

## SAR EVALUATION REPORT

For

**b mobile HK Limited**

G/F. 144 UN CHAU STREET, SHAM SHUI PO, KOWLOON, HONG KONG

**FCC ID: ZSW-AX690-AX695**

<b>Report Type:</b> Original Report	<b>Product Type:</b> Mobile Phone
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<b>Report Number:</b> <u>RSZ131125001-20</u>	
<b>Report Date:</b> <u>2013-12-11</u>	
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Attestation of Test Results		
<b>EUT Information</b>	<b>Company Name</b>	b mobile HK Limited
	<b>EUT Description</b>	Mobile Phone
	<b>FCC ID</b>	ZSW-AX690-AX695
	<b>Model Number</b>	AX690
	<b>Test Date</b>	2013-12-08 to 2013-12-10
<b>Frequency</b>	<b>Max. SAR Level(s) Reported</b>	<b>Limit(W/Kg)</b>
<b>GSM 850</b>	0.599 W/kg 1g Head SAR 0.729 W/kg 1g Body SAR	<b>1.6</b>
<b>PCS 1900</b>	0.507 W/kg 1g Head SAR 0.290 W/kg 1g Body SAR	
<b>WCDMA850</b>	0.589 W/kg 1g Head SAR 0.277 W/kg 1g Body SAR	
<b>WCDMA1900</b>	1.106 W/kg 1g Head SAR 0.316 W/kg 1g Body SAR	
<b>Simultaneous</b>	1.523 W/kg 1g Head SAR 0.938 W/kg 1g Body SAR	
<b>Applicable Standards</b>	<b>ANSI/IEEE C95.1: 2005</b> IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields,3 kHz to 300 GHz.	
	<b>ANSI/IEEE C95.3: 2002</b> IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to Such Fields,100 kHz—300 GHz.	
	<b>IEEE 1528: 2003</b> IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques	
	<b>KDB procedures</b> 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.	
<p><b>Note:</b> 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.</p> <p><b>The results and statements contained in this report pertain only to the device(s) evaluated.</b></p>		

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**DOCUMENT REVISION HISTORY**

<b>Revision Number</b>	<b>Report Number</b>	<b>Description of Revision</b>	<b>Date of Revision</b>
0	RSZ131125001-20	Original Report	2013-12-11

## EUT DESCRIPTION

This report has been prepared on behalf of *b mobile HK Limited* and their product, FCC ID: ZSW-AX690-AX695, Model: AX690 or the EUT (Equipment under Test) as referred to in the rest of this report. The EUT is a *Mobile Phone*.

### Technical Specification

<b>Product Type</b>	Portable
<b>Exposure Category:</b>	Population/Uncontrolled
<b>Antenna Type(s):</b>	Internal Antenna
<b>Body-Worn Accessories:</b>	Headset
<b>Face-Head Accessories:</b>	None
<b>Multi-slot Class:</b>	Class 12
<b>Operation Mode :</b>	GSM Voice, GPRS Data, WCDMA, Wi-Fi and Bluetooth
<b>Frequency Band:</b>	GSM850 : 824-849 MHz (TX) ; 869-894 MHz (RX) PCS1900: 1850-1910 MHz (TX) ; 1930-1990 MHz (RX) WCDMA850: 824-849 MHz (TX) ; 869-894 MHz (RX) WCDMA1900: 1850-1910 MHz (TX) ; 1930-1990 MHz (RX) Wi-Fi: 2412-2462 MHz, 2422-2452 MHz Bluetooth : 2402-2480 MHz
<b>Conducted RF Power:</b>	GSM850 : 32.38 dBm PCS1900: 29.84 dBm WCDMA 850: 22.53 dBm WCDMA 1900: 20.95 dBm Wi-Fi: 9.69 dBm Bluetooth: 5.92 dBm
<b>Dimensions (L*W*H):</b>	136.2 mm (L) × 67.8 mm (W) × 10 mm (H)
<b>Power Source:</b>	3.7 V <sub>DC</sub> 1500 mAh Rechargeable Battery
<b>Normal Operation:</b>	Head and Body-worn

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## REFERENCE, STANDARDS, AND GUIDELINES

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### **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**

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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 10mm<sup>2</sup> 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/m<sup>3</sup> 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**

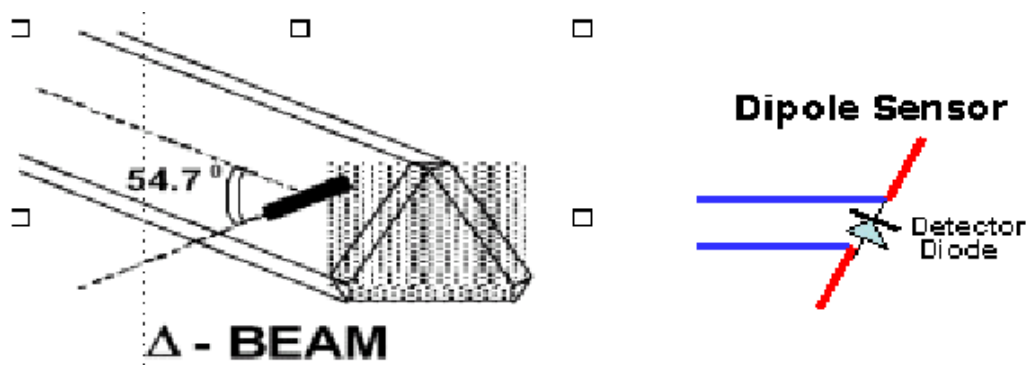
The overall uncertainty for the methodology and algorithms the used during the SAR calculation was evaluated using the data from IEEE 1528 based on the example f3 algorithm:

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

**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

<b>Calibration Method</b>	Frequency Dependent Below 1 GHz Calibration in air performed in a TEM Cell Above 1 GHz Calibration in air performed in waveguide
<b>Sensitivity</b>	0.70 $\mu\text{V}/(\text{V}/\text{m})^2$ to 0.85 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Dynamic Range</b>	0.0005 W/kg to 100 W/kg
<b>Isotropic Response</b>	Better than 0.1 dB
<b>Diode Compression Point (DCP)</b>	Calibration for Specific Frequency
<b>Probe Tip Diameter</b>	< 2.9 mm
<b>Sensor Offset</b>	1.56 (+/- 0.02 mm)
<b>Probe Length</b>	289 mm
<b>Video Bandwidth</b>	@ 500 Hz: 1 dB @ 1.02 kHz: 3 dB
<b>Boundary Effect</b>	Less than 2.1% for distance greater than 0.58 mm
<b>Spatial Resolution</b>	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 5 $\mu\text{V}$  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.

<b>ADC</b>	12 Bit
<b>Amplifier Range</b>	20 mV to 200 mV and 150 mV to 800 mV
<b>Field Integration</b>	Local Co-Processor utilizing proprietary integration algorithms
<b>Number of Input Channels</b>	4 in total 3 dedicated and 1 spare
<b>Communication</b>	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.



<b>Robot/Controller Manufacturer</b>	Thermo CRS
<b>Number of Axis</b>	Six independently controlled axis
<b>Positioning Repeatability</b>	0.05 mm
<b>Controller Type</b>	Single phase Pentium based C500C
<b>Robot Reach</b>	710 mm
<b>Communication</b>	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	
	$\epsilon_r$	$\sigma$ (S/m)	$\epsilon_r$	$\sigma$ (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



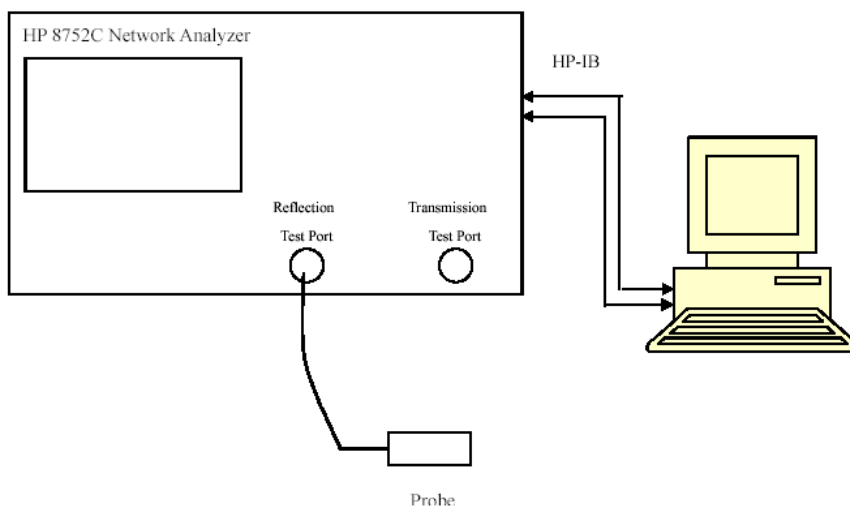
## EQUIPMENT LIST AND CALIBRATION

### 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 (%)
		$\epsilon_r$	$\sigma$ (S/m)	$\epsilon_r$	$\sigma$ (S/m)	$\Delta\epsilon_r$	$\Delta\sigma$ (S/m)	
824.2	Head	41.54	0.90	41.50	0.90	0.099	0.000	±5
	Body	54.87	0.94	55.20	0.97	-0.598	-3.093	±5
826.4	Head	41.43	0.90	41.50	0.90	-0.172	0.000	±5
	Body	54.89	0.95	55.20	0.97	-0.570	-2.062	±5
836.6	Head	41.49	0.91	41.50	0.90	-0.034	1.111	±5
	Body	54.95	0.96	55.20	0.97	-0.456	-1.031	±5
846.6	Head	41.34	0.92	41.50	0.90	-0.374	2.222	±5
	Body	55.01	0.98	55.20	0.97	-0.342	1.031	±5
848.8	Head	41.27	0.92	41.50	0.90	-0.562	2.222	±5
	Body	55.03	0.98	55.20	0.97	-0.314	1.031	±5
1850.2	Head	40.05	1.39	40.00	1.40	0.126	-0.714	±5
	Body	52.23	1.48	53.30	1.52	-2.016	-2.632	±5
1852.4	Head	40.05	1.38	40.00	1.40	0.132	-1.429	±5
	Body	52.18	1.48	53.30	1.52	-2.108	-2.632	±5
1880.0	Head	40.06	1.41	40.00	1.40	0.146	0.714	±5
	Body	51.98	1.52	53.30	1.52	-2.480	0.000	±5
1907.6	Head	40.06	1.42	40.00	1.40	0.161	1.429	±5
	Body	51.94	1.54	53.30	1.52	-2.544	1.316	±5
1909.8	Head	40.06	1.42	40.00	1.40	0.162	1.429	±5
	Body	52.05	1.53	53.30	1.52	-2.336	0.658	±5

\*Liquid Verification was performed on 2013-12-08.

Please refer to the following tables.

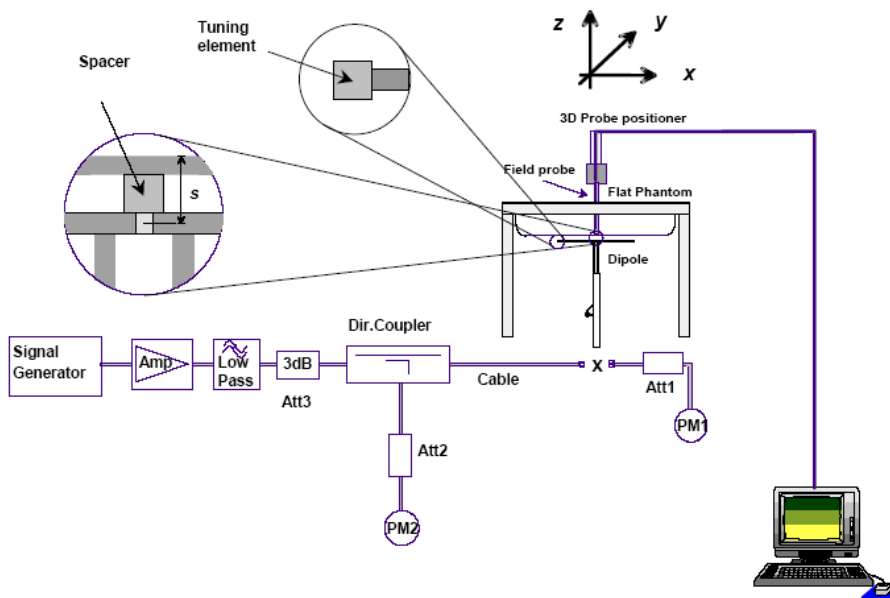
835 MHz Head				835 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
824.0	41.5412	19.5371		824.0	54.8698	20.5958
824.5	41.5102	19.5376		824.5	54.8729	20.4953
825.0	41.4936	19.5382		825.0	54.8760	20.5078
825.5	41.3884	19.5387		825.5	54.8792	20.5202
826.0	41.4068	19.5393		826.0	54.8823	20.6553
826.5	41.4287	19.5398		826.5	54.8854	20.7190
827.0	41.4052	19.5404		827.0	54.8886	20.6335
827.5	41.4525	19.5409		827.5	54.8917	20.5117
828.0	41.4721	19.5415		828.0	54.8949	20.5462
828.5	41.4785	19.5420		828.5	54.8980	20.5037
829.0	41.5294	19.5426		829.0	54.9011	20.6078
829.5	41.4779	19.5431		829.5	54.9043	20.5506
830.0	41.5143	19.5437		830.0	54.9074	20.4285
830.5	41.4743	19.5443		830.5	54.9105	20.4929
831.0	41.4473	19.5448		831.0	54.9137	20.4781
831.5	41.4669	19.5454		831.5	54.9168	20.6855
832.0	41.4287	19.5459		832.0	54.9200	20.6632
832.5	41.4035	19.5465		832.5	54.9231	20.4399
833.0	41.4441	19.5470		833.0	54.9262	20.3733
833.5	41.4755	19.5476		833.5	54.9294	20.4847
834.0	41.4729	19.5481		834.0	54.9325	20.6366
834.5	41.4715	19.5487		834.5	54.9357	20.5295
835.0	41.4963	19.5492		835.0	54.9388	20.4730
835.5	41.4973	19.5501		835.5	54.9419	20.7207
836.0	41.5009	19.5510		836.0	54.9451	20.7276
836.5	41.4859	19.5518		836.5	54.9482	20.5854
837.0	41.4727	19.5527		837.0	54.9513	20.4125
837.5	41.4670	19.5535		837.5	54.9545	20.4488
838.0	41.4901	19.5544		838.0	54.9576	20.7331
838.5	41.4487	19.5552		838.5	54.9608	20.7483
839.0	41.4386	19.5561		839.0	54.9639	20.6703
839.5	41.4411	19.5569		839.5	54.9670	20.6052
840.0	41.4521	19.5578		840.0	54.9702	20.6724
840.5	41.4415	19.5586		840.5	54.9733	20.7177
841.0	41.4248	19.5595		841.0	54.9764	20.6729
841.5	41.4542	19.5604		841.5	54.9796	20.6096
842.0	41.4559	19.5612		842.0	54.9827	20.7855
842.5	41.4596	19.5621		842.5	54.9859	20.7540
843.0	41.4537	19.5529		843.0	54.9890	20.7144
843.5	41.3774	19.5537		843.5	54.9921	20.6699
844.0	41.4536	19.5546		844.0	54.9953	20.6875
844.5	41.4079	19.5555		844.5	54.9984	20.7134
845.0	41.3340	19.5563		845.0	55.0015	20.6229
845.5	41.3493	19.5572		845.5	55.0047	20.5692
846.0	41.3038	19.5781		846.0	55.0078	20.7422
846.5	41.3448	19.5789		846.5	55.0110	20.8036
847.0	41.3250	19.5798		847.0	55.0141	20.7525
847.5	41.3282	19.5807		847.5	55.0172	20.6728
848.0	41.3018	19.5815		848.0	55.0204	20.7630
848.5	41.3064	19.5824		848.5	55.0235	20.8410
849.0	41.2667	19.5832		849.0	55.0267	20.8412

1900 MHz Head				1900 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
1850.0	40.0504	13.4850		1850.0	52.2256	14.3937
1851.2	40.0527	13.4550		1851.2	52.1575	14.3511
1852.4	40.0529	13.4223		1852.4	52.1764	14.3522
1853.6	40.0532	13.4457		1853.6	52.1530	14.3285
1854.8	40.0534	13.4396		1854.8	52.0558	14.3479
1856.0	40.0537	13.3637		1856.0	52.1588	14.3844
1857.2	40.0539	13.5036		1857.2	52.1520	14.4103
1858.4	40.0542	13.3998		1858.4	52.1340	14.3316
1859.6	40.0544	13.4537		1859.6	52.1157	14.3259
1860.8	40.0547	13.4551		1860.8	52.0115	14.3787
1862.0	40.0549	13.4716		1862.0	52.0391	14.2059
1863.2	40.0552	13.4940		1863.2	51.9851	14.2187
1864.4	40.0554	13.5290		1864.4	52.0199	14.2358
1865.6	40.0557	13.5236		1865.6	52.0263	14.2068
1866.8	40.0559	13.5124		1866.8	52.1014	14.1974
1868.0	40.0562	13.5309		1868.0	52.1698	14.2135
1869.2	40.0564	13.5917		1869.2	52.1789	14.2359
1870.4	40.0567	13.5844		1870.4	52.0924	14.2874
1871.6	40.0569	13.5583		1871.6	52.0347	14.2881
1872.8	40.0572	13.5884		1872.8	52.0732	14.3170
1874.0	40.0574	13.5311		1874.0	51.9996	14.3254
1875.2	40.0577	13.5651		1875.2	52.0628	14.3886
1876.4	40.0579	13.5631		1876.4	51.9659	14.3114
1877.6	40.0581	13.6276		1877.6	52.0682	14.3914
1878.8	40.0584	13.5232		1878.8	52.0960	14.5233
1880.0	40.0586	13.4684		1880.0	51.9783	14.5422
1881.2	40.0589	13.5172		1881.2	51.9365	14.5393
1882.4	40.0591	13.5398		1882.4	52.0321	14.5106
1883.6	40.0594	13.5085		1883.6	51.9976	14.4667
1884.8	40.0596	13.5091		1884.8	52.0225	14.4894
1886.0	40.0599	13.5084		1886.0	52.0577	14.4216
1887.2	40.0601	13.5036		1887.2	52.0385	14.3978
1888.4	40.0604	13.4987		1888.4	52.1282	14.4321
1889.6	40.0606	13.4939		1889.6	52.0587	14.4367
1890.8	40.0609	13.4890		1890.8	52.1044	14.4935
1892.0	40.0611	13.4842		1892.0	52.0924	14.2897
1893.2	40.0614	13.4793		1893.2	52.0648	14.2506
1894.4	40.0616	13.4745		1894.4	52.0375	14.2997
1895.6	40.0619	13.4696		1895.6	52.0303	14.6335
1896.8	40.0621	13.4648		1896.8	52.0202	14.6316
1898.0	40.0624	13.4599		1898.0	52.0205	14.6122
1899.2	40.0626	13.4551		1899.2	52.0975	14.6126
1900.4	40.0629	13.4503		1900.4	52.0625	14.5113
1901.6	40.0631	13.4454		1901.6	52.0659	14.6006
1902.8	40.0634	13.4406		1902.8	52.0350	14.5606
1904.0	40.0636	13.4357		1904.0	52.1167	14.5295
1905.2	40.0639	13.4309		1905.2	52.0285	14.4980
1906.4	40.0641	13.4260		1906.4	52.0184	14.4229
1907.6	40.0644	13.4212		1907.6	51.9441	14.5397
1908.8	40.0646	13.4163		1908.8	52.0284	14.4751
1910.0	40.0649	13.4115		1910.0	52.0549	14.4387

### System Accuracy Verification

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

### System Verification Setup Block Diagram



### 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 (%)
2013-12-08	835	Head	1g	9.603	9.590	0.136	$\pm 10$
		Body	1g	9.724	9.684	0.413	$\pm 10$
	1900	Head	1g	39.570	39.648	-0.197	$\pm 10$
		Body	1g	40.613	39.769	2.122	$\pm 10$

\*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 : 9.170 W/kg  
 Power Drift-Finish : 9.382 W/kg  
 Power Drift (%) : 2.312

## 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 : 08-Dec-2013  
 Temperature : 20.00 °C  
 Ambient Temp. : 21.00 °C  
 Humidity : 56.00 RH%  
 Epsilon : 41.50 F/m  
 Sigma : 0.91 S/m  
 Density : 1000.00 kg/cu. m

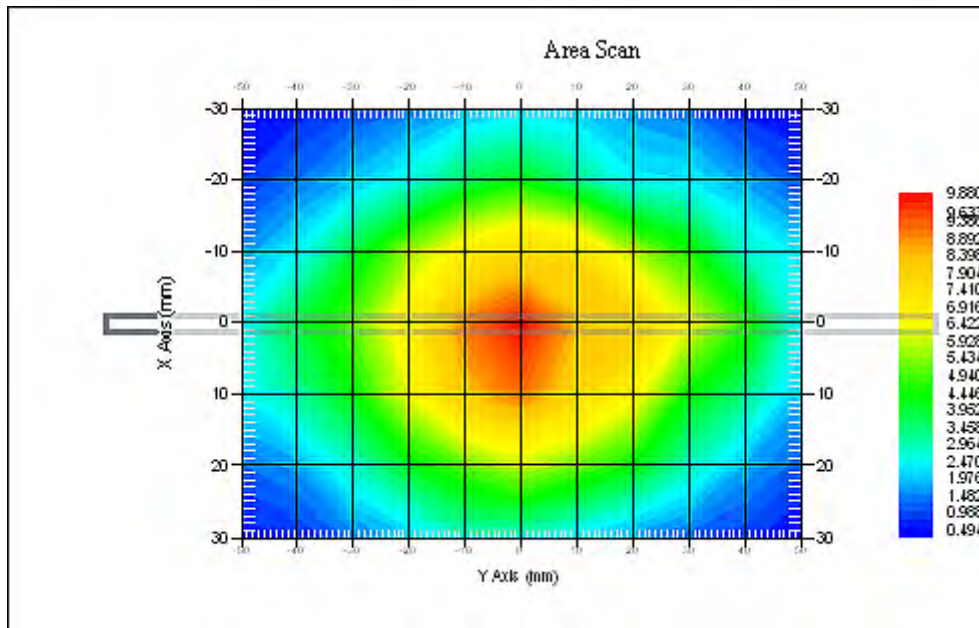
## Probe Data

Name : E-Field  
 Model : E-020  
 Type : E-Field Triangle  
 Serial No. : 500-00283  
 Last Calib. Date : 08-Oct-2013  
 Frequency Band : 835  
 Duty Cycle Factor : 1  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 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 : 9.603 W/kg  
 10 gram SAR value : 5.972 W/kg  
 Area Scan Peak SAR : 9.852 W/kg  
 Zoom Scan Peak SAR : 15.914 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 : 9.102 W/kg  
Power Drift-Finish : 9.254 W/kg  
Power Drift (%) : 1.670

## 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 : 08-Dec-2013  
Temperature : 20.00 °C  
Ambient Temp. : 21.00 °C  
Humidity : 56.00 RH%  
Epsilon : 54.94 F/m  
Sigma : 0.95 S/m  
Density : 1000.00 kg/cu. m

## Probe Data

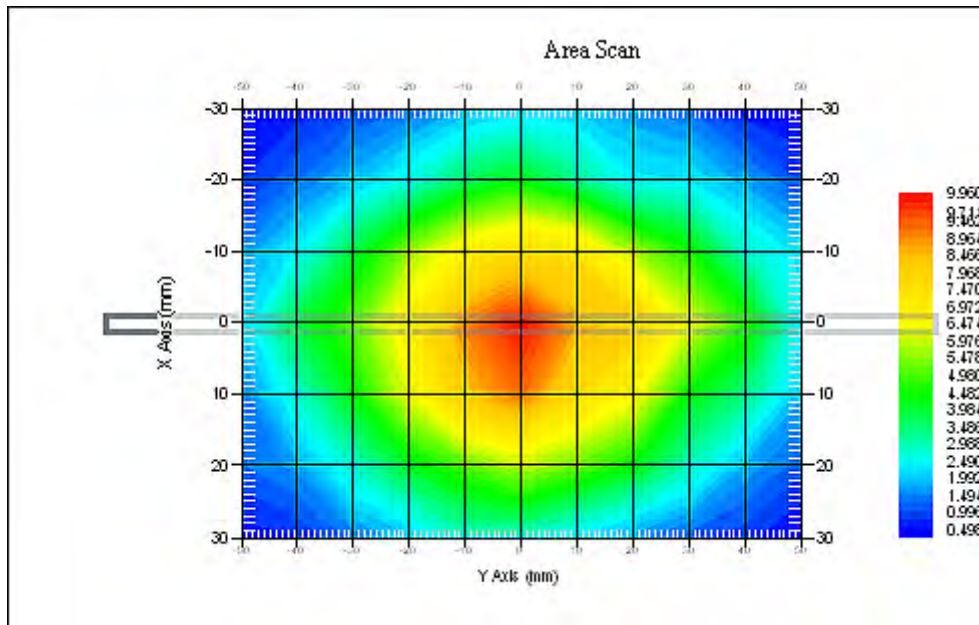
Name : E-Field  
Model : E-020  
Type : E-Field Triangle  
Serial No. : 500-00283  
Last Calib. Date : 08-Oct-2013  
Frequency Band : 835  
Duty Cycle Factor : 1  
Conversion Factor : 5.9  
Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
Compression Point : 95.00 mV  
Offset : 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 : 9.724 W/kg  
 10 gram SAR value : 5.998 W/kg  
 Area Scan Peak SAR : 9.859 W/kg  
 Zoom Scan Peak SAR : 15.730 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 : 38.728 W/kg  
Power Drift-Finish : 38.615 W/kg  
Power Drift (%) : -0.292

