JQA File No. : 400-090318
Issue Date : December 26, 2009

TEST REPORT

APPLICANT	:	KORG INC.
ADDRESS	:	4015-2 Yanokuchi, Inagi-City, Tokyo 206-0812 JAPAN
PRODUCTS	:	WIRELESS MODULE
MODEL No.	:	WR RF MODULE
SERIAL No.	:	None
FCC ID	:	KIJ-WRRF
TEST STANDARD	:	CFR 47 FCC Rules and Regulations Part 15 Subpart A, B and C
TESTING LOCATION	:	Japan Quality Assurance Organization SAFETY & EMC CENTER EMC Engineering Department Testing Division 1-21-25, Kinuta, Setagaya-ku, Tokyo 157-8573, Japan
TEST RESULTS	:	**Passed**
DATE OF TEST	:	November 25, 2009 - December 26, 2009

Eiichi Saegusa
Manager
Japan Quality Assurance Organization
SAFETY & EMC CENTER
EMC Engineering Dept. Testing Division
1-21-25, Kinuta, Setagaya-ku, Tokyo 157-8573, Japan

Table of Contents

Definitions for Abbreviation and Symbols Used In This Test Report

"EUT" means Equipment Under the Test.
"AE" means Associated Equipment.
"N/A" means that Not Applicable.
"N/T" means that Not Tested.

☒-indicates that the listed condition, standard or equipment is applicable for this report.
☐-indicates that the listed condition, standard or equipment is not applicable for this report.

Documentation

1 Test Regulation

Applied Standard : CFR 47 FCC Rules and Regulations Part 15 Subpart A, B and C

Test Procedure : The tests were performed with reference to the FCC Public Notice DA 00-705, released March 30, 2000. The test set-up was made in accordance to the general provisions of ANSI C63.4-2003.

2 Test Location

Japan Quality Assurance Organization
SAFETY & EMC CENTER
EMC Engineering Department Testing Division
1-21-25, Kinuta, Setagaya-ku, Tokyo 157-8573, Japan

3 Recognition of Test Laboratory

Japan Quality Assurance Organization
SAFETY & EMC CENTER
EMC Engineering Department Testing Division
is accredited under ISO/IEC 17025 by following accreditation bodies and the test facility of Testing Division is registered by the following bodies .

VLAC Code : VLAC-001-1 (Effective through : April 3, 2010)
NVLAP Lab Code : 200189-0 (Effective through : June 30, 2010)
VCCI Registration Number : R-002, R-003, C-002, C-966 (Effective through : April 3, 2010)
FCC Registration Number : 349652 (Date of Listing : April 1, 2010)
IC Registration Number : 2079-7, 2079-8 (Effective through : August 29, 2011)
Accredited as conformity assessment body for Japan electrical appliances and material law by METI. (Effective through : February 22, 2010)

4 Description of the Equipment Under Test

1	Manufacturer	:	KORG DOUNG GUAN ELECTRONICS LTD. Lin Dong 3 Road No.8-301 Lin Chun Tang Xia Town Dong Guan City Guang Dong Province P.R.China
2	Products	:	WIRELESS MODULE
3	Trade Name	:	KORG
4	Model No.	:	WR RF MODULE
5	Serial No.	:	None
6	FCC ID	:	KIJ-WRRF
7	Product Type	:	Pre-Production
8	Date of Manufacture	:	None
9	Power Rating	:	3.0 VDC(*1)
10	EUT Grounding	:	None
11	Category	:	Transceiver
12	Received Date of EUT	:	November 20, 2009
13	EUT Authorization	:	Certification
14	Fundamental Frequency Generated/used in the EUT	:	16 MHz
15	Operating Frequency Range	:	2405 MHz - 2480 MHz
16	EUT Highest Frequency Used/Generated	:	2480 MHz (the part of Intentional Radiators) 16 MHz (the part of Unintentional Radiators)
17	RF Output Power	:	80.4 dBμV(measured value:Average) 93.1 dBμV(measured value:Peak)
18	Antenna Type	:	Integral Internal antenna (not accessible to the user)
19	Antenna Gain	:	2.14 dBi
20	Modulation Type	:	GFSK(2Mbps)

Note *1 : The EUT was operated with the AC Adapter(Model: GF12-US03320, Input:100-240VAC 50/60Hz, Output:3.3VDC by GO FORWARD ENTERPRISE CORP.).
The supply voltage is AC 120 V, 60Hz. This operational condition is mentioned by applicant.

5 Test Condition

5.1 Output Power (Radiation)

The requirements are ☒-Applicable [☒-Tested ☐-Not tested by applicant request.]
☐-Not Applicable

Test site & instruments :

Type	Number of test site & instruments (Refer to Appendix C)
Test Site	1
Test Receiver	13
Spectrum Analyzer	--
Antenna	31
Cable	195
RF Amplifier	--
Band Reject Filter	--
High Pass Filter	--
Thermo-Hygrometer	204

5.2 Occupied Bandwidth

The requirements are ☒-Applicable [☒-Tested ☐-Not tested by applicant request.]
☐-Not Applicable

Test site & instruments :

Type	Number of test site & instruments (Refer to Appendix C)
Test Site	1
Test Receiver	13
Spectrum Analyzer	--
Antenna	31
Cable	195
RF Amplifier	--
Attenuator	--
Thermo-Hygrometer	--
	204

5.3 Spurious Emissions for Transmitter (Radiation)

The requirements are ☒-Applicable [☒-Tested ☐-Not tested by applicant request.]
☐-Not Applicable

Test site & instruments : (for 9 kHz – 30 MHz)

Type	Number of test site & instruments (Refer to Appendix C)
Test Site	1
Test Receiver	13
Spectrum Analyzer	--
Antenna	21
Cable	43
Thermo-Hygrometer	204

Test site & instruments : (for 30 MHz – 1000 MHz)

Type	Number of test site & instruments (Refer to Appendix C)
Test Site	1
Test Receiver	13
Spectrum Analyzer	--
Antenna	167 168
Cable	38
Thermo-Hygrometer	204

Test site & instruments : (for above 1 GHz)

Type	Number of test site & instruments (Refer to Appendix C)
Test Site	1
Test Receiver	13
Spectrum Analyzer	--
Antenna	31 32
Cable	48 49 195
RF Amplifier	57
Band Reject Filter	78
High Pass Filter	--
Thermo-Hygrometer	204

5.4 AC Power Line Conducted Emissions for Transmitter

The requirements are ☒-Applicable [☒-Tested ☐-Not tested by applicant request.]
☐-Not Applicable

Test site & instruments :

Type	Number of test site & instruments (Refer to Appendix C)
Test Site	3
Test Receiver	172
Spectrum Analyzer	--
Cable	40
AMN(for EUT)	34
Pulse-Limiter	175
AMN(for Peripheral)	--
Termination	--
Thermo-Hygrometer	202

5.5 Spurious Emissions for Receiver (Radiation)

The requirements are ☒-Applicable [☒-Tested ☐-Not tested by applicant request.]
☐-Not Applicable

Test site & instruments : (for 9 kHz – 30 MHz)

Type	Number of test site & instruments (Refer to Appendix C)
Test Site	1
Test Receiver	13
Spectrum Analyzer	--
Antenna	21
Cable	43
Thermo-Hygrometer	204

Test site & instruments : (for 30 MHz – 1000 MHz)

Type	Number of test site & instruments (Refer to Appendix C)
Test Site	1
Test Receiver	13
Spectrum Analyzer	--
Antenna	167 168
Cable	38
Thermo-Hygrometer	204

Test site & instruments : (for above 1 GHz)

Type	Number of test site & instruments (Refer to Appendix C)
Test Site	1
Test Receiver	13
Spectrum Analyzer	--
Antenna	31 32
Cable	48 49 195
RF Amplifier	57
Band Reject Filter	--
High Pass Filter	--
Thermo-Hygrometer	204

5.6 AC Power Line Conducted Emissions for Receiver

The requirements are ☒-Applicable [☒-Tested ☐-Not tested by applicant request.]
☐-Not Applicable

Test site & instruments :

Type	Number of test site & instruments (Refer to Appendix C)
Test Site	3
Test Receiver	172
Spectrum Analyzer	--
Cable	40
AMN(for EUT)	34
Pulse-Limiter	175
AMN(for Peripheral)	--
Termination	--
Thermo-Hygrometer	202

6 Preliminary Test and Test Setup

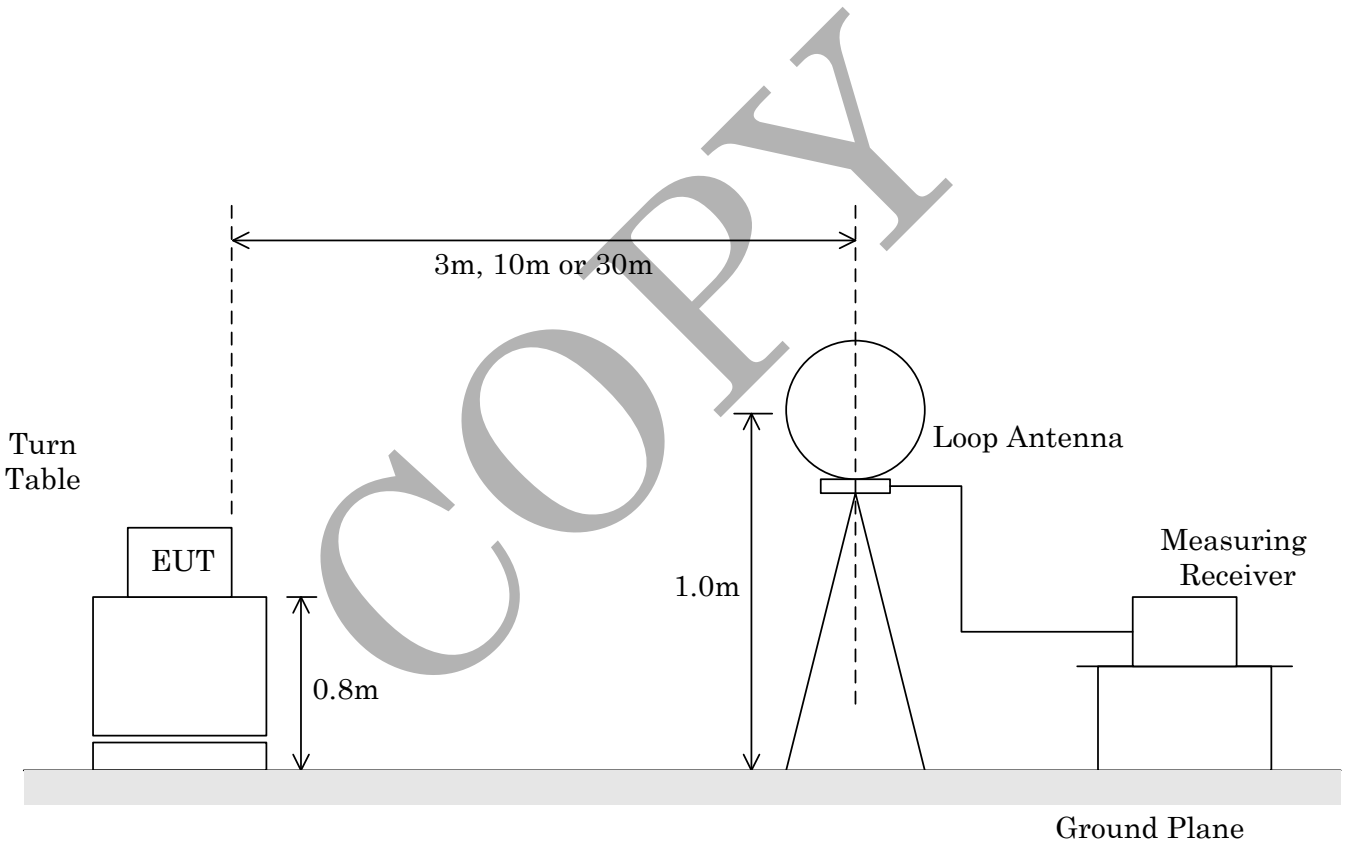
6.1 Output Power (Radiation) and Spurious Emissions (Radiation)

