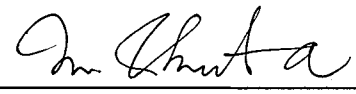
SAR EVALUATION REPORT

Report No. : 24EE0063-HO-3

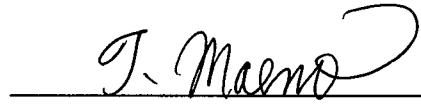
Applicant	:	**Sony Corporation**
Type of Equipment	:	**Wireless LAN Module**
Model No.	:	**IRF303J**
FCC ID	:	**AK8IRF303J**
Test standard	:	**FCC47CFR 2.1093** **FCC OET Bulletin 65, Supplement C**
Test Result	:	**Complied**
Max SAR Measured	:	**0.533W/kg(Body, 2462MHz)**

1. This test report shall not be reproduced except full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with above regulation. We hereby certify that the data contain a true representation of the SAR profile.
4. The test results in this test report are traceable to the national or international standards.

Date of test : January 17 and 18

Tested by : 

Miyo Ikuta
EMC Lab.Head Office

Approved by : 

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SECTION 1 : Client information

Company Name	:	Sony Corporation
Brand Name	:	SONY
Address	:	Gate City Osaki West Tower Osaki East Tec. 1-11-1 Osaki Shinagawa-ku, Tokyo141-0032, Japan
Telephone Number	:	81-3-5435-3977
Facsimile Number	:	81-3-5435-3963
Contact Person	:	Masaki Nishimura

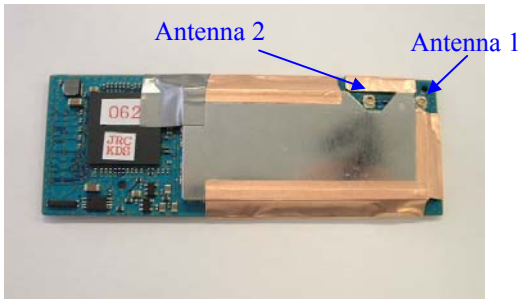
SECTION 2 : Equipment under test

2.1 Identification of EUT

APPLICANT	:	Sony Corporation
Type of Equipment	:	Wireless LAN Module
Model No.	:	IRF303J
Serial No.	:	062
Country of Manufacture	:	Japan
Receipt Date of Sample	:	January 17, 2005
Condition of EUT	:	Production prototype (Not for sale: This sample is equivalent to mass-produced items.)
Category Identified	:	Portable device

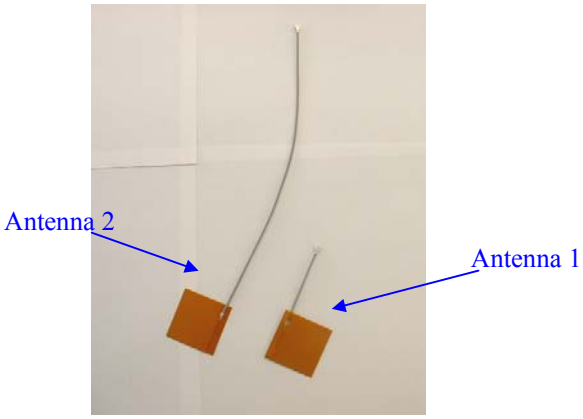
2.2 Product description of EUT (Module)

Tx Frequency	:	2412-2462MHz(802.11b/g)
Modulation	:	DSSS,OFDM
Rating	:	DC3.3V / 0.81A
Max.Output Power Tested	:	17.99dBm Peak Conducted



2.3 Product description of EUT (Antenna)

Antenna Type	:	Film Antenna
Antenna Gain	:	1.9dBi (Max)



SECTION 3 : Requirements for compliance testing defined by the FCC

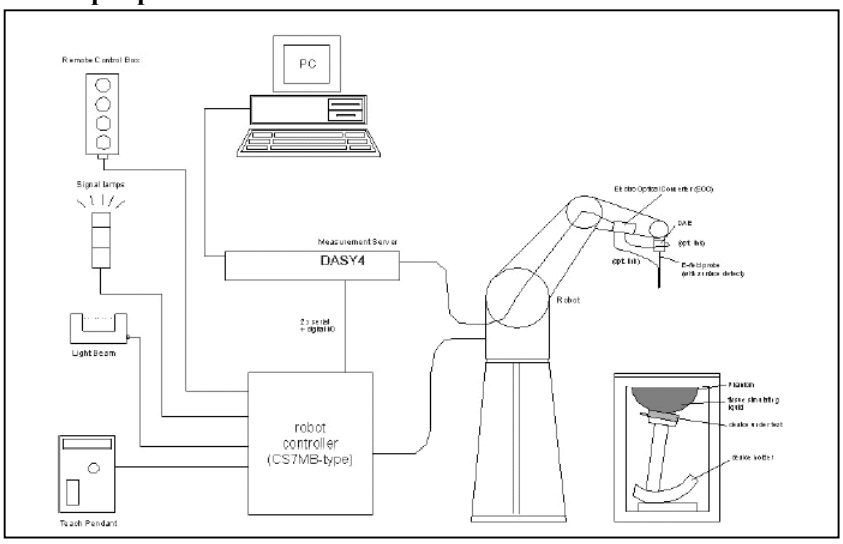
The US Federal Communications Commission has released the report and order “Guidelines for Evaluating the Environmental Effects of RF Radiation", ET Docket No. 93-62 in August 1996. The order requires routine SAR evaluation prior to equipment authorization of portable transmitter devices, including portable telephones. For consumer products, the applicable limit is 1.6 mW/g for an uncontrolled environment and 8.0 mW/g for an occupational/controlled environment as recommended by the ANSI/IEEE standard C95.1-1992. According to the Supplement C of OET Bulletin 65 “Evaluating Compliance with FCC Guide-lines for Human Exposure to Radio frequency Electromagnetic Fields", released on Jun 29, 2001 by the FCC, the device should be evaluated at
maximum output power (radiated from the antenna) under “worst-case” conditions for normal or intended use, incorporating normal antenna operating positions, device peak performance frequencies and positions for maximum RF energy coupling.

1 Specific Absorption Rate (SAR) is a measure of the rate of energy absorption due to exposure to an RF transmitting source (wireless portable device).
2 IEEE/ANSI Std. C95.1-1992 limits are used to determine compliance with FCC ET Docket 93-62.

SECTION 4 : Dosimetry assessment setup

These measurements were performed with the automated near-field scanning system DASY4 from Schmid & Partner Engineering AG (SPEAG). The system is based on a high precision robot (working range greater than 0.9 m), which positions the probes with a positional repeatability of better than +/- 0.02 mm. Special E- and H-field probes have been developed for measurements close to material discontinuity, the sensors of which are directly loaded with a Schottky diode and connected via highly resistive lines to the data acquisition unit. The SAR measurements were conducted with the dosimetry probe ET3DV6, SN: 1685 (manufactured by SPEAG), designed in the classical triangular configuration and optimized for dosimetric evaluation. The probe has been calibrated according to the procedure described in [2] with accuracy of better than +/-10%. The spherical isotropy was evaluated with the procedure described in [3] and found to be better than +/-0.25 dB. The phantom used was the
SAM Twin Phantom as described in FCC supplement C, IEEE P1528 and CENELEC EN50361.

