JQA File No. : KL80050140

Issued Date : June 10, 2005

TEST REPORT (SAR EVALUATION)

APPLICANT	:	Sony Computer Entertainment Inc.
ADDRESS	:	2-6-21 Minami-Aoyama, Minato-ku, Tokyo, 107-0062, Japan
PRODUCTS	:	PSP
MODEL NO.	:	PSP-1001
SERIAL NO.	:	00-TSPT000K-0000290
FCC ID / IC	:	AK8PSP1001 / 409B-PSP1001
TEST STANDARD	:	RSS-102 Issue 1 (Provisional)
TEST RESULTS	:	**Passed**
DATE OF TEST	:	June 3, 2005

Yuichi Fukumoto
Manager
Japan Quality Assurance Organization
KITA-KANSAI TESTING CENTER
Testing Dept. EMC Division
1-7-7, Ishimaru, Minoh-shi, Osaka 562-0027, Japan

TABLE OF CONTENTS

DEFINITIONS FOR ABBREVIATION AND SYMBOLS USED IN THIS TEST REPORT

"EUT" means Equipment Under the Test.
"N/A" means that Not Applicable.
"N/T" means that Not Tested.

☒ - indicates that the listed condition, standard or equipment is applicable for this report.
☐ - indicates that the listed condition, standard or equipment is not applicable for this report.

Documentation

1 Test Regulation

Applied Standard : RSS-102 Issue 1 (Provisional) – September 25, 1999

Test Procedure : FCC/OET Bulletin 65 Supplement C (July, 2001) and IEEE Std.1528™–2003

Exposure Limits : Health Canada Safety Code 6

2 Test Location

KITA-KANSAI Testing Center
7-7, Ishimaru, 1-chome, Minoh-shi, Osaka, 562-0027, Japan
KAMEOKA EMC Branch
9-1, Ozaki, Inukanno, Nishibetsuin-cho, Kameoka-shi, Kyoto, 621-0126, Japan

3 Recognition of Test Laboratory

JQA KITA-KANSAI Testing Center Testing Department EMC Division is recognized under ISO/IEC 17025 by following accreditation bodies and the test facility of Testing Division is registered by the following bodies.

VLAC Code	:	VLAC-001-2 (Effective through : April 3, 2006)
NVLAP Lab Code	:	200191-0 (Effective through : June 30, 2005)
BSMI Recognition No.	:	SL2-IN-E-6006 (Effective through : September 14, 2007)
VCCI Registration No.	:	R-006, R-008, R-1117, C-006, C-007, C-1674, C-2143 (Effective through : April 3, 2006)
FCC Registration No.	:	683630 (Effective through : May 27, 2005)

