

TEST REPORT

APPLICANT : Panasonic Communications Co., Ltd.
ADDRESS : 1-62, 4-chome, Minoshima, Hakata-ku, Fukuoka, 812-8531, Japan

PRODUCTS : 2.4GHz FHSS Cordless Teelphone(Base)
MODEL NO. : KX-TG2431
SERIAL NO. : --
FCC ID : ACJ96NKX-TG2431

TEST STANDARD : CFR 47 FCC Rules and Regulations Part 15

TESTING LOCATION : Japan Quality Assurance Organization
KITA-KANSAI Testing Center
1-7-7, Ishimaru, Minoh-shi, Osaka 562-0027, Japan

TEST RESULTS : **Passed**

DATE OF TEST : October 7, 2005 - October 11, 2005



Yuichi Fukumoto
Manager
Japan Quality Assurance Organization
KITA-KANSAI Testing Center
Testing Dept. EMC Division
1-7-7, Ishimaru, Minoh-shi, Osaka 562-0027, Japan

-
- The measurement values stated in Test Report was made with traceable to National Institute of Advanced Industrial Science and Technology (AIST) of Japan and National Institute of Information and Communications Technology (NICT) of Japan.
 - The applicable standard, testing condition and testing method which were used for the tests are based on the request of the applicant.
 - The test results presented in this report relate only to the offered test sample.
 - The contents of this test report cannot be used for the purposes, such as advertisement for consumers.
 - This test report shall not be reproduced except in full without the written approval of JQA.

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DEFINITIONS FOR ABBREVIATION AND SYMBOLS USED IN THIS TEST REPORT

“EUT” means Equipment Under the Test.

“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 C – Intentional Radiators

Test Requirements : §15.205, §15.207, §15.209 and §15.247

Test Procedure : ANSI C63.4–2003

Note) The test items requested by applicant are shown as follows:

- 1) AC Powerline Conducted Emission(§ 15.207)
- 2) Radiated Emission(§ 15.209)(30 – 1000MHz)

2 Test Location

KITA-KANSAI Testing Center

1-7-7, Ishimaru, Minoh-shi, Osaka 562-0027, Japan

KAMEOKA EMC Branch

9-1, Ozaki, Inukanno, Nishibetsuin-cho, Kameoka-shi, Kyoto 621-0126, Japan

3 Recognition of Test Laboratory

JQA KITA-KANSAI Testing Center Testing Department EMC Division is recognized under ISO/IEC 17025 by following accreditation bodies and the test facility of Testing Division is registered by the following bodies.

VLAC Code : VLAC-001-2 (Effective through : April 3, 2006)

NVLAP Lab Code : 200191-0 (Effective through : June 30, 2006)

BSMI Recognition No. : SL2-IS-E-6006, SL2-IN-E-6006, SL2-AI-E-6006
(Effective through : September 14, 2007)

VCCI Registration No. : R-006, R-008, R-1117, C-006, C-007, C-1674, C-2143
(Effective through : April 3, 2006)

FCC Registration No. : 683630 (Effective through : June 30, 2006)

Accredited as conformity assessment body for Japan electrical appliances and material law by METI.
(Effective through : February 24, 2007)

Accredited as conformity assessment body for Article 2, Paragraph 8, Item 5 on law for implementation of the Mutual Recognition between Japan and the European Community by METI.
(Effective through : August 7, 2007)

4 Description of the Equipment Under Test

1. Manufacturer : Panasonic Communications Co., Ltd.
1-62, 4-chome, Minoshima, Hakata-ku, Fukuoka, 812-8531 Japan
2. Products : 2.4GHz FHSS Cordless Teelphone(Base)
3. Model No. : KX-TG2431
4. Serial No. : --
5. Product Type : Pre-production
6. Date of Manufacture : October, 2005
7. Transmitting Frequency : 2400.914355 MHz (01ch) - 2480.292773 MHz (90ch)
8. Receiving Frequency : 2400.914355 MHz (01ch) - 2480.292773 MHz (90ch)
9. Method/System : Frequency Hopping Spread Spectrum(FHSS)
10. Type of Antenna : Dipole Antenna
11. Antenna Gain : 2.15dBi(Rated)
12. Power Rating : 100-240VAC50/ 60Hz200mA(AC Adaptor : PQLV255)
(Rated, Output DC6.5V1A)
13. EUT Grounding : None
14. Category : Intentional Radiator
15. EUT Authorization : Certification
16. Received Date of EUT : October 5, 2005

5 Test Condition

5.1 AC Powerline Conducted Emission(§ 15.207)

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

Test site : KITA-KANSAI ☒ - Shielded room ☐ - Anechoic chamber
KAMEOKA ☐ - On 1st open site ☐ - Shielded room

Test instruments : Refer to Appendix B.

5.2 Radiated Emission(§ 15.209)

5.2.1 Radiated Emission 30 MHz – 1000 MHz

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

Test site : ☒ - KITA-KANSAI 1st open site (3 m)
☐ - KAMEOKA 1st open site ☐ - 3 m ☐ - 10 m ☐ - 30 m
☐ - KAMEOKA 2nd open site ☐ - 3 m ☐ - 10 m

Test instruments : Refer to Appendix B.

5.2.2 Radiated Emission above 1 GHz

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

Test site : ☐ - KITA-KANSAI 1st open site (3 m)
☐ - KITA-KANSAI Anechoic chamber (3 m)
☐ - KAMEOKA 1st open site ☐ - 3 m ☐ - 10 m ☐ - 30 m
☐ - KAMEOKA 2nd open site ☐ - 3 m ☐ - 10 m

Test instruments : Refer to Appendix B.

