SAR Evaluation Report

FCC ID : OVFKWC-C3900

Project Reference No. : NK08R229

Product Type : Wi-max USB Modem

Applicant Name : Kyocera Wireless Corp.

Model : C3900

Tested According to : FCC Part 2(Section 2.1093) / OET Bulletin 65 Supplement C

Tested Period : December. 17. 2008 to December. 23. 2008

Tested by	Minchul Shin		date : December. 24. 2008
Verified by	Seonteag.Jin		date : December. 24. 2008

This test results are only related to the item tested.
This test report is only limited to the client company and the product.
This report must not be used by the client to claim product endorsement by any agency of the U.S. Government.

Lab Address : Nemko Korea Co., Ltd
300-2, Osan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, Korea
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Contents of This Report

1. General Information

1.1 Applicant

Company Name:	Kyocera Wireless Corp.
Company Address:	10300 Campus Point Drive San Diego, CA 92121 USA
Phone/e-mail:	1-858-882-3945 / cli@kyocera-wireless.com
Contact Name:	C.K.Li

1.2 Manufacturer

Company Name:	Kyocera Wireless Corp.
Company Address:	10300 Campus Point Drive San Diego, CA 92121 USA
Phone/e-mail:	1-858-882-3945 / cli@kyocera-wireless.com
Contact Name:	C.K.Li

1.3 Description of Device

Category:	Wi-max USB Modem
Model Name:	C3900
Brand Name:	Kyocera
Frequency of Operation	Tx/Rx : 2501 MHz ~ 2685 MHz
Power Output	EIRP : 0.423 W (26.26 dBm)
Channel Bandwidth	10 MHz
Modulation	QPSK, 16QAM
Antenna Gain	2.76 dBi
Antenna Type	PCB Pattern Antenna (Internal)
Data Throughput	Downlink : 30 Mbps, Uplink : 6 Mbps
Power Supply	+5.0 Vdc from USB slot
Operating Condition	-20°C ~ +60°C
Dimensions	27 mm x 62 mm x 11 mm
Weight	Approx. 18 g
Remarks:	-
Type of EUT	Production sample

2. General Test Condition

2.1 Location

Nemko Korea
300-2, Osan-Ri, Mohyeon-Myeon, Cheoin-Gu, Yongin-Si, Gyeonggi-Do, Korea
Phone : 82-31-322-2333 , Fax : 82-31-322-2332

2.2 Operating Environment

Parameters	Recording during test	Accepted deviation
Ambient temperature	21 ± 2 ℃	25 ~ 55 ℃
Relative humidity	40 ± 15 %	20 ~ 75 %

2.3 Support Equipment

Equipment	Manufacturer	Model Name	Serial Number
Laptop	HP	HSTNN-A25C	CNC64300PW
Laptop	Samsung	NT-X20 E	955C93DY800185K
Laptop	Samsung	NT-R70	BD0093CQ100230F

2.4 Test Frequency and Mode Information

Channel	Test Frequency (MHz)	Remark
Low	2501	Channel BW : 10 MHz Modulation type: QPSK, 16QAM Data rate : 1/2, 3/4
Middle	2593	
High	2685	

3. Description of Test Equipment

3.1 SAR Measurement Setup

Robotic System

Measurements are performed using the DASY4 automated dosimetric assessment system. Which is made by Schmid & Partner Engineering AG (SPEAG) in Zurich, Switzerland and consists of high precision robotics system (Stäubli), robot controller, measurement server, DELL computer, nearfield probe, probe alignment sensor, and the SAM twin phantom containing the brain equivalent material. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF) (see Fig. 3.1).

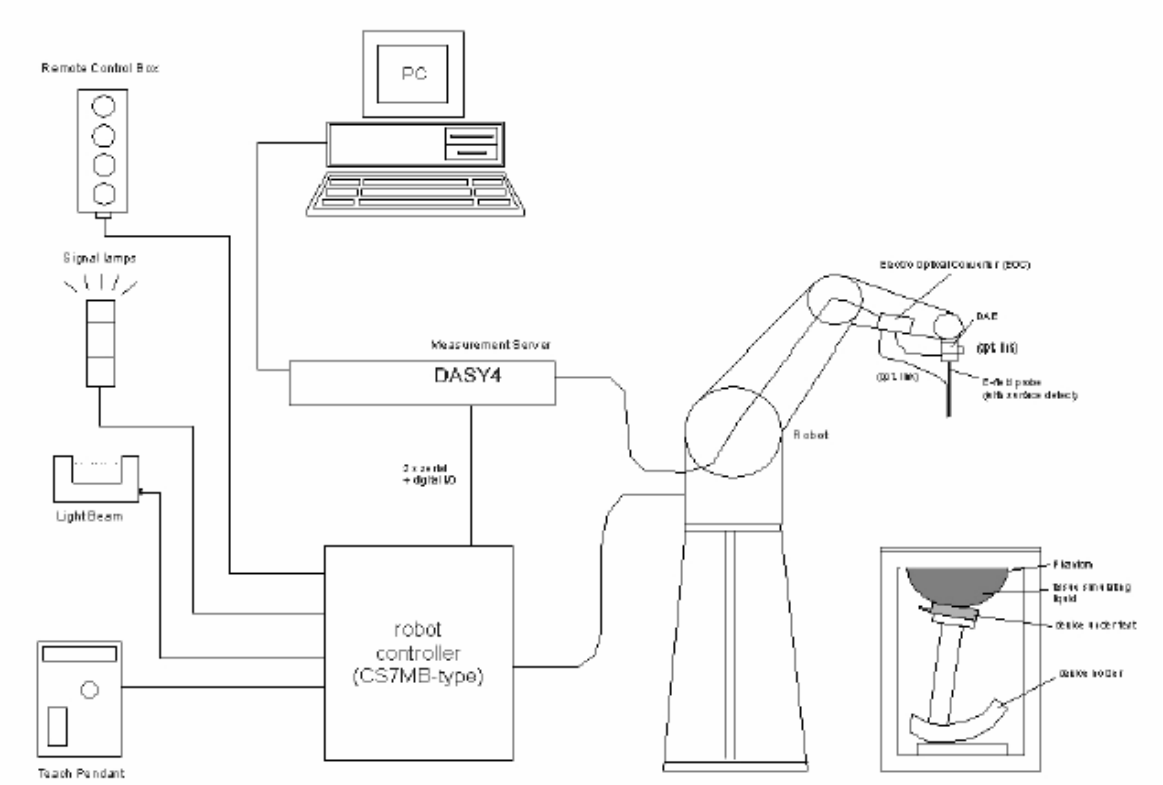


Figure 3.1 SAR Measurement System Setup

System Hardware

A cell controller system contains the power supply, robot controller, teach pendant (Joystick), and a remote control is used to drive the robot motors. The PC consists of the DELL computer with Windows XP system and SAR Measurement Software DASY4, LCD monitor, mouse and keyboard. The Stäubli Robot is connected to the cell controller to allow software manipulation of the robot.
A Data Acquisition Electronic (DAE) circuit that performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc.
This is connected to the Electro-Optical Coupler (EOC). The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the measurement server.

System Electronics

The DAE4 consists of a highly sensitive electrometer-grade preamplifier with autozeroing, a channel and gain-switching multiplexer, a fast 16-bit AD-converter and a command decoder and control logic unit. Transmission to the measurement server is accomplished through an optical downlink for data and status information and an optical uplink for commands and clock lines. The mechanical probe mounting device includes two different sensor systems for frontal and sidewise probe contacts. They are also used for mechanical surface detection and probe collision detection. The robot uses its own controller with a built in VME-bus computer.

3.2 E-field Probe

The SAR measurement were conducted with the dosimetric probe ES3DV3, designed in the classical triangular configuration (see Fig.3.3) and optimized for dosimetric evaluation. The probe is constructed using the thick film technique; with printed resistive lines on ceramic substrates.

The probe is equipped with an optical multi-fiber line ending at the front of the probe tip (see Fig.3.4). It is connected to the EOC box on the robot arm and provides an automatic detection of the phantom surface.

Half of the fibers are connected to a pulsed infrared transmitter, the other half to a synchronized receiver. As the probe approaches the surface, the reflection from the surface produces a coupling from the transmitting to the receiving fibers. This reflection increases first during the approach, reaches a System maximum and then decreases. If the probe is flatly touching the surface, the coupling is zero.

The distance of the coupling maximum to the surface is independent of the surface reflectivity and largely independent of the surface to probe angle. The DASY4 software reads the reflection during a software approach and looks for the maximum using a 2nd order fitting (see Fig.3.2). The approach is stopped at reaching the maximum.

Figure 3.2 DAE System

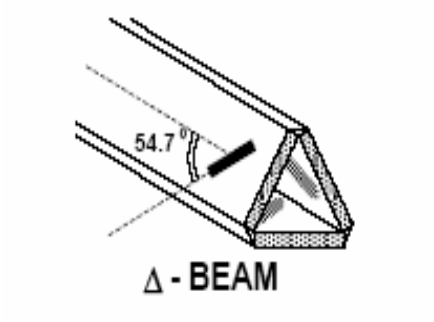


Figure 3.3 Triangular Probe Configuration

Figure 3.4 Probe Thick-Film Technique

Probe Specifications

Construction : Symmetrical design with triangular core
Interleaved sensors
Built-in shielding against static charges
PEEK enclosure material (resistant to organic DGBE)

Calibration : Basic Broad Band Calibration In air from 10 MHz to 6.0 GHz
In brain and body simulating tissue at Frequencies of HSL2600,
MSL2600 MHz, Calibration certificates please find attached.

Frequency : 10 MHz to > 6 GHz; Linearity: ±0.2 dB (30 MHz to 6 GHz)

Directivity ±0.2 dB in HSL (rotation around probe axis)
±0.3 dB in HSL (rotation normal to probe axis)

Dynamic Range 5μW/g to > 100mW/g; Linearity: ±0.2dB

Dimensions Overall length: 330mm
Tip diameter: 2.5mm
Body diameter : 12mm)
Tip center : 1.0mm
Distance from probe tip to dipole centers: 2.0mm

Application SAR dosimetry testing
Compliance tests of mobile phones
Fast automatic scanning in arbitrary phantoms

Optical Surface Detection
± 0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces

3.3 SAM Phantom

The SAM Twin Phantom V4.0C is constructed of a fiberglass shell Integrated in a wooden table. The shape of the shell is based on data from an anatomical study designed to determine the maximum exposure in at least 90% of all users.
It enables the dosimetric evaluation of left and right hand phone usage as well as body mounted usage at the flat phantom region.
A cover prevents the 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 in the robot.
(See Figure 3.5)

Figure 3.5 SAM Twin Phantom

Phantom Specification

Construction : The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-200X, CENELEC 50361 and IEC 62209. It enables the dosimetric evaluation of left and right hand phone 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 teaching three points with the robot.

Shell Thickness : 2 ± 0.2 mm
Filling Volume : Approx. 25 liters
Dimensions : Height; 830 mm; Length: 1000 mm; Width: 500 mm

3.4 Device Holder for Transmitters

In combination with the SAM Twin Phantom V4.0, the Mounting Device (see Fig. 3.6) enables the rotation of the mounted transmitter in spherical coordinates whereby the rotation point is the ear opening.
The device holder can be locked at different phantom locations (left head, right head, flat phantom).
* Note: A simulating human hand is not used due to the complex anatomical and geometrical structure of the hand that may produce infinite number of configurations .
To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

Figure 3.6 Device Holder

4. Measurement Procedure

EUT at the maximum power level is placed by a non metallic device holder in the above described positions at a shell phantom of a human being.
The distribution of the electric field strength *E* is measured in the tissue simulating liquid within the shell phantom.
For this miniaturized field probes with high sensitivity and low field disturbance are used.
Afterwards the corresponding SAR values are calculated with the known electrical conductivity σ and the mass density *p* of the tissue in the SEMCAD software.
The software is able to determine the averaged SAR values (averaging region 1g or 10g) for compliance testing.

The measurements are done by two scans: first a coarse scan determines the region of the maximum SAR, afterwards the averaged SAR is measured in a second scan within the sharp of a cube. The measurement times takes about 20 minutes.

The following steps are used for each test position:

STEP 1
Establish a call with the maximum output power with a base station simulator.
The connection between the EUT and the base station simulator is established via air interface.

STEP 2
Measurement of the local E-Field value at a fixed location (P1).
This value serves as a reference value for calculating a possible power drift.

STEP 3
Measurement of the SAR distribution with a grid spacing of 15 mm × 15 mm and a constant distance to the inner surface of the phantom.
Since the sensors can not directly measure at the inner surface of the phantom.
Since the sensors can not directly measure at the inner phantom surface, the values between the sensors and the inner phantom surface are extrapolated. With this values the area of the maximum SAR is calculated by a interpolation scheme (combination of a least-square fitted function and a weighted average method). Additional peaks within 3dB of the maximum SAR are searched.

STEP 4
Around this points, a cube of 30 mm×30 mm×30 mm is assessed by measuring 7×7×7 points. With these data, the peak spatial-average SAR value can be calculated with the SEMCAD software.

STEP 5
The used extrapolation and interpolation routines are all based on the modified Quadratic Shepard's method [DASY4].

STEP 6
Repetition of the E-Field measurement at the fixed location(P1) and repetition of the whole procedure if the two results differ by more than ±0.223dB.

4.1 Body Simulating Mixture Characterization

The brain mixture consists of a viscous gel using hydroxethyl-cellullose (HEC) gelling agent and saline solution. Preservation with a bacteriacide is added and visual inspection is made to make sure air Bubbles are not trapped during the mixing process.
The mixture is calibrated to obtain proper dielectric constant (permittivity) and conductivity of the desired tissue.

Ingredient (% by weight)	Frequency (MHz)
	2600
Tissue Type	Body
Water	69.83
Salt	N/A
DGBE	30.17
Dielectric Constant	52.51 ± 5%
Conductivity (S/m)	2.16 ± 5%

Typical Composition of Ingredients for Liquid Tissue Phantoms

4.2 FCC Limits for Specific Absorption Rate (SAR)

Limits for Occupational/Controlled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.4	8.0	20.0

Limits for General Population/Uncontrolled Exposure (W/kg)

Whole-Body	Partial-Body	Hands, Wrists, Feet and Ankles
0.08	**1.6**	4.0

NOTE 1: See Section 1 for discussion of exposure categories.

NOTE 2: Whole-Body SAR is averaged over the entire body, partial-body SAR is averaged over any 1 gram of tissue defined as a tissue volume in the shape of a cube. SAR for hands, wrists, feet and ankles is averaged over any 10 grams of tissue defined as a tissue volume in the shape of a cube.

NOTE 3: At frequencies above 6.0 GHz, SAR limits are not applicable and MPE limits for power density should be applied at 5 cm or more from the transmitting device.

Note 4: The time averaging criteria for field strength and power density do not apply to general population SAR limit of 47 CFR §2.1093.

5. Description of Test Modes and Configurations

5.1 Description of Antenna Location

- Please refer to SAR Test Setup Photographs and Photographs of EUT -

5.2 Description of Test Position

The following test configurations have been applied in this report.

- Please refer to SAR Test Setup Photographs and Photographs of EUT -

Horizontal Top : The front of EUT face to the Phantom with 5mm separation distance.

- Please refer to SAR Test Setup Photographs and Photographs of EUT -

Horizontal Bottom : The bottom of EUT face to the Phantom with 5mm separation distance.

- Please refer to SAR Test Setup Photographs and Photographs of EUT -

Vertical Right : The right edge of EUT face to the Phantom with 5mm separation distance.

- Please refer to SAR Test Setup Photographs and Photographs of EUT -

Vertical Left : The right edge of EUT face to the Phantom with 5mm separation distance.

- Please refer to SAR Test Setup Photographs and Photographs of EUT -

Vertical Top : The front Top side of EUT face to the Phantom with 5mm separation distance.

- Please refer to SAR Test Setup Photographs and Photographs of EUT -

Laptop(Horizontal) : The front of EUT face to the Phantom with 5mm separation distance.

- Please refer to SAR Test Setup Photographs and Photographs of EUT -

Laptop(Vertical) : The right edge of EUT face to the Phantom with 7mm separation distance.

5.3 Description of Test Mode

Communication	Modulation Type	Test Position	Test Channel
Wi-max (10MHz Bandwidth)	QPSK	Horizontal Top	L,M,H
	QPSK	Horizontal Bottom	L,M,H
	QPSK	Vertical Right	L,M,H
	QPSK	Vertical Left	L,M,H
	QPSK	Vertical Top	L,M,H
	16QAM	Horizontal Top	L,M,H
	QPSK	Laptop(Horizontal)	L,M,H
	QPSK	Laptop(Vertical)	L,M,H

5.4 Test Signal detail

The USB Adapter (EUT) is plugged into the notebook computer and configured exactly as it would be in the field on a normal network.
There is no test software present in the USB adapter. The software on the USB adaptor is the same software used under normal operation. The CM(Connection Manager) test tool is used on the laptop.
DM is used to instruct the USB dongle to go to full power. Under normal operating conditions the BS(Base station) would be responsible for controlling the MS(Mobile station) TX power. When working with a BS, the MS cannot transmit at a power greater than the max power requested by CM.

On the network side, there is a vector signal generator as below:

Agilent N5182A MXG Vector Signal Generator with below options:
N7615B-3FP : Wi-max – Connect to N5182A Signal Generator
N7615B-EFP : Basic 802.16 OFDMA
N7615B-QFP : Advanced 802.16 OFDMA

Software is loaded into the MXG (Vector Signal Generator) that produces an output signal that looks like a 29:18 Wi-max frame(AMC Waveform), the EUT detects the “network” and begins to transmit based on the commands from the VSG signal and the measurements are then taken on the EUT.

The C3900 device is 2.5 GHz Wi-max transceiver in a USB dongle configuration using GCT chipset which supports 1xTx and 2xRx for this device. Only one antenna is used for both transmitting and receiving while the other antenna is strictly used for RX diversity. Its uplink is capable of 10 MHz bandwidths.
For the 10 MHz bandwidth, it has 48 sub-channels structured from 1024 subcarriers; 159 are used as spare/safeguard subcarriers, leaving 865 available for transmission. From this, 768 subcarriers for data transmission with 96 subcarriers intended for pilot use. AMC waveform is the structure described above.

The up-link sub-frame is triggered by an Allocation Start Time contained in the information of UL-MAP. This information specifies the starting times of the Uplink and Downlink frames.
In any UL sub-frame, the duty factor ranging and bandwidth information is used to ensure optimal system operation. In normal device transmission the device will transmit control signaling at the first 3 uplink symbols and then use the rest of the uplink symbols for data traffic bursts in the uplink sub-frame.
Since the first 3 symbols are also used for ranging detection purposes and are shared among other device users, its transmitting power is much smaller than the data burst symbol power.
During the testing modes the first 3 symbols are also kept in reduced power level and the data traffic bursts are always running at the maximum output power level. In the real usage, the data burst power will be adjusted according to the signal strength of the communication. In this way, by using the test mode arrangement we are transmitting at a worst case RF level.

The signal generator produces a downlink DL burst every 5 milliseconds which simulates the transmission of a base-station operating under normal mode. This DL burst instructs the mobile station MS to transmit for 15 symbols in the UL data zone.
This UL transmission is repeated every 5 milliseconds.

The TX power of the mobile station is set to maximum power.
The VSG and MS use same frequency. The MXG power is much less than the MS Tx power (Approximately 80dB less than the MS power) and so does not affect the SAR readings.
Since both the signal generator (BS simulator) and MS are working in TDD mode, co-operation under same frequency is not an issue.

The MXG (Vector Signal Generator) is loaded with a BS (Base Station) downlink signal which contains the 29:18 information. The mobile station (MS) (DUT) synchronizes to the signal from the VSG in frequency and time and then demodulates two maps contained in the MXG DL frame. The first map, called the DL map, specifies the number of DL symbols (29).
The second map, called the UL map, specifies the number of UL symbols (18). The UL map also tells the MS to transmit a burst which occupies all data symbols and all sub-channels. No control channel transmissions are requested by the MXG.
Measurements were taken in this configuration with the MS transmitting using the 29:18 ratio, but since there was no energy in the control symbols, the effective power is only across 15 symbols.

The terms ESG and MXG are equivalent. As mentioned above the DL:UL frame is specified in the DL and UL maps respectively. There is no ranging present when there is data traffic.
The other types of control traffic are HARQ ACK/NACK, CQICH (CINR reporting) and bandwidth BW requests. BW requests are piggy-backed onto the data symbols when traffic is present. Since the BW requests are shared across the Control Symbols (traffic versus non-traffic modes) the control traffic that is relevant to the SAR calculation is CQICH and HARQ ACK/NACK.

In the test mode the UL operates in AMC with all data sub-channels (All 48 sub-channels for 10MHz) occupied with data. During normal operation the MS will transmit on all sub-channels when maximum UL throughput is required. It is possible for the mobile-station to transmit will fewer sub-channels. The sub-channels consist of tones that are distributed over the entire signal BW and a jump every three symbols so that the spectral density and hence SAR for the fractional sub-channel case will be similar to the full sub-channel case that is tested. (Note: In the Wi-max standard a sub-channel consists of tones that are spread across the occupied bandwidth. After every three symbols, the tones that make up the sub-channel switch to a new set of frequencies spread across the band. This “jumping” is called sub-channel rotation and helps to give the sub-channel frequency diversity.)

For the signal from the MXG (Vector Signal Generator), it looks identical to the signal that would come from a Base Station in the field. The intent is to make the USB adapter think it is in a real network. The transmission from the USB adapter under test conditions is exactly the same as in the field in normal operation. That same software is in the device, the same responses are sent to the signal generator, and the same power outputs emanate from the device. The only difference is that normally in the field there will be information in some of the control symbols, whereas in the tests that were performed, the control symbols were not used.
That necessitated a scaling factor that takes into consideration this fact. You will see two different alculations, one scaling from the measurements (the measurements were taken under a channel configuration of 29:18, without control symbols) to a network configuration using 29:18 uplink: downlink channel, and another using a 31:15 uplink: downlink channel. It is also calculated for 10MHz bandwidth channels.

The testing was done using a common 29:18 ratio as specified in the Wi-max specifications.
The 29 indicates the number of downlink (from the base station) symbols, and the 18 indicates the number of uplink (transmitted from the MS) symbols. Inside the uplink, 15 of the symbols are used for data, and three of the symbols are used for sending control information to the network. During the testing, the control symbols contained no information, so did not contribute to the total energy transmitted.

