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: 2ABYGB8404

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	2ABYGB8404
	Model Number	B8404
	Test Date	2014-2-12 to 2013-2-14

Frequency	Max. SAR Level(s) Reported	Limit(W/Kg)
GSM 850	0.454 W/kg 1g Head SAR 1.385 W/kg 1g Body SAR	**1. 6**
PCS 1900	0.230 W/kg 1g Head SAR 0.792 W/kg 1g Body SAR	
WCDMA1900	0.456 W/kg 1g Head SAR 0.916 W/kg 1g Body SAR	
Simultaneous	0.873 W/kg 1g Head SAR 1.594 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	RSZ140121003-20	Original Report	2014-02-19

EUT DESCRIPTION

This report has been prepared on behalf of Shenzhen Xiangyue Perfect Digital Science&Technology Co., Ltd and their product, FCC ID: 2ABYGB8404, Model: *B8404* 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 : 33.16 dBm PCS 1900: 31.11 dBm WCDMA 1900: 22.85 dBm WiFi: 9.80 dBm Bluetooth: 5.39 dBm
Dimensions (L*W*H):	125 mm (L) × 65 mm (W) × 11.8 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

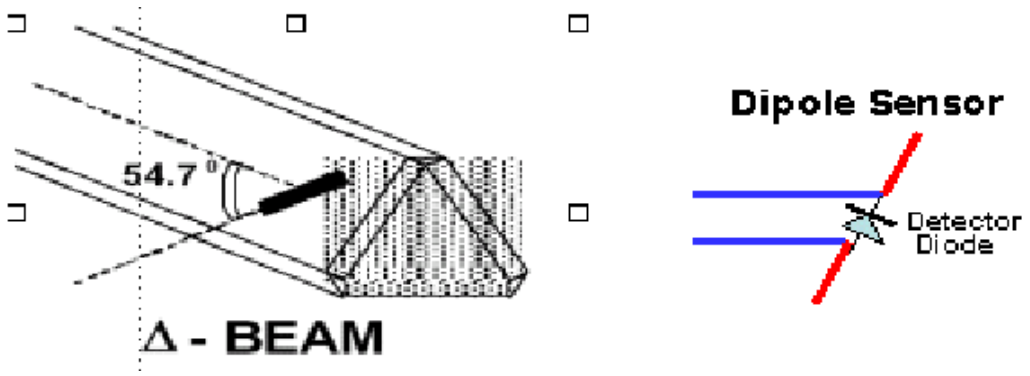
The overall uncertainty for the methodology and algorithms the used during the SAR calculation was evaluated using the data from IEEE 1528 based on the example f3 algorithm:

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

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

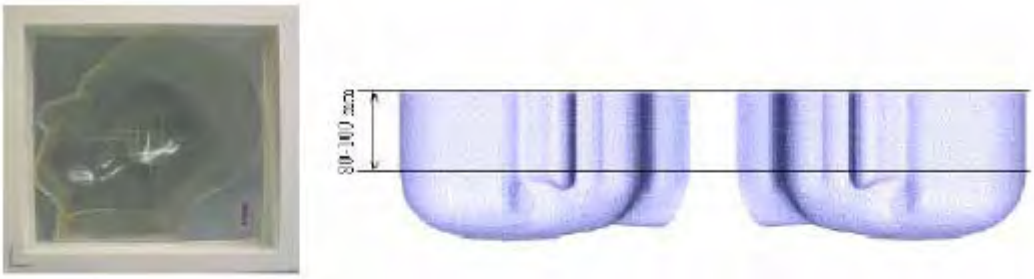
The universal device positioner allows complete freedom of movement of the EUT. Developed to hold a EUT in a free-space scenario any additional loading attributable to the material used in the construction of the positioner has been eliminated. Repeatability has been enhanced through the linear scales 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	σ (S/m)	εr	σ (S/m)
150	52.3	0.76	61.9	0.80
300	45.3	0.87	58.2	0.92
450	43.5	0.87	56.7	0.94
835	41.5	0.90	55.2	0.97
900	41.5	0.97	55.0	1.05
915	41.5	0.98	55.0	1.06
1450	40.5	1.20	54.0	1.30
1610	40.3	1.29	53.8	1.40
1800-2000	40.0	1.40	53.3	1.52
2450	39.2	1.80	52.7	1.95
3000	38.5	2.40	52.0	2.73
5800	35.3	5.27	48.2	6.00

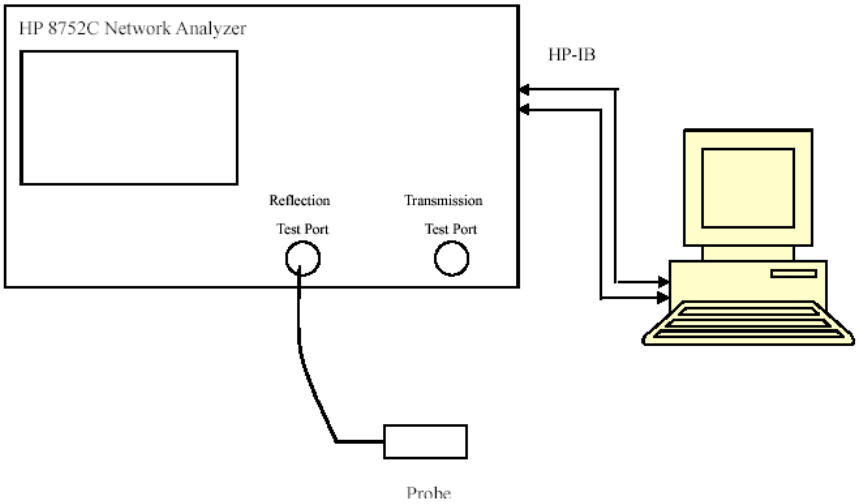
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Information

Equipment	Model	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	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ (S/m)	
824.2	Head	41.31	0.89	41.50	0.90	-0.458	-1.111	±5
	Body	55.03	0.95	55.20	0.97	-0.308	-2.062	±5
836.6	Head	41.27	0.90	41.50	0.90	-0.554	0.000	±5
	Body	55.10	0.97	55.20	0.97	-0.181	0.000	±5
848.8	Head	41.04	0.92	41.50	0.90	-1.108	2.222	±5
	Body	55.19	0.99	55.20	0.97	-0.018	2.062	±5
1850.2	Head	40.10	1.40	40.00	1.40	0.250	0.000	±5
	Body	53.46	1.51	53.30	1.52	0.300	-0.658	±5
1852.4	Head	40.11	1.39	40.00	1.40	0.275	-0.714	±5
	Body	53.41	1.51	53.30	1.52	0.206	-0.658	±5
1880.0	Head	40.11	1.42	40.00	1.40	0.275	1.429	±5
	Body	53.21	1.55	53.30	1.52	-0.169	1.974	±5
1907.6	Head	40.12	1.44	40.00	1.40	0.300	2.857	±5
	Body	53.17	1.57	53.30	1.52	-0.244	3.289	±5
1909.8	Head	40.12	1.44	40.00	1.40	0.300	2.857	±5
	Body	53.29	1.56	53.30	1.52	-0.019	2.632	±5

**Liquid Verification was performed on 2014-02-12.*

Please refer to the following tables.

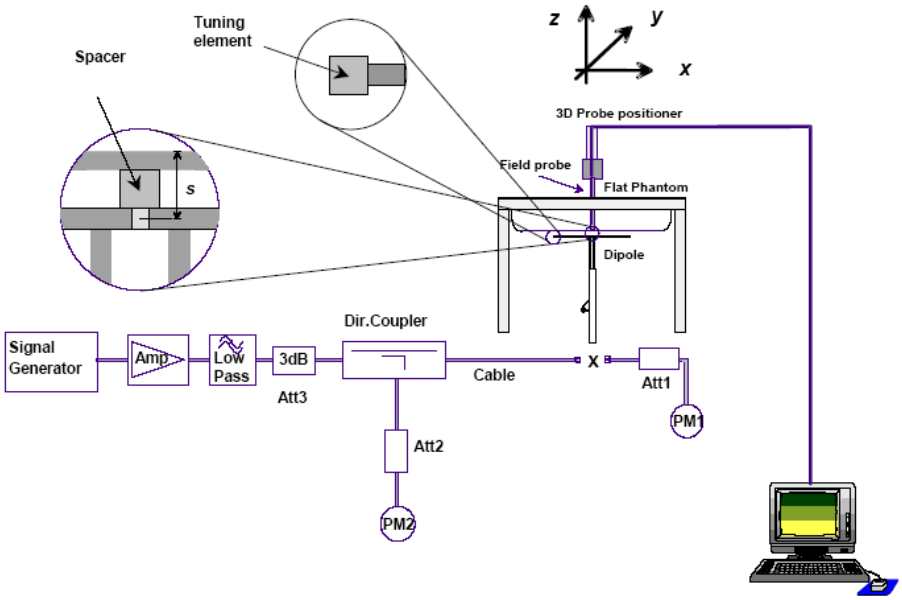
835 MHz Head				835 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
824.0	41.3149	19.4446		824.0	55.0322	20.8061
824.5	41.2839	19.4451		824.5	55.0353	20.7056
825.0	41.2672	19.4457		825.0	55.0384	20.7182
825.5	41.1621	19.4462		825.5	55.0416	20.7306
826.0	41.1804	19.4468		826.0	55.0447	20.8656
826.5	41.2023	19.4473		826.5	55.0479	20.9294
827.0	41.1788	19.4479		827.0	55.0510	20.8439
827.5	41.2261	19.4484		827.5	55.0541	20.7220
828.0	41.2457	19.4490		828.0	55.0573	20.7566
828.5	41.2522	19.4495		828.5	55.0604	20.7140
829.0	41.3031	19.4501		829.0	55.0636	20.8182
829.5	41.2516	19.4507		829.5	55.0667	20.7610
830.0	41.2880	19.4512		830.0	55.0698	20.6389
830.5	41.2480	19.4518		830.5	55.0730	20.7033
831.0	41.2210	19.4523		831.0	55.0761	20.6884
831.5	41.2405	19.4529		831.5	55.0792	20.8959
832.0	41.2024	19.4534		832.0	55.0824	20.8735
832.5	41.1772	19.4540		832.5	55.0855	20.6502
833.0	41.2177	19.4545		833.0	55.0887	20.5836
833.5	41.2491	19.4551		833.5	55.0918	20.6951
834.0	41.2466	19.4556		834.0	55.0949	20.8469
834.5	41.2451	19.4562		834.5	55.0981	20.7399
835.0	41.2700	19.4567		835.0	55.1012	20.6833
835.5	41.2710	19.4576		835.5	55.1043	20.9310
836.0	41.2746	19.4585		836.0	55.1065	20.9380
836.5	41.2696	19.4593		836.5	55.1006	20.7958
837.0	41.2664	19.4602		837.0	55.1138	20.6229
837.5	41.2406	19.4610		837.5	55.1169	20.6591
838.0	41.2638	19.4619		838.0	55.1200	20.9434
838.5	41.2223	19.4627		838.5	55.1232	20.9586
839.0	41.2122	19.4636		839.0	55.1263	20.8806
839.5	41.2147	19.4644		839.5	55.1294	20.8156
840.0	41.2258	19.4653		840.0	55.1326	20.8827
840.5	41.2151	19.4662		840.5	55.1357	20.9281
841.0	41.1984	19.4670		841.0	55.1389	20.8832
841.5	41.2279	19.4679		841.5	55.1420	20.8200
842.0	41.2296	19.4687		842.0	55.1451	20.9958
842.5	41.2332	19.4696		842.5	55.1483	20.9643
843.0	41.2273	19.4604		843.0	55.1514	20.9247
843.5	41.1510	19.4612		843.5	55.1546	20.8802
844.0	41.2273	19.4621		844.0	55.1577	20.8979
844.5	41.1816	19.4630		844.5	55.1608	20.9238
845.0	41.1076	19.4638		845.0	55.1640	20.8332
845.5	41.1229	19.4647		845.5	55.1671	20.7796
846.0	41.0775	19.4856		846.0	55.1702	20.9526
846.5	41.1184	19.4865		846.5	55.1734	21.0140
847.0	41.0987	19.4873		847.0	55.1765	20.9628
847.5	41.1019	19.4882		847.5	55.1797	20.8832
848.0	41.0755	19.4890		848.0	55.1828	20.9733
848.5	41.0801	19.4899		848.5	55.1859	21.0514
849.0	41.0403	19.4907		849.0	55.1891	21.0516

1900 MHz Head				1900 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
1850.0	40.1046	13.5988		1850.0	53.4563	14.6615
1851.2	40.1069	13.5688		1851.2	53.3882	14.6189
1852.4	40.1071	13.5361		1852.4	53.4071	14.6200
1853.6	40.1074	13.5594		1853.6	53.3837	14.5963
1854.8	40.1076	13.5534		1854.8	53.2865	14.6157
1856.0	40.1079	13.4775		1856.0	53.3895	14.6522
1857.2	40.1081	13.6174		1857.2	53.3827	14.6782
1858.4	40.1084	13.5136		1858.4	53.3647	14.5994
1859.6	40.1086	13.5675		1859.6	53.3464	14.5937
1860.8	40.1089	13.5688		1860.8	53.2422	14.6465
1862.0	40.1091	13.5854		1862.0	53.2699	14.4737
1863.2	40.1094	13.6078		1863.2	53.2158	14.4865
1864.4	40.1096	13.6428		1864.4	53.2506	14.5036
1865.6	40.1099	13.6374		1865.6	53.2571	14.4746
1866.8	40.1101	13.6262		1866.8	53.3321	14.4652
1868.0	40.1104	13.6447		1868.0	53.4005	14.4813
1869.2	40.1106	13.7054		1869.2	53.4096	14.5037
1870.4	40.1109	13.6982		1870.4	53.3231	14.5552
1871.6	40.1111	13.6721		1871.6	53.2655	14.5559
1872.8	40.1114	13.7022		1872.8	53.3039	14.5849
1874.0	40.1116	13.6448		1874.0	53.2304	14.5932
1875.2	40.1119	13.6789		1875.2	53.2935	14.6564
1876.4	40.1121	13.6769		1876.4	53.1966	14.5792
1877.6	40.1123	13.7414		1877.6	53.2989	14.6592
1878.8	40.1126	13.6370		1878.8	53.3267	14.7911
1880.0	40.1128	13.5822		1880.0	53.2090	14.8100
1881.2	40.1131	13.6309		1881.2	53.1673	14.8071
1882.4	40.1133	13.6535		1882.4	53.2628	14.7784
1883.6	40.1136	13.6223		1883.6	53.2283	14.7345
1884.8	40.1138	13.6229		1884.8	53.2532	14.7572
1886.0	40.1141	13.6222		1886.0	53.2884	14.6894
1887.2	40.1143	13.6173		1887.2	53.2692	14.6656
1888.4	40.1146	13.6124		1888.4	53.3590	14.6999
1889.6	40.1148	13.6076		1889.6	53.2895	14.7045
1890.8	40.1151	13.6028		1890.8	53.3351	14.7613
1892.0	40.1153	13.5980		1892.0	53.3231	14.5575
1893.2	40.1156	13.5931		1893.2	53.2955	14.5184
1894.4	40.1158	13.5883		1894.4	53.2682	14.5675
1895.6	40.1161	13.5834		1895.6	53.2610	14.9013
1896.8	40.1163	13.5786		1896.8	53.2509	14.8994
1898.0	40.1166	13.5737		1898.0	53.2513	14.8800
1899.2	40.1168	13.5689		1899.2	53.3283	14.8804
1900.4	40.1171	13.5640		1900.4	53.2932	14.7791
1901.6	40.1173	13.5592		1901.6	53.2967	14.8684
1902.8	40.1176	13.5543		1902.8	53.2658	14.8284
1904.0	40.1178	13.5495		1904.0	53.3475	14.7973
1905.2	40.1181	13.5446		1905.2	53.2592	14.7658
1906.4	40.1183	13.5398		1906.4	53.2491	14.6907
1907.6	40.1186	13.5349		1907.6	53.1748	14.8075
1908.8	40.1188	13.5301		1908.8	53.2591	14.7429
1910.0	40.1191	13.5252		1910.0	53.2856	14.7066

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 (%)
2014-2-12	835	Head	1g	9.773	9.590	1.908	±10
		Body	1g	9.814	9.684	1.342	±10
	1900	Head	1g	40.214	39.648	1.428	±10
		Body	1g	40.012	39.769	0.611	±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 : 9.528 W/kg
Power Drift-Finish : 9.541 W/kg
Power Drift (%) : 1.335

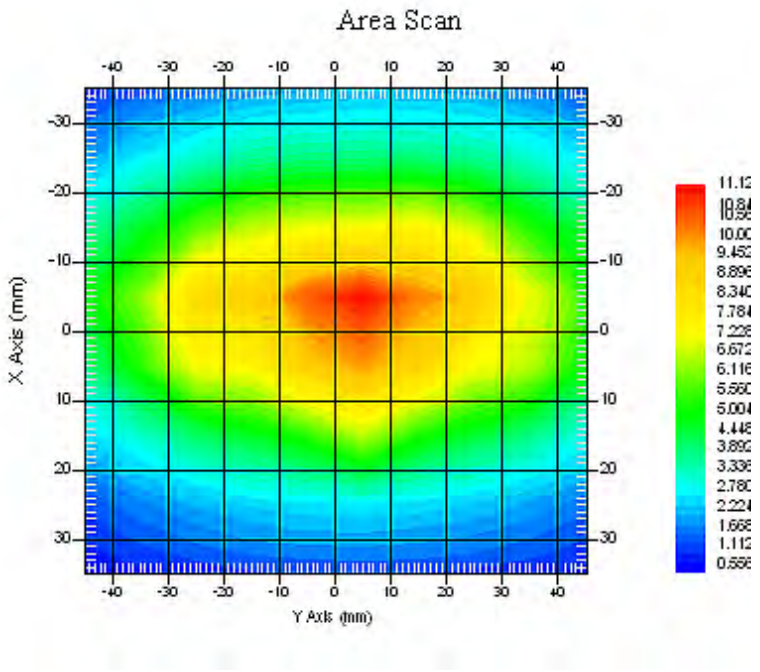
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Serial No. : System Default
Location : Center
Description : Default
Phantom Data

Tissue Data
Type : Head
Serial No. : 270-01002
Frequency : 835.0 MHz
Last Calib. Date : 12-Feb-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 41.27 F/m
Sigma : 0.90 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 : 9.773 W/kg
10 gram SAR value : 6.569W/kg
Area Scan Peak SAR : 11.114 W/kg
Zoom Scan Peak SAR : 16.125 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 : 9.852 W/kg
Power Drift-Finish : 9.840 W/kg
Power Drift (%) : -1.247

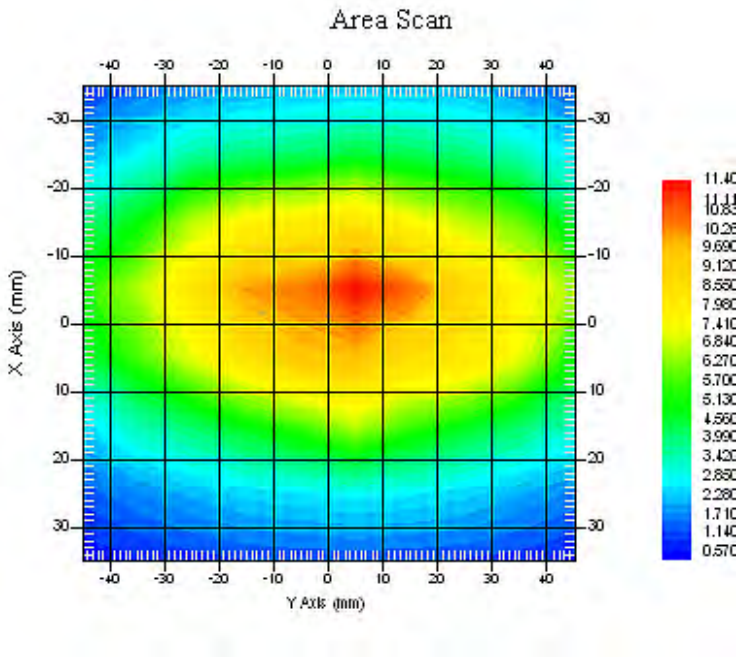
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Serial No. : System Default
Location : Center
Description : Default
Phantom Data

Tissue Data
Type : Body
Serial No. : 270-02101
Frequency : 835.0 MHz
Last Calib. Date : 12-Feb-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 55.10 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 : 9.814 W/kg
10 gram SAR value : 6.758 W/kg
Area Scan Peak SAR : 11.335 W/kg
Zoom Scan Peak SAR : 16.845 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 : 40.112 W/kg
Power Drift-Finish : 39.195 W/kg
Power Drift (%) : -0.821

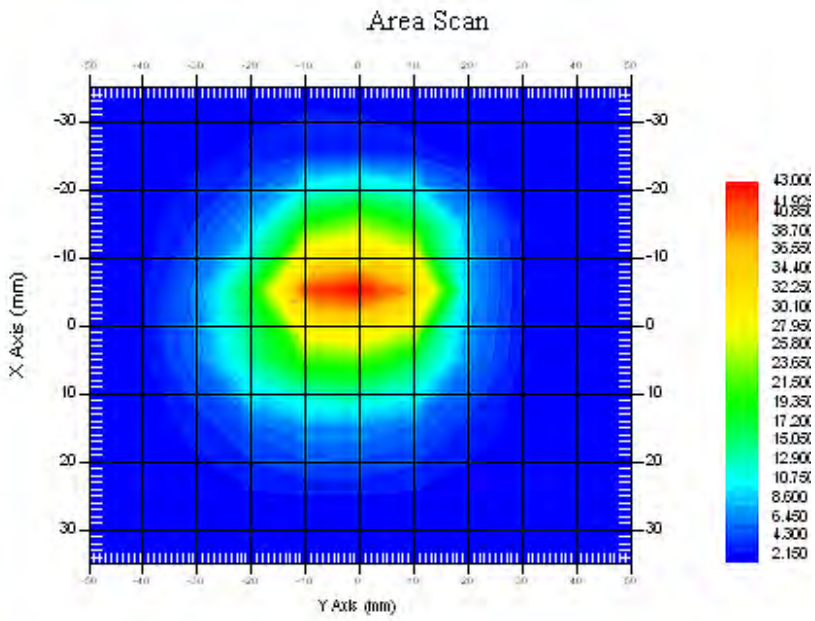
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Serial No. : System Default
Location : Center
Description : Default

Tissue Data
Type : Head
Serial No. : 295-01103
Frequency : 1900.00 MHz
Last Calib. Date : 12-Feb-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 40.12 F/m
Sigma : 1.43 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 : 40.214 W/kg
10 gram SAR value : 20.447 W/kg
Area Scan Peak SAR : 42.993 W/kg
Zoom Scan Peak SAR : 85.849 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 : 39.002 W/kg
Power Drift-Finish : 39.658 W/kg
Power Drift (%) : 1.626

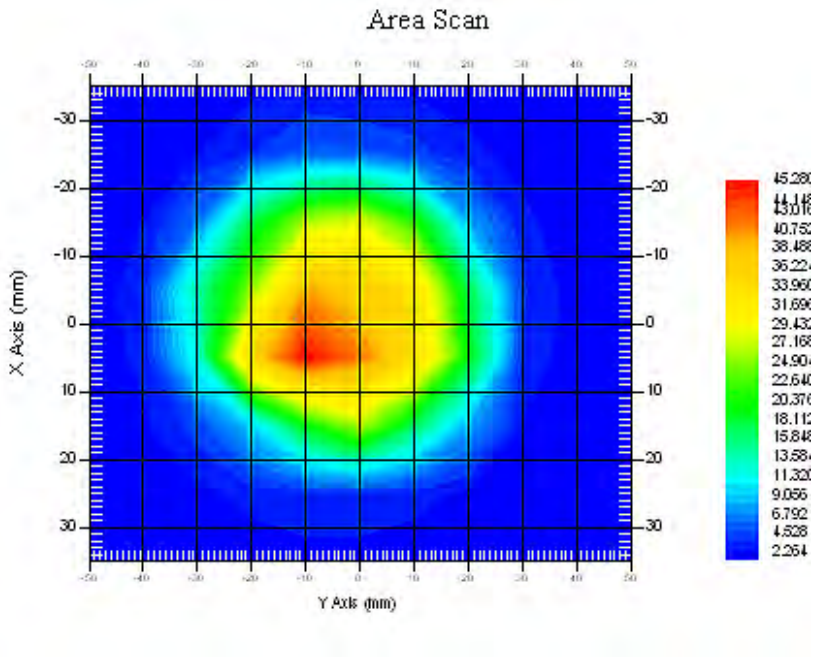
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Serial No. : System Default
Location : Center
Description : Default

