

SAR EVALUATION REPORT

For

ITALCOM GROUP

1728 Coral Way, Coral Gables, Miami, Florida, United States

FCC ID: YPVITALCOMFLY

Report Type: Original Report	Product Type: Mobile Phone
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Report Number: <u>RSZ130131001-20</u>	
Report Date: <u>2013-03-01</u>	
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* This report may contain data that are not covered by the NVLAP accreditation and shall be marked with an asterisk "★"

Attestation of Test Results		
EUT Information	Company Name	ITALCOM GROUP
	EUT Description	Mobile Phone
	FCC ID	YPVITALCOMFLY
	Model Number	fly
	Test Date	2013-02-25 to 2013-02-26
Frequency	Max. SAR Level(s) Measured	Limit(W/Kg)
Cellular Band	0.048 W/kg 1g Head SAR 0.335 W/kg 1g Body SAR	1.6
PCS Band	0.047 W/kg 1g Head SAR 0.904 W/kg 1g Body SAR	
WCDMA850	0.123 W/kg 1g Head SAR 0.108 W/kg 1g Body SAR	
WCDMA1900	0.351 W/kg 1g Head SAR 0.571W/kg 1g Body SAR	
WiFi(802.11b)	0.095 W/kg 1g Head SAR 0.188 W/kg 1g Body SAR	
Simultaneous SAR	1.040 W/kg 1g Body SAR	
Applicable Standards	ANSI / IEEE C95.1 : 2005 IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields,3 kHz to 300 GHz.	
	ANSI / IEEE C95.3 : 2002 IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to SuchFields,100 kHz—300 GHz.	
	OET BULLETIN 65 SUPPLEMENT C Evaluating Compliance with FCC Guidelines for Human Exposure To Radiofrequency Electromagnetic Fields	
	IEEE1528:2003 IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques	
<p>Note: This wireless device has been shown to be capable of compliance for localized specific absorption rate (SAR) for General Population/Uncontrolled Exposure limits specified in ANSI/IEEE Standards and has been tested in accordance with the measurement procedures specified in FCC OET 65 Supplement C and IEEE 1528-2003.</p> <p>The results and statements contained in this report pertain only to the device(s) evaluated.</p>		

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RSZ130131001-20	Original Report	2013-03-01

EUT DESCRIPTION

This report has been prepared on behalf of ITALCOM GROUP and their product, FCC ID: YPVITALCOMFLY, Model: fly or the EUT (Equipment Under Test) as referred to in the rest of this report. The EUT is a Mobile Phone.

Technical Specification

Product Type	Portable
Exposure Category:	Population / Uncontrolled
Antenna Type(s):	Internal Antenna
Body-Worn Accessories:	Headset
Face-Head Accessories:	None
Multi-slot Class:	Class12
Operation Mode :	GSM Voice, GPRS Data, EGPRS, WCDMA, Bluetooth4.0 and WiFi
Frequency Band:	Cellular Band : 824-849 MHz(TX) ; 869-894 MHz(RX) PCS Band : 1850-1910 MHz(TX) ; 1930-1990 MHz(RX) WCDMA850: 824-849MHz(TX); 869-894MHz(RX) WCDMA1900: 1850-1910MHz(TX); 1930-1990MHz(RX) WiFi(802.11b/g) : 2412MHz-2462MHz Bluetooth : 2402MHz-2480MHz
Conducted RF Power:	Cellular Band : 33.62dBm PCS Band : 30.17dBm WCDMA850:24.50dBm WCDMA1900:25.10dBm WiFi(802.11b/g) :16.37dBm Bluetooth: 7.35dBm
Dimensions (L*W*H):	151mm (L)× 82mm (W)× 12mm (H)
Weight:	216.5g
Power Source:	3.7 VDC/2500mAh Rechargeable Battery
Normal Operation:	Head and Body-worn

REFERENCE, STANDARDS, AND GUIDELINES

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 AND ACCREDITATION

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

Additionally, Bay Area Compliance Laboratories Corp. (Shenzhen) is a National Institute of Standards and Technology (NIST) accredited laboratory, under the National Voluntary Laboratory Accredited Program (Lab Code 200707-0).



The current scope of accreditations can be found at <http://ts.nist.gov/Standards/scopes/2007070.htm>

DESCRIPTION OF TEST SYSTEM

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

ALSAS-10U System Description

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

Applications

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

Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 10mm² step integral, with 1mm interpolation used to locate the peak SAR area used for zoom scan assessments.

Where the system identifies multiple SAR peaks (which are within 25% of peak value) the system will provide the user with the option of assessing each peak location individually for zoom scan averaging.

Zoom Scan (Cube Scan Averaging)

The averaging zoom scan volume utilized in the ALSAS-10U software is in the shape of a cube and the side dimension of a 1 g or 10 g mass is dependent on the density of the liquid representing the simulated tissue. A density of 1000 kg/m³ is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1 g cube is 10mm, with the side length of the 10 g cube 21,5mm.

When the cube intersects with the surface of the phantom, it is oriented so that 3 vertices touch the surface of the shell or the center of a face is tangent to the surface. The face of the cube closest to the surface is modified in order to conform to the tangent surface.

The zoom scan integer steps can be user defined so as to reduce uncertainty, but normal practice for typical test applications (including FCC) utilize a physical step of 5x5x8 (8mmx8mmx5mm) providing a volume of 32mm³ in the X & Y axis, and 35mm in the Z axis.



ALSAS-10U Interpolation and Extrapolation Uncertainty

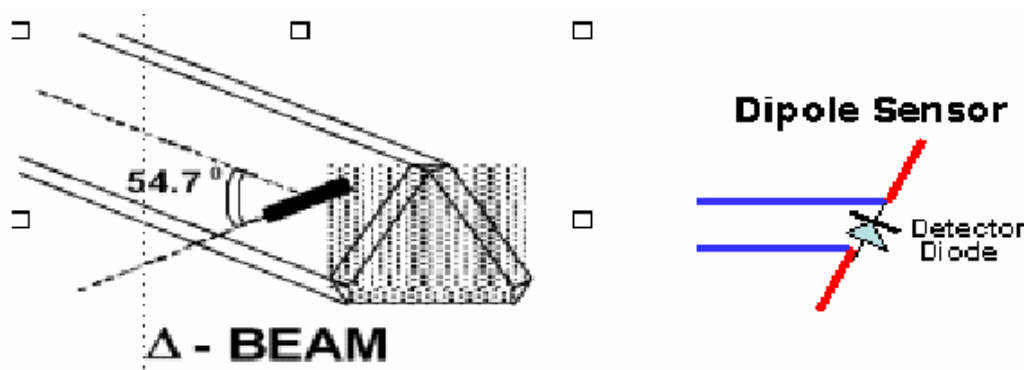
The overall uncertainty for the methodology and algorithms the used during the SAR calculation was evaluated using the data from IEEE 1528 based on the example f3 algorithm:

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

Isotropic E-Field Probe

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

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



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

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

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

Isotropic E-Field Probe Specification

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

Boundary Detection Unit and Probe Mounting Device

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

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

Daq-Paq (Analog to Digital Electronics)

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

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

Axis Articulated Robot

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



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

ALSAS Universal Workstation

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

Universal Device Positioner

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

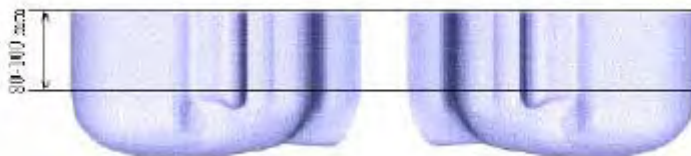


Phantom Types

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

APREL SAM Phantoms

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



APREL Laboratories Universal Phantom

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

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

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



Tissue Dielectric Parameters for Head and Body Phantoms

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

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

Recommended Tissue Dielectric Parameters for Head and Body

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

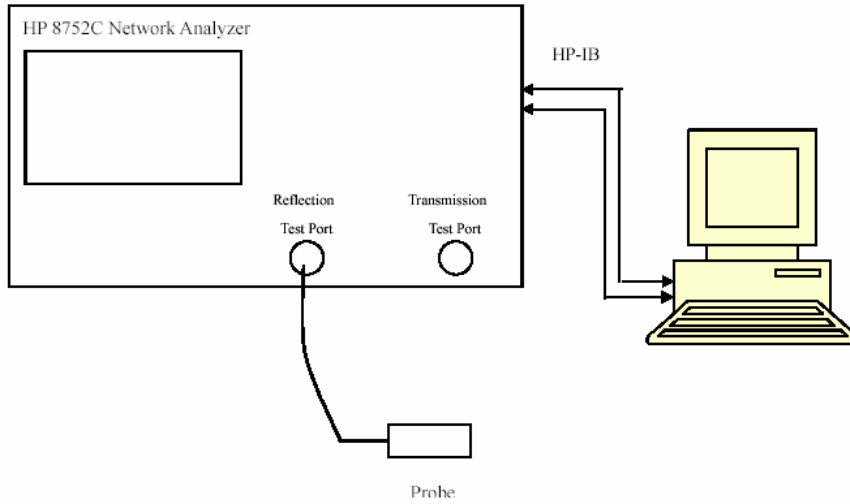
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Information

Equipment	Model	Calibration Date	S/N
CRS F3 robot	ALS-F3	N/A	RAF0805352
CRS F3 Software	ALS-F3-SW	N/A	N/A
CRS C500C controller	ALS-C500	N/A	RCF0805379
Probe mounting device & Boundary Detection Sensor System	ALS-PMDPS-3	N/A	120-00270
Universal Work Station	ALS-UWS	N/A	100-00157
Data Acquisition Package	ALS-DAQ-PAQ-3	2012-05-13	110-00212
Miniature E-Field Probe	ALS-E-020	2012-08-09	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,2450MHz	ALS-D-2450-S-2	2011-08-25	220-00758
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
Simulated Tissue 2450 MHz Head	ALS-TS-2450-H	Each Time	290-01108
Simulated Tissue 2450 MHz Body	ALS-TS-2450-B	Each Time	290-01109
Power Amplifier	5S1G4	N/A	71377
Synthesized Sweeper	HP 8341B	2012-05-17	2624A00116
UNIVERSAL RADIO COMMUNICATION TESTER	CMU 200	2012-05-28	1100.0008.02
EMI Test Receiver	ESCI	2012-08-08	101122

SAR MEASUREMENT SYSTEM VERIFICATION

Liquid Verification



Liquid Verification Setup Block Diagram

Liquid Verification Results

Frequency	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ϵ_r	O (S/m)	ϵ_r	O (S/m)	$\Delta\epsilon_r$	ΔO (S/m)	
824.2	Head	41.62	0.91	41.50	0.90	0.289	1.111	±5
	Body	55.13	0.95	55.20	0.97	-0.127	-2.062	±5
826.4	Head	41.51	0.91	41.50	0.90	0.024	1.111	±5
	Body	55.15	0.96	55.20	0.97	-0.091	-1.031	±5
836.6	Head	41.57	0.92	41.50	0.90	0.169	2.222	±5
	Body	55.21	0.97	55.20	0.97	0.018	0.000	±5
846.6	Head	41.43	0.93	41.50	0.90	-0.169	3.333	±5
	Body	55.27	0.98	55.20	0.97	0.127	1.031	±5
848.8	Head	41.35	0.94	41.50	0.90	-0.361	4.444	±5
	Body	55.29	0.99	55.20	0.97	0.163	2.062	±5
1850.2	Head	40.13	1.42	40.00	1.40	0.325	1.429	±5
	Body	53.10	1.49	53.30	1.52	-0.375	-1.974	±5
1852.4	Head	40.14	1.41	40.00	1.40	0.350	0.714	±5
	Body	53.36	1.49	53.30	1.52	0.113	-1.974	±5
1880.0	Head	40.14	1.44	40.00	1.40	0.350	2.857	±5
	Body	53.16	1.53	53.30	1.52	-0.263	0.658	±5
1907.6	Head	40.15	1.45	40.00	1.40	0.375	3.571	±5
	Body	53.12	1.55	53.30	1.52	-0.338	1.974	±5
1909.8	Head	40.15	1.45	40.00	1.40	0.375	3.571	±5
	Body	53.23	1.54	53.30	1.52	-0.131	1.316	±5
2412.0	Head	39.78	1.78	39.20	1.80	1.480	-1.111	±5
	Body	52.48	1.92	52.70	1.95	-0.417	-1.538	±5
2437.0	Head	39.84	1.80	39.20	1.80	1.633	0.000	±5
	Body	52.29	1.97	52.70	1.95	-0.778	1.026	±5
2462.0	Head	39.94	1.81	39.20	1.80	1.888	0.556	±5
	Body	52.12	2.00	52.70	1.95	-1.101	2.564	±5

*Liquid Verification was performed on 2013-02-25

Please refer to the following tables.

850 MHz Head				850 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
824.0	41.621991	19.808690		824.0	55.131154	20.715415
824.5	41.590962	19.809244		824.5	55.134291	20.614926
825.0	41.574302	19.809798		825.0	55.137424	20.627444
825.5	41.469162	19.810352		825.5	55.140567	20.639878
826.0	41.487520	19.810907		826.0	55.143705	20.774940
826.5	41.509413	19.811460		826.5	55.146843	20.838671
827.0	41.485900	19.812014		827.0	55.149981	20.753170
827.5	41.533221	19.812568		827.5	55.153119	20.631306
828.0	41.552827	19.813122		828.0	55.156257	20.665868
828.5	41.559253	19.813677		828.5	55.159395	20.623291
829.0	41.610184	19.814230		829.0	55.162533	20.727446
829.5	41.558677	19.814785		829.5	55.165671	20.670275
830.0	41.595045	19.815339		830.0	55.168809	20.548172
830.5	41.555074	19.815893		830.5	55.171947	20.612560
831.0	41.528072	19.816447		831.0	55.175085	20.597735
831.5	41.547627	19.817001		831.5	55.178223	20.805159
832.0	41.509445	19.817555		832.0	55.181361	20.782823
832.5	41.484269	19.818109		832.5	55.184499	20.559522
833.0	41.524805	19.818663		833.0	55.187637	20.492886
833.5	41.556224	19.819217		833.5	55.190775	20.604353
834.0	41.553649	19.819771		834.0	55.193913	20.756210
834.5	41.552229	19.820327		834.5	55.197051	20.649172
835.0	41.577058	19.820880		835.0	55.200189	20.592631
835.5	41.578058	19.821735		835.5	55.203327	20.840338
836.0	41.581658	19.822590		836.0	55.206465	20.847261
836.5	41.566690	19.823445		836.5	55.209603	20.705068
837.0	41.553487	19.824301		837.0	55.212741	20.532151
837.5	41.547694	19.825159		837.5	55.215879	20.568417
838.0	41.570867	19.826011		838.0	55.219017	20.852700
838.5	41.529397	19.826868		838.5	55.222155	20.867904
839.0	41.519328	19.827722		839.0	55.225293	20.789916
839.5	41.521798	19.828577		839.5	55.228431	20.724874
840.0	41.532865	19.829432		840.0	55.231569	20.792017
840.5	41.522227	19.830287		840.5	55.234706	20.837381
841.0	41.505499	19.831143		841.0	55.237844	20.792509
841.5	41.534941	19.831998		841.5	55.240982	20.729246
842.0	41.536643	19.832853		842.0	55.244120	20.905086
842.5	41.540339	19.833708		842.5	55.247258	20.873599
843.0	41.534434	19.824530		843.0	55.250396	20.833997
843.5	41.458137	19.825381		843.5	55.253534	20.789508
844.0	41.534389	19.826237		844.0	55.256672	20.807166
844.5	41.488680	19.827091		844.5	55.259810	20.833073
845.0	41.414698	19.827950		845.0	55.262948	20.742491
845.5	41.430000	19.828802		845.5	55.266086	20.688877
846.0	41.384583	19.849733		846.0	55.269224	20.861878
846.5	41.425522	19.850588		846.5	55.272362	20.923282
847.0	41.405791	19.851444		847.0	55.275500	20.872141
847.5	41.408975	19.852299		847.5	55.278638	20.792442
848.0	41.382577	19.853154		848.0	55.281776	20.882599
848.5	41.387172	19.854009		848.5	55.284914	20.960683
849.0	41.347440	19.854864		849.0	55.288052	20.960865

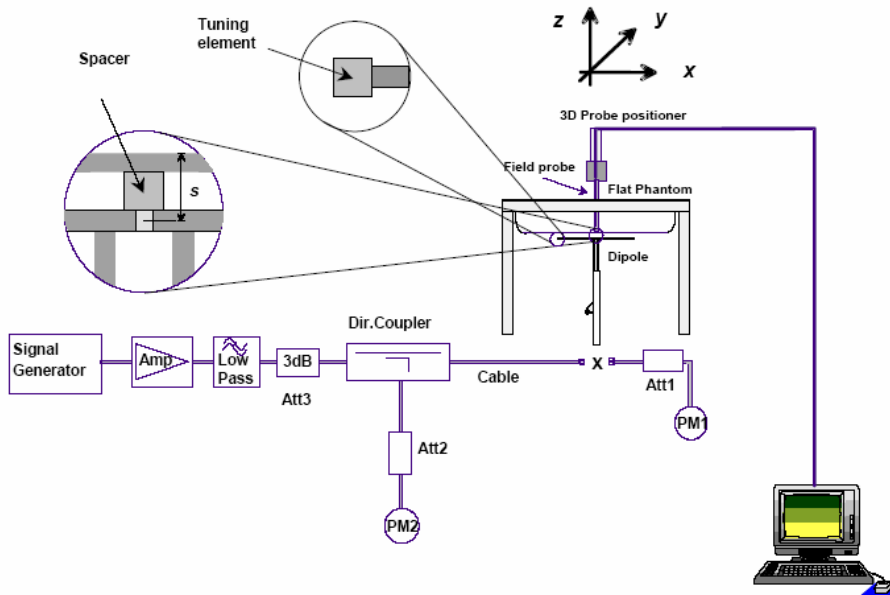
1900 MHz Head				1900 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
1850.0	40.133731	13.762203		1850.0	53.095417	14.340296
1851.2	40.135959	13.732227		1851.2	53.337436	14.347293
1852.4	40.136211	13.699508		1852.4	53.35628	14.352295
1853.6	40.136458	13.722879		1853.6	53.332863	14.357292
1854.8	40.136706	13.716835		1854.8	53.235699	14.362295
1856.0	40.136955	13.640948		1856.0	53.338722	14.367300
1857.2	40.137204	13.780806		1857.2	53.331893	14.372295
1858.4	40.137456	13.677008		1858.4	53.313907	14.377295
1859.6	40.137703	13.730945		1859.6	53.295578	14.382294
1860.8	40.137953	13.732265		1860.8	53.191369	14.387292
1862.0	40.138201	13.748807		1862.0	53.219045	14.392299
1863.2	40.138451	13.771237		1863.2	53.165026	14.417295
1864.4	40.138700	13.806225		1864.4	53.199778	14.424298
1865.6	40.138949	13.800794		1865.6	53.206251	14.431295
1866.8	40.139198	13.789611		1866.8	53.281261	14.438294
1868.0	40.139497	13.808118		1868.0	53.349705	14.445295
1869.2	40.139696	13.868878		1869.2	53.358767	14.452294
1870.4	40.139948	13.861619		1870.4	53.272265	14.459293
1871.6	40.140195	13.835549		1871.6	53.214645	14.466300
1872.8	40.140444	13.865604		1872.8	53.253079	14.473295
1874.0	40.140693	13.808257		1874.0	53.179544	14.480292
1875.2	40.140943	13.842320		1875.2	53.242707	14.487292
1876.4	40.141202	13.840287		1876.4	53.145822	14.494294
1877.6	40.141441	13.904787		1877.6	53.248105	14.501299
1878.8	40.141690	13.800390		1878.8	53.275892	14.508294
1880.0	40.141939	13.745613		1880.0	53.158213	14.515294
1881.2	40.142188	13.794353		1881.2	53.116453	14.522299
1882.4	40.142439	13.816951		1882.4	53.211995	14.529298
1883.6	40.142687	13.785724		1883.6	53.177496	14.536298
1884.8	40.142936	13.786302		1884.8	53.202393	14.543294
1886.0	40.143185	13.785628		1886.0	53.237604	14.550293
1887.2	40.143434	13.780775		1887.2	53.218379	14.557292
1888.4	40.143685	13.775857		1888.4	53.308156	14.561291
1889.6	40.143932	13.771078		1889.6	53.238647	14.565294
1890.8	40.144182	13.766231		1890.8	53.284322	14.569297
1892.0	40.144430	13.761387		1892.0	53.272286	14.573296
1893.2	40.144680	13.756537		1893.2	53.244738	14.577295
1894.4	40.144930	13.751690		1894.4	53.217376	14.581293
1895.6	40.145178	13.746843		1895.6	53.210224	14.585293
1896.8	40.145427	13.741996		1896.8	53.200125	14.589294
1898.0	40.145677	13.737149		1898.0	53.200455	14.593293
1899.2	40.145926	13.732302		1899.2	53.277456	14.597292
1900.4	40.146177	13.727455		1900.4	53.242372	14.601293
1901.6	40.146424	13.722608		1901.6	53.245855	14.605297
1902.8	40.146695	13.717761		1902.8	53.214946	14.609293
1904.0	40.146922	13.712923		1904.0	53.296657	14.613293
1905.2	40.147172	13.708067		1905.2	53.208414	14.617300
1906.4	40.147432	13.703220		1906.4	53.198326	14.621293
1907.6	40.147670	13.698373		1907.6	53.124006	14.625298
1908.8	40.147919	13.693526		1908.8	53.208286	14.629293
1910.0	40.148170	13.688679		1910.0	53.234809	14.633296

2450 MHz Head			2450 MHz Body		
Frequency (MHz)	e'	e''	Frequency (MHz)	e'	e''
2410	39.779145	13.247474	2410	52.501037	14.743414
2411	39.778146	13.247672	2411	52.492007	14.750411
2412	39.776148	13.247870	2412	52.482995	14.755413
2413	39.774150	13.248068	2413	52.473986	14.760410
2414	39.775149	13.248266	2414	52.464975	14.765413
2415	39.776148	13.248464	2415	52.455972	14.770418
2416	39.777147	13.248662	2416	52.446963	14.775413
2417	39.778146	13.248860	2417	52.437948	14.780413
2418	39.779145	13.249058	2418	52.428940	14.785412
2419	39.783141	13.249256	2419	52.419931	14.790410
2420	39.787137	13.249454	2420	52.410936	14.795417
2421	39.791133	13.249652	2421	52.401905	14.820413
2422	39.795129	13.249850	2422	52.394896	14.827416
2423	39.799125	13.250048	2423	52.387888	14.834413
2424	39.803121	13.250246	2424	52.380880	14.841412
2425	39.807117	13.250444	2425	52.373873	14.848413
2426	39.811113	13.250642	2426	52.366865	14.855412
2427	39.815109	13.250840	2427	52.359857	14.862411
2428	39.819105	13.251038	2428	52.352849	14.869418
2429	39.823101	13.251236	2429	52.345842	14.876413
2430	39.824100	13.251434	2430	52.338838	14.883410
2431	39.825099	13.251632	2431	52.331826	14.890410
2432	39.826098	13.251830	2432	52.324818	14.897412
2433	39.827097	13.252028	2433	52.317810	14.904417
2434	39.828096	13.252226	2434	52.310803	14.911412
2435	39.829095	13.252424	2435	52.303795	14.918412
2436	39.832092	13.252622	2436	52.296787	14.925417
2437	39.835089	13.252820	2437	52.289779	14.932416
2438	39.838086	13.253018	2438	52.282771	14.939416
2439	39.841083	13.253216	2439	52.275769	14.946412
2440	39.844080	13.253414	2440	52.268756	14.953411
2441	39.847077	13.253612	2441	52.261748	14.960410
2442	39.852072	13.253810	2442	52.254740	14.964409
2443	39.857067	13.254008	2443	52.247733	14.968412
2444	39.862062	13.254206	2444	52.240725	14.972415
2445	39.867057	13.254404	2445	52.233717	14.976414
2446	39.872052	13.254602	2446	52.226709	14.980413
2447	39.877047	13.254800	2447	52.219701	14.984411
2448	39.882042	13.254998	2448	52.212698	14.988411
2449	39.887037	13.255196	2449	52.205686	14.992412
2450	39.892032	13.255394	2450	52.198678	14.996411
2451	39.897027	13.255592	2451	52.191670	15.000410
2452	39.902022	13.255790	2452	52.184662	15.004411
2453	39.907017	13.255988	2453	52.177655	15.008415
2454	39.911013	13.256186	2454	52.170647	15.012411
2455	39.915009	13.256384	2455	52.163639	15.016411
2456	39.919005	13.256582	2456	52.156631	15.020418
2457	39.923001	13.256780	2457	52.149625	15.024411
2458	39.926997	13.256978	2458	52.142616	15.028416
2459	39.930993	13.257176	2459	52.135608	15.032411
2460	39.934989	13.257374	2460	52.128600	15.036414
2461	39.938985	13.257572	2461	52.121592	15.040409
2462	39.942981	13.257770	2462	52.121592	15.040409

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	2012-08-09	2013-08-08
APREL	Dipole antenna(835MHz)	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
APREL	Dipole antenna(2450MHz)	ALS-D-2450-S-2	220-00758	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 (%)	
2013-02-25	835	Head	1g	9.824	9.590	2.440	± 10
		Body	1g	9.581	9.684	-1.064	± 10
	1900	Head	1g	40.329	39.648	1.718	± 10
		Body	1g	39.897	39.769	0.322	± 10
	2450	Head	1g	53.314	52.667	1.228	± 10
		Body	1g	52.637	52.561	0.145	± 10

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

SAR SYSTEM VALIDATION DATA**Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)****System Performance Check 835 MHz Head Liquid****Dipole 835 MHz; Type: ALS-D-835-S-2; S/N: 180-00558**

Product Data

Device Name : Dipole 835 MHz
 Serial No. : 180-00558
 Type : Dipole
 Model : ALS-D-835-S-2
 Frequency Band : 835
 Max. Transmit Pwr : 1 W
 Drift Time : 3 min(s)
 Power Drift-Start : 10.204 W/kg
 Power Drift-Finish : 10.392W/kg
 Power Drift (%) : 1.759

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 : 25-Feb-2013
 Temperature : 20.00 °C
 Ambient Temp. : 21.00 °C
 Humidity : 56.00 RH%
 Epsilon : 41.58 F/m
 Sigma : 0.92 S/m
 Density : 1000.00 kg/cu. m

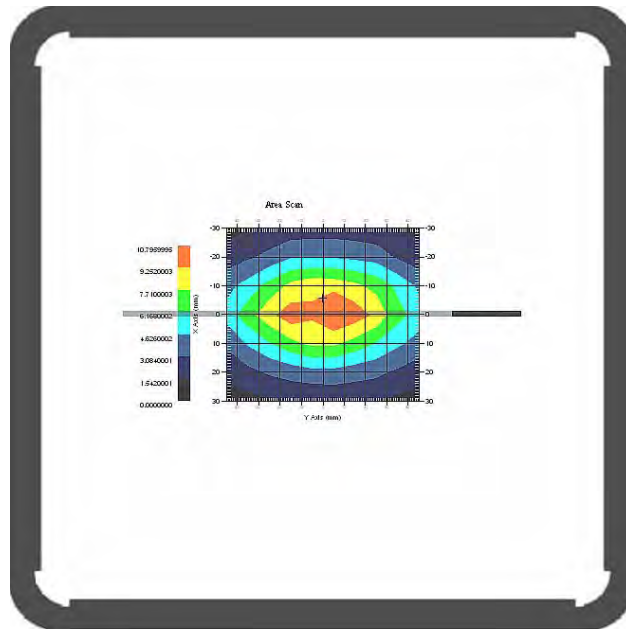
Probe Data

Name : E-Field
 Model : E-020
 Type : E-Field Triangle
 Serial No. : 500-00283
 Last Calib. Date : 09-Aug-2012
 Frequency Band : 835
 Duty Cycle Factor : 1
 Conversion Factor : 6.6
 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 : 7x15x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm

1 gram SAR value : 9.824 W/kg
10 gram SAR value : 5.937 W/kg
Area Scan Peak SAR : 10.796 W/kg
Zoom Scan Peak SAR : 17.089 W/kg



835 MHz System Validation with Head Tissue

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**System Performance Check 835MHz 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 : 9.684 W/kg
Power Drift-Finish : 9.471 W/kg
Power Drift (%) : -2.109

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 : 25-Feb-2013
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 55.20 F/m
Sigma : 0.96 S/m
Density : 1000.00 kg/cu. m

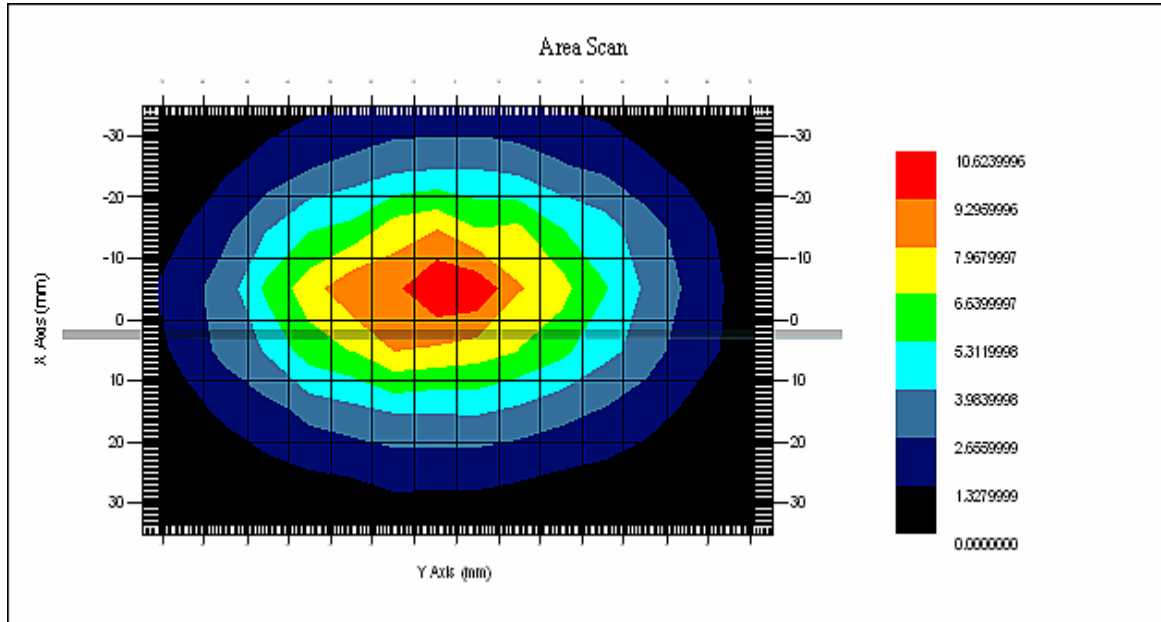
Probe Data

Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 09-Aug-2012
Frequency Band : 835
Duty Cycle Factor : 1
Conversion Factor : 6.6
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 : 8x16x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm

1 gram SAR value : 9.581 W/kg
 10 gram SAR value : 6.017 W/kg
 Area Scan Peak SAR : 10.624 W/kg
 Zoom Scan Peak SAR : 15.925 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 : 44.055 W/kg
Power Drift-Finish : 43.524 W/kg
Power Drift (%) : -1.523

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 : 25-Feb-2013
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 40.15 F/m
Sigma : 1.45 S/m
Density : 1000.00 kg/cu. M

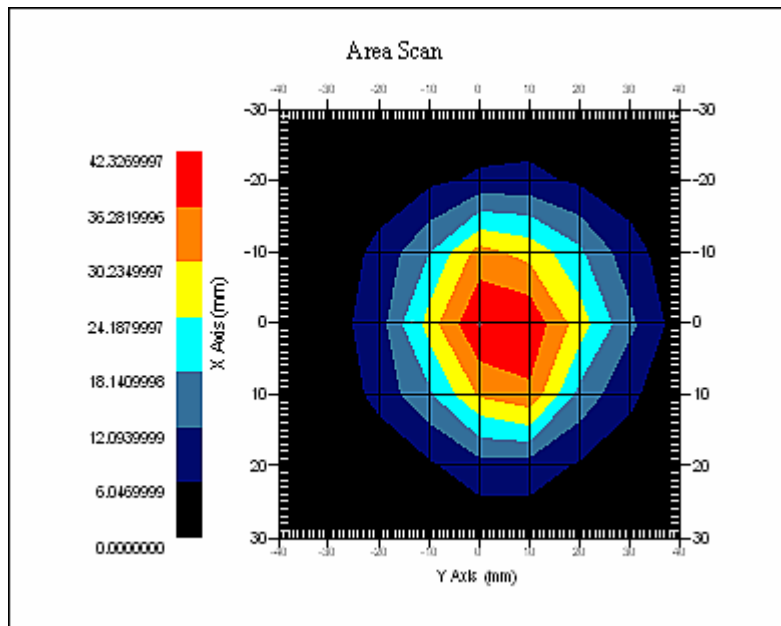
Probe Data

Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 09-Aug-2012
Frequency Band : 1900
Duty Cycle Factor : 1
Conversion Factor : 5.20
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 : 40.329 W/kg
 10 gram SAR value : 22.192 W/kg
 Area Scan Peak SAR : 42.327 W/kg
 Zoom Scan Peak SAR : 88.621 W/kg