5.5 Transmitter Conducted Output Power

Measurement Results: PUSC

Frequency (MHz)	QPSK		16QAM	
	Coding Rate 1/2 (dBm)	Coding Rate 3/4 (dBm)	Coding Rate 1/2 (dBm)	Coding Rate 3/4 (dBm)
2501	22.15	22.20	22.02	22.03
2593	22.28	22.33	22.15	22.15
2685	22.85	22.94	22.83	22.85

Measurement Results: AMC

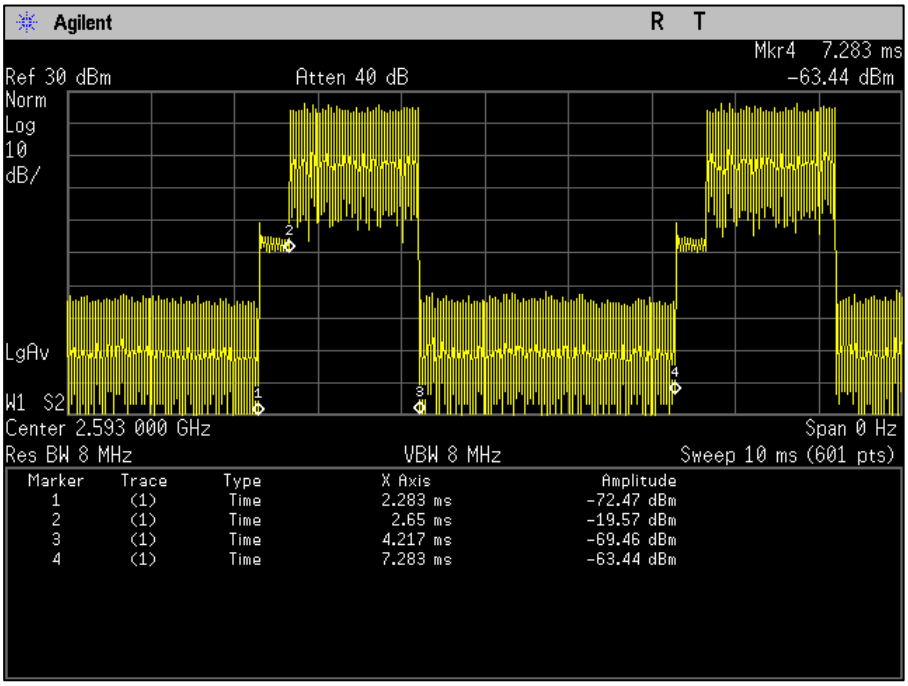
Frequency (MHz)	QPSK		16QAM	
	Coding Rate 1/2 (dBm)	Coding Rate 3/4 (dBm)	Coding Rate 1/2 (dBm)	Coding Rate 3/4 (dBm)
2501	22.58	22.25	22.23	22.23
2593	22.75	22.40	22.35	22.31
2685	23.50	23.12	23.05	23.02

Test Method :
Transmitter conducted output power were measured by channel power with RBW, VBW =100 kHz, RMS detector on TX burst time (1.56 ms) only using the gate function of Spectrum analyzer.

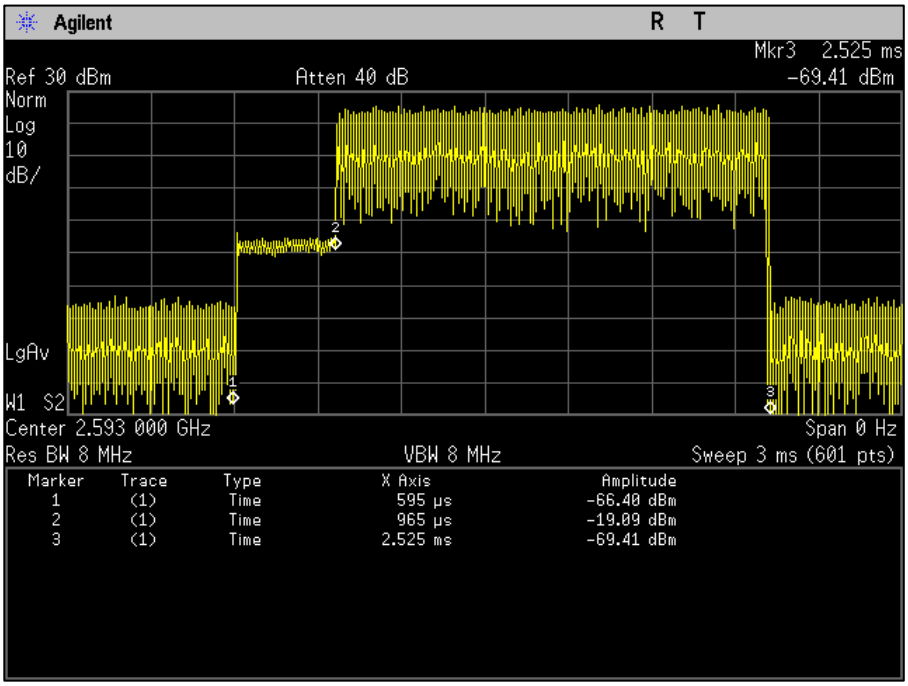
5.6 Duty factor consideration

Waveform of QPSK

Plot 1



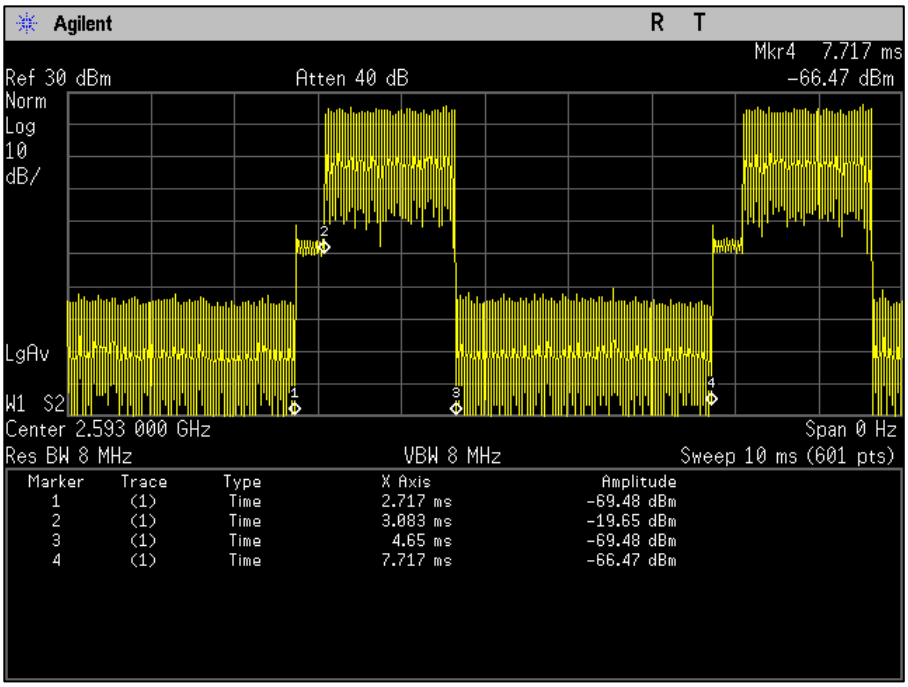
Plot 2



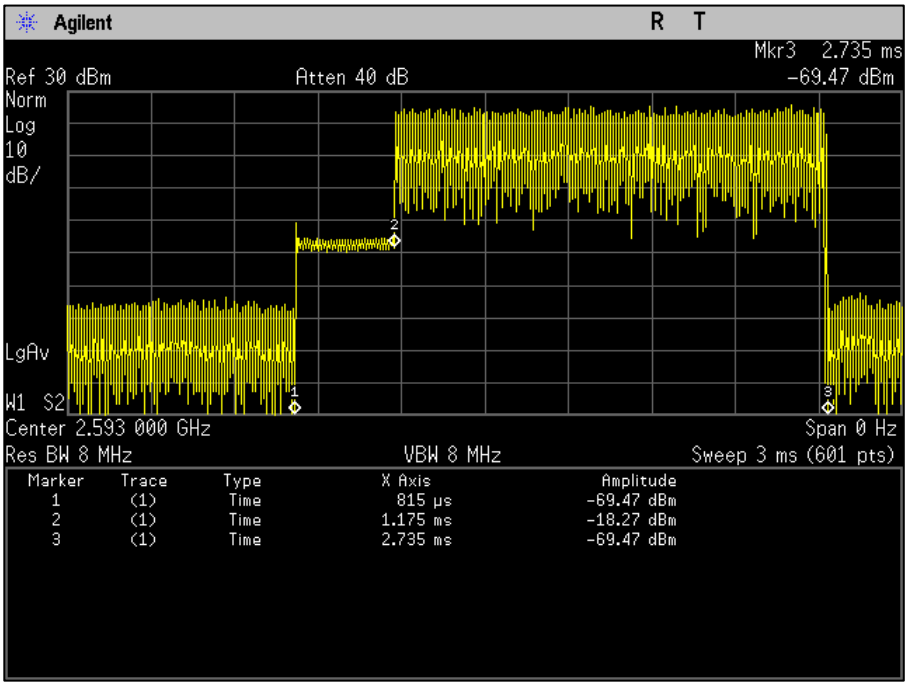
Burst length (Plot 1) = Mark4 – Mark 1 = 7.283 ms – 2.283 ms = 5 ms
Symbol length (Plot 2) = Mark 3 – Mark 2 = 2.525 ms – 0.965 ms = 1.56 ms
Duty Cycle = 1.56 / 5 x 100 % = 31.2%
The crest factor was called duty cycle in the raw data and the value is 3.21 (5 ms/1.56 ms).

Waveform of 16QAM

Plot 1



Plot 2



Burst length (Plot 1) = Mark4 – Mark 1 = 7.717 ms – 2.717 ms = 5 ms
Symbol length (Plot 2) = Mark 3 – Mark 2 = 2.735 ms – 1.175 ms = 1.56 ms
Duty Cycle = 1.56 / 5 x 100% = 31.2 %
The crest factor was called duty cycle in the raw data and the value is 3.21 (5 ms/1.56 ms).

5.7 Linearity Response Check / Worst Case / Scan Resolution

5.7.1 Linearity Response Check

The output power was adjusted to the target value with a spectrum analyzer which is capable of channel power measurement.

Output Power	dBm	11	14	17	20	23
	mW	12.5	25	50	100	200
Peak SAR(W/kg)		0.084	0.185	0.341	0.686	1.370

5.7.2 Worst Case (Each modulation type and Coding Rate)

Modulation types to determine worst case.

Modulation Type	Power drift	SAR Value (W/kg)
QPSK 1/2	0.047	**1.080**
QPSK 3/4	0.029	1.080
16QAM 1/2	0.066	1.050
16QAM 3/4	0.070	1.040

5.7.3 Compare with different scan resolution

Scan resolution	SAR value (W/kg)
2.5 mm	1.080
5.0 mm	1.080

5.7.1.1 Linearity Response Check test data_Output power 12.5 mW

Date/Time: 2008-12-19 12:46:03

Test Laboratory: Nemko Korea File Name: C3900 Horizontal Position High CH QPSK LRC 12.5mW.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2585 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2585 MHz; σ = 2.2 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

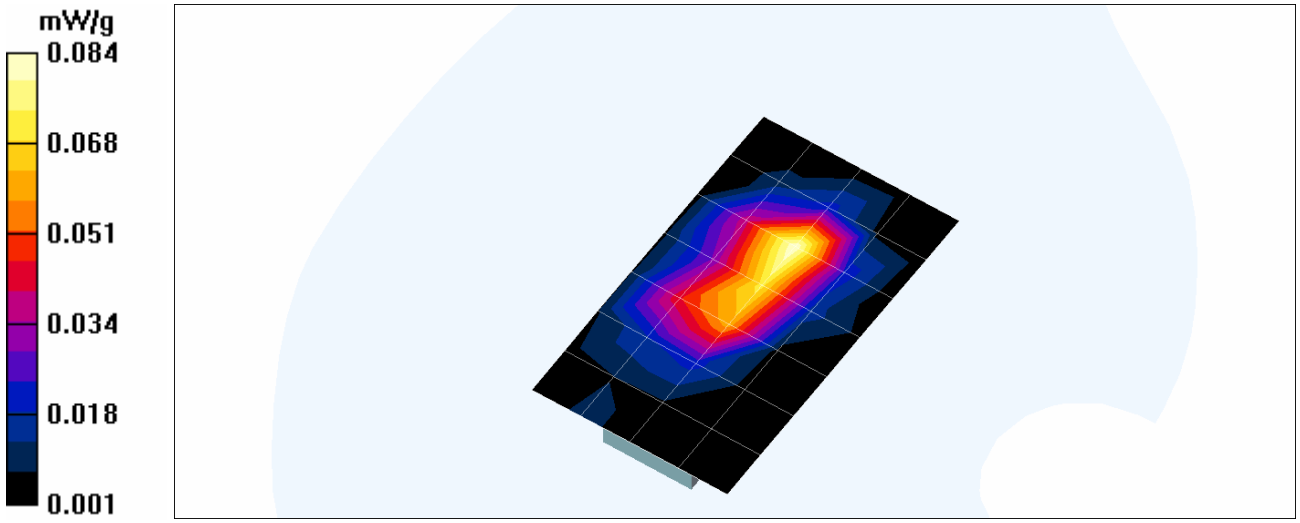
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Horizontal Position High CH QPSK LRC 12.5mW/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.084 mW/g



5.7.1.2 Linearity Response Check test data_Output power 25 mW

Date/Time: 2008-12-19 12:53:04

Test Laboratory: Nemko Korea File Name: C3900 Horizontal Position High CH QPSK LRC 25mW.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2585 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2585 MHz; σ = 2.2 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

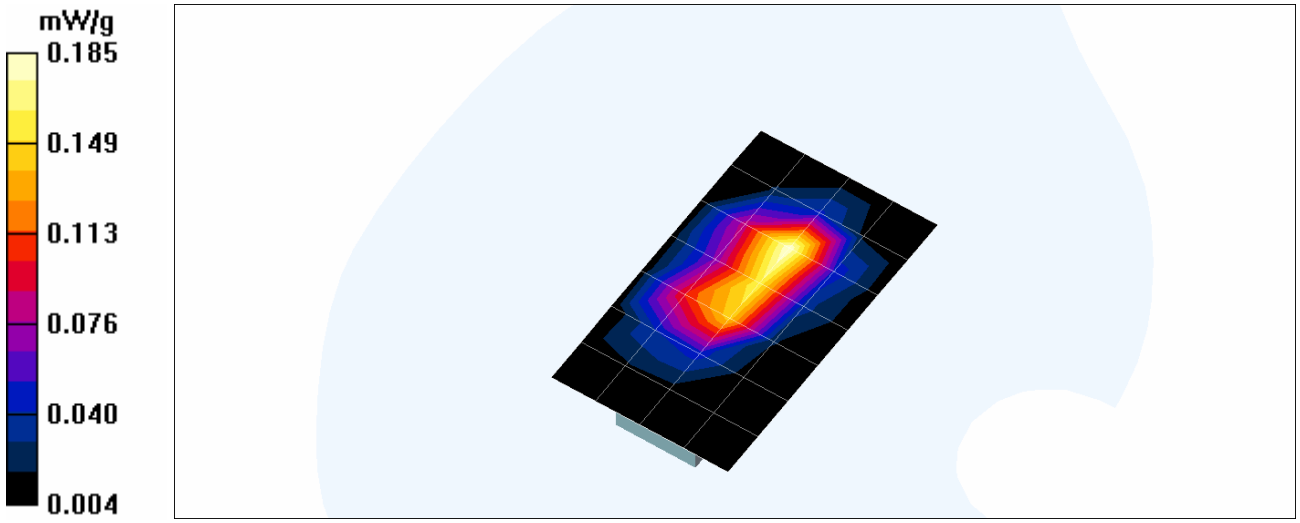
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Horizontal Position High CH QPSK LRC 25mW/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.185 mW/g



5.7.1.3 Linearity Response Check test data_Output power 50 mW

Date/Time: 2008-12-19 12:58:01

Test Laboratory: Nemko Korea File Name: C3900 Horizontal Position High CH QPSK LRC 50mW.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2585 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2585 MHz; σ = 2.2 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

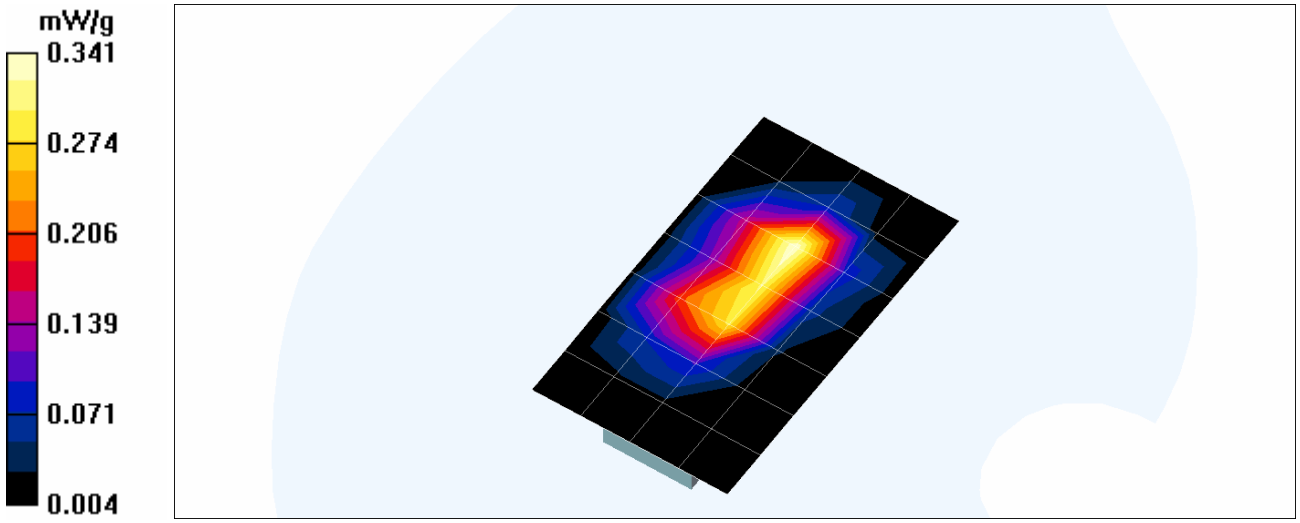
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Horizontal Position High CH QPSK LRC 50mW/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.341 mW/g



5.7.1.4 Linearity Response Check test data_Output power 100 mW

Date/Time: 2008-12-19 1:02:52

Test Laboratory: Nemko Korea File Name: C3900 Horizontal Position High CH QPSK LRC 100mW.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2585 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2585 MHz; σ = 2.2 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

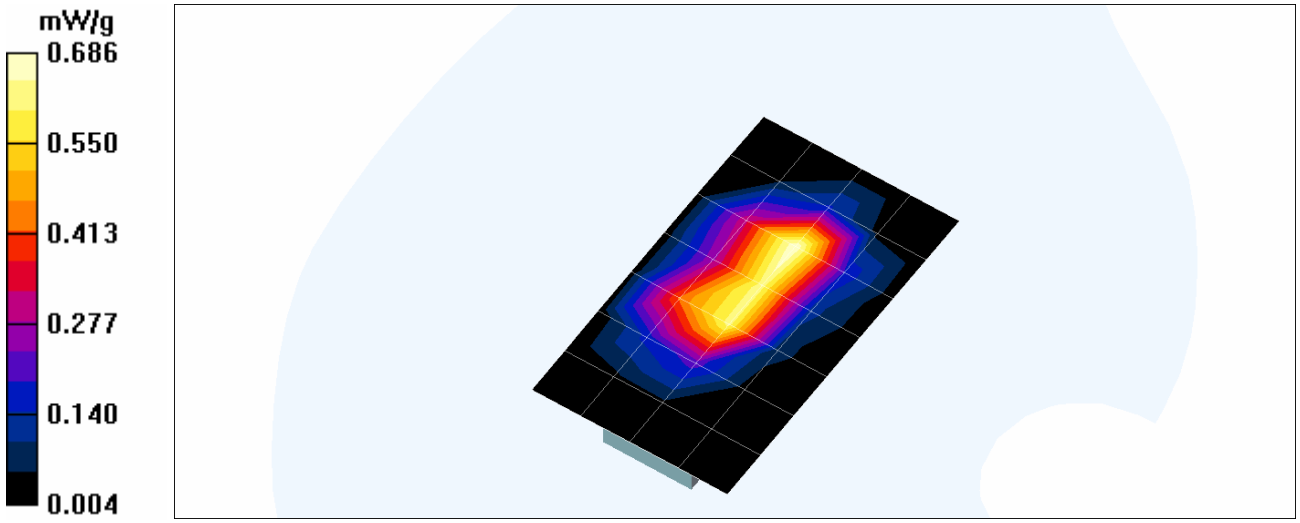
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Horizontal Position High CH QPSK LRC 100mW/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.686 mW/g



5.7.1.5 Linearity Response Check test data_Output power 200 mW

Date/Time: 2008-12-19 1:14:09

Test Laboratory: Nemko Korea File Name: C3900 Horizontal Position High CH QPSK LRC 200mW.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2585 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2585 MHz; σ = 2.2 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

