Duty Cycle Correction Factor

Antenna Port	Operational Mode	Measured On Time (mS / P_{obs})	Calculated Duty Cycle D	DCCF (dB)
		Test Data Summary		
Wi-Fi	802.11b/1Mbps	11ms/11.76ms	0.935374	0.29
Wi-Fi	802.11b/11Mbps	1.212ms/1.454ms	0.833563	0.79
Wi-Fi	802.11g/6Mbps	1.891ms/2.078ms	0.91001	0.41
Wi-Fi	802.11g/54Mbps	0.4508ms/1.617ms	0.278788	5.55
Wi-Fi	802.11n20/MCS0	1.754ms/1.911ms	0.917844	0.37
Wi-Fi	802.11n20/MCS7	0.392ms/1.578ms	0.248416	6.05

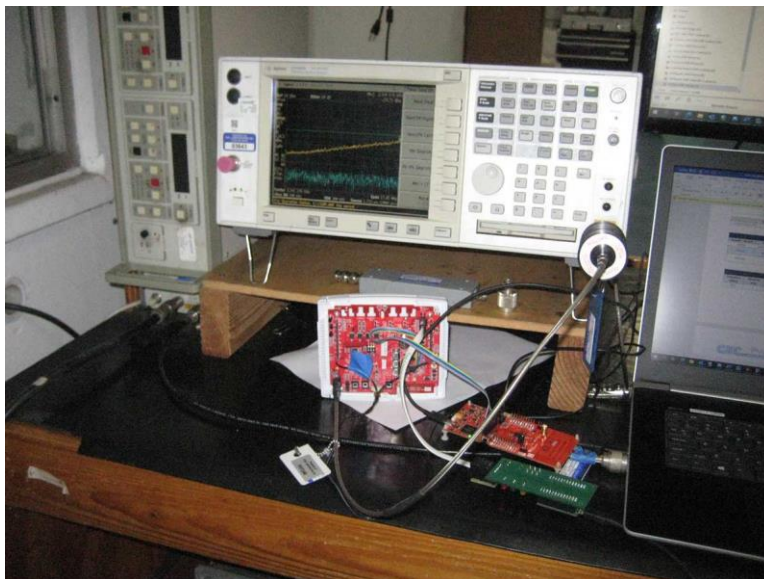Observation Period, P_{obs} is the duration of the pulse train

Measured results are calculated as follows:

$$On\ Time = \left(\sum_{Bursts} RF\ Burst\ On\ Time + \sum_{Control} Control\ Signal\ On\ time \right)\Bigg|_{P_{obs}\ (max\ 100ms)}$$

Duty Cycle Correction Factor (DCCF) is calculated in accordance with ANSI C63.10:

$$DCCF = 10 \cdot Log(\frac{1}{D})$$

Test Setup Photo(s)

15.247(e) Power Spectral Density

<table>
<tr><th colspan="4">Test Setup/Conditions</th></tr>
<tr><td>Test Location:</td><td>Brea Lab A</td><td>Test Engineer:</td><td>Don Nguyen</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10 (2013)
KDB 558074 D01 15.247 Meas
Guidance v05r02</td><td>Test Date(s):</td><td>11/17/2020</td></tr>
<tr><td>Configuration:</td><td colspan="3">1</td></tr>
<tr><td>Test Setup:</td><td colspan="3">EUT is powered from 24Vac AC Adapter and connected to a laptop via USB cable and test board. The laptop is running software CC31XX/CC32XX Radio Tool ver.1.0.3.16 to activate transmitter.
Software setting:
Testing Frequency: 2412, 2437, 2462MHz

Data Rate
802.11b: 1Mbps (DSSS), 11Mbps (CCK)
802.11g: 6Mbps (OFDM), 54Mbps (OFDM)
802.11n20: MCS0 (BPSK), MCS7 (64-QAM)

Modulation: DSSS, CCK, OFDM, BPSK, 64-QAM
Mode: Continuous TX/ Modulated
Packet Size: 1400 Bytes
TX Power Level: 0

Frequency of measurement: 2412, 2437, 2462MHz
RBW=100kHz, VBW=300kHz</td></tr>
</table>

<table>
<tr><th colspan="4">Environmental Conditions</th></tr>
<tr><td>Temperature (ºC)</td><td>23.5</td><td>Relative Humidity (%):</td><td>27</td></tr>
</table>

<table>
<tr><th colspan="6">Test Equipment</th></tr>
<tr><th>Asset#</th><th>Description</th><th>Manufacturer</th><th>Model</th><th>Cal Date</th><th>Cal Due</th></tr>
<tr><td>03643</td><td>Spectrum Analyzer</td><td>Agilent</td><td>E4440</td><td>5/20/2020</td><td>5/20/2021</td></tr>
<tr><td>03431</td><td>Attenuator</td><td>Aeroflex/Weinschel</td><td>89-20-21</td><td>12/20/2019</td><td>12/20/2021</td></tr>
<tr><td>P07246</td><td>Cable</td><td>H&S</td><td>32022-29094K-29094K-24TC</td><td>5/29/2020</td><td>5/29/2022</td></tr>
</table>

Test Data Summary - RF Conducted Measurement

Measurement Method: AVGPSD-2

| Frequency (MHz)	Mode/Data Rate	Measured (dBm/100kHz)	Measured+DDCF (dBm/100kHz)	Limit (dBm/3kHz)	Results
2412	802.11b/1Mbps	-3.659	-3.369	≤8	Pass
2437	802.11b/1Mbps	-3.134	-2.844	≤8	Pass
2462	802.11b/1Mbps	-3.310	-3.02	≤8	Pass
2412	802.11b/11Mbps	-3.770	-2.98	≤8	Pass
2437	802.11b/11Mbps	-4.039	-3.249	≤8	Pass
2462	802.11b/11Mbps	-3.958	-3.168	≤8	Pass
2412	802.11g/6Mbps	-10.701	-10.291	≤8	Pass
2437	802.11g/6Mbps	-6.054	-5.644	≤8	Pass
2462	802.11g/6Mbps	-11.228	-10.818	≤8	Pass
2412	802.11g/54Mbps	-15.216	-9.666	≤8	Pass
2437	802.11g/54Mbps	-14.660	-9.11	≤8	Pass
2462	802.11g/54Mbps	-15.846	-10.296	≤8	Pass
2412	802.11n20/MCS0	-10.600	-10.23	≤8	Pass
2437	802.11n20/MCS0	-7.532	-7.162	≤8	Pass
2462	802.11n20/MCS0	-11.708	-11.338	≤8	Pass
2412	802.11n20/MCS7	-15.438	-9.388	≤8	Pass
2437	802.11n20/MCS7	-15.603	-9.553	≤8	Pass
2462	802.11n20/MCS7	-16.774	-10.724	≤8	Pass

Plots
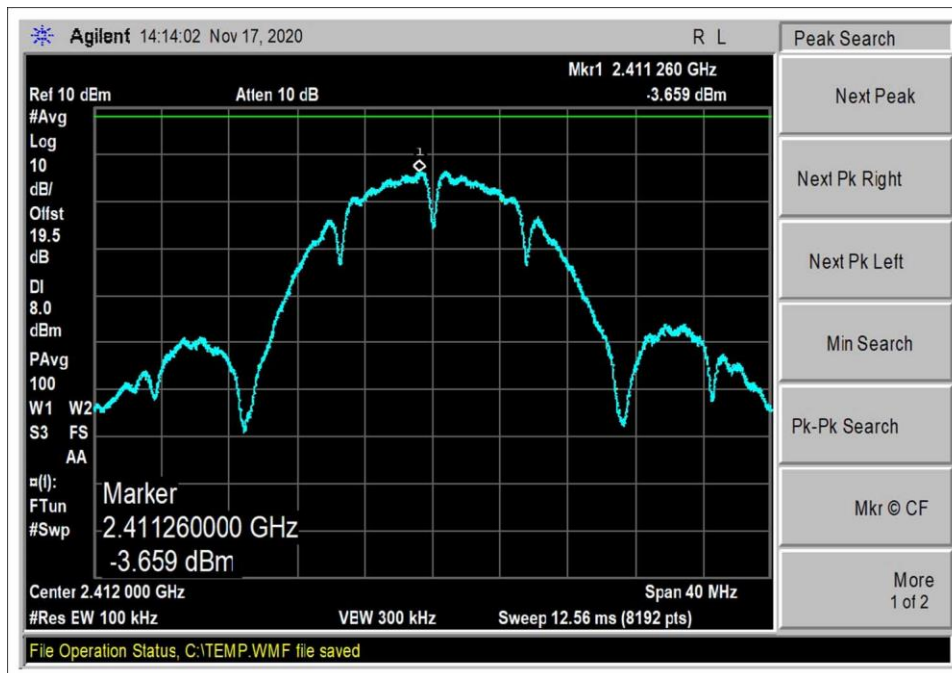
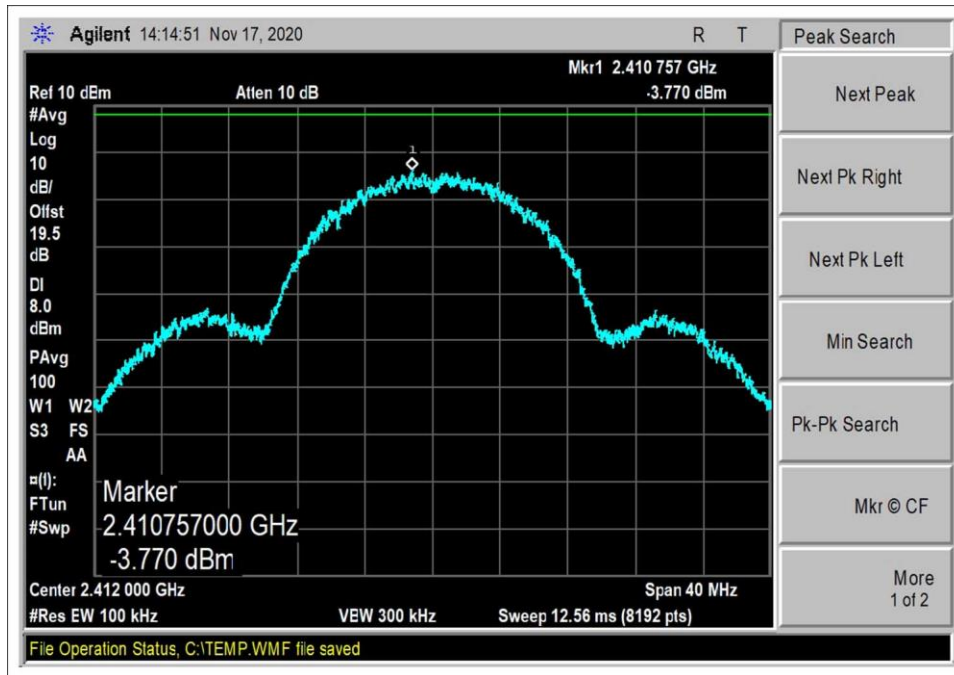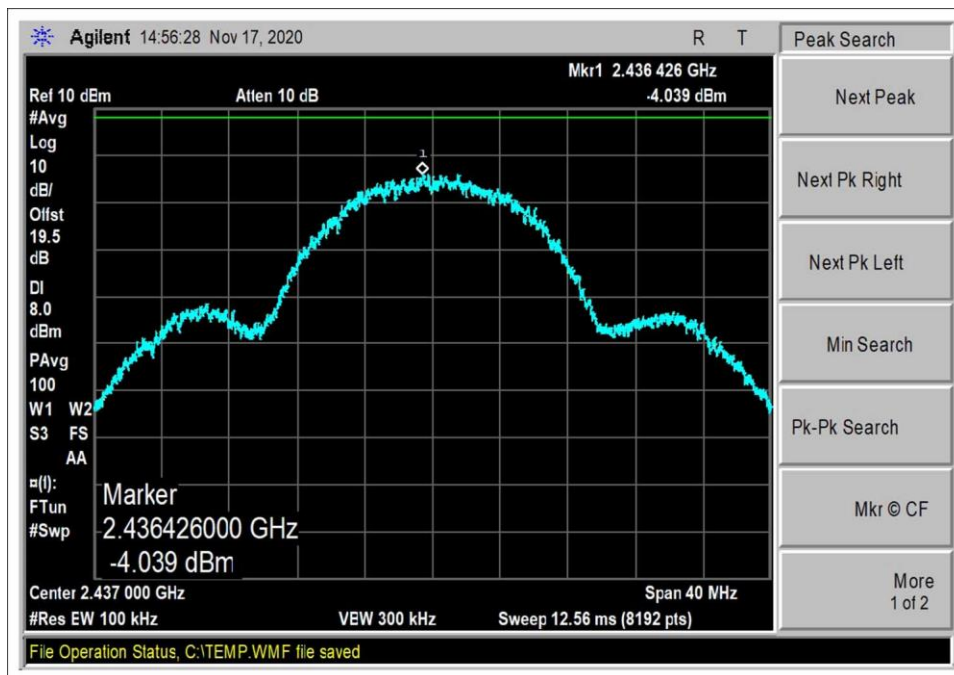802.11b 1Mbps; Low Channel
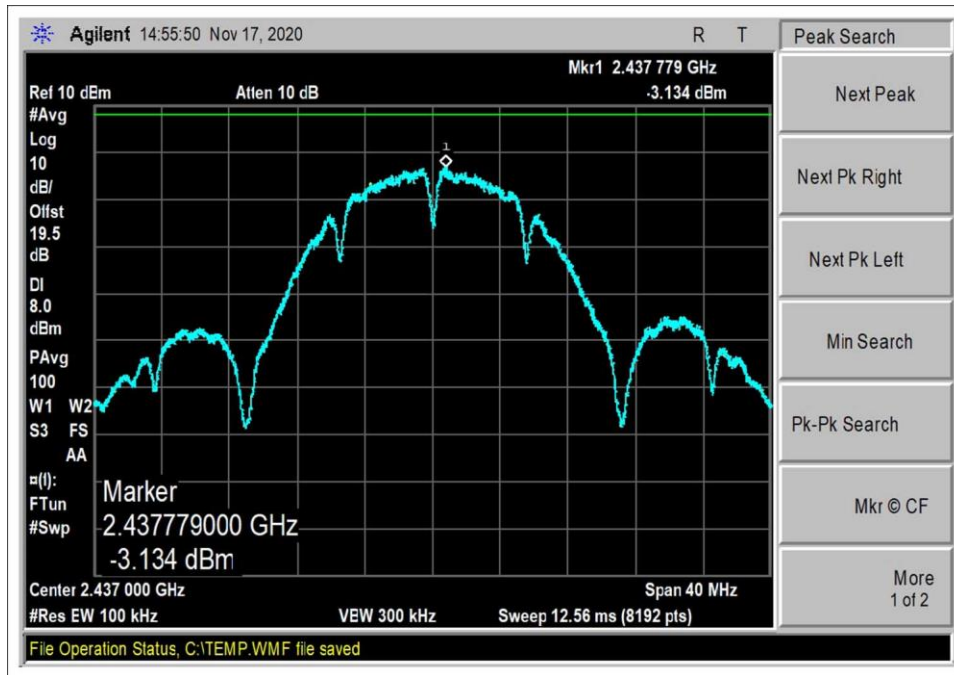
802.11b 1Mbps; Middle Channel
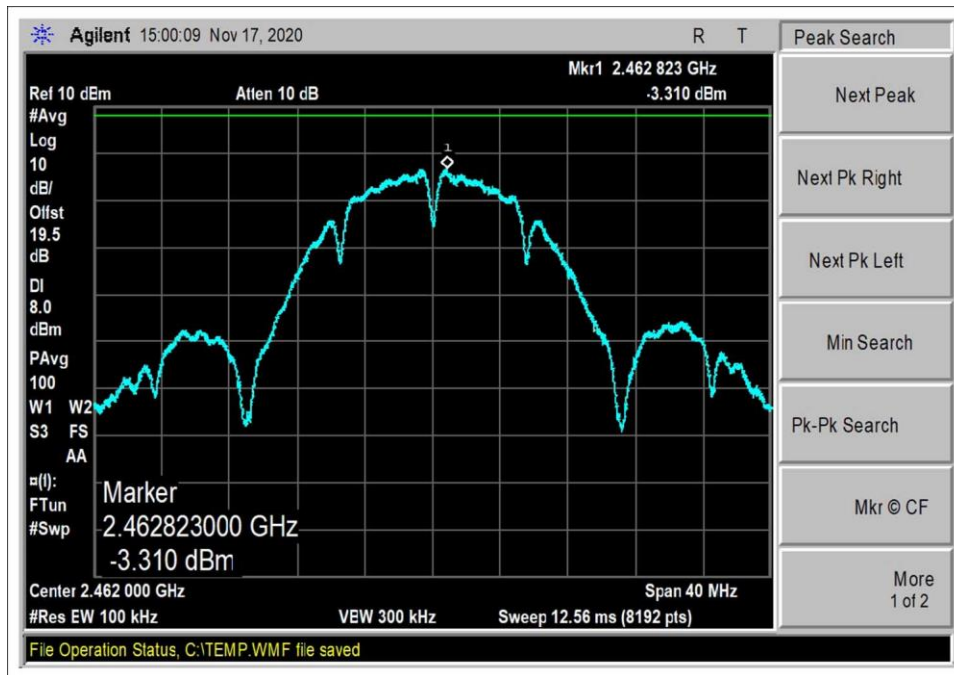
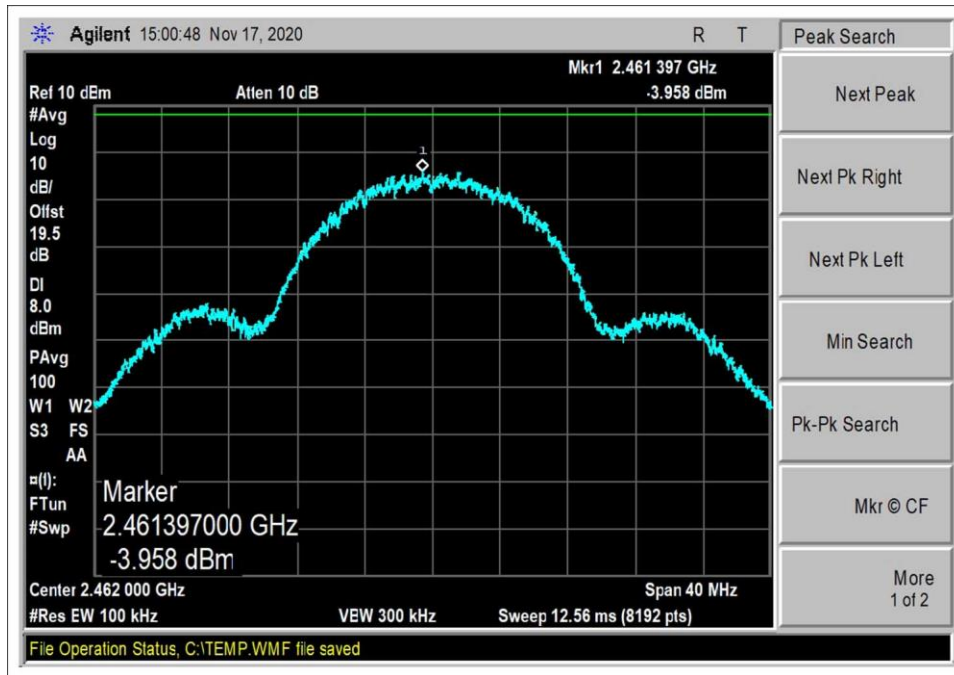