1900 MHz System Validation with Head Tissue

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**System Performance Check 1900 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 : 43.055 W/kg
Power Drift-Finish : 43.875 W/kg
Power Drift (%) : 1.895

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 : 25-Feb-2013
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 53.24 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

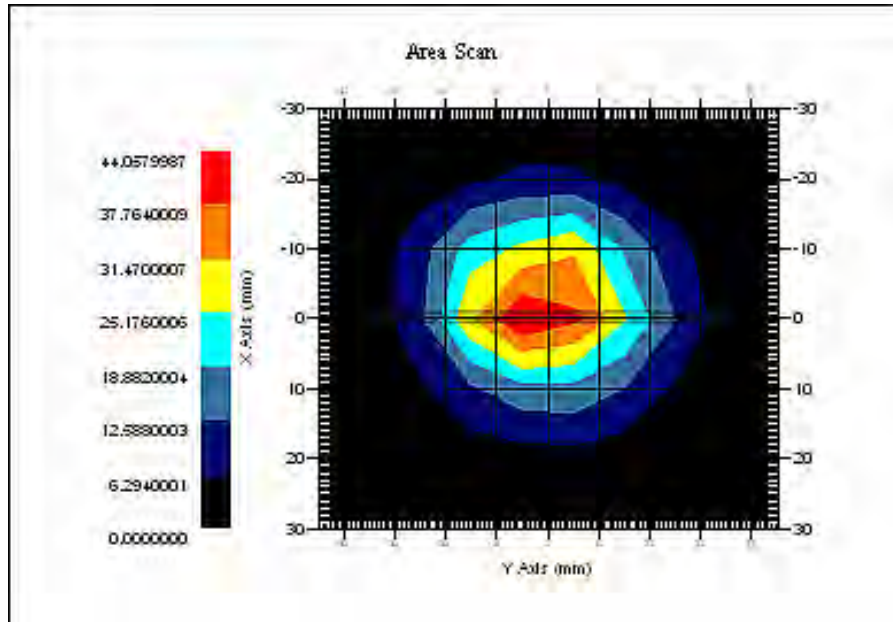
Probe Data

Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 09-Aug-2012
Frequency Band : 1900
Duty Cycle Factor : 1
Conversion Factor : 5.0
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 : 39.897 W/kg
 10 gram SAR value : 22.033 W/kg
 Area Scan Peak SAR : 44.058 W/kg
 Zoom Scan Peak SAR : 93.055 W/kg



1900 MHz System Validation with Body Tissue

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**System Performance Check 2450 MHz Head Liquid****Dipole 2450 MHz; Type: ALS-D-2450-S-2; S/N: 220-00758**

Product Data

Device Name : Dipole 2450MHz
Serial No. : 220-00758
Type : Dipole
Model : ALS-D-2450-S-2
Frequency Band : 2450
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 50.251 W/kg
Power Drift-Finish : 50.785 W/kg
Power Drift (%) : 1.102

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. : 290-01109
Frequency : 2450.00 MHz
Last Calib. Date : 25-Feb-2013
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 50.00 RH%
Epsilon : 39.89 F/m
Sigma : 1.81 S/m
Density : 1000.00 kg/cu. M

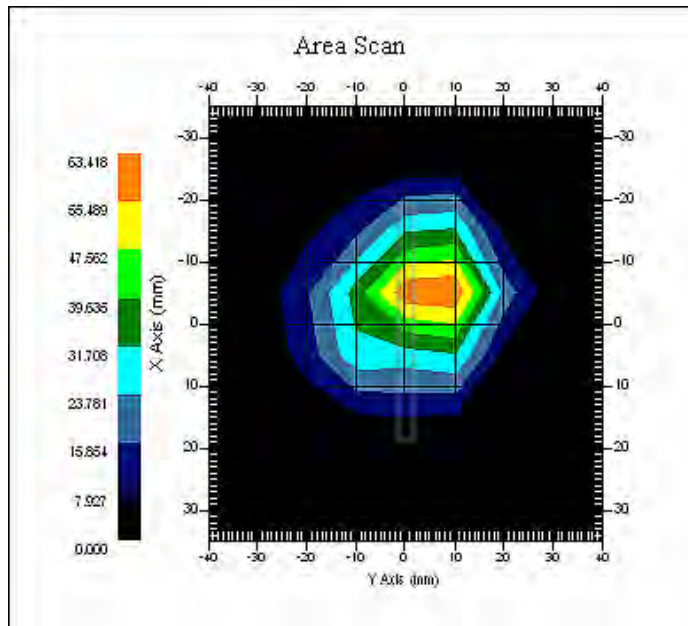
Probe Data

Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 09-Aug-2012
Frequency Band : 2450
Duty Cycle Factor : 1
Conversion Factor : 4.3
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 : 8x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm

1 gram SAR value : 53.314 W/kg
10 gram SAR value : 26.021 W/kg
Area Scan Peak SAR : 63.416 W/kg
Zoom Scan Peak SAR : 100.255 W/kg



2450 MHz System Validation with Head Tissue

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**System Performance Check 2450 MHz Body Liquid****Dipole 2450 MHz; Type: ALS-D-2450-S-2; S/N: 220-00758**

Product Data

Device Name : Dipole 2450MHz
Serial No. : 220-00758
Type : Dipole
Model : ALS-D-2450-S-2
Frequency Band : 2450
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 52.065 W/kg
Power Drift-Finish : 51.021 W/kg
Power Drift (%) : -1.907

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. : 290-01109
Frequency : 2450.00 MHz
Last Calib. Date : 25-Feb-2013
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 50.00 RH%
Epsilon : 52.20 F/m
Sigma : 2.04 S/m
Density : 1000.00 kg/cu. M

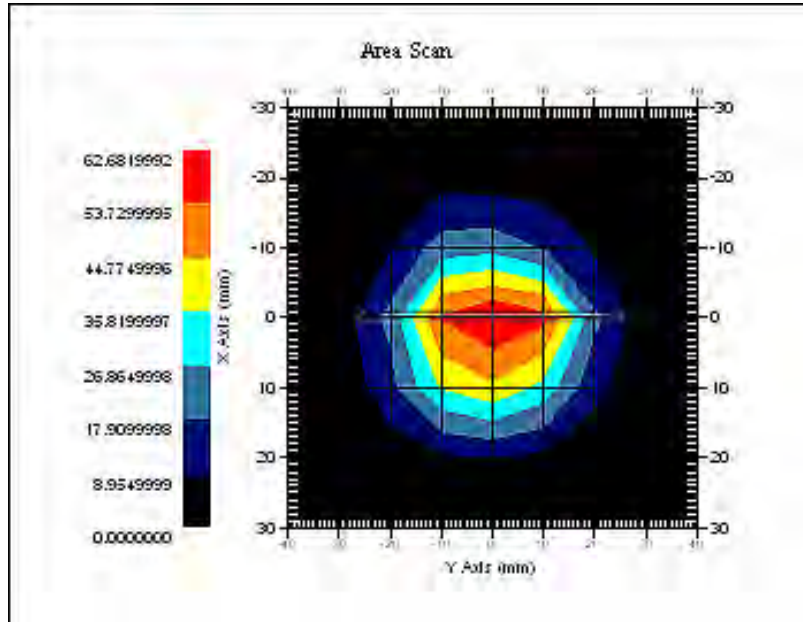
Probe Data

Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 09-Aug-2012
Frequency Band : 2450
Duty Cycle Factor : 1
Conversion Factor : 4.3
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 : 8x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm

1 gram SAR value : 52.637 W/kg
 10 gram SAR value : 24.928 W/kg
 Area Scan Peak SAR : 62.682 W/kg
 Zoom Scan Peak SAR : 102.980 W/kg



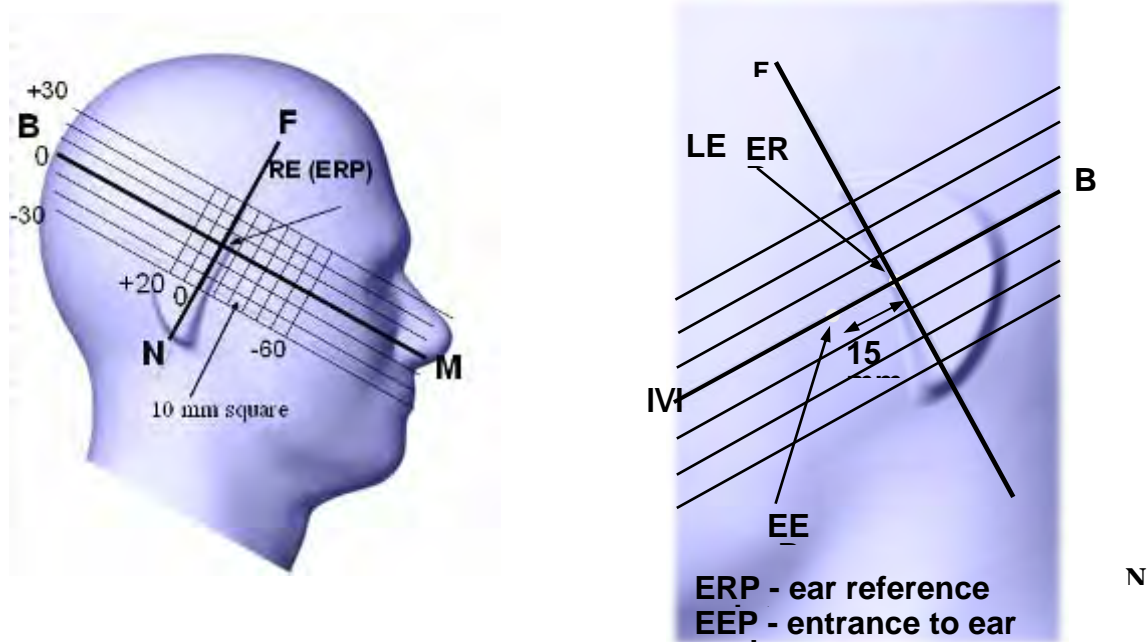
2450 MHz System Validation with Body Tissue

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

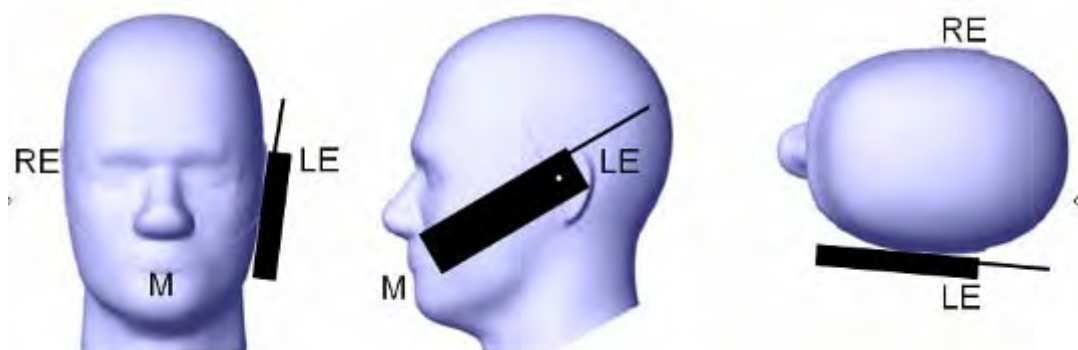
The device is brought toward the mouth of the head phantom by pivoting against the “ear reference point” or along the “N-F” line for the SCC-34/SC-2 head phantom.

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

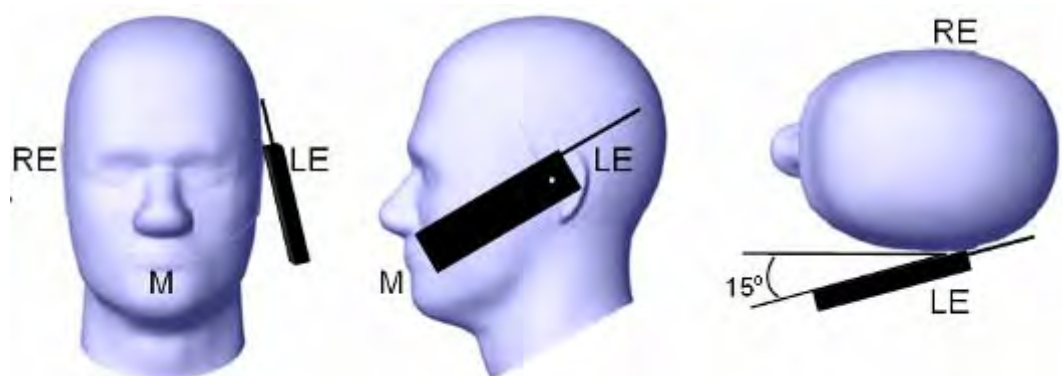
With the handset aligned in the “Cheek/Touch Position”:

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 80°. After the tilt, it is then moved (translated) back toward the head perpendicular to the line passes through both “ear reference points” until the device touches the phantom or the ear spacer. If the antenna touches the head first, the positioning process should be repeated with a tilt angle less than 15° so that the device and its antenna would touch the phantom simultaneously. This test position may require a device holder or positioner to achieve the translation and tilting with acceptable positioning repeatability.

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

Ear /Tilt 15° Position



Test positions for body-worn and other configurations

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

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

SAR Evaluation Procedure

The evaluation was performed with the following procedure:

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

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

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

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

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

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

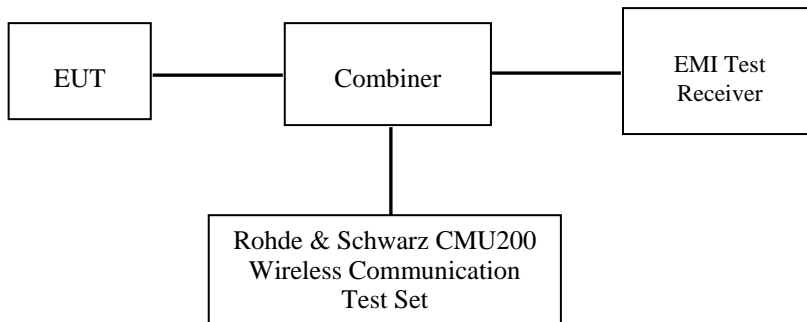
CONDUCTED OUTPUT POWER MEASUREMENT

Provision Applicable

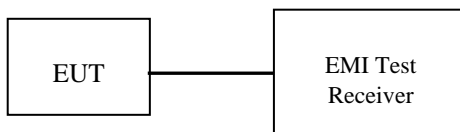
The measured peak output power should be greater and within 5% than EMI measurement.

Test Procedure

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



GSM/3G



WiFi

Test Results:

GSM

Band	Frequency (MHz)	Conducted Output Power	
		GSM (dBm)	GSM (W)
Cellular	824.2	33.16	2.070
	836.6	33.35	2.163
	848.8	33.46	2.218
PCS	1850.2	29.64	0.920
	1880.0	29.17	0.826
	1909.8	28.84	0.766

GPRS

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
Cellular	128	824.2	33.35	33.17	30.09	29.25
	190	836.6	33.51	33.32	30.04	29.20
	251	848.8	33.62	33.43	30.02	29.16
PCS	512	1850.2	30.17	28.80	27.08	26.27
	661	1880.0	29.65	28.16	26.50	25.66
	810	1909.8	29.33	27.88	26.18	25.29

EGPRS

Mode	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			1 slot	2 slots	3 slots	4 slots
Cellular	128	824.2	29.74	29.01	27.61	26.75
	190	836.6	29.73	29.03	27.61	26.76
	251	848.8	29.75	29.04	27.64	26.79
PCS	512	1850.2	24.15	23.42	22.19	21.24
	661	1880.0	24.13	23.52	22.18	21.33
	810	1909.8	24.04	23.53	22.13	21.26

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

GPRS

Band	Channel No.	Frequency (MHz)	Time based average Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
Cellular	128	824.2	24.35	27.17	25.84	26.25
	190	836.6	24.51	27.32	25.79	26.20
	251	848.8	24.62	27.43	25.77	26.16
PCS	512	1850.2	21.17	22.80	22.83	23.27
	661	1880.0	20.65	22.16	22.25	22.66
	810	1909.8	20.33	21.88	21.93	22.29

EGPRS

Band	Channel No.	Frequency (MHz)	Time based average Power (dBm)			
			1 slot	2 slots	3 slots	4 slots
Cellular	128	824.2	20.74	23.01	23.36	23.75
	190	836.6	20.73	23.03	23.36	23.76
	251	848.8	20.75	23.04	23.39	23.79
PCS	512	1850.2	15.15	17.42	17.94	18.24
	661	1880.0	15.13	17.52	17.93	18.33
	810	1909.8	15.04	17.53	17.88	18.26

Note:

1. Rohde & Schwarz Radio Communication Tester (CMU200) was used for the measurement of GSM peak and average output power for active timeslots.
2. For GSM voice, 1 timeslot has been activated with power level 5 (850 MHz band) and 0 (1900 MHz band).
3. For GPRS, 1, 2, 3 and 4 timeslots has been activated separately with power level 5(850 MHz band) and 0(1900 MHz band).
4. For EGPRS, 1, 2, 3 and 4 timeslots has been activated separately with power level 8(850 MHz band) and 2(1900 MHz band).
5. The maximum average output power of the GPRS mode is more than 2 dB higher than EGPRS mode measured in the same frequency band, according to IEEE1528, only GPRS mode SAR is required.

WCDMA-Release 99:

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

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

Results (12.2kbps RMC)

Band	Frequency (MHz)	Channel NO.	Conducted Output Power	
			(dBm)	(Watt)
WCDMA 850	826.4	4132	24.26	0.267
	836.6	4183	24.50	0.282
	846.6	4233	24.45	0.279
WCDMA 1900	1852.4	9262	24.25	0.266
	1880.0	9400	25.10	0.324
	1907.6	9538	24.09	0.256

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			
	β_c	2/15	12/15	15/15	15/15
	β_d	15/15	15/15	8/15	4/15
	β_d (SF)	64			
	β_c/β_d	2/15	12/15	15/8	15/4
	β_{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			
			Subset 1	Subset 2	Subset 3	Subset 4
WCDMA 850	826.4	4132	24.21	24.18	24.12	24.21
	836.6	4 183	24.39	24.47	24.37	24.46
	846.6	4 233	24.41	24.33	24.28	24.17
WCDMA 1900	1852.4	9 262	23.98	24.00	24.18	24.22
	1880.0	9 400	25.05	24.95	24.77	25.07
	1907.6	9 538	22.88	22.75	22.62	22.81

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				
	β_c	11/15	6/15	15/15	2/15	15/15
	β_d	15/15	15/15	9/15	15/15	0
	β_{ec}	209/225	12/15	30/15	2/15	5/15
	β_c/β_d	11/15	6/15	15/9	2/15	-
	β_{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				
			Subset 1	Subset 2	Subset 3	Subset 4	Subset 5
WCDMA 850	826.4	4132	24.15	24.18	24.12	24.25	24.21
	836.6	4 183	24.32	24.47	24.37	24.46	24.39
	846.6	4 233	24.24	24.33	24.28	24.17	24.41
WCDMA 1900	1852.4	9 262	23.85	24.01	24.11	24.20	23.95
	1880.0	9 400	24.86	24.59	24.74	25.01	24.66
	1907.6	9 538	22.49	22.42	22.47	22.75	22.40

Note:

1. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement Channel) Configured in Test Loop Model 1.
2. KDB 941225 D01-Body SAR is not required for HSDPA when the maximum average output of each RF channel with HSDPA active is less than ¼ dB higher than measured without HSDPA using 12.2kbps RMC or the maximum SAR for 12.2kbps RMC is < 75% of SAR limit..
3. KDB 941225 D01-Body SAR is not required for HSUPA when the maximum average output of each RF channel with HSUPA active is less than ¼ dB higher than measured without HSUPA using 12.2kbps RMC and the maximum SAR for 12.2kbps RMC is < 75% of SAR limit..

WiFi

Band	Frequency (MHz)	Conducted Output Power	
		(dBm)	(Watt)
802.11b	2412	16.37	0.043
	2437	15.41	0.035
	2462	14.77	0.030
802.11g	2412	16.16	0.041
	2437	15.31	0.034
	2462	14.62	0.029
802.11n20	2412	16.10	0.041
	2437	15.24	0.033
	2462	14.54	0.028
802.11n40	2422	15.62	0.036
	2437	15.18	0.033
	2452	14.51	0.028

Note:

1. The output power was tested under data rate 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n-20 and 13.5Mbps for 802.11n-40.
2. KDB248227-SAR is not required for 802.11g/n channels when the maximum average output power is less than 1/4 dB higher than that measured on the corresponding 802.11b channels.

Bluetooth

Mode	Channel frequency (MHz)	Reading power (dBm)	Power output (mw)
BDR(GFSK)	(Low)2402	7.35	5.433
	(Middle)2441	5.73	3.741
	(High)2480	3.94	2.477
EDR(4-DQPSK)	(Low)2402	7.15	5.188
	(Middle)2441	5.59	3.622
	(High)2480	3.76	2.377
EDR-8DPSK	(Low)2402	7.32	5.395
	(Middle)2441	5.69	3.707
	(High)2480	3.93	2.472
BLE-GFSK	(Low)2402	-0.13	0.971
	(Middle)2440	-0.74	0.843
	(High)2480	-2.36	0.947

Note:

According to the appendix A of FCC KDB 447498 D01 General RF Exposure Guidance v05 generic portable criteria, the exclusion thresholds for 2450 MHz is 10 mW. So SAR test is not required for Bluetooth.

SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

SAR Test Data

Environmental Conditions

Temperature:	21-22° C
Relative Humidity:	50-53%
ATM Pressure:	1001-1002 mbar

* Testing was performed by Sandy Wang on 2013-01-25 to 2013-01-26

Cellular Band:

EUT Position	Frequency (MHz)		Test Mode	Antenna Type	Phantom Type	Power Drift (%)	FCC 1g SAR (W/Kg)	
	Channel	MHz					Measurement	Limit
Left Head Cheek	128(Low)	824.2	GSM	Integral	SAM	/	/	1.6
	190(Middle)	836.6	GSM	Integral	SAM	/	/	1.6
	251(High)	848.8	GSM	Integral	SAM	-2.152	0.048	1.6
Left Head Tilt	128(Low)	824.2	GSM	Integral	SAM	/	/	1.6
	190(Middle)	836.6	GSM	Integral	SAM	/	/	1.6
	251(High)	848.8	GSM	Integral	SAM	1.058	0.028	1.6
Right Head Cheek	128(Low)	824.2	GSM	Integral	SAM	/	/	1.6
	190(Middle)	836.6	GSM	Integral	SAM	/	/	1.6
	251(High)	848.8	GSM	Integral	SAM	-1.955	0.044	1.6
Right Head Tilt	128(Low)	824.2	GSM	Integral	SAM	/	/	1.6
	190(Middle)	836.6	GSM	Integral	SAM	/	/	1.6
	251(High)	848.8	GSM	Integral	SAM	-2.105	0.026	1.6
Body-Front-Headset (10mm)	128(Low)	824.2	GSM	Integral	Universal	/	/	1.6
	190(Middle)	836.6	GSM	Integral	Universal	/	/	1.6
	251(High)	848.8	GSM	Integral	Universal	-1.207	0.102	1.6
Body-Back-Headset (10mm)	128(Low)	824.2	GSM	Integral	Universal	/	/	1.6
	190(Middle)	836.6	GSM	Integral	Universal	/	/	1.6
	251(High)	848.8	GSM	Integral	Universal	2.296	0.154	1.6

Note:

1. When the 1-g SAR is $\leq 0.8W/Kg$, testing for other channels are optional.

PCS Band:

EUT Position	Frequency (MHz)		Test Mode	Antenna Type	Phantom Type	Power Drift (%)	FCC 1g SAR (W/Kg)	
	Channel	MHz					Measurement	Limit
Left Head Cheek	512(Low)	1850.2	GSM	Integral	SAM	2.845	0.046	1.6
	661(Middle)	1880.0	GSM	Integral	SAM	/	/	1.6
	810(High)	1909.8	GSM	Integral	SAM	/	/	1.6
Left Head Tilt	512(Low)	1850.2	GSM	Integral	SAM	-1.525	0.021	1.6
	661(Middle)	1880.0	GSM	Integral	SAM	/	/	1.6
	810(High)	1909.8	GSM	Integral	SAM	/	/	1.6
Right Head Cheek	512(Low)	1850.2	GSM	Integral	SAM	-0.965	0.047	1.6
	661(Middle)	1880.0	GSM	Integral	SAM	/	/	1.6
	810(High)	1909.8	GSM	Integral	SAM	/	/	1.6
Right Head Tilt	512(Low)	1850.2	GSM	Integral	SAM	-3.981	0.023	1.6
	661(Middle)	1880.0	GSM	Integral	SAM	/	/	1.6
	810(High)	1909.8	GSM	Integral	SAM	/	/	1.6
Body-Front-Headset (10mm)	512(Low)	1850.2	GSM	Integral	Universal	2.573	0.367	1.6
	661(Middle)	1880.0	GSM	Integral	Universal	/	/	1.6
	810(High)	1909.8	GSM	Integral	Universal	/	/	1.6
Body-Back-Headset (10mm)	512(Low)	1850.2	GSM	Integral	Universal	-1.452	0.514	1.6
	661(Middle)	1880.0	GSM	Integral	Universal	/	/	1.6
	810(High)	1909.8	GSM	Integral	Universal	/	/	1.6

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.

WCDMA850

EUT Position	Frequency (MHz)		Test Mode	Antenna Type	Phantom Type	Power Drift (%)	FCC 1g SAR (W/Kg)	
	Channel	MHz					Measurement	Limit
Left Head Cheek	4132(Low)	826.4	WCDMA850	Integral	SAM	/	/	1.6
	4183(Middle)	836.6	WCDMA850	Integral	SAM	-3.855	0.123	1.6
	4233(High)	846.6	WCDMA850	Integral	SAM	/	/	1.6
Left Head Tilt	4132(Low)	826.4	WCDMA850	Integral	SAM	/	/	1.6
	4183(Middle)	836.6	WCDMA850	Integral	SAM	2.117	0.022	1.6
	4233(High)	846.6	WCDMA850	Integral	SAM	/	/	1.6
Right Head Cheek	4132(Low)	826.4	WCDMA850	Integral	SAM	/	/	1.6
	4183(Middle)	836.6	WCDMA850	Integral	SAM	-1.055	0.120	1.6
	4233(High)	846.6	WCDMA850	Integral	SAM	/	/	1.6
Right Head Tilt	4132(Low)	826.4	WCDMA850	Integral	SAM	/	/	1.6
	4183(Middle)	836.6	WCDMA850	Integral	SAM	2.597	0.025	1.6
	4233(High)	846.6	WCDMA850	Integral	SAM	/	/	1.6

Note:

1. When the 1-g SAR is $\leq 0.8W/kg$, testing for other channels are optional.

WCDMA1900

EUT Position	Frequency (MHz)		Test Mode	Antenna Type	Phantom Type	Power Drift (%)	FCC 1g SAR (W/Kg)	
	Channel	MHz					Measurement	Limit
Left Head Cheek	9262(Low)	1852.4	WCDMA1900	Integral	SAM	/	/	1.6
	9400(Middle)	1880.0	WCDMA1900	Integral	SAM	0.921	0.351	1.6
	9538(High)	1907.6	WCDMA1900	Integral	SAM	/	/	1.6
Left Head Tilt	9262(Low)	1852.4	WCDMA1900	Integral	SAM	/	/	1.6
	9400(Middle)	1880.0	WCDMA1900	Integral	SAM	-2.415	0.015	1.6
	9538(High)	1907.6	WCDMA1900	Integral	SAM	/	/	1.6
Right Head Cheek	9262(Low)	1852.4	WCDMA1900	Integral	SAM	/	/	1.6
	9400(Middle)	1880.0	WCDMA1900	Integral	SAM	-1.195	0.336	1.6
	9538(High)	1907.6	WCDMA1900	Integral	SAM	/	/	1.6
Right Head Tilt	9262(Low)	1852.4	WCDMA1900	Integral	SAM	/	/	1.6
	9400(Middle)	1880.0	WCDMA1900	Integral	SAM	-4.055	0.013	1.6
	9538(High)	1907.6	WCDMA1900	Integral	SAM	/	/	1.6

Note:

1. When the 1-g SAR is $\leq 0.8W/kg$, testing for other channels are optional.

2. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement Channel) Configured in Test Loop Mode.

WiFi (802.11b)

EUT Position	Frequency (MHz)		Test Mode	Antenna Type	Phantom Type	Power Drift (%)	FCC 1g SAR (W/Kg)	
	Channel NO.	MHz					Measurement	Limit
Left Head Cheek	1	2412.0	802.11b	Integral	SAM	-1.891	0.095	1.6
	6	2437.0	802.11b	Integral	SAM	/	/	1.6
	11	2462.0	802.11b	Integral	SAM	/	/	1.6
Left Head Tilt	1	2412.0	802.11b	Integral	SAM	-1.493	0.070	1.6
	6	2437.0	802.11b	Integral	SAM	/	/	1.6
	11	2462.0	802.11b	Integral	SAM	/	/	1.6
Right Head Cheek	1	2412.0	802.11b	Integral	SAM	-3.427	0.092	1.6
	6	2437.0	802.11b	Integral	SAM	/	/	1.6
	11	2462.0	802.11b	Integral	SAM	/	/	1.6
Right Head Tilt	1	2412.0	802.11b	Integral	SAM	-0.633	0.066	1.6
	6	2437.0	802.11b	Integral	SAM	/	/	1.6
	11	2462.0	802.11b	Integral	SAM	/	/	1.6

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, testing for other channels are optional.
2. The SAR testing is conducted with 100% duty cycle factor.
3. The output power was tested under data rate 1Mbps for 802.11b.

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: 835MHz)

EUT Position	Frequency (MHz)		Test Mode	Antenna Type	Phantom Type	Power Drift (%)	FCC 1g SAR (W/Kg)	
	Channel	MHz					Measurement	Limit
Body-Front (10mm)	128	824.2	GPRS	Integral	Universal	-1.927	0.202	1.6
	190	836.6	GPRS	Integral	Universal	/	/	1.6
	251	848.8	GPRS	Integral	Universal	/	/	1.6
Body-Back (10mm)	128	824.2	GPRS	Integral	Universal	2.411	0.335	1.6
	190	836.6	GPRS	Integral	Universal	/	/	1.6
	251	848.8	GPRS	Integral	Universal	/	/	1.6
Body-Left (10mm)	128	824.2	GPRS	Integral	Universal	-0.711	0.052	1.6
	190	836.6	GPRS	Integral	Universal	/	/	1.6
	251	848.8	GPRS	Integral	Universal	/	/	1.6
Body-Right (10mm)	128	824.2	GPRS	Integral	Universal	-2.103	0.169	1.6
	190	836.6	GPRS	Integral	Universal	/	/	1.6
	251	848.8	GPRS	Integral	Universal	/	/	1.6
Body-Bottom (10mm)	128	824.2	GPRS	Integral	Universal	-2.488	0.084	1.6
	190	836.6	GPRS	Integral	Universal	/	/	1.6
	251	848.8	GPRS	Integral	Universal	/	/	1.6

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, 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 Class 12 which has maximum 4 Downlink slots and 4 Uplink slots, the maximum active slots is 5, when perform the multiple slots scan, 3DL+2UL is the worse case.
4. The EUT transmit and receive through the same GSM antenna while testing SAR.

Hot spot-GPRS (Frequency Band: 1900MHz)

EUT Position	Frequency (MHz)		Test Mode	Antenna Type	Phantom Type	Power Drift (%)	FCC 1g SAR (W/Kg)	
	Channel	MHz					Measurement	Limit
Body-Front (10mm)	512	1850.2	GPRS	Integral	Universal	-1.422	0.625	1.6
	661	1880.0	GPRS	Integral	Universal	/	/	1.6
	810	1909.8	GPRS	Integral	Universal	/	/	1.6
Body-Back (10mm)	512	1850.2	GPRS	Integral	Universal	-1.386	0.904	1.6
	661	1880.0	GPRS	Integral	Universal	1.786	0.896	1.6
	810	1909.8	GPRS	Integral	Universal	-2.011	0.736	1.6
Body-Left (10mm)	512	1850.2	GPRS	Integral	Universal	2.522	0.089	1.6
	661	1880.0	GPRS	Integral	Universal	/	/	1.6
	810	1909.8	GPRS	Integral	Universal	/	/	1.6
Body-Right (10mm)	512	1850.2	GPRS	Integral	Universal	1.249	0.093	1.6
	661	1880.0	GPRS	Integral	Universal	/	/	1.6
	810	1909.8	GPRS	Integral	Universal	/	/	1.6
Body-Bottom (10mm)	512	1850.2	GPRS	Integral	Universal	-0.819	0.620	1.6
	661	1880.0	GPRS	Integral	Universal	/	/	1.6
	810	1909.8	GPRS	Integral	Universal	/	/	1.6

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, 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 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 worse case.
4. The EUT transmit and receive through the same GSM antenna while testing SAR.