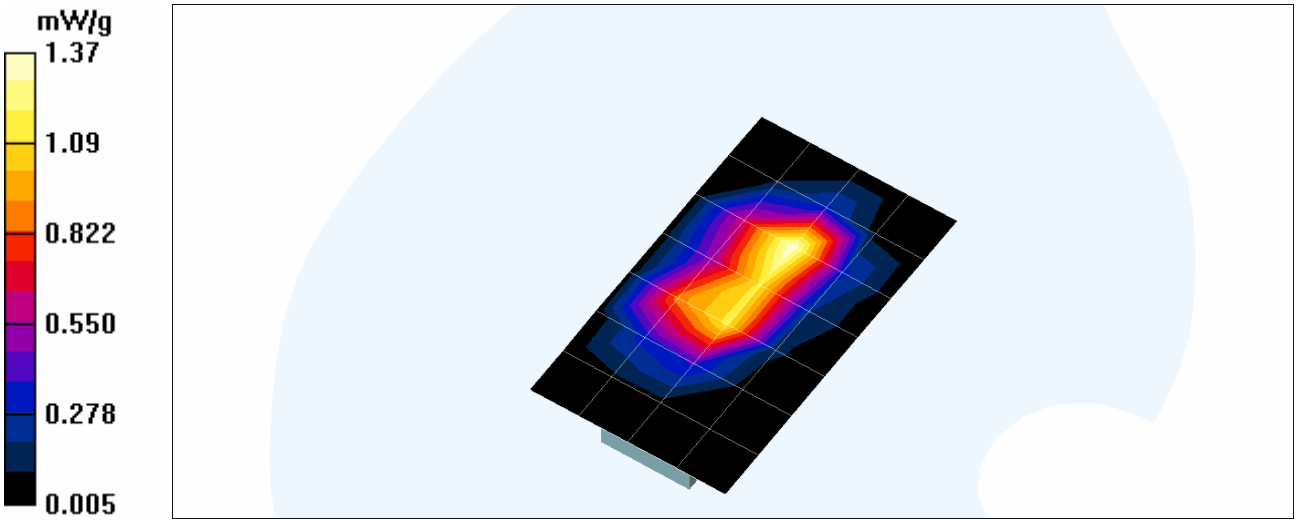
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Horizontal Position High CH QPSK LRC 200mW/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.37 mW/g



5.7.2.1 Worst Case test data_Modulation type QPSK 1/2

Date/Time: 2008-12-19 3:51:40

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QPSK High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QPSK High CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.52 mW/g

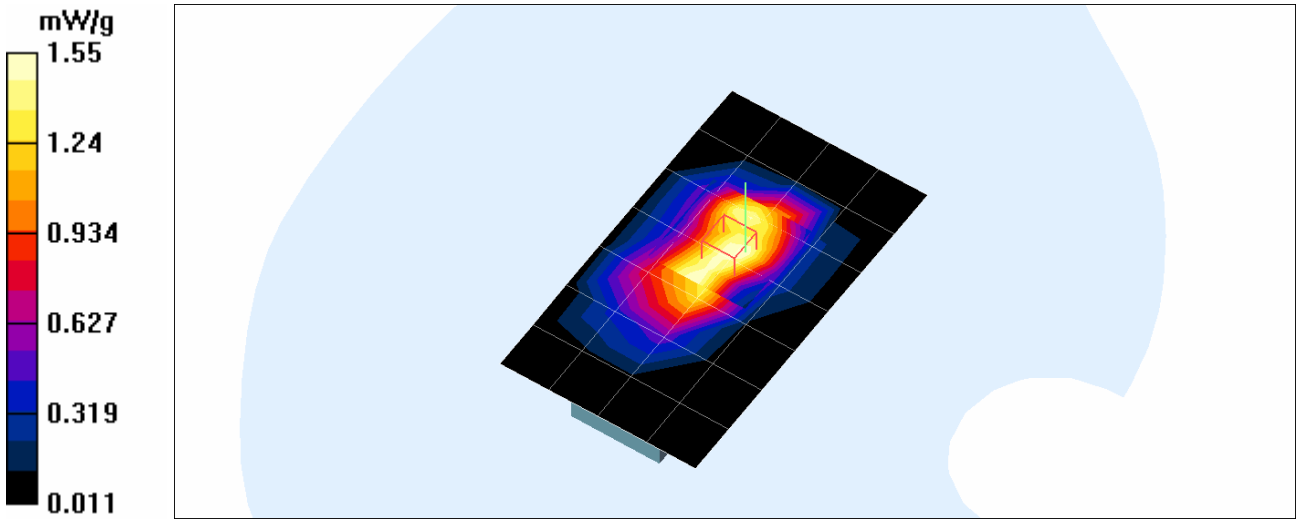
C3900 distance 5.0mm Horizontal position QPSK High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.8 V/m; Power Drift = 0.047 dB

Peak SAR (extrapolated) = 2.56 W/kg

SAR(1 g) = 1.08 mW/g

Maximum value of SAR (measured) = 1.55 mW/g



5.7.2.2 Worst Case test data_Modulation type QPSK 3/4

Date/Time: 2008-12-19 4:07:54

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QPSK 3.4 High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QPSK 3.4 High CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.52 mW/g

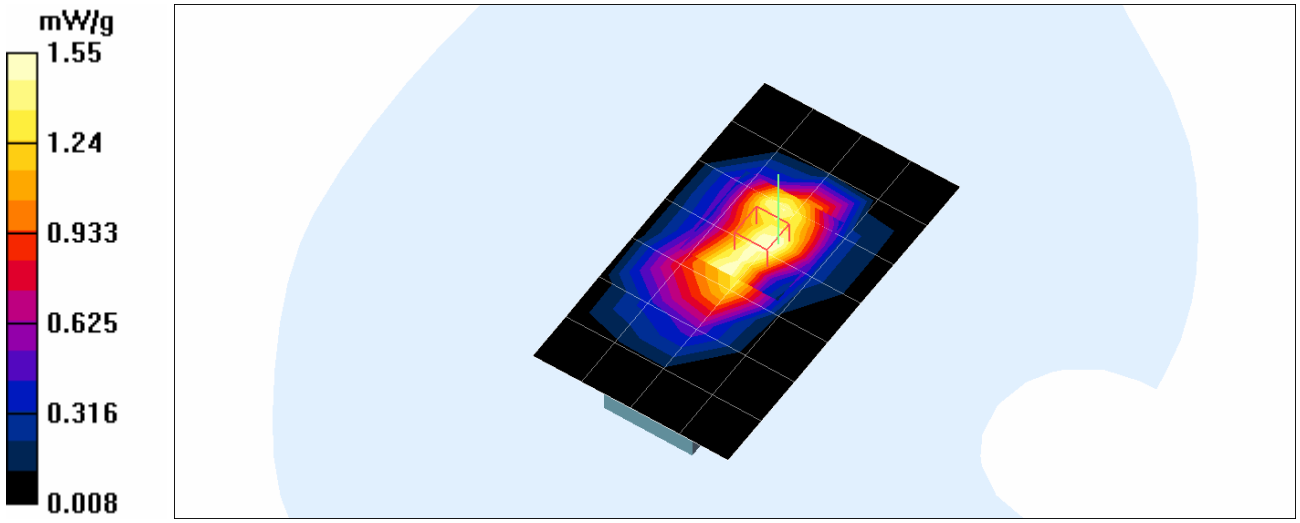
C3900 distance 5.0mm Horizontal position QPSK 3.4 High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.9 V/m; Power Drift = 0.029 dB

Peak SAR (extrapolated) = 2.57 W/kg

SAR(1 g) = 1.08 mW/g

Maximum value of SAR (measured) = 1.55 mW/g



5.7.2.3 Worst Case test data_Modulation type 16QAM 1/2

Date/Time: 2008-12-18 5:14:00

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QAM High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QAM High CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.38 mW/g

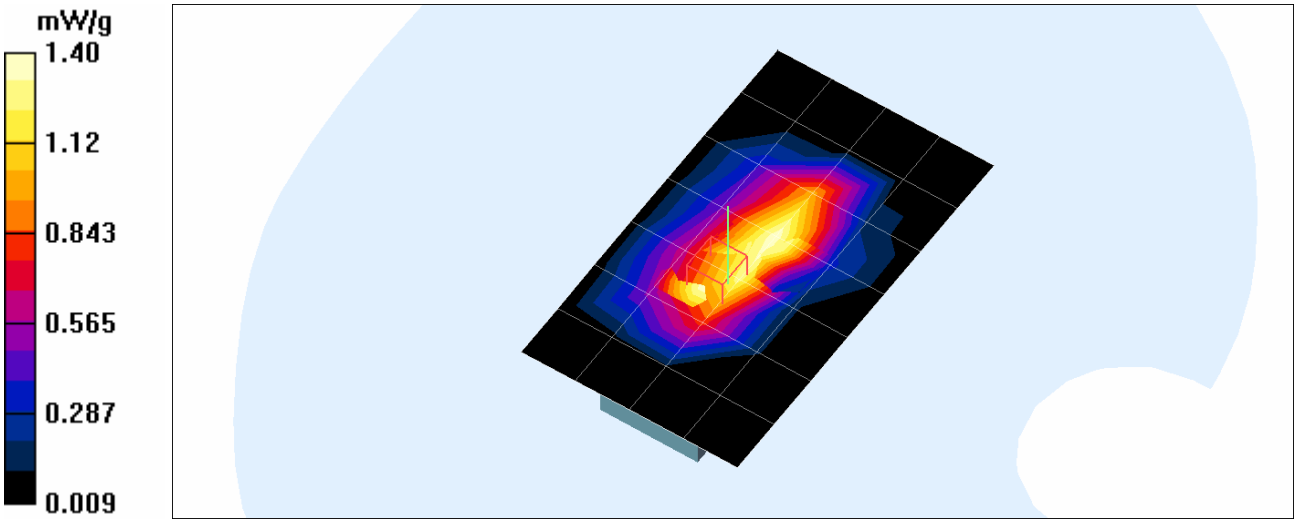
C3900 distance 5.0mm Horizontal position QAM High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.1 V/m; Power Drift = 0.066 dB

Peak SAR (extrapolated) = 2.10 W/kg

SAR(1 g) = 1.05 mW/g

Maximum value of SAR (measured) = 1.40 mW/g



5.7.2.4 Worst Case test data_Modulation type 16QAM 3/4

Date/Time: 2008-12-19 2:28:54

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QAM 3.4 High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QAM 3/4 High CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.47 mW/g

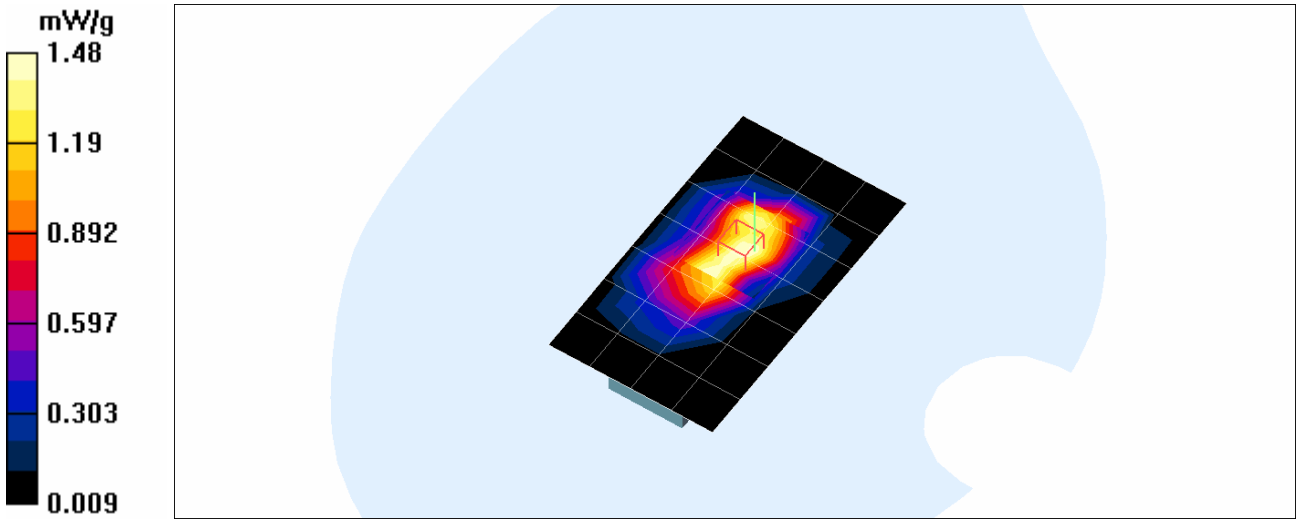
C3900 distance 5.0mm Horizontal position QAM 3/4 High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.4 V/m; Power Drift = 0.070 dB

Peak SAR (extrapolated) = 2.45 W/kg

SAR(1 g) = 1.04 mW/g

Maximum value of SAR (measured) = 1.48 mW/g



5.7.3.1 Compare with different scan resolution test data_2.5 mm scan resolution

Date/Time: 2008-12-19 2:44:57

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QPSK 2.5mm High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QPSK High CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.52 mW/g

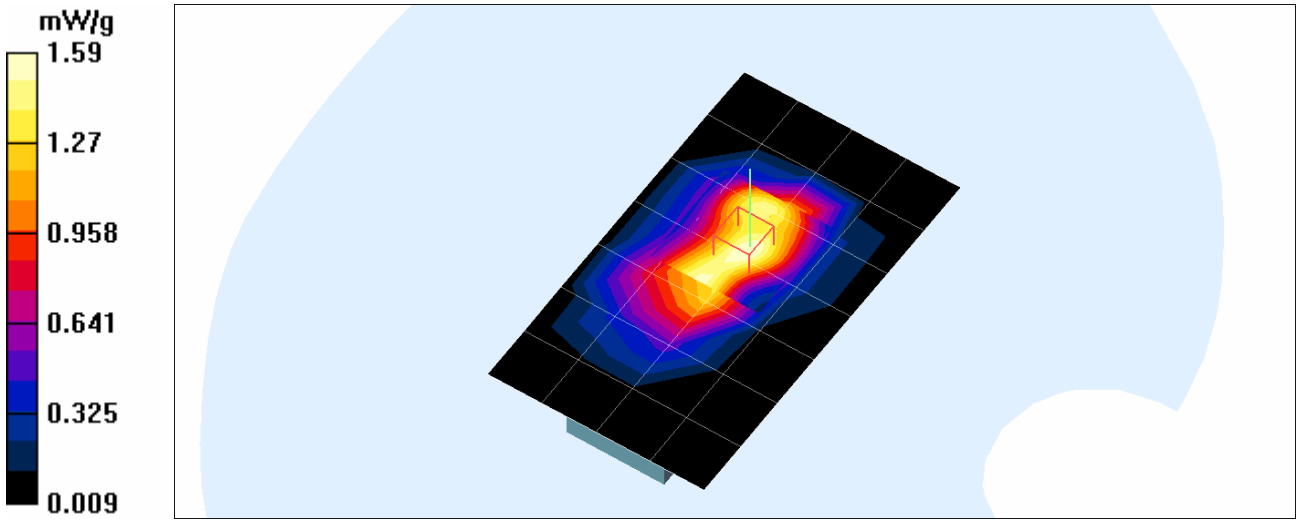
C3900 distance 5.0mm Horizontal position QPSK High CH/Zoom Scan (13x13x13)/Cube 0: Measurement grid: dx=2.5mm, dy=2.5mm, dz=2.5mm

Reference Value = 24.0 V/m; Power Drift = -0.008 dB

Peak SAR (extrapolated) = 2.54 W/kg

SAR(1 g) = 1.08 mW/g

Maximum value of SAR (measured) = 1.59 mW/g



5.7.3.2 Compare with different scan resolution test data_5 mm scan resolution

Date/Time: 2008-12-19 3:51:40

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QPSK High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QPSK High CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.52 mW/g

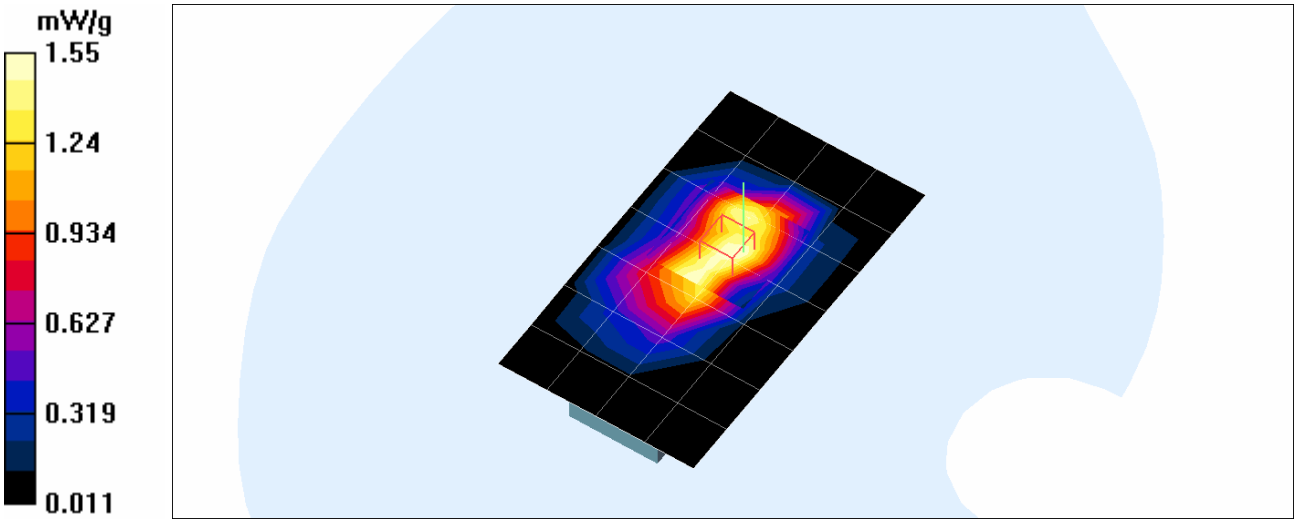
C3900 distance 5.0mm Horizontal position QPSK High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.8 V/m; Power Drift = 0.047 dB

Peak SAR (extrapolated) = 2.56 W/kg

SAR(1 g) = 1.08 mW/g

Maximum value of SAR (measured) = 1.55 mW/g



5.7.4 Enhanced energy coupling at Increased Separation Distances

Initial Position

The probe tip is position at the peak SAR location of high channel in the Horizontal top position test , at a distance of one half the probe tip diameter from the phantom surface.
Under this condition to get a single SAR value.

5mm Increments from Initial Position

With the probe fixed at this location, the device is moved away the phantom in 5mm increments from the initial touching or minimum separation position.
A single point SAR is measured for each of these device positions until the SAR is less than 50% of that measured at the Initial Position.

Test Position	SAR Value (W/kg)
Initial Position	2.450
5mm Increments from Initial Position	0.869

5.7.4.1 Enhanced energy coupling_Initial point

Date/Time: 2008-12-19 2:00:31

Test Laboratory: Nemko Korea File Name: C3900 Horizontal Position High CH QPSK initial tip.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2585 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2585 MHz; σ = 2.2 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

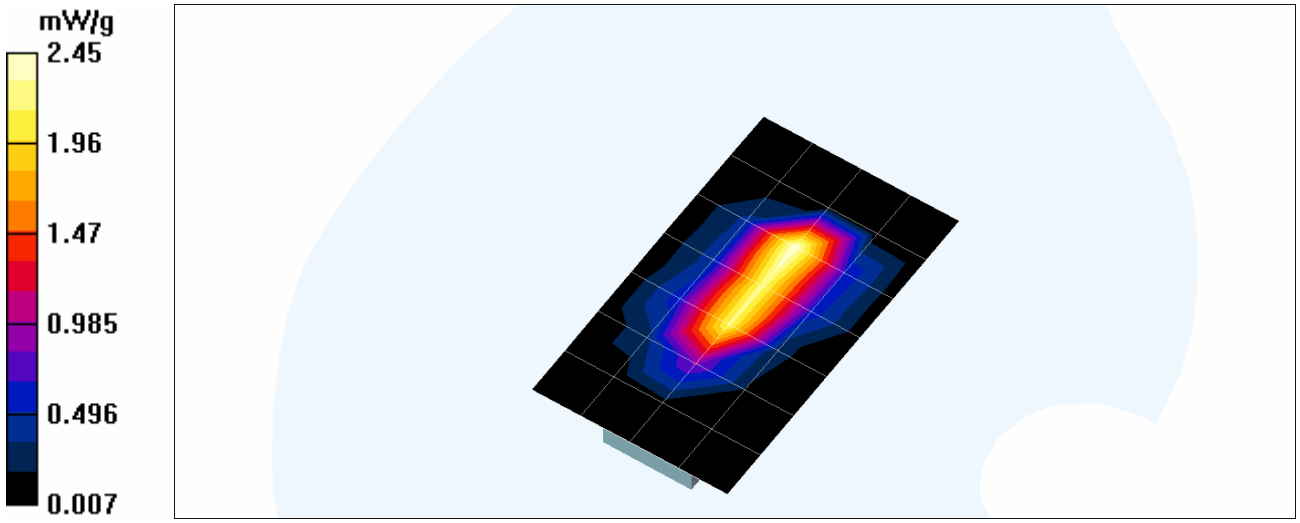
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Horizontal Position High CH QPSK Initial tip/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 2.45 mW/g



5.7.4.2 Enhanced energy coupling_5mm Increments from Initial Position

Date/Time: 2008-12-19 1:33:32

Test Laboratory: Nemko Korea File Name: C3900 Horizontal Position High CH QPSK initial.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2585 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2585 MHz; σ = 2.2 mho/m; ε_r = 52.1; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

