

FCC Test Report

Product Name	Industrial WiFi module
Model No	WM-AN-AT-01
FCC ID.	SLE-WM-AN-AT-01

Applicant	Moxa Inc.
Address	FL. 4, NO. 135, LANE 235, BAOQIAO RD., XINDIAN DIST., NEW TAIPEI CITY, TAIWAN

Date of Receipt	Apr. 30, 2020
Issue Date	Jun. 17, 2020
Report No.	2040838R-E3032110113
Report Version	V1.0



The test results relate only to the samples tested.

The test results shown in the test report are traceable to the national/international standard through the calibration of the equipment and evaluated measurement uncertainty herein.

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Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test Report

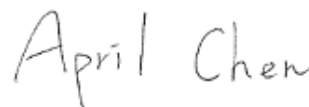
Issue Date: Jun. 17, 2020

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Product Name	Industrial WiFi module
Applicant	Moxa Inc.
Address	FL. 4, NO. 135, LANE 235, BAOQIAO RD., XINDIAN DIST., NEW TAIPEI CITY, TAIWAN
Manufacturer	Moxa Inc.
Model No.	WM-AN-AT-01
FCC ID.	SLE-WM-AN-AT-01
EUT Rated Voltage	DC 3.3V (via PCI Express slot)
EUT Test Voltage	DC 3.3V (via PCI Express slot)
Applicable Standard	FCC CFR Title 47 Part 15 Subpart C ANSI C63.4: 2014, ANSI C63.10: 2013
Test Result	Complied

Documented By :



(Senior Adm. Specialist / April Chen)

Tested By :



(Engineer / Yunche Chen)

Approved By :



(Director / Vincent Lin)

Revision History

Report No.	Version	Description	Issued Date
2040838R-E3032110113	V1.0	Initial issue of report.	2020-06-30

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1. GENERAL INFORMATION

1.1. EUT Description

Product Name	Industrial WiFi module
Model No.	WM-AN-AT-01
FCC ID.	SLE-WM-AN-AT-01
Frequency Range	2412-2462MHz for 802.11b/g/n-20BW
Number of Channels	802.11b/g/n-20MHz:11
Data Speed	802.11b: 1-11Mbps, 802.11g: 6-54Mbps, 802.11n: up to 72.2Mbps
Type of Modulation	802.11b: DSSS (DBPSK, DQPSK, CCK) 802.11g/n: OFDM (BPSK, QPSK, 16QAM, 64QAM)
Antenna Type	Dipole Antenna
Antenna Gain	Refer to the table “Antenna List”
Channel Control	Auto

Antenna List

No.	Manufacturer	Part No.	Antenna Type	Peak Gain
1	KINSUN	ANT-WDB-ARM-02	Dipole	2.04dBi in 2.4GHz

Note: The antenna of EUT conforms to FCC 15.203.

802.11b/g/n-20MHz Center Frequency of Each Channel:

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
Channel 01:	2412 MHz	Channel 02:	2417 MHz	Channel 03:	2422 MHz	Channel 04:	2427 MHz
Channel 05:	2432 MHz	Channel 06:	2437 MHz	Channel 07:	2442 MHz	Channel 08:	2447 MHz
Channel 09:	2452 MHz	Channel 10:	2457 MHz	Channel 11:	2462 MHz		

Note:

1. The EUT is a Industrial WiFi module with built-in 802.11a/b/g/n 2.4GHz and 5GHz WLAN transceiver, this report for 2.4GHz WLAN.
2. Regarding to the operation frequency, the lowest, middle and highest frequency are selected to perform the test.
3. Lowest and highest data rates are tested in each mode. Only worst case is shown in the report. (802.11b is 1Mbps 、802.11g is 6Mbps 、802.11n(20M-BW) is 7.2Mbps).
4. These tests are conducted on a sample for the purpose of demonstrating compliance of 802.11b/g/n transmitter with Part 15 Subpart C Paragraph 15.247 of spread spectrum devices.

Test Mode:	Mode 1: Transmit (802.11b 1Mbps)
	Mode 2: Transmit (802.11g 6Mbps)
	Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

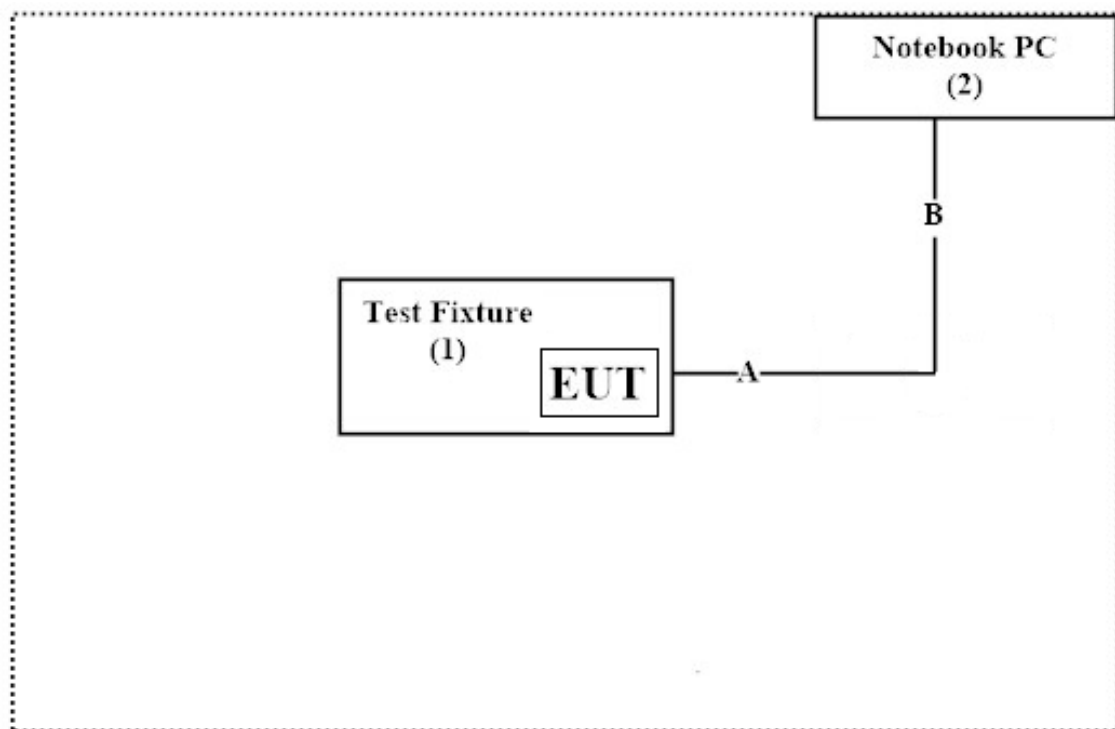
1.3. Tested System Details

The types for all equipment, plus descriptions of all cables used in the tested system (including inserted cards) are:

Product	Manufacturer	Model No.	Serial No.	Power Cord
1	Test Fixture	MOXA	N/A	N/A
2	Notebook PC	DELL	Latitude 5580	GDZN7H2
				Non-Shielded, 0.8m

Signal Cable Type	Signal cable Description
A	Signal Cable
B	RS232 to USB Cable

1.4. Configuration of Tested System



1.5. EUT Exercise Software

1. Setup the EUT as shown in Section 1.4.
2. Execute software "Putty Version.0.063" on the EUT.
3. Configure the test mode, the test channel, and the data rate.
4. Press "OK" to start the continuous Transmit.
5. Verify that the EUT works properly.

