Lab Code: 200707-0

SAR EVALUATION REPORT

For

Unical Enterprises, Inc.

16960 Gale Avenue, City of Industry, CA 91745, USA

FCC ID: LZX-CL6065AP

Report Type:	**Product Type:**
Original Report	DECT 1.9 GHz Cordless Phone(Handset)

Test Engineer:	Cabin Hu
Report Number:	RSZ11011304-SAR
Report Date:	2010-04-20
Reviewed By:	William Chen EMC Engineer
Prepared By:	Bay Area Compliance Laboratories Corp. (Shenzhen) 6/F, the 3rd Phase of WanLi Industrial Building, ShiHua Road, FuTian Free Trade Zone Shenzhen, Guangdong, China Tel: +86-755-33320018 Fax: +86-755-33320008

Summary of Test Results	
Rule Part(s):	CFR 47 §2.1093
Test Procedure(s):	FCC OET Bulletin 65C IEEE 1528-2003
Device Type:	Portable device
Exposure Category	Population/Uncontrolled
Modulation:	GFSK
TX Frequency Range:	1921.536-1928.448 MHz
Maximum Conducted Power Tested:	19.65 dBm
Antenna Type(s):	Integrated Antenna
Body-worn Accessories:	Belt Clip and Headset
Max. SAR Level(s) Measured:	0.331 W/Kg 1g Head Tissue (model:CL-60A) 0.243 W/Kg 1g Body Tissue (model:CL-60A) 0.318 W/Kg 1g Head Tissue (model: CL-65A) 0.233 W/Kg 1g Body Tissue (model: CL-65A)

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.

Model: CL-60A

Model: CL-65P

EUT Photos

TABLE OF CONTENTS

REFERENCE, STANDARDS AND GUILDELINES

FCC:

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

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

CE:

The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 2 mW/g as recommended by the EN50360 for an uncontrolled environment. According to the Standard, the device should be evaluated at maximum output power (radiated from the antenna) under “worst-case” conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

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

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

SAR Limits

FCC Limit (1g Tissue)

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

CE Limit (10g Tissue)

EXPOSURE LIMITS	SAR (W/kg)	
	(General Population / Uncontrolled Exposure Environment)	(Occupational / Controlled Exposure Environment)
Spatial Average (averaged over the whole body)	0.08	0.4
Spatial Peak (averaged over any 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.

EUT DESCRIPTION

This Bay Area Compliance Laboratories Corp. test report has been prepared on behalf of Unical Enterprises, Inc. And their product, Model: CL-60A, CL-65P, CL-60P, CL-35A, CL-35P, CL-65A, CL-30A, CL-30P, VM-150, CL-60, CL-30, CL-35, and FCC ID: LZX-CL6065AP or the EUT (Equipment Under Test) as referred to in the rest of this report.

***Note:** The series products, model: CL-60A, CL-65P, CL-60P, CL-35A, CL-35P, CL-65A, CL-30A, CL-30P, VM-150, CL-60, CL-30, CL-35, we also select CL-60A, CL-65P to test, there is no electrical change has been made to the equipment, which was explained in the Appendix J Product Similar Declaration Letter.

Technical Specification

Item	Content
Modulation	GFSK
Frequency Band	1921.536-1928.448 MHz
Dimensions (L*W*H)	178mm(L)*55mm(W)*28mm(H)
Weight	133 g
Power Source	2.4 Vdc/1200mAh, Rechargeable Battery
Normal Operation	Head & Body-worn

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

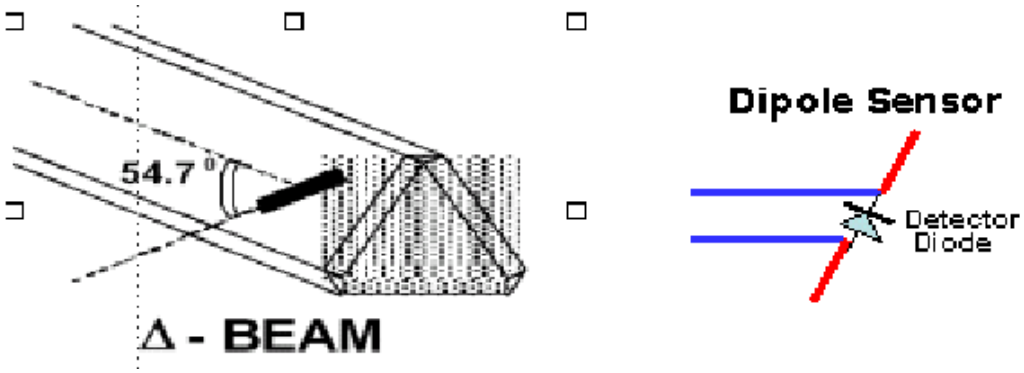
The overall uncertainty for the methodology and algorithms the used during the SAR calculation was evaluated using the data from IEEE 1528 based on the example f3 algorithm:

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

Isotropic E-Field Probe

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

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



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

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

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

Isotropic E-Field Probe Specification

Calibration in Air	Frequency Dependent Below 2 GHz Calibration in air performed in a TEM Cell Above 2 GHz Calibration in air performed in waveguide
Sensitivity	0.70 μV/(V/m)^2 to 0.85 μV/(V/m)^2
Dynamic Range	0.0005 W/kg to 100 W/kg
Isotropic Response	Better than 0.2 dB
Diode Compression Point (DCP)	Calibration for Specific Frequency
Probe Tip Radius	< 5 mm
Sensor Offset	1.56 (+/- 0.02 mm)
Probe Length	290 mm
Video Bandwidth	@ 500 Hz: 1 dB @ 1.02 kHz: 3 dB
Boundary Effect	Less than 2% for distance greater than 2.4 mm
Spatial Resolution	Diameter less than 5 mm Compliant with Standards

Boundary Detection Unit and Probe Mounting Device

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

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

Daq-Paq (Analog to Digital Electronics)

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

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

Axis Articulated Robot

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

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

ALSAS Universal Workstation

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

Universal Device Positioner

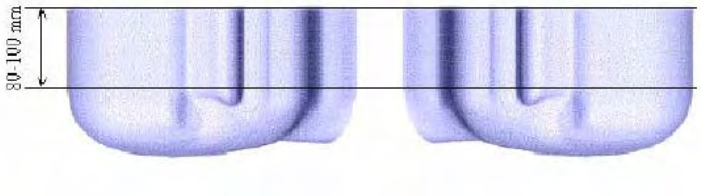
The universal device positioner allows complete freedom of movement of the EUT. Developed to hold a EUT in a free-space scenario any additional loading attributable to the material used in the construction of the positioner has been eliminated. Repeatability has been enhanced through the linear scales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

Phantom Types

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

APREL SAM Phantoms

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



APREL Laboratories Universal Phantom

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

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

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

Tissue Dielectric Parameters for Head and Body Phantoms

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

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

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

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

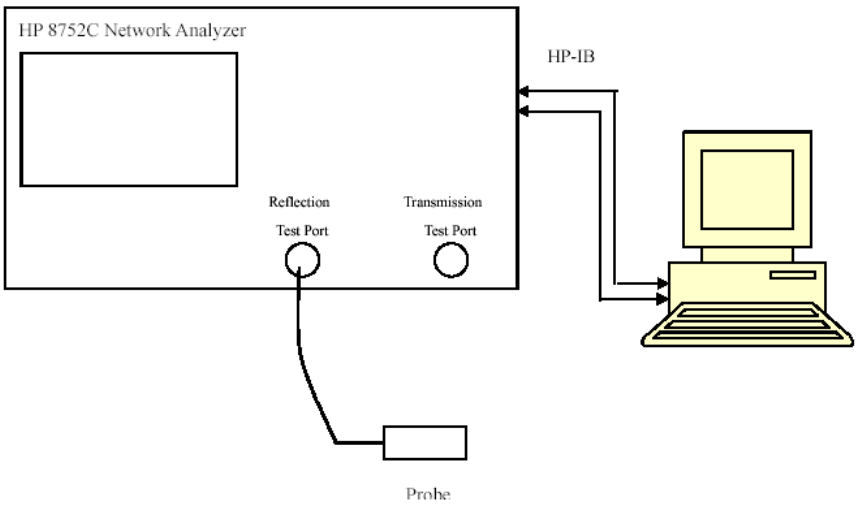
EQUIPMENT LIST AND CALIBRATION

Equipments List & Calibration Info

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	N/A	110-00212
Miniature E-Field Probe	ALS-E-020	2010-08-21	273
Dipole,1900MHz	ALS-D-1900-S-2	2010-09-20	210-00710
Dipole Spacer	ALS-DS-U	N/A	250-00907
Digital Radio communication Tester	CMD60	2010-10-21	8281461029
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 1900 MHz Head	ALS-T-1900-1-H	Each Time	295-01103
Signal Generator	HP8648C	2010-04-28	3426A01345
Power Amplifier	5S1G4	N/A	71377
Spectrum Analyzer	FSEM30	2010-07-05	849720/019

SAR MEASUREMENT SYSTEM VERIFICATION

Liquid Verification



Liquid Verification Setup Block Diagram

Liquid Verification Results

Frequency (MHz)	Liquid Type	Liquid Parameter		Result
		εr	σ (S/m)	
1900	Head	39.37	1.47	In Tolerance
1900	Body	53.81	1.49	In Tolerance

** Liquid Verification was performed on 2011-3-10*

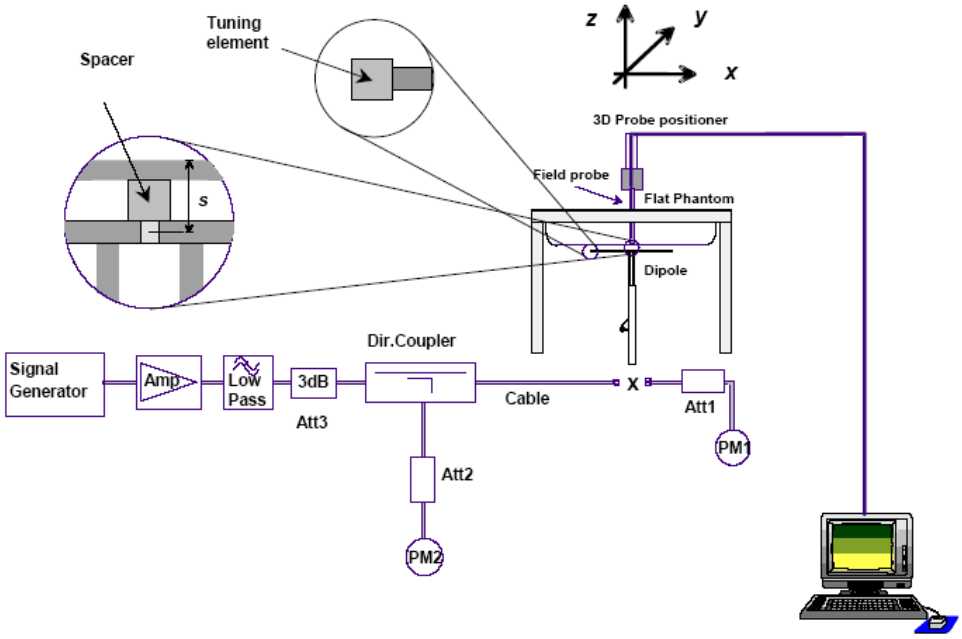
Please refer to the following tables.

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

System Accuracy Verification

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

System Verification Setup Block Diagram



System Accuracy Check Results

Frequency (MHz)	Liquid Type	1 g SAR (W/Kg)	10 g SAR (W/Kg)	Result
1900	Head	40.346	20.526	In Tolerance
1900	Body	43.070	22.019	In Tolerance

** System Check was performed on 2011-03-11.*
All SAR values are normalized to 1 Watt forward power.

IEEE P1528 recommended reference value for Required Tissue

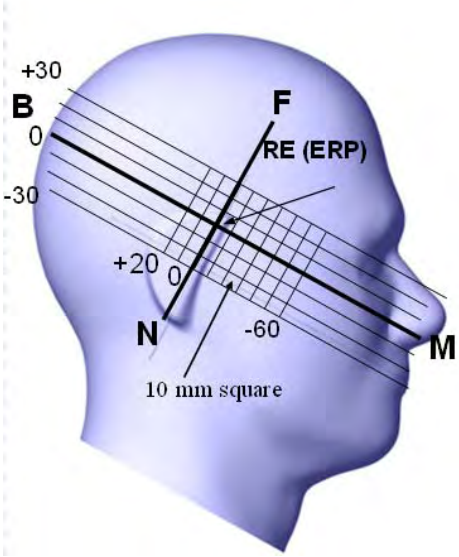
Frequency (MHz)	1 g SAR (W/Kg)	10 g SAR (W/Kg)	Local SAR at surface (above feed point)	Local SAR at surface (v=2cm offset from feed point)
300	3.0	2.0	4.4	2.1
450	4.9	3.3	7.2	3.2
835	9.5	6.2	14.1	4.9
900	10.8	6.9	16.4	5.4
1450	29.0	16.0	50.2	6.5
1800	38.1	19.8	69.5	6.8
1900	39.7	20.5	72.1	6.6
2000	41.1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

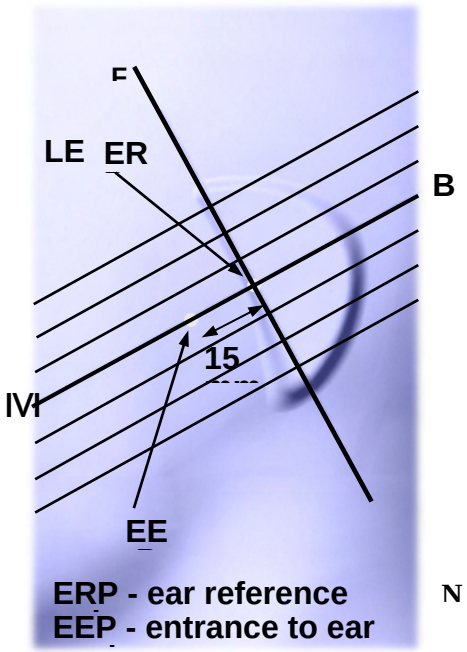
EUT TEST STRATEGY AND METHODOLOGY

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

This category includes most wireless handsets with fixed, retractable or internal antennas located toward the top half of the device, with or without a foldout, sliding or similar keypad cover. The handset should have its earpiece located within the upper ¼ of the device, either along the centerline or off-centered, as perceived by its users. This type of handset should be positioned in a normal operating position with the "test device reference point" located along the "vertical centerline" on the front of the device aligned to the "ear reference point". The "test device reference point" should be located at the same level as the center of the earpiece region. The "vertical centerline" should bisect the front surface of the handset at its top and bottom edges. A "ear reference point" is located on the outer surface of the head phantom on each ear spacer. It is located 1.5 cm above the center of the ear canal entrance in the "phantom reference plane" defined by the three lines joining the center of each "ear reference point" (left and right) and the tip of the mouth.

