TEST REPORT ADDENDUM – RADIATED

FROM

Test of: Radwin Ltd. Outdoor Subscriber Radio Unit

To: FCC CFR 47 Part 15 Subpart C 15.247 & IC RSS 247 (DTS)

Test Report Serial No.: RDWN41-U2_Radiated Rev A

Issue Date: 13th July 2016

Master Document Number	Addendum Reports
RDWN41-U2_Master	RDWN41-U2_Conducted
	RDWN41-U2_Radiated
	RDWN41-U5_(FCC Part15B & ICES-003)

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1. MEASUREMENT AND PRESENTATION OF TEST DATA

The measurement and graphical data presented in this test report was generated automatically using state-of-the-art technology creating an easy to read report structure. Numerical measurement data is separated from supporting graphical data (plots) through hyperlinks. Numerical measurement data can be reviewed without scrolling through numerous graphical pages to arrive at the next data matrix.

Plots have been relegated into the Appendix 'Graphical Data'.

Test and report automation was performed by MiTest. MiTest is an automated test system developed by MiCOM Labs. MiTest is the first cloud based modular test system enabling end-to-end automation of regulatory compliance testing for conducted RF testing.

The MiCOM Labs "MiTest" Automated Test System" (Patent Pending)

2. TEST RESULTS

2.1. Radiated Emissions

Radiated Test Conditions for Radiated Spurious and Band-Edge Emissions (Restricted Bands)			
Standard:	FCC CFR 47 Part 15 Subpart C 15.247 (DTS)	**Ambient Temp. (ºC):**	20.0 - 24.5
Test Heading:	Radiated Spurious and Band-Edge Emissions	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.205, 15.209	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Radiated Spurious and Band-Edge Emissions (Restricted Bands)
Radiated emissions for restricted bands above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned. Measurements on any restricted band frequency or frequencies above 1 GHz are based on the use of measurement instrumentation employing peak and average detectors. All measurements were performed using a resolution bandwidth of 1 MHz.

Test configuration and setup for Radiated Spurious and Band-Edge Measurement were per the Radiated Test Set-up specified in this document.

Limits for Restricted Bands
Peak emission: 74 dBuV/m
Average emission: 54 dBuV/m

Field Strength Calculation
The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.
FS = R + AF + CORR - FO

where:
FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss or Waveguide Loss

Example:
Given receiver input reading of 51.5 dBmV; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength (FS) of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3 dBmV/m

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are as follows:
Level (dBmV/m) = 20 * Log (level (mV/m))

40 dBmV/m = 100 mV/m
48 dBmV/m = 250 mV/m
Restricted Bands of Operation (15.205)
(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

Frequency Band			
MHz	**MHz**	**MHz**	**GHz**
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

(b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

(c) Except as provided in paragraphs (d) and (e) of this section, regardless of the field strength limits specified elsewhere in this subpart, the provisions of this section apply to emissions from any intentional radiator.

(d) The following devices are exempt from the requirements of this section:

(1) Swept frequency field disturbance sensors operating between 1.705 and 37 MHz provided their emissions only sweep through the bands listed in paragraph (a) of this section, the sweep is never stopped with the fundamental emission within the bands listed in paragraph (a) of this section, and the fundamental emission is outside of the bands listed in paragraph (a) of this section more than 99% of the time the device is actively transmitting, without compensation for duty cycle.

(2) Transmitters used to detect buried electronic markers at 101.4 kHz which are employed by telephone companies.

(3) Cable locating equipment operated pursuant to §15.213.

(4) Any equipment operated under the provisions of §15.253, 15.255, and 15.256 in the frequency band 75-85 GHz, or §15.257 of this part.

(5) Biomedical telemetry devices operating under the provisions of §15.242 of this part are not subject to the restricted band 608-614 MHz but are subject to compliance within the other restricted bands.

(6) Transmitters operating under the provisions of subparts D or F of this part.

(7) Devices operated pursuant to §15.225 are exempt from complying with this section for the 13.36-13.41 MHz band only.

(8) Devices operated in the 24.075-24.175 GHz band under §15.245 are exempt from complying with the requirements of this section for the 48.15-48.35 GHz and 72.225-72.525 GHz bands only, and shall not exceed the limits specified in §15.245(b).

(9) Devices operated in the 24.0-24.25 GHz band under §15.249 are exempt from complying with the requirements of this section for the 48.0-48.5 GHz and 72.0-72.75 GHz bands only, and shall not exceed the limits specified in §15.249(a).

(e) Harmonic emissions appearing in the restricted bands above 17.7 GHz from field disturbance sensors operating under the provisions of §15.245 shall not exceed the limits specified in §15.245(b).

2.1.1. Restricted Band Emissions

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	RADWIN Ltd. NA	**Variant:**	802.11n HT-20
Antenna Gain (dBi):	3.00	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	2412.00	**Data Rate:**	6.50 MBit/s
Power Setting:	22	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	2405.39	53.13	2.69	-11.82	44.00	Fundamental	Horizontal	100	197	--	--	
#2	3215.94	61.57	2.99	-11.27	53.29	Peak (NRB)	Horizontal	151	57	--	--	Pass
#3	3856.63	61.32	3.23	-10.81	53.74	Max Peak	Vertical	113	356	74.0	-20.3	Pass
#4	3856.63	59.05	3.23	-10.81	51.47	Max Avg	Vertical	113	356	54.0	-2.5	Pass
#5	4820.48	67.38	3.53	-11.15	59.76	Max Peak	Vertical	117	40	74.0	-14.2	Pass
#6	4820.48	52.66	3.53	-11.15	45.04	Max Avg	Vertical	117	40	54.0	-9.0	Pass
#7	5785.05	52.70	3.80	-10.44	46.06	Peak (NRB)	Vertical	151	57	--	--	Pass
#8	7232.56	54.55	4.26	-7.34	51.47	Peak (NRB)	Vertical	151	57	--	--	Pass

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	RADWIN Ltd. NA	**Variant:**	802.11n HT-20
Antenna Gain (dBi):	3.00	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	2437.00	**Data Rate:**	6.50 MBit/s
Power Setting:	22	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	2437.84	54.47	2.72	-11.73	45.46	Fundamental	Vertical	151	1	--	--	
#2	2831.04	56.51	2.85	-11.33	48.03	Peak (Scan)	Vertical	151	0	74.0	-26.0	Pass
#3	2968.27	53.23	2.90	-11.03	45.10	Peak (NRB)	Vertical	151	0	--	--	Pass
#4	3249.29	57.23	3.03	-11.26	49.00	Peak (NRB)	Horizontal	151	1	--	--	Pass
#5	3856.60	62.94	3.23	-10.81	55.36	Max Peak	Horizontal	100	61	74.0	-18.6	Pass
#6	3856.60	61.10	3.23	-10.81	53.52	Max Avg	Horizontal	100	61	54.0	-0.5	Pass
#7	4873.89	62.39	3.53	-11.24	54.68	Max Peak	Vertical	100	9	74.0	-19.3	Pass
#8	4873.89	49.84	3.53	-11.24	42.13	Max Avg	Vertical	100	9	54.0	-11.9	Pass
#9	5784.91	55.43	3.80	-10.44	48.79	Peak (NRB)	Vertical	151	0	--	--	Pass
#10	7308.67	58.20	4.23	-7.29	55.14	Max Peak	Vertical	118	48	74.0	-18.9	Pass
#11	7308.67	42.56	4.23	-7.29	39.50	Max Avg	Vertical	118	48	54.0	-14.5	Pass