## 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 : 08-Dec-2013  
Temperature : 20.00 °C  
Ambient Temp. : 21.00 °C  
Humidity : 56.00 RH%  
Epsilon : 40.06 F/m  
Sigma : 1.42 S/m  
Density : 1000.00 kg/cu. M

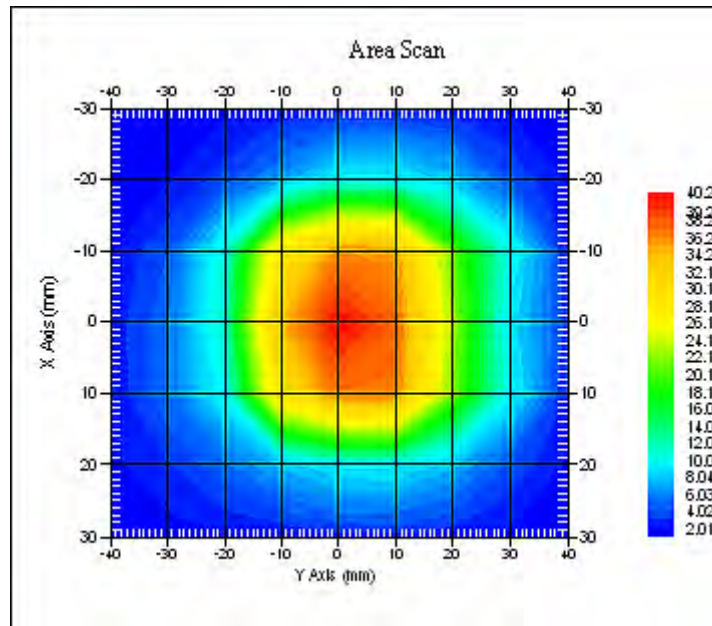
## Probe Data

Name : E-Field  
Model : E-020  
Type : E-Field Triangle  
Serial No. : 500-00283  
Last Calib. Date : 08-Oct-2013  
Frequency Band : 1900  
Duty Cycle Factor : 1  
Conversion Factor : 4.8  
Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
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 : 39.570 W/kg  
10 gram SAR value : 19.961 W/kg  
Area Scan Peak SAR : 39.892 W/kg  
Zoom Scan Peak SAR : 73.885 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 : 40.865 W/kg  
Power Drift-Finish : 40.702 W/kg  
Power Drift (%) : -0.399

## 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 : 08-Dec-2013  
Temperature : 20.00 °C  
Ambient Temp. : 21.00 °C  
Humidity : 56.00 RH%  
Epsilon : 52.06 F/m  
Sigma : 1.53 S/m  
Density : 1000.00 kg/cu. m

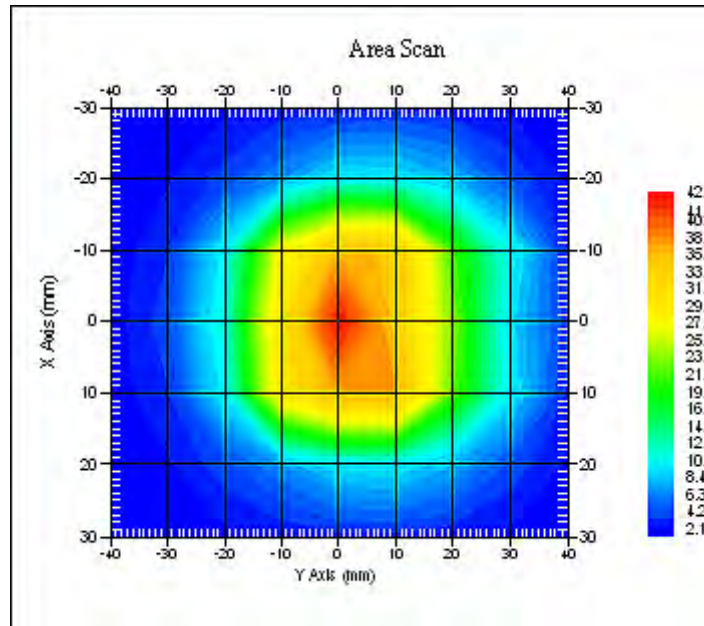
## Probe Data

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 : 4.5  
Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
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 : 40.613 W/kg  
10 gram SAR value : 20.794 W/kg  
Area Scan Peak SAR : 42.106 W/kg  
Zoom Scan Peak SAR : 75.118 W/kg



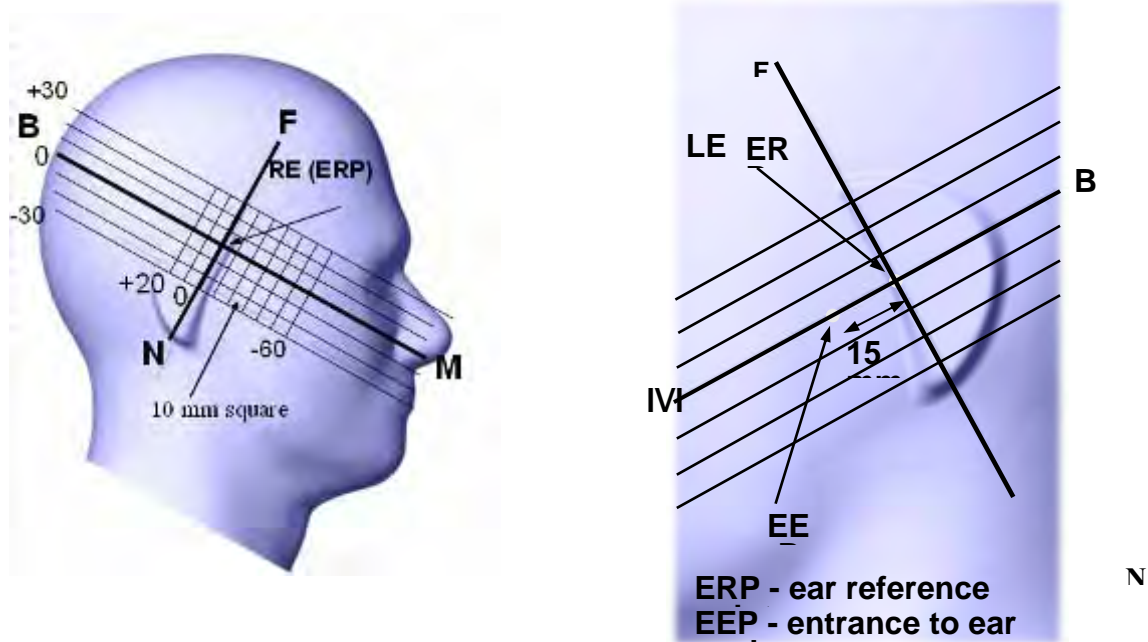
**1900 MHz System Validation with Body Tissue**

## 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

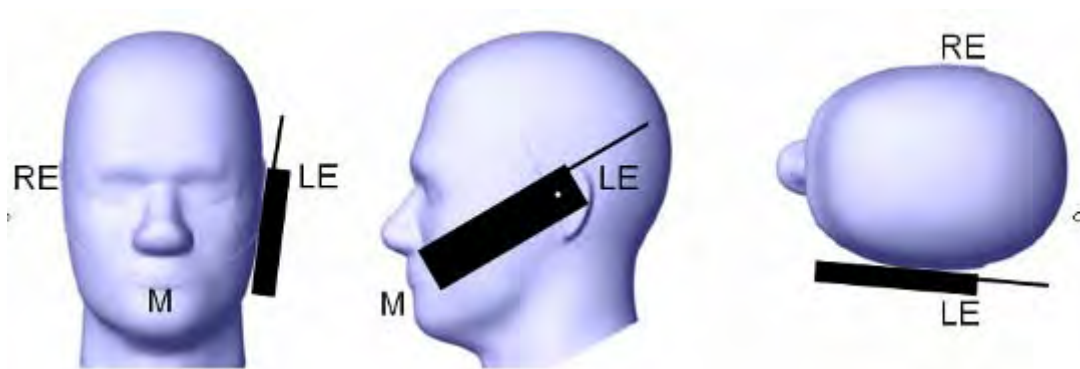
The device is brought toward the mouth of the head phantom by pivoting against the “ear reference point” or along the “N-F” line for the SCC-34/SC-2 head phantom.

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

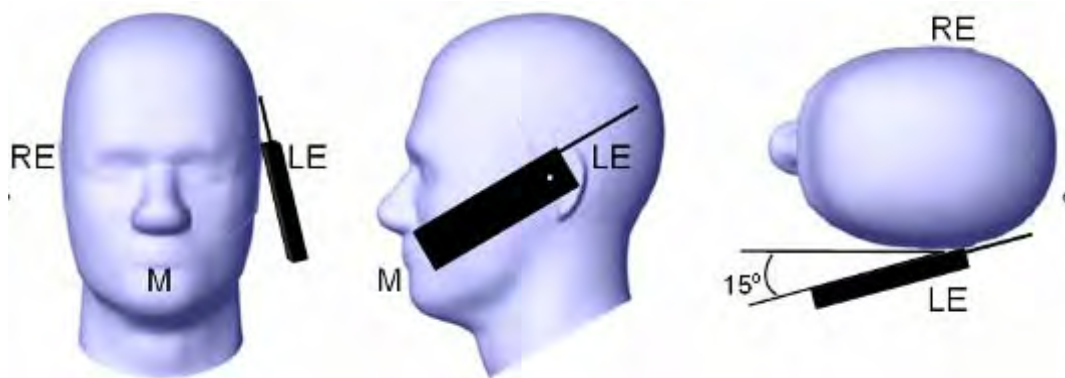
With the handset aligned in the “Cheek/Touch Position”:

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 is by  $15^{\circ}$  to  $80^{\circ}$ . 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  $15^{\circ}$  so that the device and its antenna would touch the phantom simultaneously. This test position may require a device holder or positioner to achieve the translation and tilting with acceptable positioning repeatability.

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

### Ear /Tilt 15° Position



### **Test positions for body-worn and other configurations**

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

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



## SAR Evaluation Procedure

The evaluation was performed with the following procedure:

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

Step 2: The SAR distribution at the exposed side of the head was measured at a distance of 4 mm from the inner surface of the shell. The area covered the entire dimension of the head or EUT and the horizontal grid spacing was 10 mm x 10 mm. Based on these data, the area of the maximum absorption was determined by spline interpolation. The first Area Scan covers the entire dimension of the EUT to ensure that the hotspot was correctly identified.

Step 3: Around this point, a volume of 35 mm x 35 mm x 35 mm was assessed by measuring 7x 7 x 7 points. On the basis of this data set, the spatial peak SAR value was evaluated under the following procedure:

- 1) The data at the surface were extrapolated, since the center of the dipoles is 1.2 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.
- 2) The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed by the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one dimensional splines with the "Not a knot"-condition (in x, y and z-directions). The volume was integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the averages.

All neighboring volumes were evaluated until no neighboring volume with a higher average value was found.

Step 4: Re-measurement of the SAR value at the same location as in Step 1. If the value changed by more than 5%, the evaluation was repeated.

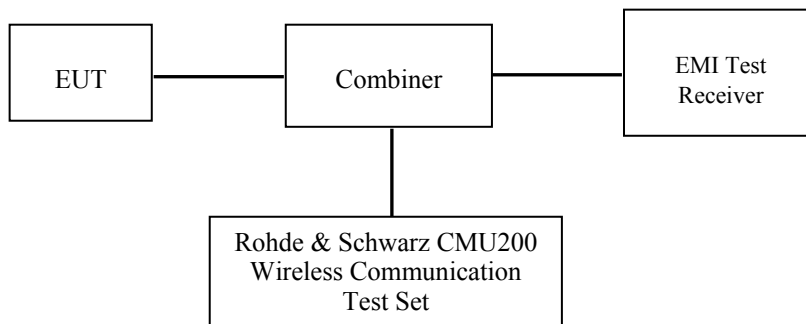
## CONDUCTED OUTPUT POWER MEASUREMENT

### Provision Applicable

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

### Test Procedure

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



### GSM&3G

### Maximum Output Power among production units

Max Target Power for Production Unit (dBm)			
Mode/Band	Channel		
	Low	Middle	High
GSM 850	32.50	32.50	32.50
GPRS 1 slot	32.50	32.50	32.50
GPRS 2 slot	32.00	32.00	32.00
GPRS 3 slot	30.50	30.50	30.50
GPRS 4 slot	29.00	29.00	29.00
PCS 1900	30.00	30.00	30.00
GPRS 1 slot	30.00	30.00	30.00
GPRS 2 slot	29.50	29.50	29.50
GPRS 3 slot	28.00	28.00	28.00
GPRS 4 slot	26.50	26.50	26.50
WCDMA850	23.00	23.00	23.00
WCDMA1900	21.00	21.00	21.00
WiFi 802.11b	10.00	10.00	10.00
WiFi 802.11g	9.00	9.00	9.00
WiFi 802.11n-HT20	8.00	8.00	8.00
WiFi 802.11n-HT40	7.00	7.00	7.00
Bluetooth	6.00	6.00	6.00

**Test Results:**

**GSM**

Band	Frequency (MHz)	Conducted Peak Output Power	
		Meas. Power (dBm)	Meas. Power (W)
GSM 850	824.2	32.25	1.679
	836.6	32.31	1.702
	848.8	32.38	1.730
PCS 1900	1850.2	29.66	0.925
	1880.0	29.79	0.953
	1909.8	29.84	0.964

**GPRS**

Band	Channel No.	Frequency (MHz)	RF Peak Output Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	32.29	31.64	30.08	28.91
	190	836.6	32.36	31.72	30.14	28.96
	251	848.8	32.35	31.71	30.14	28.96
PCS 1900	512	1850.2	29.91	29.22	27.55	26.49
	661	1880.0	29.85	29.15	27.43	26.38
	810	1909.8	29.89	29.09	27.32	26.41

**EGPRS**

Band	Channel No.	Frequency (MHz)	RF Peak Output Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	26.40	25.13	22.88	20.64
	190	836.6	25.94	24.60	22.24	20.75
	251	848.8	25.58	24.12	21.85	20.63
PCS 1900	512	1850.2	26.34	25.10	23.04	21.69
	661	1880.0	26.12	24.81	22.69	21.42
	810	1909.8	26.35	25.01	22.87	21.51

For SAR, the time based average power is relevant, the difference in between depends on the duty cycle of the TDMA signal.

Number of Time slot	1	2	3	4
Duty Cycle	1:8	1:4	1:2.66	1:2
Time based Ave. power compared to slotted Ave. power	-9 dB	-6 dB	-4.25 dB	-3 dB
Crest Factor	8	4	2.66	2

**The time based average power for GPRS**

Band	Channel No.	Frequency (MHz)	Time based average Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	23.29	25.64	25.83	25.91
	190	836.6	23.36	25.72	25.89	25.96
	251	848.8	23.35	25.71	25.89	25.96
PCS 1900	512	1850.2	20.91	23.22	23.30	23.49
	661	1880.0	20.85	23.15	23.18	23.38
	810	1909.8	20.89	23.09	23.07	23.41

**The time based average power for EGPRS**

Band	Channel No.	Frequency (MHz)	Time based average Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	17.40	19.13	18.63	17.64
	190	836.6	16.94	18.60	17.99	17.75
	251	848.8	16.58	18.12	17.60	17.63
PCS 1900	512	1850.2	17.34	19.10	18.79	18.69
	661	1880.0	17.12	18.81	18.44	18.42
	810	1909.8	17.35	19.01	18.62	18.51

**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. The max average output power of the GPRS mode is more than 2 dB higher than the EGPRS measured in the same frequency band, according to IEEE1528, 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).

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

**Results (12.2kbps RMC)**

Band	Frequency (MHz)	Channel NO.	Conducted Output Power	
			(dBm)	(Watt)
WCDMA 850	826.4	4132	22.28	0.169
	836.6	4183	22.53	0.179
	846.6	4233	22.32	0.171
WCDMA 1900	1852.4	9262	20.95	0.124
	1880.0	9400	20.93	0.124
	1907.6	9538	20.72	0.118

**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			
	$\beta_c$	2/15	12/15	15/15	15/15
	$\beta_d$	15/15	15/15	8/15	4/15
	$\beta_d$ (SF)	64			
	$\beta_c / \beta_d$	2/15	12/15	15/8	15/4
	$\beta_{hs}$	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			
	$A_{hs} = \beta_{hs} / \beta_c$	30/15			

**Results (HSDPA)**

Band	Frequency (MHz)	Channel NO.	Conducted Output Power (dBm)			
			Subset 1	Subset 2	Subset 3	Subset 4
WCDMA 850	826.4	4132	21.15	21.13	21.08	21.19
	836.6	4183	21.43	21.46	21.33	21.45
	846.6	4233	21.29	21.24	20.99	21.20
WCDMA 1900	1852.4	9262	19.95	19.91	19.87	19.92
	1880.0	9400	19.71	19.68	19.64	19.73
	1907.6	9538	19.71	19.68	19.64	19.73

**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				
	$\beta_c$	11/15	6/15	15/15	2/15	15/15
	$\beta_d$	15/15	15/15	9/15	15/15	0
	$\beta_{ec}$	209/225	12/15	30/15	2/15	5/15
	$\beta_c/\beta_d$	11/15	6/15	15/9	2/15	-
	$\beta_{hs}$	22/15	12/15	30/15	4/15	5/15
	CM(dB)	1.0	3.0	2.0	3.0	1.0
MPR(dB)	0	2	1	2	0	
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback	4ms				
	CQI Repetition Factor	2				
	$A_{hs} = \beta_{hs}/\beta_c$	30/15				
HSUPA Specific Settings	DE-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_FCIs	E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27	E-TFCI 11 E-TFCI PO4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27		

**Results (HSUPA)**

Band	Frequency (MHz)	Channel NO.	Conducted Output Power (dBm)				
			Subset 1	Subset 2	Subset 3	Subset 4	Subset 5
WCDMA 850	826.4	4132	21.15	21.12	21.17	21.14	21.13
	836.6	4183	21.42	21.35	21.26	21.47	21.43
	846.6	4233	21.27	21.25	21.28	21.26	21.18
WCDMA 1900	1852.4	9262	19.93	19.92	19.84	19.90	19.91
	1880.0	9400	19.71	19.69	19.68	19.65	19.67
	1907.6	9538	19.71	19.69	19.68	19.65	19.67

**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  $\frac{1}{4}$  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  $\frac{1}{4}$  dB higher than measured without HSUPA using 12.2kbps RMC and the maximum SAR for 12.2kbps RMC is  $< 75\%$  of SAR limit.

**Bluetooth**

Mode	Channel frequency (MHz)	Reading power (dBm)	Power output (mw)	Limit (mw)
BDR(GFSK)	(Low)2402	5.14	3.266	1000
	(Middle)2441	5.68	3.698	1000
	(High)2480	5.79	3.793	1000
EDR(4-DQPSK)	(Low)2402	4.78	3.006	1000
	(Middle)2441	5.40	3.467	1000
	(High)2480	5.48	3.532	1000
EDR-8DPSK	(Low)2402	5.22	3.327	1000
	(Middle)2441	5.81	3.811	1000
	(High)2480	5.92	3.908	1000



**WiFi**

Band	Frequency (MHz)	Conducted Output Power	
		(dBm)	(mw)
802.11b	2412	9.47	8.851
	2437	9.52	8.954
	2462	9.69	9.311
802.11g	2412	8.84	7.656
	2437	8.43	6.966
	2462	8.42	6.950
802.11n-HT20	2412	7.97	6.266
	2437	7.50	5.623
	2462	7.53	5.662
802.11n-HT40	2422	6.65	4.624
	2437	6.37	4.335
	2452	6.04	4.018

**Note:**

1. The output power was tested under data rate 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n-HT20, 13.5 Mbps 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 °C
Relative Humidity:	50-53 %
ATM Pressure:	1001-1002 mbar

Testing was performed by Wilson Chen from 2013-12-08 to 2013-12-10.

### 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	/	/	/	/	/	/
	190(Middle)	836.6	GSM	-2.642	32.31	32.50	1.045	0.435	0.454
	251(High)	848.8	GSM	/	/	/	/	/	/
Left Head Tilt	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	0.588	32.31	32.50	1.045	0.283	0.296
	251(High)	848.8	GSM	/	/	/	/	/	/
Right Head Cheek	128(Low)	824.2	GSM	2.807	32.25	32.50	1.059	0.525	0.556
	190(Middle)	836.6	GSM	3.462	32.31	32.50	1.045	0.573	<b>0.599</b>
	251(High)	848.8	GSM	-1.914	32.38	32.50	1.028	0.527	0.542
Right Head Tilt	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	-2.055	32.31	32.50	1.045	0.319	0.333
	251(High)	848.8	GSM	/	/	/	/	/	/
Body-Front-Headset (10mm)	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	1.238	32.31	32.50	1.045	0.255	0.266
	251(High)	848.8	GSM	/	/	/	/	/	/
Body-Back-Headset (10mm)	128(Low)	824.2	GSM	/	/	/	/	/	/
	190(Middle)	836.6	GSM	-2.017	32.31	32.50	1.045	0.391	0.408
	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	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	-1.172	29.79	30.00	1.050	0.208	0.218
	810(High)	1909.8	GSM	/	/	/	/	/	/
Left Head Tilt	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	0.959	29.79	30.00	1.050	0.257	0.270
	810(High)	1909.8	GSM	/	/	/	/	/	/
Right Head Cheek	512(Low)	1850.2	GSM	0.787	29.66	30.00	1.081	0.414	0.448
	661(Middle)	1880.0	GSM	0.949	29.79	30.00	1.050	0.483	<b>0.507</b>
	810(High)	1909.8	GSM	-2.433	29.84	30.00	1.038	0.446	0.463
Right Head Tilt	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	-1.560	29.79	30.00	1.050	0.455	0.478
	810(High)	1909.8	GSM	/	/	/	/	/	/
Body-Front-Headset (10mm)	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	2.713	29.79	30.00	1.050	0.095	0.100
	810(High)	1909.8	GSM	/	/	/	/	/	/
Body-Back-Headset (10mm)	512(Low)	1850.2	GSM	/	/	/	/	/	/
	661(Middle)	1880.0	GSM	1.436	29.79	30.00	1.050	0.118	0.124
	810(High)	1909.8	GSM	/	/	/	/	/	/

**Note:**

1. When the 1-g SAR is  $\leq 0.8\text{W/Kg}$ , testing for other channels are optional.
2. The EUT transmit and receive through the same GSM antenna while testing SAR.
3. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.

**WCDMA 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	4132	826.4	WCDMA 850	/	/	/	/	/	/
	4183	836.6	WCDMA 850	2.212	22.53	23.00	1.114	0.335	0.373
	4233	846.6	WCDMA 850	/	/	/	/	/	/
Left Head Tilt	4132	826.4	WCDMA 850	/	/	/	/	/	/
	4183	836.6	WCDMA 850	-1.834	22.53	23.00	1.114	0.213	0.237
	4233	846.6	WCDMA 850	/	/	/	/	/	/
Right Head Cheek	4132	826.4	WCDMA 850	-1.778	22.28	23.00	1.180	0.388	0.458
	4183	836.6	WCDMA 850	-3.914	22.53	23.00	1.114	0.478	0.533
	4233	846.6	WCDMA 850	3.577	22.32	23.00	1.169	0.504	<b>0.589</b>
Right Head Tilt	4132	826.4	WCDMA 850	/	/	/	/	/	/
	4183	836.6	WCDMA 850	-0.673	22.53	23.00	1.114	0.284	0.316
	4233	846.6	WCDMA 850	/	/	/	/	/	/

**WCDMA1900**

EUT Position	Frequency (MHz)		Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)		
	Channel	MHz					Scaled Factor	Meas. SAR	Scaled SAR
Left Head Cheek	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	-0.514	20.93	21.00	1.016	0.523	0.531
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Left Head Tilt	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	-1.054	20.93	21.00	1.016	0.421	0.428
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Right Head Cheek	9262	1852.4	WCDMA1900	1.460	20.95	21.00	1.012	0.905	0.915
	9400	1880.0	WCDMA1900	-2.663	20.93	21.00	1.016	1.088	<b>1.106</b>
	9538	1907.6	WCDMA1900	0.782	20.72	21.00	1.067	1.004	1.071
Right Head Tilt	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	-2.663	20.93	21.00	1.016	0.602	0.612
	9538	1907.6	WCDMA1900	/	/	/	/	/	/

**Note:**

1. When the 1-g SAR is  $\leq 0.8$ W/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  $\frac{1}{4}$  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.

