



## EMI TEST REPORT

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

**Applicant** : Sony Corporation  
**Type of Equipment** : UHF Synthesized Transmitter  
**Model No.** : UTX-B2(42)  
**Test regulation** : FCC Part 74: 2006  
**FCC ID** : AK8UTXB2A  
**Test Result** : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Japan, Inc.
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-E.

**Date of test:**

March 4 to April 30, 2008

**Tested by:**

Kenichi Adachi  
EMC Services

Shinya Watanabe  
EMC Services

Takahiro Hatakeda  
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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**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

## **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(42)  
Serial No. : 8022(U4244)  
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(42) (referred to as the EUT in this report) is the UHF Synthesized Transmitter.

Equipment Type : Transmitter  
Emission designator : 116KF3E  
Necessary Bandwidth :  $116\text{kHz} = 2M + 2D = (2 \times 18\text{kHz}) + (2 \times 40\text{kHz})$   
M : Maximum modulation frequency = 18kHz  
D : Peak deviation = 40kHz  
Channel spacing : 125kHz  
Frequency of Operation : 566.125MHz to 589.875MHz (Serial No: 8021(U3032))  
(\*For this frequency range, please refer to Test report No. 28GE0170-HO-01-A)  
638.125MHz to 661.875MHz (Serial No: 8022(U4244))  
(This frequency range is tested in this report.)  
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> 7.2dB 650.125MHz, 661.875MHz, Horizontal, AV <Conducted> 8.48dB 638.125MHz, 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	34.6dB 5743.13MHz Horizontal, 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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#### 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

### 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

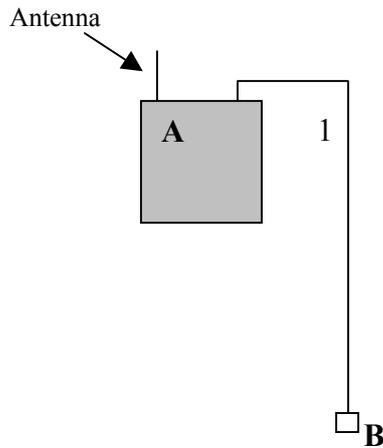
Refer to APPENDIX 1 to 3.

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

### **4.1 Operating Modes**

The sequence is used : Continuous Transmitting  
Operating Frequency : High band: Low: 638.125MHz, Mid: 650.125MHz, High: 661.875MHz  
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(42)	8022	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.

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**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

**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

Transmitter RF Output Limit : 250mW

Transmitter Spurious Limit : mean output power [dBm] – ( 43 + 10log<sub>10</sub> ( mean output power in W ) ) = -13dBm

**5.2 Test Data : APPENDIX 2**

**5.3 Test Result : Pass**

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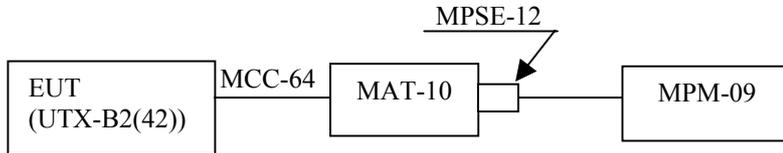
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