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	RADWIN Ltd. NA	**Variant:**	802.11n HT-20
Antenna Gain (dBi):	3.00	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	2462.00	**Data Rate:**	6.50 MBit/s
Power Setting:	22	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	2465.06	56.14	2.73	-11.67	47.20	Fundamental	Vertical	151	1	--	--	
#2	2736.55	48.37	2.83	-11.36	39.84	Max Peak	Vertical	100	323	74.0	-34.2	Pass
#3	2736.55	35.42	2.83	-11.36	26.89	Max Avg	Vertical	100	323	54.0	-27.1	Pass
#4	3282.67	57.21	3.02	-11.20	49.03	Peak (NRB)	Horizontal	151	1	--	--	Pass
#5	3856.63	62.68	3.23	-10.81	55.10	Max Peak	Horizontal	126	62	74.0	-18.9	Pass
#6	3856.63	60.84	3.23	-10.81	53.26	Max Avg	Horizontal	126	62	54.0	-0.7	Pass
#7	4921.17	65.89	3.57	-11.37	58.09	Max Peak	Vertical	135	42	74.0	-15.9	Pass
#8	4921.17	52.23	3.57	-11.37	44.43	Max Avg	Vertical	135	42	54.0	-9.6	Pass
#9	5784.91	52.44	3.80	-10.44	45.80	Peak (NRB)	Vertical	151	67	--	--	Pass
#10	7384.07	58.95	4.29	-7.17	56.07	Max Peak	Vertical	155	69	74.0	-17.9	Pass
#11	7384.07	43.29	4.29	-7.17	40.41	Max Avg	Vertical	155	69	54.0	-13.6	Pass

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup

2.1.2. Restricted Band Emissions

RADWIN Ltd. NA		Band-Edge Freq	Limit 74.0dBµV/m	Limit 54.0dBµV/m	Power Setting
Operational Mode	Operating Frequency (MHz)	MHz	dBµV/m	dBµV/m	
802.11n HT-20	2412.00	2390.00	61.32	46.87	22
802.11n HT-40	2422.00	2390.00	68.40	52.82	20

RADWIN Ltd. NA		Band-Edge Freq	Limit 74.0dBµV/m	Limit 54.0dBµV/m	Power Setting
Operational Mode	Operating Frequency (MHz)	MHz	dBµV/m	dBµV/m	
802.11n HT-20	2462.00	2483.50	57.82	44.98	22
802.11n HT-40	2452.00	2483.50	68.76	52.60	22

Equipment Configuration for Radiated - Lower Restricted Band-Edge Emissions

Antenna:	RADWIN Ltd. NA	**Variant:**	802.11n HT-20
Antenna Gain (dBi):	3.00	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	2412.00	**Data Rate:**	6.50 MBit/s
Power Setting:	22	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	2390.00	12.14	2.69	32.04	46.87	Max Avg	Vertical	157	374	54.0	-7.1	Pass
#2	2390.00	26.59	2.69	32.04	61.32	Max Peak	Vertical	157	374	74.0	-12.7	Pass
#3	2390.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--
Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup												

Equipment Configuration for Radiated - Lower Restricted Band-Edge Emissions

Antenna:	RADWIN Ltd. NA	**Variant:**	802.11n HT-40
Antenna Gain (dBi):	3.00	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	2422.00	**Data Rate:**	13.50 MBit/s
Power Setting:	20	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	2390.00	18.09	2.69	32.04	52.82	Max Avg	Vertical	157	374	54.0	-1.2	Pass
#2	2390.00	33.67	2.69	32.04	68.40	Max Peak	Vertical	157	374	74.0	-5.6	Pass
#3	2390.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup. Power reduced to meet Band Edge limit

Radiated Test Conditions for Radiated Spurious and Band-Edge Emissions (Restricted Bands)			
Standard:	FCC CFR 47:15.247	**Ambient Temp. (ºC):**	20.0 - 24.5
Test Heading:	Radiated Spurious and Band-Edge Emissions	**Rel. Humidity (%):**	32 - 45
Standard Section(s):	15.205, 15.209	**Pressure (mBars):**	999 - 1001
Reference Document(s):	See Normative References		

Test Procedure for Radiated Spurious and Band-Edge Emissions (Restricted Bands)
Radiated emissions for restricted bands above 1 GHz are measured in the anechoic chamber at a 3-meter distance on every azimuth in both horizontal and vertical polarities. The emissions are recorded and maximized as a function of azimuth by rotation through 360° with a spectrum analyzer in peak hold mode. Depending on the frequency band spanned a notch filter and waveguide filter was used to remove the fundamental frequency. The highest emissions relative to the limit are listed for each frequency spanned. Measurements on any restricted band frequency or frequencies above 1 GHz are based on the use of measurement instrumentation employing peak and average detectors. All measurements were performed using a resolution bandwidth of 1 MHz.

Test configuration and setup for Radiated Spurious and Band-Edge Measurement were per the Radiated Test Set-up specified in this document.

Limits for Restricted Bands
Peak emission: 74 dBuV/m
Average emission: 54 dBuV/m

Field Strength Calculation
The field strength is calculated by adding the Antenna Factor and Cable Loss, and subtracting Amplifier Gain from the measured reading. All factors are included in the reported data.
FS = R + AF + CORR - FO

where:
FS = Field Strength
R = Measured Spectrum analyzer Input Amplitude
AF = Antenna Factor
CORR = Correction Factor = CL – AG + NFL
CL = Cable Loss
AG = Amplifier Gain
FO = Distance Falloff Factor
NFL = Notch Filter Loss or Waveguide Loss

Example:
Given receiver input reading of 51.5 dBmV; Antenna Factor of 8.5 dB; Cable Loss of 1.3 dB; Falloff Factor of 0 dB, an Amplifier Gain of 26 dB and Notch Filter Loss of 1 dB. The Field Strength (FS) of the measured emission is:

FS = 51.5 + 8.5 + 1.3 - 26.0 +1 = 36.3 dBmV/m

Conversion between dBmV/m (or dBmV) and mV/m (or mV) are as follows:
Level (dBmV/m) = 20 * Log (level (mV/m))

40 dBmV/m = 100 mV/m
48 dBmV/m = 250 mV/m
Restricted Bands of Operation (15.205)
(a) Except as shown in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

Frequency Band			
MHz	**MHz**	**MHz**	**GHz**
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15

0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	Above 38.6
13.36-13.41			

(b) Except as provided in paragraphs (d) and (e) of this section, the field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

(c) Except as provided in paragraphs (d) and (e) of this section, regardless of the field strength limits specified elsewhere in this subpart, the provisions of this section apply to emissions from any intentional radiator.