**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	/	/	/	/	/	/
	190(Middle)	836.6	GPRS	-3.249	28.96	29.00	1.009	0.537	0.542
	251(High)	848.8	GPRS	/	/	/	/	/	/
Body-Back (10mm)	128(Low)	824.2	GPRS	/	/	/	/	/	/
	190(Middle)	836.6	GPRS	-2.868	28.96	29.00	1.009	0.722	<b>0.729</b>
	251(High)	848.8	GPRS	/	/	/	/	/	/
Body-Left (10mm)	128(Low)	824.2	GPRS	/	/	/	/	/	/
	190(Middle)	836.6	GPRS	-3.564	28.96	29.00	1.009	0.562	0.567
	251(High)	848.8	GPRS	/	/	/	/	/	/
Body-Top (10mm)	128(Low)	824.2	GPRS	/	/	/	/	/	/
	190(Middle)	836.6	GPRS	-4.247	28.96	29.00	1.009	0.077	0.078
	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	-3.364	26.38	26.50	1.028	0.257	0.264
	810(High)	1909.8	GPRS	/	/	/	/	/	/
Body-Back (10mm)	512(Low)	1850.2	GPRS	/	/	/	/	/	/
	661(Middle)	1880.0	GPRS	-4.633	26.38	26.50	1.028	0.282	<b>0.290</b>
	810(High)	1909.8	GPRS	/	/	/	/	/	/
Body-Left (10mm)	512(Low)	1850.2	GPRS	/	/	/	/	/	/
	661(Middle)	1880.0	GPRS	0.853	26.38	26.50	1.028	0.026	0.027
	810(High)	1909.8	GPRS	/	/	/	/	/	/
Body-Top (10mm)	512(Low)	1850.2	GPRS	/	/	/	/	/	/
	661(Middle)	1880.0	GPRS	-1.511	26.38	26.50	1.028	0.161	0.166
	810(High)	1909.8	GPRS	/	/	/	/	/	/

**Note:**

1. When the 1-g SAR is  $\leq 0.8$ W/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-WCDMA850**

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)	4132	826.4	WCDMA850	/	/	/	/	/	/
	4183	836.6	WCDMA850	-4.514	22.53	23.00	1.114	0.184	0.205
	4233	846.6	WCDMA850	/	/	/	/	/	/
Body-Back (10mm)	4132	826.4	WCDMA850	/	/	/	/	/	/
	4183	836.6	WCDMA850	1.729	22.53	23.00	1.114	0.249	<b>0.277</b>
	4233	846.6	WCDMA850	/	/	/	/	/	/
Body-Left (10mm)	4132	826.4	WCDMA850	/	/	/	/	/	/
	4183	836.6	WCDMA850	1.804	22.53	23.00	1.114	0.214	0.238
	4233	846.6	WCDMA850	/	/	/	/	/	/
Body-Top (10mm)	9262	826.4	WCDMA850	/	/	/	/	/	/
	9400	836.6	WCDMA850	-0.802	22.53	23.00	1.114	0.006	0.007
	9538	846.6	WCDMA850	/	/	/	/	/	/

**Hot Spot-WCDMA1900**

EUT Position	Frequency (MHz)		Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)		
	Channel	MHz					Scaled Factor	Meas. SAR	Scaled SAR
Body-Front (10mm)	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	1.338	20.93	21.00	1.016	0.206	0.209
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Body-Back (10mm)	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	0.697	20.93	21.00	1.016	0.311	<b>0.316</b>
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Body-Left (10mm)	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	-0.582	20.93	21.00	1.016	0.001	0.001
	9538	1907.6	WCDMA1900	/	/	/	/	/	/
Body-Top (10mm)	9262	1852.4	WCDMA1900	/	/	/	/	/	/
	9400	1880.0	WCDMA1900	3.816	20.93	21.00	1.016	0.092	0.093
	9538	1907.6	WCDMA1900	/	/	/	/	/	/

**Note:**

1. When the 1-g SAR is  $\leq 0.8\text{W/Kg}$ , 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  $\frac{1}{4}$  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  $\frac{1}{4}$  dB higher than measured without HSUPA using 12.2kbps RMC and the maximum SAR for 12.2kbps RMC is  $< 75\%$  of SAR limit.

## 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 based 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	√	×	45
GSM + WiFi	√	√	45
GPRS + WCDMA	×	×	0
GPRS + Bluetooth	√	×	45
GPRS + WiFi	√	√	45
WCDMA + Bluetooth	√	×	45
WCDMA + WiFi	√	√	45



**Standalone SAR test exclusion considerations**

Head Position:

Mode	Frequency (MHz)	P <sub>avg</sub> (dBm)	P <sub>avg</sub> (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
GSM850	850	23.38	217.771	0	40.2	3.0	No
PCS1900	1900	20.84	121.339	0	33.5	3.0	No
WCDMSA850	850	22.53	179.061	0	33.0	3.0	No
WCDMSA1900	1900	20.95	124.451	0	34.3	3.0	No
Bluetooth	2450	5.92	3.908	0	1.2	3.0	Yes
WiFi	2450	9.69	9.311	0	2.9	3.0	Yes

Body Position:

Mode	Frequency (MHz)	P <sub>avg</sub> (dBm)	P <sub>avg</sub> (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
GSM850	850	25.96	394.457	10	36.4	3.0	No
PCS1900	1900	23.49	223.357	10	30.8	3.0	No
WCDMSA850	850	22.53	179.061	10	16.5	3.0	No
WCDMSA1900	1900	20.95	124.451	10	17.2	3.0	No
Bluetooth	2450	5.92	3.908	10	0.6	3.0	Yes
WiFi	2450	9.69	9.311	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:

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

$[\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR and  $\leq 7.5$  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	0.166	0.620
	Left Head Tile	0.296	0.166	0.462
	Right Head Cheek	0.599	0.166	0.765
	Right Head Tilt	0.333	0.166	0.499
	Body-Headset-Front	0.266	0.083	0.349
	Body-Headset-Back	0.408	0.083	0.491
PCS1900	Left Head Cheek	0.218	0.166	0.384
	Left Head Tile	0.270	0.166	0.436
	Right Head Cheek	0.507	0.166	0.673
	Right Head Tilt	0.478	0.166	0.644
	Body-Headset-Front	0.100	0.083	0.183
	Body-Headset-Back	0.124	0.083	0.207

WCDMA with BT:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		WCDMA	BT	< 1.6W/kg
WCDMA 850	Left Head Cheek	0.373	0.166	0.539
	Left Head Tile	0.237	0.166	0.403
	Right Head Cheek	0.589	0.166	0.755
	Right Head Tilt	0.316	0.166	0.482
	Body-Headset-Front	0.205	0.083	0.288
	Body-Headset-Back	0.277	0.083	0.360
WCDMA 1900	Left Head Cheek	0.531	0.166	0.697
	Left Head Tile	0.428	0.166	0.594
	Right Head Cheek	1.106	0.166	1.272
	Right Head Tilt	0.612	0.166	0.778
	Body-Headset-Front	0.209	0.083	0.292
	Body-Headset-Back	0.316	0.083	0.399

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	0.296	0.417	0.713
	Right Head Cheek	0.599	0.417	1.016
	Right Head Tilt	0.333	0.417	0.750
	Body-Headset-Front	0.266	0.209	0.475
	Body-Headset-Back	0.408	0.209	0.617
PCS1900	Left Head Cheek	0.218	0.417	0.635
	Left Head Tile	0.270	0.417	0.687
	Right Head Cheek	0.507	0.417	0.924
	Right Head Tilt	0.478	0.417	0.895
	Body-Headset-Front	0.100	0.209	0.309
	Body-Headset-Back	0.124	0.209	0.333

WCDMA with WiFi:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		WCDMA	WiFi	< 1.6W/kg
WCDMA 850	Left Head Cheek	0.373	0.417	0.790
	Left Head Tile	0.237	0.417	0.654
	Right Head Cheek	0.589	0.417	1.006
	Right Head Tilt	0.316	0.417	0.733
	Body-Headset-Front	0.205	0.209	0.414
	Body-Headset-Back	0.277	0.209	0.486
WCDMA 1900	Left Head Cheek	0.531	0.417	0.948
	Left Head Tile	0.428	0.417	0.845
	Right Head Cheek	1.106	0.417	<b>1.523</b>
	Right Head Tilt	0.612	0.417	1.029
	Body-Headset-Front	0.209	0.209	0.418
	Body-Headset-Back	0.316	0.209	0.525

Mode	Frequency (GHz)	Distance (mm)	P <sub>avg</sub> (dBm)	P <sub>avg</sub> (mW)	Estimated 1-g (W/kg)
Bluetooth Head	2.45	0	6.00	3.981	0.166
Bluetooth Body	2.45	10	6.00	3.981	0.083
WiFi Head	2.45	0	10.00	10.000	0.417
WiFi Body	2.45	10	10.00	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:

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

W/kg for test separation distances  $\leq 50$  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:**

$\Sigma$ SAR  $< 1.6$  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-Top (1.0cm)	Body-Bottom (1.0cm)
Mode	Stand Alone 1-g SAR (W/Kg)					
GSM 850	0.542	0.729	0.567	/	0.078	/
PCS 1900	0.264	0.290	0.027	/	0.166	/
WCDMA850	0.205	0.277	0.238	/	0.007	/
WCDMA 1900	0.209	0.316	0.001	/	0.093	/
WiFi	0.209	0.209	/	/	0.209	/
	$\Sigma$ 1-g SAR(W/Kg)					
GSM850 + WiFi	0.751	<b>0.938</b>	/	/	0.287	/
PCS 1900 + WiFi	0.473	0.499	/	/	0.375	/
WCDMA850 + WiFi	0.414	0.486	/	/	0.216	/
WCDMA 1900 + WiFi	0.418	0.525	/	/	0.302	/

**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 (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 : 0.265 W/kg  
 Power Drift-Finish : 0.258 W/kg  
 Power Drift (%) : -2.642

Tissue Data

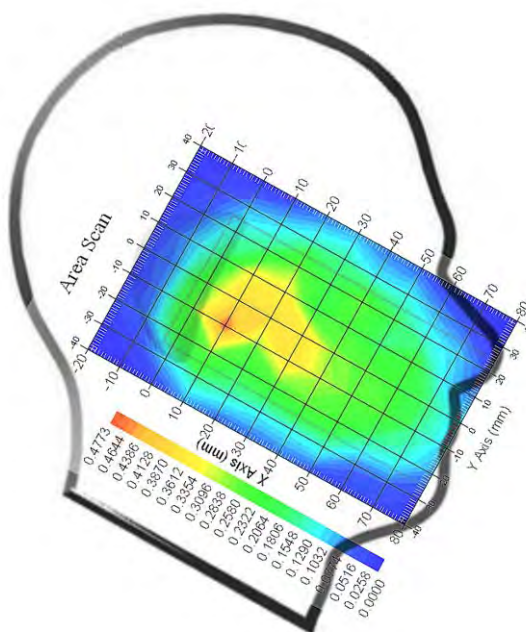
Type : Head  
 Frequency : 836.6 MHz  
 Epsilon : 41.49 F/m  
 Sigma : 0.91 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

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

1 gram SAR value : 0.435 W/kg  
 10 gram SAR value : 0.331 W/kg  
 Area Scan Peak SAR : 0.476 W/kg  
 Zoom Scan Peak SAR : 0.580 W/kg

**Plot 1#**



**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 : 0.170 W/kg  
 Power Drift-Finish : 0.171 W/kg  
 Power Drift (%) : 0.588

Tissue Data

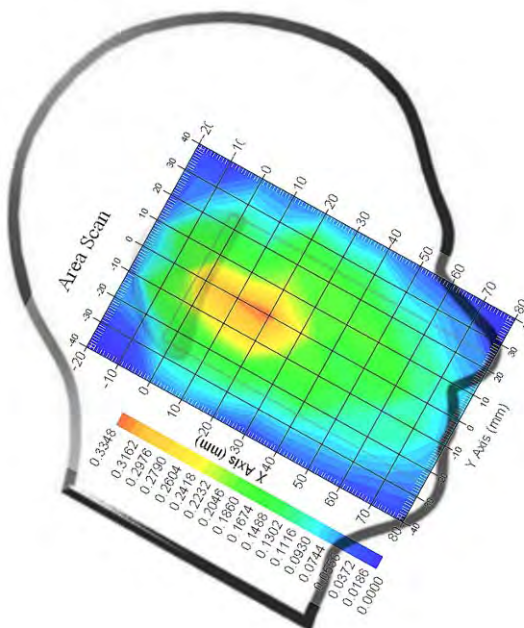
Type : Head  
 Frequency : 836.6 MHz  
 Epsilon : 41.49 F/m  
 Sigma : 0.91 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

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

1 gram SAR value : 0.283 W/kg  
 10 gram SAR value : 0.207 W/kg  
 Area Scan Peak SAR : 0.334 W/kg  
 Zoom Scan Peak SAR : 0.450 W/kg

**Plot 2#**



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

**Right 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 : 0.285 W/kg  
 Power Drift-Finish : 0.293 W/kg  
 Power Drift (%) : 2.807

Tissue Data

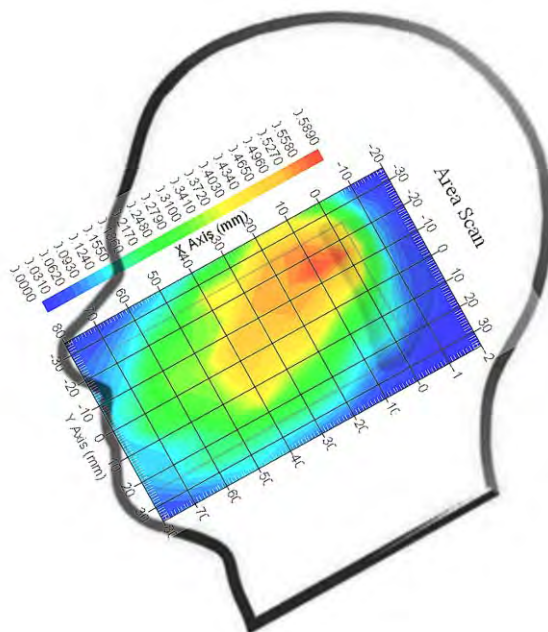
Type : Head  
 Frequency : 824.2 MHz  
 Epsilon : 41.54 F/m  
 Sigma : 0.90 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.525 W/kg  
 10 gram SAR value : 0.345 W/kg  
 Area Scan Peak SAR : 0.580 W/kg  
 Zoom Scan Peak SAR : 1.241 W/kg

**Plot 3#**



**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 : 0.262 W/kg  
 Power Drift-Finish : 0.269 W/kg  
 Power Drift (%) : 3.462

Tissue Data

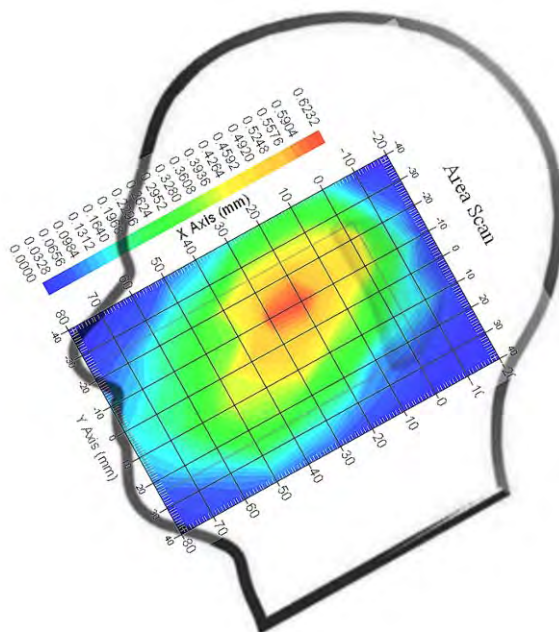
Type : Head  
 Frequency : 836.6 MHz  
 Epsilon : 41.49 F/m  
 Sigma : 0.91 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

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

1 gram SAR value : 0.573 W/kg  
 10 gram SAR value : 0.481 W/kg  
 Area Scan Peak SAR : 0.615 W/kg  
 Zoom Scan Peak SAR : 1.080 W/kg

**Plot 4#**





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

**Right 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 : 0.209 W/kg  
 Power Drift-Finish : 0.205 W/kg  
 Power Drift (%) : -1.914

Tissue Data

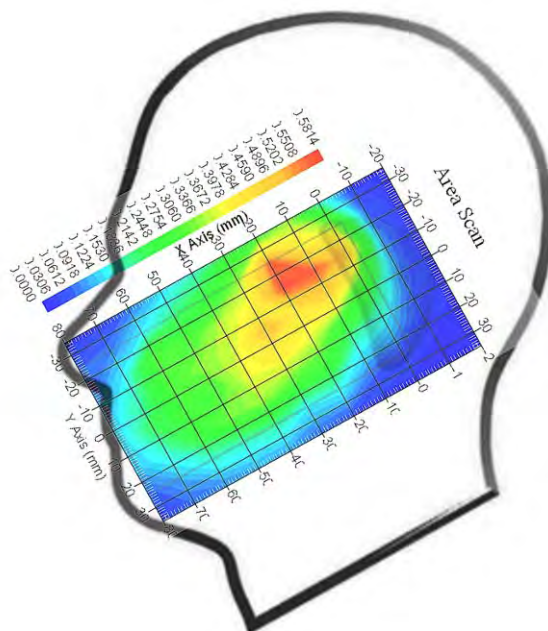
Type : Head  
 Frequency : 848.8 MHz  
 Epsilon : 41.27 F/m  
 Sigma : 0.92 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.527 W/kg  
 10 gram SAR value : 0.387 W/kg  
 Area Scan Peak SAR : 0.571 W/kg  
 Zoom Scan Peak SAR : 0.980 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 : 0.146 W/kg  
 Power Drift-Finish : 0.143 W/kg  
 Power Drift (%) : -2.055

Tissue Data

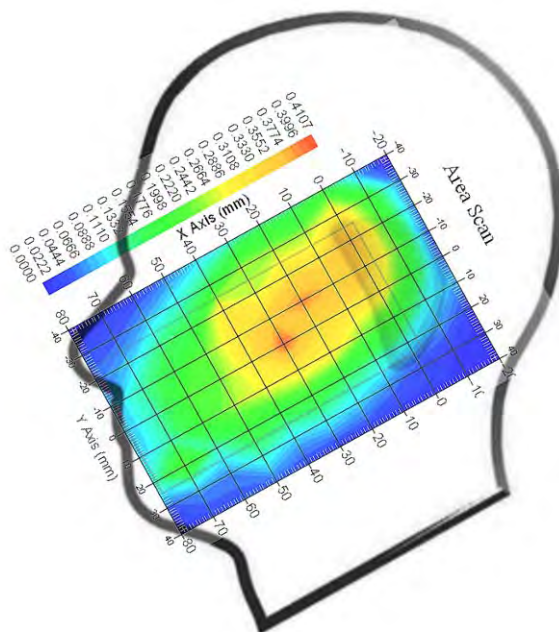
Type : Head  
 Frequency : 836.6 MHz  
 Epsilon : 41.49 F/m  
 Sigma : 0.91 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

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

1 gram SAR value : 0.319 W/kg  
 10 gram SAR value : 0.220 W/kg  
 Area Scan Peak SAR : 0.403 W/kg  
 Zoom Scan Peak SAR : 0.510 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 : 0.198 W/kg  
 Power Drift-Finish : 0.202 W/kg  
 Power Drift (%) : 1.238

Tissue Data

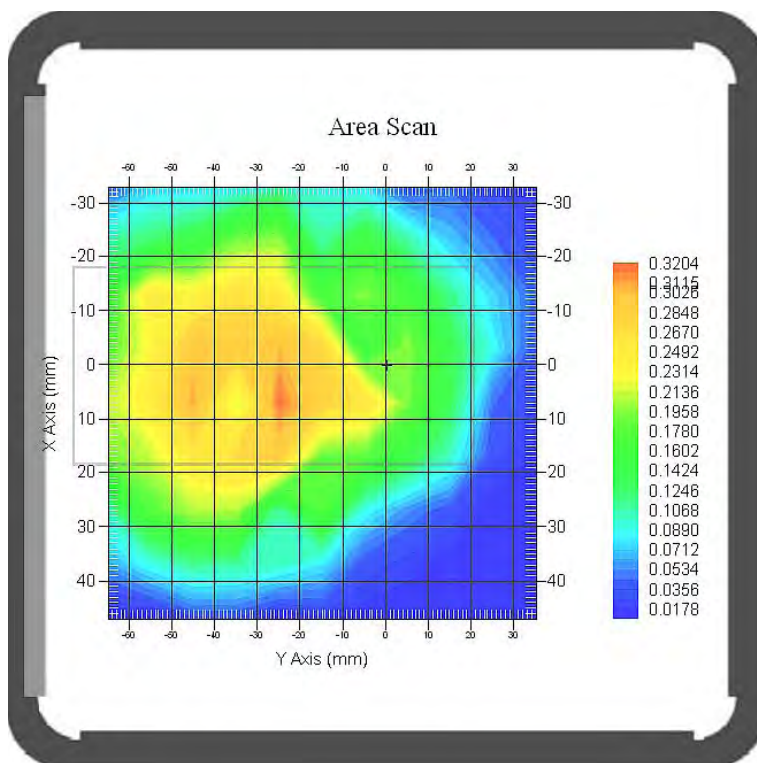
Type : Body  
 Frequency : 836.6 MHz  
 Epsilon : 54.95 F/m  
 Sigma : 0.96 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

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

1 gram SAR value : 0.255 W/kg  
 10 gram SAR value : 0.219 W/kg  
 Area Scan Peak SAR : 0.315 W/kg  
 Zoom Scan Peak SAR : 0.420 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 : 0.347 W/kg  
 Power Drift-Finish : 0.340 W/kg  
 Power Drift (%) : -2.017

Tissue Data

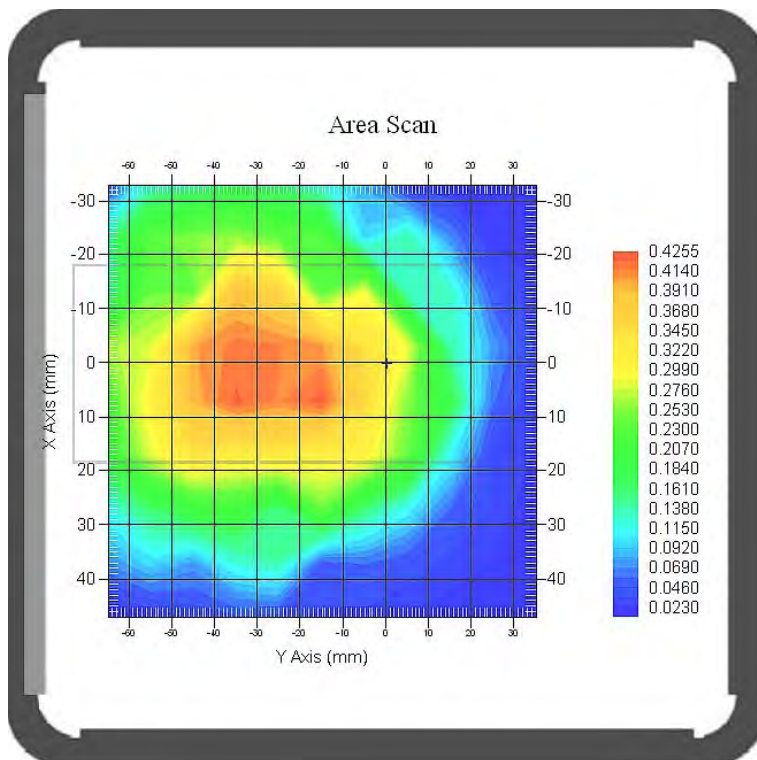
Type : Body  
 Frequency : 836.6 MHz  
 Epsilon : 54.95 F/m  
 Sigma : 0.96 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

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

1 gram SAR value : 0.391 W/kg  
 10 gram SAR value : 0.276 W/kg  
 Area Scan Peak SAR : 0.419 W/kg  
 Zoom Scan Peak SAR : 0.730 W/kg

**Plot 8#**



**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 : 0.148 W/kg  
 Power Drift-Finish : 0.143 W/kg  
 Power Drift (%) : -1.172

