SAR EVALUATION REPORT

For

DDM Brands LLC

1616 NW, 84TH Ave. Miami, Florida, U.S.A

FCC ID: A4JANDY5QL

Report Type:	Product Type:
Original Report	LTE mobile Phone

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Report Number:	RSZ141126002-20
Report Date:	2014-12-05
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Note: This test report is prepared for the customer shown above and for the equipment described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp.

Attestation of Test Results		
EUT Information	Company Name	DDM Brands LLC
	EUT Description	LTE mobile Phone
	FCC ID	A4JANDY5QL
	Model Number	Main tested model: ANDY 5Q Adding model: Andy 5Q, Andy 5QL, AM5QL133, Andy C5Q, Andy C5QL, AC5QL133
	Test Date	2014-12-02

Frequency	Max. SAR Level(s) Reported	Limit(W/Kg)
GSM 850	0.195 W/kg 1g Head SAR 0.494 W/kg 1g Body SAR	1. 6
PCS 1900	0.212 W/kg 1g Head SAR 0.638 W/kg 1g Body SAR	
WCDMA850	0.153 W/kg 1g Head SAR 0.264 W/kg 1g Body SAR	
WCDMA1900	0.246 W/kg 1g Head SAR 0.777 W/kg 1g Body SAR	
LTE Band 4	0.171 W/kg 1g Head SAR 0.150 W/kg 1g Body SAR	
LTE Band 7	0.471 W/kg 1g Head SAR 1.183 W/kg 1g Body SAR	
LTE Band 17	0.057 W/kg 1g Head SAR 0.103 W/kg 1g Body SAR	
Simultaneous	0.835 W/kg 1g Head SAR 1.365 W/kg 1g Body SAR	

Applicable Standards	**ANSI / IEEE C95.1 : 2005** IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fileds,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.
	IEEE1528:2013 IEEE Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques
	KDB procedures KDB447498 D01 General RF Exposure Guidance v05r02. KDB 648474 D04 Handset SAR v01r02. KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03 KDB 865664 D02 RF Exposure Reporting v01r01 KDB 941225 D01 3G SAR Procedures v03 KDB 941225 D05 SAR for LTE Devices v02r03 KDB 941225 D06 Hotspot Mode v02

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 IEEE 1528-2013 and RF exposure KDB procedures.

The results and statements contained in this report pertain only to the device(s) evaluated.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
0	RSZ141126002-20	Original Report	2014-12-05

EUT DESCRIPTION

This report has been prepared on behalf of DDM Brands LLC and their product, FCC ID: A4JANDY5QL, Model: ANDY 5Q or the EUT (Equipment under Test) as referred to in the rest of this report.

***Note:**
1. This series products model: ANDY 5Q, Andy 5Q, Andy 5QL, AM5QL133, Andy C5Q, Andy C5QL and AC5QL133, we select model: ANDY 5Q to test, there is no electrical change has been made to the equipment, please refer to the product similarity letter.
2. The device is capable of personal hotspot mode. Wi-Fi Hotspot mode permits the device to share its cellular data connection with other 2.4 GHz Wi-Fi enabled devices (channels 1 - 11).

Technical Specification

Product Type	Portable
Exposure Category:	Population / Uncontrolled
Antenna Type(s):	Internal Antenna
Body-Worn Accessories:	Headset
Face-Head Accessories:	None
Multi-slot Class:	Class12
Operation Mode :	GSM Voice, GPRS/EGPRS Data, WCDMA, LTE, Wi-Fi and Bluetooth
Frequency Band:	GSM 850 : 824-849 MHz(TX) ; 869-894 MHz(RX) PCS 1900: 1850-1910 MHz(TX) ; 1930-1990 MHz(RX) LTE Band 4: 1710-1755 MHz(TX) ; 2110-2155 MHz(RX) LTE Band 7: 2500-2570 MHz(TX) ; 2620-2690 MHz(RX) LTE Band 17: 704-716 MHz(TX) ; 734-746 MHz(RX) WCDMA850: 824-849 MHz(TX) ; 869-894 MHz(RX) WCDMA1900: 1850-1910 MHz(TX) ; 1930-1990 MHz(RX) WiFi: 2412MHz-2462MHz Bluetooth : 2402MHz-2480MHz
Conducted RF Power:	GSM 850 : 32.36 dBm PCS 1900: 29.74 dBm WCDMA 850: 22.52 dBm WCDMA 1900: 22.85 dBm LTE Band 4: 23.43dBm LTE Band 7: 23.17dBm LTE Band 17: 23.56dBm WiFi: 9.38 dBm Bluetooth: 0.46dBm
Dimensions (L*W*H):	143mm (L) × 73 mm (W) × 8 mm (H)
Power Source:	3.8 V_{DC} Rechargeable Battery
Normal Operation:	Head and Body-worn

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 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

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

DESCRIPTION OF TEST SYSTEM

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

ALSAS-10U System Description

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

Applications

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

Area Scans

Area scans are defined prior to the measurement process being executed with a user defined variable spacing between each measurement point (integral) allowing low uncertainty measurements to be conducted. Scans defined for FCC applications utilize a 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

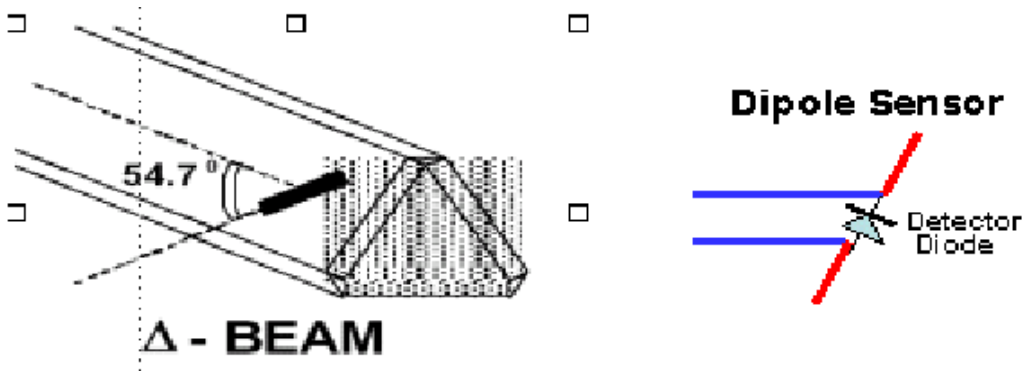
The overall uncertainty for the methodology and algorithms the used during the SAR calculation was evaluated using the data from IEEE 1528 based on the example f3 algorithm:

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

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 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 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 0.1 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 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

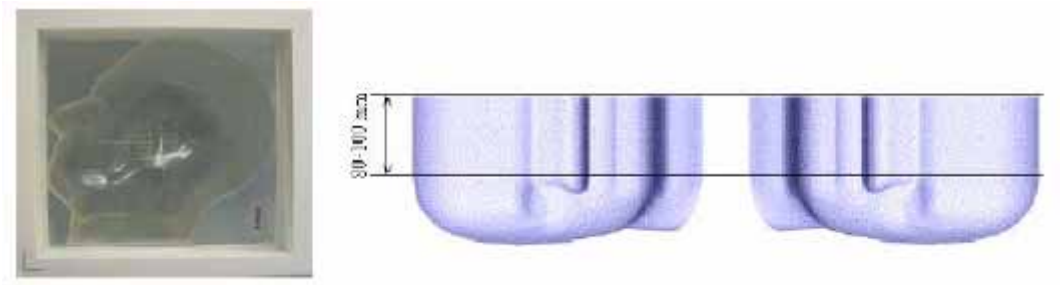
The universal device positioner allows complete freedom of movement of the EUT. Developed to hold a EUT in a free-space scenario any additional loading attributable to the material used in the construction of the positioner has been eliminated. Repeatability has been enhanced through the linear scales 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

Recommended Tissue Dielectric Parameters for Head and Body

Frequency (MHz)	Head Tissue		Body Tissue	
	εr	O' (S/m)	εr	O' (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

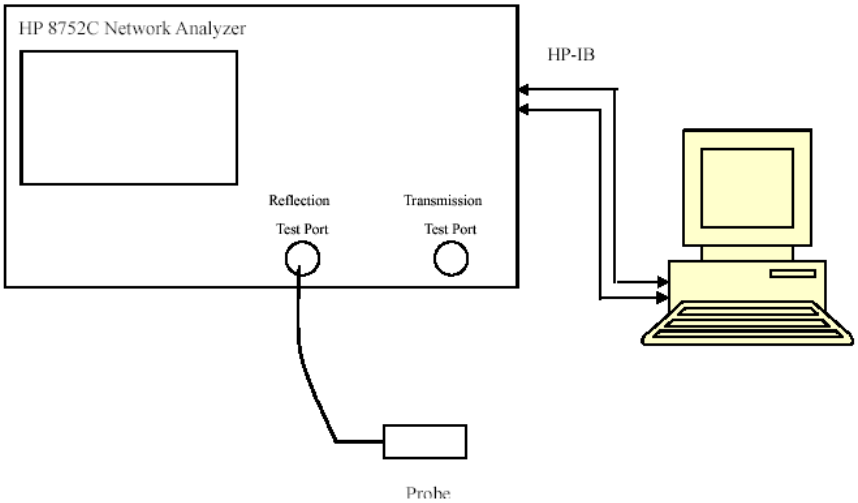
EQUIPMENT LIST AND CALIBRATION

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	2014-10-14	110-00212
Miniature E-Field Probe	ALS-E-020	2014-10-14	500-00283
Dipole,750MHz	ALS-D-750-S-2	2013-10-08	177-00505
Dipole, 835MHz	ALS-D-835-S-2	2014-10-08	180-00558
Dipole, 1750MHz	ALS-D-1750-S-2	2013-10-08	198-00304
Dipole, 1900MHz	ALS-D-1900-S-2	2014-10-09	210-00710
Dipole, 2450MHz	ALS-D-2450-S-2	2014-10-09	220-00758
Dipole Spacer	ALS-DS-U	N/A	250-00907
Device holder/Positioner	ALS-H-E-SET-2	N/A	170-00510
Left ear SAM phantom	ALS-P-SAM-L	N/A	130-00311
Right ear SAM phantom	ALS-P-SAM-R	N/A	140-00359
UniPhantom	ALS-P-UP-1	N/A	150-00413
Simulated Tissue 750 MHz Head	ALS-TS-750-H	Each Time	269-01003
Simulated Tissue 750 MHz Body	ALS-TS-750-B	Each Time	269-02102
Simulated Tissue 835 MHz Head	ALS-TS-835-H	Each Time	270-01002
Simulated Tissue 835 MHz Body	ALS-TS-835-B	Each Time	270-02101
Simulated Tissue 1750 MHz Head	ALS-TS-1750-H	Each Time	295-01103
Simulated Tissue 1750 MHz Body	ALS-TS-1750-B	Each Time	295-02102
Simulated Tissue 1900 MHz Head	ALS-TS-1900-H	Each Time	295-01103
Simulated Tissue 1900 MHz Body	ALS-TS-1900-B	Each Time	296-02102
Simulated Tissue 2450 MHz Head	ALS-TS-2450-H	Each Time	290-01108
Simulated Tissue 2450 MHz Body	ALS-TS-2450-B	Each Time	290-01109
Directional couple	DC6180A	N/A	0325849
Power Amplifier	5S1G4	N/A	71377
Dielectric probe kit	HP85070B	2014-06-13	N/A
Attenuator	3dB	2014-05-08	5402
Network analyzer	8752C	2014-06-03	3410A02356
Synthesized Sweeper	HP 8341B	2014-06-03	2624A00116
WIDEBAND RADIO COMMUNICATION TESTER	CMW500	N/A	1201.002K50-14
UNIVERSAL RADIO COMMUNICATION TESTER	CMU200	2013-11-23	106891
EMI Test Receiver	ESCI	2014-06-13	101746

SAR MEASUREMENT SYSTEM VERIFICATION

Liquid Verification



Liquid Verification Setup Block Diagram

Liquid Verification Results

Frequency	Liquid Type	Liquid Parameter		Target Value		Delta (%)		Tolerance (%)
		ε_r	σ (S/m)	ε_r	σ (S/m)	$\Delta\varepsilon_r$	Δσ (S/m)	
709	Head	41.02	0.88	41.75	0.90	-1.749	-2.222	±5
	Body	53.79	0.96	55.40	0.97	-2.906	-1.031	±5
710	Head	41.07	0.88	41.75	0.90	-1.629	-2.222	±5
	Body	53.82	0.96	55.40	0.97	-2.852	-1.031	±5
711	Head	41.06	0.88	41.75	0.90	-1.653	-2.222	±5
	Body	53.86	0.96	55.40	0.97	-2.780	-1.031	±5
824.2	Head	41.04	0.90	41.50	0.90	-1.108	0.000	±5
	Body	53.79	0.95	55.20	0.97	-2.554	-2.062	±5
826.4	Head	41.03	0.91	41.50	0.90	-1.133	1.111	±5
	Body	53.80	0.95	55.20	0.97	-2.536	-2.062	±5
836.6	Head	41.01	0.92	41.50	0.90	-1.181	2.222	±5
	Body	53.79	0.96	55.20	0.97	-2.554	-1.031	±5
846.6	Head	41.01	0.92	41.50	0.90	-1.181	2.222	±5
	Body	53.80	0.97	55.20	0.97	-2.536	0.000	±5
848.8	Head	41.00	0.92	41.50	0.90	-1.205	2.222	±5
	Body	53.83	0.98	55.20	0.97	-2.482	1.031	±5
1720	Head	39.27	1.37	40.00	1.40	-1.825	-2.143	±5
	Body	51.90	1.50	53.43	1.49	-2.864	0.671	±5
1732.5	Head	39.38	1.37	40.00	1.40	-1.550	-2.143	±5
	Body	51.95	1.50	53.43	1.49	-2.770	0.671	±5
1750	Head	39.37	1.38	40.00	1.40	-1.575	-1.429	±5
	Body	51.94	1.52	53.43	1.49	-2.789	2.013	±5
1850.2	Head	39.58	1.36	40.00	1.40	-1.050	-2.857	±5
	Body	52.02	1.49	53.30	1.52	-2.402	-1.974	±5
1852.4	Head	39.7	1.37	40.00	1.40	-0.750	-2.143	±5
	Body	51.96	1.49	53.30	1.52	-2.514	-1.974	±5
1880.0	Head	39.61	1.40	40.00	1.40	-0.975	0.000	±5
	Body	51.75	1.51	53.30	1.52	-2.908	-0.658	±5
1907.6	Head	39.73	1.42	40.00	1.40	-0.675	1.429	±5
	Body	52.01	1.54	53.30	1.52	-2.420	1.316	±5
1909.8	Head	39.68	1.42	40.00	1.40	-0.800	1.429	±5
	Body	51.78	1.54	53.30	1.52	-2.852	1.316	±5
2510	Head	39.61	1.78	39.20	1.80	1.046	-1.111	±5
	Body	51.94	1.91	52.70	1.95	-1.442	-2.051	±5
2535	Head	39.58	1.79	39.20	1.80	0.969	-0.556	±5
	Body	51.99	1.94	52.70	1.95	-1.347	-0.513	±5
2560	Head	39.73	1.81	39.20	1.80	1.352	0.556	±5
	Body	51.75	1.95	52.70	1.95	-1.803	0.000	±5

**Liquid Verification was performed on 2014-12-02.*

Please refer to the following tables.

750 MHz Head				750 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
701.0	41.0918	22.3232		701.0	53.7958	24.1512
702.0	41.0242	22.3111		702.0	53.8289	24.2870
703.0	41.0696	22.3316		703.0	53.8509	24.2087
704.0	41.1027	22.3155		704.0	53.7888	24.1874
705.0	41.0762	22.2824		705.0	53.8010	24.1437
706.0	41.0119	22.2913		706.0	53.8469	24.2538
707.0	40.9992	22.3419		707.0	53.7884	24.1910
708.0	41.0778	22.3866		708.0	53.7891	24.2837
709.0	41.0219	22.4215		709.0	53.7855	24.2585
710.0	41.0728	22.3847		710.0	53.8224	24.2541
711.0	41.0627	22.3838		711.0	53.8575	24.2145
712.0	41.0474	22.3830		712.0	53.8617	24.2259
713.0	41.0974	22.4167		713.0	53.8281	24.2251
714.0	41.0544	22.4128		714.0	53.8311	24.2218
715.0	41.0775	22.3098		715.0	53.8444	24.1525
716.0	41.0798	22.3098		716.0	53.8281	24.1845
717.0	41.0389	22.2947		717.0	53.7991	24.1123
718.0	41.0083	22.4024		718.0	53.7674	24.1827
719.0	41.0641	22.3926		719.0	53.8681	24.1509
720.0	41.0116	22.4307		720.0	53.7847	24.2888
721.0	41.0561	22.4272		721.0	53.7684	24.1591
722.0	41.0126	22.4057		722.0	53.8191	24.1710
723.0	41.0970	22.3321		723.0	53.7856	24.2102
724.0	41.0823	22.3686		724.0	53.8426	24.1641
725.0	41.1033	22.2808		725.0	53.7934	24.2265
726.0	41.0196	22.3126		726.0	53.7709	24.1891
727.0	41.0883	22.3552		727.0	53.8502	24.1978
728.0	41.0327	22.4025		728.0	53.8523	24.1684
729.0	41.0650	22.3261		729.0	53.7692	24.2356
730.0	41.0563	22.2950		730.0	53.7683	24.2376
731.0	41.0654	22.3201		731.0	53.8645	24.2737
732.0	41.0659	22.3180		732.0	53.7978	24.1571
733.0	41.0093	22.3102		733.0	53.7833	24.2164
734.0	41.0026	22.2967		734.0	53.8622	24.2406
735.0	41.0119	22.3426		735.0	53.8052	24.1735
736.0	41.0309	22.3850		736.0	53.8216	24.1778
737.0	41.0436	22.4267		737.0	53.7779	24.1828
738.0	41.0192	22.3635		738.0	53.8551	24.1727
739.0	41.0416	22.3871		739.0	53.7689	24.1850
740.0	41.0849	22.4168		740.0	53.7888	24.2431
741.0	41.0625	22.3711		741.0	53.8288	24.2832
742.0	41.0875	22.3734		742.0	53.8715	24.2257
743.0	41.0485	22.3544		743.0	53.8065	24.2094
744.0	41.0047	22.3685		744.0	53.8693	24.2088
745.0	41.0493	22.2905		745.0	53.8287	24.2124
746.0	41.0933	22.3446		746.0	53.7849	24.2188
747.0	41.0826	22.3042		747.0	53.7889	24.2411
748.0	41.0248	22.3289		748.0	53.7817	24.1832
749.0	41.0266	22.3751		749.0	53.8711	24.2179
750.0	41.0123	22.1049		750.0	53.8670	24.2384
751.0	41.0755	22.1829		751.0	53.8390	24.2614

835 MHz Head				835 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
824.0	41.0395	19.7287		824.0	53.7887	20.6706
824.5	41.1043	19.7649		824.5	53.8643	20.6435
825.0	40.9959	19.7428		825.0	53.7893	20.6819
825.5	41.0019	19.6882		825.5	53.7701	20.6241
826.0	41.0513	19.7608		826.0	53.8478	20.6931
826.5	41.0306	19.7553		826.5	53.8003	20.6432
827.0	41.0493	19.7688		827.0	53.8573	20.6368
827.5	41.0375	19.7222		827.5	53.7950	20.6649
828.0	41.0222	19.6814		828.0	53.7795	20.6460
828.5	41.0155	19.7153		828.5	53.8642	20.6408
829.0	41.0872	19.7635		829.0	53.8665	20.6691
829.5	40.9971	19.6797		829.5	53.8121	20.6795
830.0	41.0746	19.7691		830.0	53.7683	20.6124
830.5	41.0557	19.7122		830.5	53.7711	20.6263
831.0	40.9976	19.6831		831.0	53.8651	20.7083
831.5	41.0869	19.7051		831.5	53.8424	20.6708
832.0	41.0372	19.6845		832.0	53.7736	20.6719
832.5	41.0451	19.7436		832.5	53.8441	20.6556
833.0	41.0993	19.7118		833.0	53.8525	20.7058
833.5	41.0893	19.7613		833.5	53.8385	20.6345
834.0	41.0183	19.7146		834.0	53.8354	20.6177
834.5	41.0620	19.7473		834.5	53.7645	20.6158
835.0	41.0750	19.7107		835.0	53.7853	20.6903
835.5	41.0101	19.7169		835.5	53.7935	20.6295
836.0	41.0430	19.7554		836.0	53.8520	20.6126
836.5	41.0404	19.7736		836.5	53.7975	20.6844
837.0	41.0004	19.6712		837.0	53.7705	20.6843
837.5	41.0414	19.6855		837.5	53.8511	20.6558
838.0	41.0037	19.7567		838.0	53.8330	20.6501
838.5	41.0349	19.6858		838.5	53.8316	20.6554
839.0	40.9972	19.7047		839.0	53.8200	20.6831
839.5	41.0831	19.7105		839.5	53.8438	20.6284
840.0	41.0257	19.3818		840.0	53.7961	20.6744
840.5	41.1033	19.4604		840.5	53.8720	20.6839
841.0	41.0853	19.4606		841.0	53.7633	20.6489
841.5	41.0628	19.4248		841.5	53.7677	20.6800
842.0	41.0654	19.3896		842.0	53.8166	20.6312
842.5	41.0749	19.3851		842.5	53.8469	20.6961
843.0	41.0346	19.3846		843.0	53.7635	20.6372
843.5	41.0301	19.4044		843.5	53.8179	20.6223
844.0	41.0166	19.4036		844.0	53.8275	20.6410
844.5	41.0596	19.3693		844.5	53.7926	20.6884
845.0	41.0900	19.4133		845.0	53.8363	20.6808
845.5	41.0432	19.4369		845.5	53.8647	20.6224
846.0	41.0763	19.4281		846.0	53.7927	20.6784
846.5	41.0057	19.4660		846.5	53.7994	20.6300
847.0	41.0922	19.3782		847.0	53.7920	20.6603
847.5	41.0113	19.3936		847.5	53.8007	20.6991
848.0	41.0463	19.4325		848.0	53.8641	20.6364
848.5	41.0684	19.4712		848.5	53.7926	20.6329
849.0	41.0030	19.3904		849.0	53.8255	20.6833

