



NVLAP LAB CODE 200707-0



SAR EVALUATION REPORT

For

Beyond E-Tech Inc

3005 WEST LOOP SOUTH, STE.100, HOUSTON, Tx77027 USA

FCC ID: WTID8

Report Type: Original Report	Product Type: GSM Touch Screen Mobile Phone
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Report Number: <u>RSZ09041301-SAR</u>	
Report Date: <u>2009-04-21</u>	
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* This report may contain data that are not covered by the NVLAP accreditation and are marked with an asterisk “*”.

Summary of Test Results	
Rule Part(s):	CFR 47 §2.1093
Test Procedure(s):	FCC OET Bulletin 65C IEEE 1528-2003
Device Type:	Portable device
Exposure Category	Population/Uncontrolled
Modulation:	GMSK
TX Frequency Range:	824-849 MHz (Cellular Band) 1850-1910 MHz (PCS Band)
Maximum Conducted Power Tested:	31.75dBm (Cellular Band) 29.13dBm(PCS Band)
Antenna Type(s):	Internal Antenna
Body-Worn Accessories:	Headset
Face-Head Accessories:	None
Max. SAR Level(s) Measured:	0.068 W/Kg 1g Head Tissue (Cellular Band) 0.101 W/Kg 1g Body Tissue (Cellular Band) 0.109 W/Kg 1g Head Tissue (PCS Band) 0.328 W/Kg 1g Body Tissue (PCS Band)
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.	
The results and statements contained in this report pertain only to the device(s) evaluated.	
	
EUT Photo	

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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 the EN50360 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 1 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).

EUT DESCRIPTION

This Bay Area Compliance Laboratories Corp. test report has been prepared on behalf of Beyond E-Tech Inc. and their product, model Number: D8 (FCC ID: WTID8) or the EUT (Equipment Under Test) as referred to in the rest of this report.

Technical Specification

Item	Content
Modulation	GMSK
Frequency Band	Cellular Band: 824-849 MHz (TX) 869-894 MHz (RX) PCS Band: 1850-1910 MHz (TX) 1930-1990 MHz (RX)
Dimensions (L*W*H)	108mm (L)× 56mm (W)× 14mm (H)
Weight	120 g
Power Source	3.7 Vdc/700mAh Rechargeable Battery
Normal Operation	Head and Body-worn

EUT Photo



*Model: D8
Please refer to Appendix H*

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 32mm in the X & Y axis, and 35mm in the Z axis.

ALSAS-10U Interpolation and Extrapolation Uncertainty

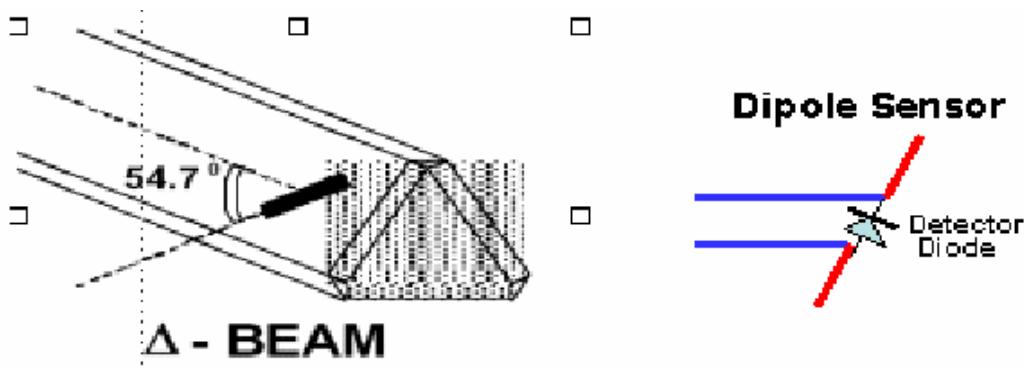
The overall uncertainty for the methodology and algorithms used during the SAR calculation was evaluated using the data from IEEE 1528 based on the example f3 algorithm:

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

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 in Air	Frequency Dependent Below 2 GHz Calibration in air performed in a TEM Cell Above 2 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 0.2 dB
Diode Compression Point (DCP)	Calibration for Specific Frequency
Probe Tip Radius	< 5 mm
Sensor Offset	1.56 (+/- 0.02 mm)
Probe Length	290 mm
Video Bandwidth	@ 500 Hz: 1 dB @ 1.02 kHz: 3 dB
Boundary Effect	Less than 2% for distance greater than 2.4 mm
Spatial Resolution	Diameter less than 5 mm Compliant with Standards

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 aid of 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.

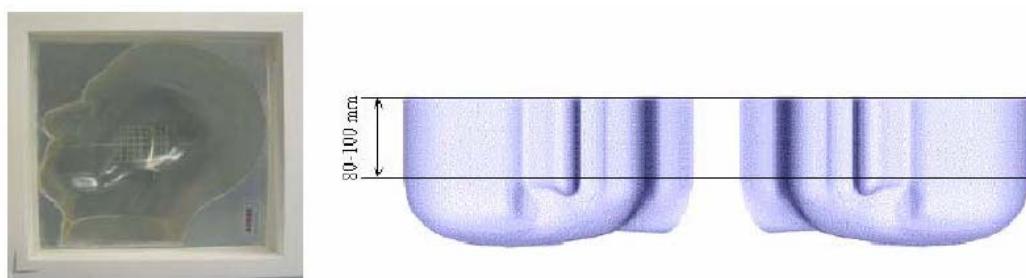


Phantom Types

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

IEEE SCC-34/SC-2 P1528 Recommended Tissue Dielectric Parameters

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

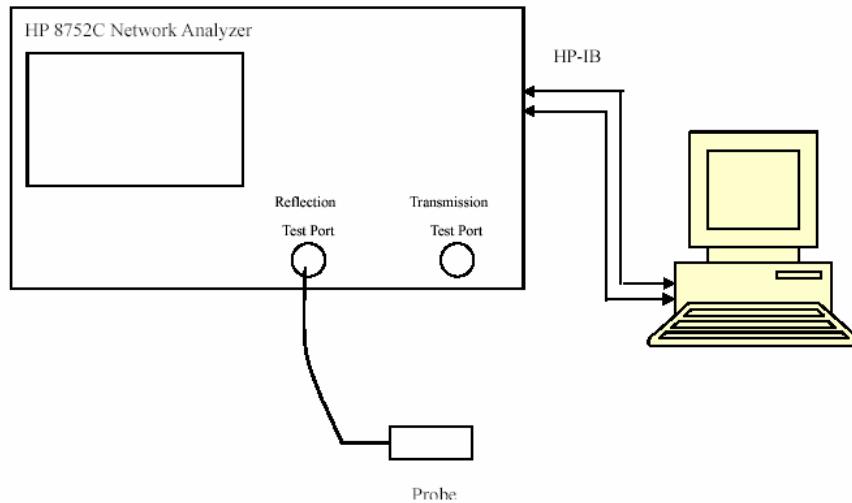
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Info

Equipment	Model	Calibration Due 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	N/A	110-00212
Miniature E-Field Probe	ALS-E-020	2009-08-01	273
Dipole, 835MHz	ALS-D-835-S-2	2009-08-01	180-00558
Dipole, 1900MHz	ALS-D-1900-S-2	2009-08-01	210-00710
Dipole Spacer	ALS-DS-U	N/A	250-00907
R&S, universal Radio Communication Tester	CMU200	2008-06-21	1100.0008.02
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-T-835-1-H	Each Time	270-01002
Simulated Tissue 835 MHz Body	ALS-T-835-1-B	Each Time	270-02101
Simulated Tissue 1900 MHz Head	ALS-T-1900-1-H	Each Time	295-01103
Simulated Tissue 1900 MHz Body	ALS-T-1900-1-B	Each Time	295-02102
Signal Generator	HP8341B	2009-11-06	2624A00116
Power Amplifier	5S1G4	N/A	71377
Spectrum Analyzer	FSEM30	2009-05-08	849720/019

SAR MEASUREMENT SYSTEM VERIFICATION

Liquid Verification



Liquid Verification Setup Block Diagram

Liquid Verification Results

Frequency (MHz)	Liquid Type	Liquid Parameter		Result
		ϵ_r	σ (S/m)	
850	Head	40.58	0.87	In Tolerance
850	Body	55.15	0.98	In Tolerance
1900	Head	39.37	1.47	In Tolerance
1900	Body	52.81	1.56	In Tolerance

Please refer to the following tables.

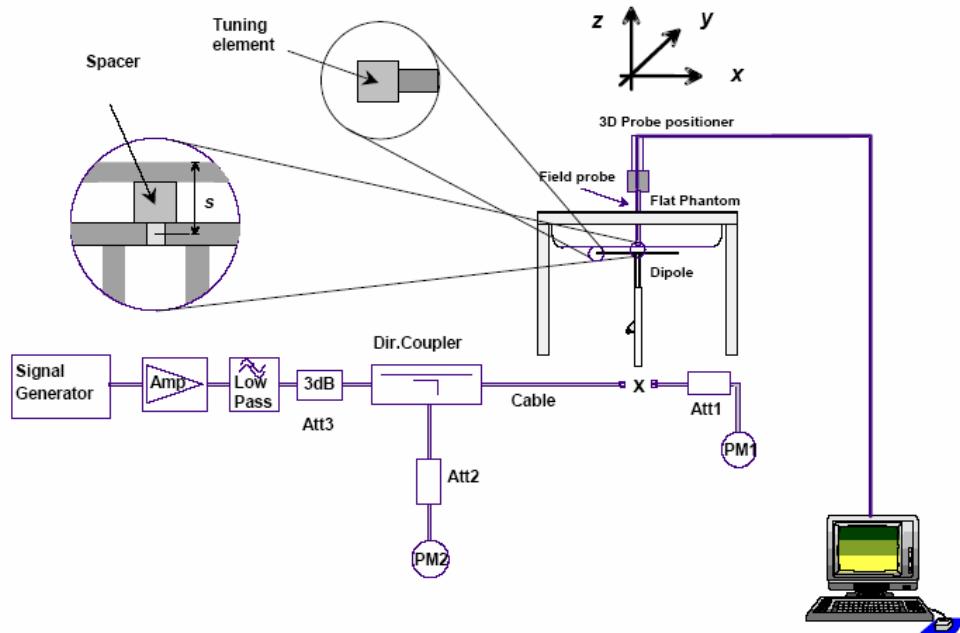
850 MHz Head				850 MHz Body		
Frequency	e'	e''		Frequency	e'	e''
824000000	40.700416	18.749188		824000000	55.198839	21.200918
824500000	40.735439	18.749309		824500000	55.263310	21.243185
825000000	40.770414	18.749400		825000000	55.273880	21.260625
825500000	40.759834	18.756571		825500000	55.222251	21.200620
826000000	40.752435	18.678617		826000000	55.270254	21.198514
826500000	40.777080	18.776186		826500000	55.260713	21.206645
827000000	40.786560	18.741033		827000000	55.254172	21.252609
827500000	40.750743	18.770828		827500000	55.252731	21.207573
828000000	40.706534	18.750397		828000000	55.175732	21.168569
828500000	40.724548	18.765452		828500000	55.226624	21.204112
829000000	40.713306	18.788485		829000000	55.138753	21.224837
829500000	40.696764	18.791988		829500000	55.220107	21.193381
830000000	40.736933	18.811327		830000000	55.188361	21.215352
830500000	40.676211	18.806032		830500000	55.188228	21.203278
831000000	40.690634	18.769687		831000000	55.249955	21.179056
831500000	40.718378	18.781905		831500000	55.208656	21.204597
832000000	40.666589	18.732579		832000000	55.126225	21.179264
832500000	40.703992	18.742100		832500000	55.151572	21.146614
833000000	40.663980	18.772947		833000000	55.099627	21.143122
833500000	40.671354	18.749081		833500000	55.161168	21.118921
834000000	40.628818	18.770208		834000000	55.123893	21.154030
834500000	40.664541	18.811218		834500000	55.138359	21.136529
835000000	40.676226	18.765423		835000000	55.145682	21.143734
835500000	40.576101	18.802475		835500000	55.103002	21.120401
836000000	40.625219	18.798174		836000000	55.108552	21.122762
836500000	40.651863	18.769039		836500000	55.153801	21.142970
837000000	40.612881	18.820184		837000000	55.131088	21.128617
837500000	40.559582	18.782263		837500000	55.132554	21.148903
838000000	40.557234	18.797362		838000000	55.077129	21.163440
838500000	40.582286	18.799666		838500000	55.088696	21.152482
839000000	40.579647	18.758142		839000000	55.070959	21.136315
839500000	40.578444	18.814071		839500000	55.079850	21.175550
840000000	40.545297	18.755396		840000000	55.122957	21.147068
840500000	40.520770	18.745812		840500000	55.062467	21.147289
841000000	40.552805	18.828268		841000000	55.052126	21.150138
841500000	40.558392	18.779453		841500000	55.070322	21.142077
842000000	40.540607	18.793635		842000000	55.076813	21.160258
842500000	40.508792	18.775885		842500000	55.060380	21.132818
843000000	40.554258	18.741616		843000000	55.080392	21.129445
843500000	40.440465	18.777651		843500000	55.050911	21.166820
844000000	40.471551	18.783217		844000000	55.089091	21.140112
844500000	40.457543	18.755509		844500000	55.032096	21.133836
845000000	40.432637	18.761503		845000000	55.031845	21.176132
845500000	40.427848	18.802603		845500000	55.069343	21.203818
846000000	40.436913	18.748104		846000000	55.047320	21.189490
846500000	40.441614	18.786467		846500000	55.051443	21.186691
847000000	40.453080	18.812693		847000000	55.115598	21.171425
847500000	40.358624	18.787508		847500000	55.070663	21.209252
848000000	40.387744	18.768106		848000000	55.093555	21.199094
848500000	40.381925	18.768747		848500000	55.037840	21.208711
849000000	40.349402	18.746548		849000000	55.011865	21.239105

1900 MHz Head				1900 MHz Body		
Frequency	e'	e''		Frequency	e'	e''
1850000000	39.344392	13.557827		1850000000	52.771059	14.528976
1851200000	39.307660	13.579605		1851200000	52.758544	14.535969
1852400000	39.332182	13.593578		1852400000	52.787648	14.524260
1853600000	39.324834	13.546237		1853600000	52.786720	14.531948
1854800000	39.306309	13.577806		1854800000	52.735890	14.536605
1856000000	39.303884	13.572412		1856000000	52.769022	14.553918
1857200000	39.293856	13.583736		1857200000	52.762266	14.530448
1858400000	39.282900	13.622603		1858400000	52.715647	14.531492
1859600000	39.274225	13.573151		1859600000	52.753974	14.525963
1860800000	39.295742	13.615865		1860800000	52.772808	14.592390
1862000000	39.269269	13.634400		1862000000	52.772358	14.592323
1863200000	39.257670	13.652664		1863200000	52.757552	14.575993
1864400000	39.251030	13.649902		1864400000	52.734303	14.607171
1865600000	39.230633	13.658682		1865600000	52.713214	14.600068
1866800000	39.243622	13.682649		1866800000	52.742439	14.620748
1868000000	39.265852	13.682925		1868000000	52.743942	14.622633
1869200000	39.248489	13.686861		1869200000	52.776603	14.651124
1870400000	39.262336	13.707254		1870400000	52.757071	14.617293
1871600000	39.279447	13.713652		1871600000	52.767266	14.636764
1872800000	39.241142	13.712688		1872800000	52.775263	14.625492
1874000000	39.262826	13.731128		1874000000	52.743872	14.635056
1875200000	39.240422	13.741213		1875200000	52.741788	14.669129
1876400000	39.263207	13.746985		1876400000	52.778942	14.649787
1877600000	39.282512	13.751953		1877600000	52.760713	14.665796
1878800000	39.270117	13.782700		1878800000	52.782613	14.681926
1880000000	39.236221	13.802938		1880000000	52.706961	14.698724
1881200000	39.268703	13.814525		1881200000	52.760183	14.701083
1882400000	39.286669	13.793376		1882400000	52.769075	14.674494
1883600000	39.300128	13.807899		1883600000	52.774805	14.672511
1884800000	39.298263	13.817072		1884800000	52.785936	14.676519
1886000000	39.299843	13.803147		1886000000	52.744805	14.695091
1887200000	39.310619	13.813319		1887200000	52.768781	14.709202
1888400000	39.322971	13.816511		1888400000	52.768529	14.712621
1889600000	39.321945	13.822145		1889600000	52.752887	14.719052
1890800000	39.339695	13.833841		1890800000	52.776590	14.700674
1892000000	39.377114	13.815177		1892000000	52.800139	14.726133
1893200000	39.359055	13.831574		1893200000	52.813523	14.764438
1894400000	39.341540	13.853541		1894400000	52.768393	14.750400
1895600000	39.364695	13.873672		1895600000	52.771509	14.765205
1896800000	39.354627	13.879020		1896800000	52.773216	14.810476
1898000000	39.356935	13.894414		1898000000	52.760774	14.832219
1899200000	39.379403	13.885082		1899200000	52.819917	14.788645
1900400000	39.374054	13.869532		1900400000	52.812992	14.776377
1901600000	39.372557	13.869422		1901600000	52.772574	14.831017
1902800000	39.377613	13.889010		1902800000	52.760887	14.837461
1904000000	39.362216	13.885808		1904000000	52.753605	14.832695
1905200000	39.363825	13.871784		1905200000	52.742394	14.831553
1906400000	39.382027	13.865092		1906400000	52.765487	14.828107
1907600000	39.372092	13.870377		1907600000	52.757612	14.838527
1908800000	39.374457	13.852895		1908800000	52.704419	14.843138
1910000000	39.368426	13.873555		1910000000	52.726534	14.862335

