SAR TEST REPORT

For

Alltronic Tech. Mftg.Limited

Room 1108, 11/F, Eastwood Centre No.5 A Kung Ngam
Village Road, Shau Kei Wan, Hong Kong.

Model No: LD-500

FCC ID: UPNLD500

This Report Concerns: ☒ Original Report	**Equipment Type:** Professional Radio
Test Engineer:	Paul Tan
Report No.:	BTR06092601-18
Report Date:	2007-03-10
Reviewed By:	Chris Zeng
Prepared By:	Best Test Service (Shenzhen) Co., Ltd. Flat 11E, Xinhaofang Building, 11018,Shennan Road, Nanshan District, Shenzhen, China Tel: +86-755-86182350 Fax: +86-755-86182353

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GENERAL INFORMATION

Product Description for Equipment Under Test (EUT)

The *Alltronics Tech. Mftg. Limited.'s* Model: *LD-500* or the "EUT" as referred to in this report is a Professional Radio, which measures approximately 60mmL x 50mmW x 265mmH, powered by DC 7.2V battery. Frequency range is from 400MHz to 470MHz, modulation type: 11K0F3E for 12.5 KHz, 16K0F3E for 25 KHz

**The test data gathered are from production sample serial number 060918743 provided by the manufacturer.*

Test Methodology

All tests and measurements indicated in t his document were performed in accordance with 47CFR §2.1093

Radiofrequency Radiation Exposure Evaluation: Portable Device;

FCC OET Bulletin 65(Edition 97-01) Evaluating Compliance with FCC Guidelines for Human Exposure to

Radiofrequency Electromagnetic Fields

IEEE1528-2003 Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in

the Human Head from Wireless Communications Devices: Measurement Techniques

RSS-102 Issue 2 November 2005 Radio Frequency Exposure Compliance of Radio communication Apparatus (All

Frequency Bands)

Test Facility

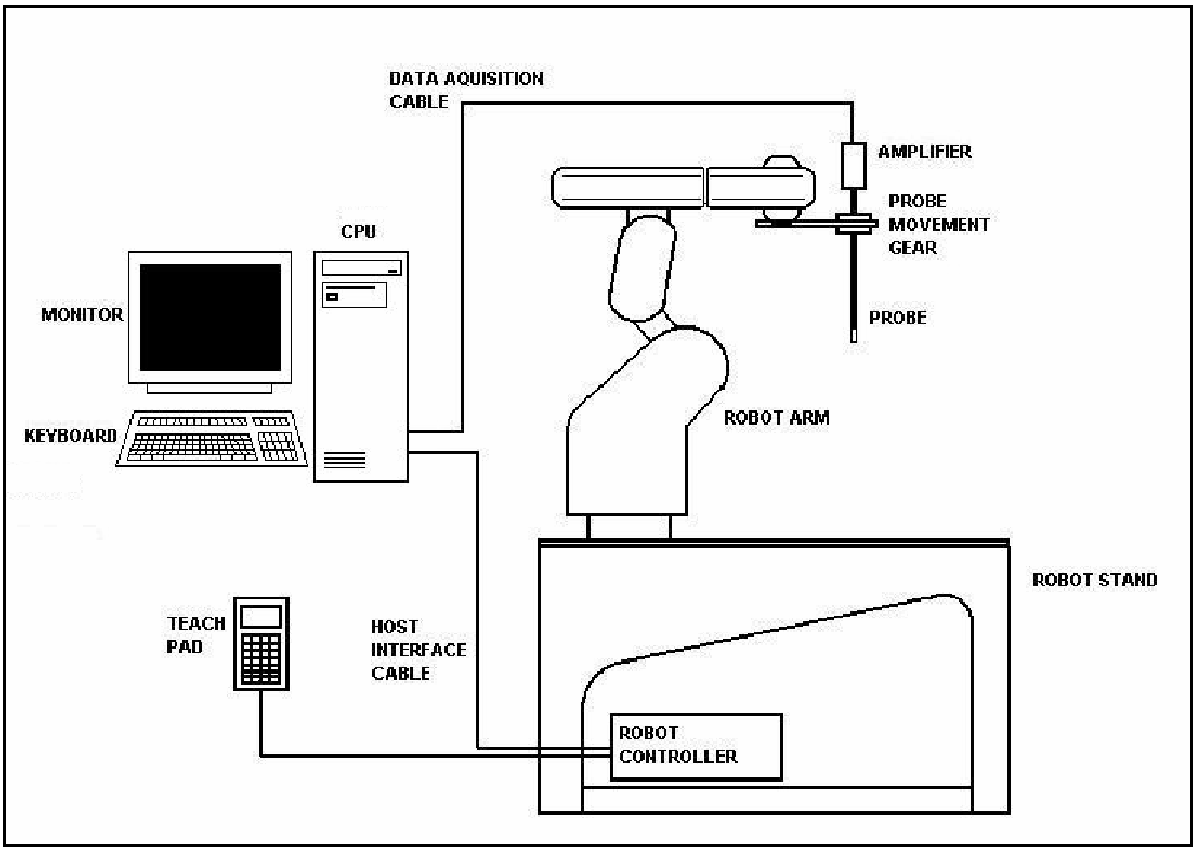
All measurement facilities used to collect the data are located at Morlab, Huatongwei Building , Keji Rd, 12 S, high-Tech Park, Nanshan District, Shenzhen, China.
The sites are constructed in conformance with the requirements of ANSI C63.7/634 and CISPR 22, The site was accredited by FCC(662850), NVLAP(200770) and CNAL (L1225)

Operational Conditions

During SAR test, EUT is in Traffic Mode (Channel Allocated) at Normal Voltage Condition. A communication link is set up with a System Simulator (SS) by air link, and a call is established. The TCH is allocated to CH1 (400.0125 MHz), CH2 (435.0125 MHz) and CH3 (469.9875 MHz).The EUT is commanded to operate at maximum transmitting power.
The EUT shall use its internal transmitter. The antenna(s), battery and accessories shall be those specified by the manufacturer. The EUT battery must be fully charged and checked periodically during the test to ascertain uniform power output. If a wireless link is used, the antenna connected to the output of the base station simulator shall be placed at least 50 cm away from the handset.
The signal transmitted by the simulator to the antenna feeding point shall be lower than the output power level of the handset by at least 35 dB.

Measure System

System Block



The SAR measurement system being used is the IndexSAR SARA2 system, which consists of a Mitsubishi RV-E2 6-axis robot arm and controller, IndexSAR probe and amplifier and SAM phantom Head Shape. The system is controlled remotely from a PC, which contains the software to control the robot and data acquisition equipment. The software also displays the data obtained from test scans.

In operation, the system first does an area (2D) scan at a fixed depth within the liquid from the inside wall of the phantom. When the maximum SAR point has been found, the system will then carry out a 3D scan centered at that point to determine volume averaged SAR level.

System Specification

The robot is used to articulate the probe to programmed positions inside the phantom head to obtain the SAR readings from the DUT.