A handset should be initially positioned with the earpiece region pressed against the ear spacer of a head phantom. For the SCC-34/SC-2 head phantom, the device should be positioned parallel to the "N-F" line defined along the base of the ear spacer that contains the "ear reference point". For interim head phantoms, the device should be positioned parallel to the cheek for maximum RF energy coupling. The "test device reference point" is aligned to the "ear reference point" on the head phantom and the "vertical centerline" is aligned to the "phantom reference plane". This is called the "initial ear position". While maintaining these three alignments, the body of the handset is gradually adjusted to each of the following positions for evaluating SAR:





Cheek/Touch Position

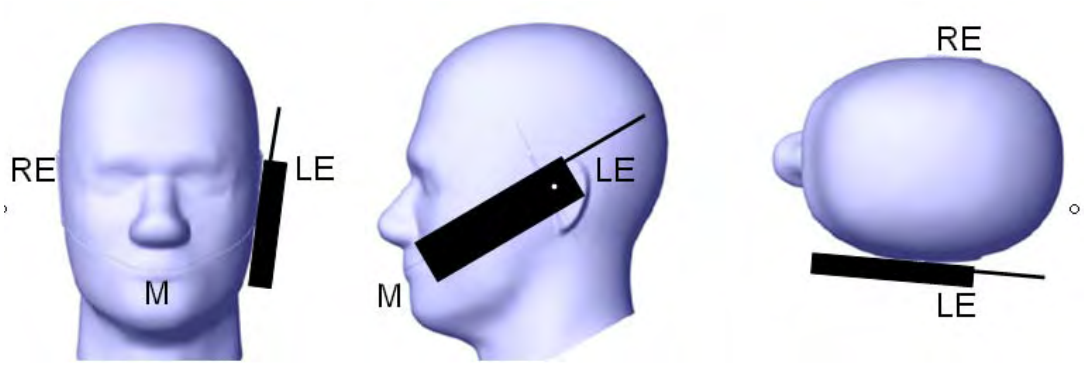
The device is brought toward the mouth of the head phantom by pivoting against the “ear reference point” or along the “N-F” line for the SCC-34/SC-2 head phantom.

This test position is established:

- When any point on the display, keypad or mouthpiece portions of the handset is in contact with the phantom.
- (or) When any portion of a foldout, sliding or similar keypad cover opened to its intended self-adjusting normal use position is in contact with the cheek or mouth of the phantom.

For existing head phantoms – when the handset loses contact with the phantom at the pivoting point, rotation should continue until the device touches the cheek of the phantom or breaks its last contact from the ear spacer.

Check /Touch Position



Ear/Tilt Position

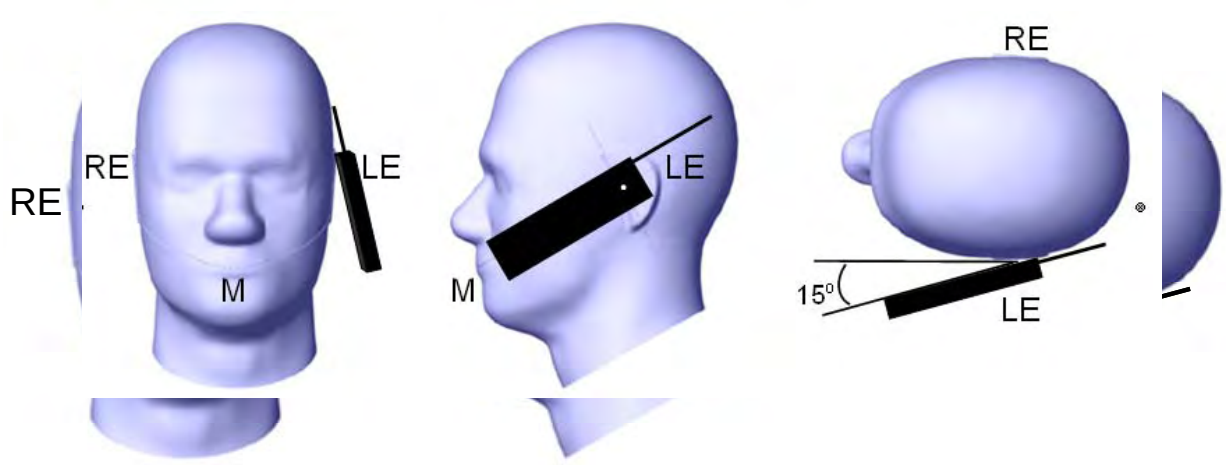
With the handset aligned in the “Cheek/Touch Position”:

1) If the earpiece of the handset is not in full contact with the phantom’s ear spacer (in the “Cheek/Touch position”) and the peak SAR location for the “Cheek/Touch” position is located at the ear spacer region or corresponds to the earpiece region of the handset, the device should be returned to the “initial ear position” by rotating it away from the mouth until the earpiece is in full contact with the ear spacer.

2) (otherwise) The handset should be moved (translated) away from the cheek perpendicular to the line passes through both “ear reference points” (note: one of these ear reference points may not physically exist on a split head model) for approximate 2-3 cm. While it is in this position, the device handset is tilted away from the mouth with respect to the “test device reference point” until the inside angle between the vertical centerline on the front surface of the phone and the horizontal line passing through the ear reference point is by 15 80°. After the tilt, it is then moved (translated) back toward the head perpendicular to the line passes through both “ear reference points” until the device touches the phantom or the ear spacer. If the antenna touches the head first, the positioning process should be repeated with a tilt angle less than 15° so that the device and its antenna would touch the phantom simultaneously. This test position may require a device holder or positioner to achieve the translation and tilting with acceptable positioning repeatability.

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

Ear /Tilt 15° Position



Test positions for body-worn and other configurations

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

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

SAR Evaluation Procedure

The evaluation was performed with the following procedure:

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

Step 2: The SAR distribution at the exposed side of the head was measured at a distance of 4 mm from the inner surface of the shell. The area covered the entire dimension of the head or EUT and the horizontal grid spacing was 15 mm x 15 mm. Based on these data, the area of the maximum absorption was determined by spline interpolation. The first Area Scan covers the entire dimension of the EUT to ensure that the hotspot was correctly identified.

Step 3: Around this point, a volume of 30 mm x 30 mm x 21 mm was assessed by measuring 5 x 5 x 7 points. On the basis of this data set, the spatial peak SAR value was evaluated under the following procedure:

1) The data at the surface were extrapolated, since the center of the dipoles is 1.2 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation was based on a least square algorithm. A polynomial of the fourth order was calculated through the points in z-axes. This polynomial was then used to evaluate the points between the surface and the probe tip.

2) The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed by the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one dimensional splines with the “Not a knot"-condition (in x, y and z-directions). The volume was integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the averages.

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

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

SAR MEASUREMENT RESULTS

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

SAR Test Data

Environmental Conditions

Temperature:	21° C
Relative Humidity:	56%
ATM Pressure:	1005 mbar

** Testing was performed by Cabin Hu on 2011-3-11---2011-3-13.*

Model: CL-60A

EUT Position	Frequency (MHz)		Antenna Type	1 g SAR Value (W/Kg)	FCC Limit (W/Kg)	Ref. Plot #
	Channel	MHz				
Left Head Cheek	0 (High)	1928.448	Integral	0.331	1.6	1
	2 (Middle)	1924.992	Integral	0.328	1.6	2
	4 (Low)	1921.536	Integral	0.317	1.6	3
Left Head Tilt	0 (High)	1928.448	Integral	0.178	1.6	4
	2 (Middle)	1924.992	Integral	-	1.6	/
	4 (Low)	1921.536	Integral	-	1.6	/
Right Head Cheek	0 (High)	1928.448	Integral	0.320	1.6	5
	2 (Middle)	1924.992	Integral	-	1.6	/
	4 (Low)	1921.536	Integral	-	1.6	/
Right Head Tilt	0 (High)	1928.448	Integral	0.171	1.6	6
	2 (Middle)	1924.992	Integral	-	1.6	/
	4 (Low)	1921.536	Integral	-	1.6	/
Body-worn back	0 (High)	1928.448	Integral	0.243	1.6	7

Model: CL-65P

EUT Position	Frequency (MHz)		Antenna Type	1 g SAR Value (W/Kg)	FCC Limit (W/Kg)	Ref. Plot #
	Channel	MHz				
Left Head Cheek	0 (High)	1928.448	Integral	0.318	1.6	8
	2 (Middle)	1924.992	Integral	0.310	1.6	9
	4 (Low)	1921.536	Integral	0.292	1.6	10
Left Head Tilt	0 (High)	1928.448	Integral	0.177	1.6	11
	2 (Middle)	1924.992	Integral	-	1.6	/
	4 (Low)	1921.536	Integral	-	1.6	/
Right Head Cheek	0 (High)	1928.448	Integral	0.297	1.6	12
	2 (Middle)	1924.992	Integral	-	1.6	/
	4 (Low)	1921.536	Integral	-	1.6	/
Right Head Tilt	0 (High)	1928.448	Integral	0.166	1.6	13
	2 (Middle)	1924.992	Integral	-	1.6	/
	4 (Low)	1921.536	Integral	-	1.6	/
Body-worn back	0 (High)	1928.448	Integral	0.233	1.6	14

APPENDIX A – MEASUREMENT UNCERTAINTY

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

Exposure Assessment Measurement Uncertainty

Source of Uncertainty	Tolerance Value	Probability Distribution	Divisor	c_i^1 (1-g)	c_i^1 (10-g)	Standard Uncertainty (1-g) %	Standard Uncertainty (10-g) %
Measurement System							
Probe Calibration	3.5	normal	1	1	1	3.5	3.5
Axial Isotropy	3.7	rectangular	$\sqrt{3}$	$(1\text{-cp})^{1/2}$	$(1\text{-cp})^{1}_{/2}$	1.5	1.5
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	$\sqrt{cp}$	$\sqrt{cp}$	4.4	4.4
Boundary Effect	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Linearity	4.7	rectangular	$\sqrt{3}$	1	1	2.7	2.7
Detection Limit	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
Readout Electronics	1.0	normal	1	1	1	1.0	1.0
Response Time	0.8	rectangular	$\sqrt{3}$	1	1	0.5	0.5
Integration Time	1.7	rectangular	$\sqrt{3}$	1	1	1.0	1.0
RF Ambient Condition	3.0	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Probe Positioner Mech.	0.4	rectangular	$\sqrt{3}$	1	1	0.2	0.2
Restriction							
Probe Positioning with respect to Phantom Shell	2.9	rectangular	$\sqrt{3}$	1	1	1.7	1.7
Extrapolation and Integration	3.7	rectangular	$\sqrt{3}$	1	1	2.1	2.1
Test Sample Positioning	4.0	normal	1	1	1	4.0	4.0
Device Holder Uncertainty	2.0	normal	1	1	1	2.0	2.0
Drift of Output Power	3.2	rectangular	$\sqrt{3}$	1	1	1.8	1.8
Phantom and Setup							
Phantom Uncertainty(shape & thickness tolerance)	3.4	rectangular	$\sqrt{3}$	1	1	2.0	2.0
Liquid Conductivity(target)	5.0	rectangular	$\sqrt{3}$	0.7	0.5	2.0	1.4
Liquid Conductivity(meas.)	0.0	normal	1	0.7	0.5	0.0	0.0
Liquid Permittivity(target)	5.0	rectangular	$\sqrt{3}$	0.6	0.5	1.7	1.4
Liquid Permittivity(meas.)	0.0	normal	1	0.6	0.5	0.0	0.0
Combined Uncertainty		RSS				9.4	9.2
Combined Uncertainty (coverage factor=2)		Normal(k=2)				18.8	18.5

APPENDIX B – PROBE CALIBRATION CERTIFICATES

NCL CALIBRATION LABORATORIES

Calibration File No.: CP-1141

Client.: BACL

CERTIFICATE OF CALIBRATION

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

Equipment: Miniature Isotropic RF Probe 1900 MHz

Manufacturer: APREL Laboratories
Model No.: E-020
Serial No.: 273

Calibration in Head Tissue

Calibration Procedure: SSI/DRB-TP-D01-032-E020-V2
Project No: BACB-E020-5537

Calibrated: 21st August 2010
Released on: 24th August 2010

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

Released By: _____

NCL CALIBRATION LABORATORIES
51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6
Division of APREL Lab.
TEL: (613) 820-4988
FAX: (613) 820-4161

NCL Calibration Laboratories
Division of APREL Laboratories.

Introduction

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

References

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

Conditions

Probe 273 was a 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 probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.

Stuart Nicol

Jesse Hones

NCL Calibration Laboratories
Division of APREL Laboratories.

Calibration Results Summary

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

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

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

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

NCL Calibration Laboratories
Division of APREL Laboratories.

