PCTEST Engineering Laboratory, Inc.

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VERIFICATION OF COMPLIANCE

Matsushita Electric Industrial Co., Ltd.
1006 Oaza Kadoma
Kadoma, Osaka 571 JAPAN
Attn: K. Nawata (KMECL), Rich Mullen (PSCD, MECA)

Dates of Tests: July 28-30, 1999
Test Report S/N: 15.990719435.ACJ
Test Site: PCTEST Lab, Columbia, MD

FCC ID	**ACJ96NKX-TC1800**
APPLICANT	**Matsushita Electric Industrial Co., Ltd.**

FCC Rule Part(s):	**15.247 Subpart C; ANSI C-63.4 (1992)**
Application Type:	**Class II Permissive Change**
Classification:	**Spread Spectrum Transceiver (DSS)**
Method/System:	**Direct Sequence System (DSS)**
Equipment Type:	**Digital Spread Spectrum Cordless Telephone System (Base/Handset)**
Tx/Rx Freq. Range:	**905.22 - 925.55 MHz**
Max. RF Output Power:	**60 mW**
Trade Name/Model:	***Panasonic KX-TC1850B***
Original Grant Date:	**June 21, 1999**
Class II Change(s):	**1. Increased output power of base unit to 60mW (to match handset)** **2. Changed base unit antenna from metal rod type to rubber rod type**

This equipment, with the Class II Permissive Change(s) described, has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C-63-4.

I attest to the accuracy of data. All measurements reported herein were performed by me or were made under my supervision and are correct to the best of my knowledge and belief. I assume full responsibility for the completeness of these measurements and vouch for the qualifications of all persons taking them.

PCTEST certifies that no party to this application has been denied the FCC benefits pursuant to Section 5301 of the Anti-Drug Abuse Act of 1988, 21 U.S.C. 853(a)

Randy Ortanez
President & Chief Engineer

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NVLAP LAB CODE 100431-0

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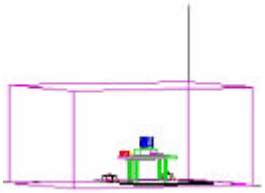
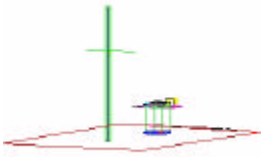


MEASUREMENT REPORT



Scope - Measurement and determination of electromagnetic emissions (EME) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission.

§2.1033(a) General Information

Applicant:	**Matsushita Electric Industrial Co., Ltd.**
Address:	**1006 Oaza Kadoma** **Kadoma, Osaka 571 JAPAN**
Attention:	**K. Nawata (KMEC)** **Rich Mullen (PSCD, MECA)**

- FCC ID: **ACJ96NKX-TC1800**
- Equipment Class: Spread Spectrum Transceiver (DSS)
- Equipment Type: Digital Spread Spectrum Cordless Telephone (Base/Handset)
- Tx/Rx Frequency Range: 905.22 – 925.55 MHz
- Method/System: Direct Sequence System (DSS)
- Trade Name: ***PANASONIC***
- Model: ***KX-TC1850B***
- Max. RF Output Power: 60 mW
- Power Supply: Base Unit: 9VDC 350mAh DC Adapter Model: KX-TCA1
Handset: Ni-Cd Battery Pack Model: KX-TCA14
- Rule Part(s): § 15.247 Subpart C
- Application Type: Class II Permissive Change
- Original Grant Date: June 21, 1999
- **Class II Change(s):** **1. Increased output power of base unit to 60mW (to match handset)**
2. Changed base unit antenna from metal rod type to rubber rod type
- Dates of Tests: July 28-30, 1999
- Place of Tests: PCTEST Lab, Columbia, MD U.S.A.
- Test Report S/N: 15.990719435.ACJ

NVLAP Lab Code 100431-0

INTRODUCTION

The measurement procedure described in American National Standard for Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-1992) and FCC Public Notice dated July 12, 1995 entitled "Guidance on Measurement for Direct Sequence Spread Spectrum Systems" were used in the measurement of **PANASONIC Digital Spread Spectrum Cordless Telephone System (Base/Handset) FCC ID: ACJ96NKX-TC1800.**

These measurement tests were conducted at ***PCTEST Engineering Laboratory, Inc.*** facility in New Concept Business Park, Guilford Industrial Park, Columbia, Maryland. The site address is 6660-B Dobbin Road, Columbia, MD 21045. The test site is one of the highest points in the Columbia area with an elevation of 390 feet above mean sea level. The site coordinates are 39° 11'15" N latitude and 76° 49'38" W longitude. The facility is 1.5 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. There are no FM or TV transmitters within 15 miles of the site. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4 on October 19, 1992.

PCTEST Location

The map at right shows the location of the PCTEST Lab, its proximity to the FCC Lab, the Columbia vicinity area, the Baltimore-Washington International (BWI) airport, and the city of Baltimore, and the Washington, D.C. area. (see Figure1).