Tissue Data
Type : Body
Serial No. : 295-02102
Frequency : 1900.00 MHz
Last Calib. Date : 12-Feb-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 53.29 F/m
Sigma : 1.56 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 : 40.012 W/kg
10 gram SAR value : 20.825 W/kg
Area Scan Peak SAR : 45.277 W/kg
Zoom Scan Peak SAR : 90.528 W/kg



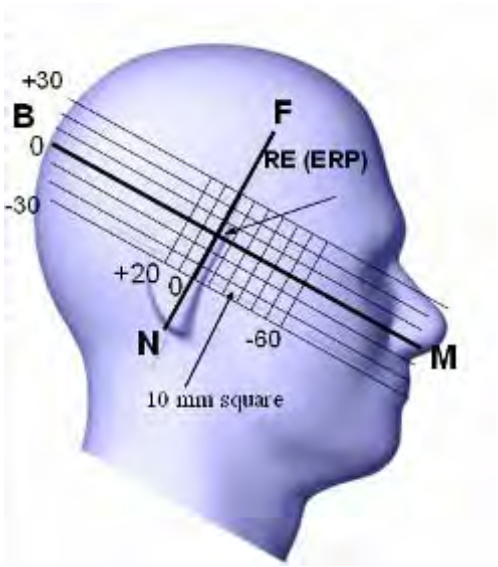
1900 MHz System Validation with Body Tissue

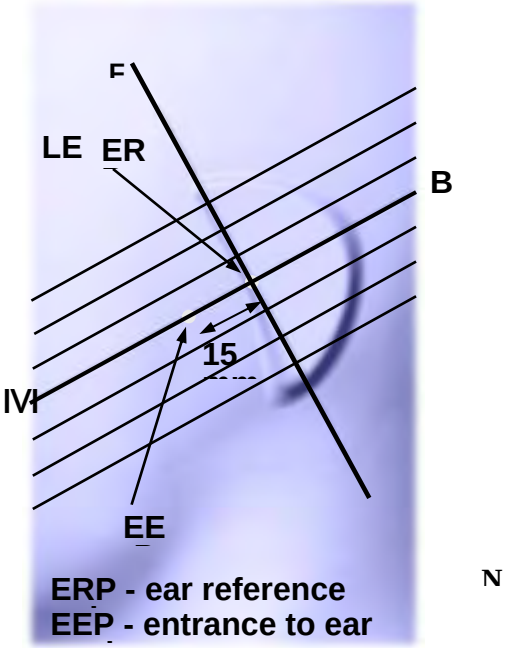
EUT TEST STRATEGY AND METHODOLOGY

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

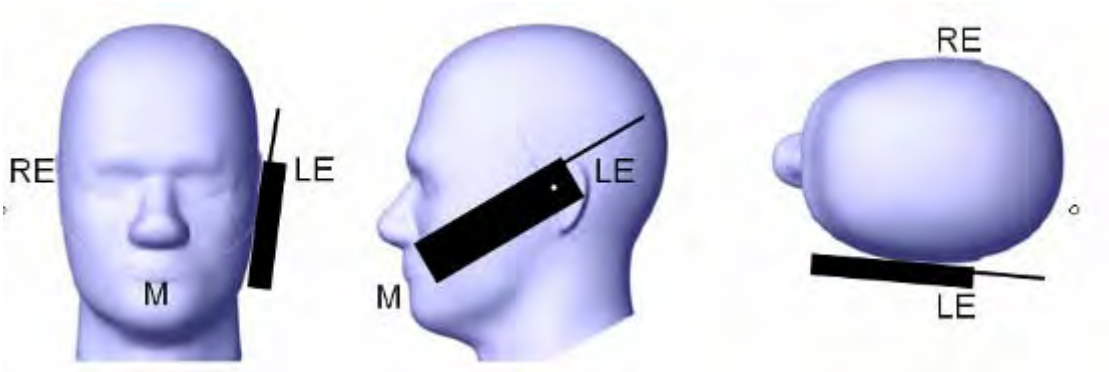
The device is brought toward the mouth of the head phantom by pivoting against the "ear reference point" or along the "N-F" line for the SCC-34/SC-2 head phantom.

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

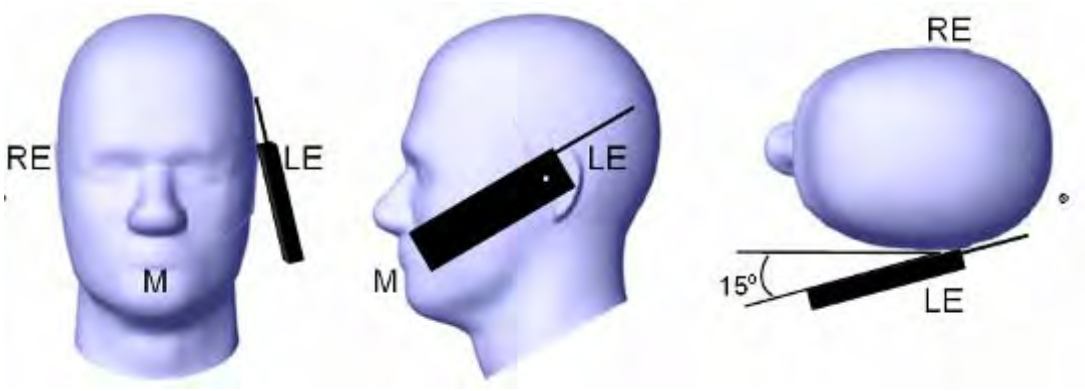
With the handset aligned in the "Cheek/Touch Position":

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.

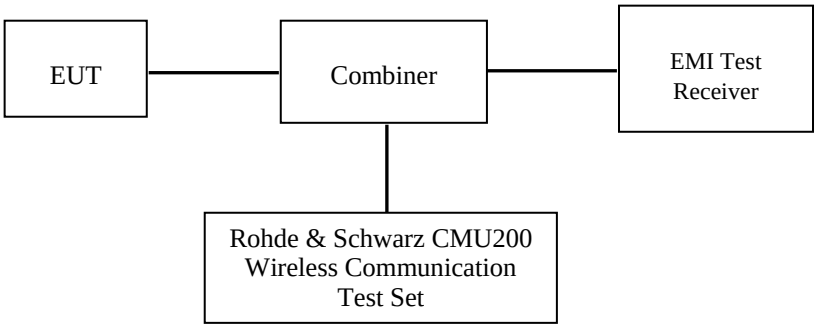
CONDUCTED OUTPUT POWER MEASUREMENT

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	33.50	33.50	33.50
GPRS 1 slot	33.50	33.50	33.50
GPRS 2 slot	32.50	32.50	32.50
GPRS 3 slot	30.50	30.50	30.50
GPRS 4 slot	30.00	30.00	30.00
EGPRS 1 slot	27.50	27.50	27.50
EGPRS 2 slot	26.00	26.00	26.00
EGPRS 3 slot	24.00	24.00	24.00
EGPRS 4 slot	22.50	22.50	22.50
PCS 1900	31.50	31.50	31.50
GPRS 1 slot	31.50	31.50	31.50
GPRS 2 slot	30.50	30.50	30.50
GPRS 3 slot	29.00	29.00	29.00
GPRS 4 slot	28.00	28.00	28.00
EGPRS 1 slot	27.00	27.00	27.00
EGPRS 2 slot	26.00	26.00	26.00
EGPRS 3 slot	23.50	23.50	23.50
EGPRS 4 slot	22.50	22.50	22.50
WCDMA1900	23.00	23.00	23.00
WiFi	10.00	10.00	10.00
Bluetooth	5.50	5.50	5.50

Test Results:

GSM

Band	Frequency (MHz)	Conducted Peak Output Power	
		Meas. Power (dBm)	Meas. Power (W)
GSM 850	824.2	33.16	2.070
	836.6	33.05	2.018
	848.8	33.08	2.032
PCS 1900	1850.2	31.06	1.276
	1880.0	31.11	1.291
	1909.8	31.02	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	33.19	32.26	30.48	29.70
	190	836.6	33.07	32.16	30.35	29.69
	251	848.8	33.10	32.19	30.37	29.74
PCS 1900	512	1850.2	30.95	30.31	28.51	27.44
	661	1880.0	31.02	30.35	28.57	27.56
	810	1909.8	30.98	30.35	28.49	27.46

EGPRS

Band	Channel No.	Frequency (MHz)	RF Peak Output Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	27.24	25.91	23.33	22.03
	190	836.6	27.10	25.76	23.21	21.86
	251	848.8	26.88	25.59	23.01	21.69
PCS 1900	512	1850.2	26.72	25.58	23.31	22.01
	661	1880.0	26.68	25.56	23.37	21.86
	810	1909.8	26.46	25.41	23.17	21.58

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	24.19	26.26	26.23	26.70
	190	836.6	24.07	26.16	26.10	**26.69**
	251	848.8	24.10	26.19	26.12	26.74
PCS 1900	512	1850.2	21.95	24.31	24.26	24.44
	661	1880.0	22.02	24.35	24.32	**24.56**
	810	1909.8	21.98	24.35	24.24	24.46

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	18.24	19.91	19.08	19.03
	190	836.6	18.10	19.76	18.96	18.86
	251	848.8	17.88	19.59	18.76	18.69
PCS 1900	512	1850.2	17.72	19.58	19.06	19.01
	661	1880.0	17.68	19.56	19.12	18.86
	810	1909.8	17.46	19.41	18.92	18.58

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	**22.85**	0.193
	1880.0	9400	22.50	0.178
	1907.6	9538	22.30	0.170

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	21.07	21.05	21.04	21.03
	1880.0	9400	21.38	21.35	20.34	20.32
	1907.6	9538	20.75	20.73	20.72	20.72

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	21.06	21.05	21.04	21.03	21.02
	1880.0	9400	21.43	21.41	21.40	21.38	21.37
	1907.6	9538	20.82	20.80	20.75	20.74	20.72

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	4.60	2.884	1000
	(Middle)2441	5.24	3.342	1000
	(High)2480	5.39	3.459	1000
EDR(4-DQPSK)	(Low)2402	4.34	2.716	1000
	(Middle)2441	4.95	3.126	1000
	(High)2480	5.13	3.258	1000
EDR-8DPSK	(Low)2402	4.57	2.864	1000
	(Middle)2441	5.24	3.342	1000
	(High)2480	5.38	3.451	1000
BT4.0	(Low)2402	-2.10	0.617	1000
	(Middle)2440	-1.86	0.652	1000
	(High)2480	-2.18	0.605	1000

WiFi

Band	Frequency (MHz)	Conducted Output Power	
		(dBm)	(mw)
802.11b	2412	9.26	8.433
	2437	9.46	8.831
	2462	9.65	9.226
802.11g	2412	9.80	9.550
	2437	9.02	7.980
	2462	9.06	8.054
802.11n-HT20	2412	9.58	9.078
	2437	9.04	8.017
	2462	9.04	8.017
802.11n-HT40	2422	9.02	7.980
	2437	9.02	7.980
	2452	9.14	8.204

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 2014-2-12 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	-0.484	33.16	33.50	1.081	0.389	0.421
	190(Middle)	836.6	GSM	0.952	33.05	33.50	1.109	0.393	0.436
	251(High)	848.8	GSM	1.614	33.08	33.50	1.102	0.412	**0.454**
Left Head Tilt	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	1.755	33.05	33.50	1.109	0.226	0.251
	251(High)	848.8	GSM	/	/	/	/	/	/
Right Head Cheek	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	-1.098	33.05	33.50	1.109	0.361	0.400
	251(High)	848.8	GSM	/	/	/	/	/	/
Right Head Tilt	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	-0.571	33.05	33.50	1.109	0.252	0.279
	251(High)	848.8	GSM	/	/	/	/	/	/
Body-Front-Headset (10mm)	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	0.788	33.05	33.50	1.109	0.374	0.415
	251(High)	848.8	GSM	/	/	/	/	/	/
Body-Back-Headset (10mm)	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	1.289	33.05	33.50	1.109	0.662	0.734
	251(High)	848.8	GSM	/	/	/	/	/	/

PCS Band:

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	1.156	31.06	31.50	1.066	0.182	0.194
	661(Middle)	1880.0	GSM	-0.447	31.11	31.50	1.094	0.173	0.189
	810(High)	1909.8	GSM	-1.481	31.02	31.50	1.117	0.206	**0.230**
Left Head Tilt	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	-2.525	31.11	31.50	1.094	0.082	0.090
	810(High)	1909.8	GSM	/	/	/	/	/	/
Right Head Cheek	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	-0.479	31.11	31.50	1.094	0.165	0.181
	810(High)	1909.8	GSM	/	/	/	/	/	/
Right Head Tilt	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	1.305	31.11	31.50	1.094	0.084	0.092
	810(High)	1909.8	GSM	/	/	/	/	/	/
Body-Front-Headset (10mm)	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	-1.824	31.11	31.50	1.094	0.230	0.252
	810(High)	1909.8	GSM	/	/	/	/	/	/
Body-Back-Headset (10mm)	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	2.527	31.11	31.50	1.094	0.253	0.277
	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	3.022	22.85	23.00	1.035	0.392	0.406
	9400	1880.0	WCDMA1900	-0.498	22.50	23.00	1.122	0.365	0.410
	9538	1907.6	WCDMA1900	-1.358	22.30	23.00	1.175	0.388	**0.456**
Left Head Tilt	9262	1852.4	WCDMA1900	-0.846	22.85	23.00	1.035	0.139	0.144
	9400	1880.0	WCDMA1900	/	/	/	/	/	/
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Right Head Cheek	9262	1852.4	WCDMA1900	-1.368	22.85	23.00	1.035	0.344	0.356
	9400	1880.0	WCDMA1900	/	/	/	/	/	/
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Right Head Tilt	9262	1852.4	WCDMA1900	-2.548	22.85	23.00	1.035	0.145	0.150
	9400	1880.0	WCDMA1900	/	/	/	/	/	/
	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	1.152	29.70	30.00	1.072	0.864	0.926
	190(Middle)	836.6	GPRS	-0.868	29.69	30.00	1.074	0.867	0.931
	251(High)	848.8	GPRS	-1.260	29.74	30.00	1.057	0.888	0.939
Body-Back (10mm)	128(Low)	824.2	GPRS	1.525	29.70	30.00	1.072	1.282	1.374
	190(Middle)	836.6	GPRS	2.005	29.69	30.00	1.074	1.290	**1.385**
	251(High)	848.8	GPRS	-2.458	29.74	30.00	1.057	1.242	1.313
Body-Left (10mm)	128(Low)	824.2	GPRS	/	/	/	/	/	/
	190(Middle)	836.6	GPRS	-0.801	29.69	30.00	1.074	0.742	0.797
	251(High)	848.8	GPRS	/	/	/	/	/	/
Body-Right (10mm)	128(Low)	824.2	GPRS	/	/	/	/	/	/
	190(Middle)	836.6	GPRS	-1.207	29.69	30.00	1.074	0.699	0.751
	251(High)	848.8	GPRS	/	/	/	/	/	/
Body-Bottom (10mm)	128(Low)	824.2	GPRS	/	/	/	/	/	/
	190(Middle)	836.6	GPRS	-0.746	29.69	30.00	1.074	0.037	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	-1.102	27.56	28.00	1.107	0.630	0.697
	810(High)	1909.8	GPRS	/	/	/	/	/	/
Body-Back (10mm)	512(Low)	1850.2	GPRS	/	/	/	/	/	/
	661(Middle)	1880.0	GPRS	-1.219	27.56	28.00	1.107	0.691	0.765
	810(High)	1909.8	GPRS	/	/	/	/	/	/
Body-Left (10mm)	512(Low)	1850.2	GPRS	/	/	/	/	/	/
	661(Middle)	1880.0	GPRS	1.355	27.56	28.00	1.107	0.107	0.118
	810(High)	1909.8	GPRS	/	/	/	/	/	/
Body-Right (10mm)	512(Low)	1850.2	GPRS	/	/	/	/	/	/
	661(Middle)	1880.0	GPRS	2.015	27.56	28.00	1.107	0.246	0.272
	810(High)	1909.8	GPRS	/	/	/	/	/	/
Body-Bottom (10mm)	512(Low)	1850.2	GPRS	/	/	/	/	/	/
	661(Middle)	1880.0	GPRS	1.485	27.56	28.00	1.107	0.715	0.792
	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	-1.045	22.85	23.00	1.035	0.739	0.765
	9400	1880.0	WCDMA1900	/	/	/	/	/	/
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Body-Back (10mm)	9262	1852.4	WCDMA1900	-2.301	22.85	23.00	1.035	0.747	0.773
	9400	1880.0	WCDMA1900	-0.675	22.50	23.00	1.122	0.816	**0.916**
	9538	1907.6	WCDMA1900	-1.209	22.30	23.00	1.175	0.756	0.888
Body-Left (10mm)	9262	1852.4	WCDMA1900	-1.732	22.85	23.00	1.035	0.085	0.088
	9400	1880.0	WCDMA1900	/	/	/	/	/	/
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Body-Right (10mm)	9262	1852.4	WCDMA1900	1.859	22.85	23.00	1.035	0.180	0.186
	9400	1880.0	WCDMA1900	/	/	/	/	/	/
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Body-Bottom (10mm)	9262	1852.4	WCDMA1900	-1.901	22.85	23.00	1.035	0.746	0.772
	9400	1880.0	WCDMA1900	/	/	/	/	/	/
	9538	1907.6	WCDMA1900	/	/	/	/	/	/

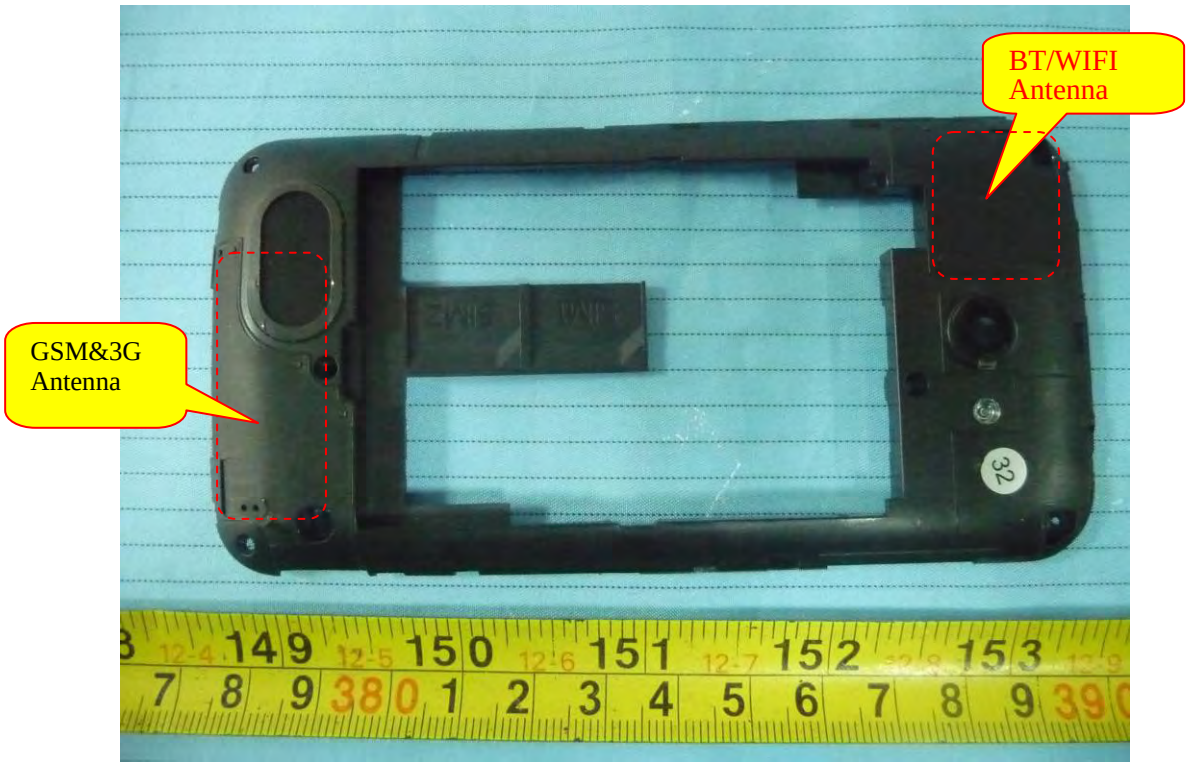
Note:
1. When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement Channel) Configured in Test Loop Model.
3. KDB 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	√	×	98
GSM + WiFi	√	√	98
GPRS + WCDMA	×	×	0
GPRS + Bluetooth	√	×	98
GPRS + WiFi	√	√	98
WCDMA + Bluetooth	√	×	98
WCDMA + WiFI	√	√	98

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	24.16	260.615	0	48.1	3.0	No
PCS1900	1900	22.11	162.555	0	44.8	3.0	No
WCDMSA1900	1900	22.85	192.752	0	53.1	3.0	No
Bluetooth	2450	5.39	3.459	0	1.1	3.0	Yes
WiFi	2450	9.80	9.550	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	26.70	467.735	10	43.1	3.0	No
PCS1900	1900	24.56	285.759	10	39.4	3.0	No
WCDMSA1900	1900	22.85	192.752	10	26.6	3.0	No
Bluetooth	2450	5.39	3.459	10	0.5	3.0	Yes
WiFi	2450	9.80	9.550	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	0.454	0.148	0.602
	Left Head Tile	0.251	0.148	0.399
	Right Head Cheek	0.400	0.148	0.548
	Right Head Tilt	0.279	0.148	0.427
	Body–Headset-Front	0.415	0.074	0.489
	Body–Headset-Back	0.734	0.074	0.808
PCS1900	Left Head Cheek	0.230	0.148	0.378
	Left Head Tile	0.090	0.148	0.238
	Right Head Cheek	0.181	0.148	0.329
	Right Head Tilt	0.092	0.148	0.240
	Body–Headset-Front	0.252	0.074	0.326
	Body–Headset-Back	0.277	0.074	0.351

WCDMA with BT:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		WCDMA	BT	< 1.6W/kg
WCDMA 1900	Left Head Cheek	0.456	0.148	0.604
	Left Head Tile	0.144	0.148	0.292
	Right Head Cheek	0.356	0.148	0.504
	Right Head Tilt	0.150	0.148	0.298
	Body–Headset-Front	0.765	0.074	0.839
	Body–Headset-Back	0.916	0.074	0.990

GSM with WiFi:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		GSM	WiFi	< 1.6W/kg
GSM850	Left Head Cheek	0.454	0.417	0.871
	Left Head Tile	0.251	0.417	0.668
	Right Head Cheek	0.400	0.417	0.817
	Right Head Tilt	0.279	0.417	0.696
	Body–Headset-Front	0.415	0.209	0.624
	Body–Headset-Back	0.734	0.209	0.943
PCS1900	Left Head Cheek	0.230	0.417	0.647
	Left Head Tile	0.090	0.417	0.507
	Right Head Cheek	0.181	0.417	0.598
	Right Head Tilt	0.092	0.417	0.509
	Body–Headset-Front	0.252	0.209	0.461
	Body–Headset-Back	0.277	0.209	0.486

WCDMA with WiFi:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		WCDMA	WiFi	< 1.6W/kg
WCDMA 1900	Left Head Cheek	0.456	0.417	**0.873**
	Left Head Tile	0.144	0.417	0.561
	Right Head Cheek	0.356	0.417	0.773
	Right Head Tilt	0.150	0.417	0.567
	Body–Headset-Front	0.765	0.209	0.974
	Body–Headset-Back	0.916	0.209	1.125

