JAPAN QUALITY ASSURANCE ORGANIZATION
KITA-KANSAI TESTING CENTER
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EMC EMISSION - TEST REPORT

JQA APPLICATION No. : KL80040604

Name of Product : 2.4GHz Frequency Hopping Spread Spectrum Cordeless Telephone
: (Base Unit)

Model/Type No. : KX-TG2970B

FCC ID : ACJ96NKX-TG2770

Applicant : Panasonic Communications Co., Ltd.

Address : 1-62, 4-chome, Minoshima, Hakata-ku, Fukuoka 812-8531, Japan

Manufacturer : Panasonic Communications Co., Ltd.

Address : 1-62, 4-chome, Minoshima, Hakata-ku, Fukuoka 812-8531, Japan

Receive date of EUT : February 18, 2005

Final Judgement : **Passed**

TEST RESULTS IN THIS REPORT are obtained in use of equipment that is traceable to National Institute of Advanced Industrial Science and Technology (AIST) under METI Japan and National Institute of Information and Communications Technology(NICT) under MPHPT Japan.

THE TEST RESULTS only responds to the test sample. This test report shall not be reproduced except in full.

Authorized by:

Takashi Yamanaka, Director
JQA KITA-KANSAI Testing Center

DIRECTORY

TEST REGULATION

FCC Rules and Regulations Part 15 Subpart A and C (Effective October 7, 2004)

○ - Class A Digital Device
○ - Class B Digital Device
● - Intentional Radiator (Sec.15.247)
○ - Receiver

Test items:

○ - Sec.15.203 : Antenna requirement
○ - Sec.15.205 : Restricted bands of operation
● - Sec.15.207 : Conducted limits
○ - Sec.15.209 : Radiated emission limits general requirements
○ - Sec.15.214 : Cordless Telephones
○ - Sec.15.247 : Operation within the bands 902-928MHz, 2400-2483.5MHz, 5725-5875MHz, and 24.0-24.25GHz

※: Only the AC Powerline Conducted Emission Measurement was performed at the request of the applicant.

Test procedure:

The tests were performed according to the procedures in ANSI C63.4-2003.

GENERAL INFORMATION

Test facility:

1) Test Facility located at Kita-Kansai : 1st Open Site (3 m Site)
Test Facility located at Kameoka : 1st Open Site (3, 10 and 30 m, on common plane)
: 2nd Open Site (3 and 10 m, on common plane)
FCC filing No. : 31040/SIT 1300F2

2) KITA-KANSAI TESTING CENTER is recognized under the National Voluntary Laboratory Accreditation Program for satisfactory compliance established in Title 15, Part 285 Code of Federal Regulations.
NVLAP Lab Code: 200191-0

3) Average Measurement Method
FCC filing No. : 950523A 1300F2

Definitions for symbols used in this test report:

● - Black box indicates that the listed condition, standard or equipment is applicable for this Report.
○ - Blank box indicates that the listed condition, standard or equipment is not applicable for this Report.

Description of the Equipment Under Test (EUT):

1) Name	:	2.4GHz Frequency Hopping Spread Spectrum Cordless Telephone (Base Unit)
2) Model/Type No.	:	KX-TG2970B
3) Product Type	:	Mass Production(S/N : 4IATA001049)
4) Category	:	Intentional Radiator
5) EUT Authorization	:	○ - Verification ● - Certification ○ - D.o.C.
6) Transmitting Frequency	:	2400.917MHz(00ch) - 2479.401MHz(88ch)
7) Receiving Frequency	:	2400.917MHz(00ch) - 2479.401MHz (88ch)
8) Method/System	:	Frequency Hopping Spread Spectrum (FHSS)
9) Power Rating	:	AC 120V 60Hz 1ϕ 2-pin plug (AC Adapter : PQLV10)
	:	(Rated,INPUT:AC120V/60Hz,124mA,OUTPUT DC9V850mA)

Detailed Transmitter portion (Channel plan):

Transmitting frequency	:	2400.917MHz(00ch) - 2479.401MHz(88ch)
Number of channel	:	89
Channel Separation	:	891.87kHz

Detailed Receiver portion:

Receiving frequency	:	2400.917MHz(00ch) - 2479.401MHz(88ch)
Local frequency	:	2398.917MHz(00ch) - 2477.401MHz(88ch)
Intermediate frequency	:	2.00 MHz

Other used (generated) frequencies in the EUT:

Reference Clock	:	13.824 MHz
PLL1(2nd, Reference Clock)	:	129.6 MHz

TEST CONDITIONS

AC Powerline Conducted Emission Measurement (Sec.15.207(a))
was performed in the following test site.