Tissue Data

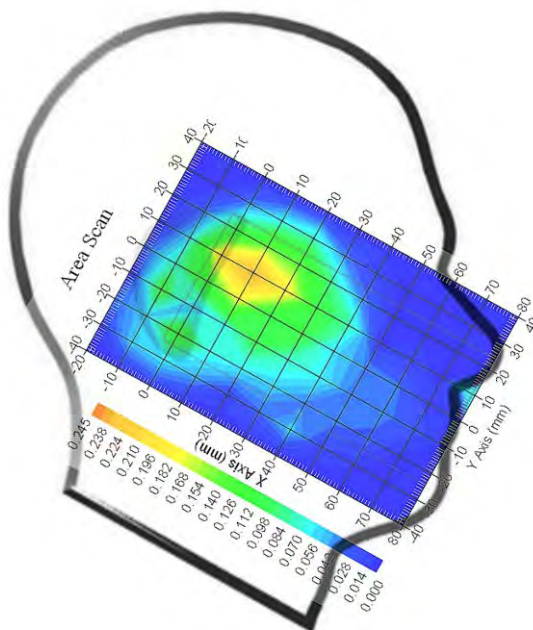
Type : Head  
 Frequency : 1880.0 MHz  
 Epsilon : 40.06 F/m  
 Sigma : 1.41 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.208 W/kg  
 10 gram SAR value : 0.108 W/kg  
 Area Scan Peak SAR : 0.241 W/kg  
 Zoom Scan Peak SAR : 0.630 W/kg

**Plot 9#**



**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 : 0.167 W/kg  
 Power Drift-Finish : 0.169 W/kg  
 Power Drift (%) : 0.959

Tissue Data

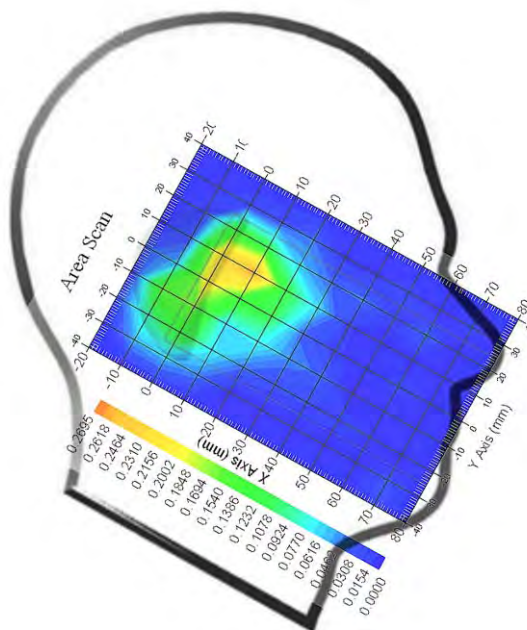
Type : Head  
 Frequency : 1880.0 MHz  
 Epsilon : 40.06 F/m  
 Sigma : 1.41 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.257 W/kg  
 10 gram SAR value : 0.111 W/kg  
 Area Scan Peak SAR : 0.269 W/kg  
 Zoom Scan Peak SAR : 0.560 W/kg

**Plot 10#**



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

**Right 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 : 0.139 W/kg  
 Power Drift-Finish : 0.141 W/kg  
 Power Drift (%) : 0.787

Tissue Data

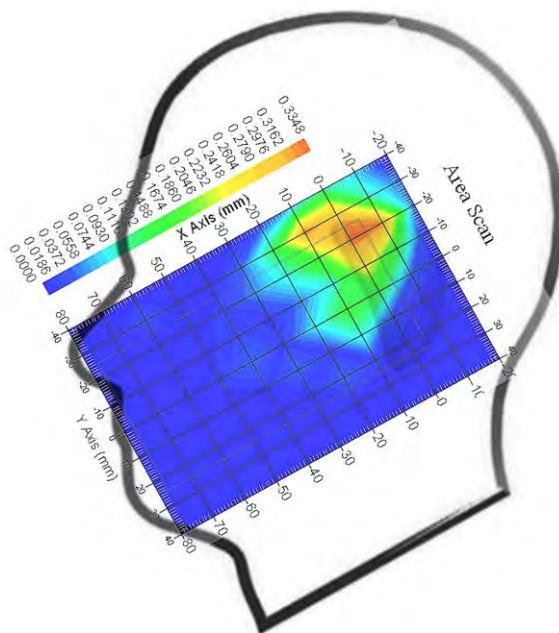
Type : Head  
 Frequency : 1850.2 MHz  
 Epsilon : 40.05 F/m  
 Sigma : 1.39 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency Band : 1900  
 Duty Cycle Factor : 8  
 Conversion Factor : 4.8  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.414 W/kg  
 10 gram SAR value : 0.153 W/kg  
 Area Scan Peak SAR : 0.333 W/kg  
 Zoom Scan Peak SAR : 0.810 W/kg

**Plot 11#**



**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 : 0.213 W/kg  
 Power Drift-Finish : 0.217 W/kg  
 Power Drift (%) : 0.949

Tissue Data

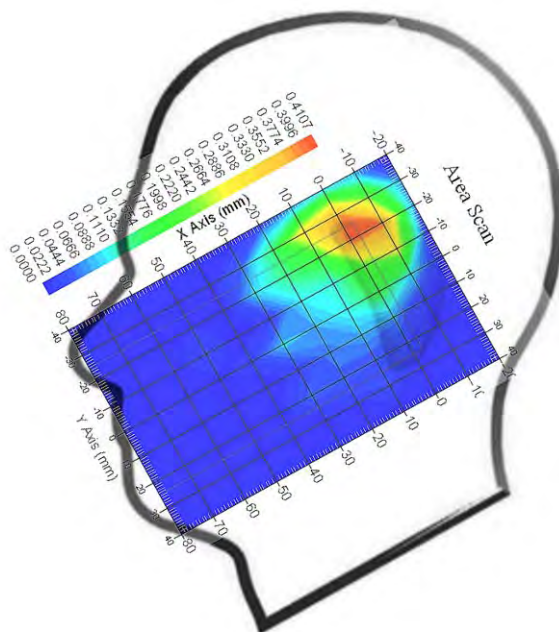
Type : Head  
 Frequency : 1880.0 MHz  
 Epsilon : 40.06 F/m  
 Sigma : 1.41 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.483 W/kg  
 10 gram SAR value : 0.175 W/kg  
 Area Scan Peak SAR : 0.406 W/kg  
 Zoom Scan Peak SAR : 1.261 W/kg

**Plot 12#**





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

**Right 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 : 0.214 W/kg  
 Power Drift-Finish : 0.208 W/kg  
 Power Drift (%) : -2.433

Tissue Data

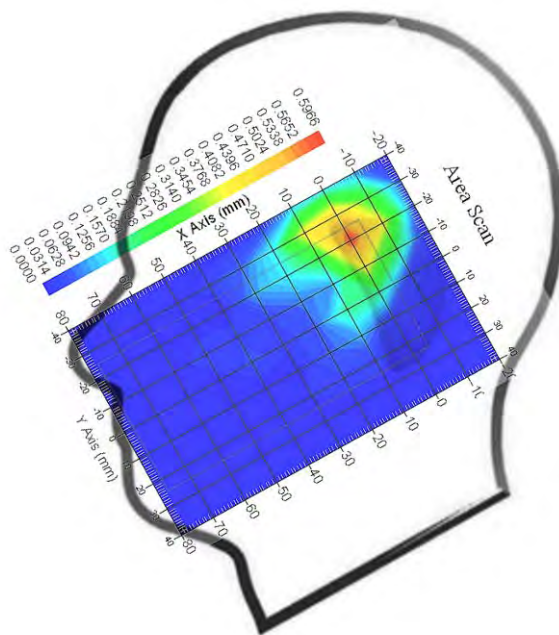
Type : Head  
 Frequency : 1909.8 MHz  
 Epsilon : 40.06 F/m  
 Sigma : 1.42 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.446 W/kg  
 10 gram SAR value : 0.172 W/kg  
 Area Scan Peak SAR : 0.587 W/kg  
 Zoom Scan Peak SAR : 1.191 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 : 0.254 W/kg  
 Power Drift-Finish : 0.250 W/kg  
 Power Drift (%) : -1.560

Tissue Data

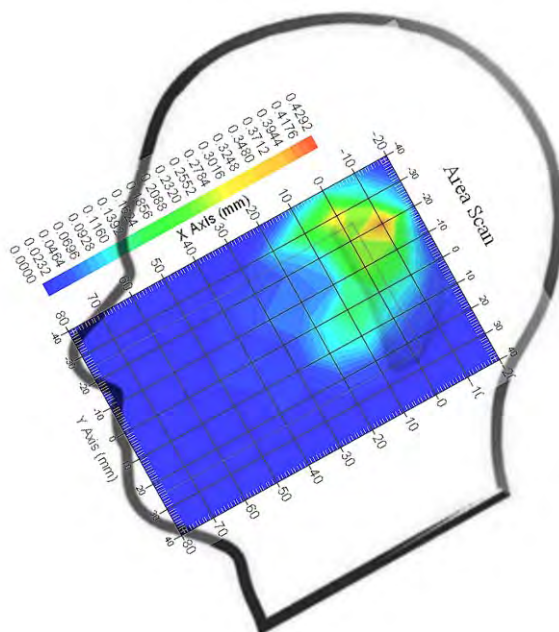
Type : Head  
 Frequency : 1880.0 MHz  
 Epsilon : 40.06 F/m  
 Sigma : 1.41 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.455 W/kg  
 10 gram SAR value : 0.164 W/kg  
 Area Scan Peak SAR : 0.424 W/kg  
 Zoom Scan Peak SAR : 1.361 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 : 0.051 W/kg  
 Power Drift-Finish : 0.053 W/kg  
 Power Drift (%) : 2.713

Tissue Data

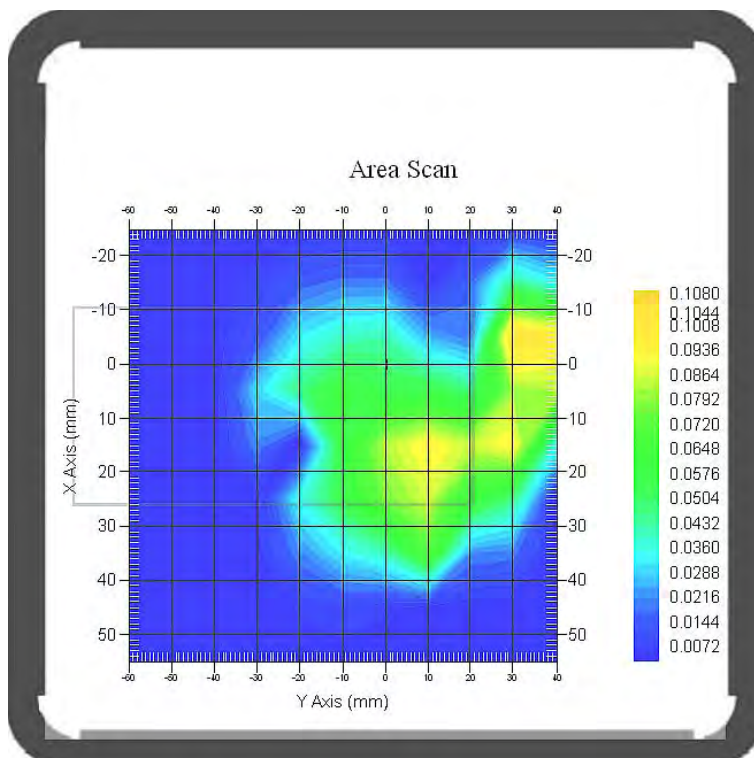
Type : Body  
 Frequency : 1880.0 MHz  
 Epsilon : 51.98 F/m  
 Sigma : 1.52 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.095 W/kg  
 10 gram SAR value : 0.051 W/kg  
 Area Scan Peak SAR : 0.105 W/kg  
 Zoom Scan Peak SAR : 0.230 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 : 0.109 W/kg  
 Power Drift-Finish : 0.112 W/kg  
 Power Drift (%) : 1.436

Tissue Data

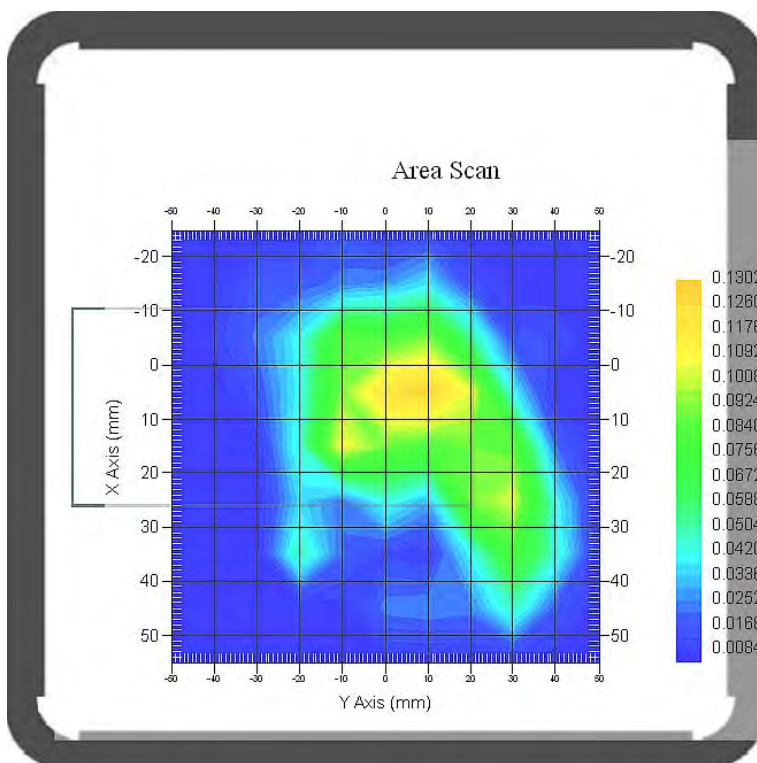
Type : Body  
 Frequency : 1880.0 MHz  
 Epsilon : 51.98 F/m  
 Sigma : 1.52 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.118 W/kg  
 10 gram SAR value : 0.101 W/kg  
 Area Scan Peak SAR : 0.128 W/kg  
 Zoom Scan Peak SAR : 0.290 W/kg

**Plot 16#**



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

**WCDMA850; Left Head Cheek (836.6 MHz Middle Channel)**

Measurement Data

Test mode : WCDMA850  
 Crest Factor : 1  
 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 : 0.251 W/kg  
 Power Drift-Finish : 0.259 W/kg  
 Power Drift (%) : 2.212

Tissue Data

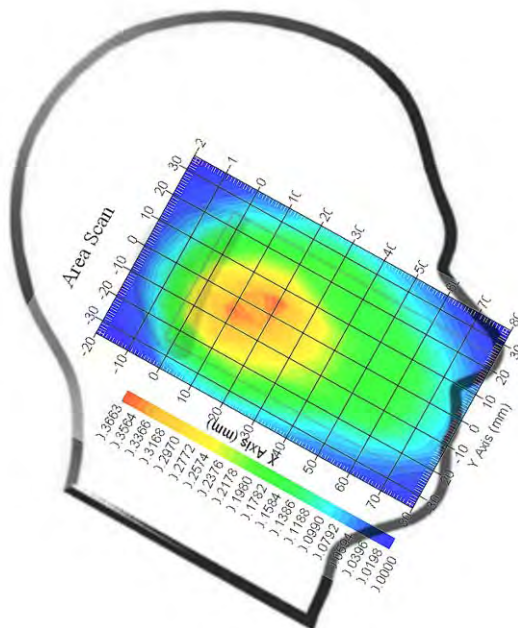
Type : Head  
 Frequency : 836.6 MHz  
 Epsilon : 41.49 F/m  
 Sigma : 0.91 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency Band : 835  
 Duty Cycle Factor : 1  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.355 W/kg  
 10 gram SAR value : 0.213 W/kg  
 Area Scan Peak SAR : 0.357 W/kg  
 Zoom Scan Peak SAR : 0.590 W/kg

**Plot 17#**



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

**WCDMA850; Left Head Tilt (836.6 MHz Middle Channel)**

Measurement Data

Test mode : WCDMA850  
 Crest Factor : 1  
 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 : 0.210 W/kg  
 Power Drift-Finish : 0.208 W/kg  
 Power Drift (%) : -1.834

Tissue Data

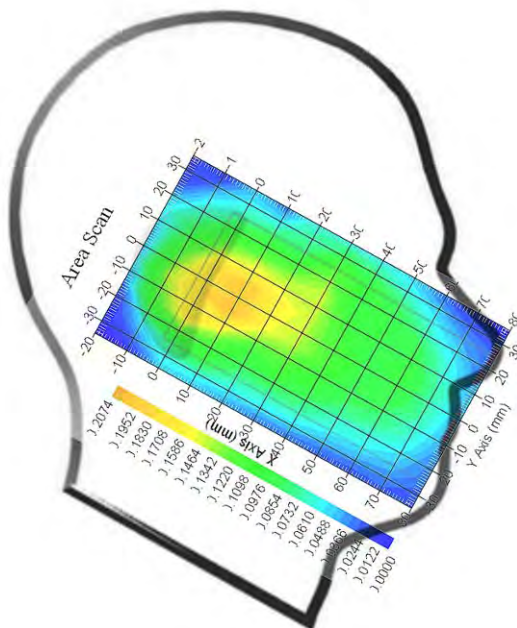
Type : Head  
 Frequency : 836.6 MHz  
 Epsilon : 41.49 F/m  
 Sigma : 0.91 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency Band : 835  
 Duty Cycle Factor : 1  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.213 W/kg  
 10 gram SAR value : 0.140 W/kg  
 Area Scan Peak SAR : 0.203 W/kg  
 Zoom Scan Peak SAR : 0.320 W/kg

**Plot 18#**



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

**WCDMA850; Right Head Cheek (826.4 MHz Low Channel)**

Measurement Data

Test mode : WCDMA850  
 Crest Factor : 1  
 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 : 0.126 W/kg  
 Power Drift-Finish : 0.123 W/kg  
 Power Drift (%) : -1.778

Tissue Data

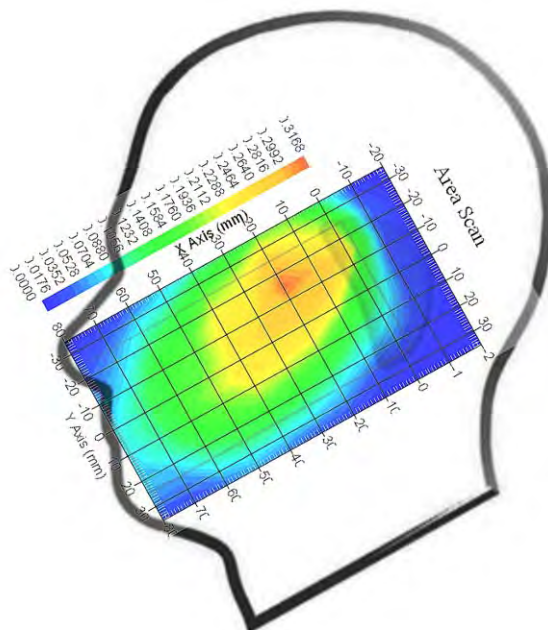
Type : Head  
 Frequency : 826.4 MHz  
 Epsilon : 41.43 F/m  
 Sigma : 0.90 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency Band : 835  
 Duty Cycle Factor : 1  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.388 W/kg  
 10 gram SAR value : 0.263 W/kg  
 Area Scan Peak SAR : 0.313 W/kg  
 Zoom Scan Peak SAR : 0.610 W/kg

**Plot 19#**



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

**WCDMA850; Right Head Cheek (836.6 MHz Middle Channel)**

Measurement Data

Test mode : WCDMA850  
 Crest Factor : 1  
 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 : 0.217 W/kg  
 Power Drift-Finish : 0.209 W/kg  
 Power Drift (%) : -3.914

Tissue Data

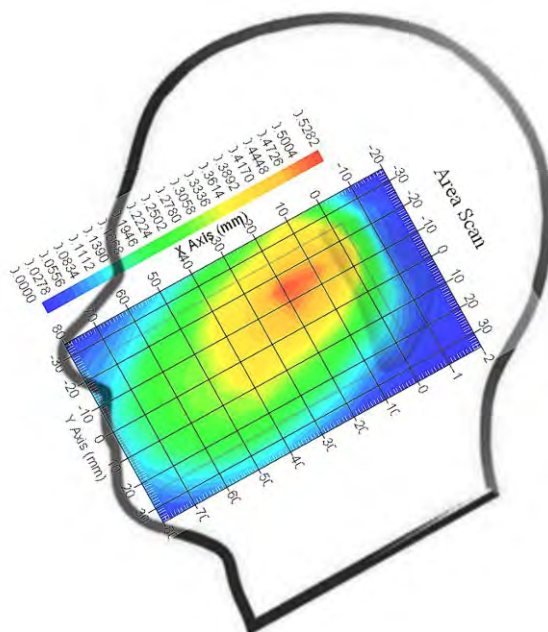
Type : Head  
 Frequency : 836.6 MHz  
 Epsilon : 41.49 F/m  
 Sigma : 0.91 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency Band : 835  
 Duty Cycle Factor : 1  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.478 W/kg  
 10 gram SAR value : 0.319 W/kg  
 Area Scan Peak SAR : 0.516 W/kg  
 Zoom Scan Peak SAR : 0.840 W/kg

**Plot 20#**





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

**WCDMA850; Right Head Cheek (846.6 MHz High Channel)**

Measurement Data

Test mode : WCDMA850  
 Crest Factor : 1  
 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 : 0.240 W/kg  
 Power Drift-Finish : 0.250 W/kg  
 Power Drift (%) : 3.577

Tissue Data

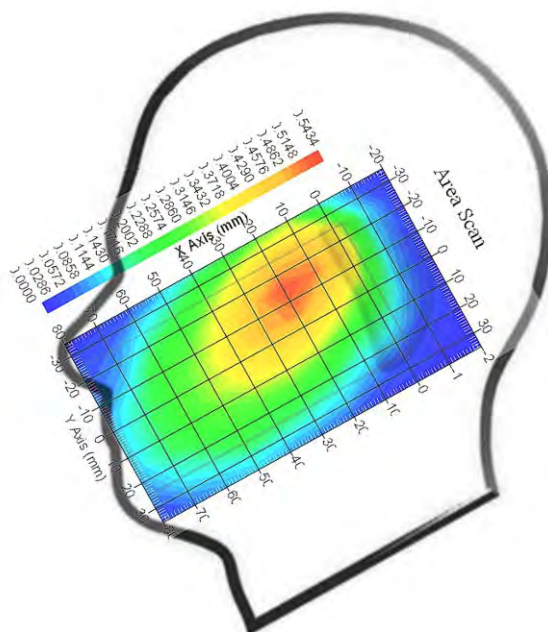
Type : Head  
 Frequency : 846.6 MHz  
 Epsilon : 41.34 F/m  
 Sigma : 0.92 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency Band : 835  
 Duty Cycle Factor : 1  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.504 W/kg  
 10 gram SAR value : 0.266 W/kg  
 Area Scan Peak SAR : 0.532 W/kg  
 Zoom Scan Peak SAR : 0.970 W/kg

**Plot 21#**



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

**WCDMA850; Right Head Tilt (836.6 MHz Middle Channel)**

Measurement Data

Test mode : WCDMA850  
 Crest Factor : 1  
 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 : 0.176 W/kg  
 Power Drift-Finish : 0.173 W/kg  
 Power Drift (%) : -0.673

Tissue Data

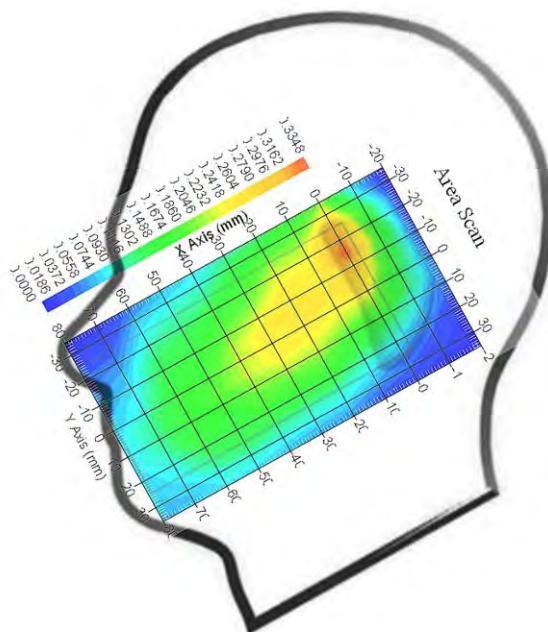
Type : Head  
 Frequency : 836.6 MHz  
 Epsilon : 41.49 F/m  
 Sigma : 0.91 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency Band : 835  
 Duty Cycle Factor : 1  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.284 W/kg  
 10 gram SAR value : 0.118 W/kg  
 Area Scan Peak SAR : 0.332 W/kg  
 Zoom Scan Peak SAR : 0.610 W/kg