Mode	Frequency (GHz)	Distance (mm)	P_{avg} (dBm)	P_{avg} (mW)	Estimated $_{1-g}$ (W/kg)
Bluetooth Head	2.45	0	5.5	3.548	0.148
Bluetooth Body	2.45	10	5.5	3.548	0.074
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	0.939	1.385	0.797	0.751	0.040	/
PCS 1900	0.697	0.765	0.118	0.272	0.792	/
WCDMA 1900	0.765	0.916	0.088	0.186	0.772	/
WiFi	0.209	0.209	/	0.209	/	0.209
	∑ 1-g SAR(W/Kg)					
GSM850 + WiFi	1.148	**1.594**	/	0.960	/	/
PCS 1900 + WiFi	0.906	0.974	/	0.481	/	/
WCDMA 1900 + WiFi	0.974	1.125	/	0.395	/	/

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 (%)	: -0.484

Tissue Data

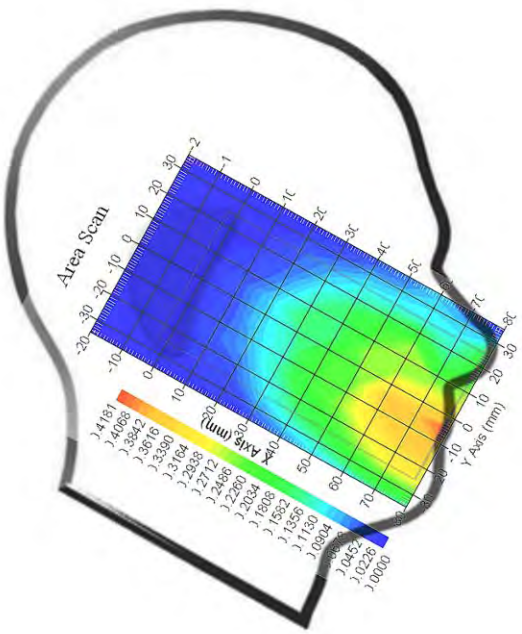
Type	: Head
Frequency	: 824.2 MHz
Epsilon	: 41.31 F/m
Sigma	: 0.89 S/m
Density	: 1000.00 kg/cu. m

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	: 0.389 W/kg
10 gram SAR value	: 0.236 W/kg
Area Scan Peak SAR	: 0.413 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)

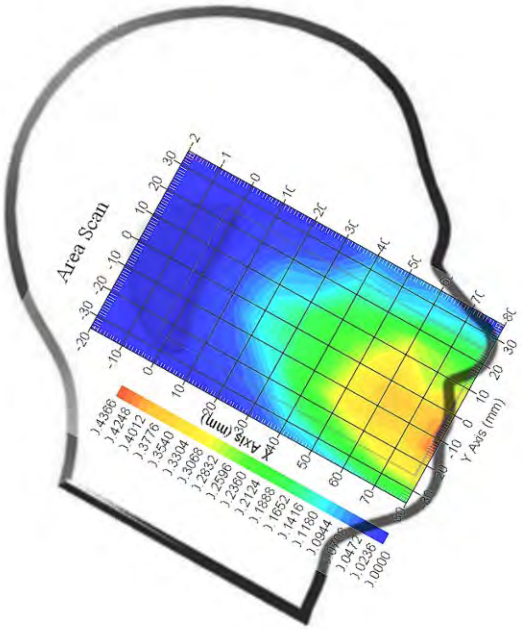
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.019 W/kg
Power Drift-Finish : 0.019 W/kg
Power Drift (%) : 0.952

Tissue Data
Type : Head
Frequency : 836.6 MHz
Epsilon : 41.27 F/m
Sigma : 0.90 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 : 0.393 W/kg
10 gram SAR value : 0.261 W/kg
Area Scan Peak SAR : 0.436 W/kg
Zoom Scan Peak SAR : 0.650 W/kg

Plot 2#



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

Left Head Cheek (848.8 MHz High Channel)

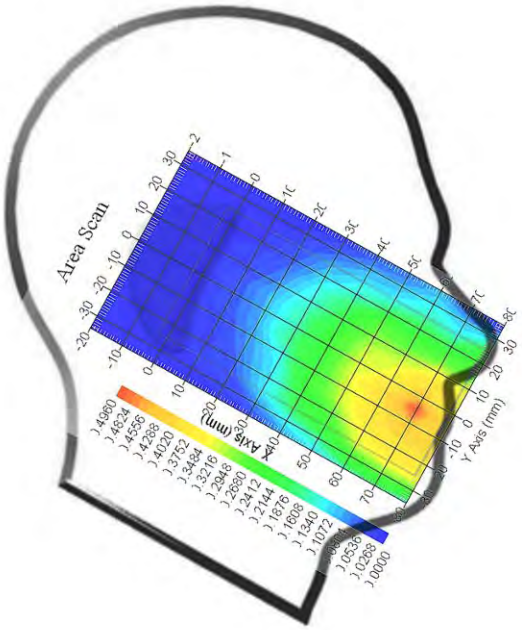
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.011 W/kg
Power Drift-Finish : 0.011 W/kg
Power Drift (%) : 1.614

Tissue Data
Type : Head
Frequency : 848.8 MHz
Epsilon : 41.04 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 : 0.412 W/kg
10 gram SAR value : 0.279 W/kg
Area Scan Peak SAR : 0.496 W/kg
Zoom Scan Peak SAR : 0.520 W/kg

Plot 3#



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

Left Head Tilt (836.6 MHz Middle Channel)

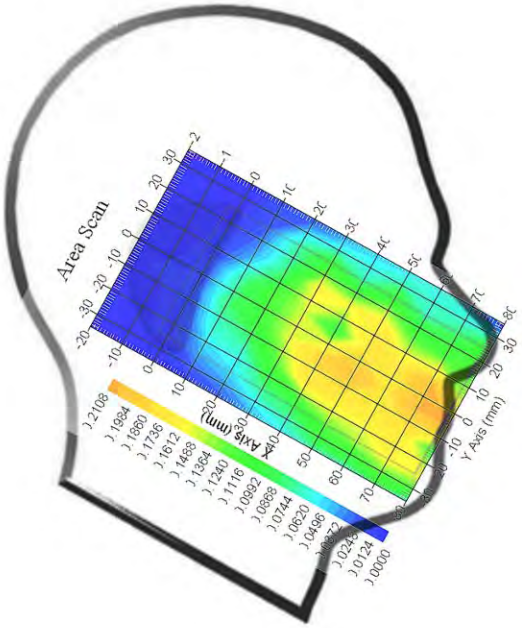
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.058 W/kg
Power Drift-Finish : 0.059 W/kg
Power Drift (%) : 1.755

Tissue Data
Type : Head
Frequency : 836.6 MHz
Epsilon : 41.27 F/m
Sigma : 0.90 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 : 0.226 W/kg
10 gram SAR value : 0.149 W/kg
Area Scan Peak SAR : 0.206 W/kg
Zoom Scan Peak SAR : 0.630 W/kg

Plot 4#



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

Right Head Cheek (836.6 MHz Middle Channel)

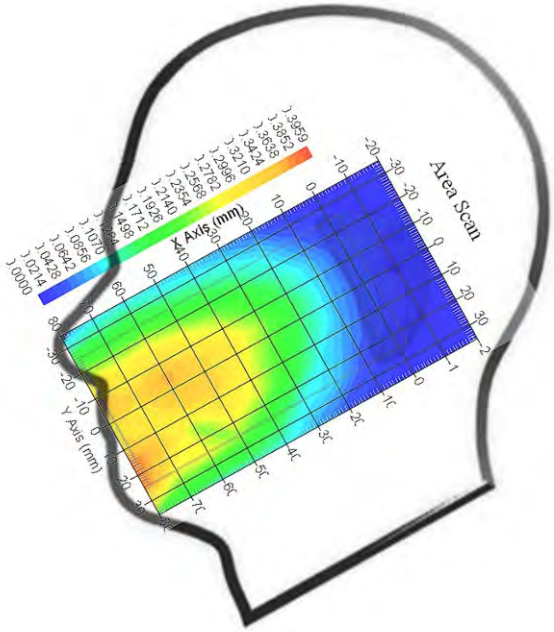
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.029 W/kg
Power Drift-Finish : 0.029 W/kg
Power Drift (%) : -1.098

Tissue Data
Type : Head
Frequency : 836.6 MHz
Epsilon : 41.27 F/m
Sigma : 0.90 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 : 0.361 W/kg
10 gram SAR value : 0.220 W/kg
Area Scan Peak SAR : 0.386 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)

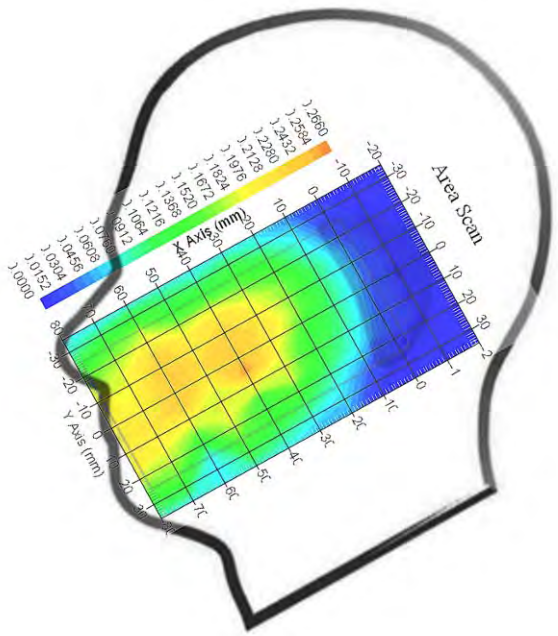
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.043 W/kg
Power Drift-Finish : 0.043 W/kg
Power Drift (%) : -0.571

Tissue Data
Type : Head
Frequency : 836.6 MHz
Epsilon : 41.27 F/m
Sigma : 0.90 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 : 0.252 W/kg
10 gram SAR value : 0.180 W/kg
Area Scan Peak SAR : 0.265 W/kg
Zoom Scan Peak SAR : 0.320 W/kg

Plot 6#



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

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

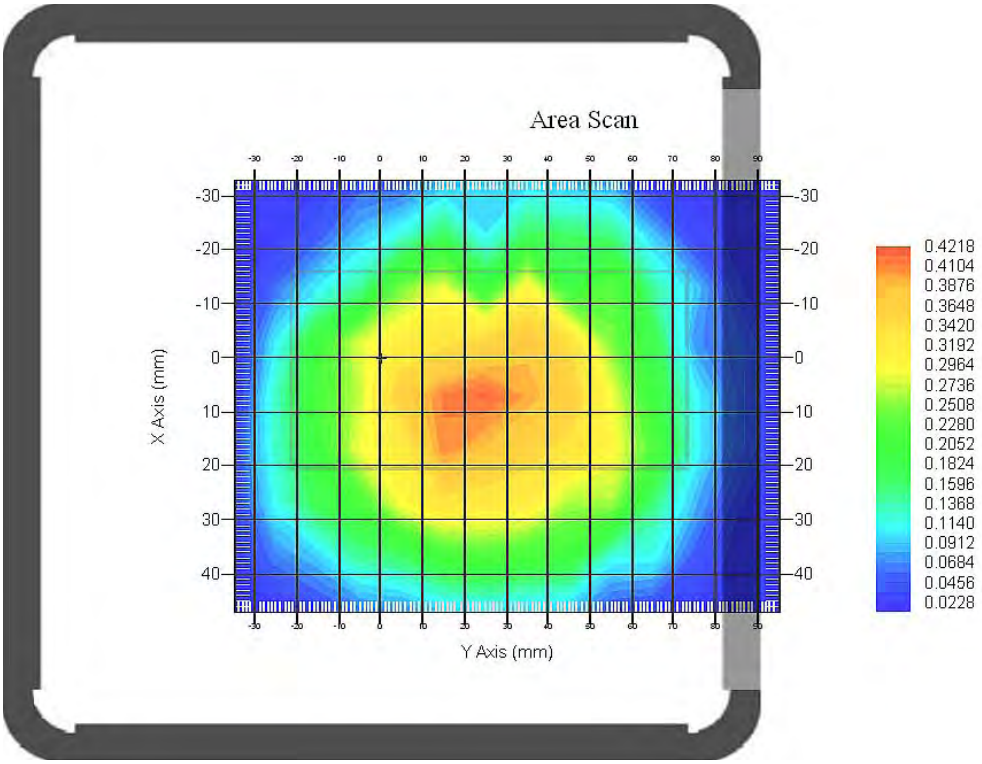
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type： : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.352 W/kg
Power Drift-Finish : 0.355 W/kg
Power Drift (%) : 0.788

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.10 F/m
Sigma : 0.97 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 : 0.374 W/kg
10 gram SAR value : 0.234 W/kg
Area Scan Peak SAR : 0.414 W/kg
Zoom Scan Peak SAR : 0.550 W/kg

Plot 7#



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

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

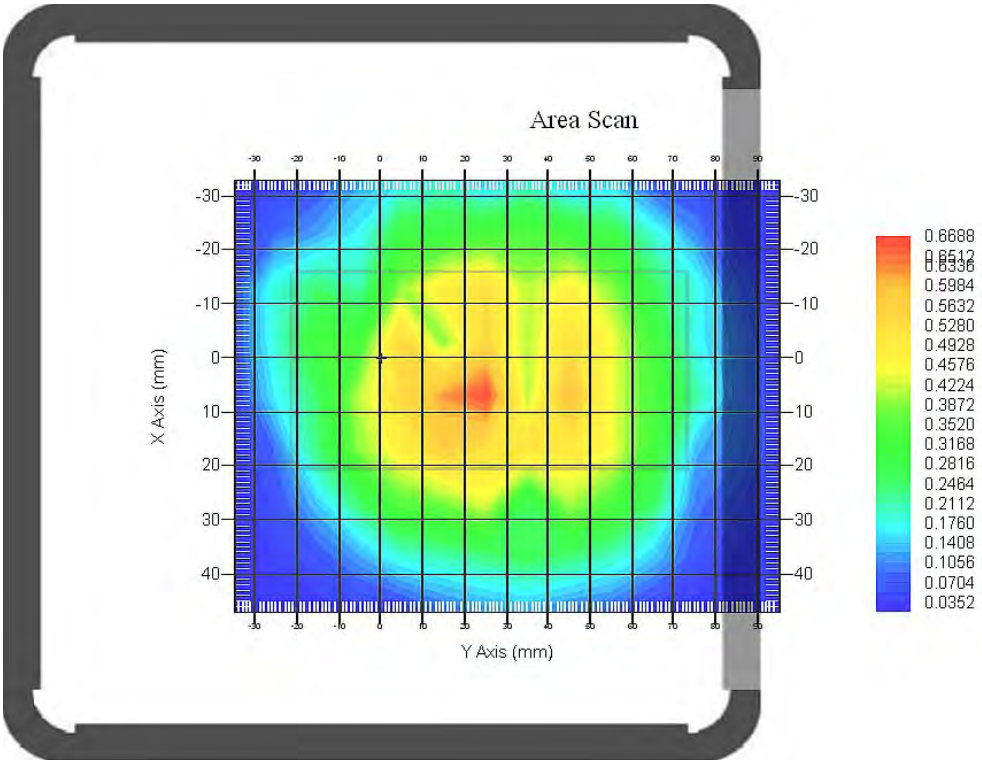
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type： : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.497 W/kg
Power Drift-Finish : 0.503 W/kg
Power Drift (%) : 1.289

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.10 F/m
Sigma : 0.97 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 : 0.662 W/kg
10 gram SAR value : 0.545 W/kg
Area Scan Peak SAR : 0.662 W/kg
Zoom Scan Peak SAR : 0.990 W/kg

Plot 8#



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

Left Head Cheek (1850.2 MHz Low Channel)

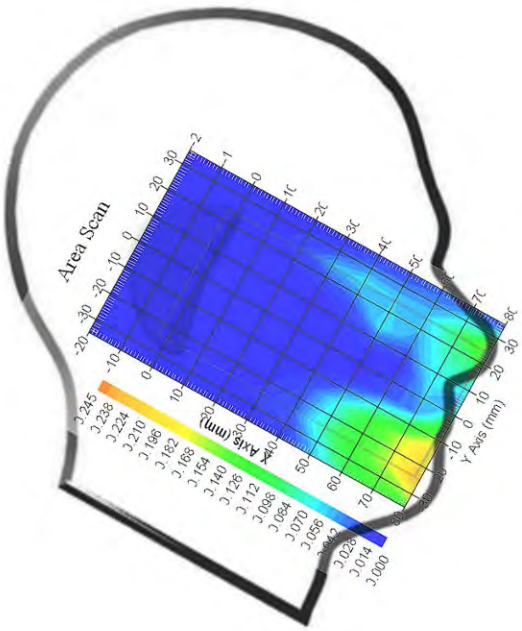
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.005 W/kg
Power Drift-Finish : 0.005 W/kg
Power Drift (%) : 1.156

Tissue Data
Type : Head
Frequency : 1850.2 MHz
Epsilon : 40.10 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 : 0.182 W/kg
10 gram SAR value : 0.067 W/kg
Area Scan Peak SAR : 0.241 W/kg
Zoom Scan Peak SAR : 0.360 W/kg

Plot 9#



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

Left Head Cheek (1880.0 MHz Middle Channel)

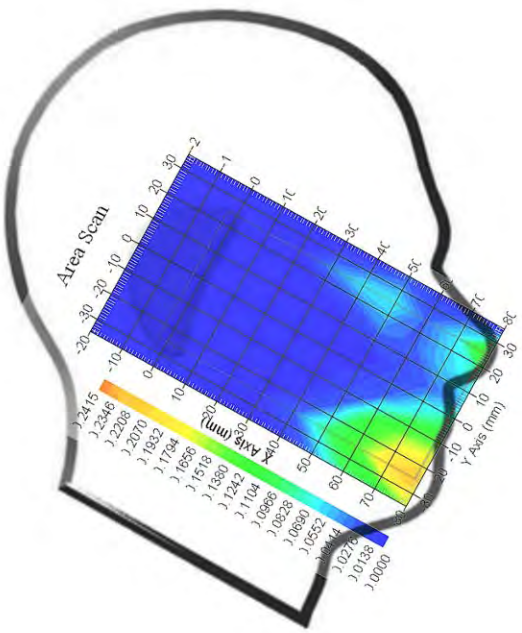
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.001 W/kg
Power Drift-Finish : 0.001 W/kg
Power Drift (%) : -0.447

Tissue Data
Type : Head
Frequency : 1880.0 MHz
Epsilon : 40.11 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 : 0.173 W/kg
10 gram SAR value : 0.071 W/kg
Area Scan Peak SAR : 0.241 W/kg
Zoom Scan Peak SAR : 0.300 W/kg

Plot 10#



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

Left Head Cheek (1909.8 MHz High Channel)

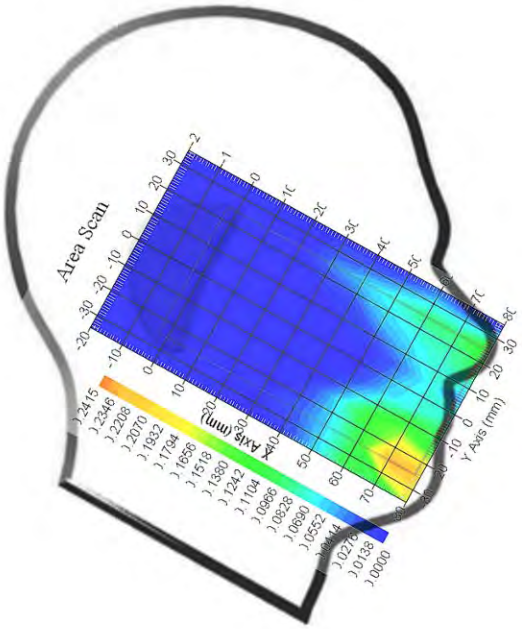
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.008 W/kg
Power Drift-Finish : 0.008 W/kg
Power Drift (%) : -1.481

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 : 0.206 W/kg
10 gram SAR value : 0.108 W/kg
Area Scan Peak SAR : 0.235 W/kg
Zoom Scan Peak SAR : 0.400 W/kg

Plot 11#



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

Left Head Tilt (1880.0 MHz Middle Channel)

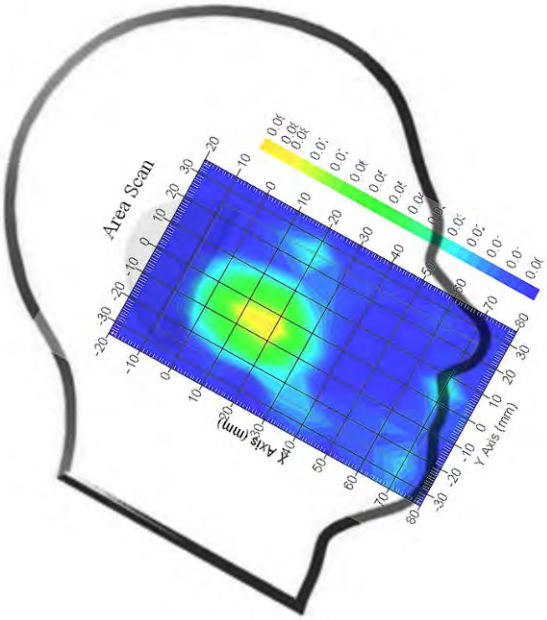
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.004 W/kg
Power Drift-Finish : 0.004 W/kg
Power Drift (%) : -2.525

Tissue Data
Type : Head
Frequency : 1880.0 MHz
Epsilon : 40.11 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 : 0.082 W/kg
10 gram SAR value : 0.040 W/kg
Area Scan Peak SAR : 0.091 W/kg
Zoom Scan Peak SAR : 0.133 W/kg

Plot 12#



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

Right Head Cheek (1880.0 MHz Middle Channel)

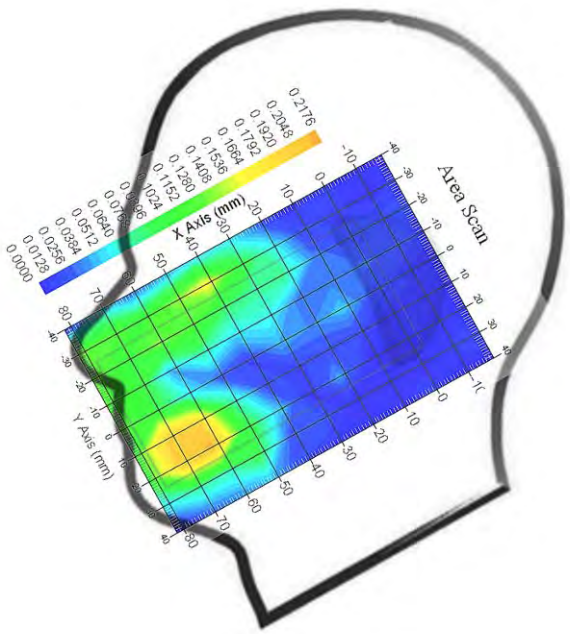
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.003 W/kg
Power Drift-Finish : 0.003 W/kg
Power Drift (%) : -0.479

Tissue Data
Type : Head
Frequency : 1880.0 MHz
Epsilon : 40.11 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 : 0.165 W/kg
10 gram SAR value : 0.075 W/kg
Area Scan Peak SAR : 0.217 W/kg
Zoom Scan Peak SAR : 0.361 W/kg

Plot 13#



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

Right Head Tilt (1880.0 MHz Middle Channel)

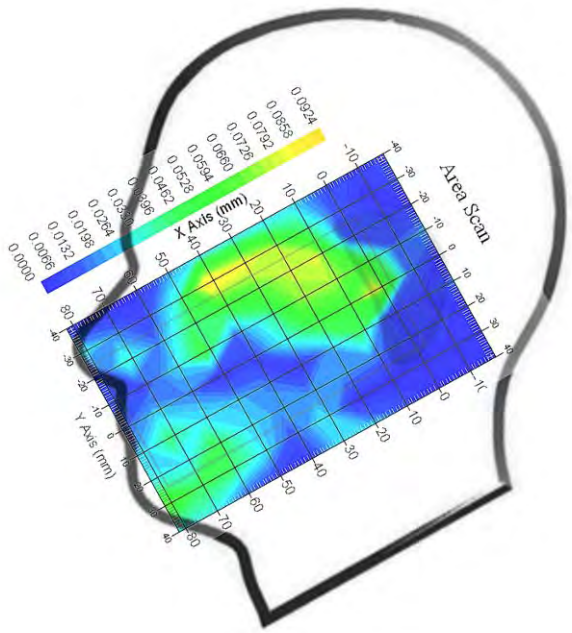
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.012 W/kg
Power Drift-Finish : 0.012 W/kg
Power Drift (%) : 1.305