1.6. Test Facility

Ambient conditions in the laboratory:

Performed Item	Items	Required	Actual
Conducted Emission	Temperature (°C)	10~40 °C	24.1 °C
	Humidity (%RH)	10~90 %	60 %
Radiated Emission	Temperature (°C)	10~40 °C	34 °C
	Humidity (%RH)	10~90 %	50 %
Conductive	Temperature (°C)	10~40 °C	25.3 °C
	Humidity (%RH)	10~90 %	71.0 %

USA : FCC Registration Number: TW3023

Canada : IC Registration Number: 4075A

Site Description: Accredited by TAF
Accredited Number: 3023

Test Laboratory: DEKRA Testing and Certification Co., Ltd
Address: No.5-22, Ruishukeng, Linkou Dist., New Taipei City 24451,
Taiwan, R.O.C.
Phone number: 886-2-8601-3788
Fax number: 886-2-8601-3789
Email address: info.tw@dekra.com
Website: <http://www.dekra.com.tw>

1.7. List of Test Equipment

For Conducted measurements /CB3/SR8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
	Temperature Chamber	WIT GROUP	TH-1S-B	EQ-201-00146	2020/04/06	2021/04/05
X	Spectrum Analyzer	Agilent	N9010A	MY53470892	2019/09/25	2020/09/24
X	Peak Power Analyzer	Keysight	8990B	MY51000410	2019/07/30	2020/07/29
X	Wideband Power Sensor	Keysight	N1923A	MY56080003	2019/07/30	2020/07/29
X	Wideband Power Sensor	Keysight	N1923A	MY56080004	2019/07/30	2020/07/29
X	EMI Test Receiver	R&S	ESCS 30	100369	2019/11/27	2020/11/26
X	LISN	R&S	ENV216	101105	2020/04/27	2021/04/26
X	LISN	R&S	ESH3-Z5	836679/014	2020/04/26	2021/04/25
X	Coaxial Cable	DEKRA	RG 400	LC018-RG	2019/06/20	2020/06/19

Note:

1. All equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Conduction Test SystemV9.0.5.

For Radiated measurements /Site3/CB8

	Equipment	Manufacturer	Model No.	Serial No.	Cali. Date	Due. Date
X	Test Receiver	R&S	ESR7	101602	2019/12/16	2020/12/15
X	Signal Analyzer	R&S	FSV40	101869	2019/07/04	2020/07/03
X	Loop Antenna	Teseq	HLA6121	37133	2019/10/15	2021/10/14
X	Bilog Antenna	Schaffner Chase	CBL6112B	2916	2020/01/20	2021/01/19
X	Coaxial Cable	DEKRA	L1907-001C	280280.F141.1000D	2019/07/10	2020/07/09
X	Amplifier	EMCI	EMC001330	980254	2019/08/22	2020/08/21
X	Horn Antenna	ETS-LINDGREN	3117	00228113	2020/05/01	2021/04/30
X	Coaxial Cable	DEKRA	L1907-002C	280280.F141.1000D	2019/07/10	2020/07/09
X	Amplifier	EMCI	EMC05820SE	980362	2019/06/26	2020/06/25
X	Amplifier	EMCI	EMC051845SE	980632	2019/08/08	2020/08/07
	Horn Antenna	Com-Power	AH-1840	101101	2019/10/31	2020/10/30
	Amplifier + Cable	EMCI	EMC184045SE	980369	2020/04/23	2021/04/22
	Bilog Antenna	Schaffner Chase	CBL6112B	2925	2020/02/20	2021/02/19
	Coaxial Cable	DEKRA	L1907-003C	00100A1B3A120M	2019/07/10	2020/07/09
	Amplifier	EMCI	EMC001330	980255	2020/03/17	2021/03/16
X	Filter	MICRO-TRONICS	BRM50702	G270	2019/08/08	2020/08/07
	Filter	MICRO-TRONICS	BRM50716	G196	2019/08/08	2020/08/07

Note:

1. Loop Antenna is calibrated every two years, the other equipments are calibrated every one year.
2. The test instruments marked with "X" are used to measure the final test results.
3. Test Software version : DEKRA Test SystemV1.1.

1.8. Uncertainty

Uncertainties have been calculated according to the DEKRA internal document, and is described in each test chapter of this report.

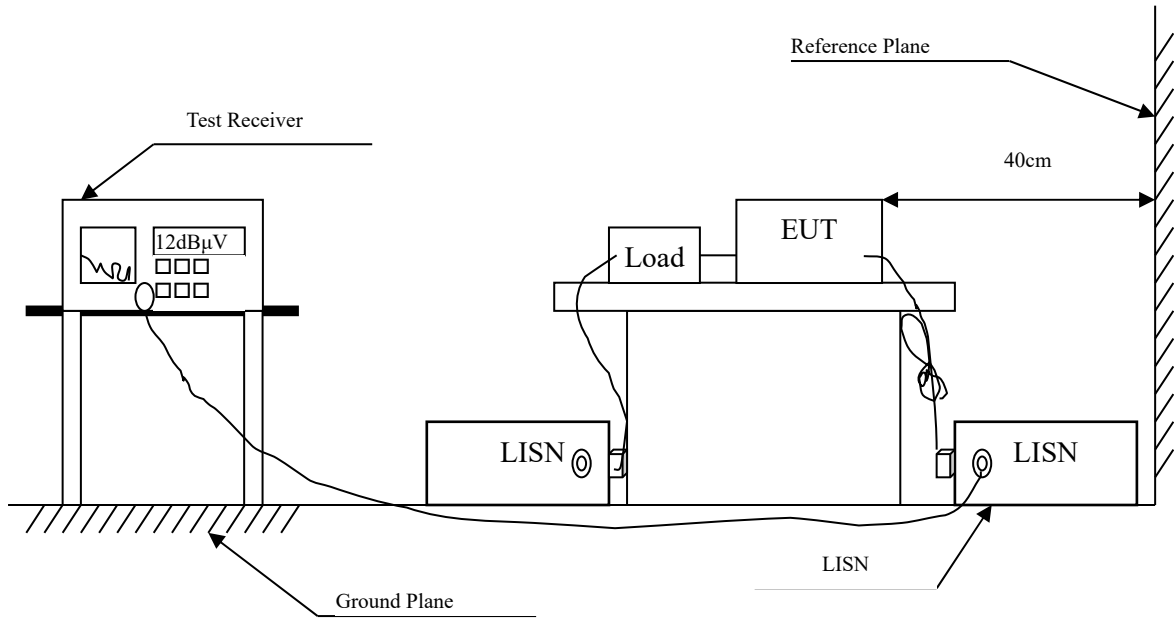
The reported expanded uncertainties are based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Measurement uncertainties evaluated for each testing system and associated connections are given here to provide the system information for reference. Compliance determinations do not take into account measurement uncertainties for each testing system, but are based on the results of the compliance measurement.