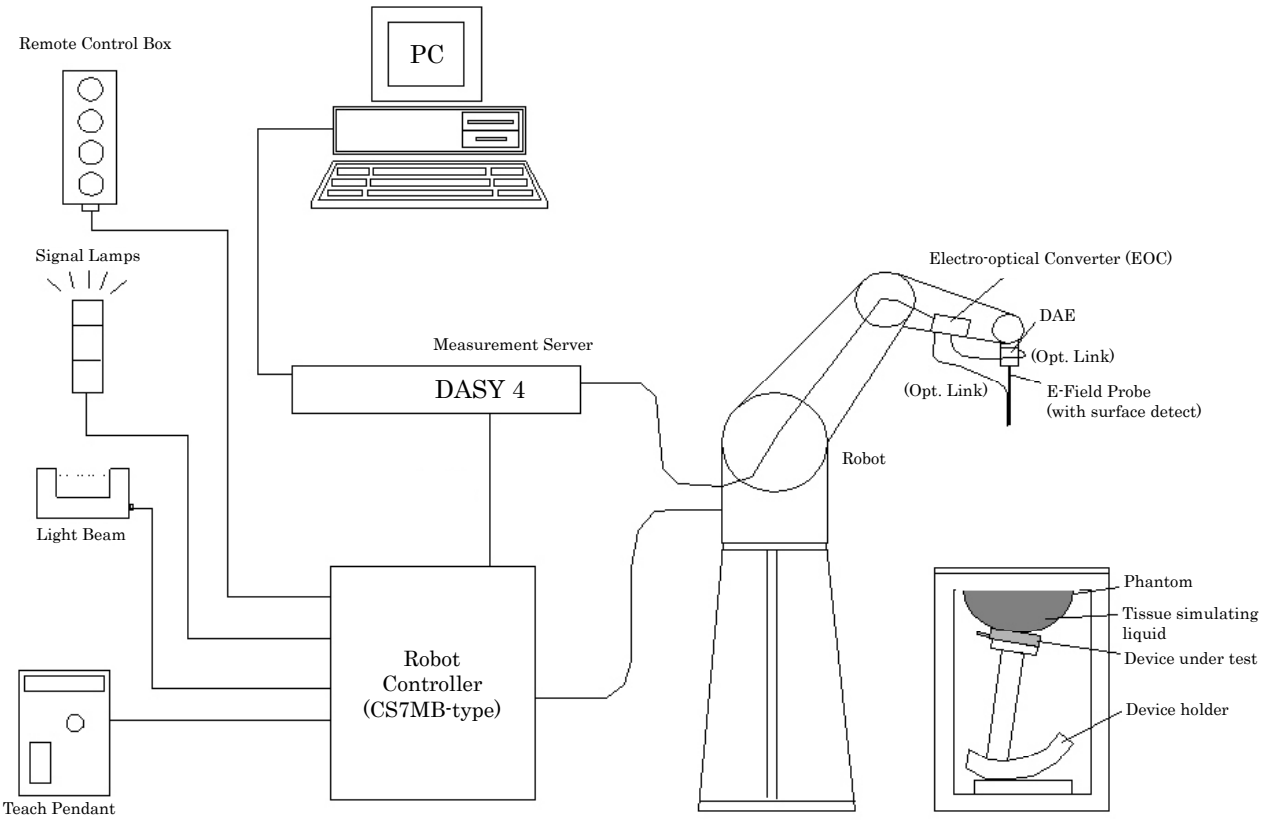
Accredited as conformity assessment body for Japan electrical appliances and material law by METI. (Effective through : February 24, 2007)
Accredited as conformity assessment body for Article 2, Paragraph 8, Item 5 on law for implementation of the Mutual Recognition between Japan and the European Community by METI.
(Effective through : August 7, 2007)

4 Description of the Equipment Under Test

1.	Manufacturer	:	Sony Computer Entertainment Inc. 2-6-21 Minami-Aoyama, Minato-ku, Tokyo, 107-0062, Japan
2.	Products	:	PSP
3.	Model No.	:	PSP-1001
4.	Serial No.	:	00-TSPT000K-0000290
5.	Product Type	:	Pre-production
6.	Date of Manufacture	:	--
7.	Transmitting Frequency	:	2412 MHz – 2462 MHz
8.	Receiving Frequency	:	2412 MHz – 2462 MHz
9.	Max. RF Output Power	:	10.26 dBm (at 2412 MHz, Data Rate 11 Mbps)
10.	Antenna	:	Built-in type (right side) Length 43.1 mm / Width 25.35 mm
11.	Battery Option	:	Lithium-ion Battery Pack PSP-110 (1800mAh)
12.	Power Rating	:	3.6VDC
13.	EUT Grounding	:	None
14.	Device Category	:	Portable Device
15.	Exposure Category	:	General Population/Uncontrolled Exposure
16.	EUT Authorization	:	Certification
17.	Date of EUT Received	:	June 3, 2005

