILE INTERNATIONAL LIMITED and their product, Model: DPF500, FCC ID: N2GDPF500 or the EUT (Equipment under Test) as referred to in the rest of this report.

Technical Specification

Exposure Category:	Population / Uncontrolled
Antenna Type(s):	Internal Antenna
Body-Worn Accessories:	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 4: 1710-1755MHz(TX) ; 2110-2155MHz(RX) WLAN: 2412MHz-2462MHz Bluetooth : 2402MHz-2480MHz
Conducted RF Power:	GSM 850 : 32.9 dBm PCS 1900: 29.7 dBm WCDMA 850: 22.27 dBm WCDMA 1900: 22.48 dBm LTE Band 4:22.7 dBm WLAN: 16.94 dBm Bluetooth: 6.39 dBm BLE:-1.11 dBm
Dimensions (L*W*H):	124.3 mm (L) × 64 mm (W) × 10.3 mm (H)
Power Source:	3.8 VDC Rechargeable Battery
Normal Operation:	Head and Body-worn

REFERENCE, STANDARDS, AND GUILDELINES

FCC:

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

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

CE:

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

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

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

SAR Limits

FCC Limit (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

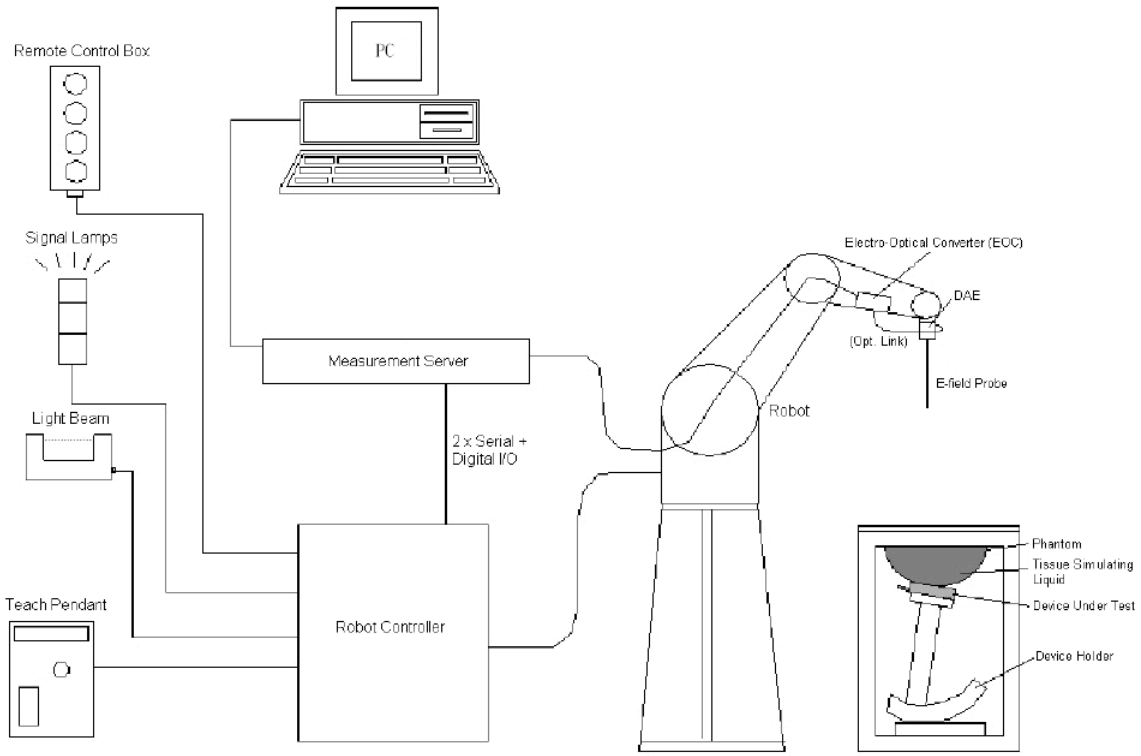
The Test site used by Bay Area Compliance Laboratories Corp. (Dongguan) to collect test data is located on the No.69 Pulongcun, Puxinhu Industrial Zone, Tangxia, Dongguan, Guangdong, China

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

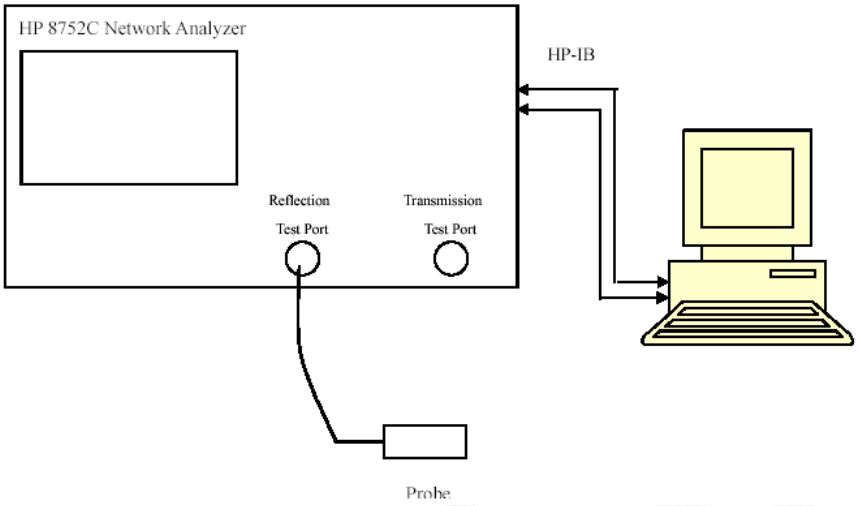
EQUIPMENT LIST AND CALIBRATION

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	2014-10-09	2017-10-09
R&S, universal Radio Communication Tester	CMU200	105047	2014-11-20	2015-11-20
Wideband Radio Communication Tester	CMW500	1201.0002K50-146520-wh	2014-11-19	2015-11-19
Mounting Device	MD4HHTV5	SD 000 H01 KA	N/A	N/A
Twin SAM	Twin SAM V5.0	1874	N/A	N/A
Simulated Tissue 835 MHz Head	TS-835-H	201504	Each Time	/
Simulated Tissue 835 MHz Body	TS-835-B	201505	Each Time	/
Simulated Tissue 1750 MHz Head	TS-1750-H	201508	Each Time	/
Simulated Tissue 1750 MHz Body	TS-1750-B	201509	Each Time	/
Simulated Tissue 1900 MHz Head	TS-1900-H	201506	Each Time	/
Simulated Tissue 1900 MHz Body	TS-1900-B	201507	Each Time	/
Simulated Tissue 2450 MHz Head	TS-2450-H	201512	Each Time	/
Simulated Tissue 2450 MHz Body	TS-2450-B	201513	Each Time	/
Network Analyzer	8752C	3140A02356	2015-06-03	2016-06-03
Dielectric probe kit	85070B	US33020324	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	42.92	0.88	41.5	0.9	3.42	-2.22	±5
	Body	55.17	0.96	55.2	0.97	-0.05	-1.03	±5
826.4	Head	42.88	0.88	41.5	0.9	3.33	-2.22	±5
	Body	55.12	0.97	55.2	0.97	-0.14	0	±5
836.6	Head	42.86	0.89	41.5	0.9	3.28	-1.11	±5
	Body	55.1	0.98	55.2	0.97	-0.18	1.03	±5
846.6	Head	42.83	0.9	41.5	0.9	3.2	0	±5
	Body	55.01	0.98	55.2	0.97	-0.34	1.03	±5
848.8	Head	42.73	0.9	41.5	0.9	2.96	0	±5
	Body	55.01	0.99	55.2	0.97	-0.34	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	53.44	1.48	53.43	1.49	0.02	-0.67	±5
1745	Head	39.71	1.38	40.8	1.37	-2.67	0.73	±5
	Body	53.3	1.49	53.43	1.49	-0.24	0	±5
1850.2	Head	39.87	1.36	40	1.4	-0.33	-2.86	±5
	Body	55.27	1.48	53.3	1.52	3.7	-2.63	±5
1852.4	Head	39.85	1.36	40	1.4	-0.37	-2.86	±5
	Body	55.21	1.48	53.3	1.52	3.58	-2.63	±5
1880	Head	39.74	1.38	40	1.4	-0.65	-1.43	±5
	Body	53.74	1.54	53.3	1.52	0.83	1.32	±5
1907.6	Head	39.57	1.41	40	1.4	-1.08	0.71	±5
	Body	53.61	1.49	53.3	1.52	0.58	-1.97	±5
1909.8	Head	39.6	1.41	40	1.4	-1	0.71	±5
	Body	53.38	1.49	53.3	1.52	0.15	-1.97	±5

**Liquid Verification above was performed on 2015-07-14.*

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)	
2412	Head	39.36	1.79	39.2	1.8	0.41	-0.56	±5
	Body	53.25	1.94	52.7	1.95	1.04	-0.51	±5
2437	Head	39.16	1.82	39.2	1.8	-0.1	1.11	±5
	Body	51.66	1.98	52.7	1.95	-1.97	1.54	±5
2462	Head	39.03	1.84	39.2	1.8	-0.43	2.22	±5
	Body	52.2	1.98	52.7	1.95	-0.95	1.54	±5

**Liquid Verification above was performed on 2015-07-15.*

Please refer to the following tables.

835 MHz Head			835 MHz Body		
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
824	42.8811	19.1594	824	55.1542	21.0394
824.5	42.9701	19.1191	824.5	55.186	20.9588
825	42.9767	19.1236	825	55.1358	21.0194
825.5	42.913	19.1904	825.5	55.2155	20.9607
826	42.9144	19.1217	826	55.0983	21.0418
826.5	42.8723	19.1691	826.5	55.1237	21.0355
827	42.9186	19.1622	827	55.019	20.9854
827.5	42.881	19.1616	827.5	55.1854	20.9756
828	42.9911	19.2313	828	55.1517	21.0059
828.5	42.9361	19.1728	828.5	55.2015	21.0027
829	42.9537	19.2337	829	55.1142	20.9395
829.5	42.9272	19.1418	829.5	55.0947	20.932
830	43.0008	19.1999	830	55.1343	20.93
830.5	42.9604	19.2268	830.5	55.0849	20.9908
831	42.916	19.202	831	55.1181	20.9348
831.5	42.8946	19.168	831.5	55.1659	20.9697
832	42.962	19.1705	832	55.2042	20.9774
832.5	42.9124	19.2206	832.5	55.0954	20.9173
833	42.9811	19.2166	833	55.1367	20.92
833.5	42.9187	19.2471	833.5	55.1428	20.9605
834	42.9094	19.1957	834	55.1743	21.0551
834.5	42.9008	19.2188	834.5	55.0821	20.9264
835	42.9513	19.2433	835	55.0972	20.9452
835.5	42.9398	19.1808	835.5	55.0849	20.9958
836	42.9434	19.1464	836	55.1057	21.0138
836.5	42.8546	19.1685	836.5	55.1007	20.9686
837	42.8646	19.1788	837	55.0792	20.9873
837.5	42.8591	19.1781	837.5	55.0339	20.9209
838	42.8823	19.2034	838	55.0906	21.0035
838.5	42.8997	19.1927	838.5	55.1253	21.0045
839	42.9399	19.2198	839	55.0811	20.9876
839.5	42.8941	19.1404	839.5	55.0859	21.0379
840	42.9281	19.1012	840	55.0444	20.9922
840.5	42.8794	19.0617	840.5	55.1807	20.9721
841	42.919	19.1903	841	55.0388	20.9946
841.5	42.8687	19.1509	841.5	55.0319	20.955
842	42.8682	19.0812	842	55.0969	20.9612
842.5	42.8273	19.1192	842.5	54.9956	20.9687
843	42.8138	19.0904	843	55.0298	20.9833
843.5	42.8115	19.0764	843.5	55.0037	20.9216
844	42.7912	19.0587	844	55.0504	20.9027
844.5	42.8713	19.0307	844.5	55.0575	21.0491
845	42.7475	19.0779	845	55.1169	20.9789
845.5	42.8046	19.0663	845.5	55.0104	20.9038
846	42.8336	19.0048	846	55.0271	20.975
846.5	42.8539	18.9998	846.5	55.0152	20.9048
847	42.7439	19.0918	847	55	20.9447
847.5	42.7169	18.9972	847.5	55.0471	20.9818
848	42.7985	19.0158	848	54.9965	20.9865
848.5	42.7348	19.0105	848.5	55.0053	20.9033
849	42.7296	18.9776	849	55.0139	20.9416

1750 MHz Head					
Frequency (MHz)	**e'**	**e''**	**Frequency (MHz)**	**e'**	**e''**
1710	40.4617	14.3238	1748	40.2008	14.2390
1711	40.4531	14.2991	1749	40.2621	14.2467
1712	40.4408	14.3297	1750	40.3303	14.2412
1713	40.3877	14.3083	1751	40.3371	14.2810
1714	40.4311	14.3143	1752	40.3511	14.2666
1715	40.4023	14.3144	1753	40.3425	14.2405
1716	40.4673	14.2885	1754	40.2981	14.2613
1717	40.4227	14.3048	1755	40.315	14.2038
1718	40.4489	14.2863	1756	40.3102	14.2759
1719	40.3722	14.3342	1757	40.2551	14.2306
1720	40.4585	14.3063	1758	40.2226	14.1901
1721	40.5923	14.2266	1759	40.2382	14.2020
1722	40.5325	14.2523	1760	40.2845	14.1978
1723	40.4909	14.2765	1761	40.2898	14.3264
1724	40.5737	14.2207	1762	40.3261	14.2831
1725	40.5391	14.2727	1763	40.2437	14.2902
1726	40.5611	14.2208	1764	40.1788	14.2856
1727	40.4619	14.3161	1765	40.1893	14.3050
1728	40.5035	14.3323	1766	40.2166	14.3060
1729	40.5022	14.2810	1767	40.1848	14.2569
1730	40.4547	14.3014	1768	40.1768	14.2263
1731	40.3965	14.3690	1769	40.3587	14.2834
1732	40.4454	14.3242	1770	40.3327	14.1945
1733	40.3732	14.3190	1771	40.3151	14.2619
1734	40.3962	14.2576	1772	40.3451	14.2441
1735	40.3627	14.3295	1773	40.2817	14.2760
1736	40.4101	14.2742	1774	40.2953	14.2377
1737	40.3564	14.2656	1775	40.3293	14.2491
1738	40.3011	14.2959	1776	40.2931	14.2327
1739	40.3561	14.3322	1777	40.2395	14.1949
1740	40.3663	14.3050	1778	40.217	14.2624
1741	40.3442	14.2484	1779	40.2665	14.2250
1742	40.3455	14.2986	1780	40.3776	14.2650
1743	40.2918	14.2813	1781	40.3521	14.2025
1744	40.3358	14.3130	1782	40.3672	14.2874
1745	40.314	14.2702	1783	40.3003	14.2424
1746	40.2919	14.2408	1784	40.3061	14.1597
1747	40.2296	14.2763	1785	40.3363	14.2031

1750 MHz Body					
Frequency (MHz)	**e'**	**e''**	**Frequency (MHz)**	**e'**	**e''**
1710	53.51	15.3855	1748	53.2036	15.2985
1711	53.494	15.3596	1749	53.2453	15.3051
1712	53.483	15.3806	1750	53.3701	15.3477
1713	53.4701	15.3483	1751	53.389	15.3172
1714	53.4586	15.3873	1752	53.3489	15.3103
1715	53.4066	15.3878	1753	53.3249	15.2953
1716	53.4675	15.3917	1754	53.2979	15.3306
1717	53.4145	15.3709	1755	53.3274	15.2764
1718	53.4891	15.4003	1756	53.2991	15.3283
1719	53.3944	15.4159	1757	53.245	15.2786
1720	53.4526	15.4077	1758	53.1804	15.2645
1721	53.6616	15.3219	1759	53.1928	15.2685
1722	53.5725	15.3485	1760	53.2545	15.2704
1723	53.5874	15.3105	1761	53.2549	15.397
1724	53.6971	15.3052	1762	53.281	15.3383
1725	53.5867	15.3143	1763	53.2101	15.3114
1726	53.6572	15.3049	1764	53.1749	15.3507
1727	53.5046	15.3739	1765	53.1363	15.3514
1728	53.5382	15.3976	1766	53.1616	15.3774
1729	53.5327	15.3216	1767	53.1687	15.3419
1730	53.4928	15.3888	1768	53.1183	15.3346
1731	53.425	15.4329	1769	53.3731	15.3626
1732	53.4831	15.3476	1770	53.3406	15.2624
1733	53.3922	15.3965	1771	53.3485	15.2914
1734	53.3865	15.3334	1772	53.3281	15.3304
1735	53.4005	15.3698	1773	53.3049	15.3526
1736	53.4136	15.3565	1774	53.3237	15.3169
1737	53.372	15.3725	1775	53.3091	15.3125
1738	53.3328	15.3942	1776	53.2471	15.3409
1739	53.3469	15.408	1777	53.2143	15.2482
1740	53.3517	15.3375	1778	53.1889	15.3751
1741	53.3689	15.3151	1779	53.2448	15.3188
1742	53.3149	15.3323	1780	53.3436	15.3231
1743	53.2895	15.3615	1781	53.3955	15.2469
1744	53.3468	15.3761	1782	53.3456	15.3725
1745	53.304	15.3476	1783	53.3229	15.2974
1746	53.2591	15.3054	1784	53.3187	15.2479
1747	53.1985	15.3662	1785	53.3238	15.2608

1900 MHz Head			1900 MHz Body		
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
1850	39.8575	13.2041	1850	55.2464	14.3555
1851	39.8961	13.1974	1851	55.352	14.3394
1852	39.8604	13.1814	1852	55.2367	14.3713
1853	39.843	13.1283	1853	55.1733	14.3011
1854	39.8944	13.1789	1854	55.057	14.1596
1855	39.8717	13.2013	1855	55.0415	14.2496
1856	39.8312	13.2036	1856	54.8932	14.2861
1857	39.8975	13.1953	1857	54.7285	14.2046
1858	39.8553	13.1787	1858	54.6401	14.1133
1859	39.7945	13.2036	1859	54.5759	14.0759
1860	39.8274	13.2491	1860	54.4422	14.1816
1861	39.8458	13.2214	1861	54.5257	14.0884
1862	39.8735	13.2146	1862	54.3363	14.1278
1863	39.8254	13.1321	1863	54.1956	14.1476
1864	39.8391	13.1913	1864	54.1627	14.1357
1865	39.8314	13.1875	1865	54.095	14.1753
1866	39.8178	13.2273	1866	53.9859	14.1271
1867	39.7915	13.1925	1867	53.9247	14.1847
1868	39.7884	13.2309	1868	53.815	14.2117
1869	39.831	13.2738	1869	53.7162	14.217
1870	39.8355	13.2506	1870	53.6829	14.2911
1871	39.8458	13.2022	1871	53.6296	14.285
1872	39.8076	13.2202	1872	53.6661	14.3409
1873	39.8043	13.1747	1873	53.6538	14.4473
1874	39.7372	13.2383	1874	53.6243	14.4562
1875	39.7907	13.2359	1875	53.6366	14.5003
1876	39.7579	13.2409	1876	53.6327	14.5842
1877	39.8168	13.2284	1877	53.6826	14.6352
1878	39.7813	13.2351	1878	53.6073	14.6833
1879	39.7651	13.2162	1879	53.6874	14.6632
1880	39.7432	13.2438	1880	53.7355	14.7744
1881	39.7168	13.2482	1881	53.7774	14.7563
1882	39.7497	13.2941	1882	53.7899	14.781
1883	39.7418	13.2551	1883	53.8083	14.8118
1884	39.7463	13.2636	1884	53.8712	14.775
1885	39.6957	13.296	1885	53.9593	14.8574
1886	39.6982	13.3027	1886	54.1075	14.7648
1887	39.6443	13.2581	1887	54.1754	14.76
1888	39.6625	13.2448	1888	54.269	14.8165
1889	39.6887	13.3065	1889	54.25	14.7182
1890	39.656	13.318	1890	54.2872	14.7525
1891	39.7082	13.3064	1891	54.3356	14.733
1892	39.7042	13.2804	1892	54.3694	14.7274
1893	39.6377	13.2987	1893	54.3863	14.6934
1894	39.6543	13.2896	1894	54.3474	14.669
1895	39.625	13.3032	1895	54.33	14.6368
1896	39.6916	13.3058	1896	54.4591	14.5306
1897	39.6607	13.2907	1897	54.4213	14.4731
1898	39.645	13.2808	1898	54.429	14.4369
1899	39.6297	13.2832	1899	54.269	14.3644
1900	39.6731	13.3227	1900	54.1843	14.3455

1900 MHz Head			1900 MHz Body		
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
1901	39.6434	13.2881	1901	54.1451	14.2566
1902	39.5887	13.3432	1902	54.0657	14.232
1903	39.5952	13.2505	1903	53.9666	14.2327
1904	39.6313	13.3243	1904	53.8916	14.1254
1905	39.6337	13.3257	1905	53.7914	14.1237
1906	39.6068	13.3424	1906	53.7016	14.1284
1907	39.5766	13.3251	1907	53.6193	14.1112
1908	39.571	13.2988	1908	53.5967	14.0479
1909	39.6012	13.3375	1909	53.4322	14.032
1910	39.6031	13.2968	1910	53.3613	14.0662

