

PCTEST ENGINEERING LABORATORY, INC.

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CERTIFICATE OF COMPLIANCE

MANUFACTURER NAME & ADDRESS:

Panasonic Corporation of North America One Panasonic Way, 4B-8 Secaucus, NJ 07094 **DATE & LOCATION OF TESTING:**

Date(s) of Tests: January 17-20, 2006 Test Report S/N: 0512280868

Test Site: PCTEST Lab, Columbia, MD Project Number: ITPD-05-F038A

FCC ID: ACJ9TGCF-189A

APPLICANT: Panasonic Corporation of North America

SUMMARY:

Frequency Range:

Model No.: CF-18mk4

Equipment EUT Type: Notebook PC w/ Intel WLAN and EVDO

Max. Output Power: 17.36 dBm (Peak) Conducted (Low Band)

20.96 dBm (Peak) Conducted (High Band)

5180 – 5240 MHz (Low Band)

5260 – 5320 MHz (High Band)

FCC Classification: Unlicensed National Information Infrastructure (NII)

FCC Rule Part(s): Parts 15.407; ANSI C-63.4-2001

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-63.4-2001. If the EUT contains any additional embedded transmitters, then those transmitters were active during all tests. The JBC portion of this EUT is covered in the DOC report. Radiated data was taken with the highest gain antenna.

I authorize and 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. 862.

Alfred Cirwithian Vice President Engineering 

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Attestation Statements

PCTEST LAB TEST REPORT 15.407	VPCTEST (C CERTIFICATION REPORT	Panasonic	Reviewed by: Quality Manager
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MEASUREMENT REPORT



FCC Part 15.407 Measurement Report Cover Page

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) Parts 15.407; ANSI C-63.4-2001

MODEL NAME CF-18mk4

FCC ID ACJ9TGCF-189A

Test Device Serial No.: S/N: 5KKSB50328 □ Production □ Engineering

FCC CLASSIFICATION Unlicensed National Information Infrastructure (NII)

DATE(S) OF TEST January 17-20, 2006

TESTS REPORT S/N: 0512280868

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 C63.4-2001) and FCC Public Notice dated July 12, 1995 entitled "Guidance on Measurement for Direct Sequence Spread Spectrum System" were used in the measurement of **Notebook PC w/ WLAN (Intel Centrino Model: 2915ABG).**

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 Internt'l (BWI) airport, the city of Baltimore and the Washington, DC area. (see Figure 1.2-1).

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

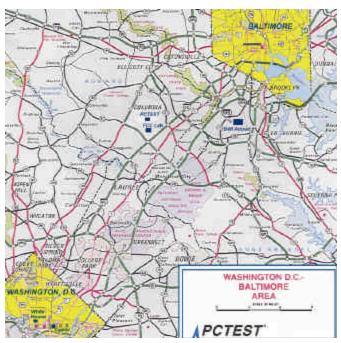


Figure 1.3-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the *Notebook PC w/ WLAN (Intel Centrino Model: 2915ABG)*. The EUT consisted of the following components(s):

Table 2-1. EUT Equipment Description

Manufacturer / Model / Description	Serial Number
Panasonic Notebook PC w/ WLAN	5KKSB50328

2.2 Enclosure

The EUT incorporates the following enclosure:

NONE

2.3 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

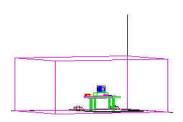


Figure 3.1-1. Shielded Enclosure Line-Conducted Test Facility

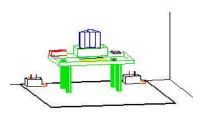


Figure 3.1-2. Line Conducted Emission Test Set-Up

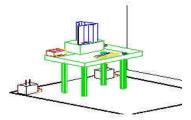


Figure 3.1-3. Wooden Table & Bonded LISNs

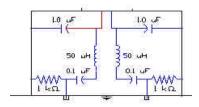


Figure 3.1-4. LISN Schematic Diagram

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 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 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 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 reexamined 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

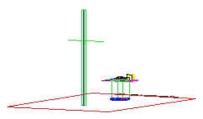


Figure 3.2-1. Meter Test Site

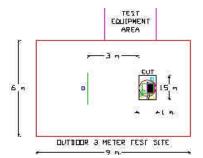


Figure 3.2-2. Dimensions of Outdoor Test Site

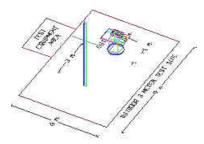


Figure 3.2-3. Turntable and System Setup

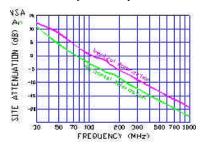


Figure 3.2-4. Normalized Site Attenuation Curves (H&V)

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, turntable azimuth with respect to the antenna was noted for each frequency found. The spectrum was scanned from 30 to 200 MHz using bi-conical 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 TM Dipole antennas or horn antenna (see Figure 3.2-1). 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 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 1 MHz 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.

