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CERTIFICATE OF COMPLIANCE FCC Part 15.247 Certification

Applicant Name:
Philips Industrial Activities Louvain
Interleuvenlaan 74-82
B-3001 Leuven
Belgium

Date of Testing:
November 1-2, 2007
Test Site/Location:
PCTEST Lab, Columbia, MD, USA
Test Report Serial No.:
0710181221.PT5


FCC ID:	PT5RFX9200
APPLICANT:	Philips Industrial Activities Louvain

Model(s): RFX9200
EUT Type: Wireless Remote Control Extender
Frequency Range: 2405 – 2475 MHz
FCC Classification: Digital Transmission System (DTS)
FCC Rule Part(s): FCC Part 15 Subpart C (15.247)

The device bearing the FCC Identifier specified above has been shown to comply with the applicable technical standards as indicated in the measurement report and has been tested in accordance with the measurement procedures specified in ANSI C63.4-2003 (See Test Report). These measurements were performed with no deviation from the standards.

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.

NVLAP accreditation does not constitute any product endorsement by NVLAP or any agency of the United States Government. 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






FCC ID: PT5RFX9200		FCC Pt. 15.247 MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0710181221.PT5	Test Dates: November 1-2, 2007	EUT Type: Wireless Remote Control Extender		Page 1 of 34

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MEASUREMENT REPORT

FCC Part 15.247



§ 2.1033 General Information

APPLICANT: Philips Industrial Activities Louvain
APPLICANT ADDRESS: Interleuvenlaan 74-82
 B-3001 Leuven, Belgium
TEST SITE: PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS: 6660-B Dobbin Road, Columbia, MD 21045 USA
FCC RULE PART(S): Part 15 Subpart C (15.247)
MODEL : RFX9200
FCC ID: PT5RFX9200
Test Device Serial No.: None Production Pre-Production Engineering
FCC CLASSIFICATION: Digital Transmission System (DTS)
DATE(S) OF TEST: November 1-2, 2007
TEST REPORT S/N: 0710181221.PT5

Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located 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 to ISO 17025 by U.S. National Institute of Standards and Technology (NIST) under the National Voluntary Laboratory Accreditation Program (NVLAP Lab code: 100431-0) in EMC, FCC and Telecommunications.
- PCTEST Lab is accredited to ISO 17025-2005 by the American Association for Laboratory Accreditation (A2LA) in Specific Absorption Rate (SAR) testing, Hearing Aid Compatibility (HAC) testing, CTIA Test Plans, and wireless testing for FCC and Industry Canada Rules.
- 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 and Industry Canada Standards (RSS).
- PCTEST facility is an IC registered (IC-2451) test laboratory with the site description on file at Industry Canada.
- PCTEST is a CTIA Authorized Test Laboratory (CATL) for AMPS, CDMA, and EvDO wireless devices and for Over-the-Air (OTA) Antenna Performance testing for AMPS, CDMA, GSM, GPRS, EGPRS, UMTS (W-CDMA), CDMA 1xEVDO, and CDMA 1xRTT.



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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) was used in the measurement of the **Pronto Wireless Remote Control Extender** **FCC ID: PT5RFX9200**.

Deviation from measurement procedure.....None

1.2 Scope

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

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 C63.4-2003 on January 27, 2006 and Industry Canada.

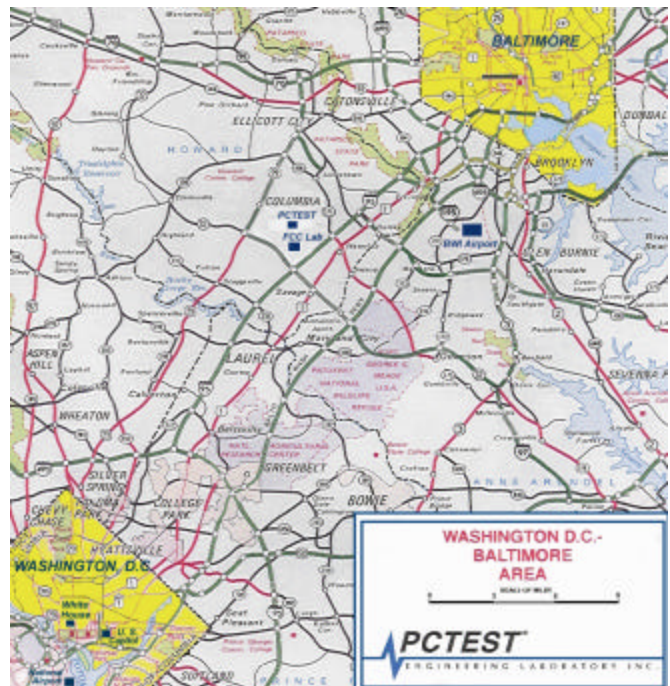


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Pronto Wireless Remote Control Extender FCC ID: PT5RFX9200**. The unit is powered from an internal rechargeable battery. Recharging occurs when the unit is placed in the cradle.

Manufacturer / Model	FCC ID	Description
Philips Pronto / Model: RFX9200	PT5RFX9200	Wireless Remote Control Extender



Accessories:

Philips / Model: AY3192/17	N/A	AC Power Adapter (120Vac/5Vdc)
Phillips / Model: N/A	N/A	Infrared extenders

Table 2-1. EUT Equipment Description

The Pronto Wireless Remote Control Extender utilizes 802.15.4 ZigBee technology and operates on channels 11 – 25 from 2405 to 2475 MHz as shown in the following table.

Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
11	2405	19	2445
12	2410	20	2450
13	2415	21	2455
14	2420	22	2460
15	2425	23	2465
16	2430	24	2470
17	2435	25	2475
18	2440		

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2.2 Operation Mode

The Pronto Wireless Remote Control Extender FCC ID: PT5RFX9200 was set to continuously transmit on the high, low and mid channels of operation. The device was provided with special software and instructions that enabled the unit to operate on four different channels from the lowest to highest channel. Since the exact center channel (Ch. 18) was not programmed data for the two nearest center channels (Ch. 15 and Ch. 21) are included. Please see Section 8.0 for more information on the test setup.

2.3 EMI Suppression Device(s)/Modifications



No EMI suppression device(s) were added and no modifications were made during testing.

2.4 Labeling Requirements

Per 15.19; Docket 95-19

The label 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 and FCC ID must be displayed on the device per Section 15.19(b)(2).

Please see attachment for FCC ID label and label location.

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3.0 DESCRIPTION OF TEST

3.1 Conducted Emissions

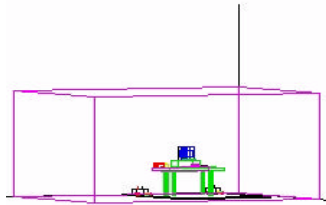


Figure 3-1. Shielded Enclosure Line-Conducted Test Facility

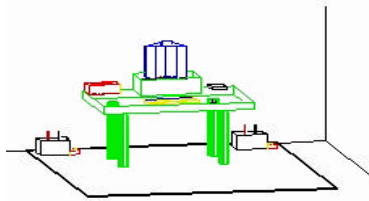


Figure 3-2. Line Conducted Emission Test Set-Up

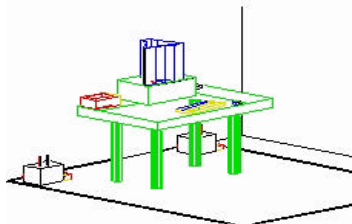


Figure 3-3. Wooden Table & Bonded LISNs

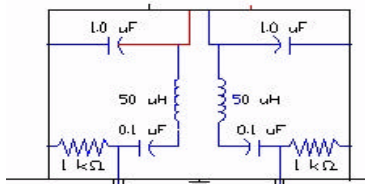


Figure 3-4. LISN Schematic Diagram

The line-conducted facility is located inside a 16'x20'x10' shielded enclosure, manufactured by Ray Proof Series 81 (see *Figure 3-1*). 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 3-2*). Solar Electronics and EMCO Model 3725/2 (10kHz-30MHz) 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room (see *Figure 3-3*). 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 3-4*). 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 spectrum analyzer. The detector function was set to CISPR quasi-peak and average mode. The bandwidth of the analyzer 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 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. Each EME reported was calibrated using the Agilent E8257D (250kHz – 20GHz) PSG Signal Generator.

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3.2 Radiated Emissions

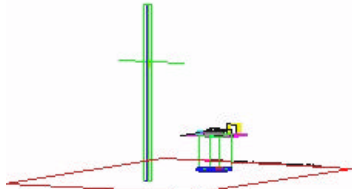


Figure 3-5. 3-Meter Test Site

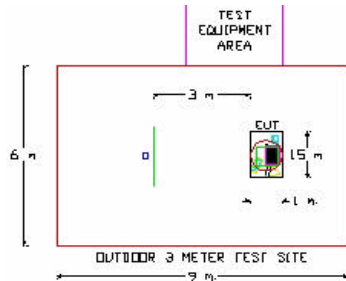


Figure 3-6. Dimensions of Outdoor Test Site

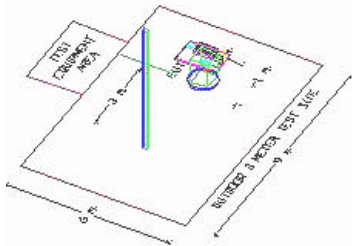


Figure 3-7. Turntable and System Setup

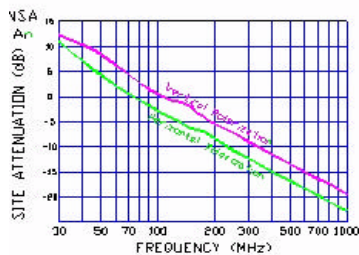


Figure 3-8. Normalized Site Attenuation Curves (H&V)

Preliminary measurements were made indoors at 1-meter using broadband antennas, broadband amplifiers, and spectrum analyzers 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 Roberts™ Dipole antennas or horn antennas (see Figure 3-5). 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 3-6). 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 detector function was set to CISPR quasi-peak mode and the bandwidth of the spectrum analyzer was set to 100kHz for frequencies below 1GHz or 1MHz for frequencies above 1GHz. Above 1GHz the detector function was set to 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 3-7). The EUT, support equipment, and interconnecting cables were re-arranged and manipulated to maximize each EME emission. The turntable containing the system was rotated and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and 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 the test setup photographs. Each EME reported was calibrated using the Agilent E8257D (250kHz – 20GHz) PSG Signal Generator. The Theoretical Normalized Site Attenuation Curves for both horizontal and vertical polarization are shown in Figure 3-8.