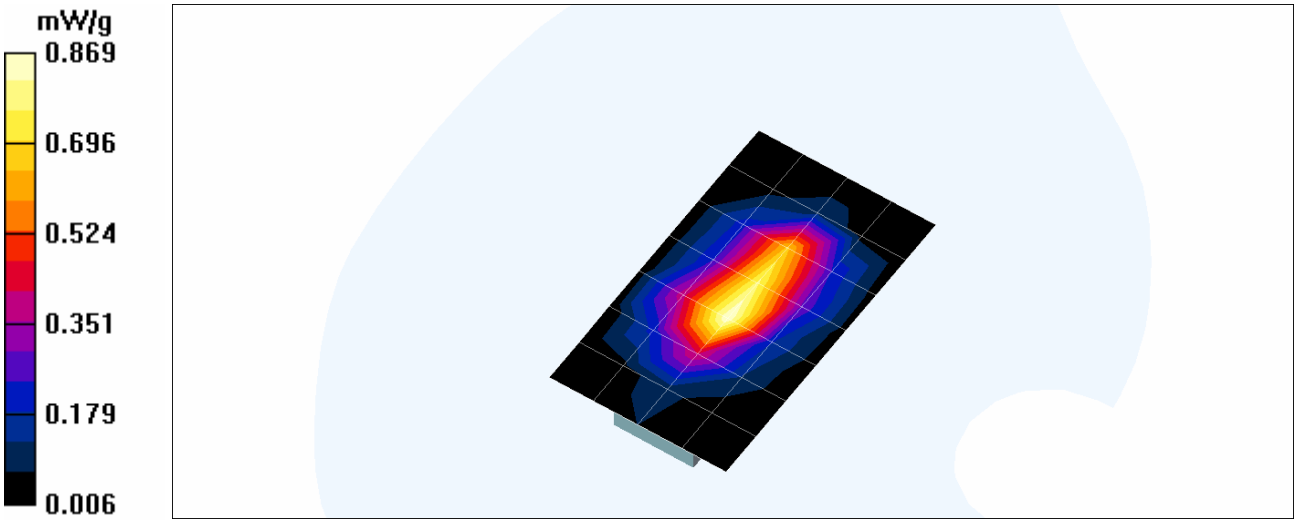
Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Horizontal Position High CH QPSK Initial/Area Scan (5x8x1): Measurement

grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.869 mW/g



6. Measurement Uncertainty

Error Description	Tolerance (±%)	Prob. Dist.	Divisor	(Ci)		Standard Uncertainty		(Vi)
				(1g)	(10g)	(1g)	(10g)	
Measurement System								
Probe Calibration	5.5	Normal	1	1	1	5.5	5.5	∞
Axial Isotropy	4.7	Rectangular	1.73	0.7	0.7	1.9	1.9	∞
Hemispherical Isotropy	9.6	Rectangular	1.73	0.7	0.7	3.9	3.9	∞
Hboundary Effects	1.0	Rectangular	1.73	1	1	0.6	0.6	∞
Linearity	4.7	Rectangular	1.73	1	1	2.7	2.7	∞
System Detection Limits	1.0	Rectangular	1.73	1	1	0.6	0.6	∞
Readout Electronics	0.3	Normal	1	1	1	0.3	0.3	∞
Response Time	0.8	Rectangular	1.73	1	1	0.5	0.5	∞
Intergration Time	2.6	Rectangular	1.73	1	1	1.5	1.5	∞
RF Ambient Conditions	3.0	Rectangular	1.73	1	1	1.7	1.7	∞
Probe Positioner	0.4	Rectangular	1.73	1	1	0.2	0.2	∞
Probe Positioning	2.9	Rectangular	1.73	1	1	1.7	1.7	∞
Max. SAR Eval.	1.0	Rectangular	1.73	1	1	0.6	0.6	∞
Test Sample Related								
Device Positioning	2.9	Normal	1	1	1	2.9	2.9	145
Device Holder	3.6	Normal	1	1	1	3.6	3.6	5
Power Drift	5.0	Rectangular	1.73	1	1	2.9	2.9	∞
Phantom and Setup								
Phantom Uncertainty	4.0	Rectangular	1.73	1	1	2.3	2.3	∞
Liquid Conductivity(target)	5.0	Rectangular	1.73	0.64	0.43	1.8	1.2	∞
Liquid Conductivity(Meas.)	2.5	Normal	1	0.64	0.43	1.6	1.1	∞
Liquid Permittivity(target)	5.0	Rectangular	1.73	0.6	0.49	1.7	1.4	∞
Liquid Permittivity(meas.)	2.5	Normal	1	0.6	0.49	1.5	1.2	∞
Combined Std. Uncertainty						**10.6**	**10.3**	
Expanded STD Uncertainty (k=2)						**21.2**	**20.7**	

Note: The above measurement uncertainties are according to IEEE Std. 1528-2003

7. System Verification

7.1 Tissue Verification

For the measurement of the following parameters the HP 85070E dielectric probe kit is used, representing the open-ended slim form probe measurement procedure. The measured values should be within ±5% of the recommended values given by the IEEE 1528-2003 / OET Bulletin 65 Supplement C.

Table 7.1 Measured Tissue Parameters

Liquid Temperature (°C)		22.3	
Test date		December.18.2008	
Frequency (MHz)	Liquid Parameter	Target	Measured
2500	Dielectric Constant (ε_r)	52.64	52.36
2600		52.51	52.00
2700		52.38	51.62
2500	Conductivity . (σ)	2.02	2.09
2600		2.16	2.22
2700		2.30	2.35
Dielectric Parameters Required at 22°C		f = 2600MHz ε_r = 52.51 ± 5% σ = 2.16 ± 5%	

Table 7.2 Measured Tissue Parameters

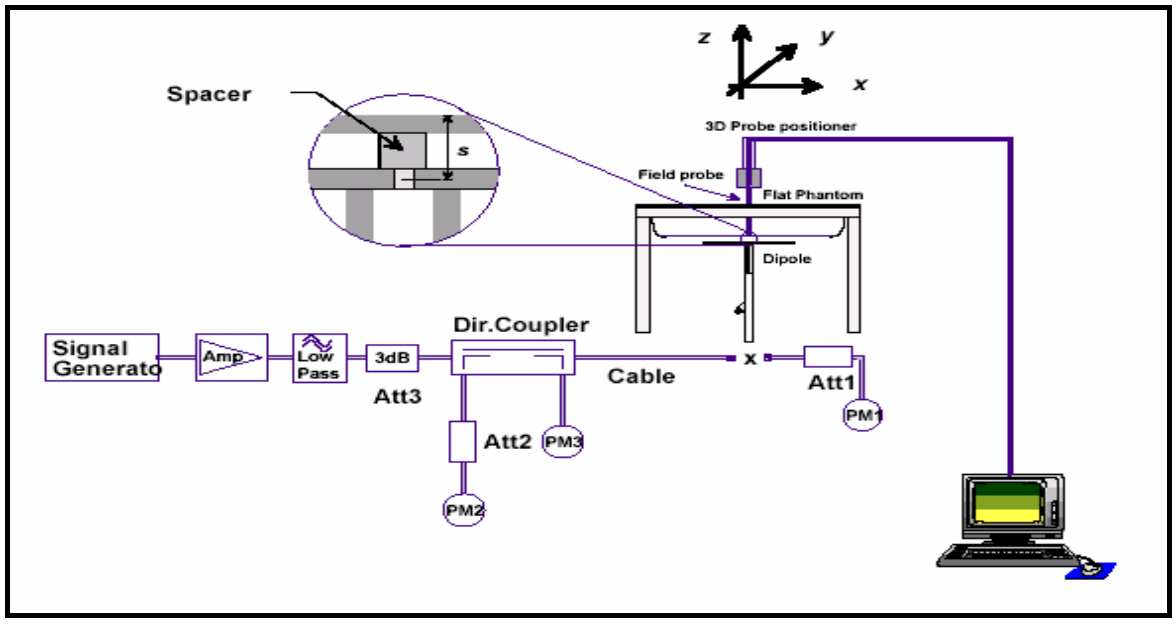
Liquid Temperature (°C)		21.8	
Test date		December.22.2008	
Frequency (MHz)	Liquid Parameter	Target	Measured
2500	Dielectric Constant (ε_r)	52.64	50.84
2600		52.51	50.67
2700		52.38	50.46
2500	Conductivity . (σ)	2.02	2.07
2600		2.16	2.19
2700		2.30	2.31
Dielectric Parameters Required at 22°C		f = 2600MHz ε_r = 52.51 ± 5% σ = 2.16 ± 5%	

7.2 Test System Validation

The simplified performance check was realized using the dipole validation kits.
The input power of the dipole antenna was 250 mW and it was placed under the flat Part of the SAM phantoms.
The target and measured results are listed in the table 7.2

Table 7.2 System Validation Results

Date	Liquid Temperature (°C)	Frequency (MHz)	Targeted SAR (mW/g)	Measured SAR (mW/g)	Deviation (%)
			1g	1g	
December 18. 2008	22.3	2600	13.877	**14.3**	**3.05**
December 22. 2008	21.8	2600	13.877	**14.1**	**1.61**



Dipole Validation Test Setup

7.2.1 Measurement Result of Test Data (Wi-max Validation)

Date/Time: 2008-12-18 1:07:43

Test Laboratory: Nemko Korea File Name: C3900 Wimax USB Modem Validation.da4

DUT: Dipole 2600 MHz Type: D2600V2 Serial: D2600V2 - SN:1010 Applicant Name: Kyocera Wireless Corp.

Communication System: CW Frequency: 2600 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2600 MHz; σ = 2.22 mho/m; ε_r = 52; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Wimax Validation/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 19.6 mW/g

C3900 Wimax Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

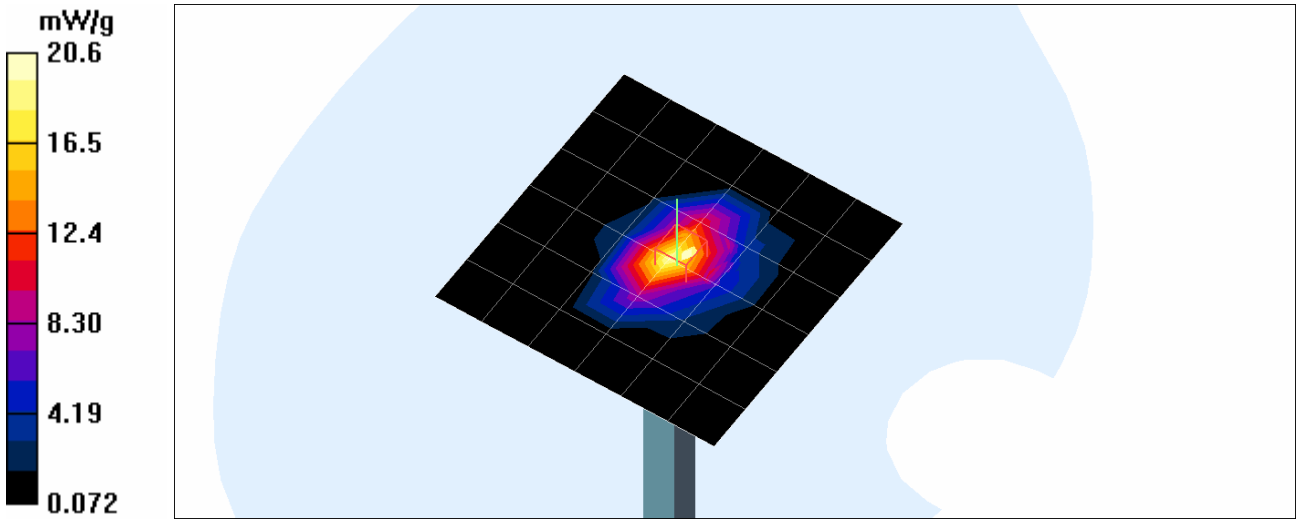
Reference Value = 95.5 V/m; Power Drift = -0.075 dB

Peak SAR (extrapolated) = 31.3 W/kg

SAR(1 g) = 14.3 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 20.6 mW/g



7.2.2 Measurement Result of Test Data (Wi-max Validation)-Continued

Date/Time: 2008-12-22 12:21:24

Test Laboratory: Nemko Korea File Name: C3900 Wimax USB Modem Validation-2.da4

DUT: Dipole 2600 MHz Type: D2600V2 Serial: D2600V2 - SN:1010 Applicant Name: Kyocera Wireless Corp.

Communication System: CW Frequency: 2600 MHz

Duty Cycle: 1:1 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2600 MHz; σ = 2.2 mho/m; ε_r = 50.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Wimax Validation/Area Scan (7x7x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 19.5 mW/g

C3900 Wimax Validation/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

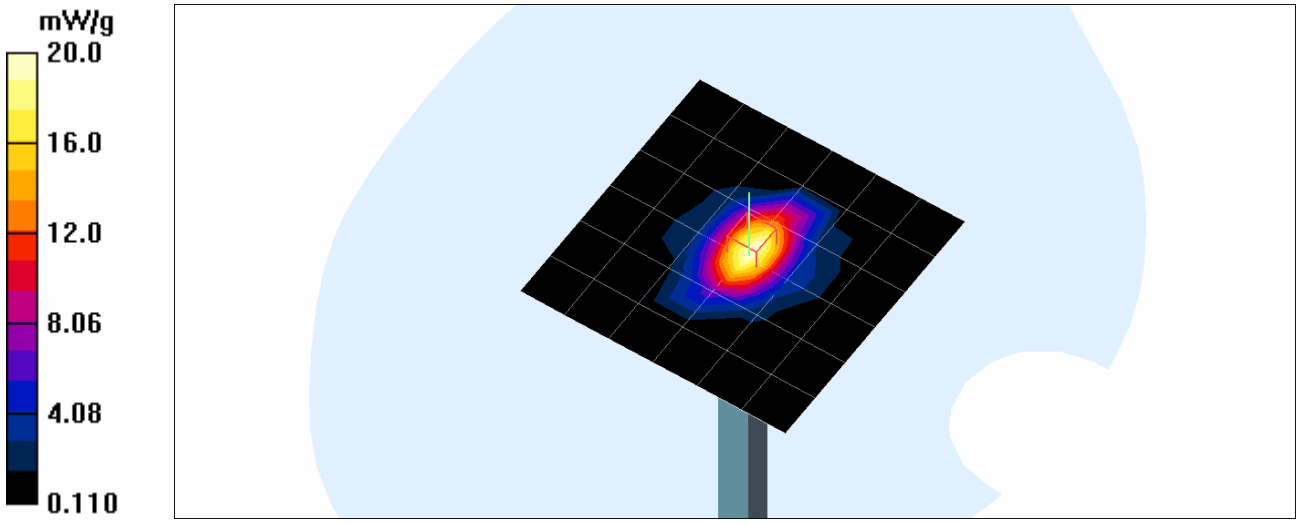
Reference Value = 95.3 V/m; Power Drift = 0.028 dB

Peak SAR (extrapolated) = 29.5 W/kg

SAR(1 g) = 14.1 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 20.0 mW/g



8. SAR Measurement Results

8.1 Test Results

Date of Test : December 18. 2008 ~ December 22. 2008
Mixture Type: 2600 MHz body
Tissue Depth: 15.2 Cm

Mode	Modulation	Channel	Frequency (MHz)	Power drift (dB)	Test Position	1g SAR (W/kg)
Wi-max	QPSK 1/2	Low	2501	-0.053	Horizontal Top	0.849
		Middle	2593	0.019	Horizontal Top	1.010
		High	2685	0.047	Horizontal Top	1.080
	QPSK 1/2	Low	2501	0.146	Horizontal Bottom	0.255
		Middle	2593	0.175	Horizontal Bottom	0.574
		High	2685	-0.083	Horizontal Bottom	0.768
	QPSK 1/2	Low	2501	0.128	Vertical Right	0.671
		Middle	2593	-0.008	Vertical Right	1.010
		High	2685	-0.017	Vertical Right	1.050
	QPSK 1/2	Low	2501	0.163	Vertical Left	0.331
		Middle	2593	-0.074	Vertical Left	0.530
		High	2685	0.170	Vertical Left	0.562

Test Results – continued

Date of Test : December 18. 2008 ~ December 22. 2008
Mixture Type: 2600 MHz body
Tissue Depth: 15.2 Cm

Mode	Modulation	Channel	Frequency (MHz)	Power drift (dB)	Test Position	1g SAR (W/kg)
Wi-max	QPSK 1/2	Low	2501	-0.052	Vertical Top	0.141
		Middle	2593	0.010	Vertical Top	0.142
		High	2685	-0.052	Vertical Top	0.232
	16QAM 1/2	Low	2501	-0.073	Horizontal Top	0.740
		Middle	2593	-0.131	Horizontal Top	1.000
		High	2685	0.066	Horizontal Top	1.050
	QPSK 1/2	Low	2501	0.179	Laptop (Horizontal)	0.323
		Middle	2593	0.029	Laptop (Horizontal)	0.793
		High	2685	-0.007	Laptop (Horizontal)	0.883
	QPSK 1/2	Low	2501	-0.198	Laptop (Vertical)	0.288
		Middle	2593	0.099	Laptop (Vertical)	0.545
		High	2685	0.102	Laptop (Vertical)	0.497

Notes:

1. The test data reported are the worst-case SAR value with the antenna-head position set in a typical configuration.
2. All modes of operation were investigated, and worst-case results are reported.
3. Tissue parameters are listed on the SAR plots.
4. In this testing, the limit for General Population Spatial Peak averaged over 1g, 1.6 W/kg, is applied

Date/Time: 2008-12-18 3:59:09

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QPSK Low CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2501 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2501 MHz; σ = 2.09 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QPSK Low CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.28 mW/g

C3900 distance 5.0mm Horizontal position QPSK Low CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

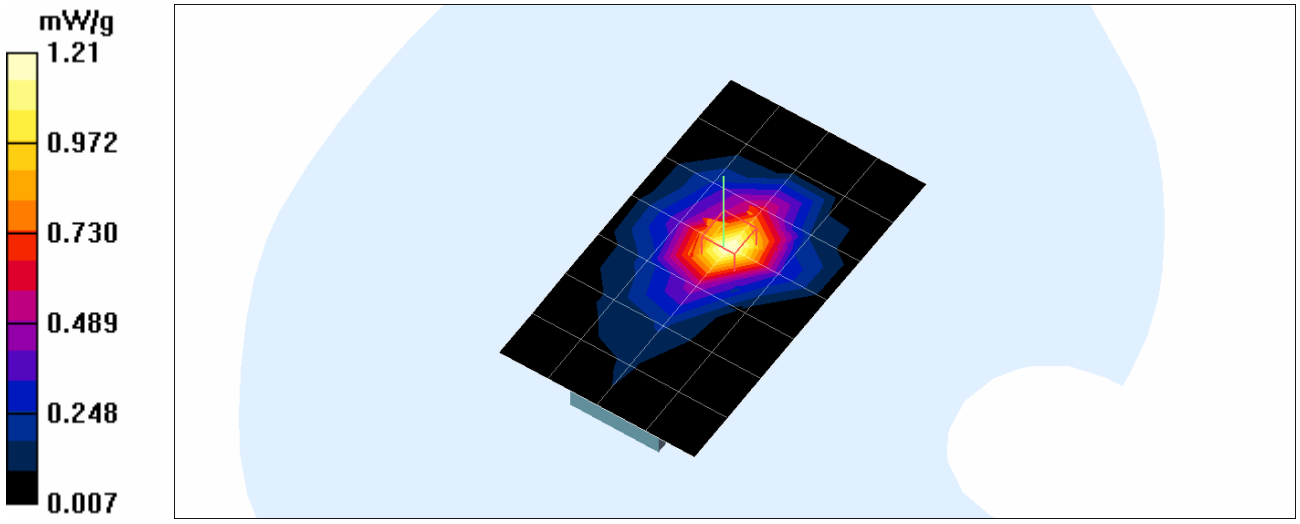
Reference Value = 23.5 V/m; Power Drift = -0.053 dB

Peak SAR (extrapolated) = 1.84 W/kg

SAR(1 g) = 0.849 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.21 mW/g



Date/Time: 2008-12-18 3:42:16

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QPSK Middle CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2593 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2593.1 MHz; σ = 2.21 mho/m; ε_r = 52; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QPSK Middle/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.14 mW/g

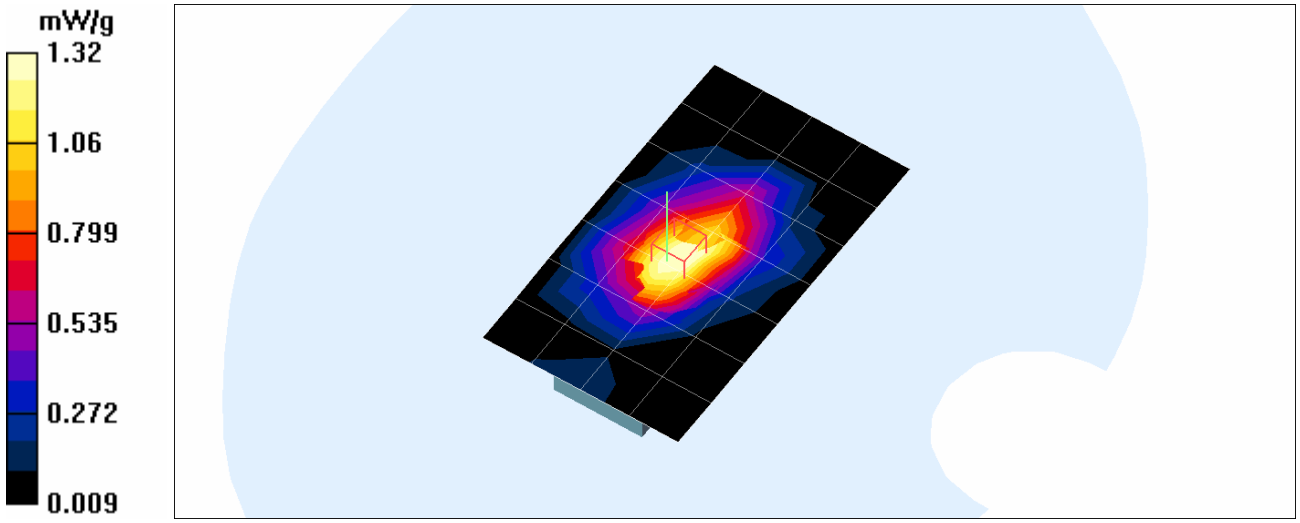
C3900 distance 5.0mm Horizontal position QPSK Middle/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.5 V/m; Power Drift = 0.019 dB

Peak SAR (extrapolated) = 1.89 W/kg

SAR(1 g) = 1.01 mW/g

Maximum value of SAR (measured) = 1.32 mW/g



Date/Time: 2008-12-19 3:51:40

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QPSK High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QPSK High CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.52 mW/g