6 Preliminary Test and Test Setup

6.1 AC Powerline Conducted Emission(§ 15.207)

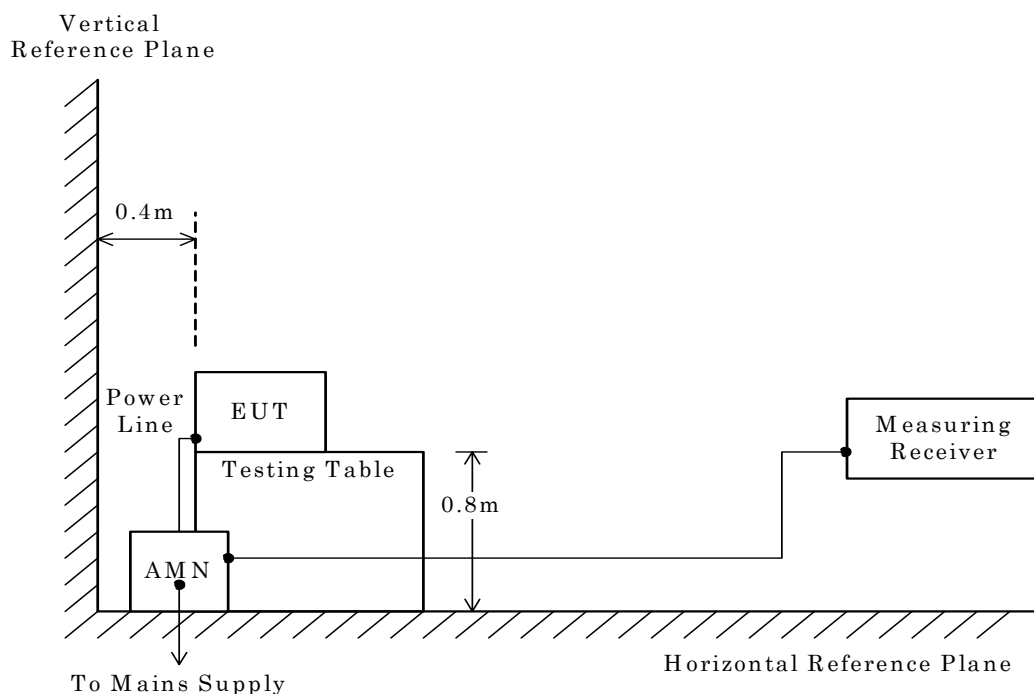
The preliminary tests were carried out.

The preliminary tests were performed using the spectrum analyzer to observe the emissions characteristics of the EUT.

The EUT configuration, cable configuration and mode of operation were determined for producing the maximum level of emissions.

This configurations was used for final tests.

– Side View –



* AMN : Artificial Mains Network

6.2 Radiated Emission(§ 15.209)

6.2.1 Radiated Emission 30 MHz – 1000 MHz

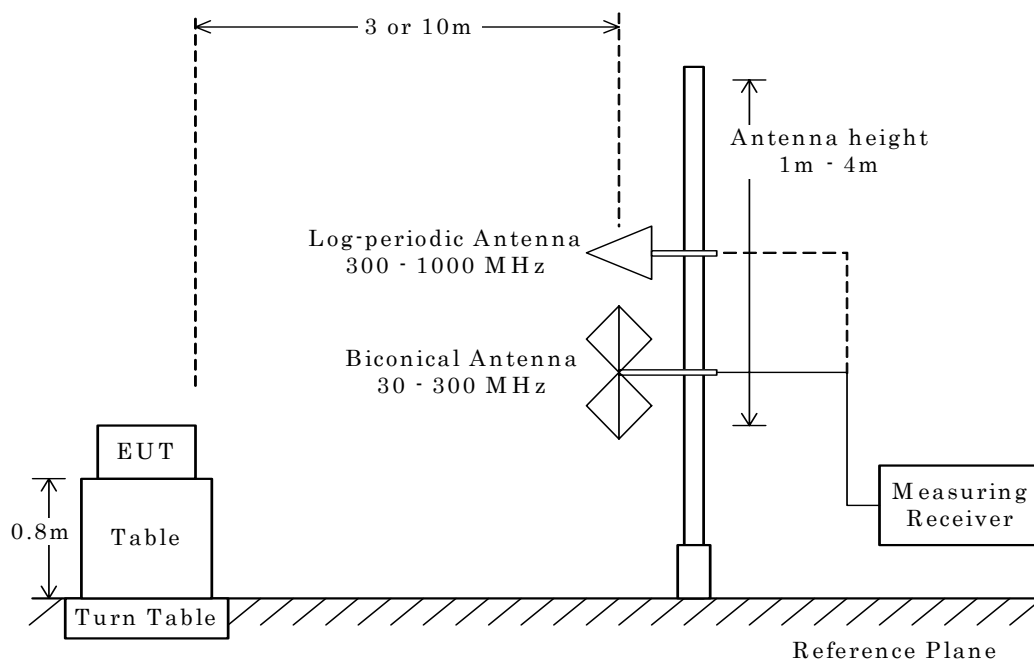
The preliminary tests were carried out.

The preliminary tests 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.

This configurations was used for the final tests.

– Side View –



6.2.2 Radiated Emission above 1 GHz

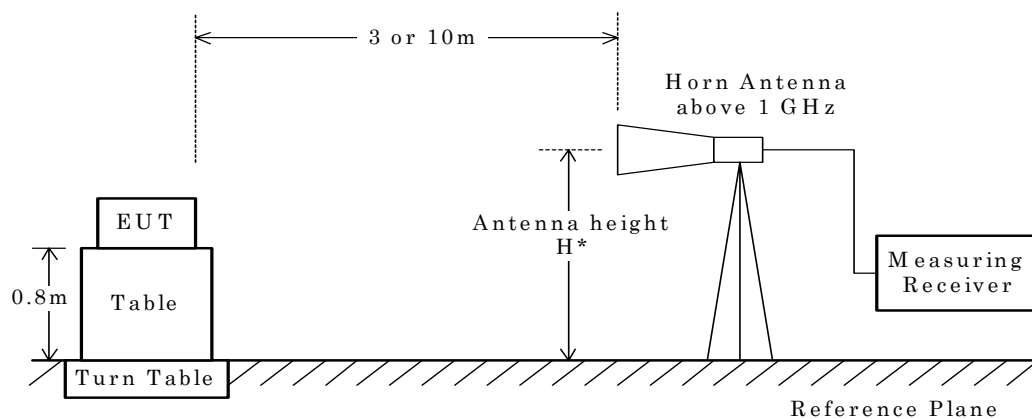
The preliminary tests were carried out.