(d) The following devices are exempt from the requirements of this section:

(1) Swept frequency field disturbance sensors operating between 1.705 and 37 MHz provided their emissions only sweep through the bands listed in paragraph (a) of this section, the sweep is never stopped with the fundamental emission within the bands listed in paragraph (a) of this section, and the fundamental emission is outside of the bands listed in paragraph (a) of this section more than 99% of the time the device is actively transmitting, without compensation for duty cycle.

(2) Transmitters used to detect buried electronic markers at 101.4 kHz which are employed by telephone companies.

(3) Cable locating equipment operated pursuant to §15.213.

(4) Any equipment operated under the provisions of §15.253, 15.255, and 15.256 in the frequency band 75-85 GHz, or §15.257 of this part.

(5) Biomedical telemetry devices operating under the provisions of §15.242 of this part are not subject to the restricted band 608-614 MHz but are subject to compliance within the other restricted bands.

(6) Transmitters operating under the provisions of subparts D or F of this part.

(7) Devices operated pursuant to §15.225 are exempt from complying with this section for the 13.36-13.41 MHz band only.

(8) Devices operated in the 24.075-24.175 GHz band under §15.245 are exempt from complying with the requirements of this section for the 48.15-48.35 GHz and 72.225-72.525 GHz bands only, and shall not exceed the limits specified in §15.245(b).

(9) Devices operated in the 24.0-24.25 GHz band under §15.249 are exempt from complying with the requirements of this

section for the 48.0-48.5 GHz and 72.0-72.75 GHz bands only, and shall not exceed the limits specified in §15.249(a).

(e) Harmonic emissions appearing in the restricted bands above 17.7 GHz from field disturbance sensors operating under the provisions of §15.245 shall not exceed the limits specified in §15.245(b).

Equipment Configuration for Radiated - Upper Restricted Band-Edge Emissions

Antenna:	RADWIN Ltd. NA	**Variant:**	802.11n HT-20
Antenna Gain (dBi):	3.00	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	2462.00	**Data Rate:**	6.50 MBit/s
Power Setting:	22	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#2	2483.63	9.88	2.73	32.37	44.98	Max Avg	Vertical	144	23	54.0	-9.0	Pass
#3	2484.07	22.72	2.73	32.37	57.82	Max Peak	Vertical	144	23	74.0	-16.2	Pass
#1	2483.50	--	--	--	--	Restricted-Band	--	--	--	--	--	--
Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup.												

Equipment Configuration for Radiated - Upper Restricted Band-Edge Emissions

Antenna:	RADWIN Ltd. NA	**Variant:**	802.11n HT-40
Antenna Gain (dBi):	3.00	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	2452.00	**Data Rate:**	13.50 MBit/s
Power Setting:	22	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	2483.50	17.50	2.73	32.37	52.60	Max Avg	Vertical	144	23	54.0	-1.4	Pass
#3	2484.85	33.66	2.73	32.37	68.76	Max Peak	Vertical	144	23	74.0	-5.2	Pass
#2	2483.50	--	--	--	--	Restricted-Band	--	--	--	--	--	--
Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup.												

2.1.3. Colocation

Colocation: Band Edge 5150 MHz

Equipment Configuration for Restricted Lower Band-Edge Emissions

Antenna:	RADWIN Ltd. NA	**Variant:**	Colocation
Antenna Gain (dBi):	16.00	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	2462.00 & 5160.00	**Data Rate:**	15.00 MBit/s
Power Setting:	22 (2462) 16 (5160)	**Tested By:**	JMH

Test Measurement Results

Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	5145.64	34.64	3.69	34.11	72.44	Max Peak	Horizontal	154	179	74.0	-1.6	Pass
#2	5150.00	10.29	3.67	34.11	48.07	Max Avg	Horizontal	154	179	54.0	-5.9	Pass
#3	5150.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup. Colocation - broadcasting simultaneously at 2462 and 5160 MHz

Colocation: TX Spurious 1-18GHz

Equipment Configuration for Radiated Spurious - Restricted Band Emissions

Antenna:	RADWIN Ltd. NA	**Variant:**	20 MHz
Antenna Gain (dBi):	16.00	**Modulation:**	OFDM
Beam Forming Gain (Y):	Not Applicable	**Duty Cycle (%):**	99
Channel Frequency (MHz):	2462.00 & 5160.00	**Data Rate:**	15.00 MBit/s
Power Setting:	22 (2462) 16 (5160)	**Tested By:**	JMH

