RADIO TEST REPORT

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

Applicant	:	**ONKYO CORPORATION**
Type of Equipment	:	**Digital Wireless Audio Transmitter**
Model No.	:	**UTX-1**
FCC ID	:	**ATMUTX1**
Test standard	:	**FCC Part 15 Subpart C Section 15.207, Section 15.247: 2006**
Test Result	:	**Complied**

1. This test report shall not be reproduced in 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 regulation.
4. The test results in this report are traceable to the national or international standards.

Date of test:
May 29 to September 11, 2006

Tested by:
Y. Yoshida
Yutaka Yoshida
EMC Services

T. Shimada
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Approved by :
Naoki Sakamoto
Group Leader of EMC Services

NVLAP LAB CODE: 200572-0

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.	pp1, pp10
Country of Manufacture	China (assemble in Japan)
DC Supply	DC5.0V / 0.4A (USB BUS powered)
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.

2.2 Product Description

Model No: UTX-1 is the Digital Wireless Audio Transmitter.
Clock frequency : 12MHz for USB IC, 44MHz for Baseband IC
Feature of EUT : EUT plugs into a USB port on your PC and wirelessly transmits audio.

Equipment Type	Transmitter
Frequency of Operation	2412-2462MHz
Bandwidth	13MHz
Channel spacing	5MHz
Type of Modulation	DSSS (DQPSK, 2Mbps only)
Antenna Type	Chip Ceramic Antenna
Antenna Connector Type	N/A
Antenna Gain	2.0 dBi max
Operating voltage(Inner)	DC3.3V,2.8V

SECTION 3: Test specification, procedures & results

3.1 Test Specification

Test Specification	:	FCC Part15 Subpart C : 2006
Title	:	FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators Section 15.207 Conducted limits : 2006 Section 15.247 Operation within the bands 902-928MHz, 2400-2483.5MHz, and 5725-5850MHz : 2006

FCC 15.31 (e)
This EUT provides stable voltage (DC5.0V) from Host, and it is constantly converted into and provided with DC3.3V and 2.8V for the Operational voltage within RF Module. Therefore, this EUT complies with the requirement.

FCC Part 15.203 Antenna requirement
It is impossible for end users to replace the antenna, because the antenna is mounted inside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

3.2 Procedures and results

[DSSS and other forms of modulation]

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	Conducted emission	**FCC:** ANSI C63.4:2003 7. AC powerline conducted emission measurements	**FCC:** Section 15.207	-	N/A	13.2dB, 0.18325MHz, L, AV	Complied
		IC: RSS-Gen 7.2.2	**IC:** RSS-Gen 7.2.2				
2	6dB Bandwidth	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section 15.247(a)(2)	Conducted	N/A	See data.	Complied
		IC: RSS-Gen 4.4.2	**IC:** RSS-210 A8.2(1)				
3	Maximum Peak Output Power	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section 15.247(b)(3)	Conducted	N/A		Complied
		IC: RSS-Gen 4.6	**IC:** RSS-210 A8.4(4)				
4	Restricted Band Edges	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section 15.247 (d)	Conducted/ Radiated	N/A		Complied
		IC: -	**IC:** RSS-210 A8.5				
5	Power Density	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section 15.247 (e)	Conducted	N/A		Complied
		IC: -	**IC:** RSS-210 A8.2(2)				
6	Spurious Emission	**FCC:** ANSI C63.4:2003 13. Measurement of intentional radiators	**FCC:** Section15.247(d)	Conducted/ Radiated	N/A	5.9dB 58.671MHz, QP, Vertical	Complied
		IC: RSS-Gen 4.7 RSS-Gen 4.8	**IC:** RSS-210 A8.5 RSS-Gen 7.2.1 and 7.2.3				

Note: UL Apex's EMI Work Procedures No.QPM05 and QPM15.
*0) The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

*These tests were also referred to "Guidance on Measurement of Digital Transmission Systems Operating under Section15.247".
*These tests were performed without any deviations from test procedure except for additions or exclusions.

3.3 Addition to standards

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	99% Occupied Band Width	RSS-Gen 4.4.1	-	Conducted	N/A	N/A	N/A

3.4 Uncertainty

Conducted Emission
The measurement uncertainty (with a 95% confidence level) for this test is ±2.6dB.
The data listed in this test report has enough margin, more than the site margin.