1750 MHz Head				1750 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
1710.0	39.1240	14.2259		1710.0	51.9402	15.6615
1711.5	39.4753	14.2145		1711.5	52.0898	15.5613
1713.0	39.3990	14.2386		1713.0	52.1619	15.5462
1714.5	39.1009	14.3261		1714.5	52.2818	15.5855
1716.0	39.1319	14.5789		1716.0	52.4800	15.7060
1717.5	39.2860	14.2895		1717.5	52.6990	15.7772
1719.0	39.1714	14.4805		1719.0	52.3732	15.7068
1720.5	39.3738	14.1940		1720.5	52.2781	15.5875
1722.0	39.4684	14.4340		1722.0	52.2695	15.6008
1723.5	39.4860	14.1393		1723.5	52.2158	15.5342
1725.0	39.5219	14.5403		1725.0	52.4600	15.6465
1726.5	39.3264	14.4062		1726.5	52.3698	15.6190
1728.0	39.1159	14.2779		1728.0	52.1438	15.4919
1729.5	39.3126	14.1879		1729.5	52.2880	15.5379
1731.0	39.2861	14.5445		1731.0	52.1937	15.5266
1732.5	39.3820	14.1730		1732.5	52.5534	15.7503
1734.0	39.5642	14.4095		1734.0	52.5889	15.7358
1735.5	39.4627	14.3690		1735.5	52.1230	15.4825
1737.0	39.5038	14.4095		1737.0	52.0029	15.4192
1738.5	39.5335	14.5467		1738.5	52.3126	15.5597
1740.0	39.5446	14.2767		1740.0	52.5416	15.7159
1741.5	39.3883	14.4986		1741.5	52.3556	15.5669
1743.0	39.6070	14.2181		1743.0	52.1811	15.5034
1744.5	39.5542	14.3613		1744.5	52.5739	15.7673
1746.0	39.1780	14.0868		1746.0	52.6213	15.7694
1747.5	39.4067	14.0995		1747.5	52.2910	15.6522
1749.0	39.6210	14.1269		1749.0	51.9388	15.4463
1750.5	39.0969	14.4134		1750.5	51.9850	15.5049
1752.0	39.2801	14.3891		1752.0	52.5624	15.8026
1753.5	39.3383	14.1669		1753.5	52.6873	15.7853
1755.0	39.2443	14.5561		1755.0	52.4572	15.7096
1756.5	39.3130	14.1907		1756.5	52.3293	15.6401
1758.0	39.6099	14.5451		1758.0	52.5245	15.7111
1759.5	39.2677	14.5212		1759.5	52.6102	15.7639
1761.0	39.1292	14.1570		1761.0	52.3919	15.7252
1762.5	39.5765	14.2612		1762.5	52.4466	15.6620
1764.0	39.1409	14.4614		1764.0	52.7221	15.8530
1765.5	39.1012	14.5762		1765.5	52.6741	15.7972
1767.0	39.5709	14.2882		1767.0	52.5483	15.7545
1768.5	39.3762	14.1812		1768.5	52.3531	15.7437
1770.0	39.1359	14.0886		1770.0	52.5950	15.7495
1771.5	39.5839	14.5812		1771.5	52.6456	15.7515
1773.0	39.3745	14.1008		1773.0	52.3546	15.6818
1774.5	39.5556	14.2673		1774.5	52.3208	15.6430
1776.0	39.2580	14.2458		1776.0	52.6550	15.7872
1777.5	39.5074	14.3148		1777.5	52.7254	15.8787
1779.0	39.4118	14.3347		1779.0	52.6610	15.7959
1780.5	39.4125	14.2265		1780.5	52.4856	15.7328
1782.0	39.5625	14.5487		1782.0	52.6089	15.8156
1783.5	39.3996	14.3330		1783.5	52.7747	15.9088
1785.0	39.1018	14.5481		1785.0	52.8093	15.8736

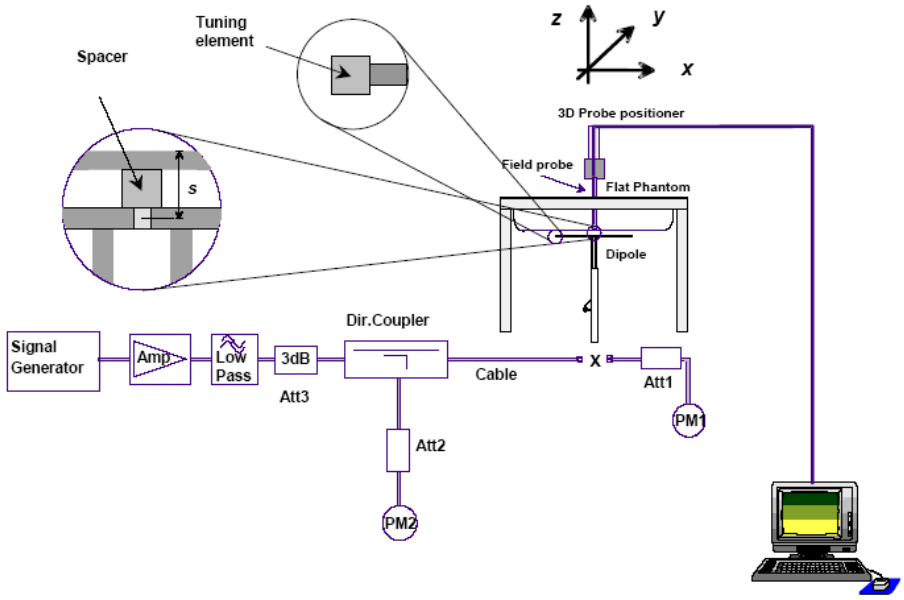
1900 MHz Head				1900 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
1850.0	39.5828	13.2558		1850.0	52.0180	14.4746
1851.2	39.6700	13.2741		1851.2	52.0646	14.4121
1852.4	39.7047	13.2583		1852.4	51.9638	14.5065
1853.6	39.7159	13.3202		1853.6	51.7878	14.5618
1854.8	39.6499	13.4053		1854.8	51.7697	14.4749
1856.0	39.7125	13.4227		1856.0	51.7355	14.4331
1857.2	39.5936	13.3775		1857.2	51.7430	14.5678
1858.4	39.6767	13.4293		1858.4	51.8156	14.5415
1859.6	39.6589	13.3425		1859.6	51.9070	14.4830
1860.8	39.6916	13.4307		1860.8	52.0750	14.4665
1862.0	39.7396	13.2601		1862.0	51.7644	14.4790
1863.2	39.6422	13.2524		1863.2	51.8863	14.4408
1864.4	39.7252	13.3376		1864.4	51.9718	14.4195
1865.6	39.7400	13.3340		1865.6	51.9182	14.4307
1866.8	39.5876	13.2658		1866.8	52.0345	14.5479
1868.0	39.7138	13.4332		1868.0	51.8301	14.5668
1869.2	39.6816	13.2417		1869.2	51.8135	14.5624
1870.4	39.7285	13.4192		1870.4	51.9553	14.4751
1871.6	39.6422	13.2878		1871.6	52.0192	14.4361
1872.8	39.5514	13.3591		1872.8	51.9002	14.4205
1874.0	39.6311	13.3496		1874.0	52.0276	14.4307
1875.2	39.6798	13.3265		1875.2	51.7730	14.5587
1876.4	39.7164	13.2876		1876.4	51.8488	14.5300
1877.6	39.6924	13.3932		1877.6	52.0310	14.5227
1878.8	39.5660	13.4115		1878.8	51.7995	14.5734
1880.0	39.6131	13.3937		1880.0	51.7538	14.4318
1881.2	39.5485	13.4126		1881.2	51.7893	14.4614
1882.4	39.6238	13.4223		1882.4	51.9478	14.4259
1883.6	39.7292	13.2989		1883.6	52.0516	14.5181
1884.8	39.6393	13.3007		1884.8	51.8394	14.5583
1886.0	39.7221	13.3221		1886.0	51.7907	14.5081
1887.2	39.6324	13.4274		1887.2	51.9185	14.5451
1888.4	39.5748	13.3464		1888.4	51.8195	14.5033
1889.6	39.5860	13.2461		1889.6	52.0203	14.5072
1890.8	39.6720	13.3257		1890.8	51.8446	14.5758
1892.0	39.5549	13.3278		1892.0	51.7987	14.5392
1893.2	39.6391	13.3086		1893.2	51.9144	14.5085
1894.4	39.5840	13.2472		1894.4	51.8519	14.4721
1895.6	39.5903	13.2955		1895.6	51.8843	14.5355
1896.8	39.6555	13.3943		1896.8	51.8082	14.4929
1898.0	39.7379	13.3412		1898.0	52.0614	14.5415
1899.2	39.6633	13.3996		1899.2	51.7571	14.4899
1900.4	39.5991	13.3680		1900.4	51.9539	14.5750
1901.6	39.5470	13.2547		1901.6	51.8042	14.5361
1902.8	39.7077	13.3456		1902.8	51.9208	14.4530
1904.0	39.6152	13.4008		1904.0	51.9455	14.4548
1905.2	39.5964	13.3966		1905.2	51.9664	14.4933
1906.4	39.6730	13.2720		1906.4	51.8794	14.4929
1907.6	39.7299	13.3607		1907.6	52.0122	14.5593
1908.8	39.5831	13.2687		1908.8	52.0123	14.5301
1910.0	39.6810	13.3598		1910.0	51.7769	14.5450

2450 MHz Head				2450 MHz Body		
Frequency (MHz)	e'	e''		Frequency (MHz)	e'	e''
2500.0	39.6729	12.7097		2500.0	51.9920	13.7335
2501.5	39.6222	12.7908		2501.5	51.9994	13.6316
2503.0	39.6492	12.7937		2503.0	51.7882	13.6926
2504.5	39.6278	12.6714		2504.5	51.8835	13.6972
2506.0	39.6590	12.7783		2506.0	52.0427	13.6414
2507.5	39.6018	12.6576		2507.5	52.0845	13.6892
2509.0	39.6405	12.7865		2509.0	52.0209	13.6725
2510.5	39.6016	12.7248		2510.5	51.9029	13.7245
2512.0	39.6271	12.6698		2512.0	52.0139	13.6561
2513.5	39.5984	12.7326		2513.5	52.0253	13.7245
2515.0	39.6621	12.8327		2515.0	52.0407	13.6960
2516.5	39.6401	12.7600		2516.5	52.0012	13.6262
2518.0	39.6172	12.7277		2518.0	51.7814	13.6527
2519.5	39.7159	12.8260		2519.5	51.9483	13.7117
2521.0	39.7295	12.7675		2521.0	51.9882	13.6677
2522.5	39.6012	12.7533		2522.5	51.8823	13.7493
2524.0	39.6259	12.7172		2524.0	52.0736	13.7445
2525.5	39.7103	12.8301		2525.5	51.7416	13.6674
2527.0	39.5476	12.7193		2527.0	51.8308	13.7607
2528.5	39.6726	12.6681		2528.5	51.7429	13.7476
2530.0	39.6066	12.7279		2530.0	51.7804	13.6179
2531.5	39.5738	12.7871		2531.5	52.0658	13.6513
2533.0	39.6043	12.7425		2533.0	51.8069	13.7665
2534.5	39.5522	12.6872		2534.5	52.0633	13.7784
2536.0	39.6317	12.8130		2536.0	51.8206	13.7231
2537.5	39.6211	12.8235		2537.5	51.9965	13.7213
2539.0	39.5553	12.6815		2539.0	51.8878	13.7348
2540.5	39.7251	12.6813		2540.5	52.0520	13.7333
2542.0	39.6787	12.6808		2542.0	51.7978	13.6963
2543.5	39.7293	12.7425		2543.5	52.0415	13.6410
2545.0	39.7140	12.6935		2545.0	51.7764	13.7151
2546.5	39.7070	12.8175		2546.5	51.8532	13.7614
2548.0	39.6120	12.8235		2548.0	51.8079	13.7741
2549.5	39.6989	12.6786		2549.5	52.0356	13.7543
2551.0	39.5965	12.8200		2551.0	51.9090	13.7582
2552.5	39.6544	12.7743		2552.5	52.0239	13.6171
2554.0	39.6807	12.8258		2554.0	52.0627	13.7642
2555.5	39.6598	12.7156		2555.5	51.8268	13.6194
2557.0	39.5721	12.7621		2557.0	51.9893	13.6178
2558.5	39.6965	12.6781		2558.5	52.0669	13.7478
2560.0	39.7335	12.7241		2560.0	51.7537	13.7078
2561.5	39.5604	12.7736		2561.5	51.9491	13.7558
2563.0	39.5640	12.7351		2563.0	51.8890	13.7633
2564.5	39.5602	12.7677		2564.5	52.0293	13.7284
2566.0	39.6106	12.6744		2566.0	52.0158	13.6950
2567.5	39.6269	12.8110		2567.5	51.9134	13.6226
2569.0	39.7045	12.6996		2569.0	51.7659	13.6954
2570.5	39.5686	12.8207		2570.5	52.0410	13.7656
2572.0	39.6256	12.7031		2572.0	51.8821	13.7680
2573.5	39.5765	12.7768		2573.5	52.0013	13.6812
2575.0	39.6420	12.7016		2575.0	51.8666	13.6232

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



Probe and dipole antenna List and Detail

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date
APREL	Probe	ALS-E-020	500-00283	2014-10-14	2015-10-13
APREL	Dipole antenna(750MHz)	ALS-D-750-S-2	177-00505	2013-10-08	2016-10-07
APREL	Dipole antenna(835MHz)	ALS-D-835-S-2	180-00558	2014-10-08	2017-10-07
APREL	Dipole antenna(1750MHz)	ALS-D-1750-S-2	198-00304	2013-10-08	2016-10-07
APREL	Dipole antenna(1900MHz)	ALS-D-1900-S-2	210-00710	2014-10-09	2017-10-08
APREL	Dipole antenna(2450MHz)	ALS-D-2450-S-2	220-00758	2014-10-09	2017-10-08

System Accuracy Check Results

Date	Frequency Band	Liquid Type	Measured SAR (W/Kg)		Target Value (W/Kg)	Delta (%)	Tolerance (%)
2014-12-02	750	Head	1g-SAR		8.50		±10
		Body	1g-SAR		8.54		±10
	835	Head	1g-SAR		9.773		±10
		Body	1g-SAR		9.736		±10
	1750	Head	1g-SAR		37.020		±10
		Body	1g-SAR		36.650		±10
	1900	Head	1g-SAR		39.481		±10
		Body	1g-SAR		39.715		±10
	2450	Head	1g-SAR		54.916		±10
		Body	1g-SAR		52.418		±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 750 MHz Head Liquid

Dipole 750 MHz; Type: ALS-D-750-S-2; S/N: 177-00505

Product Data
Device Name : Dipole 750 MHz
Serial No. : 170-00505
Type : Dipole
Model : ALS-D-750-S-2
Frequency Band : 750
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 8.025 W/kg
Power Drift-Finish : 8.095 W/kg
Power Drift (%) : 0.849

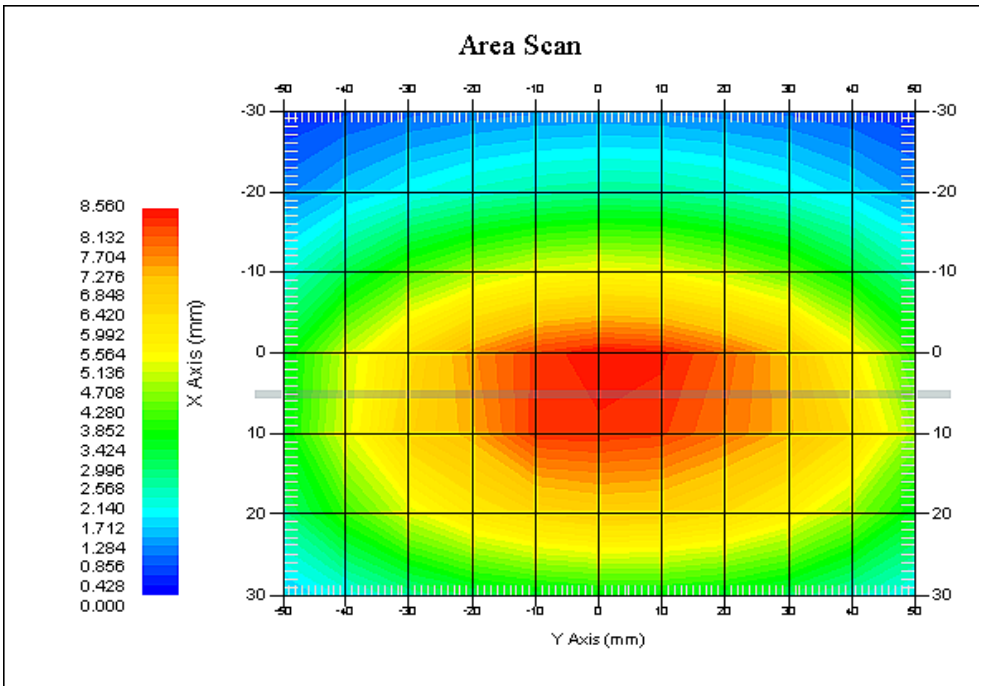
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Serial No. : System Default
Location : Center
Description : Default
Phantom Data

Tissue Data
Type : Head
Serial No. : 269-01003
Frequency : 750.0 MHz
Last Calib. Date : 02-Dec-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 41.01 F/m
Sigma : 0.92 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 14-Oct-2014
Frequency Band : 750
Duty Cycle Factor : 1
Conversion Factor : 6.0
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. : 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 : 8.475 W/kg
10 gram SAR value : 5.846 W/kg
Area Scan Peak SAR : 8.557 W/kg
Zoom Scan Peak SAR : 11.765 W/kg



750 MHz System Validation with Head Tissue

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

System Performance Check 750 MHz Head Liquid

Dipole 750 MHz; Type: ALS-D-750-S-2; S/N: 177-00505

Product Data
Device Name : Dipole 750 MHz
Serial No. : 170-00505
Type : Dipole
Model : ALS-D-750-S-2
Frequency Band : 750
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 8.235 W/kg
Power Drift-Finish : 8.152 W/kg
Power Drift (%) : -1.041

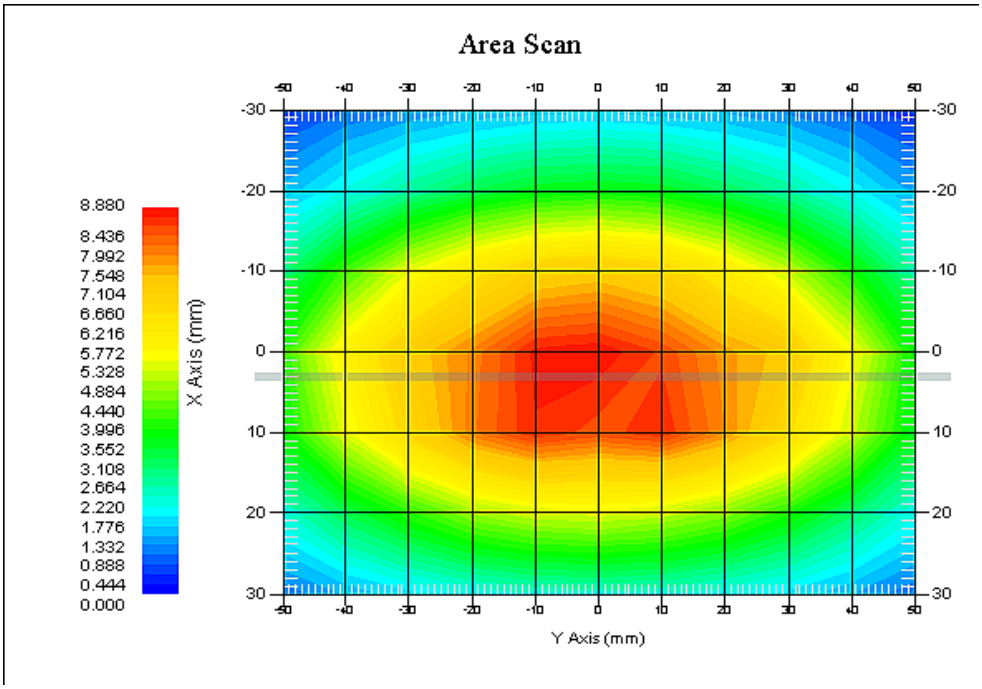
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Serial No. : System Default
Location : Center
Description : Default
Phantom Data

