




SAR TEST REPORT

Test Report No. : 26HE0163-HO-N-1

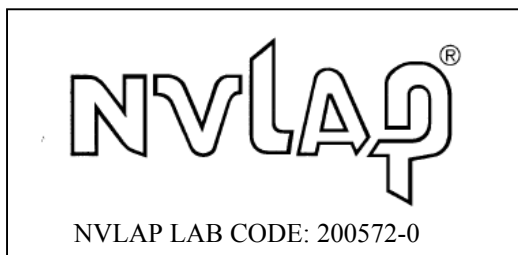
Applicant : ONKYO CORPORATION
Type of Equipment : Digital Wireless Audio Transmitter
Model No. : UTX-1
FCC ID : ATMUTX1
Test standard : FCC47CFR 2.1093
FCC OET Bulletin 65, Supplement C
Test Result : Complied
Max. SAR Measured : 0.409W/kg (Body, 2412MHz)

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 the above standard. 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 : September 11, 2006

Tested by : 
Miyo Ikuta
EMC Services

Approved by : 
Tetsuo Maeno
Site Manager of EMC Services



This laboratory is accredited by the NVLAP LAB CODE 200572-0, U.S.A. The tests reported herein have been performed in accordance with its terms of accreditation.
*As for the range of Accreditation in NVLAP, you may refer to the WEB address, <http://ulapex.jp/emc/nvlap.htm>

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SECTION 1 : Client information

Company Name	ONKYO CORPORATION
Brand name	ONKYO
Address	2-1 Nisshin-cho Neyagawa-shi Osaka 572-8540, Japan
Telephone Number	+81-72-831-8073
Facsimile Number	+81-72-831-8069
Contact Person	Wataru Komine

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

2.1 Identification of E.U.T.

Type of Equipment	Digital Wireless Audio Transmitter
Model No.	UTX-1
Serial No.	pp10
Country of Manufacture	China(assemble Japan)
DC Supply	DC5.0V / 0.4A (USB BUS powered)
Accessories	N/A
Size of EUT	(W×D×H): About 86.5×28.5×13mm
Condition of EUT	Production prototype (Not for Sale: This sample is equivalent to mass-produced items.)
Receipt Date of Sample	May 26, 2006
Modification of EUT	No modification by the test lab.
Category Identified	Portable device

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2.3 Identification of Wireless LAN Module

2.3.1 Product Description

Equipment Type	Transmitter
Frequency of Operation	2412-2462MHz
Antenn Terminal Conducted power tested	17.92 dBm (61.94mW)
Type of Modulation	DSSS (DQPSK 2Mbps only)
Operating voltage(Inner)	3.3V,2.8V
Bandwidth	13MHz
Channel spacing	5MHz
Channel number	11
Antenna type	Chip Ceramic antenna
Antenna connector Type	N/A
Antenna Gain	2.0dBi
Other Clock Frequency	12MHz(for USB IC),44MHz(for Baseband IC)
Temperature of operation	0 deg. C. to + 35 deg. C

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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 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.

<p style="text-align: center;">NOTE:GENERAL POPULATION/UNCONTROLLED EXPOSURE SPATIAL PEAK(averaged over any 1g of tissue) LIMIT 1.6 W/kg</p>

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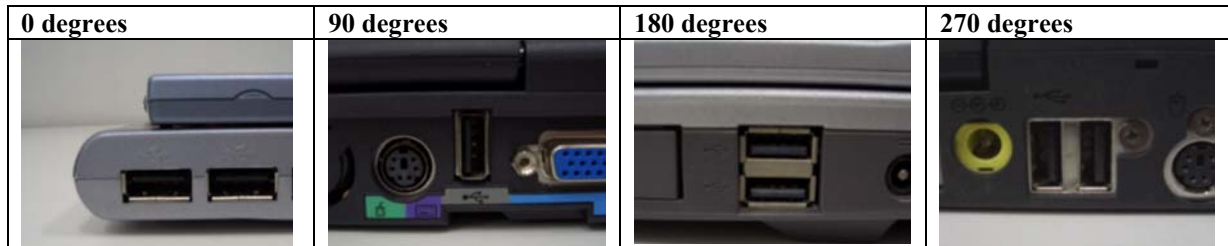
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SECTION 4 : Outline and result of test

4.1 Outline of test

An alignment of USB port has 4 types of 0 degrees, 90 degrees, 180 degrees, and 270 degrees by various PC
It is not required 3 hosts test for the device which the output power is less than 100mW by FCC.