Robot RV-2A

The Mitsubishi robot is both compact and lightweight with high reliability and has the benefit of Mitsubishi's worldwide service support.

Model	The Worldwide Movemaster RV-2A / 6 axis vertical articulated robot
Dimensions (robot)	Height: 790mm (in home position)
Dimensions (robot stand)	1010L x 450W x 820H mm
Weight	Approx. 36 kg
Position repeatability	+/- 0.04mm
Drive Method	AC servomotor
Expandability	Extra axis expansion capability for probe calibration applications E-Field probe

Robot Controller Unit

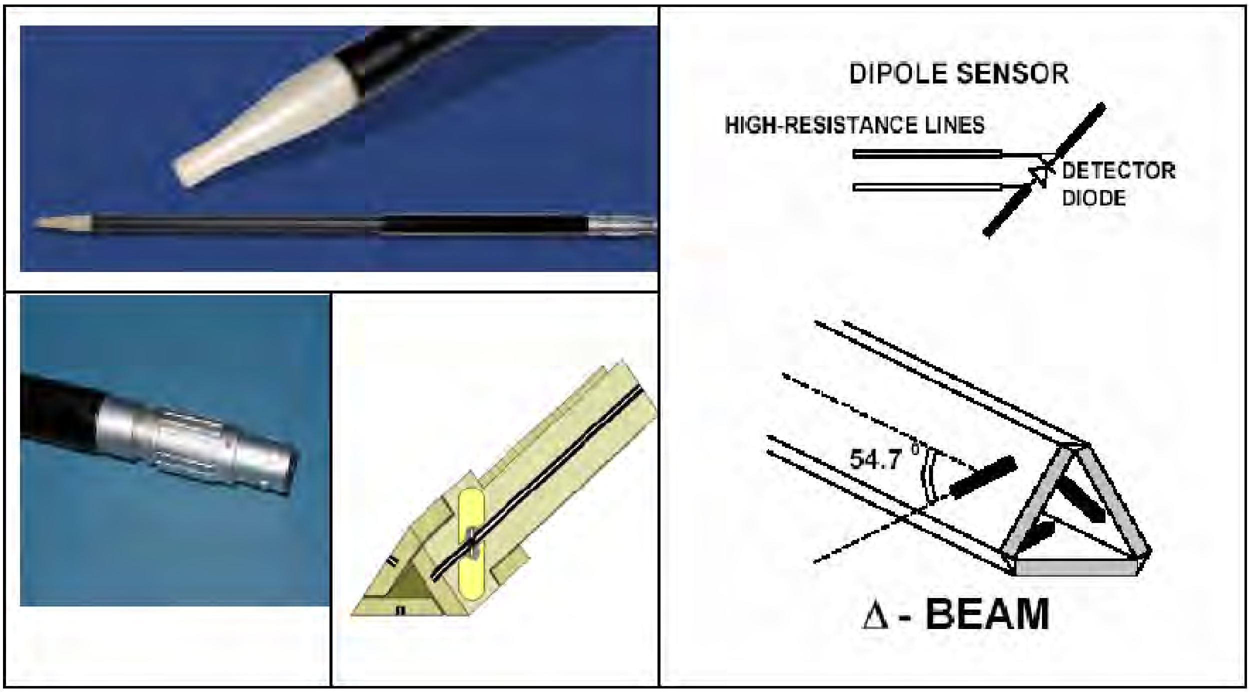
The CR1-571 is extremely efficient & lightweight and can be mounted easily under the robot.

Model	CR1 - 571
Dimensions	212W x 290D x 151H mm
Weight	8 kg
Power requirement	single-phase 100 - 240 VAC
Operating current	< 5 Amp

Probe and amplifier specification

E-filed Probe

Type	Three orthogonal dipole sensors arranged on triangular, interlocking substrates
Dimensions	**Overall length:** 350mm **Tip length:** 10mm **Body diameter:** 12mm **Tip diameter:** 5mm **Distance from probe tip to dipole centers:** 2.5mm
Interfacing	Lemo 6 pole latching connector for interfacing to high impedance amplifier
Isotropy	+/- 0.5dB in brain liquids (rotation about probe axis) typically +/- 0.15dB +/- 0.5dB in brain liquids (rotation normal to probe axis)
Calibration	Indexsar calibration in brain tissue simulating liquids at frequency of 450MHz
Dynamic Range	0.001W/kg to 100W/kg in liquid. Linearity +/- 0.2W/kg



The probes are constructed using three orthogonal dipole sensors arranged on an interlocking, triangular prism core. The probes have built-in shielding against static charges and are contained within a PEEK cylindrical enclosure material at the tip (showed in figure 2). The system uses diode compression potential (DCP) to determine SAR values for different types of modulation. Crest factor is not used for determining SAR values. The DCP for different types of modulation is determined during the probe calibration procedure.

Amplifier

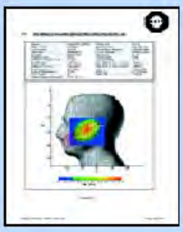
Probe Amplifier and PC Interface

Type High impedance inputs with 3 independent x,y,z sensor channels giving simultaneous measurement data every 2ms. Reads true average of modulated signals without the need for duty cycle corrections

Ranges Software selectable of x1 to 63

Cable Optical cable with self-powered 9 way RS232 converter. 3m cable length supplied as standard. Other lengths to order.

Power Requirements 2 x AAA batteries giving approximately 100 hours usage.



'Word' report format
The results of each frequency scan are presented in a Microsoft 'Word' document with all the necessary measurement parameters automatically tabulated. Users can customise the layout and in some cases language changes are possible.

The amplifier unit has a multi-pole connector to connect to the probe and a multiplexer selects between the 3-channel single-ended inputs. A 16-bit A/D converter with programmable gain is used along with an on-board micro-controller with non-volatile firmware. Battery life is around 150 hours and data are transferred to the PC via 3m of duplex optical fiber and a self-powered RS232 to optical converter.

SAR head phantom (SAM)

Head Phantom

Type 2	Upright SAM phantom
Dimensions	Height: 320mm Baseplate diameter: 275mm
Weight	empty: 1.2 kg filled: 7.2 kg
Wall thickness	2.0 mm ±0.2
Construction	Low loss resin / Strengthened saggital seam

The Indexsar SAM Upright Phantom is fabricated to the shape defined in these CAD files by Antennessa. It is mounted on the base table, which holds the robotic positioner. Both mechanical and laser-based system. In the SARA2 implementation, the SAM phantom is mounted on a supporting table made of low dielectric loss material, which includes mounting brackets for DUT positioners, dipole holders and (optionally) a shelf for supporting larger devices like laptop computers.

