



PCTEST ENGINEERING LABORATORY, INC.

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MEASUREMENT REPORT FCC PART 15.247

Applicant Name:

JAPAN REMOTE CONTROL CO., LTD.
2-12, 2 Chome, Eiwa
Higashi Osaka
Osaka 577-0809,
Japan

Date of Testing:

9/08 – 10/22/2014

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

0Y1409031809.AXG

FCC ID:

AXG-RF2RPA

APPLICANT:

Japan Remote Control

Application Type:

Certification

Model(s):

RF2RPA

EUT Type:

Telemetry Radio Control System

Max. RF Output Power:

70.275 mW (18.47 dBm) Peak Conducted

Frequency Range:

2404 – 2479MHz

FCC Classification:

FCC Part 15 Spread Spectrum Transmitter (DSS)

FCC Rule Part(s):


Part 15 Subpart C (15.247)

Test Procedure(s):

DA 00-705

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 DA 00-705. Test results reported herein relate only to the item(s) tested.

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.


Randy Ortanez
President

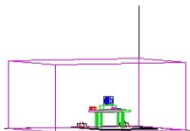


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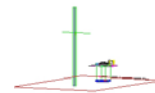
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MEASUREMENT REPORT

FCC Part 15.247



§ 2.1033 General Information

APPLICANT: Japan Remote Control Co., Ltd.
APPLICANT ADDRESS: Eiwa 2-2-12
Higashi Osaka-shi, Osaka
577-0809 Japan
TEST SITE: PCTEST ENGINEERING LABORATORY, INC.
TEST SITE ADDRESS: 7185 Oakland Mills Road, Columbia, MD 21046 USA
FCC RULE PART(S): Part 15 Subpart C (15.247)
BASE MODEL: RF2RPA
FCC ID: AXG-RF2RPA
FCC CLASSIFICATION: FCC Part 15 Spread Spectrum Transmitter (DSS)
Test Device Serial No.: TG2.4XP, NET-P141M, ☐ Production ☒ Pre-Production ☐ Engineering
RG712BX, 44R282C4
Method/System: Frequency Hopping Spread Spectrum (FHSS)
DATE(S) OF TEST: 9/08 – 10/22/2014
TEST REPORT S/N: 0Y1409031809.AXG

Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.



- PCTEST facility is an FCC registered (PCTEST Reg. No. 159966) 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 (2451B-1).
- 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 (2451B-1) 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 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 and the Industry Canada Certification and Engineering Bureau.

1.2 PCTEST Test Location

The map below shows the location of the PCTEST LABORATORY, its proximity to the FCC Laboratory, the Columbia vicinity, 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 located at 7185 Oakland Mills Road, Columbia, MD 21046. The site coordinates are 39° 10'23" N latitude and 76° 49'50" W longitude. The facility is 0.4 miles North of the FCC laboratory, and the ambient signal and ambient signal strength are approximately equal to those of the FCC laboratory. The detailed description of the measurement facility was found to be in compliance with the requirements of § 2.948 according to ANSI C63.4-2009 on February 15, 2012.

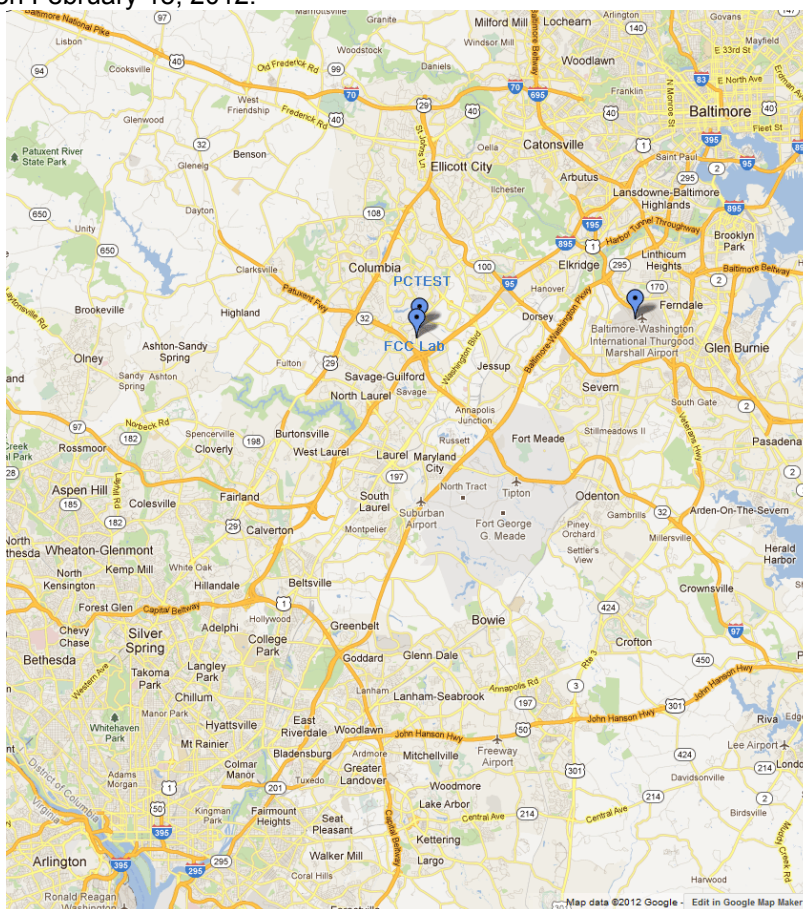


Figure 1-1. Map of the Greater Baltimore and Metropolitan Washington, D.C. area

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Japan Remote Control Telemetry Radio Control System FCC ID:AXG-RF2RPA**. The test data contained in this report pertains only to the emissions due to the EUT's 2400MHz transmitter.

- This module has been previously approved and we confirm the following:
 - A) The hopping sequence is pseudorandom
 - B) All channels are 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): 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): The system does not coordinate its channel selection/hopping sequence with other frequency hopping systems for the express purpose of avoiding the simultaneous occupancy of individual hopping frequencies by multiple transmitters.

2.2 Device Capabilities

This device contains the following capabilities:

2.4GHz Frequency Hopper

2.3 Test Configuration

The **Japan Remote Control Telemetry Radio Control System FCC ID: AXG-RF2RPA** was tested per the guidance of ANSI C63.10-2009 and DA 00-705. ANSI C63.10-2009 was used to reference the appropriate EUT setup for radiated spurious emissions testing. See Sections 3.2 for radiated emissions test setups, and 6.2, 6.3, 6.4, 6.5, 6.6, 6.7, and 6.8 for antenna port conducted emissions test setups.

2.4 EMI Suppression Device(s)/Modifications

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

2.5 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(a)(5). Please see attachment for FCC ID label and label location.

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3.0 DESCRIPTION OF TEST

3.1 Evaluation Procedure

The measurement procedure described in the American National Standard for Testing Unlicensed Wireless Devices (ANSI C63.10-2009) and the "Filing and Measurement Guidelines for Frequency Hopping Spread Spectrum Systems" (DA 00-705) were used in the measurement of the Japan Remote Control Telemetry Radio Control System **FCC ID: AXG-RF2RPA**.

Deviation from measurement procedure.....None

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%, and the atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

3.2 Radiated Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Clause 5, Figure 5.7 of ANSI C63.4-2009. For measurements above 1GHz absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections. For measurements below 1GHz, the absorbers are removed. An ETS Lindgren Model 2188 raised turntable is used for radiated measurement. It is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. A 78cm high PVC support structure is placed on top of the turntable. A ¾" (~1.9cm) sheet of high density polyethylene is used as the table top and is placed on top of the PVC supports to bring the total height of the table to 80cm.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33(b)(1) depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. 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 test set-up was placed on top of the 0.8 meter high, 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, clock speed, mode of operation or video resolution, if applicable, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees 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 changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions. For the EUT positioning, "H" is defined with the EUT lying flat on the test surface, "H2" is defined with the EUT standing up on its side, and "V" is defined with the EUT standing upright.

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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 of the Japan Remote Control Telemetry Radio Control System uses a unique coupling to the module.

Conclusion:

The **Japan Remote Control Telemetry Radio Control System FCC ID: AXG-RF2RPA** unit complies with the requirement of §15.203.

Ch.	Frequency (MHz)
1	2404
:	:
13	2440
:	:
26	2479

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).