802.11b 1Mbps; High Channel

802.11b 11Mbps; Low Channel

802.11b 11Mbps; Middle Channel

802.11b 11Mbps; High Channel

802.11g 6Mbps; Low Channel

802.11g 6Mbps; Middle Channel

802.11g 6Mbps; High Channel
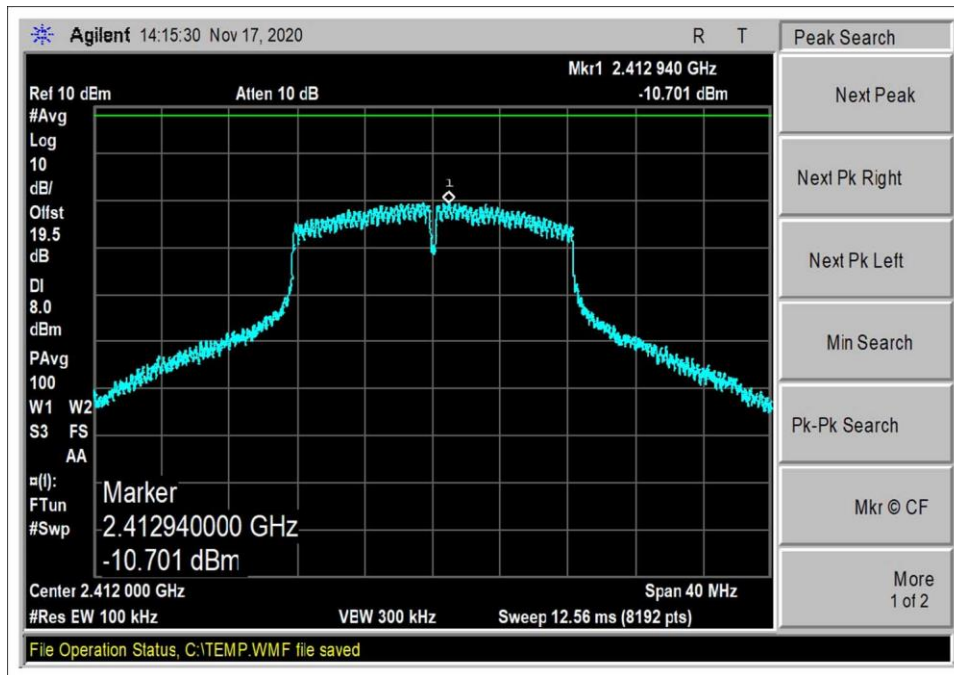
802.11g 54Mbps; Low Channel

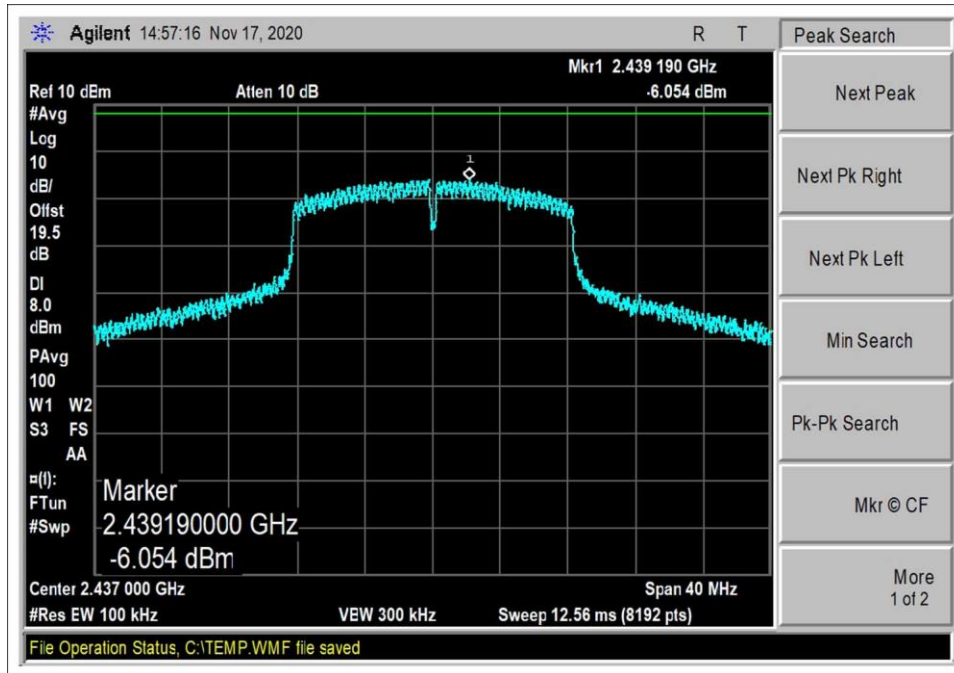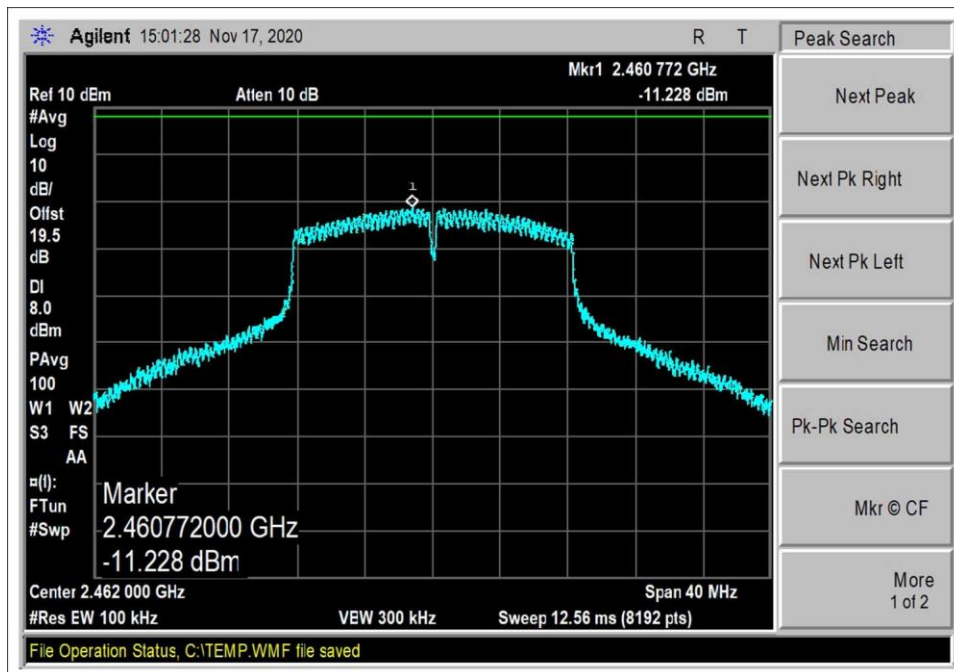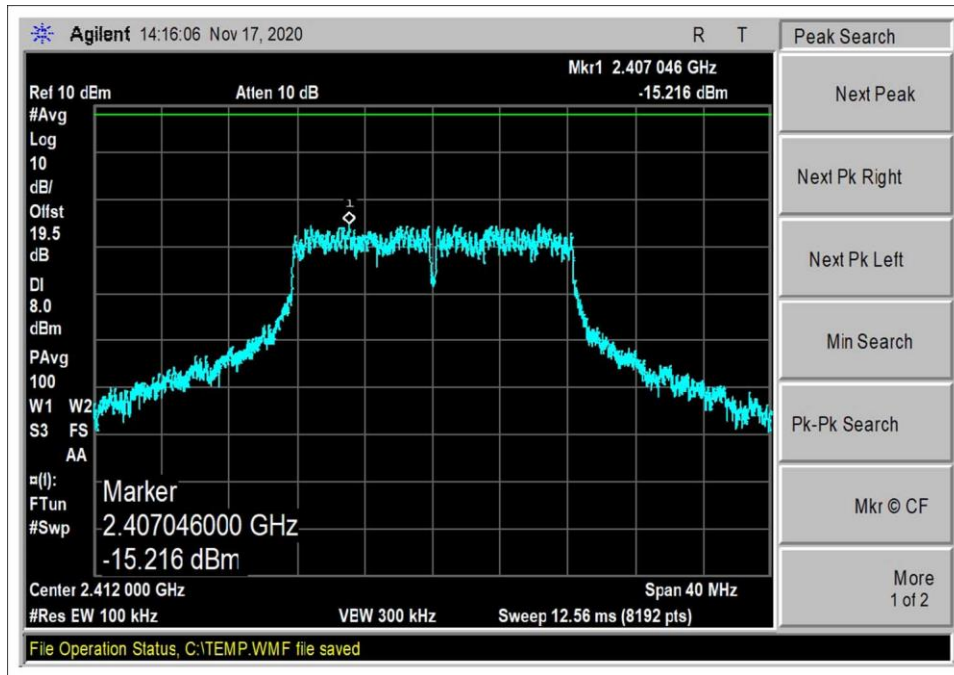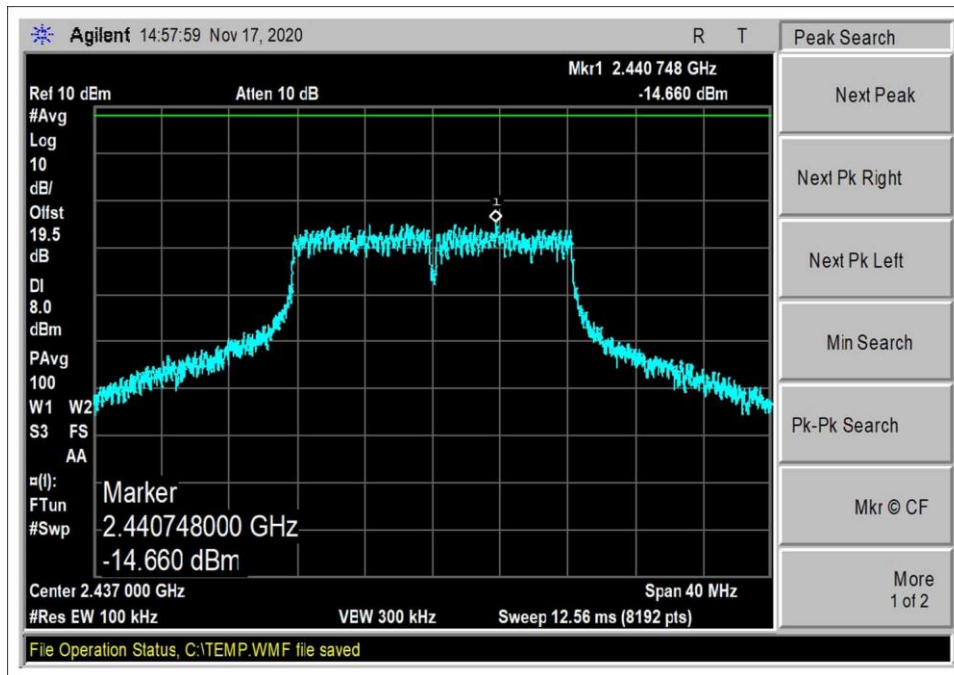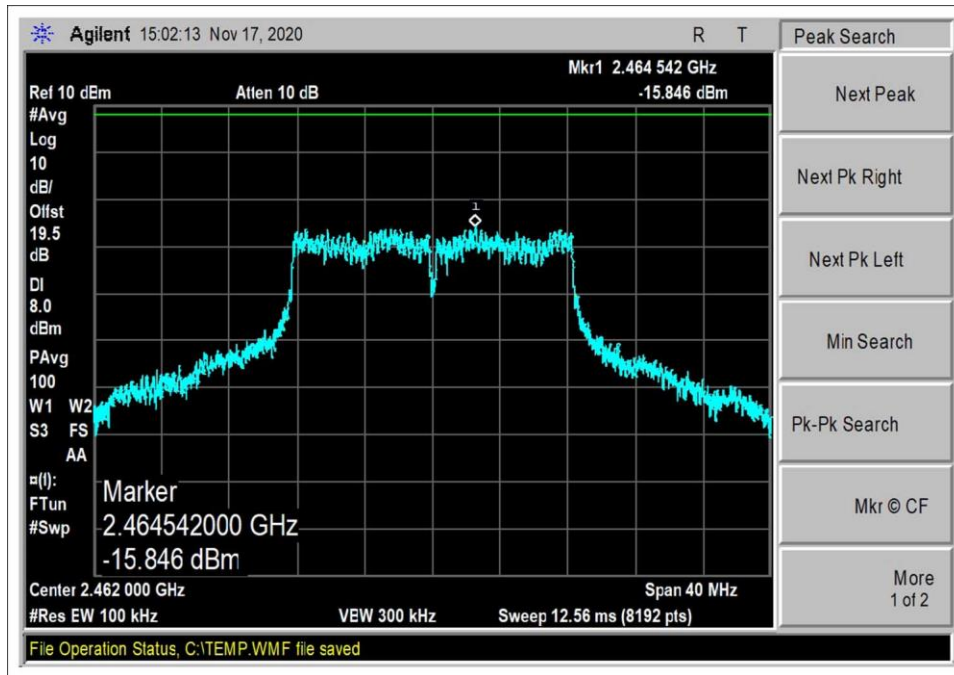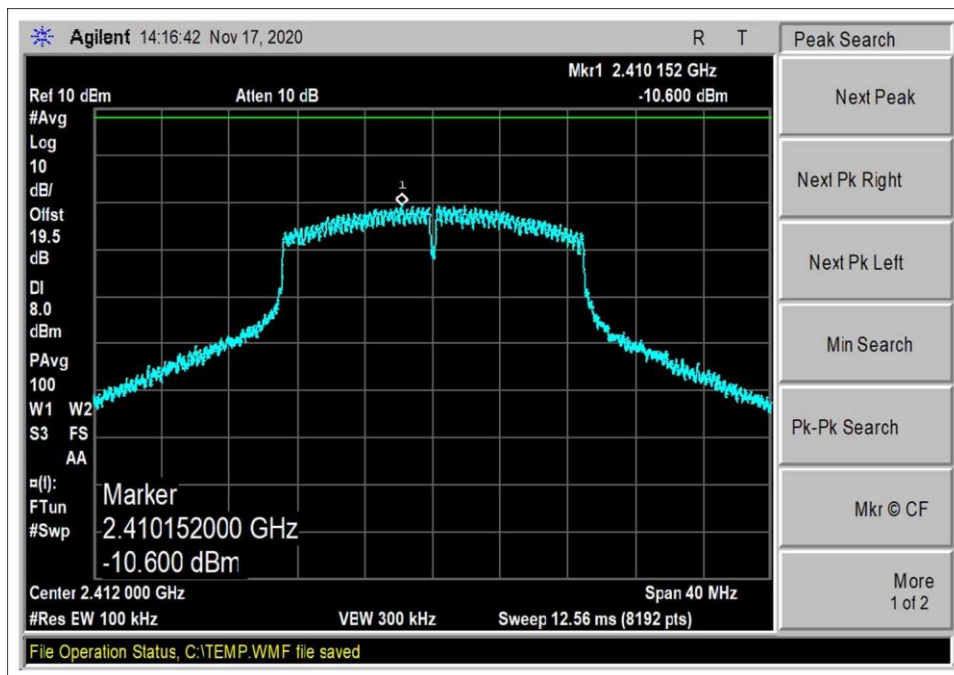802.11g 54Mbps; Middle Channel