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4.0 ANTENNA REQUIREMENTS

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 antennas are **permanently attached antenna**.

There are provisions for connection to an external antenna. Please refer to Panasonic's application cover letter for details.

Conclusion:

The **Panasonic CF-18mk4** unit complies with the requirement of §15.203.

Low Band:

Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
36	5180	52	5260
-	:	-	:
42	5210	56	5280
-	:	-	:
48	5240	64	5320

Table 4.1 Frequency/ Channel Operations

	PCTEST LAB TEST REPORT 15.407	VPCTEST C	C CERTIFICATION REPORT	Panasonic	Reviewed by: Quality Manager
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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	S/N
Microwave Spectrum Analyzer	HP 8566 (100Hz-22GHz)	12/5/2006	3638A08713
Microwave Spectrum Analyzer	HP 8566 (100Hz-22GHz)	4/17/2006	2542A11898
Spectrum Analyzer/Tracking Generator	HP 8591A (9kHz-1.8GHz)	3/24/2006	3144A02458
Spectrum Analyzer	HP 8591A (9kHz-1.8GHz)	4/23/2006	3108A02053
Spectrum Analyzer	HP 8594A (9kHz-2.9GHz)	11/2/2006	3051A00187
Signal Generator	HP 8650B (500Hz-1GHz)	6/2/2006	2232A19558
Signal Generator	HP 8640B (500Hz-1GHz)	6/2/2006	1851A09816
Signal Generator	Rohde & Schwarz (0.1-1GHz)	9/22/2006	894215/012
Ailtech/Eaton Receiver	NM 37/57A-SL (30MHz-1GHz)	4/12/2006	0792-03271
Ailtech/Eaton Receiver	NM 37/57A (30MHz-1GHz)	3/11/2006	0805-03334
Ailtech/Eaton Receiver	NM 17/27A (0.1-32MHz)	9/17/2006	0608-03241
Quasi-Peak Adapter	HP 85650A	8/9/2006	2043A00301
Ailtech/Eaton Adapter	CCA-7 CISPR/ANSI QP Adapter	3/11/2006	0194-04082
RG58 Coax Test Cable	No.167	3/26/2006	n/a
Harmonic/Flicker Test System	HP 6841A (IEC 555-2/3)	11/15/2006	3531A00115
Broadband Amplifier	HP 8447D	2/26/2006	1145A00470
Broadband Amplifier	HP 8447D	2/26/2006	1937A03348
Horn Antenna (2)	EMCO Model 3115 (1-18GHz)	3/15/2006	9704-5182, 9205-3874
Horn Antenna	EMCO Model 3116 (18-40GHz)	3/28/2006	9203-2178
Biconical Antenna (3)	Eaton 94455-1	1/26/2006	1295, 1332, 1277
Roberts Dipoles	Compliance Design (1 set) A100	8/11/2006	5118
EMCO LISN (3)	3816/2, 3816/2, 3725/2	10/26/2006	1077, 1079, 2099
50-ohm Terminator	n/a	n/a	n/a
Microwave Preamp 30dB Gain	HP 83017A (0.5-26.5GHz)	3/26/2006	3123A00181
Microwave Cables	MicroCoax (1.0-26.5GHz)	2/26/2006	n/a
Spectrum Analyzer	HP 8591A	6/18/2006	3034A01395
Modulation Analyzer	HP 8901A	6/26/2006	2432A03467
Microwave Survey Meter	Holaday Model 1501 (2.45GHz)	2/21/2006	80931
Digital Thermometer	Extech Instruments 421305	3/15/2006	426966
Attenuator	4108 (6dB)	3/26/2006	n/a
Shielded Screen Room	RF Lindgren Model 26-2/2-0	n/a	6710 (PCT270)
Shielded Semi-Anechoic Chamber	Ray Proof Model S81	4/15/2006	R2437 (PCT278)
Environmental Chamber	Associated Systems 1025	8/8/2006	PCT285
OATS	n/a	12/31/2006	n/a

Table 5-1. Annual Test Equipment Calibration Schedule

	PCTEST LAB TEST REPORT 15.407	VPCTEST C	C CERTIFICATION REPORT	Panasonic	Reviewed by: Quality Manager
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6.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Notebook PC w/ WLAN (Intel Centrino Model: 2915ABG)** is in compliance with Part 15E 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.