The preliminary tests 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.

This configurations was used for the final tests.

– Side View –



* The antenna height H is scanned depending on the EUT's size and mounting height.

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

Position : Not Applicable

8 Responsible PartyResponsible 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 AC Powerline Conducted Emission(§ 15.207)

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

☒ - Passed ☐ - Failed ☐ - Not judged

Min. Limit Margin (Quasi-Peak) 17.9 dB at 0.62 MHz

Max. Limit Exceeding (Quasi-Peak) _____ dB at _____ MHz

Uncertainty of Measurement Results +/-2.1 dB(2 σ)

Remarks : _____

10.2 Radiated Emission(§ 15.209)

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

☒ - Passed ☐ - Failed ☐ - Not judged

Min. Limit Margin (Quasi-Peak) 6.4 dB at 327.7 MHz

Max. Limit Exceeding (Quasi-Peak) _____ dB at _____ MHz

Uncertainty of Measurement Results
30 MHz – 300 MHz +4.1/-4.2 dB(2 σ)
300 MHz – 1000 MHz +4.1/-4.2 dB(2 σ)
above 1 GHz _____ dB(2 σ)

Remarks : The measured frequency range is 30 - 1000MHz.

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 final judgment.

Final Judgment :

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 Kinoshita
Deputy Manager
Testing Dept. EMC Div.
JQA KITA-KANSAI Testing Center

Tested by:



Yuzo Tanaka
Engineer
Testing Dept. EMC Div.
JQA KITA-KANSAI Testing Center

12 Operating Condition

Power Supply Voltage : 120VAC, 60Hz

Operation Mode

1. Transmitting/Receiving(CH45)
2. Charging

13 Test Configuration

The equipment under test (EUT) consists of :

	Item	Manufacturer	Model No.	Serial No.	FCC ID
A	2.4GHz FHSS Cordless Telephone (Base)	Panasonic Communications Co., Ltd.	KX-TG2431	--	ACJ96NKX- TG2431
B	AC Adaptor	Panasonic Communications Co., Ltd.	PQLV255	--	N/A

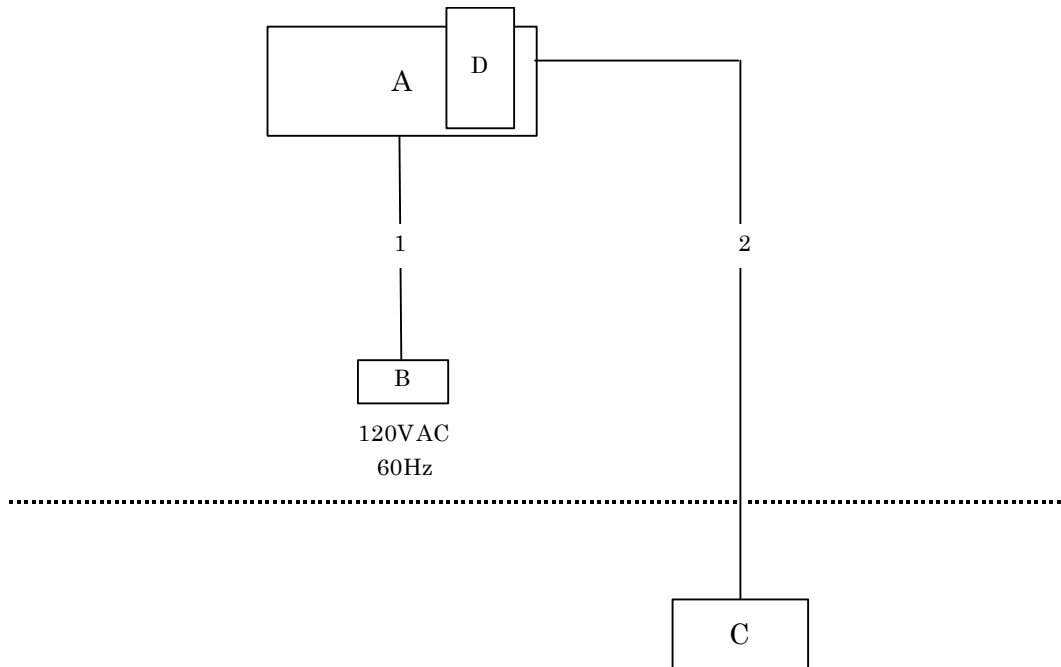
The auxiliary equipment used for testing :

	Item	Manufacturer	Model No.	Serial No.	FCC ID
C	Telephone Line Emulator	LSI JAPAN	TLE101	03144	N/A
D	2.4GHz FHSS Cordless Telephone (Handset)	Panasonic Communications Co., Ltd.	KX-TGA242	--	ACJ96NKX- TG2431

Type of Cable:

No.	Description	Identification (Manu. etc.)	Connector Shielded	Cable Shielded	Ferrite Core	Length (m)
1	Telephone Line	--	--	NO	NO	1.8
2	DC Cable	--	--	NO	NO	1.9

