D-PL-12111-01-01

CNAS L0447

Registration No.910917

CONFORMANCE TEST REPORT FOR

HUMAN EXPOSURE TO ELECTROMAGNETIC FIELDS

Report No.: SRTC2011-H024-E0056

Product Name: Seven inches Tablet PC

Product Model: CRUZ L47

Applicant: PRECENO TECHNOLOGY PTE.LTD.

Manufacture: PRECENO TECHNOLOGY PTE.LTD.

Specification: FCC OET Bulletin 65 (Edition 97-01)

Supplement C (Edition 01-01)

47CFR 2.1093

FCC ID: ZJTCRUZL47

The State Radio_monitoring_center Testing Center (SRTC)

No.80 Beilishi Road Xicheng District Beijing, China

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Executive summary

Test report no.:	**SRTC2011-H024-E0056**
Product Model:	**CRUZ L47**
Date of test:	**2011.07.09**
Date of report:	**2011.07.11**
Laboratory:	**The State Radio_monitoring_center Testing Center (SRTC)**
Test has been Carried out in accordance with:	**FCC OET Bulletin 65 (Edition 97-01), Supplement C (Edition 01-01)** **RSS-102 Issue 4** **IEEE 1528 - 2003**
Test Methodology:	The tests documented in this report were performed in accordance with FCC OET Bulletin 65 Supplement C 01-01, IEEE STD 1528:2003, IC RSS 102 Issue 4 and the following specific FCC Test Procedures. - **KDB 248227 D01** SAR Measurement Procedure for 802 11abg v01r02 - **KDB 447498 D01** Mobile Portable RF Exposure v04 - **KDB 616217 D03** SAR Supp Note and Netbook Laptop v01
Documentation:	**The documentation of the testing performed on the tested devices is archived for 5 years at SRTC**

Result summary:

Mode	data rate \Channel	MaximumAV Power(dBm)	Position	Sar Limit (1g avg) (mW/g)	Measured value (1g avg)(mW/g)	Result
802.11b	1Mbps/ channel 11	12.56	Towards ground	1.6	**0.799**	PASS

This Test Report Is Issued by: Mr. Song Qizhu Director of the test lab 宋琦珠	Checked by: Mr. Wang Junfeng Deputy director of the test lab 王俊峰
Tested by: Ms. Liu Jia Test engineer 刘佳	Issued date: **2011.07.11**

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1. GENERAL INFORMATION

1.1 Notes of the test report

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The test results relate only to individual items of the samples which have been tested.

1.2 Information about the testing laboratory

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1.5 Test Details

Period of test	2011.07.11	
Device type	Portable Device	
State of sample	production unit	
H/W Version S/W Version	Rockchip RK2918 Android2.3	
Supporting Mode(s):	802.11b,(tested) 802.11g 802.11n	
Test channel: (low-middle-high)	1-6-11 (802.11b/g/n20)	
Operating Frequency Range(s):	Band	Tx(MHz)
	802.11b	2412~2462

1.6 Maximum Results

Body Worn Configuration

Mode	Channel\data rate	MaximumAV Power(dBm)	Position	Sar Limit (1g avg) (mW/g)	Measured value (1g avg)(mW/g)	Result
802.11b	1Mbps/ channel 11	12.56	Towards ground	1.6	**0.799**	PASS

2. DESCRIPTION OF THE DEVICE UNDER TEST

2.1 General Description of Test Procedures

For the 802.11b/g SAR body tests, a communication link is set up with the test mode software for WIFI mode test. The Absolute Radiofrequency Channel Number (ARFCN) is allocated to 1, 6 and 11 respectively in the case of 2450 MHz. During the test, at the each test frequency channel, the EUT is operated at the RF continuous emission mode. Each channel should be tested at the lowest data rate.

802.11b/g operating modes are tested independently according to the service requirements in each frequency band.802.11b/g modes are tested on channels1,6,11;however,if output power reduction is necessary for channels 1 and /or 11 to meet restricted band requirements the highest output channels closest to each of these channels must be tested instead.

SAR is not required for 802.11g channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding

802.11b channels. When the maximum average output channel in each frequency band is not included in the “default test channels”, the maximum channel should be tested instead of an adjacent “default test channels”, these are referred to as the “required test channels” and are illustrated in table 1. Then The Absolute Radiofrequency Channel Number (ARFCN) is firstly allocated to 2437 respectively in the case of 802.11b/g.

Table 1: “Default Test Channels”

Mode	**GHz**	**Channel**	**Turbo Channel**	**“Default Test Channels”**			
				15.247		**UNII**	
				802.11b	**802.11g**		
802.11b/g	2.412	1#		√	*		
	2.437	6	6	√	*		
	2.462	11#		√	*		

Note: #=when output power is reduced for channel 1 and /or 11to meet restricted band requirements the highest out put channels closet to each of these channels should be tested.

√= “default test channels”

* =possible 802.11g channels with maximum average output 0.25dB>=the “default test channels”

2.2 Picture of the EUT


2.3 Test Positions for the Device under test

Test Position 1 The back side of the EUT towards and directed tightly to touch the bottom of the flat phantom. (ANNEX E)

Test Position 2: The right side of the EUT towards and directed tightly to touch the bottom of the flat phantom. (ANNEX E)

Test Position 3: The left side of the EUT towards and directed tightly to touch the bottom of

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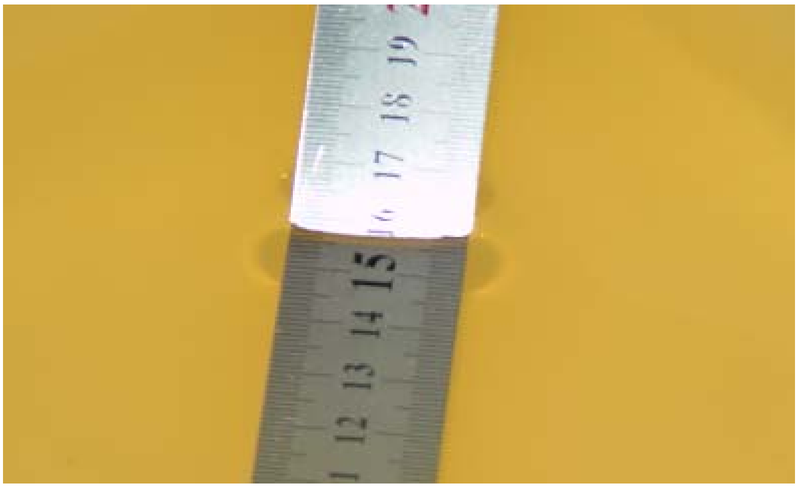
the flat phantom. (ANNEX E)

Test Position 4: The top side of the EUT towards and directed tightly to touch the bottom of the flat phantom. (ANNEX E)

Test Position 5: The bottom side of the EUT towards and directed tightly to touch the bottom of the flat phantom. (ANNEX E)

2.4 Picture to demonstrate the required liquid depth

the liquid depth in the used SAM phantoms



Liquid depth for SAR Measurement

3. TEST CONDITIONS

3.1 Temperature and Humidity

Ambient temperature (° C)	21.0 to 23.0
Ambient humidity (RH %)	30 to 45

3.2 SAR Measurement Set-up

The DASY4 system for performing compliance tests consists of the following items:

- A standard high precision 6-axis robot (Stäubli RX family) with controller and software. An arm extension for accommodating the data acquisition electronics (DAE).
- A dosimetric probe, i.e. an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

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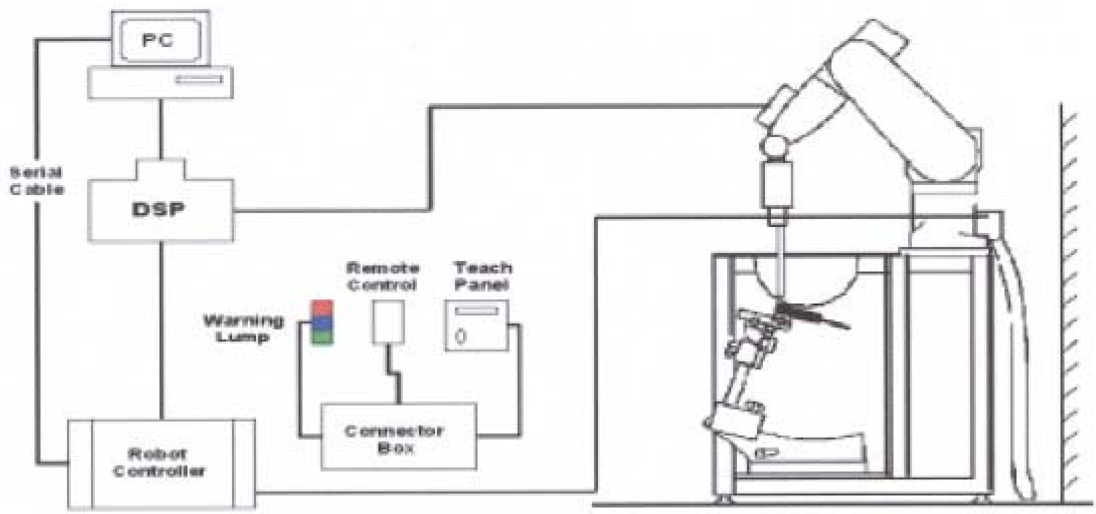
- A data acquisition electronic (DAE) which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collisiondetection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.
- A unit to operate the optical surface detector which is connected to the EOC.
- The Electro-Optical Coupler (EOC) performs the conversion from the optical into a digital electric signal of the DAE. The EOC is connected to the DASY4 measurement server.
- The DASY4 measurement server, which performs all real-time data evaluation for field measurements and surface detection, controls robot movements and handles safety operation. A computer operating Windows 2003
- DASY4 software and SEMCAD data evaluation software.
- Remote control with teach panel and additional circuitry for robot safety such as warning lamps, etc.
- The generic twin phantom enabling the testing of left-hand and right-hand usage.
- The device holder for handheld mobile phones.
- Tissue simulating liquid mixed according to the given recipes.
- System validation dipoles allowing to validate the proper functioning of the system



SAR Lab Test Measurement Set-up

3.3 Scanning Procedure

The DASY4 installation includes predefined files with recommended procedures for measurements and validation. They are read-only document files and destined as fully defined but unmeasured masks. All test positions (head or body-worn) are tested with the same configuration of test steps differing only in the grid definition for the different test positions.