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	5/29/2014	Annual	5/29/2015	N/A
Agilent	8447D	Broadband Amplifier	5/30/2014	Annual	5/30/2015	2443A01900
Agilent	N9020A	MXA Signal Analyzer	10/29/2013	Annual	10/29/2014	US46470561
Agilent	N9038A	MXE EMI Receiver	1/3/2014	Annual	1/3/2015	MY51210133
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	6/26/2013	Biennial	6/26/2015	121034
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/8/2014	Biennial	4/8/2016	125518
ETS Lindgren	3160-09	18-26.5 GHz Standard Gain Horn	6/17/2014	Biennial	6/17/2016	135427
K & L	11SH10-3075/U18000	High Pass Filter	5/2/2014	Annual	5/2/2015	2
Pasternack	NMLC-1	Line Conducted Emissions Cable (NM)	1/28/2014	Annual	1/28/2015	N/A
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	1/27/2014	Annual	1/27/2015	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/21/2014	Annual	5/21/2015	100348
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	3/5/2014	Annual	3/5/2015	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/12/2014	Annual	3/12/2015	100040
Seekonk	NC-100	Torque Wrench 5/16", 8" lbs	3/18/2014	Biennial	3/18/2016	N/A
Solar Electronics	8012-50-R-24-BNC	Line Impedance Stabilization Network	6/20/2013	Biennial	6/20/2015	310233
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	1/28/2014	Biennial	1/28/2016	A051107

Table 5-1. Annual Test Equipment Calibration Schedule

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6.0 TEST RESULTS

6.1 Summary

Company Name: Japan Remote Control
 FCC ID: AXG-RF2RPA
 Method/System: Frequency Hopping Spread Spectrum (FHSS)
 Number of Channels: 26

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (Tx)					
15.247(a)(1)	20dB Bandwidth	< 1 MHz only if using less than 15 non-overlapping channels	CONDUCTED	PASS	Section 6.2
15.247(b)(1)	Peak Transmitter Output Power	≤ 0.125 Watts if using at least 25 channels		PASS	Section 6.3
15.247(a)(1)	Channel Separation	> 2/3 of 20 dB BW for systems with Output Power < 125mW		PASS	Section 6.5
15.247(a)(1)(iii)	Number of Channels	> 15 Channels		PASS	Section 6.7
15.247(a)(1)(iii)	Time of Occupancy	< 0.4 sec in 10.4 sec period		PASS	Section 6.6
15.247(d)	Band Edge / Out-of-Band Emissions	Conducted > 20dBc		PASS	Section 6.4, 6.8
15.205, 15.209	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)	RADIATED	PASS	Section 6.9

Table 6-1. Summary of Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.

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6.2 20dB Bandwidth Measurement

§15.247 (a)(1)

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.**

Frequency [MHz]	Channel No.	20dB Bandwidth Test Results	
		Measured Bandwidth [MHz]	Pass/Fail
2404	1	2.64	Pass
2440	13	2.75	Pass
2479	26	2.77	Pass

Table 6-2. Conducted 20dB Bandwidth Measurements

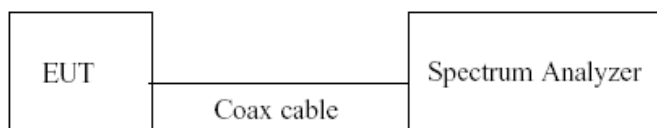
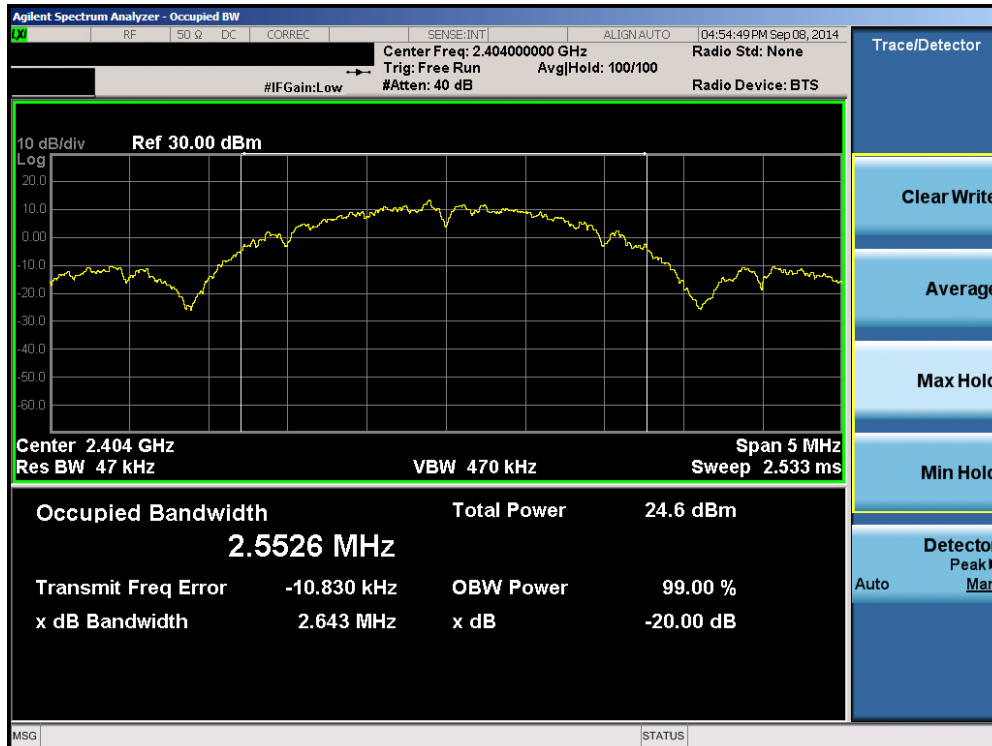
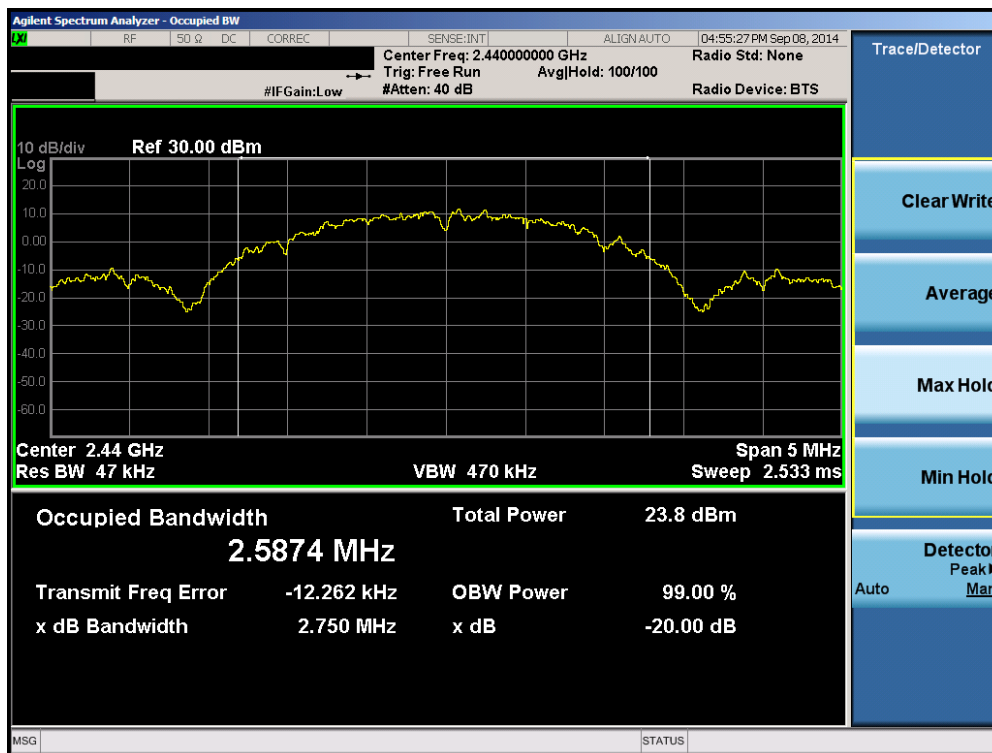


Figure 6-1. Test Instrument & Measurement Setup

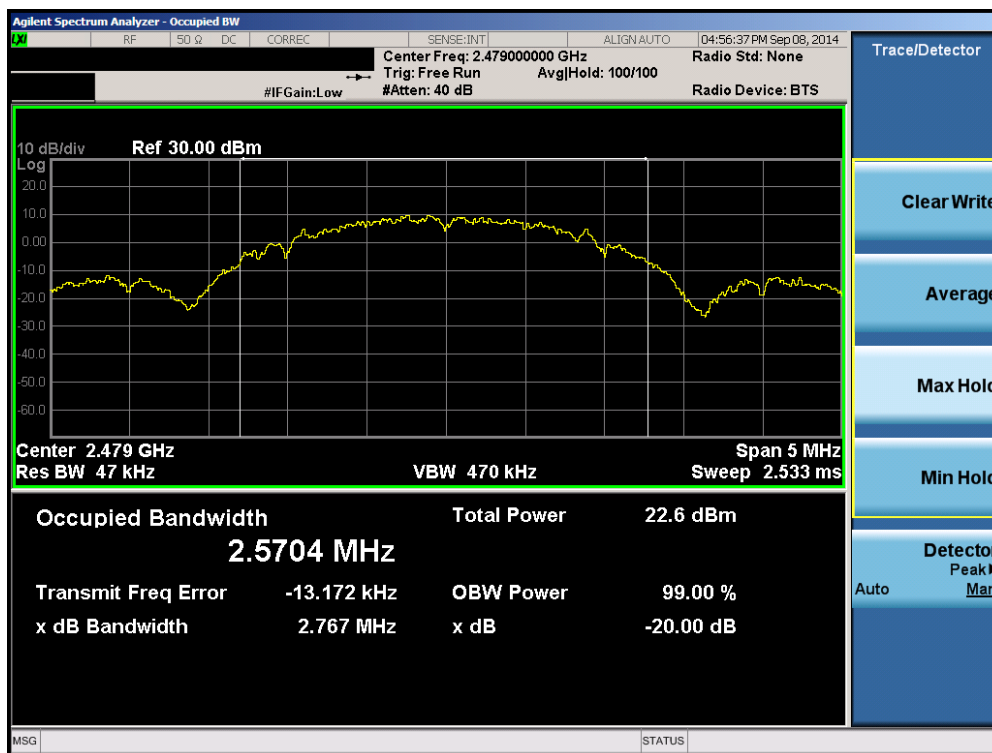


Plot 6-1. 20dB Bandwidth Plot (2400 MHz Band – Ch. 1)