Tests were performed with the radio transmitting at full power on the specified channels and at the data rates specified below. **Final data was taken at a data rate of 9 Mbps**, because at the higher available data rates the output power is automatically reduced by several dB. The channels tested are low, middle and high 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:
 U-NII

 Data Rate(s) Tested:
 9, 12, 18, 24, 36, 48, 54 Mbps

FCC Part Section(s)	RSS 210 Section	Test Description	Test Limit	Test Condition	Verdict	
TRANSMITTER MOD	E (TX)					
15.403 (c)	6.2.2(q)(iv)(b)	26 dB Bandwidth	> 500kHz	CONDUCTED	PASS	
15.407 (a)(1), (2), (3)	6.2.2(q1)(i)(ii)	Transmitter Output Power Conducted	<50 mW 5150-5250 MHz , <250 mW 5250-5350 <1 W 5725-5825 MHz		PASS	
15.407 (a)(1), (2), (3), (5)	6.2.2(q1)(i)(ii)	Transmitter Power Spectral Density	<4 dBm 5150-5250 MHz IC: <10 dBm <11dBm 5250-5350 MHz		PASS	
15.407(a)(6)	N/A	Peak Excursion	<13 dB across 1 MHz		PASS	
15.407(b)(1), (2)(5)(6)		Undesirable Emissions	-27 dBm/MHz EIRP	Radiated	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	Radiated (30MHz-1GHz) (1-25 GHz)	PASS	
15.207	6.6	AC Conducted Emissions 150kHz – 30MHz	EN55022	Line Conducted	PASS	
RECEIVER MODE (RX	<u>Ω</u>					
15.107	7.4	AC Conducted Emissions 150kHz – 30MHz	EN55022	Line Conducted	PASS	
15.109	7.3	General Field Strength Limits (Restricted Bands and Radiated Emissions Limits)	< FCC 15.209 limits or < RSS-210 table 3 limits	Radiated (30MHz-1GHz) (1-25 GHz	PASS	
RF EXPOSURE (SAR or MPE)						
2.1093/2.1091	RSS-102	SAR Test or MPE	1.6 W/kg or mw/cm²	3 Channels	PASS	

Table A-1. Summary of Test Results

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26dB Bandwidth Measurement

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating in transmission mode at the appropriate frequencies.

The spectrum analyzer is set to:

RBW = 300 kHz (10 dB/div)

VBW = 1.0 MHz Span = 30 MHz Sweep = 1.065 ms

Frequency	Channel	Test	Results
(MHz)	No.	26dB Bandwidth (MHz)	Pass/Fail
5180	36	16.91	Pass
5260	52	16.91	Pass
5320	64	17.35	Pass

⁻ See next pages for actual measured spectrum plots

Table A-2. Conducted Bandwidth Measurements

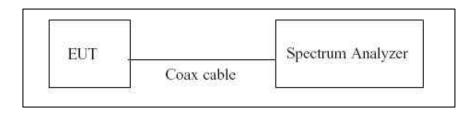
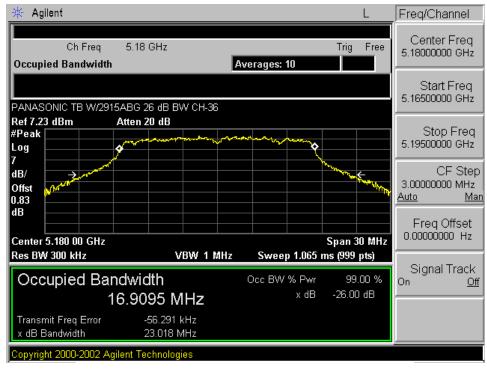


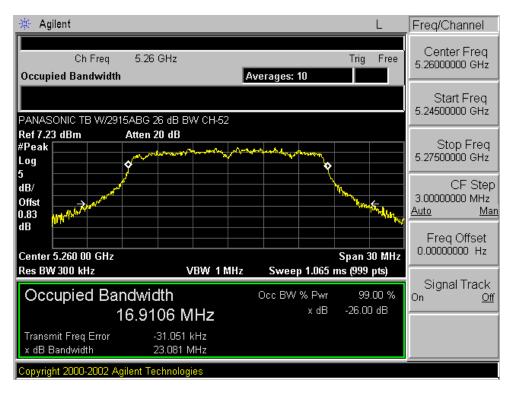
Figure A-1. Test Instrument & Measurement Setup