Spurious Emission (Radiated)
The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is ±4.59dB(3m)/ ±4.58dB(10m).
The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is ±4.62dB(3m)/ ±4.60dB(10m).
The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is ±5.27dB.
The data listed in this test report has enough margin, more than the site margin.

Other test except Conducted Emission and Spurious Emission (Radiated)
The measurement uncertainty (with a 95% confidence level) for this test is ±3.0dB.

3.5 Test Location

UL Apex Co., Ltd. Head Office EMC Lab. *NVLAP Lab. code: 200572-0
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN
Telephone : +81 596 24 8116 Facsimile : +81 596 24 8124

	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane (m) / horizontal conducting plane	Other rooms
No.1 semi-anechoic chamber	313583	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	655103	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247A-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	IC4247A-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	-
No.4 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.5 semi-anechoic chamber	-	-	6.0 x 6.0 x 3.9m	N/A	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	2.0 x 2.0 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 5.4 m	-
No.7 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.8 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-

* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1, No.2, No.3 and No.4 semi-anechoic chambers and No.7 shielded room.

3.6 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

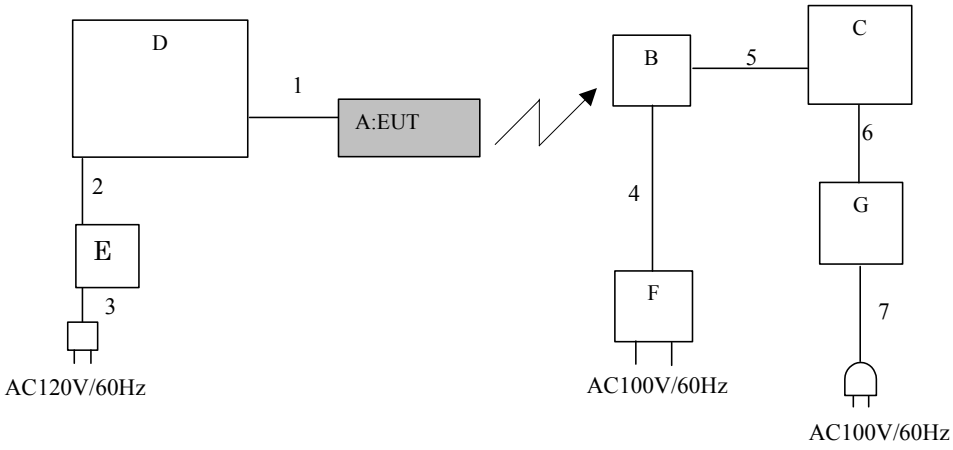
SECTION 4: Operation of E.U.T. during testing

4.1 Operating Modes

The mode is used : 1) Communication mode (for Conducted emission)
-Low channel: 2412MHz
-Mid channel: 2437MHz
-High channel: 2462MHz
2) Continuous transmitting mode (for Radiated emission and Antenna terminal tests)
-Low channel: 2412MHz
-Mid channel: 2437MHz
-High channel: 2462MHz

4.2 Configuration and peripherals

<Conducted emission>



*Cabling and setup were taken into consideration and test data was taken under worse case conditions.

Description of EUT and Support equipment

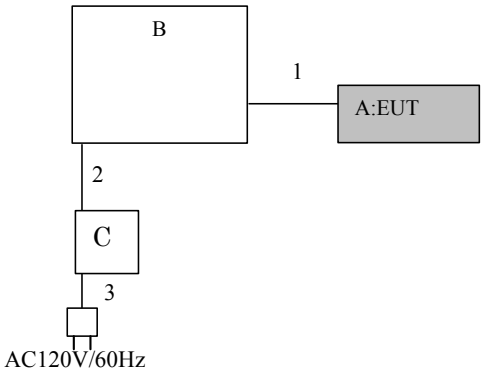
No.	Item	Model number	Serial number	Manufacturer	Remark
A	Digital Wireless Audio Transmitter	UTX-1	pp1	ONKYO	EUT
B	Receiver	RX-1	P650910007	ONKYO	-
C	Speaker	GX-R3X	P430930013	ONKYO	-
D	Note PC	PAV2470PMC	61026293	TOSHIBA	-
E	AC Adaptor	PA3048U-1ACA	0306A1201120G	TOSHIBA	-
F	AC Adaptor	MU12-2050100-A1	0616	LEADER ELECTRONICS INC.	-
G	AC Adaptor	AD-015AD17.5J	-	ONKYO	-