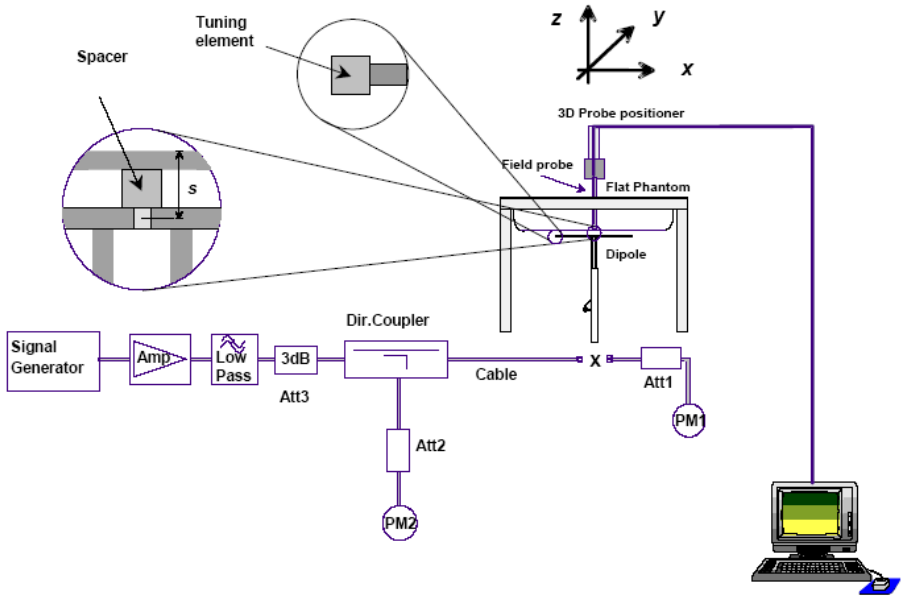
2450 MHz Head					
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
2412	39.3558	13.3583	2443	39.1526	13.4423
2413	39.2784	13.3362	2444	39.1711	13.4194
2414	39.353	13.3308	2445	39.189	13.4374
2415	39.3212	13.405	2446	39.1376	13.4208
2416	39.3129	13.3521	2447	39.159	13.4582
2417	39.3495	13.3842	2448	39.1173	13.4408
2418	39.314	13.3731	2449	39.1424	13.4467
2419	39.3292	13.369	2450	39.1317	13.4173
2420	39.3578	13.412	2451	39.1126	13.4307
2421	39.2524	13.5016	2452	39.1106	13.425
2422	39.2388	13.5014	2453	39.1139	13.4261
2423	39.2088	13.5004	2454	39.1246	13.4059
2424	39.2285	13.5033	2455	39.0732	13.3998
2425	39.198	13.4595	2456	39.0883	13.4486
2426	39.217	13.49	2457	39.0943	13.4208
2427	39.2196	13.4783	2458	39.0722	13.4186
2428	39.196	13.5159	2459	39.0521	13.4095
2429	39.1392	13.4763	2460	39.008	13.46
2430	39.2157	13.442	2461	39.0729	13.4522
2431	39.235	13.4936	2462	39.0327	13.4212
2432	39.2257	13.4621	2463	39.0428	13.4821
2433	39.2172	13.4979	2464	39.0341	13.4858
2434	39.2527	13.5051	2465	39.0237	13.5277
2435	39.2124	13.466	2466	39.0041	13.5215
2436	39.1651	13.4822	2467	38.9779	13.4878
2437	39.1646	13.4455	2468	39.0267	13.5022
2438	39.1939	13.4592	2469	38.9984	13.4796
2439	39.2141	13.4647	2470	38.9942	13.5085
2440	39.1833	13.4638	2471	39.0275	13.5108
2441	39.1821	13.4346	2472	38.9457	13.5433
2442	39.1899	13.4442	/	/	/

2450 MHz Body					
Frequency (MHz)	**e'**	**e''**	**Frequency (MHz)**	**e'**	**e''**
2412	53.2534	14.477	2443	51.7412	14.8703
2413	53.3643	14.4925	2444	51.7915	14.8644
2414	53.2647	14.4546	2445	51.8398	14.9029
2415	53.1831	14.4176	2446	51.8877	14.9075
2416	53.0495	14.2967	2447	51.9606	14.9385
2417	53.0178	14.3833	2448	52.0994	14.8754
2418	52.9436	14.4098	2449	52.1592	14.8866
2419	52.7701	14.2885	2450	52.2151	14.9145
2420	52.6322	14.2627	2451	52.2198	14.8615
2421	52.6154	14.1916	2452	52.309	14.8344
2422	52.4592	14.3372	2453	52.3424	14.8401
2423	52.4936	14.232	2454	52.3759	14.8005
2424	52.3206	14.2886	2455	52.3385	14.7647
2425	52.1782	14.2737	2456	52.3434	14.7616
2426	52.1467	14.2802	2457	52.3396	14.7609
2427	52.0435	14.2875	2458	52.4629	14.5841
2428	51.9853	14.2681	2459	52.3782	14.6132
2429	51.9133	14.3192	2460	52.407	14.5451
2430	51.8559	14.3309	2461	52.2504	14.5209
2431	51.7428	14.3074	2462	52.1992	14.4592
2432	51.6754	14.366	2463	52.1071	14.3973
2433	51.6621	14.4505	2464	52.0553	14.3711
2434	51.6849	14.4762	2465	51.9622	14.3416
2435	51.65	14.5438	2466	51.9139	14.2452
2436	51.5926	14.548	2467	51.7739	14.287
2437	51.6571	14.616	2468	51.7264	14.2183
2438	51.6508	14.6445	2469	51.6284	14.2375
2439	51.6725	14.7097	2470	51.5726	14.2231
2440	51.6009	14.7845	2471	51.4641	14.1627
2441	51.6691	14.7855	2472	51.3381	14.1899
2442	51.7308	14.8273	/	/	/

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 (%)
2015/7/14	835	Head	1g	9.81	9.773	0.38	±10
		Body	1g	9.26	9.736	-4.89	±10
	1750	Head	1g	37.3	37.02	0.76	±10
		Body	1g	37.7	36.65	2.86	±10
	1900	Head	1g	40.9	39.481	3.59	±10
		Body	1g	41.7	39.715	5.00	±10
2015/7/15	2450	Head	1g	51.3	52.4	-2.10	±10
		Body	1g	53.6	52.4	2.29	±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

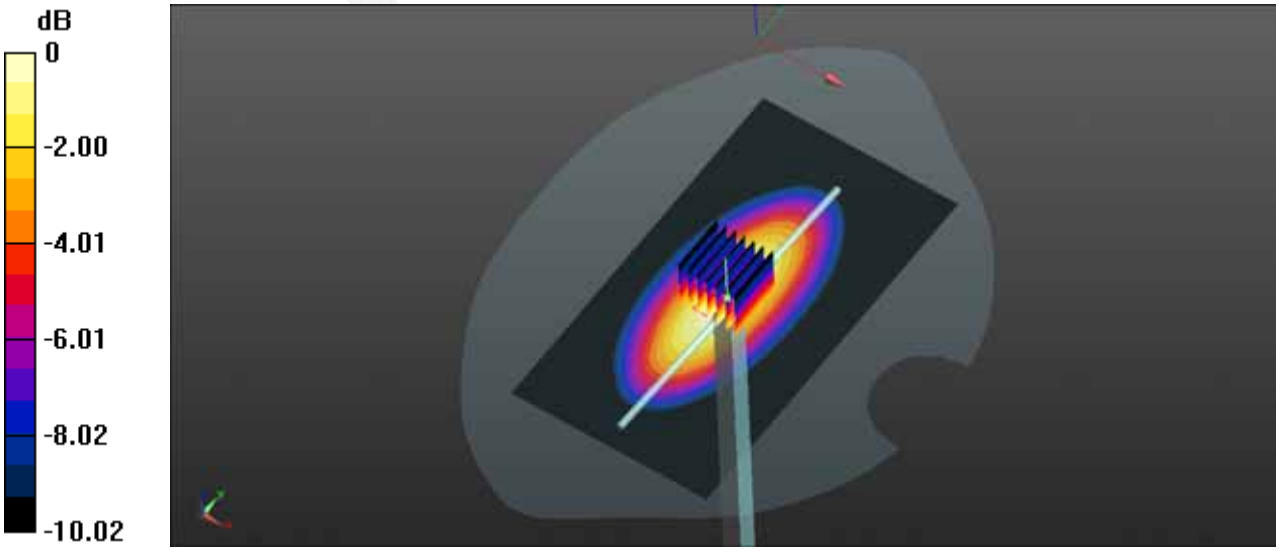
Communication System:CW ; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.892 S/m; ε_r = 42.952; ρ = 1000 kg/m^3
Phantom section: Flat Section

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) = 10.4 W/kg

System Performance 835MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 107.3 V/m; Power Drift = 0.09 dB
Peak SAR (extrapolated) = 15.2 W/kg
SAR(1 g) = 9.81 W/kg; SAR(10 g) = 6.28 W/kg
Maximum value of SAR (measured) = 10.6 W/kg



0 dB = 10.6 W/kg = 10.25 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

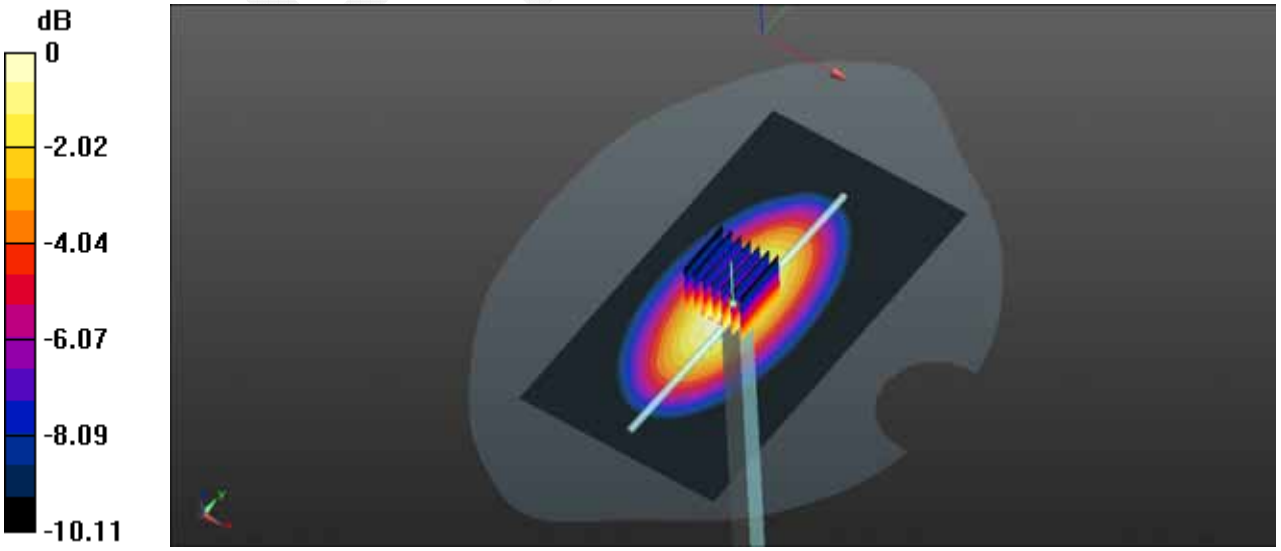
Communication System:CW ; Frequency: 835 MHz;Duty Cycle: 1:1
Medium parameters used: f = 835 MHz; σ = 0.973 S/m; ε_r = 55.099; ρ = 1000 kg/m^3
Phantom section: Flat Section

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) = 9.95 W/kg

System Performance 835MHz Body /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 99.47 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 13.9 W/kg
SAR(1 g) = 9.26 W/kg; SAR(10 g) = 6.07 W/kg
Maximum value of SAR (measured) = 9.98 W/kg



0 dB = 9.98 W/kg = 9.99 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

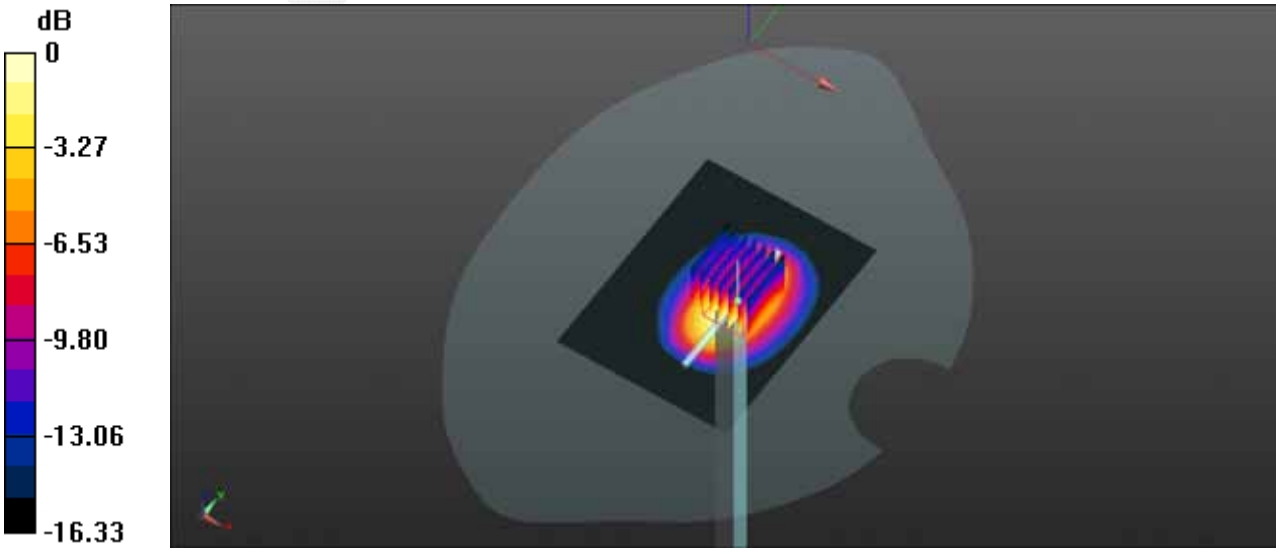
Communication System:CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1750 MHz; σ = 1.386 S/m; ε_r = 40.33; ρ = 1000 kg/m^3
Phantom section: Flat Section

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) = 43.2 W/kg

System Performance 1750MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 136.1 V/m; Power Drift = -0.19 dB
Peak SAR (extrapolated) = 68.5 W/kg
SAR(1 g) = 37.3 W/kg; SAR(10 g) = 19.8 W/kg
Maximum value of SAR (measured) = 41.7 W/kg



0 dB = 41.7 W/kg = 16.20 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

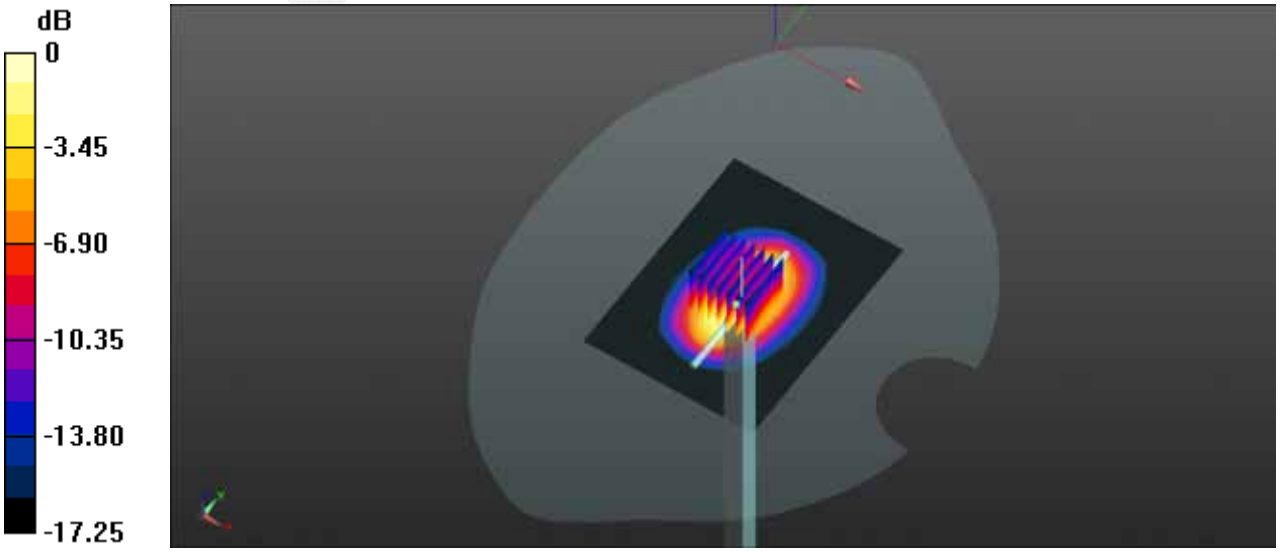
Communication System:CW; Frequency: 1750 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1750 MHz; σ = 1.494 S/m; ε_r = 53.37; ρ = 1000 kg/m^3
Phantom section: Flat Section

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) = 43.8 W/kg

System Performance 1750MHz Body /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 167.3 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 70.4 W/kg
SAR(1 g) = 37.7 W/kg; SAR(10 g) = 19.9 W/kg
Maximum value of SAR (measured) = 42.0 W/kg



0 dB = 42.0 W/kg = 16.23 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

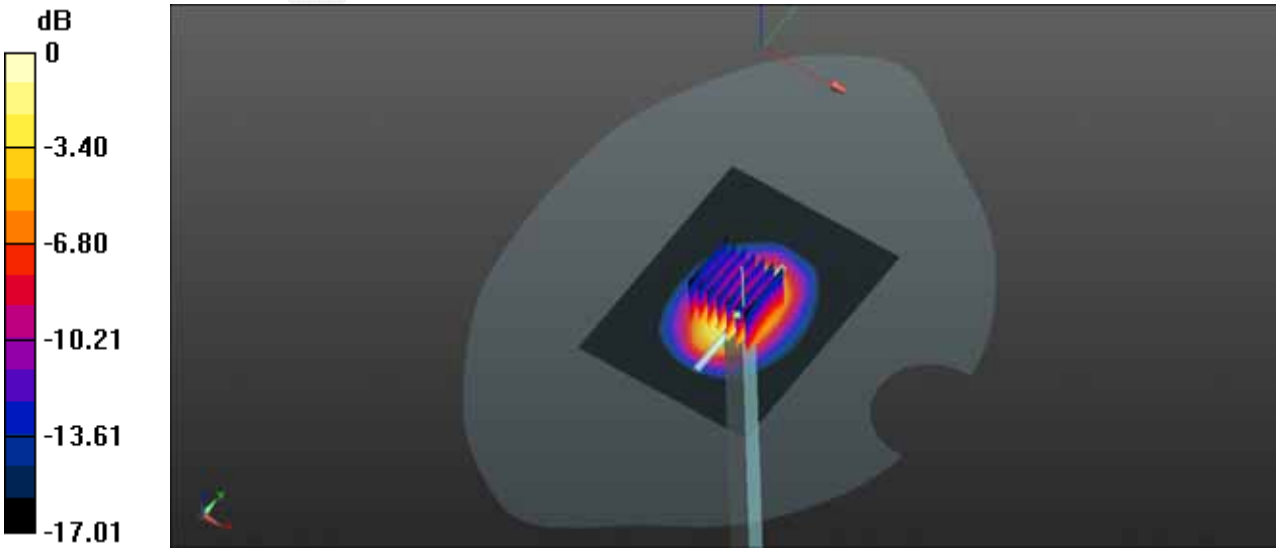
Communication System:CW ; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.409 S/m; ε_r = 39.624; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 = -0.08 dB
Peak SAR (extrapolated) = 76.8 W/kg
SAR(1 g) = 40.9 W/kg; SAR(10 g) = 21.2 W/kg
Maximum value of SAR (measured) = 45.8 W/kg



0 dB = 45.8 W/kg = 16.61 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

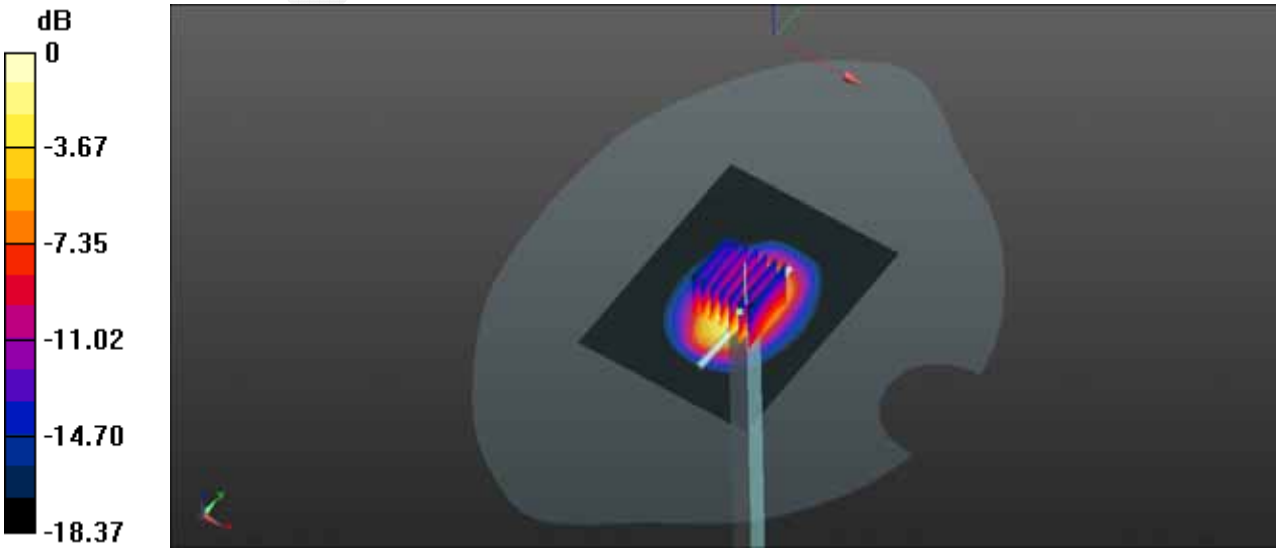
Communication System:CW ; Frequency: 1900 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.518 S/m; ε_r = 54.202; ρ = 1000 kg/m^3
Phantom section: Flat Section

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) = 48.7 W/kg

System Performance 1900MHz Body /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 171.8 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 79.0 W/kg
SAR(1 g) = 41.7 W/kg; SAR(10 g) = 21 W/kg
Maximum value of SAR (measured) = 47.0 W/kg