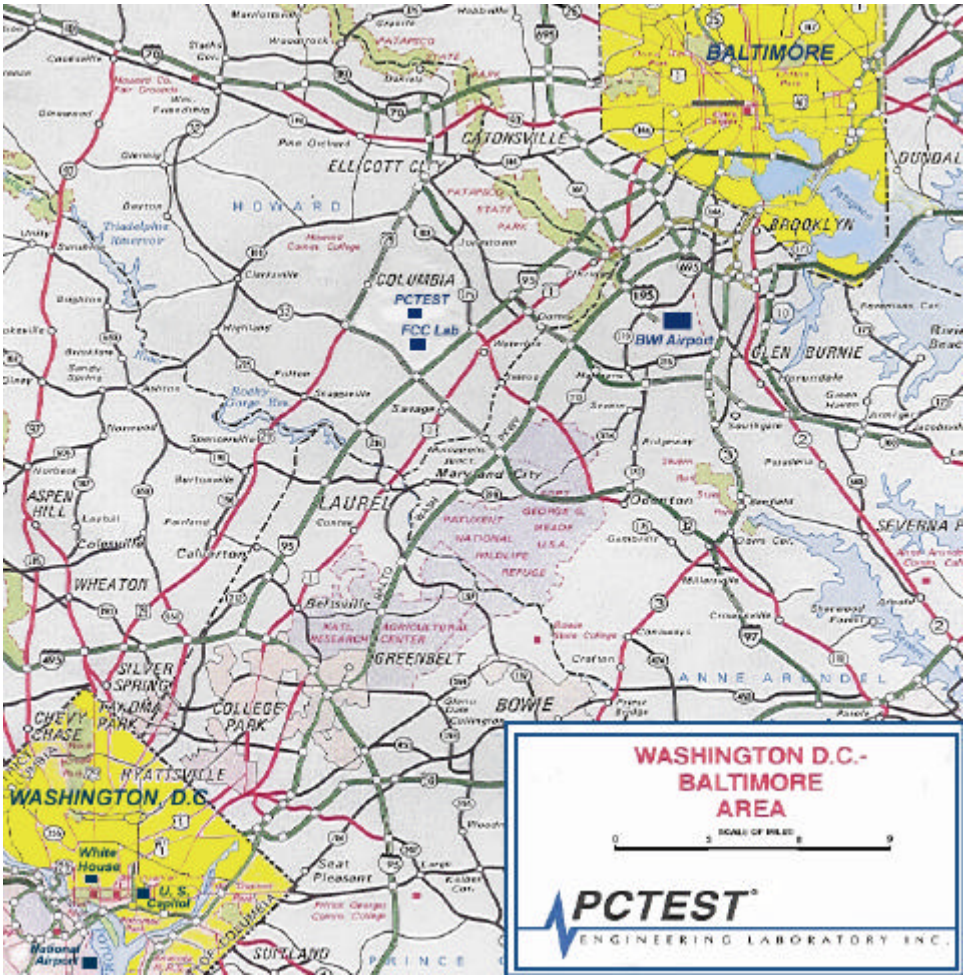


Figure 1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area.

PRODUCT INFORMATION

Equipment Description:

The Equipment under test (EUT) is **the PANASONIC *KX-TC1850B* Digital Spread Spectrum Cordless Telephone System (Base/Handset) FCC ID: ACJ96NKX-TC1800, with the Class II Permissive Change(s) described below:**

1. Increased output power of base unit to 60mW (to match handset).
2. Changed base unit antenna from metal rod type to rubber rod type.

Tx/Rx Frequency Range:	905.22 – 925.55 MHz
Channels:	20
Channel Separation:	1.07 MHz
Spread Spectrum Method:	Direct Sequence System
Modulation:	QPSK
Max RF Output Power:	60 mW
Antenna:	Omni-directional
Digital Security Codes:	1,000,000
Power Supply:	Base Unit: 9V 350mA DC Power Adapter Model: KX-TCA1 Handset: 3.6VDC 600mAh Ni-Cd Battery Pack Model: KX-TCA14

EMI suppression device(s) added and/or modified during testing: None

CH	Rx Freq. (MHz)	Tx Freq. (MHz)	CH	Rx Freq. (MHz)	Tx Freq. (MHz)
1	915.92	905.22	11	905.22	915.92
2	916.99	906.29	12	906.29	916.99
3	918.06	907.36	13	907.36	918.06
4	919.13	908.43	14	908.43	919.13
5	920.20	909.50	15	909.50	920.20
6	921.27	910.57	16	910.57	921.27
7	922.34	911.64	17	911.64	922.34
8	923.41	912.71	18	912.71	923.41
9	924.48	913.78	19	913.78	924.48
10	925.55	914.85	20	914.85	925.55

