MEASUREMENT/TECHNICAL REPORT
FCC Part 15 Subpart C

Issued: November 12, 2008

Name and Address of the Applicant:	KYOCERAMITA Corporation 2-28,1-CHOME, TAMATSUKURI, CHUO-KU, Osaka, 540-8585 Japan
Test Item:	RFID Module
Identification:	2KP0110
Serial No.:	1
FCC ID:	E522KP0110
Sample Receipt Date:	October 27, 2008
Test Specification:	FCC Part 15 Subpart C, 15.225
Date of Testing:	October 27 and 28, 2008
Test Result:	PASS

Report Prepared by: Cosmos Corporation
2-3571 Ohnogi, Watarai-cho, Watarai-gun, Mie, Japan 516-2102
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Tested by: M. Yamanaka, Engineer — November 12, 2008 (Date)

Reviewed by: Y. Kawahara, Leader — November 12, 2008 (Date)

Notes:
1. This report should not be reproduced except in full, without the written approval of Cosmos Corporation.
2. All measurement data contained in this report may have uncertainty. A judgment for the limitation should be taken into the count.
3. The report in this report apply only to the sample tested.

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1. Description of Equipment Under Test

1.1 Product Description

Manufacturer : KYOCERAMITA Corporation Tamaki Plant 704-19, Nojino, Tamaki-Cho, Watarai-Gun, Mie Pref 519-0497 Japan
Model (referred to as the EUT) : 2KP0110
z : AC 120V, AC220-240V
Type of Modulation : ACK
Mode of Operation : ☐ duplex ☐ 1/2 duplex ☒ simplex ☐ other
The type of the equipment : ☐ Stand-alone ☒ Combined Equipment
☐ Plug –In Card ☐ Other (Module Unit)
The type of the antenna : ☒ Integral ☐ external ☐ Other
The type of power source : ☒ AC mains ☐ Dedicated AC adapter (V)
☐ DC Voltage ☐ Battery
The type of battery (if applicable) : N/A
Type of Operation : ☐ Continuous ☐ Burst ☒ Intermittent
Stand by Mode : ☐ Available ☒ N/A
Intended functions : RFID Module Reader/Writer
The bandwidth of the IF filters : N/A
Method of Communication Link : Software to make maximum speed transmitting
The operating frequency band : 13.56 MHz
The thermal limitation : Not specified

1.2 Antenna Description

No.	Type Name	Gain	Antenna Type	Remarks
1	39221	−53dB	Printed Loop	Originally Integrated.

1.3 Accompanied Peripherals Description

No	Equipment Name	Manufacturer	Type Name	Serial Number	Remarks
1	DC Power Supply	---	---	---	AC 100～120 V, 50/60 Hz

2. General Information

2.1 Test Methodology

All measurement subject to the present test report is carried out according to the procedures in ANSI C63.4:2003.

2.2 Test Facility

All measurement was performed in the following facility;

Cosmos Corporation EMC Lab. Ohnogi

(2-3571 Ohaza-iwatachi, Ohnogi, Watarai-cho, Watarai-gun, Mie-ken 516-2102, Japan) The test site has been filed by FCC.

2.3 Tractability

The calibration of measurement equipment used in the test subject to the present report is designed and operated to ensure that the measurement is traceable to national standards of measurement or equivalent abroad.

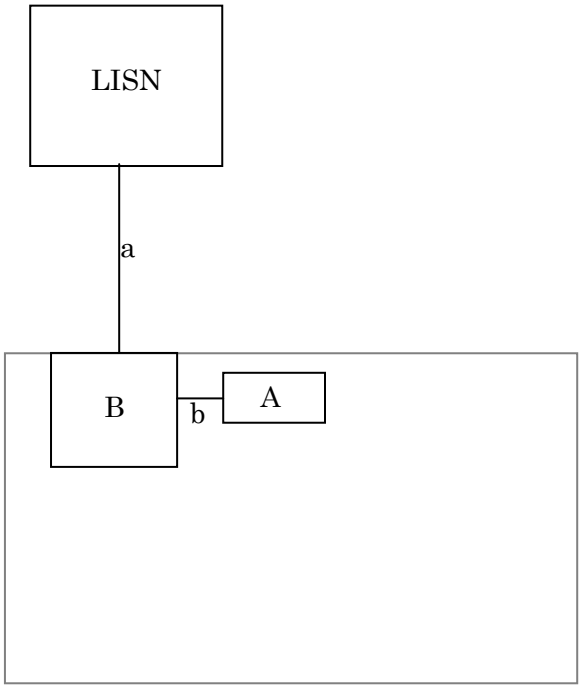
3. Summary of Test Results

No.	Requirement	RSS 210 Issue 7, RSS-Gen Issue 2 (Industry Canada)	CFR 47 Part. 15 (FCC)	Result
1	Frequency Tolerance	A2.6 – RSS 210	15.225 (e)	Pass
2	Maximum Output Power	A2.6 – RSS 210	15.225 (a)(b)(c)	Pass
3	Field Strength of Spurious Emission (Transmitter)	A2.6 – RSS 210	15.209, 15.225 (d)	Pass
4	AC Power lines Conducted Emission	7.2.2 – RSS-Gen	15.207	Pass
5	Spurious Emission (Receiver)	7.2.3 – RSS-Gen	N/A	N/A
6	Occupied Band Width(99%)	4.6.1 – RSS-Gen	N/A	N/A

4. Test Configuration

	Instrument	Model		Cable	Length	Shield
A	EUT	2KP0110	a	AC Power Cable	2.0 m	×
B	DC Power Supply	---	b	DC Power Cord	0.1 m	×

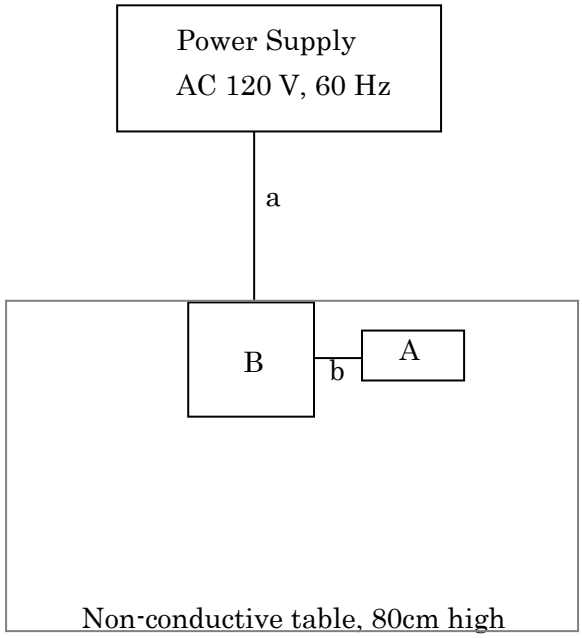
4.1 AC Power Lines Conducted Emission Measurement

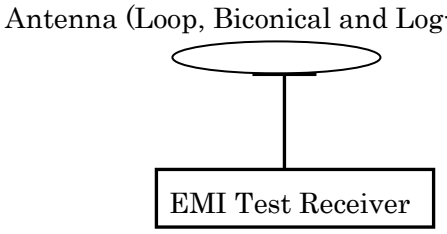


Non-conductive table, 80cm high

4. Test Configuration (Continued)

4.2 Radiated Measurement in 3m Anechoic Chamber (Radiated Emission, Maximum Carrier Output Power, Frequency Tolerance)





4.3 Test Mode

In all test configurations above, EUT makes communication link between the integrated RFID module and a RFID tag in a dedicated ink ribbon with the maximum RF power by a special test program.

Maximum Output Power and Frequency Tolerance measurement were performed with an external stabilized DC power supply voltage varied between 85% and 115%.

Frequency Tolerance and Maximum Output Power measurements are performed under the following condition:

Temperature: - 20℃ to +50℃
Voltage: DC 3.3 V ±15% (Lower limit of operating voltage 2.9V)

5. Measurement Result

5.1 15. 207 AC Power Lines Conducted Emission

5.1.1 Setting Remarks

- Configure the EUT System in accordance with ANSI C63.4-2003.
- Non-conductive board (10mm thick) for EUT and non-conductive table (80cm high) for personal computer were used.
- Other power cord of support equipment is connected to another LISN to isolate its emission from the measured emission of EUT.
- The measuring port of LISN for support equipment was terminated by the 50Ω
- Activate the EUT System and run the software prepared for the test, if necessary.
- Refer to test configuration figure 4.1.

5.1.2 Minimum Standard

15. 207 (a) Except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency of Emission (MHz)	Conducted Limit (dBuV)	
	Quasi-peak	Average
0.15-0.5	66 to 56 *	56 to 46 *
0.5-5	56	46
5-30	60	50

* Decreases with the logarithm of the frequency.

5.1.3 Result

EUT complies with the requirement.