Hot spot-WCDMA850

EUT Position	Frequency (MHz)		Test Mode	Antenna Type	Phantom Type	Power Drift (%)	FCC 1g SAR (W/Kg)	
	Channel	MHz					Measurement	Limit
Body-Front (10mm)	4132(Low)	826.4	WCDMA850	Integral	Universal	/	/	1.6
	4183(Middle)	836.6	WCDMA850	Integral	Universal	-1.041	0.048	1.6
	4233(High)	846.6	WCDMA850	Integral	Universal	/	/	1.6
Body-Back (10mm)	4132(Low)	826.4	WCDMA850	Integral	Universal	/	/	1.6
	4183(Middle)	836.6	WCDMA850	Integral	Universal	-2.488	0.108	1.6
	4233(High)	846.6	WCDMA850	Integral	Universal	/	/	1.6
Body-Left (10mm)	4132(Low)	826.4	WCDMA850	Integral	Universal	/	/	1.6
	4183(Middle)	836.6	WCDMA850	Integral	Universal	2.723	0.005	1.6
	4233(High)	846.6	WCDMA850	Integral	Universal	/	/	1.6
Body-Right (10mm)	4132(Low)	826.4	WCDMA850	Integral	Universal	/	/	1.6
	4183(Middle)	836.6	WCDMA850	Integral	Universal	-2.537	0.049	1.6
	4233(High)	846.6	WCDMA850	Integral	Universal	/	/	1.6
Body-Bottom (10mm)	4132(Low)	826.4	WCDMA850	Integral	Universal	/	/	1.6
	4183(Middle)	836.6	WCDMA850	Integral	Universal	-3.054	0.006	1.6
	4233(High)	846.6	WCDMA850	Integral	Universal	/	/	1.6

WCDMA1900

EUT Position	Frequency (MHz)		Test Mode	Antenna Type	Phantom Type	Power Drift (%)	FCC 1g SAR (W/Kg)	
	Channel	MHz					Measurement	Limit
Body-Front (10mm)	9262(Low)	1852.4	WCDMA1900	Integral	Universal	/	/	1.6
	9400(Middle)	1880.0	WCDMA1900	Integral	Universal	-1.713	0.282	1.6
	9538(High)	1907.6	WCDMA1900	Integral	Universal	/	/	1.6
Body-Back (10mm)	9262(Low)	1852.4	WCDMA1900	Integral	Universal	/	/	1.6
	9400(Middle)	1880.0	WCDMA1900	Integral	Universal	1.809	0.571	1.6
	9538(High)	1907.6	WCDMA1900	Integral	Universal	/	/	1.6
Body-Left (10mm)	9262(Low)	1852.4	WCDMA1900	Integral	Universal	/	/	1.6
	9400(Middle)	1880.0	WCDMA1900	Integral	Universal	2.719	0.042	1.6
	9538(High)	1907.6	WCDMA1900	Integral	Universal	/	/	1.6
Body-Right (10mm)	9262(Low)	1852.4	WCDMA1900	Integral	Universal	/	/	1.6
	9400(Middle)	1880.0	WCDMA1900	Integral	Universal	-1.788	0.028	1.6
	9538(High)	1907.6	WCDMA1900	Integral	Universal	/	/	1.6
Body-Bottom (10mm)	9262(Low)	1852.4	WCDMA1900	Integral	Universal	/	/	1.6
	9400(Middle)	1880.0	WCDMA1900	Integral	Universal	-1.529	0.507	1.6
	9538(High)	1907.6	WCDMA1900	Integral	Universal	/	/	1.6

Note:

1. When the 1-g SAR is ≤ 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 Mode.

Hot Spot-WiFi

EUT Position	Frequency (MHz)		Test Mode	Antenna Type	Phantom Type	Power Drift (%)	FCC 1g SAR (W/Kg)	
	Channel	MHz					Measurement	Limit
Body-Front (10mm)	1	2412	802.11b	Integral	Universal	2.736	0.037	1.6
	6	2437	802.11b	Integral	Universal	/	/	1.6
	11	2462	802.11b	Integral	Universal	/	/	1.6
Body-Back (10mm)	1	2412	802.11b	Integral	Universal	-2.692	0.136	1.6
	6	2437	802.11b	Integral	Universal	/	/	1.6
	11	2462	802.11b	Integral	Universal	/	/	1.6
Body-Left (10mm)	1	2412	802.11b	Integral	Universal	2.117	0.050	1.6
	6	2437	802.11b	Integral	Universal	/	/	1.6
	11	2462	802.11b	Integral	Universal	/	/	1.6
Body-Right (10mm)	1	2412	802.11b	Integral	Universal	-2.093	0.058	1.6
	6	2437	802.11b	Integral	Universal	/	/	1.6
	11	2462	802.11b	Integral	Universal	/	/	1.6
Body-Top (10mm)	1	2412	802.11b	Integral	Universal	-1.492	0.188	1.6
	6	2437	802.11b	Integral	Universal	/	/	1.6
	11	2462	802.11b	Integral	Universal	/	/	1.6

Note:

1. When the 1-g SAR is $\leq 0.8\text{W/Kg}$, testing for other channels are optional.
2. The SAR testing is conducted with 100% duty cycle factor.
3. The output power was tested under data rate 1Mbps for 802.11b.

SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

KDB 447498D01 General RF Exposure Guidance v05 KDB 648474 D04 SAR Handsets Multi Xmitter and Ant v01

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

WiFi & BT and GSM Antenna Location:



Antenna Information:

Description of Simultaneous Transmit Capabilities			Antennas Distance (mm)
Transmitter Combination	Scenario Supported?	Supported for Mobile Hot Spot	
GSM + GPRS	×	×	0.00
GSM + WCDMA	×	×	0.00
GSM + WiFi	√	×	129
GSM + Bluetooth	√	×	129
GPRS + WCDMA	×	×	0.00
GPRS + WiFi	√	√	129
GPRS + Bluetooth	√	×	129
WCDMA + WiFi	√	√	129
WCDMA + Bluetooth	√	×	129
WiFi + Bluetooth	×	×	0.00

Standalone SAR test exclusion considerations:

Head Position:

Mode	Frequency (MHz)	P _{avg} (dBm)	P _{avg} (mW)	Threshold (1-g)	Distance (mm)	SAR Test Exclusion
GSM850	835	24.46	279.25	16	5	No
PCS1900	1900	20.64	115.88	11	5	No
WCDMA850	850	24.50	281.84	16	5	No
WCDMA1900	1900	25.10	323.59	11	5	No
WiFi	2450	16.37	43.35	10	5	No
Bluetooth	2450	7.35	5.43	10	5	Yes

Body Position:

Mode	Frequency (MHz)	P _{avg} (dBm)	P _{avg} (mW)	Threshold (1-g)	Distance (mm)	SAR Test Exclusion
GSM850	835	27.43	553.35	33	10	No
PCS1900	1900	23.27	212.32	22	10	No
WCDMA850	850	24.50	281.84	33	10	No
WCDMA1900	1900	25.10	323.59	22	10	No
WiFi	2450	16.37	43.35	19	10	No
Bluetooth	2450	7.35	5.43	19	10	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:

$$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] \cdot [\sqrt{f(\text{GHz})}] \leq 3.0 \text{ for 1-g SAR and } \leq 7.5 \text{ for 10-g extremity SAR, where}$$

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.

Simultaneous SAR test exclusion considerations:

GSM&3G with WiFi:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		GSM	WiFi	< 1.6W/kg
GSM850	Left Head Cheek	0.048	0.095	0.143
	Left Head Tile	0.028	0.070	0.098
	Right Head Cheek	0.044	0.092	0.136
	Right Head Tilt	0.026	0.066	0.092
	Body-Headset-Front	0.102	0.037	0.139
	Body-Headset-Back	0.154	0.136	0.290
WCDMA 850	Left Head Cheek	0.123	0.095	0.218
	Left Head Tile	0.022	0.070	0.092
	Right Head Cheek	0.120	0.092	0.212
	Right Head Tilt	0.025	0.066	0.091
	Body Front	0.048	0.037	0.085
	Body Back	0.108	0.136	0.244
PCS1900	Left Head Cheek	0.046	0.095	0.141
	Left Head Tile	0.021	0.070	0.091
	Right Head Cheek	0.047	0.092	0.139
	Right Head Tilt	0.023	0.066	0.089
	Body-Headset-Front	0.367	0.037	0.404
	Body-Headset-Back	0.514	0.136	0.650
WCDMA 1900	Left Head Cheek	0.351	0.095	0.446
	Left Head Tile	0.015	0.070	0.085
	Right Head Cheek	0.336	0.092	0.428
	Right Head Tilt	0.013	0.066	0.079
	Body Front	0.282	0.037	0.319
	Body Back	0.571	0.136	0.707

GSM&3G with BT

Mode	Position	Reported SAR (W/kg)		ΣSAR
		GSM	Bluetooth	< 1.6W/kg
GSM850	Left Head Cheek	0.048	0.227	0.275
	Left Head Tile	0.028		0.255
	Right Head Cheek	0.044		0.271
	Right Head Tilt	0.026		0.253
	Body-Headset-Front	0.102	0.113	0.215
	Body-Headset-Back	0.154		0.267
WCDMA 850	Left Head Cheek	0.123	0.227	0.350
	Left Head Tile	0.022		0.249
	Right Head Cheek	0.120		0.347
	Right Head Tilt	0.025		0.252
	Body Front	0.048	0.113	0.161
	Body Back	0.108		0.221
PCS1900	Left Head Cheek	0.046	0.227	0.273
	Left Head Tile	0.021		0.248
	Right Head Cheek	0.047		0.274
	Right Head Tilt	0.023		0.250
	Body-Headset-Front	0.367	0.113	0.480
	Body-Headset-Back	0.514		0.627
WCDMA 1900	Left Head Cheek	0.351	0.227	0.578
	Left Head Tile	0.015		0.242
	Right Head Cheek	0.336		0.563
	Right Head Tilt	0.013		0.240
	Body Front	0.282	0.113	0.395
	Body Back	0.571		0.684

Mode	Frequency (GHz)	Distance (mm)	P _{avg} (dBm)	P _{avg} (mW)	Estimated 1-g (W/kg)
Bluetooth Head	2.45	5	7.35	5.43	0.227
Bluetooth Body	2.45	10	7.35	5.43	0.113

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 ≤ 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:

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

Evaluations for Simultaneous SAR									
Test Position	Stand Alone 1-g SAR (W/Kg)					Σ 1-g SAR (W/Kg)			
	GSM 850	WCDMA 850	GSM 1900	WCDMA 1900	WiFi	GSM 850+WiFi	WCDMA 850 +WiFi	GSM 1900+WiFi	WCDMA 1900+WiFi
Body-Front (1.0cm)	0.202	0.048	0.625	0.282	0.037	0.239	0.085	0.662	0.319
Body-Back (1.0cm)	0.335	0.108	0.904	0.571	0.136	0.471	0.244	1.040	0.707
Body-Left (1.0cm)	0.052	0.005	0.089	0.042	0.050	0.102	0.055	0.139	0.092
Body-Right (1.0cm)	0.169	0.049	0.093	0.028	0.058	0.227	0.107	0.151	0.086
Body-Bottom (1.0cm)	0.084	0.006	0.620	0.507	/	/	/	/	/

Note:

1. 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 (848.8MHz High Channel)

Measurement Data

Test mode : GSM
 Crest Factor : 8
 Scan Type : Complete
 Area Scan : 12x9x1: 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 : 0.001W/kg
 Power Drift (%) : -2.152

Tissue Data

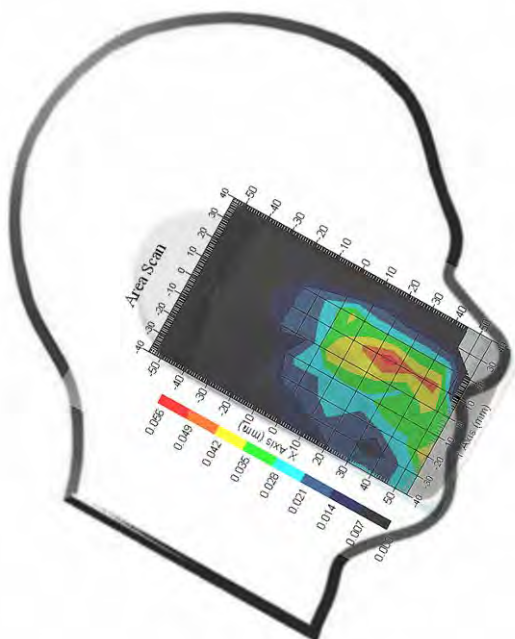
Type : Head
 Frequency : 848.80MHz
 Epsilon : 41.35 F/m
 Sigma : 0.94 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 8
 Conversion Factor : 6.6
 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 : 0.048 W/kg
 10 gram SAR value : 0.033 W/kg
 Area Scan Peak SAR : 0.053 W/kg
 Zoom Scan Peak SAR : 0.080 W/kg

Plot 1#



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

Left Head Tilt (848.8MHz High Channel)

Measurement Data

Test mode : GSM
 Crest Factor : 8
 Scan Type : Complete
 Area Scan : 12x9x1: 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 : 0.001W/kg
 Power Drift (%) : 1.058

Tissue Data

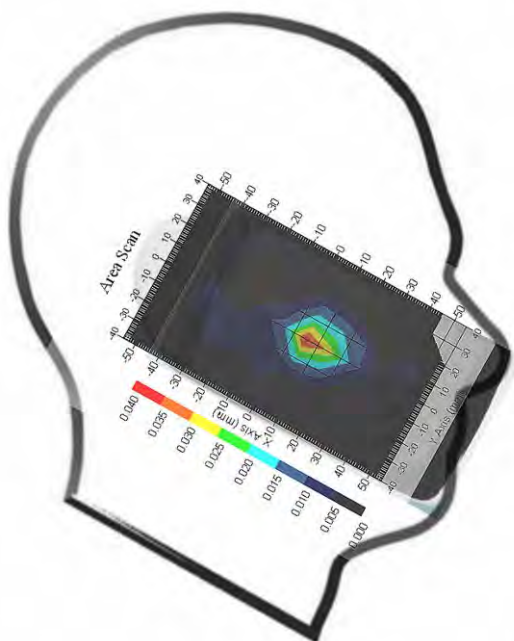
Type : Head
 Frequency : 848.80MHz
 Epsilon : 41.35 F/m
 Sigma : 0.94 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 8
 Conversion Factor : 6.6
 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 : 0.028 W/kg
 10 gram SAR value : 0.012 W/kg
 Area Scan Peak SAR : 0.037 W/kg
 Zoom Scan Peak SAR : 0.080 W/kg

Plot 2#



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

Right Head Cheek (848.8MHz High Channel)

Measurement Data

Test mode : GSM
 Crest Factor : 8
 Scan Type : Complete
 Area Scan : 12x9x1: 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 : 0.001W/kg
 Power Drift (%) : -1.955

Tissue Data

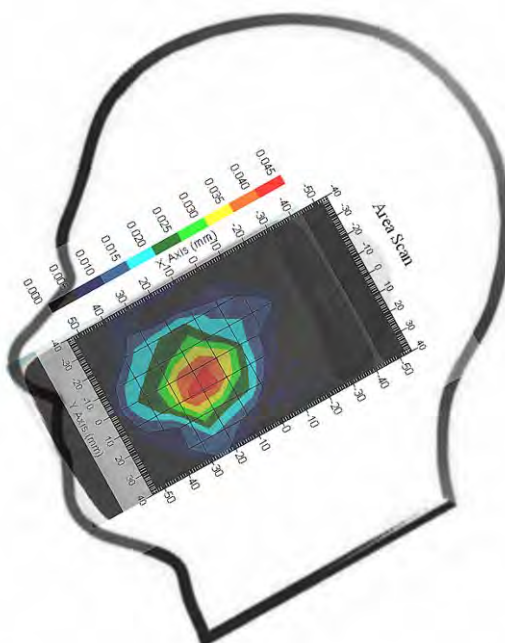
Type : Head
 Frequency : 848.80MHz
 Epsilon : 41.35 F/m
 Sigma : 0.94 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 8
 Conversion Factor : 6.6
 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 : 0.044 W/kg
 10 gram SAR value : 0.026 W/kg
 Area Scan Peak SAR : 0.045 W/kg
 Zoom Scan Peak SAR : 0.100 W/kg

Plot 3#



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

Right Head Tilt (848.8MHz High Channel)

Measurement Data

Test mode : GSM
 Crest Factor : 8
 Scan Type : Complete
 Area Scan : 12x9x1: 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 : 0.001W/kg
 Power Drift (%) : -2.105

Tissue Data

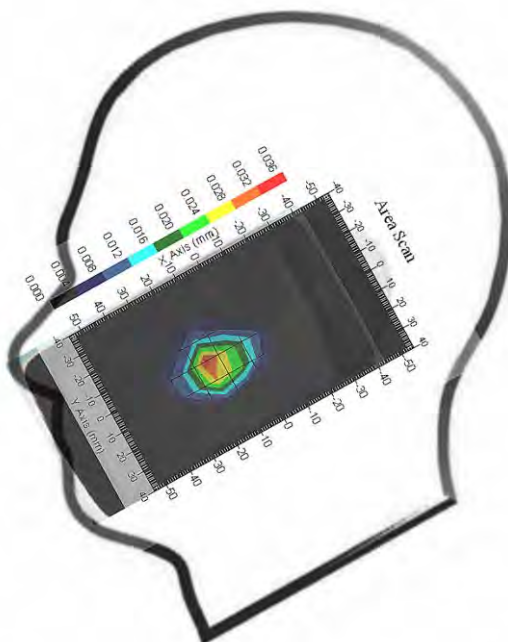
Type : Head
 Frequency : 848.80MHz
 Epsilon : 41.35 F/m
 Sigma : 0.94 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 8
 Conversion Factor : 6.6
 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 : 0.013 W/kg
 Area Scan Peak SAR : 0.034 W/kg
 Zoom Scan Peak SAR : 0.061 W/kg

Plot 4#



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

Body-worn Front-Headset (848.8MHz High Channel)

Measurement Data

Test mode : GSM
 Crest Factor : 8
 Scan Type : Complete
 Area Scan : 9x12x1 : 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 : 0.094 W/kg
 Power Drift (%) : -1.207

Tissue Data

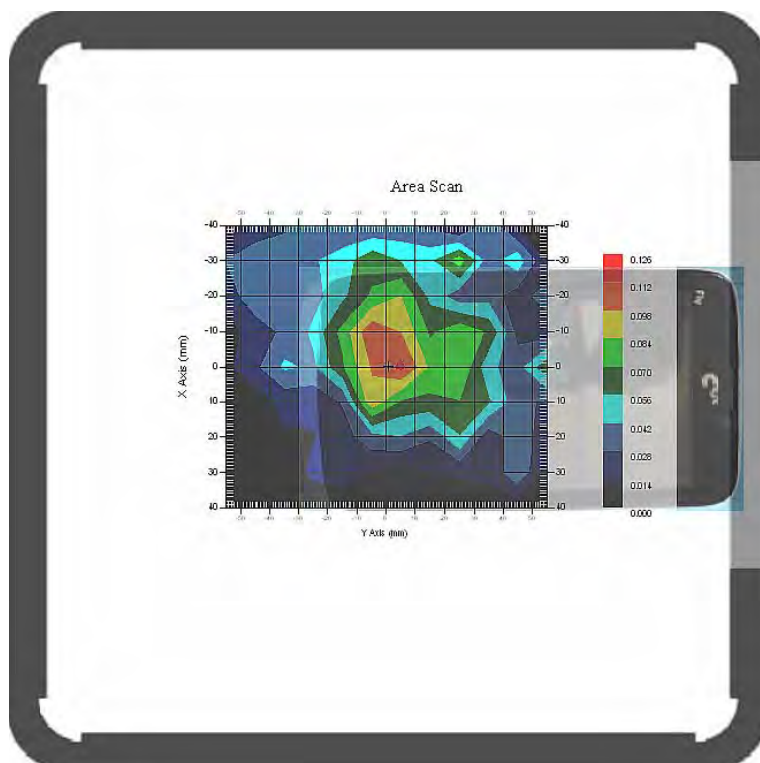
Type : Body
 Frequency : 848.80 MHz
 Epsilon : 55.29 F/m
 Sigma : 0.99 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 8
 Conversion Factor : 6.6
 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 : 0.102 W/kg
 10 gram SAR value : 0.053 W/kg
 Area Scan Peak SAR : 0.116 W/kg
 Zoom Scan Peak SAR : 0.190 W/kg

Plot 5#



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

Body-worn Back -Headset (848.8MHz High Channel)

Measurement Data

Test mode : GSM
 Crest Factor : 8
 Scan Type : Complete
 Area Scan : 9x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.138 W/kg
 Power Drift-Finish : 0.141 W/kg
 Power Drift (%) : 2.296

Tissue Data

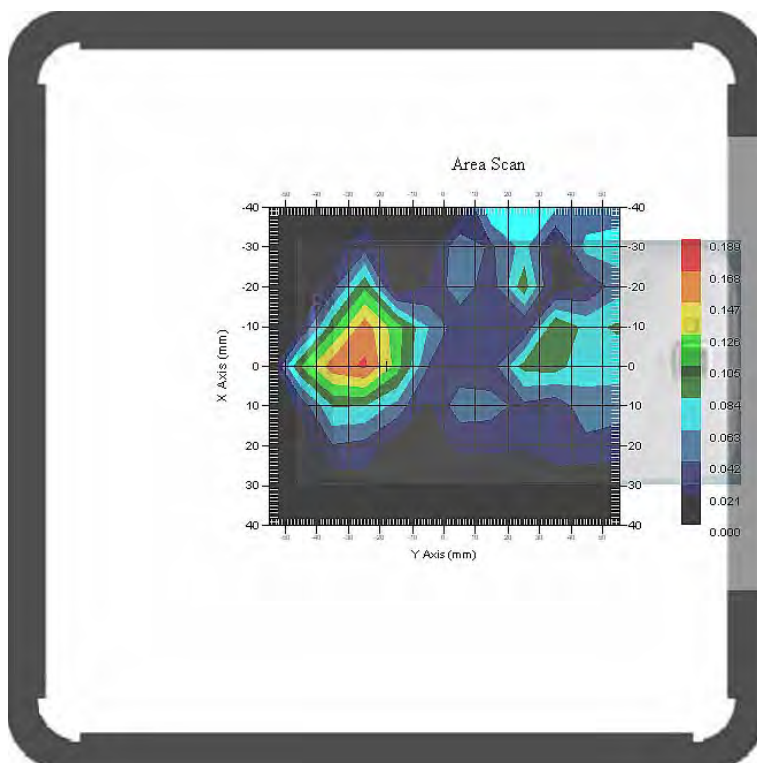
Type : Body
 Frequency : 848.80 MHz
 Epsilon : 55.29 F/m
 Sigma : 0.99 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 8
 Conversion Factor : 6.6
 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 : 0.154 W/kg
 10 gram SAR value : 0.067 W/kg
 Area Scan Peak SAR : 0.171 W/kg
 Zoom Scan Peak SAR : 0.470 W/kg

Plot 6#



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

Left Head Cheek (1850.2 MHz Low Channel)

Measurement Data

Test mode : GSM
 Crest Factor : 8
 Scan Type : Complete
 Area Scan : 12x9x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.003 W/kg
 Power Drift-Finish : 0.003 W/kg
 Power Drift (%) : 2.845

Tissue Data

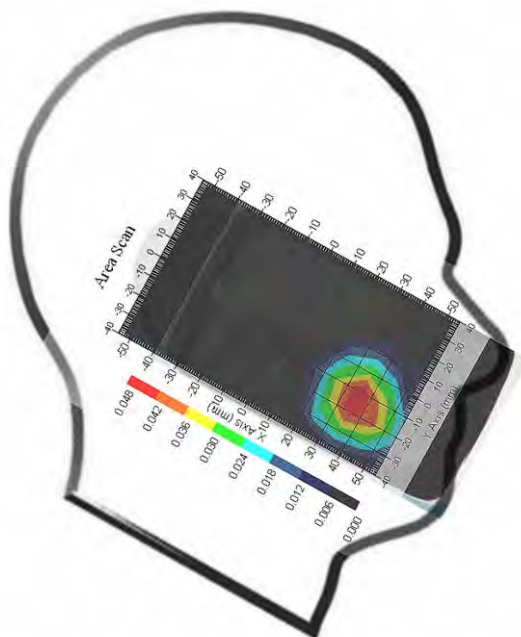
Type : Head
 Frequency : 1850.20 MHz
 Epsilon : 40.13 F/m
 Sigma : 1.42 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 8
 Conversion Factor : 5.2
 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 : 0.046 W/kg
 10 gram SAR value : 0.022 W/kg
 Area Scan Peak SAR : 0.048 W/kg
 Zoom Scan Peak SAR : 0.160 W/kg

Plot 7#



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

Left Head Tilt (1850.2 MHz Low Channel)

Measurement Data

Test mode : GSM
 Crest Factor : 8
 Scan Type : Complete
 Area Scan : 12x9x1 : 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 (%) : -1.525

Tissue Data

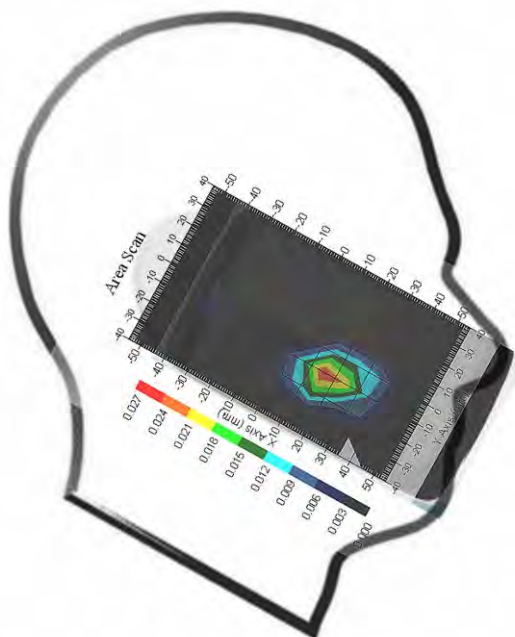
Type : Head
 Frequency : 1850.20 MHz
 Epsilon : 40.13 F/m
 Sigma : 1.42 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 8
 Conversion Factor : 5.2
 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 : 0.021 W/kg
 10 gram SAR value : 0.009 W/kg
 Area Scan Peak SAR : 0.025 W/kg
 Zoom Scan Peak SAR : 0.060 W/kg

Plot 8#



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 : 12x9x1 : 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 (%) : -0.965

Tissue Data

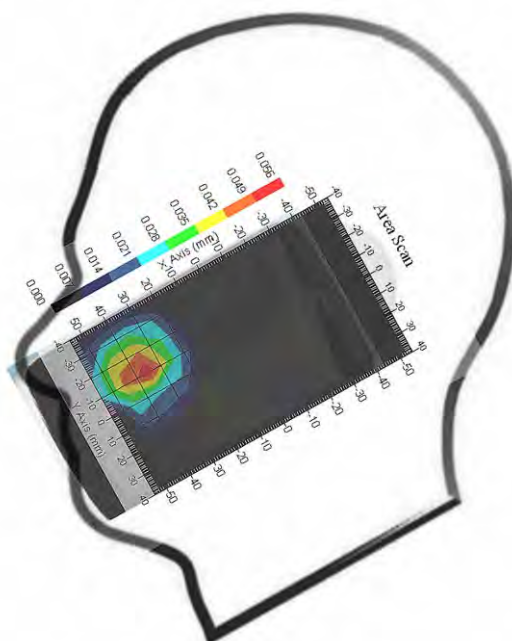
Type : Head
 Frequency : 1850.20 MHz
 Epsilon : 40.13 F/m
 Sigma : 1.42 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 8
 Conversion Factor : 5.2
 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 : 0.047 W/kg
 10 gram SAR value : 0.023 W/kg
 Area Scan Peak SAR : 0.055 W/kg
 Zoom Scan Peak SAR : 0.133 W/kg

Plot 9#



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

Right Head Tilt (1850.2 MHz Low Channel)

Measurement Data

Test mode : GSM
 Crest Factor : 8
 Scan Type : Complete
 Area Scan : 12x9x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.001 W/kg
 Power Drift-Finish : 0.001 W/kg
 Power Drift (%) : -3.981

Tissue Data

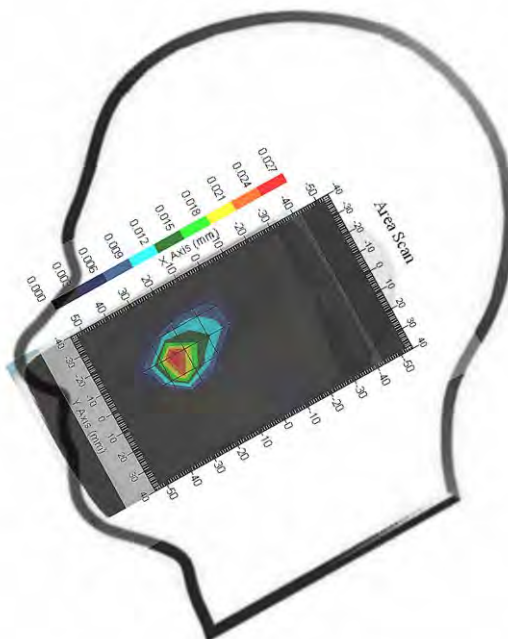
Type : Head
 Frequency : 1850.20 MHz
 Epsilon : 40.13 F/m
 Sigma : 1.42 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 8
 Conversion Factor : 5.2
 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 : 0.023 W/kg
 10 gram SAR value : 0.010 W/kg
 Area Scan Peak SAR : 0.026 W/kg
 Zoom Scan Peak SAR : 0.039 W/kg

Plot 10#



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

Body- worn Front-Headset (1850.2 MHz Low Channel)

Measurement Data

Test mode : GSM
 Crest Factor : 8
 Scan Type : Complete
 Area Scan : 9x12x1 : 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 (%) : 2.573

Tissue Data

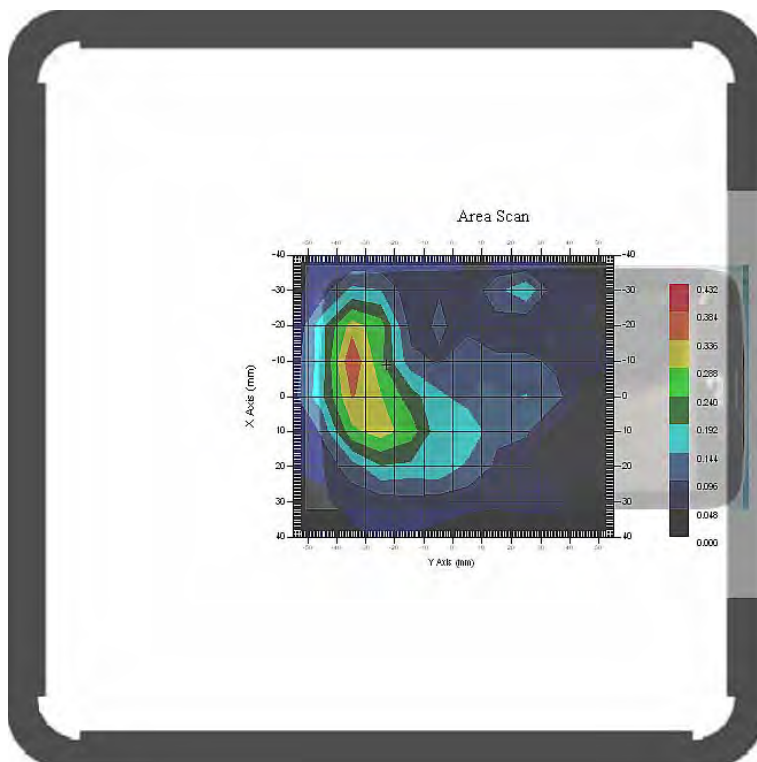
Type : Body
 Frequency : 1850.20 MHz
 Epsilon : 53.10 F/m
 Sigma : 1.49 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 8
 Conversion Factor : 5.0
 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 : 0.367 W/kg
 10 gram SAR value : 0.150 W/kg
 Area Scan Peak SAR : 0.386 W/kg
 Zoom Scan Peak SAR : 0.970 W/kg

