

# ltron, Inc.

REVISED TEST REPORT TO 103786-2

**ORRNC**  
**Model: RN-EGM**

**Tested to The Following Standards:**

**FCC Part 15 Subpart C Section(s)**

**15.207 & 15.247**  
**(DTS 2400-2483.5 MHz)**

**Report No.: 103786-2A**

**Date of issue: July 16, 2020**



**Test Certificate # 803.01**

This test report bears the accreditation symbol indicating that the testing performed herein meets the test and reporting requirements of ISO/IEC 17025 under the applicable scope of testing for CKC Laboratories, Inc.

We strive to create long-term, trust based relationships by providing sound, adaptive, customer first testing services. We embrace each of our customers' unique EMC challenges, not as an interruption to set processes, but rather as the reason we are in business.

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## ADMINISTRATIVE INFORMATION

### Test Report Information

**REPORT PREPARED FOR:**

Ittron, Inc.  
2111 N. Molter Road  
Liberty Lake, WA 99019

Representative: Jay Holcomb  
Customer Reference Number: 205550

**DATE OF EQUIPMENT RECEIPT:****DATE(S) OF TESTING:****REPORT PREPARED BY:**

Darcy Thompson  
CKC Laboratories, Inc.  
5046 Sierra Pines Drive  
Mariposa, CA 95338

Project Number: 103786

May 7, 2020

May 7-15, 2020 and July 7 and 10, 2020

### Revision History

**Original:** Testing of the ORRNC Model: RN-EGM to FCC Part 15 Subpart C Section(s) 15.207 & 15.247 (DTS 2400-2483.5 MHz).

**Revision A:** Updated the test equipment table in Section 15.247(b)(3) Power Output, revised calculation statements in Sections 15.247(b)(3) Power Output and Section 15.247(e) PSD and replaced Section 15.247(d) Band Edge results table, plot data and datasheet. Added new test dates.

### Report Authorization

The test data contained in this report documents the observed testing parameters pertaining to and are relevant for only the equipment provided by the client, tested in the agreed upon operational mode(s) and configuration(s) as identified herein. Compliance assessment remains the client's responsibility. This report may not be used to claim product endorsement by A2LA or any government agencies. This test report has been authorized for release under quality control from CKC Laboratories, Inc.



**Steve Behm**  
*Director of Quality Assurance & Engineering Services*  
CKC Laboratories, Inc.

## Test Facility Information



Our laboratories are configured to effectively test a wide variety of product types. CKC utilizes first class test equipment, anechoic chambers, data acquisition and information services to create accurate, repeatable and affordable test results.

TEST LOCATION(S):  
CKC Laboratories, Inc.  
22116 23rd Drive S.E., Suite A  
Canyon Park, Bothell, WA 98021

## Software Versions

CKC Laboratories Proprietary Software	Version
EMITest Emissions	5.03.12
EMITest Emissions	5.03.19

## Site Registration & Accreditation Information

Location	*NIST CB #	FCC	Japan
Canyon Park, Bothell, WA	US0081	US1022	A-0136
Brea, CA	US0060	US1025	A-0136
Fremont, CA	US0082	US1023	A-0136
Mariposa, CA	US0103	US1024	A-0136

\*CKC's list of NIST designated countries can be found at: <https://standards.gov/cabs/designations.html>

## SUMMARY OF RESULTS

### Standard / Specification: FCC Part 15 Subpart C - 15.247 (DTS)

Test Procedure	Description	Modifications	Results
15.247(a)(2)	6dB Bandwidth	NA	Pass
15.247(b)(3)	Output Power	NA	Pass
15.247(e)	Power Spectral Density	NA	Pass
15.247(d)	RF Conducted Emissions & Band Edge	NA	NA1
15.247(d)	Radiated Emissions & Band Edge	NA	Pass
15.207	AC Conducted Emissions	NA	Pass

NA = Not Applicable

NA1 = Not applicable because EUT has an integral antenna.

#### ISO/IEC 17025 Decision Rule

The declaration of pass or fail herein is based upon assessment to the specification(s) listed above, including where applicable, assessment of measurement uncertainties. For performance related tests, equipment was monitored for specified criteria identified in that section of testing.

## Modifications During Testing

This list is a summary of the modifications made to the equipment during testing.

#### Summary of Conditions

No modifications were made during testing.

**Modifications listed above must be incorporated into all production units.**

## Conditions During Testing

This list is a summary of the conditions noted to the equipment during testing.

#### Summary of Conditions

None

## EQUIPMENT UNDER TEST (EUT)

During testing, numerous configurations may have been utilized. The configurations listed below support compliance to the standard(s) listed in the Summary of Results section.

### Configuration 1

#### *Equipment Tested:*

Device	Manufacturer	Model #	S/N
ORRNC	Itron, Inc.	RN-EGM	FCC-1

#### *Support Equipment:*

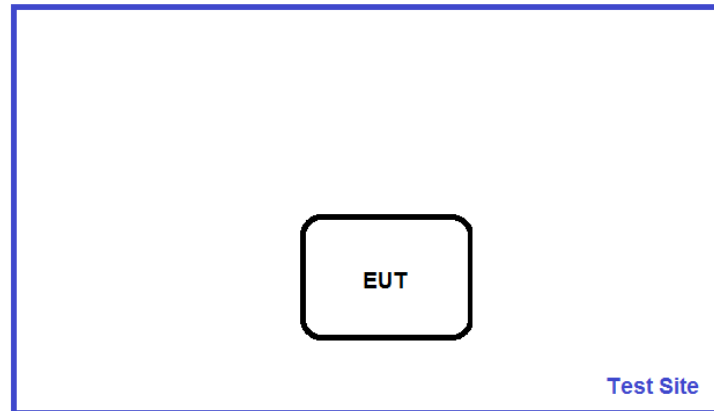
Device	Manufacturer	Model #	S/N
Antenna (Transceiver)	PCTEL	BOA9022NM-ITR	NA
Antenna (Receiver)	PCTEL	BOA9025NM-ITR	NA

### General Product Information:

Product Information	Manufacturer-Provided Details
Equipment Type:	Stand-Alone Equipment
Type of Wideband System:	802.11b/g/n20/n40
Operating Frequency Range:	2412-2462MHz
Modulation Type(s):	802.11b 1M (DBPSK) 802.11b 5M (CCK) 802.11b 11M (CCK) 802.11g 54M (OFDM) 802.11n20 65M/MCS7 (64-QAM) 802.11n40 MCS11 (16-QAM)
Maximum Duty Cycle:	Assume 100% as worst case
Number of TX Chains:	1
Antenna Type(s) and Gain:	Trace, -5dBi
Beamforming Type:	NA
Antenna Connection Type:	Integral
Nominal Input Voltage:	115VAC Nominal (85-264VAC supported)
Firmware / Software used for Test:	TeraTerm v4.104 Calibrator 0.8 Test FW 0.0.0.0 (current as of 4/27/2020)

**Block Diagram of Test Setup(s)**

**Test Setup Block Diagram**



## FCC Part 15 Subpart C

### 15.247(a)(2) 6dB Bandwidth

Test Setup/Conditions			
Test Location:	Bothell Lab C3	Test Engineer:	M. Atkinson
Test Method:	ANSI C63.10 (2013), KDB 558074 v05r02: 04/02/2019	Test Date(s):	5/12/2020
Configuration:	1		
Test Setup:	The equipment under test (EUT) is placed on the tabletop. The EUT is transmitting at its rated output power through integral antenna.		

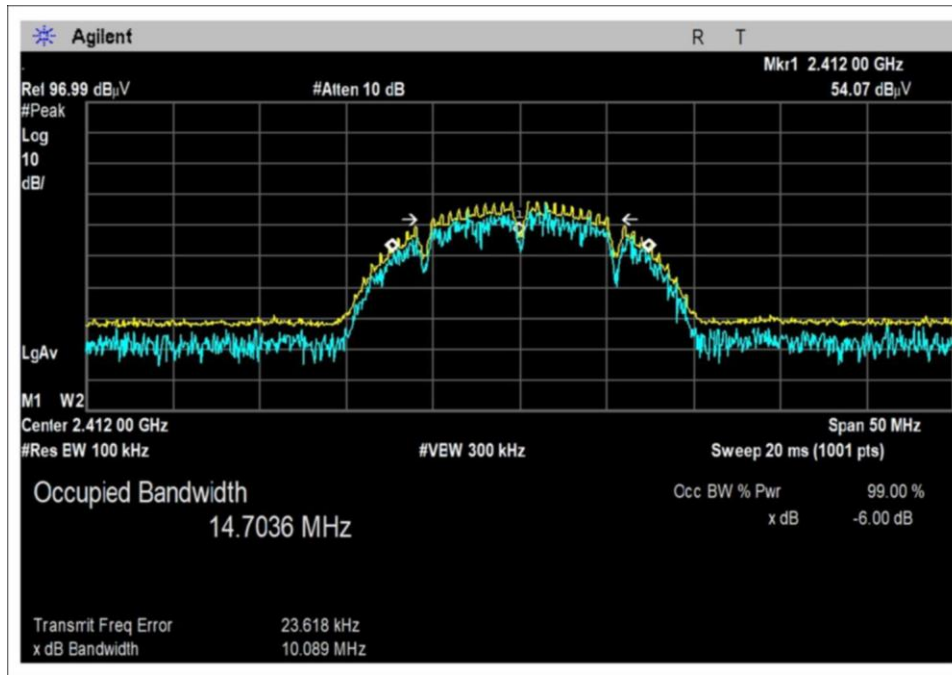
Environmental Conditions			
Temperature (°C)	24	Relative Humidity (%):	100.5

Test Equipment					
Asset#	Description	Manufacturer	Model	Cal Date	Cal Due
02673	Spectrum Analyzer	Agilent	E4446A	2/22/2019	2/22/2021
P06540	Cable	Andrews	Heliast	8/23/2019	8/23/2021
P06515	Cable	Andrews	Heliast	6/29/2018	6/29/2020
01467	Horn Antenna	EMCO	3115	7/5/2019	7/5/2021

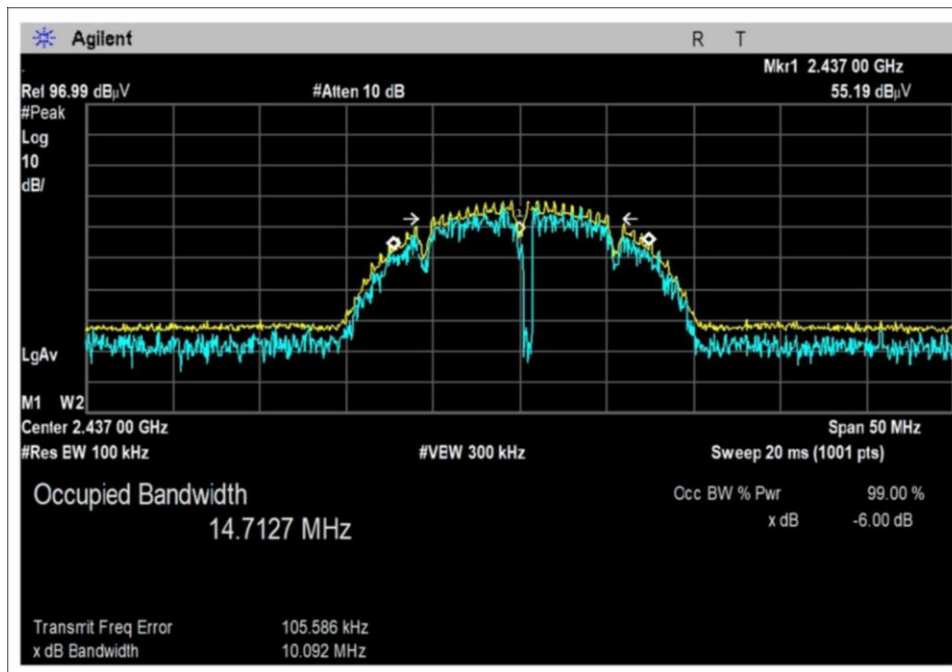
Test Data Summary					
Frequency (MHz)	Antenna Port	Modulation	Measured (MHz)	Limit (MHz)	Results
2412	1	802.11b 1Mbps	10.089	≥0.500	Pass
2437	1	802.11b 1Mbps	10.092	≥0.500	Pass
2462	1	802.11b 1Mbps	10.083	≥0.500	Pass
2412	1	802.11b 5Mbps	9.675	≥0.500	Pass
2437	1	802.11b 5Mbps	9.786	≥0.500	Pass
2462	1	802.11b 5Mbps	10.446	≥0.500	Pass
2412	1	802.11b 11Mbps	9.930	≥0.500	Pass
2437	1	802.11b 11Mbps	11.050	≥0.500	Pass
2462	1	802.11b 11Mbps	10.983	≥0.500	Pass
2412	1	802.11g 54Mbps	15.419	≥0.500	Pass
2437	1	802.11g 54Mbps	15.704	≥0.500	Pass
2462	1	802.11g 54Mbps	15.443	≥0.500	Pass
2412	1	802.11n20 (MCS7)	15.442	≥0.500	Pass
2437	1	802.11n20 (MCS7)	15.066	≥0.500	Pass
2462	1	802.11n20 (MCS7)	15.147	≥0.500	Pass
2422	1	802.11n40 (MCS11)	33.952	≥0.500	Pass
2437	1	802.11n40 (MCS11)	33.962	≥0.500	Pass
2452	1	802.11n40 (MCS11)	33.768	≥0.500	Pass