Uncertainty of measurement : ± 2.26 dB
Temperature, Humidity : 26℃ / 42%

5.1.4 Measured Data

Measured Value Table

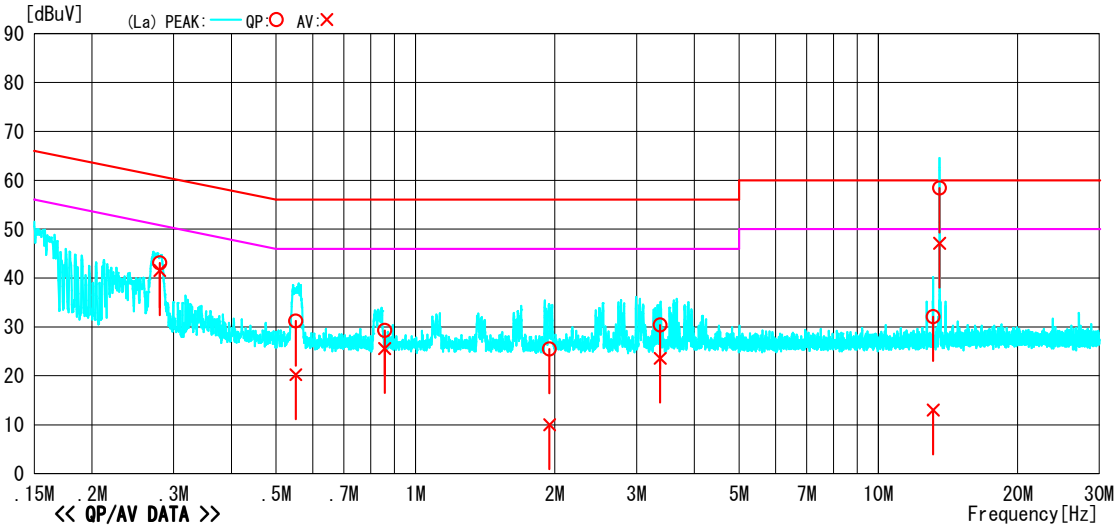
<<Conducted Emission>>

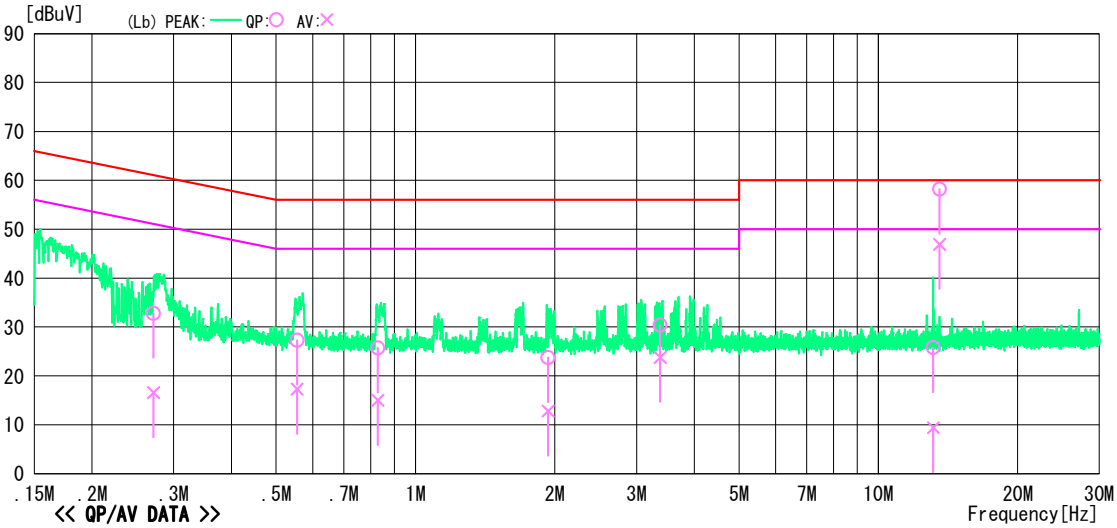
Cosmos Corporation Onoki Lab.

Model Name	: 2KP0110	Job No	: CJ08-077749E
Serial No.	: 1	Temp/Humi	: 26℃/42%
Operator	: M.Yamanaka	Condition	: Operated
Power Supply	: AC 120V, 60Hz	Remark	:

Memo : RBW:9kHz(150k-30MHz)

LIMIT : FCC 15.207(QP)
FCC 15.207(AV)





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5.1.4 Measured Data (Continued)

Measured Value Table

<<Conducted Emission>>

Cosmos Corporation Onoki Lab.

Model Name : 2KP0110
Serial No. : 1
Operator : M.Yamanaka
Power Supply : AC 120V,60Hz

Job No : CJ08-077749E
Temp/Humi : 26℃/42%
Condition : Operated
Remark :

Memo : RBW:9kHz(150k-30MHz)

LIMIT : FCC 15.207(QP)
FCC 15.207(AV)

<< QP/AV DATA >>

No	Freq.	Reading Level		C.Fac	Results		Limit		Margin		Phase	Comment
		QP	AV		QP	AV	QP	AV	QP	AV		
	[MHz]	[dBuV]	[dBuV]	[dB]	[dBuV]	[dBuV]	[dBuV]	[dBuV]	[dB]	[dB]		
1	0.28035	33.0	31.4	10.1	43.1	41.5	60.8	50.8	17.7	9.3	La	
2	0.55155	21.1	10.1	10.1	31.2	20.2	56.0	46.0	24.8	25.8	La	
3	0.85815	19.2	15.5	10.1	29.3	25.6	56.0	46.0	26.7	20.4	La	
4	1.94800	15.4	-0.1	10.1	25.5	10.0	56.0	46.0	30.5	36.0	La	
5	3.37790	20.2	13.4	10.2	30.4	23.6	56.0	46.0	25.6	22.4	La	
6	13.13830	21.3	2.2	10.8	32.1	13.0	60.0	50.0	27.9	37.0	La	
7	13.56150	47.6	36.3	10.8	58.4	47.1	60.0	50.0	1.6	2.9	La	
8	0.27150	22.7	6.5	10.1	32.8	16.6	61.1	51.1	28.3	34.5	Lb	
9	0.55485	17.2	7.2	10.1	27.3	17.3	56.0	46.0	28.7	28.7	Lb	
10	0.82910	15.6	4.9	10.1	25.7	15.0	56.0	46.0	30.3	31.0	Lb	
11	1.93360	13.6	2.7	10.1	23.7	12.8	56.0	46.0	32.3	33.2	Lb	
12	3.37580	20.2	13.6	10.2	30.4	23.8	56.0	46.0	25.6	22.2	Lb	
13	13.14190	15.1	-1.3	10.7	25.8	9.4	60.0	50.0	34.2	40.6	Lb	
14	13.56150	47.5	36.2	10.7	58.2	46.9	60.0	50.0	1.8	3.1	Lb	

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5.2 15. 209 Transmitter Radiated Emissions

5.2.1 Setting Remarks

- The data lists in "5.2.4 Measured Data " list the significant emission frequencies, measured levels, correction factor (includes cable and antenna corrections), the corrected reading, plus the limit.
- In the frequency range between 9kHz to 1 GHz, the Electric Field Strength was measured in accordance with ANSI C63.4: 2003 and CISPR22: 1997.
- The test setup was made in accordance with ANSI C63.4: 2003.
- The antenna was measured at 1-4m height for 30MHz to 1GHz.
- The EUT was placed on the non-conductive table in the center of turntable. The height of this table was 0.8m.
- The measurement was carried out with both horizontal and vertical antenna polarization.
- The highest radiation from the equipment was recorded.
- Below 30MHz, a loop antenna was used at 1m height.
- By varying the configuration of the test sample and the cable routing, it was attempted to maximize the emission.
- The test receiver with Quasi Peak and Average detector is in compliance with CISPR 16-1.
- The spectrum analyzer was set-up as following;

  (Frequency range : 9kHz - 30 MHz)
  - ✓ Resolution bandwidth : 10 kHz
  - ✓ Video bandwidth : 100 kHz
  - ✓ Detector function : Peak
  - ✓ Trace Mode : Max Hold

  (Frequency range : 30 - 1000 MHz)
  - ✓ Resolution bandwidth : 100 kHz
  - ✓ Video bandwidth : 300 kHz
  - ✓ Detector function : Peak
  - ✓ Trace Mode : Max Hold

- EMI Test Receiver analyzer was set-up as following (Quasi-Peak Detector);

  - ✓ IF bandwidth : 200 Hz (9kHz - 150kHz)
  - ✓ IF bandwidth : 9 kHz (150kHz - 30MHz)
  - ✓ IF bandwidth : 120 kHz (30MHz - 1GHz)

- Refer to test configuration figure 4.2.

5.2.2 Minimum Standard

15. 225 (d) The field strength of any emissions appearing outside of the 13.110-14.010 MHz band shall not exceed the general radiated emission limits in § 15.209.

5.2.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 3.64 dB
Temperature, Humidity : Refer to each data table

5.2.4 Note (Specification limits)

SUBCLAUSE § 15.209

Frequency (MHz)	Field strength (μ V/m)	Measurement distance (m)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
above 960	500	3

Note:

below 30 MHz

(a) Measurement of magnetic field strength were performed using a magnetic field loop antenna, according to ANSIC63.4:2003 Section 4.1.5.1, referenced by 47 CFR Part 15 Section 15.31(3). The results were expressed as electric field strength assuming far field measurement conditions in order to compare with the limit which is expressed as electric field.

(b) Where results have been measured at one distance, and a signal level displayed at another, the results have been extrapolated using the following formula:

$$\text{Extrapolation(dB)} = 40\log_{10}\left(\frac{\text{measurement distance}}{\text{specification distance}}\right)$$

The results displayed take into account applicable antenna factors and cable losses.

measurement distance

below 30 MHz : 3m
over 30 MHz : 3m

5.2.5 Measured Data

9kHz to 30MHz (Angle1)