802.11g 54Mbps; High Channel

802.11n20 MCS0; Low Channel
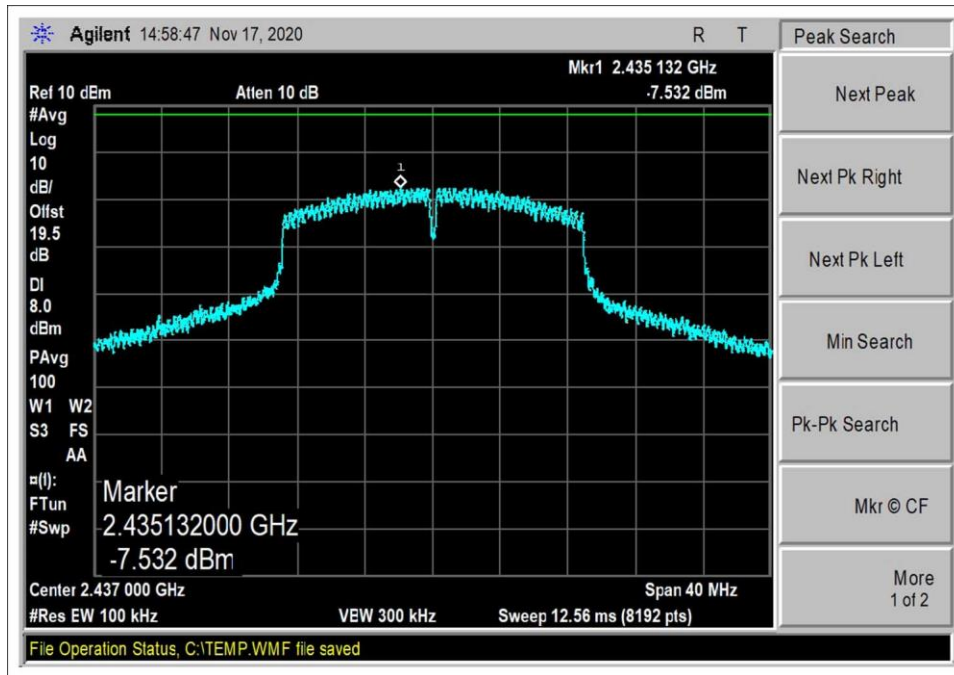
802.11n20MCS0; Middle Channel
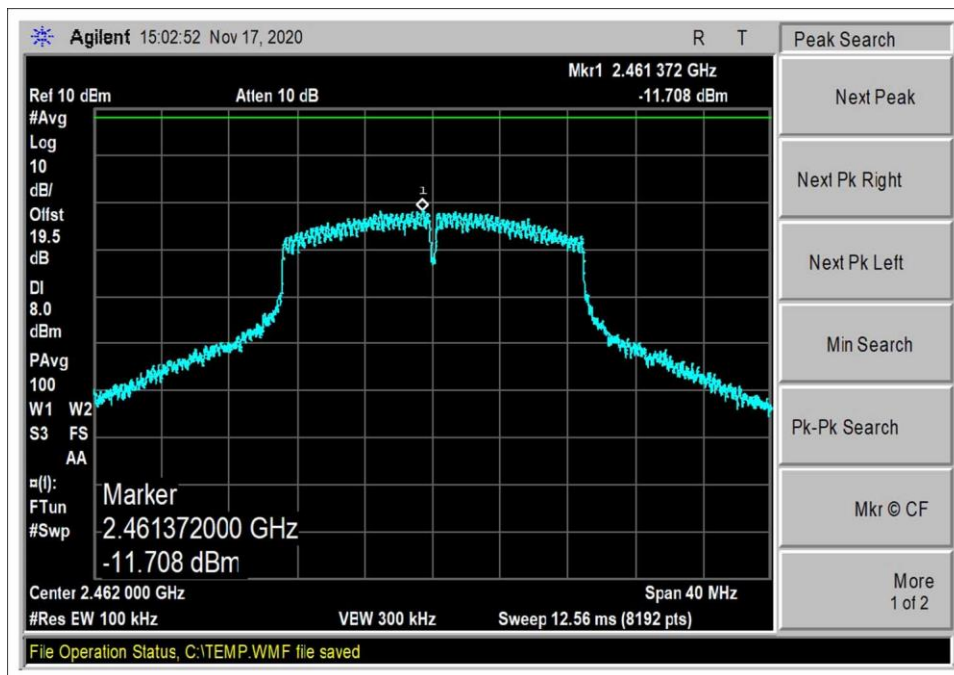
802.11n20 MCS0; High Channel
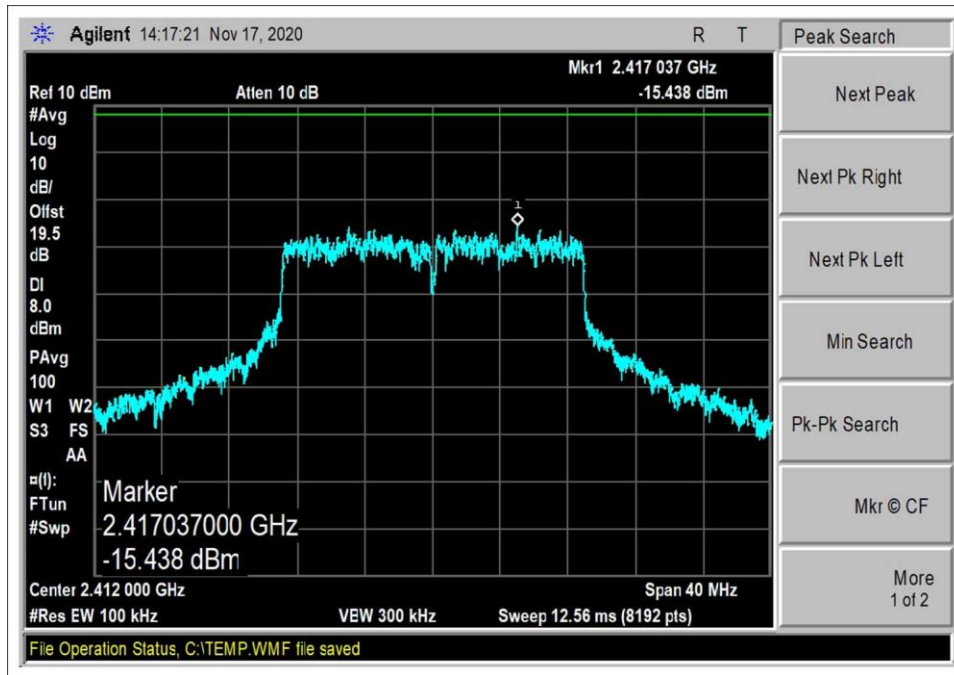
802.11n20 MCS7; Low Channel
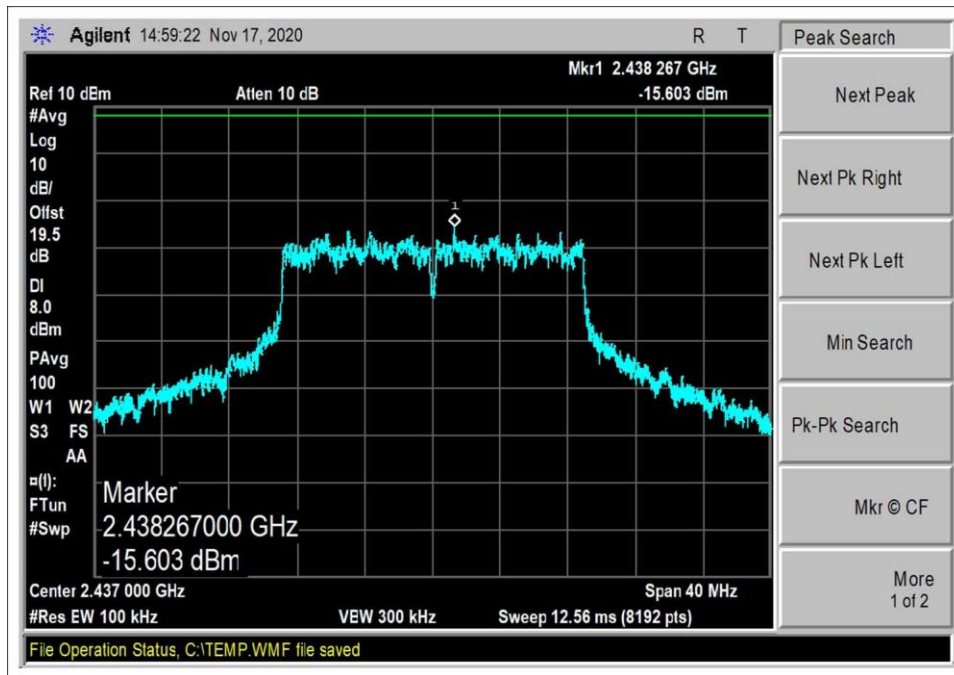
802.11n20 MCS7; Middle Channel
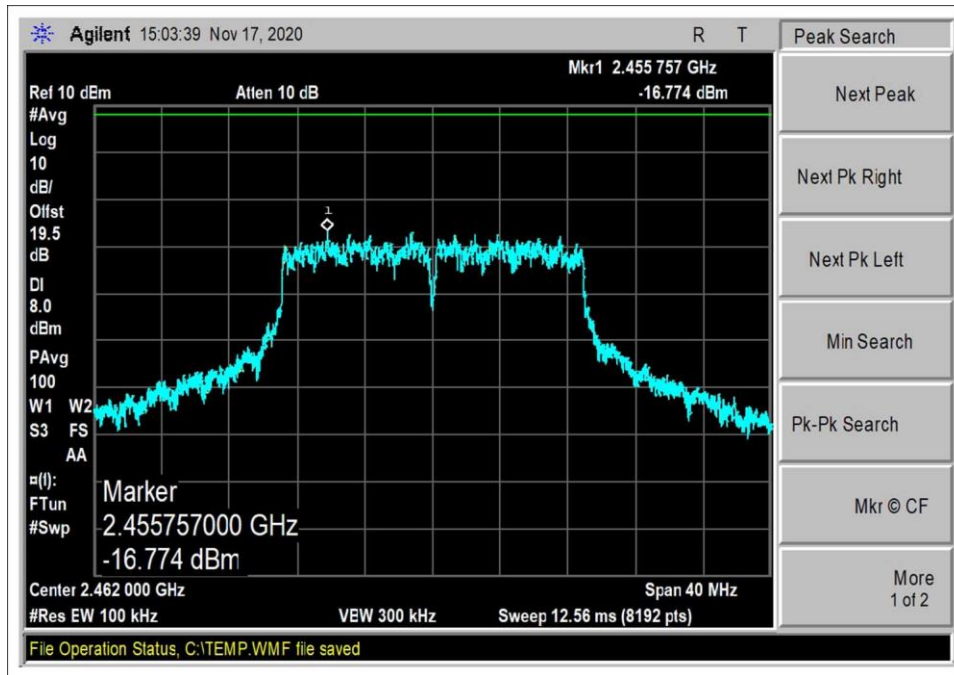
802.11n20 MCS7; High Channel

