



SAR EVALUATION REPORT

For

Verykool USA INC.

4350 Executive Dr.100 San Diego, CA 92121

FCC ID: WA6I605

Report Type: Original Report	Product Type: GSM Mobile Phone
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Report Number: <u>RSZ120104002-20</u>	
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* This report contain data that are not covered by the NVLAP accreditation and are marked with an asterisk “★” (Rev.2)

Attestation of Test Results					
EUT Information	Company Name	Verykool USA INC.			
	EUT Description	GSM Mobile Phone			
	FCC ID	WA6I605			
	Model Number	I605, I604			
	Test Date	2012.02.22--2012.02.24			
Frequency	Max. SAR Level(s) Measured	Limit(W/Kg)			
Cellular Band	0.355 W/kg 1g Head Tissue 0.944 W/kg 1g Body Tissue	1.6			
PCS Band	0.171 W/kg 1g Head Tissue 0.915 W/kg 1g Body Tissue				
Applicable Standards	ANSI / IEEE C95.1 : 2005 IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields,3 kHz to 300 GHz.				
	ANSI / IEEE C95.3 : 2002 IEEE Recommended Practice for Measurements and Computations of Radio Frequency Electromagnetic Fields With Respect to Human Exposure to SuchFields,100 kHz—300 GHz.				
	OET BULLETIN 65 SUPPLEMENT C Evaluating Compliance with FCC Guidelines for Human Exposure To Radiofrequency Electromagnetic Fields				
	IEEE1528:2003 IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques				
Note: This wireless device has been shown to be capable of compliance for localized specific absorption rate (SAR) for General Population/Uncontrolled Exposure limits specified in ANSI/IEEE Standards and has been tested in accordance with the measurement procedures specified in FCC OET 65 Supplement C and IEEE 1528-2003.					
The results and statements contained in this report pertain only to the device(s) evaluated.					

TABLE OF CONTENTS

DOCUMENT REVISION HISTORY	4
EUT DESCRIPTION	5
TECHNICAL SPECIFICATION	5
REFERENCE, STANDARDS, AND GUILDELINE.....	6
SAR LIMITS	7
FACILITIES AND ACCREDITATION	8
DESCRIPTION OF TEST SYSTEM	9
EQUIPMENT LIST AND CALIBRATION	16
EQUIPMENTS LIST & CALIBRATION INFORMATION	16
SAR MEASUREMENT SYSTEM VERIFICATION.....	17
LIQUID VERIFICATION	17
SYSTEM ACCURACY VERIFICATION.....	20
SAR SYSTEM VALIDATION DATA	21
EUT TEST STRATEGY AND METHODOLOGY	29
TEST POSITIONS FOR DEVICE OPERATING NEXT TO A PERSON'S EAR.....	29
CHEEK/TOUCH POSITION	30
EAR/TILT POSITION	30
TEST POSITIONS FOR BODY-WORN AND OTHER CONFIGURATIONS	31
SAR EVALUATION PROCEDURE.....	32
CONDUCTED OUTPUT POWER MEASUREMENT.....	33
PROVISION APPLICABLE	33
TEST PROCEDURE	33
TEST RESULTS:	33
SAR SIMULTANEOUS TRANSMISSION EVALUATION	35
SAR MEASUREMENT RESULTS.....	37
EUT SCAN RESULTS	40
APPENDIX A – MEASUREMENT UNCERTAINTY	56
APPENDIX B – PROBE CALIBRATION CERTIFICATES.....	57
APPENDIX C – DIPOLE CALIBRATION CERTIFICATES	67
APPENDIX D – EUT TEST POSITION PHOTOS	85
LIQUID DEPTH $\geq 15\text{CM}$	85
BODY-WORN BACK SETUP PHOTO	85
LEFT HEAD TOUCH SETUP PHOTO	86
LEFT HEAD TILT SETUP PHOTO	86
RIGHT HEAD TOUCH SETUP PHOTO	87
RIGHT HEAD TILT SETUP PHOTO	87
APPENDIX E – EUT PHOTOS.....	88
EUT – FRONT VIEW.....	88
EUT – BACK VIEW	88
EUT-TOP VIEW	89
EUT-BOTTOM VIEW	89
EUT – UNCOVERED VIEW	90
APPENDIX F – DECLARATION LETTERS.....	91
APPENDIX G – INFORMATIVE REFERENCES	92

DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RSZ120104002-20	Original Report	2012-02-29

EUT DESCRIPTION

This report has been prepared on behalf of Verykool USA INC and their product, FCC ID: WA6I605, Model: I605, I604 or the EUT (Equipment Under Test) as referred to in the rest of this report. The EUT is a GSM Mobile phone.

***Note:** The series products model: I605, I604, we select model: I605 to test, there is no electrical change has been made to the equipment, please refer to the product similarity letter.

Technical Specification

Product Type	Portable
Exposure Category:	Population / Uncontrolled
Antenna Type(s):	Internal Antenna
Body-Worn Accessories:	Headset
Face-Head Accessories:	None
Multi-slot Class:	Class 12
Operation Mode :	GSM Voice , GPRS Data and Bluetooth
Frequency Band:	Cellular Band : 824-849 MHz(TX) ; 869-894 MHz(RX) PCS Band : 1850-1910 MHz(TX) ; 1930-1990 MHz(RX) Bluetooth: 2402MHz-2480MHz (TX/RX)
Conducted RF Power:	Cellular Band :31.14dBm PCS Band : 28.76dBm Bluetooth : 4.82dBm
Dimensions (L*W*H):	90mm (L)× 55.5mm (W)× 13.7mm (H)
Weight:	79g
Power Source:	3.7VDC/ 1000mAh Rechargeable Battery
Normal Operation:	Head and Body-worn

REFERENCE, STANDARDS, AND GUIDELINES

FCC:

The Report and Order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g as recommended by the ANSI/IEEE standard C95.1-1992 [6] for an uncontrolled environment (Paragraph 65). According to the Supplement C of OET Bulletin 65 "Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields", released on Jun 29, 2001 by the FCC, the device should be evaluated at maximum output power (radiated from the antenna) under "worst-case" conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

This report describes the methodology and results of experiments performed on wireless data terminal. The objective was to determine if there is RF radiation and if radiation is found, what is the extent of radiation with respect to safety limits. SAR (Specific Absorption Rate) is the measure of RF exposure determined by the amount of RF energy absorbed by human body (or its parts) – to determine how the RF energy couples to the body or head which is a primary health concern for body worn devices. The limit below which the exposure to RF is considered safe by regulatory bodies in North America is 1.6 mW/g average over 1 gram of tissue mass.

CE:

The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 2 mW/g as recommended by EN62209-1 for an uncontrolled environment. According to the Standard, the device should be evaluated at maximum output power (radiated from the antenna) under "worst-case" conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

This report describes the methodology and results of experiments performed on wireless data terminal. The objective was to determine if there is RF radiation and if radiation is found, what is the extent of radiation with respect to safety limits. SAR (Specific Absorption Rate) is the measure of RF exposure determined by the amount of RF energy absorbed by human body (or its parts) – to determine how the RF energy couples to the body or head which is a primary health concern for body worn devices. The limit below which the exposure to RF is considered safe by regulatory bodies in Europe is 2 mW/g average over 10 gram of tissue mass.

The test configurations were laid out on a specially designed test fixture to ensure the reproducibility of measurements. Each configuration was scanned for SAR. Analysis of each scan was carried out to characterize the above effects in the device.

SAR Limits

FCC Limit (1g Tissue)

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 1 g of tissue)	1.60	8.0
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

CE Limit (10g Tissue)

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 10 g of tissue)	2.0	10
Spatial Peak (hands/wrists/feet/ankles averaged over 10 g)	4.0	20.0

Population/Uncontrolled Environments are defined as locations where there is the exposure of individual who have no knowledge or control of their exposure.

Occupational/Controlled Environments are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure (i.e. as a result of employment or occupation).

General Population/Uncontrolled environments Spatial Peak limit 1.6W/kg (FCC) & 2 W/kg (CE) applied to the EUT.

FACILITIES AND ACCREDITATION

The test site used by Bay Area Compliance Laboratories Corp. (Shenzhen) to collect data is located at 6/F, the 3rd Phase of WanLi Industrial Building, Shi Hua Road, Fu Tian Free Trade Zone, Shenzhen, Guangdong, P.R. of China

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



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

DESCRIPTION OF TEST SYSTEM

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

ALSAS-10U System Description

ALSAS-10-U is fully compliant with the technical and scientific requirements of IEEE 1528, IEC 62209, CENELEC, ARIB, ACA, and the Federal Communications Commission. The system comprises of a six axes articulated robot which utilizes a dedicated controller.

ALSAS-10U uses the latest methodologies. And FDTD modeling to provide a platform which is repeatable with minimum uncertainty.

Applications

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

Area Scans

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

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

Zoom Scan (Cube Scan Averaging)

The averaging zoom scan volume utilized in the ALSAS-10U software is in the shape of a cube and the side dimension of a 1 g or 10 g mass is dependent on the density of the liquid representing the simulated tissue. A density of 1000 kg/m³ is used to represent the head and body tissue density and not the phantom liquid density, in order to be consistent with the definition of the liquid dielectric properties, i.e. the side length of the 1 g cube is 10mm, with the side length of the 10 g cube 21.5mm.

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

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



ALSAS-10U Interpolation and Extrapolation Uncertainty

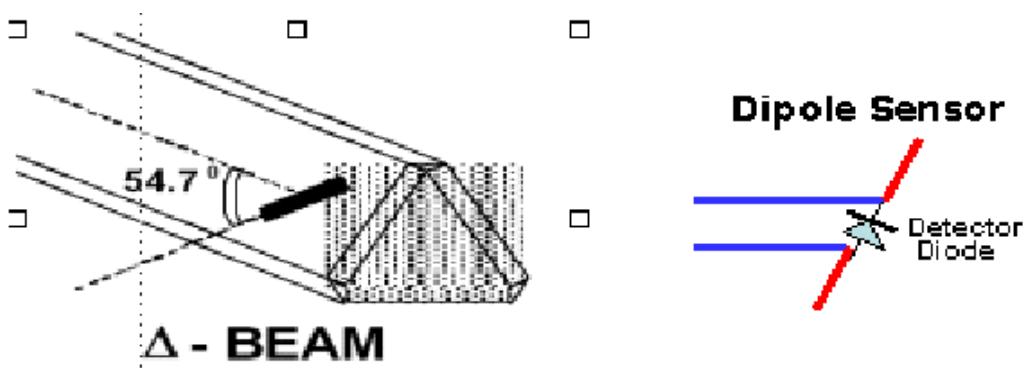
The overall uncertainty for the methodology and algorithms used during the SAR calculation was evaluated using the data from IEEE 1528 based on the example f3 algorithm:

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

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

Boundary Detection Unit and Probe Mounting Device

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

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

Daq-Paq (Analog to Digital Electronics)

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

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

Axis Articulated Robot

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



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

ALSAS Universal Workstation

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

Universal Device Positioner

The universal device positioner allows complete freedom of movement of the EUT. Developed to hold a EUT in a free-space scenario any additional loading attributable to the material used in the construction of the positioner has been eliminated. Repeatability has been enhanced through the linear scales which form the design used to indicate positioning for any given test scenario in all major axes. A 15° tilt indicator is included for the 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.

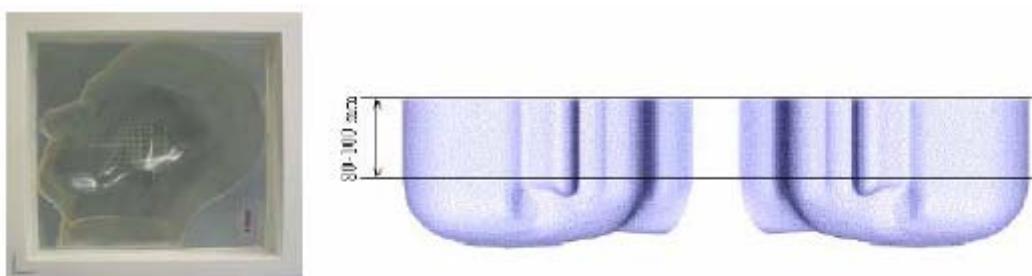


Phantom Types

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 one frequency for both left and right head experiments in one measurement.



Tissue Dielectric Parameters for Head and Body Phantoms

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

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

Recommended Tissue Dielectric Parameters for Head and Body

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

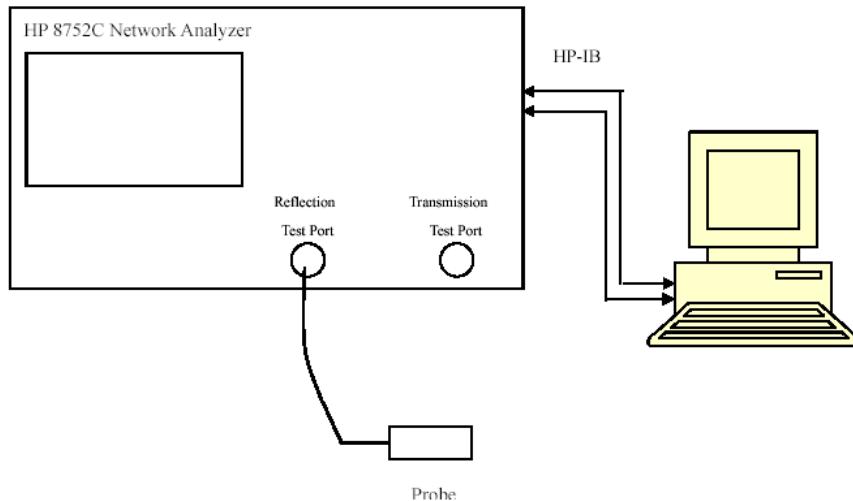
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Information

Equipment	Model	Calibration Date	S/N
CRS F3 robot	ALS-F3	N/A	RAF0805352
CRS F3 Software	ALS-F3-SW	N/A	N/A
CRS C500C controller	ALS-C500	N/A	RCF0805379
Probe mounting device & Boundary Detection Sensor System	ALS-PMDPS-3	N/A	120-00270
Universal Work Station	ALS-UWS	N/A	100-00157
Data Acquisition Package	ALS-DAQ-PAQ-3	2011-05-13	110-00212
Miniature E-Field Probe	ALS-E-020	2011-07-14	500-00283
Dipole, 835MHz	ALS-D-835-S-2	2011-08-25	210-00558
Dipole, 1900MHz	ALS-D-1900-S-2	2011-08-25	210-00710
Dipole Spacer	ALS-DS-U	N/A	250-00907
R&S, universal Radio Communication Tester	CMU200	2011-06-28	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
Power Amplifier	5S1G4	N/A	71377
Synthesized Sweeper	HP 8341B	2011-04-11	2624A00116
Spectrum Analyzer	FSEM30	2011-07-05	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)	
835	Head	40.65	0.89	In Tolerance
835	Body	53.35	0.97	In Tolerance
1900	Head	39.51	1.38	In Tolerance
1900	Body	53.57	1.50	In Tolerance

*Liquid Verification was performed on 2012-2-22

Please refer to the following tables.