6.1.1 Radiated Emission (9 kHz – 30 MHz)

According to description of ANSI C63.4-2003 sec.13.1.4, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

- Side View -

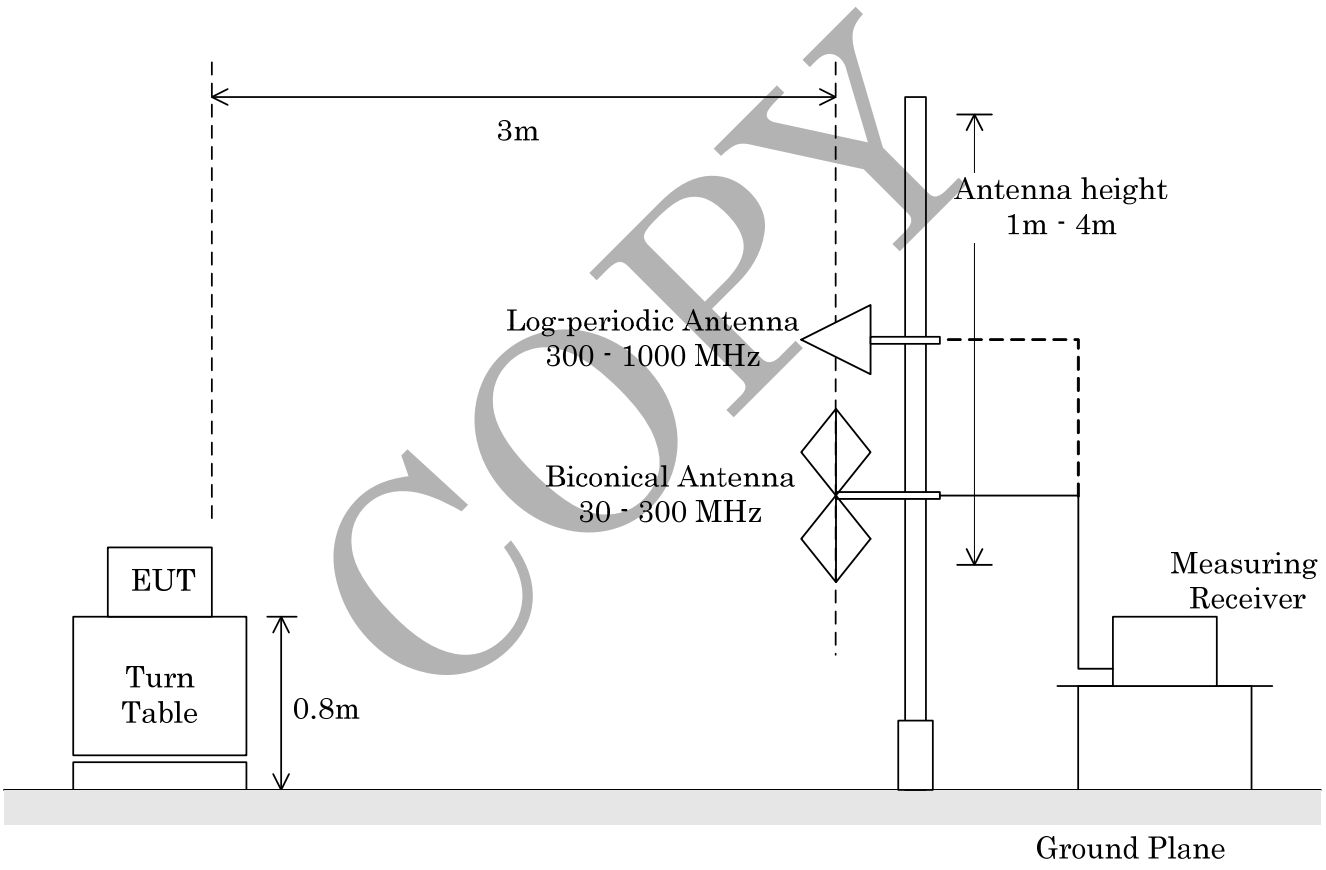


6.1.2 Radiated Emission (30 MHz – 1000 MHz)

According to description of ANSI C63.4-2003 sec.13.1.4, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration (in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

- Side View -

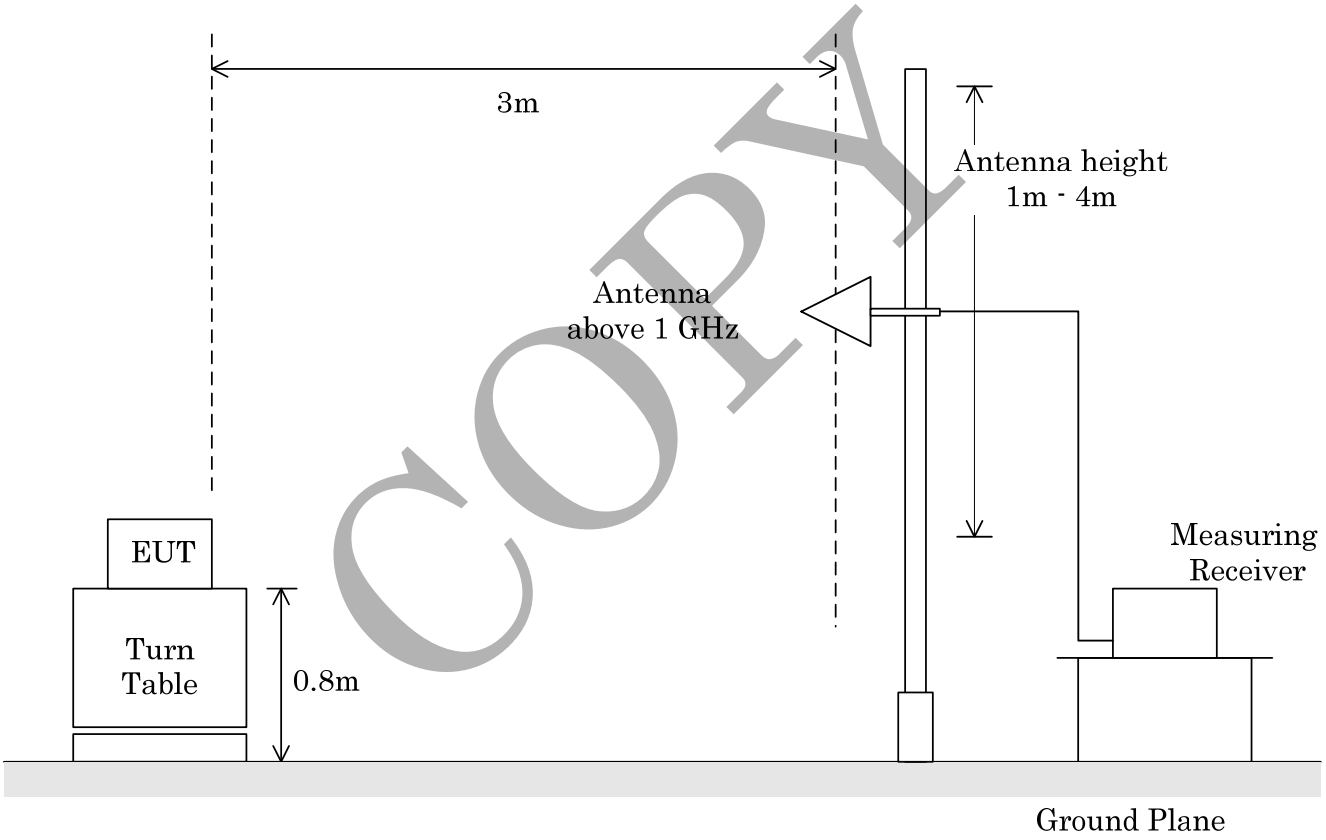


6.1.3 Radiated Emission (above 1 GHz)

According to description of ANSI C63.4-2003 sec.13.1.4, the preliminary radiated emissions measurement were carried out. The preliminary radiated measurements were performed at the measurement distance that specified for compliance to determine the emission characteristics of the EUT.

The EUT configuration (in X, Y and Z axis), cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for the final radiated emissions measurements.

- Side View -



6.2 Occupied Bandwidth

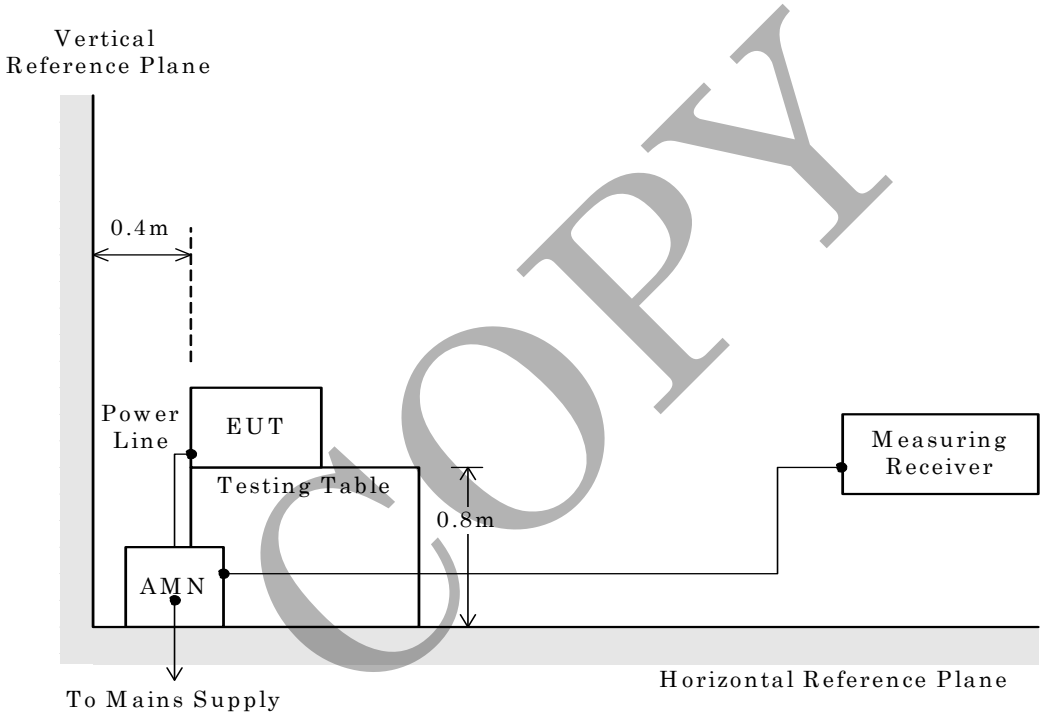
Use the following spectrum analyzer settings:
Span = approximately 2 to 3 times the 6 dB or 20 dB bandwidth, centered on a channel
RBW ≥ 1% of the 6 dB or 20 dB bandwidth
VBW ≥ RBW
Sweep = auto
Detector function = peak
Trace = max hold
The EUT should be transmitting at its maximum data rate. Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission. Use the marker-delta function to measure 6 dB or 20 dB down one side of the emission. Reset the marker-delta function, and move the marker to the other side of the emission, until it is (as close as possible to) even with the reference marker level. The marker-delta reading at this point is the 6 dB or 20 dB bandwidth of the emission. If this value varies with different modes of operation (e.g., data rate, modulation format, etc.), repeat this test for each variation.