Test Setup Photo(s)
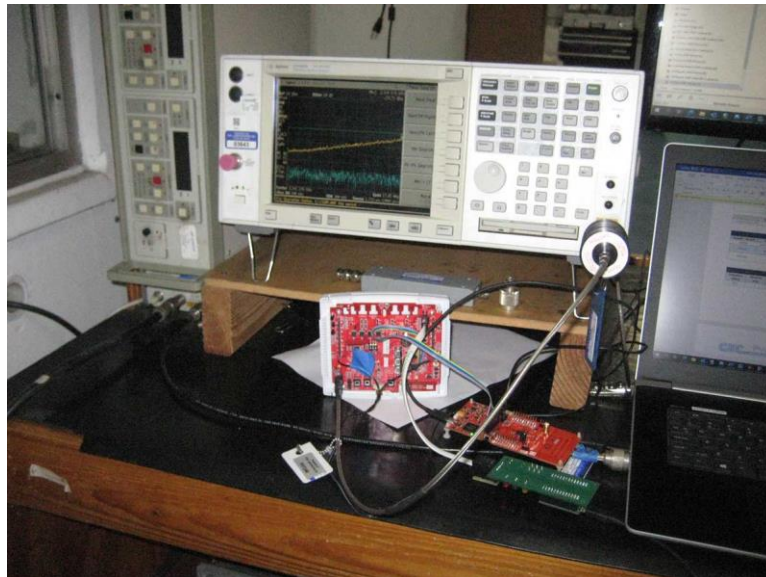
15.247(d) RF Conducted Emissions & Band Edge

Test Setup / Conditions / Data

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
Customer: **Venstar, Inc.**
Specification: **15.247(d) Conducted Spurious Emissions**
Work Order #:   **104728**   Date: 11/24/2020
Test Type: **Conducted Emissions**   Time: 14:08:45
Tested By: Don Nguyen   Sequence#: 2
Software: EMITest 5.03.19   24Vac

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

EUT is powered from 24Vac AC Adapter and connected to a laptop via USB cable and test board. The laptop is running software CC31XX/CC32XX Radio Tool ver.1.0.3.16 to activate transmitter.
Software setting:
Testing Frequency: 2412, 2437, 2462MHz

Data Rate
802.11b: 1Mbps
Modulation: DSSS
Mode: Continuous TX/ Modulated
Packet Size: 1400 Bytes
TX Power Level: 0

Frequency of Measurement: 9kHz-25GHz
RBW=100kHz, VBW=300kHz

Test Environment Conditions:
Temperature: 24.9°C
Relative Humidity: 26%

Test Methods: ANSI C63.10 (2013)
KDB 558074 D01 15.247 Meas Guidance v05r02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07246	Cable	32022-29094K-29094K-24TC	5/29/2020	5/29/2022
T2	AN03431	Attenuator	89-20-21	12/20/2019	12/20/2021
	AN03643	Spectrum Analyzer	E4440A	5/20/2020	5/20/2022

Measurement Data: Reading listed by margin.   Test Lead: Antenna Port

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	4103.100M	34.9	+0.6	+19.3			+0.0	54.8	80.7	-25.9	Anten
2	4063.000M	34.5	+0.6	+19.3			+0.0	54.4	80.7	-26.3	Anten
3	4021.700M	33.7	+0.6	+19.3			+0.0	53.6	80.7	-27.1	Anten
4	3249.700M	30.3	+0.5	+19.3			+0.0	50.1	80.7	-30.6	Anten
5	3283.100M	30.1	+0.5	+19.3			+0.0	49.9	80.7	-30.8	Anten
6	7386.400M	29.6	+0.9	+19.3			+0.0	49.8	80.7	-30.9	Anten
7	7311.750M	29.5	+0.8	+19.2			+0.0	49.5	80.7	-31.2	Anten
8	7236.790M	29.4	+0.8	+19.2			+0.0	49.4	80.7	-31.3	Anten
9	3216.043M	28.8	+0.5	+19.3			+0.0	48.6	80.7	-32.1	Anten

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
Customer: **Venstar, Inc.**
Specification: **15.247(d) Conducted Spurious Emissions**
Work Order #: **104728**   Date: 11/24/2020
Test Type: **Conducted Emissions**   Time: 14:12:10
Tested By: Don Nguyen   Sequence#: 3
Software: EMITest 5.03.19   24Vac

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

EUT is powered from 24Vac AC Adapter and connected to a laptop via USB cable and test board. The laptop is running software CC31XX/CC32XX Radio Tool ver.1.0.3.16 to activate transmitter.
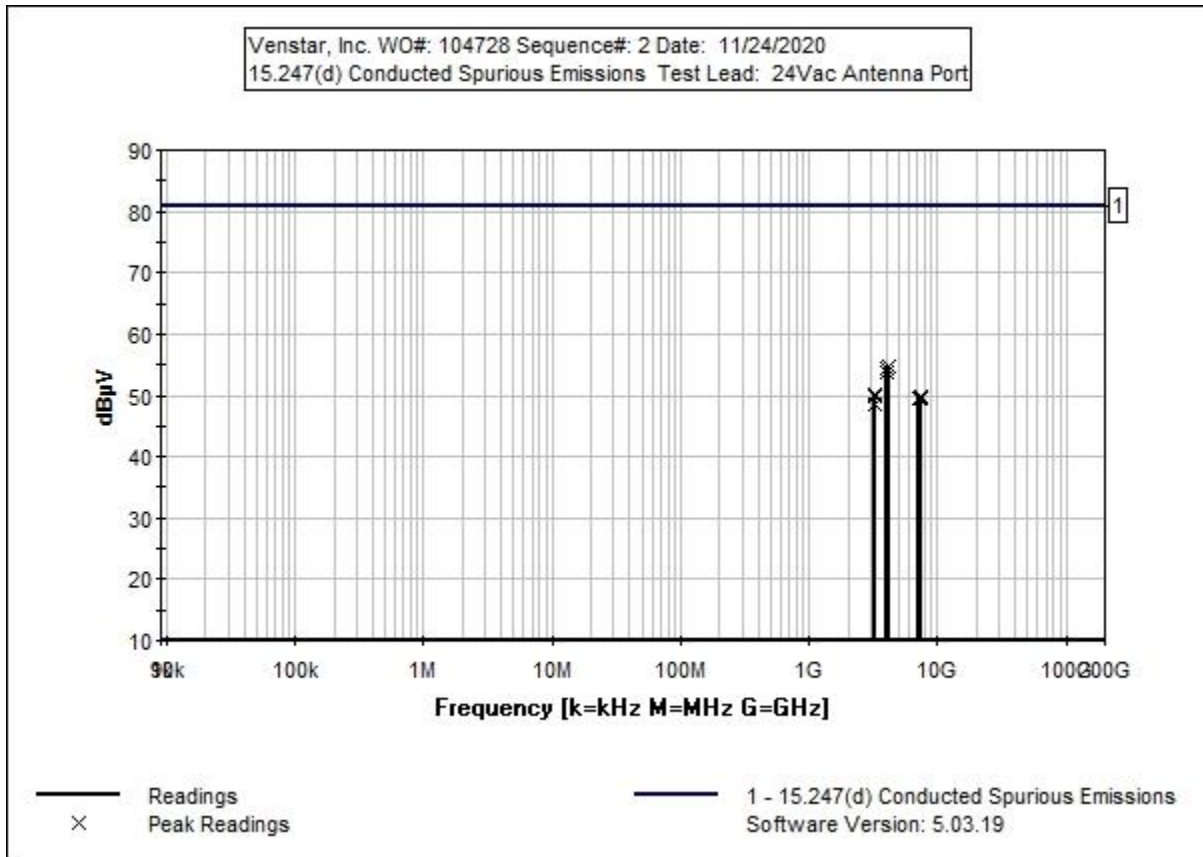Software setting:
Testing Frequency: 2412, 2437, 2462MHz

Data Rate
802.11b: 11Mbps
Modulation: CCK
Mode: Continuous TX/ Modulated
Packet Size: 1400 Bytes
TX Power Level: 0

Frequency of Measurement: 9kHz-25GHz
RBW=100kHz, VBW=300kHz

Test Environment Conditions:
Temperature: 24.9°C
Relative Humidity: 26%

Test Methods: ANSI C63.10 (2013)
KDB 558074 D01 15.247 Meas Guidance v05r02

Venstar, Inc. WO#: 104728 Sequence#: 3 Date: 11/24/2020
15.247(d) Conducted Spurious Emissions Test Lead: 24Vac Antenna Port

Readings
× Peak Readings

1 - 15.247(d) Conducted Spurious Emissions
Software Version: 5.03.19

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07246	Cable	32022-29094K-29094K-24TC	5/29/2020	5/29/2022
T2	AN03431	Attenuator	89-20-21	12/20/2019	12/20/2021
	AN03643	Spectrum Analyzer	E4440A	5/20/2020	5/20/2022

Measurement Data: Reading listed by margin.   Test Lead: Antenna Port

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	4021.300M	36.3	+0.6	+19.3			+0.0	56.2	82.7	-26.5	Anten
2	4102.300M	35.4	+0.6	+19.3			+0.0	55.3	82.7	-27.4	Anten
3	4063.000M	34.0	+0.6	+19.3			+0.0	53.9	82.7	-28.8	Anten
4	7238.100M	30.5	+0.8	+19.2			+0.0	50.5	82.7	-32.2	Anten
5	7314.800M	29.8	+0.8	+19.2			+0.0	49.8	82.7	-32.9	Anten
6	7384.900M	29.2	+0.9	+19.3			+0.0	49.4	82.7	-33.3	Anten
7	3248.900M	29.4	+0.5	+19.3			+0.0	49.2	82.7	-33.5	Anten
8	3282.600M	29.4	+0.5	+19.3			+0.0	49.2	82.7	-33.5	Anten
9	3216.400M	29.2	+0.5	+19.3			+0.0	49.0	82.7	-33.7	Anten

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
Customer: **Venstar, Inc.**
Specification: **15.247(d) Conducted Spurious Emissions**
Work Order #: **104728**   Date: 11/24/2020
Test Type: **Conducted Emissions**   Time: 14:15:52
Tested By: Don Nguyen   Sequence#: 4
Software: EMITest 5.03.19   24Vac