Sensitivity in Head Tissue Measured

Frequency: 1900 MHz

Epsilon: 38.90 (+/-5%) **Sigma:** 1.39 S/m (+/-5%)

ConvF

Channel X: 5.25

Channel Y: 5.25

Channel Z: 5.25

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

Boundary Effect:

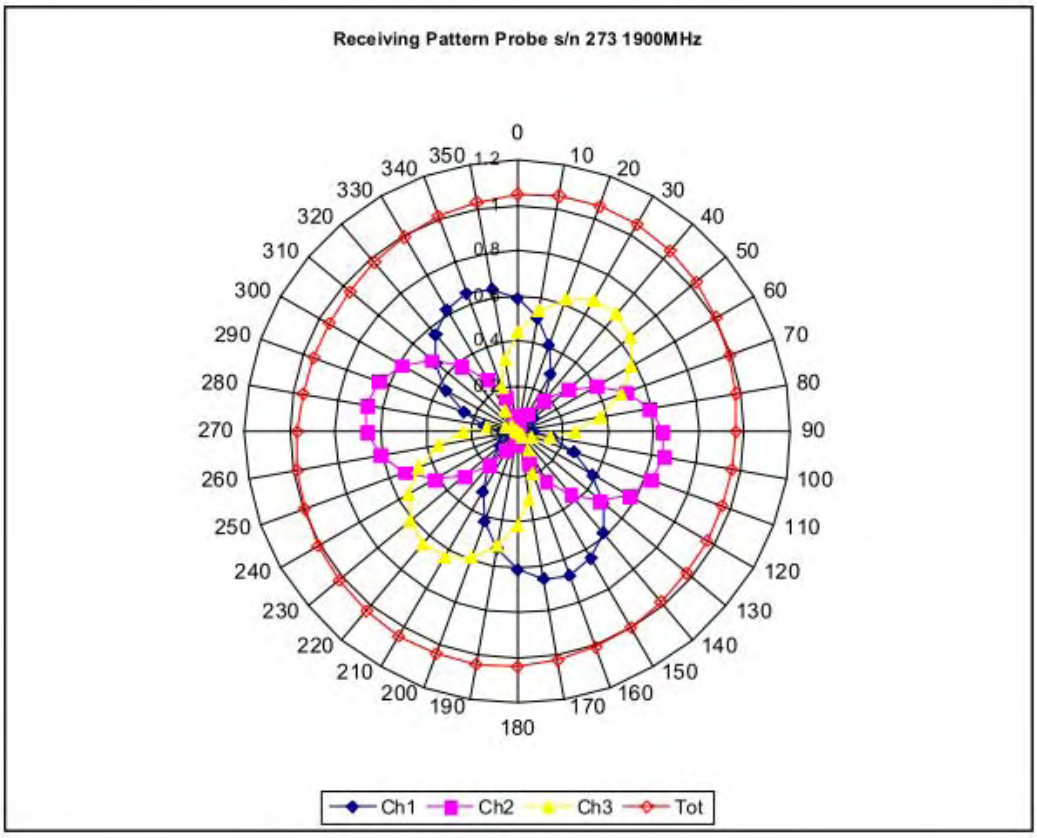
Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.44mm.

Spatial Resolution:

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

NCL Calibration Laboratories
Division of APREL Laboratories.

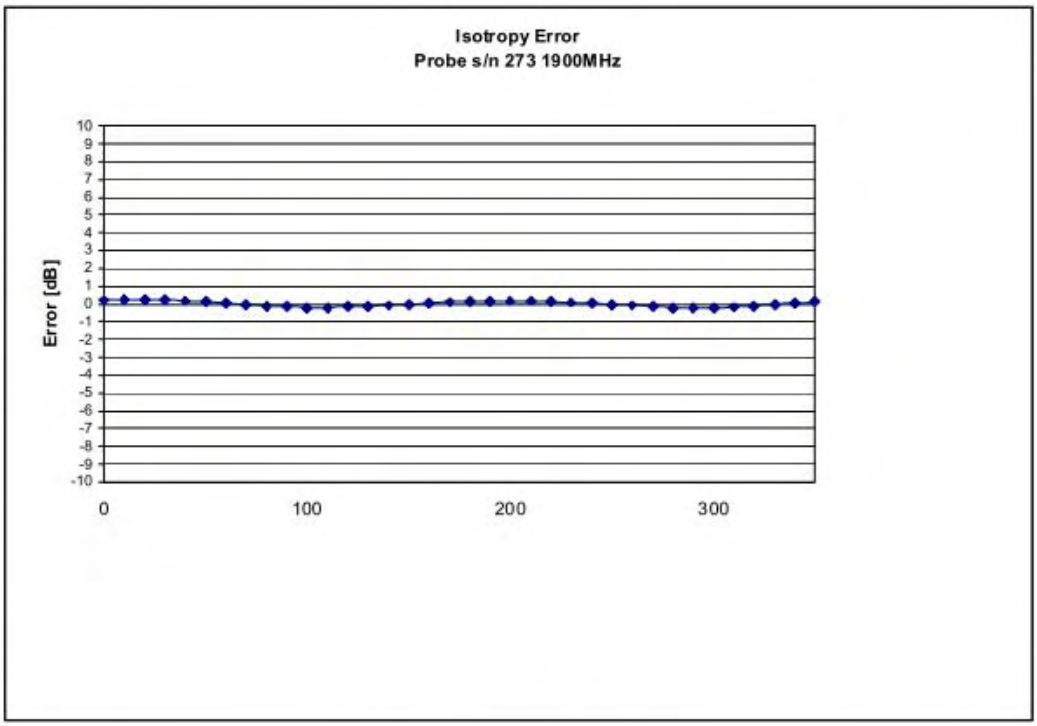
Receiving Pattern 1900 MHz (Air)

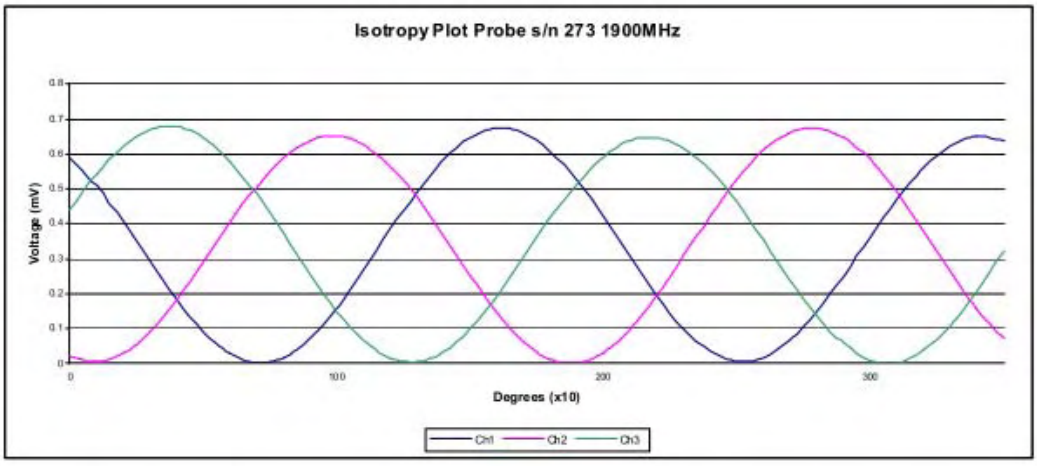


This page has been reviewed for content and attested to on Page 2 of this document.

NCL Calibration Laboratories
Division of APREL Laboratories.

Isotropy Error 1900 MHz (Air)

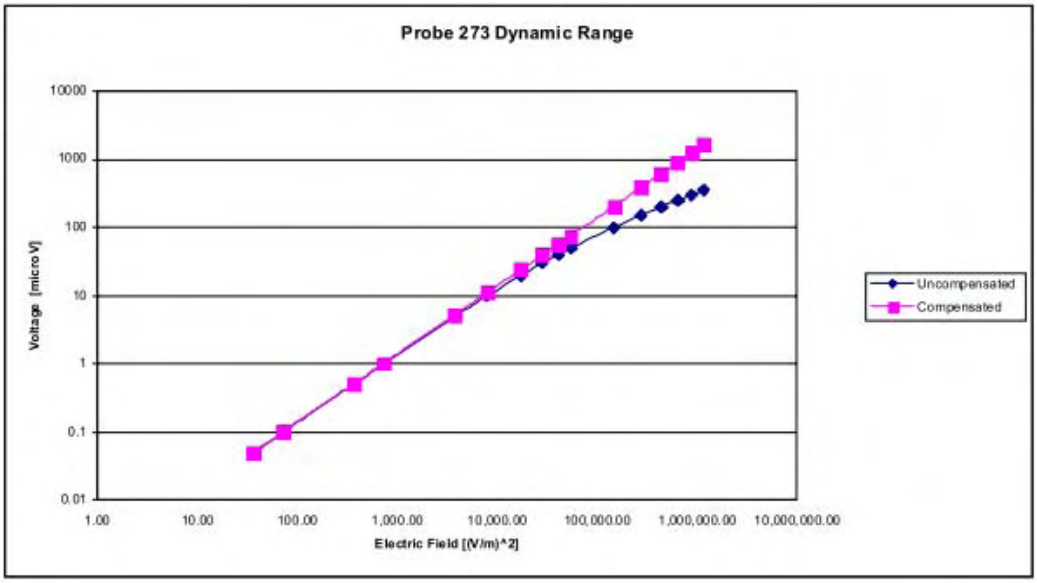




Isotropicity in Tissue: 0.10 dB

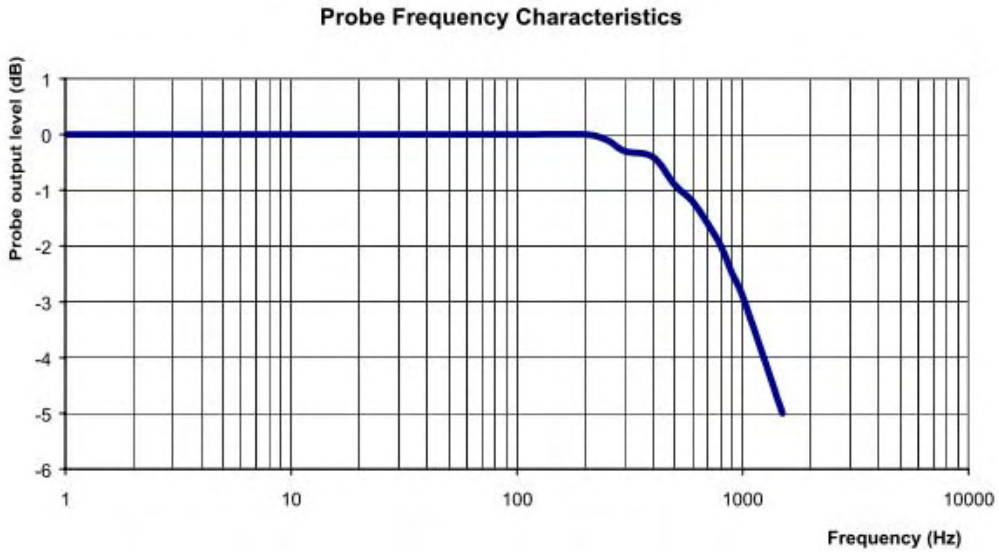
NCL Calibration Laboratories
Division of APREL Laboratories.

Dynamic Range



NCL Calibration Laboratories
Division of APREL Laboratories.

Video Bandwidth



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

NCL Calibration Laboratories
Division of APREL Laboratories.

Conversion Factor Uncertainty Assessment

Frequency:		1900MHz	
Epsilon:	38.90 (+/-5%)	**Sigma:**	1.39 S/m (+/-5%)
ConvF			
Channel X:	5.25	7%(K=2)	
Channel Y:	5.25	7%(K=2)	
Channel Z:	5.25	7%(K=2)	

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

Boundary Effect:

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

NCL Calibration Laboratories
Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2010.

NCL CALIBRATION LABORATORIES

Calibration File No.: CP-1142

Client.: BACL

CERTIFICATE OF CALIBRATION

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

Equipment: Miniature Isotropic RF Probe 1900 MHz

Manufacturer: APREL Laboratories
Model No.: E-020
Serial No.: 273

Calibration in Body Tissue

Calibration Procedure: SSI/DRB-TP-D01-032-E020-V2
Project No: BACB-E020-5537

Calibrated: 21st August 2010
Released on: 24th August 2010

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

Released By: _____

NCL CALIBRATION LABORATORIES
51 SPECTRUM WAY
NEPEAN, ONTARIO
CANADA K2R 1E6
Division of APREL Lab.
TEL: (613) 820-4988
FAX: (613) 820-4161

NCL Calibration Laboratories
Division of APREL Laboratories.

Introduction

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

References

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

Conditions

Probe 273 was a 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 probe has been accurately conducted and that all information contained within this report has been reviewed for accuracy.

Stuart Nicol

Jesse Hones

NCL Calibration Laboratories
Division of APREL Laboratories.

Calibration Results Summary

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

*Resistive to recommended tissue recipes per IEEE-1528

Sensitivity in Air

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

NCL Calibration Laboratories
Division of APREL Laboratories.

Sensitivity in Body Tissue Measured

Frequency: 1900 MHz

Epsilon: 53.11 (+/-5%) **Sigma:** 1.56 S/m (+/-5%)

ConvF

Channel X: 5.15

Channel Y: 5.15

Channel Z: 5.15

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

Boundary Effect:

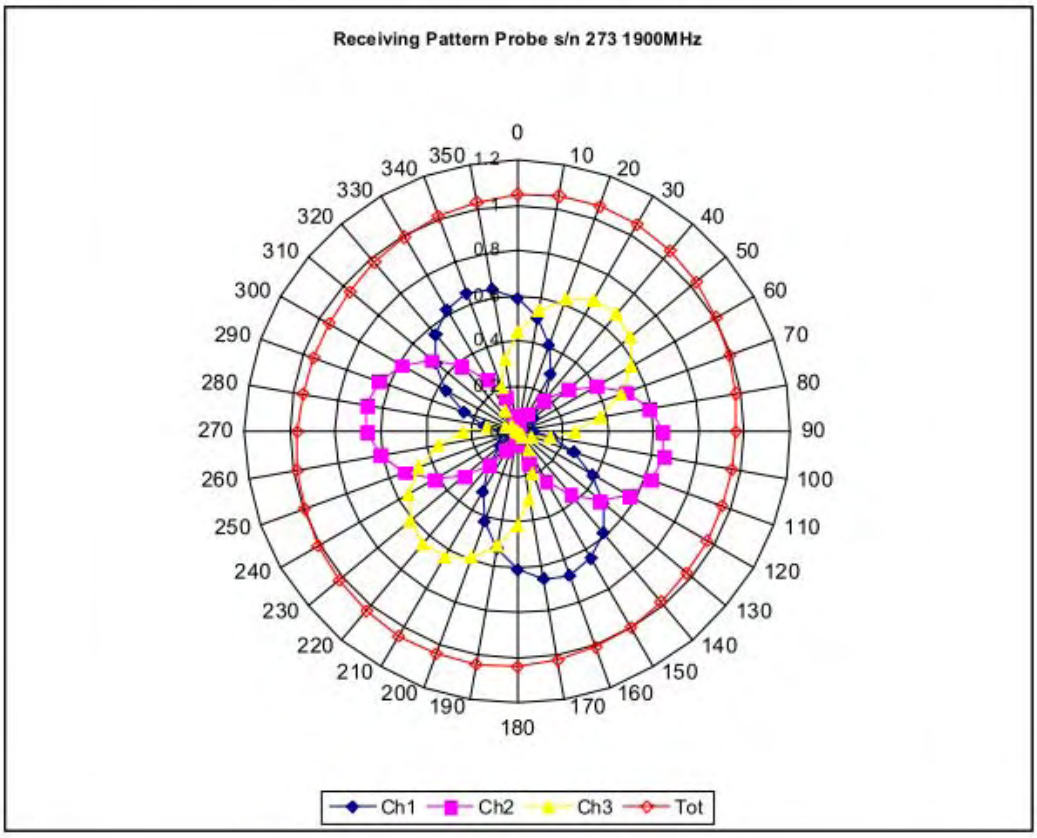
Uncertainty resulting from the boundary effect is less than 2% for the distance between the tip of the probe and the tissue boundary, when less than 2.44mm.