Measurement setup is same as sub-clause 6.1.

6.3 AC Power Line Conducted Emissions (150 kHz – 30 MHz)

According to description of ANSI C63.4-2003 sec.13.1.3, the AC power line preliminary conducted emissions measurements were carried out.
The preliminary conducted measurements were performed using the spectrum analyzer to observe the emission characteristics of the EUT.
The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions. These configurations were used for final AC power line conducted emissions measurements.

- Side View -



* AMN : Artificial Mains Network

7 Equipment Under Test Modification

☒-No modifications were conducted by JQA to achieve compliance to the limitations.
☐-To achieve compliance to the limitations, the following changes were made by JQA during the compliance test.

The modifications will be implemented in all production models of this equipment.

Applicant : Not Applicable
Date : Not Applicable
Typed Name : Not Applicable Signatory : Not Applicable
Position : Not Applicable

8 Responsible Party

Responsible Party of Test Item (Product)

Responsible Party :

Contact Person :

Signatory

9 Deviation from Standard

☒-No deviations from the standard described in clause 1.
☐-The following deviations were employed from the standard described in clause 1.

10 Test Results

10.1 Output Power (Radiation) [§15.249(a)]

The requirements are ☒-Applicable [☒-Tested ☐-Not tested by applicant request.]
☐-Not Applicable

☒-Passed ☐-Failed ☐-Not judged

For the Frequency Range below 1000 MHz

Min. Limit Margin	--	dB	at	-- MHz
Max. Limit Excess	--	dB	at	-- MHz

For the Frequency Range above 1000 MHz

Min. Limit Margin(Average)	13.6	dB	at	2405.00 MHz
Min. Limit Margin(Peak)	20.9	dB	at	2405.00 MHz
Max. Limit Excess	--	dB	at	-- MHz

Uncertainty of measurement results

30-300	MHz	± 4.6 dB(2σ)
300-1000	MHz	± 4.5 dB(2σ)
1-18	GHz	± 5.0 dB(2σ)
18-40	GHz	± 5.3 dB(2σ)

Remarks :

10.2 Occupied Bandwidth [§15.215(c)]

The requirements are ☒-Applicable [☒-Tested ☐-Not tested by applicant request.]
☐-Not Applicable

☒-Passed ☐-Failed ☐-Not judged

Uncertainty of measurement results

± 0.6 %(2σ)

Remarks : Within in the specified frequency band.

10.3 Spurious Emissions for Transmitter (Radiation) [§15.249(a) / §15.249(d) / §15.35(b) / §15.209(a)]

The requirements are ☒-Applicable [☒-Tested ☐-Not tested by applicant request.]
☐-Not Applicable

☒-Passed ☐-Failed ☐- Not judged

For the Frequency Range below 1000 MHz

Min. Limit Margin	9.2	dB	at	30.16	MHz
Max. Limit Excess	--	dB	at	--	MHz

For the Frequency Range above 1000 MHz

Min. Limit Margin(Average)	3.7	dB	at	7439.50	MHz
Min. Limit Margin(Peak)	9.9	dB	at	7214.00	MHz
Max. Limit Excess	--	dB	at	--	MHz

Uncertainty of measurement results

30-300	MHz	± 4.6 dB(2σ)
300-1000	MHz	± 4.5 dB(2σ)
1-18	GHz	± 5.0 dB(2σ)
18-40	GHz	± 5.3 dB(2σ)

Remarks : The measurement results is within the range of measurement uncertainty.

10.4 AC Power Line Conducted Emissions for Transmitter [§15.207(a)]

The requirements are ☒-Applicable [☒-Tested ☐-Not tested by applicant request.]
☐-Not Applicable

☒-Passed ☐-Failed ☐- Not judged

Min. Limit Margin (QP)	18.0	dB	at	0.60	MHz
Min. Limit Margin (AVE)	--	dB	at	--	MHz
Max. Limit Exceeding (QP)	--	dB	at	--	MHz
Max. Limit Exceeding (AVE)	--	dB	at	--	MHz

Uncertainty of measurement results

± 2.9 dB(2σ)

Remarks :

10.5 Spurious Emissions for Receiver (Radiation) [§15.109(a)]

The requirements are ☒-Applicable [☒-Tested ☐-Not tested by applicant request.]
☐-Not Applicable

☒-Passed ☐-Failed ☐- Not judged

For the Frequency Range below 1000 MHz

Min. Limit Margin	16.0	dB	at	30.16	MHz
Max. Limit Excess	--	dB	at	--	MHz

For the Frequency Range above 1000 MHz

Min. Limit Margin(Average)	8.6	dB	at	2791.00	MHz
Min. Limit Margin(Peak)	23.7	dB	at	5501.80	MHz
Max. Limit Excess	--	dB	at	--	MHz

Uncertainty of measurement results

30-300	MHz	± 4.6 dB(2σ)
300-1000	MHz	± 4.5 dB(2σ)
1-18	GHz	± 5.0 dB(2σ)
18-40	GHz	± 5.3 dB(2σ)

Remarks :

10.6 AC Power Line Conducted Emissions for Receiver [§15.107(a)]

The requirements are ☒-Applicable [☒-Tested ☐-Not tested by applicant request.]
☐-Not Applicable

☒-Passed ☐-Failed ☐- Not judged

Min. Limit Margin (QP)	17.6	dB	at	0.60	MHz
Min. Limit Margin (AVE)	--	dB	at	--	MHz
Max. Limit Exceeding (QP)	--	dB	at	--	MHz
Max. Limit Exceeding (AVE)	--	dB	at	--	MHz

Uncertainty of measurement results

± 2.9 dB(2σ)

Remarks :

11 Summary

General Remarks

The EUT was tested according to the requirements of CFR 47 FCC Rules and Regulations Part 15 under the test configuration, as shown in clause 12 to 14.
The conclusion for the test items of which are required by the applied regulation is indicated under the test result.

Test Result :

The "as received" sample;
☒-fulfill the test requirements of the regulation mentioned on clause 1.
☐-doesn't fulfill the test requirements of the regulation mentioned on clause 1.

Reviewed by:

Shigeru Osawa
Deputy Manager
SAFETY & EMC CENTER
EMC Engineering Dept. Testing Division

Tested by:

Katsunori Miura
Assistant Manager
SAFETY & EMC CENTER
EMC Engineering Dept. Testing Division

12 Operating Condition

Power Supply Voltage : 3.3 VDC operate with the AC Adapter(Model: GF12-US03320, by GO FORWARD ENTERPRISE CORP.).

Operation Mode

The EUT is set with the test mode, the specification of the test mode is as following.

(1) TX Mode (2405MHz)
(2) TX Mode (2440MHz)
(3) TX Mode (2480MHz)
(4) RX Mode

Used application to controlled : The operation of the EUT is carried out using the test program supplied by manufacturer.

13 Test Configuration

The equipment under test consists of :

Sign	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	WIRELESS MODULE	KORG DOUNG GUAN ELECTRONICS LTD.	WR RF MODULE	None	KIJ-WRRF

The auxiliary equipment used for testing :

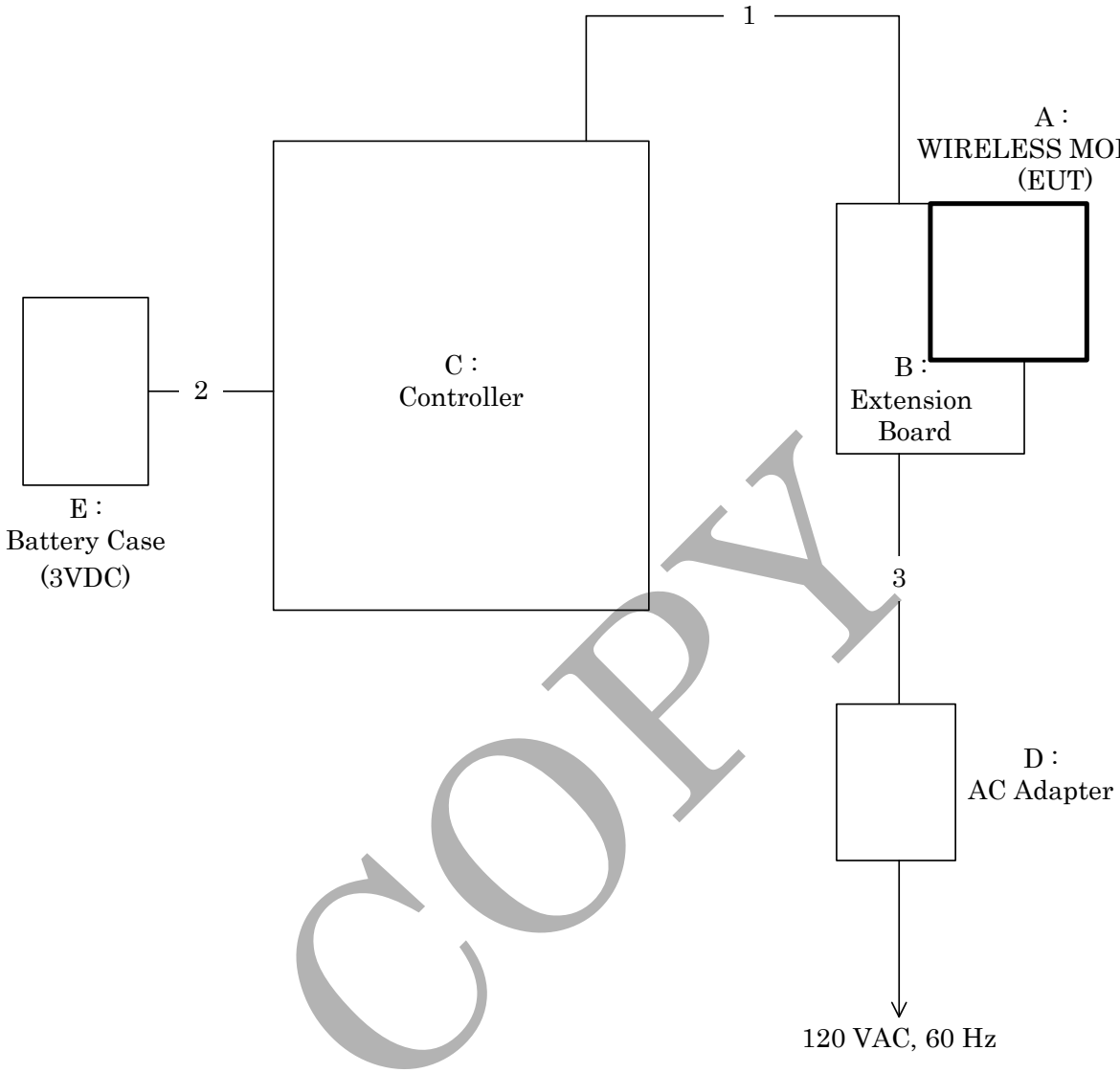
Sign	Item	Manufacturer	Model No.	Serial No.	FCC ID
B	Extension Board	KORG INC.	None	None	--
C	Controller	KORG INC.	None	None	--
D	AC Adapter(*1)	GO FORWARD ENTERPRISE CORP.	GF12-US03320	None	--
E	Battery Case(*2)	--	None	None	--

(*1) This AC adaptor supplies DC power to the EUT.
(*2) This battery supplies DC power(3.0V) to the controller.