Tissue Data
Type : Head
Frequency : 1880.0 MHz
Epsilon : 40.11 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 : 0.084 W/kg
10 gram SAR value : 0.045 W/kg
Area Scan Peak SAR : 0.092 W/kg
Zoom Scan Peak SAR : 0.147 W/kg

Plot 14#



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

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

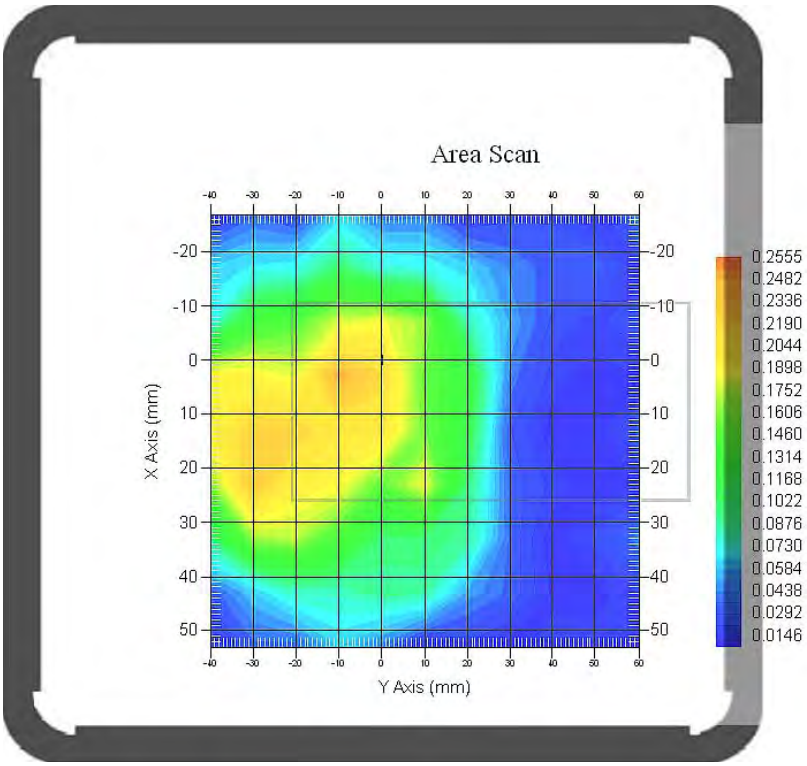
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.221 W/kg
Power Drift-Finish : 0.217 W/kg
Power Drift (%) : -1.824

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.21 F/m
Sigma : 1.55 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 : 0.230 W/kg
10 gram SAR value : 0.131 W/kg
Area Scan Peak SAR : 0.250 W/kg
Zoom Scan Peak SAR : 0.510 W/kg

Plot 15#



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

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

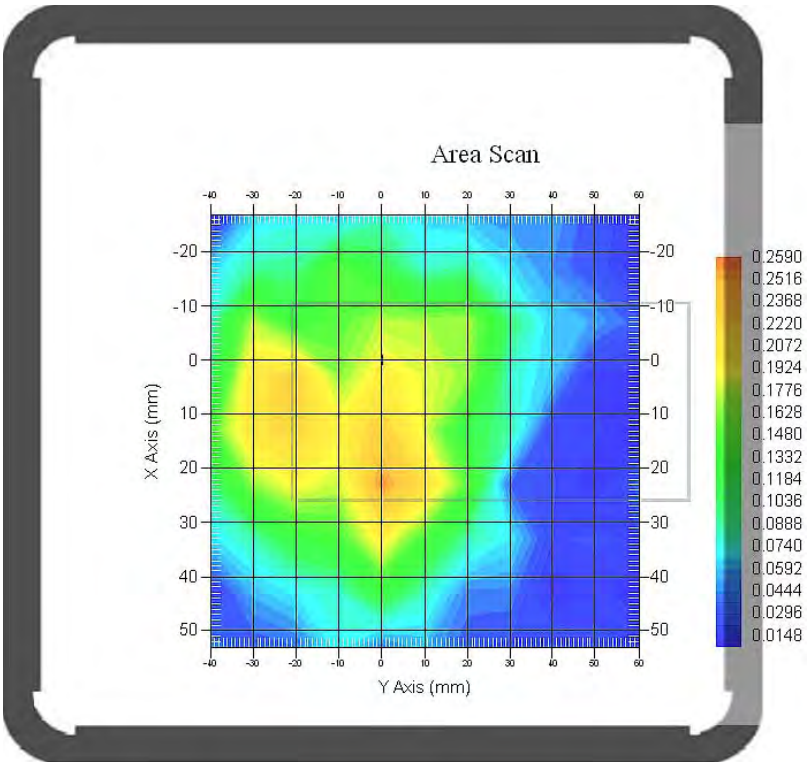
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.296 W/kg
Power Drift-Finish : 0.303 W/kg
Power Drift (%) : 2.527

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.21 F/m
Sigma : 1.55 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 : 0.253 W/kg
10 gram SAR value : 0.144 W/kg
Area Scan Peak SAR : 0.257 W/kg
Zoom Scan Peak SAR : 0.520 W/kg

Plot 16#



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

WCDMA1900; Left Head Cheek (1852.4 MHz Low 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	: 0.001 W/kg
Power Drift-Finish	: 0.001 W/kg
Power Drift (%)	: 3.022

Tissue Data

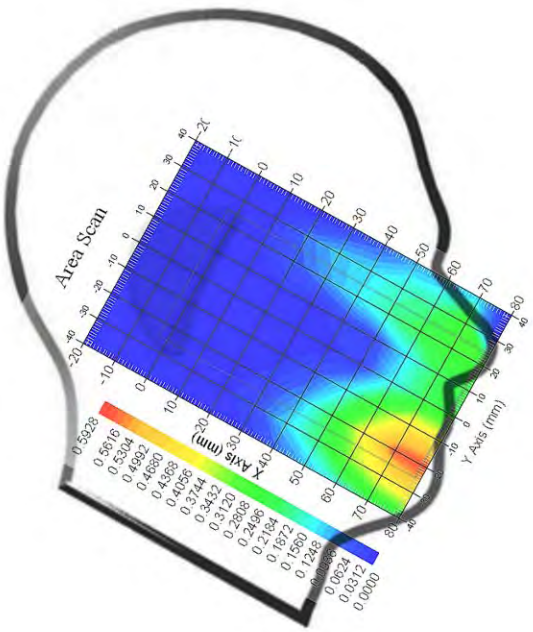
Type	: Head
Frequency	: 1852.4 MHz
Epsilon	: 40.11 F/m
Sigma	: 1.39 S/m
Density	: 1000.00 kg/cu. m

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	: 0.392 W/kg
10 gram SAR value	: 0.249 W/kg
Area Scan Peak SAR	: 0.584 W/kg
Zoom Scan Peak SAR	: 0.900 W/kg

Plot 17#



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

WCDMA1900; Left Head Cheek (1880.0 MHz Middle Channel)

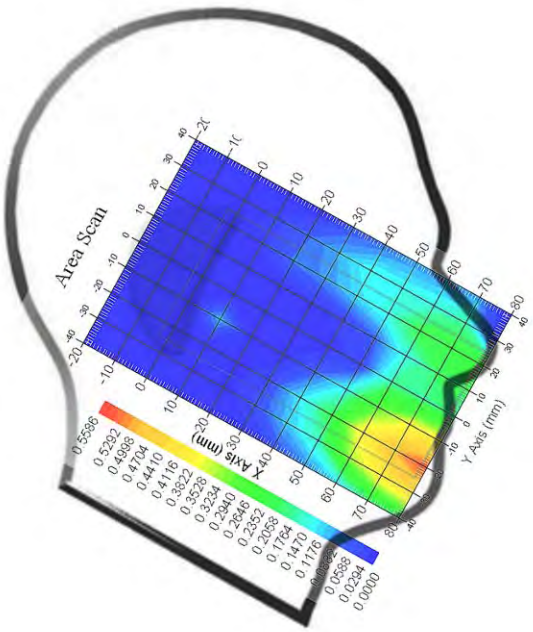
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.012 W/kg
Power Drift-Finish : 0.012 W/kg
Power Drift (%) : -0.498

Tissue Data
Type : Head
Frequency : 1880.0 MHz
Epsilon : 40.11 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 : 0.365 W/kg
10 gram SAR value : 0.165 W/kg
Area Scan Peak SAR : 0.550 W/kg
Zoom Scan Peak SAR : 0.700 W/kg

Plot 18#



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

WCDMA1900; Left Head Cheek (1907.6 MHz High Channel)

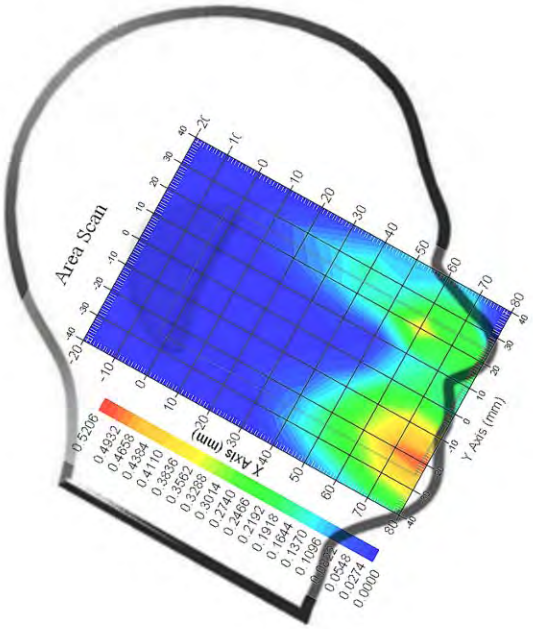
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.008 W/kg
Power Drift-Finish : 0.008 W/kg
Power Drift (%) : -1.358

Tissue Data
Type : Head
Frequency : 1907.6 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 : 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 : 0.388 W/kg
10 gram SAR value : 0.199 W/kg
Area Scan Peak SAR : 0.510 W/kg
Zoom Scan Peak SAR : 0.370 W/kg

Plot 19#



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

WCDMA1900; Left Head Tilt (1852.4 MHz Low 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 (%)	: -0.846

Tissue Data

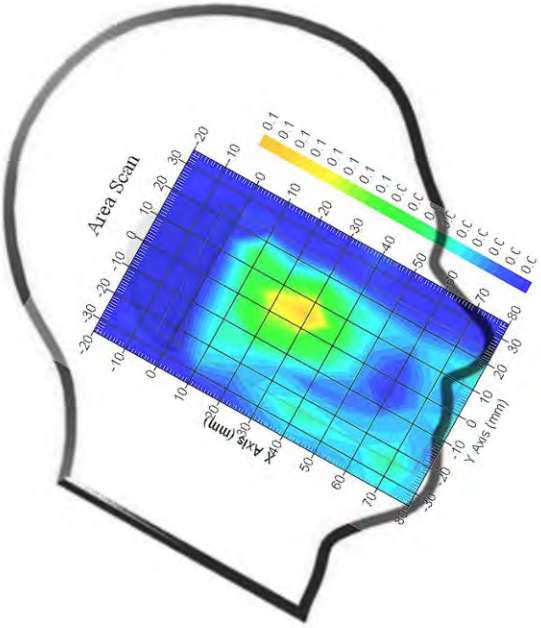
Type	: Head
Frequency	: 1852.4 MHz
Epsilon	: 40.11 F/m
Sigma	: 1.39 S/m
Density	: 1000.00 kg/cu. m

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	: 0.139 W/kg
10 gram SAR value	: 0.035 W/kg
Area Scan Peak SAR	: 0.150 W/kg
Zoom Scan Peak SAR	: 0.196 W/kg

Plot 20#



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

WCDMA1900; Right Head Cheek (1852.4 MHz Low Channel)

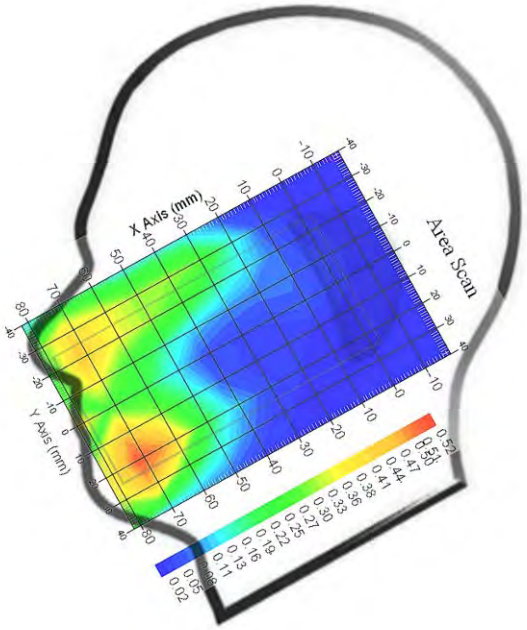
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.002 W/kg
Power Drift-Finish : 0.002 W/kg
Power Drift (%) : -1.368

Tissue Data
Type : Head
Frequency : 1852.4 MHz
Epsilon : 40.11 F/m
Sigma : 1.39 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 : 0.344 W/kg
10 gram SAR value : 0.162 W/kg
Area Scan Peak SAR : 0.520 W/kg
Zoom Scan Peak SAR : 0.810 W/kg

Plot 21#



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

WCDMA1900; Right Head Tilt (1852.4 MHz Low 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 (%)	: 2.548

Tissue Data

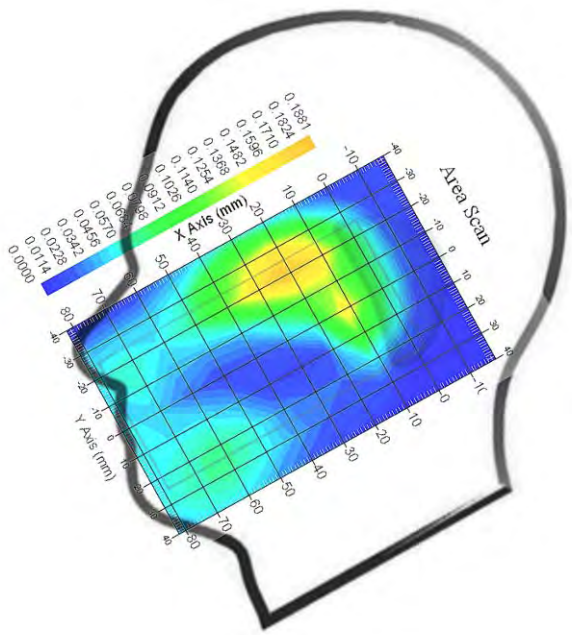
Type	: Head
Frequency	: 1852.4 MHz
Epsilon	: 40.11 F/m
Sigma	: 1.39 S/m
Density	: 1000.00 kg/cu. m

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	: 0.145 W/kg
10 gram SAR value	: 0.065 W/kg
Area Scan Peak SAR	: 0.188 W/kg
Zoom Scan Peak SAR	: 0.301 W/kg

Plot 22#



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

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

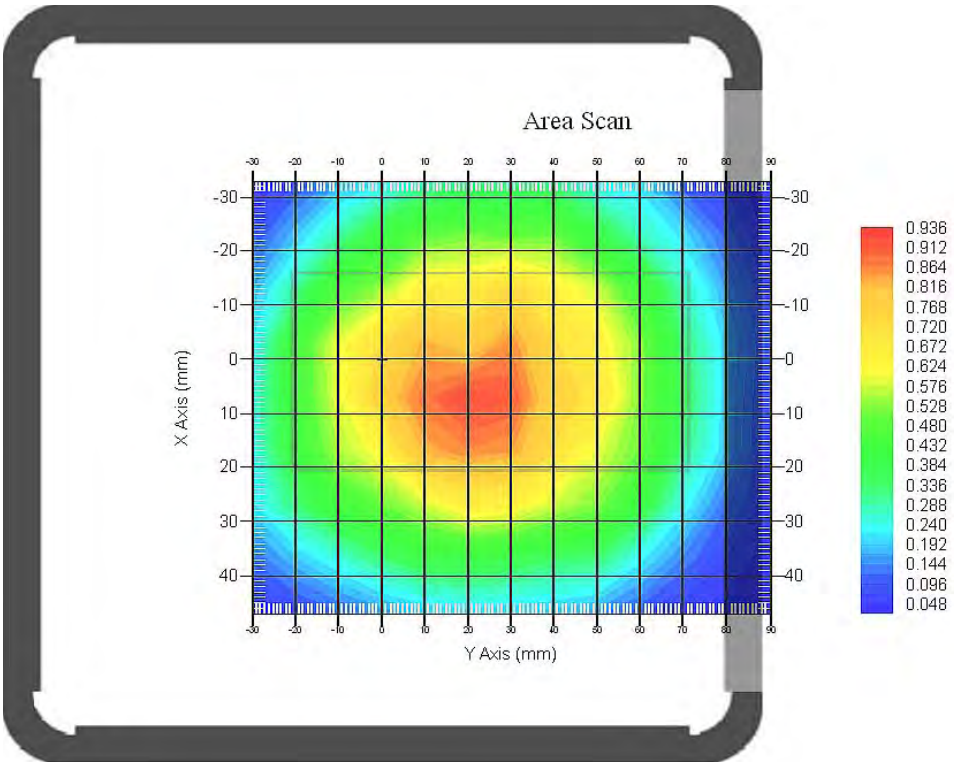
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.752 W/kg
Power Drift-Finish : 0.760 W/kg
Power Drift (%) : 1.152

Tissue Data
Type : Body
Frequency : 824.2 MHz
Epsilon : 55.03 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 : 0.864 W/kg
10 gram SAR value : 0.438 W/kg
Area Scan Peak SAR : 0.914 W/kg
Zoom Scan Peak SAR : 1.061 W/kg

Plot 23#



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

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

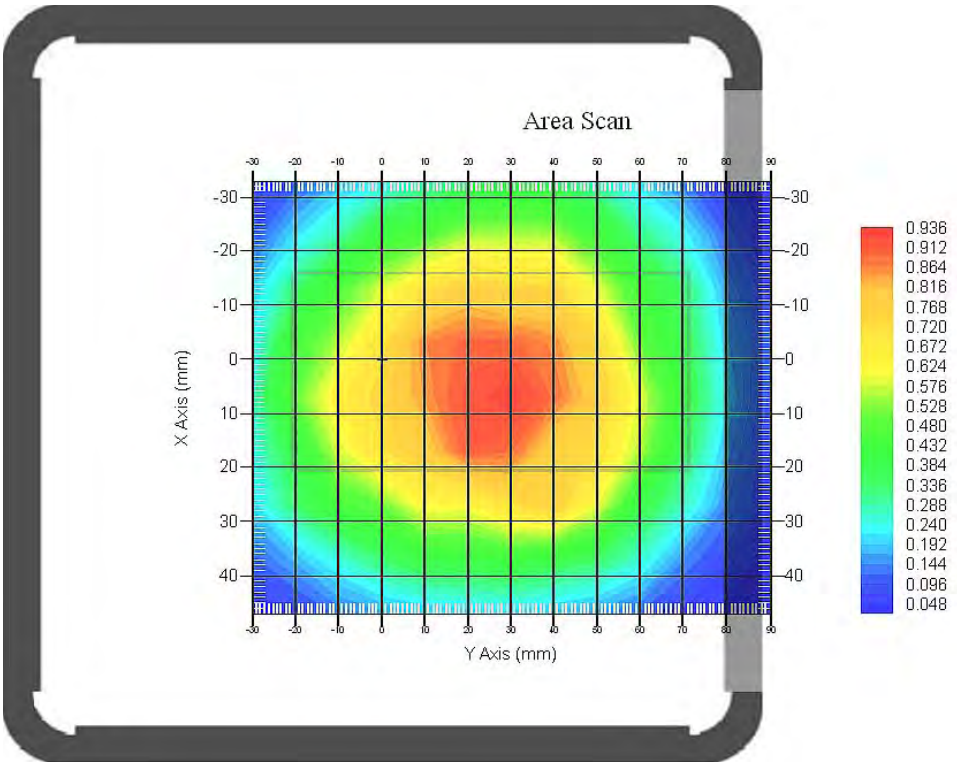
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.749 W/kg
Power Drift-Finish : 0.743 W/kg
Power Drift (%) : -0.868

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.10 F/m
Sigma : 0.97 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 : 0.867 W/kg
10 gram SAR value : 0.630 W/kg
Area Scan Peak SAR : 0.931 W/kg
Zoom Scan Peak SAR : 1.171 W/kg

Plot 24#



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

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

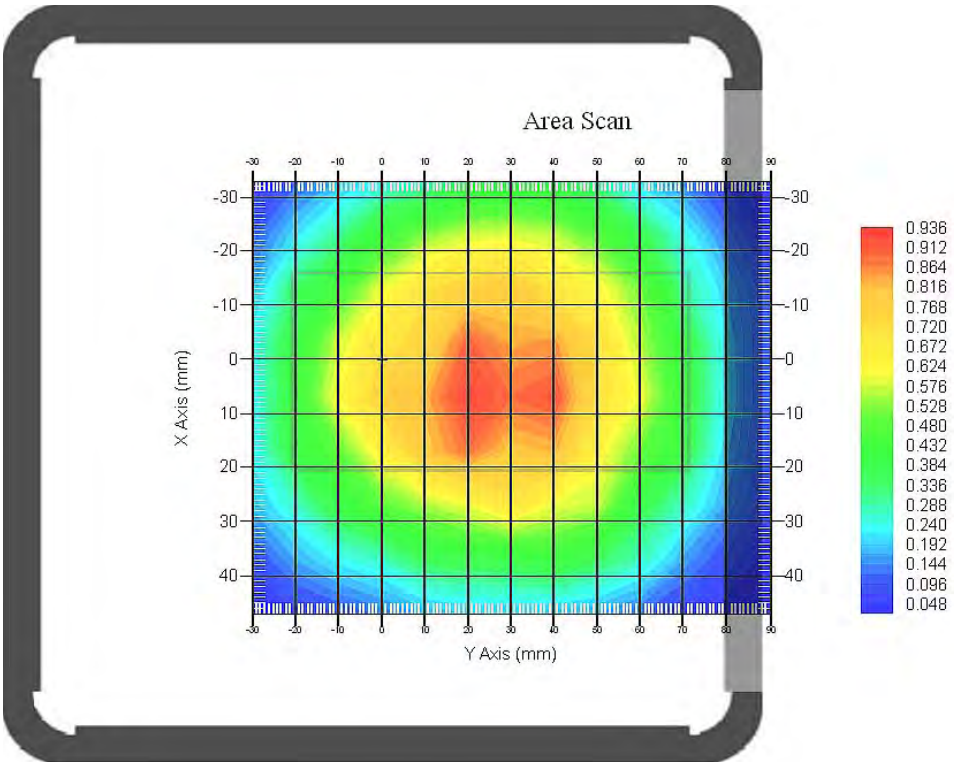
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.802 W/kg
Power Drift-Finish : 0.792 W/kg
Power Drift (%) : -1.260

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 : 0.888 W/kg
10 gram SAR value : 0.634 W/kg
Area Scan Peak SAR : 0.925 W/kg
Zoom Scan Peak SAR : 1.211 W/kg