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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 antenna(s) of the Pronto Wireless Remote Control Extender are permanently attached.
- There are no provisions for connection to an external antenna.

Conclusion:

The **Pronto Pronto Wireless Remote Control Extender FCC ID: PT5RFX9200** unit complies with the requirement of §15.203.

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5.0 SAMPLE CALCULATIONS

5.1 Conducted Emission Measurement Sample Calculation

@ 20.3 MHz

Class B limit = 60.0 dBmV (Quasi-peak limit)
 Reading = - 57.8 dBm (calibrated quasi-peak level)
 Convert to dBμV = - 57.8 + 107 = 49.2 dBμV

 Margin = 49.2 - 60.0 = - 10.8 dB
 = **10.8 dB below limit**

5.2 Radiated Emission Measurement Sample Calculation

@ 66.7 MHz



Class B limit = 100 mV/m = 40.0 dBmV/m
 Reading = - 76.0 dBm (calibrated level)
 Convert to dBμV = - 76.0 + 107 = 31.0 dBμV
 Antenna Factor + Cable Loss = 5.8 dB/m
 Total = 36.8 dBμV/m

 Margin = 36.8 - 40.0 = - 3.2 dB
 = **3.2 dB below limit**

Note:

$$\text{Level [dB}\mu\text{V]} = 20 \log_{10} (\text{Level } [\mu\text{V/m}])$$

$$\text{Level [dB}\mu\text{V]} = \text{Level [dBm]} + 107$$



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6.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model / Equipment	Calibration Date	Cal Interval	Calibration Due	Serial No.
Agilent	E4407B ESA Spectrum Analyzer	04/29/07	Annual	04/28/08	US39210313
Agilent	HP 8566B (100Hz–22GHz) Spectrum Analyzer	12/21/06	Annual	12/21/07	3638A08713
Agilent	E8257D (250kHz-20GHz) Signal Generator	03/08/07	Annual	03/07/08	MY45470194
CCA-7	CISPR QP Adapter	12/21/06	Annual	12/21/07	0194-04082
CCA-7	CISPR QP Adapter	12/21/06	Annual	12/21/07	0194-04082
Agilent	HP 85650A Quasi-Peak Adapter	12/21/06	Annual	12/21/07	2043A00301
Agilent	HP 8449B (1-26.5GHz) Pre-Amplifier	12/12/06	Annual	12/12/07	3008A00985
Agilent	HP 11713A Attenuation/Switch Driver	12/12/06	Annual	12/12/07	N/A
Agilent	HP 85685A (20Hz-2GHz) Preselector	12/12/06	Annual	12/12/07	N/A
Agilent	HP 8566B Opt. 462 Impulse Bandwidth	12/12/06	Annual	12/12/07	3701A22204
EMCO	Dipole Pair	09/21/06	Biennial	09/20/08	23951
SOLAR	8012-50 LISN (2)	11/18/05	Biennial	11/18/07	0313233, 0310234
Pasternack	PE7000-6 6 dB Attenuator	N/A		N/A	N/A
-	No.165 (30MHz - 1000MHz) RG58 Coax Cable	N/A		N/A	N/A
-	No.166 (1000-26500MHz) Microwave RF Cable	N/A		N/A	N/A
-	No.167 (100kHz - 100MHz) RG58 Coax Cable	N/A		N/A	N/A

Table 6-1. Annual Test Equipment Calibration Schedule



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7.0 ENVIRONMENTAL CONDITIONS

The temperature is controlled within range of 15°C to 35°C.

The relative humidity is controlled within range of 10% to 75%.

The atmospheric pressure is controlled within the range 86-106kPa (860-1060mbar).

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8.0 TEST DATA

8.1 Summary


Company Name: Philips Industrial Activities Louvain

FCC ID: PT5RFX9200

Frequencies Examined: 2405, 2425, 2455, 2475 MHz

FCC Part Section(s)	RSS 210 Section	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (TX)						
15.247(a)(2)	RSS-210 [A8.2 (1)]	6dB Bandwidth	> 500kHz	RADIATED	PASS	Section 8.2
15.247(b)(3)	RSS-210 [A8.4 (4)]	Transmitter Output Power	< 1 Watt		PASS	Sections 8.3
15.247(e)	RSS-210 [A8.2 (2)]	Transmitter Power Spectral Density	< 8dBm / 3kHz Band		PASS	Section 8.4
15.247(d)	RSS-210 [A8.5]	Band Edge / Out-of-Band Emissions	Conducted < 20dBc		PASS	Sections 8.5
15.205 15.209	RSS-210 [A8.5]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209 (RSS-210 table 3 limits)		PASS	Sections 8.7 - 8.9
15.207	RSS-Gen [7.2.2]	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 limits or < RSS-Gen table 2 limits	LINE CONDUCTED	PASS	Section 8.10
RECEIVER MODE (RX) / DIGITAL EMISSIONS						
15.107	RSS-Gen [7.2.2]	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.107 limits or < RSS-Gen table 2 limits	LINE CONDUCTED	PASS	Part 15B Test Report
15.109	RSS-Gen [7.2.3.2]	General Field Strength Limits (Restricted Bands and Radiated Emissions Limits)	< FCC 15.109 limits or < RSS-210 table 3 limits	RADIATED (30MHz-1GHz) (1-25 GHz)	PASS	Part 15B Test Report
RF EXPOSURE						
2.1091 / 2.1093	RSS-102	MPE	1 mW/cm ² (MPE) @ 20cm	MPE	PASS	MPE Report

Table 8-1 Summary of Test Results

FCC ID: PT5RFX9200	 FCC Pt. 15.247 MEASUREMENT REPORT (CERTIFICATION)		PHILIPS	Reviewed by: Quality Manager
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8.2 6dB Bandwidth Measurement – DTS (802.15.4) §15.247(a)(2); RSS-210(A8.2 (1))

The bandwidth at 6dB 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 minimum permissible 6dB bandwidth is 500 kHz.**

Frequency [MHz]	Channel No.	Measured Bandwidth [MHz]	Minimum Bandwidth [MHz]	Pass / Fail
2405	11	1.620	0.500	Pass
2425	15	1.645	0.500	Pass
2455	21	1.575	0.500	Pass
2475	25	1.570	0.500	Pass

Table 6-2. Bandwidth Measurements, 802.15.4 (ZigBee)

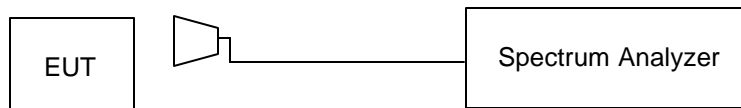


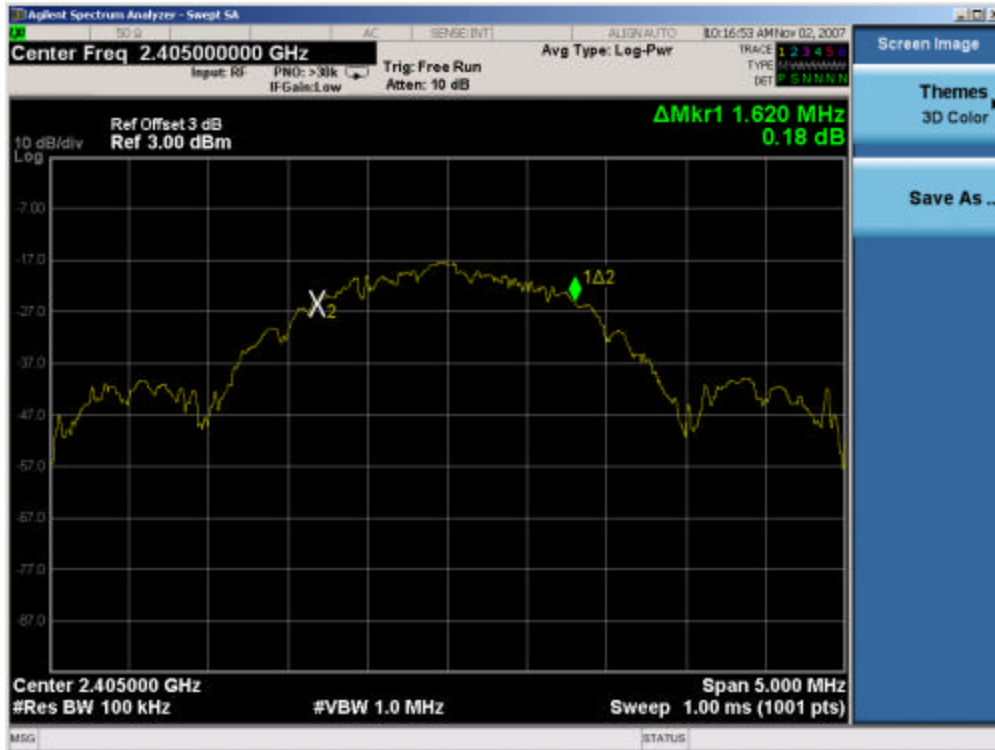
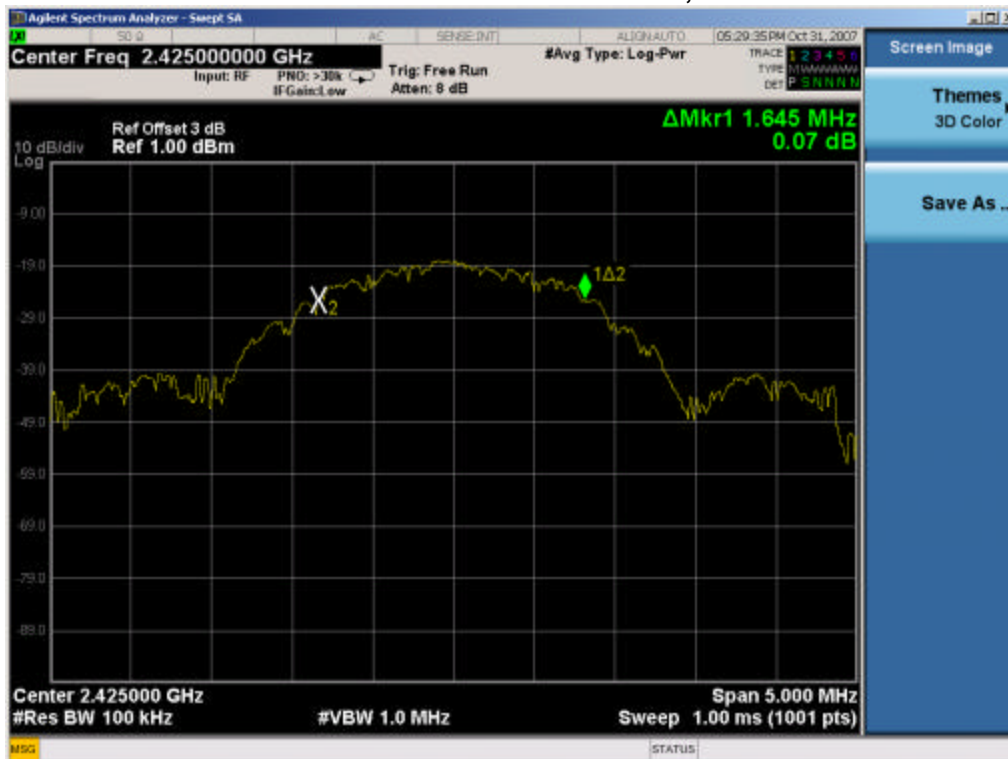


