SAR EVALUATION REPORT

For

Shenzhen Xiangyue Perfect Digital Science&Technology Co., Ltd

Building A1, Jiujiutongxin Industrial Zone11, Xinbu, Tongle, Longgang, Shenzhen, Guangdong, China

FCC ID: 2ABYGB8501

Report Type:	**Product Type:**
Original Report	3G Mobile Phone

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

Attestation of Test Results		
EUT Information	**Company Name**	Shenzhen Xiangyue Perfect Digital Science&Technology Co., Ltd
	EUT Description	3G Mobile Phone
	FCC ID	2ABYGB8501
	Model Number	B8501
	Test Date	2014-02-13 to 2013-02-14

Frequency	Max. SAR Level(s) Reported	Limit(W/Kg)
GSM 850	0.645 W/kg 1g Head SAR 1.166 W/kg 1g Body SAR	**1. 6**
PCS 1900	0.340 W/kg 1g Head SAR 0.756 W/kg 1g Body SAR	
WCDMA1900	0.213 W/kg 1g Head SAR 1.126 W/kg 1g Body SAR	
Simultaneous	1.062 W/kg 1g Head SAR 1.375 W/kg 1g Body SAR	

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.
	IEEE1528:2003 IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
	KDB procedures KDB 447498 D01 Mobile and Portable Devices RF Exposure Procedures and Equipment Authorization Policies. KDB 648474 D04 SAR Evaluation Considerations for Wireless Handsets KDB 865664 D01 SAR Measurement Requirements for 100 MHz to 6 GHz KDB 941225 D01 SAR Measurement Procedures for 3G Devices-CDMA 2000/EV-Do WCDMA/HSDPA/HSUPA KDB 941225 D06 SAR Evaluation Procedures for Portable Devices with Wireless Router Capabilities.

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 1528-2003 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	RSZ140121002-20	Original Report	2014-02-24

EUT DESCRIPTION

This report has been prepared on behalf of Shenzhen Xiangyue Perfect Digital Science&Technology Co., Ltd and their product, FCC ID: 2ABYGB8501, Model: *B8501* or the EUT (Equipment under Test) as referred to in the rest of this report. The EUT is a *3G mobile phone*.

Technical Specification

Product Type	Portable
Exposure Category:	Population / Uncontrolled
Antenna Type(s):	Internal Antenna
Body-Worn Accessories:	Headset
Face-Head Accessories:	None
Multi-slot Class:	Class12
Operation Mode :	GSM Voice, GPRS Data, EGPRS Data, WCDMA, WiFi and Bluetooth
Frequency Band:	GSM 850 : 824-849 MHz(TX) ; 869-894 MHz(RX) PCS 1900: 1850-1910 MHz(TX) ; 1930-1990 MHz(RX) WCDMA1900: 1850-1910 MHz(TX) ; 1930-1990 MHz(RX) WiFi: 2412MHz-2462MHz Bluetooth : 2402MHz-2480MHz
Conducted RF Power:	GSM 850 : 31.98 dBm PCS 1900: 28.46 dBm WCDMA 1900: 22.83 dBm WiFi: 9.88 dBm Bluetooth: 4.85 dBm
Dimensions (L*W*H):	134.4 mm (L) × 68 mm (W) × 9.9 mm (H)
Power Source:	3.7 V_{DC} 1600 mAh 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. (Shenzhen) to collect data is located at 6/F, the 3rd Phase of WanLi Industrial Building, Shi Hua Road, Fu Tian Free Trade Zone, Shenzhen, Guangdong, P.R. of China

DESCRIPTION OF TEST SYSTEM

These measurements were performed with ALSAS 10 Universal Integrated SAR Measurement system from APREL Laboratories.

ALSAS-10U System Description

ALSAS-10-U is fully compliant with the technical and scientific requirements of IEEE 1528, IEC 62209, CENELEC, ARIB, ACA, and the Federal Communications Commission. The system comprises of a six axes articulated robot which utilizes a dedicated controller.
ALSAS-10U uses the latest methodologies. And FDTD modeling to provide a platform which is repeatable with minimum uncertainty.

Applications

Predefined measurement procedures compliant with the guidelines of CENELEC, IEEE, IEC, FCC, etc are utilized during the assessment for the device. Automatic detection for all SAR maxima are embedded within the core architecture for the system, ensuring that peak locations used for centering the zoom scan are within a 1mm resolution and a 0.05mm repeatable position. System operation range currently available up-to 6 GHz in simulated tissue.

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 ALSAS-10U 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.

ALSAS-10U Interpolation and Extrapolation Uncertainty

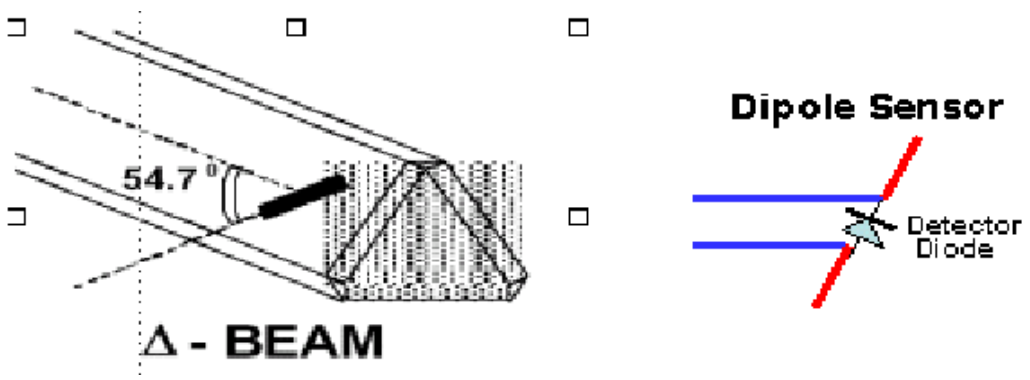
The overall uncertainty for the methodology and algorithms the used during the SAR calculation was evaluated using the data from IEEE 1528 based on the example f3 algorithm:

$$f_3(x,y,z) = A \frac{a^2}{\frac{a^2}{4} + x'^2 + y'^2} \cdot \left(e^{-\frac{2z}{a}} + \frac{a^2}{2(a+2z)^2} \right)$$

Isotropic E-Field Probe

The isotropic E-Field probe has been fully calibrated and assessed for isotropicity, and boundary effect within a controlled environment. Depending on the frequency for which the probe is calibrated the method utilized for calibration will change.

The E-Field probe utilizes a triangular sensor arrangement as detailed in the diagram below:



SAR is assessed with a calibrated probe which moves at a default height of 5mm from the center of the diode, which is mounted to the sensor, to the phantom surface (in the Z Axis). The 5mm offset height has been selected so as to minimize any resultant boundary effect due to the probe being in close proximity to the phantom surface.

The following algorithm is an example of the function used by the system for linearization of the output from the probe when measuring complex modulation schemes.

$$V_i = U_i + U_i^2 \cdot \frac{cf}{dcp_i}$$

Isotropic E-Field Probe Specification

Calibration Method	Frequency Dependent Below 1 GHz Calibration in air performed in a TEM Cell Above 1 GHz Calibration in air performed in waveguide
Sensitivity	0.70 μV/(V/m)^2 to 0.85 μV/(V/m)^2
Dynamic Range	0.0005 W/kg to 100 W/kg
Isotropic Response	Better than 0.1 dB
Diode Compression Point (DCP)	Calibration for Specific Frequency
Probe Tip Diameter	< 2.9 mm
Sensor Offset	1.56 (+/- 0.02 mm)
Probe Length	289 mm
Video Bandwidth	@ 500 Hz: 1 dB @ 1.02 kHz: 3 dB
Boundary Effect	Less than 2.1% for distance greater than 0.58 mm
Spatial Resolution	The spatial resolution uncertainty is less than 1.5% for 4.9mm diameter probe. The spatial resolution uncertainty is less than 1.0% for 2.5mm diameter probe

Boundary Detection Unit and Probe Mounting Device

ALSAS-10U incorporates a boundary detection unit with a sensitivity of 0.05mm for detecting all types of surfaces. The robust design allows for detection during probe tilt (probe normalize) exercises, and utilizes a second stage emergency stop. The signal electronics are fed directly into the robot controller for high accuracy surface detection in lateral and axial detection modes (X, Y, & Z).

The probe is mounted directly onto the Boundary Detection unit for accurate tooling and displacement calculations controlled by the robot kinematics. The probe is connect to an isolated probe interconnect where the output stage of the probe is fed directly into the amplifier stage of the Daq-Paq.

Daq-Paq (Analog to Digital Electronics)

ALSAS-10U incorporates a fully calibrated Daq-Paq (analog to digital conversion system) which has a 4 channel input stage, sent via a 2 stage auto-set amplifier module. The input signal is amplified accordingly so as to offer a dynamic range from 5μV to 800mV. Integration of the fields measured is carried out at board level utilizing a Co-Processor which then sends the measured fields down into the main computational module in digitized form via an RS232 communications port. Probe linearity and duty cycle compensation is carried out within the main Daq-Paq module.

ADC	12 Bit
Amplifier Range	20 mV to 200 mV and 150 mV to 800 mV
Field Integration	Local Co-Processor utilizing proprietary integration algorithms
Number of Input Channels	4 in total 3 dedicated and 1 spare
Communication	Packet data via RS232

Axis Articulated Robot

ALSAS-10U utilizes a six axis articulated robot, which is controlled using a Pentium based real-time movement controller. The movement kinematics engine utilizes proprietary (Thermo CRS) interpolation and extrapolation algorithms, which allow full freedom of movement for each of the six joints within the working envelope. Utilization of joint 6 allows for full probe rotation with a tolerance better than 0.05mm around the central axis.

Robot/Controller Manufacturer	Thermo CRS
Number of Axis	Six independently controlled axis
Positioning Repeatability	0.05 mm
Controller Type	Single phase Pentium based C500C
Robot Reach	710 mm
Communication	RS232 and LAN compatible

ALSAS Universal Workstation

ALSAS Universal workstation allows for repeatability and fast adaptability. It allows users to do calibration, testing and measurements using different types of phantoms with one set up, which significantly speeds up the measurement process.

Universal Device Positioner

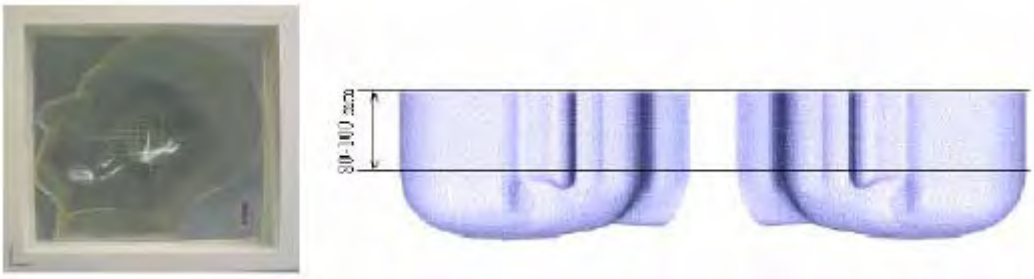
The universal device positioner allows complete freedom of movement of the EUT. Developed to hold a EUT in a free-space scenario any additional loading attributable to the material used in the construction of the positioner has been eliminated. Repeatability has been enhanced through the linear scales which form the design used to indicate positioning for any given test scenario in all major axes. A 15° tilt indicator is included for the of aid cheek to tilt movements for head SAR analysis. Overall uncertainty for measurements have been reduced due to the design of the Universal device positioner, which allows positioning of a device in as near to a free-space scenario as possible, and by providing the means for complete repeatability.

Phantom Types

The ALSAS-10U allows the integration of multiple phantom types. SAM Phantoms fully compliant with IEEE 1528, Universal Phantom, and Universal Flat.

APREL SAM Phantoms

The SAM phantoms developed using the IEEE SAM CAD file. They are fully compliant with the requirements for both IEEE 1528 and FCC Supplement C. Both the left and right SAM phantoms are interchangeable, transparent and include the IEEE 1528 grid with visible NF and MB lines.



APREL Laboratories Universal Phantom

The Universal Phantom is used on the ALSAS-10U as a system validation phantom. The Universal Phantom has been fully validated both experimentally from 800MHz to 6GHz and numerically using XFDTD numerical software.

The shell thickness is 2mm overall, with a 4mm spacer located at the NF/MB intersection providing an overall thickness of 6mm in line with the requirements of IEEE-1528.

The design allows for fast and accurate measurements, of handsets, by allowing the conservative SAR to be evaluated at on frequency for both left and right head experiments in one measurement.

Tissue Dielectric Parameters for Head and Body Phantoms

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

Ingredients (% by weight)	Frequency (MHz)									
	450		835		915		1900		2450	
Tissue Type	Head	Body	Head	Body	Head	Body	Head	Body	Head	Body
Water	38.56	51.16	41.45	52.4	41.05	56.0	54.9	40.4	62.7	73.2
Salt (Nacl)	3.95	1.49	1.45	1.4	1.35	0.76	0.18	0.5	0.5	0.04
Sugar	56.32	46.78	56.0	45.0	56.5	41.76	0.0	58.0	0.0	0.0
HEC	0.98	0.52	1.0	1.0	1.0	1.21	0.0	1.0	0.0	0.0
Bactericide	0.19	0.05	0.1	0.1	0.1	0.27	0.0	0.1	0.0	0.0
Triton x-100	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.8	0.0
DGBE	0.0	0.0	0.0	0.0	0.0	0.0	44.92	0.0	0.0	26.7
Dielectric Constant	43.42	58.0	42.54	56.1	42.0	56.8	39.9	54.0	39.8	52.5
Conductivity (s/m)	0.85	0.83	0.91	0.95	1.0	1.07	1.42	1.45	1.88	1.78

Recommended Tissue Dielectric Parameters for Head and Body

Frequency (MHz)	Head Tissue		Body Tissue	
	εr	O' (S/m)	εr	O' (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

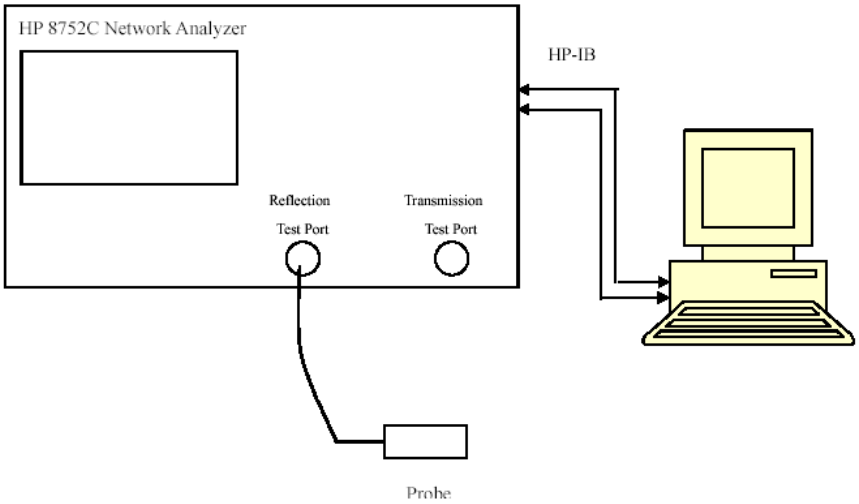
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Information

Equipment	Model	Calibration Date	S/N
CRS F3 robot	ALS-F3	N/A	RAF0805352
CRS F3 Software	ALS-F3-SW	N/A	N/A
CRS C500C controller	ALS-C500	N/A	RCF0805379
Probe mounting device & Boundary Detection Sensor System	ALS-PMDPS-3	N/A	120-00270
Universal Work Station	ALS-UWS	N/A	100-00157
Data Acquisition Package	ALS-DAQ-PAQ-3	2013-10-08	110-00212
Miniature E-Field Probe	ALS-E-020	2013-10-08	500-00283
Dipole, 835MHz	ALS-D-835-S-2	2011-08-25	180-00558
Dipole, 1900MHz	ALS-D-1900-S-2	2011-08-25	210-00710
Dipole Spacer	ALS-DS-U	N/A	250-00907
Device holder/Positioner	ALS-H-E-SET-2	N/A	170-00510
Left ear SAM phantom	ALS-P-SAM-L	N/A	130-00311
Right ear SAM phantom	ALS-P-SAM-R	N/A	140-00359
UniPhantom	ALS-P-UP-1	N/A	150-00413
Simulated Tissue 835 MHz Head	ALS-TS-835-H	Each Time	270-01002
Simulated Tissue 835 MHz Body	ALS-TS-835-B	Each Time	270-02101
Simulated Tissue 1900 MHz Head	ALS-TS-1900-H	Each Time	295-01103
Simulated Tissue 1900 MHz Body	ALS-TS-1900-B	Each Time	295-02102
Power Amplifier	5S1G4	N/A	71377
Synthesized Sweeper	HP 8341B	2013-05-09	2624A00116
UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	2013-11-23	106891
EMI Test Receiver	ESCI	2013-11-12	101120

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	O' (S/m)	ε_r	O' (S/m)	$\Delta\varepsilon_r$	ΔO' (S/m)	
824.2	Head	41.32	0.89	41.50	0.90	-0.439	-1.111	±5
	Body	55.04	0.95	55.20	0.97	-0.288	-2.062	±5
836.6	Head	41.27	0.91	41.50	0.90	-0.548	1.111	±5
	Body	55.12	0.96	55.20	0.97	-0.146	-1.031	±5
848.8	Head	41.08	0.92	41.50	0.90	-1.005	2.222	±5
	Body	55.19	0.99	55.20	0.97	-0.009	2.062	±5
1850.2	Head	40.11	1.40	40.00	1.40	0.268	0.000	±5
	Body	53.47	1.50	53.30	1.52	0.310	-1.316	±5
1852.4	Head	40.11	1.39	40.00	1.40	0.275	-0.714	±5
	Body	53.42	1.50	53.30	1.52	0.218	-1.316	±5
1880.0	Head	40.12	1.42	40.00	1.40	0.289	1.429	±5
	Body	53.22	1.54	53.30	1.52	-0.154	1.316	±5
1907.6	Head	40.12	1.44	40.00	1.40	0.304	2.857	±5
	Body	53.18	1.56	53.30	1.52	-0.218	2.632	±5
1909.8	Head	40.12	1.44	40.00	1.40	0.305	2.857	±5
	Body	53.29	1.55	53.30	1.52	-0.010	1.974	±5

**Liquid Verification was performed on 2014-02-13.*

Please refer to the following tables.

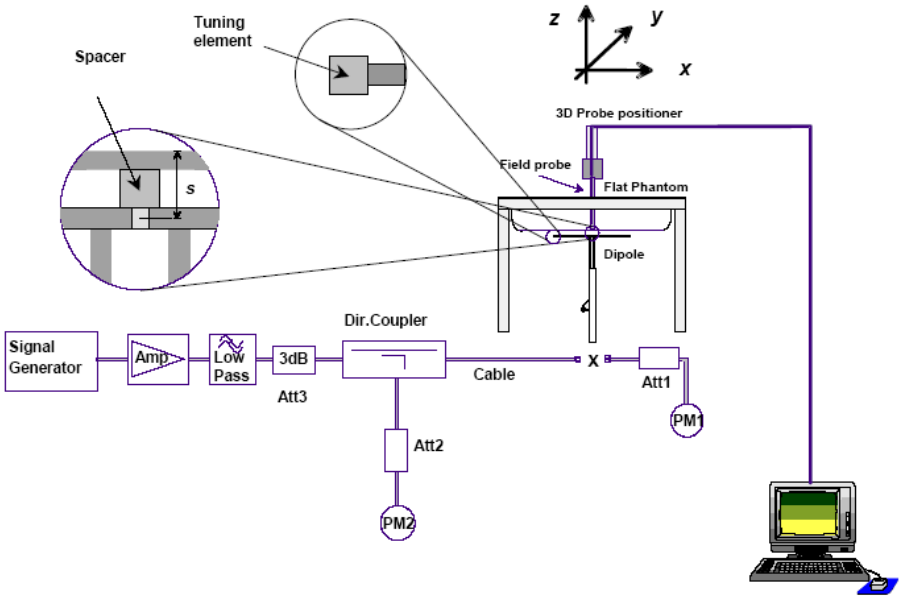
835 MHz Head				835 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
824.0	41.3177	19.4418		824.0	55.0411	20.7251
824.5	41.2867	19.4423		824.5	55.0442	20.6246
825.0	41.2700	19.4429		825.0	55.0473	20.6372
825.5	41.1649	19.4434		825.5	55.0505	20.6496
826.0	41.1832	19.4440		826.0	55.0536	20.7846
826.5	41.2051	19.4445		826.5	55.0568	20.8484
827.0	41.1816	19.4451		827.0	55.0599	20.7629
827.5	41.2289	19.4456		827.5	55.0630	20.6410
828.0	41.2485	19.4462		828.0	55.0662	20.6756
828.5	41.2550	19.4467		828.5	55.0693	20.6330
829.0	41.3059	19.4473		829.0	55.0725	20.7372
829.5	41.2544	19.4479		829.5	55.0756	20.6800
830.0	41.2908	19.4484		830.0	55.0787	20.5579
830.5	41.2508	19.4490		830.5	55.0819	20.6223
831.0	41.2238	19.4495		831.0	55.0850	20.6074
831.5	41.2433	19.4501		831.5	55.0881	20.8149
832.0	41.2052	19.4506		832.0	55.0913	20.7925
832.5	41.1800	19.4512		832.5	55.0944	20.5692
833.0	41.2205	19.4517		833.0	55.0976	20.5026
833.5	41.2519	19.4523		833.5	55.1007	20.6141
834.0	41.2494	19.4528		834.0	55.1038	20.7659
834.5	41.2479	19.4534		834.5	55.1070	20.6589
835.0	41.2728	19.4539		835.0	55.1101	20.6023
835.5	41.2738	19.4548		835.5	55.1132	20.8500
836.0	41.2774	19.4557		836.0	55.1154	20.8570
836.5	41.2724	19.4565		836.5	55.1195	20.7148
837.0	41.2692	19.4574		837.0	55.1227	20.5419
837.5	41.2434	19.4582		837.5	55.1258	20.5781
838.0	41.2666	19.4591		838.0	55.1289	20.8624
838.5	41.2251	19.4599		838.5	55.1321	20.8776
839.0	41.2150	19.4608		839.0	55.1352	20.7996
839.5	41.2175	19.4616		839.5	55.1383	20.7346
840.0	41.2286	19.4625		840.0	55.1415	20.8017
840.5	41.2179	19.4634		840.5	55.1446	20.8471
841.0	41.2012	19.4642		841.0	55.1478	20.8022
841.5	41.2307	19.4651		841.5	55.1509	20.7390
842.0	41.2324	19.4659		842.0	55.1540	20.9148
842.5	41.2360	19.4668		842.5	55.1572	20.8833
843.0	41.2301	19.4576		843.0	55.1603	20.8437
843.5	41.1538	19.4584		843.5	55.1635	20.7992
844.0	41.2301	19.4593		844.0	55.1666	20.8169
844.5	41.1844	19.4602		844.5	55.1697	20.8428
845.0	41.1104	19.4610		845.0	55.1729	20.7522
845.5	41.1257	19.4619		845.5	55.1760	20.6986
846.0	41.0803	19.4828		846.0	55.1791	20.8716
846.5	41.1212	19.4837		846.5	55.1823	20.9330
847.0	41.1015	19.4845		847.0	55.1854	20.8818
847.5	41.1047	19.4854		847.5	55.1886	20.8022
848.0	41.0783	19.4862		848.0	55.1917	20.8923
848.5	41.0829	19.4871		848.5	55.1948	20.9704
849.0	41.0431	19.4879		849.0	55.1980	20.9706

1900 MHz Head				1900 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
1850.0	40.1074	13.5960		1850.0	53.4652	14.5805
1851.2	40.1097	13.5660		1851.2	53.3971	14.5379
1852.4	40.1099	13.5333		1852.4	53.4160	14.5390
1853.6	40.1102	13.5566		1853.6	53.3926	14.5153
1854.8	40.1104	13.5506		1854.8	53.2954	14.5347
1856.0	40.1107	13.4747		1856.0	53.3984	14.5712
1857.2	40.1109	13.6146		1857.2	53.3916	14.5972
1858.4	40.1112	13.5108		1858.4	53.3736	14.5184
1859.6	40.1114	13.5647		1859.6	53.3553	14.5127
1860.8	40.1117	13.5660		1860.8	53.2511	14.5655
1862.0	40.1119	13.5826		1862.0	53.2788	14.3927
1863.2	40.1122	13.6050		1863.2	53.2247	14.4055
1864.4	40.1124	13.6400		1864.4	53.2595	14.4226
1865.6	40.1127	13.6346		1865.6	53.2660	14.3936
1866.8	40.1129	13.6234		1866.8	53.3410	14.3842
1868.0	40.1132	13.6419		1868.0	53.4094	14.4003
1869.2	40.1134	13.7026		1869.2	53.4185	14.4227
1870.4	40.1137	13.6954		1870.4	53.3320	14.4742
1871.6	40.1139	13.6693		1871.6	53.2744	14.4749
1872.8	40.1142	13.6994		1872.8	53.3128	14.5039
1874.0	40.1144	13.6420		1874.0	53.2393	14.5122
1875.2	40.1147	13.6761		1875.2	53.3024	14.5754
1876.4	40.1149	13.6741		1876.4	53.2055	14.4982
1877.6	40.1151	13.7386		1877.6	53.3078	14.5782
1878.8	40.1154	13.6342		1878.8	53.3356	14.7101
1880.0	40.1156	13.5794		1880.0	53.2179	14.7290
1881.2	40.1159	13.6281		1881.2	53.1762	14.7261
1882.4	40.1161	13.6507		1882.4	53.2717	14.6974
1883.6	40.1164	13.6195		1883.6	53.2372	14.6535
1884.8	40.1166	13.6201		1884.8	53.2621	14.6762
1886.0	40.1169	13.6194		1886.0	53.2973	14.6084
1887.2	40.1171	13.6145		1887.2	53.2781	14.5846
1888.4	40.1174	13.6096		1888.4	53.3679	14.6189
1889.6	40.1176	13.6048		1889.6	53.2984	14.6235
1890.8	40.1179	13.6000		1890.8	53.3440	14.6803
1892.0	40.1181	13.5952		1892.0	53.3320	14.4765
1893.2	40.1184	13.5903		1893.2	53.3044	14.4374
1894.4	40.1186	13.5855		1894.4	53.2771	14.4865
1895.6	40.1189	13.5806		1895.6	53.2699	14.8203
1896.8	40.1191	13.5758		1896.8	53.2598	14.8184
1898.0	40.1194	13.5709		1898.0	53.2602	14.7990
1899.2	40.1196	13.5661		1899.2	53.3372	14.7994
1900.4	40.1199	13.5612		1900.4	53.3021	14.6981
1901.6	40.1201	13.5564		1901.6	53.3056	14.7874
1902.8	40.1204	13.5515		1902.8	53.2747	14.7474
1904.0	40.1206	13.5467		1904.0	53.3564	14.7163
1905.2	40.1209	13.5418		1905.2	53.2681	14.6848
1906.4	40.1211	13.5370		1906.4	53.2580	14.6097
1907.6	40.1214	13.5321		1907.6	53.1837	14.7265
1908.8	40.1216	13.5273		1908.8	53.2680	14.6619
1910.0	40.1219	13.5224		1910.0	53.2945	14.6256

