



# RADIO TEST REPORT

Test Report No.: 26GE0067-HO

Applicant : Panasonic Communications Co., Ltd.  
Type of Equipment : 2.4GHz FHSS Cordless Telephone (Base Unit)  
Model No. : KX-TH112  
FCC ID : ACJ96NKX-TH112  
Test standard : FCC Part 15 Subpart C  
Section 15.207, Section 15.247: 2006  
Test Result : Complied

1. This test report shall not be reproduced in full or partial, without the written approval of UL Apex Co., Ltd.
2. The results in this report apply only to the sample tested.
3. This equipment is in compliance with the above regulation. We hereby certify that the data contain a true representation of the EMC profile.
4. The test results in this report are traceable to the national or international standards.

Date of test:

March 6 to 12, 2006

Tested by:

*T. Shimada*

Takumi Shimada  
EMC Services

*K. Adachi*

Kenichi Adachi  
EMC Services

Approved by :

*H. Shinoji*

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### **SECTION 3: Test specification, procedures & results**

#### **3.1 Test Specification**

Test Specification : FCC Part15 Subpart C : 2006  
Title : FCC 47CFR Part15 Radio Frequency Device Subpart C Intentional Radiators  
Section 15.207 Conducted limits: 2006  
Section 15.247 Operation within the bands 902-928MHz,  
2400-2483.5MHz, and 5725-5850MHz: 2006

#### **FCC 15.31 (e)**

This EUT provides stable voltage (DC9.0V), and it is constantly converted into and provided with DC2.5V for the operational voltage within RF Module regardless of input voltage. Therefore, this EUT complies with the requirement.

#### **FCC Part 15.203 Antenna requirement**

It is impossible for end users to replace the antenna, because the antenna is fixed outside of the EUT. Therefore, the equipment complies with the antenna requirement of Section 15.203.

### 3.2 Procedures and results

No.	Item	Test Procedure	Specification	Remarks	Deviation	Worst Margin*0)	Results
1	Conducted emission	ANSI C63.4:2003 7. AC powerline conducted emission measurements	Section 15.207	-	N/A	[Mode 1] 14.1dB, 0.53497MHz, L, QP [Mode 2] 14.5dB, 0.52986MHz, L, QP	Complied
2	Carrier Frequency Separation	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(a)(1)	Conducted	N/A	See data.	Complied
3	20dB Bandwidth	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(a)(1)	Conducted	N/A		Complied
4	Number of Hopping Frequency	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(a)(1)(iii)	Conducted	N/A		Complied
5	Dwell time	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(a)(1)(iii)	Conducted	N/A		Complied
6	Maximum Peak Output Power	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(b)(1)	Conducted	N/A		Complied
7	Band Edge Compliance	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(d)	Conducted	N/A		Complied
8	Spurious Emission	ANSI C63.4:2003 13. Measurement of intentional radiators	Section15.247(d)	Conducted/ Radiated	N/A		[Mode 1] 5.1dB, 318.9MHz, Horizontal, QP [Mode 2] 4.5dB, 318.9MHz, Horizontal, QP 3.5dB, 1604.3MHz, Horizontal, PK

Note: UL Apex's EMI Work Procedures No.QPM05 and QPM15.

\*0) The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

\*These tests were also referred to FCC Public Notice DA 00-705 "Guidance on Measurement for Frequency Hopping Spread Spectrum Systems".

\*These tests were performed without any deviations from test procedure except for additions or exclusions.

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### 3.3 Uncertainty

#### Conducted Emission

The measurement uncertainty (with a 95% confidence level) for this test is  $\pm 2.6$ dB.  
The data listed in this test report has enough margin, more than the site margin.

#### Spurious Emission (Radiated)

The measurement uncertainty (with a 95% confidence level) for this test using Biconical antenna is  $\pm 4.59$ dB(3m)/  
 $\pm 4.58$ dB(10m).

The measurement uncertainty (with a 95% confidence level) for this test using Logperiodic antenna is  $\pm 4.62$ dB(3m)/  
 $\pm 4.60$ dB(10m).

The measurement uncertainty (with a 95% confidence level) for this test using Horn antenna is  $\pm 5.27$ dB.  
The data listed in this report meets the limits unless the uncertainty is taken into consideration.

#### Other test except Conducted Emission and Spurious Emission

The measurement uncertainty (with a 95% confidence level) for this test is  $\pm 3.27$ dB.

### 3.4 Test Location

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	FCC Registration Number	IC Registration Number	Width x Depth x Height (m)	Size of reference ground plane / horizontal conducting plane (m)	Other rooms
No.1 semi-anechoic chamber	313583	IC4247A	19.2 x 11.2 x 7.7m	7.0 x 6.0m	Preparation room
No.2 semi-anechoic chamber	846015	IC4247A-2	7.5 x 5.8 x 5.2m	4.0 x 4.0m	-
No.3 shielded room	-	-	4.7 x 7.5 x 2.7m	4.7 x 7.5m	-
No.4 measurement room	-	-	3.1 x 5.0 x 2.7m	N/A	-

\* Size of vertical conducting plane (for Conducted Emission test) : 2.0 x 2.0m for No.1 and No.2 semi-anechoic and No.3 shielded room.

### 3.5 Test set up, Test instruments and Data of EMI

Refer to APPENDIX 1 to 3.

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

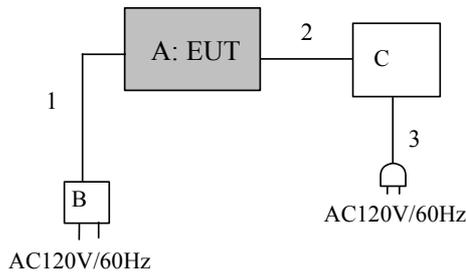
### **4.1 Operating Modes**

The mode is used : [Mode1]  
Transmitting mode(Packet size DH1, DH3)  
- Low Channel :2402MHz  
- Mid Channel :2441MHz  
- High Channel :2480MHz  
- Inquiry  
\*Remarks: AFH OFF mode: 79ch, AFH ON mode 20ch

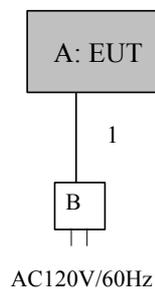
[Mode2]  
Transmitting mode(Packet size DH1, DH3)  
- Low Channel :2402MHz  
- Mid Channel :2440MHz  
- High Channel :2480MHz  
\*Remarks: AFH OFF mode: 40ch, AFH ON mode 20ch

### **4.2 Configuration and peripherals**

**[Conducted Emission/ Radiated Emission test]**



**[Antenna Terminal Conducted test]**



\* Cabling and setup were taken into consideration and test data was taken under worse case conditions.

**Description of Support equipment**

No.	Item	Model number	Serial number	Manufacturer	Remarks
A	2.4GHz FHSS Cordless Telephone (Base Unit)	KX-TH112	0080 f080 582e for AT test 0080 f080 5850 for CE / RE test	Panasonic	EUT
B	AC Adaptor	PQLV206	-	Panasonic	-
C	Facsimile	FO-70	17104455	SHARP	-

**List of cables used**

No.	Name	Length (m)	Shield
1	DC Cable	1.9	N
2	TEL Cable	1.8	N
3	AC Cable	2.0	N

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## **SECTION 5: Conducted Emission**

### **Test Procedure and conditions**

EUT was placed on a platform of nominal size, 1m by 1.5m, raised 80cm above the conducting ground plane. The rear of tabletop was located 40cm to the vertical conducting plane. The rear of EUT, including peripherals aligned and flushed with rear of tabletop. All other surfaces of tabletop were at least 80cm from any other grounded conducting surface. EUT was located 80cm from a Line Impedance Stabilization Network (LISN)/ Artificial mains Network (AMN) and excess AC cable was bundled in center.

#### For the tests on EUT with other peripherals (as a whole system)

I/O cable and AC cables that were connected to the peripherals were bundled in center. They were folded back and forth forming a bundle 30cm to 40cm long and were hanged at a 40cm height to the ground plane.

The AC Mains Terminal Continuous disturbance Voltage has been measured with the EUT in a Semi Anechoic Chamber or a Measurement Room.

The EUT was connected to a LISN (AMN).

An overview sweep with peak detection has been performed.

<b>Detector</b>	<b>: CISPR quasi-peak and average detector (IF BW 9 kHz)</b>
<b>Measurement range</b>	<b>: 0.15-30MHz</b>
<b>Test data</b>	<b>: APPENDIX 3</b>
<b>Test result</b>	<b>: Pass</b>

Date: March 11, 2006

Test engineer: Takumi Shimada

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## **SECTION 6: Spurious Emission**

### **[Conducted]**

#### **Test Procedure**

The Out of Band Emission was measured with a spectrum analyzer connected to the antenna port.

**Test data : APPENDIX 3**

**Test result : Pass**

### **[Radiated]**

#### **Test Procedure**

EUT was placed on a platform of nominal size, 0.5m by 1.0m, raised 80cm above the conducting ground plane.

The Radiated Electric Field Strength intensity has been measured in a Semi Anechoic Chamber with a ground plane and at a distance of 3m(Below 10GHz) and 1m(Upper 10GHz).

The height of the measuring varied between 1 and 4m and EUT was rotated a full revolution in order to obtain the maximum value of the electric field intensity.

The measurements were performed for both vertical and horizontal antenna polarization with the Test Receiver, or the Spectrum Analyzer (in linear mode).

The test was made with the detector (RBW/VBW) in the following table.

When using Spectrum analyzer, the test was made with adjusting span to zero by using peak hold.

#### **\*Delta Marker Method (Measurement for Band-edge)**

STEP 1) Perform an in-band field strength measurement of the fundamental emission using the RBW table below.

STEP 2) Choose a spectrum analyzer span that encompasses both the peak of the fundamental emission and the band-edge emission under investigation. Set the analyzer RBW to 1% of the total span, and measure the amplitude delta between the peak of the fundamental and the peak of the band-edge emission.

STEP 3) Subtract the delta measured in STEP 2) from the field strengths measured in STEP 1). The result is the field strength of band-edge.

In any 100kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator confirmed 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power, based on a radiated measurement.

#### **20dBc was applied to the frequency over the limit of FCC 15.209 and outside the restricted band of 15.205.**

Frequency	Below 1GHz	Above 1GHz
Instrument used	Test Receiver / Spectrum Analyzer	Spectrum Analyzer
Detector	QP: BW 120kHz(T/R)	PK: RBW:1MHz/VBW: 1MHz
IF Bandwidth	20dBc : RBW: 100kHz VBW: 300kHz (S/A)	AV: RBW:1MHz/VBW:10Hz 20dBc : RBW:100kHz/VBW:300kHz

- The carrier level and noise levels were confirmed at each position of 0, 90, and 180 degree of Antenna to see the position of maximum noise, and the test was made at the position that has the maximum noise.

**Test data : APPENDIX 3**

**Test result : Pass**

Date: March 7 and 10, 2006  
March 12, 2006

Test engineer: Takumi Shimada  
Kenichi Adachi

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## **SECTION 7: Bandwidth**

### **Test Procedure**

The bandwidth was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3  
Test result : Pass

## **SECTION 8: Maximum Peak Output Power**

### **Test Procedure**

The Maximum Peak Output Power was measured with a power meter connected to the antenna port.

Test data : APPENDIX 3  
Test result : Pass

## **SECTION 9: Carrier Frequency Separation**

### **Test Procedure**

The carrier frequency separation was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3  
Test result : Pass

## **SECTION 10: Number of Hopping Frequency**

### **Test Procedure**

The Number of Hopping Frequency was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3  
Test result : Pass

## **SECTION 11: Dwell time**

### **Test Procedure**

The Dwell time was measured with a spectrum analyzer connected to the antenna port.

Test data : APPENDIX 3  
Test result : Pass

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Pleade see Test Setup Photo Exhibit.

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Pleade see Test Setup Photo Exhibit.

## APPENDIX 2:Test instruments

### EMI test equipment

Control No.	Instrument	Manufacturer	Model No	Test Item	Calibration Date * Interval(month)
MRENT-26	Spectrum Analyzer	Advantest	R3273	AT / RE	2006/02/15 * 12
MCC-05	Microwave Cable 1G-50GHz	Storm	421-011 ( 90- 1394-079 )	AT	2006/01/04 * 12
MAT-24	Attenuator(10dB)(ab ove1GHz)	Agilent	8493C	RE/AT	2005/06/03 * 12
MOS-04	Digital Humidity Indicator	N.T	NT-1800	AT	2004/11/25 * 24
MAEC-01	Anechoic Chamber	TDK	Semi Anechoic Chamber 10m	RE/CE	2005/11/14 * 12
MOS-01	Digital Humidity Indicator	N.T	NT-1800	RE/CE	2004/11/25 * 24
MTR-01	Test Receiver	Rohde & Schwarz	ESI40	RE/CE	2005/11/10 * 12
MHA-05	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2006/01/09 * 12
MCC-15	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX 104	RE	2006/02/02 * 12
MCC-18	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX 104	RE	2006/02/02 * 12
MPA-01	Pre Amplifier	Agilent	8449B	RE	2006/02/09 * 12
MHF-05	High Pass Filter	Tokimec	TF323DCA	RE	2006/01/24 * 12
MBA-02	Biconical Antenna	Schwarzbeck	BBA9106	RE	2005/10/10 * 12
MLA-02	Logperiodic Antenna	Schwarzbeck	USLP9143	RE	2005/10/14 * 12
MAEC-02	Anechoic Chamber	TDK	Semi Anechoic Chamber 3m	RE	2005/04/11 * 12
MCC-12	Coaxial Cable	Fujikura/Agilent	-	RE	2006/02/23 * 12
MPA-09	Pre Amplifier	Agilent	8447D	RE	2005/09/07 * 12
MAT-07	Attenuator(6dB)	Weinschel Corp	2	RE	2005/12/16 * 12
MOS-02	Digital Humidity Indicator	N.T	NT-1800	RE	2004/11/25 * 24
MLS-02	LISN(AMN)	Schwarzbeck	NSLK8127	CE (EUT)	2005/11/09 * 12
MCC-03	Coaxial Cable	Fujikura/Suhner/Agi lent/TSJ	-	CE	2005/12/18 * 12
MLS-03	LISN(AMN)	Schwarzbeck	NSLK8127	CE (AE)	2005/11/09 * 12
MTA-06	Terminator	MCL	BTRM-50	CE	2006/02/06 * 12
MCC-16	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX 104	RE	2006/02/02 * 12
MPA-10	Pre Amplifier	Agilent	8449B	RE	2005/09/07 * 12
MCC-47	Microwave Cable 1G-26.5GHz	Suhner	SUCOFLEX104	RE	2005/08/30 * 12
MHA-06	Horn Antenna	Schwarzbeck	BBHA9120D	RE	2006/01/09 * 12
MHA-02	Horn Antenna	EMCO	3160-09	RE	2006/01/09 * 12

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All equipment is calibrated with traceable calibrations. Each calibration is traceable to the national or international standards.

Test Item: CE: Conducted Emission  
RE: Radiated Emission  
AT: Antenna Terminal Conducted measurement

**APPENDIX 3: Data of EMI test**

**[Mode 1]**

**Conducted Emission (Mode 1)**

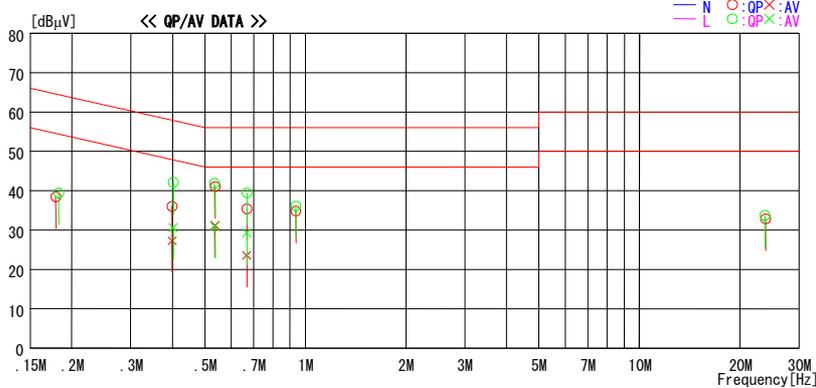
**DATA OF CONDUCTED EMISSION TEST**

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2006/03/11 15:07:07

Applicant : Panasonic Communications Co., Ltd. Report No. : 26GE0067-HO  
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit) Power : AC120V / 60Hz  
Model No. : KX-TH12 Temp./Humi. : 25deg. C / 31%  
Serial No. : 0080 F080 5850 Operator : Takumi Shimada

Mode / Remarks : Mode1 Tx2480MHz / Main Antenna

LIMIT : FCC15C § 15.207 (QP)  
FCC15C § 15.207 (AV)



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase
	QP [dBμV]	AV [dBμV]		QP [dBμV]	AV [dBμV]	QP [dBμV]	AV [dBμV]	QP [dB]	AV [dB]	
0.17896	38.4	---	0.1	38.5	---	64.5	---	26.0	---	N
0.39870	35.9	27.1	0.2	36.1	27.3	57.9	47.9	21.8	20.6	N
0.53667	40.8	30.9	0.3	41.1	31.2	56.0	46.0	14.9	14.8	N
0.66783	35.1	23.3	0.3	35.4	23.6	56.0	46.0	20.6	22.4	N
0.93527	34.6	---	0.3	34.9	---	56.0	---	21.1	---	N
23.82781	30.5	---	2.4	32.9	---	60.0	---	27.1	---	N
0.18237	39.3	---	0.1	39.4	---	64.4	---	25.0	---	L
0.40211	41.9	30.4	0.2	42.1	30.6	57.8	47.8	15.7	17.2	L
0.53497	41.6	30.6	0.3	41.9	30.9	56.0	46.0	14.1	15.1	L
0.66783	39.1	29.0	0.3	39.4	29.3	56.0	46.0	16.6	16.7	L
0.93527	35.8	---	0.3	36.1	---	56.0	---	19.9	---	L
23.74765	31.3	---	2.4	33.7	---	60.0	---	26.3	---	L

CHART: WITH FACTOR, Peak hold data. Data is uncorrected. CALCULATION: RESULT=READING+C.F (L1SN LOSS+CABLE LOSS)  
Except for the above table : adequate margin data below the limits.

## Conducted Emission (Mode 1)

### DATA OF CONDUCTED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2006/03/11 14:51:35

Applicant : Panasonic Communications Co., Ltd.	Report No. : 26GE0067-HO
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit)	Power : AC120V / 60Hz
Model No. : KX-TH112	Temp./Humi. : 25deg. C / 31%
Serial No. : 0080 f080 5850	Operator : Takumi Shimada

Mode / Remarks : Mode1 Tx2402MHz / Main Antenna

LIMIT : FCC15C § 15.207 (QP)  
 FCC15C § 15.207 (AV)

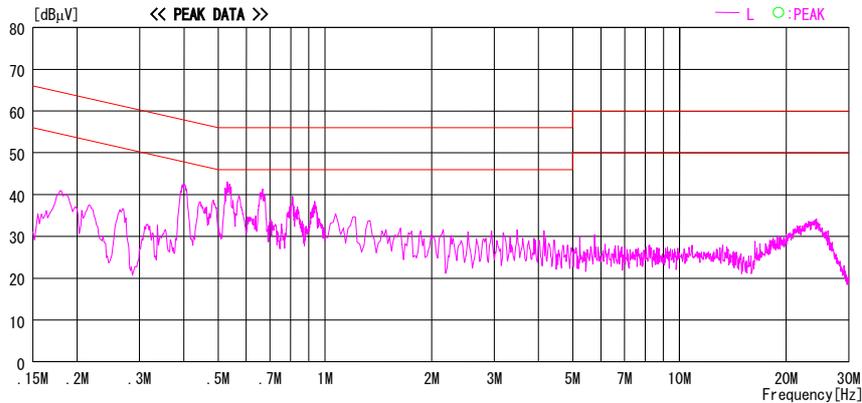
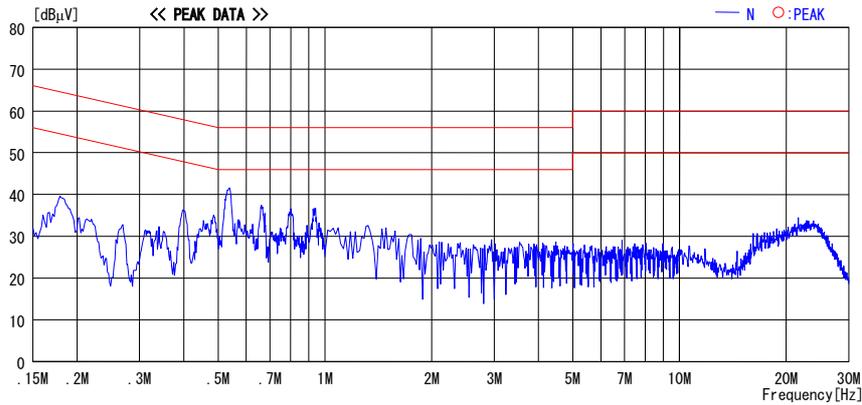


CHART: WITH FACTOR, Peak hold data. Data is uncorrected. CALCULATION: RESULT=READING+C.F (LISN LOSS+CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.