Box phantom

IXB – 070 Specification and characterisation parameters

Constructional details	
Internal dimensions:	200mm x 200mm x 200mm
Thickness of base:	2mm +/- 0.2mm
Wall thickness:	4mm
Material:	PMMA
Frequency range	300MHz – 6GHz
Dielectric properties	Relative permittivity 2.7 Loss tangent <0.02

Tissue-simulant volume required for 150mm depth (6 litres)

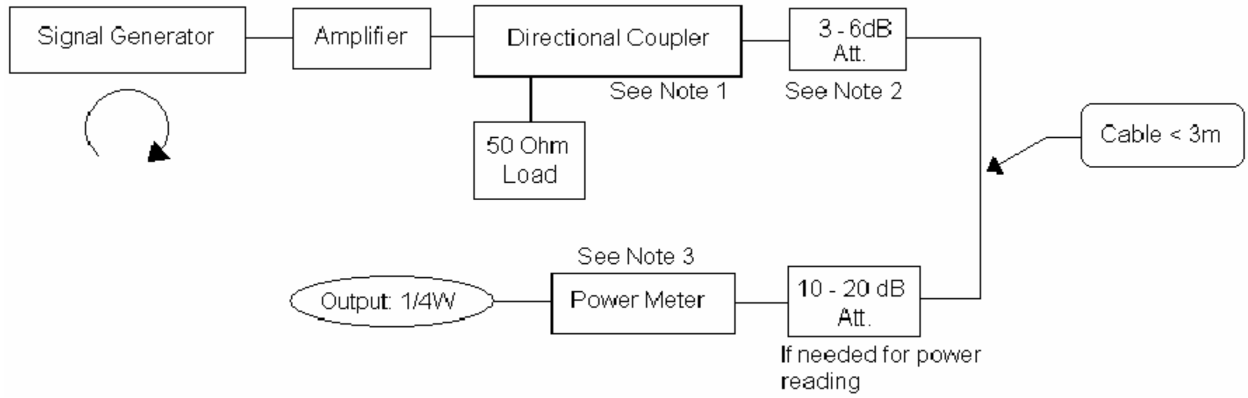
The box phantom used for body testing and for validation is manufactured from Perspex.

Simulant liquids

Simulant liquids that are used for testing at frequencies of 450MHz, which are made mainly of sugar, salt and water solutions may be left in the phantoms. Approximately 7litres are needed for an upright head compared to about 27litres for a horizontal bath phantom.

Ingredients (% by weight)	Frequency(MHz)	
	450	
Tissue Type	Head	Body
Water	N/A	N/A
Salt(NaCl)	N/A	N/A
Sugar	N/A	N/A
HEC	N/A	N/A
Bacterial de	N/A	N/A
DGBE	N/A	N/A
Acticide SPX	N/A	N/A
Dielectric Constant	43.5	56.7
Conductivity (S/m)	0.87	0.94

Validation testing using box phantoms



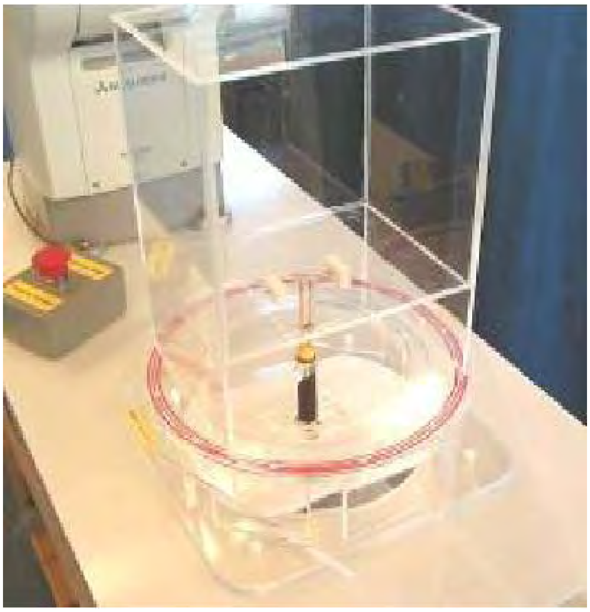
The following procedure, recommended for performing validation tests using box phantoms is based on he procedures described in the draft IEEE standard P1528

With the SG and Amp and with directional coupler in place, set up the source signal at the relevant frequency and use a power meter to measure the power at the end of the SMA cable that you intend to connect to the balanced dipole. Adjust the SG to make this, say, 0.25W (24 dBm). If this level is too high to read directly with the power meter sensor, insert a calibrated attenuator (e.g. 10 or 20 dB) and make a suitable correction to the power meter reading.

Note 1: In this method, the directional coupler is used for monitoring rather than setting the exact feed power level. If, however, the directional coupler is used for power measurement, you should check the frequency range and power rating of the coupler and measure the coupling factor (referred to output) at the test frequency using a VNA.
Note 2: Remember that the use of a 3dB attenuator (as shown in Figure 8.1 of P1528) means that you need an RF amplifier of 2 times greater power for the same feed power. The other issue is the cable length. You might get up to 1dB of loss per meter of cable, so the cable length after the coupler needs to be quite short.
Note 3: For the validation testing done using CW signals, most power meters are suitable. However, if you are measuring the output of a modulated signal from either a signal generator or a handset, you must ensure that the power meter correctly reads the modulated signals.

Setting up the box phantom for validation testing

The main purpose of the box phantom is for validation of the system. By placing the box phantom in place of the upright head, using the box phantom dipole holder the system can now be used to check that the probe and software are giving accurate readings.



Equipments and results of validation testing

Name	Type and specification
Signal generator	SML02
Directional coupler	450MHz-3GHz
Amplifier	3W 502(10-2500MHz)
Reference dipole	IXD-045 validation dipole

Result:

Frequency	Date	Target Value(1g) W/kg	Test value(1g) W/kg
450MHz	2007.01.29	4.9	4.856

SARA2 Interpolation and Extrapolation schemes

SARA2 software contains support for both 2D cubic B-spline interpolation as well as 3D cubic B-spline interpolation. In addition, for extrapolation purposes, a general n-th order polynomial fitting routine is implemented following a singular value decomposition algorithm. A 4th order polynomial fit is used by default for data extrapolation, but a linear-logarithmic fitting function can be selected as an option. The polynomial fitting procedures have been tested by comparing the fitting coefficients generated by the SARA2 procedures with those obtained using the polynomial fit functions of Microsoft Excel when applied to the same test input data.

Interpolation of 2D area scan

The 2D cubic B-spline interpolation is used after the initial area scan at fixed distance from the phantom shell wall. The initial scan data are collected with approx. 10mm spatial resolution and spline interpolation is used to find the location of the local maximum to within a 1mm resolution for positioning the subsequent 3D scanning.

Extrapolation of 3D scan

For the 3D scan, data are collected on a spatially regular 3D grid having (by default) 6.4 mm steps in the lateral dimensions and 3.5 mm steps in the depth direction (away from the source). SARA2 enables full control over the selection of alternative step sizes in all directions.
The digitised shape of the head is available to the SARA2 software, which decides which points in the 3D array are sufficiently well within the shell wall to be 'visited' by the SAR probe. After the data collection, the data are extrapolated in the depth direction to assign values to points in the 3D array closer to the shell wall. A notional extrapolation value is also assigned to the first point outside the shell wall so that subsequent interpolation schemes will be applicable right up to the shell wall boundary.

