



EMI TEST REPORT

Test Report No. : 28GE0170-HO-01-A-R1

Applicant : Sony Corporation
Type of Equipment : UHF Synthesized Transmitter
Model No. : UTX-B2(30)
Test regulation : FCC Part 74: 2006
FCC ID : AK8UTXB2
Test Result : Complied

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2. The results in this report apply only to the sample tested.
3. This sample tested is in compliance with above regulation.
4. The test results in this report are traceable to the national or international standards.
5. This test report must not be used by the customer product certification, approval, or endorsement by NVLAP, NIST, or any agency of the Federal Government.
6. Original test report number of this report is 28GE0170-HO-01-A.

Date of test:

February 24 to April 30, 2008

Tested by:

Kenichi Adachi
EMC Services

Shinya Watanabe
EMC Services

Takahiro Hatakeda
EMC Services

Tomotaka Sasagawa
EMC Services

Kazufumi Nakai
EMC Services

Approved by :

Mitsuru Fujimura
Assistant Manager of EMC Services

UL Japan, Inc.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

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SECTION 1: Customer information

Company Name : SONY EMCS CORPORATION KOSAI TEC
Address : 554 Sakaijuku Kosai-shi, Shizuoka, 431-0452 Japan
Telephone Number : +81-53-577-1012
Facsimile Number : +81-53-577-3489
Contact Person : Youhei Hisano

* SONY EMCS CORPORATION KOSAI TEC (Subsidiary Company Name) is on behalf of the applicant:
Sony Corporation.

Company Name : Sony Corporation
Address : 1-7-1 Konan, Minato-ku, Tokyo, 108-0075 Japan

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

2.1 Identification of E.U.T.

Type of Equipment : UHF Synthesized Transmitter
Model No. : UTX-B2(30)
Serial No. : 8021(U3032)
Rating : DC 3.0V (Battery)
Receipt Date of Sample : February 13, 2008
Country of Mass-production : Korea
Condition of EUT : Engineering prototype
(Not for Sale: This sample is equivalent to mass-produced items.)
Modification of EUT : No modification by the test lab.

2.2 Product Description

Model: UTX-B2(30) (referred to as the EUT in this report) is the UHF Synthesized Transmitter.

Equipment Type : Transmitter
Emission designator : 116KF3E
Necessary Bandwidth : 116kHz = 2M + 2D = (2 x 18kHz) + (2 x 40kHz)
M : Maximum modulation frequency = 18kHz
D : Peak deviation = 40kHz
Channel spacing : 125kHz
Frequency of Operation : 566.125MHz to 589.875MHz (Serial No: 8021(U3032))
(This frequency range is tested in this report.)
638.125MHz to 661.875MHz (Serial No: 8022(U4244))
(*For this frequency range, please refer to Test report No. 28GE0170-HO-01-E.)
Other Clock Frequency(ies) : CPU 8MHz, 300kHz(DC-DC Converter clock), 500kHz(DC-DC Converter clock),
32.000kHz (Tone pulse)
Antenna type : 1/4 Lambda wave length wire
Modulation : Frequency modulation
Transmit power or power range : High: 30mW, Low: 5mW
Method of Frequency Generation : Crystal method
Operating Voltage (inner) : DC 5.0V

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SECTION 3: Test specification, procedures and results

3.1 Test Specification

Test Specification : FCC Part74: 2006, final revised on December 15, 2006
Title : EXPERIMENTAL RADIO, AUXILIARY, SPECIAL BROADCAST
AND OTHER PROGRAM DISTRIBUTIONAL SERVICES

3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst margin	Results
1	RF Output Power	FCC Section 2.1046	FCC Section 74.861(e)(1) ----- RSS-123 Section 6.2	-	N/A	<Radiated> 8.0dB 589.875MHz, Horizontal, AV <Conducted> 8.65dB 578.125MHz, AV	Complied
2	Modulation Characteristics	FCC Section 2.1047(a) and (b)	FCC Section 74.861(e)(3) ----- RSS-123 Section 5.5	-	N/A	-	Complied
3	Emission Bandwidth	FCC Section 2.1049	FCC Section 74.861(e)(5),(6) ----- RSS-123 Section 6.3	-	N/A	-	Complied
4	Field Strength of Spurious Emission	FCC Section 2.1053	FCC Section 74.861(e)(6) ----- RSS-123 Section 6.3	-	N/A	37.0dB 2890.63MHz Vertical, PK	Complied
5	Frequency Stability Measurement	FCC Section 2.1055	FCC Section 74.861(e)(4) ----- RSS-123 Section 7	-	N/A	-	Complied

Note: UL Japan, Inc.'s EMI Work Test Procedure QPM05.