Test Measurement Results

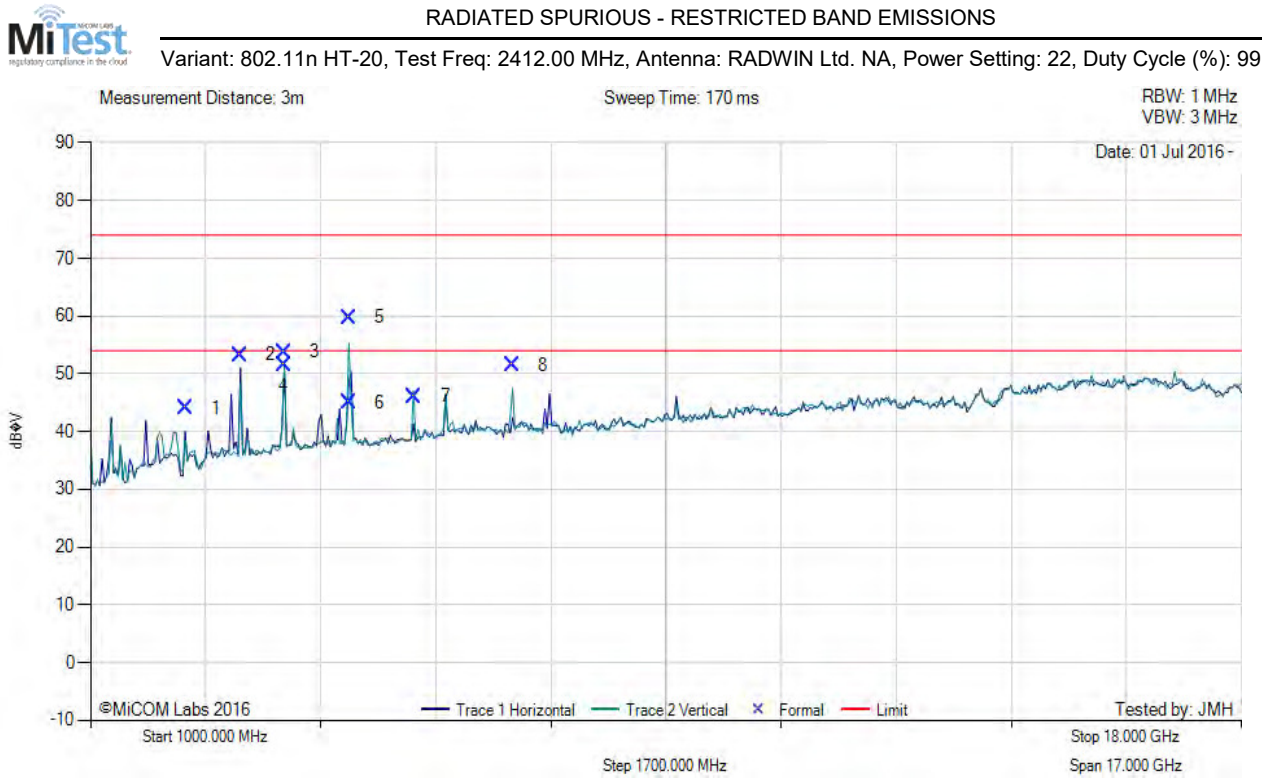
Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
#1	3282.56	56.84	3.02	-11.20	48.66	Peak (NRB)	Horizontal	101	130	--	--	Pass
#2	3439.93	56.02	3.11	-11.25	47.88	Peak (NRB)	Vertical	200	0	--	--	Pass
#3	5161.08	67.57	3.68	-11.55	59.70	Fundamental	Horizontal	101	189	--	--	
#4	6250.04	53.56	3.93	-8.57	48.92	Peak (NRB)	Vertical	148	229	--	--	Pass

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup. Colocation - broadcasting simultaneously at 2462 and 5160 MHz

A. APPENDIX - GRAPHICAL IMAGES

A.1. Radiated Emissions

A.1.1. Restricted Band Emissions



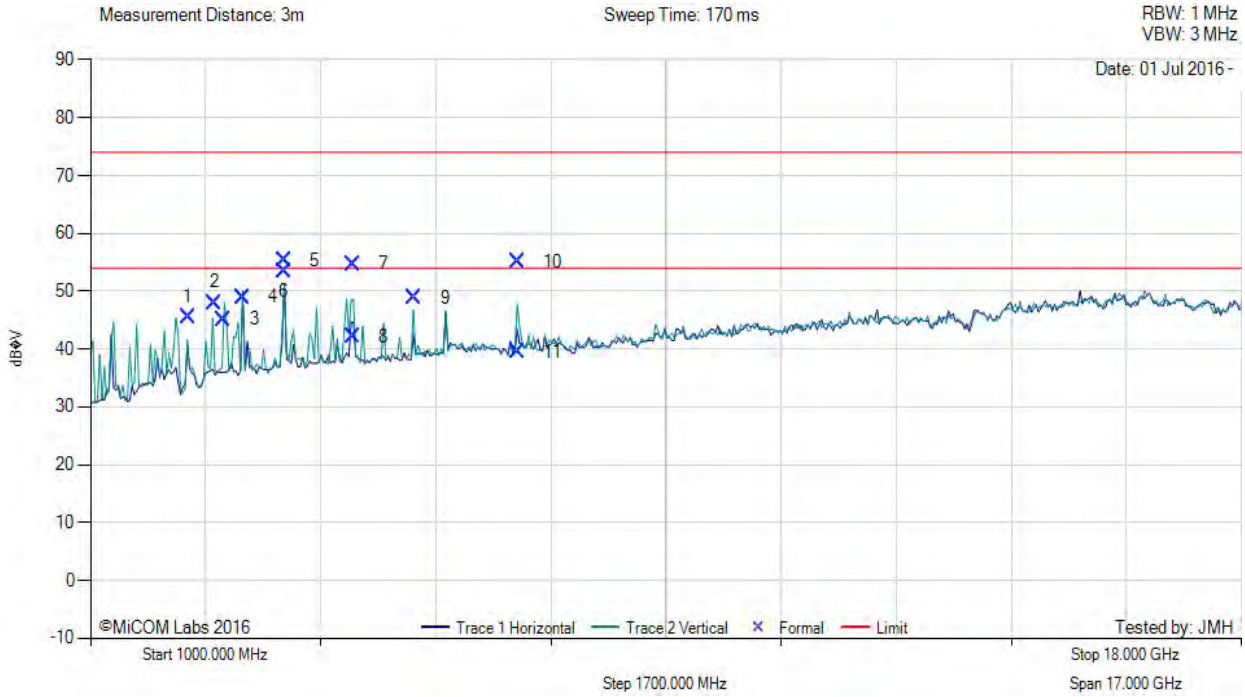
Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	2405.39	53.13	2.69	-11.82	44.00	Fundamental	Horizontal	100	197	--	--	
2	3215.94	61.57	2.99	-11.27	53.29	Peak (NRB)	Horizontal	151	57	--	--	Pass
3	3856.63	61.32	3.23	-10.81	53.74	Max Peak	Vertical	113	356	74.0	-20.3	Pass
4	3856.63	59.05	3.23	-10.81	51.47	Max Avg	Vertical	113	356	54.0	-2.5	Pass
5	4820.48	67.38	3.53	-11.15	59.76	Max Peak	Vertical	117	40	74.0	-14.2	Pass
6	4820.48	52.66	3.53	-11.15	45.04	Max Avg	Vertical	117	40	54.0	-9.0	Pass
7	5785.05	52.70	3.80	-10.44	46.06	Peak (NRB)	Vertical	151	57	--	--	Pass
8	7232.56	54.55	4.26	-7.34	51.47	Peak (NRB)	Vertical	151	57	--	--	Pass

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup

back to matrix

RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

Variant: 802.11n HT-20, Test Freq: 2437.00 MHz, Antenna: RADWIN Ltd. NA, Power Setting: 22, Duty Cycle (%): 99