Type of Cable:

No.	Description	Identification (Manu. Etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	Control Cable	--	--	--	--	2.00
2	DC Cable (for Controller)	--	--	--	--	0.10
3	DC Cable(for AC Adapter)	--	--	--	--	1.60

14 Equipment Under Test Arrangement (Drawings)



Appendix A : Test Data

A.1 Output Power (Radiation)

Date : December 26, 2009
Temp. : 22 °C Humi. : 30 %

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
2.4050	0.0	31.6	H	48.8	61.5	94.0	114.0	80.4	93.1	13.6	20.9
2.4398	0.0	31.7	H	46.6	58.2	94.0	114.0	78.3	89.9	15.7	24.1
2.4798	0.0	31.9	H	46.7	58.1	94.0	114.0	78.6	90.0	15.4	24.0

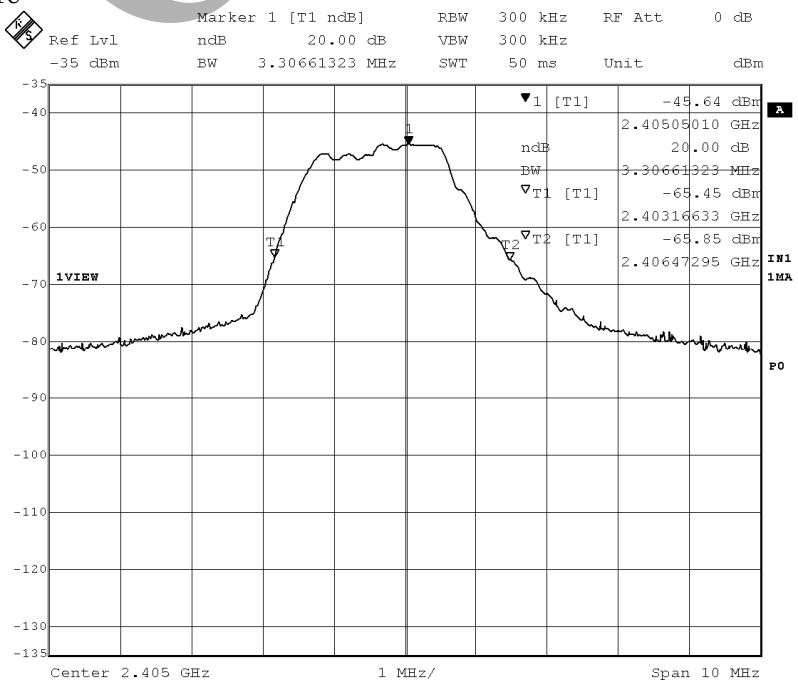
Note : 1) The cable loss, amp. gain and antenna factor are included in the correction factor.
2) A sample calculation(Average) was made at 2.4050 GHz.
PA + CF + MR = 0 + (31.6) + 48.8 = 80.4 (dBuV/m)
PA : Peak to Average Factor (P-A Factor)
CF : Correction Factor
MR : Meter Reading
3) Measuring Instruments Setting :

Detector Function	Resolution Bandwidth	Video Bandwidth
Average (AV)	1 MHz	10 Hz
Peak	1 MHz	1 MHz

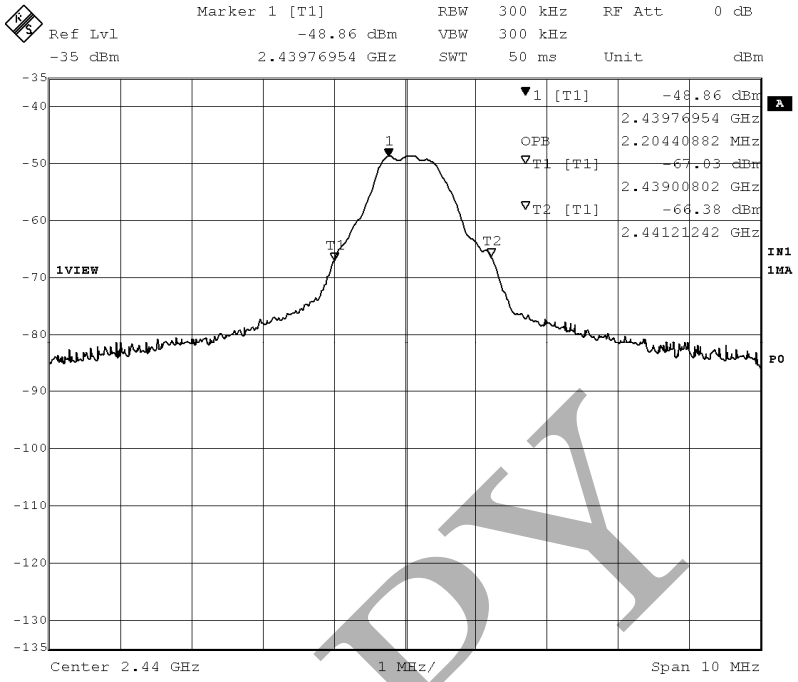
A.2 Occupied Bandwidth

Date : December 26, 2009
Temp. : 22 °C Humi. : 30 %

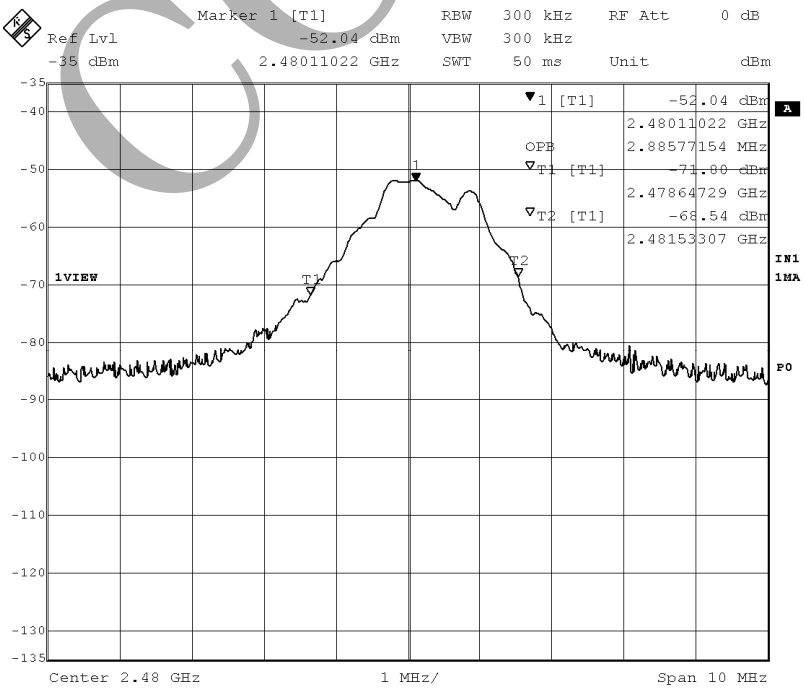
Mode of EUT : TX Mode (2405MHz)
Test Port : Enclosure



Mode of EUT : TX Mode (2440MHz)
Test Port : Enclosure



Mode of EUT : TX Mode (2480MHz)
Test Port : Enclosure

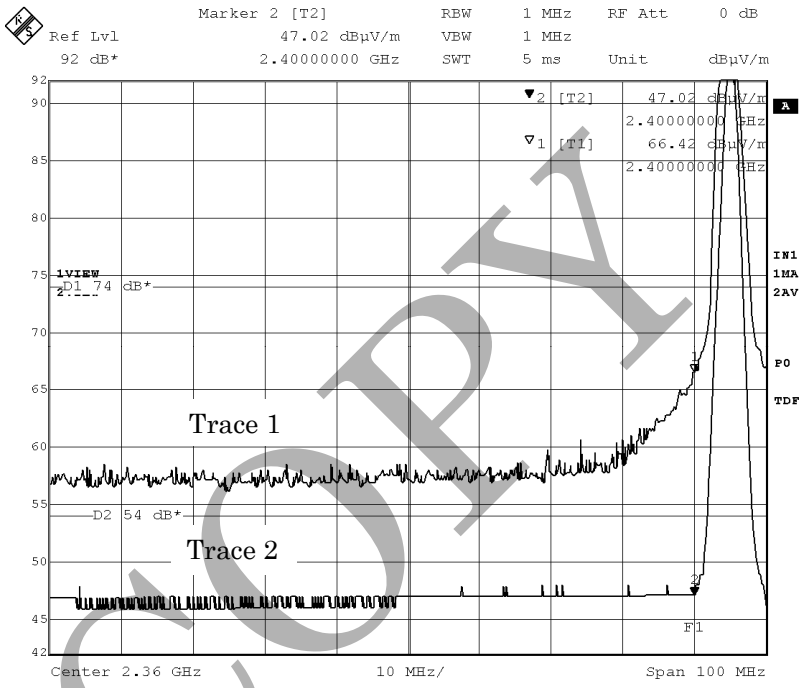


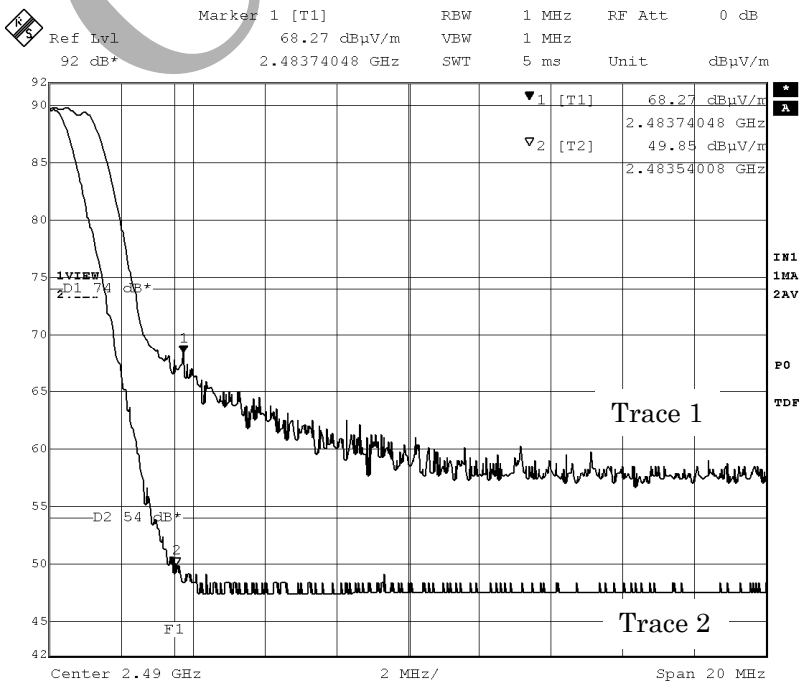
A.3 Spurious Emissions for Transmitter (Radiation)

