

TEST REPORT

Test Report No.: 7077F

Applicant : TAIYO YUDEN CO., LTD.
EUT : Bluetooth Module
Model No. : EYTF3CSFT
Serial No. : 31
FCC ID : RYYEYTF3CSFT
Issue Date : 7 August 2007
Date of Test : 30 July 2007
Test Standard : FCC Part 15 Subpart C Section 15.247 (10-1-06 Edition)
Procedure : ANSI C63.4-2003 PUBLIC NOTICE DA 00-705
Test Results : PASS


Approved By:


Manager / Kenzo Furuta



NVLAP LAB CODE 200607-0

Reviewed By:


Chief Engineer / Takeshi Matsumura

Tested By:



Engineer / Kentaro Fukuda

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Revised Record

Revised Record				
Number of Revised Time	Date	Person in Charge	Detail of Revision	Approved By
Initial	7 August 2007	K. Fukuda	-	-

1 Test Report

- (1) This report summarizes the result of a single investigation and test result relate only to tested sample.
- (2) The report shall not be reproduced except in full without the written approval of the TAIYO YUDEN Co., Ltd.
- (3) This test report must not be used by the client to claim product endorsement by any government agency.
- (4) We hereby certify that no party to the applications authorized hereunder is subject to a denial of benefits, including FCC benefits, pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C 853(a).
- (5) The test results in this report are traceable to international standards.

2 General Information

2.1 Applicant Information

Company Name	TAIYO YUDEN CO., LTD.
Address	8-1 Sakai-cho, Takasaki-shi, Gunma, 370-8522, Japan

2.2 Product Description

EUT	Bluetooth Module
Model No.	EYTF3CSFT
Serial No	31
FCC ID	RYYEYTF3CSFT
Production Stage	Pre-Production
Type of Wide Band Modulation	FHSS with AFH
Type of Modulation	GFSK, /4-DQPSK and 8DPSK
ITU Code	F1D
Power Supply	DC 3.3V form Supporting Equipment
Operating Voltage Range	DC 3.15V Min. DC 3.45V Max.
AC Adaptor	-
Operating Temperature Range	0 Min. 70 Max.
Weight	2.3g
Dimensions of EUT	W26.0mm × D23.0mm × H2.65mm
Antenna Type	Inverted F
Max Antenna Gain	2.95dBi
Operating Clocks	1MHz, 1.5MHz, 1200.25 to 1239.25MHz 1201 to 1240MHz and 2.4GHz
Receipt Date of Tested Sample	30 July 2007

EUT is attached to the PC provided with the USB port, and it is a wireless applications communicate with other Bluetooth devices.

This is operated within the bands 2400 - 2483.5MHz frequency hopping intentional radiators that comply with FCC15.247.

It provides 79 channels. And it adopts an AFH function to prevent interference with other wireless applications. Refer to Appendix 1.

EUT operates in the unlicensed 2.4 GHz ISM (Industrial Scientific Medical) band. A frequency hop transceiver is applied to combat interference and fading.

2.3 Summary of Test and Inspection Result

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin	Results
1	Radiated Emission	ANSI C63.4: 2003 Public Notice DA00-705	FCC 15.247(d)	Radiated Emission Test	N/A	4.9dB Transmitting Mode: 2402MHz Frequency: 1602.030MHz Axial Direction: XY-Plane Antenna Polarization: Horizontal	Pass

2.4 Test Methodology

Interference measurements were made in accordance with ANSI C63.4-2003 Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

2.5 Test Facility

TAIYO YUDEN CO., LTD. EMC Center.
5607-2, Nakamuroda-machi, Takasaki-shi, Gunma, 370-3347, Japan.