4.1 Configuration and peripherals



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

1. A standard high precision 6-axis robot (Stäubli RX family) with controller and software.
   An arm extension for accommodating the data acquisition electronics (DAE).

2. A dosimetric probe, i.e., an isotropic E-field probe optimized and calibrated for usage in tissue simulating liquid. The probe is equipped with an optical surface detector system.

3. A data acquisition electronic (DAE), which performs the signal amplification, signal multiplexing, AD-conversion, offset measurements, mechanical surface detection, collision detection, etc. The unit is battery powered with standard or rechargeable batteries. The signal is optically transmitted to the EOC.

4. The Electro-optical converter (EOC) performs the conversion between optical and electrical of the signals for the digital communication to the DAE and for the analog signal from the optical surface detection.
   The EOC is connected to the measurement server.

5. The function of the measurement server is to perform the time critical tasks such as signal filtering, control of the robot operation and fast movement interrupts.

6. A probe alignment unit which improves the (absolute) accuracy of the probe positioning.

7. A computer operating Windows 2000.

8. DASY4 software.

9. Remote control with teaches pendant and additional circuitry for robot safety such as warning lamps, etc.

10. The SAM twin phantom enabling testing left-hand and right-hand usage.

11. The device holder for handheld mobile phones.

12. Tissue simulating liquid mixed according to the given recipes.

13. Validation dipole kits allowing to validate the proper functioning of the system.

4.2 System components

4.2.1 ET3DV6 Probe Specification

Construction:
Symmetrical design with triangular core
Built-in optical fiber for surface detection System
Built-in shielding against static charges
PEEK enclosure material (resistant to organic solvents, e.g., glycol ether)

Calibration:
Basic Broad Band calibration in air from 10 MHz to 2.5 GHz
In brain and muscle simulating tissue at
Frequencies of 450 MHz, 900 MHz, 1.8 GHz and 2.45GHz (accuracy +/-8%)

Frequency:
10 MHz to 3GHz; Linearity: +/-0.2 dB
(30 MHz to 3 GHz)

Directivity:
+/-0.2 dB in brain tissue (rotation around probe axis)
+/-0.4 dB in brain tissue (rotation normal probe axis)

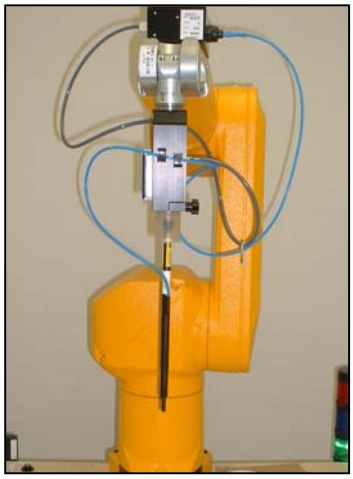
Dynamic Range:
5 mW/g to > 100 mW/g;Linearity: +/-0.2 dB

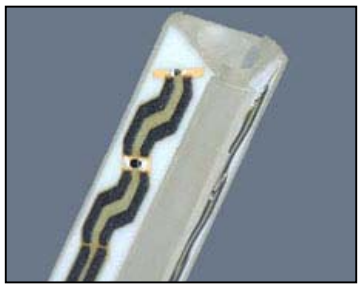
Optical Surface Detection:
+/-0.2 mm repeatability in air and clear liquids over diffuse reflecting surfaces.

Dimensions:
Overall length: 330 mm (Tip: 16 mm)
Tip length: 16 mm
Body diameter: 12 mm (Body: 12 mm)

Tip diameter: 6.8 mm
Distance from probe tip to dipole centers: 2.7 mm

Application:
General dosimetric up to 3 GHz
Compliance tests of mobile phones
Fast automatic scanning in arbitrary phantoms

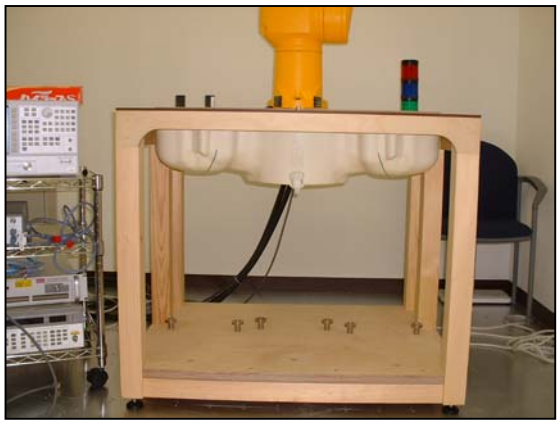




ET3DV6 E-field Probe

4.2.2 SAM Phantom

Construction:
The shell corresponds to the specifications of the Specific Anthropomorphic Mannequin (SAM) phantom defined in IEEE 1528-200X, CENELEC EN 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 manually teaching three points with the robot.
Shell Thickness:
2 +/-0.2 mm
Filling Volume:
Approx. 25 liters
Dimensions:
(H x L x W): 810 x 1000 x 500 mm



SAM Phantom

4.2.3 Device Holder for Transmitters

In combination with the SAM Twin Phantom V4.0, the Mounting Device enables the rotation of the mounted transmitter
in spherical coordinates whereby the rotation points is the ear opening. The devices can be easily, accurately, and repeatedly positioned according to the FCC and CENELEC specifications. 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 produced infinite number of configurations.
To produce the worst-case condition (the hand absorbs antenna output power), the hand is omitted during the tests.

Device holder couldn't be used at this SAR measurement.

Device Holder

SECTION 5 : Test system specifications

Robot RX60L

Number of Axes	:	6
Payload	:	1.6 kg
Reach	:	800mm
Repeatability	:	+/-0.025mm
Control Unit	:	CS7M
Programming Language	:	V+
Manuafacture	:	Stäubli Unimation Corp. Robot Model: RX60

DASY4 Measurement sever

Features	:	166MHz low power Pentium MMX 32MB chipdisk and 64MB RAM Serial link to DAE (with watchdog supervision) 16 Bit A/D converter for surface detection system Two serial links to robot (one for real-time communication which is supervised by watchdog) Ethernet link to PC (with watchdog supervision) Emergency stop relay for robot safety chainTwo expansion slots for future applications
Manufacture	:	Schimid & Partner Engineering AG

Data Acquisition Electronic (DAE)

Features	:	Signal amplifier, multiplexer, A/D converter and control logic Serial optical link for communication with DASY4 embedded system (fully remote controlled) 2 step probe touch detector for mechanical surface detection and emergency robot stop (not in -R version)
Measurement Range	:	1 µV to > 200 mV (16 bit resolution and two range settings: 4mV, 400mV)
Input Offset voltage	:	< 1 µV (with auto zero)
Input Resistance	:	200 MΩ
Battery Power	:	> 10 h of operation (with two 9 V battery)
Dimension	:	60 x 60 x 68 mm
Manufacture	:	Schimid & Partner Engineering AG

Software

Item	:	Dosimetric Assesment System DASY4
Type No.	:	SD 000 401A, SD 000 402A
Software version No.	:	4.1
Manufacture / Origin	:	Schimid & Partner Engineering AG

E-Field Probe

Model	:	ET3DV6
Serial No.	:	1685
Construction	:	Triangular core fiber optic detection system
Frequency	:	10 MHz to 6 GHz
Linearity	:	+/-0.2 dB (30 MHz to 3 GHz)
Manufacture	:	Schimid & Partner Engineering AG