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



Probe and dipole antenna List and Detail

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
APREL	Probe	ALS-E-020	500-00283	2013-10-08	2014-10-07
APREL	Dipole antenna(850MHz)	ALS-D-835-S-2	180-00558	2011-08-25	2014-08-24
APREL	Dipole antenna(1900MHz)	ALS-D-1900-S-2	210-00710	2011-08-25	2014-08-24

System Accuracy Check Results

Date	Frequency Band	Liquid Type	Measured SAR (W/Kg)		Target Value (W/Kg)	Delta (%)	Tolerance (%)
2014-2-15	835	Head	1g	9.639	9.590	0.511	±10
		Body	1g	10.023	9.684	3.501	±10
	1900	Head	1g	40.698	39.648	2.648	±10
		Body	1g	40.158	39.769	0.978	±10

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

SAR SYSTEM VALIDATION DATA

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

System Performance Check 835 MHz Head Liquid

Dipole 835 MHz; Type: ALS-D-835-S-2; S/N: 180-00558

Product Data
Device Name : Dipole 835 MHz
Serial No. : 180-00558
Type : Dipole
Model : ALS-D-835-S-2
Frequency Band : 835
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 10.118 W/kg
Power Drift-Finish : 10.119 W/kg
Power Drift (%) : 0.015

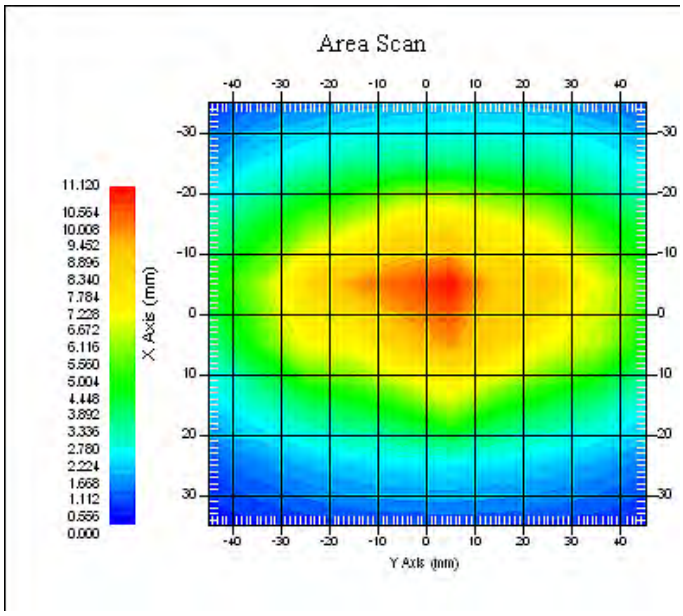
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Serial No. : System Default
Location : Center
Description : Default
Phantom Data

Tissue Data
Type : Head
Serial No. : 270-01002
Frequency : 835.0 MHz
Last Calib. Date : 15-Feb-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 41.27 F/m
Sigma : 0.91 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 08-Oct-2013
Frequency Band : 835
Duty Cycle Factor : 1
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

Measurement Data
Crest Factor : 1
Scan Type : Complete
Tissue Temp. : 21.00 °C
Ambient Temp. : 21.00 °C
Area Scan : 7x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm

1 gram SAR value : 9.639 W/kg
10 gram SAR value : 6.569 W/kg
Area Scan Peak SAR : 10.943 W/kg
Zoom Scan Peak SAR : 15.983 W/kg



835 MHz System Validation with Head Tissue

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

System Performance Check 835 MHz Body Liquid

Dipole 835 MHz; Type: ALS-D-835-S-2; S/N: 180-00558

Product Data
Device Name : Dipole 835 MHz
Serial No. : 180-00558
Type : Dipole
Model : ALS-D-835-S-2
Frequency Band : 835
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 11.134 W/kg
Power Drift-Finish : 11.135 W/kg
Power Drift (%) : 0.083

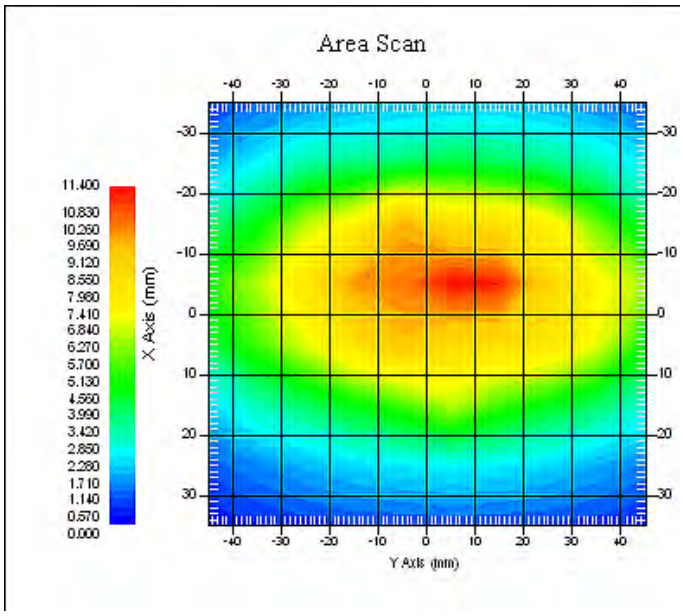
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Serial No. : System Default
Location : Center
Description : Default
Phantom Data

Tissue Data
Type : Body
Serial No. : 270-02101
Frequency : 835.0 MHz
Last Calib. Date : 15-Feb-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 55.12 F/m
Sigma : 0.96 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 08-Oct-2013
Frequency Band : 835
Duty Cycle Factor : 1
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

Measurement Data
Crest Factor : 1
Scan Type : Complete
Tissue Temp. : 21.00 °C
Ambient Temp. : 21.00 °C
Area Scan : 7x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm

1 gram SAR value : 10.023 W/kg
10 gram SAR value : 6.511 W/kg
Area Scan Peak SAR : 10.947 W/kg
Zoom Scan Peak SAR : 16.664 W/kg



835 MHz System Validation with Body Tissue

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

System Performance Check 1900 MHz Head Liquid

Dipole 1900 MHz; Type: ALS-D-1900-S-2; S/N: 210-00710

Product Data
Device Name : Dipole 1900MHz
Serial No. : 210-00710
Type : Dipole
Model : ALS-D-1900-S-2
Frequency Band : 1900
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 33.688 W/kg
Power Drift-Finish : 33.698 W/kg
Power Drift (%) : 0.551

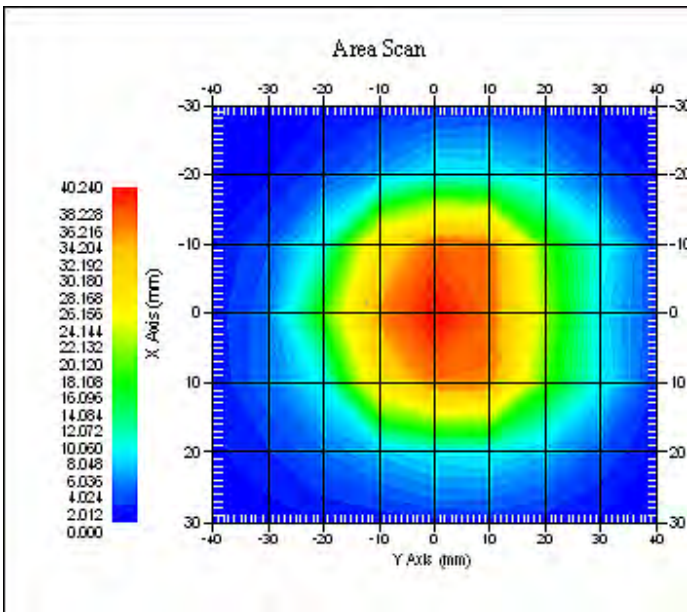
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Serial No. : System Default
Location : Center
Description : Default

Tissue Data
Type : Head
Serial No. : 295-01103
Frequency : 1900.00 MHz
Last Calib. Date : 15-Feb-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 40.12 F/m
Sigma : 1.42 S/m
Density : 1000.00 kg/cu. M

Probe Data
Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 08-Oct-2013
Frequency Band : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.8
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

Measurement Data
Crest Factor : 1
Scan Type : Complete
Tissue Temp. : 20.00 °C
Ambient Temp. : 20.00 °C
Area Scan : 7x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm

1 gram SAR value : 40.698 W/kg
10 gram SAR value : 21.159 W/kg
Area Scan Peak SAR : 42.127 W/kg
Zoom Scan Peak SAR : 90.007 W/kg



1900 MHz System Validation with Head Tissue

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

System Performance Check 1900 MHz Body Liquid

Dipole 1900 MHz; Type: ALS-D-1900-S-2; S/N: 210-00710

Product Data
Device Name : Dipole 1900MHz
Serial No. : 210-00710
Type : Dipole
Model : ALS-D-1900-S-2
Frequency Band : 1900
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 33.865 W/kg
Power Drift-Finish : 33.702 W/kg
Power Drift (%) : -0.529

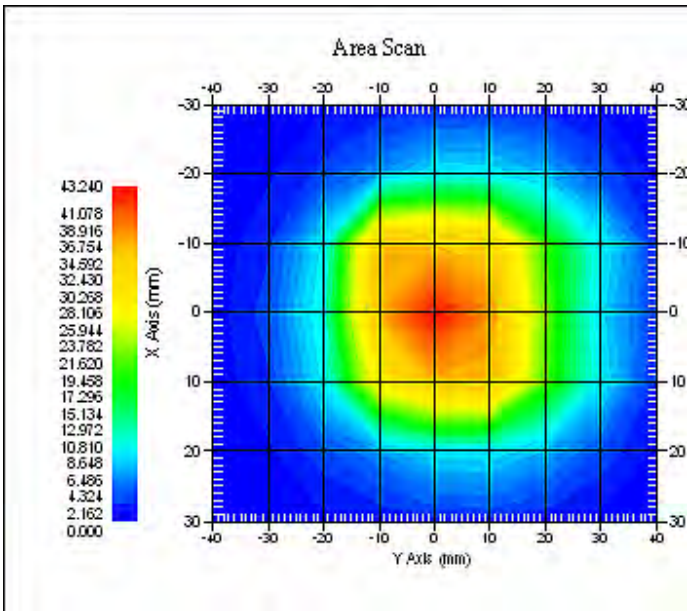
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Serial No. : System Default
Location : Center
Description : Default

Tissue Data
Type : Body
Serial No. : 295-02102
Frequency : 1900.00 MHz
Last Calib. Date : 15-Feb-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 08-Oct-2012
Frequency Band : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

Measurement Data
Crest Factor : 1
Scan Type : Complete
Tissue Temp. : 20.00 °C
Ambient Temp. : 21.00 °C
Area Scan : 7x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm

1 gram SAR value : 40.158 W/kg
10 gram SAR value : 21.301 W/kg
Area Scan Peak SAR : 42.523 W/kg
Zoom Scan Peak SAR : 90.088 W/kg



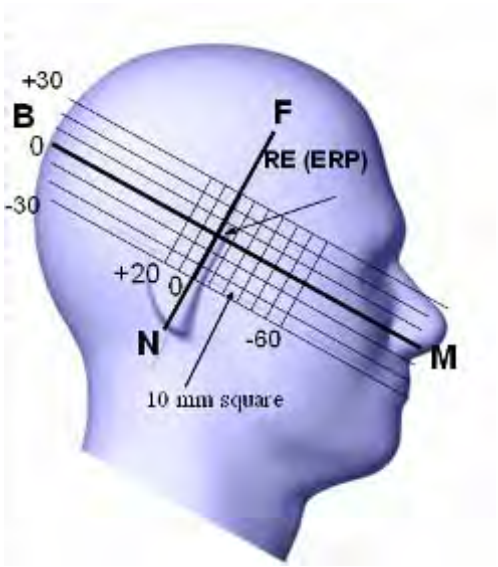
1900 MHz System Validation with Body Tissue

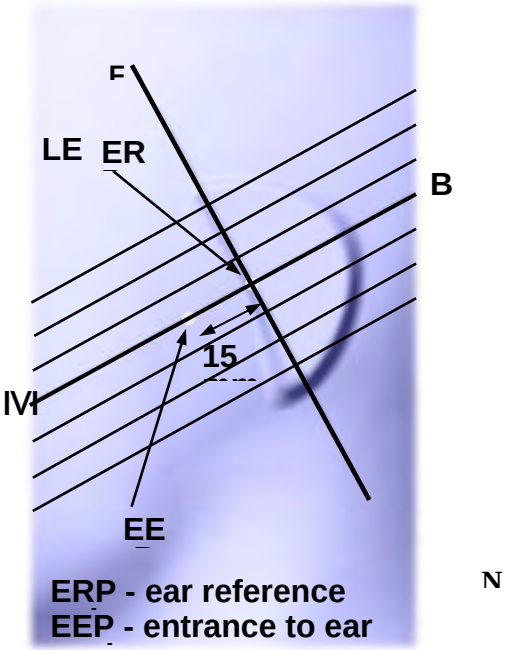
EUT TEST STRATEGY AND METHODOLOGY

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

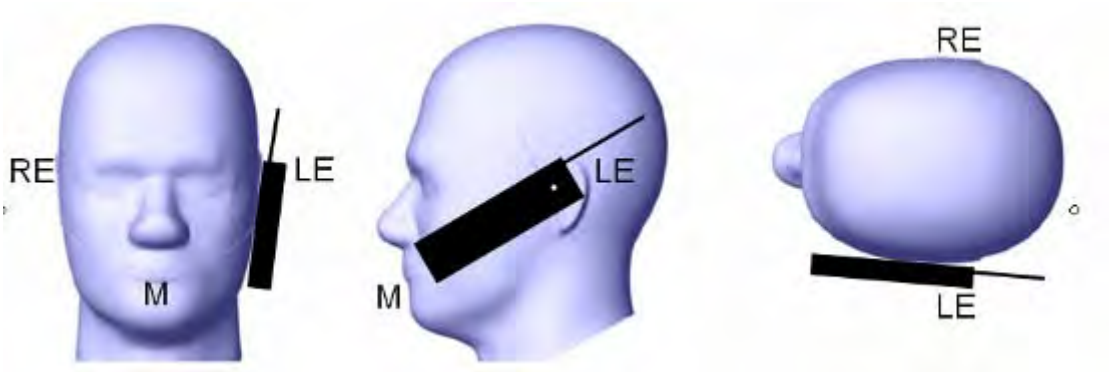
The device is brought toward the mouth of the head phantom by pivoting against the "ear reference point" or along the "N-F" line for the SCC-34/SC-2 head phantom.

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

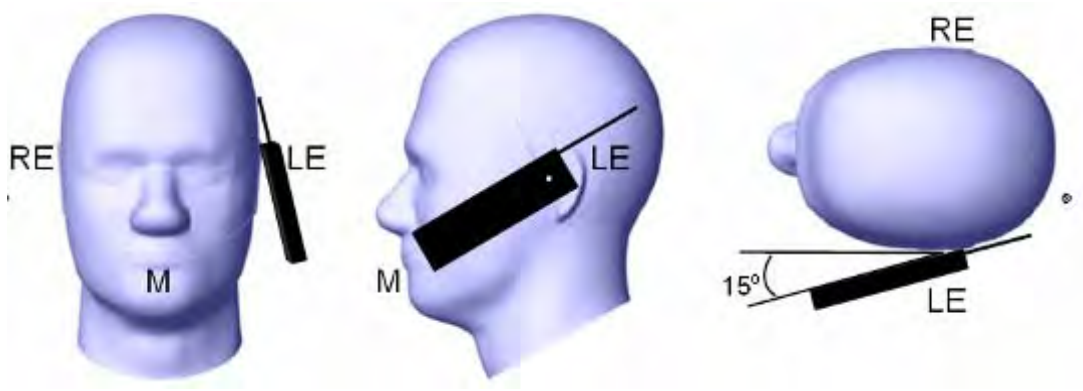
With the handset aligned in the "Cheek/Touch Position":

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, Tile/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.

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.

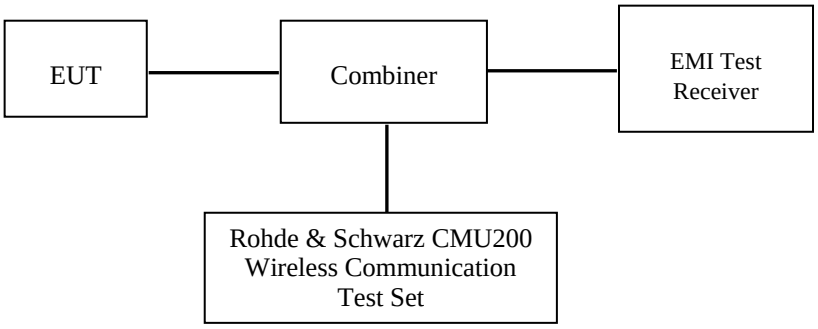
CONDUCTED OUTPUT POWER MEASUREMENT

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&3G

Maximum Output Power among production units

Max Target Power for Production Unit (dBm)			
Mode/Band	Channel		
	Low	Middle	High
GSM 850	32.00	32.00	32.00
GPRS 1 slot	32.00	32.00	32.00
GPRS 2 slot	32.00	32.00	32.00
GPRS 3 slot	30.50	30.50	30.50
GPRS 4 slot	29.00	29.00	29.00
EGPRS 1 slot	26.00	26.00	26.00
EGPRS 2 slot	24.50	24.50	24.50
EGPRS 3 slot	22.00	22.00	22.00
EGPRS 4 slot	21.00	21.00	21.00
PCS 1900	28.50	28.50	28.50
GPRS 1 slot	28.50	28.50	28.50
GPRS 2 slot	28.00	28.00	28.00
GPRS 3 slot	26.50	26.50	26.50
GPRS 4 slot	25.50	25.50	25.50
EGPRS 1 slot	25.00	25.00	25.00
EGPRS 2 slot	23.50	23.50	23.50
EGPRS 3 slot	21.00	21.00	21.00
EGPRS 4 slot	19.50	19.50	19.50
WCDMA1900	23.00	23.00	23.00
WiFi	10.00	10.00	10.00
Bluetooth	5.00	5.00	5.00

Test Results:

GSM

Band	**Frequency (MHz)**	**Conducted Peak Output Power**	
		Meas. Power (dBm)	**Meas. Power (W)**
GSM 850	824.2	31.98	2.070
	836.6	31.97	2.018
	848.8	31.95	2.032
PCS 1900	1850.2	28.35	1.276
	1880.0	28.46	1.291
	1909.8	28.40	1.265

GPRS

Band	Channel No.	Frequency (MHz)	RF Peak Output Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	31.99	31.64	30.16	28.99
	190	836.6	31.98	31.64	30.17	28.99
	251	848.8	31.96	31.61	30.13	28.99
PCS 1900	512	1850.2	28.37	27.85	26.37	25.34
	661	1880.0	28.49	27.98	26.45	25.49
	810	1909.8	28.44	27.94	26.41	25.47

EGPRS

Band	Channel No.	Frequency (MHz)	RF Peak Output Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	25.65	24.13	21.77	20.57
	190	836.6	25.57	24.04	21.67	20.44
	251	848.8	25.44	23.94	21.49	20.33
PCS 1900	512	1850.2	24.65	23.19	20.93	19.46
	661	1880.0	24.45	23.00	20.66	19.30
	810	1909.8	24.02	22.59	20.22	18.92

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	22.99	25.64	25.91	25.99
	190	836.6	22.98	25.64	25.92	25.99
	251	848.8	22.96	25.61	25.88	25.99
PCS 1900	512	1850.2	19.37	21.85	22.12	22.34
	661	1880.0	19.49	21.98	22.20	22.49
	810	1909.8	19.44	21.94	22.16	22.47

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	16.65	18.13	17.52	17.57
	190	836.6	16.57	18.04	17.42	17.44
	251	848.8	16.44	17.94	17.24	17.33
PCS 1900	512	1850.2	15.65	17.19	16.68	16.46
	661	1880.0	15.45	17.00	16.41	16.30
	810	1909.8	15.02	16.59	15.97	15.92

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 timeslots has been activated separately with power level 5(850 MHz band) and 0(1900 MHz band).
4. For E-GRPS, 1, 2, 3 and 4 timeslots has been activated separately with power control level 8(850 MHz band) and 2(1900 MHz band).
5. KDB941225 D03-The max average output power of the EGPRS mode is lower than in the normal GSM voice mode, the SAR of EGPRS mode is not required.

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

Results (12.2kbps RMC)

Band	Frequency (MHz)	Channel NO.	Conducted Output Power	
			(dBm)	(Watt)
WCDMA 1900	1852.4	9262	22.80	0.191
	1880.0	9400	**22.83**	0.192
	1907.6	9538	22.58	0.181

WCDMA 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	D_{ACK}	8			
	D_{NAK}	8			
	D_{CQI}	8			
	Ack-Nack repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs= βhs/βc	30/15			

Results (HSDPA)

Band	Frequency (MHz)	Channel NO.	Conducted Output Power (dBm)			
			Subset 1	Subset 2	Subset 3	Subset 4
WCDMA 1900	1852.4	9262	21.75	21.75	21.65	21.56
	1880.0	9400	21.58	21.56	20.58	20.53
	1907.6	9538	21.62	21.68	21.62	21.61

WCDMA 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_FCls	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	

Results (HSUPA)

Band	Frequency (MHz)	Channel NO.	Conducted Output Power (dBm)				
			Subset 1	Subset 2	Subset 3	Subset 4	Subset 5
WCDMA 1900	1852.4	9262	21.74	21.71	21.66	21.68	21.72
	1880.0	9400	21.62	21.48	21.51	21.46	21.43
	1907.6	9538	21.57	21.56	21.69	21.64	22.49

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 when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than measured without HSDPA using 12.2kbps RMC or the maximum SAR for 12.2kbps RMC is < 75% of SAR limit.
3. KDB 941225 D01-Body SAR is not required for HSUPA when the maximum average output of each RF channel with HSUPA active is less than ¼ dB higher than measured without HSUPA using 12.2kbps RMC and the maximum SAR for 12.2kbps RMC is < 75% of SAR limit.
4. KDB447498-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.

Bluetooth

Mode	Channel frequency (MHz)	Reading power (dBm)	Power output (mw)	Limit (mw)
BDR(GFSK)	(Low)2402	3.79	2.393	1000
	(Middle)2441	4.62	2.897	1000
	(High)2480	4.56	2.858	1000
EDR(4-DQPSK)	(Low)2402	3.79	2.393	1000
	(Middle)2441	4.41	2.761	1000
	(High)2480	4.56	2.858	1000
EDR-8DPSK	(Low)2402	4.00	2.512	1000
	(Middle)2441	4.41	2.761	1000
	(High)2480	4.85	3.055	1000
BLE	(Low)2402	-2.69	0.538	1000
	(Middle)2440	-2.45	0.569	1000
	(High)2480	-2.71	0.536	1000

WiFi

Band	Frequency (MHz)	Conducted Output Power	
		(dBm)	(mw)
802.11b	2412	8.39	6.902
	2437	8.49	7.063
	2462	8.63	7.295
802.11g	2412	9.29	8.492
	2437	9.67	9.268
	2462	9.88	9.727
802.11n-HT20	2412	9.38	8.670
	2437	9.59	9.099
	2462	9.76	9.462
802.11n-HT40	2422	9.11	8.147
	2437	9.28	8.472
	2452	9.50	8.913

Note:

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

SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

SAR Test Data

Environmental Conditions

Temperature:	21-24 ℃
Relative Humidity:	50-53 %
ATM Pressure:	1001-1002 mbar

Testing was performed by Wilson Chen from 2014-2-13 to 2013-2-14.

GSM 850:

EUT Position	Frequency (MHz)		Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)		
	Channel	MHz					Scaled Factor	Meas. SAR	Scaled SAR
Left Head Cheek	128(Low)	824.2	GSM	-0.730	31.98	32.00	1.005	0.514	0.516
	190(Middle)	836.6	GSM	0.709	31.97	32.00	1.007	0.544	0.548
	251(High)	848.8	GSM	1.038	31.95	32.00	1.012	0.638	**0.645**
Left Head Tilt	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	1.828	31.97	32.00	1.007	0.415	0.418
	251(High)	848.8	GSM	/	/	/	/	/	/
Right Head Cheek	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	-1.573	31.97	32.00	1.007	0.518	0.522
	251(High)	848.8	GSM	/	/	/	/	/	/
Right Head Tilt	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	-0.625	31.97	32.00	1.007	0.428	0.431
	251(High)	848.8	GSM	/	/	/	/	/	/
Body-Front-Headset (10mm)	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	0.520	31.97	32.00	1.007	0.509	0.513
	251(High)	848.8	GSM	/	/	/	/	/	/
Body-Back-Headset (10mm)	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	1.916	31.97	32.00	1.007	0.703	0.708
	251(High)	848.8	GSM	/	/	/	/	/	/

PCS 1900:

EUT Position	Frequency (MHz)		Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)		
	Channel	MHz					Scaled Factor	Meas. SAR	Scaled SAR
Left Head Cheek	512(Low)	1850.2	GSM	1.711	28.35	28.50	1.035	0.328	**0.340**
	661(Middle)	1880.0	GSM	-0.498	28.46	28.50	1.009	0.143	0.144
	810(High)	1909.8	GSM	-1.156	28.40	28.50	1.023	0.119	0.122
Left Head Tilt	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	-2.431	28.46	28.50	1.009	0.077	0.078
	810(High)	1909.8	GSM	/	/	/	/	/	/
Right Head Cheek	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	-0.368	28.46	28.50	1.009	0.138	0.139
	810(High)	1909.8	GSM	/	/	/	/	/	/
Right Head Tilt	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	1.569	28.46	28.50	1.009	0.072	0.073
	810(High)	1909.8	GSM	/	/	/	/	/	/
Body-Front-Headset (10mm)	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	-1.161	28.46	28.50	1.009	0.243	0.245
	810(High)	1909.8	GSM	/	/	/	/	/	/
Body-Back-Headset (10mm)	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	2.827	28.46	28.50	1.009	0.282	0.285
	810(High)	1909.8	GSM	/	/	/	/	/	/

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.

WCDMA1900

EUT Position	Frequency (MHz)		Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)		
	Channel	MHz					Scaled Factor	Meas. SAR	Scaled SAR
Left Head Cheek	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	-0.822	22.83	23.00	1.040	0.205	0.213
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Left Head Tilt	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	-0.868	22.83	23.00	1.040	0.201	0.209
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Right Head Cheek	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	-1.753	22.83	23.00	1.040	0.202	0.210
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Right Head Tilt	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	2.618	22.83	23.00	1.040	0.178	0.185
	9538	1907.6	WCDMA1900	/	/	/	/	/	/

Note:
1. When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. 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.
3. KDB 941225 D01-Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than measured without HSDPA using 12.2kbps RMC or the maximum SAR for 12.2kbps RMC is < 75% of SAR limit.
4. KDB 941225 D01-Body SAR is not required for HSUPA when the maximum average output of each RF channel with HSUPA active is less than ¼ dB higher than measured without HSUPA using 12.2kbps RMC and 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.
6. KDB447498-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.

Mobile Hot-Spot Test Result

The DUT is capable of functioning as a WiFi to Cellular Mobile hotspot. Additional SAR testing was performed according to KDB 941225 D06. Testing was performed with a separation of 1cm between the DUT and the flat phantom. The DUT was positioned for SAR tests with the front and back surfaces facing the phantom, and also with the edges facing the phantom in which the transmitting antenna is <2.5 cm from 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.