Interpolation of 3D scan and volume averaging

The procedure used for defining the shape of the volumes used for SAR averaging in the SARA2 software follow the method of adapting the surface of the 'cube' to conform with the curved inner surface of the phantom. This is called, here, the conformal scheme.
For each row of data in the depth direction, the data are extrapolated and interpolated to less than 1mm spacing and average values are calculated from the phantom surface for the row of data over distances corresponding to the requisite depth for 10g and 1g cubes. This result in two 2D arrays of data, which are then cubic B-spline interpolated to sub mm lateral resolution. A search routine then moves an averaging square around through the 2D array and records the maximum value of the corresponding 1g and 10g volume averages. For the definition of the surface in this procedure, the digitized position of the head shell surface is used for measurement in head-shaped phantoms. For measurements in rectangular, box phantoms, the distance between the phantom wall and the closest set of gridded data points is entered into the software. For measurements in box-shaped phantoms, this distance is under the control of the user. The effective distance must be greater than 2.5mm as this is the tip-sensor distance and to avoid interface proximity effects, it should be at least 5mm. A value of 6 or 8mm is recommended. This distance is called dbe.
For automated measurements inside the head, the distance cannot be less than 2.5mm, which is the radius of the probe tip and to avoid interface proximity effects, a minimum clearance distance of x mm is retained. The actual value of dbe will vary from point to point depending upon how the spatially regular 3D grid points fit within the shell. The greatest separation is when a grid point is just not visited due to the probe tip dimensions. In this case the distance could be as large as the step-size plus the minimum clearance distance (i.e with x=5 and a step size of 3.5, dbe will be between 3.5 and 8.5mm). The default step size (dstep) used is 3.5mm, but this is under user-control.
The compromise is with time of scan, so it is not practical to make it much smaller or scan times become long and power-drop influences become larger.
The robot positioning system specification for the repeatability of the positioning (dss) is +/- 0.04mm.
The phantom shell is made by an industrial moulding process from the CAD files of the SAM shape, with both internal and external moulds. For the upright phantoms, the external shape is subsequently digitized on a Mitutoyo CMM machine (Euro an ultrasonic sensor indicate that the shell thickness (dph) away from the ear is 2.0 +/- 0.1mm. The ultrasonic measurements were calibrated using additional mechanical measurements on available cut surfaces of the phantom shells. See support document IXS-020x.
For the upright phantom, the alignment is based upon registration of the rotation axis of the phantom on its 253mm diameter baseplate bearing and the position of the probe axis when commanded to go to the axial position. A laser alignment tool is provided (procedure detailed elsewhere). This enables the registration of the phantom tip (dmis) to be assured to within approx. 0.2mm. This alignment is done with reference to the actual probe tip after installation and probe alignment. The rotational positioning of the phantom is variable

– offering advantages for special studies, but locating pins ensure accurate repositioning at the principal positions (LH and RH ears).

Probe anisotropy and boundary proximity influence correction software

Indexsar Report IXS0223 provides a background to the factors affecting measurements at high frequencies when using SAR probes of size 8 – 5mm tip diameter. Although the Indexsar probes are at the smaller end of this range, SAR probes are not isotropic in 5GHz phantom field gradients and ad

1) At >5GHz, the SAR field decays to 1/e of its value within 3-4mm of the surface of a phantom with a source adjacent. So, measurements are significantly affected by small errors in the separation distances employed between the probe and the phantom surface. The distance between the probe tip and the plane of the sensors should be allowed for using the same value as th at declared in the probe calibration document. Distances between the probe tip and phantom surface should be measured accurately to 0.1mm. The best way to assure this is to use the robot to position the probe in light contact with the phantom wall and then to withdraw the probe by the selected amount under robot control..

2) The preferred test geometry at 5GHz is for testing at the bottom of an open phantom. If tests at the side of a phantom are performed, it will be necessary to apply VPM corrections as described below. In either case, careful monitoring of probe spacing from the phantom is required. Probe isotropy is improved for measuring fields polarized either normal to or parallel to the probe axis. If the source polarization is known, this arrangement should be established, if possible.

3) The probe calibration factors including boundary correction terms should be carefully entered from the calibration document. The probe calibration factors require that the probe be oriented in a known rotational position. The red spot on the Indexsar probe should be aligned facing away from the robot arm.

4) The latest SARA2 software (VPM editions) contain support for correcting for probe anisotropy in strong field gradients and include a procedure for correcting for boundary proximity influences. As noted above, the probe has to be oriented in a given rotational position and some familiarity with the new measurement procedures is necessary. The calculations can be performed either with or without the extended correction schemes applied.

5) If boundary corrections are used, it may be preferable to go rather closer to the phantom surface than is usually recommended and to perform scans using small steps between the measurement planes so that good data on the SAR profiles are collected within the first 10mm of the phantom depth.

TEST RESULT

Applicable Measurement Standards

IEEE 1528–2003: Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Body Due to Wireless Communications Devices: Experimental Techniques. They specify the measurement method for demonstration of compliance with the SAR limits for such equipments.

Ambient Conditions

Temperature: 23.1 to 23.6degree Relative humidity: 56% to 59% Ambient noise is checked and found very low and in compliance with requirement of standards. Reflection of surrounding objects is minimized and in compliance with requirement of standards.

Limit

47CFR §2.1093: Radiofrequency Radiation Exposure Evaluation: Portable Devices
FCC OET Bulletin 65(Edition 97-01), Supplement C(Edition 01-01): Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields
ANSI C95.1–1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz to 300 GHz.

Dielectric Performance

The measured 1-gram averaged SAR values of the device against the head and the body are provided in Table 1 and 2 respectively. The humidity and ambient temperature of the test facility were 56% to 59% and 23.1℃ to 23.6℃ respectively. The SAM head phantom (SN0380 SH AND SN 0381 SH) were full of the head tissue simulating liquid. The depth of the body tissue was 15.1cm. The distance between the back of the device and the bottom of the flat phantom is 1.5Cm. The distance between the back of the device and the bottom of the flat phantom is 1.5cm, a base station simulator was used to control the device during the SAR measurement. The phone was supplied with full-charged battery for each measurement.
For body-worn measurements, the device was tested against flat phantom representing the user body. Under measurement phone was put on in the belt holder.