Plot 11#



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

Body- worn Back-Headset (1850.2 MHz Low Channel)

Measurement Data

Test mode : GSM
 Crest Factor : 8
 Scan Type : Complete
 Area Scan : 9x12x1 : 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 : 0.412 W/kg
 Power Drift (%) : -1.452

Tissue Data

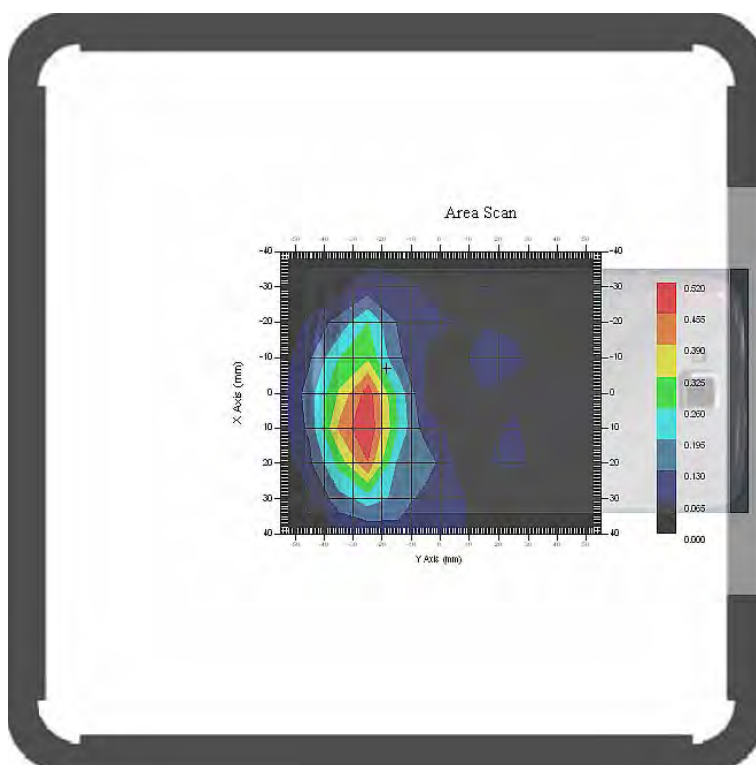
Type : Body
 Frequency : 1850.20 MHz
 Epsilon : 53.10 F/m
 Sigma : 1.49 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 8
 Conversion Factor : 5.0
 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 : 0.514 W/kg
 10 gram SAR value : 0.289 W/kg
 Area Scan Peak SAR : 0.519 W/kg
 Zoom Scan Peak SAR : 1.241 W/kg

Plot 12#



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

WCDMA850; Left Head Cheek (836.6MHz Middle Channel)

Measurement Data

Test mode : WCDMA850
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 12x9x1: 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 (%) : -3.855

Tissue Data

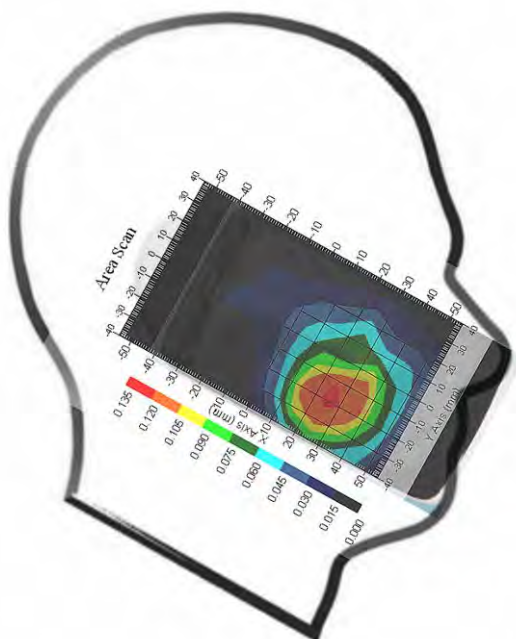
Type : Head
 Frequency : 836.60 MHz
 Epsilon : 41.57 F/m
 Sigma : 0.92 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 1
 Conversion Factor : 6.6
 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 : 0.123 W/kg
 10 gram SAR value : 0.060 W/kg
 Area Scan Peak SAR : 0.133 W/kg
 Zoom Scan Peak SAR : 0.391 W/kg

Plot 13#



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

WCDMA850; Left Head Tilt (836.6MHz Middle Channel)

Measurement Data

Test mode : WCDMA850
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 12x9x1: 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 (%) : 2.117

Tissue Data

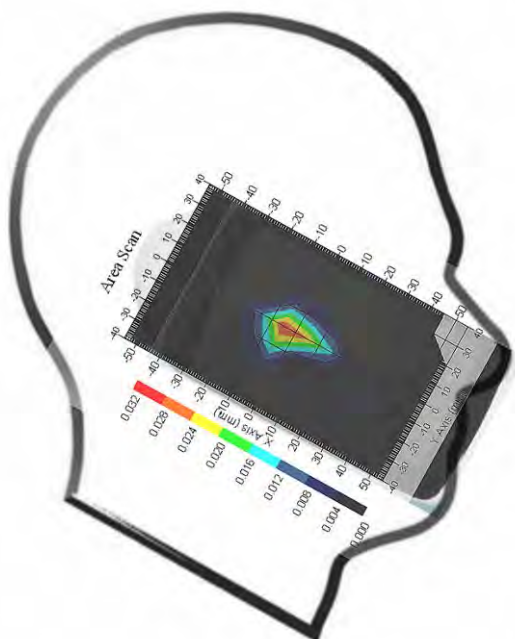
Type : Head
 Frequency : 836.60 MHz
 Epsilon : 41.57 F/m
 Sigma : 0.92 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 1
 Conversion Factor : 6.6
 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 : 0.022 W/kg
 10 gram SAR value : 0.010 W/kg
 Area Scan Peak SAR : 0.029 W/kg
 Zoom Scan Peak SAR : 0.059 W/kg

Plot 14#



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

WCDMA850; Right Head Cheek (836.6MHz Middle Channel)

Measurement Data

Test mode : WCDMA850
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 12x9x1: Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.010 W/kg
 Power Drift-Finish : 0.010 W/kg
 Power Drift (%) : -1.055

Tissue Data

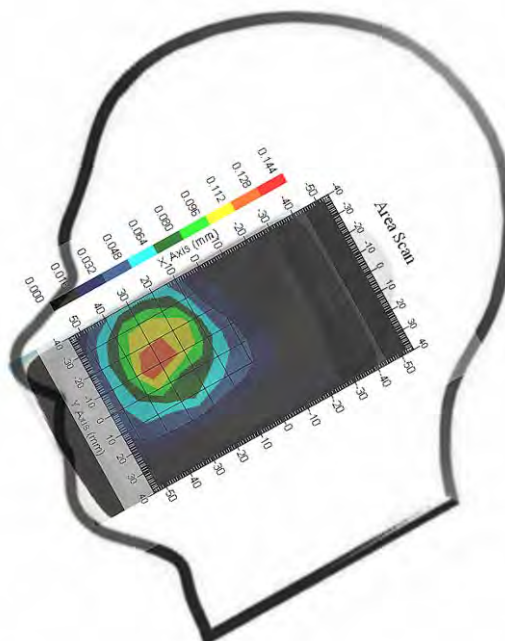
Type : Head
 Frequency : 836.60 MHz
 Epsilon : 41.57 F/m
 Sigma : 0.92 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 1
 Conversion Factor : 6.6
 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 : 0.120 W/kg
 10 gram SAR value : 0.058 W/kg
 Area Scan Peak SAR : 0.130 W/kg
 Zoom Scan Peak SAR : 0.261 W/kg

Plot 15#



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

WCDMA850; Right Head Tilt (836.6MHz Middle Channel)

Measurement Data

Test mode : WCDMA850
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 12x9x1: 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 (%) : 2.597

Tissue Data

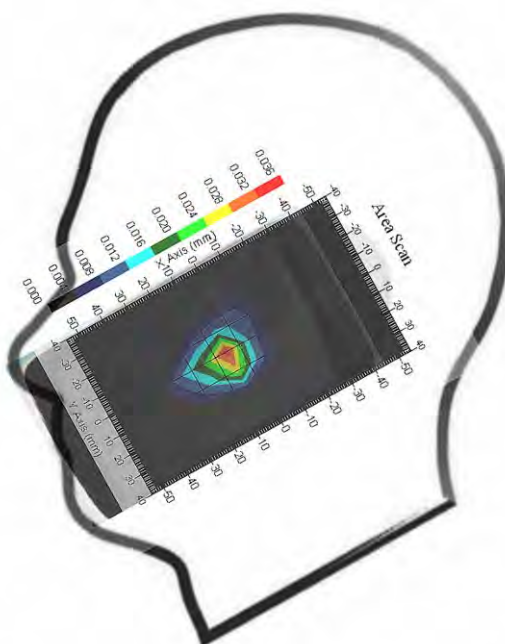
Type : Head
 Frequency : 836.60 MHz
 Epsilon : 41.57 F/m
 Sigma : 0.92 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 1
 Conversion Factor : 6.6
 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 : 0.025 W/kg
 10 gram SAR value : 0.011 W/kg
 Area Scan Peak SAR : 0.034 W/kg
 Zoom Scan Peak SAR : 0.071 W/kg

Plot 16#



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

WCDMA1900; Left Head Cheek (1880.0 MHz Middle Channel)

Measurement Data

Test mode : WCDMA1900
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 12x9x1: 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 (%) : 0.921

Tissue Data

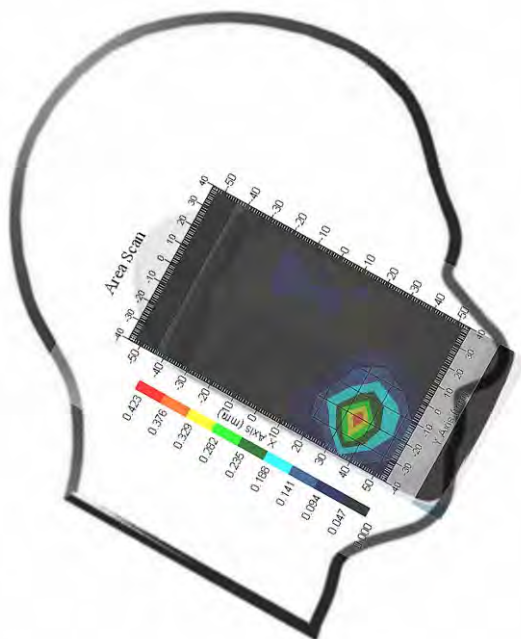
Type : Head
 Frequency : 1880.0 MHz
 Epsilon : 40.14 F/m
 Sigma : 1.44 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 1
 Conversion Factor : 5.2
 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 : 0.351 W/kg
 10 gram SAR value : 0.177 W/kg
 Area Scan Peak SAR : 0.378 W/kg
 Zoom Scan Peak SAR : 0.650 W/kg

Plot 17#



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

WCDMA1900; Left Head Tilt (1880.0 MHz Middle Channel)

Measurement Data

Test mode : WCDMA1900
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 12x9x1: 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 (%) : -2.415

Tissue Data

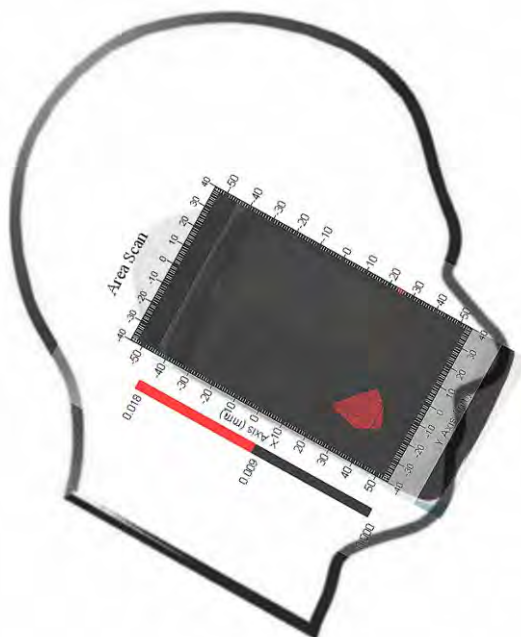
Type : Head
 Frequency : 1880.0 MHz
 Epsilon : 40.14 F/m
 Sigma : 1.44 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 1
 Conversion Factor : 5.2
 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 : 0.015 W/kg
 10 gram SAR value : 0.007 W/kg
 Area Scan Peak SAR : 0.018 W/kg
 Zoom Scan Peak SAR : 0.029 W/kg

Plot 18#



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

WCDMA1900; Right Head Cheek (1880.0 MHz Middle Channel)

Measurement Data

Test mode : WCDMA1900
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 12x9x1: Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.015 W/kg
 Power Drift-Finish : 0.015 W/kg
 Power Drift (%) : -1.195

Tissue Data

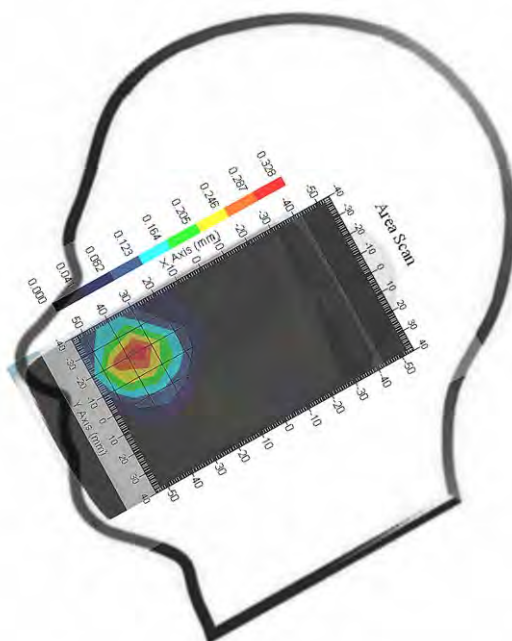
Type : Head
 Frequency : 1880.0 MHz
 Epsilon : 40.14 F/m
 Sigma : 1.44 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 1
 Conversion Factor : 5.2
 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 : 0.336 W/kg
 10 gram SAR value : 0.187 W/kg
 Area Scan Peak SAR : 0.327 W/kg
 Zoom Scan Peak SAR : 0.811 W/kg

Plot 19#



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

WCDMA1900; Right Head Tilt (1880.0 MHz Middle Channel)

Measurement Data

Test mode : WCDMA1900
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 12x9x1: 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 (%) : -4.055

Tissue Data

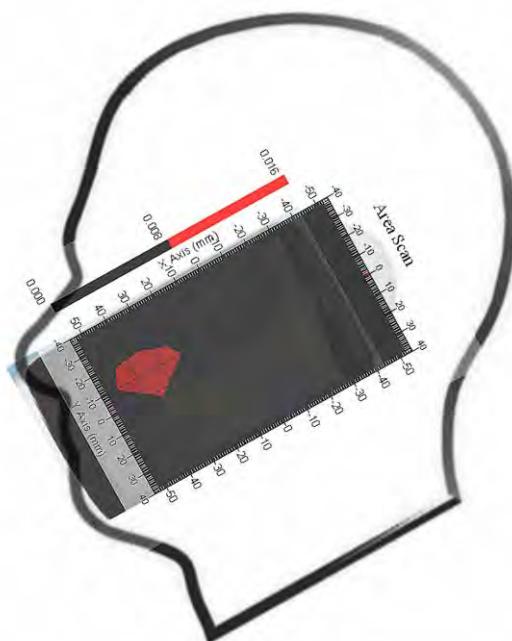
Type : Head
 Frequency : 1880.0 MHz
 Epsilon : 40.14 F/m
 Sigma : 1.44 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 1
 Conversion Factor : 5.2
 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 : 0.013 W/kg
 10 gram SAR value : 0.008 W/kg
 Area Scan Peak SAR : 0.016 W/kg
 Zoom Scan Peak SAR : 0.071 W/kg

Plot 20#



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

Left Head Cheek (2412 MHz Low Channel)

Measurement Data

Crest Factor : 1
 Scan Type : Complete
 Area Scan : 12x9x1 : 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 : 0.050 W/kg
 Power Drift (%) : -1.891

Tissue Data

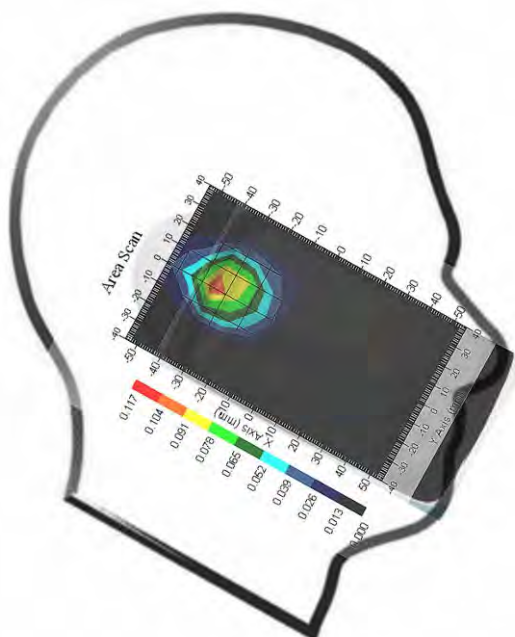
Type : Head
 Frequency : 2412.0 MHz
 Epsilon : 39.78 F/m
 Sigma : 1.78 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 2450
 Duty Cycle Factor : 1
 Conversion Factor : 4.3
 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 : 0.043 W/kg
 Area Scan Peak SAR : 0.106 W/kg
 Zoom Scan Peak SAR : 0.265 W/kg

Plot 21#



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

Left Head Tilt (2412 MHz Low Channel)

Measurement Data

Crest Factor : 1
 Scan Type : Complete
 Area Scan : 12x9x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.071 W/kg
 Power Drift-Finish : 0.070 W/kg
 Power Drift (%) : -1.493

Tissue Data

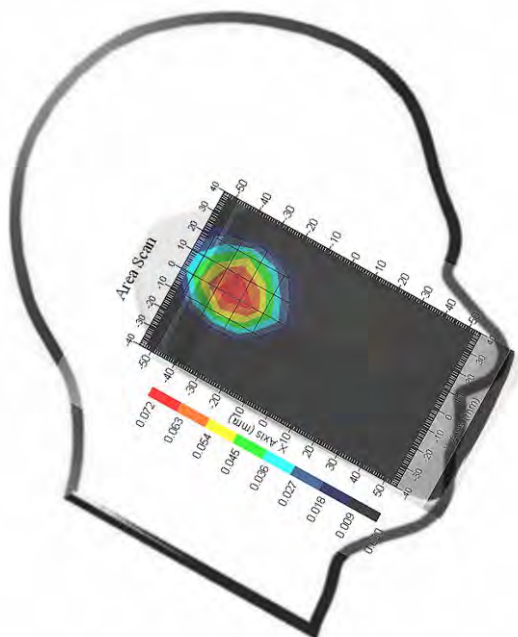
Type : Head
 Frequency : 2412.0 MHz
 Epsilon : 39.78 F/m
 Sigma : 1.78 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 2450
 Duty Cycle Factor : 1
 Conversion Factor : 4.3
 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 : 0.070 W/kg
 10 gram SAR value : 0.034 W/kg
 Area Scan Peak SAR : 0.072 W/kg
 Zoom Scan Peak SAR : 0.150 W/kg

Plot 22#



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

Right Head Cheek (2412 MHz Low Channel)

Measurement Data

Crest Factor : 1
 Scan Type : Complete
 Area Scan : 12x9x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.060 W/kg
 Power Drift-Finish : 0.058 W/kg
 Power Drift (%) : -3.427

Tissue Data

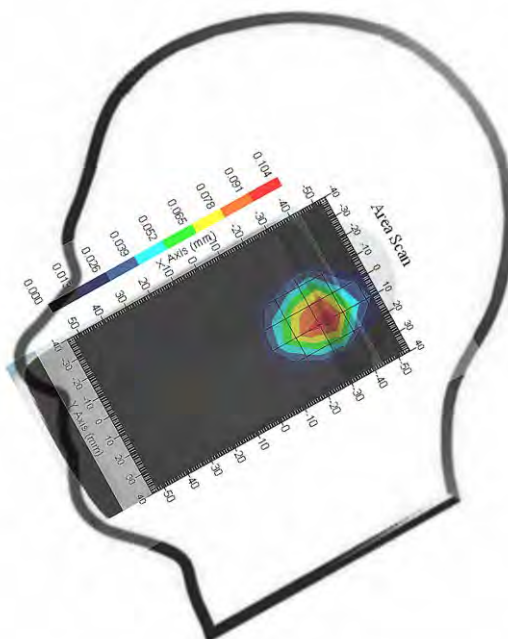
Type : Head
 Frequency : 2412.0 MHz
 Epsilon : 39.78 F/m
 Sigma : 1.78 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 2450
 Duty Cycle Factor : 1
 Conversion Factor : 4.3
 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 : 0.046 W/kg
 Area Scan Peak SAR : 0.103 W/kg
 Zoom Scan Peak SAR : 0.255 W/kg

Plot 23#



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

Right Head Tilt (2412 MHz Low Channel)

Measurement Data

Crest Factor : 1
 Scan Type : Complete
 Area Scan : 12x9x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.068 W/kg
 Power Drift-Finish : 0.068 W/kg
 Power Drift (%) : -0.633

Tissue Data

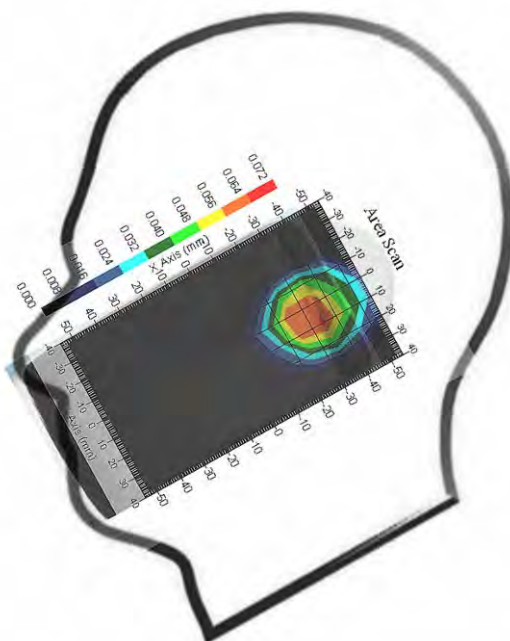
Type : Head
 Frequency : 2412.0 MHz
 Epsilon : 39.78 F/m
 Sigma : 1.78 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 2450
 Duty Cycle Factor : 1
 Conversion Factor : 4.3
 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 : 0.066 W/kg
 10 gram SAR value : 0.032 W/kg
 Area Scan Peak SAR : 0.069 W/kg
 Zoom Scan Peak SAR : 0.201 W/kg

Plot 24#



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

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

Measurement Data

Test mode : GPRS
 Crest Factor : 4
 Scan Type : Complete
 Area Scan : 9x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.157 W/kg
 Power Drift-Finish : 0.154 W/kg
 Power Drift (%) : -1.927

Tissue Data

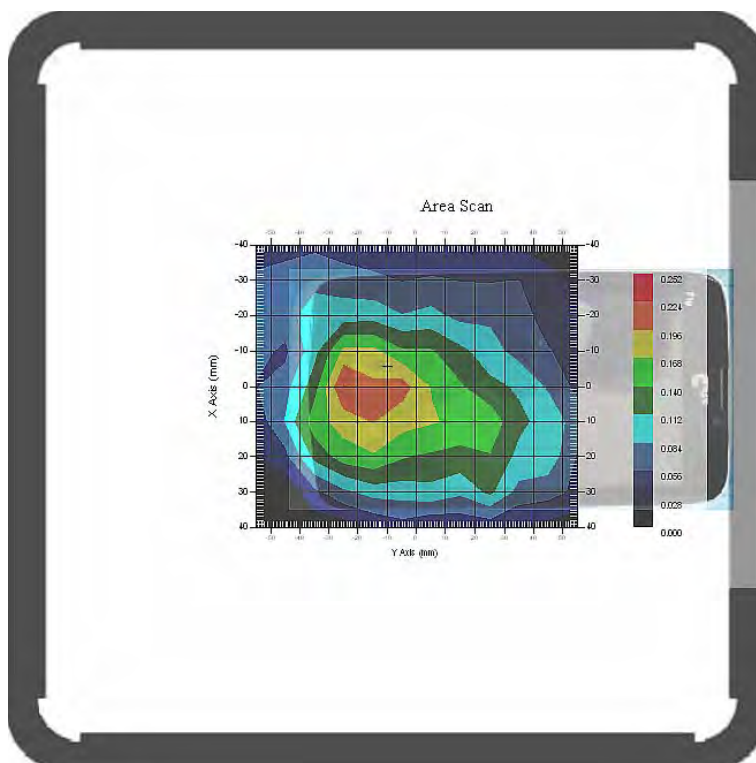
Type : Body
 Frequency : 848.80 MHz
 Epsilon : 55.29 F/m
 Sigma : 0.99 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 4
 Conversion Factor : 6.6
 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 : 0.202 W/kg
 10 gram SAR value : 0.121 W/kg
 Area Scan Peak SAR : 0.226 W/kg
 Zoom Scan Peak SAR : 0.340 W/kg

Plot 25#



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

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

Measurement Data

Test mode : GPRS
 Crest Factor : 4
 Scan Type : Complete
 Area Scan : 9x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.250 W/kg
 Power Drift-Finish : 0.254 W/kg
 Power Drift (%) : 2.411

Tissue Data

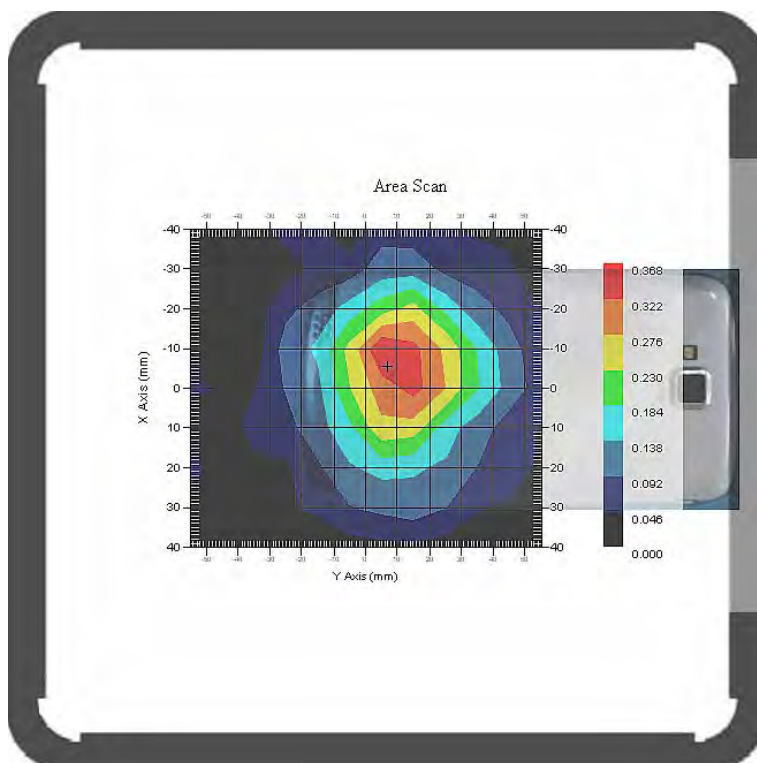
Type : Body
 Frequency : 848.80 MHz
 Epsilon : 55.29 F/m
 Sigma : 0.99 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 4
 Conversion Factor : 6.6
 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 : 0.335 W/kg
 10 gram SAR value : 0.217 W/kg
 Area Scan Peak SAR : 0.366 W/kg
 Zoom Scan Peak SAR : 0.500 W/kg

Plot 26#



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

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

Measurement Data

Test mode : GPRS
 Crest Factor : 4
 Scan Type : Complete
 Area Scan : 7x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.048 W/kg
 Power Drift-Finish : 0.048 W/kg
 Power Drift (%) : -0.711

Tissue Data

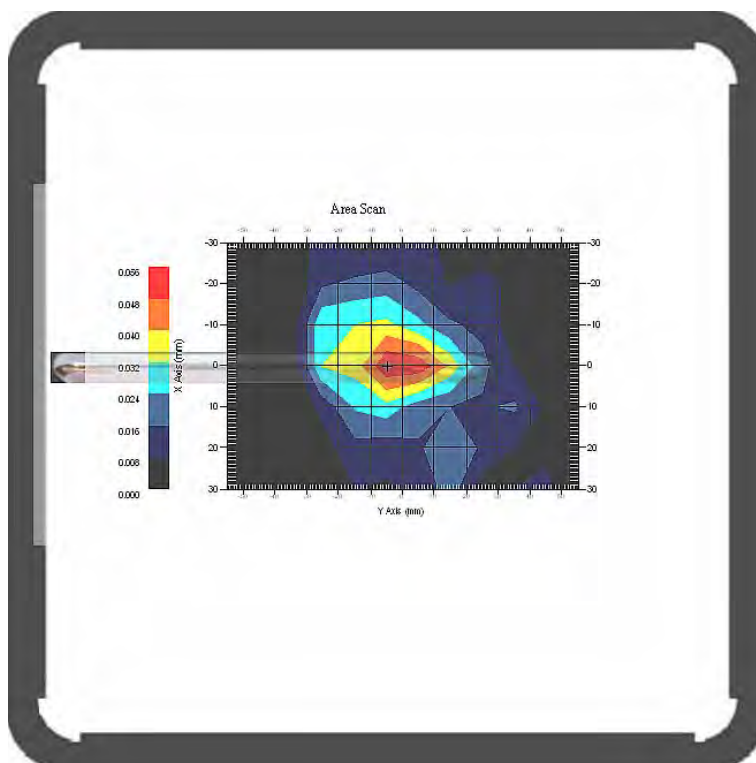
Type : Body
 Frequency : 848.80 MHz
 Epsilon : 55.29 F/m
 Sigma : 0.99 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 4
 Conversion Factor : 6.6
 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 : 0.052 W/kg
 10 gram SAR value : 0.029 W/kg
 Area Scan Peak SAR : 0.055 W/kg
 Zoom Scan Peak SAR : 0.130 W/kg

Plot 27#



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

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

Measurement Data

Test mode : GPRS
 Crest Factor : 4
 Scan Type : Complete
 Area Scan : 7x12x1 : 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 : 0.145 W/kg
 Power Drift (%) : -2.103

Tissue Data

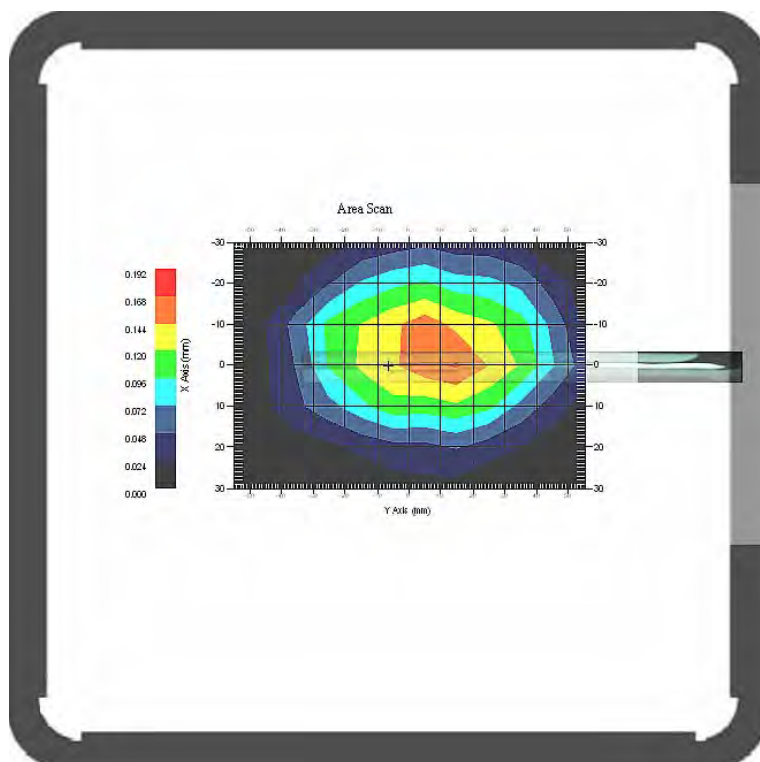
Type : Body
 Frequency : 848.80 MHz
 Epsilon : 55.29 F/m
 Sigma : 0.99 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 835
 Duty Cycle Factor : 4
 Conversion Factor : 6.6
 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 : 0.169 W/kg
 10 gram SAR value : 0.096 W/kg
 Area Scan Peak SAR : 0.170 W/kg
 Zoom Scan Peak SAR : 0.260 W/kg