Hot spot-GPRS (Frequency Band: 835)

EUT Position	Frequency (MHz)		Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)		
	Channel	MHz					Scaled Factor	Meas. SAR	Scaled SAR
Body-Front (10mm)	128(Low)	824.2	GPRS	1.561	28.99	29.00	1.002	1.015	1.017
	190(Middle)	836.6	GPRS	-0.957	28.99	29.00	1.002	1.028	1.030
	251(High)	848.8	GPRS	-1.869	28.99	29.00	1.002	1.021	1.023
Body-Back (10mm)	128(Low)	824.2	GPRS	1.400	28.99	29.00	1.002	1.164	**1.166**
	190(Middle)	836.6	GPRS	2.096	28.99	29.00	1.002	1.148	1.150
	251(High)	848.8	GPRS	-2.102	28.99	29.00	1.002	1.119	1.121
Body-Left (10mm)	128(Low)	824.2	GPRS	/	/	/	/	/	/
	190(Middle)	836.6	GPRS	-0.454	28.99	29.00	1.002	0.615	0.616
	251(High)	848.8	GPRS	/	/	/	/	/	/
Body-Right (10mm)	128(Low)	824.2	GPRS	/	/	/	/	/	/
	190(Middle)	836.6	GPRS	-1.355	28.99	29.00	1.002	0.512	0.513
	251(High)	848.8	GPRS	/	/	/	/	/	/
Body-Bottom (10mm)	128(Low)	824.2	GPRS	/	/	/	/	/	/
	190(Middle)	836.6	GPRS	-0.142	28.99	29.00	1.002	0.040	0.040
	251(High)	848.8	GPRS	/	/	/	/	/	/

Note:
1 .When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. The EUT is a Capability Class B mobile phone which can be attached to both GPRS and GSM services.
3.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.
4. The EUT transmit and receive through the same GSM antenna while testing SAR.
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.

Hot spot-GPRS (Frequency Band: 1900)

EUT Position	Frequency (MHz)		Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)		
	Channel	MHz					Scaled Factor	Meas. SAR	Scaled SAR
Body-Front (10mm)	512(Low)	1850.2	GPRS	/	/	/	/	/	/
	661(Middle)	1880.0	GPRS	-1.758	25.49	25.50	1.002	0.583	0.584
	810(High)	1909.8	GPRS	/	/	/	/	/	/
Body-Back (10mm)	512(Low)	1850.2	GPRS	/	/	/	/	/	/
	661(Middle)	1880.0	GPRS	-1.219	25.49	25.50	1.002	0.754	**0.756**
	810(High)	1909.8	GPRS	/	/	/	/	/	/
Body-Left (10mm)	512(Low)	1850.2	GPRS	/	/	/	/	/	/
	661(Middle)	1880.0	GPRS	1.769	25.49	25.50	1.002	0.180	0.180
	810(High)	1909.8	GPRS	/	/	/	/	/	/
Body-Right (10mm)	512(Low)	1850.2	GPRS	/	/	/	/	/	/
	661(Middle)	1880.0	GPRS	2.592	25.49	25.50	1.002	0.019	0.019
	810(High)	1909.8	GPRS	/	/	/	/	/	/
Body-Bottom (10mm)	512(Low)	1850.2	GPRS	/	/	/	/	/	/
	661(Middle)	1880.0	GPRS	1.260	25.49	25.50	1.002	0.672	0.674
	810(High)	1909.8	GPRS	/	/	/	/	/	/

Note:
1 .When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. The EUT is a Capability Class B mobile phone which can be attached to both GPRS and GSM services.
3. The Multi-slot Classes of EUT is Class12 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.
4. The EUT transmit and receive through the same GSM antenna while testing SAR.
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.

Hot Spot-WCDMA1900

EUT Position	Frequency (MHz)		Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)		
	Channel	MHz					Scaled Factor	Meas. SAR	Scaled SAR
Body-Front (10mm)	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	-1.348	22.83	23.00	1.040	0.595	0.619
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Body-Back (10mm)	9262	1852.4	WCDMA1900	-2.201	22.80	23.00	1.047	1.075	**1.126**
	9400	1880.0	WCDMA1900	0.948	22.83	23.00	1.040	0.828	0.861
	9538	1907.6	WCDMA1900	-1.031	22.58	23.00	1.102	0.888	0.979
Body-Left (10mm)	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	-1.395	22.83	23.00	1.040	0.152	0.158
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Body-Right (10mm)	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	1.347	22.83	23.00	1.040	0.012	0.012
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Body-Bottom (10mm)	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	-1.403	22.83	23.00	1.040	0.386	0.401
	9538	1907.6	WCDMA1900	/	/	/	/	/	/

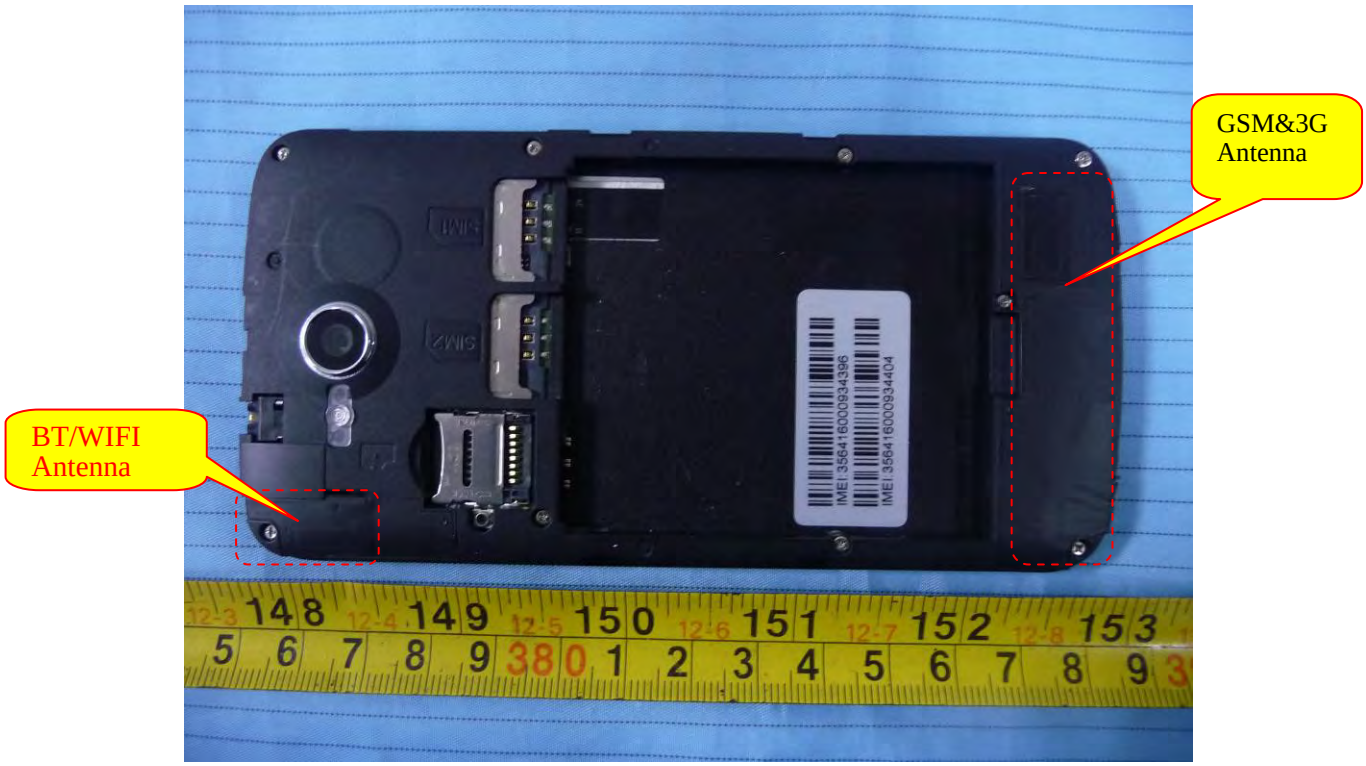
Note:
1. When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement Channel) Configured in Test Loop Model.
3. KDB 941225 D01-Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than measured without HSDPA using 12.2kbps RMC or the maximum SAR for 12.2kbps RMC is < 75% of SAR limit.
4. KDB 941225 D01-Body SAR is not required for HSUPA when the maximum average output of each RF channel with HSUPA active is less than ¼ dB higher than measured without HSUPA using 12.2kbps RMC and the maximum SAR for 12.2kbps RMC is < 75% of SAR limit.
5. KDB447498-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.

SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

KDB 447498D01 General RF Exposure Guidance v05

Stand-alone and simultaneous SAR evaluation for a cell phone with multiple transmitters is base on the antennas distance of each radio.

BT, WiFi, GSM and 3G Antenna Location:



Antenna Information:

Description of Simultaneous Transmit Capabilities			Antennas Distance (mm)
Transmitter Combination	Simultaneous?	Hotspot?	
GSM + GPRS	×	×	0
GSM + WCDMA	×	×	0
GSM + Bluetooth	√	×	82
GSM + WiFi	√	√	82
GPRS + WCDMA	×	×	0
GPRS + Bluetooth	√	×	82
GPRS + WiFi	√	√	82
WCDMA + Bluetooth	√	×	82
WCDMA + WiFI	√	√	82

Standalone SAR test exclusion considerations

Head Position:

Mode	Frequency (MHz)	P_{avg} (dBm)	P_{avg} (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
GSM850	850	22.98	198.609	0	36.6	3.0	No
PCS1900	1900	19.46	88.308	0	24.3	3.0	No
WCDMSA1900	1900	22.83	191.867	0	52.9	3.0	No
Bluetooth	2450	4.85	3.055	0	1.0	3.0	Yes
WiFi	2450	9.88	9.727	0	3.0	3.0	Yes

Body Position:

Mode	Frequency (MHz)	P_{avg} (dBm)	P_{avg} (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
GSM850	850	25.99	397.192	10	36.6	3.0	No
PCS1900	1900	22.49	177.419	10	24.5	3.0	No
WCDMSA1900	1900	22.83	191.867	10	26.4	3.0	No
Bluetooth	2450	4.85	3.055	10	0.5	3.0	Yes
WiFi	2450	9.88	9.727	10	1.5	3.0	Yes

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.

Simultaneous SAR test exclusion considerations:

GSM with BT:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		GSM	BT	< 1.6W/kg
GSM850	Left Head Cheek	0.645	0.132	0.777
	Left Head Tile	0.418	0.132	0.550
	Right Head Cheek	0.522	0.132	0.654
	Right Head Tilt	0.431	0.132	0.563
	Body–Headset-Front	0.513	0.066	0.579
	Body–Headset-Back	0.708	0.066	0.774
PCS1900	Left Head Cheek	0.340	0.132	0.472
	Left Head Tile	0.078	0.132	0.210
	Right Head Cheek	0.139	0.132	0.271
	Right Head Tilt	0.073	0.132	0.205
	Body–Headset-Front	0.245	0.066	0.311
	Body–Headset-Back	0.285	0.066	0.351

WCDMA with BT:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		WCDMA	BT	< 1.6W/kg
WCDMA 1900	Left Head Cheek	0.213	0.132	0.345
	Left Head Tile	0.209	0.132	0.341
	Right Head Cheek	0.210	0.132	0.342
	Right Head Tilt	0.185	0.132	0.317
	Body–Headset-Front	0.619	0.066	0.685
	Body–Headset-Back	1.126	0.066	1.192

GSM with WiFi:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		GSM	WiFi	< 1.6W/kg
GSM850	Left Head Cheek	0.645	0.417	**1.062**
	Left Head Tile	0.418	0.417	0.835
	Right Head Cheek	0.522	0.417	0.939
	Right Head Tilt	0.431	0.417	0.848
	Body–Headset-Front	0.513	0.209	0.722
	Body–Headset-Back	0.708	0.209	0.917
PCS1900	Left Head Cheek	0.340	0.417	0.757
	Left Head Tile	0.078	0.417	0.495
	Right Head Cheek	0.139	0.417	0.556
	Right Head Tilt	0.073	0.417	0.49
	Body–Headset-Front	0.245	0.209	0.454
	Body–Headset-Back	0.285	0.209	0.494

WCDMA with WiFi:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		WCDMA	WiFi	< 1.6W/kg
WCDMA 1900	Left Head Cheek	0.213	0.417	0.630
	Left Head Tile	0.209	0.417	0.626
	Right Head Cheek	0.210	0.417	0.627
	Right Head Tilt	0.185	0.417	0.602
	Body–Headset-Front	0.619	0.209	0.828
	Body–Headset-Back	1.126	0.209	1.335

Mode	Frequency (GHz)	Distance (mm)	P_{avg} (dBm)	P_{avg} (mW)	Estimated $_{1-g}$ (W/kg)
Bluetooth Head	2.45	0	5.00	3.162	0.132
Bluetooth Body	2.45	10	5.00	3.162	0.066
WiFi Head	2.45	0	10.0	10.000	0.417
WiFi Body	2.45	10	10.0	10.000	0.209

Note:
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

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

Hotspot:

Evaluations for Simultaneous SAR, Mobile Hot Spot Positions						
Test Position	Body-Front (1.0cm)	Body-Back (1.0cm)	Body-Left (1.0cm)	Body-Right (1.0cm)	Body-Bottom (1.0cm)	Body-Top (1.0cm)
Mode	Stand Alone 1-g SAR (W/Kg)					
GSM 850	1.030	1.166	0.616	0.513	0.040	/
PCS 1900	0.584	0.756	0.180	0.019	0.674	/
WCDMA 1900	0.619	1.126	0.158	0.012	0.401	/
WiFi	0.209	0.209	/	0.209	/	/
	∑ 1-g SAR(W/Kg)					
GSM850 + WiFi	1.239	**1.375**	/	0.722	/	/
PCS 1900 + WiFi	0.793	0.965	/	0.228	/	/
WCDMA 1900 + WiFi	0.828	1.335	/	0.221	/	/

Note:
If the sum of the 1g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR measurement for simultaneous transmission is not required.

EUT SCAN RESULTS

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Left Head Cheek (824.2 MHz Low Channel)

Measurement Data

Test mode	: GSM
Crest Factor	: 8
Scan Type	: Complete
Area Scan	: 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan	: 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start	: 0.005 W/kg
Power Drift-Finish	: 0.005 W/kg
Power Drift (%)	: -0.730

Tissue Data

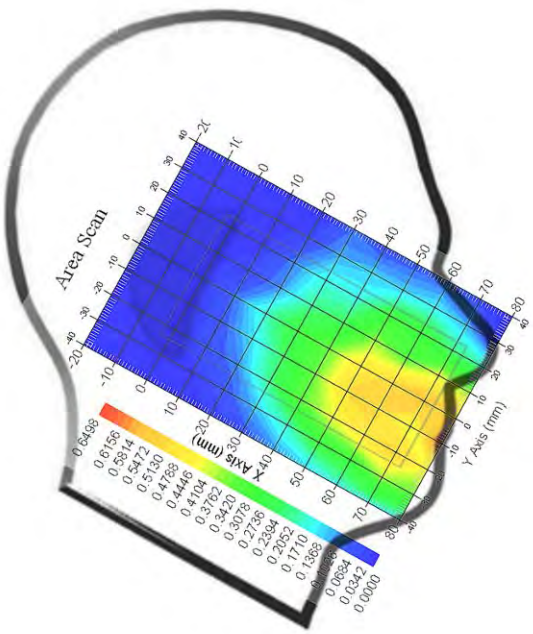
Type	: Head
Frequency	: 824.2 MHz
Epsilon	: 41.32 F/m
Sigma	: 0.89 S/m
Density	: 1000.00 kg/cu. m

Probe Data

Serial No.	: 500-00283
Frequency Band	: 835
Duty Cycle Factor	: 8
Conversion Factor	: 5.9
Probe Sensitivity	: 1.20 1.20 1.20 µV/(V/m)2
Compression Point	: 95.00 mV
Offset	: 1.56 mm

1 gram SAR value	: 0.514 W/kg
10 gram SAR value	: 0.378 W/kg
Area Scan Peak SAR	: 0.645 W/kg
Zoom Scan Peak SAR	: 0.640 W/kg

Plot 1#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Left Head Cheek (836.6 MHz Middle Channel)

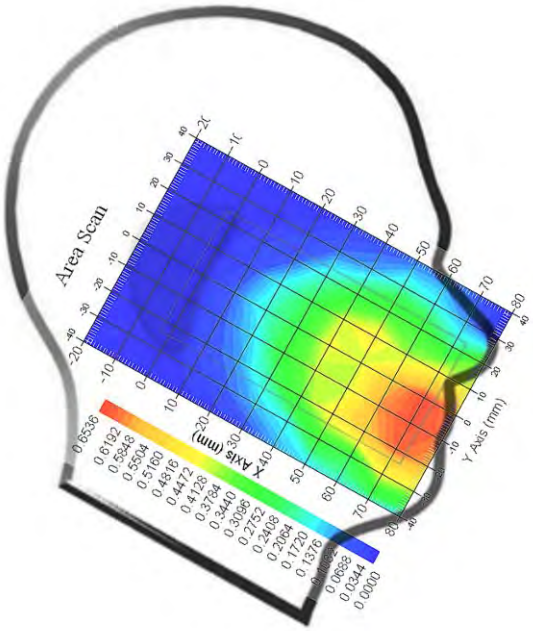
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.019 W/kg
Power Drift-Finish : 0.019 W/kg
Power Drift (%) : 0.709

Tissue Data
Type : Head
Frequency : 836.6 MHz
Epsilon : 41.27 F/m
Sigma : 0.91 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 8
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.544 W/kg
10 gram SAR value : 0.374 W/kg
Area Scan Peak SAR : 0.649 W/kg
Zoom Scan Peak SAR : 0.630 W/kg

Plot 2#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Left Head Cheek (848.8 MHz High Channel)

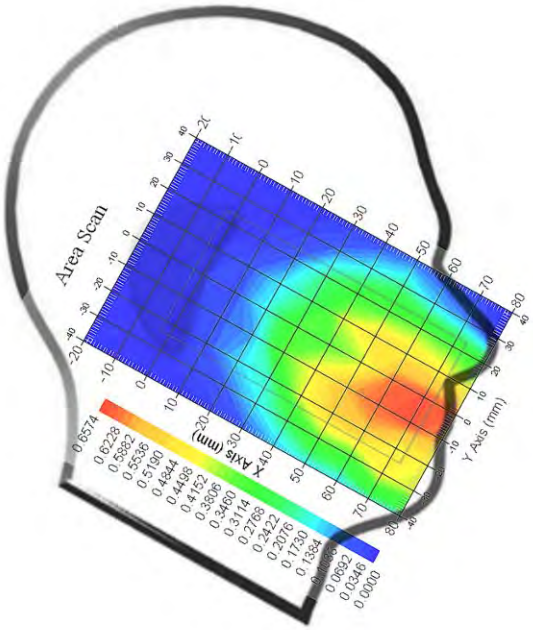
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.011 W/kg
Power Drift-Finish : 0.011 W/kg
Power Drift (%) : 1.038

Tissue Data
Type : Head
Frequency : 848.8 MHz
Epsilon : 41.08 F/m
Sigma : 0.92 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 8
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.638 W/kg
10 gram SAR value : 0.415 W/kg
Area Scan Peak SAR : 0.651 W/kg
Zoom Scan Peak SAR : 0.980 W/kg

Plot 3#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Left Head Tilt (836.6 MHz Middle Channel)

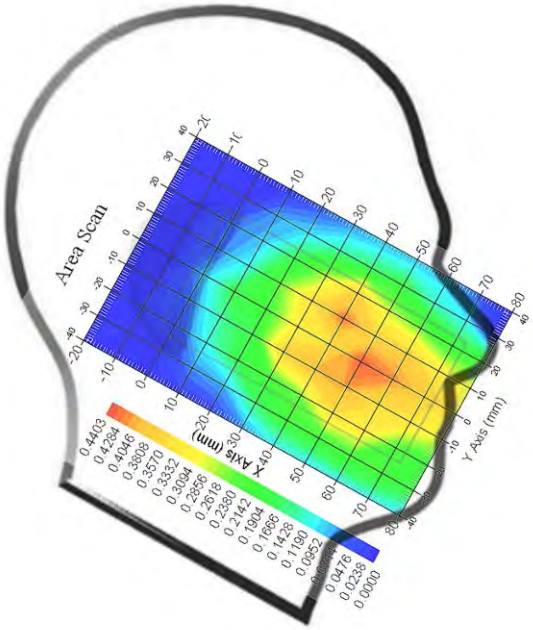
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.058 W/kg
Power Drift-Finish : 0.059 W/kg
Power Drift (%) : 1.828

Tissue Data
Type : Head
Frequency : 836.6 MHz
Epsilon : 41.27 F/m
Sigma : 0.91 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 8
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.415 W/kg
10 gram SAR value : 0.297 W/kg
Area Scan Peak SAR : 0.436 W/kg
Zoom Scan Peak SAR : 0.490 W/kg

Plot 4#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Right Head Cheek (836.6 MHz Middle Channel)

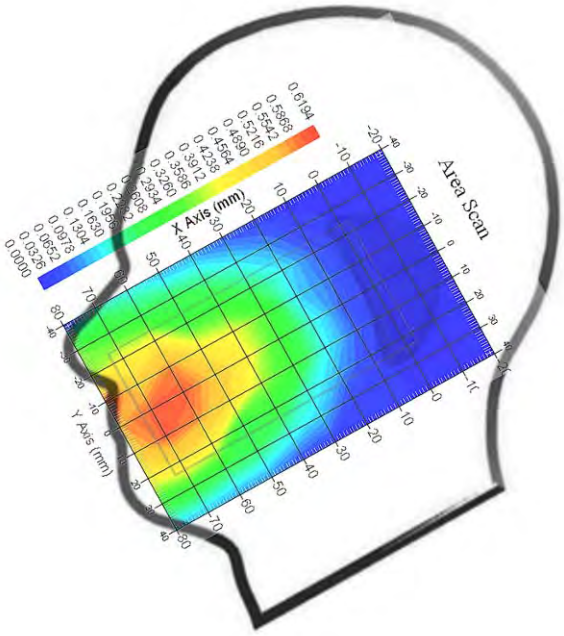
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.029 W/kg
Power Drift-Finish : 0.029 W/kg
Power Drift (%) : -1.573

Tissue Data
Type : Head
Frequency : 836.6 MHz
Epsilon : 41.27 F/m
Sigma : 0.91 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 8
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.518 W/kg
10 gram SAR value : 0.377 W/kg
Area Scan Peak SAR : 0.611 W/kg
Zoom Scan Peak SAR : 0.700 W/kg

Plot 5#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Right Head Tilt (836.6 MHz Middle Channel)

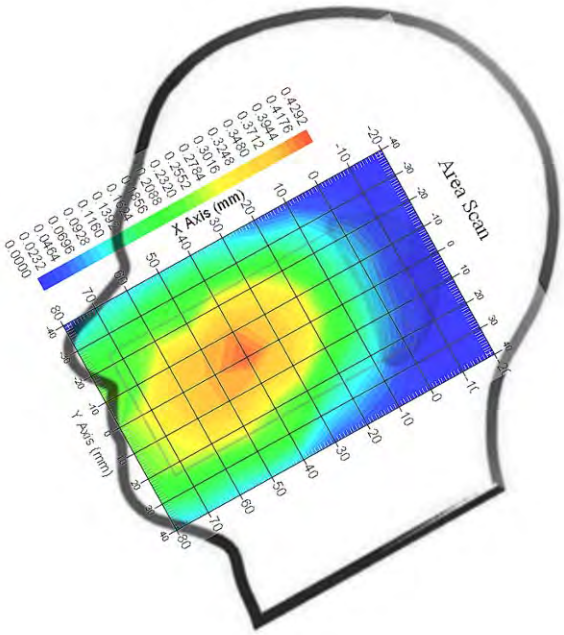
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.043 W/kg
Power Drift-Finish : 0.043 W/kg
Power Drift (%) : -0.625

Tissue Data
Type : Head
Frequency : 836.6 MHz
Epsilon : 41.27 F/m
Sigma : 0.91 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 8
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.428 W/kg
10 gram SAR value : 0.304 W/kg
Area Scan Peak SAR : 0.424 W/kg
Zoom Scan Peak SAR : 0.550 W/kg

Plot 6#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Body-worn Front-Headset (836.6 MHz Middle Channel)

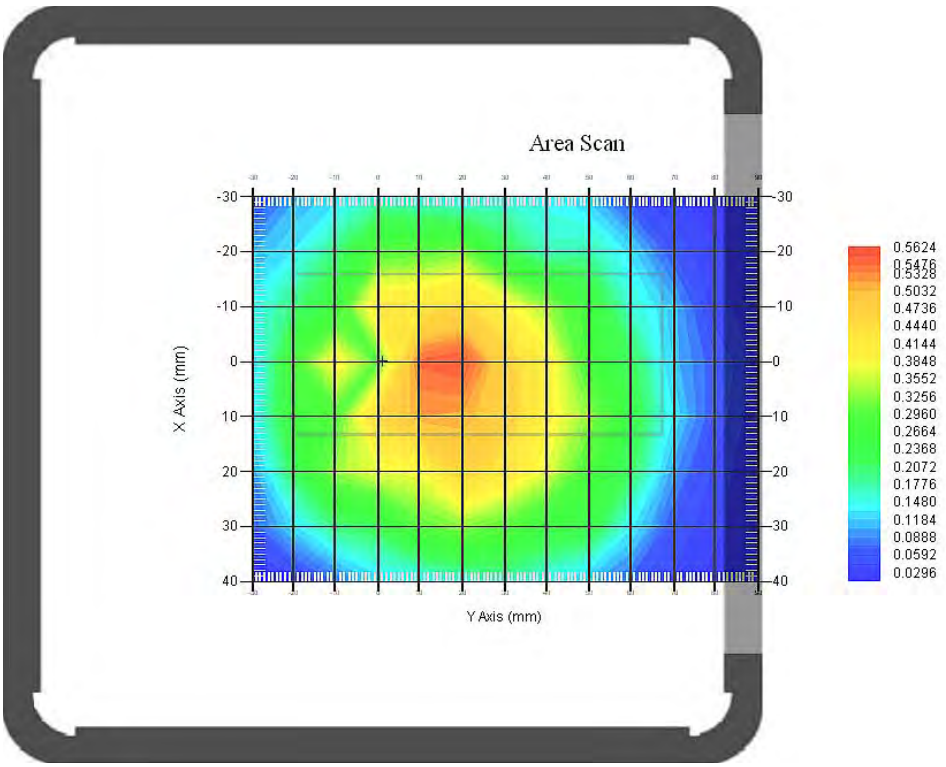
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type： : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.352 W/kg
Power Drift-Finish : 0.355 W/kg
Power Drift (%) : 0.520

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.12 F/m
Sigma : 0.96 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 8
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.509 W/kg
10 gram SAR value : 0.302 W/kg
Area Scan Peak SAR : 0.560 W/kg
Zoom Scan Peak SAR : 0.687 W/kg

Plot 7#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Body-worn Back-Headset (836.6 MHz Middle Channel)