Table 1 Dielectric Performance of Body Tissue Simulating Liquid

/	Frequency	Permittivity ε	Conductivity(S/M)
Target value	450MHz	56.7	0.94
Validation value (	450MHz	56.63	0.933

Summary of Measurement Results

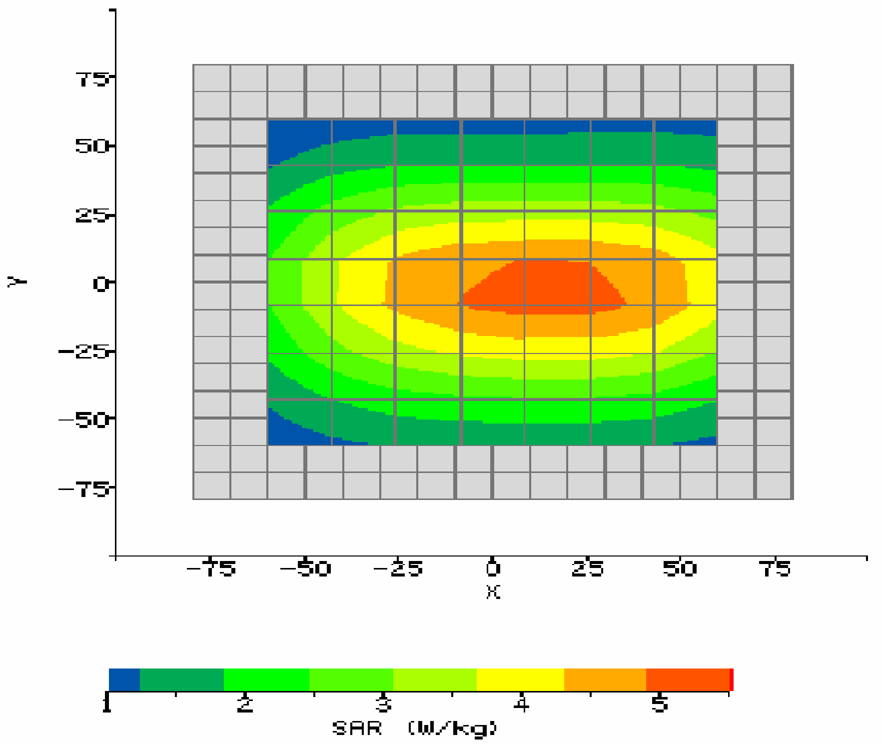
Limit of SAR(W/kg)	1g Average		
	8		
Test Case	Measure Result		
	1g W/kg) 100%Cycle	1g W/kg) 50% Cycle	Power Level(dBm)
Body, Bottom Channe (CH1-400.0125MHz)	5.768	2.884	36.06
Body, Mid Channel (CH2-435.0125MHz)	5.487	2.744	35.97
Body, Top Channel (CH3-469.9875MHz)	4.955	2.478	35.92

Conclusion

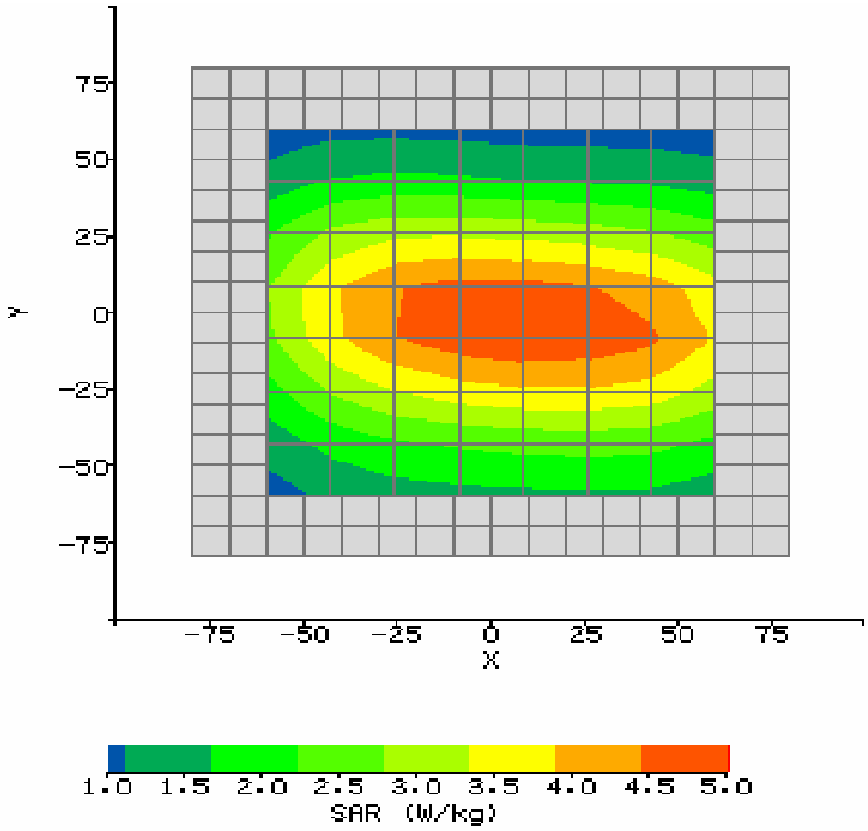
Localized Specific Absorption Rate (SAR) of this portable wireless device has been measured in all cases requested by the relevant standards cited in Clause Test Methodology. Maximum localized SAR is below exposure limits specified in the relevant standards list as above.

TEST PLOTS

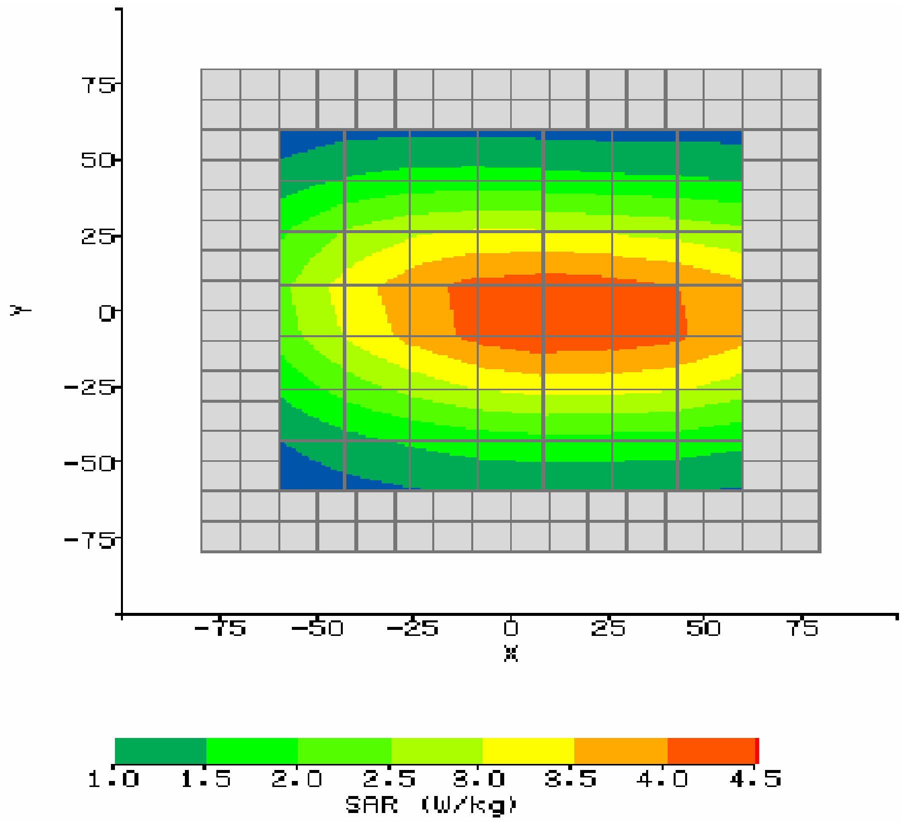
System/Software	SARA2/2.40VPM	Input Power Draft	
Date	2007.01.29	EUT Battery Model	
File Name	LD-500-BOTTOM BODY	Probe Serial Number	0177
Ambiet Temperature	23.3	Liquid Simulant	Body Tissue
EUT	LD-500	Relative Permittivity	56.62
Relative Humidity	56	Conductivity	.932
Phantom S/No	HeadBox75mm.csv	Liquid Temperature	23.2
Phantom Rotation	180	Max SAR X-AXIS Location	13.71mm
EUT Position	450 BOTTOM BODY	Max SAR Y-AXIS Location	-1.71mm
Antenna Configuration	SMA Connector	Max E-Field	74.45V/m
Test Frequency	450MHz	SAR 1g	5.768W/kg
Air Factors	417/368/414	SAR 10g	4.680W/kg
Conversion Factors	.268/ .268/ .268	SAR Start	2.884W/kg
Type of Modulation		SAR End	2.711W/kg
Modn. Duty Cycle		SAR Drift During Scan	-5.99%
Diode Compresssion Factor(V*200)	20/ 20/ 20	Probe Battery Last Changed	20/05/05
Input Power Level	Max Power	Extrapolation	Poly4