Phantom

Type	:	SAM Twin Phantom V4.0
Shell Material	:	Fiberglass
Thickness	:	2.0 +/-0.2 mm
Volume	:	Approx. 25 liters
Manufacture	:	Schimid & Partner Engineering AG

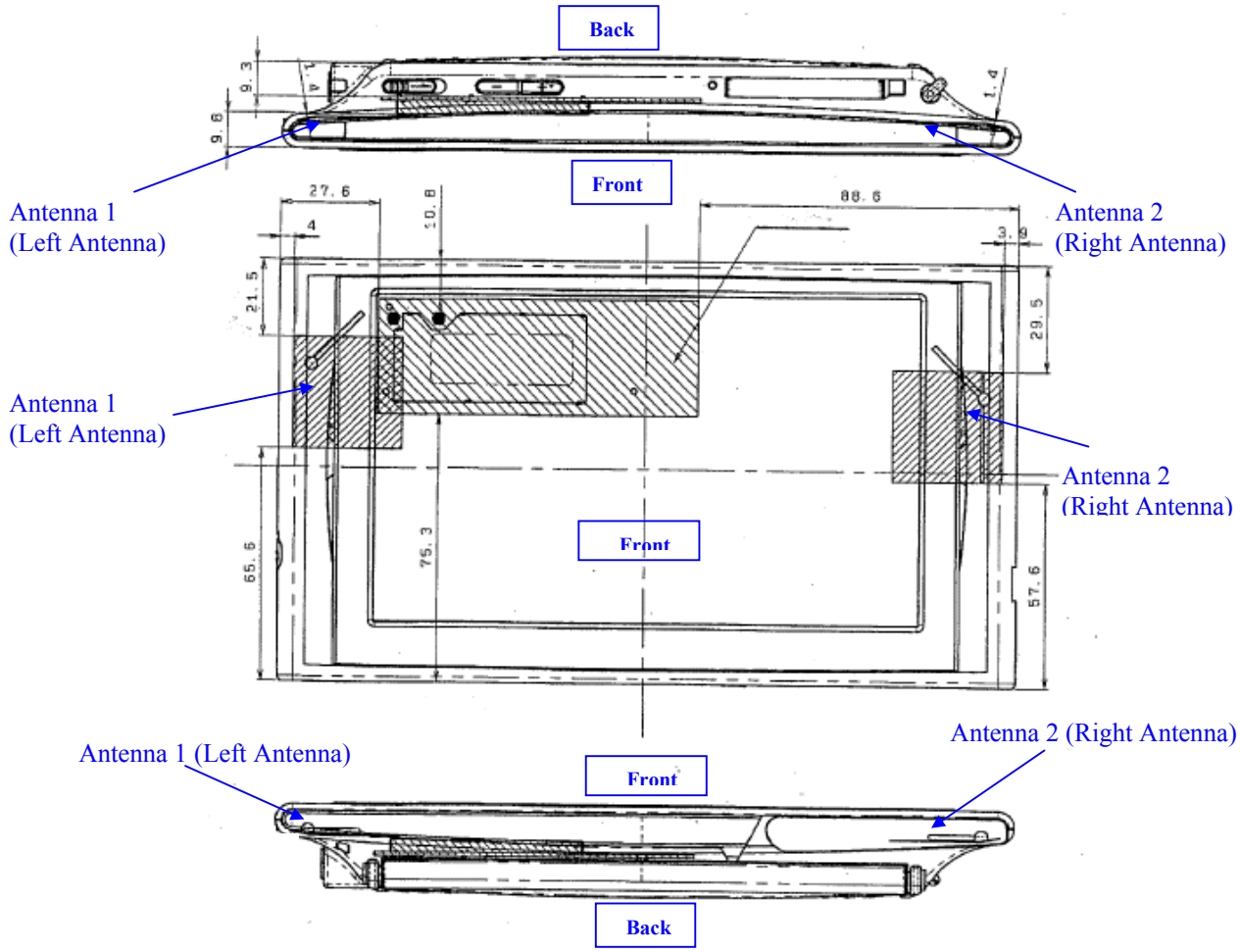
SECTION 6 : Measurement outline

We tested with this EUT was inserted into the limited host device. (Location Free TV, model : LF-X5)
The test operation of the EUT was controlled by the PC. Therefore, we tested connecting the PC and the Location Free TV which inserted in the EUT.

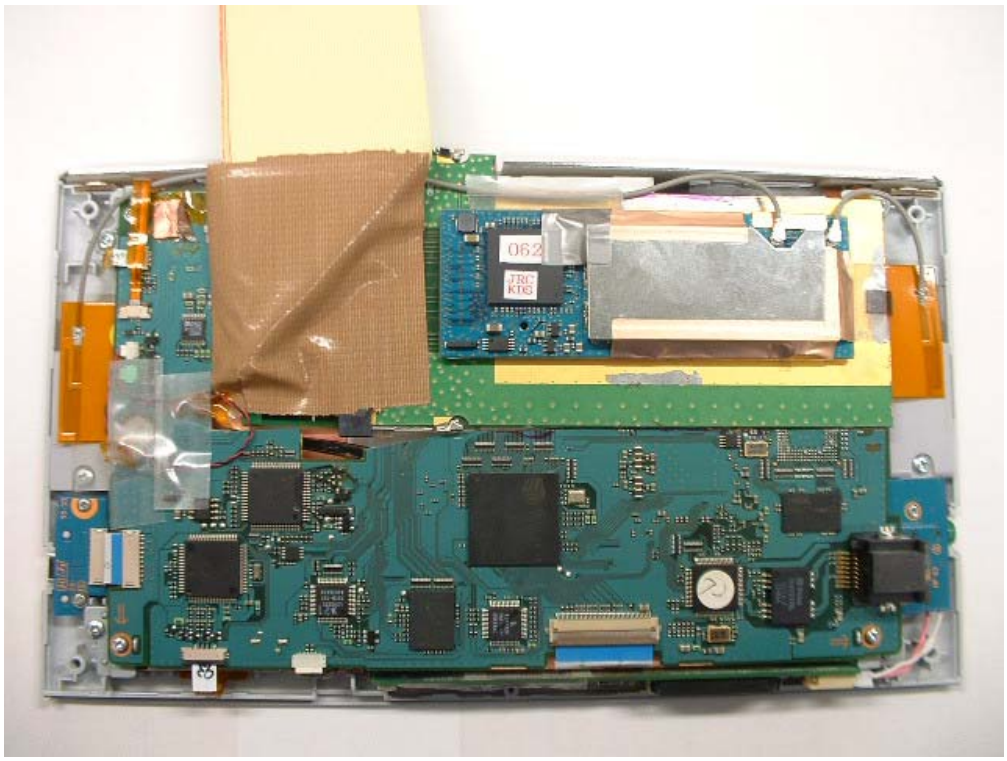
The detail of the Location Free TV that we used for SAR testing is showing in the following.
The shortest distance between the surface of this Location Free TV and antenna is 1.4 mm.