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



System Accuracy Check Results

Frequency (MHz)	1 g SAR (W/Kg)	10 g SAR (W/Kg)	Result
835	9.651	6.042	In Tolerance
1900	40.328	20.137	In Tolerance

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

IEEE P1528 recommended reference value for Head Tissue

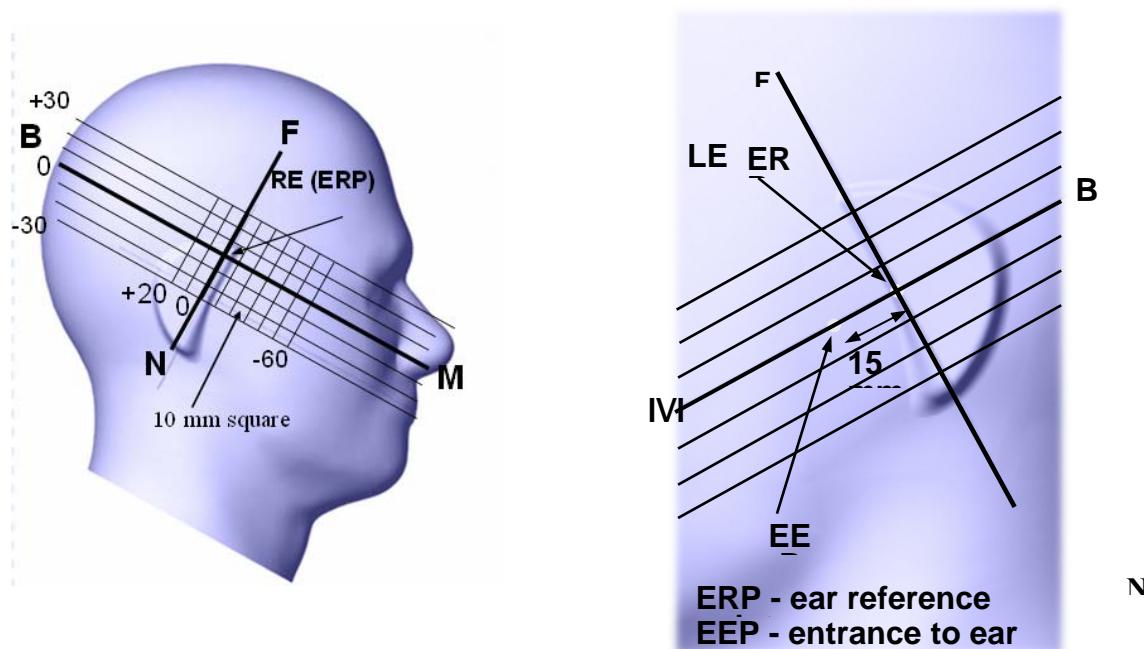
Frequency (MHz)	1 g SAR (W/Kg)	10 g SAR (W/Kg)	Local SAR at surface (above feed point)	Local SAR at surface (v=2cm offset from feed point)
300	3.0	2.0	4.4	2.1
450	4.9	3.3	7.2	3.2
835	9.5	6.2	14.1	4.9
900	10.8	6.9	16.4	5.4
1450	29.0	16.0	50.2	6.5
1800	38.1	19.8	69.5	6.8
1900	39.7	20.5	72.1	6.6
2000	41.1	21.1	74.6	6.5
2450	52.4	24.0	104.2	7.7
3000	63.8	25.7	140.2	9.5

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 $\frac{1}{4}$ 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

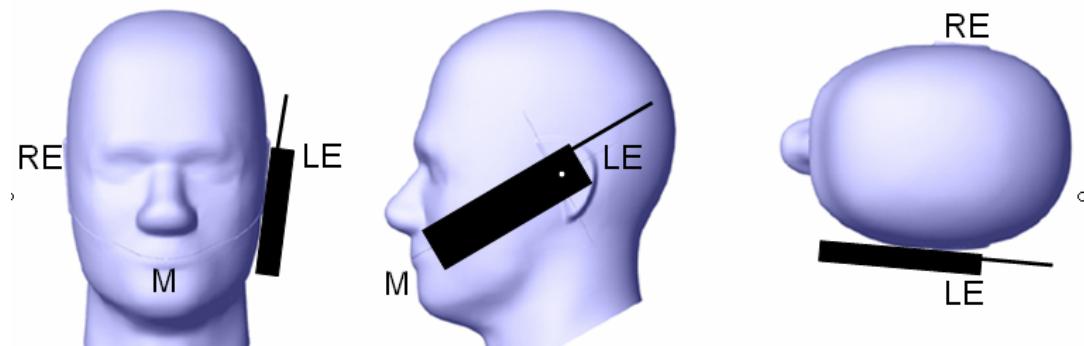
The device is brought toward the mouth of the head phantom by pivoting against the “ear reference point” or along the “N-F” line for the SCC-34/SC-2 head phantom.

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

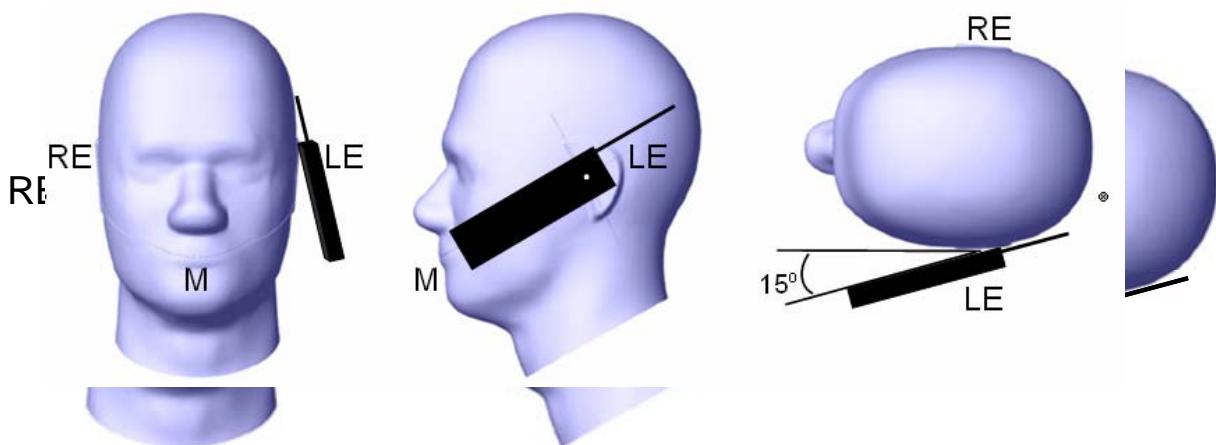
With the handset aligned in the “Cheek/Touch Position”:

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°. 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, Ear/Tilt, 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 15 mm x 15 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 30 mm x 30 mm x 21 mm was assessed by measuring 5 x 5 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.

SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation. The plots with the corresponding SAR distributions, which reveal information about the location of the maximum SAR with respect to the device, could be found in Appendix E.

SAR Test Data

Environmental Conditions

Temperature:	21° C
Relative Humidity:	54%
ATM Pressure:	1005 mbar

* Testing was performed by Eric Zhang on 2009-04-20.

Cellular Band:

EUT Position	Frequency (MHz)	Test Type	Test Mode	Antenna Type	Liquid	Phantom	Accessories	Measured 1g SAR Value (W/Kg)	FCC Limit (W/Kg)	Ref. Plot #
Left Head Cheek	836.6	Head	GSM	Integral	Head	Left Head	-	0.058	1.6	1
Left Head Tilt	836.6	Head	GSM	Integral	Head	Left Head	-	0.068	1.6	2
Left Head Tilt	824.2	Head	GSM	Integral	Head	Left Head	-	0.059	1.6	3
Left Head Tilt	848.8	Head	GSM	Integral	Head	Left Head	-	0.062	1.6	4
Right Head Cheek	836.6	Head	GSM	Integral	Head	Right Head	-	0.035	1.6	5
Right Head Tilt	836.6	Head	GSM	Integral	Head	Right Head	-	0.039	1.6	6
Body-Worn Back	836.6	Body	GSM	Integral	Body	Flat	Headset	0.086	1.6	7
Body-Worn Back	824.2	Body	GSM	Integral	Body	Flat	Headset	0.093	1.6	8
Body-Worn Back	848.8	Body	GSM	Integral	Body	Flat	Headset	0.101	1.6	9

PCS Band:

EUT Position	Frequency (MHz)	Test Type	Test Mode	Antenna Type	Liquid	Phantom	Accessories	Measured 1g SAR Value (W/Kg)	FCC Limit (W/Kg)	Ref. Plot #
Left Head Cheek	1880.0	Head	GSM	Integral	Head	Left Head	-	0.052	1.6	10
Left Head Tilt	1880.0	Head	GSM	Integral	Head	Left Head	-	0.086	1.6	11
Left Head Tilt	1850.2	Head	GSM	Integral	Head	Left Head	-	0.109	1.6	12
Left Head Tilt	1909.8	Head	GSM	Integral	Head	Left Head	-	0.066	1.6	13
Right Head Cheek	1880.0	Head	GSM	Integral	Head	Right Head	-	0.084	1.6	14
Right Head Tilt	1880.0	Head	GSM	Integral	Head	Right Head	-	0.068	1.6	15
Body-Worn Back	1880.0	Body	GSM	Integral	Body	Flat	Headset	0.328	1.6	16
Body-Worn Back	1850.2	Body	GSM	Integral	Body	Flat	Headset	0.282	1.6	17
Body-Worn Back	1909.8	Body	GSM	Integral	Body	Flat	Headset	0.304	1.6	18

APPENDIX A – MEASUREMENT UNCERTAINTY

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

Exposure Assessment Measurement Uncertainty

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	$\sqrt{3}$	$(1-cp)^{1/2}$	$\frac{(1-cp)^1}{\sqrt{2}}$	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	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech.	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	4.0	normal	1	1	1	4.0	4.0
Device Holder Uncertainty	2.0	normal	1	1	1	2.0	2.0
Drift of Output Power	3.2	rectangular	$\sqrt{3}$	1	1	1.8	1.8
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.)	0.0	normal	1	0.7	0.5	0.0	0.0
Liquid Permittivity(target)	5.0	rectangular	$\sqrt{3}$	0.6	0.5	1.7	1.4
Liquid Permittivity(meas.)	0.0	normal	1	0.6	0.5	0.0	0.0
Combined Uncertainty		RSS				9.4	9.2
Combined Uncertainty (coverage factor=2)		Normal(k=2)				18.8	18.5

APPENDIX B – PROBE CALIBRATION CERTIFICATES**NCL CALIBRATION LABORATORIES**

Calibration File No.: CP-871

Client.: BACL

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 835 MHz

Manufacturer: APREL Laboratories

Model No.: E-020

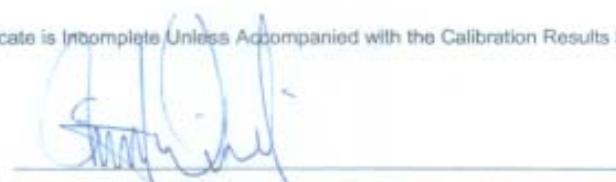
Serial No.: 273

Calibration Procedure: SSI/DRB-TP-D01-032-E020-V2
Project No: BACB-ALSAS10U-5323

Calibrated: 1st August 2008
Released on: 1st September 2008

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

Released By:

**NCL CALIBRATION LABORATORIES**

51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2B 1E6

Division of APREL Lab
TEL: (613) 820-4988
FAX: (613) 820-4181

NCL Calibration Laboratories

Division of APREL Laboratories.

Introduction

This Calibration Report reproduces the results of the calibration performed in line with the SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure. The results contained within this report are for APREL E-Field Probe E-020 273.

References

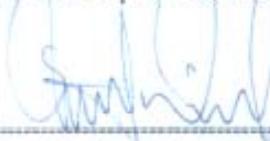
SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure
IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"
SSI-TP-011 Tissue Calibration Procedure

Conditions

Probe 273 was a new probe taken from stock prior to 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 probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.



Stuart Nicol



Jesse Hones

NCL Calibration Laboratories

Division of APREL Laboratories.

Calibration Results Summary

Probe Type:	E-Field Probe E-020
Serial Number:	273
Frequency:	835 MHz
Sensor Offset:	1.56 mm
Sensor Length:	2.5 mm
Tip Enclosure:	Ertalyte*
Tip Diameter:	<5 mm
Tip Length:	60 mm
Total Length:	290 mm

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

Channel X:	1.2 μ V/(V/m) ²
Channel Y:	1.2 μ V/(V/m) ²
Channel Z:	1.2 μ V/(V/m) ²
Diode Compression Point:	95 mV

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Sensitivity in Head Tissue Measured**Frequency:** 835 MHz**Epsilon:** 41.24 (+/-5%) **Sigma:** 0.87 S/m (+/-5%)**ConvF****Channel X:** 6.5**Channel Y:** 6.5**Channel Z:** 6.5

Tissue sensitivity values were calculated using the load impedance of the APREL Laboratories Daq-Paq.

Boundary Effect:

Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.44mm.

Spatial Resolution:

The measured probe tip diameter is 5 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.

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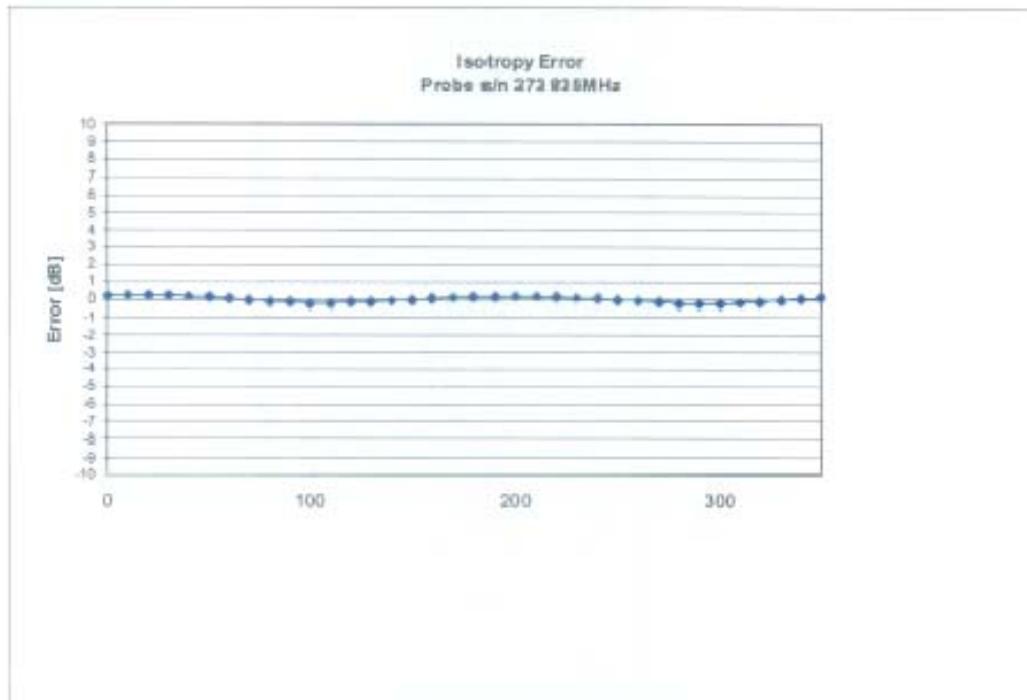
Receiving Pattern 835 MHz (Air)

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Isotropy Error 835 MHz (Air)**Isotropicity Tissue:**

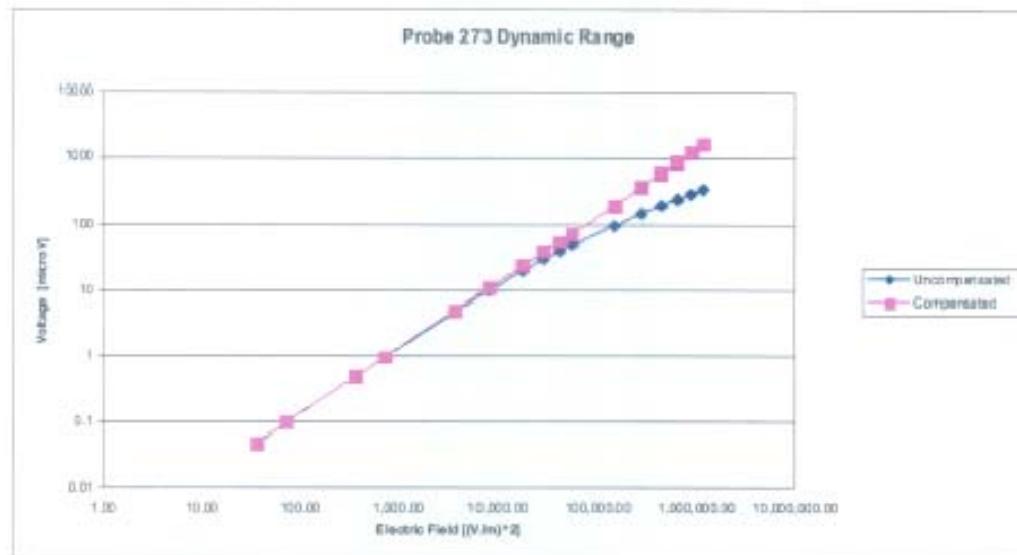
0.10 dB

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Dynamic Range

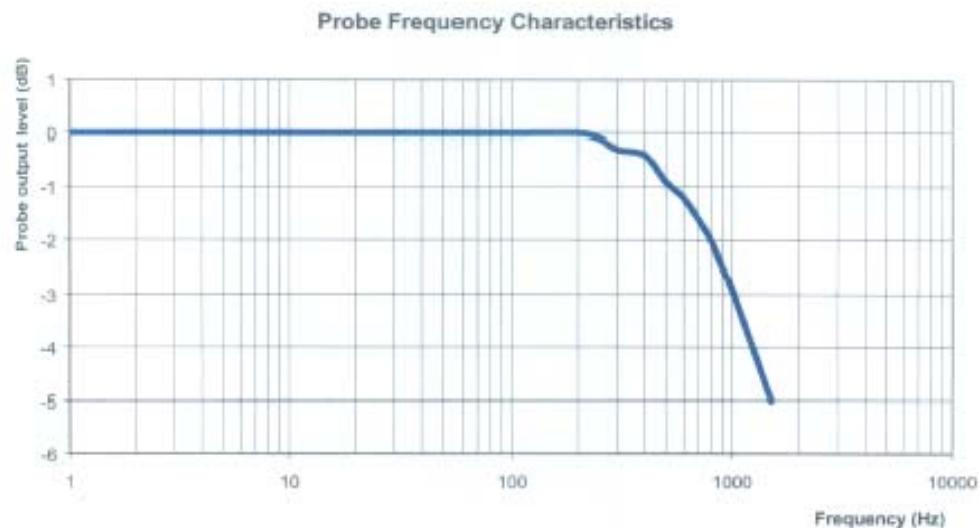


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Video Bandwidth



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

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Conversion Factor Uncertainty Assessment**Frequency:** 835MHz**Epsilon:** 41.24 (+/-5%) **Sigma:** 0.87 S/m (+/-5%)**ConvF****Channel X:** 6.5 7%(K=2)**Channel Y:** 6.5 7%(K=2)**Channel Z:** 6.5 7%(K=2)

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

Boundary Effect:

For a distance of 2.5mm the evaluated uncertainty (increase in the probe sensitivity) is less than 2%.