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Plot 6-2. 20dB Bandwidth Plot (2400MHz Band – Ch. 13)



Plot 6-3. 20dB Bandwidth Plot (2400MHz Band – Ch. 26)

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6.3 Output Power Measurement §15.247 (b.1)

Measurement is made while the EUT is operating in non-hopping transmission mode. The powers shown below are peak powers measured using a spectrum analyzer. Peak power measurements are performed in the analyzers' swept spectrum mode using a peak detector with RBW = 3MHz and VBW ≥ RBW. **The maximum permissible output power is 0.125 Watt.**

Frequency [MHz]	Channel No.	Peak Conducted Power	
		[dBm]	[mW]
2404	1	18.47	70.275
2440	13	17.78	59.979
2479	26	16.50	44.648

Table 6-3. Conducted Output Power Measurements



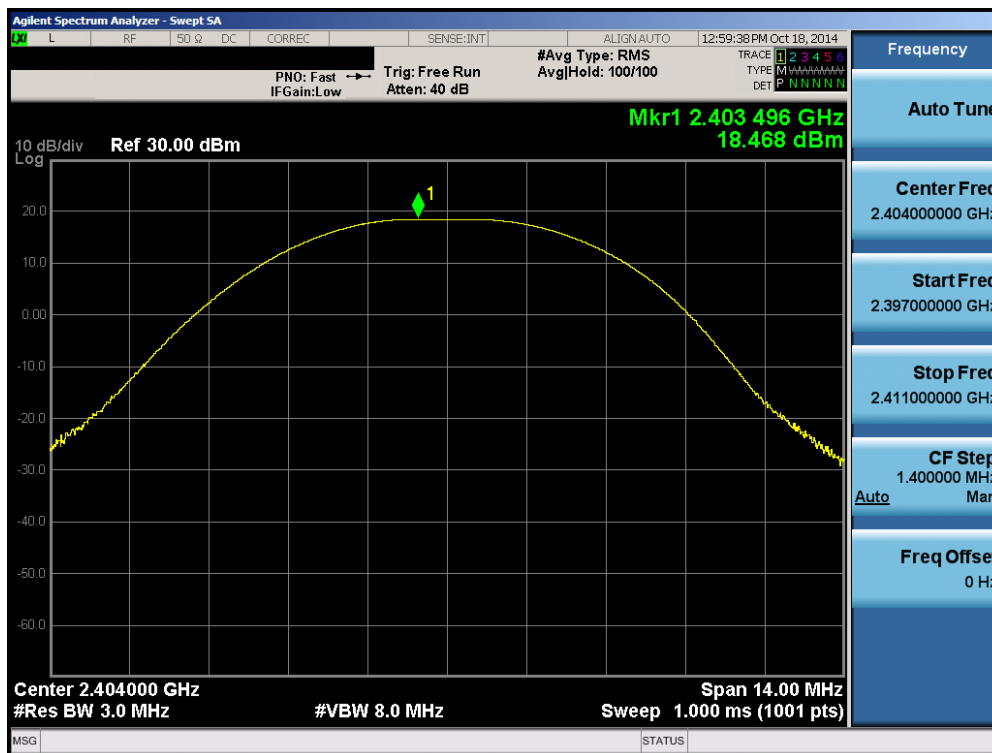
Figure 6-2. Test Instrument & Measurement Setup

Note

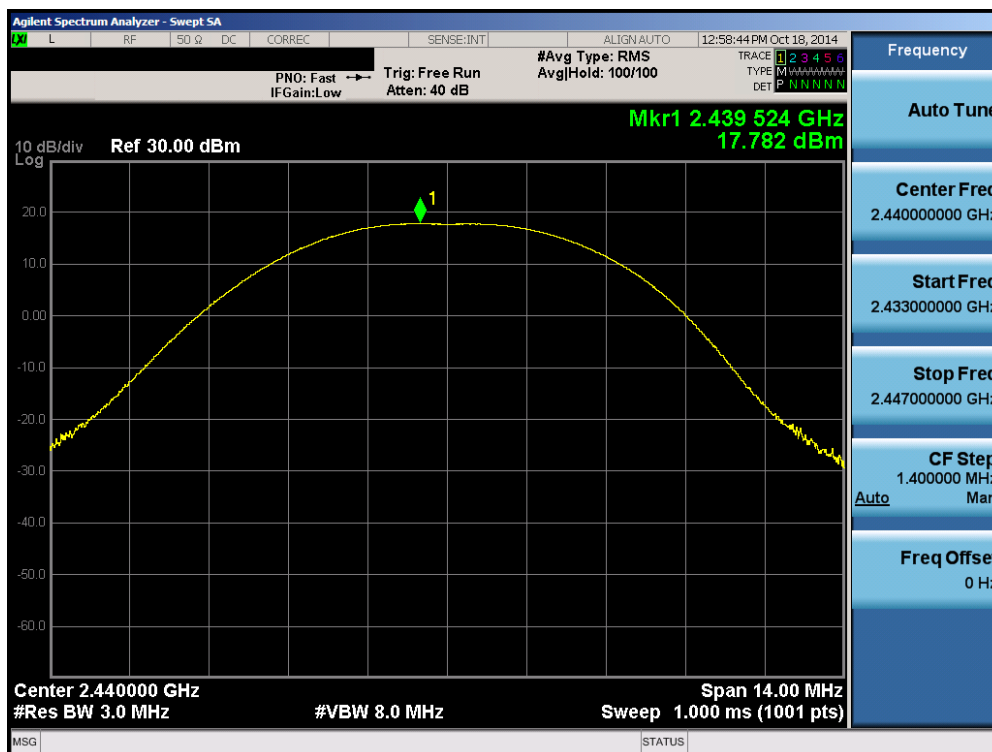
Final results were obtained using calibrated couplers, attenuators and cables. The following formula was used:

$$\text{Output Power (dBm)} = \text{Raw Analyzer Level (dBm)} + \text{Cable Loss (dB)}$$

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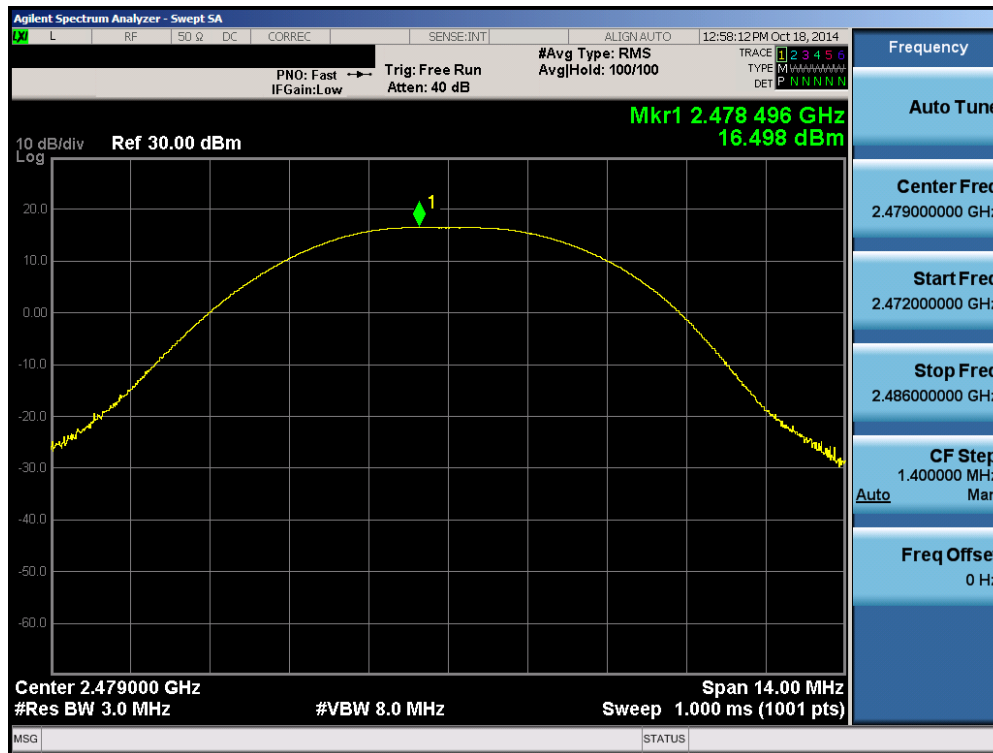