Figure 6-1. Test Instrument & Measurement Setup

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Test Report S/N: 0710181221.PT5	Test Dates: November 1-2, 2007	EUT Type: Wireless Remote Control Extender	Page 14 of 34	

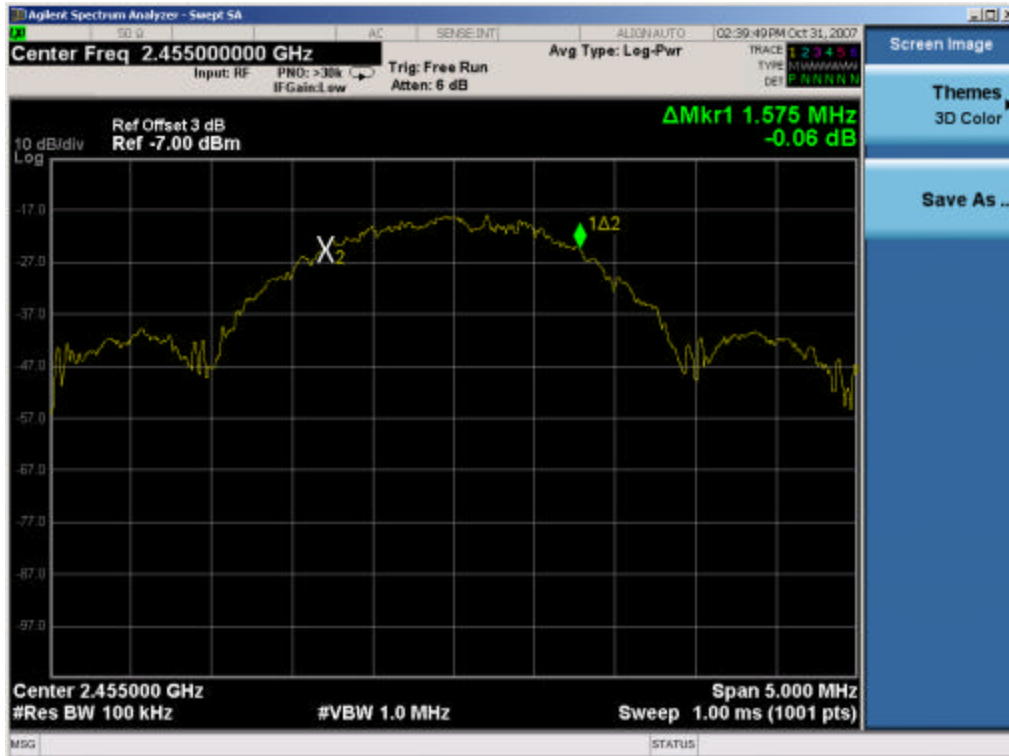


Plot 8-1. Bandwidth Plot Low Channel, 2405 MHz

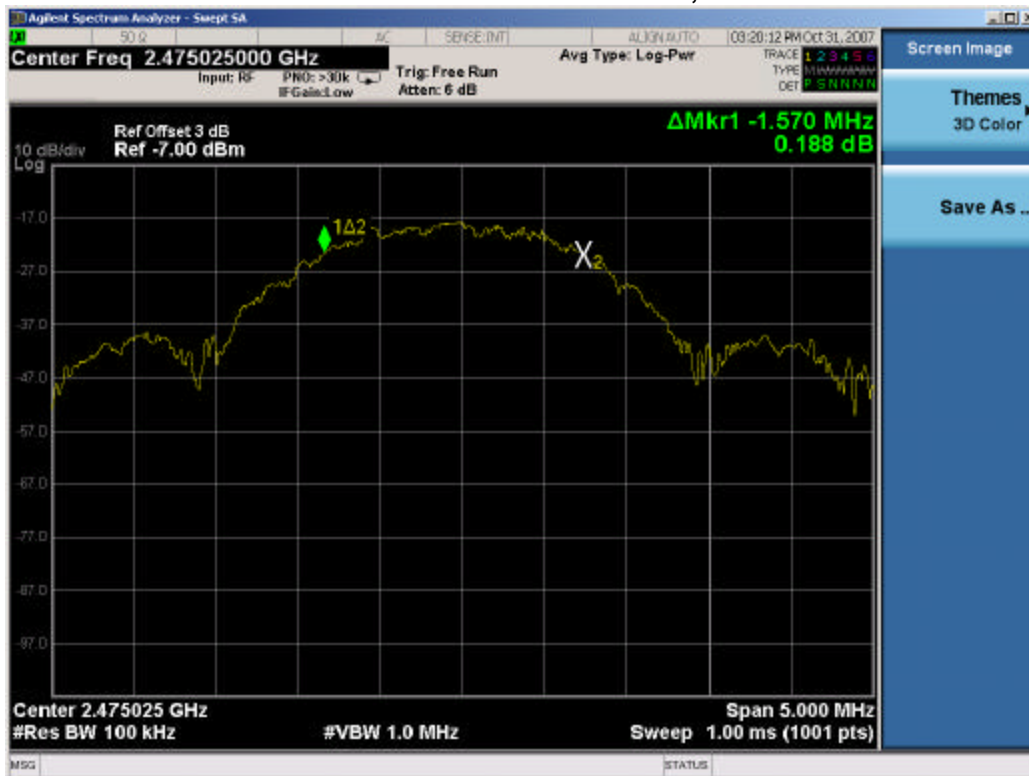


Plot 8-2. Bandwidth Plot Mid Channel, 2425 MHz



FCC ID: PT5RFX9200		FCC Pt. 15.247 MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0710181221.PT5	Test Dates: November 1-2, 2007	EUT Type: Wireless Remote Control Extender		Page 15 of 34



Plot 8-3. Bandwidth Plot Mid Channel, 2455 MHz



Plot 8-4. Bandwidth Plot High Channel, 2475 MHz

FCC ID: PT5RFX9200		FCC Pt. 15.247 MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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8.3 Output Power Measurement – 802.15.4

§15.247(b)(3); RSS-210(A8.4 (4))

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. **The maximum permissible conducted output power is 1 Watt.**

Since there were no provisions to perform a conducted test at the antenna the alternative procedures as described in the OET Digital Transmission Measurement Procedure Dated March 23, 2005 were implemented.

The following formula was used for calculating the Peak Conducted Output Power:

$$P = \frac{(E \times d)^2}{(30 \times G)}$$

Where: E = Field Strength level in V/m
d = Measurement distance (3m)



From information provided the maximum antenna gain is 4dBi thus the linear gain used for G in the power calculation is 2.51. Emissions were maximized at each of the channels tested and the highest levels were recorded.

Frequency [MHz]	Channel No.	Limit [dBm]	Peak Output Power	
			[dBm]	[mW]
2405	11	30	-1.24	0.75
2425	15	30	-0.59	0.87
2455	21	30	0.43	1.11
2475	25	30	0.93	1.24

Table 8-2. Output Power Measurements

FREQ [MHz]	LEVEL [dBm]	Antenna Factor [dBm]	Cable Loss [dBm]	Amplifier Gain [dB]	AFCL [dBm]	POL [H/V]	Field Strength [dBmV/m]	Output Power [dBm]	Limit [dBm]	Margin [dB]
2405	-14.45	28.78	4.67	28.01	33.45	H	98.0	-1.24	30.000	-31.24
2425	-13.9	28.84	4.70	28.00	33.54	H	98.6	-0.59	30.000	-30.59
2455	-13	28.91	4.75	28.00	33.66	H	99.7	0.43	30.000	-29.57
2475	-12.6	28.97	4.78	27.99	33.75	H	100.2	0.93	30.000	-29.07

Table 8-3. Radiated Emission Data for Output Power Measurements

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8.4 Power Spectral Density (802.15.4)

§15.247(e); RSS-210(A8.2 (2))

The peak power 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 maximum permissible power spectral density is 8 dBm in any 3 kHz band.**

Since there were no provisions to perform a conducted test at the antenna the alternative procedures as described in the OET Digital Transmission Measurement Procedure Dated March 23, 2005 were implemented.



The following formula was used for calculating the Power Spectral Density from the radiated emissions levels:

$$P_{SD} = \frac{(E \times d)^2}{(30 \times G)}$$

From information provided the maximum antenna gain is 4dBi thus the linear gain used for G in the power calculation is 2.51. Emissions were maximized at each of the channels tested and the highest levels were recorded.