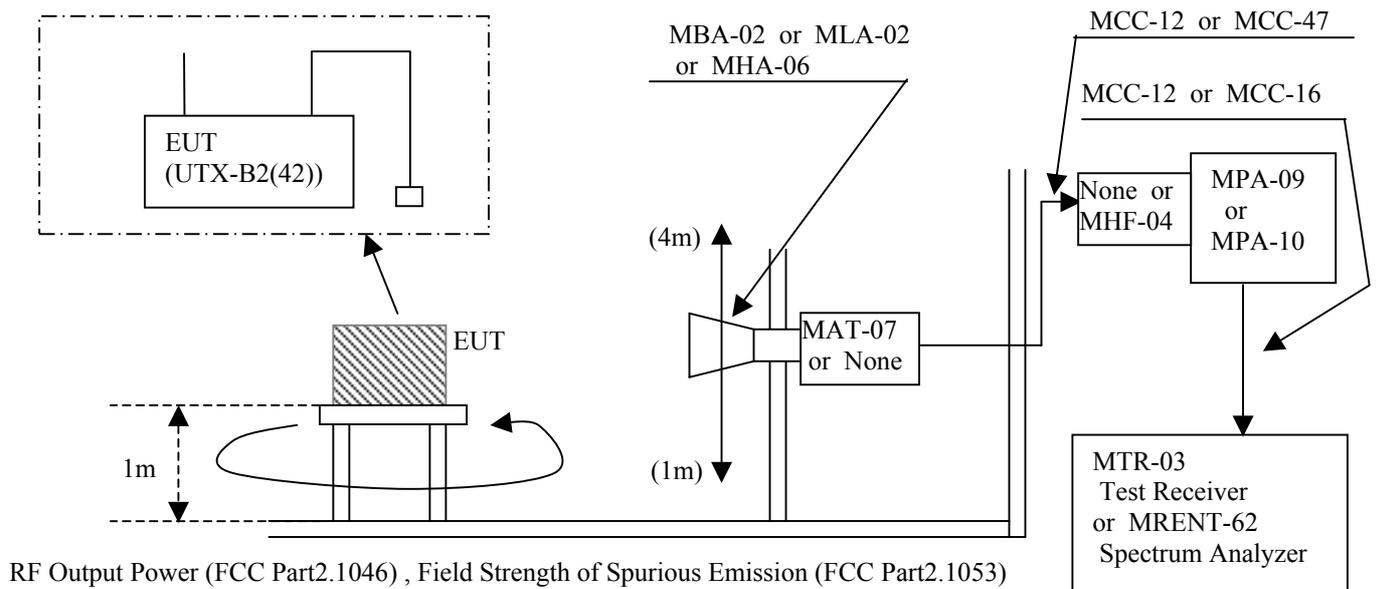
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### 5.4 Measurement Block Diagram

[Conducted]



[Radiated]



## 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)

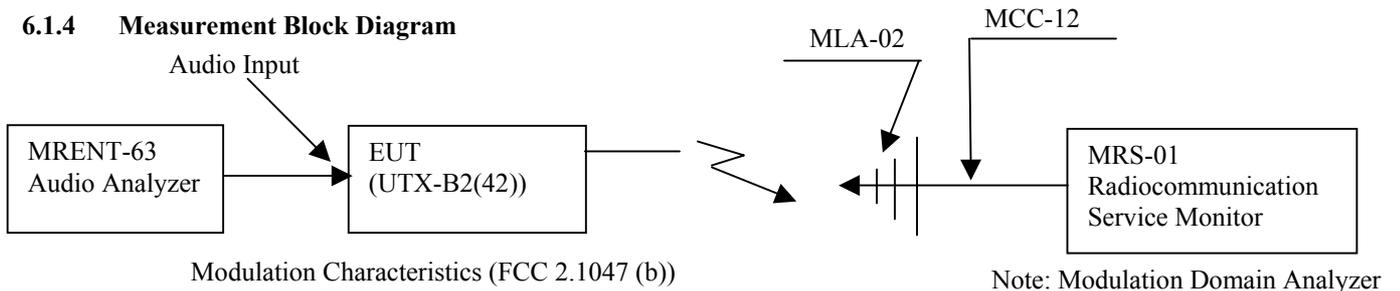
- 1) When input Level from  $-80\text{dBV}$  to  $0\text{dBV}$  is applied to audio input of EUT each modulation.  
Audio frequency 100Hz, 300Hz, 1kHz 2.5kHz, 3kHz, and 15kHz frequency deviation is measured with MRS-01: Radiocommunication Service Monitor (Model CMS54).