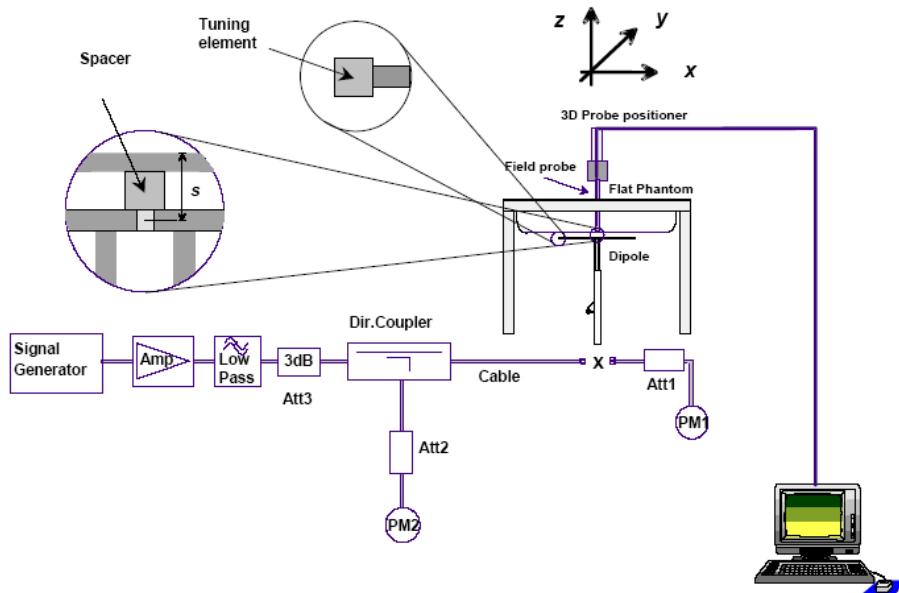
850 MHz Head				1900 MHz Head		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
824.0	40.68228	20.05827		1850.0	39.64920	13.75471
824.5	40.69434	20.03564		1851.2	39.62731	13.71648
825.0	40.65337	20.03342		1852.4	39.64937	13.70369
825.5	40.58572	20.01209		1853.6	39.60153	13.67872
826.0	40.51328	19.99219		1854.8	39.60043	13.70840
826.5	40.58037	19.97543		1856.0	39.60288	13.68925
827.0	40.61495	19.99450		1857.2	39.58448	13.68632
827.5	40.66145	19.99945		1858.4	39.57276	13.67919
828.0	40.61802	19.98746		1859.6	39.56862	13.68905
828.5	40.58868	20.02459		1860.8	39.53763	13.64131
829.0	40.63513	20.02943		1862.0	39.57033	13.66525
829.5	40.64373	20.08749		1863.2	39.55930	13.68880
830.0	40.66346	20.03623		1864.4	39.56894	13.64656
830.5	40.62165	19.99211		1865.6	39.51527	13.60710
831.0	40.60379	20.06817		1866.8	39.50097	13.62026
831.5	40.67660	20.05464		1868.0	39.52736	13.60473
832.0	40.61952	19.99393		1869.2	39.52706	13.64009
832.5	40.60862	19.98338		1870.4	39.52186	13.63827
833.0	40.59361	19.99513		1871.6	39.52857	13.62583
833.5	40.60931	20.04016		1872.8	39.52251	13.66170
834.0	40.65116	19.99332		1874.0	39.52108	13.68533
834.5	40.61961	20.02034		1875.2	39.53568	13.64622
835.0	40.64849	20.05612		1876.4	39.53898	13.65760
835.5	40.64238	20.00741		1877.6	39.47988	13.70230
836.0	40.59212	19.98734		1878.8	39.52204	13.69206
836.5	40.62724	20.02643		1880.0	39.51053	13.71902
837.0	40.59640	20.00079		1881.2	39.48143	13.72308
837.5	40.60800	20.03089		1882.4	39.50799	13.73200
838.0	40.62685	19.99607		1883.6	39.48776	13.73049
838.5	40.59973	20.00082		1884.8	39.52592	13.77218
839.0	40.61136	20.03081		1886.0	39.49129	13.80146
839.5	40.59712	19.99004		1887.2	39.52327	13.79448
840.0	40.58373	19.96995		1888.4	39.49811	13.75598
840.5	40.59575	19.94768		1889.6	39.46862	13.78816
841.0	40.59047	20.00854		1890.8	39.43091	13.76384
841.5	40.61346	19.98822		1892.0	39.48786	13.77179
842.0	40.59873	19.96341		1893.2	39.46540	13.78106
842.5	40.61746	19.92880		1894.4	39.44570	13.76076
843.0	40.59770	19.95741		1895.6	39.43607	13.78031
843.5	40.54208	19.93437		1896.8	39.42201	13.76879
844.0	40.55524	19.96879		1898.0	39.43070	13.77356
844.5	40.52862	19.97350		1899.2	39.40392	13.75175
845.0	40.49086	19.94015		1900.4	39.41700	13.75369
845.5	40.52138	19.92804		1901.6	39.44126	13.77312
846.0	40.45975	19.95347		1902.8	39.44157	13.76479
846.5	40.51697	19.89222		1904.0	39.40333	13.74425
847.0	40.48953	19.92819		1905.2	39.43723	13.78816
847.5	40.46425	19.90171		1906.4	39.42977	13.77251
848.0	40.46913	19.90748		1907.6	39.45577	13.77532
848.5	40.46074	19.93773		1908.8	39.43702	13.79463
849.0	40.48172	19.92841		1910.0	39.46116	13.82319

850 MHz Body				1900 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
824.0	53.37648	21.39081		1850.0	53.44364	14.42183
824.5	53.35019	21.39943		1851.2	53.43022	14.40790
825.0	53.33870	21.40255		1852.4	53.45450	14.25165
825.5	53.27508	21.43062		1853.6	53.40406	14.25617
826.0	53.25965	21.36266		1854.8	53.42112	14.27816
826.5	53.34735	21.40701		1856.0	53.40612	14.25449
827.0	53.37025	21.39733		1857.2	53.41614	14.31054
827.5	53.38336	21.39125		1858.4	53.41123	14.28932
828.0	53.32938	21.35459		1859.6	53.41359	14.29843
828.5	53.32419	21.31332		1860.8	53.44698	14.30854
829.0	53.34343	21.25152		1862.0	53.43455	14.34180
829.5	53.35779	21.27827		1863.2	53.43651	14.32338
830.0	53.40376	21.27088		1864.4	53.41152	14.31710
830.5	53.32819	21.26478		1865.6	53.45956	14.34087
831.0	53.28917	21.26713		1866.8	53.42867	14.29692
831.5	53.34494	21.34459		1868.0	53.41102	14.25988
832.0	53.30701	21.20272		1869.2	53.48101	14.31297
832.5	53.27186	21.21477		1870.4	53.45274	14.27714
833.0	53.31171	21.22063		1871.6	53.47846	14.22529
833.5	53.39094	21.27225		1872.8	53.49122	14.23859
834.0	53.33861	21.18050		1874.0	53.48186	14.26426
834.5	53.38270	21.21212		1875.2	53.50385	14.22117
835.0	53.35436	21.22712		1876.4	53.50799	14.22642
835.5	53.38610	21.19726		1877.6	53.50568	14.22153
836.0	53.32540	21.21358		1878.8	53.54569	14.21210
836.5	53.33105	21.25958		1880.0	53.57009	14.24142
837.0	53.34519	21.19799		1881.2	53.54026	14.17440
837.5	53.43233	21.21280		1882.4	53.53323	14.16222
838.0	53.41017	21.21446		1883.6	53.55041	14.13367
838.5	53.37077	21.22817		1884.8	53.59098	14.04453
839.0	53.32485	21.23891		1886.0	53.57787	14.05691
839.5	53.38581	21.21419		1887.2	53.59225	14.42183
840.0	53.35106	21.18246		1888.4	53.56913	14.40790
840.5	53.35881	21.16175		1889.6	53.56624	14.25165
841.0	53.33328	21.15387		1890.8	53.55152	14.25617
841.5	53.38051	21.15072		1892.0	53.58452	14.27816
842.0	53.33462	21.18887		1893.2	53.58808	14.25449
842.5	53.38396	21.16301		1894.4	53.55642	14.31054
843.0	53.35965	21.14385		1895.6	53.54591	14.28932
843.5	53.33764	21.17273		1896.8	53.52602	14.29843
844.0	53.31524	21.15828		1898.0	53.52515	14.30854
844.5	53.31118	21.19107		1899.2	53.55801	14.34180
845.0	53.29678	21.14102		1900.4	53.53083	14.32338
845.5	53.31588	21.12141		1901.6	53.54670	14.31710
846.0	53.24448	21.14779		1902.8	53.54335	14.34087
846.5	53.31582	21.15118		1904.0	53.53861	14.29692
847.0	53.34271	21.09608		1905.2	53.52457	14.25988
847.5	53.33152	21.10988		1906.4	53.50004	14.31297
848.0	53.28126	21.10649		1907.6	53.52384	14.27714
848.5	53.27953	21.11658		1908.8	53.49078	14.22529
849.0	53.32096	21.09902		1910.0	53.50415	14.23859

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

Date	Frequency (MHz)	Liquid Type	Measured SAR (W/Kg)		Target Value (W/Kg)	Delta (%)	Tolerance (%)
2012-2-22	835	Head	1g	9.460	9.590	-1.356	± 10
		Body	1g	9.074	9.684	-6.299	± 10
	1900	Head	1g	40.364	39.648	1.806	± 10
		Body	1g	38.842	39.769	-2.331	± 10

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

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

Product Data

Device Name : Dipole 835 MHz
Serial No. : 180-00558
Type : Dipole
Model : ALS-D-835-S-2
Frequency : 835.00 MHz
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 10.604 W/kg
Power Drift-Finish : 10.805 W/kg
Power Drift (%) : 2.534

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 : 22-Feb-2012
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 40.65 F/m
Sigma : 0.89 S/m
Density : 1000.00 kg/cu. m

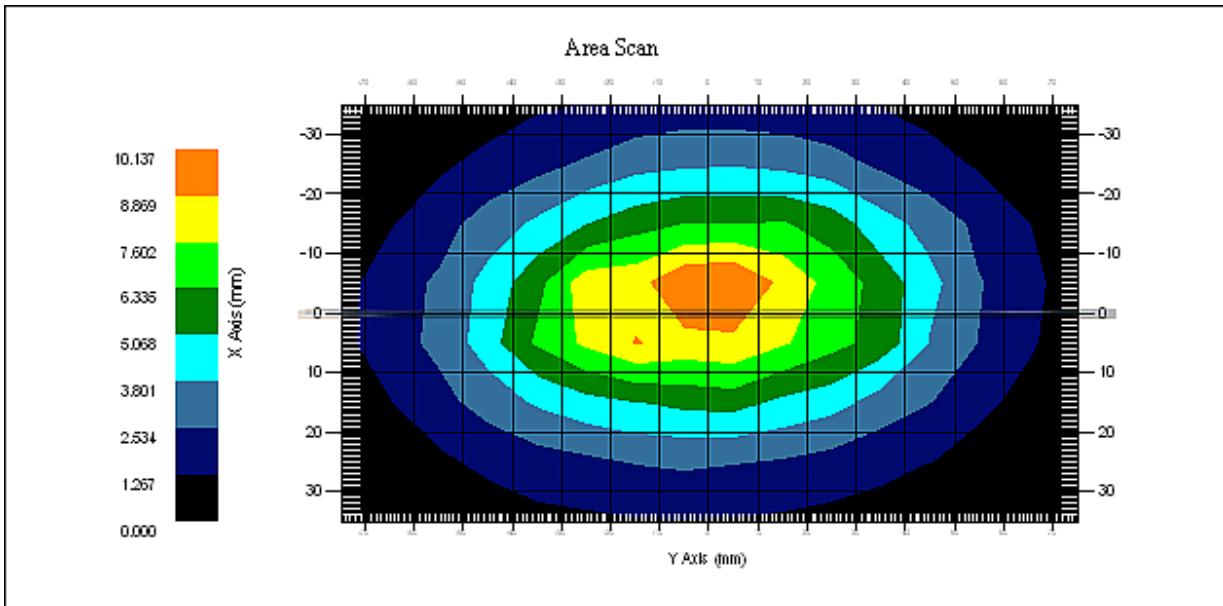
Probe Data

Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 14-Jul-2011
Frequency : 835.00 MHz
Duty Cycle Factor : 1
Conversion Factor : 6.6
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 : 9.460 W/kg
10 gram SAR value : 5.891 W/kg
Area Scan Peak SAR : 10.137 W/kg
Zoom Scan Peak SAR : 15.013 W/kg



835 MHz System Validation with Head Tissue

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

Product Data

Device Name : Dipole 835 MHz
Serial No. : 180-00558
Type : Dipole
Model : ALS-D-835-S-2
Frequency : 835.00 MHz
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 10.776 W/kg
Power Drift-Finish : 10.395 W/kg
Power Drift (%) : -2.814

Phantom Data

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

Tissue Data

Type : Body
Serial No. : 270-02101
Frequency : 835.00 MHz
Last Calib. Date : 22-Feb-2012
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 53.35 F/m
Sigma : 0.97 S/m
Density : 1000.00 kg/cu. m

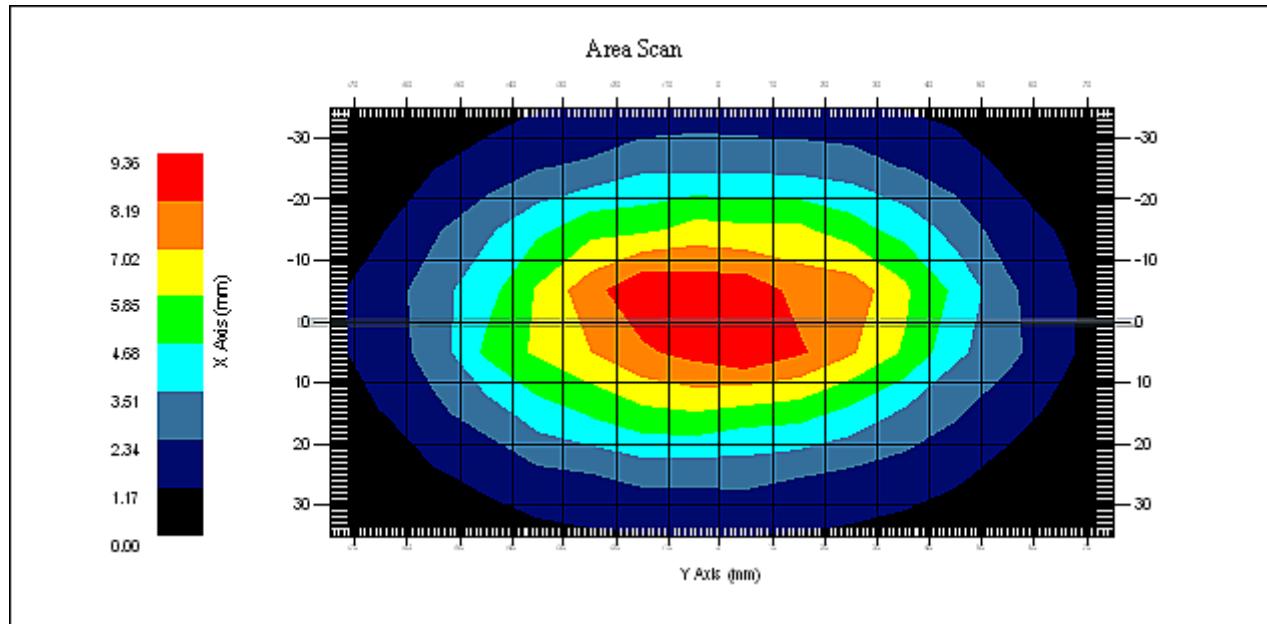
Probe Data

Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 14-Jul-2011
Frequency : 835.00 MHz
Duty Cycle Factor : 1
Conversion Factor : 6.6
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 : 9.074 W/kg
10 gram SAR value : 6.095 W/kg
Area Scan Peak SAR : 9.358 W/kg
Zoom Scan Peak SAR : 13.912 W/kg



835 MHz System Validation with Body Tissue

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 : 40.489 W/kg
Power Drift-Finish : 41.316 W/kg
Power Drift (%) : 1.920

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 : 22-Feb-2012
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 39.51 F/m
Sigma : 1.38 S/m
Density : 1000.00 kg/cu. M