Frequency [MHz]	Channel No.	Measured Power Spectral Density [dBm]	Maximum Permissible Power Density [dBm/3kHz]	Margin [dB]
2405	11	-15.8	8	-23.8
2425	15	-15.5	8	-23.5
2455	21	-14.4	8	-22.4
2475	25	-17.0	8	-25.0

Table 8-4. Power Density Measurements

FCC ID: PT5RFX9200		FCC Pt. 15.247 MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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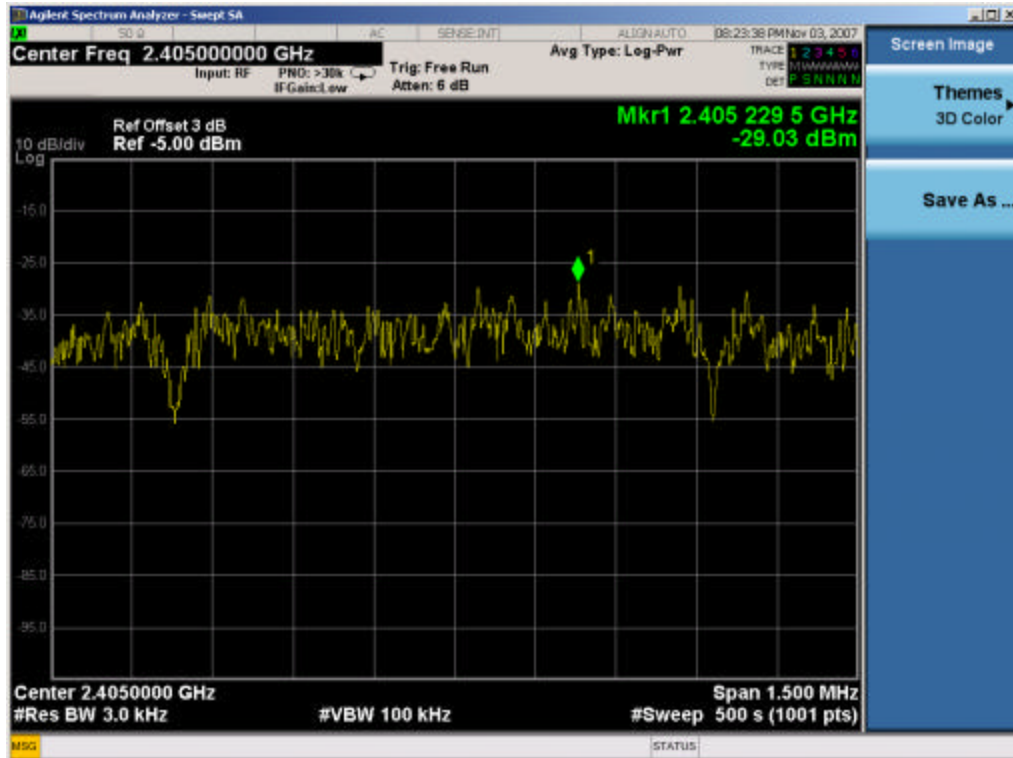


Figure 8-1. PSD Plot, Low Channel, 2405MHz

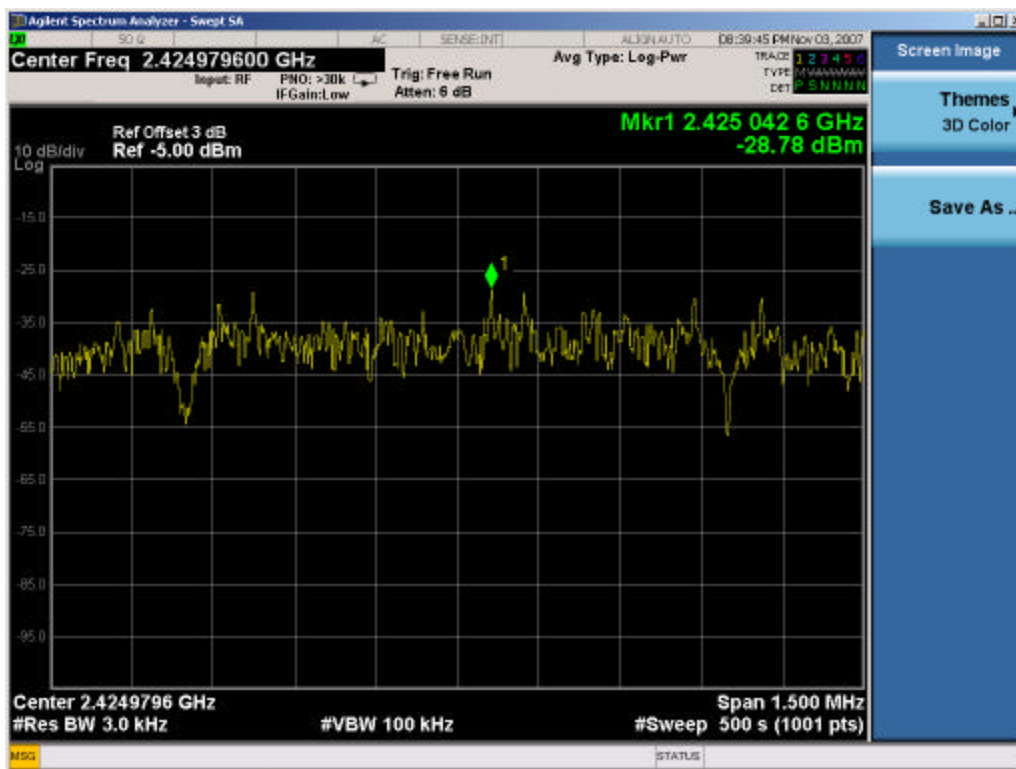


Figure 8-2. PSD Plot, Mid Channel, 2425 MHz

FCC ID: PT5RFX9200		FCC Pt. 15.247 MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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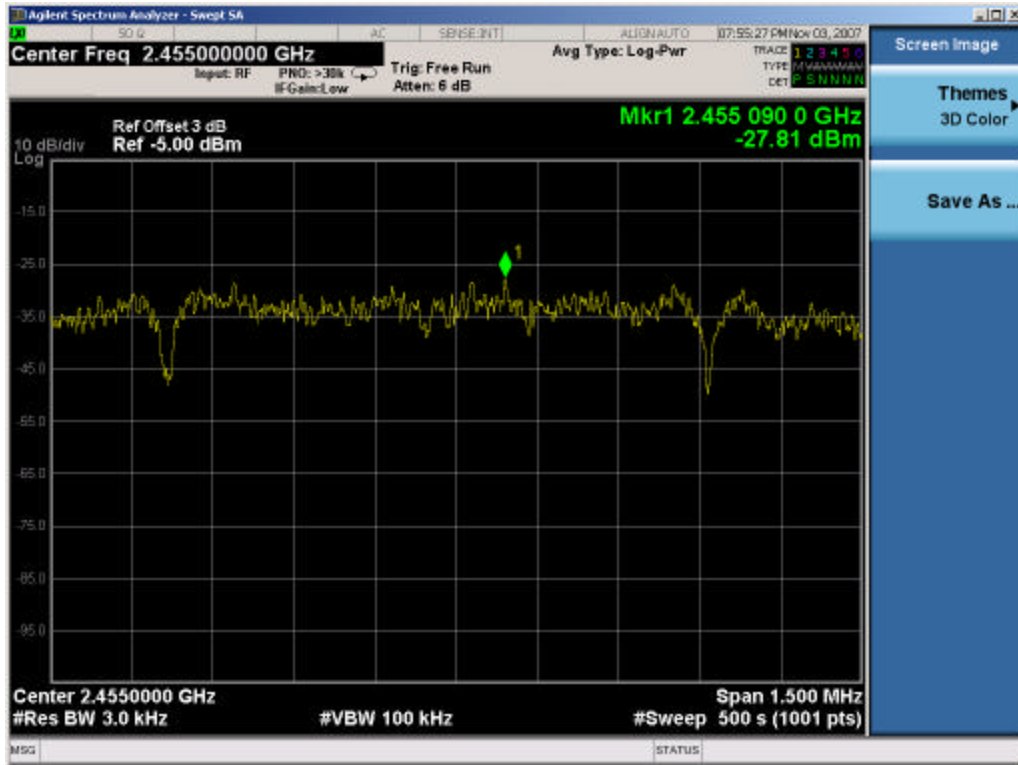


Figure 8-3. Mid Channel, 2455 MHz

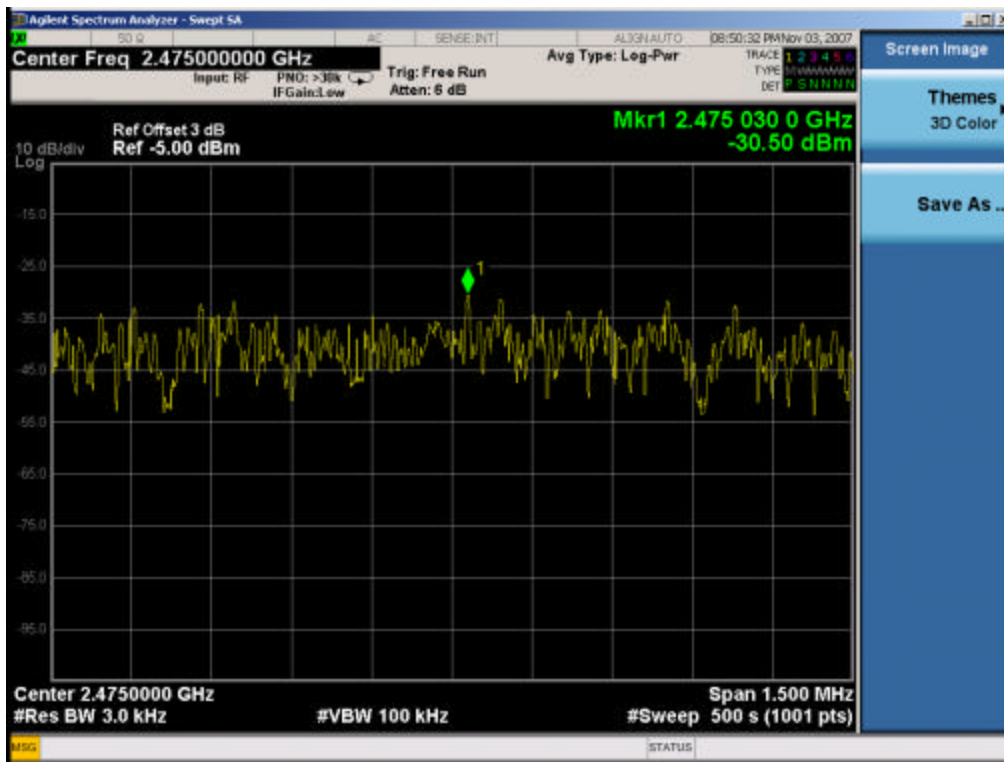


Figure 8-4. PSD Plot, High Channel, 2475 MHz

FCC ID: PT5RFX9200		FCC Pt. 15.247 MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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8.5 Out of Band Emissions – Band Edge

§15.247(d); RSS-210(A8.5)