### Conducted Emission (Mode 1)

#### DATA OF CONDUCTED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2006/03/11 14:59:11

Applicant : Panasonic Communications Co., Ltd.	Report No. : 26GE0067-HO
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit)	Power : AC120V / 60Hz
Model No. : KX-TH112	Temp./Humi. : 25deg. C / 31%
Serial No. : 0080 f080 5850	Operator : Takumi Shimada

Mode / Remarks : Mode1 Tx2441MHz / Main Antenna

LIMIT : FCC15C § 15.207 (QP)  
 FCC15C § 15.207 (AV)

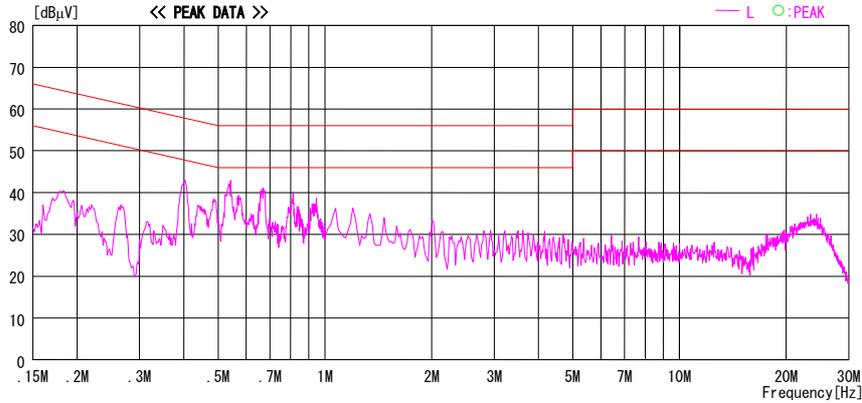
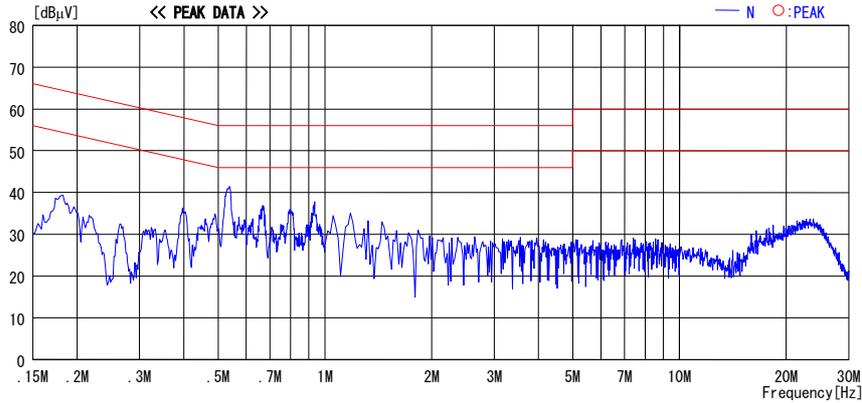


CHART:WITH FACTOR,Peak hold data.Data is uncorrected. CALCURATION:RESULT=READING+C.F(LISN LOSS+CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.

## Conducted Emission (Mode 1)

### DATA OF CONDUCTED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2006/03/11 15:07:07

Applicant : Panasonic Communications Co., Ltd.	Report No. : 26GE0067-HO
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit)	Power : AC120V / 60Hz
Model No. : KX-TH112	Temp./Humi. : 25deg. C / 31%
Serial No. : 0080 f080 5850	Operator : Takumi Shimada

Mode / Remarks : Mode1 Tx2480MHz / Main Antenna

LIMIT : FCC15C § 15.207 (QP)  
 FCC15C § 15.207 (AV)

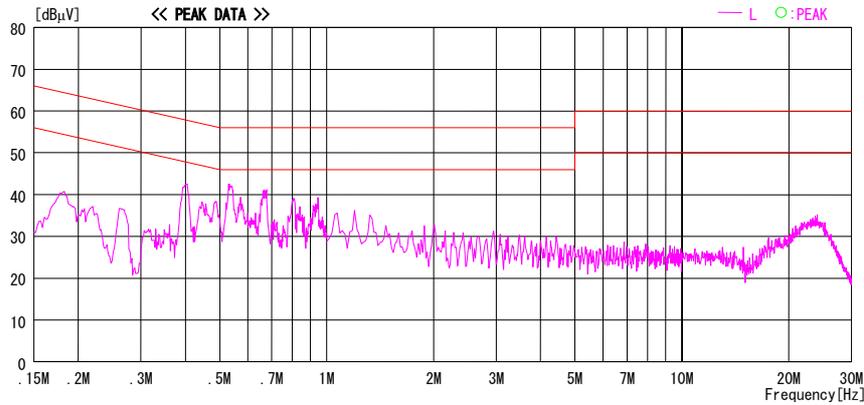
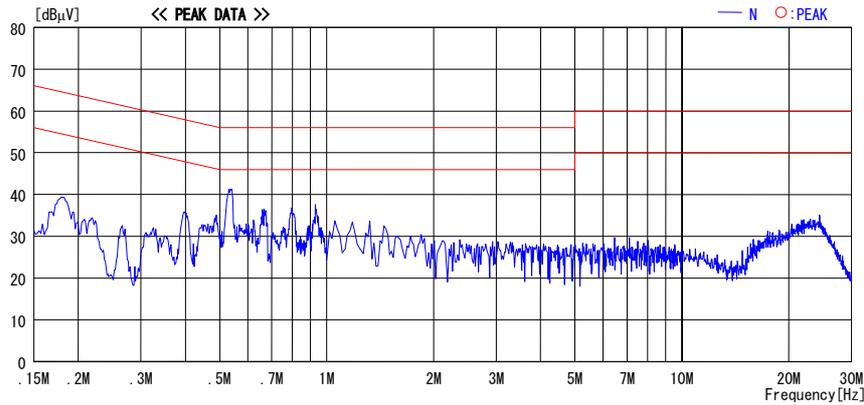


CHART: WITH FACTOR, Peak hold data. Data is uncorrected. CALCURATION: RESULT=READING+C.F (LISN LOSS+CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.

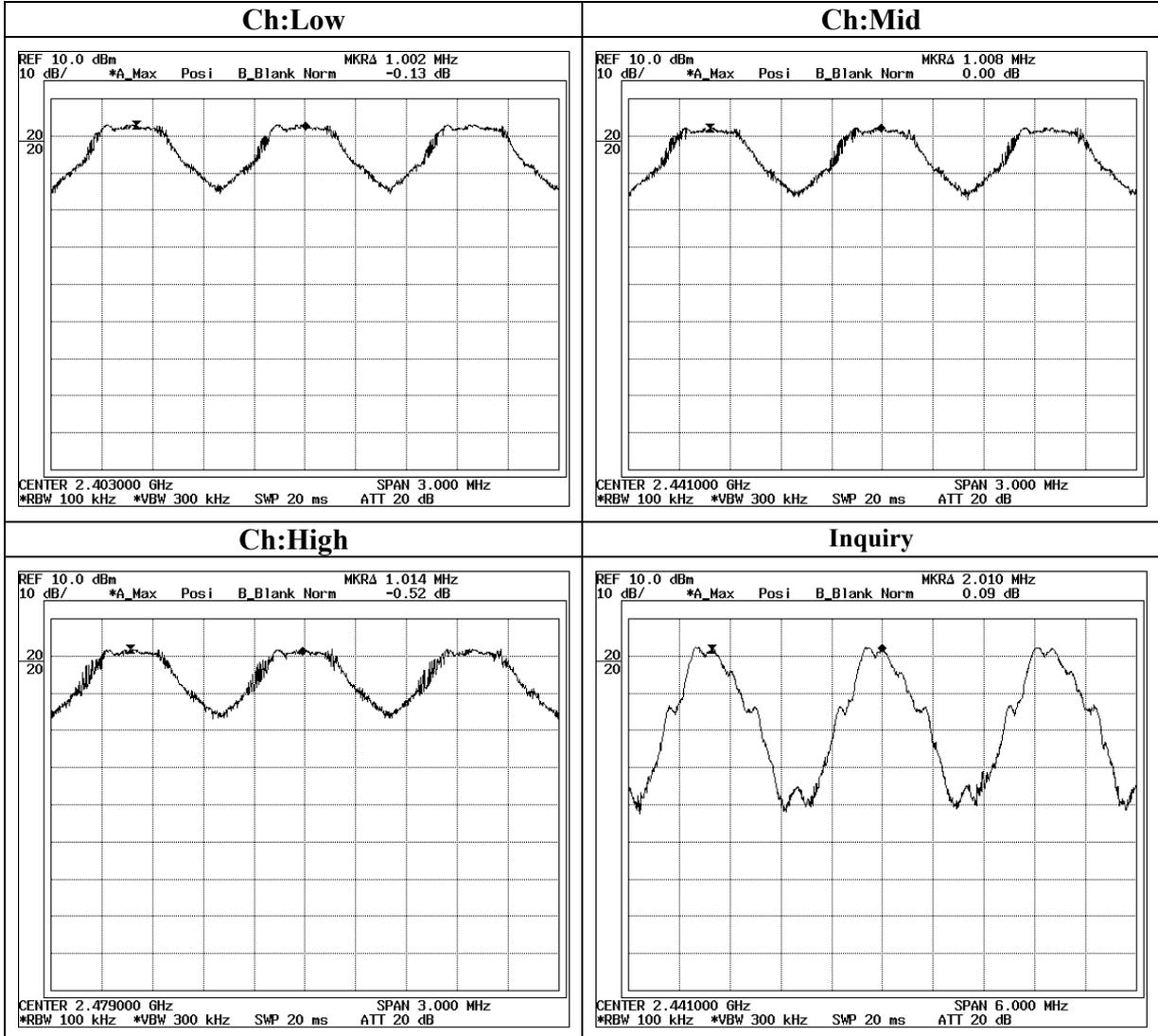
### Carrier Frequency Separation (Mode 1)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.3 Shielded Room

COMPANY	: Panasonic Communications Co., Ltd.	REGULATION	: FCC Part15 Subpart C 15.247(a)(1)
EQUIPMENT	: 2.4GHz FHSS Cordless Telephone (Base Unit)	TEST DISTANCE	: -
MODEL	: KX-TH112	DATE	: 03/07/2006
S/ N	: 0080 f080 582e	TEMPERATURE	: 23deg.C
POWER	: AC120V / 60Hz	HUMIDITY	: 33%
MODE	: Tx(Hopping on)/Inquiry	ENGINEER	: Takumi Shimada

Ch	Freq. [MHz]	Channel separation [MHz]	Limit
Low	2402.0	1.002	>20dB Bandwidth and 25[kHz]
Mid	2441.0	1.008	>20dB Bandwidth and 25[kHz]
High	2480.0	1.014	>20dB Bandwidth and 25[kHz]
Inquiry	2441.0	2.010	>20dB Bandwidth and 25[kHz]

**Carrier Frequency Separation (Mode 1)**



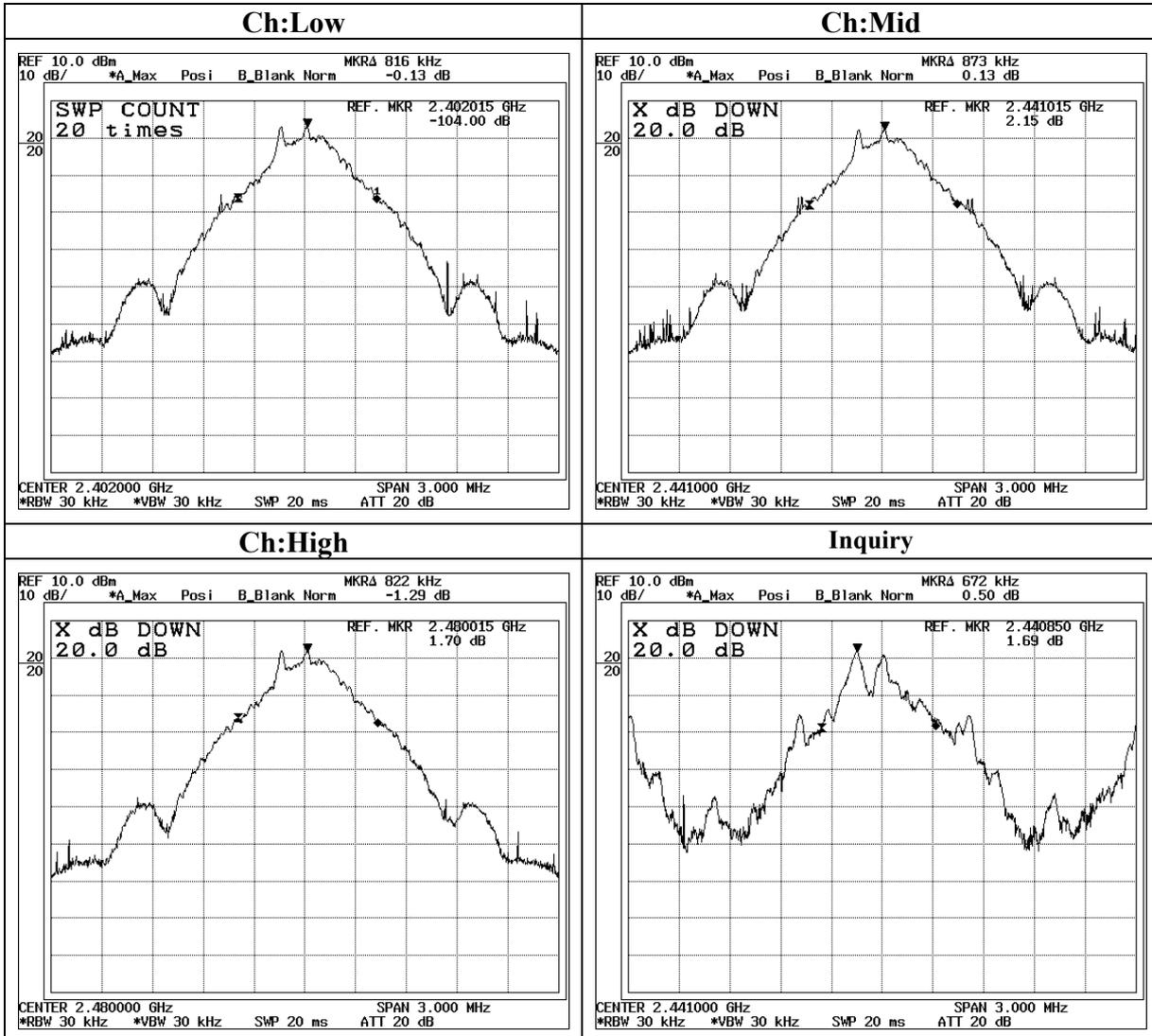
### 20dB Bandwidth (Mode 1)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.3 Shielded Room

COMPANY : Panasonic Communications Co., Ltd. REGULATION : FCC Part15 Subpart C 15.247(a)(1)  
EQUIPMENT : 2.4GHz FHSS Cordless Telephone (Base Unit) TEST DISTANCE : -  
MODEL : KX-TH112 DATE : 03/07/2006  
S/N : 0080 f080 582e TEMPERATURE : 23deg.C  
POWER : AC120V / 60Hz HUMIDITY : 33%  
MODE : Tx (Hopping off) /Inquiry ENGINEER : Takumi Shimada

Ch	Freq. [MHz]	20dB Bandwidth [MHz]	Limit [MHz]
Low	2402.0	0.816	-
Mid	2441.0	0.873	-
High	2480.0	0.822	-
Inquiry	2441.0	0.672	-

**20dB Bandwidth (Mode 1)**



### Number of Hopping Frequency (Mode 1)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.3 Shielded Room

COMPANY : Panasonic Communications Co.,Ltd. REGULATION : FCC Part15 Subpart C 15.247(a)(1)(iii)  
EQUIPMENT : 2.4GHz FHSS Cordless Telephone (Base Unit) TEST DISTANCE : -  
MODEL : KX-TH112 DATE : 03/06/2006  
S/ N : 0080 f080 582e TEMPERATURE : 25deg.C  
POWER : AC120V / 60Hz HUMIDITY : 40%  
MODE : Tx(Hopping on)/Inquiry ENGINEER : Takumi Shimada

#### Mode 1, AFH off

Mode	Number of channel [time]	Limit [time]
Tx(Hopping on)	79	$\geq 15$

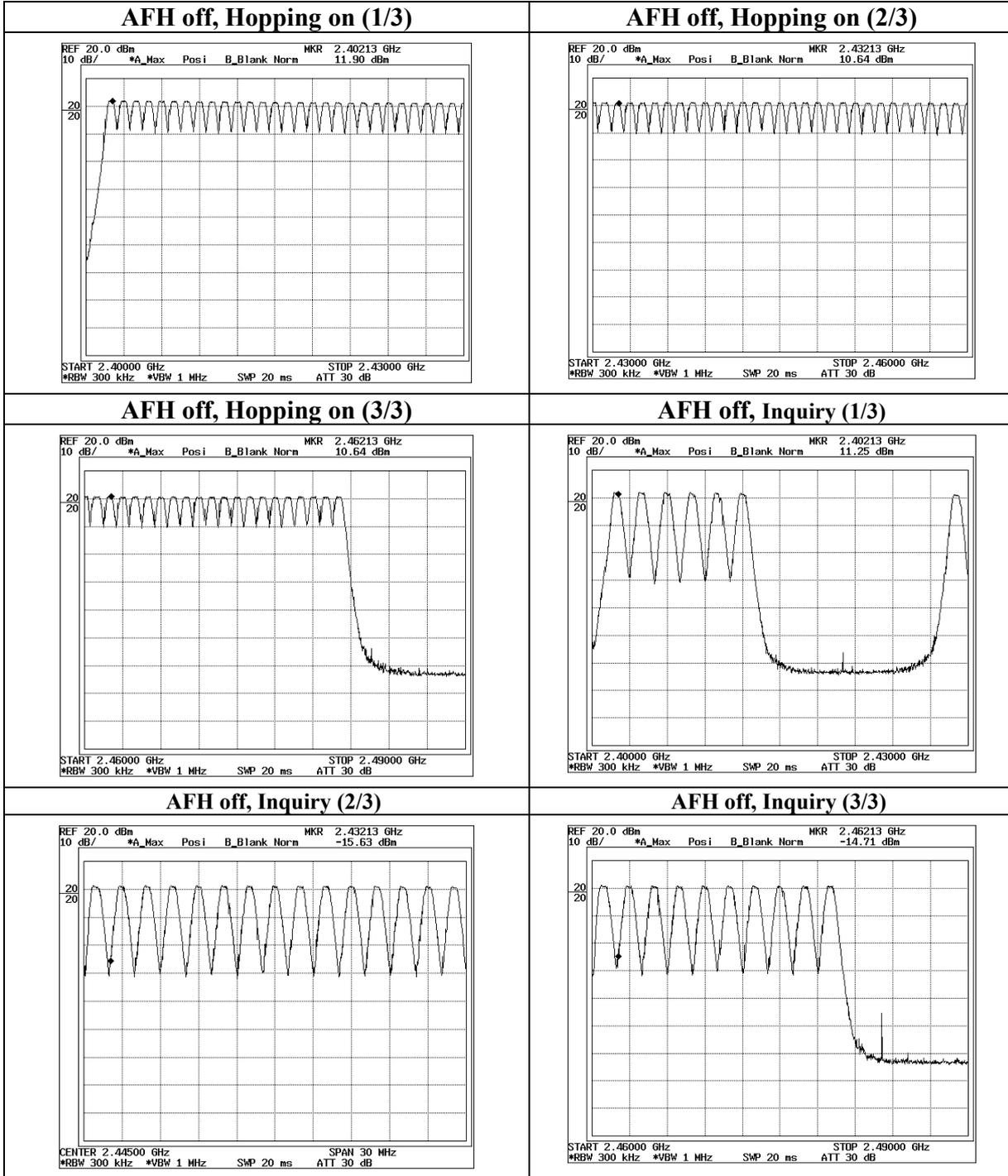
#### Mode 1, AFH off

Mode	Number of channel [time]	Limit [time]
Inquiry	32	$\geq 15$

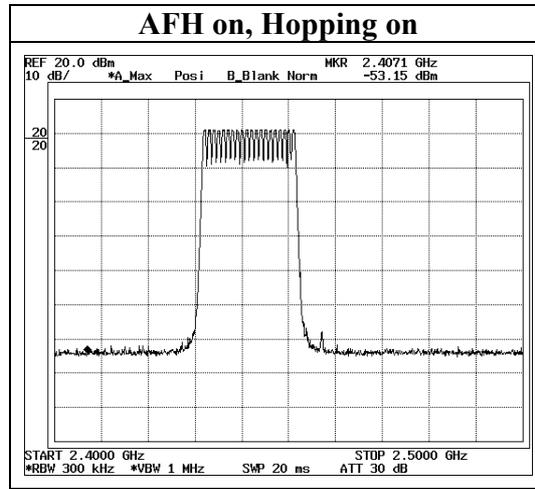
#### Mode 1, AFH on

Mode	Number of channel [time]	Limit [time]
Tx(Hopping on)	20	$\geq 15$

**Number of Hopping Frequency (Mode 1)**



**Number of Hopping Frequency (Mode 1)**



**Dwell time (Mode 1)**

UL Apex Co., Ltd.  
Head Office EMC Lab. No.3 Shielded Room

COMPANY	: Panasonic Communications Co., Ltd.	REGULATION	: FCC Part15 Subpart C 15.247(a)(1)(iii)
EQUIPMENT	: 2.4GHz FHSS Cordless Telephone (Base Unit)	TEST DISTANCE	: -
MODEL	: KX-TH112	DATE	: 03/07/2006
S/N	: 0080 f080 582e	TEMPERATURE	: 23deg C
POWER	: AC120V / 60Hz	HUMIDITY	: 33%
MODE	: Tx(Hopping on)/Inquiry	ENGINEER	: Takumi Shimada