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3.3 Uncertainty

EMI

The following uncertainties have been calculated to provide a confidence level of 95% using a coverage factor k=2.

Test room	Conducted emission	Radiated emission (10m*)			Radiated emission (3m*)			Radiated emission (3m*)	
	150kHz-30MHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	9kHz-30MHz	30MHz-300MHz	300MHz-1GHz	1GHz-18GHz	18GHz-40GHz
No.1 semi-anechoic Chamber (±)	3.7dB	3.1dB	4.7dB	4.4dB	3.2dB	3.7dB	4.4dB	5.9dB	6.1dB
No.2 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.3dB	3.9dB	5.9dB	6.1dB
No.3 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.2dB	4.4dB	5.9dB	6.1dB
No.4 semi-anechoic chamber (±)	3.7dB	-	-	-	3.2dB	4.2dB	4.4dB	5.9dB	6.1dB

*10m/3m = Measurement distance

Radiated emission test(3m)

The data listed in this test report has enough margin, more than the site margin.

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4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124

3.4 Test Location

UL Japan, Inc. 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	IC4247	19.2 x 11.2 x 7.7m	7.0 x 6.0m	No.1 Power source room
No.2 semi-anechoic chamber	655103	IC4247-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 semi-anechoic chamber	148738	IC4247-3	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.3 Preparation room
No.3 shielded room	-	-	4.0 x 6.0 x 2.7m	N/A	-
No.4 semi-anechoic chamber	134570	IC4247-4	12.0 x 8.5 x 5.9m	6.8 x 5.75m	No.4 Preparation room
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	6.0 x 6.0m	-
No.6 shielded room	-	-	4.0 x 4.5 x 2.7m	4.75 x 5.4 m	-
No.6 measurement room	-	-	4.75 x 5.4 x 3.0m	4.75 x 4.15 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	-
No.9 measurement room	-	-	8.0 x 4.5 x 2.8m	2.0 x 2.0m	-
No.10 measurement room	-	-	2.6 x 2.8 x 2.5m	2.4 x 2.4m	-
No.11 measurement room	-	-	3.1 x 3.4 x 3.0m	2.4 x 3.4m	-

* 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.3 and No.4 shielded rooms.

3.5 Test set up, Data of EMI, and Test instrument

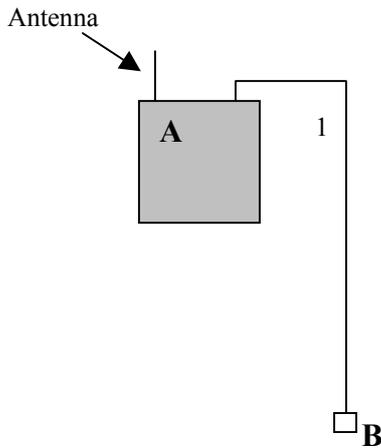
Refer to APPENDIX 1 to 3.

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

4.1 Operating Modes

The sequence is used : Continuous Transmitting
Operating Frequency : Low band: Low: 566.125MHz, Mid: 578.125MHz, High: 589.875MHz
Power setting : High (30mW) / Low (5mW)
Justification : The system was configured in typical fashion (as a customer would normally use it) for testing.

4.2 Configuration and peripherals



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

Description of EUT and Support equipment

No.	Item	Model number	Serial number	Manufacturer	Remark
A	UHF Synthesized Transmitter	UTX-B2(30)	8021	Sony Corporation	EUT
B	Microphone	-	-	Sony Corporation	- *1)

*1) Not used for Frequency Stability test.

List of cables used

No.	Name	Length (m)	Shield		Remark
			Cable	Connector	
1	Microphone Cable	1.2	Shielded	Shielded	- *1)

*1) Not used for Frequency Stability test.

SECTION 5: RF Output power and Field Strength of Spurious Emission

**5.1 Test Procedure : (RF Output Power) FCC Part 2.1046, FCC Part 74.861(e)(1)
(Spurious Emission) Part 2.1053, Part 74.861(e)(6)**

[Conducted]

The test was measured with a power meter connected to the antenna port of EUT.