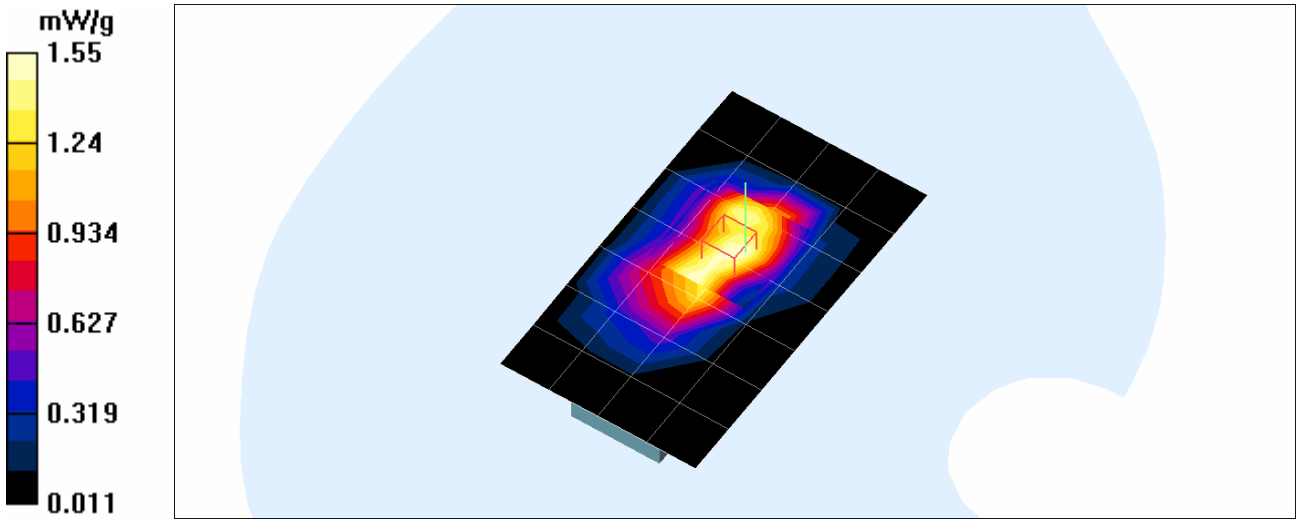
C3900 distance 5.0mm Horizontal position QPSK High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.8 V/m; Power Drift = 0.047 dB

Peak SAR (extrapolated) = 2.56 W/kg

SAR(1 g) = 1.08 mW/g

Maximum value of SAR (measured) = 1.55 mW/g



Date/Time: 2008-12-19 3:51:40

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QPSK High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QPSK High CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.52 mW/g

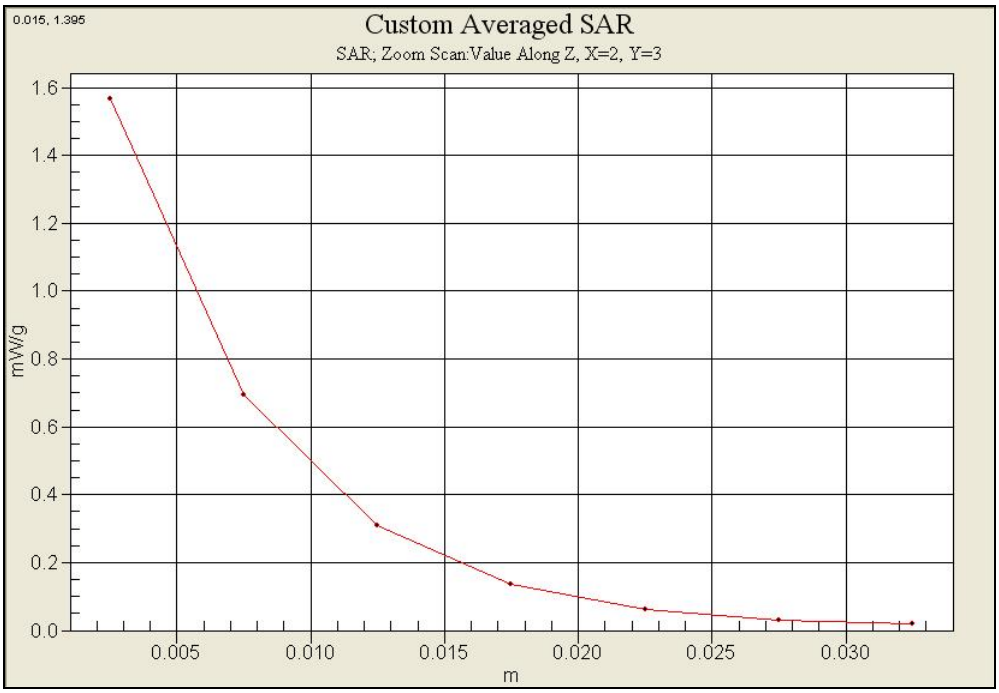
C3900 distance 5.0mm Horizontal position QPSK High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 23.8 V/m; Power Drift = 0.047 dB

Peak SAR (extrapolated) = 2.56 W/kg

SAR(1 g) = 1.08 mW/g

Maximum value of SAR (measured) = 1.55 mW/g



Date/Time: 2008-12-18 6:48:06

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal Bottom position QPSK Low CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2501 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2501 MHz; σ = 2.09 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal Bottom position QPSK Low CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.335 mW/g

C3900 distance 5.0mm Horizontal Bottom position QPSK Low CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

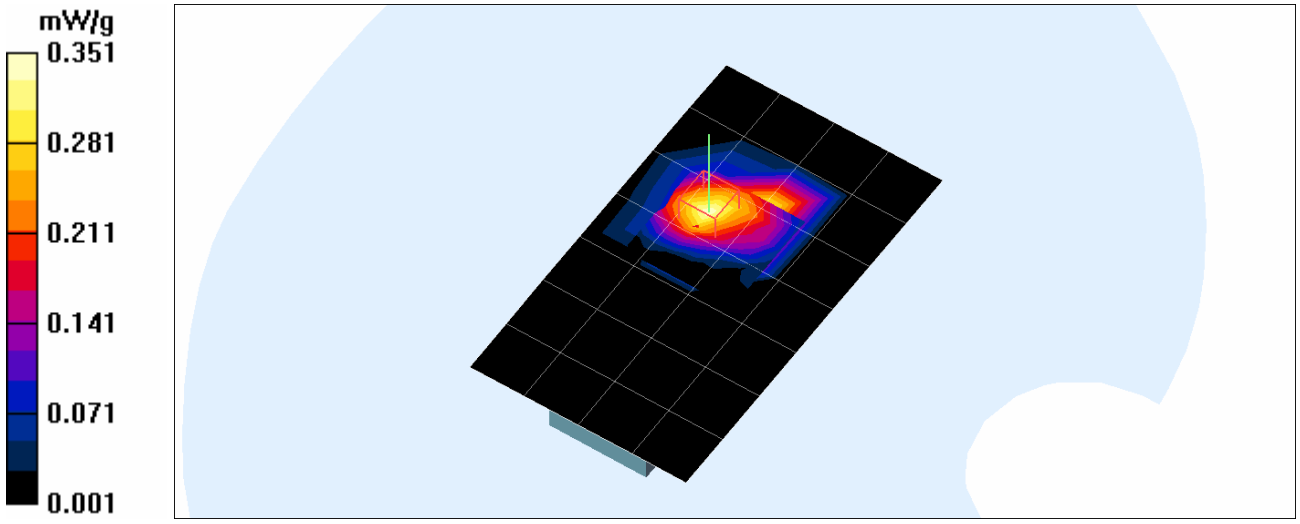
Reference Value = 12.6 V/m; Power Drift = 0.146 dB

Peak SAR (extrapolated) = 0.353 W/kg

SAR(1 g) = 0.255 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.351 mW/g



Date/Time: 2008-12-18 6:31:55

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal Bottom position QPSK Mid CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2593 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2593.1 MHz; σ = 2.21 mho/m; ε_r = 52; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal Bottom position QPSK Mid CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.673 mW/g

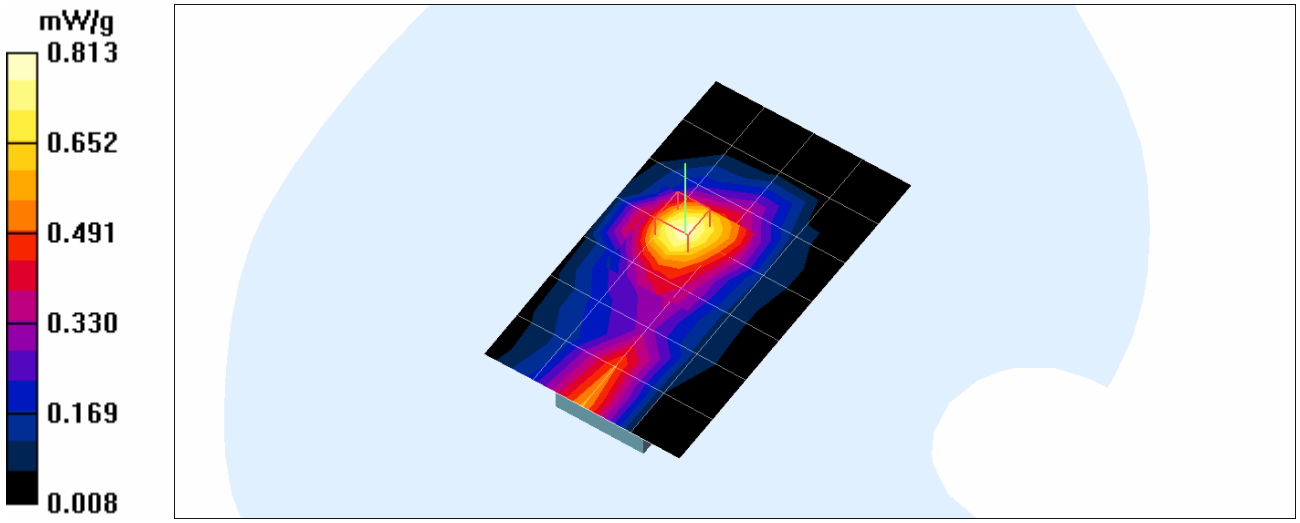
C3900 distance 5.0mm Horizontal Bottom position QPSK Mid CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 14.4 V/m; Power Drift = 0.175 dB

Peak SAR (extrapolated) = 1.20 W/kg

SAR(1 g) = 0.574 mW/g

Maximum value of SAR (measured) = 0.813 mW/g



Date/Time: 2008-12-18 5:44:24

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal Bottom position QPSK High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal Bottom position QPSK High CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.827 mW/g

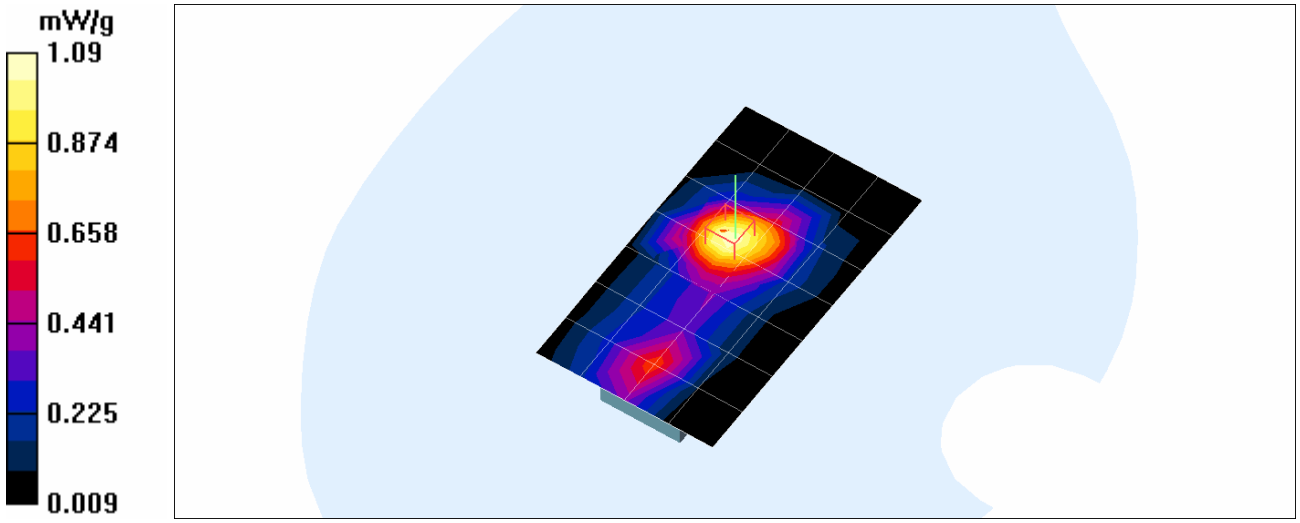
C3900 distance 5.0mm Horizontal Bottom position QPSK High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.8 V/m; Power Drift = -0.083 dB

Peak SAR (extrapolated) = 1.65 W/kg

SAR(1 g) = 0.768 mW/g

Maximum value of SAR (measured) = 1.09 mW/g



Date/Time: 2008-12-18 9:54:30

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Vertical Right Side position QPSK Low CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2501 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2501 MHz; σ = 2.09 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Vertical Right Side position QPSK Low CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.773 mW/g

C3900 distance 5.0mm Vertical Right Side position QPSK Low CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

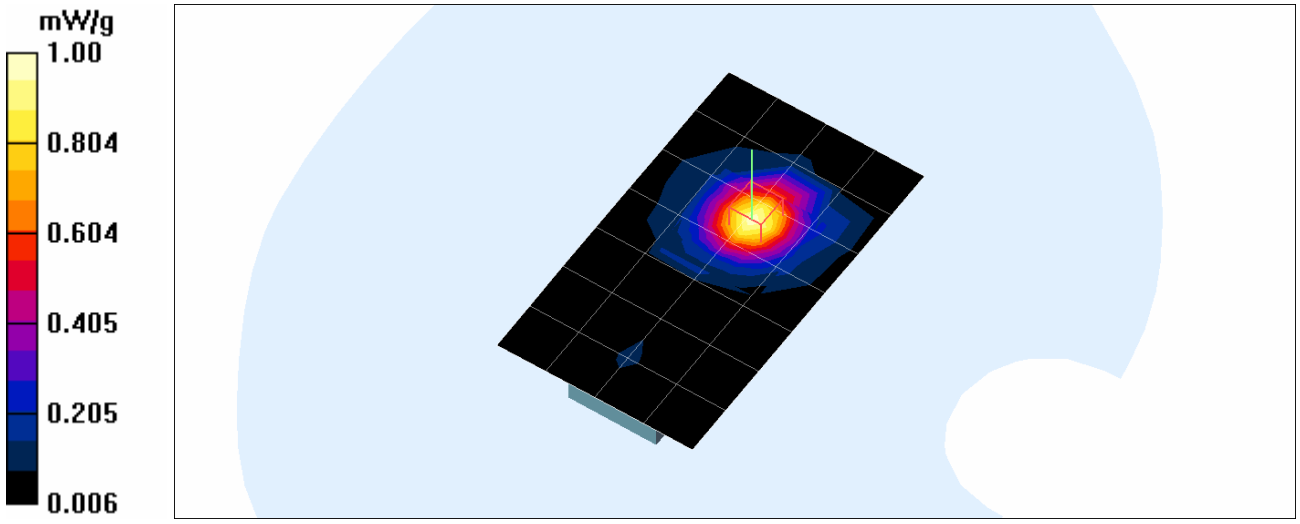
Reference Value = 11.2 V/m; Power Drift = 0.128 dB

Peak SAR (extrapolated) = 1.56 W/kg

SAR(1 g) = 0.671 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.00 mW/g



Date/Time: 2008-12-18 9:36:20

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Vertical Right Side position QPSK Middle CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2593 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2593.1 MHz; σ = 2.21 mho/m; ε_r = 52; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Vertical Right Side position QPSK Middle CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.38 mW/g

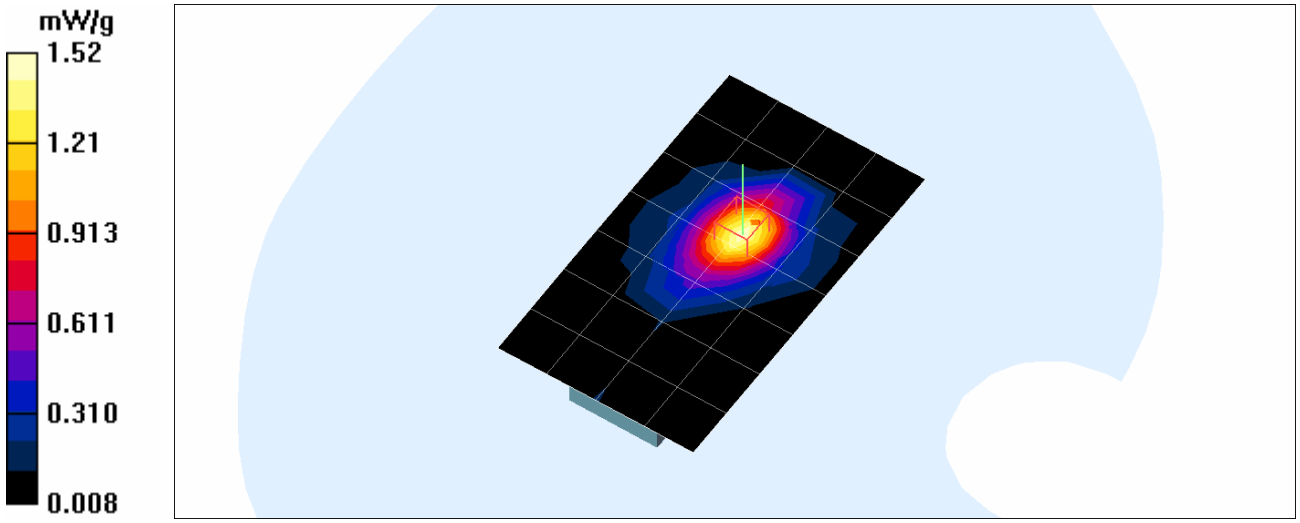
C3900 distance 5.0mm Vertical Right Side position QPSK Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 21.7 V/m; Power Drift = -0.008 dB

Peak SAR (extrapolated) = 2.38 W/kg

SAR(1 g) = 1.01 mW/g

Maximum value of SAR (measured) = 1.52 mW/g



Date/Time: 2008-12-18 9:12:39

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Vertical Right Side position QPSK High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Vertical Right Side position QPSK High CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.24 mW/g

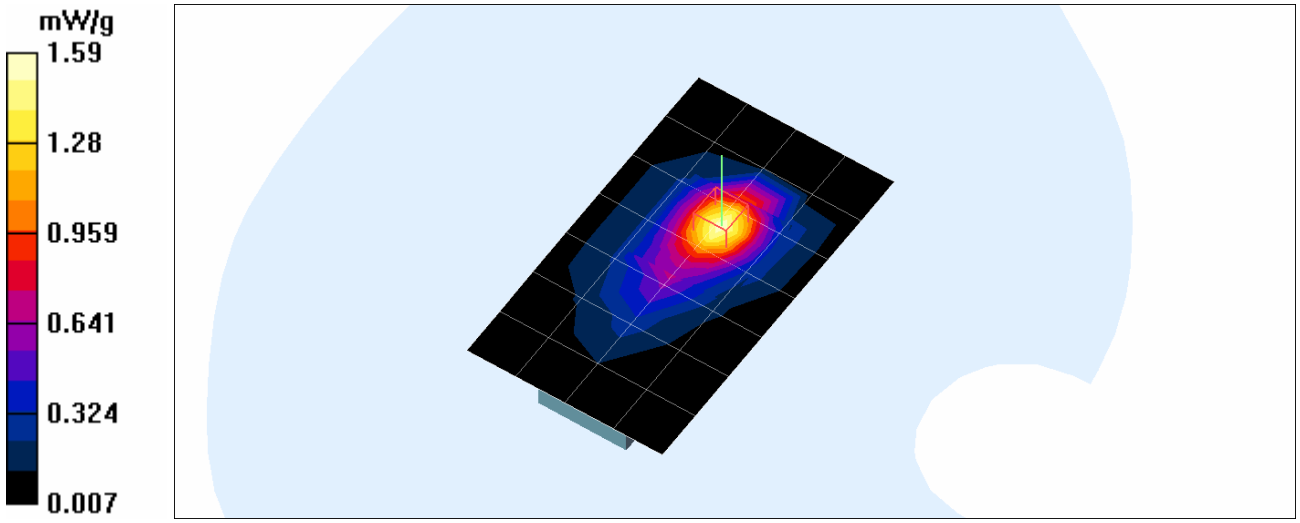
C3900 distance 5.0mm Vertical Right Side position QPSK High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.2 V/m; Power Drift = -0.017 dB

Peak SAR (extrapolated) = 2.59 W/kg

SAR(1 g) = 1.05 mW/g

Maximum value of SAR (measured) = 1.59 mW/g



Date/Time: 2008-12-18 7:44:22

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Vertical Left Side position QPSK Low CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2501 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2501 MHz; σ = 2.09 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Vertical Left Side position QPSK Low CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.457 mW/g

C3900 distance 5.0mm Vertical Left Side position QPSK Low CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

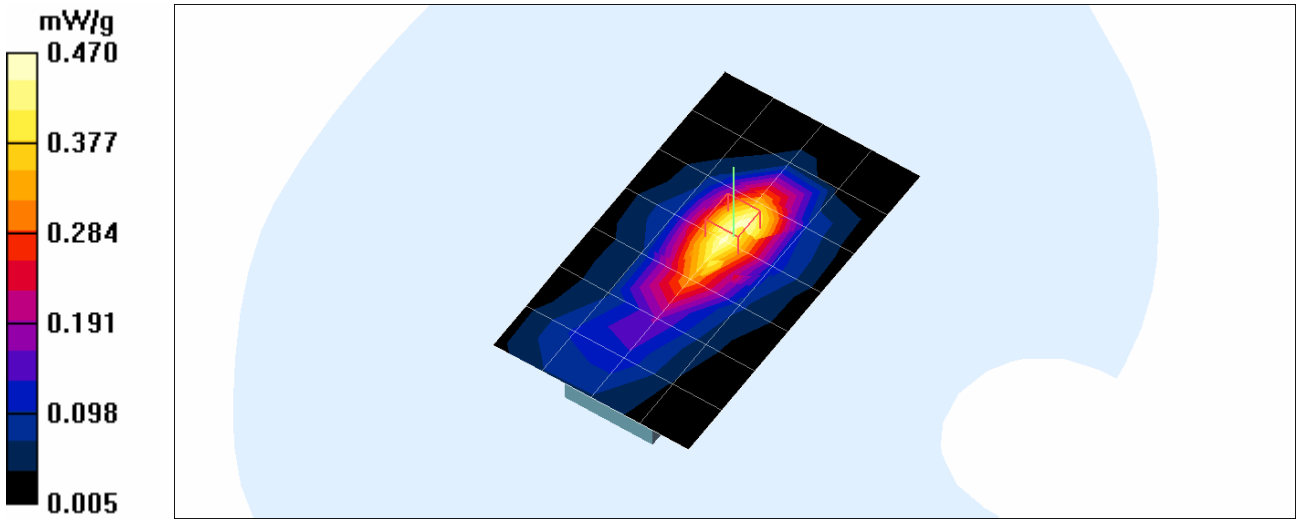
Reference Value = 14.1 V/m; Power Drift = 0.163 dB