- The “reference” and “drift” measurements are located at the beginning and end of the batch process. They measure the field drift at one single point in the liquid over

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the complete procedure. The indicated drift is mainly the variation of the DUT's output power and should vary max. ± 5 %.

- The "surface check" measurement tests the optical surface detection system of the DASY4 system by repeatedly detecting the surface with the optical and mechanical surface detector and comparing the results. The output gives the detecting heights of both systems, the difference between the two systems and the standard deviation of the detection repeatability. Air bubbles or refraction in the liquid due to separation of the sugar-water mixture gives poor repeatability (above ± 0.1mm). To prevent wrong results tests are only executed when the liquid is free of air bubbles. The difference between the optical surface detection and the actual surface depends on the probe and is specified with each probe. (It does not depend on the surface reflectivity or the probe angle to the surface within ± 30°.)
- Area Scan
  The Area Scan is used as a fast scan in two dimensions to find the area of high field values before running a detailed measurement around the hot spot. Before starting the area scan a grid spacing of 15 mm x 15 mm is set. During the scan the distance of the probe to the phantom remains unchanged.
  After finishing area scan, the field maxima within a range of 2 dB will be ascertained.
- Zoom Scan
  Zoom Scans are used to estimate the peak spatial SAR values within a cubic averaging volumecontaining 1 g and 10 g of simulated tissue. The default Zoom Scan is done by 7x7x7 points within a cube whose base is centered around the maxima found in the preceding area scan.
- Spatial Peak Detection
  The procedure for spatial peak SAR evaluation has been implemented and can determine values of masses of 1g and 10g, as well as for user-specific masses. The DASY4 system allows evaluations that combine measured data and robot positions, such as:
  - maximum search
  - extrapolation
  - boundary correction
  - peak search for averaged SAR

  During a maximum search, global and local maxima searches are automatically performed in 2-D after each Area Scan measurement with at least 6 measurement points. It is based on the evaluation of the local SAR gradient calculated by the Quadratic Shepard's method. The algorithm will find the global maximum and all local maxima within -2 dB of the global maxima for all SAR distributions.
  Extrapolation routines are used to obtain SAR values between the lowest measurement points and the inner phantom surface. The extrapolation distance is determined by the surface detection distance and the probe sensor offset. Several measurements at different distances are necessary for the extrapolation.

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Extrapolation routines require at least 10 measurement points in 3-D space. They are used in the Zoom Scan to obtain SAR values between the lowest measurement points and the inner phantom surface. The routine uses the modified Quadratic Shepard's method for extrapolation. For a grid using 7x7x7 measurement points with 5mm resolution amounting to 343 measurement points, the uncertainty of the extrapolation routines is less than 1% for 1g and 10g cubes.

- A Z-axis scan measures the total SAR value at the x-and y-position of the maximum SAR value found during the cube 7x7x7 scan. The probe is moved away in z-direction from the bottom of the SAM phantom in 5mm steps.

4. DESCRIPTION OF THE TEST EQUIPMENT

4.1 Measurement System and Components

The SAR measurements were conducted with the dosimetric probe ES3DV3 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation.

The following table lists calibration dates of SPEAG components:

Test Equipment	Serial Number	Calibration interval	Calibration expiry
DAE4	685	1year	2011.08.19
Dosimetric E-field Probe ES3DV3	3109	1year	2011.08.25
Dipole Validation Kit, D2450V2	787	2 years	2012.08.26
DASY4 software Version	4.7	N/A	N/A

Note: the Dipole Calibration interval is 24 months

Additional test equipment used in testing:

Test Equipment	Model	Serial Number	Calibration interval	Calibration expiry
CMU200	Wireless Communication Test Set	109172	2010-07-23	2011-07-23
ES3DV3	probe	3109	2010-08-19	2011-08-19
SD000D04BC	DAE4	685	2010-08-19	2011-08-19
D2450V2	dipole	787	2010-08-26	2011-08-26
NRVD	Power Meter	83584310014	2011-01-12	2012-01-12
SME03	Signal Generator	100029	2011-01-19	2012-01-19
NRV-Z4	Power Sensor	100381	2011-03-24	2012-03-24
NRV-Z2	Power Sensor	100211	2011-03-24	2012-03-24
778D	Dual directional coupler	20040	NA	NA
E3640A	DC Power Supply	MY40008487	NA	NA
85070E	Probe kit	MY44300214	NA	NA
E5071B	Network Analyzer	MY42404001	2011-01-14	2012-01-14

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Detailed information of Isotropic E-field Probe Type ES3DV3

Construction	Symmetrical design with triangular core Interleaved sensors Built-in shielding against static charges PEEK enclosure material (resistant to organic solvents, e.g., DGBE)
Calibration	Calibration certificate in Appendix C
Frequency	10 MHz to 4 GHz; Linearity: ± 0.2 dB (30 MHz to 4 GHz)
Optical Surface Detection	± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces
Dimensions	Overall length: 330 mm (Tip: 20 mm) Tip diameter: 3.9 mm (Body: 12 mm) Distance from probe tip to dipole centers: 2.0 mm
Dynamic Range	5 µW/g to > 100 mW/g; Linearity: ± 0.2 dB
Application	General dosimetry up to 4 GHz Dosimetry in strong gradient fields Compliance tests of mobile phones

4.2 Phantoms

The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (Oval Flat) phantom defined in IEEE 1528-2003, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of wireless portable device usage as well as body mounted usage at the flat phantom region. A cover prevents evaporation of the liquid. Reference markings on the phantom allow the complete setup of all predefined phantom positions and measurement grids by manually teaching three points with the robot.

Shell Thickness 2 ±0.2 mm
Filling Volume Approx. 30 liters
Dimensions 190×600×400 mm (H×L×W)

ELI4 Phantom

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4.3 Tissue Simulants

Recommended values for the dielectric parameters of the tissue simulants are given in IEEE 1528 - 2003 and FCC Supplement C to OET Bulletin 65. All tests were carried out using simulants whose dielectric parameters were within ± 5% of the recommended values. All tests were carried out within 24 hours of measuring the dielectric parameters.
The depth of the tissue simulant was 15.0 ± 0.5 cm measured from the ear reference point during system checking and device measurements.

4.3.1 Tissue Simulant Recipes

The following recipe(s) were used for Head and Body tissue stimulant(s):

2450MHz band

Ingredient	Head (% by weight)	Body (% by weight)
Water	55.00	68.64
DGBE	45.00	31.37
Nacl	0.00	0.00

4.3.2 System Checking

The manufacturer calibrates the probes annully. Dielectric parameters of the tissue simulants were measured every day using the dielectric probe kit and the network analyser. A system check measurement was made following the determination of the dielectric parameters of the simulant, using the dipole validation kit. A power level of 250 mW was supplied to the dipole antenna, which was placed under the flat section of the twin SAM phantom. The system checking results (dielectric parameters and SAR values) are given in the table below. Test Date is 2011.7.9

System checking,head tissue simulant

		SAR_{1g} [w/kg]	ε_r	σ[S/m]	Temperature	
					Ambient[℃]	Liquid[℃]
2450MHz	Target Value	52.4	39.2±3.92	1.8±0.09	15-30	-
	Measured Value	53.2	37.75	1.88	24.0	22.3

All SAR values are normalized to 1W forward power

Plots of the system checking scans are given in Appendix A.

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4.3.3 Tissue Simulants used in the Measurements

For the measurement of the following parameters the HP 85070D dielectric probe kit is used, representing the open-ended coaxial probe measurement procedure. Liquid temperature during the test: 22.3° C。Tested date is 2011.7.9

Head		εr	σ[S/m]	Temperature	
				Ambient [℃]	Liquid [℃]
2450MHz	Recommended Value	39.2±3.92	1.8±0.09	15-30	-
	Measured Value	37.75	1.88	24.0	22.3

Body		εr	σ[S/m]	Temperature	
				Ambient [℃]	Liquid [℃]
2450MHz	Recommended Value	52.7±5.27	1.95±0.0975	15-30	-
	Measured Value	51.40	1.98	24.0	22.3

5. Characteristics of the Test

5.1. Applicable Limit Regulations

IEEE Std C95.1, 1999: IEEE Standard for Safety Levels with Respect to Human Exposure to Radiofrequency Electromagnetic Fields, 3 KHz to 300 GHz.

5.2. Applicable Measurement Standards

OET Bulletin 65 supplement C, published June 2001 including DA 02-1438, published June 2002: Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits. Transition Period for the Phantom Requirements of Supplement C to OET Bulletin 65.

KDB 248227 D01 SAR meas for 802 11 a b g V01R02: SAR Measurement Procedures for 802.11a/b/g Transmitters

KDB 616217 D03 SAR Supp Note and Netbook Laptop v01: SAR Evaluation Considerations forLaptop/Notebook/Netbook and Tablet Computers – Supplement to KDB 616217

KDB 447498 D01 Mobile Portable RF Exposure v04: Mobile and Portable Device RF Exposure Procedures and Equipment Authorization Policies

6. MEASUREMENT UNCERTAINTY

It includes the uncertainty budget suggested by the [IEEE P1528] and determined by Schmid & Partner Engineering AG. The expanded uncertainty (K=2) is assessed to be ±22.0%.