5 Measurement System Diagram

These measurements are performed using the DASY4 automated dosimetric assessment system (manufactured by Schmid & Partner Engineering AG (SPEAG) in Zürich, Switzerland). It consists of high precision robotics system, cell controller system, DASY4 measurement server, personal computer with DASY4 software, data acquisition electronic (DAE) circuit, the Electro-optical converter (EOC), near-field probe, and the twin SAM phantom containing the equivalent tissue. The robot is a six-axis industrial robot performing precise movements to position the probe to the location (points) of maximum electromagnetic field (EMF).
The Robot is connected to the cell controller to allow software manipulation of the robot. The DAE is connected to the EOC. The DAE performs the signal amplification, signal multiplexing, A/D conversion, offset measurements, mechanical surface detection, collision detection, etc. The EOC performs the conversion from the optical into digital electric signal of the DAE and transfers data to the DASY4 measurement server.



6 System Components

6.1 Probe Specification

Construction : Symmetrical design with triangular core
Built-in optical fiber for surface detection system
Built-in shielding against static changes

Calibration : In air form 10 MHz to 2.5 GHz
In head tissue simulating liquid (HSL) and
muscle tissue simulating liquid
900 MHz (accuracy ± 11.0%; k=2)
1810 MHz (accuracy ± 11.0%; k=2)
2450 MHz (accuracy ± 11.8%; k=2)

Frequency : 10 MHz to 3 GHz (dosimetry);
Linearity: ±0.2 dB (30 MHz to 3 GHz)

Directivity : ± 0.2 dB in HSL (rotation around probe axis)
± 0.4 dB in HSL (rotation normal probe axis)

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

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

Dimensions : Overall length 330 mm
Tip length 16 mm
Body diameter 12 mm
Tip diameter 6.8 mm
Distance from probe tip to dipole centers 2.7 mm

6.2 Twin SAM Phantom

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 head 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 : Volume Approx. 25 liters
Dimensions : 810 × 1000 × 500 mm (H × L × W)

6.3 Mounting Device for Transmitters

The Mounting Device enables the rotation of the mounted transmitter in spherical coordinates, whereby the rotation point is the ear opening. The devices can be easily and accurately positioned according to IEC, IEEE, CENELEC, FCC or other specifications. The device holder can be locked at different phantom locations (left head, right head, flat phantom).

6.4 Typical Composition of Ingredients for Liquid Tissue

Ingredients (% by weight)	Frequency (MHz)					
	835		1900		2450	
	Head	Body	Head	Body	Head	Body
Water	41.45	52.40	54.90	40.40	62.70	73.20
Salt (NaCl)	1.45	1.40	0.18	0.50	0.50	0.04
Sugar	56.00	45.00	0.00	58.00	0.00	0.00
HEC	1.00	1.00	0.00	1.00	0.00	0.00
Bactericide	0.10	0.10	0.00	0.10	0.00	0.00
Triton X-100	0.00	0.00	0.00	0.00	36.80	0.00
DGBE	0.00	0.00	44.92	0.00	0.00	26.70

Salt : 99+% Pure Sodium Chloride Sugar : 98+% Pure Sucrose
Water : De-ionized, 16 MΩ+ resistivity HEC : Hydroxyethyl Cellulose
DGBE : 99+% Di (ethylene glycol) butyl ether, [2-(2-butoxyethoxy)ethanol]
Triton X-100 (ultra pure) : Polyethylene glycol mono [4-(1,1,3,3-tetramethylbuthyl)phenyl]ether

The composition of ingredients is according to FCC/OET Bulletin 65 Supplement C.

7 Measurement Process

Area Scan for Maximum Search :

The SAR distribution at the exposed side of the head was measured at a distance of 3.9 mm from the inner surface of the shell. The area covered the entire dimension of the head and the horizontal grid spacing was 10 mm × 10 mm. The evaluation on the measured area scan gives the interpolated maximum (hot spot) of the measured area.