0 dB = 47.0 W/kg = 16.72 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

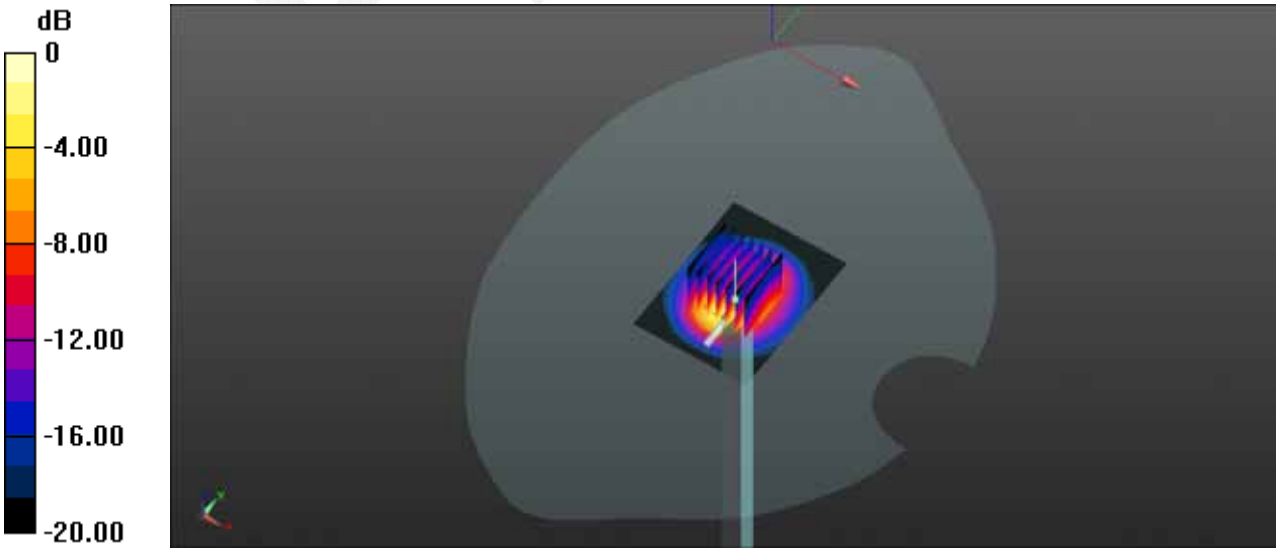
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.829 S/m; ε_r = 39.132; ρ = 1000 kg/m^3
Phantom section: Flat Section

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) = 57.9 W/kg

System Performance/2450MHz Head /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 174.5 V/m; Power Drift = -0.03 dB
Peak SAR (extrapolated) = 100 W/kg
SAR(1 g) = 51.3 W/kg; SAR(10 g) = 21.9 W/kg
Maximum value of SAR (measured) = 55.0 W/kg



0 dB = 55.0 W/kg = 17.40 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

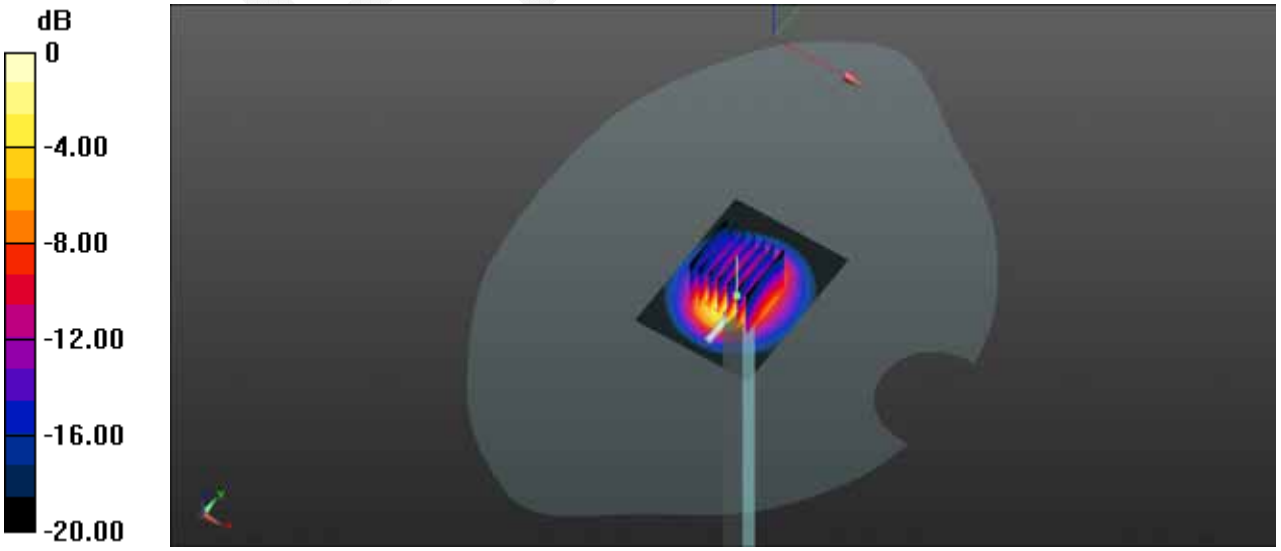
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 2.033 S/m; ε_r = 52.215; ρ = 1000 kg/m^3
Phantom section: Flat Section

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) = 67.9 W/kg

System Performance/2450MHz Body /Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 183.3 V/m; Power Drift = 0.02 dB
Peak SAR (extrapolated) = 123 W/kg
SAR(1 g) = 53.6 W/kg; SAR(10 g) = 25.3 W/kg
Maximum value of SAR (measured) = 62.3 W/kg



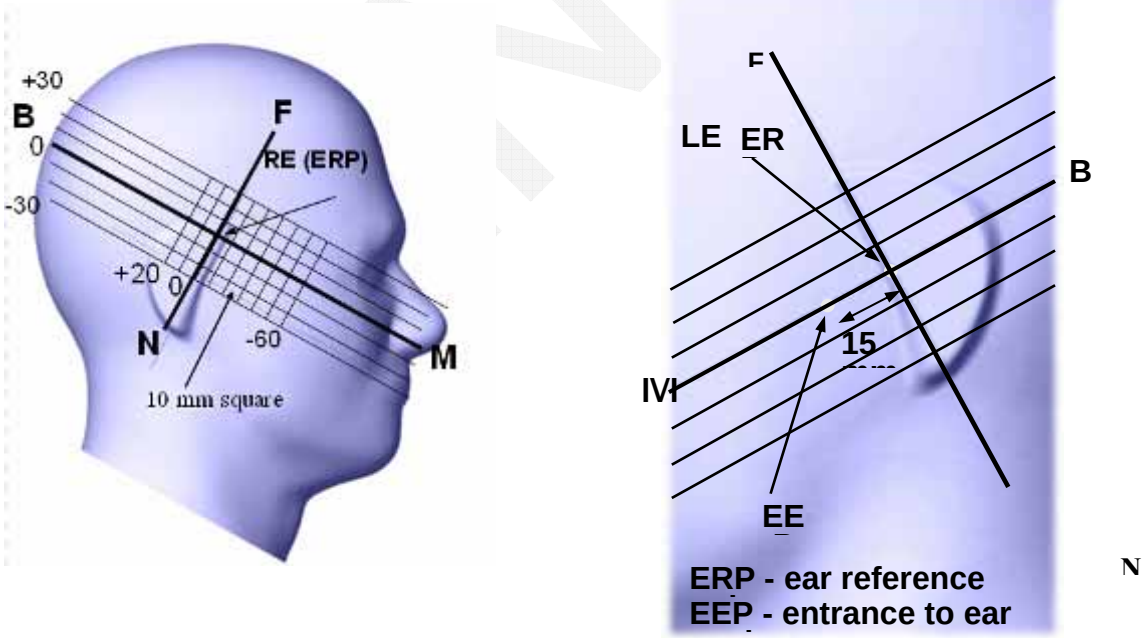
0 dB = 62.3 W/kg = 17.10 dBW/kg

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

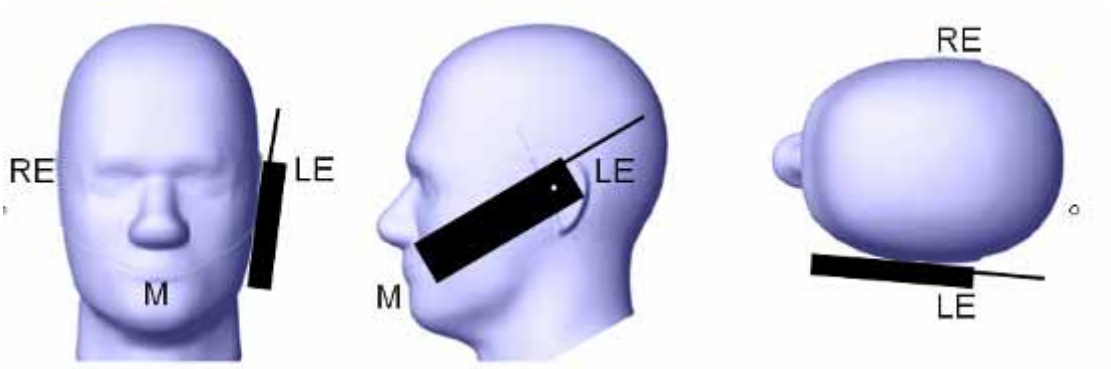
The device is brought toward the mouth of the head phantom by pivoting against the "ear reference point" or along the "N-F" line for the SCC-34/SC-2 head phantom.

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

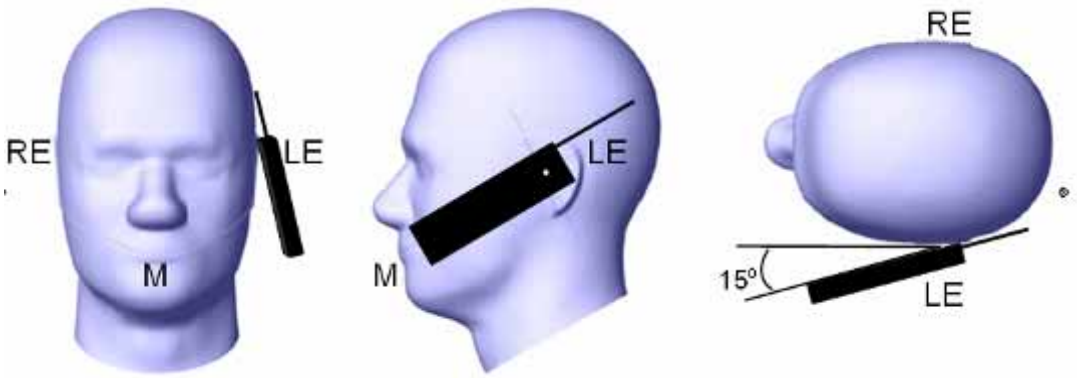
With the handset aligned in the "Cheek/Touch Position":

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.

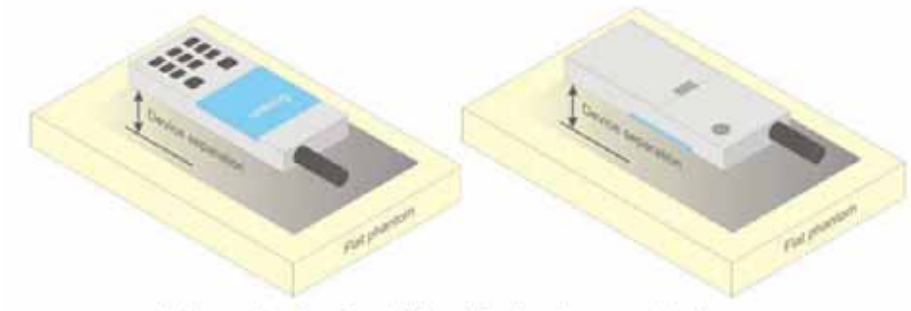


Figure 5 – Test positions for body-worn devices

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 D05 SAR for LTE Devices v02r03
KDB 941225 D06 Hotspot Mode v02
KDB 248227 D01-SAR Measurement Procedures for 802.11a/b/g Transmitters

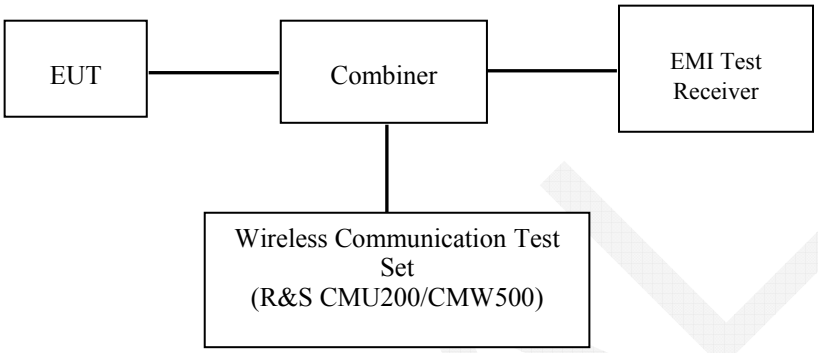
CONDUCTED OUTPUT POWER MEASUREMENT

Provision Applicable

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

Test Procedure

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



GSM/WCDMA/LTE

Radio Configuration

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

GSM

Function: Menu select > GSM Mobile Station > GSM 850/1900
Press Connection control to choose the different menus
Press RESET > choose all the reset all settings
Connection: Press Signal Off to turn off the signal and change settings
Network Support > GSM + only
MS Signal
> 33 dBm for GSM 850
> 30 dBm for PCS 1900
BS Signal:Enter the same channel number for TCH channel (test channel) and BCCH channel
Frequency Offset >+ 0 Hz
Mode > BCCH and TCH
BCCH Level > -85 dBm (May need to adjust if link is not 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			

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 Table C.8.1.12 of 3GPP TS 34.121-1

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

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

LTE

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

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

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

For UE Power Class 1 and 3 the specific requirements and identified 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	33	33
GPRS 1 TX Slot	32.8	32.8	32.8
GPRS 2 TX Slot	31.8	31.8	31.8
GPRS 3 TX Slot	30.3	30.3	30.3
GPRS 4 TX Slot	30	30	30
EDGE 1 TX Slot	26.5	26.5	26.5
EDGE 2 TX Slot	25.3	25.3	25.3
EDGE 3 TX Slot	23.8	23.8	23.8
EDGE 4 TX Slot	22.5	22.5	22.5
PCS 1900	29.8	29.8	29.8
GPRS 1 TX Slot	29.7	29.7	29.7
GPRS 2 TX Slot	28.7	28.7	28.7
GPRS 3 TX Slot	27.2	27.2	27.2
GPRS 4 TX Slot	26.1	26.1	26.1
EDGE 1 TX Slot	26.1	26.1	26.1
EDGE 2 TX Slot	25.2	25.2	25.2
EDGE 3 TX Slot	23.8	23.8	23.8
EDGE 4 TX Slot	22.4	22.4	22.4
WCDMA850	22.4	22.4	22.4
HSDPA	21.1	21.1	21.1
HSUPA	21.1	21.1	21.1
DC-HSDPA	21	21	21
HSPA+	20.9	20.9	20.9
WCDMA1900	22.6	22.6	22.6
HSDPA	21.6	21.6	21.6
HSUPA	21.4	21.4	21.4
DC-HSDPA	21.9	21.9	21.9
HSPA+	21.1	21.1	21.1
LTE Band 4	22.7	22.7	22.7
WLAN	17	17	17
Bluetooth BDR/EDR	6.5	6.5	6.5
Bluetooth LE	-1	-1	-1

Test Results:

GSM:

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)
GSM 850	128	824.2	32.6
	190	836.6	**32.9**
	251	848.8	32.8
PCS 1900	512	1850.2	29.7
	661	1880	29.3
	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	32.43	31.37	29.71	29.16
	190	836.6	32.67	31.7	30.23	29.89
	251	848.8	32.61	31.54	30.07	29.7
PCS 1900	512	1850.2	29.51	28.59	27.06	25.97
	661	1880	29.12	28.1	26.73	25.58
	810	1909.8	29.56	28.53	27.1	26.02

EGPRS:

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			1 slot	2 slots	3 slots	4 slots
GSM 850	128	824.2	25.88	24.93	23.49	22.04
	190	836.6	26.15	25.01	23.54	22.1
	251	848.8	26.36	25.2	23.72	22.37
PCS 1900	512	1850.2	25.38	24.45	23.02	21.7
	661	1880	25.92	24.96	23.55	22.03
	810	1909.8	26.03	25.13	23.7	22.31

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	23.43	25.37	25.46	26.16
	190	836.6	23.67	25.7	25.98	**26.89**
	251	848.8	23.61	25.54	25.82	26.7
PCS 1900	512	1850.2	20.51	22.59	22.81	22.97
	661	1880	20.12	22.1	22.48	22.58
	810	1909.8	20.56	22.53	22.85	**23.02**

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	16.88	18.93	19.24	19.04
	190	836.6	17.15	19.01	19.29	19.1
	251	848.8	17.36	19.2	**19.47**	19.37
PCS 1900	512	1850.2	16.38	18.45	18.77	18.7
	661	1880	16.92	18.96	19.3	19.03
	810	1909.8	17.03	19.13	**19.45**	19.31

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	**22.27**
	4183	836.6	22.11
	4233	846.6	21.8
WCDMA 1900	9262	1852.4	22.26
	9400	1880	22.03
	9538	1907.6	**22.48**

Results (HSDPA)

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			Subset 1	Subset 2	Subset 3	Subset 4
WCDMA 850	4132	826.4	20.98	21.01	**21.03**	20.95
	4183	836.6	20.84	20.87	20.83	20.86
	4233	846.6	20.76	20.71	20.73	20.79
WCDMA 1900	9262	1852.4	21.23	21.2	21.27	21.22
	9400	1880	20.95	20.97	20.91	20.99
	9538	1907.6	21.42	**21.46**	21.4	21.36

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	20.98	21.01	21.03	20.95	**21.04**
	4183	836.6	20.84	20.87	20.83	20.86	20.89
	4233	846.6	20.76	20.71	20.73	20.79	20.7
WCDMA 1900	9262	1852.4	21.17	21.19	21.13	21.1	21.16
	9400	1880	20.85	20.88	20.84	20.89	20.87
	9538	1907.6	21.3	**21.34**	21.27	21.22	21.29

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	20.9	**20.93**	20.89	20.84
	4183	836.6	20.75	20.79	20.72	20.77
	4233	846.6	20.59	20.57	20.51	20.55
WCDMA 1900	9262	1852.4	21.11	21.04	21.09	21.03
	9400	1880	20.83	**21.8**	20.82	20.75
	9538	1907.6	21.21	21.17	21.13	21.18

Results (HSPA+)

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)
WCDMA 850	4132	826.4	**20.77**
	4183	836.6	20.64
	4233	846.6	20.41
WCDMA 1900	9262	1852.4	20.94
	9400	1880	20.69
	9538	1907.6	**21.01**

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 4:

Test Bandwidth	Test Modulation	Resource Block & RB offset	Low Channel (dBm)	Middle Channel (dBm)	High Channel (dBm)
1.4M	QPSK	1#0	22.36	22.45	22.24
		1#3	22.34	22.53	22.22
		1#5	22.31	22.47	22.20
		3#0	21.96	22.19	21.97
		3#1	22.17	22.26	22.00
		3#3	22.01	22.14	21.78
		6#0	21.33	21.48	21.15
	16-QAM	1#0	21.39	21.46	21.16
		1#3	21.33	21.54	21.36
		1#5	21.40	21.48	21.12
		3#0	21.04	21.29	21.13
		3#1	21.27	21.37	21.17
		3#3	21.14	21.32	21.10
		6#0	20.34	20.54	20.26
3M	QPSK	1#0	22.22	22.41	22.19
		1#7	22.39	22.50	22.31
		1#14	22.39	22.46	22.25
		8#0	21.93	22.13	21.90
		8#4	21.97	22.19	22.02
		8#7	22.08	22.17	21.82
		15#0	21.42	21.50	21.31
	16-QAM	1#0	21.47	21.63	21.42
		1#7	21.42	21.67	21.33
		1#14	21.40	21.60	21.30
		8#0	21.01	21.23	20.93
		8#4	21.09	21.29	21.05
		8#7	21.02	21.21	20.97
		15#0	20.45	20.60	20.39
5M	QPSK	1#0	22.41	22.51	22.35
		1#12	22.43	22.59	22.33
		1#24	22.47	22.54	22.35
		12#0	21.92	22.03	21.71
		12#6	21.96	22.08	21.78
		12#11	21.91	22.01	21.77
		25#0	21.22	21.43	21.22
	16-QAM	1#0	21.25	21.46	21.12
		1#12	21.33	21.49	21.20
		1#24	21.30	21.40	21.19
		12#0	20.77	21.01	20.74
		12#6	20.86	21.07	20.82
		12#11	20.80	20.96	20.63
		25#0	20.46	20.58	20.35
10M	QPSK	1#0	22.37	22.46	22.19
		1#24	22.57	**22.70**	22.54
		1#49	22.41	22.51	22.24

		25#0	22.05	22.19	21.99
		25#12	22.19	22.30	21.99
		25#24	21.89	22.14	21.79
		50#0	21.37	21.56	21.27
	16-QAM	1#0	21.68	21.79	21.57
		1#24	21.73	21.88	21.66
		1#49	21.58	21.74	21.54
		25#0	20.99	21.11	20.85
		25#12	21.05	21.19	21.01
		25#24	20.95	21.07	20.78
		50#0	20.40	20.61	20.44
15M	QPSK	1#0	22.30	22.45	22.11
		1#37	22.36	22.60	22.44
		1#74	22.35	22.52	22.33
		36#0	21.74	21.97	21.62
		36#17	21.95	22.05	21.86
		36#35	21.84	22.01	21.67
		75#0	21.46	21.67	21.44
	16-QAM	1#0	21.67	21.74	21.55
		1#37	21.72	21.88	21.55
		1#74	21.64	21.76	21.60
		36#0	20.99	21.10	20.91
		36#17	21.03	21.23	21.06
		36#35	20.81	21.06	20.72
		75#0	20.51	20.67	20.32
20M	QPSK	1#0	22.12	22.37	22.02
		1#49	22.20	**22.40**	22.17
		1#99	22.23	22.31	22.14
		50#0	20.67	20.89	20.61
		50#24	20.78	20.93	20.70
		50#49	20.61	20.84	20.57
		100#0	21.44	21.58	21.34
	16-QAM	1#0	21.70	21.78	21.61
		1#49	21.68	21.86	21.54
		1#99	21.49	21.70	21.50
		50#0	20.65	20.89	20.63
		50#24	20.80	20.97	20.78
		50#49	20.64	20.84	20.49
		100#0	20.48	20.62	20.31