Error Source	Type	Uncertainty Value (%)	Probability Distribution	ci	Standard Uncertainty (%) $u_i^{'}$ (%)	Degree of freedom Veff or vi
System repetivity	A	0.5	N	1	1.5	4
Measurement system						
—probe calibration	B	5.9	N	1	5.9	∞
—axial isotropy of the probe	B	4.7	R	0.7	1.9	∞
—hemisphere isotropy of the probe	B	9.6	R	0.7	3.9	
—boundary effect	B	0.4	R	1	0.6	∞
—probe linearity	B	4.7	R	1	2.7	∞
—detection limit	B	1.0	R	1	0.6	∞
—Readout Electronics	B	1.0	N	1	0.3	∞
—response time	B	0.8	R	1	0.5	∞
—integration time	B	2.6	R	1	1.5	∞
—RF Ambient Noise	B	3.0	R	1	1.7	∞
—RF Ambient Reflections	B	3.0	R	1	1.7	∞
—Probe Positioning	B	0.4	R	1	0.2	∞
—Probe Positioning	B	2.9	R	1	1.7	∞
—Max. SAR Eval.	B	1.0	R	1	0.6	∞
Test Sample Related						
—Device Positioning	B	2.9	N	1	2.9	145
—Device Holder	B	3.6	N	1	3.6	∞
—Power Drift	B	5.0	R	1	2.9	∞
Phantom and setup						

—Phantom uncertainty	B	4.0	R	1	2.3	∞
—liquid conductivity (deviation from target)	B	5.0	R	0.64	1.8	∞
—liquid conductivity(measurement error)	B	2.5	N	0.64	1.6	∞
—liquid permittivity(deviation from target)	B	5.0	R	0.6	1.7	∞
—liquid permittivity(measurement error)	B	2.5	N	0.6	1.5	∞
—Combined Std. Uncertainty					11.0	∞
Expanded STD Uncertainty					22.0	∞

Table 6.1 – Measurement uncertainty evaluation

7. RESULTS

7.1 Test result

Limit of SAR (W/kg)		1g Average	Power drift
		1.6	±0.21
Test case of Body		Measurement result (W/kg)	Power Drift(dB)
Different test position	channel	1g Average	
Test Position 1	Middle/6	0.060	0.147
Test Position 2	Middle/6	0.015	0.00581
Test Position 3	Middle/6	0.021	0.0089
Test Position 4	High/11	**0.799**	0.089
Test Position 4	Middle/6	0.703	0.103
Test Position 4	Low/1	0.677	-0.077
Test Position 5	Middle/6	0.00211	-0.121

Note:

1.The value with blue color is the maximum SAR Value of each test band.

2. The SAR test shall be performed at the high, middle and low frequency channels of each operating mode. If the SAR measured at mid-band channel for each test configuration is at

least 3.0 dB (< 0.8W/kg) lower than the SAR limit, testing at the high and low channels is optional.

3. Upper and lower frequencies were measured at the worst case.

4. SAR is not required for 802.11g/n channels when the maximum average output power is less than 0.25dB higher than that measured on the corresponding 802.11b channels.

7.2 Conducted Power Results

The output power of BT antenna is as following:

Channel		Ch 0 2402 MHz	Ch 39 2441 Mhz	Ch 78 2480 MHz
Peak conducted Output power(mW)	1Mbps/GFSK	0.711	0.774	0.857
	3Mbps/8DPSK	0.733	0.798	0.889

The Bluetooth and Wifi 2.4GHz use the same antenna , the Wifi 2.4GHz can't transmit simultaneously with Bluetooth. And the Bluetooth's power is less than 24mW(2P_{ref}), so we consider that the Bluetooth's SAR is zero.

The conducted average output power of WIFI is as following:

802.11b（dBm）

Duty cycle: 1（100%）

Channel\data rate	1Mbps	2Mbps	5.5Mbps	11Mbps
1	12.60	12.59	12.58	12.6
6	**12.70**	12.69	12.67	12.64
11	12.56	12.55	12.54	12.51

802.11g（dBm）

Duty cycle: 1（100%）

Channel\data rate	6Mbps	9Mbps	12Mbps	18Mbps	24Mbps	36Mbps	48Mbps	54Mbps
1	**10.52**	10.51	10.49	10.46	10.45	10.43	10.41	10.39
6	10.50	10.49	10.47	10.45	10.43	10.42	10.41	10.38
11	10.46	10.41	10.40	10.38	10.36	10.35	10.34	10.35

802.11n(dBm)
Duty cycle: 1（100%）

Channel\data rate	MCS0	MCS1	MCS2	MCS3	MCS4	MCS5	MCS6	MCS7
1	**9.70**	9.68	9.67	9.66	9.65	9.63	9.61	9.59
6	9.49	9.46	9.45	9.43	9.42	9.4	9.38	9.37
11	9.41	9.4	9.38	9.36	9.35	9.32	9.3	9.28

APPENDIX A: SYSTEM CHECKING SCANS

SYSTEM CHECKING SCANS	2450 MHz

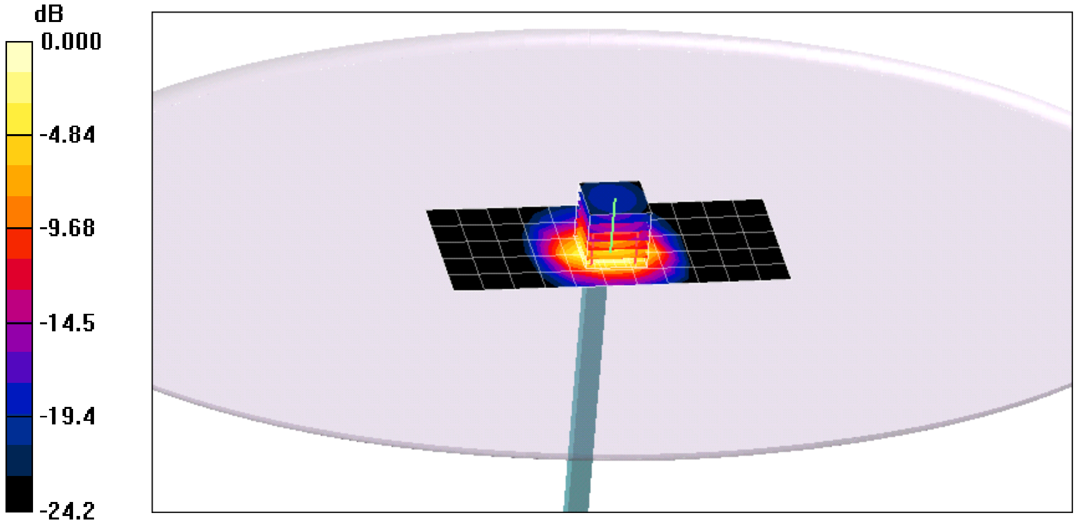
Date/Time: 7/9/2011 7:35:13 AM
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:787
Program Name: 2450
Communication System: CW; Frequency: 2450 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2450 MHz; σ = 1.88 mho/m; ε_r = 37.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.24, 4.24, 4.24); Calibrated: 8/25/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 8/19/2010
- Phantom: Flat Phantom ELI4.0; Type: QD0VA001BA; Serial: SN: ELI4
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

2450/Area Scan (6x12x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 13.6 mW/g

2450/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 77.1 V/m; Power Drift = -0.097 dB
Peak SAR (extrapolated) = 29.6 W/kg
SAR(1 g) = 13.3 mW/g; SAR(10 g) = 5.92 mW/g
Maximum value of SAR (measured) = 15.1 mW/g



0 dB =15.1mW/g

APPENDIX B: MEASUREMENT SCANS

FLAT	Test Position 1	**2437 MHz**

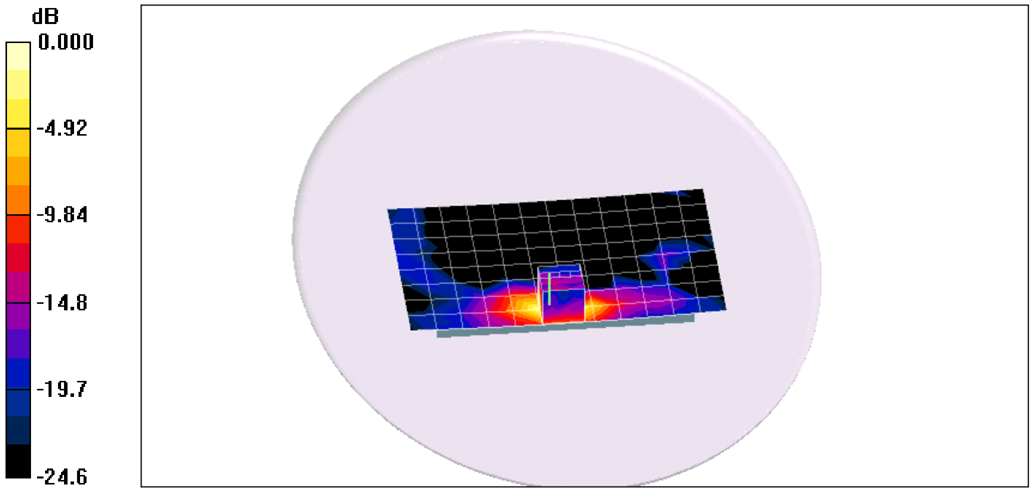
Date/Time: 7/9/2011 4:37:12 PM
Communication System: 802.11b/g; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.97 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.26, 4.26, 4.26); Calibrated: 8/25/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 8/19/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN: ELI4
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

position1 towards ground/Area Scan (9x13x1): Measurement grid: dx=20mm, dy=20mm

Maximum value of SAR (measured) = 0.062 mW/g

position1 towards ground/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm

Reference Value = 0.334 V/m; Power Drift = 0.147 dB
Peak SAR (extrapolated) = 0.125 W/kg
SAR(1 g) = 0.060 mW/g; SAR(10 g) = 0.027 mW/g
Maximum value of SAR (measured) = 0.070 mW/g



