



## SAR TEST REPORT

Test Report No. : 29FE0077-HO-02

Applicant : Sony Corporation  
Type of Equipment : Wireless Audio Transmitter  
Model No. : AIR-PC10T  
FCC ID : AK8AIRPC10T  
Test regulation : FCC47CFR 2.1093  
FCC OET BULLETIN 65, SUPPLEMENT C  
Test Result : Complied  
Max. SAR Value : 0.692W/kg (Body, 2412MHz)

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with the limits of the above regulation.
4. The test results in this test report are traceable to the national or international standards.
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Date of test: March 17, 2009

Tested by:

Miyo Kishimoto  
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Approved by :

Tetsuo Maeno  
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NVLAP LAB CODE: 200572-0

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## **SECTION 1: Customer information**

Company Name : Sony Corporation  
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Contact Person : Kikuo Murata

## **SECTION 2: Equipment under test (E.U.T.)**

### **2.1 Identification of E.U.T.**

Type of Equipment : Wireless Audio Transmitter  
Model No. : AIR-PC10T  
Serial No. : 900021  
Receipt Date of Sample : March 16, 2009  
Rating : DC 5V (USB port bus power)  
Size : W:26mm D:87mm H:13.2mm  
Country of Mass-production : China  
Condition of EUT : Engineering prototype  
(Not for Sale: This sample is equivalent to mass-produced items.)

### **2.2 Product Description**

Model No: AIR-PC10T (referred to as the EUT in this report) is the Wireless Audio Transmitter.

Clock frequency(ies) in the system : USB IC:12MHz  
Wireless Audio Control IC: 3216MHz, 3250.67MHz, 3285.33MHz  
Micom-clock: 20MHz  
Equipment Type : Transceiver  
Frequency band : 2412 to 2464MHz  
Bandwidth & Channel Spacing : 22MHz & 26MHz  
Modulation : DSSS  
Power Supply (inner) : DC 3.3 V  
Antenna Type : Chip Helical antenna  
Antenna Connector Type : Integral  
Antenna Gain : -0.31 dBi max

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### **SECTION 3 : Test standard information**

#### **3.1 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.

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**3.2 SAR Test online**

SAR evaluation was measured all USB orientations (see Appendix 1 – (1) Horizontal-Front, (2) Horizontal-Rear, (3) Vertical-Right side, and (4) Vertical-Left side) with a device to phantom separation distance of 5 mm, according to KDB 447498 requirements.

**3.3 Procedure and result**

No.	Item	Test Procedure	Limit	Remarks	Exclusion	Result
1	Human Exposure	FCC OET BULLETIN 65, SUPPLEMENT C	FCC47CFR 2.1093	SAR Measurement	N/A	Complied Max.SAR = 0.692W/kg

Note: UL Japan, Inc. 's SAR Work Procedures QPM46 and QPM47

**Result of Max. SAR value**

**Max. SAR Value: 0.692W/kg (Body, 2412MHz)**

The 1-g SAR was <0.8W/kg for all configurations.  
Therefore according to the KDB447498 D01, the EUT was approved for used in a multiple platform.

**3.3 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**

### 3.4 Test Location

\*Shielded room for SAR testings

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### 3.5 Confirmation before SAR testing

#### Correlation of Output Power between EMC and SAR tests

It was checked that the antenna port power was correlated within 0~+5% (FCC requirements)  
The result is shown in Section 6.1.

- **Peak power at EMC test (March 16, 2009)**  
EMC power was measured for SAR test sample (S/N: 900021).
- **Peak power at SAR test (March 17, 2009)**  
SAR power was measured for SAR test sample (S/N: 900021).
- **Average power at SAR test (March 17, 2009)**  
The average power was measured to decide the crest factor (PAR).

### 3.6 Confirmation after SAR testing

It was checked that the power drift [W] is within  $\pm 5\%$ . The verification of power drift during the SAR test is that DASY4 system calculates the power drift by measuring the E-field at the same location at beginning and the end of the scan measurement for each test position.

DASY4 system calculation Power drift value[dB] =  $20\log(E_a)/(E_b)$   
Before SAR testing :  $E_b$ [V/m]  
After SAR testing :  $E_a$ [V/m]

Limit of power drift[W] =  $\pm 5\%$   
 $X[\text{dB}] = 10\log(P) = 10\log(1.05/1) = 10\log(1.05) - 10\log(1) = 0.212\text{dB}$

from E-field relations with power.  
 $S = E \cdot H = E^2 / \eta = P / 4 \pi r^2$  ( $\eta$  : Space impedance)  
 $P = E^2 \cdot 4 \pi r^2 / \eta$   
Therefore, The correlation of power and the E-field  
 $X[\text{dB}] = 10\log(P) = 10\log(E)^2 = 20\log(E)$

From the above mentioned,  
The calculated power drift of DASY4 System must be the less than  $\pm 0.212\text{dB}$ .

### 3.7 Measurement procedure

Step1. The searching for the worst position

This test was performed at the worst modulation of Step 1

Step2. Change to the Low and High channels

This test was performed at the worst conditions of Step 2.