1. FCC 47CFR, Part 15, Section 15.247 regulation test were performed on the shielded room, and radiated interference field strength test was performed on the 10 meter semi-anechoic chamber located at TAIYO YUDEN CO., LTD. EMC Center, 5607-2 Nakamuroda-machi, Takasaki-shi, Gunma, 370-3347 Japan.
2. This Laboratory is accredited under the National Voluntary Laboratory Accreditation Program (NVLAP) by United States Department of Commerce, National Institute of Standard and Technology (NIST) for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations.
3. These criteria encompass the requirements of ISO/IEC 17025:2005 and the relevant requirements of ISO 9002:1994 as suppliers of calibration or test results. Accreditation awarded for specific services, listed on the Scope of Accreditation for: ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS FCC. (NVLAP LAB CODE: 200607-0). Refer the certificate of the accreditation to Appendix 2.
4. This laboratory is listed by Federal Communications Commission, Equipment Authorization Division (Registration Number: 606514).

3 System Test Configuration

3.1 Justification

1. Emission tests were performed with no deviation from the ANSI C63.4-2003 and FCC 47CFR, Part 15, Section 15.247 regulation tests were performed with no deviation from the FCC Public Notice DA00-705 released March 30, 2000.
2. The system was configured for testing a typical fashion (as a customer would normally use it.).
3. Radiate testing in the range of 1 GHz to 25 GHz was investigated with the spectrum (peak detector function) under the FCC regulation section 15.209 (e) and 15.35 (b). The test performed at an antenna to EUT distance of 1 meter. The level of any unwanted emissions from EUT did not exceed the level of the fundamental emission (Compliance with 15.209 (c)). And test result found to be compliance with FCC regulation section 15.209 (a) Radiated emission limits (500 micro-volts / meter). Data is presented for the “worst case” measurements, that E.U.T was normal operated.
4. Radiate testing in the range of 30 MHz to 1000 MHz was performed at an antenna to EUT distance of 3 meters under the 15.209 (e) and 15.31(f)(1).
5. All tests were performed with the representative channel operation as follows.
 - a. Lowest Frequency Channel: CH0 2402MHz
 - b. Middle Frequency Channel: CH39 2441MHz
 - c. Highest Frequency Channel: CH78 2480MHz

3.2 Operating Modes

Transmitting Mode

Modulation		GFSK
Signal Pattern		PRBS9
Signal Packet Type	GFSK	DH5
Representative Channel		CH0 2402MHz (Lowest Frequency Channel)
		CH39 2441MHz (Middle Frequency Channel)
		CH78 2480MHz (Highest Frequency Channel)

All Tests were performed only in GFSK Modulation because the maximum conducted spurious emission from the Bluetooth module was observed in GFSK Modulation.

Remarks:

Signal Pattern PRBS9: Periodic Pseudo Random Bit Sequence, $2^9 - 1$

Signal Packet Type:
DH1, 3, 5: Data high rate, ACL type packet
Data payload with CRC, without FEC
Fully transmission within one consecutive 625-microsecond transmission slots
Number of slot = 5(DH5)
Data size of payload = 339bytes (DH5)

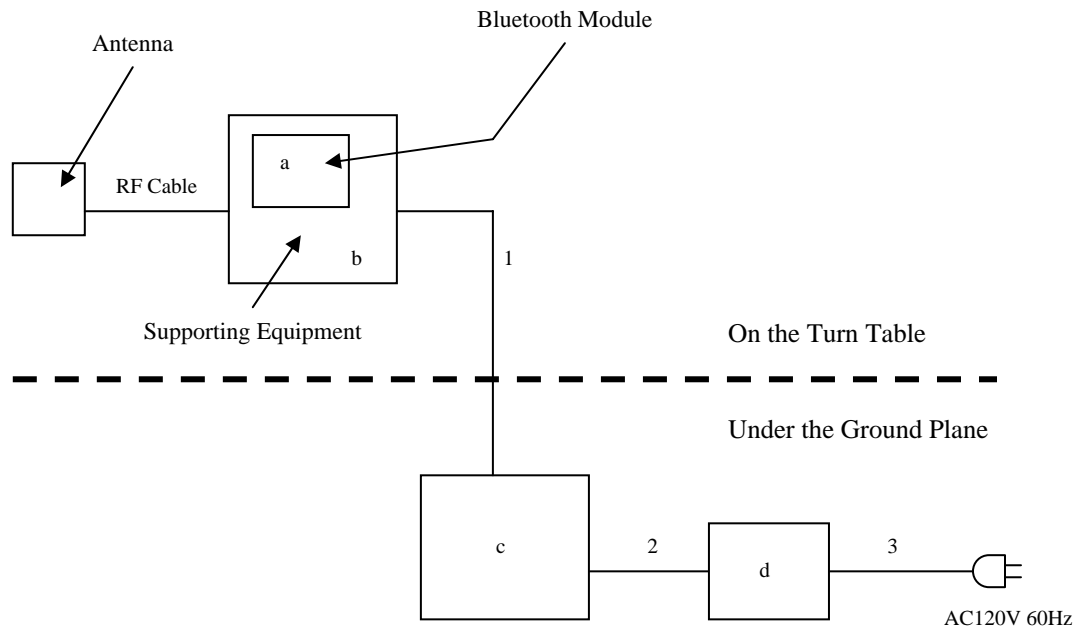
Software (Controller): Bluesuite v1.20 software supplied by CSR Company was used to set up the Bluetooth operating mode.