Cube Scan for Spatial Peak SAR Evaluation :

The 1g and 10g peak evaluations were available for the predefined cube 5×5×7 scans. The grid spacing was 8 mm × 8 mm × 5 mm. The first procedure is an extrapolation to get the points between the lowest measured plane and the surface. The next step uses 3D interpolation to get all points within the measured volume in a 1mm grid (35000 points). In the last step, a 1g cube is placed numerically into the volume and its averaged SAR is calculated. This cube is moved around until the highest averaged SAR is found. This last procedure is repeated for a 10g cube. If the highest SAR is found at the edge of the measured volume, the system will issue a warning: higher SAR values might be found outside of the measured volume. In that case the cube measurement can be repeated, using the new interpolated maximum as the center.

Extrapolation :

The extrapolation is based on a least square algorithm. Through the points in the first 3 cm in all z-axis, polynomials of order four are calculated. This polynomial is then used to evaluate the points between the surface and the probe tip. The points, calculated from the surface, have a distance of 1 mm from one another.

Interpolation :

The maximum interpolated value is serched with a straightforward algorithm. Around this maximum the SAR values averaged over the spatial volumes (1g or 10g) are computed by the 3D spline algorithm. The 3D spline is composed of three one-dimensional splines with the “Not a knot” –condition (x, y and z –directions). The volume is integrated with the trapezoidal algorithm.

8 Measurement Uncertainties

8.1 Uncertainties for System Validation

Uncertainty Component	Uncertainty value (%)	Probability distribution	Divisor	c_i	Standard uncertainty 1g (%)	v_i
Measurement System						
Probe calibration	4.8	Normal	1	1	4.8	∞
Axial isotropy	4.7	Rectangular	√3	1	2.7	∞
Hemispherical isotropy	0.0	Rectangular	√3	1	0.0	∞
Boundary effect	1.0	Rectangular	√3	1	0.6	∞
Linearity	4.7	Rectangular	√3	1	2.7	∞
Detection limits	1.0	Rectangular	√3	1	0.6	∞
Readout electronics	1.0	Normal	1	1	1.0	∞
Response time	0.0	Rectangular	√3	1	0.0	∞
Integration time	0.0	Rectangular	√3	1	0.0	∞
RF ambient conditions	3.0	Rectangular	√3	1	1.7	∞
Mechanical tolerance	0.4	Rectangular	√3	1	0.2	∞
Probe positioning	2.9	Rectangular	√3	1	1.7	∞
Extrapolation, interpolation integration algorithms	1.0	Rectangular	√3	1	0.6	∞
Dipole						
Dipole axis to liquid distance	2.0	Rectangular	√3	1	1.2	∞
Input power and SAR drift measurement	4.7	Rectangular	√3	1	2.7	∞
Physical parameters						
Phantom uncertainty	4.0	Rectangular	√3	1	2.3	∞
Liquid conductivity - deviation from target values	5.0	Rectangular	√3	0.64	1.8	∞
Liquid Conductivity - measurement uncertainty	2.5	Normal	1	0.64	1.6	∞
Liquid Permittivity - deviation from target values	5.0	Rectangular	√3	0.6	1.7	∞
Liquid Permittivity - measurement uncertainty	2.5	Normal	1	0.6	1.5	∞
Combined Standard Uncertainty					8.4	
Expanded Uncertainty (k=2) (confidence interval of 95%)					16.8	

NOTE : The above measurement uncertainties are according to IEEE Std. 1528™–2003.

