



PCTEST ENGINEERING LABORATORY, INC.

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CERTIFICATE OF COMPLIANCE FCC PART 15.247 Certification

Applicant Name:

Panasonic Corporation of North America
One Panasonic Way, 4B-8
Secaucus, NJ 07094
United States

Date of Testing:

July 6 - July 7, 2006

Test Site/Location:

PCTEST Lab, Columbia, MD, USA

Test Report Serial No.:

0606160518

FCC ID:

ACJ9TGCF-742

APPLICANT:

Panasonic Corporation of North America

Model(s):

CF-74

EUT Type:

Panasonic Toughbook Model: CF-74

Max. RF Output Power:

1.009 mW (0.04 dBm) Conducted

Frequency Range:

2400 – 2480MHz

FCC Classification:

FCC Part 15 Frequency Hopping Spread Spectrum Transceiver (DSS)

FCC Rule Part(s):

Part 15.247

This equipment 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-63.4-2003.

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.

Grant Conditions: Listed output power is conducted.

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. 862.


Randy Ortanez
President

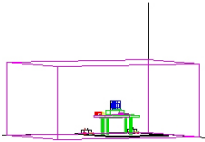


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Test Report S/N: 0606160518	Test Dates: July 6 - July 7, 2006	EUT Type: Panasonic Toughbook Model: CF-74	FCC ID: ACJ9TGCF-742	Page 1 of 32

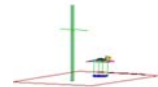
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MEASUREMENT REPORT



FCC Part 15.247

A. General Information

APPLICANT: Panasonic Corporation of North America
APPLICANT ADDRESS: One Panasonic Way, 4B-8
Secaucus, NJ 07094
TEST SITE: PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS: 6660-B Dobbin Road, Columbia, MD 21045 USA
FCC RULE PART(S): Part 15.247
MODEL NAME: CF-74
FCC ID: ACJ9TGCF-742
Test Device Serial No.: 6BKSA00246R ☐ Production ☒ Pre-Production ☐ Engineering
FCC CLASSIFICATION: FCC Part 15 Spread Spectrum Transceiver (DSS)
Method/System: FHSS Sequence Spread Spectrum (FHSS)
DATE(S) OF TEST: July 6 - July 7, 2006
TEST REPORT S/N: 0606160518

A.1 Test Facility / NVLAP Accreditation

Measurements were performed at PCTEST Engineering Lab in Columbia, MD 21045, U.S.A.

- PCTEST facility is an FCC registered (PCTEST Reg. No. 90864) test facility with the site description report on file and has met all the requirements specified in Section 2.948 of the FCC Rules and Industry Canada (IC 2451).
- PCTEST Lab is accredited by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP) in EMC, Telecommunication, and FCC for satisfactory compliance with criteria established in Title 15, Part 285 Code of Federal Regulations. (NVLAP Lab code: 100431-0).
- PCTEST Lab is a recognized U.S. Conformity Assessment Body (CAB) in EMC and R&TTE (n.b. 0982) under the U.S.-EU Mutual Recognition Agreement (MRA).
- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC Guide 65 by the American National Standards Institute (ANSI) in all scopes of FCC Rules.
- PCTEST facility is an IC registered (IC-2451) test laboratory with the site description on file at Industry Canada.

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1.0 INTRODUCTION

1.1 Evaluation Procedure

The measurement procedure described in the American National Standard for Methods of Measurement of Radio-Noise Emission from Low-Voltage Electrical and Electronic Equipment in the Range of 9kHz to 40GHz (ANSI C63.4-2003) and FCC Public Notice dated July 12, 1995 entitled "Guidance on Measurement for Direct Sequence Spread Spectrum System" were used in the measurement of **Panasonic Toughbook Model: CF-74 FCC ID: ACJ9TGCF-742**.

1.2 Scope

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

1.3 PCTEST Test Location

The map at the right shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity are, the Baltimore-Washington Interntl (BWI) airport, the city of Baltimore and the Washington, DC area. (see Figure 1.3-1).

These measurement tests were conducted at the 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, 2002.

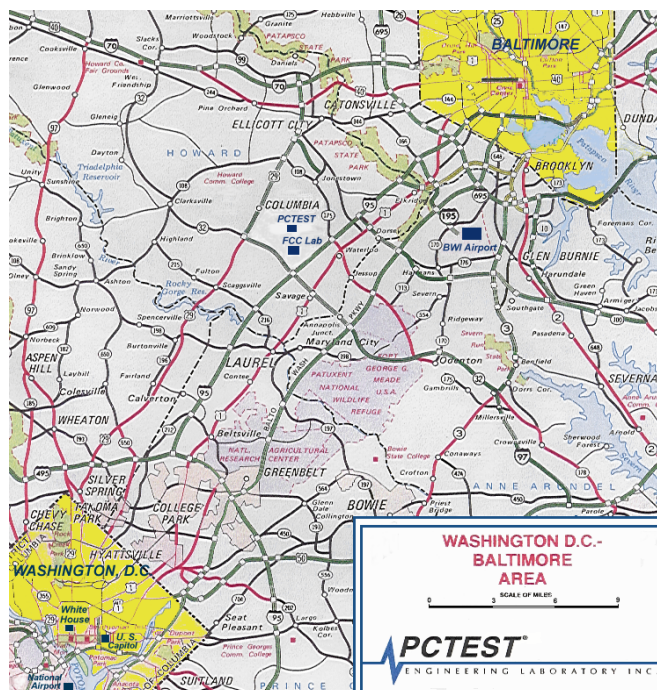


Figure 1.3-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Panasonic Toughbook Model: CF-74 FCC ID: ACJ9TGCF-742**.

- This Bluetooth module has been tested by Bluetooth Qualification Lab, and we confirm the following:
 - A) The hopping sequence is pseudorandom
 - B) All channels were used equally on average
 - C) The receiver input bandwidth equals the transmit bandwidth
 - D) The receiver hops in sequence with the transmit signal
- 15.247(g): In accordance with the Bluetooth Industry Standard, the system is designed to comply with all of the regulations in Section 15.247 when the transmitter is presented with a continuous data (or information) system.
- 15.247(h): In accordance with the Bluetooth Industry Standard, the system does not coordinate it channels selection/ hopping sequence with other frequency hopping systems for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.
- The EUT consisted of the following components(s):

Manufacturer / Description	FCC ID	Serial Number
Panasonic Notebook PC	ACJ9TGCF-742	6BKSA00246R
Intel PRO/Wireless Network Module	PD9WM3945ABG	00C857355CVD26965004
Novatel HSDPA Module	NBZNRM-EU730	010854-00-001069-2
Taiyo Yuden Bluetooth Module	N/A	N/A

Table 2-1. EUT Equipment Description

2.2 EMI Suppression Device(s)/Modifications

EMI suppression device(s) added and/or modifications made during testing.