Table 1. Frequency Table

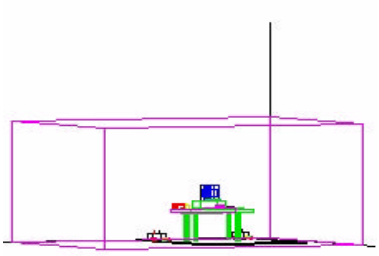


Figure 4. Shielded Enclosure Line-Conducted Test Facility

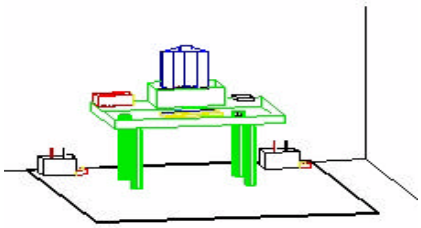


Figure 2. Line Conducted Emission Test Set-Up

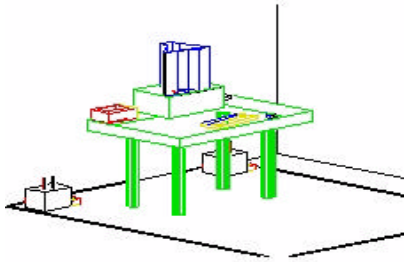


Figure 3. Wooden Table & Bonded LISNs

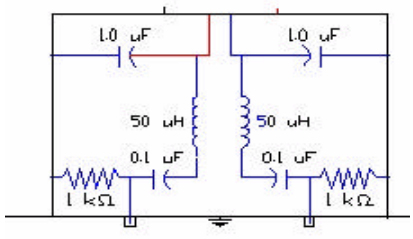


Figure 5. LISN Schematic Diagram

DESCRIPTION OF TESTS

Conducted Emissions

The line-conducted facility is located inside a 16'x20'x10' shielded enclosure. It is manufactured by Ray Proof Series 81 (see Figure 2). The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-6. A 1m. x 1.5m. wooden table 80cm. high is placed 40cm. away from the vertical wall and 1.5m away from the side wall of the shielded room (see Figure 3). Solar Electronics and EMCO Model 3725/2 (10kHz-30MHz) 50Ω/50µH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room (see Figure 4). The EUT is powered from the Solar LISN and the support equipment is powered from the EMCO LISN. Power to the LISNs are filtered by a high-current high-insertion loss Ray Proof power line filters (100dB 14kHz-10GHz). The purpose of the filter is to attenuate ambient signal interference and this filter is also bonded to the shielded enclosure. All electrical cables are shielded by braided tinned copper zipper tubing with inner diameter of 1/2". If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply lines will be connected to the Solar LISN. LISN schematic diagram is shown in Figure 5. All interconnecting cables more than 1 meter were shortened by non-inductive bundling (serpentine fashion) to a 1-meter length. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer to determine the frequency producing the maximum EME from the EUT. The spectrum was scanned from 450kHz to 30MHz with 20 msec. sweep time. The frequency producing the maximum level was reexamined using EMI/ Field Intensity Meter and Quasi-Peak adapter. The detector function was set to CISPR quasi-peak mode. The bandwidth of the receiver was set to 10 kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each EME emission. Each emission was maximized by: switching power lines; varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in the "Test Setup Photographs" attachment. Each EME reported was calibrated using the HP8640B signal generator.

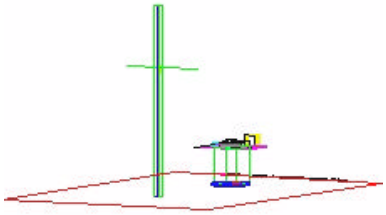


Figure 6. 3-Meter Test Site

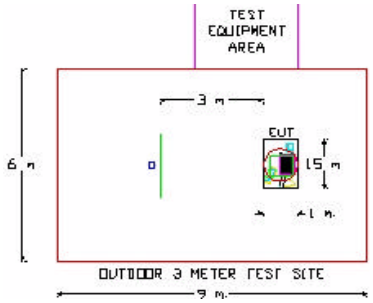


Figure 7. Dimensions of Outdoor Test Site

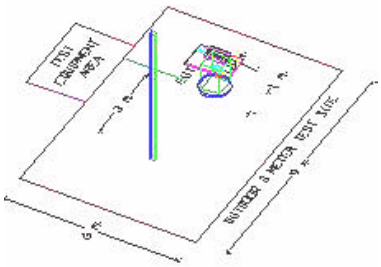


Figure 8. Turntable and System Setup

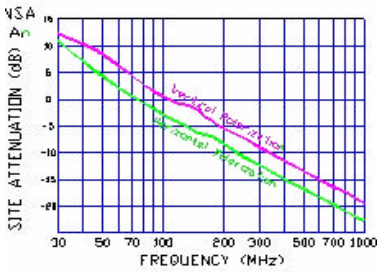


Figure 9. Normalized Site Attenuation Curves (H&V)

DESCRIPTION OF TESTS (CONTINUED)

Radiated Emissions

Preliminary measurements were made indoors at 1 meter using broadband antennas, broadband amplifier, and spectrum analyzer to determine the frequency producing the maximum EME. Appropriate precaution was taken to ensure that all EME from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, turntable azimuth with respect to the antenna were noted for each frequency found. The spectrum was scanned from 30 to 200 MHz using biconical antenna and from 200 to 1000 MHz using log-spiral antenna. Above 1 GHz, linearly polarized double ridge horn antennas were used.