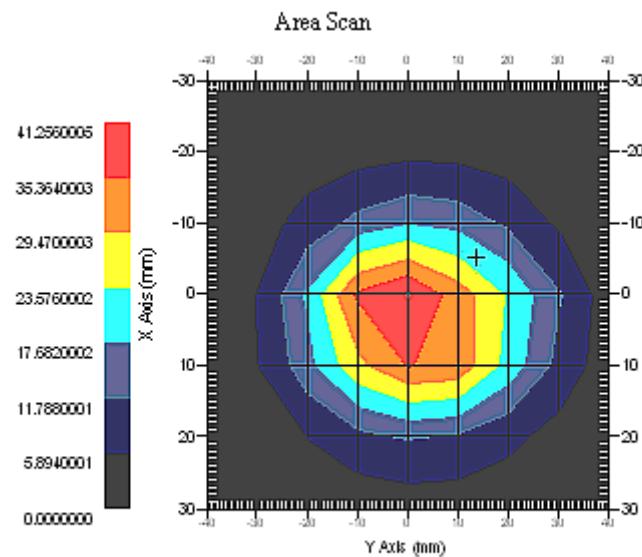
Probe Data

Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 14-Jul-2011
Frequency : 1900.00 MHz
Duty Cycle Factor : 1
Conversion Factor : 5.20
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 : 40.364 W/kg
10 gram SAR value : 20.512 W/kg
Area Scan Peak SAR : 41.256 W/kg
Zoom Scan Peak SAR : 72.841 W/kg



1900 MHz System Validation with Head Tissue

Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)**System Performance Check 1900 Body****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 : 40.755 W/kg
Power Drift-Finish : 41.887 W/kg
Power Drift (%) : 0.592

Phantom Data

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

Tissue Data

Type : Body
Serial No. : 295-02102
Frequency : 1900.00 MHz
Last Calib. Date : 22-Feb-2012
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 53.57 F/m
Sigma : 1.50 S/m
Density : 1000.00 kg/cu. m

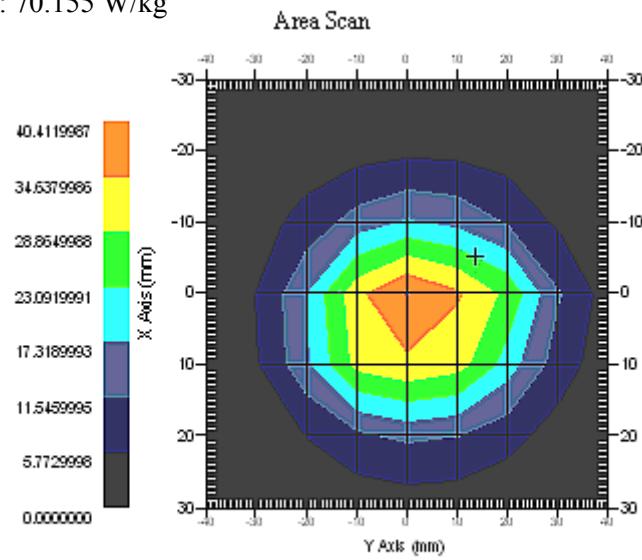
Probe Data

Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 14-Jul-2011
Frequency : 1900.00 MHz
Duty Cycle Factor : 1
Conversion Factor : 5.0
Probe Sensitivity : 1.20 1.20 1.20 μV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

Measurement Data

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

1 gram SAR value : 38.842 W/kg
10 gram SAR value : 19.564 W/kg
Area Scan Peak SAR : 40.412 W/kg
Zoom Scan Peak SAR : 70.155 W/kg



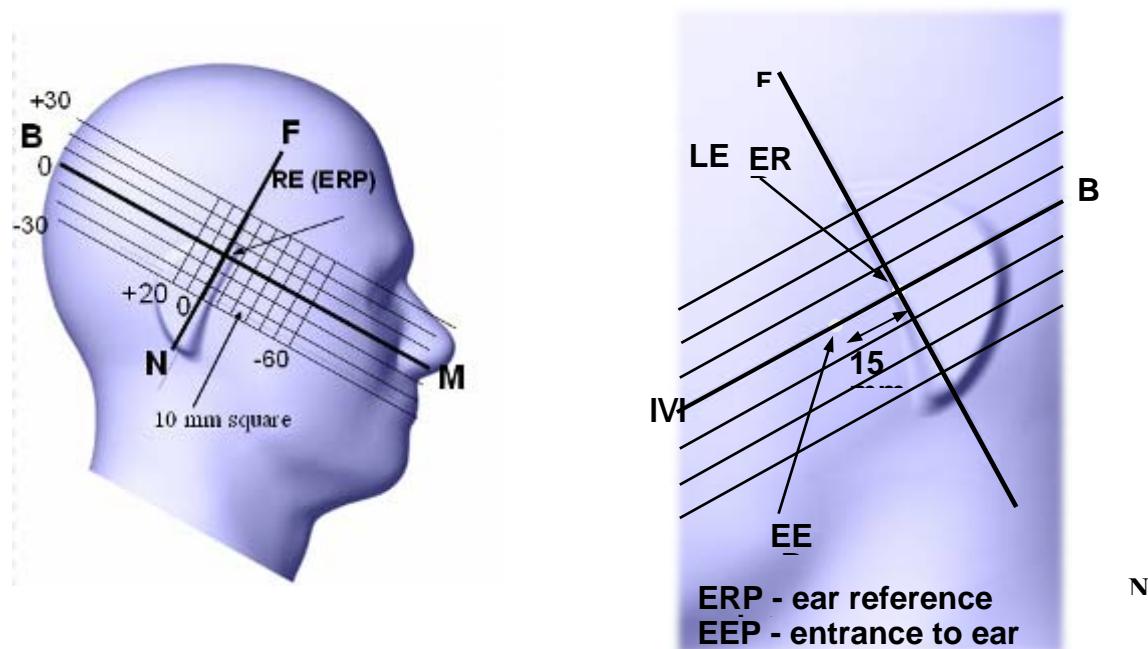
1900 MHz System Validation with Body Tissue

EUT TEST STRATEGY AND METHODOLOGY

Test Positions for Device Operating Next to a Person's Ear

This category includes most wireless handsets with fixed, retractable or internal antennas located toward the top half of the device, with or without a foldout, sliding or similar keypad cover. The handset should have its earpiece located within the upper $\frac{1}{4}$ 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

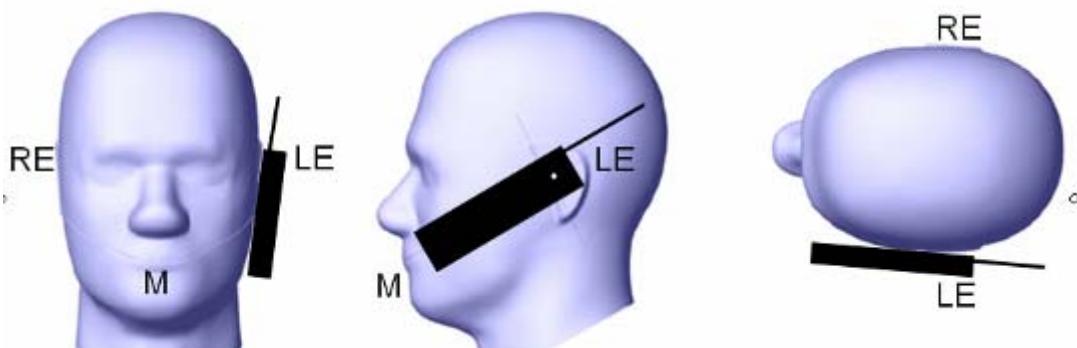
The device is brought toward the mouth of the head phantom by pivoting against the “ear reference point” or along the “N-F” line for the SCC-34/SC-2 head phantom.

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

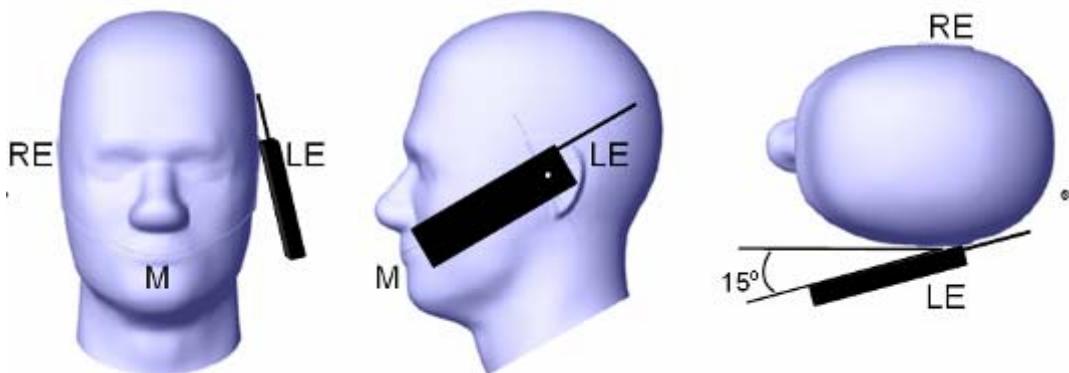
With the handset aligned in the “Cheek/Touch Position”:

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

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

Ear /Tilt 15° Position



Test positions for body-worn and other configurations

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

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

SAR Evaluation Procedure

The evaluation was performed with the following procedure:

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

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

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

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

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

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

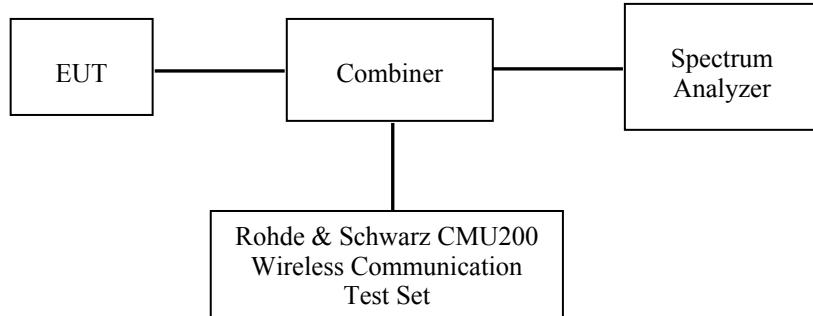
CONDUCTED OUTPUT POWER MEASUREMENT

Provision Applicable

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

Test Procedure

The RF output of the transmitter was connected to the input of the spectrum analyzer through sufficient attenuation.



Test Results:

GSM

Band	Frequency (MHz)	Conducted Output Power	
		GSM (dBm)	GSM (W)
Cellular	824.2	31.14	1.300
	836.6	31.11	1.291
	848.8	31.09	1.285
PCS	1850.2	28.70	0.741
	1880.0	28.72	0.745
	1909.8	28.76	0.752

GPRS

Frequency Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
Cellular	128	824.2	31.02	30.79	29.91	29.11
	190	836.6	31.00	30.76	29.84	29.10
	251	848.8	30.96	30.74	29.87	29.09
PCS	512	1850.2	28.59	27.61	25.71	24.86
	661	1880.0	28.64	27.64	25.82	24.96
	810	1909.8	28.68	27.80	26.01	25.18

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

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

The time based average power

Frequency Band	Channel No.	Frequency (MHz)	Time based average Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
Cellular	128	824.2	22.02	24.79	25.66	26.11
	190	836.6	22.00	24.76	25.59	26.10
	251	848.8	21.96	24.74	25.62	26.09
PCS	512	1850.2	19.59	21.61	21.46	21.86
	661	1880.0	19.64	21.64	21.57	21.96
	810	1909.8	19.68	21.80	21.76	22.18

Note:

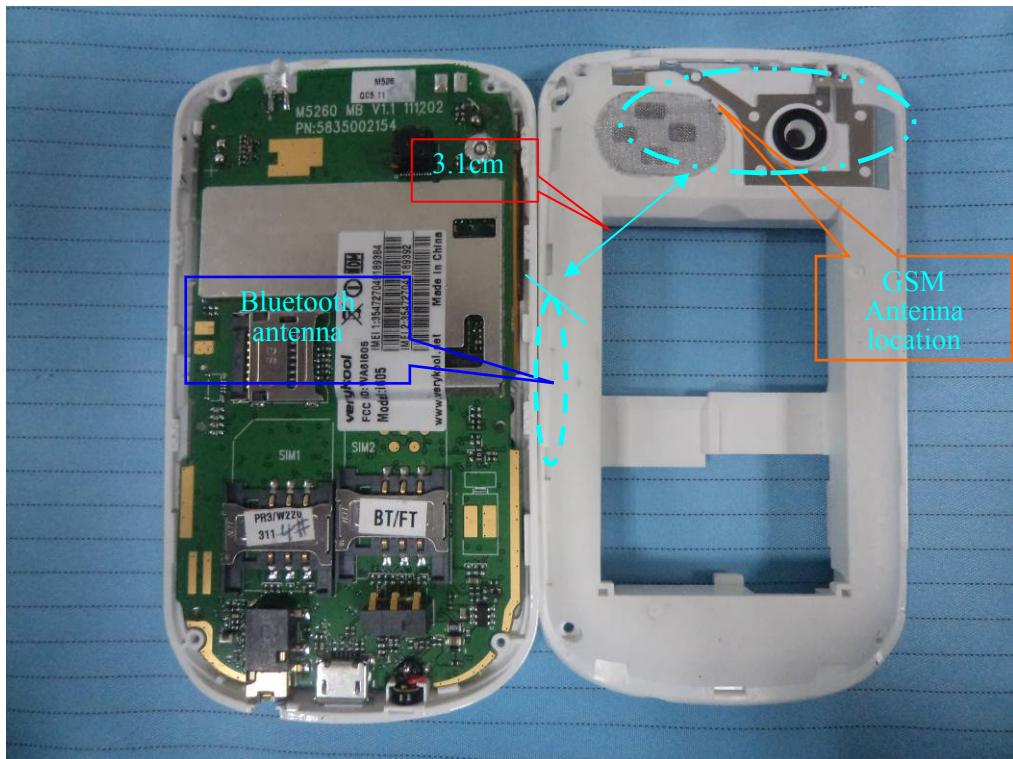
The maximum RF output power is in 4 slots GPRS mode, and the body SAR testing is under this mode and the maximum power level.

SAR SIMULTANEOUS TRANSMISSION EVALUATION

KDB648474 SIMULTANEOUS TRANSMITION CONSIDERATION

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

BT and GSM Antenna Location:



Antenna Information

Antenna-to-antenna separation distances :	3.1cm from GSM main antenna-to-BT antenna
Simultaneous transmission :	GSM voice can transmit simultaneously with Bluetooth

CONCLUSION:

Individual transmitter	Stand-alone SAR	Simultaneous SAR
Bluetooth	Not required	Not required
GSM	Required	Simultaneous SAR of Bluetooth and GSM is not required

Note:

- 1) The distance between BT and GSM antenna is 3.1cm > 2.5cm. The max output power of Bluetooth antenna is 3.034mW(4.82dBm) < P_{Ref}(12mW). According to KDB648474, stand-alone SAR is not required for BT antenna and simultaneous SAR evaluation is not required for Bluetooth and GSM antennas.
- 2) P_{Ref} is defined as the maximum conducted power available at the antenna according to source-based time-averaging requirements of Section 2.1093(d)(5).

SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

SAR Test Data

Environmental Conditions

Temperature:	21° C
Relative Humidity:	50%
ATM Pressure:	1002 mbar

* Testing was performed by Sandy Wang on 2012-12-22---2012-12-24.

Cellular Band:

EUT Position	Frequency (MHz)		Test Mode	Antenna Type	Liquid Type	FCC 1g SAR (W/Kg)	
	Channel	MHz				Measurement	Limit
Left Head Check	128(Low)	824.2	GSM	Integral	Head	0.330	1.6
	190(Middle)	836.6	GSM	Integral	Head	\	1.6
	251(High)	848.8	GSM	Integral	Head	\	1.6
Left Head Tilt	128(Low)	824.2	GSM	Integral	Head	0.156	1.6
	190(Middle)	836.6	GSM	Integral	Head	\	1.6
	251(High)	848.8	GSM	Integral	Head	\	1.6
Right Head Cheek	128(Low)	824.2	GSM	Integral	Head	0.355	1.6
	190(Middle)	836.6	GSM	Integral	Head	\	1.6
	251(High)	848.8	GSM	Integral	Head	\	1.6
Right Head Tilt	128(Low)	824.2	GSM	Integral	Head	0.193	1.6
	190(Middle)	836.6	GSM	Integral	Head	\	1.6
	251(High)	848.8	GSM	Integral	Head	\	1.6
Body-Worn-Headset	128(Low)	824.2	GSM	Integral	Body	0.366	1.6
	190(Middle)	836.6	GSM	Integral	Body	\	1.6
	251(High)	848.8	GSM	Integral	Body	\	1.6
Body-Worn Back	128(Low)	824.2	GPRS	Integral	Body	0.944	1.6
	190(Middle)	836.6	GPRS	Integral	Body	0.715	1.6
	251(High)	848.8	GPRS	Integral	Body	0.854	1.6

Note:

1. Right Head Cheek is the worst case mode
2. When the 1-g SAR is $\leq 0.8\text{W/kg}$, testing for other channels are optional.

