**MEASUREMENT REPORT**
FCC PART 15.247**Applicant Name:**SMC Corporation
4-2-2, Kinunodai, Tsukubamirai-shi
Ibaraki-ken, 300-2493
Japan**Date of Testing:**

10/18-11/28/2016

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

0Y1610131618-R1.2AJE7

FCC ID: 2AJE7SMC-DIV5**APPLICANT:** SMC Corporation**Application Type:**

Certification

Model(s):

EX600-WEN3-X40, EX600-WEN4-X40, EX600-WSV3-X41, EX600-WSV4-X41

EUT Type:

Wireless I/O Device

Max. RF Output Power:

2.864 mW (4.57 dBm) Peak Conducted

Frequency Range:

2403 – 2481MHz

FCC Classification:

FCC Part 15 Spread Spectrum Transmitter (DSS)

FCC Rule Part(s):

Part 15 Subpart C (15.247)

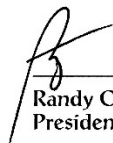
Test Procedure(s):



ANSI C63.10-2013

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 C63.10-2013. Test results reported herein relate only to the item(s) tested.

This revised Test Report (S/N: 0Y1610131618-R1.2AJE7) supersedes and replaces the previously issued test report (S/N: 0Y1610131618.2AJE7) on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.



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.

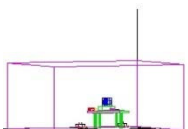

Randy Ortanez
President

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MEASUREMENT REPORT

FCC Part 15.247



§ 2.1033 General Information

APPLICANT: SMC Corporation

APPLICANT ADDRESS: 4-2-2, Kinunodai, Tsukubamirai-shi
Ibaraki-ken, 300-2493, 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)

MODELS: EX600-WEN3-X40, EX600-WEN4-X40, EX600-WSV3-X41, EX600-WSV4-X41

FCC ID: 2AJE7SMC-DIV5

FCC CLASSIFICATION: FCC Part 15 Spread Spectrum Transmitter (DSS)

Test Device Serial No.: 0401B, 04017, ☐ Production ☒ Pre-Production ☐ Engineering
0401C, 0401A

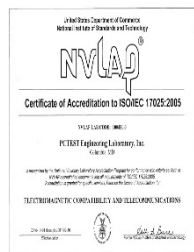
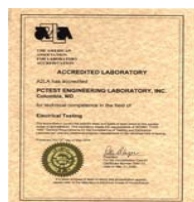
Method/System: Frequency Hopping Spread Spectrum (FHSS)

DATE(S) OF TEST: 10/18-11/28/2016



TEST REPORT S/N: 0Y1610131618-R1.2AJE7

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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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **SMC Wireless System Wireless I/O Device FCC ID: 2AJE7SMC-DIV5**. The test data contained in this report pertains only to the emissions due to the EUT's 2.4 GHz transmitter.

2.2 Device Capabilities

This device contains the following capabilities:



2.4 GHz Frequency Hopper

2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.10-2013. ANSI C63.10-2013 was also used to reference the appropriate EUT setup for radiated spurious emissions testing. See Sections 3.2 for radiated emissions test setups, and 7.2, 7.3, 7.4, 7.5, 7.6, 7.7, and 7.8 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.

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3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedure described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) was used in the measurement of the EUT.

Deviation from measurement procedure.....None

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 Figure 5.7 of Clause 5 in ANSI C63.4-2014. 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 above 1GHz. A 72.4cm high PVC support structure is placed on top of the turntable. A 3" (~7.6cm) sheet of high density polystyrene 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 measurements above 1GHz, a high density expanded polystyrene block is placed on top of the test table to bring the total table height to 1.5m.

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 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, mode of operation, 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.

3.3 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 monitored within the range 86-106kPa (860-1060mbar).

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4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

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



- The antennas of the EUT are **permanently attached**.
- There are no provisions for connection to an external antenna.

Conclusion:

The EUT complies with the requirement of §15.203.

Ch.	Frequency (MHz)
00	2403
:	:
39	2442
:	:
78	2481



Table 4-1. Frequency/ Channel Operations

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5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95% level of confidence. The measurement data shown herein meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (\pm dB)
Conducted Bench Top Measurements	1.13
Conducted Disturbance	3.09
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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6.0 TEST EQUIPMENT CALIBRATION DATA



Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2006.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	RE1	Radiated Emissions Cable Set (UHF/EHF)	7/11/2016	Annual	7/11/2017	RE1
-	WL40-1	Conducted Cable Set (40GHz)	4/26/2016	Annual	4/26/2017	WL40-1
Agilent	8447D	Broadband Amplifier	12/12/2015	Annual	12/12/2016	1937A03348
Agilent	N9020A	MXA Signal Analyzer	11/5/2015	Annual	11/5/2016	US46470561
Com-Power	PAM-118A	PREAMPLIFIER 500MHZ TO 18GHZ	7/26/2016	Annual	7/26/2017	551079
Emco	3115	Horn Antenna (1-18GHz)	3/10/2016	Biennial	3/10/2018	9704-5182
Emco	6502	Active Loop Antenna (10k - 30 MHz)	8/9/2016	Biennial	8/9/2018	2936
EMCO	3160-09	Small Horn	8/23/2016	Biennial	8/23/2018	135427
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/26/2016	Biennial	4/26/2018	125518
PCTEST	-	EMC Switch System	7/6/2016	Annual	7/6/2017	NM2
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	7/15/2016	Annual	7/15/2017	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	7/27/2016	Annual	7/27/2017	103200
Rohde & Schwarz	TS-PR18	1-18 GHz Pre-Amplifier	7/11/2016	Annual	7/11/2017	100071
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	3/7/2016	Annual	3/7/2017	100040
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	3/14/2016	Biennial	3/14/2018	A051107

Table 6-1. Annual Test Equipment Calibration Schedule

Note:

- Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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7.0 TEST RESULTS

7.1 Summary



Company Name: SMC Corporation
 FCC ID: 2AJE7SMC-DIV5
 Method/System: Frequency Hopping Spread Spectrum (FHSS)
 Number of Channels: 79

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
TRANSMITTER MODE (Tx)					
15.247(a)(1)(iii)	20dB Bandwidth	N/A	CONDUCTED	PASS	Section 7.2
15.247(b)(1)	Peak Transmitter Output Power	< 1 Watt if ≥ 75 non-overlapping channels used		PASS	Section 7.3
15.247(a)(1)	Channel Separation	> 2/3 of 20 dB BW for systems with Output Power < 125mW		PASS	Section 7.5
15.247(a)(1)(iii)	Number of Channels	> 15 Channels		PASS	Section 7.7
15.247(a)(1)(iii)	Time of Occupancy	< 0.4 sec in 31.6 sec period		PASS	Section 7.6
15.247(d)	Band Edge / Out-of-Band Emissions	Conducted > 20dBc		PASS	Section 7.4, Section 7.8
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	RADIATED	PASS	Section 7.9, Section 7.10, Section 7.11

Table 7-1. 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.
- 4) For radiated band edge, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "Chamber Automation," Version 1.1.2.
- 5) This report includes data from 4 models (EX600-WEN3-X40, EX600-WEN4-X40, EX600-WSV3-X41, EX600-WSV4-X41) that will use the same FCC ID: 2AJE7SMC-DIV5.

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7.2 20dB Bandwidth Measurement

§15.247 (a.1.iii)

Test Overview and Limit

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.

Test Procedure Used

ANSI C63.10-2013 – Section 6.9.2

Test Settings

1. The signal analyzers' automatic bandwidth measurement capability of the spectrum analyzer was used to perform the 20dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 20. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% OBW
3. VBW $\geq 3 \times$ RBW
4. Reference level set to keep signal from exceeding maximum input mixer level for linear operation.
5. Detector = Peak
6. Trace mode = max hold
7. Sweep = auto couple
8. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

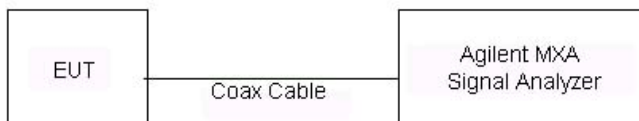




Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None

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Frequency [MHz]	Channel No.	20dB Bandwidth Test Results	
		Measured Bandwidth [kHz]	Pass/Fail
2403	0	818.70	Pass
2442	39	806.30	Pass
2481	78	811.40	Pass

Table 7-2. Conducted 20dB Bandwidth Measurements(EX600-WEN3-X40)

Frequency [MHz]	Channel No.	20dB Bandwidth Test Results	
		Measured Bandwidth [kHz]	Pass/Fail
2403	0	786.90	Pass
2442	39	809.10	Pass
2481	78	820.50	Pass

Table 7-3. Conducted 20dB Bandwidth Measurements(EX600-WEN4-X40)

Frequency [MHz]	Channel No.	20dB Bandwidth Test Results	
		Measured Bandwidth [kHz]	Pass/Fail
2403	0	811.60	Pass
2442	39	808.40	Pass
2481	78	801.30	Pass

Table 7-4. Conducted 20dB Bandwidth Measurements(EX600-WSV3-X41)

Frequency [MHz]	Channel No.	20dB Bandwidth Test Results	
		Measured Bandwidth [kHz]	Pass/Fail
2403	0	798.90	Pass
2442	39	791.50	Pass
2481	78	800.00	Pass

Table 7-5. Conducted 20dB Bandwidth Measurements(EX600-WSV4-X41)

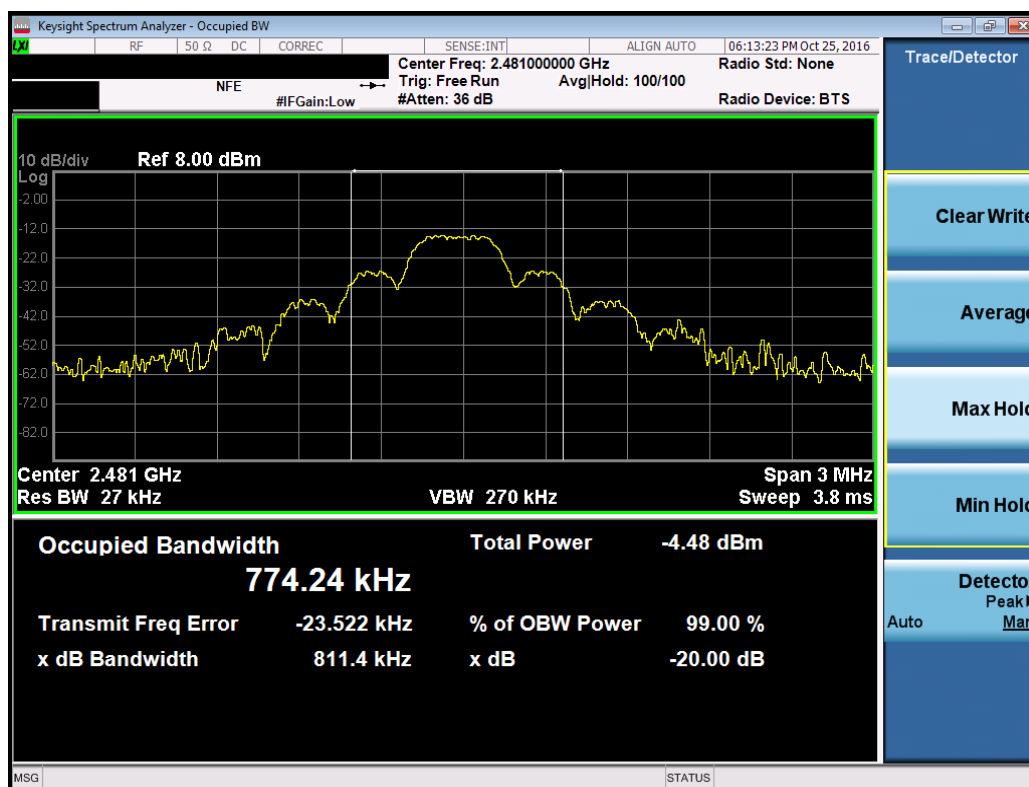


Plot 7-1. 20dB Bandwidth Plot (EX600-WEN3-X40, Ch. 0)



FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
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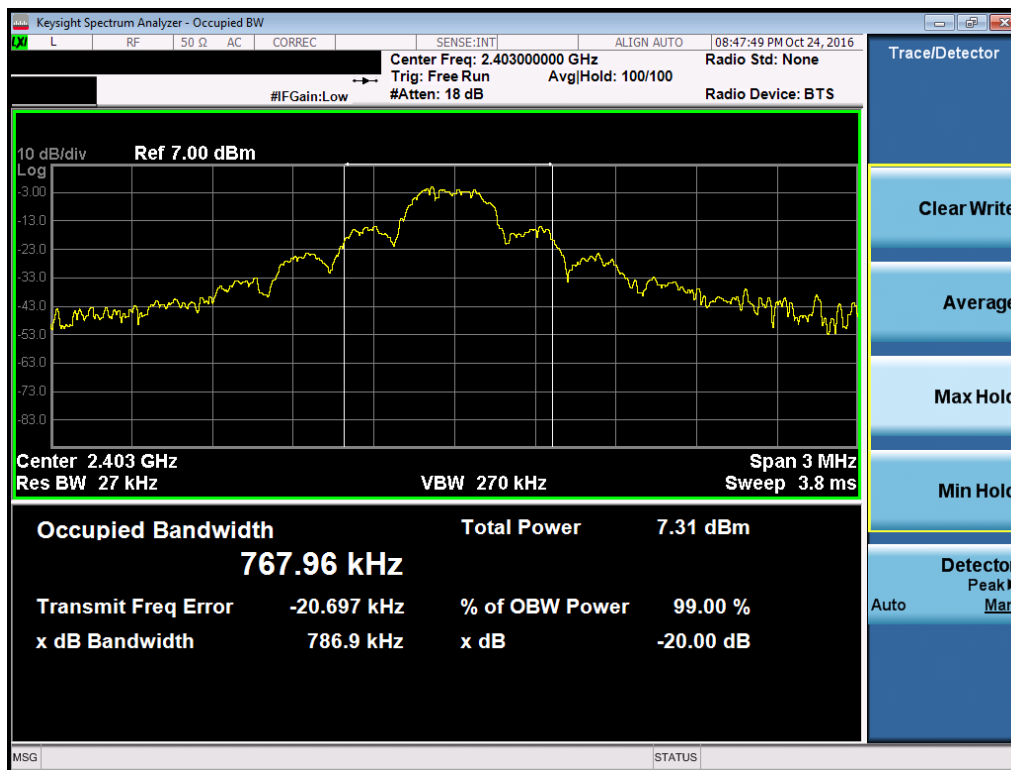


Plot 7-2. 20dB Bandwidth Plot (EX600-WEN3-X40, Ch. 39)

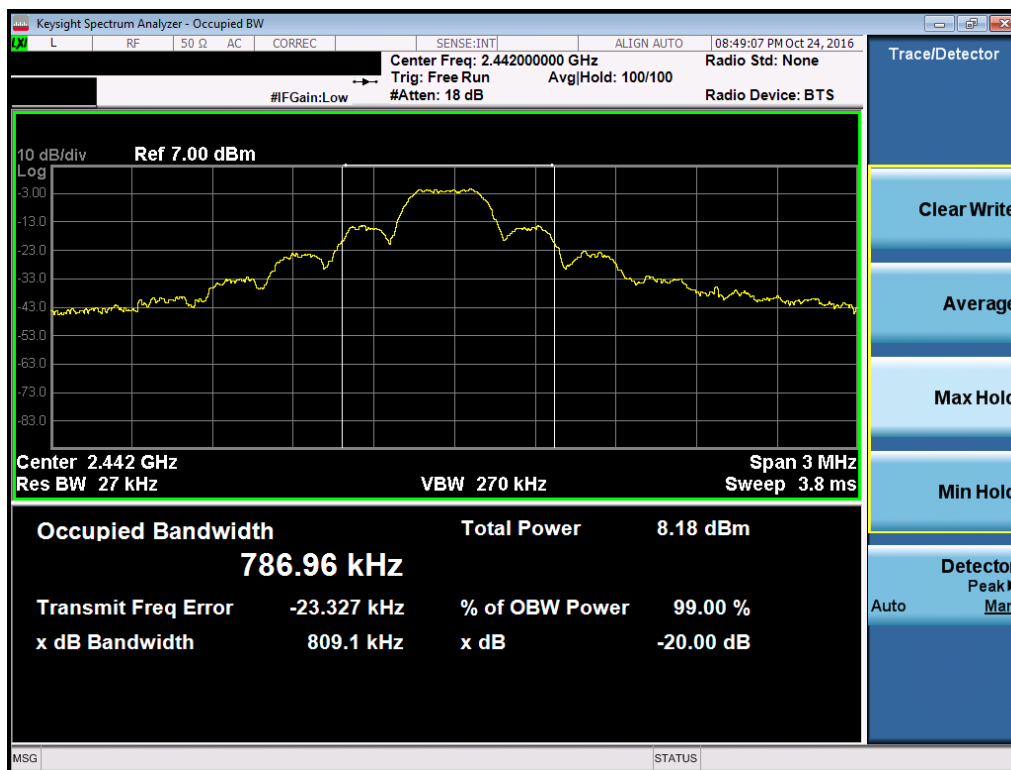


Plot 7-3. 20dB Bandwidth Plot (EX600-WEN3-X40, Ch. 78)

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Plot 7-4. 20dB Bandwidth Plot (EX600-WEN4-X40, Ch. 0)



Plot 7-5. 20dB Bandwidth Plot (EX600-WEN4-X40, Ch. 39)

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Plot 7-6. 20dB Bandwidth Plot (EX600-WEN4-X40, Ch. 78)



Plot 7-7. 20dB Bandwidth Plot (EX600-WSV3-X41, Ch. 0)

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Plot 7-8. 20dB Bandwidth Plot (EX600-WSV3-X41, Ch. 39)



Plot 7-9. 20dB Bandwidth Plot (EX600-WSV3-X41, Ch. 78)

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Plot 7-10. 20dB Bandwidth Plot (EX600-WSV4-X41, Ch. 0)





Plot 7-11. 20dB Bandwidth Plot (EX600-WSV4-X41, Ch. 39)

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Plot 7-12. 20dB Bandwidth Plot (EX600-WSV4-X41, Ch. 78)

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7.3 Output Power Measurement

§15.247 (b.1)

Test Overview and Limits

Measurement is made while the EUT is operating in non-hopping transmission mode. The powers shown below were measured using a spectrum analyzer. Average power measurements are performed using the analyzer's "burst power" function with RBW = 3MHz. The burst power function triggers on a single set burst set to maximum power and measures the maximum average power on the on-time.

The maximum permissible output power is 1 Watt.

Test Procedure Used

ANSI C63.10-2013 – Section 7.8.5

Test Settings

Peak Power Measurement

1. Span = approximately 5x 20dB bandwidth, centered on hopping channel
2. RBW > 20dB bandwidth of emission being measured
3. VBW ≥ RBW
4. Sweep = auto
5. Detector = peak
6. Trace mode = max hold
7. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

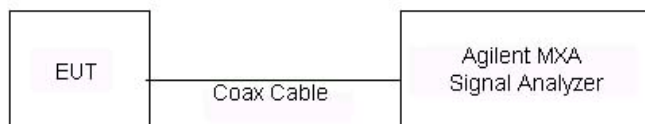




Figure 7-2. Test Instrument & Measurement Setup

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

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

Frequency [MHz]	Channel No.	Peak Conducted Power	
		[dBm]	[mW]
2403	0	4.20	2.631
2442	39	3.86	2.431
2481	78	-4.99	0.317

Table 7-6. Conducted Output Power Measurements(EX600-WEN3-X40)

Frequency [MHz]	Channel No.	Peak Conducted Power	
		[dBm]	[mW]
2403	0	3.02	2.002
2442	39	2.51	1.783
2481	78	-5.52	0.281

Table 7-7. Conducted Output Power Measurements(EX600-WEN4-X40)

Frequency [MHz]	Channel No.	Peak Conducted Power	
		[dBm]	[mW]
2403	0	3.93	2.469
2442	39	3.13	2.054
2481	78	-5.86	0.260

Table 7-8. Conducted Output Power Measurements(EX600-WSV3-X41)

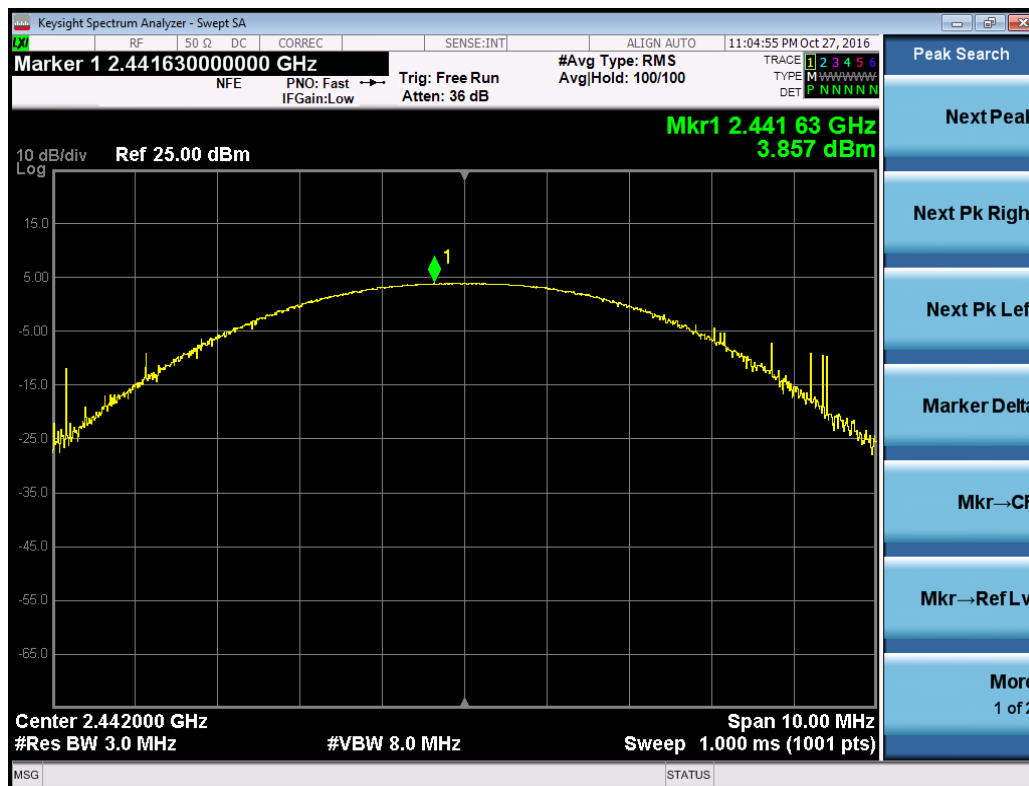
Frequency [MHz]	Channel No.	Peak Conducted Power	
		[dBm]	[mW]
2403	0	4.57	2.864
2442	39	3.87	2.436
2481	78	-5.16	0.305

Table 7-9. Conducted Output Power Measurements(EX600-WSV4-X41)

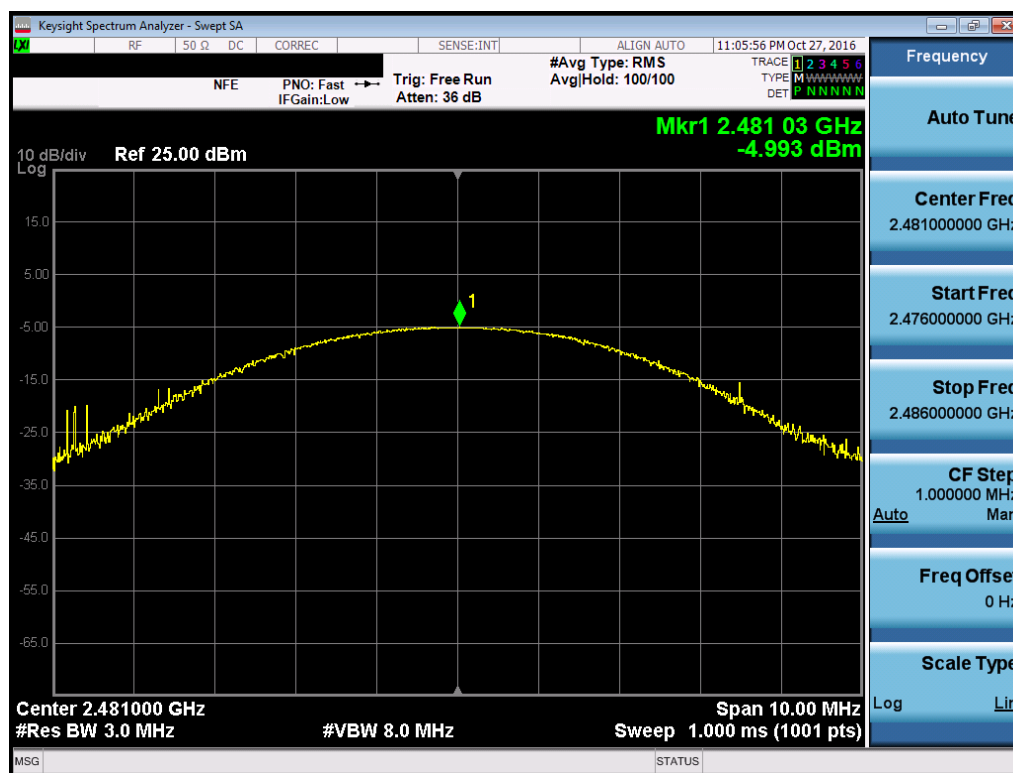


Plot 7-13. Peak Conducted Power (EX600-WEN3-X40, Ch. 0)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 22 of 109

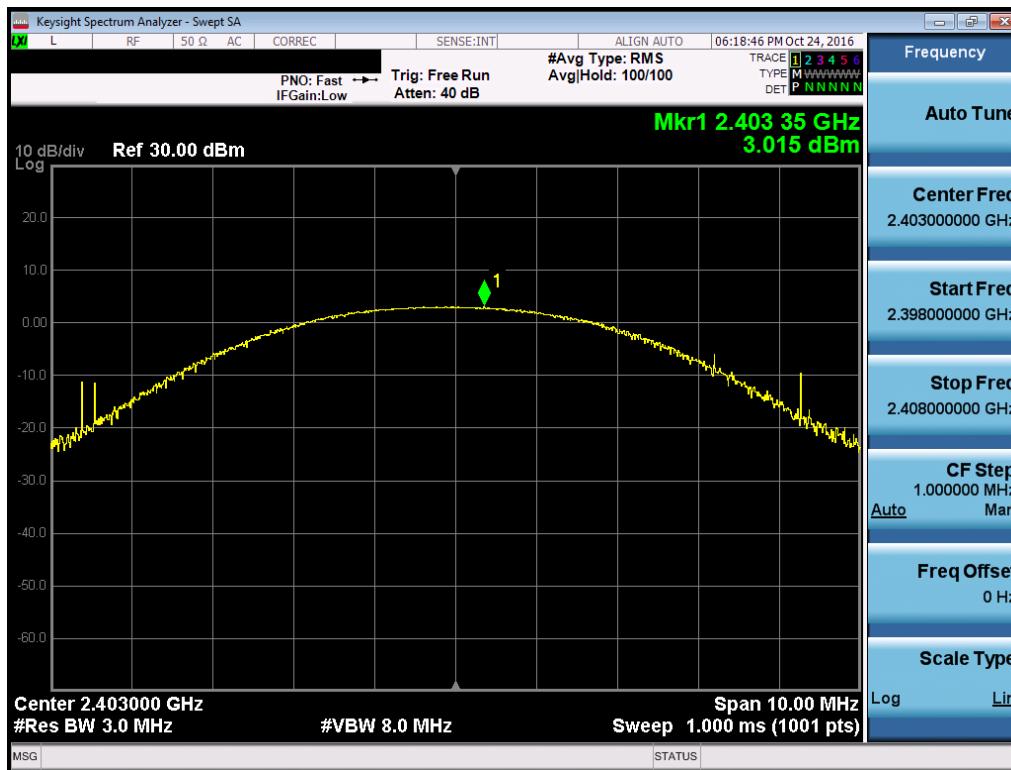


Plot 7-14. Peak Conducted Power (EX600-WEN3-X40, Ch. 39)

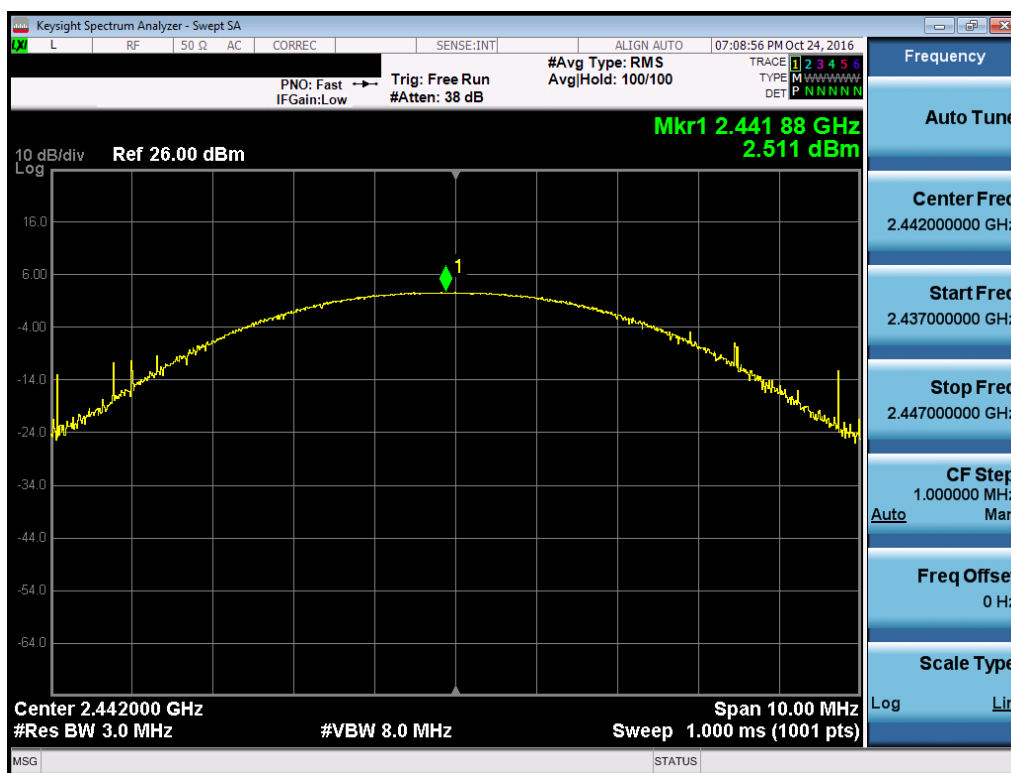


Plot 7-15. Peak Conducted Power (EX600-WEN3-X40, Ch. 78)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 23 of 109

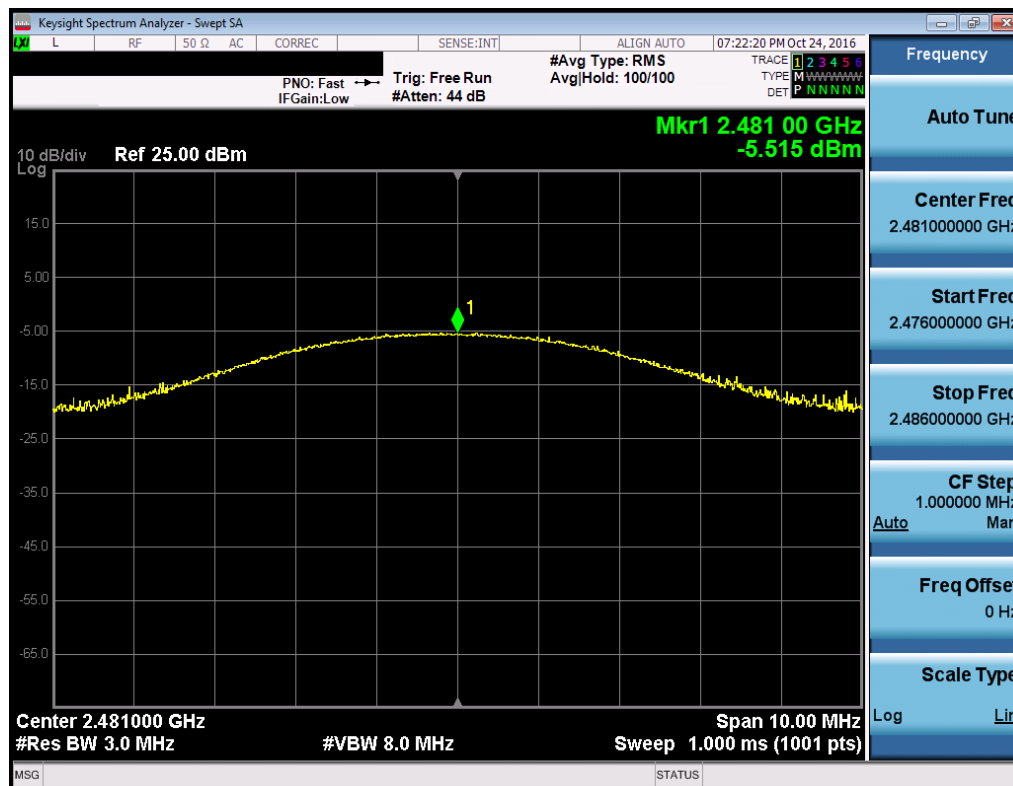


Plot 7-16. Peak Conducted Power (EX600-WEN4-X40, Ch. 0)

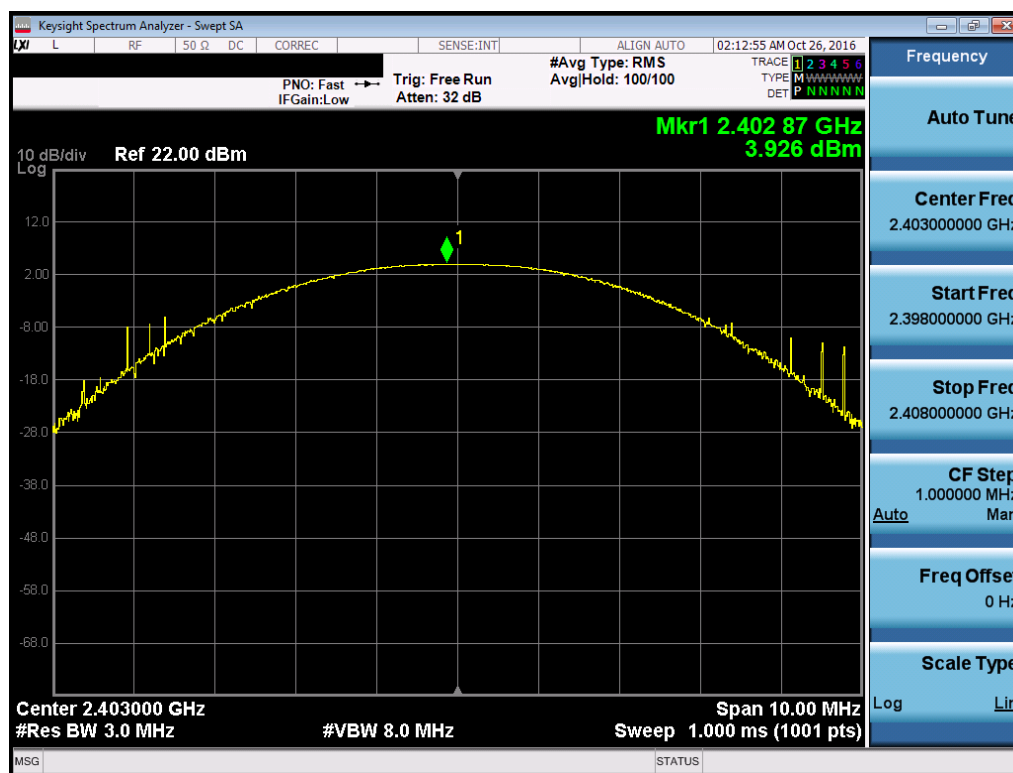


Plot 7-17. Peak Conducted Power (EX600-WEN4-X40, Ch. 39)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 24 of 109

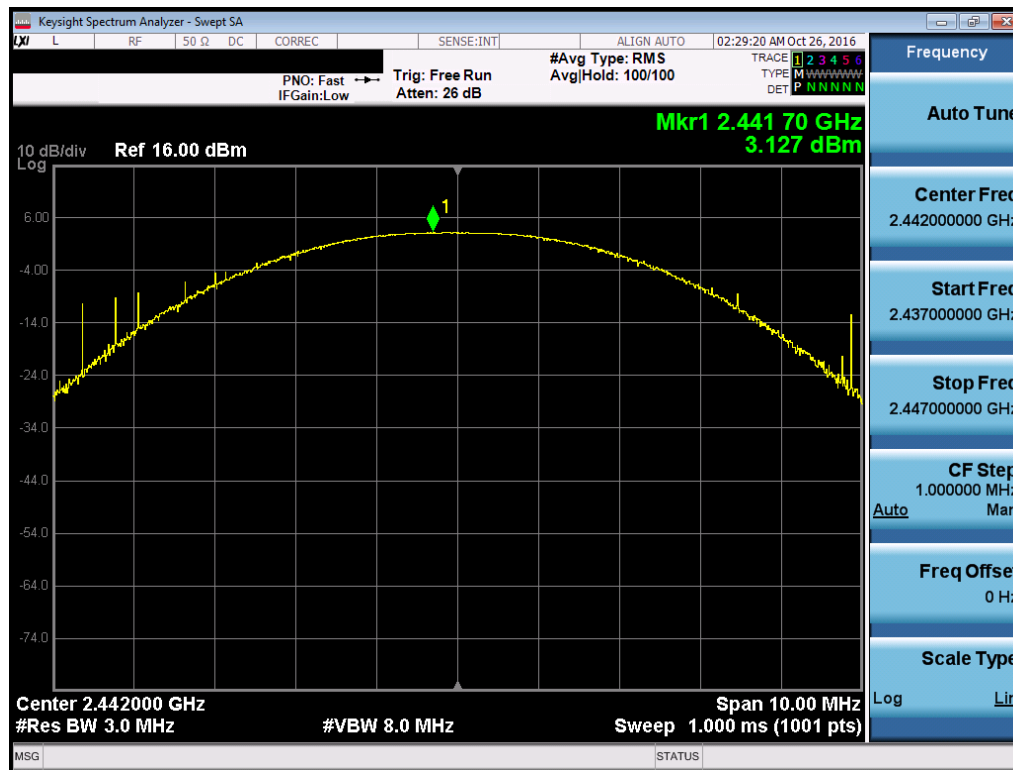


Plot 7-18. Peak Conducted Power (EX600-WEN4-X40, Ch. 78)

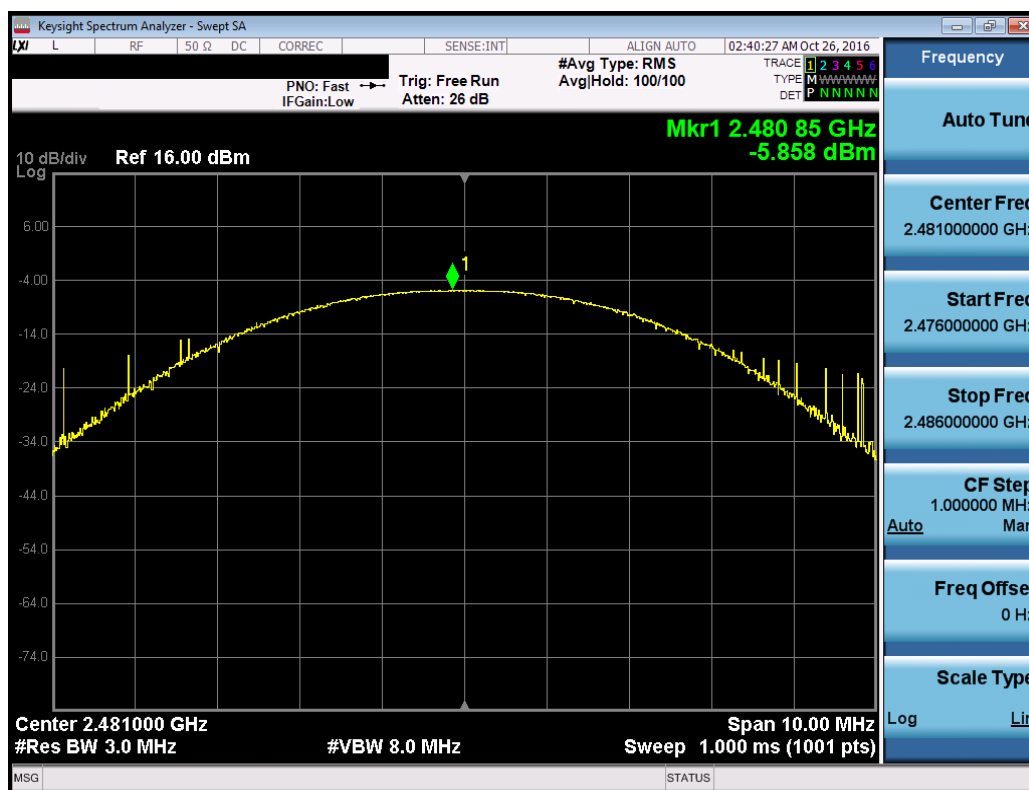


Plot 7-19. Peak Conducted Power (EX600-WSV3-X41, Ch. 0)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 25 of 109



Plot 7-20. Peak Conducted Power (EX600-WSV3-X41, Ch. 39)