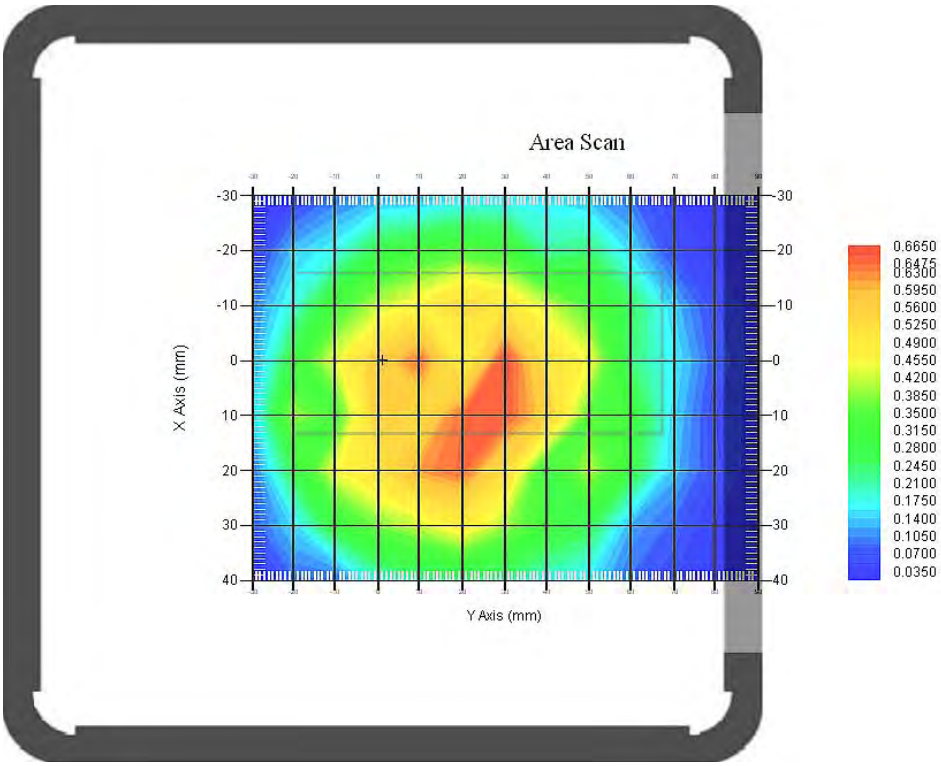
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type： : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.497 W/kg
Power Drift-Finish : 0.503 W/kg
Power Drift (%) : 1.916

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.12 F/m
Sigma : 0.96 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 8
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.703 W/kg
10 gram SAR value : 0.415 W/kg
Area Scan Peak SAR : 0.830 W/kg
Zoom Scan Peak SAR : 0.920 W/kg

Plot 8#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Left Head Cheek (1850.2 MHz Low Channel)

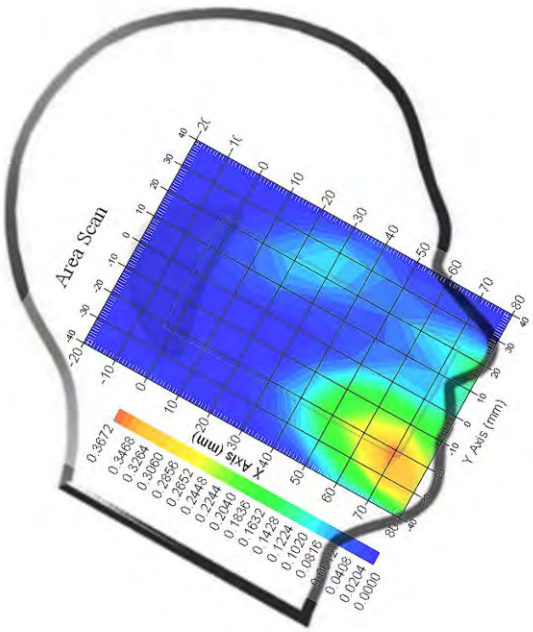
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.005 W/kg
Power Drift-Finish : 0.005 W/kg
Power Drift (%) : 1.711

Tissue Data
Type : Head
Frequency : 1850.2 MHz
Epsilon : 40.11 F/m
Sigma : 1.40 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 8
Conversion Factor : 4.8
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.328 W/kg
10 gram SAR value : 0.184 W/kg
Area Scan Peak SAR : 0.367 W/kg
Zoom Scan Peak SAR : 0.550 W/kg

Plot 9#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Left Head Cheek (1880.0 MHz Middle Channel)

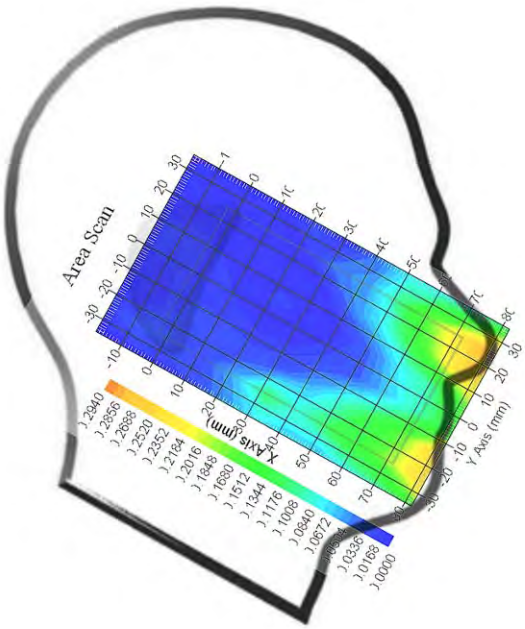
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.001 W/kg
Power Drift-Finish : 0.001 W/kg
Power Drift (%) : -0.498

Tissue Data
Type : Head
Frequency : 1880.0 MHz
Epsilon : 40.12 F/m
Sigma : 1.42 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 8
Conversion Factor : 4.8
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.143 W/kg
10 gram SAR value : 0.079 W/kg
Area Scan Peak SAR : 0.294 W/kg
Zoom Scan Peak SAR : 0.180 W/kg

Plot 10#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Left Head Cheek (1909.8 MHz High Channel)

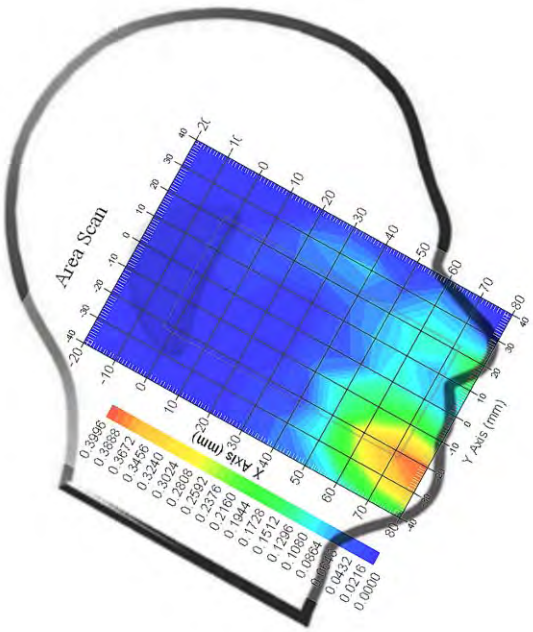
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.008 W/kg
Power Drift-Finish : 0.008 W/kg
Power Drift (%) : -1.156

Tissue Data
Type : Head
Frequency : 1909.8 MHz
Epsilon : 40.12 F/m
Sigma : 1.44 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 8
Conversion Factor : 4.8
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.119 W/kg
10 gram SAR value : 0.058 W/kg
Area Scan Peak SAR : 0.392 W/kg
Zoom Scan Peak SAR : 0.240 W/kg

Plot 11#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Left Head Tilt (1880.0 MHz Middle Channel)

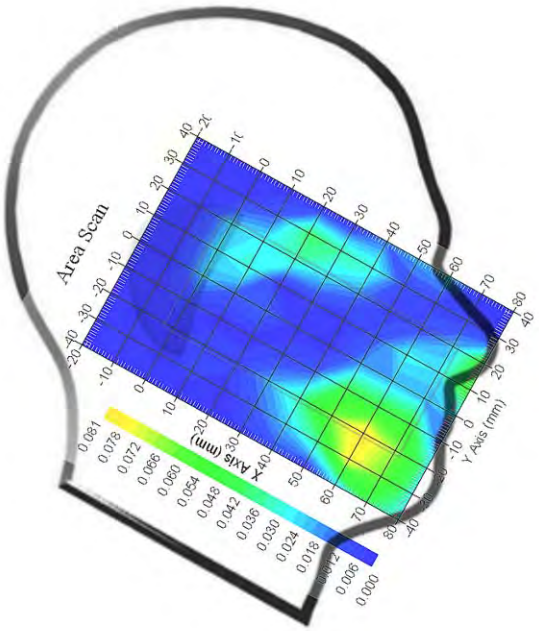
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.004 W/kg
Power Drift-Finish : 0.004 W/kg
Power Drift (%) : -2.431

Tissue Data
Type : Head
Frequency : 1880.0 MHz
Epsilon : 40.12 F/m
Sigma : 1.42 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 8
Conversion Factor : 4.8
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.077 W/kg
10 gram SAR value : 0.036 W/kg
Area Scan Peak SAR : 0.081 W/kg
Zoom Scan Peak SAR : 0.120 W/kg

Plot 12#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Right Head Cheek (1880.0 MHz Middle Channel)

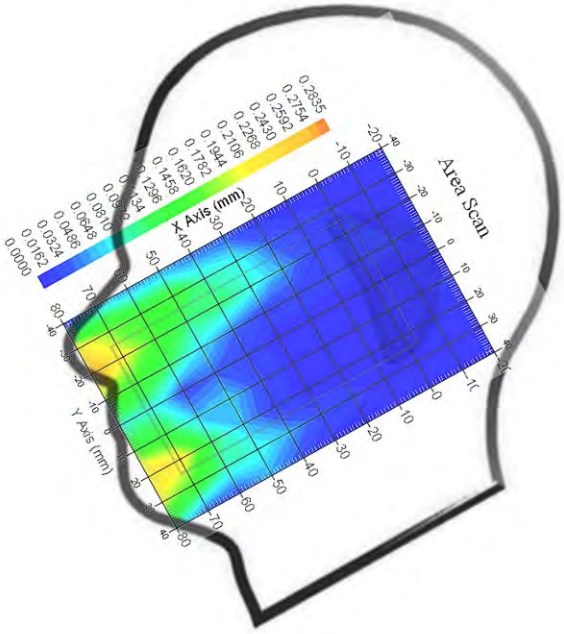
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.003 W/kg
Power Drift-Finish : 0.003 W/kg
Power Drift (%) : -0.368

Tissue Data
Type : Head
Frequency : 1880.0 MHz
Epsilon : 40.12 F/m
Sigma : 1.42 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 8
Conversion Factor : 4.8
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.138 W/kg
10 gram SAR value : 0.066 W/kg
Area Scan Peak SAR : 0.282 W/kg
Zoom Scan Peak SAR : 0.280 W/kg

Plot 13#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Right Head Tilt (1880.0 MHz Middle Channel)

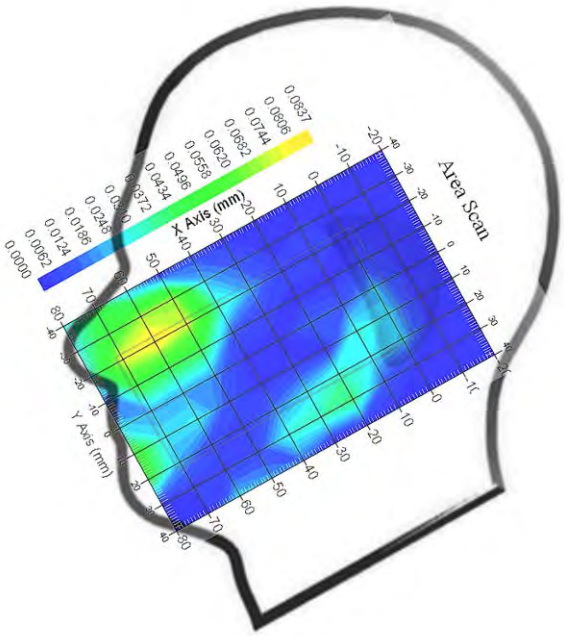
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.012 W/kg
Power Drift-Finish : 0.012 W/kg
Power Drift (%) : 1.569

Tissue Data
Type : Head
Frequency : 1880.0 MHz
Epsilon : 40.12 F/m
Sigma : 1.42 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 8
Conversion Factor : 4.8
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.072 W/kg
10 gram SAR value : 0.032 W/kg
Area Scan Peak SAR : 0.083 W/kg
Zoom Scan Peak SAR : 0.118 W/kg

Plot 14#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Body-worn Front-Headset (1880.0 MHz Middle Channel)

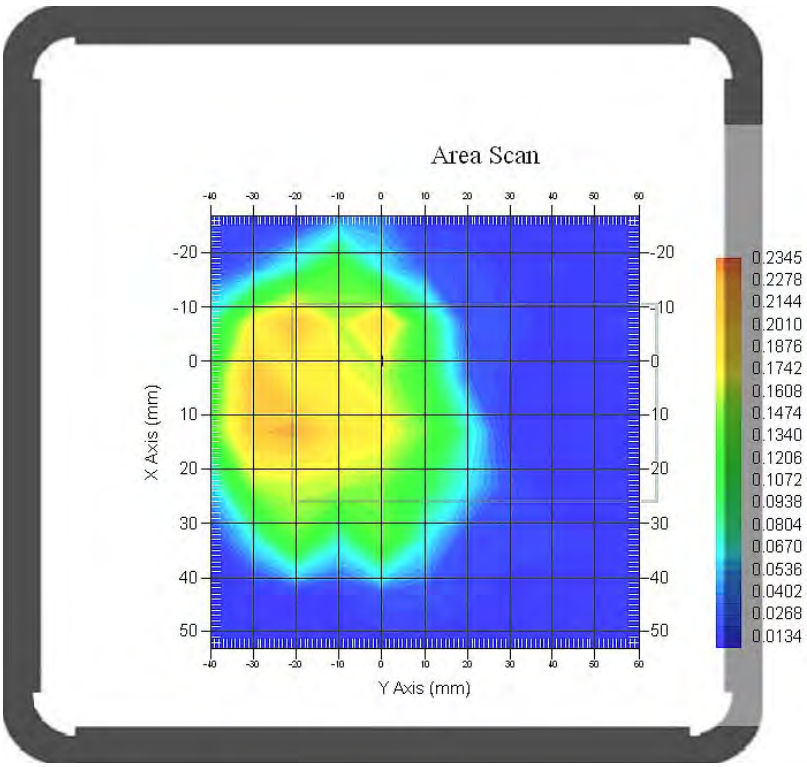
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.221 W/kg
Power Drift-Finish : 0.217 W/kg
Power Drift (%) : -1.161

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 8
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.243 W/kg
10 gram SAR value : 0.126 W/kg
Area Scan Peak SAR : 0.229 W/kg
Zoom Scan Peak SAR : 0.400 W/kg

Plot 15#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Body-worn Back- Headset (1880.0 MHz Middle Channel)

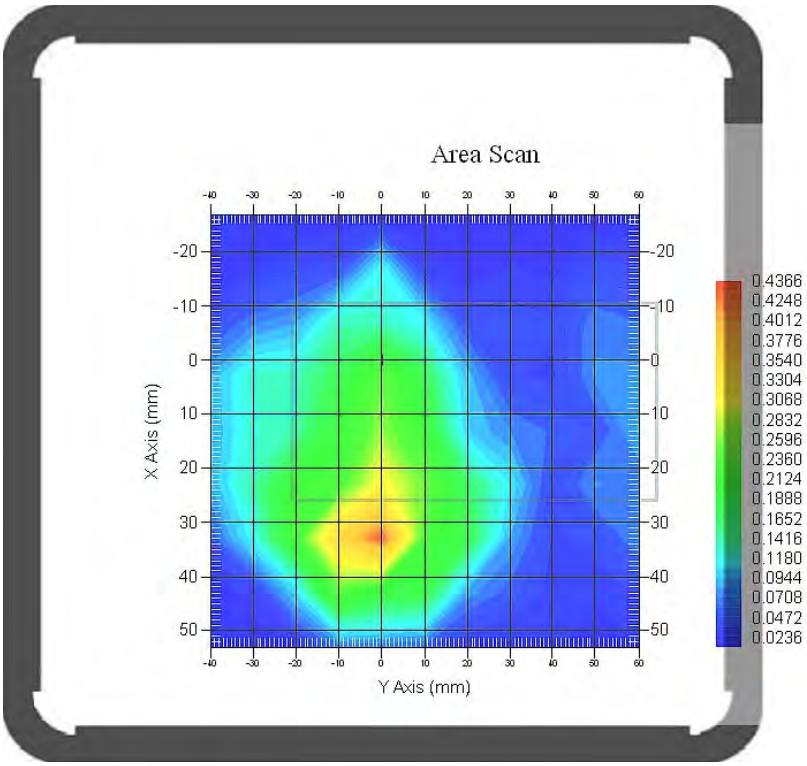
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.296 W/kg
Power Drift-Finish : 0.303 W/kg
Power Drift (%) : 2.827

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 8
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.282 W/kg
10 gram SAR value : 0.133 W/kg
Area Scan Peak SAR : 0.432 W/kg
Zoom Scan Peak SAR : 0.520 W/kg

Plot 16#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

WCDMA1900; Left Head Cheek (1880.0 MHz Middle Channel)

Measurement Data

Test mode	: WCDMA1900
Crest Factor	: 1
Scan Type	: Complete
Area Scan	: 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan	: 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start	: 0.012 W/kg
Power Drift-Finish	: 0.012 W/kg
Power Drift (%)	: -0.822

Tissue Data

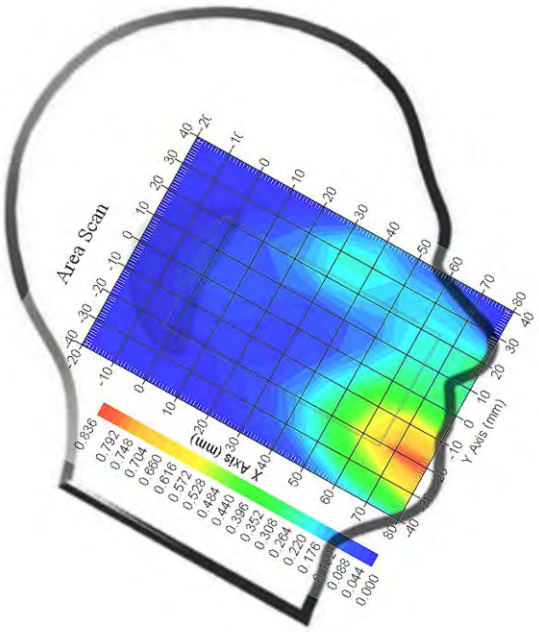
Type	: Head
Frequency	: 1880.0 MHz
Epsilon	: 40.12 F/m
Sigma	: 1.42 S/m
Density	: 1000.00 kg/cu. m

Probe Data

Serial No.	: 500-00283
Frequency Band	: 1900
Duty Cycle Factor	: 1
Conversion Factor	: 4.8
Probe Sensitivity	: 1.20 1.20 1.20 µV/(V/m)2
Compression Point	: 95.00 mV
Offset	: 1.56 mm

1 gram SAR value	: 0.205 W/kg
10 gram SAR value	: 0.108 W/kg
Area Scan Peak SAR	: 0.826 W/kg
Zoom Scan Peak SAR	: 0.350 W/kg

Plot 17#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

WCDMA1900; Left Head Tilt (1880.0 MHz Middle Channel)

Measurement Data

Test mode	: WCDMA1900
Crest Factor	: 1
Scan Type	: Complete
Area Scan	: 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan	: 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start	: 0.012 W/kg
Power Drift-Finish	: 0.012 W/kg
Power Drift (%)	: -0.868

Tissue Data

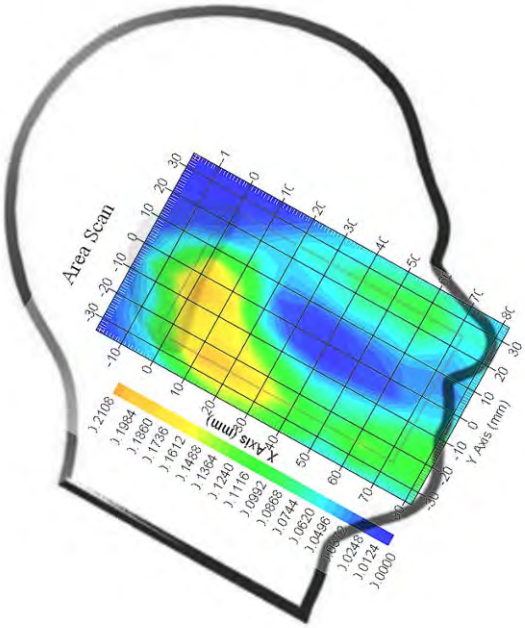
Type	: Head
Frequency	: 1880.0 MHz
Epsilon	: 40.12 F/m
Sigma	: 1.42 S/m
Density	: 1000.00 kg/cu. m

Probe Data

Serial No.	: 500-00283
Frequency Band	: 1900
Duty Cycle Factor	: 1
Conversion Factor	: 4.8
Probe Sensitivity	: 1.20 1.20 1.20 µV/(V/m)2
Compression Point	: 95.00 mV
Offset	: 1.56 mm

1 gram SAR value	: 0.201 W/kg
10 gram SAR value	: 0.126 W/kg
Area Scan Peak SAR	: 0.203 W/kg
Zoom Scan Peak SAR	: 0.493 W/kg

Plot 18#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

WCDMA1900; Right Head Cheek (1880.0 MHz Middle Channel)

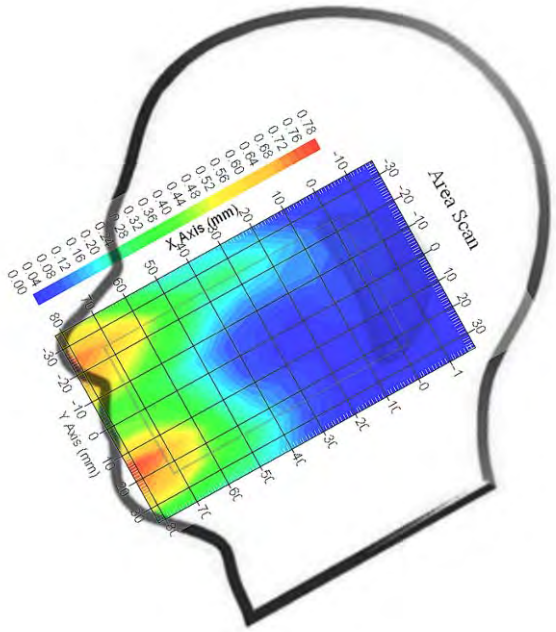
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.002 W/kg
Power Drift-Finish : 0.002 W/kg
Power Drift (%) : -1.753

Tissue Data
Type : Head
Frequency : 1880.0 MHz
Epsilon : 40.12 F/m
Sigma : 1.42 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.8
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.202 W/kg
10 gram SAR value : 0.128 W/kg
Area Scan Peak SAR : 0.764 W/kg
Zoom Scan Peak SAR : 0.480 W/kg

Plot 19#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

WCDMA1900; Right Head Tilt (1880.0 MHz Middle Channel)

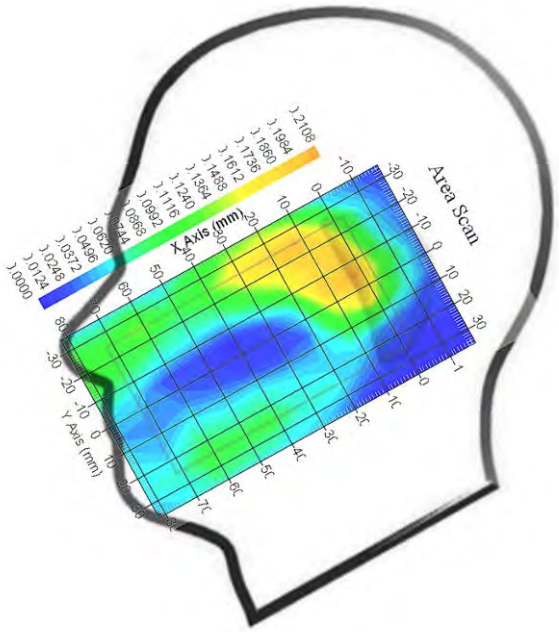
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.003 W/kg
Power Drift-Finish : 0.003 W/kg
Power Drift (%) : 2.618

Tissue Data
Type : Head
Frequency : 1880.0 MHz
Epsilon : 40.12 F/m
Sigma : 1.42 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.8
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.178 W/kg
10 gram SAR value : 0.088 W/kg
Area Scan Peak SAR : 0.208 W/kg
Zoom Scan Peak SAR : 0.450 W/kg

Plot 20#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Front (824.2 MHz Low Channel)

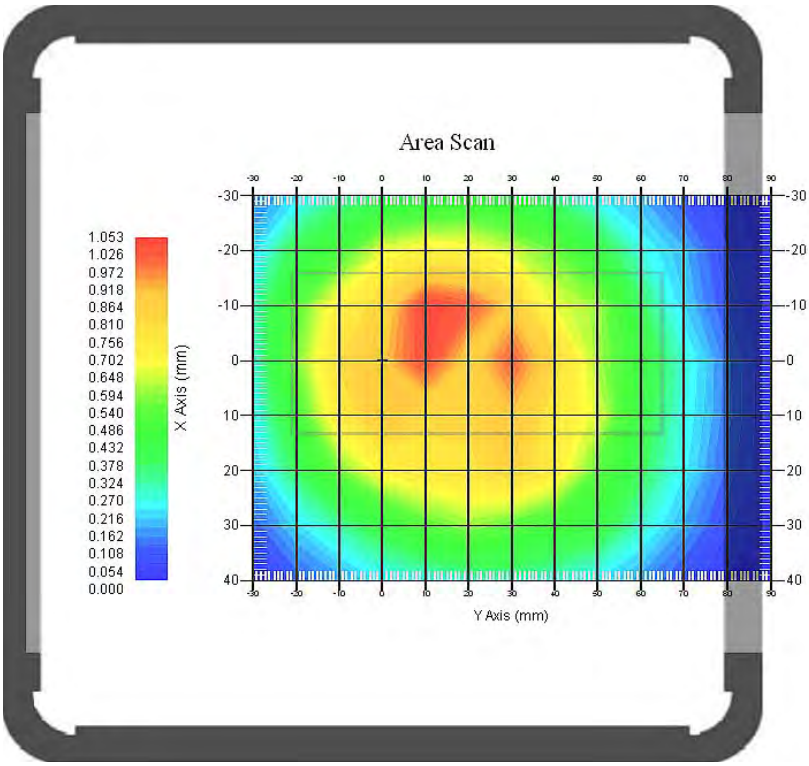
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.752 W/kg
Power Drift-Finish : 0.760 W/kg
Power Drift (%) : 1.561

Tissue Data
Type : Body
Frequency : 824.2 MHz
Epsilon : 55.04 F/m
Sigma : 0.95 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 2
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 1.015 W/kg
10 gram SAR value : 0.667 W/kg
Area Scan Peak SAR : 1.046 W/kg
Zoom Scan Peak SAR : 1.351 W/kg

Plot 21#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Front (836.6 MHz Middle Channel)