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	4.62
	39	2441	5.71
	78	2480	6.39
EDR(4-DQPSK)	0	2402	3.53
	39	2441	4.81
	78	2480	5.31
EDR-8DPSK	0	2402	3.65
	39	2441	4.94
	78	2480	5.41
BLE	0	2402	-2.47
	19	2440	-1.47
	39	2480	-1.11

WLAN

Mode	Channel No.	Channel frequency (MHz)	RF Output Power (dBm)
802.11b	1	2412	16.65
	6	2437	**16.94**
	11	2462	16.76
802.11g	1	2412	15.99
	6	2437	16.11
	11	2462	16.20
802.11n HT20	1	2412	15.65
	6	2437	15.94
	11	2462	16.08
802.11n HT40	3	2422	14.96
	6	2437	15.49
	9	2452	15.37

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:	997-994 mbar

Testing was performed by Rocky Xiao on 2015-07-14 and 2015-07-15

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	-0.087	32.6	33	1.096	0.703	0.77	/
	836.6	GSM	-3.617	32.9	33	1.023	0.772	0.79	**1#**
	848.8	GSM	1.651	32.8	33	1.047	0.753	0.788	/
Left Head Tilt	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	2.588	32.9	33	1.023	0.359	0.367	/
	848.8	GSM	/	/	/	/	/	/	/
Right Head Cheek	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	-0.286	32.9	33	1.023	0.742	0.759	/
	848.8	GSM	/	/	/	/	/	/	/
Right Head Tilt	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	2.99	32.9	33	1.023	0.345	0.353	/
	848.8	GSM	/	/	/	/	/	/	/
Body-Back-Headset (10mm)	824.2	GSM	-2.834	32.6	33	1.096	1.002	1.098	/
	836.6	GSM	3.247	32.9	33	1.023	1.08	1.105	/
	848.8	GSM	2.218	32.8	33	1.047	1.013	1.061	/
Body-Back (10mm)	824.2	GPRS	-1.992	29.16	30	1.213	0.972	1.179	/
	836.6	GPRS	1.158	29.89	30	1.026	1.23	1.262	**2#**
	848.8	GPRS	0.119	29.7	30	1.072	1.108	1.188	/
Body-Left (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	3.648	29.89	30	1.026	0.462	0.474	/
	848.8	GPRS	/	/	/	/	/	/	/
Body-Right (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	-3.986	29.89	30	1.026	0.244	0.25	/
	848.8	GPRS	/	/	/	/	/	/	/
Body-Bottom (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	-2.933	29.89	30	1.026	0.762	0.782	/
	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	-3.34	29.7	29.8	1.023	0.506	0.518	/
	1880	GSM	-2.874	29.3	29.8	1.122	0.463	0.519	/
	1909.8	GSM	2.565	29.7	29.8	1.023	0.518	0.53	**3#**
Left Head Tilt	1850.2	GSM	/	/	/	/	/	/	/
	1880	GSM	-1.645	29.7	29.8	1.023	0.246	0.252	/
	1909.8	GSM	/	/	/	/	/	/	/
Right Head Cheek	1850.2	GSM	/	/	/	/	/	/	/
	1880	GSM	-2.877	29.7	29.8	1.023	0.487	0.498	/
	1909.8	GSM	/	/	/	/	/	/	/
Right Head Tilt	1850.2	GSM	/	/	/	/	/	/	/
	1880	GSM	-2.531	29.7	29.8	1.023	0.234	0.239	/
	1909.8	GSM	/	/	/	/	/	/	/
Body-Back-Headset (10mm)	1850.2	GSM	/	/	/	/	/	/	/
	1880	GSM	0.38	29.7	29.8	1.023	0.583	0.596	/
	1909.8	GSM	/	/	/	/	/	/	/
Body-Back (10mm)	1850.2	GPRS	0.624	25.97	26.1	1.03	0.586	0.604	/
	1880.0	GPRS	-2.504	25.58	26.1	1.127	0.556	0.627	/
	1909.8	GPRS	0.231	26.02	26.1	1.019	0.619	0.631	**4#**
Body-Left (10mm)	1850.2	GPRS	/	/	/	/	/	/	/
	1880.0	GPRS	-3.231	25.58	26.1	1.127	0.263	0.296	/
	1909.8	GPRS	/	/	/	/	/	/	/
Body-Right (10mm)	1850.2	GPRS	/	/	/	/	/	/	/
	1880.0	GPRS	1.449	25.58	26.1	1.127	0.172	0.194	/
	1909.8	GPRS	/	/	/	/	/	/	/
Body-Bottom (10mm)	1850.2	GPRS	/	/	/	/	/	/	/
	1880.0	GPRS	-1.363	25.58	26.1	1.127	0.386	0.435	/
	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	-0.189	22.27	22.4	1.03	0.65	0.67	/
	836.6	WCDMA	3.514	22.11	22.4	1.069	0.648	0.693	**5#**
	846.6	WCDMA	2.941	21.8	22.4	1.148	0.572	0.657	/
Left Head Tilt	826.4	WCDMA	3.125	22.27	22.4	1.03	0.388	0.4	/
	836.6	WCDMA	/	/	/	/	/	/	/
	846.6	WCDMA	/	/	/	/	/	/	/
Right Head Cheek	826.4	WCDMA	1.307	22.27	22.4	1.03	0.627	0.646	/
	836.6	WCDMA	/	/	/	/	/	/	/
	846.6	WCDMA	/	/	/	/	/	/	/
Right Head Tilt	826.4	WCDMA	-2.021	22.27	22.4	1.03	0.371	0.382	/
	836.6	WCDMA	/	/	/	/	/	/	/
	846.6	WCDMA	/	/	/	/	/	/	/
Body-Back (10mm)	826.4	WCDMA	2.718	22.27	22.4	1.03	1.041	1.072	/
	836.6	WCDMA	-0.23	22.11	22.4	1.069	1.02	1.09	**6#**
	846.6	WCDMA	2.946	21.8	22.4	1.148	0.903	1.037	/
Body-Left (10mm)	826.4	WCDMA	3.33	22.27	22.4	1.03	0.551	0.568	/
	836.6	WCDMA	/	/	/	/	/	/	/
	846.6	WCDMA	/	/	/	/	/	/	/
Body-Right (10mm)	826.4	WCDMA	-2.013	22.27	22.4	1.03	0.441	0.454	/
	836.6	WCDMA	/	/	/	/	/	/	/
	846.6	WCDMA	/	/	/	/	/	/	/
Body-Bottom (10mm)	826.4	WCDMA	2.53	22.27	22.4	1.03	0.69	0.711	/
	836.6	WCDMA	/	/	/	/	/	/	/
	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	-1.085	22.26	22.6	1.081	0.615	0.665	/
	1880	WCDMA	-1.535	22.03	22.6	1.14	0.589	0.671	/
	1907.6	WCDMA	-2.501	22.48	22.6	1.028	0.696	0.715	**7#**
Left Head Tilt	1852.4	WCDMA	/	/	/	/	/	/	/
	1880	WCDMA	/	/	/	/	/	/	/
	1907.6	WCDMA	-3.409	22.48	22.6	1.028	0.376	0.387	/
Right Head Cheek	1852.4	WCDMA	/	/	/	/	/	/	/
	1880	WCDMA	/	/	/	/	/	/	/
	1907.6	WCDMA	3.538	22.48	22.6	1.028	0.632	0.65	/
Right Head Tilt	1852.4	WCDMA	/	/	/	/	/	/	/
	1880	WCDMA	/	/	/	/	/	/	/
	1907.6	WCDMA	-2.398	22.48	22.6	1.028	0.323	0.332	/
Body-Back (10mm)	1852.4	WCDMA	3.083	22.26	22.6	1.081	1.14	1.232	/
	1880.0	WCDMA	3.343	22.03	22.6	1.14	1.01	1.151	/
	1907.6	WCDMA	-2.051	22.48	22.6	1.028	1.28	1.316	**8#**
Body-Left (10mm)	1852.4	WCDMA	/	/	/	/	/	/	/
	1880.0	WCDMA	/	/	/	/	/	/	/
	1907.6	WCDMA	-3.918	22.48	22.6	1.028	0.403	0.414	/
Body-Right (10mm)	1852.4	WCDMA	/	/	/	/	/	/	/
	1880.0	WCDMA	/	/	/	/	/	/	/
	1907.6	WCDMA	1.121	22.48	22.6	1.028	0.326	0.335	/
Body-Bottom (10mm)	1852.4	WCDMA	-2.064	22.26	22.6	1.081	0.863	0.933	/
	1880.0	WCDMA	-2.182	22.03	22.6	1.14	0.754	0.86	/
	1907.6	WCDMA	-0.327	22.48	22.6	1.028	0.927	0.953	/

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 4:

EUT Position	Frequency (MHz)	Bandwidth (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	1720	20	1RB	-0.356	22.2	22.7	1.122	0.634	0.711	/
	1732.5	20	1RB	-3.395	22.4	22.7	1.072	0.699	0.749	**9#**
	1744.9	20	1RB	-3.625	22.17	22.7	1.13	0.637	0.72	/
	1732.5	20	50%RB	0.79	20.89	22.7	1.517	0.432	0.655	/
Left Head Tilt	1720	20	1RB	/	/	/	/	/	/	/
	1732.5	20	1RB	-0.464	22.4	22.7	1.072	0.326	0.349	/
	1744.9	20	1RB	/	/	/	/	/	/	/
	1732.5	20	50%RB	-3.879	20.89	22.7	1.517	0.226	0.343	
Right Head Cheek	1720	20	1RB	/	/	/	/	/	/	/
	1732.5	20	1RB	-0.473	22.4	22.7	1.072	0.659	0.706	/
	1744.9	20	1RB	/	/	/	/	/	/	/
	1732.5	20	50%RB	1.568	20.89	22.7	1.517	0.418	0.634	
Right Head Tilt	1720	20	1RB	/	/	/	/	/	/	/
	1732.5	20	1RB	0.252	22.4	22.7	1.072	0.299	0.321	/
	1744.9	20	1RB	/	/	/	/	/	/	/
	1732.5	20	50%RB	-2.336	20.89	22.7	1.517	0.211	0.32	/
Body-Back (10mm)	1710	20	1RB	-3.557	22.2	22.7	1.122	0.946	1.061	/
	1732.5	20	1RB	1.158	22.4	22.7	1.072	1.11	1.19	**12#**
	1754.9	20	1RB	-2.489	22.17	22.7	1.13	0.958	1.083	/
	1732.5	20	50%RB	-3.817	20.89	22.7	1.517	0.726	1.101	/
Body-Left (10mm)	1710	20	1RB	/	/	/	/	/	/	/
	1732.5	20	1RB	-2.675	22.4	22.7	1.072	0.328	0.352	/
	1754.9	20	1RB	/	/	/	/	/	/	/
	1732.5	20	50%RB	0.969	20.89	22.7	1.517	0.203	0.308	/
Body-Right (10mm)	1710	20	1RB	/	/	/	/	/	/	/
	1732.5	20	1RB	-0.038	22.4	22.7	1.072	0.274	0.294	/
	1754.9	20	1RB	/	/	/	/	/	/	/
	1732.5	20	50%RB	-1.805	20.89	22.7	1.517	0.186	0.282	/
Body-Bottom (10mm)	1710	20	1RB	/	/	/	/	/	/	/
	1732.5	20	1RB	-3.959	22.4	22.7	1.072	0.615	0.659	/
	1754.9	20	1RB	/	/	/	/	/	/	/
	1732.5	20	50%RB	-3.874	20.89	22.7	1.517	0.441	0.669	/

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 (20M) and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offset the upper edge, middle and lower edge of each required test channel.
7. Worst case SAR for 50% RB allocation is selected to be tested.

WLAN:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	2412	802.11b							
	2437	802.11b	-3.212	16.94	17	1.062	0.184	0.195	/
	2462	802.11b							
Left Head Tilt	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	-1.494	16.94	17	1.062	0.168	0.178	/
	2462	802.11b	/	/	/	/	/	/	/
Right Head Cheek	2412	802.11b	1.958	16.65	17	1.062	0.176	0.187	/
	2437	802.11b	2.565	16.94	17	1.062	0.195	0.207	**13#**
	2462	802.11b	-0.467	16.76	17	1.062	0.177	0.188	/
Right Head Tilt	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	-3.194	16.94	17	1.062	0.155	0.165	/
	2462	802.11b	/	/	/	/	/	/	/
Body-Back-Headset (10mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	-2.015	16.94	17	1.062	0.244	0.259	/
	2462	802.11b	/	/	/	/	/	/	/
Body-Worn-Back (10mm)	2412	802.11b	-3.295	16.65	17	1.062	0.233	0.247	/
	2437	802.11b	-3.172	16.94	17	1.062	0.246	0.261	**14#**
	2462	802.11b	-2.869	16.76	17	1.062	0.239	0.254	/
Body-Worn-Left (10mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	-1.971	16.94	17	1.062	0.207	0.22	/
	2462	802.11b	/	/	/	/	/	/	/
Body-Worn-Top (10mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	0.651	16.94	17	1.062	0.216	0.229	/
	2462	802.11b	/	/	/	/	/	/	/
Body-Worn-Bottom (10mm)	2412	802.11b	/	/	/	/	/	/	/
	2437	802.11b	0.066	16.94	17	1.062	0.0412	0.044	/
	2462	802.11b	/	/	/	/	/	/	/

Note:

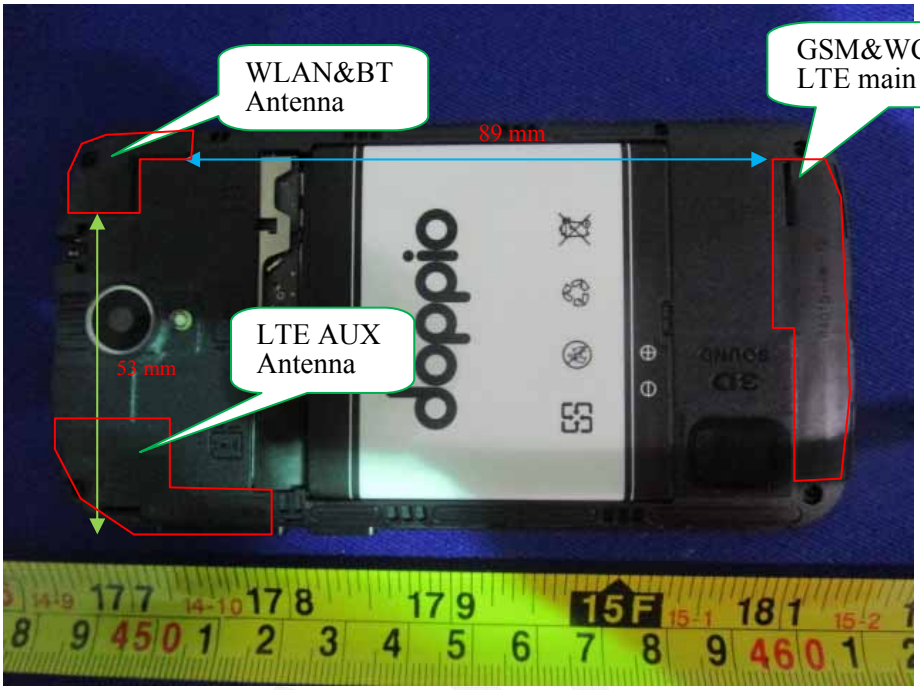
1. When the 1-g SAR is≤ 0.8W/Kg, testing for other channels are optional.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
3. KDB248227-SAR is not required for 802.11g channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.

SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

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

Left

Top



Bottom

Right

Simultaneous Transmission:

Description of Simultaneous Transmit Capabilities			Antennas Distance (mm)
Transmitter Combination	Simultaneous?	Hotspot?	
GSM + WCDMA	×	×	0
GSM+LTE	×	×	0
GSM + Bluetooth	√	×	89
GSM + WLAN	√	√	89
WCDMA+LTE	×	×	0
WCDMA + Bluetooth	√	×	89
WCDMA + WLAN	√	√	89
LTE + Bluetooth	√	×	89
LTE + WLAN	√	√	89

Standalone SAR test exclusion considerations

Mode	Frequency (MHz)	Pavg (dBm)	Pavg (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
Bluetooth	2450	6.5	4.47	0	1.4	3	YES

NOTE:

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

Standalone SAR estimation:

Mode	Frequency (GHz)	Pavg (dBm)	Pavg (mW)	Distance (mm)	Estimated 1-g (W/kg)
BT Head	2450	6.5	4.47	0	0.187
BT Body	2450	6.5	4.47	10	0.093

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	0.79	0.187	0.977
	Left Head Tilt	0.367	0.187	0.554
	Right Head Cheek	0.759	0.187	0.946
	Right Head Tilt	0.353	0.187	0.54
	Body-Back-Headset	1.105	0.093	1.198
GPRS 850 +BT	Body-Back	1.262	0.093	1.355
	Body-Right	0.474	0.093	0.567
	Body-Left	0.25	0.093	0.343
	Body-Bottom	0.782	0.093	0.875
PCS 1900+BT	Left Head Cheek	0.53	0.187	0.717
	Left Head Tilt	0.252	0.187	0.439
	Right Head Cheek	0.498	0.187	0.685
	Right Head Tilt	0.239	0.187	0.426
	Body-Back-Headset	0.596	0.093	0.689
GPRS 1900 +BT	Body-Back	0.631	0.093	0.724
	Body-Right	0.296	0.093	0.389
	Body-Left	0.194	0.093	0.287
	Body-Bottom	0.435	0.093	0.528
GSM 850 +WLAN	Left Head Cheek	0.79	0.207	0.985
	Left Head Tilt	0.367	0.178	0.545
	Right Head Cheek	0.759	0.195	0.966
	Right Head Tilt	0.353	0.165	0.518
	Body-Back-Headset	1.105	0.261	1.366
	Body-Bottom	0.782	0.044	0.826
GSM 850 +WLAN (Hotspot)	Body-Back	1.262	0.261	1.523
	Body-Left	0.25	0.22	0.47
PCS 1900 +WLAN	Left Head Cheek	0.53	0.195	0.725
	Left Head Tilt	0.252	0.178	0.43
	Right Head Cheek	0.498	0.207	0.705
	Right Head Tilt	0.239	0.165	0.404
	Body-Back-Headset	0.596	0.261	0.857
	Body-Bottom	0.435	0.044	0.479
PCS 1900 +WLAN (Hotspot)	Body-Back	0.631	0.261	0.892
	Body-Left	0.194	0.22	0.414

Mode (SAR1+SAR2)	Position	Reported SAR (W/kg)		ΣSAR < 1.6W/kg
		SAR1	SAR2	
WCDMA 850 +BT	Left Head Cheek	0.693	0.187	0.88
	Left Head Tilt	0.4	0.187	0.587
	Right Head Cheek	0.646	0.187	0.833
	Right Head Tilt	0.382	0.187	0.569
	Body-Back	1.09	0.093	1.183
	Body-Right	0.568	0.093	0.661
	Body-Left	0.454	0.093	0.547
	Body-Bottom	0.711	0.093	0.804
WCDMA 1900 +BT	Left Head Cheek	0.715	0.093	0.808
	Left Head Tilt	0.387	0.187	0.574
	Right Head Cheek	0.65	0.187	0.837
	Right Head Tilt	0.332	0.187	0.519
	Body-Back	1.316	0.187	1.503
	Body-Right	0.414	0.093	0.507
	Body-Left	0.335	0.093	0.428
	Body-Bottom	0.953	0.093	1.046
WCDMA 850 +WLAN	Left Head Cheek	0.693	0.195	0.888
	Left Head Tilt	0.4	0.178	0.578
	Right Head Cheek	0.646	0.207	0.853
	Right Head Tilt	0.382	0.165	0.547
	Body-Bottom	0.711	0.044	0.755
WCDMA 850 +WLAN (Hotspot)	Body-Back	1.09	0.261	1.351
	Body-Left	0.454	0.22	0.674
WCDMA 1900 +WLAN	Left Head Cheek	0.715	0.195	0.91
	Left Head Tilt	0.387	0.178	0.565
	Right Head Cheek	0.65	0.207	0.857
	Right Head Tilt	0.332	0.165	0.497
	Body-Bottom	0.953	0.044	0.997
WCDMA 1900 +WLAN (Hotspot)	Body-Back	1.316	0.261	**1.577**
	Body-Left	0.335	0.22	0.555

Mode(SAR1+SAR2)	Position	Reported SAR (W/kg)		ΣSAR < 1.6W/kg
		SAR1	SAR2	
LTE Band 4+BT	Left Head Cheek	0.749	0.187	0.936
	Left Head Tilt	0.349	0.187	0.536
	Right Head Cheek	0.706	0.187	0.893
	Right Head Tilt	0.321	0.187	0.508
	Body-Back	1.19	0.093	1.283
	Body-Right	0.352	0.093	0.445
	Body-Left	0.308	0.093	0.401
	Body-Bottom	0.669	0.093	0.762
LTE Band 4 +WLAN	Left Head Cheek	0.749	0.195	0.944
	Left Head Tilt	0.349	0.178	0.527
	Right Head Cheek	0.706	0.207	0.913
	Right Head Tilt	0.321	0.165	0.486
	Body-Bottom	0.669	0.044	0.713
LTE Band 4 +WLAN (Hotspot)	Body-Back	1.19	0.261	1.451
	Body-Left	0.308	0.22	0.528