6.1 Information of host device

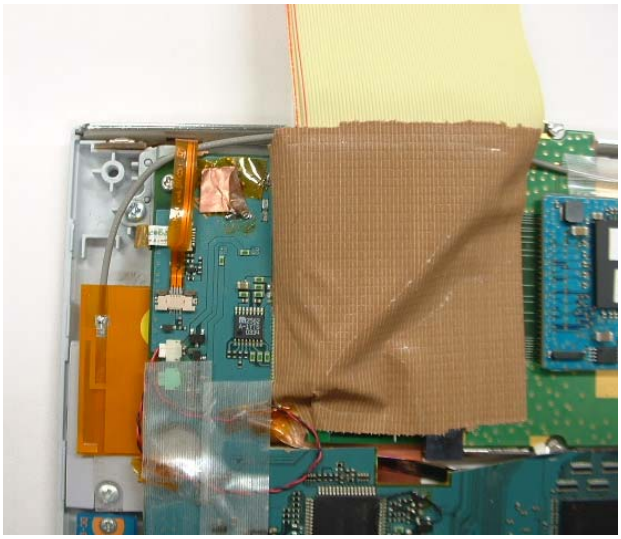
Type of Equipment	:	Location Free TV
Model name	:	LF-X5
Manufacture	:	SONY
Position of Antenna of berrow	:	See figure and photograph of right



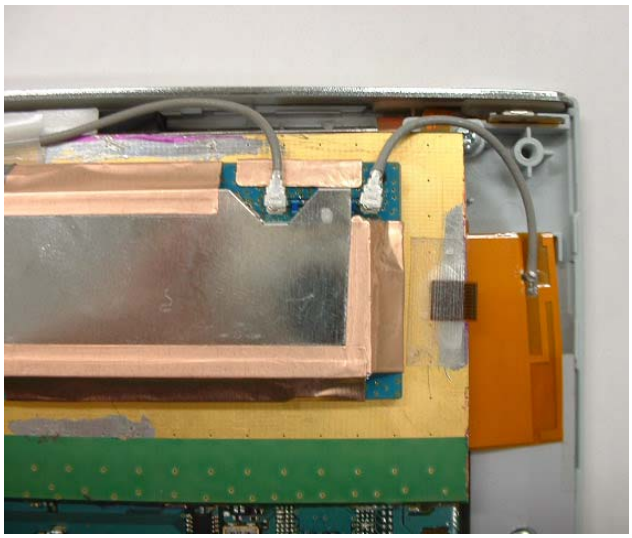
Back view



Antenna 2 (Right Antenna)



Antenna 1 (Left Antenna)



SECTION 7 : Test setup of EUT

7.1 Photographs of test setup

This EUT is inserted into the Location Free TV.(model : LF-X5).
When users operate or carry the Location Free TV, it could be considered to touch or get close to their bodies. In order to assume this situation, we performed the test at the following positions. Please refer to "APPENDIX 1" for more details.

1.Left Front : The test was performed in touch with left front surface (ANT1) of the Location Free TV to the flat section of SAM phantom.

2.Right Front : The test was performed in touch with right front surface (ANT2) of the Location Free TV to the flat section of SAM phantom.

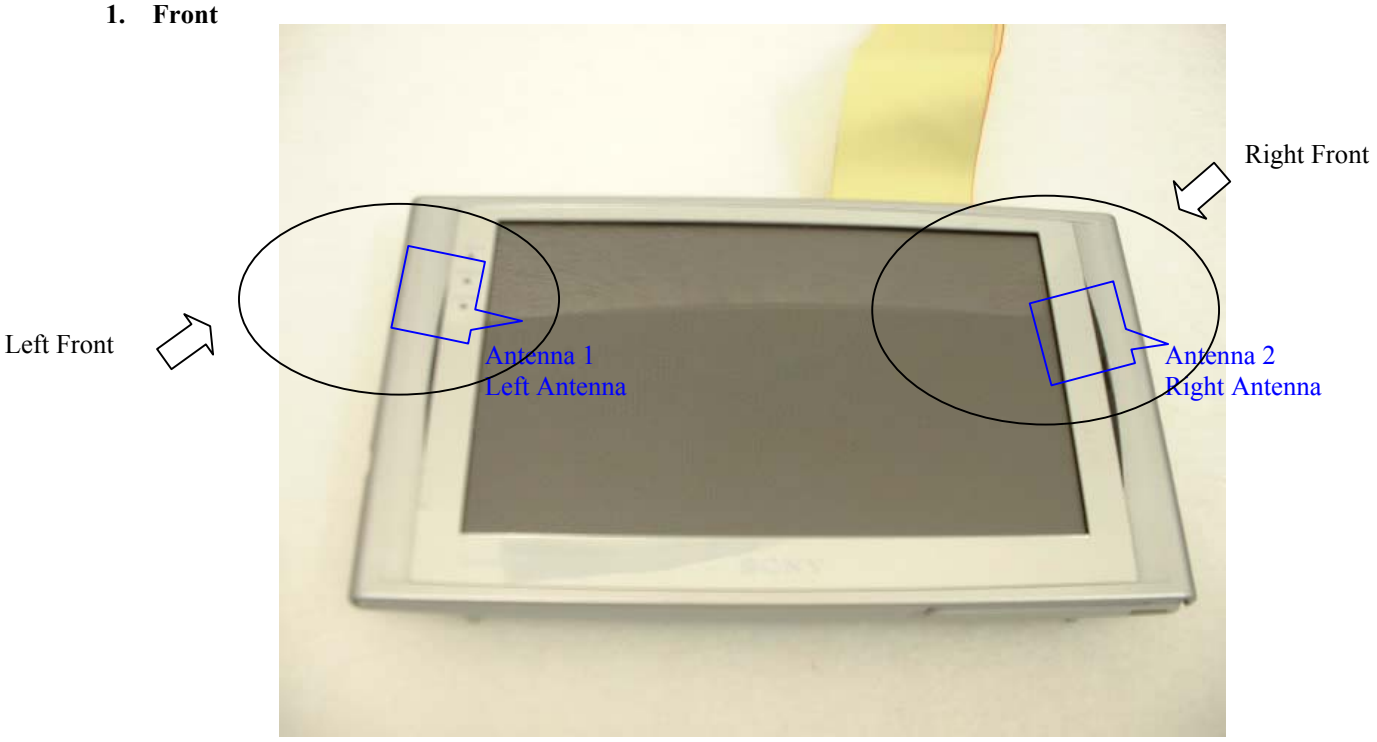
3.Left Side : The test was performed in touch with left side (ANT1) of the Location Free TV to the flat section of SAM phantom.

4.Right Side : The test was performed in touch with right side (ANT2) of the Location Free TV to the flat section of SAM phantom.