3.3 Configuration of Tested System

Radiated Emission Test

These numbers and the marks in the picture are corresponding to the numbers and the marks in Tables shown at the Section 3.4 and 3.5.

Power Supply of EUT: DC3.3V from Supporting Equipment.
 (DC3.3V is regulated from DC 5.0V in Supporting Equipment. DC 5.0V is supplied to Supporting Equipment from Personal Computer “c” via USB Cable.)



3.4 List of Accessories and EUT

	Product Name	M/N	S/N	Manufacturer	EUT / Accessory	FCC ID / DoC	Notes
a	Bluetooth Module	EYTF3CSFT	31	TAIYO YUDEN CO., LTD	EUT	RYYEYTF3CSFT	-
b	Supporting Equipment	TE6359	-	TAIYO YUDEN CO., LTD	Accessory	-	-
	Personal Computer	PP04S	CN-0Y0119-36521-467-2020	DELL	Accessory	QDS-BRCM1007	-
c	AC Adapter for PC	PA-1650-05D	-	DELL	Accessory	N/A	-

3.5 Interface Cables

	Cable Type	M/N	Shielded	Ferrite Core	Material of Connector	Length	Treatment for the Extra Length
1	USB Cable	-	Yes	No	Metal	2.0m	-
2	DC Cable	-	No	Yes	Metal	0.9m	-
3	AC Cable	-	No	Yes	Plastic	1.75m	-

3.6 Test Instruments

About test instruments for all tests, please refer to appendix 3.

3.7 Special Test Condition

Nothing

3.8 Equipment Modifications

No modification has been carried out by TAIYO YUDEN CO., LTD. EMC Center.

4 Antenna Requirement

The EUT provides a permanently attached antenna and it was found to be compliant with FCC regulation section 15.203.

Antenna Type	Inverted F
Antenna Gain	2.95dBi

5 Radiated Emission

5.1 Test Setup

The test setup was made according to ANSI STD C63.4-2003 clause 8 on the 10-meter semi-anechoic chamber, which allows a 3 or 1 m distance measurement.

EUT was placed on non-conductive table (foam polystyrene).

The height of this table was 0.8 m.

The measurement has been conducted with both horizontal and vertical antenna polarization.

The turntable has been fully rotated. The highest radiation of the equipment has been recorded.

For further description of the configuration refer to the pictures of this report.

Distance between equipment and antenna : 3m (30MHz to 18GHz)
1m (18GHz to 25GHz)

Test Receiver Setting:

30~1000MHz:

Detector Mode	Quasi-Peak
Bandwidth	120kHz

Spectrum Analyzer Setting:

1~25GHz:

Detector Mode	Peak and Average
Bandwidth	Peak: RBW: 1MHz, VBW: 1MHz
	Average: RBW: 1MHz, VBW: 10Hz

5.2 Radiated Emission Calculation

The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting the Amplifier Gain (if any) from the measured reading.