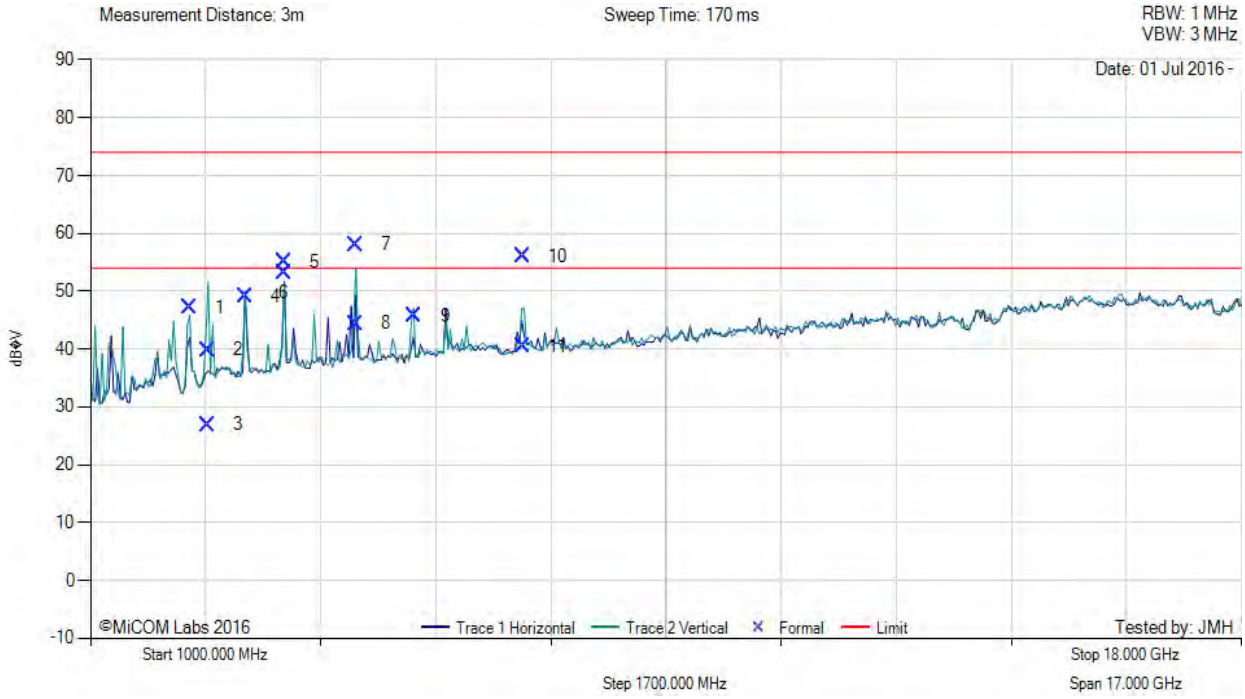
Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	2437.84	54.47	2.72	-11.73	45.46	Fundamental	Vertical	151	1	--	--	
2	2831.04	56.51	2.85	-11.33	48.03	Peak (Scan)	Vertical	151	0	74.0	-26.0	Pass
3	2968.27	53.23	2.90	-11.03	45.10	Peak (NRB)	Vertical	151	0	--	--	Pass
4	3249.29	57.23	3.03	-11.26	49.00	Peak (NRB)	Horizontal	151	1	--	--	Pass
5	3856.60	62.94	3.23	-10.81	55.36	Max Peak	Horizontal	100	61	74.0	-18.6	Pass
6	3856.60	61.10	3.23	-10.81	53.52	Max Avg	Horizontal	100	61	54.0	-0.5	Pass
7	4873.89	62.39	3.53	-11.24	54.68	Max Peak	Vertical	100	9	74.0	-19.3	Pass
8	4873.89	49.84	3.53	-11.24	42.13	Max Avg	Vertical	100	9	54.0	-11.9	Pass
9	5784.91	55.43	3.80	-10.44	48.79	Peak (NRB)	Vertical	151	0	--	--	Pass
10	7308.67	58.20	4.23	-7.29	55.14	Max Peak	Vertical	118	48	74.0	-18.9	Pass
11	7308.67	42.56	4.23	-7.29	39.50	Max Avg	Vertical	118	48	54.0	-14.5	Pass

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup

back to matrix

RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

Variant: 802.11n HT-20, Test Freq: 2462.00 MHz, Antenna: RADWIN Ltd. NA, Power Setting: 22, Duty Cycle (%): 99