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

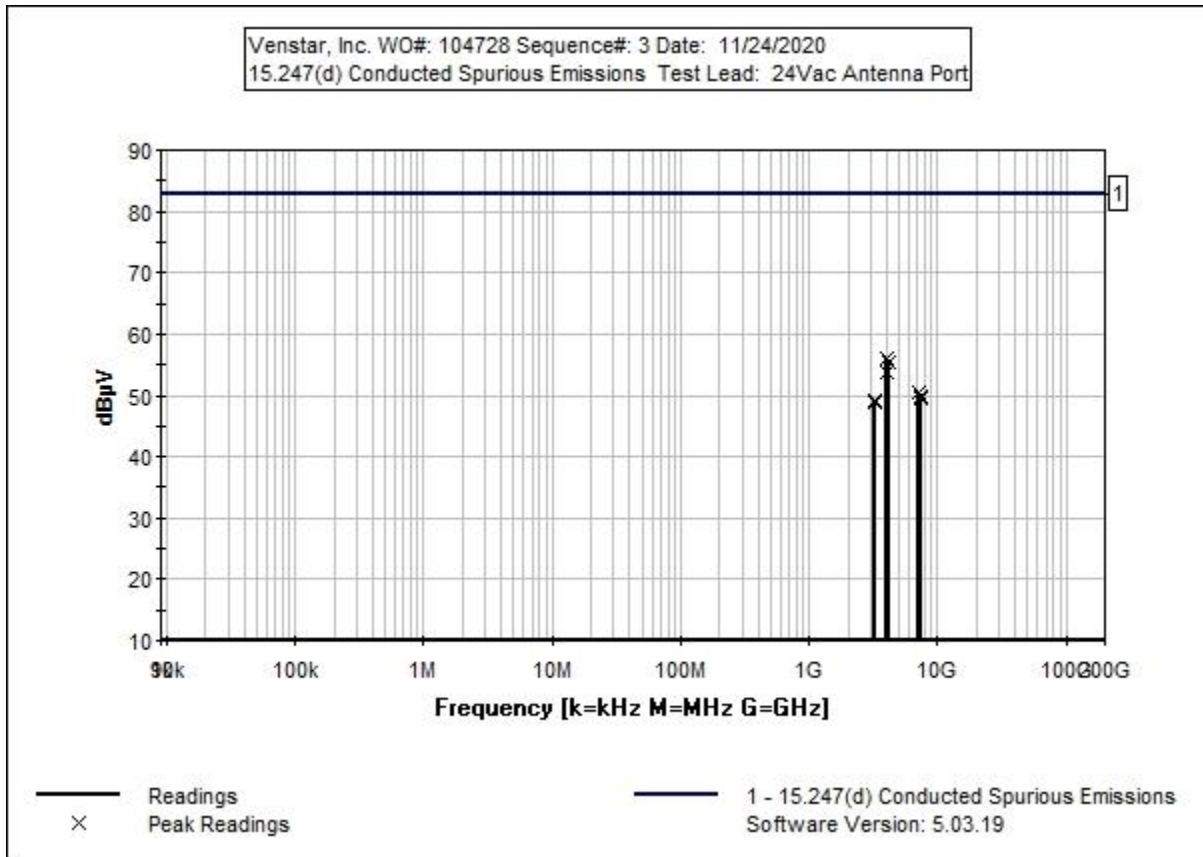| Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

EUT is powered from 24Vac AC Adapter and connected to a laptop via USB cable and test board. The laptop is running software CC31XX/CC32XX Radio Tool ver.1.0.3.16 to activate transmitter.
Software setting:
Testing Frequency: 2412, 2437, 2462MHz

Data Rate
802.11g: 6Mbps
Modulation: OFDM
Mode: Continuous TX/ Modulated
Packet Size: 1400 Bytes
TX Power Level: 0

Frequency of Measurement: 9kHz-25GHz
RBW=100kHz, VBW=300kHz

Test Environment Conditions:
Temperature: 24.9°C
Relative Humidity: 26%

Test Methods: ANSI C63.10 (2013)
KDB 558074 D01 15.247 Meas Guidance v05r02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07246	Cable	32022-29094K-29094K-24TC	5/29/2020	5/29/2022
T2	AN03431	Attenuator	89-20-21	12/20/2019	12/20/2021
	AN03643	Spectrum Analyzer	E4440A	5/20/2020	5/20/2022

Measurement Data: Reading listed by margin. Test Lead: Antenna Port

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	4064.300M	32.0	+0.6	+19.3			+0.0	51.9	78.7	-26.8	Anten
2	7317.800M	31.8	+0.8	+19.2			+0.0	51.8	78.7	-26.9	Anten
3	3282.600M	29.9	+0.5	+19.3			+0.0	49.7	78.7	-29.0	Anten
4	3249.500M	29.8	+0.5	+19.3			+0.0	49.6	78.7	-29.1	Anten
5	3216.200M	29.6	+0.5	+19.3			+0.0	49.4	78.7	-29.3	Anten
6	4013.900M	29.1	+0.6	+19.3			+0.0	49.0	78.7	-29.7	Anten
7	3215.900M	29.1	+0.5	+19.3			+0.0	48.9	78.7	-29.8	Anten
8	4102.700M	28.8	+0.6	+19.3			+0.0	48.7	78.7	-30.0	Anten

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
Customer: **Venstar, Inc.**
Specification: **15.247(d) Conducted Spurious Emissions**
Work Order #: **104728**　　　　　　　　　　　　　　　Date: 11/24/2020
Test Type: **Conducted Emissions**　　　　　　　　　Time: 14:21:25
Tested By: Don Nguyen　　　　　　　　　　　　　Sequence#: 5
Software: EMITest 5.03.19　　　　　　　　　　　　　24Vac

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

EUT is powered from 24Vac AC Adapter and connected to a laptop via USB cable and test board. The laptop is running software CC31XX/CC32XX Radio Tool ver.1.0.3.16 to activate transmitter.
Software setting:
Testing Frequency: 2412, 2437, 2462MHz

Data Rate
802.11g: 54Mbps
Modulation: OFDM
Mode: Continuous TX/ Modulated
Packet Size: 1400 Bytes
TX Power Level: 0

Frequency of Measurement: 9kHz-25GHz
RBW=100kHz, VBW=300kHz

Test Environment Conditions:
Temperature: 24.9°C
Relative Humidity: 26%

Test Methods: ANSI C63.10 (2013)
KDB 558074 D01 15.247 Meas Guidance v05r02

Venstar, Inc. WO#: 104728 Sequence#: 5 Date: 11/24/2020
15.247(d) Conducted Spurious Emissions Test Lead: 24Vac Antenna Port

Readings
× Peak Readings

1 - 15.247(d) Conducted Spurious Emissions
Software Version: 5.03.19

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07246	Cable	32022-29094K-29094K-24TC	5/29/2020	5/29/2022
T2	AN03431	Attenuator	89-20-21	12/20/2019	12/20/2021
	AN03643	Spectrum Analyzer	E4440A	5/20/2020	5/20/2022

Measurement Data: Reading listed by margin.   Test Lead: Antenna Port

#	Freq MHz	Rdng dBμV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBμV	Spec dBμV	Margin dB	Polar Ant
1	4024.200M	30.1	+0.6	+19.3			+0.0	50.0	75.7	-25.7	Anten
2	4110.600M	29.5	+0.6	+19.3			+0.0	49.4	75.7	-26.3	Anten
3	4059.300M	29.4	+0.6	+19.3			+0.0	49.3	75.7	-26.4	Anten

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
Customer: **Venstar, Inc.**
Specification: **15.247(d) Conducted Spurious Emissions**
Work Order #: **104728**   Date: 11/24/2020
Test Type: **Conducted Emissions**   Time: 14:25:20
Tested By: Don Nguyen   Sequence#: 6
Software: EMITest 5.03.19   24Vac

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

EUT is powered from 24Vac AC Adapter and connected to a laptop via USB cable and test board. The laptop is running software CC31XX/CC32XX Radio Tool ver.1.0.3.16 to activate transmitter.
Software setting:
Testing Frequency: 2412, 2437, 2462MHz

Data Rate
802.11n20: MCS0
Modulation: BPSK
Mode: Continuous TX/ Modulated
Packet Size: 1400 Bytes
TX Power Level: 0

Frequency of Measurement: 9kHz-25GHz
RBW=100kHz, VBW=300kHz

Test Environment Conditions:
Temperature: 24.9°C
Relative Humidity: 26%

Test Methods: ANSI C63.10 (2013)
KDB 558074 D01 15.247 Meas Guidance v05r02

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07246	Cable	32022-29094K-29094K-24TC	5/29/2020	5/29/2022
T2	AN03431	Attenuator	89-20-21	12/20/2019	12/20/2021
	AN03643	Spectrum Analyzer	E4440A	5/20/2020	5/20/2022

Measurement Data: Reading listed by margin.   Test Lead: Antenna Port

#	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	4060.500M	31.6	+0.6	+19.3			+0.0	51.5	78.5	-27.0	Anten
2	4108.900M	29.1	+0.6	+19.3			+0.0	49.0	78.5	-29.5	Anten
3	4018.700M	28.7	+0.6	+19.3			+0.0	48.6	78.5	-29.9	Anten

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
Customer: **Venstar, Inc.**
Specification: **15.247(d) Conducted Spurious Emissions**
Work Order #: **104728**   Date: 11/24/2020
Test Type: **Conducted Emissions**   Time: 14:27:40
Tested By: Don Nguyen   Sequence#: 7
Software: EMITest 5.03.19   24Vac

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 1			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 1			

Test Conditions / Notes:

EUT is powered from 24Vac AC Adapter and connected to a laptop via USB cable and test board. The laptop is running software CC31XX/CC32XX Radio Tool ver.1.0.3.16 to activate transmitter.
Software setting:
Testing Frequency: 2412, 2437, 2462MHz

Data Rate
802.11n20: MCS7
Modulation: 64-QAM
Mode: Continuous TX/ Modulated
Packet Size: 1400 Bytes
TX Power Level: 0

Frequency of Measurement: 9kHz-25GHz
RBW=100kHz, VBW=300kHz

Test Environment Conditions:
Temperature: 24.9°C
Relative Humidity: 26%

Test Methods: ANSI C63.10 (2013)
KDB 558074 D01 15.247 Meas Guidance v05r02

Venstar, Inc. WO#: 104728 Sequence#: 7 Date: 11/24/2020
15.247(d) Conducted Spurious Emissions Test Lead: 24Vac Antenna Port

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
T1	ANP07246	Cable	32022-29094K-29094K-24TC	5/29/2020	5/29/2022
T2	AN03431	Attenuator	89-20-21	12/20/2019	12/20/2021
	AN03643	Spectrum Analyzer	E4440A	5/20/2020	5/20/2022

Measurement Data: Reading listed by margin. Test Lead: Antenna Port

| #	Freq MHz	Rdng dBµV	T1 dB	T2 dB	dB	dB	Dist Table	Corr dBµV	Spec dBµV	Margin dB	Polar Ant
1	4058.800M	28.8	+0.6	+19.3			+0.0	48.7	74.4	-25.7	Anten
2	4104.800M	27.9	+0.6	+19.3			+0.0	47.8	74.4	-26.6	Anten
3	4013.500M	27.8	+0.6	+19.3			+0.0	47.7	74.4	-26.7	Anten

Band Edge

Band Edge Summary

Limit applied: Max Power/100kHz - 30dB (When average power limit is applied).

Frequency (MHz)	Modulation	Measured (dBm)	Limit (dBm)	Results
2400.0	802.11b/1Mbps	-37.14	< -26.3	Pass
2483.5	802.11b/1Mbps	-43.12	< -26.3	Pass
2400.0	802.11b/11Mbps	-28.27	< -24.3	Pass
2483.5	802.11b/11Mbps	-43.24	< -24.3	Pass
2400.0	802.11g/6Mbps	-33.20	< -28.3	Pass
2483.5	802.11g/6Mbps	-46.60	< -28.3	Pass
2400.0	802.11g/54Mbps	-32.15	< -31.3	Pass
2483.5	802.11g/54Mbps	-46.35	< -31.3	Pass
2400.0	802.11n20/MCS0	-32.36	< -28.5	Pass
2483.5	802.11n20/MCS0	-45.90	< -28.5	Pass
2400.0	802.11n20/MCS7	-35.18	< -32.6	Pass
2483.5	802.11n20/MCS7	-46.42	< -32.6	Pass

Band Edge Plots
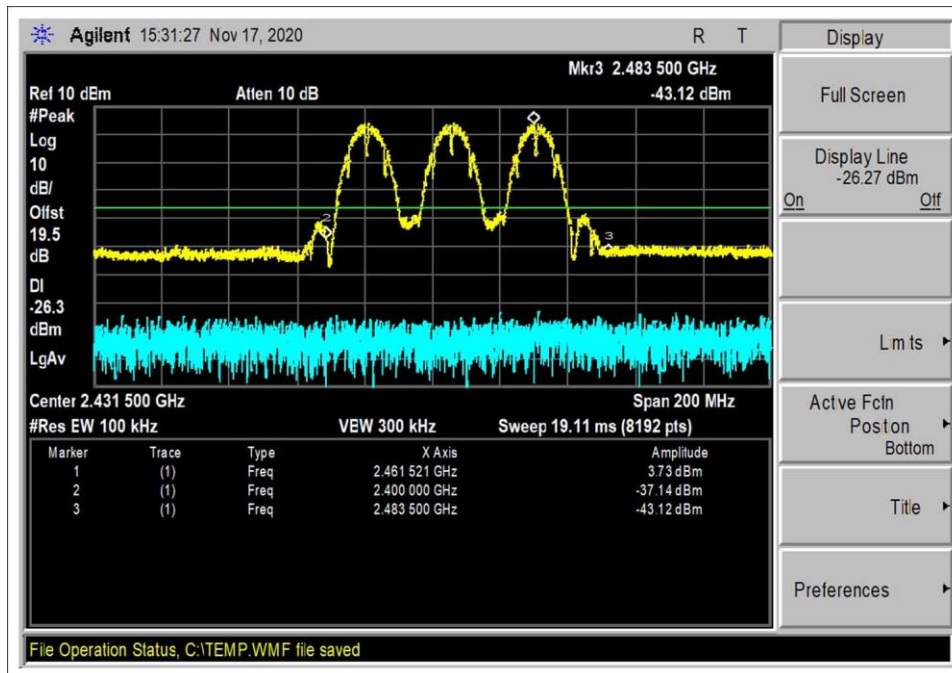
1Mbps; 802.11b
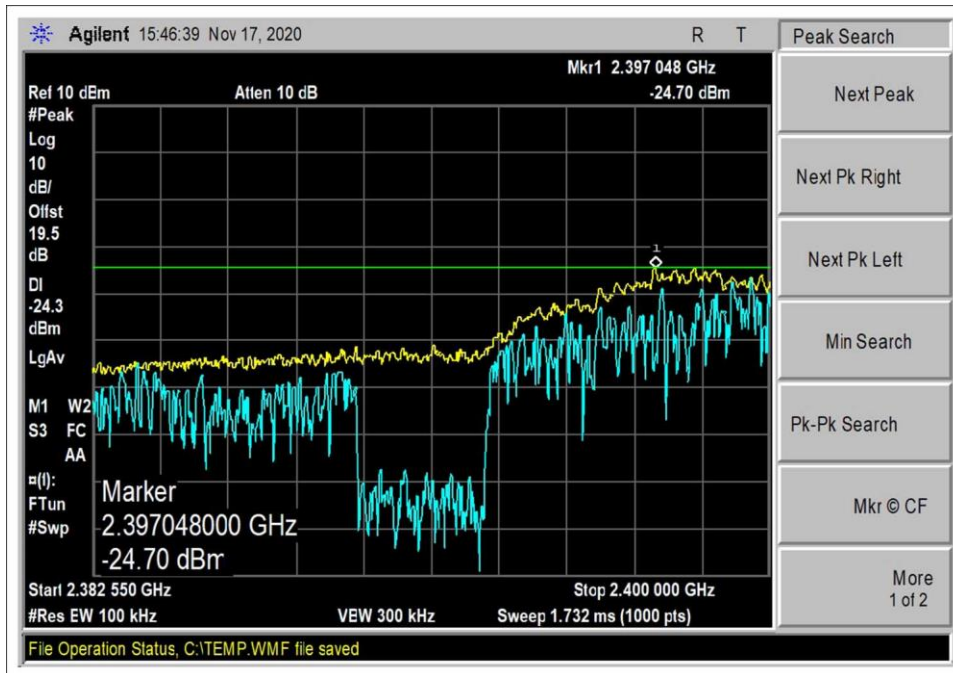
11Mbps; 802.11b, Peak Lower Edge