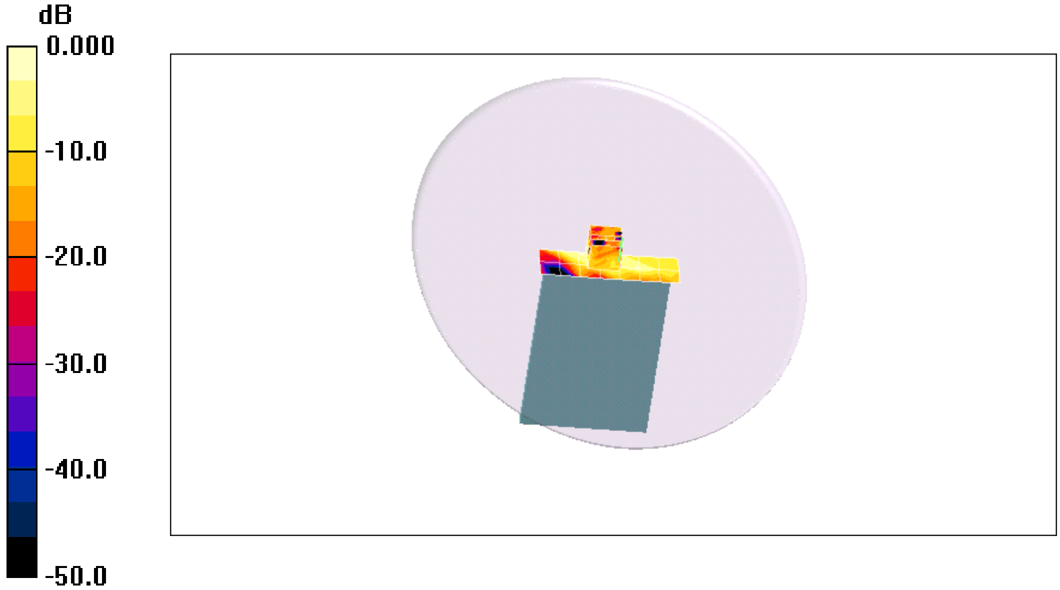
0 dB =0.070mW/g

FLAT	Test Position 2	2437MHz

Date/Time: 7/9/2011 5:47:24 PM
Communication System: 802.11b/g; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.97 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.26, 4.26, 4.26); Calibrated: 8/25/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 8/19/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN: ELI4
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

position1 towards ground MID/Area Scan (3x8x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (measured) = 0.011 mW/g

position1 towards ground MID/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 2.64 V/m; Power Drift = 0.042 dB
Peak SAR (extrapolated) = 0.031 W/kg
SAR(1 g) = 0.015 mW/g; SAR(10 g) = 0.00581 mW/g
Maximum value of SAR (measured) = 0.020 mW/g



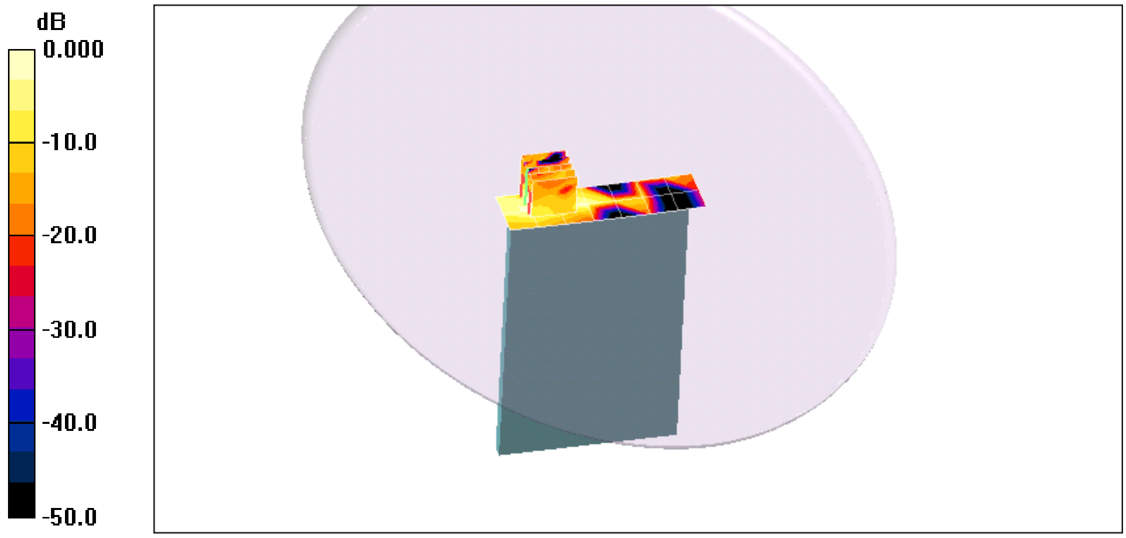
0 dB =0.020mW/g

FLAT	Test Position 3	2437MHz

Date/Time: 7/9/2011 6:52:17 PM
Communication System: 802.11b/g; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.97 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.26, 4.26, 4.26); Calibrated: 8/25/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 8/19/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN: ELI4
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

position1 towards ground MID/Area Scan (3x8x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (measured) = 0.017 mW/g

position1 towards ground MID/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 1.90 V/m; Power Drift = 0.176 dB
Peak SAR (extrapolated) = 0.049 W/kg
SAR(1 g) = 0.021 mW/g; SAR(10 g) = 0.0089 mW/g
Maximum value of SAR (measured) = 0.026 mW/g



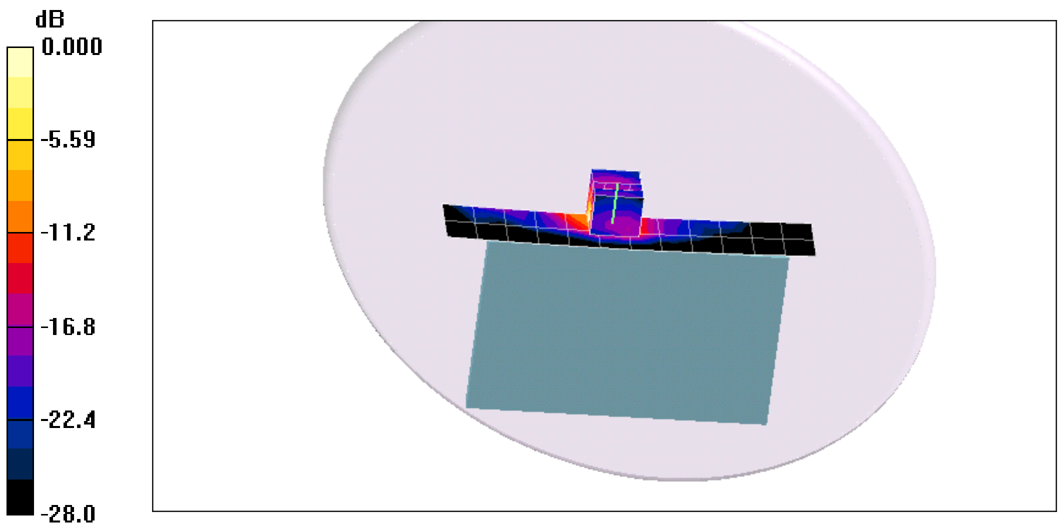
0 dB =0.026mW/g

FLAT	Test Position 4	2462MHz

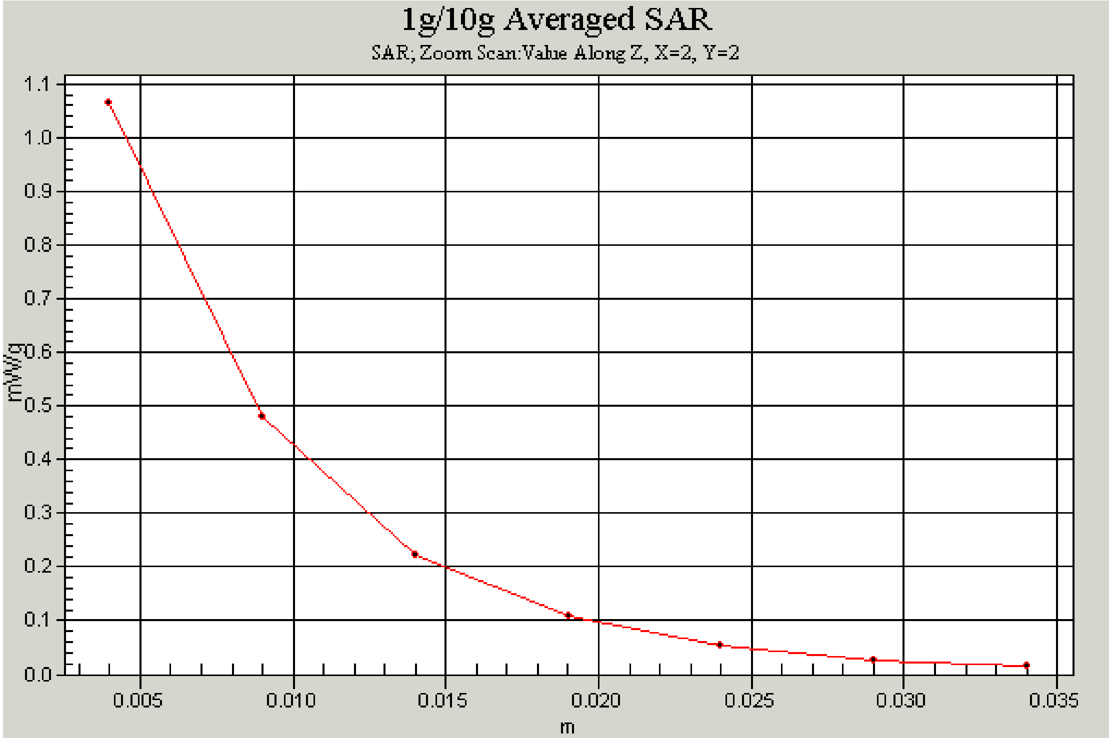
Date/Time: 7/9/2011 7:5709:49 PM
Communication System: 802.11b/g; Frequency: 2462 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2462 MHz; σ = 2 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.26, 4.26, 4.26); Calibrated: 8/25/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 8/19/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN: ELI4
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

position1 towards ground HIGH/Area Scan (3x13x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (measured) = 0.152 mW/g

position1 towards ground HIGH/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.57 V/m; Power Drift = 0.089 dB
Peak SAR (extrapolated) = 1.88 W/kg
SAR(1 g) = 0.799 mW/g; SAR(10 g) = 0.307 mW/g
Maximum value of SAR (measured) = 1.07 mW/g