Plot 6-4. Peak Conducted Power (Ch. 1)



Plot 6-5. Peak Conducted Power (Ch. 13)

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Plot 6-6. Peak Conducted Power (Ch. 26)

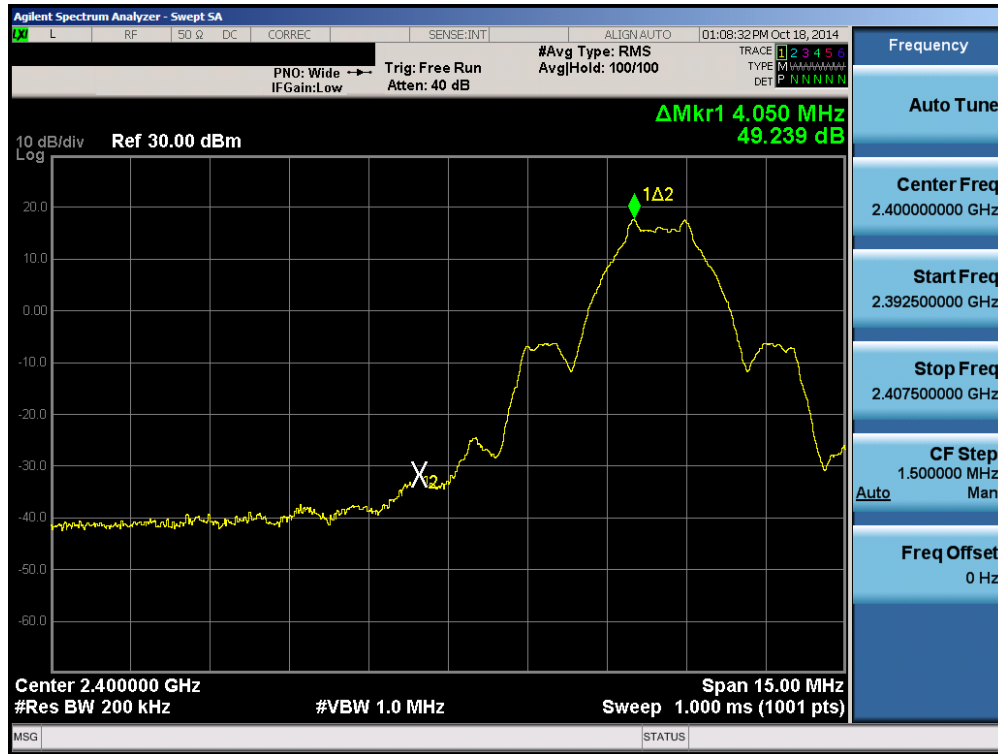
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6.4 Band Edge Compliance

\$15.247 (d)

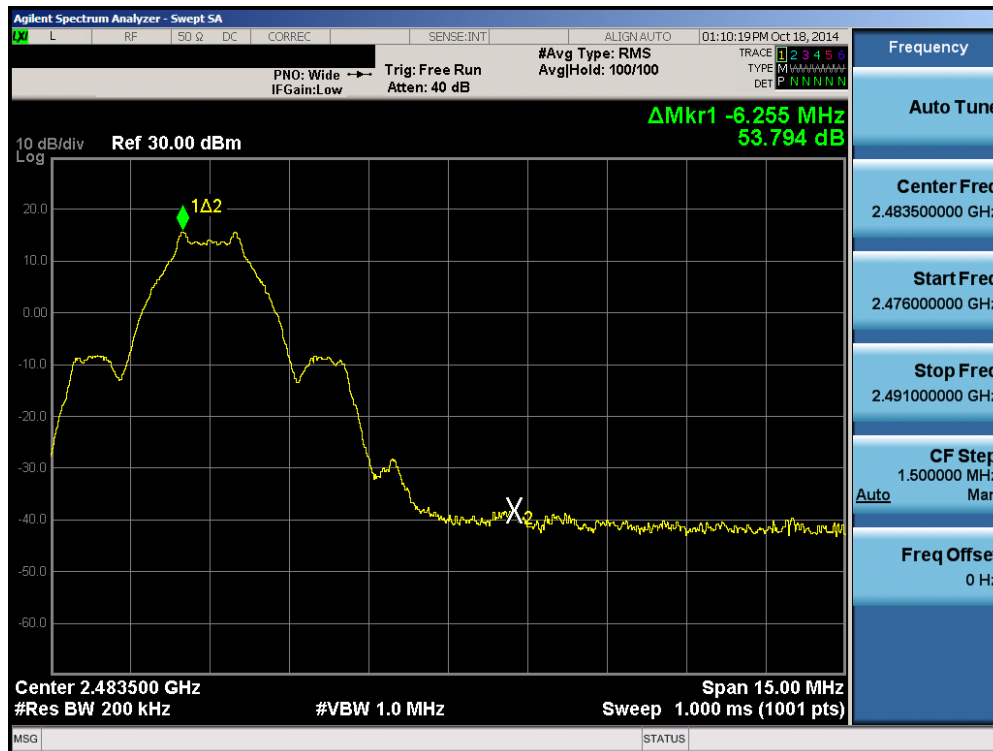
Measurement is taken at the highest point located outside of the emission bandwidth. **The maximum permissible emission level is 20 dBc. Any emission lying outside of the emission bandwidth and in a restricted band is subject to a field strength limit specified in Section 15.209 of the Title 47 CFR.**

Out of band conducted spurious emissions at the band edge were investigated while the device was operating in hopping and non-hopping mode. Plots of the worst case emissions are shown below.



Plot 6-7. Band Edge Plot (Hopping Disabled)

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Plot 6-8. Band Edge Plot (Hopping Disabled)



Plot 6-9. Band Edge Plot (Hopping Enabled)

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Plot 6-10. Band Edge Plot (Hopping Enabled)

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6.5 Carrier Frequency Separation

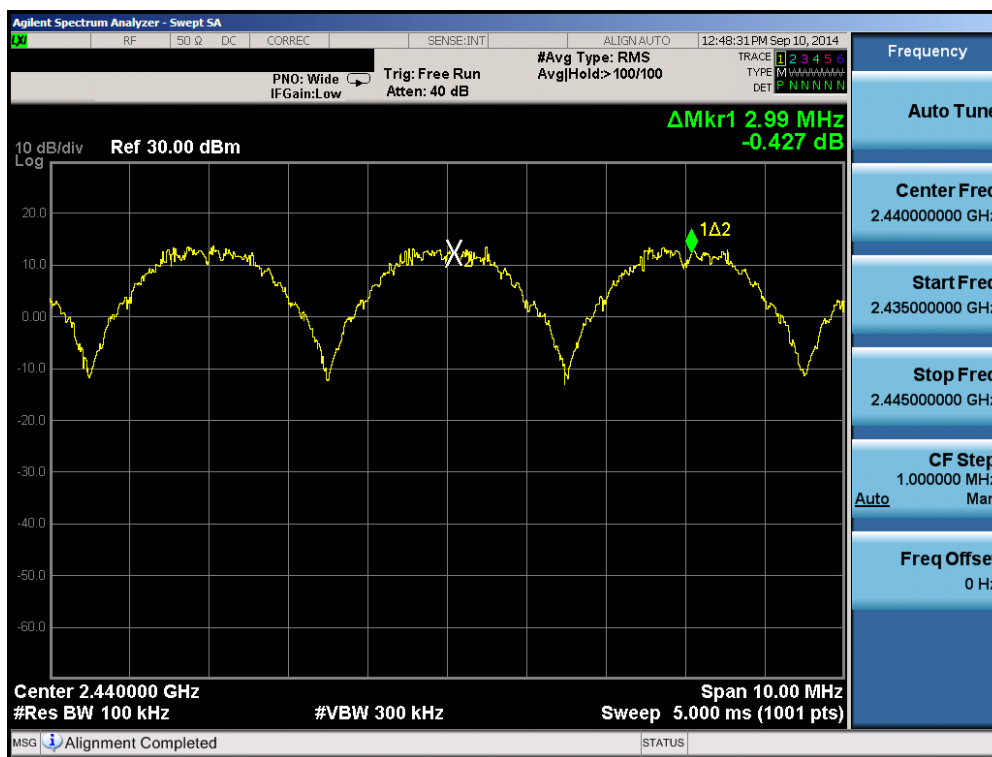
§15.247 (a.1)

Measurement is made with EUT operating in hopping mode. **The minimum permissible channel separation for this system is 2/3 the value of the 20dB BW.**

The EUT complies with the minimum channel separation requirement when it is operating in normal hopping mode.