11Mbps; 802.11b
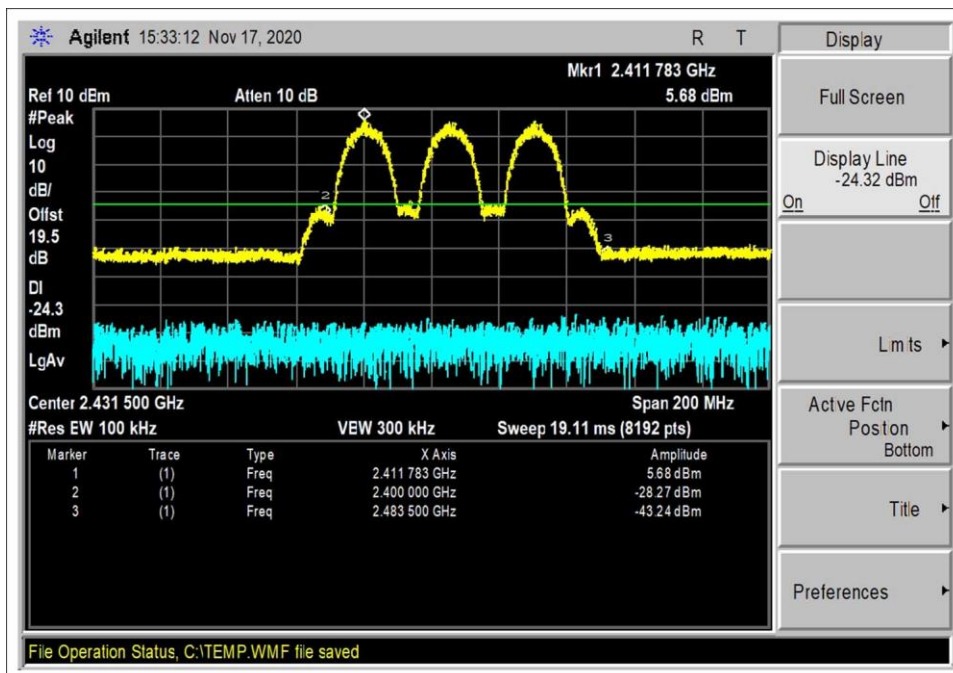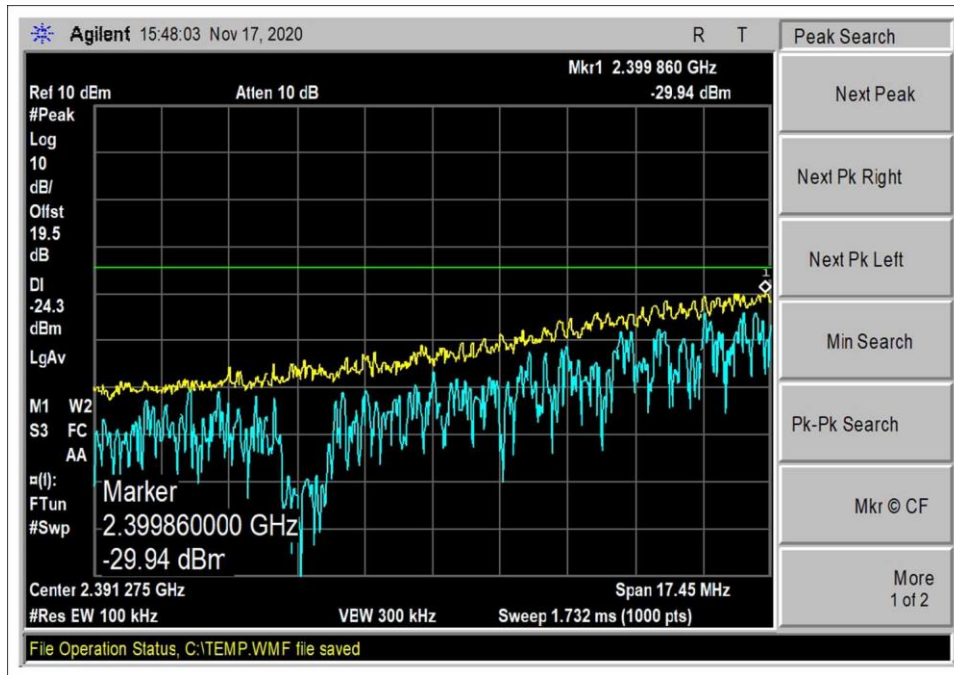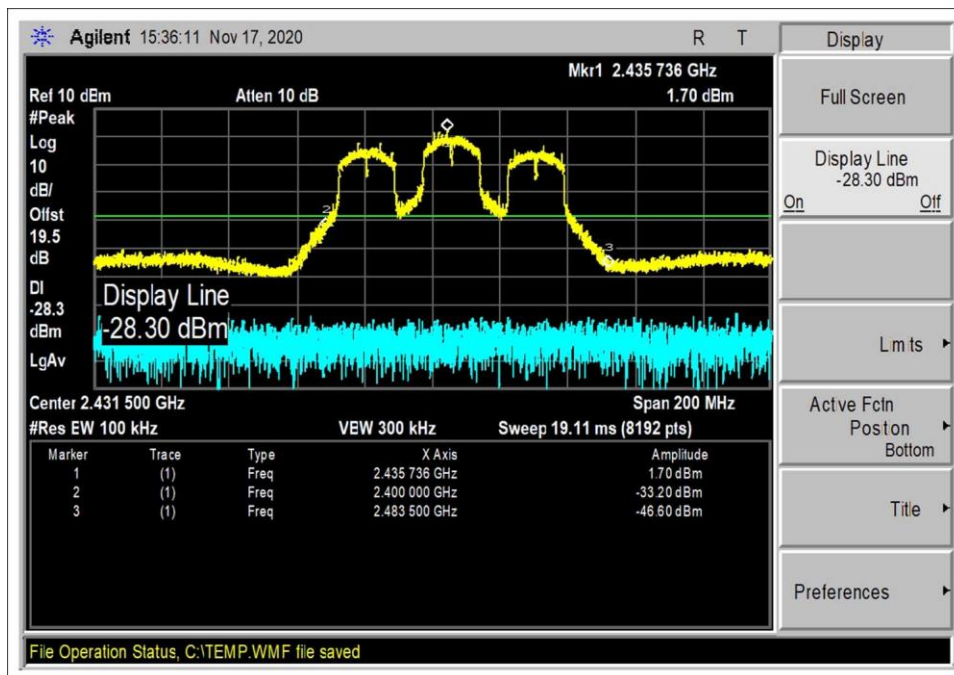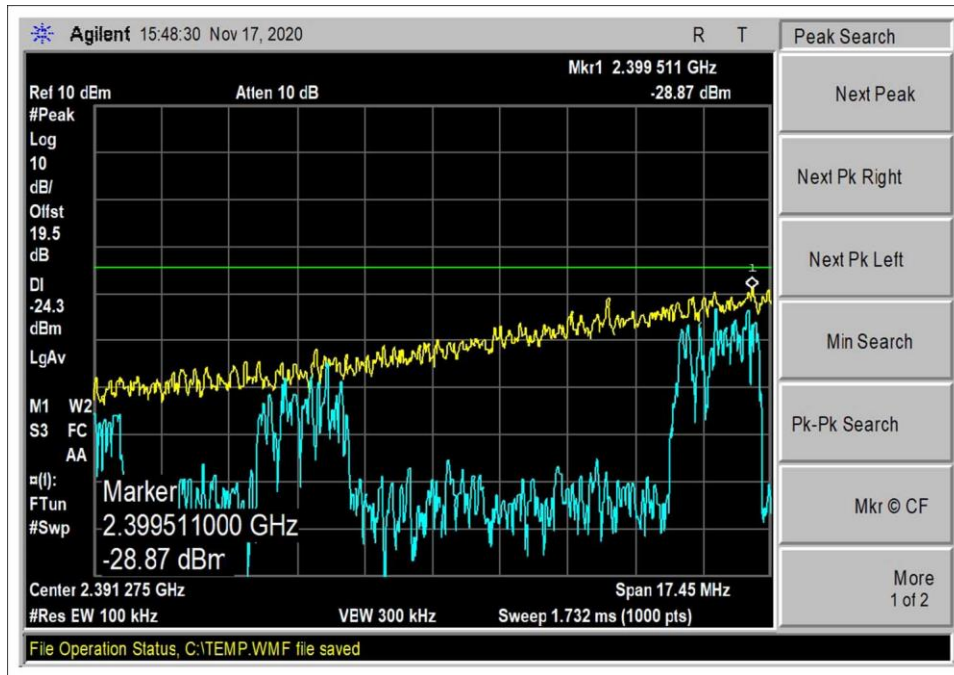
6Mbps; 802.11g, Peak Lower Edge