- None

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3.0 DESCRIPTION OF TEST

3.1 Conducted Emissions

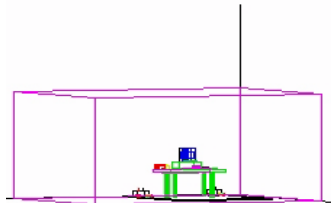


Figure 3.1-1. Shielded Enclosure Line-Conducted Test Facility

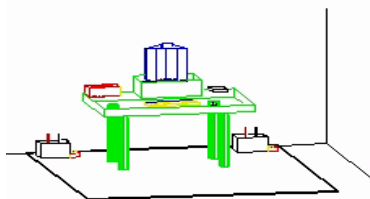


Figure 3.1-2. Line Conducted Emission Test Set-Up

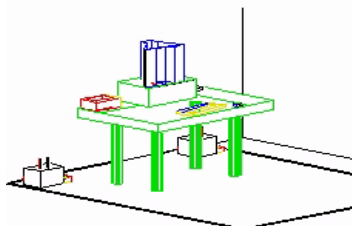


Figure 3.1-3. Wooden Table & Bonded LISNs

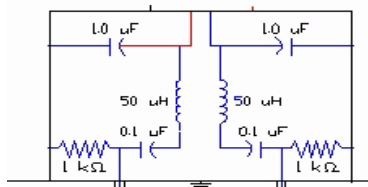


Figure 3.1-4. LISN Schematic Diagram

The line-conducted facility is located inside a 16'x20'x10' shielded enclosure, manufactured by Ray Proof Series 81 (see Figure 3.1-1). The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 1.5m away from the sidewall of the shielded room (see Figure 3.1-2). Solar Electronics and EMCO Model 3725/2 (10kHz-30MHz) 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room (See Figure 3.1-3). 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 filter (100dB 14Hz-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 an inner diameter of ½". 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 line(s) will be connected to the Solar LISN. The LISN schematic diagram is shown (See Figure 3.1-4). All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion). 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 150kHz to 30Mhz with a 20msec. sweep time. The frequencies producing the maximum level were re-examined using an EMI/Field Intensity Meter and Quasi-Peak adapter. The detector function was set to CISPR quasi-peak and average mode. The bandwidth of the receiver was set to 10kHz. 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 patter 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 Exhibit M. Each EME reported was calibrated using the HP8640B signal generator.

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3.2 Radiated Emissions

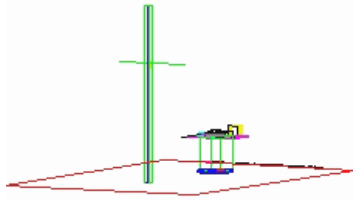


Figure 3.2-1. Meter Test Site

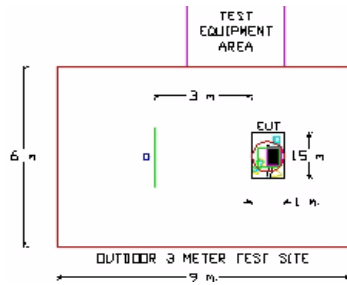


Figure 3.2-2. Dimensions of Outdoor Test Site

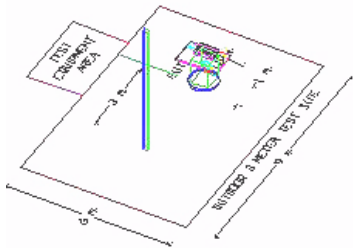


Figure 3.2-3. Turntable and System Setup

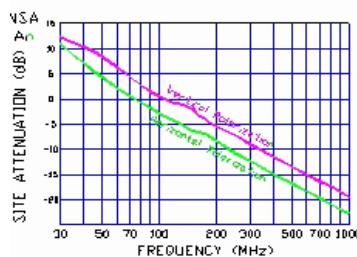


Figure 3.2-4. Normalized Site Attenuation Curves (H&V)

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, and turntable azimuth with respect to the antenna was noted for each frequency found. The spectrum was scanned from 30 to 200 MHz using a bi-conical antenna and from 200 to 1000 MHz using a 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 RobertsTM Dipole antennas or horn antennas (see Figure 3.2-1). The test equipment was placed on a wooden and plastic bench situated on a 1.5m x 2m area adjacent to the measurement area (see Figure 3.2-2). 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 1MHz depending on the frequency or type of signal. Above 1GHz the detector function was set to CISPR average mode (RBW = 1MHz, VBW = 10Hz).

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 3.2-3). 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 Exhibit E-G. 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 3.2-4.

PCTEST TM PT. 15.247 BT TEST REPORT	PCTEST WIRELESS	FCC CERTIFICATION REPORT (BLUETOOTH)	Panasonic	Reviewed by: Quality Manager
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4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party 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 the provisions of this section.”

- The antennas of the Panasonic Toughbook Model: CF-74 are **permanently attached antennae**.
- There are provisions for connection to an external antenna. Please refer to Panasonic's application cover letter for details.

Conclusion:

The **Panasonic Toughbook Model: CF-74 FCC ID: ACJ9TGCF-742** unit complies with the requirement of §15.203.

Ch.	Frequency (MHz)
00	2402
:	:
39	2441
:	:
78	2480

Table 4.1 Frequency/ Channel Operations

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5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST).