NCL Calibration Laboratories

Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2008.

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

NCL CALIBRATION LABORATORIES

Calibration File No.: CP-872

Client.: BACL

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 835 MHz

Manufacturer: APREL Laboratories

Model No.: E-020

Serial No.: 273

Calibration in Body Tissue

Calibration Procedure: SSI/DRB-TP-D01-032-E020-V2

Project No: BACL-ALSAS10U-5323

Calibrated: 1st September 2008
Released on: 1st September 2008

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

Released By:



NCL CALIBRATION LABORATORIES

51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E8

Division of APREL Lab.
TEL: (613) 820-4888
FAX: (613) 820-4161

NCL Calibration Laboratories

Division of APREL Laboratories.

Introduction

This Calibration Report reproduces the results of the calibration performed in line with the SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure. The results contained within this report are for APREL E-Field Probe E-020 273.

References

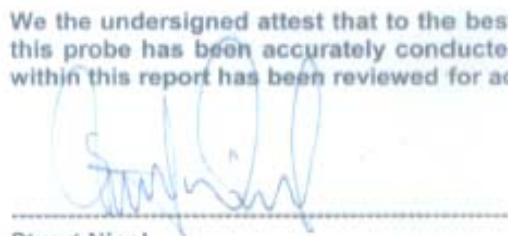
SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure
IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"
SSI-TP-011 Tissue Calibration Procedure

Conditions

Probe 273 was a new probe taken from stock prior to 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 probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.



Stuart Nicol



Jesse Hones

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 Laboratories.

Calibration Results Summary

Probe Type:	E-Field Probe E-020
Serial Number:	273
Frequency:	835 MHz
Sensor Offset:	1.56 mm
Sensor Length:	2.5 mm
Tip Enclosure:	Ertalyte*
Tip Diameter:	<5 mm
Tip Length:	60 mm
Total Length:	290 mm

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

Channel X:	1.2 μ V/(V/m) ²
Channel Y:	1.2 μ V/(V/m) ²
Channel Z:	1.2 μ V/(V/m) ²
Diode Compression Point:	95 mV

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 Laboratories.

Sensitivity in Body Tissue Measured**Frequency:** 835 MHz**Epsilon:** 56.16 (+/-5%) **Sigma:** 0.09 S/m (+/-10%)**ConvF****Channel X:** 6.7**Channel Y:** 6.7**Channel Z:** 6.7

Tissue sensitivity values were calculated using the load impedance of the APREL Laboratories Daq-Paq.

Boundary Effect:

Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.44mm.

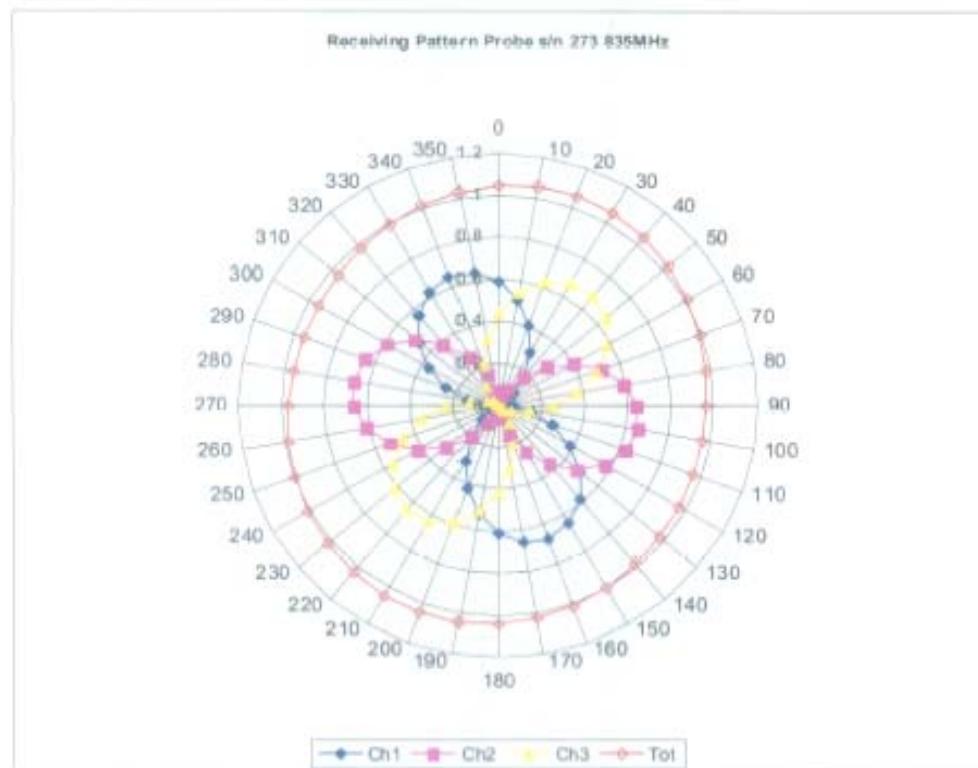
Spatial Resolution:

The measured probe tip diameter is 5 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.

Page 4 of 10
This page has been reviewed for content and attested to on Page 2 of this document.

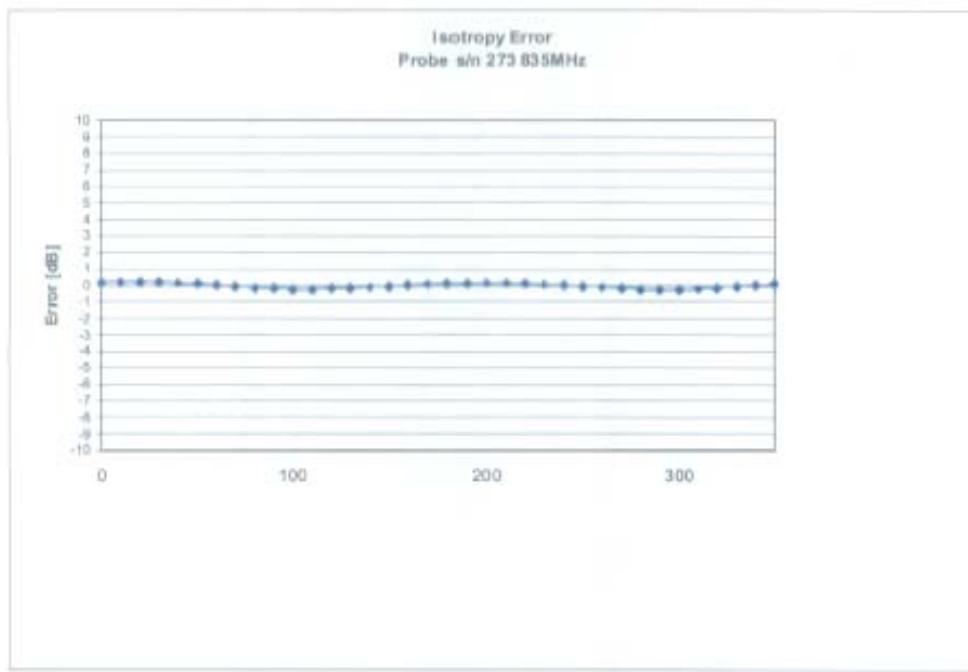
NCL Calibration Laboratories

Division of APREL Laboratories.

Receiving Pattern 835 MHz (Air)

NCL Calibration Laboratories
Division of APREL Laboratories.

Isotropy Error 835 MHz (Air)



Isotropicity in Tissue: 0.10 dB

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 Laboratories,

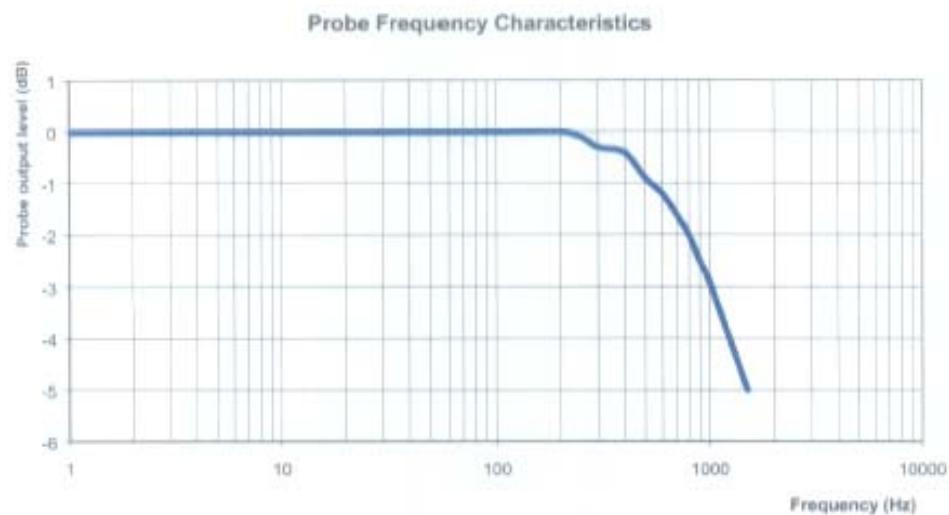
Dynamic Range



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 Laboratories.

Video Bandwidth

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

Page 8 of 10
This page has been reviewed for content and attested to on Page 2 of this document.

NCL Calibration Laboratories

Division of APREL Laboratories.

Conversion Factor Uncertainty Assessment**Frequency:** 835MHz**Epsilon:** 56.16 (+/-5%) **Sigma:** 0.99 S/m (+/-10%)**ConvF****Channel X:** 6.7 7%(K=2)**Channel Y:** 6.7 7%(K=2)**Channel Z:** 6.7 7%(K=2)

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

Boundary Effect:

For a distance of 2.4mm the evaluated uncertainty (increase in the probe sensitivity) is less than 2%.

NCL Calibration Laboratories

Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2008.

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

NCL CALIBRATION LABORATORIES

Calibration File No.: CP-877

Client.: BACL

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 1900 MHz

Manufacturer: APREL Laboratories

Model No.: E-020

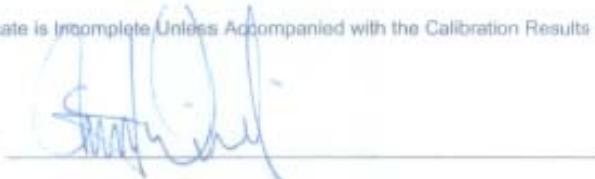
Serial No.: 273

Calibration Procedure: SSI/DRB-TP-D01-032-E020-V2

Project No: BACB-ALSAS10U-5323

Calibrated: 1st August 2008
Released on: 1st September 2008

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

Released By: 

NCL CALIBRATION LABORATORIES

51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6

Division of APREL Lab.
TEL: (613) 820-4958
FAX: (613) 820-4161

NCL Calibration Laboratories

Division of APREL Laboratories.

Introduction

This Calibration Report reproduces the results of the calibration performed in line with the SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure. The results contained within this report are for APREL E-Field Probe E-020 273.

References

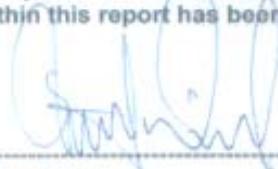
SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure
IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"
SSI-TP-011 Tissue Calibration Procedure

Conditions

Probe 273 was a new probe taken from stock prior to 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 probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.


Stuart Nicol
Jesse Hones

NCL Calibration Laboratories

Division of APREL Laboratories.

Calibration Results Summary

Probe Type:	E-Field Probe E-020
Serial Number:	273
Frequency:	1900 MHz
Sensor Offset:	1.56 mm
Sensor Length:	2.5 mm
Tip Enclosure:	Ertalyte*
Tip Diameter:	<5 mm
Tip Length:	60 mm
Total Length:	290 mm

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

Channel X:	1.2 μ V/(V/m) ²
Channel Y:	1.2 μ V/(V/m) ²
Channel Z:	1.2 μ V/(V/m) ²
Diode Compression Point:	95 mV

NCL Calibration Laboratories

Division of APREL Laboratories.

Sensitivity in Head Tissue Measured**Frequency:** 1900 MHz**Epsilon:** 38.50 (+/-5%) **Sigma:** 1.40 S/m (+/-5%)**ConvF****Channel X:** 5.25**Channel Y:** 5.25**Channel Z:** 5.25

Tissue sensitivity values were calculated using the load impedance of the APREL Laboratories Daq-Paq.

Boundary Effect:

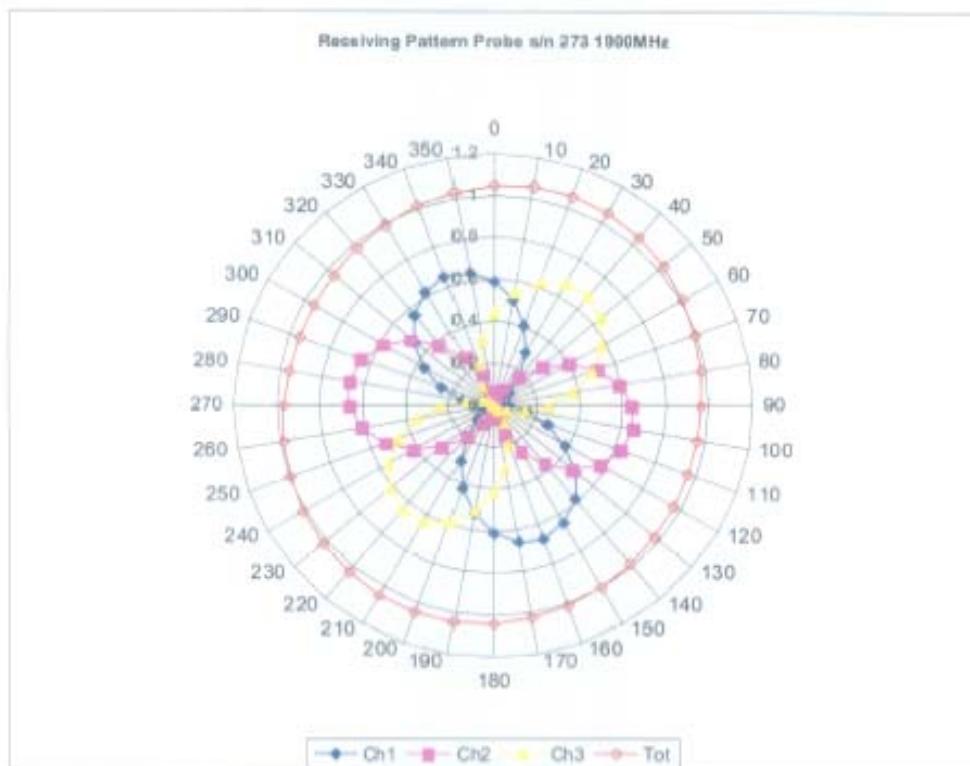
Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.44mm.

Spatial Resolution:

The measured probe tip diameter is 5 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.