**Mode 1, AFH off**

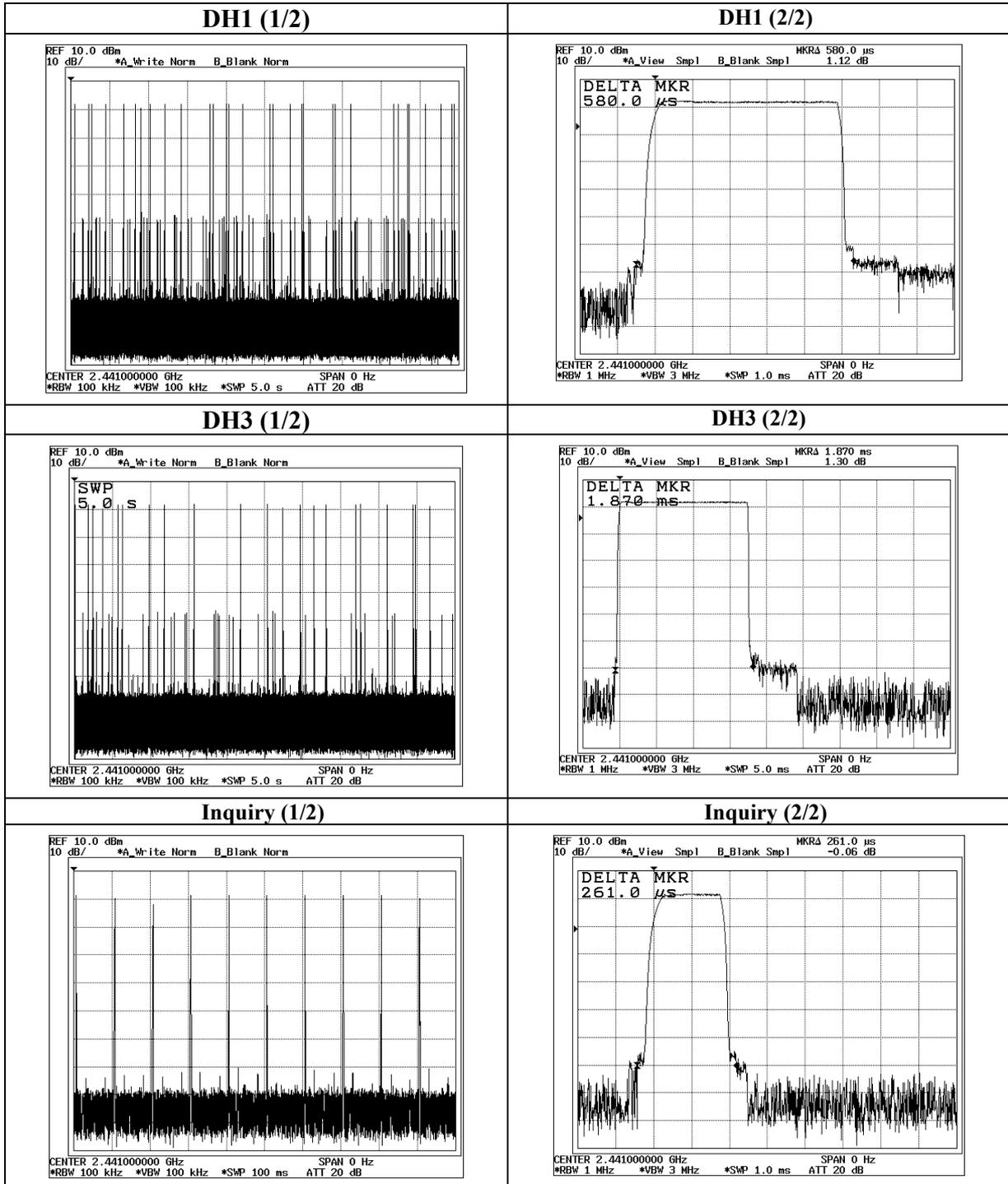
Mode	Number of transmission in a 31.6(79 Hopping x 0.4) / 12.8(32 Hopping x 0.4)second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	31 times / 5sec. x 31.6 = 195.92 times	0.580	114	400
DH3	21 times / 5 sec. x 31.6 = 132.72 times	1.870	248	400
Inquiry	10 times / 0.1sec. x 12.8 = 1280 times	0.261	334	400

**Mode 1, AFH on**

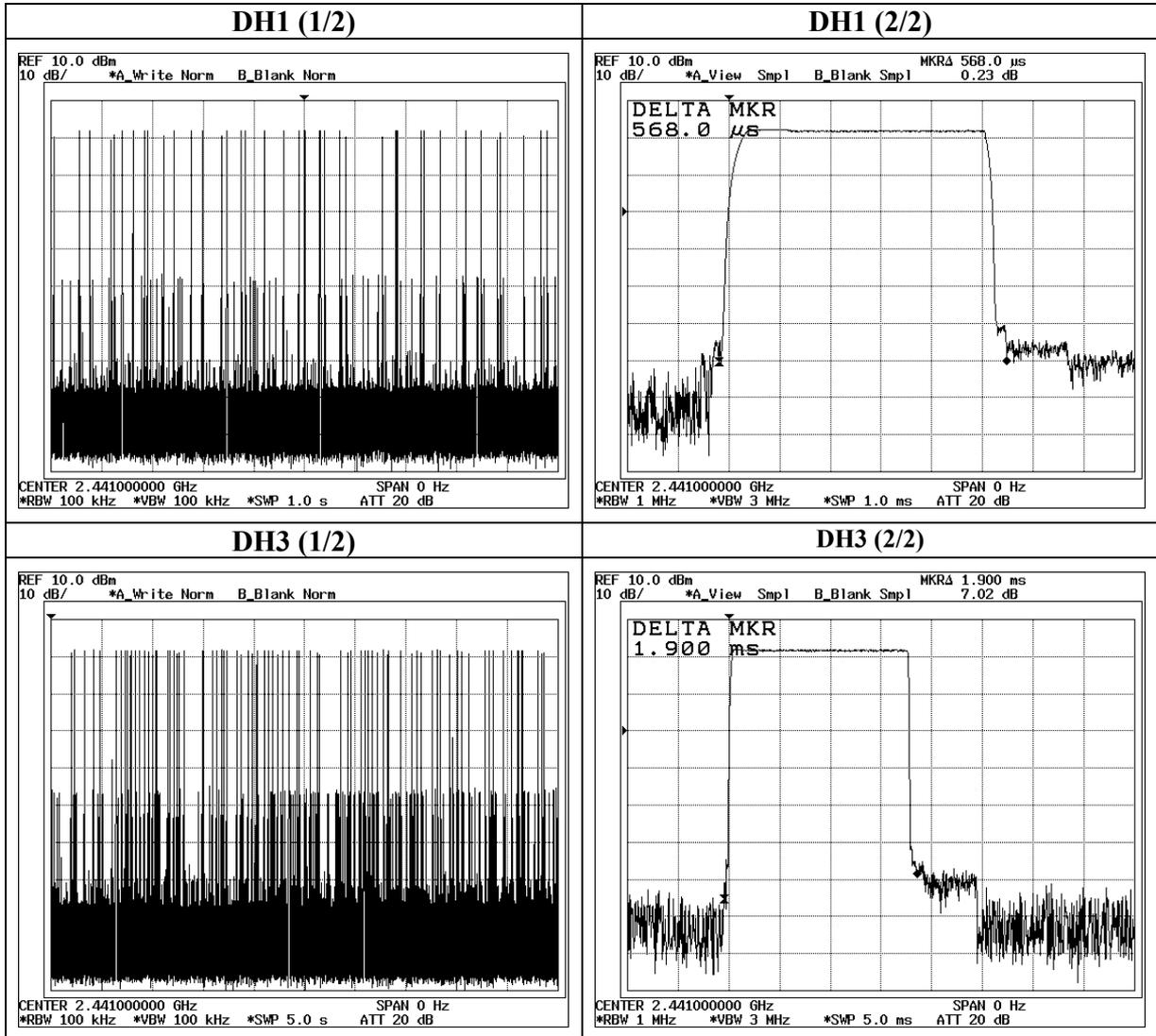
Mode	Number of transmission in a 8(20 Hopping x 0.4) second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	40 times / 1sec. x 8 = 320 times	0.568	182	400
DH3	82 times / 5 sec. x 8 = 131 times	1.900	249	400

\*Dwell Factor calculation for Spurious emissions :  $= 20 \times \log \left( \left( 1.900 \text{ [ms]} \times \left( 82 / \left( 5 \text{ [s]} / 0.100 \text{ [s]} \right) \right) \right) / 100 \text{ [ms]} \right) = -30.1 \text{ dB}$

**Dwell time (Mode 1)**  
**AFH off**



**Dwell time (Model)**  
**AFH on**



### Maximum Peak Output Power (Mode 1)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.3 Shielded Room

COMPANY : Panasonic Communications Co.,Ltd. REGULATION : FCC Part15 Subpart C 15.247(b)(1)  
EQUIPMENT : 2.4GHz FHSS Cordless Telephone (Base Unit) TEST DISTANCE : -  
MODEL : KX-TH112 DATE : 03/06/2006  
S/N : 0080 f080 582e TEMPERATURE : 25deg.C  
POWER : AC120V / 60Hz HUMIDITY : 40%  
MODE : Tx(Hopping off)/Inquiry ENGINEER : Takumi Shimada

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2402.0	4.25	1.43	10.00	15.68	36.98	20.96	124.74	5.28
Mid	2441.0	3.45	1.50	10.00	14.95	31.26	20.96	124.74	6.01
High	2480.0	3.10	1.59	10.00	14.69	29.44	20.96	124.74	6.27
Inquiry	2441.0	4.26	1.50	10.00	15.76	37.67	20.96	124.74	5.20

Sample Calculation:

Result = Reading + Cable Loss + Attenuator

\* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.

**Radiated Spurious Emission (Mode 1)**

\* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

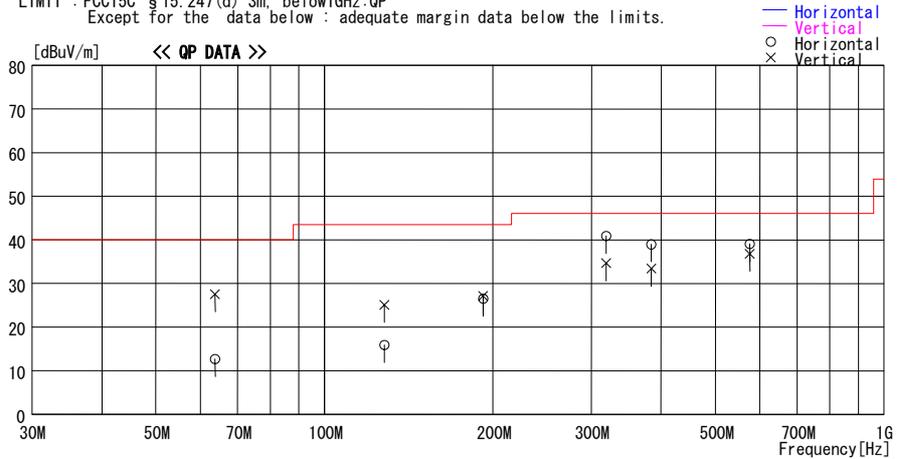
**DATA OF RADIATED EMISSION TEST**

UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
Date : 2006/03/10 11:43:06

Applicant : Panasonic Communications Co., Ltd. Report No. : 26GE0067-HO  
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit) Power : AC120V / 60Hz  
Model No. : KY-TH112 Temp./ Humi. : 25 deg. C. / 38 %  
Serial No. : 0080 F080 5850 Operator : Takumi Shimada

Mode / Remarks: Model Tx240MHz / Main Antenna / Ant-axis:Hor 180deg , Ver 90deg (Max-axis)

LIMIT : FCC15C §15.247(d) 3m. below1GHz:QP  
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]
			Factor [dB/m]	Gain [dB]						
63.750	27.0	QP	7.6	-21.9	12.7	286	100	Hori.	40.0	27.3
63.750	41.8	QP	7.6	-21.9	27.5	0	100	Vert.	40.0	12.5
128.009	23.5	QP	13.3	-20.9	15.9	0	143	Hori.	43.5	27.6
128.009	32.7	QP	13.3	-20.9	25.1	0	100	Vert.	43.5	18.4
192.000	30.4	QP	16.4	-20.3	26.5	219	100	Hori.	43.5	17.0
192.000	31.0	QP	16.4	-20.3	27.1	0	100	Vert.	43.5	16.4
318.900	44.5	QP	14.9	-18.5	40.9	0	100	Hori.	46.0	5.1
318.900	38.2	QP	14.9	-18.5	34.6	256	143	Vert.	46.0	11.4
383.990	41.3	QP	17.3	-19.6	39.0	64	100	Hori.	46.0	7.0
383.990	35.7	QP	17.3	-19.6	33.4	257	145	Vert.	46.0	12.6
575.805	39.5	QP	18.9	-19.3	39.1	157	152	Hori.	46.0	6.9
575.805	37.2	QP	18.9	-19.3	36.8	280	154	Vert.	46.0	9.2

CHART:WITH FACTOR ANT TYPE : -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz--HOR  
CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

**Radiated Spurious Emission (Mode 1)**

\* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

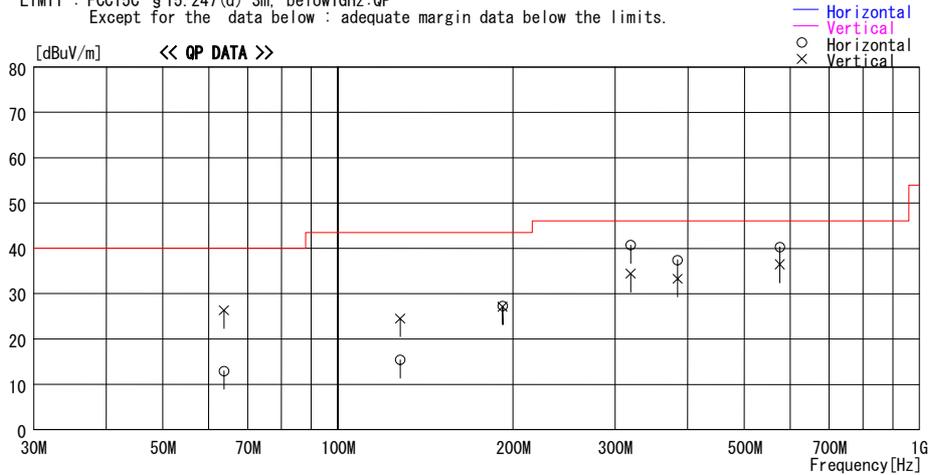
**DATA OF RADIATED EMISSION TEST**

UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
Date : 2006/03/10 14:28:21

Applicant : Panasonic Communications Co., Ltd. Report No. : 26GE0067-HO  
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit) Power : AC120V / 60Hz  
Model No. : KX-TH112 Temp./ Humi. : 25 deg.C. / 38 %  
Serial No. : 0080 f080 5850 Operator : Takumi Shimada

Mode / Remarks : Model Tx2441MHz / Main Antenna / Ant-axis:Hor 180deg , Ver 90deg (Max-axis)

LIMIT : FCC15C § 15.247(d) 3m, below1GHz:QP  
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin
			Factor	Gain					[dBuV/m]	[dB]
[MHz]	[dBuV]		[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]
63.750	27.2	QP	7.6	-21.9	12.9	283	100	Hori.	40.0	27.1
63.750	40.6	QP	7.6	-21.9	26.3	0	100	Vert.	40.0	13.7
128.009	23.0	QP	13.3	-20.9	15.4	49	300	Hori.	43.5	28.1
128.009	32.1	QP	13.3	-20.9	24.5	0	100	Vert.	43.5	19.0
192.000	31.2	QP	16.4	-20.3	27.3	248	100	Hori.	43.5	16.2
192.000	31.0	QP	16.4	-20.3	27.1	0	100	Vert.	43.5	16.4
318.900	44.3	QP	14.9	-18.5	40.7	0	100	Hori.	46.0	5.3
318.900	38.0	QP	14.9	-18.5	34.4	265	145	Vert.	46.0	11.6
384.000	39.7	QP	17.3	-19.6	37.4	70	100	Hori.	46.0	8.6
384.000	35.6	QP	17.3	-19.6	33.3	254	125	Vert.	46.0	12.7
575.805	40.7	QP	18.9	-19.3	40.3	153	162	Hori.	46.0	5.7
575.805	36.8	QP	18.9	-19.3	36.4	285	130	Vert.	46.0	9.6

CHART:WITH FACTOR ANT TYPE : -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN  
CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

**Radiated Spurious Emission (Mode 1)**

\* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

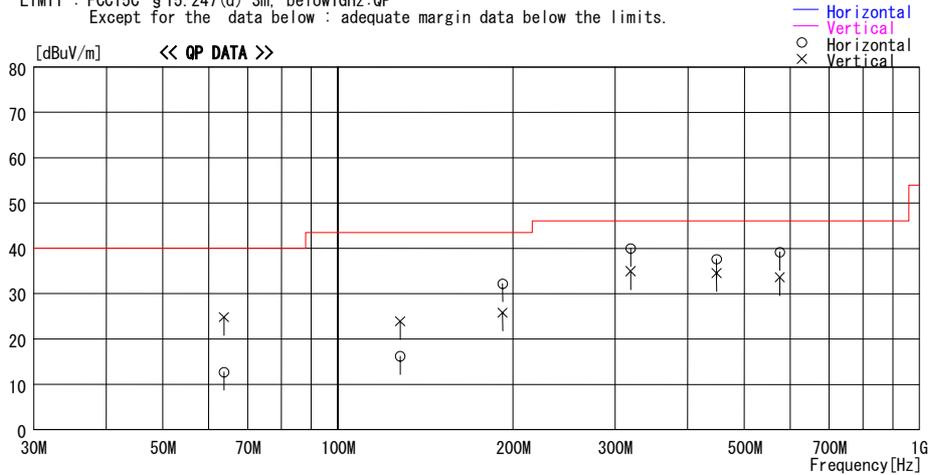
**DATA OF RADIATED EMISSION TEST**

UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
Date : 2006/03/10 15:23:10

Applicant : Panasonic Communications Co., Ltd. Report No. : 26GE0067-HO  
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit) Power : AC120V / 60Hz  
Model No. : KX-TH112 Temp./ Humi. : 25 deg.C. / 38 %  
Serial No. : 0080 f080 5850 Operator : Takumi Shimada

Mode / Remarks : Model Tx2480MHz / Main Antenna / Ant-axis:Hor 180deg , Ver 90deg (Max-axis)

LIMIT : FCC15C § 15.247(d) 3m, below1GHz:QP  
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level	Angle	Height	Polar.	Limit	Margin
			Factor	Gain					[dBuV/m]	[dB]
			[dB/m]	[dB]	[dBuV/m]	[Deg]	[cm]		[dBuV/m]	[dB]
63.750	27.0	QP	7.6	-21.9	12.7	333	100	Hori.	40.0	27.3
63.750	39.1	QP	7.6	-21.9	24.8	0	100	Vert.	40.0	15.2
128.009	23.8	QP	13.3	-20.9	16.2	36	201	Hori.	43.5	27.3
128.009	31.5	QP	13.3	-20.9	23.9	0	100	Vert.	43.5	19.6
192.000	36.1	QP	16.4	-20.3	32.2	61	188	Hori.	43.5	11.3
192.000	29.7	QP	16.4	-20.3	25.8	0	100	Vert.	43.5	17.7
318.900	43.6	QP	14.9	-18.5	40.0	0	100	Hori.	46.0	6.0
318.900	38.5	QP	14.9	-18.5	34.9	278	153	Vert.	46.0	11.1
448.005	39.5	QP	17.8	-19.7	37.6	6	100	Hori.	46.0	8.4
448.005	36.4	QP	17.8	-19.7	34.5	101	100	Vert.	46.0	11.5
576.005	39.6	QP	18.9	-19.3	39.2	142	183	Hori.	46.0	6.8
576.005	34.0	QP	18.9	-19.3	33.6	215	118	Vert.	46.0	12.4

CHART:WITH FACTOR ANT TYPE : -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN  
CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

### Radiated Spurious Emission (Mode 1)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.1 / No.2 Semi Anechoic Chamber

Company : Panasonic Communications Co.,Ltd.  
Equipment : 2.4GHz FHSS Cordless Telephone(Base Unit)  
Model : KX-TH112  
Sample No. : 0080 f080 5850  
Power : AC 120 V / 60 Hz  
Mode : Mode1, Tx 2402MHz  
Remarks : Ant-axis:Hor 180deg / Ver 90deg

REPORT NO : 26GE0067-HO  
REGULATION : Fcc Part15 Subpart C 15.247(d)  
TEST DISTANCE : 3m / 1m  
DATE : 03/07/2006 03/12/2006  
TEMPERATURE : 24deg.C 22 deg.C.  
HUMIDITY : 31% 44 %  
ENGINEER : Takumi Shimada Kenichi Adachi  
(below10GHz:No.1 A/C) (above10GHz:No.2 A/C)

**PK DETECT** (RBW: 1MHz, VBW: 1MHz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell Factor [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
1	2390.0	47.4	47.0	30.5	36.3	2.3	0.0	0.0	43.9	43.5	74.0	30.1	30.5
2*	2400.0	81.7	79.1	30.5	36.3	2.3	9.5	0.0	87.7	85.1	74.0	-	-
3	4804.0	48.2	47.6	35.3	35.9	3.4	1.4	0.0	52.4	51.8	74.0	21.6	22.2
4	7206.0	50.3	46.5	37.6	35.8	4.2	1.2	0.0	57.5	53.7	74.0	16.5	20.3
5	8226.4	50.1	56.2	36.9	35.9	4.6	1.2	0.0	56.9	63.0	74.0	17.1	11.0
6	9608.0	46.5	45.3	36.6	36.4	4.7	1.0	0.0	52.4	51.2	74.0	21.6	22.8
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>													
7	12011.1	41.5	41.8	40.3	31.3	7.8	1.8	0.0	50.6	50.9	74.0	23.4	23.1
8	14412.0	41.5	41.6	43.2	31.0	8.7	0.9	0.0	53.8	53.9	74.0	20.2	20.1
9	16814.0	-	-	46.4	30.8	9.6	1.3	0.0	-	-	74.0	-	-
10	19216.0	-	-	39.0	30.0	10.5	0.0	0.0	-	-	74.0	-	-
11	21618.0	-	-	39.3	30.3	11.0	0.0	0.0	-	-	74.0	-	-
12	24020.0	42.7	42.8	39.1	30.4	11.2	0.0	0.0	53.1	53.2	74.0	20.9	20.8

**AV DETECT** (RBW: 1MHz, VBW: 10Hz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell*** Factor [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
1	2390.0	33.0	34.1	30.5	36.3	2.3	0.0	-30.1	-0.6	0.5	54.0	54.6	53.5
2*	2400.0	68.4	65.0	30.5	36.3	2.3	9.5	-30.1	44.3	40.9	54.0	-	-
3	4804.0	39.0	38.8	35.3	35.9	3.4	1.4	-30.1	13.1	12.9	54.0	40.9	41.1
4	7206.0	41.9	38.9	37.6	35.8	4.2	1.2	-30.1	19.0	16.0	54.0	35.0	38.0
5	8226.4	41.7	49.8	36.9	35.9	4.6	1.2	-30.1	18.4	26.5	54.0	35.6	27.5
6	9608.0	32.3	32.8	36.6	36.4	4.7	1.0	-30.1	8.1	8.6	54.0	45.9	45.4
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>													
7	12011.1	29.6	30.8	40.3	31.3	7.8	1.8	-30.1	8.6	9.8	54.0	45.4	44.2
8	14412.0	28.5	28.6	43.2	31.0	8.7	0.9	-30.1	10.7	10.8	54.0	43.3	43.2
9	16814.0	-	-	46.4	30.8	9.6	1.3	-30.1	-	-	54.0	-	-
10	19216.0	-	-	39.0	30.0	10.5	0.0	-30.1	-	-	54.0	-	-
11	21618.0	-	-	39.3	30.3	11.0	0.0	-30.1	-	-	54.0	-	-
12	24020.0	30.4	30.5	39.1	30.4	11.2	0.0	-30.1	10.7	10.8	54.0	43.3	43.2

\* Reference data.