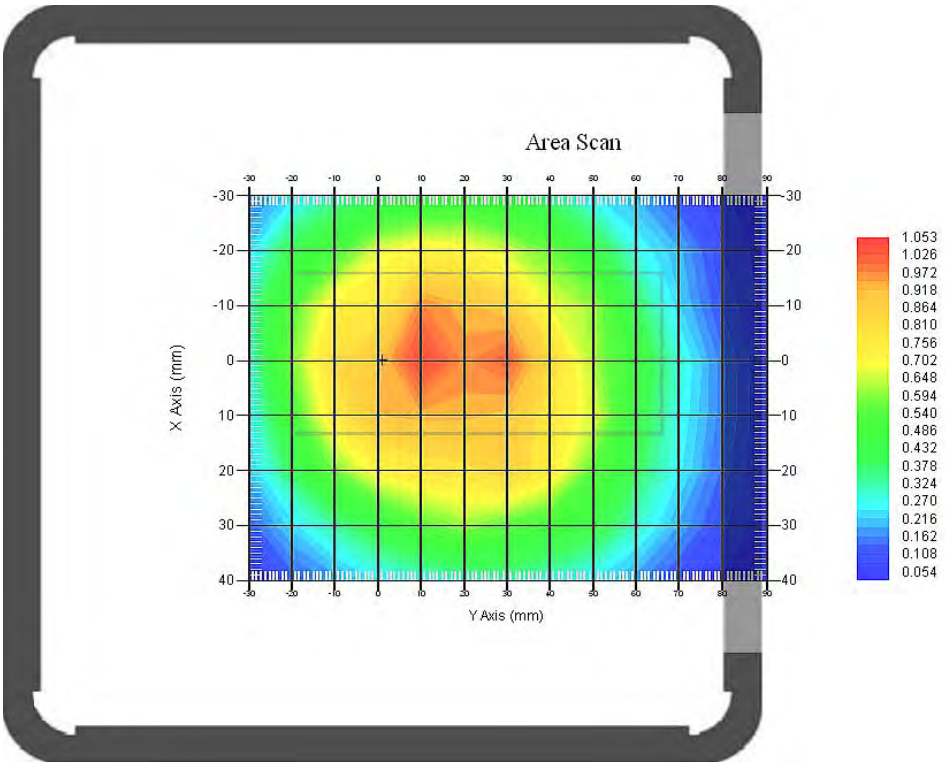
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.749 W/kg
Power Drift-Finish : 0.743 W/kg
Power Drift (%) : -0.957

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.12 F/m
Sigma : 0.96 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 2
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 1.028 W/kg
10 gram SAR value : 0.731 W/kg
Area Scan Peak SAR : 1.033 W/kg
Zoom Scan Peak SAR : 1.351 W/kg

Plot 22#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Front (848.8 MHz High Channel)

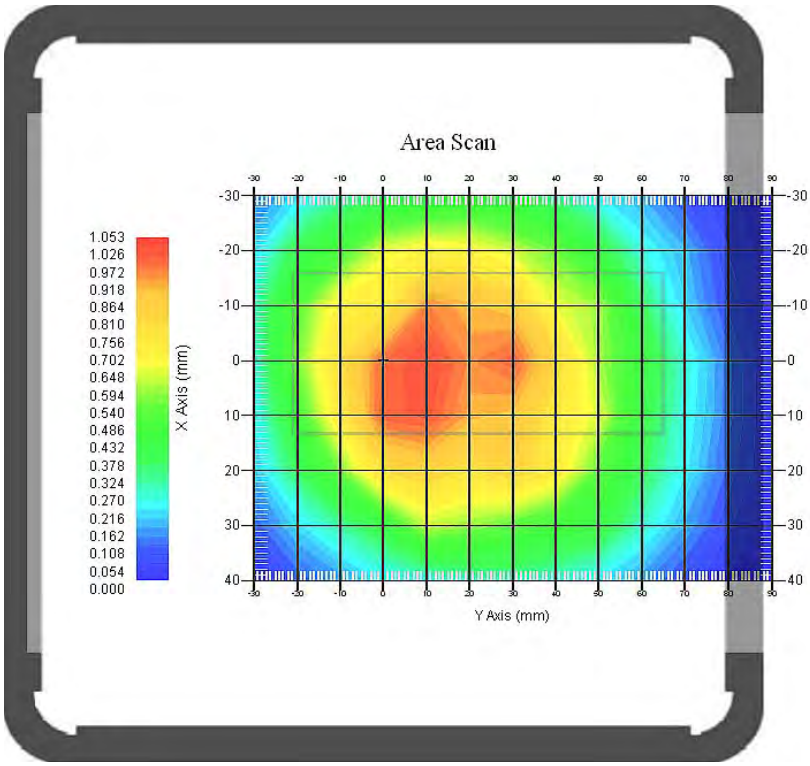
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.802 W/kg
Power Drift-Finish : 0.792 W/kg
Power Drift (%) : -1.869

Tissue Data
Type : Body
Frequency : 848.8 MHz
Epsilon : 55.19 F/m
Sigma : 0.99 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 2
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 1.021 W/kg
10 gram SAR value : 0.736 W/kg
Area Scan Peak SAR : 1.039 W/kg
Zoom Scan Peak SAR : 1.311 W/kg

Plot 23#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Back (824.2 MHz Low Channel)

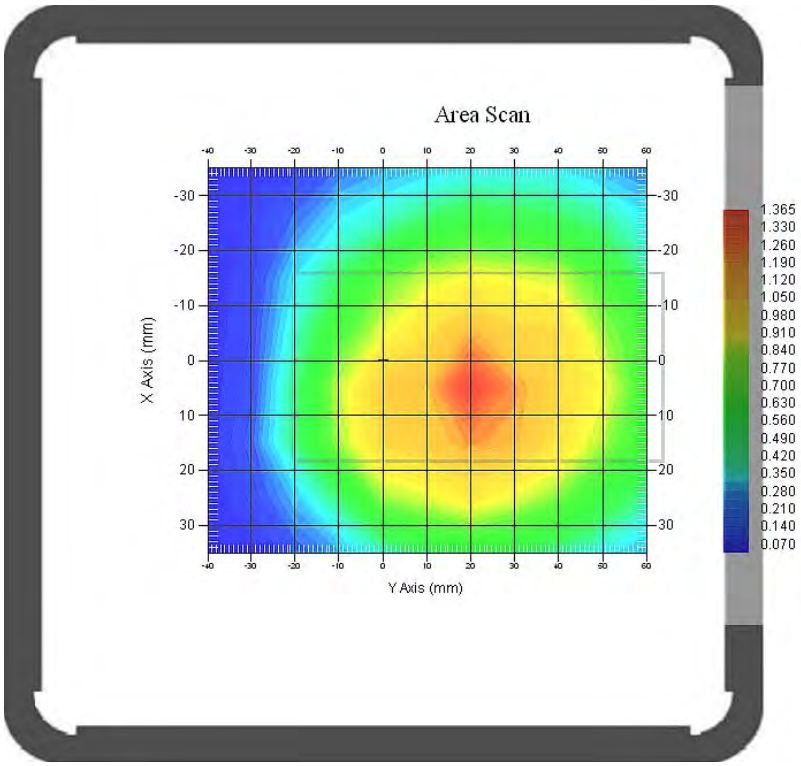
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.990 W/kg
Power Drift-Finish : 1.005 W/kg
Power Drift (%) : 1.400

Tissue Data
Type : Body
Frequency : 824.2 MHz
Epsilon : 55.04 F/m
Sigma : 0.95 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 2
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 1.164 W/kg
10 gram SAR value : 0.881 W/kg
Area Scan Peak SAR : 1.347 W/kg
Zoom Scan Peak SAR : 1.851 W/kg

Plot 24#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Back (836.6 MHz Middle Channel)

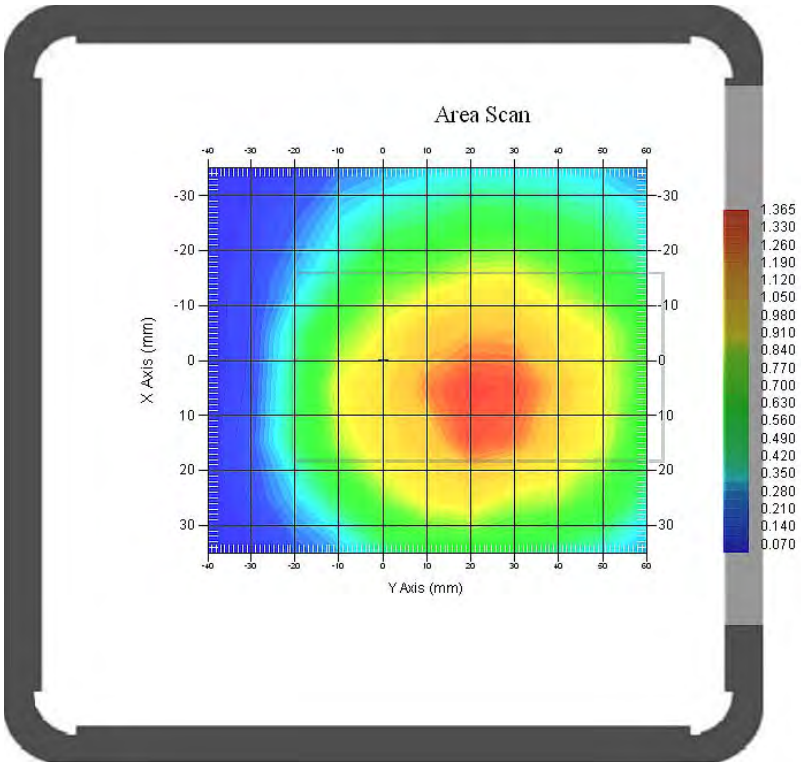
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 1.021 W/kg
Power Drift-Finish : 1.042 W/kg
Power Drift (%) : 2.096

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.12 F/m
Sigma : 0.96 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 2
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 1.148 W/kg
10 gram SAR value : 0.913 W/kg
Area Scan Peak SAR : 1.349 W/kg
Zoom Scan Peak SAR : 2.342 W/kg

Plot 25#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Back (848.8 MHz High Channel)

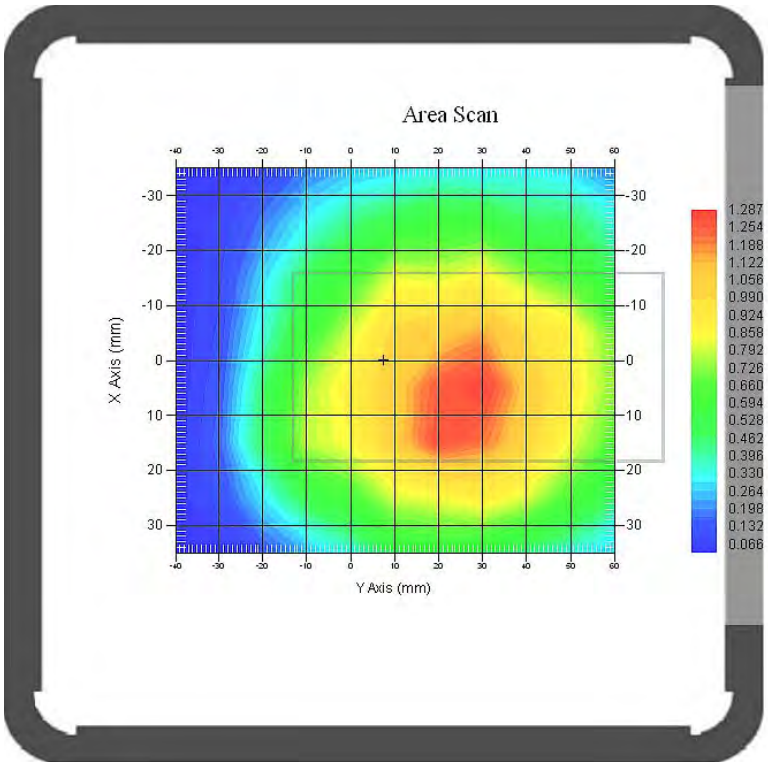
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 1.039 W/kg
Power Drift-Finish : 1.014 W/kg
Power Drift (%) : -2.102

Tissue Data
Type : Body
Frequency : 848.8 MHz
Epsilon : 55.19 F/m
Sigma : 0.99 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 2
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 1.119 W/kg
10 gram SAR value : 0.836 W/kg
Area Scan Peak SAR : 1.285 W/kg
Zoom Scan Peak SAR : 1.771 W/kg

Plot 26#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Left (836.6 MHz Middle Channel)

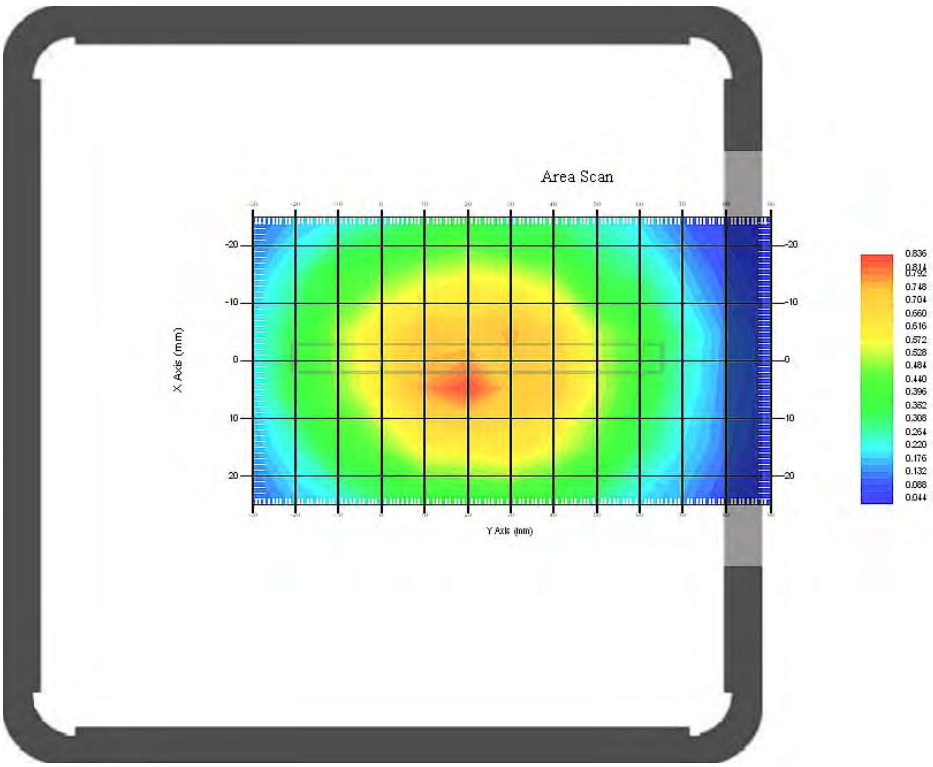
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type： : Complete
Area Scan : 7x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.181 W/kg
Power Drift-Finish : 0.180 W/kg
Power Drift (%) : -0.454

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.12 F/m
Sigma : 0.96 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 2
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.615 W/kg
10 gram SAR value : 0.310 W/kg
Area Scan Peak SAR : 0.790 W/kg
Zoom Scan Peak SAR : 0.820 W/kg

Plot 27#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Right (836.6 MHz Middle Channel)

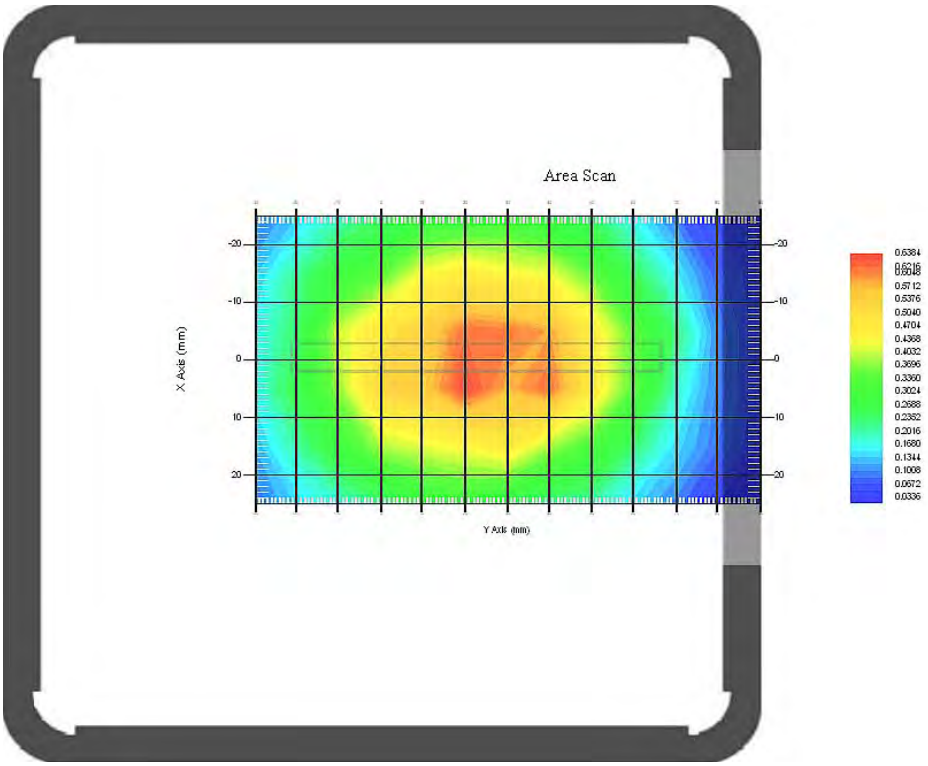
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type： : Complete
Area Scan : 7x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.587 W/kg
Power Drift-Finish : 0.580 W/kg
Power Drift (%) : -1.355

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.12 F/m
Sigma : 0.96 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 2
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.512 W/kg
10 gram SAR value : 0.207 W/kg
Area Scan Peak SAR : 0.599 W/kg
Zoom Scan Peak SAR : 0.670 W/kg

Plot 28#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Bottom (836.6 MHz Middle Channel)

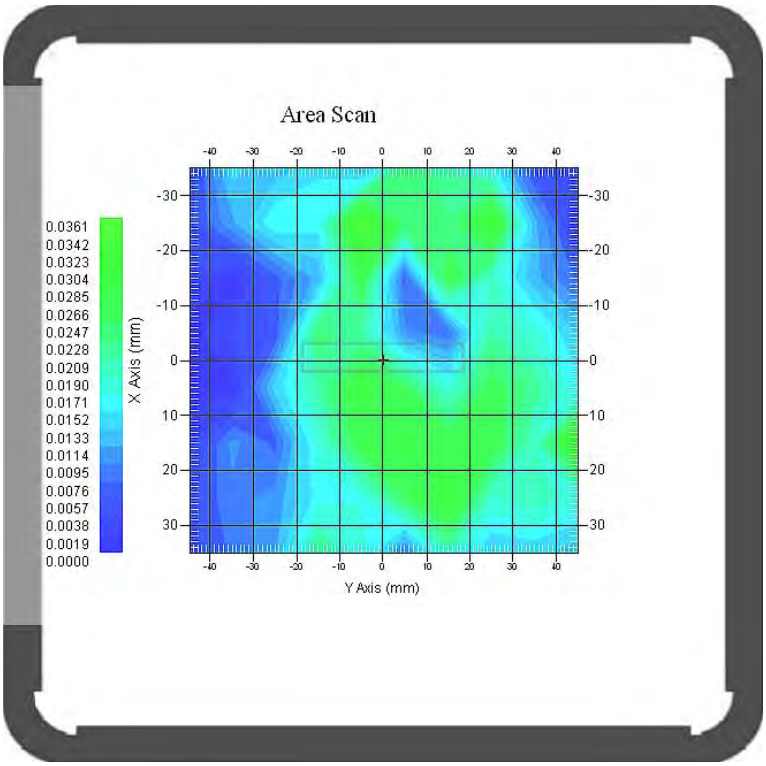
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type： : Complete
Area Scan : 7x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.035 W/kg
Power Drift-Finish : 0.035 W/kg
Power Drift (%) : -0.142

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.12 F/m
Sigma : 0.96 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 2
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.040 W/kg
10 gram SAR value : 0.023 W/kg
Area Scan Peak SAR : 0.035 W/kg
Zoom Scan Peak SAR : 0.080 W/kg

Plot 29#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Front (1880.0 MHz Middle Channel)

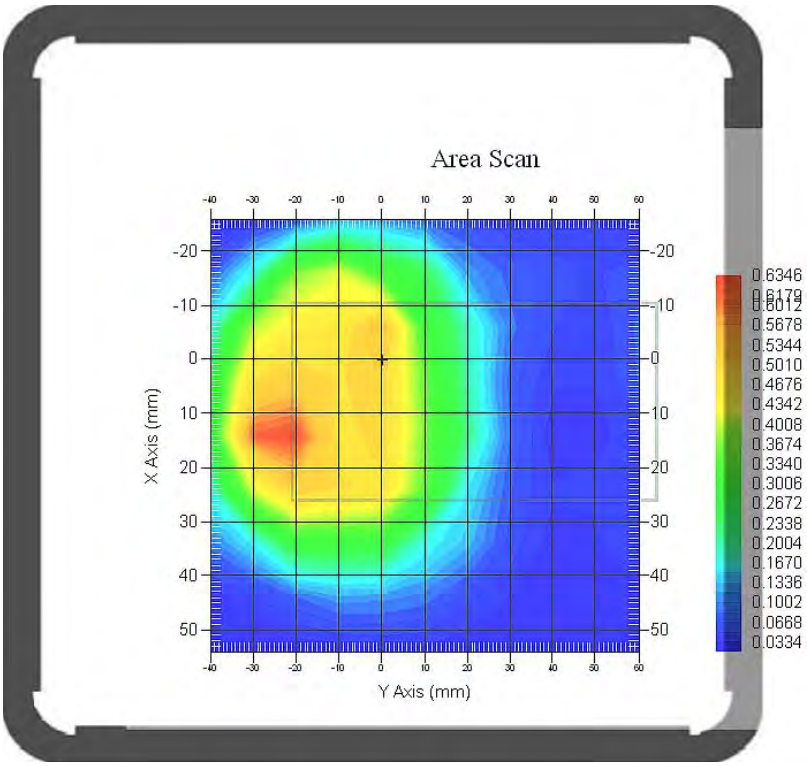
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.485 W/kg
Power Drift-Finish : 0.480 W/kg
Power Drift (%) : -1.758

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 2
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.583 W/kg
10 gram SAR value : 0.308 W/kg
Area Scan Peak SAR : 0.626 W/kg
Zoom Scan Peak SAR : 1.050 W/kg

Plot 30#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Back (1880.0 MHz Middle Channel)

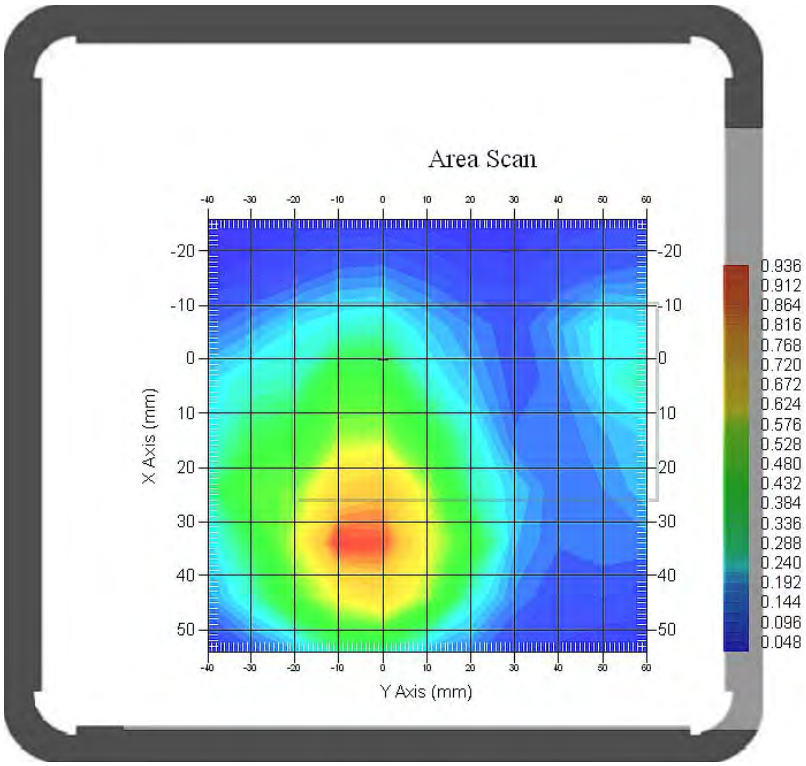
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.633 W/kg
Power Drift-Finish : 0.625 W/kg
Power Drift (%) : -1.219

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 2
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.754 W/kg
10 gram SAR value : 0.377 W/kg
Area Scan Peak SAR : 0.924 W/kg
Zoom Scan Peak SAR : 1.471 W/kg

Plot 31#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Left (1880.0 MHz Middle Channel)

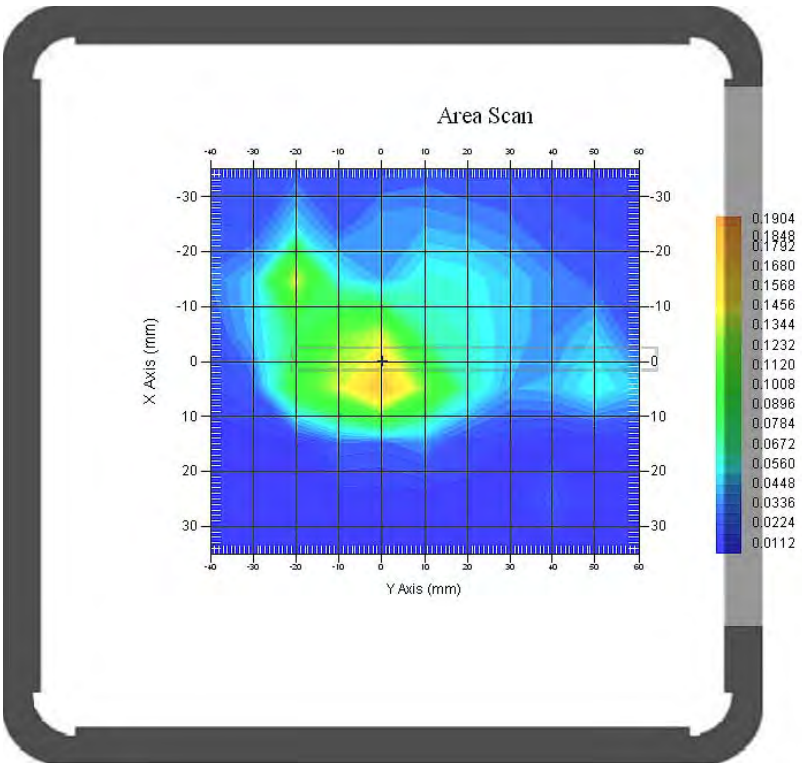
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.085 W/kg
Power Drift-Finish : 0.086 W/kg
Power Drift (%) : 1.769

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 2
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.180 W/kg
10 gram SAR value : 0.069 W/kg
Area Scan Peak SAR : 0.185 W/kg
Zoom Scan Peak SAR : 0.500 W/kg

Plot 32#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Right (1880.0 MHz Middle Channel)