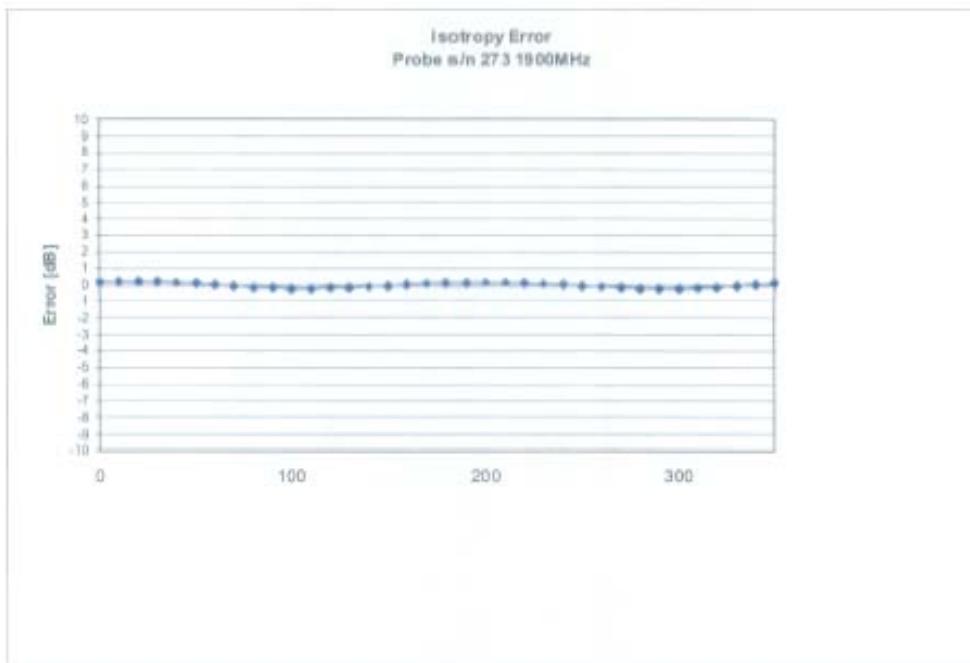
NCL Calibration Laboratories

Division of APREL Laboratories

Receiving Pattern 1900 MHz (Air)

NCL Calibration Laboratories
Division of APREL Laboratories.

Isotropy Error 1900 MHz (Air)



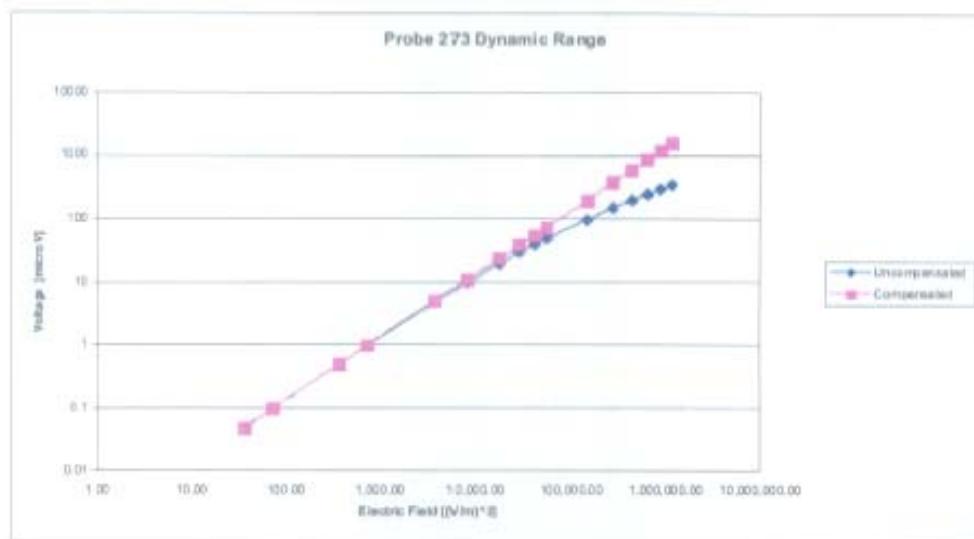
Isotropicity in Tissue: 0.10 dB

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 Laboratories.

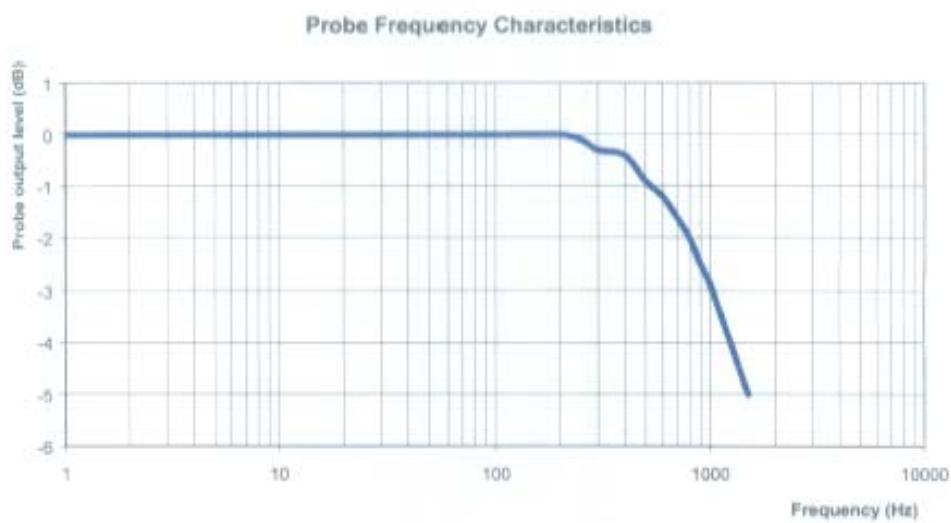
Dynamic Range

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 Laboratories.

Video Bandwidth

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

Page 8 of 10
This page has been reviewed for content and attested to on Page 2 of this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Conversion Factor Uncertainty Assessment

Frequency: 1900MHz

Epsilon: 38.50 (+/-5%) **Sigma:** 1.40 S/m (+/-5%)

ConvF

Channel X: 5.25 7%(K=2)

Channel Y: 5.25 7%(K=2)

Channel Z: 5.25 7%(K=2)

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

Boundary Effect:

For a distance of 2.4mm the evaluated uncertainty (increase in the probe sensitivity) is less than 2%.

Page 9 of 10
This page has been reviewed for content and attested to on Page 2 of this document.

NCL Calibration Laboratories

Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2008.

Page 10 of 10

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

NCL CALIBRATION LABORATORIES

Calibration File No.: CP-278

Client.: BACL

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 1900 MHz

Manufacturer: APREL Laboratories

Model No.: E-020

Serial No.: 273

Calibration in Body Tissue

Calibration Procedure: SSI/DRB-TP-D01-032-E020-V2

Project No: BACB-ALSAS10U-5323

Calibrated: 1st August 2008
Released on: 1st September 2008

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

Released By:



NCL CALIBRATION LABORATORIES

61 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2B 1E8

Division of APREL Lab.
TEL: (613) 820-4958
FAX: (613) 820-4161

NCL Calibration Laboratories

Division of APREL Laboratories.

Introduction

This Calibration Report reproduces the results of the calibration performed in line with the SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure. The results contained within this report are for APREL E-Field Probe E-020 273.

References

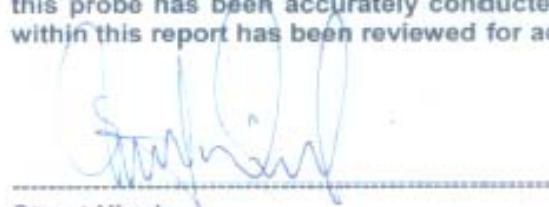
SSI/DRB-TP-D01-032-E020-V2 E-Field Probe Calibration Procedure
IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"
SSI-TP-011 Tissue Calibration Procedure

Conditions

Probe 273 was a new probe taken from stock prior to 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 probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.



Stuart Nicol



Jesse Hones

NCL Calibration Laboratories

Division of APREL Laboratories.

Calibration Results Summary

Probe Type:	E-Field Probe E-020
Serial Number:	273
Frequency:	1900 MHz
Sensor Offset:	1.56 mm
Sensor Length:	2.5 mm
Tip Enclosure:	Ertalyte*
Tip Diameter:	<5 mm
Tip Length:	60 mm
Total Length:	290 mm

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

Channel X:	1.2 μ V/(V/m) ²
Channel Y:	1.2 μ V/(V/m) ²
Channel Z:	1.2 μ V/(V/m) ²
Diode Compression Point:	95 mV

NCL Calibration Laboratories

Division of APREL Laboratories.

Sensitivity in Body Tissue Measured**Frequency:** 1900 MHz**Epsilon:** 53.05 (+/-5%) **Sigma:** 1.58 S/m (+/-5%)**ConvF****Channel X:** 5.15**Channel Y:** 5.15**Channel Z:** 5.15

Tissue sensitivity values were calculated using the load impedance of the APREL Laboratories Daq-Paq.

Boundary Effect:

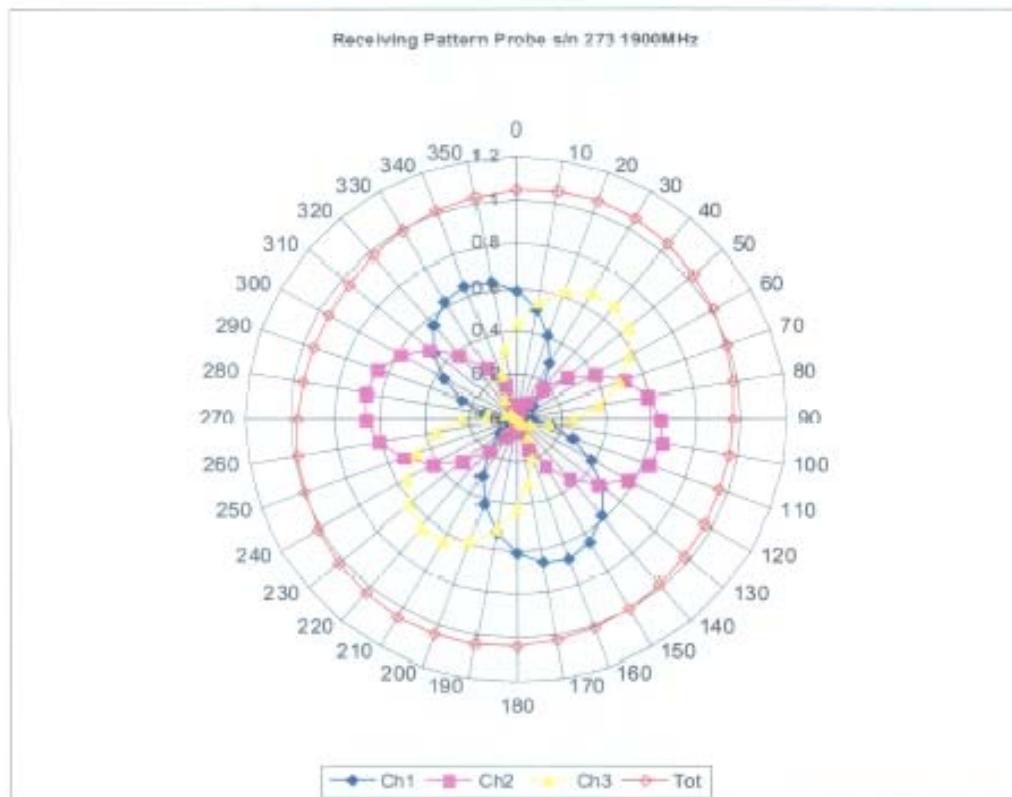
Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.44mm.

Spatial Resolution:

The measured probe tip diameter is 5 mm (+/- 0.01 mm) and therefore meets the requirements of SSI/DRB-TP-D01-032 for spatial resolution.

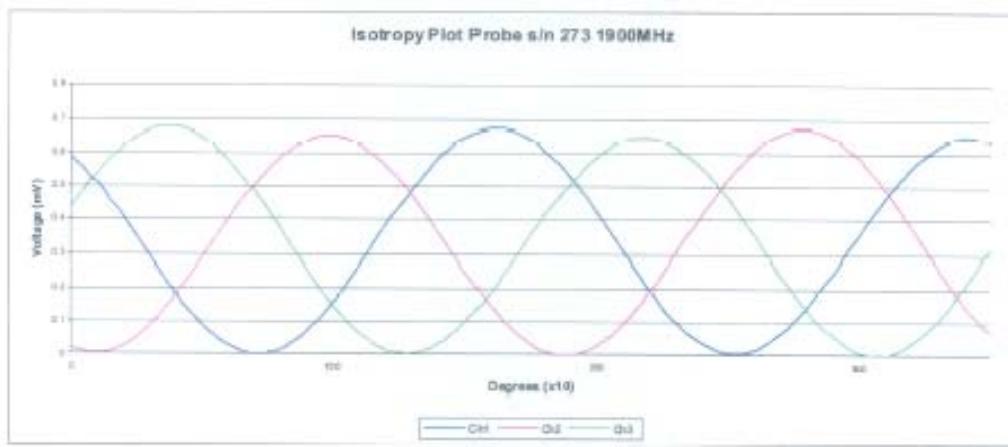
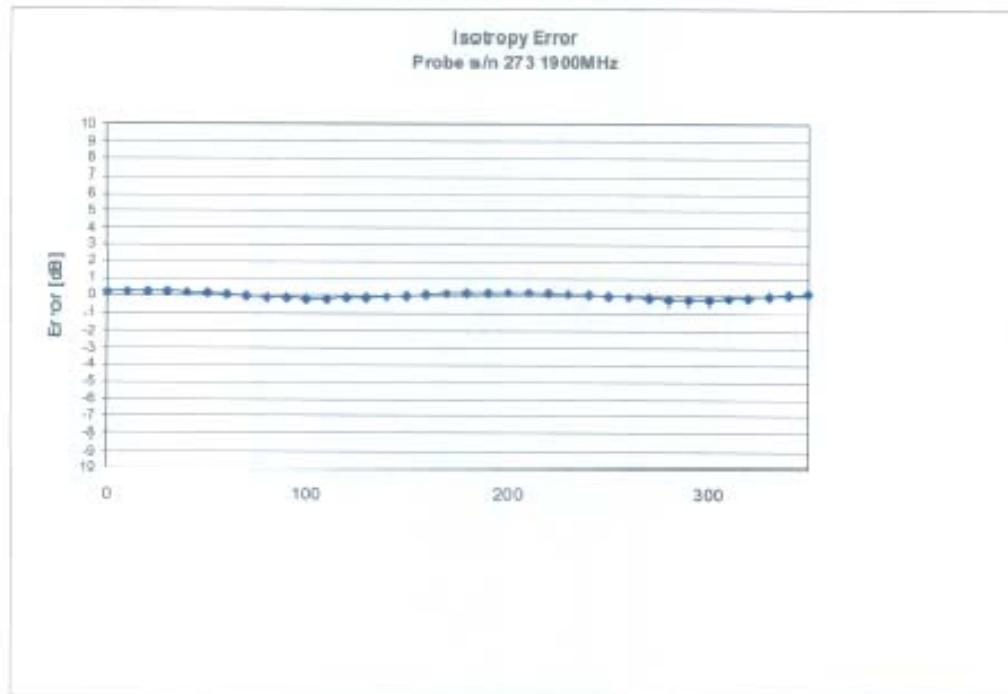
NCL Calibration Laboratories

Division of APREL Laboratories

Receiving Pattern 1900 MHz (Air)

NCL Calibration Laboratories

Division of APREL Laboratories.

Isotropy Error 1900 MHz (Air)**Isotropicity in Tissue:**

0.10 dB

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 Laboratories.

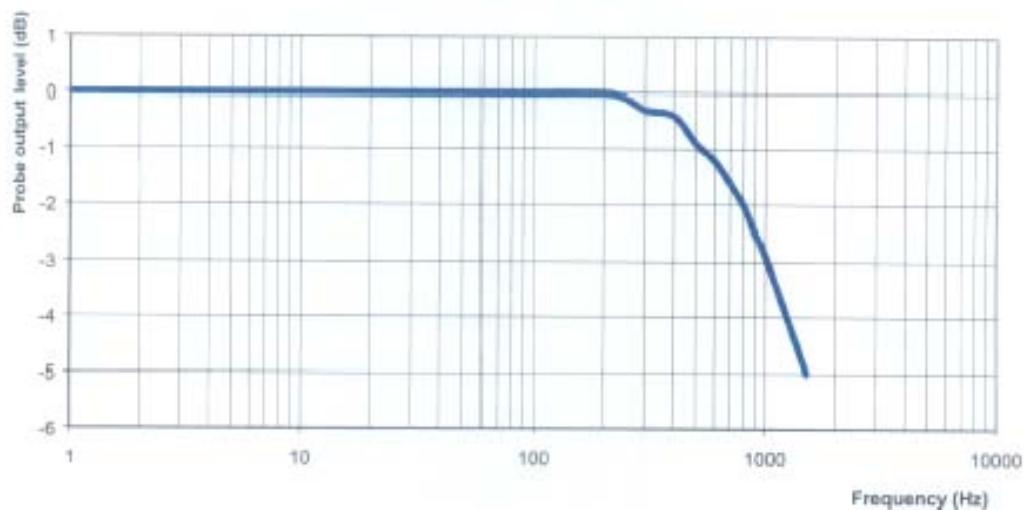
Dynamic Range

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 Laboratories.

Video Bandwidth**Probe Frequency Characteristics**

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

Page 8 of 10
This page has been reviewed for content and attested to on Page 2 of this document.