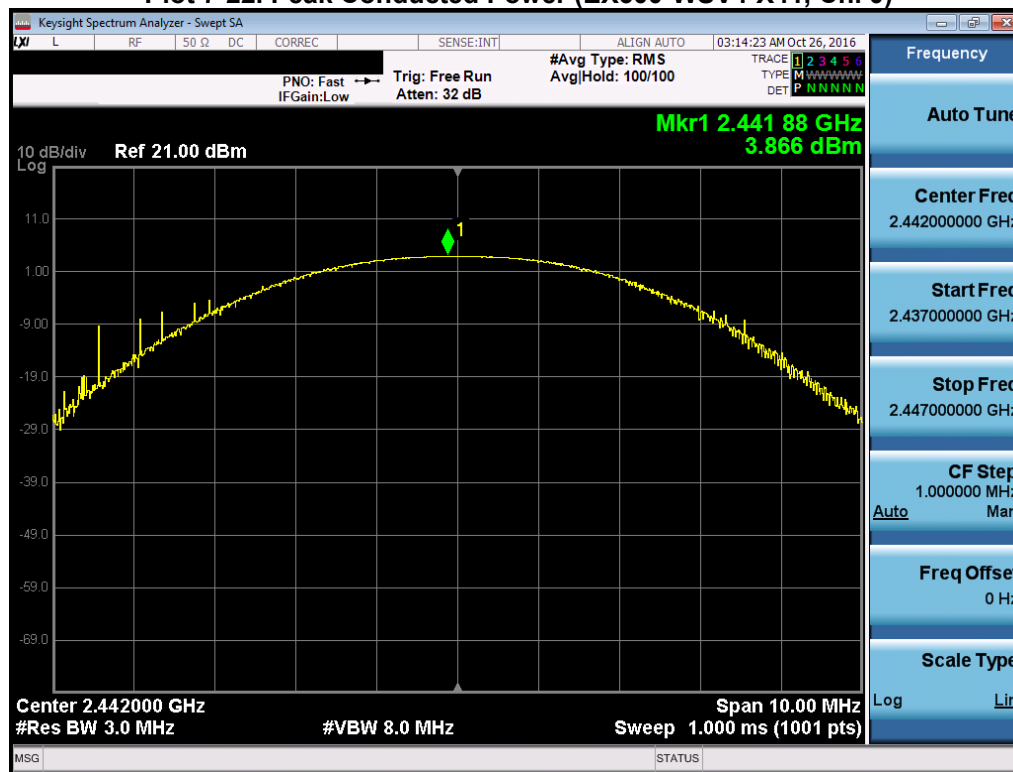


Plot 7-21. Peak Conducted Power (EX600-WSV3-X41, Ch. 78)

FCC ID: 2AJE7SMC-DIV5	<p>PCTEST ENGINEERING LABORATORY, INC.</p> <p>FCC Pt. 15.247 TEST REPORT (CERTIFICATION)</p>		<p>SVC</p> <p>Reviewed by: Quality Manager</p>
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device	Page 26 of 109

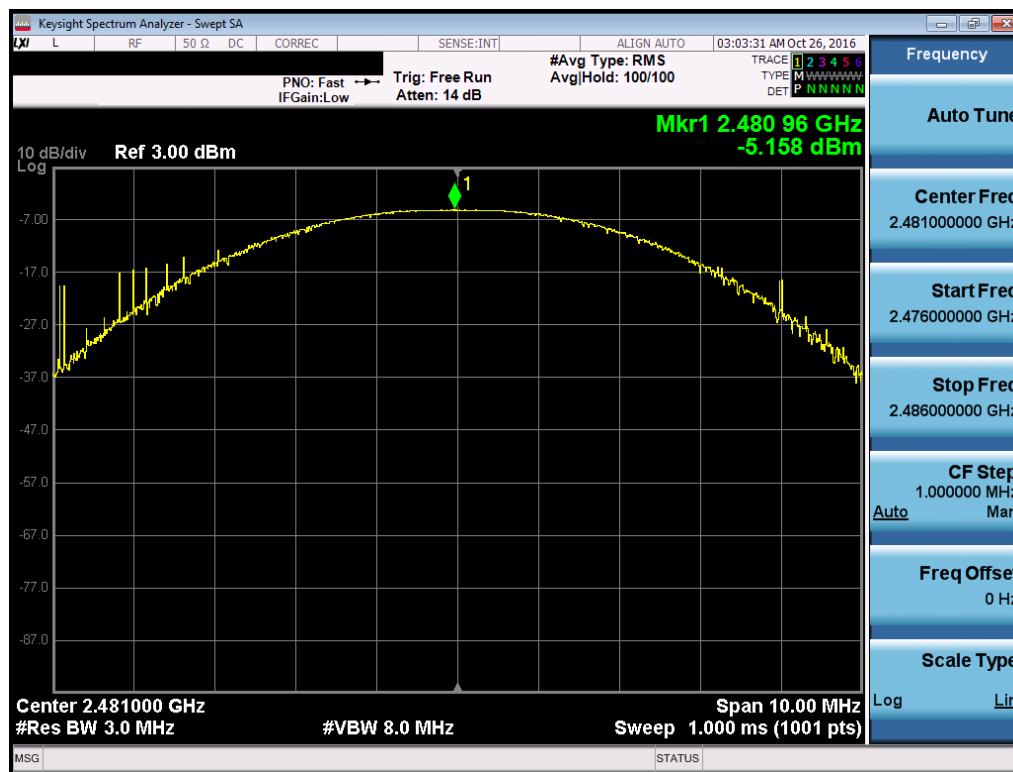


Plot 7-22. Peak Conducted Power (EX600-WSV4-X41, Ch. 0)



Plot 7-23. Peak Conducted Power (EX600-WSV4-X41, Ch. 39)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 27 of 109



Plot 7-24. Peak Conducted Power (EX600-WSV4-X41, Ch. 78)

FCC ID: 2AJE7SMC-DIV5	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)			Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 28 of 109

7.4 Band Edge Compliance

§15.247 (d)

Test Overview and Limits

EUT operates in hopping and non-hopping transmission mode. Measurement is taken at the highest point located outside of the emission bandwidth. ***The maximum permissible out-of-band emission level is 20 dBc.***

Test Procedure Used

ANSI C63.10-2013 – Section 6.10.4

Test Settings

1. Start and stop frequency were set such that the band edge would be placed in the center of the plot
2. Span was set large enough so as to capture all out of band emissions near the band edge
3. RBW = 100kHz
4. VBW = 300kHz
5. Detector = Peak
6. Number of sweep points $\geq 2 \times \text{Span/RBW}$
7. Trace mode = max hold
8. Sweep time = auto couple
9. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

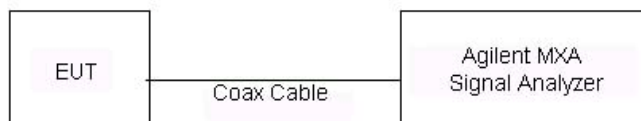


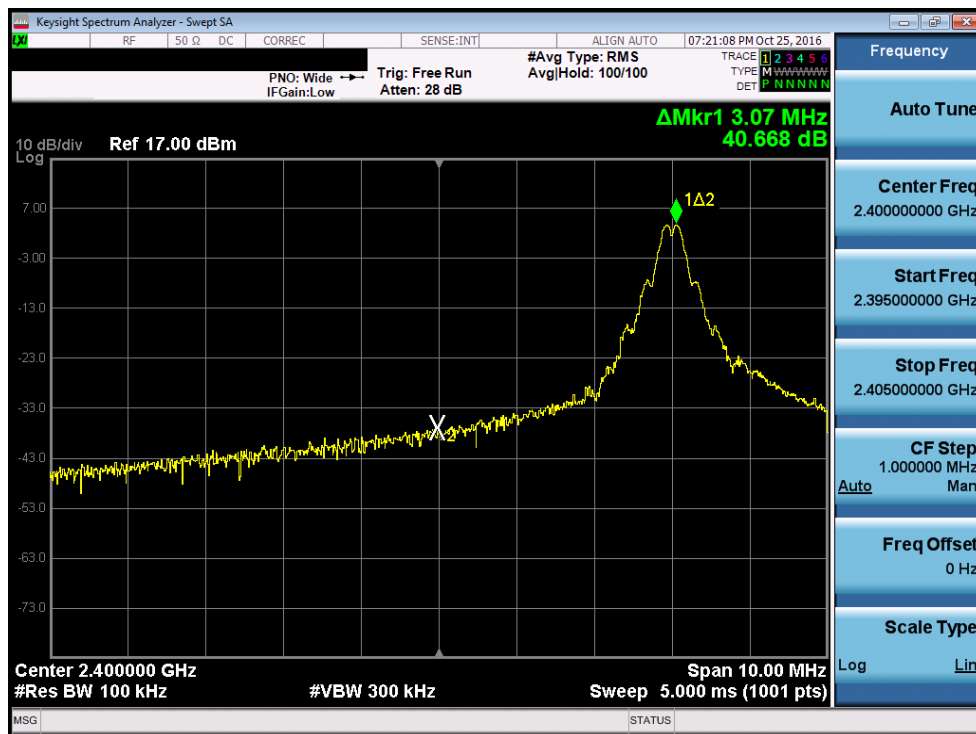


Figure 7-3. Test Instrument & Measurement Setup

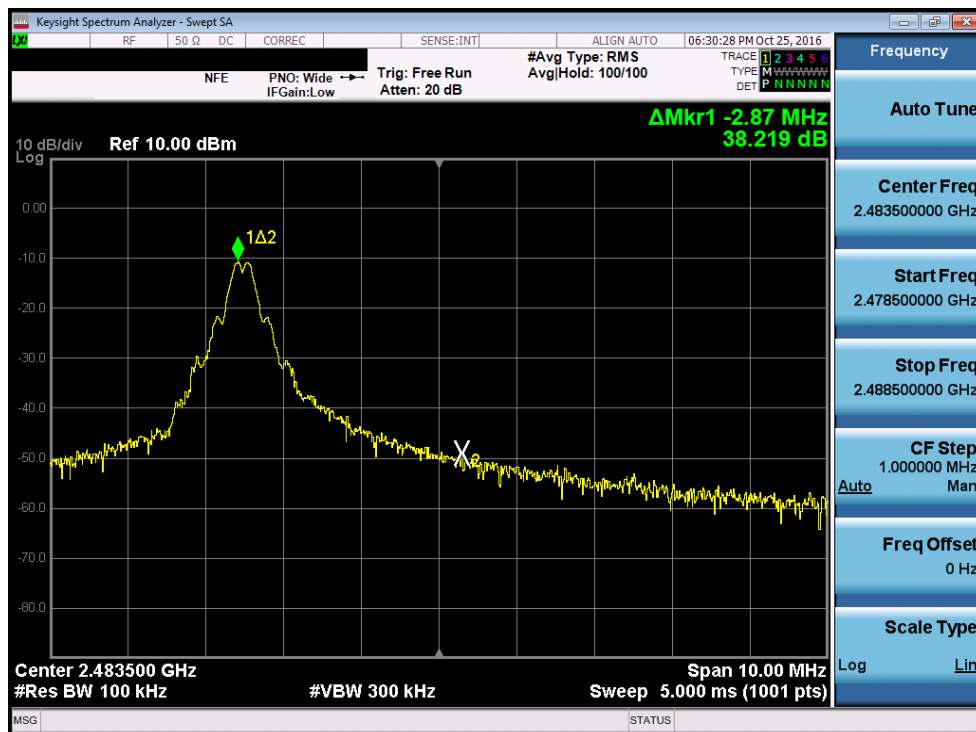
Test Notes

Out of band conducted spurious emissions at the band edge were investigated for all data rates in hopping and non-hopping modes. The worst case emissions were found with the EUT transmitting at 3 Mbps. Band edge emissions were also investigated with the EUT transmitting in all data rates. Plots of the worst case emissions are shown below.

FCC ID: 2AJE7SMC-DIV5		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device	Page 29 of 109	

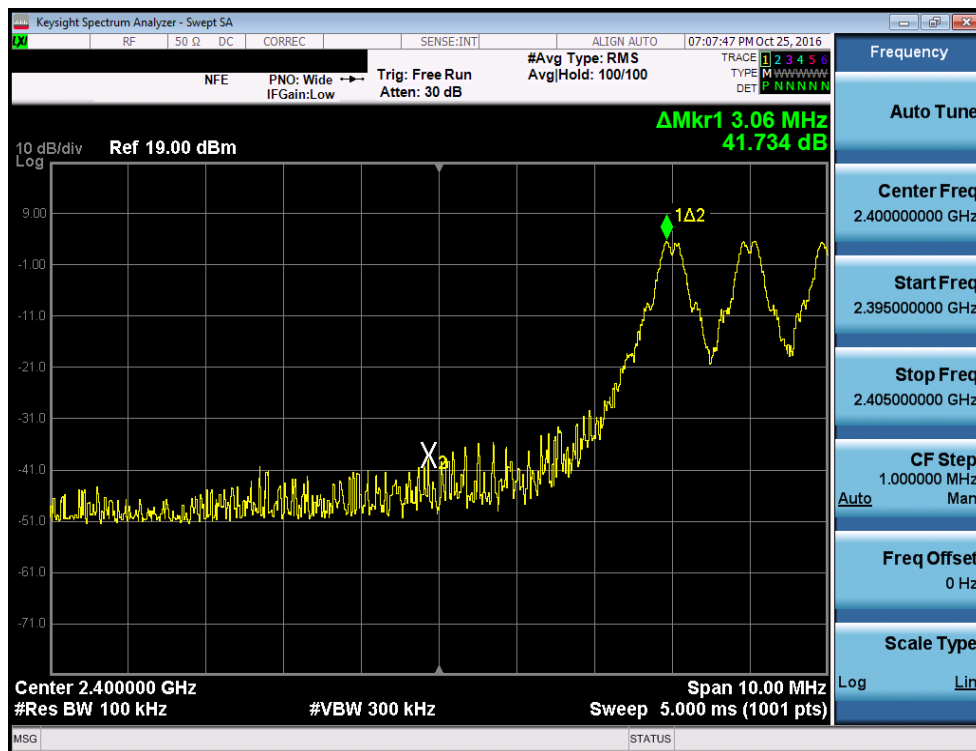


Plot 7-25. Band Edge Plot (Hopping Disabled, EX600-WEN3-X40, Ch. 0)

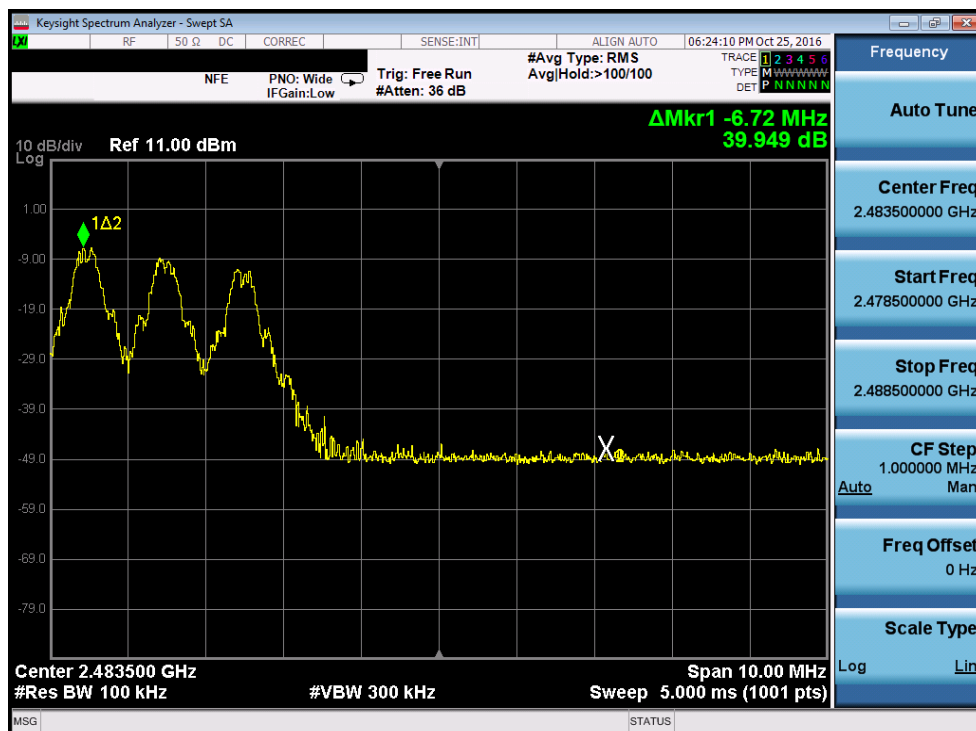


Plot 7-26. Band Edge Plot (Hopping Disabled, EX600-WEN3-X40, Ch. 78)

FCC ID: 2AJE7SMC-DIV5	<p>PCTEST ENGINEERING LABORATORY, INC.</p>		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	<p>SVC</p>	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 30 of 109

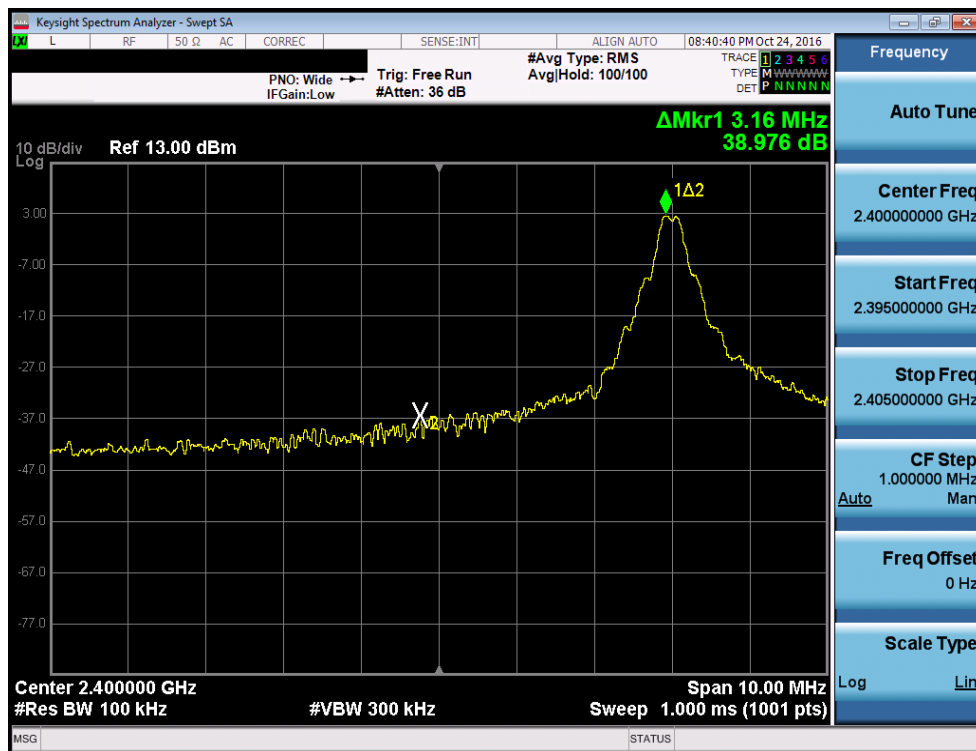


Plot 7-27. Band Edge Plot (Hopping Enabled, EX600-WEN3-X40)

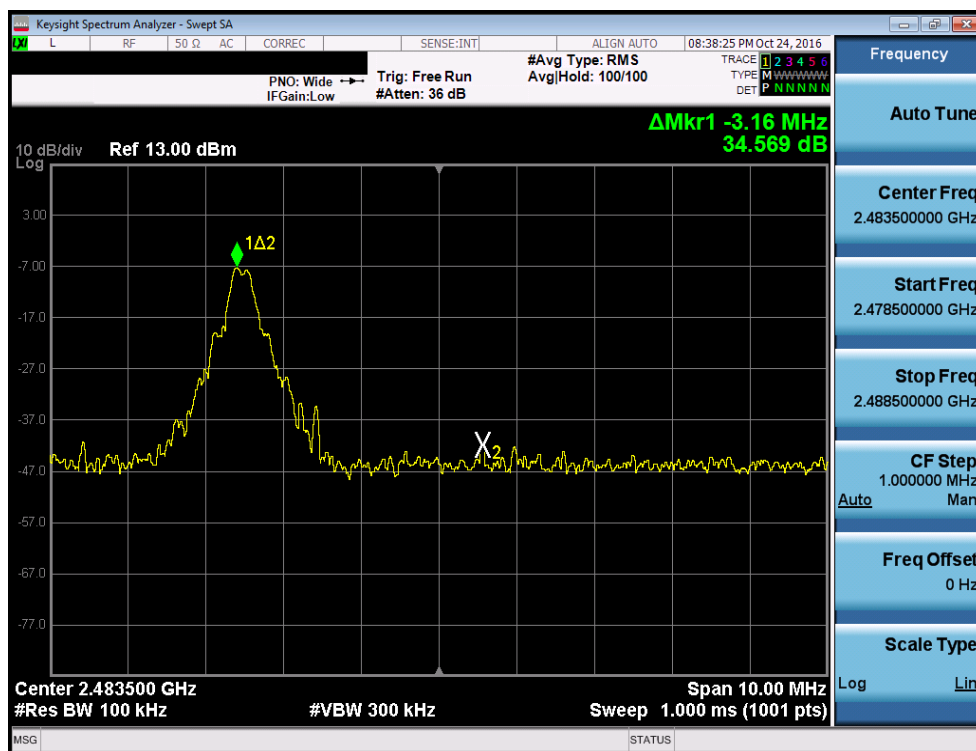


Plot 7-28. Band Edge Plot (Hopping Enabled, EX600-WEN3-X40)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 31 of 109



Plot 7-29. Band Edge Plot (Hopping Disabled, EX600-WEN4-X40, Ch. 0)

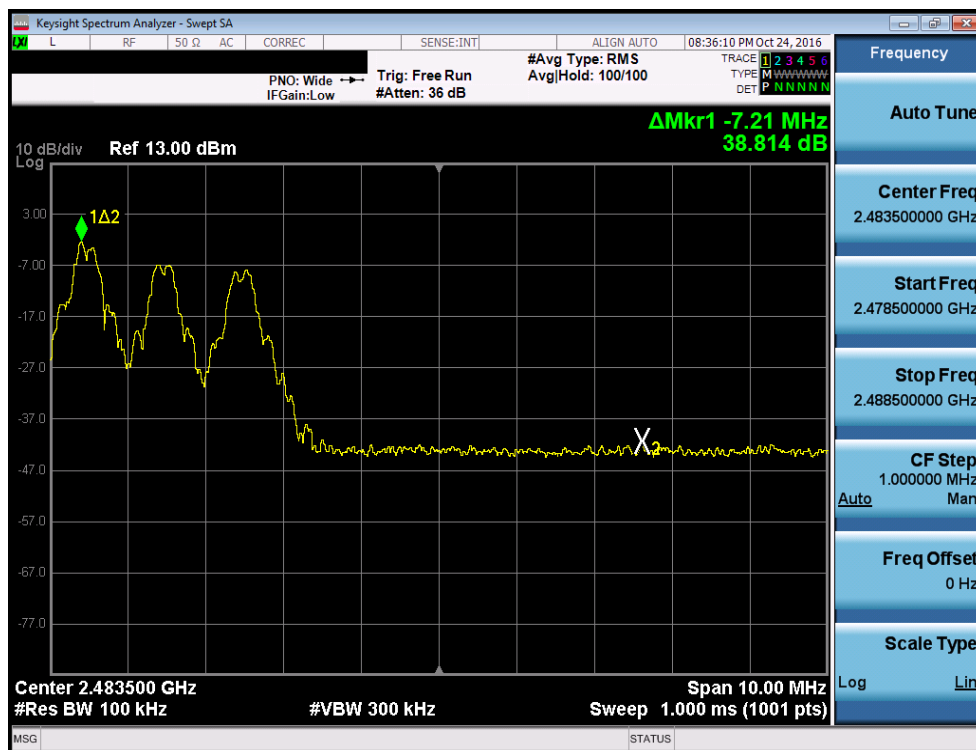


Plot 7-30. Band Edge Plot (Hopping Disabled, EX600-WEN4-X40, Ch. 78)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 32 of 109

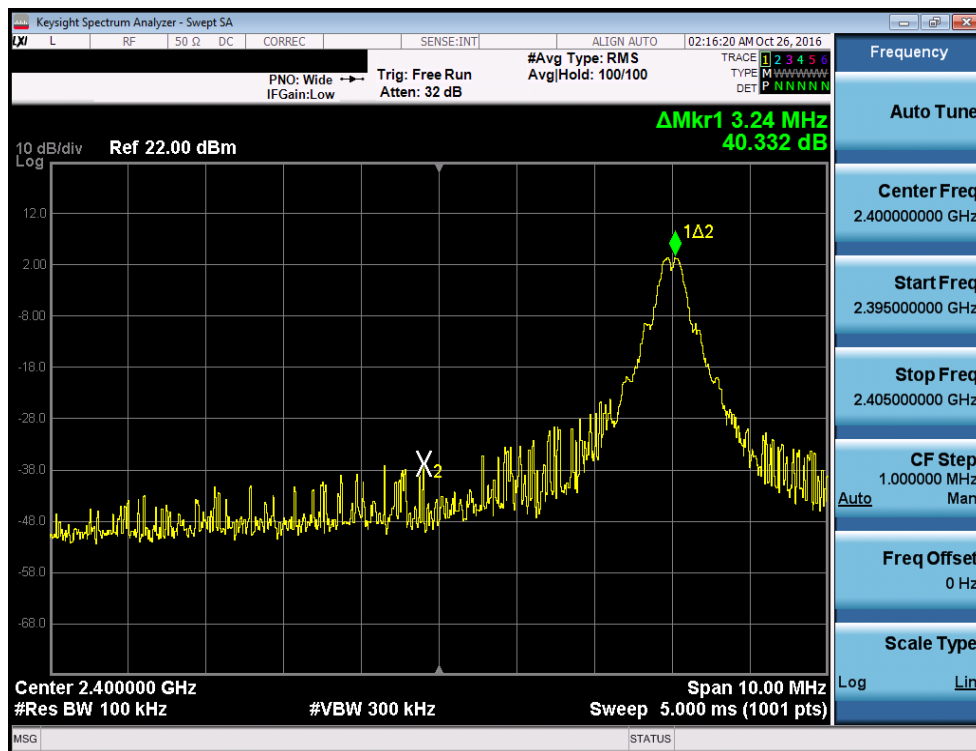


Plot 7-31. Band Edge Plot (Hopping Enabled, EX600-WEN4-X40)

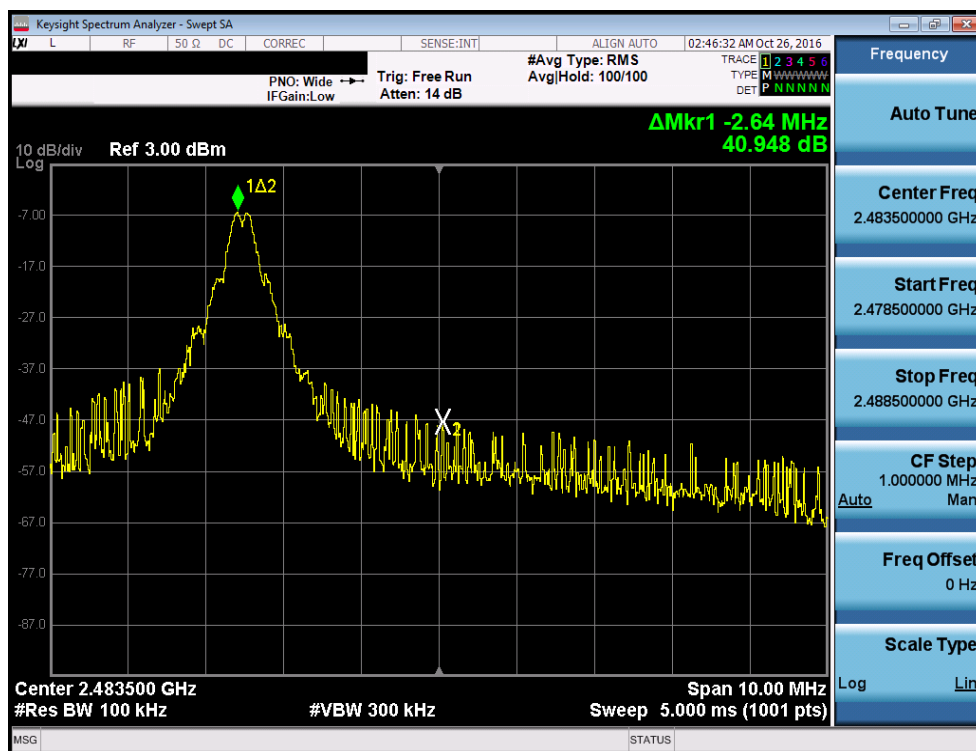


Plot 7-32. Band Edge Plot (Hopping Enabled, EX600-WEN4-X40)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 33 of 109

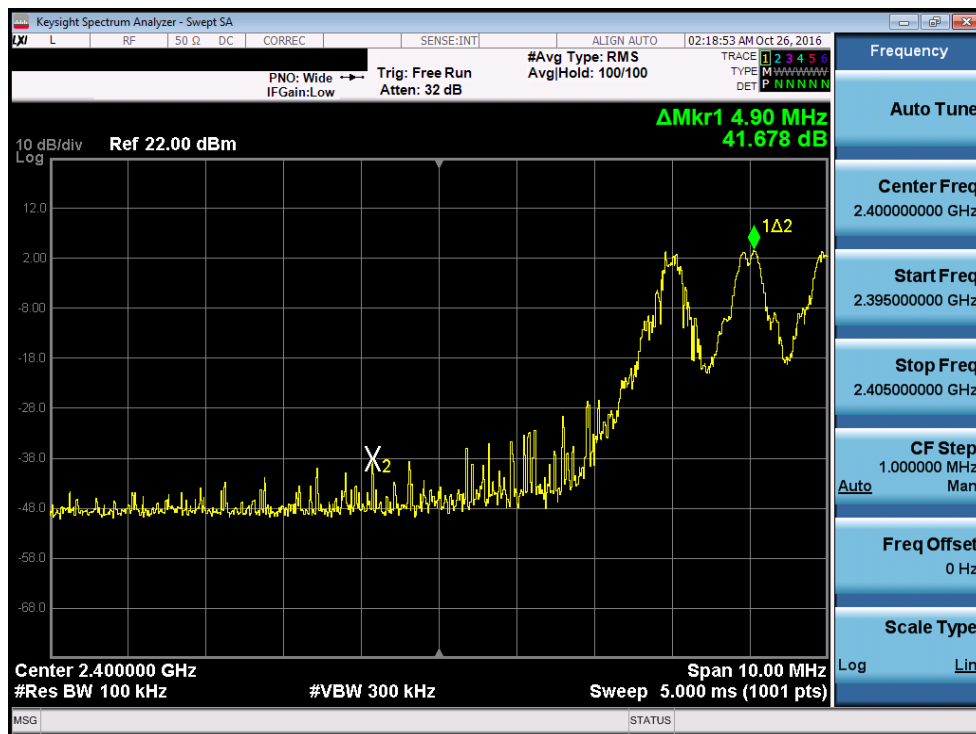


Plot 7-33. Band Edge Plot (Hopping Disabled, EX600-WSV3-X41, Ch. 0)

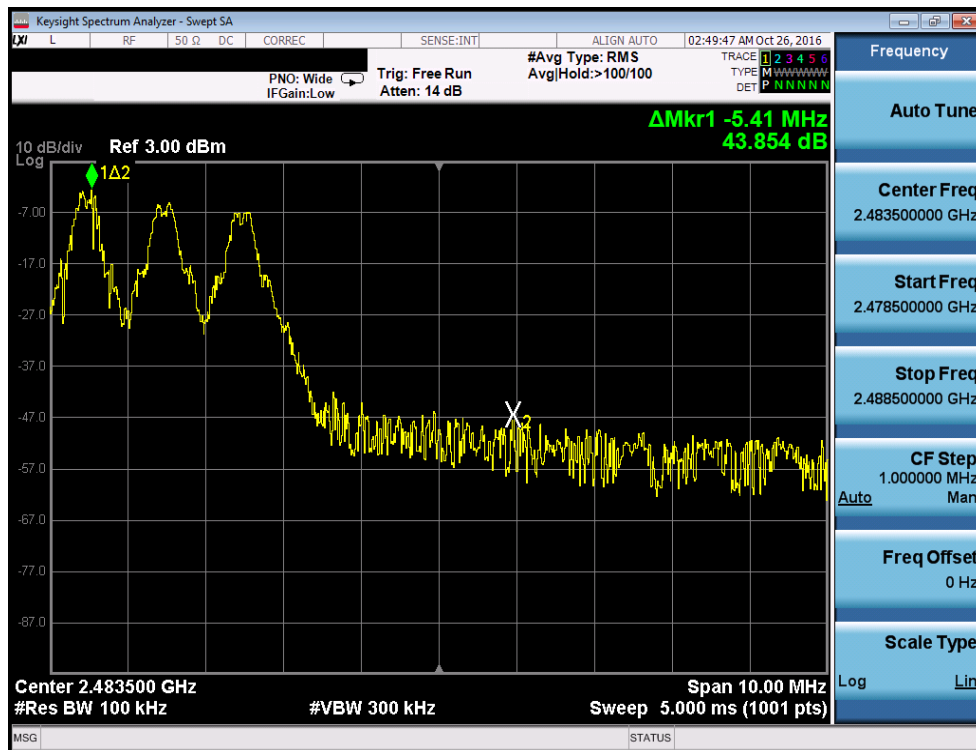


Plot 7-34. Band Edge Plot (Hopping Disabled, EX600-WSV3-X41, Ch. 78)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 34 of 109

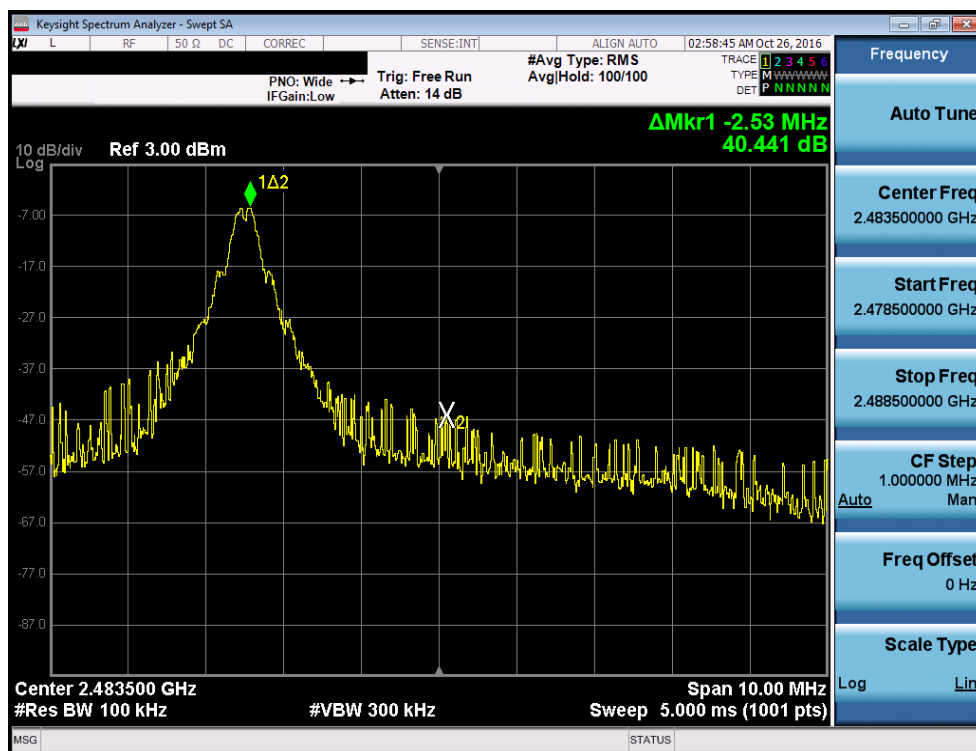
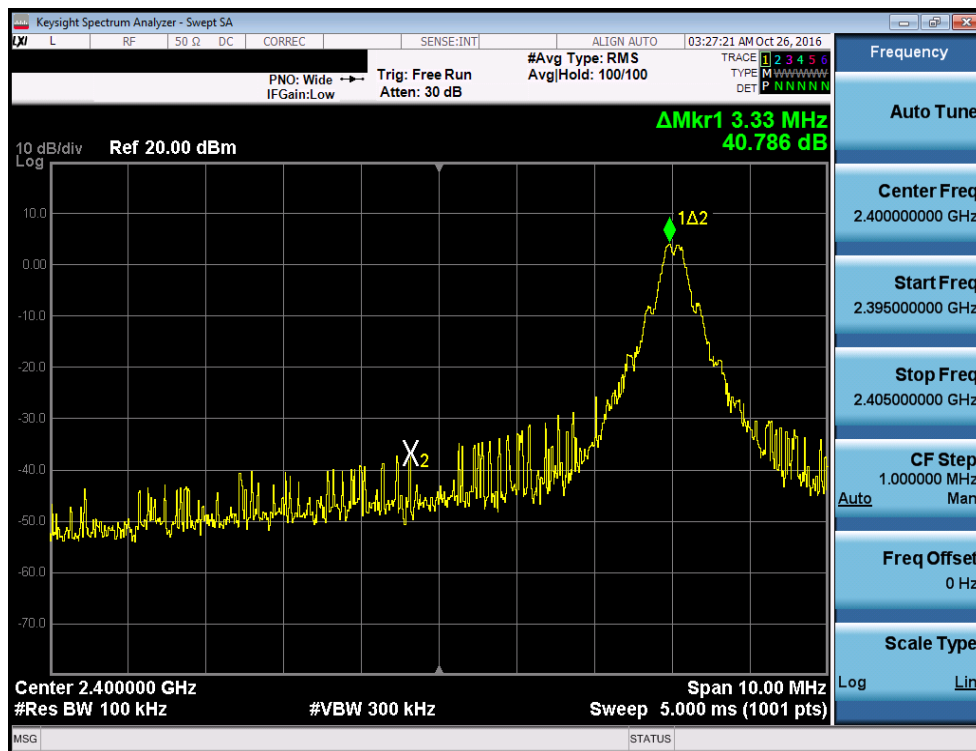


Plot 7-35. Band Edge Plot (Hopping Enabled, EX600-WSV3-X41)



Plot 7-36. Band Edge Plot (Hopping Enabled, EX600-WSV3-X41)

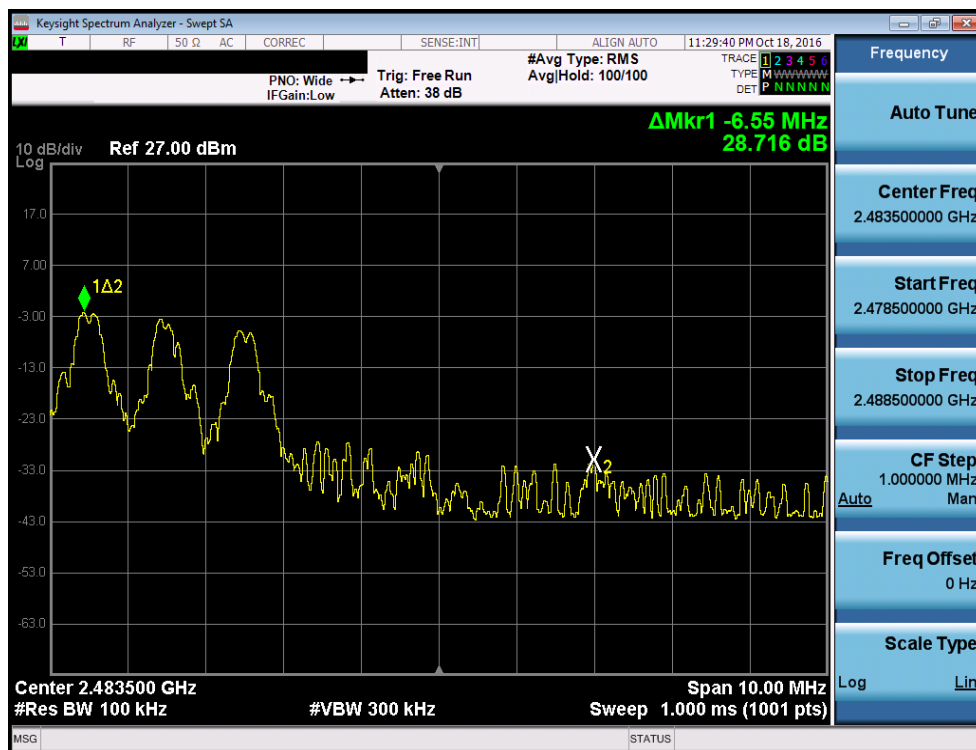
FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 35 of 109



FCC ID: 2AJE7SMC-DIV5	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device	Page 36 of 109



Plot 7-39. Band Edge Plot (Hopping Enabled, EX600-WSV4-X41)



Plot 7-40. Band Edge Plot (Hopping Enabled, EX600-WSV4-X41)

FCC ID: 2AJE7SMC-DIV5	<p>PCTEST ENGINEERING LABORATORY, INC.</p> <p>FCC Pt. 15.247 TEST REPORT (CERTIFICATION)</p>		<p>SVC</p> <p>Reviewed by: Quality Manager</p>
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device	Page 37 of 109

7.5 Carrier Frequency Separation

§15.247 (a.1)

Test Overview and Limit

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.***

Test Procedure Used

ANSI C63.10-2013 – Section 7.8.2

Test Settings

1. Span = Wide enough to capture peaks of two adjacent channels
2. RBW = 30% of channel spacing. Adjust as necessary to best identify center of each individual channel
3. VBW \geq RBW
4. Sweep = Auto
5. Detector = Peak
6. Trace mode = max hold
7. The trace was allowed to stabilize.
8. Marker-delta function used to determine separation between peaks of the adjacent channels

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

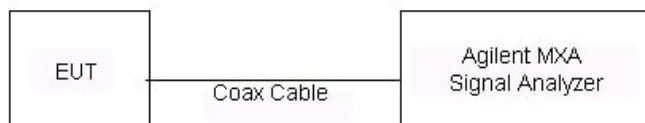




Figure 7-4. Test Instrument & Measurement Setup

FCC ID: 2AJE7SMC-DIV5		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Frequency [MHz]	Channel No.	Min. Channel Separation [MHz]	Pass/Fail
2403	0	0.546	Pass
2442	39	0.538	Pass
2481	78	0.541	Pass

Table 7-10. Minimum Channel Separation(EX600-WEN3-X40)

Frequency [MHz]	Channel No.	Min. Channel Separation [MHz]	Pass/Fail
2403	0	0.525	Pass
2442	39	0.539	Pass
2481	78	0.547	Pass



Table 7-11. Minimum Channel Separation(EX600-WEN4-X40)