Plot 28#



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

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

Measurement Data

Test mode : GPRS
Crest Factor : 4
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 : 0.074 W/kg
Power Drift-Finish : 0.072 W/kg
Power Drift (%) : -2.488

Tissue Data

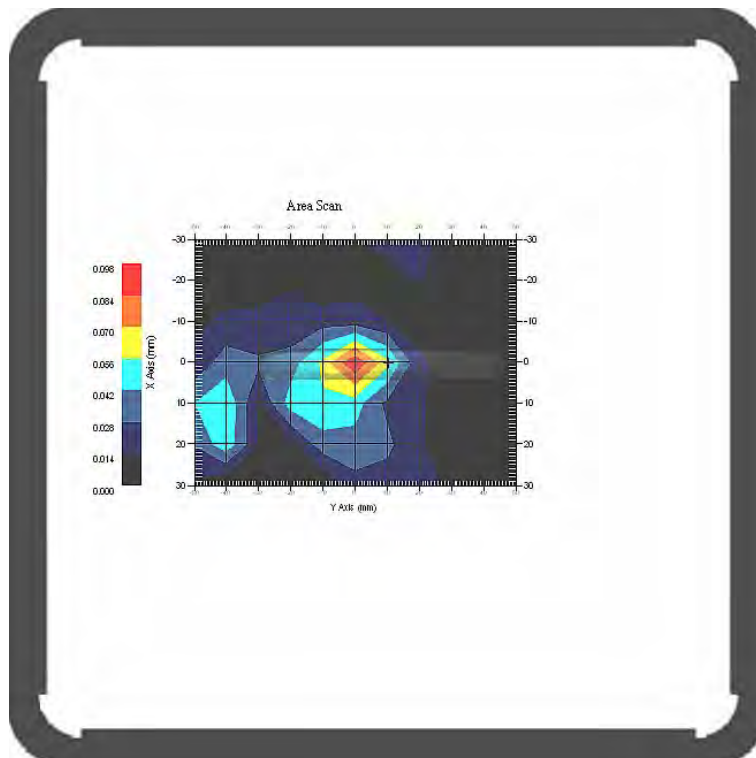
Type : Body
Frequency : 848.80 MHz
Epsilon : 55.29 F/m
Sigma : 0.99 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 4
Conversion Factor : 6.6
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 : 0.084 W/kg
10 gram SAR value : 0.036 W/kg
Area Scan Peak SAR : 0.097 W/kg
Zoom Scan Peak SAR : 0.183 W/kg

Plot 29#



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

Hot Spot: Body-Front (1850.2 MHz Low Channel)

Measurement Data

Test mode : GPRS
 Crest Factor : 2
 Scan Type : Complete
 Area Scan : 9x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.488 W/kg
 Power Drift-Finish : 0.481 W/kg
 Power Drift (%) : -1.422

Tissue Data

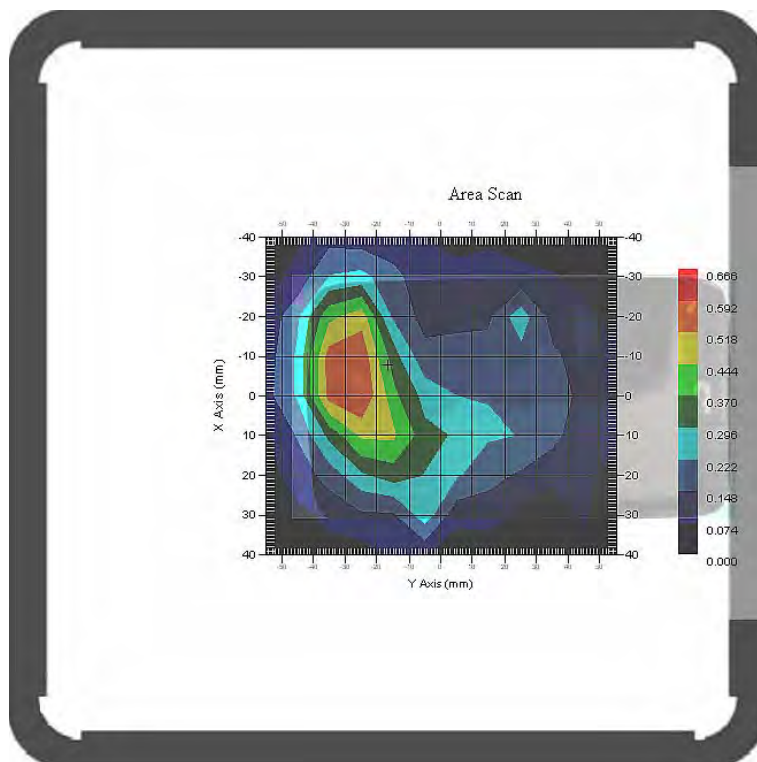
Type : Body
 Frequency : 1850.20 MHz
 Epsilon : 53.10 F/m
 Sigma : 1.49 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 2
 Conversion Factor : 5.0
 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 : 0.625 W/kg
 10 gram SAR value : 0.345 W/kg
 Area Scan Peak SAR : 0.593 W/kg
 Zoom Scan Peak SAR : 1.090 W/kg

Plot 30#



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

Hot Spot: Body-Back (1850.2 MHz Low Channel)

Measurement Data

Test mode : GPRS
 Crest Factor : 2
 Scan Type : Complete
 Area Scan : 9x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.622 W/kg
 Power Drift-Finish : 0.614 W/kg
 Power Drift (%) : -1.386

Tissue Data

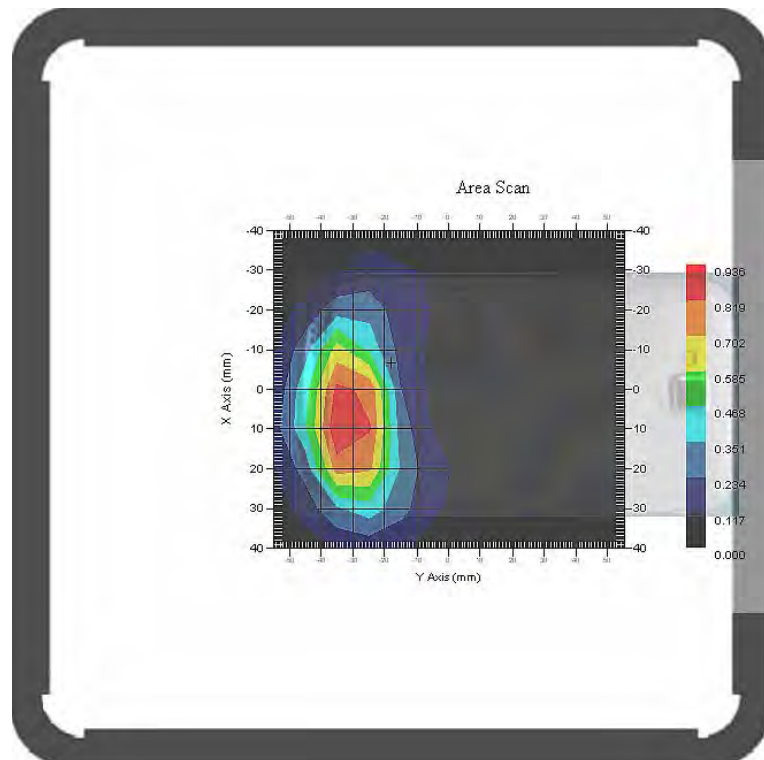
Type : Body
 Frequency : 1850.20 MHz
 Epsilon : 53.10 F/m
 Sigma : 1.49 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 2
 Conversion Factor : 5.0
 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 : 0.904 W/kg
 10 gram SAR value : 0.526 W/kg
 Area Scan Peak SAR : 0.933 W/kg
 Zoom Scan Peak SAR : 1.761 W/kg

Plot 31#



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

Hot Spot: Body-Back (1880 MHz Middle Channel)

Measurement Data

Test mode : GPRS
 Crest Factor : 2
 Scan Type : Complete
 Area Scan : 9x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.502 W/kg
 Power Drift-Finish : 0.511 W/kg
 Power Drift (%) : 1.786

Tissue Data

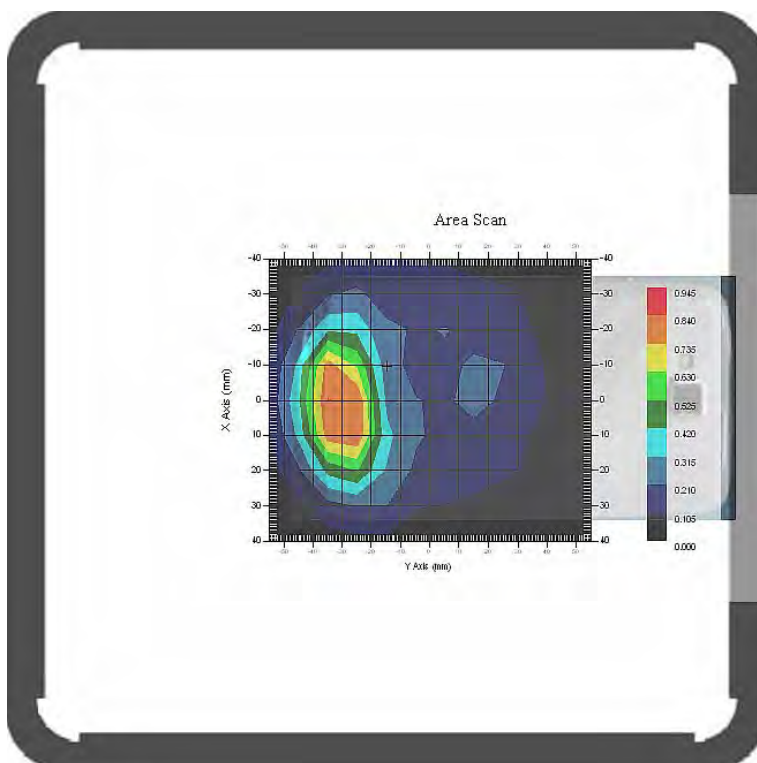
Type : Body
 Frequency : 1880.00 MHz
 Epsilon : 53.16 F/m
 Sigma : 1.53 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 2
 Conversion Factor : 5.0
 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 : 0.896 W/kg
 10 gram SAR value : 0.478 W/kg
 Area Scan Peak SAR : 0.842 W/kg
 Zoom Scan Peak SAR : 1.501 W/kg

Plot 32#



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

Hot Spot: Body-Back (1909.8 MHz High Channel)

Measurement Data

Test mode : GPRS
 Crest Factor : 2
 Scan Type : Complete
 Area Scan : 9x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.450 W/kg
 Power Drift-Finish : 0.441 W/kg
 Power Drift (%) : -2.011

Tissue Data

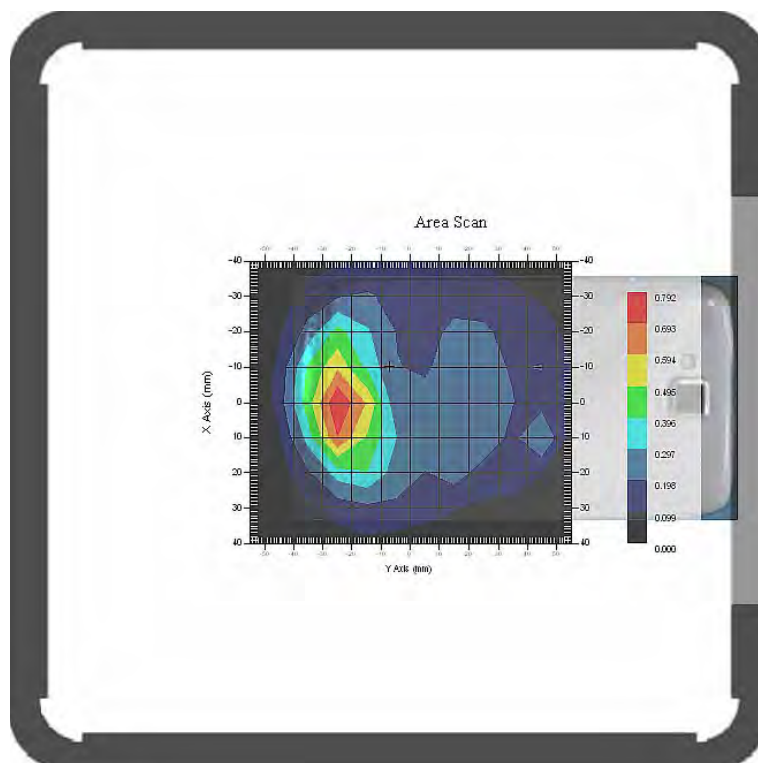
Type : Body
 Frequency : 1909.80 MHz
 Epsilon : 53.23 F/m
 Sigma : 1.54 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 2
 Conversion Factor : 5.0
 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 : 0.736 W/kg
 10 gram SAR value : 0.390 W/kg
 Area Scan Peak SAR : 0.790 W/kg
 Zoom Scan Peak SAR : 1.321 W/kg

Plot 33#



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

Hot Spot: Body-Left (1850.2 MHz Low Channel)

Measurement Data

Test mode : GPRS
 Crest Factor : 2
 Scan Type : Complete
 Area Scan : 7x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.085 W/kg
 Power Drift-Finish : 0.087 W/kg
 Power Drift (%) : 2.522

Tissue Data

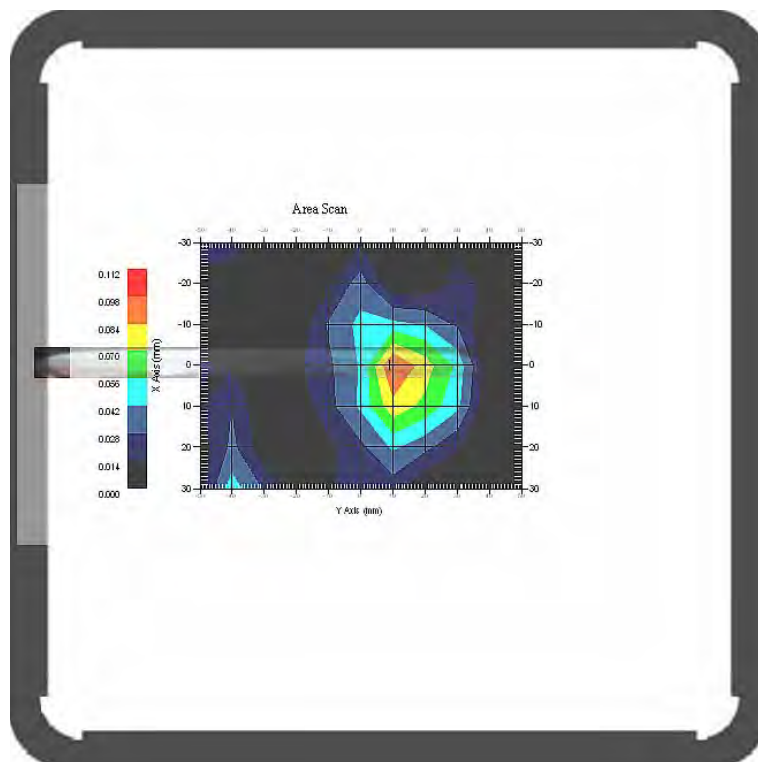
Type : Body
 Frequency : 1850.20 MHz
 Epsilon : 53.10 F/m
 Sigma : 1.49 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 2
 Conversion Factor : 5.0
 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 : 0.089 W/kg
 10 gram SAR value : 0.039 W/kg
 Area Scan Peak SAR : 0.099 W/kg
 Zoom Scan Peak SAR : 0.200 W/kg

Plot 34#



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

Hot Spot: Body-Right (1850.2 MHz Low Channel)

Measurement Data

Test mode : GPRS
 Crest Factor : 2
 Scan Type : Complete
 Area Scan : 7x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.082 W/kg
 Power Drift-Finish : 0.083 W/kg
 Power Drift (%) : 1.249

Tissue Data

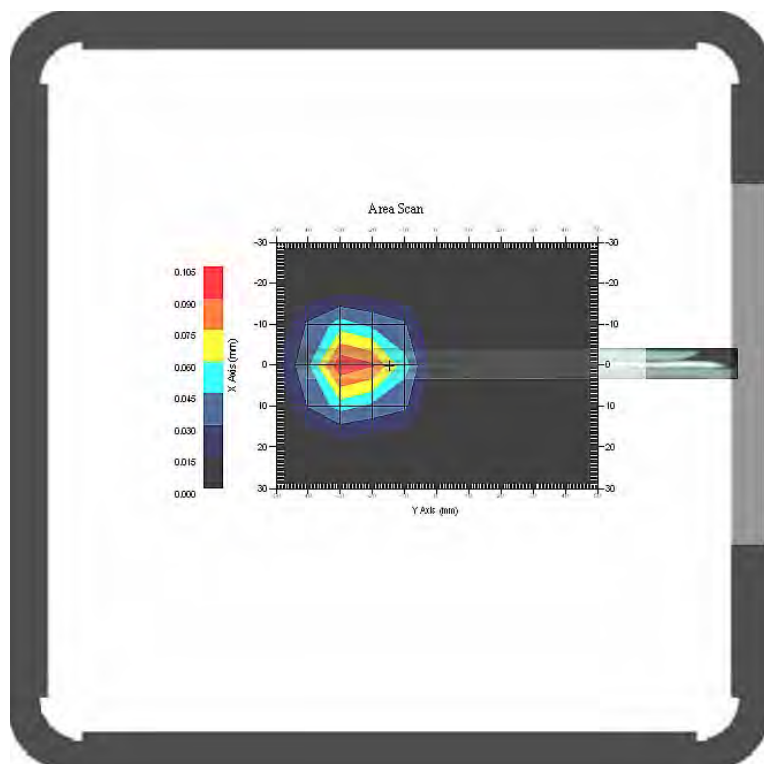
Type : Body
 Frequency : 1850.20 MHz
 Epsilon : 53.10 F/m
 Sigma : 1.49 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 2
 Conversion Factor : 5.0
 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 : 0.093 W/kg
 10 gram SAR value : 0.041 W/kg
 Area Scan Peak SAR : 0.104 W/kg
 Zoom Scan Peak SAR : 0.291 W/kg

Plot 35#



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

Hot Spot: Body-Bottom (1850.2 MHz Low 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 : 0.635 W/kg
 Power Drift-Finish : 0.630 W/kg
 Power Drift (%) : -0.819

Tissue Data

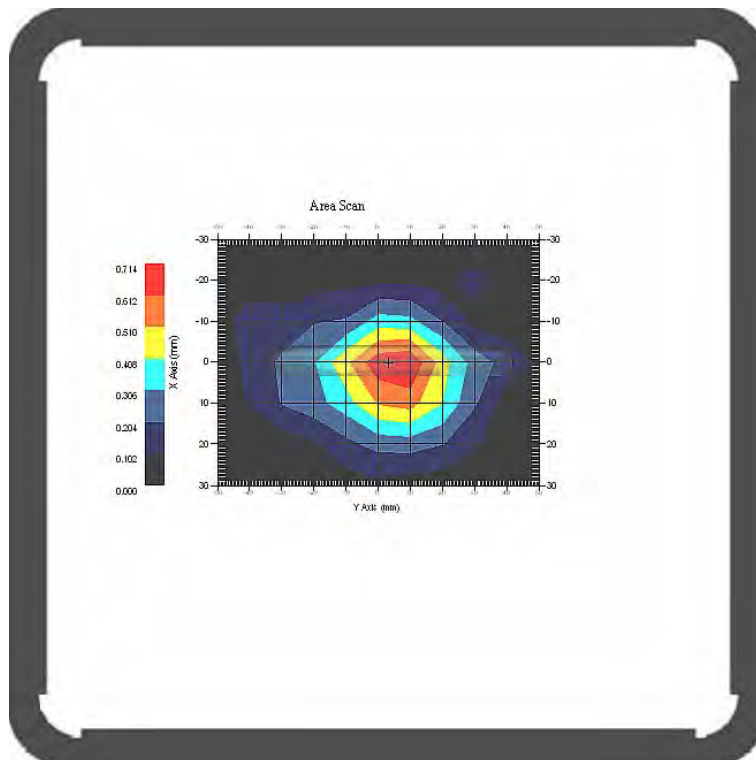
Type : Body
 Frequency : 1850.20 MHz
 Epsilon : 53.10 F/m
 Sigma : 1.49 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 2
 Conversion Factor : 5.0
 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 : 0.620 W/kg
 10 gram SAR value : 0.326 W/kg
 Area Scan Peak SAR : 0.714 W/kg
 Zoom Scan Peak SAR : 1.151 W/kg

Plot 36#



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

WCDMA850; Body-Front (836.6 MHz Middle Channel)

Measurement Data

Test mode : WCDMA850
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 9x12x1: Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.042 W/kg
 Power Drift-Finish : 0.042 W/kg
 Power Drift (%) : -1.041

Tissue Data

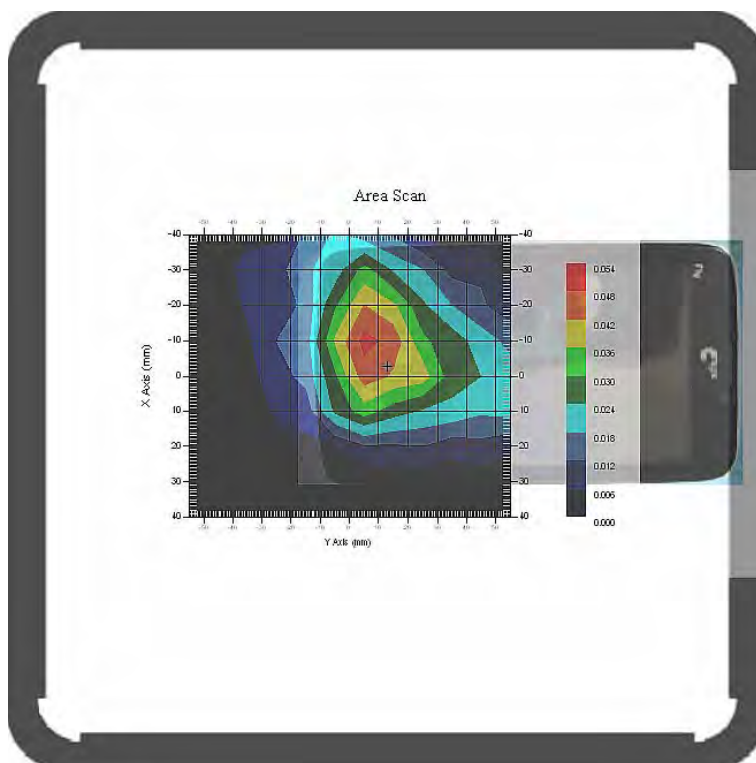
Type : Body
 Frequency : 836.60 MHz
 Epsilon : 55.21 F/m
 Sigma : 0.97 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 850
 Duty Cycle Factor : 1
 Conversion Factor : 6.6
 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 : 0.048 W/kg
 10 gram SAR value : 0.026 W/kg
 Area Scan Peak SAR : 0.052 W/kg
 Zoom Scan Peak SAR : 0.080 W/kg

Plot 37#



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

WCDMA850; Body-Back (836.6 MHz Middle Channel)

Measurement Data

Test mode : WCDMA850
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 9x12x1: Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.082 W/kg
 Power Drift-Finish : 0.080 W/kg
 Power Drift (%) : -2.488

Tissue Data

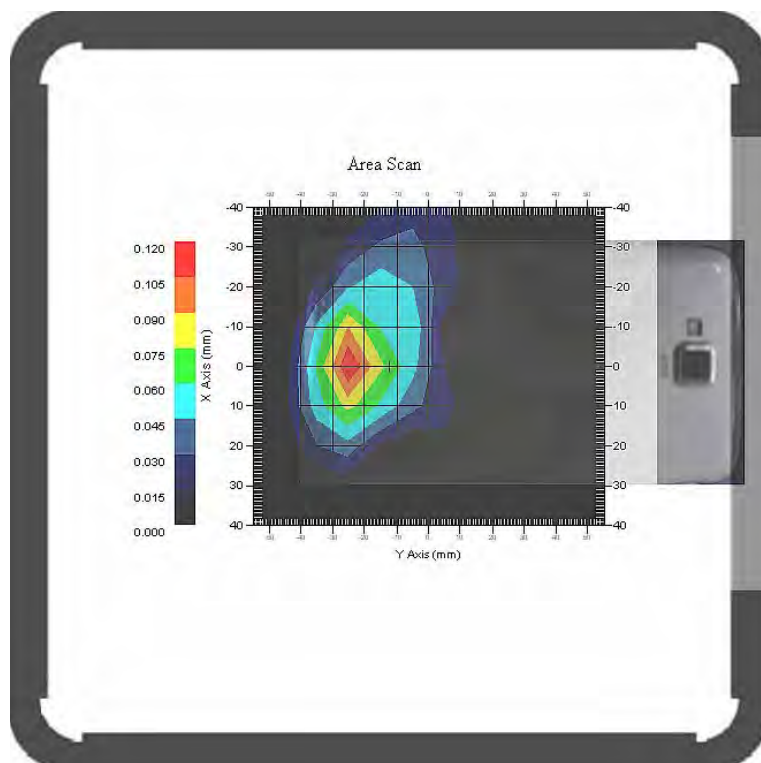
Type : Body
 Frequency : 836.60 MHz
 Epsilon : 55.21 F/m
 Sigma : 0.97 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 850
 Duty Cycle Factor : 1
 Conversion Factor : 6.6
 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 : 0.108 W/kg
 10 gram SAR value : 0.051 W/kg
 Area Scan Peak SAR : 0.120 W/kg
 Zoom Scan Peak SAR : 0.291 W/kg

Plot 38#



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

WCDMA850; Body-Left (836.6 MHz Middle Channel)

Measurement Data

Test mode : WCDMA850
Crest Factor : 1
Scan Type : Complete
Area Scan : 7x12x1: 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 (%) : 2.723

Tissue Data

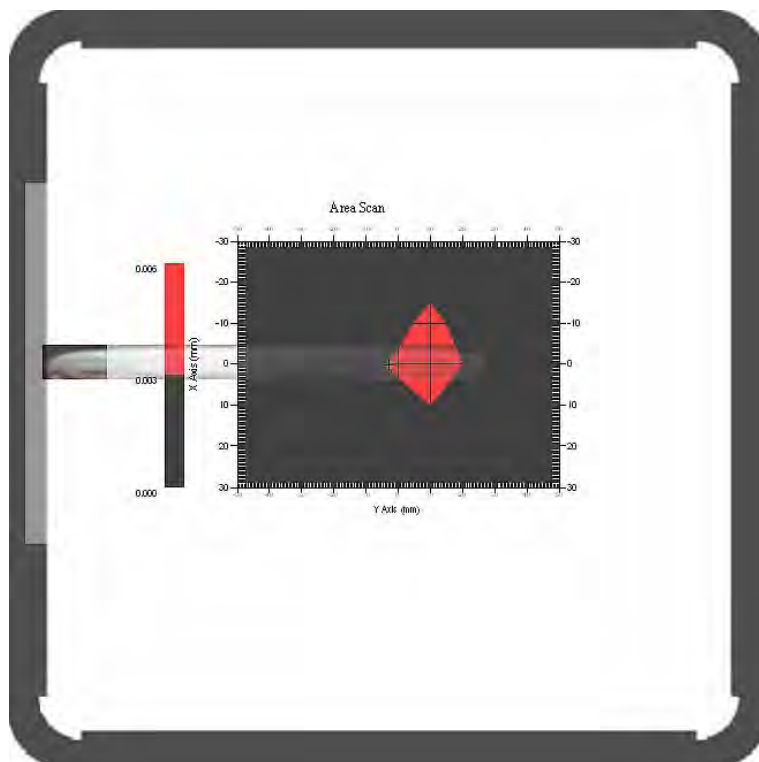
Type : Body
Frequency : 836.60 MHz
Epsilon : 55.21 F/m
Sigma : 0.97 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency Band : 850
Duty Cycle Factor : 1
Conversion Factor : 6.6
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 : 0.005 W/kg
10 gram SAR value : 0.002 W/kg
Area Scan Peak SAR : 0.006 W/kg
Zoom Scan Peak SAR : 0.019 W/kg

Plot 39#



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

WCDMA850; Body-Right (836.6 MHz Middle Channel)

Measurement Data

Test mode : WCDMA850
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 7x12x1: Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.039 W/kg
 Power Drift-Finish : 0.038 W/kg
 Power Drift (%) : -2.537

Tissue Data

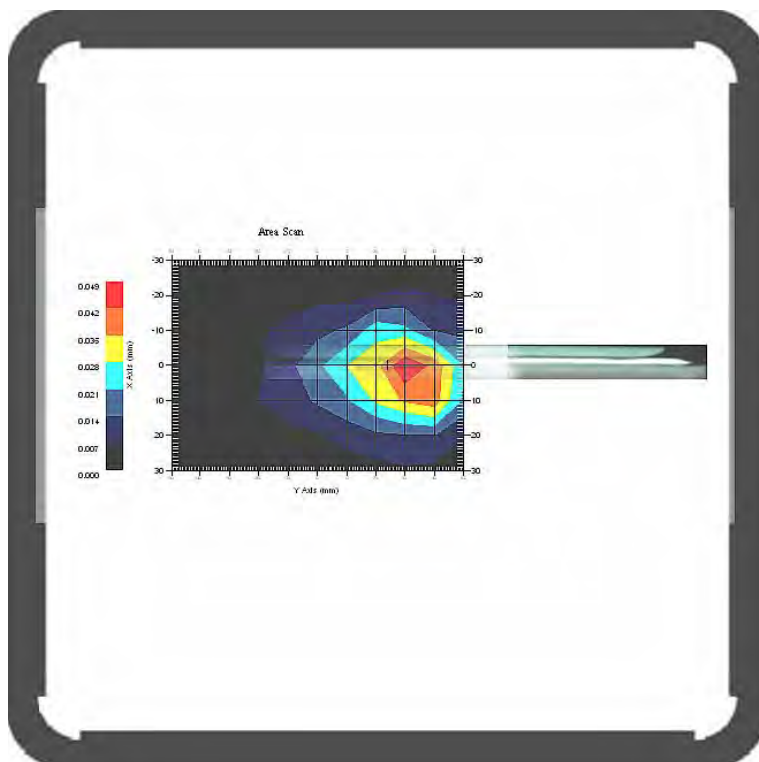
Type : Body
 Frequency : 836.60 MHz
 Epsilon : 55.21 F/m
 Sigma : 0.97 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 850
 Duty Cycle Factor : 1
 Conversion Factor : 6.6
 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 : 0.049 W/kg
 10 gram SAR value : 0.023 W/kg
 Area Scan Peak SAR : 0.048 W/kg
 Zoom Scan Peak SAR : 0.120 W/kg

Plot 40#



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

WCDMA850; Body-Bottom (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 : 0.001 W/kg
 Power Drift-Finish : 0.001 W/kg
 Power Drift (%) : 3.054

Tissue Data

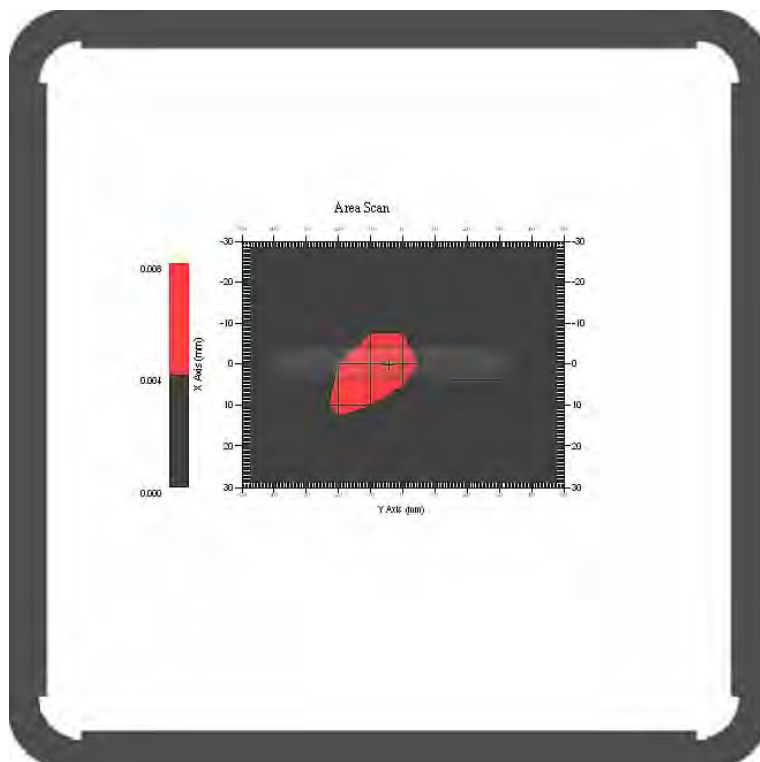
Type : Body
 Frequency : 836.60 MHz
 Epsilon : 55.21 F/m
 Sigma : 0.97 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 850
 Duty Cycle Factor : 1
 Conversion Factor : 6.6
 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 : 0.006 W/kg
 10 gram SAR value : 0.004 W/kg
 Area Scan Peak SAR : 0.008 W/kg
 Zoom Scan Peak SAR : 0.025 W/kg