However, we tested 4 hosts to measure SAR value regarding all installed directions at the bottom position of notebook PC which has possibility to touch the body.



4.2 Result of Max. SAR value

Max SAR Measured : 0.409W/kg (Body Lch 2412MHz)

4.3 Test location

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SECTION 5 : Operation of E.U.T. during testing

5.1 Confirmation before SAR testing

(i) Correlation of EMC power and SAR power

Peak Power test

SAR power is equal to DATA of EMC test (September 8, 2006) based on the following reason.

- EMC and SAR tests are performed with the same test sample under the same condition.
- EMC and SAR tests are performed at the same laboratory.
- The test mode setting is simple, and there is no possibility that the power (value) is changed by the wrong setting.

The result is shown in Section 7.1.

Average Power test

The average power of EUT was confirmed before SAR testing.

The result is shown in Section 7.1.

5.2 Confirmation after SAR testing

It was checked that the power drift is within $\pm 5\%$ in the evaluation procedure of SAR testing.

The result is shown in APPENDIX 2.

5.3 Operating modes for SAR testing

5.3.1 Setting of EUT

Tx frequency band : 2412MHz-2462 MHz
Channel : 1ch(2412MHz), 6ch(2437MHz), 11ch(2462MHz)
Modulation : DSSS (DQPSK 2Mbps)
Crest factor : 1

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5.3.2 SAR Measurement (Radiated power is always monitored by Spectrum Analyzer.)

Step1. The searching for the worst position

- 1-1 PC type #1 (EUT Back / 3mm)
- 1-2 PC type #2 (EUT Front / 9mm)
- 1-3 PC type #3 (EUT Left side / 0mm)
- 1-4 PC type #4 (EUT Right side / 0mm)
- 1-5 PC type #1 (EUT Top / 15mm)

Step2. The changing to the Low and High channels

This test was performed at the worst condition of Step1.

5.4 Test setup of EUT

In order to assume this situation, we performed the test at the following positions. Please refer to "APPENDIX 1" for more details.

1. PC type #1 (EUT Back / 3mm) : The test was performed in touch with bottom of the PC to the flat section of SAM Twin Phantom. The separation between the EUT and phantom was 3mm.
2. PC type #2 (EUT Front / 9mm) : The test was performed in touch with bottom of the PC to the flat section of SAM Twin Phantom. The separation between the EUT and phantom was 9mm.
3. PC type #3 (EUT Left side / 0mm): The test was performed in touch with left side of the EUT to the flat section of SAM Twin Phantom.
4. PC type #4 Bottom (Right side 0mm): The test was performed in touch with right side of the EUT to the flat section of SAM Twin Phantom.
5. PC type #1 (EUT Top / 15mm) : The test was performed in the separation of 15mm between top of the EUT and flat sections of the SAM Twin Phantom.

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SECTION 6 : Test surrounding

6.1 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 \pm %	Probability distribution	divisor	(ci) 1g	Standard Uncertainty (1g)	vi or v _{eff}
Measurement System						
Probe calibration	± 6.8	Normal	1	1	± 6.8	∞
Axial isotropy of the probe	± 4.7	Rectangular	$\sqrt{3}$	$(1-c_p)^{1/2}$	± 1.9	∞
Spherical isotropy of the probe	± 9.6	Rectangular	$\sqrt{3}$	$(c_p)^{1/2}$	± 3.9	∞
Boundary effects	± 2.0	Rectangular	$\sqrt{3}$	1	± 1.2	∞
Probe linearity	± 4.7	Rectangular	$\sqrt{3}$	1	± 2.7	∞
Detection limit	± 1.0	Rectangular	$\sqrt{3}$	1	± 0.6	∞
Readout electronics	± 0.3	Normal	1	1	± 0.3	∞
Response time	± 0.8	Rectangular	$\sqrt{3}$	1	± 0.5	∞
Integration time	± 2.6	Rectangular	$\sqrt{3}$	1	± 1.5	∞
RF ambient Noise	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
RF ambient Reflections	± 3.0	Rectangular	$\sqrt{3}$	1	± 1.7	∞
Probe Positioner	± 0.8	Rectangular	$\sqrt{3}$	1	± 0.5	∞
Probe positioning	± 9.9	Rectangular	$\sqrt{3}$	1	± 5.7	∞
Max.SAR Eval.	± 4.0	Rectangular	$\sqrt{3}$	1	± 2.3	∞
Test Sample Related						
Device positioning	± 2.9	Normal	1	1	± 2.9	6
Device holder uncertainty	± 3.6	Normal	1	1	± 3.6	4
Power drift	± 5.0	Rectangular	$\sqrt{3}$	1	± 2.9	∞
Phantom and Setup						
Phantom uncertainty	± 4.0	Rectangular	$\sqrt{3}$	1	± 2.3	∞
Liquid conductivity (target)	± 5.0	Rectangular	$\sqrt{3}$	0.64	± 1.8	∞
Liquid conductivity (meas.)	± 5.0	Rectangular	1	0.64	± 3.2	∞
Liquid permittivity (target)	± 5.0	Rectangular	$\sqrt{3}$	0.6	± 1.7	∞
Liquid permittivity (meas.)	± 5.0	Rectangular	1	0.6	± 3.0	∞
Combined Standard Uncertainty						
					± 13.45	
Expanded Uncertainty (k=2)						
					± 26.91	