The basic equation with a sample calculation is as follows:

$$c.f. = AF + CF + AL - AG - DF$$

$$RE = RA + c.f.$$

- Where
- c.f. : Correction Factor [dB(1/m)]
 - RE : Radiated Emission (Emission Level - Result) [dB(uV/m)]
 - RA : Receiver Amplitude (Reading Level) [dBuV]
 - AF : Antenna Factor [dB(1/m)]
 - CF : Cable Attenuation Loss [dB]
 - AG : Amplifier Gain [dB]
 - AL : Attenuator Loss [dB]
 - DF : Distance Factor
 - Distance between equipment and antenna: 3m = 0 [dB]
 - Distance between equipment and antenna: 1m = 9.5 [dB]

Assume a receiver reading of 36.5 dBuV is obtained.
 The Correction Factor of -2.0 dB/m is added, giving a Radiated Emission of 34.5 dBuV/m.
 The 34.5 dBuV/m value was mathematically converted to its corresponding level in uV/m.

$$RE = 36.5 + (-2.0) = 34.5 \text{ dBuV/m}$$

No.	Frequency [MHz]	Reading [dB(μV)]	c. f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	259.310	36.5	-2.0	34.5	46.0	11.5	

$$\text{Level in uV/m} = \text{Common Antilogarithm: } 10^{(34.5/20)} = 53.1 \text{ uV/m}$$

5.3 Test Results

- Serial No. : 31
- Power : DC 3.3V (DC 5.0V from Personal Computer USB)
- Mode : Transmitting Mode, Non Frequency Hopping
- Temperature : Refer to Spurious Emission Data
- Humidity : Refer to Spurious Emission Data
- Regulation : FCC Part15 C §15.247 (d)

The spurious emission data are attached next page.

Note: * = Out of Restricted Band.

This frequency is out of the restricted bands, so radiated emission limits specified in Section 15.209 does not apply.

15.247(d):

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

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Standard : FCC Part15 Subpart C §15.247(d)
 Model No. : EYTF3CSFT
 Serial No. : 31
 Operator : Fukuda
 Power Supply : DC 5.0V from USB
 Temp./Humid. : 23.8 / 67.0%
 Remark1 : Transmitting Mode
 Remark2 : GFSK Modulation
 Remark3 : Lch
 Remark4 : XY

Final Result

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1602.030	60.9	-10.1	50.8	74.0	23.2	
2	2390.000	43.7	-5.8	37.9	74.0	36.1	Floor Noise
3	4804.000	48.8	0.7	49.5	74.0	24.5	
4	7206.000	44.2	4.0	48.2	74.0	25.8	* Floor Noise
5	9608.000	44.4	6.9	51.3	74.0	22.7	* Floor Noise
6	12010.000	46.3	7.8	54.1	74.0	19.9	Floor Noise

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1602.100	58.7	-10.1	48.6	74.0	25.4	
2	4804.000	50.5	0.7	51.2	74.0	22.8	

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Final Result

--- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1602.030	59.2	-10.1	49.1	54.0	4.9	
2	2390.000	32.5	-5.8	26.7	54.0	27.3	Floor Noise
3	4804.000	41.7	0.7	42.4	54.0	11.6	
4	7206.000	31.5	4.0	35.5	54.0	18.5	* Floor Noise
5	9608.000	31.5	6.9	38.4	54.0	15.6	* Floor Noise
6	12010.000	32.9	7.8	40.7	54.0	13.3	Floor Noise

--- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1602.100	56.3	-10.1	46.2	54.0	7.8	
2	4804.000	43.7	0.7	44.4	54.0	9.6	

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Final Result

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1601.980	58.5	-10.1	48.4	74.0	25.6	
2	2390.000	43.7	-5.8	37.9	74.0	36.1	Floor Noise
3	4804.000	49.1	0.7	49.8	74.0	24.2	
4	7206.000	44.2	4.0	48.2	74.0	25.8	* Floor Noise
5	9608.000	44.4	6.9	51.3	74.0	22.7	* Floor Noise
6	12010.000	46.3	7.8	54.1	74.0	19.9	Floor Noise

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1602.000	58.9	-10.1	48.8	74.0	25.2	
2	4804.000	52.9	0.7	53.6	74.0	20.4	