Test item	Uncertainty	
Conducted Emission	$\pm 3.42\text{dB}$	
Peak Power Output	Power Meter $\pm 2.06\text{ dB}$	Spectrum Analyzer $\pm 0.89\text{ dB}$
Radiated Emission	Under 1GHz $\pm 4.06\text{dB}$	Above 1GHz $\pm 3.73\text{dB}$
RF antenna conducted test	$\pm 2.06\text{ dB}$	
Band Edge	$\pm 2.06\text{ dB}$	
6dB Bandwidth	$\pm 1544.74\text{Hz}$	
Power Density	$\pm 2.06\text{ dB}$	
Duty Cycle (2.4GHz)	$\pm 2.31\text{ ms}$	

2. Conducted Emission

2.1. Test Setup



2.2. Limits

FCC Part 15 Subpart C Paragraph 15.207 (dBμV) Limit		
Frequency MHz	Limits	
	QP	AVG
0.15 - 0.50	66-56	56-46
0.50-5.0	56	46
5.0 - 30	60	50

2.3. Test Procedure

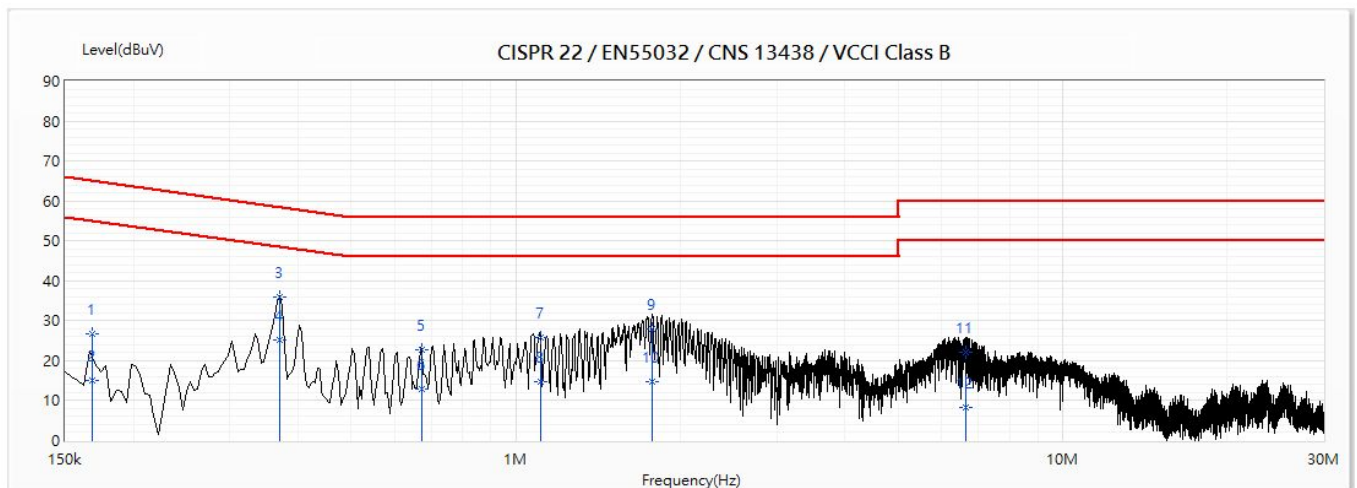
The EUT and simulators are connected to the main power through a line impedance stabilization network (L.I.S.N.). This provides a 50 ohm /50uH coupling impedance for the measuring equipment. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm /50uH coupling impedance with 50ohm termination. (Please refers to the block diagram of the test setup and photographs.)

Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.4: 2014 on conducted measurement.

Conducted emissions were investigated over the frequency range from 0.15MHz to 30MHz using a receiver bandwidth of 9kHz.

2.4. Test Result of Conducted Emission

Product : Industrial WiFi module
 Test Item : Conducted Emission Test
 Power Line : Line 1
 Test Date : 2020/06/09
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)

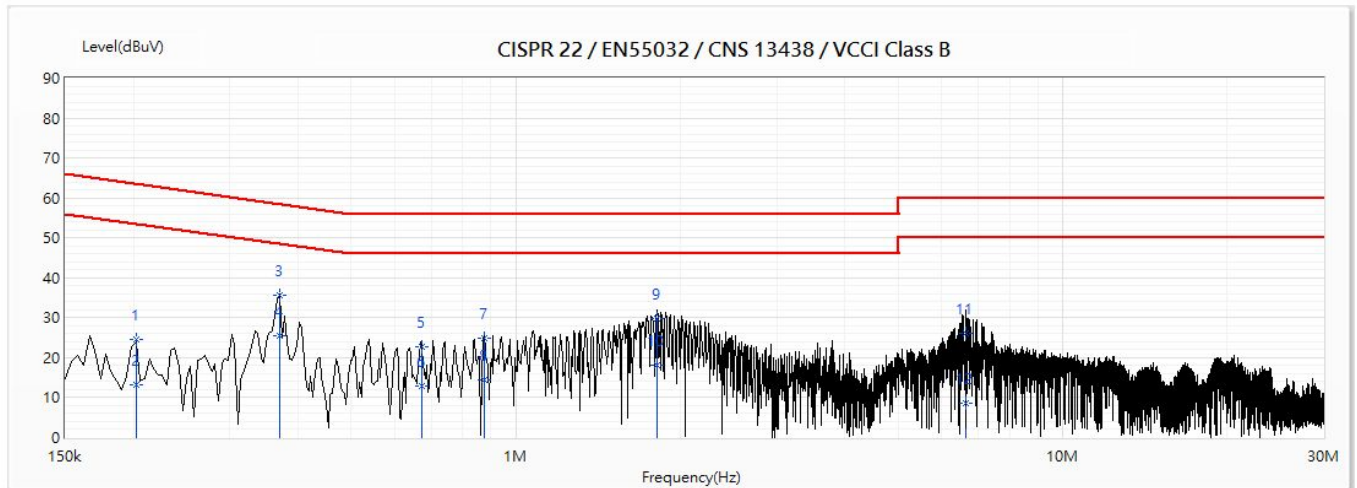


No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.168	26.59	65.05	-38.46	16.79	9.80	QP
2	0.168	15.02	55.05	-40.03	5.22	9.80	AV
*3	0.37	35.83	58.50	-22.67	26.04	9.79	QP
4	0.37	25.26	48.50	-23.24	15.47	9.79	AV
5	0.673	22.60	56.00	-33.40	12.80	9.80	QP
6	0.673	12.98	46.00	-33.02	3.18	9.80	AV
7	1.109	25.79	56.00	-30.21	15.97	9.82	QP
8	1.109	14.82	46.00	-31.18	4.99	9.82	AV
9	1.776	27.85	56.00	-28.15	17.99	9.86	QP
10	1.776	14.86	46.00	-31.14	5.00	9.86	AV
11	6.657	22.16	60.00	-37.84	12.14	10.01	QP
12	6.657	8.43	50.00	-41.57	-1.58	10.01	AV

Remark:

1. "*" means this data is the worst emission level; "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=LISN Factor+Cable Loss).
3. Margin=Emission Level-Limit

Product : Industrial WiFi module
 Test Item : Conducted Emission Test
 Power Line : Line 2
 Test Date : 2020/06/09
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437MHz)



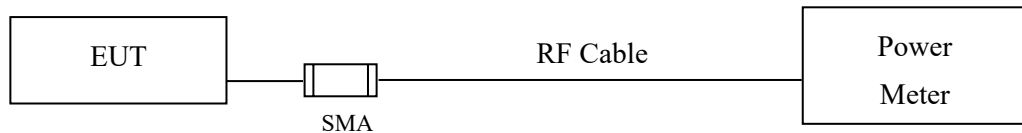
No	Frequency (MHz)	Emission Level (dBuV)	Limit (dBuV)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB)	Detector Type
1	0.202	24.48	63.53	-39.04	14.71	9.77	QP
2	0.202	13.29	53.53	-40.24	3.51	9.77	AV
*3	0.37	35.62	58.50	-22.88	25.84	9.78	QP
4	0.37	25.44	48.50	-23.05	15.67	9.78	AV
5	0.672	22.88	56.00	-33.12	13.09	9.79	QP
6	0.672	13.00	46.00	-33.00	3.21	9.79	AV
7	0.874	24.93	56.00	-31.07	15.13	9.80	QP
8	0.874	14.38	46.00	-31.62	4.58	9.80	AV
9	1.813	29.89	56.00	-26.11	20.04	9.85	QP
10	1.813	18.24	46.00	-27.76	8.39	9.85	AV
11	6.655	26.15	60.00	-33.85	16.14	10.01	QP
12	6.655	8.62	50.00	-41.38	-1.40	10.01	AV

Remark:

1. "*" means this data is the worst emission level; "!" means this data is over limit.
2. Emission Level=Reading Level + Correct Factor(Correct Factor=LISN Factor+Cable Loss).
3. Margin=Emission Level-Limit

3. Peak Power Output

3.1. Test Setup



3.2. Limits

The maximum peak power shall be less 1 Watt.