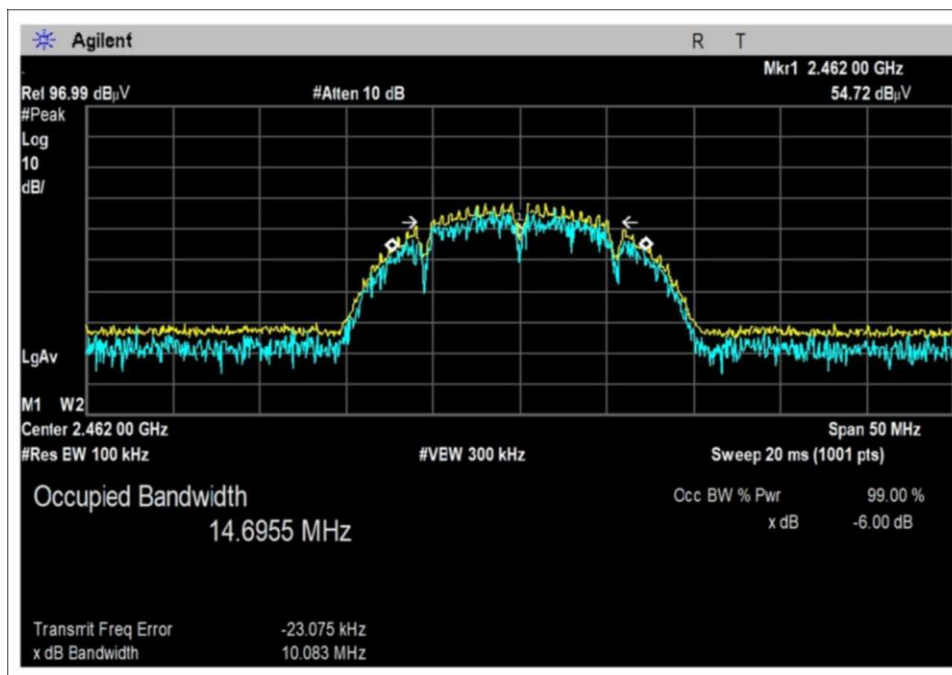
## Plot(s)