0 dB =1.07mW/g



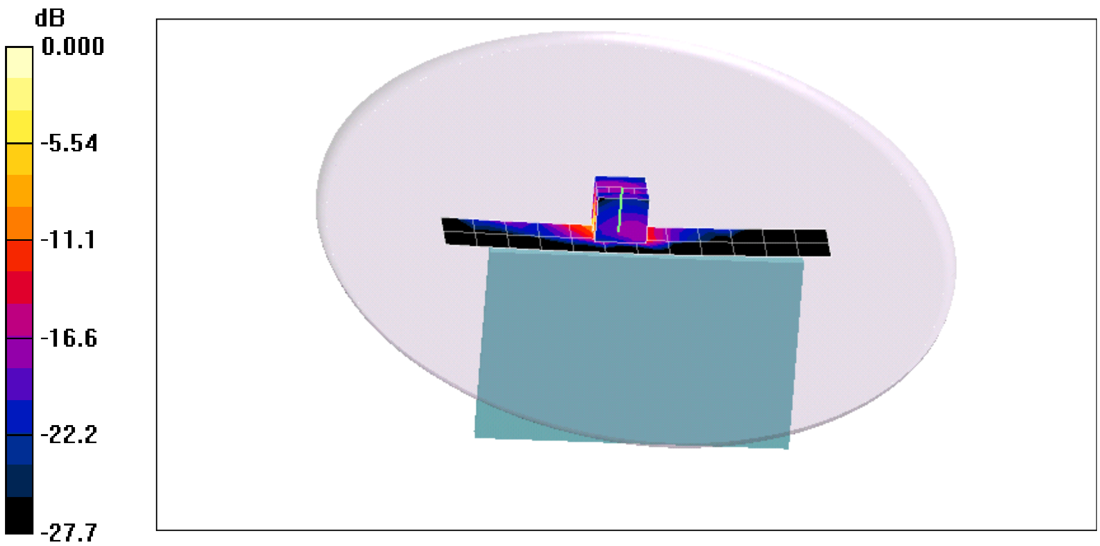
Z-Scan at power reference point (2462MHz CH11)

FLAT	Test Position 4	2437MHz

Date/Time: 7/9/2011 9:17:19 PM
Communication System: 802.11b/g; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.97 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.26, 4.26, 4.26); Calibrated: 8/25/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 8/19/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN: ELI4
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

position1 towards ground MID/Area Scan (3x13x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (measured) = 0.138 mW/g

position1 towards ground MID/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 8.06 V/m; Power Drift = 0.103 dB
Peak SAR (extrapolated) = 1.63 W/kg
SAR(1 g) = 0.703 mW/g; SAR(10 g) = 0.270 mW/g
Maximum value of SAR (measured) = 0.957 mW/g



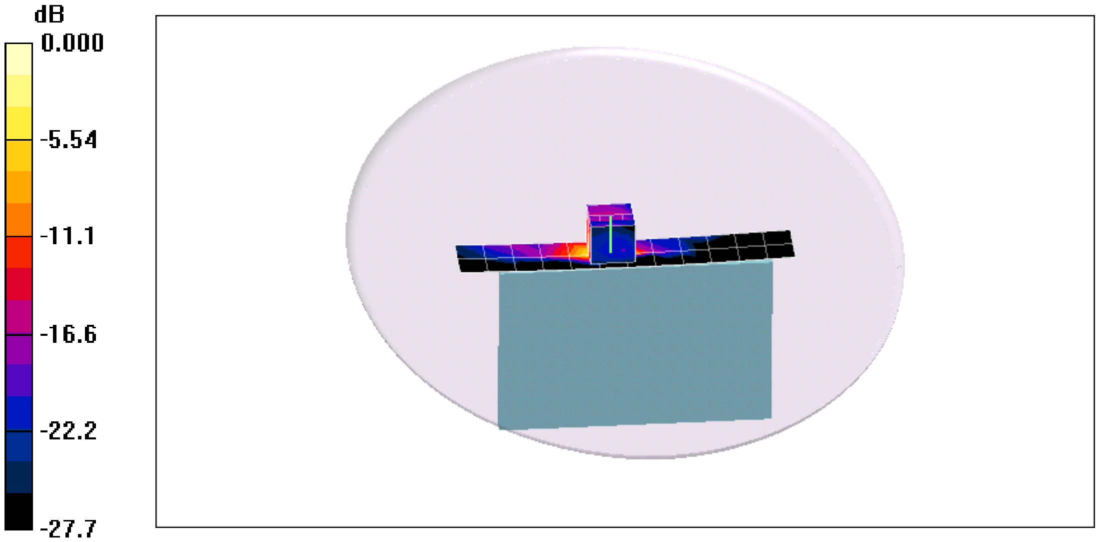
0 dB =0.957mW/g

FLAT	Test Position 4	2412MHz

Date/Time: 6/21/2011 10:21:23 PM
Communication System: 802.11b/g; Frequency: 2412 MHz;Duty Cycle: 1:1
Medium parameters used: f = 2412 MHz; σ = 1.93 mho/m; ε_r = 51.5; ρ = 1000 kg/m^3
Phantom section: Flat Section
DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.26, 4.26, 4.26); Calibrated: 8/25/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 8/19/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN: ELI4
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

position1 towards ground LOW/Area Scan (3x13x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (measured) = 0.433 mW/g

position1 towards ground LOW/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 14.3 V/m; Power Drift = -0.077 dB
Peak SAR (extrapolated) = 1.72 W/kg
SAR(1 g) = 0.677 mW/g; SAR(10 g) = 0.247 mW/g
Maximum value of SAR (measured) = 0.729 mW/g



0 dB =0.729mW/g

FLAT	Test Position 5	2437MHz

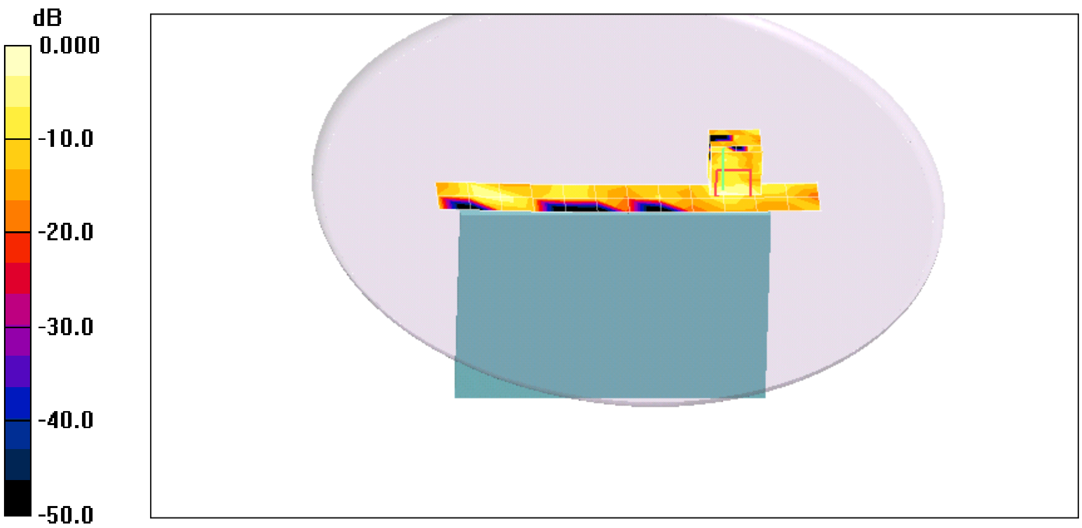
Date/Time: 6/21/2011 11:32:24 PM

Communication System: 802.11b/g; Frequency: 2437 MHz;Duty Cycle: 1:1
Medium parameters used (interpolated): f = 2437 MHz; σ = 1.97 mho/m; ε_r = 51.4; ρ = 1000 kg/m^3
Phantom section: Flat Section

DASY4 Configuration:
- Probe: ES3DV3 - SN3109; ConvF(4.26, 4.26, 4.26); Calibrated: 8/25/2010
- Sensor-Surface: 4mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn685; Calibrated: 8/19/2010
- Phantom: Flat Phantom ELI4.0; Type: QDOVA001BA; Serial: SN: ELI4
- Measurement SW: DASY4, V4.7 Build 80; Postprocessing SW: SEMCAD, V1.8 Build 186

position1 towards ground MID/Area Scan (3x13x1): Measurement grid: dx=20mm, dy=20mm
Maximum value of SAR (measured) = 0.003 mW/g

position1 towards ground MID/Zoom Scan (5x5x7)/Cube 0: Measurement grid: dx=8mm, dy=8mm, dz=5mm
Reference Value = 0.505 V/m; Power Drift = -0.121 dB
Peak SAR (extrapolated) = 0.011 W/kg
SAR(1 g) = 0.00491 mW/g; SAR(10 g) = 0.00211 mW/g
Maximum value of SAR (measured) = 0.006 mW/g



0 dB =0.006mW/g

APPENDIX C: RELEVANT PAGES FROM PROBE CALIBRATION REPORT(S)

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S **Schweizerischer Kalibrierdienst**
C **Service suisse d'étalonnage**
Servizio svizzero di taratura
S **Swiss Calibration Service**

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: SCS 108

Client **Flextronics (Auden)**

Certificate No: ES3-3109_Aug10

CALIBRATION CERTIFICATE

Object: ES3DV3 - SN:3109

Calibration procedure(s): QA CAL-01.v6, QA CAL-23.v3 and QA CAL-25.v2
Calibration procedure for dosimetric E-field probes

Calibration date: August 25, 2010

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter E4419B	GB41293874	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41495277	1-Apr-10 (No. 217-01136)	Apr-11
Power sensor E4412A	MY41498087	1-Apr-10 (No. 217-01136)	Apr-11
Reference 3 dB Attenuator	SN: S5054 (3c)	30-Mar-10 (No. 217-01159)	Mar-11
Reference 20 dB Attenuator	SN: S5086 (20b)	30-Mar-10 (No. 217-01161)	Mar-11
Reference 30 dB Attenuator	SN: S5129 (30b)	30-Mar-10 (No. 217-01160)	Mar-11
Reference Probe ES3DV2	SN: 3013	30-Dec-09 (No. ES3-3013_Dec09)	Dec-10
DAE4	SN: 660	20-Apr-10 (No. DAE4-660_Apr10)	Apr-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-09)	In house check: Oct10

	Name	Function	Signature
Calibrated by:	Jeton Kastrati	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 25, 2010