TYPE	MODEL	CAL. DUE DATE	CAL. INTERVAL	SERIAL No.
Microwave Spectrum Analyzer	Agilent E4448A (3Hz-50GHz)	09/19/06	Annual	US42510244
Spectrum Analyzer	HP 8566B (100Hz-2.5GHz/2-22GHz)	12/22/06	Annual	3638A08713
ESA-E Series Spectrum Analyzer	HP E4407B (9kHz-26.5GHz)	04/20/07	Annual	US39210313
Signal Generator	HP 8640D (500Hz-1GHz)	12/07/07	Annual	3613A00315
Series Signal Generator	Agilent E4432B (250kHz-3GHz)	04/15/07	Annual	US40053896
Power Meter	Rohde & Schwarz NRVS	06/02/07	Annual	835360/079
Power Sensor	Rohde & Schwarz NRV-Z53 (100μW – 10W)	06/02/07	Annual	846076/007
Quasi-Peak Adapter	HP 85650A	08/09/06	Annual	2043A00301
Preamplifier	HP 8449B (1-26.5GHz)	12/22/06	Annual	3008A00985
Attenuation/Switch Driver	HP 11713A	12/22/06	Annual	N/A
Preselector	HP 85685A (20Hz-2GHz)	12/22/06	Annual	N/A
6dB Resolution Bandwidth Spectrum Analyzer Display	OPT 462	12/22/06	Annual	3701A22204
Ailtech/Eaton Adapter	CCA-7 CISPR/ANSI QP Adapter	12/19/06	Annual	0194-04082
Ailtech/Eaton Receiver	NM 37/57A (30MHz – 1GHz)	06/07/07	Annual	0805-03334
Broadband Amplifier (2)	HP 8447D (0.1 – 1300MHz)	N/A	N/A	2443A01900, 1937A03348
Horn Antenna	EMCO Model 3115 (1-18GHz)	08/25/07	Annual	9704-5182
Horn Antenna	EMCO Model 3116 (18-40GHz)	08/25/07	Annual	9203-2178
Roberts Dipoles	Compliance Design (1 set) A100	08/31/06	Annual	5118
EMCO Dipoles (2)	N/A	05/08/08	Annual	00023951
EMCO LISN (3)	3816/2, 3816/2, 3725/2	10/26/06	Annual	1077, 1079, 2099
50-ohm Terminator	N/A	N/A	Annual	N/A
10dB Attenuator	HP 8493B	N/A	N/A	N/A
Microwave Cables	MicroCoax (1.0-26.5GHz)	02/26/07	Annual	N/A
Shielded Screen Room	RF Lindgren Model 26-2/2-0	N/A	N/A	6710 (PCT270)
Shielded Semi-Anechoic Chamber	Ray Proof Model S81	N/A	N/A	R2437 (PCT278)
Environmental Chamber	Associated Systems 1025	08/08/06	Annual	PCT285
OATS	N/A	12/31/2006	Tri-annual	N/A

Table 5-1. Annual Test Equipment Calibration Schedule

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6.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Panasonic Toughbook Model: CF-74**
FCC ID: ACJ9TGCF-742 is in compliance with Part 15C of the FCC Rules.

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EXHIBIT A - TEST RESULTS

Summary

The intentional radiator has been tested in a simulated typical installation to demonstrate compliance with the relevant FCC performance and procedural standards.
The radio was transmitting at full power on the specified channels and at a data rate(s) specified above. The channels tested are high, middle and low of the allocated bands.
Final system data was gathered in a mode that tended to maximize emissions by varying the orientation of the EUT, orientation of power and I/O cabling, antenna search height, and antenna polarization.

Method/System: Frequency Hopping Spread Spectrum (FHSS)

Number of Channels: 79

FCC Part Section(s)	RSS 210 Section	Test Description	Test Limit	Result
TRANSMITTER MODE (TX)				
15.247(a)(2)		20dB Bandwidth	< 1 MHz if using less than 15 non-overlapping channels	Pass
15.247(b)	6.22(o)(a3)	Transmitter Output Power	< 1 Watt	Pass
15.247(d)	5.9.1 6.2.2(o) (e1)	Occupied BandEdge Out-of-Band Emissions (Band Edge at 20dB below)	Radiated <20dBc. Emissions in restricted bands must meet the radiated limits detailed in 15.207	Pass
15.205 15.209	6.2.1 6.3	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	< FCC 15.209 limits or < RSS-210 table 3 limits Emissions in restricted bands must meet the radiated limits detailed in 15.209	Pass
15.207	6.6	AC Conducted Emissions 150kHz – 30MHz	EN55022	Pass
RECEIVER MODE (RX)				
15.207	7.4	AC Conducted Emissions 150kHz – 30MHz	Class B = 250µV	Pass
15.209	7.3	General Field Strength Limits (Restricted Bands and Radiated Emissions Limits)	< FCC 15.209 limits or < RSS-210 table 3 limits	Pass

Table A-1. Summary of Test Results

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20dB Bandwidth Measurement

§15.247(a)(2)

The bandwidth at 20dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the receive antenna while the EUT is operating in transmission mode at the appropriate frequencies. **The maximum permissible 20dB bandwidth is 1 MHz, unless more than 15 non-overlapping channels are employed.**

The spectrum analyzer is set to:

RBW = 30 kHz (5 dB/div)
 VBW = 30 kHz
 Span = 1.5 MHz
 Ref. Level = 12.5 dBm (Low, High) / 12.8dBm (Mid)
 Sweep = 2.04 ms

Frequency [MHz]	Channel No.	20dB Bandwidth Test Results	
		[kHz]	Pass/Fail
2402	0	696	Pass
2441	39	689	Pass
2480	78	692	Pass

See next pages for spectrum plots (Reference Only).

Table A-2. Conducted Bandwidth Measurements

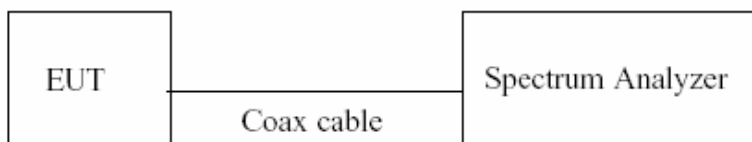


Figure A-1. Test Instrument & Measurement Setup

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Output Power Measurement

§15.247(b)

Measurement is made while the EUT is operating in non-hopping transmission mode. ***The maximum permissible output power is 1 Watt.***

Frequency [MHz]	Channel No.	Conducted Power	
		[dBm]	[mW]
2402	0	-0.06	0.986
2441	39	0.04	1.009
2480	78	-1.01	0.793

See next pages for spectrum plots (Reference Only).