8.2 Uncertainties for SAR Measurement

Uncertainty Component	Uncertainty value (%)	Probability distribution	Divisor	c_i	Standard uncertainty 1g (%)	v_i
Measurement System						
Probe calibration	4.8	Normal	1	1	4.8	∞
Axial isotropy	4.7	Rectangular	√3	0.7	1.9	∞
Hemispherical isotropy	9.6	Rectangular	√3	0.7	3.9	∞
Boundary effect	1.0	Rectangular	√3	1	0.6	∞
Linearity	4.7	Rectangular	√3	1	2.7	∞
Detection limits	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	∞
Mechanical tolerance	0.4	Rectangular	√3	1	0.2	∞
Probe positioning	2.9	Rectangular	√3	1	1.7	∞
Extrapolation, interpolation integration algorithms	1.0	Rectangular	√3	1	0.6	∞
Test Sample Related						
Device positioning	3.4	Normal	1	1	3.4	23
Device holder uncertainty	4.6	Normal	1	1	4.6	5
Output power drift	5.0	Rectangular	√3	1	2.9	∞
Physical parameters						
Phantom uncertainty	4.0	Rectangular	√3	1	2.3	∞
Liquid conductivity - deviation from target values	5.0	Rectangular	√3	0.64	1.8	∞
Liquid Conductivity - measurement uncertainty	2.5	Normal	1	0.64	1.6	∞
Liquid Permittivity - deviation from target values	5.0	Rectangular	√3	0.6	1.7	∞
Liquid Permittivity - measurement uncertainty	2.5	Normal	1	0.6	1.5	∞
Combined Standard Uncertainty					10.8	
Expanded Uncertainty (k=2) (confidence interval of 95%)					21.6	

NOTE : The above measurement uncertainties are according to IEEE Std. 1528™–2003.

9 Equipment Under Test Modification

☒ - No modifications were conducted by JQA to achieve compliance to the limitations.
☐ - To achieve compliance to the limitations, the following changes were made by JQA during the compliance test.

The modifications will be implemented in all production models of this equipment.

Applicant : Not Applicable
Date : Not Applicable
Typed Name : Not Applicable
Position : Not Applicable

10 Responsible Party

Responsible Party of Test Item (Product)

Responsible Party :

Contact Person :

Signatory

11 Deviation from Standard

☒ - No deviations from the standard described in clause 1.
☐ - The following deviations were employed from the standard described in clause 1.

12 Test Results

12.1 SAR Measurement for Head Configuration

The requirements are ☐ - Applicable [☐ - Tested. ☐ - Not tested by applicant request.]
☒ - Not Applicable

☐ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Maximum SAR (1g) _____ mW/g at _____ MHz

Phantom Position ☐ - Left Head ☐ - Right Head

Device Position ☐ - Cheek/Touch ☐ - Ear/Tilt

Antenna Position ☐ - In ☐ - Out ☐ - Fixed

Modulation Type _____

Remarks : _____

12.2 SAR Measurement for Body-worn Configuration

The requirements are ☒ - Applicable [☒ - Tested. ☐ - Not tested by applicant request.]
☐ - Not Applicable

☒ - **Passed** ☐ - **Failed** ☐ - **Not judged**

Maximum SAR (1g) 0.0697 mW/g at 2412 MHz

Modulation Type DSSS

Remarks : _____

13 Summary

General Remarks :

The EUT was tested according to the requirements of
RSS-102 Issue 1 (Provisional)
under the test configuration, as shown in clause 14 to 15.
The conclusion for the test items of which are required by the applied regulation is indicated under the final judgment.

Final Judgment :

The "as received" sample;

☒ - fulfill the test requirements of the regulation mentioned on clause 1.
☐ - doesn't fulfill the test requirements of the regulation mentioned on clause 1.

Reviewed by:

S. Kino

Shigeru Kinoshita
Deputy Manager
Testing Dept. EMC Div.
JQA KITA-KANSAI Testing Center

Tested by:

Y. Sakai

Yasuhisa Sakai
Engineer
Testing Dept. EMC Div.
JQA KITA-KANSAI Testing Center

14 Test Arrangement

The device is tested against a flat phantom representing the user body. A headset is connected to the device. The device is 0 cm on distance from the flat phantom.

Configuration 1 (Flat – Body-worn Position / Back)

Configuration 2 (Flat – Body-worn Position / Side)

15 Equipment Under Test Tune-Up Procedures

The following procedures had been used to prepare the EUT for the SAR test.