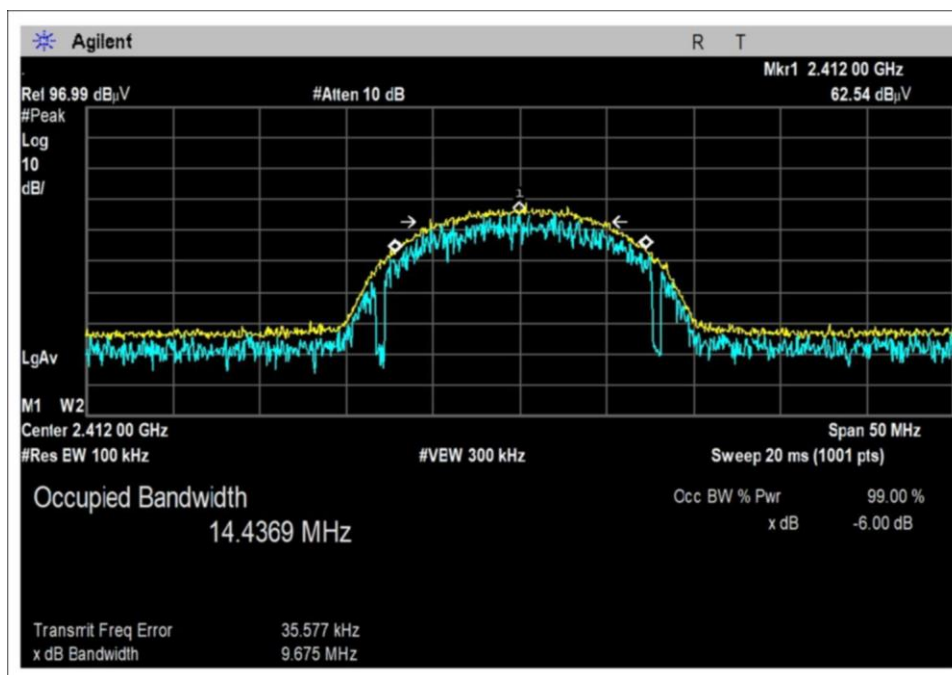
802.11b 1Mbps Low Channel



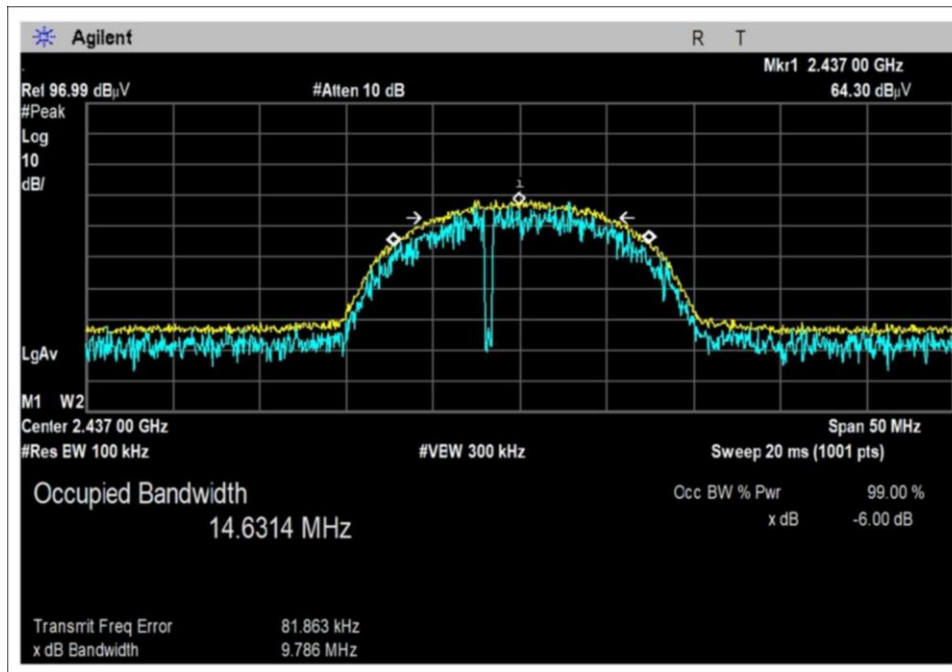
802.11b 1Mbps Middle Channel



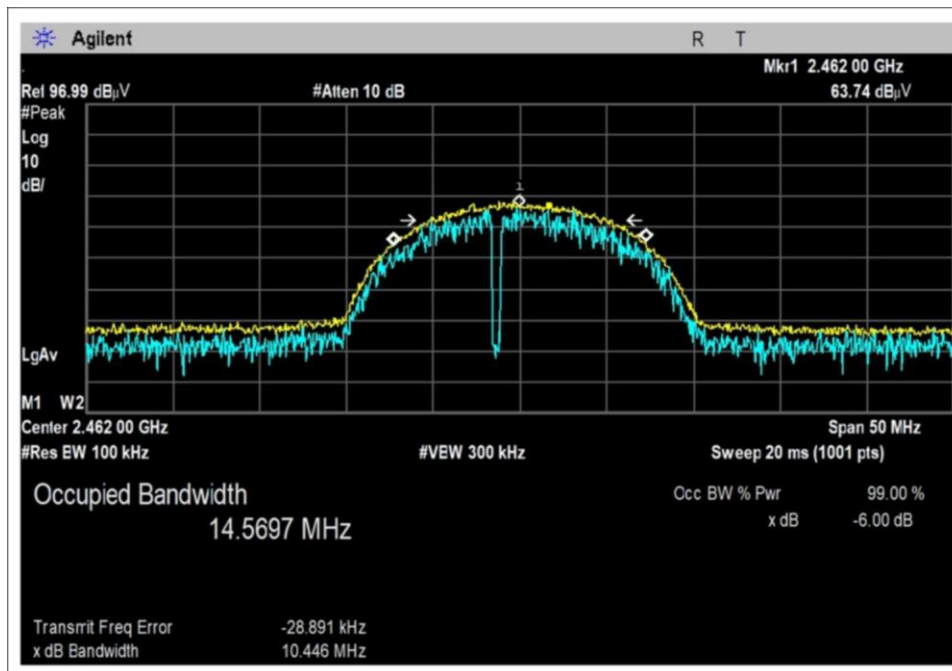
802.11b 1Mbps High Channel



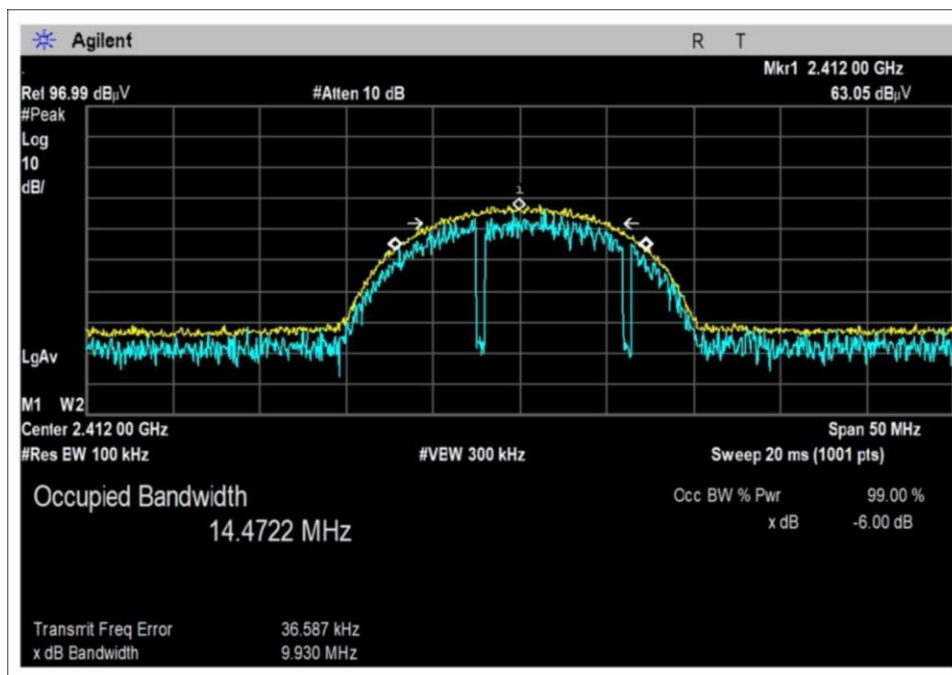
802.11b 5Mbps Low Channel



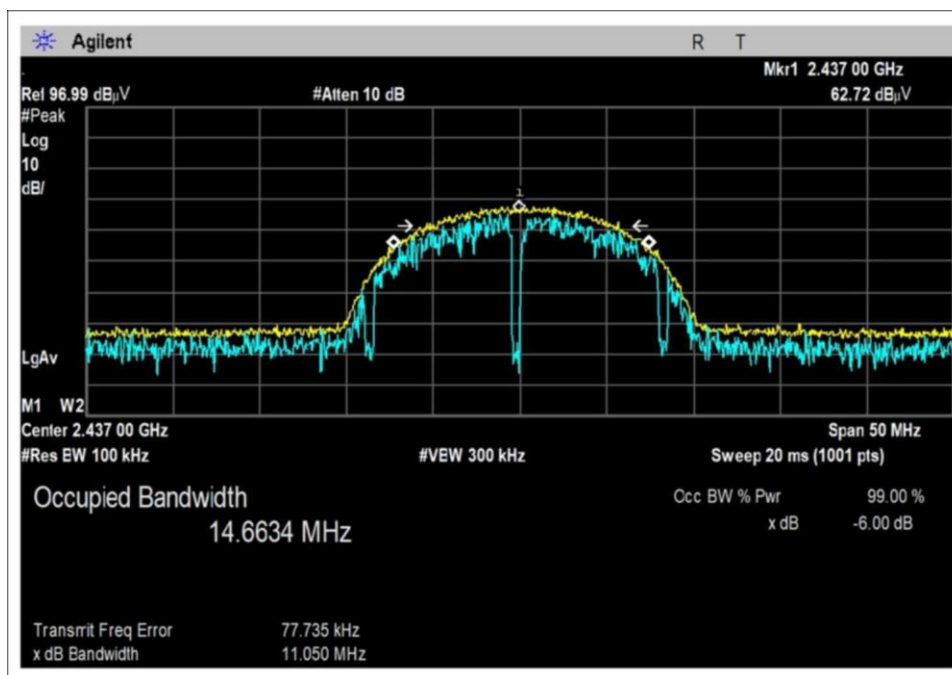
802.11b 5Mbps Middle Channel



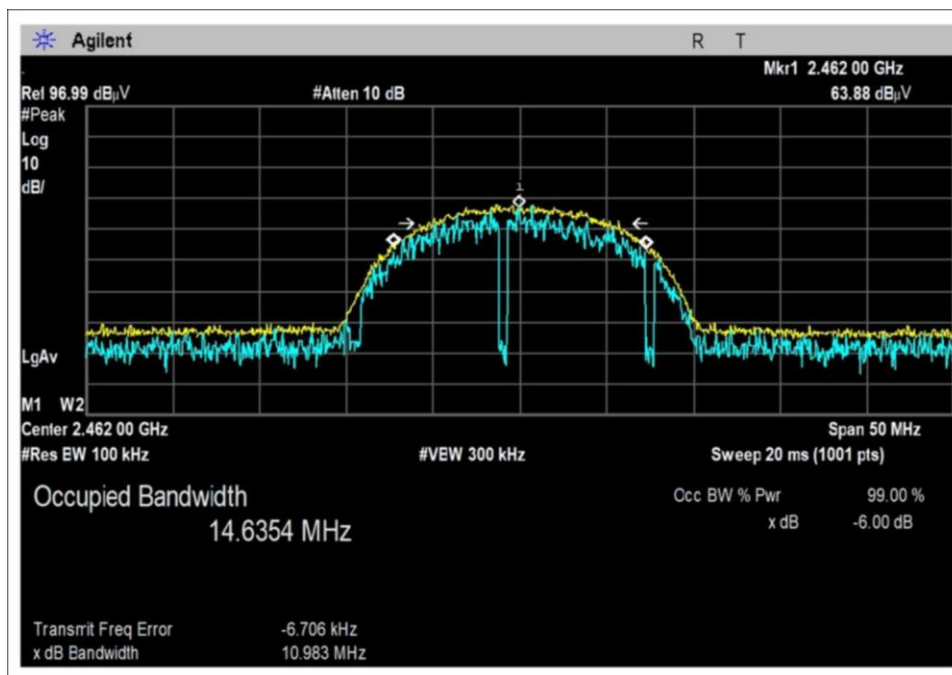
802.11b 5Mbps High Channel



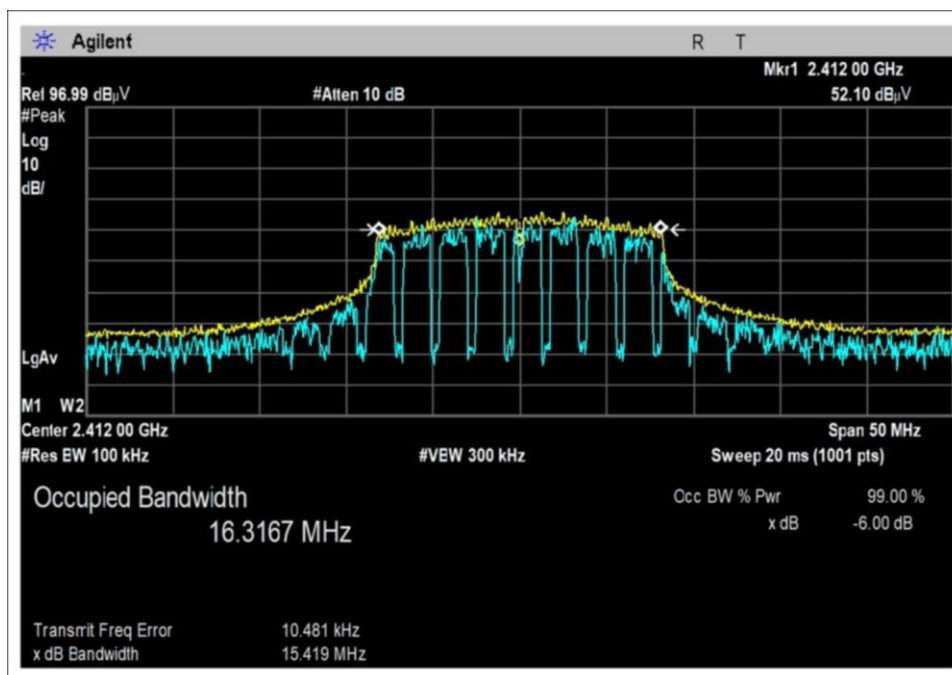
802.11b 11Mbps Low Channel



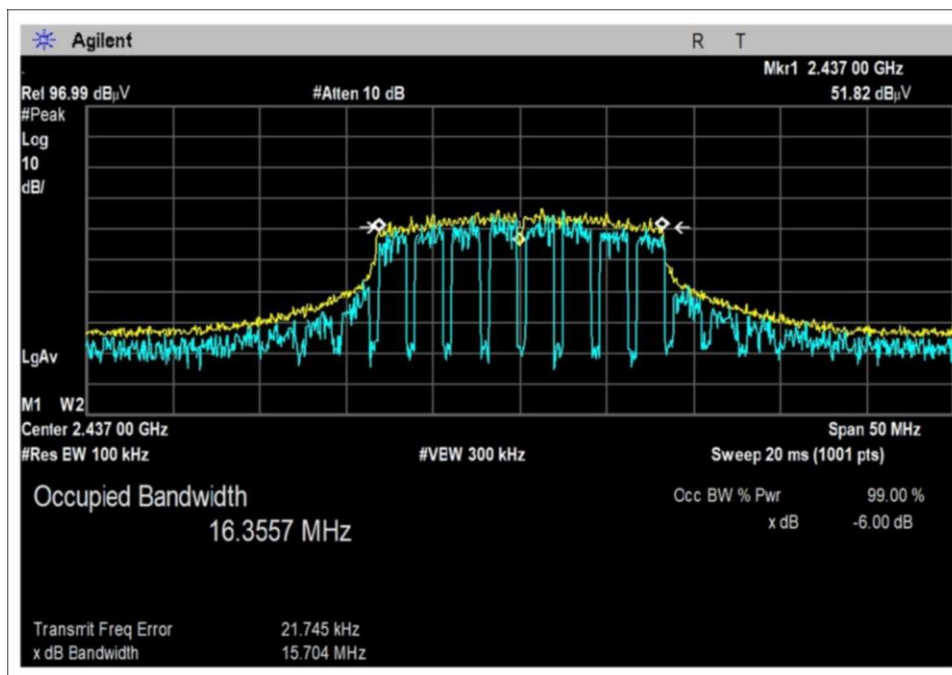
802.11b 11Mbps Middle Channel



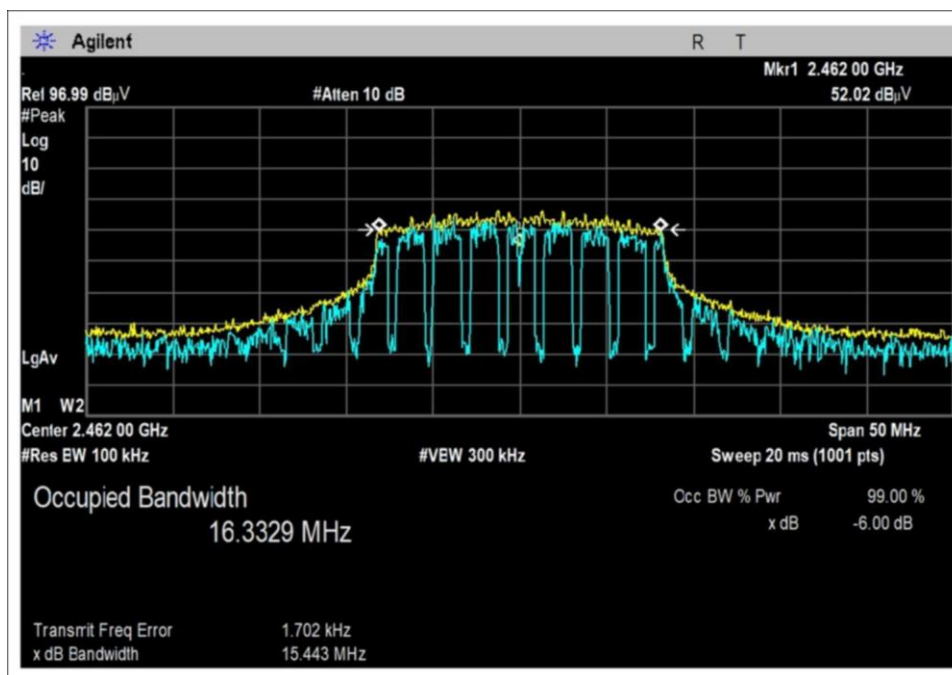
802.11b 11Mbps High Channel



802.11g 54Mbps Low Channel

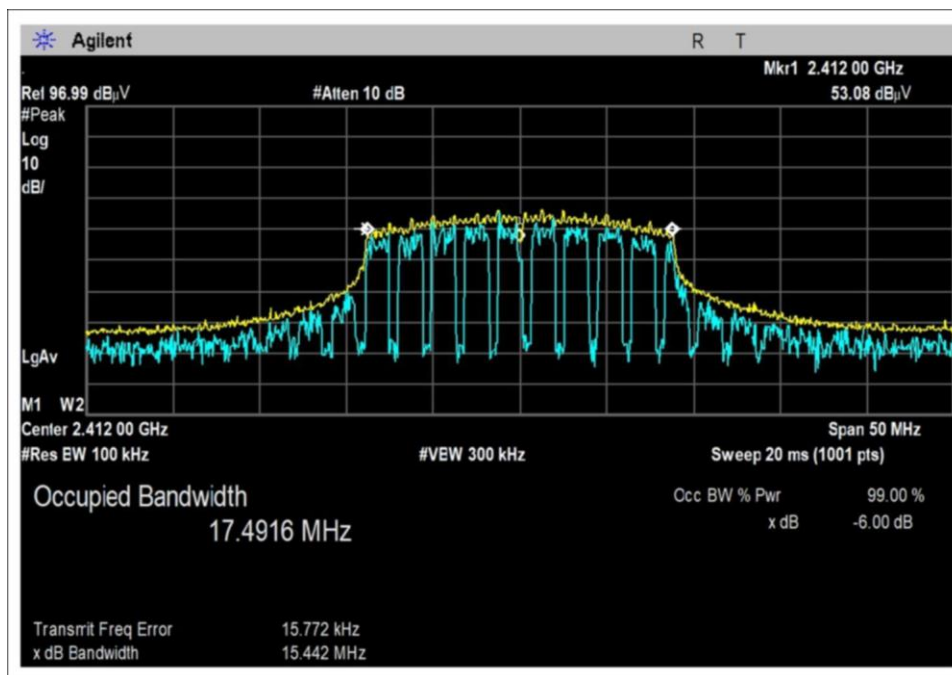


802.11g 54Mbps Middle Channel

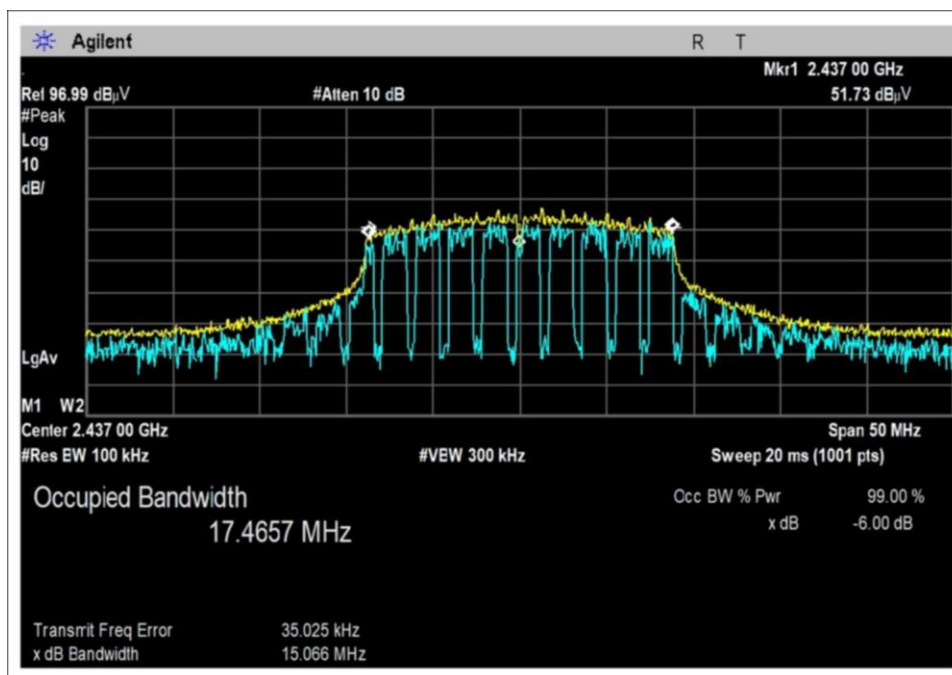


802.11g 54Mbps High Channel

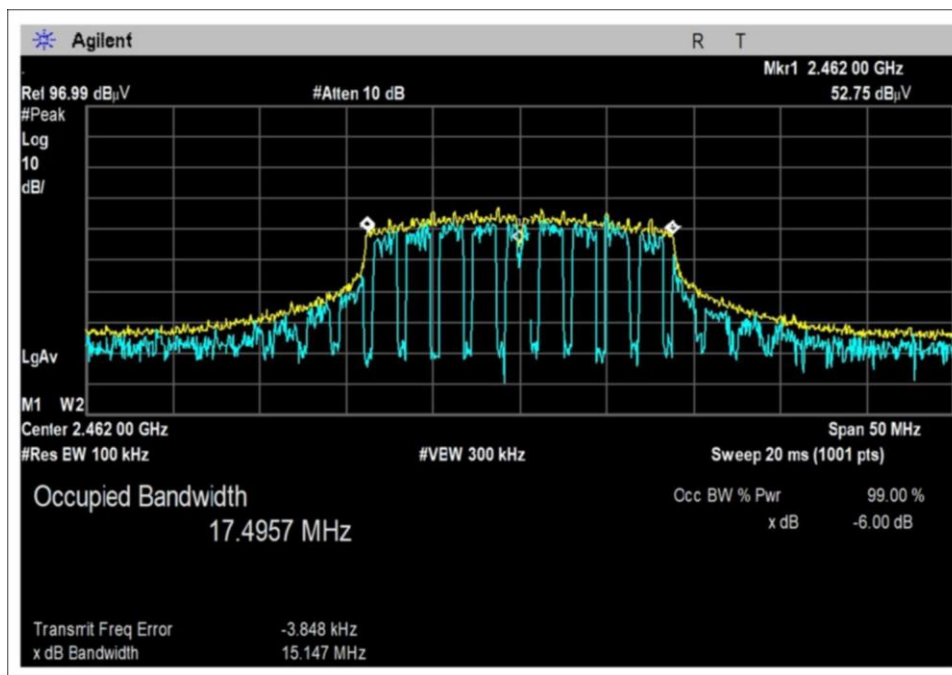




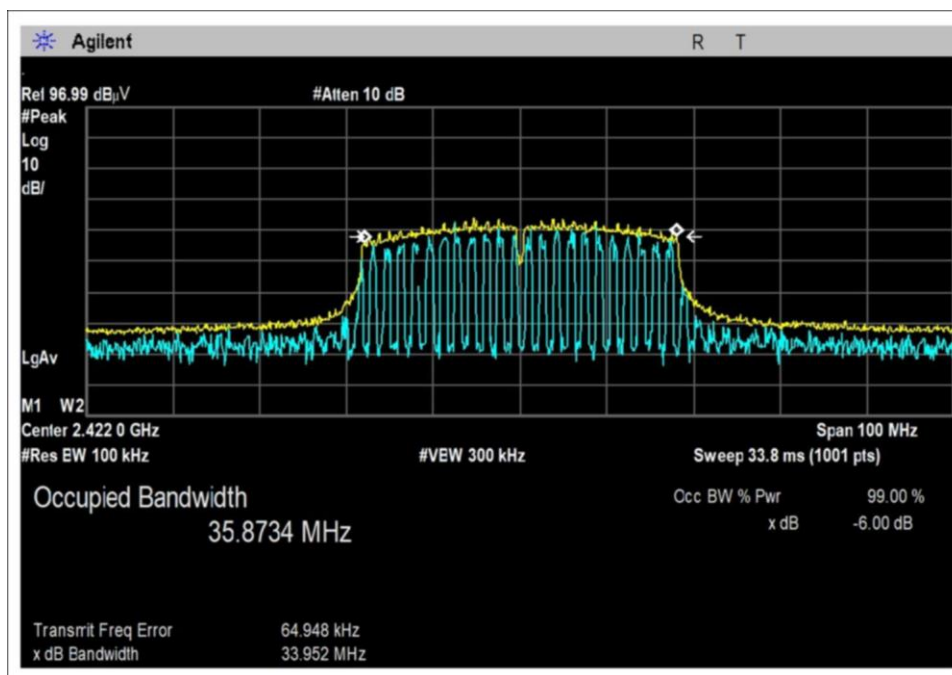
802.11n20 Low Channel



802.11n20 Middle Channel

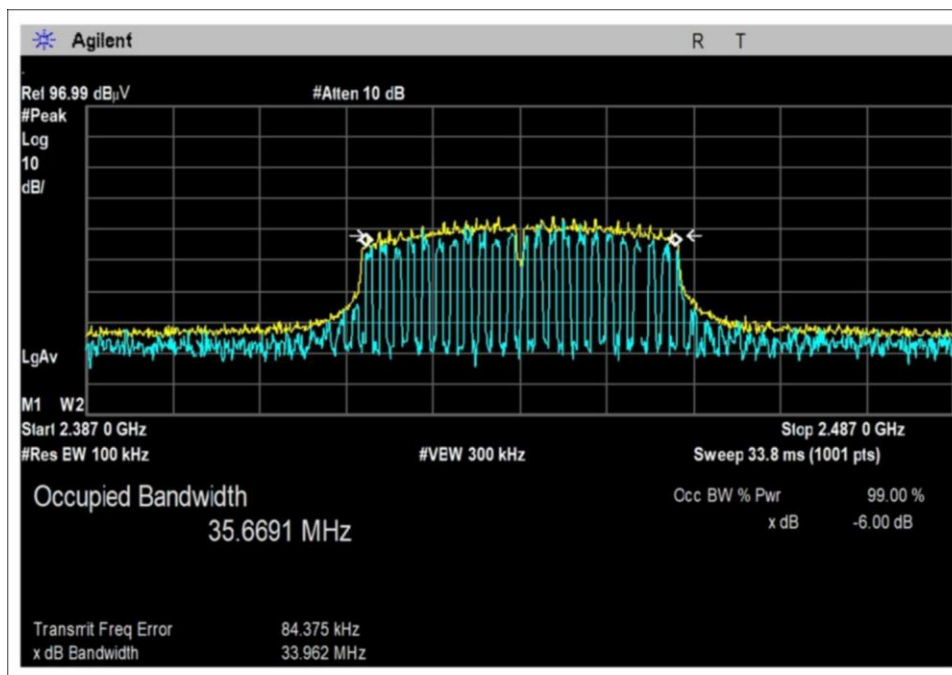


802.11n20 High Channel

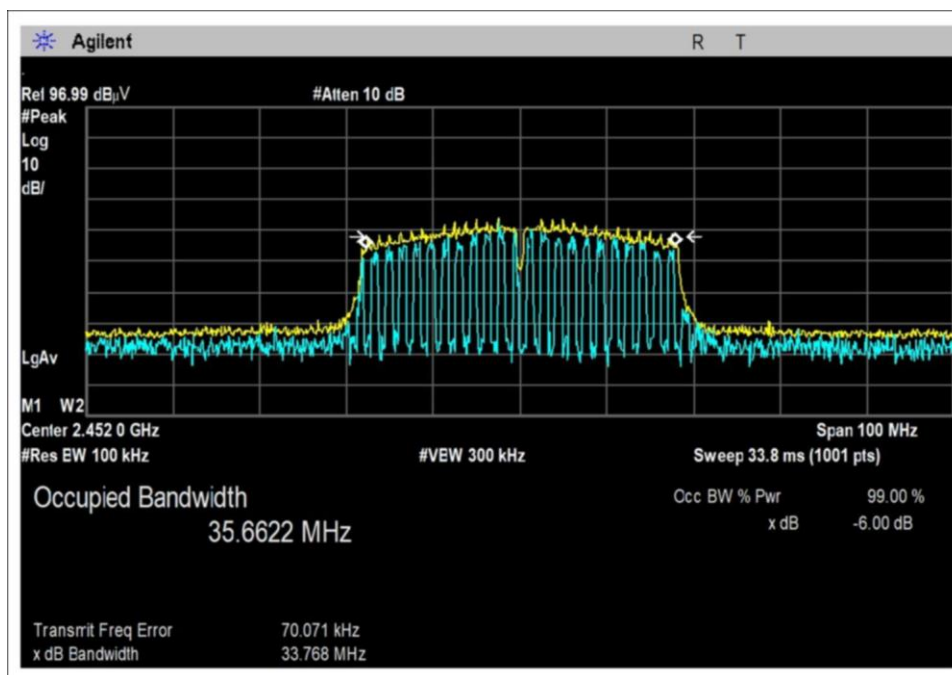


802.11n40 Low Channel





802.11n40 Middle Channel



802.11n40 High Channel

Test Setup Photo(s)



## 15.247(b)(3) Output Power

Test Data Summary - Voltage Variations					
Frequency (MHz)	Modulation / Ant Port	V <sub>Minimum</sub> (dBm)	V <sub>Nominal</sub> (dBm)	V <sub>Maximum</sub> (dBm)	Max Deviation from V <sub>Nominal</sub> (dB)
2412	802.11b 1Mbps	24.2	24.2	24.2	0
2437	802.11b 1Mbps	25.2	25.2	25.2	0
2462	802.11b 1Mbps	24.8	24.8	24.8	0
2422	802.11n40 (MCS11)	24.8	24.7	24.9	0.2
2437	802.11n40 (MCS11)	25.1	25	25.2	0.2
2452	802.11n40 (MCS11)	24.8	24.7	24.9	0.2

Test performed using operational mode with the highest output power, representing worst case.

### ***Parameter Definitions:***

Measurements performed at input voltage according to manufacturer specification.

Parameter	Value
V <sub>Nominal</sub> :	115
V <sub>Minimum</sub> :	85
V <sub>Maximum</sub> :	264

Test Data Summary - Radiated Measurement						
Measurement Option: PKPM1						
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Field Strength (dBuV/m @3m)	Calculated (dBm)	Limit (dBm)	Results
2412	802.11b 1Mbps	Trace, -5dBi	114.4	24.2	≤30	Pass
2437	802.11b 1Mbps	Trace, -5dBi	115.4	25.2	≤30	Pass
2462	802.11b 1Mbps	Trace, -5dBi	115	24.8	≤30	Pass
2412	802.11b 5Mbps	Trace, -5dBi	114.4	24.2	≤30	Pass
2437	802.11b 5Mbps	Trace, -5dBi	115.4	25.2	≤30	Pass
2462	802.11b 5Mbps	Trace, -5dBi	114.9	24.7	≤30	Pass
2412	802.11b 11Mbps	Trace, -5dBi	114.4	24.2	≤30	Pass
2437	802.11b 11Mbps	Trace, -5dBi	115.3	25.1	≤30	Pass
2462	802.11b 11Mbps	Trace, -5dBi	114.9	24.7	≤30	Pass
2412	802.11g 54Mbps	Trace, -5dBi	114.1	23.9	≤30	Pass
2437	802.11g 54Mbps	Trace, -5dBi	115.1	24.9	≤30	Pass
2462	802.11g 54Mbps	Trace, -5dBi	114.8	24.6	≤30	Pass
2412	802.11n20 (MCS7)	Trace, -5dBi	114.3	24.1	≤30	Pass
2437	802.11n20 (MCS7)	Trace, -5dBi	115.2	25	≤30	Pass
2462	802.11n20 (MCS7)	Trace, -5dBi	114.8	24.6	≤30	Pass
2422	802.11n40 (MCS11)	Trace, -5dBi	114.9	24.7	≤30	Pass
2437	802.11n40 (MCS11)	Trace, -5dBi	115.2	25	≤30	Pass
2452	802.11n40 (MCS11)	Trace, -5dBi	114.9	24.7	≤30	Pass

Conducted RF output power calculated in accordance with ANSI C63.10.

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

Or equivalently, in logarithmic form:

$$P(dBm) = E(dBuV/m) + 20LOG(d) - G - 104.77$$

The above equation was used to calculate conducted power from the peak field strength reading assuming d = 3 meters and G = -5dBi

### Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98201 • 435-402-1717  
 Customer: **Itron, Inc.**  
 Specification: **15.247(b) Power Output (2400-2483.5 MHz DTS)**  
 Work Order #: **103786** Date: 5/14/2020  
 Test Type: **Maximized Emissions** Time: 15:00:36  
 Tested By: Michael Atkinson Sequence#: 102  