6Mbps; 802.11g

54Mbps; 802.11g, Peak Lower Edge
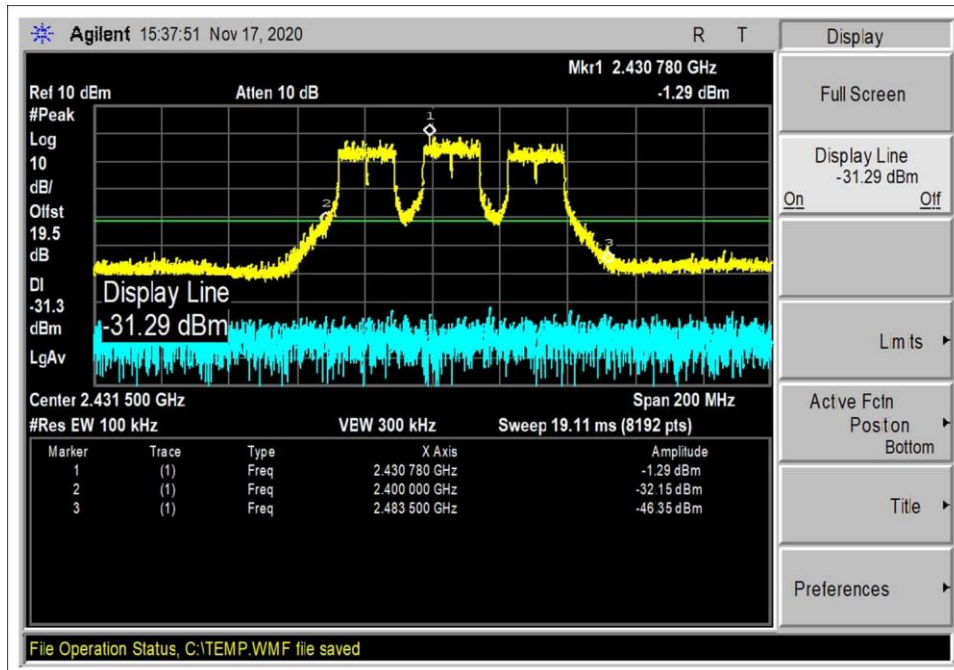
54Mbps; 802.11g
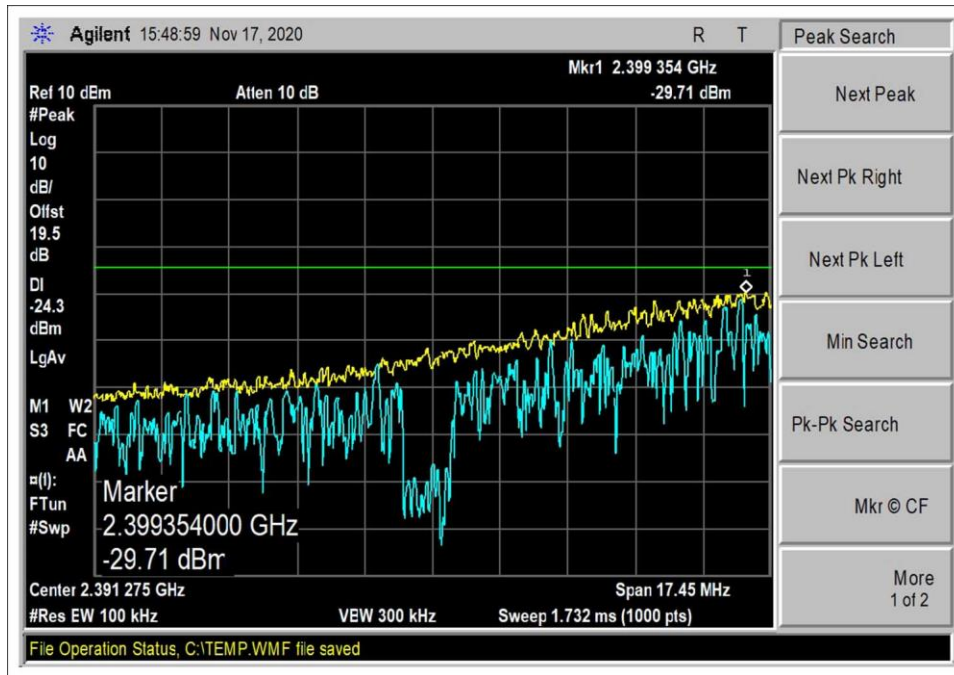
MCS0; 802.11n20, Peak Lower Edge
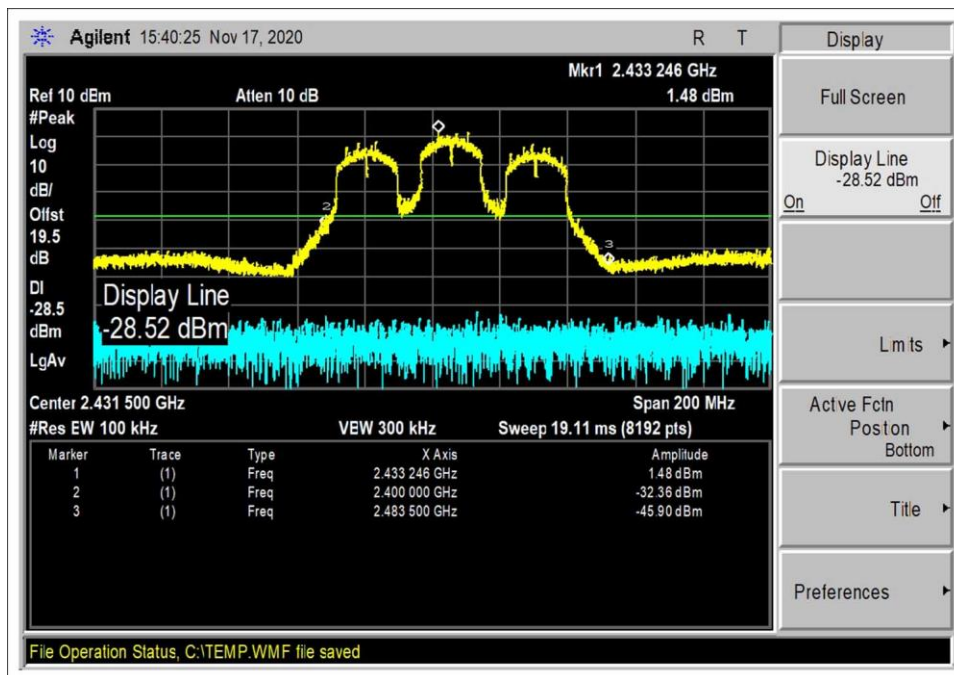
MCS0; 802.11n20
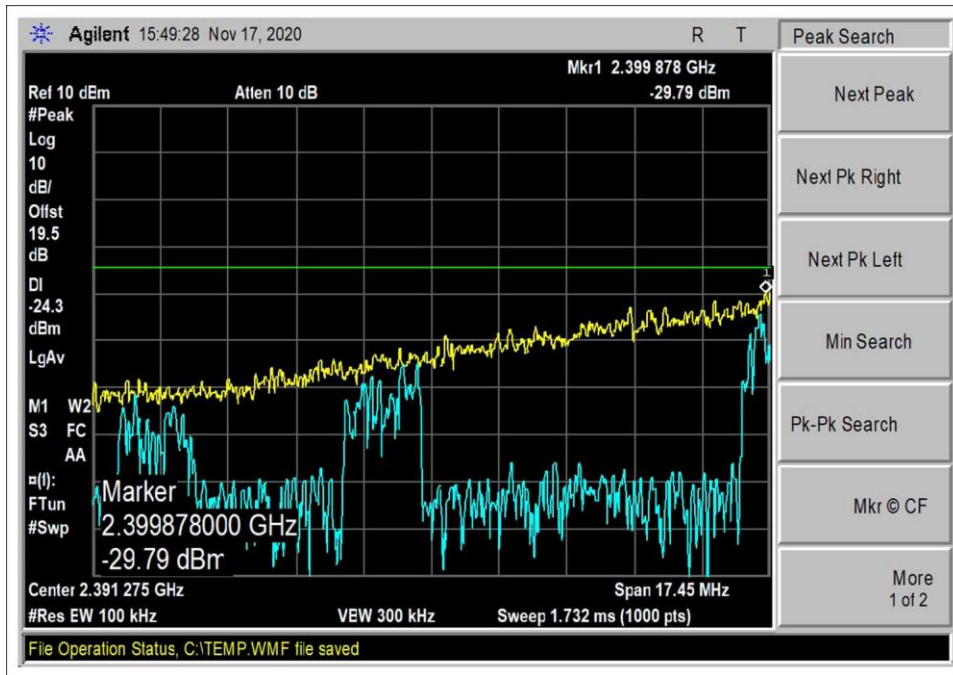
MCS7; 802.11n20, Peak Lower Edge
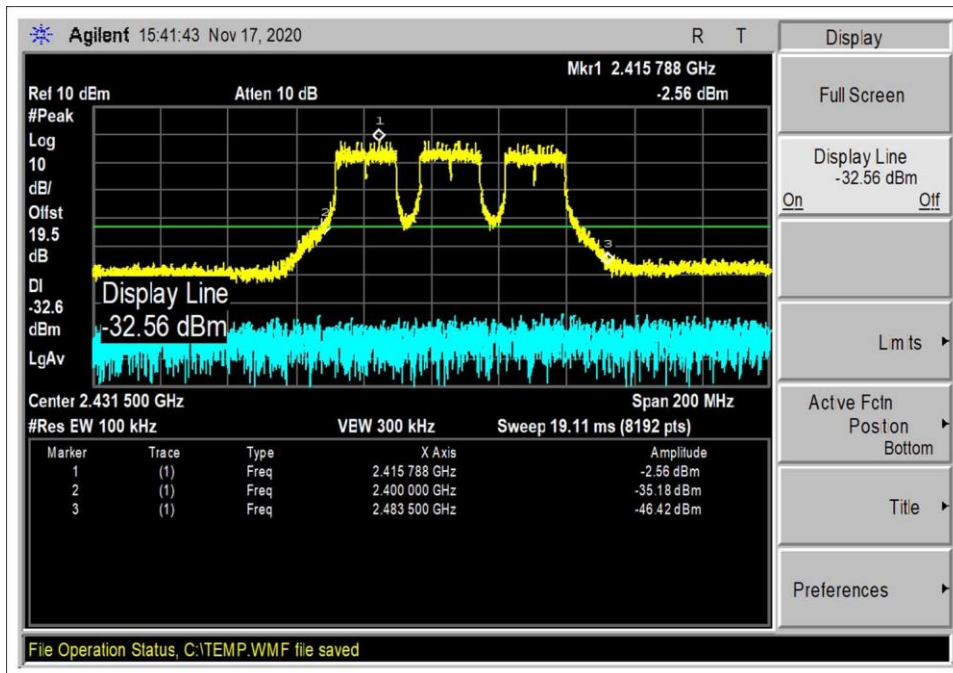
MCS7; 802.11n20
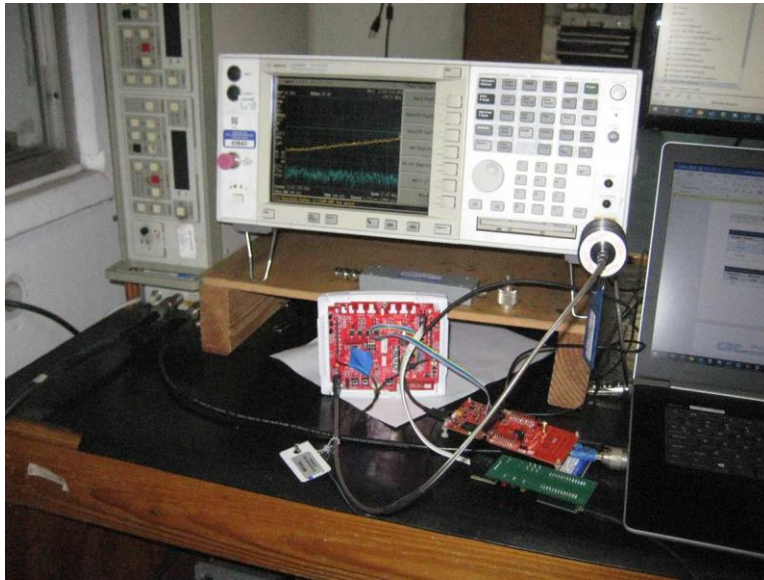
15.247(d) Radiated Emissions & Band Edge

Test Setup / Conditions / Data

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
Customer: **Venstar, Inc.**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **104728**   Date: 11/24/2020
Test Type: **Maximized Emissions**   Time: 10:48:46
Tested By: Don Nguyen   Sequence#: 7
Software: EMITest 5.03.19

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

EUT is powered from 24Vac AC Adapter and set to transmit continuously. All IO ports are populated with unterminated cables.

Software setting:
Testing Frequency: 2412, 2437, 2462MHz

Data Rate
802.11b: 1Mbps
Modulation: DSSS
Mode: Continuous TX/ Modulated
Packet Size: 1400 Bytes
TX Power Level: 0

Frequency of Measurement: 9kHz-25000MHz
9kHz to 150kHz RBW=0.2kHz, VBW=0.6kHz.
150kHz to 30MHz RBW=9kHz, VBW=27kHz.
30-1000MHz, RBW=120kHz, VBW=360kHz
1000-25000MHz, RBW=1MHz, VBW=3MHz
-30dBc limit, RBW=100kHz, VBW=300kHz

Test Environment Conditions:
Temperature:20°C
Relative Humidity: 48%

Site A

Test Methods: ANSI C63.10 (2013)
KDB 558074 D01 15.247 Meas Guidance v05r02

Venstar, Inc. WO#: 104728 Sequence#: 7 Date: 11/24/2020
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz

— Readings
× QP Readings
▼ Ambient
— 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

O Peak Readings
∗ Average Readings
Software Version: 5.03.19

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	4/13/2020	4/13/2022
T1	AN00309	Preamp	8447D	12/24/2019	12/24/2021
T2	ANP05281	Attenuator	1B	4/7/2020	4/7/2022
T3	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T4	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T5	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T6	AN03643	Spectrum Analyzer	E4440A	5/20/2020	5/20/2022
T7	AN00786	Preamp	83017A	5/20/2020	5/20/2022
T8	AN00849	Horn Antenna	3115	3/17/2020	3/17/2022
T9	ANP06360	Cable	L1-PNMNM-48	8/8/2019	8/8/2021
T10	ANP07246	Cable	32022-29094K-29094K-24TC	5/29/2020	5/29/2022
T11	AN03385	High Pass Filter	11SH10-3000/T10000-O/O	5/13/2019	5/13/2021
	AN01413	Horn Antenna	84125-80008	10/19/2020	10/19/2022
	AN03367	Horn Antenna	62-GH-62-25.	8/1/2019	8/1/2021

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

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7 T11	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1	247.190M QP	49.9	-27.9 +12.1 +0.0	+5.9 +0.0 +0.0	+0.2 +0.0 +0.0	+2.9 +0.0	+0.0	43.1	46.0	-2.9	Horiz
^	247.190M	53.1	-27.9 +12.1 +0.0	+5.9 +0.0 +0.0	+0.2 +0.0 +0.0	+2.9 +0.0	+0.0	46.3	46.0	+0.3	Horiz
3	4102.267M Ave	49.3	+0.0 +0.0 +4.2	+0.0 +0.0 +0.6	+0.0 -37.8 +0.5	+0.0 +32.4	+0.0	49.2	54.0	-4.8	Horiz
^	4102.267M	55.5	+0.0 +0.0 +4.2	+0.0 +0.0 +0.6	+0.0 -37.8 +0.5	+0.0 +32.4	+0.0	55.4	54.0	+1.4	Horiz
5	325.540M	45.4	-27.9 +14.1 +0.0	+5.9 +0.0 +0.0	+0.3 +0.0 +0.0	+3.4 +0.0	+0.0	41.2	46.0	-4.8	Horiz
6	256.590M	46.2	-27.9 +12.4 +0.0	+5.9 +0.0 +0.0	+0.2 +0.0 +0.0	+2.9 +0.0	+0.0	39.7	46.0	-6.3	Horiz
7	4021.200M Ave	47.2	+0.0 +0.0 +4.2	+0.0 +0.0 +0.6	+0.0 -37.9 +0.5	+0.0 +32.5	+0.0	47.1	54.0	-6.9	Horiz
^	4021.200M	55.8	+0.0 +0.0 +4.2	+0.0 +0.0 +0.6	+0.0 -37.9 +0.5	+0.0 +32.5	+0.0	55.7	54.0	+1.7	Horiz
9	4924.000M	45.3	+0.0 +0.0 +4.5	+0.0 +0.0 +0.6	+0.0 -37.6 +0.3	+0.0 +33.3	+0.0	46.4	54.0	-7.6	Vert
10	4924.080M	44.2	+0.0 +0.0 +4.5	+0.0 +0.0 +0.6	+0.0 -37.6 +0.4	+0.0 +33.3	+0.0	45.4	54.0	-8.6	Horiz
11	7385.180M Ave	37.5	+0.0 +0.0 +6.1	+0.0 +0.0 +0.9	+0.0 -37.3 +0.2	+0.0 +36.3	+0.0	43.7	54.0	-10.3	Horiz
^	7385.180M	45.2	+0.0 +0.0 +6.1	+0.0 +0.0 +0.9	+0.0 -37.3 +0.2	+0.0 +36.3	+0.0	51.4	54.0	-2.6	Horiz
13	7384.600M Ave	37.5	+0.0 +0.0 +6.1	+0.0 +0.0 +0.9	+0.0 -37.3 +0.2	+0.0 +36.3	+0.0	43.7	54.0	-10.3	Vert
^	7384.600M	46.7	+0.0 +0.0 +6.1	+0.0 +0.0 +0.9	+0.0 -37.3 +0.2	+0.0 +36.3	+0.0	52.9	54.0	-1.1	Vert