Plot 41#



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

WCDMA1900; Body-Front (1880.0 MHz Middle Channel)

Measurement Data

Test mode : WCDMA1900
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 9x12x1: Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.280 W/kg
 Power Drift-Finish : 0.275W/kg
 Power Drift (%) : -1.713

Tissue Data

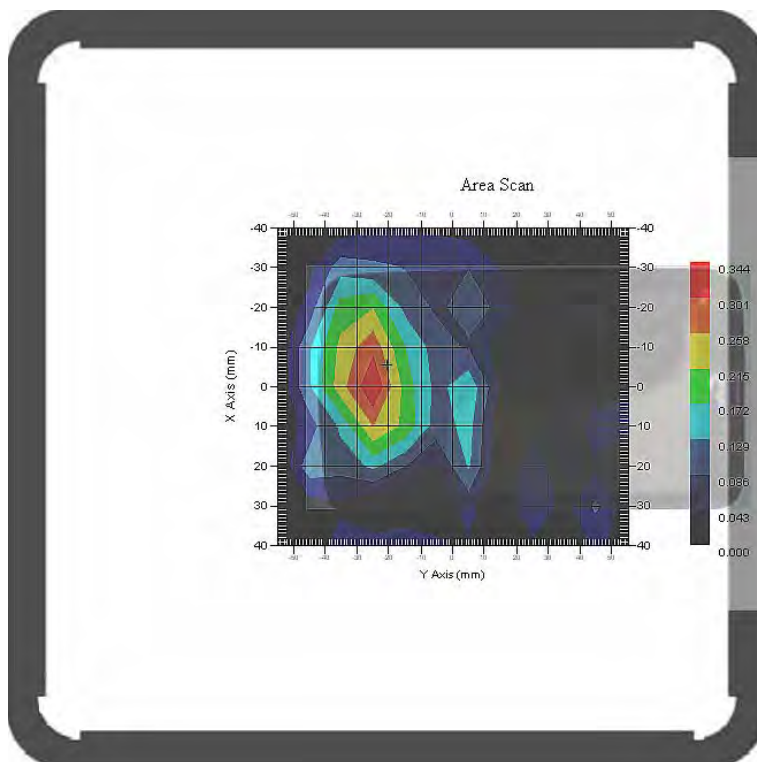
Type : Body
 Frequency : 1880.0 MHz
 Epsilon : 53.16 F/m
 Sigma : 1.53 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 1
 Conversion Factor : 5.0
 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 : 0.282 W/kg
 10 gram SAR value : 0.162 W/kg
 Area Scan Peak SAR : 0.341 W/kg
 Zoom Scan Peak SAR : 0.260 W/kg

Plot 42#



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

WCDMA1900; Body-Back (1880.0 MHz Middle Channel)

Measurement Data

Test mode : WCDMA1900
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 9x12x1: Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.415 W/kg
 Power Drift-Finish : 0.423 W/kg
 Power Drift (%) : 1.809

Tissue Data

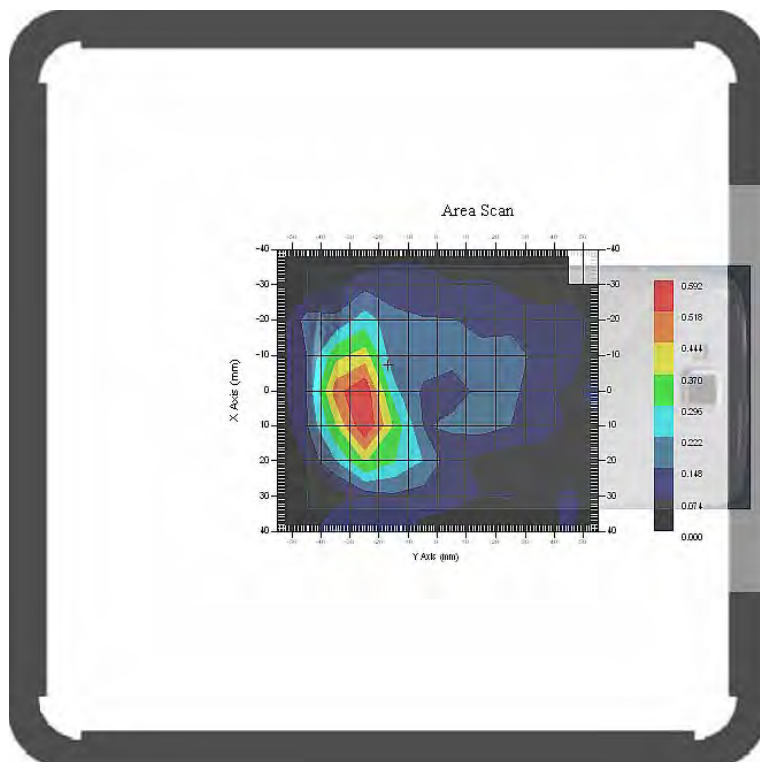
Type : Body
 Frequency : 1880.0 MHz
 Epsilon : 53.16 F/m
 Sigma : 1.53 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 1
 Conversion Factor : 5.0
 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 : 0.571 W/kg
 10 gram SAR value : 0.274 W/kg
 Area Scan Peak SAR : 0.592 W/kg
 Zoom Scan Peak SAR : 1.100 W/kg

Plot 43#



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

WCDMA1900; Body-Left (1880.0 MHz Middle Channel)

Measurement Data

Test mode : WCDMA1900
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 7x12x1: Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.035 W/kg
 Power Drift-Finish : 0.036 W/kg
 Power Drift (%) : 2.719

Tissue Data

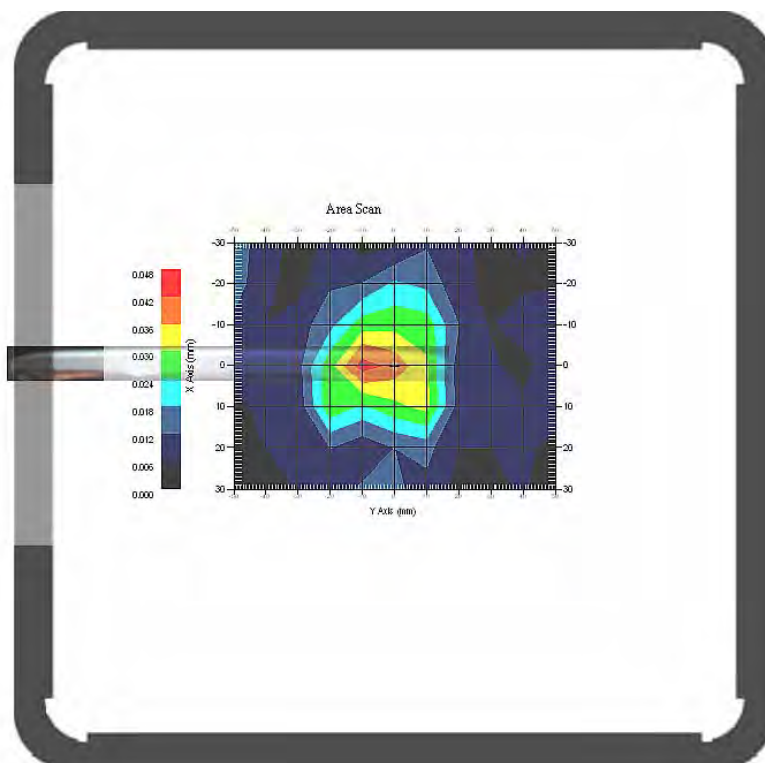
Type : Body
 Frequency : 1880.0 MHz
 Epsilon : 53.16 F/m
 Sigma : 1.53 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 1
 Conversion Factor : 5.0
 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 : 0.042 W/kg
 10 gram SAR value : 0.022 W/kg
 Area Scan Peak SAR : 0.045 W/kg
 Zoom Scan Peak SAR : 0.100 W/kg

Plot 44#



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

WCDMA1900; Body-Right (1880.0 MHz Middle Channel)

Measurement Data

Test mode : WCDMA1900
 Crest Factor : 1
 Scan Type : Complete
 Area Scan : 9x12x1: Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.029 W/kg
 Power Drift-Finish : 0.029 W/kg
 Power Drift (%) : -1.788

Tissue Data

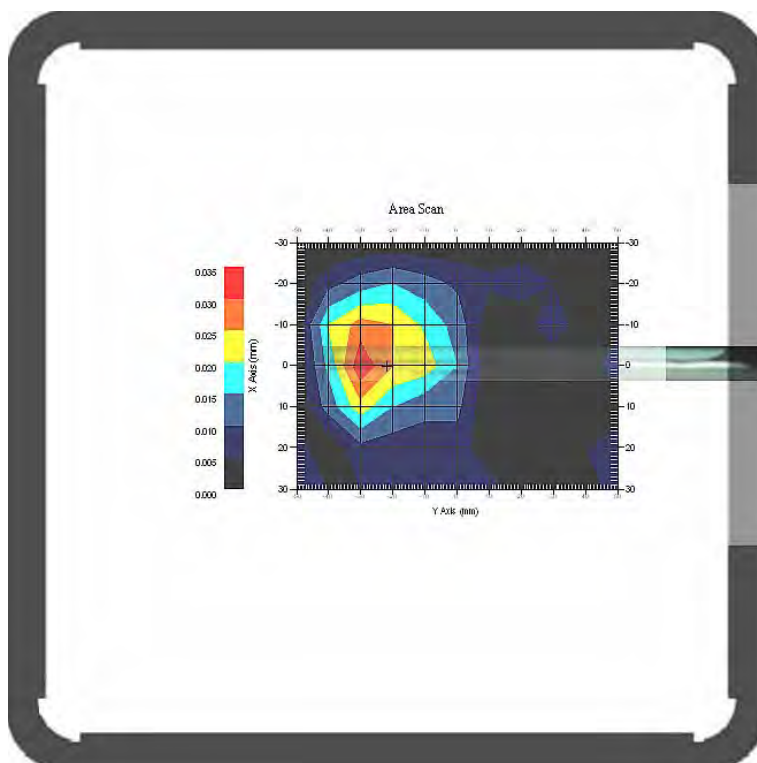
Type : Body
 Frequency : 1880.0 MHz
 Epsilon : 53.16 F/m
 Sigma : 1.53 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 1
 Conversion Factor : 5.0
 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 : 0.028 W/kg
 10 gram SAR value : 0.013 W/kg
 Area Scan Peak SAR : 0.034 W/kg
 Zoom Scan Peak SAR : 0.050 W/kg

Plot 45#



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

WCDMA1900; Body-Bottom (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 : 0.536 W/kg
 Power Drift-Finish : 0.528 W/kg
 Power Drift (%) : -1.529

Tissue Data

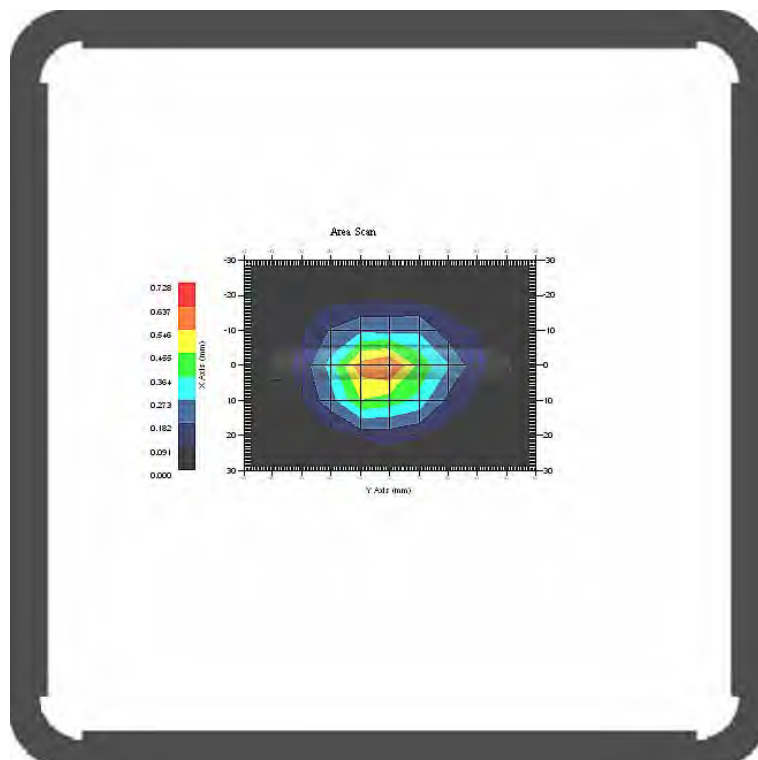
Type : Body
 Frequency : 1880.0 MHz
 Epsilon : 53.16 F/m
 Sigma : 1.53 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 1900
 Duty Cycle Factor : 1
 Conversion Factor : 5.0
 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 : 0.507 W/kg
 10 gram SAR value : 0.256 W/kg
 Area Scan Peak SAR : 0.638 W/kg
 Zoom Scan Peak SAR : 0.910 W/kg

Plot 46#



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

Hot Spot: 802.11b; Body-Worn-Front (2412 MHz Low Channel)

Measurement Data

Crest Factor : 1
 Scan Type : Complete
 Area Scan : 9x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.035 W/kg
 Power Drift-Finish : 0.036 W/kg
 Power Drift (%) : 2.763

Tissue Data

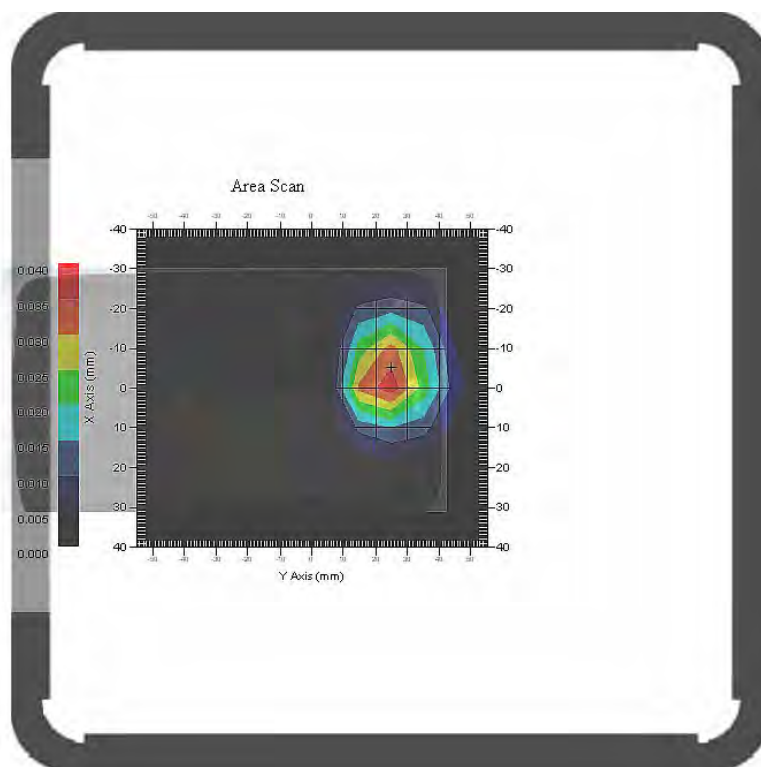
Type : Body
 Frequency : 2412 MHz
 Epsilon : 52.48 F/m
 Sigma : 1.98 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 2450
 Duty Cycle Factor : 1
 Conversion Factor : 4.3
 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 : 0.037 W/kg
 10 gram SAR value : 0.015 W/kg
 Area Scan Peak SAR : 0.040 W/kg
 Zoom Scan Peak SAR : 0.109 W/kg

Plot 47#



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

Hot Spot: 802.11b; Body-Worn-Back (2412 MHz Low Channel)

Measurement Data

Crest Factor : 1
 Scan Type : Complete
 Area Scan : 9x12x1 : 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 : 0.132 W/kg
 Power Drift (%) : -2.692

Tissue Data

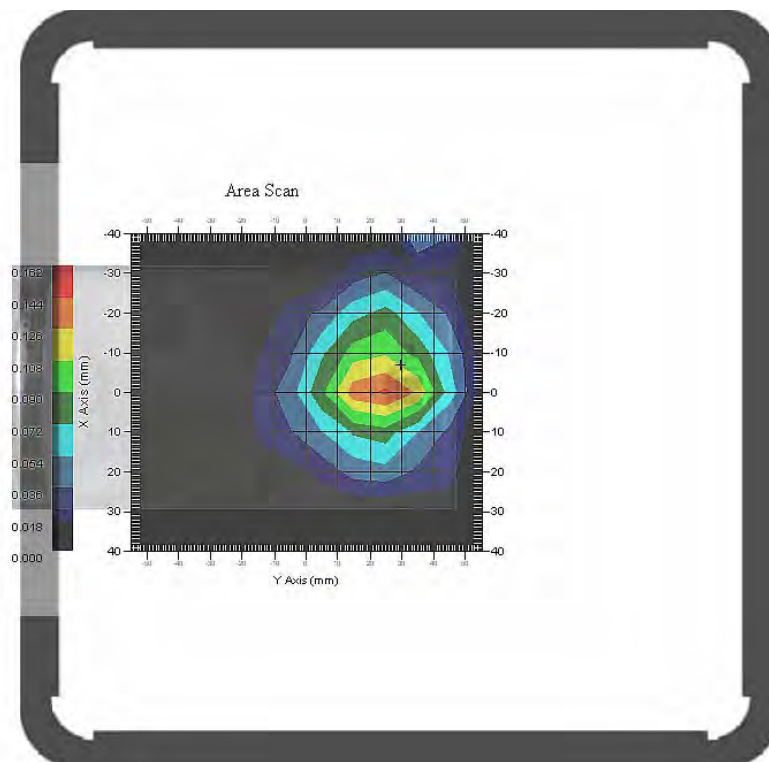
Type : Body
 Frequency : 2412 MHz
 Epsilon : 52.48 F/m
 Sigma : 1.98 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 2450
 Duty Cycle Factor : 1
 Conversion Factor : 4.3
 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 : 0.136 W/kg
 10 gram SAR value : 0.069 W/kg
 Area Scan Peak SAR : 0.147 W/kg
 Zoom Scan Peak SAR : 0.290 W/kg

Plot 48#



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

Hot Spot: 802.11b; Body-Worn-Left (2412 MHz Low Channel)

Measurement Data

Crest Factor : 1
 Scan Type : Complete
 Area Scan : 7x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.049 W/kg
 Power Drift-Finish : 0.050 W/kg
 Power Drift (%) : 2.117

Tissue Data

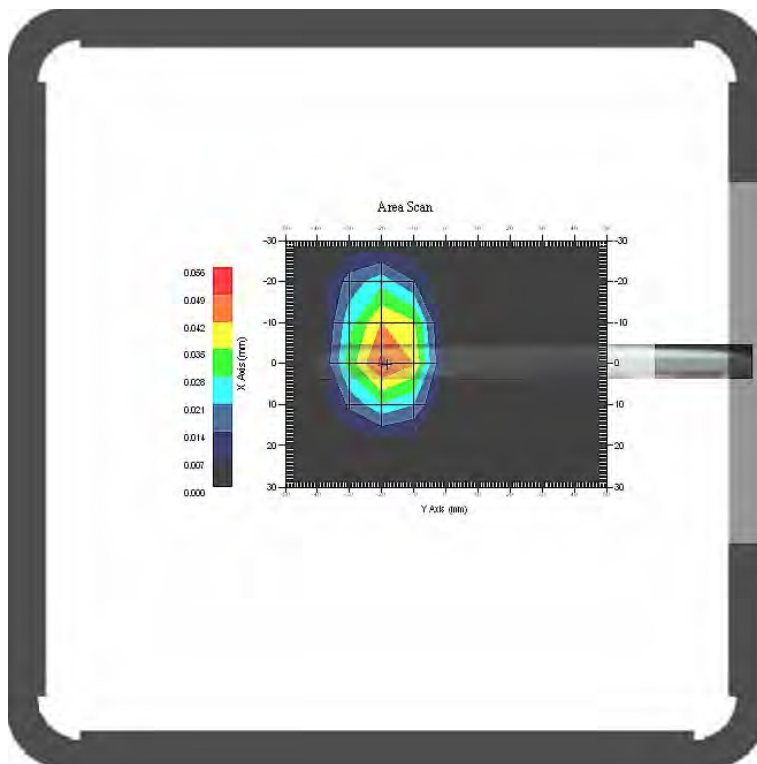
Type : Body
 Frequency : 2412 MHz
 Epsilon : 52.48 F/m
 Sigma : 1.98 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 2450
 Duty Cycle Factor : 1
 Conversion Factor : 4.3
 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 : 0.050 W/kg
 10 gram SAR value : 0.026 W/kg
 Area Scan Peak SAR : 0.053 W/kg
 Zoom Scan Peak SAR : 0.206 W/kg

Plot 49#



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

Hot Spot: 802.11b; Body-Worn-Right (2412 MHz Low Channel)

Measurement Data

Crest Factor : 1
 Scan Type : Complete
 Area Scan : 7x12x1 : Measurement x=10mm, y=10mm, z=4mm
 Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
 Power Drift-Start : 0.047 W/kg
 Power Drift-Finish : 0.046 W/kg
 Power Drift (%) : -2.093

Tissue Data

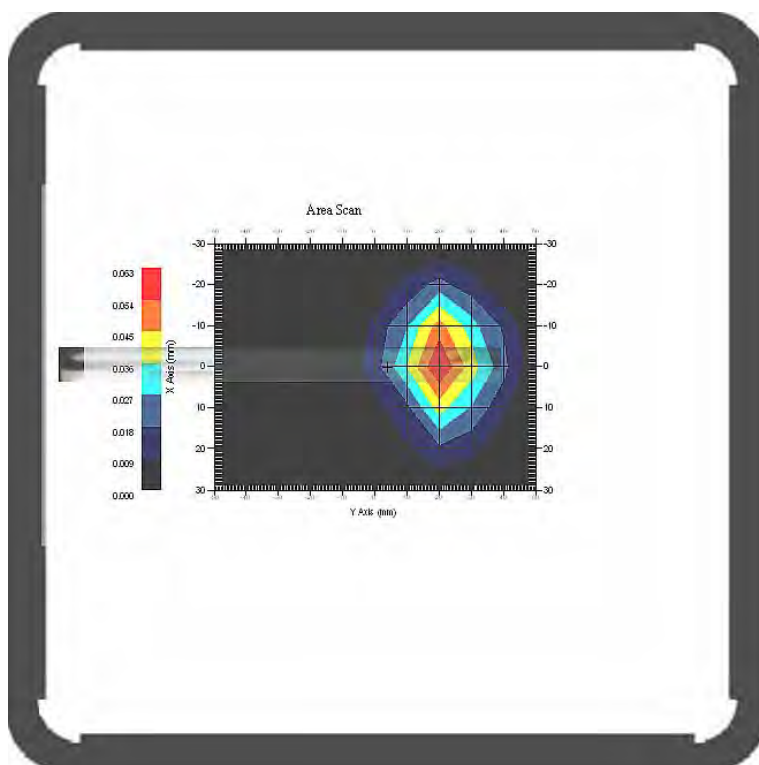
Type : Body
 Frequency : 2412 MHz
 Epsilon : 52.48 F/m
 Sigma : 1.98 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 2450
 Duty Cycle Factor : 1
 Conversion Factor : 4.3
 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 : 0.058 W/kg
 10 gram SAR value : 0.025 W/kg
 Area Scan Peak SAR : 0.062 W/kg
 Zoom Scan Peak SAR : 0.197 W/kg

Plot 50#



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

Hot Spot: 802.11b; Body-Worn-Top (2412 MHz Low Channel)

Measurement Data

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 : 0.203 W/kg
 Power Drift-Finish : 0.200 W/kg
 Power Drift (%) : -1.492

Tissue Data

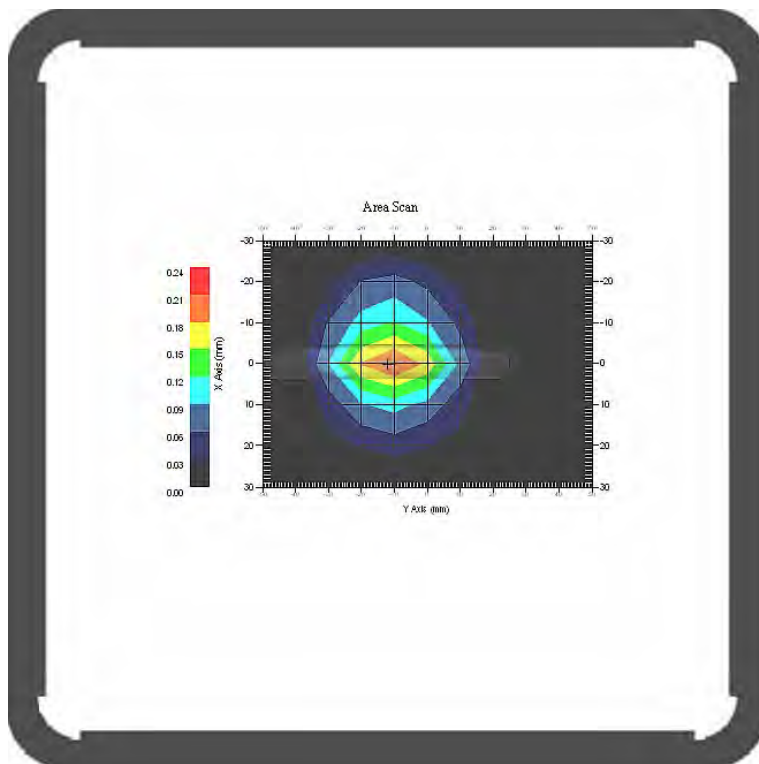
Type : Body
 Frequency : 2412 MHz
 Epsilon : 52.48 F/m
 Sigma : 1.98 S/m
 Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
 Frequency Band : 2450
 Duty Cycle Factor : 1
 Conversion Factor : 4.3
 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 : 0.188 W/kg
 10 gram SAR value : 0.090 W/kg
 Area Scan Peak SAR : 0.238 W/kg
 Zoom Scan Peak SAR : 0.350 W/kg

Plot 51#



APPENDIX A – MEASUREMENT UNCERTAINTY

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

Measurement Uncertainty for 300MHz to 3GHz

Source of Uncertainty	Tolerance Value	Probability Distribution	Divisor	c _i ¹ (1-g)	c _i ¹ (10-g)	Standard Uncertainty (1-g) %	Standard Uncertainty (10-g) %
Measurement System							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	(1-cp) ^{1/2}	$(\frac{1-cp}{2})^{1/2}$	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
Restriction							
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1
Test Sample Positioning	0.023	normal	1	1	1	0.023	0.023
Device Holder Uncertainty	6.215	normal	1	1	1	6.215	6.215
Drift of Output Power	4.627	rectangular	$\sqrt{3}$	1	1	2.67	2.67
Phantom and Setup							
Phantom Uncertainty(shape & thickness tolerance)	3.4	rectangular	$\sqrt{3}$	1	1	2.0	2.0
Liquid Conductivity(target)	5.0	rectangular	$\sqrt{3}$	0.7	0.5	2.0	1.4
Liquid Conductivity(meas.)	1.938	normal	1	0.7	0.5	1.36	0.97
Liquid Permittivity(target)	5.0	rectangular	$\sqrt{3}$	0.6	0.5	1.7	1.4
Liquid Permittivity(meas.)	3.093	normal	1	0.6	0.5	1.86	1.55
Combined Uncertainty		RSS				10.78	10.55
Expanded uncertainty (coverage factor=2)		Normal(k=2)				21.56	21.10

APPENDIX B – PROBE CALIBRATION CERTIFICATES

NCL CALIBRATION LABORATORIES

Calibration File No.: 1427-1430

Client.: BACL Lab

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-5673

Calibrated: 8th August 2012
Released on: 9th August 2012

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 (2003) including Amendment 1
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 (2006)
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 Ed. 1.0 (2010-03)
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 Draft Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9kHz to 40GHz

Page 2 of 10

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

NCL Calibration Laboratories

Division of APREL Inc.

Conditions

Probe 500-00283 was a recalibration with the exception frequency of 450 MHz .which was a new calibration

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

Primary Measurement Standards

Instrument	Serial Number	Cal due date
Power meter Anritsu MA2408A	90025437	Nov.4, 2012
Power Sensor Anritsu MA2481D	103555	Nov 4, 2012
Attenuator HP 8495A (70dB)	1944A10711	Sept. 14, 2012
Network Analyzer Anritsu MT8801C	MB11855	Feb. 8, 2013

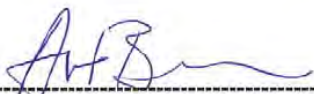
Secondary Measurement Standards

Signal Generator Agilent E4438C -506 MY55182336 June 7, 2013


Attestation

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

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



Art Brennan, Quality Manager



Dan Brooks, Test Engineer

Page 3 of 10

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

NCL Calibration Laboratories

Division of APREL Inc.

Probe Summary

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

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

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

NCL Calibration Laboratories

Division of APREL Inc.

Calibration for Tissue (Head H, Body B)

Frequency	Tissue Type	Measured Epsilon	Measured Sigma	Calibration Uncertainty	Tolerance Uncertainty for 5%*	Conversion Factor
450 H	Head	43.98	0.9	3.5	3.4	6
450 B	Body	57.07	0.92	3.5	3.4	6
750 H	Head	X	X	X	X	X
750 B	Body	X	X	X	X	X
835 H	Head	42.35	0.938	3.5	3.4	6.6
835 B	Body	56.65	1.018	3.5	3.4	6.6
900 H	Head	41.35	0.98	3.5	3.4	6
900 B	Body	56.08	1.05	3.5	3.4	6
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	X	X	X	X	X
1750 B	Body	X	X	X	X	X
1800 H	Head	X	X	X	X	X
1800 B	Body	X	X	X	X	X
1900 H	Head	38.72	1.35	3.5	2.7	5.2
1900 B	Body	51.62	1.48	3.5	2.7	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	38.06	1.87	3.5	3.5	4.9
2450 B	Body	50.22	2.03	3.5	3.5	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
5200 H	Head	X	X	X	X	X
5200 B	Body	X	X	X	X	X
5600 H	Head	X	X	X	X	X
5600 B	Body	X	X	X	X	X
5800 H	Head	X	X	X	X	X
5800 B	Body	X	X	X	X	X

NCL Calibration Laboratories

Division of APREL Inc.

Boundary Effect:

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

Spatial Resolution:

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

DAQ-PAQ Contribution

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

Boundary Effect:

For a distance of 0.58mm the worst case evaluated uncertainty (increase in the probe sensitivity) is less than 2.1%.

NOTES:

*The maximum deviation from the centre frequency when comparing the lower to upper range is listed.

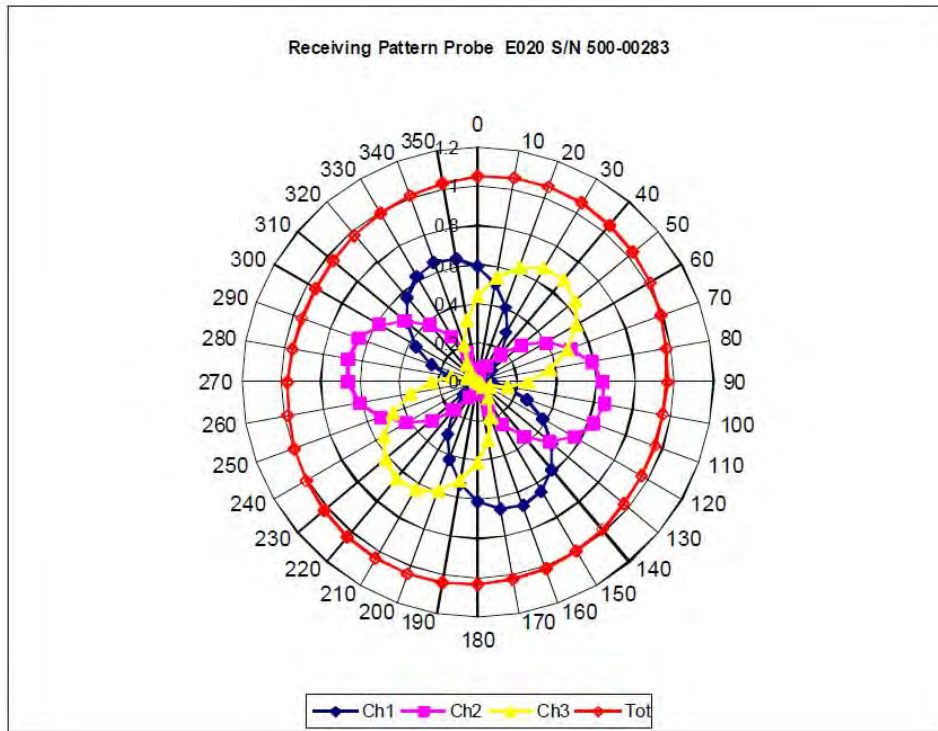
Page 6 of 10

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

NCL Calibration Laboratories

Division of APREL Inc.