Tissue Data
Type : Body
Serial No. : 269-01002
Frequency : 750.0 MHz
Last Calib. Date : 02-Dec-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 53.87 F/m
Sigma : 1.01 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-Oct-2014
Frequency Band : 750
Duty Cycle Factor : 1
Conversion Factor : 5.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

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

1 gram SAR value : 8.563 W/kg
10 gram SAR value : 5.912 W/kg
Area Scan Peak SAR : 8.877 W/kg
Zoom Scan Peak SAR : 12.714 W/kg



750 MHz System Validation with Body Tissue

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

System Performance Check 835 MHz Head Liquid

Dipole 835 MHz; Type: ALS-D-835-S-2; S/N: 180-00558

Product Data
Device Name : Dipole 835 MHz
Serial No. : 180-00558
Type : Dipole
Model : ALS-D-835-S-2
Frequency Band : 835
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 9.512 W/kg
Power Drift-Finish : 9.411 W/kg
Power Drift (%) : -1.089

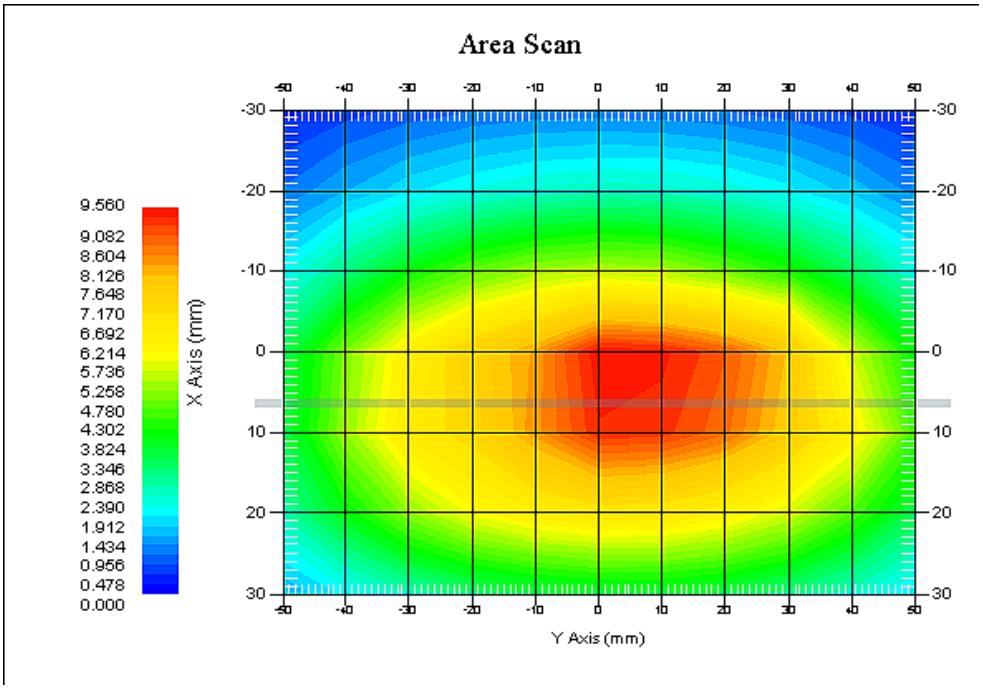
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Serial No. : System Default
Location : Center
Description : Default
Phantom Data

Tissue Data
Type : Head
Serial No. : 270-01002
Frequency : 835.0 MHz
Last Calib. Date : 02-Dec-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 41.08 F/m
Sigma : 0.92 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 14-Oct-2014
Frequency Band : 835
Duty Cycle Factor : 1
Conversion Factor : 5.9
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 : 9.429 W/kg
10 gram SAR value : 6.274 W/kg
Area Scan Peak SAR : 9.557 W/kg
Zoom Scan Peak SAR : 14.714 W/kg



835 MHz System Validation with Head Tissue

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

System Performance Check 835 MHz Body Liquid

Dipole 835 MHz; Type: ALS-D-835-S-2; S/N: 180-00558

Product Data
Device Name : Dipole 835 MHz
Serial No. : 180-00558
Type : Dipole
Model : ALS-D-835-S-2
Frequency Band : 835
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 9.215 W/kg
Power Drift-Finish : 9.328 W/kg
Power Drift (%) : 1.375

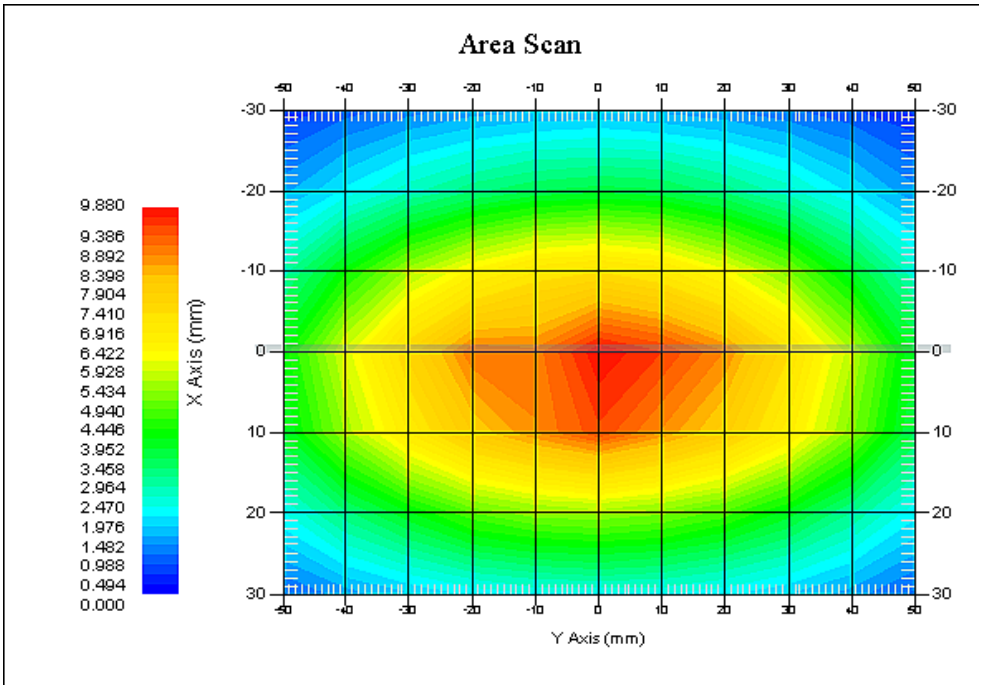
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Serial No. : System Default
Location : Center
Description : Default
Phantom Data

Tissue Data
Type : Body
Serial No. : 270-02101
Frequency : 835.0 MHz
Last Calib. Date : 02-Dec-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 53.79 F/m
Sigma : 0.96 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 14-Oct-2014
Frequency Band : 835
Duty Cycle Factor : 1
Conversion Factor : 5.9
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 : 9.589 W/kg
10 gram SAR value : 6.224 W/kg
Area Scan Peak SAR : 9.871 W/kg
Zoom Scan Peak SAR : 13.857 W/kg



835 MHz System Validation with Body Tissue

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

System Performance Check 1750 MHz Head Liquid

Dipole 1750 MHz; Type: ALS-D-1750-S-2; S/N: 198-00304

Product Data
Device Name : Dipole 1750MHz
Serial No. : 198-00304
Type : Dipole
Model : ALS-D-1750-S-2
Frequency Band : 1700
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 37.102 W/kg
Power Drift-Finish : 37.452 W/kg
Power Drift (%) : 0.891

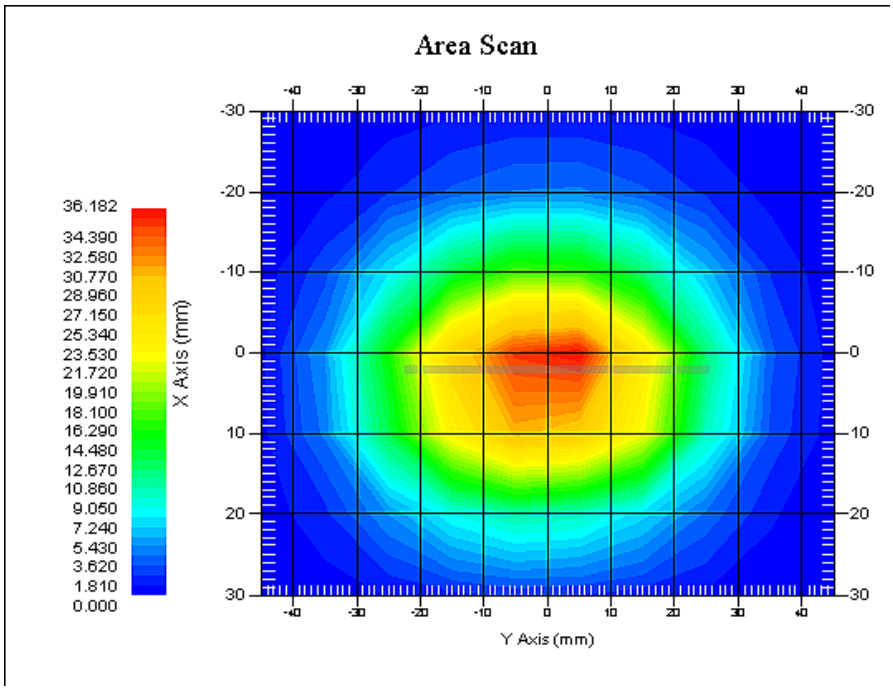
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Serial No. : System Default
Location : Center
Description : Default

Tissue Data
Type : Head
Serial No. : 295-01101
Frequency : 1750.00 MHz
Last Calib. Date : 02-Dec-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 39.37 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-Oct-2014
Frequency Band : 1750
Duty Cycle Factor : 1
Conversion Factor : 5.4
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 : 35.412 W/kg
10 gram SAR value : 19.528 W/kg
Area Scan Peak SAR : 36.181 W/kg
Zoom Scan Peak SAR : 69.427 W/kg



1750 MHz System Validation with Head Tissue

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

System Performance Check 1750 MHz Body Liquid

Dipole 1750 MHz; Type: ALS-D-1750-S-2; S/N: 198-00304

Product Data
Device Name : Dipole 1750MHz
Serial No. : 198-00304
Type : Dipole
Model : ALS-D-1750-S-2
Frequency Band : 1700
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 33.204 W/kg
Power Drift-Finish : 33.856 W/kg
Power Drift (%) : 1.868

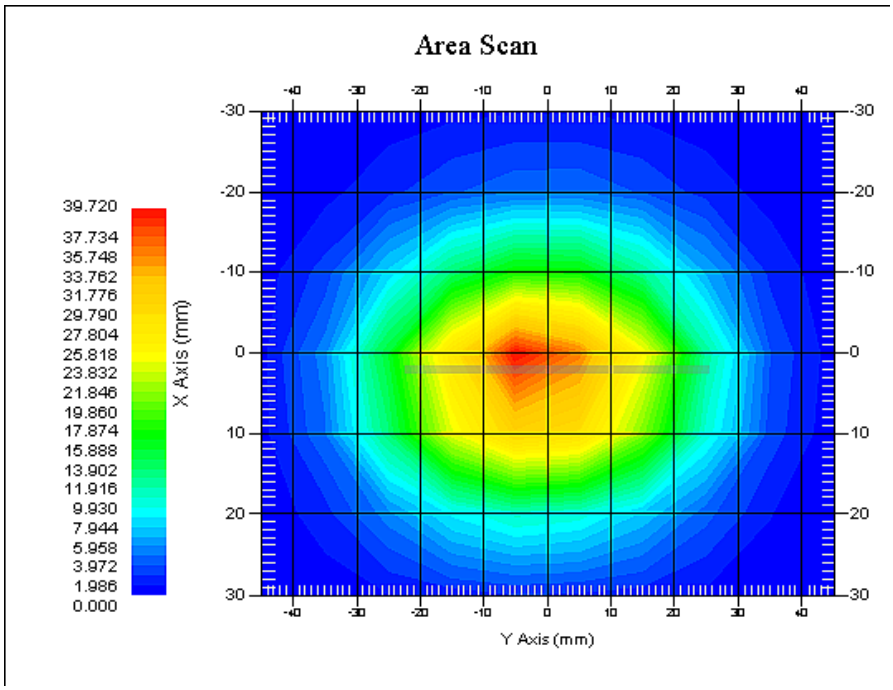
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Serial No. : System Default
Location : Center
Description : Default

Tissue Data
Type : Body
Serial No. : 295-02105
Frequency : 1750.00 MHz
Last Calib. Date : 02-Dec-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 51.94 F/m
Sigma : 1.53 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 08-Oct-2013
Frequency Band : 1700
Duty Cycle Factor : 1
Conversion Factor : 5.3
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 : 36.038 W/kg
10 gram SAR value : 19.796 W/kg
Area Scan Peak SAR : 39.717 W/kg
Zoom Scan Peak SAR : 71.066 W/kg



1750 MHz System Validation with Body Tissue

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

System Performance Check 1900 MHz Head Liquid

Dipole 1900 MHz; Type: ALS-D-1900-S-2; S/N: 210-00710

Product Data
Device Name : Dipole 1900MHz
Serial No. : 210-00710
Type : Dipole
Model : ALS-D-1900-S-2
Frequency Band : 1900
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 38.969 W/kg
Power Drift-Finish : 38.032 W/kg
Power Drift (%) : -2.195

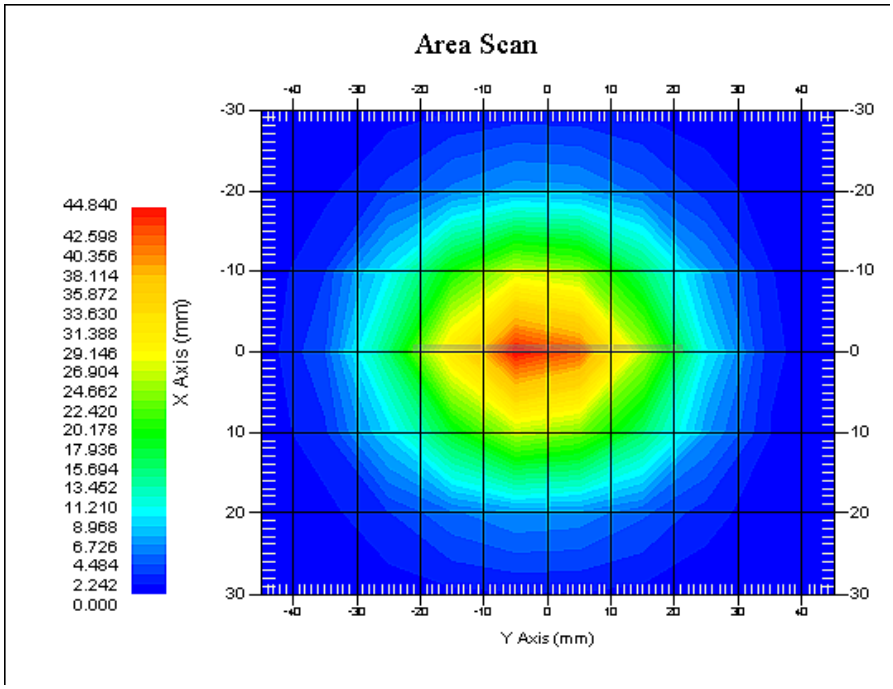
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Serial No. : System Default
Location : Center
Description : Default

Tissue Data
Type : Head
Serial No. : 295-01103
Frequency : 1900.00 MHz
Last Calib. Date : 02-Dec-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 39.61 F/m
Sigma : 1.41 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-Oct-2014
Frequency Band : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.8
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 : 41.967 W/kg
10 gram SAR value : 22.415 W/kg
Area Scan Peak SAR : 44.839 W/kg
Zoom Scan Peak SAR : 80.127 W/kg



1900 MHz System Validation with Head Tissue

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

System Performance Check 1900 MHz Body Liquid

Dipole 1900 MHz; Type: ALS-D-1900-S-2; S/N: 210-00710

Product Data
Device Name : Dipole 1900MHz
Serial No. : 210-00710
Type : Dipole
Model : ALS-D-1900-S-2
Frequency Band : 1900
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 40.403 W/kg
Power Drift-Finish : 40.012 W/kg
Power Drift (%) : -0.894

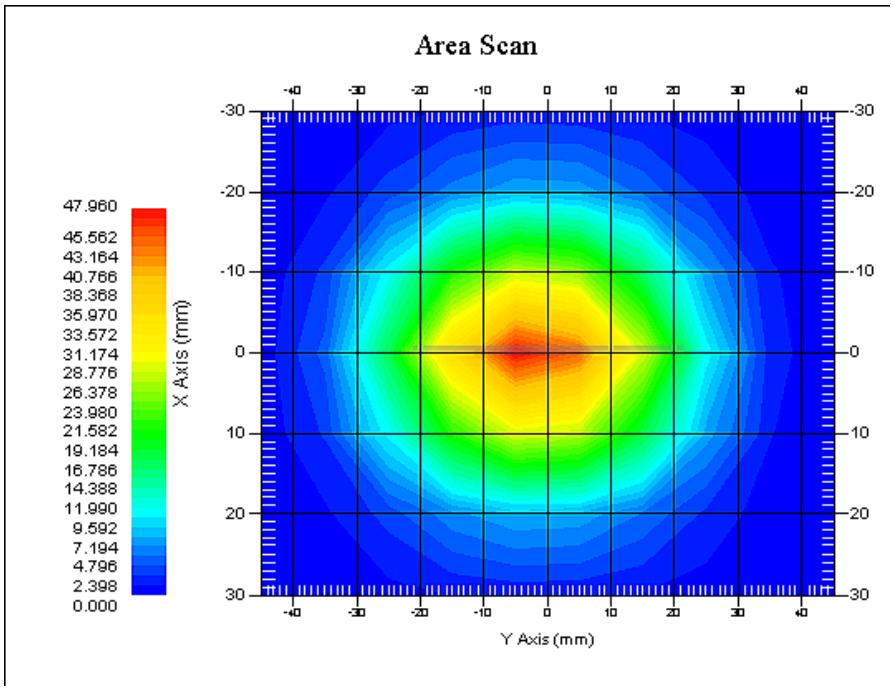
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Serial No. : System Default
Location : Center
Description : Default

Tissue Data
Type : Body
Serial No. : 295-02102
Frequency : 1900.00 MHz
Last Calib. Date : 02-Dec-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 56.00 RH%
Epsilon : 51.87 F/m
Sigma : 1.53 S/m
Density : 1000.00 kg/cu. m

Probe Data
Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 14-Oct-2014
Frequency Band : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.5
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

Measurement Data
Crest Factor : 1
Scan Type : Complete
Tissue Temp. : 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 : 42.125 W/kg
10 gram SAR value : 21.986 W/kg
Area Scan Peak SAR : 47.953 W/kg
Zoom Scan Peak SAR : 75.887 W/kg



1900 MHz System Validation with Body Tissue

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

System Performance Check 2450 MHz Head Liquid

Dipole 2450 MHz; Type: ALS-D-2450-S-2; S/N: 220-00758

Product Data
Device Name : Dipole 2450MHz
Serial No. : 220-00758
Type : Dipole
Model : ALS-D-2450-S-2
Frequency Band : 2450 MHz
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 51.639 W/kg
Power Drift-Finish : 51.024 W/kg
Power Drift (%) : -1.241