NCL Calibration Laboratories

Division of APREL Laboratories

Conversion Factor Uncertainty Assessment**Frequency:** 1900MHz**Epsilon:** 53.05 (+/-5%) **Sigma:** 1.58 S/m (+/-5%)**ConvF****Channel X:** 5.15 7%(K=2)**Channel Y:** 5.15 7%(K=2)**Channel Z:** 5.15 7%(K=2)

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

Boundary Effect:

For a distance of 2.4mm the evaluated uncertainty (increase in the probe sensitivity) is less than 2%.

NCL Calibration Laboratories

Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2008.

Page 10 of 10

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

APPENDIX C – DIPOLE CALIBRATION CERTIFICATES**NCL CALIBRATION LABORATORIES**

Calibration File No: DC-917
Project Number: BACL-ALSAS10U-5323

C E R T I F I C A T E O F C A L I B R A T I O N

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

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

Customer: Bay Area Compliance Laboratory

Calibrated: 1st September 2008
Released on: 1st September 2008

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

Released By: _____

NCL CALIBRATION LABORATORIES

51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6

Division of APREL Lab.
TEL: (613) 820-4988
FAX: (613) 820-4162

NCL Calibration Laboratories

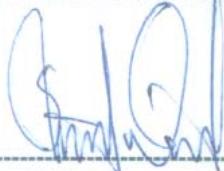
Division of APREL Laboratories.

Conditions

Dipole 180-00558 was new and taken from stock prior to 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

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

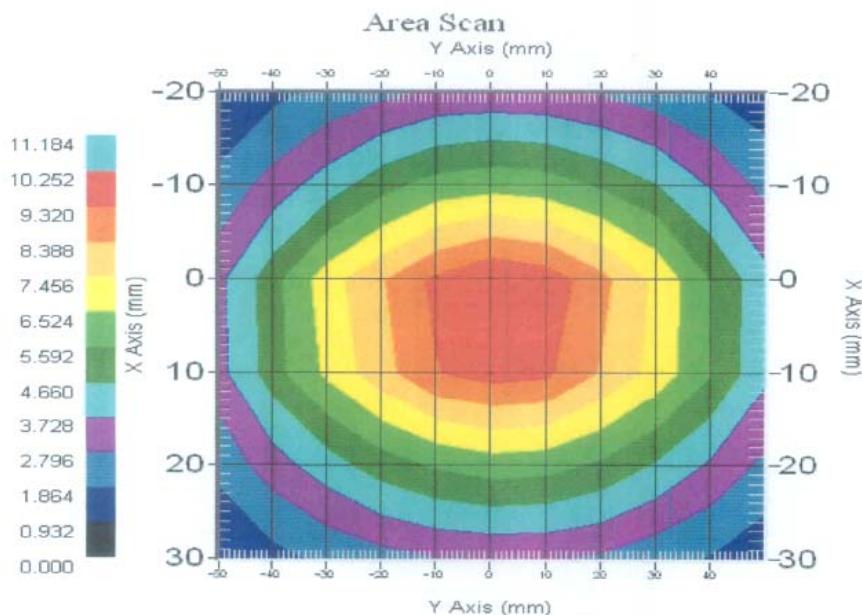
Length: 162.2 mm
Height: 89.4 mm

Electrical Specification

SWR: 1.018 U
Return Loss: -41.371 dB
Impedance: 51.739 Ω

System Validation Results

Frequency	1 Gram	10 Gram	Peak
835 MHz	9.49	6.1	14.21



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

3

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

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 Validation

Head Tissue 835MHz	Measured
Dielectric constant, ϵ_r	41.12
Conductivity, σ [S/m]	0.92

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

5

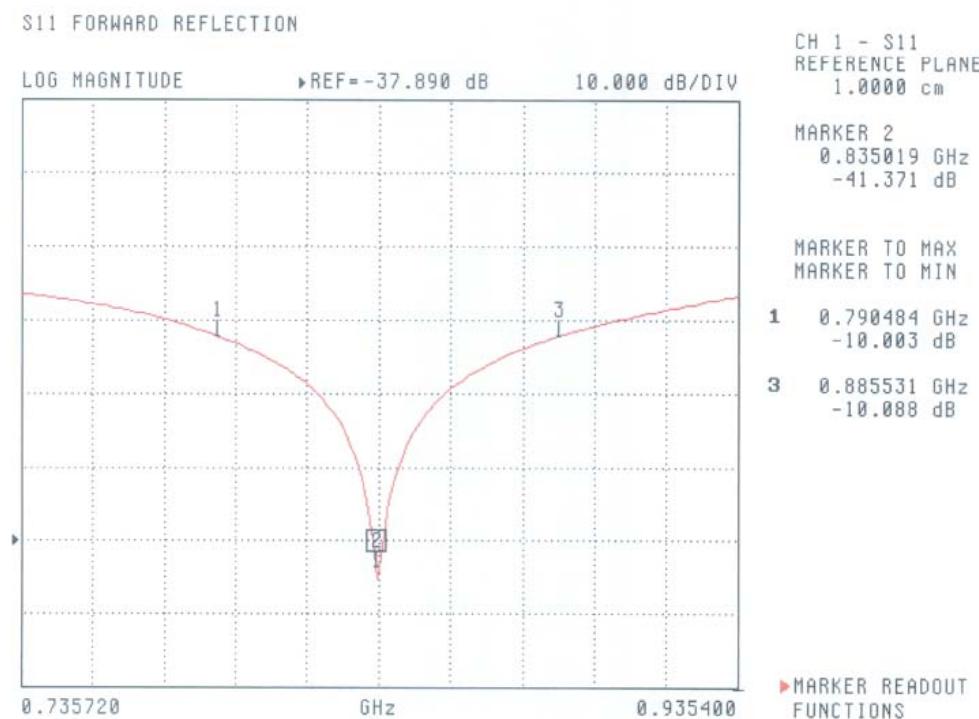
NCL Calibration Laboratories

Division of APREL Laboratories.

Electrical Calibration

Test	Result
S11 RL	-41.371 dB
SWR	1.018 U
Impedance	51.739 Ω

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

S11 Parameter Return Loss

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

NCL Calibration Laboratories
Division of APREL Laboratories.

SWR

S11 FORWARD REFLECTION

SWR

►REF=500.000 mU

1.000 U/DIV



CH 1 - S11
REFERENCE PLANE
1.0000 cm

MARKER 2
0.835019 GHz
1.018 U

MARKER TO MAX
MARKER TO MIN

1 0.790484 GHz
1.925 U

3 0.885531 GHz
1.911 U

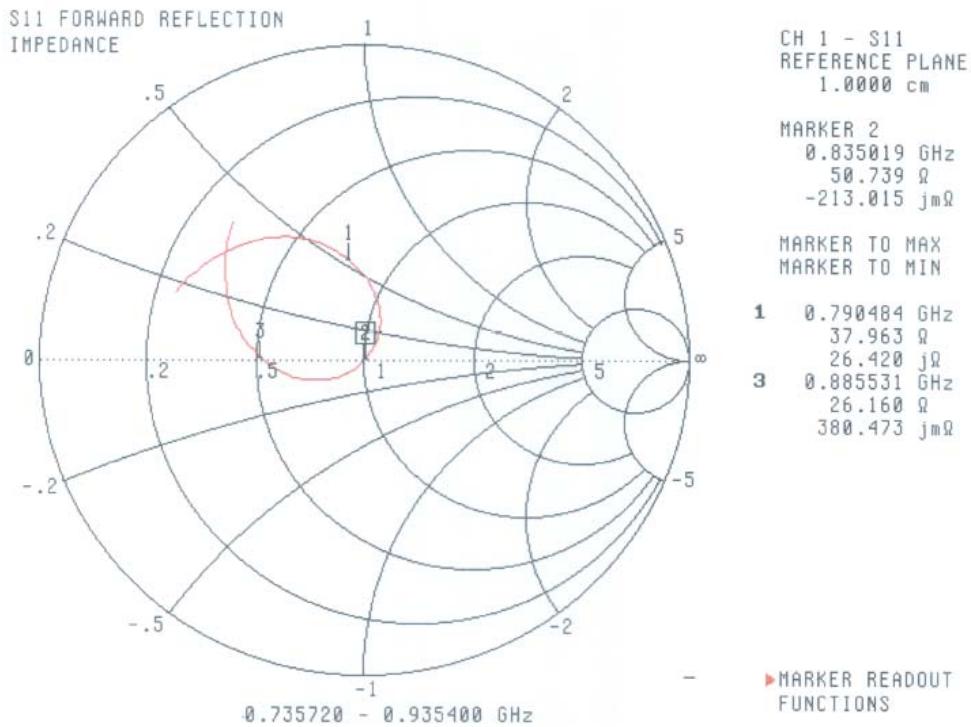
► MARKER READOUT
FUNCTIONS

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

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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.

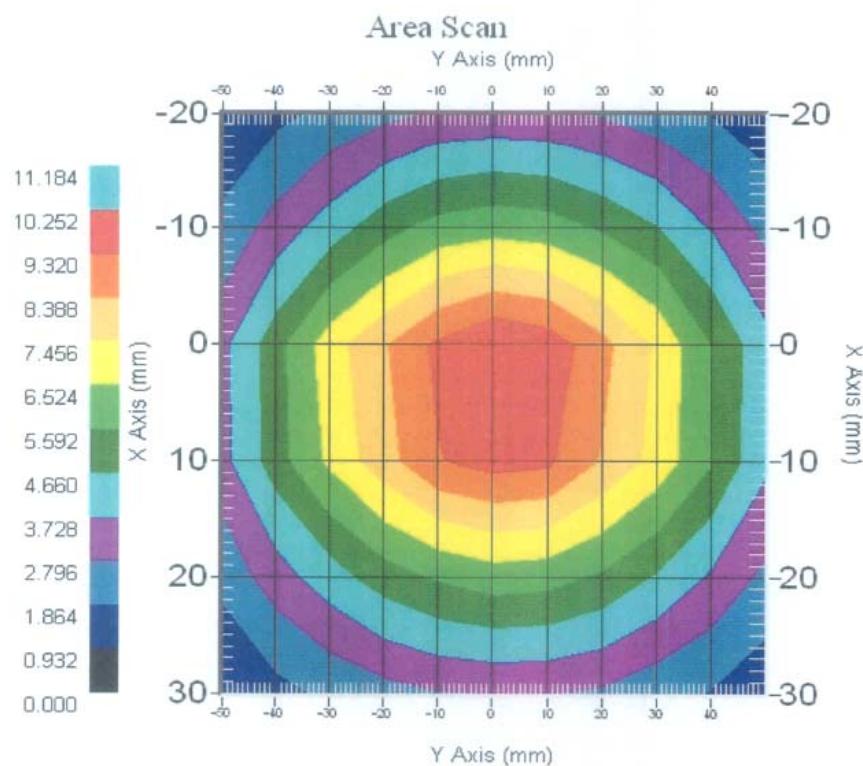
8

NCL Calibration Laboratories

Division of APREL Laboratories.

System Validation Results Using the Electrically Calibrated Dipole

Head Tissue Frequency	1 Gram	10 Gram	Peak Above Feed Point
835 MHz	9.49	6.1	14.21



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 2008.

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

10

NCL CALIBRATION LABORATORIES

Calibration File No: DC-920
Project Number: BACL-ALSAS10U-5323

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

Manufacturer: APREL Laboratories

Part number: ALS-D-1900-S-2

Frequency: 1900 MHz

Serial No: 210-00710

Customer: Bay Area Compliance Laboratory

Calibrated: 1st September 2008
Released on: 1st September 2008

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

Released By:

NCL CALIBRATION LABORATORIES

51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2B 1E6

Division of APREL Lab.
TEL: (613) 820-4988
FAX: (613) 820-4162

NCL Calibration Laboratories

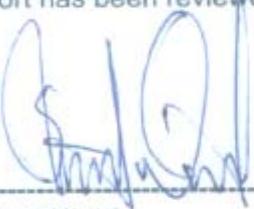
Division of APREL Laboratories.

Conditions

Dipole 210-00710 was new and taken from stock prior to 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

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

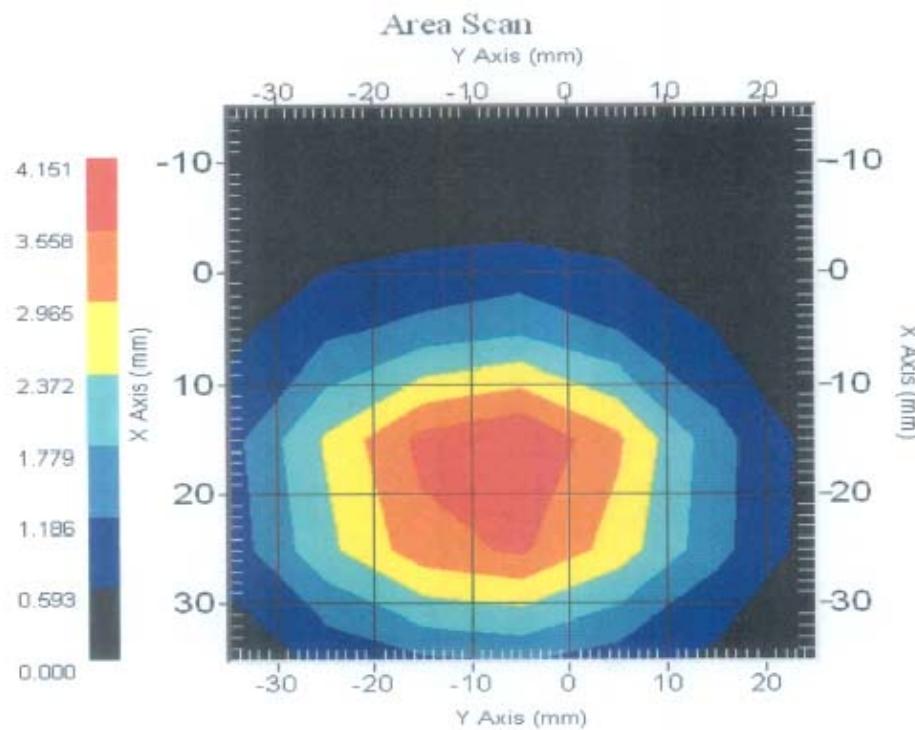
Length: 67.1 mm
Height: 38.9 mm

Electrical Specification

SWR: 1.059 U
Return Loss: -30.831 dB
Impedance: 50.914 Ω

System Validation Results

Frequency	1 Gram	10 Gram	Peak
1900 MHz	38.7	20.5	69.7



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Introduction

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

References

SSI-TP-018-ALSAS Dipole Calibration Procedure

SSI-TP-016 Tissue Calibration Procedure

IEEE 1528 "Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques"

Conditions

Dipole 210-00710 was new taken from stock.

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

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

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Dipole Calibration Results**Mechanical Verification**

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

Tissue Validation

Head Tissue 1900 MHz	Measured
Dielectric constant, ϵ_r	40.03
Conductivity, σ [S/m]	1.38

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Electrical Calibration

Test	Result
S11 R/L	-30.831 dB
SWR	1.059 U
Impedance	50.914 Ω

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

S11 Parameter Return Loss

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SWR

S11 FORWARD REFLECTION

SWR

REF = 449.865 mU

900.000 mU/DIV



CH 1 - S11
REFERENCE PLANE
5.1000 mm

MARKER 2
1.900000 GHz
1.059 U

MARKER TO MAX
MARKER TO MIN

1 1.860000 GHz
1.241 U

3 1.957500 GHz
1.229 U

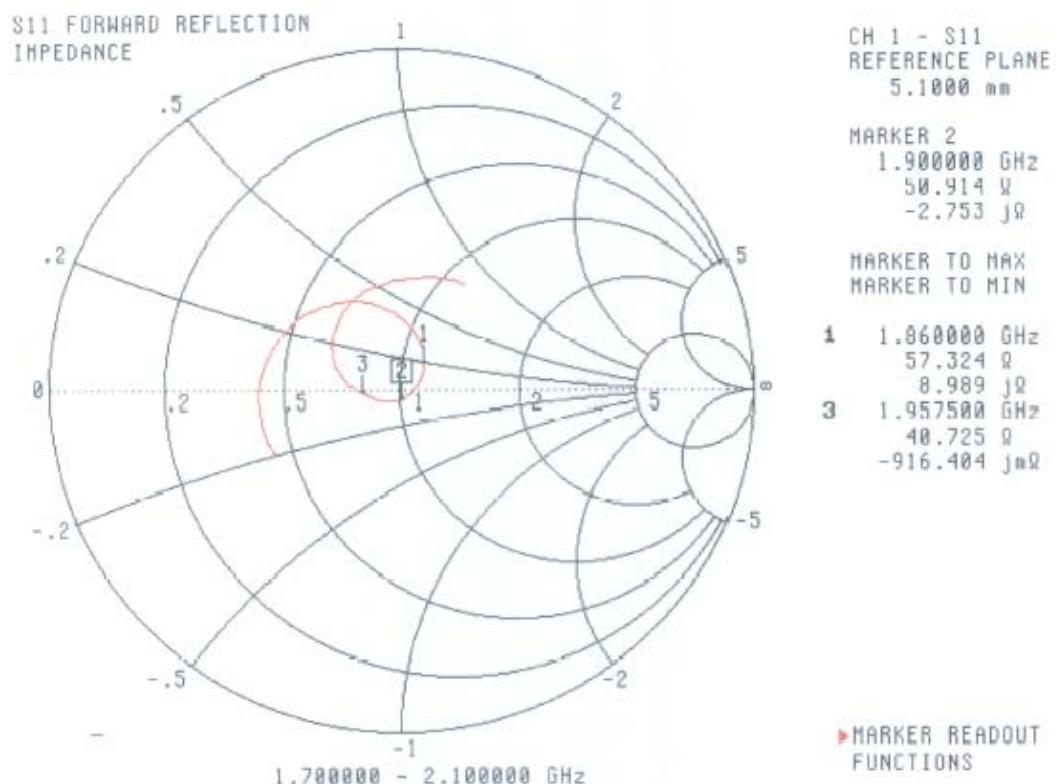
► MARKER READOUT
FUNCTIONS

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Smith Chart Dipole Impedance