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SECTION 7 : Results of confirmation before SAR testing

7.1 Result of correlation of EMC power and SAR power

7.1.1 Peak Power results

This data is reference data of EMC test. (Report No. 26HE0163-HO-B-1)

Test Date : September 8, 2006

Ch	Frequency [MHz]	PM(PK) Reading [dBm]	Atten. [dB]	Cable Loss [dB]	Result	
					[dBm]	[mW]
Low	2412	6.30	10.00	1.45	17.75	59.57
Mid	2437	6.42	10.00	1.50	17.92	61.94
High	2462	6.10	10.00	1.55	17.65	58.21

Sample Calculation : Result = Reading + Atten. + Cable Loss

* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

7.1.2 Average Power results

Test Date : September 11, 2006					
Ch	Freq. [MHz]	PM(AV) Reading [dBm]	Cable Loss [dB]	Atten. Loss [dB]	Result [dBm]
Low	2412.0	3.12	1.45	10.0	14.57
Mid	2437.0	3.12	1.50	10.0	14.62
High	2462.0	2.85	1.55	10.0	14.40

Sample Calculation:
Result = Reading + Cable Loss + Attenuator Loss

*Result is calculated to two places of decimals. Therefore, there may be 0.1 difference for the result.

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SECTION 8 : Measurement results

8.1 SAR measurement results

All of power drifts were within $\pm 5\%$. The measurement data is shown the "APPENDIX 2".

Liquid Depth (cm) : **15.0** Model : **UTX-1**
Parameters : $\epsilon_r = 50.3$ $\sigma = 2.02$ Serial No. : **PP10**
Ambient temperature (deg.c.) : **25.0** Modulation : **DSSS**
Relative Humidity (%) : **54** Crest factor : **1**
Date : **September 11, 2006** Measured By : **Miyo Ikuta**

BODY SAR MEASUREMENT										
Frequency		Modulation	Phantom Section	EUT Set-up Conditions				Liquid Temp. [deg.c]		SAR(1g) [W/kg]
Chann	[MHz]			PC		EUT		Before	After	Maximum value of multi-peak
				Position	Separation [mm]	Position	Separation [mm]			
Position search										
Mid	2437	DSSS	Flat	#1 PC Bottom	0	Back	3	23.6	23.6	0.266
Mid	2437	DSSS	Flat	#2 PC Bottom	0	Front	9	23.6	23.5	0.106
Mid	2437	DSSS	Flat	#3 PC Bottom	0	Left Side	0	24.0	24.0	0.161
Mid	2437	DSSS	Flat	#4 PC Bottom	0	Right Side	0	23.5	23.5	0.155
Mid	2437	DSSS	Flat	#1 PC Side	-	Top	15	23.5	23.5	0.00733
Frequency Change										
Low	2412	DSSS	Flat	#1 PC Bottom	0	Back	3	23.5	23.6	0.409
High	2462	DSSS	Flat	#1 PC Bottom	0	Back	3	23.6	23.5	0.269
ANSI / IEEE C95.1 1992 - SAFETY LIMIT								Body SAR : 1.6 W/kg		
Spatial Peak Uncontrolled Exposure / General Population								(averaged over 1 gram)		

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