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 Middle Channel

DUT: SIRIUS; Type: DPF500

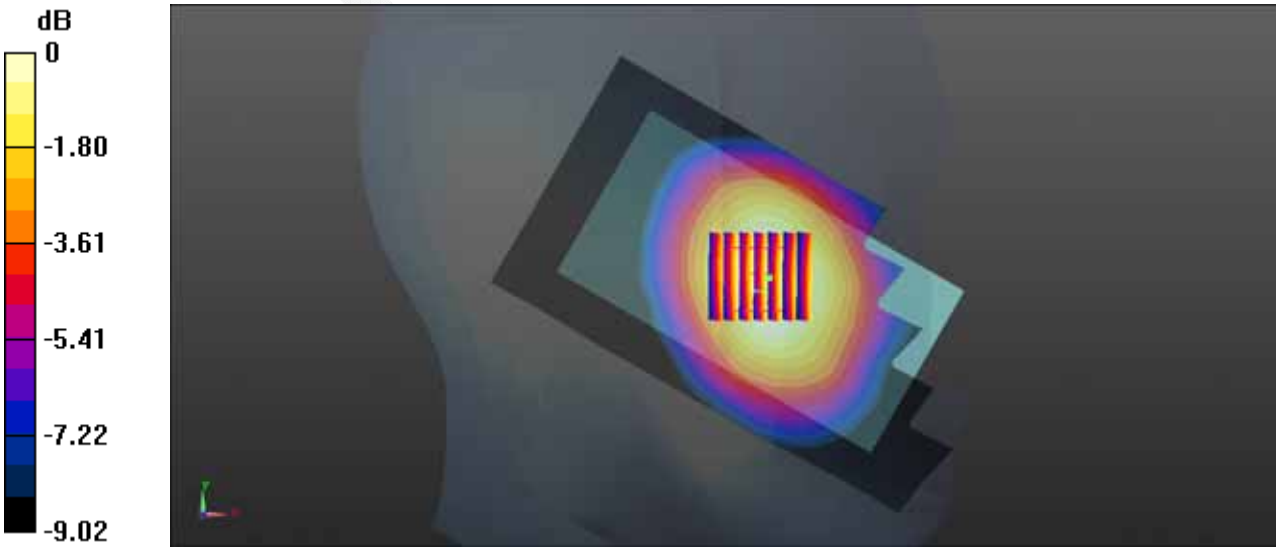
Communication System:Generic GSM ; Frequency: 836.6 MHz;Duty Cycle: 1:8
Medium parameters used: f = 836.6 MHz; σ = 0.892 S/m; ε_r = 42.855; ρ = 1000 kg/m^3
Phantom section: Left Section

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 Head Left Cheek/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.927 W/kg

Head/GSM 850 Head Left Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 8.314 V/m; Power Drift = -0.16 dB
Peak SAR (extrapolated) = 0.992 W/kg
SAR(1 g) = 0.772 W/kg; SAR(10 g) = 0.573 W/kg
Maximum value of SAR (measured) = 0.828 W/kg



0 dB = 0.828 W/kg = -0.82 dBW/kg

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

Test Plot 2#:GSM 850 Back Middle Channel

DUT: SIRIUS; Type: DPF500

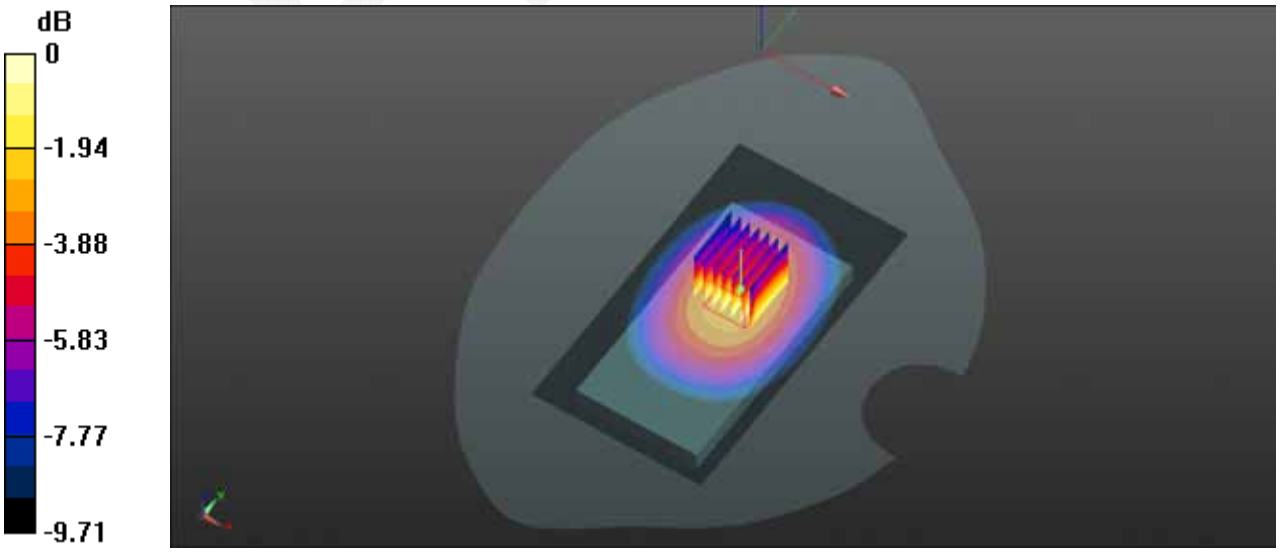
Communication System: Generic GPRS-4 SLOT ; Frequency: 836.6 MHz;Duty Cycle: 1:2
Medium parameters used: f = 836.6 MHz; σ = 0.976 S/m; ε_r = 55.101; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.32 W/kg

Body/GSM 850 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 19.50 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.84 W/kg
SAR(1 g) = 1.23 W/kg; SAR(10 g) = 0.89 W/kg
Maximum value of SAR (measured) = 1.35 W/kg



0 dB = 1.35 W/kg = 1.30 dBW/kg

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

Test Plot 3#:PCS 1900Left Cheek High Channel

DUT: SIRIUS; Type: DPF500

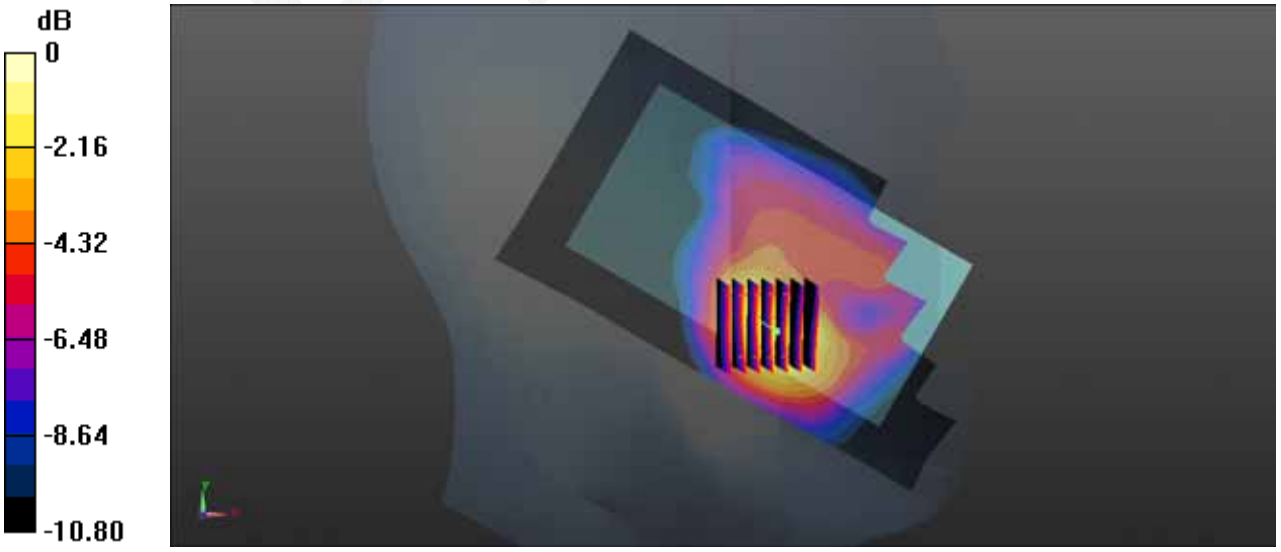
Communication System: Generic GSM ; Frequency: 1909.8 MHz;Duty Cycle: 1:8
Medium parameters used: f = 1909.8 MHz; σ = 1.495 S/m; ε_r = 53.361; ρ = 1000 kg/m^3
Phantom section: Left Section

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);

Head 2/PCS 1900/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.571 W/kg

Head 2/PCS 1900/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.068 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.817 W/kg
SAR(1 g) = 0.518 W/kg; SAR(10 g) = 0.302 W/kg
Maximum value of SAR (measured) = 0.566 W/kg



0 dB = 0.566 W/kg = -2.47 dBW/kg

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

Test Plot 4#:PCS 1900 Back High Channel

DUT: SIRIUS; Type: DPF500

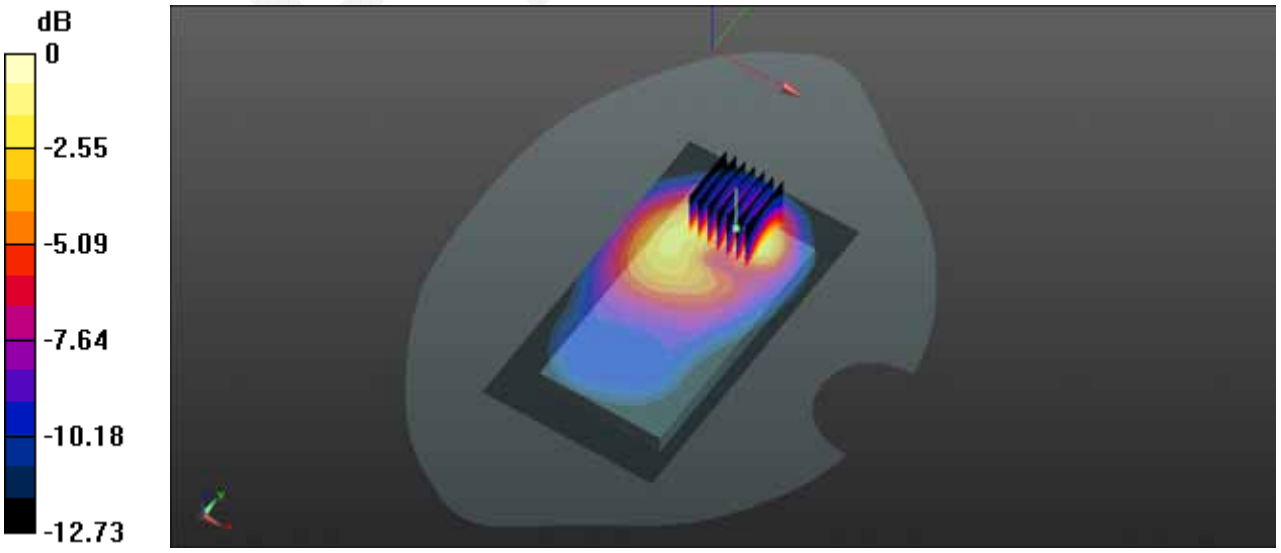
Communication System:Generic GPRS-4 SLOT ; Frequency: 1909.8 MHz;Duty Cycle: 1:2
Medium parameters used: f = 1909.8 MHz; σ = 1.495 S/m; ε_r = 53.361; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 2/PCS 1900 Back/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.658 W/kg

Body 2/PCS 1900 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 11.06 V/m; Power Drift = 0.01 dB
Peak SAR (extrapolated) = 1.03 W/kg
SAR(1 g) = 0.619 W/kg; SAR(10 g) = 0.330 W/kg
Maximum value of SAR (measured) = 0.682 W/kg



0 dB = 0.682 W/kg = -1.66 dBW/kg

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

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

DUT: SIRIUS; Type: DPF500

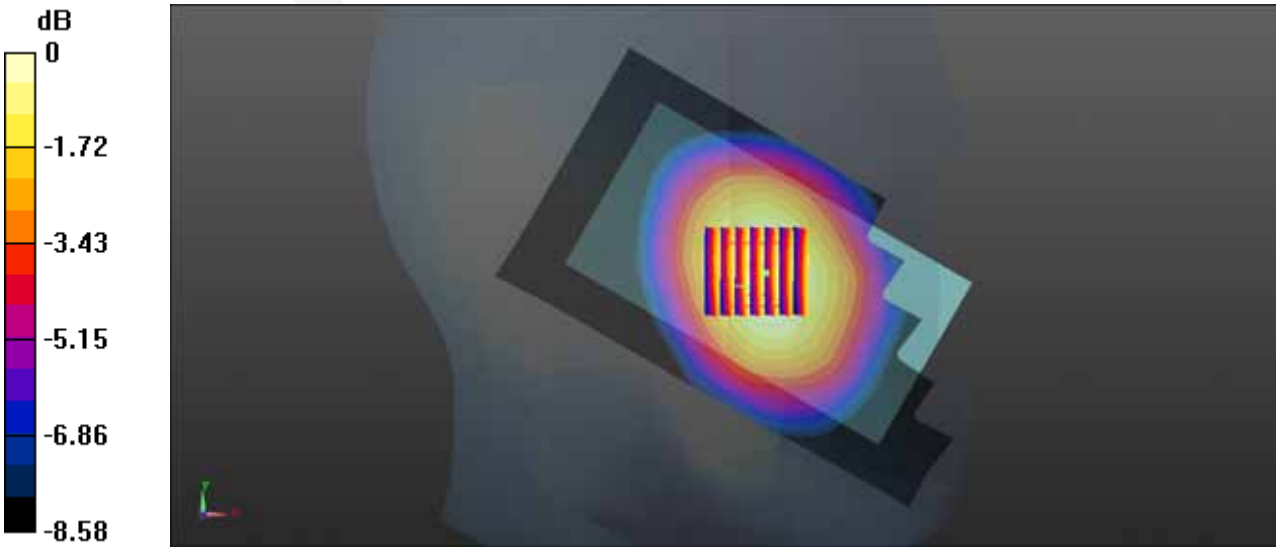
Communication System: BAND V ; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.892 S/m; ε_r = 42.855; ρ = 1000 kg/m^3
Phantom section: Left Section

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 Head Left Cheek/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.697 W/kg

Head/WCDMA 850 Head Left Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 9.060 V/m; Power Drift = 0.15 dB
Peak SAR (extrapolated) = 0.833 W/kg
SAR(1 g) = 0.648 W/kg; SAR(10 g) = 0.487 W/kg
Maximum value of SAR (measured) = 0.675 W/kg



0 dB = 0.675 W/kg = -1.71 dBW/kg

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

Test Plot 6#:WCDMA 850 Back Middle Channel

DUT: SIRIUS; Type: DPF500

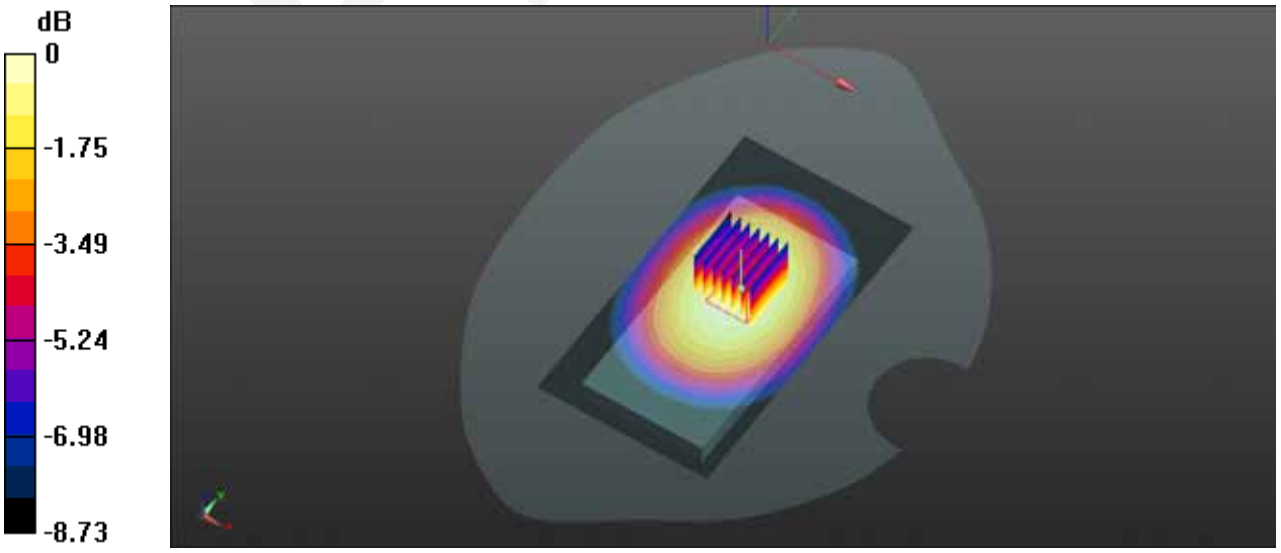
Communication System: BAND V ; Frequency: 836.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 836.6 MHz; σ = 0.976 S/m; ε_r = 55.101; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.90 W/kg

Body/WCDMA 850 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 22.00 V/m; Power Drift = -0.01 dB
Peak SAR (extrapolated) = 1.28 W/kg
SAR(1 g) = 1.02 W/kg; SAR(10 g) = 0.76 W/kg
Maximum value of SAR (measured) = 1.29 W/kg



0 dB = 1.29 W/kg = 1.11 dBW/kg

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

Test Plot 7#:WCDMA 1900 Left Cheek High Channel

DUT: SIRIUS; Type: DPF500

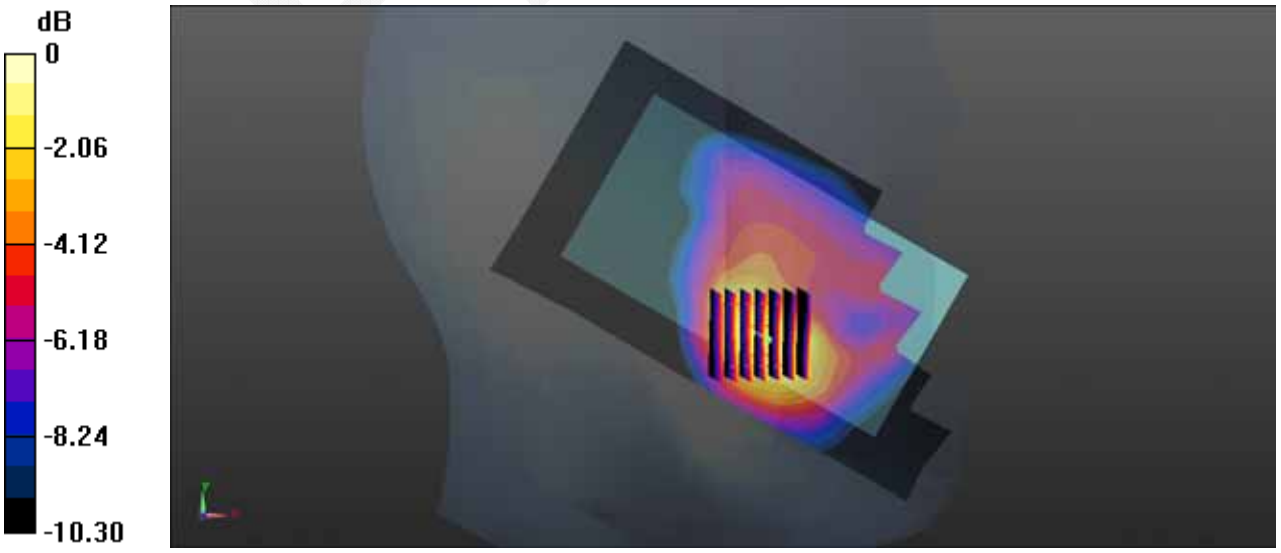
Communication System:BAND II ; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.491 S/m; ε_r = 53.597; ρ = 1000 kg/m^3
Phantom section: Left Section

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);

Head/WCDMA 1900 Left Cheek/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.773 W/kg

Head/WCDMA 1900 Left Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.114 V/m; Power Drift = -0.11 dB
Peak SAR (extrapolated) = 1.08 W/kg
SAR(1 g) = 0.696 W/kg; SAR(10 g) = 0.415 W/kg
Maximum value of SAR (measured) = 0.759 W/kg



0 dB = 0.759 W/kg = -1.20 dBW/kg

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

Test Plot 8#:WCDMA 1900 Back High Channel

DUT: SIRIUS; Type: DPF500

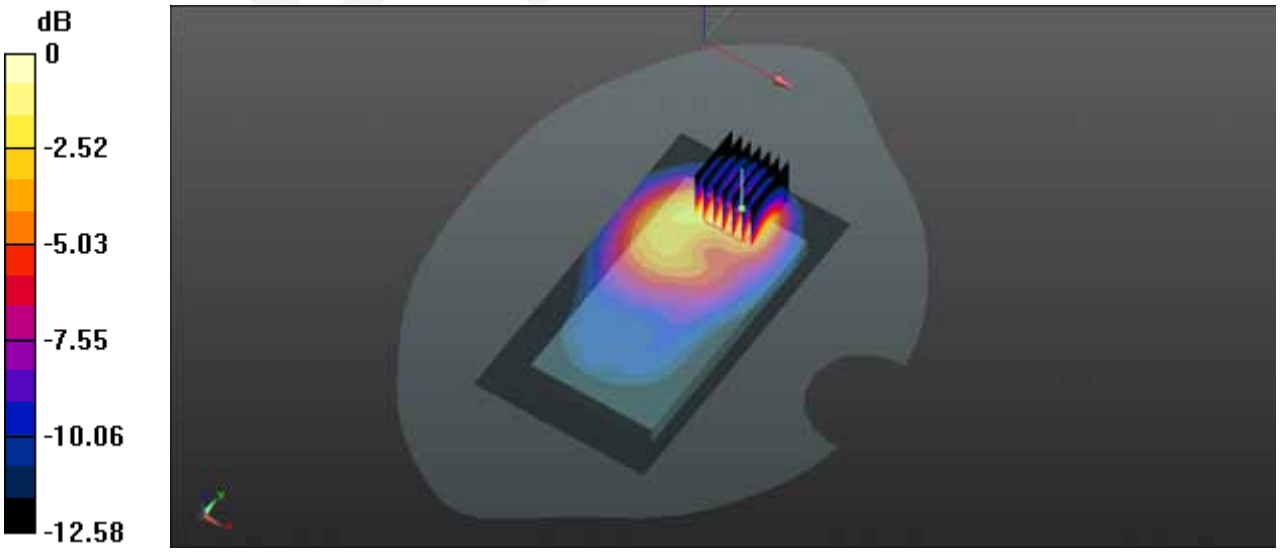
Communication System:BAND II ; Frequency: 1907.6 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1908 MHz; σ = 1.491 S/m; ε_r = 53.597; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.41 W/kg