14 Equipment Under Test Arrangement (Drawings)

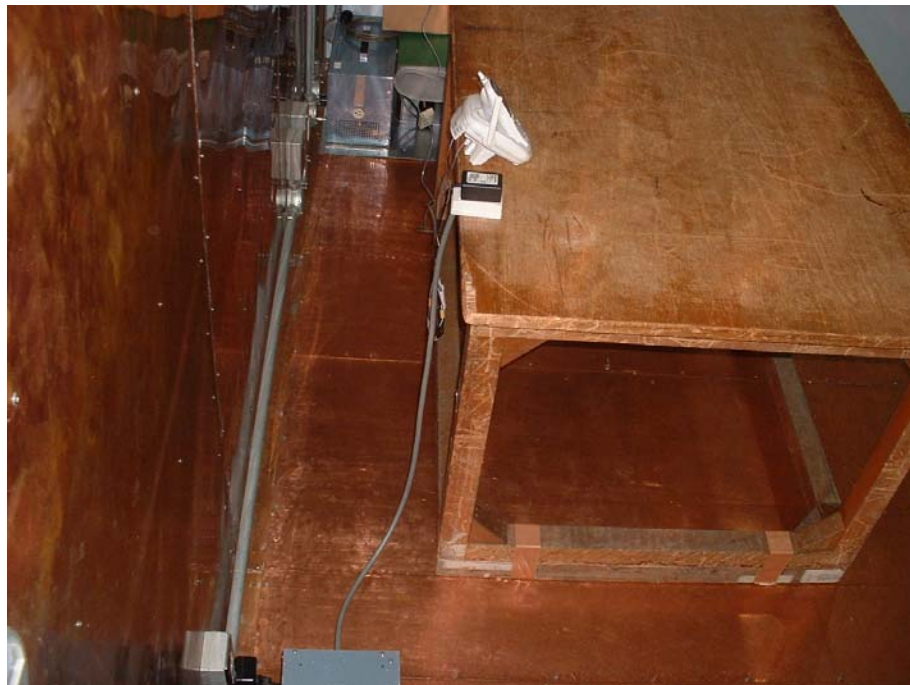


15 Equipment Under Test Arrangement (Photographs)

15.1 AC Powerline Conducted Emission(§ 15.207)



– Front View –



– Side View –

Photograph present configuration with maximum emission

15.2 Radiated Emission(§ 15.209)

– Front View –



– Rear View –

Photograph present configuration with maximum emission

Appendix A: Test Data

A.1 AC Powerline Conducted Emission(§ 15.207)

A.1.1 Transmitting/Receiving

Test condition : Transmitting/Receiving											Test Date: October 7, 2005	
											Temp.: 23 °C, Humi: 64 %	
Frequency	Corr.	Meter Readings [dB(μV)]				Limits		Results		Margin	Remarks	
	Factor	VA		VB		[dB(μV)]		[dB(μV)]		[dB]		
[MHz]	[dB]	QP	AVE	QP	AVE	QP	AVE	QP	AVE			
0.18	0.2	36.0	--	35.0	--	64.4	54.4	36.2	--	+28.2	A	
0.27	0.1	37.0	--	36.0	--	61.2	51.2	37.1	--	+24.1	A	
0.54	0.1	36.0	--	35.0	--	56.0	46.0	36.1	--	+19.9	A	
1.06	0.1	28.0	--	29.0	--	56.0	46.0	29.1	--	+26.9	A	
2.57	0.2	21.0	--	22.0	--	56.0	46.0	22.2	--	+33.8	A	
7.73	0.5	34.0	--	30.0	--	60.0	50.0	34.5	--	+25.5	A	
16.60	0.7	29.0	--	26.0	--	60.0	50.0	29.7	--	+30.3	A	
25.00	0.9	25.0	--	23.0	--	60.0	50.0	25.9	--	+34.1	A	

Calculated result at 0.54 MHz, as the worst point shown on underline:

Corr. Factor	=	0.1 dB
+) Meter Reading	=	36.0 dB(μV)
Result	=	36.1 dB(μV)

Minimum Margin: 56.0 - 36.1 = 19.9 (dB)

NOTES

1. The spectrum was checked from 0.15 MHz to 30 MHz.
2. The correction factor includes the AMN insertion loss and the cable loss.
3. The symbol of "<" means "or less".
4. The symbol of ">" means "more than".
5. The symbol of "--" means "not applicable".
6. QP : Quasi-Peak Detector AVE : Average Detector
7. Setting of measuring instrument(s) :