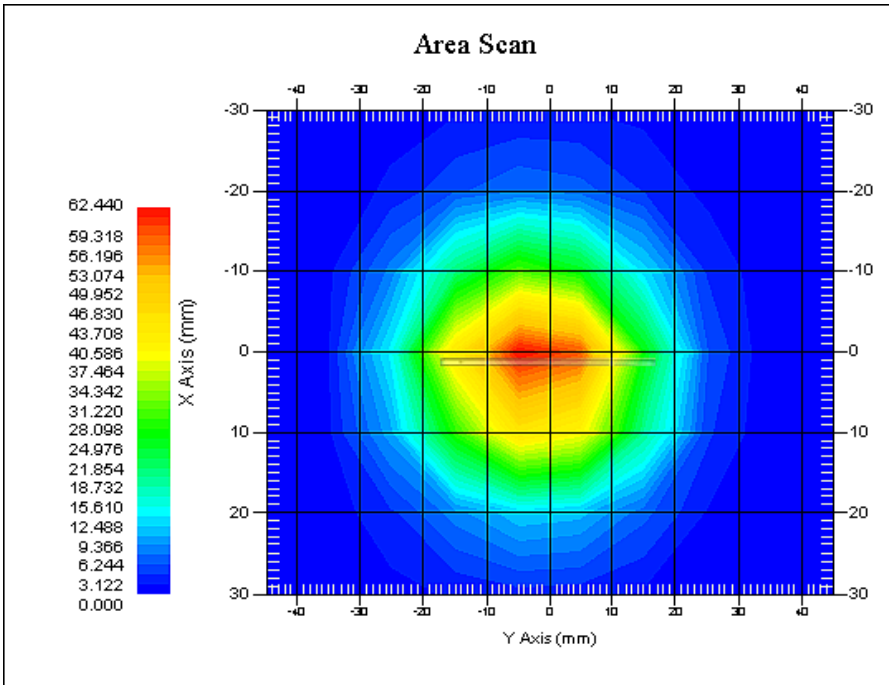
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Serial No. : System Default
Location : Center
Description : Default

Tissue Data
Type : Head
Serial No. : 290-01109
Frequency : 2450.0 MHz
Last Calib. Date : 02-Dec-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 50.00 RH%
Epsilon : 39.40 F/m
Sigma : 1.78 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-Oct-2014
Frequency Band : 2450 MHz
Duty Cycle Factor : 1
Conversion Factor : 4.3
Probe Sensitivity : 1.20 1.20 1.20 $\mu V/(V/m)^2$
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 : 57.427 W/kg
10 gram SAR value : 24.336 W/kg
Area Scan Peak SAR : 61.437 W/kg
Zoom Scan Peak SAR : 91.747 W/kg



2450 MHz System Validation with Head Tissue

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

System Performance Check 2450 MHz Body Liquid

Dipole 2450 MHz; Type: ALS-D-2450-S-2; S/N: 220-00758

Product Data
Device Name : Dipole 2450MHz
Serial No. : 220-00758
Type : Dipole
Model : ALS-D-2450-S-2
Frequency Band : 2450 MHz
Max. Transmit Pwr : 1 W
Drift Time : 3 min(s)
Power Drift-Start : 55.969 W/kg
Power Drift-Finish : 55.032 W/kg
Power Drift (%) : -1.648

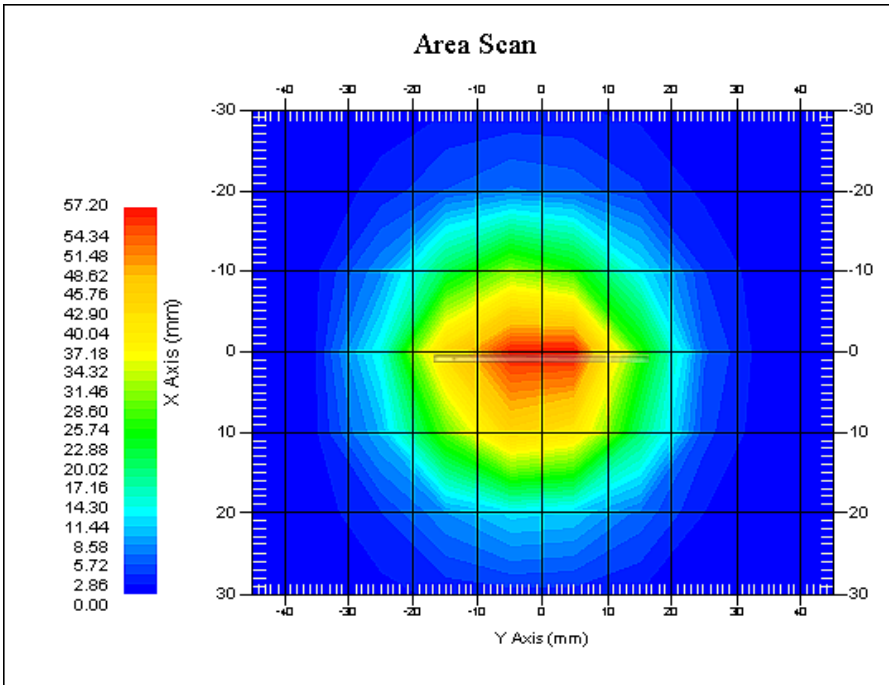
Phantom Data
Name : APREL-Uni
Type : Uni-Phantom
Serial No. : System Default
Location : Center
Description : Default

Tissue Data
Type : BODY
Serial No. : 290-01109
Frequency : 2450.0 MHz
Last Calib. Date : 02-Dec-2014
Temperature : 20.00 °C
Ambient Temp. : 21.00 °C
Humidity : 50.00 RH%
Epsilon : 51.82 F/m
Sigma : 1.96 S/m
Density : 1000.00 kg/cu. M

Probe Data
Name : E-Field
Model : E-020
Type : E-Field Triangle
Serial No. : 500-00283
Last Calib. Date : 14-Oct-2014
Frequency Band : 2450 MHz
Duty Cycle Factor : 1
Conversion Factor : 4.3
Probe Sensitivity : 1.20 1.20 1.20 $\mu V/(V/m)^2$
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 : 8x9x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm

1 gram SAR value : 54.639 W/kg
10 gram SAR value : 23.987 W/kg
Area Scan Peak SAR : 57.197 W/kg
Zoom Scan Peak SAR : 85.959 W/kg



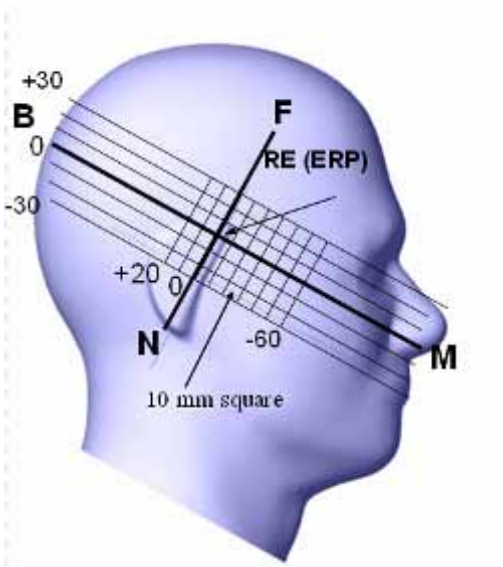
2450 MHz System Validation with Body Tissue

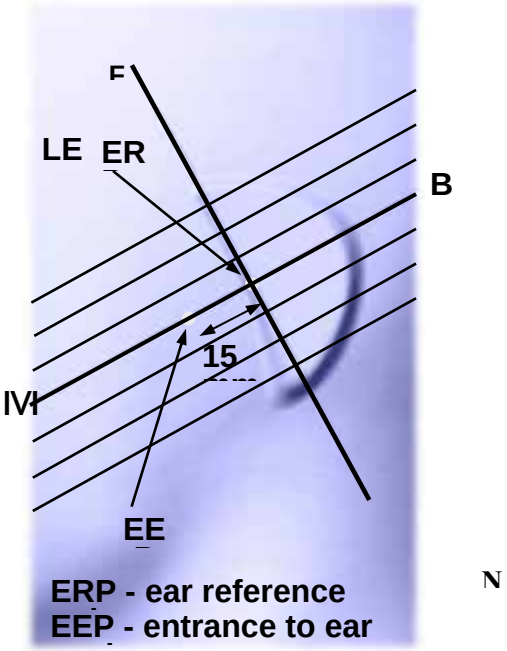
EUT TEST STRATEGY AND METHODOLOGY

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

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

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





Cheek/Touch Position

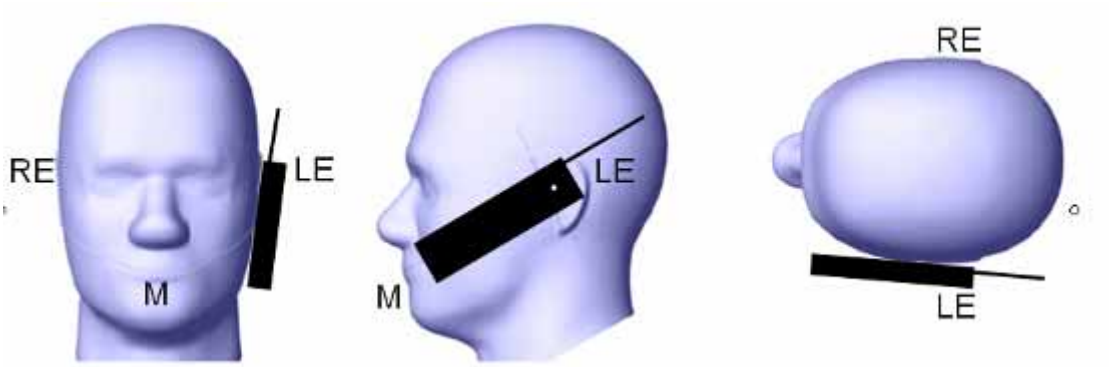
The device is brought toward the mouth of the head phantom by pivoting against the "ear reference point" or along the "N-F" line for the SCC-34/SC-2 head phantom.

This test position is established:

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

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

Cheek /Touch Position



Ear/Tilt Position

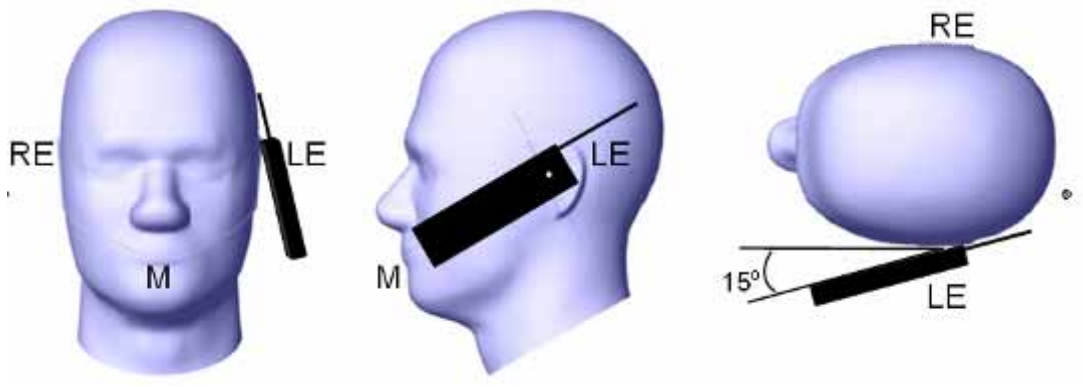
With the handset aligned in the "Cheek/Touch Position":

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

2) (otherwise) The handset should be moved (translated) away from the cheek perpendicular to the line passes through both "ear reference points" (note: one of these ear reference points may not physically exist on a split head model) for approximate 2-3 cm. While it is in this position, the device handset is tilted away from the mouth with respect to the "test device reference point" until the inside angle between the vertical centerline on the front surface of the phone and the horizontal line passing through the ear reference point 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, 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.

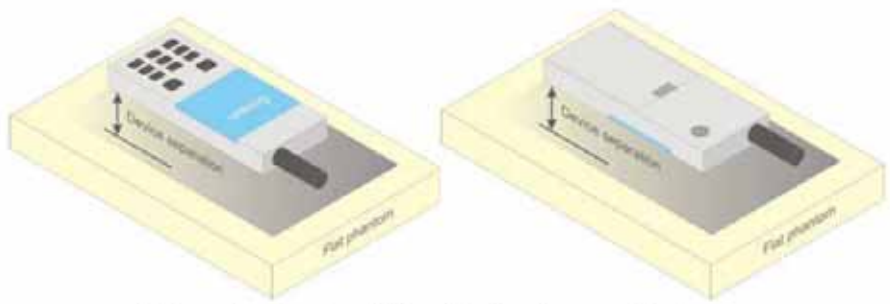


Figure 5 – Test positions for body-worn devices

SAR Evaluation Procedure

The evaluation was performed with the following procedure:

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

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

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

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

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

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

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

Test methodology

KDB447498 D01 General RF Exposure Guidance v05r02.
KDB 648474 D04 Handset SAR v01r02.
KDB 865664 D01 SAR measurement 100 MHz to 6 GHz v01r03
KDB 865664 D02 RF Exposure Reporting v01r01
KDB 941225 D01 3G SAR Procedures v03
KDB 941225 D05 SAR for LTE Devices v02r03
KDB 941225 D06 Hotspot Mode v02

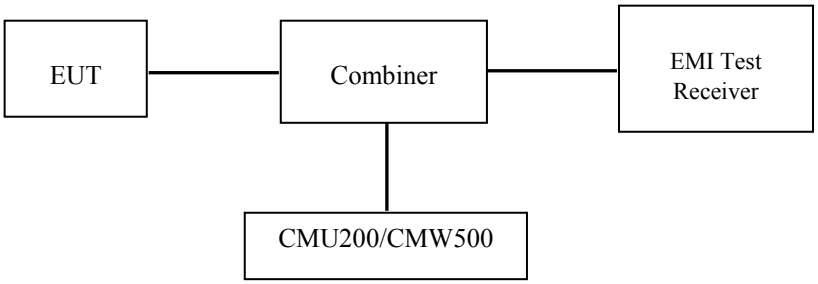
CONDUCTED OUTPUT POWER MEASUREMENT

Provision Applicable

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

Test Procedure

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



GSM&3G&LTE

Maximum Output Power among production units

Max Target Power for Production Unit (dBm)			
Mode/Band	Channel		
	Low	Middle	High
GSM 850	32.40	32.40	32.40
GPRS 1 slot	32.40	32.40	32.40
GPRS 2 slot	31.80	31.80	31.80
GPRS 3 slot	30.30	30.30	30.30
GPRS 4 slot	29.20	29.20	29.20
EGPRS 1 slot	25.70	25.70	25.70
EGPRS 2 slot	24.30	24.30	24.30
EGPRS 3 slot	22.10	22.10	22.10
EGPRS 4 slot	21.00	21.00	21.00
PCS 1900	29.80	29.80	29.80
GPRS 1 slot	29.80	29.80	29.80
GPRS 2 slot	29.20	29.20	29.20
GPRS 3 slot	27.60	27.60	27.60
GPRS 4 slot	26.40	26.40	26.40
EGPRS 1 slot	25.80	25.80	25.80
EGPRS 2 slot	24.40	24.40	24.40
EGPRS 3 slot	22.40	22.40	22.40
EGPRS 4 slot	21.20	21.20	21.20
WCDMA850	22.60	22.60	22.60

WCDMA1900	22.90	22.90	22.90
LTE Band 4	23.50	23.50	23.50
LTE Band 7	23.20	23.20	23.20
LTE Band 17	23.60	23.60	23.60
Wi-Fi	9.40	9.40	9.40
Bluetooth	0.50	0.50	0.50

Test Results:

GSM:

Band	Frequency (MHz)	Conducted Output Power	
		Meas. Power (dBm)	Meas. Power (W)
GSM 850	824.2	32.26	1.683
	836.6	32.34	1.714
	848.8	**32.36**	1.722
PCS 1900	1850.2	**29.74**	0.942
	1880.0	29.56	0.904
	1909.8	29.70	0.933

GPRS:

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	32.28	31.70	30.16	29.16
	190	836.6	32.34	31.72	30.21	29.16
	251	848.8	32.37	31.75	30.22	29.16
PCS 1900	512	1850.2	29.73	29.16	27.52	26.36
	661	1880.0	29.56	28.93	27.31	26.12
	810	1909.8	29.70	29.10	27.46	26.30

EGPRS:

Band	Channel No.	Frequency (MHz)	RF Output Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	25.69	24.22	22.02	20.78
	190	836.6	25.42	23.97	21.73	20.52
	251	848.8	25.11	23.65	21.42	20.27
PCS 1900	512	1850.2	25.74	24.37	22.40	21.19
	661	1880.0	25.56	24.17	22.24	20.90
	810	1909.8	25.68	24.24	22.19	21.06

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

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

The time based average power for GPRS

Band	Channel No.	Frequency (MHz)	Time based average Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	23.28	25.70	25.91	26.16
	190	836.6	23.34	25.72	25.96	**26.16**
	251	848.8	23.37	25.75	25.97	26.16
PCS 1900	512	1850.2	20.73	23.16	23.27	**23.36**
	661	1880.0	20.56	22.93	23.06	23.12
	810	1909.8	20.70	23.10	23.21	23.30

The time based average power for EGPRS

Band	Channel No.	Frequency (MHz)	Time based average Power (dBm)			
			1 slot	2 slot	3 slots	4 slots
GSM 850	128	824.2	16.69	18.22	17.77	17.78
	190	836.6	16.42	17.97	17.48	17.52
	251	848.8	16.11	17.65	17.17	17.27
PCS 1900	512	1850.2	16.74	18.37	18.15	18.19
	661	1880.0	16.56	18.17	17.99	17.90
	810	1909.8	16.68	18.24	17.94	18.06

Note:
1. Rohde & Schwarz Radio Communication Tester (CMU200) was used for the measurement of GSM peak and average output power for active timeslots.
2. For GSM voice, 1 timeslot has been activated with power level 5 (850 MHz band) and 0 (1900 MHz band).
3. For GPRS, 1, 2, 3 and 4 timeslots has been activated separately with power level 3(850 MHz band) and 3(1900 MHz band).
4. For EGPRS, 1, 2, 3 and 4 timeslots has been activated separately with power level 6(850 MHz band) and 5(1900 MHz band).
5. According to KDB941225D06-SAR for GPRS and EDGE modes are not required when the source-based time-averaged output power for each data mode is lower than that in the normal GSM voice mode

WCDMA-Release 99:

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

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

WCDMA HSDPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

	Mode	HSDPA	HSDPA	HSDPA	HSDPA
	Subset	1	2	3	4
WCDMA General Settings	Loopback Mode	Test Mode 1			
	Rel99 RMC	12.2kbps RMC			
	HSDPA FRC	H-Set1			
	Power Control Algorithm	Algorithm2			
	βc	2/15	12/15	15/15	15/15
	βd	15/15	15/15	8/15	4/15
	βd (SF)	64			
	βc/ βd	2/15	12/15	15/8	15/4
	βhs	4/15	24/15	30/15	30/15
	MPR(dB)	0	0	0.5	0.5
HSDPA Specific Settings	D_{ACK}	8			
	D_{NAK}	8			
	D_{CQI}	8			
	Ack-Nack repetition factor	3			
	CQI Feedback	4ms			
	CQI Repetition Factor	2			
	Ahs= βhs/ βc	30/15			

WCDMA HSUPA

The following tests were conducted according to the test requirements outlines in section 5.2 of the 3GPP TS34.121-1 specification.