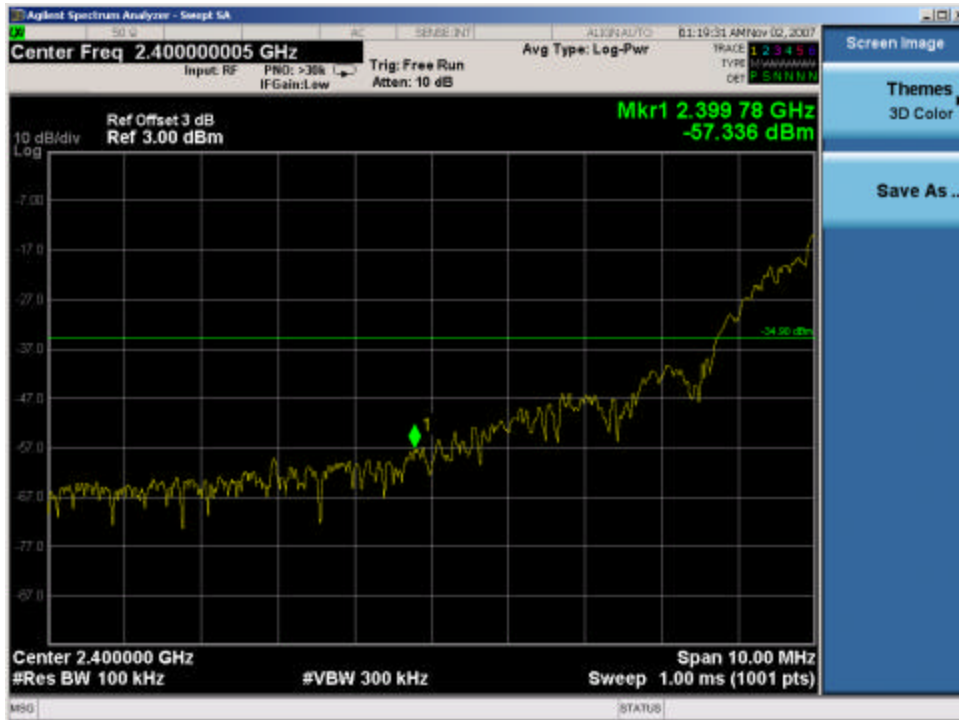


Figure 8-5: Band Edge Plot at 2400 MHz – Low Channel, Ch. 11

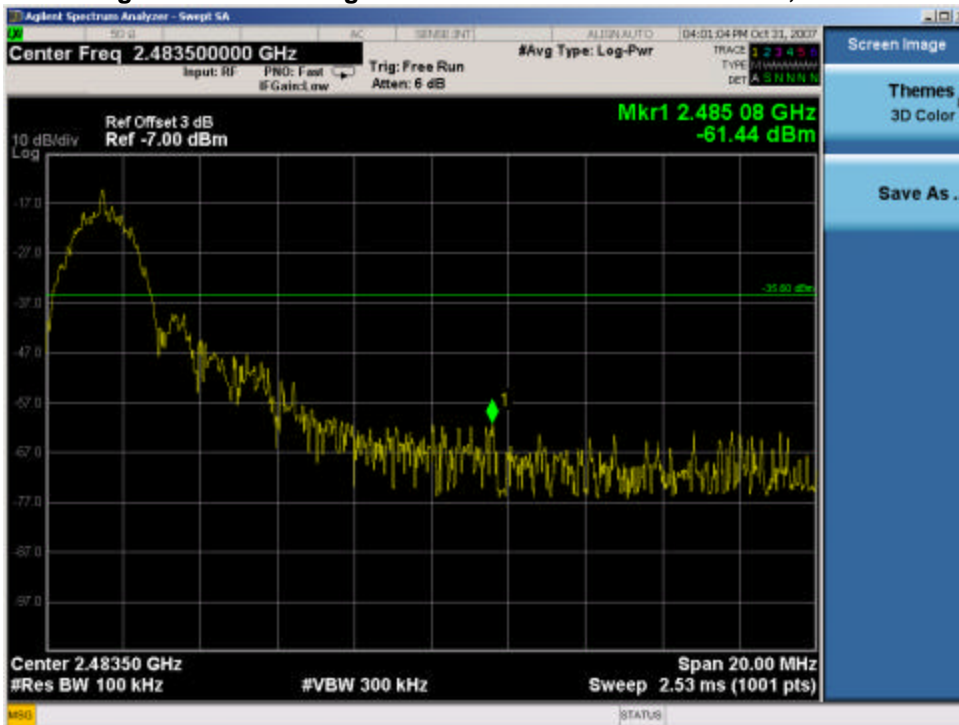


Figure 8-6: Band Edge Plot at 2483.5 MHz – High Channel, Ch. 25

FCC ID: PT5RFX9200		FCC Pt. 15.247 MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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8.6 Out of Band Emissions – 20dBc

§15.247(d); RSS-210(A8.5)

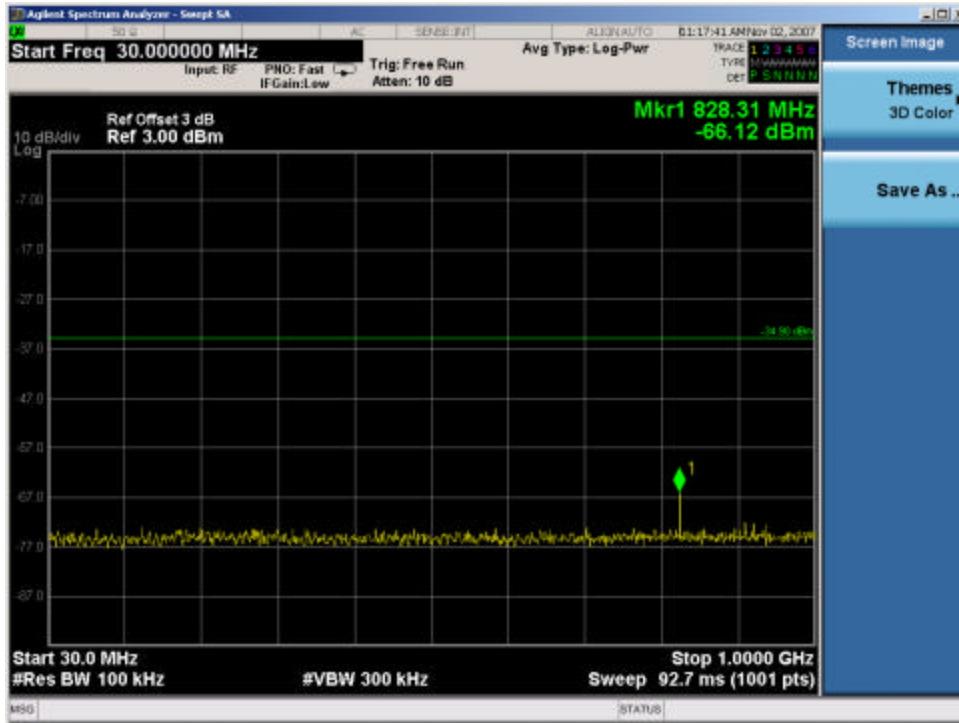


Figure 8-7: 20dBc Spurious Plot, Channel 11

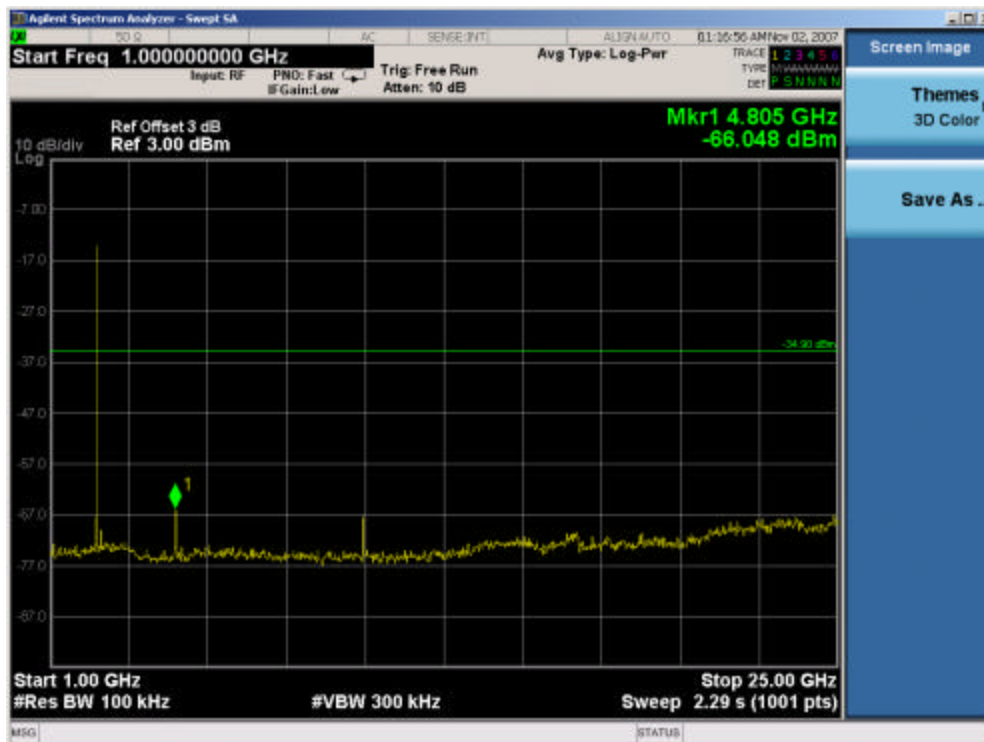


Figure 8-8: 20dBc Spurious Plot, Channel 11

FCC ID: PT5RFX9200		FCC Pt. 15.247 MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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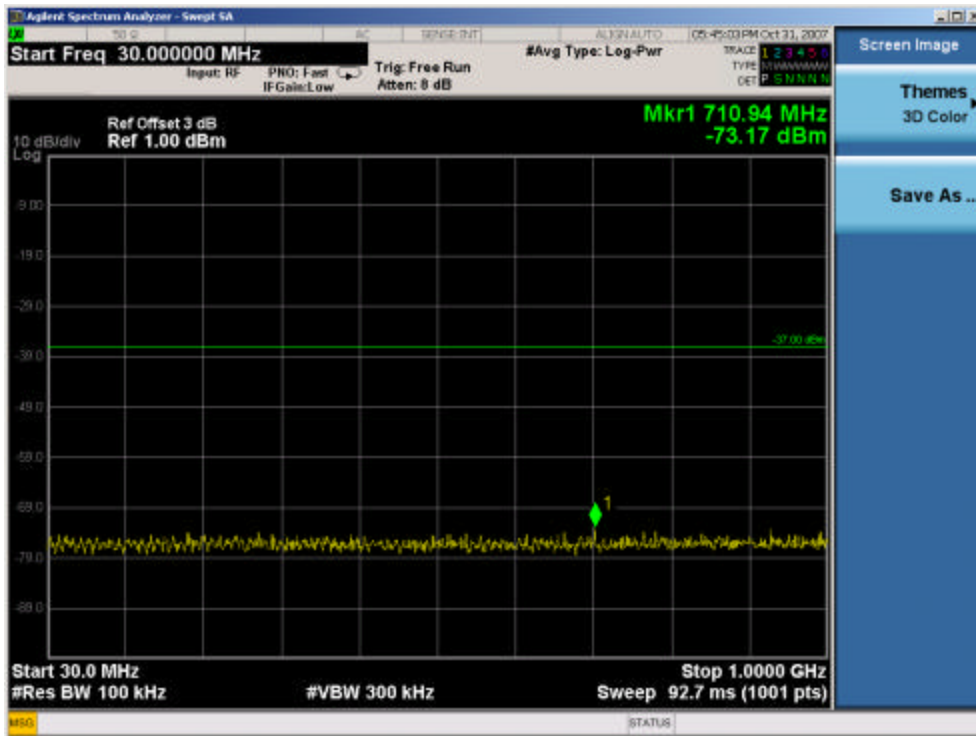