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

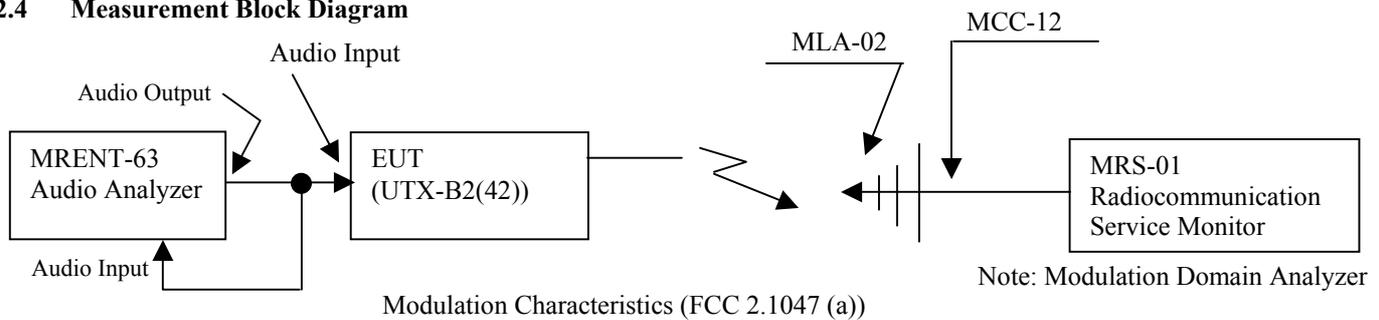
#### 6.2.1 Test Procedure : FCC Part 2.1047(a)

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

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**SECTION 7: Emission Bandwidth**

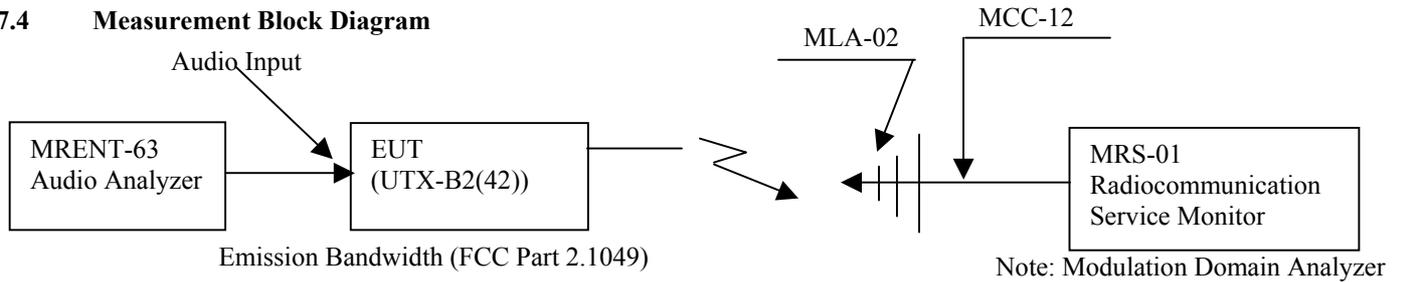
**7.1 Test Procedure : FCC Part 2.1049 , Part 74.861(e)(6)**

- 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**



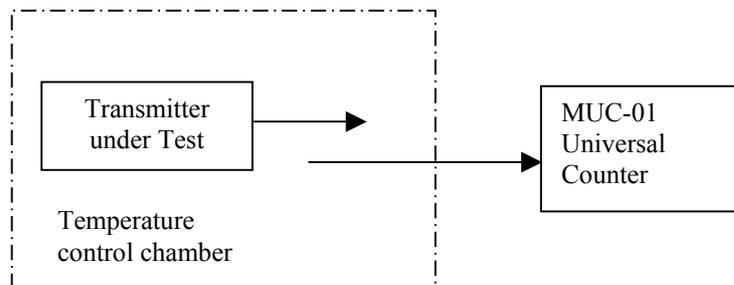
**SECTION 8: Frequency Stability**

**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)

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**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