Peak SAR (extrapolated) = 0.725 W/kg

SAR(1 g) = 0.331 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.470 mW/g



Date/Time: 2008-12-18 8:02:48

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Vertical Left Side position QPSK Middle CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2593 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2593.1 MHz; σ = 2.21 mho/m; ε_r = 52; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Vertical Left Side position QPSK Middle CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.737 mW/g

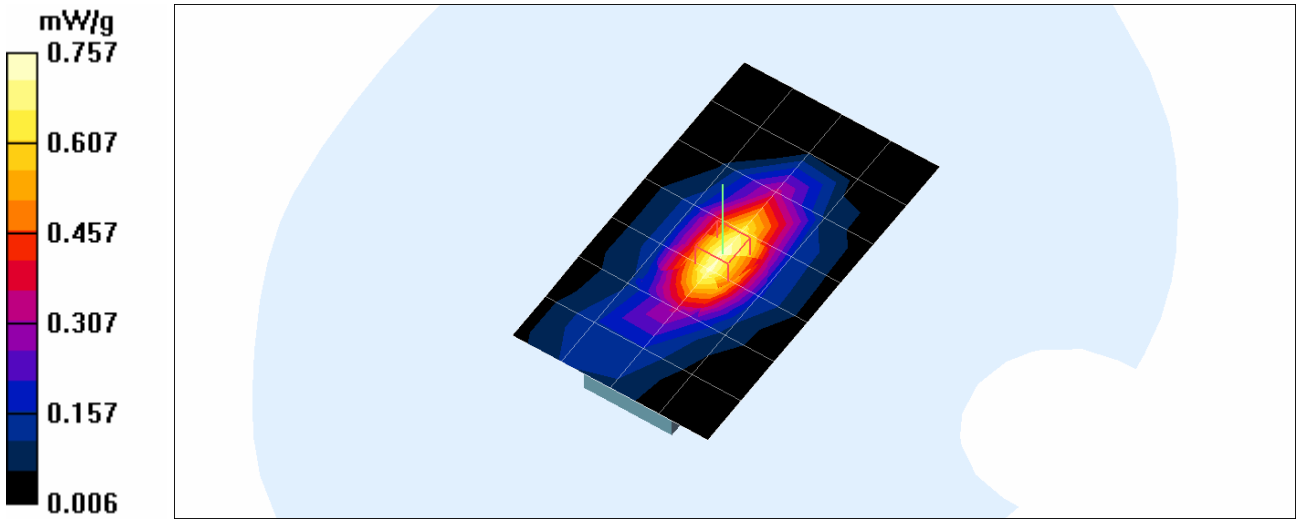
C3900 distance 5.0mm Vertical Left Side position QPSK Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.6 V/m; Power Drift = -0.074 dB

Peak SAR (extrapolated) = 1.16 W/kg

SAR(1 g) = 0.530 mW/g

Maximum value of SAR (measured) = 0.757 mW/g



Date/Time: 2008-12-18 8:24:14

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Vertical Left Side position QPSK High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Vertical Left Side position QPSK High CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.716 mW/g

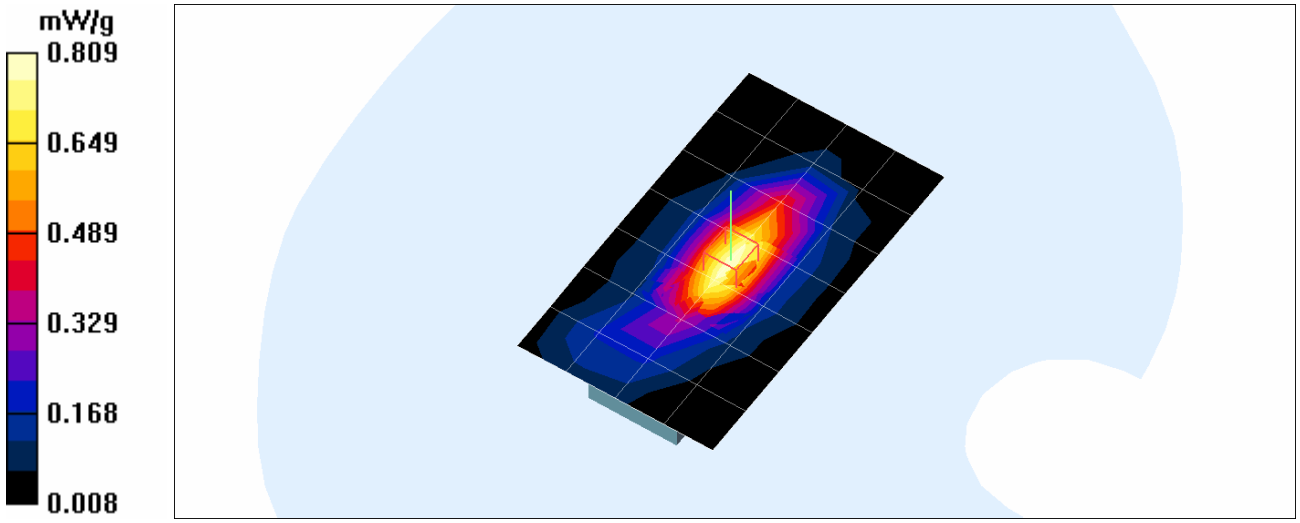
C3900 distance 5.0mm Vertical Left Side position QPSK High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.4 V/m; Power Drift = 0.170 dB

Peak SAR (extrapolated) = 1.24 W/kg

SAR(1 g) = 0.562 mW/g

Maximum value of SAR (measured) = 0.809 mW/g



Date/Time: 2008-12-19 12:30:11

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Vertical Top Side position QPSK Low CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2501 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2501 MHz; σ = 2.09 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Vertical Top Side position QPSK Low CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.201 mW/g

C3900 distance 5.0mm Vertical Top Side position QPSK Low CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

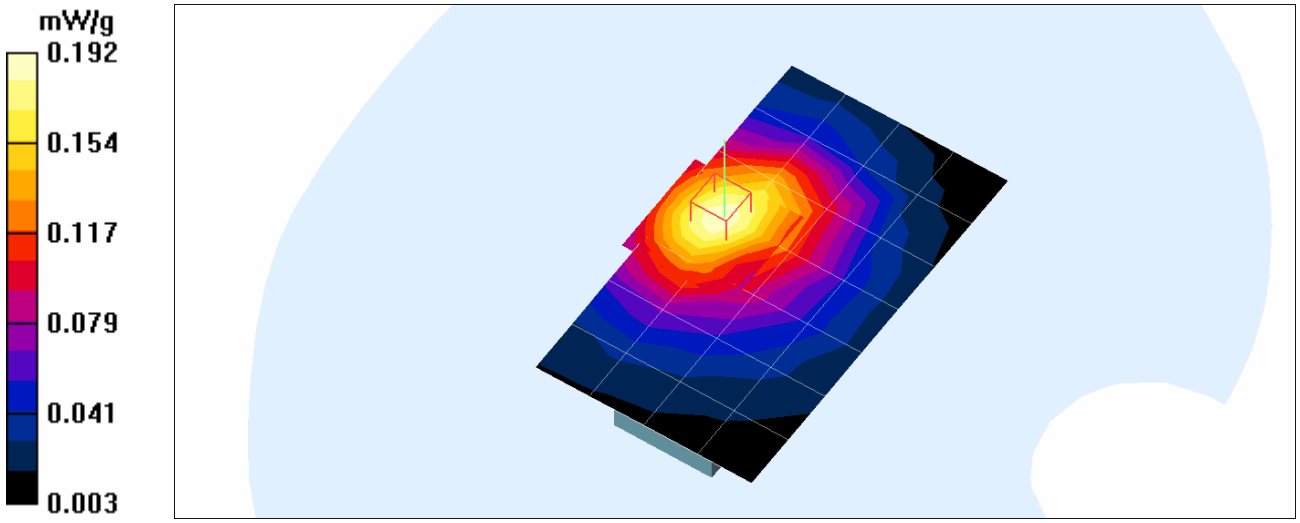
Reference Value = 7.31 V/m; Power Drift = -0.052 dB

Peak SAR (extrapolated) = 0.284 W/kg

SAR(1 g) = 0.141 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.192 mW/g



Date/Time: 2008-12-19 12:02:52

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Vertical Top Side position QPSK Middle CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2593 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2593.1 MHz; σ = 2.21 mho/m; ε_r = 52; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Vertical Top Side position QPSK Middle CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.194 mW/g

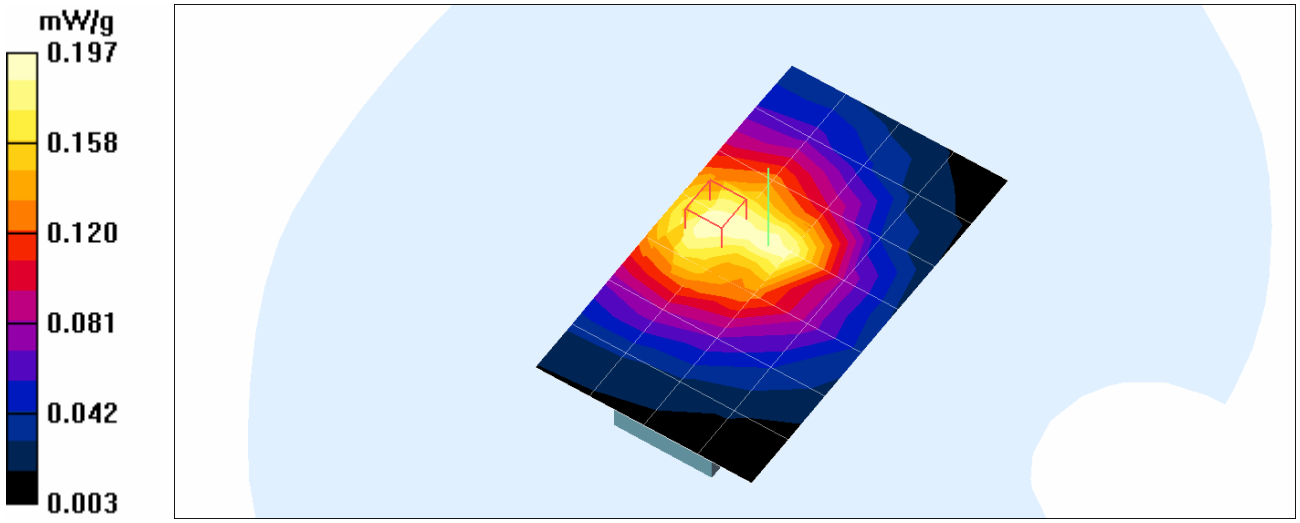
C3900 distance 5.0mm Vertical Top Side position QPSK Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 9.09 V/m; Power Drift = 0.010 dB

Peak SAR (extrapolated) = 0.305 W/kg

SAR(1 g) = 0.142 mW/g

Maximum value of SAR (measured) = 0.197 mW/g



Date/Time: 2008-12-18 11:12:00

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Vertical Top Side position QPSK High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Vertical Top Side position QPSK High CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.316 mW/g

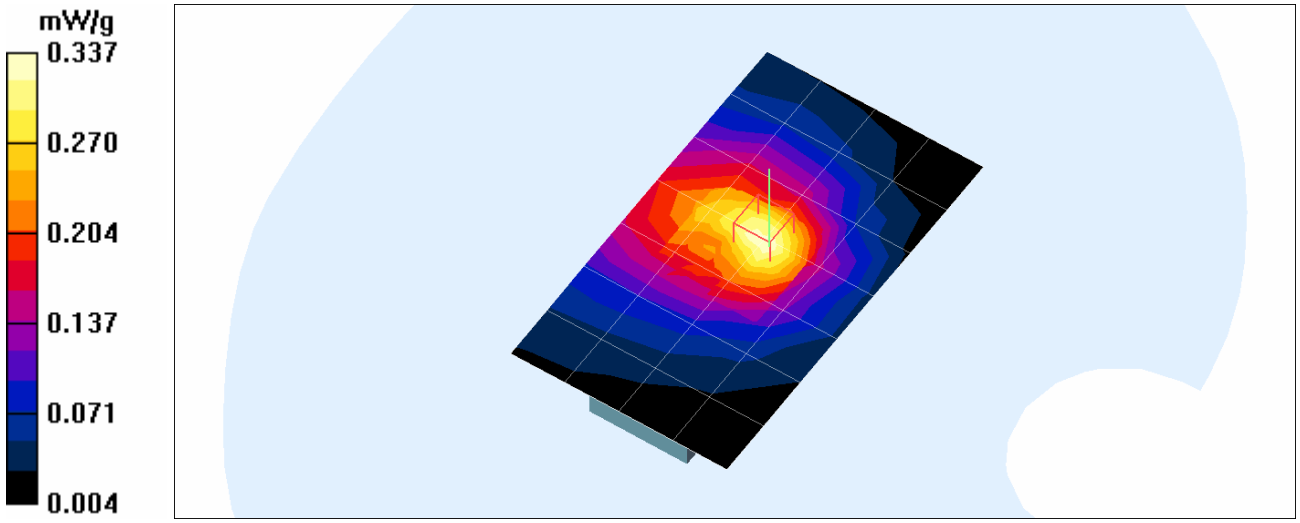
C3900 distance 5.0mm Vertical Top Side position QPSK High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 11.3 V/m; Power Drift = -0.052 dB

Peak SAR (extrapolated) = 0.542 W/kg

SAR(1 g) = 0.232 mW/g

Maximum value of SAR (measured) = 0.337 mW/g



Date/Time: 2008-12-19 1:59:02

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QAM Low CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2501 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2501 MHz; σ = 2.09 mho/m; ε_r = 52.4; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QAM Low CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.854 mW/g

C3900 distance 5.0mm Horizontal position QAM Low CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

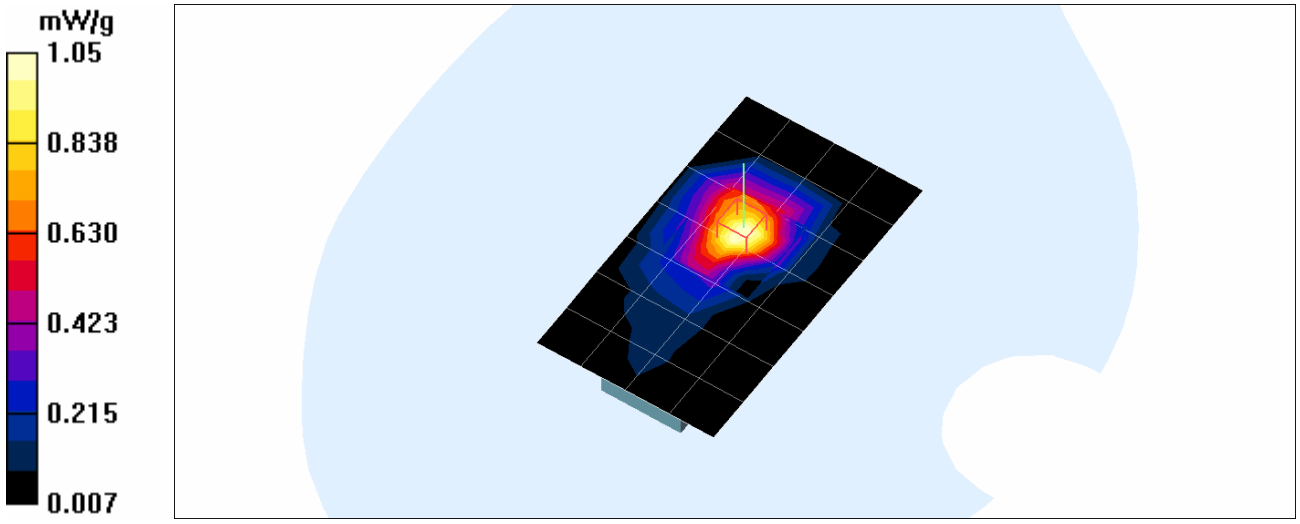
Reference Value = 15.4 V/m; Power Drift = -0.073 dB

Peak SAR (extrapolated) = 1.61 W/kg

SAR(1 g) = 0.740 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 1.05 mW/g



Date/Time: 2008-12-19 2:18:26

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QAM Middle CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2593 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2593.1 MHz; σ = 2.21 mho/m; ε_r = 52; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QAM Middle CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.14 mW/g

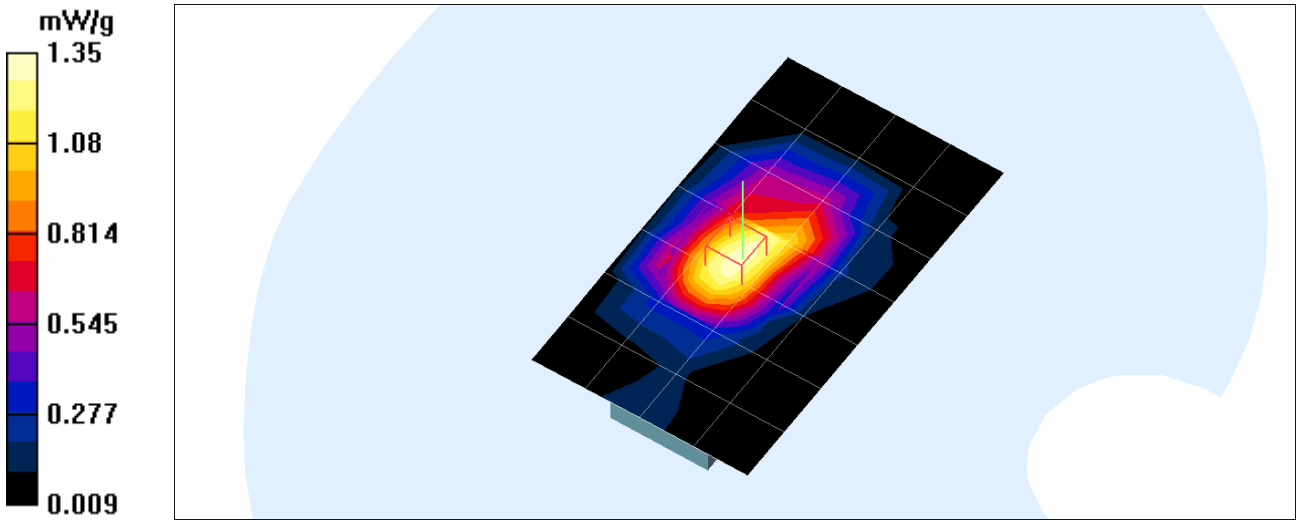
C3900 distance 5.0mm Horizontal position QAM Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 22.8 V/m; Power Drift = -0.131 dB

Peak SAR (extrapolated) = 1.85 W/kg

SAR(1 g) = 1 mW/g

Maximum value of SAR (measured) = 1.35 mW/g



Date/Time: 2008-12-18 5:14:00

Test Laboratory: Nemko Korea File Name: C3900 distance 5mm Horizontal position QAM High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.35 mho/m; ε_r = 51.6; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 distance 5.0mm Horizontal position QAM High CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 1.38 mW/g

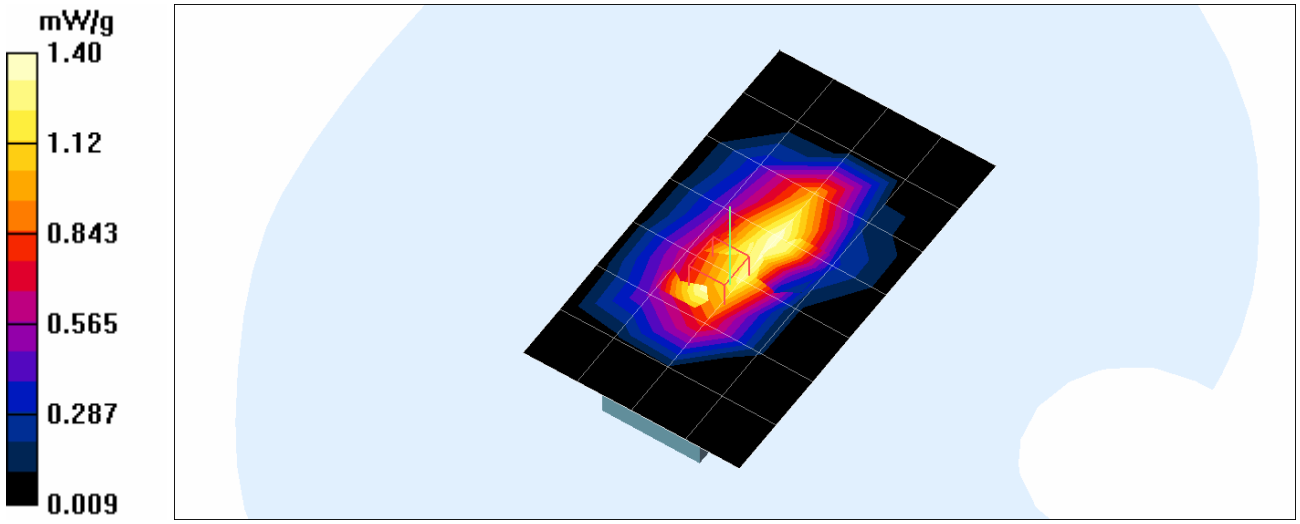
C3900 distance 5.0mm Horizontal position QAM High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 24.1 V/m; Power Drift = 0.066 dB

Peak SAR (extrapolated) = 2.10 W/kg

SAR(1 g) = 1.05 mW/g

Maximum value of SAR (measured) = 1.40 mW/g



Date/Time: 2008-12-22 8:25:37

Test Laboratory: Nemko Korea File Name: C3900 Samsung NT-R70 Horizontal Laptop QPSK Low CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2501 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2501 MHz; σ = 2.08 mho/m; ε_r = 50.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Samsung NT-R70 Horizontal Laptop QPSK Low CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.404 mW/g

C3900 Samsung NT-R70 Horizontal Laptop QPSK Low CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