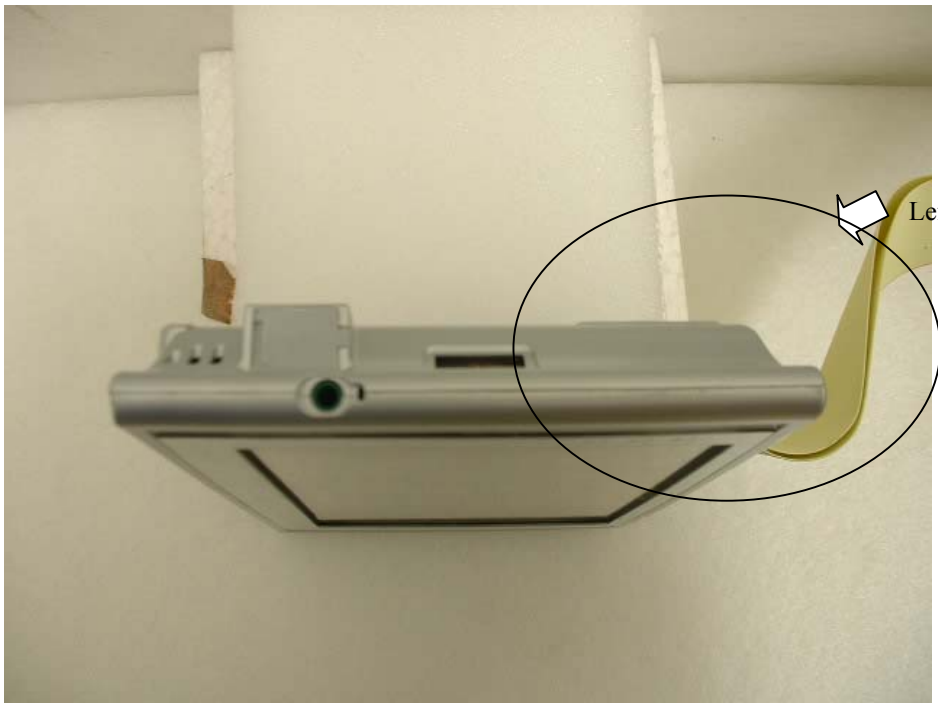
5.Left Back : The test was performed in touch with left back surface (ANT1)of the Location Free TV to the flat section of SAM phantom

6.Right Back : The test was performed in touch with right back surface (ANT2) of the Location Free TV to the flat section of SAM phantom.

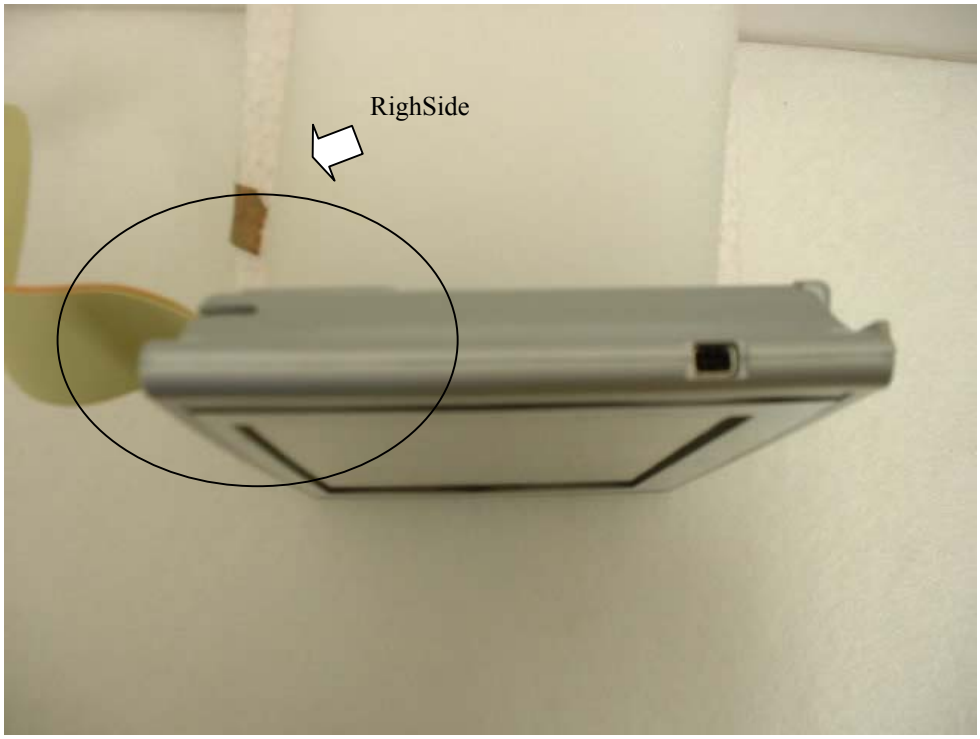
1. Front



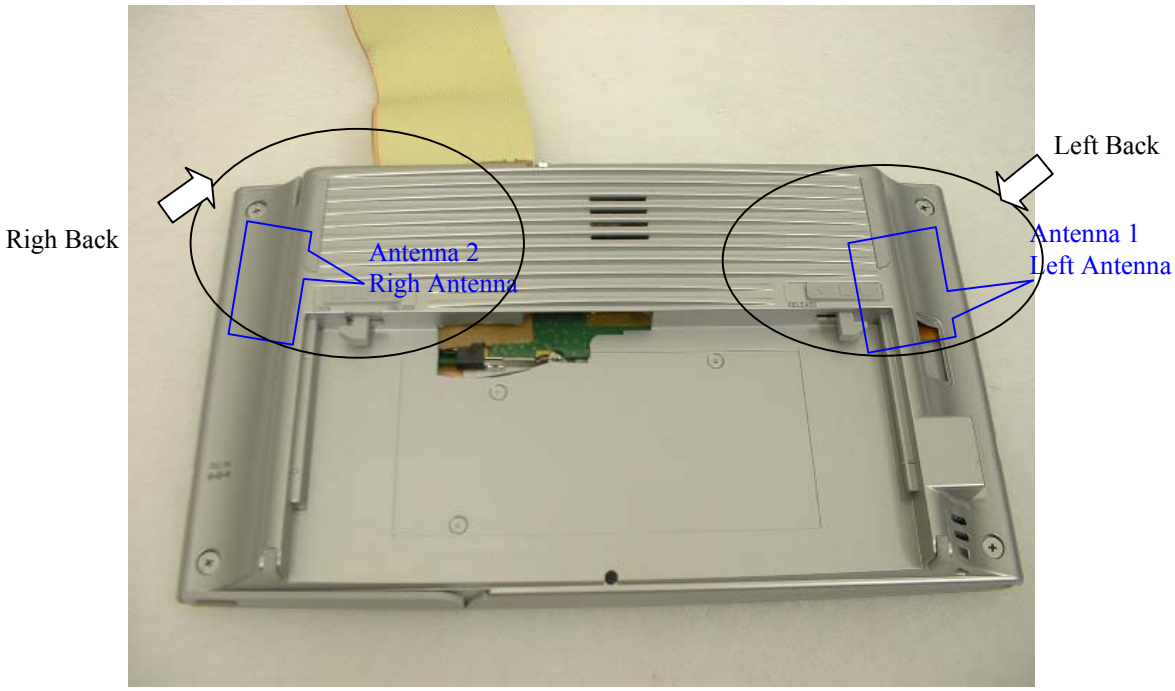
2. Left Side



3. Right Side



4. Back


Righ Back
Antenna 2
Righ Antenna
Left Back
Antenna 1
Left Antenna

7.2 EUT Tune-up procedure

This EUT (Wireless LAN module) has IEEE.802.11b/11g modes.
The frequency range and the modulation were performed on the following.