	Freq											
15	4824.000M Ave	42.3	+0.0	+0.0	+0.0	+0.0	+0.0	43.3	54.0	-10.7	Horiz
			+0.0	+0.0	-37.6	+33.1					
			+4.5	+0.7	+0.3						
^	4824.000M	49.8	+0.0	+0.0	+0.0	+0.0	+0.0	50.8	54.0	-3.2	Horiz
			+0.0	+0.0	-37.6	+33.1					
			+4.5	+0.7	+0.3						
17	4104.750M Ave	43.2	+0.0	+0.0	+0.0	+0.0	+0.0	43.1	54.0	-10.9	Vert
			+0.0	+0.0	-37.8	+32.4					
			+4.2	+0.6	+0.5						
^	4104.750M	50.9	+0.0	+0.0	+0.0	+0.0	+0.0	50.8	54.0	-3.2	Vert
			+0.0	+0.0	-37.8	+32.4					
			+4.2	+0.6	+0.5						
19	4874.000M Ave	41.8	+0.0	+0.0	+0.0	+0.0	+0.0	42.8	54.0	-11.2	Vert
			+0.0	+0.0	-37.6	+33.2					
			+4.5	+0.6	+0.3						
^	4874.000M	48.5	+0.0	+0.0	+0.0	+0.0	+0.0	49.5	54.0	-4.5	Vert
			+0.0	+0.0	-37.6	+33.2					
			+4.5	+0.6	+0.3						
21	109.100M	41.9	-28.0	+5.9	+0.1	+1.8	+0.0	32.3	43.5	-11.2	Vert
			+10.6	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
22	247.150M	41.4	-27.9	+5.9	+0.2	+2.9	+0.0	34.6	46.0	-11.4	Vert
			+12.1	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
23	266.190M	39.5	-27.9	+5.9	+0.2	+3.0	+0.0	33.3	46.0	-12.7	Horiz
			+12.6	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
24	109.090M	39.5	-28.0	+5.9	+0.1	+1.8	+0.0	29.9	43.5	-13.6	Horiz
			+10.6	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
25	4063.000M Ave	40.4	+0.0	+0.0	+0.0	+0.0	+0.0	40.3	54.0	-13.7	Vert
			+0.0	+0.0	-37.8	+32.4					
			+4.2	+0.6	+0.5						
^	4063.000M	50.1	+0.0	+0.0	+0.0	+0.0	+0.0	50.0	54.0	-4.0	Vert
			+0.0	+0.0	-37.8	+32.4					
			+4.2	+0.6	+0.5						
27	7311.000M Ave	34.1	+0.0	+0.0	+0.0	+0.0	+0.0	40.2	54.0	-13.8	Vert
			+0.0	+0.0	-37.2	+36.2					
			+6.1	+0.8	+0.2						
^	7311.000M	48.1	+0.0	+0.0	+0.0	+0.0	+0.0	54.2	54.0	+0.2	Vert
			+0.0	+0.0	-37.2	+36.2					
			+6.1	+0.8	+0.2						
29	9848.080M	40.0	+0.0	+0.0	+0.0	+0.0	+0.0	51.0	70.3	-19.3	Vert
			+0.0	+0.0	-36.1	+38.3					
			+7.4	+1.0	+0.4						
30	7236.000M	43.6	+0.0	+0.0	+0.0	+0.0	+0.0	49.6	70.3	-20.7	Horiz
			+0.0	+0.0	-37.1	+36.0					
			+6.1	+0.8	+0.2						
31	6565.230M	45.3	+0.0	+0.0	+0.0	+0.0	+0.0	49.4	70.3	-20.9	Horiz
			+0.0	+0.0	-37.3	+34.5					
			+5.8	+0.7	+0.4						

32	189.090M	58.7	-28.0	+5.9	+0.2	+2.5	+0.0	48.3	70.3	-22.0	Horiz
			+9.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
33	214.590M	55.2	-27.9	+5.9	+0.2	+2.7	+0.0	46.1	70.3	-24.2	Horiz
			+10.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
34	203.590M	55.4	-28.0	+5.9	+0.2	+2.6	+0.0	45.3	70.3	-25.0	Horiz
			+9.2	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
35	553.450M	42.1	-27.6	+5.9	+0.4	+4.5	+0.0	44.1	70.3	-26.2	Vert
			+18.8	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
36	304.140M	48.6	-27.9	+5.9	+0.3	+3.2	+0.0	43.5	70.3	-26.8	Horiz
			+13.4	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
37	308.890M	47.9	-27.9	+5.9	+0.3	+3.3	+0.0	43.1	70.3	-27.2	Horiz
			+13.6	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
38	544.050M	41.2	-27.6	+5.9	+0.4	+4.5	+0.0	43.1	70.3	-27.2	Vert
			+18.7	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
39	544.050M	41.2	-27.6	+5.9	+0.4	+4.5	+0.0	43.1	70.3	-27.2	Vert
			+18.7	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
40	546.350M	39.1	-27.6	+5.9	+0.4	+4.5	+0.0	41.0	70.3	-29.3	Vert
			+18.7	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
41	503.550M	38.2	-27.7	+5.9	+0.3	+4.2	+0.0	38.9	70.3	-31.4	Vert
			+18.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
42	218.150M	46.9	-27.9	+5.9	+0.2	+2.7	+0.0	38.0	70.3	-32.3	Vert
			+10.2	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
43	214.550M	46.8	-27.9	+5.9	+0.2	+2.7	+0.0	37.7	70.3	-32.6	Vert
			+10.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
44	396.540M	38.2	-27.9	+5.9	+0.3	+3.7	+0.0	36.2	70.3	-34.1	Horiz
			+16.0	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						
45	418.150M	36.6	-27.9	+5.9	+0.3	+3.8	+0.0	35.2	70.3	-35.1	Vert
			+16.5	+0.0	+0.0	+0.0					
			+0.0	+0.0	+0.0						

46	352.700M	38.5	-27.9 +14.9 +0.0	+5.9 +0.0 +0.0	+0.3 +0.0 +0.0	+3.5 +0.0	+0.0	35.2	70.3	-35.1	Vert
47	306.450M	40.0	-27.9 +13.5 +0.0	+5.9 +0.0 +0.0	+0.3 +0.0 +0.0	+3.2 +0.0	+0.0	35.0	70.3	-35.3	Vert
48	308.950M	39.8	-27.9 +13.6 +0.0	+5.9 +0.0 +0.0	+0.3 +0.0 +0.0	+3.3 +0.0	+0.0	35.0	70.3	-35.3	Vert
49	458.550M	34.7	-27.8 +17.2 +0.0	+5.9 +0.0 +0.0	+0.3 +0.0 +0.0	+4.0 +0.0	+0.0	34.3	70.3	-36.0	Vert
50	363.600M	36.4	-27.9 +15.2 +0.0	+5.9 +0.0 +0.0	+0.3 +0.0 +0.0	+3.6 +0.0	+0.0	33.5	70.3	-36.8	Vert

Test Location: CKC Laboratories Inc. • 110 N. Olinda Pl. • Brea, CA 92823 • 714-993-6112
Customer: **Venstar, Inc.**
Specification: **15.247(d) / 15.209 Radiated Spurious Emissions**
Work Order #: **104728**   Date: 11/24/2020
Test Type: **Maximized Emissions**   Time: 10:49:14
Tested By: Don Nguyen   Sequence#: 8
Software: EMITest 5.03.19

Equipment Tested:

Device	Manufacturer	Model #	S/N
Configuration 2			

Support Equipment:

Device	Manufacturer	Model #	S/N
Configuration 2			

Test Conditions / Notes:

EUT is powered from 24Vac AC Adapter and set to transmit continuously. All IO ports are populated with unterminated cables.

Software setting:
Testing Frequency: 2412, 2437, 2462MHz

Data Rate
802.11b: 11Mbps
Modulation: CCK
Mode: Continuous TX/ Modulated
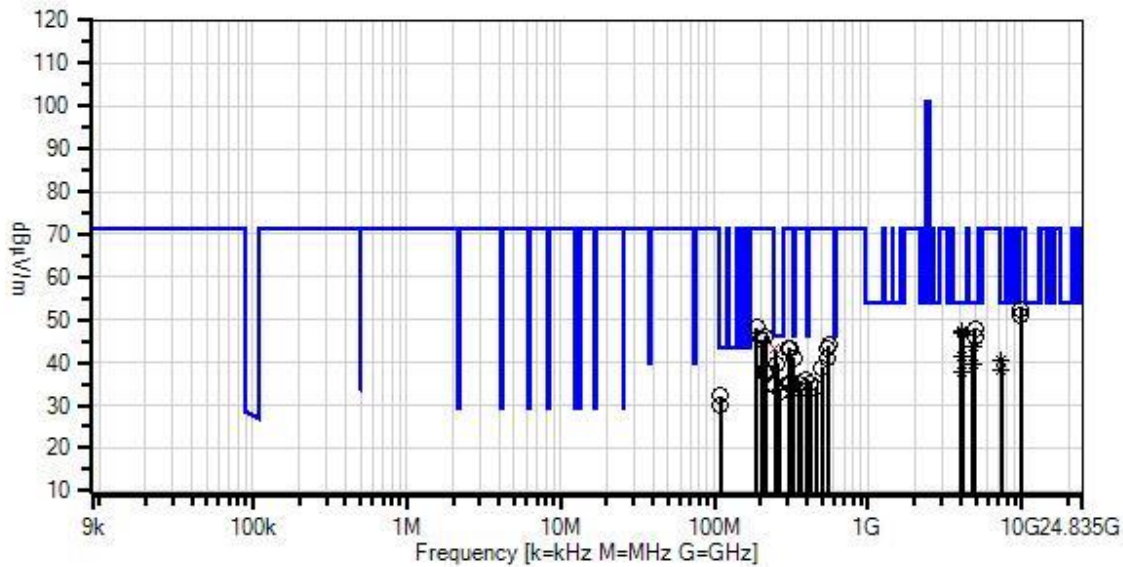Packet Size: 1400 Bytes
TX Power Level: 0

Frequency of Measurement: 9kHz-25000MHz
9kHz to 150kHz RBW=0.2kHz, VBW=0.6kHz.
150kHz to 30MHz RBW=9kHz, VBW=27kHz.
30-1000MHz, RBW=120kHz, VBW=360kHz
1000-25000MHz, RBW=1MHz, VBW=3MHz
-30dBc limit, RBW=100kHz, VBW=300kHz

Test Environment Conditions:
Temperature:20°C
Relative Humidity: 48%

Site A

Test Methods: ANSI C63.10 (2013)
KDB 558074 D01 15.247 Meas Guidance v05r02

Venstar, Inc. WO#: 104728 Sequence#: 8 Date: 11/24/2020
15.247(d) / 15.209 Radiated Spurious Emissions Test Distance: 3 Meters Horiz

Legend:
— Readings
× QP Readings
▼ Ambient
— 1 - 15.247(d) / 15.209 Radiated Spurious Emissions

○ Peak Readings
✳ Average Readings
Software Version: 5.03.19

Test Equipment:

ID	Asset #	Description	Model	Calibration Date	Cal Due Date
	AN00314	Loop Antenna	6502	4/13/2020	4/13/2022
T1	AN00309	Preamp	8447D	12/24/2019	12/24/2021
T2	ANP05281	Attenuator	1B	4/7/2020	4/7/2022
T3	ANP05050	Cable	RG223/U	12/24/2018	12/24/2020
T4	ANP05198	Cable-Amplitude +15C to +45C (dB)	8268	12/4/2018	12/4/2020
T5	AN01993	Biconilog Antenna	CBL6111C	6/11/2019	6/11/2021
T6	AN03643	Spectrum Analyzer	E4440A	5/20/2020	5/20/2022
T7	AN00786	Preamp	83017A	5/20/2020	5/20/2022
T8	AN00849	Horn Antenna	3115	3/17/2020	3/17/2022
T9	ANP06360	Cable	L1-PNMNM-48	8/8/2019	8/8/2021
T10	ANP07246	Cable	32022-29094K-29094K-24TC	5/29/2020	5/29/2022
T11	AN03385	High Pass Filter	11SH10-3000/T10000-O/O	5/13/2019	5/13/2021
	AN01413	Horn Antenna	84125-80008	10/19/2020	10/19/2022
	AN03367	Horn Antenna	62-GH-62-25.	8/1/2019	8/1/2021

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

#	Freq	Rdng	T1 T5 T9	T2 T6 T10	T3 T7 T11	T4 T8	Dist	Corr	Spec	Margin	Polar
	MHz	dBµV	dB	dB	dB	dB	Table	dBµV/m	dBµV/m	dB	Ant
1 QP	247.190M	49.9	-27.9 +12.1 +0.0	+5.9 +0.0 +0.0	+0.2 +0.0 +0.0	+2.9 +0.0	+0.0	43.1	46.0	-2.9	Horiz
^	247.190M	53.1	-27.9 +12.1 +0.0	+5.9 +0.0 +0.0	+0.2 +0.0 +0.0	+2.9 +0.0	+0.0	46.3	46.0	+0.3	Horiz
3	325.540M	45.4	-27.9 +14.1 +0.0	+5.9 +0.0 +0.0	+0.3 +0.0 +0.0	+3.4 +0.0	+0.0	41.2	46.0	-4.8	Horiz
4	4924.000M	46.7	+0.0 +0.0 +4.5	+0.0 +0.0 +0.6	+0.0 -37.6 +0.3	+0.0 +33.3	+0.0	47.8	54.0	-6.2	Vert
5	256.590M	46.2	-27.9 +12.4 +0.0	+5.9 +0.0 +0.0	+0.2 +0.0 +0.0	+2.9 +0.0	+0.0	39.7	46.0	-6.3	Horiz
6 Ave	4102.150M	47.6	+0.0 +0.0 +4.2	+0.0 +0.0 +0.6	+0.0 -37.8 +0.5	+0.0 +32.4	+0.0	47.5	54.0	-6.5	Horiz
^	4102.150M	58.8	+0.0 +0.0 +4.2	+0.0 +0.0 +0.6	+0.0 -37.8 +0.5	+0.0 +32.4	+0.0	58.7	54.0	+4.7	Horiz
8 Ave	4018.667M	47.1	+0.0 +0.0 +4.2	+0.0 +0.0 +0.6	+0.0 -37.9 +0.5	+0.0 +32.5	+0.0	47.0	54.0	-7.0	Horiz
^	4018.667M	55.9	+0.0 +0.0 +4.2	+0.0 +0.0 +0.6	+0.0 -37.9 +0.5	+0.0 +32.5	+0.0	55.8	54.0	+1.8	Horiz
10	4923.930M	45.0	+0.0 +0.0 +4.5	+0.0 +0.0 +0.6	+0.0 -37.6 +0.3	+0.0 +33.3	+0.0	46.1	54.0	-7.9	Horiz
11 Ave	4824.000M	42.5	+0.0 +0.0 +4.5	+0.0 +0.0 +0.7	+0.0 -37.6 +0.3	+0.0 +33.1	+0.0	43.5	54.0	-10.5	Horiz
^	4824.000M	49.1	+0.0 +0.0 +4.5	+0.0 +0.0 +0.7	+0.0 -37.6 +0.3	+0.0 +33.1	+0.0	50.1	54.0	-3.9	Horiz
13	109.100M	41.9	-28.0 +10.6 +0.0	+5.9 +0.0 +0.0	+0.1 +0.0 +0.0	+1.8 +0.0	+0.0	32.3	43.5	-11.2	Vert
14	247.150M	41.4	-27.9 +12.1 +0.0	+5.9 +0.0 +0.0	+0.2 +0.0 +0.0	+2.9 +0.0	+0.0	34.6	46.0	-11.4	Vert