To setup the desire channel frequency and the maximum output power, RF test mode prepared by the manufacturer was used to program the EUT.

Communication system : Wireless LAN (based on IEEE 802.11b)
Modulation type : Direct Sequence Spread Spectrum (DSSS)

Channel	Frequency
01	2412.0
06	2437.0
11	2462.0

The EUT has 4 data rates as 1, 2, 5.5 and 11 Mbps. SAR should be tested at the lowest data rate. Then the test was performed at 1 Mbps data rate. Higher data rates were checked at the channel and position which gives maximum SAR.

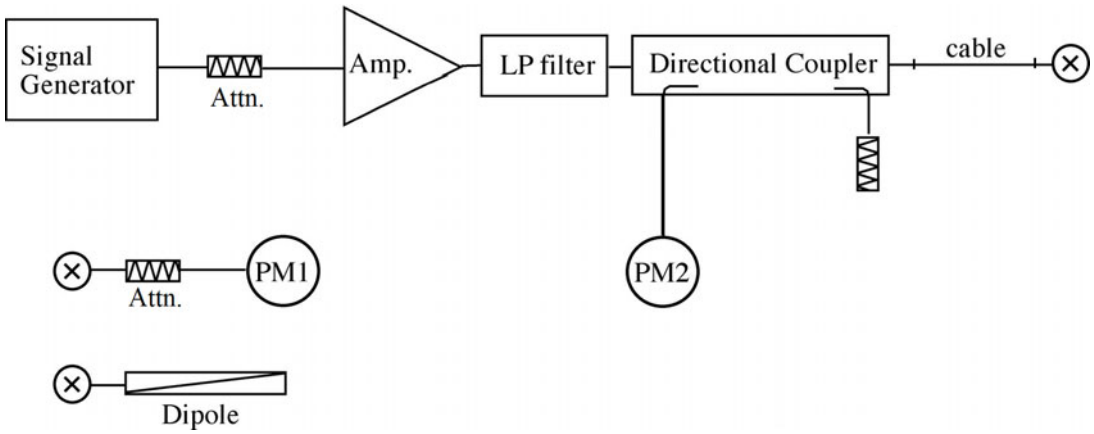
Maximum conducted power was measured by replacing the antenna with an adapter for conductive measurements, before and after the SAR measurements was done.

Appendix A: Test Data

A.1 System Validation

The power meter PM1 (including Attenuator) measures the forward power at the location of the validation dipole connector. The signal generator is adjusted for 250 mW at the dipole connector and the power meter PM2 is read at that level. After connecting the cable to the dipole, the signal generator is readjusted for the same reading at power meter PM2.

The dipole antenna is matched to be used near flat phantom filled with tissue simulating solution. A specific distance holder is used in the positioning of the antenna to ensure correct spacing between the phantom and the dipole.



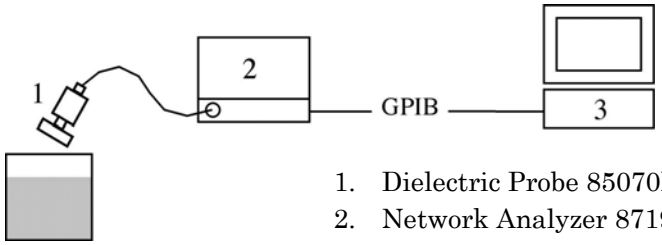
System Validation Results :

System Validation Dipole : D2450V2, S/N: 714						
Ambient Conditions : 21°C 57%		Depth of Liquid : 15.0 cm			Date : June 3, 2005	
Liquid		Parameters	Target	Measured	Deviation [%]	Limit [%]
Medium	Temp. [°C]					
Muscle 2450 MHz	21.0	Permitivity	52.7	52.63	-0.13	± 5
		Conductivity	1.95	2.039	+4.56	± 5
		1g SAR (mW/g)	13.5	13.5	±0.00	± 10

NOTE : Please refer to attachment for the result presentation in plot format.