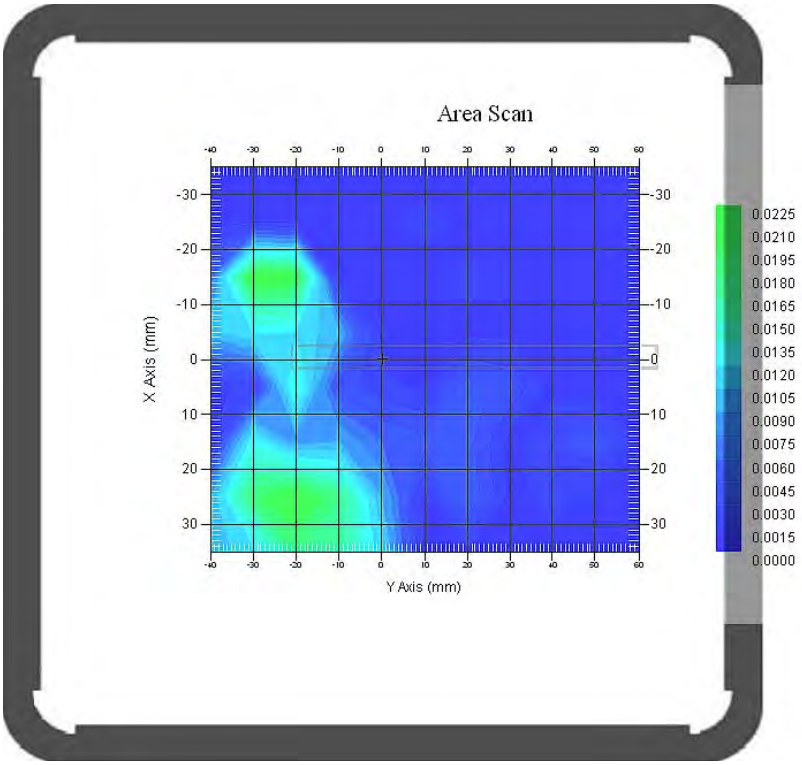
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.009 W/kg
Power Drift-Finish : 0.009 W/kg
Power Drift (%) : 2.592

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 2
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.019 W/kg
10 gram SAR value : 0.009 W/kg
Area Scan Peak SAR : 0.022 W/kg
Zoom Scan Peak SAR : 0.050 W/kg

Plot 33#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: Body-Bottom (1880.0 MHz Middle Channel)

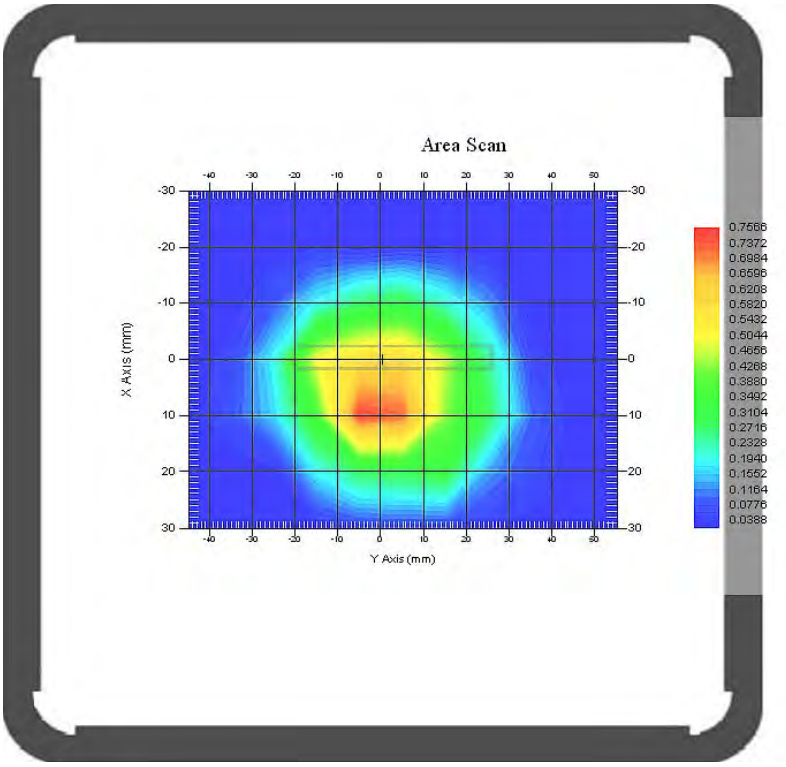
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.712 W/kg
Power Drift-Finish : 0.722 W/kg
Power Drift (%) : 1.260

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 2
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.672 W/kg
10 gram SAR value : 0.292 W/kg
Area Scan Peak SAR : 0.738 W/kg
Zoom Scan Peak SAR : 1.681 W/kg

Plot 34#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: WCDMA1900; Body-Front (1880.0 MHz Middle Channel)

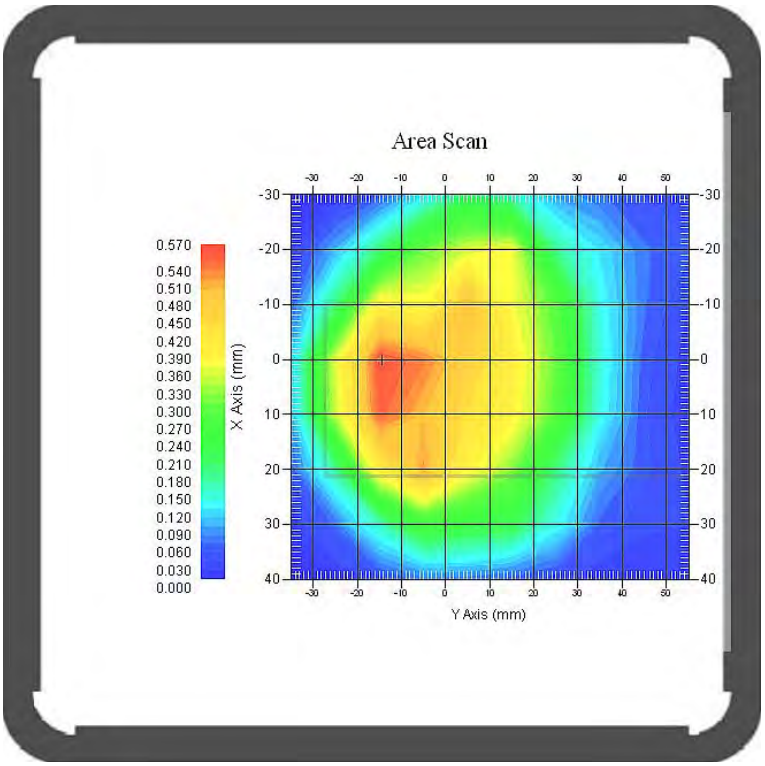
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.458 W/kg
Power Drift-Finish : 0.451 W/kg
Power Drift (%) : -1.348

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.595 W/kg
10 gram SAR value : 0.315 W/kg
Area Scan Peak SAR : 0.558 W/kg
Zoom Scan Peak SAR : 1.050 W/kg

Plot 35#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: WCDMA1900; Body-Back (1852.4 MHz Low Channel)

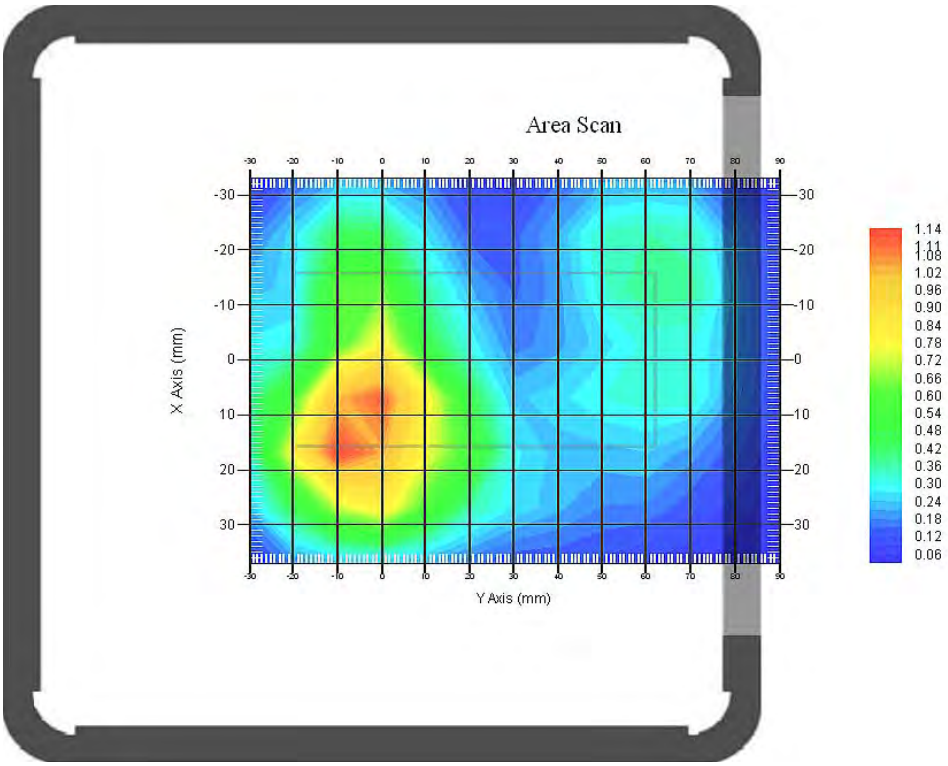
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.584 W/kg
Power Drift-Finish : 0.570 W/kg
Power Drift (%) : -2.201

Tissue Data
Type : Body
Frequency : 1852.4 MHz
Epsilon : 53.42 F/m
Sigma : 1.50 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 1.075 W/kg
10 gram SAR value : 0.536 W/kg
Area Scan Peak SAR : 1.140 W/kg
Zoom Scan Peak SAR : 1.981 W/kg

Plot 36#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: WCDMA1900; Body-Back (1880.0 MHz Middle Channel)

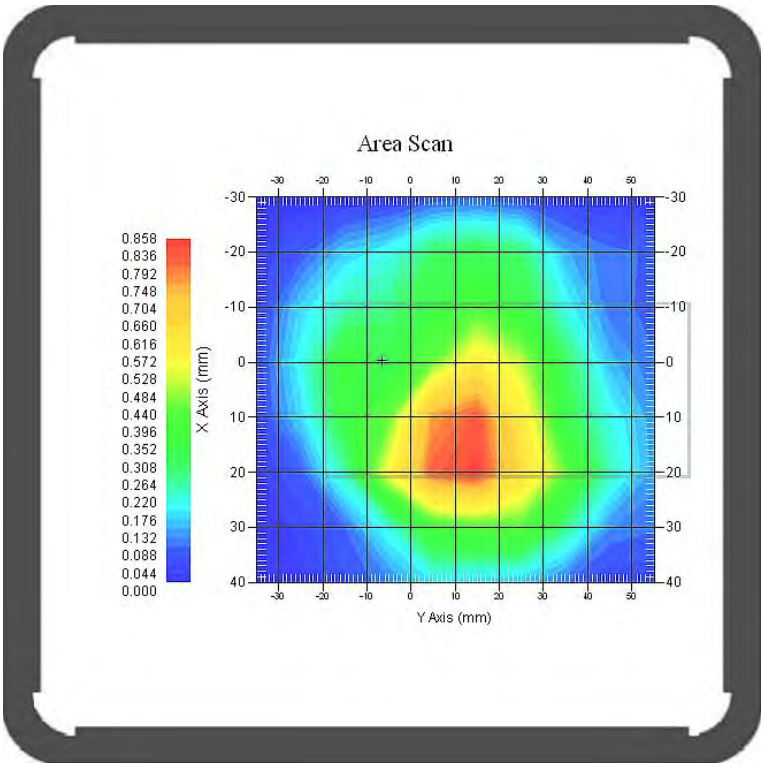
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.211 W/kg
Power Drift-Finish : 0.210 W/kg
Power Drift (%) : 0.948

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.828 W/kg
10 gram SAR value : 0.407 W/kg
Area Scan Peak SAR : 0.849 W/kg
Zoom Scan Peak SAR : 1.561 W/kg

Plot 37#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: WCDMA1900; Body-Back (1907.6 MHz High Channel)

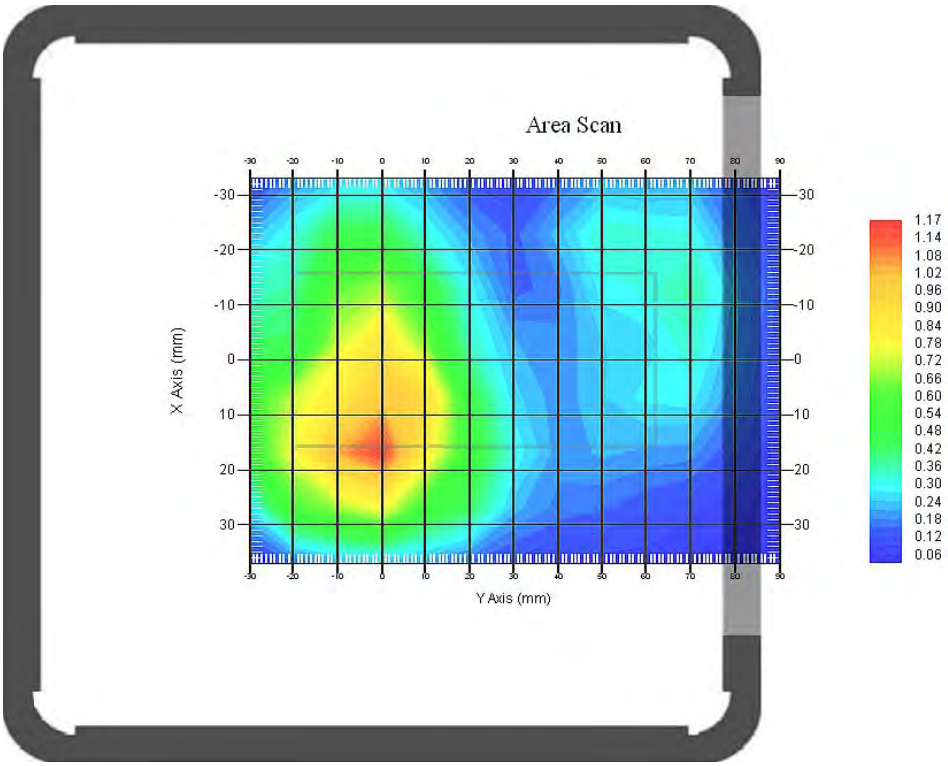
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.635 W/kg
Power Drift-Finish : 0.628 W/kg
Power Drift (%) : -1.031

Tissue Data
Type : Body
Frequency : 1907.6 MHz
Epsilon : 53.18 F/m
Sigma : 1.56 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.888 W/kg
10 gram SAR value : 0.545 W/kg
Area Scan Peak SAR : 1.153 W/kg
Zoom Scan Peak SAR : 1.961 W/kg

Plot 38#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: WCDMA1900; Body-Left (1880.0 MHz Middle Channel)

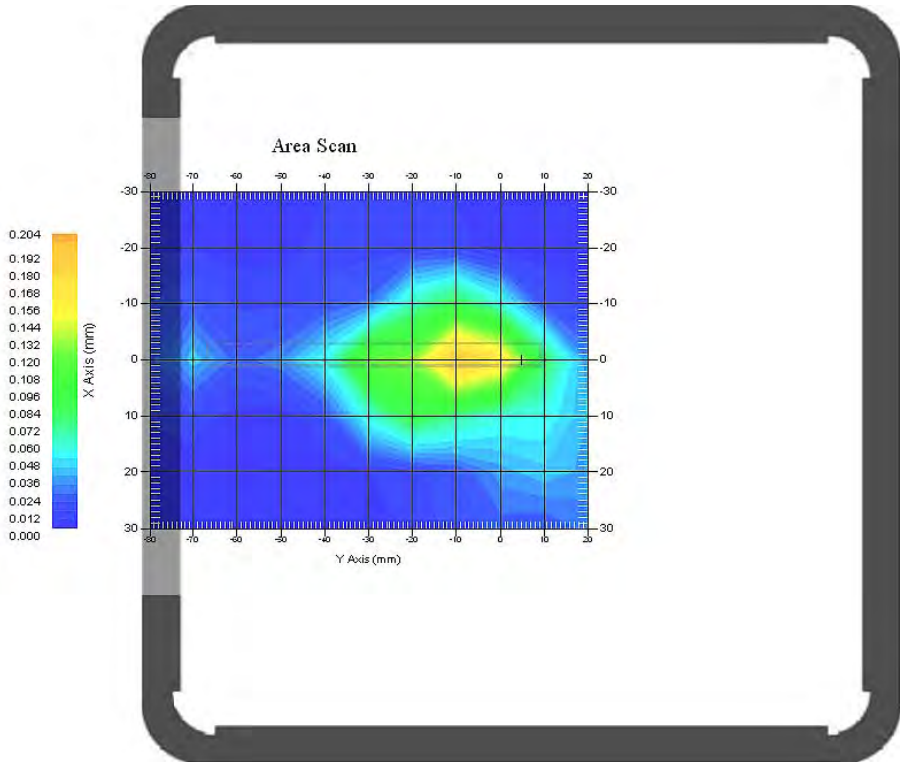
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 7x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.060 W/kg
Power Drift-Finish : 0.059 W/kg
Power Drift (%) : -1.395

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.152 W/kg
10 gram SAR value : 0.060 W/kg
Area Scan Peak SAR : 0.199 W/kg
Zoom Scan Peak SAR : 0.400 W/kg

Plot 39#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: WCDMA1900; Body-Right (1880.0 MHz Middle Channel)

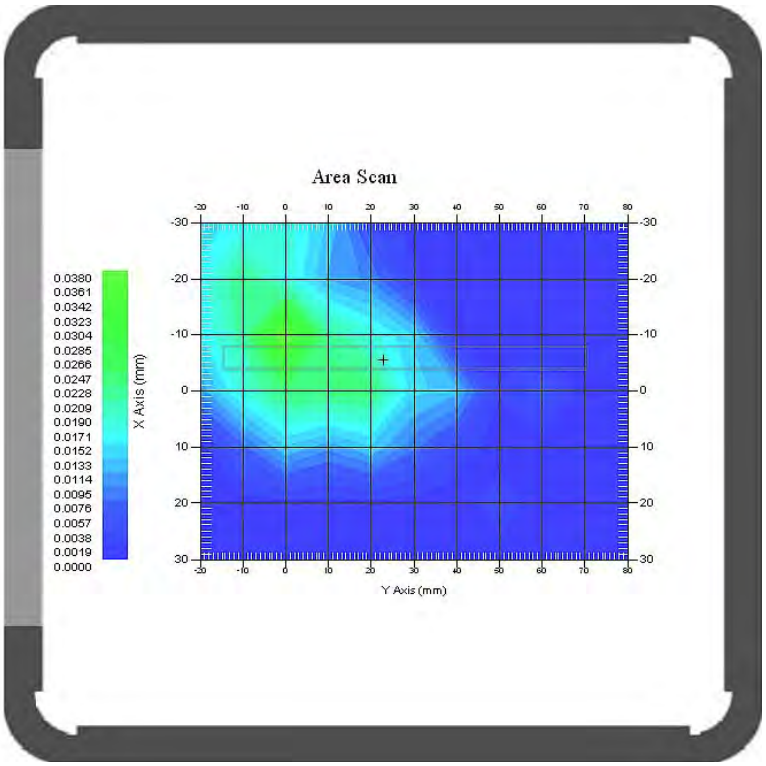
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 7x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.010 W/kg
Power Drift-Finish : 0.010 W/kg
Power Drift (%) : 1.347

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.012 W/kg
10 gram SAR value : 0.025 W/kg
Area Scan Peak SAR : 0.038 W/kg
Zoom Scan Peak SAR : 0.060 W/kg

Plot 40#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Hot Spot: WCDMA1900; Body-Bottom (1880.0 MHz Middle Channel)

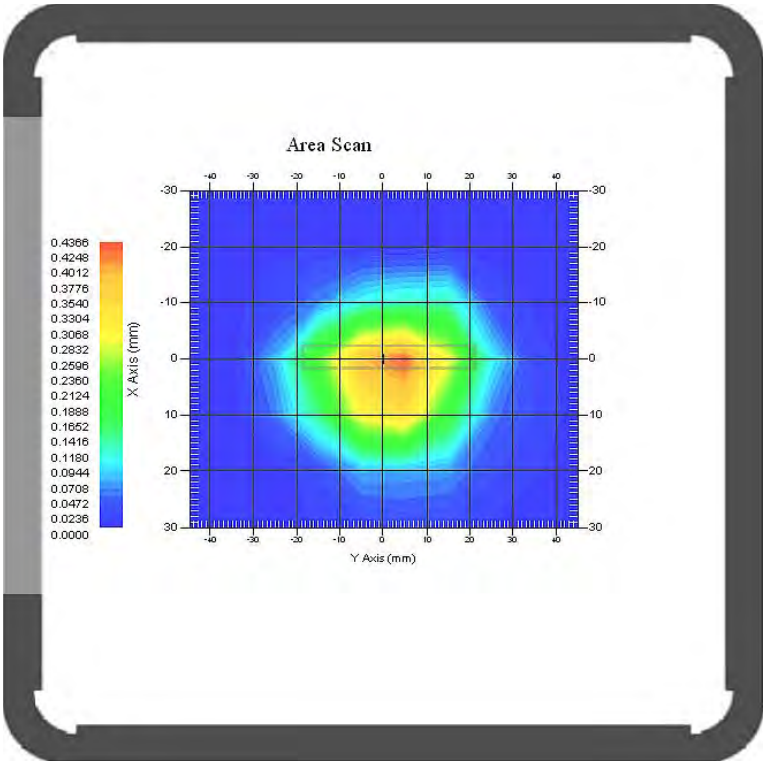
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 7x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.314 W/kg
Power Drift-Finish : 0.311 W/kg
Power Drift (%) : -1.403

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.22 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.386 W/kg
10 gram SAR value : 0.169 W/kg
Area Scan Peak SAR : 0.431 W/kg
Zoom Scan Peak SAR : 0.840 W/kg

Plot 41#



APPENDIX A MEASUREMENT UNCERTAINTY

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

Measurement Uncertainty for 300MHz to 3GHz

Source of Uncertainty	Tolerance Value	Probability Distribution	Divisor	c_i^1 (1-g)	c_i^1 (10-g)	Standard Uncertainty (1-g) %	Standard Uncertainty (10-g) %
Measurement System							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	$(1-cp)^{1/2}$	1.5	1.5
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	$\sqrt{cp}$	$\sqrt{cp}$	4.4	4.4
Boundary Effect	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	rectangular	$\sqrt{3}$	1	1	2.7	2.7
Detection Limit	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Readout Electronics	1.0	normal	1	1	1	1.0	1.0
Response Time	0.8	rectangular	$\sqrt{3}$	1	1	0.5	0.5
Integration Time	1.7	rectangular	$\sqrt{3}$	1	1	1.0	1.0
RF Ambient Condition -Noise	0.006	rectangular	$\sqrt{3}$	1	1	0.003	0.003
RF Ambient Condition - Reflections	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech. Restrictions	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2
Restriction							
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1
Test Sample Positioning	0.023	normal	1	1	1	0.023	0.023
Device Holder Uncertainty	6.215	normal	1	1	1	6.215	6.215
Drift of Output Power	4.627	rectangular	$\sqrt{3}$	1	1	2.67	2.67
Phantom and Setup							
Phantom Uncertainty(shape & thickness tolerance)	3.4	rectangular	$\sqrt{3}$	1	1	2.0	2.0
Liquid Conductivity(target)	5.0	rectangular	$\sqrt{3}$	0.7	0.5	2.0	1.4
Liquid Conductivity(meas.)	1.938	normal	1	0.7	0.5	1.36	0.97
Liquid Permittivity(target)	5.0	rectangular	$\sqrt{3}$	0.6	0.5	1.7	1.4
Liquid Permittivity(meas.)	3.093	normal	1	0.6	0.5	1.86	1.55
Combined Uncertainty		RSS				10.78	10.55
Expanded uncertainty (coverage factor=2)		Normal(k=2)				21.56	21.10

APPENDIX B – PROBE CALIBRATION CERTIFICATES

NCL CALIBRATION LABORATORIES

Calibration File No.: PC-1537

Task No: 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.

Equipment: Miniature Isotropic RF Probe
Record of Calibration
Head and Body
Manufacturer: APREL Laboratories
Model No.: E-020
Serial No.: 500-00283

Calibration Procedure: D01-032-E020-V2, D22-012-Tissue, D28-002-Dipole
Project No: BACL-5745

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 Inc.

Introduction

This Calibration Report reproduces the results of the calibration performed in line with the references listed below. Calibration is performed using accepted methodologies as per the references listed below. Probes are calibrated for air, and tissue and the values reported are the results from the physical quantification of the probe through meteorgical practices.

Calibration Method

Probes are calibrated using the following methods.

<1000MHz
TEM Cell for sensitivity in air
Standard phantom using temperature transfer method for sensitivity in tissue

>1000MHz
Waveguide* method to determine sensitivity in air and tissue
*Waveguide is numerically (simulation) assessed to determine the field distribution and power

The boundary effect for the probe is assessed using a standard flat phantom where the probe output is compared against a numerically simulated series of data points

References

- IEEE Standard 1528
  IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
- EN 62209-1
  Human Exposure to RF Fields from hand-held and body-mounted wireless communication devices - Human models. instrumentation, and procedures-Part 1: Procedure to measure the Specific Absorption Rate (SAR) for hand-held mobile wireless devices
- IEC 62209-2
  Human exposure to RF fields from hand-held and body-mounted wireless devices - Human models, instrumentation, and procedures - Part 2: specific absorption rate (SAR) for wireless communication devices (30 MHz - 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 Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9kHz to 40GHz

Page 2 of 10
This page has been reviewed for content and attested to on Page 2 of this document.

NCL Calibration Laboratories
Division of APREL Inc.

Conditions

Probe 500-00283 was a recalibration.

Ambient Temperature of the Laboratory:	22 °C +/- 1.5°C
Temperature of the Tissue:	21 °C +/- 1.5°C
Relative Humidity:	< 60%

Primary Measurement Standards

Instrument	**Serial Number**	**Cal due date**
Tektronix USB Power Meter	11C940	May 14, 2015
Signal Generator HP 83640B	3844A00689	Feb 12, 2015

Secondary Measurement Standards

Network Analyzer Anritsu 37347C	002106	Feb. 20, 2015

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

Dan Brooks, Test Engineer

Page 3 of 10
This page has been reviewed for content and attested to on Page 2 of this document.

NCL Calibration Laboratories
Division of APREL Inc.

Probe Summary

Probe Type:	E-Field Probe E020
Serial Number:	500-00283
Frequency:	As presented on page 5
Sensor Offset:	1.56
Sensor Length:	2.5
Tip Enclosure:	Composite*
Tip Diameter:	< 2.9 mm
Tip Length:	55 mm
Total Length:	289 mm

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

Channel X:	1.2 $\mu V/(V/m)^2$
Channel Y:	1.2 $\mu V/(V/m)^2$
Channel Z:	1.2 $\mu V/(V/m)^2$
Diode Compression Point:	95 mV

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NCL Calibration Laboratories
Division of APREL Inc.

Calibration for Tissue (Head H, Body B)

Frequency	Tissue Type	Measured Epsilon	Measured Sigma	Standard Uncertainty (%)	Calibration Frequency Range (MHz)	Conversion Factor
450 H	Head	44.29	0.86	3.5	±50	5.7
450 B	Body	56.6	0.94	3.5	±50	5.8
750 H	Head	42.7	0.85	3.5	±50	5.6
750 B	Body	56.6	0.94	3.5	±50	5.5
835 H	Head	42.35	0.938	3.5	±50	5.9
835 B	Body	56.65	1.018	3.5	±50	5.9
900 H	Head	X	X	X	X	X
900 B	Body	X	X	X	X	X
1450 H	Head	X	X	X	X	X
1450 B	Body	X	X	X	X	X
1500 H	Head	X	X	X	X	X
1500 B	Body	X	X	X	X	X
1640 H	Head	X	X	X	X	X
1640 B	Body	X	X	X	X	X
1750 H	Head	38.51	1.36	3.5	±75	5.4
1750 B	Body	51.79	1.53	3.5	±75	5.3
1800 H	Head	38.26	1.41	3.5	±75	5.0
1800 B	Body	51.61	1.58	3.5	±75	5.0
1900 H	Head	38.03	1.36	3.5	±75	4.8
1900 B	Body	53.13	1.58	3.5	±75	4.5
2000 H	Head	X	X	X	X	X
2000 B	Body	X	X	X	X	X
2100 H	Head	X	X	X	X	X
2100 B	Body	X	X	X	X	X
2300 H	Head	X	X	X	X	X
2300 B	Body	X	X	X	X	X
2450 H	Head	37.64	1.88	3.5	±75	4.9
2450B	Body	50.7	2.03	3.5	±75	4.3
2600 H	Head	X	X	X	X	X
2600 B	Body	X	X	X	X	X
3000 H	Head	X	X	X	X	X
3000 B	Body	X	X	X	X	X
3600 H	Head	X	X	X	X	X
3600 B	Body	X	X	X	X	X
5250 H	Head	34.65	4.8	3.5	±100	2.7
5250 B	Body	47.6	5.3	3.5	±100	2.6
5600 H	Head	33.2	5.15	3.5	±100	2.5
5600 B	Body	45.21	5.57	3.5	±100	2.2
5800 H	Head	32.72	5.38	3.5	±100	3.2
5800 B	Body	44.28	6.04	3.5	±100	2.5

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This page has been reviewed for content and attested to on Page 2 of this document.