A.3.1 Band Edge Compliance

Date : December 26, 2009
Temp. : 22 °C Humi. : 30 %

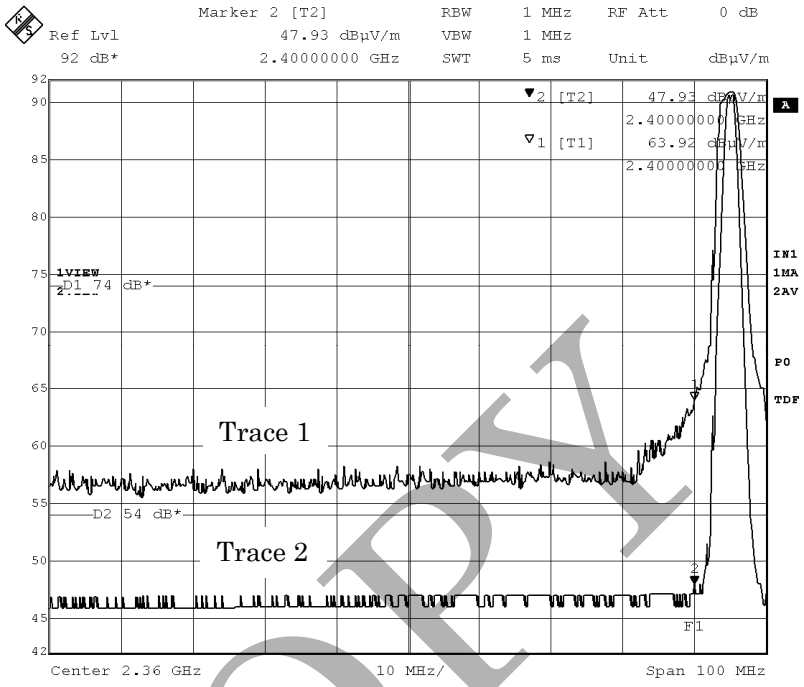
Mode of EUT : TX Mode
Test Port : Enclosure
Antenna Polarization : Horizontal

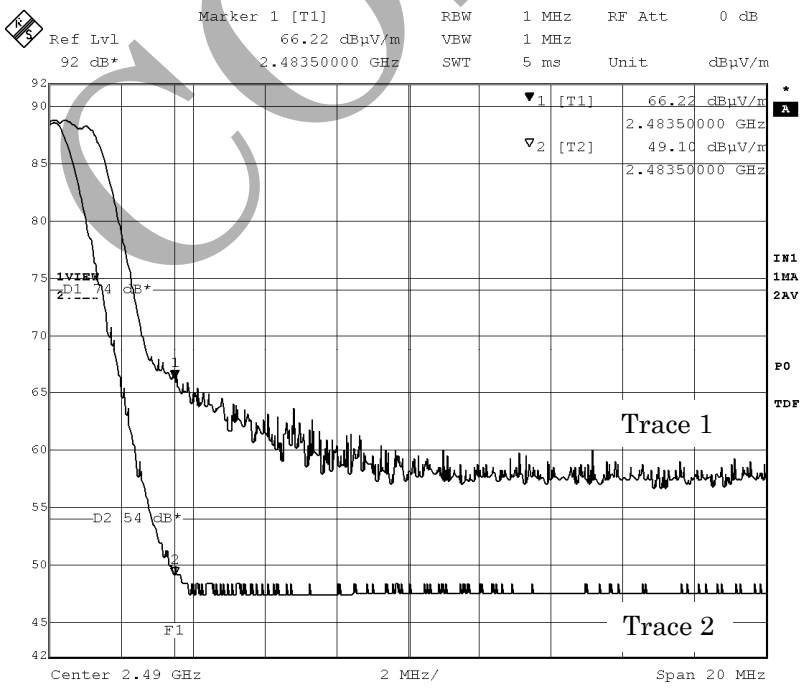




Note : The trace 1 is Peak detection. The Trace 2 is Average detection.

Mode of EUT : TX Mode
Test Port : Enclosure
Antenna Polarization : Vertical





Note : The trace 1 is Peak detection. The Trace 2 is Average detection.

A.3.2 Other Spurious Emissions

A.3.2.1 Spurious Emissions in the frequency range from 9 kHz to 30 MHz

Date : December 26, 2009
Temp. : 20 °C Humi. : 30 %

Mode of EUT : All modes have been investigated and worst case mode for Channel (0ch : 2440 MHz) has been listed.
Test Port : Enclosure

No spurious emissions of the EUT in the range 20 dB below the limit.

A.3.2.2 Spurious Emissions in the frequency range from 30 MHz to 1000 MHz

Date : December 26, 2009
Temp. : 22 °C Humi. : 30 %

Mode of EUT : All modes have been investigated and worst case mode for Channel (2440 MHz) has been listed.
Test Port : Enclosure

Frequency (MHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) QP	AV	Peak	Limits (dBuV/m) QP/AV	Peak	Emission Levels (dBuV/m) QP/AV	Peak	Margins (dB) QP/AV	Peak
30.16	0.0	22.0	V	8.8	-	-	40.0	-	30.8	-	9.2	-
64.00	0.0	11.2	V	19.1	-	-	40.0	-	30.3	-	9.7	-
72.00	0.0	10.3	V	14.6	-	-	40.0	-	24.9	-	15.1	-
200.00	0.0	21.3	V	2.2	-	-	43.5	-	23.5	-	20.0	-
260.00	0.0	22.4	V	3.5	-	-	46.0	-	25.9	-	20.1	-

Note : 1) The spectrum was checked from 30 MHz to 1000 MHz.
2) The cable loss, amp. gain and antenna factor are included in the correction factor.
3) The symbol of "<" means "or less".
4) The symbol of ">" means "or greater".
5) A sample calculation(QP) was made at 30.16 MHz.
PA + CF + MR = 0 + 22.0 + 8.8 = 30.8 (dBuV/m)
PA : Peak to Average Factor (P-A Factor)
CF : Correction Factor
MR : Meter Reading
6) Measuring Instruments Setting :

Detector Function	Resolution Bandwidth	Video Bandwidth
Quasi-peak (QP)	120 kHz	--

A.3.2.3 Spurious Emissions in the frequency range above 1 GHz

Date : December 26, 2009
Temp. : 22 °C Humi. : 30 %

Mode of EUT : TX Mode (2405MHz)
Test Port : Enclosure

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.2026	0.0	-2.0	V	31.4	43.2	54.0	74.0	29.4	41.2	24.6	32.8
4.8101	0.0	8.4	H	29.8	45.3	54.0	74.0	38.2	53.7	15.8	20.3
7.2140	0.0	12.0	H	36.6	52.1	54.0	74.0	48.6	64.1	5.4	9.9
9.6186	0.0	14.8	H	29.5	44.9	54.0	74.0	44.3	59.7	9.7	14.3

Mode of EUT : TX Mode (2440MHz)
Test Port : Enclosure

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.2199	0.0	-2.0	V	32.1	43.8	54.0	74.0	30.1	41.8	23.9	32.2
4.8796	0.0	8.5	V	33.1	46.8	54.0	74.0	41.6	55.3	12.4	18.7
7.3193	0.0	12.1	V	37.8	51.6	54.0	74.0	49.9	63.7	4.1	10.3
9.7592	0.0	15.0	V	28.3	42.2	54.0	74.0	43.3	57.2	10.7	16.8

Mode of EUT : TX Mode (2480MHz)
Test Port : Enclosure

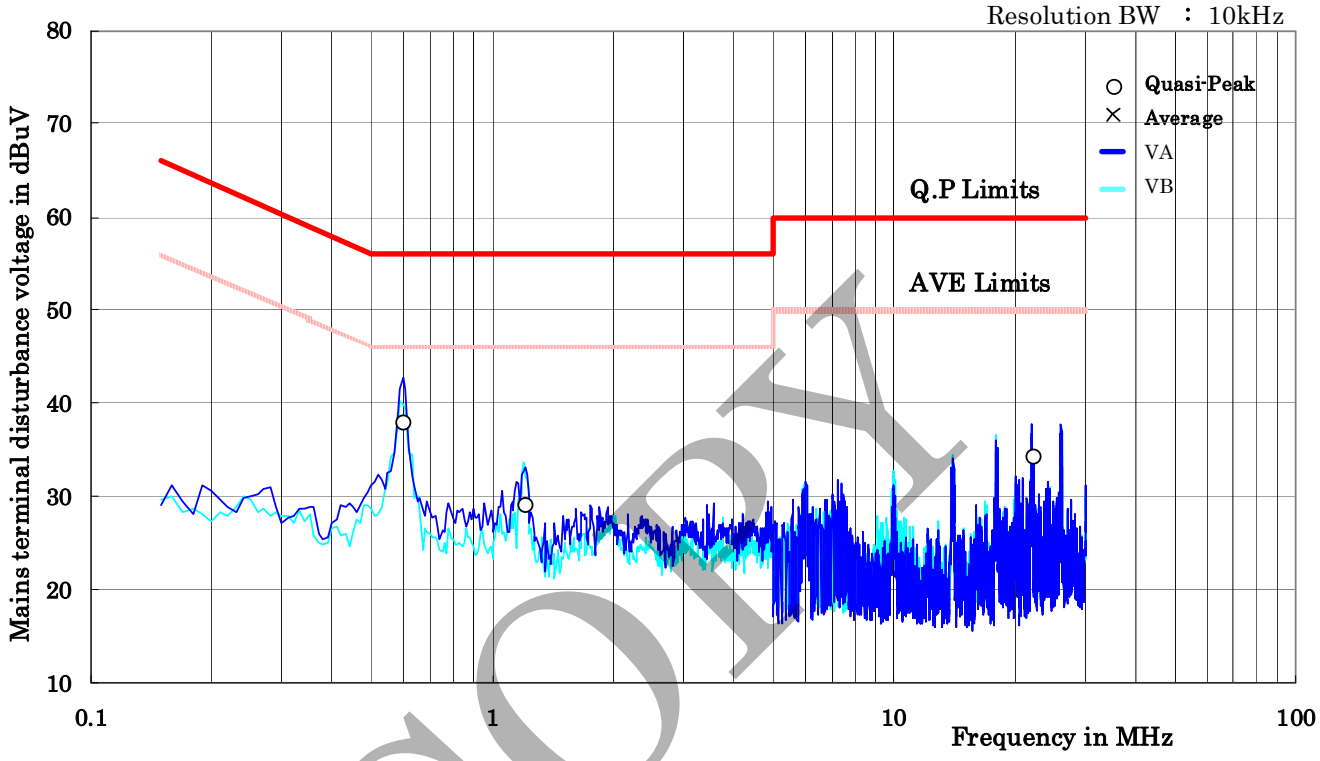
Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.2399	0.0	-1.9	H	31.7	44.0	54.0	74.0	29.8	42.1	24.2	31.9
4.9596	0.0	8.6	H	36.0	49.6	54.0	74.0	44.6	58.2	9.4	15.8
7.4395	0.0	12.3	V	38.0	51.5	54.0	74.0	50.3	63.8	3.7	10.2
9.9192	0.0	15.2	V	< 28.0	< 41.0	54.0	74.0	< 43.2	< 56.2	> 10.8	> 17.8