3.3. Test Procedure

The EUT was tested according to C63.10:2013 for compliance to FCC 47CFR 15.247 requirements. The maximum peak conducted output power using C63.10:2013 Section 11.9.1.3 PKPM1 Peak power meter method. The maximum average conducted output power using C63.10:2013 Section 11.9.2.3 Measurement using a power meter (PM). (Measurement using a gated RF average-reading power meter).

3.4. Test Result of Peak Power Output

Product : Industrial WiFi module
 Test Item : Peak Power Output Data
 Test Date : 2020/05/11
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)				Peak Power	Required Limit	Result
		1	2	5.5	11	1		
		Measurement Level (dBm)						
01	2412	15.28	--	--	--	17.81	<30dBm	Pass
06	2437	15.08	15	14.9	14.8	17.78	<30dBm	Pass
11	2462	14.31	--	--	--	16.88	<30dBm	Pass

Note: Peak Power Output Value = Reading value on power meter + cable loss

Product : Industrial WiFi module
 Test Item : Peak Power Output Data
 Test Date : 2020/05/11
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		6	9	12	18	24	36	48	54	6		
		Measurement Level (dBm)										
01	2412	12.3	--	--	--	--	--	--	--	20.89	<30dBm	Pass
06	2437	14.68	14.57	14.51	14.45	14.34	14.26	14.22	14.16	21.98	<30dBm	Pass
11	2462	12.47	--	--	--	--	--	--	--	21.01	<30dBm	Pass

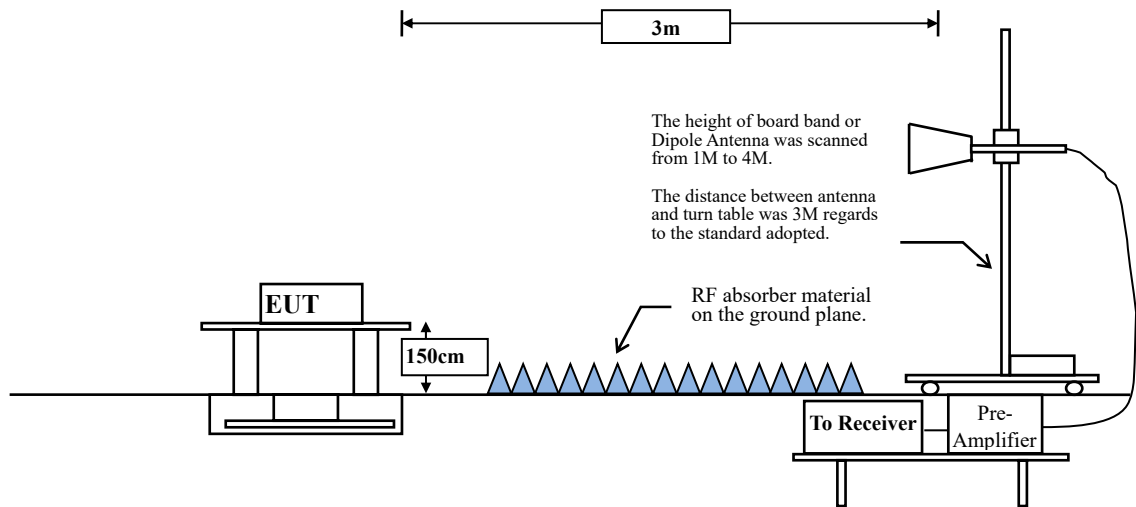
Note: Peak Power Output Value = Reading value on power meter + cable loss

Product : Industrial WiFi module
 Test Item : Peak Power Output Data
 Test Date : 2020/05/11
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel No	Frequency (MHz)	Average Power For different Data Rate (Mbps)								Peak Power	Required Limit	Result
		HT0	HT1	HT2	HT3	HT4	HT5	HT6	HT7	HT0		
		Measurement Level (dBm)										
01	2412	13.67	--	--	--	--	--	--	--	21.33	<30dBm	Pass
06	2437	15.77	15.71	15.63	15.57	15.49	15.45	15.4	15.31	22.18	<30dBm	Pass
11	2462	14.3	--	--	--	--	--	--	--	21.7	<30dBm	Pass

Note: Peak Power Output Value = Reading value on power meter + cable loss

Radiated Emission Above 1GHz



4.2. Limits

Emissions radiated outside of the specified frequency bands, except for harmonics, shall be attenuated by at least 20dB below the level of the fundamental or to the general radiated emission limits in paragraph 15.209, whichever is the lesser attenuation.

FCC Part 15 Subpart C Paragraph 15.209(a) Limits		
Frequency MHz	Field strength (microvolts/meter)	Measurement distance (meter)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remarks: E field strength (dBμV/m) = 20 log E field strength (uV/m)

4.3. Test Procedure

The EUT was setup according to ANSI C63.10: 2013 and tested according to C63.10:2013 Section 11.12.1 for compliance to FCC 47CFR 15.247 requirements.

Measuring the frequency range below 1GHz, the EUT is placed on a turn table which is 0.8 meter above ground, when measuring the frequency range above 1GHz, the EUT is placed on a turn table which is 1.5 meter above ground.

The turn table is rotated 360 degrees to determine the position of the maximum emission level.

The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned between 1 meter and 4 meters to find out the maximum emission level.

This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10: 2013 on radiated measurement.

The resolution bandwidth below 30MHz setting on the field strength meter is 9kHz and 30MHz~1GHz is 120kHz and above 1GHz is 1MHz.

Radiated emission measurements below 30MHz are made using Loop Antenna and 30MHz~1GHz are made using broadband Bilog antenna and above 1GHz are made using Horn Antennas.

The measurement is divided into the Preliminary Measurement and the Final Measurement.

The suspected frequencies are searched for in Preliminary Measurement with the measurement antenna kept pointed at the source of the emission both in azimuth and elevation, with the polarization of the antenna oriented for maximum response. The antenna is pointed at an angle towards the source of the emission, and the EUT is rotated in both height and polarization to maximize the measured emission. The emission is kept within the illumination area of the 3 dB bandwidth of the antenna.

The measurement frequency range from 9kHz - 10th Harmonic of fundamental was investigated.

RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure.

RBW = as specified in Table 1.

$VBW \geq 3 \times RBW$.

Table 1 —RBW as a function of frequency

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

According to C63.10 Section 11.12.2.5 Average measurement procedure.

RBW = 1MHz.