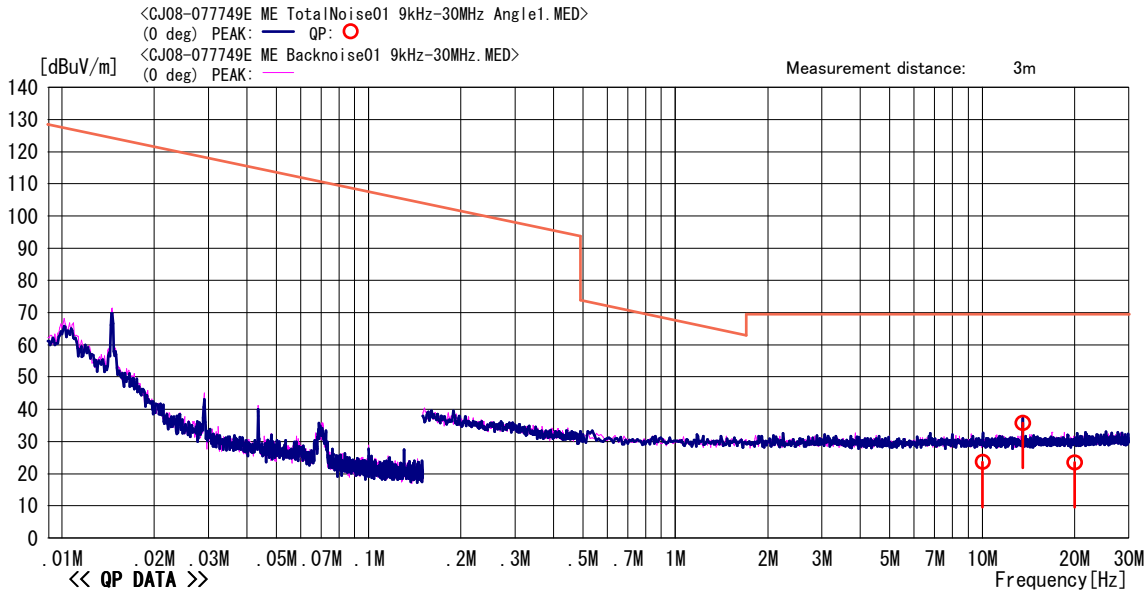
<<Electromagnetic Radiation>>

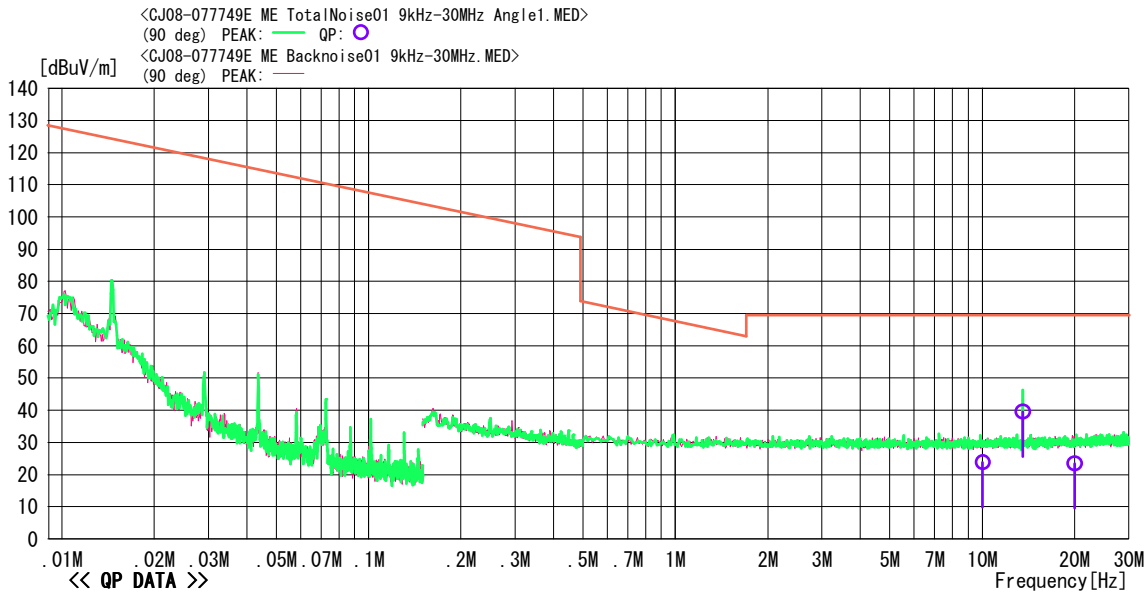
Cosmos Corporation Onoki Lab.
Date : 2008/10/27 17:05:28

Model Name	: 2KP0110	Job No.	: CJ08-077749E
Serial No.	: 1	Temp./Humi.	: 23℃/44%
Operator	: M.Yamanaka	Condition	: Operated
Power Supply	: AC 120 V, 60 Hz	Remark	: Angle1

Memo : RBW:200Hz(9k-150kHz),9kHz(150k-30MHz)

LIMIT : FCC Part15 SubpartC 15.209 9KHz-30MHz





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5.2.4 Measured Data (Continued)

9kHz to 30MHz (Angle 1)

<<Electromagnetic Radiation>>

Cosmos Corporation Onoki Lab.
Date : 2008/10/27 17:05:28

Model Name : 2KP0110
Serial No. : 1
Operator : M.Yamanaka
Power Supply : AC 120 V, 60 Hz

Job No. : CJ08-077749E
Temp./Humi. : 23℃/44%
Condition : Operated
Remark : Angle1

Memo : RBW:200Hz(9k-150kHz),9kHz(150k-30MHz)

LIMIT : FCC Part15 SubpartC 15.209 9KHz-30MHz

Measurement distance: 3m

<< QP DATA >>

No	Freq. [MHz]	Reading [dBuV]	Ant.Fac [dB/m]	Loss [dB]	Result [dBuV/m]	Limit [dBuV/m]	Margin [dB]	Antenna	Angle [deg]	Comment
1	10.00000	4.3	18.6	0.7	23.6	69.5	45.9	0deg	0	
2	13.56164	16.5	18.4	0.8	35.7	69.5	33.8	0deg	263	Fundamental Frequency
3	20.00000	4.0	18.6	0.9	23.5	69.5	46.0	0deg	0	
4	10.00000	4.5	18.6	0.7	23.8	69.5	45.7	90deg	0	
5	13.56184	20.4	18.4	0.8	39.6	69.5	29.9	90deg	167	Fundamental Frequency
6	20.00000	4.0	18.6	0.9	23.5	69.5	46.0	90deg	0	

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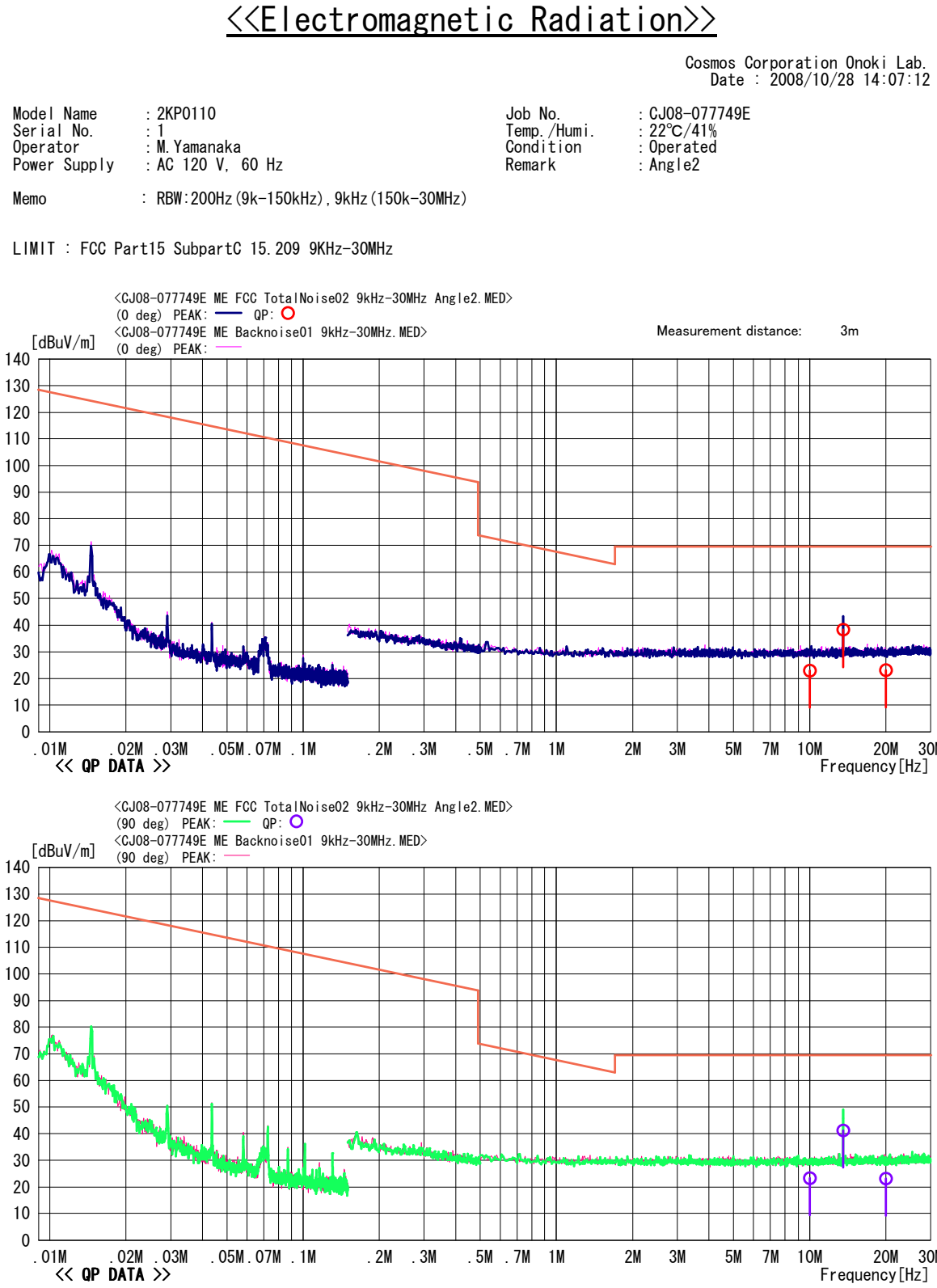
5.2.4 Measured Data (Continued)

9kHz to 30MHz (Angle2)



5.2.4 Measured Data (Continued)

9kHz to 30MHz (Angle 2)

<<Electromagnetic Radiation>>

Cosmos Corporation Onoki Lab.
Date : 2008/10/28 14:07:12

Model Name : 2KP0110
Serial No. : 1
Operator : M.Yamanaka
Power Supply : AC 120 V, 60 Hz

Job No. : CJ08-077749E
Temp./Humi. : 22℃/41%
Condition : Operated
Remark : Angle2

Memo : RBW:200Hz(9k-150kHz),9kHz(150k-30MHz)

LIMIT : FCC Part15 SubpartC 15.209 9KHz-30MHz

Measurement distance: 3m

<< QP DATA >>

No	Freq.	Reading	Ant.Fac	Loss	Result	Limit	Margin	Antenna	Angle	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]		[deg]	
1	10.00000	3.7	18.6	0.7	23.0	69.5	46.5	0deg	0	
2	13.56114	19.1	18.4	0.8	38.3	69.5	31.2	0deg	176	Fundamental Frequency
3	20.00000	3.7	18.6	0.9	23.2	69.5	46.3	0deg	0	
4	10.00000	4.0	18.6	0.7	23.3	69.5	46.2	90deg	0	
5	13.56019	22.0	18.4	0.8	41.2	69.5	28.3	90deg	137	Fundamental Frequency
6	20.00000	3.7	18.6	0.9	23.2	69.5	46.3	90deg	0	

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5.2.4 Measured Data (Continued)

9kHz to 30MHz (Angle3)