Test location:

KITA-KANSAI Testing Center
7-7, Ishimaru, 1-Chome, Mino-Shi, Osaka, 562-0027, Japan
● - Shielded room
KAMEOKA EMC Branch
9-1, Ozaki, Inukanno, Nishibetsuin-Cho, Kameoka-Shi, Kyoto, 621-0126, Japan
○ - Shielded room
○ - On metal plane of open site

Used test instruments and sites:

Model No.	Device ID	Last Cal. Date	Cal. Interval
● - ESCS 30	A - 1	August, 2004	1 Year
○ - ESH 2	A - 2		
○ - ESH 2	A - 3		
● - KNW-407	D - 6	October, 2004	1 Year
○ - KNW-408	D - 11		
○ - KNW-242	D - 7		
○ - ESH3-Z5	D - 12		
○ - KNW-341C	D - 13		
○ - KNW-408	D - 14		
○ - KNW-244C	D - 77		
○ - KNW-408	D - 78		
○ - ESH2-Z5	D - 10		
○ - ESH2-Z3	D - 17		
○ - 65 BNC-50-0-1	H - 26		
○ - 65 BNC-50-0-1	H - 27		
○ - Cable	H - 7		
● - Cable	H - 8	October, 2004	1 Year

Environmental conditions:

Temperature: 22 °C Humidity: 40 %

CONFIGURATION OF EUT

The Equipment Under Test (EUT) consists of:

Description	Applicant (Manufacturer)	Model No. (Serial No.)	FCC ID
2.4GHz FHSS Cordless Telephone (Base Unit)	Panasonic Communications Co., Ltd. (Panasonic Communications Co., Ltd.)	KX-TG2970B (4IATA001049)	ACJ96NKX-TG2770
AC Adaptor	Panasonic Communications Co., Ltd. (Panasonic Communications Co., Ltd.)	PQLV10 (--)	N/A

The measurement was carried out with the following equipment connected:

Description	Grantee/Distributor	Model No. (Serial No.)	FCC ID
None			

Type of Interface Cable(s) and the AC Power Cord used with the EUT:

	Description	Port	Shielded Cable	Shell Material	Ferrite Core	Cable Length
1	EUT	LINE	NO	--	NO	1.8 m
	No termination	--		--		
2	DC Power Cord (EUT / AC Adaptor) 1ϕ 2-pin plug	--	NO	--	NO	1.8 m
				--		

Operation - mode of the EUT:

The EUT was operated during the test under the following specification:

Transmitting
Modulation signal : TDMA/TDD Burst Type (FSK 190kHz dev.)

For operating condition of the EUT, the typical modulating signal is not used and input because the occupied bandwidth of the EUT is subject to restriction due to the bit rate of preamble data other than audio data in the transmitting data .

Test system:

The EUT has a DC IN port and a LINE port.

Special accessories:

None

EUT Modification

● - No modifications were conducted by JQA to achieve compliance to applied levels.

○ - To achieve compliance to applied levels, the following change(s) were made by JQA during the compliance test.

The modification(s) will be implemented in all production models of this equipment.

Applicant : N/A Date : N/A

Typed Name : N/A Position : N/A

Responsible Party

Responsible Party of Test Item(Product)

Responsible party :

Contact Person :

Signatory

Deviation from Standard

● - No deviations from the standard described in page 3.

○ - The following deviations were employed from the standard described in page 3.

TEST RESULTS

AC Powerline Conducted Emission 150 kHz - 30 MHz (Sec.15.207(a))

The requirements are ● - Passed ○ - Not Passed

Min. limit margin 27.8 dB at 0.15 MHz

Max. limit exceeding _____ dB at _____ MHz

Uncertainty of measurement results + 2.1 dB(2σ) - 2.1 dB(2σ)

Remarks: _____

SUMMARY

GENERAL REMARKS :

The EUT was tested according to the requirements of FCC Rules and Regulations Part 15 Subpart A and C (Effective October 7, 2004) under the test configuration, as shown in page 12.