	Mode	HSUPA	HSUPA	HSUPA	HSUPA	HSUPA
	Subset	1	2	3	4	5
WCDMA General Settings	Loopback Mode	Test Mode 1				
	Rel99 RMC	12.2kbps RMC				
	HSDPA FRC	H-Set1				
	HSUPA Test	HSUPA Loopback				
	Power Control Algorithm	Algorithm2				
	βc	11/15	6/15	15/15	2/15	15/15
	βd	15/15	15/15	9/15	15/15	0
	βec	209/225	12/15	30/15	2/15	5/15
	βc/ βd	11/15	6/15	15/9	2/15	-
	βhs	22/15	12/15	30/15	4/15	5/15
	CM(dB)	1.0	3.0	2.0	3.0	1.0
	MPR(dB)	0	2	1	2	0
HSDPA Specific Settings	DACK	8				
	DNAK	8				
	DCQI	8				
	Ack-Nack repetition factor	3				
	CQI Feedback	4ms				
	CQI Repetition Factor	2				
	Ahs= βhs/ βc	30/15				
HSUPA Specific Settings	DE-DPCCH	6	8	8	5	7
	DHARQ	0	0	0	0	0
	AG Index	20	12	15	17	21
	ETFCI	75	67	92	71	81
	Associated Max UL Data Rate kbps	242.1	174.9	482.8	205.8	308.9
	Reference E_FCls	E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27		E-TFCI 11 E-TFCI PO4 E-TFCI 92 E-TFCI PO 18	E-TFCI 11 E E-TFCI PO 4 E-TFCI 67 E-TFCI PO 18 E-TFCI 71 E-TFCI PO23 E-TFCI 75 E-TFCI PO26 E-TFCI 81 E-TFCI PO 27	

Results (12.2kbps RMC)

Band	Frequency (MHz)	Channel NO.	Conducted Output Power	
			(dBm)	(Watt)
WCDMA 850	826.4	4132	22.49	0.177
	836.6	4183	22.51	0.178
	846.6	4233	**22.52**	0.179
WCDMA 1900	1852.4	9262	22.73	0.187
	1880.0	9400	22.65	0.184
	1907.6	9538	**22.85**	0.193

Results (HSDPA)

Band	Frequency (MHz)	Channel NO.	Conducted Output Power (dBm)			
			Subset 1	Subset 2	Subset 3	Subset 4
WCDMA 850	826.4	4132	21.42	21.32	21.55	21.39
	836.6	4183	21.43	21.34	21.49	21.36
	846.6	4233	21.34	21.31	21.41	21.29
WCDMA 1900	1852.4	9262	21.62	21.52	21.57	21.56
	1880.0	9400	21.44	21.38	21.37	21.35
	1907.6	9538	21.71	21.62	21.56	21.65

Results (HSUPA)

Band	Frequency (MHz)	Channel NO.	Conducted Output Power (dBm)				
			Subset 1	Subset 2	Subset 3	Subset 4	Subset 5
WCDMA 850	826.4	4132	21.31	21.38	21.30	21.45	21.31
	836.6	4183	21.15	21.39	21.36	21.43	21.31
	846.6	4233	20.96	21.31	21.20	21.41	21.19
WCDMA 1900	1852.4	9262	20.98	21.56	21.46	21.65	21.45
	1880.0	9400	21.17	21.64	21.61	21.72	21.59
	1907.6	9538	20.84	21.75	21.71	21.83	21.71

Note:

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

LTE Band 4:

Band/BW	Modulation	Resource Block Size	Resource Block Offset	Ave Tx Power (dBm)		
				Low Channel	Middle Channel	High Channel
Band 4/1.4MHz	QPSK	RB1	0	23.11	23.25	23.14
			2	22.37	23.16	22.23
			5	22.14	22.77	22.74
		RB3	0	22.56	23.22	22.40
			1	22.19	22.81	21.88
			2	21.63	22.85	21.84
		RB6	6	22.13	22.40	21.47
	16-QAM	RB1	0	22.13	22.24	22.17
			2	21.92	22.21	21.91
			5	21.30	22.18	21.43
		RB3	0	21.41	22.05	22.06
			1	20.98	21.51	21.78
			2	20.95	22.01	21.59
		RB6	6	21.73	21.66	21.49
Band 4/3MHz	QPSK	RB1	0	23.12	23.24	23.16
			7	22.36	22.56	22.78
			14	22.37	22.88	22.71
		RB8	0	22.74	22.60	22.48
			4	22.08	21.75	22.23
			7	21.78	22.13	22.13
		RB15	0	22.11	22.37	22.72
	16-QAM	RB1	0	22.12	22.22	22.15
			7	22.01	21.48	21.90
			14	21.27	21.82	21.88
		RB8	0	21.77	21.79	21.16
			4	21.48	20.76	21.33
			7	21.70	20.56	21.14
		RB15	0	21.53	21.18	21.59
Band 4/5MHz	QPSK	RB1	0	23.24	23.33	23.22
			12	22.35	22.35	22.32
			24	22.32	22.43	22.30
		RB12	0	22.92	23.05	22.37
			6	21.92	21.65	21.71
			11	22.16	21.46	21.61
		RB25	0	22.31	21.80	21.39
	16-QAM	RB1	0	22.19	22.28	22.21
			12	21.65	21.92	21.47
			24	21.88	21.57	21.90
		RB12	0	22.13	22.14	21.66
			6	21.50	21.06	21.10
			11	21.38	21.62	21.03
		RB25	0	20.80	21.23	21.42

Band 4/10MHz	QPSK	RB1	0	23.26	23.36	23.29
			25	22.29	23.27	22.52
			49	22.41	22.89	23.03
		RB25	0	22.61	23.10	22.38
			12	21.75	22.77	22.24
			24	22.08	22.40	21.83
		RB50	0	22.28	23.13	22.05
	16-QAM	RB1	0	22.64	22.75	22.67
			25	22.14	22.31	22.13
			49	22.35	21.91	22.25
		RB25	0	21.68	22.03	22.31
			12	21.22	21.70	22.06
			24	21.34	21.65	21.66
		RB50	0	21.33	22.03	21.35

Band 4/15MHz	QPSK	RB1	0	23.30	23.41	23.33
			37	23.03	23.12	23.11
			74	23.02	22.78	23.18
		RB36	0	22.73	22.67	22.77
			18	22.95	22.64	23.10
			37	22.59	22.69	23.06
		RB75	0	22.60	22.47	23.02
	16-QAM	RB1	0	22.77	22.82	22.72
			37	22.13	22.04	21.80
			74	21.93	22.20	22.39
		RB36	0	22.28	21.91	22.19
			18	21.77	21.09	21.35
			37	22.06	21.90	20.85
		RB75	0	21.98	21.67	21.76
Band 4/20MHz	QPSK	RB1	0	23.31	**23.43**	23.35
			49	23.16	22.60	22.37
			99	23.25	22.86	22.56
		RB50	0	23.20	22.77	22.96
			24	23.11	22.54	21.93
			49	22.86	21.76	21.49
		RB100	0	22.74	21.89	22.12
	16-QAM	RB1	0	22.48	22.66	22.51
			49	21.94	21.82	22.35
			99	22.46	22.40	22.11
		RB50	0	21.65	22.43	21.61
			24	21.66	21.73	21.46
			49	21.07	21.08	21.48
		RB100	0	21.17	21.49	21.73

LTE Band 7:

Band/BW	Modulation	Resource Block Size	Resource Block Offset	Ave Tx Power (dBm)		
				Low Channel	Middle Channel	High Channel
Band 7/5MHz	QPSK	RB1	0	22.92	23.07	22.95
			12	22.49	22.32	22.73
			24	22.11	22.22	22.85
		RB12	0	22.81	22.12	22.54
			6	22.31	22.15	21.96
			11	22.40	22.21	22.30
		RB25	0	21.65	22.05	22.41
	16-QAM	RB1	0	21.76	21.97	21.82
			12	21.50	21.52	21.26
			24	21.40	21.39	21.51
		RB12	0	21.32	21.43	20.83
			6	20.64	20.62	20.94
			11	21.01	20.53	20.82
		RB25	0	20.83	20.84	20.96
Band 7/10MHz	QPSK	RB1	0	22.93	23.11	22.89
			25	22.72	23.06	21.91
			49	22.18	22.39	22.31
		RB25	0	22.64	22.20	22.58
			12	22.50	23.05	21.70
			24	22.66	22.68	21.33
		RB50	0	22.30	22.36	21.00
	16-QAM	RB1	0	22.20	22.41	22.33
			25	21.53	22.13	21.95
			49	22.14	22.35	21.67
		RB25	0	21.77	21.58	21.67
			12	21.27	21.36	21.26
			24	21.35	21.89	21.83
		RB50	0	20.75	21.23	21.28
Band 7/15MHz	QPSK	RB1	0	22.98	23.15	23.06
			37	22.48	22.85	22.50
			74	22.58	22.19	22.95
		RB36	0	22.34	22.32	22.18
			18	22.11	22.71	21.61
			37	22.02	22.54	22.02
		RB75	0	22.18	22.54	21.81
	16-QAM	RB1	0	22.33	22.43	22.36
			37	21.83	21.48	21.90
			74	21.83	22.31	22.20
		RB36	0	22.10	22.13	22.14
			18	21.36	20.85	21.22
			37	21.61	21.44	21.17
		RB75	0	21.32	20.58	21.28

Band 7/20MHz	QPSK	RB1	0	23.07	**23.17**	23.11
			49	23.01	22.71	22.44
			99	22.87	22.40	22.83
		RB50	0	22.76	22.74	22.31
			24	22.91	22.69	21.74
			49	22.29	22.04	21.62
		RB100	0	22.68	21.89	21.60
	16-QAM	RB1	0	22.26	22.33	22.24
			49	22.05	22.09	21.26
			99	21.66	21.43	21.27
		RB50	0	21.99	21.98	21.61
			24	21.36	22.05	20.39
			49	21.32	22.04	20.45
		RB100	0	21.24	22.05	20.68

LTE Band 17:

Band/BW	Modulation	Resource Block Size	Resource Block Offset	Ave Tx Power (dBm)		
				Low Channel	Middle Channel	High Channel
Band 17/5MHz	QPSK	RB1	0	23.31	23.46	23.41
			12	23.08	22.53	22.60
			24	22.94	22.48	22.67
		RB12	0	22.74	23.41	22.79
			6	22.85	21.85	21.78
			11	22.33	22.39	21.96
		RB25	0	22.92	22.48	22.07
	16-QAM	RB1	0	22.56	22.64	22.54
			12	22.40	22.01	21.58
			24	22.07	22.23	21.88
		RB12	0	22.34	22.28	22.06
			6	21.45	21.45	21.15
			11	21.47	21.84	21.44
		RB25	0	21.72	21.97	20.85

Band17 /10MHz	QPSK	RB1	0	23.48	**23.56**	23.42
			25	22.72	23.18	22.75
			49	22.93	22.83	23.25
		RB25	0	23.11	22.96	22.49
			12	22.36	22.58	22.16
			24	21.98	22.69	22.27
		RB50	0	22.22	22.44	21.80
	16-QAM	RB1	0	22.53	22.64	22.57
			25	21.99	21.88	22.52
			49	21.64	21.78	21.88
		RB25	0	21.96	21.65	22.35
			12	21.62	21.27	21.70
			24	21.82	21.41	22.24
		RB50	0	21.16	21.32	21.58

Note:

1. The CMW500 Wideband Radio Communication tester is used for LTE output power measurements and SAR testing. Closed loop power control is used to keep the radio transmitters the max output power during the test.
2. KDB941225D05v02 r03- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

Bluetooth

Mode	Channel frequency (MHz)	Conducted Output Power	
		(dBm)	(mw)
BDR(GFSK)	(Low)2402	-0.75	0.841
	(Middle)2441	**0.46**	1.112
	(High)2480	-0.58	0.875
EDR(4-DQPSK)	(Low)2402	-1.32	0.738
	(Middle)2441	0.11	1.026
	(High)2480	-0.92	0.809
EDR-8DPSK	(Low)2402	-0.96	0.802
	(Middle)2441	0.31	1.074
	(High)2480	-0.59	0.873
BLE	(Low)2402	-6.01	0.251
	(Middle)2440	-5.47	0.284
	(High)2480	-7.20	0.191

Wi-Fi

Band	Frequency (MHz)	Conducted Output Power	
		(dBm)	(mw)
802.11b	2412	8.75	7.499
	2437	9.15	8.222
	2462	8.32	6.792
802.11g	2412	8.68	7.379
	2437	**9.38**	8.670
	2462	8.57	7.194
802.11n HT20	2412	8.76	7.516
	2437	9.25	8.414
	2462	8.45	6.998
802.11n HT40	2422	8.31	6.776
	2437	8.74	7.482
	2452	8.16	6.546

Note:

1. The output power was tested under data rate 1Mbps for 802.11b, 6Mbps for 802.11g, 6.5Mbps for 802.11n HT20, 13.5Mbps for 802.11n HT40.

SAR MEASUREMENT RESULTS

This page summarizes the results of the performed dosimetric evaluation.

SAR Test Data

Environmental Conditions

Temperature:	21-24 ℃
Relative Humidity:	50-53 %
ATM Pressure:	1001-1002 mbar

Testing was performed by Wilson Chen on 2014-12-02

GSM 850:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	824.2	GSM	-1.188	32.26	32.40	1.033	0.185	0.191	/
	836.6	GSM	-0.277	32.34	32.40	1.014	0.192	0.195	**1#**
	848.8	GSM	2.158	32.36	32.40	1.009	0.190	0.192	/
Left Head Tilt	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	1.298	32.34	32.40	1.014	0.112	0.114	/
	848.8	GSM	/	/	/	/	/	/	/
Right Head Cheek	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	1.925	32.34	32.40	1.014	0.184	0.187	/
	848.8	GSM	/	/	/	/	/	/	/
Right Head Tilt	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	0.749	32.34	32.40	1.014	0.106	0.107	/
	848.8	GSM	/	/	/	/	/	/	/
Body-Back-Headset (10mm)	824.2	GSM	/	/	/	/	/	/	/
	836.6	GSM	-2.659	32.34	32.40	1.014	0.331	0.336	/
	848.8	GSM	/	/	/	/	/	/	/

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

PCS Band:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	1850.2	GSM	/	/	/	/	/	/	/
	1880.0	GSM	-0.258	29.56	29.80	1.057	0.184	0.194	/
	1909.8	GSM	/	/	/	/	/	/	/
Left Head Tilt	1850.2	GSM	/	/	/	/	/	/	/
	1880.0	GSM	1.024	29.56	29.80	1.057	0.075	0.079	/
	1909.8	GSM	/	/	/	/	/	/	/
Right Head Cheek	1850.2	GSM	1.588	29.74	29.80	1.014	0.197	0.200	/
	1880.0	GSM	-1.657	29.56	29.80	1.057	0.191	0.202	/
	1909.8	GSM	-2.587	29.70	29.80	1.023	0.207	**0.212**	**2#**
Right Head Tilt	1850.2	GSM	/	/	/	/	/	/	/
	1880.0	GSM	1.015	29.56	29.80	1.057	0.071	0.075	/
	1909.8	GSM	/	/	/	/	/	/	/
Body-Back-Headset (10mm)	1850.2	GSM	/	/	/	/	/	/	/
	1880.0	GSM	1.265	29.56	29.80	1.057	0.398	0.421	/
	1909.8	GSM	/	/	/	/	/	/	/

Note:
1. When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. The EUT transmit and receive through the same GSM antenna while testing SAR.
3. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.
4. When the maximum output power variation across the required test channels is > ½ dB, instead of the middle channel, the highest output power channel must be used.

WCDMA 850

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	IC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	826.4	WCDMA 850	/	/	/	/	/	/	/
	836.6	WCDMA 850	/	/	/	/	/	/	/
	846.6	WCDMA 850	-1.554	22.52	22.60	1.019	0.149	**0.152**	**3#**
Left Head Tilt	826.4	WCDMA 850	/	/	/	/	/	/	/
	836.6	WCDMA 850	/	/	/	/	/	/	/
	846.6	WCDMA 850	1.858	22.52	22.60	1.019	0.086	0.088	/
Right Head Cheek	826.4	WCDMA 850	/	/	/	/	/	/	/
	836.6	WCDMA 850	/	/	/	/	/	/	/
	846.6	WCDMA 850	0.214	22.52	22.60	1.019	0.138	0.141	/
Right Head Tilt	826.4	WCDMA 850	/	/	/	/	/	/	/
	836.6	WCDMA 850	/	/	/	/	/	/	/
	846.6	WCDMA 850	2.118	22.52	22.60	1.019	0.074	0.075	/

WCDMA1900

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	1852.4	WCDMA1900	/	/	/	/	/	/	/
	1880.0	WCDMA1900	/	/	/	/	/	/	/
	1907.6	WCDMA1900	-2.549	22.85	22.90	1.012	0.229	0.232	/
Left Head Tilt	1852.4	WCDMA1900	/	/	/	/	/	/	/
	1880.0	WCDMA1900	/	/	/	/	/	/	/
	1907.6	WCDMA1900	1.255	22.85	22.90	1.012	0.106	0.107	/
Right Head Cheek	1852.4	WCDMA1900	/	/	/	/	/	/	/
	1880.0	WCDMA1900	/	/	/	/	/	/	/
	1907.6	WCDMA1900	2.268	22.85	22.90	1.012	0.243	**0.246**	**4#**
Right Head Tilt	1852.4	WCDMA1900	/	/	/	/	/	/	/
	1880.0	WCDMA1900	/	/	/	/	/	/	/
	1907.6	WCDMA1900	1.337	22.85	22.90	1.012	0.115	0.116	/

Note:

1. When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement Channel) Configured in Test Loop Model.
5. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.

LTE Band 4:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	1720	LTE Band 4	/	/	/	/	/	/	/
	1735	LTE Band 4	-2.588	22.43	22.50	1.016	0.162	0.165	/
	1745	LTE Band 4	/	/	/	/	/	/	/
Left Head Tilt	1720	LTE Band 4	/	/	/	/	/	/	/
	1735	LTE Band 4	1.884	22.43	22.50	1.016	0.069	0.070	/
	1745	LTE Band 4	/	/	/	/	/	/	/
Right Head Cheek	1720	LTE Band 4	/	/	/	/	/	/	/
	1735	LTE Band 4	0.958	22.43	22.50	1.016	0.168	**0.171**	**5#**
	1745	LTE Band 4	/	/	/	/	/	/	/
Right Head Tilt	1720	LTE Band 4	/	/	/	/	/	/	/
	1735	LTE Band 4	-1.628	22.43	22.50	1.016	0.073	0.074	/
	1745	LTE Band 4	/	/	/	/	/	/	/

LTE Band 7:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Left Head Cheek	2510	LTE Band 7	/	/	/	/	/	/	/
	2535	LTE Band 7	-2.858	23.17	23.20	1.007	0.439	0.442	/
	2560	LTE Band 7	/	/	/	/	/	/	/
Left Head Tilt	2510	LTE Band 7	/	/	/	/	/	/	/
	2535	LTE Band 7	1.032	23.17	23.20	1.007	0.215	0.217	/
	2560	LTE Band 7	/	/	/	/	/	/	/
Right Head Cheek	2510	LTE Band 7	/	/	/	/	/	/	/
	2535	LTE Band 7	-3.554	23.17	23.20	1.007	0.468	**0.471**	**6#**
	2560	LTE Band 7	/	/	/	/	/	/	/
Right Head Tilt	2510	LTE Band 7	/	/	/	/	/	/	/
	2535	LTE Band 7	1.227	23.17	23.20	1.007	0.207	0.208	/
	2560	LTE Band 7	/	/	/	/	/	/	/

LTE Band 17:

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Corr. SAR	Plot
Left Head Cheek	709	LTE Band 17	/	/	/	/	/	/	/
	710	LTE Band 17	-0.571	23.56	23.60	1.009	0.056	**0.057**	**7#**
	711	LTE Band 17	/	/	/	/	/	/	/
Left Head Tilt	709	LTE Band 17	/	/	/	/	/	/	/
	710	LTE Band 17	0.458	23.56	23.60	1.009	0.035	0.035	/
	711	LTE Band 17	/	/	/	/	/	/	/
Right Head Cheek	709	LTE Band 17	/	/	/	/	/	/	/
	710	LTE Band 17	-2.655	23.56	23.60	1.009	0.052	0.052	
	711	LTE Band 17	/	/	/	/	/	/	/
Right Head Tilt	709	LTE Band 17	/	/	/	/	/	/	/
	710	LTE Band 17	1.845	23.56	23.60	1.009	0.033	0.033	/
	711	LTE Band 17	/	/	/	/	/	/	/

Note:

KDB941225D05v02 r03- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.

Mobile Hot-Spot Test Result

The DUT is capable of functioning as a WiFi to Cellular Mobile hotspot. Additional SAR testing was performed according to KDB 941225 D06. Testing was performed with a separation of 1cm between the DUT and the flat phantom. The DUT was positioned for SAR tests with the back surfaces facing the phantom, and also with the edges facing the phantom in which the transmitting antenna is <2.5 cm from the edge. Each transmit band was utilized for SAR testing. The tested mode has been selected within each band that exhibits the highest time average output power.

Hot spot-GPRS (Frequency Band: 835)

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Corr. SAR	Plot
Body-Back (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	1.129	29.12	29.20	1.019	0.485	**0.494**	**8#**
	848.8	GPRS	/	/	/	/	/	/	/
Body-Left (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	1.058	29.12	29.20	1.019	0.394	0.401	/
	848.8	GPRS	/	/	/	/	/	/	/
Body-Right (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	2.274	29.12	29.20	1.019	0.192	0.196	
	848.8	GPRS	/	/	/	/	/	/	/
Body-Bottom (10mm)	824.2	GPRS	/	/	/	/	/	/	/
	836.6	GPRS	-2.659	29.12	29.20	1.019	0.095	0.097	/
	848.8	GPRS	/	/	/	/	/	/	/

Note:
1 .When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. The EUT is a Capability Class B mobile phone which can be attached to both GPRS and GSM services.
3.The Multi-slot Classes of EUT is Class 12 which has maximum 4 Downlink slots and 4 Uplink slots, the maximum active slots is 5, when perform the multiple slots scan, 1DL+4UL is the worst case.
4. The EUT transmit and receive through the same GSM antenna while testing SAR.
5. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.