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No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1601.980	56.6	-10.1	46.5	54.0	7.5	
2	2390.000	32.5	-5.8	26.7	54.0	27.3	Floor Noise
3	4804.000	42.5	0.7	43.2	54.0	10.8	
4	7206.000	31.5	4.0	35.5	54.0	18.5	* Floor Noise
5	9608.000	31.5	6.9	38.4	54.0	15.6	* Floor Noise
6	12010.000	32.9	7.8	40.7	54.0	13.3	Floor Noise

--- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
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2	4804.000	46.0	0.7	46.7	54.0	7.3	

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1	1602.000	59.5	-10.1	49.4	74.0	24.6	
2	2390.000	43.7	-5.8	37.9	74.0	36.1	Floor Noise
3	4804.000	47.5	0.7	48.2	74.0	25.8	
4	7206.000	44.2	4.0	48.2	74.0	25.8	* Floor Noise
5	9608.000	44.4	6.9	51.3	74.0	22.7	* Floor Noise
6	12010.000	46.3	7.8	54.1	74.0	19.9	Floor Noise

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1602.200	56.3	-10.1	46.2	74.0	27.8	
2	4804.000	52.7	0.7	53.4	74.0	20.6	

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No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1602.000	57.8	-10.1	47.7	54.0	6.3	
2	2390.000	32.5	-5.8	26.7	54.0	27.3	Floor Noise
3	4804.000	40.9	0.7	41.6	54.0	12.4	
4	7206.000	31.5	4.0	35.5	54.0	18.5	* Floor Noise
5	9608.000	31.5	6.9	38.4	54.0	15.6	* Floor Noise
6	12010.000	32.9	7.8	40.7	54.0	13.3	Floor Noise

--- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1602.200	53.7	-10.1	43.6	54.0	10.4	
2	4804.000	45.9	0.7	46.6	54.0	7.4	

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 Remark1 : Transmitting Mode
 Remark2 : GFSK Modulation
 Remark3 : Mch
 Remark4 : XY

Final Result

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1627.980	60.3	-10.0	50.3	74.0	23.7	*
2	4882.000	46.7	0.8	47.5	74.0	26.5	
3	7323.000	44.6	4.1	48.7	74.0	25.3	Floor Noise
4	9764.000	43.7	6.8	50.5	74.0	23.5	* Floor Noise
5	12205.000	45.1	7.7	52.8	74.0	21.2	Floor Noise
6	14646.000	46.5	10.9	57.4	74.0	16.6	* Floor Noise
7	17087.000	46.9	11.0	57.9	74.0	16.1	* Floor Noise

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1628.060	58.4	-10.0	48.4	74.0	25.6	*
2	4882.000	48.5	0.8	49.3	74.0	24.7	

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No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1627.980	58.7	-10.0	48.7	54.0	5.3	*
2	4882.000	39.1	0.8	39.9	54.0	14.1	
3	7323.000	31.7	4.1	35.8	54.0	18.2	Floor Noise
4	9764.000	31.3	6.8	38.1	54.0	15.9	* Floor Noise
5	12205.000	32.3	7.7	40.0	54.0	14.0	Floor Noise
6	14646.000	33.7	10.9	44.6	54.0	9.4	* Floor Noise
7	17087.000	34.5	11.0	45.5	54.0	8.5	* Floor Noise

--- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1628.060	56.6	-10.0	46.6	54.0	7.4	*
2	4882.000	41.2	0.8	42.0	54.0	12.0	

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 Remark4 : YZ

Final Result

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1627.950	59.0	-10.0	49.0	74.0	25.0	*
2	4882.000	48.2	0.8	49.0	74.0	25.0	
3	7323.000	44.6	4.1	48.7	74.0	25.3	Floor Noise
4	9764.000	43.7	6.8	50.5	74.0	23.5	* Floor Noise
5	12205.000	45.1	7.7	52.8	74.0	21.2	Floor Noise
6	14646.000	46.5	10.9	57.4	74.0	16.6	* Floor Noise
7	17087.000	46.9	11.0	57.9	74.0	16.1	* Floor Noise