A.2 Tissue Verification

The tissue dielectric parameters of the tissue medium at the middle of a device transmission band should be within ±5% of the parameters specified at that target frequency. It is verified by using the dielectric probe and the network analyzer.



1. Dielectric Probe 85070D
2. Network Analyzer 8719ET
3. Personal Computer

Tissue Verification Results :

Ambient Conditions : 21°C 57%					Date : June 3, 2005	
Liquid		Parameters	Target	Measured	Deviation [%]	Limit [%]
Medium	Temp. [°C]					
Muscle 2450 MHz	21.0	Permitivity	52.7	52.63	-0.13	± 5
		Conductivity	1.95	2.039	+4.56	± 5

A.3 SAR Measurement Data

Modulation Type: DSSS (Duty Cycle: 100 %, Crest Factor: 1)

Configuration 1 – **Flat / Back** Depth of Liquid : 15.0 cm Date : June 3, 2005

EUT Set-up Configuration		Frequency		Power [dBm] (Peak)		Limit [mW/g]	**SAR (1g) [mW/g]**	Tissue Temp. [°C]
Separation	Antenna	Channel	MHz	Start	End			
0 cm	--	01	2412	10.23	10.22	1.6	0.0533	21.0
		06	2437	9.48	9.46		0.0473	21.0
		11	2462	10.04	10.03		0.0406	21.0
Configuration 2 – **Flat / Side**								
EUT Set-up Configuration		Frequency		Power [dBm] (Peak)		Limit [mW/g]	**SAR (1g) [mW/g]**	Tissue Temp. [°C]
Separation	Antenna	Channel	MHz	Start	End			
0 cm	--	01	2412	10.23	10.22	1.6	0.0690	21.0
		06	2437	9.48	9.46		0.0588	21.0
		11	2462	10.04	10.03		0.0445	21.0
Data Rate 2 Mbps								
0 cm	--	01	2412	10.23	10.22	1.6	0.0613	21.0
Data Rate 5.5 Mbps								
0 cm	--	01	2412	9.79	9.78	1.6	**0.0697**	21.0
Data Rate 11 Mbps								
0 cm	--	01	2412	**10.26**	10.26	1.6	0.0663	21.0

NOTES : 1. Transmitter power was measured at the antenna-conducted terminal.
2. Please refer to attachment for the result presentation in plot format.

Appendix B: Test Instruments

B.1 SAR Measurement

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
E-Field Probe	ET3DV6	SPEAG	S-2	2004/12	1 Year
DAE	DAE3 V1	SPEAG	S-3	2004/12	1 Year
Robot	RX60L	Stäubli	S-7	N/A	N/A
Probe Alignment Unit	LB1RX60L	SPEAG	S-13	N/A	N/A

B.2 System Validation and Tissue Verification

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Network Analyzer	8719ET	Agilent	B-53	2004/9	1 Year
Dielectric Probe	85070D	Agilent	B-54	N/A	N/A
2450 MHz Dipole	D2450V2	SPEAG	S-6	2004/12	2 Years
Signal Generator	MG3681A	Anritsu	B-3	2005/2	1 Year
Power Amplifier	A0840-3833-R	B&R	A-34	N/A	N/A
Power Meter	E4417A	Agilent	B-51	2004/8	1 Year
Power Sensor	E9323A	Agilent	B-59	2004/8	1 Year

B.3 Antenna-Conducted Power Measurement

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Power Meter	E4417A	Agilent	B-51	2004/8	1 Year
Power Sensor	E9323A	Agilent	B-59	2004/8	1 Year

Appendix C: Attachments

Exhibit	Contents	No. of page(s)
1	System Validation Plots	1
2	SAR Test Plots	10
3	Dosimetric E-Field Probe – ET3DV6, S/N: 1679	9
4	System Validation Dipole – D2450V2, S/N: 714	9
5	EUT Photographs	1