Frequency [MHz]	Channel No.	Min. Channel Separation [MHz]
2404	1	1.762
2440	13	1.833
2479	26	1.845

Table 6-4. Minimum Channel Separation



Plot 6-11. Channel Spacing Plot (2400MHz Band)

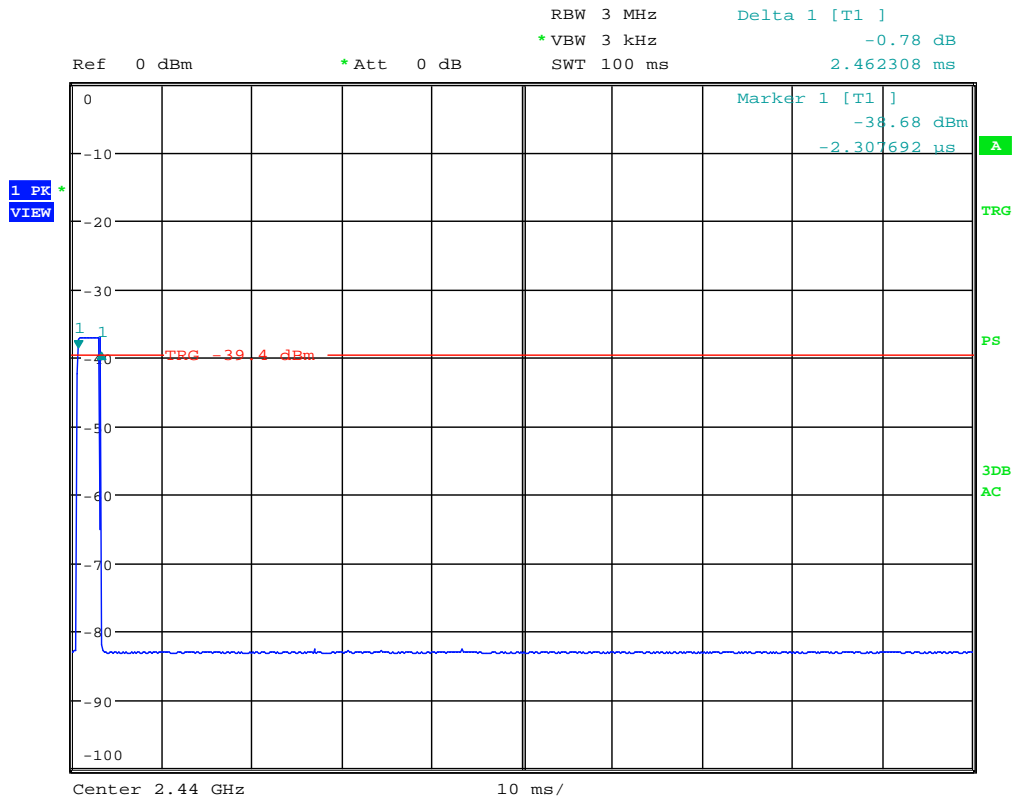
FCC ID: AXG-RF2RPA	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 2400MHz FHSS TEST REPORT (CERTIFICATION)	IN PROPO	Reviewed by: Quality Manager
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6.6 Time of Occupancy

§15.247 (a)(1)(iii)

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 a period of 0.4 seconds multiplied by the number of hopping channels employed.**

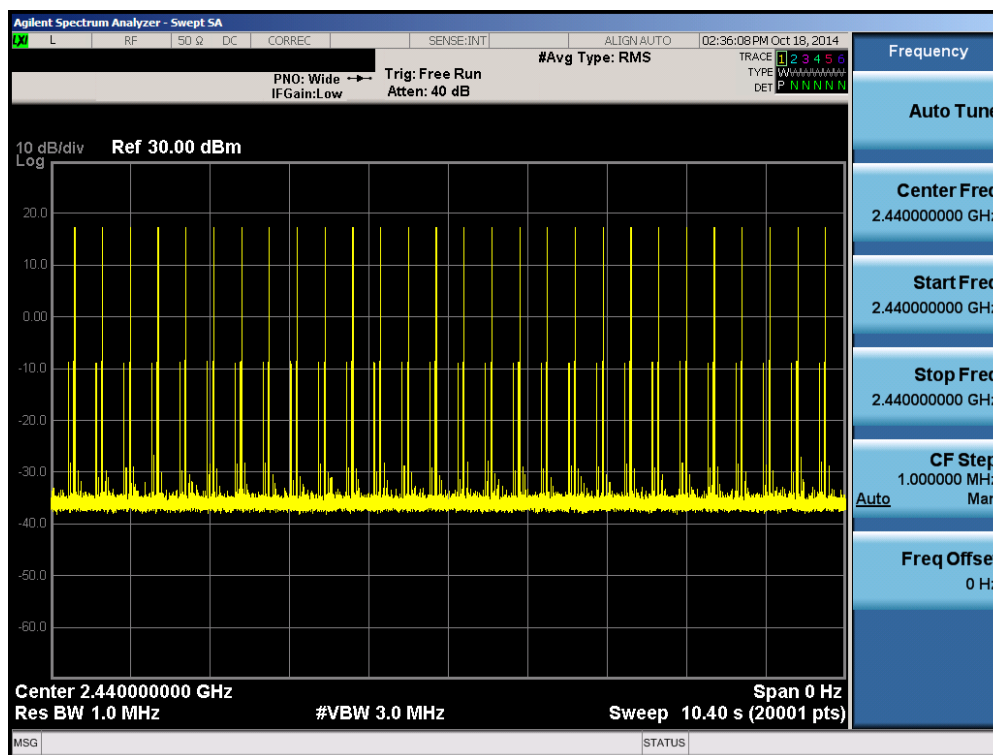
The pulse width for this device was measured on a spectrum analyzer and found to be 2.46 ms, as shown in Plot 6-12 below. After determining the pulse width, the analyzer was set to capture 10.4 seconds worth of data to determine the maximum number of times that one particular channel is transmitting. As shown in Plot 6-13 on the following page, the maximum occurrence of a channel is 29 times within a 10.4 second window.



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Plot 6-12. Time of Occupancy Plot (2400MHz Band)

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Plot 6-13. 10.4 Second Sweep Time

Time of Occupancy Calculation

Based on the previous two plots, the time of occupancy can be determined as follows:

- Pulse Width = 2.46 ms (See Plot 6-12)
- 400 ms x 26 hopping channels = 10.4 sec (Time of Occupancy Limit)
- Number of times that one particular channel appears in a 10.4 second period = 29 (See Plot 6-13)
- Time of Occupancy = 2.46 ms/pulse x 29 pulses/10.4 sec = 71.34 ms/10.4 sec

Note:

Since the EUT was operating in hopping mode, there are several pulses shown in Plot 6-13 due to operation on adjacent channels. Only the twenty-nine pulses with the highest amplitude are used in the “time of occupancy” calculation because they are from the channel on which the analyzer was tuned.

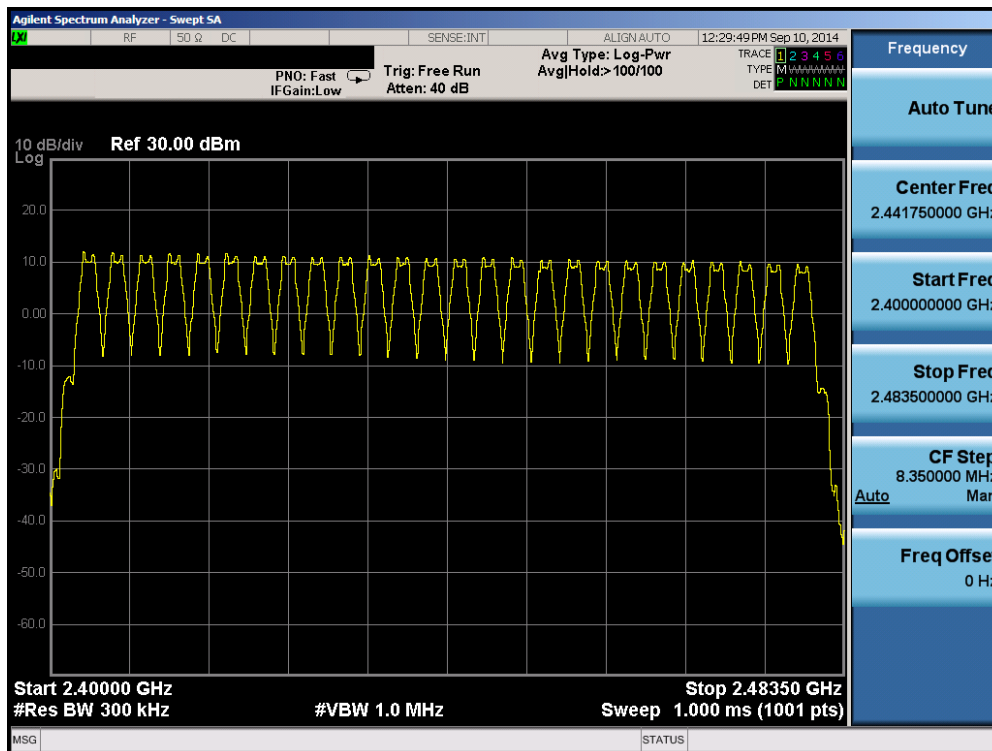
FCC ID: AXG-RF2RPA		FCC Pt. 15.247 2400MHz FHSS TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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6.7 Number of Hopping Channels

§15.247 (a.1.iii)

Measurement is made while EUT is operating in hopping mode. ***This frequency hopping system must employ a minimum of 15 hopping channels.***

The EUT operates using 26 channels so the requirement for minimum number of hopping channels is satisfied.