Plot 25#



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

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

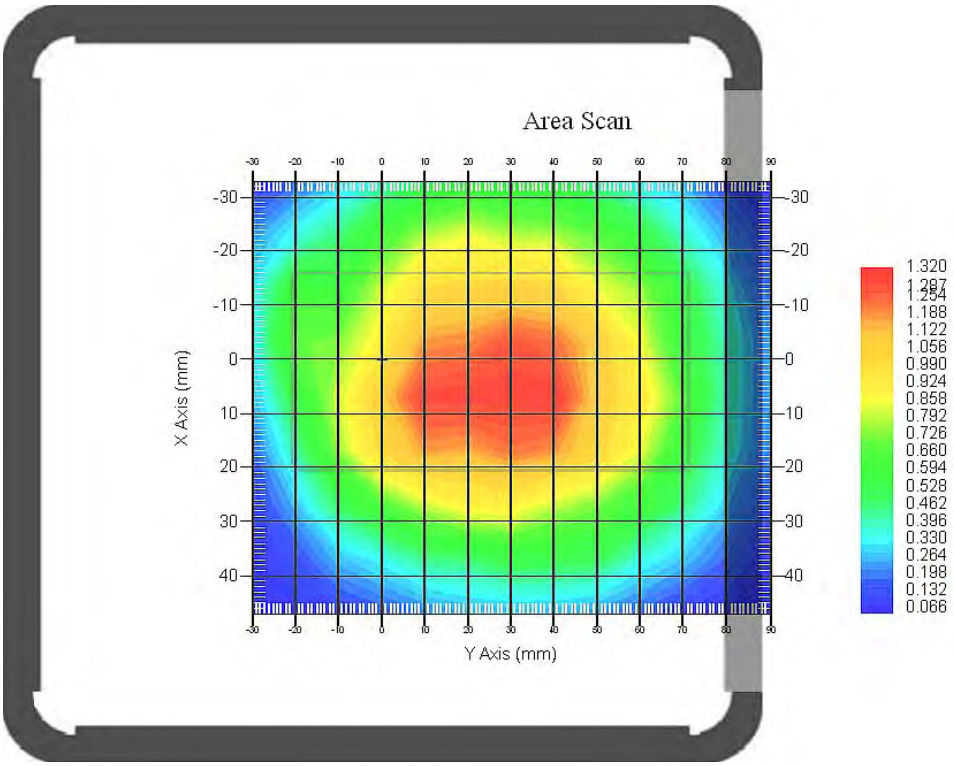
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.990 W/kg
Power Drift-Finish : 1.005 W/kg
Power Drift (%) : 1.525

Tissue Data
Type : Body
Frequency : 824.2 MHz
Epsilon : 55.03 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 : 1.282 W/kg
10 gram SAR value : 0.914 W/kg
Area Scan Peak SAR : 1.293 W/kg
Zoom Scan Peak SAR : 1.321 W/kg

Plot 26#



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

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

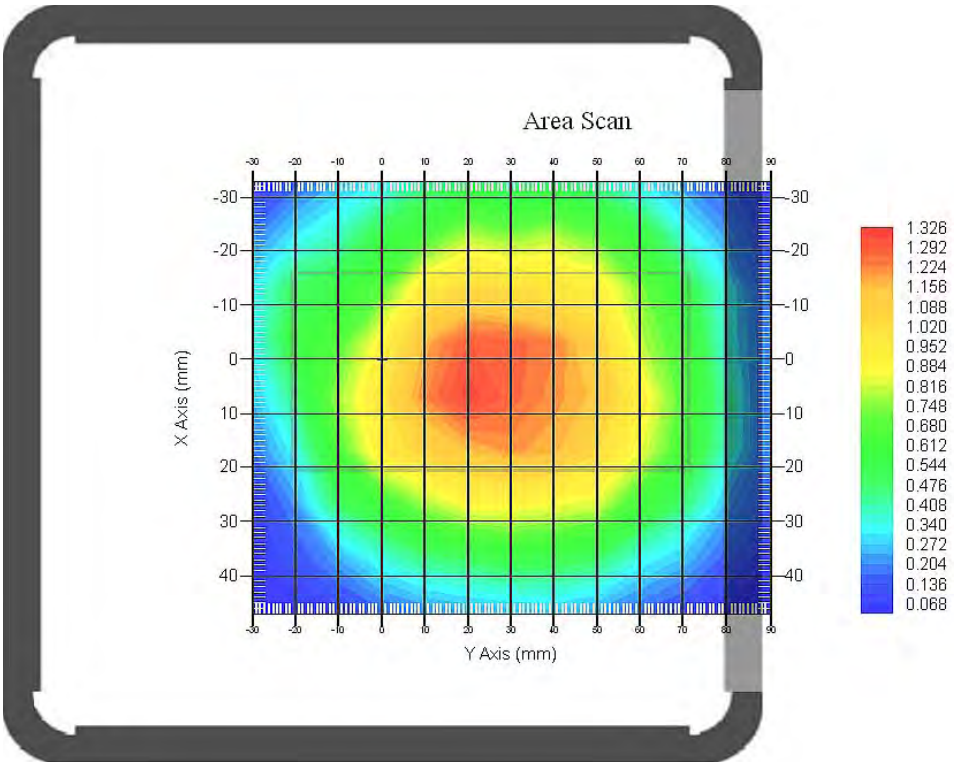
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 1.021 W/kg
Power Drift-Finish : 1.042 W/kg
Power Drift (%) : 2.005

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.10 F/m
Sigma : 0.97 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 : 1.290 W/kg
10 gram SAR value : 0.927 W/kg
Area Scan Peak SAR : 1.312 W/kg
Zoom Scan Peak SAR : 1.991 W/kg

Plot 27#



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

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

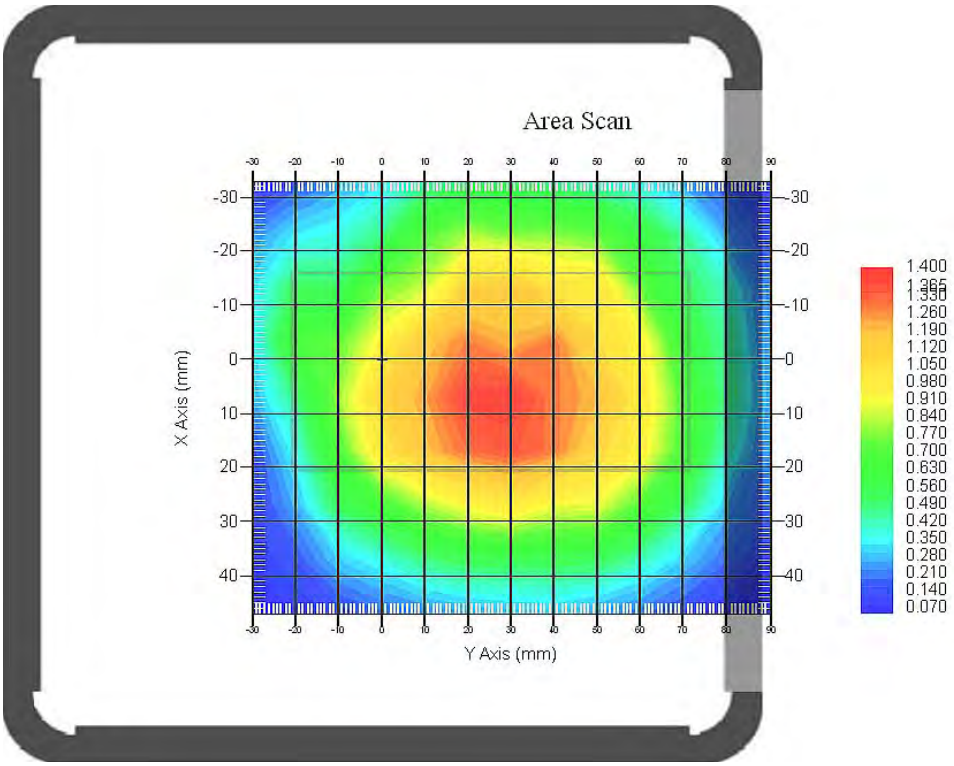
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 1.039 W/kg
Power Drift-Finish : 1.014 W/kg
Power Drift (%) : -2.458

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 : 1.242 W/kg
10 gram SAR value : 0.910 W/kg
Area Scan Peak SAR : 1.367 W/kg
Zoom Scan Peak SAR : 1.681 W/kg

Plot 28#



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

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

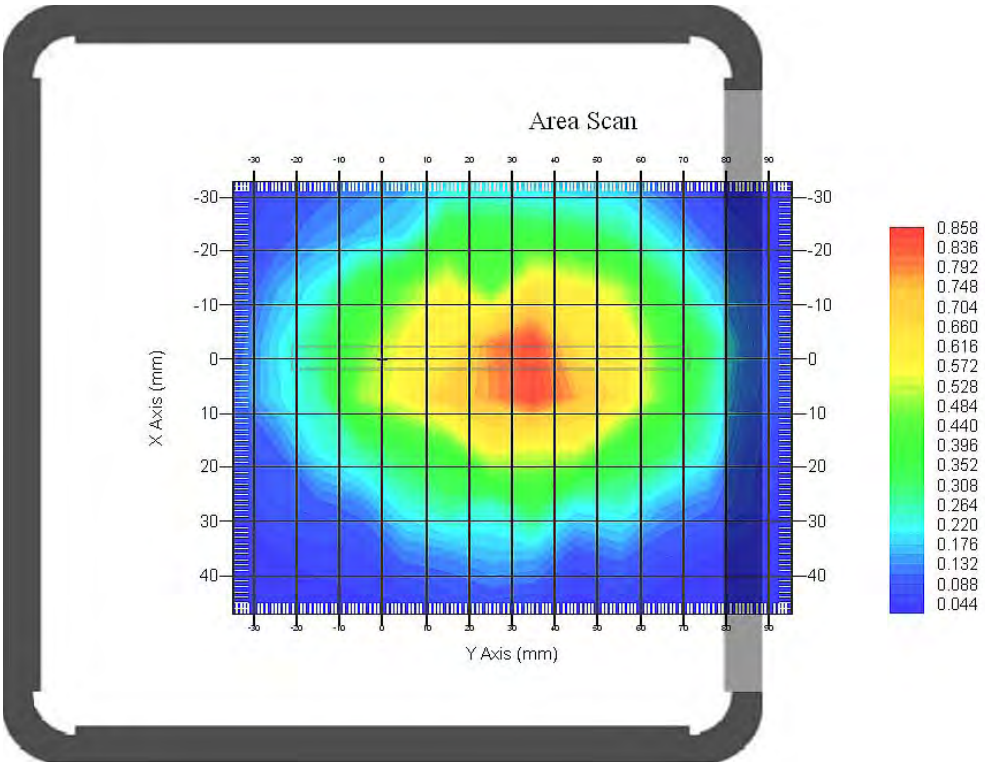
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type： : Complete
Area Scan : 7x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.685 W/kg
Power Drift-Finish : 0.680 W/kg
Power Drift (%) : -0.801

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.10 F/m
Sigma : 0.97 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 : 0.742 W/kg
10 gram SAR value : 0.434 W/kg
Area Scan Peak SAR : 0.837 W/kg
Zoom Scan Peak SAR : 1.131 W/kg

Plot 29#



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

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

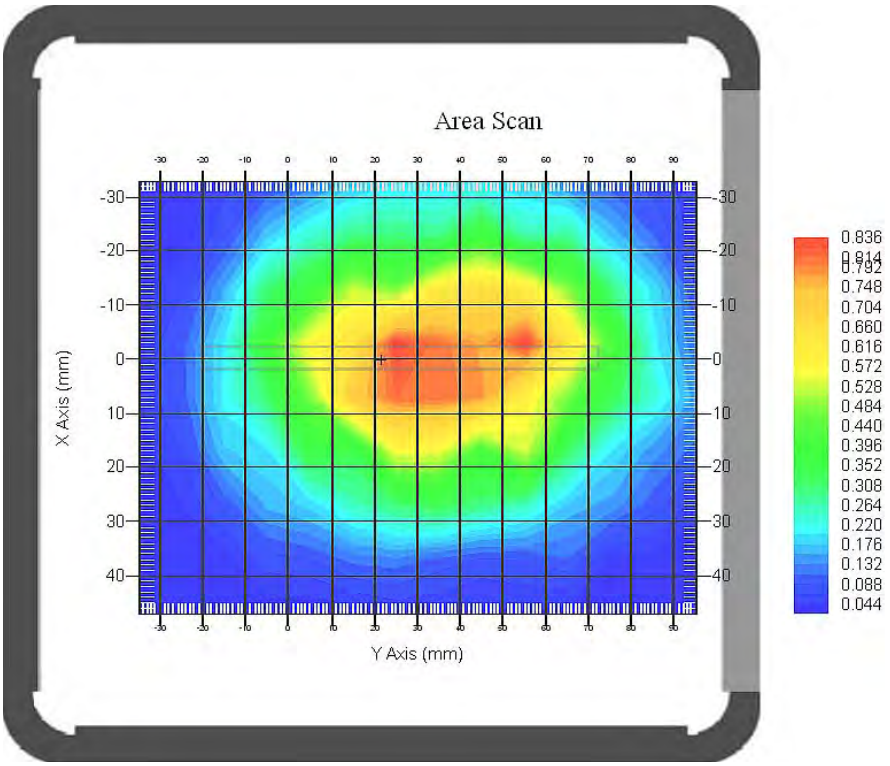
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type： : Complete
Area Scan : 7x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.587 W/kg
Power Drift-Finish : 0.580 W/kg
Power Drift (%) : -1.207

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.10 F/m
Sigma : 0.97 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 : 0.699 W/kg
10 gram SAR value : 0.396 W/kg
Area Scan Peak SAR : 0.833 W/kg
Zoom Scan Peak SAR : 1.431 W/kg

Plot 30#



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

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

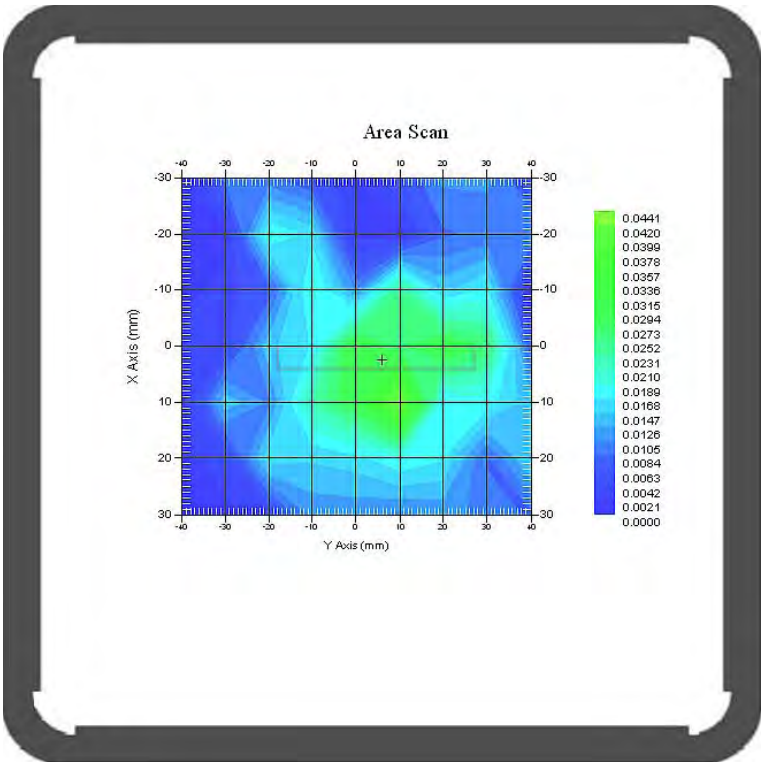
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type： : Complete
Area Scan : 7x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.035 W/kg
Power Drift-Finish : 0.035 W/kg
Power Drift (%) : -0.746

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 55.10 F/m
Sigma : 0.97 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 : 0.037 W/kg
10 gram SAR value : 0.020 W/kg
Area Scan Peak SAR : 0.043 W/kg
Zoom Scan Peak SAR : 0.080 W/kg

Plot 31#



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

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

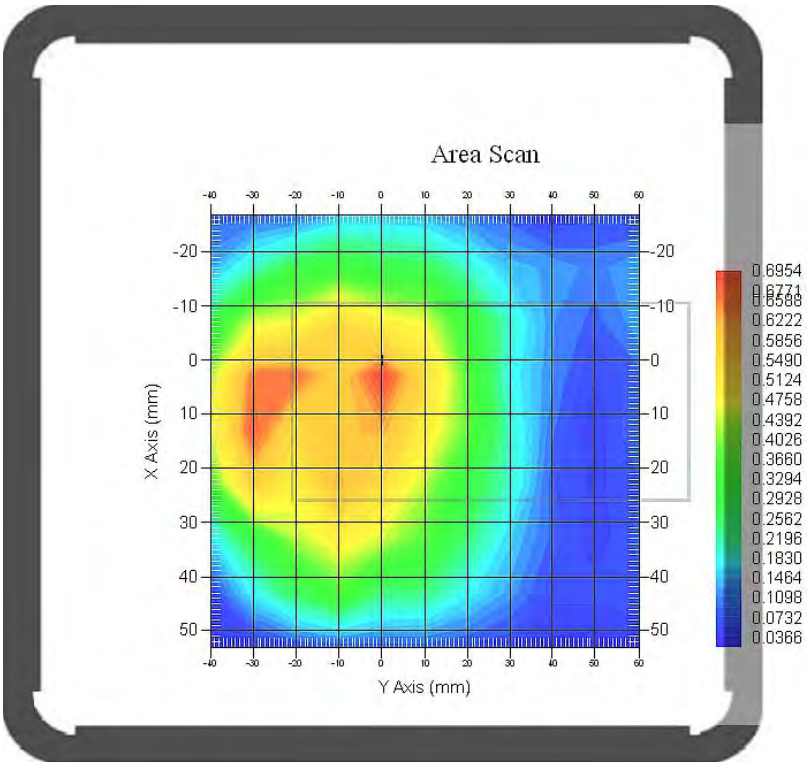
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.485 W/kg
Power Drift-Finish : 0.480 W/kg
Power Drift (%) : -1.102

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.21 F/m
Sigma : 1.55 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 : 0.630 W/kg
10 gram SAR value : 0.405 W/kg
Area Scan Peak SAR : 0.694 W/kg
Zoom Scan Peak SAR : 1.201 W/kg

Plot 32#



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

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

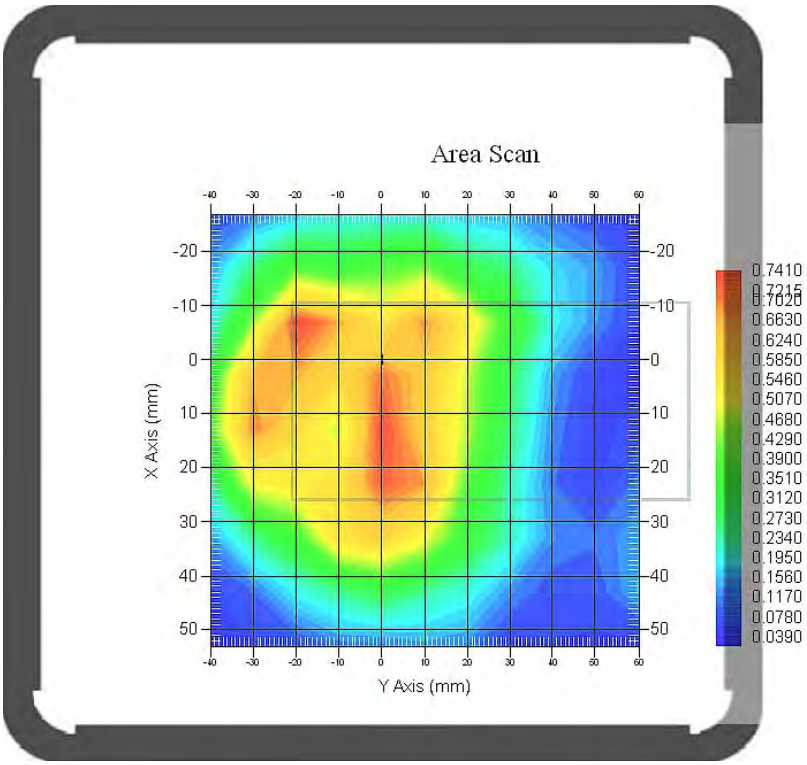
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.633 W/kg
Power Drift-Finish : 0.625 W/kg
Power Drift (%) : -1.219

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.21 F/m
Sigma : 1.55 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 : 0.691 W/kg
10 gram SAR value : 0.364 W/kg
Area Scan Peak SAR : 0.740 W/kg
Zoom Scan Peak SAR : 1.111 W/kg

Plot 33#



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

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

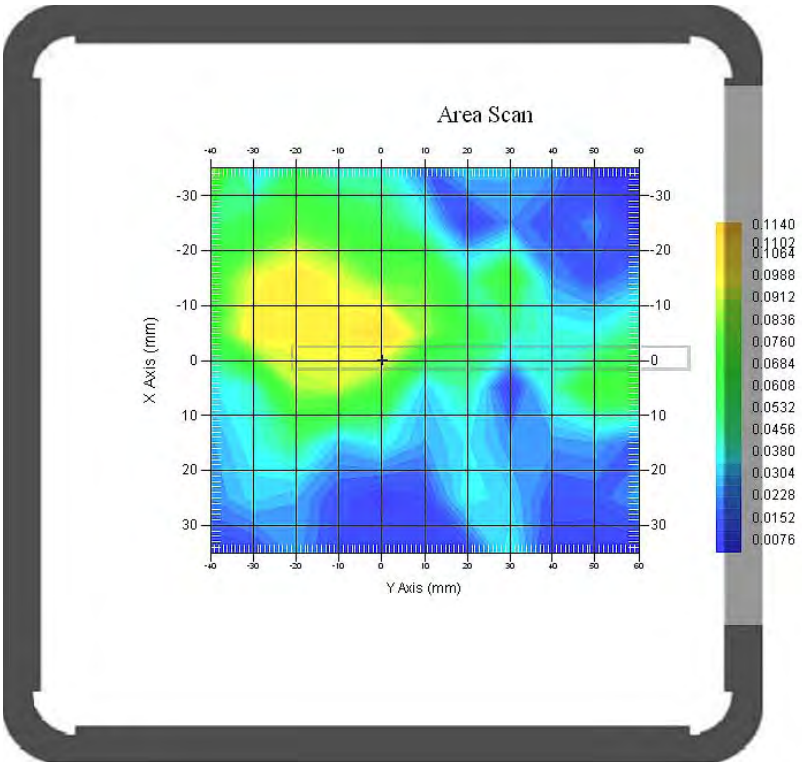
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.085 W/kg
Power Drift-Finish : 0.086 W/kg
Power Drift (%) : 1.355

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.21 F/m
Sigma : 1.55 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 : 0.107 W/kg
10 gram SAR value : 0.056 W/kg
Area Scan Peak SAR : 0.112 W/kg
Zoom Scan Peak SAR : 0.280 W/kg

Plot 34#



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

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

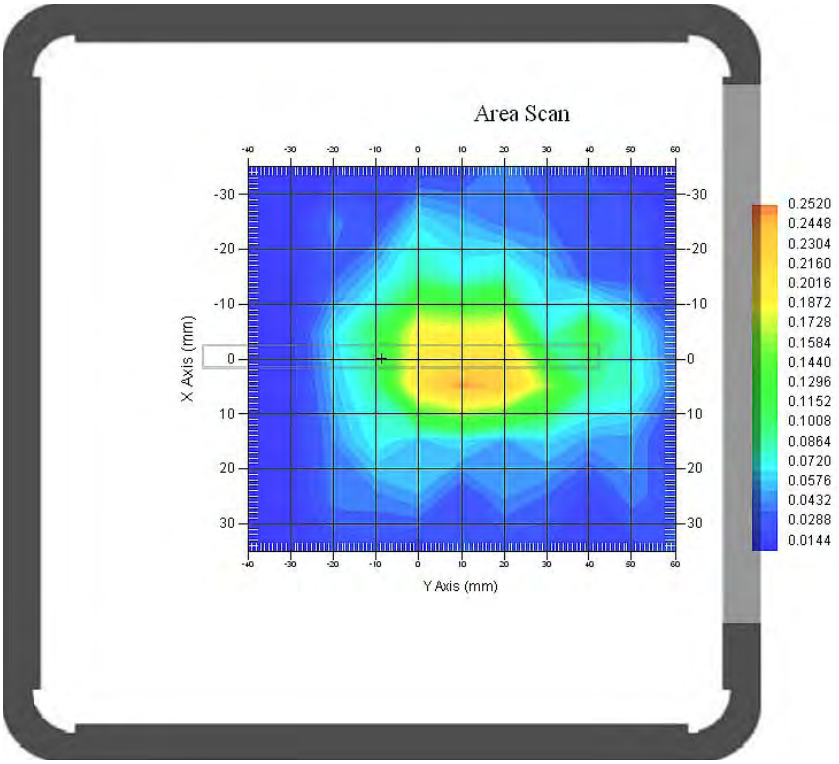
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.199 W/kg
Power Drift-Finish : 0.203 W/kg
Power Drift (%) : 2.015