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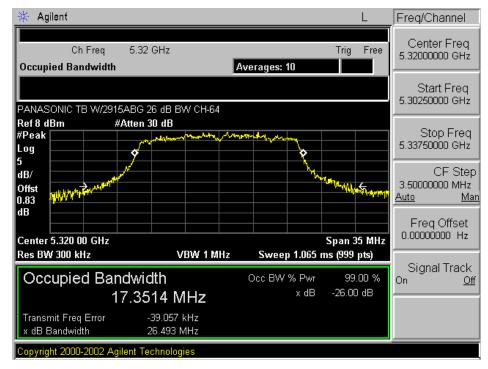
Plot A-1. 26dB Bandwidth Plot - Ch. 36



Plot A-2. 26dB Bandwidth Plot - Ch. 52

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Plot A-3. 26dB Bandwidth Plot - Ch. 64

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Output Power Measurement 802.11a (5.2 GHz Band)

§15.407(a) (1), (2), (3)

A transmitter antenna terminal of EUT is connected to the input of a RF power sensor. Measurement is made while the EUT is operating in transmission mode at the appropriate frequencies.

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

Freq (MHz)	Chan	Rate (MBps)	Measured Avg. Power (dBm)	Cable Loss (dB)	Average Power (dBm)	Peak Power (dBm)
5180	36	6	11.03	0.83	11.86	17.36
		9	10.84	0.83	11.67	17.17
		12	10.82	0.83	11.65	17.15
		18	10.74	0.83	11.57	17.07
		24	10.57	0.83	11.40	16.90
		36	10.40	0.83	11.23	16.73
		48	10.23	0.83	11.06	16.56
		54	10.57	0.83	11.40	16.90
5210	42	6	10.05	0.83	10.88	16.18
		9	9.78	0.83	10.61	15.91
		12	9.50	0.83	10.33	15.63
		18	9.84	0.83	10.67	15.97
		24	9.46	0.83	10.29	15.59
		36	9.67	0.83	10.50	15.80
		48	9.48	0.83	10.31	15.61
		54	9.88	0.83	10.71	16.01
5240	48	6	9.76	0.83	10.59	15.39
		9	9.67	0.83	10.50	15.30
		12	9.55	0.83	10.38	15.18
		18	9.47	0.83	10.30	15.10
		24	9.25	0.83	10.08	14.88
		36	9.20	0.83	10.03	14.83
		48	8.91	0.83	9.74	14.54
		54	9.59	0.83	10.42	15.22
5260	52	6	13.97	0.83	14.80	20.00

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		9	13.79	0.83	14.62	19.82
		12	13.80	0.83	14.63	19.83
		18	13.75	0.83	14.58	19.78
		24	13.72	0.83	14.55	19.75
		36	12.73	0.83	13.56	18.76
		48	12.74	0.83	13.57	18.77
		54	10.59	0.83	11.42	16.62
5280	56	6	14.02	0.83	14.85	19.65
		9	14.45	0.83	15.28	20.08
		12	14.40	0.83	15.23	20.03
		18	14.32	0.83	15.15	19.95
		24	14.27	0.83	15.10	19.90
		36	13.30	0.83	14.13	18.93
		48	13.16	0.83	13.99	18.79
		54	11.02	0.83	11.85	16.65
5320	64	6	15.01	0.83	15.84	20.94
		9	15.03	0.83	15.86	20.96
		12	14.82	0.83	15.65	20.75
		18	14.94	0.83	15.77	20.87
		24	14.88	0.83	15.71	20.81
		36	13.68	0.83	14.51	19.61
		48	13.61	0.83	14.44	19.54
		54	11.41	0.83	12.24	17.34

Table A-5. Conducted Output Power Measurements

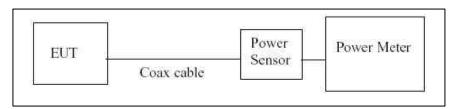


Figure A-4. Test Instrument & Measurement Setup

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PEAK Power Spectral Density FCC 15.407(a)(1) and (a)(2)

The spectrum analyzer was connected to the antenna teminal while the EUT was operating in a continuous transmission mode at the appropriate center frequencies.

The spectrum analyzer was set to: RBW=1 MHz, VBW=8MHz, mode=Sample "on" for FCC (Measurement Method 2 from FCC Public Notice DA 02-2138) and "off" for Industry Canada.