Hot spot-GPRS (Frequency Band: 1900)

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body-Back (10mm)	1850.2	GPRS	-1.279	36.36	36.40	1.009	0.632	**0.638**	**9#**
	1880.0	GPRS	/	/	/	/	/	/	/
	1909.8	GPRS	/	/	/	/	/	/	/
Body-Left (10mm)	1850.2	GPRS	0.128	36.36	36.40	1.009	0.125	0.126	/
	1880.0	GPRS	/	/	/	/	/	/	/
	1909.8	GPRS	/	/	/	/	/	/	/
Body-Right (10mm)	1850.2	GPRS	-2.658	36.36	36.40	1.009	0.186	0.188	
	1880.0	GPRS	/	/	/	/	/	/	/
	1909.8	GPRS	/	/	/	/	/	/	/
Body-Bottom (10mm)	1850.2	GPRS	1.958	36.36	36.40	1.009	0.482	0.486	/
	1880.0	GPRS	/	/	/	/	/	/	/
	1909.8	GPRS	/	/	/	/	/	/	/

Note:
1 .When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. The EUT is a Capability Class B mobile phone which can be attached to both GPRS and GSM services.
3. The Multi-slot Classes of EUT is Class12 which has maximum 4 Downlink slots and 4 Uplink slots, the maximum active slots is 5, when perform the multiple slots scan, 1DL+4UL is the worst case.
4. The EUT transmit and receive through the same GSM antenna while testing SAR.
5. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.

Hot Spot-WCDMA850

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body-Back (10mm)	826.4	WCDMA850	/	/	/	/	/	/	/
	836.6	WCDMA850	/	/	/	/	/	/	/
	846.6	WCDMA850	-1.984	22.52	22.60	1.019	0.259	**0.264**	**10#**
Body-Left (10mm)	826.4	WCDMA850	/	/	/	/	/	/	/
	836.6	WCDMA850	/	/	/	/	/	/	/
	846.6	WCDMA850	2.658	22.52	22.60	1.019	0.139	0.142	/
Body-Right (10mm)	826.4	WCDMA850	/	/	/	/	/	/	/
	836.6	WCDMA850	/	/	/	/	/	/	/
	846.6	WCDMA850	1.068	22.52	22.60	1.019	0.095	0.097	
Body-Bottom (10mm)	826.4	WCDMA850	/	/	/	/	/	/	/
	836.6	WCDMA850	/	/	/	/	/	/	/
	846.6	WCDMA850	1.665	22.52	22.60	1.019	0.042	0.043	/

Hot Spot-WCDMA1900

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body-Back (10mm)	1852.4	WCDMA1900	/	/	/	/	/	/	/
	1880.0	WCDMA1900	/	/	/	/	/	/	/
	1907.6	WCDMA1900	0.771	22.85	22.90	1.012	0.768	**0.777**	**11#**
Body-Left (10mm)	1852.4	WCDMA1900	/	/	/	/	/	/	/
	1880.0	WCDMA1900	/	/	/	/	/	/	/
	1907.6	WCDMA1900	-2.658	22.85	22.90	1.012	0.174	0.176	/
Body-Right (10mm)	1852.4	WCDMA1900	/	/	/	/	/	/	/
	1880.0	WCDMA1900	/	/	/	/	/	/	/
	1907.6	WCDMA1900	0.528	22.85	22.90	1.012	0.263	0.266	
Body-Bottom (10mm)	1852.4	WCDMA1900	/	/	/	/	/	/	/
	1880.0	WCDMA1900	/	/	/	/	/	/	/
	1907.6	WCDMA1900	2.195	22.85	22.90	1.012	0.695	0.703	/

Note:
1. When the 1-g SAR is ≤ 0.8W/Kg, testing for other channels are optional.
2. The default test configuration is to measure SAR with an established radio link between the EUT and a communication test set using a 12.2 kbps RMC (reference measurement Channel) Configured in Test Loop Model.
5. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.

Hot Spot-LTE Band 4

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body-Back (10mm)	1720	RB1	/	/	/	/	/	/	/
	1732.5	RB1	1.669	23.43	23.50	1.016	0.148	**0.150**	**12#**
	1745	RB1	/	/	/	/	/	/	/
Body-Left (10mm)	1720	RB1	/	/	/	/	/	/	/
	1732.5	RB1	0.825	23.43	23.50	1.016	0.065	0.066	/
	1745	RB1	/	/	/	/	/	/	/
Body-Right (10mm)	1720	RB1	/	/	/	/	/	/	/
	1732.5	RB1	-2.557	23.43	23.50	1.016	0.078	0.079	
	1745	RB1	/	/	/	/	/	/	/
Body-Bottom (10mm)	1720	RB1	/	/	/	/	/	/	/
	1732.5	RB1	0.714	23.43	23.50	1.016	0.113	0.115	/
	1745	RB1	/	/	/	/	/	/	/

Hot Spot-LTE Band 7

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body-Back (10mm)	2510	RB1	0.747	23.07	23.20	1.030	0.974	1.003	/
	2535	RB1	-2.474	23.17	23.20	1.007	1.175	**1.183**	**13#**
	2560	RB1	3.125	23.11	23.20	1.021	0.895	0.914	/
	2535	50%RB	1.054	23.17	23.20	1.007	0.984	0.991	/
	2535	100%RB	2.658	23.17	23.20	1.007	1.001	1.008	/
Body-Left (10mm)	2510	RB1	/	/	/	/	/	/	/
	2535	RB1	0.528	23.17	23.20	1.007	0.185	0.186	/
	2560	RB1	/	/	/	/	/	/	/
Body-Right (10mm)	2510	RB1	/	/	/	/	/	/	/
	2535	RB1	0.714	23.17	23.20	1.007	0.329	0.331	
	2560	RB1	/	/	/	/	/	/	/
Body-Bottom (10mm)	2510	RB1	2.154	23.07	23.20	1.030	0.802	0.826	/
	2535	RB1	2.215	23.17	23.20	1.007	0.913	0.919	/
	2560	RB1	-3.124	23.11	23.20	1.021	0.774	0.790	/
	2535	50%RB	1.065	23.17	23.20	1.007	0.875	0.881	/
	2535	100%RB	-0.992	23.17	23.20	1.007	0.854	0.860	/

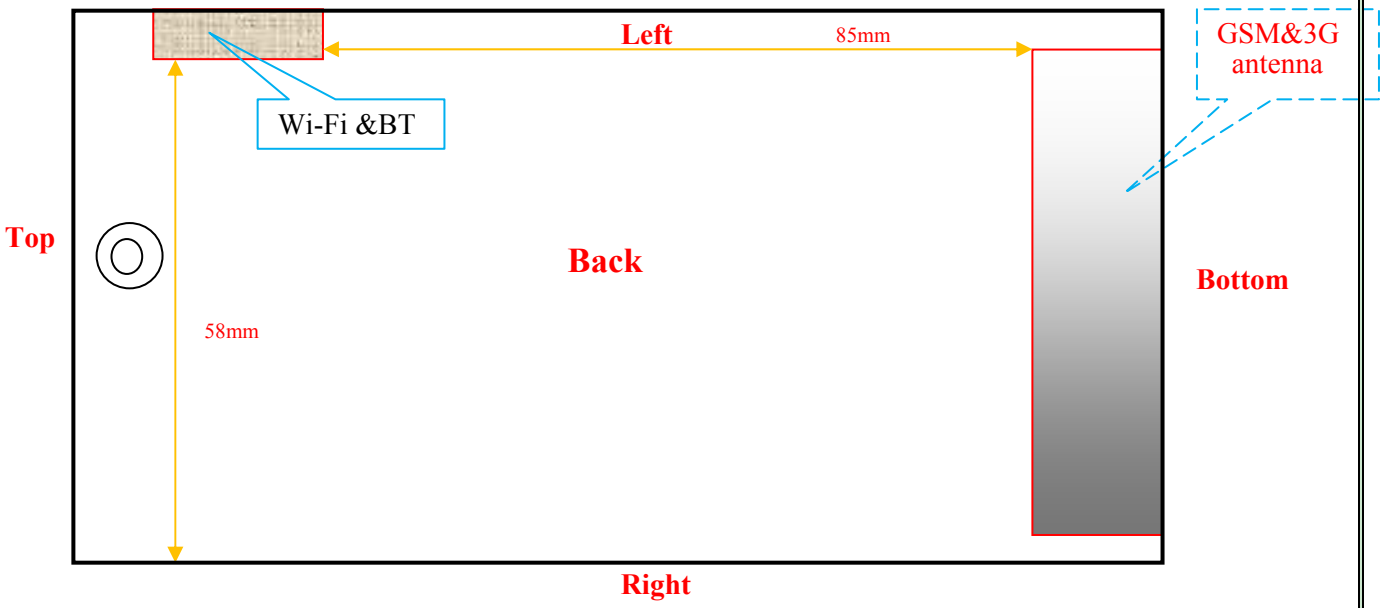
Hot Spot-LTE Band 17

EUT Position	Frequency (MHz)	Test Mode	Power Drift (%)	Max. Meas. Power (dBm)	Max. Rated Power (dBm)	FCC 1g SAR (W/Kg)			
						Scaled Factor	Meas. SAR	Scaled SAR	Plot
Body-Back (10mm)	709	RB1	/	/	/	/	/	/	/
	710	RB1	1.855	23.56	23.60	1.009	0.102	**0.103**	**14#**
	711	RB1	/	/	/	/	/	/	/
Body-Left (10mm)	709	RB1	/	/	/	/	/	/	/
	710	RB1	0.265	23.56	23.60	1.009	0.032	0.032	/
	711	RB1	/	/	/	/	/	/	/
Body-Right (10mm)	709	RB1	/	/	/	/	/	/	/
	710	RB1	1.977	23.56	23.60	1.009	0.065	0.066	
	711	RB1	/	/	/	/	/	/	/
Body-Bottom (10mm)	709	RB1	/	/	/	/	/	/	/
	710	RB1	-2.659	23.56	23.60	1.009	0.013	0.013	/
	711	RB1	/	/	/	/	/	/	/

Note:
1. KDB941225D05v02 r03- Start with the largest channel bandwidth and measure SAR for QPSK with 1 RB allocation, using the RB offset and required test channel combination with the highest maximum output power among RB offsets at the upper edge, middle and lower edge of each required test channel. When the reported SAR is ≤ 0.8 W/kg, testing of the remaining RB offset configurations and required test channels is not required for 1 RB allocation; otherwise, SAR is required for the remaining required test channels and only for the RB offset configuration with the highest output power for that channel. When the reported SAR of a required test channel is > 1.45 W/kg, SAR is required for all three RB offset configurations for that required test channel.
2. When SAR or MPE is not measured at the maximum power level allowed for production units, the results must be scaled to the maximum tune-up tolerance limit according to the power applied to the individual channels tested to determine compliance.

SAR SIMULTANEOUS TRANSMISSION DESCRIPTION

BT&WiFi and GSM&3G Antennas Location:



Simultaneous Transmission:

Description of Simultaneous Transmit Capabilities			Antennas Distance (mm)
Transmitter Combination	Simultaneous?	Hotspot?	
GSM + WCDMA	×	×	0
GSM + LTE	×	×	0
GSM + Bluetooth	√	×	85
GSM + Wi-Fi	√	×	85
GPRS + WCDMA	×	×	0
GPRS + LTE	×	×	0
GPRS + Bluetooth	√	×	85
GPRS + Wi-Fi	√	√	85
WCDMA + Bluetooth	√	×	85
WCDMA + Wi-Fi	√	√	85
WCDMA + LTE	×	×	0
LTE+ Wi-Fi	√	√	85
LTE+ Bluetooth	√	×	85
Wi-Fi+ Bluetooth	×	×	0

Standalone SAR test exclusion considerations

Head Position:

Mode	P_{avg} (dBm)	P_{avg} (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
GSM850	23.40	218.78	0	40.34	3.0	No
PCS1900	20.80	120.23	0	33.14	3.0	No
WCDMSA850	22.60	181.97	0	33.55	3.0	No
WCDMSA1900	22.90	194.98	0	53.75	3.0	No
LTE Band4	23.50	223.87	0	58.89	3.0	No
LTE Band7	23.20	208.93	0	66.53	3.0	No
LTE Band17	23.60	229.09	0	38.61	3.0	No
Wi-Fi	9.40	8.71	0	**2.73**	3.0	Yes
Bluetooth	0.50	1.12	0	**0.35**	3.0	Yes

Body Position:

Mode	P_{avg} (dBm)	P_{avg} (mW)	Distance (mm)	Calculated value	Threshold (1-g)	SAR Test Exclusion
GPRS850	26.20	416.87	10.00	38.43	3.0	No
GPRS1900	23.40	218.78	10.00	30.16	3.0	No
WCDMSA850	22.60	181.97	10.00	16.78	3.0	No
WCDMSA1900	22.90	194.98	10.00	26.88	3.0	No
LTE Band4	23.50	223.87	10.00	29.45	3.0	No
LTE Band7	23.20	208.93	10.00	33.27	3.0	No
LTE Band17	23.60	229.09	10.00	19.30	3.0	No
Wi-Fi	9.40	8.71	10.00	**1.36**	3.0	Yes
Bluetooth	0.50	1.12	10.00	**0.18**	3.0	Yes

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at *test separation distances* ≤ 50 mm are determined by:

[(*max. power of channel, including tune-up tolerance, mW*)/(*min. test separation distance, mm*)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion.

Standalone SAR estimation:

Mode	Frequency (GHz)	Distance (mm)	P_{avg} (dBm)	P_{avg} (mW)	Estimated $_{1-g}$ (W/kg)
Wi-Fi Head	2.45	0	9.40	8.71	0.364
BT Head	2.45	0	0.50	1.12	0.047
Wi-Fi Body	2.45	10	9.40	8.71	0.182
BT Body	2.45	10	0.50	1.12	0.024

When standalone SAR test exclusion applies to an antenna that transmits simultaneously with other antennas, the standalone SAR must be estimated according to following to determine simultaneous transmission SAR test exclusion:
[(*max. power of channel, including* ***tune-up tolerance****, mW*)/(*min. test separation distance,mm*)]·[√f(GHz)/*x*] W/kg for *test separation distances* ≤ 50 mm;
where *x* = 7.5 for 1-g SAR.
When the minimum test separation distance is < 5 mm, a distance of 5 mm is applied to determine SAR test Exclusion

Simultaneous SAR test exclusion considerations:

GSM with BT:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		GSM	BT	< 1.6W/kg
GSM850	Left Head Cheek	0.195	0.047	0.242
	Left Head Tile	0.114	0.047	0.161
	Right Head Cheek	0.187	0.047	0.234
	Right Head Tilt	0.107	0.047	0.154
	Body–Headset-Back	0.336	0.024	0.360
PCS1900	Left Head Cheek	0.194	0.047	0.241
	Left Head Tile	0.079	0.047	0.126
	Right Head Cheek	0.212	0.047	0.259
	Right Head Tilt	0.075	0.047	0.122
	Body–Headset-Back	0.421	0.024	0.445

WCDMA with BT:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		WCDMA	BT	< 1.6W/kg
WCDMA 850	Left Head Cheek	0.153	0.047	0.200
	Left Head Tile	0.088	0.047	0.135
	Right Head Cheek	0.141	0.047	0.188
	Right Head Tilt	0.075	0.047	0.122
WCDMA 1900	Left Head Cheek	0.232	0.047	0.279
	Left Head Tile	0.107	0.047	0.154
	Right Head Cheek	0.246	0.047	0.293
	Right Head Tilt	0.116	0.047	0.163

LTE with BT:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		WCDMA	BT	< 1.6W/kg
Band 4	Left Head Cheek	0.165	0.047	0.212
	Left Head Tile	0.070	0.047	0.117
	Right Head Cheek	0.171	0.047	0.218
	Right Head Tilt	0.074	0.047	0.121
Band 7	Left Head Cheek	0.442	0.047	0.489
	Left Head Tile	0.217	0.047	0.264
	Right Head Cheek	0.471	0.047	0.518
	Right Head Tilt	0.208	0.047	0.255
Band 17	Left Head Cheek	0.057	0.047	0.104
	Left Head Tile	0.035	0.047	0.082
	Right Head Cheek	0.052	0.047	0.099
	Right Head Tilt	0.033	0.047	0.080

GSM with WiFi:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		GSM	Wi-Fi	< 1.6W/kg
GSM850	Left Head Cheek	0.195	0.364	0.559
	Left Head Tile	0.114	0.364	0.478
	Right Head Cheek	0.187	0.364	0.551
	Right Head Tilt	0.107	0.364	0.471
	Body–Headset-Back	0.336	0.182	0.518
PCS1900	Left Head Cheek	0.194	0.364	0.558
	Left Head Tile	0.079	0.364	0.443
	Right Head Cheek	0.212	0.364	0.576
	Right Head Tilt	0.075	0.364	0.439
	Body–Headset-Back	0.421	0.182	0.603

WCDMA with Wi-Fi:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		WCDMA	Wi-Fi	< 1.6W/kg
WCDMA 850	Left Head Cheek	0.153	0.364	0.517
	Left Head Tile	0.088	0.364	0.452
	Right Head Cheek	0.141	0.364	0.505
	Right Head Tilt	0.075	0.364	0.439
WCDMA 1900	Left Head Cheek	0.232	0.364	0.596
	Left Head Tile	0.107	0.364	0.471
	Right Head Cheek	0.246	0.364	0.610
	Right Head Tilt	0.116	0.364	0.480

LTE with Wi-Fi:

Mode	Position	Reported SAR (W/kg)		ΣSAR
		WCDMA	BT	< 1.6W/kg
Band 4	Left Head Cheek	0.165	0.364	0.529
	Left Head Tile	0.070	0.364	0.434
	Right Head Cheek	0.171	0.364	0.535
	Right Head Tilt	0.074	0.364	0.438
Band 7	Left Head Cheek	0.442	0.364	0.806
	Left Head Tile	0.217	0.364	0.581
	Right Head Cheek	0.471	0.364	**0.835**
	Right Head Tilt	0.208	0.364	0.572
Band 17	Left Head Cheek	0.057	0.364	0.421
	Left Head Tile	0.035	0.364	0.399
	Right Head Cheek	0.052	0.364	0.416
	Right Head Tilt	0.033	0.364	0.397

Conclusion:

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

Hotspot:

Evaluations for Simultaneous SAR, Mobile Hot Spot Positions					
Test Position	Body-Back (1.0cm)	Body-Left (1.0cm)	Body-Right (1.0cm)	Body-Bottom (1.0cm)	Body-Top (1.0cm)
Mode	Stand Alone 1-g SAR (W/Kg)				
GPRS 850	0.494	0.401	0.196	0.097	
GPRS 1900	0.638	0.126	0.188	0.486	
WCDMA850	0.264	0.142	0.097	0.043	
WCDMA 1900	0.777	0.176	0.266	0.703	
LTE Band 4	0.150	0.066	0.079	0.115	
LTE Band 7	1.183	0.186	0.331	0.919	
LTE Band 17	0.103	0.032	0.066	0.013	
Wi-Fi	0.182	0.182	/	/	0.182
	∑ 1-g SAR(W/Kg)				
GPRS850 + Wi-Fi	0.676	0.583	/	/	/
GPRS1900 + Wi-Fi	0.82	0.308	/	/	/
WCDMA850 + Wi-Fi	0.446	0.324	/	/	/
WCDMA 1900 + Wi-Fi	0.959	0.358	/	/	/
LTE Band 4+ Wi-Fi	0.332	0.248	/	/	/
LTE Band 7+ Wi-Fi	**1.365**	0.368	/	/	/
LTE Band 17+ Wi-Fi	0.285	0.214	/	/	/

Note:

If the sum of the 1g SAR measured for the simultaneously transmitting antennas is less than the SAR limit, SAR measurement for simultaneous transmission is not required.