Receiving Pattern Air



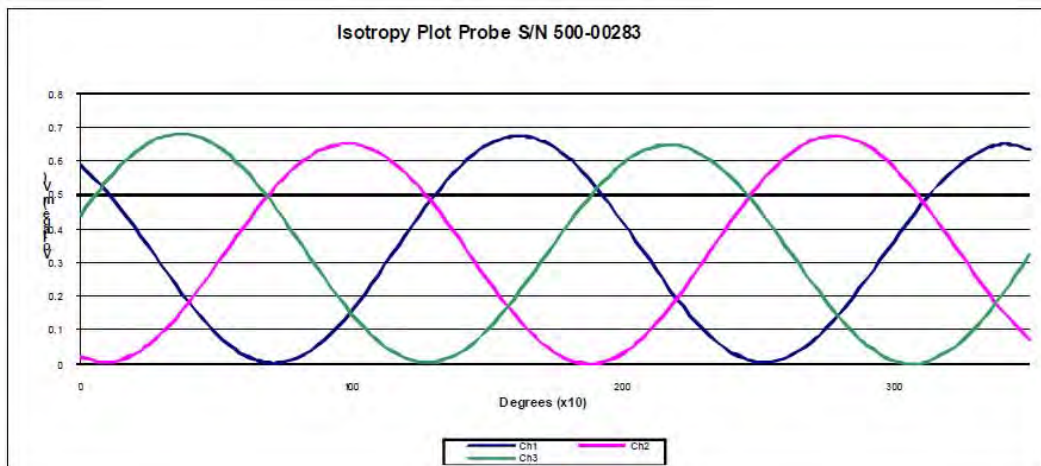
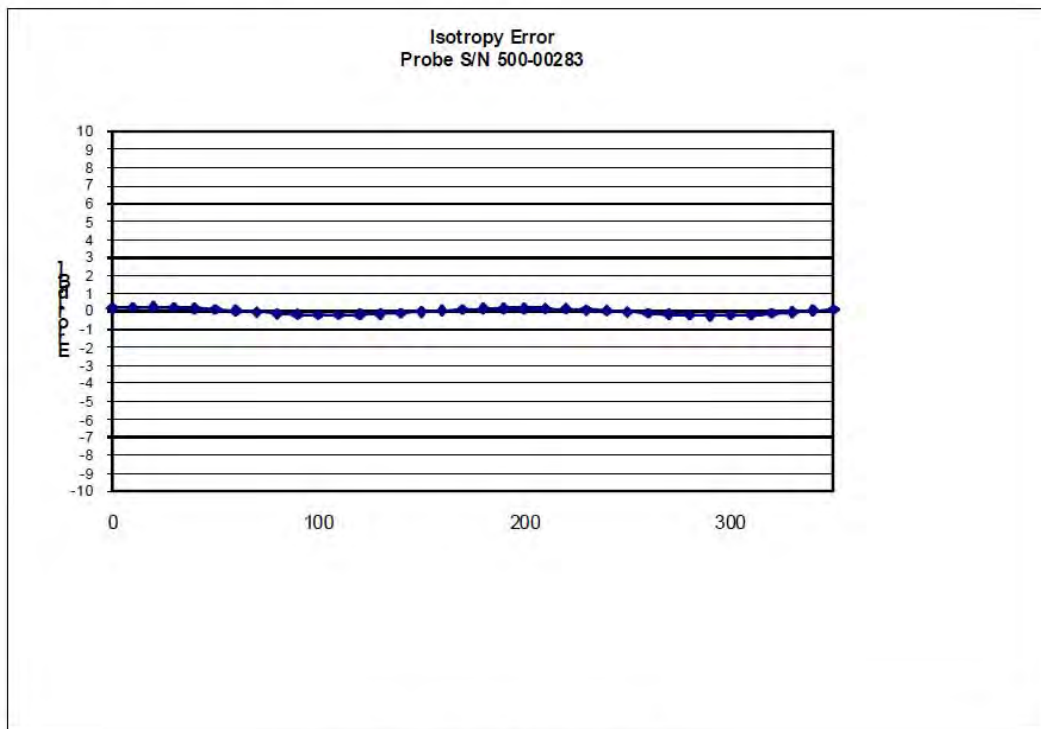
Page 7 of 10

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

NCL Calibration Laboratories

Division of APREL Inc.

Isotropy Error Air

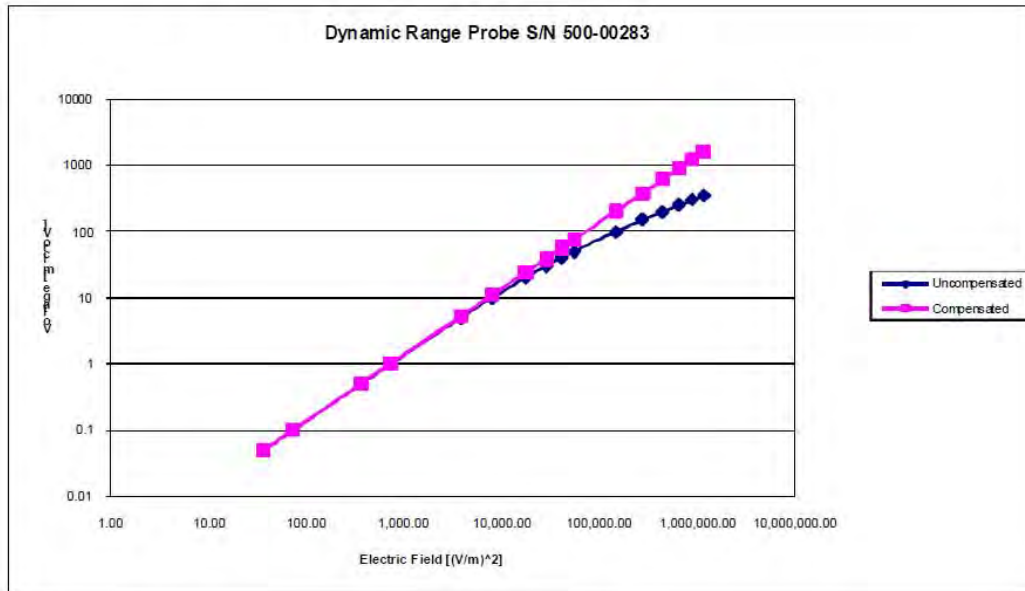


Isotropy Tissue: 0.10 dB

NCL Calibration Laboratories

Division of APREL Inc.

Dynamic Range

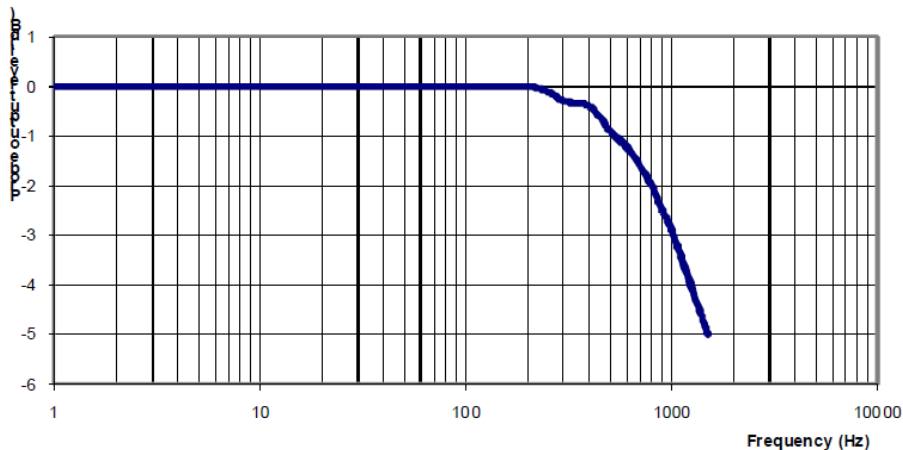


NCL Calibration Laboratories

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 2012.

APPENDIX C – DIPOLE CALIBRATION CERTIFICATES

NCL CALIBRATION LABORATORIES

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

CERTIFICATE OF CALIBRATION

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

Validation Dipole(Head and Body)

Manufacturer: APREL Laboratories
Part number: ALS-D-835-S-2
Frequency: 835 MHz
Serial No: 180-00558

Customer: Bay Area Compliance Laboratory

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

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

Released By: _____

NCL CALIBRATION LABORATORIES

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

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

NCL Calibration Laboratories

Division of APREL Laboratories.

Conditions

Dipole 180-00558 was received in good condition and a re-calibration.

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

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

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



Stuart Nicol



C. Teodorian

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

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

NCL Calibration Laboratories

Division of APREL Laboratories.

Calibration Results Summary

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

Mechanical Dimensions

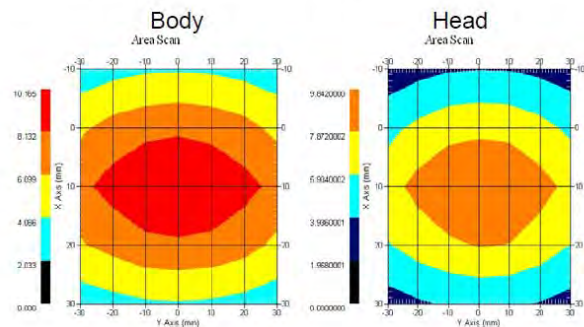
Length: 162.2 mm
Height: 89.4 mm

Electrical Specification

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

System Validation Results

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



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

NCL Calibration Laboratories

Division of APREL Laboratories.

Introduction

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

References

SSI-TP-018-ALSAS Dipole Calibration Procedure
SSI-TP-016 Tissue Calibration Procedure
IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"

Conditions

Dipole 180-00558 was new taken from stock.

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

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

Dipole Calibration uncertainty

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

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

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

4

NCL Calibration Laboratories

Division of APREL Laboratories.

Dipole Calibration Results

Mechanical Verification

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

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

Tissue Validation

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

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

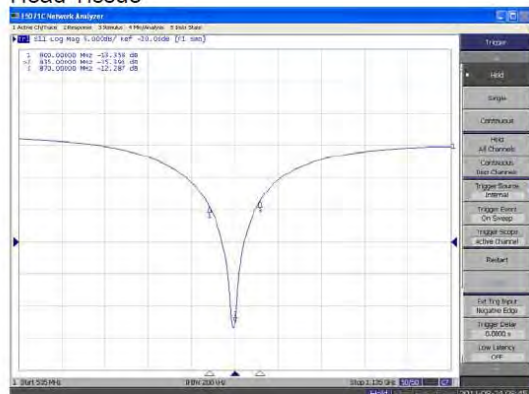
NCL Calibration Laboratories

Division of APREL Laboratories.

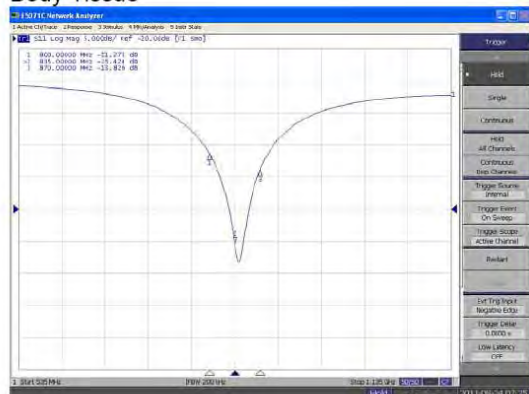
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

Head Tissue



Body Tissue

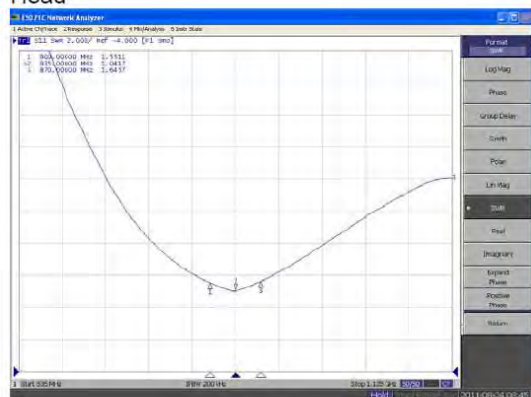


This page has been reviewed for content and attested to by signature within this document.

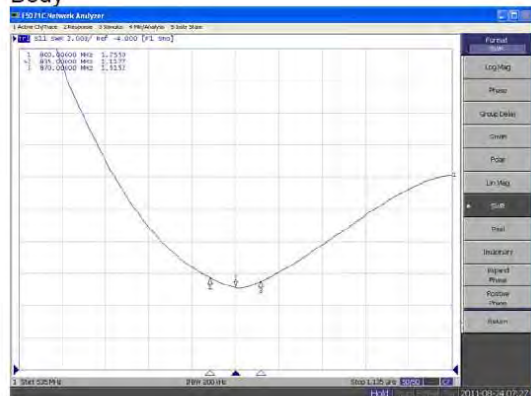
NCL Calibration Laboratories

Division of APREL Laboratories.

**SWR
Head**



Body

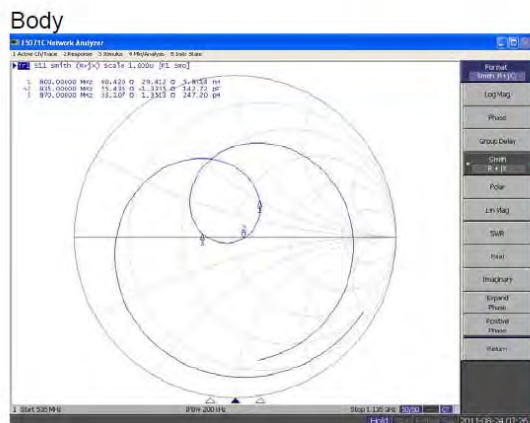
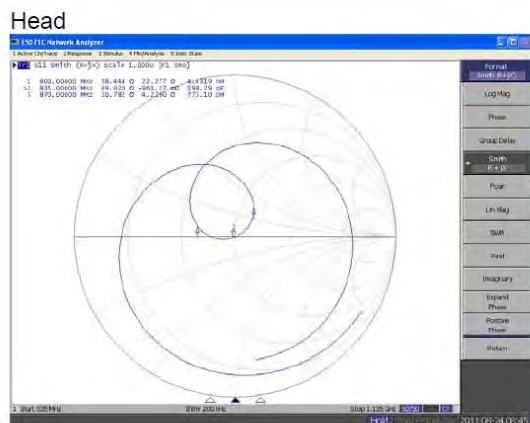


This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories

Division of APREL Laboratories.

Smith Chart Dipole Impedance



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

NCL Calibration Laboratories

Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List 2011.

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

9

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

Mechanical Verification

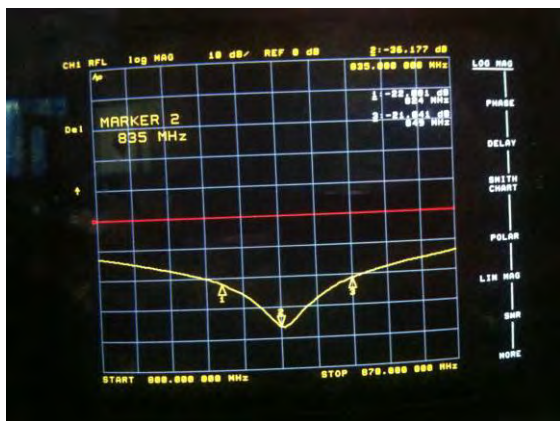
APREL Length	APREL Height	Measured Length	Measured Height
161.0 mm	89.8 mm	161.2 mm	89.5 mm

Tissue Type	Measured Return Loss	Measured Impedance
Head	-36.177 dB	50.207 Ω
Body	-24.964 dB	49.594 Ω

Test Graphs:

Head Tissue

Return Loss :

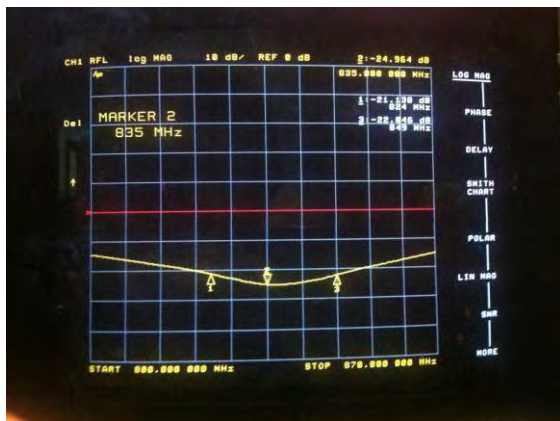


Impedance :



Body Tissue

Return Loss :



Impedance :



NCL CALIBRATION LABORATORIES

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

CERTIFICATE OF CALIBRATION

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

Validation Dipole (Head & Body)

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

Customer: Bay Area Compliance Laboratory

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

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

Released By: _____

NCL CALIBRATION LABORATORIES

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

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

NCL Calibration Laboratories

Division of APREL Laboratories.

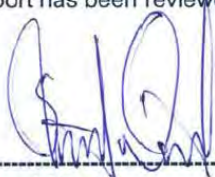
Conditions

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

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

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

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



Stuart Nicol



C. Teodorian

Primary Measurement Standards

Instrument	Serial Number	Cal due date
Power meter Anritsu MA2408A	245025437	Nov.4, 2011
Power Sensor Anritsu MA2481D	103555	Nov 4, 2011
Attenuator HP 8495A (70dB) 1	944A10711	Aug.8, 2012
Network Analyzer Agilent E5071C	1334746J	Feb. 8, 2012

Secondary Measurement Standards

Signal Generator Agilent E4438C	-506 MY55182336	June 7, 2012
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This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories

Division of APREL Laboratories.

Calibration Results Summary

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

Mechanical Dimensions

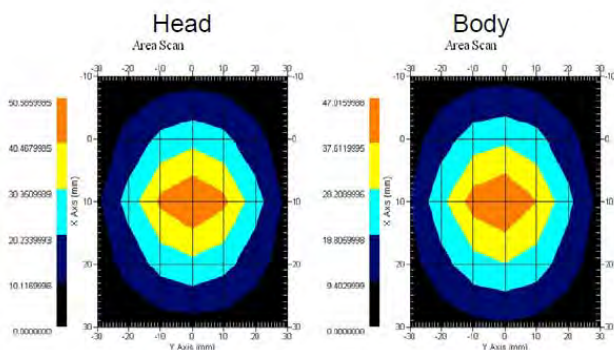
Length: 67.1 mm
Height: 38.9 mm

Electrical Specification

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

System Validation Results

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



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

NCL Calibration Laboratories

Division of APREL Laboratories.

Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018-ALSAS. The results contained within this report are for Validation Dipole 210-00710. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-020 130 MHz to 26 GHz E-Field Probe Serial Number 212.

References

SSI-TP-018-ALSAS Dipole Calibration Procedure
 SSI-TP-016 Tissue Calibration Procedure
 IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"

Conditions

Dipole 210-00710 was new taken from stock.

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

Dipole Calibration uncertainty

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

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

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

NCL Calibration Laboratories

Division of APREL Laboratories.

Dipole Calibration Results

Mechanical Verification

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

Electrical Validation

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

Tissue Validation

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

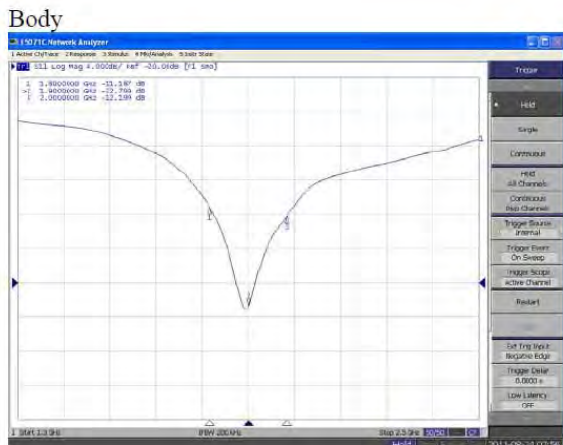
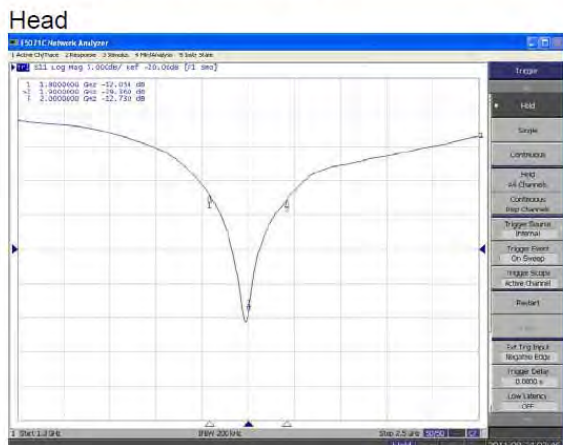
This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories

Division of APREL Laboratories.

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

S11 Parameter Return Loss



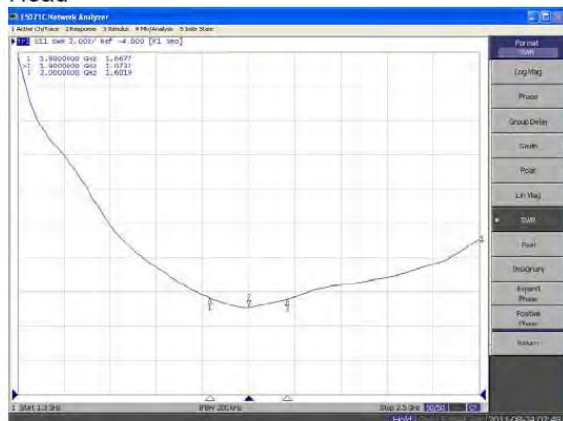
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NCL Calibration Laboratories

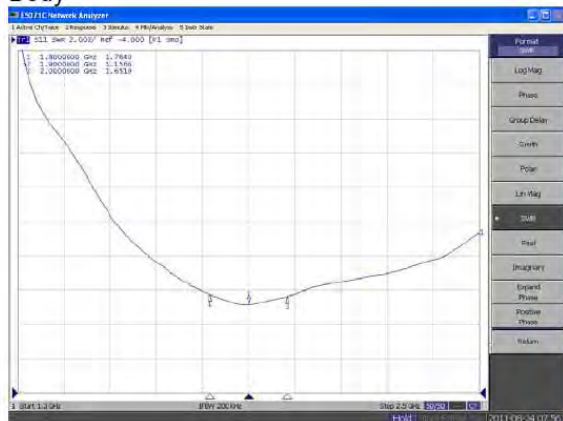
Division of APREL Laboratories.

SWR

Head



Body



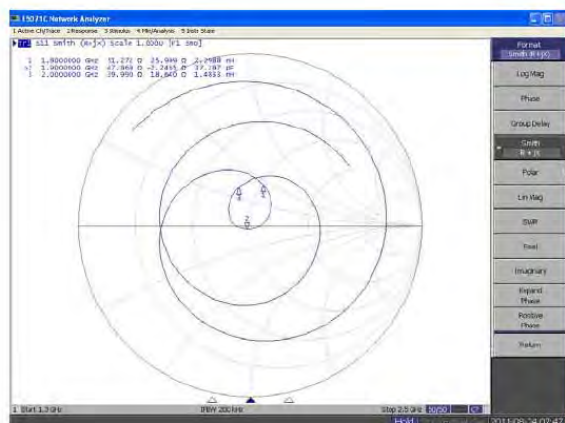
This page has been reviewed for content and attested to by signature within this document.

NCL Calibration Laboratories

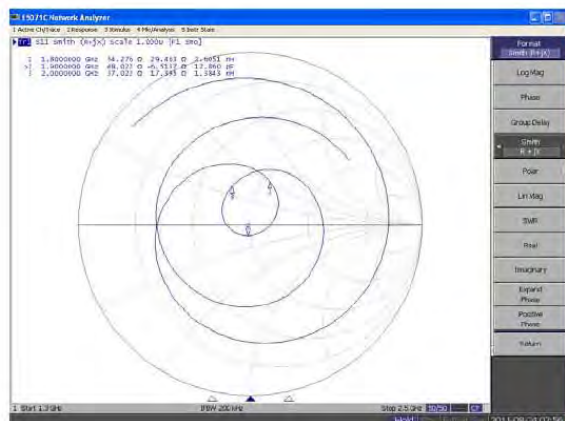
Division of APREL Laboratories.

Smith Chart Dipole Impedance

Head



Body



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

NCL Calibration Laboratories

Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List 2011

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

9

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

Mechanical Verification

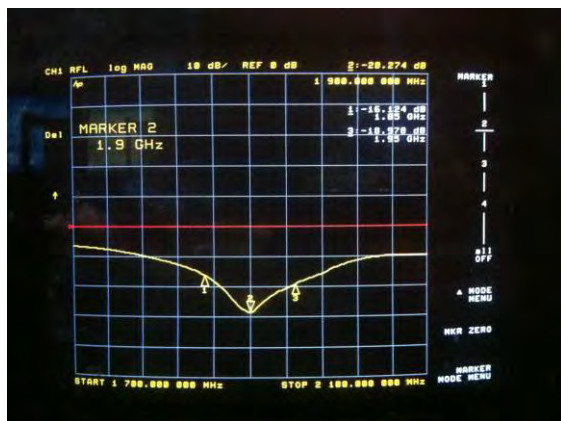
APREL Length	APREL Height	Measured Length	Measured Height
68.0 mm	39.5 mm	68.2 mm	39.2 mm

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 :

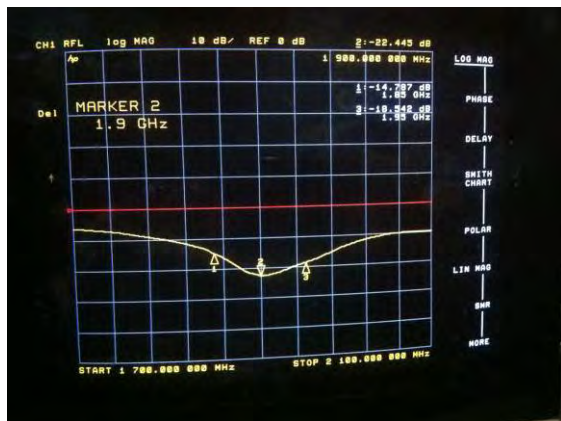


Impedance :



Body Tissue

Return Loss :



Impedance :



NCL CALIBRATION LABORATORIES

Calibration File No: DC-1330
Project Number: BAC-dipole-cal-5619

CERTIFICATE OF CALIBRATION

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

Validation Dipole (Head & Body)

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

Customer: Bay Area Compliance Laboratory

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

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

Released By: _____

***NCL* CALIBRATION LABORATORIES**

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

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

NCL Calibration Laboratories

Division of APREL Laboratories.

Conditions

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

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

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

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



Stuart Nicol



C. Teodorian

Primary Measurement Standards

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

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

NCL Calibration Laboratories

Division of APREL Laboratories.

Calibration Results Summary

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

Mechanical Dimensions

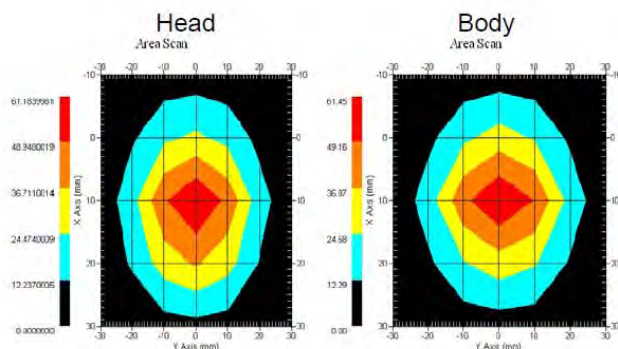
Length: 52.4 mm
Height: 30.3 mm

Electrical Specification

Tissue	Frequency	SWR:	Return Loss	Impedance
Head	2450 MHz	1.0459 U	-33.024 dB	48.533 Ω
Body	2450 MHz	1.1159 U	-25.235 dB	46.676 Ω

System Validation Results

Tissue	Frequency	1 Gram	10 Gram	Peak
Head	2450 MHz	52.667	24.518	105.920
Body	2450 MHz	52.561	24.104	108.940



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

NCL Calibration Laboratories

Division of APREL Laboratories.

Introduction

This Calibration Report has been produced in line with the SSI Dipole Calibration Procedure SSI-TP-018-ALSAS. The results contained within this report are for Validation Dipole 220-00758. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-020 130 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"
 IEC-62209 "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures"
 Part 1: "Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity of the ear (frequency range of 300 MHz to 3 GHz)"
 IEC-62209 "Human exposure to radio frequency fields from hand-held and body-mounted wireless communication devices – Human models, instrumentation, and procedures"
 Part 2 *Draft*: "Procedure to determine the Specific Absorption Rate (SAR) for hand-held devices used in close proximity of the ear (frequency range of 30 MHz to 6 GHz)"

Conditions

Dipole 220-00758 was a re-calibration.

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

Dipole Calibration uncertainty

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

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

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Dipole Calibration Results

Mechanical Verification

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

Electrical Calibration

Tissue Type	Return Loss:	SWR:	Impedance:
Head	-33.024 dB	1.0459 U	48.533 Ω
Body	-25.235 dB	1.1159 U	46.676 Ω

Tissue Validation

	Dielectric constant, ϵ_r	Conductivity, σ [S/m]
Head Tissue 2450MHz	38.2	1.82
Body Tissue 2450MHz	51.74	1.96

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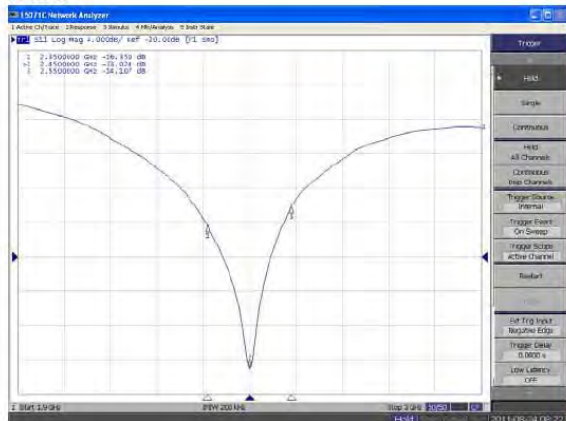
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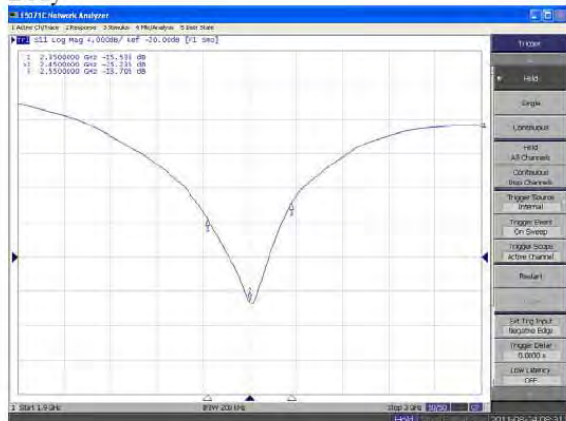
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss

Head



Body



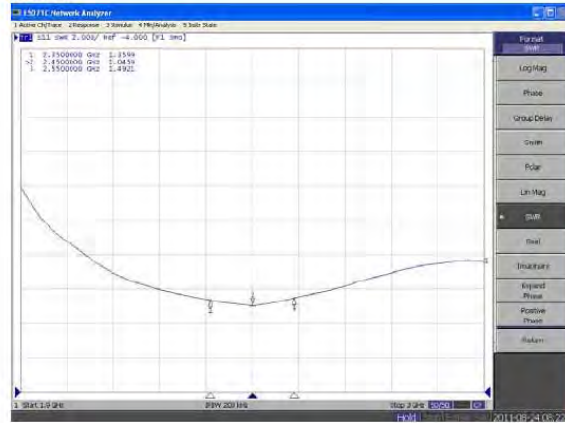
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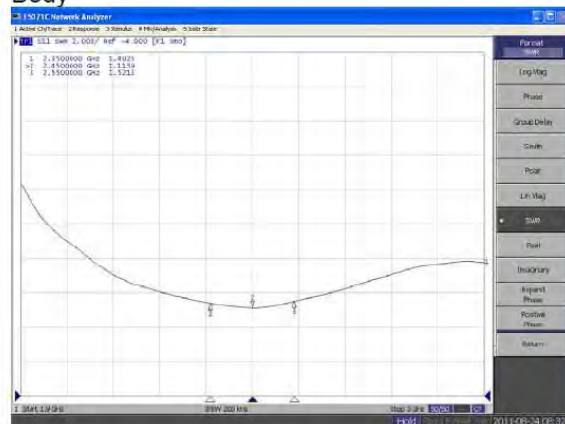
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SWR

Head



Body



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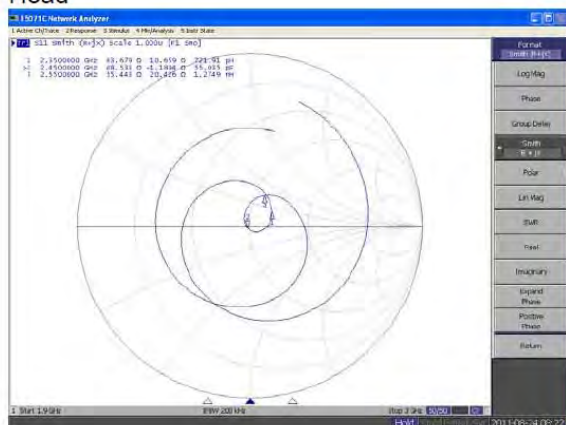
7

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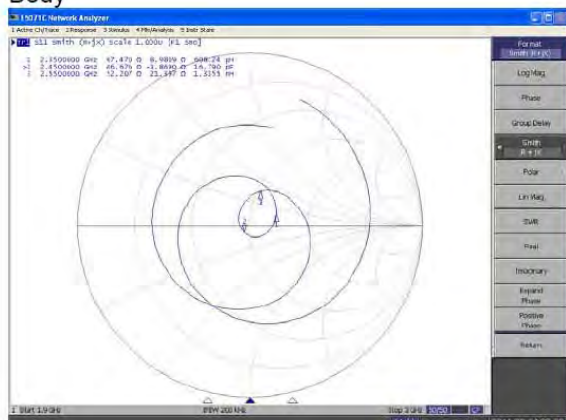
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Smith Chart Dipole Impedance

Head



Body



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Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2011.