VBW = 10Hz, when duty cycle $\geq 98\%$

$VBW \geq 1/T$, when duty cycle $< 98\%$

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

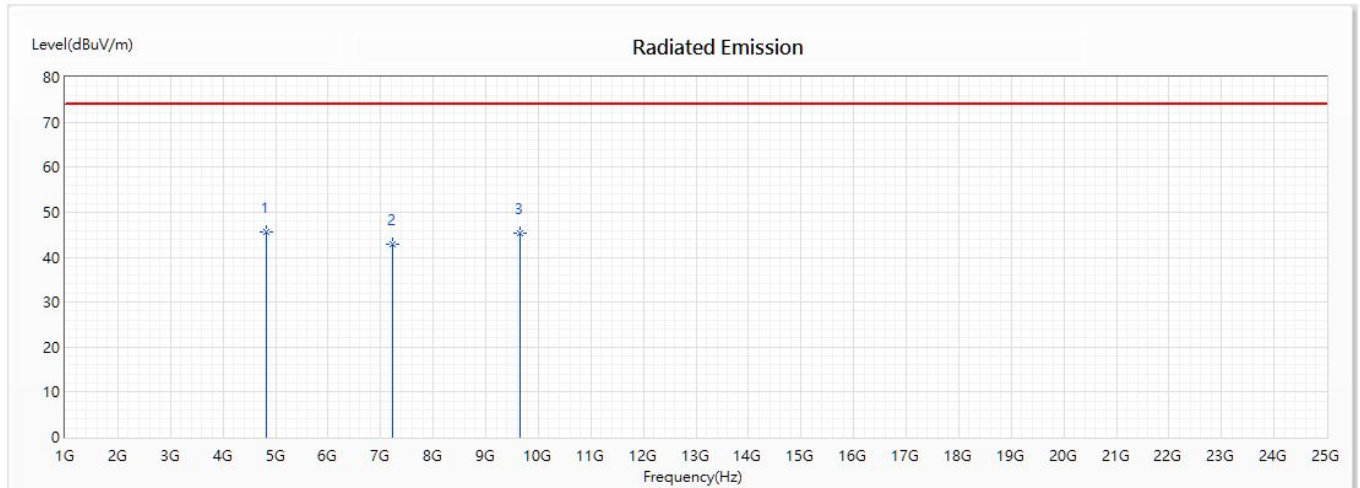
2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11b	100.00	--	--	10
802.11g	97.93	2.0580	486	500
802.11n20	97.04	1.8986	527	1000

Note: Duty Cycle Refer to Section 9.

4.4. Test Result of Radiated Emission

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Horizontal



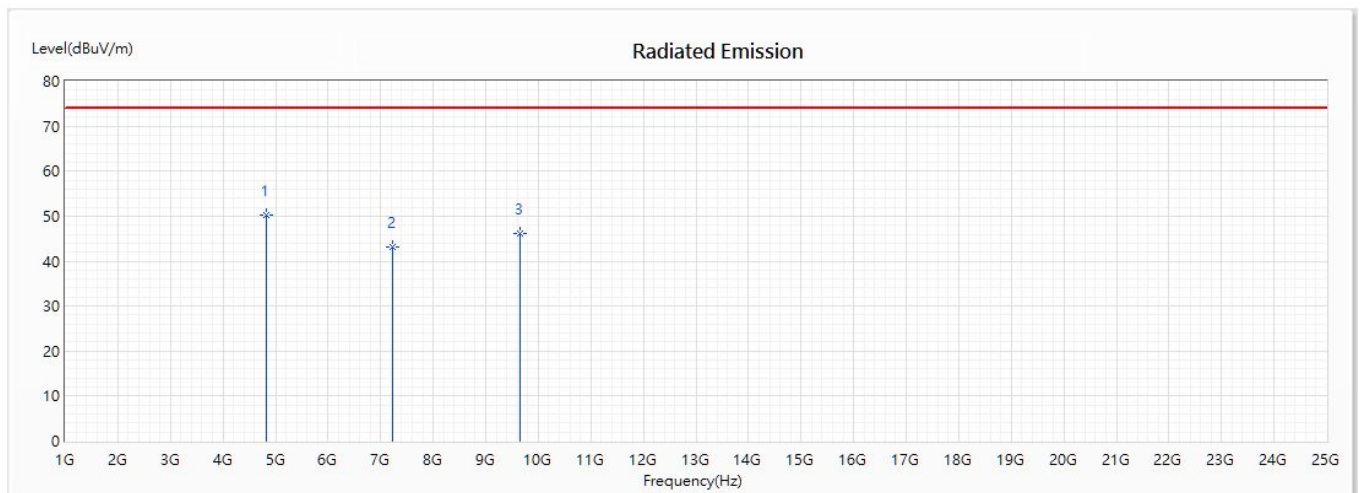
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4824	45.56	74.00	-28.44	57.55	-11.99	PK
2	7236	42.86	74.00	-31.14	55.82	-12.96	PK
3	9648	45.19	74.00	-28.81	58.29	-13.10	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report..

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Vertical



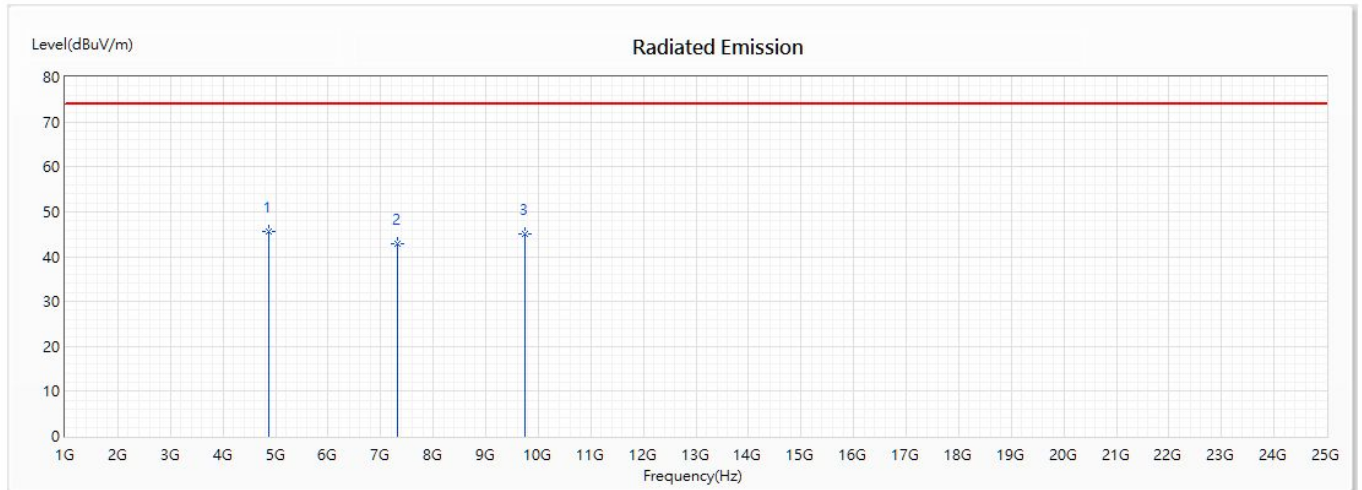
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4824	50.35	74.00	-23.65	62.34	-11.99	PK
2	7236	43.06	74.00	-30.94	56.02	-12.96	PK
3	9648	46.26	74.00	-27.74	59.36	-13.10	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Horizontal



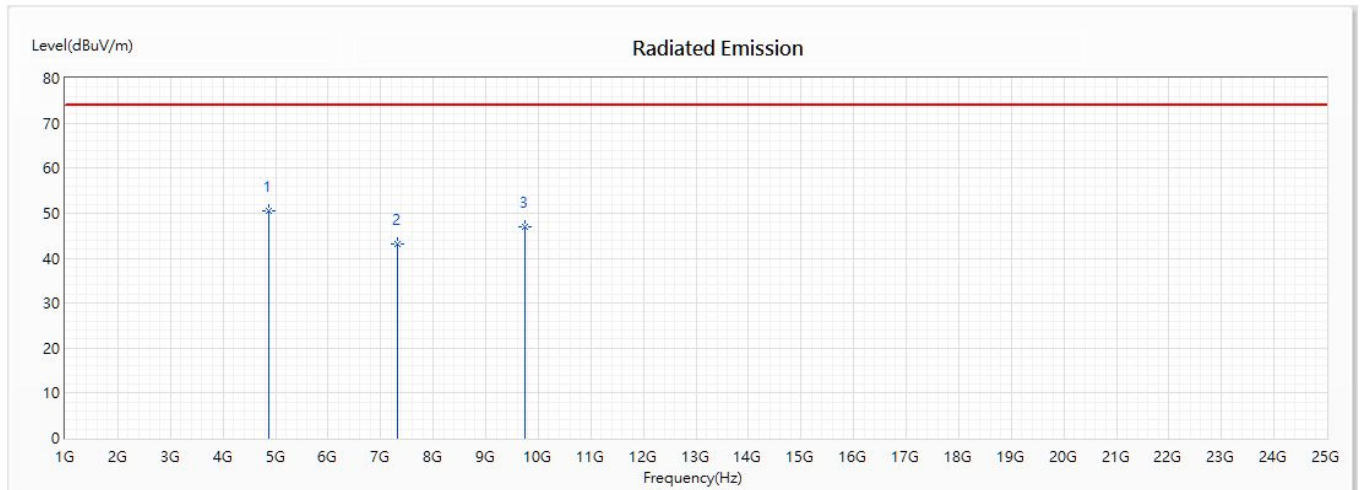
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4874	45.71	74.00	-28.29	57.35	-11.64	PK
2	7311	42.98	74.00	-31.02	56.46	-13.48	PK
3	9748	45.05	74.00	-28.95	57.44	-12.39	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report..