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.21 F/m
Sigma : 1.55 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 : 0.246 W/kg
10 gram SAR value : 0.114 W/kg
Area Scan Peak SAR : 0.248 W/kg
Zoom Scan Peak SAR : 0.560 W/kg

Plot 35#



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

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

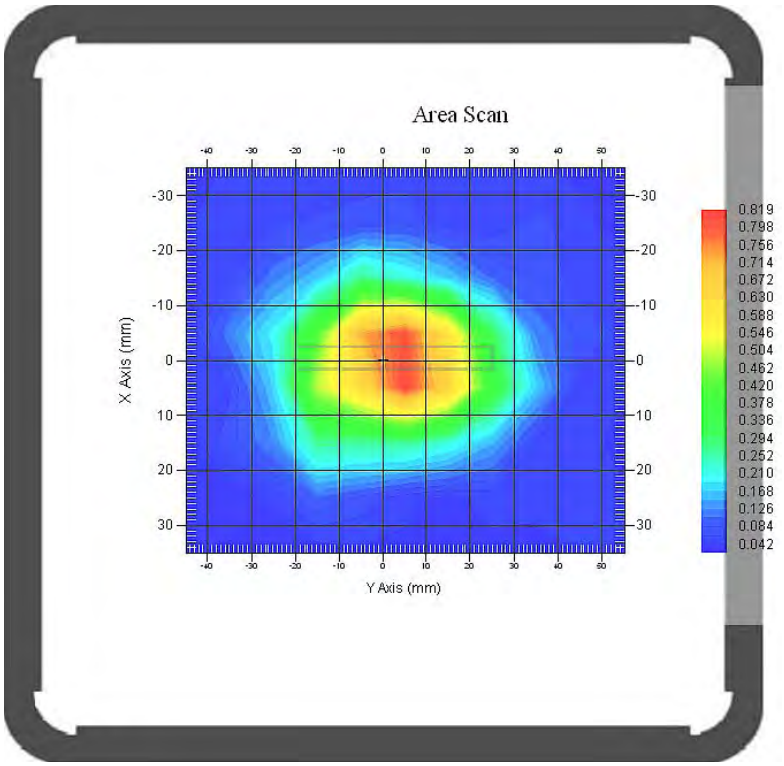
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.712 W/kg
Power Drift-Finish : 0.722 W/kg
Power Drift (%) : 1.485

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.21 F/m
Sigma : 1.55 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 : 0.715 W/kg
10 gram SAR value : 0.357 W/kg
Area Scan Peak SAR : 0.801 W/kg
Zoom Scan Peak SAR : 1.561 W/kg

Plot 36#



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

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

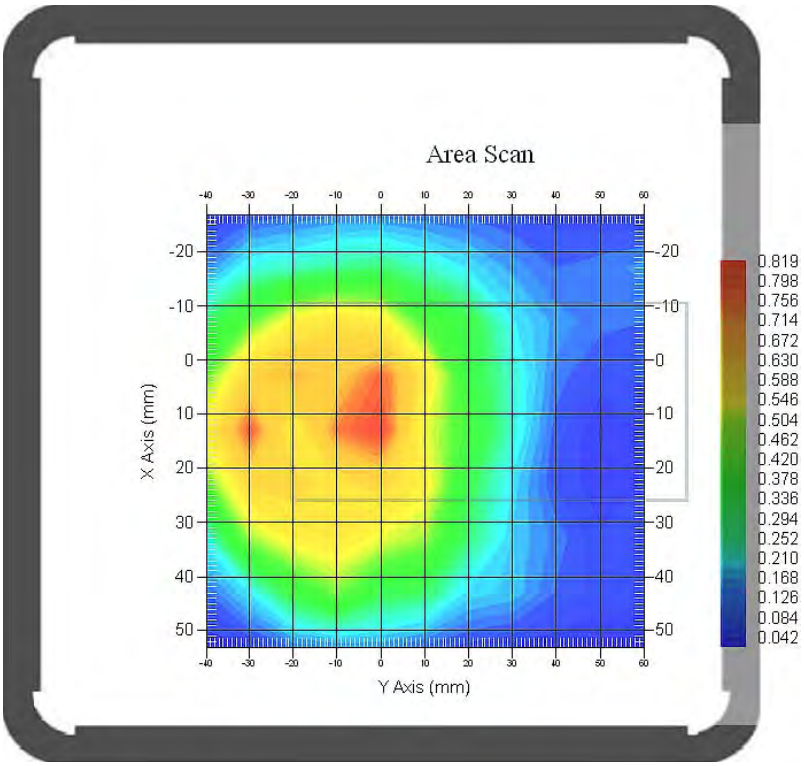
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.658 W/kg
Power Drift-Finish : 0.651 W/kg
Power Drift (%) : -1.045

Tissue Data
Type : Body
Frequency : 1852.4 MHz
Epsilon : 53.41 F/m
Sigma : 1.51 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 : 0.739 W/kg
10 gram SAR value : 0.417 W/kg
Area Scan Peak SAR : 0.800 W/kg
Zoom Scan Peak SAR : 1.311 W/kg

Plot 37#



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

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

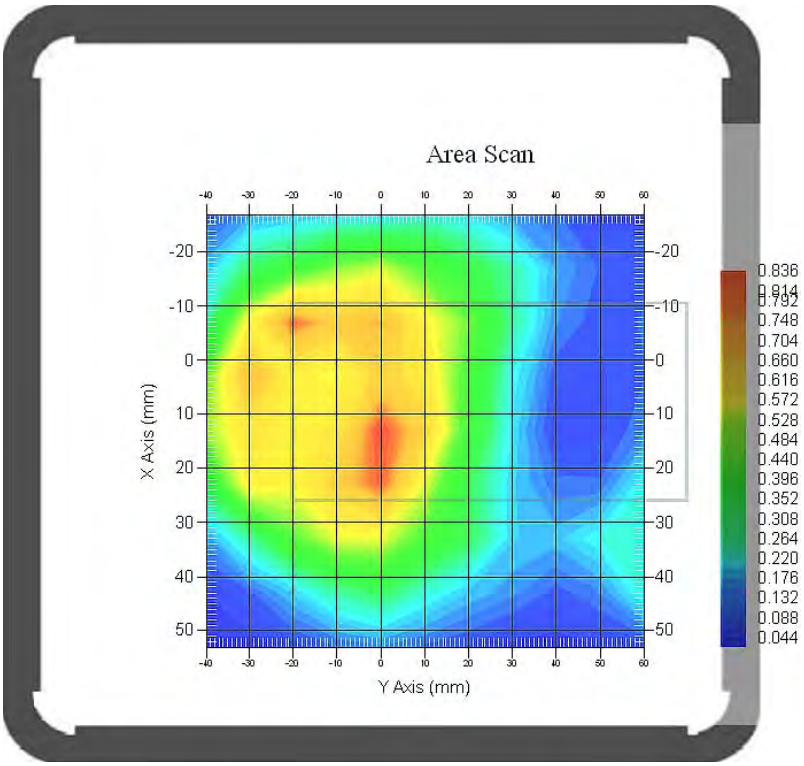
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.584 W/kg
Power Drift-Finish : 0.570 W/kg
Power Drift (%) : -2.301

Tissue Data
Type : Body
Frequency : 1852.4 MHz
Epsilon : 53.41 F/m
Sigma : 1.51 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 : 0.747 W/kg
10 gram SAR value : 0.361 W/kg
Area Scan Peak SAR : 0.827 W/kg
Zoom Scan Peak SAR : 1.311 W/kg

Plot 38#



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

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

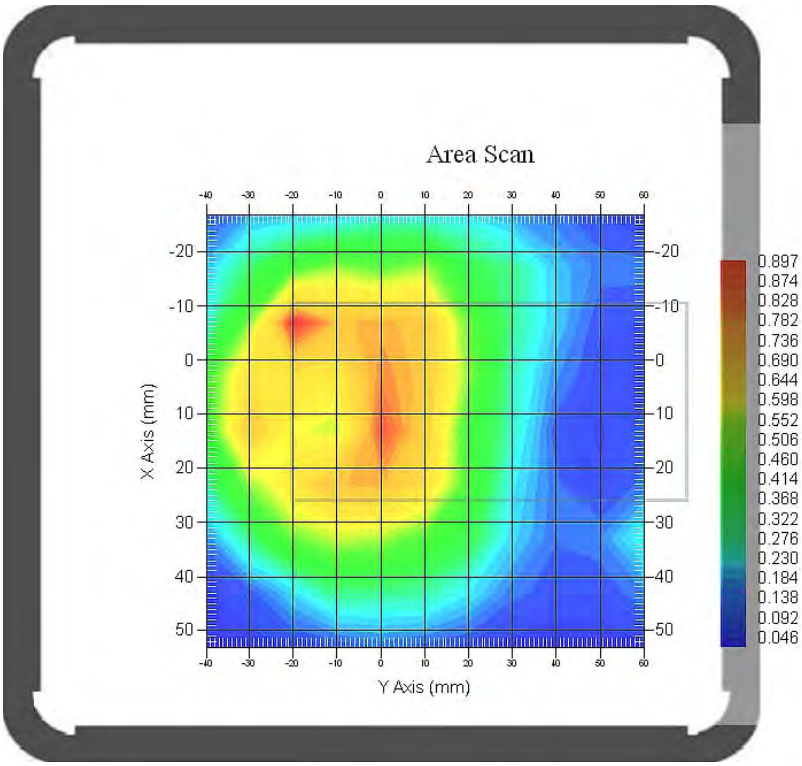
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.715 W/kg
Power Drift-Finish : 0.710 W/kg
Power Drift (%) : -0.675

Tissue Data
Type : Body
Frequency : 1880.0 MHz
Epsilon : 53.21 F/m
Sigma : 1.55 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 : 0.816 W/kg
10 gram SAR value : 0.423 W/kg
Area Scan Peak SAR : 0.893 W/kg
Zoom Scan Peak SAR : 1.461 W/kg

Plot 39#



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

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

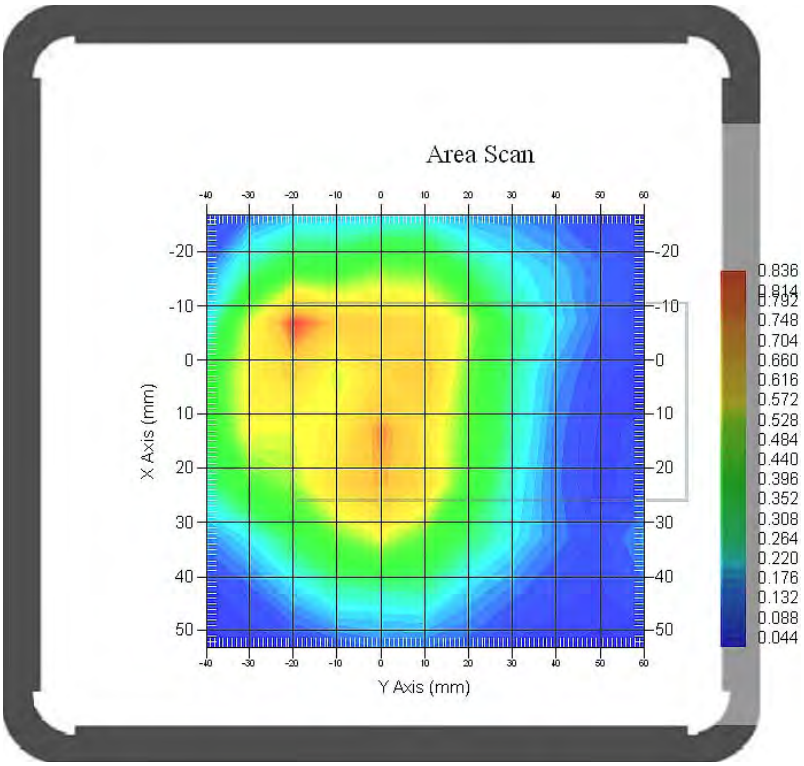
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.635 W/kg
Power Drift-Finish : 0.628 W/kg
Power Drift (%) : -1.209

Tissue Data
Type : Body
Frequency : 1907.6 MHz
Epsilon : 53.17 F/m
Sigma : 1.57 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 : 0.756 W/kg
10 gram SAR value : 0.403 W/kg
Area Scan Peak SAR : 0.828 W/kg
Zoom Scan Peak SAR : 1.251 W/kg

Plot 40#



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

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

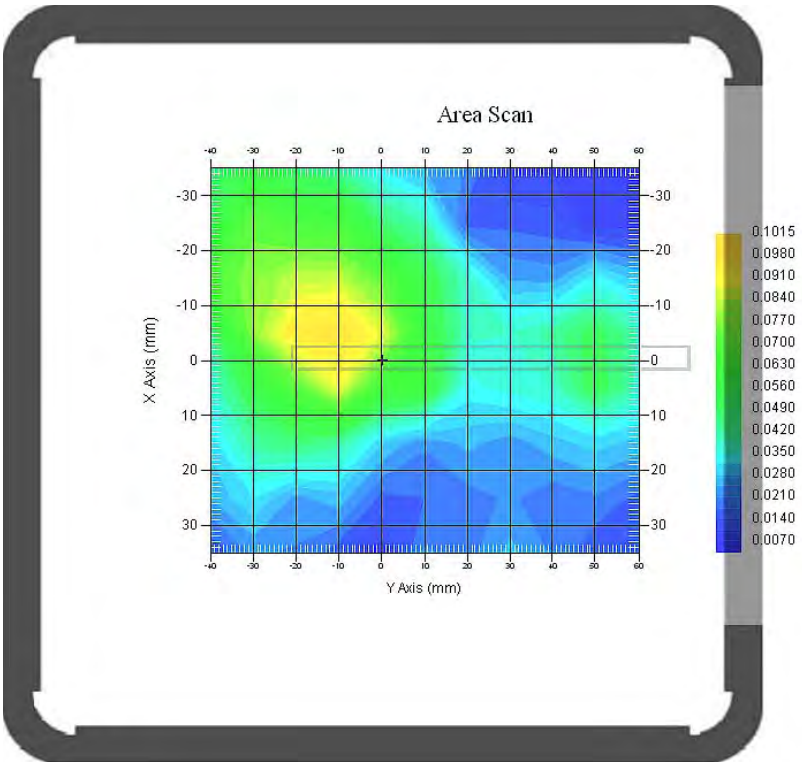
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 7x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.060 W/kg
Power Drift-Finish : 0.059 W/kg
Power Drift (%) : -1.732

Tissue Data
Type : Body
Frequency : 1852.4 MHz
Epsilon : 53.41 F/m
Sigma : 1.51 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 : 0.085 W/kg
10 gram SAR value : 0.046 W/kg
Area Scan Peak SAR : 0.099 W/kg
Zoom Scan Peak SAR : 0.150 W/kg

Plot 41#



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

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

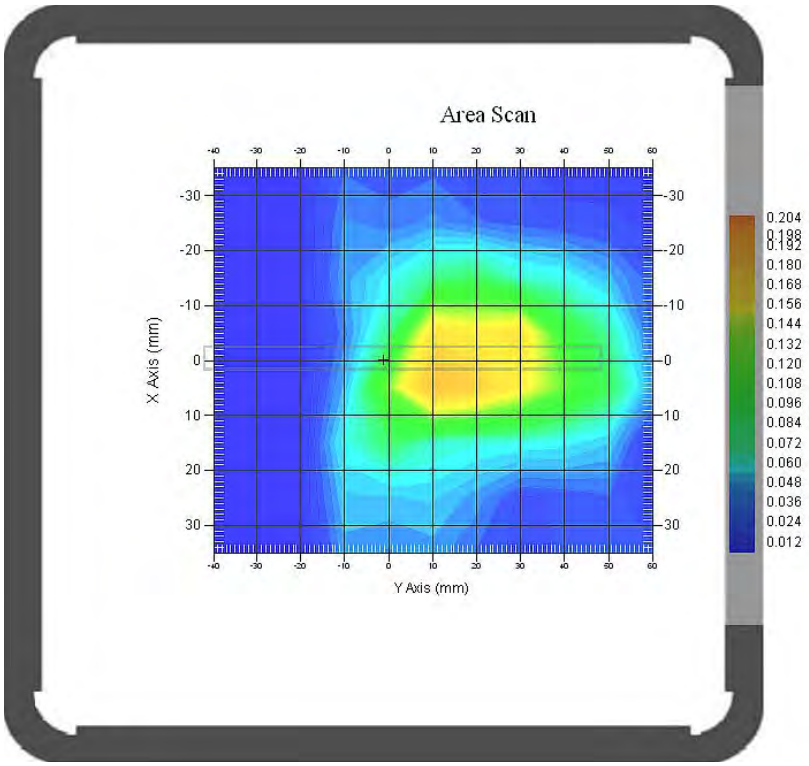
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 7x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.123 W/kg
Power Drift-Finish : 0.125 W/kg
Power Drift (%) : 1.859

Tissue Data
Type : Body
Frequency : 1852.4 MHz
Epsilon : 53.41 F/m
Sigma : 1.51 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 : 0.180 W/kg
10 gram SAR value : 0.102 W/kg
Area Scan Peak SAR : 0.200 W/kg
Zoom Scan Peak SAR : 0.460 W/kg

Plot 42#



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

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

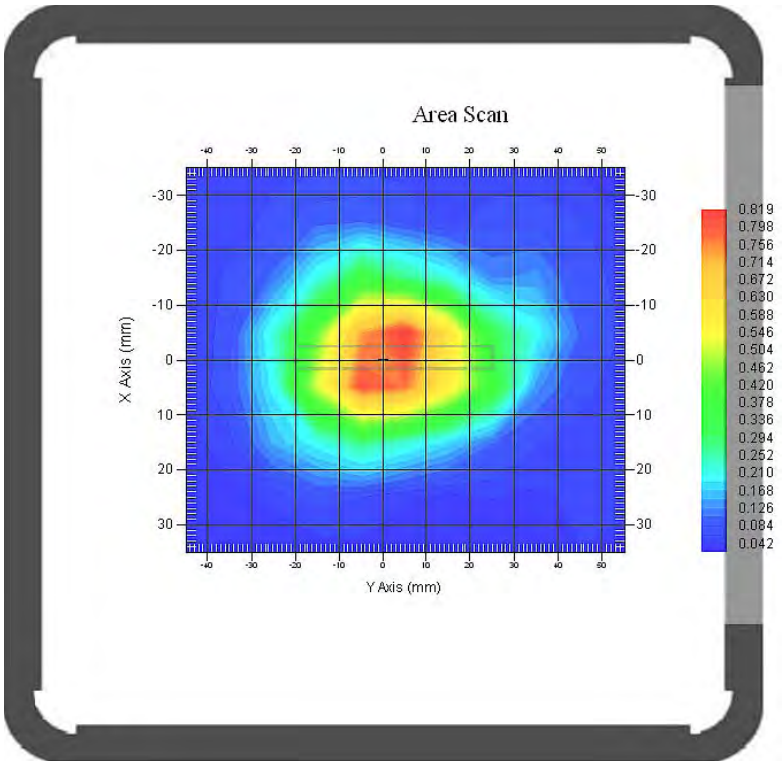
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 7x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.714 W/kg
Power Drift-Finish : 0.701 W/kg
Power Drift (%) : -1.901

Tissue Data
Type : Body
Frequency : 1852.4 MHz
Epsilon : 53.41 F/m
Sigma : 1.51 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 : 0.746 W/kg
10 gram SAR value : 0.426 W/kg
Area Scan Peak SAR : 0.818 W/kg
Zoom Scan Peak SAR : 1.811 W/kg

Plot 43#



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.

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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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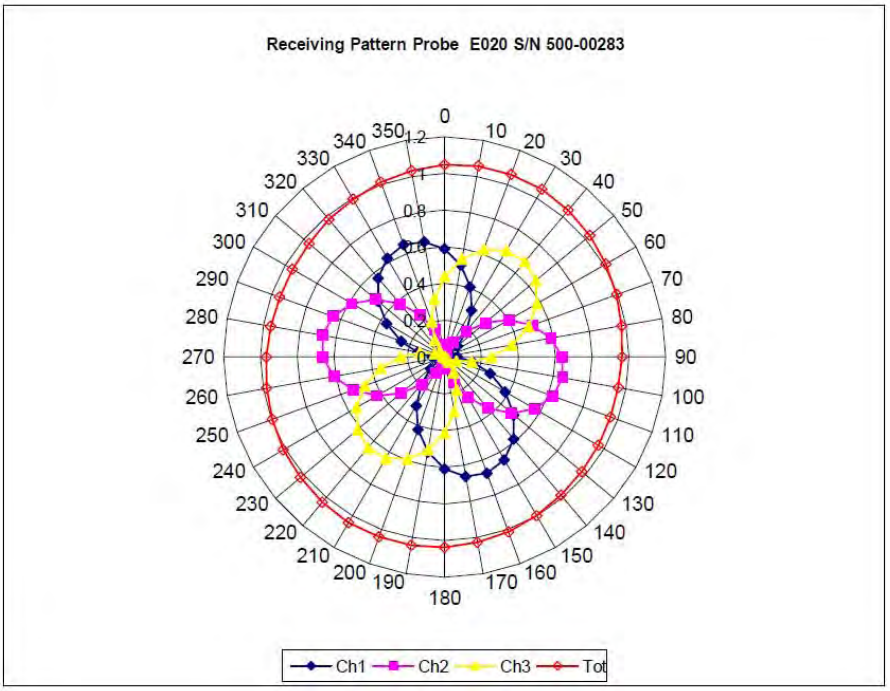
Receiving Pattern Air



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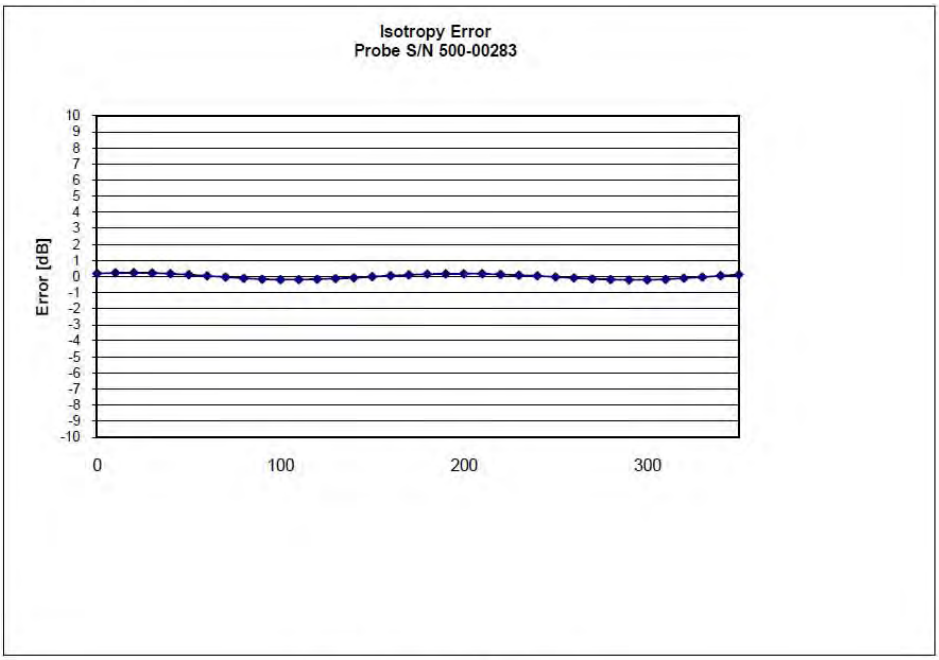
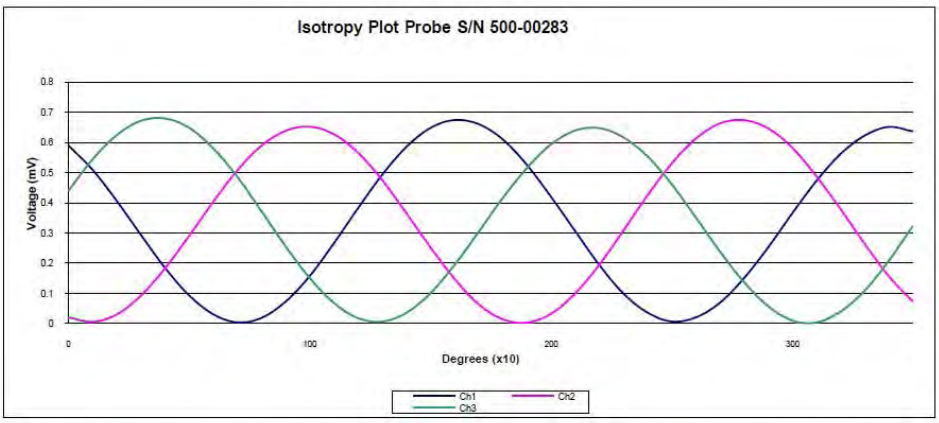
Isotropy Error Air