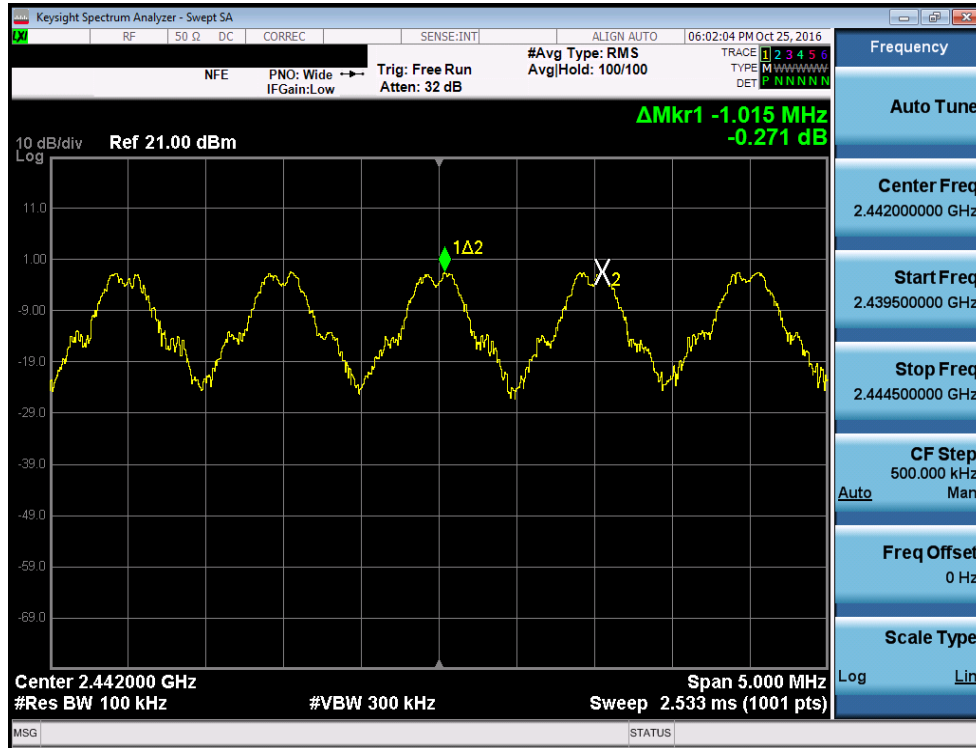
Frequency [MHz]	Channel No.	Min. Channel Separation [MHz]	Pass/Fail
2403	0	0.541	Pass
2442	39	0.539	Pass
2481	78	0.534	Pass

Table 7-12. Minimum Channel Separation(EX600-WSV3-X41)

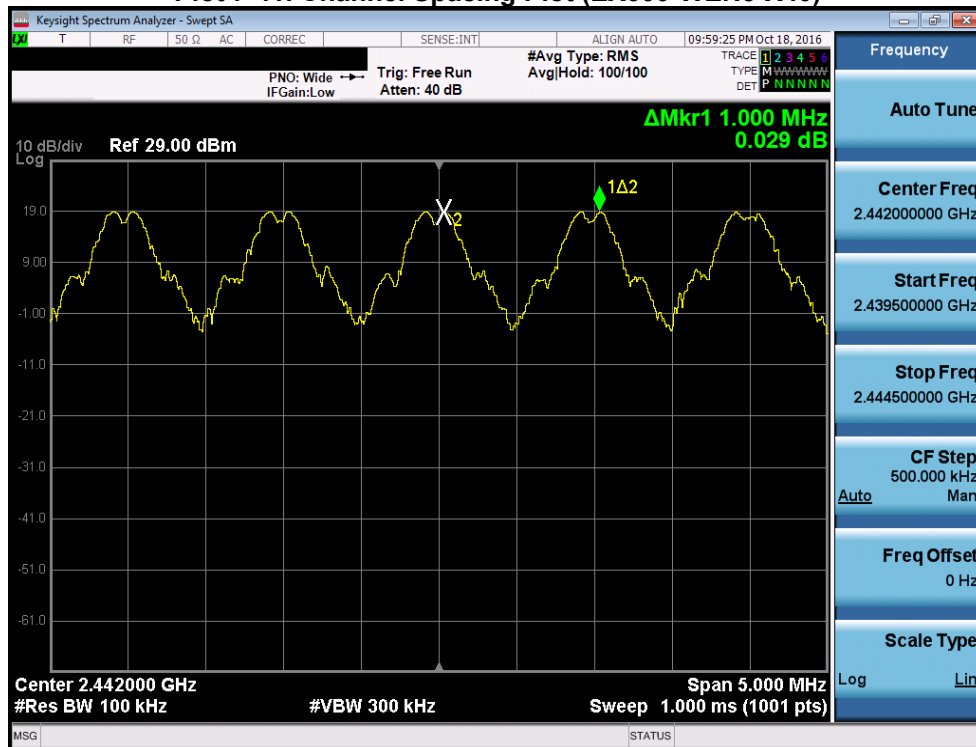
Frequency [MHz]	Channel No.	Min. Channel Separation [MHz]	Pass/Fail
2403	0	0.533	Pass
2442	39	0.528	Pass
2481	78	0.533	Pass

Table 7-13. Minimum Channel Separation(EX600-WSV4-X41)

FCC ID: 2AJE7SMC-DIV5	 FCC Pt. 15.247 TEST REPORT (CERTIFICATION)			Reviewed by: Quality Manager
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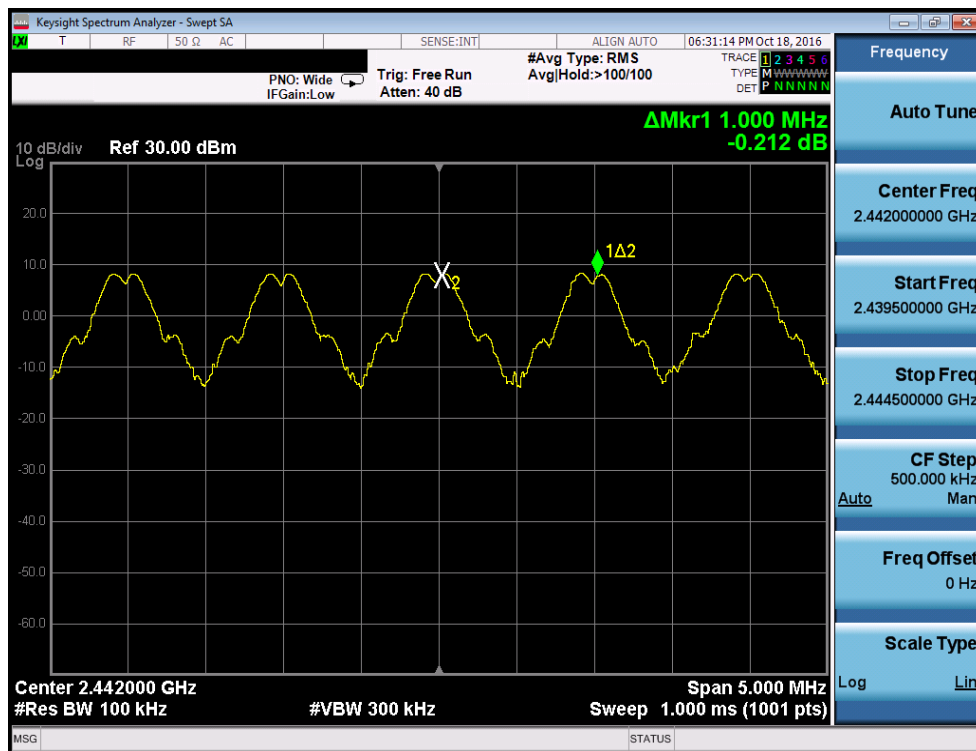


Plot 7-41. Channel Spacing Plot (EX600-WEN3-X40)

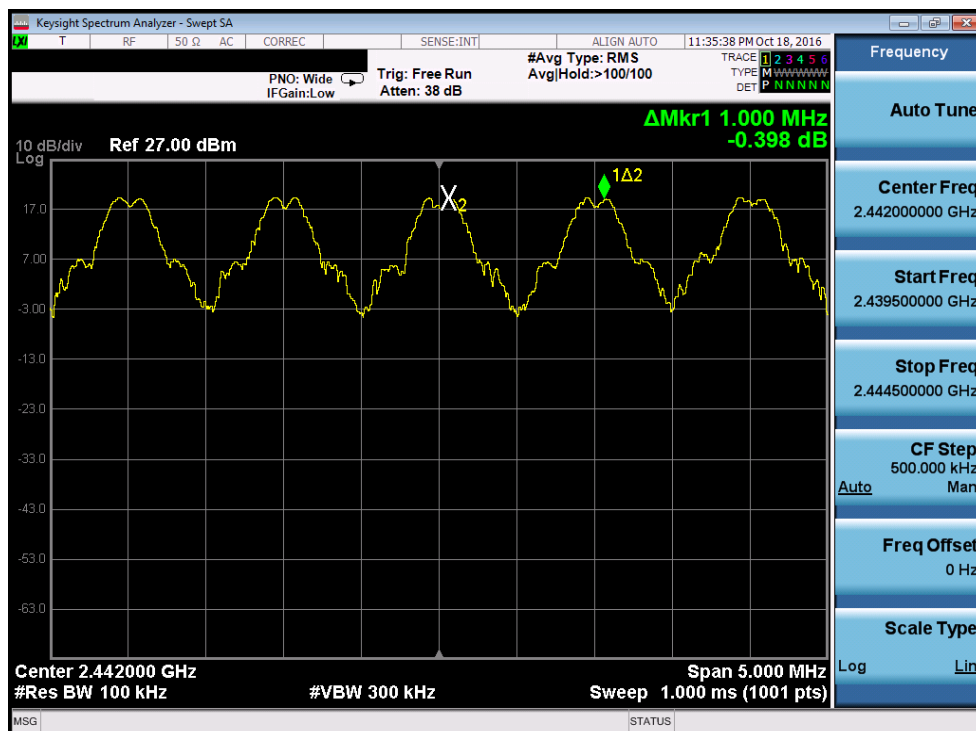


Plot 7-42. Channel Spacing Plot (EX600-WEN4-X40)

FCC ID: 2AJE7SMC-DIV5	<p>PCTEST ENGINEERING LABORATORY, INC.</p>		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	<p>SVC</p>	Reviewed by: Quality Manager
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Plot 7-43. Channel Spacing Plot (EX600-WSV3-X41)



Plot 7-44. Channel Spacing Plot (EX600-WSV4-X41)

FCC ID: 2AJE7SMC-DIV5	<p>PCTEST ENGINEERING LABORATORY, INC.</p> <p>FCC Pt. 15.247 TEST REPORT (CERTIFICATION)</p>		<p>SVC</p> <p>Reviewed by: Quality Manager</p>
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device	Page 41 of 109

7.6 Time of Occupancy

§15.247 (a.1.iii)

Test Overview and Limit

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 400ms multiplied by the number of hopping channels employed.**

Test Procedure Used

ANSI C63.10-2013 – Section 7.8.4

Test Settings

1. Span = zero span, centered on a hopping channel
2. RBW \leq channel spacing and $\gg 1/T$, where T is expected dwell time per channel
3. Sweep = as necessary to capture entire dwell time. Second plot may be required to demonstrate two successive hops on a channel
4. Trigger is set with appropriate trigger delay to place pulse near the center of the plot
5. Detector = peak
6. Trace mode = max hold
7. Marker-delta function used to determine transmit time per hop

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

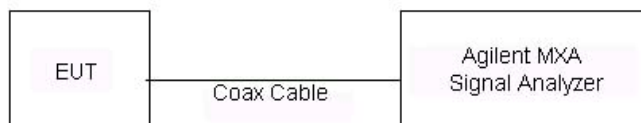


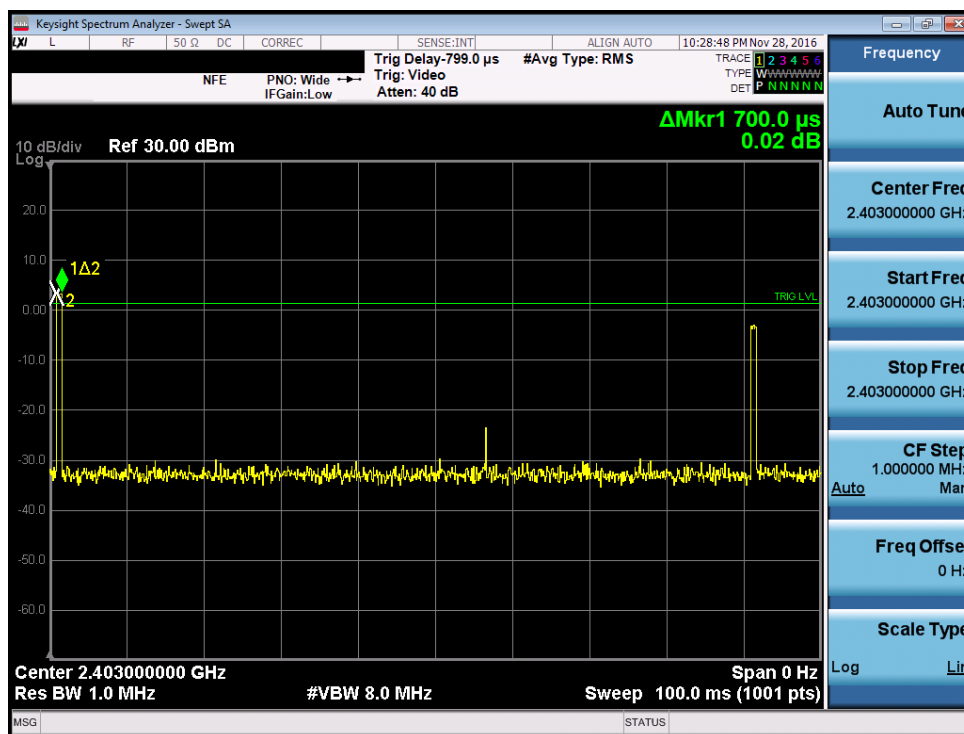


Figure 7-5. Test Instrument & Measurement Setup

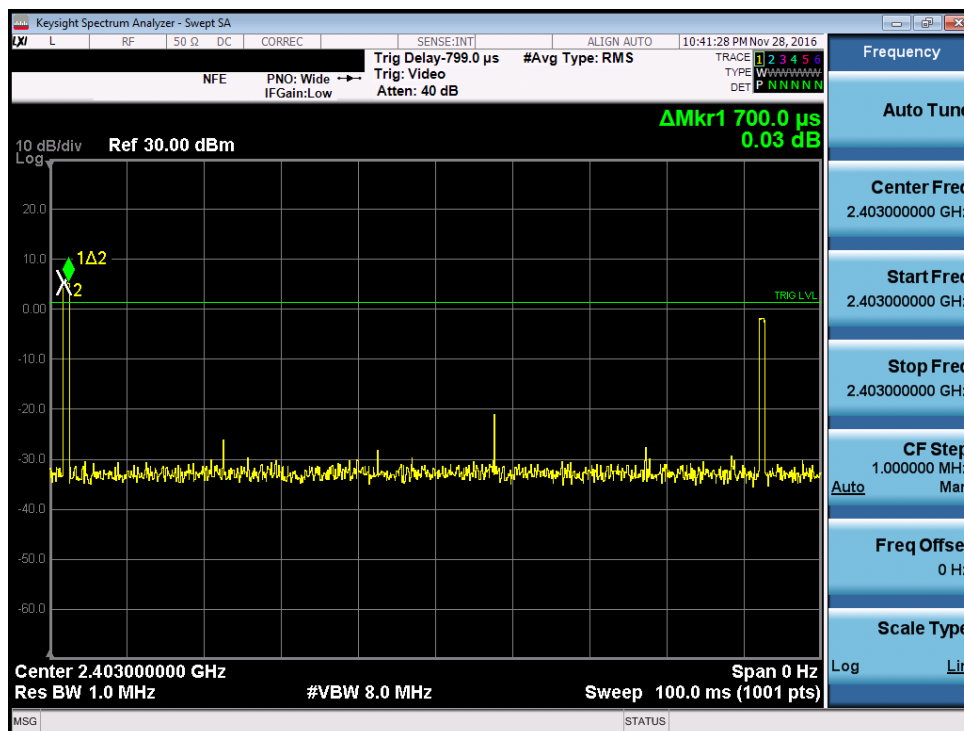
Test Notes

None



FCC ID: 2AJE7SMC-DIV5		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device	Page 42 of 109	

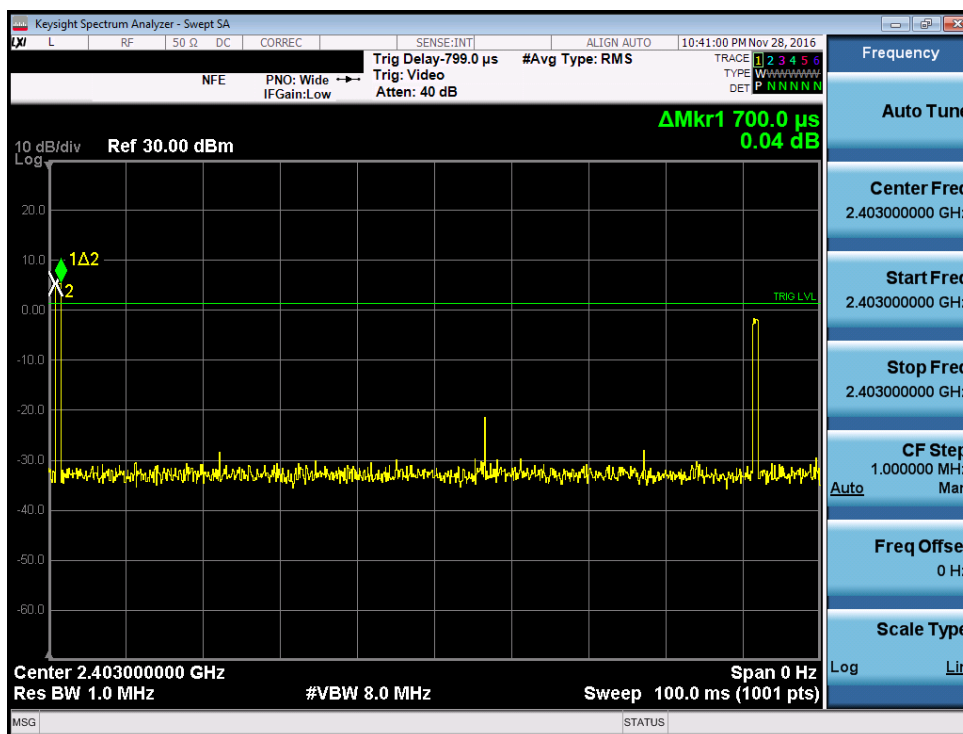


Plot 7-45. Time of Occupancy Plot(EX600-WEN3-X40)

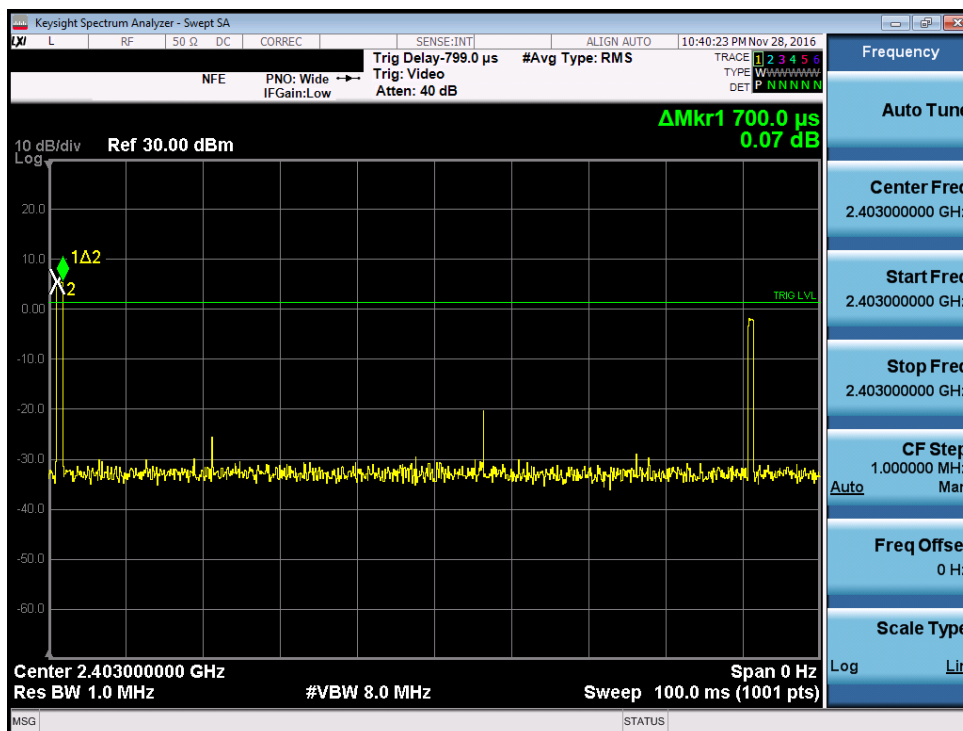


Plot 7-46. Time of Occupancy Plot(EX600-WEN4-X40)



FCC ID: 2AJE7SMC-DIV5	 FCC Pt. 15.247 TEST REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
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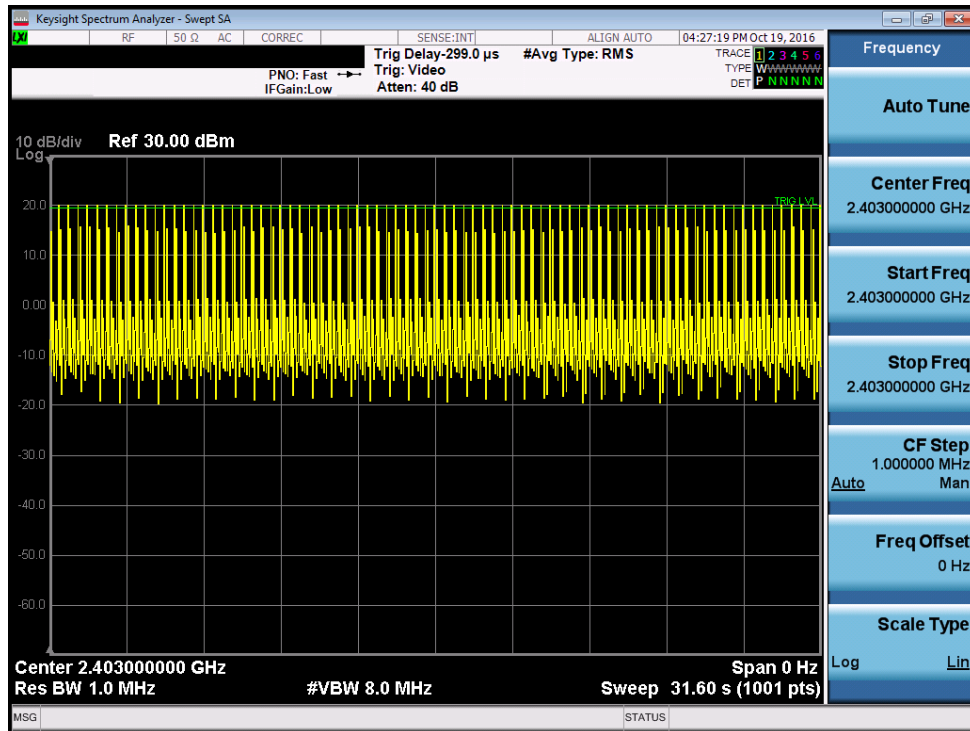


Plot 7-47. Time of Occupancy Plot(EX600-WSV3-X41)

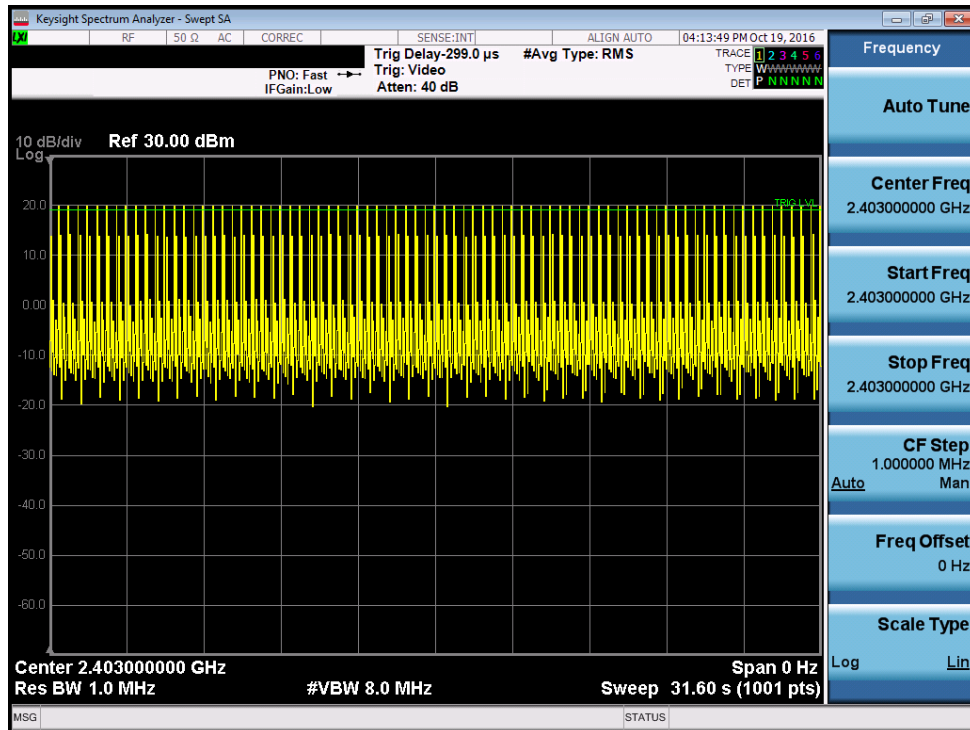


Plot 7-48. Time of Occupancy Plot(EX600-WSV4-X41)

FCC ID: 2AJE7SMC-DIV5	 FCC Pt. 15.247 TEST REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
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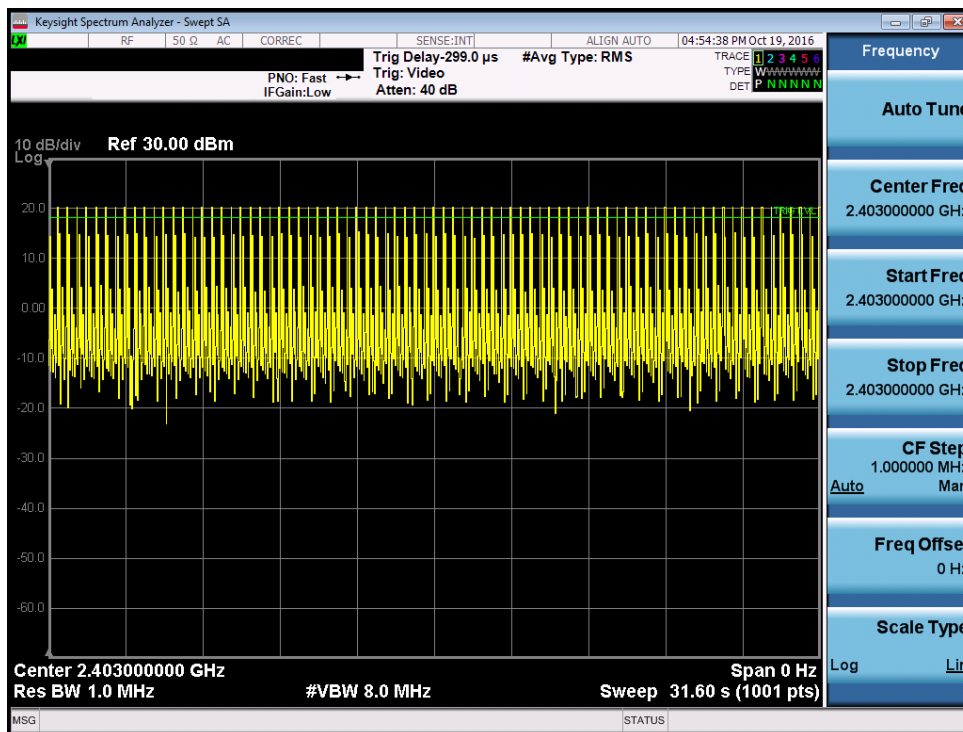


Plot 7-49. Dwell Time Plot(EX600-WEN3-X40)

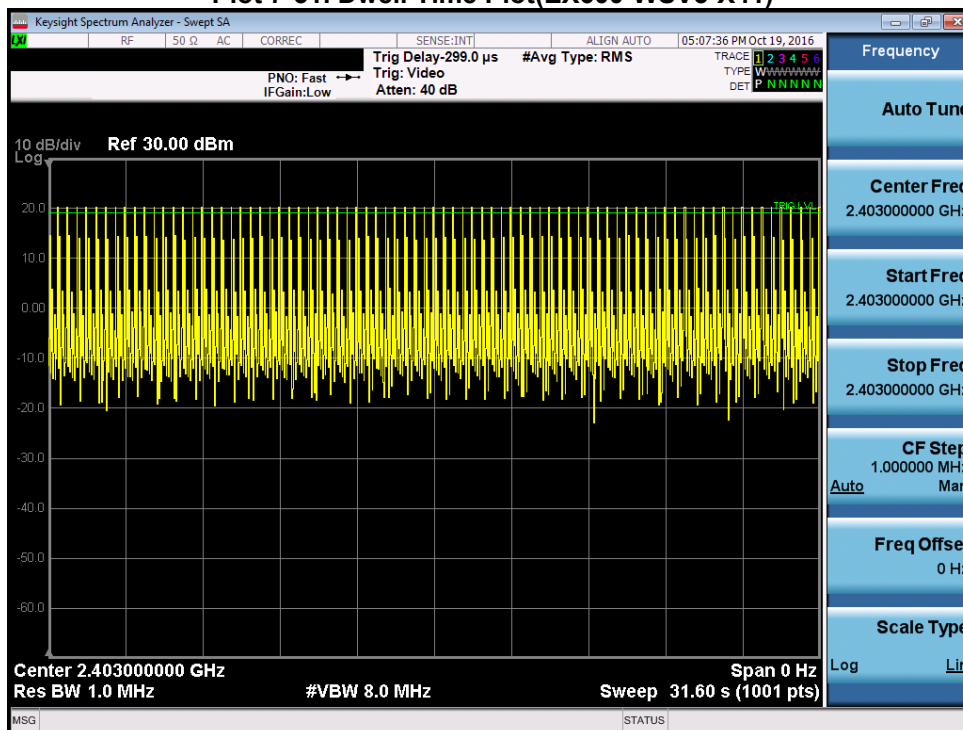


Plot 7-50. Dwell Time Plot(EX600-WEN4-X40)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
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Plot 7-51. Dwell Time Plot(EX600-WSV3-X41)





Plot 7-52. Dwell Time Plot(EX600-WSV4-X41)

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Time of Occupancy Calculation

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

- Pulse Width = 0.7ms (See Plot 7-57)
- 400ms x 79 hopping channels = 31.6 sec (Time of Occupancy Limit)
- Number of times that one particular channel appears in a 31.6 second period = 81 (See Plot 7-58)
- Time of Occupancy = 0.7 ms/pulse x 81 pulses/31.6 sec = 56.7ms/31.6 sec
- Above calculations show the devices are compliant with the Time of Occupancy requirement

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7.7 Number of Hopping Channels

§15.247 (a.1.iii)

Test Overview and Limit

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

Test Procedure Used

ANSI C63.10-2013 – Section 7.8.3

Test Settings

1. Span = frequency of band of operation (divided into two plots)
2. RBW < 30% of channel spacing or 20dB bandwidth, whichever is smaller.
3. VBW ≥ RBW
4. Sweep = auto
5. Detector = peak
6. Trace mode = max hold
7. Trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

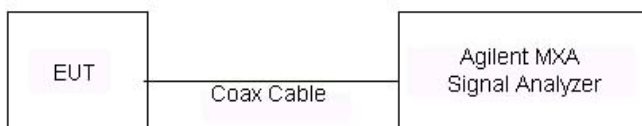


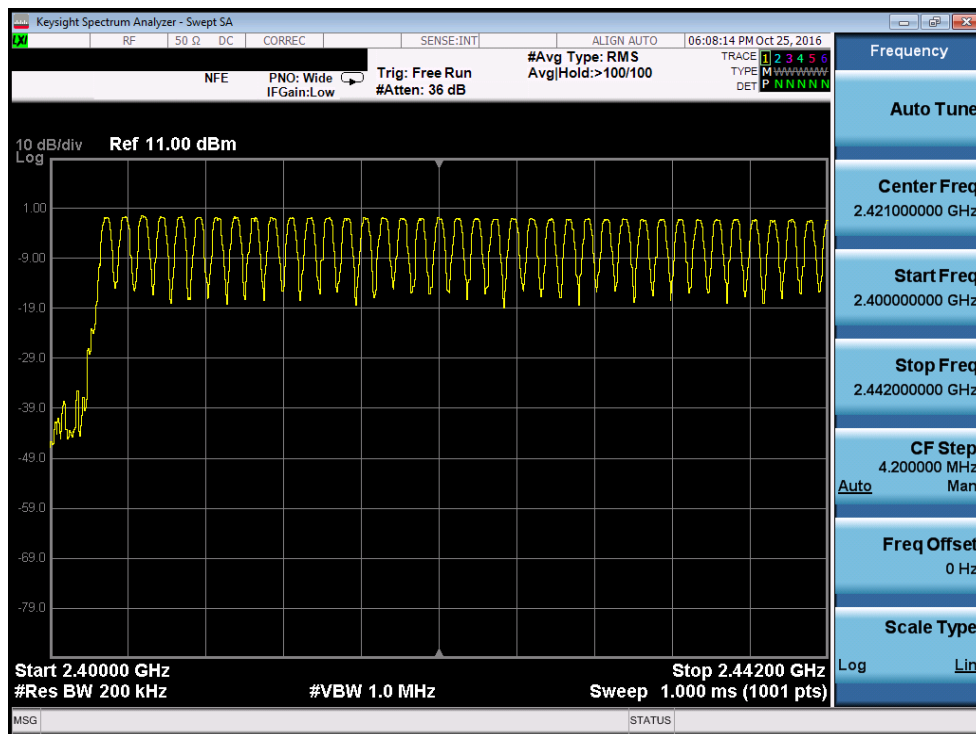


Figure 7-6. Test Instrument & Measurement Setup

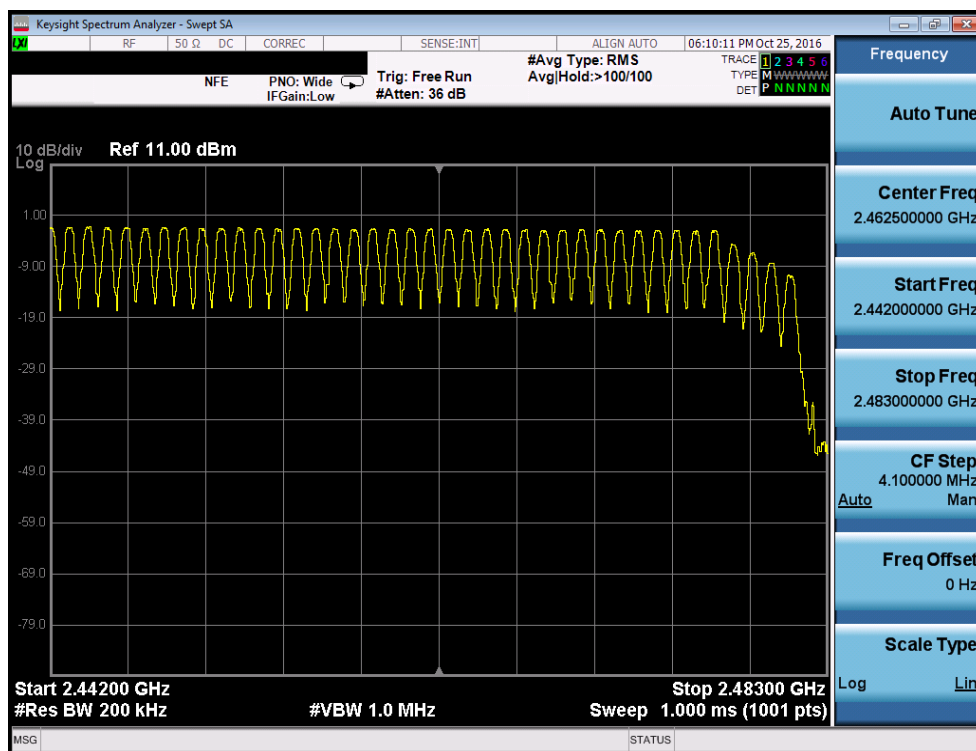
Test Notes

The frequency spectrum was broken up into two sub-ranges to clearly show all of the hopping frequencies.