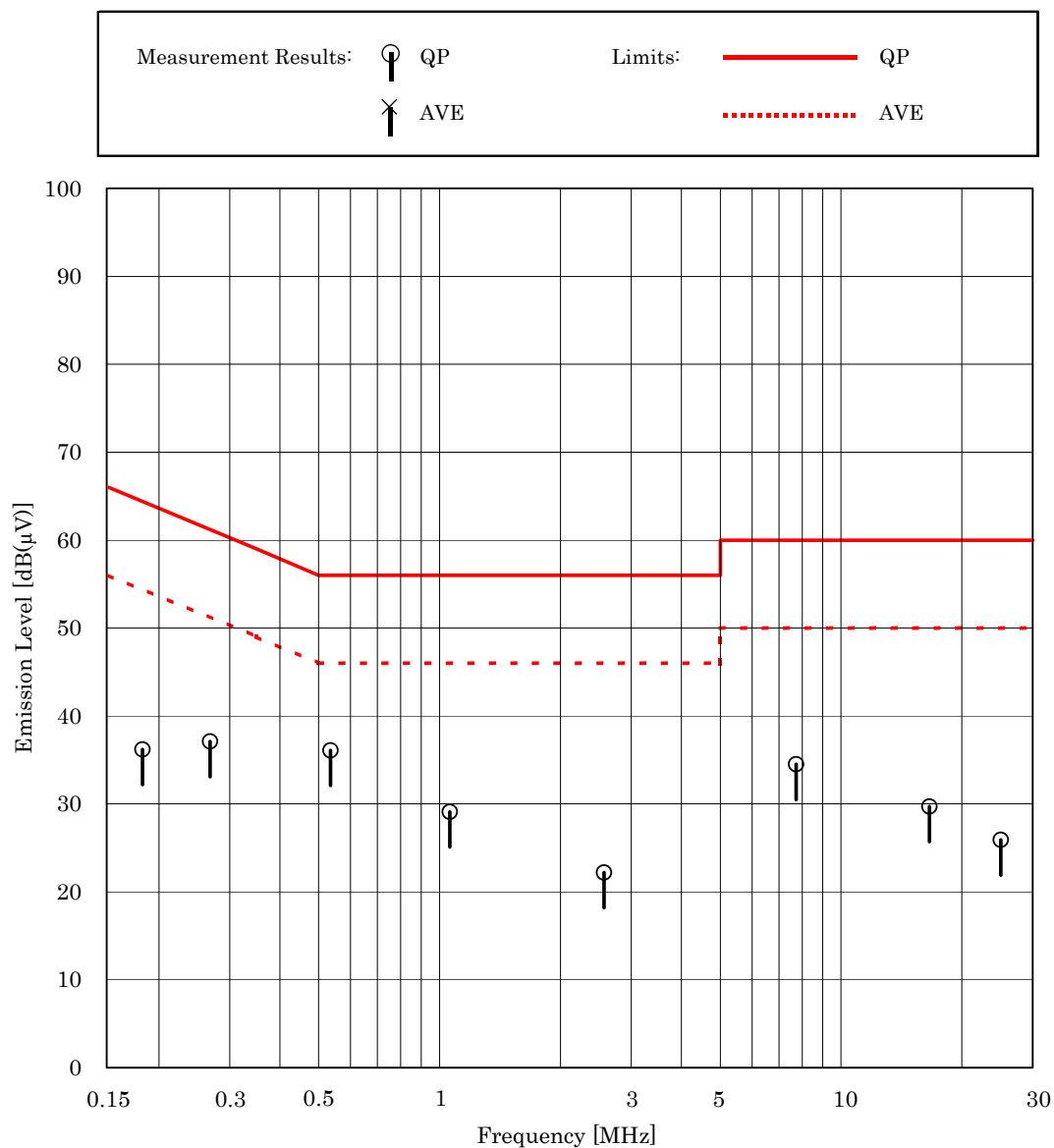
	Detector Function	IF Bandwidth
A	CISPR QP	9 kHz
B	Average	10 kHz

Graph Data : AC Powerline Conducted Emission

Test condition : Transmitting/Receiving

Test Date: October 7, 2005

Temp.: 23 °C, Humi: 64 %



A.1.2 Charging

Test condition : Charging

Test Date: October 7, 2005

Temp.: 23 °C, Humi: 64 %

Frequency [MHz]	Corr. Factor [dB]	Meter Readings [dB(μV)]				Limits [dB(μV)]		Results [dB(μV)]		Margin [dB]	Remarks
		VA		VB							
		QP	AVE	QP	AVE	QP	AVE	QP	AVE		
0.19	0.2	39.0	--	38.0	--	64.2	54.2	39.2	--	+25.0	A
0.27	0.1	37.0	--	35.0	--	61.2	51.2	37.1	--	+24.1	A
0.41	0.1	38.0	--	36.0	--	57.8	47.8	38.1	--	+19.7	A
0.62	0.1	38.0	--	36.0	--	56.0	46.0	38.1	--	+17.9	A
1.09	0.1	32.0	--	32.0	--	56.0	46.0	32.1	--	+23.9	A
7.86	0.5	33.0	--	29.0	--	60.0	50.0	33.5	--	+26.5	A
17.20	0.7	28.0	--	28.0	--	60.0	50.0	28.7	--	+31.3	A
22.00	0.8	29.0	--	31.0	--	60.0	50.0	31.8	--	+28.2	A
25.00	0.9	30.0	--	30.0	--	60.0	50.0	30.9	--	+29.1	A
30.00	0.9	28.0	--	26.0	--	60.0	50.0	28.9	--	+31.1	A

Calculated result at 0.62 MHz, as the worst point shown on underline:

Corr. Factor	=	0.1 dB
+) Meter Reading	=	38.0 dB(μV)
Result	=	38.1 dB(μV)

Minimum Margin: 56.0 - 38.1 = 17.9 (dB)

NOTES

- The spectrum was checked from 0.15 MHz to 30 MHz.
- The correction factor includes the AMN insertion loss and the cable loss.
- The symbol of "<" means "or less".
- The symbol of ">" means "more than".
- The symbol of "--" means "not applicable".
- QP : Quasi-Peak Detector AVE : Average Detector
- Setting of measuring instrument(s) :