Table A-3. Output Power Measurements

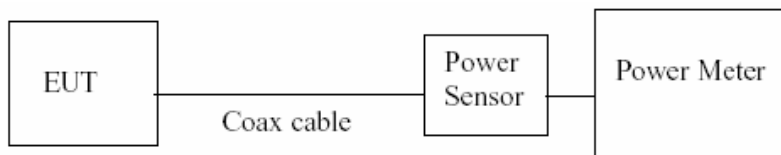
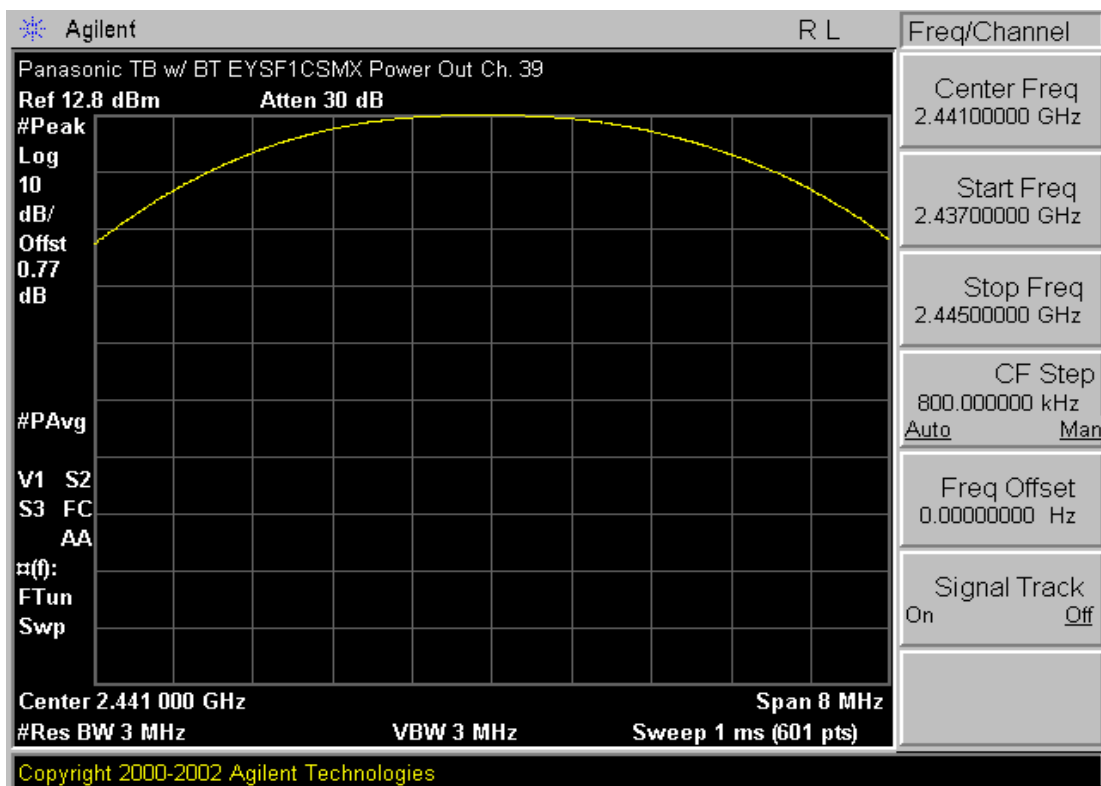
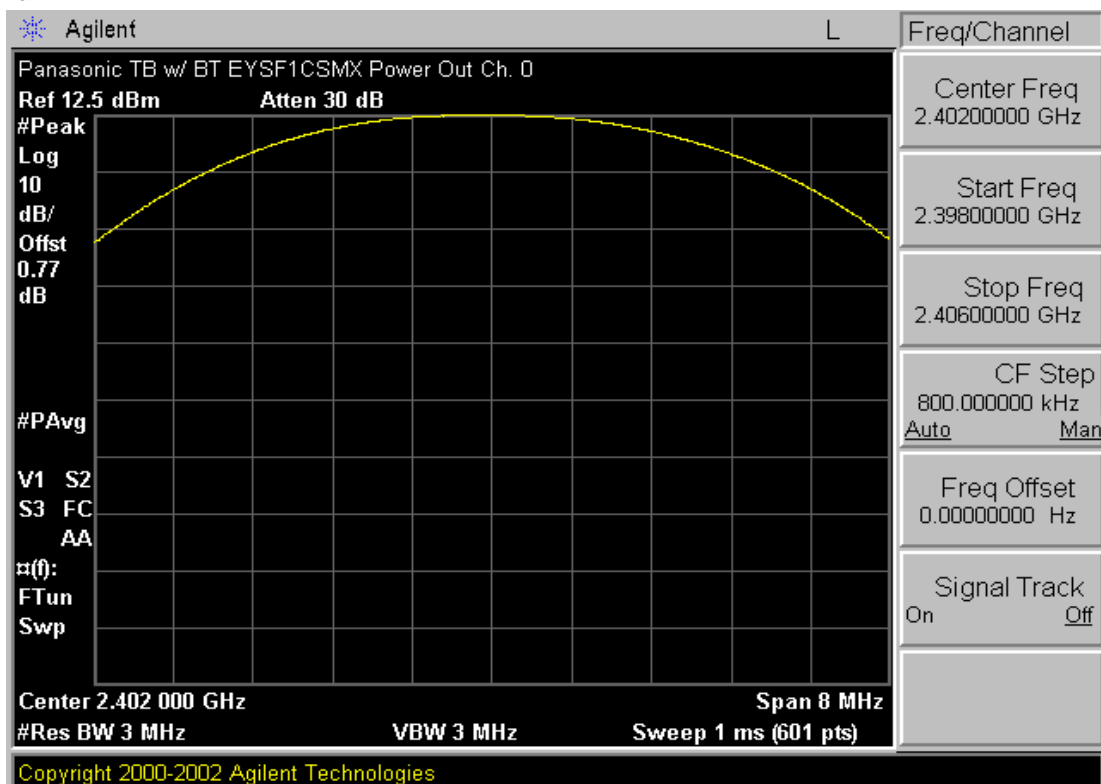
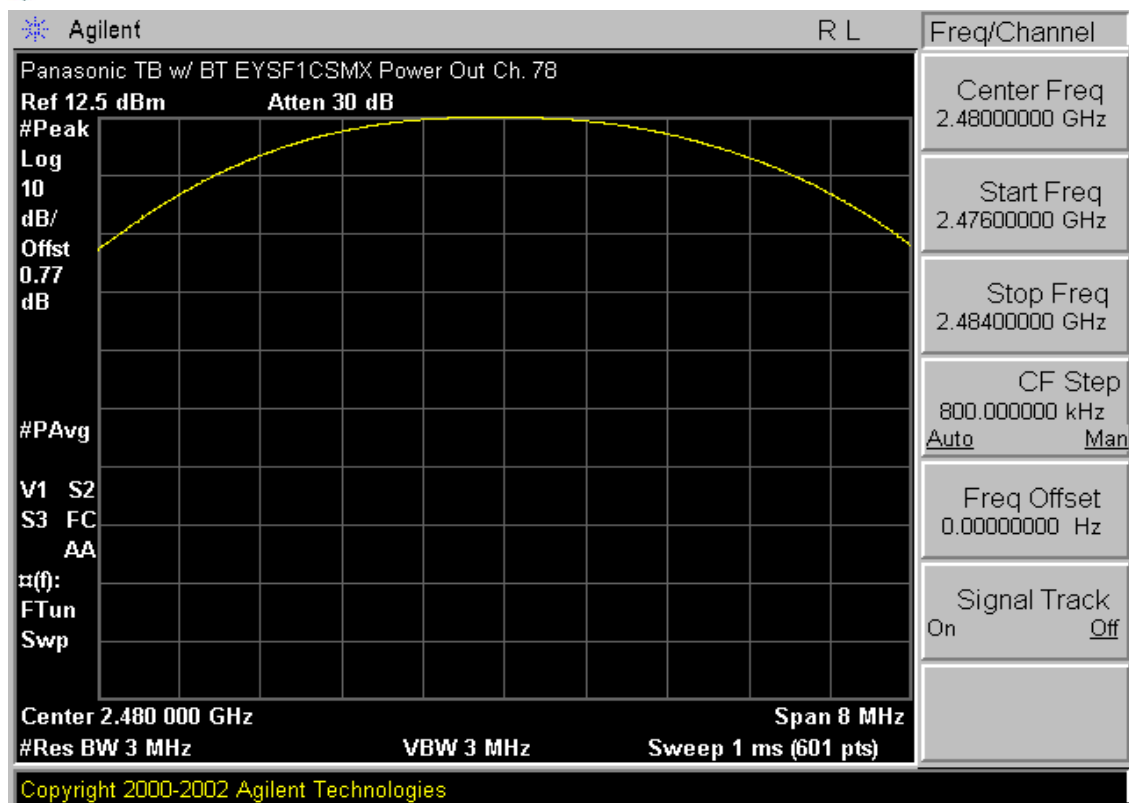