**Plot 22#**



**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 : 0.523 W/kg  
 Power Drift-Finish : 0.527 W/kg  
 Power Drift (%) : -0.514

Tissue Data

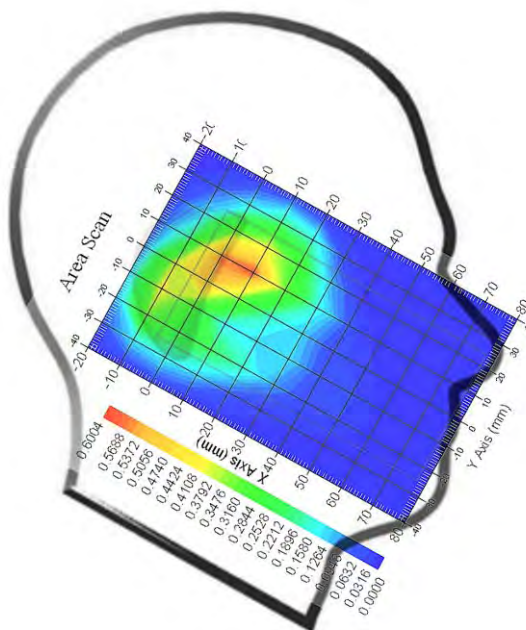
Type : Head  
 Frequency : 1880.0 MHz  
 Epsilon : 40.06 F/m  
 Sigma : 1.41 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.523 W/kg  
 10 gram SAR value : 0.227 W/kg  
 Area Scan Peak SAR : 0.591 W/kg  
 Zoom Scan Peak SAR : 1.231 W/kg

**Plot 23#**



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

**WCDMA1900; Left Head Tilt (1880.0 MHz Middle Channel)**

Measurement Data

Test mode : WCDMA1900  
 Crest Factor : 1  
 Scan Type : Complete  
 Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm  
 Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm  
 Power Drift-Start : 0.445 W/kg  
 Power Drift-Finish : 0.440 W/kg  
 Power Drift (%) : -1.054

Tissue Data

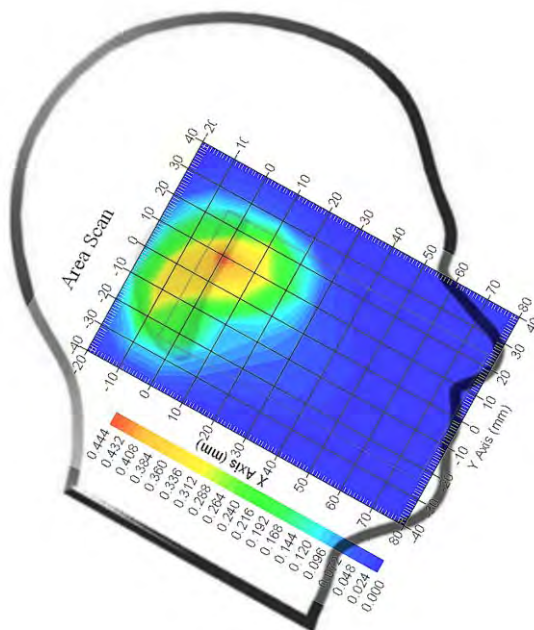
Type : Head  
 Frequency : 1880.0 MHz  
 Epsilon : 40.06 F/m  
 Sigma : 1.41 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.421 W/kg  
 10 gram SAR value : 0.213 W/kg  
 Area Scan Peak SAR : 0.439 W/kg  
 Zoom Scan Peak SAR : 0.970 W/kg

**Plot 24#**



**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 : 0.292 W/kg  
 Power Drift-Finish : 0.300 W/kg  
 Power Drift (%) : 1.460

Tissue Data

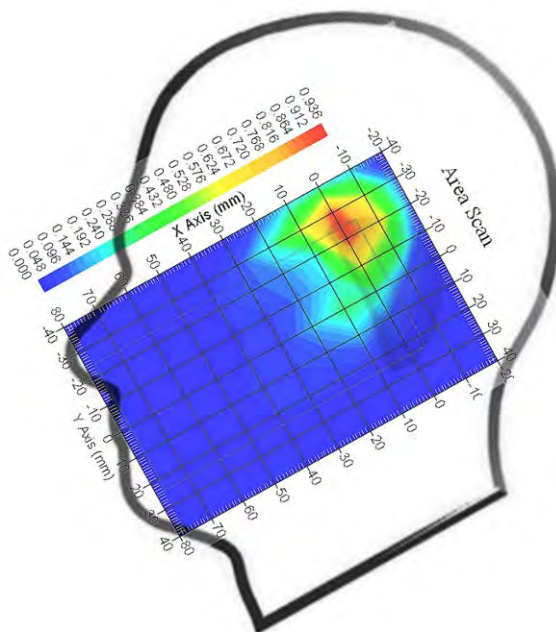
Type : Head  
 Frequency : 1852.4 MHz  
 Epsilon : 40.05 F/m  
 Sigma : 1.38 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.905 W/kg  
 10 gram SAR value : 0.333 W/kg  
 Area Scan Peak SAR : 0.921 W/kg  
 Zoom Scan Peak SAR : 2.051 W/kg

**Plot 25#**



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

**WCDMA1900; Right Head Cheek (1880.0 MHz Middle Channel)**

Measurement Data

Test mode : WCDMA1900  
 Crest Factor : 1  
 Scan Type : Complete  
 Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm  
 Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm  
 Power Drift-Start : 0.413 W/kg  
 Power Drift-Finish : 0.402 W/kg  
 Power Drift (%) : -2.663

Tissue Data

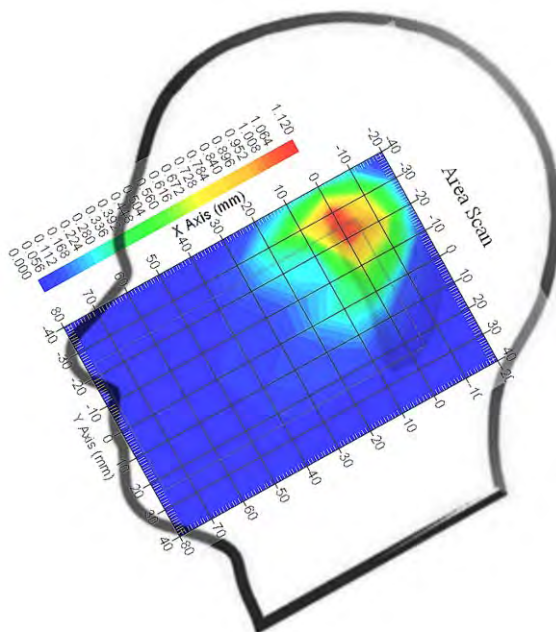
Type : Head  
 Frequency : 1880.0 MHz  
 Epsilon : 40.06 F/m  
 Sigma : 1.41 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 1.088 W/kg  
 10 gram SAR value : 0.454 W/kg  
 Area Scan Peak SAR : 1.096 W/kg  
 Zoom Scan Peak SAR : 2.402 W/kg

**Plot 26#**



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

**WCDMA1900; Right 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 : 0.418 W/kg  
 Power Drift-Finish : 0.421 W/kg  
 Power Drift (%) : 0.782

Tissue Data

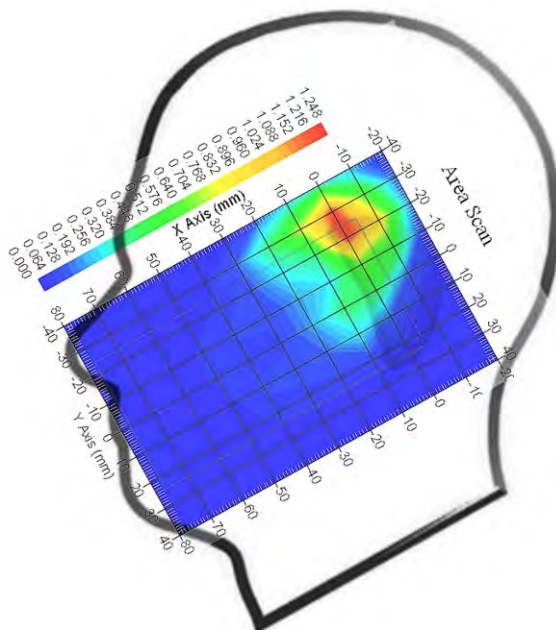
Type : Head  
 Frequency : 1907.6 MHz  
 Epsilon : 40.06 F/m  
 Sigma : 1.42 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 1.004 W/kg  
 10 gram SAR value : 0.425 W/kg  
 Area Scan Peak SAR : 1.233 W/kg  
 Zoom Scan Peak SAR : 2.311 W/kg

**Plot 27#**



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

**WCDMA1900; Right Head Tilt (1880.0 MHz Middle Channel)**

Measurement Data

Test mode : WCDMA1900  
 Crest Factor : 1  
 Scan Type : Complete  
 Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm  
 Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm  
 Power Drift-Start : 0.338 W/kg  
 Power Drift-Finish : 0.329 W/kg  
 Power Drift (%) : -2.582

Tissue Data

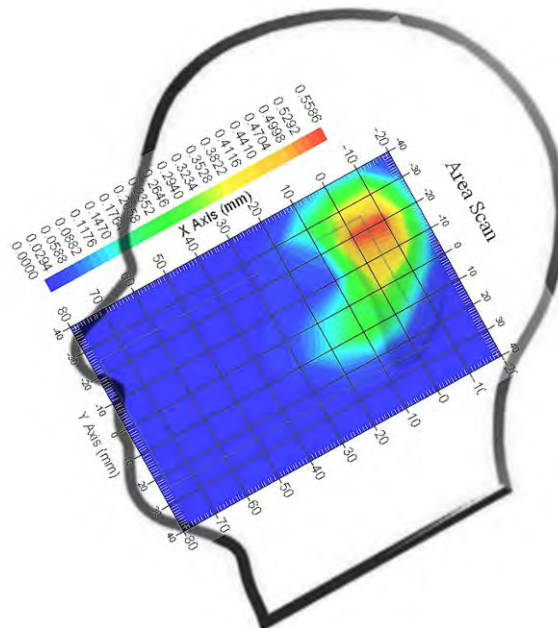
Type : Head  
 Frequency : 1880.0 MHz  
 Epsilon : 40.06 F/m  
 Sigma : 1.41 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.602 W/kg  
 10 gram SAR value : 0.226 W/kg  
 Area Scan Peak SAR : 0.548 W/kg  
 Zoom Scan Peak SAR : 1.421 W/kg

**Plot 28#**





**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 : 0.404 W/kg  
 Power Drift-Finish : 0.390 W/kg  
 Power Drift (%) : -3.249

Tissue Data

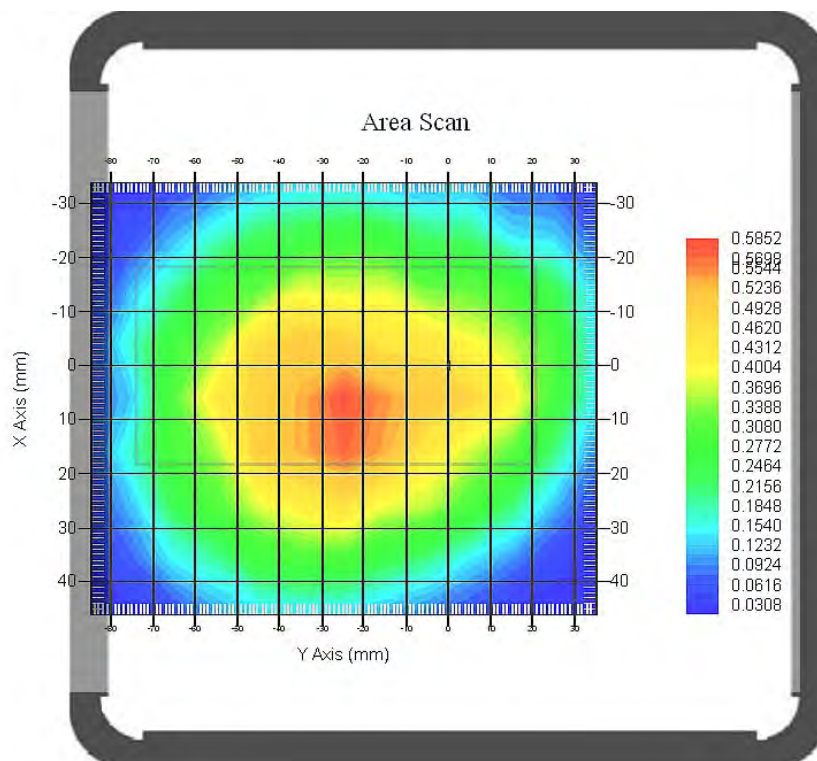
Type : Body  
 Frequency : 836.6 MHz  
 Epsilon : 54.95 F/m  
 Sigma : 0.96 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency Band : 835  
 Duty Cycle Factor : 2  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.537 W/kg  
 10 gram SAR value : 0.381 W/kg  
 Area Scan Peak SAR : 0.575 W/kg  
 Zoom Scan Peak SAR : 0.630 W/kg

**Plot 29#**



**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 : 0.673 W/kg  
 Power Drift-Finish : 0.660 W/kg  
 Power Drift (%) : -2.868

Tissue Data

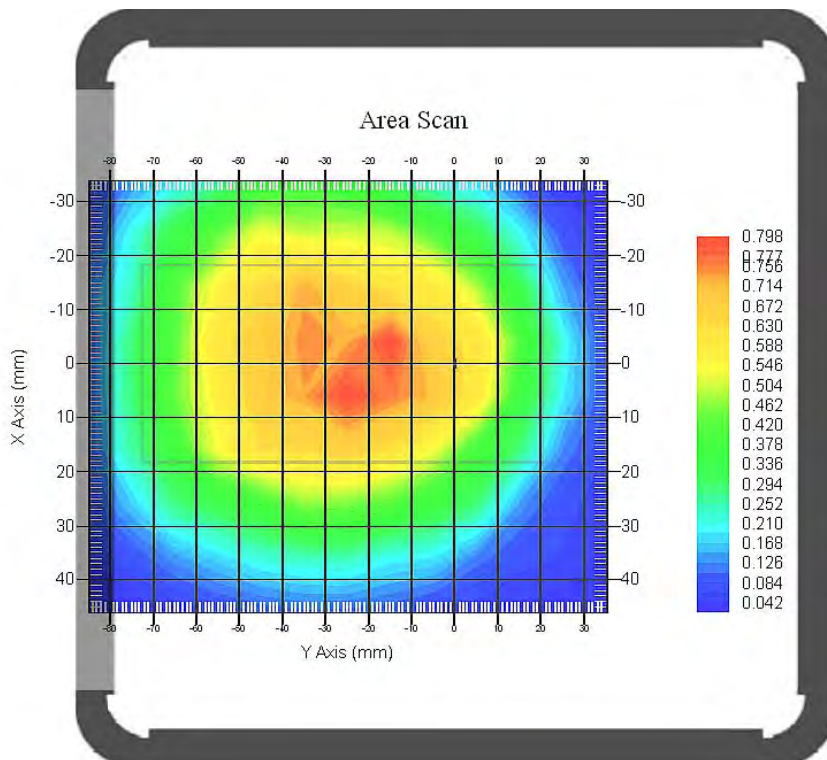
Type : Body  
 Frequency : 836.6 MHz  
 Epsilon : 54.95 F/m  
 Sigma : 0.96 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency Band : 835  
 Duty Cycle Factor : 2  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.722 W/kg  
 10 gram SAR value : 0.504 W/kg  
 Area Scan Peak SAR : 0.793 W/kg  
 Zoom Scan Peak SAR : 1.010 W/kg

**Plot 30#**



**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 : 0.397 W/kg  
 Power Drift-Finish : 0.381 W/kg  
 Power Drift (%) : -3.564

Tissue Data

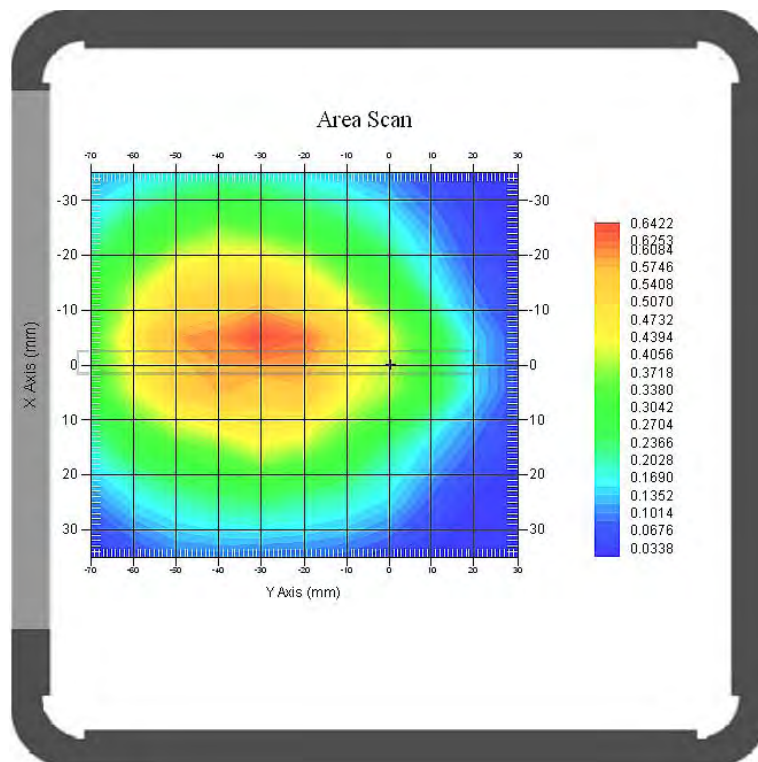
Type : Body  
 Frequency : 836.6 MHz  
 Epsilon : 54.95 F/m  
 Sigma : 0.96 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency Band : 835  
 Duty Cycle Factor : 2  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.562 W/kg  
 10 gram SAR value : 0.376 W/kg  
 Area Scan Peak SAR : 0.638 W/kg  
 Zoom Scan Peak SAR : 0.930 W/kg

**Plot 31#**



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

**Hot Spot: Body-Top (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 : 0.095 W/kg  
 Power Drift-Finish : 0.091 W/kg  
 Power Drift (%) : -4.247

Tissue Data

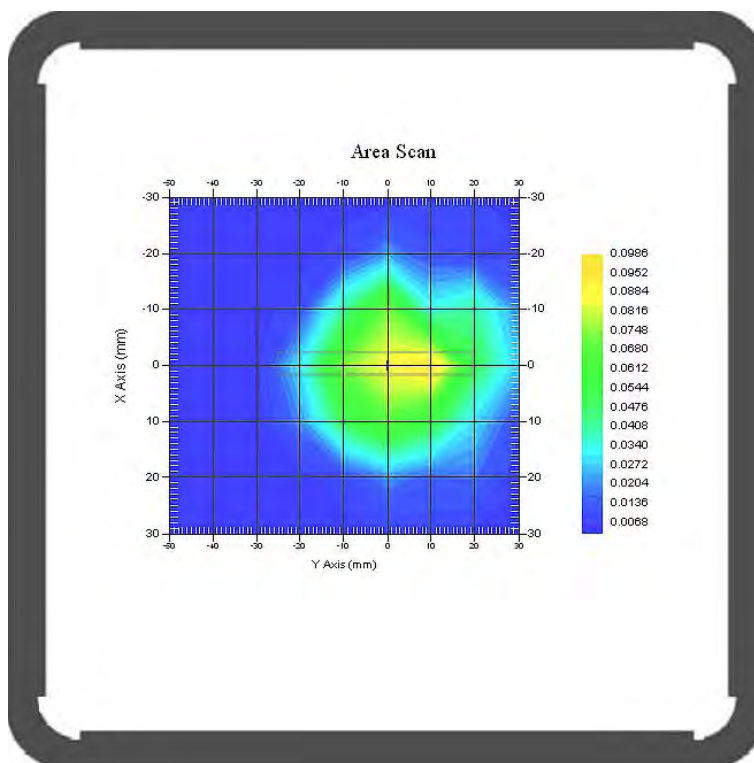
Type : Body  
 Frequency : 836.6 MHz  
 Epsilon : 54.95 F/m  
 Sigma : 0.96 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency Band : 835  
 Duty Cycle Factor : 2  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.077 W/kg  
 10 gram SAR value : 0.032 W/kg  
 Area Scan Peak SAR : 0.096 W/kg  
 Zoom Scan Peak SAR : 0.160 W/kg

**Plot 32#**



**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 : 0.141 W/kg  
 Power Drift-Finish : 0.136 W/kg  
 Power Drift (%) : -3.364

Tissue Data

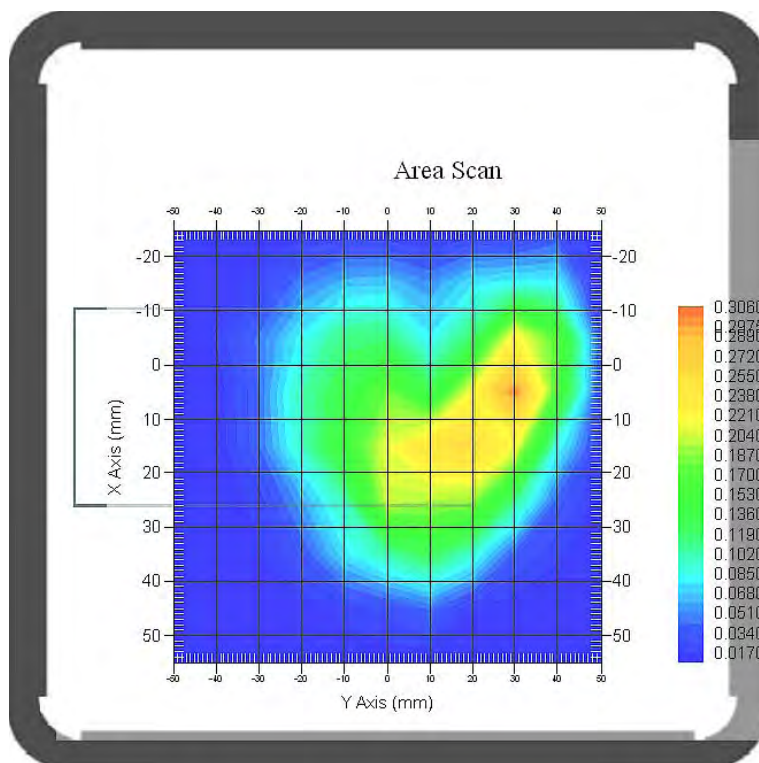
Type : Body  
 Frequency : 1880.00 MHz  
 Epsilon : 51.98 F/m  
 Sigma : 1.52 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.257 W/kg  
 10 gram SAR value : 0.126 W/kg  
 Area Scan Peak SAR : 0.301 W/kg  
 Zoom Scan Peak SAR : 0.430 W/kg

**Plot 33#**



**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 : 0.259 W/kg  
 Power Drift-Finish : 0.247 W/kg  
 Power Drift (%) : -4.633

Tissue Data

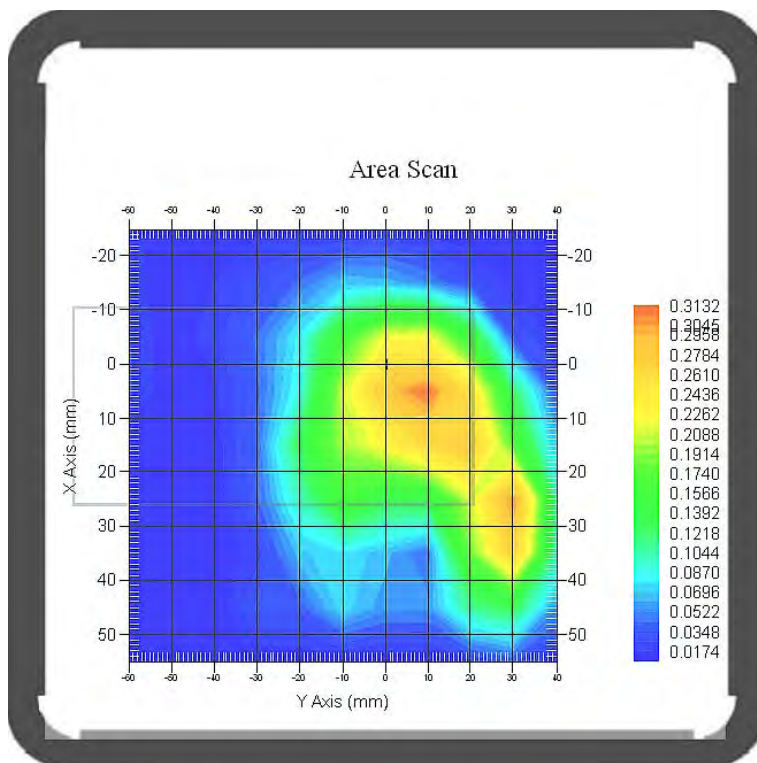
Type : Body  
 Frequency : 1880.00 MHz  
 Epsilon : 51.98 F/m  
 Sigma : 1.52 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.282 W/kg  
 10 gram SAR value : 0.150 W/kg  
 Area Scan Peak SAR : 0.310 W/kg  
 Zoom Scan Peak SAR : 0.460 W/kg