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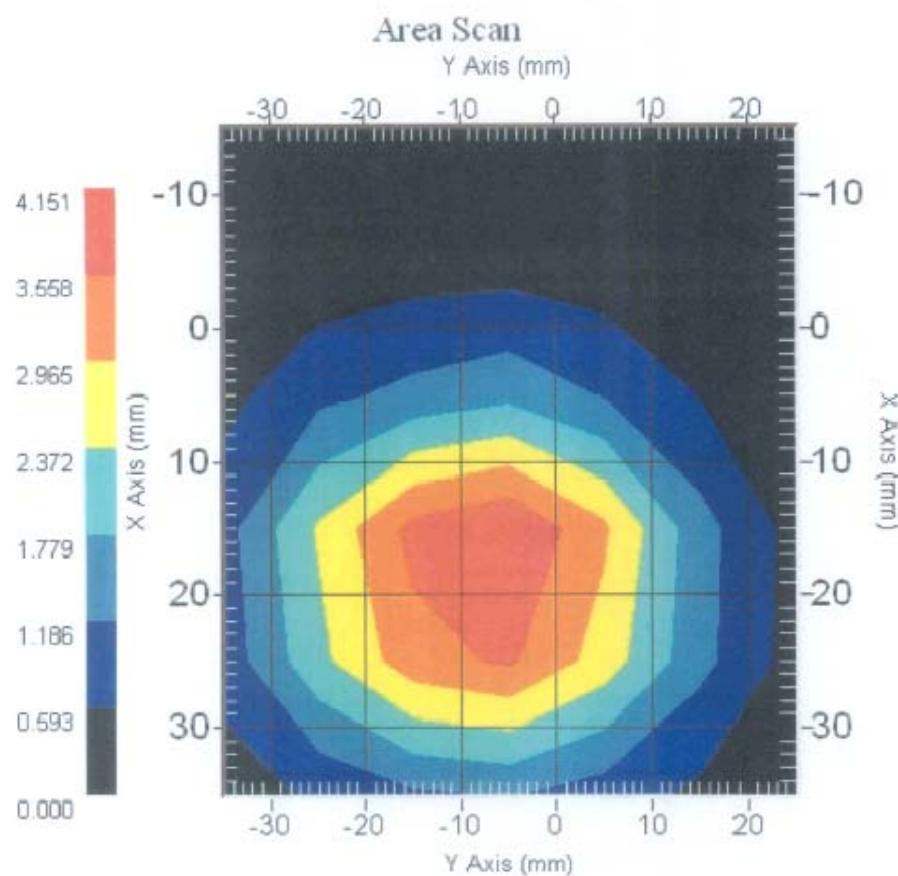
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System Validation Results Using the Electrically Calibrated Dipole

Head Tissue Frequency	1 Gram	10 Gram	Peak Above Feed Point
1900 MHz	38.7	20.5	69.7



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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 2007.

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APPENDIX D – SAR SYSTEM VALIDATION DATA

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

System Performance Check 835MHz Head

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 : 835.00 MHz
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 10.066 W/kg
Power Drift-Finish : 9.926 W/kg
Power Drift (%) : -1.391

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 : 835.00 MHz
Last Calib. Date : 15-Apr-2008
Temperature : 20.00 °C
Ambient Temp. : 20.00 °C
Humidity : 50.00 RH%
Epsilon : 41.50 F/m
Sigma : 0.90 S/m
Density : 1000.00 kg/cu. m

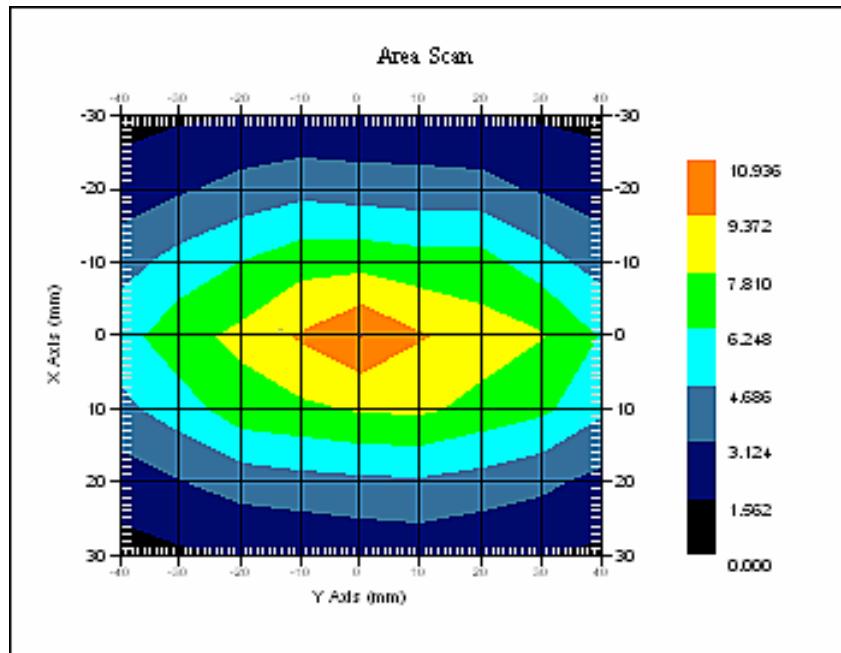
Probe Data

Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 273
Last Calib. Date : 08-Jan-2008
Frequency : 835.00 MHz
Duty Cycle Factor : 1
Conversion Factor : 6.5
Probe Sensitivity : 1.20 1.20 1.20 μV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

Measurement Data

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

1 gram SAR value : 9.651 W/kg
10 gram SAR value : 6.042 W/kg
Area Scan Peak SAR : 10.936 W/kg
Zoom Scan Peak SAR : 15.013 W/kg



835 MHz System Validation

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**System Performance Check 1900 Head****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 : 1900.00 MHz
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 43.370 W/kg
Power Drift-Finish : 41.609 W/kg
Power Drift (%) : -4.059

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 : 16-Apr-2008
Temperature : 20.00 °C
Ambient Temp. : 20.00 °C
Humidity : 56.00 RH%
Epsilon : 40.00 F/m
Sigma : 1.40 S/m
Density : 1000.00 kg/cu. m

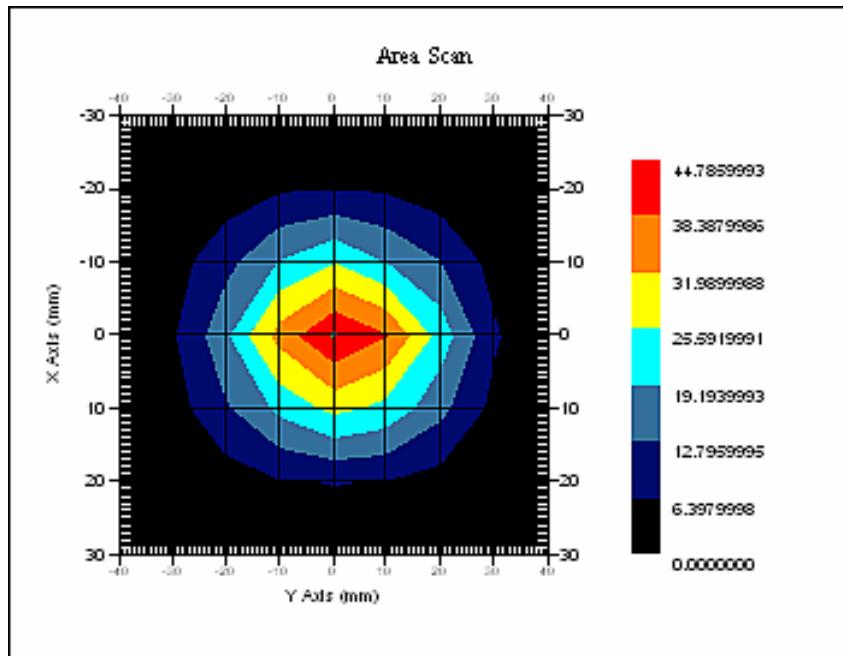
Probe Data

Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 273
Last Calib. Date : 01-Aug-2008
Frequency : 1900.00 MHz
Duty Cycle Factor : 1
Conversion Factor : 5.15
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

Measurement Data

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

1 gram SAR value : 40.328 W/kg
10 gram SAR value : 20.137 W/kg
Area Scan Peak SAR : 44.786 W/kg
Zoom Scan Peak SAR : 75.567 W/kg



1900 MHz System Validation

APPENDIX E – EUT SCAN RESULTS

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

Left Head Cheek (835 MHz Middle Channel)

Measurement Data

Test mode	:GSM
Crest Factor	: 8
Scan Type	: Complete
Area Scan	: 12x6x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan	: 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start	: 0.025 W/kg
Power Drift-Finish	: 0.026 W/kg
Power Drift (%)	: 4.066

Tissue Data

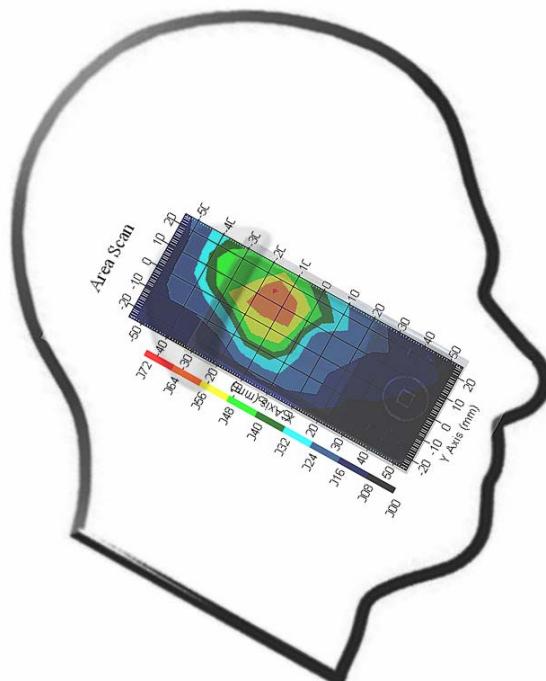
Type	: HEAD
Frequency	: 835.00 MHz
Epsilon	: 40.58 F/m
Sigma	: 0.87 S/m
Density	: 1000.00 kg/cu. m

Probe Data

Serial No.	: 273
Frequency	: 835.00 MHz
Duty Cycle Factor	: 8
Conversion Factor	: 6.5
Probe Sensitivity	: 1.20 1.20 1.20 μ V/(V/m)2
Compression Point	: 95.00 mV
Offset	: 1.56 mm

1 gram SAR value	: 0.058 W/kg
10 gram SAR value	: 0.033 W/kg
Area Scan Peak SAR	: 0.065 W/kg
Zoom Scan Peak SAR	: 0.090 W/kg

Plot 1#



Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Left Head Tilt (835 MHz Middle Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.036 W/kg
Power Drift-Finish : 0.037 W/kg
Power Drift (%) : 3.030

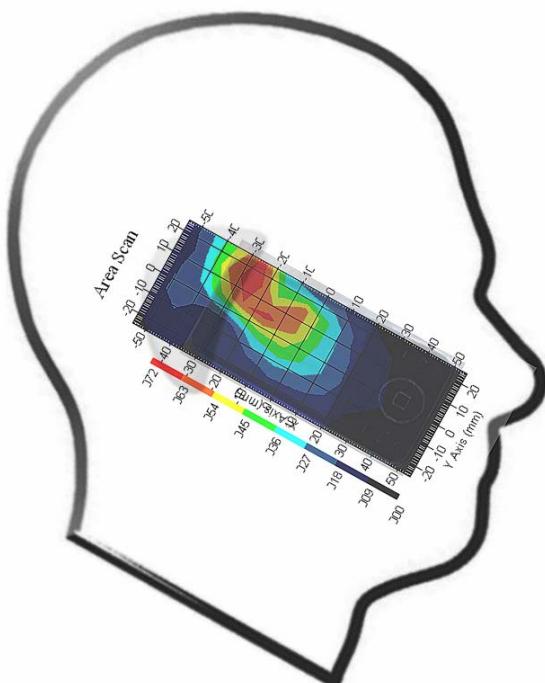
Tissue Data

Type : HEAD
Frequency : 835.00 MHz
Epsilon : 40.58 F/m
Sigma : 0.87 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.5
Probe Sensitivity : 1.20 1.20 1.20 μ V/(V/m)²
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.068 W/kg
10 gram SAR value : 0.039 W/kg
Area Scan Peak SAR : 0.072 W/kg
Zoom Scan Peak SAR : 0.100 W/kg

Plot 2#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Left Head Tilt (835 MHz Low Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.034 W/kg
Power Drift-Finish : 0.033 W/kg
Power Drift (%) : -2.941

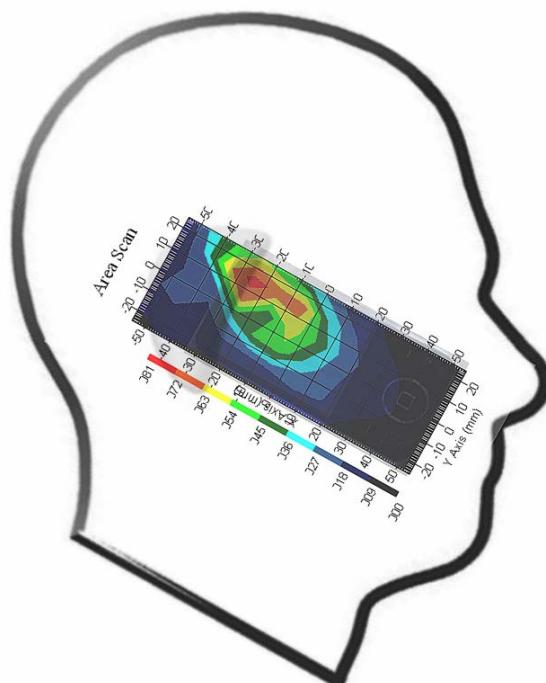
Tissue Data

Type : HEAD
Frequency : 835.00 MHz
Epsilon : 40.58 F/m
Sigma : 0.87 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.5
Probe Sensitivity : 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.059 W/kg
10 gram SAR value : 0.035 W/kg
Area Scan Peak SAR : 0.076 W/kg
Zoom Scan Peak SAR : 0.110 W/kg

Plot 3#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Left Head Tilt (835 MHz High Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.036 W/kg
Power Drift-Finish : 0.035 W/kg
Power Drift (%) : -2.779

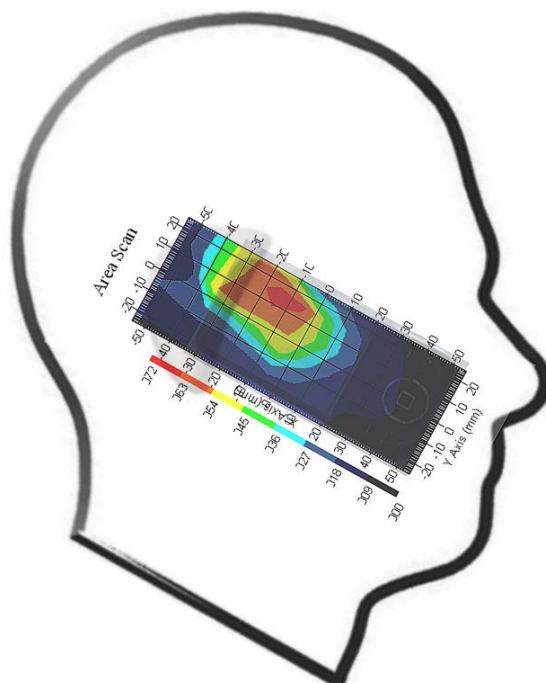
Tissue Data

Type : HEAD
Frequency : 835.00 MHz
Epsilon : 40.58 F/m
Sigma : 0.87 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.5
Probe Sensitivity : 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.059 W/kg
10 gram SAR value : 0.051 W/kg
Area Scan Peak SAR : 0.068 W/kg
Zoom Scan Peak SAR : 0.100 W/kg

Plot 4#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Right Head Cheek (835 MHz Middle Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 12x6x1 : 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 (%) : 1.348

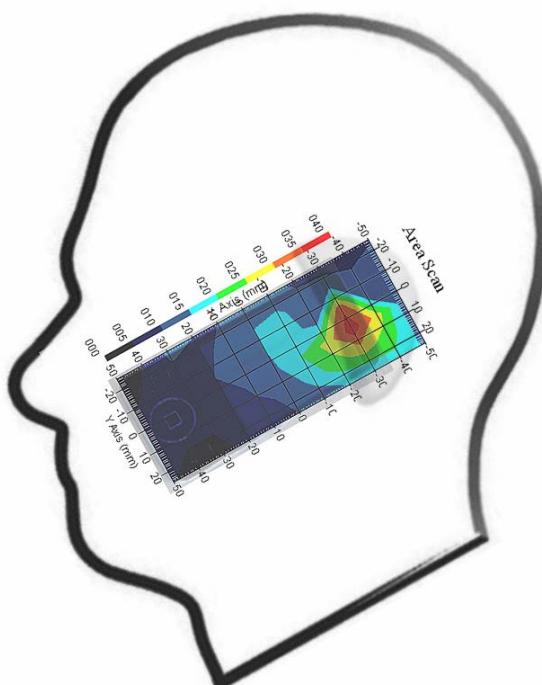
Tissue Data

Type : HEAD
Frequency : 835.00 MHz
Epsilon : 40.58 F/m
Sigma : 0.87 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.5
Probe Sensitivity : 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.035 W/kg
10 gram SAR value : 0.013 W/kg
Area Scan Peak SAR : 0.039 W/kg
Zoom Scan Peak SAR : 0.102 W/kg