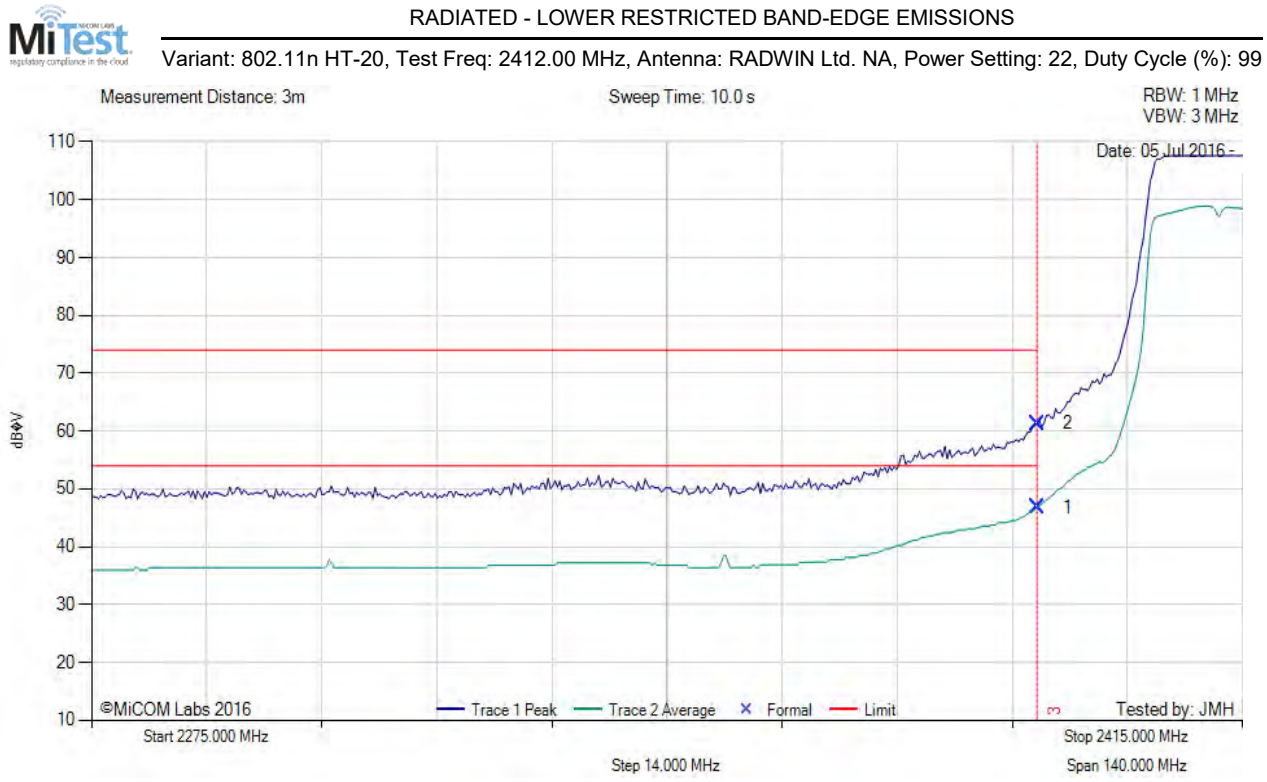


Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	2465.06	56.14	2.73	-11.67	47.20	Fundamental	Vertical	151	1	--	--	
2	2736.55	48.37	2.83	-11.36	39.84	Max Peak	Vertical	100	323	74.0	-34.2	Pass
3	2736.55	35.42	2.83	-11.36	26.89	Max Avg	Vertical	100	323	54.0	-27.1	Pass
4	3282.67	57.21	3.02	-11.20	49.03	Peak (NRB)	Horizontal	151	1	--	--	Pass
5	3856.63	62.68	3.23	-10.81	55.10	Max Peak	Horizontal	126	62	74.0	-18.9	Pass
6	3856.63	60.84	3.23	-10.81	53.26	Max Avg	Horizontal	126	62	54.0	-0.7	Pass
7	4921.17	65.89	3.57	-11.37	58.09	Max Peak	Vertical	135	42	74.0	-15.9	Pass
8	4921.17	52.23	3.57	-11.37	44.43	Max Avg	Vertical	135	42	54.0	-9.6	Pass
9	5784.91	52.44	3.80	-10.44	45.80	Peak (NRB)	Vertical	151	67	--	--	Pass
10	7384.07	58.95	4.29	-7.17	56.07	Max Peak	Vertical	155	69	74.0	-17.9	Pass
11	7384.07	43.29	4.29	-7.17	40.41	Max Avg	Vertical	155	69	54.0	-13.6	Pass

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup

back to matrix

A.1.2. Restricted Band-Edge Emissions



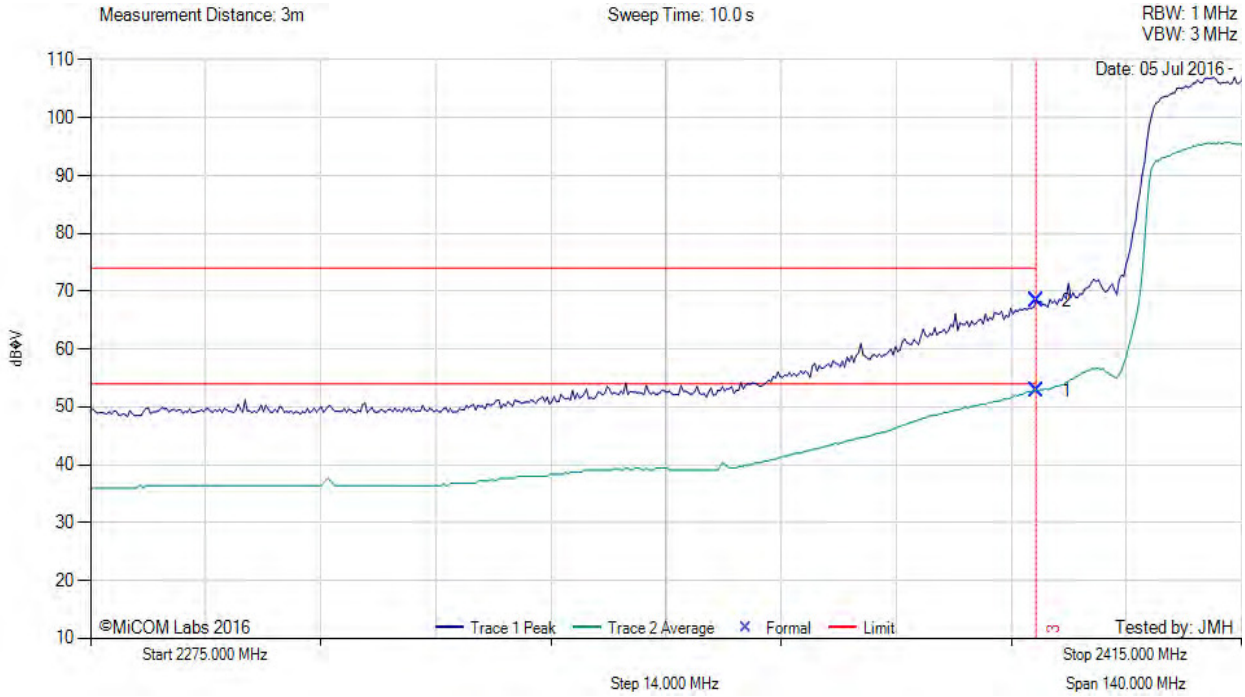
Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	2390.00	12.14	2.69	32.04	46.87	Max Avg	Vertical	157	374	54.0	-7.1	Pass
2	2390.00	26.59	2.69	32.04	61.32	Max Peak	Vertical	157	374	74.0	-12.7	Pass
3	2390.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup

back to matrix

RADIATED - LOWER RESTRICTED BAND-EDGE EMISSIONS

Variant: 802.11n HT-40, Test Freq: 2422.00 MHz, Antenna: RADWIN Ltd. NA, Power Setting: 20, Duty Cycle (%): 99