Plot 6-14. 2400MHz Spectrum Channel Hopping Plot

FCC ID: AXG-RF2RPA	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 2400MHz FHSS TEST REPORT (CERTIFICATION)	IN PROPO	Reviewed by: Quality Manager
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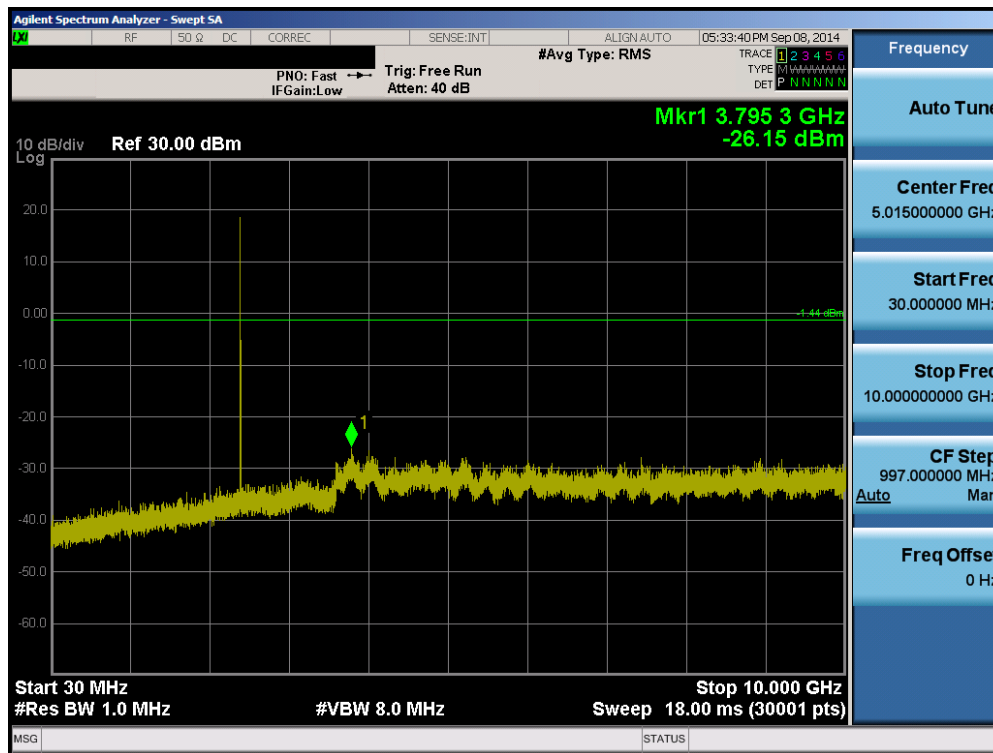
6.8 Conducted Spurious Emissions

\$15.247 (d)

Out of band conducted spurious emissions were found with the EUT transmitting at maximum power in non-hopping mode. Plots of the worst case emissions are shown below.

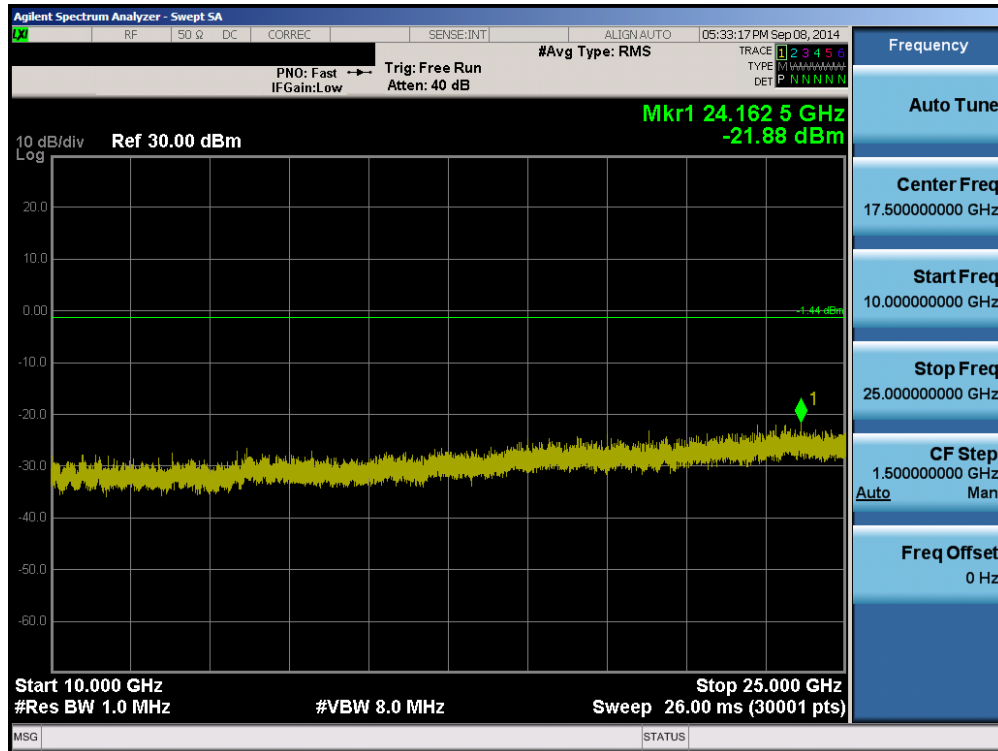
Test Notes

1. RBW was set to 1MHz rather than 100kHz in order to increase the measurement speed.
2. The display line shown in the following plots denotes the limit at 20dB below the fundamental emission level measured in a 100kHz bandwidth. However, since the traces in the following plots are measured with a 1MHz RBW, the display line may not necessarily appear to be 20dB below the level of the fundamental in a 1MHz bandwidth.

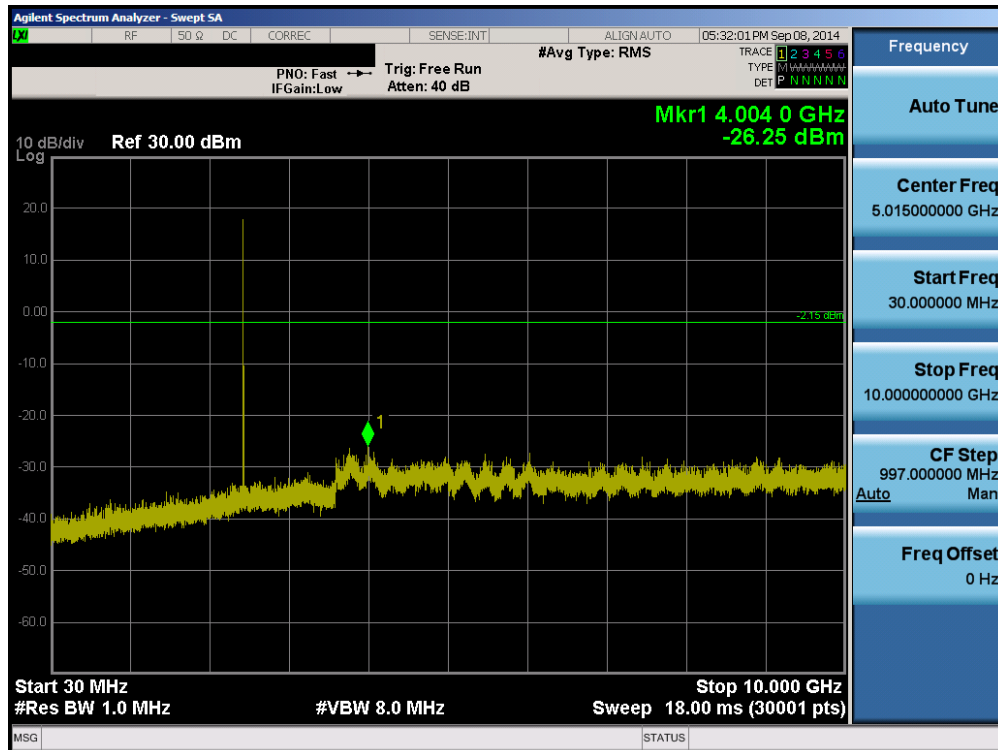


Plot 6-15. Conducted Spurious Plot (2400MHz Band – Ch. 1)