PCS Band:

EUT Position	Frequency (MHz)		Test Mode	Antenna Type	Liquid Type	FCC 1g SAR (W/Kg)	
	Channel	MHz				Measurement	Limit
Left Head Check	512(Low)	1850.2	GSM	Integral	Head		1.6
	661(Middle)	1880.0	GSM	Integral	Head		1.6
	810(High)	1909.8	GSM	Integral	Head	0.171	1.6
Left Head Tilt	512(Low)	1850.2	GSM	Integral	Head		1.6
	661(Middle)	1880.0	GSM	Integral	Head		1.6
	810(High)	1909.8	GSM	Integral	Head	0.100	1.6
Right Head Cheek	512(Low)	1850.2	GSM	Integral	Head		1.6
	661(Middle)	1880.0	GSM	Integral	Head		1.6
	810(High)	1909.8	GSM	Integral	Head	0.158	1.6
Right Head Tilt	512(Low)	1850.2	GSM	Integral	Head		1.6
	661(Middle)	1880.0	GSM	Integral	Head		1.6
	810(High)	1909.8	GSM	Integral	Head	0.136	1.6
Body-Worn-Headset	512(Low)	1850.2	GSM	Integral	Body		1.6
	661(Middle)	1880.0	GSM	Integral	Body		1.6
	810(High)	1909.8	GSM	Integral	Body	0.425	1.6
Body-Worn Back	512(Low)	1850.2	GPRS	Integral	Body	0.781	1.6
	661(Middle)	1880.0	GPRS	Integral	Body	0.915	1.6
	810(High)	1909.8	GPRS	Integral	Body	0.813	1.6

Note:

1. Left Head Cheek is the worst case mode.
2. The EUT is a Class B mobile phone which can be attached to both GPRS and GSM services, using one service at a time.
3. The Multi-slot Classes of EUT is Class 12 which has maximum 4 Downlink slots and 4 Uplink slots, the maximum active slots is 5, when perform the multiple slots scan, 1DL+4UL is the worse case.
4. The EUT transmit and receive through the same GSM antenna while testing SAR.
5. When the 1-g SAR is $\leq 0.8\text{W/kg}$, testing for other channels are optional.

EUT SCAN RESULTS

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

Left Head Cheek (835 MHz Low Channel)

Measurement Data

Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 13x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.266 W/kg
Power Drift-Finish : 0.271 W/kg
Power Drift (%) : 2.375

Tissue Data

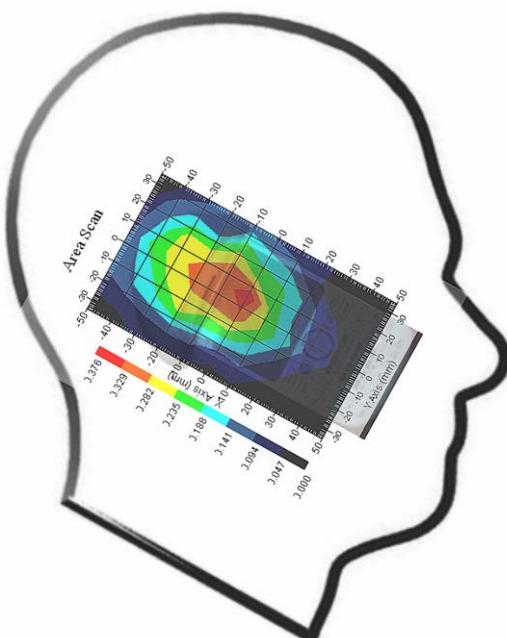
Type : HEAD
Frequency : 835.00 MHz
Epsilon : 40.65 F/m
Sigma : 0.89 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.6
Probe Sensitivity : 1.20 1.20 1.20 $\mu\text{V}/(\text{V}/\text{m})^2$
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.330 W/kg
10 gram SAR value : 0.212 W/kg
Area Scan Peak SAR : 0.375 W/kg
Zoom Scan Peak SAR : 0.580 W/kg

Plot 1#



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 : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.176 W/kg
Power Drift-Finish : 0.174 W/kg
Power Drift (%) : -1.967

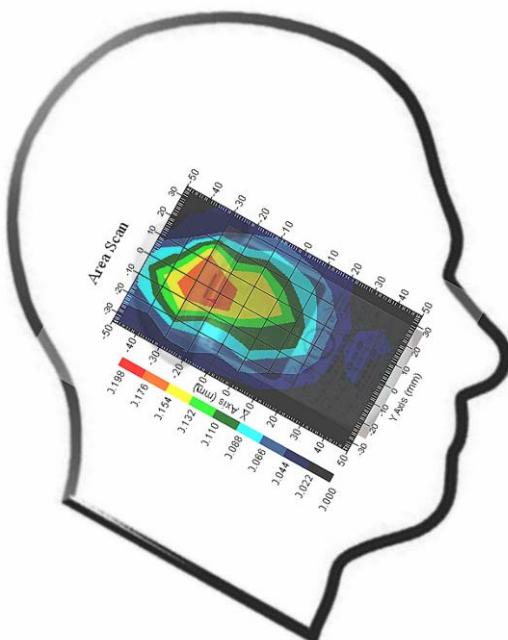
Tissue Data

Type : HEAD
Frequency : 835.00 MHz
Epsilon : 40.65 F/m
Sigma : 0.89 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.6
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 : 0.156 W/kg
10 gram SAR value : 0.113 W/kg
Area Scan Peak SAR : 0.178 W/kg
Zoom Scan Peak SAR : 0.220 W/kg

Plot 2#

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

Measurement Data

Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.400 W/kg
Power Drift-Finish : 0.394 W/kg
Power Drift (%) : -1.133

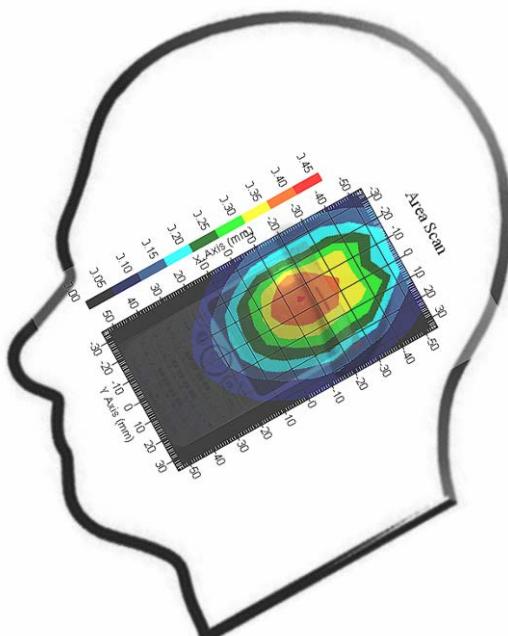
Tissue Data

Type : HEAD
Frequency : 835.00 MHz
Epsilon : 40.65 F/m
Sigma : 0.89 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.6
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 : 0.355 W/kg
10 gram SAR value : 0.243 W/kg
Area Scan Peak SAR : 0.403 W/kg
Zoom Scan Peak SAR : 0.560 W/kg

Plot 3#

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

Measurement Data

Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.147 W/kg
Power Drift-Finish : 0.142 W/kg
Power Drift (%) : -3.671

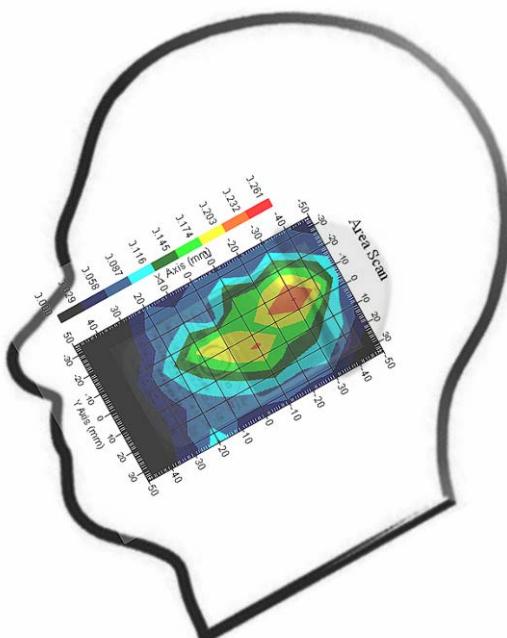
Tissue Data

Type : HEAD
Frequency : 835.00 MHz
Epsilon : 40.65 F/m
Sigma : 0.89 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.6
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 : 0.193 W/kg
10 gram SAR value : 0.125 W/kg
Area Scan Peak SAR : 0.235 W/kg
Zoom Scan Peak SAR : 0.270 W/kg

Plot 4#

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 : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.414 W/kg
Power Drift-Finish : 0.395 W/kg
Power Drift (%) : -4.565

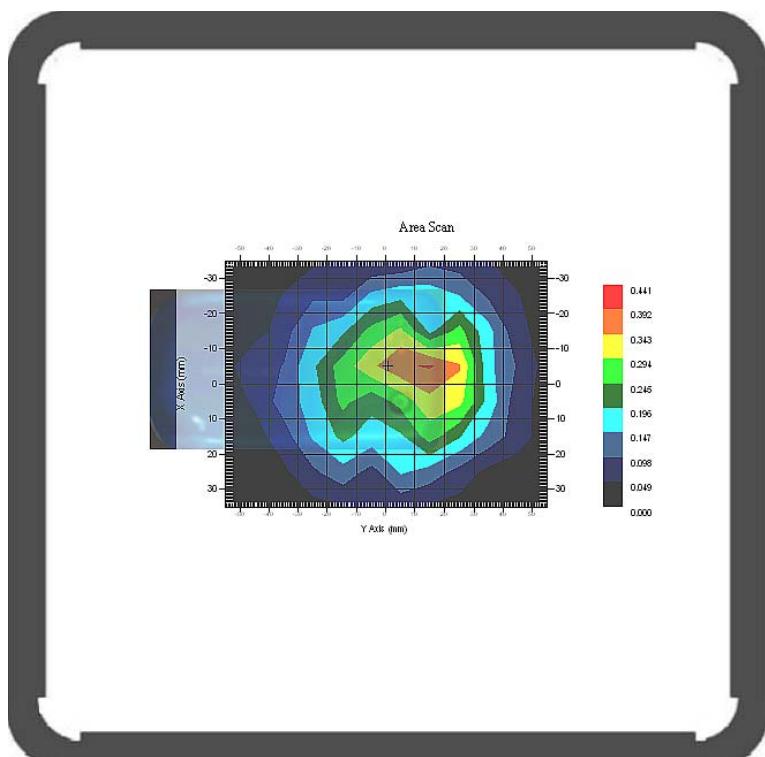
Tissue Data

Type : Body
Frequency : 835.00 MHz
Epsilon : 53.35 F/m
Sigma : 0.97 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 835.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 6.6
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 : 0.366 W/kg
10 gram SAR value : 0.213 W/kg
Area Scan Peak SAR : 0.396 W/kg
Zoom Scan Peak SAR : 0.570 W/kg

Plot 5#

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

Measurement Data

Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 1.115 W/kg
Power Drift-Finish : 1.093 W/kg
Power Drift (%) : -1.926

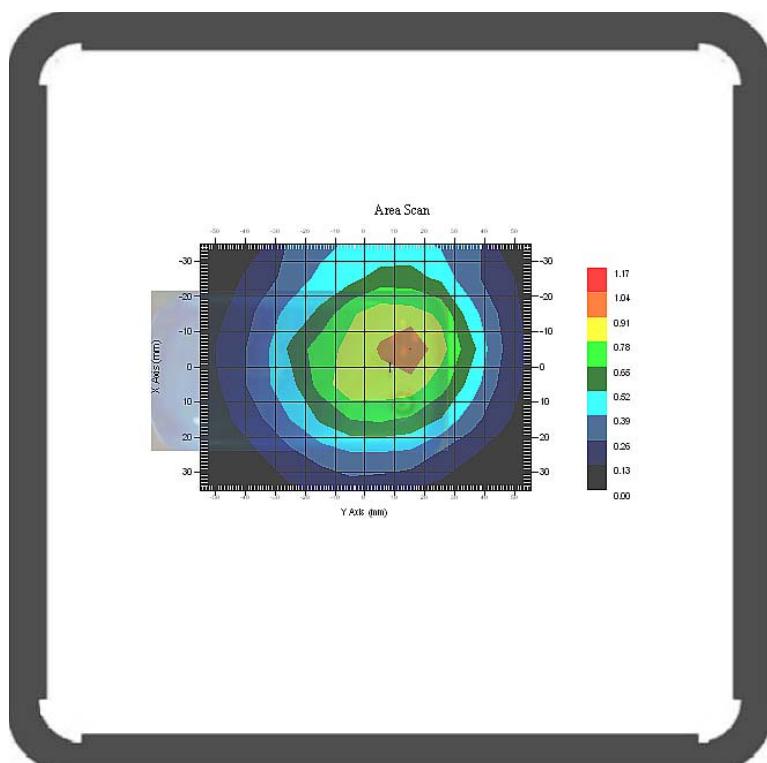
Tissue Data

Type : Body
Frequency : 835.00 MHz
Epsilon : 53.35 F/m
Sigma : 0.97 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 835.00 MHz
Duty Cycle Factor : 2
Conversion Factor : 6.6
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 : 0.944 W/kg
10 gram SAR value : 0.579 W/kg
Area Scan Peak SAR : 1.043 W/kg
Zoom Scan Peak SAR : 1.451 W/kg

Plot 6#

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

Measurement Data

Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.824 W/kg
Power Drift-Finish : 0.842 W/kg
Power Drift (%) : 2.192

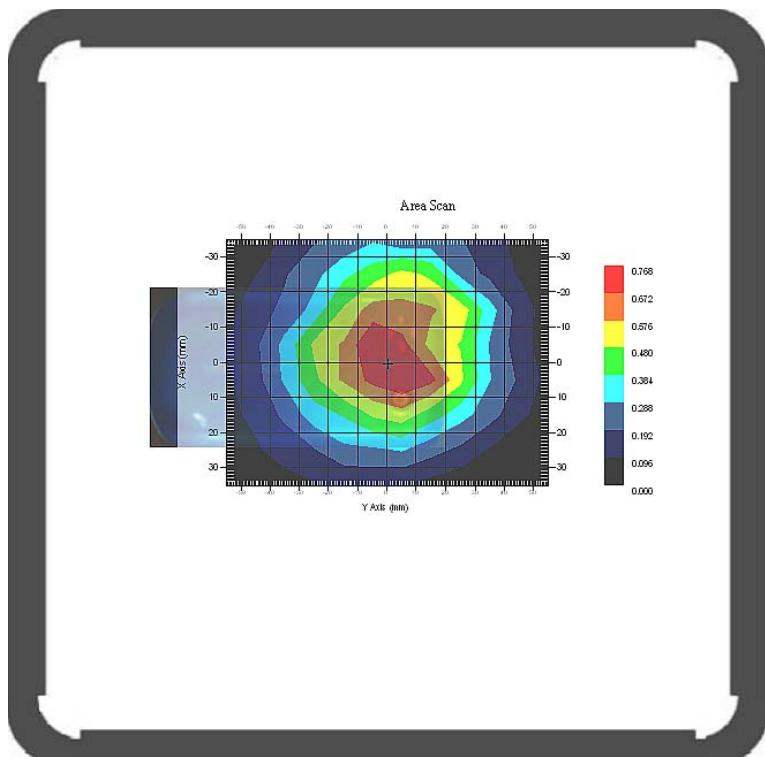
Tissue Data

Type : Body
Frequency : 835.00 MHz
Epsilon : 53.35 F/m
Sigma : 0.97 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 835.00 MHz
Duty Cycle Factor : 2
Conversion Factor : 6.6
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 : 0.715 W/kg
10 gram SAR value : 0.435 W/kg
Area Scan Peak SAR : 0.768 W/kg
Zoom Scan Peak SAR : 1.161 W/kg