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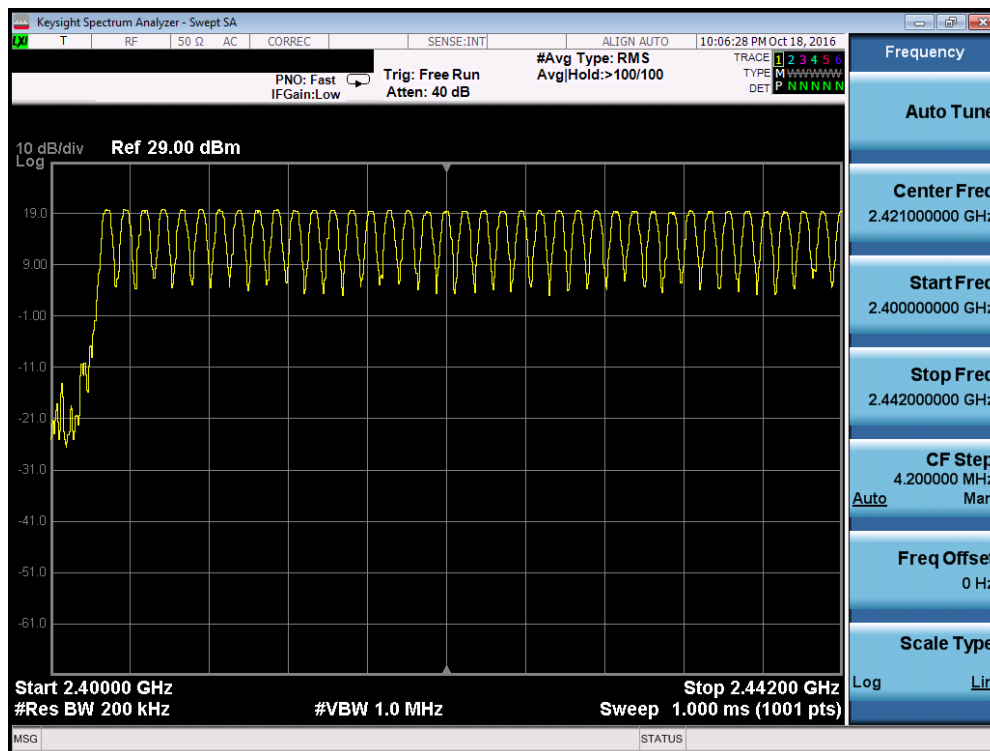


Plot 7-53. Low End Spectrum Channel Hopping Plot(EX600-WEN3-X40)

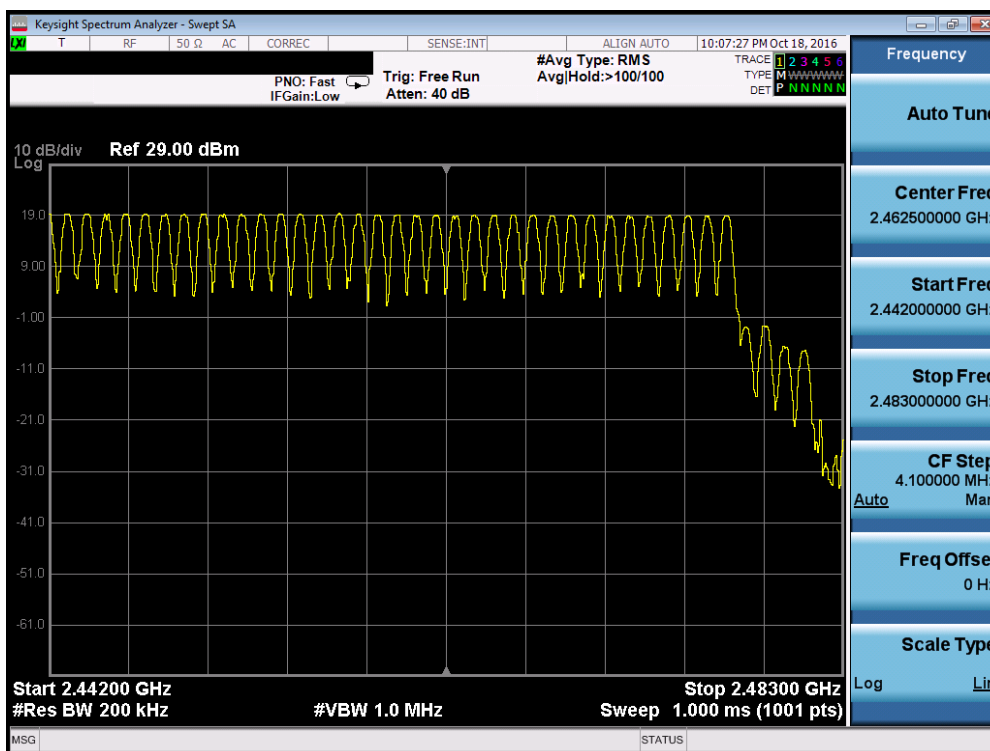


Plot 7-54. High End Spectrum Channel Hopping Plot(EX600-WEN3-X40)

FCC ID: 2AJE7SMC-DIV5	<p>PCTEST ENGINEERING LABORATORY, INC.</p>		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	<p>SVC</p>	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 49 of 109

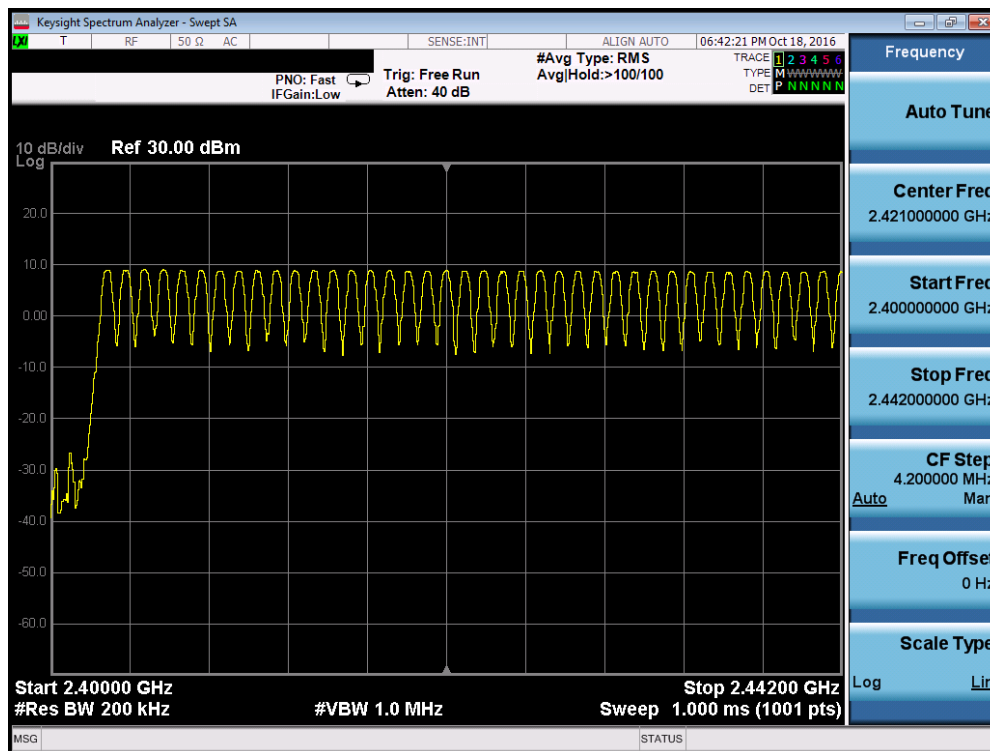


Plot 7-55. Low End Spectrum Channel Hopping Plot(EX600-WEN4-X40)

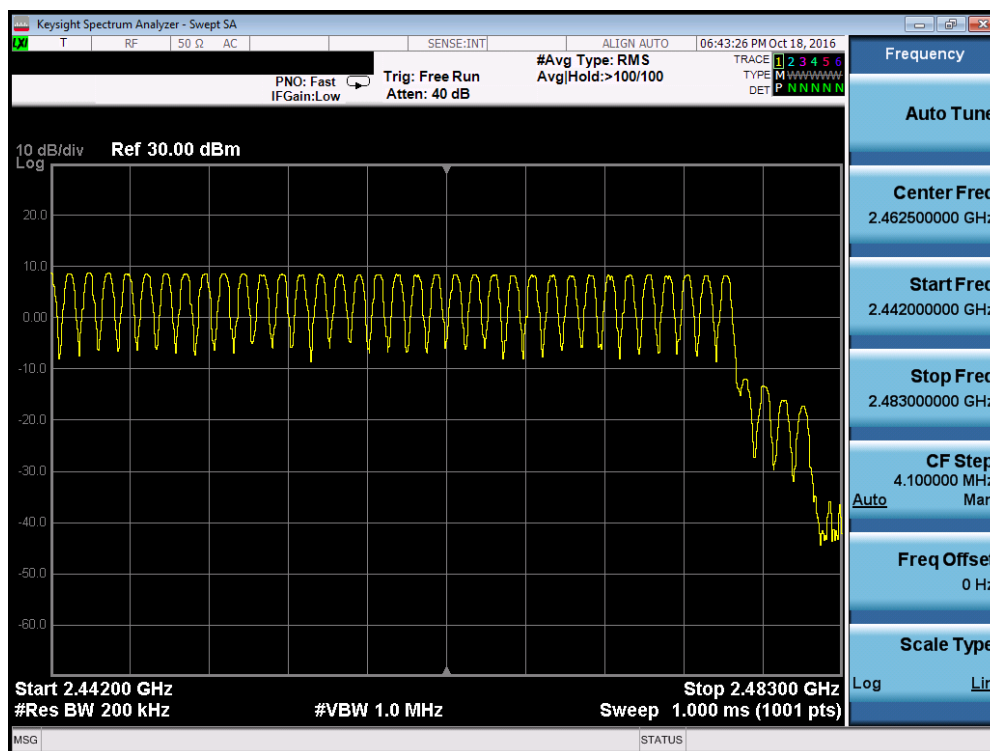


Plot 7-56. High End Spectrum Channel Hopping Plot(EX600-WEN4-X40)

FCC ID: 2AJE7SMC-DIV5	<p>PCTEST ENGINEERING LABORATORY, INC.</p> <p>FCC Pt. 15.247 TEST REPORT (CERTIFICATION)</p>		<p>SVC</p> <p>Reviewed by: Quality Manager</p>
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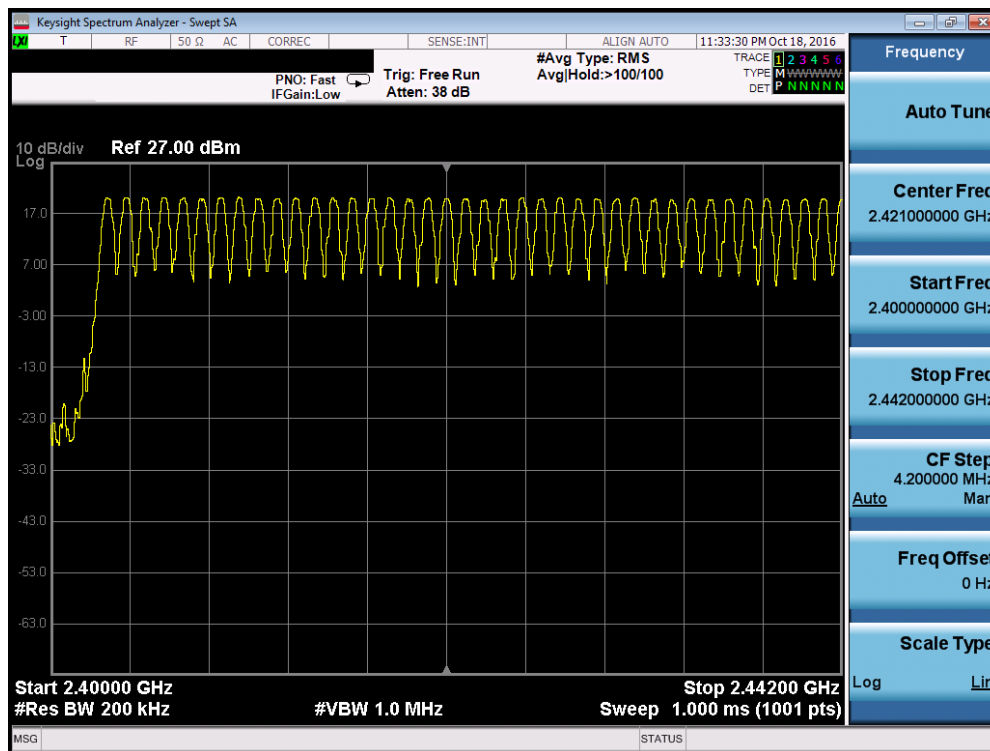


Plot 7-57. Low End Spectrum Channel Hopping Plot(EX600-WSV3-X41)

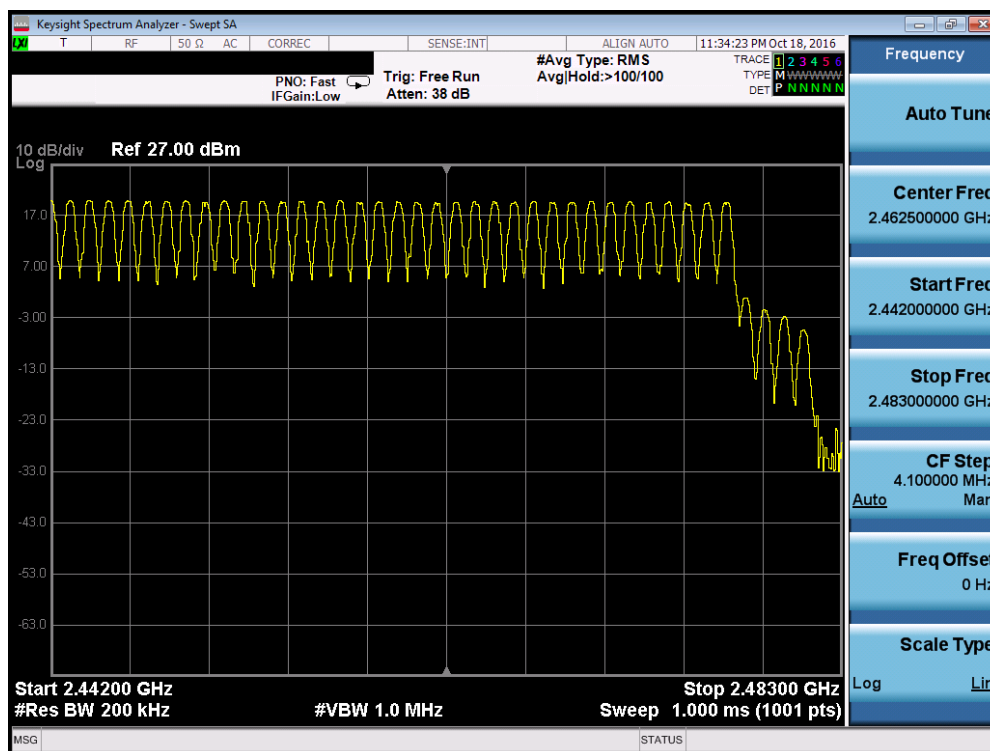


Plot 7-58. High End Spectrum Channel Hopping Plot(EX600-WSV3-X41)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
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Plot 7-59. Low End Spectrum Channel Hopping Plot(EX600-WSV4-X41)



Plot 7-60. High End Spectrum Channel Hopping Plot(EX600-WSV4-X41)

FCC ID: 2AJE7SMC-DIV5	<p>PCTEST ENGINEERING LABORATORY, INC.</p>		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	<p>SVC</p>	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 52 of 109

7.8 Conducted Spurious Emissions

§15.247 (d)

Test Overview and Limit

Conducted out-of-band spurious emissions were investigated from 30MHz up to 25GHz to include the 10th harmonic of the fundamental transmit frequency. ***The maximum permissible out-of-band emission level is 20 dBc.***

Test Procedure Used

ANSI C63.10-2013 – Section 7.8.8

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 25GHz (separated into two plots per channel)
2. RBW = 1MHz* (See note below)
3. VBW = 3MHz
4. Detector = Peak
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

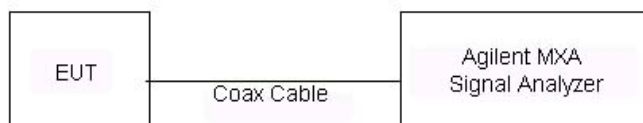


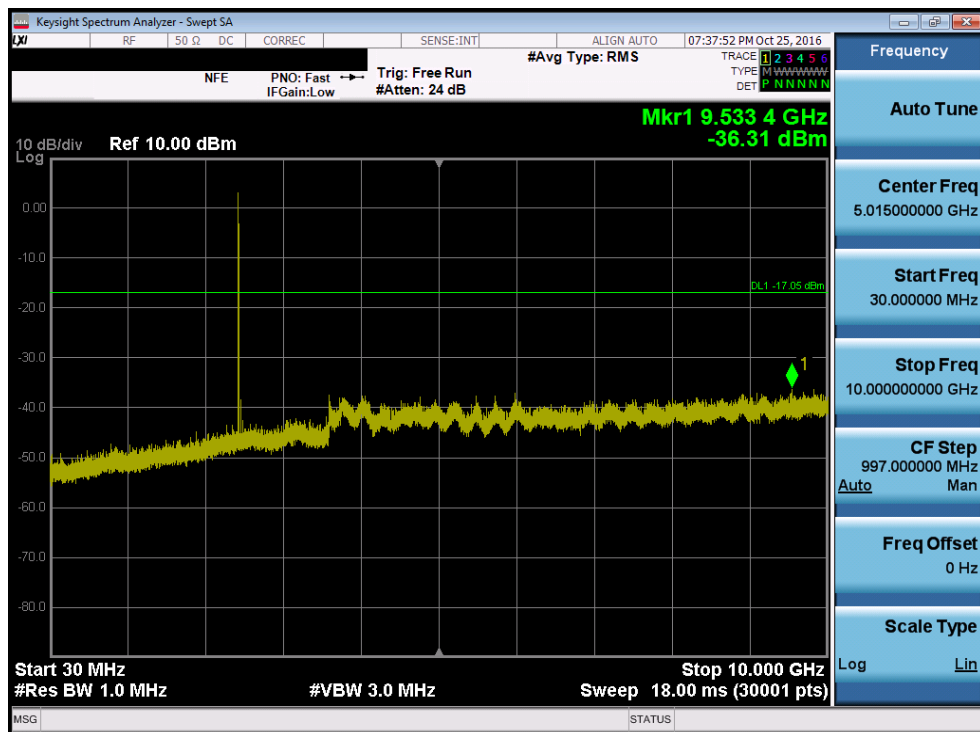


Figure 7-7. Test Instrument & Measurement Setup

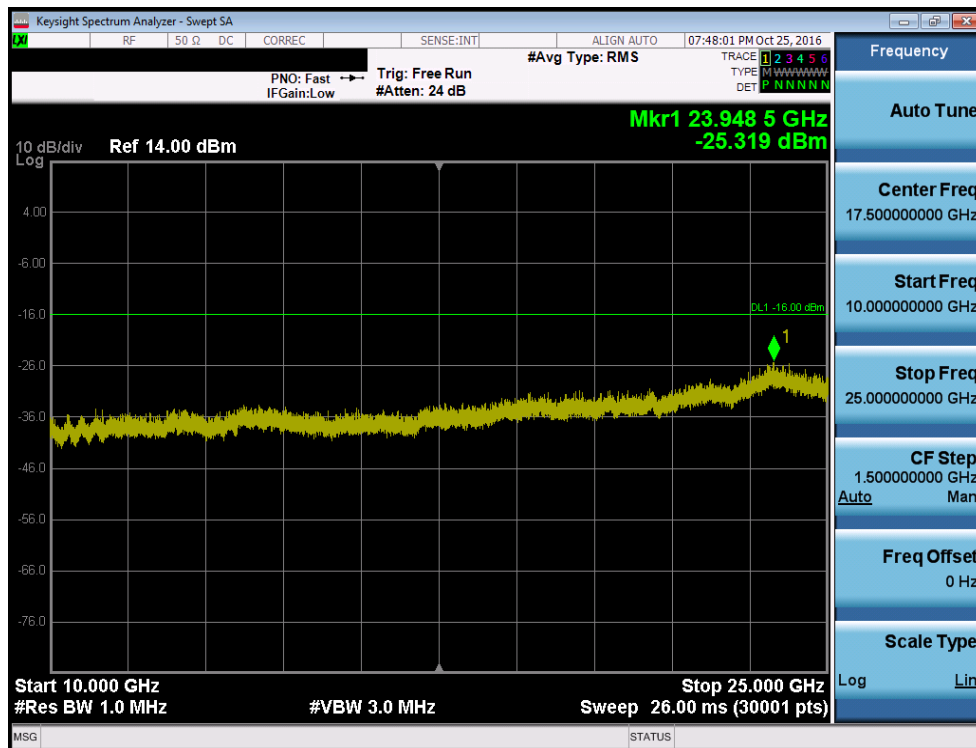
Test Notes

Out-of-band conducted spurious emissions were investigated for all data rates. The display line shown in the following plots is the limit at 20dB below the fundamental emission level measured in a 100kHz bandwidth. However, the traces in the following plots are measured with a 1MHz RBW to reduce test time, so the display line may not necessarily appear to be 20dB below the level of the fundamental in a 1MHz bandwidth.

FCC ID: 2AJE7SMC-DIV5			FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 53 of 109

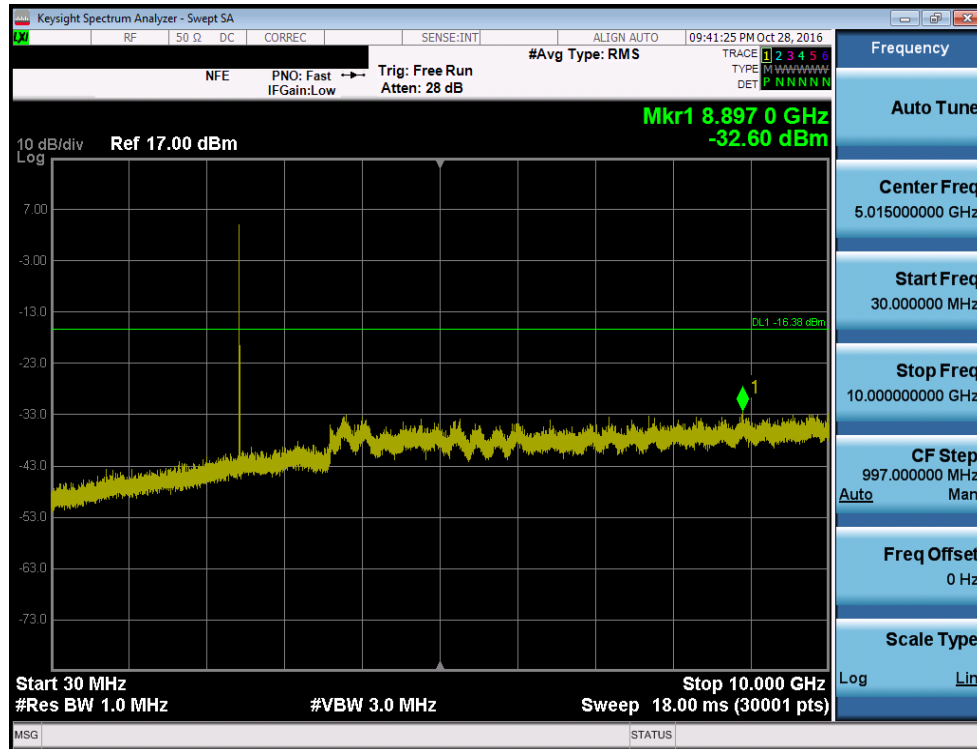


Plot 7-61. Conducted Spurious Plot (EX600-WEN3-X40, Ch. 0)

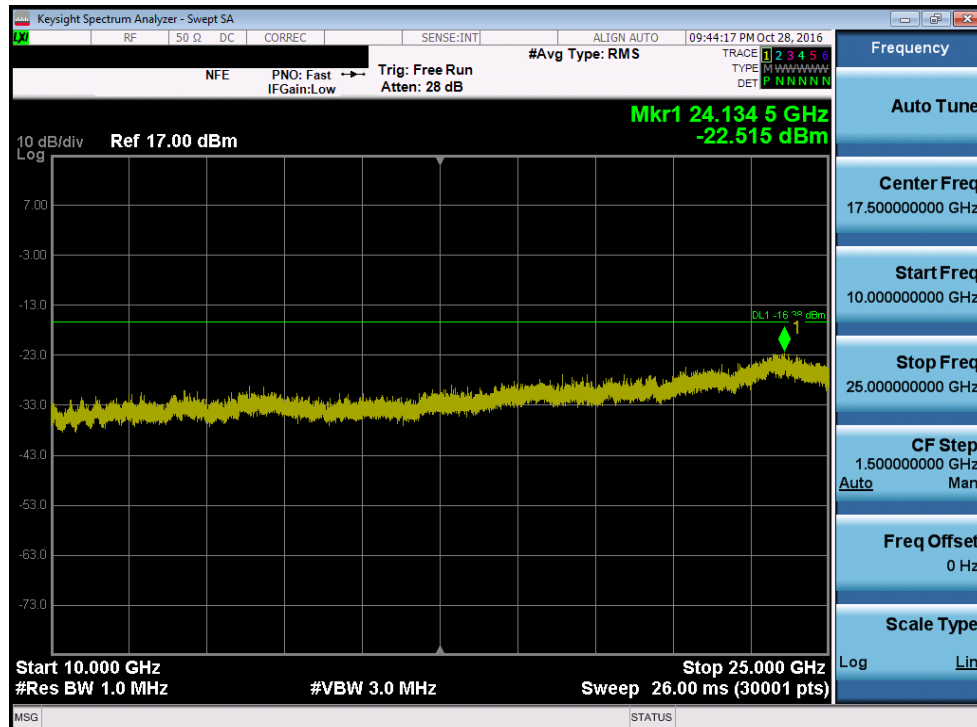


Plot 7-62. Conducted Spurious Plot (EX600-WEN3-X40, Ch. 0)

FCC ID: 2AJE7SMC-DIV5	<p>PCTEST ENGINEERING LABORATORY, INC.</p>		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	<p>SVC</p>	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 54 of 109

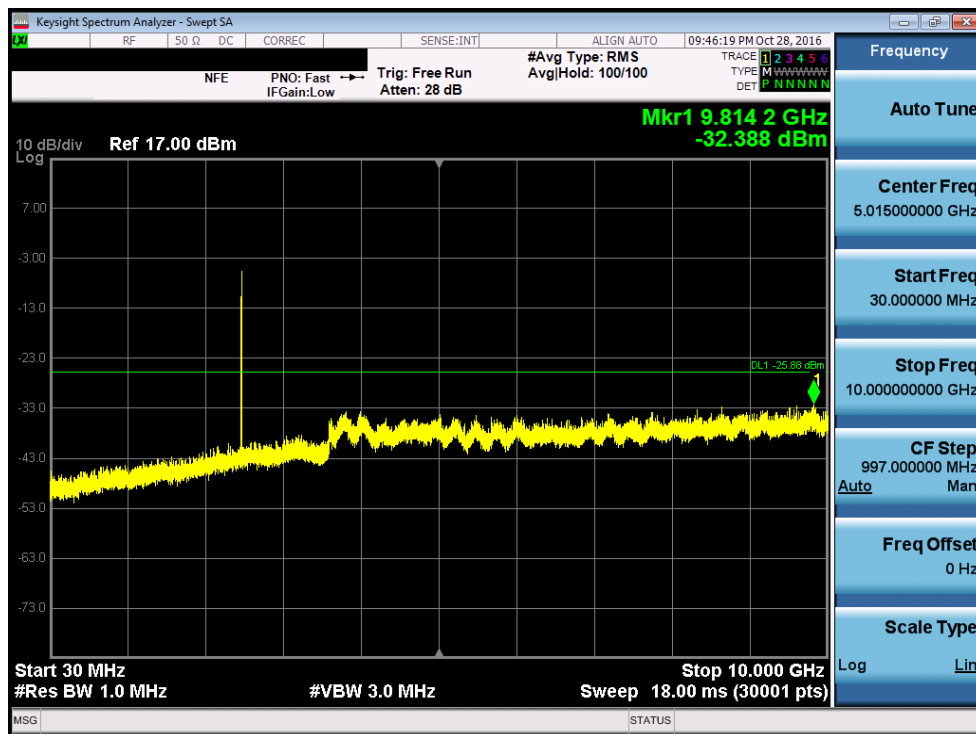


Plot 7-63. Conducted Spurious Plot (EX600-WEN3-X40, Ch. 39)

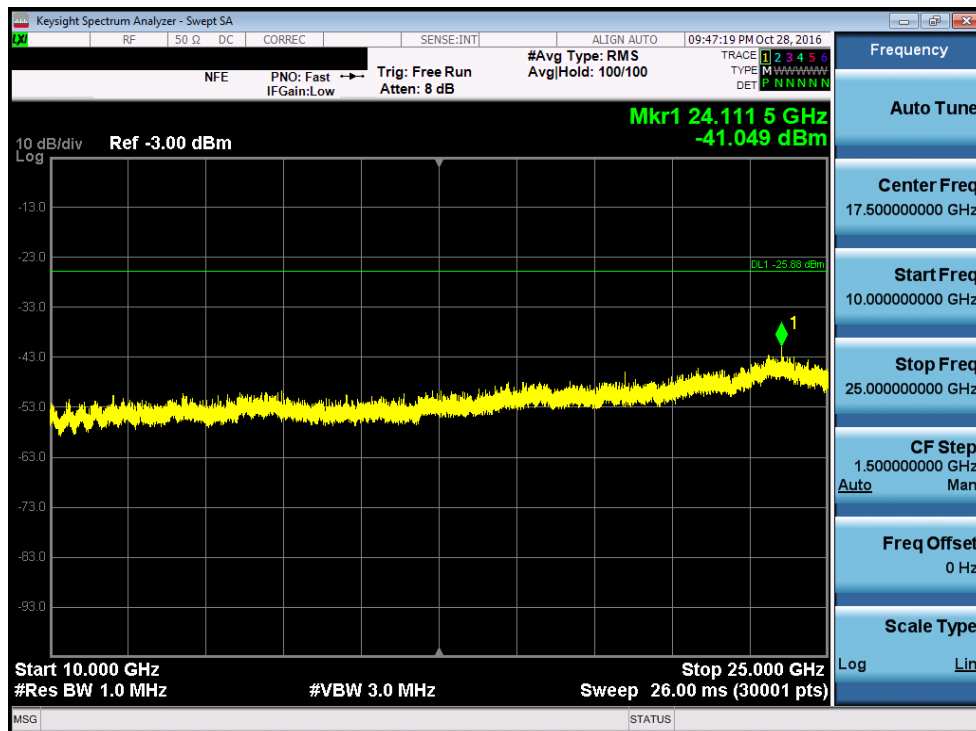


Plot 7-64. Conducted Spurious Plot (EX600-WEN3-X40, Ch. 39)

FCC ID: 2AJE7SMC-DIV5	<p>PCTEST ENGINEERING LABORATORY, INC.</p>		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	<p>SVC</p>	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 55 of 109

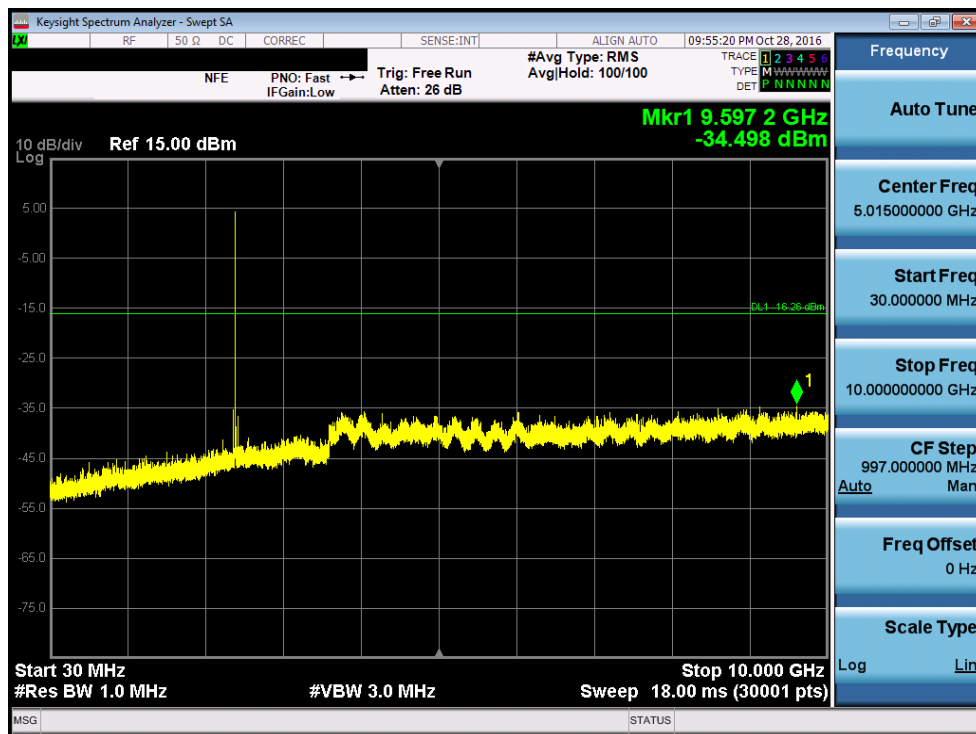


Plot 7-65. Conducted Spurious Plot (EX600-WEN3-X40, Ch. 78)

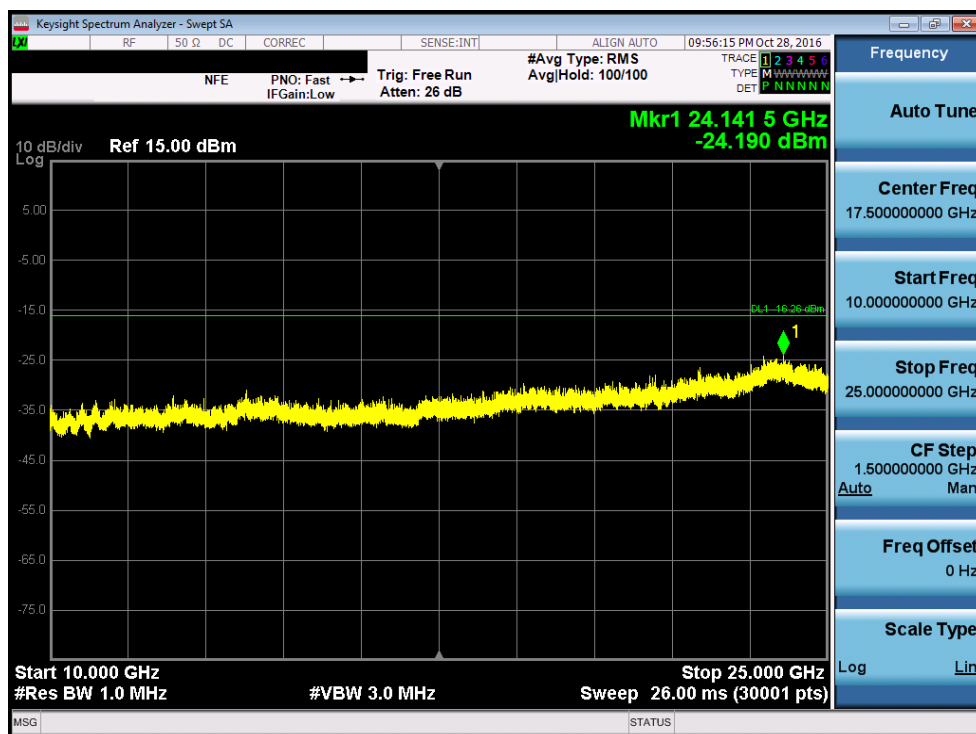


Plot 7-66. Conducted Spurious Plot (EX600-WEN3-X40, Ch. 78)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 56 of 109

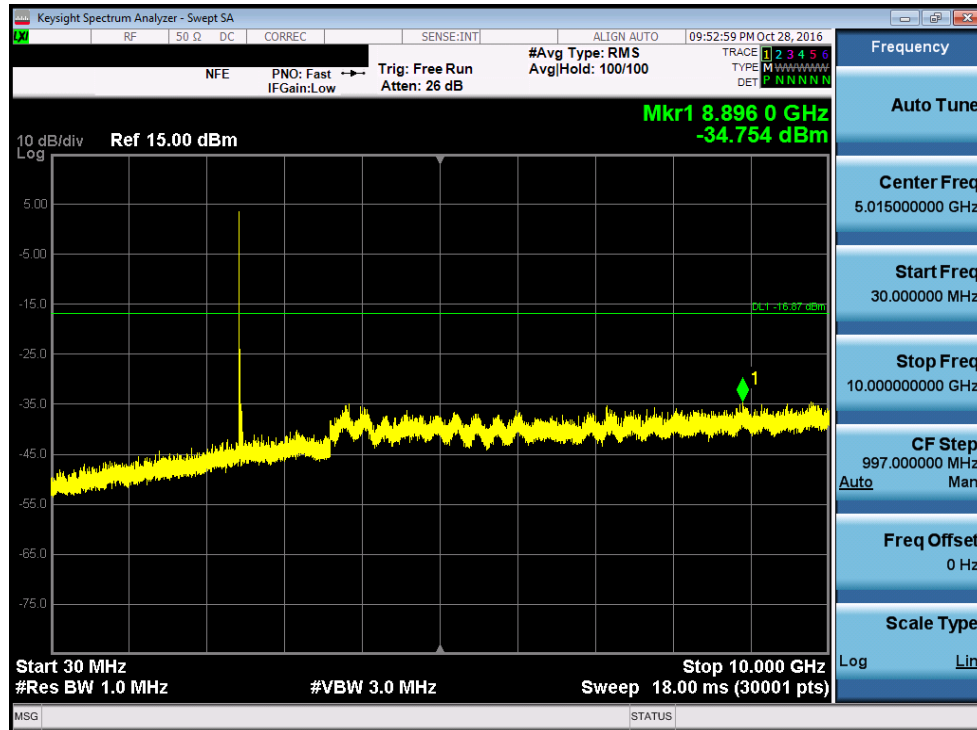


Plot 7-67. Conducted Spurious Plot (EX600-WEN4-X40, Ch. 0)

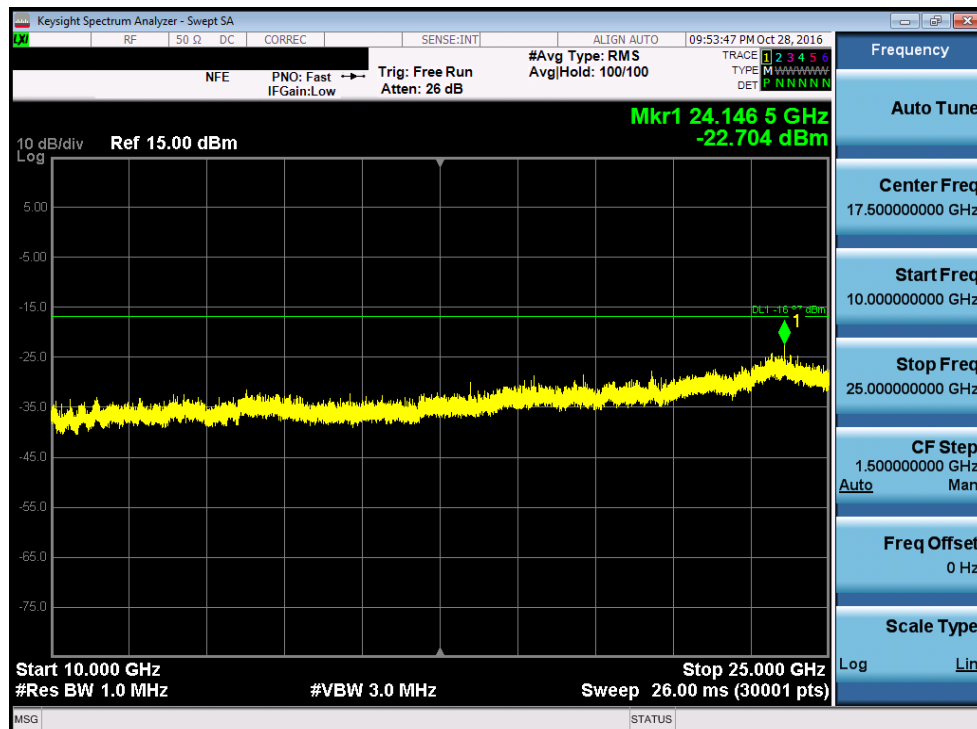


Plot 7-68. Conducted Spurious Plot (EX600-WEN4-X40, Ch. 0)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 57 of 109

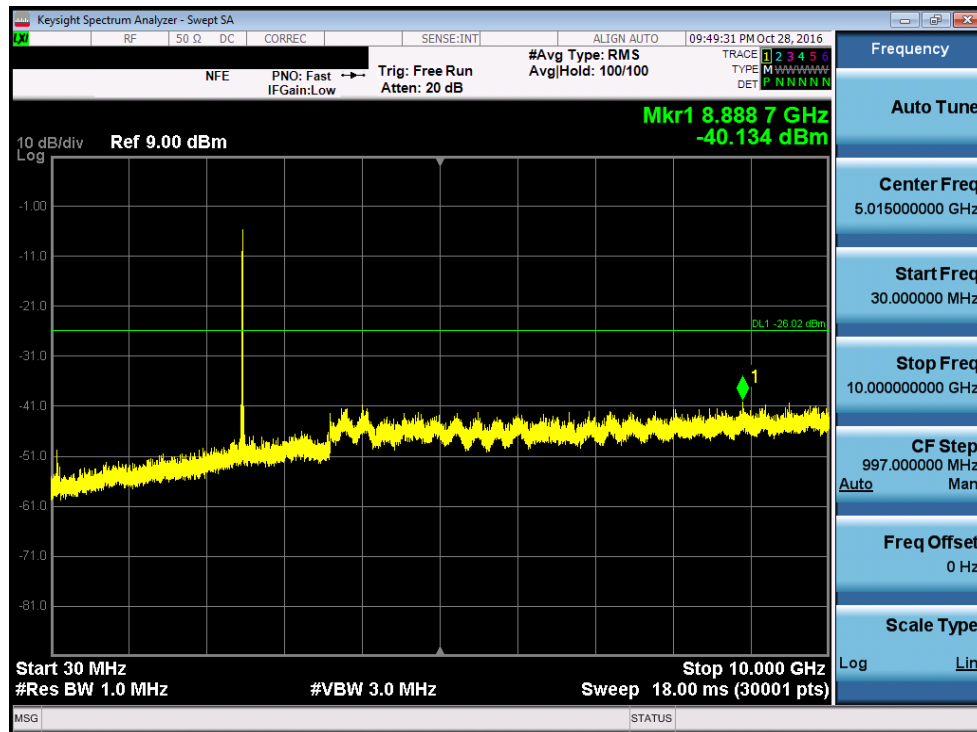


Plot 7-69. Conducted Spurious Plot (EX600-WEN4-X40, Ch. 39)

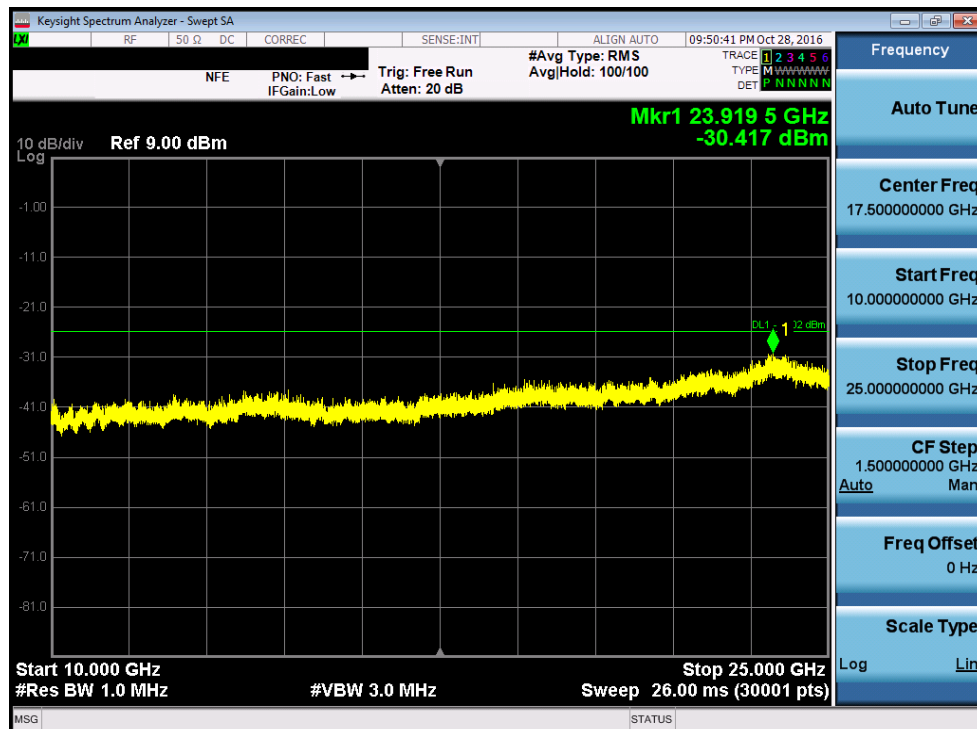


Plot 7-70. Conducted Spurious Plot (EX600-WEN4-X40, Ch. 39)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 58 of 109

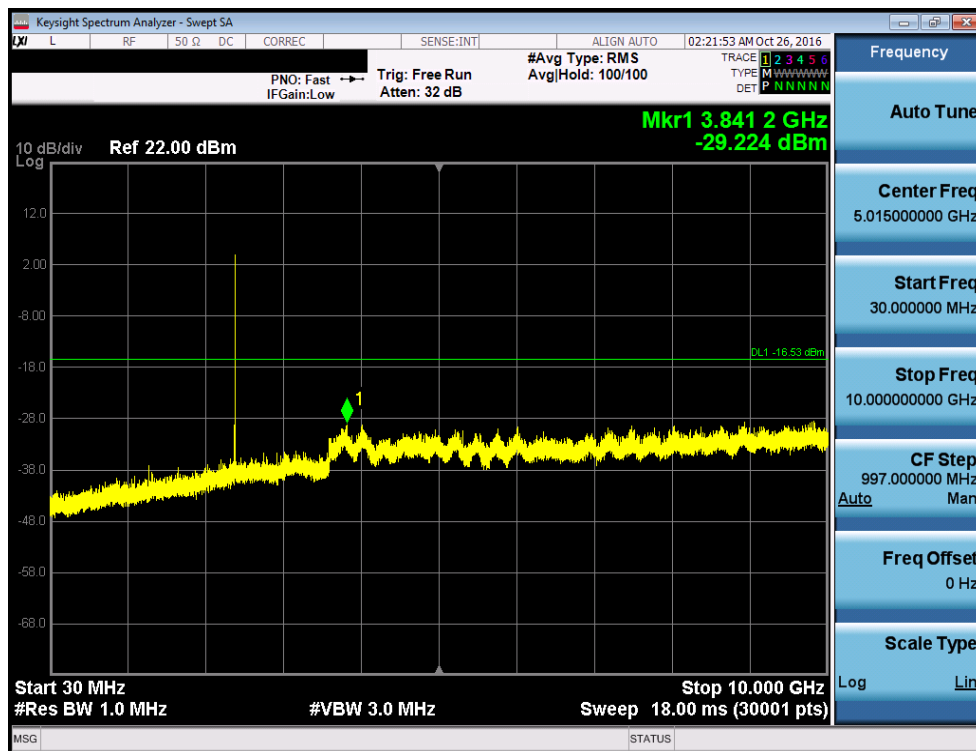


Plot 7-71. Conducted Spurious Plot (EX600-WEN4-X40, Ch. 78)