Body/WCDMA 1900 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 16.09 V/m; Power Drift = -0.09 dB
Peak SAR (extrapolated) = 2.40 W/kg
SAR(1 g) = 1.28 W/kg; SAR(10 g) = 0.707 W/kg
Maximum value of SAR (measured) = 1.53 W/kg



0 dB = 1.53 W/kg = 1.85 dBW/kg

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

Test Plot 9#:LTE Band 4 Left-Cheek Middle Channel

DUT: SIRIUS; Type: DPF500

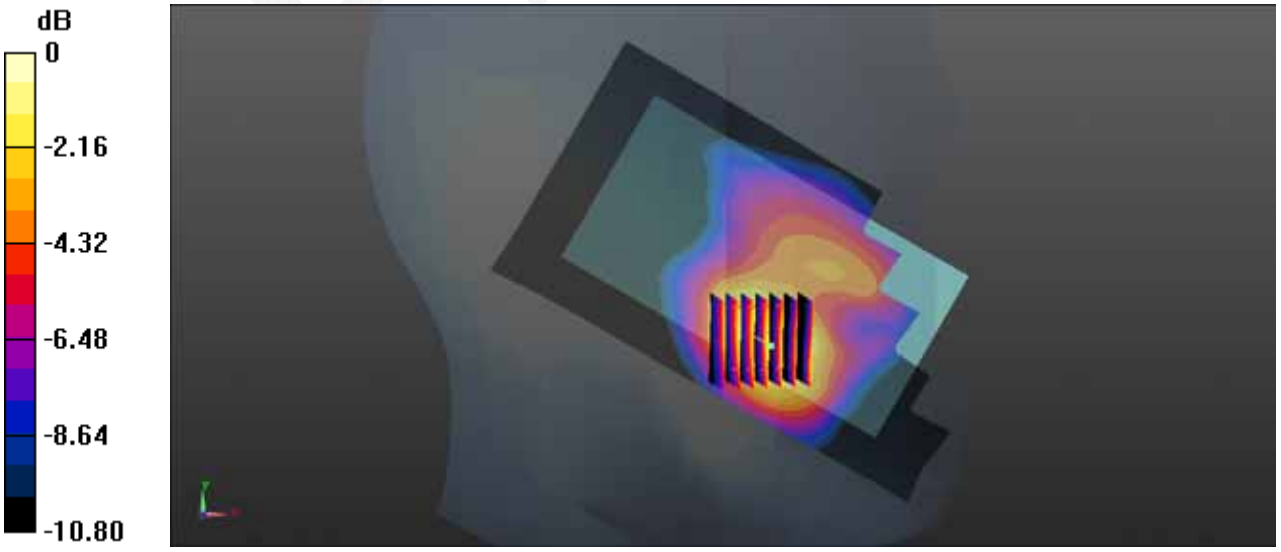
Communication System:Generic LTE ; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732 MHz; σ = 1.38 S/m; ε_r = 40.445; ρ = 1000 kg/m^3
Phantom section: Left Section

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 Head Left Cheek/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.749 W/kg

Head/LTE Band 4 Head Left Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 5.460 V/m; Power Drift = -0.15 dB
Peak SAR (extrapolated) = 0.994 W/kg
SAR(1 g) = 0.699 W/kg; SAR(10 g) = 0.414 W/kg
Maximum value of SAR (measured) = 0.745 W/kg



0 dB = 0.745 W/kg = -1.28 dBW/kg

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

Test Plot 10#:LTE Band 4 Back Middle Channel

DUT: SIRIUS; Type: DPF500

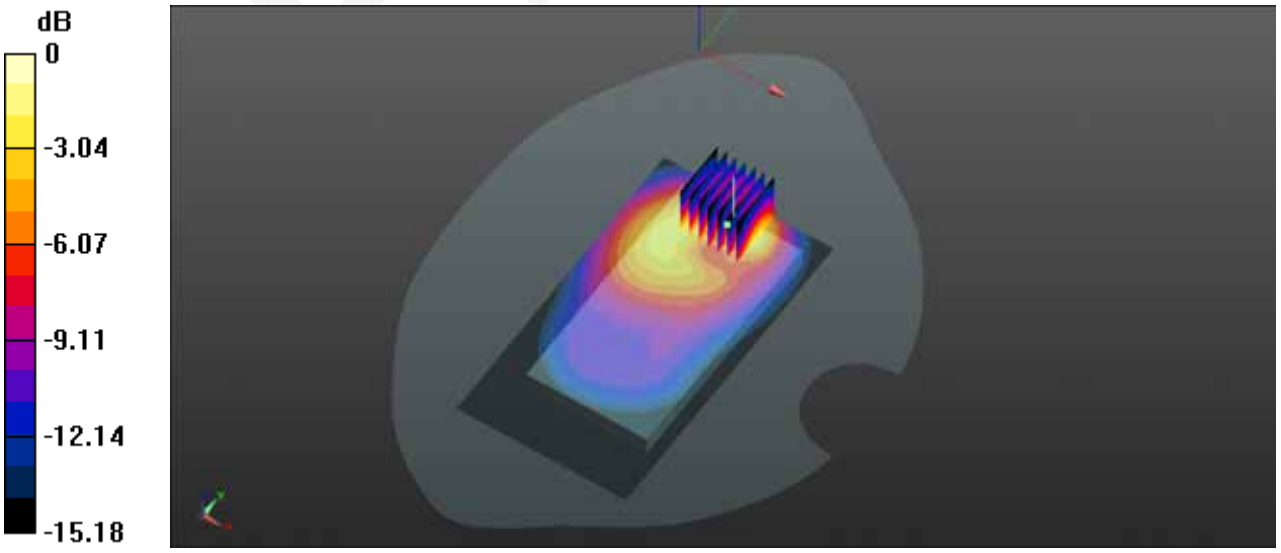
Communication System:Generic LTE ; Frequency: 1732.5 MHz;Duty Cycle: 1:1
Medium parameters used: f = 1732 MHz; σ = 1.479 S/m; ε_r = 53.483; ρ = 1000 kg/m^3
Phantom section: Flat Section

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 (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 1.39 W/kg

Body/LTE Band 4 Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 14.31 V/m; Power Drift = 0.05 dB
Peak SAR (extrapolated) = 2.29 W/kg
SAR(1 g) = 1.11 W/kg; SAR(10 g) = 0.610 W/kg
Maximum value of SAR (measured) = 1.46 W/kg



0 dB = 1.46 W/kg = 1.64 dBW/kg

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

Test Plot 11#:WLAN Head Right-Cheek Middle Channel

DUT: SIRIUS; Type: DPF500

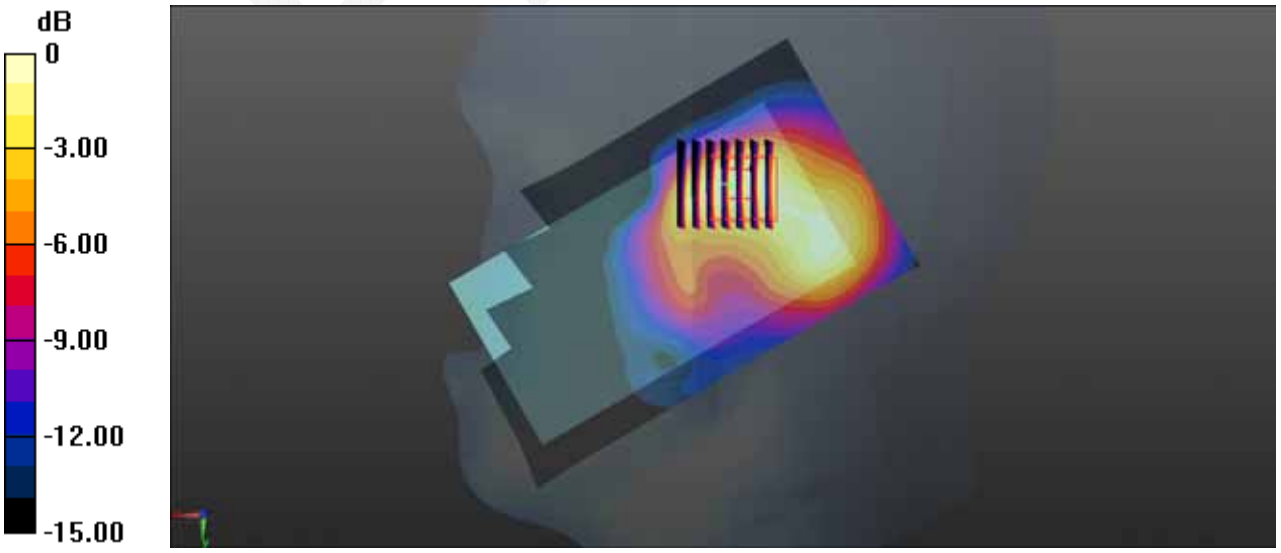
Communication System:CW ; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.823 S/m; ε_r = 39.165; ρ = 1000 kg/m^3
Phantom section: Right Section

DASY5 Configuration:

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

Head/WLan Head Right Cheek/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.245 W/kg

Head/WLan Head Right Cheek/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 7.914 V/m; Power Drift = 0.11 dB
Peak SAR (extrapolated) = 0.385 W/kg
SAR(1 g) = 0.195 W/kg; SAR(10 g) = 0.098 W/kg
Maximum value of SAR (measured) = 0.218 W/kg



0 dB = 0.218 W/kg = -6.62 dBW/kg

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

Test Plot 12#: WLan Body Back Middle Channel

DUT: SIRIUS; Type: DPF500

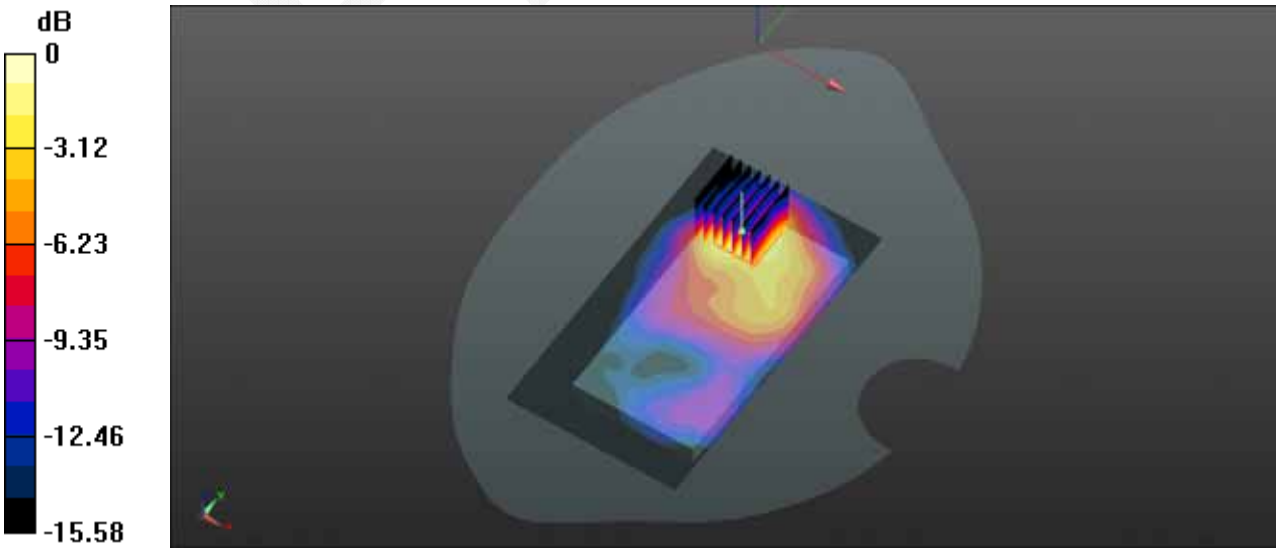
Communication System:CW ; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2437 MHz; σ = 1.982 S/m; ε_r = 51.657; ρ = 1000 kg/m^3
Phantom section: Flat Section

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/WLan Back/Area Scan (61x111x1): Interpolated grid: dx=1.500 mm, dy=1.500 mm
Maximum value of SAR (interpolated) = 0.304 W/kg

Body/WLan Back/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 6.324 V/m; Power Drift = -0.14 dB
Peak SAR (extrapolated) = 0.451 W/kg
SAR(1 g) = 0.246 W/kg; SAR(10 g) = 0.126 W/kg
Maximum value of SAR (measured) = 0.275 W/kg



0 dB = 0.275 W/kg = -5.61 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
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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Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS) Accreditation No.: **SCS 0108**
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Glossary:

TSL	tissue simulating liquid
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 %

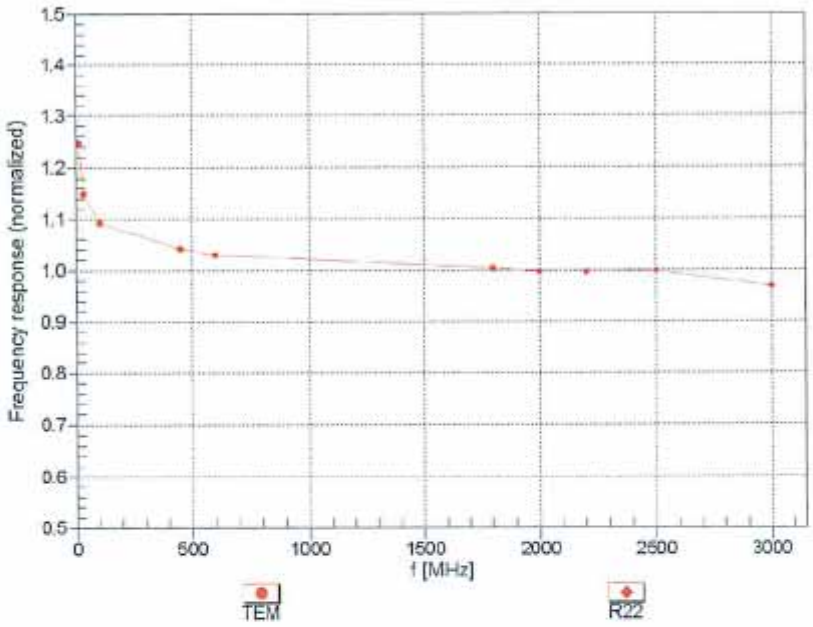
[C] Frequency validity above 300 MHz of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2), else it is restricted to ± 50 MHz. The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band. Frequency validity below 300 MHz 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)

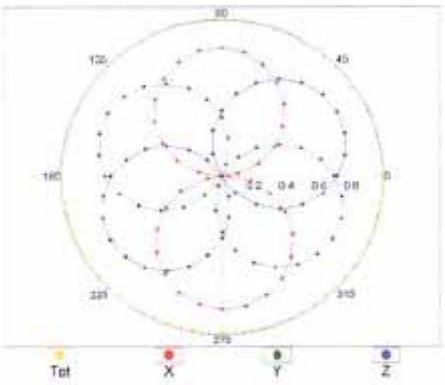


Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

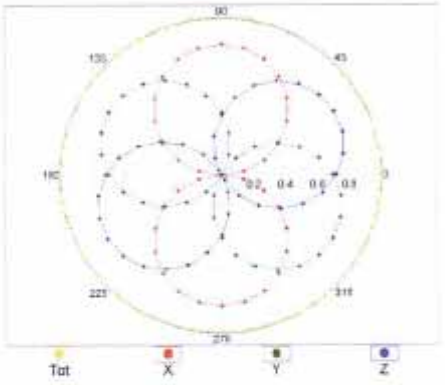
EX3DV4– SN:7329 February 5, 2015

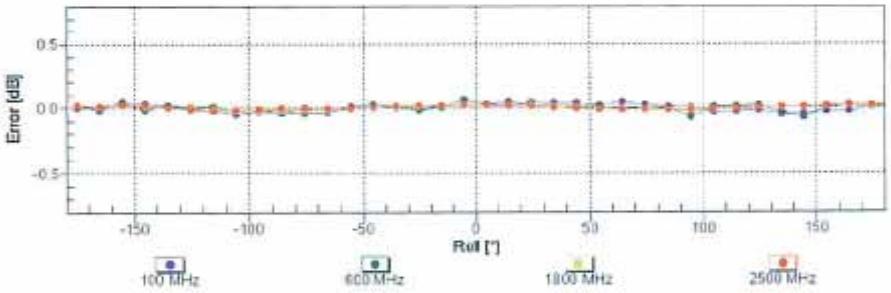
Receiving Pattern (ϕ), ϑ = 0°

f=600 MHz,TEM



f=1800 MHz,R22

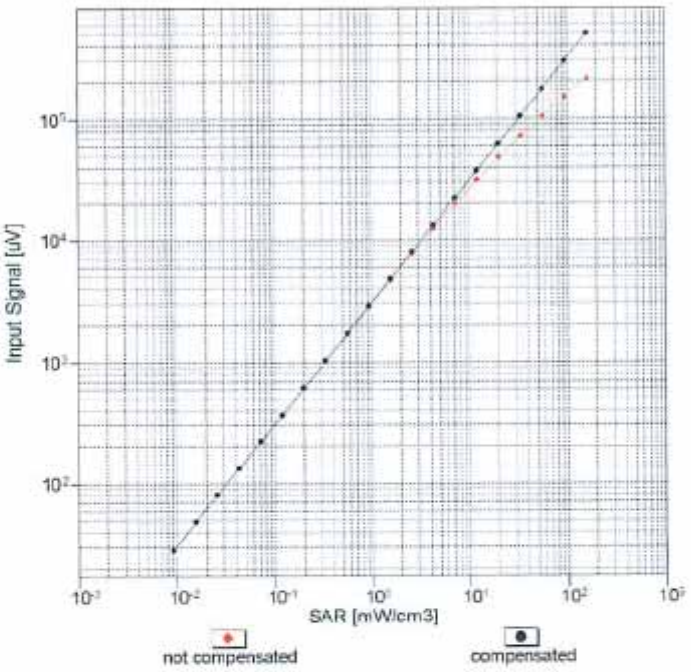


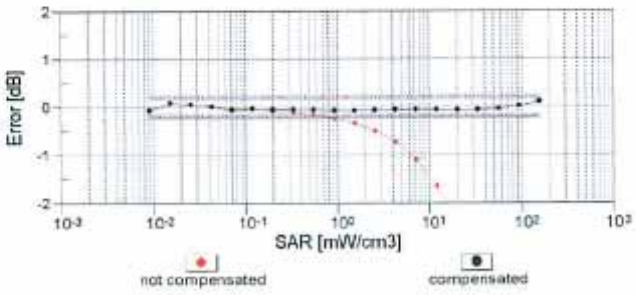


Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

EX3DV4– SN:7329 February 5, 2015

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



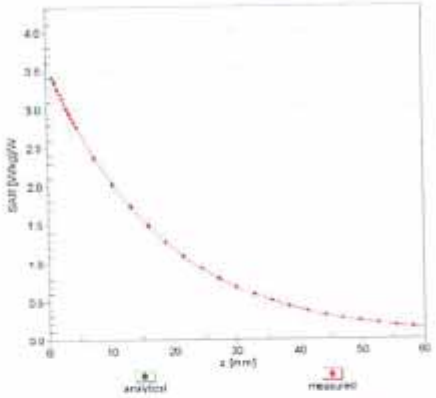


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

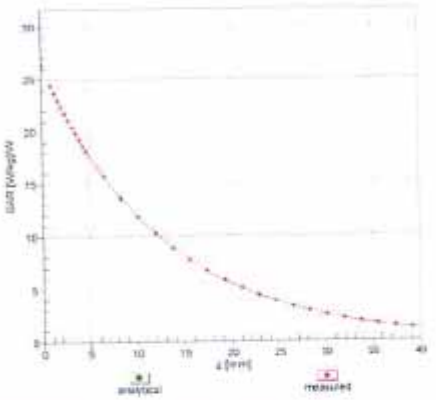
EX3DV4– SN:7329 February 5, 2015

Conversion Factor Assessment

f = 900 MHz,WGLS R9 (H_convF)

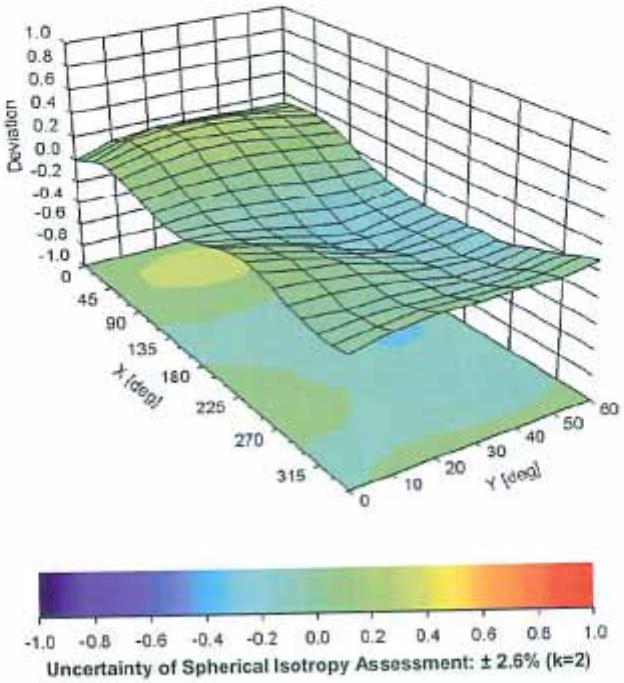


f = 1750 MHz,WGLS R22 (H_convF)



Deviation from Isotropy in Liquid

Error (ϕ, ϑ), f = 900 MHz



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

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

Other Probe Parameters

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

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: 180-00558

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

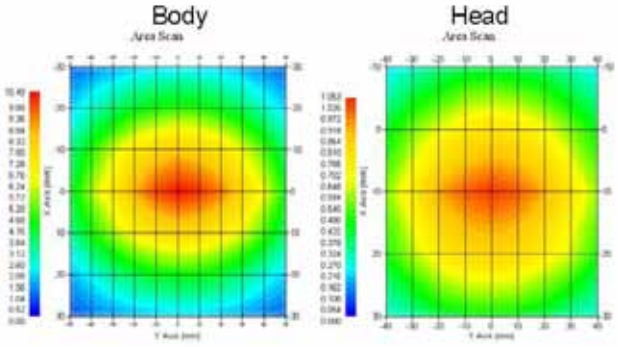
Length: 162.2 mm
Height: 89.4 mm

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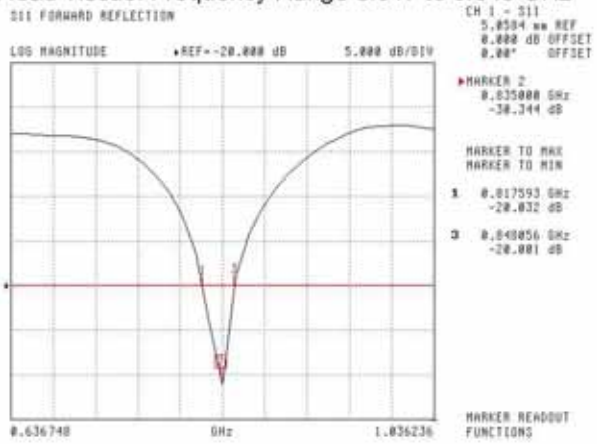
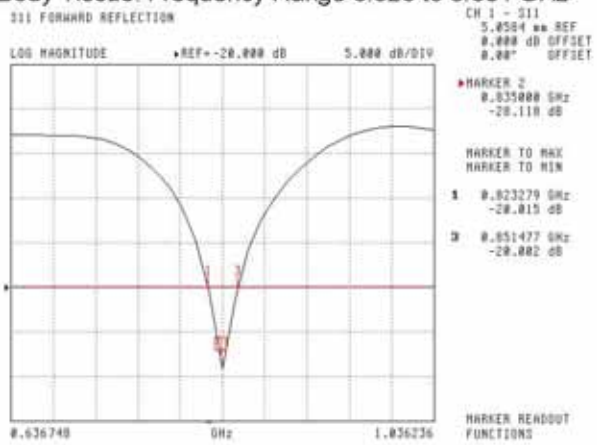
The Following Graphs are the results as displayed on the Vector Network Analyzer.