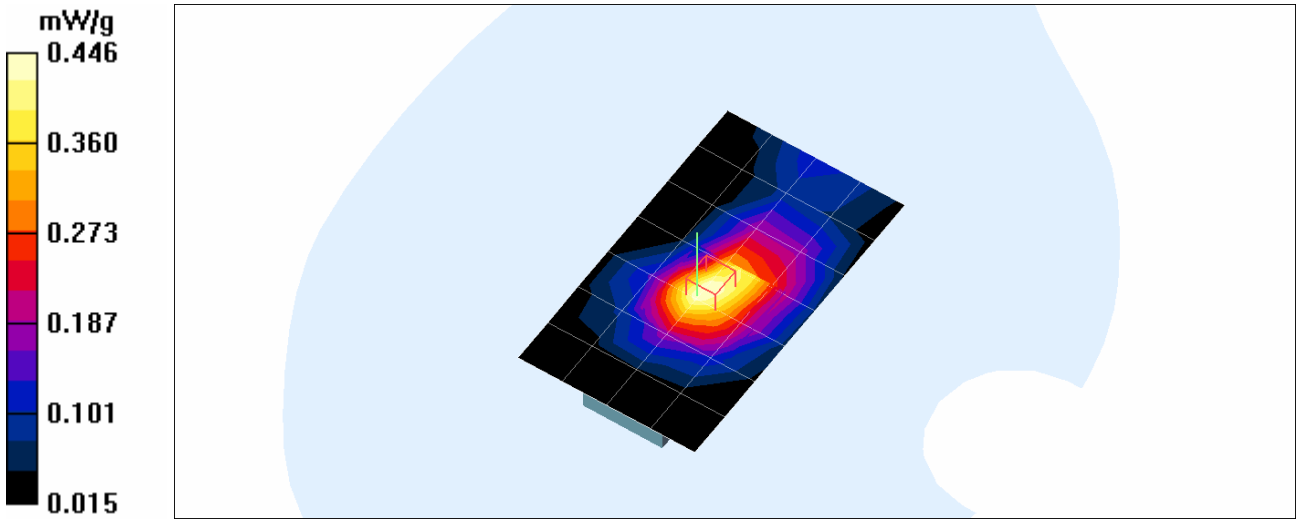
Reference Value = 13.5 V/m; Power Drift = 0.179 dB

Peak SAR (extrapolated) = 0.669 W/kg

SAR(1 g) = 0.323 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.446 mW/g



Date/Time: 2008-12-22 8:05:47

Test Laboratory: Nemko Korea File Name: C3900 Samsung NT-R70 Horizontal Laptop QPSK Middle CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2593 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2593.1 MHz; σ = 2.2 mho/m; ε_r = 50.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Samsung NT-R70 Horizontal Laptop QPSK Middle CH/Area Scan (5x8x1): Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.784 mW/g

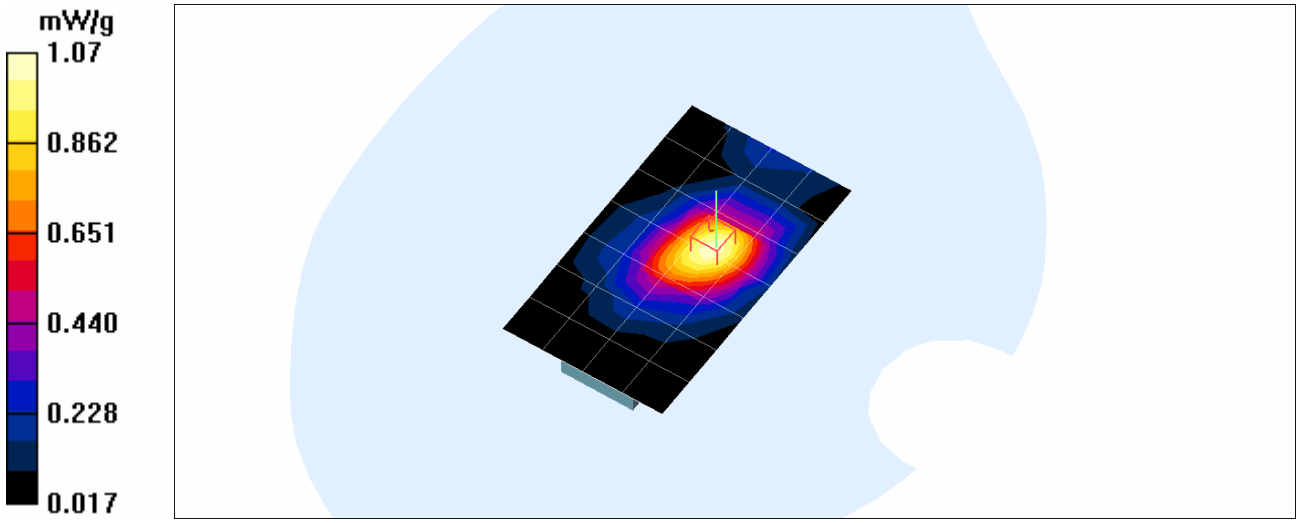
C3900 Samsung NT-R70 Horizontal Laptop QPSK Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 19.2 V/m; Power Drift = 0.029 dB

Peak SAR (extrapolated) = 1.53 W/kg

SAR(1 g) = 0.793 mW/g

Maximum value of SAR (measured) = 1.07 mW/g



Date/Time: 2008-12-22 8:44:05

Test Laboratory: Nemko Korea File Name: C3900 Samsung NT-R70 Horizontal Laptop QPSK High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.31 mho/m; ε_r = 50.5; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Samsung NT-R70 Horizontal Laptop QPSK High CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.894 mW/g

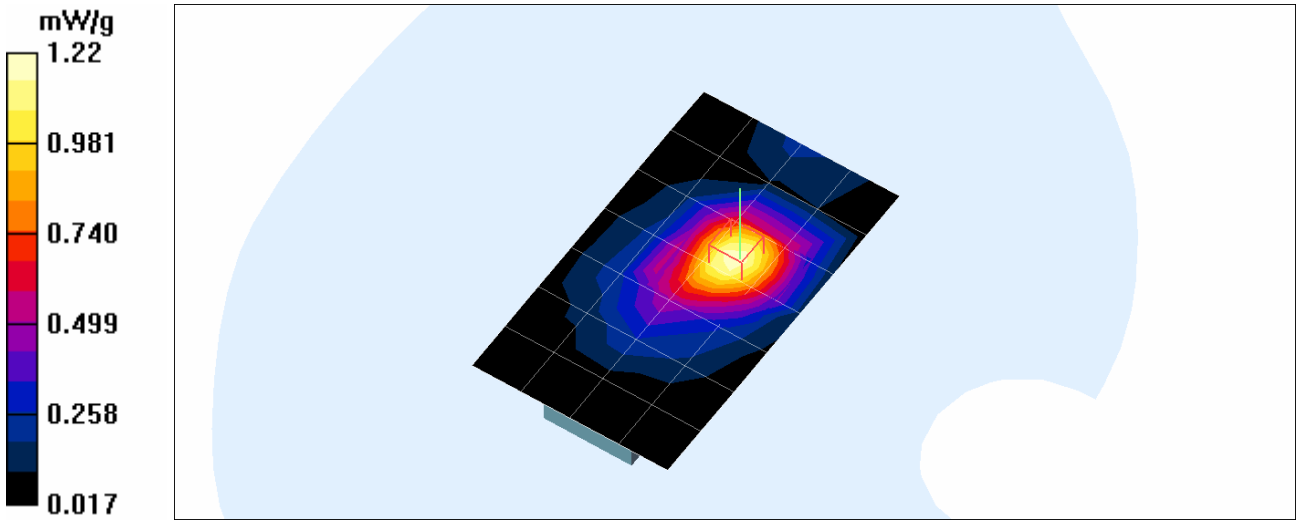
C3900 Samsung NT-R70 Horizontal Laptop QPSK High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 18.9 V/m; Power Drift = -0.007 dB

Peak SAR (extrapolated) = 1.79 W/kg

SAR(1 g) = 0.883 mW/g

Maximum value of SAR (measured) = 1.22 mW/g



Date/Time: 2008-12-22 4:34:46

Test Laboratory: Nemko Korea File Name: C3900 Samsung NT-X20E Vertical Laptop QPSK Low CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2501 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used (interpolated): f = 2501 MHz; σ = 2.08 mho/m; ε_r = 50.8; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Samsung NT-X20E Vertical Laptop QPSK Low CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.346 mW/g

C3900 Samsung NT-X20E Vertical Laptop QPSK Low CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

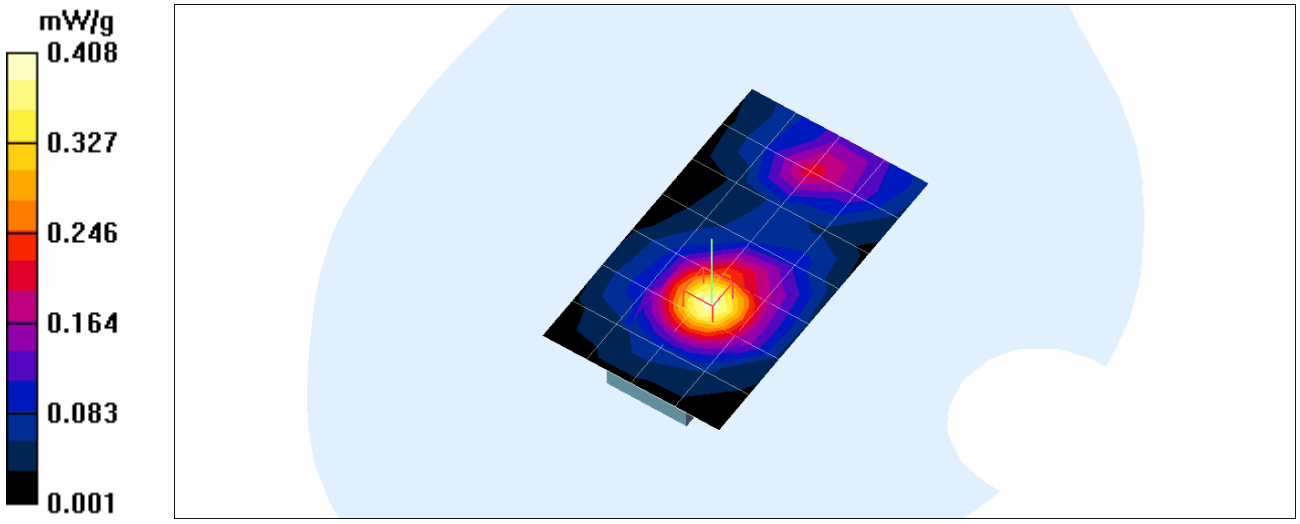
Reference Value = 7.09 V/m; Power Drift = -0.198 dB

Peak SAR (extrapolated) = 0.610 W/kg

SAR(1 g) = 0.288 mW/g

Info: Interpolated medium parameters used for SAR evaluation.

Maximum value of SAR (measured) = 0.408 mW/g



Date/Time: 2008-12-22 4:05:33

Test Laboratory: Nemko Korea File Name: C3900 Samsung NT-X20E Vertical Laptop QPSK Middle CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2593 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2593.1 MHz; σ = 2.2 mho/m; ε_r = 50.7; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Samsung NT-X20E Vertical Laptop QPSK Middle CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.719 mW/g

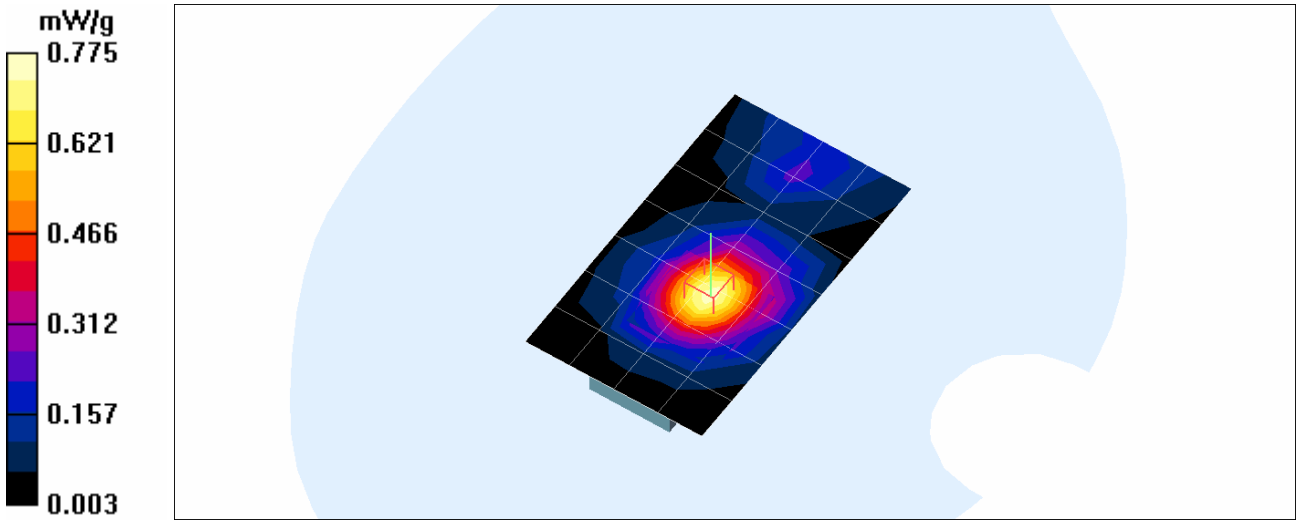
C3900 Samsung NT-X20E Vertical Laptop QPSK Middle CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 13.9 V/m; Power Drift = 0.099 dB

Peak SAR (extrapolated) = 1.15 W/kg

SAR(1 g) = 0.545 mW/g

Maximum value of SAR (measured) = 0.775 mW/g



Date/Time: 2008-12-22 4:51:23

Test Laboratory: Nemko Korea File Name: C3900 Samsung NT-X20E Vertical Laptop QPSK High CH.da4

DUT: C3900 Type: USB Modem Serial: 00000001 Applicant Name: Kyocera Wireless Corp.

Communication System: Wimax 10MHz Frequency: 2685 MHz

Duty Cycle: 1:3.21 Phantom section: Flat Section

Medium parameters used: f = 2685.25 MHz; σ = 2.31 mho/m; ε_r = 50.5; ρ = 1000 kg/m^3

DASY4 Configuration:

Probe: EX3DV4 - SN3682; ConvF(7.06, 7.06, 7.06); Calibrated: 2008-09-30

Sensor-Surface: 2.5mm (Mechanical Surface Detection)

Electronics: DAE4 Sn672; Calibrated: 2008-03-17

Phantom: SAM Phantom; Type: SAM; Serial: TP-1358

Measurement SW: DASY4, V4.7 Build 71; Postprocessing SW: SEMCAD, V1.8 Build 184

C3900 Samsung NT-X20E Vertical Laptop QPSK High CH/Area Scan (5x8x1):

Measurement grid: dx=15mm, dy=15mm

Maximum value of SAR (measured) = 0.629 mW/g

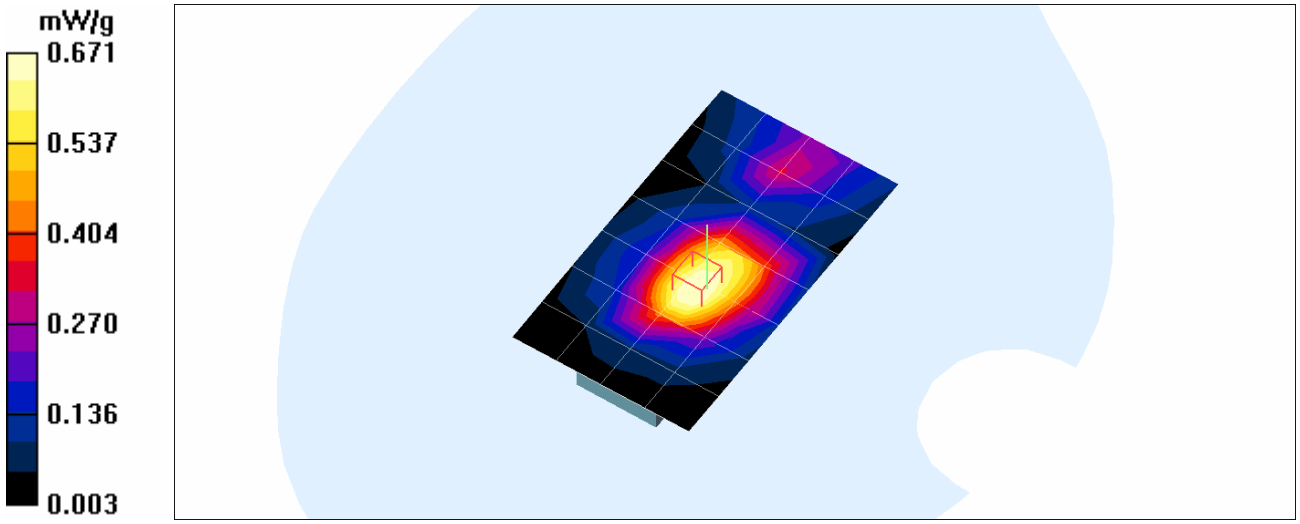
C3900 Samsung NT-X20E Vertical Laptop QPSK High CH/Zoom Scan (7x7x7)/Cube 0: Measurement grid: dx=5mm, dy=5mm, dz=5mm

Reference Value = 15.5 V/m; Power Drift = 0.102 dB

Peak SAR (extrapolated) = 1.08 W/kg

SAR(1 g) = 0.497 mW/g

Maximum value of SAR (measured) = 0.671 mW/g



9. Conclusion

The SAR evaluation indicates that the EUT complies with the RF radiation exposure limits according to 47 CFR 2.1093 safety limit under the general population environment of the FCC, with respect to all parameters subject to this test. The results and statements relate only to the item(s) tested.

10. SAR Test Equipment

Table 9.1 Test Equipment Calibration

Description	Model	Serial No.	Calibration Date	Calibration Interval
Staubli Robot Unit	RX60L	F05/51E1A1/A/01	N/A	N/A
Data Acquisition Electronics	DAE4	672	March.17. 2008	1 year
E-Field Probe	EX3DV4	3682	September.30. 2008	1 year
Electro-Optical Converter	EOC3	398	N/A	N/A
SAM Twin Phantom V4.0C	TP-1358	SM 00 T02 DA	N/A	N/A
Validation Dipole Antenna	D2450V2	774	July.16. 2008	2 year
Validation Dipole Antenna	D2600V2	1010	November.06.2007	2 year
MXA Signal Analyzer	N9020A	MY48010788	May.30.2008	1 year
PSA Series Spectrum Analyzer	E4440A	MY44303257	September.03.2008	1 year
PSA Series Spectrum Analyzer	E4440A	MY44022567	September.09.2008	1 year
Dielectric Probe Kit	85070E	MY44300121	N/A	N/A
Network Analyzer	8753ES	US39171172	February.27. 2008	1 year
Power Amplifier	5303075	509/0743	November.04.2008	1 year
Power Meter	437B	2912U01687	December.11.2008	1 year
Power Sensor	8481A	3318A83210	July.24.2008	1 year
Power Meter	ML2437A	97310060	May.27.2008	1 year
Power Sensor	MA2474A	3455	May.27.2008	1 year
Series Signal Generator	E4438C	US45092564	Febuary.27.2008	1 year
Series Signal Generator	E4436B	US39260598	November 11.2008	1 year
MXG Vector Signal Generator	N5182A	MY48180482	September.22.2008	1 year

Note:

The E-field probe was calibrated by SPEAG, by waveguide technique procedure. Dipole Validation measurement is performed by Nemkokorea Lab. before each test. The brain simulating material is calibrated by Nemkokorea using the dielectric probe system and network analyzer to determine the conductivity and permittivity (dielectric constant) of the brain-equivalent material.

11. References

[1] IEEE 1528-2003, “Recommended Practice for Determining the Peak Spatial-Average Specific Absorption Rate (SAR) in the Human Head from Wireless Communications Devices: Measurement Techniques, December 2003

[2] EN 50361:2001, “Basic standard fields from mobile phones (200MHz – 3 GHz)”, July 2001

[3] IEC 62209 - 1, “Specific Absorption Rate (SAR) in the frequency range of 300 MHz to 3 GHz

[4] IEC 62209 - 2, Draft Version 0.9, “Evaluation of Human Exposure to Radio Frequency Fields from Handheld and Body - Mounted Wireless Communication Devices in the Frequency Range of 30 MHz to 6 GHz: Human models, Instrumentation and Procedures
Part 2: Procedure to determine the Specific Absorption Rate (SAR) for … including accessories and multiple transmitters”, December 2004

[5] OET Bulletin 65, Supplement C, “Evaluating Compliance with FCC Guidelines for Human Exposure to Radio frequency Electromagnetic Fields”, Edition 01-01

[6] ANSI-PC63.19-2001, Draft 3.6, “American National Standard for Methods of Measurement of Compatibility between Wireless Communication Devices and Hearing Aids”, April 2005

Nemko

Appendix A

SAR Definition

Specific Absorption Rate (SAR) is defined as the time derivative (rate) of the incremental energy (*dU*) absorbed by (dissipated in) an incremental mass (*dm*) contained in a volume element (*dV*) of a given density (*p*). It is also defined as the rate of RF energy absorption pet unit mass at a point in an absorbing body (see Fig. A.1).

$$SAR = \frac{d}{dt}\left(\frac{dU}{dm}\right) = \frac{d}{dt}\left(\frac{dU}{pdv}\right)$$

Figure A.1 SAR Mathematical Equation

SAR is expressed in units of Watts per Kilogram (W/kg).

$$SAR = \sigma E^2 / p$$

Where :

σ = conductivity of the tissue-simulant material (S/m)
p = mass density of the tissue-simulant material (kg/m3)
E = Total RMS electric field strength (V/m)

Note:
The primary factors that control rate or energy absorption were found to be the wavelength of the incident field in relations to the dimensions and geometry of the irradiated organism, the orientation of the organism in relation to the polarity of field vectors, the presence of reflecting surfaces, and whether conductive contact is made by the organism with a ground plane.