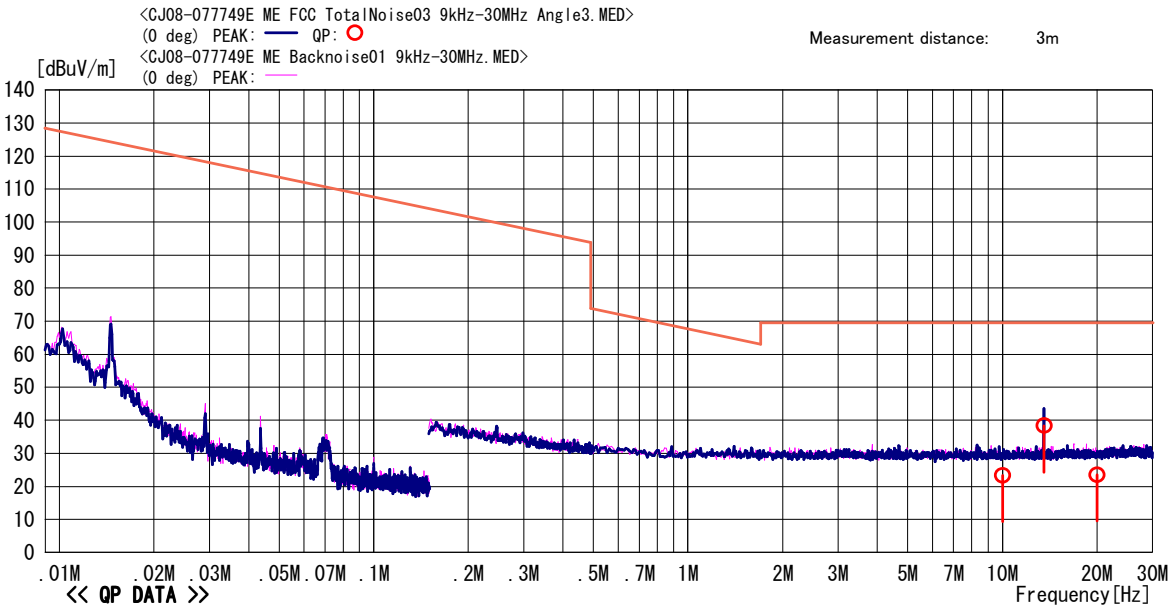
<<Electromagnetic Radiation>>

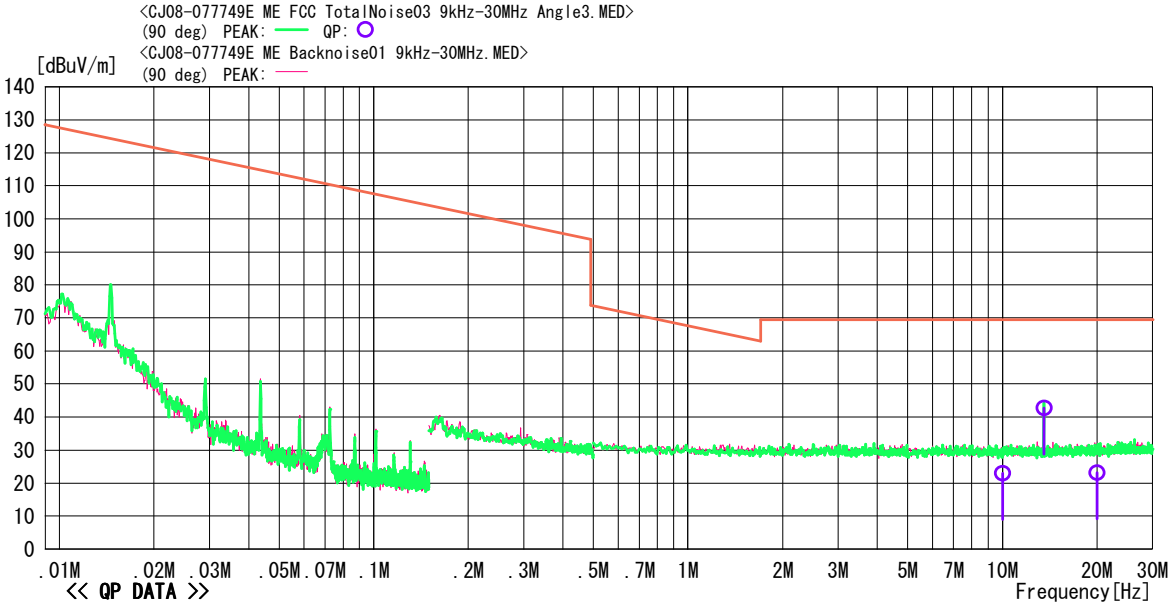
Cosmos Corporation Onoki Lab.
Date : 2008/10/28 14:35:17

Model Name	: 2KP0110	Job No.	: CJ08-077749E
Serial No.	: 1	Temp./Humi.	: 22℃/41%
Operator	: M.Yamanaka	Condition	: Operated
Power Supply	: AC 120 V, 60 Hz	Remark	: Angle3

Memo : RBW:200Hz(9k-150kHz),9kHz(150k-30MHz)

LIMIT : FCC Part15 SubpartC 15.209 9KHz-30MHz





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5.2.4 Measured Data (Continued)

9kHz to 30MHz (Angle 3)

<<Electromagnetic Radiation>>

Cosmos Corporation Onoki Lab.
Date : 2008/10/28 14:35:17

Model Name : 2KP0110
Serial No. : 1
Operator : M.Yamanaka
Power Supply : AC 120 V, 60 Hz

Job No. : CJ08-077749E
Temp./Humi. : 22℃/41%
Condition : Operated
Remark : Angle3

Memo : RBW:200Hz(9k-150kHz),9kHz(150k-30MHz)

LIMIT : FCC Part15 SubpartC 15.209 9KHz-30MHz

Measurement distance: 3m

<< QP DATA >>

No	Freq.	Reading	Ant.Fac	Loss	Result	Limit	Margin	Antenna	Angle	Comment
	[MHz]	[dBuV]	[dB/m]	[dB]	[dBuV/m]	[dBuV/m]	[dB]		[deg]	
1	10.00000	4.0	18.6	0.7	23.3	69.5	46.2	0deg	163	
2	13.56074	19.1	18.4	0.8	38.3	69.5	31.2	0deg	184	
3	20.00000	4.0	18.6	0.9	23.5	69.5	46.0	0deg	54	
4	10.00000	3.7	18.6	0.7	23.0	69.5	46.5	90deg	342	
5	13.56074	23.5	18.4	0.8	42.7	69.5	26.8	90deg	140	
6	20.00000	3.7	18.6	0.9	23.2	69.5	46.3	90deg	31	

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5.2.4 Measured Data (Continued)

30MHz to 1GHz (Angle 1)

<<Radiated Emission>>

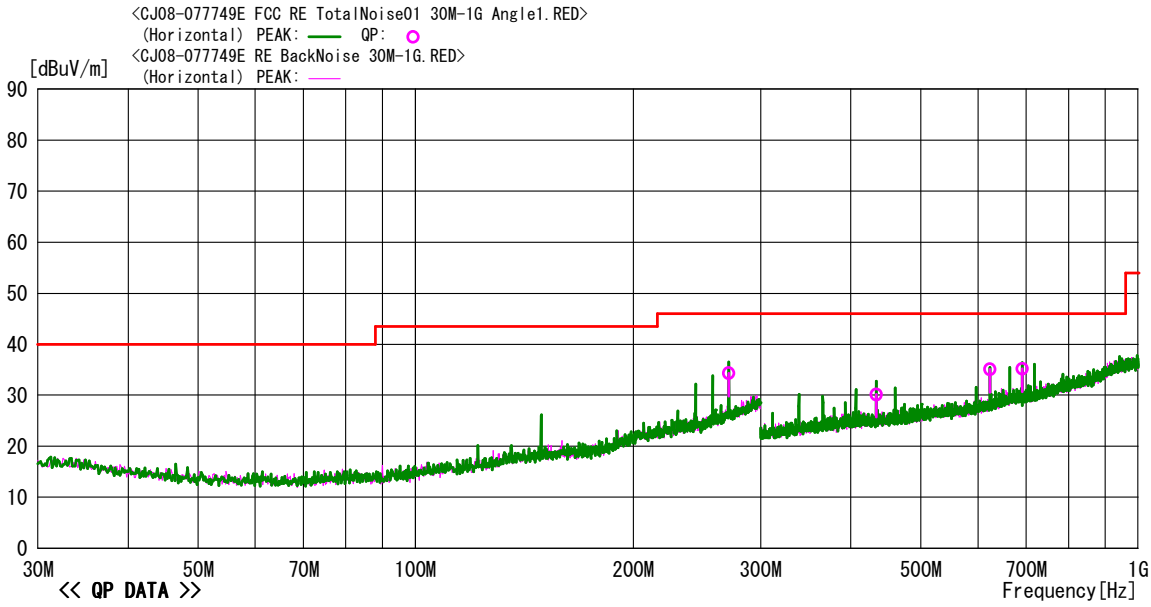
Cosmos Corporation Onoki Lab.

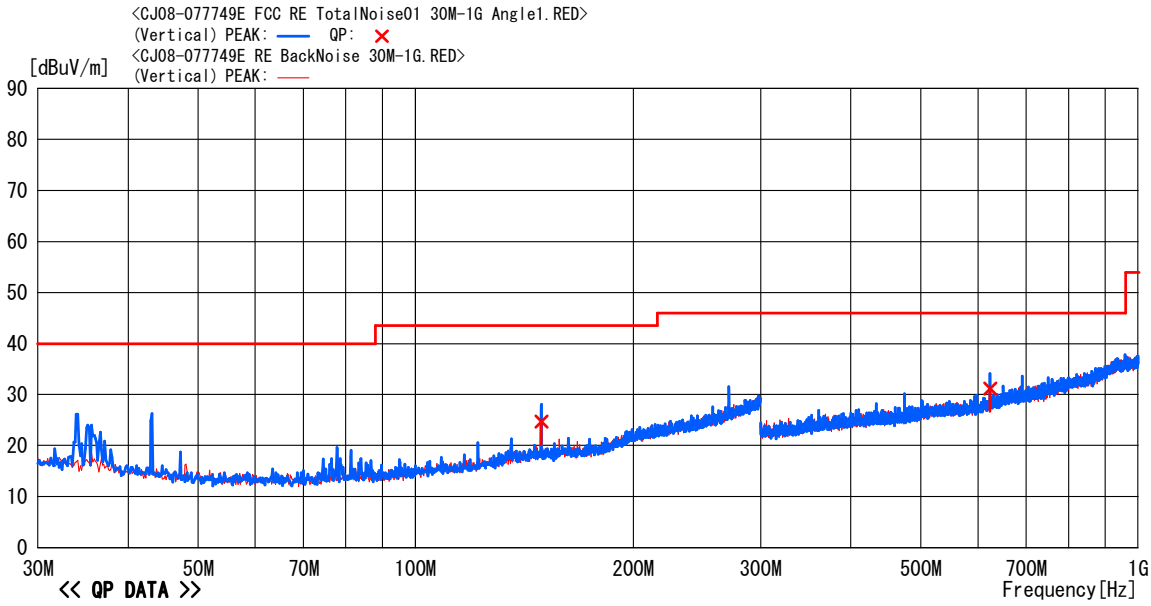
Model Name : 2KP0110
Serial No. : 1
Operator : M.Yamanaka
Power Supply : AC 120V, 60Hz

Job No : CJ08-077749E
Temp./Humi. : 22℃/49%
Condition : Operated
Remark : Angle1

Memo : RBW:30M～1GHz(120kHz)

LIMIT : Fcc15C 15_209 (3m) 30MHz-1000MHz





-TEPTO-DV/RE Ver 1.80.0020

5.2.4 Measured Data (Continued)

30MHz to 1GHz (Angle 1)

<<Radiated Emission>>

Cosmos Corporation Onoki Lab.