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1627.970	59.6	-10.0	49.6	74.0	24.4	*
2	4882.000	51.5	0.8	52.3	74.0	21.7	

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Standard : FCC Part15 Subpart C §15.247(d)
 Model No. : EYTF3CSFT
 Serial No. : 31
 Operator : Fukuda
 Power Supply : DC 5.0V from USB
 Temp./Humid. : 23.8 / 67.0%
 Remark1 : Transmitting Mode
 Remark2 : GFSK Modulation
 Remark3 : Mch
 Remark4 : YZ

Final Result

--- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1627.950	57.4	-10.0	47.4	54.0	6.6	*
2	4882.000	41.5	0.8	42.3	54.0	11.7	
3	7323.000	31.7	4.1	35.8	54.0	18.2	Floor Noise
4	9764.000	31.3	6.8	38.1	54.0	15.9	* Floor Noise
5	12205.000	32.3	7.7	40.0	54.0	14.0	Floor Noise
6	14646.000	33.7	10.9	44.6	54.0	9.4	* Floor Noise
7	17087.000	34.5	11.0	45.5	54.0	8.5	* Floor Noise

--- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1627.970	57.7	-10.0	47.7	54.0	6.3	*
2	4882.000	44.9	0.8	45.7	54.0	8.3	

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 Remark1 : Transmitting Mode
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 Remark3 : Mch
 Remark4 : ZX

Final Result

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1627.970	60.9	-10.0	50.9	74.0	23.1	*
2	4882.000	47.2	0.8	48.0	74.0	26.0	
3	7323.000	44.6	4.1	48.7	74.0	25.3	Floor Noise
4	9764.000	43.7	6.8	50.5	74.0	23.5	* Floor Noise
5	12205.000	45.1	7.7	52.8	74.0	21.2	Floor Noise
6	14646.000	46.5	10.9	57.4	74.0	16.6	* Floor Noise
7	17087.000	46.9	11.0	57.9	74.0	16.1	* Floor Noise

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1628.030	58.6	-10.0	48.6	74.0	25.4	*
2	4882.000	53.6	0.8	54.4	74.0	19.6	

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 Operator : Fukuda
 Power Supply : DC 5.0V from USB
 Temp./Humid. : 23.8 / 67.0%
 Remark1 : Transmitting Mode
 Remark2 : GFSK Modulation
 Remark3 : Mch
 Remark4 : ZX

Final Result

--- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1627.970	59.3	-10.0	49.3	54.0	4.7	*
2	4882.000	39.5	0.8	40.3	54.0	13.7	
3	7323.000	31.7	4.1	35.8	54.0	18.2	Floor Noise
4	9764.000	31.3	6.8	38.1	54.0	15.9	* Floor Noise
5	12205.000	32.3	7.7	40.0	54.0	14.0	Floor Noise
6	14646.000	33.7	10.9	44.6	54.0	9.4	* Floor Noise
7	17087.000	34.5	11.0	45.5	54.0	8.5	* Floor Noise

--- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1628.030	56.6	-10.0	46.6	54.0	7.4	*
2	4882.000	46.4	0.8	47.2	54.0	6.8	

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 Serial No. : 31
 Operator : Fukuda
 Power Supply : DC 5.0V from USB
 Temp./Humid. : 23.8 / 67.0%
 Remark1 : Transmitting Mode
 Remark2 : GFSK Modulation
 Remark3 : Hch
 Remark4 : XY

Final Result

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1654.130	58.9	-9.8	49.1	74.0	24.9	*
2	2483.500	54.8	-5.5	49.3	74.0	24.7	
3	4960.000	46.0	0.7	46.7	74.0	27.3	
4	7440.000	45.7	3.9	49.6	74.0	24.4	Floor Noise
5	9920.000	44.7	6.5	51.2	74.0	22.8	* Floor Noise
6	12400.000	46.2	7.2	53.4	74.0	20.6	Floor Noise
7	14880.000	45.1	10.3	55.4	74.0	18.6	* Floor Noise