 Software: EMITest 5.03.12

#### Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

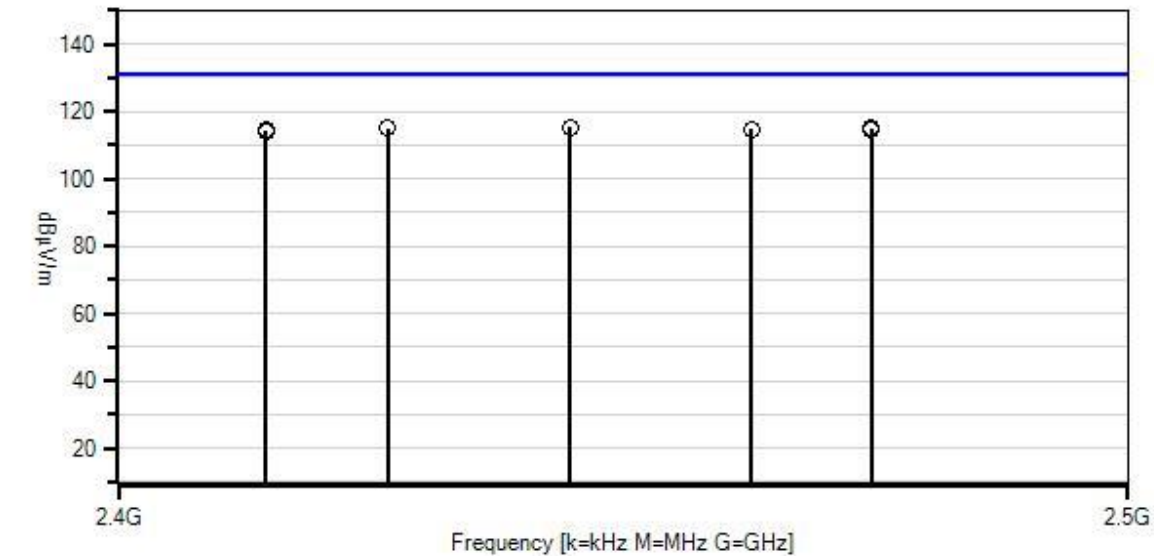
#### Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

#### Test Conditions / Notes:

Vertical and horizontal polarity investigated, worst case reported.

Itron, Inc. W/O#: 103786 Sequence#: 102 Date: 5/14/2020  
 15.247(b) Power Output (2400-2483.5 MHz DTS) Test Distance: 3 Meters Horiz



— Readings  
 × QP Readings  
 ▼ Ambient  
 — 1 - 15.247(b) Power Output (2400-2483.5 MHz DTS)  
 ○ Peak Readings  
 \* Average Readings  
 Software Version: 5.03.12

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	03477	*Power Sensor	NRP-Z81	11/7/2019	11/7/2020
T2	ANP06540	Cable	Heliac	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliac	6/29/2018	6/29/2020
T4	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/5/2019	7/5/2021
	01314	AC Power Supply	345AMXT-UPC3	8/13/2019	8/13/2021

\* Power Sensor functions as a Peak Power Meter

**Measurement Data:** Reading listed by margin. Test Distance: 3 Meters

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dBμV/m	Spec dBμV/m	Margin dB	Polar Ant
1	2437.000M	84.6	+0.0	+0.6	+2.6	+27.6	+0.0	115.4	131.2 1M	-15.8	Horiz
2	2437.000M	84.6	+0.0	+0.6	+2.6	+27.6	+0.0	115.4	131.2 5M	-15.8	Horiz
3	2437.000M	84.5	+0.0	+0.6	+2.6	+27.6	+0.0	115.3	131.2 11M	-15.9	Horiz
4	2437.000M	84.4	+0.0	+0.6	+2.6	+27.6	+0.0	115.2	131.2 65M	-16.0	Horiz
5	2437.000M	84.4	+0.0	+0.6	+2.6	+27.6	+0.0	115.2	131.2 n40	-16.0	Horiz
6	2437.000M	84.3	+0.0	+0.6	+2.6	+27.6	+0.0	115.1	131.2 54M	-16.1	Horiz
7	2462.000M	84.1	+0.0	+0.6	+2.7	+27.6	+0.0	115.0	131.2 1M	-16.2	Horiz
8	2462.000M	84.0	+0.0	+0.6	+2.7	+27.6	+0.0	114.9	131.2 11M	-16.3	Horiz
9	2462.000M	84.0	+0.0	+0.6	+2.7	+27.6	+0.0	114.9	131.2 5M	-16.3	Horiz
10	2422.000M	84.1	+0.0	+0.6	+2.6	+27.6	+0.0	114.9	131.2 n40	-16.3	Horiz
11	2462.000M	83.9	+0.0	+0.6	+2.7	+27.6	+0.0	114.8	131.2 65M	-16.4	Horiz
12	2462.000M	83.9	+0.0	+0.6	+2.7	+27.6	+0.0	114.8	131.2 54M	-16.4	Horiz
13	2452.000M	84.0	+0.0	+0.6	+2.6	+27.6	+0.0	114.8	131.2 n40	-16.4	Horiz
14	2412.000M	83.6	+0.0	+0.6	+2.6	+27.6	+0.0	114.4	131.2 1M	-16.8	Horiz
15	2412.000M	83.6	+0.0	+0.6	+2.6	+27.6	+0.0	114.4	131.2 5M	-16.8	Horiz
16	2412.000M	83.6	+0.0	+0.6	+2.6	+27.6	+0.0	114.4	131.2 11M	-16.8	Horiz
17	2412.000M	83.5	+0.0	+0.6	+2.6	+27.6	+0.0	114.3	131.2 65M	-16.9	Horiz
18	2412.000M	83.3	+0.0	+0.6	+2.6	+27.6	+0.0	114.1	131.2 54M	-17.1	Horiz



Test Setup Photo(s)



## 15.247(e) Power Spectral Density

PSD Test Data Summary - Radiated Measurement						
Measurement Method: PKPSD						
Frequency (MHz)	Modulation	Ant. Type / Gain (dBi)	Field Strength (dBuV/m @3m)	Calculated (dBm/51kHz)	Limit (dBm/3kHz)	Results
2412	802.11b 1Mbps	Trace, -5dBi	95.7	5.5	≤8	Pass
2437	802.11b 1Mbps	Trace, -5dBi	95.8	5.6	≤8	Pass
2462	802.11b 1Mbps	Trace, -5dBi	95.8	5.6	≤8	Pass
2412	802.11b 5Mbps	Trace, -5dBi	94.1	3.9	≤8	Pass
2437	802.11b 5Mbps	Trace, -5dBi	95.1	4.9	≤8	Pass
2462	802.11b 5Mbps	Trace, -5dBi	94.7	4.5	≤8	Pass
2412	802.11b 11Mbps	Trace, -5dBi	93.8	3.6	≤8	Pass
2437	802.11b 11Mbps	Trace, -5dBi	94.5	4.3	≤8	Pass
2462	802.11b 11Mbps	Trace, -5dBi	94	3.8	≤8	Pass
2412	802.11g 54Mbps	Trace, -5dBi	91.3	1.1	≤8	Pass
2437	802.11g 54Mbps	Trace, -5dBi	92.6	2.4	≤8	Pass
2462	802.11g 54Mbps	Trace, -5dBi	91.9	1.7	≤8	Pass
2412	802.11n20 (MCS7)	Trace, -5dBi	91.7	1.5	≤8	Pass
2437	802.11n20 (MCS7)	Trace, -5dBi	93	2.8	≤8	Pass
2462	802.11n20 (MCS7)	Trace, -5dBi	92.1	1.9	≤8	Pass
2422	802.11n40 (MCS11)	Trace, -5dBi	89.4	-0.8	≤8	Pass
2437	802.11n40 (MCS11)	Trace, -5dBi	90.3	0.1	≤8	Pass
2452	802.11n40 (MCS11)	Trace, -5dBi	89.2	-1.0	≤8	Pass

51kHz measurement RBW used as worst case compared to 3kHz RBW limit

Conducted RF output power calculated in accordance with ANSI C63.10.