Figure A-2. Test Instrument & Measurement Setup

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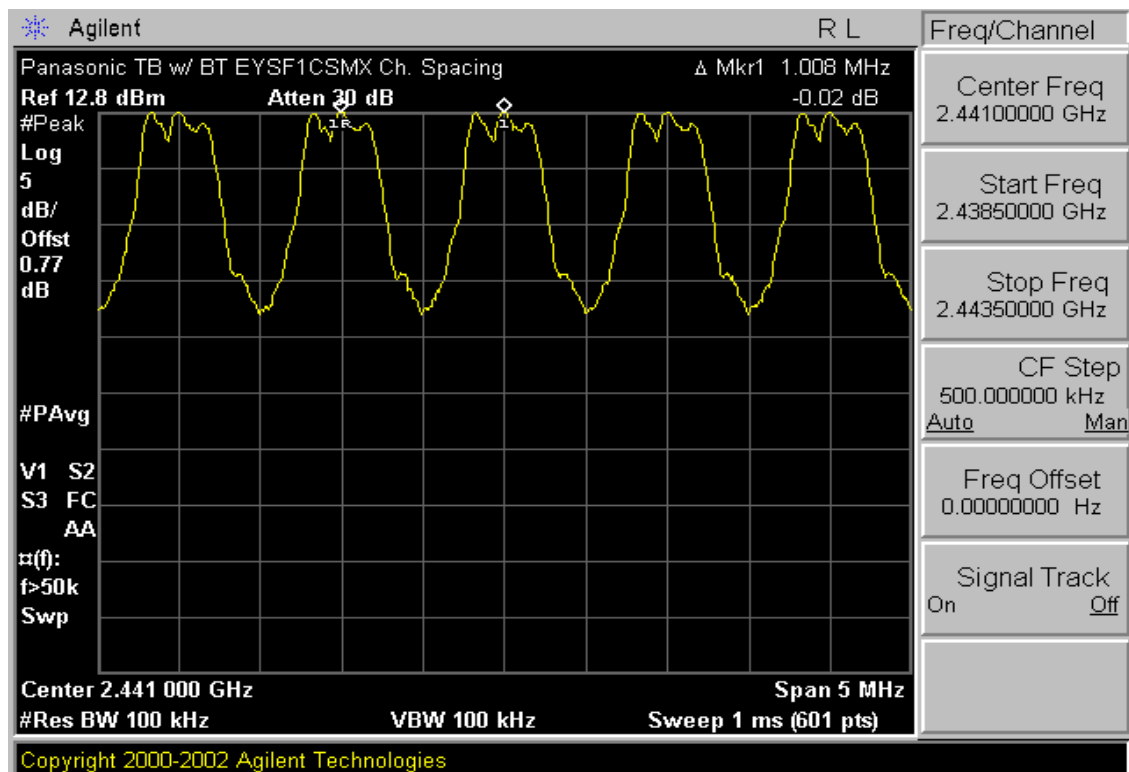
PCTEST™ PT. 15.247 BT TEST REPORT		FCC CERTIFICATION REPORT (BLUETOOTH)		Reviewed by: Quality Manager
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Band Edge Compliance



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Carrier Frequency Separation