The spectrum analyzer is set to:

RBW 1 MHz (10dB/div)

VBW 3 MHz
Span 20 MHz
Ref. Level 19.83 dBm
Sweep 50.03 ms

Detector Sampling with power averaging (100 sweeps)

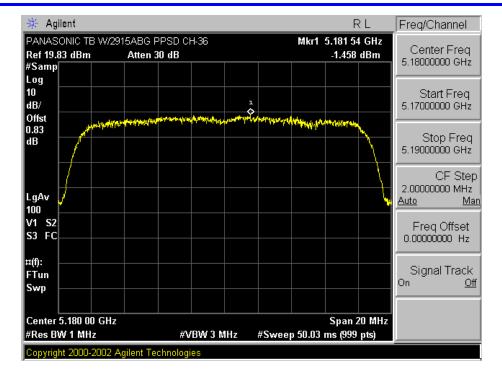
	Frequency	Channel		Test Results		
	(MHz)	No.	Power Density (dBm)	Limit	Margin (dB)	
	5180	36	-1.458	4 dBm	-5.458	
	5260	52	0.807	11 dBm	-10.193	
İ	5320	64	2.347	11 dBm	-8.653	

1See next pages for actual measured spectrum plots

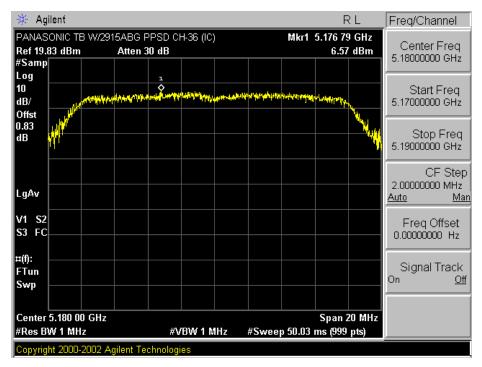
Table A-4. Conducted Power Density Measurements (9 Mbps)

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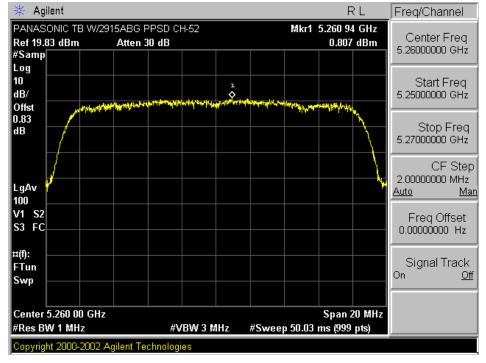
Plot A-7. Peak Power Spectral Density Plot - Low channel / Low Band



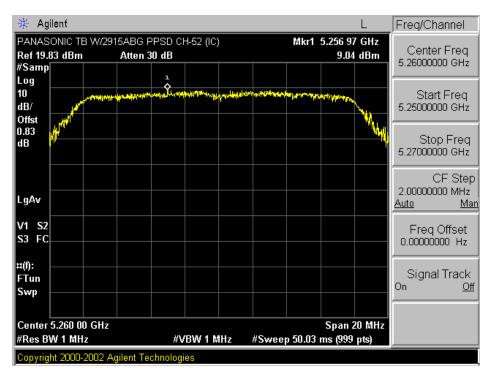
Plot A-8. Peak Power Spectral Density Plot – Low Channel / Low Band (IC)

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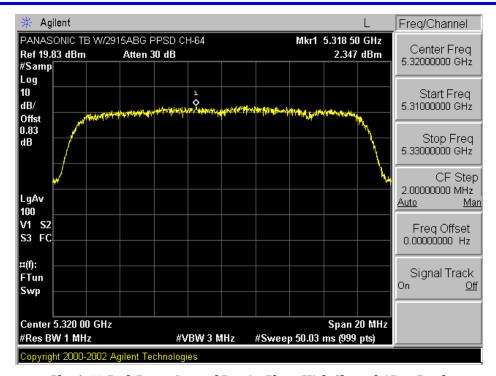
Plot A-8. Peak Power Spectral Density Plot - Mid Channel / Low Band