**20dBc(Fundamental 2402MHz)** (RBW: 100kHz, VBW: 300kHz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATT LOSS [dB]	Dwell Factor [dB]	RESULT		Limit 20dBc [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
0	2402.0	108.5	105.0	30.5	36.3	2.4	9.5	0.0	114.6	111.1	-	-	-
2	2400.0	50.3	47.3	30.5	36.3	2.3	9.5	0.0	56.3	53.3	Funda-20dB	38.3	37.8

\*Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.54 dB

\*Except for the above table : All other spurious emissions were less than 20dB for the limit.

\*The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

\*Hi-Pass Fiter was not used for factor 0.0dB of the above table.

\*\*In the frequency over the sixth harmonic, the noise from the EUT was not seen.The data above is its base noise.

\*\*\*Dwell Factor calculation for Spurious emissions : = 20 x log ( ( 1.900 [ms] x ( 82 / ( 5[s] / 0.100 [s] ) ) ) / 100 [ms] ) = -30.1 dB

**Radiated Spurious Emission (Mode 1)**

UL Apex Co., Ltd.  
Head Office EMC Lab. No.1 / No.2 Semi Anechoic Chamber

Company : Panasonic Communications Co.,Ltd.  
Equipment : 2.4GHz FHSS Cordless Telephone(Base Unit)  
Model : KX-TH112  
Sample No. : 0080 f080 5850  
Power : AC 120 V / 60 Hz  
Mode : Model, Tx 2441MHz  
Remarks : Ant-axis:Hor 180deg / Ver 90deg

REPORT NO : 26GE0067-HO  
REGULATION : Fcc Part15 Subpart C 15.247(d)  
TEST DISTANCE : 3m / 1m  
DATE : 03/07/2006 03/12/2006  
TEMPERATURE : 24deg.C 22 deg.C  
HUMIDITY : 31% 44 %  
ENGINEER : Takumi Shimada Kenichi Adachi  
(below10GHz: No.1 A/C) (above10GHz: No.2 A/C)

**PK DETECT (RBW: 1MHz, VBW: 1MHz)**

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell Factor [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
1	4882.0	46.9	47.7	35.6	35.9	3.4	1.4	0.0	51.4	52.2	74.0	22.6	21.8
2	7323.0	50.6	50.8	37.7	35.8	4.2	1.1	0.0	57.8	58.0	74.0	16.2	16.0
3	8225.2	52.3	56.1	36.9	35.9	4.6	1.2	0.0	59.1	62.9	74.0	14.9	11.1
4	9764.1	45.5	44.1	36.5	36.5	4.8	1.1	0.0	51.4	50.0	74.0	22.6	24.0
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>													
5	12205.0	41.6	41.7	40.4	31.0	7.9	1.7	0.0	51.1	51.2	74.0	22.9	22.8
6	14646.0	41.6	41.5	43.1	31.1	8.8	1.4	0.0	54.3	54.2	74.0	19.7	19.8
7	17087.0	-	-	46.1	30.7	9.7	1.3	0.0	-	-	74.0	-	-
8	19528.0	-	-	39.1	29.7	10.6	0.0	0.0	-	-	74.0	-	-
9	21969.0	-	-	39.6	30.7	11.0	0.0	0.0	-	-	74.0	-	-
10	24410.0	43.3	43.4	39.1	30.5	11.3	0.0	0.0	53.7	53.8	74.0	20.3	20.2

**AV DETECT (RBW: 1MHz, VBW: 10Hz)**

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell*** Factor [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
1	4882.0	38.1	39.4	35.6	35.9	3.4	1.4	-30.1	12.5	13.8	54.0	41.5	40.2
2	7323.0	42.1	42.3	37.7	35.8	4.2	1.1	-30.1	19.2	19.4	54.0	34.8	34.6
3	8225.2	44.8	49.5	36.9	35.9	4.6	1.2	-30.1	21.5	26.2	54.0	32.5	27.8
4	9764.1	31.5	31.5	36.5	36.5	4.8	1.1	-30.1	7.3	7.3	54.0	46.7	46.7
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>													
5	12205.0	29.7	30.9	40.4	31.0	7.9	1.7	-30.1	9.1	10.3	54.0	44.9	43.7
6	14646.0	28.5	28.5	43.1	31.1	8.8	1.4	-30.1	11.0	11.0	54.0	43.0	43.0
7	17087.0	-	-	46.1	30.7	9.7	1.3	-30.1	-	-	54.0	-	-
8	19528.0	-	-	39.1	29.7	10.6	0.0	-30.1	-	-	54.0	-	-
9	21969.0	-	-	39.6	30.7	11.0	0.0	-30.1	-	-	54.0	-	-
10	24410.0	31.4	31.3	39.1	30.5	11.3	0.0	-30.1	11.7	11.6	54.0	42.4	42.5

\*Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.54 dB

\*Except for the above table : All other spurious emissions were less than 20dB for the limit.

\*The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

\*Hi-Pass Fiter was not used for factor 0.0dB of the above table.

\*\*In the frequency over the sixth harmonic, the noise from the EUT was not seen.The data above is its base noise.

\*\*\*Dwell Factor calculation for Spurious emissions : = 20 x log ( ( 1.900 [ms] x ( 82 / ( 5[s] /0.100 [s] ) ) ) / 100 [ms] ) = -30.1 dB

**UL Apex Co., Ltd.**

**Head Office EMC Lab.**

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MF060b(01.06.05)

## Radiated Spurious Emission (Mode 1)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.1 / No.2 Semi Anechoic Chamber

Company : Panasonic Communications Co.,Ltd.  
Equipment : 2.4GHz FHSS Cordless Telephone(Base Unit)  
Model : KX-TH112  
Sample No. : 0080 #080 5850  
Power : AC 120 V / 60 Hz  
Mode : Mode1, Tx 2480MHz  
Remarks : Ant-axis:Hor 180deg / Ver 90deg

REPORT NO : 26GE0067-HO  
REGULATION : Fcc Part15 Subpart C 15.247(d)  
TEST DISTANCE : 3m / 1m  
DATE : 03/07/2006 03/12/2006  
TEMPERATURE : 24deg.C 22 deg.C.  
HUMIDITY : 31% 44 %  
ENGINEER : Takumi Shimada Kenichi Adachi  
(below10GHz: No.1 A/C) (above10GHz: No.2 A/C)

**PK DETECT** (RBW: 1MHz, VBW: 1MHz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell Factor [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
2	4960.0	47.9	48.8	35.9	35.8	3.4	1.4	0.0	52.8	53.7	74.0	21.2	20.3
3	7440.0	53.0	49.9	37.8	35.8	4.3	1.1	0.0	60.4	57.3	74.0	13.6	16.7
4	8229.5	54.0	55.1	36.9	35.9	4.6	1.2	0.0	60.8	61.9	74.0	13.2	12.1
5	9920.4	45.1	46.1	36.3	36.6	4.9	1.2	0.0	50.9	51.9	74.0	23.1	22.1
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>													
6	12400.0	41.7	41.9	40.5	30.7	8.0	1.6	0.0	51.5	51.7	74.0	22.5	22.3
7	14880.0	41.7	41.6	42.8	31.0	8.8	1.0	0.0	53.8	53.7	74.0	20.2	20.3
8	17360.0	-	-	46.2	31.0	9.9	1.7	0.0	-	-	74.0	-	-
9	19840.0	-	-	39.1	30.3	10.7	0.0	0.0	-	-	74.0	-	-
10	22320.0	-	-	39.5	30.7	11.1	0.0	0.0	-	-	74.0	-	-
11	24800.0	43.8	43.9	39.3	30.6	11.5	0.0	0.0	54.5	54.6	74.0	19.6	19.5

**AV DETECT** (RBW: 1MHz, VBW: 10Hz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell *** Factor [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
2	4960.0	37.8	39.5	35.9	35.8	3.4	1.4	-30.1	12.6	14.3	54.0	41.4	39.7
3	7440.0	45.1	40.6	37.8	35.8	4.3	1.1	-30.1	22.4	17.9	54.0	31.6	36.1
4	8229.5	47.3	48.9	36.9	35.9	4.6	1.2	-30.1	24.0	25.6	54.0	30.0	28.4
5	9920.4	32.1	32.1	36.3	36.6	4.9	1.2	-30.1	7.8	7.8	54.0	46.2	46.2
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>													
6	12400.0	29.9	30.6	40.5	30.7	8.0	1.6	-30.1	9.6	10.3	54.0	44.4	43.7
7	14880.0	28.5	28.6	42.8	31.0	8.8	1.0	-30.1	10.5	10.6	54.0	43.5	43.4
8	17360.0	-	-	46.2	31.0	9.9	1.7	-30.1	-	-	54.0	-	-
9	19840.0	-	-	39.1	30.3	10.7	0.0	-30.1	-	-	54.0	-	-
10	22320.0	-	-	39.5	30.7	11.1	0.0	-30.1	-	-	54.0	-	-
11	24800.0	31.6	31.6	39.3	30.6	11.5	0.0	-30.1	12.2	12.2	54.0	41.9	41.9

**Marker-Delta Method** (Delta chart: RBW: 50kHz (= SPAN / 100), VBW: 200kHz, SPAN: 5MHz)

No.	FREQ [MHz]	Carrier Level - delta S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATT LOSS [dB]	Dwell Factor [dB]	RESULT		Limit [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Carrier Reading - Delta (Carrier - Bandedge) + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
<b>PK DETECT</b>													
1	2483.5	42.5	42.8	30.3	36.3	2.4	9.5	0.0	48.4	48.7	74.0	25.6	25.3
<b>AV DETECT</b>													
1	2483.5	32.5	31.8	30.3	36.3	2.4	9.5	0.0	38.4	37.7	54.0	15.6	16.3

\*Marker-Delta Method S/A Reading Calculation:

HOR, PK (Carrier reading: 108.5dBuV(RBW 1MHz)) - (Carrier Reading 108.76dBuV(RBW 50kHz) - Bandedge Reading 42.74dBuV(RBW 50kHz))  
VER, PK (Carrier reading: 107.2dBuV(RBW 1MHz)) - (Carrier Reading 107.51dBuV (RBW 50kHz) - Bandedge Reading 43.06dBuV (RBW 50kHz))  
HOR, AV (Carrier reading: 98.5dBuV(RBW 1MHz)) - (Carrier Reading 108.76dBuV(RBW 50kHz) - Bandedge Reading 42.74dBuV(RBW 50kHz))  
VER, AV (Carrier reading: 96.2dBuV(RBW 1MHz)) - (Carrier Reading 107.51dBuV (RBW 50kHz) - Bandedge Reading 43.06dBuV (RBW 50kHz))

\*Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.54 dB

\*Except for the above table : All other spurious emissions were less than 20dB for the limit.

\*The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

\*Hi-Pass Fiter was not used for factor 0.0dB of the above table.

\*\*In the frequency over the sixth harmonic, the noise from the EUT was not seen.The data above is its base noise.

\*\*\*Dwell Factor calculation for Spurious emissions : = 20 x log ( ( 1.900 [ms] x ( 82 / ( 5[s] / 0.100 [s] ) ) ) / 100 [ms] ) = -30.1 dB

**UL Apex Co., Ltd.**

**Head Office EMC Lab.**

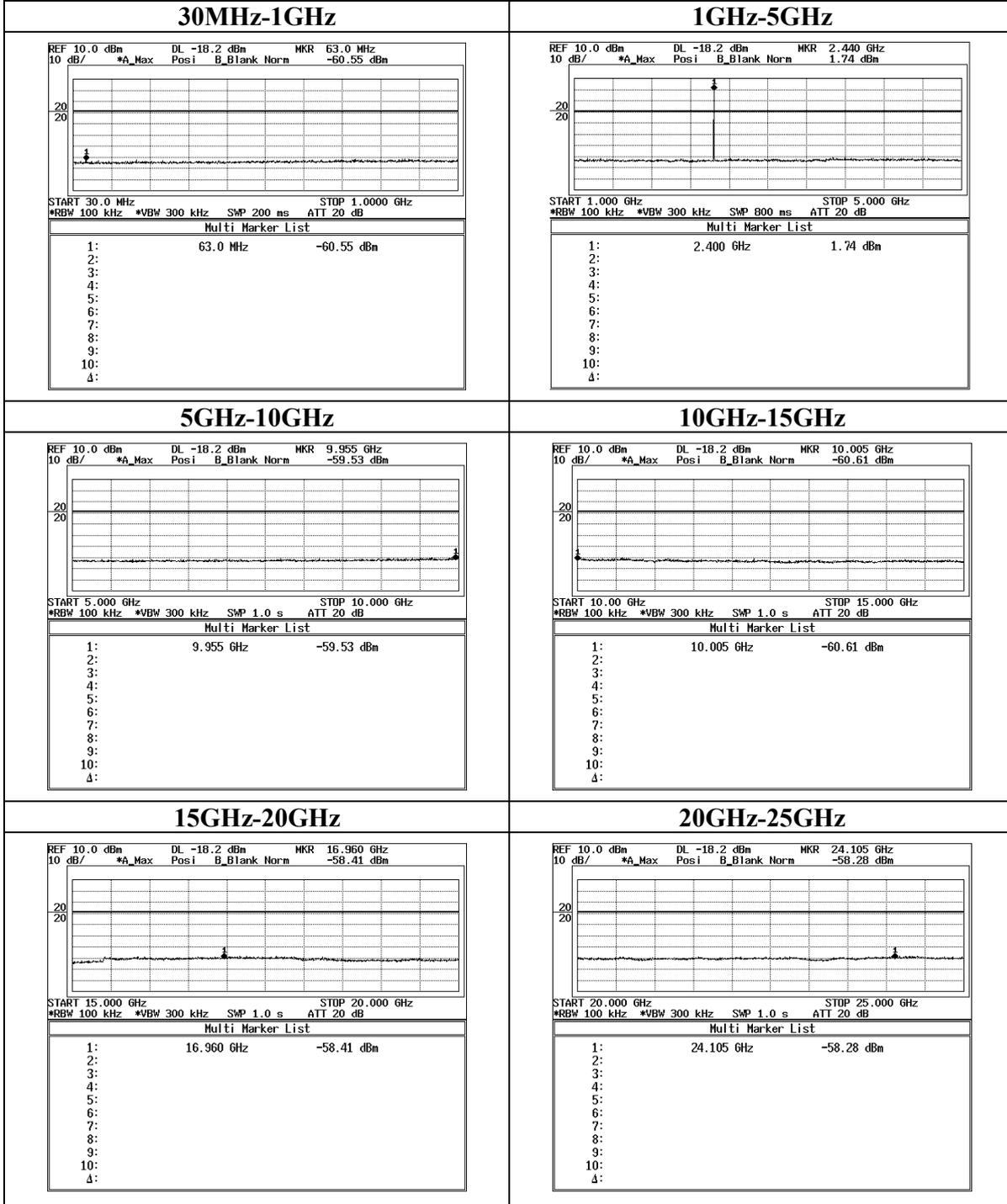
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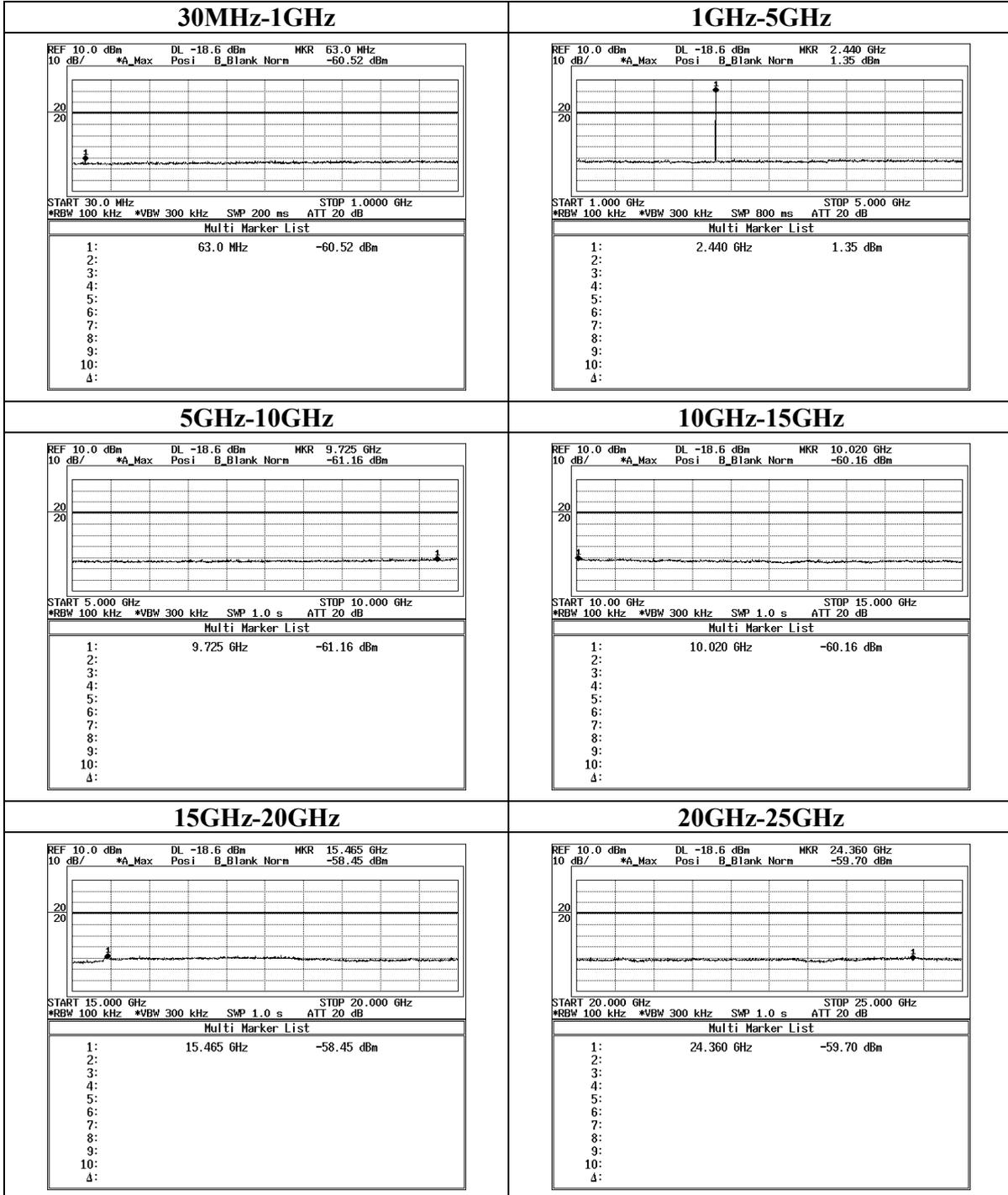
Facsimile : +81 596 24 8124