Figure 8-9: 20dBc Spurious Plot, Channel 15

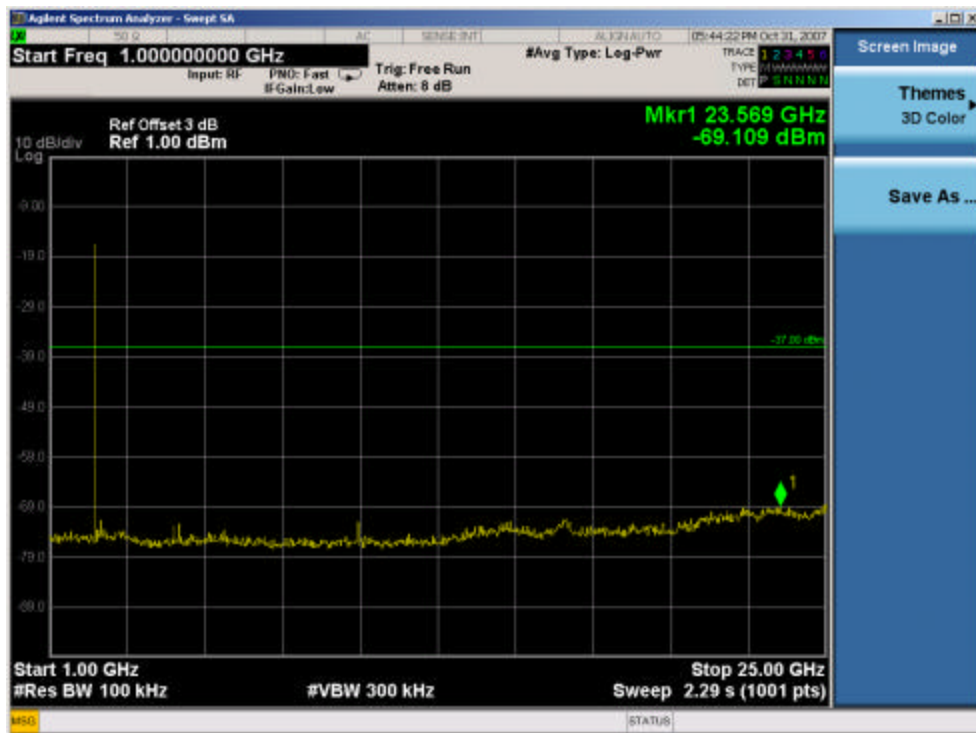


Figure 8-10: 20dBc Spurious Plot, Channel 15

FCC ID: PT5RFX9200		FCC Pt. 15.247 MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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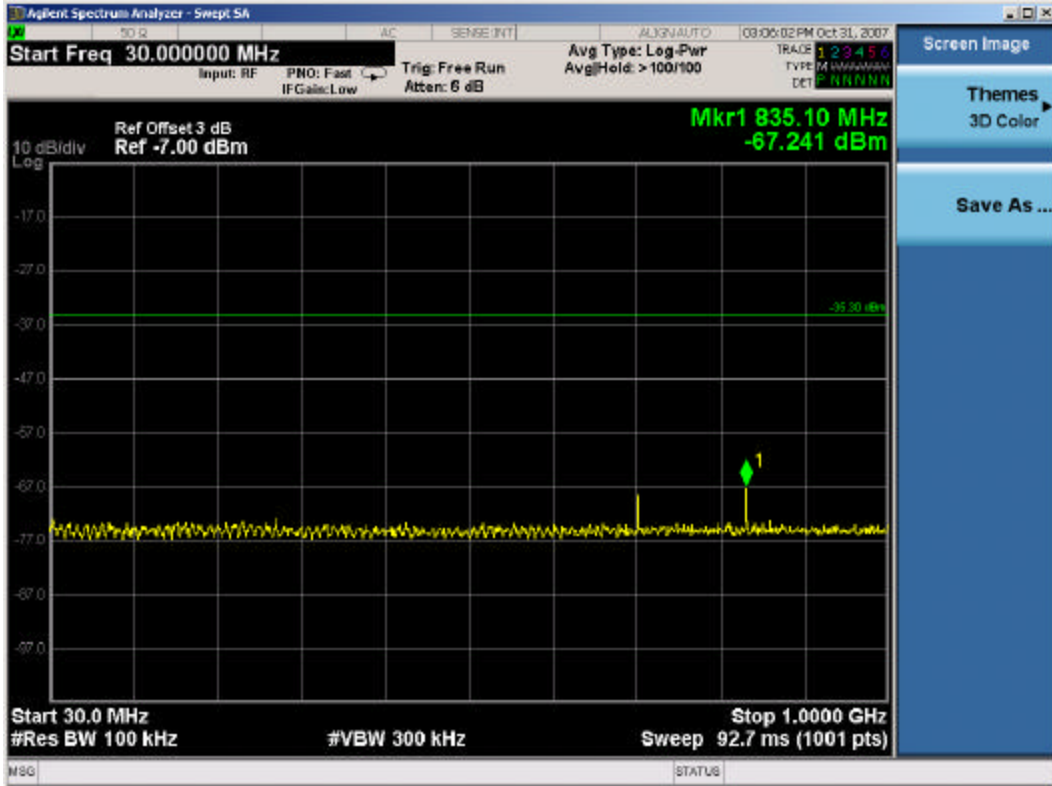


Figure 8-11: 20dBc Spurious Plot, Channel 21

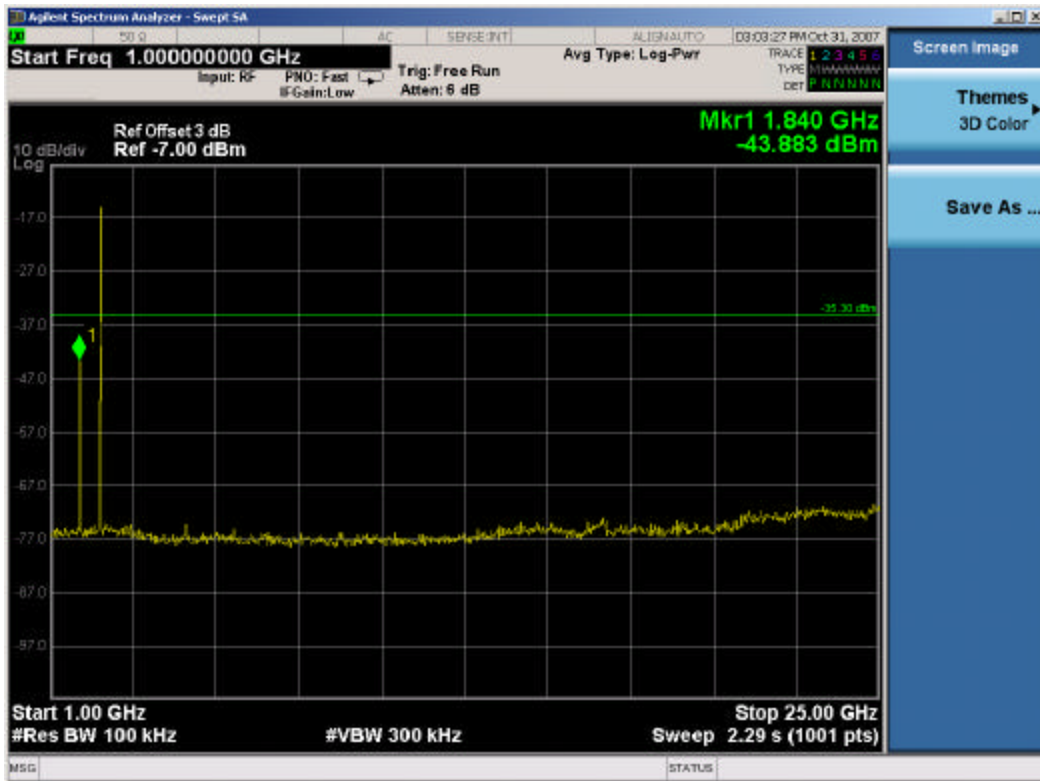


Figure 8-12: 20dBc Spurious Plot, Channel 21

FCC ID: PT5RFX9200		FCC Pt. 15.247 MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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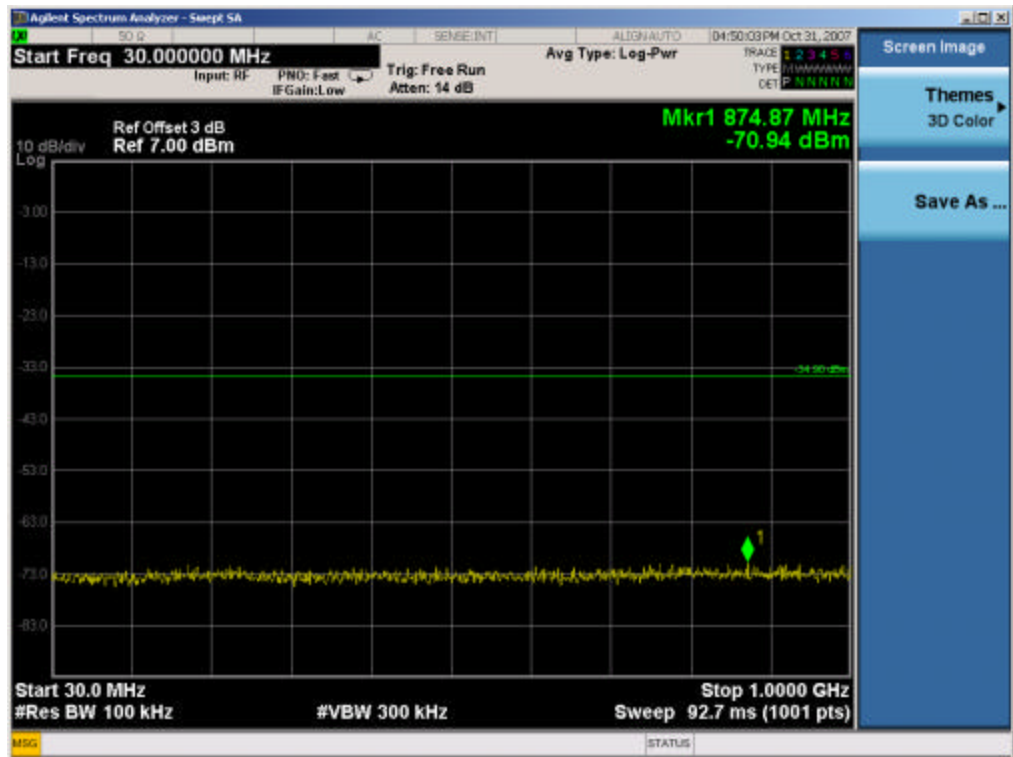