The conclusion for the test item(AC Powerline Conducted Emission Measurement) of which are required by the applied regulation is indicated under the final judgement.

FINAL JUDGEMENT :

The "as received" sample;

● - fulfill the test requirements of the regulation mentioned on page 3.

○ - fulfill the test requirements of the regulation mentioned on page 3, but with certain qualifications.

○ - doesn't fulfill the test regulation mentioned on page 3.

Begin of testing : March 4, 2005

End of testing : March 4, 2005

- JAPAN QUALITY ASSURANCE ORGANIZATION -

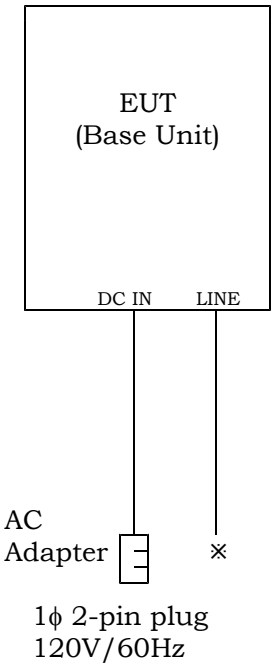
Approved by :

Akio Hosoda
Manager
EMC Div.
JQA KITA-KANSAI Testing Center

Issued by :

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

Test System-Arrangement (Drawings)

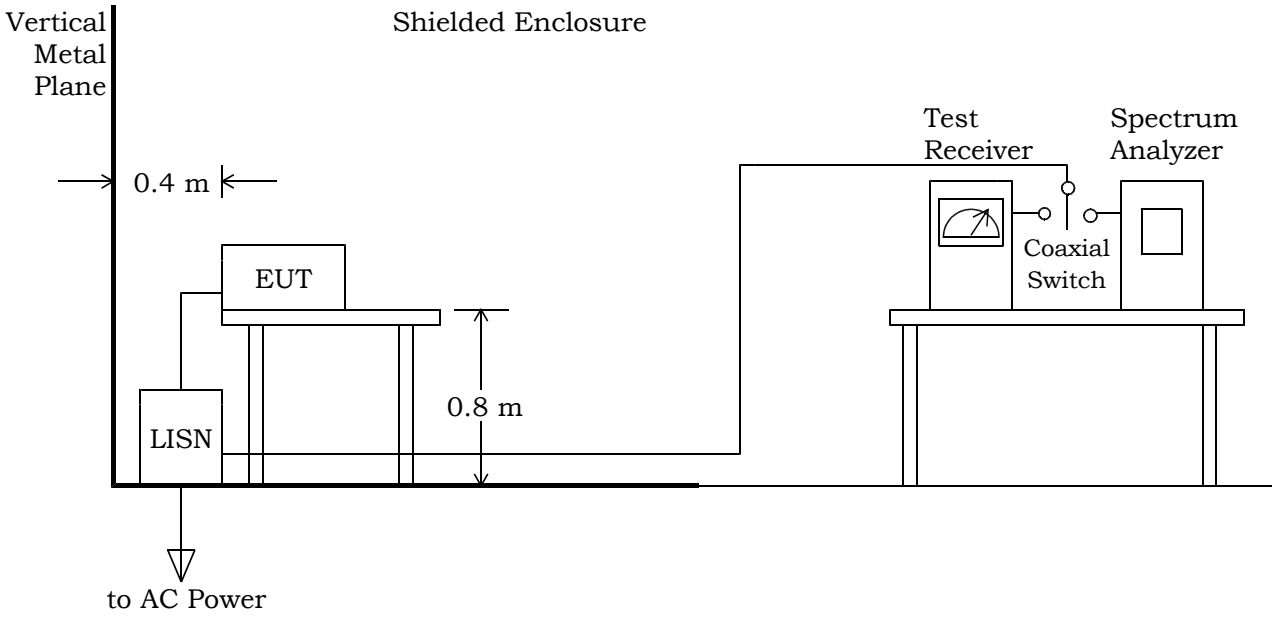


Note)
※ : No termination

Preliminary Test and Test-setup(Drawings)