Note : 1) The spectrum was checked from 1.0 GHz to 26.5 GHz.
2) The cable loss, amp. gain and antenna factor are included in the correction factor.
3) The symbol of "<" means "or less".
4) The symbol of ">" means "or greater".
5) A sample calculation(Peak) was made at 1.2026 GHz.
PA + CF + MR = 0 + (-2.0) + 43.2 = 41.2 (dBuV/m)
PA : Peak to Average Factor (P-A Factor)
CF : Correction Factor
MR : Meter Reading
6) Measuring Instruments Setting :

Detector Function	Resolution Bandwidth	Video Bandwidth
Average (AV)	1 MHz	10 Hz
Peak	1 MHz	1 MHz

A.4 AC Power Line Conducted Emissions for Transmitter

Date : December 26, 2009
Temp. : 22 °C Humi. : 30 %



Freq. [MHz]	Correction Factor [dB]	Meter Reading [dBuV] VA QP	VA AV	VB QP	VB AV	Limit [dBuV] QP	Limit [dBuV] AV	Result [dBuV] QP	Result [dBuV] AV	Margin [dB] QP	Margin [dB] AV
0.60	0.10	37.9	-	36.9	-	56.0	46.0	38.0	-	18.0	-
1.21	0.10	29.1	-	28.5	-	56.0	46.0	29.2	-	26.8	-
22.056	0.50	33.9	-	33.2	-	60.0	50.0	34.4	-	25.6	-

Note : 1) QP : CISPR Quasi-Peak ; AV : Average IF bandwidth : 9 kHz.
2) VA : One end & grounded ; VB : The other end & grounded
3) The symbol of '<' means 'or less' .
4) The symbol of '>' means 'or greater' .
5) The symbol of '-' means 'Not applicable' .
6) Factor includes an artificial mains network factor and a cable (4.0 m) loss.
7) A sample calculation was made at 0.60MHz
Factor + Meter Reading = 0.1 + 37.9 = 38.0

A.5 Spurious Emissions for Receiver (Radiation)

A.5.1 Spurious Emissions in the frequency range from 30 MHz to 1000 MHz

Date : December 26, 2009
Temp. : 22 °C Humi. : 30 %

Mode of EUT : All modes have been investigated and worst case mode for Channel (2440 MHz) has been listed.
Test Port : Enclosure

Frequency (MHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) QP	AV	Peak	Limits (dBuV/m) QP/AV	Peak	Emission Levels (dBuV/m) QP/AV	Peak	Margins (dB) QP/AV	Peak
30.16	0.0	22.0	V	2.0	-	-	40.0	-	24.0	-	16.0	-
64.00	0.0	11.2	V	8.0	-	-	40.0	-	19.2	-	20.8	-
72.00	0.0	10.3	V	5.1	-	-	40.0	-	15.4	-	24.6	-
200.00	0.0	21.3	V	2.1	-	-	43.5	-	23.4	-	20.1	-
260.00	0.0	22.4	V	3.3	-	-	46.0	-	25.7	-	20.3	-

Note : 1) The spectrum was checked from 30 MHz to 1000 MHz.
2) The cable loss, amp. gain and antenna factor are included in the correction factor.
3) The symbol of "<" means "or less".
4) The symbol of ">" means "or greater".
5) A sample calculation(QP) was made at 30.16 MHz.
PA + CF + MR = 0 + 22.0 + 2.0 = 24.0 (dBuV/m)
PA : Peak to Average Factor (P-A Factor)
CF : Correction Factor
MR : Meter Reading
6) Measuring Instruments Setting :

Detector Function	Resolution Bandwidth	Video Bandwidth
Quasi-peak (QP)	120 kHz	--

A.5.2 Spurious Emissions in the frequency range above 1 GHz

Date : December 26, 2009
Temp. : 22 °C Temp. : 22 °C

Mode of EUT : RX Mode (2405MHz)
Test Port : Enclosure

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.3755	0.0	-1.8	H	33.9	41.8	54.0	74.0	32.1	40.0	21.9	34.0
2.7509	0.0	3.1	H	39.0	44.0	54.0	74.0	42.1	47.1	11.9	26.9
5.5018	0.0	9.0	H	29.7	41.3	54.0	74.0	38.7	50.3	15.3	23.7

Mode of EUT : RX Mode (2440MHz)
Test Port : Enclosure

Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.3955	0.0	-1.8	V	37.5	42.7	54.0	74.0	35.7	40.9	18.3	33.1
2.7910	0.0	3.2	H	42.2	46.1	54.0	74.0	45.4	49.3	8.6	24.7
5.5820	0.0	9.2	H	28.5 <	41.0	54.0	74.0	37.7 <	50.2	16.3 >	23.8

Mode of EUT : RX Mode (2480MHz)
Test Port : Enclosure

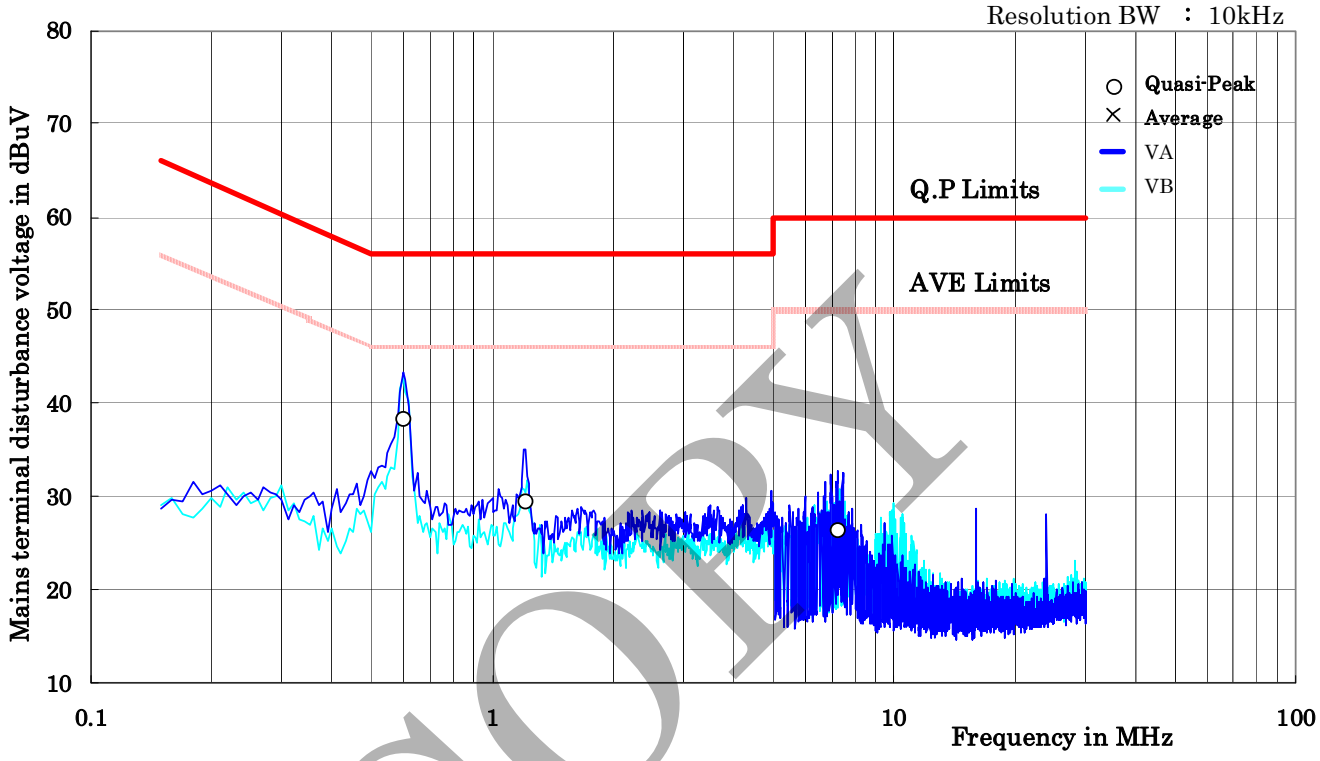
Frequency (GHz)	P-A Factor (dB)	Correction Factor (dB)	Polarization	Meter Reading (dBuV) AV	Meter Reading (dBuV) Peak	Limits (dBuV/m) AV	Limits (dBuV/m) Peak	Emission Levels (dBuV/m) AV	Emission Levels (dBuV/m) Peak	Margins (dB) AV	Margins (dB) Peak
1.4183	0.0	-1.7	H	37.8	43.2	54.0	74.0	36.1	41.5	17.9	32.5
2.8367	0.0	3.4	H	41.2	45.2	54.0	74.0	44.6	48.6	9.4	25.4
5.6734	0.0	9.3	H <	28.0 <	41.0	54.0	74.0 <	37.3 <	50.3 >	16.7 >	23.7

Note : 1) The spectrum was checked from 1.0 GHz to 26.5 GHz.
2) The cable loss, amp. gain and antenna factor are included in the correction factor.
3) The symbol of "<" means "or less".
4) The symbol of ">" means "or greater".
5) A sample calculation(Peak) was made at 1.3755 GHz.
PA + CF + MR = 0 + (-1.8) + 41.8 = 40.0 (dBuV/m)
PA : Peak to Average Factor (P-A Factor)
CF : Correction Factor
MR : Meter Reading
6) Measuring Instruments Setting :

Detector Function	Resolution Bandwidth	Video Bandwidth
Average (AV)	1 MHz	10 Hz
Peak	1 MHz	1 MHz