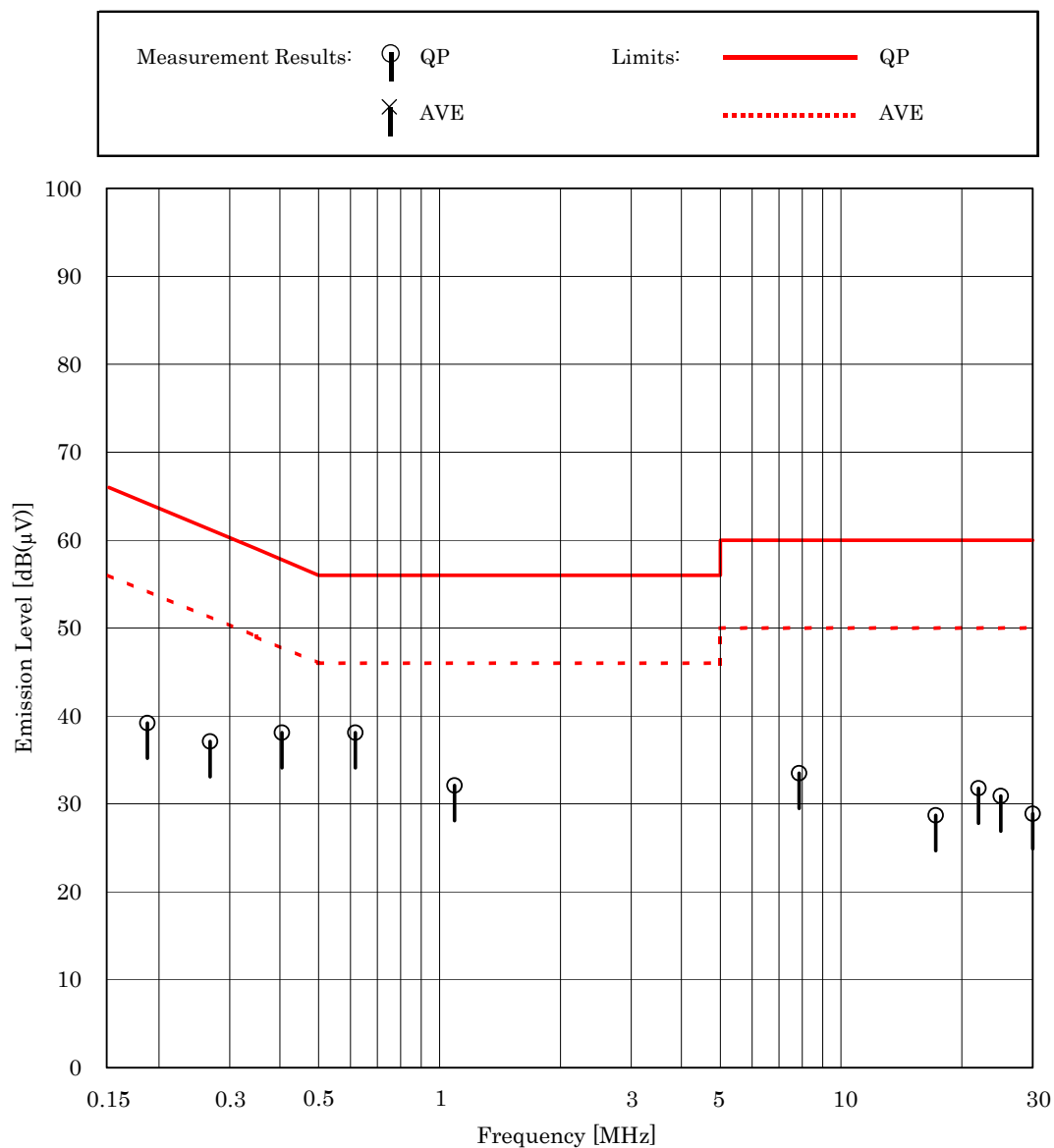
	Detector Function	IF Bandwidth
A	CISPR QP	9 kHz
B	Average	10 kHz

Graph Data : AC Powerline Conducted Emission

Test condition : Charging

Test Date: October 7, 2005

Temp.: 23 °C, Humi: 64 %



A.2 Radiated Emission(§ 15.209)

A.2.1 Radiated Emission 30 MHz – 1000 MHz

A.2.1.1 Transmitting/Receiving

Test Date: October 11, 2005

Temp.: 23 °C, Humi: 78 %

Test condition : Transmitting/Receiving

Frequency [MHz]	Antenna Factor [dB(1/m)]	Cable Loss [dB]	Meter Readings [dB(μV)]		Limits [dB(μV/m)]	Results [dB(μV/m)]		Margin [dB]	Remarks
			Hori.	Vert.		Hori.	Vert.		
33.0	17.5	0.8	< 1.0	< 7.0	40.0	< 19.3	< 25.3	> +14.7	A
38.0	15.6	0.9	< 3.0	9.0	40.0	< 19.5	25.5	+14.5	A
66.0	7.1	1.2	< 9.0	14.0	40.0	< 17.3	22.3	+17.7	A
81.9	6.8	1.4	< 19.0	< 19.0	40.0	< 27.2	< 27.2	> +12.8	A
124.4	13.4	1.7	3.0	10.0	43.5	18.1	25.1	+18.4	A
163.8	15.4	2.0	9.0	10.0	43.5	26.4	27.4	+16.1	A
248.9	17.1	2.5	4.0	4.0	46.0	23.6	23.6	+22.4	A
327.7	15.7	2.9	21.0	18.0	46.0	39.6	36.6	+ 6.4	A
655.4	21.9	4.3	2.0	0.0	46.0	28.2	26.2	+17.8	A
819.2	22.6	4.8	< 4.0	< 10.0	46.0	< 31.4	< 37.4	> + 8.6	A

Calculated result at 327.7 MHz, as the worst point shown on underline:

Antenna Factor	=	15.7 dB(1/m)
Cable Loss	=	2.9 dB
+) Meter Reading	=	21.0 dB(μV)
Result	=	39.6 dB(μV/m)

Minimum Margin: 46.0 - 39.6 = 6.4 (dB)

NOTES

1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 1000 MHz.
3. The symbol of "<" means "or less".
4. The symbol of ">" means "more than".
5. Setting of measuring instrument(s) :