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

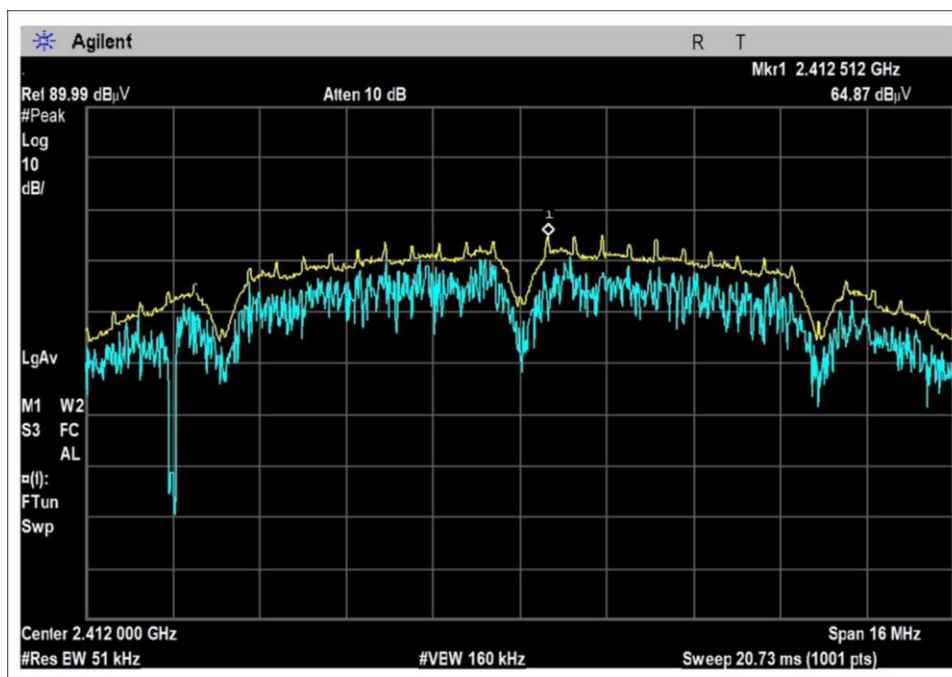
Or equivalently, in logarithmic form:

$$P(dBm) = E(dBuV/m) + 20LOG(d) - G - 104.77$$

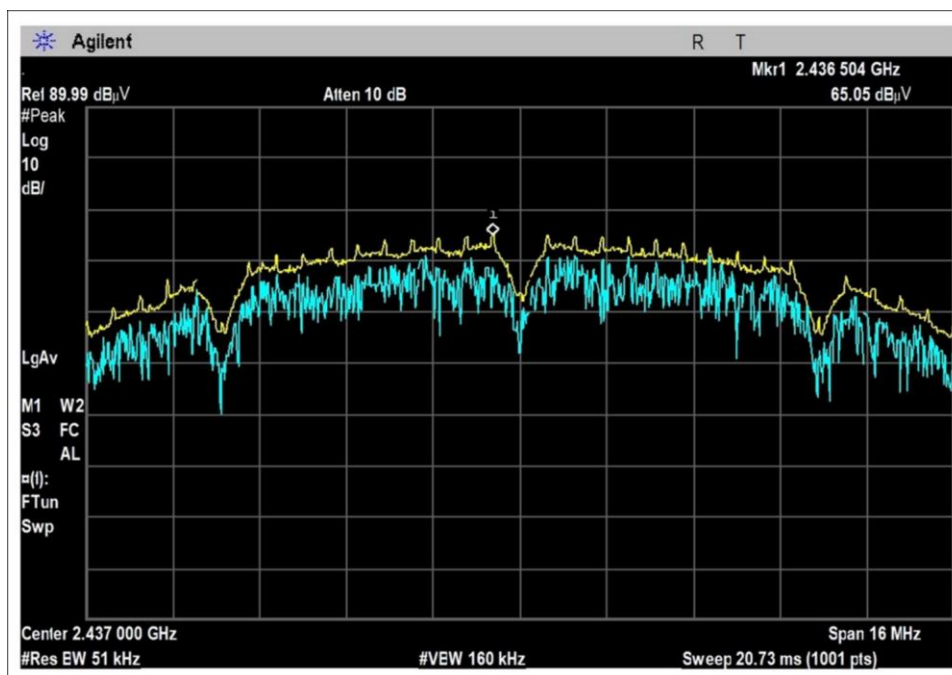
The above equation was used to calculate conducted power from the peak field strength reading assuming d = 3 meters and G = -5dBi