Figure 8-13: 20dBc Spur Plot, Channel 25

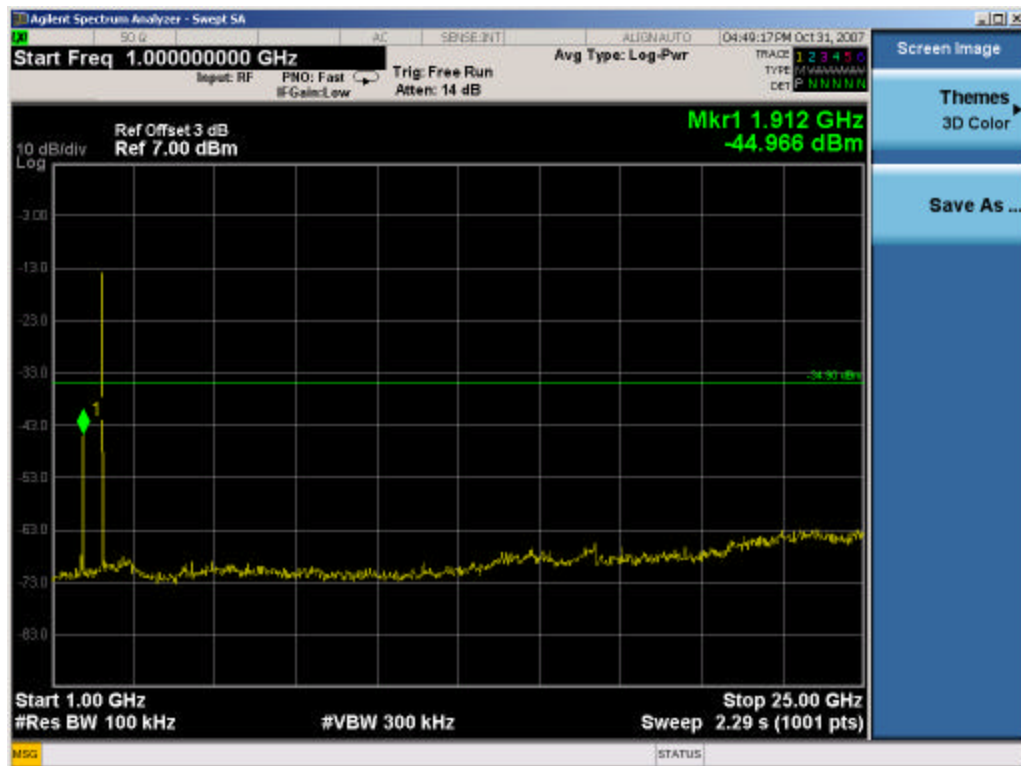


Figure 8-14: 20dBc Spur Plot, Channel 25

FCC ID: PT5RFX9200	PCTEST w i r e l e s s	FCC Pt. 15.247 MEASUREMENT REPORT (CERTIFICATION)	PHILIPS	Reviewed by: Quality Manager
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8.7 Radiated Spurious Emission Measurements

§15.247 (c) / §15.209

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= 1kHz, 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	Field Strength [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 8-5. Radiated Limits

Sample Calculation

- Field Strength Level $_{[dB\mu V/m]} = \text{Analyzer Level }_{[dBm]} + 107 + \text{AFCL }_{[dB]} + \text{Duty Cycle Correction }_{[dB]}$

Notes:

- AFCL = Antenna Factor $_{[dB]} + \text{Cable Loss }_{[dB]}$

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8.8 Radiated Spurious Emission Measurements

§15.247 (c) / §15.209

Operating Frequency: 2405MHz

Channel: 11 (Low)

FREQ [MHz]	Level (Avg) [dBm]	Amplifier Gain [dB]	AFCL [dBm]	POL [H/V]	Field Strength [dBuV/m]	Field Strength [uV/m]	Limit [uV/m]	Margin [dB]
* 4810	-66.9	27.56	39.07	H	51.6	380.95	500.0	-2.36
7215	-82.8	27.30	44.30	H	41.2	114.78	500.0	-12.78
9620	-82.6	27.56	46.63	H	43.5	148.97	500.0	-10.52
* 12025	-82.7	27.78	49.45	H	46.0	198.93	500.0	-8.01

FREQ [MHz]	Level (Peak) [dBm]	Amplifier Gain [dB]	AFCL [dBm]	POL [H/V]	Field Strength [dBuV/m]	Field Strength [uV/m]	Limit [uV/m]	Margin [dB]
* 4810	-61.4	27.56	39.07	H	57.1	717.57	5000.0	-16.86
7215	-65.3	27.30	44.30	H	58.7	860.73	5000.0	-15.28
9620	-79.6	27.56	46.63	H	46.5	210.43	5000.0	-27.52
* 12025	-79.5	27.78	49.45	H	49.2	287.55	5000.0	-24.81

Table 8-6. Spurious Radiated Emissions Measurements

NOTES:

- All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table 8-5.
(Note: * = Restricted Band measured frequency)
- Average Measurements > 1GHz using RBW = 1MHz VBW = 1 kHz
- The peak emissions above 1GHz are not more than 20dB above the average limit.
- The antenna is manipulated through typical positions, polarity and length during the tests. Worst case levels are reported.
- The EUT is supplied with nominal fully-recharged battery.
- The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
- No emissions were detected above the 2nd harmonic. Ambient levels are recorded for frequencies >2nd harmonic.
- Above 1GHz, the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

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Radiated Spurious Emission Measurements – Cont'd.

Operating Frequency: 2425MHz

Channel: 15 (Mid)

FREQ [MHz]	Level (Avg) [dBm]	Amplifier Gain [dB]	AFCL [dBm]	POL [H/V]	Field Strength [dBuV/m]	Field Strength [uV/m]	Limit [uV/m]	Margin [dB]
* 4850	-78.4	27.55	39.19	H	40.2	102.80	500.0	-13.74
* 7275	-80.7	27.31	44.34	H	43.3	146.85	500.0	-10.64
* 9700	-83	27.57	46.68	H	43.1	143.00	500.0	-10.87
* 12125	-84.2	27.73	49.39	H	44.5	167.13	500.0	-9.52

FREQ [MHz]	Level (Peak) [dBm]	Amplifier Gain [dB]	AFCL [dBm]	POL [H/V]	Field Strength [dBuV/m]	Field Strength [uV/m]	Limit [uV/m]	Margin [dB]
* 4850	-64.4	27.55	39.19	H	54.2	515.21	5000.0	-19.74
* 7275	-67.2	27.31	44.34	H	56.8	694.84	5000.0	-17.14
* 9700	-70.2	27.57	46.68	H	55.9	624.20	5000.0	-18.07
* 12125	-70.3	27.73	49.39	H	58.4	828.04	5000.0	-15.62

Table 8-7. Spurious Radiated Emissions Measurements

NOTES:

9. All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table 8-5.
(Note: * = Restricted Band measured frequency)
10. Average Measurements > 1GHz using RBW = 1MHz VBW = 1kHz
11. The peak emissions above 1GHz are not more than 20dB above the average limit.
12. The antenna is manipulated through typical positions, polarity and length during the tests. Worst case levels are reported.
13. The EUT is supplied with nominal fully-recharged battery.
14. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
15. No emissions were detected above the 2nd harmonic. Ambient levels are recorded for frequencies >2nd harmonic.
16. Above 1GHz, the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

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Radiated Spurious Emission Measurements – Cont'd.

Operating Frequency: 2455MHz

Channel: 21 (Mid)

FREQ [MHz]	Level (Avg) [dBm]	Amplifier Gain [dB]	AFCL [dBm]	POL [H/V]	Field Strength [dBuV/m]	Field Strength [uV/m]	Limit [uV/m]	Margin [dB]
* 4910	-73.4	27.54	39.36	H	45.4	186.67	500.0	-8.56
* 7365	-86.9	27.32	44.41	H	37.2	72.42	500.0	-16.78
9820	-86.3	27.58	46.76	H	39.9	98.54	500.0	-14.11
* 12275	-86.4	27.66	49.31	H	42.2	129.44	500.0	-11.74

FREQ [MHz]	Level (Peak) [dBm]	Amplifier Gain [dB]	AFCL [dBm]	POL [H/V]	Field Strength [dBuV/m]	Field Strength [uV/m]	Limit [uV/m]	Margin [dB]
* 4910	-65.6	27.54	39.36	H	53.2	458.22	5000.0	-20.76
* 7365	-67.4	27.32	44.41	H	56.7	683.72	5000.0	-17.28
9820	-70.2	27.58	46.76	H	56.0	628.96	5000.0	-18.01
* 12275	-70.0	27.66	49.31	H	58.6	855.22	5000.0	-15.34

Table 8-8. Spurious Radiated Emissions Measurements

NOTES:

17. All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table 8-5.
(Note: * = Restricted Band measured frequency)
18. Average Measurements > 1GHz using RBW = 1MHz VBW = 1kHz
19. The peak emissions above 1GHz are not more than 20dB above the average limit.
20. The antenna is manipulated through typical positions, polarity and length during the tests. Worst case levels are reported.
21. The EUT is supplied with nominal fully-recharged battery.
22. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
23. No emissions were detected above the 2nd harmonic. Ambient levels are recorded for frequencies >2nd harmonic.
24. Above 1GHz, the limit is 500 μV/m (54dBμ/m) at 3 meters radiated.