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Vertical



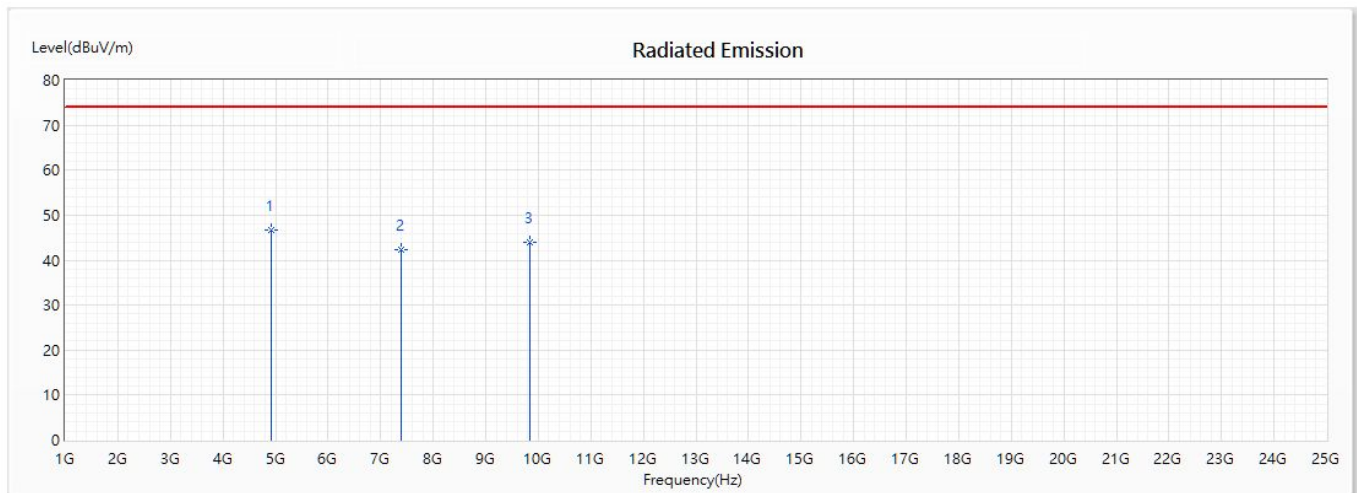
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4874	50.53	74.00	-23.47	62.17	-11.64	PK
2	7311	43.15	74.00	-30.85	56.63	-13.48	PK
3	9748	46.96	74.00	-27.04	59.35	-12.39	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)

Horizontal



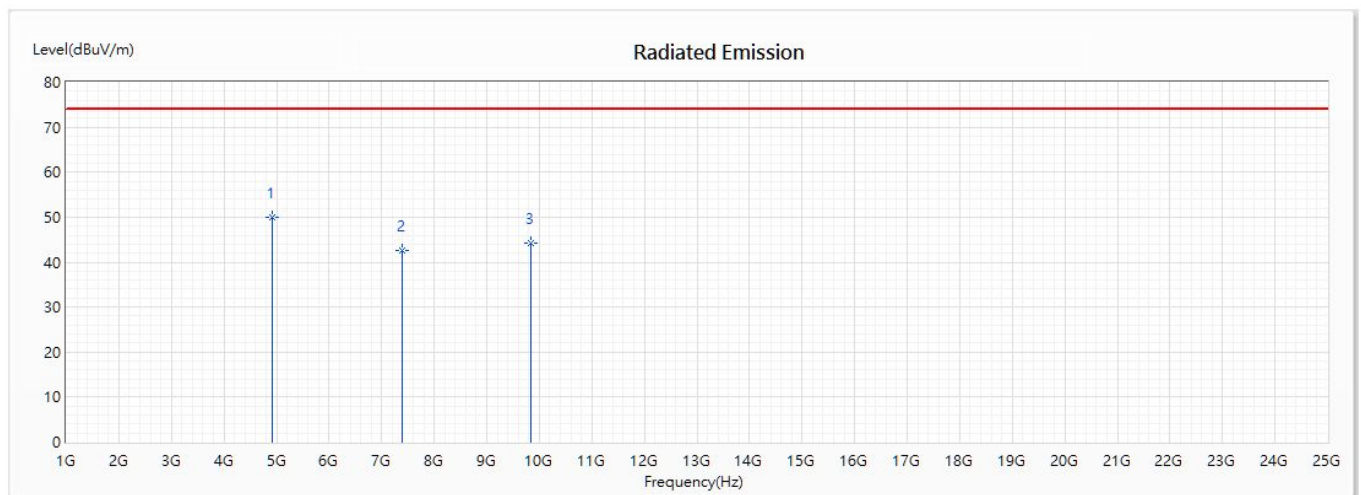
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4924	46.61	74.00	-27.39	57.85	-11.24	PK
2	7386	42.43	74.00	-31.57	56.53	-14.10	PK
3	9848	43.85	74.00	-30.15	57.29	-13.44	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462 MHz)

Vertical



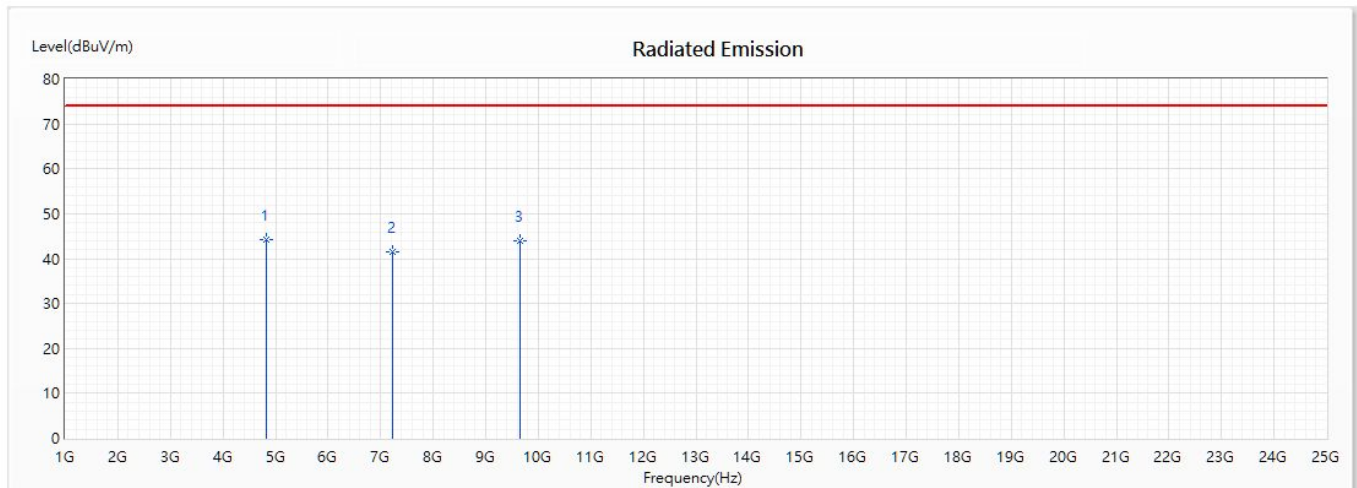
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4924	49.98	74.00	-24.02	61.22	-11.24	PK
2	7386	42.47	74.00	-31.53	56.57	-14.10	PK
3	9848	44.31	74.00	-29.69	57.75	-13.44	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Horizontal