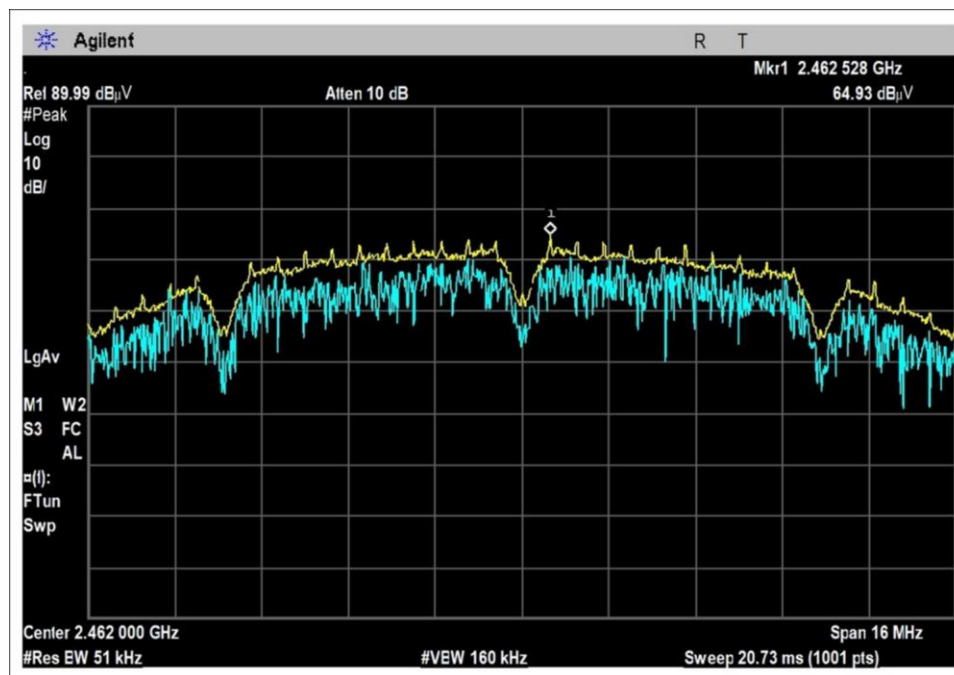
## Plots



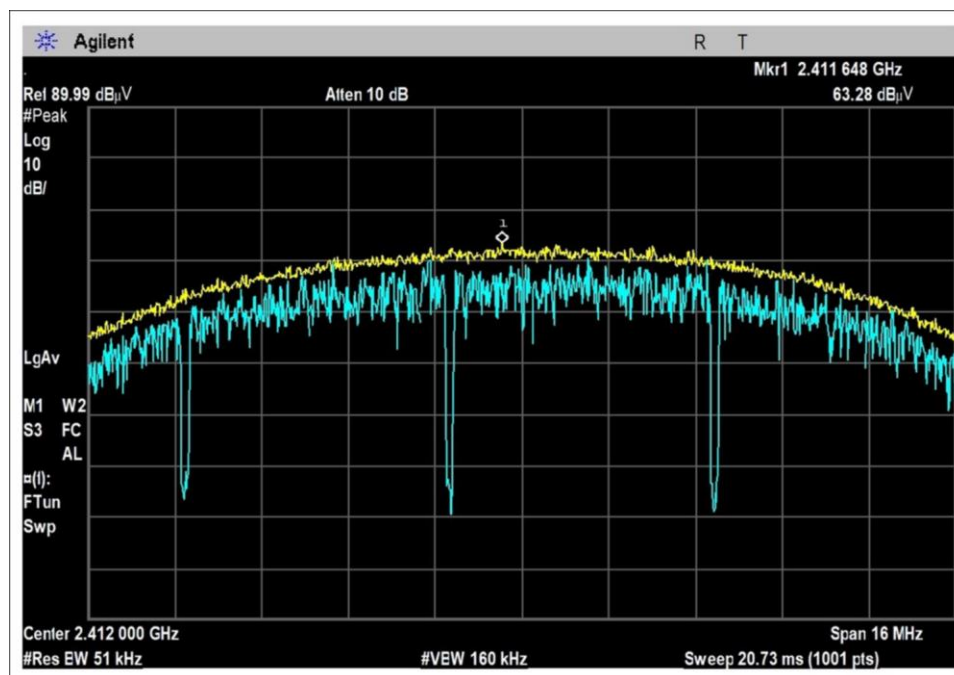
802.11b 1Mbps Low Channel



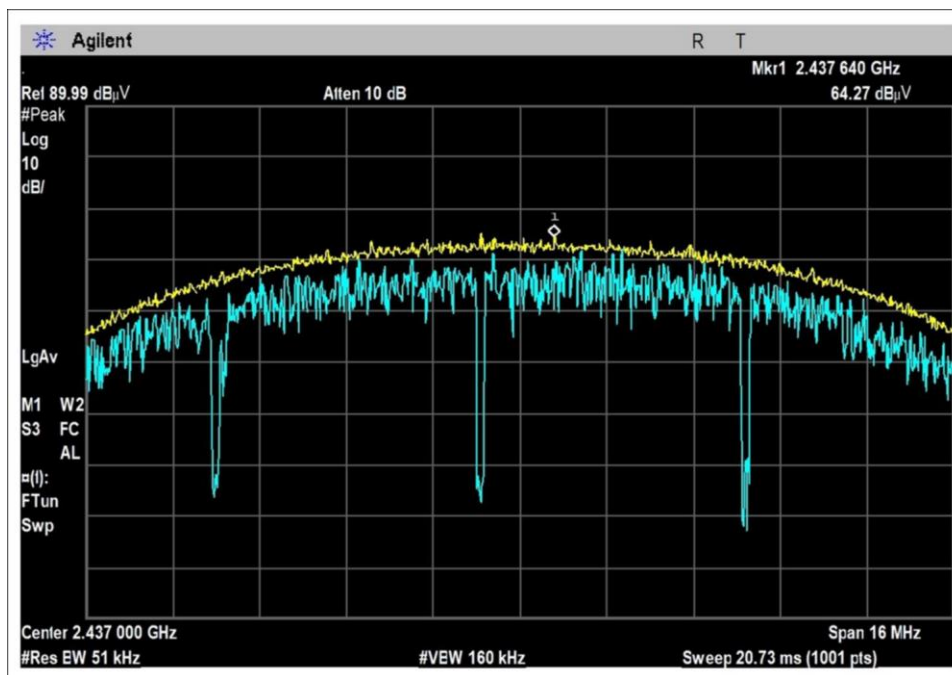
802.11b 1Mbps Middle Channel



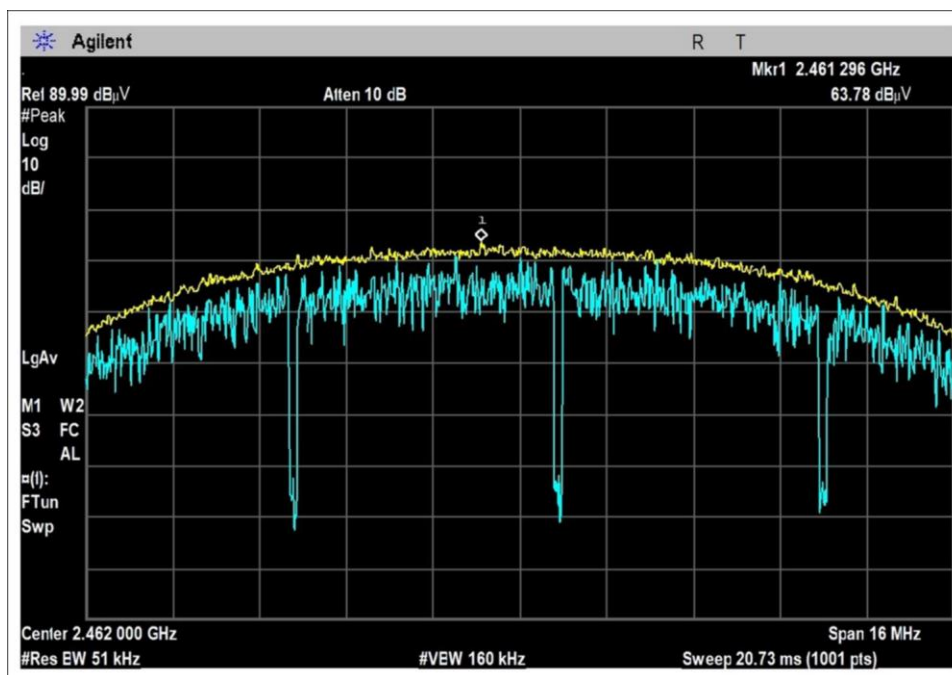
802.11b 1Mbps High Channel



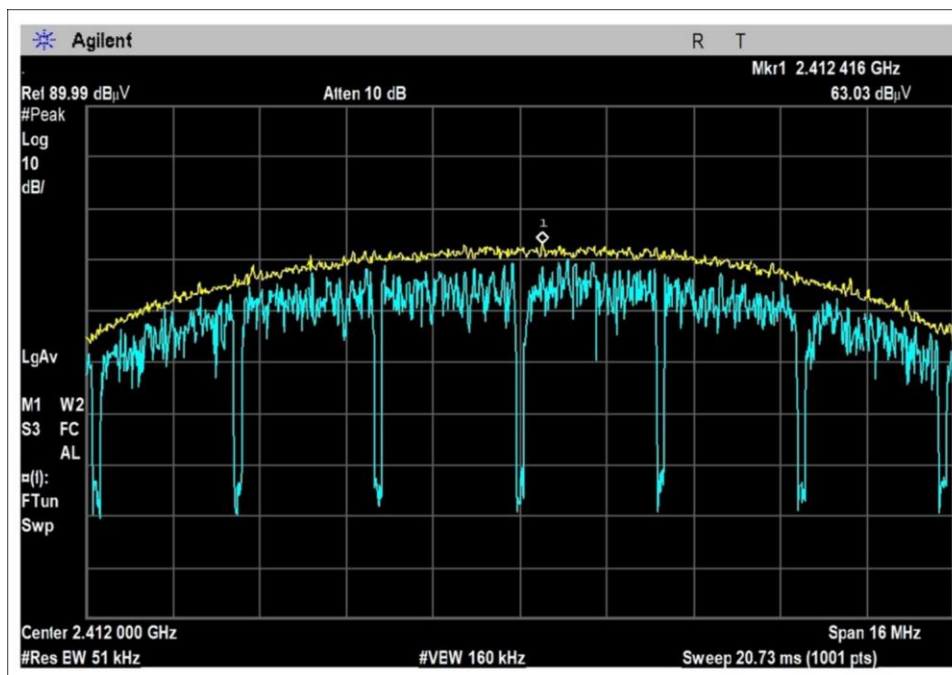
802.11b 5Mbps Low Channel



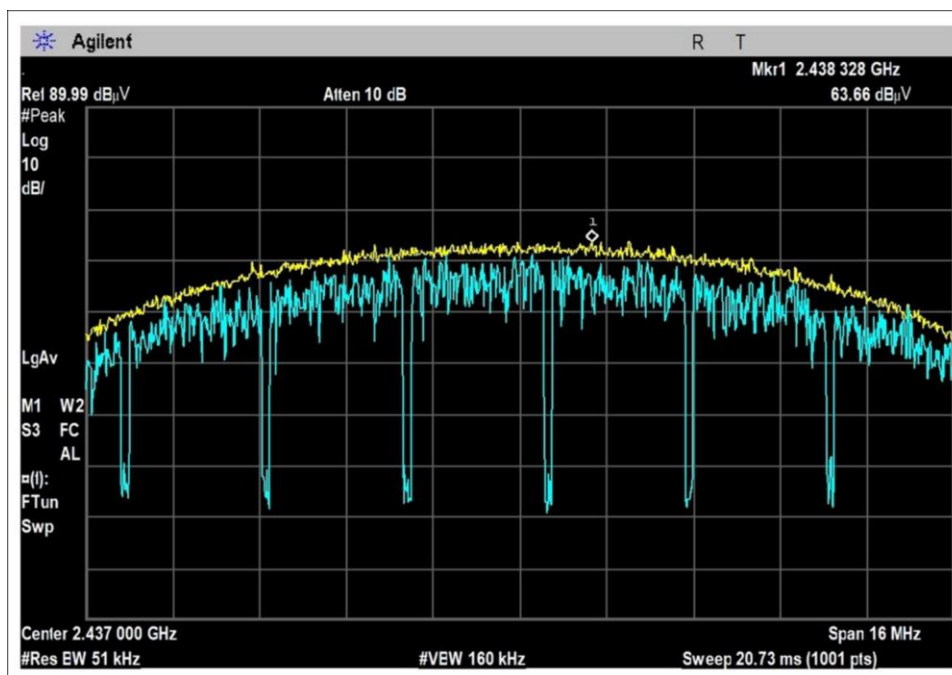
802.11b 5Mbps Middle Channel



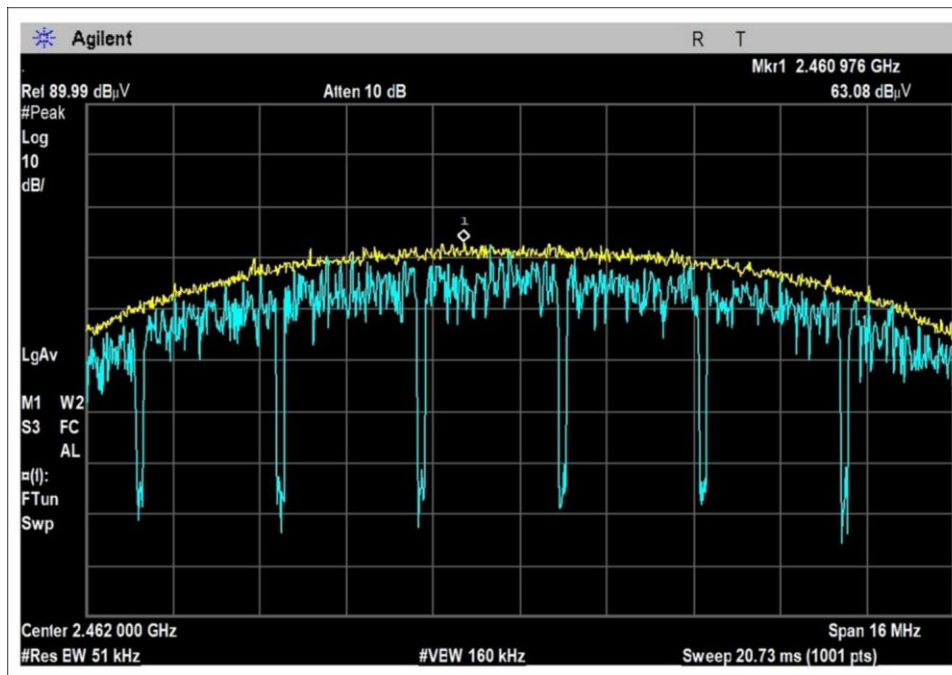
802.11b 5Mbps High Channel



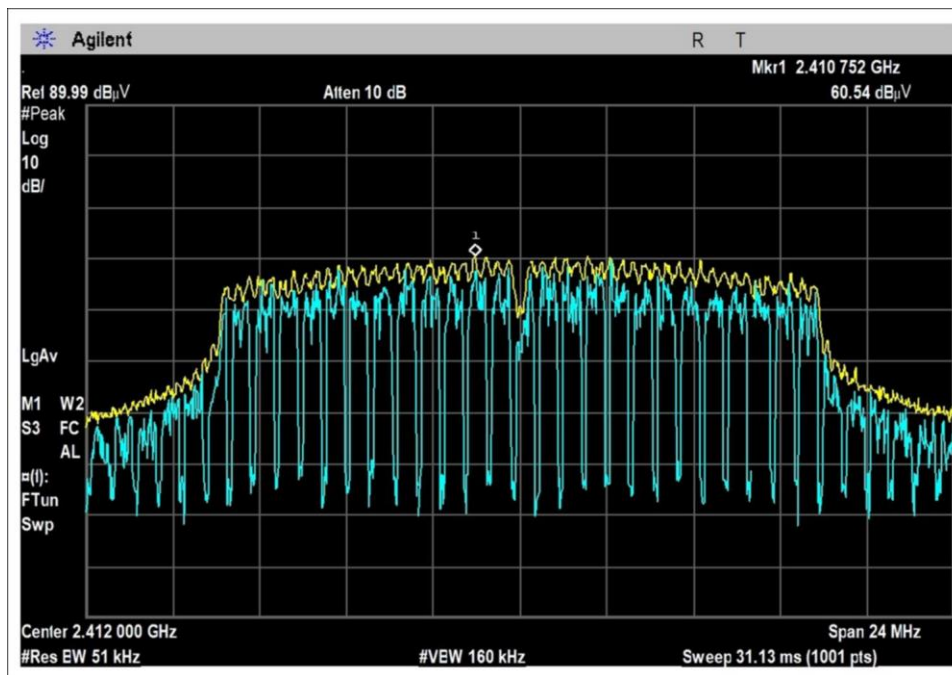
802.11b 11Mbps Low Channel



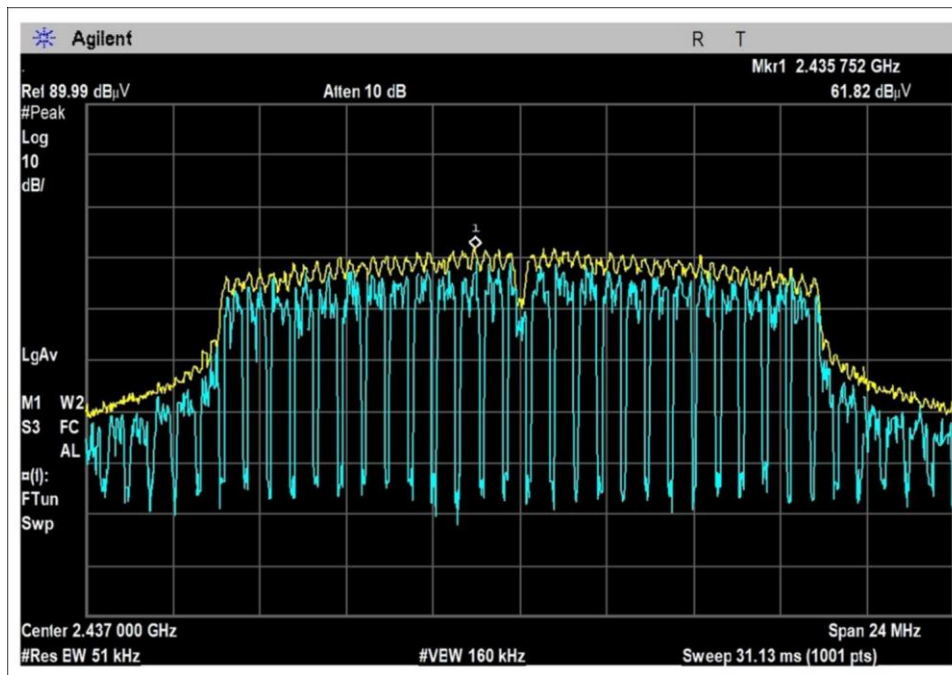
802.11b 11Mbps Middle Channel



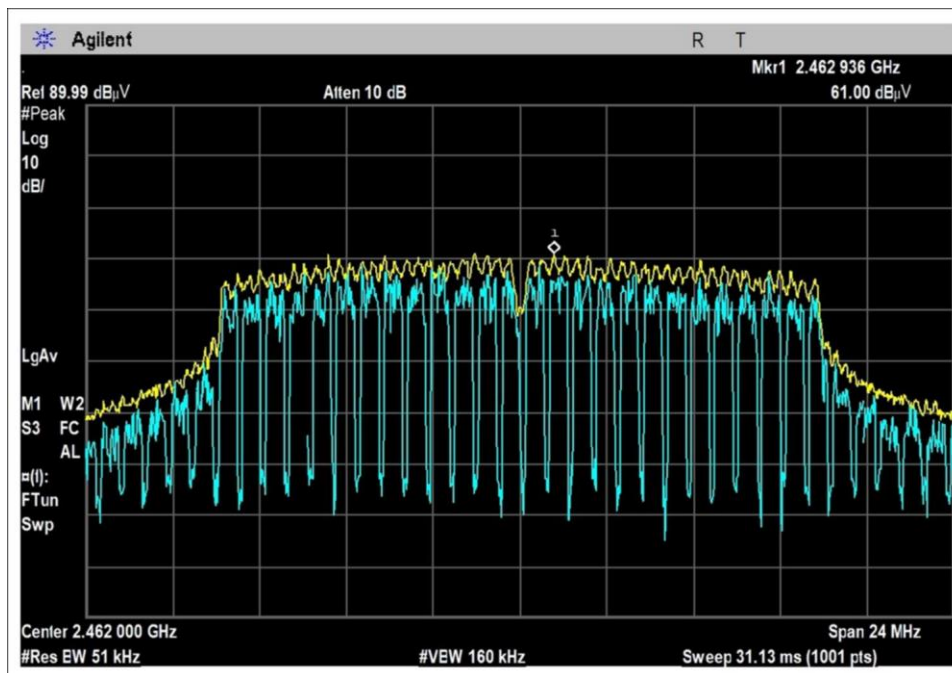
802.11b 11Mbps High Channel



802.11g 54Mbps Low Channel

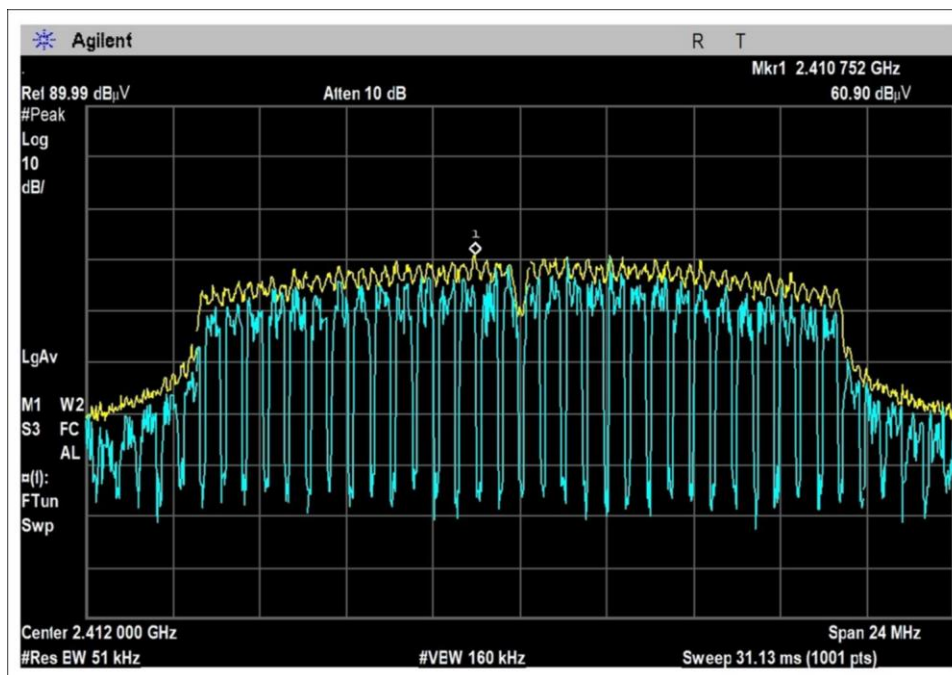


802.11g 54Mbps Middle Channel

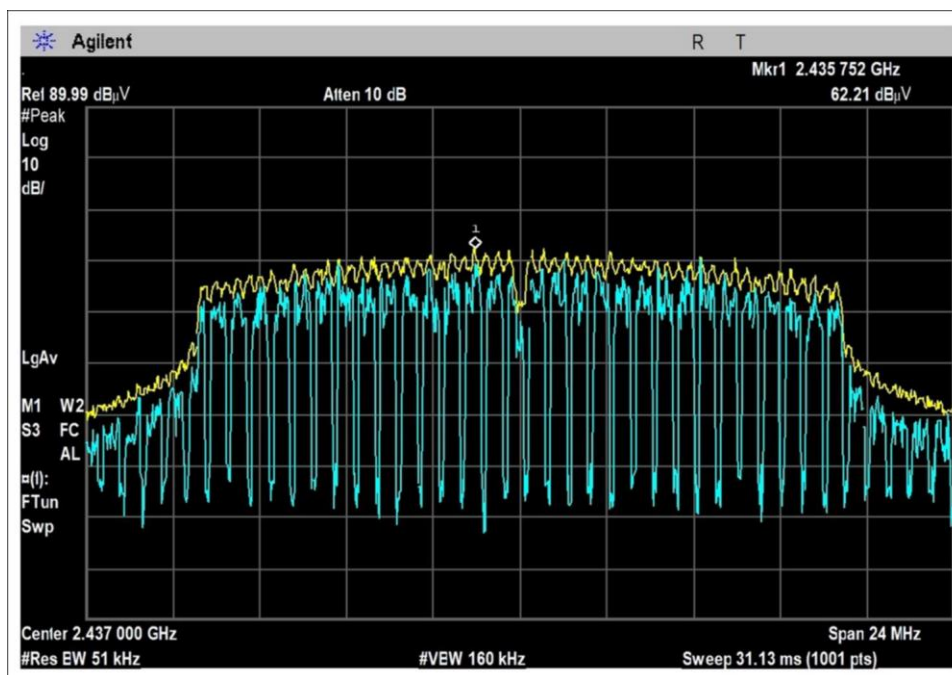


802.11g 54Mbps High Channel

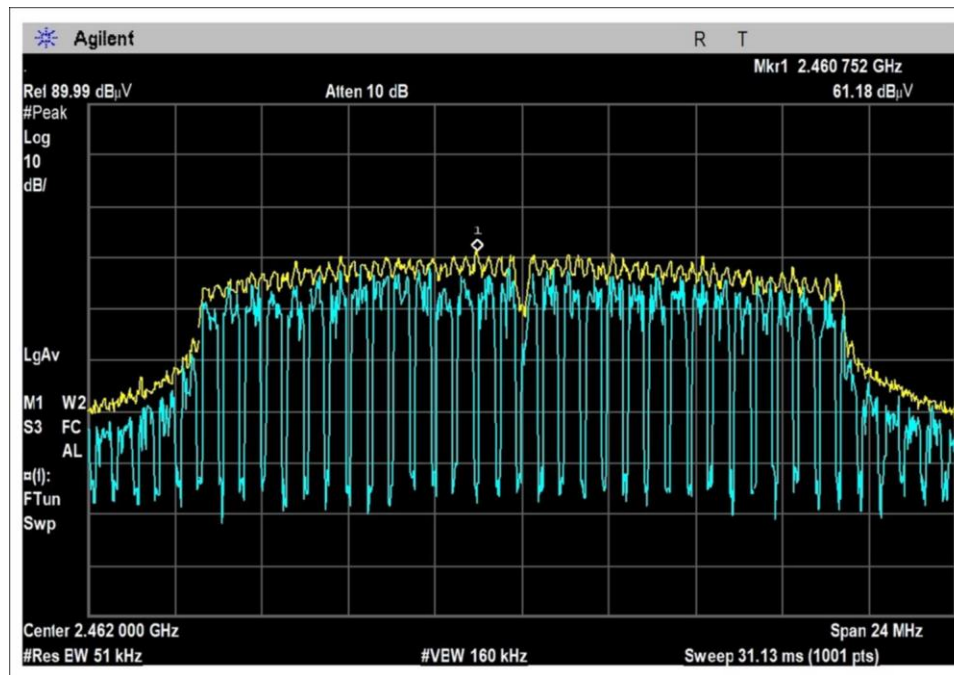




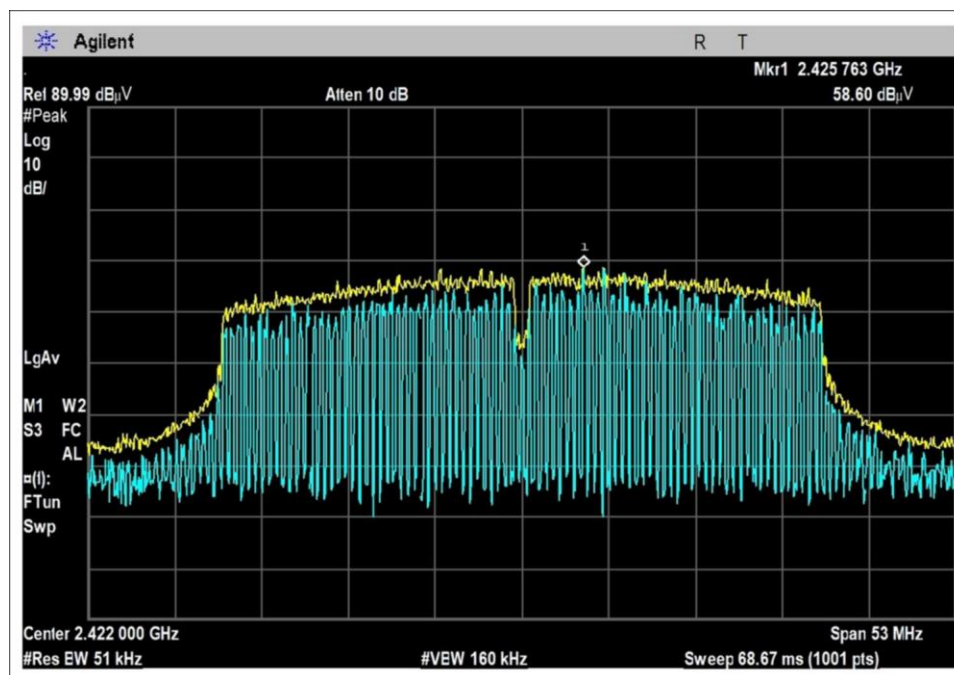
802.11n20 Low Channel



802.11n20 Middle Channel