Spatial Resolution:

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

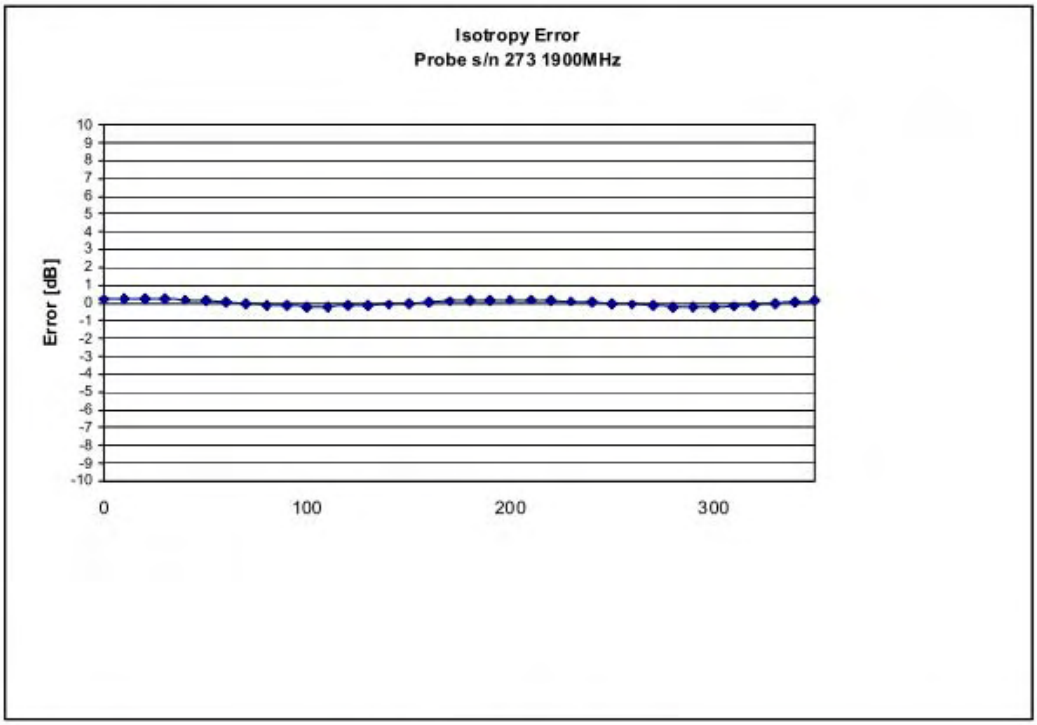
NCL Calibration Laboratories
Division of APREL Laboratories.

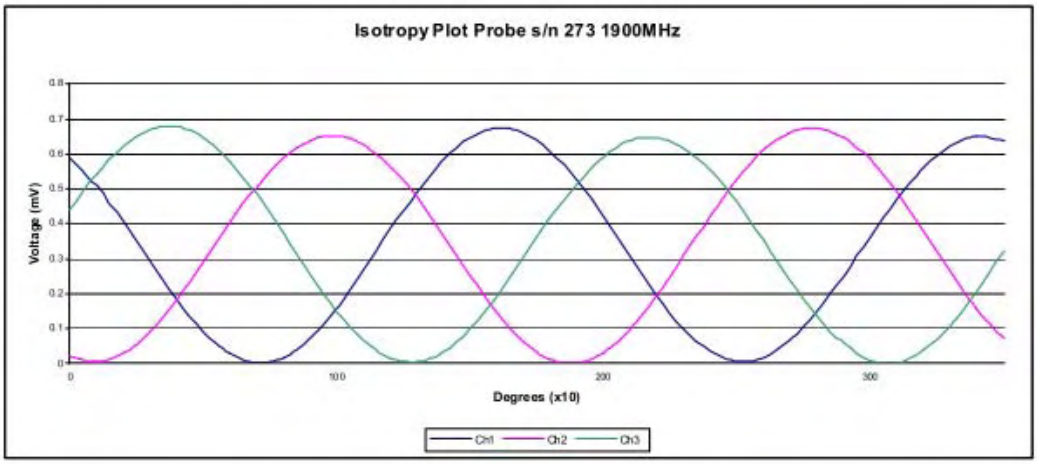
Receiving Pattern 1900 MHz (Air)



NCL Calibration Laboratories
Division of APREL Laboratories.

Isotropy Error 1900 MHz (Air)



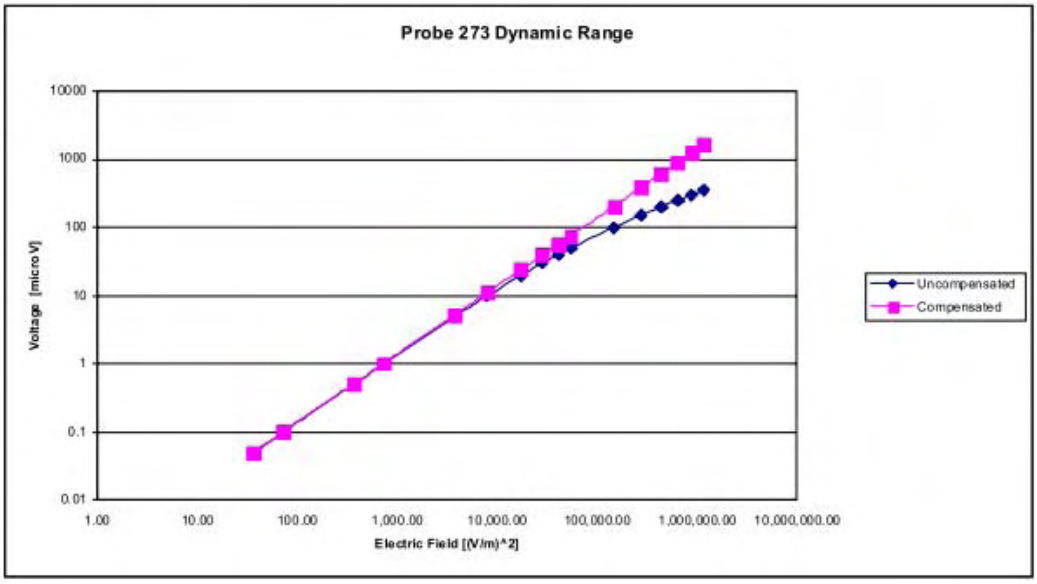


Isotropicity in Tissue: 0.10 dB

Page 6 of 10
This page has been reviewed for content and attested to on Page 2 of this document.

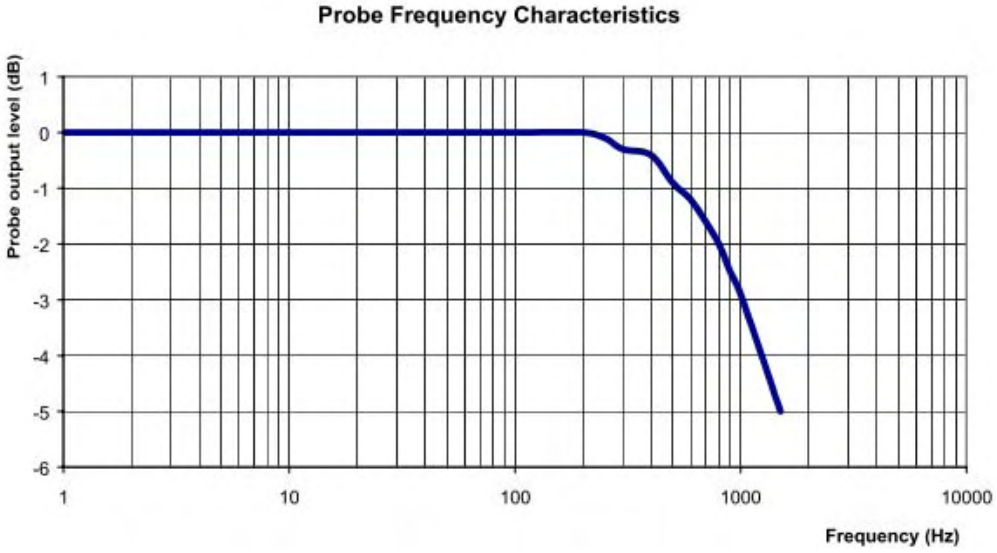
NCL Calibration Laboratories
Division of APREL Laboratories.

Dynamic Range



NCL Calibration Laboratories
Division of APREL Laboratories.

Video Bandwidth



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

NCL Calibration Laboratories
Division of APREL Laboratories.

Conversion Factor Uncertainty Assessment

Frequency:		1900MHz	
Epsilon:	53.11 (+/-5%)	**Sigma:**	1.56 S/m (+/-5%)
ConvF			
Channel X:	5.15	7%(K=2)	
Channel Y:	5.15	7%(K=2)	
Channel Z:	5.15	7%(K=2)	

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

Boundary Effect:

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

NCL Calibration Laboratories
Division of APREL Laboratories.

Test Equipment

The test equipment used during Probe Calibration, manufacturer, model number and, current calibration status are listed and located on the main APREL server R:\NCL\Calibration Equipment\Instrument List May 2010.

APPENDIX C – DIPOLE CALIBRATION CERTIFICATES

Bay Area Compliance Laboratories Corp.
1274 Anvilwood Ave, Sunnyvale, CA 94089
Tel: (408)732-9162 / Fax: (408)732-9164

Verification of Calibration Report

Report Number: CAL 2010-09-20

Description: Dipole Antenna

Manufacturer: APREL Laboratories

Model Number: ALS-D-1900-S-2

Serial Number: SN: 210-00710

Date of Calibration: 20 Sept 2010

Condition Received: In Tolerance

Condition Returned: In Tolerance

Conditions and results of calibration: See attachment

This device has been instrumented, measured and calibrated in accordance with the Bay Area Compliance Laboratories Corp. ("BACL") Quality Assurance Manual procedures and the results being traceable to the National Institute of Standards and Technology (NIST). The BACL Quality System is accredited by NVLAP to ISO/IEC 17025:2005. Unless stated otherwise; Measurement Uncertainties are derived from ISO Guide to the Determination of Uncertainties with a Coverage Factor of k = 2 for a 95% level of confidence, no sampling plan or other process was used for this calibration (unless stated otherwise), the results reported herein apply only to the calibration of the item described above, and limitations of use (if any) shall be stated this Calibration Report.

Calibrated By: Quinn Jiang — Date: 9/20/2010

Reviewed By: Victor Zhang — Date: 9/21/2010

Quality Assurance: Hans Mellberg — Date: 21 SEP 2010

Attachment

Ambient Environment of Calibration

Temperature	Relative Humidity	Pressure
22 ° C	53.5 %	104.55 k Pa

Equipment List

Description	Manufacturer	Model	Serial #	Cal Date
Signal Generator	HP	8648C	3426A00417	2010-08-30
Network Analyzer	HP	8753D	3410A04346	2010-06-03
Power meter	Agilent	E4419B	MY41291511	2010-09-01
Power Sensor	Agilent	E9301A	MY41497252	2010-02-19
Reference Probe	SPEAG	ET3DV6	1604	2010-09-16

Measurement Conditions

DASY Version	DASY4	V4.7
Extrapolation	Advanced Extrapolation	
Phantom	Flat Phantom	
Distance Dipole Center-TSL	10 mm	With Spacer
Area Scan resolution	dx,dy = 15 mm	
Zoom Scan resolution	dx,dy,dz = 5 mm	
Frequency	1900 MHz ± 1MHz	

Calibration is performed According to the Following Standards:

1. **IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003**
2. **IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devise used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005**
3. **DASY 4 System Handbook**

Calibration Data:

Head TSL Parameters
The following parameters and calculations were applied

	Temperature	Permittivity	Conductivity
Nominal Head TSL Parameters	22.0°C	40.0	1.40
Measured Head TSL Parameters	(22.0±0.3)°C	39.9	1.38
Head TSL Temperature during test	(23.0±0.3)°C		

SAR result with Head TSL

SAR average over 1 cm3 (1g) of Head TSL	Condition	
SAR measured	500 mW input power	18.8 mW / g
SAR normalized	Normalized to 1W	37.6 mW / g
SAR for nominal Head TSL parameters[1]	Normalized to 1W	39.7 mW / g ± 10%

SAR average over 10 cm3 (10g) of Head TSL	Condition	
SAR measured	500 mW input power	9.58 mW / g
SAR normalized	Normalized to 1W	19.16 mW / g
SAR for nominal Head TSL parameters[1]	Normalized to 1W	20.5 mW / g ± 10%

Antenna Parameters with Head TSL

Impedance, transformed to feed point	50.727 Ω
Return Loss	-35.881 dB

[1]Correction to nominal TSL parameters according to DASY 4 System Handbook, chapter "SAR Sensitivities"

DASY4 Validation Report for Head TSL

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

System Performance Test (1900 MHz Head Tissue)

DUT: Dipole 1900 MHz; Type: ALS-D-1900-S-2; Serial: SN: 210-00710

Communication System: CW; Frequency: 1900 MHz; Duty Cycle: 1:1
Medium parameters used: f = 1900 MHz; σ = 1.38 mho/m; ε_r = 39.9; ρ = 1000 kg/m^3
Phantom section: Flat Section

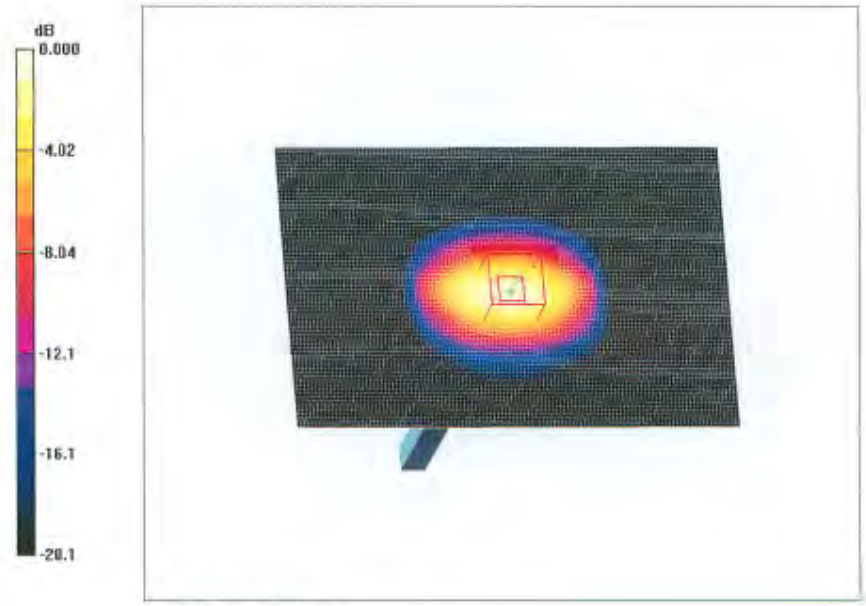
DASY4 Configuration:

- Probe: ET3DV6 - SN1604; ConvF(5.04, 5.04, 5.04); Calibrated: 9/16/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE3 Sn456; Calibrated: 11/8/2007
- Phantom: SAM with CRP; Type: Twin SAM; Serial: TP-1032
- Measurement SW: DASY4, V4.6 Build 23; Post processing SW: SEMCAD, V1.8 Build 184

d =10 mm, Pin = 0.5W /Area Scan (81x121x1): Measurement grid: dx=15mm, dy=15mm
Maximum value of SAR (interpolated) = 20.7 mW/g

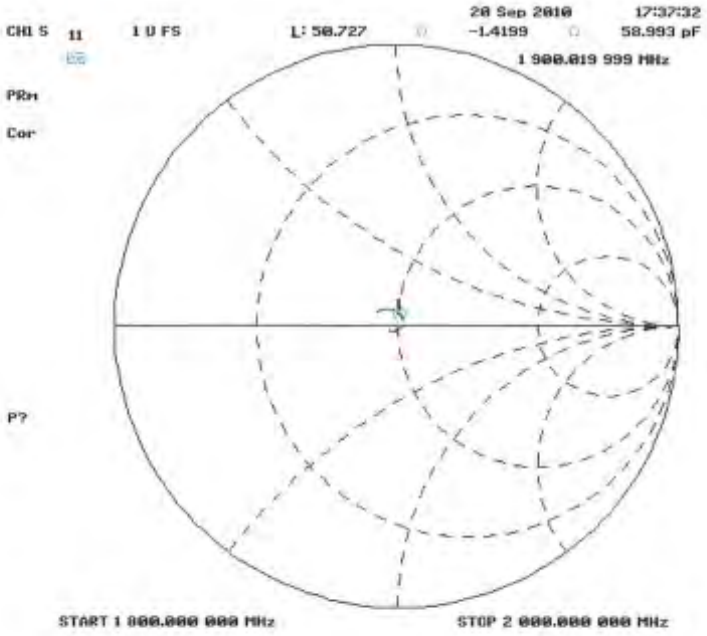
d =10 mm, Pin = 0.5W /Zoom Scan (8x8x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 127.5 V/m; Power Drift = -0.054 dB
Peak SAR (extrapolated) = 34.7 W/kg

SAR(1 g) = 18.8 mW/g; SAR(10 g) = 9.58 mW/g
Maximum value of SAR (measured) = 21.3 mW/g

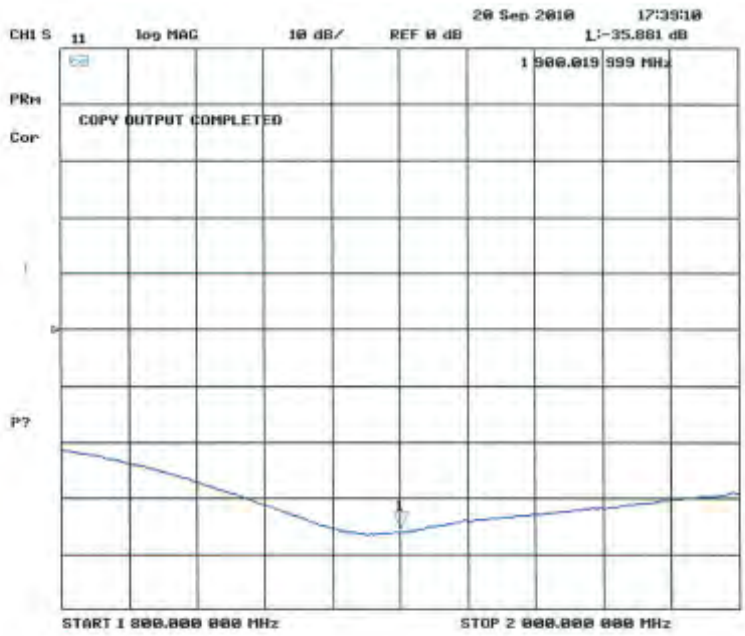


0 dB = 21.3mW/g

Impedance Measurement Plot for Head TSL



Return Loss Measurement Plot for Head TSL



APPENDIX D – SAR SYSTEM VALIDATION DATA

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

System Performance Check 1900 MHz, Head Tissue

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 : 45.287 W/kg
Power Drift-Finish : 47.328 W/kg
Power Drift (%) : 3.637

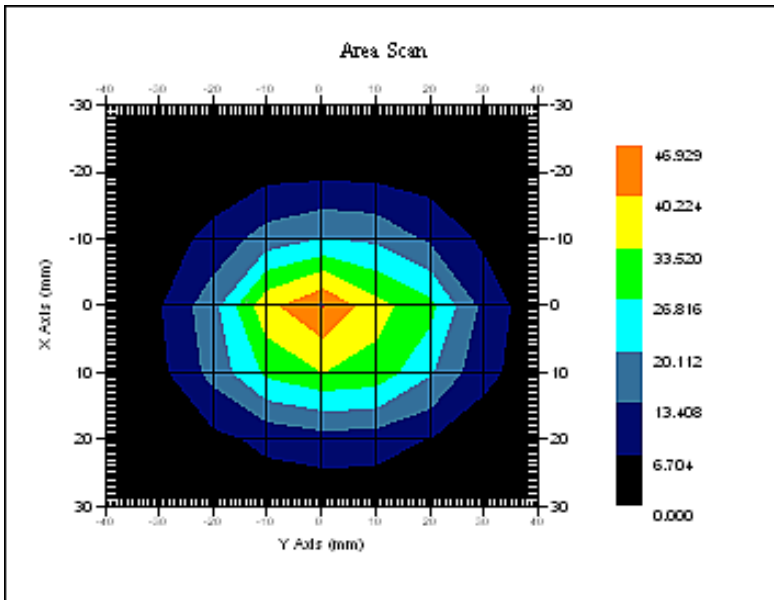
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Serial No. : System Default
Location : Center
Description : Default

Tissue Data
Type : HEAD
Serial No. : 295-01103
Frequency : 1900.00 MHz
Last Calib. Date : 10-Mar -2011
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 39.37 F/m
Sigma : 1.47S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 273
Last Calib. Date : 21-Aug-2010
Frequency : 1900.00 MHz
Duty Cycle Factor : 1
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

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

1 gram SAR value : 40.346 W/kg
10 gram SAR value : 20.526 W/kg
Area Scan Peak SAR : 45.836 W/kg
Zoom Scan Peak SAR : 75.249 W/kg



1900 MHz System Check with Head Tissue

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

System Performance Check 1900 MHz, Body Tissue

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 : 49.197 W/kg
Power Drift-Finish : 49.612 W/kg
Power Drift (%) : 0.843

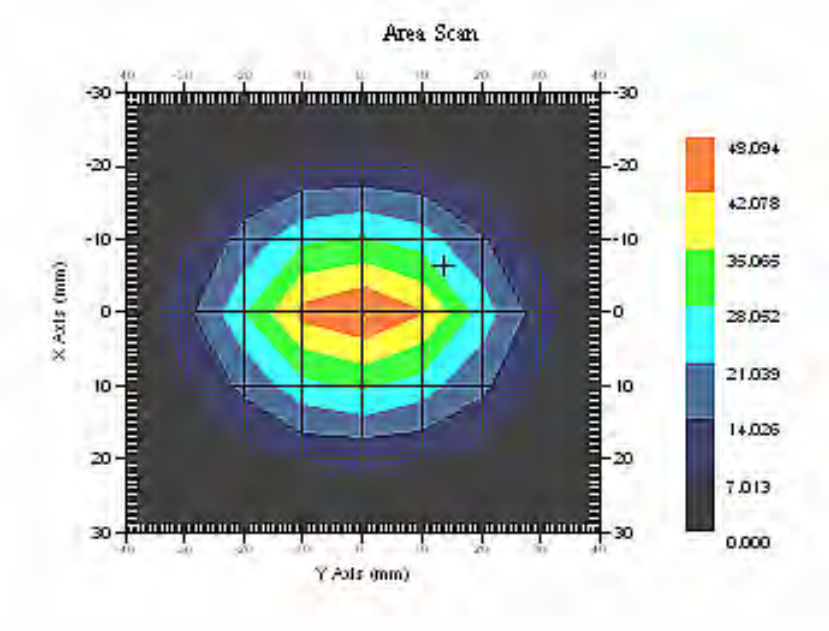
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Size (mm) : 280 x 280 x 200
Serial No. : System Default
Location : Center
Description : Default

Tissue Data
Type : Body
Serial No. : 295-02102
Frequency : 1900.00 MHz
Last Calib. Date : 10-Mar-2011
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 53.81 F/m
Sigma : 1.49 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 273
Last Calib. Date : 21-Aug-2010
Frequency : 1900.00 MHz
Duty Cycle Factor : 1
Conversion Factor : 5.25
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 : 43.070 W/kg
10 gram SAR value : 22.019 W/kg
Area Scan Peak SAR : 48.094 W/kg
Zoom Scan Peak SAR : 76.569 W/kg



1900 MHz System Check with Body Tissue

APPENDIX E – EUT SCAN RESULTS (MODEL: CL-60A)

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

Left Head Cheek (1900 MHz Channel 0), Model: CL-60A

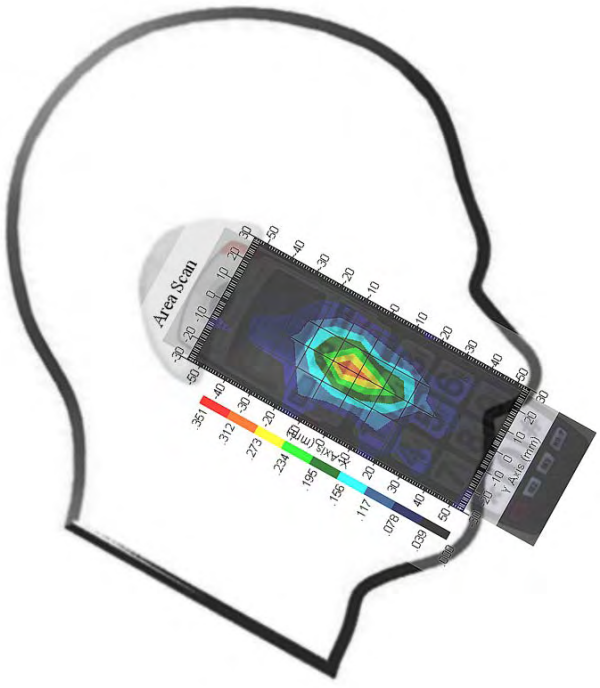
Measurement Data
Crest Factor : 12
Scan Type: : Complete
Area Scan : 11x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.006 W/kg
Power Drift-Finish : 0.006 W/kg
Power Drift (%) : 0.757

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

Probe Data
Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 12
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.331 W/kg
10 gram SAR value : 0.191 W/kg
Area Scan Peak SAR : 0.335 W/kg
Zoom Scan Peak SAR : 0.522 W/kg

Plot 1#



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

Left Head Cheek (1900 MHz Channel 2), Model: CL-60A

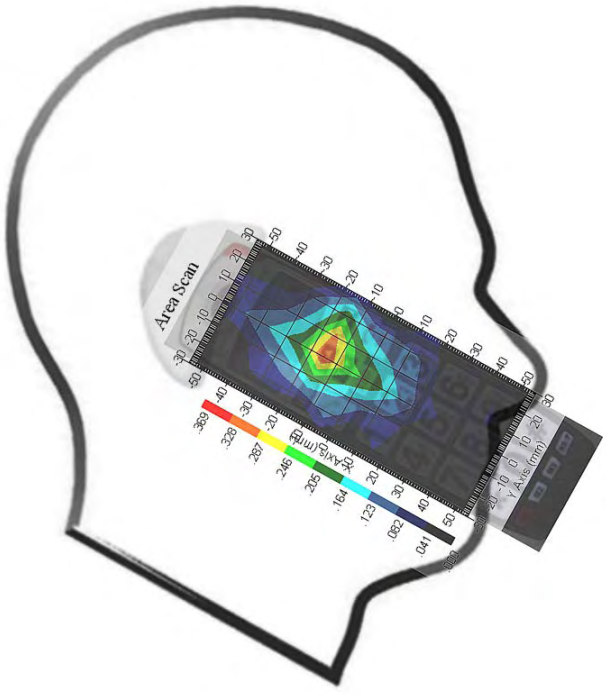
Measurement Data
Crest Factor : 12
Scan Type: : Complete
Area Scan : 11x7x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.035 W/kg
Power Drift-Finish : 0.034 W/kg
Power Drift (%) : -3.130

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

Probe Data
Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 12
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.328 W/kg
10 gram SAR value : 0.163 W/kg
Area Scan Peak SAR : 0.340 W/kg
Zoom Scan Peak SAR : 0.530 W/kg

Plot 2#

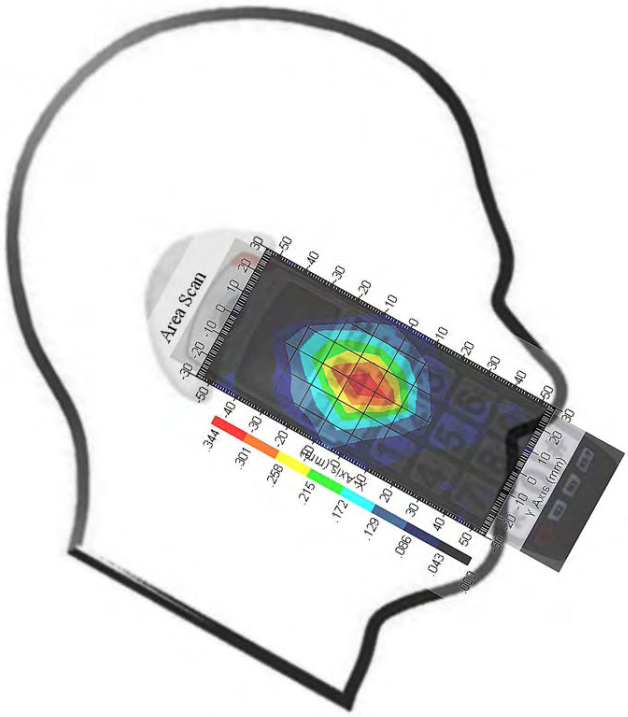


Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Left Head Cheek (1900 MHz Channel 4), Model: CL-60A