SAR Plots (Summary of the Highest SAR Values)

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

Left Head Cheek (836.6 MHz Middle Channel)

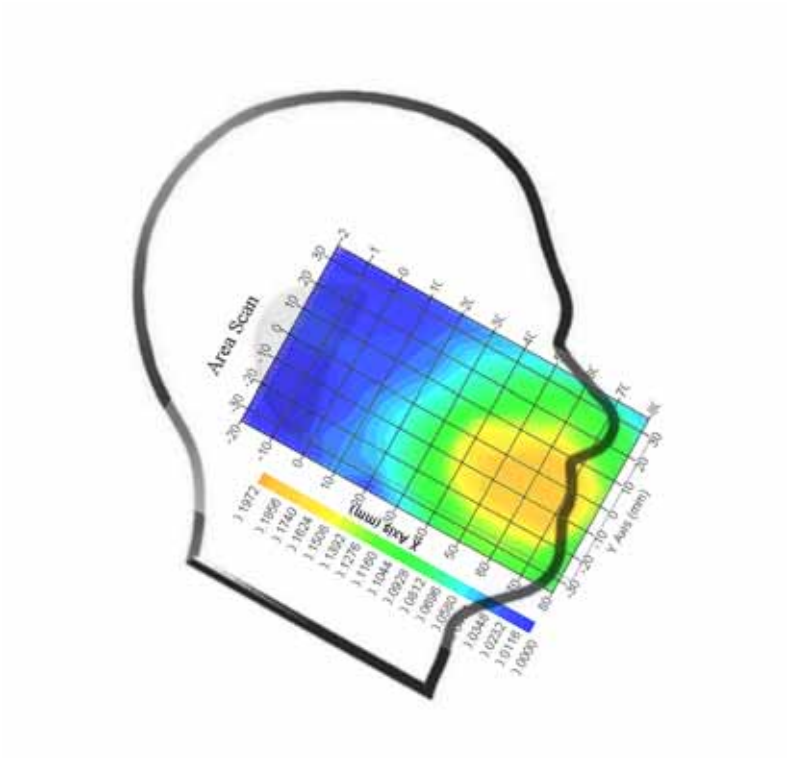
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 10x13x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.024 W/kg
Power Drift-Finish : 0.024 W/kg
Power Drift (%) : -0.277

Tissue Data
Type : Head
Frequency : 836.6 MHz
Epsilon : 41.01 F/m
Sigma : 0.92 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 8
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.192 W/kg
10 gram SAR value : 0.129 W/kg
Area Scan Peak SAR : 0.197 W/kg
Zoom Scan Peak SAR : 0.331 W/kg

Plot 1#



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

Right Head Cheek(1909.8 MHz High Channel)

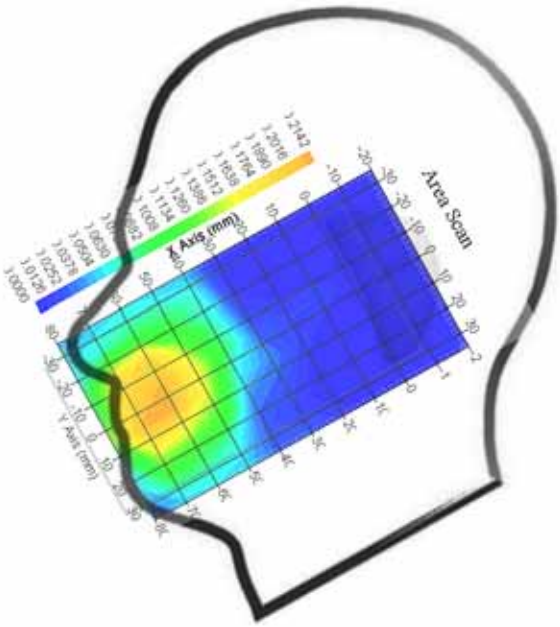
Measurement Data
Test mode : GSM
Crest Factor : 8
Scan Type : Complete
Area Scan : 11x8x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.001 W/kg
Power Drift-Finish : 0.001 W/kg
Power Drift (%) : -2.587

Tissue Data
Type : Head
Frequency : 1909.8 MHz
Epsilon : 39.68 F/m
Sigma : 1.42 S/m
Density : 1000.00 kg/cu. M

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 8
Conversion Factor : 4.8
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.207 W/kg
10 gram SAR value : 0.119 W/kg
Area Scan Peak SAR : 0.214 W/kg
Zoom Scan Peak SAR : 0.349 W/kg

Plot 2#



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

WCDMA850; Left Head Cheek (846.6 MHz High Channel)

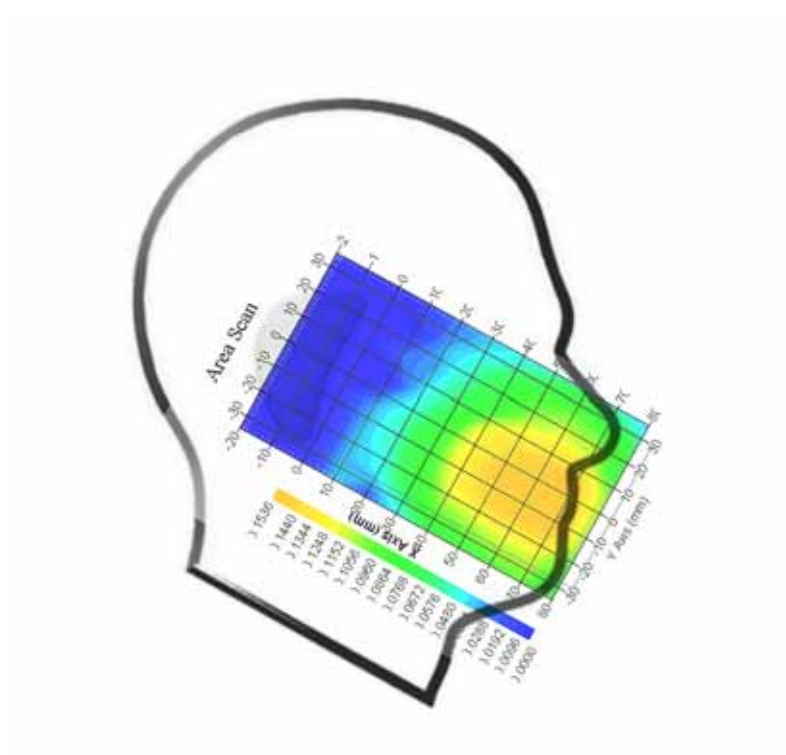
Measurement Data
Test mode : WCDMA850
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.008 W/kg
Power Drift-Finish : 0.008 W/kg
Power Drift (%) : -1.554

Tissue Data
Type : Head
Frequency : 846.6 MHz
Epsilon : 41.01 F/m
Sigma : 0.92 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 1
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.149 W/kg
10 gram SAR value : 0.102 W/kg
Area Scan Peak SAR : 0.154 W/kg
Zoom Scan Peak SAR : 0.273 W/kg

Plot 3#



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

WCDMA1900; Right Head Cheek (1907.6 MHz High Channel)

Measurement Data

Test mode	: WCDMA1900
Crest Factor	: 1
Scan Type	: Complete
Area Scan	: 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan	: 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start	: 0.001 W/kg
Power Drift-Finish	: 0.001 W/kg
Power Drift (%)	: 2.268

Tissue Data

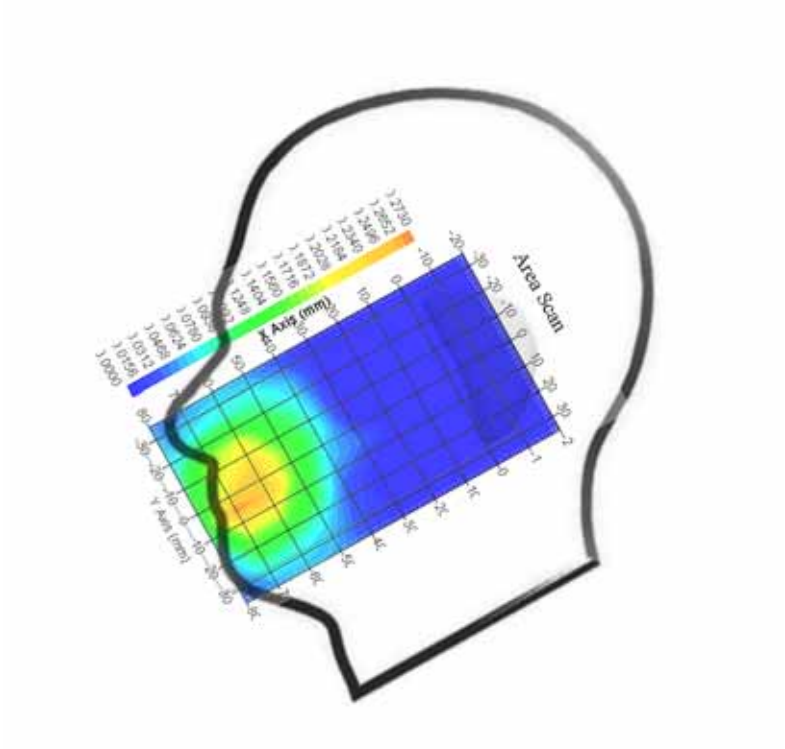
Type	: Head
Frequency	: 1907.6 MHz
Epsilon	: 39.73 F/m
Sigma	: 1.42 S/m
Density	: 1000.00 kg/cu. m

Probe Data

Serial No.	: 500-00283
Frequency Band	: 1900
Duty Cycle Factor	: 1
Conversion Factor	: 4.8
Probe Sensitivity	: 1.20 1.20 1.20 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	: 0.130 W/kg
Area Scan Peak SAR	: 0.273 W/kg
Zoom Scan Peak SAR	: 0.410 W/kg

Plot 4#



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

LTE Band 4; Right Head Cheek (1732.5MHz Middle Channel)

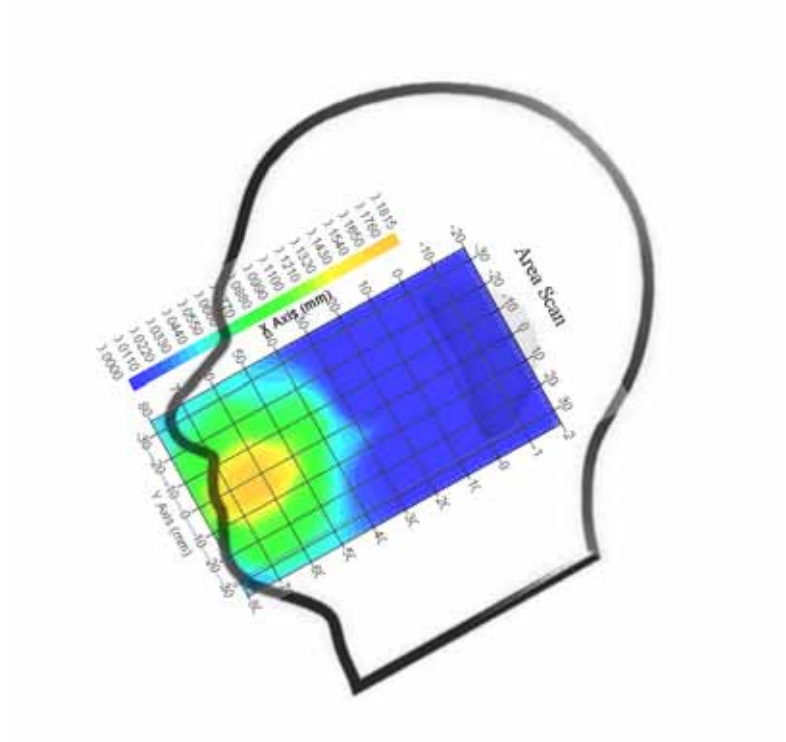
Measurement Data
Test mode : RB1
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.001 W/kg
Power Drift-Finish : 0.001 W/kg
Power Drift (%) : 0.958

Tissue Data
Type : Head
Frequency : 1732.5 MHz
Epsilon : 39.38 F/m
Sigma : 1.37 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1750
Duty Cycle Factor : 1
Conversion Factor : 5.4
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 : 0.168 W/kg
10 gram SAR value : 0.091 W/kg
Area Scan Peak SAR : 0.181 W/kg
Zoom Scan Peak SAR : 0.295 W/kg

Plot 5#



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

LTE Band 7; Right Head Cheek (2535MHz Middle Channel)

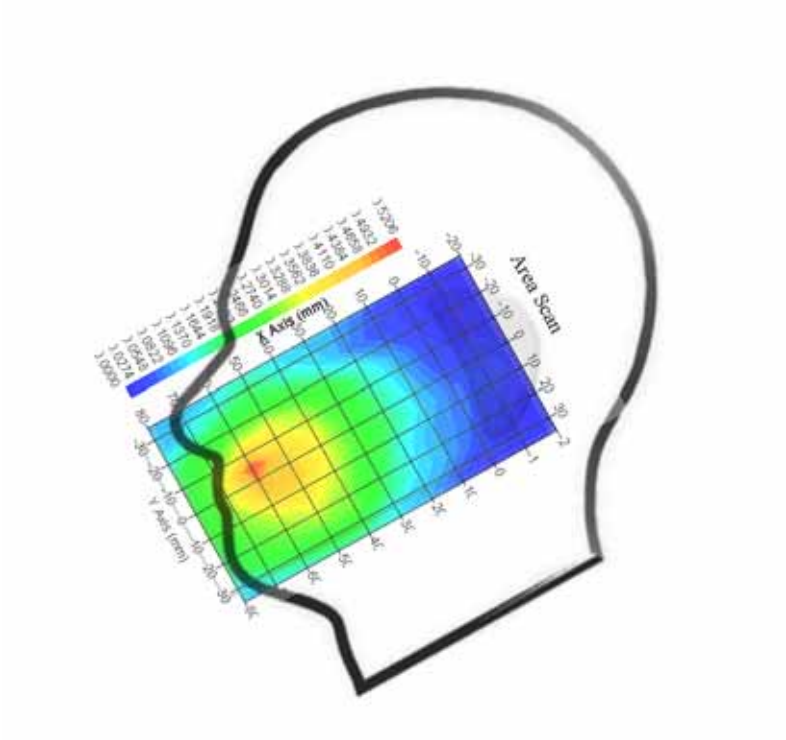
Measurement Data
Test mode : RB1
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.005 W/kg
Power Drift-Finish : 0.005 W/kg
Power Drift (%) : -3.554

Tissue Data
Type : Head
Frequency : 2535 MHz
Epsilon : 39.58 F/m
Sigma : 1.79 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 2450
Duty Cycle Factor : 1
Conversion Factor : 4.9
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 : 0.468 W/kg
10 gram SAR value : 0.302 W/kg
Area Scan Peak SAR : 0.521 W/kg
Zoom Scan Peak SAR : 0.813 W/kg

Plot 6#



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

LTE Band 17; Left Head Cheek (710MHz Middle Channel)

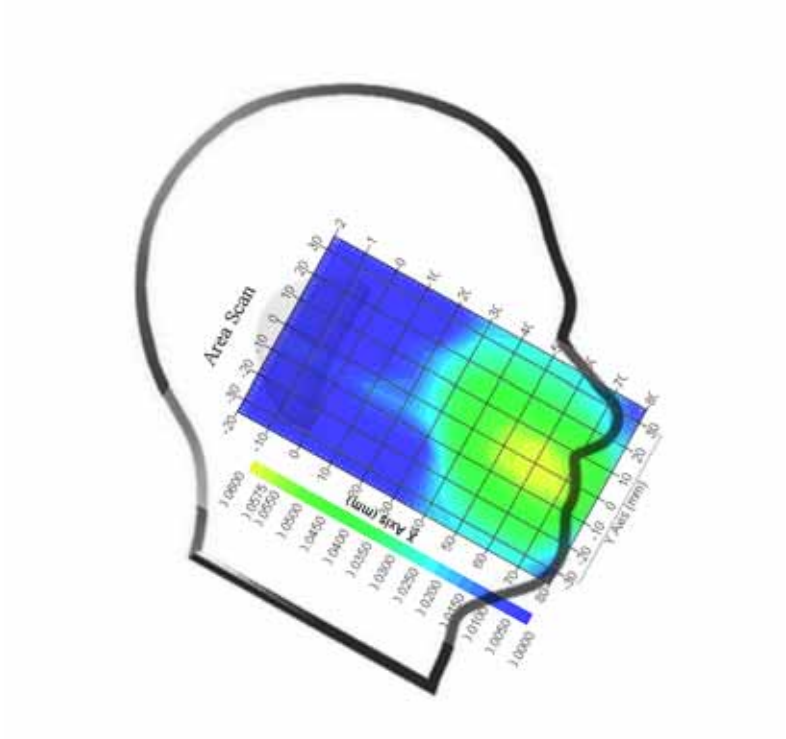
Measurement Data
Test mode : RB1
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.005 W/kg
Power Drift-Finish : 0.005 W/kg
Power Drift (%) : -0.571

Tissue Data
Type : Head
Frequency : 710 MHz
Epsilon : 41.07 F/m
Sigma : 0.88 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 750
Duty Cycle Factor : 1
Conversion Factor : 6.0
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 : 0.056 W/kg
10 gram SAR value : 0.034 W/kg
Area Scan Peak SAR : 0.060 W/kg
Zoom Scan Peak SAR : 0.100 W/kg

Plot 7#



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

Body-worn-Back (836.6 MHz Middle Channel)

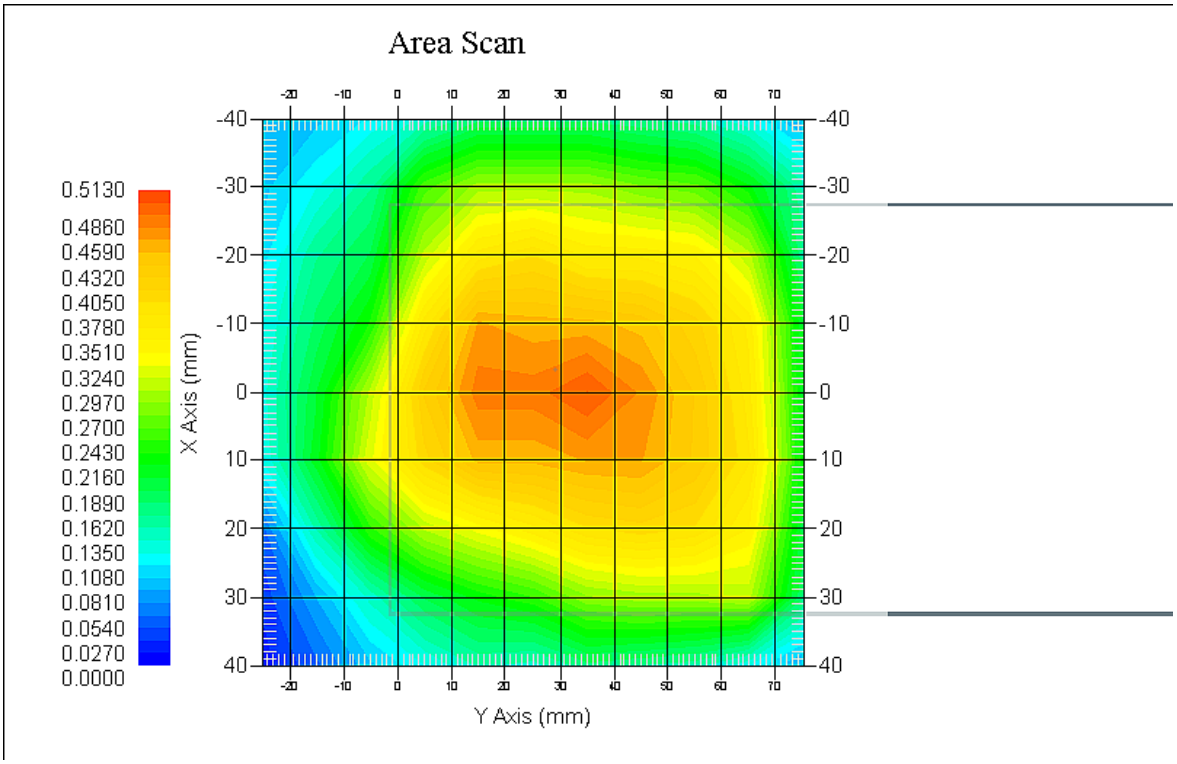
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type： : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.415 W/kg
Power Drift-Finish : 0.420W/kg
Power Drift (%) : 1.129

Tissue Data
Type : Body
Frequency : 836.6 MHz
Epsilon : 53.79 F/m
Sigma : 0.96 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 2
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.485 W/kg
10 gram SAR value : 0.362 W/kg
Area Scan Peak SAR : 0.513 W/kg
Zoom Scan Peak SAR : 0.844 W/kg

Plot 8#



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

Body-worn-Back (1850.2 MHz Low Channel)

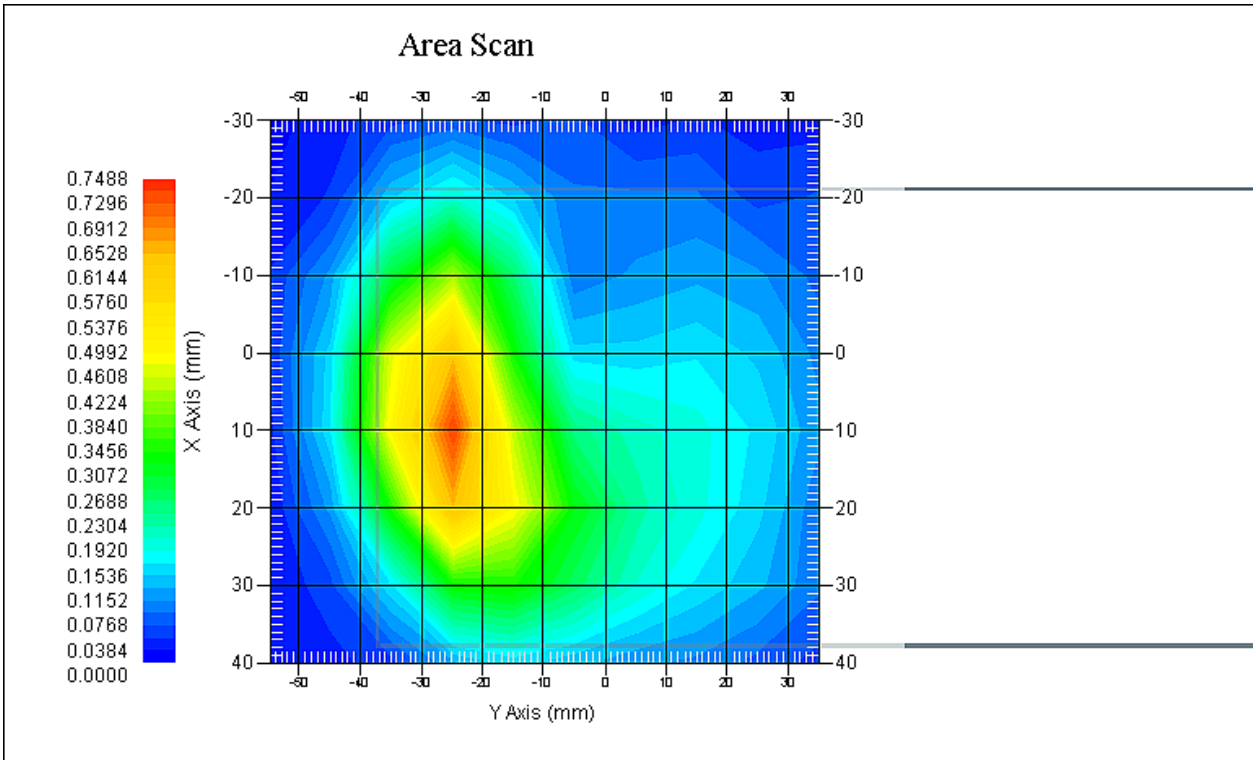
Measurement Data
Test mode : GPRS
Crest Factor : 2
Scan Type : Complete
Area Scan : 8x11x1 : Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7 : Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.263 W/kg
Power Drift-Finish : 0.260 W/kg
Power Drift (%) : -1.279