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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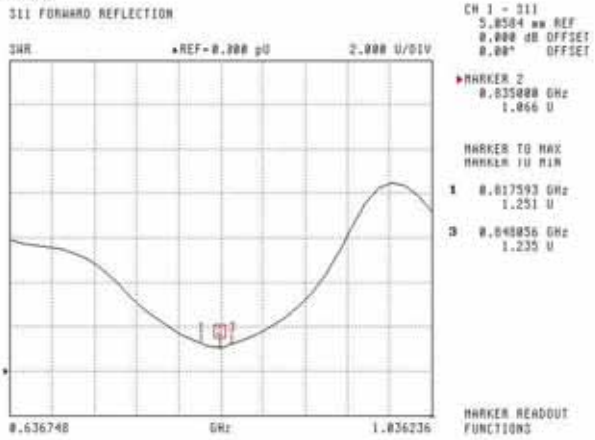
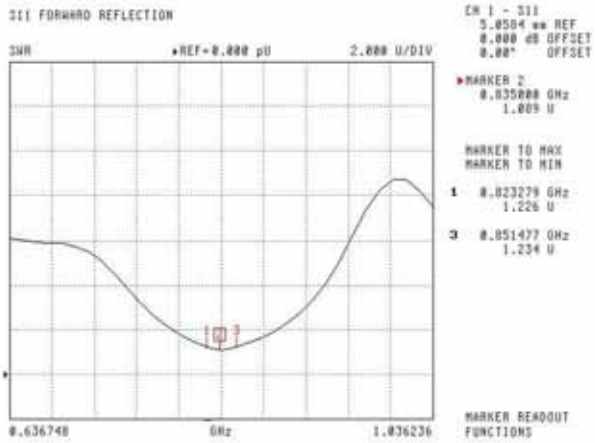
SWR

Head



Body



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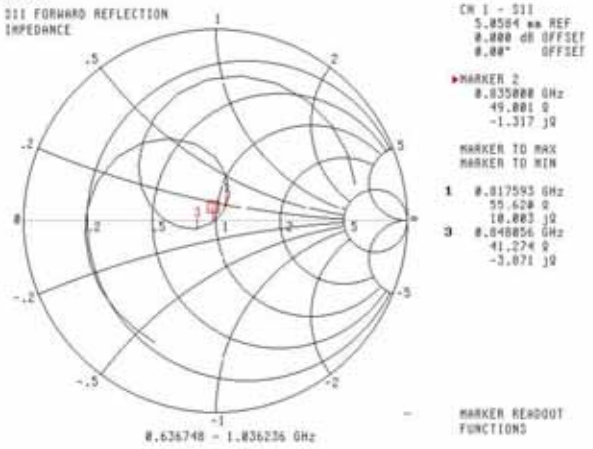
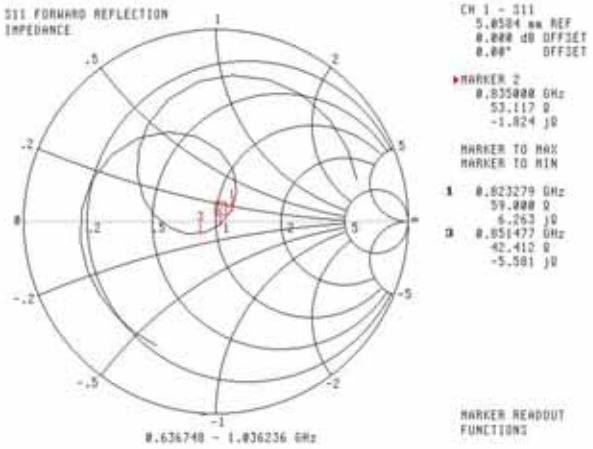
Division of APREL Laboratories.

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

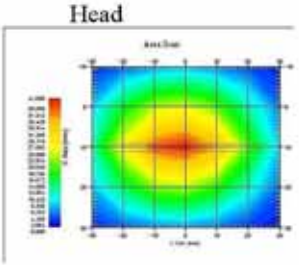
Test	Result Head	Result Body
S11 R/L	-25.567	-20.548 dB
SWR	1.111U	1.207 U
Impedance	53.637Ω	55.929 Ω

System Validation Results, 1750 MHz

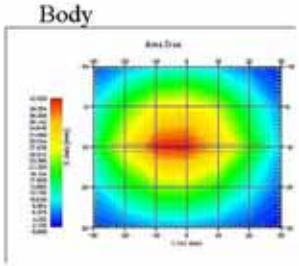
	1g	10g
Head	37.02	18.99
Body	36.65	18.85

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.

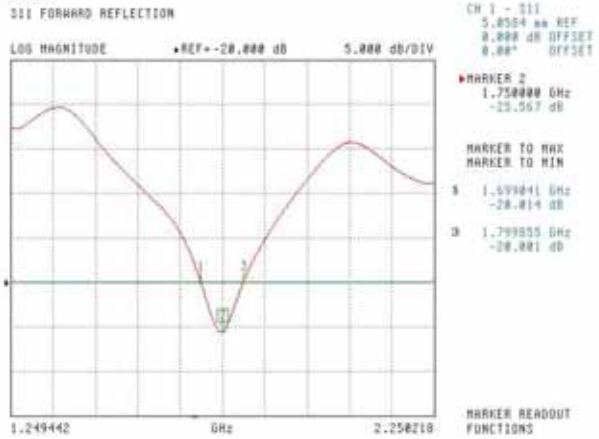
Electrical Calibration

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

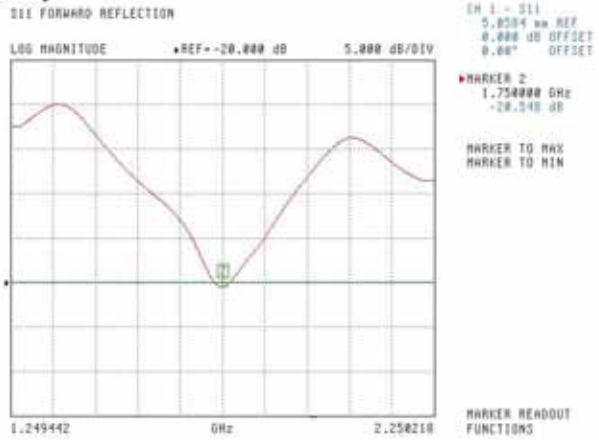
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

Head



Body



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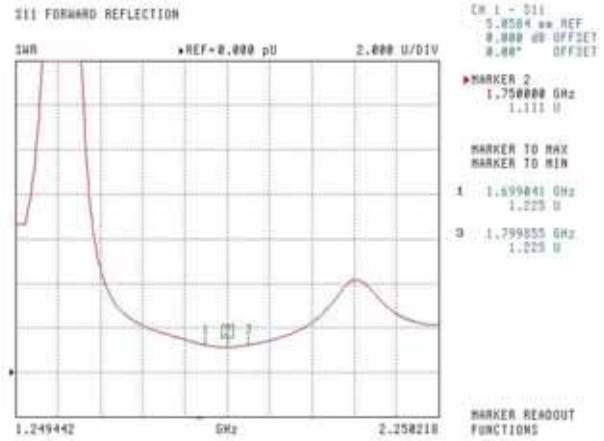
This page has been reviewed for content and attested to by signature within this document.

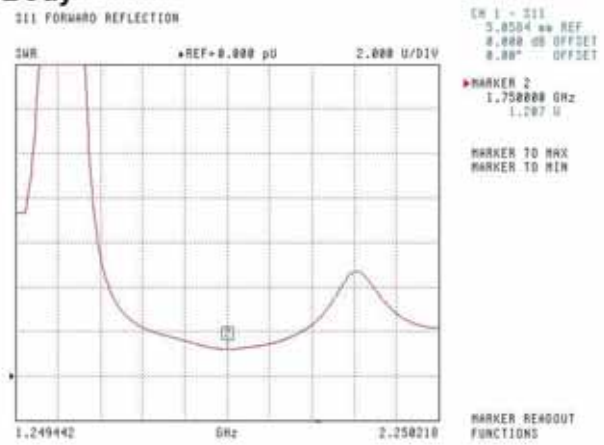
NCL Calibration Laboratories
Division of APREL Laboratories.

SWR

Head



Body



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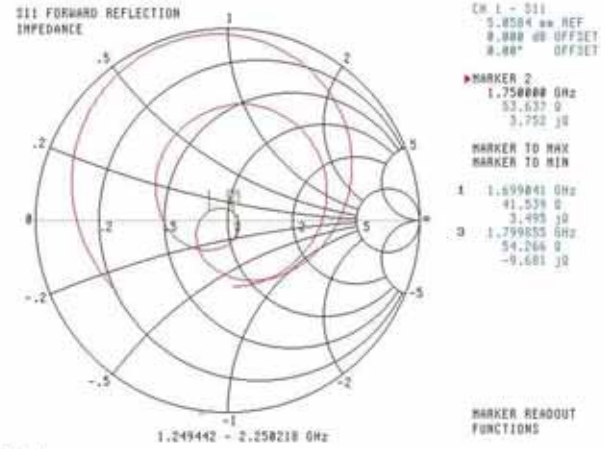
This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Smith Chart Dipole Impedance

Head



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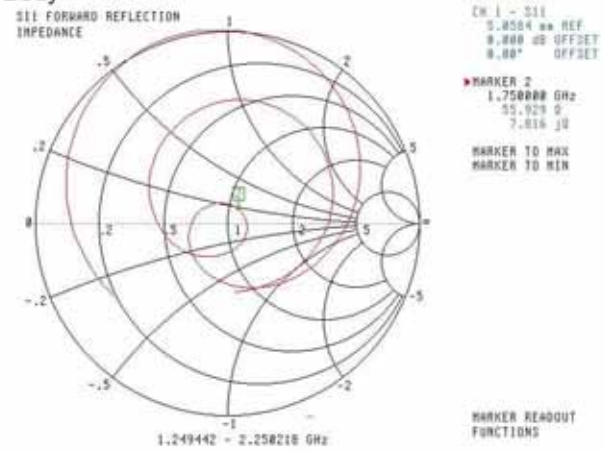

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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

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
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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.
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 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

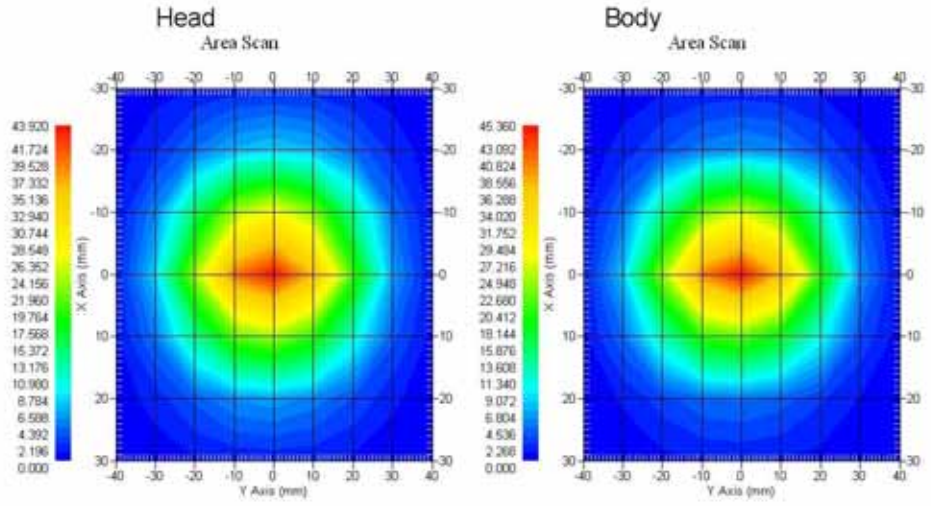
Length: 67.1 mm
Height: 38.9 mm

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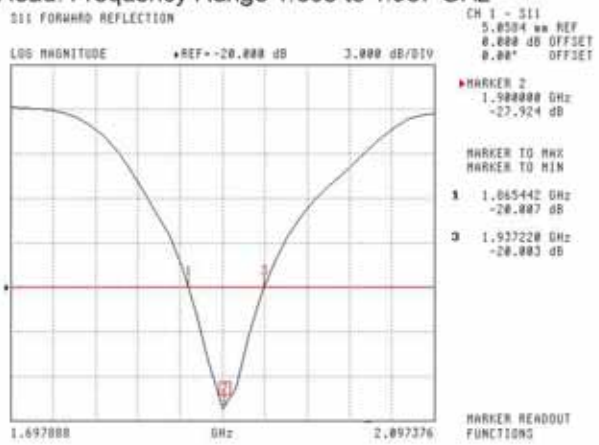
This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

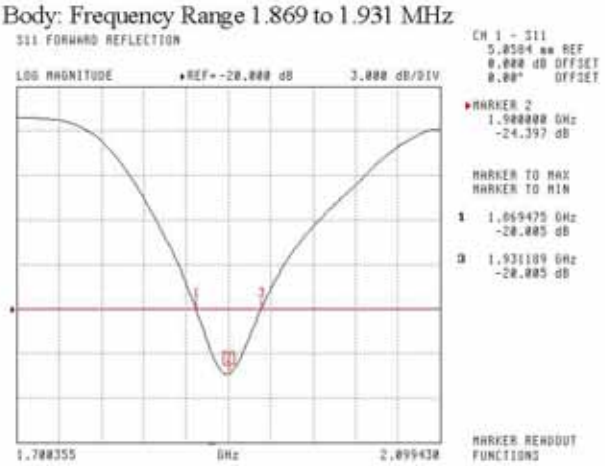
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

Head: Frequency Range 1.865 to 1.937 GHz



Body: Frequency Range 1.869 to 1.931 MHz



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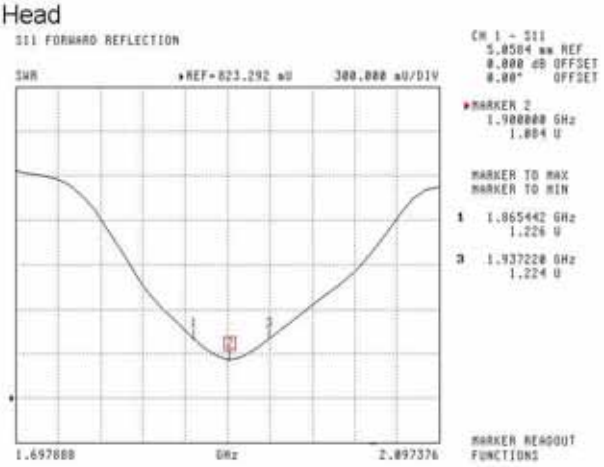
This page has been reviewed for content and attested to by signature within this document.

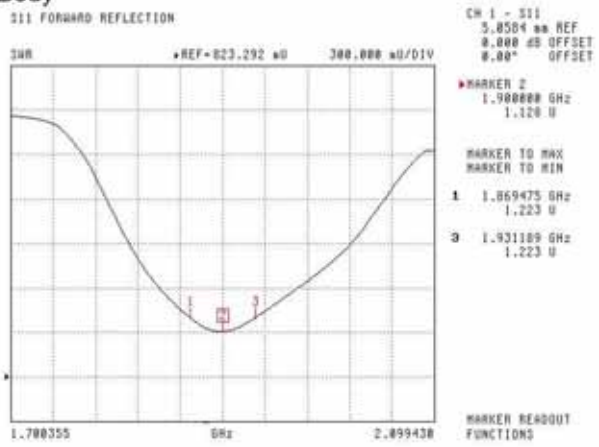
NCL Calibration Laboratories
Division of APREL Laboratories.

SWR

Head



Body



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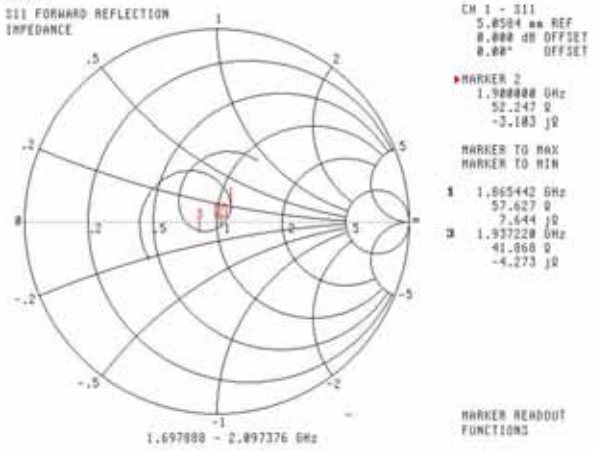
This page has been reviewed for content and attested to by signature within this document.

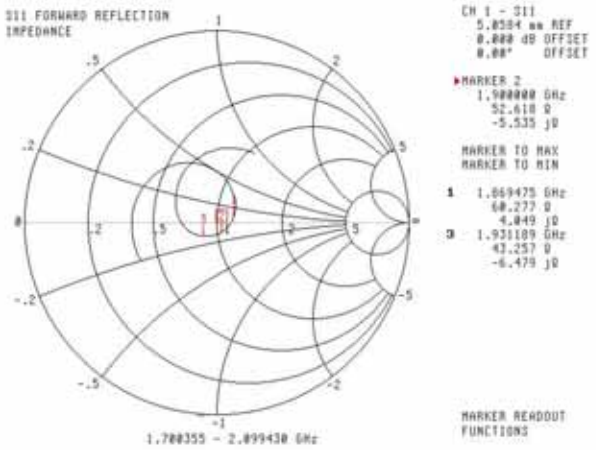
NCL Calibration Laboratories
Division of APREL Laboratories.