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	0.5	Shielded	Shielded	*1)
2	DC Cable	1.5	Unshielded	Unshielded	-
3	AC Cable	2.0	Unshielded	Unshielded	-
4	DC Cable	1.9	Unshielded	Unshielded	-
5	Audio Cable	1.0	Unshielded	Unshielded	-
6	DC Cable	1.9	Unshielded	Unshielded	-
7	AC Cable	1.9	Unshielded	Unshielded	-

*1) Standard attachment for the exclusive use.

<Radiated emission>



Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	Digital Wireless Audio Transmitter	UTX-1	pp1 *1), pp10 *2)	ONKYO	EUT
B	Note PC	PAV2470PMC	61026293	TOSHIBA	-
C	AC Adaptor	PA3048U-1ACA	0306A1201120G	TOSHIBA	-

*1) Used for Radiated emission test (30MHz-1GHz)
*2) Used for Radiated emission test (above 1GHz) and the other tests

List of cables used

No.	Name	Length (m)	Shield		Remarks
			Cable	Connector	
1	USB Cable	0.5	Shielded	Shielded	*1)
2	DC Cable	1.5	Unshielded	Unshielded	-
3	AC Cable	2.0	Unshielded	Unshielded	-

*1) Standard attachment for the exclusive use.

SECTION 5: Conducted Emission

Test Procedure and conditions

EUT was placed on a wooden table of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane.
The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface.
EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

1) For the tests on EUT with other peripherals (as a whole system)
I/O cable and AC cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane. All unused 50ohm connectors of the LISN(AMN) were resistivity terminated in 50ohm when not connected to the measuring equipment.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber or a Measurement Room.
The EUT was connected to a LISN (AMN).
An overview sweep with peak detection has been performed.

Detector : CISPR quasi-peak and average detector (IF BW 9 kHz)
Measurement range : 0.15-30MHz
Test data : APPENDIX 2
Test result : Pass

SECTION 6: Spurious Emission

[Conducted]
Test Procedure
The Out of Band Emission was measured with a spectrum analyzer connected to the antenna port.
Test data : APPENDIX 2
Test result : Pass

[Radiated]
Test Procedure
EUT was placed on a wooden table of nominal size, 0.5m by 1.0m, raised 80cm above the conducting ground plane.
The Radiated Electric Field Strength intensity has been measured in a Semi Anechoic Chamber with a ground plane and at a distance of 3m(Below 10GHz) and 1m(Above 10GHz), and 0.5 m(Above 18GHz).
The height of the measuring varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.
The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer (in linear mode).
The test was made with the detector (RBW/VBW) in the following table.
When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

20dBc was applied to the frequency over the limit of FCC 15.209 and outside the restricted band of FCC15.205.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver / Spectrum Analyzer	Spectrum Analyzer
Detector IF Bandwidth	QP: BW 120kHz(T/R) 20dBc : RBW: 100kHz VBW: 300kHz (S/A)	PK: RBW:1MHz/VBW: 1MHz AV: RBW:1MHz/VBW:10Hz 20dBc : RBW:100kHz/VBW:300kHz

- The carrier level and noise levels were confirmed at each position of X, Y and Z axes of EUT to see the position of maximum noise, and the test was made at the position that has the maximum noise.

Test data : APPENDIX 2
*The confirmation test was made on EUT with and without USB cable, and the final test was made on EUT with USB cable that had higher Emission level.
Test result : Pass

SECTION 7: Bandwidth

Test Procedure
The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Test data **: APPENDIX 2**
Test result **: Pass**

SECTION 8: Maximum Peak Output Power

Test Procedure
The Maximum Peak Output Power was measured with a power meter (tested bandwidth: 50MHz) connected to the antenna port.

Test data **: APPENDIX 2**
Test result **: Pass**

SECTION 9: Peak Power Density

[Conducted]
Test Procedure
The Peak Power Density was measured with a spectrum analyzer connected to the antenna port.

Test data **: APPENDIX 2**
Test result **: Pass**