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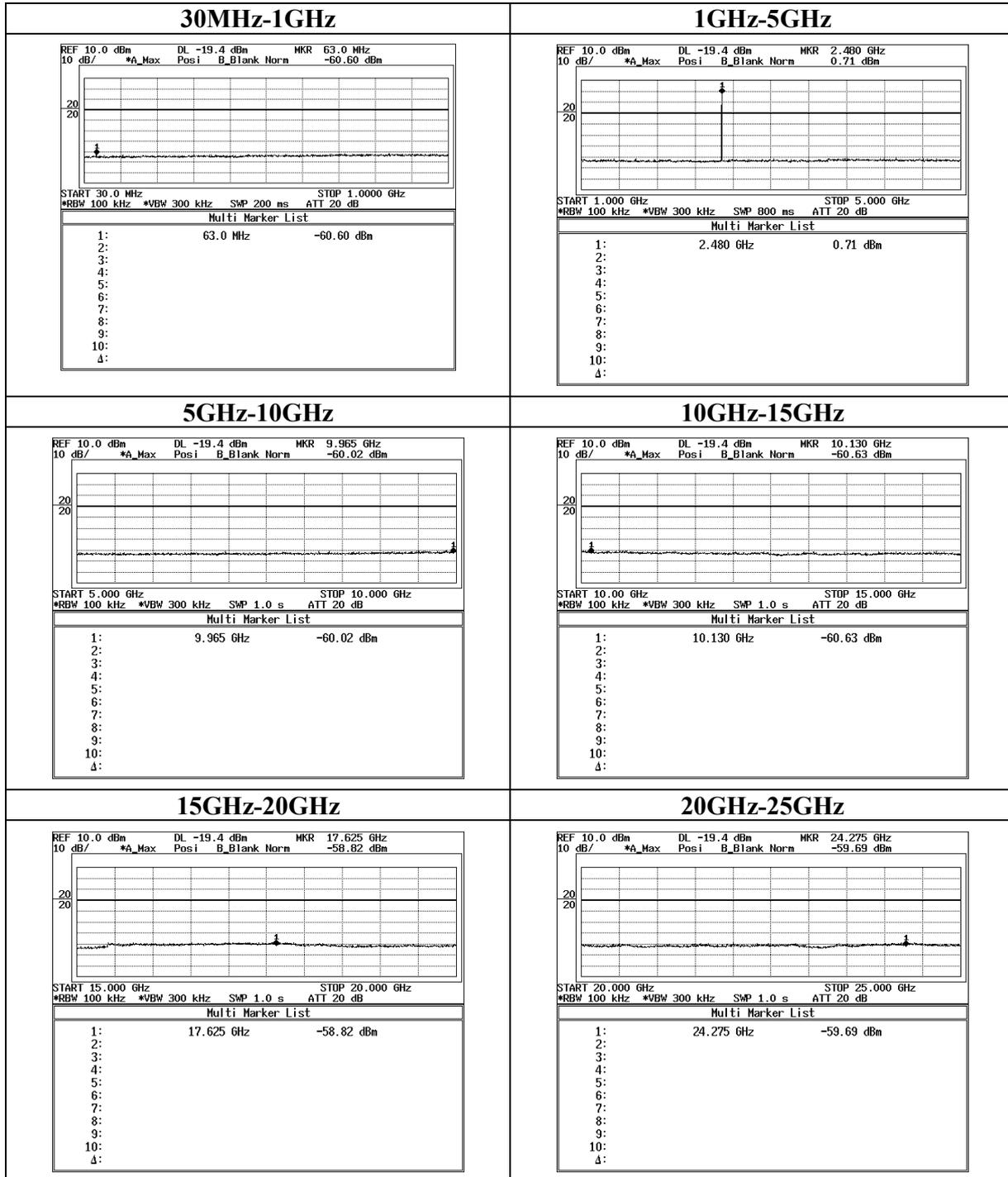
**Conducted Spurious Emission (Mode 1)**  
**Ch:Low**



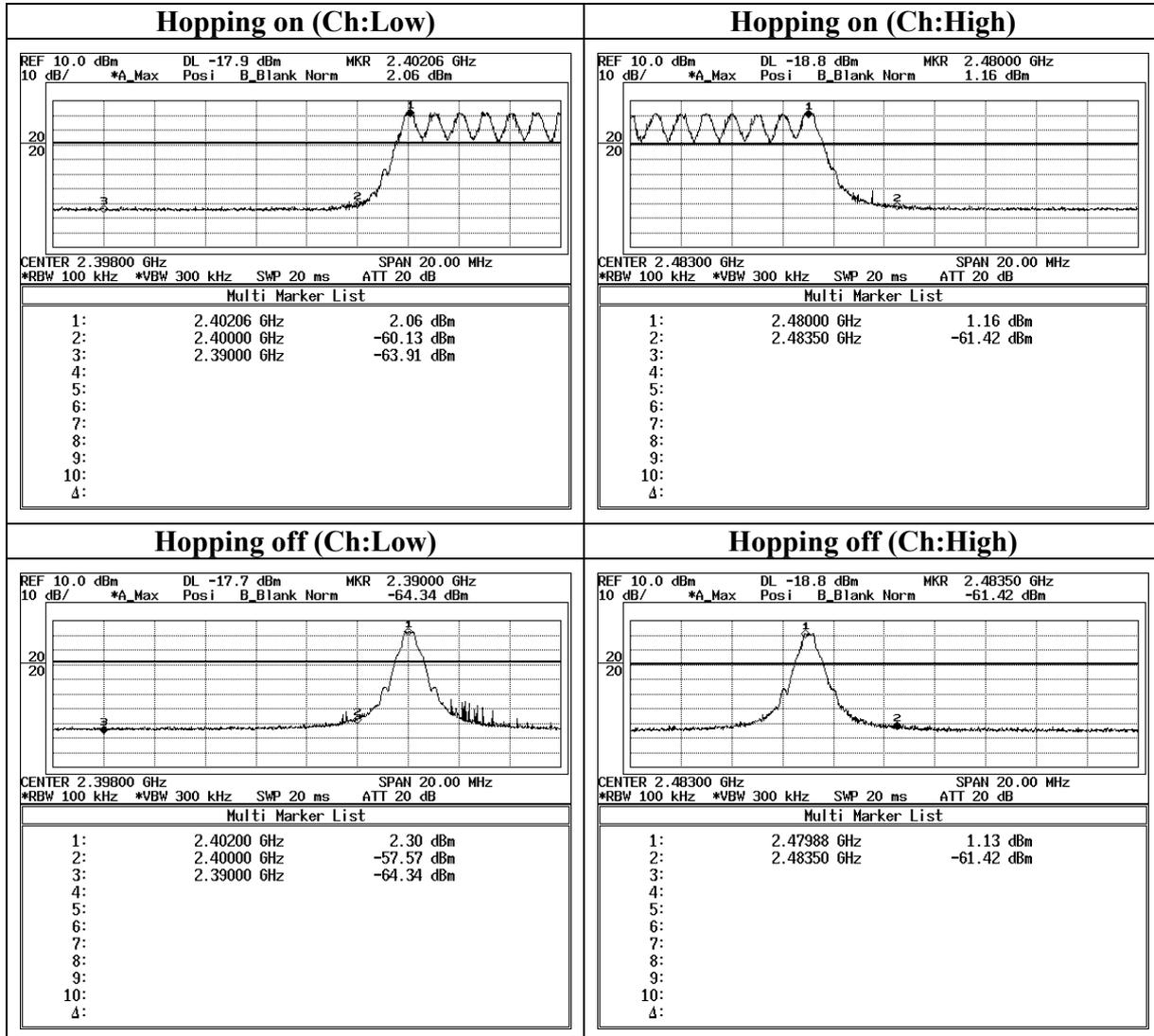
**Conducted Spurious Emission (Mode 1)**  
**Ch:Mid**



**Conducted Spurious Emission (Mode 1)**  
**Ch:High**



**Conducted Spurious Emission (Mode 1)**  
**Band Edge compliance**



**[Mode2]**

**Conducted Emission (Mode 2)**

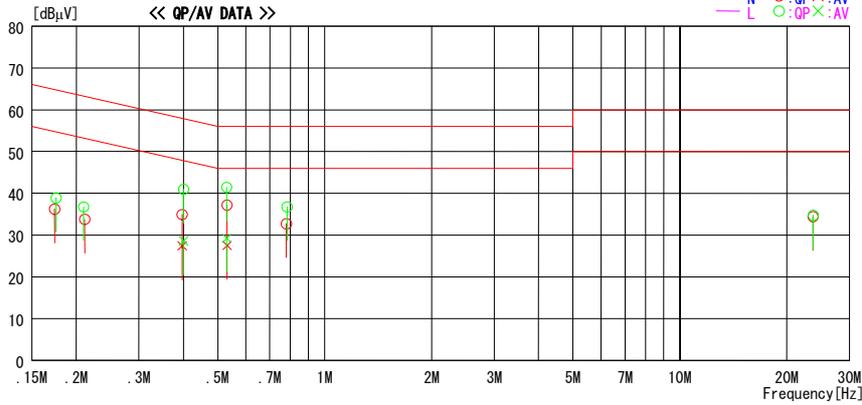
**DATA OF CONDUCTED EMISSION TEST**

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
Date : 2006/03/11 16:42:53

Applicant : Panasonic Communications Co., Ltd. Report No. : 26GE0067-HO  
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit) Power : AC120V / 60Hz  
Model No. : KX-TH112 Temp./Humi. : 25deg. C / 31%  
Serial No. : 0080 f080 5850 Operator : Takumi Shimada

Mode / Remarks : Mode2 Tx2480MHz / Main Antenna

LIMIT : FCC15C § 15.207 (QP)  
FCC15C § 15.207 (AV)



Frequency [MHz]	Reading Level		Corr. Factor	Results		Limit		Margin		Phase
	QP [dBμV]	AV [dBμV]		QP [dBμV]	AV [dBμV]	QP [dBμV]	AV [dBμV]	QP [dB]	AV [dB]	
0.17385	36.1	---	0.1	36.2	---	64.8	---	28.6	---	N
0.21132	33.7	---	0.1	33.8	---	63.2	---	29.4	---	N
0.39700	34.7	27.2	0.2	34.9	27.4	57.9	47.9	23.0	20.5	N
0.53156	36.9	27.3	0.3	37.2	27.6	56.0	46.0	18.8	18.4	N
0.78026	32.5	---	0.3	32.8	---	56.0	---	23.3	---	N
23.70757	32.0	---	2.4	34.4	---	60.0	---	25.6	---	N
0.17555	38.8	---	0.1	38.9	---	64.7	---	25.8	---	L
0.20962	36.7	---	0.1	36.8	---	63.2	---	26.4	---	L
0.40040	40.8	28.4	0.2	41.0	28.6	57.8	47.8	16.8	19.2	L
0.52986	41.2	29.0	0.3	41.5	29.3	56.0	46.0	14.5	16.8	L
0.78366	36.5	---	0.3	36.8	---	56.0	---	19.2	---	L
23.74765	32.4	---	2.4	34.8	---	60.0	---	25.2	---	L

CHART: WITH FACTOR, Peak hold data. Data is uncorrected. CALCURATION: RESULT=READING+C.F (LISN LOSS+CABLE LOSS)  
Except for the above table : adequate margin data below the limits.

## Conducted Emission (Mode 2)

### DATA OF CONDUCTED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2006/03/11 16:28:30

Applicant : Panasonic Communications Co., Ltd.	Report No. : 26GE0067-HO
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit)	Power : AC120V / 60Hz
Model No. : KX-TH112	Temp./Humi. : 25deg. C / 31%
Serial No. : 0080 f080 5850	Operator : Takumi Shimada

Mode / Remarks : Mode2 Tx2402MHz / Main Antenna

LIMIT : FCC15C § 15.207 (QP)  
 FCC15C § 15.207 (AV)

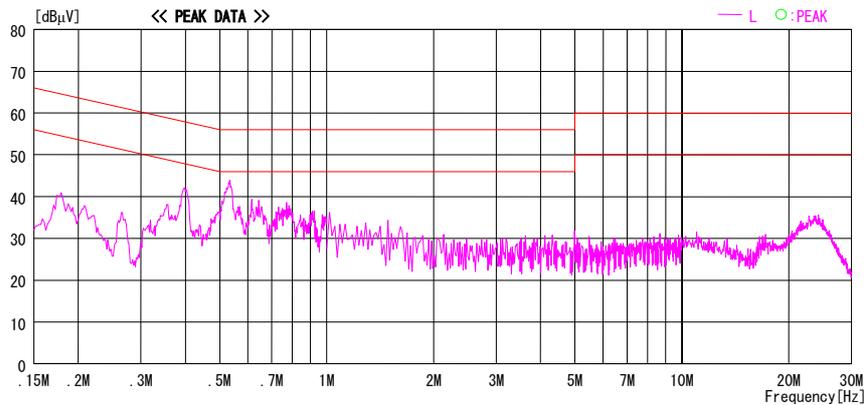
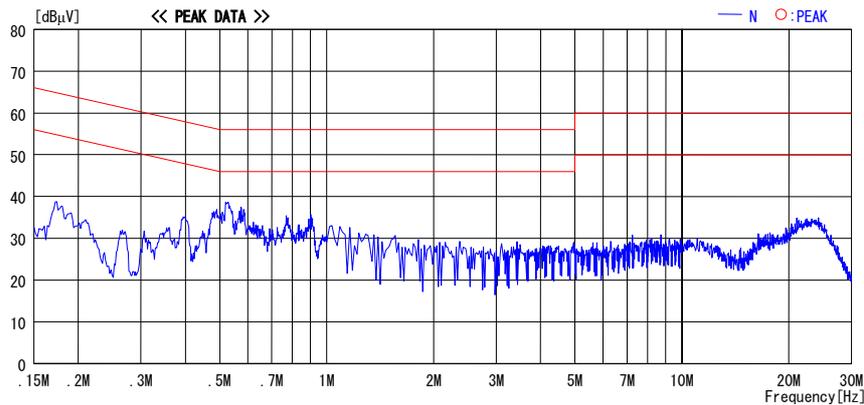


CHART: WITH FACTOR, Peak hold data. Data is uncorrected. CALCURATION: RESULT=READING+C.F (LISN LOSS+CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.

## Conducted Emission (Mode 2)

### DATA OF CONDUCTED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2006/03/11 16:34:43

Applicant : Panasonic Communications Co., Ltd. Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit) Model No. : KY-TH112 Serial No. : 0080 f080 5850	Report No. : 26GE0067-HO Power : AC120V / 60Hz Temp./Humi. : 25deg. C / 31% Operator : Takumi Shimada
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Mode / Remarks : Mode2 Tx2440MHz / Main Antenna

LIMIT : FCC15C § 15.207 (QP)  
 FCC15C § 15.207 (AV)

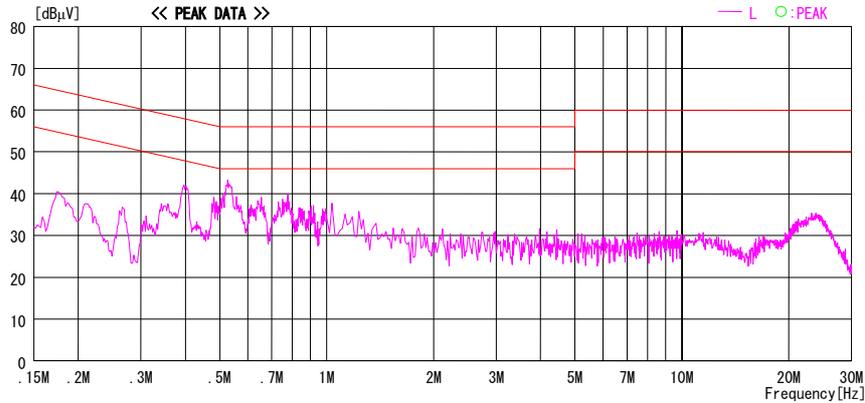
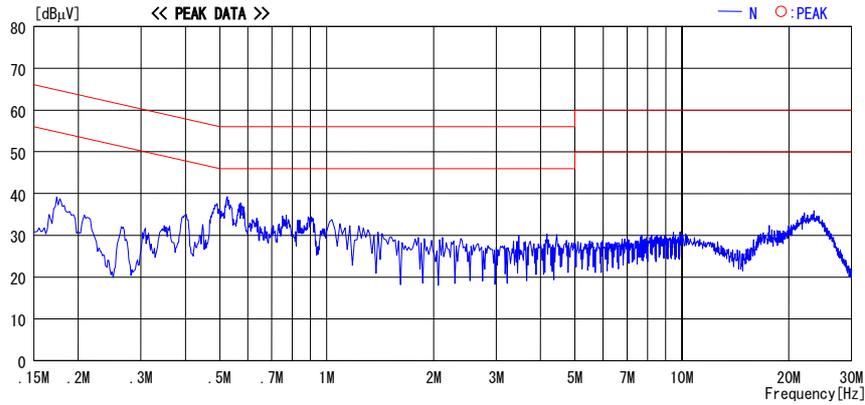


CHART:WITH FACTOR,Peak hold data.Data is uncorrected. CALCURATION:RESULT=READING+C.F(LISN LOSS+CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.

## Conducted Emission (Mode 2)

### DATA OF CONDUCTED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No.1 Semi Anechoic Chamber  
 Date : 2006/03/11 16:42:53

Applicant : Panasonic Communications Co., Ltd.	Report No. : 26GE0067-HO
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit)	Power : AC120V / 60Hz
Model No. : KX-TH112	Temp./Humi. : 25deg. C / 31%
Serial No. : 0080 f080 5850	Operator : Takumi Shimada

Mode / Remarks : Mode2 Tx2480MHz / Main Antenna

LIMIT : FCC15C § 15.207 (QP)  
 FCC15C § 15.207 (AV)

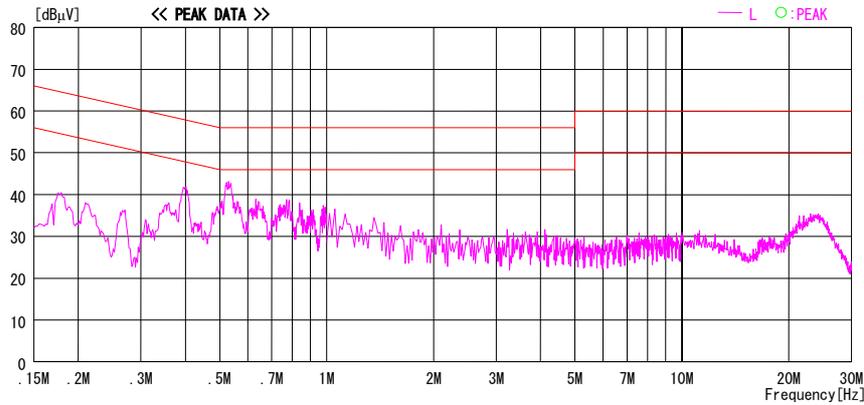
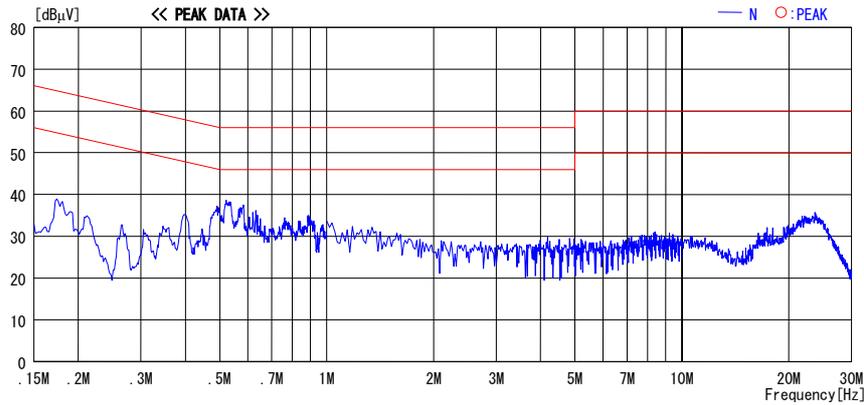


CHART: WITH FACTOR, Peak hold data. Data is uncorrected. CALCULATION: RESULT=READING+C.F (LISN LOSS+CABLE LOSS)  
 Except for the above table : adequate margin data below the limits.