Model Name : 2KP0110
Serial No. : 1
Operator : M.Yamanaka
Power Supply : AC 120V, 60Hz

Job No : CJ08-077749E
Temp./Humi. : 22℃/49%
Condition : Operated
Remark : Angle1

Memo : RBW:30M～1GHz(120kHz)

LIMIT : Fcc15C 15_209 (3m) 30MHz-1000MHz

<< QP DATA >>

No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	271.187	37.1	-2.8	34.3	46.0	11.7	Hori.	112	180	BC	
2	433.923	34.2	-4.0	30.2	46.0	15.8	Hori.	100	349	LP	
3	623.742	36.8	-1.7	35.1	46.0	10.9	Hori.	131	194	LP	
4	691.548	35.6	-0.4	35.2	46.0	10.8	Hori.	100	186	LP	
5	149.173	35.2	-10.5	24.7	43.5	18.8	Vert.	100	156	BC	
6	623.762	32.9	-1.7	31.2	46.0	14.8	Vert.	100	238	LP	

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5.2.4 Measured Data (Continued)

30MHz to 1GHz (Angle 2)

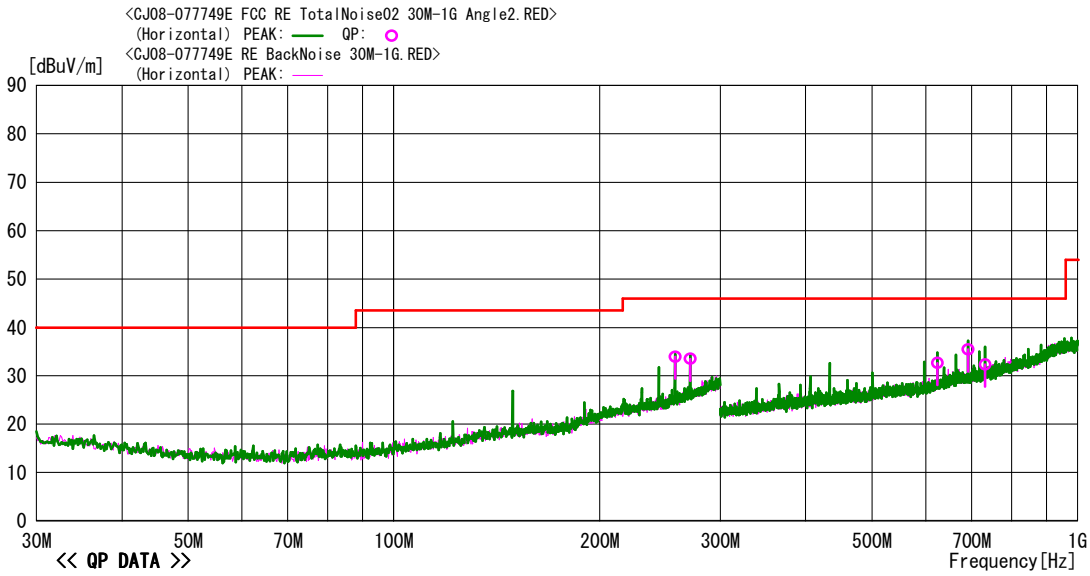
<<Radiated Emission>>

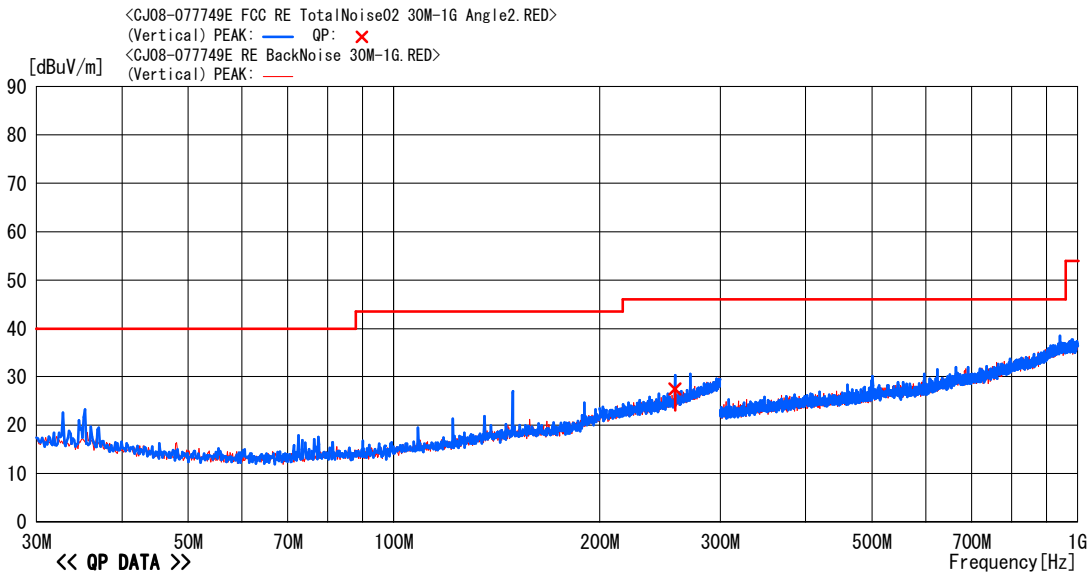
Cosmos Corporation Onoki Lab.

Model Name	: 2KP0110	Job No	: CJ08-077749E
Serial No.	: 1	Temp./Humi.	: 22℃/49%
Operator	: M.Yamanaka	Condition	: Operated
Power Supply	: AC 120V, 60Hz	Remark	: Angle2

Memo : RBW:30M～1GHz(120kHz)

LIMIT : Fcc15C 15_209 (3m) 30MHz-1000MHz





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5.2.4 Measured Data (Continued)

30MHz to 1GHz (Angle 2)

<<Radiated Emission>>

Cosmos Corporation Onoki Lab.

Model Name : 2KP0110
Serial No. : 1
Operator : M.Yamanaka
Power Supply : AC 120V, 60Hz

Job No : CJ08-077749E
Temp./Humi. : 22℃/49%
Condition : Operated
Remark : Angle2

Memo : RBW:30M～1GHz(120kHz)

LIMIT : Fcc15C 15_209 (3m) 30MHz-1000MHz

<< QP DATA >>

No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	257.640	37.9	-4.0	33.9	46.0	12.1	Hori.	120	186	BC	
2	271.197	36.3	-2.8	33.5	46.0	12.5	Hori.	113	186	BC	
3	623.742	34.3	-1.7	32.6	46.0	13.4	Hori.	100	182	LP	
4	691.558	35.8	-0.4	35.4	46.0	10.6	Hori.	100	201	LP	
5	732.229	32.2	0.1	32.3	46.0	13.7	Hori.	100	191	LP	
6	257.630	31.5	-4.0	27.5	46.0	18.5	Vert.	100	304	BC	

-TEPTO-DV/RE Ver 1.80.0020

5.2.4 Measured Data (Continued)

30MHz to 1GHz (Angle 3)

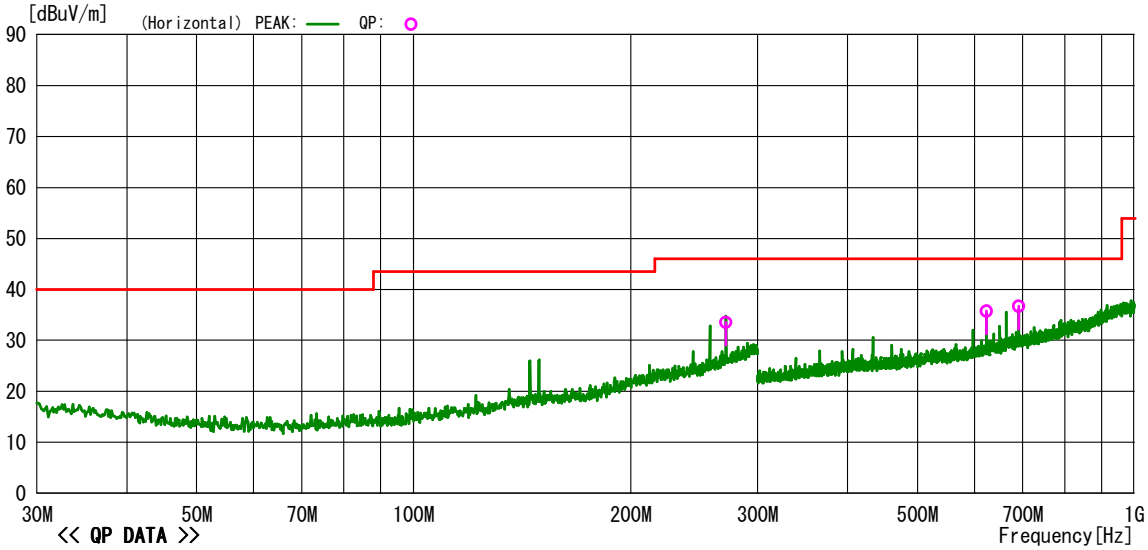
<<Radiated Emission>>

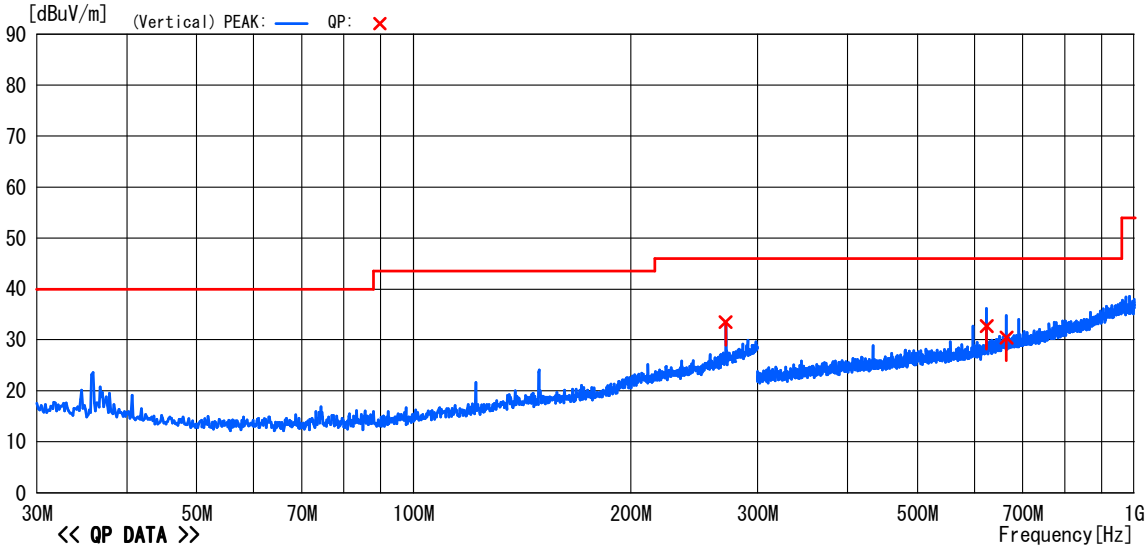
Cosmos Corporation Onoki Lab.

Model Name	: 2KP0110	Job No	: CJ08-077749E
Serial No.	: 1	Temp./Humi.	: 22℃/49%
Operator	: M.Yamanaka	Condition	: Operated
Power Supply	: AC 120V, 60Hz	Remark	: Angle3

Memo : RBW:30M～1GHz(120kHz)

LIMIT : Fcc15C 15_209 (3m) 30MHz-1000MHz





-TEPTO-DV/RE Ver 1.80.0020

5.2.4 Measured Data (Continued)

30MHz to 1GHz (Angle 3)

<<Radiated Emission>>

Cosmos Corporation Onoki Lab.