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 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)435-8306

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

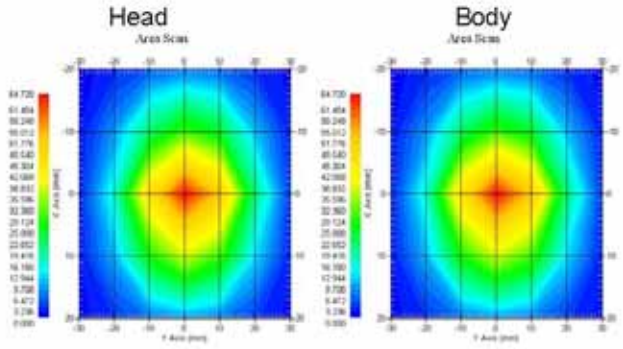
Length: 52.4 mm
Height: 30.3 mm

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)**

4

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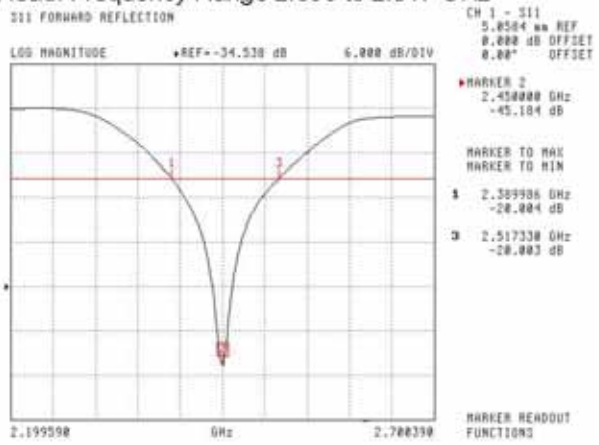
This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

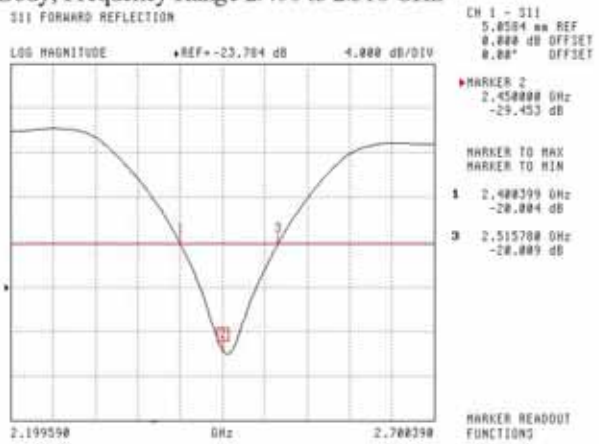
The Following Graphs are the results as displayed on the Vector Network Analyzer.

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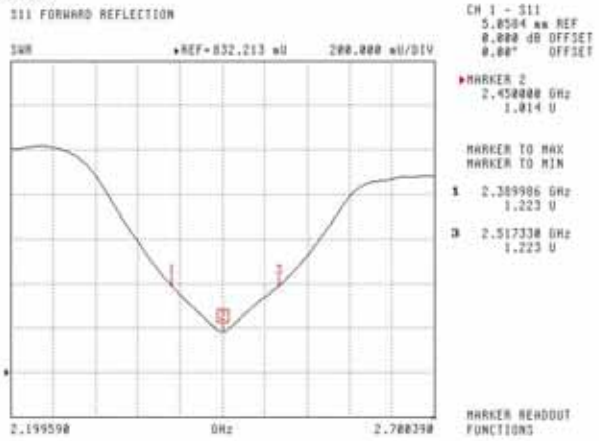
This page has been reviewed for content and attested to by signature within this document.

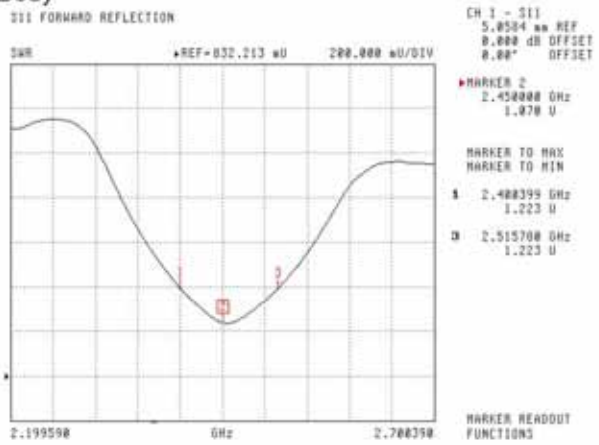
NCL Calibration Laboratories
Division of APREL Laboratories.

SWR

Head



Body



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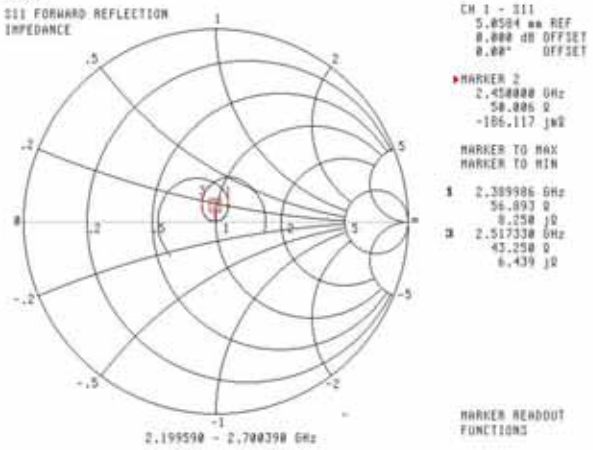
This page has been reviewed for content and attested to by signature within this document.

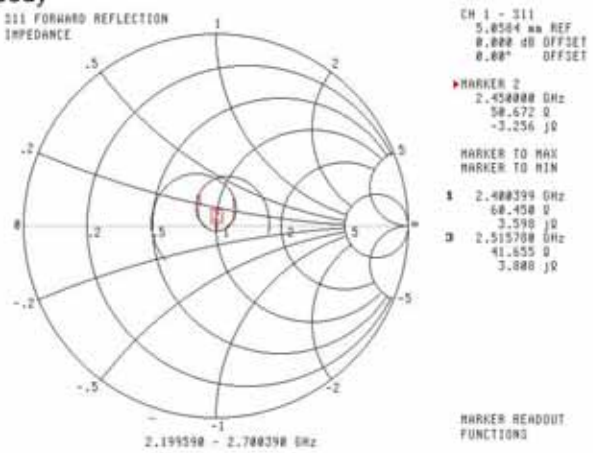
NCL Calibration Laboratories
Division of APREL Laboratories.

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

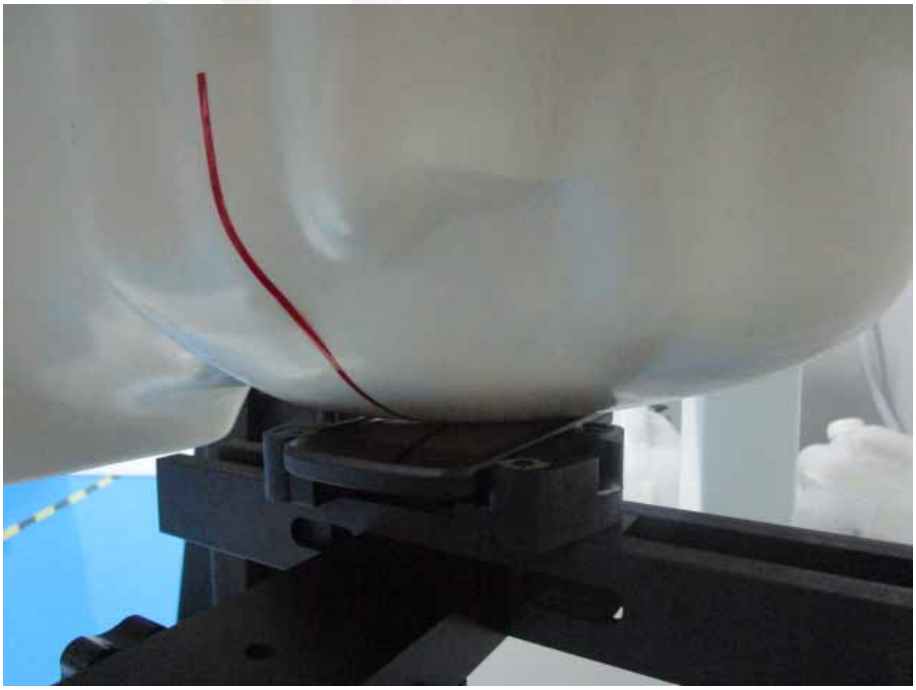
The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2014.

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

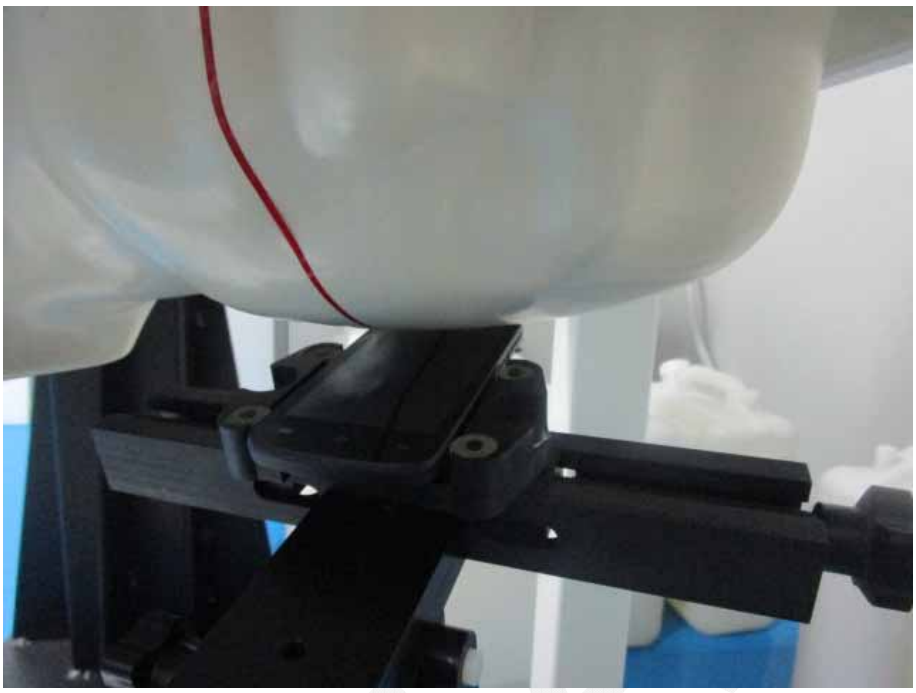
APPENDIX D EUT TEST POSITION PHOTOS

Liquid depth ≥ 15cm

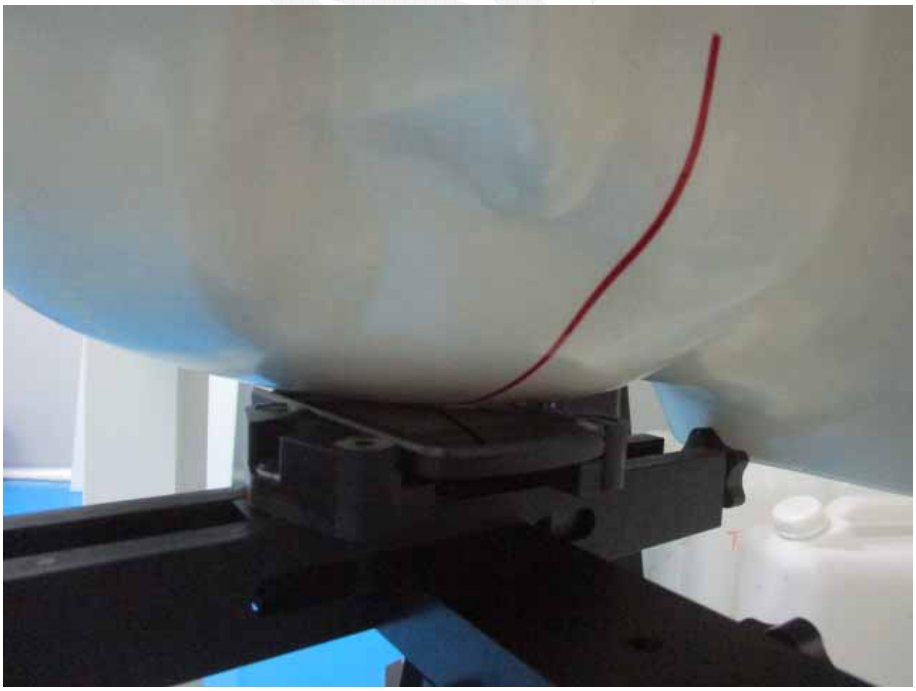
Left Head Cheek



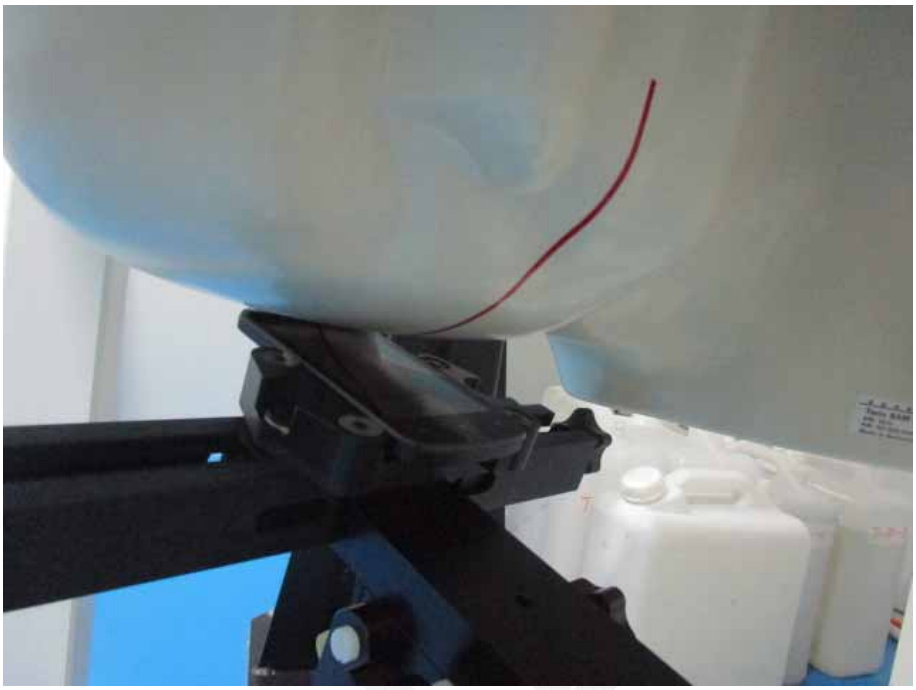
Left Head Tilt



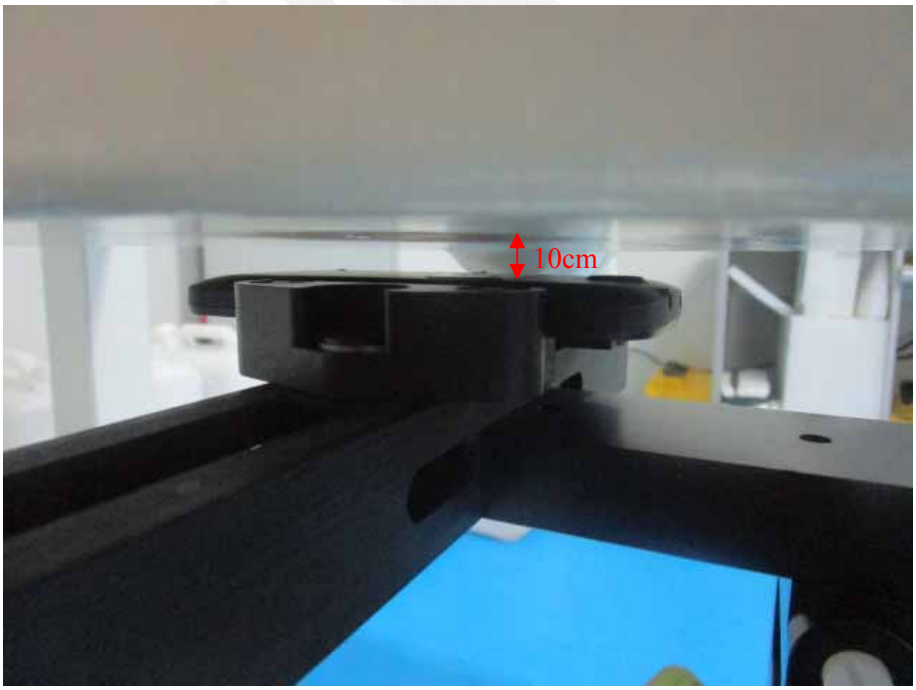
Right Head Cheek



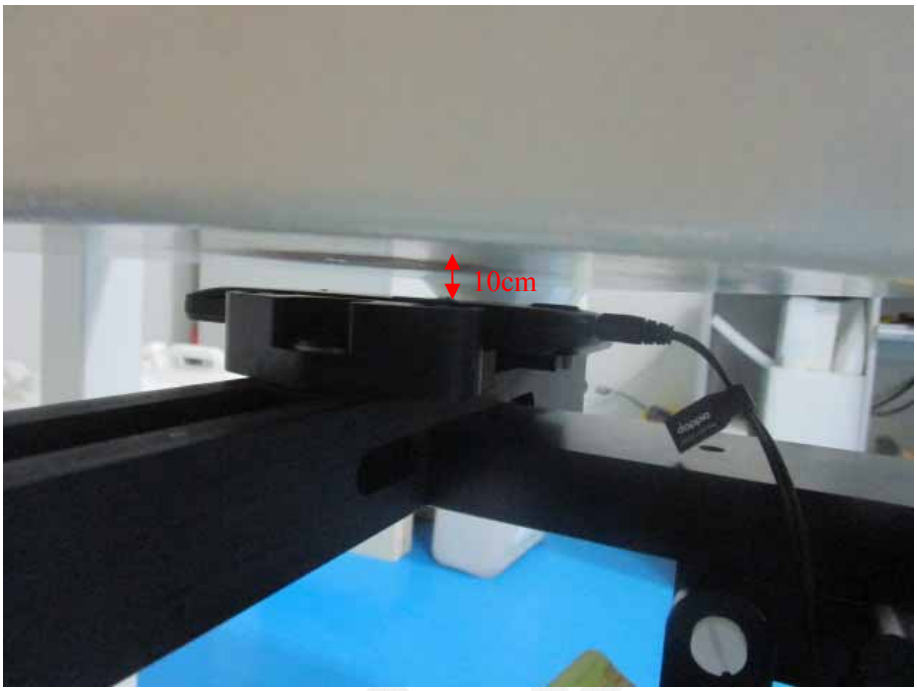
Right Head Tilt



Body -Worn-Back (10mm)



Body -Headset-Back (10mm)



Body -Worn-Left (10mm)

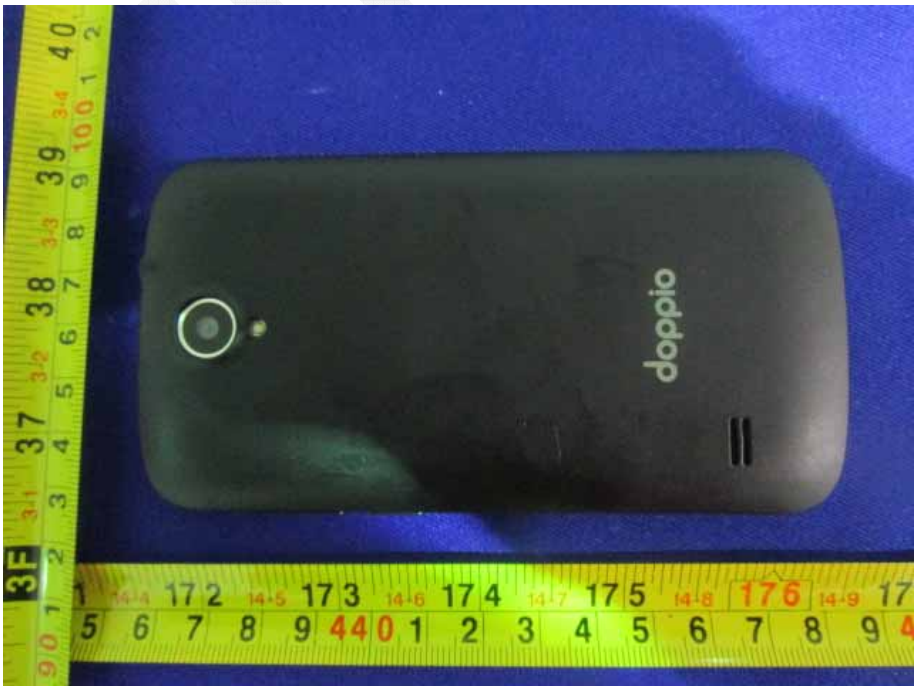
Body -Worn-Right (10mm)

Body -Worn-Bottom(10mm)

APPENDIX E EUT PHOTOS

EUT – Front View

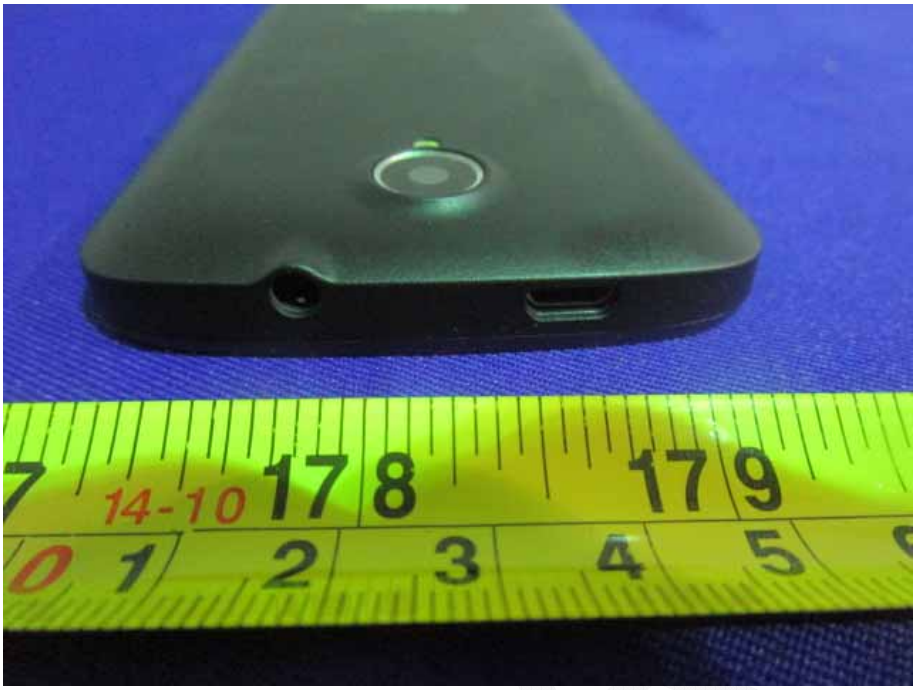
EUT – Back View



EUT –Left Side View

EUT – Right Side View

EUT –Top View



EUT – Bottom View

EUT – Uncover View

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