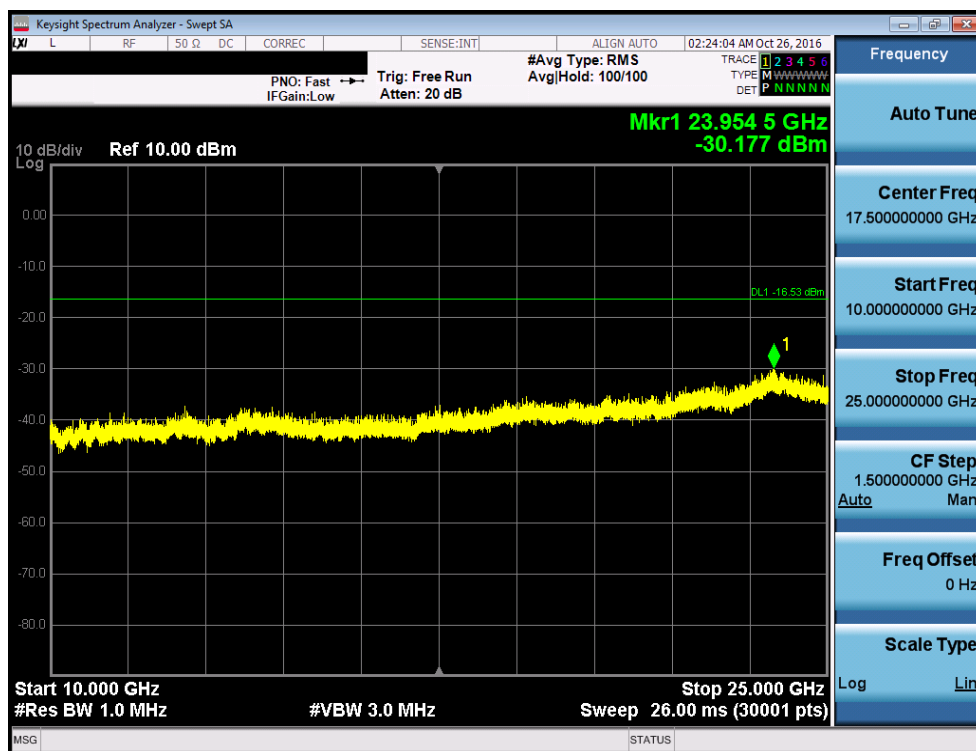


Plot 7-72. Conducted Spurious Plot (EX600-WEN4-X40, Ch. 78)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 59 of 109

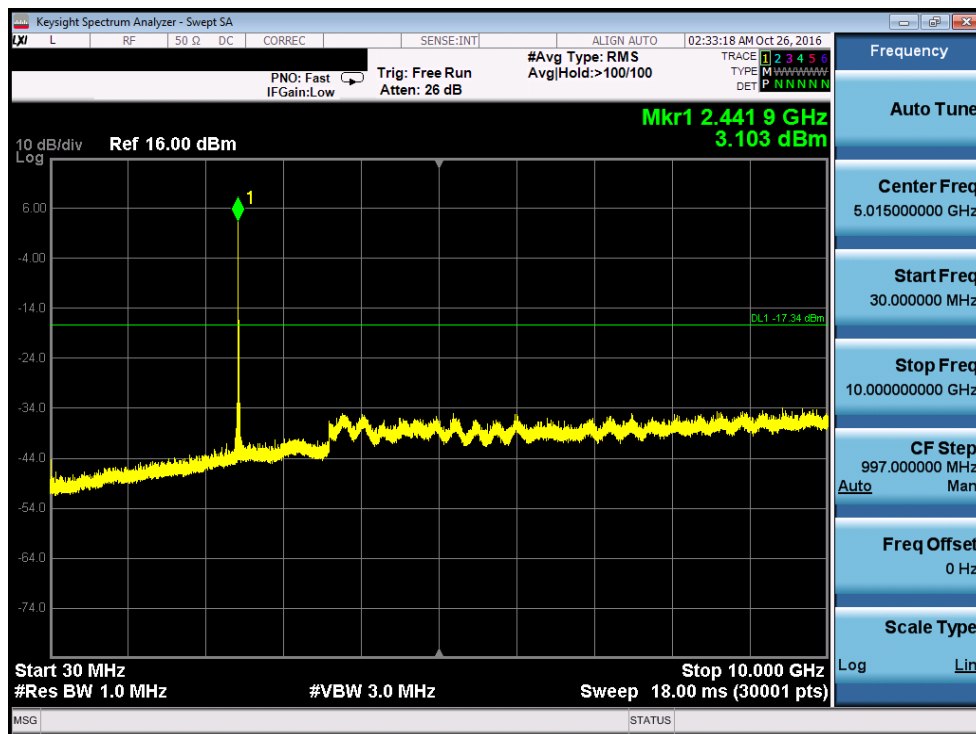


Plot 7-73. Conducted Spurious Plot (EX600-WSV3-X41, Ch. 0)

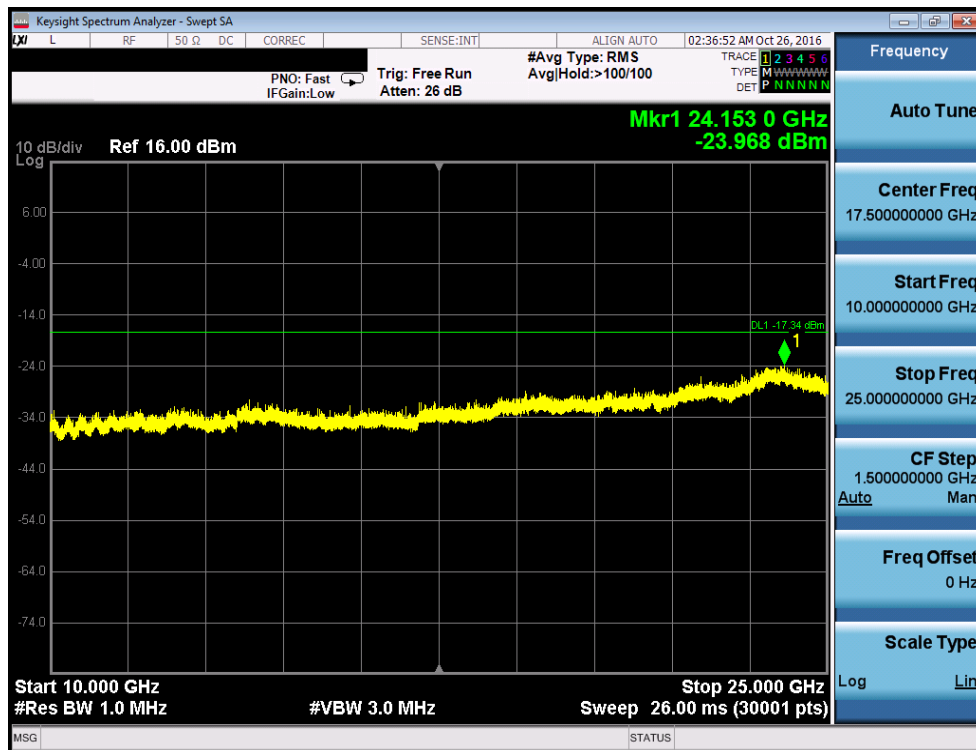


Plot 7-74. Conducted Spurious Plot (EX600-WSV3-X41, Ch. 0)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 60 of 109

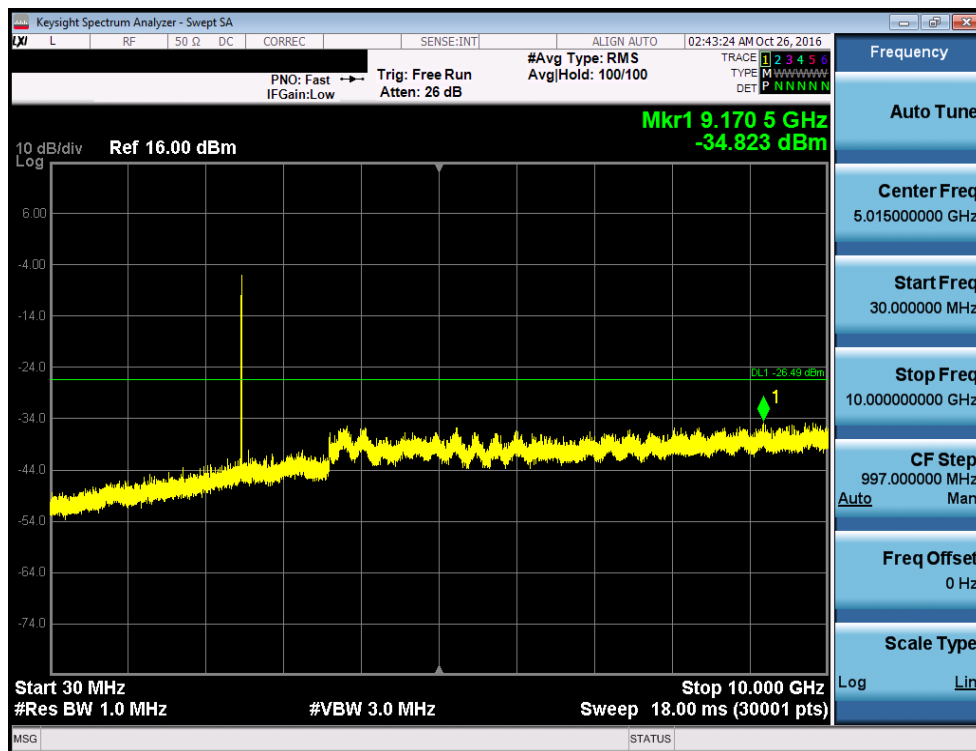


Plot 7-75. Conducted Spurious Plot (EX600-WSV3-X41, Ch. 39)

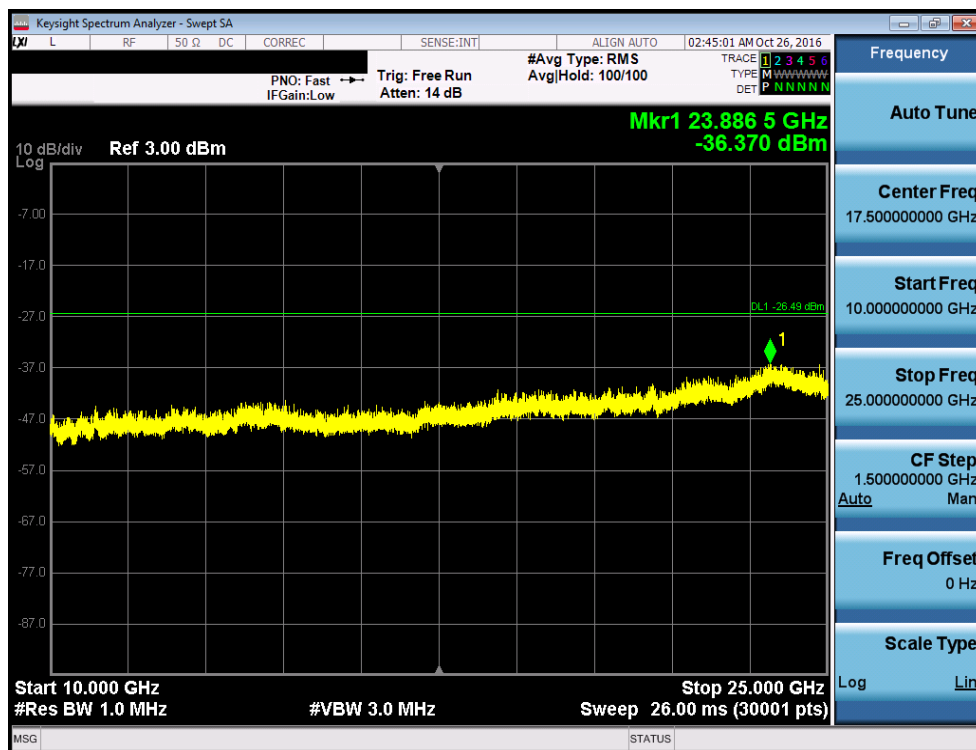


Plot 7-76. Conducted Spurious Plot (EX600-WSV3-X41, Ch. 39)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 61 of 109

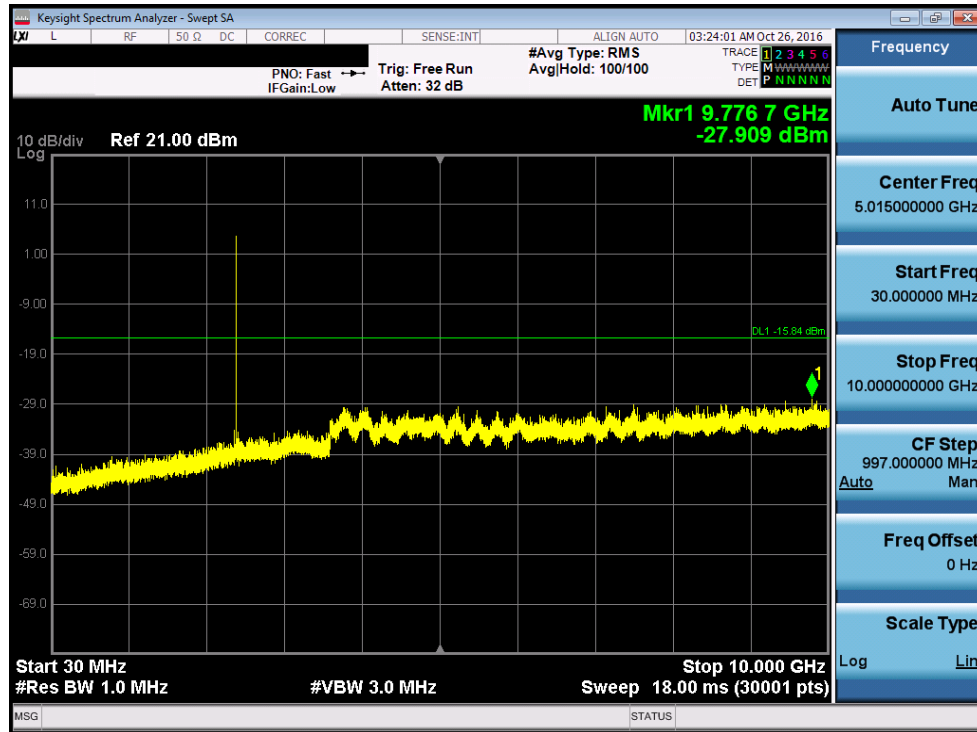


Plot 7-77. Conducted Spurious Plot (EX600-WSV3-X41, Ch. 78)

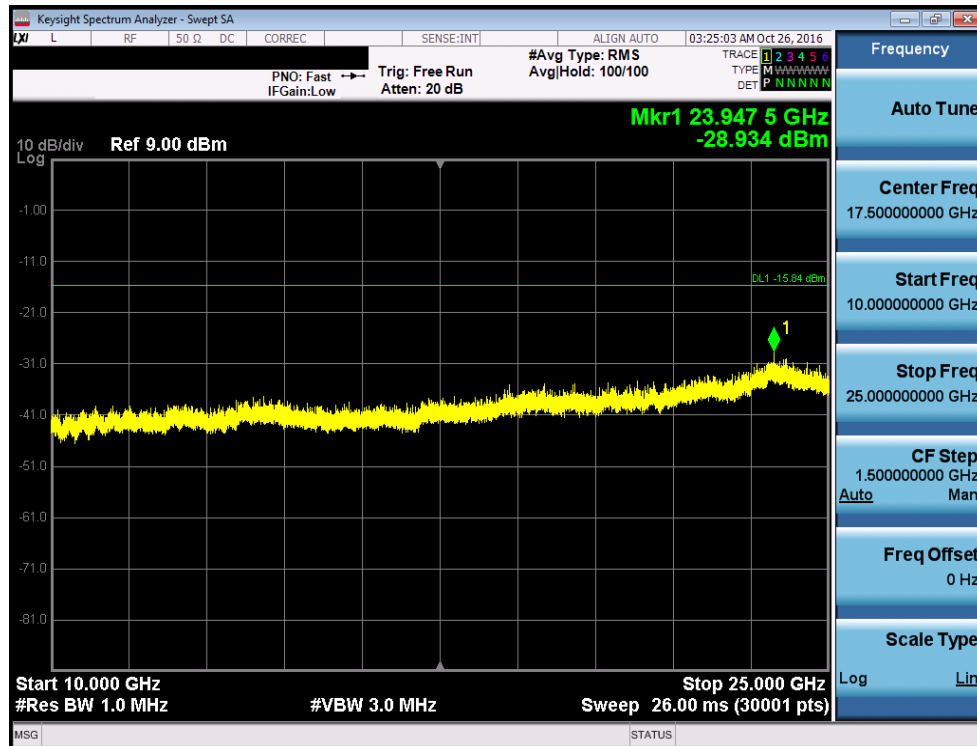


Plot 7-78. Conducted Spurious Plot (EX600-WSV3-X41, Ch. 78)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 62 of 109

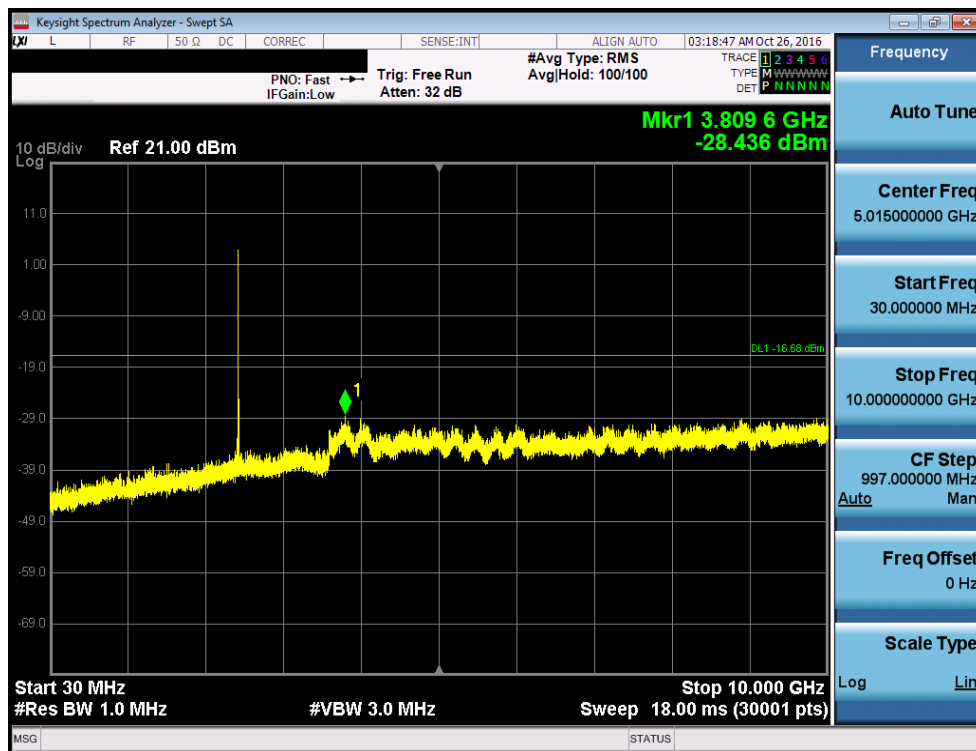


Plot 7-79. Conducted Spurious Plot (EX600-WSV4-X41, Ch. 0)

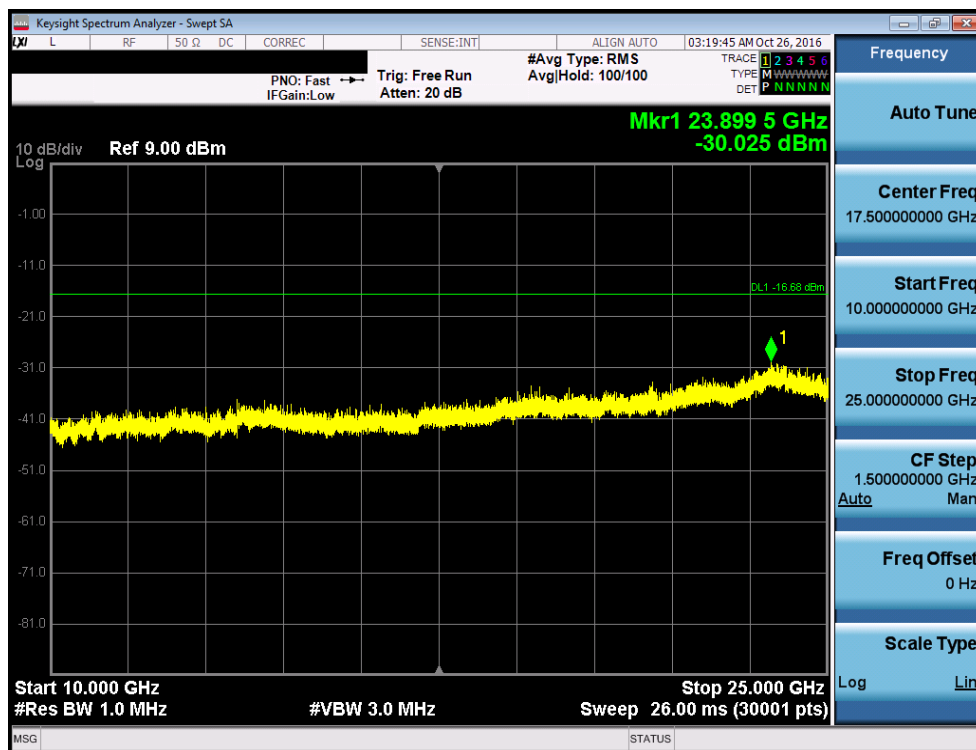


Plot 7-80. Conducted Spurious Plot (EX600-WSV4-X41, Ch. 0)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 63 of 109

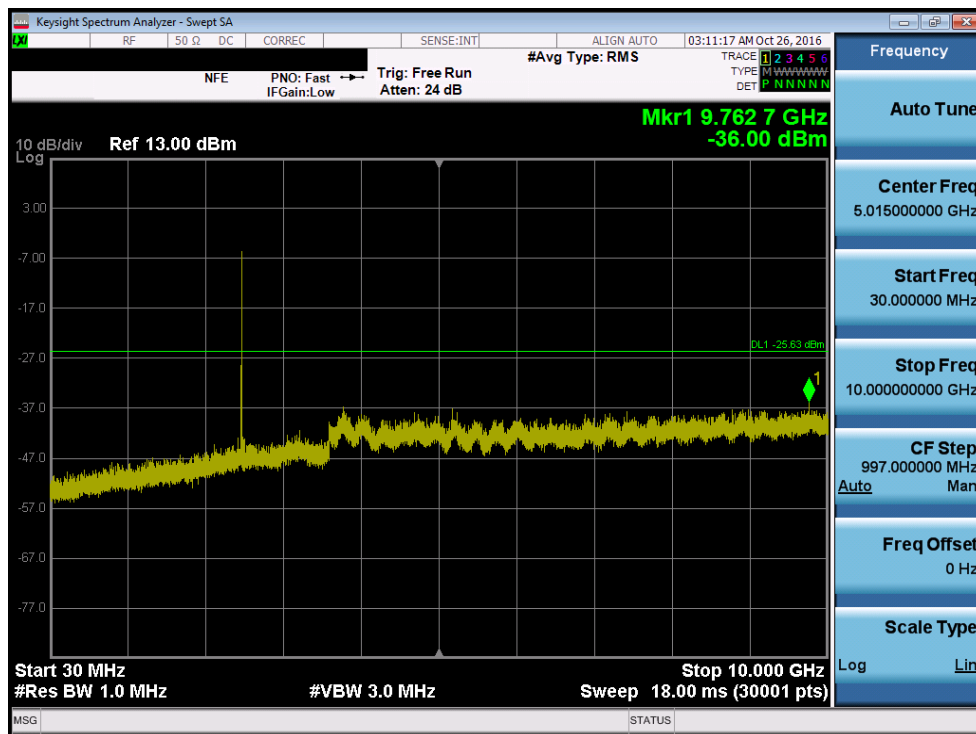


Plot 7-81. Conducted Spurious Plot (EX600-WSV4-X41, Ch. 39)

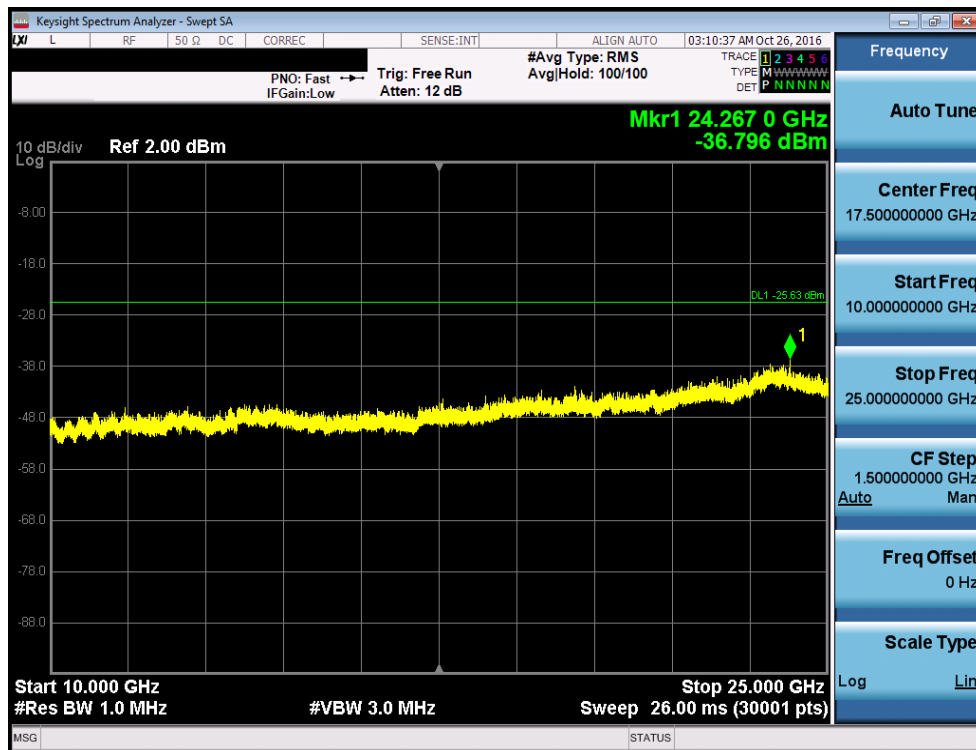


Plot 7-82. Conducted Spurious Plot (EX600-WSV4-X41, Ch. 39)

FCC ID: 2AJE7SMC-DIV5	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Plot 7-83. Conducted Spurious Plot (EX600-WSV4-X41, Ch. 78)



Plot 7-84. Conducted Spurious Plot (EX600-WSV4-X41, Ch. 78)

FCC ID: 2AJE7SMC-DIV5	<p>PCTEST ENGINEERING LABORATORY, INC.</p> <p>FCC Pt. 15.247 TEST REPORT (CERTIFICATION)</p>		<p>SVC</p> <p>Reviewed by: Quality Manager</p>
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7.9 Radiated Spurious Emission Measurements – Above 1GHz

§15.205 §15.209 §15.247 (d)

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at maximum power and at the appropriate frequencies. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 7-14 per Section 15.209.

Frequency	Field Strength [μV/m]	Measured Distance [Meters]
Above 960.0 MHz	500	3

Table 7-14. Radiated Limits

Test Procedure Used

ANSI C63.10-2013 – Section 6.6.4.3



Test Settings

Average Field Strength Measurements per Section 4.1.4.2.3 of ANSI C63.10-2013

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 1kHz $\geq 1/\tau$ Hz, where τ = pulse width in seconds
4. Averaging type was set to RMS to ensure that video filtering was applied in the power domain
5. Detector = peak
6. Sweep time = auto
7. Trace mode = max hold
8. Trace was allowed to stabilize

Peak Field Strength Measurements per Section 4.1.4.2.2 of ANSI C63.10-2013

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW is set depending on measurement frequency, as specified in Table 7-15 below
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

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Frequency	RBW
9 – 150kHz	200 – 300Hz
0.15 – 30MHz	9 – 10kHz
30 – 1000MHz	100 – 120kHz
> 1000MHz	1MHz

Table 7-15. RBW as a Function of Frequency

Test Setup

The EUT and measurement equipment were set up as shown in the diagram below.

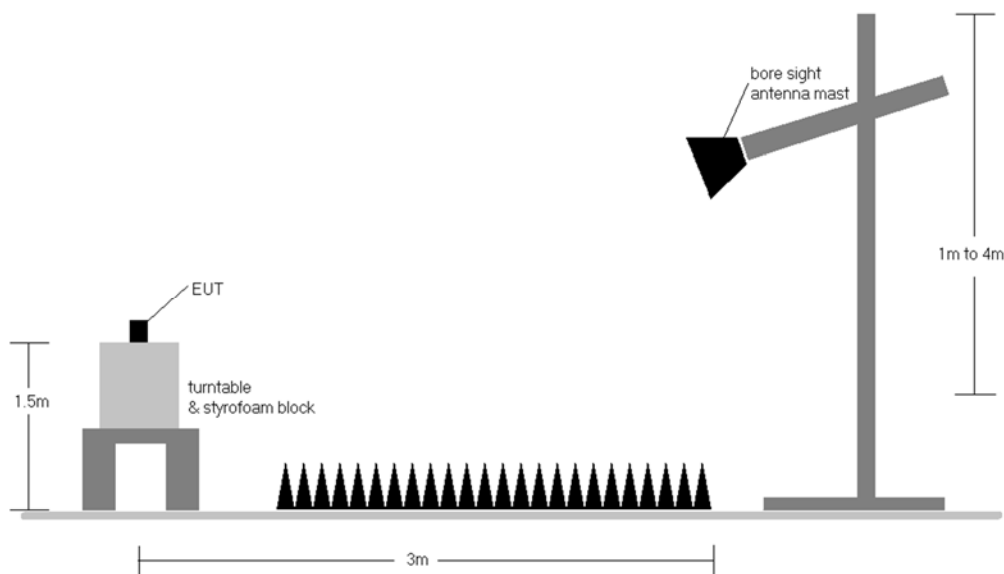


Figure 7-8. Radiated Test Setup >1GHz

Test Notes

1. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-14.
2. No significant radiated emissions were found in the 2310 - 2390MHz restricted band.
3. The antenna is manipulated through typical positions, polarity and length during the tests. The EUT is manipulated through three orthogonal planes.
4. This unit was tested while powered by an DC power source.
5. The spectrum is measured from 9kHz to the 10th harmonic and the worst-case emissions are reported.
6. The duty cycle correction factor was not applied to noise floor measurements.
7. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section.
8. The "-" shown in the following RSE tables are used to denote a noise floor measurement.



FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
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Sample Calculation

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

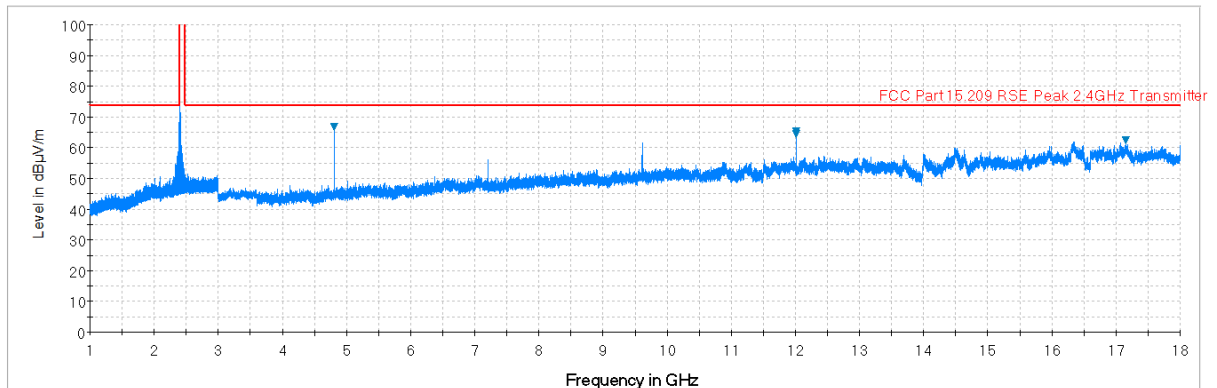
Duty Cycle Correction Factor Calculation

- Number of times transmitter hits on one channel = 1 time(s) / 100 ms
- Worst case dwell time = 0.7 ms
- Duty cycle correction factor = $20\log_{10}(0.7\text{ms}/100\text{ms}) = -43.10 \text{ dB}$

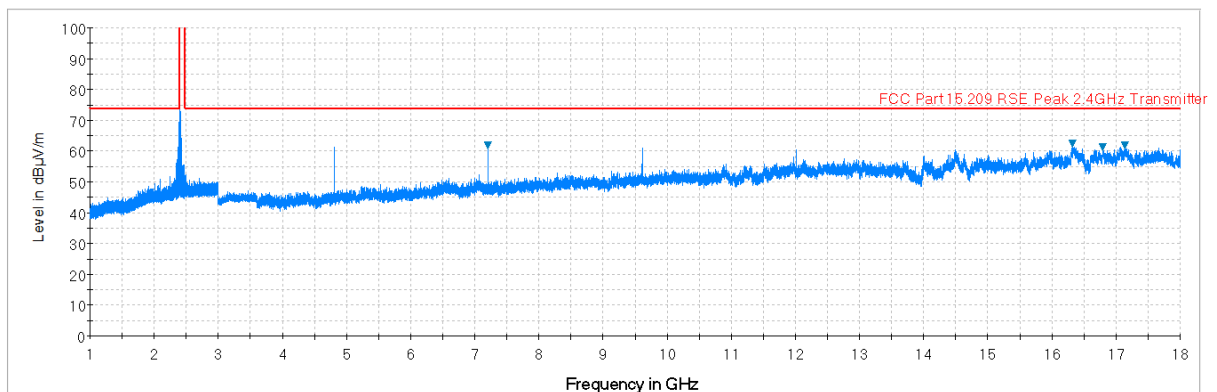
FCC ID: 2AJE7SMC-DIV5		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device	Page 68 of 109	

Radiated Spurious Emission Measurements

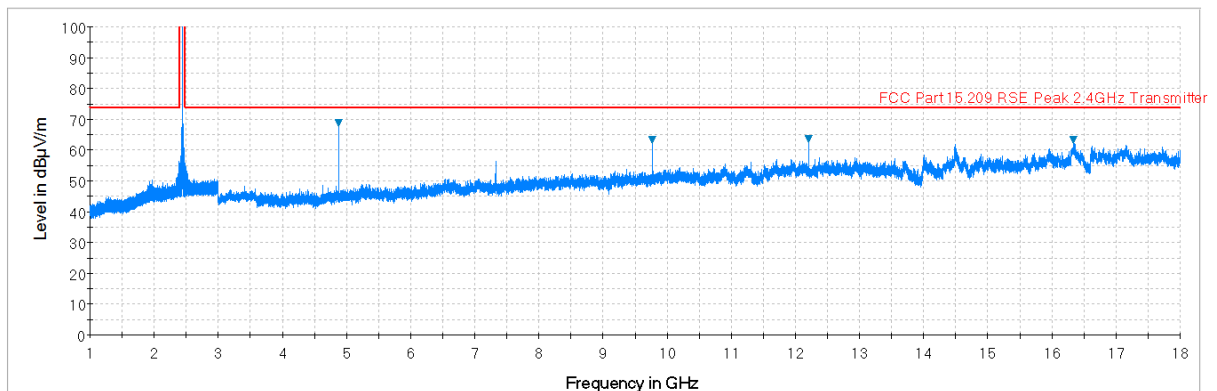
§15.205 §15.209 §15.247 (d)



Plot 7-85. Radiated Spurious Plot above 1GHz (EX600-WEN3-X40, Ch. 0, Ant. Pol. H)

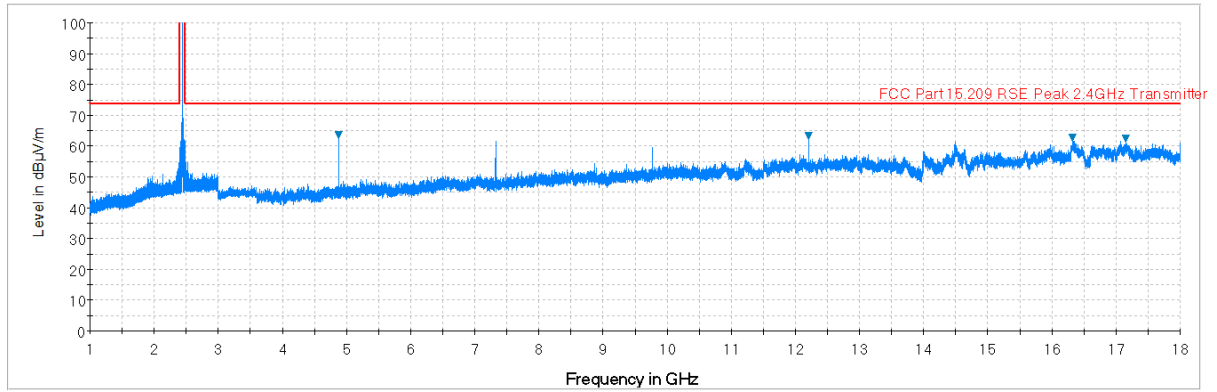


Plot 7-86. Radiated Spurious Plot above 1GHz (EX600-WEN3-X40, Ch. 0, Ant. Pol. V)

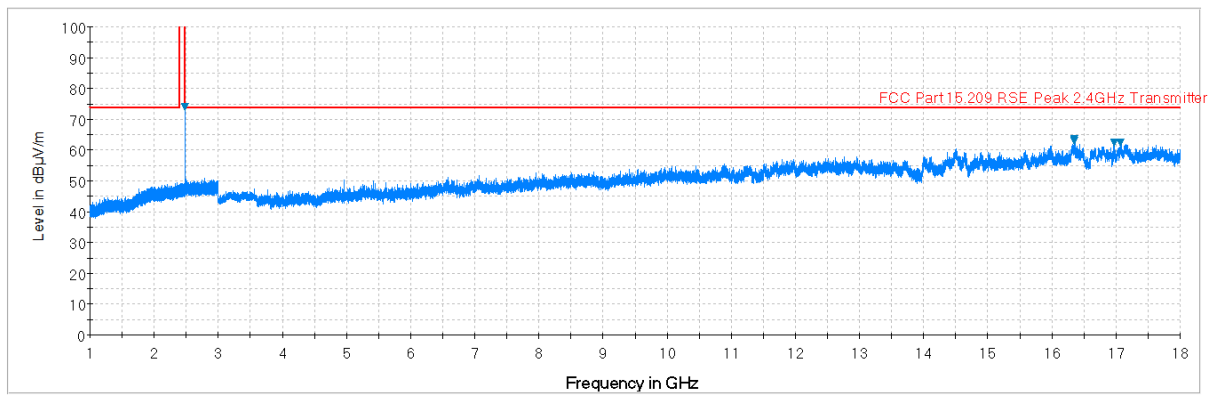


Plot 7-87. Radiated Spurious Plot above 1GHz (EX600-WEN3-X40, Ch. 39, Ant. Pol. H)

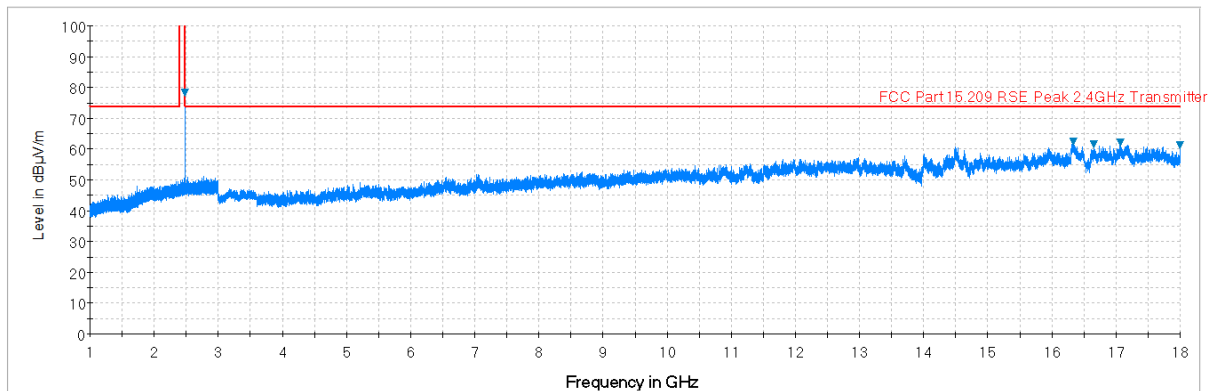
FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 69 of 109



Plot 7-88. Radiated Spurious Plot above 1GHz (EX600-WEN3-X40, Ch. 39, Ant. Pol. V)

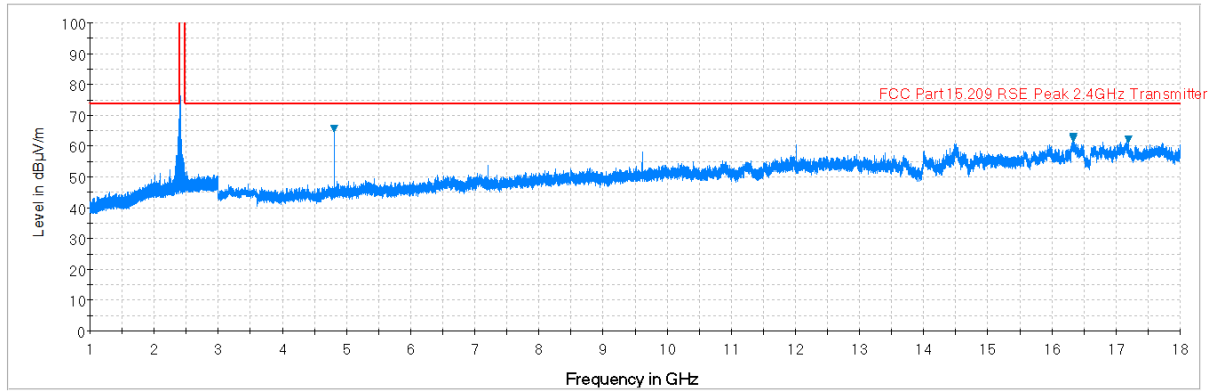


Plot 7-89. Radiated Spurious Plot above 1GHz (EX600-WEN3-X40, Ch. 78, Ant. Pol. H)