1. IEEE 802.11b mode
Frequency band : 2412-2462MHz
Channel : 1ch(2412MHz),6ch(2437MHz),11ch(2462MHz)
Modulation : DSSS
Crest factor : 1

2. IEEE 802.11g mode
Frequency band : 2412-2462MHz
Channel : 1ch(2412MHz),6ch(2437MHz),11ch(2462MHz)
Modulation : OFDM
Crest factor : 1

7.3 Methode of measurement

1. IEEE 802.11b mode
The 11b (DSSS) mode test was performed on the CCK[11Mbps] modulation, because it was the highest peak power and data rate.

2. IEEE 802.11g mode
Step1. The searching of the worst position
Mode : QPSK[12Mbps] (The highest peak power)
Channel : 6ch (Mid ch)

Step2. The searching of the worst modulation

Step3. The changing of the Low and High channels
Mode : QPSK[12Mbps] (The highest SAR value for the data rate)

7.4 Distance between Location Free TV and Phantom

The measurement was performed with the distance,5mm,10mm and 15mm to check if the distance 0mm may not have the worst value at the conditions of the highest SAR value of this Location Free TV with the EUT .
As a result, the distance 0mm had the worst value.

SECTION 8 : Measurement uncertainty

8.1 Uncertainty of 802.11b/g modes testing

The uncertainty budget has been determined for the DASY4 measurement system according to the NIS81 [13] and the NIST1297 [6] documents and is given in the following Table.

Error Description	Uncertainty value ± %	Probability distribution	divisor	(ci)1 1g	Standard Uncertainty (1g)	vi or veff
Measurement System						
Probe calibration	±4.8	Normal	1	1	±4.8	∞
Axial isotropy of the probe	±4.7	Rectangular	√3	$(1-c_p)^{1/2}$	±1.9	∞
Spherical isotropy of the probe	±9.6	Rectangular	√3	$(c_p)^{1/2}$	±3.9	∞
Boundary effects	±1.0	Rectangular	√3	1	±0.6	∞
Probe linearity	±4.7	Rectangular	√3	1	±2.7	∞
Detection limit	±1.0	Rectangular	√3	1	±0.6	∞
Readout electronics	±1.0	Normal	1	1	±1.0	∞
Response time	±0.8	Rectangular	√3	1	±0.5	∞
Integration time	±2.6	Rectangular	√3	1	±1.5	∞
RF ambient conditions	±3.0	Rectangular	√3	1	±1.7	∞
Mech. constraints of robot	±0.4	Rectangular	√3	1	±0.2	∞
Probe positioning	±2.9	Rectangular	√3	1	±1.7	∞
Extrap. and integration	±1.0	Rectangular	√3	1	±0.6	∞
Test Sample Related						
Device positioning	±2.9	Rectangular	√3	1	±2.9	28
Device holder uncertainty	±3.6	Rectangular	√3	1	±3.6	5
Power drift	±10.0	Rectangular	√3	1	±2.9	∞
Phantom and Setup						
Phantom uncertainty	±4.0	Rectangular	√3	1	±2.3	∞
Liquid conductivity (target)	±5.0	Rectangular	√3	0.64	±1.8	∞
Liquid conductivity (meas.)	±5.0	Rectangular	√3	0.64	±1.8	∞
Liquid permittivity (target)	±10.0	Rectangular	√3	0.6	±3.5	∞
Liquid permittivity (meas.)	±10.0	Rectangular	√3	0.6	±3.5	∞
Combined Standard Uncertainty					**±12.273**	
Expanded Uncertainty (k=2)					**±24.5**	

The result of some test showed that the power drift has exceeded 5%. Therefor, the uncertainty of power drift expanded to 10%. However, the extended uncertainty (k= 2) of a test is less than 30%.

SECTION 9 : Simulated tissue liquid parameter

9.1 Simulated Tissue Liquid Parameter confirmation

The dielectric parameters were checked prior to assessment using the HP85070D dielectric probe kit.
The dielectric parameters measurement are reported in each correspondent section.

9.2 Head 2450 MHz

Type of liquid : **Head 2450 MHz**
Ambient temperature (deg.c.) : **25.0(January 17 & 18)**
Relative Humidity (%) : **33(January 17), 31(January 18)**
Lquid depth (cm) : **15.1**

DIELECTRIC PARAMETERS MEASUREMENT RESULTS								
Date	Frequency	Liquid Temp [deg.c]		Parameters	Target Value	Measured	Deviation [%]	Limit [%]
		Before	After					
17-Jan	2450	24.3	24.3	Relative Permittivity εr	39.2	36.5	-6.9	+/-10
				Coductivity σ [mho/m]	1.80	1.83	1.7	+/-5
18-Jan	2450	24.1	24.1	Relative Permittivity εr	39.2	36.5	-6.9	+/-10
				Coductivity σ [mho/m]	1.80	1.83	1.7	+/-5

9.3 Muscle 2450 MHz

Type of liquid : **Muscle 2450 MHz**
Ambient temperature (deg.c.) : **25.0(January 17 & 18)**
Relative Humidity (%) : **33(January 17), 31(January 18)**
Liquid depth (cm) : **15.2**

DIELECTRIC PARAMETERS MEASUREMENT RESULTS								
Date	Frequency	Liquid Temp [deg.c]		Parameters	Target Value	Measured	Deviation [%]	Limit [%]
		Before	After					
17-Jan	2450	24.0	24.0	Relative Permittivity εr	52.7	48.6	-7.8	+/-10
				Coductivity σ [mho/m]	1.95	2.00	2.6	+/-5
18-Jan	2450	23.2	23.2	Relative Permittivity εr	52.7	48.8	-7.4	+/-10
				Coductivity σ [mho/m]	1.95	1.99	2.1	+/-5

9.4 Simulated Tissues Composition of 2450MHz

Ingredient	MiXTURE(%)	
	Head 2450MHz	Muscle 2450MHz
Water	45.0	69.83
DGMBE	55.0	30.17

Note:DGMBE(Diethylenglycol-monobuthyl ether)

SECTION 10 : System validation data

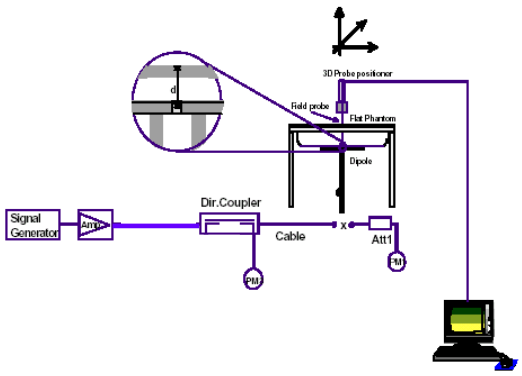
Prior to the assessment, the system validation kit was used to test whether the system was operating within its specifications of +/-10%.

10.1 System validation of 2450MHz

Type of liquid	:	**HEAD 2450MHz**
Frequency	:	**2450MHz**
Ambient temperature (deg.c.)	:	**25.0(January 17 & 18)**
Relative Humidity (%)	:	**33(January 17), 31(January 18)**
Dipole	:	**D2450V2 SN:713**
Power	:	**250mW**

SYSTEM PERFORMANCE CHECK										
Date	Liquid (HEAD 2450MHz)						System dipole validation target & measured			
	Liquid Temp [deg.c.]		Relative Permittivity εr		Conductivity σ [mho/m]		SAR 1g [W/kg]		Deviation [%]	Limit [%]
	Before	After	Target	Measured	Target	Measured	Target	Measured		
17-Jan	23.8	23.8	39.2	36.5	1.80	1.83	13.1	14.2	8.4	+/-10
18-Jan	24.0	24.0	39.2	36.5	1.80	1.83	13.1	14.0	6.9	+/-10

Note: Please refer to Attachment for the result representation in plot format



2450MHz System performance check setup

Test system for the system performance check setup diagram

SECTION 11 : Evaluation procedure

The evaluation was performed with the following procedure:

Step 1: Measurement of the E-field at a fixed location above the ear point or central position of flat phantom was used as a reference value for assessing the power drop.