**Note:**Radiated power is always monitored by Spectrum Analyzer.)

### 3.8 Test setup of EUT

SAR evaluation was measured all USB orientations (see Appendix 1 – (1) Horizontal-Front, (2) Horizontal-Rear, (3) Vertical-Right side, and (4) Vertical-Left side) with a device to phantom separation distance of 5 mm, according to KDB 447498 requirements.

(1): Horizontal-Front:

The test was performed in separated distance of 5 mm between front surface of the EUT and the flat phantom.

(2) Horizontal-Rear:

The test was performed in separated distance of 5 mm between rear surface of the EUT and the flat phantom.

(3): Vertical-Right side:

The test was performed in separated distance of 5 mm between right side of the EUT and the flat phantom.

(4): Vertical-Left side:

The test was performed in separated distance of 5 mm between left side of the EUT and the flat phantom.

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## **SECTION 4 : Operation of E.U.T. during testing**

### **4.1 Operating modes for SAR testing**

#### **4.1.1 Setting of EUT**

1. Measurement mode  
Tx frequency band : 2412-2464MHz  
Channel : 1ch(2412MHz),2ch(2438MHz),3ch(2464MHz)  
Modulation : DSSS  
TX data sequence : Pseudo random sequence  
Crest factor : Refer to the following

**Note:** Details of crest factor (PAR)

The data of worst SAR result and maximum PAR was used for the following PAR value.

Frequency[MHz]	PK	AVG	Crest factor (PAR)*
2412	91.83	58.88	1.6
2438	78.70	50.93	1.5
2464	66.99	43.25	1.5

\*2 Crest factor (PAR) = PK power / AVG power

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## **SECTION 5 : Test surrounding**

### **5.1 Measurement uncertainty**

The uncertainty budget has been determined for the DASY4 measurement system according to the SPEAG documents[6][7] and is given in the following Table.

Error Description	Uncertainty value ± %	Probability distribution	divisor	(ci) 1g	Standard Uncertainty (1g)	vi or v <sub>eff</sub>
<b>Measurement System</b>						
Probe calibration	±6.8	Normal	1	1	±6.8	∞
Axial isotropy of the probe	±4.7	Rectangular	√3	(1-cp) <sup>1/2</sup>	±1.9	∞
Spherical isotropy of the probe	±9.6	Rectangular	√3	(cp) <sup>1/2</sup>	±3.9	∞
Boundary effects	±2.0	Rectangular	√3	1	±1.2	∞
Probe linearity	±4.7	Rectangular	√3	1	±2.7	∞
Detection limit	±1.0	Rectangular	√3	1	±0.6	∞
Readout electronics	±0.3	Normal	1	1	±0.3	∞
Response time	±0.8	Rectangular	√3	1	±0.5	∞
Integration time	±2.6	Rectangular	√3	1	±1.5	∞
RF ambient Noise	±3.0	Rectangular	√3	1	±1.7	∞
RF ambient Reflections	±3.0	Rectangular	√3	1	±1.7	∞
Probe Positioner	±0.8	Rectangular	√3	1	±0.5	∞
Probe positioning	±9.9	Rectangular	√3	1	±5.7	∞
Max.SAR Eval.	±4.0	Rectangular	√3	1	±2.3	∞
<b>Test Sample Related</b>						
Device positioning	±2.9	Normal	1	1	±2.9	5
Device holder uncertainty	±3.6	Normal	1	1	±3.6	3
Power drift	±5.0	Rectangular	√3	1	±5.8	∞
<b>Phantom and Setup</b>						
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	1	0.64	±3.2	∞
Liquid permittivity (target)	±5.0	Rectangular	√3	0.6	±1.7	∞
Liquid permittivity (meas.)	±5.0	Rectangular	1	0.6	±3.0	∞
<b>Combined Standard Uncertainty</b>					<b>±14.360</b>	
<b>Expanded Uncertainty (k=2)</b>					<b>±28.7</b>	

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**SECTION 6 : Confirmation before testing**

**6.1.1 EMC power**

This data is reference data of EMC test(Report No. 29FE0077-HO-01).

Date of test: March 16,2009

**[Peak Detect]**

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result	
					[dBm]	[mW]
Low	2412.0	7.87	1.67	10.08	19.62	91.62
Mid	2438.0	7.18	1.69	10.08	18.95	78.52
High	2464.0	6.46	1.69	10.08	18.23	66.53

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer) + Attenuator

**6.1.2 SAR power**

Date of test: March 17,2009

Ch	Frequency [MHz]	P/M		Cable Loss [dB]	Atten. [dB]	Result			
		Reading [dBm]				[dBm]		[mW]	
		PK	AVG			PK	AVG	PK	AVG
Low	2412.0	7.88	5.95	1.67	10.08	19.63	17.70	91.83	58.88
Mid	2437.0	7.19	5.30	1.69	10.08	18.96	17.07	78.70	50.93
High	2462.0	6.49	4.59	1.69	10.08	18.26	16.36	66.99	43.25

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer) + Attenuator

\* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.

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