FCC ID: AXG-RF2RPA	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 2400MHz FHSS TEST REPORT (CERTIFICATION)	IN PROPO	Reviewed by: Quality Manager
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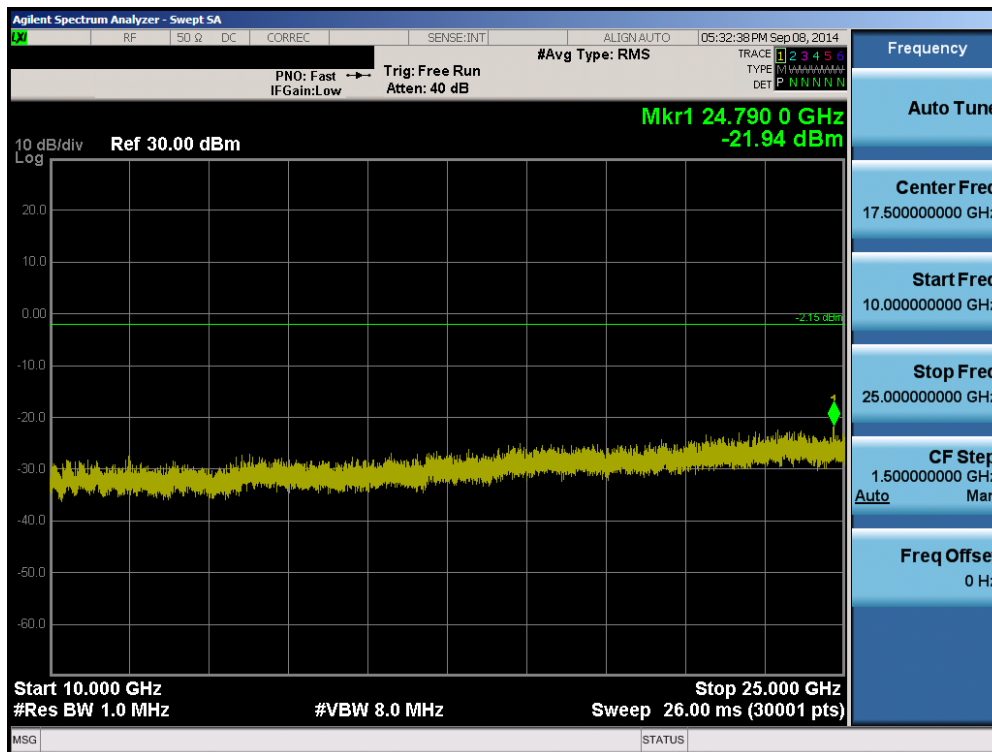


Plot 6-16. Conducted Spurious Plot (2400MHz Band – Ch. 1)

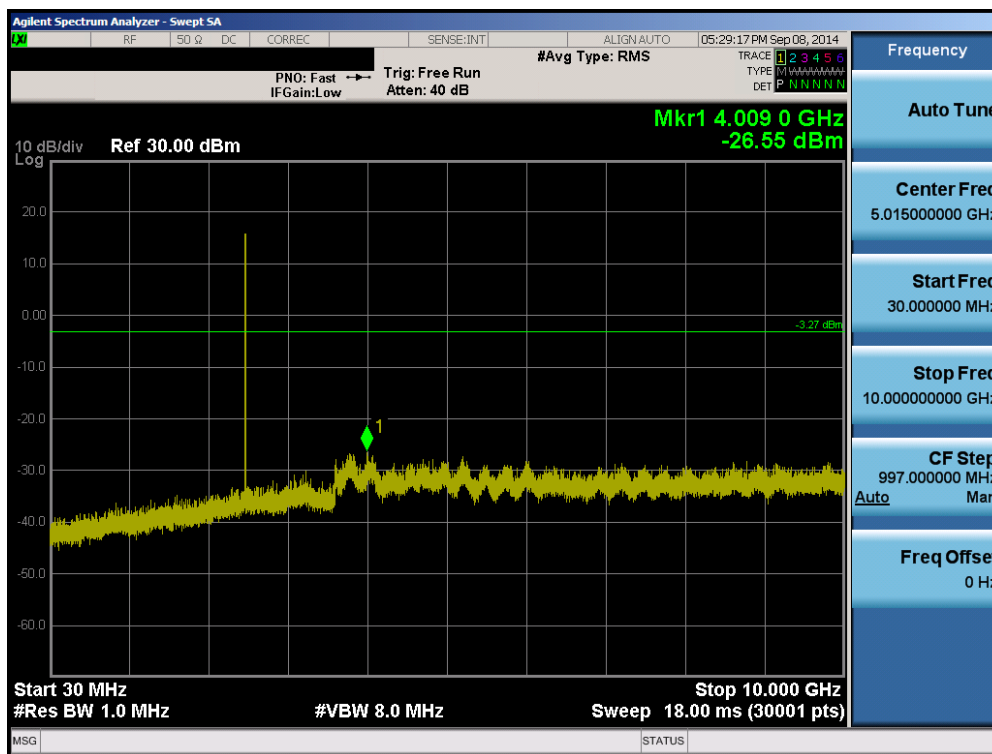


Plot 6-17. Conducted Spurious Plot (2400MHz Band – Ch. 13)

FCC ID: AXG-RF2RPA	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 2400MHz FHSS TEST REPORT (CERTIFICATION)	IN PROPO	Reviewed by: Quality Manager
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Plot 6-18. Conducted Spurious Plot (2400MHz Band – Ch. 13)



Plot 6-19. Conducted Spurious Plot (2400MHz Band – Ch. 26)

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6.9 Radiated Spurious Emission Measurements

§15.205 §15.209

Frequency	Field Strength [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 6-5. Radiated Limits

Sample Calculation

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

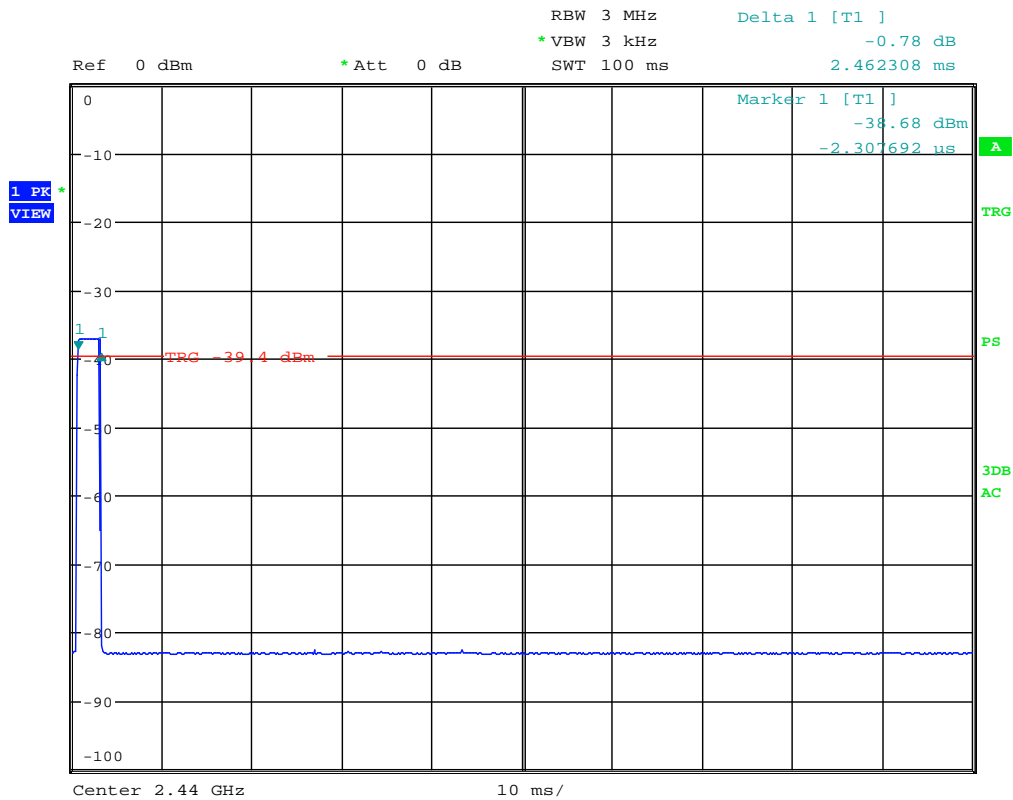
Test Notes

- All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 6-5.
- No significant radiated emissions were found in the 2310 - 2390MHz restricted band.
- Average measurements > 1GHz using RBW = 1MHz and VBW = 1kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds. Peak measurements > 1GHz using RBW = 1MHz and VBW = 3MHz. Both average and peak measurements were made using a peak detector.
- The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
- The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
- The duty cycle correction factor was not applied to noise floor measurements.