Step 2: The SAR distribution at the exposed side of head or body position was measured at a distance of each device from the inner surface of the shell. The area covered the entire dimension of the antenna of EUT and the horizontal grid spacing was 20 mm x 20 mm . Based on these data, the area of the maximum absorption was determined by spline interpolation.

Step 3: Around this point found in the Step 2 (area scan) , a volume of 32 mm x 32 mm x 30 mm was assessed by measuring 5 x 5 x 7 points. And for any secondary peaks found in the Step2 which are within 2dB of maximum peak and not with this Step3 (Zoom scan) is repeated. On the basis of this data set, the spatial peak SAR value was evaluated under the following procedure:

1. The data at the surface were extrapolated, since the center of the dipoles is 2.7 mm away from the tip of the probe and the distance between the surface and the lowest measuring point is 1.3 mm. The extrapolation was based on a least square algorithm [4]. A polynomial of the fourth order was calculated through the points in z-axes.
This polynomial was then used to evaluate the points between the surface and the probe tip.

2. The maximum interpolated value was searched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1 g or 10 g) were computed by the 3D-Spline interpolation algorithm. The 3D-Spline is composed of three one-dimensional splines with the “Not a knot"-condition (in x, y and z-directions) [4], [5]. The volume was integrated with the trapezoidal-algorithm. One thousand points (10 x 10 x 10) were interpolated to calculate the average.

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

Step 4: Re-measurement of the E-field at the same location as in Step 1.

SECTION 12 : Exposure limit

(A) Limits for Occupational/Controlled Exposure (W/kg)

Spatial Average (averaged over the whole body)	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.4	8.0	20.0

(B) Limits for General population/Uncontrolled Exposure (W/kg)

Spatial Average (averaged over the whole body	Spatial Peak (averaged over any 1g of tissue)	Spatial Peak (hands/wrists/feet/ankles averaged over 10g)
0.08	1.6	4.0

Occupational/Controlled Environments: are defined as locations where there is exposure that may be incurred by people who are aware of the potential for exposure, (i.e. as a result of employment or occupation).

General Population/Uncontrolled Environments: are defined as locations where there is the exposure of individuals who have no knowledge or control of their exposure.

NOTE:GENERAL POPULATION/UNCONTROLLED EXPOSURE
SPATIAL PEAK(averaged over any 1g of tissue) LIMIT
1.6 W/kg

SECTION 13 : SAR Measurement results

13.1 Antenna 1(Left Antenna)

13.1.1 Conducted power measurement results

Measured By : Miyo Ikuta

[IEEE802.11b : 11Mbps : Antenna 1]						
Ch	Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Converted [mW]
Low	2412.0	6.62	0.63	10.00	17.25	53.09
Mid	2437.0	6.80	0.63	10.00	17.43	55.34
High	2462.0	7.36	0.63	10.00	17.99	62.95

[IEEE802.11g : Antenna 1(by the data rate)]						
Ch	Data rate [bps]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Converted [mW]
Mid	6	3.58	0.63	10.00	14.21	26.36
Mid	9	3.58	0.63	10.00	14.21	26.36
Mid	12	3.80	0.63	10.00	14.43	27.73
Mid	18	3.74	0.63	10.00	14.37	27.35
Mid	24	3.62	0.63	10.00	14.25	26.61
Mid	36	3.65	0.63	10.00	14.28	26.79
Mid	48	3.47	0.63	10.00	14.10	25.70
Mid	54	3.38	0.63	10.00	14.01	25.18

[IEEE802.11g : 12Mbps : Antenna 1]						
Ch	Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Converted [mW]
Low	2412.0	3.24	0.63	10.00	13.87	24.38
Mid	2437.0	3.80	0.63	10.00	14.43	27.73
High	2462.0	4.08	0.63	10.00	14.71	29.58

[IEEE802.11g : 54Mbps : Antenna 1]						
Ch	Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Converted [mW]
Low	2412.0	3.12	0.63	10.00	13.75	23.71
Mid	2437.0	3.38	0.63	10.00	14.01	25.18
High	2462.0	3.83	0.63	10.00	14.46	27.93

13.1.2 Body 2450MHz SAR of Antenna 1

Liquid Depth (cm)	:	**15.2**	Model	:	**IRF303J**
Parameters	:	ε_r =**48.6**, σ =**2.00**	Serial No.	:	**062**
Ambient temperature (deg.c.)	:	**25.0**	Modulation	:	**DSSS**
Relative Humidity (%)	:	**33**	Crest factor	:	**1**

Date : January 17
Measured By : Miyo Ikuta

BODY SAR MEASUREMENT RESULTS OFANTENNA 1(IEEE802.11b)									
Frequency		Modulation	Phantom Section	EUT Set-up Conditions			Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Position	Separation [mm]	Before	After	Maximum value of multi-peak
Mid	2437	DSSS(CCK)	Flat	Fixed	Left Front	0	22.9	22.9	**0.128**
Mid	2437	DSSS(CCK)	Flat	Fixed	Left Side	0	22.9	22.9	**0.159**
Mid	2437	DSSS(CCK)	Flat	Fixed	Left Back	0	22.9	22.9	**0.0261**
Low	2412	DSSS(CCK)	Flat	Fixed	Left Side	0	22.9	22.9	**0.149**
High	2462	DSSS(CCK)	Flat	Fixed	Left Side	0	22.9	22.9	**0.235**
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population							**Body SAR: 1.6 W/kg (averaged over 1 gram)**		

Liquid Depth (cm)	:	**15.2**	Model	:	**IRF303J**
Parameters	:	ε_r =**48.8**, σ =**1.99**	Serial No.	:	**062**
Ambient temperature (deg.c.)	:	**25.0**	Modulation	:	**OFDM**
Relative Humidity (%)	:	**31**	Crest factor	:	**1**

Date : January 18
Measured By : Miyo Ikuta

BODY SAR MEASUREMENT RESULTS OF ANTENNA 1 (IEEE 802.11g)

Frequency		Modulation	Phantom Section	EUT Set-up Conditions			Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Position	Separation [mm]	Before	After	Maximum value of multi-peak
Position seach									
Mid	2437	QPSK	Flat	Fixed	Left Front	0	23.3	23..3	**0.0548**
Mid	2437	QPSK	Flat	Fixed	Left Side	0	23.2	23.2	**0.0648**
Mid	2437	QPSK	Flat	Fixed	Left Back	0	23.2	23.2	**0.00871**
Modulation seach									
Mid	2437	BPSK	Flat	Fixed	Left Side	0	23.9	23.9	**0.0601**
Mid	2437	16QAM	Flat	Fixed	Left Side	0	23.9	23.9	**0.0602**
Mid	2437	64QAM	Flat	Fixed	Left Side	0	23.6	23.8	**0.0578**
Channel change									
Low	2412	QPSK	Flat	Fixed	Left Side	0	23.4	23.4	**0.0635**
High	2462	QPSK	Flat	Fixed	Left Side	0	23.4	23.4	**0.0965**
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population							**Body SAR: 1.6 W/kg (averaged over 1 gram)**		