System/Software	SARA2/2.40VPM	Input Power Draft	
Date	2007.01.29	EUT Battery Model	
File Name	LD-500-Middle BODY	Probe Serial Number	0177
Ambiet Temperature	23.3	Liquid Simulant	Body Tissue
EUT	LD-500	Relative Permittivity	56.62
Relative Humidity	56	Conductivity	.932
Phantom S/No	HeadBox75mm.csv	Liquid Temperature	23.2
Phantom Rotation	180	Max SAR X-AXIS Location	6.86mm
EUT Position	450 MIDDLE BODY	Max SAR Y-AXIS Location	-3.43mm
Antenna Configuration	SMA Connector	Max E-Field	72.91V/m
Test Frequency	450MHz	SAR 1g	5.478W/kg
Air Factors	417/368/414	SAR 10g	4.499W/kg
Conversion Factors	.268/ .268/ .268	SAR Start	2.810W/kg
Type of Modulation		SAR End	2.758W/kg
Modn. Duty Cycle		SAR Drift During Scan	-1.84%
Diode Compresssion Factor(V*200)	20/ 20/ 20	Probe Battery Last Changed	20/05/05
Input Power Level	Max Power	Extrapolation	Poly4

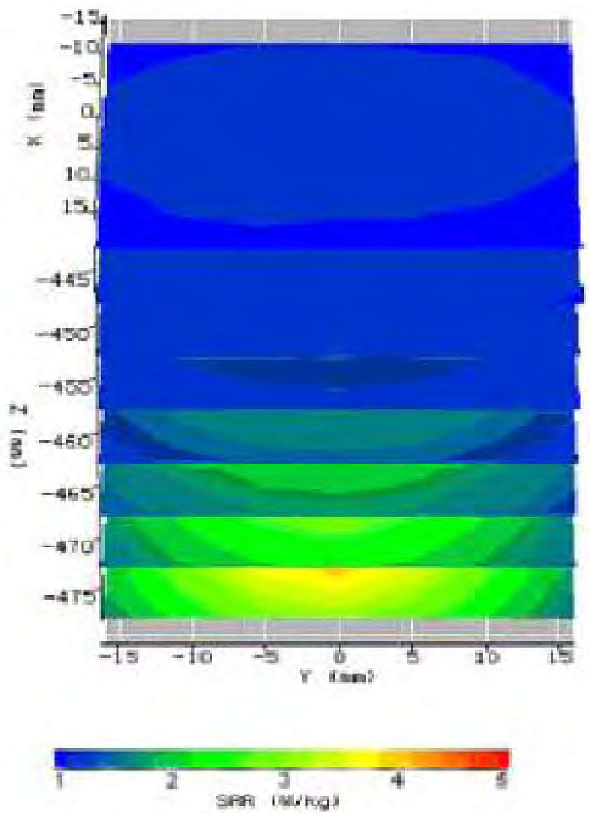


System/Software	SARA2/2.40VPM	Input Power Draft	
Date	2007.01.29	EUT Battery Model	
File Name	LD-500-TOP BODY	Probe Serial Number	0177
Ambiet Temperature	23.3	Liquid Simulant	Body Tissue
EUT	LD-500	Relative Permittivity	56.62
Relative Humidity	56	Conductivity	.932
Phantom S/No	HeadBox75mm.csv	Liquid Temperature	23.2
Phantom Rotation	180	Max SAR X-AXIS Location	12.00mm
EUT Position	450 TOP BODY	Max SAR Y-AXIS Location	0.00mm
Antenna Configuration	SMA Connector	Max E-Field	69.12V/m
Test Frequency	450MHz	SAR 1g	4.955W/kg
Air Factors	417/368/414	SAR 10g	4.045W/kg
Conversion Factors	.268/ .268/ .268	SAR Start	2.546W/kg
Type of Modulation		SAR End	2.431W/kg
Modn. Duty Cycle		SAR Drift During Scan	-4.53%
Diode Compresssion Factor(V*200)	20/ 20/ 20	Probe Battery Last Changed	20/05/05
Input Power Level	Max Power	Extrapolation	Poly4



System Check:

System/Software	SARA2/2.40VPM	Input Power Draft	0.01
Date	2007.01.29	EUT Battery Model	
File Name	System Check	Probe Serial Number	0177
Ambiet Temperature	23.3	Liquid Simulant	Body Tissue
EUT	LD-500	Relative Permittivity	56.62
Relative Humidity	56	Conductivity	.932
Phantom S/No	HeadBox75mm.csv	Liquid Temperature	23.2
Phantom Rotation	180	Max SAR X-AXIS Location	0.00mm
EUT Position	450 BODY	Max SAR Y-AXIS Location	0.00mm
Antenna Configuration	SMA Connector	Max E-Field	21.08V/m
Test Frequency	450MHz	SAR 1g	1.212 W/kg
Air Factors	417/368/414	SAR 10g	0.819 W/kg
Conversion Factors	.268/ .268/ .268	SAR Start	0.884 W/kg
Type of Modulation		SAR End	0.871 W/kg
Modn. Duty Cycle	1	SAR Drift During Scan	1.43%
Diode Compresssion Factor(V*200)	20/ 20/ 20	Probe Battery Last Changed	20/05/05
Input Power Level	24dBm	Extrapolation	Poly4