Measurement Data	
Crest Factor	: 12
Scan Type:	: Complete
Area Scan	: 11x7x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan	: 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start	: 0.076 W/kg
Power Drift-Finish	: 0.075 W/kg
Power Drift (%)	: -2.421
Tissue Data	
Type	: HEAD
Frequency	: 1900.00 MHz
Epsilon	: 39.37 F/m
Sigma	: 1.47 S/m
Density	: 1000.00 kg/cu. m
Probe Data	
Serial No.	: 273
Frequency	: 1900.00 MHz
Duty Cycle Factor	: 12
Conversion Factor	: 5.25
Probe Sensitivity	: 1.20 1.20 1.20 µV/(V/m)2
Compression Point	: 95.00 mV
Offset	: 1.56 mm
1 gram SAR value	: 0.317 W/kg
10 gram SAR value	: 0.152 W/kg
Area Scan Peak SAR	: 0.321 W/kg
Zoom Scan Peak SAR	: 0.571 W/kg

Plot 3#



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

Left Head Tilt (1900 MHz Channel 0), Model: CL-60A

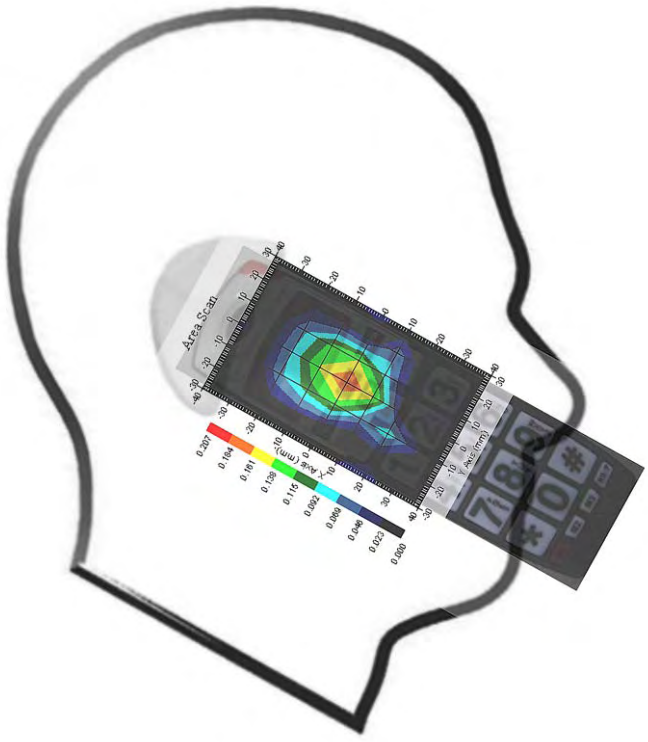
Measurement Data
Crest Factor : 12
Scan Type: : Complete
Area Scan : 11x7x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.012 W/kg
Power Drift-Finish : 0.012 W/kg
Power Drift (%) : -1.827

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

Probe Data
Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 12
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.178 W/kg
10 gram SAR value : 0.108 W/kg
Area Scan Peak SAR : 0.185 W/kg
Zoom Scan Peak SAR : 0.308 W/kg

Plot 4#



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

Right Head Cheek (1900 MHz Channel 0), Model: CL-60A

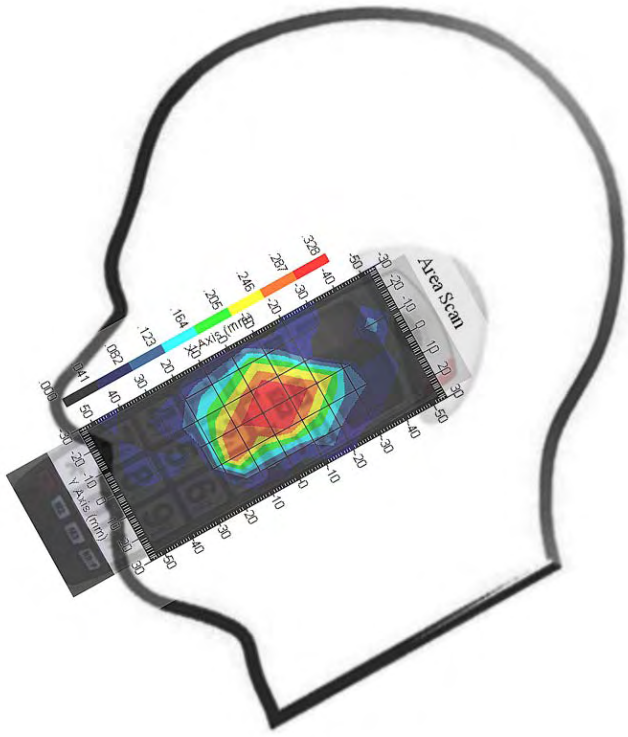
Measurement Data
Crest Factor : 12
Scan Type: : Complete
Area Scan : 11x7x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.043 W/kg
Power Drift-Finish : 0.043 W/kg
Power Drift (%) : 0.704

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

Probe Data
Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 12
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 μV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.320 W/kg
10 gram SAR value : 0.199 W/kg
Area Scan Peak SAR : 0.326 W/kg
Zoom Scan Peak SAR : 0.560 W/kg

Plot 5#



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

Right Head Tilt (1900 MHz Channel 0), Model: CL-60A

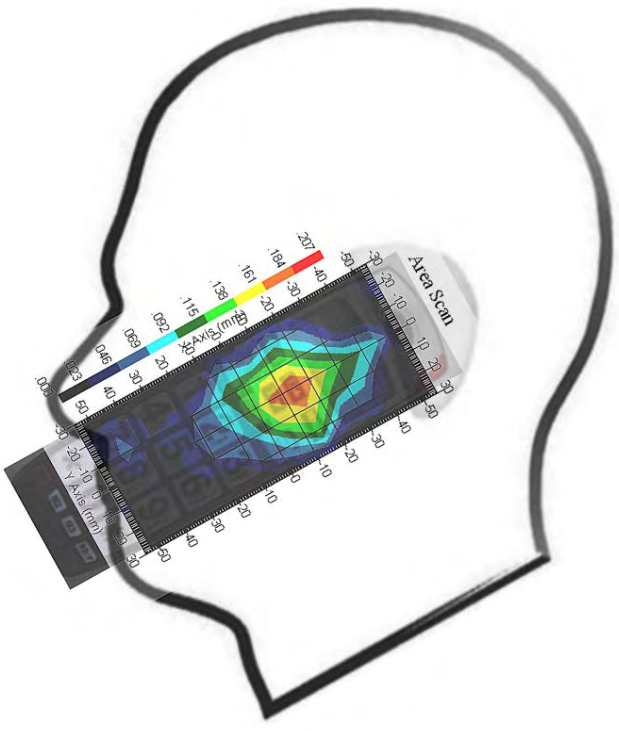
Measurement Data
Crest Factor : 12
Scan Type: : Complete
Area Scan : 11x7x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.016 W/kg
Power Drift-Finish : 0.015 W/kg
Power Drift (%) : -3.752

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

Probe Data
Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 12
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.171 W/kg
10 gram SAR value : 0.106 W/kg
Area Scan Peak SAR : 0.175 W/kg
Zoom Scan Peak SAR : 0.327 W/kg

Plot 6#



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

Body- worn Back (1900 MHz Channel 0), Model: CL-60A

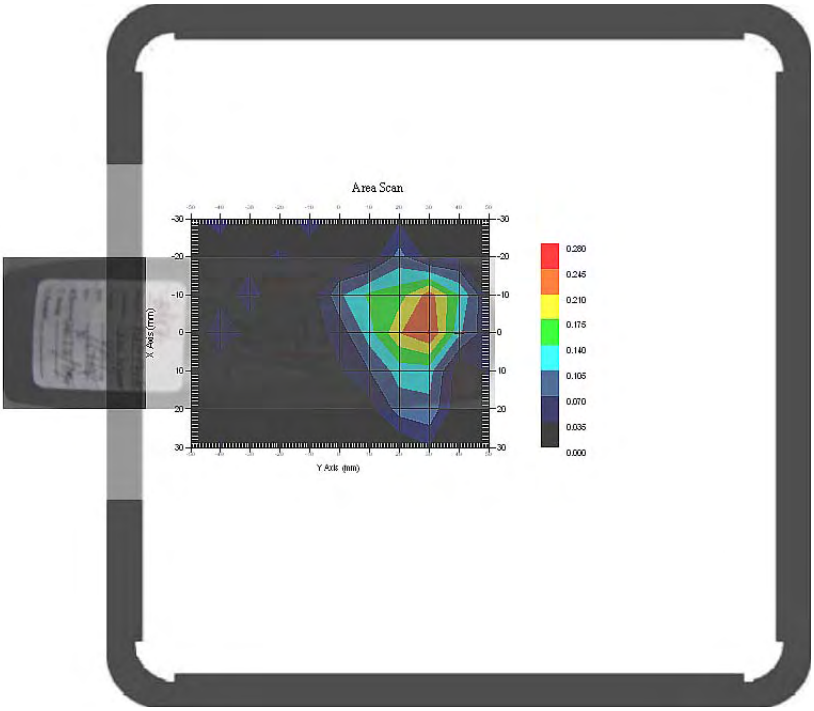
Measurement Data
Test mode : GFSK
Crest Factor : 12
Scan Type : Complete
Area Scan : 7x11x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.054 W/kg
Power Drift-Finish : 0.054 W/kg
Power Drift (%) : 0.306

Tissue Data
Type : BODY
Frequency : 1900.00 MHz
Epsilon : 53.81 F/m
Sigma : 1.49 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 12
Conversion Factor : 5.15
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.243 W/kg
10 gram SAR value : 0.107 W/kg
Area Scan Peak SAR : 0.256 W/kg
Zoom Scan Peak SAR : 0.400 W/kg

Plot 7#

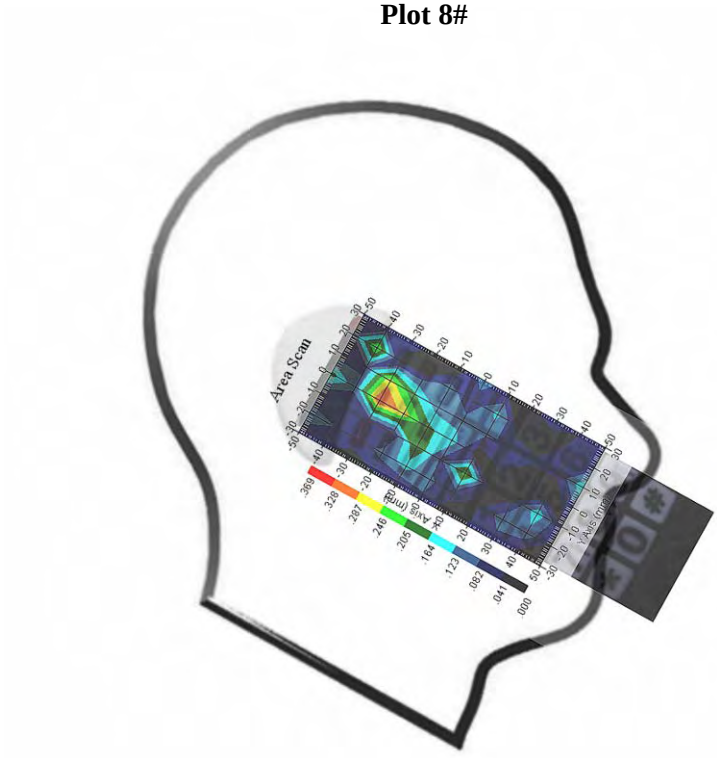


Test Laboratory: Bay Area Compliance Lab Corp. (Shenzhen)

Left Head Cheek (1900 MHz Channel 0), Model: CL-65P

Measurement Data	
Crest Factor	: 12
Scan Type:	: Complete
Area Scan	: 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan	: 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start	: 0.094 W/kg
Power Drift-Finish	: 0.096 W/kg
Power Drift (%)	: 1.407
Tissue Data	
Type	: HEAD
Frequency	: 1900.00 MHz
Epsilon	: 39.37 F/m
Sigma	: 1.47 S/m
Density	: 1000.00 kg/cu. m
Probe Data	
Serial No.	: 273
Frequency	: 1900.00 MHz
Duty Cycle Factor	: 12
Conversion Factor	: 5.25
Probe Sensitivity	: 1.20 1.20 1.20 µV/(V/m)2
Compression Point	: 95.00 mV
Offset	: 1.56 mm
1 gram SAR value	: 0.318 W/kg
10 gram SAR value	: 0.163 W/kg
Area Scan Peak SAR	: 0.331 W/kg
Zoom Scan Peak SAR	: 0.600 W/kg

Plot 8#



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

Left Head Cheek (1900 MHz Channel 2), Model: CL-65P

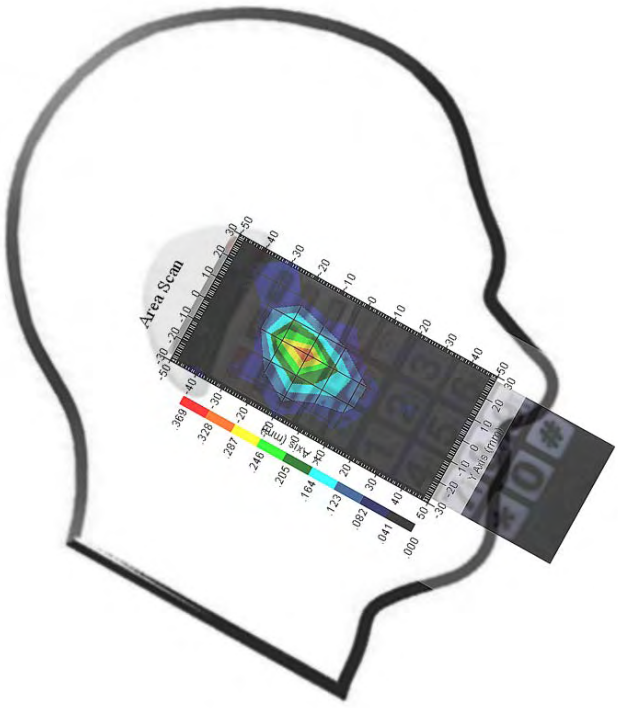
Measurement Data
Crest Factor : 12
Scan Type: : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.033 W/kg
Power Drift-Finish : 0.032 W/kg
Power Drift (%) : -2.159