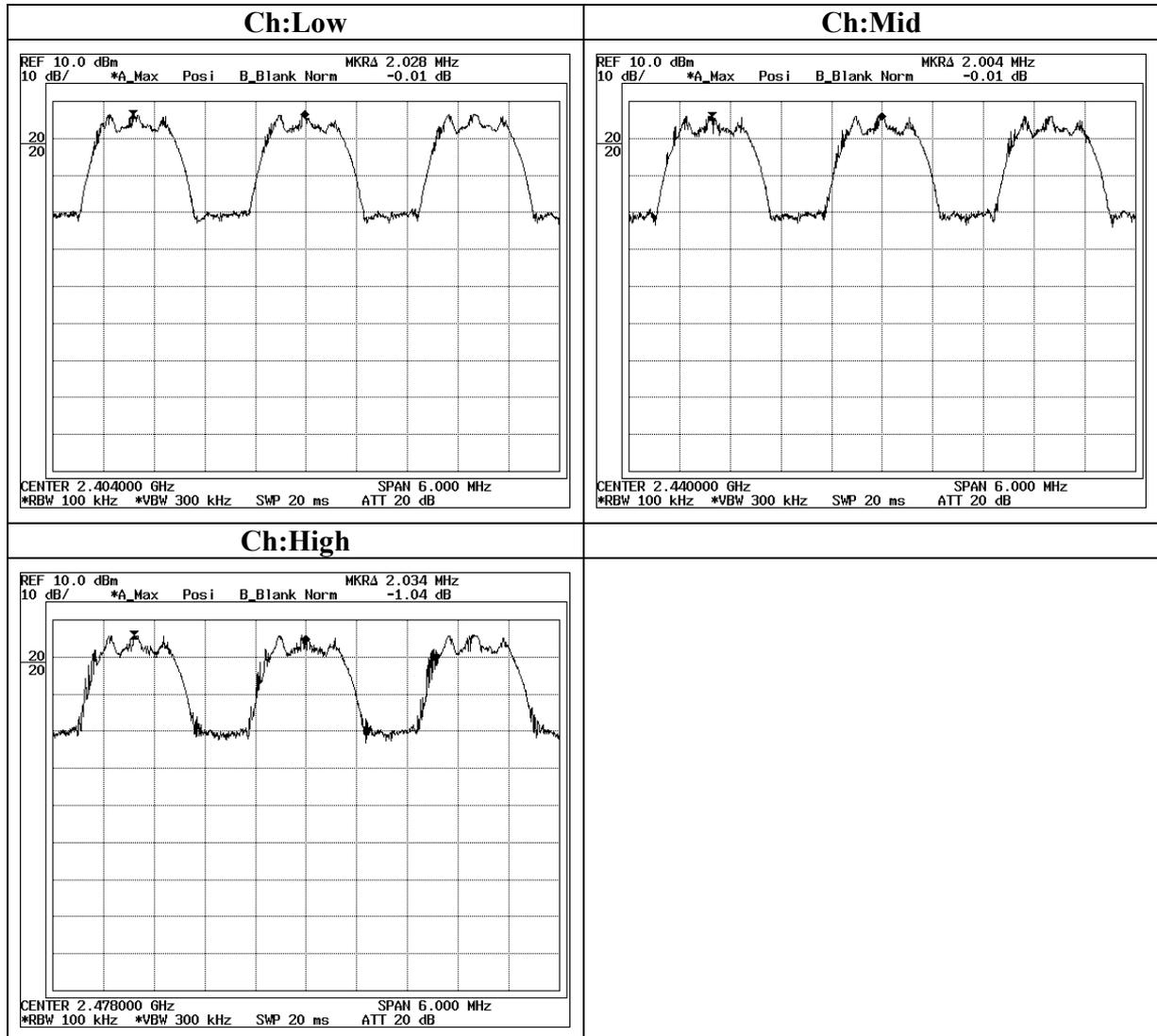
## Carrier Frequency Separation (Mode 2)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.3 Shielded Room

COMPANY	: Panasonic Communications Co., Ltd.	REGULATION	: FCC Part15 Subpart C 15.247(a)(1)
EQUIPMENT	: 2.4GHz FHSS Cordless Telephone (Base Unit)	TEST DISTANCE	: -
MODEL	: KX-TH112	DATE	: 03/07/2006
S/ N	: 0080 f080 582e	TEMPERATURE	: 23deg.C
POWER	: AC120V / 60Hz	HUMIDITY	: 33%
MODE	: Tx(Hopping on)	ENGINEER	: Takumi Shimada

Ch	Freq. [MHz]	Channel separation [MHz]	Limit
Low	2402.0	2.028	>20dB Bandwidth and 25[kHz]
Mid	2440.0	2.004	>20dB Bandwidth and 25[kHz]
High	2480.0	2.034	>20dB Bandwidth and 25[kHz]

**Carrier Frequency Separation (Mode 2)**



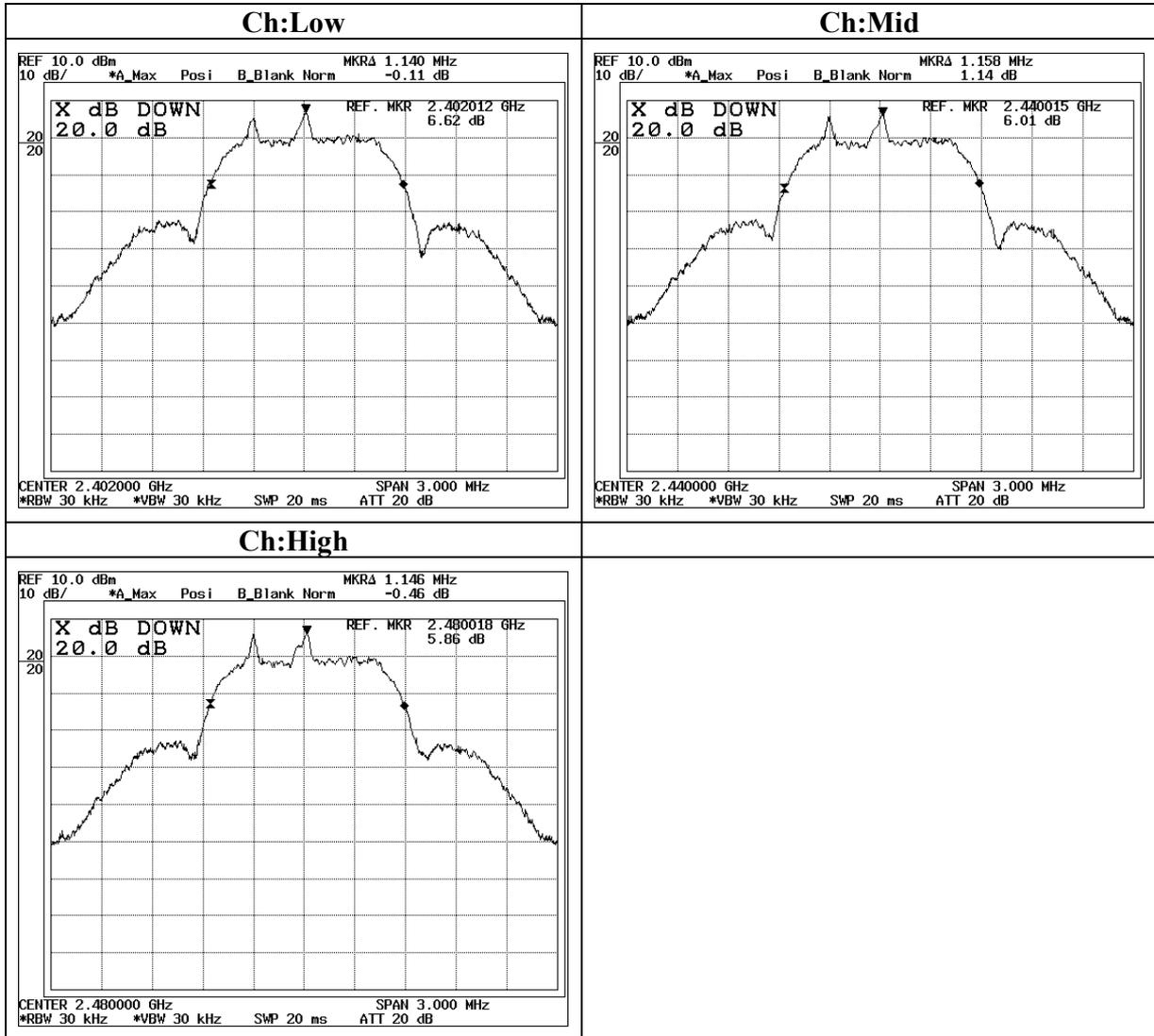
### 20dB Bandwidth (Mode 2)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.3 Shielded Room

COMPANY : Panasonic Communications Co., Ltd.      REGULATION : FCC Part15 Subpart C 15.247(a)(1)  
EQUIPMENT : 2.4GHz FHSS Cordless Telephone (Base Unit)      TEST DISTANCE : -  
MODEL : KX-TH112      DATE : 03/07/2006  
S/N : 0080 f080 582e      TEMPERATURE : 23deg.C  
POWER : AC120V / 60Hz      HUMIDITY : 33%  
MODE : Tx (Hopping off)      ENGINEER : Takumi Shimada

Ch	Freq. [MHz]	20dB Bandwidth [MHz]	Limit [MHz]
Low	2402.0	1.140	-
Mid	2440.0	1.158	-
High	2480.0	1.146	-

**20dB Bandwidth (Mode 2)**



### Number of Hopping Frequency (Mode 2)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.3 Shielded Room

COMPANY : Panasonic Communications Co.,Ltd. REGULATION : FCC Part15 Subpart C 15.247(a)(1)(iii)  
EQUIPMENT : 2.4GHz FHSS Cordless Telephone (Base Unit) TEST DISTANCE : -  
MODEL : KX-TH112 DATE : 03/06/2006  
S/N : 0080 F080 582e TEMPERATURE : 25deg.C  
POWER : AC120V / 60Hz HUMIDITY : 40%  
MODE : Tx(Hopping on) ENGINEER : Takumi Shimada

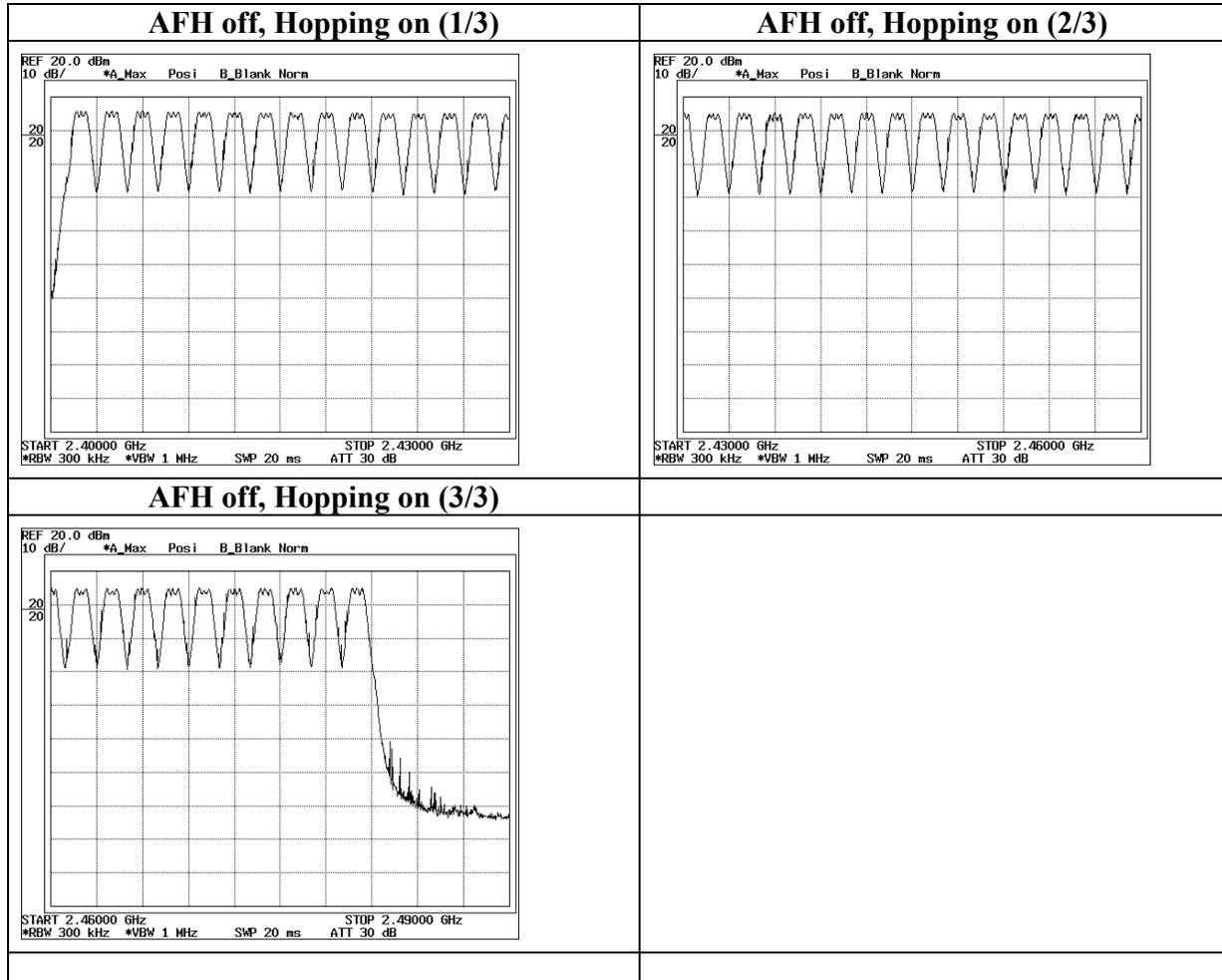
#### Mode 2, AFH off

Mode	Number of channel	Limit
	[time]	[time]
Tx(Hopping on)	40	$\geq 15$

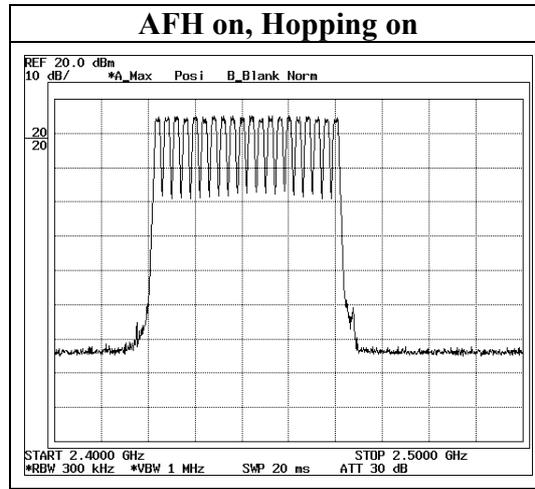
#### Mode 2, AFH on

Mode	Number of channel	Limit
	[time]	[time]
Tx(Hopping on)	20	$\geq 15$

**Number of Hopping Frequency (Mode 2)**



**Number of Hopping Frequency (Mode 2)**



### Dwell time (Mode 2)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.3 Shielded Room

COMPANY : Panasonic Communications Co., Ltd.	REGULATION : FCC Part15 Subpart C 15.247(a)(1)(iii)
EQUIPMENT : 2.4GHz FHSS Cordless Telephone (Base Unit)	TEST DISTANCE : -
MODEL : KX-TH112	DATE : 03/07/2006
S/ N : 0080 f080 582e	TEMPERATURE : 23deg.C
POWER : AC120V / 60Hz	HUMIDITY : 33%
MODE : Tx(Hopping on)	ENGINEER : Takumi Shimada

**Mode 2, AFH off**

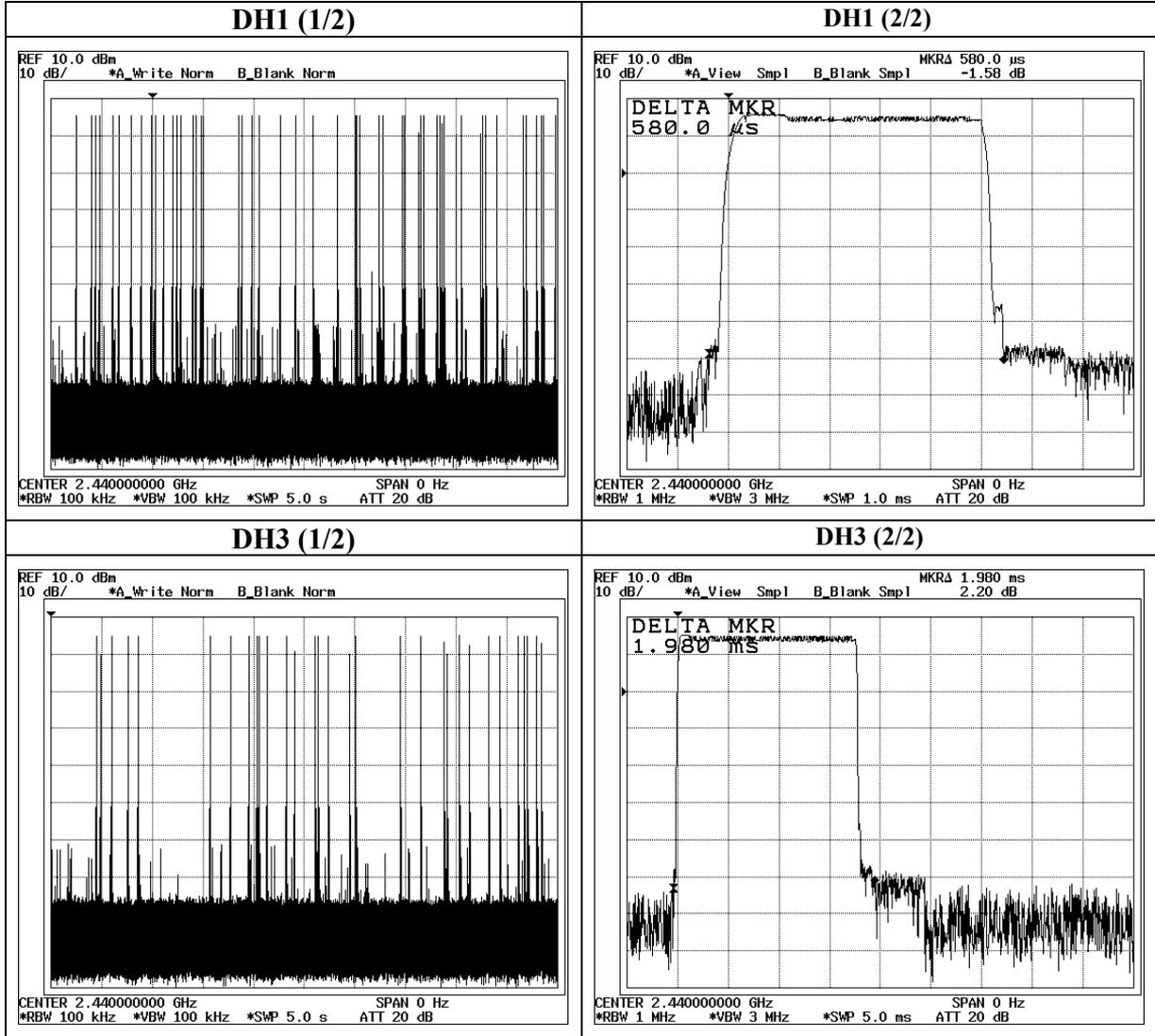
Mode	Number of transmission in a 16(40 Hopping x 0.4) second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	51 times /5sec. x 16 = 163.2 times	0.580	95	400
DH3	31 times /5 sec. x 16 = 99.2 times	1.980	196	400

**Mode 2, AFH on**

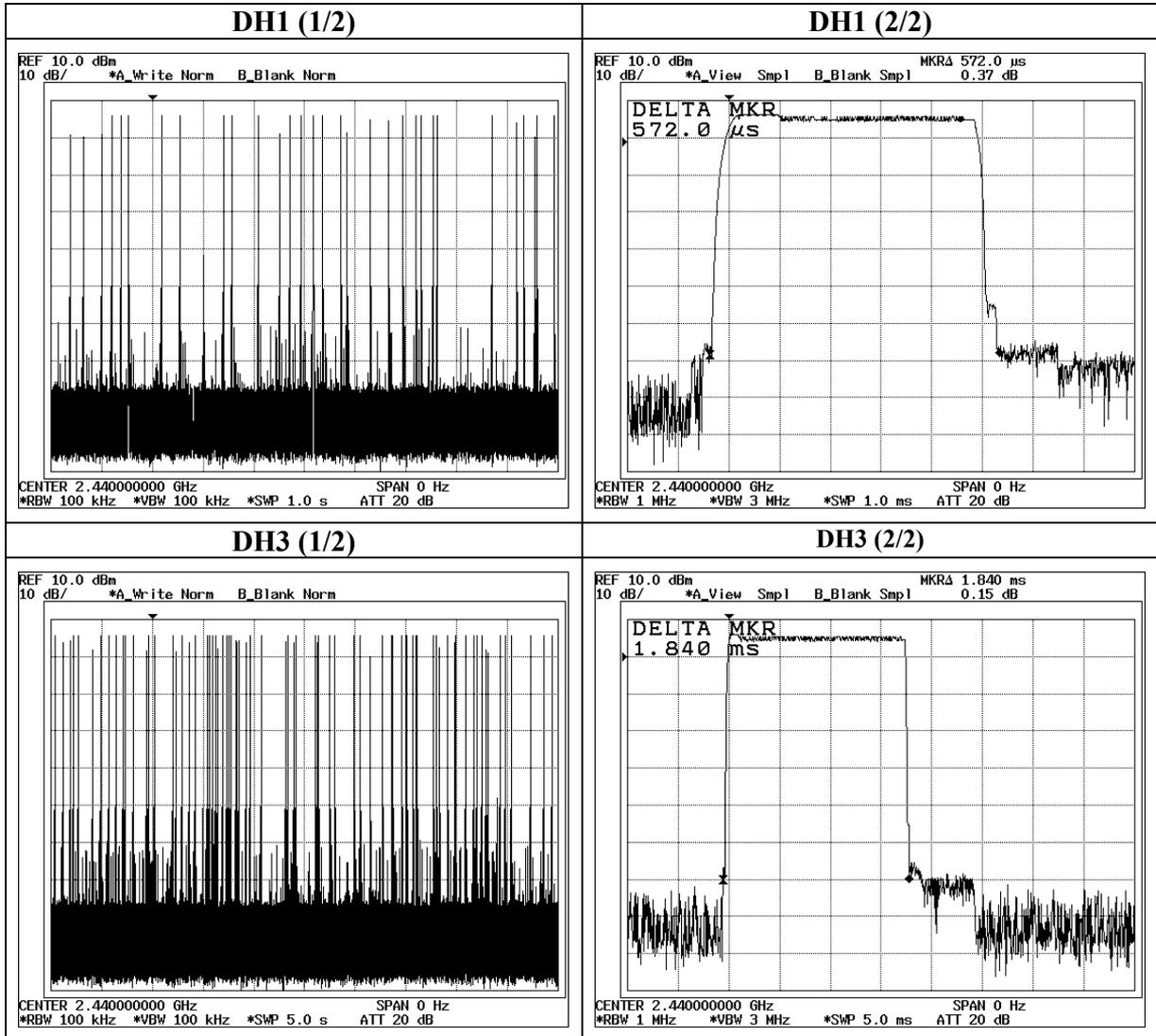
Mode	Number of transmission in a 8(20 Hopping x 0.4) second period	Length of transmission time [msec]	Result [msec]	Limit [msec]
DH1	31 times /1sec. x 8 = 248.0 times	0.572	142	400
DH3	74 times /5 sec. x 8 = 118.4 times	1.840	218	400

\*Dwell Factor calculation for Spurious emissions : = 20 x log ( ( 1.840 [ms] x ( 74 / ( 5[s] /0.100 [s] ) ) ) / 100 [ms] ) = -31.3 dB

**Dwell time (Mode 2)**  
**AFH off**



**Dwell time (Mode 2)**  
**AFH on**



### Maximum Peak Output Power (Mode 2)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.3 Shielded Room

COMPANY : Panasonic Communications Co.,Ltd.      REGULATION : FCC Part15 Subpart C 15.247(b)(1)  
EQUIPMENT : 2.4GHz FHSS Cordless Telephone (Base Unit)      TEST DISTANCE : -  
MODEL : KX-TH112      DATE : 03/06/2006  
S/ N : 0080 F080 582e      TEMPERATURE : 25deg.C  
POWER : AC120V / 60Hz      HUMIDITY : 40%  
MODE : Tx(Hopping off)      ENGINEER : Takumi Shimada

Ch	Freq. [MHz]	P/M Reading [dBm]	Cable Loss [dB]	Atten. [dB]	Result		Limit		Margin [dB]
					[dBm]	[mW]	[dBm]	[mW]	
Low	2402.0	7.90	1.43	10.00	19.33	85.70	20.96	124.74	1.63
Mid	2440.0	7.35	1.50	10.00	18.85	76.74	20.96	124.74	2.11
High	2480.0	7.19	1.59	10.00	18.78	75.51	20.96	124.74	2.18

Sample Calculation:

Result = Reading + Cable Loss (supplied by customer)+ Attenuator

\* In the above table, factor 0.0dB represents no use of Atten. and/or Filter.