Final measurements were made outdoors at 3-meter test range using Roberts™ Dipole antennas or horn antenna (see Figure 6). The test equipment was placed on a wooden and plastic bench situated on a 1.5 x 2 meter area adjacent to the measurement area (see Figure 7). Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. Each frequency found during pre-scan measurements was re-examined and investigated using EMI/Field Intensity Meter and Quasi-Peak Adapter. The detector function was set to CISPR quasi-peak mode and the bandwidth of the receiver was set to 100kHz or 1 MHz depending on the frequency or type of signal.

The half-wave dipole antenna was tuned to the frequency found during preliminary radiated measurements. The EUT, support equipment and interconnecting cables were re-configured to the set-up producing the maximum emission for the frequency and were placed on top of a 0.8-meter high non-metallic 1 x 1.5 meter table (see Figure 8). The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated; the antenna height was varied 1 to 4 meters and stopped at the azimuth or height producing the maximum emission. Each emission was maximized by: varying the mode of operation or resolution; clock or data exchange speed; scrolling H pattern to the EUT and/or support equipment, and powering the monitor from the floor mounted outlet box and the computer aux AC outlet, if applicable; and changing the polarity of the antenna, whichever determined the worst-case emission. Photographs of the worst-case emission can be seen in "Test Setup Photographs" Attachment. Each EME reported was calibrated using the HP8640B signal generator. The Theoretical Normalized Site Attenuation Curves for both horizontal and vertical polarization are shown in Figure 9.

§ 15.205 RESTRICTED BANDS

Special attention is made for the EUT's harmonic and spurious radiated emission in the restricted bands of operation. The EUT was tested from 9kHz and up to the tenth harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average measurements was used using RBW 1 MHz – VBW 10Hz and linearly polarized horn antennas. In addition, peak measurements were taken to ensure that the peak levels are not more than 20dB above the average limit. All out of band emissions, other than those created by the spreading sequency, data sequence, and the carrier modulation must not exceed the limits show in Table 2 per 15.209.

Frequency (MHz)	F/S (UV/m)	Meas. Dist. (Meters)
0.009-0.490	2400/F (kHz)	300
0.490-1.705	24000/F (kHz)	30
1.705-30.00	30	30
30.0-88.0	100	3
88.0-216.0	150	3
216.0-960.0	200	3
Above 960	500	3

Table 2. Radiated Emission Limits Per 15.209

Test Equipment

HP 8566B	**Spectrum Analyzer 100Hz-22GHz**
HP83017A	**Microwave Amplifier 40dB Gain (0.5 – 26.5 GHz)**
HP 3784A	**Digital Transmission Analyzer**
EMCO 3115	**Horn Antenna (1 – 18GHz)**
HP 8495A	**20dB Attenuator (DC-40GHz) 0-70dB**
HP 8493B	**10dB Attenuator**
MicroCoax Cables	**Low Loss Microwave Cables (1-26.5 GHz)**
CDI Dipoles	**Dipole Antennas (30 – 1000 MHz)**

§ 15.203 ANTENNA REQUIREMENT

An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the applicant can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with this requirement.

The **PANASONIC TX-TC1850B Digital Spread Spectrum Cordless Telephone System** complies with the requirement of §15.203. The antenna is permanently attached.

CONCLUSION

There are no provisions for connection to an external antenna. The unit meets the Antenna Requirements of §15.203.

§15.247(A)(2) – DIRECT SEQUENCE BANDWIDTH

Base Unit

Res. Bandwidth =	100 kHz (5dB/div)
Video Bandwidth =	100 kHz
Span =	10 MHz
Ref. Level	- 29.5 dBm
Sweep	20ms
Attenuator	5 dB ext. pad
6dB Bandwidth –Mkr Delta	**(6dB down from peak)**

(see attached spectrum plots)

FREQ (MHz)	Channel	6dB Bandwidth (MHz)
905.22	1	1.08
914.85	10	1.05
925.55	20	1.05

Table 3. 6dB Bandwidth measurements

Minimum Standard – 6dB bandwidth for direct sequence systems must be at least 500kHz (0.5 MHz).