Plot 5#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Right Head Tilt (835 MHz Middle Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.035 W/kg
Power Drift-Finish : 0.035 W/kg
Power Drift (%) : 1.212

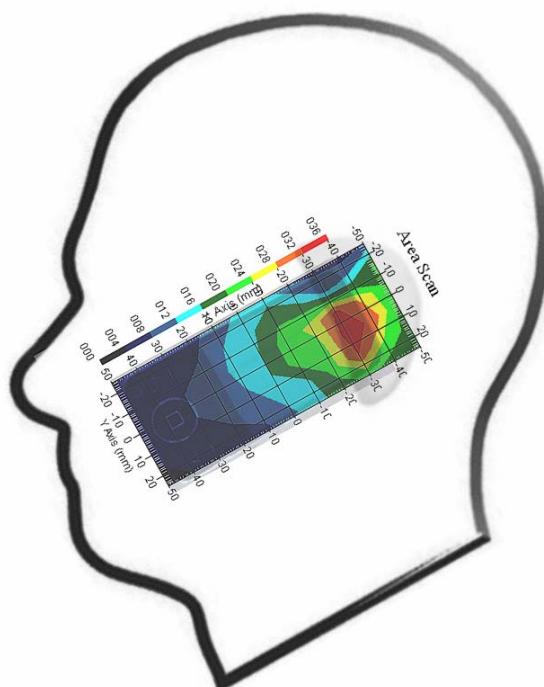
Tissue Data

Type : HEAD
Frequency : 835.00 MHz
Epsilon : 40.58 F/m
Sigma : 0.87 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.5
Probe Sensitivity : 1.20 1.20 1.20 μ V/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.039 W/kg
10 gram SAR value : 0.034 W/kg
Area Scan Peak SAR : 0.040 W/kg
Zoom Scan Peak SAR : 0.090 W/kg

Plot 6#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Body- worn Back (835 MHz Middle Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 6x12x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.084 W/kg
Power Drift-Finish : 0.082 W/kg
Power Drift (%) : -2.381

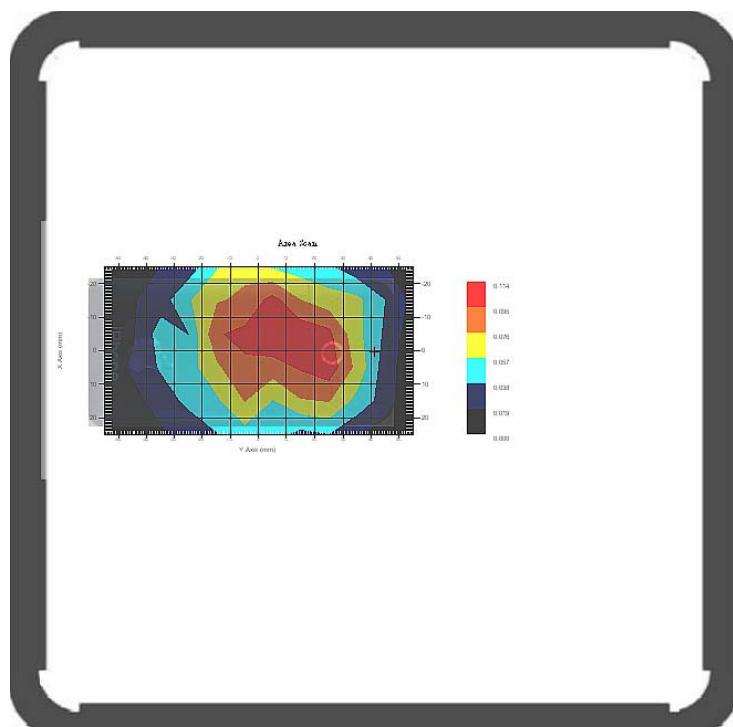
Tissue Data

Type : BODY
Frequency : 835.00 MHz
Epsilon : 55.15 F/m
Sigma : 0.98 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.7
Probe Sensitivity : 1.20 1.20 1.20 μ V/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.086 W/kg
10 gram SAR value : 0.060 W/kg
Area Scan Peak SAR : 0.113 W/kg
Zoom Scan Peak SAR : 0.140 W/kg

Plot 7#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Body- worn Back (835 MHz Low Channel)**

Measurement Data

Test mode :GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 6x12x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.087 W/kg
Power Drift-Finish : 0.090 W/kg
Power Drift (%) : 3.448

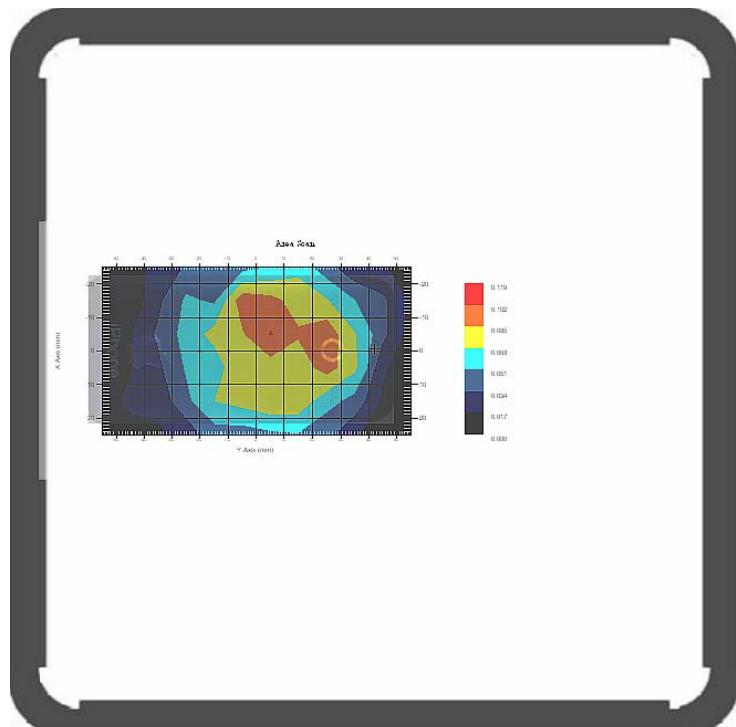
Tissue Data

Type : BODY
Frequency : 835.00 MHz
Epsilon : 55.15 F/m
Sigma : 0.98 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.7
Probe Sensitivity : 1.20 1.20 1.20 μ V/(V/m)²
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.093 W/kg
10 gram SAR value : 0.057 W/kg
Area Scan Peak SAR : 0.103 W/kg
Zoom Scan Peak SAR : 0.190 W/kg

Plot 8#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Body- worn Back (835 MHz High Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 6x12x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.084 W/kg
Power Drift-Finish : 0.082 W/kg
Power Drift (%) : 2.383

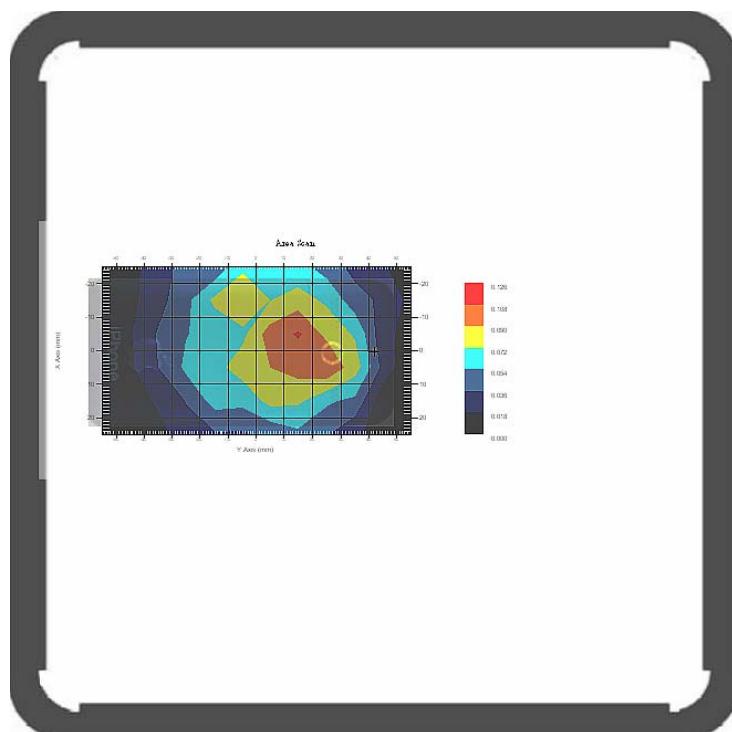
Tissue Data

Type : BODY
Frequency : 835.00 MHz
Epsilon : 55.15 F/m
Sigma : 0.98 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.7
Probe Sensitivity : 1.20 1.20 1.20 μ V/(V/m)²
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.101 W/kg
10 gram SAR value : 0.065 W/kg
Area Scan Peak SAR : 0.110 W/kg
Zoom Scan Peak SAR : 0.160 W/kg

Plot 9#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Left Head Cheek (1900 MHz Middle Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type: : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.038 W/kg
Power Drift-Finish : 0.037 W/kg
Power Drift (%) : -2.631

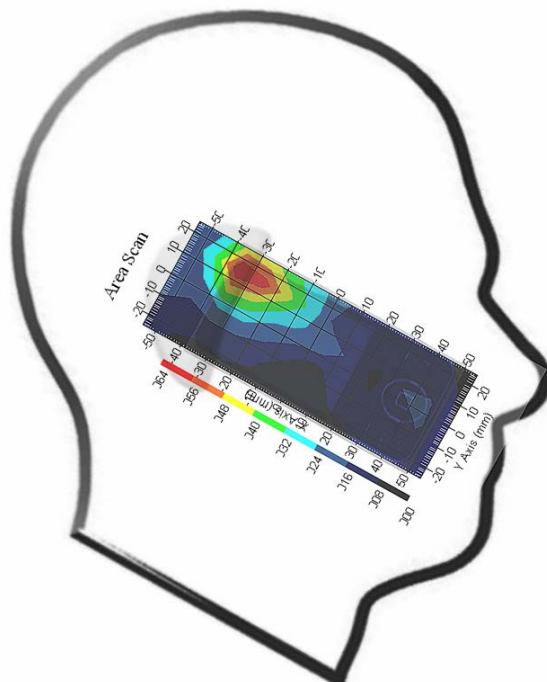
Tissue Data

Type : HEAD
Frequency : 1900.00 MHz
Epsilon : 39.37 F/m
Sigma : 1.47 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.25
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 : 0.030 W/kg
Area Scan Peak SAR : 0.064 W/kg
Zoom Scan Peak SAR : 0.090 W/kg

Plot 10#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Left Head Tilt (1900 MHz Middle Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type: : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.057 W/kg
Power Drift-Finish : 0.055 W/kg
Power Drift (%) : -3.509

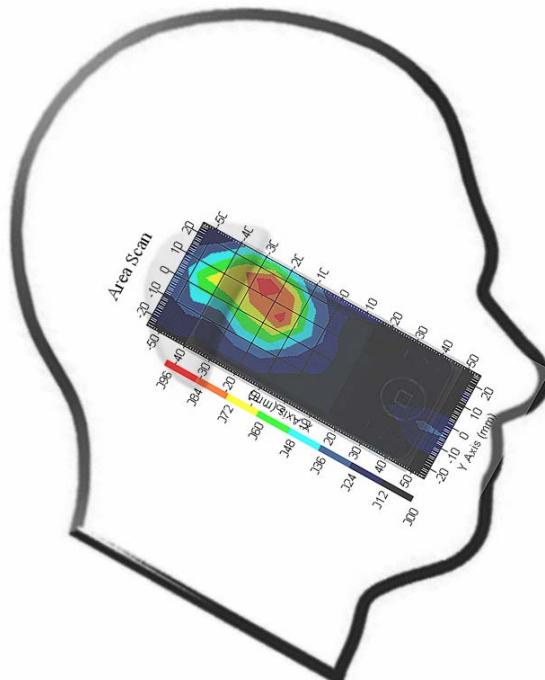
Tissue Data

Type : HEAD
Frequency : 1900.00 MHz
Epsilon : 39.37 F/m
Sigma : 1.47 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 μ V/(V/m)²
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.086 W/kg
10 gram SAR value : 0.047 W/kg
Area Scan Peak SAR : 0.096 W/kg
Zoom Scan Peak SAR : 0.203 W/kg

Plot 11#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Left Head Tilt (1900 MHz Low Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type: : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.075 W/kg
Power Drift-Finish : 0.078 W/kg
Power Drift (%) : 4.120

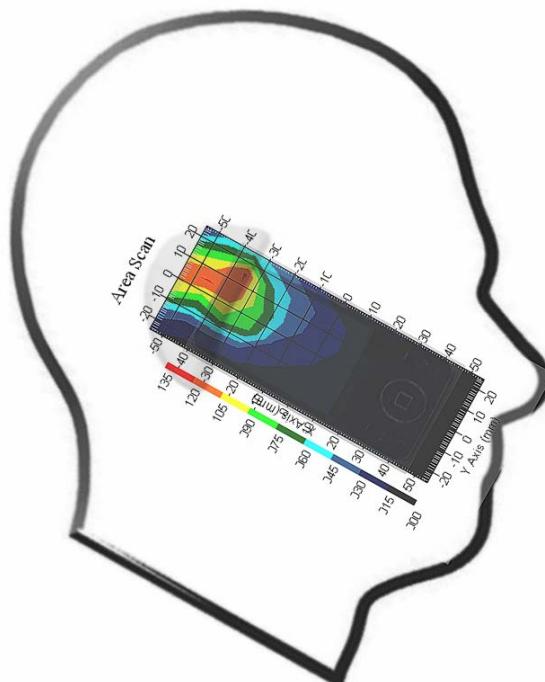
Tissue Data

Type : HEAD
Frequency : 1900.00 MHz
Epsilon : 39.37 F/m
Sigma : 1.47 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.25
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 : 0.109 W/kg
10 gram SAR value : 0.068 W/kg
Area Scan Peak SAR : 0.122 W/kg
Zoom Scan Peak SAR : 0.230 W/kg

Plot 12#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Left Head Tilt (1900 MHz High Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type: : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.069 W/kg
Power Drift-Finish : 0.070 W/kg
Power Drift (%) : 1.449

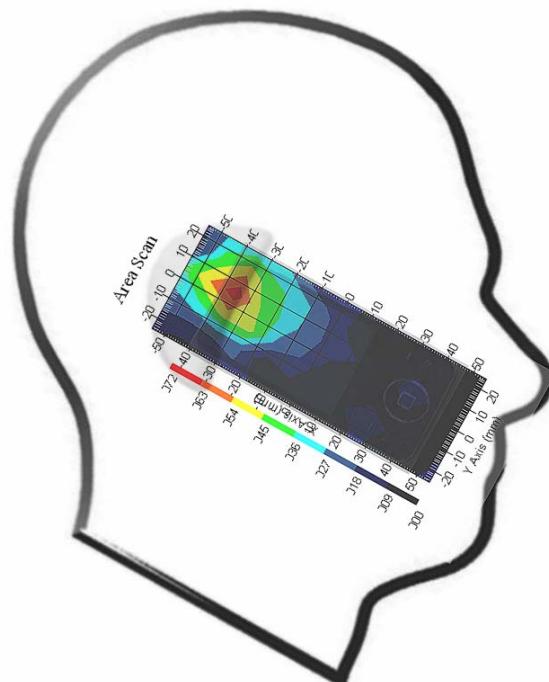
Tissue Data

Type : HEAD
Frequency : 1900.00 MHz
Epsilon : 39.37 F/m
Sigma : 1.47 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 μ V/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.066 W/kg
10 gram SAR value : 0.033 W/kg
Area Scan Peak SAR : 0.069 W/kg
Zoom Scan Peak SAR : 0.170 W/kg

Plot 13#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Right Head Cheek (1900 MHz Middle Channel)**

Measurement Data

Test mode :GSM
Crest Factor : 8
Scan Type: : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.102 W/kg
Power Drift-Finish : 0.100 W/kg
Power Drift (%) : -1.961

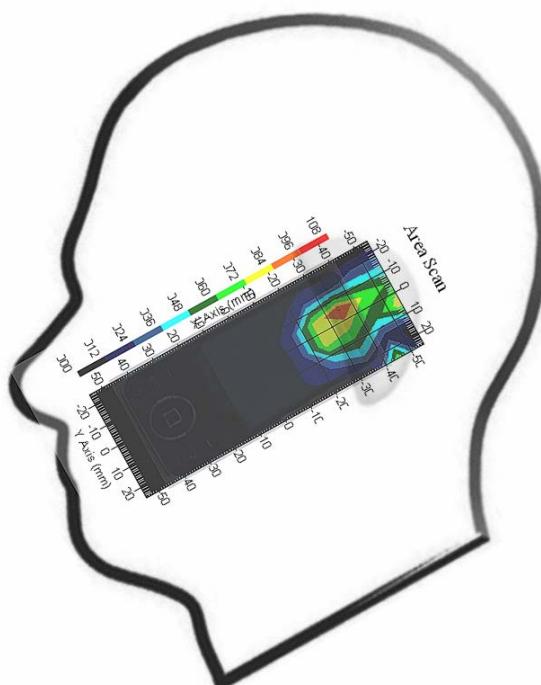
Tissue Data

Type : HEAD
Frequency : 1900.00 MHz
Epsilon : 39.37 F/m
Sigma : 1.47 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 μ V/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.084 W/kg
10 gram SAR value : 0.030 W/kg
Area Scan Peak SAR : 0.097 W/kg
Zoom Scan Peak SAR : 0.200 W/kg