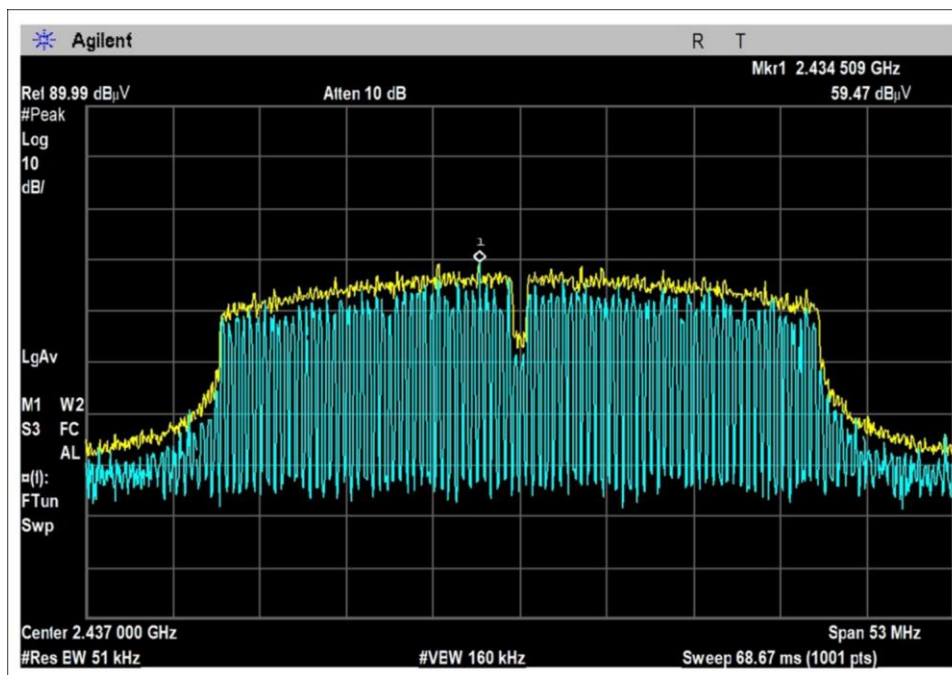


802.11n20 High Channel

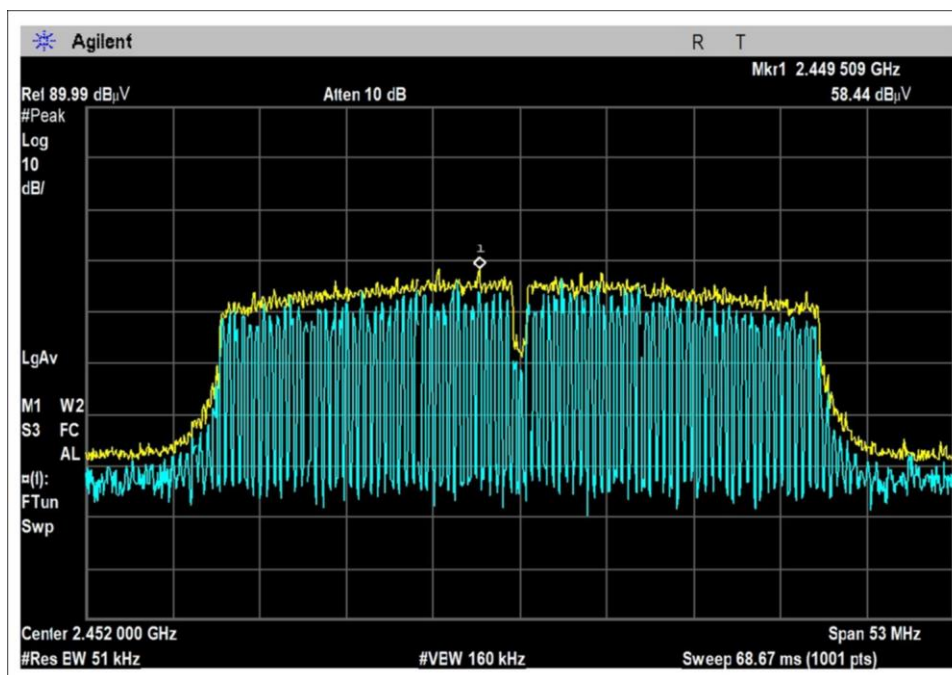


802.11n40 Low Channel





802.11n40 Middle Channel



802.11n40 High Channel

### Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98201 • 435-402-1717  
 Customer: **Itron, Inc.**  
 Specification: **15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)**  
 Work Order #: **103786** Date: 5/15/2020  
 Test Type: **Maximized Emissions** Time: 16:29:00  
 Tested By: Michael Atkinson Sequence#: 103  
 Software: EMITest 5.03.12

#### *Equipment Tested:*

Device	Manufacturer	Model #	S/N
Configuration 1			

#### *Support Equipment:*

Device	Manufacturer	Model #	S/N
Configuration 1			

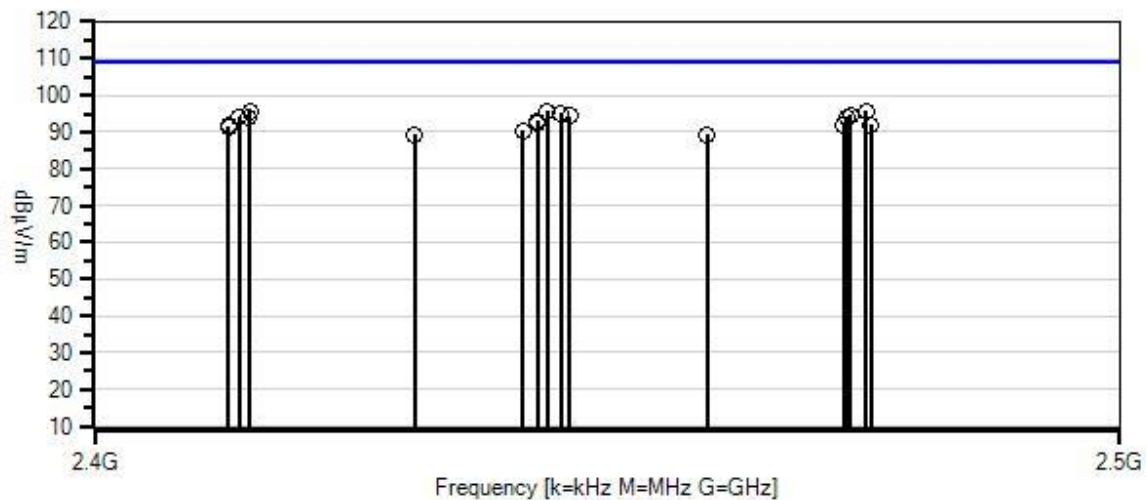
#### *Test Conditions / Notes:*

Vertical and horizontal polarity investigated, worst case reported.

The equipment under test (EUT) is placed on the tabletop. The EUT is transmitting continuously at its rated output power through integral antenna.