REMARKS:

PASS

§15.247(B) MAXIMUM PEAK OUTPUT POWER

Base Unit

Res. Bandwidth =	3 MHz (5dB/div)
Video Bandwidth =	3 MHz
Span =	10 MHz
Ref. Level	- 26.0 dBm
Sweep	20ms
Attenuator	5 dB ext. pad

FREQ (MHz)	Channel	Power Output (dBm)	Power Output (mW)
905.22	1	17.47	55.86
914.85	10	17.42	55.22
925.55	20	16.37	43.36

Table 5. Output Power Measurements

Minimum Standard – The maximum peak output power of the transmitter shall not exceed 1 watt.

The EUT is placed 3m. away from the receiving antenna and the EIRP is calculated using the formula:

EIRP (dBm) = 10 Log 10 (((r(mV/m)/1 x 10^6)^2 / 30.0/1 x 10^{-3})

EIRP (dBm) = 10 Log 10 [(3 x FS/1 x 10^6)^2 / (30.0) x 1000]

EIRP (dBm) = {(3 x FS)/1 x 10^6}^{2} / 30.0

REMARKS:

PASS

§15.247(D) POWER DENSITY

Base Unit

Res. Bandwidth =	3 kHz (7dB/div)
Video Bandwidth =	10 kHz
Span =	300 kHz (3.0 MHz)
Ref. Level	- 40.0 dBm
Sweep	1000 sec.

FREQ (MHz)	Channel	Power Density (dBm)
905.22	1	4.05
914.85	10	3.31
925.55	20	2.54

Table 7. Output Power Density Data

Minimum Standard – The transmitted power density averaged over any 1 second interval shall not be greater than 8dBm in any 3kHz bandwidth within these bands.

The EUT is placed 3m. away from the receiving antenna and the EIRP is calculated using the formula:

EIRP (dBm) = 10 Log 10 (((r(mV/m)/1 x 10^6)^2 / 30.0/1 x 10^{-3})

EIRP (dBm) = 10 Log 10 [(3 x FS/1 x 10^6)^2 / (30.0) x 1000]

EIRP (dBm) = {(3 x FS)/1 x 10^6}^{2} / 30.0

REMARKS:

PASS

RADIATED MEASUREMENTS (FUNDAMENTAL & HARMONICS)

Base Unit

Operating Frequency: 905.22 MHz

Distance of Measurements: 3 meters

Channel: 1

FREQ. (MHz)	Level* (dBm)	AFCL** (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin*** (dB)
905.22	- 27.0	32.7	V	Peak	431519.1	112.7	- 12.53
1810.44	- 68.0	30.9	V	Peak	3126.0	69.9	- 22.8
2715.66*	- 91.0	34.2	V	Peak	323.6	50.2	- 3.8
3620.88*	- 118.0	37.0	V	Peak	19.95	26.0	- 28.0
4526.1*	- 124.0	38.9	V	Peak	10.0	20.0	- 34.0
5431.32*	< -130	39.0					

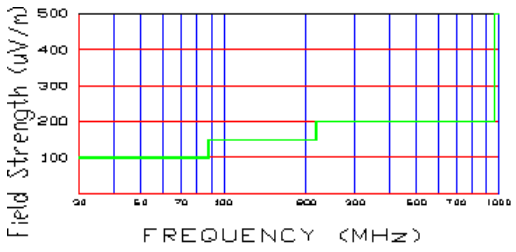


Figure 10. Restricted band harmonics and spurious limits.

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz.

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

9. ** Note: Unit is dBC.

10. Above 1 GHz, limit is 500 uV/m (54dBu/m).

Base Unit

Operating Frequency: 914.85 MHz

Distance of Measurements: 3 meters

Channel: 10

FREQ. (MHz)	Level* (dBm)	AFCL** (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin*** (dB)
914.85	- 27.15	32.8	V	Peak	429042.2	112.65	- 12.58
1829.7	- 67.2	31.0	V	Peak	70.8	3467.4	- 21.85
2744.55*	- 90.2	34.3	V	Peak	358.92	51.1	- 2.9
3659.4*	- 119.0	37.1	V	Peak	18.0	25.1	- 28.9
4574.25*	- 123.0	39.0	V	Peak	14.12	23.0	- 31.0
5489.1	< - 130						

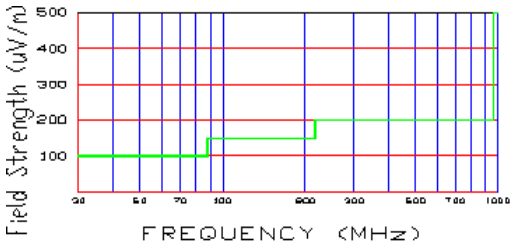


Figure 10. Restricted band harmonics and spurious limits.

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz.

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

9. ** Note: Unit is dBC.