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: ES3-3109_Aug10 Page 1 of 11

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
NORMx,y,z	sensitivity in free space
ConvF	sensitivity in TSL / NORMx,y,z
DCP	diode compression point
CF	crest factor (1/duty_cycle) of the RF signal
A, B, C	modulation dependent linearization parameters
Polarization φ	φ rotation around probe axis
Polarization ϑ	ϑ rotation around an axis that is in the plane normal to probe axis (at measurement center), i.e., ϑ = 0 is normal to probe axis

Calibration is Performed According to the Following Standards:

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

Methods Applied and Interpretation of Parameters:

- *NORMx,y,z:* Assessed for E-field polarization ϑ = 0 (f ≤ 900 MHz in TEM-cell; f > 1800 MHz: R22 waveguide). NORMx,y,z are only intermediate values, i.e., the uncertainties of NORMx,y,z does not effect the E^2-field uncertainty inside TSL (see below *ConvF*).
- *NORM(f)x,y,z = NORMx,y,z * frequency_response* (see Frequency Response Chart). This linearization is implemented in DASY4 software versions later than 4.2. The uncertainty of the frequency response is included in the stated uncertainty of *ConvF*.
- *DCPx,y,z:* DCP are numerical linearization parameters assessed based on the data of power sweep with CW signal (no uncertainty required). DCP does not depend on frequency nor media.
- *Ax,y,z; Bx,y,z; Cx,y,z, VRx,y,z: A, B, C* are numerical linearization parameters assessed based on the data of power sweep for specific modulation signal. The parameters do not depend on frequency nor media. *VR* is the maximum calibration range expressed in RMS voltage across the diode.
- *ConvF and Boundary Effect Parameters:* Assessed in flat phantom using E-field (or Temperature Transfer Standard for f ≤ 800 MHz) and inside waveguide using analytical field distributions based on power measurements for f > 800 MHz. The same setups are used for assessment of the parameters applied for boundary compensation (alpha, depth) of which typical uncertainty values are given. These parameters are used in DASY4 software to improve probe accuracy close to the boundary. The sensitivity in TSL corresponds to *NORMx,y,z * ConvF* whereby the uncertainty corresponds to that given for *ConvF*. A frequency dependent *ConvF* is used in DASY version 4.4 and higher which allows extending the validity from ± 50 MHz to ± 100 MHz.
- *Spherical isotropy (3D deviation from isotropy)*: in a field of low gradients realized using a flat phantom exposed by a patch antenna.
- *Sensor Offset*: The sensor offset corresponds to the offset of virtual measurement center from the probe tip (on probe axis). No tolerance required.

Probe ES3DV3

SN:3109

Manufactured:	September 20, 2005
Last calibrated:	February 16, 2009
Recalibrated:	August 25, 2010

Calibrated for DASY/EASY Systems

(Note: non-compatible with DASY2 system!)

Tel: 86-10-68009202 68009203
Fax: 86-10-68009195 68009205

ES3DV3 SN:3109 August 25, 2010

DASY/EASY - Parameters of Probe: ES3DV3 SN:3109

Basic Calibration Parameters

	Sensor X	Sensor Y	Sensor Z	Unc (k=2)
Norm ($\mu V/(V/m)^2$)[A]	1.22	1.33	1.30	± 10.1%
DCP (mV)[B]	96.9	95.2	92.5	

Modulation Calibration Parameters

UID	Communication System Name	PAR		A dB	B dBuV	C	VR mV	Unc[E] (k=2)
10000	CW	0.00	X	0.00	0.00	1.00	300.0	± 1.5%
			Y	0.00	0.00	1.00	300.0	
			Z	0.00	0.00	1.00	300.0	

The reported uncertainty of measurement is stated as the standard uncertainty of measurement multiplied by the coverage factor k=2, which for a normal distribution corresponds to a coverage probability of approximately 95%.

[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Pages 5 and 6).

[B] Numerical linearization parameter: uncertainty not required.

[E] Uncertainty is determined using the maximum deviation from linear response applying recatangular distribution and is expressed for the square of the field value.

Certificate No: ES3-3109_Aug10 Page 4 of 11

Tel: 86-10-68009202 68009203
Fax: 86-10-68009195 68009205

DASY/EASY - Parameters of Probe: ES3DV3 SN:3109

Calibration Parameter Determined in Head Tissue Simulating Media

f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth	Unc (k=2)
900	± 50 / ± 100	41.5 ± 5%	0.97 ± 5%	5.72	5.72	5.72	0.98	1.05	± 11.0%
1810	± 50 / ± 100	40.0 ± 5%	1.40 ± 5%	4.88	4.88	4.88	0.52	1.42	± 11.0%
2450	± 50 / ± 100	39.2 ± 5%	1.80 ± 5%	4.24	4.24	4.24	0.43	1.76	± 11.0%

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Tel: 86-10-68009202 68009203
Fax: 86-10-68009195 68009205

DASY/EASY - Parameters of Probe: ES3DV3 SN:3109

Calibration Parameter Determined in Body Tissue Simulating Media

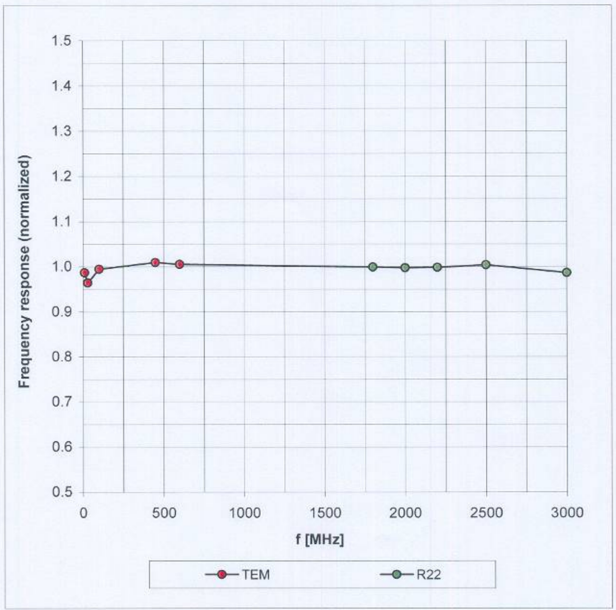
f [MHz]	Validity [MHz][C]	Permittivity	Conductivity	ConvF X	ConvF Y	ConvF Z	Alpha	Depth	Unc (k=2)
900	± 50 / ± 100	55.0 ± 5%	1.05 ± 5%	5.70	5.70	5.70	0.84	1.11	± 11.0%
1810	± 50 / ± 100	53.3 ± 5%	1.52 ± 5%	4.70	4.70	4.70	0.35	2.12	± 11.0%
2450	± 50 / ± 100	52.7 ± 5%	1.95 ± 5%	4.26	4.26	4.26	0.55	1.47	± 11.0%

[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Tel: 86-10-68009202 68009203
Fax: 86-10-68009195 68009205

Frequency Response of E-Field

(TEM-Cell:ifi110 EXX, Waveguide: R22)

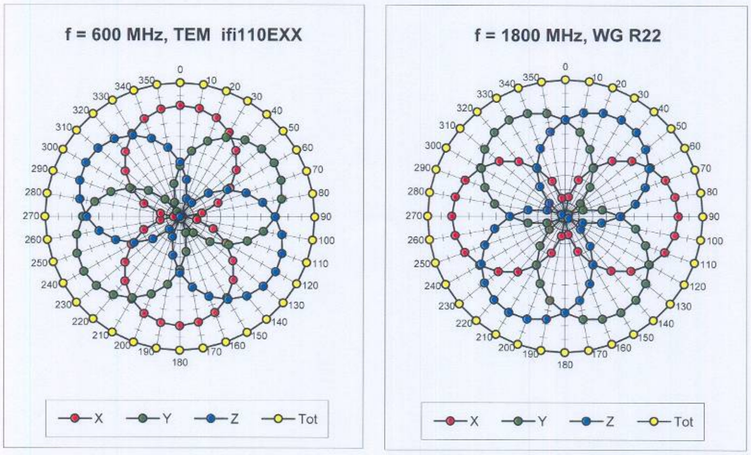


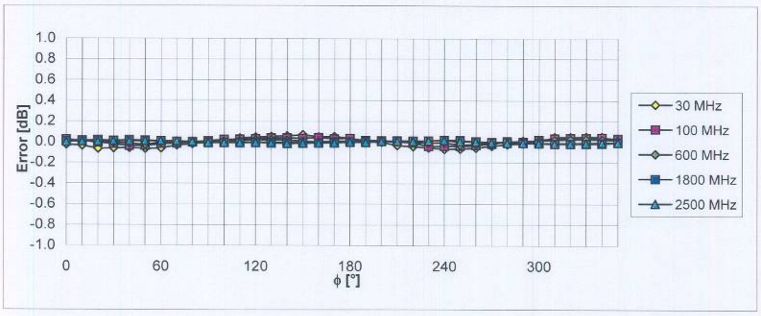
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Tel: 86-10-68009202 68009203
Fax: 86-10-68009195 68009205

ES3DV3 SN:3109 August 25, 2010

Receiving Pattern (ϕ), ϑ = 0°





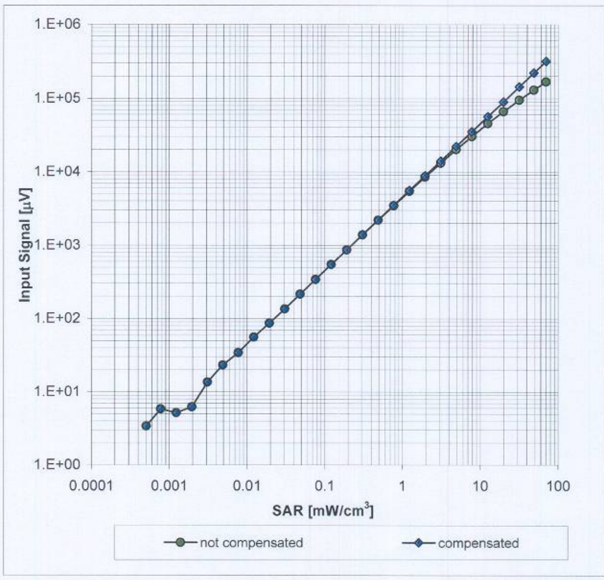
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