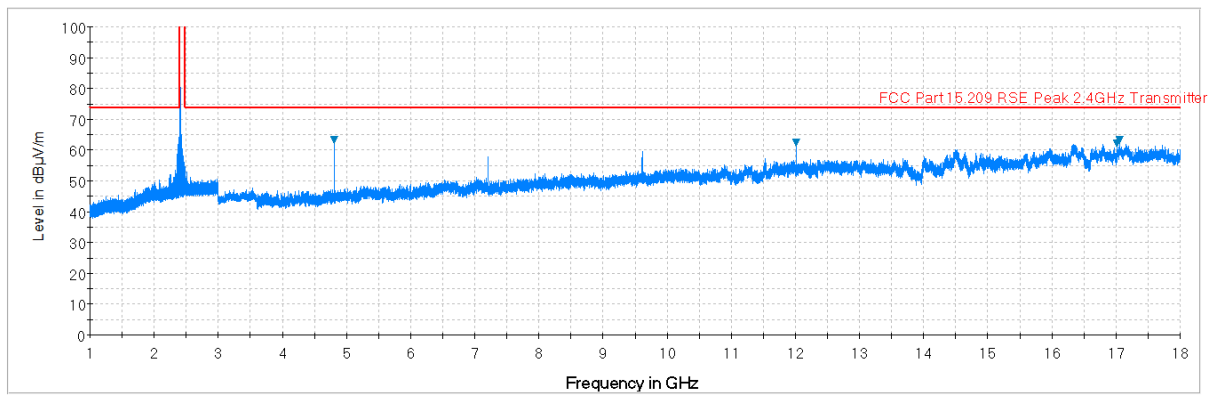


Plot 7-90. Radiated Spurious Plot above 1GHz (EX600-WEN3-X40, Ch. 78, Ant. Pol. V)

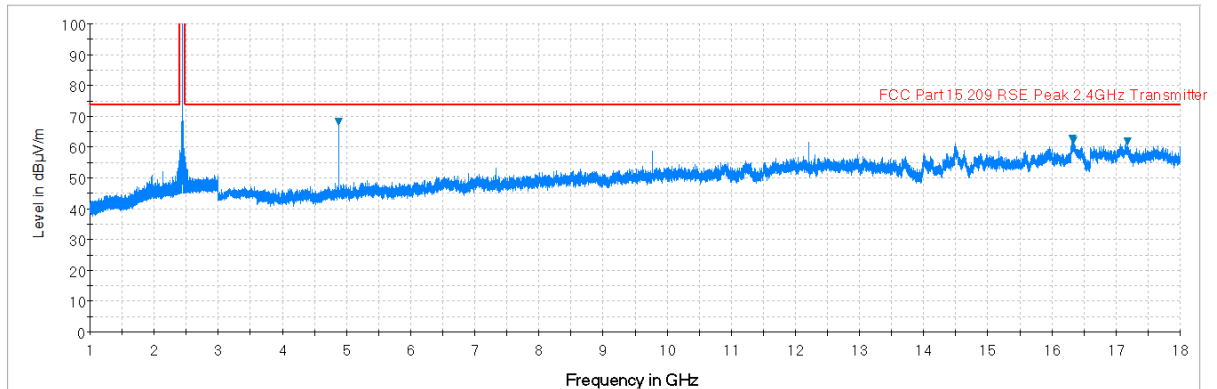
FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 70 of 109



Plot 7-91. Radiated Spurious Plot above 1GHz (EX600-WEN4-X40, Ch. 0, Ant. Pol. H)

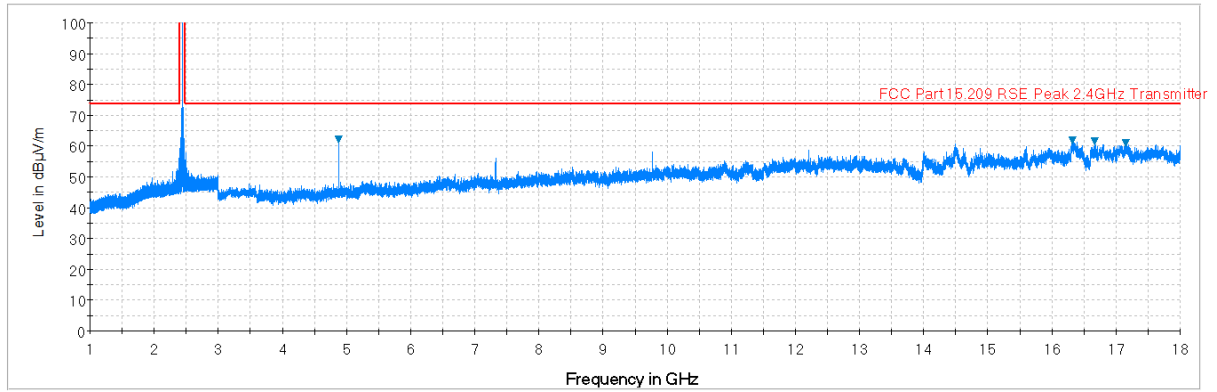


Plot 7-92. Radiated Spurious Plot above 1GHz (EX600-WEN4-X40, Ch. 0, Ant. Pol. V)

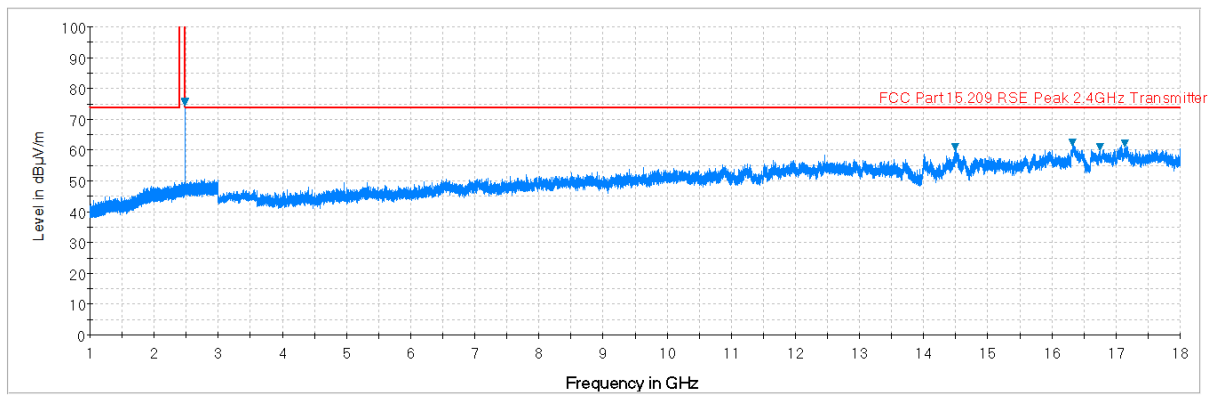


Plot 7-93. Radiated Spurious Plot above 1GHz (EX600-WEN4-X40, Ch. 39, Ant. Pol. H)

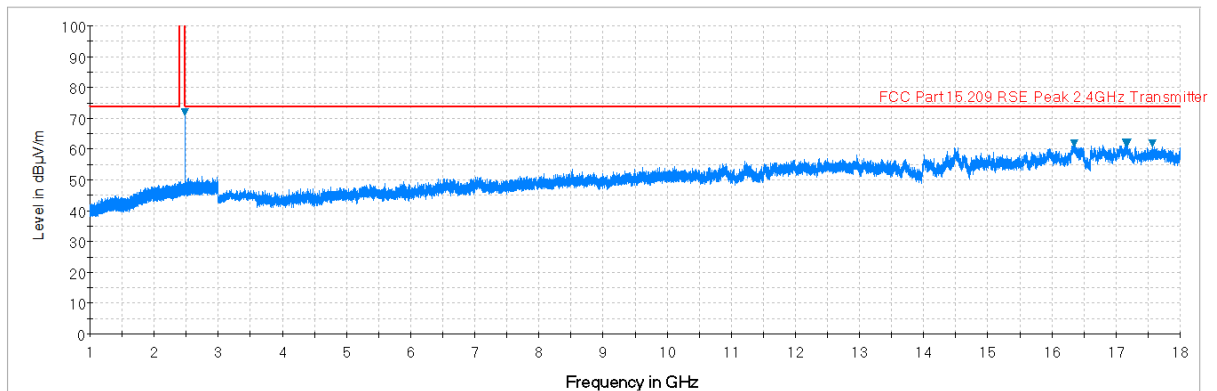
FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 71 of 109



Plot 7-94. Radiated Spurious Plot above 1GHz (EX600-WEN4-X40, Ch. 39, Ant. Pol. V)

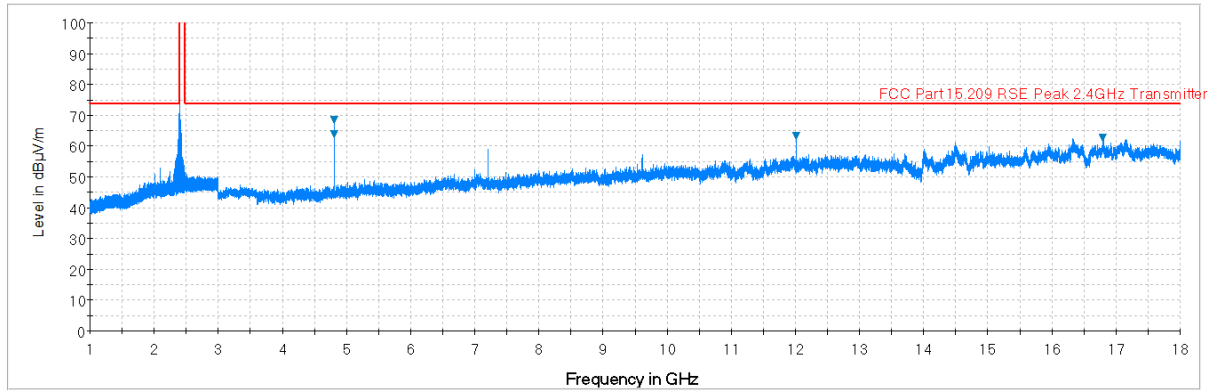


Plot 7-95. Radiated Spurious Plot above 1GHz (EX600-WEN4-X40, Ch. 78, Ant. Pol. H)

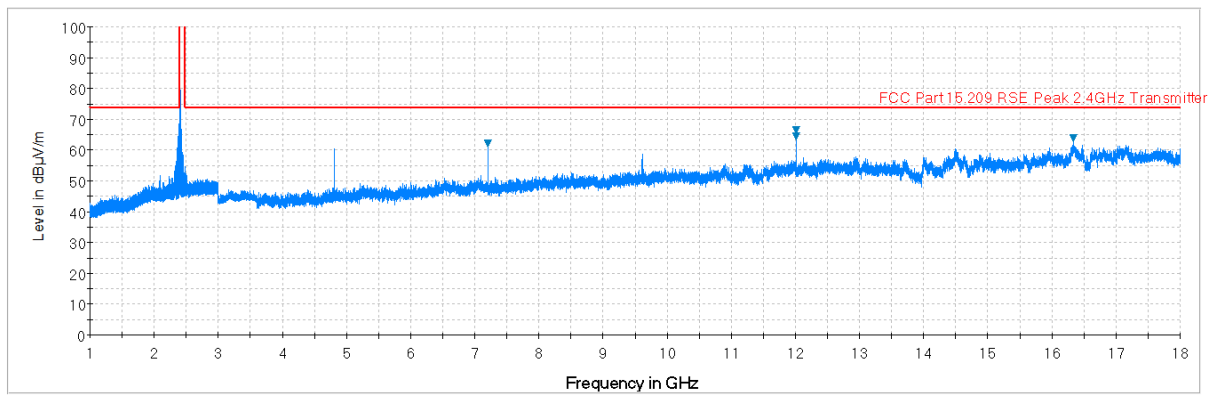


Plot 7-96. Radiated Spurious Plot above 1GHz (EX600-WEN4-X40, Ch. 78, Ant. Pol. V)

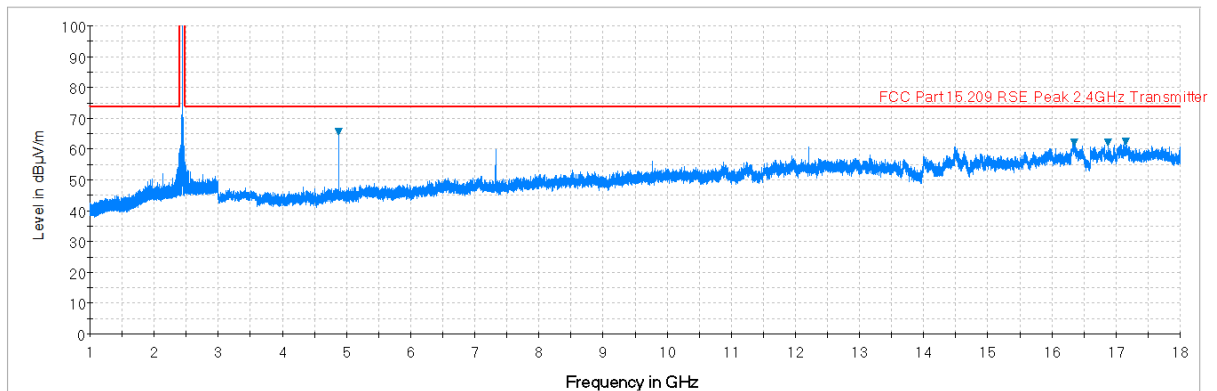
FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 72 of 109



Plot 7-97. Radiated Spurious Plot above 1GHz (EX600-WSV3-X41, Ch. 0, Ant. Pol. H)

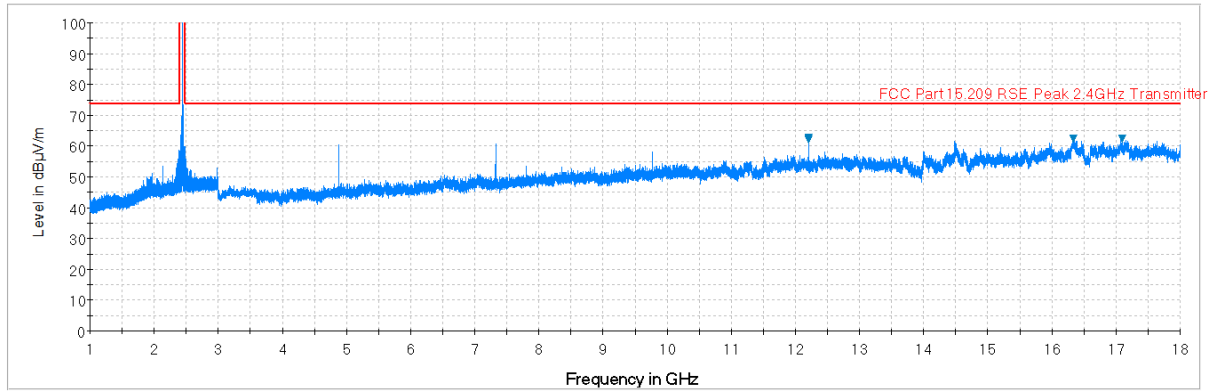


Plot 7-98. Radiated Spurious Plot above 1GHz (EX600-WSV3-X41, Ch. 0, Ant. Pol. V)

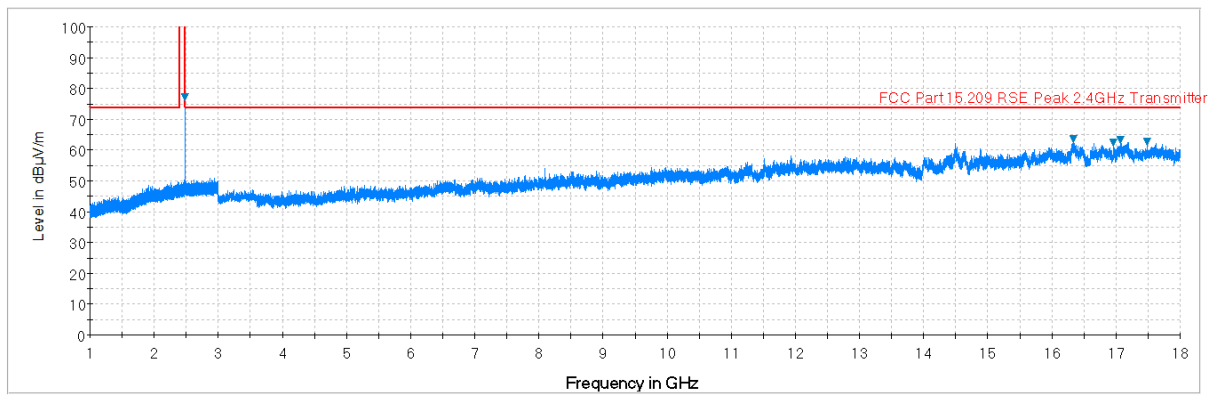


Plot 7-99. Radiated Spurious Plot above 1GHz (EX600-WSV3-X41, Ch. 39, Ant. Pol. H)

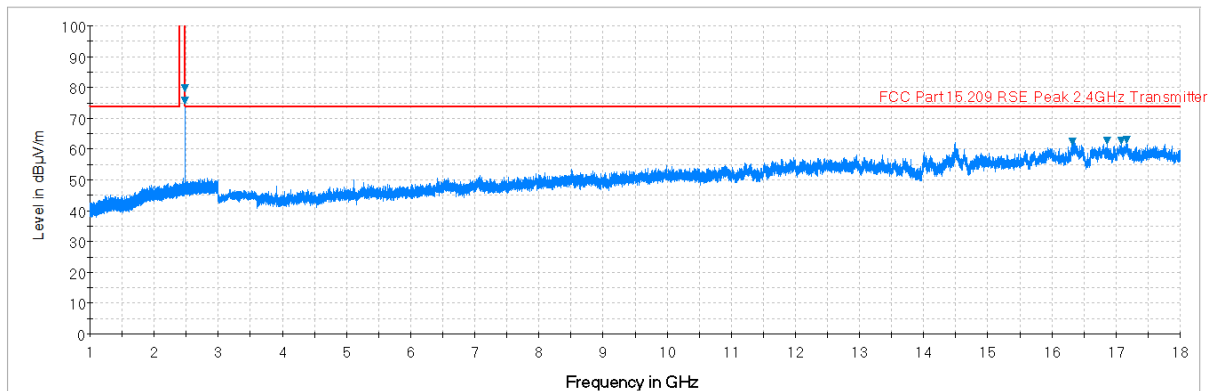
FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 73 of 109





Plot 7-100. Radiated Spurious Plot above 1GHz (EX600-WSV3-X41, Ch. 39, Ant. Pol. V)

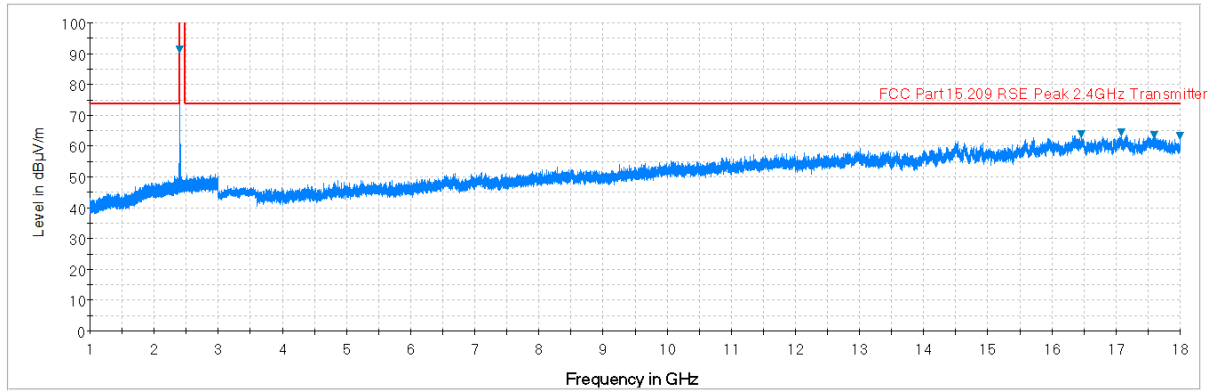


Plot 7-101. Radiated Spurious Plot above 1GHz (EX600-WSV3-X41, Ch. 78, Ant. Pol. H)

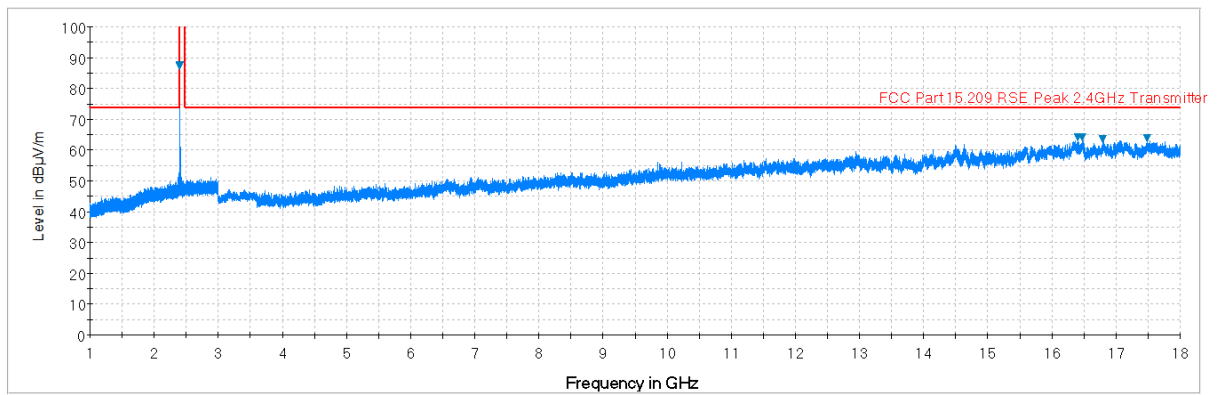


Plot 7-102. Radiated Spurious Plot above 1GHz (EX600-WSV3-X41, Ch. 78, Ant. Pol. V)

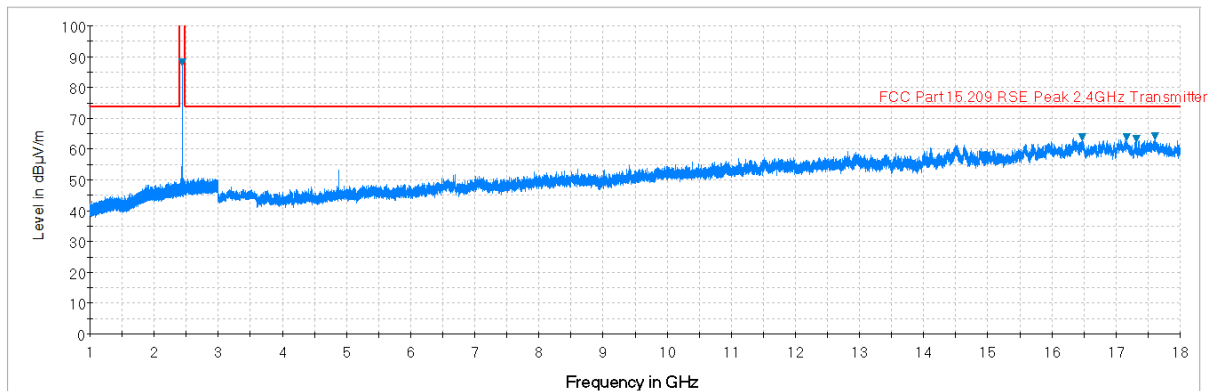
FCC ID: 2AJE7SMC-DIV5	 PCTEST ENGINEERING LABORATORY, INC.		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 74 of 109



Plot 7-103. Radiated Spurious Plot above 1GHz (EX600-WSV4-X41, Ch. 0, Ant. Pol. H)

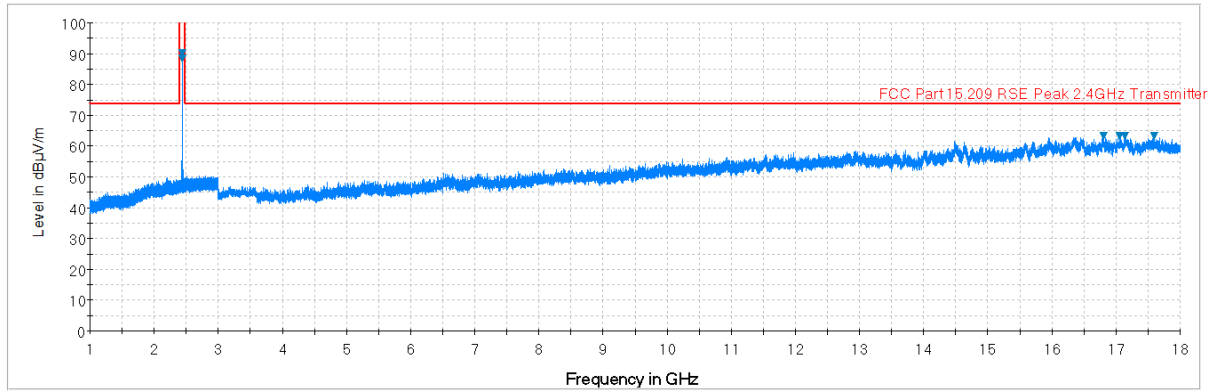


Plot 7-104. Radiated Spurious Plot above 1GHz (EX600-WSV4-X41, Ch. 0, Ant. Pol. V)

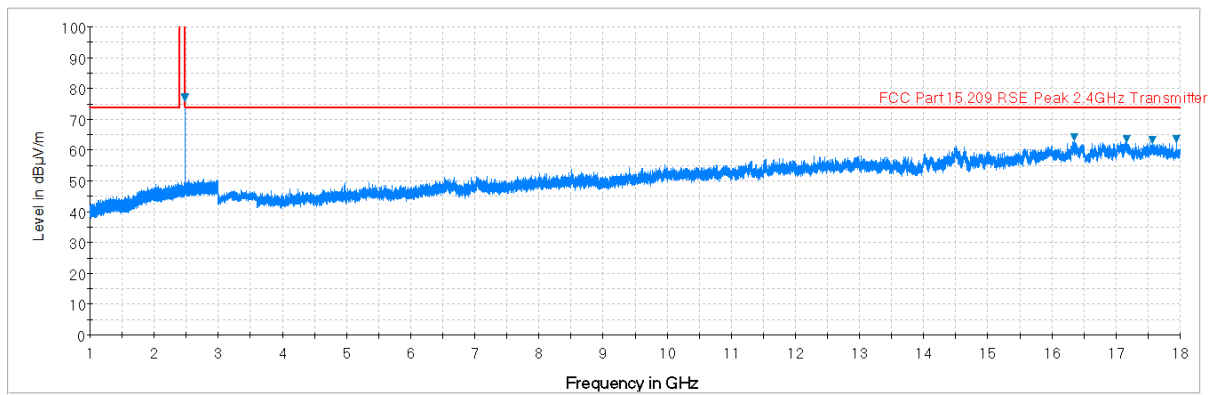


Plot 7-105. Radiated Spurious Plot above 1GHz (EX600-WSV4-X41, Ch. 39, Ant. Pol. H)

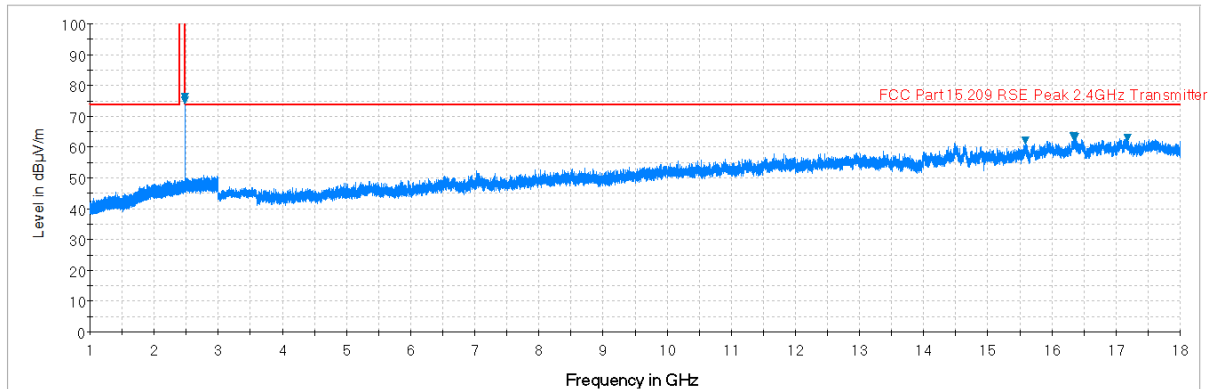
FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 75 of 109



Plot 7-106. Radiated Spurious Plot above 1GHz (EX600-WSV4-X41, Ch. 39, Ant. Pol. V)



Plot 7-107. Radiated Spurious Plot above 1GHz (EX600-WSV4-X41, Ch. 78, Ant. Pol. H)

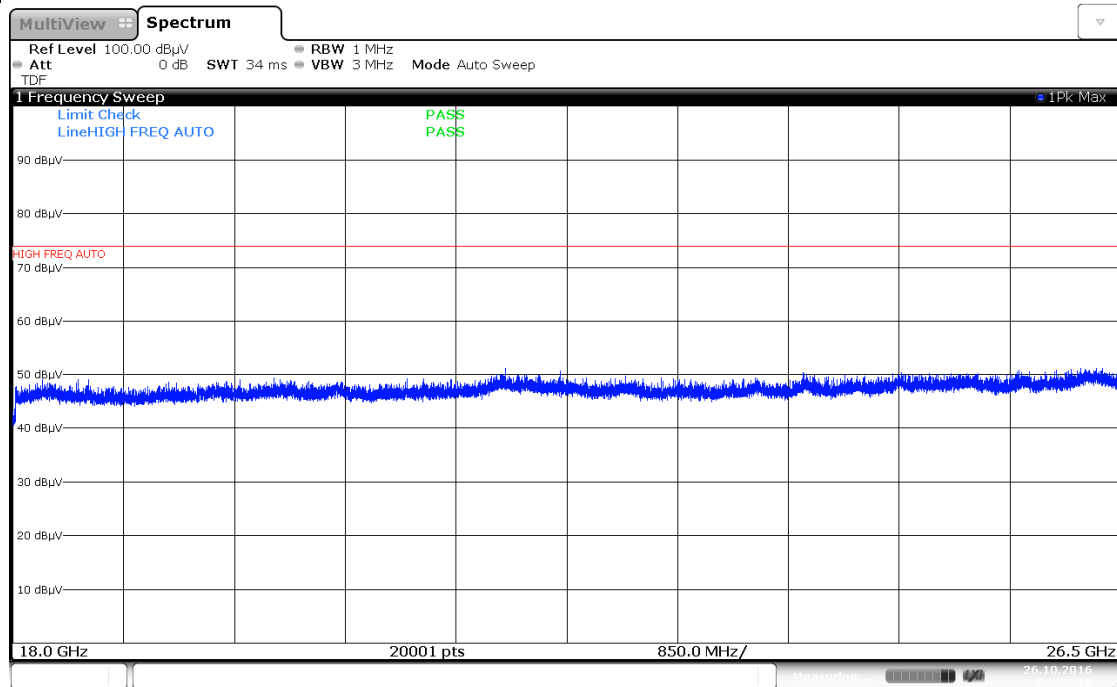


Plot 7-108. Radiated Spurious Plot above 1GHz (EX600-WSV4-X41, Ch. 78, Ant. Pol. V)

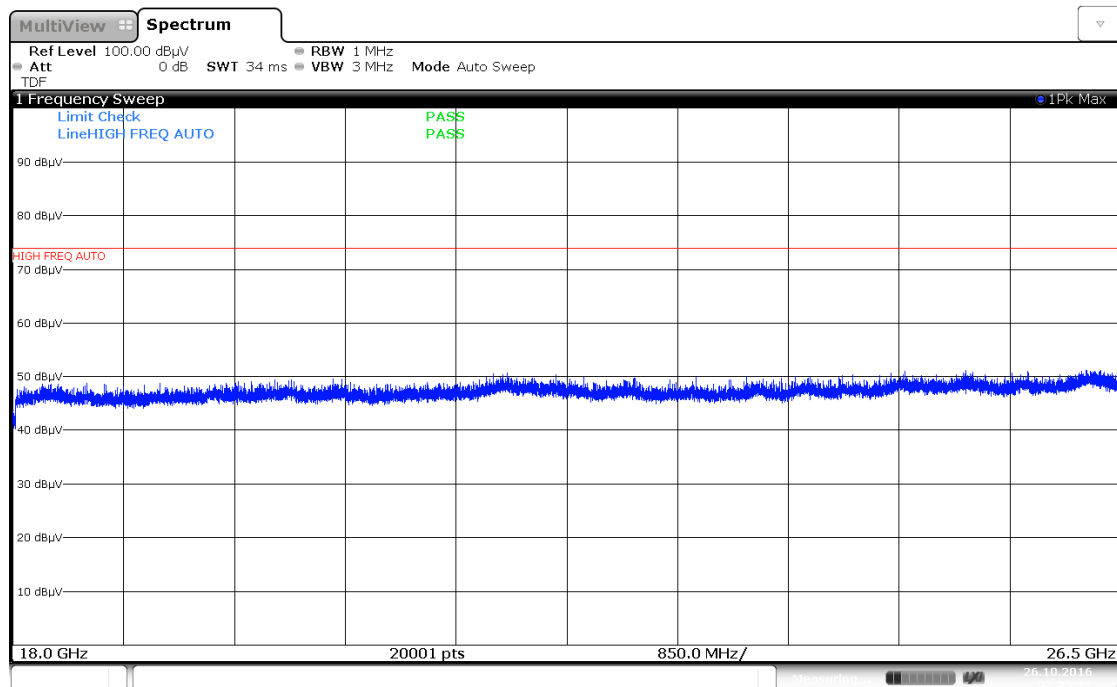
FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 76 of 109

Radiated Spurious Emissions Measurements (Above 18GHz)

\$15.209

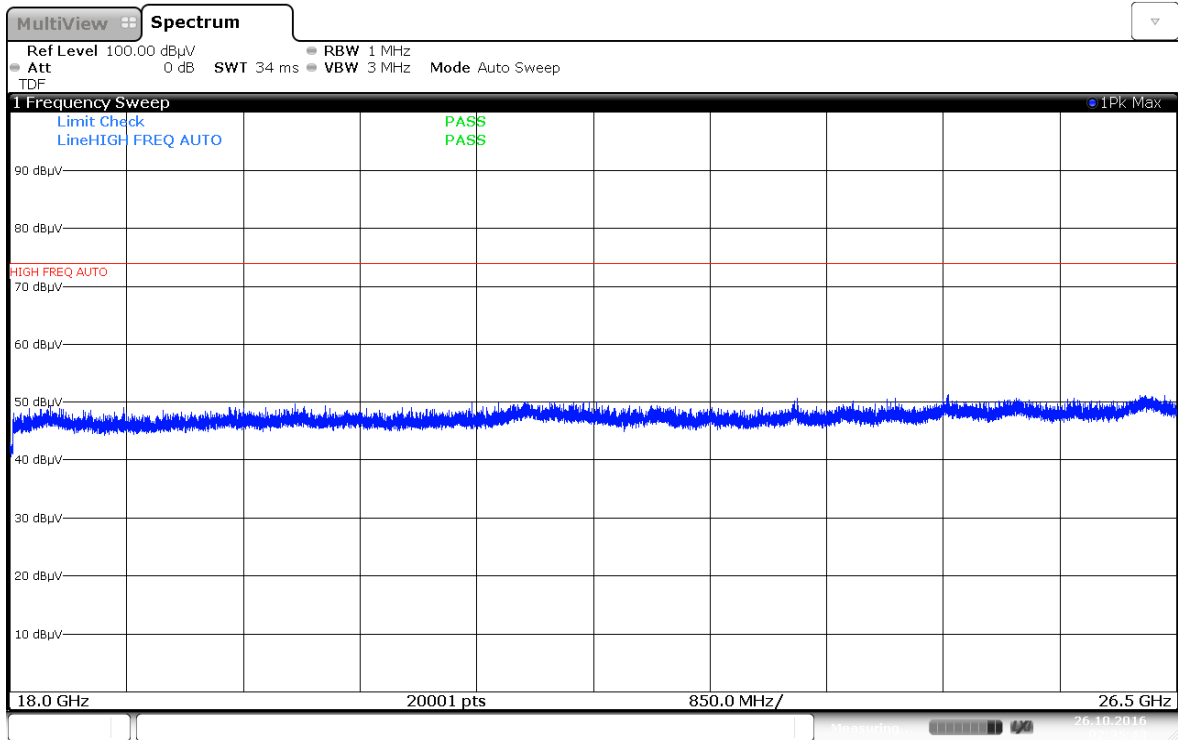


Plot 7-109. Radiated Spurious Plot above 18GHz (EX600-WEN3-X40, Pol. H)

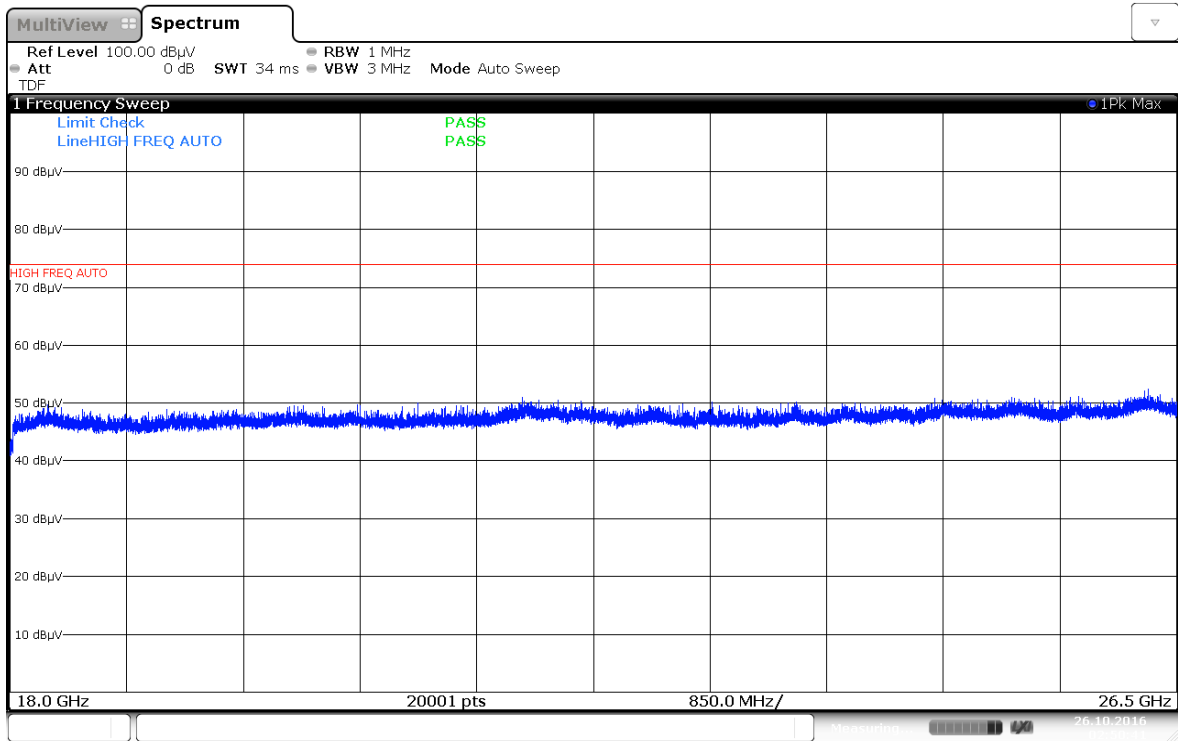


Plot 7-110. Radiated Spurious Plot above 18GHz (EX600-WEN3-X40, Pol. V)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 77 of 109

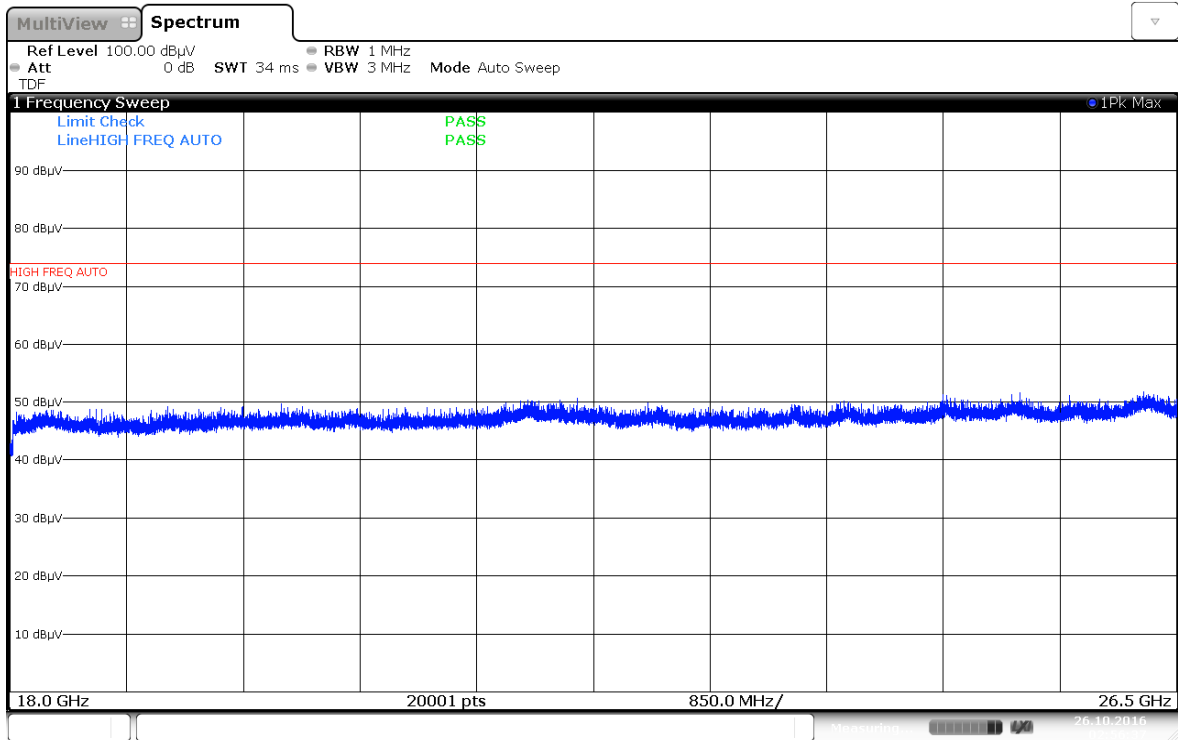


Plot 7-111. Radiated Spurious Plot above 18GHz (EX600-WEN4-X40, Pol. H)