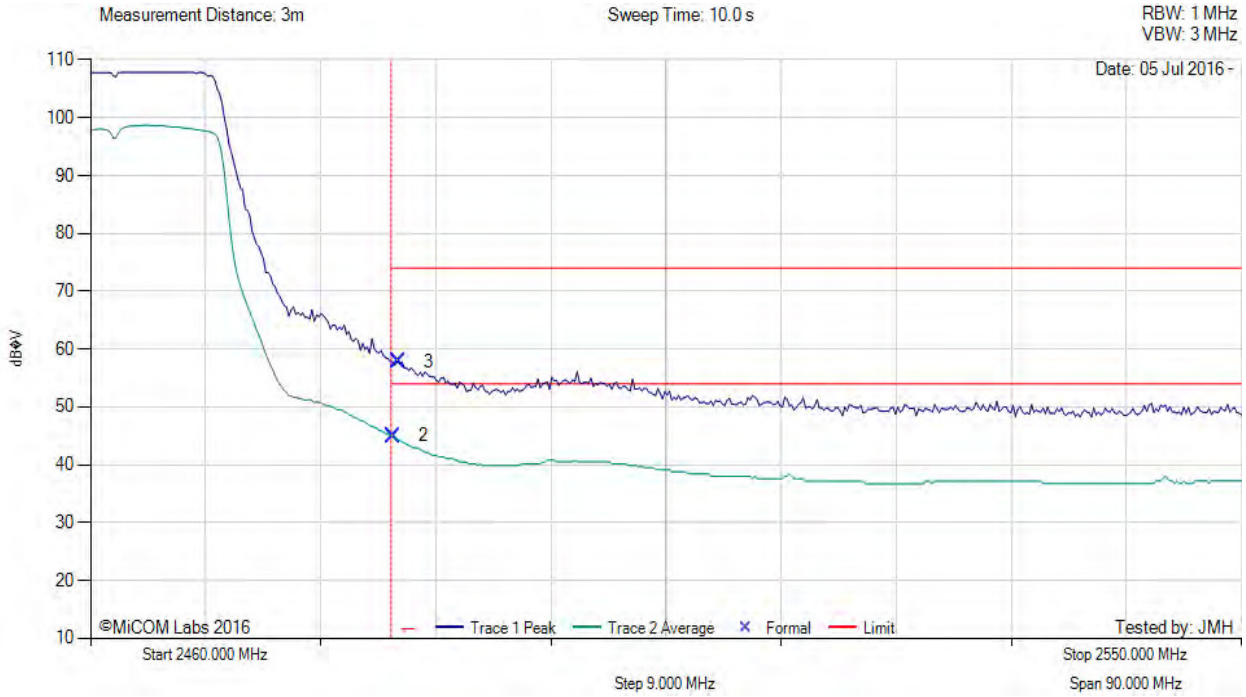
Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	2390.00	18.09	2.69	32.04	52.82	Max Avg	Vertical	157	374	54.0	-1.2	Pass
2	2390.00	33.67	2.69	32.04	68.40	Max Peak	Vertical	157	374	74.0	-5.6	Pass
3	2390.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup. Power reduced to meet Band Edge limit

back to matrix

RADIATED - UPPER RESTRICTED BAND-EDGE EMISSIONS

Variant: 802.11n HT-20, Test Freq: 2462.00 MHz, Antenna: RADWIN Ltd. NA, Power Setting: 22, Duty Cycle (%): 99



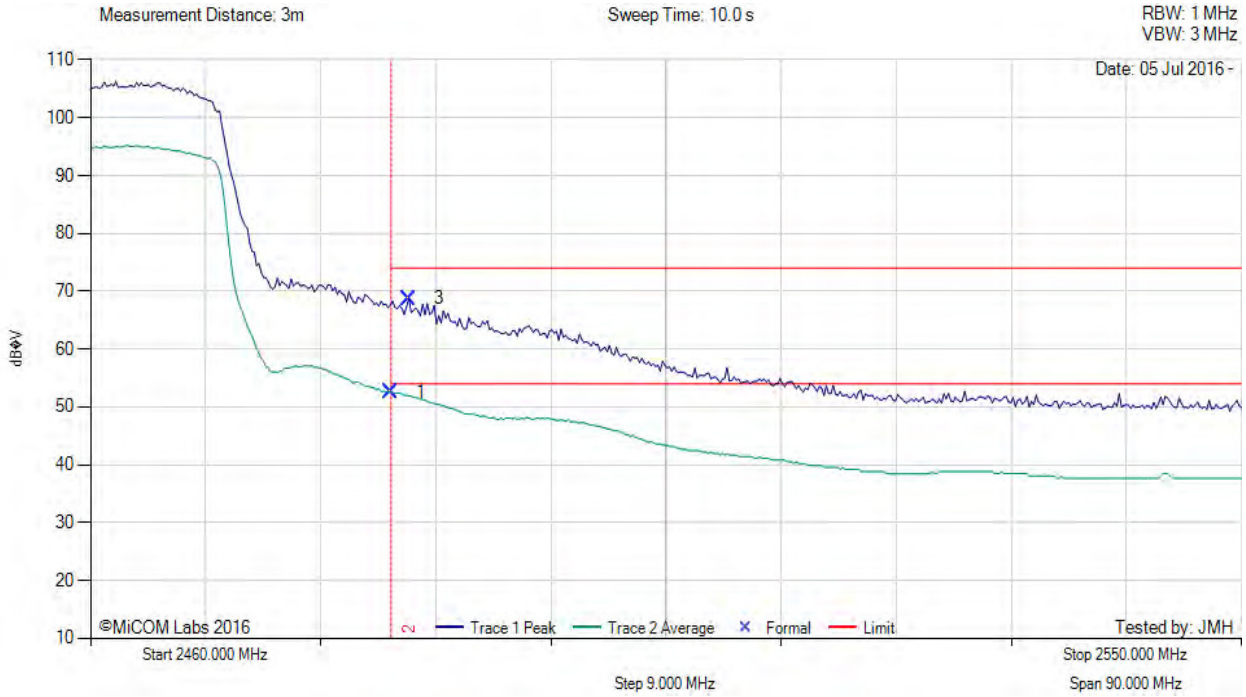
Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
2	2483.63	9.88	2.73	32.37	44.98	Max Avg	Vertical	144	23	54.0	-9.0	Pass
3	2484.07	22.72	2.73	32.37	57.82	Max Peak	Vertical	144	23	74.0	-16.2	Pass
1	2483.50	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup.

back to matrix

RADIATED - UPPER RESTRICTED BAND-EDGE EMISSIONS

Variant: 802.11n HT-40, Test Freq: 2452.00 MHz, Antenna: RADWIN Ltd. NA, Power Setting: 22, Duty Cycle (%): 99



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	2483.50	17.50	2.73	32.37	52.60	Max Avg	Vertical	144	23	54.0	-1.4	Pass
3	2484.85	33.66	2.73	32.37	68.76	Max Peak	Vertical	144	23	74.0	-5.2	Pass
2	2483.50	--	--	--	--	Restricted-Band	--	--	--	--	--	--

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup.