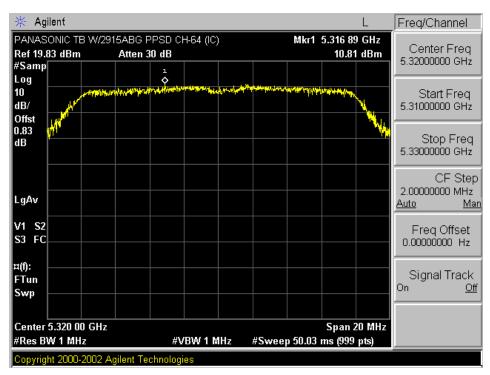
Plot A-9. Peak Power Spectral Density Plot - Mid Channel / Low Band (IC)

PCTEST LAB TEST REPORT 15.407 CC CERTIFICATI		C CERTIFICATION REPORT	Panasonic	Reviewed by: Quality Manager
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Plot A-10. Peak Power Spectral Density Plot - High Channel / Low Band



Plot A-11. Peak Power Spectral Density Plot – High Channel / Low Band (IC)

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PEAK Excursion Ratio FCC 15.407(a)(6)

The spectrum analyzer was connected to the antenna teminal while the EUT was operating is the continuous transmission mode at the appropriate center frequencies.

1st Trace:

The spectrum analyzer was set to: RBW=1 MHz, VBW=3MHz, mode=Peak detector and max hold.

2nd Trace:

The spectrum analyzer was set to : RBW=1 MHz, VBW=30kHz, trigger=free run, mode=sample detector "on" (settings tend to present similar results compared to the power meter)

Largest difference between the traces is the peak excursion.

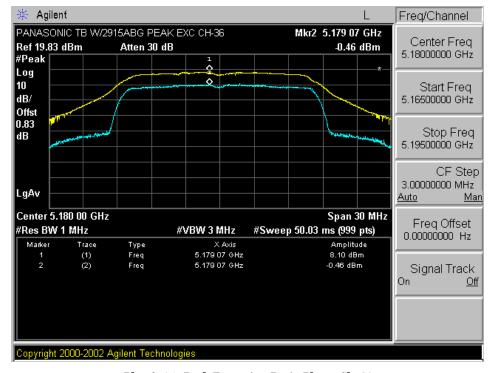
The spectrum analyzer is set to:

Frequency	Channel	Test Results		
(MHz)	No.	Excursion Ratio (dB)	Limit	Margin (dB)
5180	36	8.56	13 dBm	-3.06
5260	52	9.64	13 dBm	-1.57
5320	64	9.43	13 dBm	-2.25

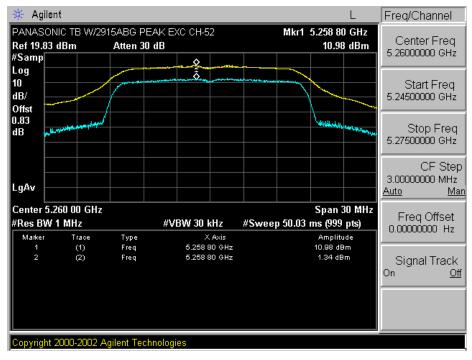
See next pages for actual measured spectrum plots

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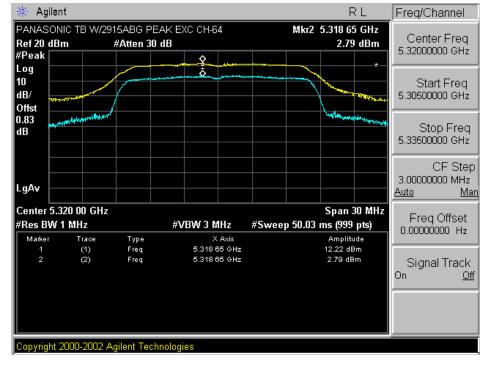
Plot A-15. Peak Excursion Ratio Plot - Ch. 36



Plot A-16. Peak Excursion Ratio Plot - Ch. 52

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Plot A-17. Peak Excursion Ratio Plot - Ch. 64

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Undesirable Emissions: Radiated Measurements and Restricted Band Measurements

The EUT was tested from 9kHz to the tenth harmonic of the fundamental frequency of the transmitter. Below 1GHZ a CISPR quasi peak detector was used. Above 1 GHz average measurements were taken, using RBW= 1MHz, VBW= 10Hz, and linearly polarized horn antennas. In addition, peak measurements (RBW= 1MHz, VBW= 1MHz) were taken to ensure that the peak levels are not more than 20dB above the average limit. No harmonics/spurs peak emissions are more than 20dB above the average limit. Special attention is taken for the EUT's harmonic and spurious radiated emissions in the restricted bands of operations, as defined in Section 15.205.