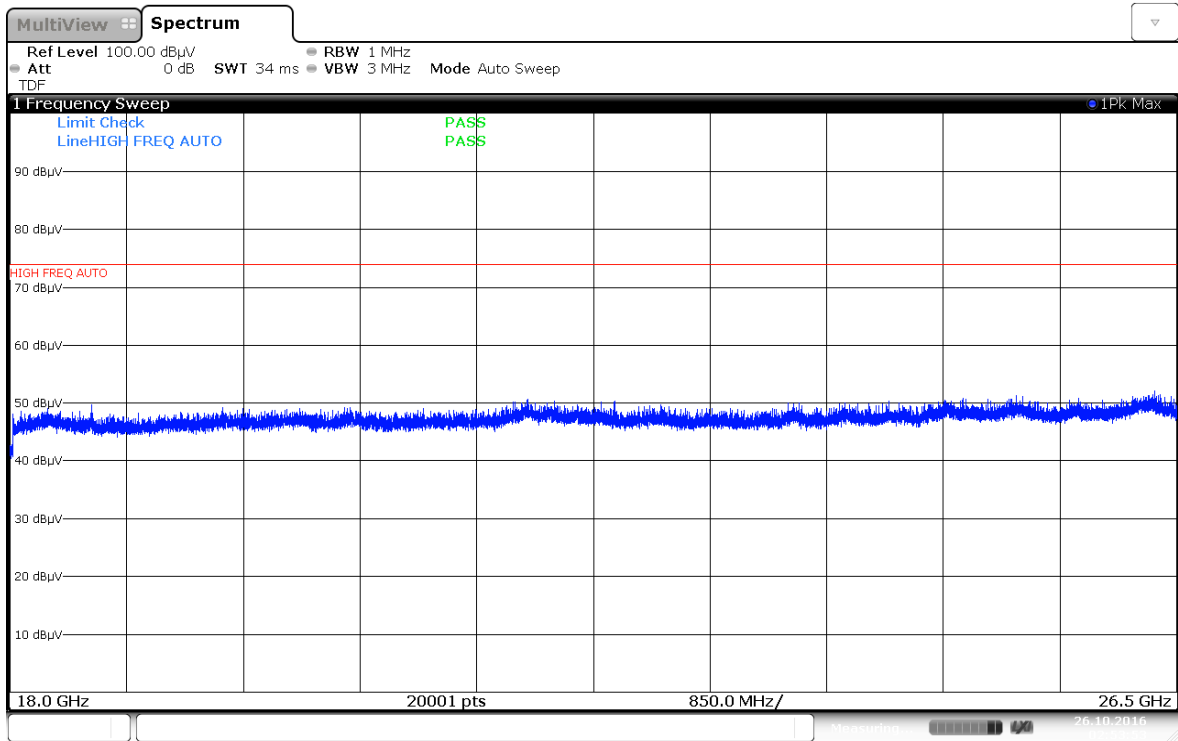


Plot 7-112. Radiated Spurious Plot above 18GHz (EX600-WEN4-X40, Pol. V)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 78 of 109

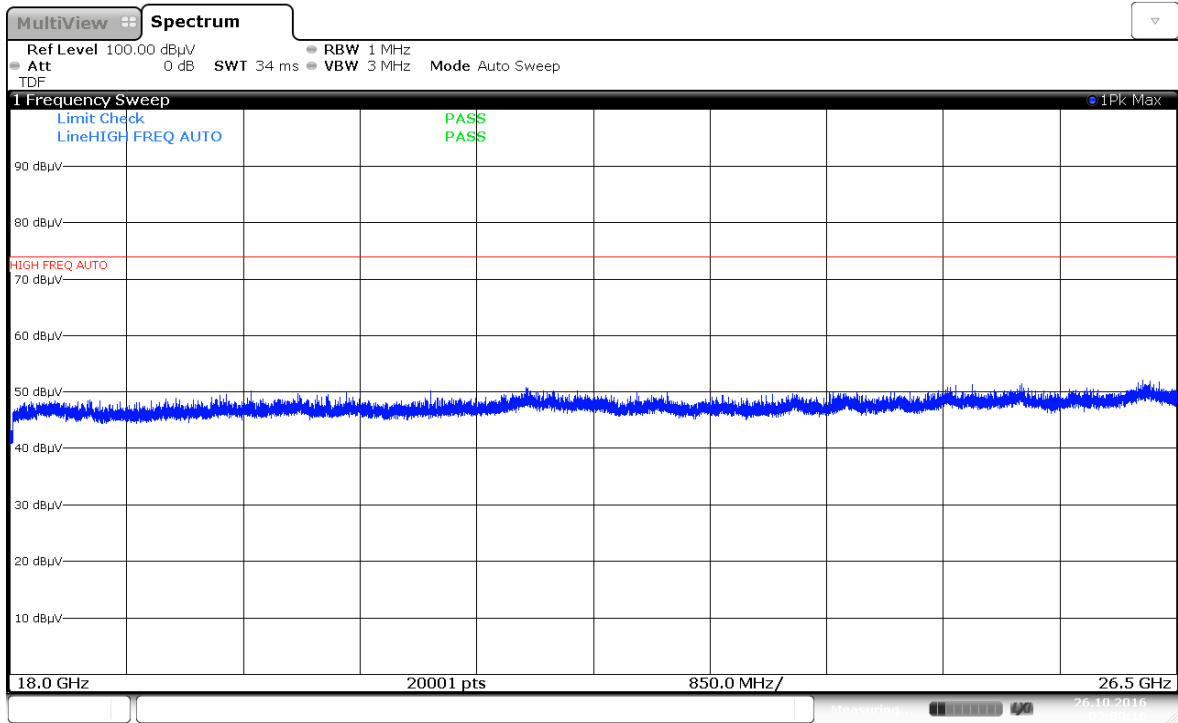


Plot 7-113. Radiated Spurious Plot above 18GHz (EX600-WSV3-X41, Pol. H)

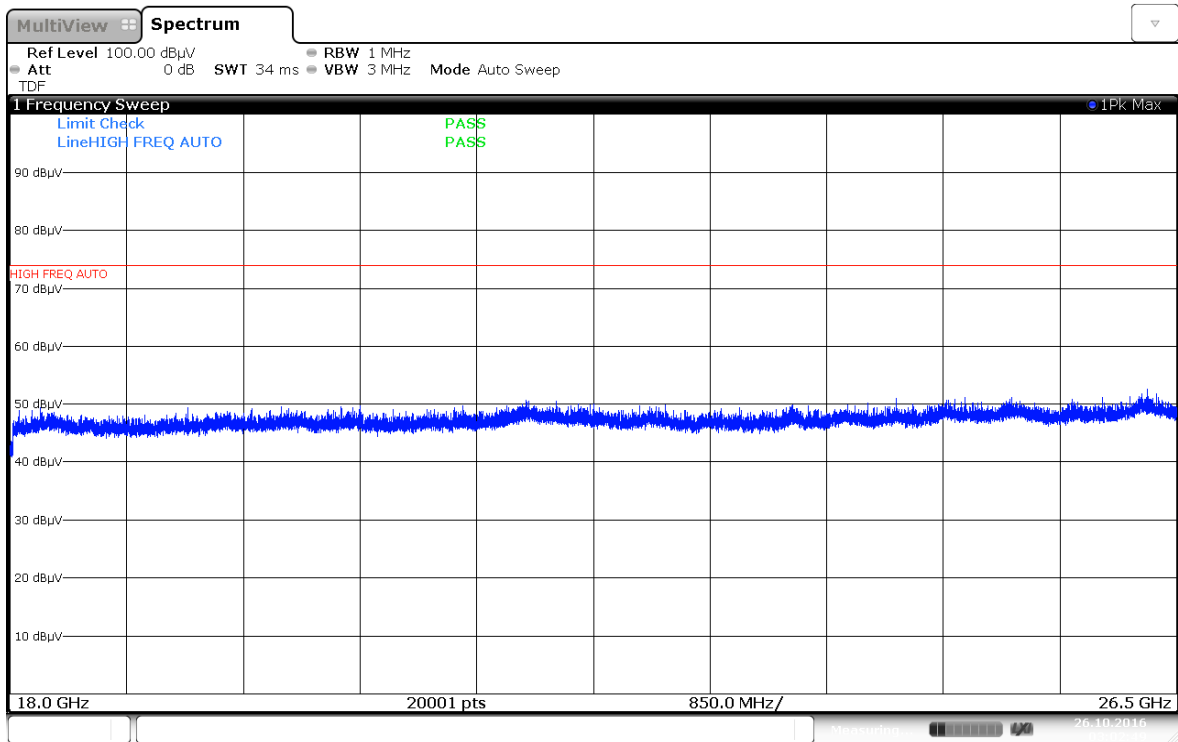


Plot 7-114. Radiated Spurious Plot above 18GHz (EX600-WSV3-X41, Pol. V)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 79 of 109



Plot 7-115. Radiated Spurious Plot above 18GHz (EX600-WSV4-X41, Pol. H)



Plot 7-116. Radiated Spurious Plot above 18GHz (EX600-WSV4-X41, Pol. V)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 80 of 109

Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d)

Measurement Distance: 3 Meters
 Operating Frequency: 2403MHz
 Channel: 0



Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4806.00	Avg	H	297	336	-53.94	0.48	-43.10	10.44	53.98	-43.54
4806.00	Peak	H	297	336	-50.02	0.48	0.00	57.46	73.98	-16.52
12015.00	Avg	H	-	-	-72.05	15.10	0.00	50.05	53.98	-3.93
12015.00	Peak	H	-	-	-58.48	15.10	0.00	63.62	73.98	-10.36

Table 7-16. Radiated Measurements(EX600-WEN3-X40)

Measurement Distance: 3 Meters
 Operating Frequency: 2442MHz
 Channel: 39

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4884.00	Avg	H	256	112	-53.74	0.96	-43.10	11.12	53.98	-42.86
4884.00	Peak	H	256	112	-49.63	0.96	0.00	58.33	73.98	-15.65
7326.00	Avg	H	-	-	-72.16	9.72	0.00	44.56	53.98	-9.42
7326.00	Peak	H	-	-	-58.47	9.72	0.00	58.25	73.98	-15.73
12210.00	Avg	H	-	-	-72.00	15.43	0.00	50.43	53.98	-3.55
12210.00	Peak	H	-	-	-60.43	15.43	0.00	62.00	73.98	-11.98

Table 7-17. Radiated Measurements(EX600-WEN3-X40)

FCC ID: 2AJE7SMC-DIV5			FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d)

Measurement Distance: 3 Meters
 Operating Frequency: 2481MHz
 Channel: 78



Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4962.00	Avg	H	103	7	-60.66	0.73	-43.10	3.97	53.98	-50.01
4962.00	Peak	H	103	7	-53.81	0.73	0.00	53.92	73.98	-20.06
7443.00	Avg	H	-	-	-70.55	10.34	0.00	46.79	53.98	-7.19
7443.00	Peak	H	-	-	-57.19	10.34	0.00	60.15	73.98	-13.83
12405.00	Avg	H	-	-	-72.06	15.08	0.00	50.02	53.98	-3.96
12405.00	Peak	H	-	-	-56.71	15.08	0.00	65.37	73.98	-8.61

Table 7-18. Radiated Measurements(EX600-WEN3-X40)

Measurement Distance: 3 Meters
 Operating Frequency: 2403MHz
 Channel: 0

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4806.00	Avg	H	250	343	-56.17	0.48	-43.10	8.21	53.98	-45.77
4806.00	Peak	H	250	343	-51.60	0.48	0.00	55.88	73.98	-18.10
12015.00	Avg	H	-	-	-73.42	15.10	0.00	48.68	53.98	-5.30
12015.00	Peak	H	-	-	-60.35	15.10	0.00	61.75	73.98	-12.23

Table 7-19. Radiated Measurements(EX600-WEN4-X40)

FCC ID: 2AJE7SMC-DIV5			FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 82 of 109

Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d)

Measurement Distance: 3 Meters
 Operating Frequency: 2442MHz
 Channel: 39

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4884.00	Avg	H	326	348	-58.45	0.96	-43.10	6.41	53.98	-47.57
4884.00	Peak	H	326	348	-54.79	0.96	0.00	53.17	73.98	-20.81
7326.00	Avg	H	-	-	-72.11	9.72	0.00	44.61	53.98	-9.37
7326.00	Peak	H	-	-	-58.45	9.72	0.00	58.27	73.98	-15.71
12210.00	Avg	H	-	-	-73.69	15.43	0.00	48.74	53.98	-5.24
12210.00	Peak	H	-	-	-60.44	15.43	0.00	61.99	73.98	-11.99

Table 7-20. Radiated Measurements(EX600-WEN4-X40)

Measurement Distance: 3 Meters
 Operating Frequency: 2481MHz
 Channel: 78

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4962.00	Avg	H	199	12	-61.20	0.73	-43.10	3.43	53.98	-50.55
4962.00	Peak	H	199	12	-54.25	0.73	0.00	53.48	73.98	-20.50
7443.00	Avg	H	-	-	-71.74	10.34	0.00	45.60	53.98	-8.38
7443.00	Peak	H	-	-	-59.45	10.34	0.00	57.89	73.98	-16.09
12405.00	Avg	H	-	-	-72.02	15.08	0.00	50.06	53.98	-3.92
12405.00	Peak	H	-	-	-59.89	15.08	0.00	62.19	73.98	-11.79

Table 7-21. Radiated Measurements(EX600-WEN4-X40)

Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d)

Measurement Distance: 3 Meters
 Operating Frequency: 2403MHz
 Channel: 0



Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4806.00	Avg	H	225	347	-56.83	0.48	-43.10	7.55	53.98	-46.43
4806.00	Peak	H	225	347	-52.71	0.48	0.00	54.77	73.98	-19.21
12015.00	Avg	H	-	-	-73.42	15.10	0.00	48.68	53.98	-5.30
12015.00	Peak	H	-	-	-60.51	15.10	0.00	61.59	73.98	-12.39

Table 7-22. Radiated Measurements(EX600-WSV3-X41)

Measurement Distance: 3 Meters
 Operating Frequency: 2442MHz
 Channel: 39

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4884.00	Avg	H	228	353	-58.95	0.96	-43.10	5.91	53.98	-48.07
4884.00	Peak	H	228	353	-54.45	0.96	0.00	53.51	73.98	-20.47
7326.00	Avg	H	-	-	-72.13	9.72	0.00	44.59	53.98	-9.39
7326.00	Peak	H	-	-	-58.55	9.72	0.00	58.17	73.98	-15.81
12210.00	Avg	H	-	-	-73.21	15.43	0.00	49.22	53.98	-4.76
12210.00	Peak	H	-	-	-60.33	15.43	0.00	62.10	73.98	-11.88

Table 7-23. Radiated Measurements(EX600-WSV3-X41)

FCC ID: 2AJE7SMC-DIV5			FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 84 of 109

Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d)

Measurement Distance: 3 Meters
 Operating Frequency: 2481MHz
 Channel: 78



Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4962.00	Avg	H	191	4	-60.50	0.73	-43.10	4.13	53.98	-49.85
4962.00	Peak	H	191	4	-54.10	0.73	0.00	53.63	73.98	-20.35
7443.00	Avg	H	-	-	-72.02	10.34	0.00	45.32	53.98	-8.66
7443.00	Peak	H	-	-	-59.62	10.34	0.00	57.72	73.98	-16.26
12405.00	Avg	H	-	-	-72.15	15.08	0.00	49.93	53.98	-4.05
12405.00	Peak	H	-	-	-59.23	15.08	0.00	62.85	73.98	-11.13

Table 7-24. Radiated Measurements(EX600-WSV3-X41)

Measurement Distance: 3 Meters
 Operating Frequency: 2403MHz
 Channel: 0

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4806.00	Avg	H	285	349	-56.36	0.48	-43.10	8.02	53.98	-45.96
4806.00	Peak	H	285	349	-52.17	0.48	0.00	55.31	73.98	-18.67
12015.00	Avg	H	-	-	-73.42	15.10	0.00	48.68	53.98	-5.30
12015.00	Peak	H	-	-	-60.54	15.10	0.00	61.56	73.98	-12.42

Table 7-25. Radiated Measurements(EX600-WSV4-X41)

FCC ID: 2AJE7SMC-DIV5			FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 85 of 109

Radiated Spurious Emission Measurements

§15.205 §15.209 §15.247 (d)

Measurement Distance: 3 Meters
 Operating Frequency: 2442MHz
 Channel: 39



Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4884.00	Avg	H	250	355	-57.17	0.96	-43.10	7.69	53.98	-46.29
4884.00	Peak	H	250	355	-53.02	0.96	0.00	54.94	73.98	-19.04
7326.00	Avg	H	-	-	-72.17	9.72	0.00	44.55	53.98	-9.43
7326.00	Peak	H	-	-	-58.64	9.72	0.00	58.08	73.98	-15.90
12210.00	Avg	H	-	-	-73.83	15.43	0.00	48.60	53.98	-5.38
12210.00	Peak	H	-	-	-60.56	15.43	0.00	61.87	73.98	-12.11

Table 7-26. Radiated Measurements(EX600-WSV4-X41)

Measurement Distance: 3 Meters
 Operating Frequency: 2481MHz
 Channel: 78

Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Duty Cycle Correction [dB]	Field Strength [dBμV/m]	Limit [dBμV/m]	Margin [dB]
4962.00	Avg	-	230	164	-59.81	0.73	-43.10	4.82	53.98	-49.16
4962.00	Peak	-	230	164	-54.12	0.73	0.00	53.61	73.98	-20.37
7443.00	Avg	-	-	-	-71.91	10.34	0.00	45.43	53.98	-8.55
7443.00	Peak	-	-	-	-59.25	10.34	0.00	58.09	73.98	-15.89
12405.00	Avg	-	-	-	-72.21	15.08	0.00	49.87	53.98	-4.11
12405.00	Peak	-	-	-	-59.40	15.08	0.00	62.68	73.98	-11.30

Table 7-27. Radiated Measurements(EX600-WSV4-X41)

FCC ID: 2AJE7SMC-DIV5			FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
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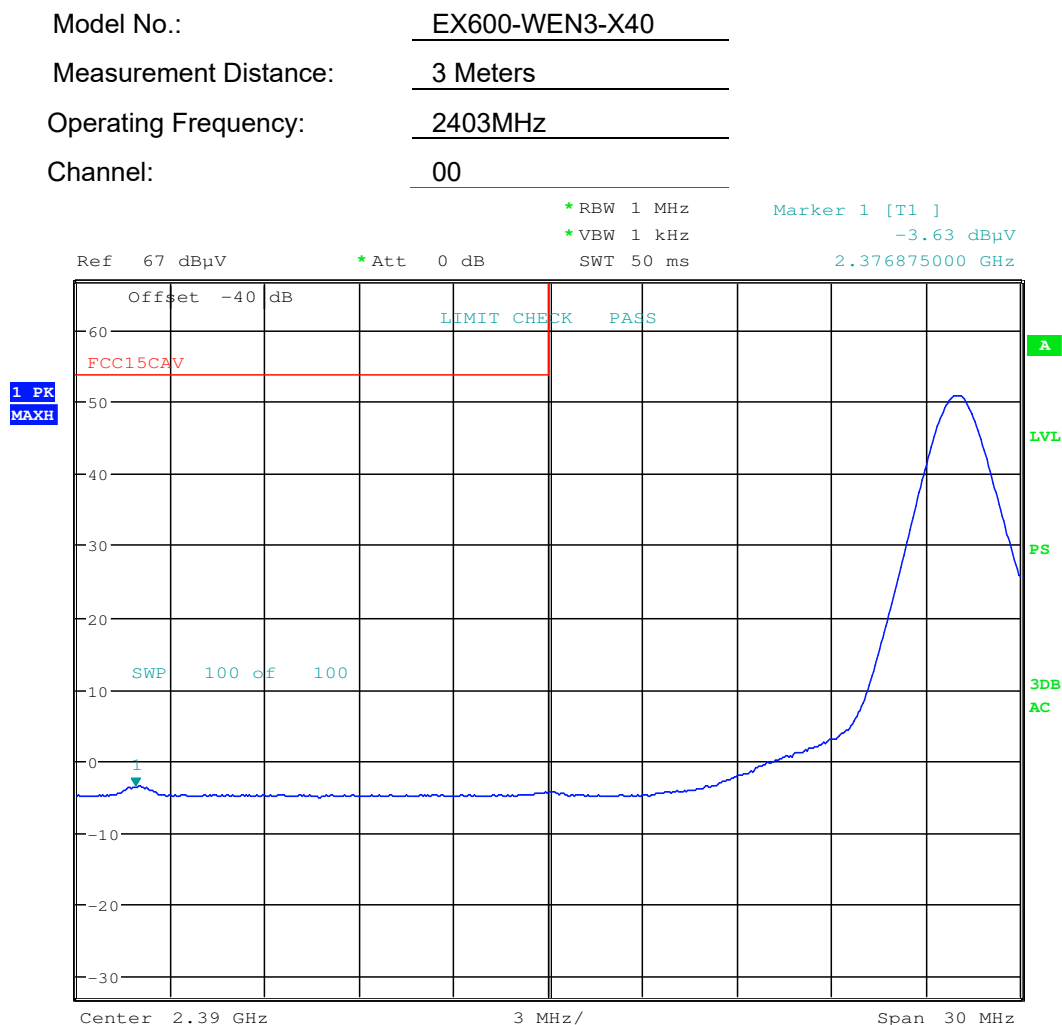
7.10 Radiated Restricted Band Edge Measurements

§15.205 §15.209 §15.247 (d)

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:

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



Date: 31.OCT.2016 15:06:23

Plot 7-117. Radiated Restricted Lower Band Edge Measurement (Average)

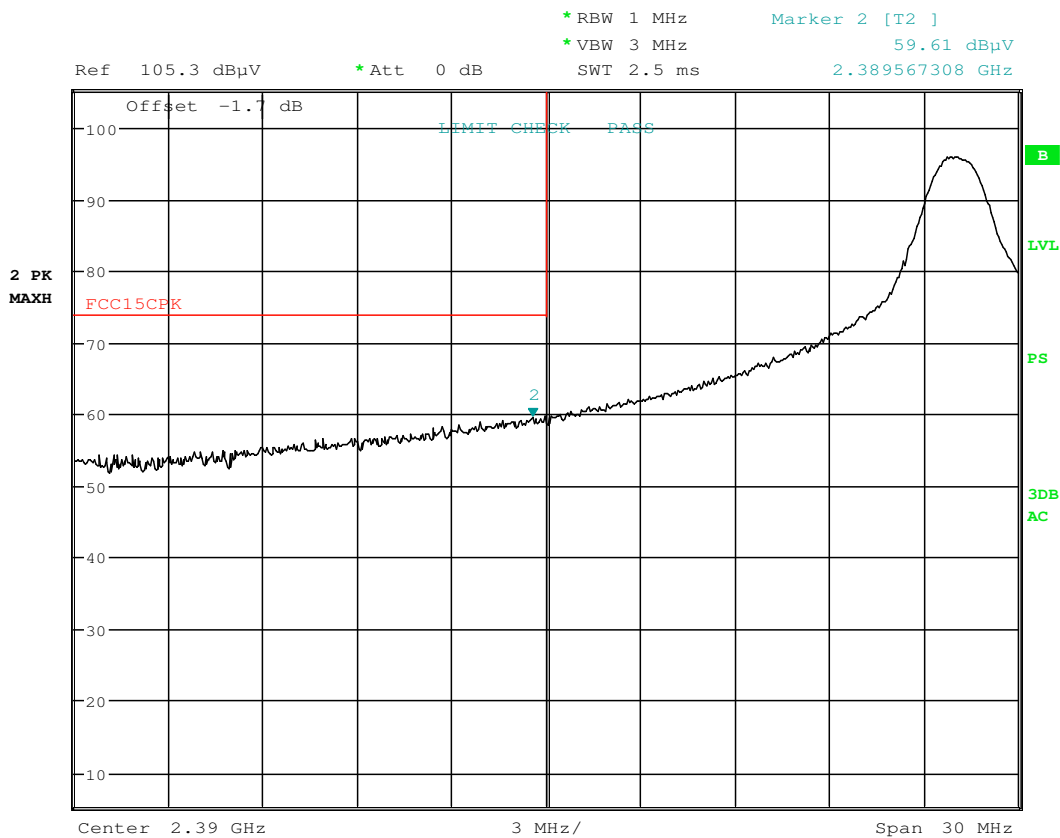
FCC ID: 2AJE7SMC-DIV5	 FCC Pt. 15.247 TEST REPORT (CERTIFICATION)			Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device	Page 87 of 109	

Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 §15.209 §15.247 (d)

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

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



Date: 24.OCT.2016 21:58:10

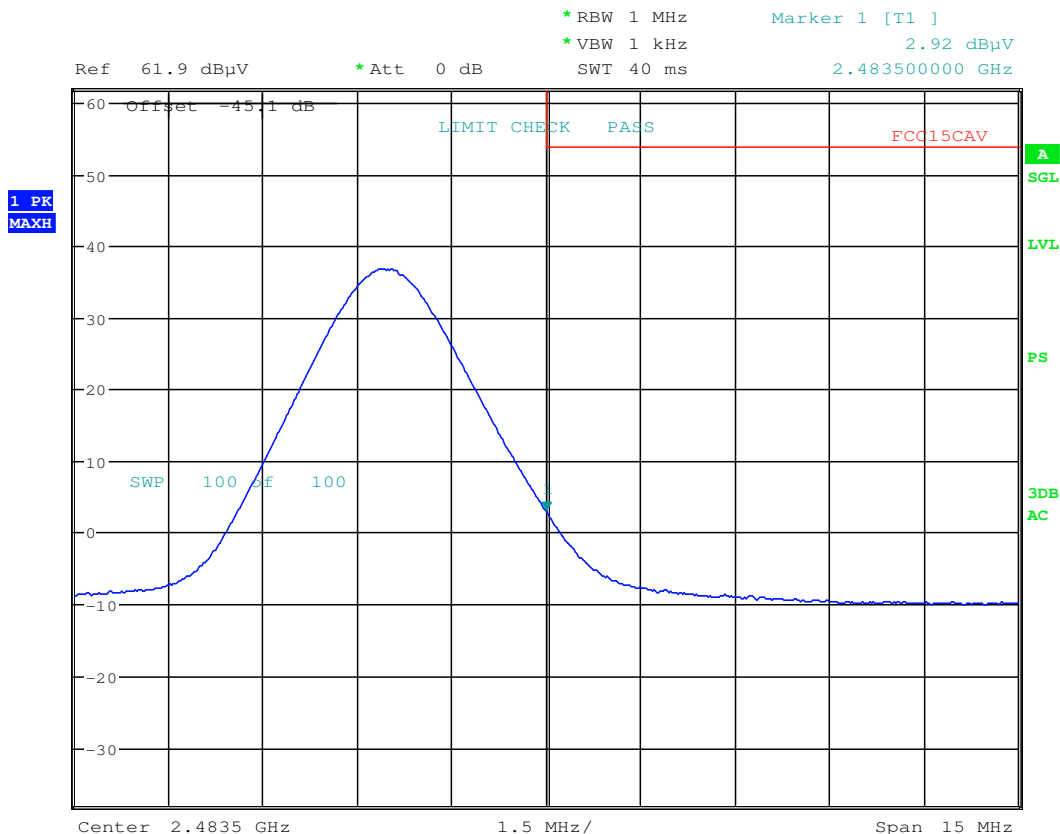
Plot 7-118. Radiated Restricted Lower Band Edge Measurement (Peak)

FCC ID: 2AJE7SMC-DIV5	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)			Reviewed by: Quality Manager
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Radiated Restricted Band Edge Measurements (Cont'd)



§15.205 §15.209 §15.247 (d)

Model: EX600-WEN3-X40
 Measurement Distance: 3 Meters
 Operating Frequency: 2481MHz
 Channel: 78



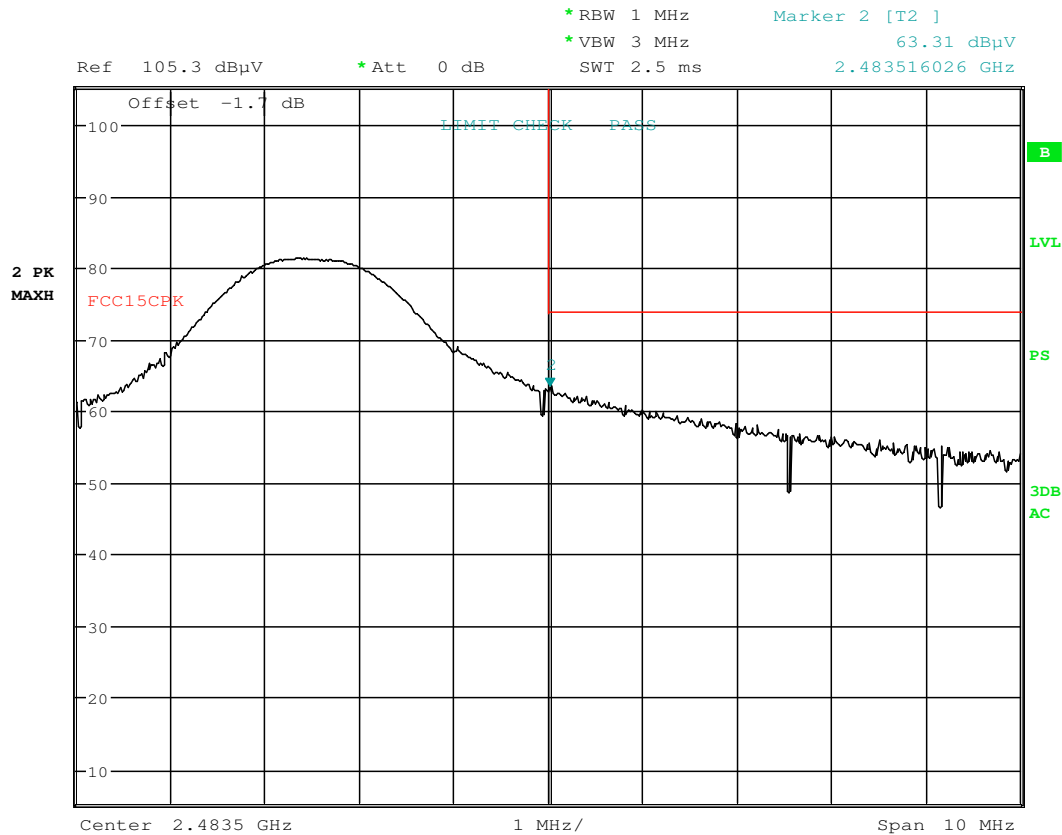
Date: 24.OCT.2016 22:36:19

Plot 7-119. Radiated Restricted Upper Band Edge Measurement (Average)

FCC ID: 2AJE7SMC-DIV5	 FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		 Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device	Page 89 of 109

Radiated Restricted Band Edge Measurements (Cont'd)

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Date: 24.OCT.2016 22:39:48

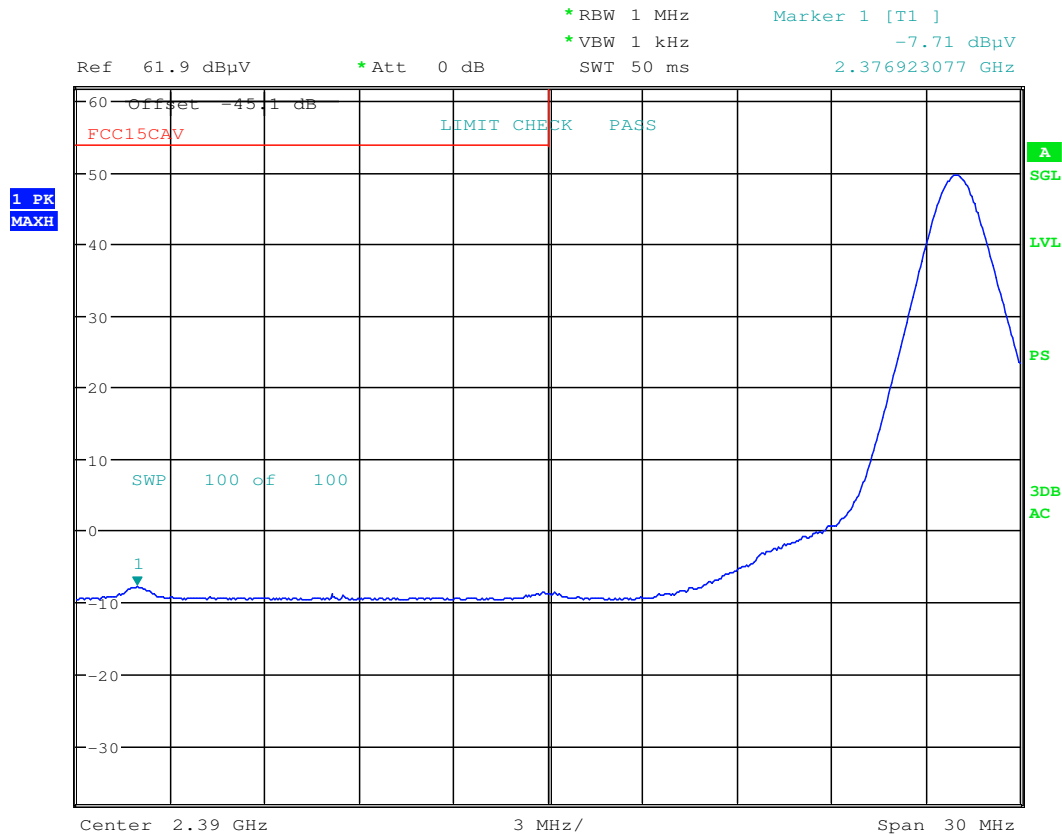
Plot 7-120. Radiated Restricted Upper Band Edge Measurement (Peak)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 90 of 109

Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 §15.209 §15.247 (d)

Model: EX600-WEN4-X40
 Measurement Distance: 3 Meters
 Operating Frequency: 2403MHz
 Channel: 00



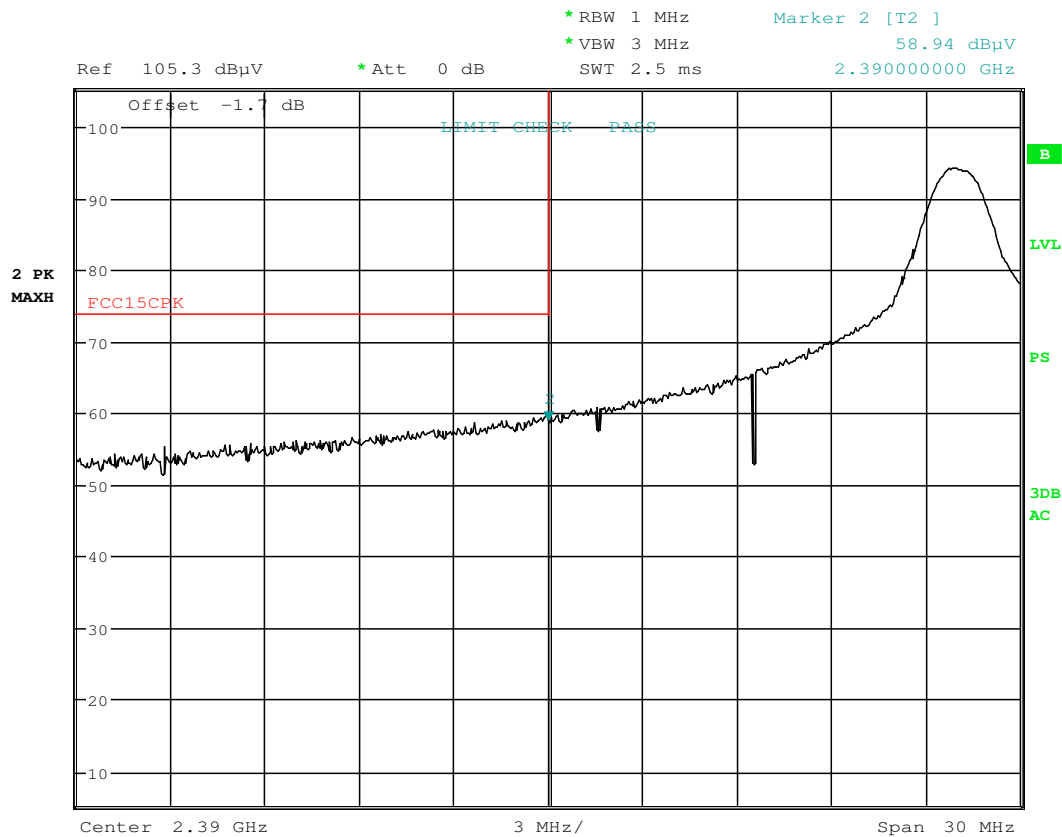
Date: 25.OCT.2016 00:09:33

Plot 7-121. Radiated Restricted Lower Band Edge Measurement (Average)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
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Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 §15.209 §15.247 (d)



Date: 25.OCT.2016 00:11:14

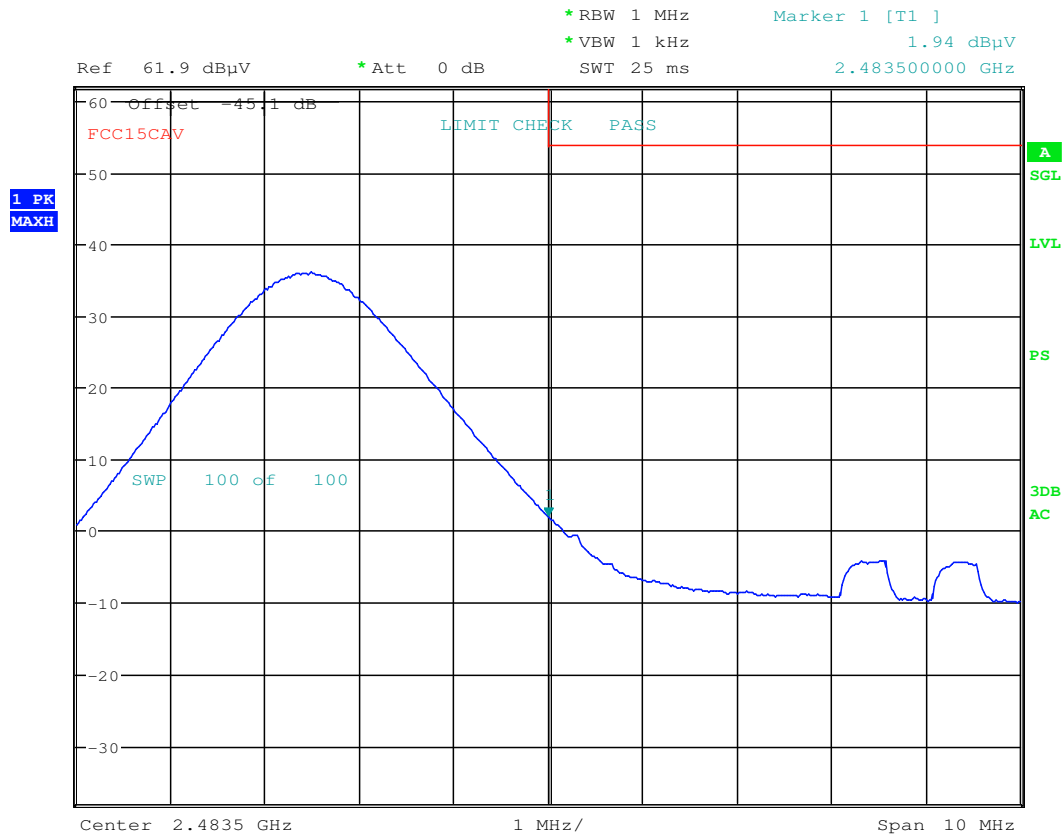
Plot 7-122. Radiated Restricted Lower Band Edge Measurement (Peak)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
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Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 §15.209 §15.247 (d)

Model: EX600-WEN4-X40
 Measurement Distance: 3 Meters
 Operating Frequency: 2481MHz
 Channel: 78