Plot 7#

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

Measurement Data

Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 1.032 W/kg
Power Drift-Finish : 0.993 W/kg
Power Drift (%) : -2.582

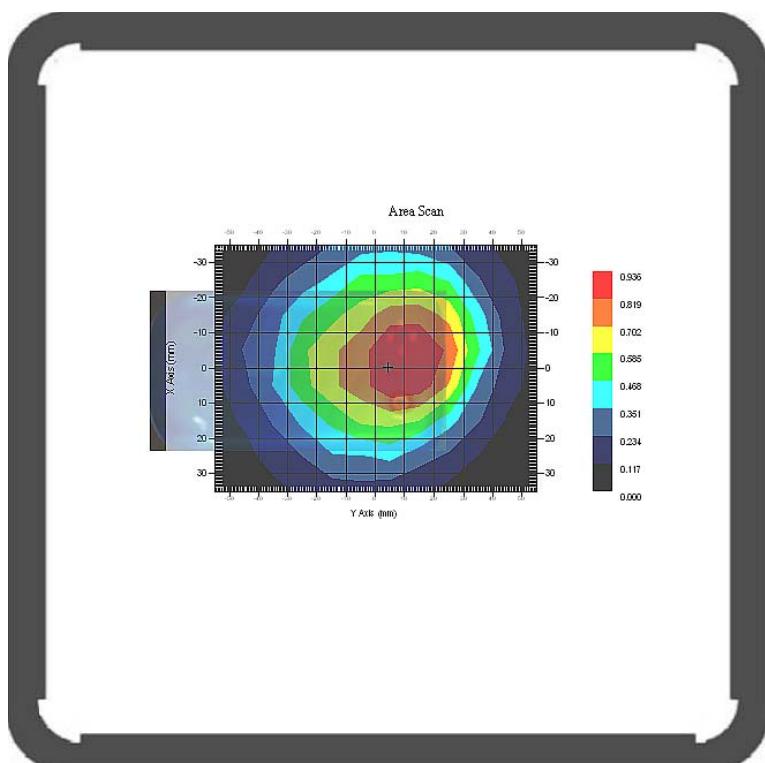
Tissue Data

Type : Body
Frequency : 835.00 MHz
Epsilon : 53.35 F/m
Sigma : 0.97 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 835.00 MHz
Duty Cycle Factor : 2
Conversion Factor : 6.6
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 : 0.854 W/kg
10 gram SAR value : 0.452 W/kg
Area Scan Peak SAR : 0.936 W/kg
Zoom Scan Peak SAR : 1.341 W/kg

Plot 8#

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

Measurement Data

Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.054 W/kg
Power Drift-Finish : 0.055 W/kg
Power Drift (%) : 2.126

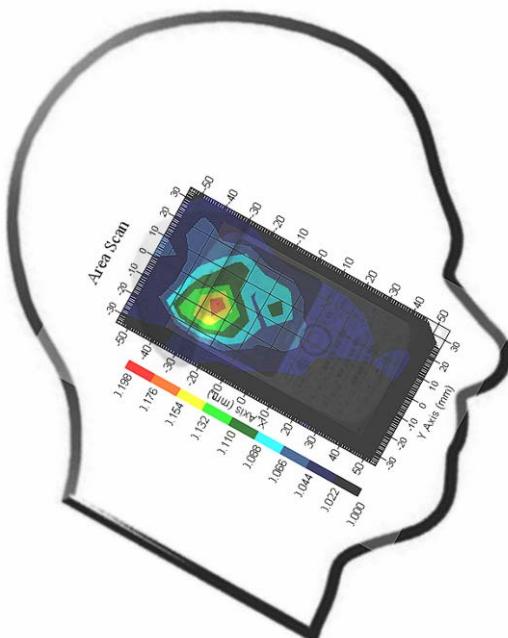
Tissue Data

Type : HEAD
Frequency : 1900.00 MHz
Epsilon : 39.51 F/m
Sigma : 1.38 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.2
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 : 0.171 W/kg
10 gram SAR value : 0.105 W/kg
Area Scan Peak SAR : 0.189 W/kg
Zoom Scan Peak SAR : 0.423 W/kg

Plot 9#

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 : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.066 W/kg
Power Drift-Finish : 0.068 W/kg
Power Drift (%) : 3.191

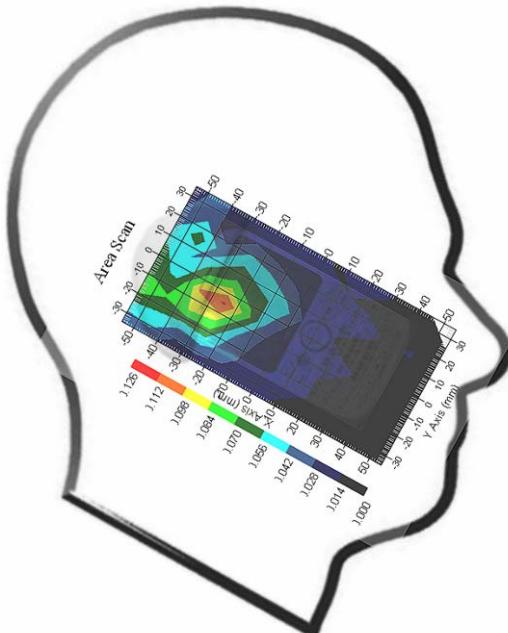
Tissue Data

Type : HEAD
Frequency : 1900.00 MHz
Epsilon : 39.51 F/m
Sigma : 1.38 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.2
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 : 0.100 W/kg
10 gram SAR value : 0.077 W/kg
Area Scan Peak SAR : 0.114 W/kg
Zoom Scan Peak SAR : 0.250 W/kg

Plot 8#

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

Measurement Data

Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.068 W/kg
Power Drift-Finish : 0.069 W/kg
Power Drift (%) : 1.170

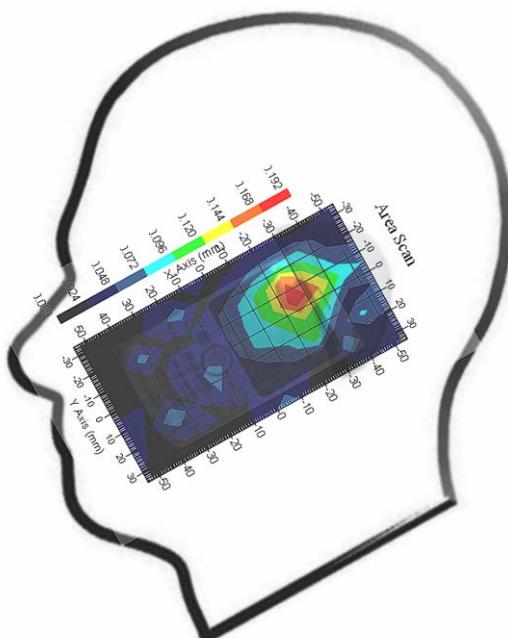
Tissue Data

Type : HEAD
Frequency : 1900.00 MHz
Epsilon : 39.51 F/m
Sigma : 1.38 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.2
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 : 0.158 W/kg
10 gram SAR value : 0.113 W/kg
Area Scan Peak SAR : 0.189 W/kg
Zoom Scan Peak SAR : 0.417 W/kg

Plot 9#

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

Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.078 W/kg
Power Drift-Finish : 0.077 W/kg
Power Drift (%) : -1.394

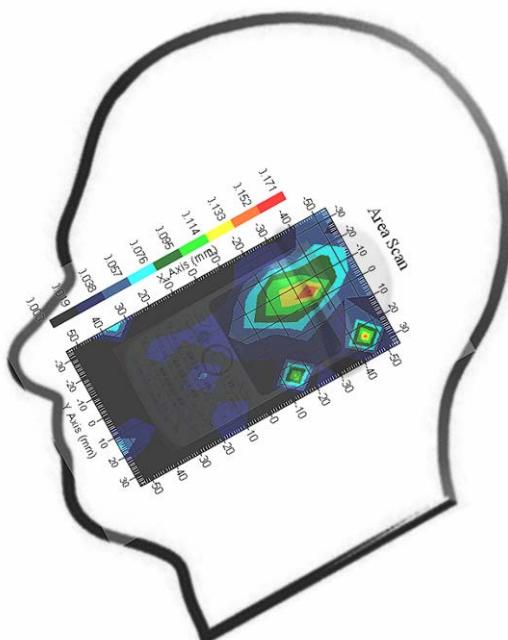
Tissue Data

Type : HEAD
Frequency : 1900.00 MHz
Epsilon : 39.51 F/m
Sigma : 1.38 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.2
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 : 0.136 W/kg
10 gram SAR value : 0.101 W/kg
Area Scan Peak SAR : 0.165 W/kg
Zoom Scan Peak SAR : 0.460 W/kg

Plot 10#

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 : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.417 W/kg
Power Drift-Finish : 0.407 W/kg
Power Drift (%) : -2.514

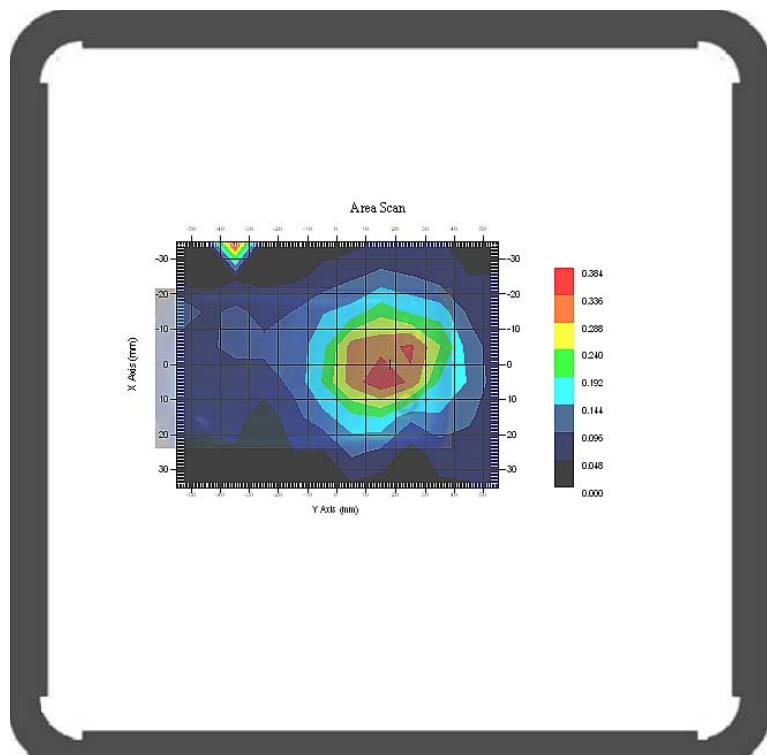
Tissue Data

Type : Body
Frequency : 1900.00 MHz
Epsilon : 53.57 F/m
Sigma : 1.50 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 1900.00 MHz
Duty Cycle Factor : 8
Conversion Factor : 5.0
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 : 0.425 W/kg
10 gram SAR value : 0.206 W/kg
Area Scan Peak SAR : 0.382 W/kg
Zoom Scan Peak SAR : 1.000 W/kg

Plot 11#

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

Measurement Data

Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.978 W/kg
Power Drift-Finish : 1.0 46 W/kg
Power Drift (%) : 2.681

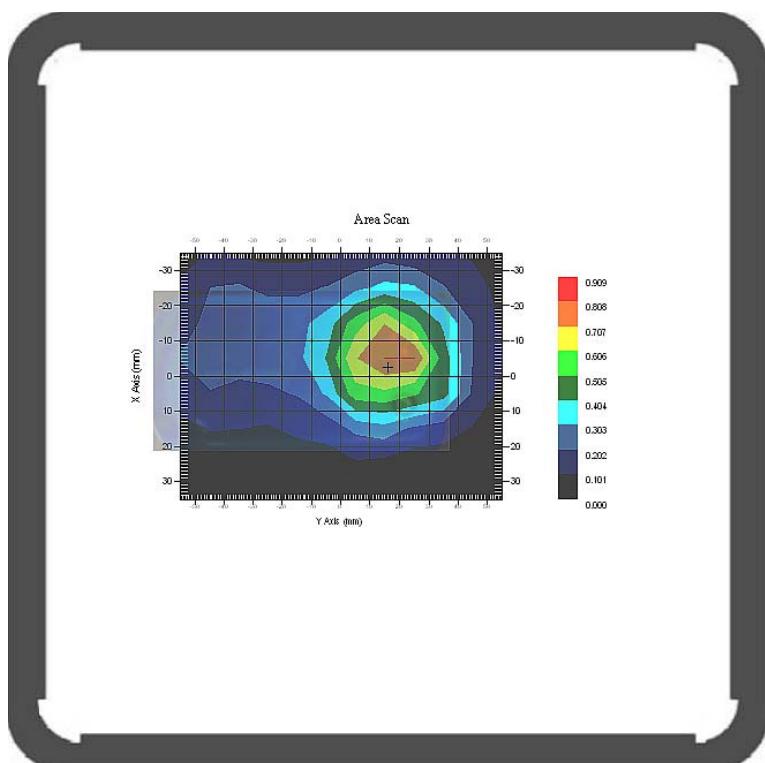
Tissue Data

Type : Body
Frequency : 1900.00 MHz
Epsilon : 53.57 F/m
Sigma : 1.50 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 1900.00 MHz
Duty Cycle Factor : 2
Conversion Factor : 5.0
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 : 0.781 W/kg
10 gram SAR value : 0.379 W/kg
Area Scan Peak SAR : 0.810 W/kg
Zoom Scan Peak SAR : 1.391 W/kg

Plot 12#

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

Measurement Data

Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 1.019 W/kg
Power Drift-Finish : 0.999 W/kg
Power Drift (%) : -1.643

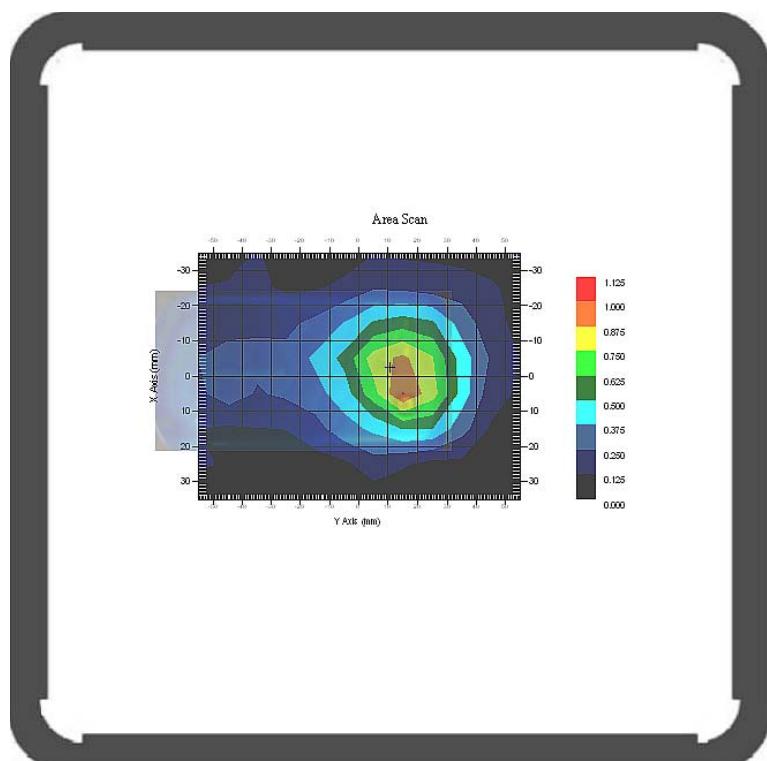
Tissue Data

Type : Body
Frequency : 1900.00 MHz
Epsilon : 53.57 F/m
Sigma : 1.50 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 1900.00 MHz
Duty Cycle Factor : 2
Conversion Factor : 5.0
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 : 0.915 W/kg
10 gram SAR value : 0.478 W/kg
Area Scan Peak SAR : 1.002 W/kg
Zoom Scan Peak SAR : 1.911 W/kg