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Duty Cycle Correction Factor Calculation

- Worst case dwell time = 2.46 ms
- Duty cycle correction factor = $20\log_{10}(2.46\text{ms}/100\text{ms}) = -32.173 \text{ dB}$



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Plot 6-21. Dwell Time

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Radiated Spurious Emission Measurements

§15.205 §15.209

Worst Case Mode: Burst Tx
 Measurement Distance: 3 Meters
 Operating Frequency: 2404MHz
 Channel: 1

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4808.00	-95.99	Avg	H	H	39.96	-32.17	18.80	53.98	-35.18
4808.00	-88.11	Peak	H	H	39.96	0.00	58.85	73.98	-15.13
12020.00	-110.94	Avg	H	H	48.32	-32.17	12.20	53.98	-41.78
12020.00	-100.13	Peak	H	H	48.32	0.00	55.18	73.98	-18.80

Table 6-6. Radiated Measurements

Worst Case Mode: Burst Tx
 Measurement Distance: 3 Meters
 Operating Frequency: 2440MHz
 Channel: 13

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4880.00	-92.92	Avg	H	H	40.50	-32.17	22.40	53.98	-31.58
4880.00	-85.43	Peak	H	H	40.50	0.00	62.07	73.98	-11.91
7320.00	-108.70	Avg	H	H	40.62	-32.17	6.75	53.98	-47.23
7320.00	-98.02	Peak	H	H	40.62	0.00	49.60	73.98	-24.38
12200.00	-109.67	Avg	H	H	45.65	-32.17	10.80	53.98	-43.18
12200.00	-99.38	Peak	H	H	45.65	0.00	53.27	73.98	-20.71

Table 6-7. Radiated Measurements

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Radiated Spurious Emission Measurements

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Worst Case Mode: Burst Tx
 Measurement Distance: 3 Meters
 Operating Frequency: 2479MHz
 Channel: 26

Frequency [MHz]	Analyzer Level [dBm]	Detector	Ant. Pol. [H/V]	EUT Pol. [H/H2/V]	AFCL [dB]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4958.00	-91.87	Avg	H	H	41.02	-32.17	23.98	53.98	-30.00
4958.00	-84.20	Peak	H	H	41.02	0.00	63.82	73.98	-10.16
7437.00	-101.94	Avg	H	H	43.51	-32.17	16.40	53.98	-37.58
7437.00	-92.03	Peak	H	H	43.51	0.00	58.48	73.98	-15.50
12395.00	-113.81	Avg	H	H	47.79	-32.17	8.81	53.98	-45.17
12395.00	-102.62	Peak	H	H	47.79	0.00	52.17	73.98	-21.81

Table 6-8. Radiated Measurements

FCC ID: AXG-RF2RPA		FCC Pt. 15.247 2400MHz FHSS TEST REPORT (CERTIFICATION)	IN PROPO	Reviewed by: Quality Manager
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6.10 Radiated Restricted Band Edge Measurements

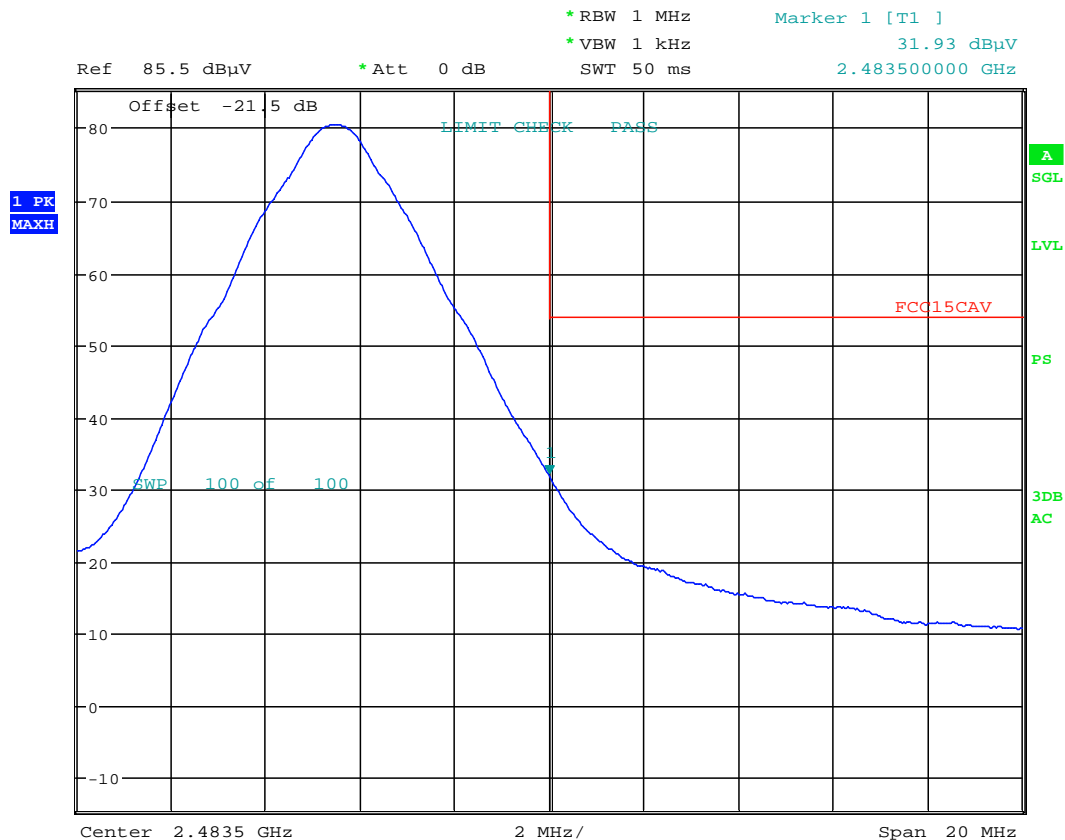
\$15.205 \$15.209

The radiated restricted band edge measurements are measured with an EMI test receiver connected to the receive antenna while the EUT is transmitting. Two different amplitude offsets were used depending on whether peak or average measurements were measured. The average measurements use a duty cycle correction factor (DCCF).

The amplitude offset shown in the following plots for average measurements was calculated using the formula:

$$\text{Offset (dB)} = (\text{Antenna Factor} + \text{Cable Loss} + 10 \text{ dB Attenuator}) - \text{Preamplifier Gain} + \text{DCCF}$$

Worst Case Mode:	Burst TX
Measurement Distance:	3 Meters
Operating Frequency:	2479MHz
Channel:	26



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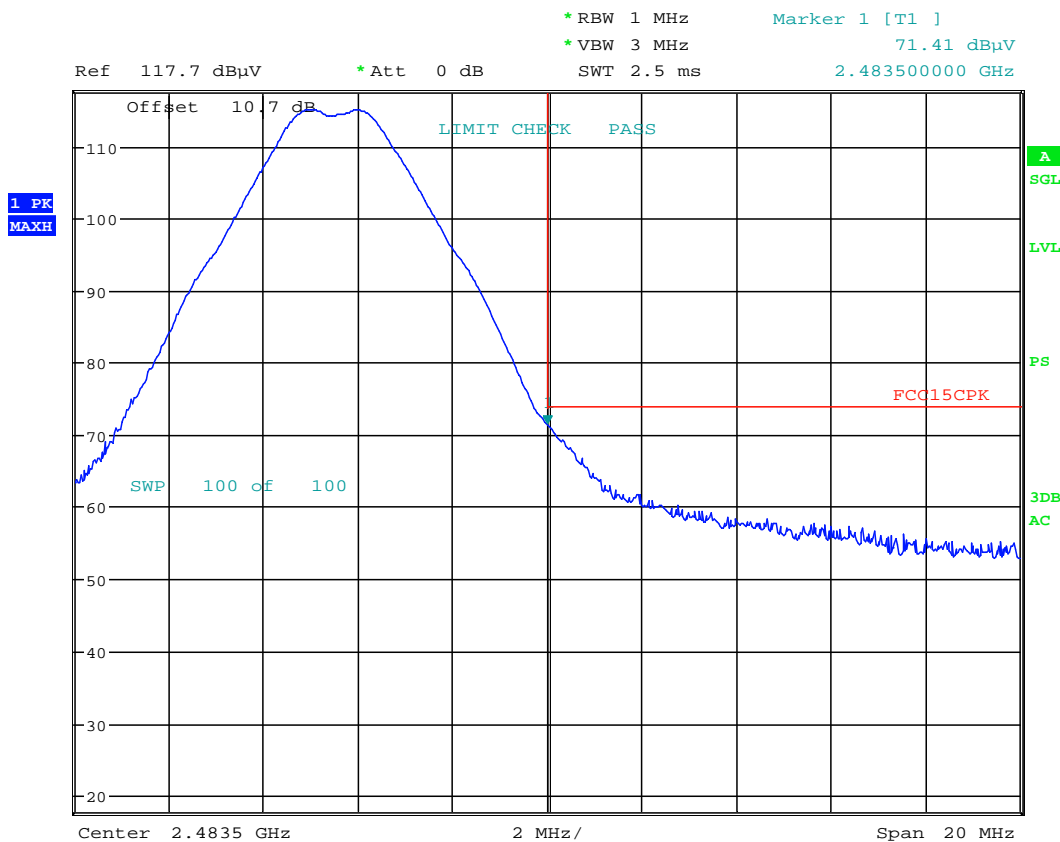
Plot 6-22. Radiated Restricted Upper Band Edge Measurement (Average)

FCC ID: AXG-RF2RPA	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 2400MHz FHSS TEST REPORT (CERTIFICATION)	IN PROGRESS	Reviewed by: Quality Manager
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Radiated Restricted Band Edge Measurements §15.205 §15.209

The amplitude offset shown in the following plots for peak measurements was calculated using the formula:

$$\text{Offset (dB)} = (\text{Antenna Factor} + \text{Cable Loss} + 10 \text{ dB Attenuator}) - \text{Preamplifier Gain}$$



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Plot 6-23. Radiated Restricted Upper Band Edge Measurement (Peak)

FCC ID: AXG-RF2RPA	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 2400MHz FHSS TEST REPORT (CERTIFICATION)	IN PROGRESS	Reviewed by: Quality Manager
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7.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **Japan Remote Control Telemetry Radio Control System FCC ID: AXG-RF2RPA** is in compliance with Part 15 Subpart C (15.247) of the FCC Rules.

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