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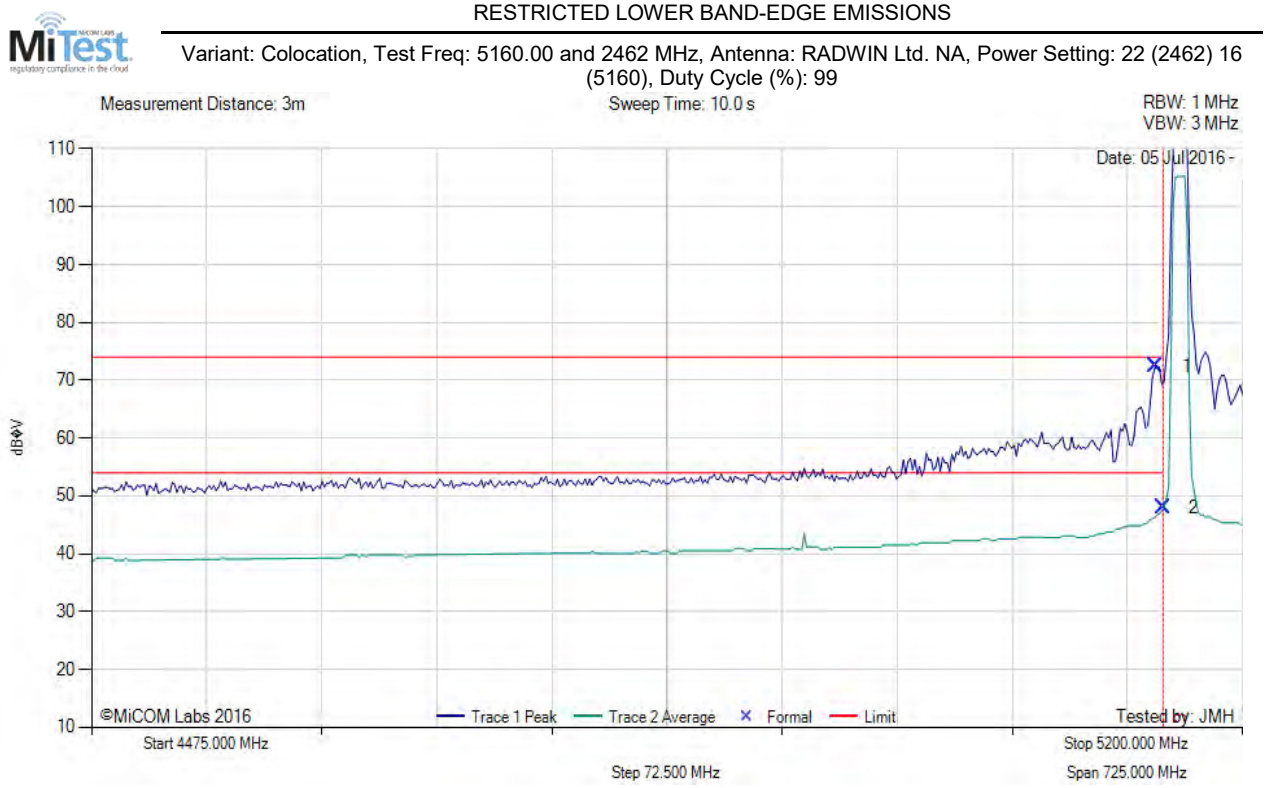
A.1.3. Colocation Emissions

Colocation: Band Edge 5150 MHz



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	5145.64	34.64	3.69	34.11	72.44	Max Peak	Horizontal	154	179	74.0	-1.6	Pass
2	5150.00	10.29	3.67	34.11	48.07	Max Avg	Horizontal	154	179	54.0	-5.9	Pass
3	5150.00	--	--	--	--	Restricted-Band	--	--	--	--	--	--

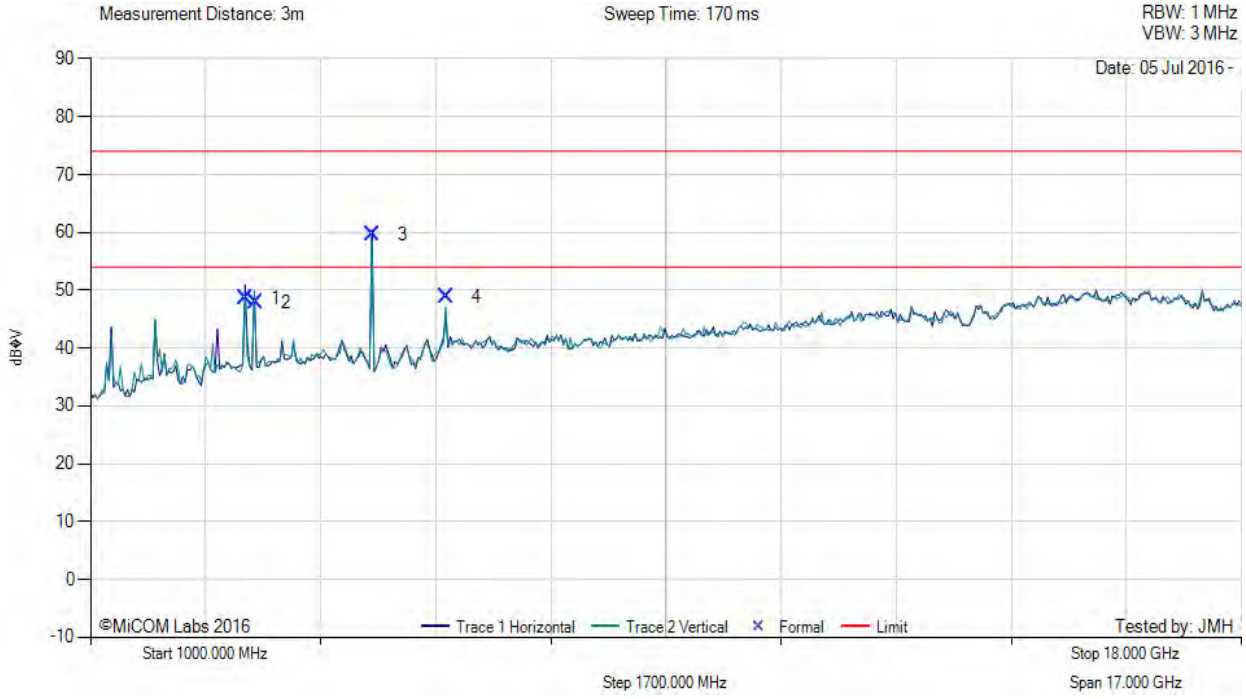
Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup. Colocation - broadcasting simultaneously at 2462 and 5160 MHz

back to matrix

Colocation: TX Spurious 1-18GHz

RADIATED SPURIOUS - RESTRICTED BAND EMISSIONS

Variant: 20 MHz, Test Freq: 5160.00 MHz, Antenna: RADWIN Ltd. NA, Power Setting: 22 (2462) 16 (5160), Duty Cycle (%): 99



Num	Frequency MHz	Raw dBµV	Cable Loss	AF dB	Level dBµV/m	Measurement Type	Pol	Hgt cm	Azt Deg	Limit dBµV/m	Margin dB	Pass /Fail
1	3282.56	56.84	3.02	-11.20	48.66	Peak (NRB)	Horizontal	101	130	--	--	Pass
2	3439.93	56.02	3.11	-11.25	47.88	Peak (NRB)	Vertical	200	0	--	--	Pass
3	5161.08	67.57	3.68	-11.55	59.70	Fundamental	Horizontal	101	189	--	--	
4	6250.04	53.56	3.93	-8.57	48.92	Peak (NRB)	Vertical	148	229	--	--	Pass

Test Notes: EUT on 150 cm table powered by 24V POE. Heat Sink grounded to turntable simulating physical setup. Colocation - broadcasting simultaneously at 2462 and 5160 MHz

back to matrix

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