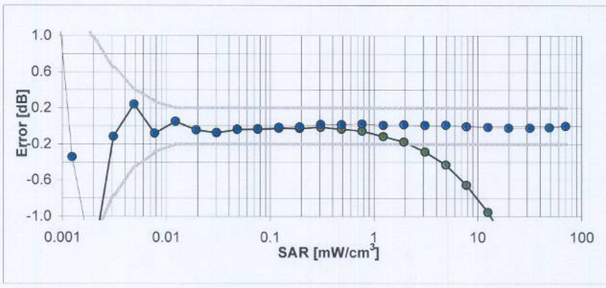
Certificate No: ES3-3109_Aug10 Page 8 of 11

Tel: 86-10-68009202 68009203
Fax: 86-10-68009195 68009205

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)

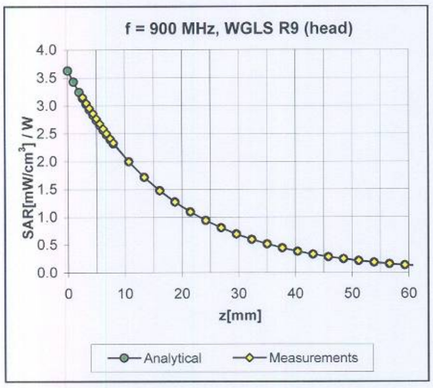


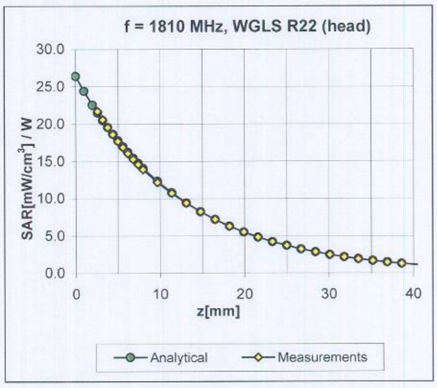


Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Tel: 86-10-68009202 68009203
Fax: 86-10-68009195 68009205

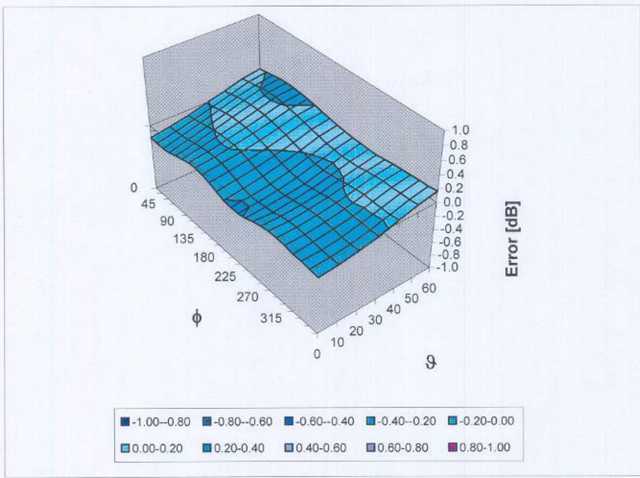
Conversion Factor Assessment





Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



Uncertainty of Spherical Isotropy Assessment: ± 2.6% (k=2)

Tel: 86-10-68009202 68009203
Fax: 86-10-68009195 68009205

Other Probe Parameters

Sensor Arrangement	Triangular
Connector Angle (°)	Not applicable
Mechanical Surface Detection Mode	enabled
Optical Surface Detection Mode	disabled
Probe Overall Length	337 mm
Probe Body Diameter	10 mm
Tip Length	10 mm
Tip Diameter	4.0 mm
Probe Tip to Sensor X Calibration Point	2 mm
Probe Tip to Sensor Y Calibration Point	2 mm
Probe Tip to Sensor Z Calibration Point	2 mm
Recommended Measurement Distance from Surface	3 mm

Tel: 86-10-68009202 68009203
Fax: 86-10-68009195 68009205

APPENDIX D: RELEVANT PAGES FROM DIPOLE VALIDATION KIT REPORT(S)

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Client **Flextronics (Auden)**

Certificate No: **D2450V2-787_Aug10**

CALIBRATION CERTIFICATE

Object	D2450V2 - SN: 787
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	August 26, 2010

This calibration certificate documents the traceability to national standards, which realize the physical units of measurements (SI).
The measurements and the uncertainties with confidence probability are given on the following pages and are part of the certificate.

All calibrations have been conducted in the closed laboratory facility: environment temperature (22 ± 3)°C and humidity < 70%.

Calibration Equipment used (M&TE critical for calibration)

Primary Standards	ID #	Cal Date (Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	06-Oct-09 (No. 217-01086)	Oct-10
Power sensor HP 8481A	US37292783	06-Oct-09 (No. 217-01086)	Oct-10
Reference 20 dB Attenuator	SN: 5086 (20g)	30-Mar-10 (No. 217-01158)	Mar-11
Type-N mismatch combination	SN: 5047.2 / 06327	30-Mar-10 (No. 217-01162)	Mar-11
Reference Probe ES3DV3	SN: 3205	30-Apr-10 (No. ES3-3205_Apr10)	Apr-11
DAE4	SN: 601	10-Jun-10 (No. DAE4-601_Jun10)	Jun-11

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (in house check Oct-09)	In house check: Oct-11
RF generator R&S SMT-06	100005	4-Aug-99 (in house check Oct-09)	In house check: Oct-11
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (in house check Oct-09)	In house check: Oct-10

	Name	Function	Signature
Calibrated by:	Claudio Leubler	Laboratory Technician	
Approved by:	Katja Pokovic	Technical Manager	

Issued: August 26, 2010

This calibration certificate shall not be reproduced except in full without written approval of the laboratory.

Certificate No: D2450V2-787_Aug10 Page 1 of 9

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Fax: 86-10-68009195 68009205

Calibration Laboratory of
Schmid & Partner
Engineering AG
Zeughausstrasse 43, 8004 Zurich, Switzerland

S Schweizerischer Kalibrierdienst
C Service suisse d'étalonnage
S Servizio svizzero di taratura
S Swiss Calibration Service

Accredited by the Swiss Accreditation Service (SAS)
The Swiss Accreditation Service is one of the signatories to the EA Multilateral Agreement for the recognition of calibration certificates

Accreditation No.: **SCS 108**

Glossary:

TSL	tissue simulating liquid
ConvF	sensitivity in TSL / NORM x,y,z
N/A	not applicable or not measured

Calibration is Performed According to the Following Standards:

a) IEEE Std 1528-2003, "IEEE Recommended Practice for Determining the Peak Spatial-Averaged Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques", December 2003
b) IEC 62209-1, "Procedure to measure the Specific Absorption Rate (SAR) for hand-held devices used in close proximity to the ear (frequency range of 300 MHz to 3 GHz)", February 2005
c) Federal Communications Commission Office of Engineering & Technology (FCC OET), "Evaluating Compliance with FCC Guidelines for Human Exposure to Radiofrequency Electromagnetic Fields; Additional Information for Evaluating Compliance of Mobile and Portable Devices with FCC Limits for Human Exposure to Radiofrequency Emissions", Supplement C (Edition 01-01) to Bulletin 65

Additional Documentation:

d) DASY4/5 System Handbook

Methods Applied and Interpretation of Parameters:

- *Measurement Conditions:* Further details are available from the Validation Report at the end of the certificate. All figures stated in the certificate are valid at the frequency indicated.
- *Antenna Parameters with TSL:* The dipole is mounted with the spacer to position its feed point exactly below the center marking of the flat phantom section, with the arms oriented parallel to the body axis.
- *Feed Point Impedance and Return Loss:* These parameters are measured with the dipole positioned under the liquid filled phantom. The impedance stated is transformed from the measurement at the SMA connector to the feed point. The Return Loss ensures low reflected power. No uncertainty required.
- *Electrical Delay:* One-way delay between the SMA connector and the antenna feed point. No uncertainty required.
- *SAR measured:* SAR measured at the stated antenna input power.
- *SAR normalized:* SAR as measured, normalized to an input power of 1 W at the antenna connector.
- *SAR for nominal TSL parameters:* The measured TSL parameters are used to calculate the nominal SAR result.

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Measurement Conditions

DASY system configuration, as far as not given on page 1.

DASY Version	DASY5	V52.2
Extrapolation	Advanced Extrapolation	
Phantom	Modular Flat Phantom V5.0	
Distance Dipole Center - TSL	10 mm	with Spacer
Zoom Scan Resolution	dx, dy, dz = 5 mm	
Frequency	2450 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Head TSL parameters	22.0 °C	39.2	1.80 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	39.2 ± 6 %	1.77 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	----	----

SAR result with Head TSL

SAR averaged over 1 cm^3 (1 g) of Head TSL	Condition	
SAR measured	250 mW input power	13.5 mW / g
SAR normalized	normalized to 1W	54.0 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**54.4 mW /g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.34 mW / g
SAR normalized	normalized to 1W	25.4 mW / g
SAR for nominal Head TSL parameters	normalized to 1W	**25.4 mW /g ± 16.5 % (k=2)**

Body TSL parameters

The following parameters and calculations were applied.

	Temperature	Permittivity	Conductivity
Nominal Body TSL parameters	22.0 °C	52.7	1.95 mho/m
Measured Body TSL parameters	(22.0 ± 0.2) °C	52.4 ± 6 %	1.95 mho/m ± 6 %
Body TSL temperature during test	(22.5 ± 0.2) °C	----	----

SAR result with Body TSL

SAR averaged over 1 cm^3 (1 g) of Body TSL	Condition	
SAR measured	250 mW input power	13.7 mW / g
SAR normalized	normalized to 1W	54.8 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**54.8 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm^3 (10 g) of Body TSL	condition	
SAR measured	250 mW input power	6.50 mW / g
SAR normalized	normalized to 1W	26.0 mW / g
SAR for nominal Body TSL parameters	normalized to 1W	**26.0 mW / g ± 16.5 % (k=2)**

The State Radio_monitoring_center Testing Center (SRTC)
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Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	53.0 Ω - 0.2 jΩ
Return Loss	- 30.8 dB

Antenna Parameters with Body TSL

Impedance, transformed to feed point	49.3 Ω + 2.0 jΩ
Return Loss	- 33.2 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.151 ns

After long term use with 100W radiated power, only a slight warming of the dipole near the feedpoint can be measured.