**Plot 34#**



**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 : 0.001 W/kg  
 Power Drift-Finish : 0.001 W/kg  
 Power Drift (%) : 0.853

Tissue Data

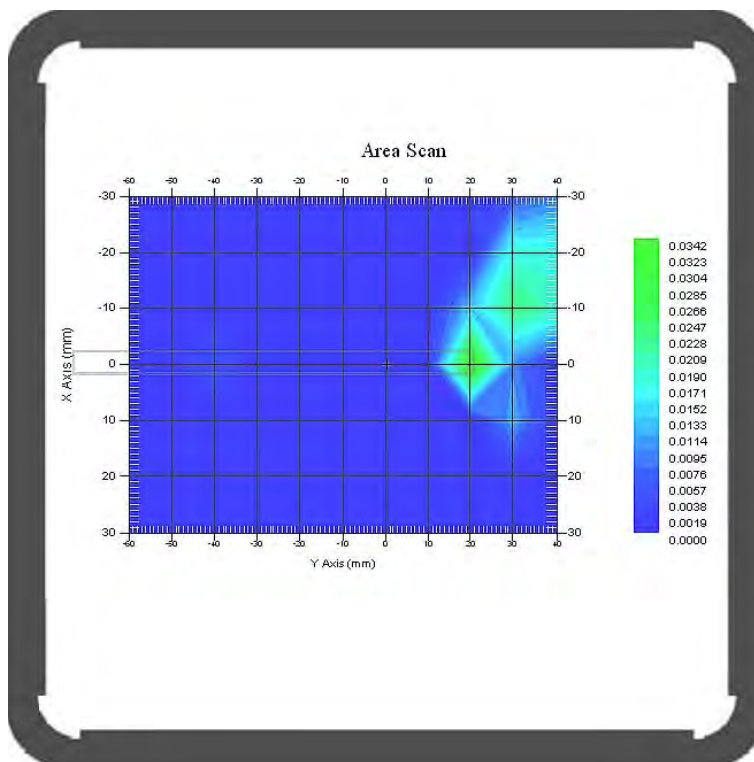
Type : Body  
 Frequency : 1880.00 MHz  
 Epsilon : 51.98 F/m  
 Sigma : 1.52 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.026 W/kg  
 10 gram SAR value : 0.017 W/kg  
 Area Scan Peak SAR : 0.034 W/kg  
 Zoom Scan Peak SAR : 0.130 W/kg

**Plot 35#**



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

**Hot Spot: Body-Top (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 : 0.145 W/kg  
 Power Drift-Finish : 0.142 W/kg  
 Power Drift (%) : -1.511

Tissue Data

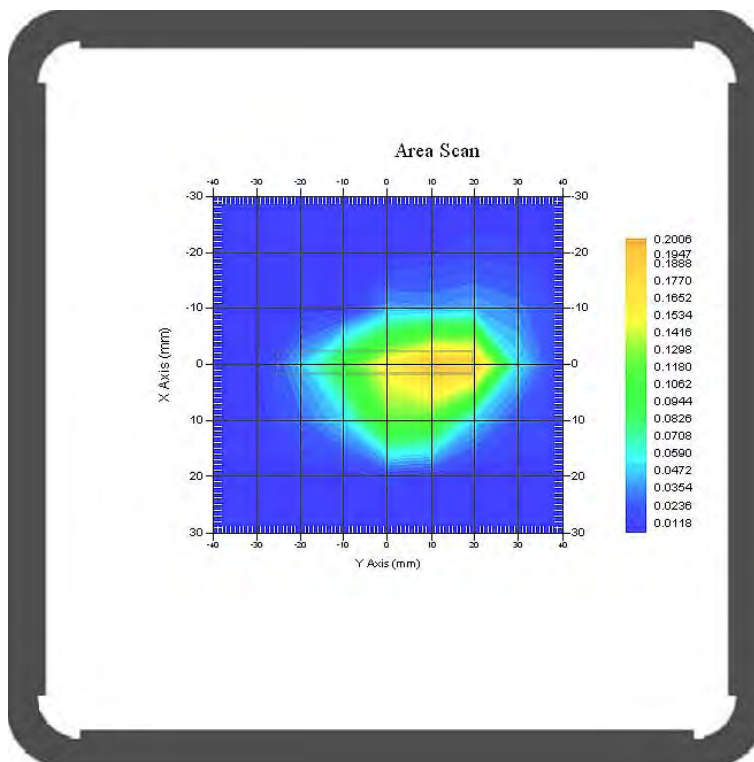
Type : Body  
 Frequency : 1880.00 MHz  
 Epsilon : 51.98 F/m  
 Sigma : 1.52 S/m  
 Density : 1000.00 kg/cu. m

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  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.161 W/kg  
 10 gram SAR value : 0.057 W/kg  
 Area Scan Peak SAR : 0.198 W/kg  
 Zoom Scan Peak SAR : 0.450 W/kg

**Plot 36#**





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

**Hot Spot: WCDMA850; Body-Front (836.6 MHz Middle Channel)**

Measurement Data

Test mode : WCDMA850  
 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 : 0.146 W/kg  
 Power Drift-Finish : 0.139 W/kg  
 Power Drift (%) : -4.514

Tissue Data

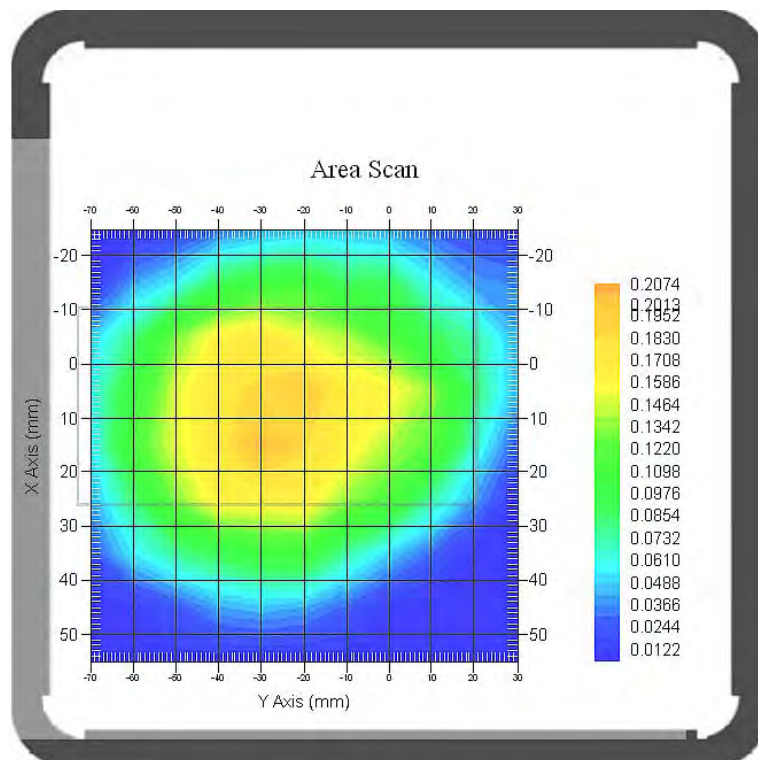
Type : Body  
 Frequency : 836.6 MHz  
 Epsilon : 54.95 F/m  
 Sigma : 0.96 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency : 835  
 Duty Cycle Factor : 1  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.184 W/kg  
 10 gram SAR value : 0.124 W/kg  
 Area Scan Peak SAR : 0.205 W/kg  
 Zoom Scan Peak SAR : 0.260 W/kg

**Plot 37#**



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

**Hot Spot: WCDMA850; Body-Back (836.6 MHz Middle Channel)**

Measurement Data

Test mode : WCDMA850  
 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 : 0.142 W/kg  
 Power Drift-Finish : 0.146 W/kg  
 Power Drift (%) : 1.729

Tissue Data

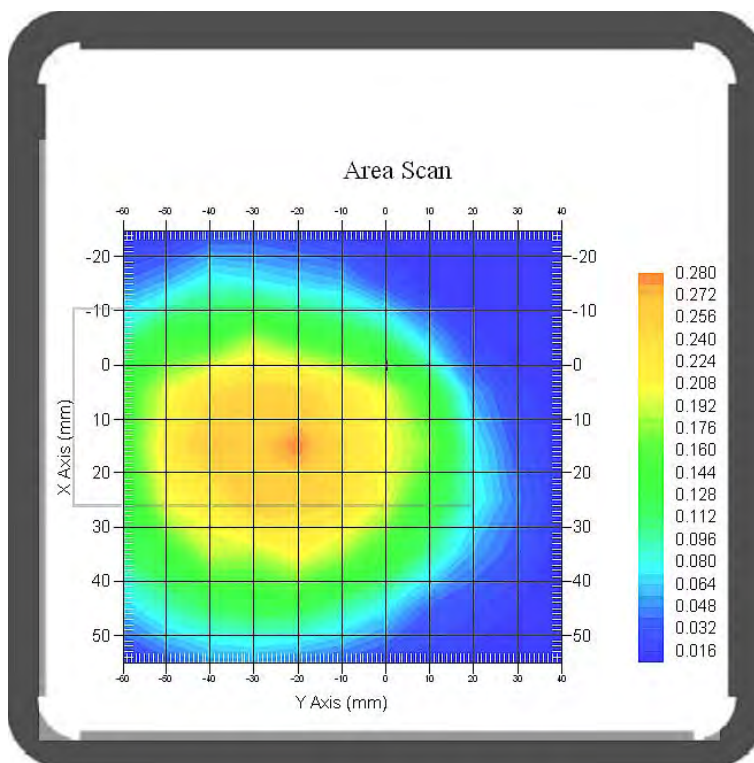
Type : Body  
 Frequency : 836.6 MHz  
 Epsilon : 54.95 F/m  
 Sigma : 0.96 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency : 835  
 Duty Cycle Factor : 1  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.249 W/kg  
 10 gram SAR value : 0.164 W/kg  
 Area Scan Peak SAR : 0.279 W/kg  
 Zoom Scan Peak SAR : 0.340 W/kg

**Plot 38#**



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

**Hot Spot: WCDMA850; Body-Left (836.6 MHz Middle Channel)**

Measurement Data

Test mode : WCDMA850  
 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 : 0.115 W/kg  
 Power Drift-Finish : 0.118 W/kg  
 Power Drift (%) : 1.804

Tissue Data

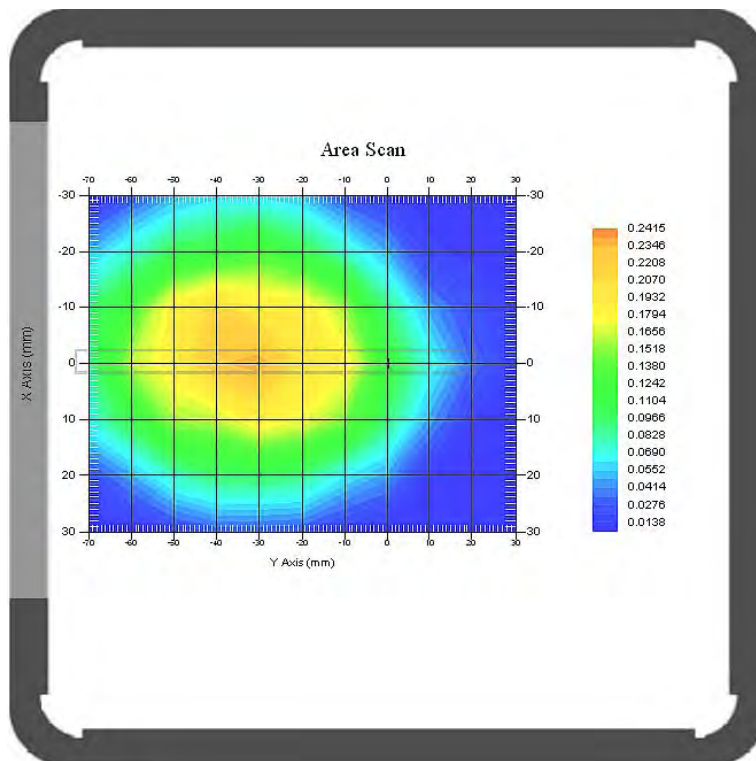
Type : Body  
 Frequency : 836.6 MHz  
 Epsilon : 54.95 F/m  
 Sigma : 0.96 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency : 835  
 Duty Cycle Factor : 1  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.214 W/kg  
 10 gram SAR value : 0.123 W/kg  
 Area Scan Peak SAR : 0.236 W/kg  
 Zoom Scan Peak SAR : 0.350 W/kg

**Plot 39#**



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

**Hot Spot: WCDMA850; Body-Top (836.6 MHz Middle Channel)**

Measurement Data

Test mode : WCDMA850  
 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 : 0.012 W/kg  
 Power Drift-Finish : 0.012 W/kg  
 Power Drift (%) : -0.802

Tissue Data

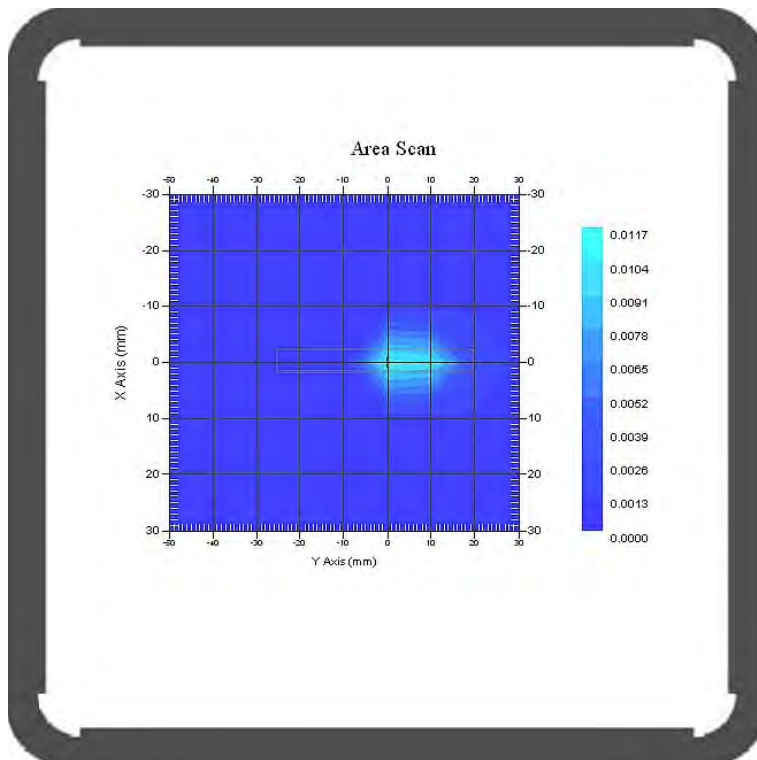
Type : Body  
 Frequency : 836.6 MHz  
 Epsilon : 54.95 F/m  
 Sigma : 0.96 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency : 835  
 Duty Cycle Factor : 1  
 Conversion Factor : 5.9  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V/m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.006 W/kg  
 10 gram SAR value : 0.003 W/kg  
 Area Scan Peak SAR : 0.011 W/kg  
 Zoom Scan Peak SAR : 0.020 W/kg

**Plot 40#**



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

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

Measurement Data

Test mode : WCDMA1900  
 Crest Factor : 1  
 Scan Type : Complete  
 Area Scan : 9x11x1 : Measurement x=10mm, y=10mm, z=4mm  
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm  
 Power Drift-Start : 0.135 W/kg  
 Power Drift-Finish : 0.134 W/kg  
 Power Drift (%) : 1.338

Tissue Data

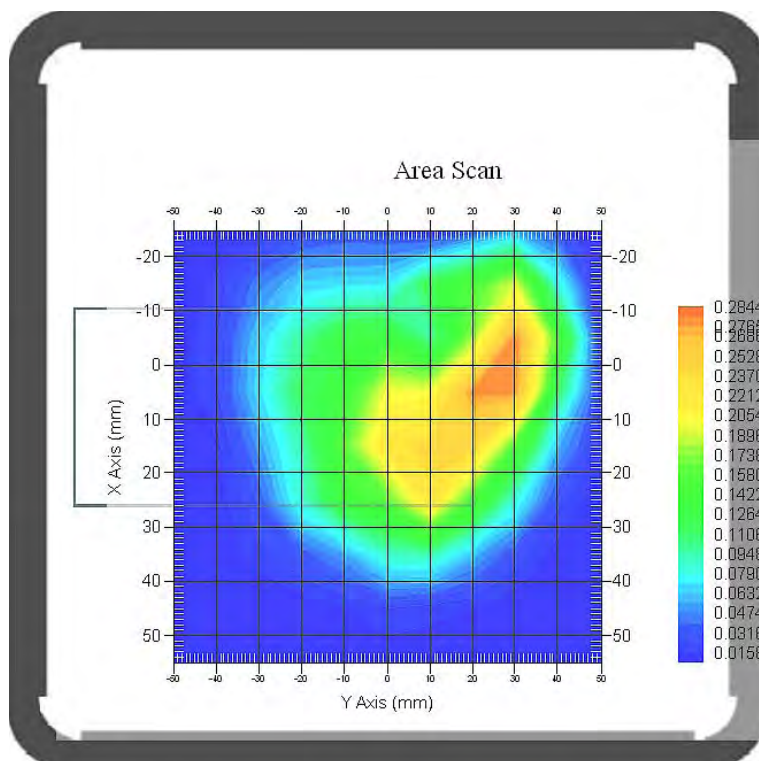
Type : Body  
 Frequency : 1880.0 MHz  
 Epsilon : 51.98 F/m  
 Sigma : 1.52 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency : 1900  
 Duty Cycle Factor : 1  
 Conversion Factor : 4.5  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.206 W/kg  
 10 gram SAR value : 0.088 W/kg  
 Area Scan Peak SAR : 0.278 W/kg  
 Zoom Scan Peak SAR : 0.460 W/kg

**Plot 41#**



**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 : 0.240 W/kg  
 Power Drift-Finish : 0.243 W/kg  
 Power Drift (%) : 0.697

Tissue Data

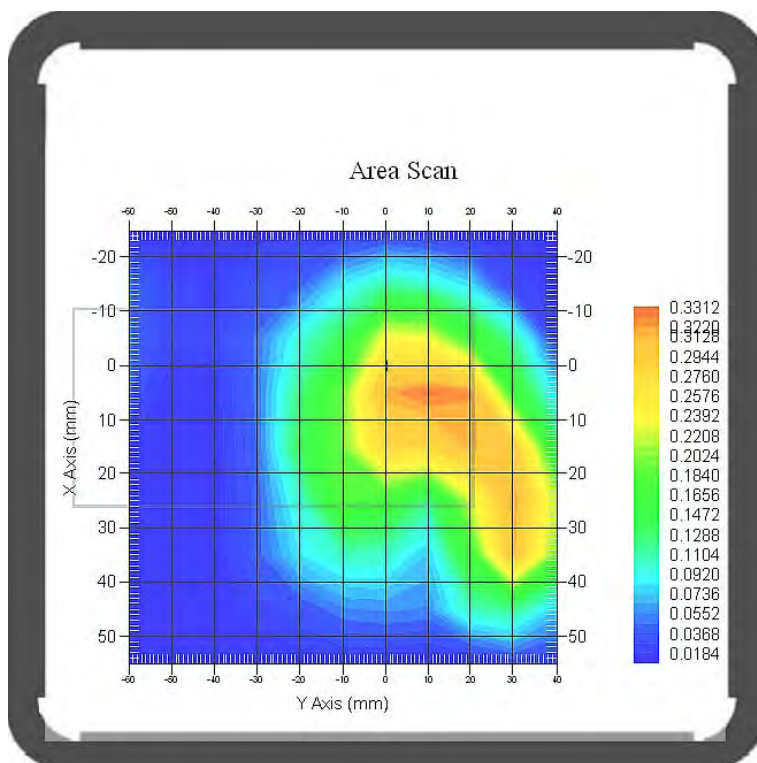
Type : Body  
 Frequency : 1880.0 MHz  
 Epsilon : 51.98 F/m  
 Sigma : 1.52 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency : 1900  
 Duty Cycle Factor : 1  
 Conversion Factor : 4.5  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.311 W/kg  
 10 gram SAR value : 0.164 W/kg  
 Area Scan Peak SAR : 0.326 W/kg  
 Zoom Scan Peak SAR : 0.560 W/kg

**Plot 42#**



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

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

Measurement Data

Test mode : WCDMA1900  
 Crest Factor : 1  
 Scan Type : Complete  
 Area Scan : 7x11x1 : Measurement x=10mm, y=10mm, z=4mm  
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm  
 Power Drift-Start : 0.001 W/kg  
 Power Drift-Finish : 0.000 W/kg  
 Power Drift (%) : -0.582

Tissue Data

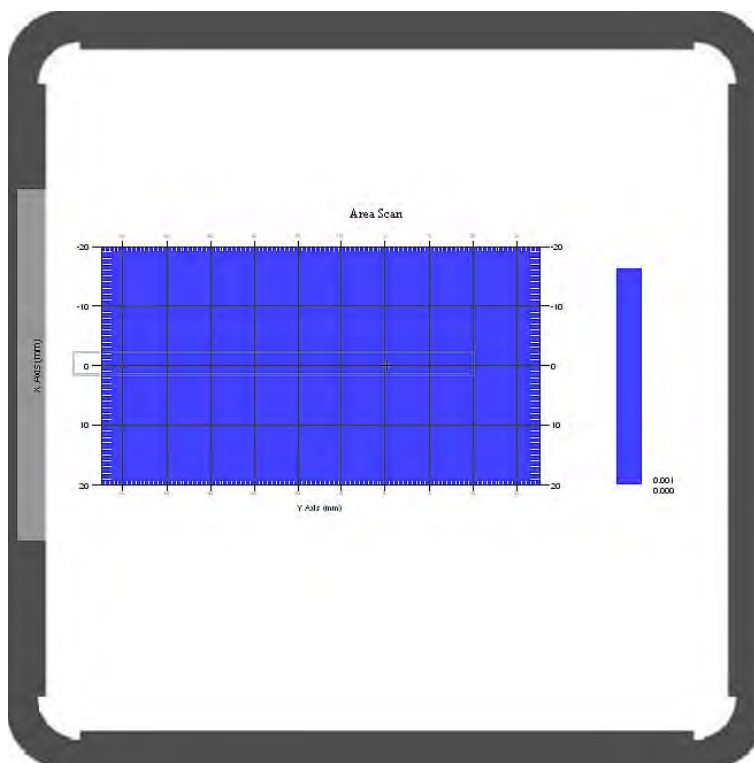
Type : Body  
 Frequency : 1880.0 MHz  
 Epsilon : 51.98 F/m  
 Sigma : 1.52 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency : 1900  
 Duty Cycle Factor : 1  
 Conversion Factor : 4.5  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.001 W/kg  
 10 gram SAR value : 0.001 W/kg  
 Area Scan Peak SAR : 0.001 W/kg  
 Zoom Scan Peak SAR : 0.000 W/kg

**Plot 43#**



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

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

Measurement Data

Test mode : WCDMA1900  
 Crest Factor : 1  
 Scan Type : Complete  
 Area Scan : 7x9x1 : Measurement x=10mm, y=10mm, z=4mm  
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm  
 Power Drift-Start : 0.029 W/kg  
 Power Drift-Finish : 0.031 W/kg  
 Power Drift (%) : 3.816

Tissue Data

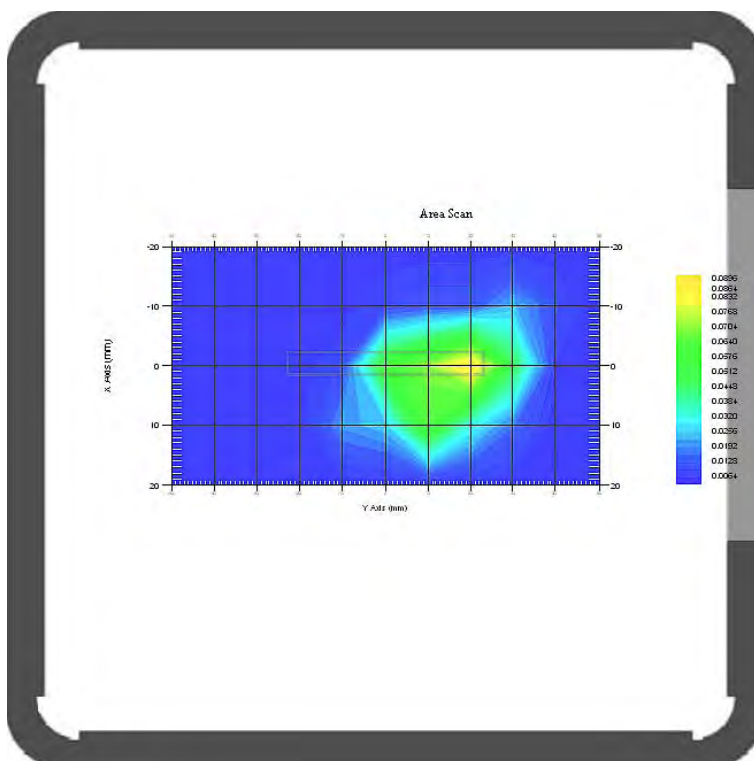
Type : Body  
 Frequency : 1880.0 MHz  
 Epsilon : 51.98 F/m  
 Sigma : 1.52 S/m  
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283  
 Frequency : 1900  
 Duty Cycle Factor : 1  
 Conversion Factor : 4.5  
 Probe Sensitivity : 1.20 1.20 1.20  $\mu\text{V}/(\text{V}/\text{m})^2$   
 Compression Point : 95.00 mV  
 Offset : 1.56 mm

1 gram SAR value : 0.092 W/kg  
 10 gram SAR value : 0.033 W/kg  
 Area Scan Peak SAR : 0.088 W/kg  
 Zoom Scan Peak SAR : 0.250 W/kg

**Plot 44#**





## 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) %
<b>Measurement System</b>							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	$(\frac{1-cp}{2})^{1/2}$	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
<b>Restriction</b>							
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
<b>Phantom and Setup</b>							
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: 8<sup>th</sup> October 2013

Released on: 8<sup>th</sup> 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 meteorological 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

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

**NCL Calibration Laboratories**

Division of APREL Inc.