Test Location: Bothell Lab C3  
 Temperature (°C): 25  
 Relative Humidity (%): 33%  
 Test Method: ANSI C63.10 (2013), KDB 558074 v05r02: 04/02/2019

Itron, Inc. WD#: 103786 Sequence#: 103 Date: 5/15/2020  
15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS) Test Distance: 3 Meters Horiz



— Readings  
○ Peak Readings  
× QP Readings  
\* Average Readings  
▼ Ambient  
Software Version: 5.03.12  
— 1 - 15.247(e) Peak Power Spectral Density (2400-2483.5 MHz DTS)

**Test Equipment:**

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
T2	ANP06540	Cable	Heliac	8/23/2019	8/23/2021
T3	ANP06515	Cable	Heliac	6/29/2018	6/29/2020
T4	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/5/2019	7/5/2021

**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq MHz	Rdng dB $\mu$ V	T1 dB	T2 dB	T3 dB	T4 dB	Dist Table	Corr dB $\mu$ V/m	Spec dB $\mu$ V/m	Margin dB	Polar Ant
1	2436.504M	65.0	+0.0	+0.6	+2.6	+27.6	+0.0	95.8	109.2 1M	-13.4	Horiz
2	2462.528M	64.9	+0.0	+0.6	+2.7	+27.6	+0.0	95.8	109.2 1M	-13.4	Horiz
3	2412.512M	64.9	+0.0	+0.6	+2.6	+27.6	+0.0	95.7	109.2 1M	-13.5	Horiz
4	2437.640M	64.3	+0.0	+0.6	+2.6	+27.6	+0.0	95.1	109.2 5M	-14.1	Horiz
5	2461.296M	63.8	+0.0	+0.6	+2.7	+27.6	+0.0	94.7	109.2 5M	-14.5	Horiz
6	2438.328M	63.7	+0.0	+0.6	+2.6	+27.6	+0.0	94.5	109.2 11M	-14.7	Horiz
7	2411.648M	63.3	+0.0	+0.6	+2.6	+27.6	+0.0	94.1	109.2 5M	-15.1	Horiz
8	2460.976M	63.1	+0.0	+0.6	+2.7	+27.6	+0.0	94.0	109.2 11M	-15.2	Horiz
9	2412.416M	63.0	+0.0	+0.6	+2.6	+27.6	+0.0	93.8	109.2 11M	-15.4	Horiz
10	2435.752M	62.2	+0.0	+0.6	+2.6	+27.6	+0.0	93.0	109.2 65M	-16.2	Horiz
11	2435.752M	61.8	+0.0	+0.6	+2.6	+27.6	+0.0	92.6	109.2 54M	-16.6	Horiz
12	2460.752M	61.2	+0.0	+0.6	+2.7	+27.6	+0.0	92.1	109.2 65M	-17.1	Horiz
13	2462.936M	61.0	+0.0	+0.6	+2.7	+27.6	+0.0	91.9	109.2 54M	-17.3	Horiz
14	2410.752M	60.9	+0.0	+0.6	+2.6	+27.6	+0.0	91.7	109.2 65M	-17.5	Horiz
15	2410.752M	60.5	+0.0	+0.6	+2.6	+27.6	+0.0	91.3	109.2 54M	-17.9	Horiz
16	2434.509M	59.5	+0.0	+0.6	+2.6	+27.6	+0.0	90.3	109.2 n40	-18.9	Horiz
17	2425.763M	58.6	+0.0	+0.6	+2.6	+27.6	+0.0	89.4	109.2 n40	-19.8	Horiz
18	2449.509M	58.4	+0.0	+0.6	+2.6	+27.6	+0.0	89.2	109.2 n40	-20.0	Horiz

Test Setup Photo(s)



## 15.247(d) Radiated Emissions & Band Edge

### Test Setup / Conditions / Data

Test Location: CKC Laboratories, Inc. • 22116 23rd Drive SE • Bothell, WA 98201 • 435-402-1717  
 Customer: **Itron, Inc.**  
 Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**  
 Work Order #: **103786** Date: 5/14/2020  
 Test Type: **Maximized Emissions** Time: 07:04:37  
 Tested By: Michael Atkinson Sequence#: 101  
 Software: EMITest 5.03.12

#### Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

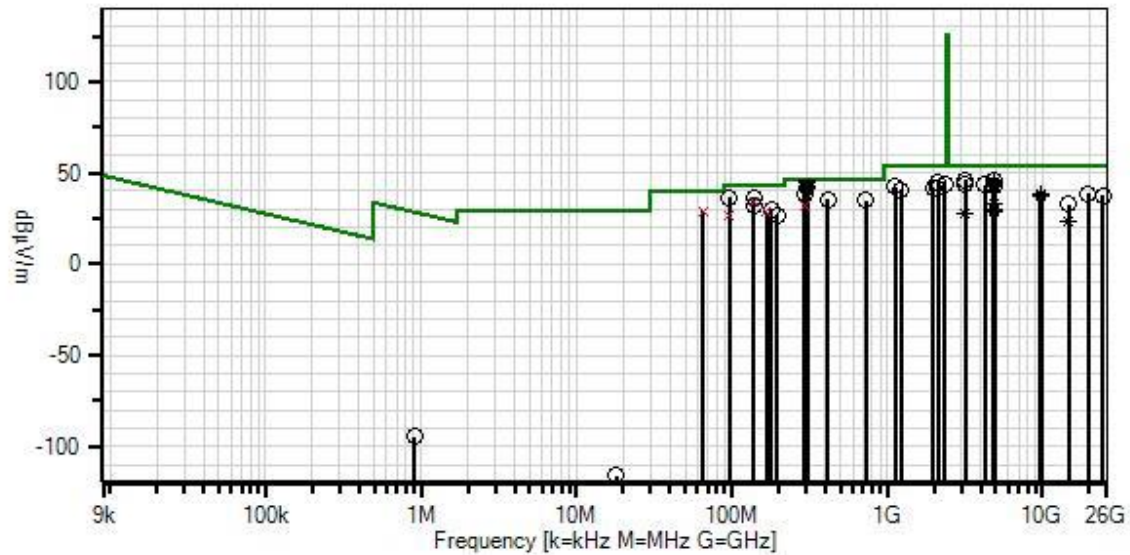
#### Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

#### Test Conditions / Notes:

Temperature: 22°C  
 Pressure: 102.0kPa  
 Humidity: 35%  
 Frequency: 9kHz-25GHz  
 Test Method: ANSI 63.10 (2013)  
 Set up:  
 Vertical and horizontal polarity investigated above 30MHz. 3 x orthogonal axes investigated below 30MHz.  
 Worst case reported.  
 EUT is on the test bench mounted on a pole stand.  
 Transmitting continuously, multiple modulations invested, Low-Mid-High channels investigated. Worst case spur reported for each modulation.  
 Emission marked as ambient if determined unrelated to radio function and is to be ignored against this limit, verified by turning radio function off and no change observed to marked emission amplitude.

Itron, Inc. WO#: 103786 Sequence#: 101 Date: 5/14/2020  
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Various



— Readings  
× QP Readings  
▲ Ambient  
○ Peak Readings  
\* Average Readings  
Software Version: 5.03.12  
1 - 15.247(d) / 15.209 Radiated Spurious Emissions



**Test Equipment:**

ID	Asset #	Description	Model	Cal Date	Cal Due Date
T1	AN03540	Preamp	83017A	5/13/2019	5/13/2021
T2	AN01467	Horn Antenna-ANSI C63.5 Calibration	3115	7/5/2019	7/5/2021
T3	ANP06515	Cable	Heliac	6/29/2018	6/29/2020
T4	ANP06540	Cable	Heliac	8/23/2019	8/23/2021
T5	ANP07504	Cable	CLU40-KMKM-02.00F	1/17/2019	1/17/2021
T6	AN02872	Spectrum Analyzer	E4440A	11/18/2019	11/18/2021
T7	AN03116	High Pass Filter	11SH10-00313	1/22/2019	1/22/2021
T8	AN02741	Active Horn Antenna	AMFW-5F-12001800-20-10P	4/26/2019	4/26/2021
T9	AN02673	Spectrum Analyzer	E4446A	2/22/2019	2/22/2021
T10	AN02742	Active Horn Antenna	AMFW-5F-18002650-20-10P	10/16/2018	10/16/2020
T11	ANP06678	Cable	32026-29801-29801-144	2/20/2020	2/20/2022
T12	ANP05305	Cable	ETSI-50T	9/6/2019	9/6/2021
T13	AN02307	Preamp	8447D	1/10/2020	1/10/2022
T14	ANP05360	Cable	RG214	2/3/2020	2/3/2022
T15	ANP06123	Attenuator	18N-6	4/5/2019	4/5/2021
T16	AN03628	Biconilog Antenna	3142E	6/11/2019	6/11/2021
T17	AN03170	High Pass Filter	HM1155-11SS	10/23/2019	10/23/2021
T18	AN03727	Band Reject Filter	10NSL33-2441.3/E79.4-O/O	2/6/2020	2/6/2022
T19	AN00052	Loop Antenna	6502	5/4/2020	5/4/2022



**Measurement Data:**

Reading listed by margin.

Test Distance: 3 Meters

#	Freq	Rdng	T1 T5 T9 T13 T17	T2 T6 T10 T14 T18	T3 T7 T11 T15 T19	T4 T8 T12 T16	Dist	Corr	Spec	Margin	Polar
	MHz	dB $\mu$ V	dB	dB	dB	dB	Table	dB $\mu$ V/m	dB $\mu$ V/m	dB	Ant
1	305.500M Ambient	49.6	+0.0 +0.0 +0.0 -27.1 +0.0	+0.0 +0.0 +0.0 +1.1 +0.0	+0.0 +0.0 +0.0 +5.8 +0.0	+0.2 +0.0 +0.9 +13.4	+0.0	43.9	46.0	-2.1	Horiz
2	305.151M Ambient	48.5	+0.0 +0.0 +0.0 -27.1 +0.0	+0.0 +0.0 +0.0 +1.1 +0.0	+0.0 +0.0 +0.0 +5.8 +0.0	+0.2 +0.0 +0.9 +13.4	+0.0	42.8	46.0	-3.2	Horiz
3	304.800M Ambient	46.4	+0.0 +0.0 +0.0 -27.1 +0.0	+0.0 +0.0 +0.0 +1.1 +0.0	+0.0 +0.0 +0.0 +5.8 +0.0	+0.2 +0.0 +0.9 +13.3	+0.0	40.6	46.0	-5.4	Vert
4	305.074M Ambient	45.4	+0.0 +0.0 +0.0 -27.1 +0.0	+0.0 +0.0 +0.0 +1.1 +0.0	+0.0 +0.0 +0.0 +5.8 +0.0	+0.2 +0.0 +0.9 +13.4	+0.0	39.7	46.0	-6.3	Vert
5	96.300M	49.3	+0.0 +0.0 +0.0 -27.7 +0.0	+0.0 +0.0 +0.0 +0.6 +0.0	+0.0 +0.0 +0.0 +5.8 +0.0	+0.1 +0.0 +0.5 +7.7	+0.0	36.3	43.5	-7.2	Vert
6	291.900M	44.8	+0.0 +0.0 +0.0 -27.0 +0.0	+0.0 +0.0 +0.0 +1.1 +0.0	+0.0 +0.0 +0.0 +5.8 +0.0	+0.2 +0.0 +0.8 +13.0	+0.0	38.7	46.0	-7.3	Vert
7	3189.000M	45.4	-34.0 +0.5 +0.0 +0.0 +0.0	+29.5 +0.0 +0.0 +0.0 +0.0	+3.1 +1.0 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0 +0.0	+0.0	46.3	54.0	-7.7	Vert
8	138.300M	47.7	+0.0 +0.0 +0.0 -27.5 +0.0	+0.0 +0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +0.0 +5.8 +0.0	+0.1 +0.0 +0.5 +8.4	+0.0	35.7	43.5	-7.8	Vert
9	4873.850M	40.5	-33.6 +0.5 +0.0 +0.0 +0.0	+32.5 +0.0 +0.0 +0.0 +0.0	+4.2 +0.6 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0	+0.0	45.6	54.0 1Mbps Mid	-8.4	Vert

10	4874.028M Ave	39.2	-33.6 +0.5 +0.0 +0.0 +0.0	+32.5 +0.0 +0.0 +0.0 +0.0	+4.2 +0.6 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0 +0.0	+0.0	44.3	54.0 1Mbps Mid	-9.7	Horiz
11	2126.000M	47.1	-34.4 +0.2 +0.0 +0.0 +0.5	+27.8 +0.0 +0.0 +0.0 +0.1	+2.4 +0.0 +0.0 +0.0 +0.0	+0.6 +0.0 +0.0 +0.0 +0.0	+0.0	44.3	54.0	-9.7	Vert
12	138.681M QP	45.6	+0.0 +0.0 +0.0 -27.5 +0.0	+0.0 +0.0 +0.0 +0.7 +0.0	+0.0 +0.0 +0.0 +5.8 +0.0	+0.1 +0.0 +0.0 +8.4 +0.0	+0.0	33.6	43.5	-9.9	Vert
13	4874.025M Ave	38.5	-33.6 +0.5 +0.0 +0.0 +0.6	+32.5 +0.0 +0.0 +0.0 +0.0	+4.2 +0.0 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0 +0.0	+0.0	43.6	54.0 5M Mid	-10.4	Horiz
14	4253.000M	40.1	-33.7 +0.4 +0.0 +0.0 +0.0	+31.6 +0.0 +0.0 +0.0 +0.0	+3.8 +0.6 +0.0 +0.0 +0.0	+0.8 +0.0 +0.0 +0.0 +0.0	+0.0	43.6	54.0	-10.4	Vert
15	416.400M	37.2	+0.0 +0.0 +0.0 -27.7 +0.0	+0.0 +0.0 +0.0 +1.3 +0.0	+0.0 +0.0 +0.0 +5.8 +0.0	+0.2 +0.0 +0.0 +17.7 +0.0	+0.0	35.5	46.0	-10.5	Vert
16	4824.086M Ave	38.6	-33.6 +0.5 +0.0 +0.0 +0.0	+32.4 +0.0 +0.0 +0.0 +0.0	+4.1 +0.6 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0 +0.0	+0.0	43.5	54.0 1Mbps Low	-10.5	Horiz
^	4824.030M	42.9	-33.6 +0.5 +0.0 +0.0 +0.0	+32.4 +0.0 +0.0 +0.0 +0.0	+4.1 +0.6 +0.0 +0.0 +0.0	+0.9 +0.0 +0.0 +0.0 +0.0	+0.0	47.8	54.0 1Mbps Low	-6.2	Horiz
18	65.600M QP	42.7	+0.0 +0.0 +0.0 -27.8 +0.0	+0.0 +0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.0 +5.8 +0.0	+0.1 +0.0 +0.0 +7.5 +0.0	+0.0	29.2	40.0	-10.8	Vert
^	65.600M	47.5	+0.0 +0.0 +0.0 -27.8 +0.0	+0.0 +0.0 +0.0 +0.5 +0.0	+0.0 +0.0 +0.0 +5.8 +0.0	+0.1 +0.0 +0.0 +7.5 +0.0	+0.0	34.0	40.0	-6.0	Vert