NCL Calibration Laboratories
Division of APREL Inc.

Boundary Effect:

Uncertainty resulting from the boundary effect is less than 2.1% for the distance between the tip of the probe and the tissue boundary, when less than 0.58mm.

Spatial Resolution:

The spatial resolution uncertainty is less than 1.5% for 4.9mm diameter probe.
The spatial resolution uncertainty is less than 1.0% for 2.5mm diameter probe.

DAQ-PAQ Contribution

To minimize the uncertainty calculation all tissue sensitivity values were calculated using a load impedance of 5 MΩ.

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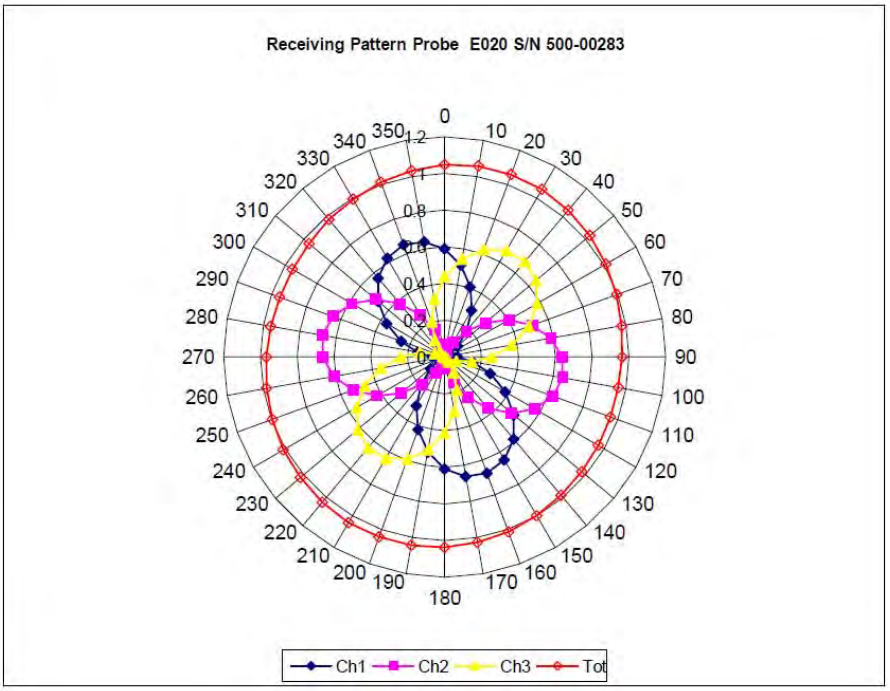
NCL Calibration Laboratories
Division of APREL Inc.

Receiving Pattern Air



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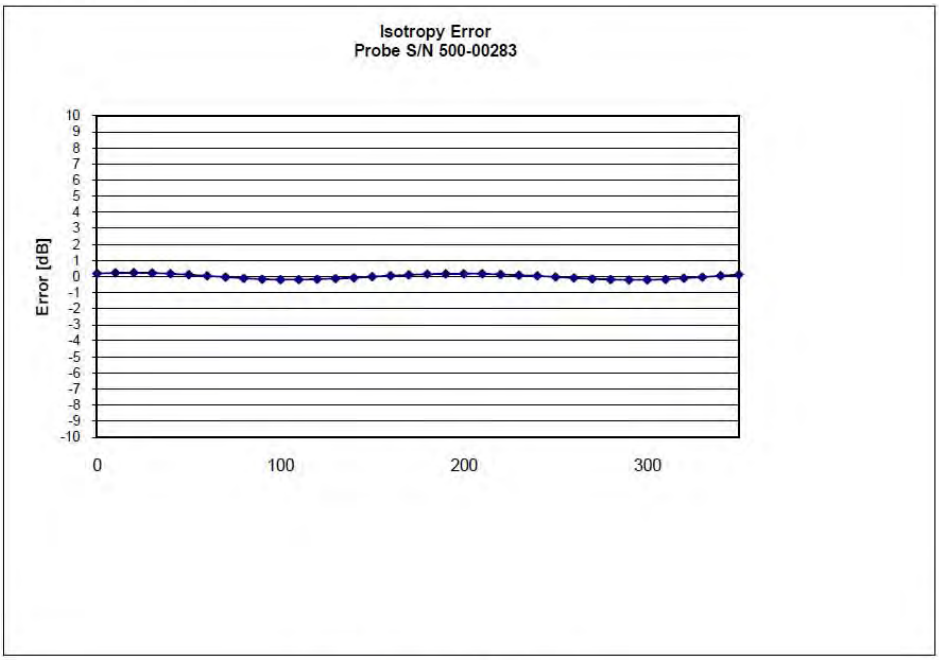
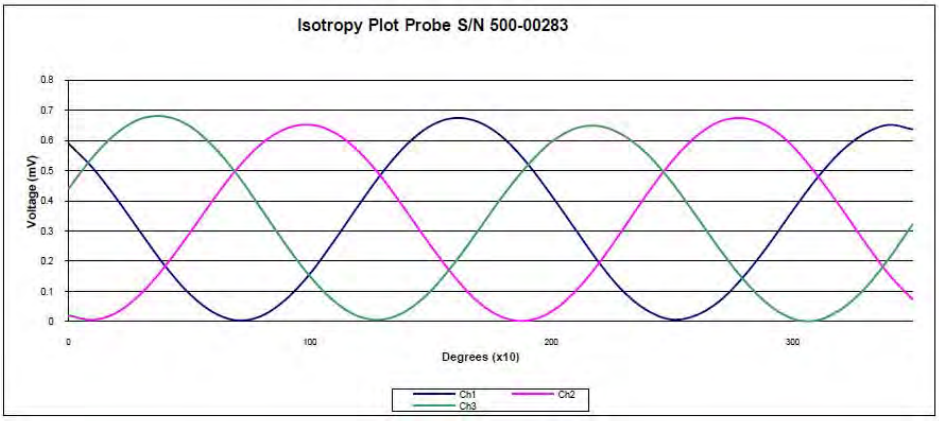
Division of APREL Inc.

Isotropy Error Air





Isotropicity Tissue: 0.10 dB

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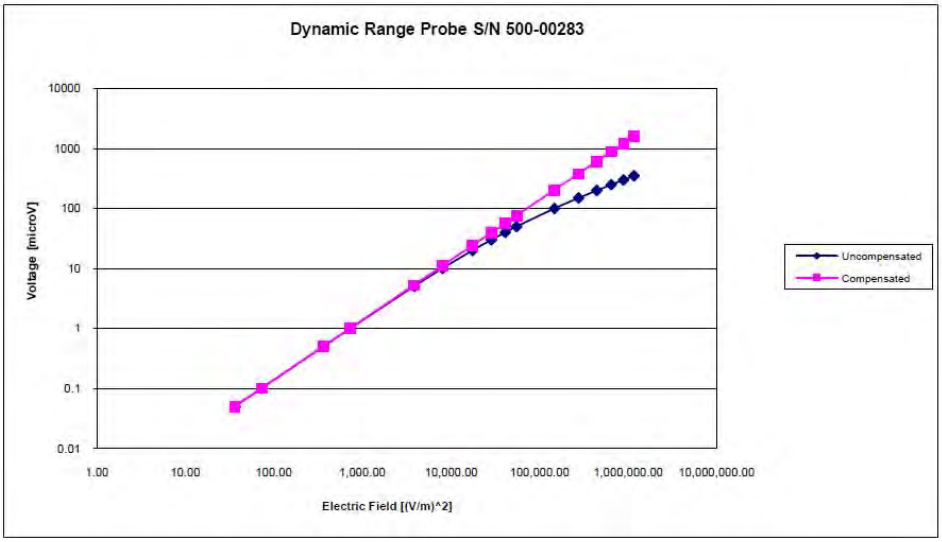
Division of APREL Inc.

Dynamic Range



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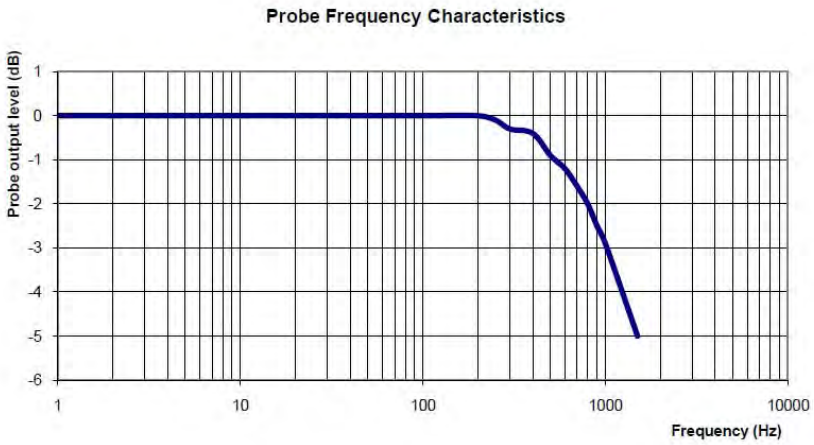
Video Bandwidth



Video Bandwidth at 500 Hz	1 dB
Video Bandwidth at 1.02 KHz:	3 dB

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 on Page 2 of this document.

APPENDIX C DIPOLE CALIBRATION CERTIFICATES

NCL CALIBRATION LABORATORIES

Calibration File No: DC-1327
Project Number: BAC-dipole-cal-5618

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

Calibrated: 25th August 2011
Released on: 25th August 2011

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

Released By: _____

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 in good condition and a re-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 device has been accurately conducted and that all information contained within this report has been reviewed for accuracy.

Stuart Nicol

C. Teodorian

Primary Measurement Standards		
Instrument	**Serial Number**	**Cal due date**
Power meter Anritsu MA2408A	245025437	Nov.4, 2011
Power Sensor Anritsu MA2481D	103555	Nov 4, 2011
Attenuator HP 8495A (70dB) 1	944A10711	Aug.8, 2012
Network Analyzer Agilent E5071C	1334746J	Feb. 8, 2012
Secondary Measurement Standards		
Signal Generator Agilent E4438C	-506 MY55182336	June 7, 2012

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

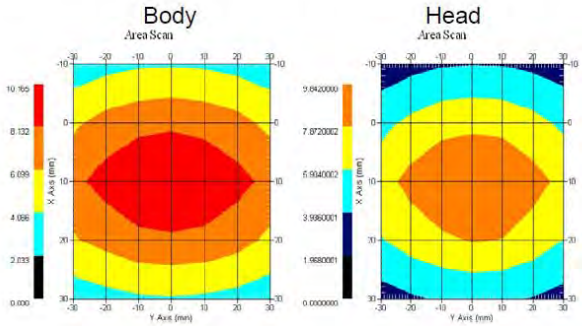
Length: 162.2 mm
Height: 89.4 mm

Electrical Specification

Tissue	Frequency	SWR:	Return Loss	Impedance
Head	835 MHz	1.0417 U	-35.395dB	49.020 Ω
Body	835 MHz	1.1177 U	-25.424dB	55.435 Ω

System Validation Results

Tissue	Frequency	1 Gram	10 Gram	Peak
Head	835 MHz	9.590	6.003	15.013
Body	835 MHz	9.684	6.263	14.23



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NCL Calibration Laboratories
Division of APREL Laboratories.

Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018-ALSAS. The results contained within this report are for Validation Dipole 180-00558. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-020 130 MHz to 26 GHz E-Field Probe Serial Number 212.

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"

Conditions

Dipole 180-00558 was new taken from stock.

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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NCL Calibration Laboratories
Division of APREL Laboratories.

Dipole Calibration Results

Mechanical Verification

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

Tissue Type	Return Loss:	SWR:	Impedance:
Head	-35.395 dB	1.0417 U	49.020Ω
Body	-25.454 dB	1.1177 U	55.435Ω

Tissue Validation

	Dielectric constant, ε_r	Conductivity, σ [S/m]
Head Tissue 835MHz	41.78	0.92
Body Tissue 835MHz	56.37	0.95

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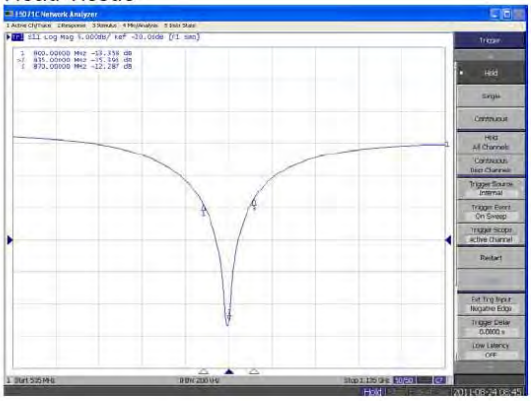
NCL Calibration Laboratories

Division of APREL Laboratories.

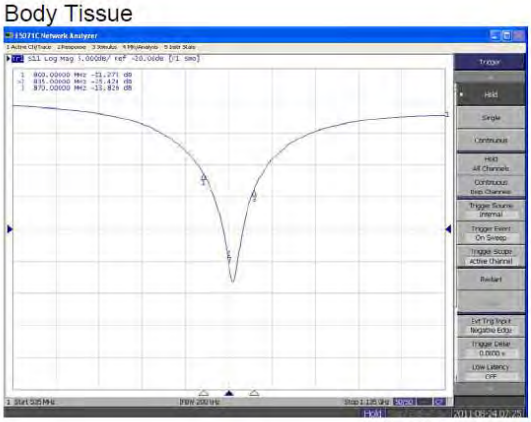
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

Head Tissue



Body Tissue



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NCL Calibration Laboratories

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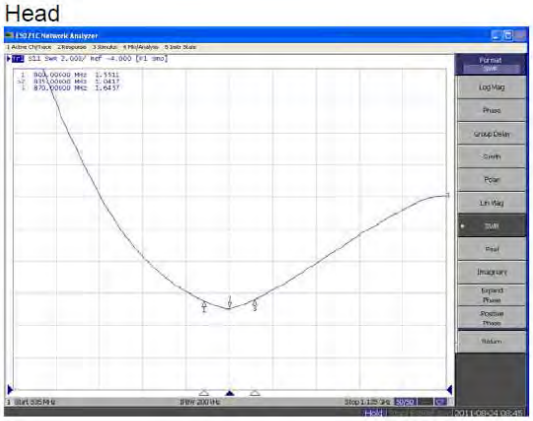
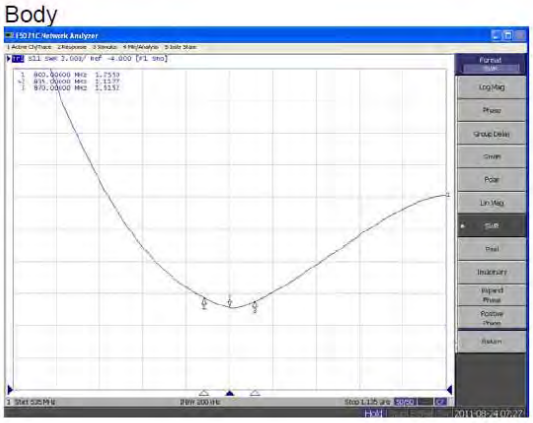
SWR

Head



Body



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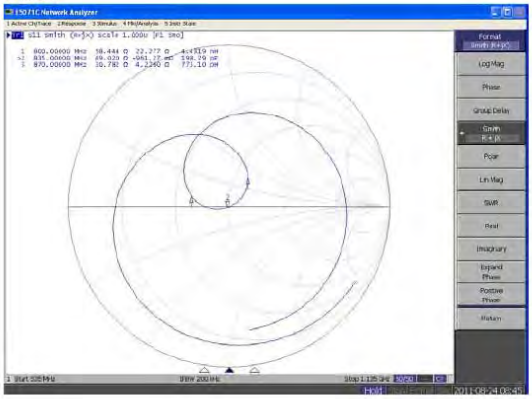
NCL Calibration Laboratories

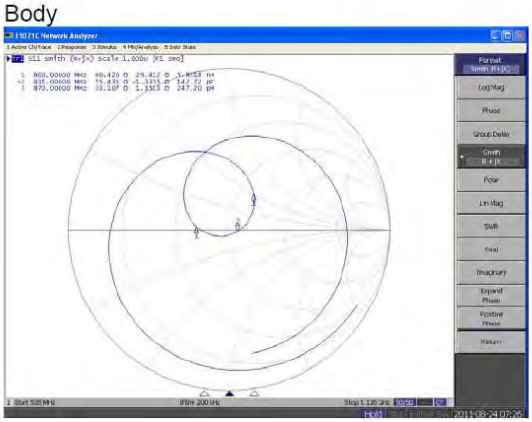
Division of APREL Laboratories.

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 2011.

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

835MHz Dipole Calibration By BACL at 2013-12-20

Mechanical Verification

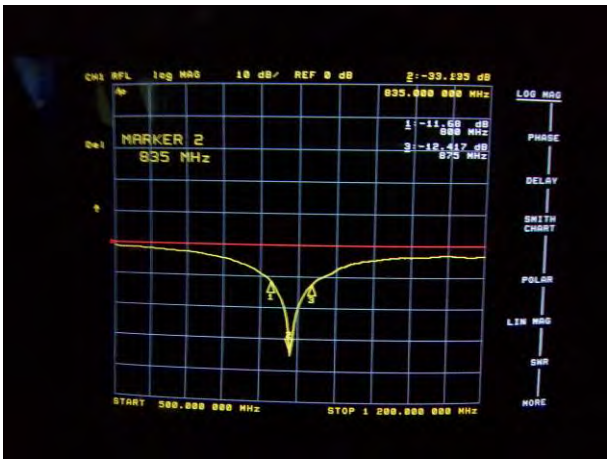
APREL Length	APREL Height	Measured Length	Measured Height
161.0 mm	89.8 mm	161.1 mm	89.7 mm

Tissue Type	Measured Return Loss	Measured Impedance
Head	-33.135 dB	51.898 Ω
Body	-25.362 dB	50.604 Ω

Test Graphs:

Head Tissue

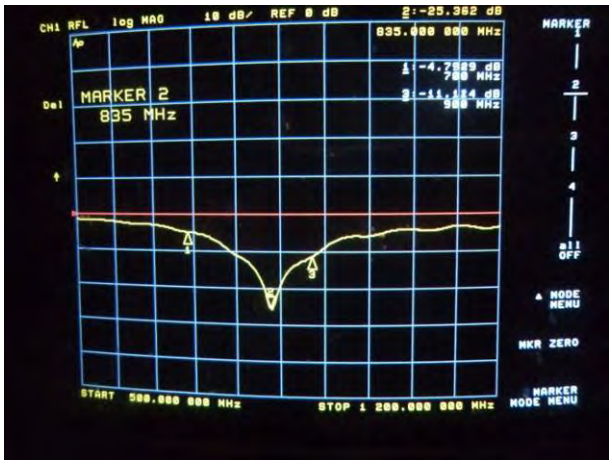
Return Loss :



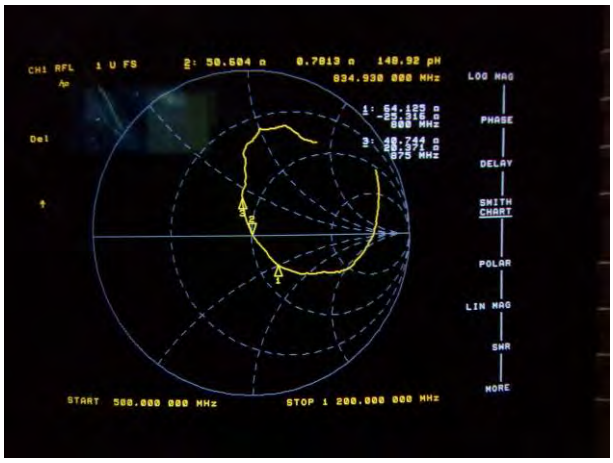
Impedance :

Body Tissue

Return Loss :



Impedance :



NCL CALIBRATION LABORATORIES

Calibration File No: DC-1331
Project Number: BAC-dipole –cal-5615

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

Calibrated: 25th August, 2011
Released on: 25th August, 2011

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

Released By: _____

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

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

Stuart Nicol

C. Teodorian

Primary Measurement Standards		
Instrument	**Serial Number**	**Cal due date**
Power meter Anritsu MA2408A	245025437	Nov.4, 2011
Power Sensor Anritsu MA2481D	103555	Nov 4, 2011
Attenuator HP 8495A (70dB) 1	944A10711	Aug.8, 2012
Network Analyzer Agilent E5071C	1334746J	Feb. 8, 2012
Secondary Measurement Standards		
Signal Generator Agilent E4438C	-506 MY55182336	June 7, 2012

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

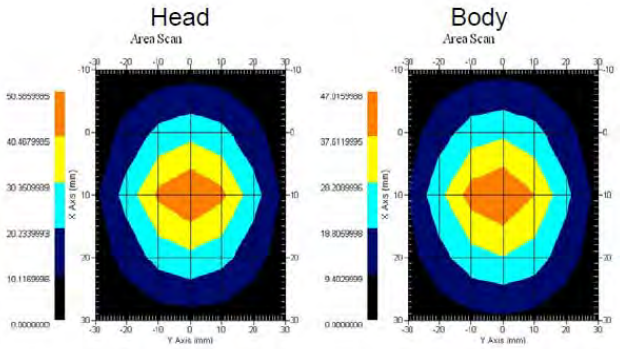
Length: 67.1 mm
Height: 38.9 mm

Electrical Specification

Tissue	Frequency	SWR:	Return Loss	Impedance
Head	1900MHz	1.0417 U	-35.395dB	49.020 Ω
Body	1900MHz	1.1177 U	-25.424dB	55.435 Ω

System Validation Results

Tissue	Frequency	1 Gram	10 Gram	Peak
Head	1900 MHz	39.648	20.311	73.365
Body	1900 MHz	39.769	20.176	75.866



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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 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-020 130 MHz to 26 GHz E-Field Probe Serial Number 212.

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"

Conditions

Dipole 210-00710 was new taken from stock.

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
68.0 mm	39.5 mm	67.1mm	38.9 mm

Electrical Validation

Tissue Type	Return Loss:	SWR:	Impedance:
Head	-29.360 dB	1.0732 U	47.869 Ω
Body	-22.799 dB	1.1566 U	48.022 Ω

Tissue Validation

	Dielectric constant, ε_r	Conductivity, σ [S/m]
Head Tissue 1900MHz	38.4	1.43
Body Tissue 1900MHz	51.87	1.59

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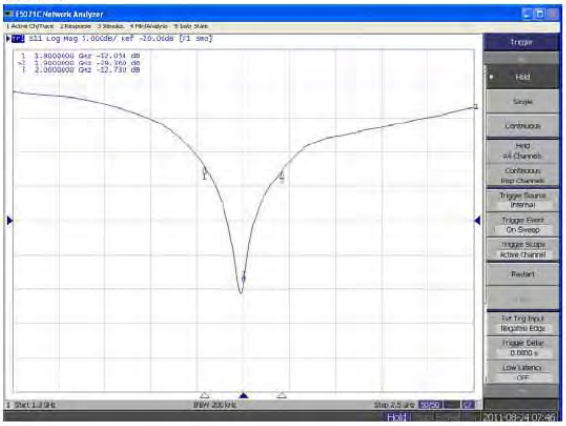
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

Head



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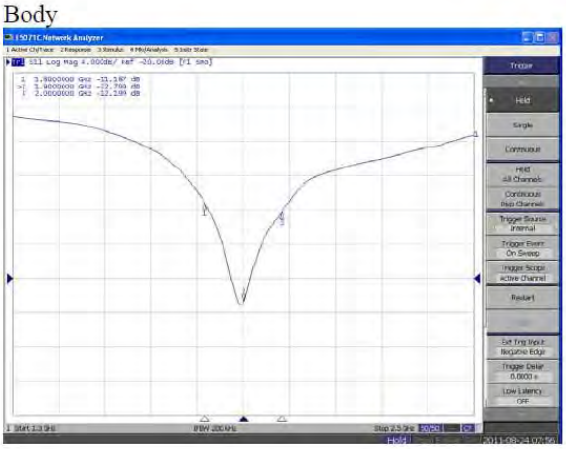

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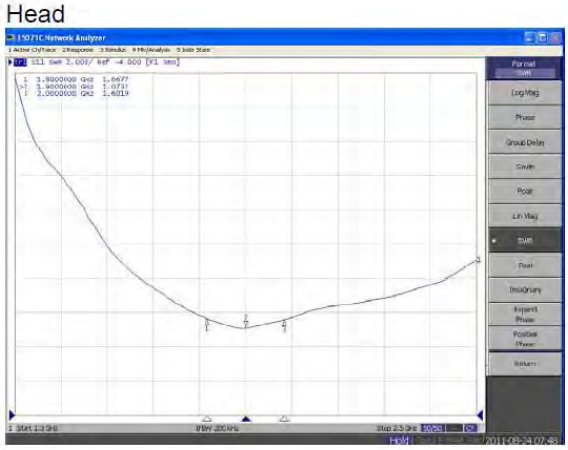
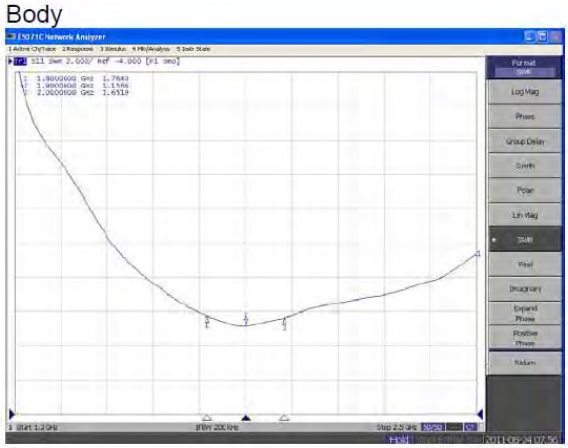
SWR

Head



Body



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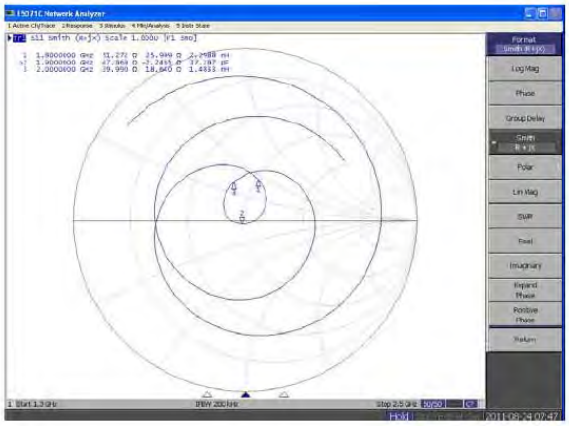
Smith Chart Dipole Impedance