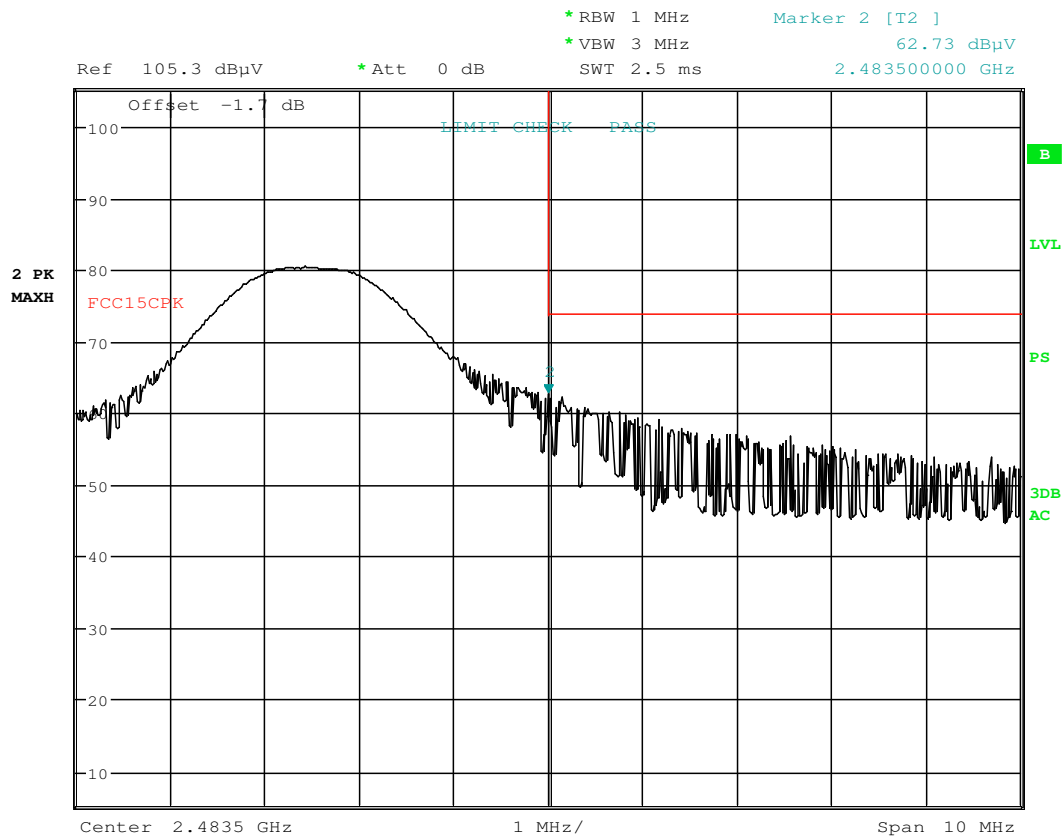
Date: 24.OCT.2016 23:56:30

Plot 7-123. Radiated Restricted Upper Band Edge Measurement (Average)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 93 of 109

Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 §15.209 §15.247 (d)



Date: 24.OCT.2016 23:58:12

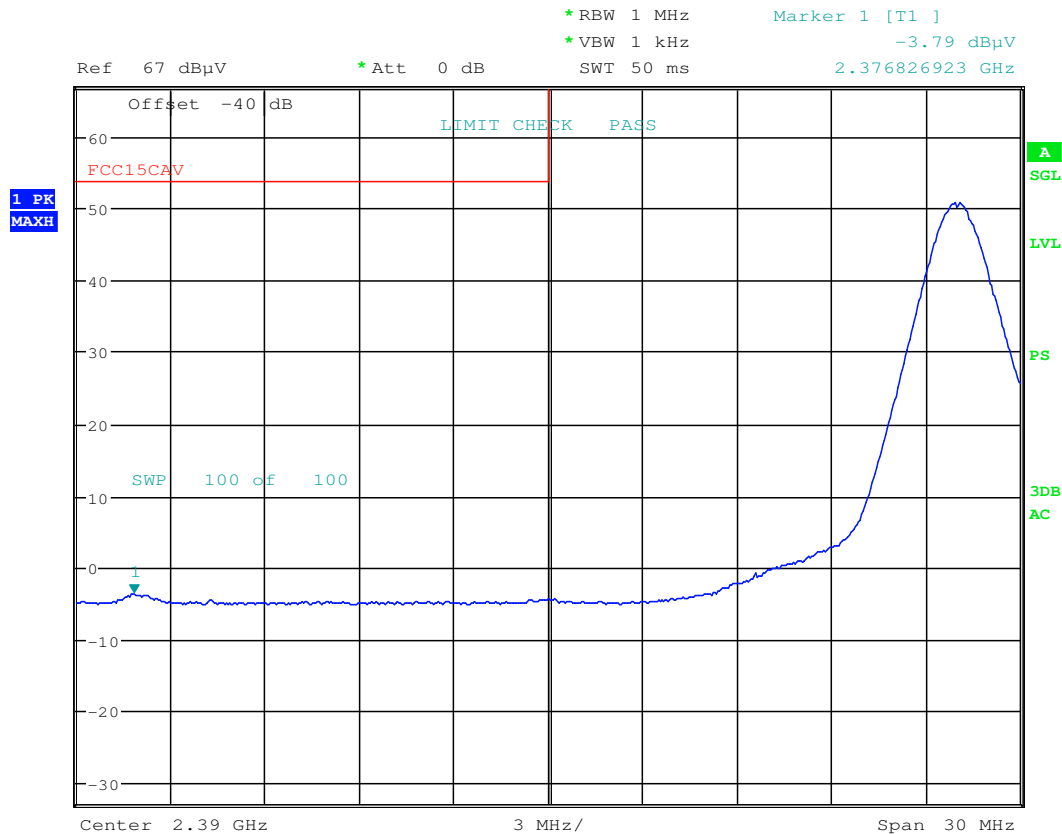
Plot 7-124. Radiated Restricted Upper Band Edge Measurement (Peak)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 94 of 109

Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 §15.209 §15.247 (d)

Model: EX600-WSV3-X41
 Measurement Distance: 3 Meters
 Operating Frequency: 2403MHz
 Channel: 00



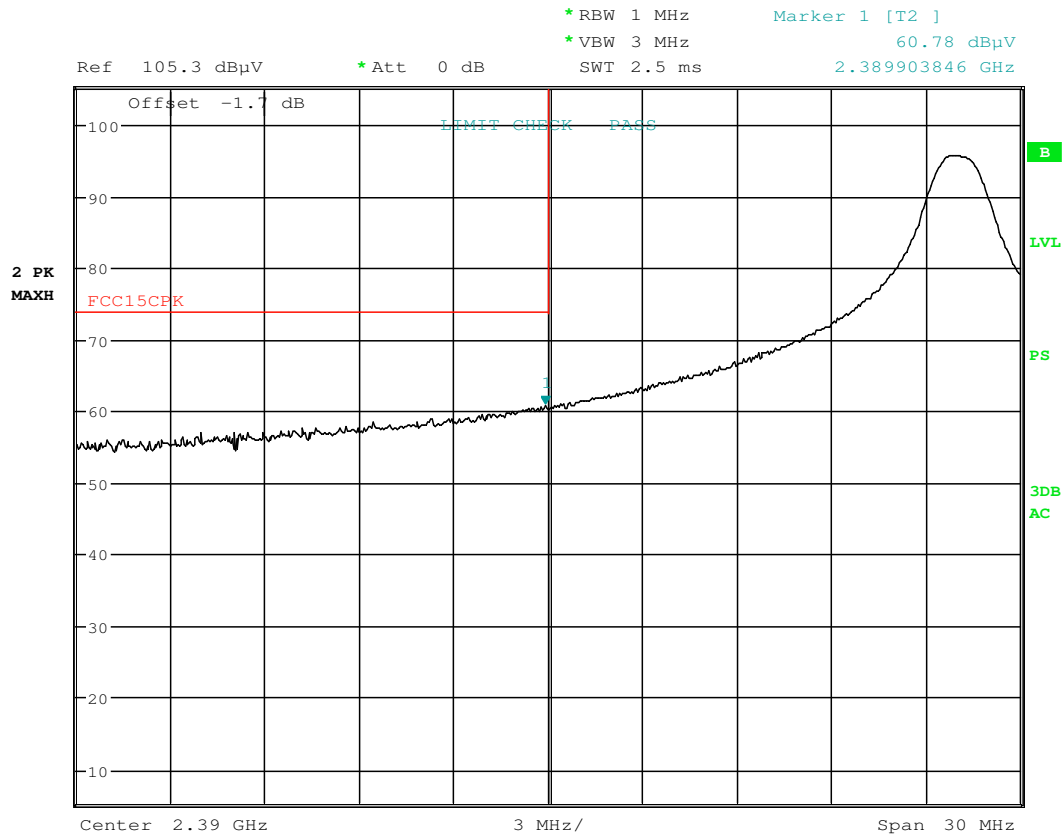
Date: 31.OCT.2016 15:03:38

Plot 7-125. Radiated Restricted Lower Band Edge Measurement (Average)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 95 of 109

Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 §15.209 §15.247 (d)



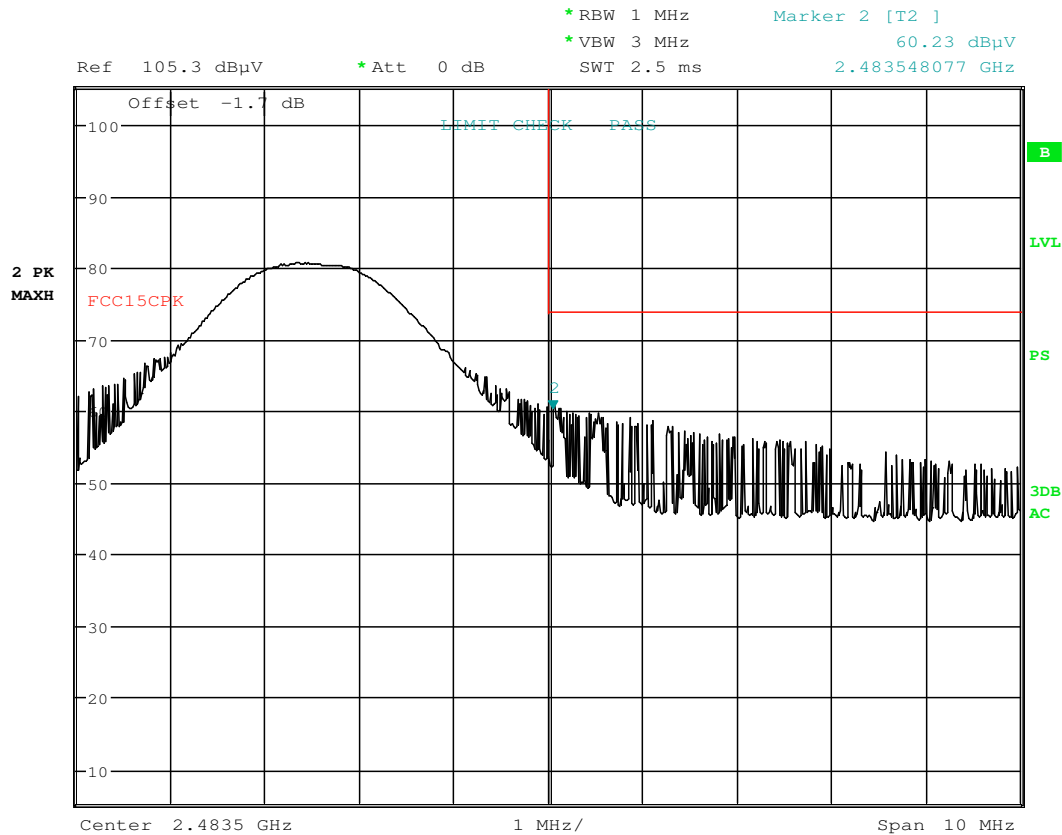
Date: 24.OCT.2016 21:43:15

Plot 7-126. Radiated Restricted Lower Band Edge Measurement (Peak)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 96 of 109

Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 §15.209 §15.247 (d)



Date: 24.OCT.2016 23:14:31

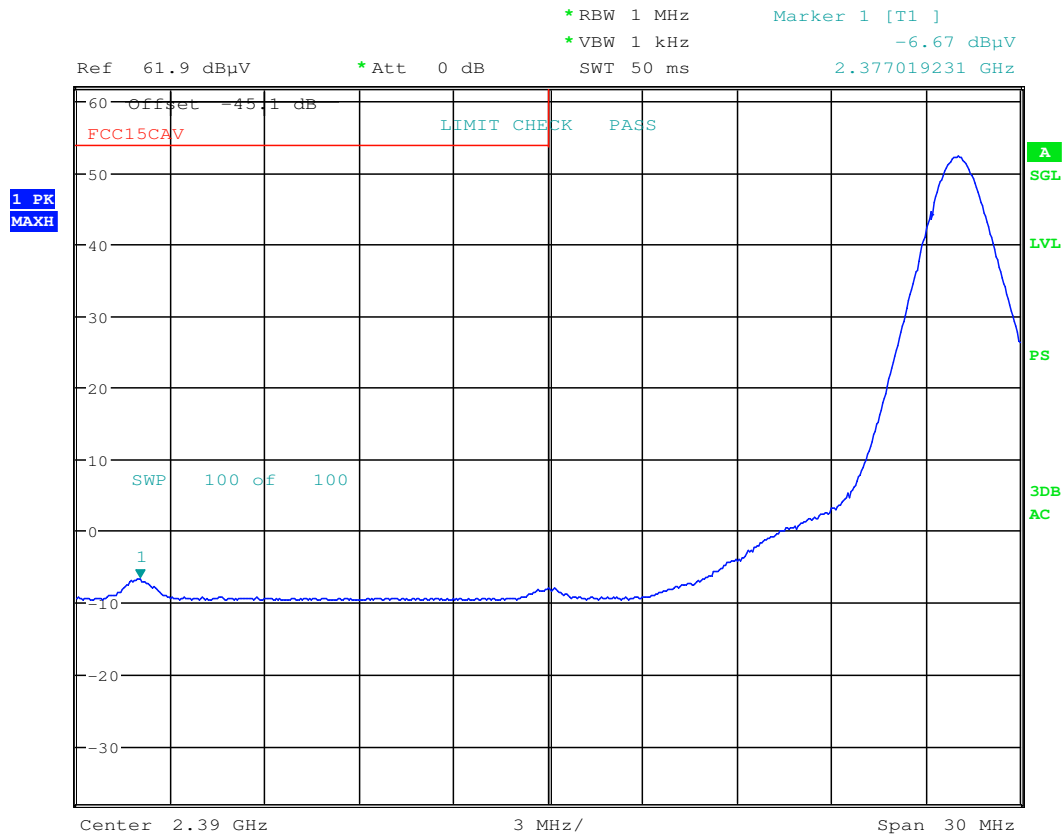
Plot 7-128. Radiated Restricted Upper Band Edge Measurement (Peak)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 98 of 109

Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 §15.209 §15.247 (d)

Model: EX600-WSV4-X41
 Measurement Distance: 3 Meters
 Operating Frequency: 2403MHz
 Channel: 00



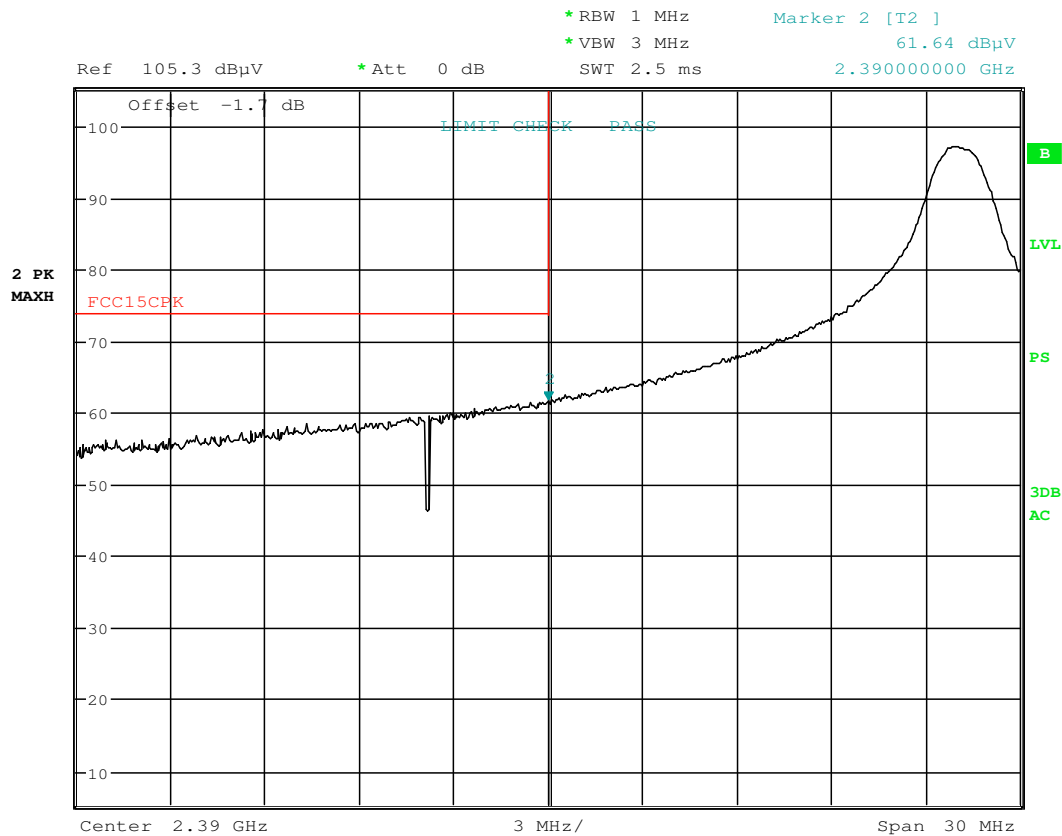
Date: 24.OCT.2016 23:31:25

Plot 7-129. Radiated Restricted Lower Band Edge Measurement (Average)

FCC ID: 2AJE7SMC-DIV5	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)			Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device	Page 99 of 109	

Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 §15.209 §15.247 (d)



Date: 24.OCT.2016 23:30:18

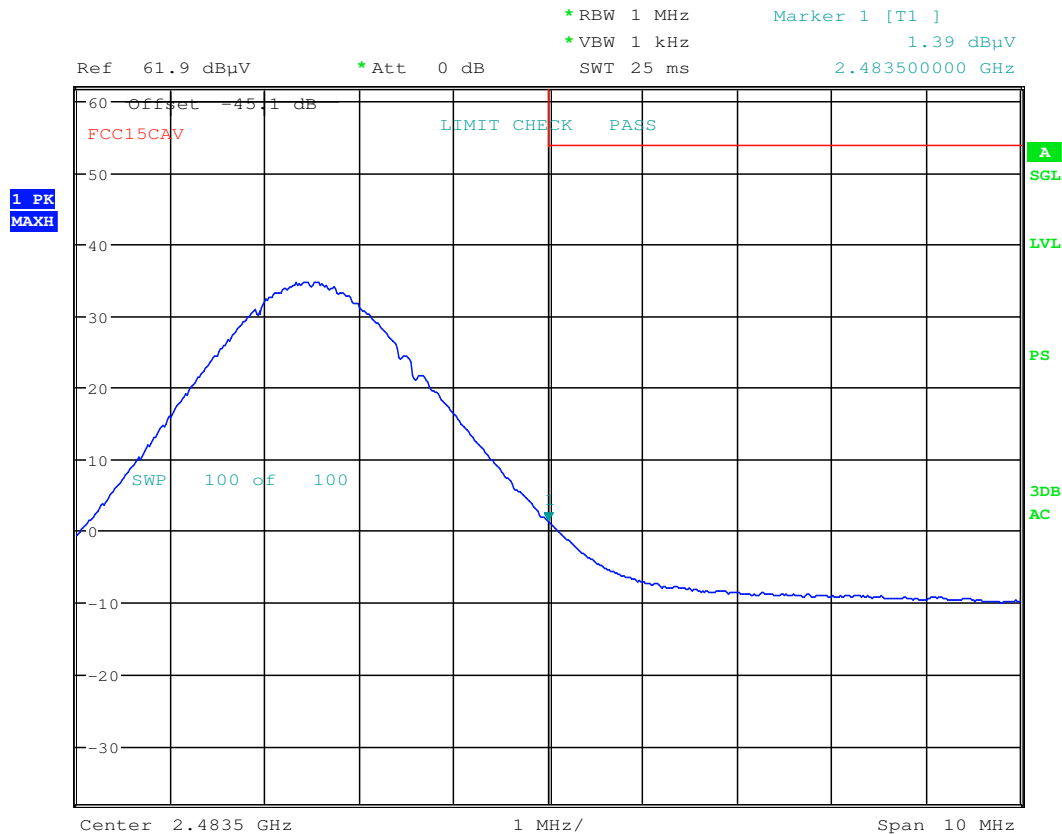
Plot 7-130. Radiated Restricted Lower Band Edge Measurement (Peak)

FCC ID: 2AJE7SMC-DIV5			FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 100 of 109

Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 §15.209 §15.247 (d)

Model: EX600-WSV4-X41
 Measurement Distance: 3 Meters
 Operating Frequency: 2481MHz
 Channel: 78



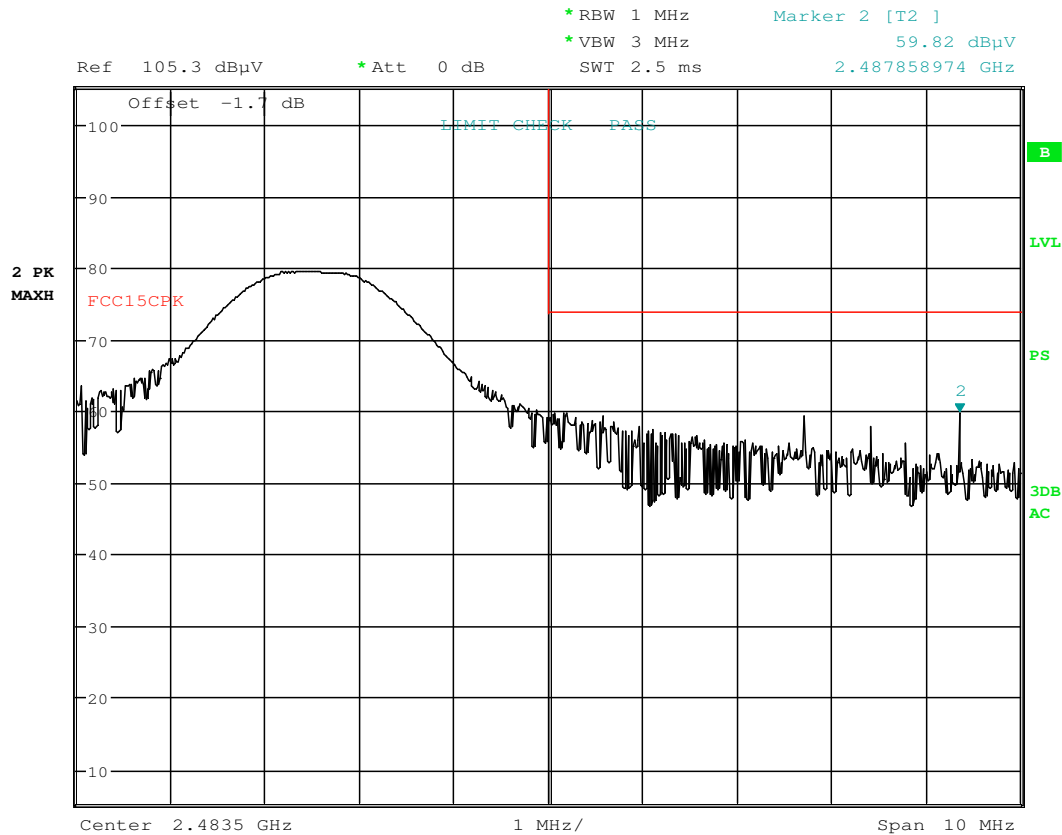
Date: 24.OCT.2016 23:48:27

Plot 7-131. Radiated Restricted Upper Band Edge Measurement (Average)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
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Radiated Restricted Band Edge Measurements (Cont'd)

§15.205 §15.209 §15.247 (d)



Date: 24.OCT.2016 23:48:06

Plot 7-132. Radiated Restricted Upper Band Edge Measurement (Peak)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
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7.11 Radiated Spurious Emissions Measurements – Below 1GHz

§15.209

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for radiated spurious emissions. Only the radiated emissions of the configuration that produced the worst case emissions are reported in this section.

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table 7-28 per Section 15.209.

Frequency	Field Strength [μ V/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 7-28. Radiated Limits



Test Procedures Used

ANSI C63.10-2013

Test Settings

Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize

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Test Setup

The EUT and measurement equipment were set up as shown in the diagrams below.

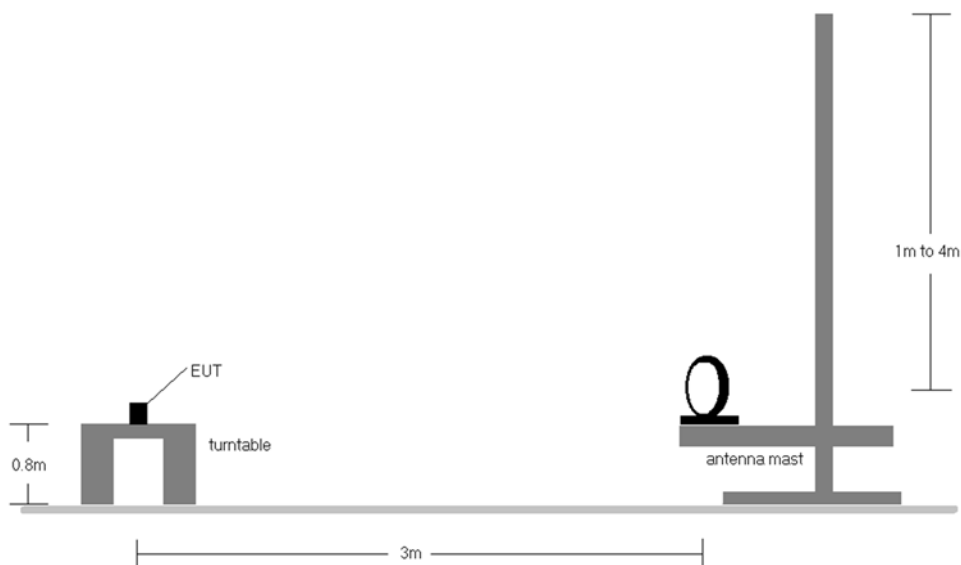


Figure 7-9. Radiated Test Setup < 30Mhz

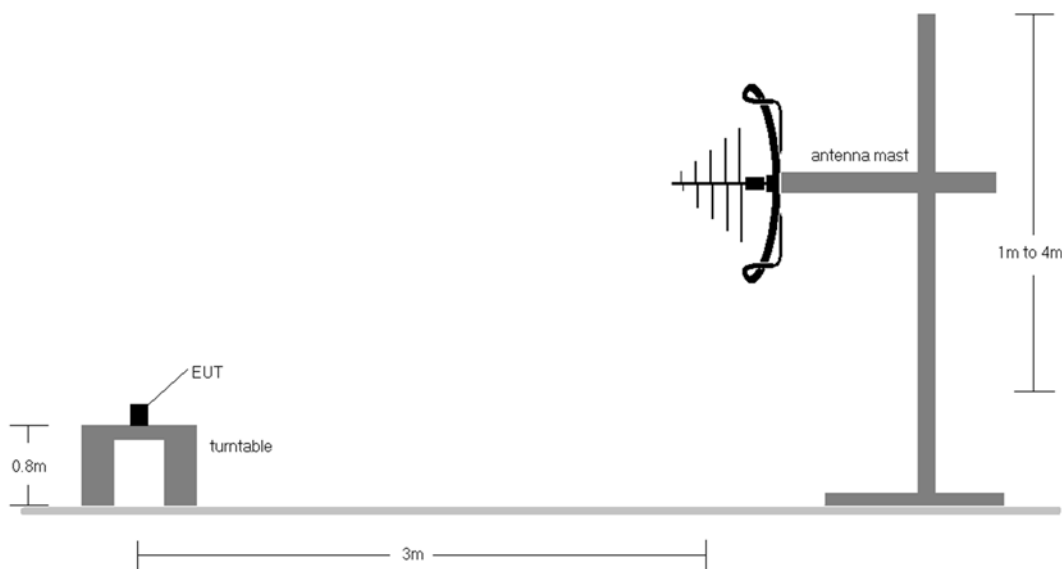




Figure 7-10. Radiated Test Setup < 1GHz

Test Notes

1. All emissions lying in restricted bands specified in §15.205 are below the limit shown in Table 7-28.
2. The broadband receive antenna is manipulated through vertical and horizontal polarizations during the tests. The EUT is manipulated through three orthogonal planes.
3. This unit was tested while powered by an DC power source.

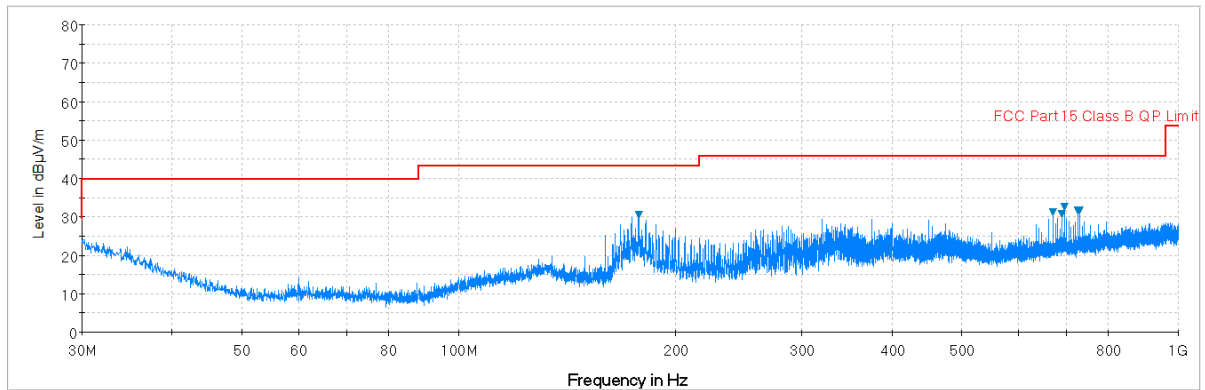
FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
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4. The spectrum is investigated using a peak detector and final measurements are recorded using CISPR quasi peak detector. The worst-case emissions are reported however emissions whose levels were not within 20dB of the respective limits were not reported.
5. Emissions were measured at a 3 meter test distance.
6. Emissions are investigated while operating on the center channel of the mode, band, and modulation that produced the worst case results during the transmitter spurious emissions testing.
7. No spurious emissions were detected within 20dB of the limit below 30MHz.
8. The results recorded using the broadband antenna is known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
9. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. There were no emissions detected in the 30MHz – 1GHz frequency range, as shown in the subsequent plots.

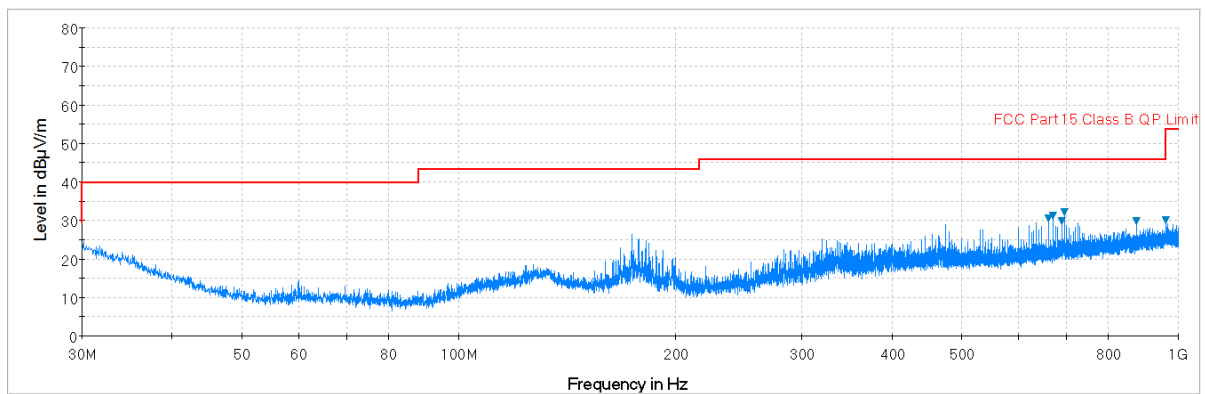
FCC ID: 2AJE7SMC-DIV5	 PCTEST ENGINEERING LABORATORY, INC.		FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device			Page 105 of 109

Radiated Spurious Emissions Measurements (Below 1GHz)

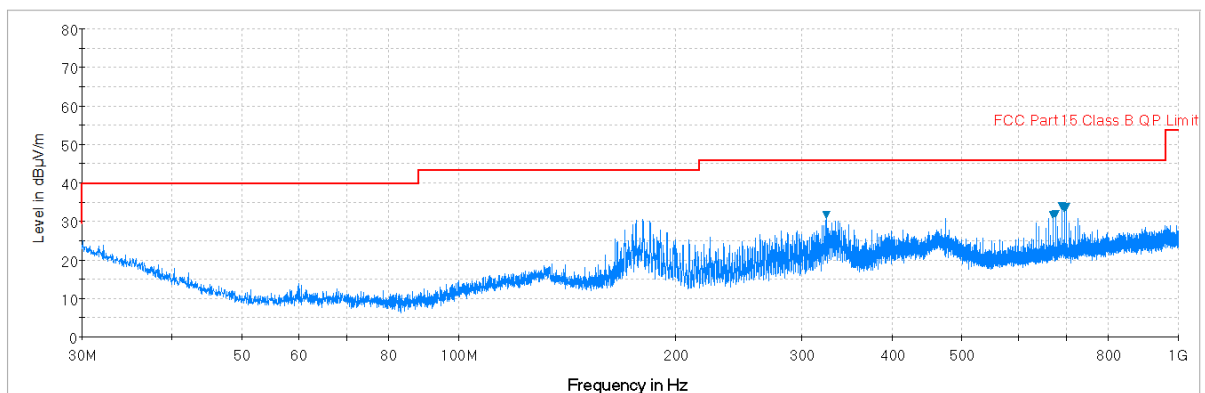
§15.209



Plot 7-133. Radiated Spurious Plot below 1GHz (EX600-WEN3-X40, Ch. 39, Pol. H)

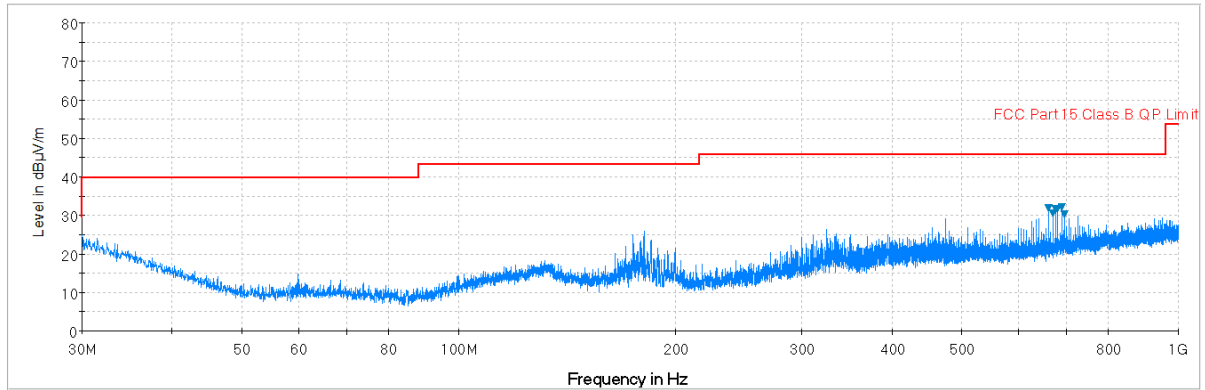


Plot 7-134. Radiated Spurious Plot below 1GHz (EX600-WEN3-X40, Ch. 39, Pol. V)

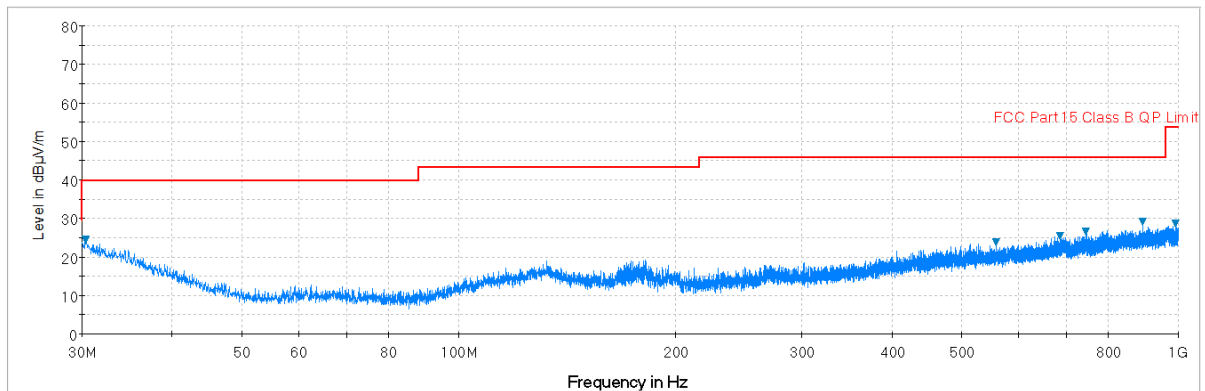


Plot 7-135. Radiated Spurious Plot below 1GHz (EX600-WEN4-X40, Ch. 39, Pol. H)

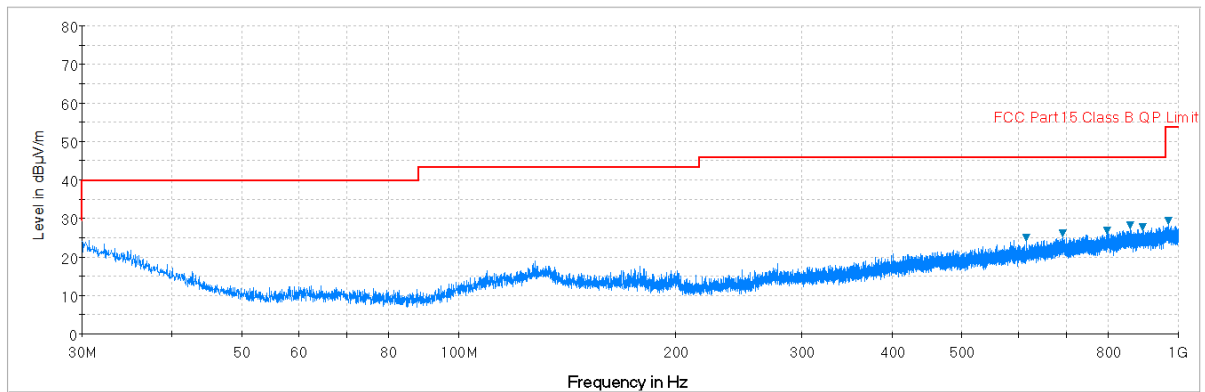
FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 106 of 109



Plot 7-136. Radiated Spurious Plot below 1GHz (EX600-WEN4-X40, Ch. 39, Pol. V)

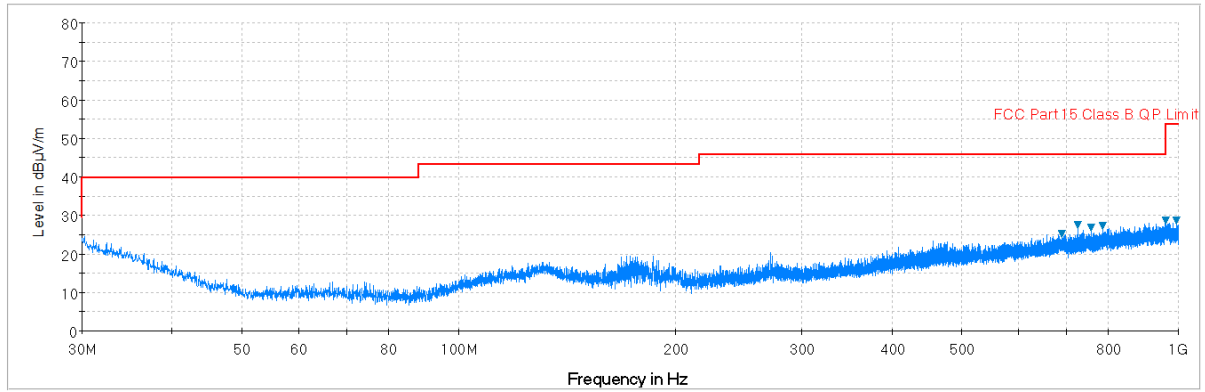


Plot 7-137. Radiated Spurious Plot below 1GHz (EX600-WSV3-X41, Ch. 39, Pol. H)

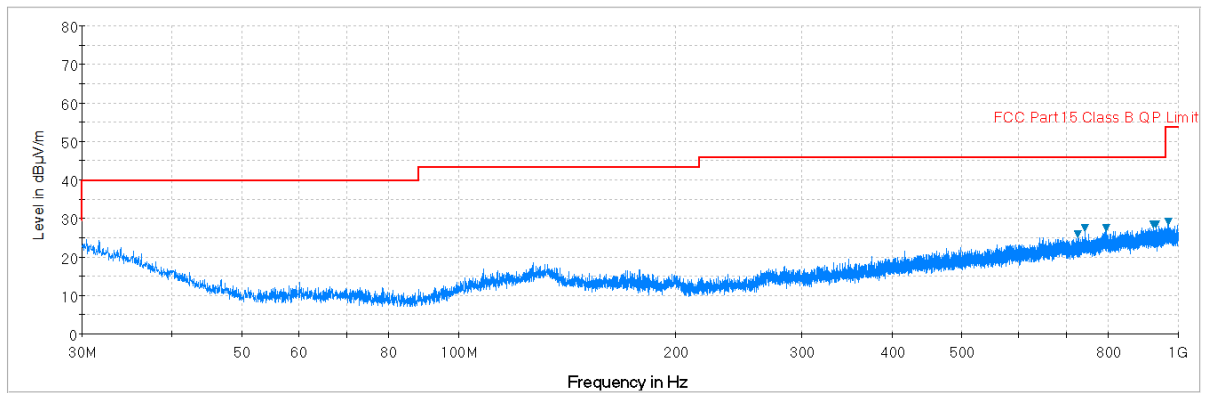


Plot 7-138. Radiated Spurious Plot below 1GHz (EX600-WSV3-X41, Ch. 39, Pol. V)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
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Plot 7-139. Radiated Spurious Plot below 1GHz (EX600-WSV4-X41, Ch. 39, Pol. H)





Plot 7-140. Radiated Spurious Plot below 1GHz (EX600-WSV4-X41, Ch. 39, Pol. V)

FCC ID: 2AJE7SMC-DIV5	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)	SVC	Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 108 of 109

8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the **SMC Wireless System Wireless I/O Device FCC ID: 2AJE7SMC-DIV5** is in compliance with Part 15 Subpart C (15.247) of the FCC Rules.

FCC ID: 2AJE7SMC-DIV5	 PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.247 TEST REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1610131618-R1.2AJE7	Test Dates: 10/18-11/28/2016	EUT Type: Wireless I/O Device		Page 109 of 109