10. Above 1 GHz, limit is 500 uV/m (54dBu/m).

Base Unit

Operating Frequency: 925.55 MHz

Distance of Measurements: 3 meters

Channel: 20

FREQ. (MHz)	Level* (dBm)	AFCL** (dB)	POL (H/V)	DET QP/AVG	F/S (µV/m)	F/S (dBµV/m)	Margin*** (dB)
925.55	- 28.3	32.9	V	Peak	380189.4	111.6	- 13.63
1851.1	- 69.0	31.1	V	Peak	2851.0	69.1	- 22.5
2776.65*	- 90.5	34.3	V	Peak	346.74	50.8	- 3.2
3702.3*	- 119.0	37.2	V	Peak	18.19	25.2	- 28.8
4627.35*	- 125.0	39.1	V	Peak	9.12	19.2	- 34.8
5553.3	< - 130						

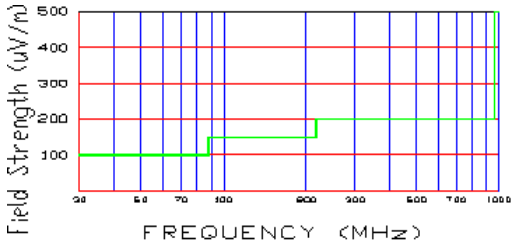


Figure 10. Restricted band harmonics and spurious limits.

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in table 2. (note: * Restricted Band)

2. All harmonics/spurs are at least 20 dB below the highest emission in the authorized band using RBW = 100kHz.

3. Average Measurements > 1GHz using RBW = 1 MHz VBW = 10 Hz

4. The peak emissions above 1 GHz are not more than 20 dB above the average limit.

5. The antenna is manipulated through typical positions, polarity and length during the tests.

6. The EUT is supplied with nominal AC voltage or/and a new/fully recharged battery.

7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.

8. < - 120 are below the analyzer floor level.

9. ** Note: Unit is dBC.

10. Above 1 GHz, limit is 500 uV/m (54dBu/m).

RADIATED MEASUREMENTS (SPURIOUS)

Base

Operating Frequency: 905.22 – 925.55 MHz

Distance of Measurements: 3 meters

Channel: 1, 10, 20

FREQ. (MHz)	Level* (dBm)	AFCL** (dB)	POL (H/V)	F/S (µV/m)	DET QP/AVG	Margin*** (dB)
40.0	- 77.4	1.2	H	34.7	QP	- 9.2
69.7	- 81.8	6.3	H	37.6	QP	- 8.5
120.0	- 87.5	11.5	V	35.5	QP	- 12.5
138.3	- 86.4	12.9	V	47.3	QP	- 10.0
154.0	- 88.4	13.9	V	42.2	QP	- 11.0
163.8	- 87.8	14.5	V	48.4	QP	- 9.8

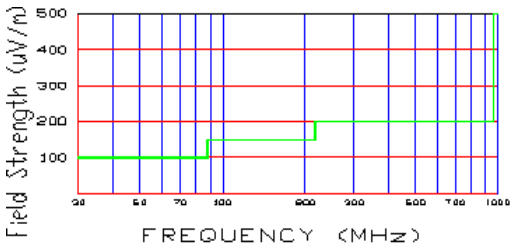


Figure 10. Restricted band harmonics and spurious limits.

NOTES:

1.All emissions were investigated and the worst case emissions are reported.

2. For hand-held devices, the EUT is rotated through three orthogonal axis to determine which configuration produces the maximum emissions.

3. The EUT is supplied with the nominal AC voltage or/and a new/fully recharged battery.

4. The EUT was tested up to the 10th harmonic (9.3 GHz) and no significant emission was found.

5. Above 1 GHz limit is 500 uV/m (54dBu/m).

§15.247(E) PROCESSING GAIN (FROM PANASONIC)

KX-TC1850B Processing Gain Test Results

Kyushu Matsushita Electric Co.,Ltd
Personal Telecom Division Engineering Department
Y.Suwa

	Portable Unit	Base Unit
Δf(kHz)	D/U Ratio(dB)	D/U Ratio(dB)
1200		
1150		
1100		
1050		
1000	26.50	24.20
950	26.30	23.50
900	26.80	26.50
850	26.20	26.00
800	17.40	15.50
750	10.00	10.20
700	11.80	12.20
650	6.10	6.20
600	5.10	5.20
550	7.60	7.20
500	4.00	3.50
450	4.00	3.50
400	3.50	3.00
350	-0.20	-1.00
300	2.40	2.00
250	1.20	1.00
200	1.40	1.00
150	8.50	7.20
100	5.80	6.20
50	5.50	3.50
0	8.60	6.20
-50	6.20	4.20
-100	7.40	5.40
-150	7.80	5.80
-200	1.20	0.40
-250	3.00	1.20
-300	1.60	0.80
-350	1.20	-0.50
-400	5.00	3.50
-450	4.40	4.50
-500	5.00	4.50
-550	8.20	7.80
-600	6.20	5.80
-650	7.20	7.80
-700	12.00	11.80
-750	10.10	11.00
-800	16.80	19.20
-850	26.40	27.00
-900	26.80	26.00
-950	26.20	25.80
-1000	26.30	26.50
-1050		
-1100		
-1150		
-1200		

D/U Ratio = (Desire Signal) /(Undesired Signal) Ratio

worst 20% points
These points are excluded.