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

Probe Data
Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 12
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.310 W/kg
10 gram SAR value : 0.155 W/kg
Area Scan Peak SAR : 0.330 W/kg
Zoom Scan Peak SAR : 0.490 W/kg

Plot 9#



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

Left Head Cheek (1900 MHz Channel 4), Model: CL-65P

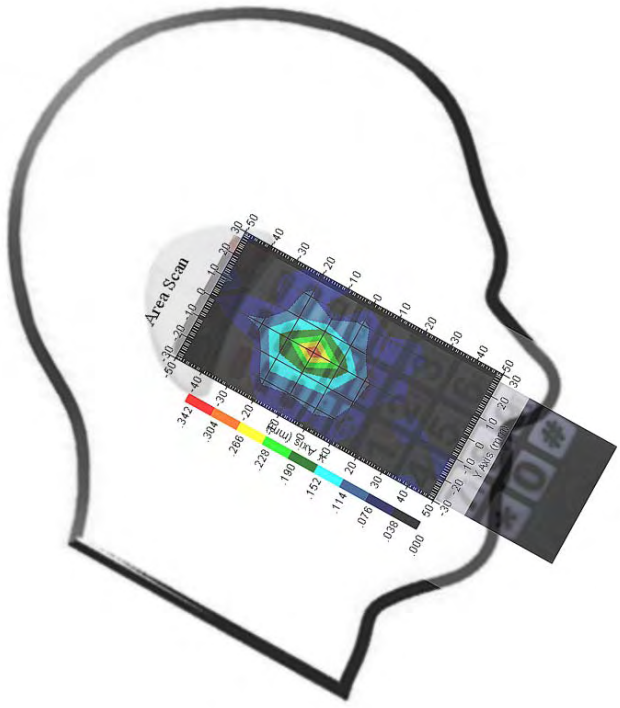
Measurement Data
Crest Factor : 12
Scan Type: : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.094 W/kg
Power Drift-Finish : 0.102 W/kg
Power Drift (%) : 3.644

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

Probe Data
Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 12
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.292 W/kg
10 gram SAR value : 0.150 W/kg
Area Scan Peak SAR : 0.307 W/kg
Zoom Scan Peak SAR : 0.520 W/kg

Plot 10#



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

Left Head Tilt (1900 MHz Channel 0), Model: CL-65P

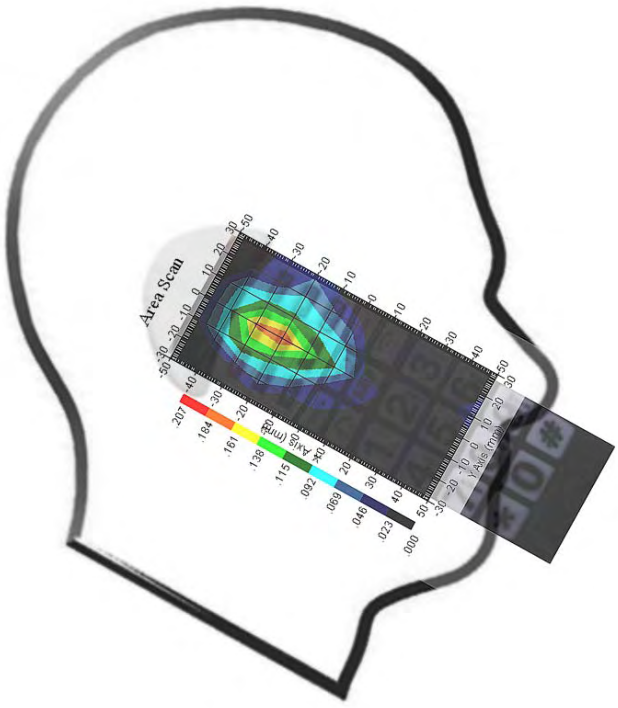
Measurement Data
Crest Factor : 12
Scan Type: : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.096 W/kg
Power Drift-Finish : 0.098 W/kg
Power Drift (%) : 1.704

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

Probe Data
Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 12
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 μV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.177 W/kg
10 gram SAR value : 0.105 W/kg
Area Scan Peak SAR : 0.187 W/kg
Zoom Scan Peak SAR : 0.321 W/kg

Plot 11#



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

Right Head Cheek (1900 MHz Channel 0), Model: CL-65P

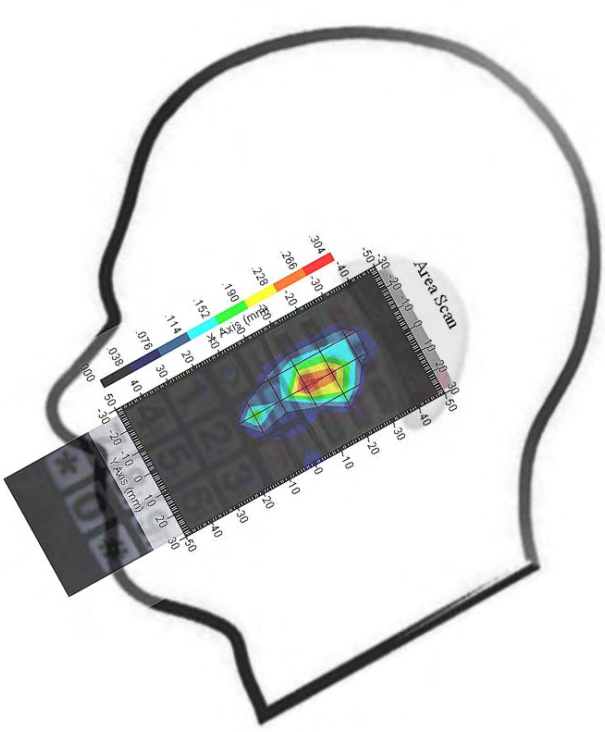
Measurement Data
Crest Factor : 12
Scan Type: : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.039 W/kg
Power Drift-Finish : 0.038 W/kg
Power Drift (%) : -1.040

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

Probe Data
Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 12
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.297 W/kg
10 gram SAR value : 0.152 W/kg
Area Scan Peak SAR : 0.299 W/kg
Zoom Scan Peak SAR : 0.450 W/kg

Plot 12#



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

Right Head Tilt (1900 MHz Channel 0), Model: CL-65P

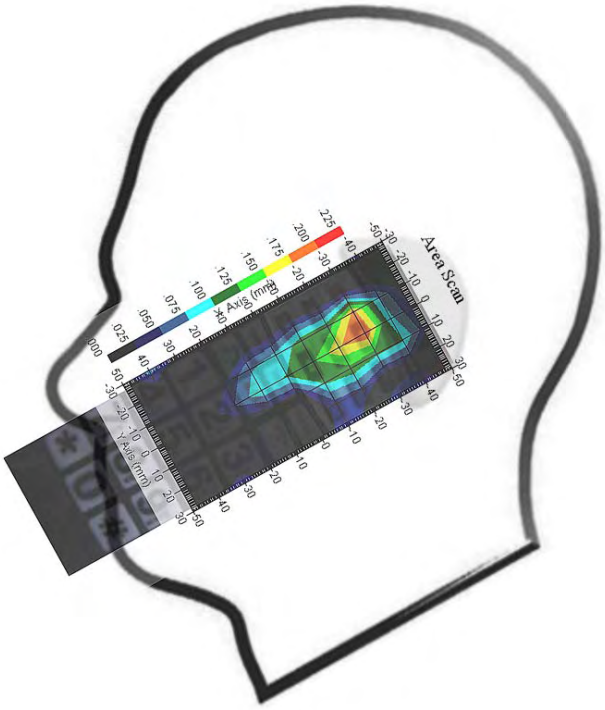
Measurement Data
Crest Factor : 12
Scan Type: : Complete
Area Scan : 12x6x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.116 W/kg
Power Drift-Finish : 0.112 W/kg
Power Drift (%) : -1.138

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

Probe Data
Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 12
Conversion Factor : 5.25
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.166 W/kg
10 gram SAR value : 0.101 W/kg
Area Scan Peak SAR : 0.182 W/kg
Zoom Scan Peak SAR : 0.340 W/kg

Plot 13#



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

Body- worn Back (1900 MHz Channel 0), Model: CL-65P

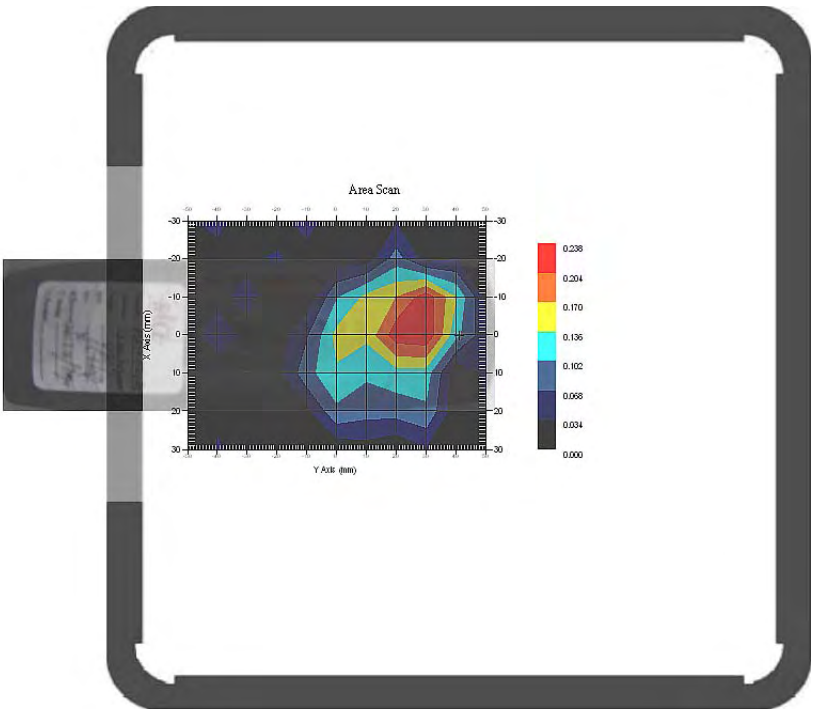
Measurement Data
Test mode : GFSK
Crest Factor : 12
Scan Type : Complete
Area Scan : 6x12x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.051 W/kg
Power Drift-Finish : 0.052 W/kg
Power Drift (%) : -2.977

Tissue Data
Type : BODY
Frequency : 1900.00 MHz
Epsilon : 53.81 F/m
Sigma : 1.49 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 273
Frequency : 1900.00 MHz
Duty Cycle Factor : 12
Conversion Factor : 5.15
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.233 W/kg
10 gram SAR value : 0.102 W/kg
Area Scan Peak SAR : 0.238 W/kg
Zoom Scan Peak SAR : 0.390 W/kg

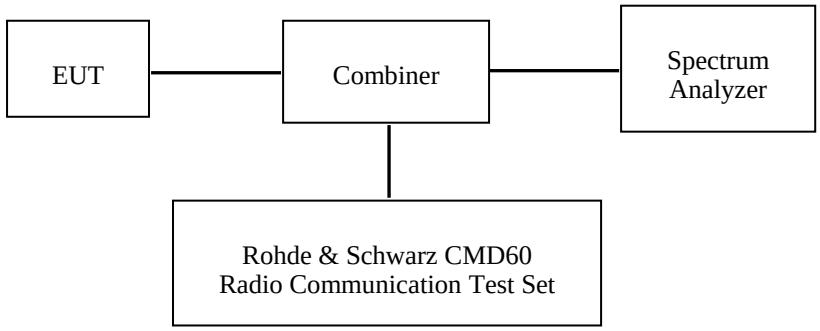
Plot 14#



APPENDIX F – CONDUCTED OUTPUT POWER MEASUREMENT

Test Block Diagram and Procedure

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



Test Equipment List and Details

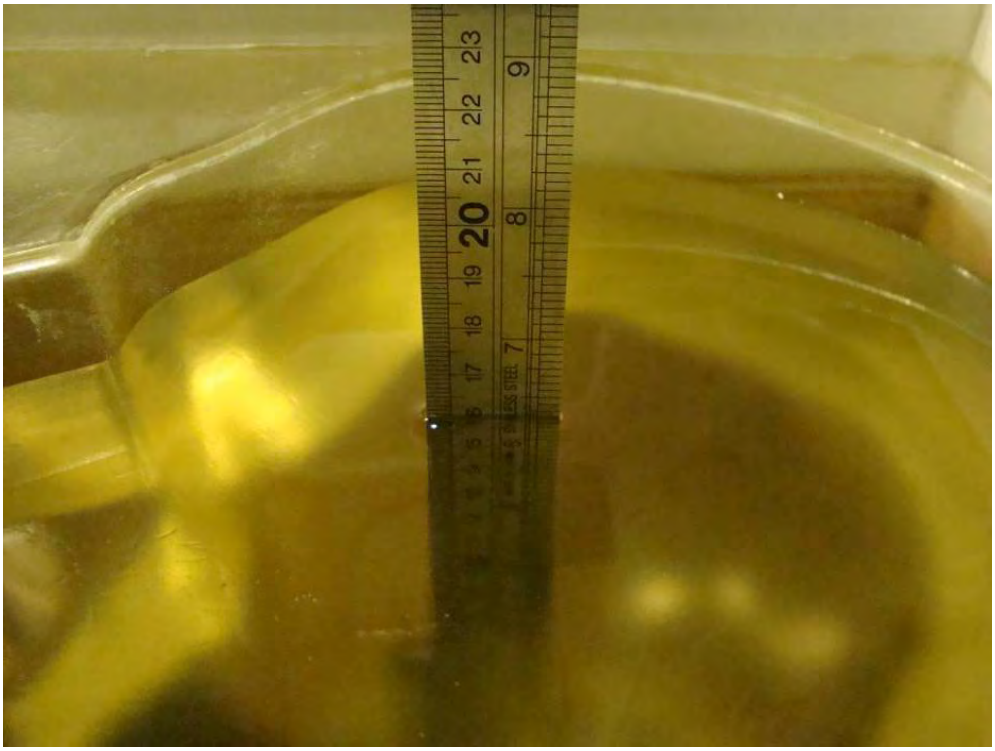
Manufacturer	Equipment Description	Model No.	Serial No.	Calibration Date
Rohde & Schwarz	Digital Radio communication Tester	CMD60	8281461029	2010-10-21
Rohde & Schwarz	Spectrum Analyzer	FSEM30	849720/019	2010-07-05

Test Result

Channel No.	Frequency (MHz)	RF Output Power	
		(dBm)	(Watt)
4	1921.536	19.56	0.090
2	1924.992	19.61	0.091
0	1928.448	19.65	0.092