[Radiated]

The test was performed to gain the maximum power output rating.

- 1) Tune-up the transmitter (EUT)
- 2) For each spurious measurement the receiving antenna is adjusted to the correct length for the frequency involved. These measurements are made from the lowest radio frequency generated in the EUT or 30MHz to the tenth harmonics of the carrier.
- 3) EUT was placed on a urethane platform of nominal size, 0.5m by 1.0m, raised 1m above the conducting ground plane. Test was made with the antenna positioned in both the horizontal and vertical planes of polarization. The Radiated Electric Field Strength intensity has been measured in semi anechoic chamber with a ground plane and at a distance of 3m. The measuring antenna height was varied between 1 to 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.
- 4) Exchanged the EUT to the Substitution Antenna, the measurement was set for the same height 1m as the EUT. The frequency below 1GHz of the Substitution Antenna was used as the Half wave dipole Antenna, which is harmonized with the measured frequency in 3). The frequency above 1GHz of the Substitution Antenna was used with Horn Antenna. The Substitution Antenna was connected with the Signal Generator, and the polarized electromagnetic radiation of the Substitution Antenna was matched with the one of the measuring Antenna, which was set with the Signal Generator to the measured frequency in 3). Then, we set with the Output power (CW) of the Signal Generator where the measuring electromagnetic field is equal to the measured value in 3). The measuring antenna height was varied between 1 to 4m to obtain the maximum receiving level. Its Output power of Signal Generator was recorded.
- 5) Effective radiated power was calculated by subtracting the cable loss and the attenuator loss connected between the Signal Generator and the Substitution Antenna from the Output power of the Signal Generator recorded in 4). For the usage of the Antenna (Horn Antenna) except for the Half wave dipole Antenna (2.15dBi) for the Substitution Antenna, the Effective radiated power was calculated by compensating the finite difference in the Antenna gain of the Half wave dipole Antenna, and Substitution Antenna.

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver	Spectrum Analyzer *
IF Bandwidth	Average: BW: 120kHz	PK: RBW: 1MHz/VBW: 10Hz

* The Spectrum Analyzer was used in 3dB resolution bandwidth.

Transmitter RF Output Limit : 250mW

Transmitter Spurious Limit : mean output power [dBm] – (43 + 10log₁₀ (mean output power in W)) = -13dBm

5.2 Test Data : APPENDIX 2

5.3 Test Result : Pass

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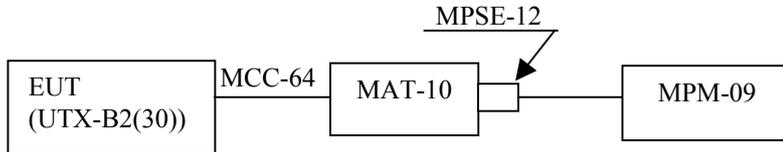
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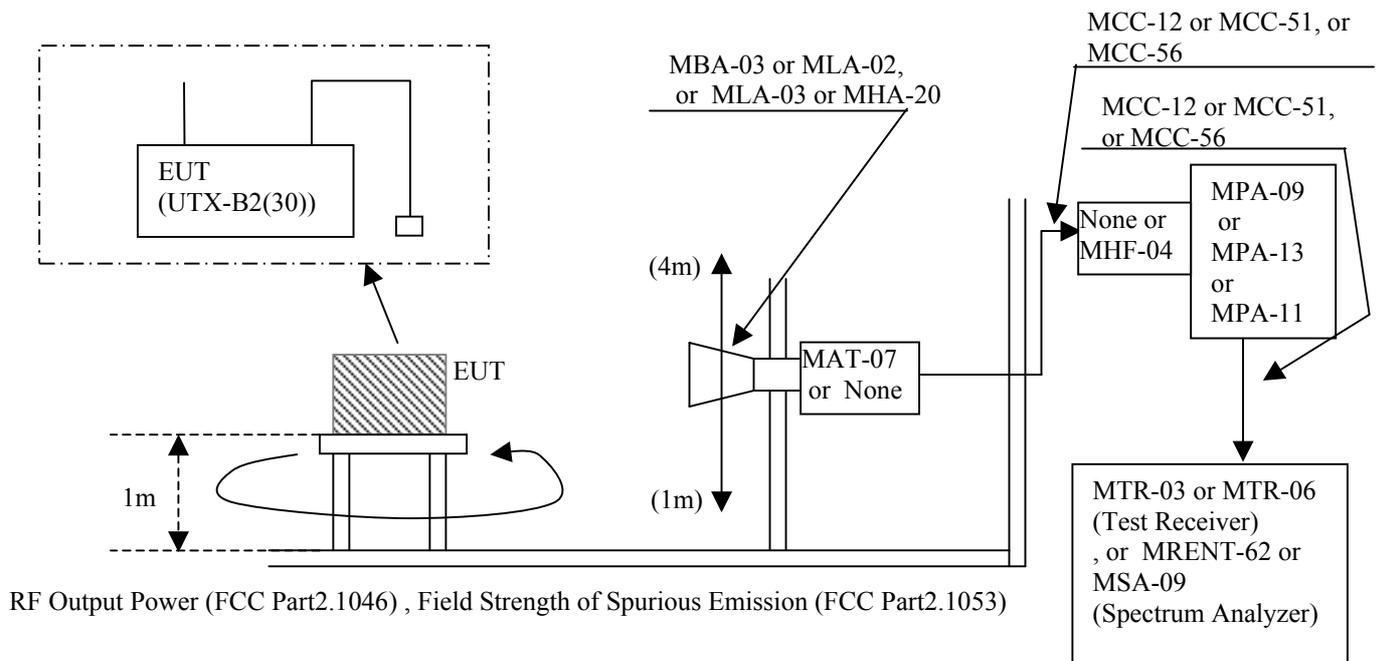
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5.4 Measurement Block Diagram