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2450MHz Dipole Calibration By BACL at 2012-12-12

Mechanical Verification

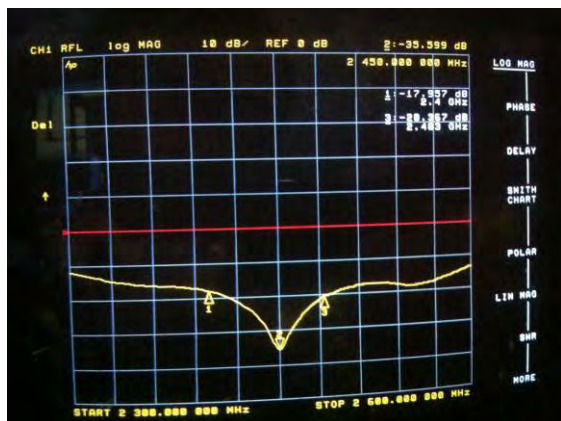
APREL Length	APREL Height	Measured Length	Measured Height
51.5mm	30.4 mm	51.6 mm	30.2 mm

Tissue Type	Measured Return Loss	Measured Impedance
Head	-35.559 dB	49.627 Ω
Body	-27.477 dB	48.238 Ω

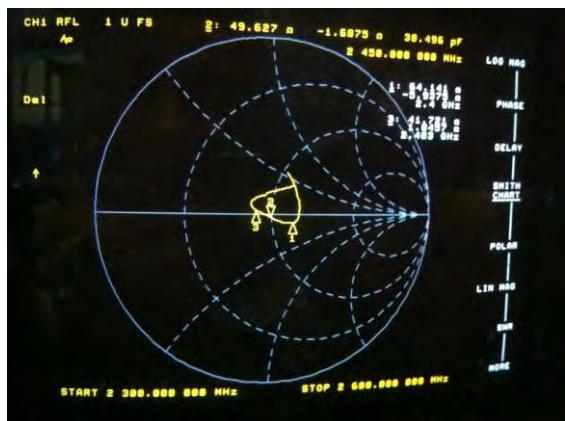
Test Graphs:

Head Tissue

Return Loss :

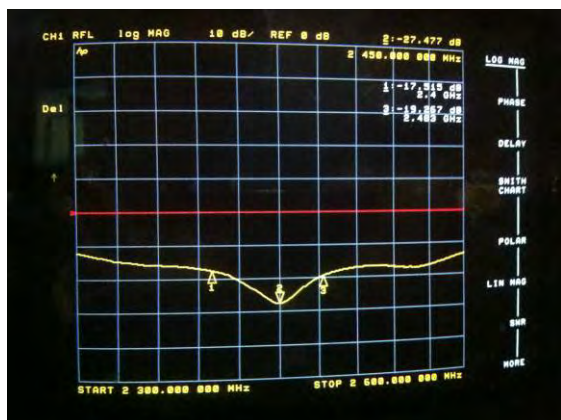


Impedance :



Body Tissue

Return Loss :

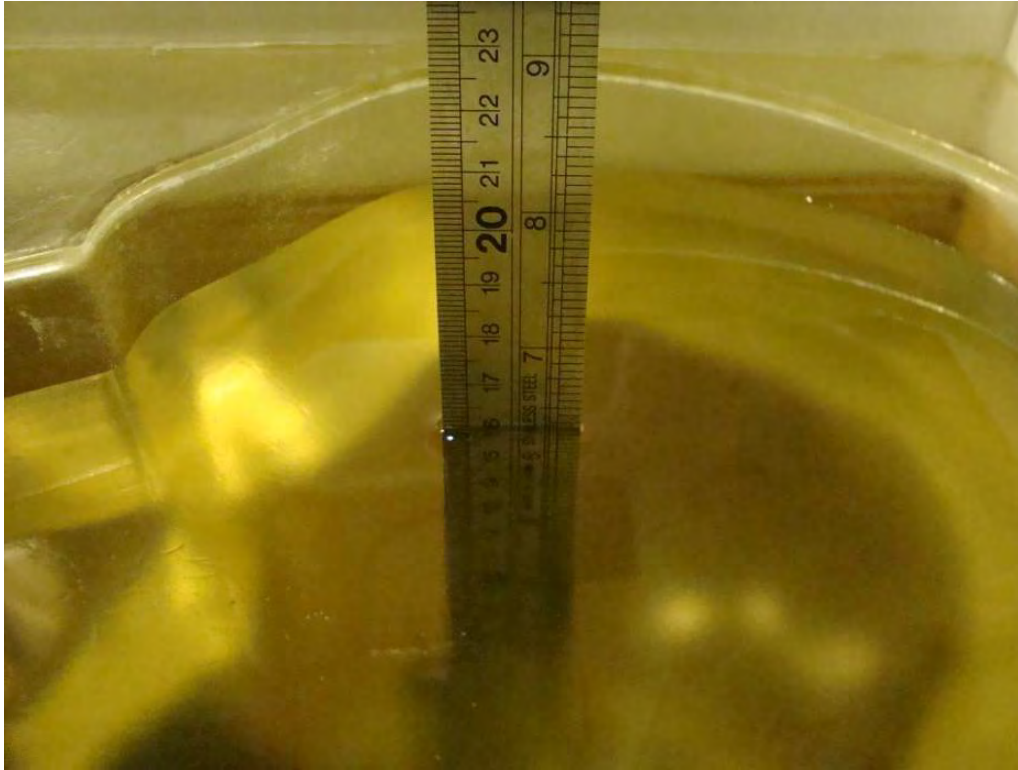


Impedance :

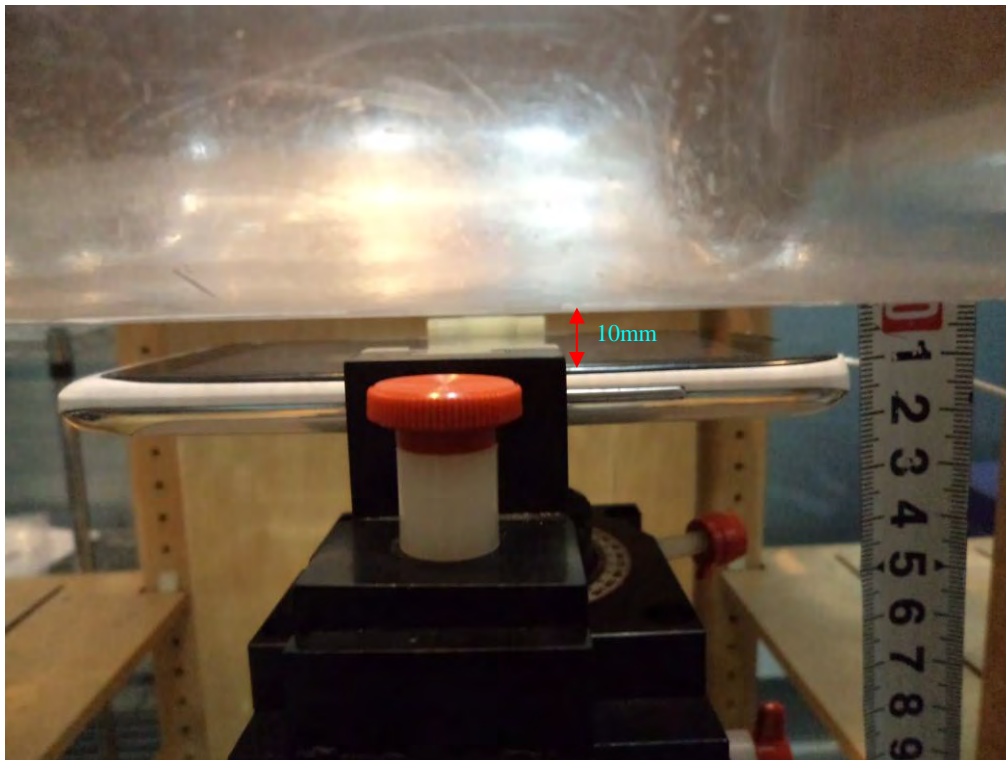


APPENDIX D EUT TEST POSITION PHOTOS

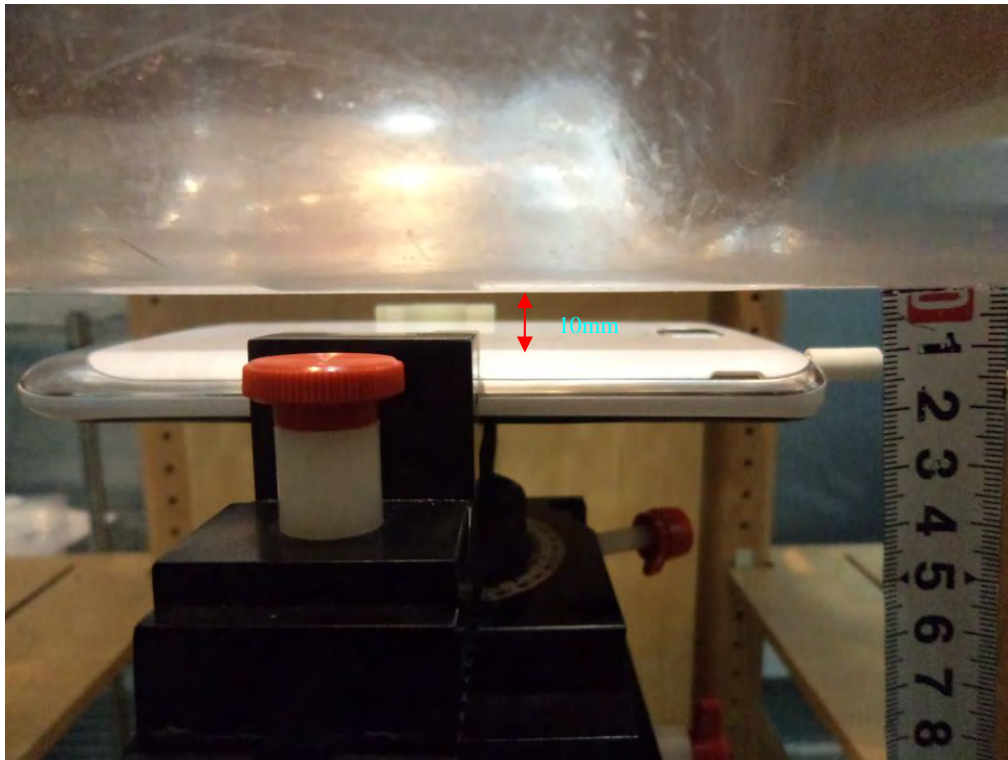
Liquid depth $\geq 15\text{cm}$



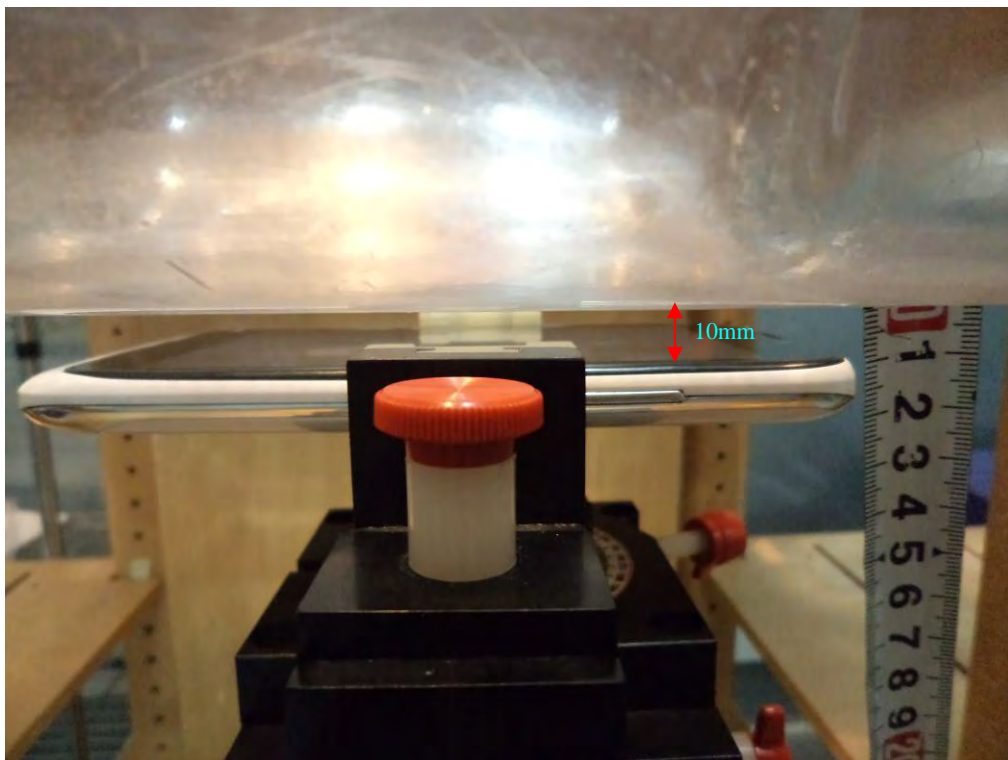
Body-worn-Headset Front Setup Photo



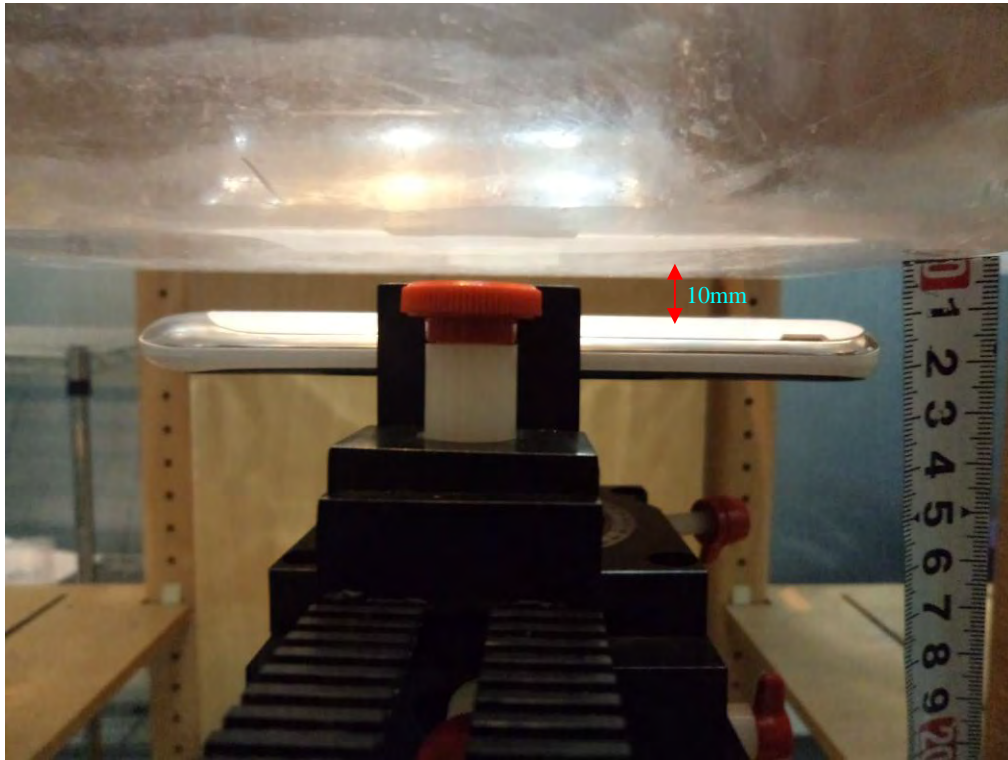
Body-worn-Headset Back Setup Photo



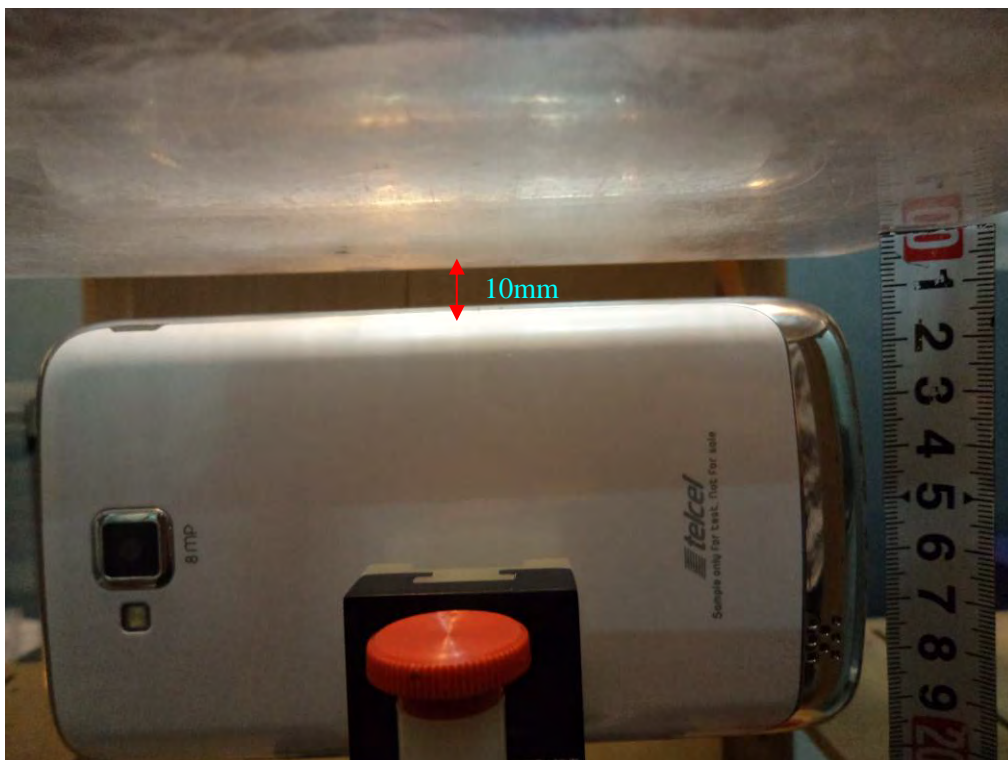
Body-Front Setup Photo



Body-Back Setup Photo



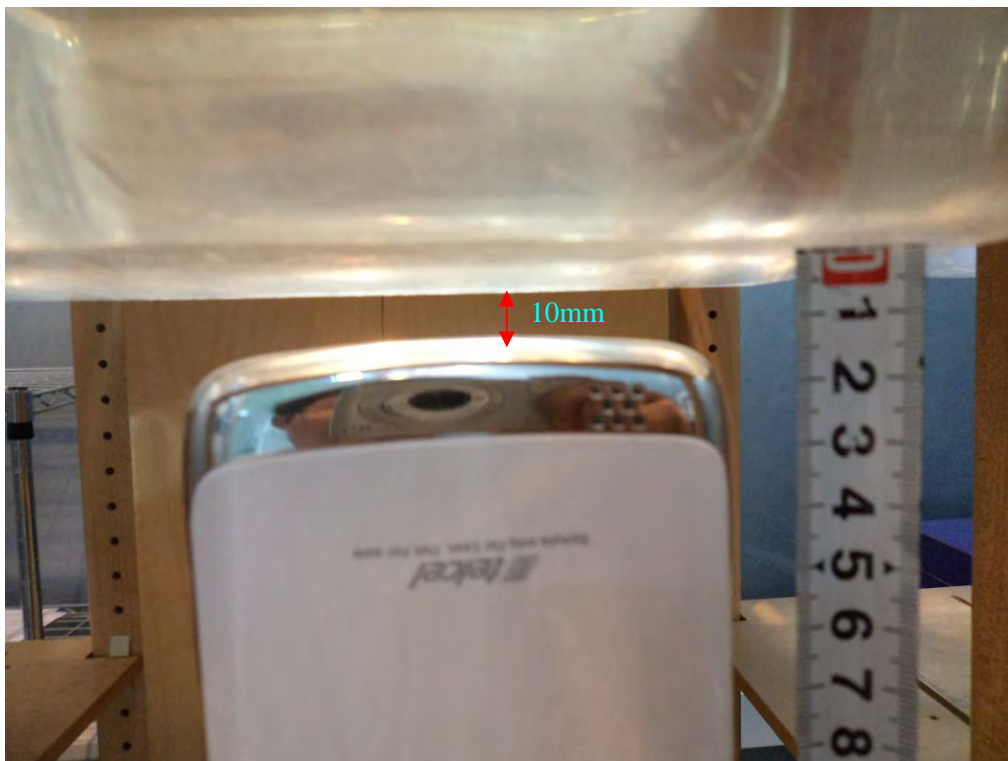
Body-Left Setup Photo



Body-Right Setup Photo



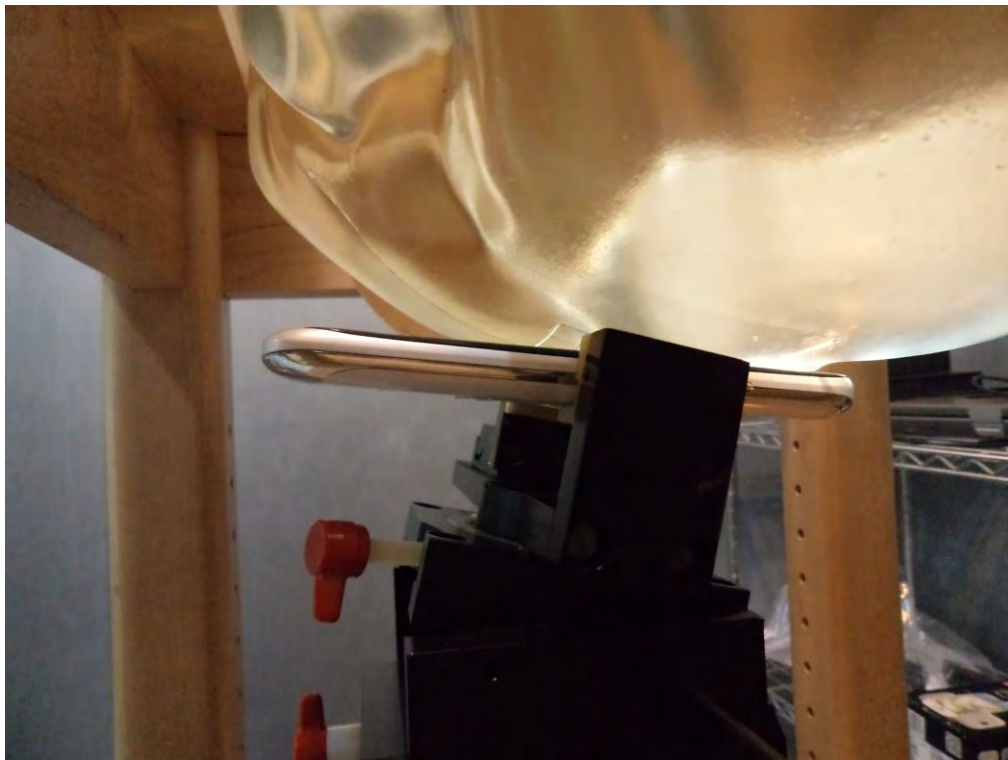
Body-Bottom Setup Photo



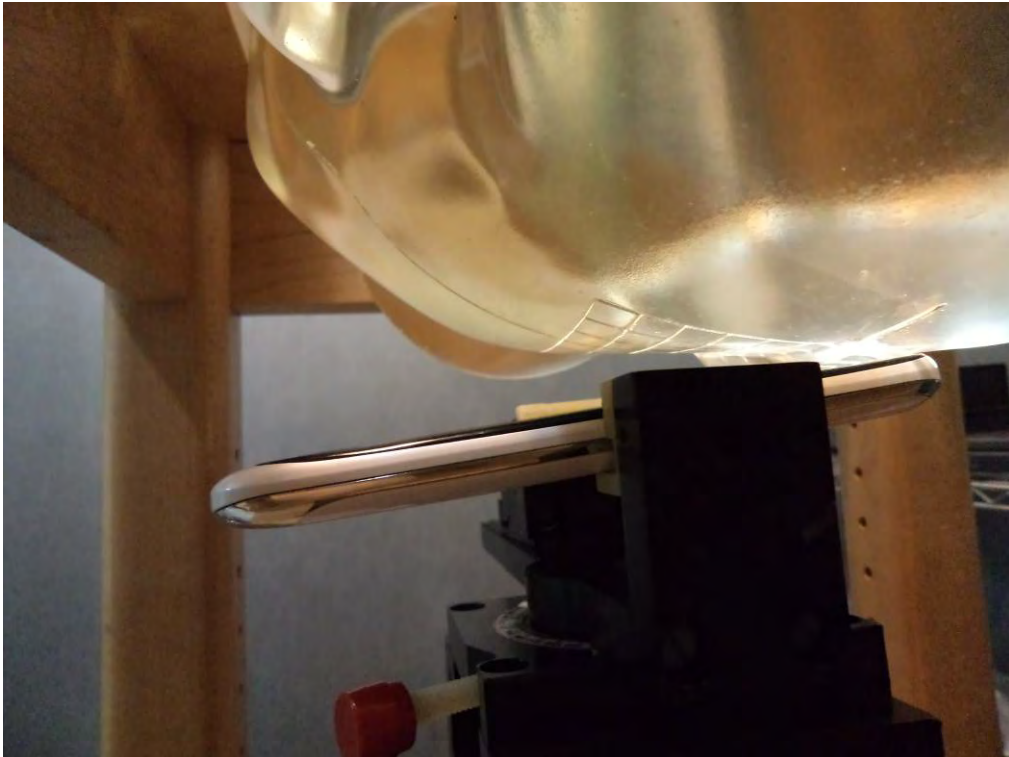
Body-Top Setup Photo



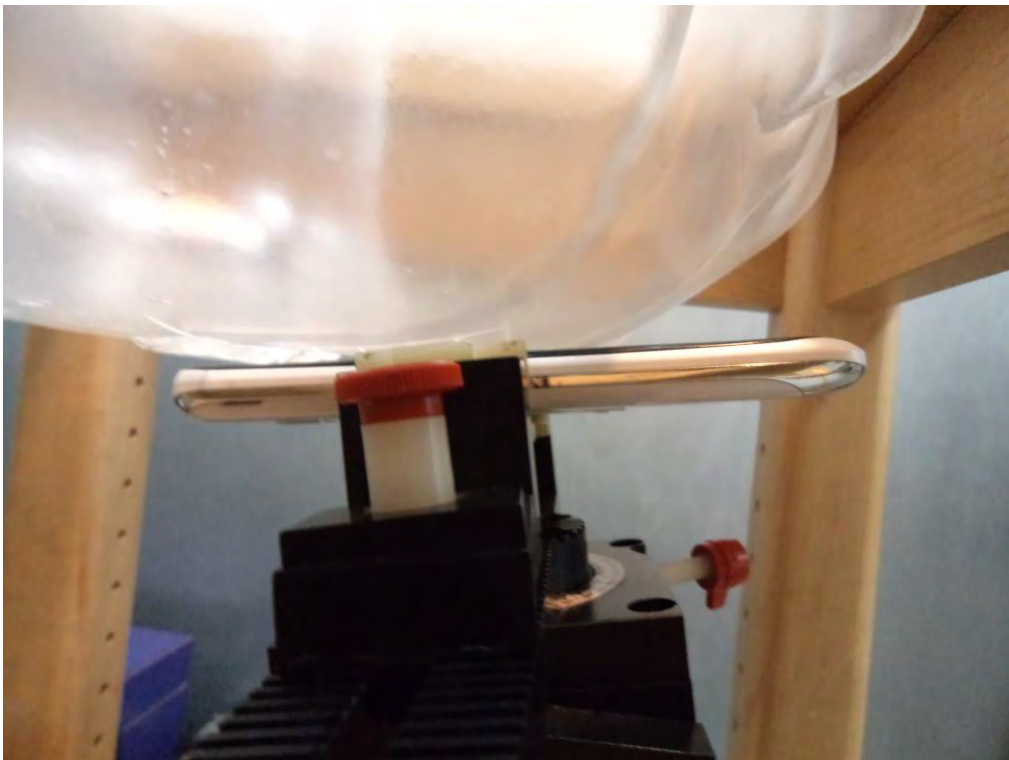
Left Head Touch Setup Photo



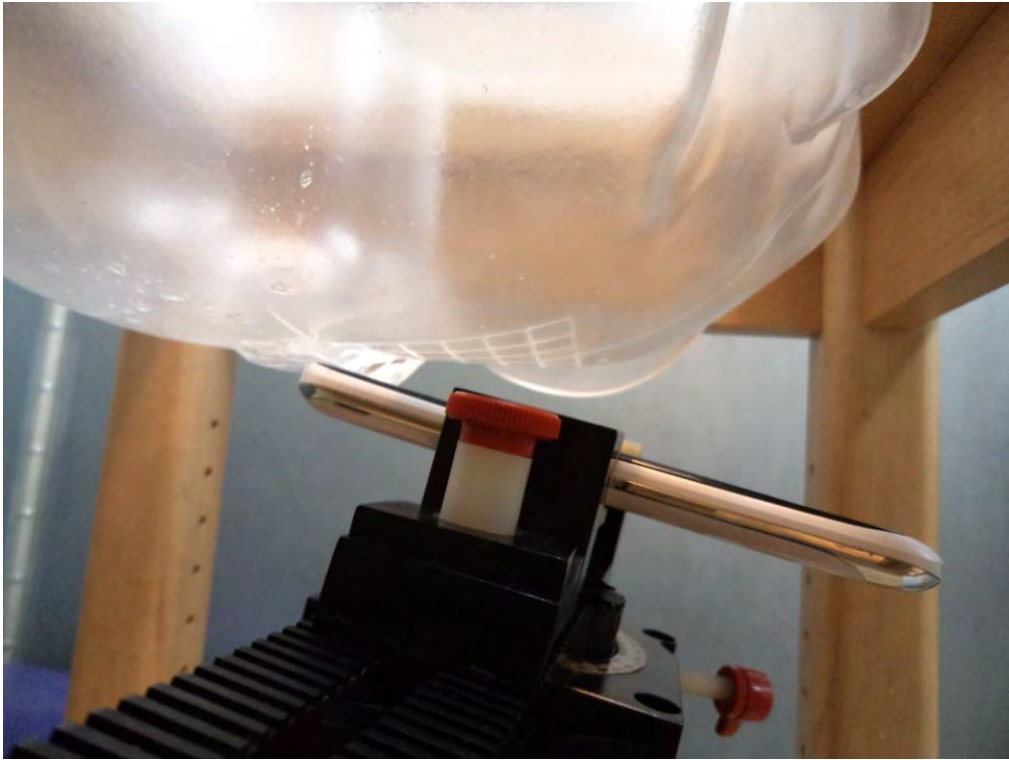
Left Head Tilt Setup Photo



Right Head Touch Setup Photo



Right Head Tilt Setup Photo



APPENDIX E EUT PHOTOS

EUT – Front View



EUT – Back View



EUT – Top View



EUT – Bottom View



EUT – Uncovered View



EUT – Headset View



APPENDIX F INFORMATIVE REFERENCES

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