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Radiated Spurious Emission Measurements – Cont'd.

Operating Frequency: 2475MHz

Channel: 25 (High)


FREQ [MHz]	Level (Avg) [dBm]	Amplifier Gain [dB]	AFCL [dBm]	POL [H/V]	Field Strength [dBuV/m]	Field Strength [uV/m]	Limit [uV/m]	Margin [dB]
* 4950	-78.4	27.54	39.48	H	40.5	106.43	500.0	-13.44
* 7425	-80.3	27.32	44.46	H	43.8	155.54	500.0	-10.14
9900	-79.8	27.59	46.81	H	46.4	209.32	500.0	-7.56
* 12375	-79.2	27.62	49.25	H	49.4	296.10	500.0	-4.55

FREQ [MHz]	Level (Peak) [dBm]	Amplifier Gain [dB]	AFCL [dBm]	POL [H/V]	Field Strength [dBuV/m]	Field Strength [uV/m]	Limit [uV/m]	Margin [dB]
* 4950	-63.8	27.54	39.48	H	55.1	571.57	5000.0	-18.84
* 7425	-67.25	27.32	44.46	H	56.9	698.80	5000.0	-17.09
9900	-65.6	27.59	46.81	H	60.6	1073.50	5000.0	-13.36
* 12375	-70.2	27.62	49.25	H	58.4	834.51	5000.0	-15.55

Table 8-9. Spurious Radiated Emissions Measurements

NOTES:

25. All harmonics in the restricted bands specified in §15.205 are below the limit shown in Table 8-5.
(Note: * = Restricted Band measured frequency)
26. Average Measurements > 1GHz using RBW = 1MHz VBW = 1kHz
27. The peak emissions above 1GHz are not more than 20dB above the average limit.
28. The antenna is manipulated through typical positions, polarity and length during the tests. Worst case levels are reported.
29. The EUT is supplied with nominal fully-recharged battery.
30. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
31. No emissions were detected above the 2nd harmonic. Ambient levels are recorded for frequencies >2nd harmonic.
32. Above 1GHz, the limit is 500 µV/m (54dBµ/m) at 3 meters radiated.

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8.9 Radiated Restricted Band Edge Measurements §15.205 / §15.209; RSS-210(A8.5)

Operating Frequency: 2475MHz

Channel: 25 (High)

FREQ [MHz]	Level (Avg) [dBm]	Amplifier Gain [dB]	AFCL [dBm]	POL [H/V]	Field Strength [dBuV/m]	Field Strength [uV/m]	Limit [uV/m]	Margin [dB]
2483.5	-78.2	27.99	33.58	H	34.4	52.41	500.0	-19.59
2488.25	-77.1	27.99	33.60	H	35.5	59.61	500.0	-18.47
2490.5	-78.4	27.99	33.61	H	34.2	51.37	500.0	-19.77

FREQ [MHz]	Level (Peak) [dBm]	Amplifier Gain [dB]	AFCL [dBm]	POL [H/V]	Field Strength [dBuV/m]	Field Strength [uV/m]	Limit [uV/m]	Margin [dB]
2483.5	-60.4	27.99	33.58	H	52.2	406.81	5000.0	-21.79
2489.8	-55.1	27.99	33.60	H	57.5	750.40	5000.0	-16.47
2499.5	-60.1	27.99	33.61	H	52.5	422.39	5000.0	-21.47

Table 8-10. Radiated Restricted Band Edge Measurements at 3-meters

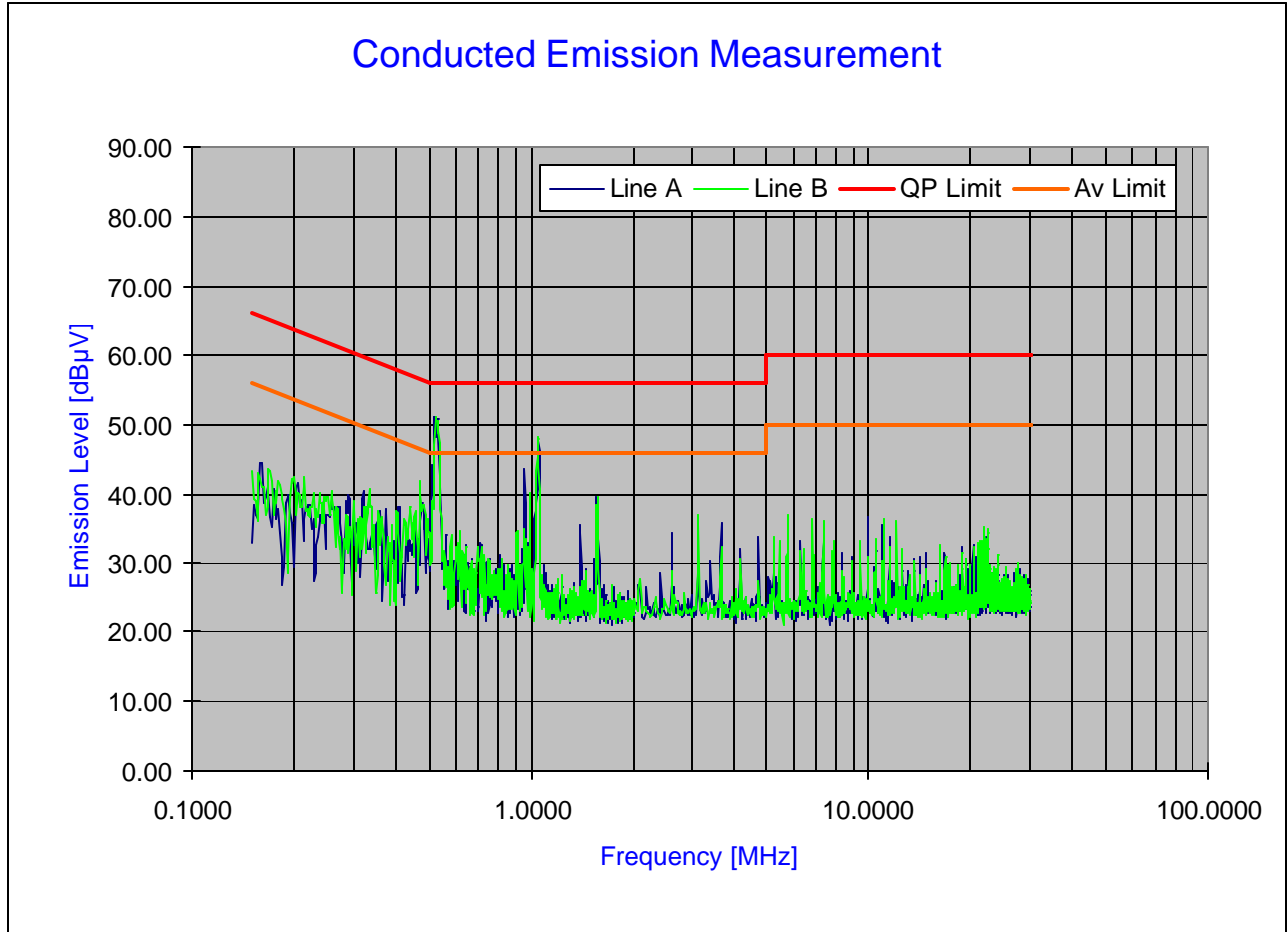
NOTES:

1. All emissions shown lie in the restricted bands specified in §15.205 and RSS-210 section 2.7, Table 1 and are below the limit shown in Table 8-5.
2. Average Measurements > 1GHz using RBW = 1MHz VBW = 1 kHz
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. The EUT is supplied with nominal AC voltage and/or a new/fully-recharged battery.
5. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the fifth harmonic for this device.
6. Above 960MHz the limit is 500 μ V/m (54dB μ /m) at 3 meters radiated.

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8.10 Line Conducted Measurement Data



§15.207; RSS-Gen (7.2.2)



Plot 8-5. Line-Conducted Test Plot

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 Section 15.107 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot are made using a peak detector.
5. Deviations to the Specifications : None.

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Line Conducted Measurement Data (Cont'd)
§15.207; RSS-Gen (7.2.2)

No.	Line	Frequency [MHz]	Factor [dB]	QP [dBµV]	Limit [dBµV]	Margin [dB]	Average [dBµV]	Limit [dBµV]	Margin [dB]
1	A	0.308	7.57	37.97	60.04	-22.07	23.22	50.04	-26.82
2	A	0.400	7.49	31.20	57.86	-26.66	20.84	47.86	-27.02
3	A	0.462	7.45	35.44	56.65	-21.21	12.46	46.65	-34.19
4	A	0.526	7.42	47.51	56.00	-8.49	31.86	46.00	-14.14
5	A	0.957	7.33	31.86	56.00	-24.14	19.64	46.00	-26.36
6	A	1.050	7.32	44.08	56.00	-11.92	31.57	46.00	-14.43
7	A	1.399	7.34	24.84	56.00	-31.16	19.44	46.00	-26.56
8	A	1.565	7.36	26.94	56.00	-29.06	19.71	46.00	-26.29
9	A	1.574	7.36	34.37	56.00	-21.63	24.09	46.00	-21.91
10	A	3.671	7.47	31.87	56.00	-24.13	23.59	46.00	-22.41
11	B	0.321	7.55	36.87	59.69	-22.82	22.52	49.69	-27.17
12	B	0.437	7.47	30.49	57.13	-26.64	20.69	47.13	-26.44
13	B	0.440	7.46	30.41	57.07	-26.66	20.47	47.07	-26.60
14	B	0.477	7.44	39.58	56.40	-16.82	20.48	46.40	-25.92
15	B	0.495	7.43	25.66	56.08	-30.42	20.52	46.08	-25.56
16	B	0.524	7.42	47.89	56.00	-8.11	34.97	46.00	-11.03
17	B	0.990	7.33	29.73	56.00	-26.27	19.32	46.00	-26.68
18	B	1.051	7.32	43.87	56.00	-12.13	18.17	46.00	-27.83
19	B	1.577	7.36	34.84	56.00	-21.16	22.76	46.00	-23.24
20	B	3.150	7.45	31.86	56.00	-24.14	22.31	46.00	-23.69

Table 8-11. 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 Section 15.107 of the Title 47 CFR.
3. Line A = Phase; Line B = Neutral
4. Traces shown in plot are made using a peak detector.
5. Deviations to the Specifications: None.

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9.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Pronto Wireless Remote Control Extender FCC ID: PT5RFX9200** has been tested to comply with the requirements specified in §15.247 of the FCC Rules.

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