[Conducted]



[Radiated]



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SECTION 6: Modulation Characteristics

6.1 Transmitter Deviation for Input Level and Modulation frequency

6.1.1 Test Procedure : FCC Part 2.1047(b) , Part 74.861(e)(3)

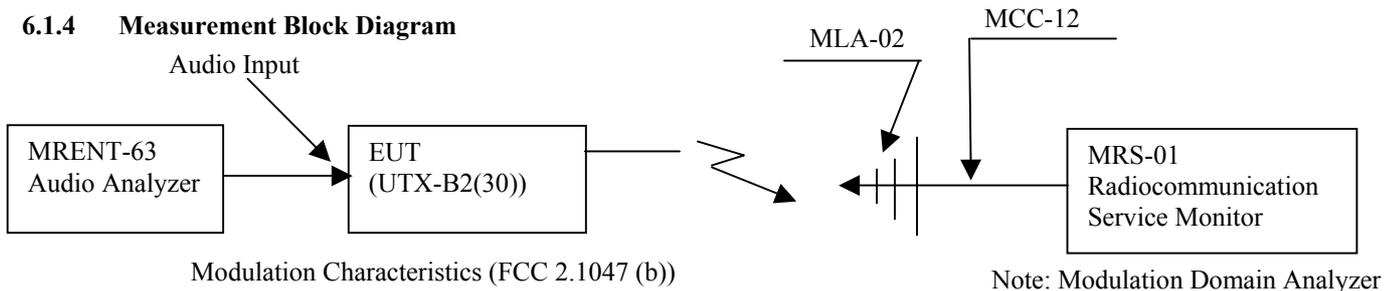
- 1) When input Level from -80dBV to 0dBV is applied to audio input of EUT each modulation.
Audio frequency 100Hz, 300Hz, 1kHz 2.5kHz, 3kHz, and 15kHz frequency deviation is measured with MRS-01: Radiocommunication Service Monitor (Model CMS54).