MEASUREMENT UNCERTAINTY

No	Uncertainty Component	Type	Uncertainty Value (%)	Probability Distribution	k	c_i	Standard Uncertainty (%) u_i(%)	Degree of freedom V_{eff} or v_i
	Measurement System							
1	—Probe Calibration	B	3.6	N	1	1	3.60	∞
2	—Axial isotropy	B	4.23	R	$\sqrt{3}$	$\sqrt{1-cp}$	0.00	∞
3	—Hemispherical Isotropy	B	10.7	R	$\sqrt{3}$	$\sqrt{cp}$	6.18	∞
4	—Boundary Effect	B	1.7	R	$\sqrt{3}$	1	0.98	∞
5	—Linearity	B	2.98	R	$\sqrt{3}$	1	1.69	∞
6	—System Detection Limits	B	1.00	R	$\sqrt{3}$	1	0.60	∞
7	—Readout Electronics	B	1.00	N	1	1	1.00	∞
8	—Response Time	B	0.80	R	$\sqrt{3}$	1	0.50	∞
9	—Integration Time	B	2.60	R	$\sqrt{3}$	1	1.50	∞
10	—RF Ambient Conditions	B	3.00	R	$\sqrt{3}$	1	1.70	∞
11	—Probe Position Mechanical tolerance	B	1.14	R	$\sqrt{3}$	1	0.33	∞
12	—Probe Position with respect to Phantom Shell	B	2.86	R	$\sqrt{3}$	1	0.83	∞
13	—Extrapolation, Interpolation and Integration Algorithms for Max. SAR evaluation	B	3.6	R	$\sqrt{3}$	1	2.08	∞
	Uncertainties of the DUT							
14	—Position of the DUT	A	2.90	N	1	1	2.90	0
15	—Holder of the DUT	A	3.60	N	1	1	3.60	0
16	—Output Power Variation – SAR drift measurement	B	5.0	R	$\sqrt{3}$	1	2.89	∞

	Phantom and Tissue Parameters							
17	—Phantom Uncertainty(shape and thickness tolerances)	B	1.43	R	$\sqrt{3}$	1	0.83	∞
18	—Liquid Conductivity Target – tolerance	B	5.0	R	$\sqrt{3}$	0.7	2.02	∞
19	—Liquid Conductivity – measurement Uncertainty)	B	2.0	R	$\sqrt{3}$	0.7	0.81	∞
20	—Liquid Permittivity Target tolerance	B	5.0	R	$\sqrt{3}$	0.6	1.73	∞
21	—Liquid Permittivity – measurement uncertainty	B	1.0	R	$\sqrt{3}$	0.6	0.35	∞
Combined Standard Uncertainty				RSS			±8.95%	
Expanded uncertainty (Confidence interval of 95 %)				K= 2.003935			±17.9%	

TEST APPARATUS

NO	Apparatus	Model	Cal. Date	Cal .Due. Date
1	E-Field SAR Probe	IXP-050 (SN 0177)	Mar 29 2006	Mar 28 2007
2	Six-axis AC Servo industrial robot	RV-2A (SN AN406018)	Mar 29 2006	Mar 28 2007
3	System Validation Dipole 450MHZ	IXD-045 (SN 00)	Mar 29 2006	Mar 28 2007
4	Probe Amplifier and PC Interface	IFA-010 (SN 0027)	Mar 29 2006	Mar 28 2007
5	SAM Head Phantom	SN 0380 SH	Mar 29 2006	Mar 28 2007
6	SAM Head Phantom	SN 0381 SH	Mar 29 2006	Mar 28 2007
7	Box Phantom	IXB–070	Mar 29 2006	Mar 28 2007