○Mj Jamming Margin

Mj(J/S ratio)	
Portable	3.50dB
Base	3.00dB

*Mj level is worst value after exclude worst 20% points.

○Process Gain

Gp=(S/N)o+Mj+Lsys

(S/N)o=8.0dB
Lsys=2.0dB
Mj: compare above table.

Gp (Process Gain)		
Portable	13.0dB	(=3+8+2)
Base	13.5dB	(=3.5+8+2)

○Measurement Equipment

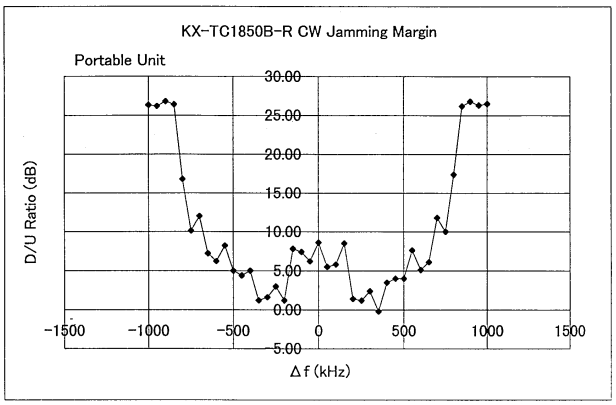
Signal Generator
① HEWLETT PACKERD ESG-D3000A
② HEWLETT PACKERD ESG-D3000A

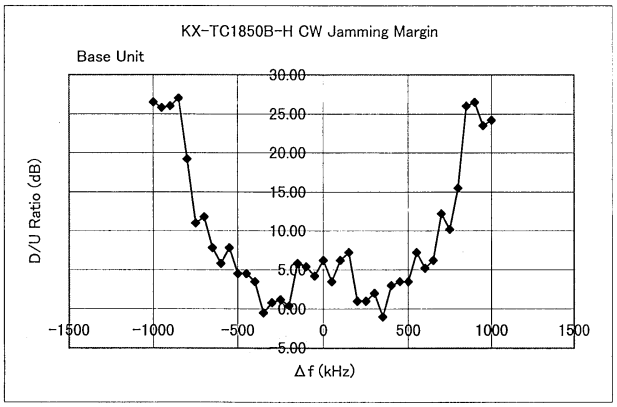
Data Error Analyzer
HEWLETT PACKERD 1645A

Four port junction Pad
Anritsu MA1612A

50 ohm terminator
HWELETT PACKERD 908A

§15.247(E) PROCESSING GAIN (CONTINUED)





TC1850B Process gain

$Gp = (C/N)_0 + Mj + Lsys$

Gp = KX-TC1850 Process Gain
$(S/N)_0$ = S/N ratio for keeping BER= 10E –2 (10000ppm)
$(S/N)_0$ is 8dB on this system.
Mj = J/S ratio (CW Jamming margin method)
Lsys = system loss (<=2.0dB)

***0:Dummy Set**

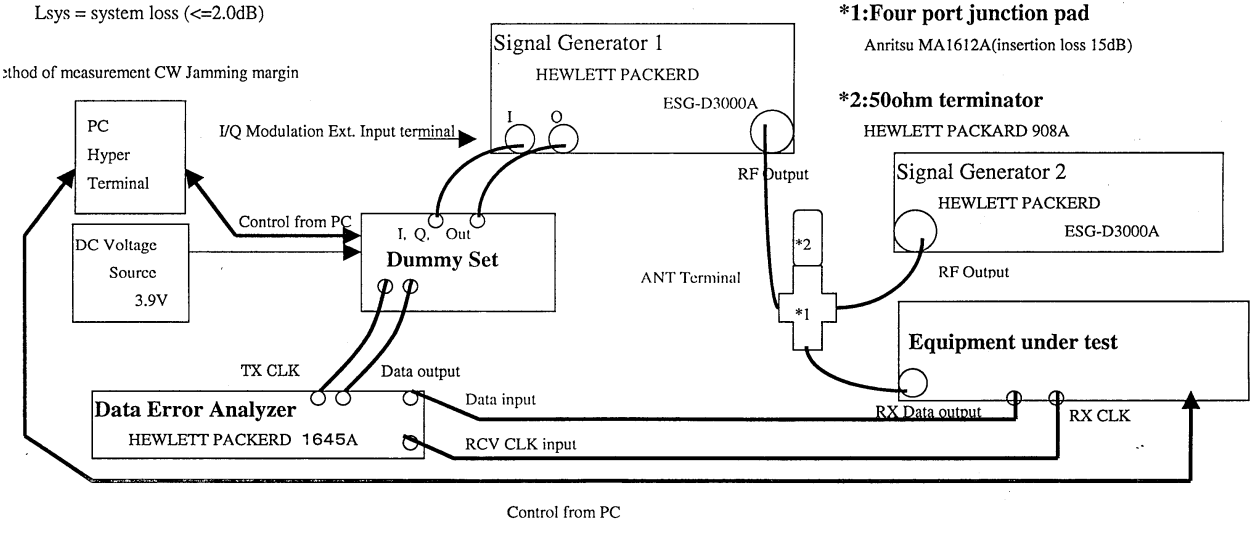
When measure Base station, Dummy set is Portable. When measuer Portable, Dummy Set is Base station.