Isotropicity Tissue: 0.10 dB

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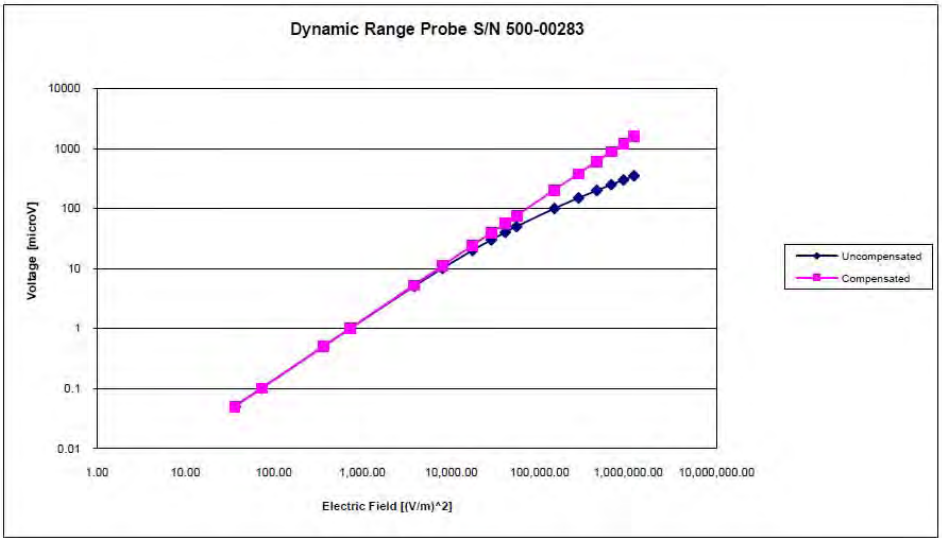
Dynamic Range



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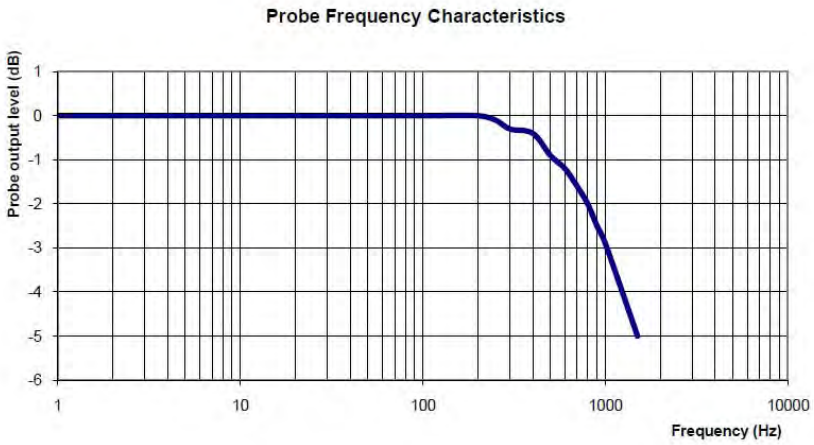
Video Bandwidth



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

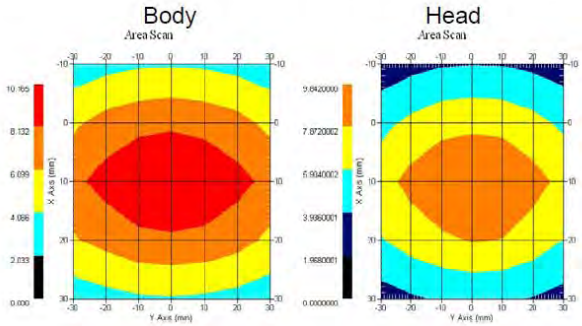
Length: 162.2 mm
Height: 89.4 mm

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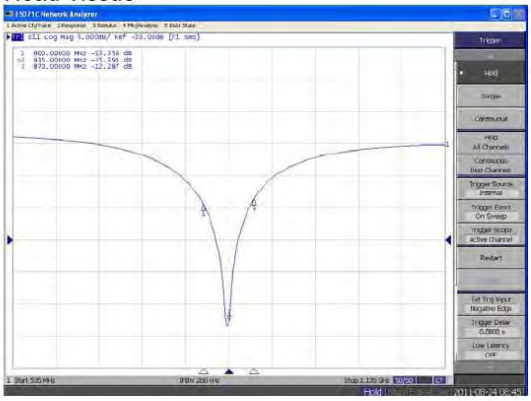
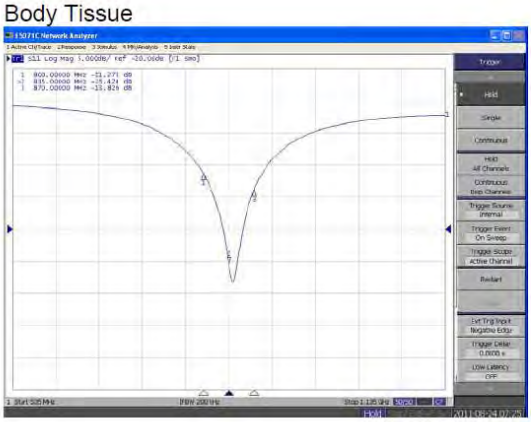
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

Head Tissue



Body Tissue



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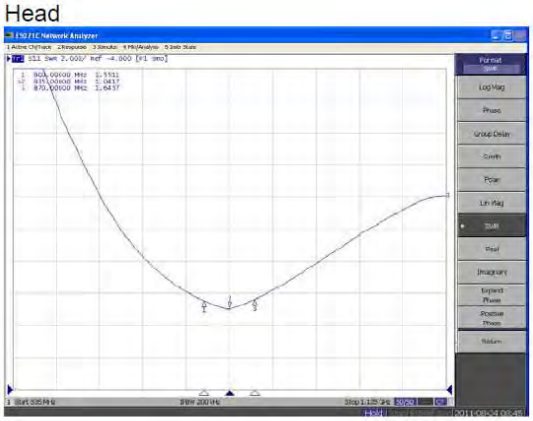
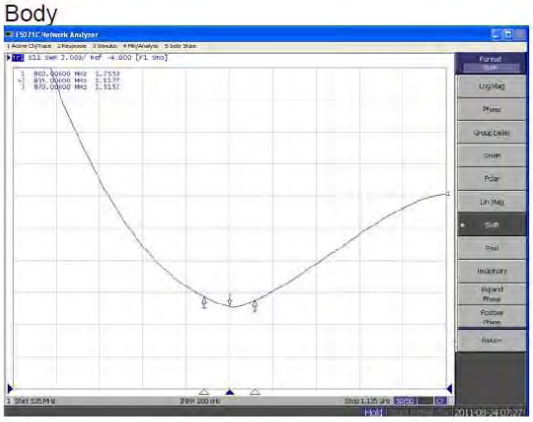
SWR

Head



Body



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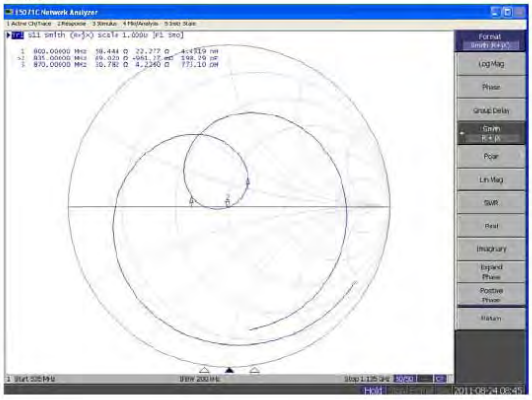
NCL Calibration Laboratories

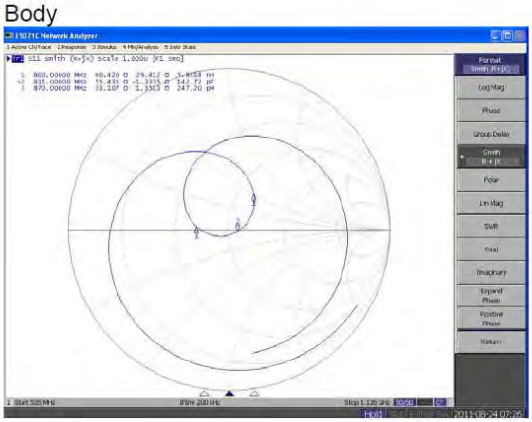
Division of APREL Laboratories.

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

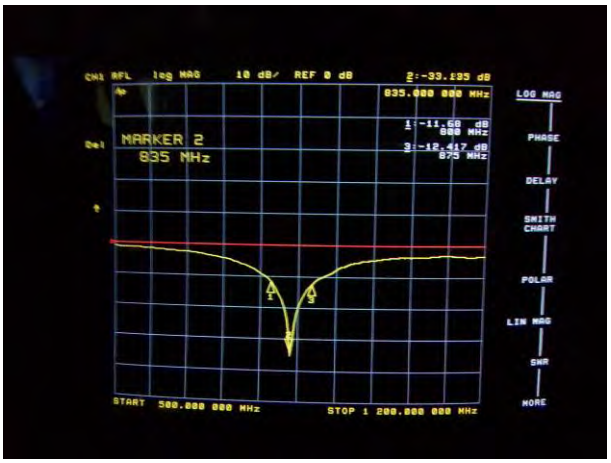
APREL Length	APREL Height	Measured Length	Measured Height
161.0 mm	89.8 mm	161.1 mm	89.7 mm

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

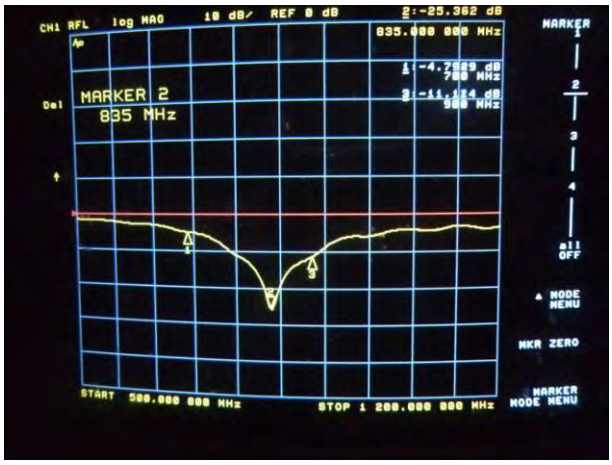
Return Loss :



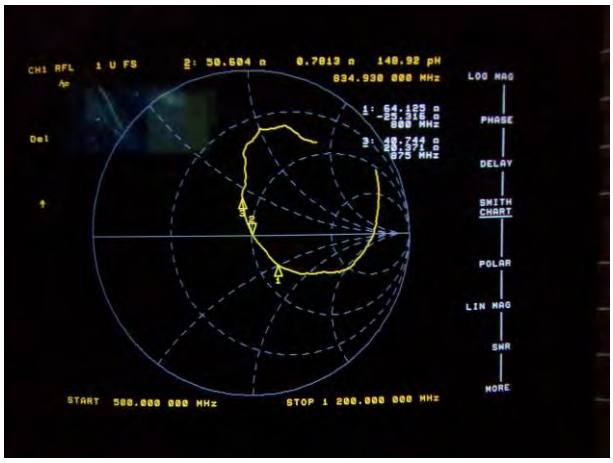
Impedance :

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

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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

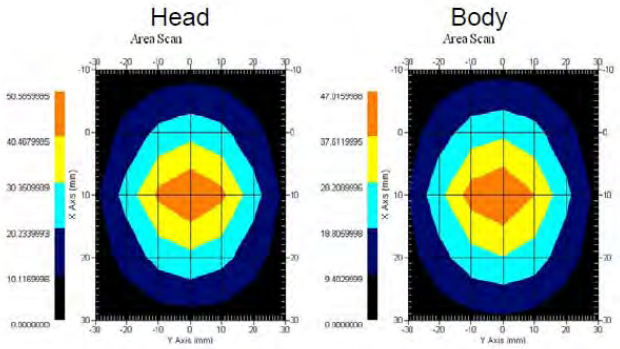
Length: 67.1 mm
Height: 38.9 mm

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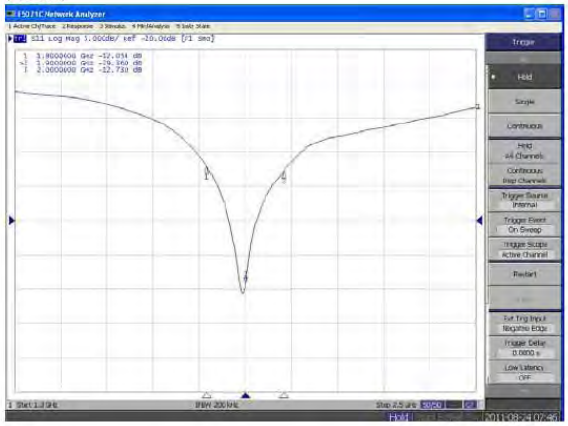
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

Head



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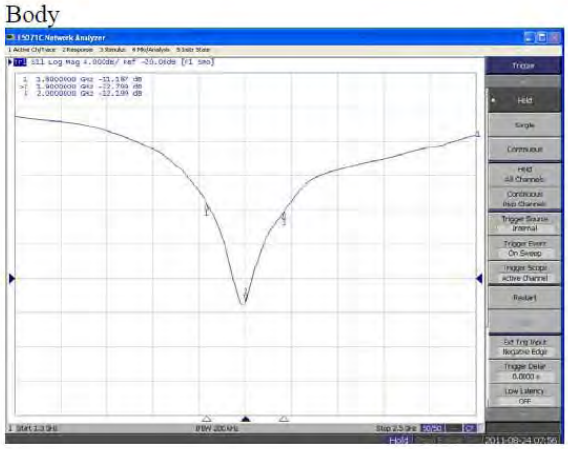

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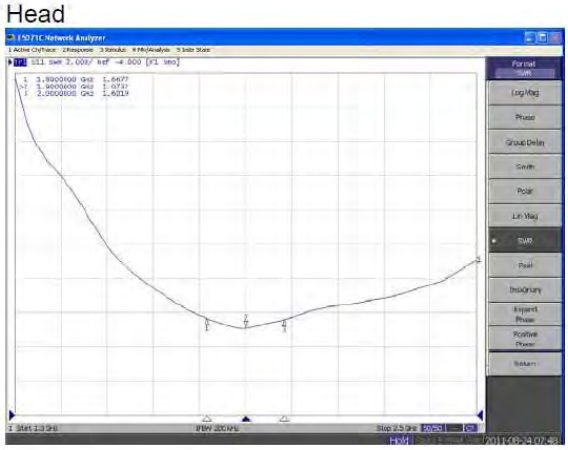
SWR

Head



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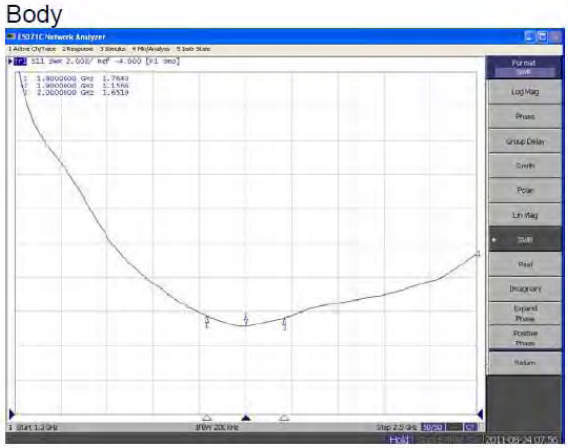

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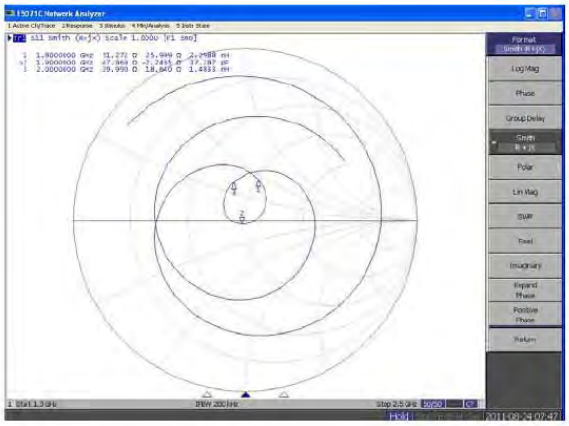
Smith Chart Dipole Impedance

Head



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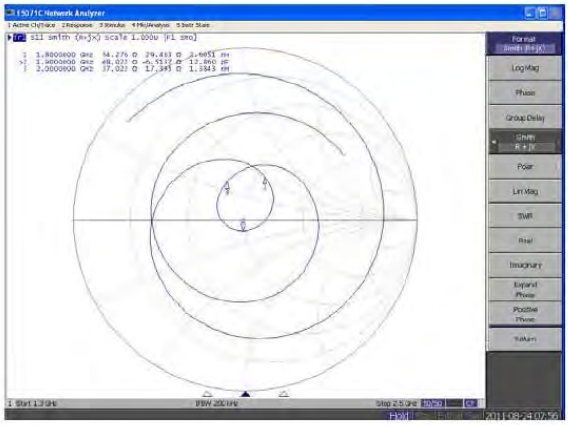

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Test Equipment

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

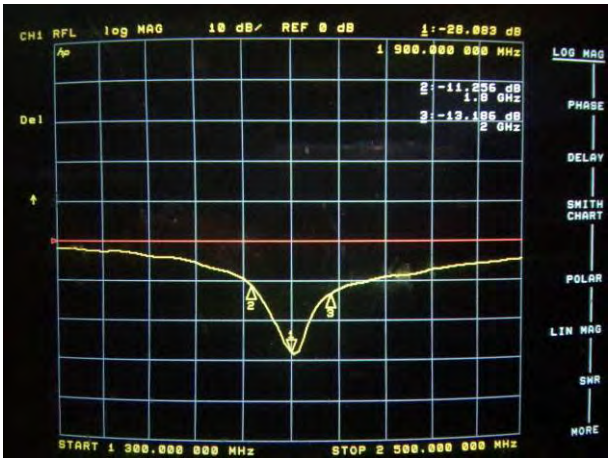
APREL Length	APREL Height	Measured Length	Measured Height
68.0 mm	39.4 mm	68.3 mm	39.2 mm

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 :



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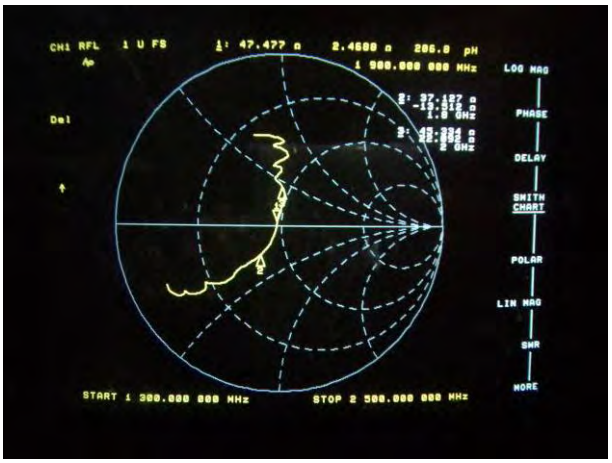
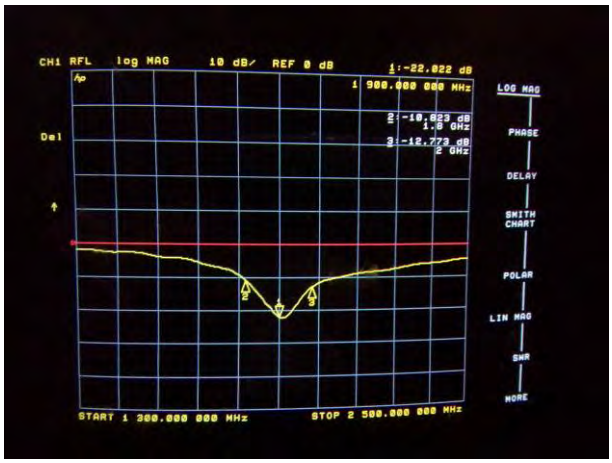


Body Tissue

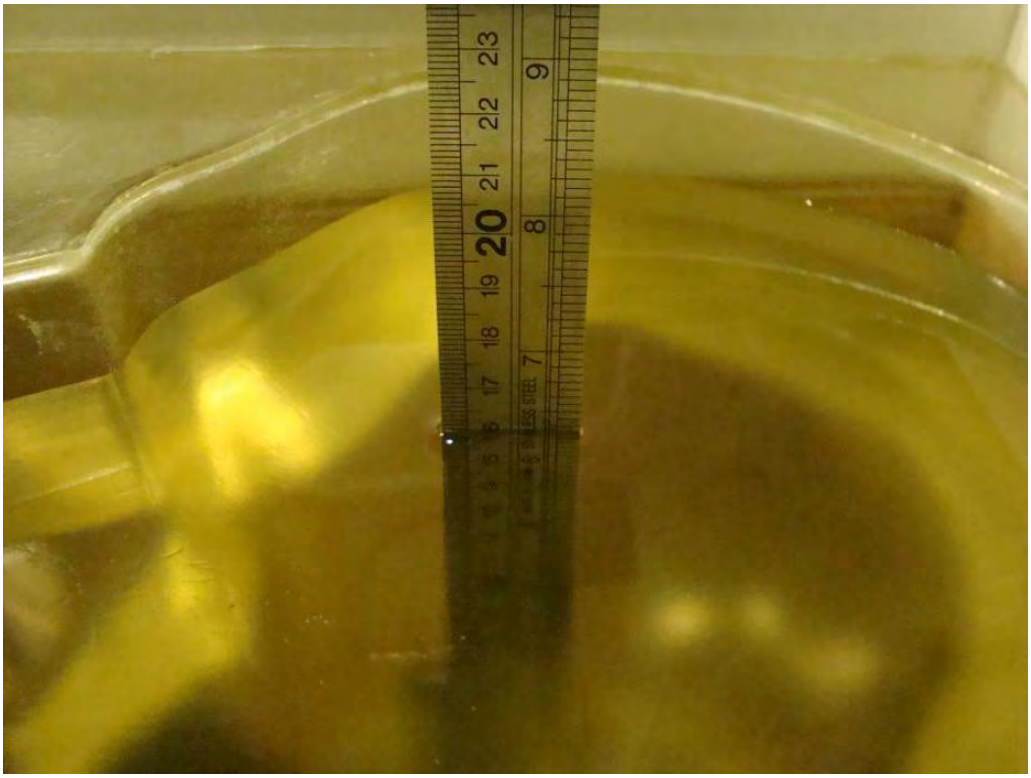
Return Loss :