Plot 13#

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

Measurement Data

Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 13x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.869 W/kg
Power Drift-Finish : 0.864 W/kg
Power Drift (%) : -0.894

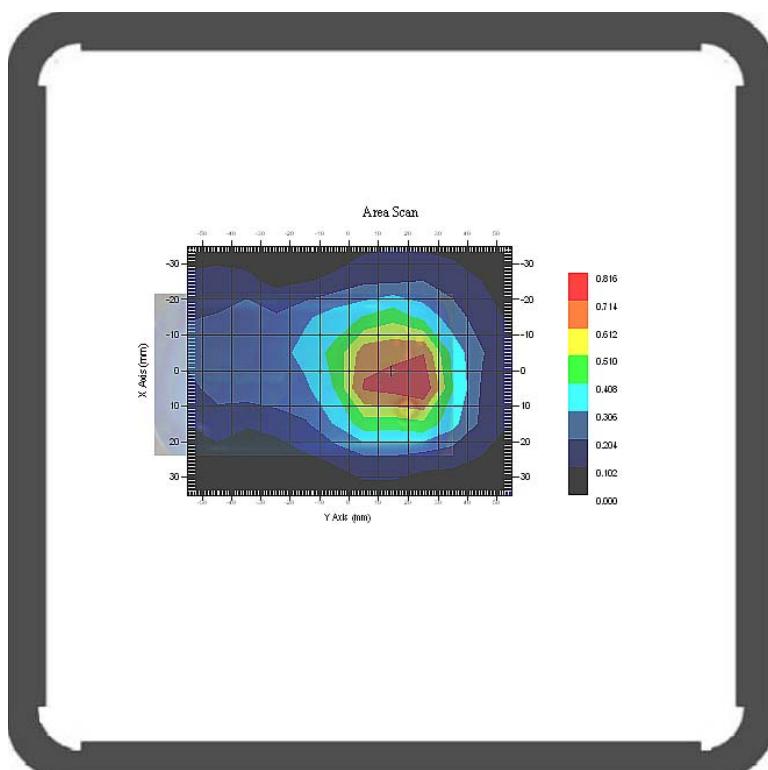
Tissue Data

Type : Body
Frequency : 1900.00 MHz
Epsilon : 53.57 F/m
Sigma : 1.50 S/m
Density : 1000.00 kg/cu. m

Probe Data

Serial No. : 500-00283
Frequency : 1900.00 MHz
Duty Cycle Factor : 2
Conversion Factor : 5.0
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 : 0.813 W/kg
10 gram SAR value : 0.408 W/kg
Area Scan Peak SAR : 0.815 W/kg
Zoom Scan Peak SAR : 1.591 W/kg

Plot 14#

APPENDIX A – MEASUREMENT UNCERTAINTY

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

Measurement Uncertainty for 300MHz to 3GHz

Source of Uncertainty	Tolerance Value	Probability Distribution	Divisor	$c_i^1 (1-g)$	$c_i^1 (10-g)$	Standard Uncertainty (1-g) %	Standard Uncertainty (10-g) %
Measurement System							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1-cp)^{1/2}$	\sqrt{cp}	1.5	1.5
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	\sqrt{cp}	\sqrt{cp}	4.4	4.4
Boundary Effect	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	rectangular	$\sqrt{3}$	1	1	2.7	2.7
Detection Limit	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Readout Electronics	1.0	normal	1	1	1	1.0	1.0
Response Time	0.8	rectangular	$\sqrt{3}$	1	1	0.5	0.5
Integration Time	1.7	rectangular	$\sqrt{3}$	1	1	1.0	1.0
RF Ambient Condition -Noise	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
RF Ambient Condition - Reflections	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech. Restrictions	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2
Restriction							
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1
Test Sample Positioning	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	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2
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.)	2.6	normal	1	0.7	0.5	1.8	1.3
Liquid Permittivity(target)	5.0	rectangular	$\sqrt{3}$	0.6	0.5	1.7	1.4
Liquid Permittivity(meas.)	2.7	normal	1	0.6	0.5	1.6	1.4
Combined Uncertainty		RSS				9.7	9.4
Combined Uncertainty (coverage factor=2)		Normal(k=2)				19.4	18.8

APPENDIX B – PROBE CALIBRATION CERTIFICATES**NCL CALIBRATION LABORATORIES****Calibration File No.: 1251-1258****Client.: BACL Lab****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.

Equipment: Miniature Isotropic RF Probe

Record of Calibration

Head and Body

Manufacturer: APREL Laboratories

Model No.: E-020**Serial No.: 500-00283****Calibration Procedure:** D01-032-E020-V2, D22-012-Tissue, D28-002-Dipole
Project No: BACL-5607**Calibrated:** 14th July 2011
Released on: 14th July 2011**Approved By:** Stuart Nicol

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

Released By: _____

NCL CALIBRATION LABORATORIES303 Terry Fox Drive, Suite 102
Kanata, Ontario
CANADA K2K 3J1Division of APREL
TEL: (613) 435-8300
FAX: (613) 435-8306

NCL Calibration Laboratories

Division of APREL Inc.

Introduction

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

Calibration Method

Probes are calibrated using the following methods.

<1000MHz

TEM Cell for sensitivity in air

Standard phantom using temperature transfer method for sensitivity in tissue

>1000MHz

Waveguide* method to determine sensitivity in air and tissue

*Waveguide is numerically (simulation) assessed to determine the field distribution and power

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

References

- IEEE Standard 1528 (2003) including Amendment 1
IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
- EN 62209-1 (2006)
Human Exposure to RF Fields from hand-held and body-mounted wireless communication devices - Human models, instrumentation, and procedures-Part 1: Procedure to measure the Specific Absorption Rate (SAR) for hand-held mobile wireless devices
- IEC 62209-2 Ed. 1.0 (2010-03)
Human exposure to RF fields from hand-held and body-mounted wireless devices - Human models, instrumentation, and procedures - Part 2: specific absorption rate (SAR) for wireless communication devices (30 MHz - 6 GHz)
- TP-D01-032-E020-V2 E-Field probe calibration procedure
- D22-012-Tissue dielectric tissue calibration procedure
- D28-002-Dipole procedure for validation of SAR system using a dipole
- IEEE 1309 Draft Standard for Calibration of Electromagnetic Field Sensors and Probes, Excluding Antennas, from 9kHz to 40GHz

NCL Calibration Laboratories

Division of APREL Inc.

Conditions

Probe 500-00283 was a new probe taken from stock.

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

Primary Measurement Standards

Instrument	Serial Number	Cal due date
Power meter Anritsu MA2408A	90025437	Nov.4, 2011
Power Sensor Anritsu MA2481D	103555	Nov 4, 2011
Attenuator HP 8495A (70dB)	1944A10711	Sept. 14, 2011
Network Analyzer Anritsu MT8801C	MB11855	Feb. 8, 2012

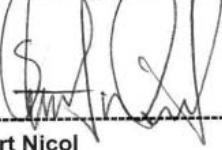
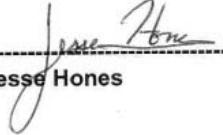
Secondary Measurement Standards

Signal Generator Agilent E4438C -506 MY55182336 June 7, 2012

Attestation

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

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


Stuart Nicol
Jesse Hones

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

NCL Calibration Laboratories

Division of APREL Inc.

Probe Summary

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

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

Channel X:	1.2 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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Calibration for Tissue (Head H, Body B)

Frequency	Tissue Type	Measured Epsilon	Measured Sigma	Calibration Uncertainty	Tolerance Uncertainty for 5%*	Conversion Factor
450 H	Head	X	X	X	X	X
450 B	Body	X	X	X	X	X
750 H	Head	X	X	X	X	X
750 B	Body	X	X	X	X	X
835 H	Head	42.35	0.938	3.5	3.4	6.6
835 B	Body	56.65	1.018	3.5	3.4	6.6
900 H	Head	41.35	0.98	3.5	3.4	6
900 B	Body	56.08	1.05	3.5	3.4	6
1450 H	Head	X	X	X	X	X
1450 B	Body	X	X	X	X	X
1500 H	Head	X	X	X	X	X
1500 B	Body	X	X	X	X	X
1640 H	Head	X	X	X	X	X
1640 B	Body	X	X	X	X	X
1750 H	Head	38.72	1.35	3.5	3.4	5.1
1750 B	Body	51.62	1.48	3.5	3.4	4.8
1800 H	Head	X	X	X	X	X
1800 B	Body	X	X	X	X	X
1900 H	Head	38.72	1.35	3.5	2.7	5.2
1900 B	Body	51.62	1.48	3.5	2.7	5
2000 H	Head	X	X	X	X	X
2000 B	Body	X	X	X	X	X
2100 H	Head	X	X	X	X	X
2100 B	Body	X	X	X	X	X
2300 H	Head	X	X	X	X	X
2300 B	Body	X	X	X	X	X
2450 H	Head	38.06	1.87	3.5	3.5	4.9
2450B	Body	50.22	2.03	3.5	3.5	4.3
2600 H	Head	X	X	X	X	X
2600 B	Body	X	X	X	X	X
3000 H	Head	X	X	X	X	X
3000 B	Body	X	X	X	X	X
3600 H	Head	X	X	X	X	X
3600 B	Body	X	X	X	X	X
5200 H	Head	X	X	X	X	X
5200 B	Body	X	X	X	X	X
5600 H	Head	X	X	X	X	X
5600 B	Body	X	X	X	X	X
5800 H	Head	X	X	X	X	X
5800 B	Body	X	X	X	X	X

Page 5 of 10

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Division of APREL Inc.

Boundary Effect:

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

Spatial Resolution:

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

DAQ-PAQ Contribution

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

Boundary Effect:

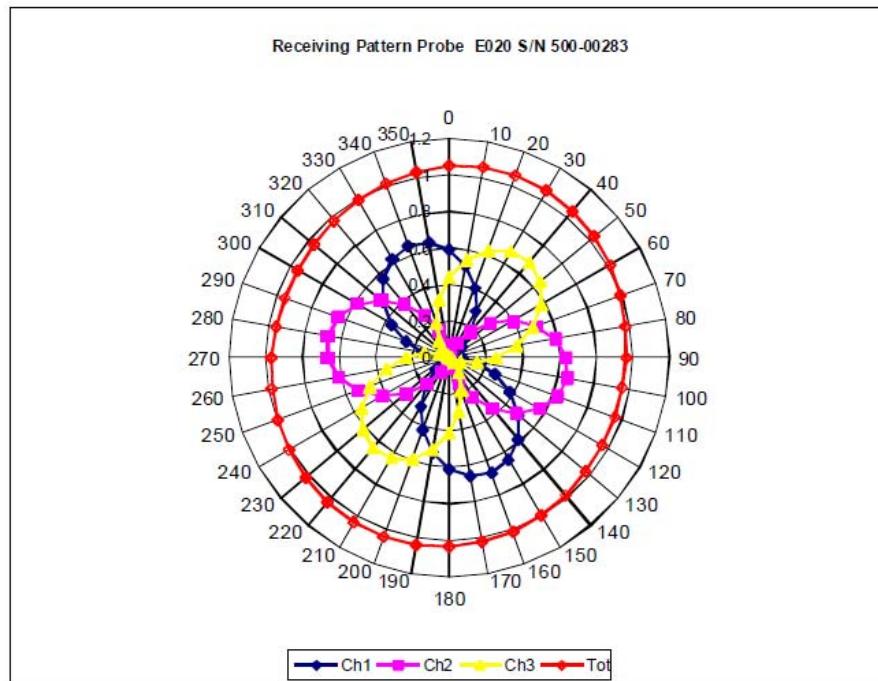
For a distance of 0.58mm the worst case evaluated uncertainty (increase in the probe sensitivity) is less than 2.1%.

NOTES:

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

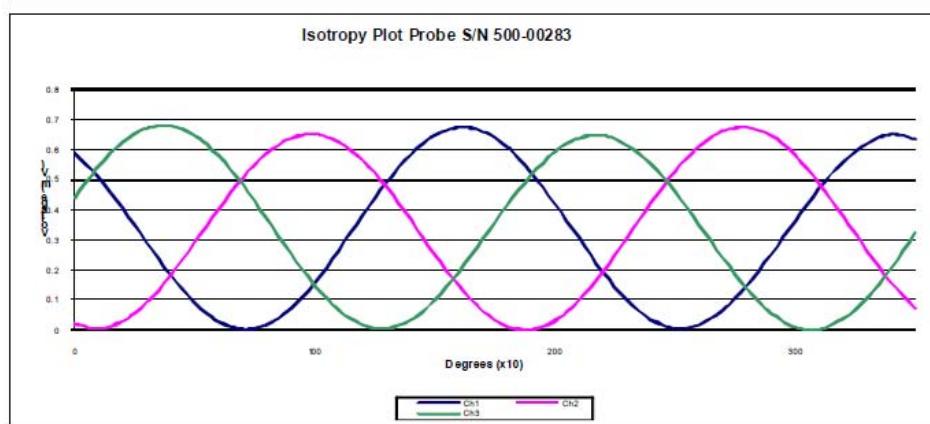
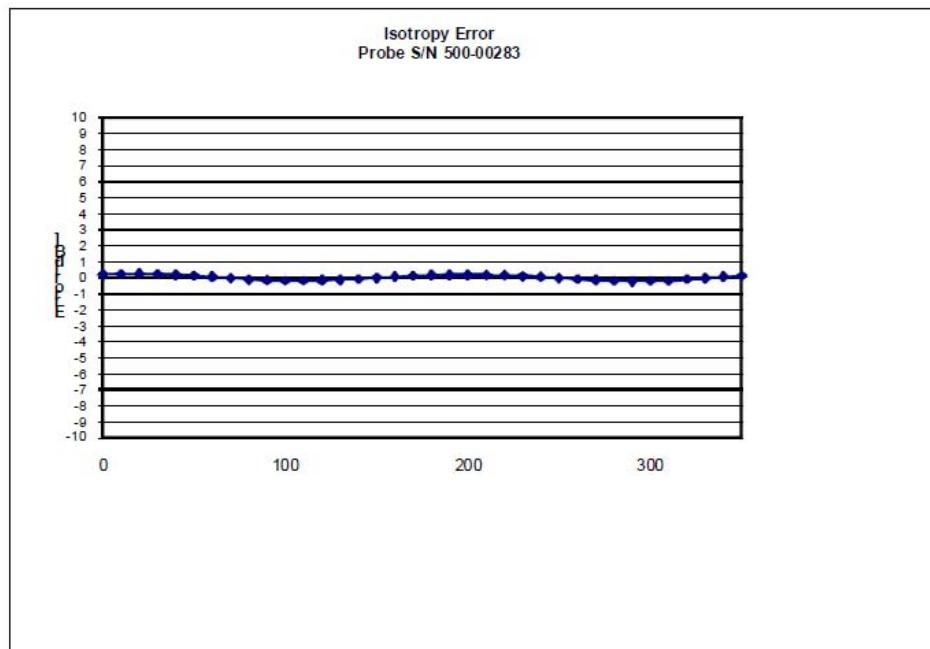
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Receiving Pattern Air

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Division of APREL Inc.