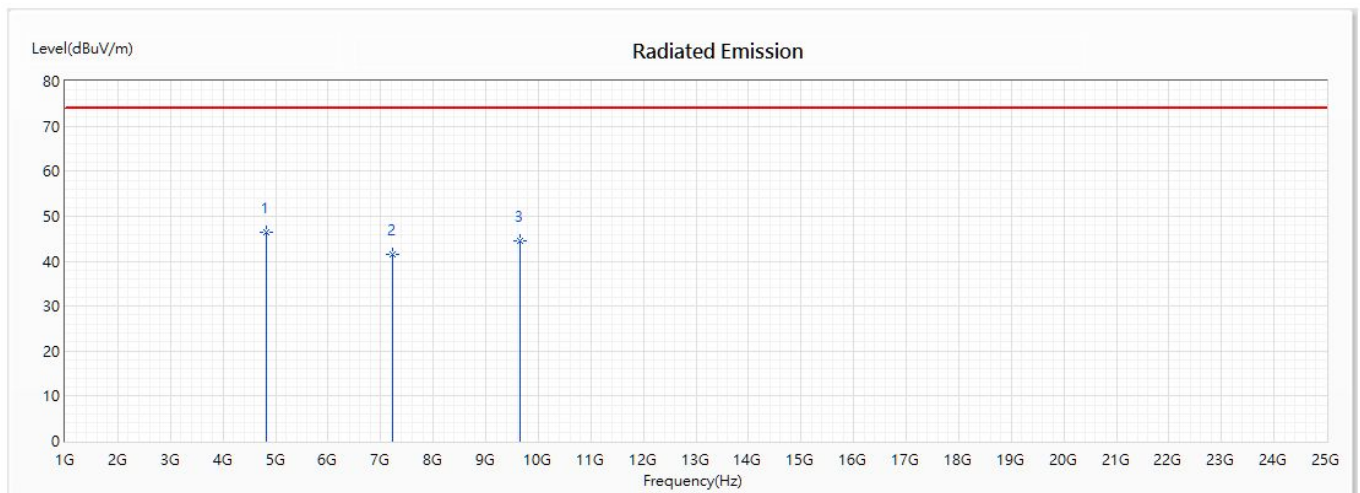
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4824	44.32	74.00	-29.68	56.31	-11.99	PK
2	7236	41.58	74.00	-32.42	54.54	-12.96	PK
3	9648	44.05	74.00	-29.95	57.15	-13.10	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report..

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Vertical



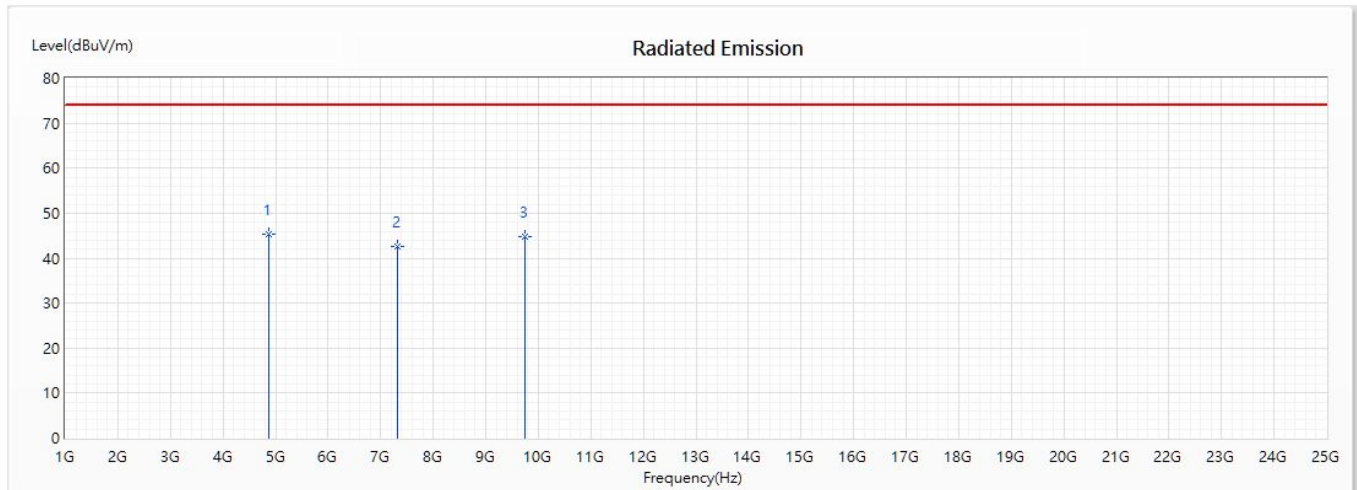
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4824	46.33	74.00	-27.67	58.32	-11.99	PK
2	7236	41.57	74.00	-32.43	54.53	-12.96	PK
3	9648	44.63	74.00	-29.37	57.73	-13.10	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Horizontal



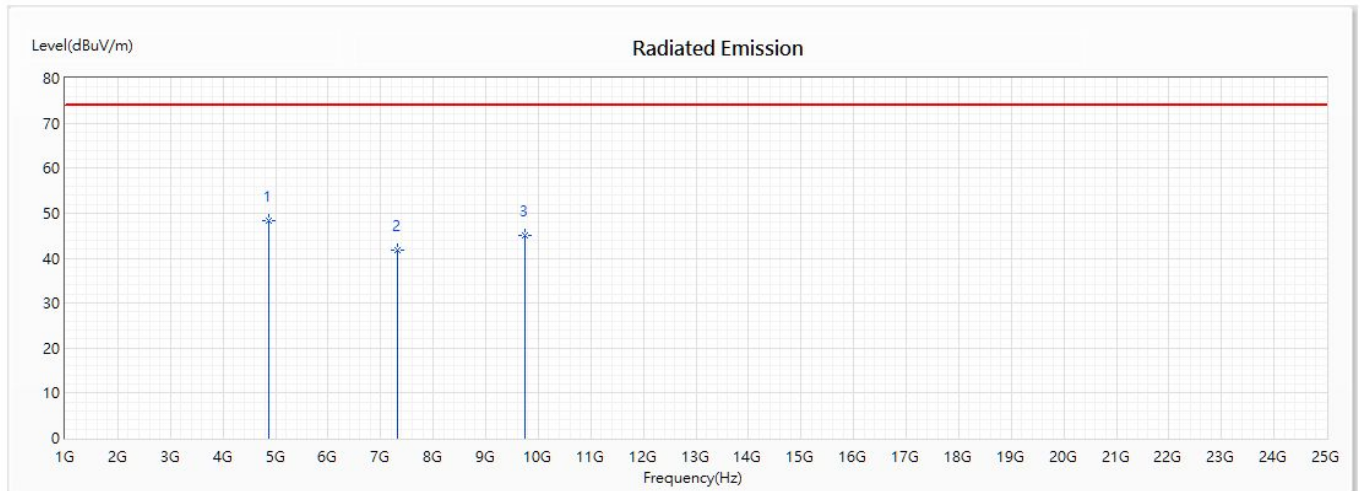
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4874	45.22	74.00	-28.78	56.86	-11.64	PK
2	7311	42.68	74.00	-31.32	56.16	-13.48	PK
3	9748	44.75	74.00	-29.25	57.14	-12.39	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report..