**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**

<b>Instrument</b>	<b>Serial Number</b>	<b>Cal due date</b>
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
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**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

**NCL Calibration Laboratories**

Division of APREL Inc.

**Probe Summary**

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

\*Resistive to recommended tissue recipes per IEEE-1528

**Sensitivity in Air**

<b>Channel X:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Channel Y:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Channel Z:</b>	1.2 $\mu\text{V}/(\text{V}/\text{m})^2$
<b>Diode Compression Point:</b>	95 mV

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**NCL Calibration Laboratories**

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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
2450 B	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

**NCL Calibration Laboratories**

Division of APREL Inc.

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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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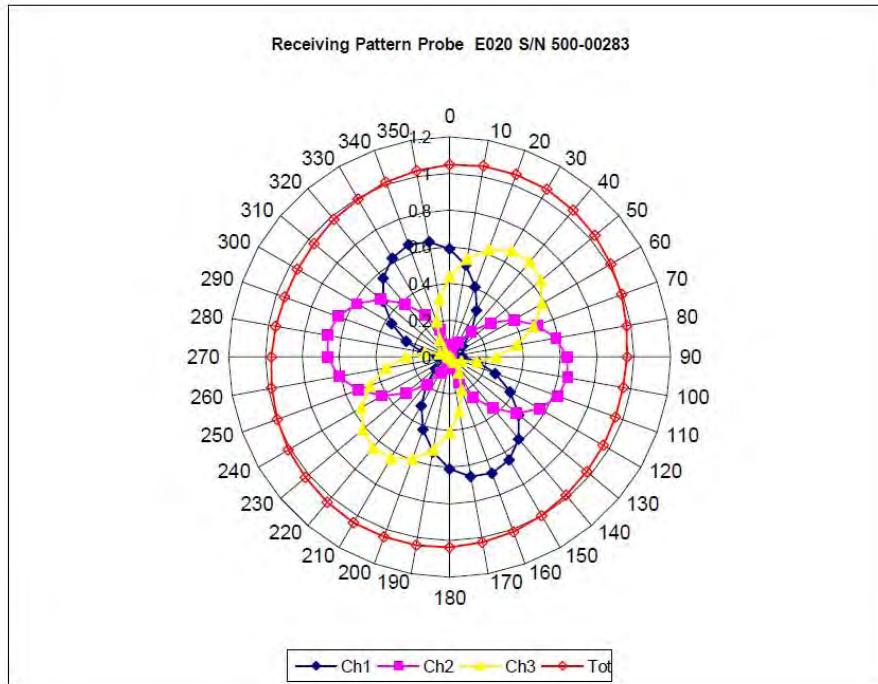
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Division of APREL Inc.

**Receiving Pattern Air**

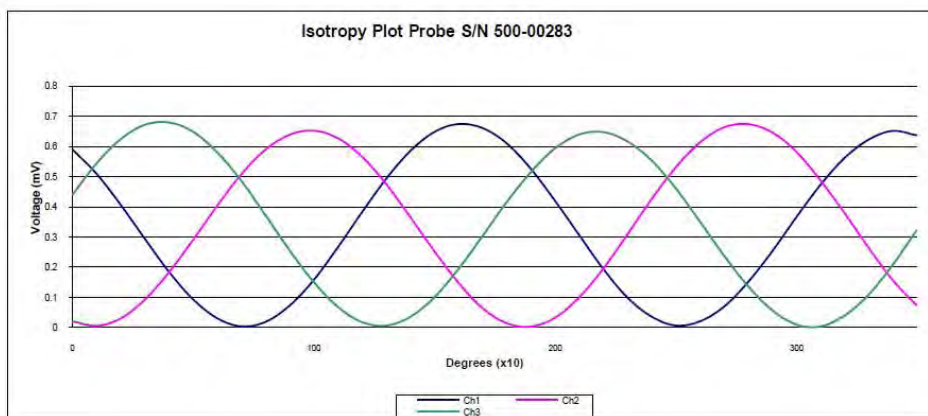
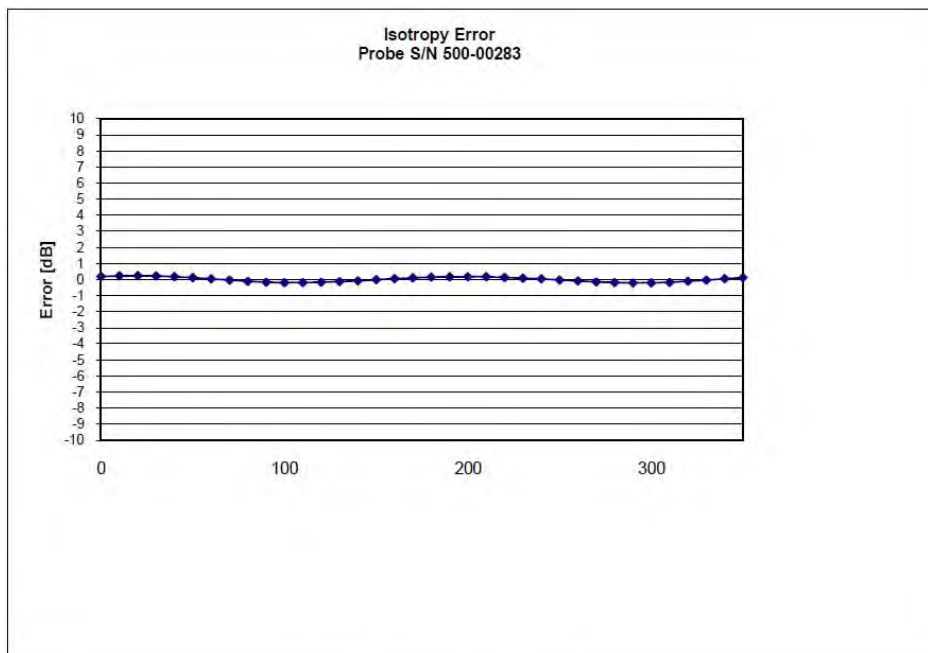




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**Isotropy Error Air**



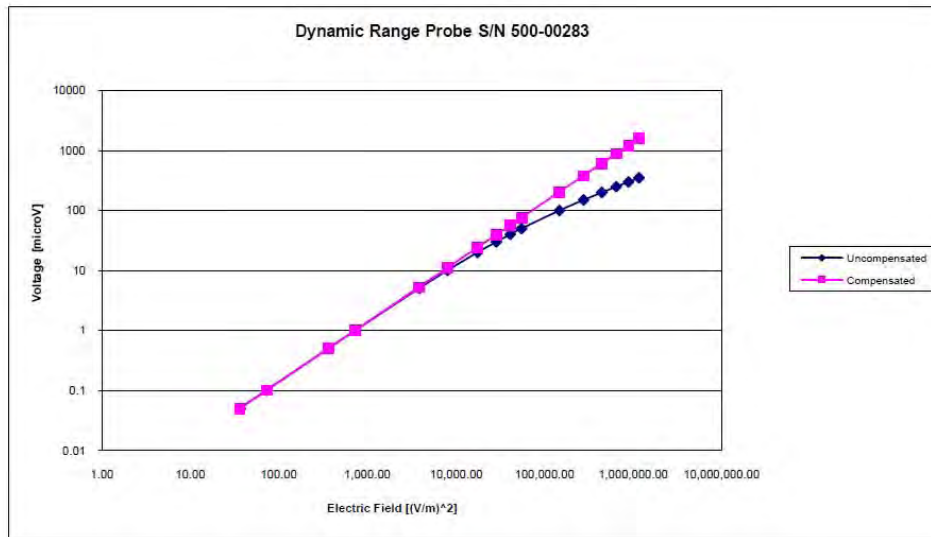
**Isotropicity Tissue:** 0.10 dB

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**Dynamic Range**



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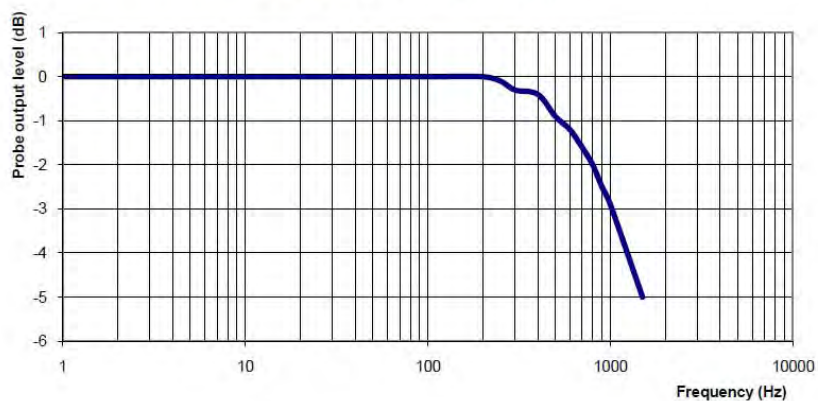
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**NCL Calibration Laboratories**

Division of APREL Inc.

**Video Bandwidth**

Probe Frequency Characteristics



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.

## 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: 25<sup>th</sup> August 2011  
Released on: 25<sup>th</sup> 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

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**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**

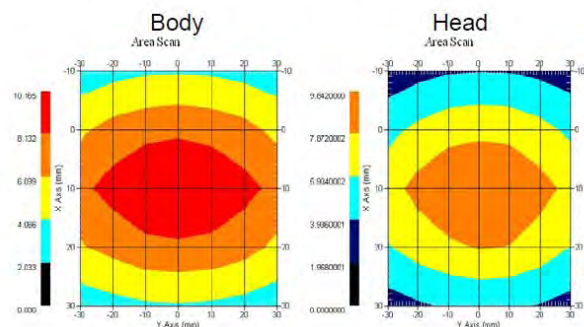
**Length:** 162.2 mm  
**Height:** 89.4 mm

**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.

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

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Division of APREL Laboratories.

**Dipole Calibration Results**

**Mechanical Verification**

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

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, $\epsilon_r$	Conductivity, $\sigma$ [S/m]
Head Tissue 835MHz	41.78	0.92
Body Tissue 835MHz	56.37	0.95

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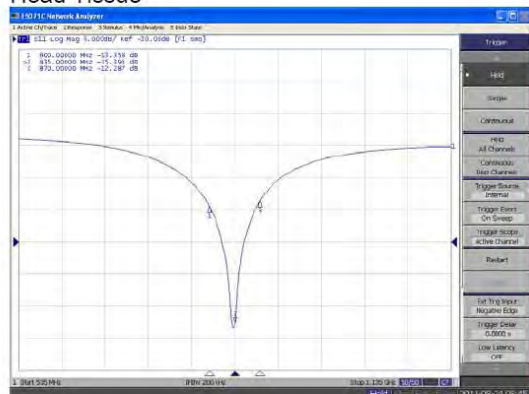
**NCL Calibration Laboratories**

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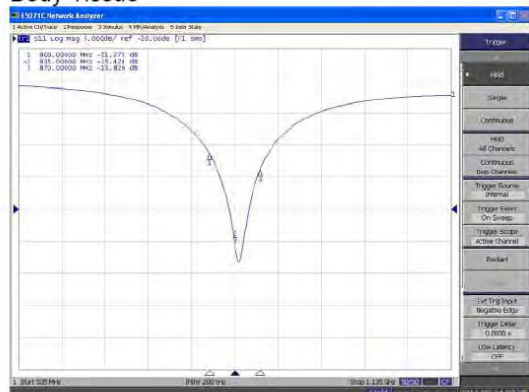
The Following Graphs are the results as displayed on the Vector Network Analyzer.

**S11 Parameter Return Loss**

**Head Tissue**



**Body Tissue**

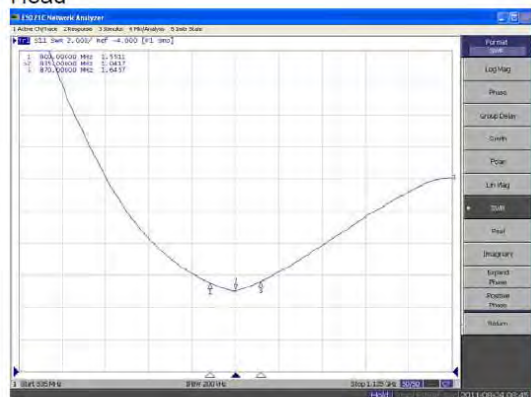


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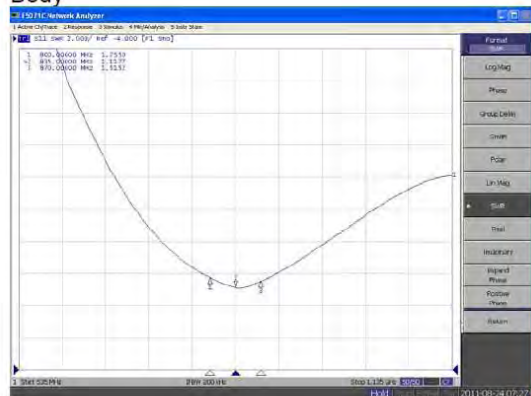
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**SWR  
Head**



**Body**



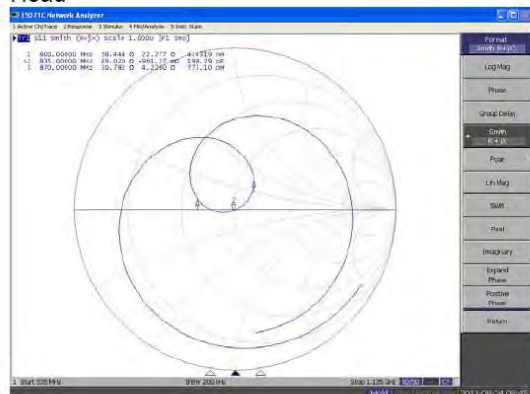
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**NCL Calibration Laboratories**

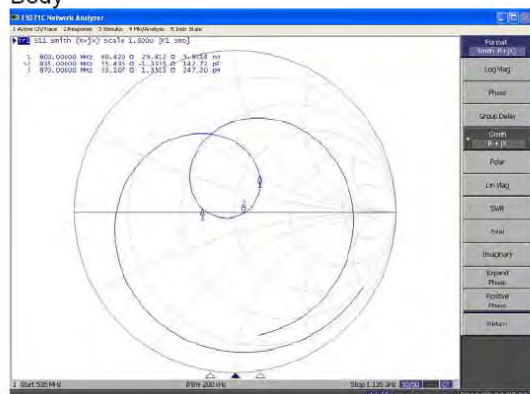
Division of APREL Laboratories.

**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.

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### 835MHz Dipole Calibration By BACL at 2012-12-12

#### Mechanical Verification

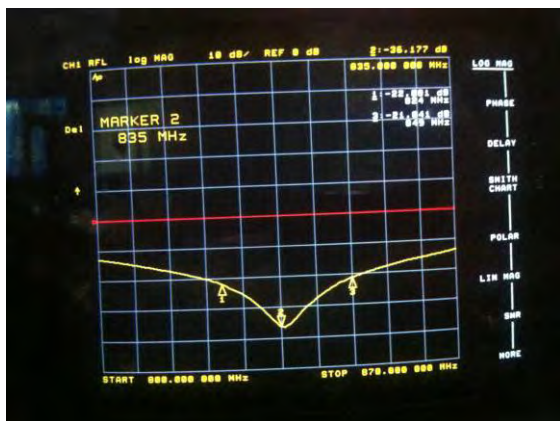
APREL Length	APREL Height	Measured Length	Measured Height
161.0 mm	89.8 mm	161.2 mm	89.5 mm

Tissue Type	Measured Return Loss	Measured Impedance
Head	-36.177 dB	50.207 $\Omega$
Body	-24.964 dB	49.594 $\Omega$

#### Test Graphs:

Head Tissue

Return Loss :

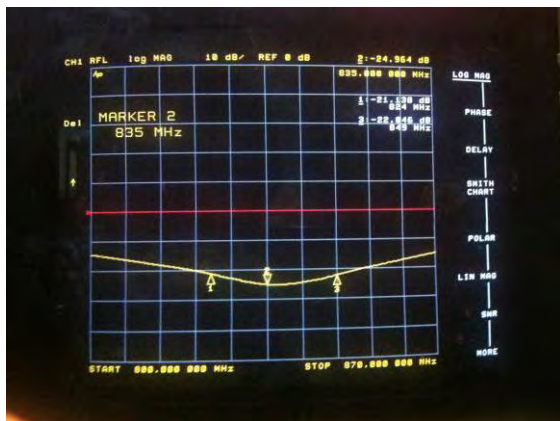


Impedance :



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)

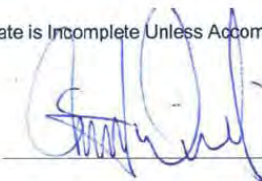
Manufacturer: APREL Laboratories  
Part number: ALS-D-1900-S-2  
Frequency: 1900 MHz  
Serial No: 210-00710

Customer: Bay Area Compliance Laboratory

Calibrated: 25<sup>th</sup> August, 2011  
Released on: 25<sup>th</sup> 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**

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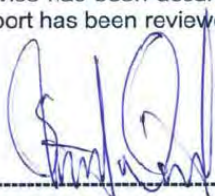
**Conditions**

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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**Calibration Results Summary**

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

**Mechanical Dimensions**

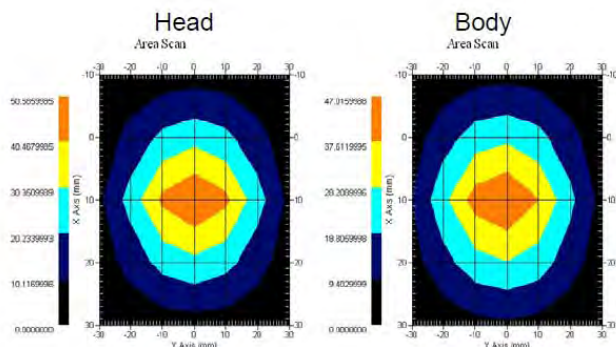
**Length:** 67.1 mm  
**Height:** 38.9 mm

**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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**NCL Calibration Laboratories**

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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.

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

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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, $\epsilon_r$	Conductivity, $\sigma$ [S/m]
Head Tissue 1900MHz	38.4	1.43
Body Tissue 1900MHz	51.87	1.59

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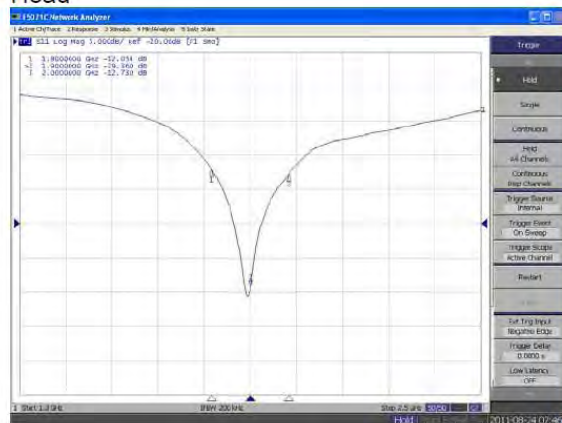
**NCL Calibration Laboratories**

Division of APREL Laboratories.

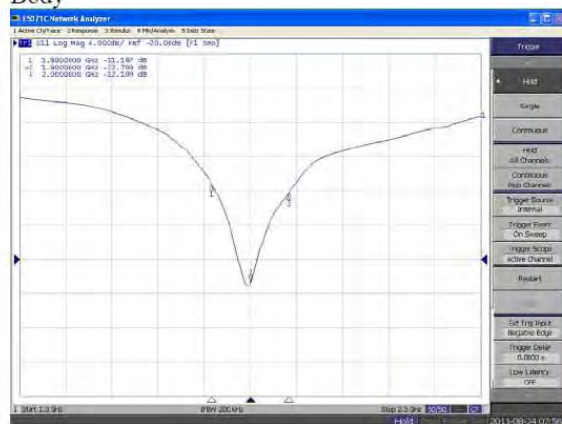
The Following Graphs are the results as displayed on the Vector Network Analyzer.