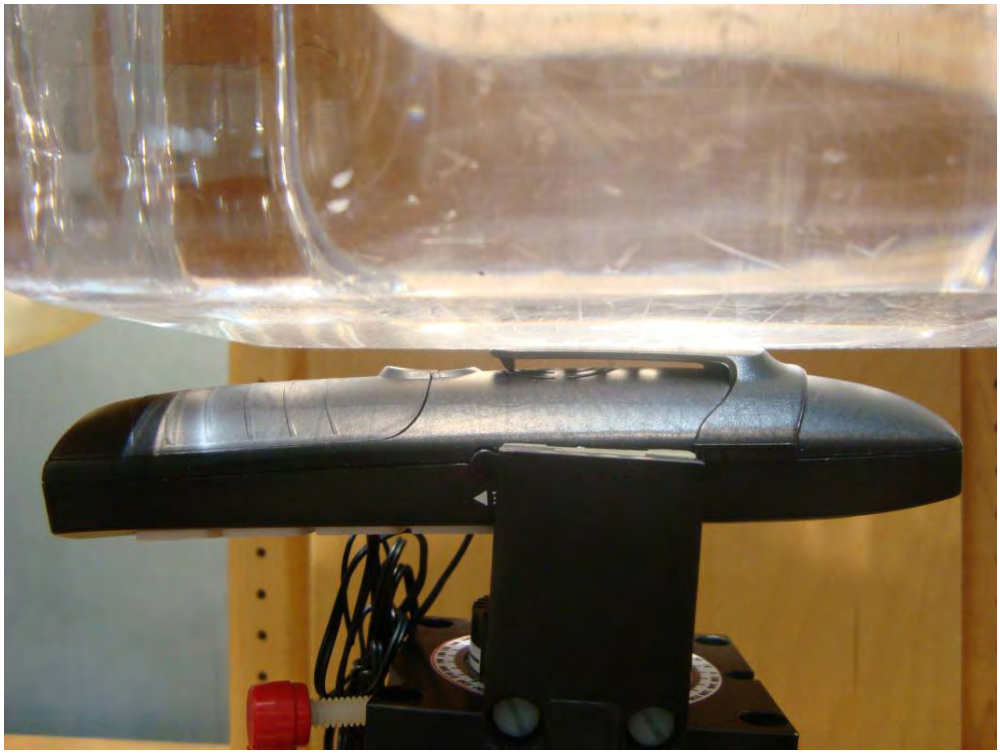
APPENDIX G – EUT TEST POSITION PHOTOS

Liquid depth ≥ 15cm

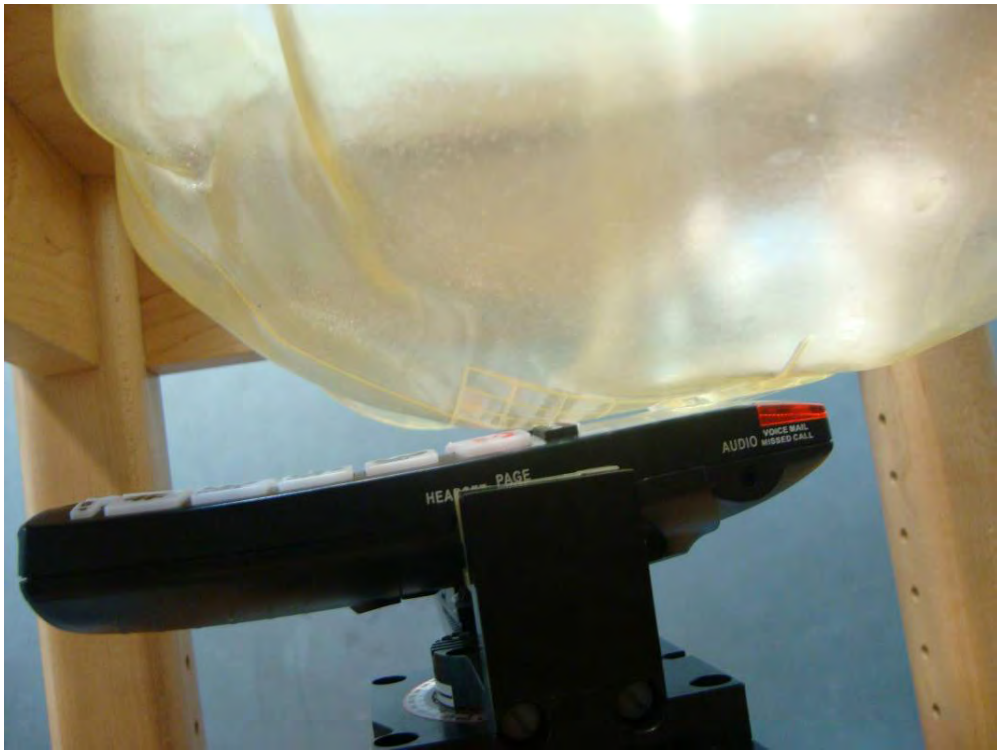


Body-worn Setup Photo (Model: CL-60A)

Body-worn Setup Photo (Model: CL-65P)



Left Head Touch Setup Photo (model: CL-60A)

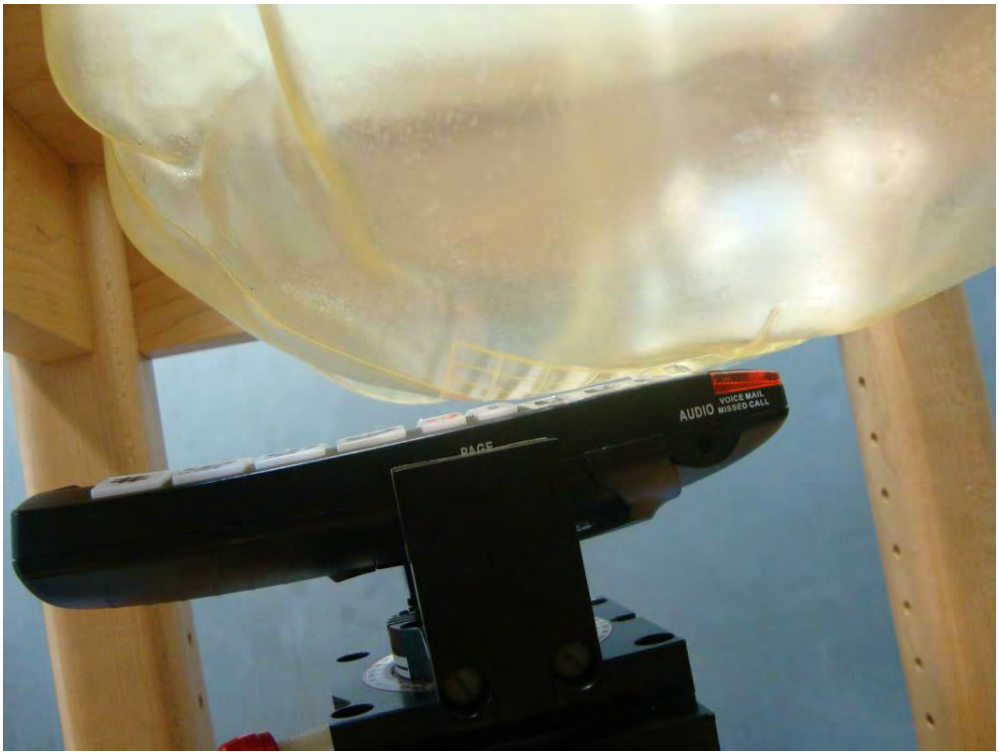


Left Head Tilt Setup Photo (model: CL-60A)

Right Head Touch Setup Photo (model: CL-60A)

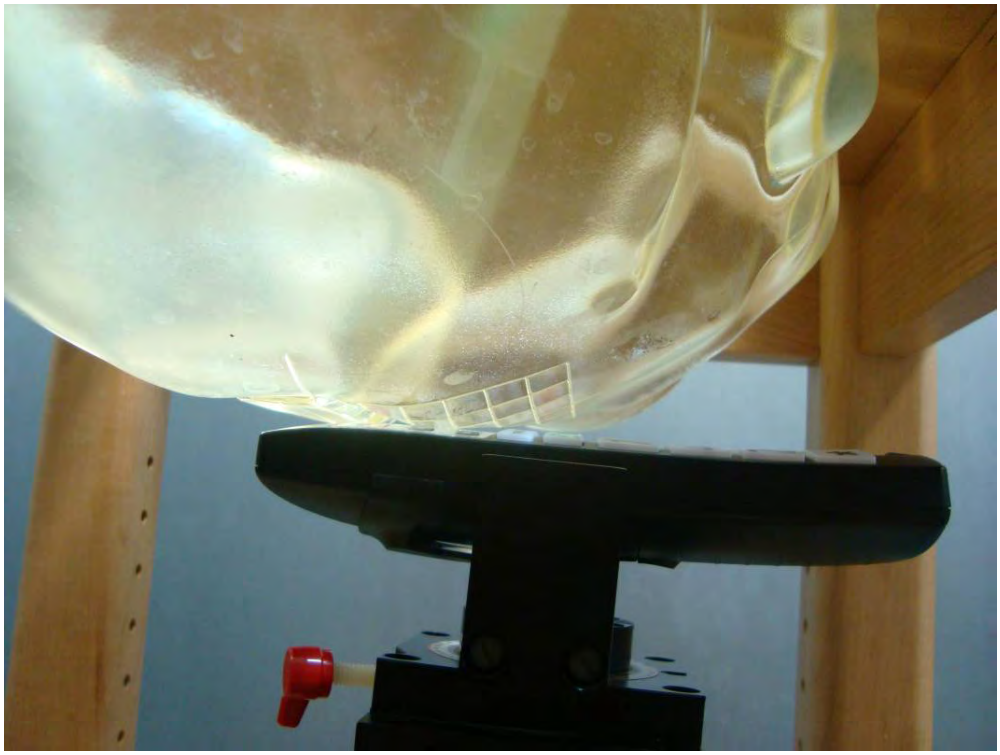
Right Head Tilt Setup Photo (model: CL-60A)

Left Head Touch Setup Photo (model: CL-65P)



Left Head Tilt Setup Photo (model: CL-65P)

Right Head Touch Setup Photo (model: CL-65P)



Right Head Tilt Setup Photo (model: CL-65P)

APPENDIX H – EUT PHOTOS

EUT – Front Side View (model: CL-60A)

EUT – Back Side View (model: CL-60A)

EUT- Uncovered View (model: CL-60A)

EUT- Belt Clip Uncovered View (model: CL-60A)

EUT- Bottom Side View (model: CL-60A)

EUT – Left Side View (model: CL-60A)

EUT – Right Side View (model: CL-60A)

EUT- Front Side View (model: CL-65P)

EUT- Front Side View (model: CL-65P)

EUT- Uncovered View (model: CL-65P)

EUT- Belt Clip Uncovered View (model: CL-65P)

EUT- Bottom View (model: CL-65P)

EUT- Left Side View (model: CL-65P)

EUT- Right Side View (model: CL-65P)

EUT- Headset View

APPENDIX I - INFORMATIVE REFERENCES

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

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

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

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

[5] CENELEC, \Considerations for evaluating of human exposure to electromagnetic fields (EMFs) from mobile telecommunication equipment (MTE) in the frequency range 30MHz - 6GHz", Tech. Rep., CENELEC, European Committee for Electrotechnical Standardization, Brussels, 1997.

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

[7] Katja Pokovic, Thomas Schmid, and Niels Kuster, \Robust setup for precise calibration of E-field probes in tissue simulating liquids at mobile communications frequencies", in ICECOM _ 97, Dubrovnik, October 15{17, 1997, pp. 120-24.

[8] Katja Pokovic, Thomas Schmid, and Niels Kuster, \E-field probe with improved isotropy in brain simulating liquids", in Proceedings of the ELMAR, Zadar, Croatia, 23{25 June, 1996, pp. 172-175.

[9] Volker Hombach, Klaus Meier, Michael Burkhardt, Eberhard K. uhn, and Niels Kuster, \The depen-dence of EM energy absorption upon human head modeling at 900 MHz", IEEE Transactions on Microwave Theory and Techniques, vol. 44, no. 10, pp. 1865-1873, Oct. 1996.

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

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

[12] W. H. Press, S. A. Teukolsky,W. T. Vetterling, and B. P. Flannery, Numerical Recepies in C, The Art of Scientific Computing, Second Edition, Cambridge University Press, 1992.Dosimetric Evaluation of Sample device, month 1998 9

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

[14] Barry N. Taylor and Christ E. Kuyatt, \Guidelines for evaluating and expressing the uncertainty of NIST measurement results", Tech. Rep., National Institute of Standards and Technology, 1994. Dosimetric Evaluation of Sample device, month 1998 10.

APPENDIX J - PRODUCT SIMILAR DECLARATION LETTER

Unical Enterprises, Inc.

16960 Gale Avenue, City of Industry, California, United States

Product Similarity Declaration

To whom it may concern:

We, Unical Enterprises Inc. hereby declare that we would like to list 12 models on reports (Project No.: RSZ11011304/ RSZ11032104/ RSZ11011305/ RSZ11011304-SAR) due to marketing purpose. We promise schematic on RF part are identical among these models, we authorize BACL to take model CL-60A and Model CL-65P as the main test samples. To make sure the test process successful, differences among 12 models are as the chart below: (main difference among these 12 models is that the different match of handset and base)

	CL-60A	CL-65P	CL-60P	CL-35A	CL-35P	CL-65A	CL-30A	CL-30P	CL-60	CL-30	CL-35
Handset	With LCD Display	Without LCD Display	The same as model CL-60A	The same as model CL-60A	The same as model CL-60A	The same as model CL-65P	The same as model CL-65P	The same as model CL-65P	The same as model CL-60A	The same as model CL-65P,	The same as model CL-60A,
Base	Keyboard is different from Model CL-65P, with 11 Keypads.	Keyboard is different from Model CL-60A, with 18 keypads.	Base is the same as model CL-65P, with 18 keypads.	Keyboard is the same as Model CL-60A , with 11 keypads.	The same as model CL-65P, with 18 keypads.	The same as model CL-60A, with 11 keypads.	The same as model CL-60A, with 11 keypads.	The same as model CL-65P, there are 18 keypad	There is only one keypad (PAGE)	There is only one keypad (PAGE)	There is only one keypad (PAGE),

Note:

1, VM-150 is just a base with 13 keypads. No dialing function. It is functioned as an answer machine and used with the handset listed above together.

2, CL-35A/CL-35P/CL-35 handset have no number talking function for the difference of software.

Please help to deal with it and contact me if you have any question.

Andy Chung

President Assistant

Tel: +626 965-5588 Fax: +626 965-6998

2011-04-20 ,

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