TEST SETUP PHOTOS

Fig.1 spacer 1.5cm

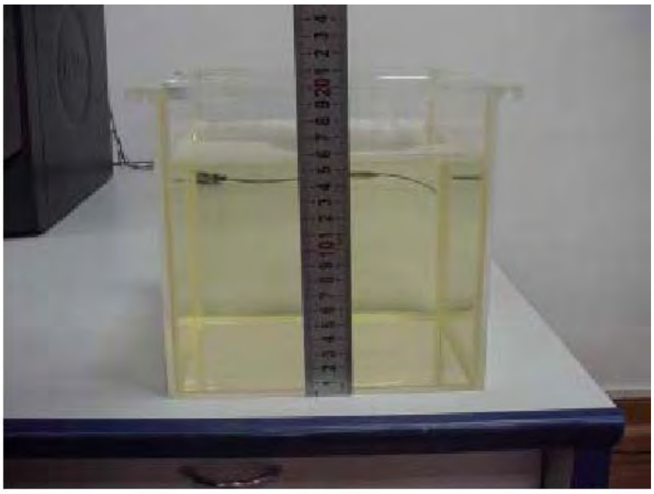


Fig.2 the depth of body tissue

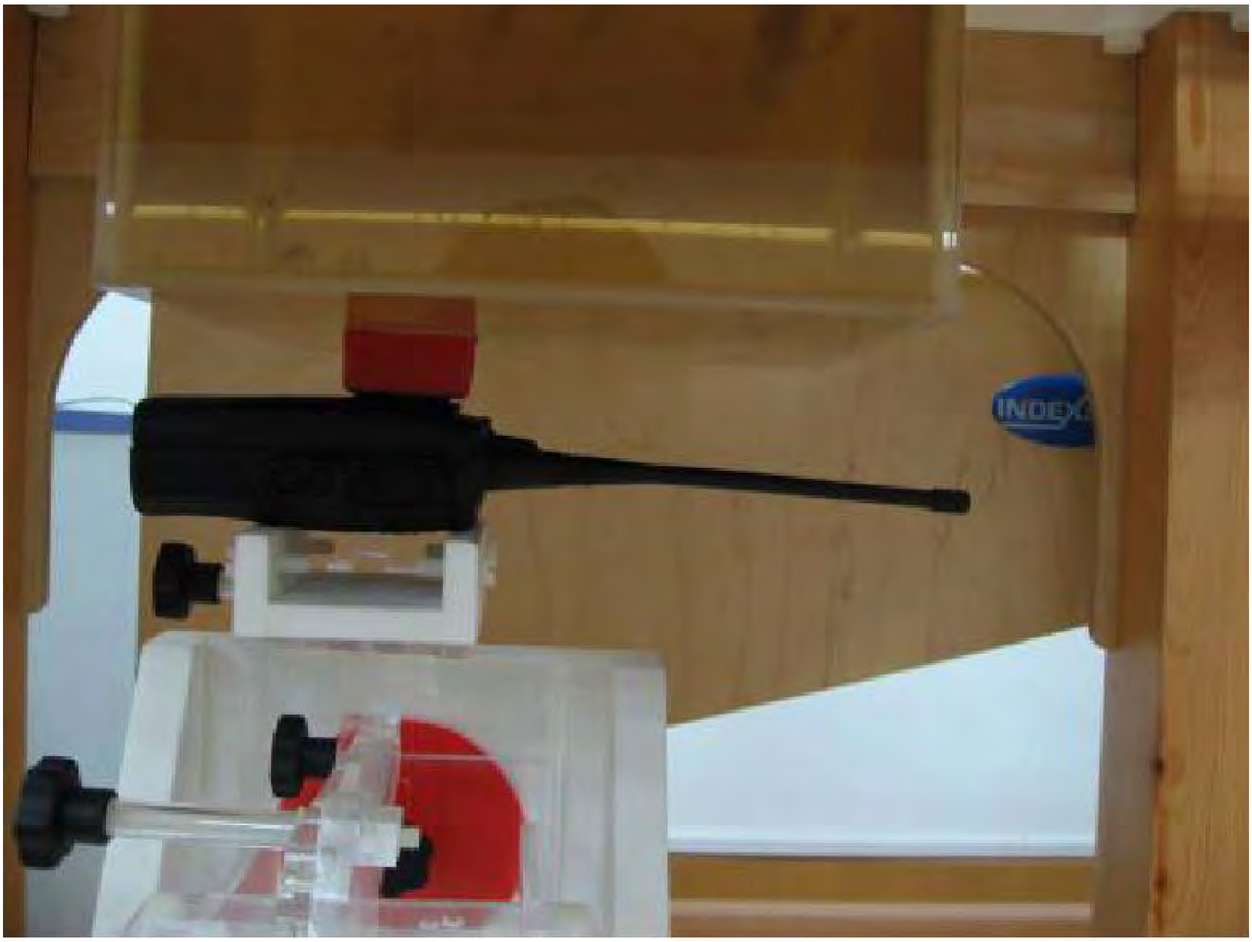


Fig.3 Side Position

Fig.4 Side Position

EUT PHOTOS

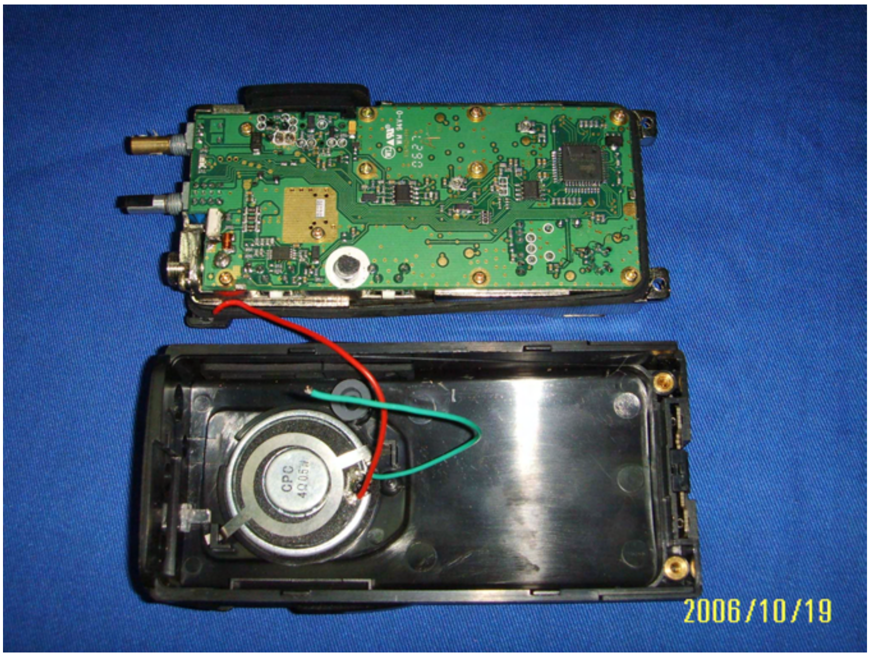
EUT – Front View

EUT – Rear View

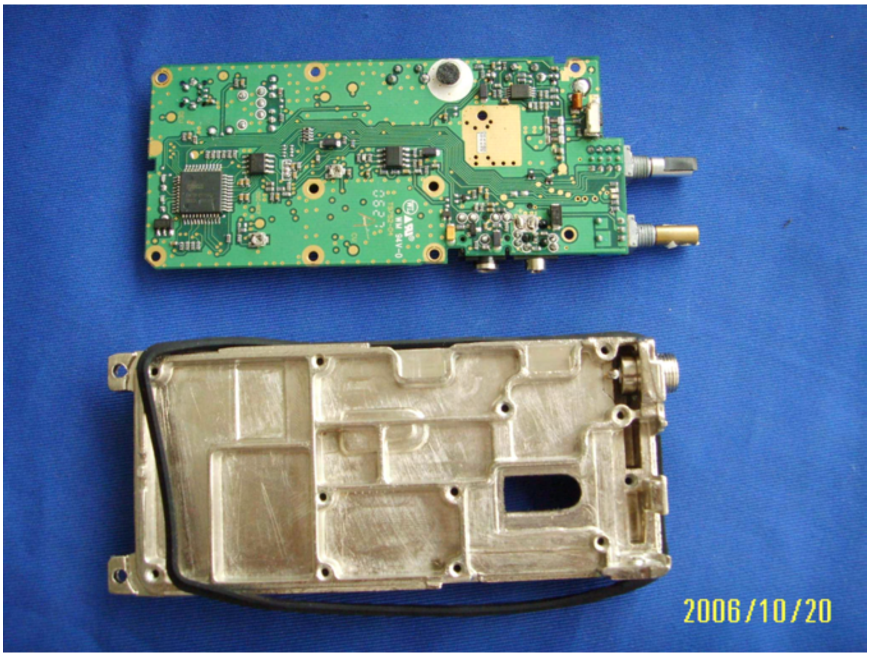
EUT – Battery Removed Back View

EUT – Top View

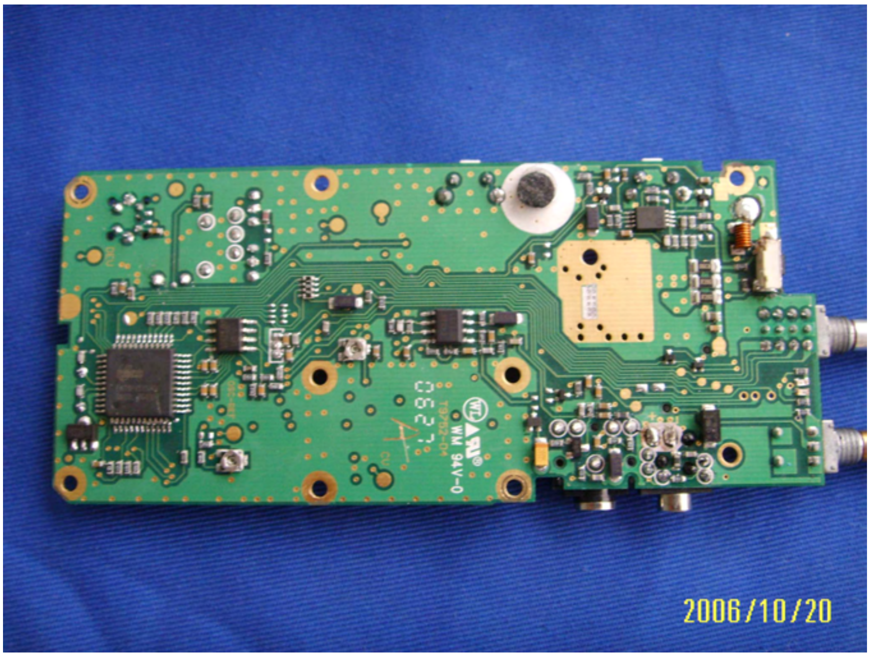
Main Board – Uncovered View-1



Main Board – Uncovered View-2



Main Board – Components View



Main Board –Components View