A.6 AC Power Line Conducted Emissions for Receiver

Date : December 26, 2009
Temp. : 22 °C Humi. : 30 %

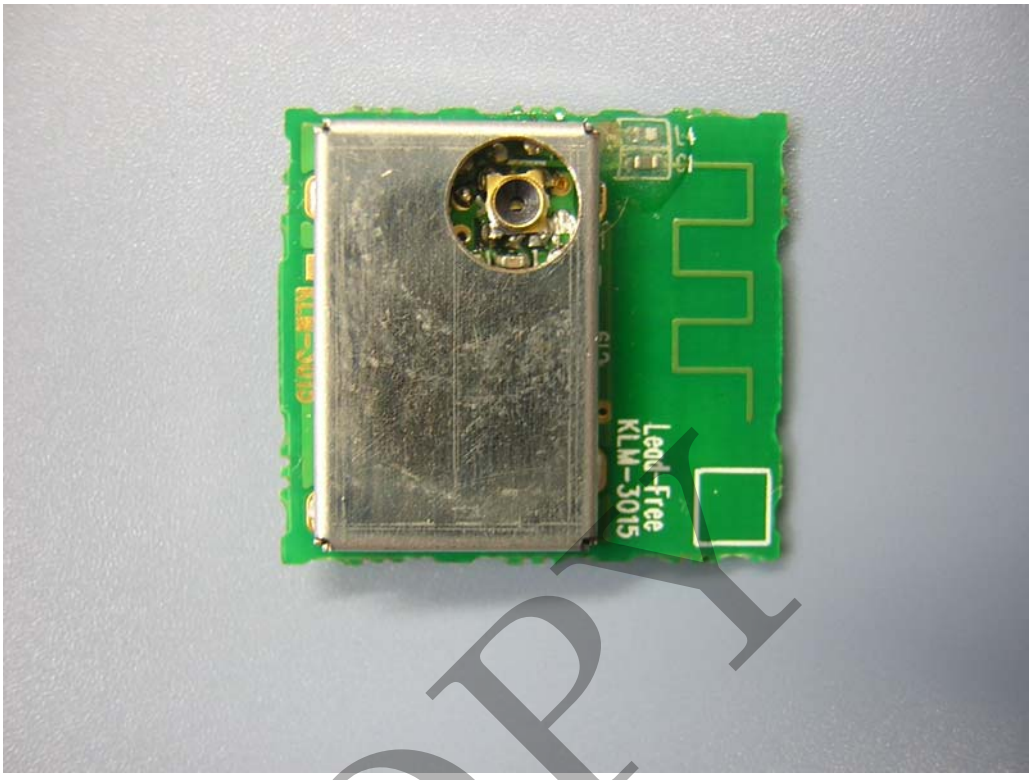


Freq. [MHz]	Correction Factor [dB]	Meter Reading [dBuV] VA QP	VA AV	VB QP	VB AV	Limit [dBuV] QP	Limit [dBuV] AV	Result [dBuV] QP	Result [dBuV] AV	Margin [dB] QP	Margin [dB] AV
0.60	0.10	38.3	-	38.1	-	56.0	46.0	38.4	-	17.6	-
1.20	0.10	29.4	-	28.7	-	56.0	46.0	29.5	-	26.5	-
7.236	0.30	26.2	-	24.8	-	60.0	50.0	26.5	-	33.5	-

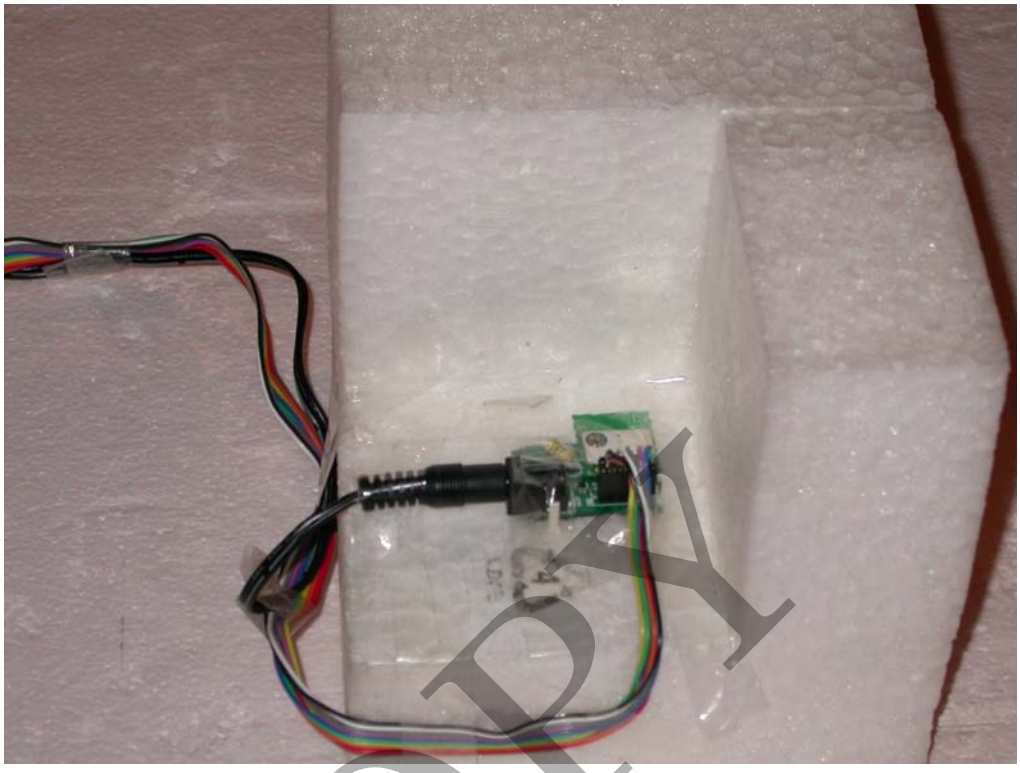
Note : 1) QP : CISPR Quasi-Peak ; AV : Average IF bandwidth : 9 kHz.
2) VA : One end & grounded ; VB : The other end & grounded
3) The symbol of '<' means 'or less' .
4) The symbol of '>' means 'or greater' .
5) The symbol of '-' means 'Not applicable' .
6) Factor includes an artificial mains network factor and a cable (4.0 m) loss.
7) A sample calculation was made at 0.60MHz
Factor + Meter Reading = 0.1 + 38.3 = 38.4

Appendix B : Test Arrangement (Photographs)