Plot 14#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Right Head Tilt (1900 MHz Middle Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type: : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.091 W/kg
Power Drift-Finish : 0.087 W/kg
Power Drift (%) : -4.489

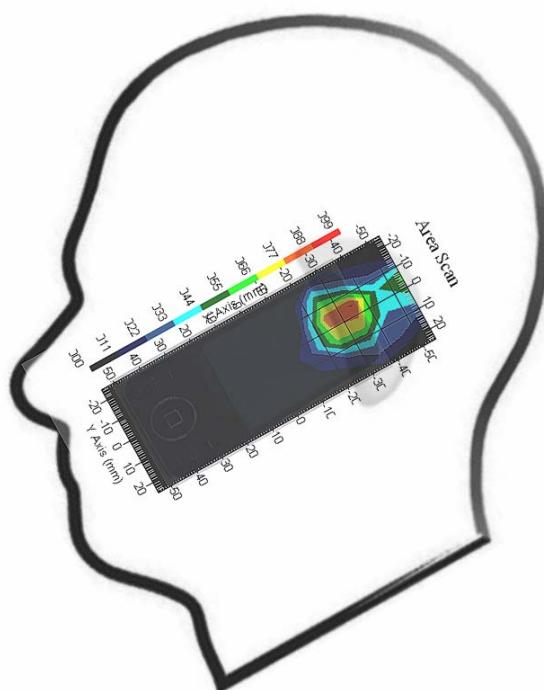
Tissue Data

Type : HEAD
Frequency : 1900.00 MHz
Epsilon : 39.37 F/m
Sigma : 1.47 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.25
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 : 0.068 W/kg
10 gram SAR value : 0.042 W/kg
Area Scan Peak SAR : 0.089 W/kg
Zoom Scan Peak SAR : 0.270 W/kg

Plot 15#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Body- worn Back (1900 MHz Middle Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 6x12x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.080 W/kg
Power Drift-Finish : 0.079 W/kg
Power Drift (%) : -1.253

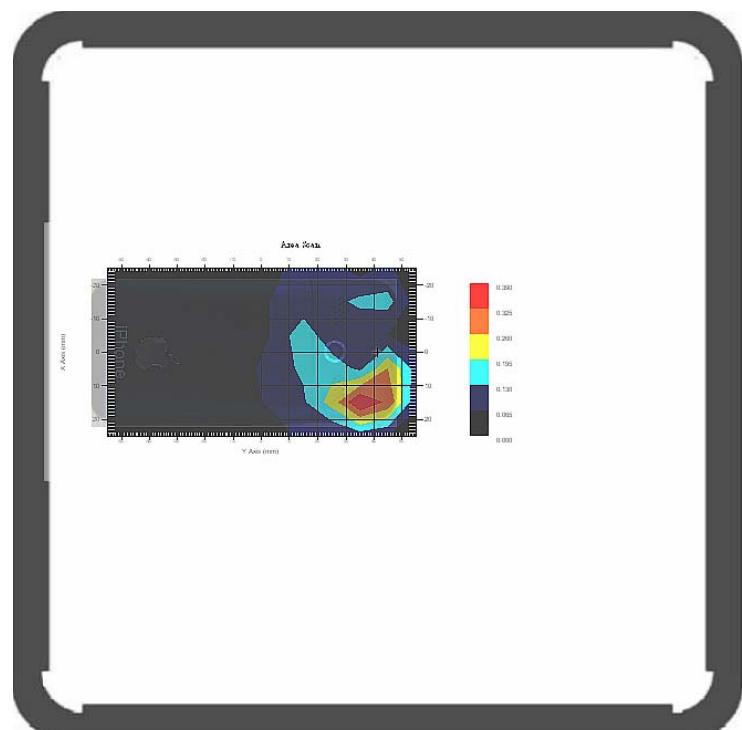
Tissue Data

Type : BODY
Frequency : 1900.00 MHz
Epsilon : 52.81 F/m
Sigma : 1.56 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.15
Probe Sensitivity : 1.20 1.20 1.20 μ V/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.328 W/kg
10 gram SAR value : 0.141 W/kg
Area Scan Peak SAR : 0.390 W/kg
Zoom Scan Peak SAR : 0.700 W/kg

Plot 16#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Body- worn Back (1900 MHz Low Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 6x12x1 : 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 : 0.093 W/kg
Power Drift (%) : -2.106

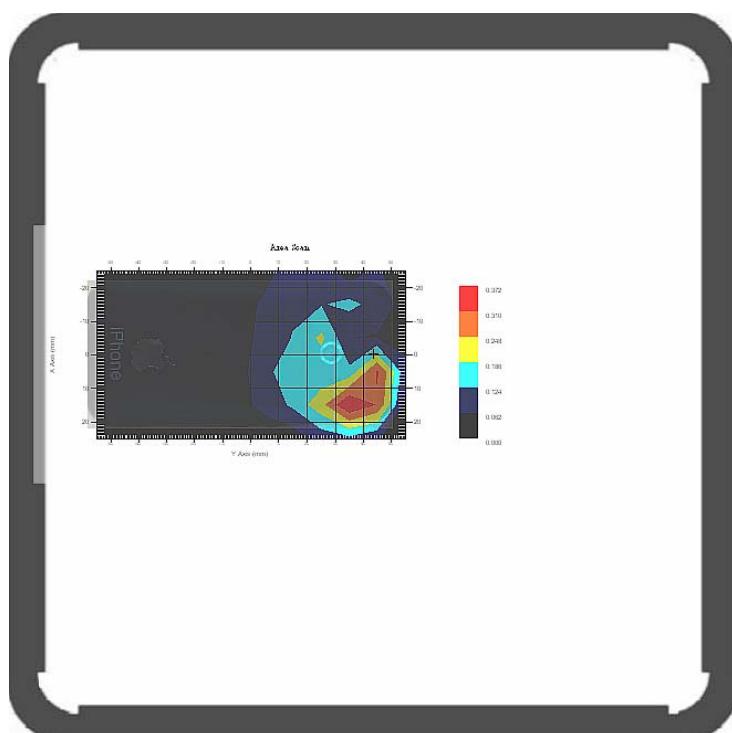
Tissue Data

Type : BODY
Frequency : 1900.00 MHz
Epsilon : 52.81 F/m
Sigma : 1.56 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.15
Probe Sensitivity : 1.20 1.20 1.20 μ V/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.282 W/kg
10 gram SAR value : 0.126 W/kg
Area Scan Peak SAR : 0.371 W/kg
Zoom Scan Peak SAR : 0.800 W/kg

Plot 17#

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**Body- worn Back (1900 MHz High Channel)****Measurement Data**

Test mode :GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 6x12x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.090 W/kg
Power Drift-Finish : 0.088 W/kg
Power Drift (%) : -2.225

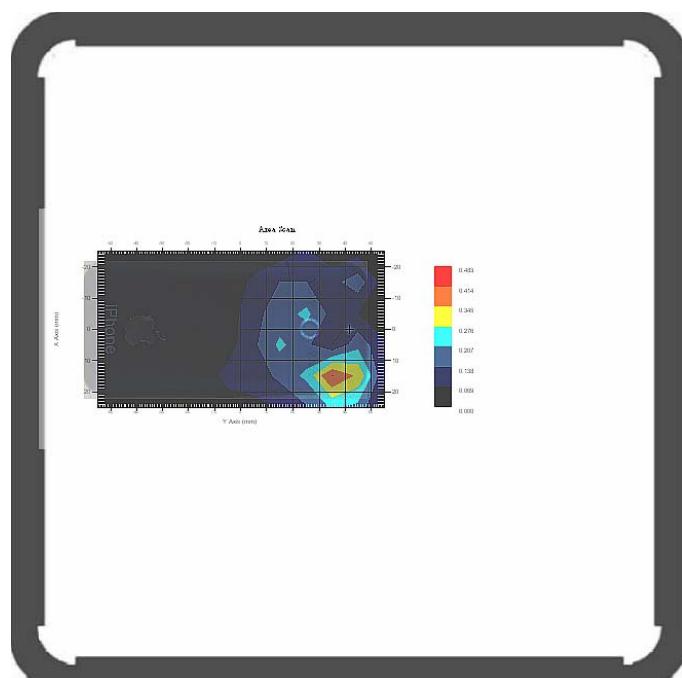
Tissue Data

Type : BODY
Frequency : 1900.00 MHz
Epsilon : 52.81 F/m
Sigma : 1.56 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.15
Probe Sensitivity : 1.20 1.20 1.20 μ V/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.304 W/kg
10 gram SAR value : 0.136 W/kg
Area Scan Peak SAR : 0.416 W/kg
Zoom Scan Peak SAR : 0.708 W/kg

Plot 18#

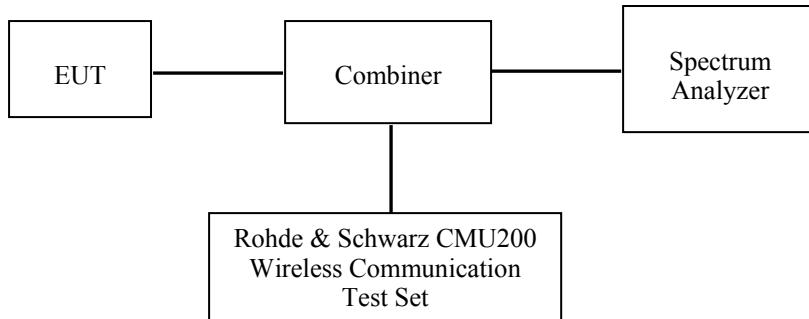
APPENDIX F – CONDUCTED OUTPUT POWER MEASUREMENT

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 spectrum analyzer through sufficient attenuation.



Test Equipment List and Details

Manufacturer	Equipment Description	Model No.	Serial No.	Calibration Date
Rohde & Schwarz	Communication Tester	CMU200	1100.0008.02	2008-06-21
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2008-05-09

Test Results

Band	Frequency (MHz)	Conducted Output Power (GSM Mode)	
		(dBm)	(Watt)
Cellular	824.2	31.75	1.496
	836.6	31.62	1.452
	848.8	31.21	1.321
PCS	1850.2	28.51	0.710
	1880.0	28.84	0.770
	1909.8	29.13	0.818

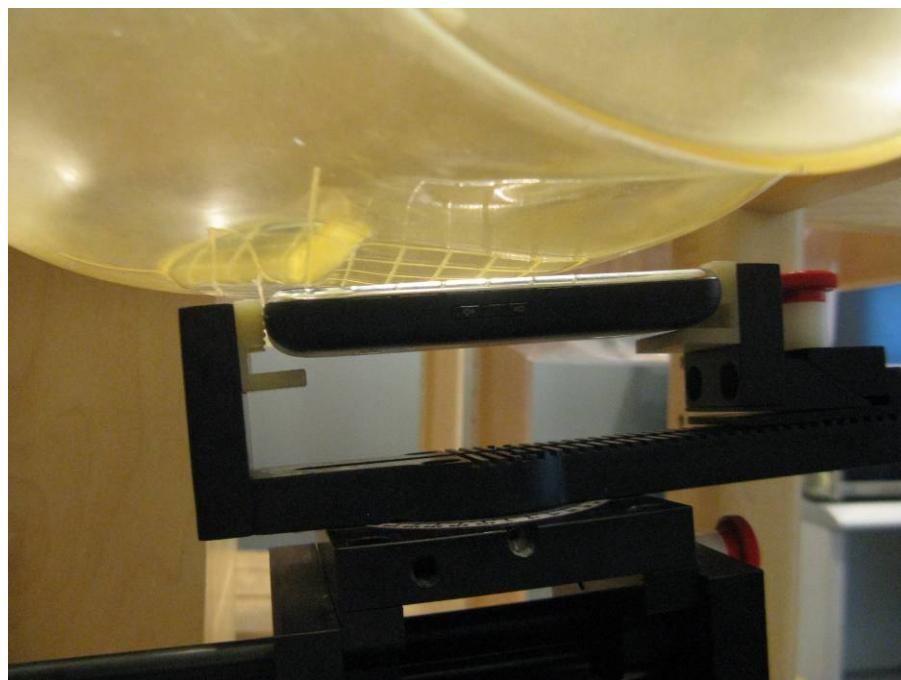
APPENDIX G – EUT TEST POSITION PHOTOS

1.5 cm Body-worn back Setup Photo

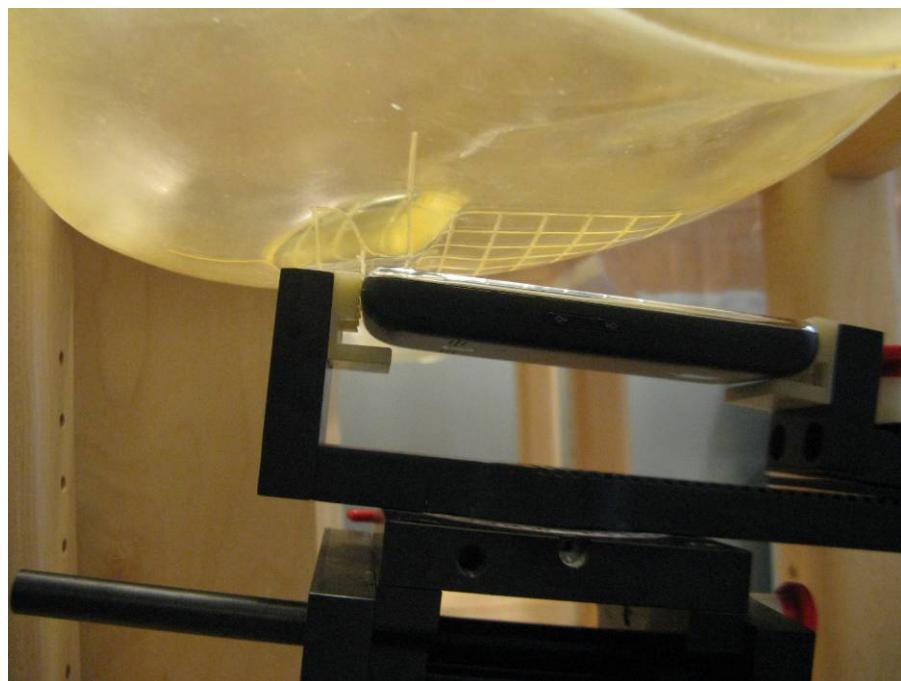
(With Headset)



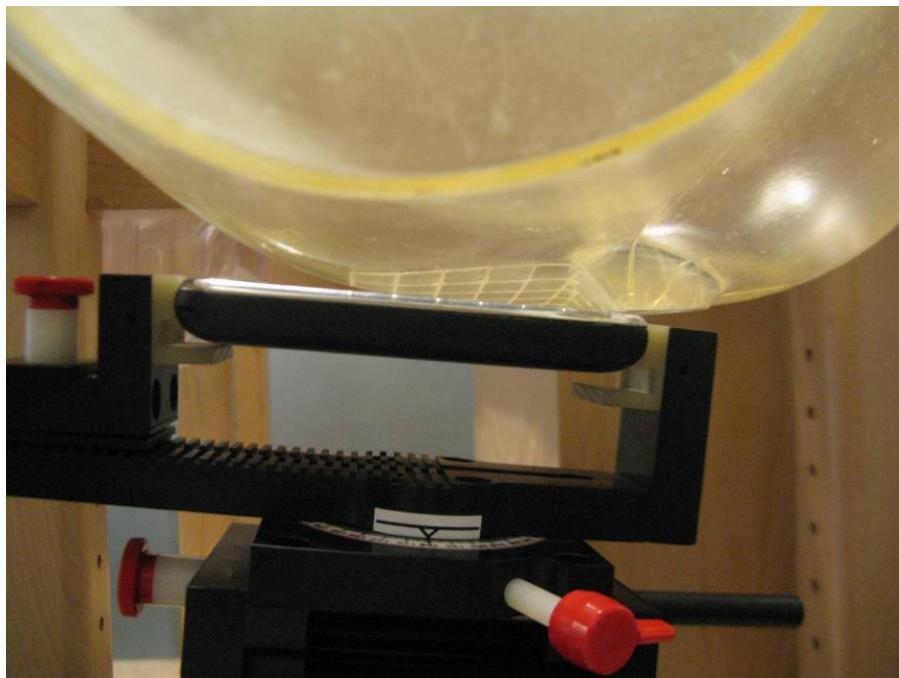
Left Head Touch Setup Photo



Left Head Tilt Setup Photo



Right Head Touch Setup Photo



Right Head Tilt Setup Photo



APPENDIX H – EUT PHOTOS

EUT - Top View



EUT - Bottom View



EUT- Uncovered View**EUT – Side View**

EUT - Headset



APPENDIX I - INFORMATIVE REFERENCES

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