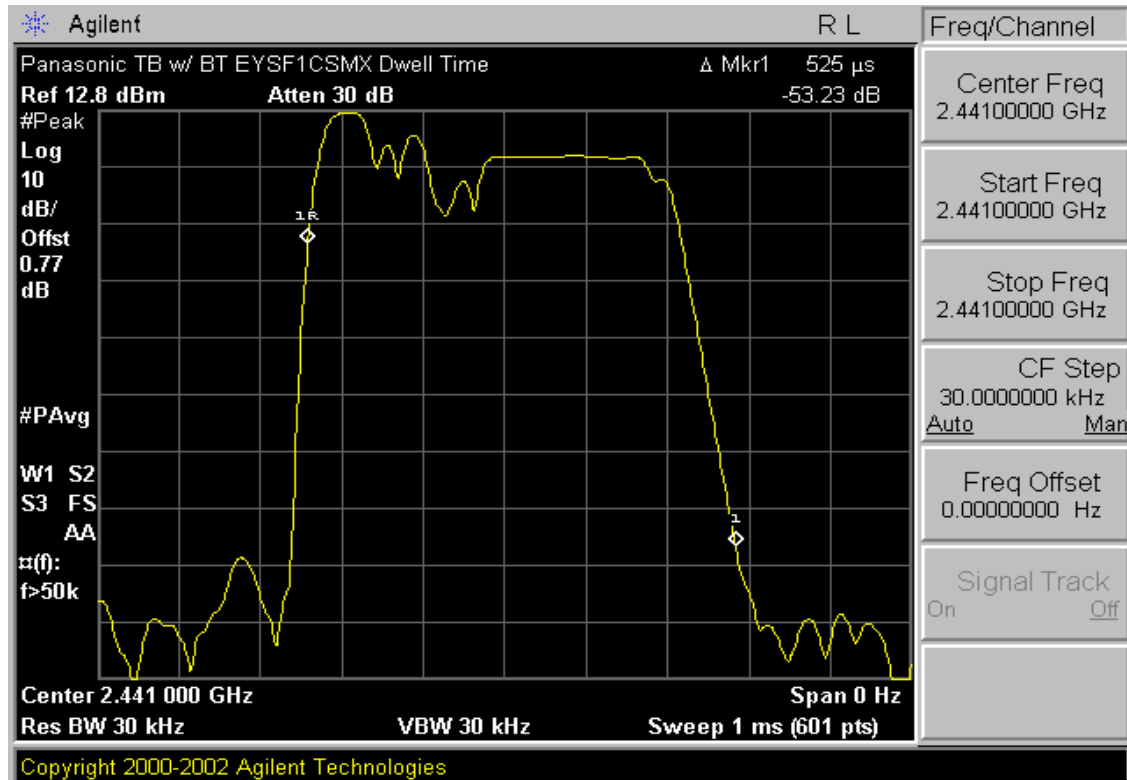
PCTEST™ PT. 15.247 BT TEST REPORT		FCC CERTIFICATION REPORT (BLUETOOTH)		Reviewed by: Quality Manager
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Dwell Time

§15.247(b) / §15.205 & §15.209

Measurement is made while EUT is operating in hopping mode with the spectrum analyzer set to zero span. **The maximum permissible time of occupancy is 400 ms within the minimum time period required to hop through all channels.**



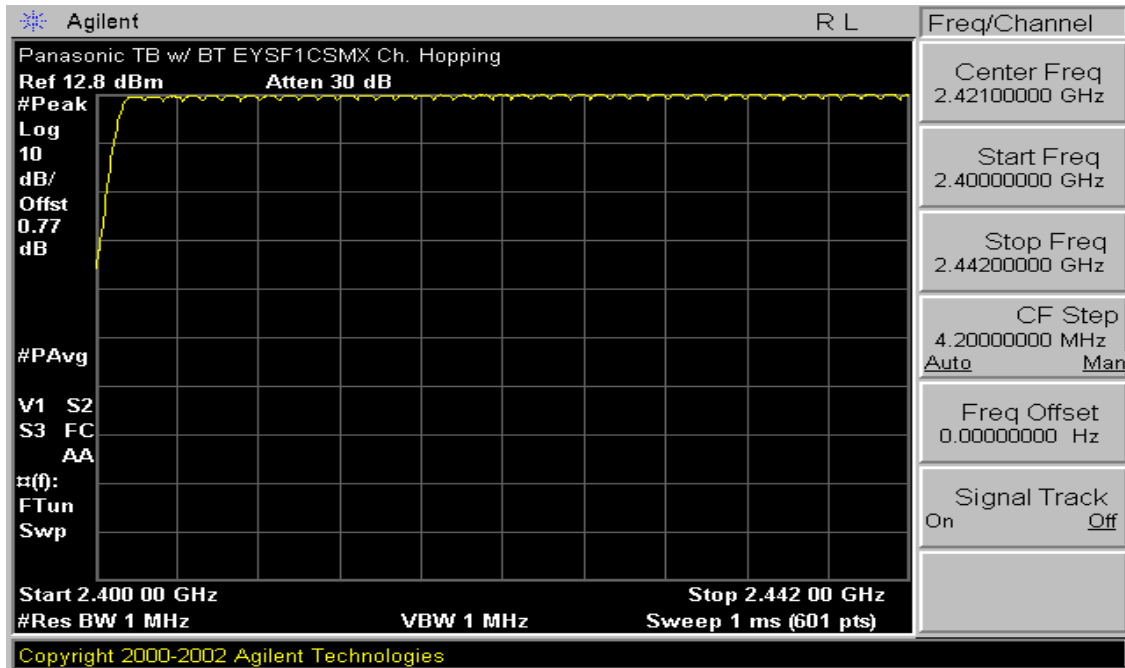
PCTEST™ PT. 15.247 BT TEST REPORT		FCC CERTIFICATION REPORT (BLUETOOTH)		Reviewed by: Quality Manager
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Number of Hopping Channels

§15.247(b) / §15.205 & §15.209

Measurement is made while EUT is operating in hopping mode. ***This frequency hopping system must employ a minimum of 75 hopping channels.***



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Radiated Harmonic Measurements

§15.247(b) / §15.205 & §15.209

The EUT was tested from 9kHz and up to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average measurement was used, using RBW = 1MHz, VBW = 10Hz and linearly polarized horn antennas. All harmonics/spurs are at least 20dB below the highest emission in the authorized band using RBW = 100kHz. 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 sequence, data sequence, and the carrier modulation must not exceed the limits show in Table G-1 per Section 15.209.