**S11 Parameter Return Loss**

Head



Body



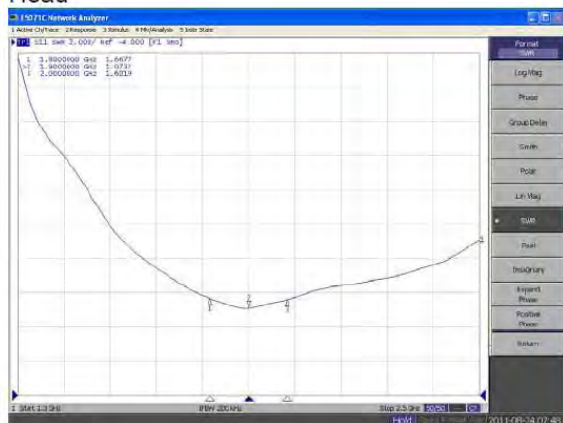
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**NCL Calibration Laboratories**

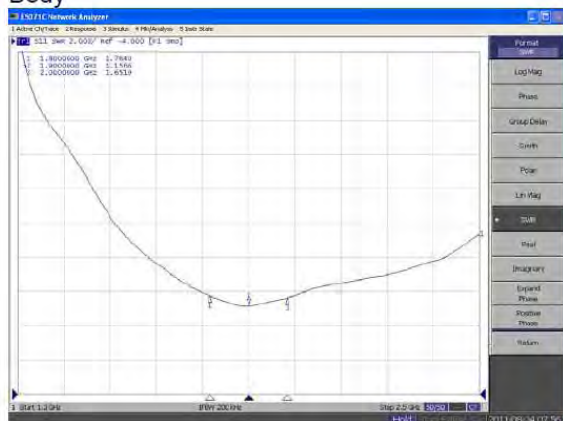
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**SWR**

**Head**



**Body**



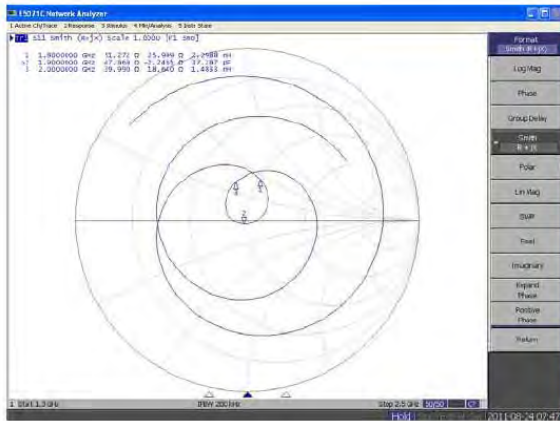
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**NCL Calibration Laboratories**

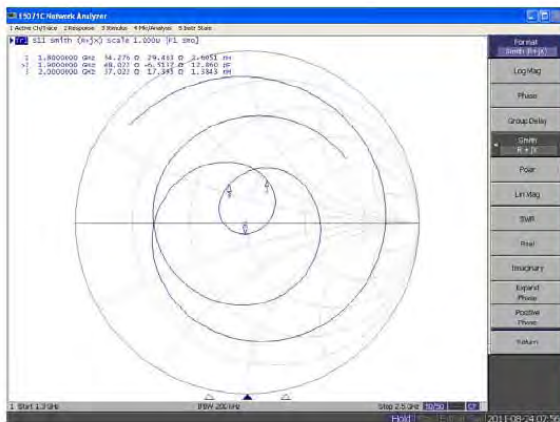
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**Smith Chart Dipole Impedance**

Head



Body



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**Test Equipment**

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### 1900MHz Dipole Calibration By BACL at 2012-12-12

#### Mechanical Verification

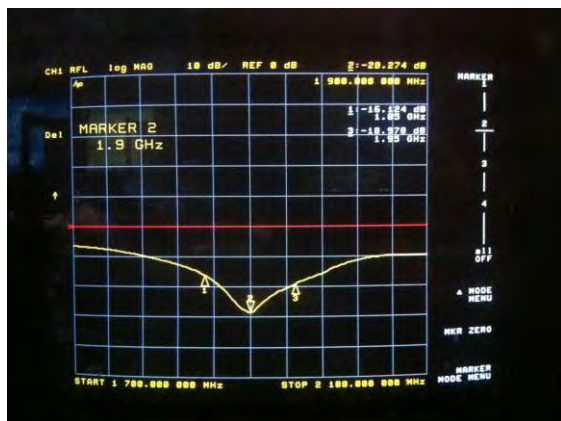
APREL Length	APREL Height	Measured Length	Measured Height
68.0 mm	39.5 mm	68.2 mm	39.2 mm

Tissue Type	Measured Return Loss	Measured Impedance
Head	-28.284 dB	49.471 Ω
Body	-22.445 dB	51.588 Ω

#### Test Graphs:

Head Tissue

Return Loss :

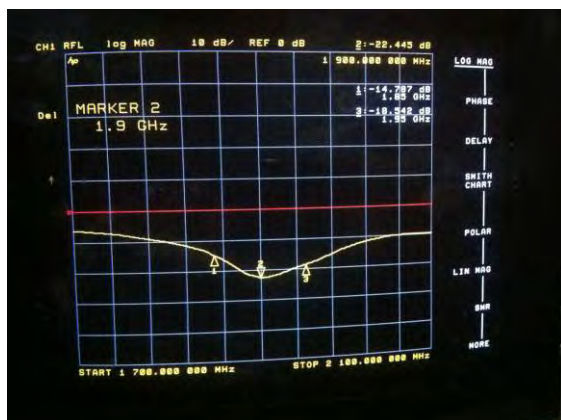


Impedance :



Body Tissue

Return Loss :

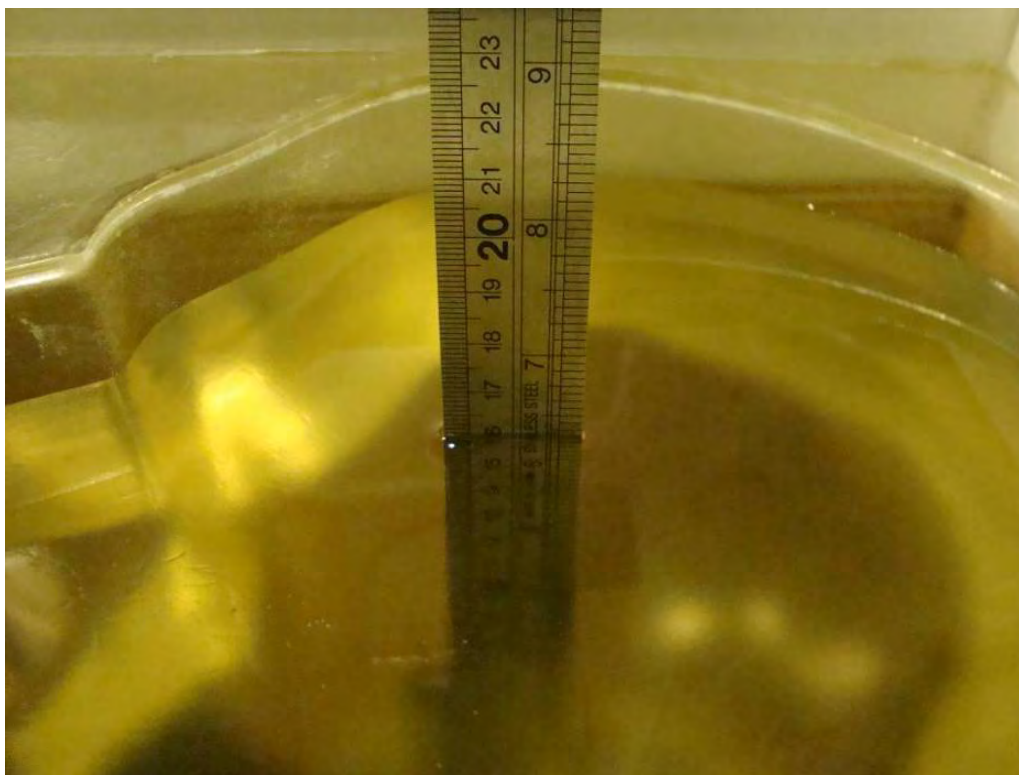


Impedance :

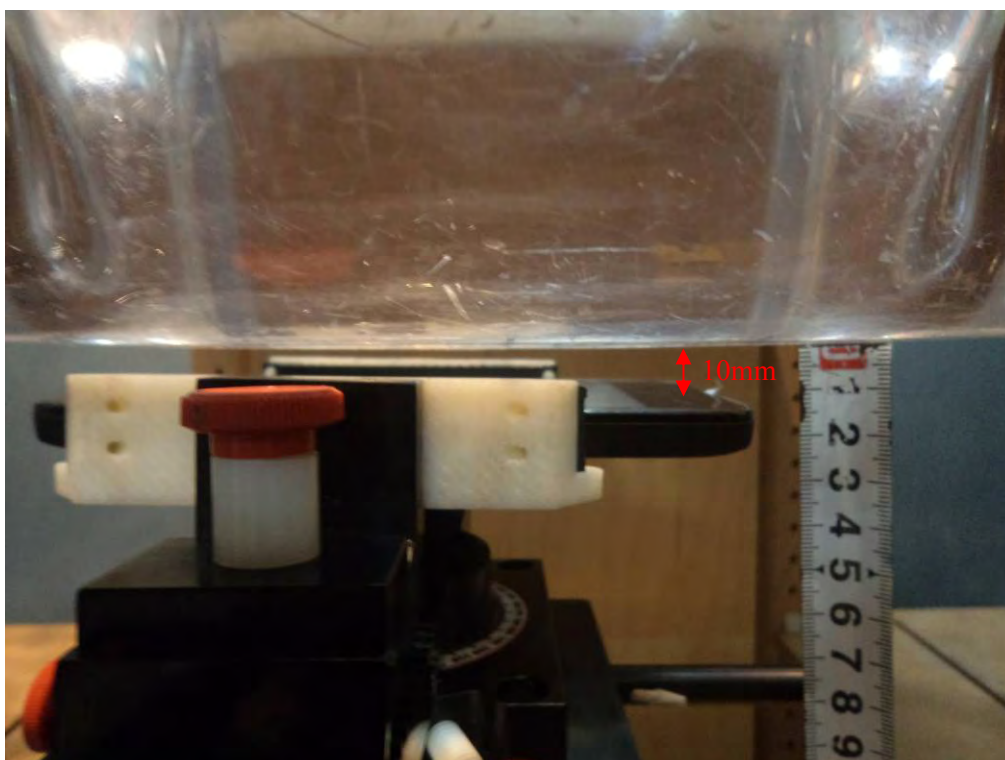


### APPENDIX D EUT TEST POSITION PHOTOS

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

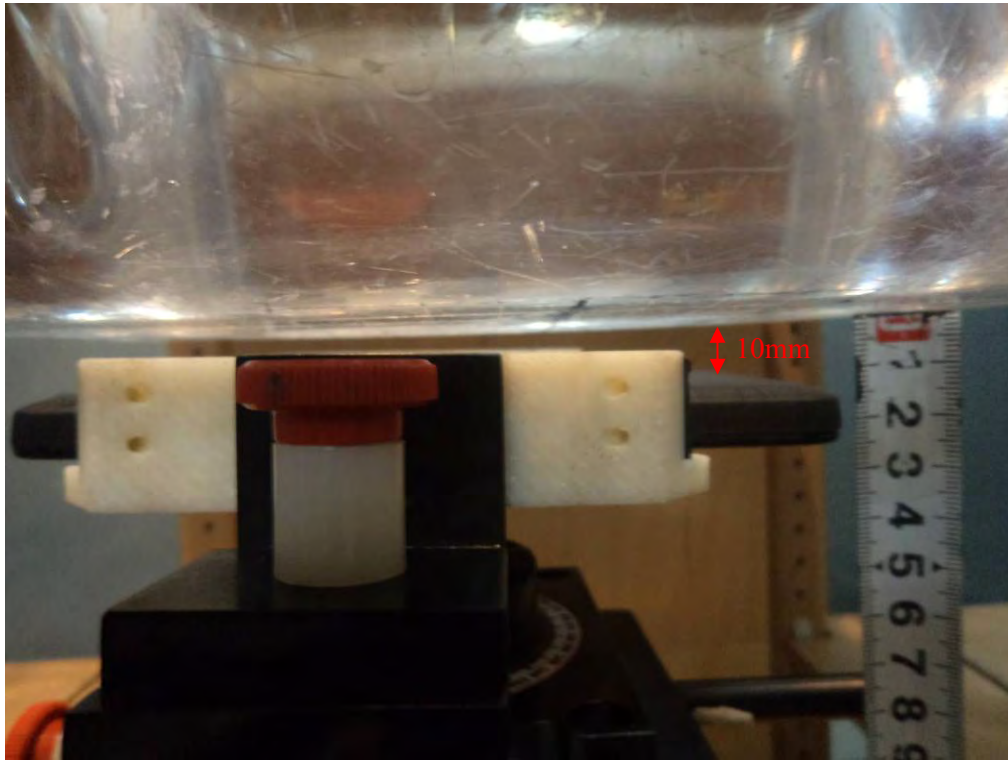


Body-worn Front Setup Photo

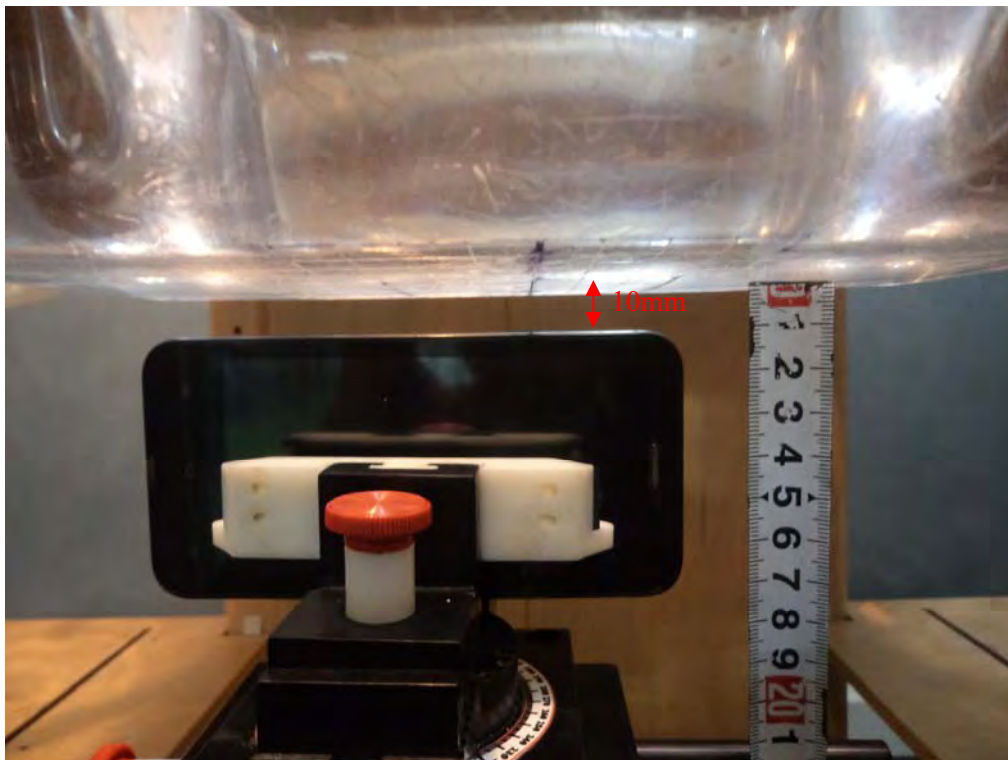




**Body-worn Back Setup Photo**



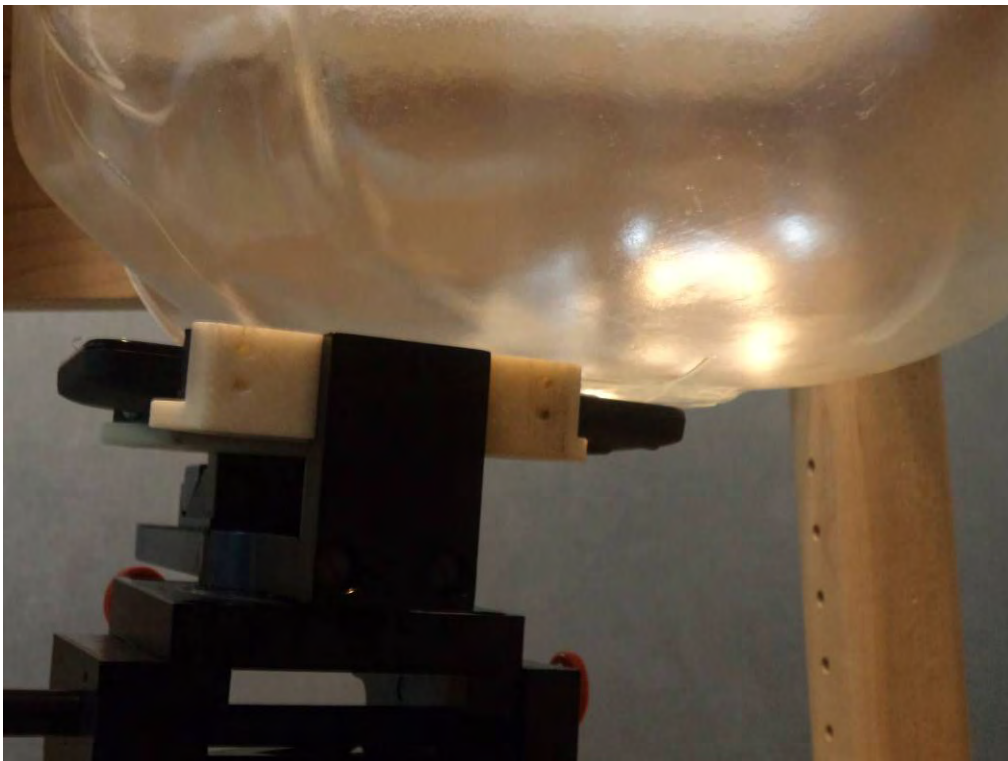
**Body-worn Left Setup Photo**



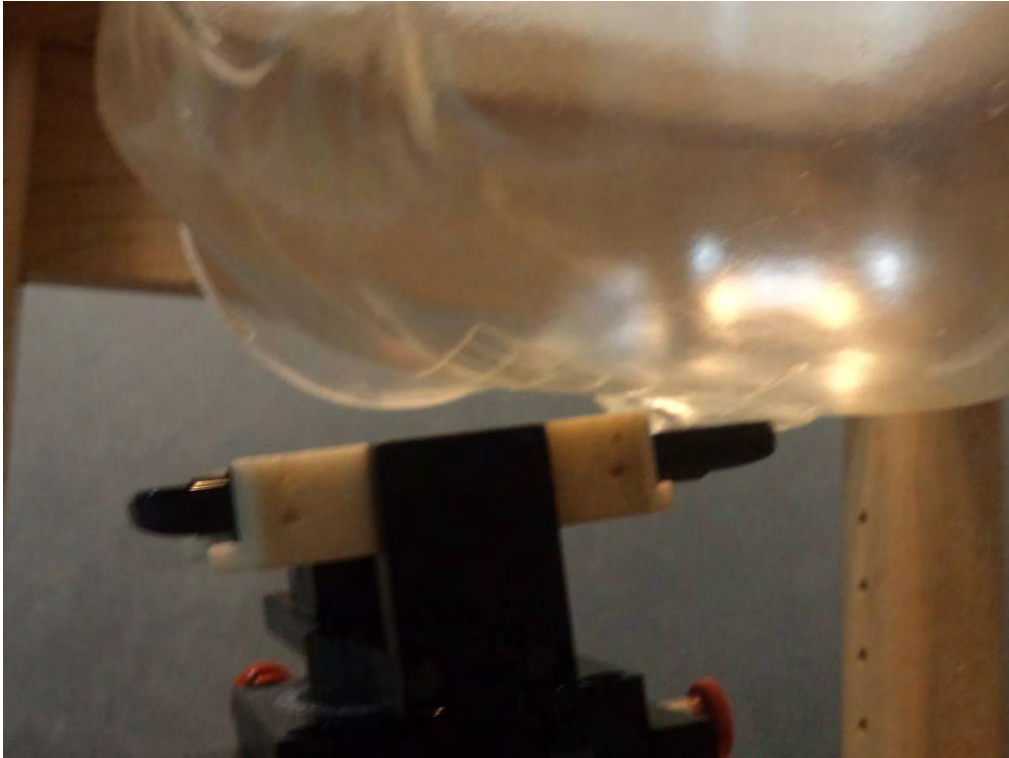
**Body-worn Bottom Setup Photo**



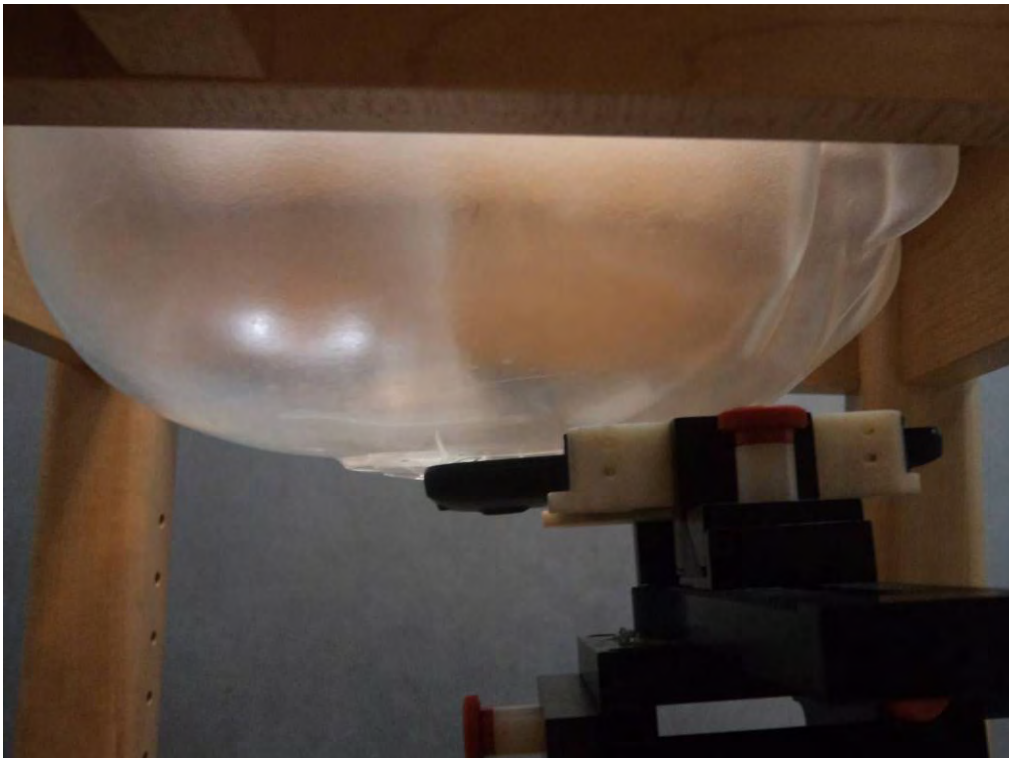
**Left Head Touch Setup Photo**



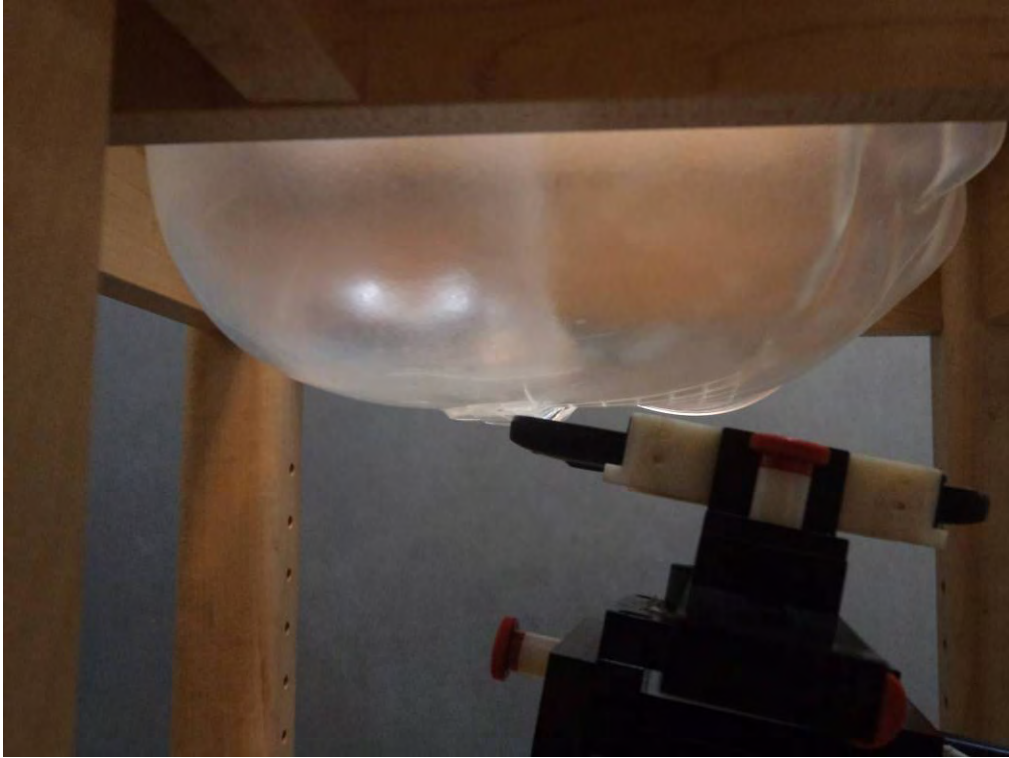
**Left Head Tilt Setup Photo**



**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**





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## APPENDIX F INFORMATIVE REFERENCES

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- [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, Office of Engineering & Technology, Washington, DC, 1997.
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- [4] Niels Kuster, Ralph Kastle, and Thomas Schmid, "Dosimetric evaluation of mobile communications equipment with known precision", IEEE Transactions on Communications, vol. E80-B, no. 5, pp. 645-652, May 1997.
- [5] CENELEC, "Considerations for evaluating of human exposure to electromagnetic fields (EMFs) from mobile telecommunication equipment (MTE) in the frequency range 30MHz - 6GHz", Tech. Rep., CENELEC, European Committee for Electrotechnical Standardization, Brussels, 1997.
- [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.
- [7] Katja Pokovic, Thomas Schmid, and Niels Kuster, "Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies", in ICECOM '97, Dubrovnik, October 15-17, 1997, pp. 120-24.
- [8] Katja Pokovic, Thomas Schmid, and Niels Kuster, "E-field probe with improved isotropy in brain simulating liquids", in Proceedings of the ELMAR, Zadar, Croatia, 23-25 June, 1996, pp. 172-175.
- [9] Volker Hombach, Klaus Meier, Michael Burkhardt, Eberhard Kuhn, and Niels Kuster, "The dependence of EM energy absorption upon human head modeling at 900 MHz", IEEE Transactions on Microwave Theory and Techniques, vol. 44, no. 10, pp. 1865-1873, Oct. 1996.
- [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 uncertainty in EMC measurement", Tech. Rep., NAMAS Executive, National Physical Laboratory, Teddington, Middlesex, England, 1994.
- [14] Barry N. Taylor and Christ E. Kuyatt, "Guidelines for evaluating and expressing the uncertainty of NIST measurement results", Tech. Rep., National Institute of Standards and Technology, 1994. Dosimetric Evaluation of Sample device, month 1998 10.

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