Model Name : 2KP0110
Serial No. : 1
Operator : M.Yamanaka
Power Supply : AC 120V, 60Hz

Job No : CJ08-077749E
Temp./Humi. : 22℃/49%
Condition : Operated
Remark : Angle3

Memo : RBW:30M～1GHz(120kHz)

LIMIT : Fcc15C 15_209 (3m) 30MHz-1000MHz

<< QP DATA >>

No	Freq.	Reading	C.Fac	Result	Limit	Margin	Pola.	Height	Angle	Ant	Comment
	[MHz]	[dBuV]	[dB/m]	[dBuV/m]	[dBuV/m]	[dB]	[H/V]	[cm]	[deg]	Type	
1	271.197	36.4	-2.8	33.6	46.0	12.4	Hori.	110	184	BC	
2	623.742	37.4	-1.7	35.7	46.0	10.3	Hori.	116	193	LP	
3	691.548	37.1	-0.4	36.7	46.0	9.3	Hori.	100	190	LP	
4	271.177	36.3	-2.8	33.5	46.0	12.5	Vert.	110	184	BC	
5	623.762	34.4	-1.7	32.7	46.0	13.3	Vert.	100	83	LP	
6	664.454	31.3	-0.9	30.4	46.0	15.6	Vert.	100	50	LP	

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5.3 Maximum Carrier Output Power

5.3.1 Setting Remarks

- Refer to 5.2.1
- The EUT was placed on the non-conductive table in the center of turntable.
- The highest radiation from the equipment was recorded.
- The test receiver with Quasi Peak is in compliance with CISPR 16-1.
- The measurement was carried out in a thermostatic chamber. (-20℃～+50℃)
- The spectrum analyzer was set-up as following;

✓	Frequency Span	: Appropriate to determine carrier frequency.
✓	Resolution bandwidth	: Appropriate to determine carrier frequency.
✓	Video bandwidth	: Appropriate to determine carrier frequency.
✓	Sweep	: Auto
✓	Detector function	: Peak
✓	Trace Mode	: Max Hold

- EMI Test Receiver analyzer was set-up as following (Quasi-Peak Detector);

✓	IF bandwidth	: 9 kHz

- Refer to test configuration figure 4.2.

5.3.2 Minimum Standard

15.225(a) The field strength of any emissions within the band 13.553-13.567 MHz shall not exceed 15,848 microvolts/meter at 30 meters.
(b) Within the bands 13.410-13.553 MHz and 13.567-13.710 MHz, the field strength of any emissions shall not exceed 334 microvolts/meter at 30 meters.
(c) Within the bands 13.110-13.410 MHz and 13.710-14.010 MHz the field strength of any emissions shall not exceed 106 microvolts/meter at 30 meters.

5.3.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 3.64 dB
Temperature, Humidity : Refer to each data table

5.3.4 Measured Data

3m distance

-20℃ (Angle 1)

Date of testing : October 28, 2008

Room temperature : 20℃

Condition: Operated

Relative humidity : 45%

【2.900V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dBμV]	Peak Power [dBμV/m]	Limit [dBμV/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	4.26	23.460	80.50	57.040
13.553	90	19.2	12.60	31.800	90.47	58.670
13.560	90	19.2	24.73	43.930	124.00	80.070
13.567	90	19.2	12.50	31.700	90.47	58.770
13.710	90	19.2	4.26	23.460	80.50	57.040
14.010	90	19.3	4.26	23.560	80.50	56.940

【3.300V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dBμV]	Peak Power [dBμV/m]	Limit [dBμV/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	13.71	32.910	90.47	57.560
13.560	90	19.2	26.08	45.280	124.00	78.720
13.567	90	19.2	14.52	33.720	90.47	56.750
13.710	90	19.2	4.26	23.460	80.50	57.040
14.010	90	19.3	4.26	23.560	80.50	56.940

【3.795V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dBμV]	Peak Power [dBμV/m]	Limit [dBμV/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	14.52	33.720	90.47	56.750
13.560	90	19.2	27.12	46.320	124.00	77.680
13.567	90	19.2	16.16	35.360	90.47	55.110
13.710	90	19.2	4.26	23.460	80.50	57.040
14.010	90	19.3	4.26	23.560	80.50	56.940

Measured Data (Continued)

3m distance

-20℃ (Angle 2)

Date of testing : October 28, 2008

Room temperature : 20℃

Condition: Operated

Relative humidity : 45%

【2.900V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	11.58	30.780	90.47	59.690
13.560	90	19.2	23.68	42.880	124.00	81.120
13.567	90	19.2	12.60	31.800	90.47	58.670
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

【3.300V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	13.02	32.220	90.47	58.250
13.560	90	19.2	25.44	44.640	124.00	79.360
13.567	90	19.2	13.90	33.100	90.47	57.370
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	4.26	23.560	80.50	56.940

【3.795V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	13.71	32.910	90.47	57.560
13.560	90	19.2	26.17	45.370	124.00	78.630
13.567	90	19.2	15.18	34.380	90.47	56.090
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

5.3.4 Measured Data (Continued)

3m distance

-20℃ (Angle 3)

Date of testing : October 28, 2008

Room temperature : 20℃

Condition: Operated

Relative humidity : 45%

【2.900V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	10.00	29.200	90.47	61.270
13.560	90	19.2	21.82	41.020	124.00	82.980
13.567	90	19.2	10.83	30.030	90.47	60.440
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

【3.300V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	11.46	30.660	90.47	59.810
13.560	90	19.2	23.68	42.880	124.00	81.120
13.567	90	19.2	12.71	31.910	90.47	58.560
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

【3.795V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	12.28	31.480	90.47	58.990
13.560	90	19.2	24.75	43.950	124.00	80.050
13.567	90	19.2	13.23	32.430	90.47	58.040
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

5.3.4 Measured Data (Continued)

3m distance

25℃ (Angle1)

Date of testing : October 28, 2008

Room temperature : 20℃

Condition: Operated

Relative humidity : 45%

【2.900V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	11.82	31.020	90.47	59.450
13.560	90	19.2	23.92	43.120	124.00	80.880
13.567	90	19.2	11.94	31.140	90.47	59.330
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

【3.300V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	13.42	32.620	90.47	57.850
13.560	90	19.2	25.85	45.050	124.00	78.950
13.567	90	19.2	14.52	33.720	90.47	56.750
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

【3.795V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	14.35	33.550	90.47	56.920
13.560	90	19.2	26.90	46.100	124.00	77.900
13.567	90	19.2	14.86	34.060	90.47	56.410
13.710	90	19.2	3.68	22.880	80.50	57.620
14.010	90	19.3	3.98	23.280	80.50	57.220

5.3.4 Measured Data (Continued)

3m distance

25℃ (Angle2)

Date of testing : October 28, 2008

Room temperature : 20℃

Condition: Operated

Relative humidity : 45%

【2.900V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.68	22.980	80.50	57.520
13.410	90	19.2	3.68	22.880	80.50	57.620
13.553	90	19.2	11.21	30.410	90.47	60.060
13.560	90	19.2	23.35	42.550	124.00	81.450
13.567	90	19.2	12.28	31.480	90.47	58.990
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

【3.300V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.68	22.980	80.50	57.520
13.410	90	19.2	3.68	22.880	80.50	57.620
13.553	90	19.2	12.60	31.800	90.47	58.670
13.560	90	19.2	24.99	44.190	124.00	79.810
13.567	90	19.2	13.12	32.320	90.47	58.150
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.68	22.980	80.50	57.520

【3.795V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.68	22.880	80.50	57.620
13.553	90	19.2	13.42	32.620	90.47	57.850
13.560	90	19.2	25.96	45.160	124.00	78.840
13.567	90	19.2	14.04	33.240	90.47	57.230
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

5.3.4 Measured Data (Continued)

3m distance

25℃ (Angle3)

Date of testing : October 28, 2008

Room temperature : 20℃

Condition: Operated

Relative humidity : 45%

【2.900V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.68	22.980	80.50	57.520
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	10.14	29.340	90.47	61.130
13.560	90	19.2	22.07	41.270	124.00	82.730
13.567	90	19.2	10.83	30.030	90.47	60.440
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

【3.300V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	11.46	30.660	90.47	59.810
13.560	90	19.2	23.62	42.820	124.00	81.180
13.567	90	19.2	11.82	31.020	90.47	59.450
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

【3.795V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	12.16	31.360	90.47	59.110
13.560	90	19.2	24.59	43.790	124.00	80.210
13.567	90	19.2	13.90	33.100	90.47	57.370
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

5.3.4 Measured Data (Continued)

3m distance

+50℃ (Angle 1)

Date of testing : October 28, 2008

Room temperature : 21℃

Condition: Operated

Relative humidity : 41%

【2.900V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.68	22.880	80.50	57.620
13.553	90	19.2	11.21	30.410	90.47	60.060
13.560	90	19.2	23.19	42.390	124.00	81.610
13.567	90	19.2	12.16	31.360	90.47	59.110
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.68	22.980	80.50	57.520

【3.300V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.68	22.880	80.50	57.620
13.553	90	19.2	12.71	31.910	90.47	58.560
13.560	90	19.2	25.04	44.240	124.00	79.760
13.567	90	19.2	13.32	32.520	90.47	57.950
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

【3.795V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.68	22.880	80.50	57.620
13.553	90	19.2	14.43	33.630	90.47	56.840
13.560	90	19.2	25.96	45.160	124.00	78.840
13.567	90	19.2	14.52	33.720	90.47	56.750
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

5.3.4 Measured Data (Continued)

3m distance

+50℃ (Angle 2)

Date of testing : October 28, 2008

Room temperature : 21℃

Condition: Operated

Relative humidity : 41%

【2.900V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	10.96	30.160	90.47	60.310
13.560	90	19.2	22.96	42.160	124.00	81.840
13.567	90	19.2	11.70	30.900	90.47	59.570
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

【3.300V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	12.28	31.480	90.47	58.990
13.560	90	19.2	24.56	43.760	124.00	80.240
13.567	90	19.2	13.52	32.720	90.47	57.750
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

【3.795V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.68	22.880	80.50	57.620
13.553	90	19.2	13.12	32.320	90.47	58.150
13.560	90	19.2	25.56	44.760	124.00	79.240
13.567	90	19.2	14.52	33.720	90.47	56.750
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.68	22.980	80.50	57.520

5.3.4 Measured Data (Continued)

3m distance

+50℃ (Angle 3)