**Radiated Spurious Emission (Mode 2)**

\* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

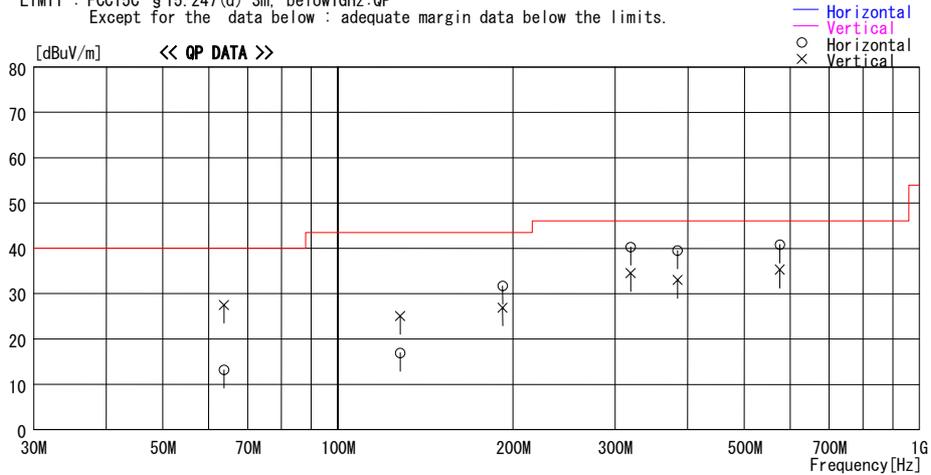
**DATA OF RADIATED EMISSION TEST**

UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
Date : 2006/03/10 16:26:02

Applicant : Panasonic Communications Co., Ltd. Report No. : 26GE0067-HO  
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit) Power : AC120V / 60Hz  
Model No. : KX-TH112 Temp./ Humi. : 25 deg.C. / 38 %  
Serial No. : 0080 f080 5850 Operator : Takumi Shimada

Mode / Remarks : Mode2 Tx2402MHz / Main Antenna / Ant-axis:Hor 180deg , Ver 90deg (Max-axis)

LIMIT : FCC15C § 15.247(d) 3m, below1GHz:QP  
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna	Loss&	Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	Margin
			Factor [dB/m]	Gain [dB]					[dBuV/m]	[dB]
63.750	27.5	QP	7.6	-21.9	13.2	301	100	Hori.	40.0	26.8
63.750	41.8	QP	7.6	-21.9	27.5	0	100	Vert.	40.0	12.5
128.009	24.5	QP	13.3	-20.9	16.9	11	300	Hori.	43.5	26.6
128.009	32.7	QP	13.3	-20.9	25.1	0	100	Vert.	43.5	18.4
192.000	35.6	QP	16.4	-20.3	31.7	60	100	Hori.	43.5	11.8
192.000	30.8	QP	16.4	-20.3	26.9	0	100	Vert.	43.5	16.6
318.900	43.9	QP	14.9	-18.5	40.3	0	100	Hori.	46.0	5.7
318.900	38.1	QP	14.9	-18.5	34.5	269	143	Vert.	46.0	11.5
383.990	41.8	QP	17.3	-19.6	39.5	42	100	Hori.	46.0	6.5
383.990	35.3	QP	17.3	-19.6	33.0	224	115	Vert.	46.0	13.0
575.805	41.2	QP	18.9	-19.3	40.8	161	158	Hori.	46.0	5.2
575.805	35.7	QP	18.9	-19.3	35.3	61	100	Vert.	46.0	10.7

CHART:WITH FACTOR ANT TYPE : -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN  
CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

### Radiated Spurious Emission (Mode 2)

\* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

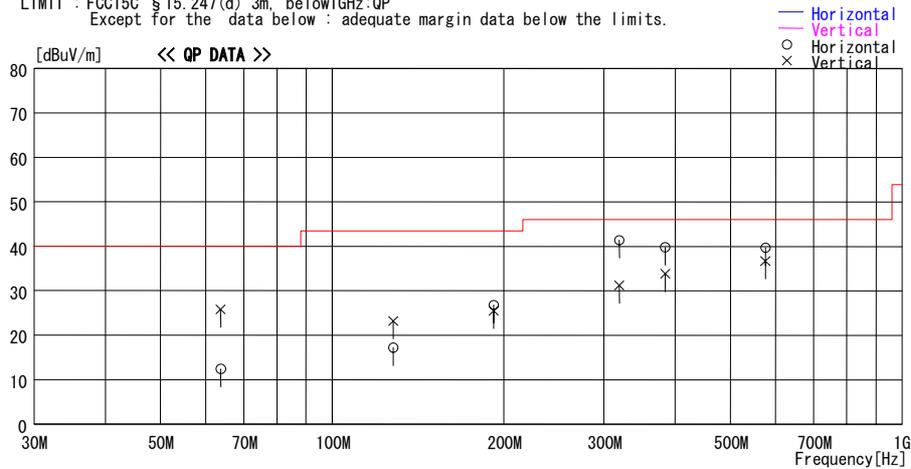
### DATA OF RADIATED EMISSION TEST

UL Apex Co., Ltd. Head Office EMC Lab. No. 2 Semi Anechoic Chamber  
Date : 2006/03/10 17:15:27

Applicant : Panasonic Communications Co., Ltd. Report No. : 26GE0067-HO  
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit) Power : AC120V / 60Hz  
Model No. : KX-TH112 Temp./ Humi. : 25 deg. C. / 38 %  
Serial No. : 0080 f080 5850 Operator : Takumi Shimada

Mode / Remarks : Mode 2 Tx2440MHz / Main Antenna / Ant-axis: Hor: 180deg, Ver: 90deg (Max-axis)

LIMIT : FCC15C §15.247(d) 3m, below1GHz:QP  
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit [dBuV/m]	Margin [dB]
			Factor [dB/m]	Loss& Gain [dB]						
63.750	26.7	QP	7.6	-21.9	12.4	291	100	Hori.	40.0	27.6
63.750	40.1	QP	7.6	-21.9	25.8	0	100	Vert.	40.0	14.2
128.009	24.8	QP	13.3	-20.9	17.2	26	137	Hori.	43.5	26.3
128.009	30.8	QP	13.3	-20.9	23.2	0	100	Vert.	43.5	20.3
192.000	30.7	QP	16.4	-20.3	26.8	249	100	Hori.	43.5	16.7
192.000	29.4	QP	16.4	-20.3	25.5	0	100	Vert.	43.5	18.0
318.900	45.0	QP	14.9	-18.5	41.4	0	100	Hori.	46.0	4.6
318.900	34.8	QP	14.9	-18.5	31.2	230	100	Vert.	46.0	14.8
383.997	42.1	QP	17.3	-19.6	39.8	31	100	Hori.	46.0	6.2
383.997	36.1	QP	17.3	-19.6	33.8	247	134	Vert.	46.0	12.2
575.805	40.1	QP	18.9	-19.3	39.7	166	161	Hori.	46.0	6.3
575.805	37.1	QP	18.9	-19.3	36.7	285	143	Vert.	46.0	9.3

CHART: WITH FACTOR ANT TYPE : -30MHz: LOOP, 30-300MHz: BICONICAL, 300MHz-1000MHz: LOGPERIODIC, 1000MHz-: HORN  
CALCULATION: RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

**Radiated Spurious Emission (Mode 2)**

\* The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

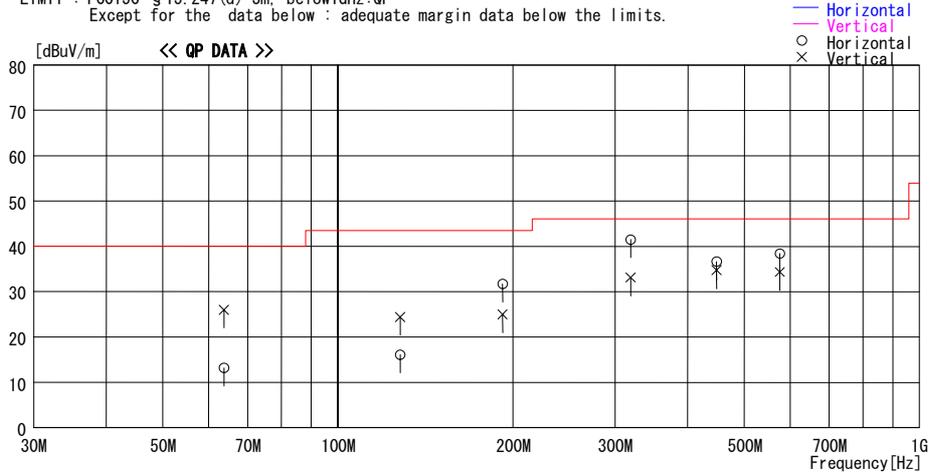
**DATA OF RADIATED EMISSION TEST**

UL Apex Co., Ltd. Head Office EMC Lab. No.2 Semi Anechoic Chamber  
Date : 2006/03/10 18:36:58

Applicant : Panasonic Communications Co., Ltd. Report No. : 26GE0067-HO  
Kind of EUT : 2.4GHz FHSS Cordless Telephone (Base Unit) Power : AC120V / 60Hz  
Model No. : KX-TH112 Temp./ Humi. : 25 deg.C. / 38 %  
Serial No. : 0080 f080 5850 Operator : Takumi Shimada

Mode / Remarks : Mode2 Tx2480MHz / Main Antenna / Ant-axis:Hor 180deg , Ver 90deg (Max-axis)

LIMIT : FCC15C § 15.247(d) 3m, below1GHz:QP  
Except for the data below : adequate margin data below the limits.



Frequency [MHz]	Reading [dBuV]	DET	Antenna		Level [dBuV/m]	Angle [Deg]	Height [cm]	Polar.	Limit	
			Factor [dB/m]	Loss& Gain [dB]					[dBuV/m]	[dB]
63.750	27.5	QP	7.6	-21.9	13.2	51	175	Hori.	40.0	26.8
63.750	40.3	QP	7.6	-21.9	26.0	0	100	Vert.	40.0	14.0
128.009	23.7	QP	13.3	-20.9	16.1	20	191	Hori.	43.5	27.4
128.009	32.0	QP	13.3	-20.9	24.4	352	100	Vert.	43.5	19.1
192.000	35.6	QP	16.4	-20.3	31.7	65	179	Hori.	43.5	11.8
192.000	28.9	QP	16.4	-20.3	25.0	65	179	Vert.	43.5	18.5
318.900	45.1	QP	14.9	-18.5	41.5	359	100	Hori.	46.0	4.5
318.900	36.7	QP	14.9	-18.5	33.1	232	154	Vert.	46.0	12.9
448.005	38.5	QP	17.8	-19.7	36.6	0	100	Hori.	46.0	9.4
448.005	36.6	QP	17.8	-19.7	34.7	97	100	Vert.	46.0	11.3
576.005	38.8	QP	18.9	-19.3	38.4	159	150	Hori.	46.0	7.6
576.005	34.7	QP	18.9	-19.3	34.3	221	115	Vert.	46.0	11.7

CHART:WITH FACTOR ANT TYPE : -30MHz:LOOP, 30-300MHz:BICONICAL, 300MHz-1000MHz:LOGPERIODIC, 1000MHz-:HORN  
CALCULATION:RESULT = READING + ANT FACTOR + LOSS (CABLE+ATTEN.) - GAIN (AMP)

### Radiated Spurious Emission (Mode 2)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.2 Semi Anechoic Chamber

Company : Panasonic Communications Co.,Ltd.  
Equipment : 2.4GHz FHSS Cordless Telephone(Base Unit)  
Model : KX-TH112  
Sample No. : 0080 #080 5850  
Power : AC 120 V / 60 Hz  
Mode : Mode2, Tx 2402MHz  
Remarks : EUT-axis: Normal-axis, Ant-axis:Hor 180deg / Ver 90deg  
**PK DETECT** (RBW: 1MHz, VBW: 1MHz)

REPORT NO : 26GE0067-HO  
REGULATION : Fcc Part15 Subpart C 15.247(d)  
TEST DISTANCE : 3m / 1m  
DATE : 03/12/2006  
TEMPERATURE : 22deg.C  
HUMIDITY : 44%  
ENGINEER : Kenichi Adachi

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell Factor [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
1	1487.2	70.9	61.3	24.0	33.0	2.8	0.0	0.0	64.7	55.0	74.0	9.3	19.0
2	2390.0	52.4	49.6	30.6	32.4	3.3	0.0	0.0	53.9	51.1	74.0	20.1	22.9
3*	2400.0	96.9	92.1	30.6	32.4	3.3	0.0	0.0	98.4	93.6	74.0	-	-
4	4803.5	44.2	44.3	35.7	31.9	4.6	1.4	0.0	54.0	54.1	74.0	20.0	19.9
5	7205.0	49.3	49.7	37.5	31.5	5.6	1.2	0.0	62.2	62.6	74.0	11.8	11.4
6	8238.3	46.6	50.6	37.2	31.5	6.0	1.2	0.0	59.5	63.5	74.0	14.5	10.5
7	9609.4	43.3	42.6	36.6	31.7	6.5	1.0	0.0	55.7	55.0	74.0	18.3	19.0
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>													
8	12009.8	44.1	45.6	40.3	31.3	7.8	1.8	0.0	53.2	54.7	74.0	20.8	19.3
9	14411.6	41.9	41.8	43.2	31.0	8.7	0.9	0.0	54.2	54.1	74.0	19.8	19.9
10	16814.0	-	-	46.4	30.8	9.6	1.3	0.0	-	-	74.0	-	-
11	19216.0	-	-	39.0	30.0	10.5	0.0	0.0	-	-	74.0	-	-
12	21618.0	-	-	39.3	30.3	11.0	0.0	0.0	-	-	74.0	-	-
13	24020.0	43.7	43.9	39.1	30.4	11.2	0.0	0.0	54.1	54.3	74.0	19.9	19.7

**AV DETECT** (RBW: 1MHz, VBW: 10Hz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell *** Factor [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
1	1487.2	53.9	47.0	24.0	33.0	2.8	0.0	-31.3	16.3	9.4	54.0	37.7	44.6
2	2390.0	36.1	32.7	30.6	32.4	3.3	0.0	-31.3	6.3	2.9	54.0	47.7	51.1
3*	2400.0	73.9	70.4	30.6	32.4	3.3	0.0	-31.3	44.0	40.6	54.0	-	-
4	4803.5	33.0	33.3	35.7	31.9	4.6	1.4	-31.3	11.5	11.9	54.0	42.5	42.1
5	7205.0	36.6	36.4	37.5	31.5	5.6	1.2	-31.3	18.2	18.0	54.0	35.8	36.0
6	8238.3	37.5	42.9	37.2	31.5	6.0	1.2	-31.3	19.1	24.5	54.0	34.9	29.5
7	9609.4	30.3	30.3	36.6	31.7	6.5	1.0	-31.3	11.4	11.4	54.0	42.6	42.6
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>													
8	12009.8	30.3	31.8	40.3	31.3	7.8	1.8	-31.3	8.1	9.6	54.0	45.9	44.4
9	14411.6	28.5	29.2	43.2	31.0	8.7	0.9	-31.3	9.6	10.2	54.0	44.4	43.8
10	16814.0	-	-	46.4	30.8	9.6	1.3	-31.3	-	-	54.0	-	-
11	19216.0	-	-	39.0	30.0	10.5	0.0	-31.3	-	-	54.0	-	-
12	21618.0	-	-	39.3	30.3	11.0	0.0	-31.3	-	-	54.0	-	-
13	24020.0	30.6	30.6	39.1	30.4	11.2	0.0	-31.3	9.7	9.7	54.0	44.3	44.3

\* Reference data

**20dBc(Fundamental 2402MHz)** (RBW: 100kHz, VBW: 300kHz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	ATT LOSS [dB]	Dwell Factor [dB]	RESULT		Limit 20dBc [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
0	2402.0	121.3	115.6	30.6	32.4	3.3	0.0	0.0	122.7	117.0	-	-	-
3	2400.0	66.3	60.9	30.6	32.4	3.3	0.0	0.0	67.8	62.4	Funda-20dB	34.9	34.6

\*Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.54 dB

\*Except for the above table : All other spurious emissions were less than 20dB for the limit.

\*The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

\*Hi-Pass Filter was not used for factor 0.0dB of the above table.

\*\*In the frequency over the sixth harmonic, the noise from the EUT was not seen. The data above is its base noise.