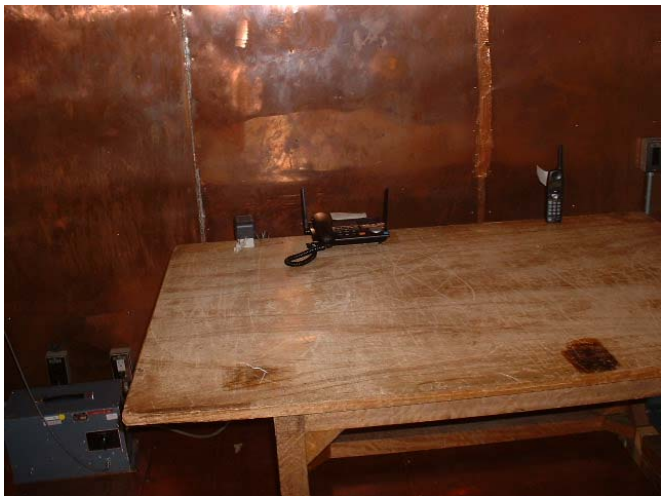
AC Powerline Conducted Emission 150 kHz - 30 MHz:

The preliminary test was performed according to the description of ANSI C63.4-2003 Sec.7.2.3 (Exploratory AC Powerline Conducted Emission Measurements) and Sec.6.2.1 (Tabletop Equipment Tests).
The preliminary test was carried out to investigate the frequency of the emission that has the highest amplitude relative to the limits within normal operating modes, cable positions, and a typical system configuration. In order to find out to the maximum emission, the preliminary test and a final test were performed in accordance with the following steps.
Step 1: One operation mode of the test system was setting.
Step 2: Using both of a spectrum analyzer and a test receiver, the emission's circumstance from the system was monitored in one of ten divided frequency bands of the specified frequency range (150 kHz - 30 MHz). The maximum emission in the band was found by changing the typical cable positions or cable manipulation under a typical system configuration and by selecting of current-carrying conductor. The level and the frequency at the one point which are regarded as relative high emission in the band was measured and recorded. This step was repeated until the ending frequency band.
Step 3: Return to step 1, if the other operation mode was possible to be setting.
Step 4: Based on the collected results, the operation mode produced the maximum emission was selected. The final test on the selected operation mode was performed. But if it was difficult to select the operation mode, the final tests on all operation modes were performed.
Step 5: Based on the same data, as result if the final measurement, at the worst point that has the highest amplitude relative to the limit the repeatability of the worst was reconfirmed.
The photographs of the test system setup on the worst point were taken and recorded.



Test-Setup (Photographs) at worst case

Conducted Emission



Front View

Side View

Radiated Emission

No Request at the applicant.

Conducted Disturbance Measurement at Mains Terminals

Test Date: March 4, 2005
Temp.: 22 °C, Humi: 40 %

Frequency	Corr. Factor	Meter Readings [dB(μV)] VA		VB		Limits [dB(μV)]		Results [dB(μV)]		Margin [dB]	Remarks
[MHz]	[dB]	QP	AVE	QP	AVE	QP	AVE	QP	AVE		
0.15	0.2	38.0	--	38.0	--	66.0	56.0	38.2	--	+27.8	A
0.20	0.2	30.0	--	30.0	--	63.6	53.6	30.2	--	+33.4	A
0.30	0.1	< 20.0	--	< 20.0	--	60.2	50.2	< 20.1	--	> +40.1	A
0.50	0.1	< 20.0	--	< 20.0	--	56.0	46.0	< 20.1	--	> +35.9	A
1.00	0.1	< 20.0	--	< 20.0	--	56.0	46.0	< 20.1	--	> +35.9	A
3.00	0.3	< 20.0	--	< 20.0	--	56.0	46.0	< 20.3	--	> +35.7	A
10.00	0.5	< 20.0	--	< 20.0	--	60.0	50.0	< 20.5	--	> +39.5	A
20.00	0.8	< 20.0	--	< 20.0	--	60.0	50.0	< 20.8	--	> +39.2	A
30.00	0.9	< 20.0	--	< 20.0	--	60.0	50.0	< 20.9	--	> +39.1	A

Sample of calculated result at 0.15 MHz, as the Minimum Margin point:

	Corr. Factor	=	0.2 dB
+)	Meter Reading	=	38.0 dB(μV)
	Result	=	38.2 dB(μV)

Minimum Margin: 66.0 - 38.2 = 27.8 (dB)
The point shown on " ____ " is the Minimum Margin Point.

Note: The correction factor includes the AMN insertion loss and the cable loss.

Remarks:

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

Tester : Shigeru Kinoshita