Frequency	F/S (mV/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-6. Restricted Band Limits

TEST MEASUREMENT EQUIPMENT

Agilent E4448A	PSA Spectrum Analyzer 3 Hz - 50GHz
HP 4448A	Spectrum Analyzer 100Hz – 50GHz
HP 83017A	Microwave Analyzer 40dB Gain (0.5 – 26.5GHz)
HP 3784A	Digital Transmission Analyzer
EMCO 3115	Horn Antenna (1 – 18GHz)
EMCO 3116	Horn Antenna (18 – 40GHz)
HP 8495A	20dB Attenuator (DC-40GHz) 0 -70dB
HP 8493B	10dB Attenuator
MicroCoax Cables	Low Loss Microwave Cables (1 – 50GHz)
CDI Dipoles	Dipole Antennas (30 – 1000MHz)
EMCO 3116	Horn Antenna (18 – 40GHz)

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Undesirable Emissions: Radiated Measurements and Restricted Band Measurements

§15.407(b)(1) and (2), §15.205 & §15.209

Transfer Rate: 36 Mbps

Distance of Measurements: 3 Meters

Channel: 36

Frequency (MHz)	Level (dBm)	AFCL (dB)	POL (H/V)	F/S (dBuV/m)	F/S (uV/m)	Margin (dB)
10360	-110.5	40.6	V	37.10	71.61	-16.9
15540	-125.0	45.8	V	27.80	24.55	-26.2
20720	-125.1	49.6	V	31.50	37.58	-22.5
25900	-125.0	52.1	V	34.10	50.70	-19.9

Table A-7. Radiated Measurements @ 3 meters

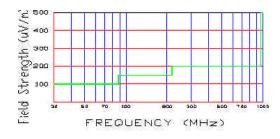


Figure A-5. Radiated limits at 3 meters.

NOTES:

- 1. The limit listed in Section 15.407(b) is $-27\,dBm/MHz$ EIRP. This is equivalent to a field strength of 68.24 dBuV/m @ 3m.
- 2. The Restricted Band limit (Section 15.205) for frequencies above 960 MHz is 54 dBuV/m @ 3m.
- 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 $10^{\rm th}$ harmonic and the worst-case emissions are reported.
- 8. Levels < -140 dBm are at the analyzer noise floor.

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Undesirable Emissions: Radiated Measurements and Restricted Band Measurements

§15.407(b)(1) and (2), §15.205 & §15.209

Transfer Rate: 36 Mbps

Distance of Measurements: 3 Meters

Channel: 52

Frequency (MHz)	Level (dBm)	AFCL (dB)	POL (H/V)	F/S (dBuV/m)	F/S (uV/m)	Margin (dB)
10520	-103.8	40.5	V	43.7	153.11	-10.3
15780	-125.2	47.3	V	29.1	28.51	-24.9
21040	-125.1	50.1	V	31.95	39.58	-22.05
26300	-125.1	52.3	V	34.2	51.29	-19.8

Table A-8. Radiated Measurements @ 3 meters

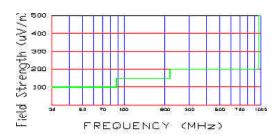


Figure A-6. Radiated limits at 3 meters.

NOTES:

- 1. The limit listed in Section 15.407(b) is $-27\,dBm/MHz$ EIRP. This is equivalent to a field strength of $68.24\,dBuV/m$ @ 3m.
- 2. The Restricted Band limit (Section 15.205) for frequencies above 960 MHz is 54 dBuV/m @ 3m.
- 3. Average Measurements $> 1 \mbox{GHz}$ 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 10^{th} harmonic and the worst-case emissions are reported.
- 8. Levels < -140 dBm are at the analyzer noise floor.

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Undesirable Emissions: Radiated Measurements and Restricted Band Measurements

§15.407(b)(1) and (2), §15.205 & §15.209

Transfer Rate: 36 Mbps

Distance of Measurements: 3 Meters

Channel: 64

Frequency (MHz)	Level (dBm)	AFCL (dB)	POL (H/V)	F/S (dBuV/m)	F/S (uV/m)	Margin (dB)
10640	-105.3	40.6	V	42.3	130.32	-11.7
15960	-125.2	45.9	V	27.7	24.27	-26.3
21280	-125.1	49.4	V	31.3	36.69	-22.7
26600	-125.2	53.4	V	35.2	57.21	-18.9

Table A-9. Radiated Measurements @ 3 meters

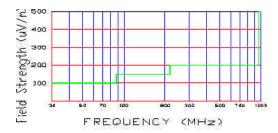


Figure A-7. Radiated limits at 3 meters.