Date of testing : October 28, 2008

Room temperature : 21℃

Condition: Operated

Relative humidity : 41%

【2.900V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.68	22.880	80.50	57.620
13.553	90	19.2	9.85	29.050	90.47	61.420
13.560	90	19.2	21.67	40.870	124.00	83.130
13.567	90	19.2	10.83	30.030	90.47	60.440
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

【3.300V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	10.96	30.160	90.47	60.310
13.560	90	19.2	23.03	42.230	124.00	81.770
13.567	90	19.2	11.34	30.540	90.47	59.930
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

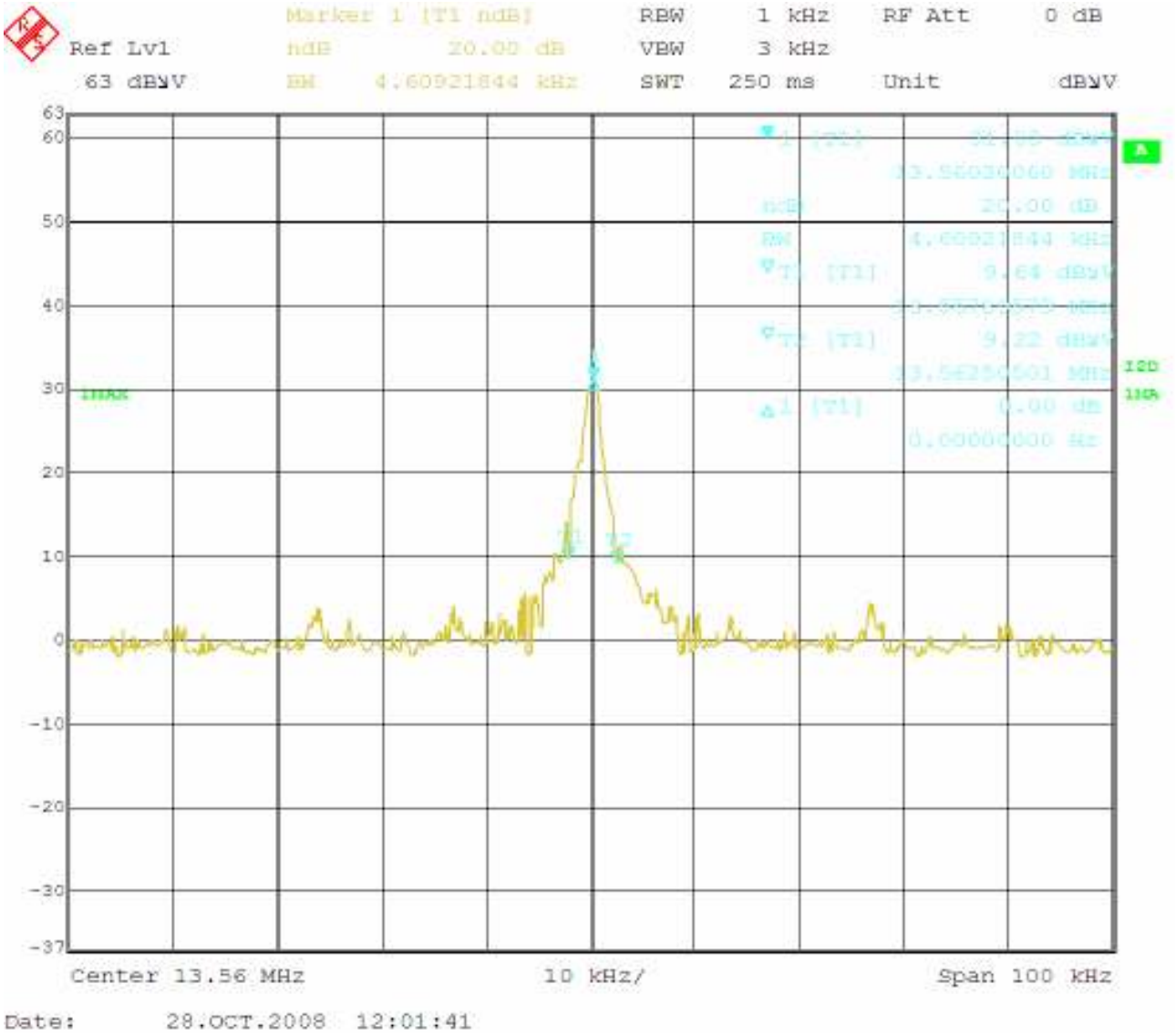
【3.795V DC】

Frequency [MHz]	Polarization [°]	Correction Factor [dB]	Reading [dB μ V]	Peak Power [dB μ V/m]	Limit [dB μ V/m]	Margin[dB]
13.110	90	19.3	3.98	23.280	80.50	57.220
13.410	90	19.2	3.98	23.180	80.50	57.320
13.553	90	19.2	11.70	30.900	90.47	59.570
13.560	90	19.2	24.03	43.230	124.00	80.770
13.567	90	19.2	12.92	32.120	90.47	58.350
13.710	90	19.2	3.98	23.180	80.50	57.320
14.010	90	19.3	3.98	23.280	80.50	57.220

5.3.4 Measured Data (Continued)

3m distance

Carrier Spectrum (20 dB BW)



▼1 [T1]	31.03 dBuV	
	13.56030060 MHz	
ndB	20.00 dB	
BW	4.60921844 kHz	
▽T1[T1]	9.64 dBuV	
	13.55709579 MHz	
▽T2[T1]	9.22 dBuV	
	13.56250501 MHz	
△1[T1]	0.00 dB	
	0.00000000 Hz	

5.4 Frequency Tolerance

5.4.1 Setting Remarks

- Refer to setting remarks 5.3.1.
- Refer to test configuration figure 4.2.
- With an environmental test chamber, EUT is exposed in extreme temperatures until its temperature is stabilized. (Approximately 30 minutes) Then EUT is on with nominal AC voltage or installed a fully charged battery or DC voltage.

5.4.2 Minimum Standard

15.225(e) The frequency tolerance of the carrier signal shall be maintained within +/- 0.01% of the operating frequency over a temperature variation of –20 degrees to +50 degrees C at normal supply voltage, and for a variation in the primary supply voltage from 85% to 115% of the rated supply voltage at a temperature of 20 degrees C. For battery operated equipment, the equipment tests shall be performed using a new battery.

5.4.3 Result

EUT complies with the requirement.

Uncertainty of measurement result: ± 1 Hz

5.4.4 Measured Data

Date of testing : October 28, 2008
Room temperature : 20℃
Relative humidity : 45%

Condition: Operated

Temp [℃]	P/S [VDC]	Frequency [Hz]	Limit [±Hz]	Offset from the CF [Hz]	Limit [%]	Error[%]
Center Frequency		13,560,000				
20	2.900	13560009	1356.00	9	±0.01	0.000
20	3.300	13560050	1356.00	50	±0.01	0.000
20	3.795	13560074	1356.00	74	±0.01	0.001
−20	2.900	13559991	1356.00	−9	±0.01	0.000
−20	3.300	13560034	1356.00	34	±0.01	0.000
−20	3.795	13560059	1356.00	59	±0.01	0.000
50	2.900	13559976	1356.00	−24	±0.01	0.000
50	3.300	13560018	1356.00	18	±0.01	0.000
50	3.795	13560044	1356.00	44	±0.01	0.000

6. Photos

6.1 Setup Photo (AC Power Lines Conducted Emission)

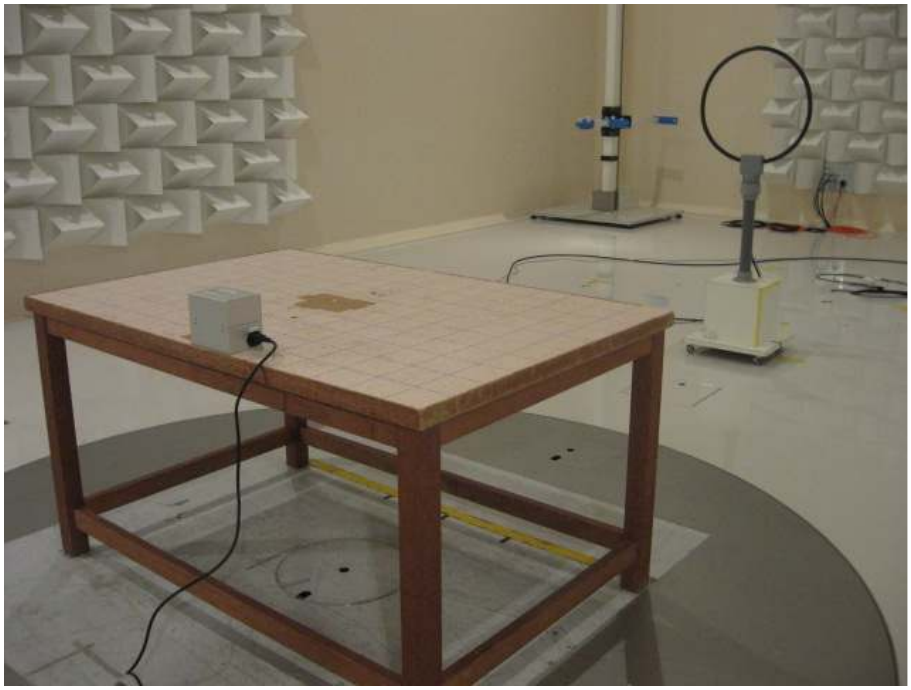
Front View

Side View

6.2 Setup Photo
(Radiated Emission, Maximum Carrier Output power, Frequency Tolerance)

Front View

Rear View



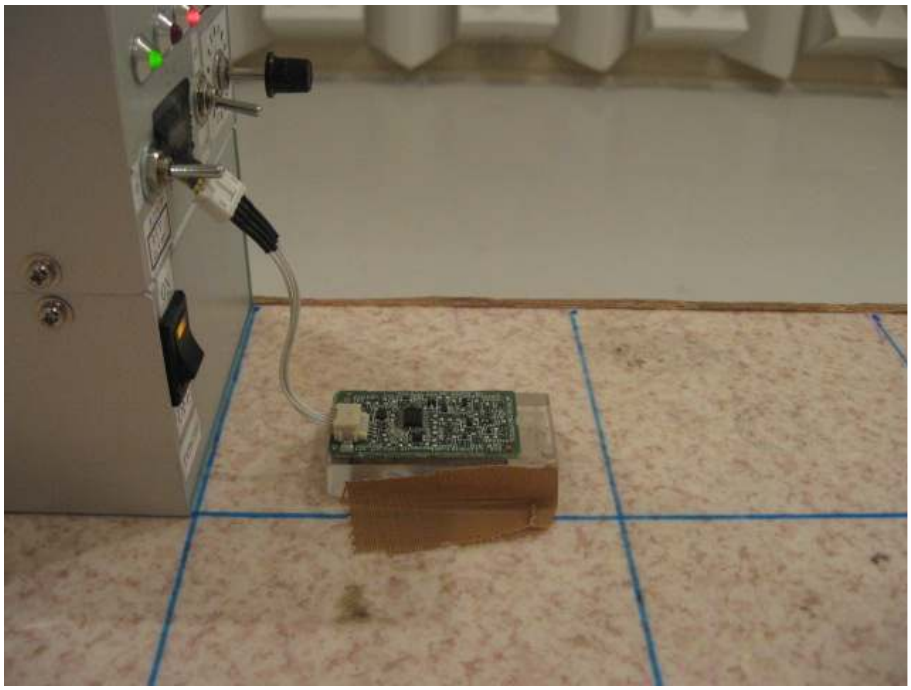
6.2 Setup Photo (Continued)
(Radiated Emission)