\*\*\*Dwell Factor calculation for Spurious emissions : = 20 x log ( ( 1.840 [ms] x ( 74 / ( 5[s] / 0.100 [s] ) ) ) / 100 [ms] ) = -31.3 dB

**Radiated Spurious Emission (Mode 2)**

UL Apex Co., Ltd.  
Head Office EMC Lab. No.2 Semi Anechoic Chamber

Company : Panasonic Communications Co.,Ltd.  
Equipment : 2.4GHz FHSS Cordless Telephone(Base Unit)  
Model : KX-TH112  
Sample No. : 0080 #080 5850  
Power : AC 120 V / 60 Hz  
Mode : Mode2, Tx 2440MHz  
Remarks : EUT-axis: Normal-axis, Ant-axis:Hor 180deg / Ver 90deg  
**PK DETECT** (RBW: 1MHz, VBW: 1MHz)

REPORT NO : 26GE0067-HO  
REGULATION : Fcc Part15 Subpart C 15.247(d)  
TEST DISTANCE : 3m / 1m  
DATE : 03/12/2006  
TEMPERATURE : 22deg.C  
HUMIDITY : 44%  
ENGINEER : Kenichi Adachi

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell Factor [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
1	1544.8	74.8	71.0	24.7	32.9	2.8	0.0	0.0	69.4	65.6	74.0	4.6	8.4
2	2323.0	46.1	44.5	30.7	32.4	3.3	0.0	0.0	47.7	46.1	74.0	26.3	27.9
3	4880.0	45.2	46.1	36.2	31.8	4.7	1.4	0.0	55.6	56.4	74.0	18.4	17.6
4	7319.0	50.3	49.9	37.9	31.7	5.7	1.1	0.0	63.3	62.9	74.0	10.7	11.1
5	8242.0	46.8	50.0	37.2	31.5	6.0	1.2	0.0	59.7	62.8	74.0	14.3	11.2
6	9760.1	42.0	42.6	36.6	31.8	6.6	1.1	0.0	54.4	55.0	74.0	19.6	19.0
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>													
7	12201.3	43.4	44.7	40.4	31.0	7.9	1.7	0.0	52.9	54.2	74.0	21.2	19.8
8	14640.3	41.6	42.4	43.1	31.1	8.8	1.4	0.0	54.2	55.0	74.0	19.8	19.0
9	17080.0	-	-	46.1	30.7	9.7	1.3	0.0	-	-	74.0	-	-
10	19520.0	-	-	39.1	29.7	10.6	0.0	0.0	-	-	74.0	-	-
11	21960.0	-	-	39.6	30.7	11.0	0.0	0.0	-	-	74.0	-	-
12	24400.0	44.1	44.3	39.1	30.5	11.3	0.0	0.0	54.5	54.7	74.0	19.6	19.4

**AV DETECT** (RBW: 1MHz, VBW: 10Hz)

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell *** Factor [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
1	1544.8	50.5	54.1	24.7	32.9	2.8	0.0	-31.3	13.8	17.4	54.0	40.2	36.6
2	2323.0	36.3	34.4	30.7	32.4	3.3	0.0	-31.3	6.6	4.7	54.0	47.4	49.3
3	4880.0	34.5	33.1	36.2	31.8	4.7	1.4	-31.3	13.5	12.1	54.0	40.5	41.9
4	7319.0	37.0	37.4	37.9	31.7	5.7	1.1	-31.3	18.7	19.1	54.0	35.3	34.9
5	8242.0	38.3	41.6	37.2	31.5	6.0	1.2	-31.3	19.9	23.2	54.0	34.1	30.8
6	9760.1	29.1	29.6	36.6	31.8	6.6	1.1	-31.3	10.2	10.7	54.0	43.8	43.3
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>													
7	12201.3	30.1	31.8	40.4	31.0	7.9	1.7	-31.3	8.3	10.0	54.0	45.7	44.0
8	14640.3	28.9	29.3	43.1	31.1	8.8	1.4	-31.3	10.2	10.6	54.0	43.8	43.4
9	17080.0	-	-	46.1	30.7	9.7	1.3	-31.3	-	-	54.0	-	-
10	19520.0	-	-	39.1	29.7	10.6	0.0	-31.3	-	-	54.0	-	-
11	21960.0	-	-	39.6	30.7	11.0	0.0	-31.3	-	-	54.0	-	-
12	24400.0	31.8	31.9	39.1	30.5	11.3	0.0	-31.3	10.9	11.0	54.0	43.2	43.1

\*Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.54 dB  
\*Except for the above table : All other spurious emissions were less than 20dB for the limit.  
\*The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.  
\*Hi-Pass Fiter was not used for factor 0.0dB of the above table.  
\*\*In the frequency over the sixth harmonic, the noise from the EUT was not seen. The data above is its base noise.  
\*\*\*Dwell Factor calculation for Spurious emissions : = 20 x log ( ( 1.840 [ms] x ( 74 / ( 5[s] / 0.100 [s] ) ) ) / 100 [ms] ) = -31.3 dB

### Radiated Spurious Emission (Mode 2)

Company : Panasonic Communications Co.,Ltd.  
Equipment : 2.4GHz FHSS Cordless Telephone(Base Unit)  
Model : KX-TH112  
Sample No. : 0080 f080 5850  
Power : AC 120 V / 60 Hz  
Mode : Mode2, Tx 2480MHz  
Remarks : EUT-axis: Normal-axis, Ant-axis:Hor 180deg / Ver 90deg  
**PK DETECT** (RBW: 1MHz, VBW: 1MHz)

UL Apex Co., Ltd.  
Head Office EMC Lab. No.2 Semi Anechoic Chamber  
REPORT NO : 26GE0067-HO  
REGULATION : Fcc Part15 Subpart C 15.247(d)  
TEST DISTANCE : 3m / 1m  
DATE : 03/12/2006  
TEMPERATURE : 22deg C  
HUMIDITY : 44%  
ENGINEER : Kenichi Adachi

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell Factor [dB]	RESULT		Limit PK [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
1	1604.3	75.1	71.3	25.6	32.9	2.8	0.0	0.0	70.7	66.9	74.0	3.3	7.1
2*	2483.5	79.2	77.6	30.4	32.4	3.5	0.0	0.0	80.7	79.0	74.0	-	-
3	4960.1	46.1	45.7	36.6	31.8	4.7	1.4	0.0	56.9	56.5	74.0	17.1	17.5
4	7440.1	50.6	49.6	38.2	31.9	5.7	1.1	0.0	63.7	62.7	74.0	10.3	11.3
5	8244.8	45.8	46.8	37.2	31.5	6.0	1.2	0.0	58.7	59.7	74.0	15.3	14.3
6	9921.8	43.1	42.3	36.5	32.0	6.7	1.2	0.0	55.5	54.7	74.0	18.5	19.3
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>													
7	12398.6	43.3	46.2	40.5	30.7	8.0	1.6	0.0	53.1	56.0	74.0	20.9	18.0
8	14879.9	42.4	41.9	42.8	31.0	8.8	1.0	0.0	54.4	54.0	74.0	19.6	20.0
9	17360.0	-	-	46.2	31.0	9.9	1.7	0.0	-	-	74.0	-	-
10	19840.0	-	-	39.1	30.3	10.7	0.0	0.0	-	-	74.0	-	-
11	22320.0	-	-	39.5	30.7	11.1	0.0	0.0	-	-	74.0	-	-
12	24800.0	43.9	44.4	39.3	30.6	11.5	0.0	0.0	54.5	55.0	74.0	19.5	19.0

No.	FREQ [MHz]	S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell *** Factor [dB]	RESULT		Limit AV [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
1	1604.3	57.6	54.7	25.6	32.9	2.8	0.0	-31.3	21.9	18.9	54.0	32.1	35.1
2*	2483.5	61.8	61.3	30.4	32.4	3.5	0.0	-31.3	31.9	31.5	54.0	-	-
3	4960.1	35.8	34.4	36.6	31.8	4.7	1.4	-31.3	15.3	13.9	54.0	38.7	40.1
4	7440.1	37.7	36.9	38.2	31.9	5.7	1.1	-31.3	19.5	18.7	54.0	34.5	35.3
5	8244.8	37.1	37.7	37.2	31.5	6.0	1.2	-31.3	18.7	19.3	54.0	35.3	34.7
6	9921.8	30.8	30.1	36.5	32.0	6.7	1.2	-31.3	11.9	11.2	54.0	42.1	42.8
<b>Test distance 1meters RESULT=Reading + ANT Factor - Amp Gain + Cable Loss + Filter Loss - Dfac</b>													
7	12398.6	30.5	32.8	40.5	30.7	8.0	1.6	-31.3	9.0	11.3	54.0	45.0	42.7
8	14879.9	28.9	29.1	42.8	31.0	8.8	1.0	-31.3	9.7	9.9	54.0	44.3	44.1
9	17360.0	-	-	46.2	31.0	9.9	1.7	-31.3	-	-	54.0	-	-
10	19840.0	-	-	39.1	30.3	10.7	0.0	-31.3	-	-	54.0	-	-
11	22320.0	-	-	39.5	30.7	11.1	0.0	-31.3	-	-	54.0	-	-
12	24800.0	31.8	32.1	39.3	30.6	11.5	0.0	-31.3	11.1	11.5	54.0	42.9	42.5

\* Reference data

**Marker-Delta Method** (Delta chart: RBW:100kHz (>= SPAN / 100 ), VBW: 300kHz, SPAN: 5MHz)

No.	FREQ [MHz]	Carrier Level - delta S/A READING		ANT Factor [dB/m]	AMP GAIN [dB]	CABLE LOSS [dB]	Hi-Pass Filter or ATT [dB]	Dwell Factor [dB]	RESULT		Limit [dBuV/m]	MARGIN	
		HOR	VER						HOR	VER		HOR	VER
<b>Test distance 3meters RESULT=Carrier Reading - Delta (Carrier - Bandedge) + ANT Factor - Amp Gain + Cable Loss + Filter Loss</b>													
<b>PK DETECT</b>													
2	2483.5	55.7	55.4	30.4	32.4	3.5	0.0	0.0	57.2	56.8	74.0	16.8	17.2
<b>AV DETECT</b>													
2	2483.5	37.1	36.8	30.4	32.4	3.5	0.0	0.0	38.6	38.2	54.0	15.5	15.8

\*Marker-Delta Method S/A Reading Calculation:

HOR, PK (Carrier reading: 120.52dBuV(RBW 1MHz) ) - (Carrier Reading 120.51dBuV(RBW 100kHz) - Bandedge Reading 55.70dBuV(RBW 100kHz) )  
VER, PK (Carrier reading: 118.77dBuV(RBW 1MHz) ) - (Carrier Reading 118.82dBuV (RBW 100kHz) - Bandedge Reading 55.42dBuV (RBW 100kHz) )  
HOR, AV (Carrier reading: 101.91dBuV (RBW 1MHz) ) - (Carrier Reading 120.51dBuV(RBW 100kHz) - Bandedge Reading 55.70dBuV(RBW 100kHz) )  
VER, AV (Carrier reading: 100.15dBuV (RBW 1MHz) ) - (Carrier Reading 118.82dBuV (RBW 100kHz) - Bandedge Reading 55.42dBuV (RBW 100kHz) )

\*Test Distance 1.0m : Distance Factor(Dfac) = 20log(3/1.0) = 9.54 dB

\*Except for the above table : All other spurious emissions were less than 20dB for the limit.

\*The result is rounded off to the second decimal place. Therefore, there may be 0.1 difference for the result.

\*Hi-Pass Fiter was not used for factor 0.0dB of the above table.

\*\*In the frequency over the sixth harmonic, the noise from the EUT was not seen.The data above is its base noise.

\*\*\*Dwell Factor calculation for Spurious emissions : = 20 x log ( ( 1.840 [ms] x ( 74 / ( 5[s] / 0.100 [s] ) ) ) / 100 [ms] ) = -31.3 dB

**UL Apex Co., Ltd.**

**Head Office EMC Lab.**

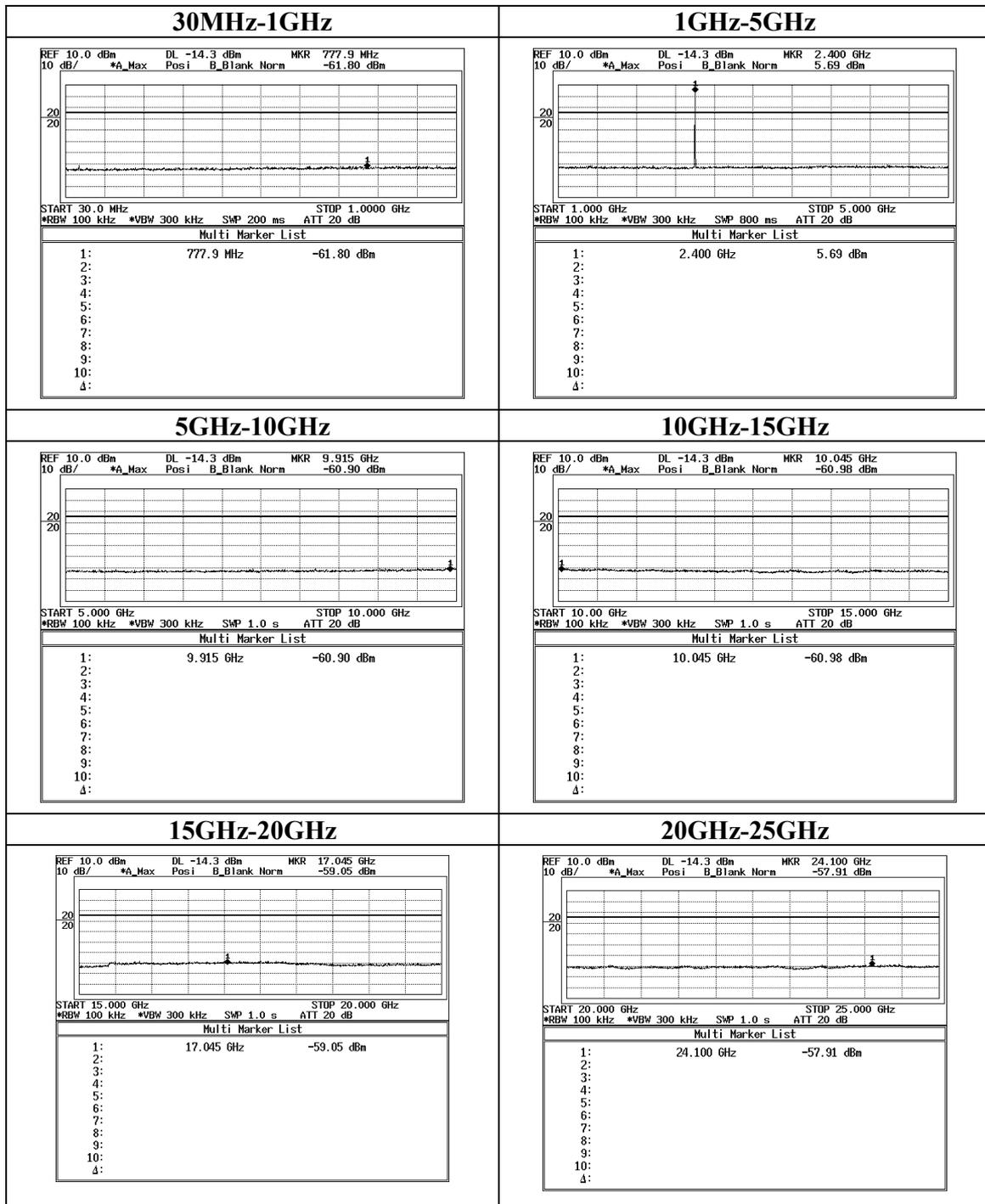
4383-326 Asama-cho, Ise-shi, Mie-ken 516-0021 JAPAN

Telephone : +81 596 24 8116

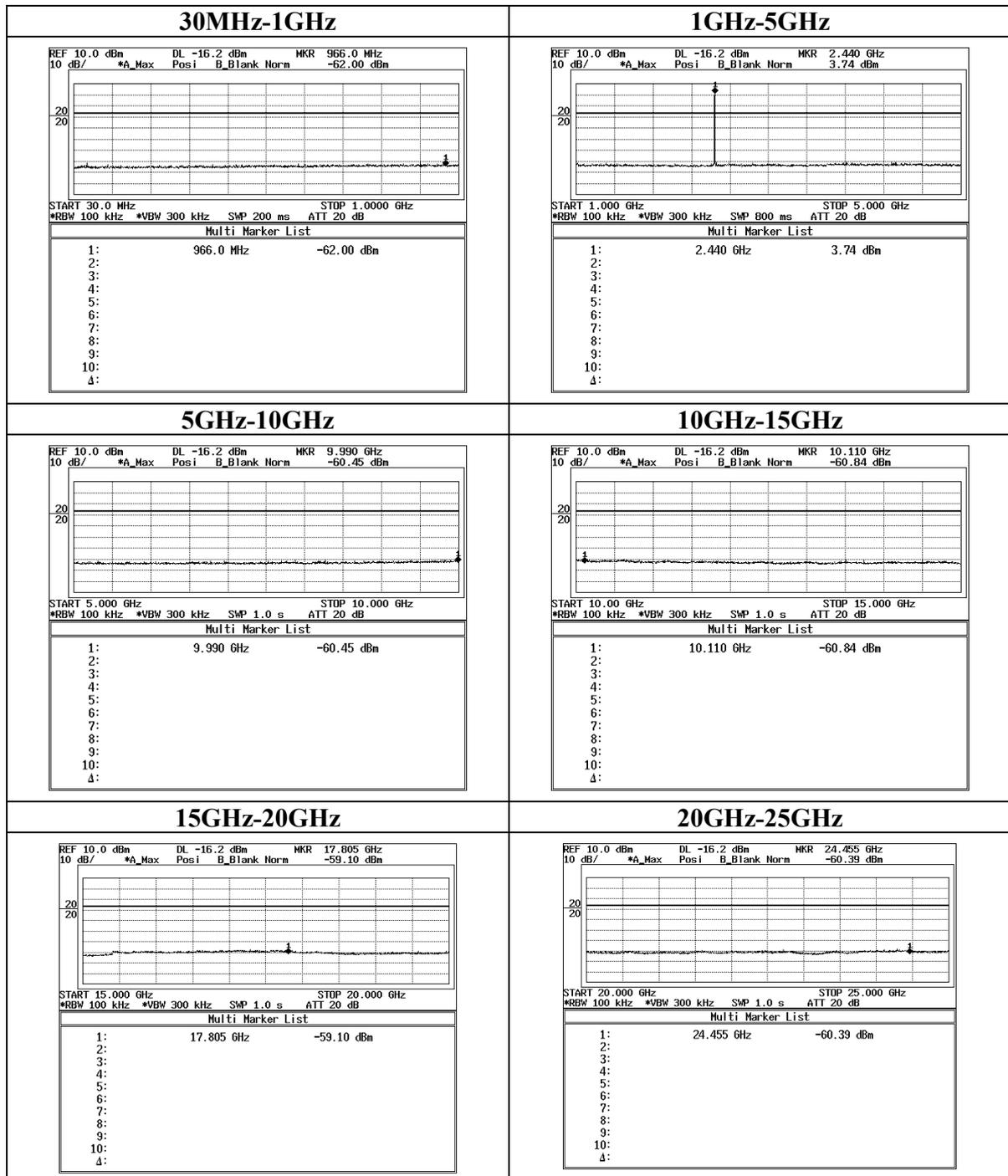
Facsimile : +81 596 24 8124

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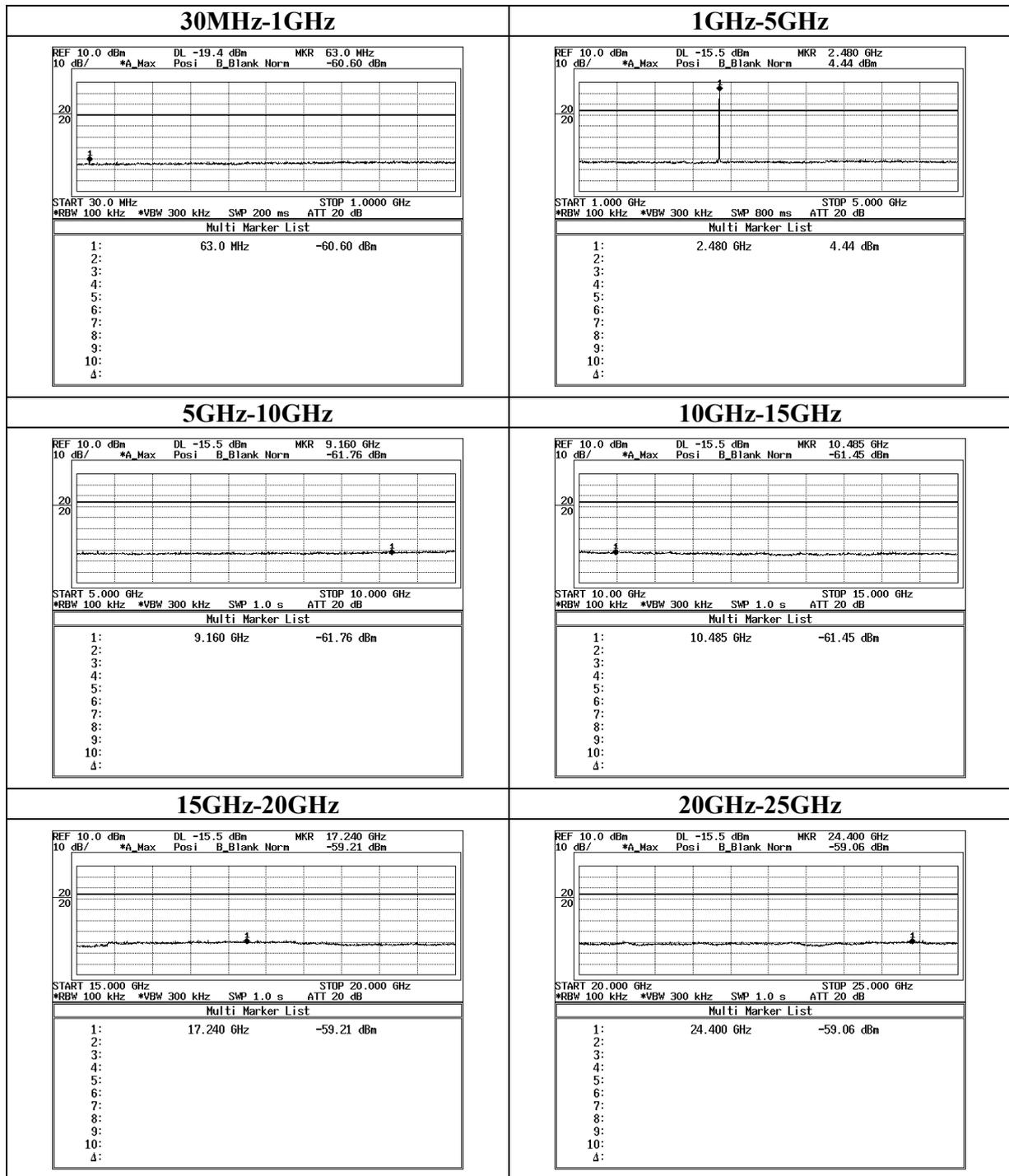
**Conducted Spurious Emission (Mode 2)**  
**Ch:Low**



**Conducted Spurious Emission (Mode 2)**  
**Ch:Mid**



**Conducted Spurious Emission (Mode 2)**  
**Ch:High**



**Conducted Spurious Emission (Mode 2)**  
**Band Edge compliance**