***1:Four port junction pad**

Anritsu MA1612A(insertion loss 15dB)

***2:50ohm terminator**

HEWLETT PACKARD 908A



TEST EQUIPMENT

Type	Model	Cal. Due Date	S/N
Microwave Spectrum Analyzer	HP 8566B (100Hz-22GHz)	08/15/99	3638A08713
Microwave Spectrum Analyzer	HP 8566B (100Hz-22GHz)	04/17/00	2542A11898
Spectrum Analyzer/Tracking Gen.	HP 8591A (100Hz-1.8GHz)	06/03/00	3144A02458
Signal Generator*	HP 8640B (500Hz-1GHz)	06/03/00	2232A19558
Signal Generator*	HP 8640B (500Hz-1GHz)	08/09/99	1851A09816
Signal Generator*	Rohde & Schwarz (0.1-1000MHz)	09/11/99	894215/012
Ailtech/Eaton Receiver	NM 37/57A-SL (30-1000MHz)	04/12/00	0792-03271
Ailtech/Eaton Receiver	NM 37/57A (30-1000MHz)	03/11/00	0805-03334
Ailtech/Eaton Receiver	NM 17/27A (0.1-32MHz)	09/17/99	0608-03241
Quasi-Peak Adapter	HP 85650A	08/15/99	2043A00301
Ailtech/Eaton Adapter	CCA-7 CISPR/ANSI QP Adapter	03/11/00	0194-04082
RG58 Coax Test Cable	No. 167		n/a
Harmonic/Flicker Test System	HP 6841A (IEC 555-2/3)		3531A00115
Broadband Amplifier (2)	HP 8447D		1145A00470, 1937A03348
Broadband Amplifier	HP 8447F		2443A03784
Transient Limiter	HP 11947A (9kHz-200MHz)		2820A00300
Horn Antenna	EMCO Model 3115 (1-18GHz)		9704-5182
Horn Antenna	EMCO Model 3115 (1-18GHz)		9205-3874
Horn Antenna	EMCO Model 3116 (18-40GHz)		9203-2178
Biconical Antenna (4)	Eaton 94455/Eaton 94455-1/Singer 94455-1/Compliance Design 1295, 1332, 0355		
Log-Spiral Antenna (3)	Ailtech/Eaton 93490-1		0608, 1103, 1104
Roberts Dipoles	Compliance Design (1 set)		
Ailtech Dipoles	DM-105A (1 set)		33448-111
EMCO LISN	3816/2		1079
EMCO LISN	3816/2		1077
EMCO LISN	3725/2		2009
Microwave Preamplifier 40dB Gain	HP 83017A (0.5-26.5GHz)		3123A00181
Microwave Cables	MicroCoax (1.0-26.5GHz)		
Ailtech/Eaton Receiver	NM37/57A-SL		0792-03271
Spectrum Analyzer	HP 8594A		3051A00187
Spectrum Analyzer (2)	HP 8591A		3034A01395, 3108A02053
Modulation Analyzer	HP 8901A		2432A03467
NTSC Pattern Generator	Leader 408		0377433
Noise Figure Meter	HP 8970B		3106A02189
Noise Figure Meter	Ailtech 7510		TE31700
Noise Generator	Ailtech 7010		1473
Microwave Survey Meter	Holaday Model 1501 (2.450GHz)		80931
Digital Thermometer	Extech Instruments 421305		426966
Attenuator	HP 8495A (0-70dB) DC-4GHz		
Bi-Directional Coax Coupler	Narda 3020A (50-1000MHz)		
Shielded Screen Room	RF Lindgren Model 26-2/2-0		6710 (PCT270)
Shielded Semi-Anechoic Chamber	Ray Proof Model S81		R2437 (PCT278)
Enviromental Chamber	Associated Systems Model 1025 (Temperature/Humidity)		PCT285

* Calibration traceable to the National Institute of Standards and Technology (NIST).

RECOMMENDATION / CONCLUSION

The data collected shows that the PANASONIC *KX-TC1850B* Digital Spread Spectrum Cordless Telephone System (Base/Handset) FCC ID: ACJ96NKX-TC1800, with the Class II Permissive Change(s) described in this report, complies with Part 15C of the FCC Rules.