Modulation (Deviation) Limit: below 75kHz

6.1.2 Test Data : APPENDIX 2

6.1.3 Test Result : Pass

6.1.4 Measurement Block Diagram



6.2 Transmitter Deviation for Input Frequency Response

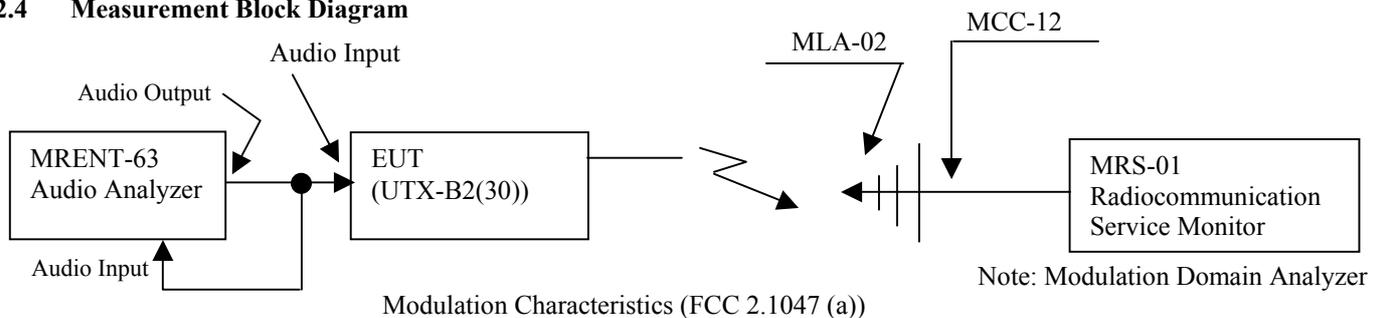
6.2.1 Test Procedure : FCC Part 2.1047(a)

- 1) When frequency from 100Hz to 15kHz is applied to audio input of EUT each input level 50% modulation, modulation input level (= EUT's audio input level) is measured with MRS-01: Radiocommunication Service Monitor (Model CMS54).

6.2.2 Test Data : APPENDIX 2

6.2.3 Test Result : Pass

6.2.4 Measurement Block Diagram



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SECTION 7: Emission Bandwidth

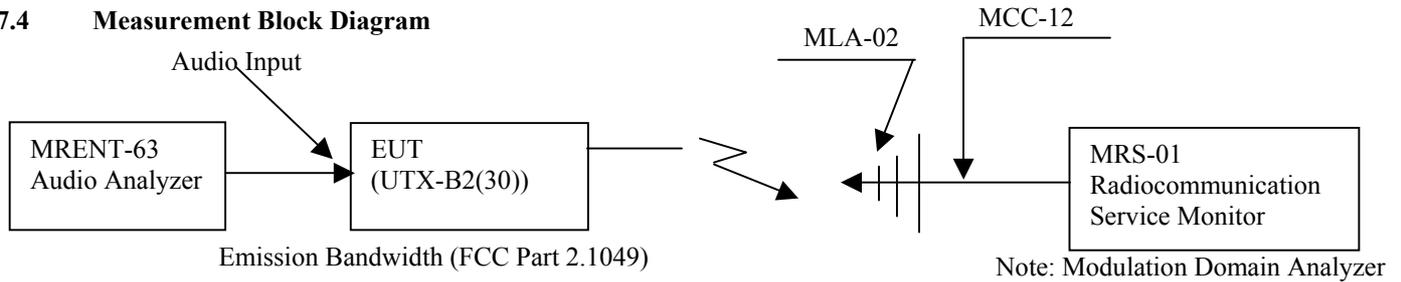
7.1 Test Procedure : FCC Part 2.1049 , Part 74.861(e)(6)

- 1) Set the reference level and the spectrum analyzer to the unmodulation carrier level on the EUT
- 2) The Carrier is modulated by a 2.5kHz tone at an input level 85 percent modulation. The input level shall be established at the frequency of maximum response of the audio modulation.

7.2 Test Data : APPENDIX 2

7.3 Test Result : Pass

7.4 Measurement Block Diagram



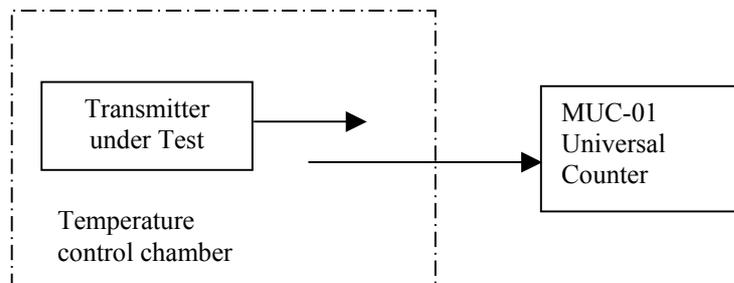
SECTION 8: Frequency Stability

8.1 Test Procedure : FCC 2.1055 , Part 74.861(e)(4)

8.2 Test Data : APPENDIX 2

8.3 Test Result : Pass

8.4 Measurement Block Diagram



Frequency Stability(FCC Part 2.1055)

UL Japan, Inc.

Head Office EMC Lab.

4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

Facsimile : +81 596 24 8124