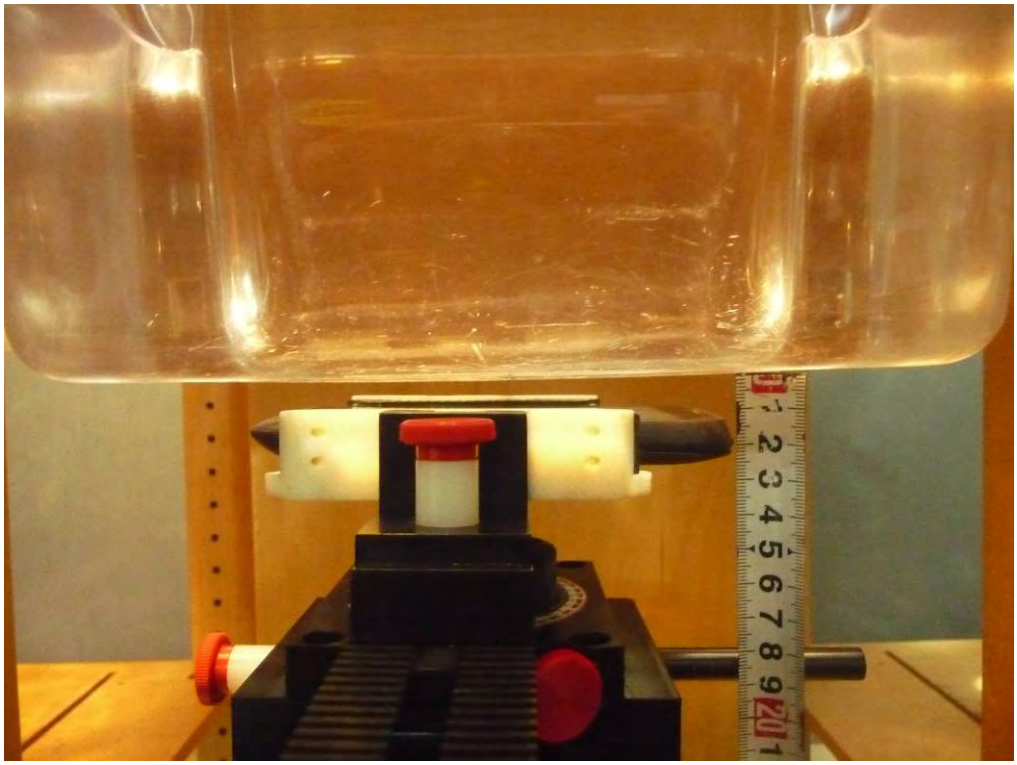
Impedance :

APPENDIX D EUT TEST POSITION PHOTOS

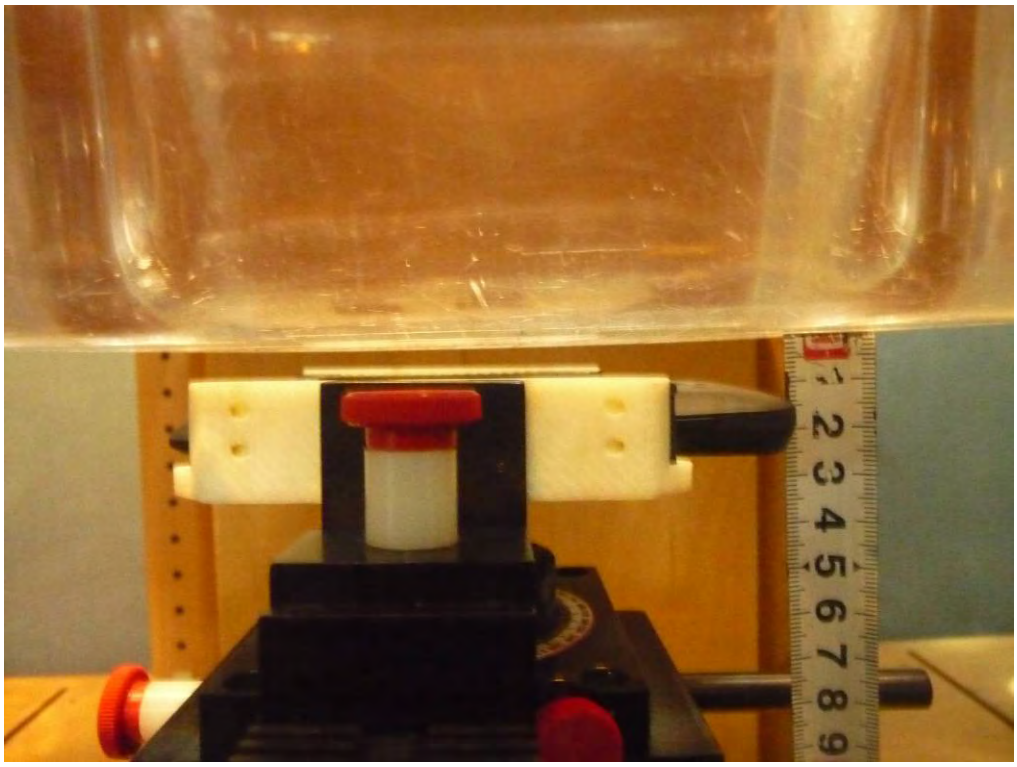
Liquid depth ≥ 15cm



Body-worn Front Setup Photo

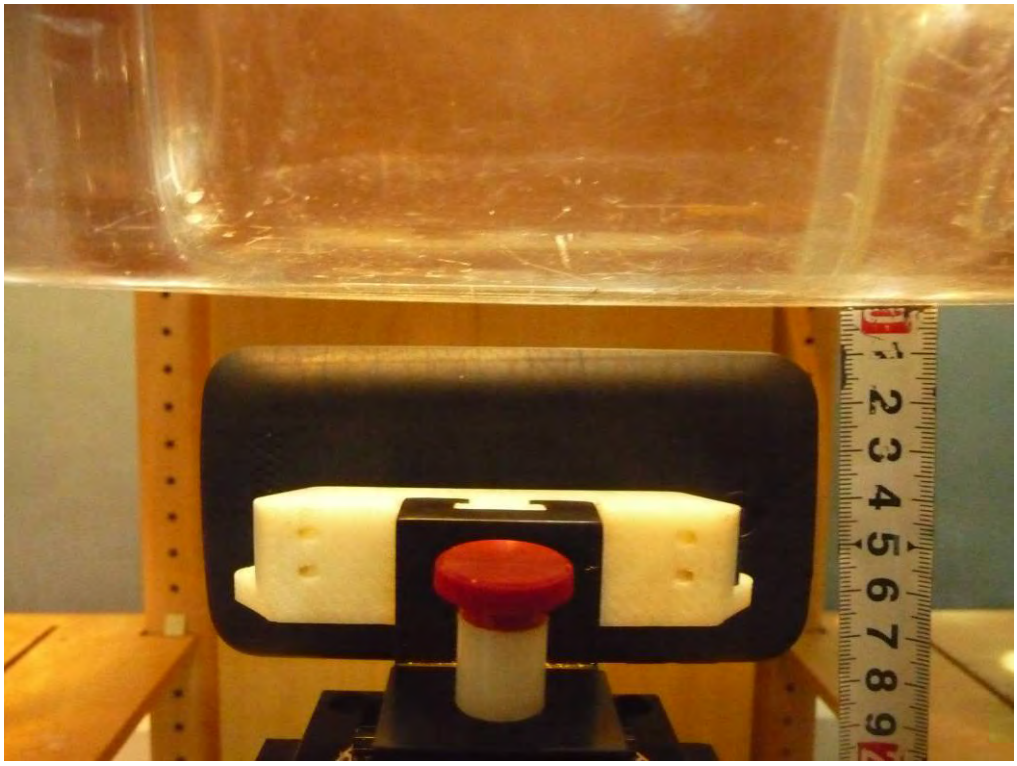


Body-worn Back Setup Photo

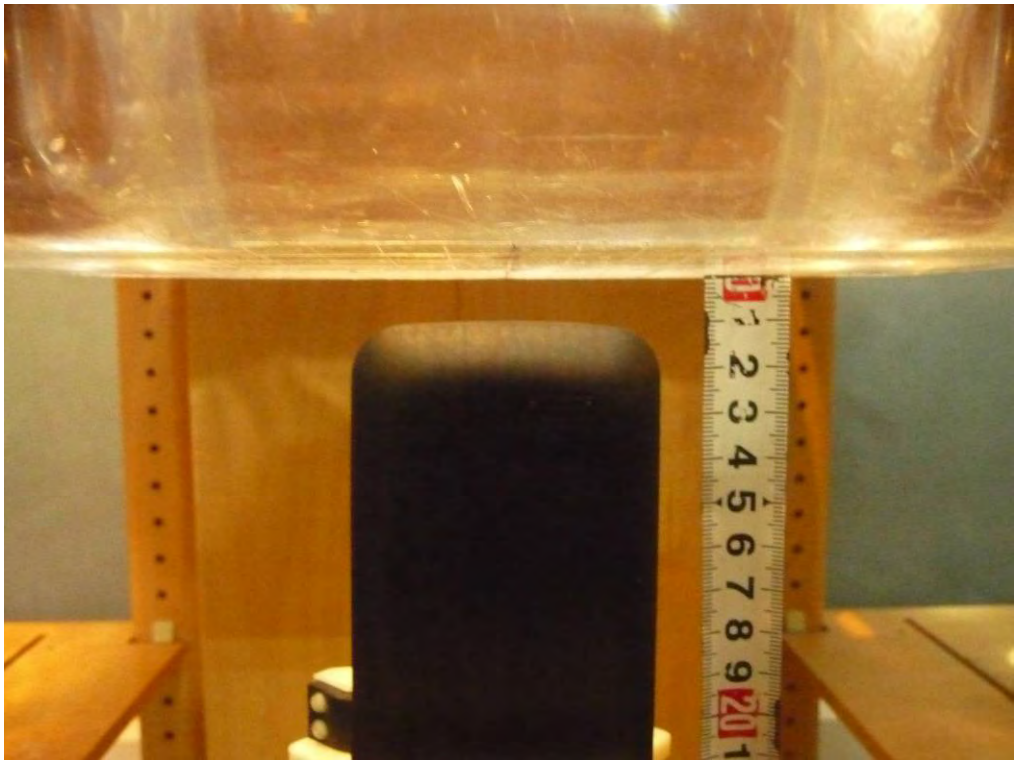


Body-worn Left Setup Photo

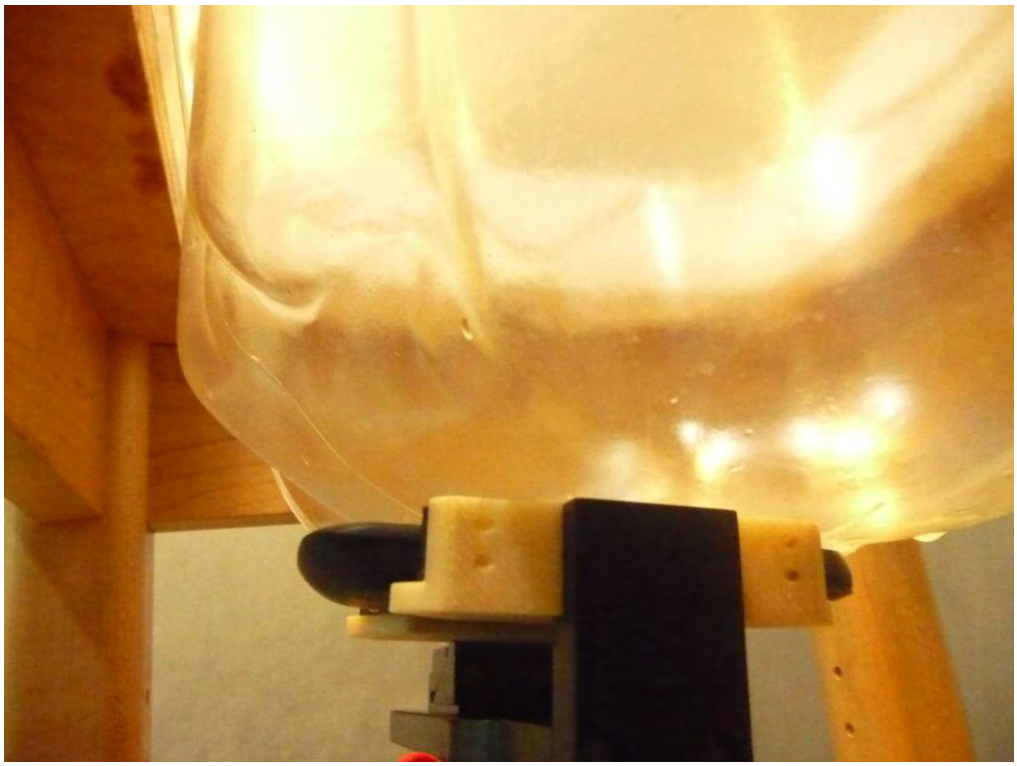
Body-worn Right Setup Photo



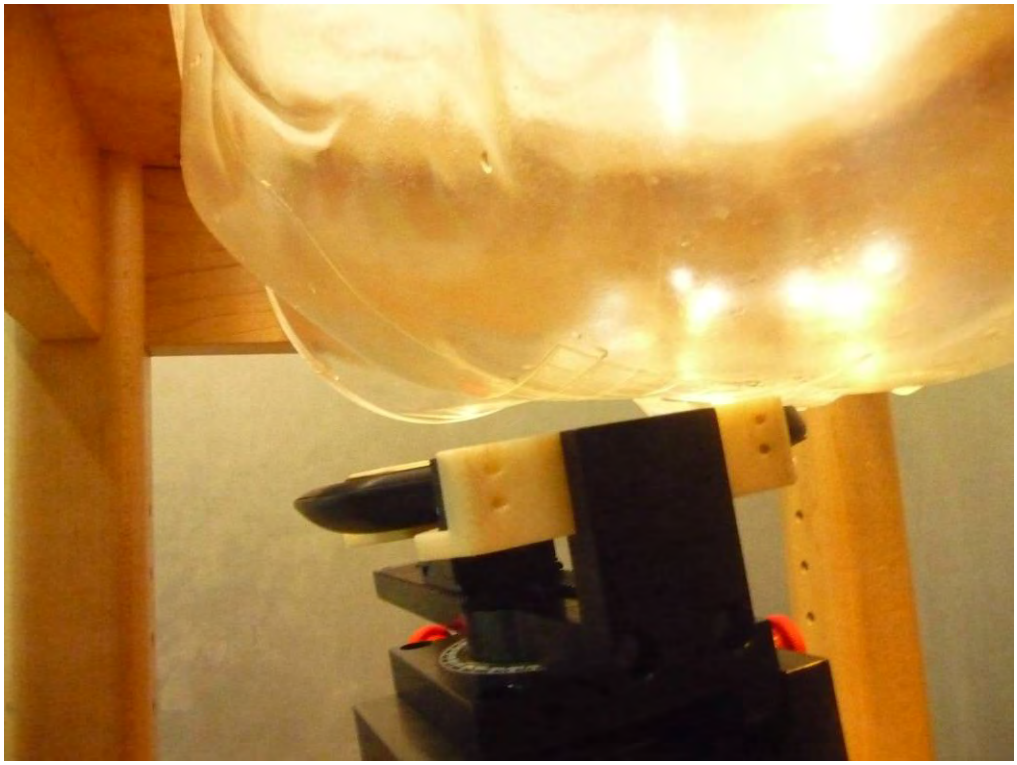
Body-worn Bottom Setup Photo



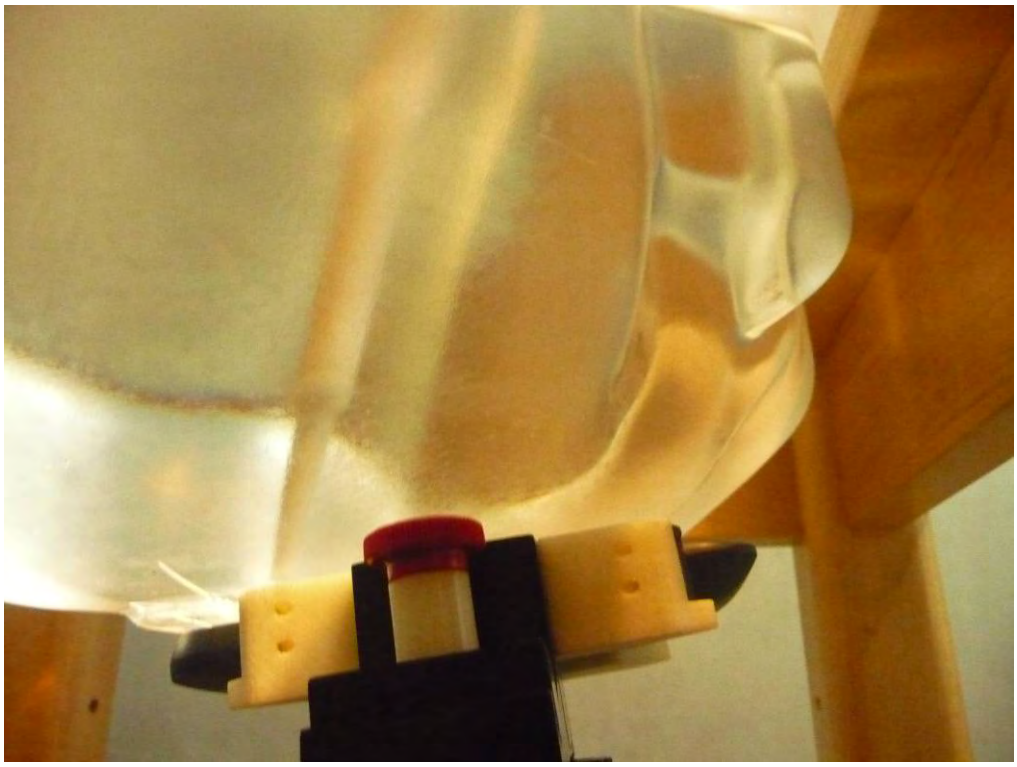
Left Head Touch Setup Photo



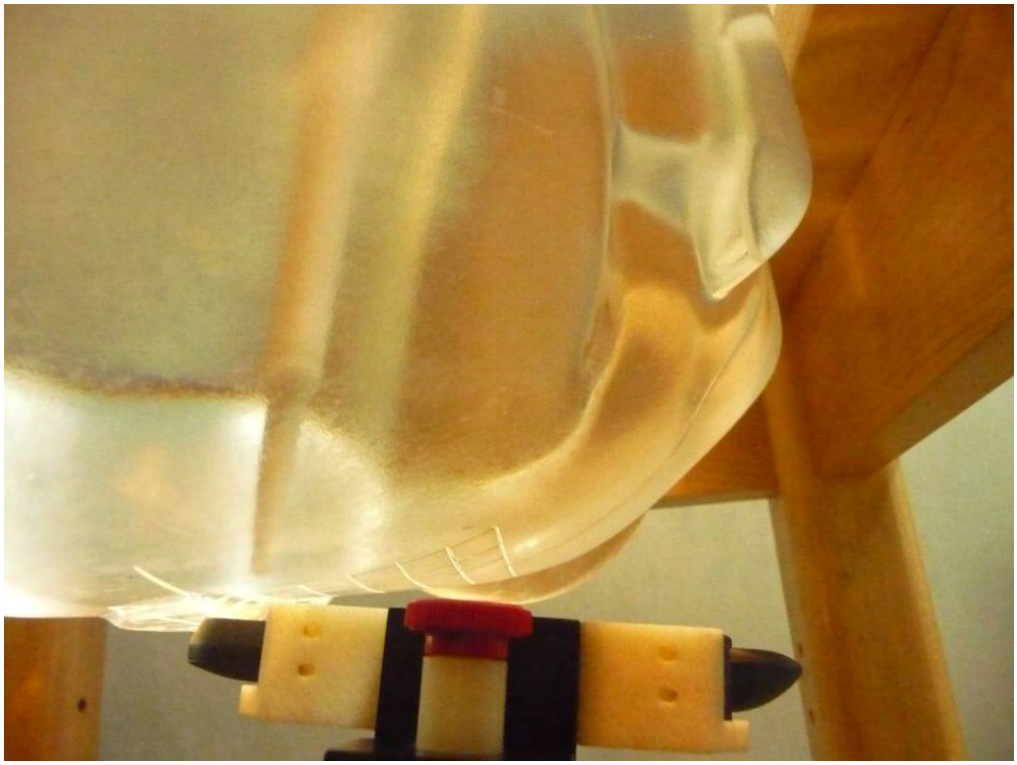
Left Head Tilt Setup Photo



Right Head Touch Setup Photo



Right Head Tilt Setup Photo

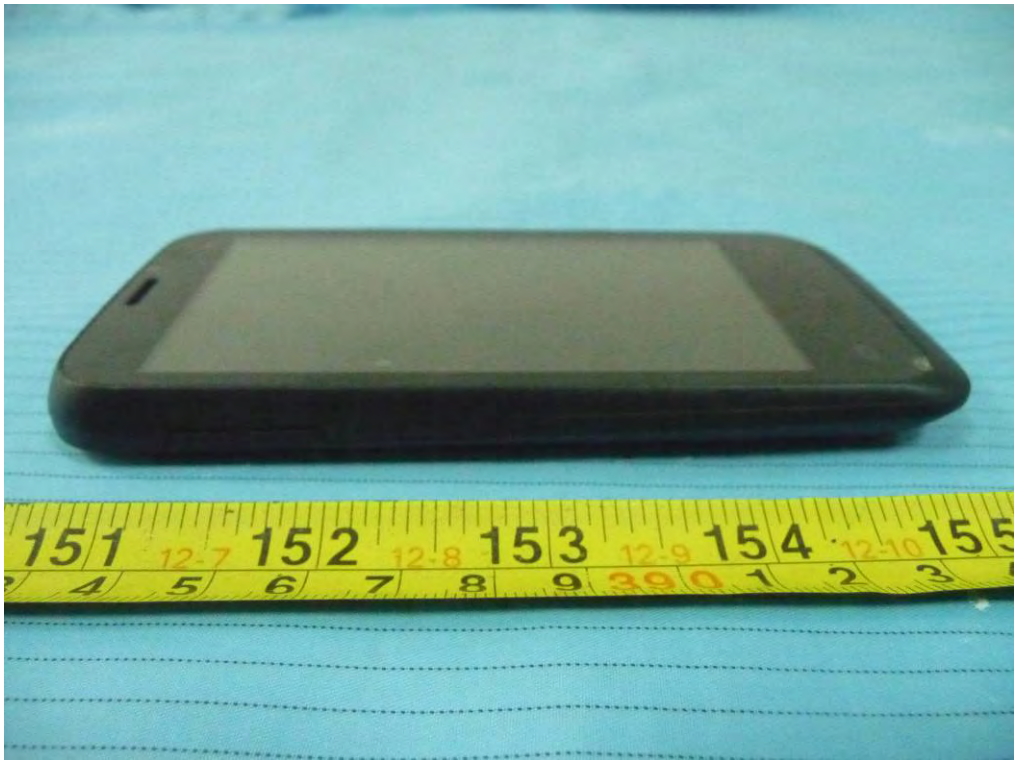


APPENDIX E EUT PHOTOS

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

[1] Federal Communications Commission, \Report and order: Guidelines for evaluating the environmental effects of radiofrequency radiation", Tech. Rep. FCC 96-326, FCC, Washington, D.C. 20554, 1996.

[2] David L. Means Kwok Chan, Robert F. Cleveland, \Evaluating compliance with FCC guidelines for human exposure to radiofrequency electromagnetic fields", Tech. Rep., Federal Communication Commission, O_ce of Engineering & Technology, Washington, DC, 1997.

[3] Thomas Schmid, Oliver Egger, and Niels Kuster, \Automated E-_eld scanning system for dosimetricPage 136 of 136
assessments", IEEE Transactions on Microwave Theory and Techniques, vol. 44, pp. 105{113, Jan. 1996.

[4] Niels Kuster, Ralph K.astle, and Thomas Schmid, \Dosimetric evaluation of mobile communications equipment with known precision", IEICE Transactions on Communications, vol. E80-B, no. 5, pp. 645{652, May 1997.

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[6] ANSI, ANSI/IEEE C95.1-1992: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz, The Institute of Electrical and Electronics Engineers, Inc., New York, NY 10017, 1992.

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[10] Klaus Meier, Ralf Kastle, Volker Hombach, Roger Tay, and Niels Kuster, \The dependence of EM energy absorption upon human head modeling at 1800 MHz", IEEE Transactions on Microwave Theory and Techniques, Oct. 1997, in press.

[11] W. Gander, Computermathematik, Birkhaeuser, Basel, 1992.

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[13] NIS81 NAMAS, \The treatment of uncertainity in EMC measurement", Tech. Rep., NAMAS Executive, National Physical Laboratory, Teddington, Middlesex, England, 1994.

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