Frequency	F/S [μV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400/F (kHz)	300
0.490 – 1.705 MHz	24000/F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table A-4. Radiated Limits

TEST MEASUREMENT EQUIPMENT

Agilent E4448A	PSA Spectrum Analyzer 3Hz - 50GHz
HP 8566B	Spectrum Analyzer 100 Hz - 22GHz
HP 83017A	Microwave Preamplifier 40dB Gain (0.5 - 26.5GHz)
EMCO 3115	Horn Antenna (1 - 18GHz)
EMCO 3116	Horn Antenna (18GHz - 40GHz)
HP 8493B	10dB Attenuator
MicroCoax Cables	Low Loss Microwave Cables (1 - 26.5GHz)

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Radiated Harmonic Measurements (Cont'd)

§15.247(b) / §15.205 & §15.209

Mode: Bluetooth

Measurement Distance: 3 Meters

Channel: 00

	Frequency [MHz]	Level [dBm]	AFCL [dB]	Pol. [H/V]	Field Strength [dB μ V/m]	Field Strength [μ V/m]	Margin [dB]
*	4804.00	-106.51	38.8	H	39.30	92.26	-14.70
	7206.00	-108.48	42.4	V	40.93	111.30	-47.37
	9608.00	-135.00	45.2	H	17.20	7.24	-71.10
*	12010.00	-135.00	46.6	H	18.63	8.54	-35.37

Table A-5. Harmonic Measurements

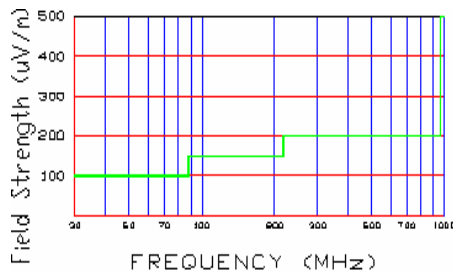


Figure A-3. Radiated limits at 3 meters.

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table G-1. (Note: * = Restricted Band measured frequency)
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 = 1MHz VBW = 10Hz
4. The peak emissions above 1GHz are not more than 20dB 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 and/or a new/fully-recharged battery.
7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
8. < - 135 dBm are below the analyzer floor level.
9. Above 1GHz, the limit is 500 μ V/m (54dB μ m) at 3 meters radiated.

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Radiated Harmonic Measurements (Cont'd)

§15.247(b) / §15.205 & §15.209

Mode: Bluetooth

Measurement Distance: 3 Meters

Channel: 39

	Frequency [MHz]	Level [dBm]	AFCL [dB]	Pol. [H/V]	Field Strength [dBμV/m]	Field Strength [μV/m]	Margin [dB]
*	4882.00	-108.26	38.95	H	37.69	76.65	-16.31
*	7323.00	-109.18	42.67	H	40.49	105.80	-13.51
	9764.00	-135.00	45.36	H	17.36	7.38	-70.91
*	12205.00	-135.00	46.68	H	18.68	8.59	-35.32

Table A-6. Harmonic Measurements

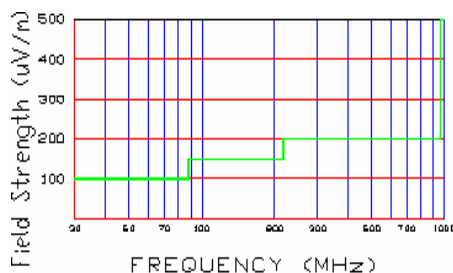


Figure A-4. Radiated limits at 3 meters.

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table G-1. (Note: * = Restricted Band measured frequency)
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 = 1MHz VBW = 10Hz
4. The peak emissions above 1GHz are not more than 20dB 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 and/or a new/fully-recharged battery.
7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
8. < - 135 dBm are below the analyzer floor level.
9. Above 1GHz, the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

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Radiated Harmonic Measurements (Cont'd)

§15.247(b) / §15.205 & §15.209

Mode: Bluetooth

Measurement Distance: 3 Meters

Channel: 78

	Frequency [MHz]	Level [dBm]	AFCL [dB]	Pol. [H/V]	Field Strength [dB μ V/m]	Field Strength [μ V/m]	Margin [dB]
*	4960.00	-106.35	39.19	H	39.84	98.17	-14.16
*	7440.00	-109.13	43.01	H	40.88	110.66	-13.12
	9920.00	-135.00	45.67	H	17.67	7.65	-70.06
	12400.00	-135.00	46.61	H	18.61	8.52	-35.39

Table A-7. Harmonic Measurements

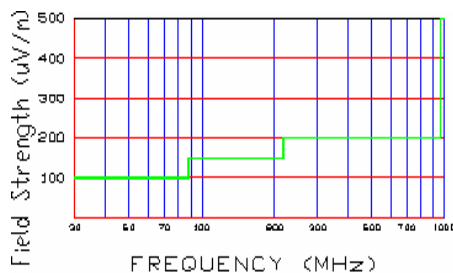


Figure A-5. Radiated limits at 3 meters.

NOTES:

1. All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table G-1. (Note: * = Restricted Band measured frequency)
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 = 1MHz VBW = 10Hz
4. The peak emissions above 1GHz are not more than 20dB 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 and/or a new/fully-recharged battery.
7. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
8. < - 135 dBm are below the analyzer floor level.
9. Above 1GHz, the limit is 500 μ V/m (54dB μ m) at 3 meters radiated.

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Radiated Restricted Band Measurements

§15.205 / §15.209

- Special attention is made for the EUT's harmonic and spurious radiated emission in the restricted bands of operations.