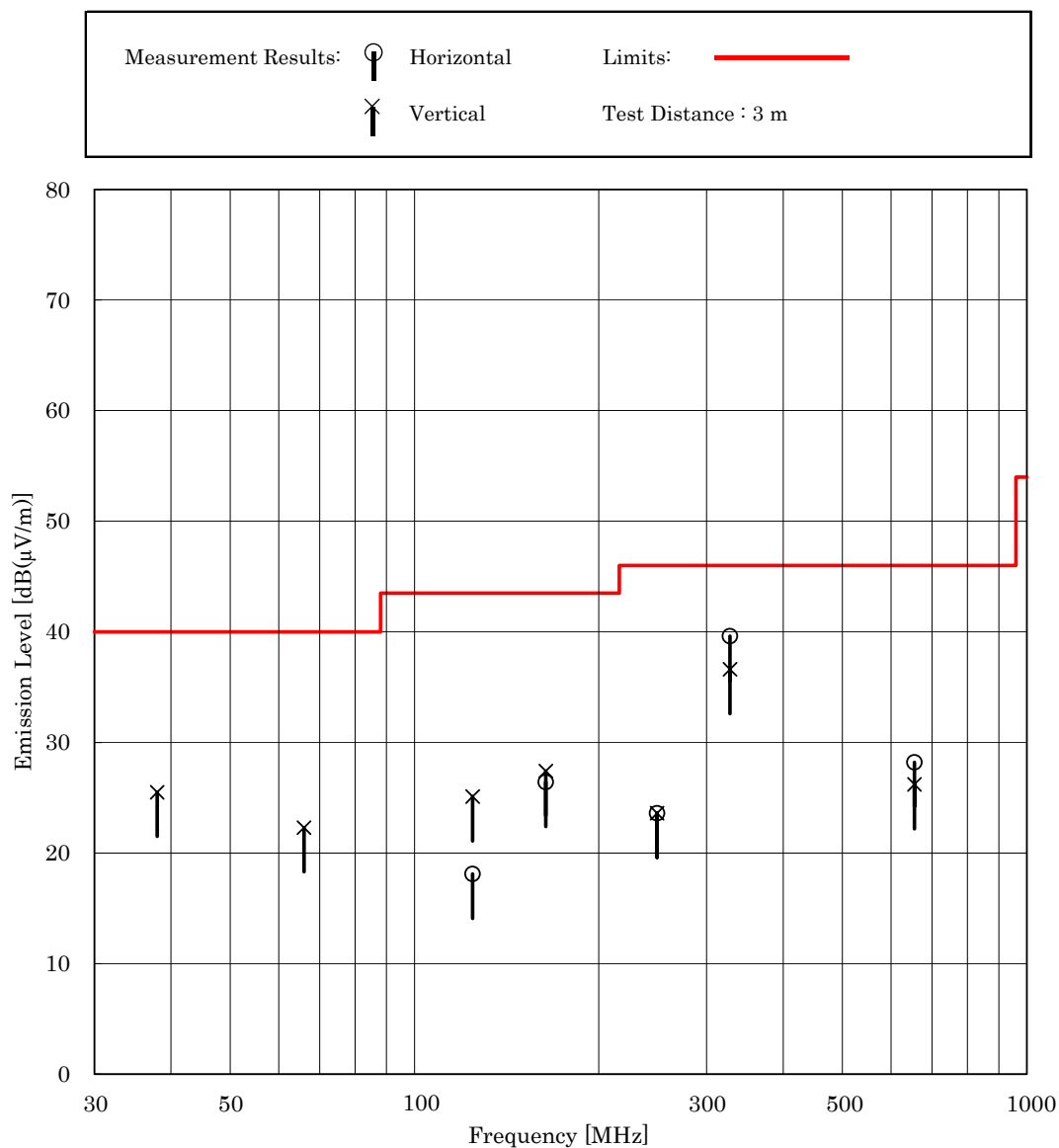
	Detector Function	IF Bandwidth	Antenna
A	CISPR QP	120 kHz	Broadband
B	Average	120 kHz	
C	Average	12 kHz	
D	Average	7.5 kHz	
E	CISPR QP	120 kHz	Tuned Dipole

Graph Data : Radiated Emission 30 MHz – 1000 MHz

Test condition : Transmitting/Receiving

Test Date: October 11, 2005

Temp.: 23 °C, Humi: 78 %



A.2.1.2 Charging

Test condition : Charging

Test Date: October 11, 2005

Temp.: 23 °C, Humi: 78 %

Frequency [MHz]	Antenna Factor [dB(1/m)]	Cable Loss [dB]	Meter Readings [dB(μV)]		Limits [dB(μV/m)]	Results [dB(μV/m)]		Margin [dB]	Remarks
			Hori.	Vert.		Hori.	Vert.		
33.0	17.5	0.8	2.0	12.0	40.0	20.3	30.3	+ 9.7	A
66.0	7.1	1.2	< 6.0	17.0	40.0	< 14.3	25.3	+14.7	A
81.9	6.8	1.4	< 15.0	< 15.0	40.0	< 23.2	< 23.2	> +16.8	A
110.6	11.6	1.6	2.0	9.0	43.5	15.2	22.2	+21.3	A
163.8	15.4	2.0	7.0	11.0	43.5	24.4	28.4	+15.1	A
248.9	17.1	2.5	5.0	3.0	46.0	24.6	22.6	+21.4	A
327.7	15.7	2.9	21.0	18.0	46.0	39.6	36.6	+ 6.4	A
655.4	21.9	4.3	1.0	0.0	46.0	27.2	26.2	+18.8	A
819.2	22.6	4.8	< 6.0	< 10.0	46.0	< 33.4	< 37.4	> + 8.6	A
983.0	25.2	5.4	< 0.0	< 0.0	54.0	< 30.6	< 30.6	> +23.4	A

Calculated result at 327.7 MHz, as the worst point shown on underline:

Antenna Factor	=	15.7 dB(1/m)
Cable Loss	=	2.9 dB
+) Meter Reading	=	21.0 dB(μV)
Result	=	39.6 dB(μV/m)

Minimum Margin: 46.0 - 39.6 = 6.4 (dB)