Isotropy Error Air

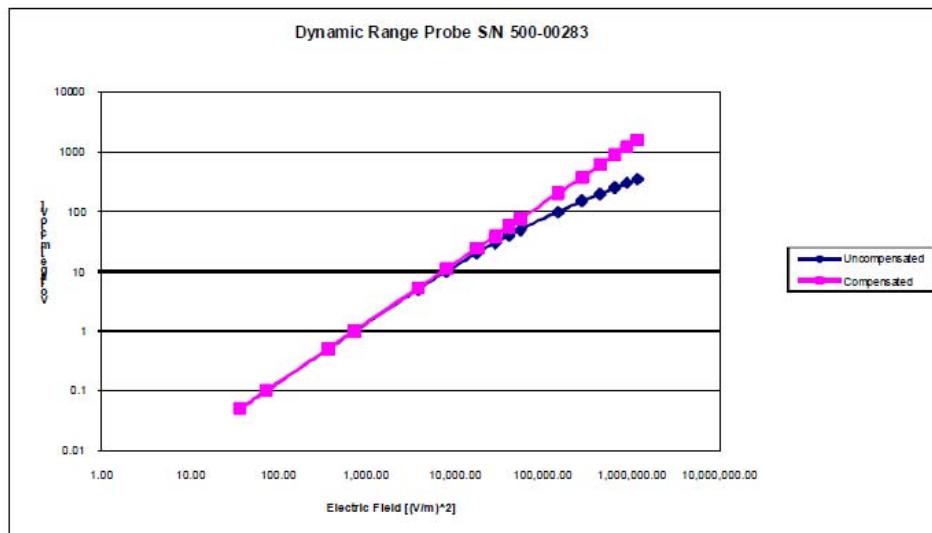


Isotropicity Tissue: 0.10 dB

Page 8 of 10
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Division of APREL Inc.

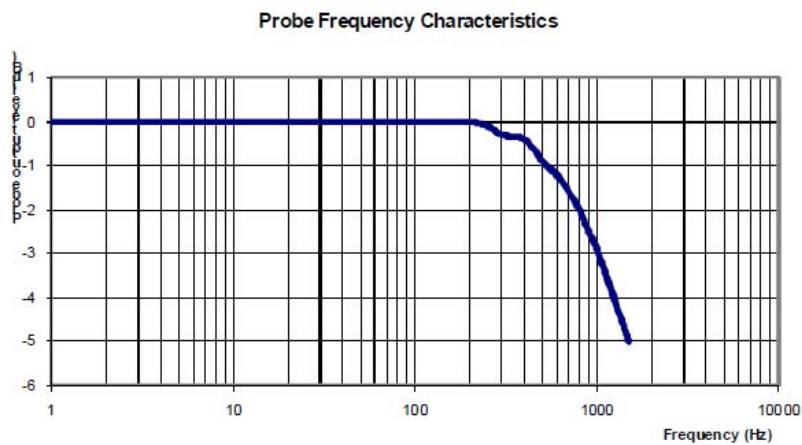
Dynamic Range



Page 9 of 10
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Division of APREL Inc.

Video Bandwidth



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

Test Equipment

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

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-1327
Project Number: BAC-dipole-cal-5618

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(Head and Body)

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

Customer: Bay Area Compliance Laboratory

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

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

Released By:

NCL CALIBRATION LABORATORIES

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

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

NCL Calibration Laboratories

Division of APREL Laboratories.

Conditions

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

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C
Temperature of the Tissue: 21 °C +/- 0.5°C

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



Stuart Nicol



C. Teodorian

Primary Measurement Standards**Instrument**

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

Secondary Measurement Standards

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

NCL Calibration Laboratories

Division of APREL Laboratories.

Calibration Results Summary

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

Mechanical Dimensions

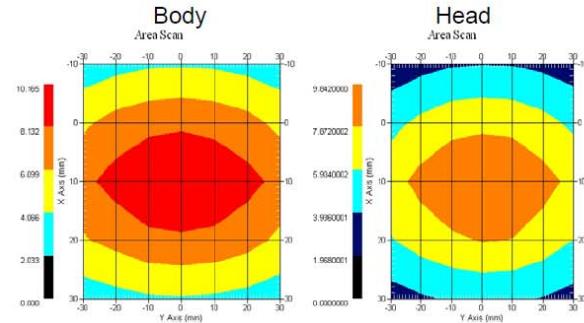
Length: 162.2 mm
Height: 89.4 mm

Electrical Specification

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

System Validation Results

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



3

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

NCL Calibration Laboratories

Division of APREL Laboratories.

Introduction

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

References

SSI-TP-018-ALSAS Dipole Calibration Procedure

SSI-TP-016 Tissue Calibration Procedure

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

Conditions

Dipole 180-00558 was new taken from stock.

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C**Temperature of the Tissue:** 20 °C +/- 0.5°C**Dipole Calibration uncertainty**

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

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

NCL Calibration Laboratories

Division of APREL Laboratories.

Dipole Calibration Results**Mechanical Verification**

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

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

Tissue Validation

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

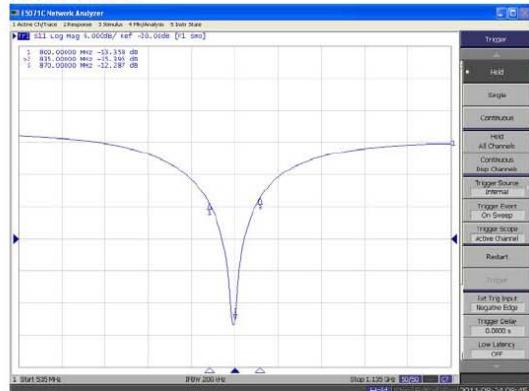
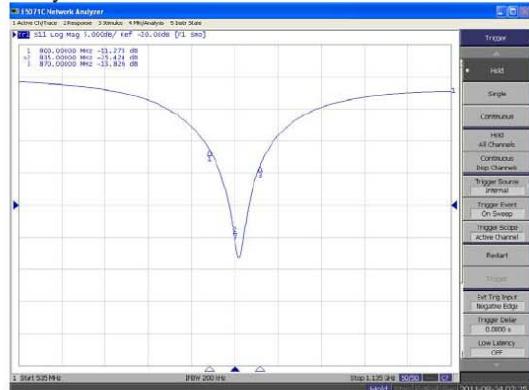
5

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NCL Calibration Laboratories

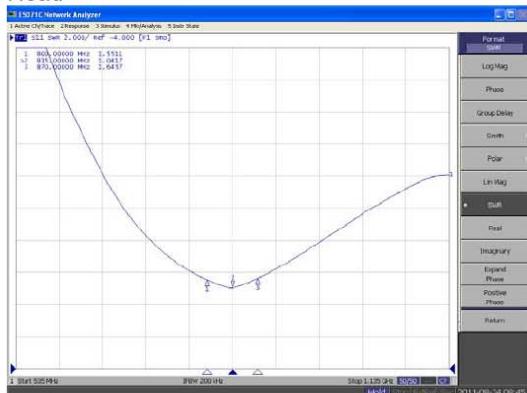
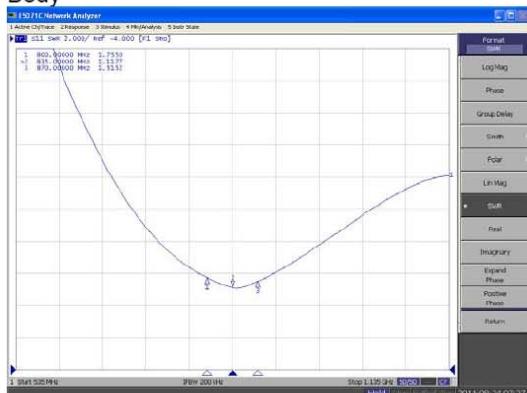
Division of APREL Laboratories.

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

S11 Parameter Return Loss**Head Tissue****Body Tissue**

NCL Calibration Laboratories

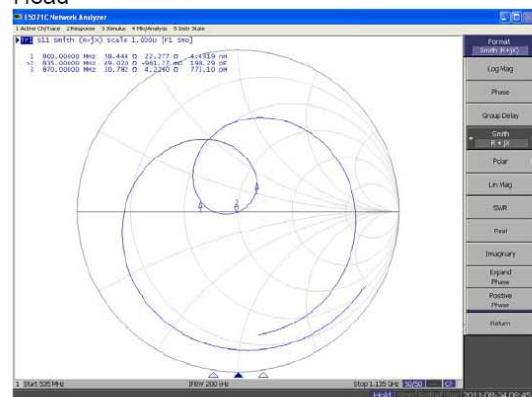
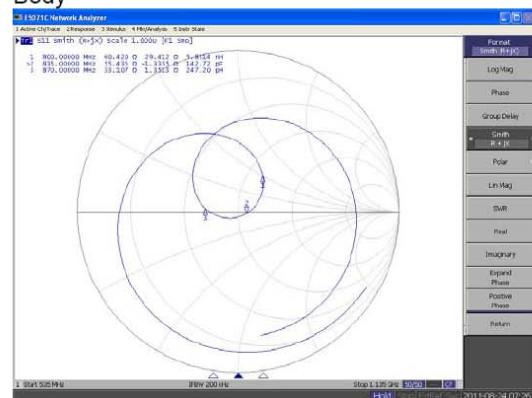
Division of APREL Laboratories.

**SWR
Head****Body**

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Smith Chart Dipole Impedance**Head****Body**

NCL Calibration Laboratories

Division of APREL Laboratories.

Test Equipment

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

NCL CALIBRATION LABORATORIES

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

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 (Head & Body)

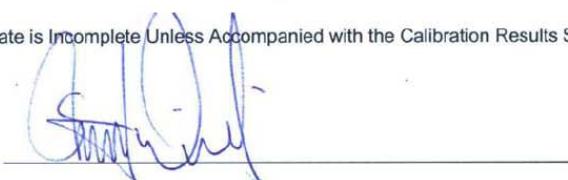
Manufacturer: APREL Laboratories
Part number: ALS-D-1900-S-2
Frequency: 1900 MHz
Serial No: 210-00710

Customer: Bay Area Compliance Laboratory

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

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

Released By:

**NCL CALIBRATION LABORATORIES**

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

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

NCL Calibration Laboratories

Division of APREL Laboratories.

Conditions

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

Ambient Temperature of the Laboratory: 22 °C +/- 0.5°C
Temperature of the Tissue: 21 °C +/- 0.5°C

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



Stuart Nicol



C. Teodorian

Primary Measurement Standards

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

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

NCL Calibration Laboratories

Division of APREL Laboratories.

Calibration Results Summary

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

Mechanical Dimensions

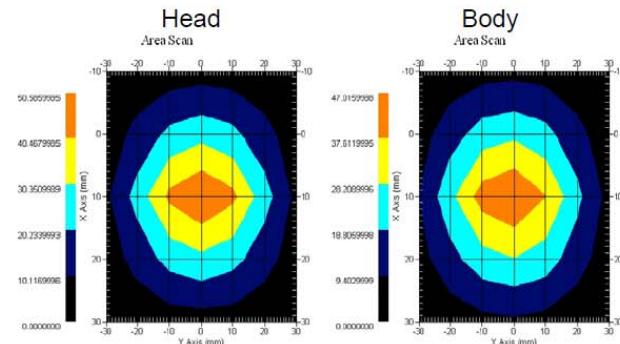
Length: 67.1 mm
Height: 38.9 mm

Electrical Specification

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

System Validation Results

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



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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 210-00710. The calibration routine consisted of a three-step process. Step 1 was a mechanical verification of the dipole to ensure that it meets the mechanical specifications. Step 2 was an Electrical Calibration for the Validation Dipole, where the SWR, Impedance, and the Return loss were assessed. Step 3 involved a System Validation using the ALSAS-10U, along with APREL E-020 130 MHz to 26 GHz E-Field Probe Serial Number 212.

References

SSI-TP-018-ALSAS Dipole Calibration Procedure

SSI-TP-016 Tissue Calibration Procedure

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

Conditions

Dipole 210-00710 was new taken from stock.

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

Dipole Calibration uncertainty

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

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

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

4

NCL Calibration Laboratories

Division of APREL Laboratories.

Dipole Calibration Results**Mechanical Verification**

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

Electrical Validation

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

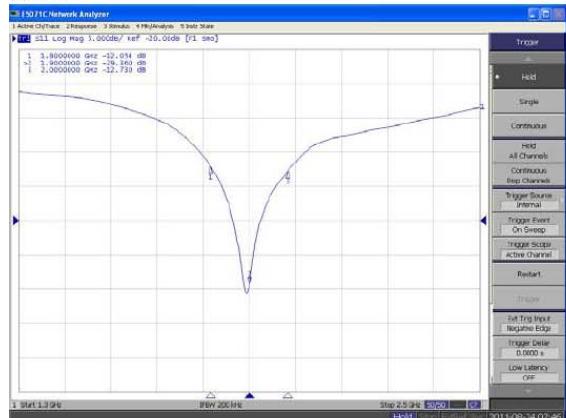
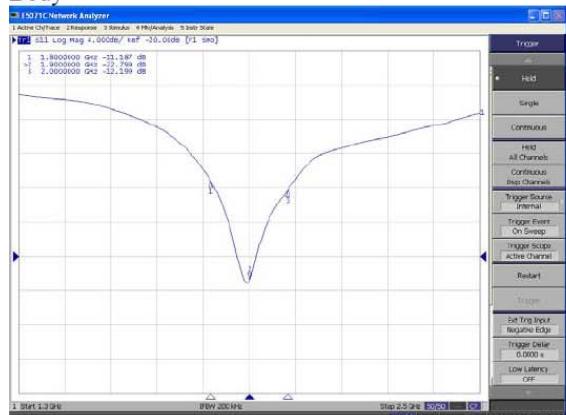
Tissue Validation

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

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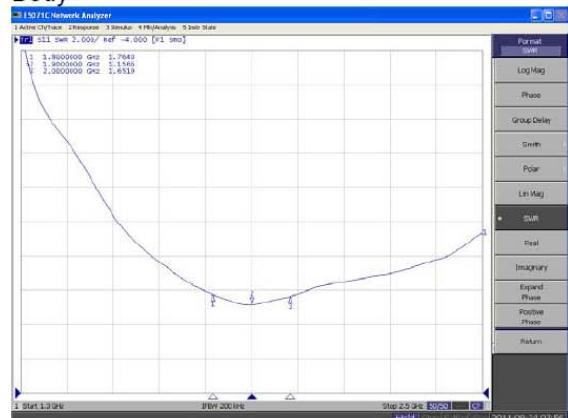
The Following Graphs are the results as displayed on the Vector Network Analyzer.