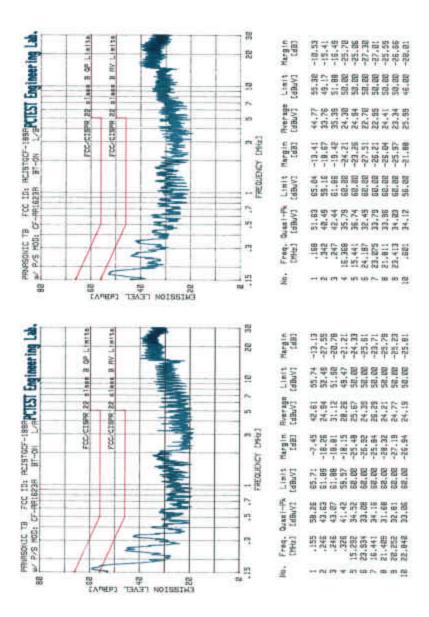
NOTES:

- 1. The limit listed in Section 15.407(b) is $-27\,dBm/MHz$ EIRP. This is equivalent to a field strength of $68.24\,dBuV/m$ @ 3m.
- 2. The Restricted Band limit (Section 15.205) for frequencies above 960 MHz is 54 dBuV/m @ 3m.
- 3. Average Measurements > 1 GHz 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 10^{th} harmonic and the worst-case emissions are reported.
- 8. Levels < -140 dBm are at the analyzer noise floor.

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Line-Conducted Test Data



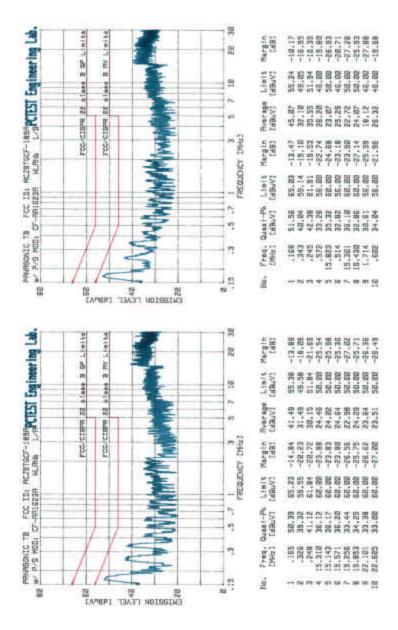
Notes:

- 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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Line-Conducted Test Data



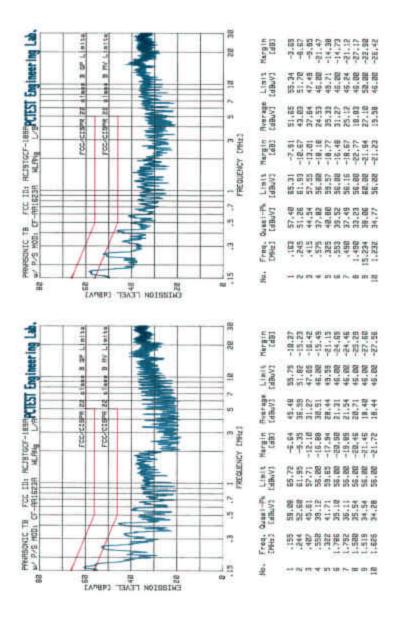
Notes:

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

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Line-Conducted Test Data



Notes:

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

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EXHIBIT B - Labeling Requirements Sample Label & Location

New Labeling Requirements

Per 2.1074 & 15.19; Docket 95-19

The sample label shown below shall be permanently affixed at a conspicuous location on the device; instruction manual or pamphlet supplied to the user and be readily visible to the purchaser at the time of purchase. However, when the device is so small wherein placement of the label with specified statement is not practical, only the trade name, FCC ID, and the FCC logo must be displayed on the device per Section $15.19 \, (b)(2)$.

FCC ID: ACJ9TGCF-189A

This device complies with Part 15 of the FCC Rules.

Operation is subject to the following two conditions.

- (1) this device may not cause harmful interference, and
- (2) this device must accept any interference received,

including interference that may cause undesired operation.

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EXHIBIT B - Labeling Requirements (Cont.) Sample Label & Location

FCC ID LABEL



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EXHIBIT C - Block Diagram/Schematics

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EXHIBIT D – Operational Description

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EXHIBIT E – Test Setup Photographs

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EXHIBIT F – EUT External/Internal Photographs

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EXHIBIT G – User's Manual

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