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13.2 Antenna 2(Right Antenna)

13.2.1 Conducted power measurement results

Measured By : Miyo Ikuta

[IEEE802.11b : 11Mbps : Antenna 2]						
Ch	Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Converted [mW]
Low	2412.0	6.50	0.63	10.00	17.13	51.64
Mid	2437.0	7.03	0.63	10.00	17.66	58.34
High	2462.0	7.29	0.63	10.00	17.92	61.94

[IEEE802.11g : Antenna 2(by the data rate)]						
Ch	Data rate [bps]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Converted [mW]
Mid	6	3.48	0.63	10.00	14.11	25.76
Mid	9	3.68	0.63	10.00	14.31	26.98
Mid	12	3.84	0.63	10.00	14.47	27.99
Mid	18	3.72	0.63	10.00	14.35	27.23
Mid	24	3.68	0.63	10.00	14.31	26.98
Mid	36	3.60	0.63	10.00	14.23	26.50
Mid	48	3.70	0.63	10.00	14.33	27.10
Mid	54	3.62	0.63	10.00	14.25	26.61

[IEEE802.11g: 12Mbps Antenna 2]						
Ch	Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Converted [mW]
Low	2412.0	3.22	0.63	10.00	13.85	24.27
Mid	2437.0	3.84	0.63	10.00	14.47	27.99
High	2462.0	4.03	0.63	10.00	14.66	29.24

[IEEE802.11g : 54Mbps : Antenna 2]						
Ch	Freq. [MHz]	S/A Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result [dBm]	Converted [mW]
Low	2412.0	3.06	0.63	10.00	13.69	23.39
Mid	2437.0	3.62	0.63	10.00	14.25	26.61
High	2462.0	3.80	0.63	10.00	14.43	27.73

13.2.2 Body 2450MHz SAR of Antenna 2

Liquid Depth (cm)	:	**15.2**	Model	:	**IRF303J**
Parameters	:	ε_r =**48.6**, σ =**2.00**	Serial No.	:	**062**
Ambient temperature (deg.c.)	:	**25.0**	Modulation	:	**DSSS**
Relative Humidity (%)	:	**33**	Crest factor	:	**1**

Date : January 17
Measured By : Miyo Ikuta

BODY SAR MEASUREMENT RESULTS OF ANTENNA 2(IEEE802.11b)

Frequency		Modulation	Phantom Section	EUT Set-up Conditions			Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Position	Separation [mm]	Before	After	Maximum value of multi-peak
Mid	2437	DSSS(CCK)	Flat	Fixed	Right Front	0	22.9	22.9	**0.168**
Mid	2437	DSSS(CCK)	Flat	Fixed	Right Side	0	22.9	22.9	**0.257**
Mid	2437	DSSS(CCK)	Flat	Fixed	Right Back	0	22.9	22.9	**0.036**
Low	2412	DSSS(CCK)	Flat	Fixed	Right Side	0	22.8	22.8	**0.153**
High	2462	DSSS(CCK)	Flat	Fixed	Right Side	0	22.9	22.9	**0.533**
High	2462	DSSS(CCK)	Flat	Fixed	Right Side	5	23.3	23.3	**0.13**
High	2462	DSSS(CCK)	Flat	Fixed	Right Side	10	23.3	23.3	**0.0425**
High	2462	DSSS(CCK)	Flat	Fixed	Right Side	15	23.3	23.3	**0.0211**
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population							**Body SAR: 1.6 W/kg (averaged over 1 gram)**		

Liquid Depth (cm)	:	**15.2**	Model	:	**IRF303J**
Parameters	:	ε_r =**48.8**, σ =**1.99**	Serial No.	:	**062**
Ambient temperature (deg.c.)	:	**25.0**	Modulation	:	**OFDM**
Relative Humidity (%)	:	**31**	Crest factor	:	**1**

Date : January 18
Measured By : Miyo Ikuta

BODY SAR MEASUREMENT RESULTS OF ANTENNA 2 (IEEE 802.11g)

Frequency		Modulation	Phantom Section	EUT Set-up Conditions			Liquid Temp.[deg.c]		SAR(1g) [W/kg]
Channel	[MHz]			Antenna	Position	Separation [mm]	Before	After	Maximum value of multi-peak
Position seach									
Mid	2437	QPSK	Flat	Fixed	Right Front	0	23.2	23.2	**0.0656**
Mid	2437	QPSK	Flat	Fixed	Right Side	0	23.2	23.4	**0.118**
Mid	2437	QPSK	Flat	Fixed	Right Back	0	23.6	23.6	**0.0103**
Modulation seach									
Mid	2437	BPSK	Flat	Fixed	Right Side	0	23.5	23.5	**0.102**
Mid	2437	16QAM	Flat	Fixed	Right Side	0	23.5	23.5	**0.102**
Mid	2437	64QAM	Flat	Fixed	RIght Side	0	23.5	23.5	**0.101**
Channel change									
Low	2412	QPSK	Flat	Fixed	Right Side	0	23.6	23.6	**0.0769**
High	2462	QPSK	Flat	Fixed	Right Side	0	23.6	23.6	**0.226**
ANSI / IEEE C95.1 1992 - SAFETY LIMIT Spatial Peak Uncontrolled Exposure / General Population							**Body SAR: 1.6 W/kg (averaged over 1 gram)**		

SECTION 14 : Equipment & calibration information

Name of Equipment	Manufacture	Model number	Serial number	Calibration	
				Last Cal	due date
Power Meter	Agilent	E4417A	GB41290639	2004/11/09	2005/11/08
Power Sensor	Agilent	E9300B	US40010300	2004/11/15	2005/11/14
Power Sensor	Agilent	E9327A	US40440545	2004/03/11	2005/03/10
Spectrum Analyzer	Agilent	E4448A	MY44020357	2004/06/12	2005/06/11
S-Parameter Network Analyzer	Agilent	8753ES	US39174808	2003/10/23	2006/10/22
Signal Generator	Rohde&Schwarz	SML40	100023	2005/01/05	2006/01/04
RF Amplifier	OPHIR	5056F	1005	2004/02/17	2005/02/16
Dosimetric E-Field Probe	Schmid&Partner Engineering AG	ET3DV6	1684	2004/09/02	2005/09/01
Data Acquisition Electronics	Schmid&Partner Engineering AG	DAE3 V1	509	2004/04/22	2005/04/21
Robot,SAM Phantom	Schmid&Partner Engineering AG	DASY4	I021834	N/A	N/A
Attenuator	Agilent	US40010300	08498-60012	2004/12/16	2005/12/15
Attenuator	Orient Microwave	BX10-0476-00	-	2004/03/30	2005/03/29
2450MHz System Validation Dipole	Schmid&Partner Engineering AG	D2450V2	713	2004/12/13	2006/12/12
Dual Directional Coupler	N/A	Narda	03702	N/A	N/A
Head 2450MHz	N/A	N/A	N/A	N/A	N/A
Body 2450MHz	N/A	N/A	N/A	N/A	N/A

SECTION 15 : References

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