Approved by:	Fin Bomholt	R&D Director	

Issued: August 14, 2008

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

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Accreditation No.: SCS 108

Client Nemko (Dymstec) **Certificate No: EX3-3682_Sep08**

CALIBRATION CERTIFICATE

Object	EX3DV4 - SN:3682
Calibration procedure(s)	QA CAL-01.v6 and QA CAL-23.v3 Calibration procedure for dosimetric E-field probes
Calibration date:	September 30, 2008
Condition of the calibrated item	In Tolerance

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-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41495277	1-Apr-08 (No. 217-00788)	Apr-09
Power sensor E4412A	MY41498087	1-Apr-08 (No. 217-00788)	Apr-09
Reference 3 dB Attenuator	SN: S5054 (3c)	1-Jul-08 (No. 217-00865)	Jul-09
Reference 20 dB Attenuator	SN: S5086 (20b)	31-Mar-08 (No. 217-00787)	Apr-09
Reference 30 dB Attenuator	SN: S5129 (30b)	1-Jul-08 (No. 217-00866)	Jul-09
Reference Probe ES3DV2	SN: 3013	2-Jan-08 (No. ES3-3013_Jan08)	Jan-09
DAE4	SN: 660	9-Sep-08 (No. DAE4-660_Sep08)	Sep-09

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
RF generator HP 8648C	US3642U01700	4-Aug-99 (in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585	18-Oct-01 (in house check Oct-07)	In house check: Oct-08

	Name	Function	Signature
Calibrated by:	Katja Pokovic	Technical Manager	
Approved by:	Niels Kuster	Quality Manager	

Issued: October 13, 2008

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
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 (no uncertainty required). DCP does not depend on frequency nor media.
- *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 EX3DV4

SN:3682

Manufactured: September 24, 2008
Calibrated: September 30, 2008

Calibrated for DASY Systems
(Note: non-compatible with DASY2 system!)

DASY - Parameters of Probe: EX3DV4 SN:3682

Sensitivity in Free Space[A]

Diode Compression[B]

NormX	**0.49** ± 10.1%	$\mu V/(V/m)^2$	DCP X	**89** mV
NormY	**0.48** ± 10.1%	$\mu V/(V/m)^2$	DCP Y	**91** mV
NormZ	**0.62** ± 10.1%	$\mu V/(V/m)^2$	DCP Z	**85** mV

Sensitivity in Tissue Simulating Liquid (Conversion Factors)

Please see Page 8.

Boundary Effect

TSL **900 MHz** **Typical SAR gradient: 5 % per mm**

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	8.0	4.2
SAR_{be} [%]	With Correction Algorithm	0.3	0.1

TSL **1810 MHz** **Typical SAR gradient: 10 % per mm**

Sensor Center to Phantom Surface Distance		**2.0 mm**	**3.0 mm**
SAR_{be} [%]	Without Correction Algorithm	7.8	4.0
SAR_{be} [%]	With Correction Algorithm	0.3	0.3

Sensor Offset

Probe Tip to Sensor Center	**1.0** mm

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%.

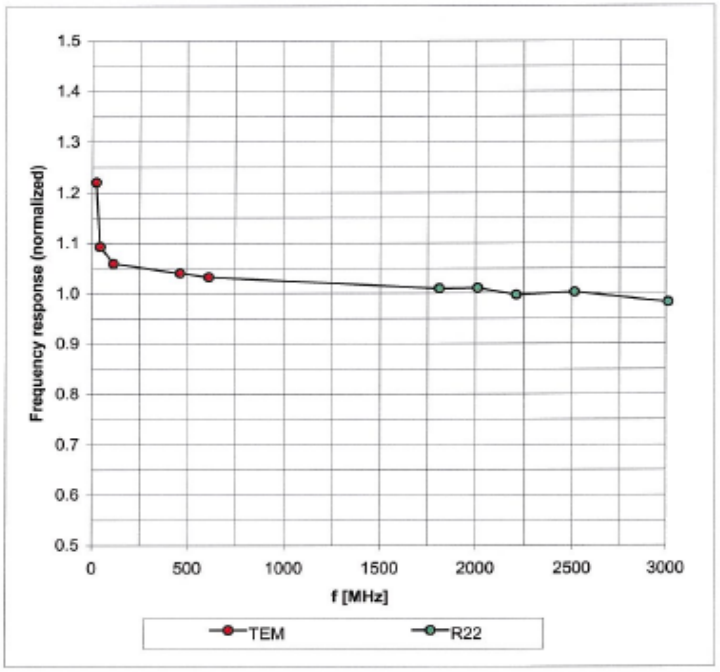
[A] The uncertainties of NormX,Y,Z do not affect the E^2-field uncertainty inside TSL (see Page 8).

[B] Numerical linearization parameter: uncertainty not required.

EX3DV4 SN:3682 September 30, 2008

Frequency Response of E-Field

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

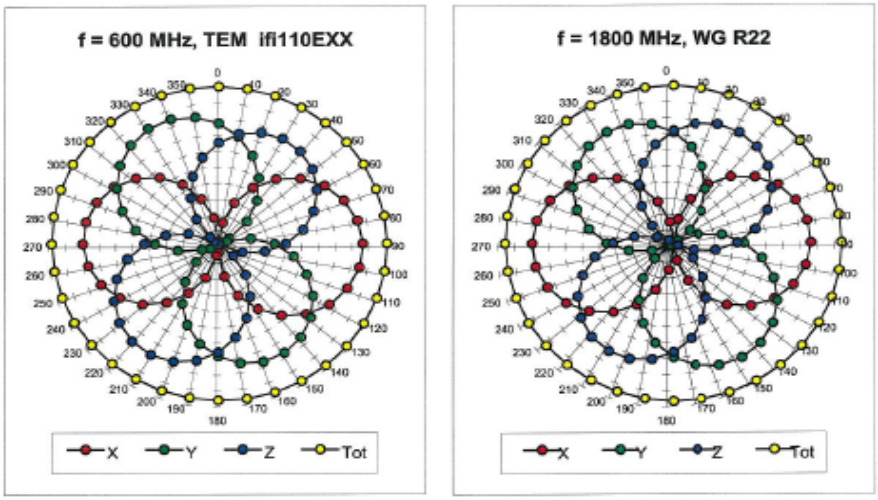


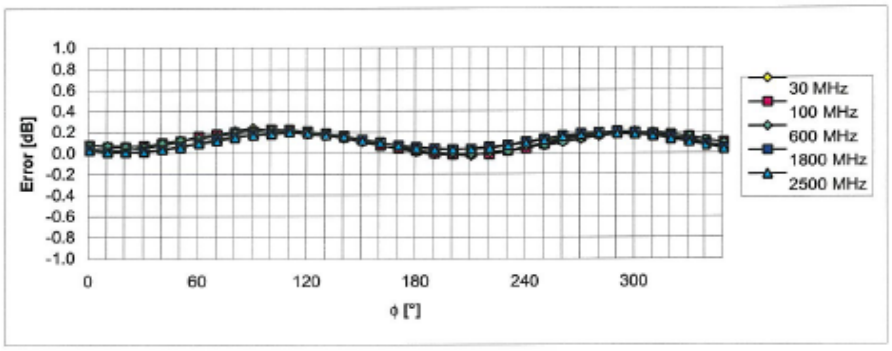
Uncertainty of Frequency Response of E-field: ± 6.3% (k=2)

Certificate No: EX3-3682_Sep08 Page 5 of 9

EX3DV4 SN:3682 September 30, 2008

Receiving Pattern (ϕ), ϑ = 0°





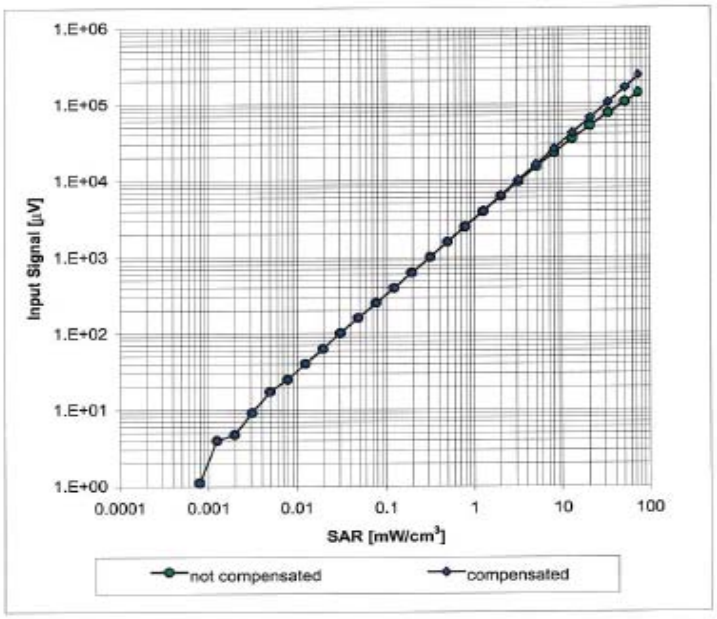
Uncertainty of Axial Isotropy Assessment: ± 0.5% (k=2)

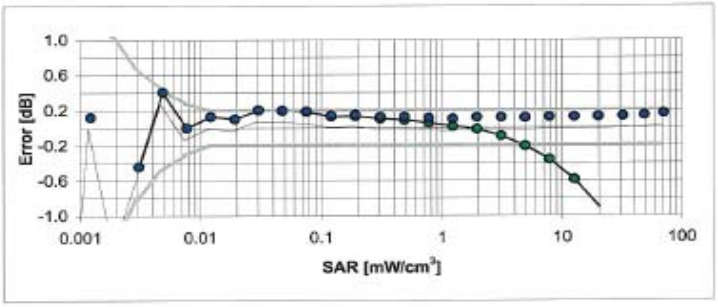
Certificate No: EX3-3682_Sep08 Page 6 of 9

EX3DV4 SN:3682 September 30, 2008

Dynamic Range f(SAR_{head})

(Waveguide R22, f = 1800 MHz)



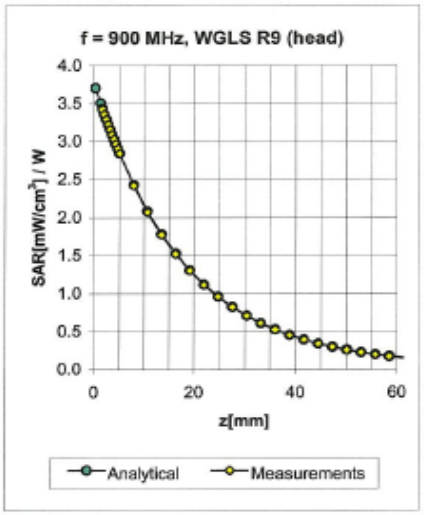


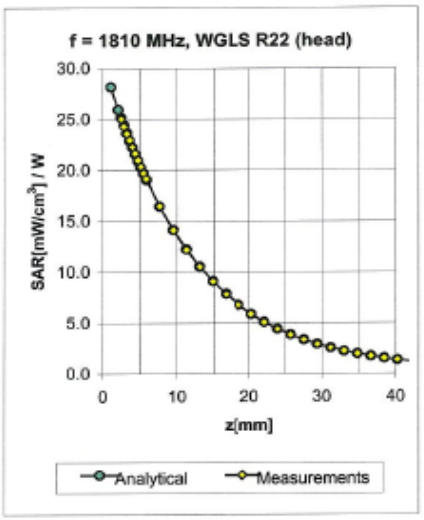
Uncertainty of Linearity Assessment: ± 0.6% (k=2)

Certificate No: EX3-3682_Sep08 Page 7 of 9

EX3DV4 SN:3682 September 30, 2008

Conversion Factor Assessment





f [MHz]	Validity [MHz][C]	TSL	Permittivity	Conductivity	Alpha	Depth	ConvF Uncertainty
900	± 50 / ± 100	Head	41.5 ± 5%	0.97 ± 5%	0.69	0.62	9.37 ± 11.0% (k=2)
1810	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.39	0.81	7.96 ± 11.0% (k=2)
1950	± 50 / ± 100	Head	40.0 ± 5%	1.40 ± 5%	0.41	0.79	7.79 ± 11.0% (k=2)
2450	± 50 / ± 100	Head	39.2 ± 5%	1.80 ± 5%	0.19	1.20	7.37 ± 11.0% (k=2)
2600	± 50 / ± 100	Head	39.0 ± 5%	1.96 ± 5%	0.24	1.03	7.33 ± 11.0% (k=2)
900	± 50 / ± 100	Body	55.0 ± 5%	1.05 ± 5%	0.56	0.74	9.33 ± 11.0% (k=2)
1900	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.15	1.27	7.69 ± 11.0% (k=2)
1950	± 50 / ± 100	Body	53.3 ± 5%	1.52 ± 5%	0.19	1.15	7.79 ± 11.0% (k=2)
2450	± 50 / ± 100	Body	52.7 ± 5%	1.95 ± 5%	0.32	0.94	7.15 ± 11.0% (k=2)
2600	± 50 / ± 100	Body	52.5 ± 5%	2.16 ± 5%	0.36	0.91	7.06 ± 11.0% (k=2)

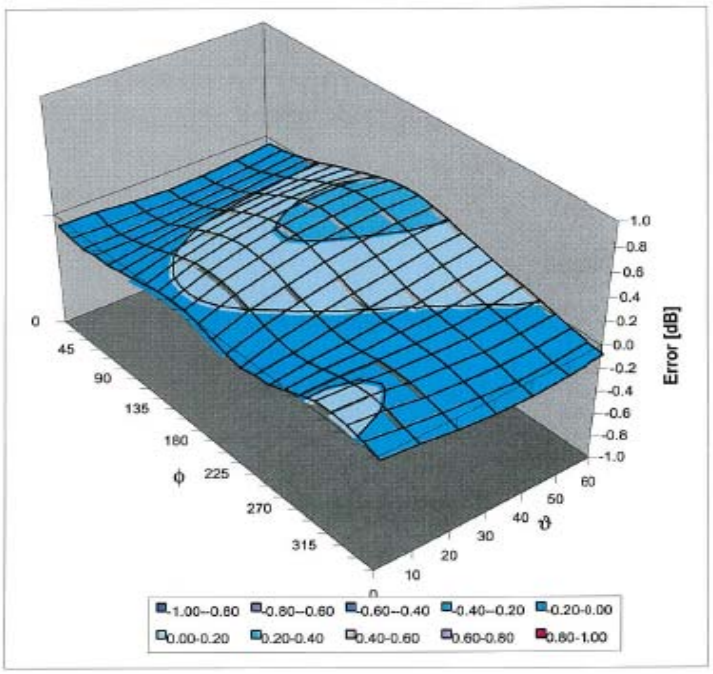
[C] The validity of ± 100 MHz only applies for DASY v4.4 and higher (see Page 2). The uncertainty is the RSS of the ConvF uncertainty at calibration frequency and the uncertainty for the indicated frequency band.

Certificate No: EX3-3682_Sep08 Page 8 of 9

EX3DV4 SN:3682 September 30, 2008

Deviation from Isotropy in HSL

Error (ϕ, ϑ), f = 900 MHz



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

Certificate No: EX3-3682_Sep08 Page 9 of 9

Appendix C : Dipole Calibrations

Calibration Laboratory of
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Zeughausstrasse 43, 8004 Zurich, Switzerland

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Accreditation No.: SCS 108

Client Nemko (Dymstec)

Certificate No: D2600V2-1010_Nov07

CALIBRATION CERTIFICATE

Object	D2600V2 - SN: 1010
Calibration procedure(s)	QA CAL-05.v7 Calibration procedure for dipole validation kits
Calibration date:	November 06, 2007
Condition of the calibrated item	In Tolerance

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 (Calibrated by, Certificate No.)	Scheduled Calibration
Power meter EPM-442A	GB37480704	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Power sensor HP 8481A	US37292783	04-Oct-07 (METAS, No. 217-00736)	Oct-08
Reference 20 dB Attenuator	SN: 5086 (20g)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference 10 dB Attenuator	SN: 5047.2 (10r)	07-Aug-07 (METAS, No 217-00718)	Aug-08
Reference Probe ES3DV2	SN: 3025	26-Oct-07 (SPEAG, No. ES3-3025_Oct07)	Oct-08
DAE4	SN: 601	30-Jan-07 (SPEAG, No. DAE4-601_Jan07)	Jan-08

Secondary Standards	ID #	Check Date (in house)	Scheduled Check
Power sensor HP 8481A	MY41092317	18-Oct-02 (SPEAG, in house check Oct-07)	In house check: Oct-08
RF generator R&S SMT-06	100005	4-Aug-99 (SPEAG, in house check Oct-07)	In house check: Oct-09
Network Analyzer HP 8753E	US37390585 S4206	18-Oct-01 (SPEAG, in house check Oct-07)	In house check: Oct-08

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

Issued: November 20, 2007

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

Certificate No: D2600V2-1010_Nov07 Page 1 of 6

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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 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.

Measurement Conditions

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

DASY Version	DASY4	V4.7
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	2600 MHz ± 1 MHz	

Head TSL parameters

The following parameters and calculations were applied.

	Temperature	**Permittivity**	**Conductivity**
Nominal Head TSL parameters	22.0 °C	39.0	1.96 mho/m
Measured Head TSL parameters	(22.0 ± 0.2) °C	37.8 ± 6 %	1.92 mho/m ± 6 %
Head TSL temperature during test	(22.0 ± 0.2) °C	-------	------

SAR result with Head TSL

SAR averaged over 1 cm³ (1 g) of Head TSL	condition	
SAR measured	250 mW input power	14.3 mW / g
SAR normalized	normalized to 1W	57.2 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**56.8 mW / g ± 17.0 % (k=2)**

SAR averaged over 10 cm³ (10 g) of Head TSL	condition	
SAR measured	250 mW input power	6.38 mW / g
SAR normalized	normalized to 1W	25.5 mW / g
SAR for nominal Head TSL parameters [1]	normalized to 1W	**25.3 mW / g ± 16.5 % (k=2)**

[1] Correction to nominal TSL parameters according to d), chapter "SAR Sensitivities"

Appendix

Antenna Parameters with Head TSL

Impedance, transformed to feed point	49.4 Ω - 4.9 jΩ
Return Loss	– 26.1 dB

General Antenna Parameters and Design

Electrical Delay (one direction)	1.149 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	April 12, 2007

DASY4 Validation Report for Head TSL

Date/Time: 06.11.2007 17:07:53

Test Laboratory: SPEAG, Zurich, Switzerland

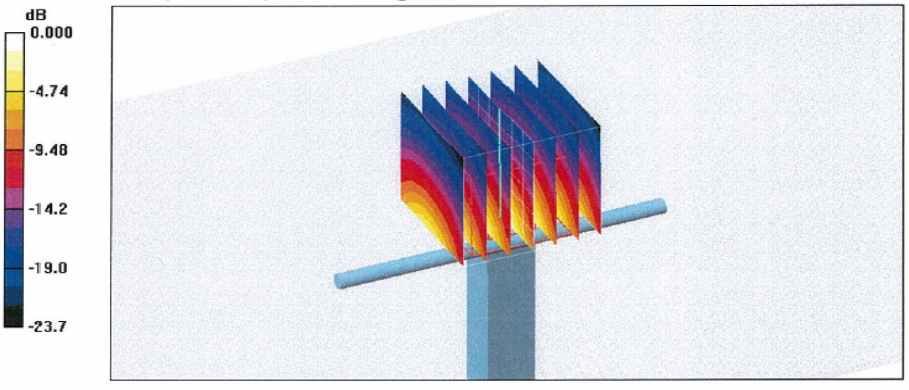
DUT: Dipole 2600 MHz; Type: D2600V2; Serial: D2600V2 - SN1010

Communication System: CW-2600; Frequency: 2600 MHz; Duty Cycle: 1:1
Medium: HSL U10 BB;
Medium parameters used: f = 2600 MHz; σ = 1.92 mho/m; ε_r = 37.8; ρ = 1000 kg/m^3
Phantom section: Flat Section
Measurement Standard: DASY4 (High Precision Assessment)

DASY4 Configuration:

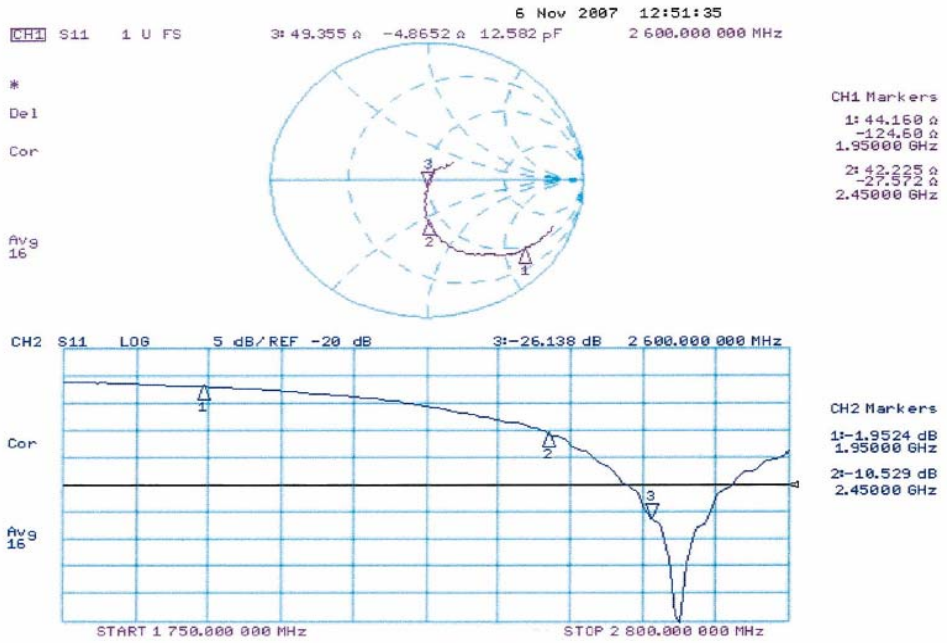
- Probe: ES3DV2 - SN3025 (HF); ConvF(4.24, 4.24, 4.24); Calibrated: 26.10.2007
- Sensor-Surface: 3mm (Mechanical Surface Detection)
- Electronics: DAE4 Sn601; Calibrated: 30.01.2007
- Phantom: Flat Phantom 5.0 (back); Type: QD000P50AA; ;
- Measurement SW: DASY4, V4.7 Build 55; Postprocessing SW: SEMCAD, V1.8 Build 172

Pin = 250 mW; d = 10 mm/Zoom Scan (dist=3mm) (7x7x7)/Cube 0:
Measurement grid: dx=5mm, dy=5mm, dz=5mm
Reference Value = 92.8 V/m; Power Drift = -0.023 dB
Peak SAR (extrapolated) = 30.8 W/kg
SAR(1 g) = 14.3 mW/g; SAR(10 g) = 6.38 mW/g
Maximum value of SAR (measured) = 18.3 mW/g



0 dB = 18.3mW/g

Impedance Measurement Plot for Head TSL



Certificate No: D2600V2-1010_Nov07 Page 6 of 6

Appendix D : Photographs of 15 cm Liquid depth

Appendix E : Photographs of EUT

- Please refer to SAR Test Setup Photographs and Photographs of EUT -