Head



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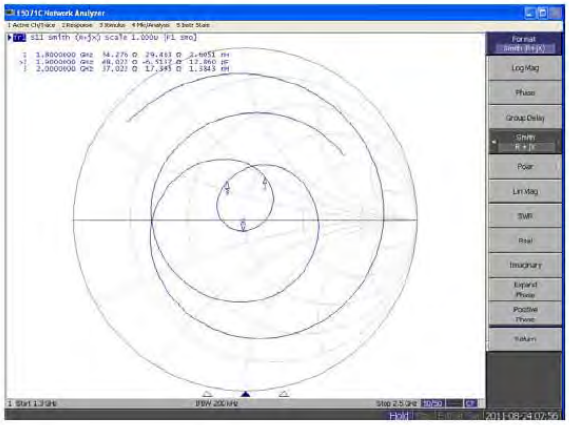

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Test Equipment

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 2011

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1900MHz Dipole Calibration By BACL at 2013-12-20

Mechanical Verification

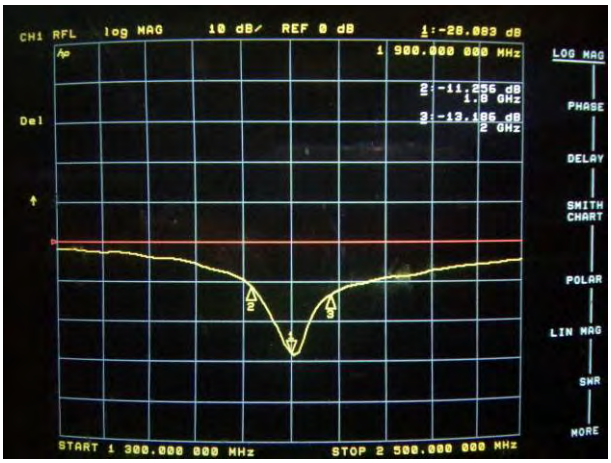
APREL Length	APREL Height	Measured Length	Measured Height
68.0 mm	39.4 mm	68.3 mm	39.2 mm

Tissue Type	Measured Return Loss	Measured Impedance
Head	-28.083 dB	47.477 Ω
Body	-22.022 dB	48.076 Ω

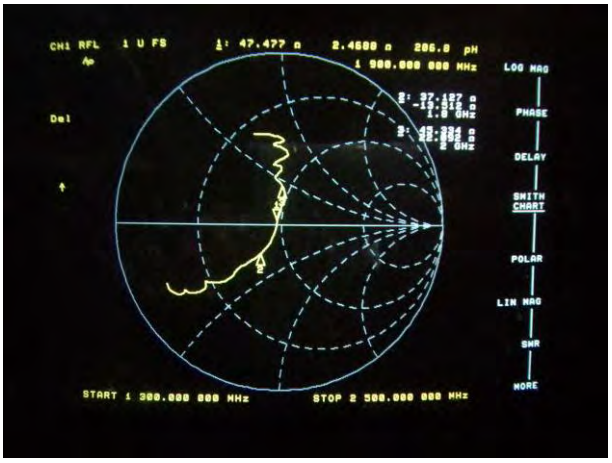
Test Graphs:

Head Tissue

Return Loss :

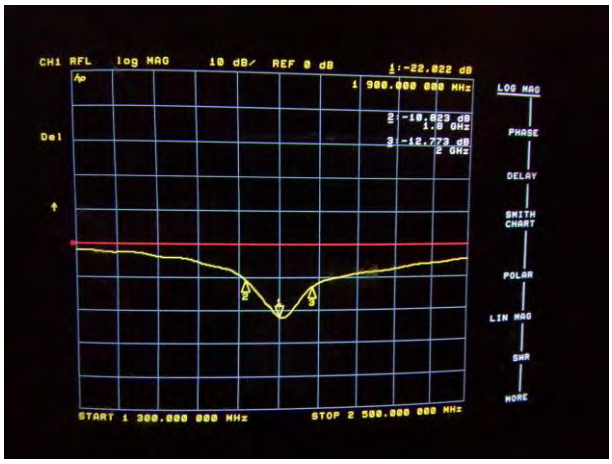


Impedance :



Body Tissue

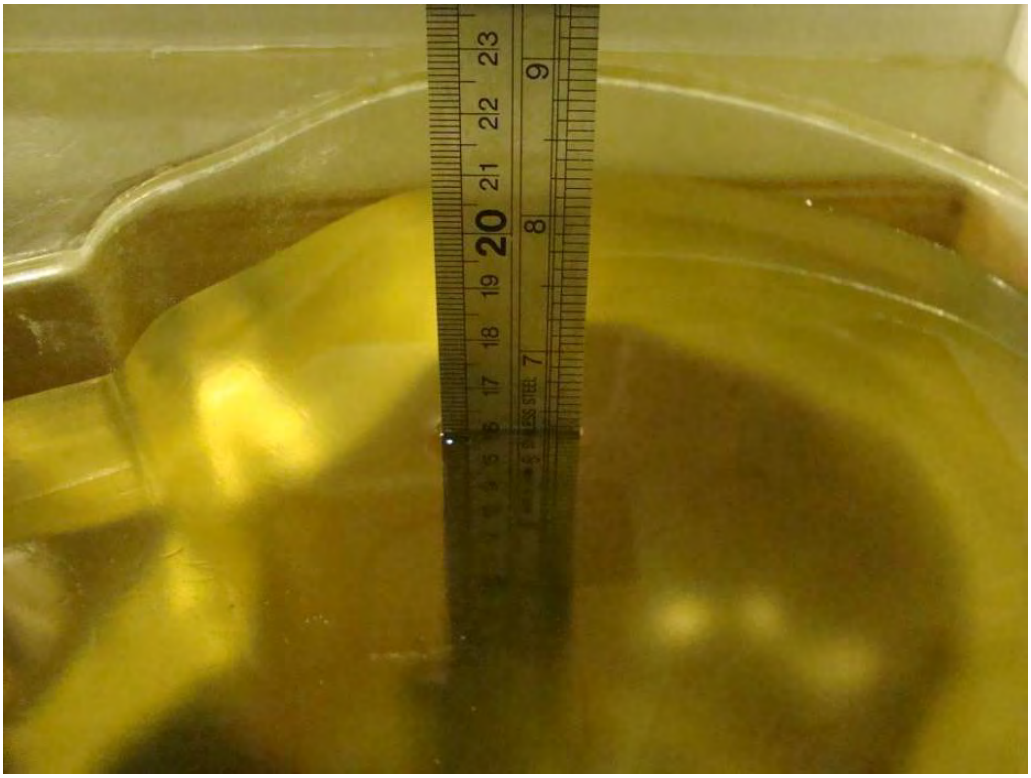
Return Loss :



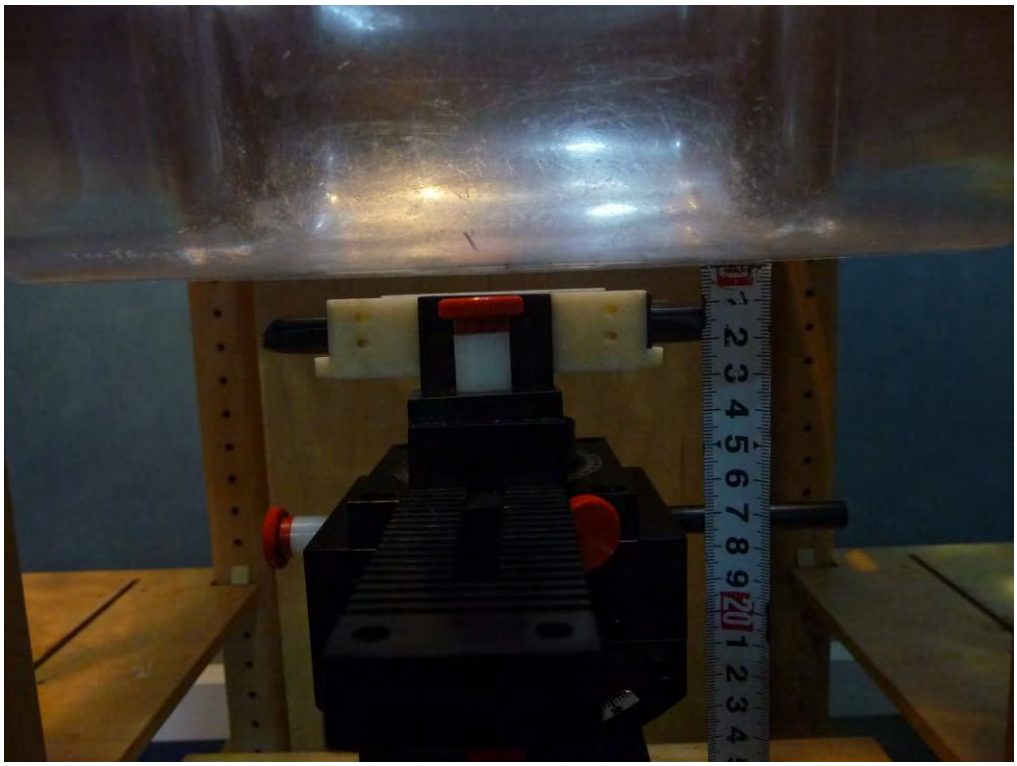
Impedance :

APPENDIX D EUT TEST POSITION PHOTOS

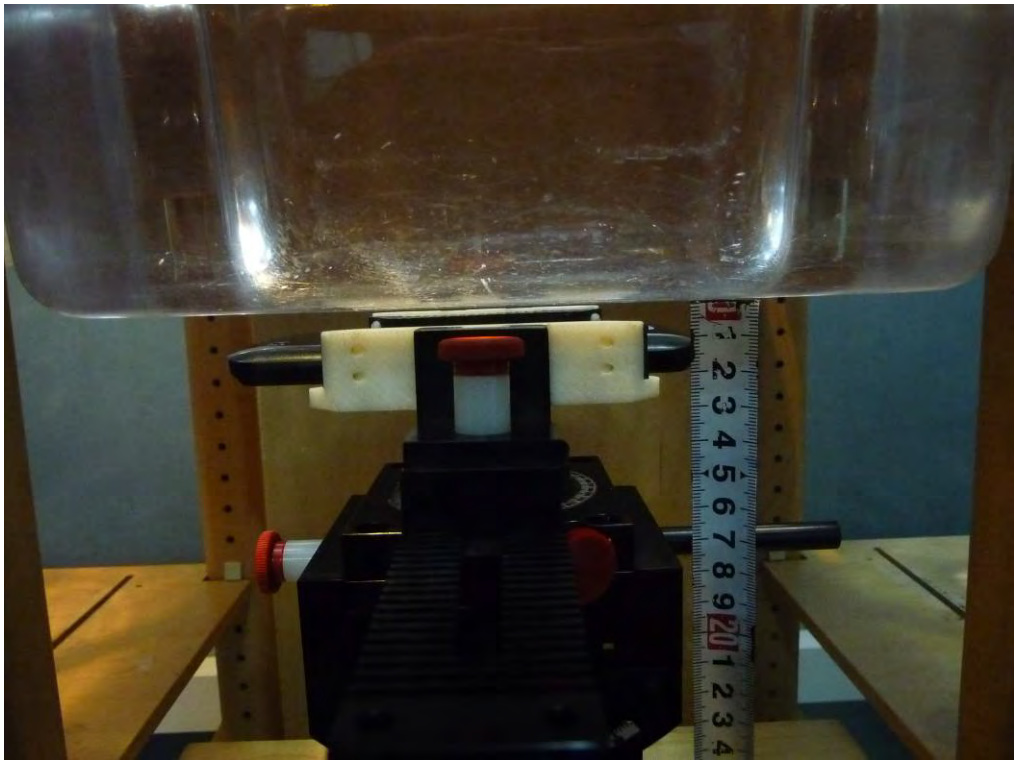
Liquid depth ≥ 15cm



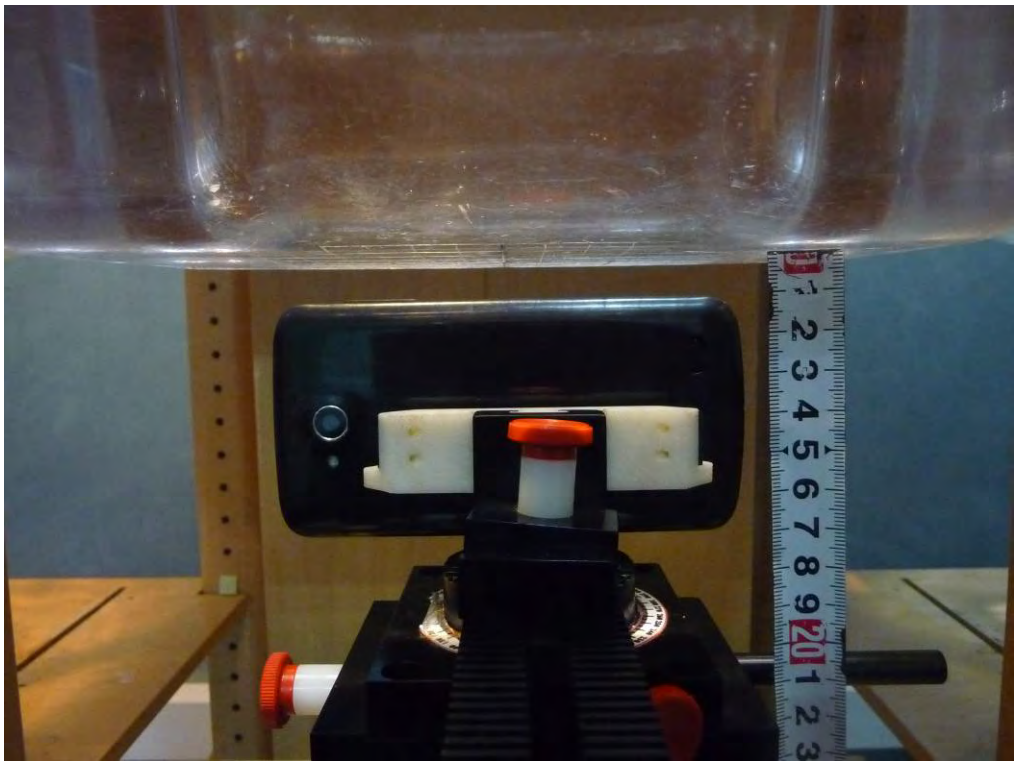
Body-worn Front Setup Photo



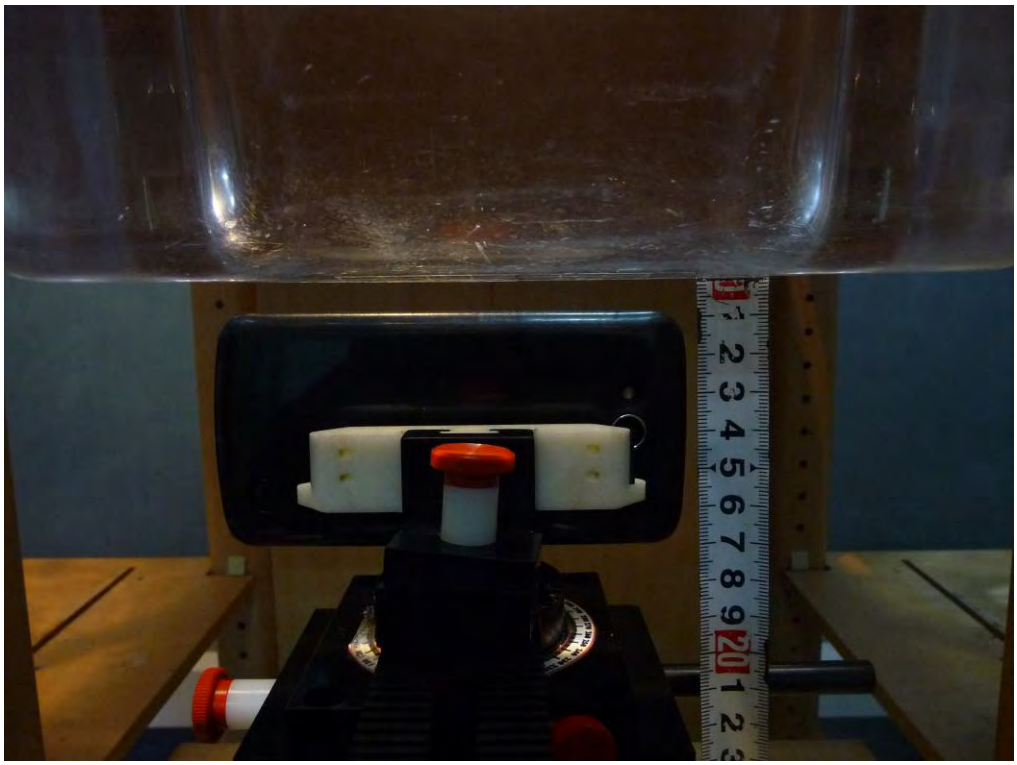
Body-worn Back Setup Photo



Body-worn Left Setup Photo

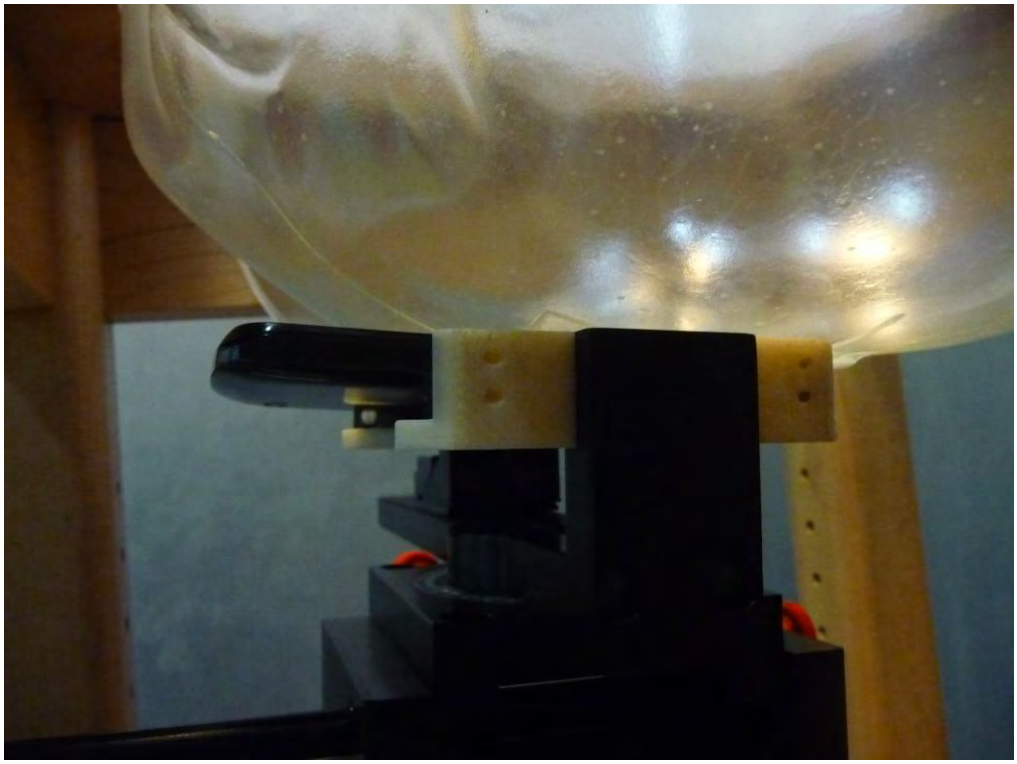


Body-worn Right Setup Photo

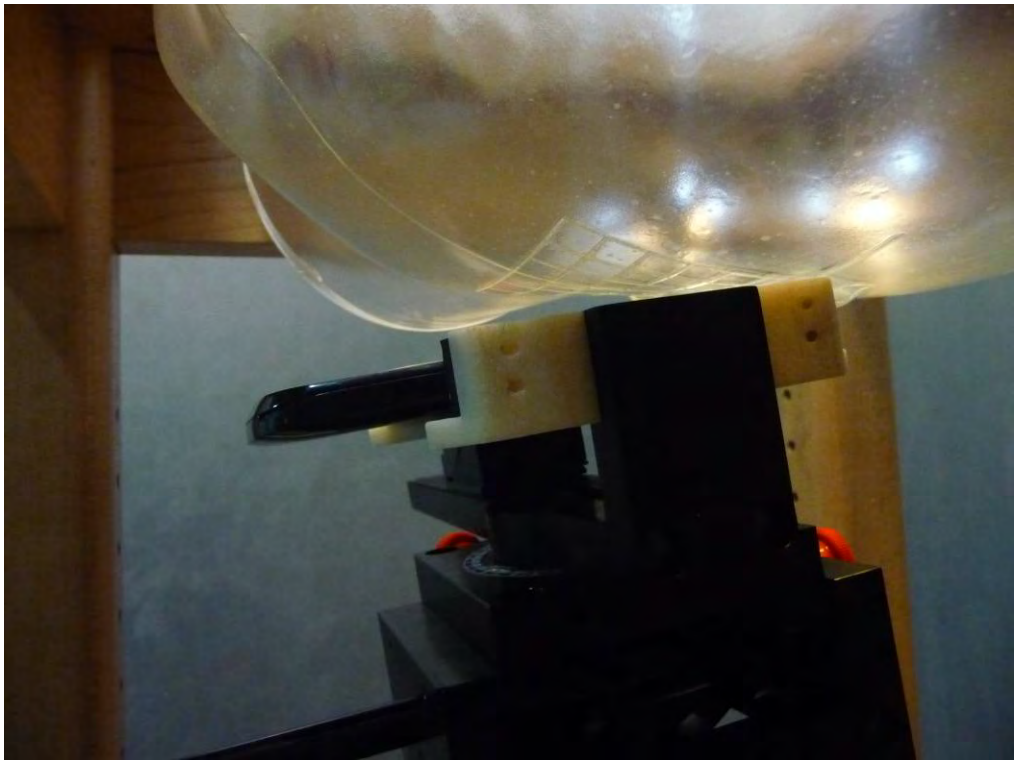


Body-worn Bottom Setup Photo

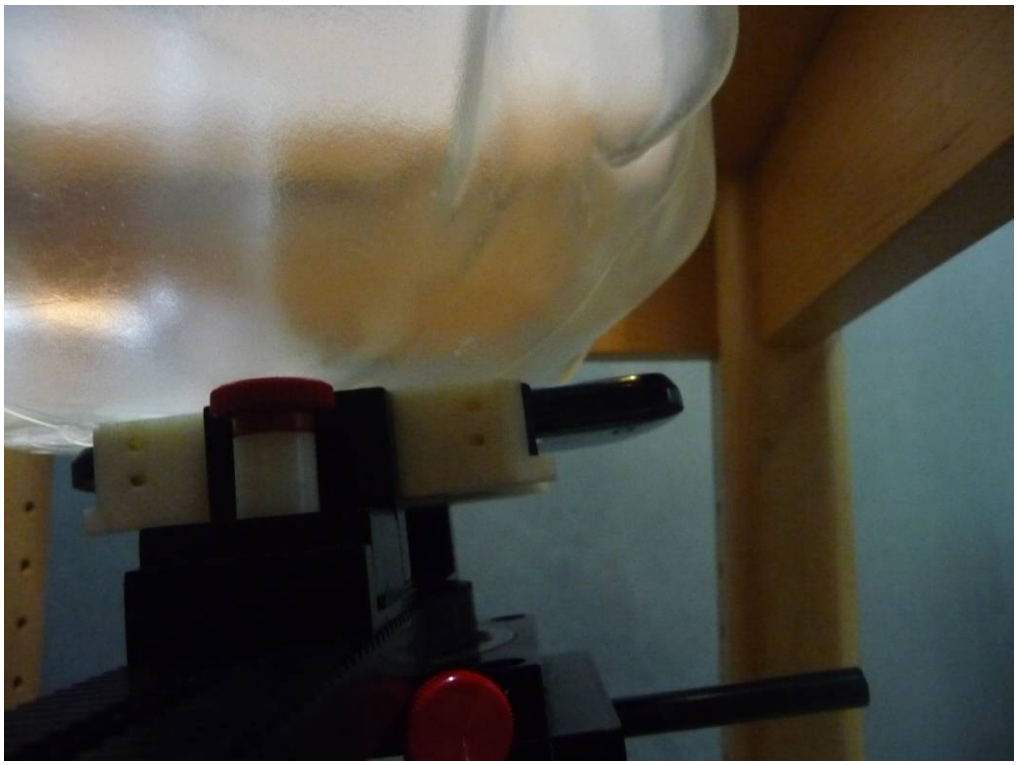
Left Head Touch Setup Photo



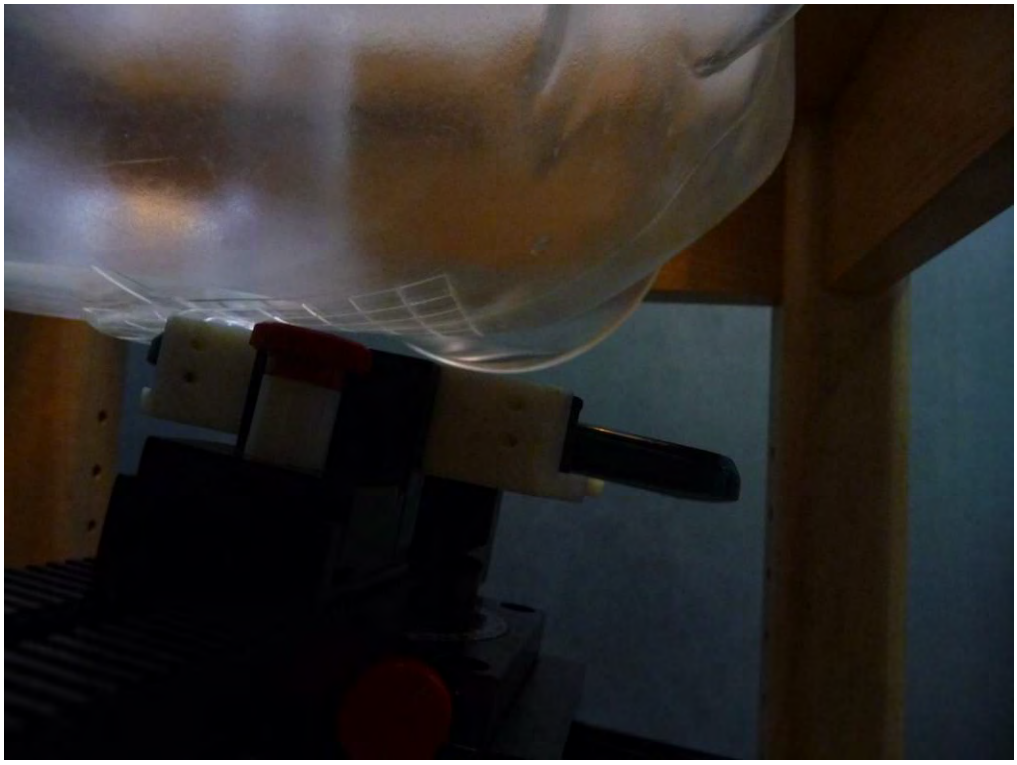
Left Head Tilt Setup Photo



Right Head Touch Setup Photo



Right Head Tilt Setup Photo



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 – Battery off View

APPENDIX F INFORMATIVE REFERENCES

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