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1654.050	59.2	-9.8	49.4	74.0	24.6	*
2	2483.500	55.5	-5.5	50.0	74.0	24.0	
3	4960.000	47.7	0.7	48.4	74.0	25.6	

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 Operator : Fukuda
 Power Supply : DC 5.0V from USB
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 Remark1 : Transmitting Mode
 Remark2 : GFSK Modulation
 Remark3 : Hch
 Remark4 : XY

Final Result

--- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1654.130	57.0	-9.8	47.2	54.0	6.8	*
2	2483.500	43.4	-5.5	37.9	54.0	16.1	
3	4960.000	37.6	0.7	38.3	54.0	15.7	
4	7440.000	32.5	3.9	36.4	54.0	17.6	Floor Noise
5	9920.000	31.7	6.5	38.2	54.0	15.8	* Floor Noise
6	12400.000	32.5	7.2	39.7	54.0	14.3	Floor Noise
7	14880.000	33.0	10.3	43.3	54.0	10.7	* Floor Noise

--- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1654.050	57.7	-9.8	47.9	54.0	6.1	*
2	2483.500	44.1	-5.5	38.6	54.0	15.4	
3	4960.000	40.4	0.7	41.1	54.0	12.9	

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Final Result

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1654.030	60.3	-9.8	50.5	74.0	23.5	*
2	2483.500	57.5	-5.5	52.0	74.0	22.0	
3	4960.000	47.4	0.7	48.1	74.0	25.9	
4	7440.000	45.7	3.9	49.6	74.0	24.4	Floor Noise
5	9920.000	44.7	6.5	51.2	74.0	22.8	* Floor Noise
6	12400.000	46.2	7.2	53.4	74.0	20.6	Floor Noise
7	14880.000	45.1	10.3	55.4	74.0	18.6	* Floor Noise

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1654.030	60.0	-9.8	50.2	74.0	23.8	*
2	2483.500	54.2	-5.5	48.7	74.0	25.3	
3	4960.000	48.8	0.7	49.5	74.0	24.5	

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--- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1654.030	58.7	-9.8	48.9	54.0	5.1	*
2	2483.500	46.0	-5.5	40.5	54.0	13.5	
3	4960.000	39.7	0.7	40.4	54.0	13.6	
4	7440.000	32.5	3.9	36.4	54.0	17.6	Floor Noise
5	9920.000	31.7	6.5	38.2	54.0	15.8	* Floor Noise
6	12400.000	32.5	7.2	39.7	54.0	14.3	Floor Noise
7	14880.000	33.0	10.3	43.3	54.0	10.7	* Floor Noise

--- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1654.030	58.2	-9.8	48.4	54.0	5.6	*
2	2483.500	42.4	-5.5	36.9	54.0	17.1	
3	4960.000	41.9	0.7	42.6	54.0	11.4	

***** TAIYO YUDEN CO.,LTD. *****
 <<7077>> 30 July,2007 11:29

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 Remark1 : Transmitting Mode
 Remark2 : GFSK Modulation
 Remark3 : Hch
 Remark4 : ZX

Final Result

--- Horizontal Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1654.020	62.2	-9.8	52.4	74.0	21.6	*
2	2483.500	55.8	-5.5	50.3	74.0	23.7	
3	4960.000	47.2	0.7	47.9	74.0	26.1	
4	7440.000	45.7	3.9	49.6	74.0	24.4	Floor Noise
5	9920.000	44.7	6.5	51.2	74.0	22.8	* Floor Noise
6	12400.000	46.2	7.2	53.4	74.0	20.6	Floor Noise
7	14880.000	45.1	10.3	55.4	74.0	18.6	* Floor Noise

--- Vertical Polarization (PK)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1653.950	59.8	-9.8	50.0	74.0	24.0	*
2	2483.500	55.2	-5.5	49.7	74.0	24.3	
3	4960.000	50.8	0.7	51.5	74.0	22.5	

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 <<7077>> 30 July,2007 11:29