Front View

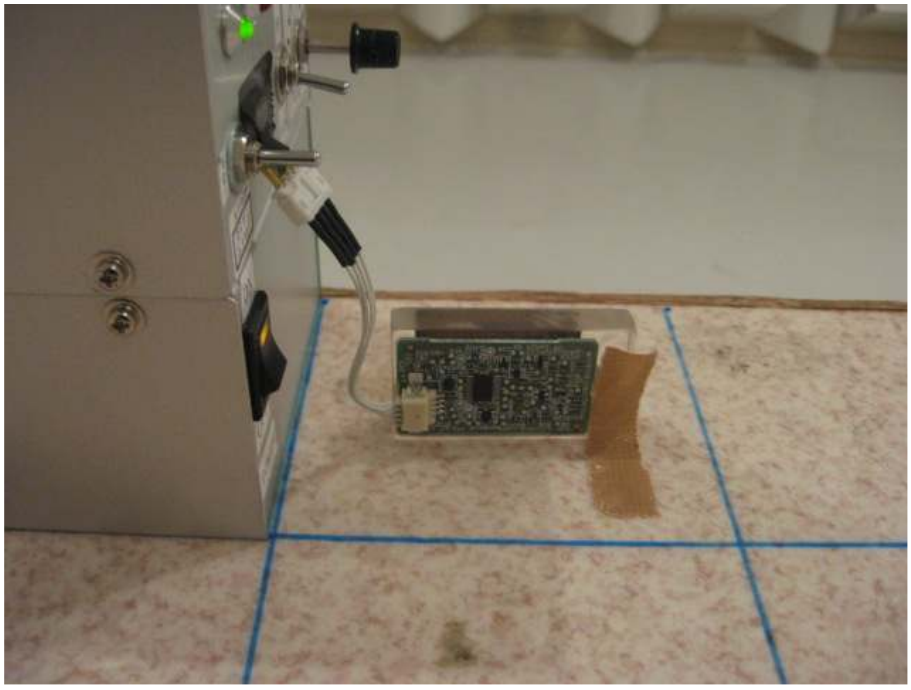
Rear View

6.2 Setup Photo (Continued)

Closeup (Angle 1)

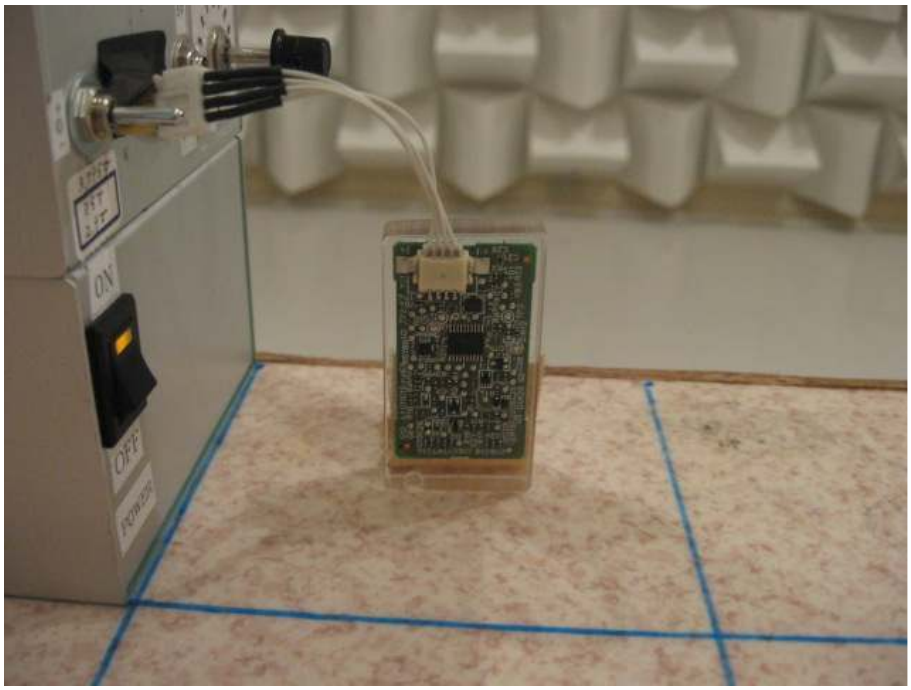


Closeup (Angle 2)

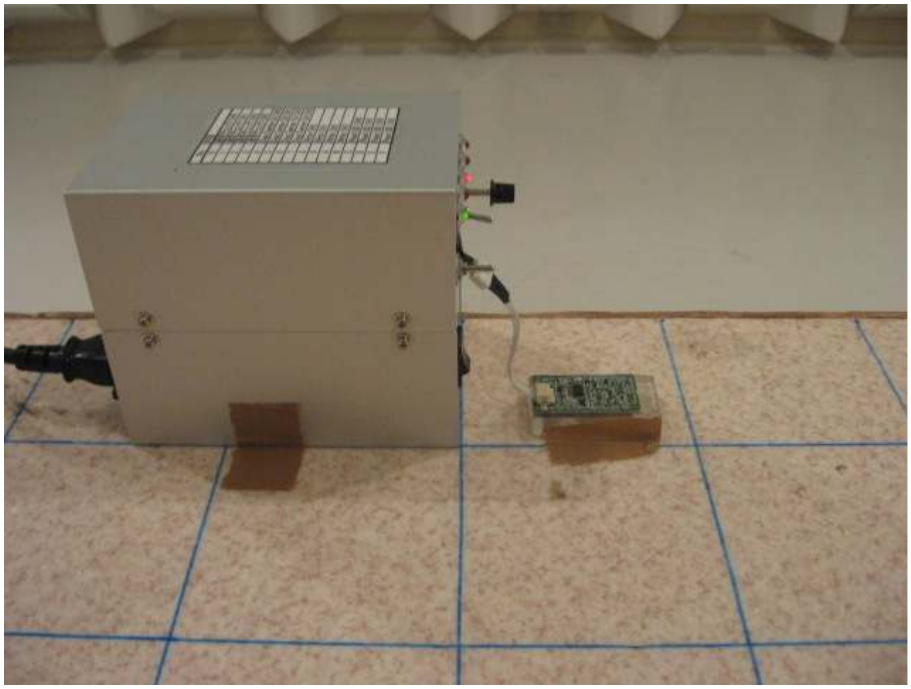


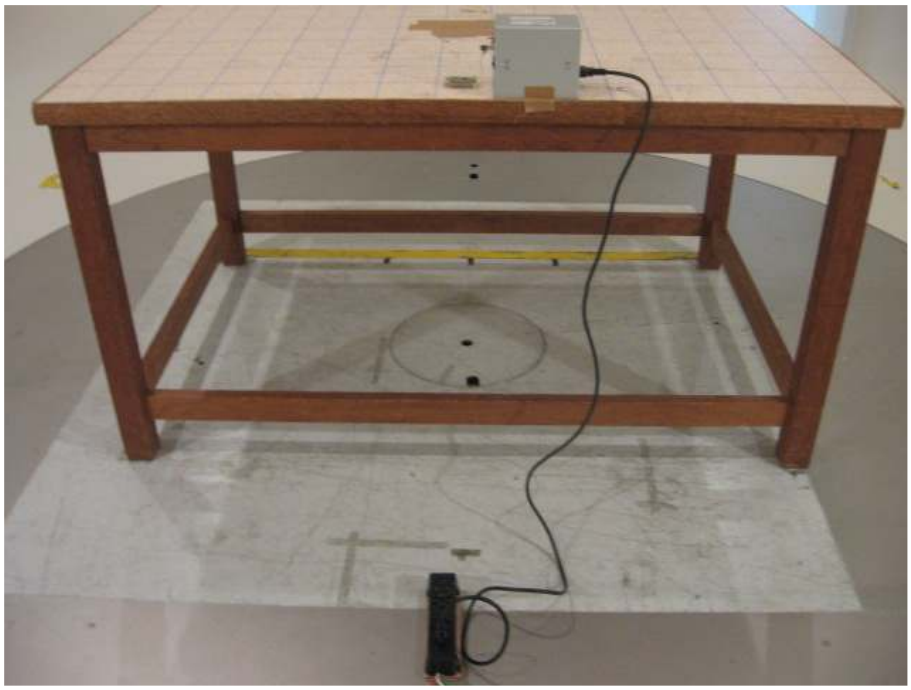
6.2 Setup Photo (Continued)

Closeup (Angle 3)



6.2 Setup Photo (Continued)





7. List of Test Measurement Instruments

7.1 AC Power Lines Conducted Emission Measurement

Instruments	Manufacturer	Model Serial No.	Calibrated Date/Until
Spectrum Analyzer	ADVANTEST CORPORATION	R3132 140501174	July, 2008 July, 2010
EMI Test Receiver	ROHDE & SCHWARZ	ESCS30 100335	August, 2008 August, 2009
Artificial-Mains Network (for EUT)	KYORITSU CORPORATION	KNW-341C 8-1659-1	April, 2007 April, 2009
Transient Limiter	AGILENT TECHNOLOGIES	11947A 3107A03745	October, 2008 October, 2009
RF Selector	Techno Science Japan Corp.	RFM-E221 3148	Confirmed before Test

7.2 Radiated Emission, Maximum Carrier Output power, Frequency Tolerance Measurement

Instruments	Manufacturer	Model / Type	Serial No.	Calibrated Date/Until
Programmable AC/DC Power Source	NF Corporation	ES18000W	425779	---
Spectrum Analyzer EMI Test Receiver	ROHDE & SCHWARZ	ESIB40	100211	April, 2008 April, 2009
Biconical Antenna (30 to 300MHz)	SCHWARZBECK	VHBB9124(Balun) BBA9106(Elements)	311	September, 2007 September, 2009
Log.-Periodic Antenna (300 MHz to 1 GHz)	SCHWARZBECK	UHALP 9108 A	645	September, 2007 September, 2009
Loop Antenna (0.15 to 30 MHz)	ROHDE & SCHWARZ	HFH2-Z2	131	August, 2008 August, 2009
Environment Chamber	ISUZU	HPAV-48-40	0092986-01	---