S11 Parameter Return Loss**Head****Body**

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SWR**Head****Body**

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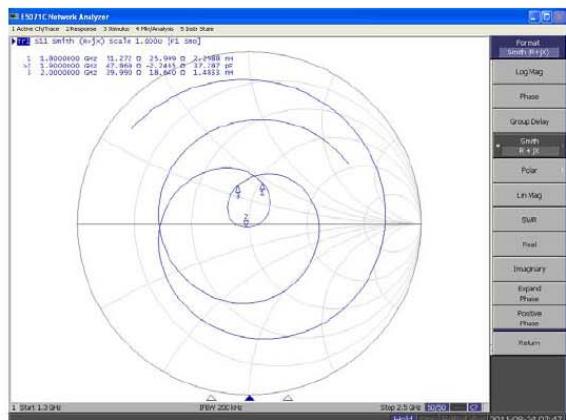
7

NCL Calibration Laboratories

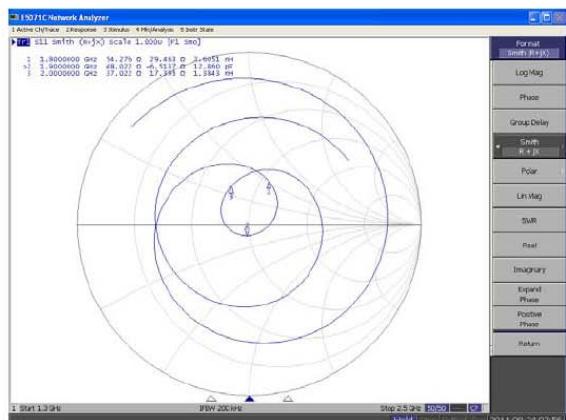
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Smith Chart Dipole Impedance

Head



Body



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8

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Test Equipment

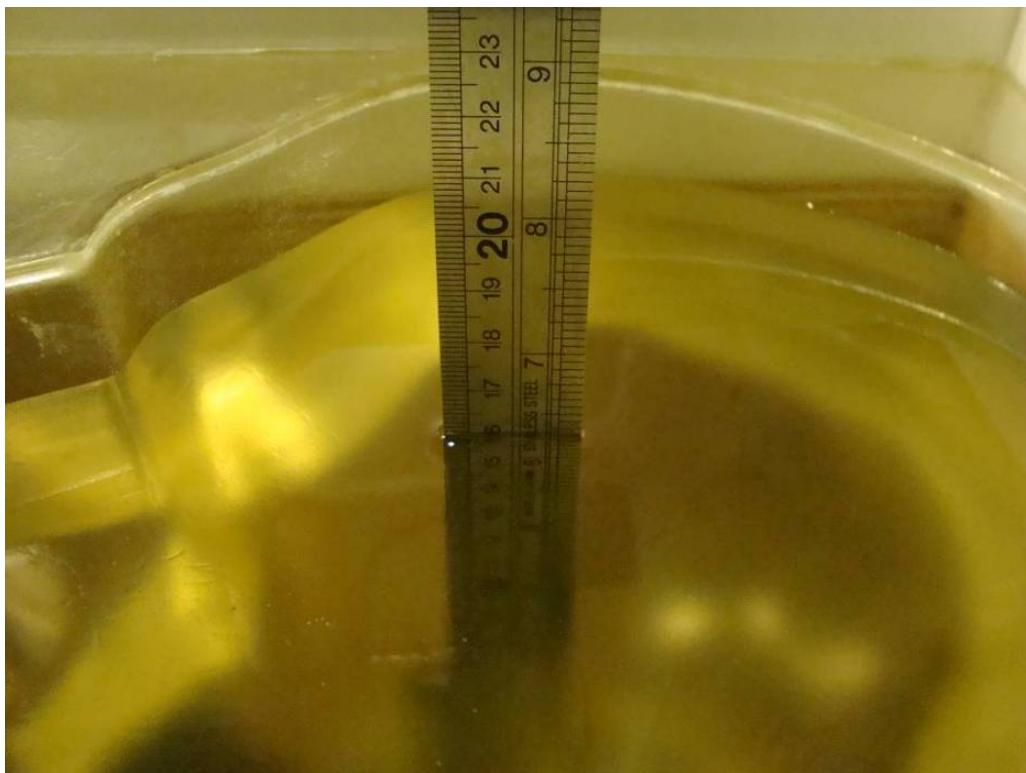
The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List 2011

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

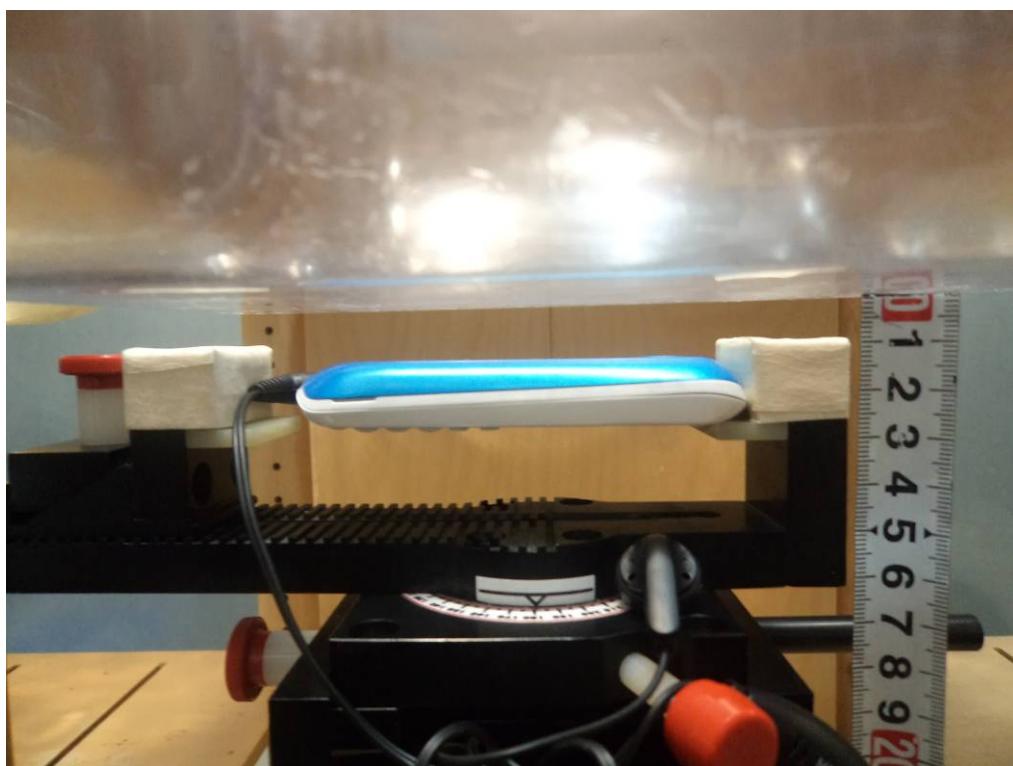
9

APPENDIX D – EUT TEST POSITION PHOTOS

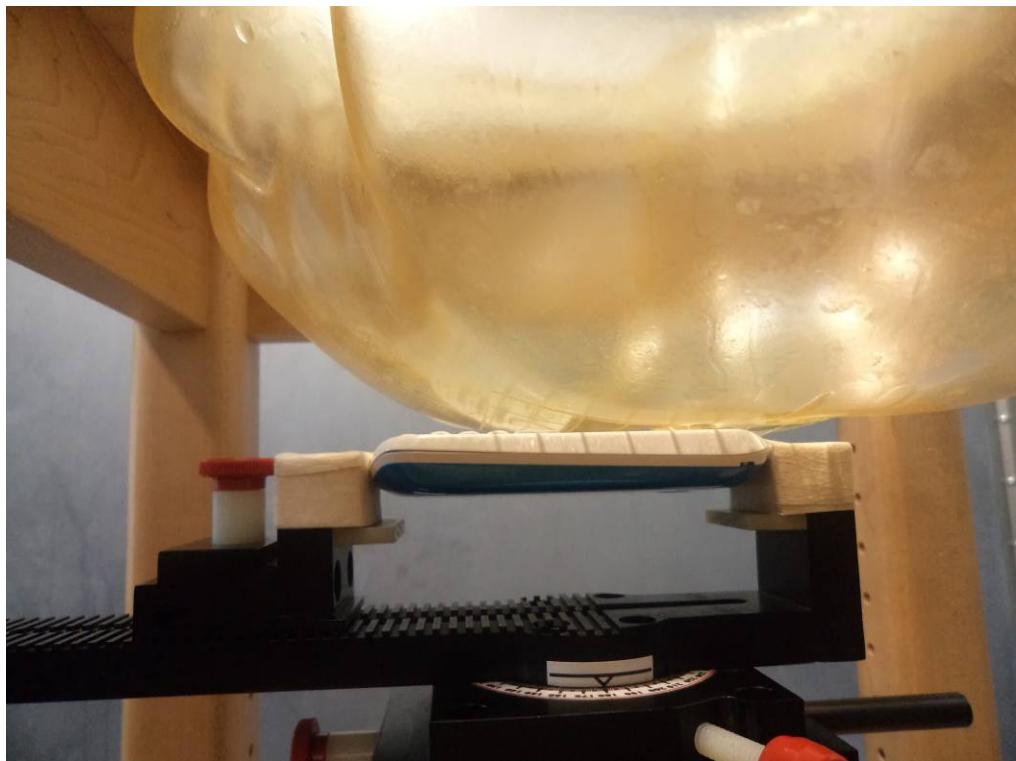
Liquid depth \geq 15cm



Body-worn Back Setup Photo



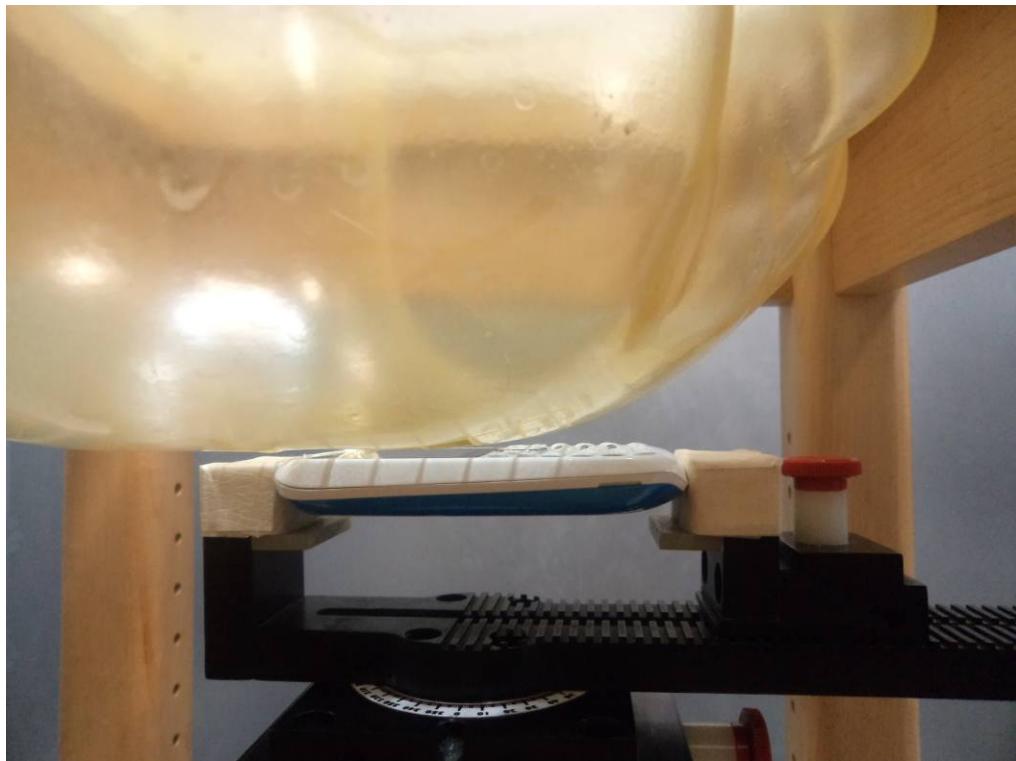
Left Head Touch Setup Photo



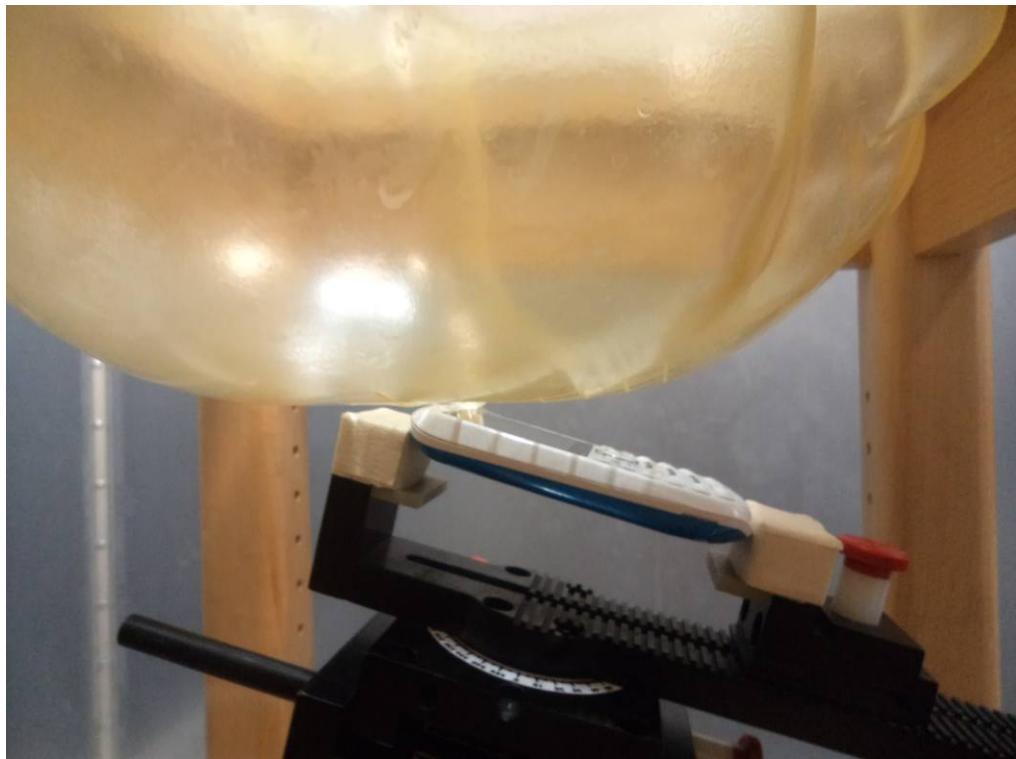
Left Head Tilt Setup Photo



Right Head Touch Setup Photo

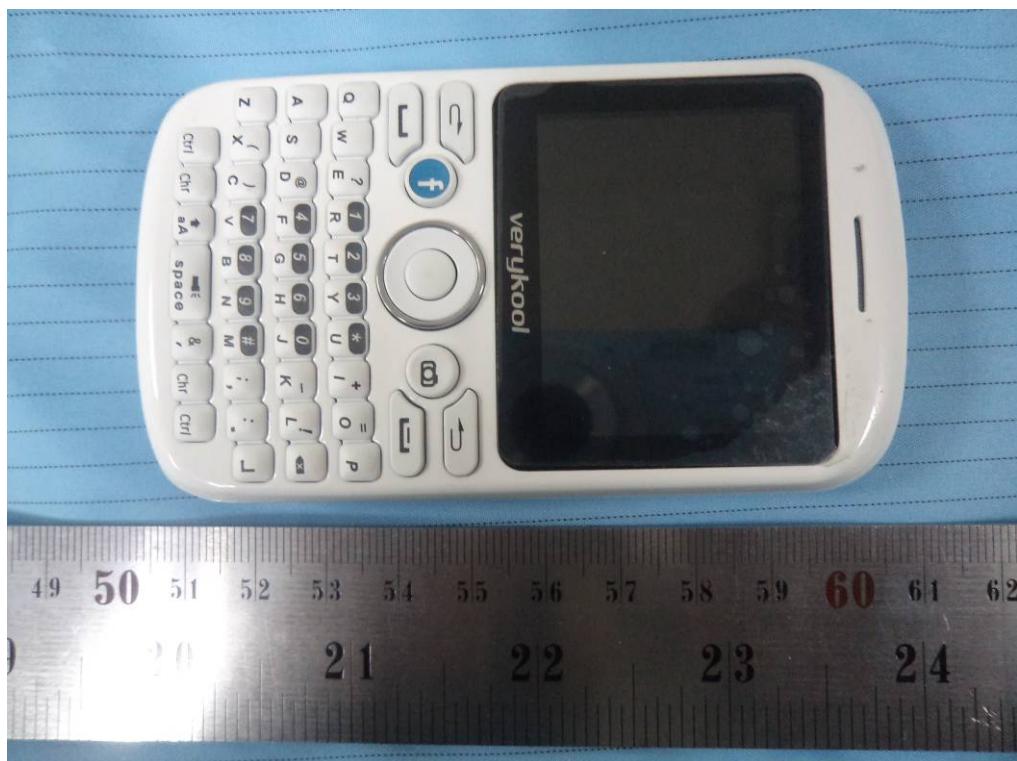


Right Head Tilt Setup Photo



APPENDIX E – EUT PHOTOS

EUT – Front View



EUT – Back View



EUT-Top View



EUT-Bottom View



EUT – Uncovered View**EUT-Headset view**

APPENDIX F – DECLARATION LETTERS**verykool**

Verykool USA INC.
4350 Executive Dr.100 San Diego, CA 92121
Tel: 001 858 373 1635
Fax: 001 858 373 1505
Date: 2012-01-04

Declaration of Similarity

To:
Bay Area Compliance Laboratories Corp. (Shenzhen)
6/F, the 3rd Phase of Wan Li Industrial Bldg., Shihua Rd.,
FuTian Free Trade Zone, Shenzhen, China
Phone: +86 755 33320018, Fax: +86 755 33320008
<http://www.baclcorp.com.cn>

We,Verykool USA INC. hereby declare that our product : GSM Mobile Phone, Model: I605 and I604. These two models are electrically and mechanically identical, share the same PCB Layout and components and the trade name. And the differences between them are the model number. Model: I605 was tested by BACL.

Sincerely,

Signature:
sunny choi
product management director


APPENDIX G – INFORMATIVE REFERENCES

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