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 Remark4 : ZX

Final Result

--- Horizontal Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1654.020	61.2	-9.8	51.4	54.0	2.6	*
2	2483.500	44.2	-5.5	38.7	54.0	15.3	
3	4960.000	38.8	0.7	39.5	54.0	14.5	
4	7440.000	32.5	3.9	36.4	54.0	17.6	Floor Noise
5	9920.000	31.7	6.5	38.2	54.0	15.8	* Floor Noise
6	12400.000	32.5	7.2	39.7	54.0	14.3	Floor Noise
7	14880.000	33.0	10.3	43.3	54.0	10.7	* Floor Noise

--- Vertical Polarization (AV)---

No.	Frequency [MHz]	Reading [dB(μV)]	c.f [dB(1/m)]	Result [dB(μV/m)]	Limit [dB(μV/m)]	Margin [dB]	Remark
1	1653.950	58.2	-9.8	48.4	54.0	5.6	*
2	2483.500	43.6	-5.5	38.1	54.0	15.9	
3	4960.000	43.4	0.7	44.1	54.0	9.9	

6 Photos of Tested EUT and Test Setup

Setup photo with EUT has been submitted as separate document named "Test Setup Photos (7077F)".

Appendix 1: Certificate of Accreditation

United States Department of Commerce
National Institute of Standards and Technology

NVLAP[®]

Certificate of Accreditation to ISO/IEC 17025:2005

NVLAP LAB CODE: 200607-0

Taiyo Yuden Co., Ltd. EMC Center
Takasaki-shi Gunma 370-3347
JAPAN

*is accredited by the National Voluntary Laboratory Accreditation Program for specific services,
listed on the Scope of Accreditation, for:*

ELECTROMAGNETIC COMPATIBILITY AND TELECOMMUNICATIONS

*This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2005.
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality
management system (refer to joint ISO-ILAC-IAF Communique dated 18 June 2005).*

2006-10-01 through 2007-09-30

Effective dates



Dolly S. Bruce

For the National Institute of Standards and Technology

NVLAP-01C (REV. 2008-09-13)

Appendix 2: Test Instruments

1. Radiated Emission Test

Instrument	Manufacturer	Model No.	Serial No.	Calibration Date (Interval (year))	
10m Anechoic Chamber	TDK Co., Ltd.	DA-06912	-	5-9 February 2007 (1)	
EMI Test Receiver	Rohde & Schwarz	ESCS 30	100148	31 July 2006 (1)	
Spectrum Analyzer	Agilent Technologies	E4407B	MY44221019	23 April 2007 (1)	
Amplifier		E4446A	US42070181	13 November 2006 (1)	
		83017A	3950M00169	2 October 2006 (1)	
		8447D	2944A06812	22 September 2006 (1)	
RF Selector	TDK Co., Ltd	NS4900	0302-010	22 September 2006 (1)	
Tunable Filter	TOYO Corporation	NF-49BT	No.1	2 October 2006 (1)	
RF Filter	Microtronics	ERM50702-01	020	2 October 2006 (1)	
RF Cable	SUHNER	RG214	RG 1	22 September 2006 (1)	
		RG214	RG 3	22 September 2006 (1)	
		RG214	RG 5	22 September 2006 (1)	
		RG214	RG 8	22 September 2006 (1)	
	HP	HP8120-4782	163 9232	22 September 2006 (1)	
	SUHNER	SUCOFLEX 106	SU1	2 October 2006 (1)	
		SUCOFLEX 103	SU5	2 October 2006 (1)	
		SUCOFLEX 103	SU6	2 October 2006 (1)	
HP	85381C	No.3	2 October 2006 (1)		
Attenuator	KYORITSU	KPD-602	220142	22 September 2006 (1)	
Antenna	Schwarzbeck	BBA9106	No.3	22 December 2006 (1)	
		UHALP9108-A	160	22 December 2006 (1)	
		VHA9103	No.3 (+D3-1, 2)	22 December 2006 (1)	
		UHA9105	No.3	22 December 2006 (1)	
	EMCO	3115	9403-4232	28 March 2007 (2)	
		3116	9311-2227	28 March 2007 (2)	
Hydro Thermograph	SEKONIC	ST-50	HE01-00511	7 February 2007 (1)	

Note:

- : Applied by measurement.
- : Not applied by measurement.