The dipole is made of standard semirigid coaxial cable. The center conductor of the feeding line is directly connected to the second arm of the dipole. The antenna is therefore short-circuited for DC-signals.
No excessive force must be applied to the dipole arms, because they might bend or the soldered connections near the feedpoint may be damaged.

Additional EUT Data

Manufactured by	SPEAG
Manufactured on	May 06, 2005

Tel: 86-10-68009202 68009203
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DASY5 Validation Report for Head TSL

Date/Time: 25.08.2010 11:19:54

Test Laboratory: SPEAG, Zurich, Switzerland

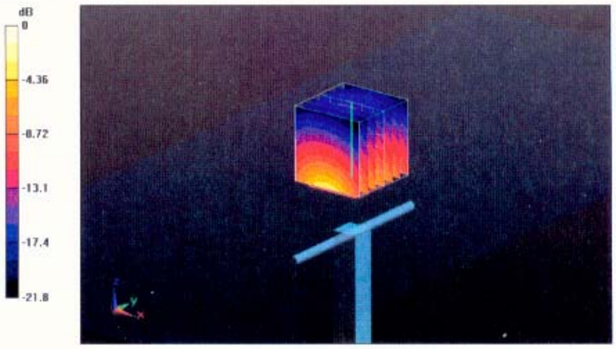
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:787

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: HSL U12 BB
Medium parameters used: f = 2450 MHz; σ = 1.77 mho/m; ε_r = 39.2; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.53, 4.53, 4.53); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (front); Type: QD000P50AA; Serial: 1001
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Head/d=10mm, Pin=250 mW, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 102.6 V/m; Power Drift = 0.044 dB
Peak SAR (extrapolated) = 27.4 W/kg
SAR(1 g) = 13.5 mW/g; SAR(10 g) = 6.34 mW/g
Maximum value of SAR (measured) = 17.3 mW/g



0 dB = 17.3mW/g

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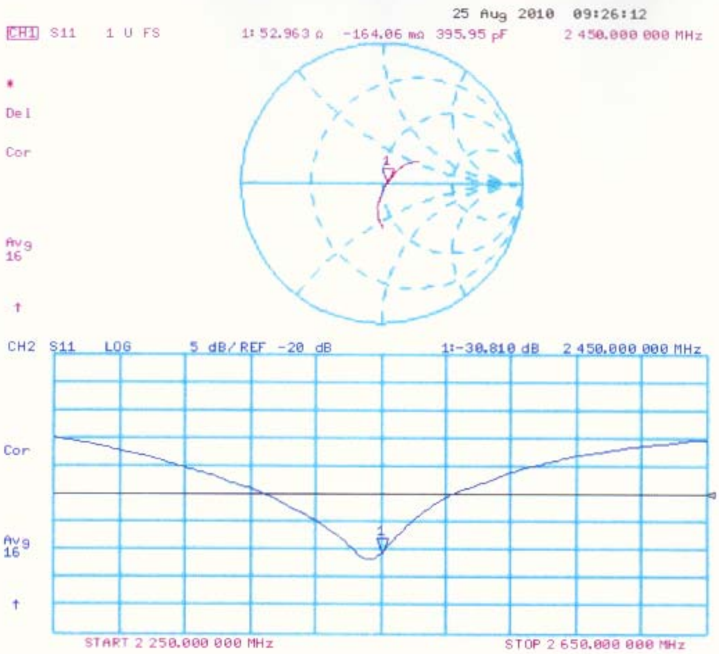
Impedance Measurement Plot for Head TSL



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Validation Report for Body

Date/Time: 26.08.2010 14:32:02

Test Laboratory: SPEAG, Zurich, Switzerland

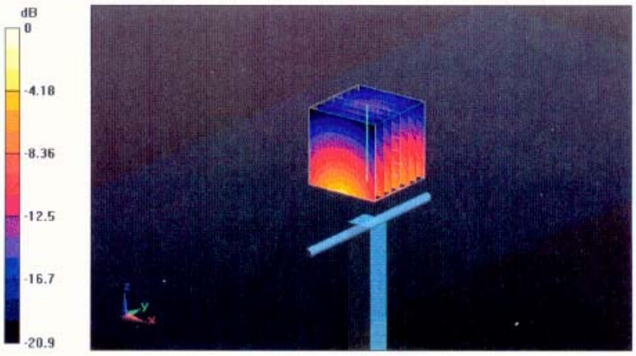
DUT: Dipole 2450 MHz; Type: D2450V2; Serial: D2450V2 - SN:787

Communication System: CW; Frequency: 2450 MHz; Duty Cycle: 1:1
Medium: MSL U11 BB
Medium parameters used: f = 2450 MHz; σ = 1.94 mho/m; ε_r = 52.3; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY5 (IEEE/IEC/ANSI C63.19-2007)

DASY5 Configuration:

- Probe: ES3DV3 - SN3205; ConvF(4.31, 4.31, 4.31); Calibrated: 30.04.2010
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 10.06.2010
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; Serial: 1002
- Measurement SW: DASY52, V52.2 Build 0, Version 52.2.0 (163)
- Postprocessing SW: SEMCAD X, V14.2 Build 2, Version 14.2.2 (1685)

Pin=250 mW /d=10mm, dist=3.0mm (ES-Probe)/Zoom Scan (7x7x7) /Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 98.3 V/m; Power Drift = 0.00171 dB
Peak SAR (extrapolated) = 27.7 W/kg
SAR(1 g) = 13.7 mW/g; SAR(10 g) = 6.5 mW/g
Maximum value of SAR (measured) = 17.7 mW/g



0 dB = 17.7mW/g

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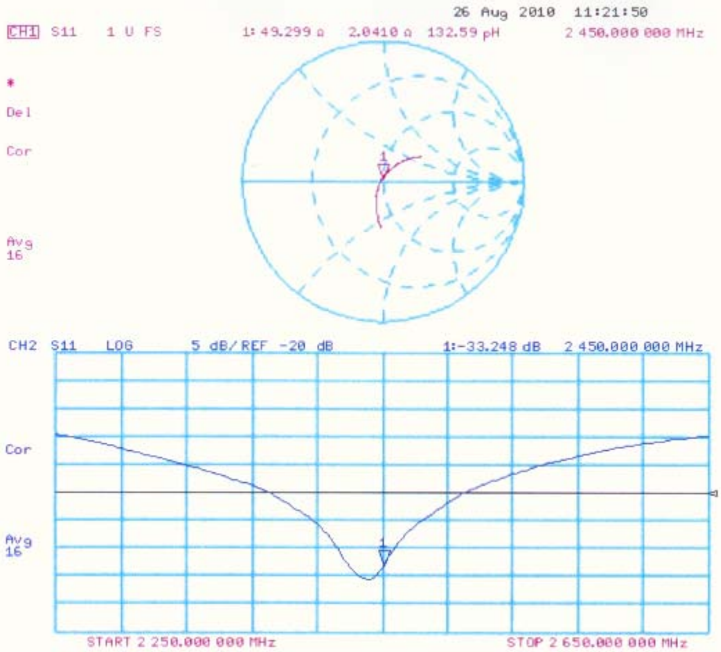
Impedance Measurement Plot for Body TSL



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APPENDIX E: The EUT Appearances

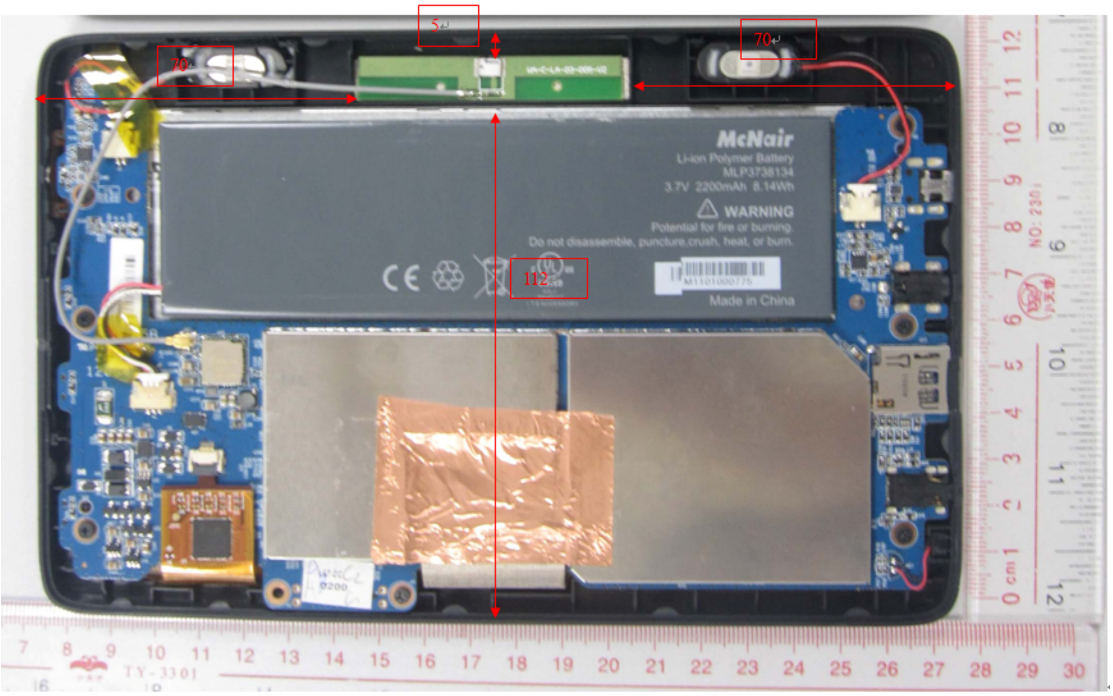
Test Position 1

Test Position 2

Test Position 3

Test Position 4:

Test Position 5



Interior of EUT