NOTES

1. Test Distance : 3 m
2. The spectrum was checked from 30 MHz to 1000 MHz.
3. The symbol of "<" means "or less".
4. The symbol of ">" means "more than".
5. Setting of measuring instrument(s) :

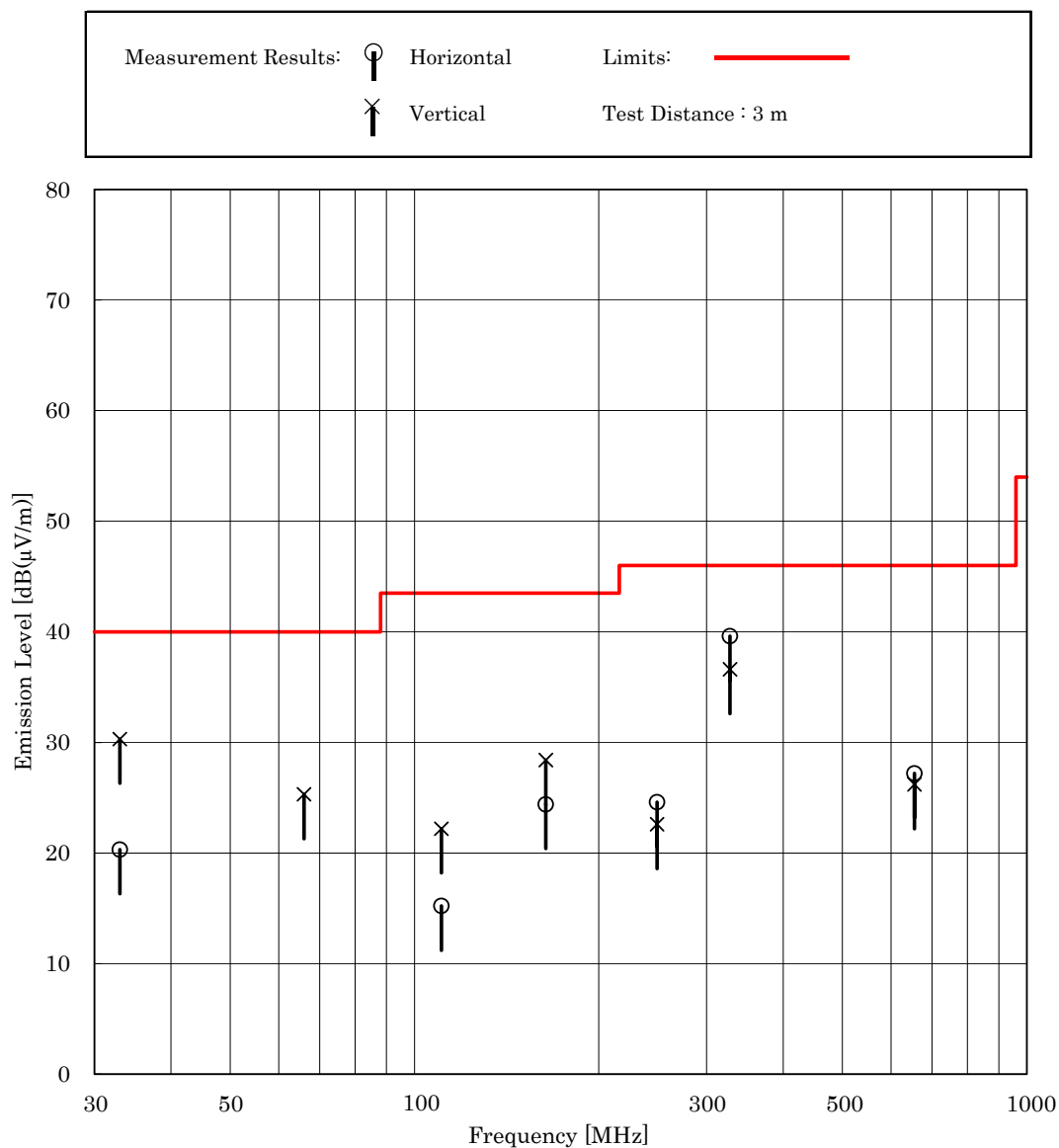
	Detector Function	IF Bandwidth	Antenna
A	CISPR QP	120 kHz	Broadband
B	Average	120 kHz	
C	Average	12 kHz	
D	Average	7.5 kHz	
E	CISPR QP	120 kHz	Tuned Dipole

Graph Data : Radiated Emission 30 MHz – 1000 MHz

Test condition : Charging

Test Date: October 11, 2005

Temp.: 23 °C, Humi: 78 %



A.2.2 Radiated Emission above 1 GHz

Not tested by applicant request.

Appendix B: Test Instruments**B.1 AC Powerline Conducted Emission(§ 15.207)**

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Test Receiver	ESCS 30	Rohde & Schwarz	A-1	2005/8	1 Year
AMN (main)	KNW-407	Kyoritsu	D-6	2004/10	1 Year
RF Cable	--	----	H-8	2004/10	1 Year

B.2 Radiated Emission(§ 15.209)**B.2.1 Radiated Emission 30 MHz – 1000 MHz**

Type	Model	Manufacturer	ID No.	Last Cal.	Interval
Test Receiver	ESV	Rohde & Schwarz	A-6	2005/6	1 Year
Pre-Amplifier	ESV-Z3	Rohde & Schwarz	A-20	2005/8	1 Year
Biconical Antenna	UHLP9103/BBA9106	Schwarzbeck	C-43	2005/8	1 Year
Log-periodic Antenna	UHALP9107	Schwarzbeck	C-42	2005/8	1 Year
RF Cable	--	----	H-5	2005/8	1 Year
Site Attenuation	--	----	H-17	2004/10	1 Year

B.2.2 Radiated Emission above 1 GHz

Not tested by applicant request.