Operating Frequency: 2480MHz

Measurement Distance: 3 Meters

Channel: 78

Frequency [MHz]	Level [dBm]	AFCL [dB]	Pol. [H/V]	Field Strength [dBμV/m]	Field Strength [μV/m]	Margin [dB]
2483.5	-94.63	30.81	H	43.18	144.21	-10.80
2485.3	-99.83	30.82	H	37.99	79.34	-15.99
2487.3	-103.83	30.83	V	34.00	50.12	-19.98
2489.4	-104.13	30.83	H	33.70	48.42	-20.28
2496.0	-94.63	30.85	V	43.22	144.88	-10.76
2499.9	-106.83	30.86	H	31.03	35.60	-22.95

Table A-8. Radiated Restricted Band Measurements at 3-meters

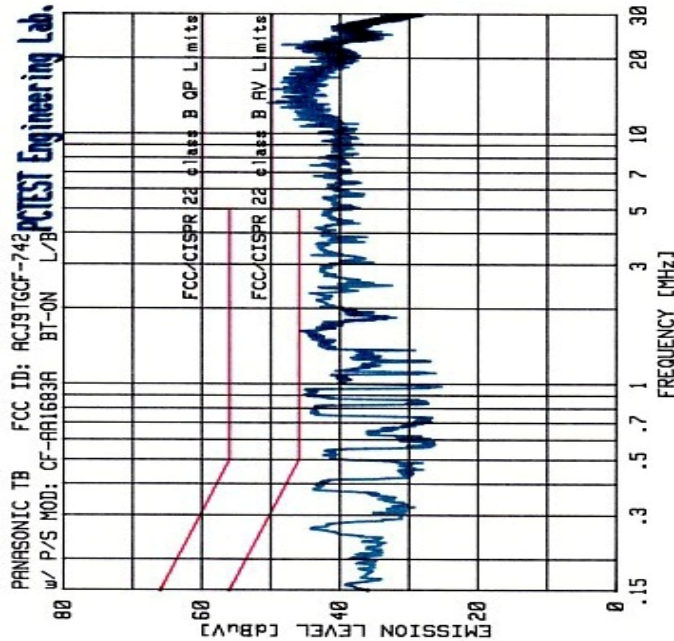
NOTES:

- The antenna is manipulated through typical positions, polarity and length during the testing.
- The EUT is supplied with the minimal AC voltage or/and a new/fully re-charged battery.
- The spectrum is measured from 9kHz up to the 10th harmonic and the worst-case emissions are reported.
- Above 1 GHz the limit is 500μV/m.
- < -135 dBm is below the analyzer measurement floor level.
- The peak emissions above 1 GHz are not more than 20 dB above the average limit.

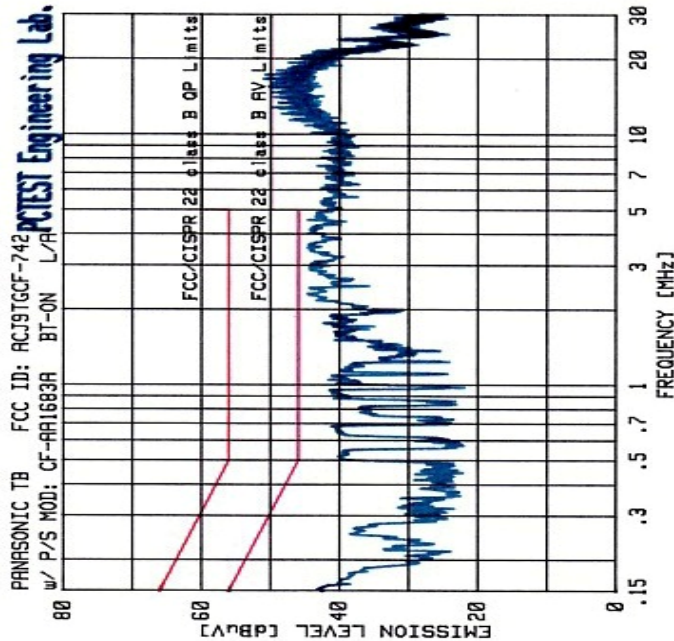
PCTEST™ PT. 15.247 BT TEST REPORT		FCC CERTIFICATION REPORT (BLUETOOTH)		Reviewed by: Quality Manager
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Line-Conducted Test Data

§15.207



No.	Freq. [MHz]	Quasi-Pk [dBuV]	Limit [dBuV]	Margin [dB]	Average [dBuV]	Limit [dBuV]	Margin [dB]
1	13.276	45.75	60.00	-14.25	29.59	50.00	-20.41
2	15.036	43.18	60.00	-16.82	28.20	50.00	-21.80
3	1.622	44.23	56.00	-11.77	32.02	46.00	-13.98
4	13.535	43.96	60.00	-16.04	29.20	50.00	-20.80
5	.925	41.20	56.00	-14.80	23.40	46.00	-22.60
6	.945	43.28	56.00	-12.72	28.54	46.00	-17.46
7	.878	40.12	56.00	-15.88	24.29	46.00	-21.71
8	12.727	45.16	60.00	-14.84	28.53	50.00	-21.47
9	16.109	43.64	60.00	-16.36	29.47	50.00	-20.53
10	2.301	43.11	56.00	-12.89	25.87	46.00	-20.13



No.	Freq. [MHz]	Quasi-Pk [dBuV]	Limit [dBuV]	Margin [dB]	Average [dBuV]	Limit [dBuV]	Margin [dB]
1	16.534	47.48	60.00	-12.52	32.87	50.00	-17.13
2	17.213	46.85	60.00	-13.15	31.84	50.00	-18.16
3	16.671	46.89	60.00	-13.11	32.73	50.00	-17.27
4	15.451	45.48	60.00	-14.52	32.25	50.00	-17.75
5	14.634	47.61	60.00	-12.39	33.46	50.00	-16.54
6	15.988	46.74	60.00	-13.26	31.76	50.00	-18.24
7	12.736	46.51	60.00	-13.49	29.81	50.00	-20.19
8	15.851	46.99	60.00	-13.01	32.32	50.00	-17.68
9	15.315	47.26	60.00	-12.74	32.16	50.00	-17.84
10	14.895	46.33	60.00	-13.67	30.84	50.00	-19.16

Notes:

1. All Modes of operation were investigated and the worst-case emissions are reported.
2. The limit for Class B device(s) from 150kHz to 30MHz are Specified in EN55022.
3. Line A = Phase; Line B = Neutral
4. Deviations to the Specifications: None.

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EXHIBIT B – BLOCK DIAGRAM / SCHEMATICS

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EXHIBIT C – OPERATIONAL DESCRIPTION

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EXHIBIT D – TEST SETUP PHOTOGRAPHS

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EXHIBIT E – EUT EXTERNAL / INTERNAL PHOTOGRAPHS

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EXHIBIT F – USER’S MANUAL

PCTEST™ PT. 15.247 BT TEST REPORT		FCC CERTIFICATION REPORT (BLUETOOTH)		Reviewed by: Quality Manager
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