Tissue Data
Type : Body
Frequency : 1850.2 MHz
Epsilon : 53.02 F/m
Sigma : 1.49 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 2
Conversion Factor : 4.5
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 : 0.632 W/kg
10 gram SAR value : 0.337 W/kg
Area Scan Peak SAR : 0.743 W/kg
Zoom Scan Peak SAR : 1.075 W/kg

Plot 9#



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

WCDMA850; Body-Worn-Back (846.6 MHz High Channel)

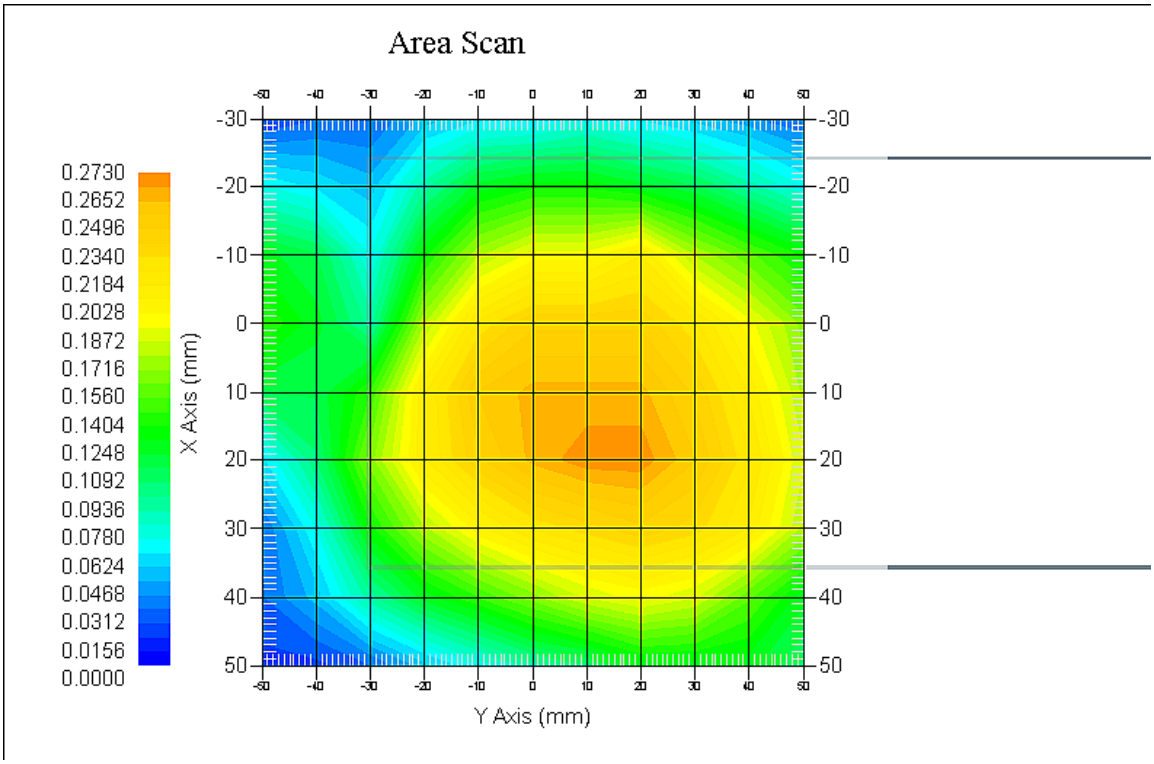
Measurement Data
Test mode : WCDMA850
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x8x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.202 W/kg
Power Drift-Finish : 0.198 W/kg
Power Drift (%) : -1.984

Tissue Data
Type : Body
Frequency : 846.6 MHz
Epsilon : 53.80 F/m
Sigma : 0.97 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 835
Duty Cycle Factor : 1
Conversion Factor : 5.9
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 0.259 W/kg
10 gram SAR value : 0.191 W/kg
Area Scan Peak SAR : 0.273 W/kg
Zoom Scan Peak SAR : 0.442 W/kg

Plot 10#



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

WCDMA1900; Body-Worn-Back (1907.6 MHz High Channel)

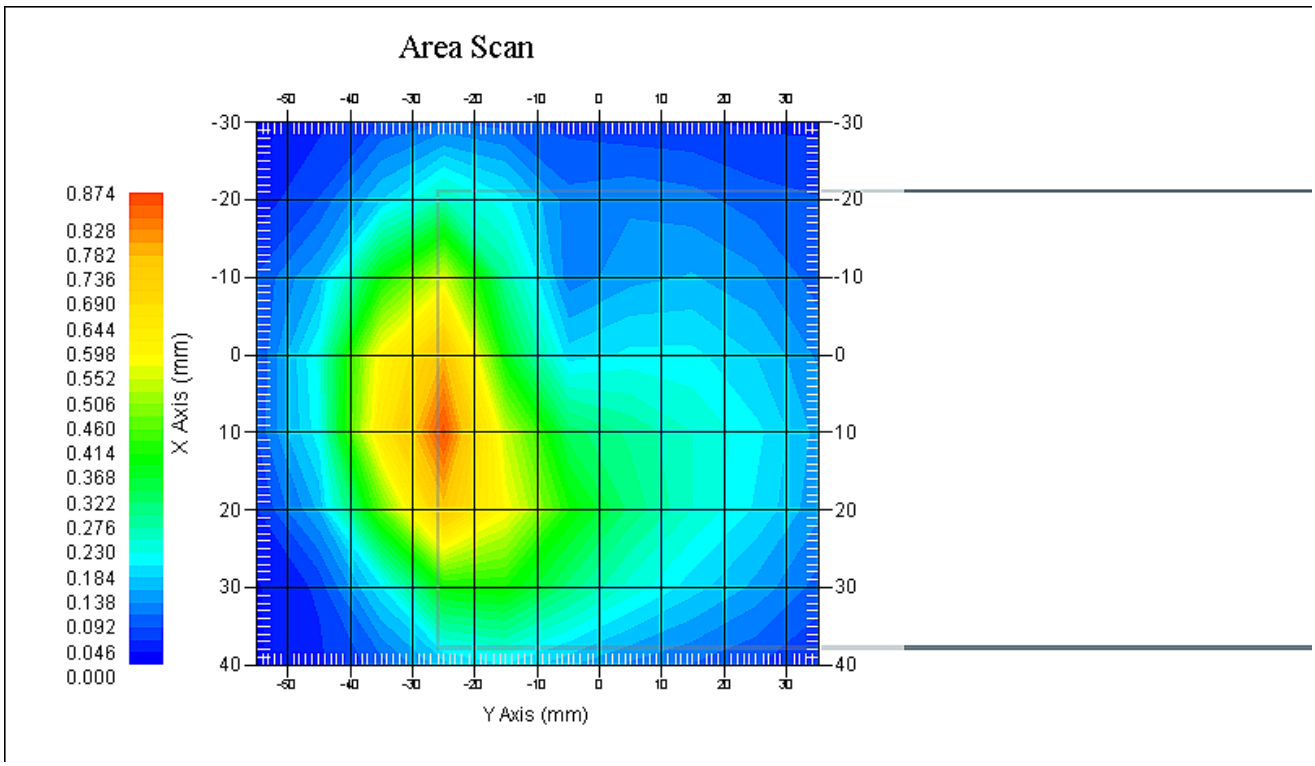
Measurement Data
Test mode : WCDMA1900
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.369 W/kg
Power Drift-Finish : 0.402 W/kg
Power Drift (%) : 0.771

Tissue Data
Type : Body
Frequency : 1907.6 MHz
Epsilon : 52.01 F/m
Sigma : 1.54 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1900
Duty Cycle Factor : 1
Conversion Factor : 4.8
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 : 0.768 W/kg
10 gram SAR value : 0.429 W/kg
Area Scan Peak SAR : 0.858 W/kg
Zoom Scan Peak SAR : 1.203 W/kg

Plot 11#



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

LTE Band 4; Body-Back (1732.5MHz Middle Channel)

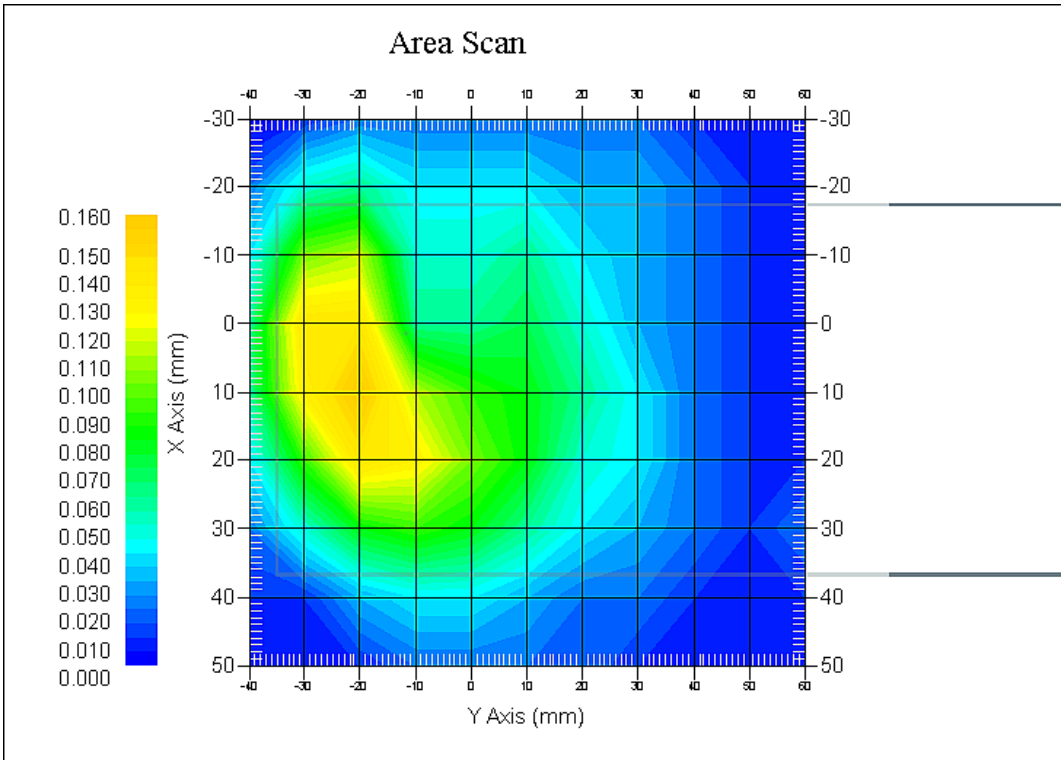
Measurement Data
Test mode : RB1
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.122 W/kg
Power Drift-Finish : 0.124 W/kg
Power Drift (%) : 1.669

Tissue Data
Type : Body
Frequency : 1732.5 MHz
Epsilon : 51.95 F/m
Sigma : 1.50 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 1750
Duty Cycle Factor : 1
Conversion Factor : 5.3
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 : 0.148 W/kg
10 gram SAR value : 0.085 W/kg
Area Scan Peak SAR : 0.157 W/kg
Zoom Scan Peak SAR : 0.263 W/kg

Plot 12#



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

LTE Band 7; Body-Back (2535MHz Middle Channel)

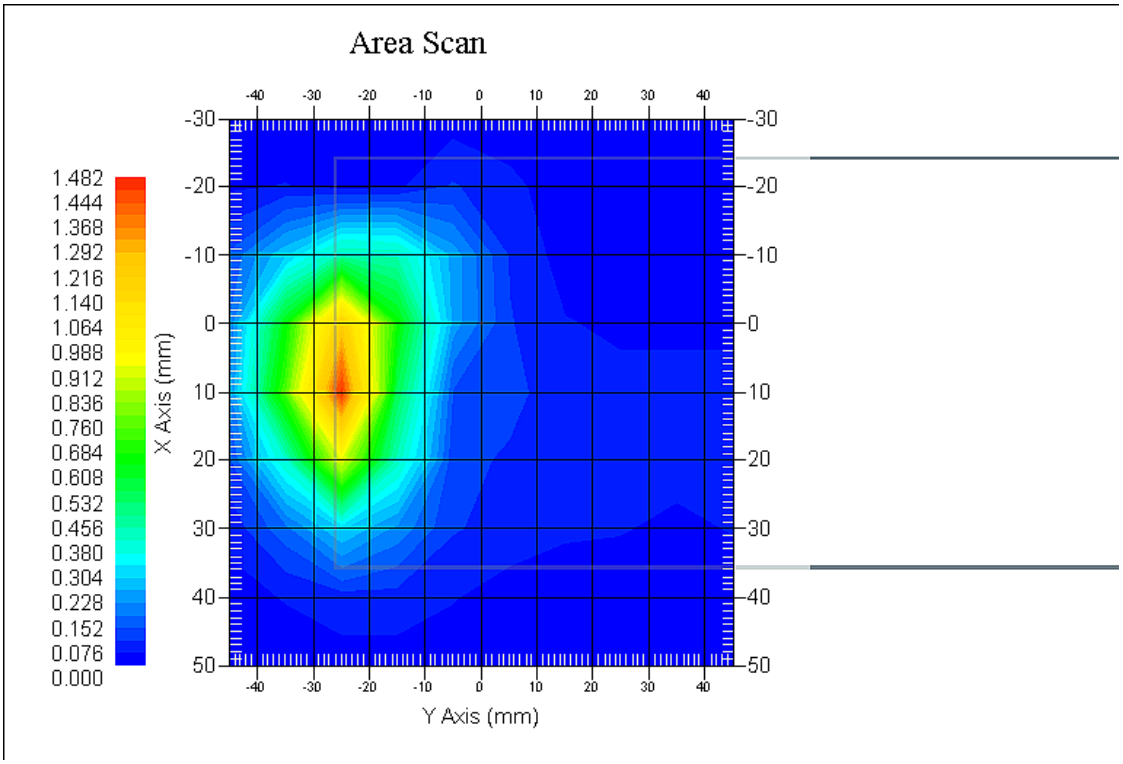
Measurement Data
Test mode : RB1
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.563 W/kg
Power Drift-Finish : 0.550 W/kg
Power Drift (%) : -2.474

Tissue Data
Type : Body
Frequency : 2535 MHz
Epsilon : 51.99 F/m
Sigma : 1.94 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 2450
Duty Cycle Factor : 1
Conversion Factor : 4.3
Probe Sensitivity : 1.20 1.20 1.20 µV/(V/m)2
Compression Point : 95.00 mV
Offset : 1.56 mm

1 gram SAR value : 1.175 W/kg
10 gram SAR value : 0.519 W/kg
Area Scan Peak SAR : 1.479 W/kg
Zoom Scan Peak SAR : 2.224 W/kg

Plot 13#



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

LTE Band 17; Body-Back (710MHz Middle Channel)

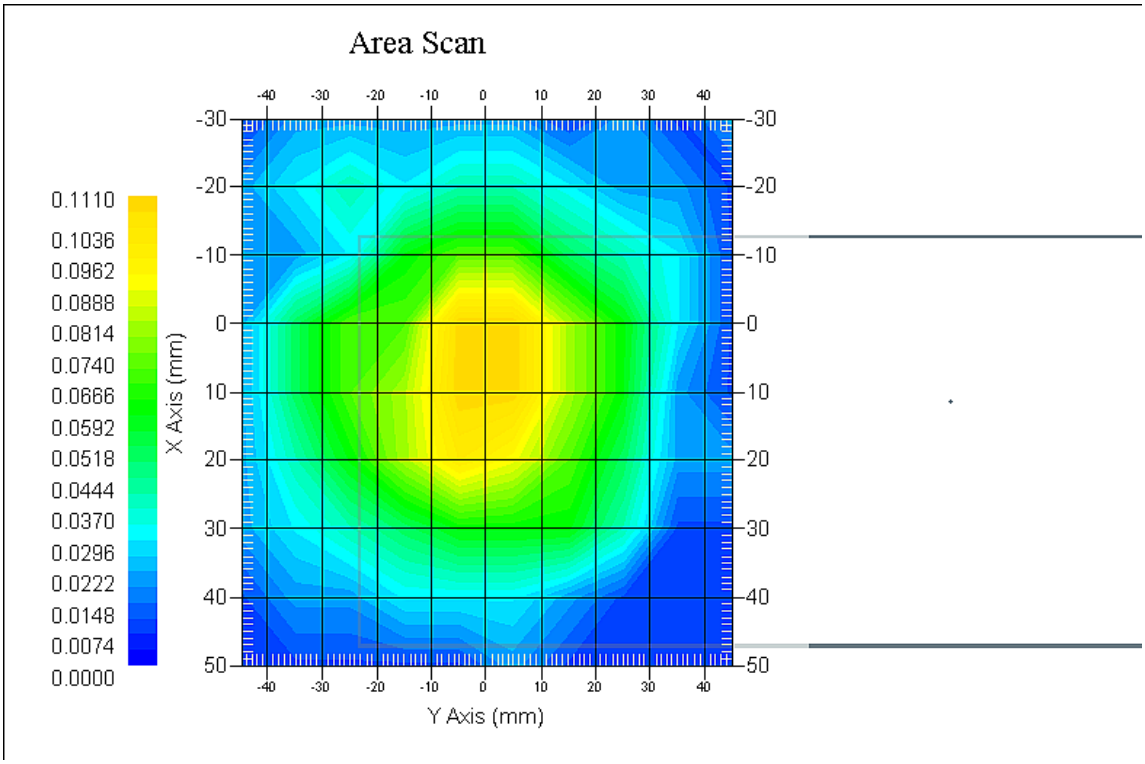
Measurement Data
Test mode : RB1
Crest Factor : 1
Scan Type : Complete
Area Scan : 11x9x1: Measurement x=10mm, y=10mm, z=4mm
Zoom Scan : 7x7x7: Measurement x=5mm, y=5mm, z=5mm
Power Drift-Start : 0.056 W/kg
Power Drift-Finish : 0.057 W/kg
Power Drift (%) : 1.855

Tissue Data
Type : Body
Frequency : 710 MHz
Epsilon : 53.82 F/m
Sigma : 0.96 S/m
Density : 1000.00 kg/cu. m

Probe Data
Serial No. : 500-00283
Frequency Band : 750
Duty Cycle Factor : 1
Conversion Factor : 5.5
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 : 0.102 W/kg
10 gram SAR value : 0.062 W/kg
Area Scan Peak SAR : 0.111 W/kg
Zoom Scan Peak SAR : 0.162 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 30MHz to 6GHz

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	(1-cp)1/2	1.5	1.5
Hemispherical Isotropy	10.9	rectangular	$\sqrt{3}$	√cp	√cp	4.4	4.4
Boundary Effect	2.1	rectangular	$\sqrt{3}$	1	1	1.21	1.21
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	1.0	rectangular	$\sqrt{3}$	1	1	0.6	0.6
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	1.0	normal	1	1	1	1.0	1.0
Device Holder Uncertainty	1.63	normal	1	1	1	1.63	1.63
Drift of Output Power	4.312	rectangular	$\sqrt{3}$	1	1	3.61	3.61
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.)	0.369	normal	1	0.7	0.5	0.259	0.185
Liquid Permittivity(target)	5.0	rectangular	$\sqrt{3}$	0.6	0.5	1.7	1.4
Liquid Permittivity(meas.)	2.062	normal	1	0.6	0.5	1.237	1.031
Combined Uncertainty		RSS				9.165	8.973
Combined Uncertainty (coverage factor=2)		Normal(k=2)				18.33	17.95