B.1 External



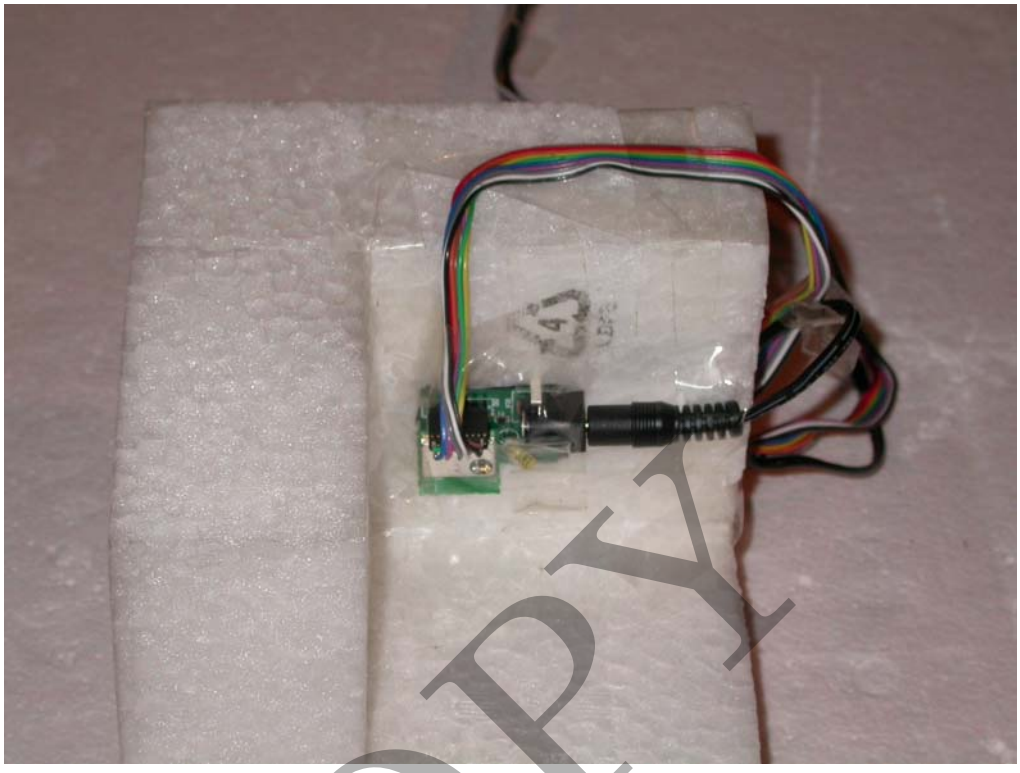
B.2 Radiated Emissions



- X axis -

- Y axis -

Photograph present configuration with maximum emission



-Z axis-

Photograph present configuration with maximum emission

B.3 AC Power Line Conducted Emissions

- Front View -

- Side View -

Photograph present configuration with maximum emission

Appendix C : Test Instruments

30-Nov-2009

No	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
Test Facilities:							
1	Anechoic Chamber A	-	TDK	-	800-01-502E0	Apr 2009	1 Year
2	Anechoic Chamber B	-	TDK	-	800-01-503E0	Apr 2009	1 Year
3	Shield Room A	-	TDK	-	800-01-501E0	-	-
4	Shield Room B	-	Ray Proof	-	800-01-010E0	-	-
5	Shield Room C	-	TDK	-	800-01-504E0	-	-
6	Shield Room D	-	Emerson	-	800-01-022E0	-	-
7	Shield Room E	-	TDK	-	800-01-505E0	-	-
Measuring Instruments:							
10	Test Receiver	ESHS10	Rohde & Schwarz	835871/004	119-01-505E0	May 2009	1 Year
11	Test Receiver	ESVS10	Rohde & Schwarz	826148/002	119-03-504E0	Jun 2009	1 Year
12	Test Receiver	ESVS10	Rohde & Schwarz	832699/001	119-03-506E0	Sep 2009	1 Year
13	Test Receiver	ESI26	Rohde & Schwarz	100043	119-04-511E0	Oct 2009	1 Year
14	Spectrum Analyzer	R3182	Advantest	120600581	122-02-521E0	Mar 2009	1 Year
19	Spectrum Analyzer	R3132	Advantest	120500072	122-02-520E0	May 2009	1 Year
20	Spectrum Analyzer	R3132	Advantest	150400998	122-02-523E0	Jul 2009	1 Year
65	Power Meter	436A	Hewlett Packard	1725A01930	100-02-501E0	Apr 2009	1 Year
66	Power Sensor	8482A	Hewlett Packard	1551A01013	100-02-501E0	Apr 2009	1 Year
68	FM Linear Detector	MS61A	Anritsu	M77486	123-02-008E0	Oct 2009	1 Year
69	Level Meter	ML422C	Anritsu	M87571	114-02-501E0	Jun 2009	1 Year
70	Measuring Amplifier	2636	B & K	1614851	082-01-502E0	May 2009	1 Year
75	Frequency Counter	53131A	Hewlett Packard	3546A11807	102-02-075E0	May 2009	1 Year
83	FFT Analyzer	R9211C	Advantest	02020253	122-02-506E0	Jun 2009	1 Year
84	Noise Meter	MN-446	Meguro	53030478	082-01-144E0	Apr 2009	1 Year
163	Digital Oscilloscope	54502A	Hewlett Packard	2934A05573	121-02-502E0	May 2009	1 Year
165	Multimeter	VOAC7413	Iwatsu Electric	0267973	114-02-502E0	Apr 2009	1 Year
172	Test Receiver	ESCI	Rohde & Schwarz	100408	119-04-512E0	Oct 2009	1 Year
210	Peak Power Meter	ML2495A	Anritsu	0836023	100-02-507E0	Nov 2009	1 Year
211	Power Sensor	MA2491A	Anritsu	0811206	100-02-507E0	Nov 2009	1 Year
212	Power Sensor	MA2411B	Anritsu	0738312	100-02-507E0	Nov 2009	1 Year
230	Spectrum Analyzer	U3751	Advantest	150800116	122-02-003T	Feb 2009	1 Year
232	Digital Oscilloscope	TDS3052C	Tektronix, Inc.	C010708	121-02-504E0	Jun 2009	1 Year
Antennas:							
21	Loop Antenna	HFH2-Z2	Rohde & Schwarz	881058/62	119-05-033E0	Jul 2009	1 Year
234	Dipole Antenna	KBA-511A	Kyoritsu	0-316-5	119-05-123E0	Nov 2009	2 Year
235	Dipole Antenna	KBA-611	Kyoritsu	0-317-3	119-05-124E0	Nov 2009	2 Year
27	Biconical Antenna	BBA9106	Schwarzbeck	-	119-05-078E0	Nov 2008	1 Year
28	Log-periodic Antenna	UHALP9107	Schwarzbeck	-	119-05-079E0	Nov 2008	1 Year
31	Horn Antenna	3115	EMC Test Systems	6442	119-05-514E0	Jan 2008	2 Year
32	Horn Antenna	3116	EMC Test Systems	2547	119-05-515E0	Jun 2009	2 Year
167	Biconical Antenna	BBA9106	Schwarzbeck	VHA91032325	119-05-520E0	Jun 2009	1 Year
168	Log-periodic Antenna	UHALP9108A	Schwarzbeck	0666	119-05-521E0	Jun 2009	1 Year
169	Biconical Antenna	BBA9106	Schwarzbeck	VHA91032399	119-05-522E0	Jun 2009	1 Year
170	Log-periodic Antenna	UHALP9108A	Schwarzbeck	0724	119-05-523E0	Jun 2009	1 Year
198	Log-periodic Antenna	HL050	Rohde & Schwarz	100251	119-05-524E0	Sep 2009	1 Year
225	Loop Sensor/Radiating Loop	F55103-2-0.13M	FCC	03018	119-05-516E0	-	-
236	Horn Antenna	3160-03	EMC Test Systems	00078687	119-05-525E0	Oct 2008	2 Year
237	Horn Antenna	3160-08	EMC Test Systems	00026081	119-05-517E0	Jan 2008	2 Year
238	Horn Antenna	3160-09	EMC Test Systems	00023883	119-05-518E0	May 2009	2 Year
239	Horn Antenna	3160-10	EMC Test Systems	00026026	119-05-519E0	Jul 2009	2 Year

30-Nov-2009

No	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
Cables:							
38	RF Cable	5D-2W	Fujikura	-	155-21-001E0	Feb 2009	1 Year
39	RF Cable	5D-2W	Fujikura	-	155-21-002E0	Feb 2009	1 Year
40	RF Cable	3D-2W	Fujikura	-	155-21-005E0	Apr 2009	1 Year
41	RF Cable	3D-2W	Fujikura	-	155-21-006E0	Apr 2009	1 Year
42	RF Cable	3D-2W	Fujikura	-	155-21-007E0	Apr 2009	1 Year
43	RF Cable	RG213/U	Rohde & Schwarz	-	155-21-010E0	Apr 2009	1 Year
44	RF Cable(10m)	S 04272B	Suhner	-	155-21-011E0	May 2009	1 Year
45	RF Cable(1.5m 18GHz)	S 04272B	Suhner	-	155-21-012E0	May 2009	1 Year
46	RF Cable(1m 18GHz)	SUCOFLEX10	Suhner	-	155-21-013E0	May 2009	1 Year
47	RF Cable(1m N)	S 04272B	Suhner	-	155-21-015E0	Jun 2009	1 Year
48	RF Cable(1m 26GHz)	SUCOFLEX 104E	Suhner	14543/4E	155-21-016E0	Dec 2008	1 Year
49	RF Cable(4m 26GHz)	SUCOFLEX10	Suhner	190630	155-21-017E0	Dec 2008	1 Year
50	RF Cable(10m)	F130-S1S1-394	MEGA PHASE	10510	155-21-018E0	Dec 2008	1 Year
51	RF Cable(5m)	3D-2W	Fujikura	-	155-21-009E0	Apr 2009	1 Year
52	RF Cable(7m)	RG223/U	Suhner	-	155-21-021E0	May 2009	1 Year
195	RF Cable(10m)	F130-S1S1-394	MEGA PHASE	20051	155-21-020E0	Apr 2009	1 Year
240	RF Cable(3m 40GHz)	KPS-1501-1181-KPS	Insulated Wire Inc.	11292001	155-21-019E0	Jan 2009	1 Year
241	RF Cable(6m 40GHz)	SUCOFLEX 102E	Suhner	6257/2E	155-21-024E0	Oct 2009	1 Year
Networks:							
33	LISN	KNW-407	Kyoritsu	8-833-6	149-04-052E0	Nov 2009	1 Year
34	LISN	KNW-407	Kyoritsu	8-855-2	149-04-055E0	May 2009	1 Year
35	LISN	KNW-407	Kyoritsu	8-1130-6	149-04-062E0	May 2009	1 Year
36	LISN	KNW-242C	Kyoritsu	8-837-13	149-04-054E0	Apr 2009	1 Year
37	Absorbing Clamp	MDS21	Luthi	03293	119-06-506E0	Aug 2009	1 Year
164	LISN	KNW-403D	Kyoritsu	8-1474-3	149-04-059E0	Apr 2009	1 Year
173	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	156-01-501E0	Apr 2009	1 Year
174	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	156-01-502E0	Apr 2009	1 Year
175	Pulse Limiter	ESH3-Z2	Rohde & Schwarz	-	156-01-503E0	Apr 2009	1 Year
194	High Impedance Probe	HP-2	JQA	001	149-06-503E0	Oct 2009	1 Year
Amplifiers:							
53	AF Amplifier	P-500L	Accuphase	BOY806	127-01-501E0	Feb 2009	1 Year
54	RF Amplifier	WJ-6882-814	Watkins-Johnson	0414	127-04-017E0	Jun 2009	1 Year
55	RF Amplifier	WJ-5315-556	Watkins-Johnson	106	127-04-006E0	Jun 2009	1 Year
56	RF Amplifier	WJ-5320-307	Watkins-Johnson	645	127-04-005E0	Jun 2009	1 Year
57	RF Amplifier	JS4-00102600-28-5A	MITEQ	669167	127-04-502E0	Apr 2009	1 Year
226	Differential Amplifier	5303	NF	155726-5305046	127-01-502E0	Apr 2009	1 Year

30-Nov-2009

No	Type	Model	Manufacturer	Serial	ID	Last Cal.	Interval
Generators:							
58	Function Generator	3325B	Hewlett Packard	2847A03284	118-08-124E0	Jul 2009	1 Year
59	Function Generator	VP-7422A	Matsushita Communication	050351E122	118-08-503E0	Jul 2009	1 Year
60	Signal Generator	8664A	Hewlett Packard	3035A00140	118-03-014E0	May 2009	1 Year
61	Signal Generator	8664A	Hewlett Packard	3438A00756	118-04-502E0	May 2009	1 Year
62	Signal Generator	6061A	Gigatronics	5130593	118-04-024E0	Mar 2009	1 Year
171	Signal Generator	SML03	Rohde & Schwarz	102651	118-04-509E0	Feb 2009	1 Year
222	Signal Generator	8673D	Hewlett Packard	2938A00988	118-04-015E0	Jul 2009	2 Year
Others:							
63	Termination(50)	-	Suhner	-	154-06-501E0	Jan 2009	1 Year
64	Termination(50)	-	Suhner	-	154-06-502E0	Jan 2009	1 Year
71	Microphone	4134	B & K	1253497	147-01-502E0	May 2009	1 Year
72	Preamplifier	2639	B & K	1268763	127-01-504E0	-	-
73	Pistonphone	4220	B & K	1165008	147-02-501E0	Mar 2009	1 Year
74	Artificial Mouth	4227	B & K	1274869	-	-	-
76	Oven	-	Ohnishi	-	023-02-018E0	-	-
77	DC Power Supply	6628A	Hewlett Packard	3224A00284	072-05-503E0	Jun 2009	1 Year
78	Band RejectFilter	BRM12294	Micro-tronics	003	149-01-501E0	Jan 2009	1 Year
79	High Pass Filter	F-100-4000-5-R	RLC Electronics	0149	149-01-502E0	Feb 2009	1 Year
80	Attenuator	43KC-10	Anritsu	-	148-03-506E0	Feb 2009	1 Year
81	Attenuator	43KC-20	Anritsu	-	148-03-507E0	Feb 2009	1 Year
82	Attenuator	355D	Hewlett Packard	219-10782	148-03-065E0	Apr 2009	1 Year
85	RF Detector	75KC-50	Anritsu	305002	100-02-506E0	Jul 2009	1 Year
200	Artificial Hand	AH-1	ES Factory	001	155-07-561E0	Jul 2009	1 Year
201	Barometer	TYPE6	Yanagi	16076	209-02-014E0	Feb 2008	2 Year
202	Thermo-Hygrometer	-	Empex	-	141-01-504E0	Mar 2008	2 Year
203	Thermo-Hygrometer	EX-2727	Empex	-	141-01-505E0	Mar 2008	2 Year
204	Thermo-Hygrometer	EX-2727	Empex	-	141-01-506E0	Mar 2008	2 Year
205	Thermo-Hygrometer	EX-2727	Empex	-	141-01-507E0	Mar 2008	2 Year
206	Low Pass Filter	LPM13323	Micro-tronics	001	149-01-505E0	Jul 2009	1 Year
207	High Pass Filter	HPM13321	Micro-tronics	001	149-01-506E0	Jul 2009	1 Year
208	High Pass Filter	HPM13322	Micro-tronics	001	149-01-507E0	Jul 2009	1 Year
242	Power Divider	1575	Aeroflex Weischel	1153	086-02-501E0	Oct 2009	1 Year
243	Power Divider	1575	Aeroflex Weischel	1157	086-02-502E0	Oct 2009	1 Year
244	Power Divider	1575	Aeroflex Weischel	1161	086-02-503E0	Oct 2009	1 Year