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Vertical



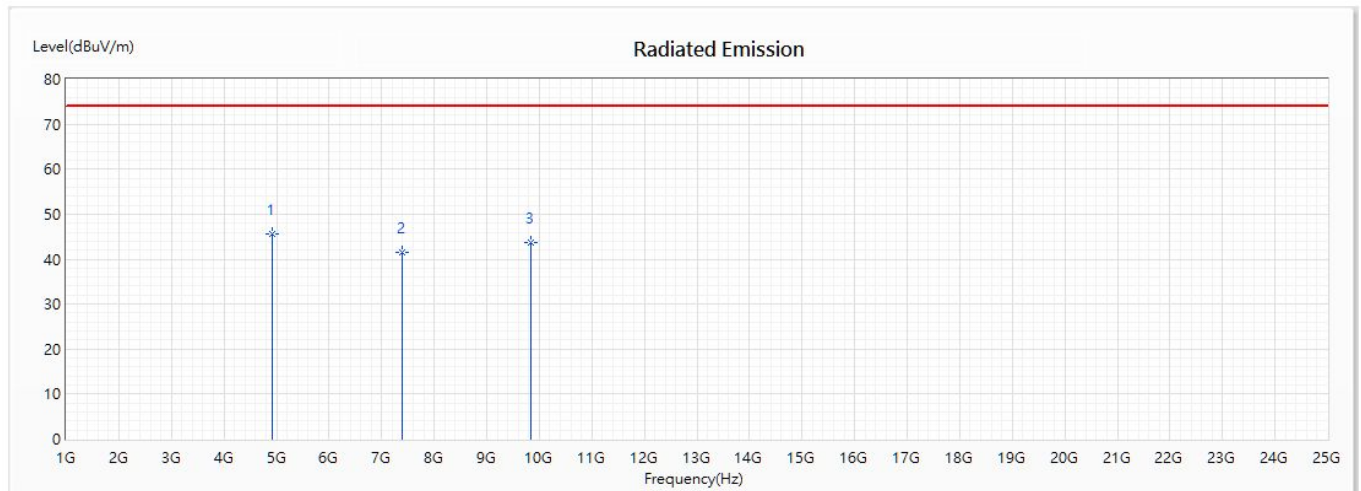
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4874	48.37	74.00	-25.63	60.01	-11.64	PK
2	7311	41.66	74.00	-32.34	55.14	-13.48	PK
3	9748	44.92	74.00	-29.08	57.31	-12.39	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)

Horizontal



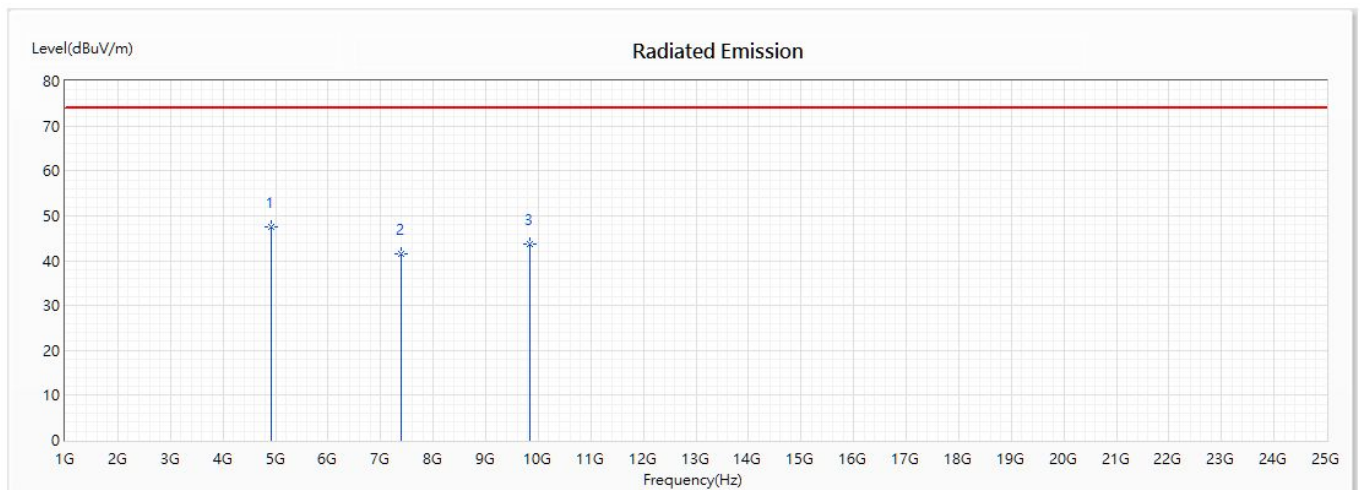
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4924	45.53	74.00	-28.47	56.77	-11.24	PK
2	7386	41.52	74.00	-32.48	55.62	-14.10	PK
3	9848	43.72	74.00	-30.28	57.16	-13.44	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462 MHz)

Vertical



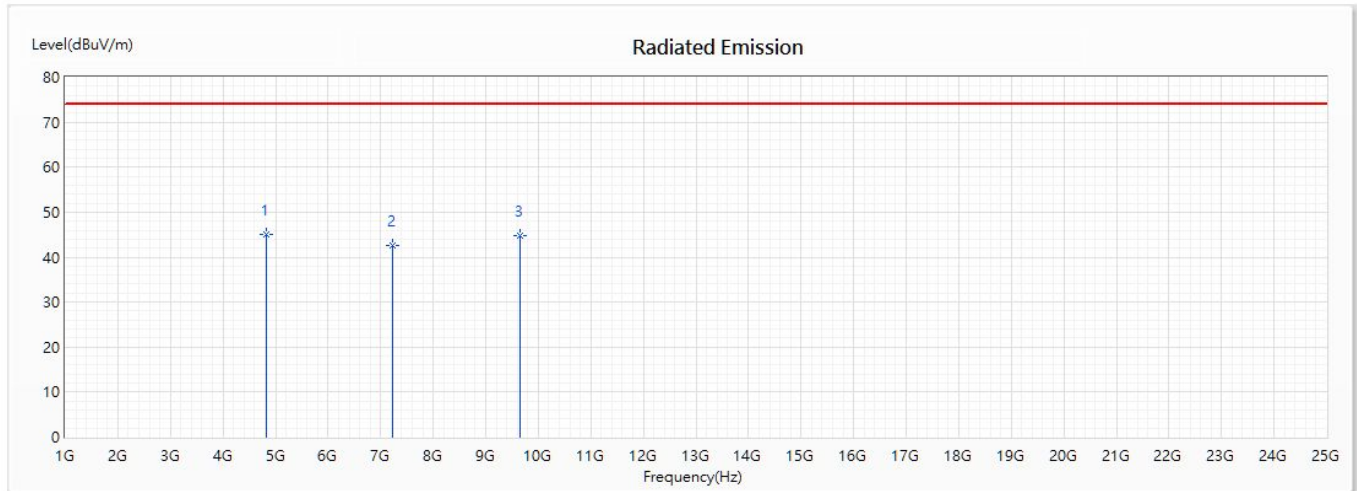
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4924	47.51	74.00	-26.49	58.75	-11.24	PK
2	7386	41.39	74.00	-32.61	55.49	-14.10	PK
3	9848	43.56	74.00	-30.44	57.00	-13.44	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Horizontal



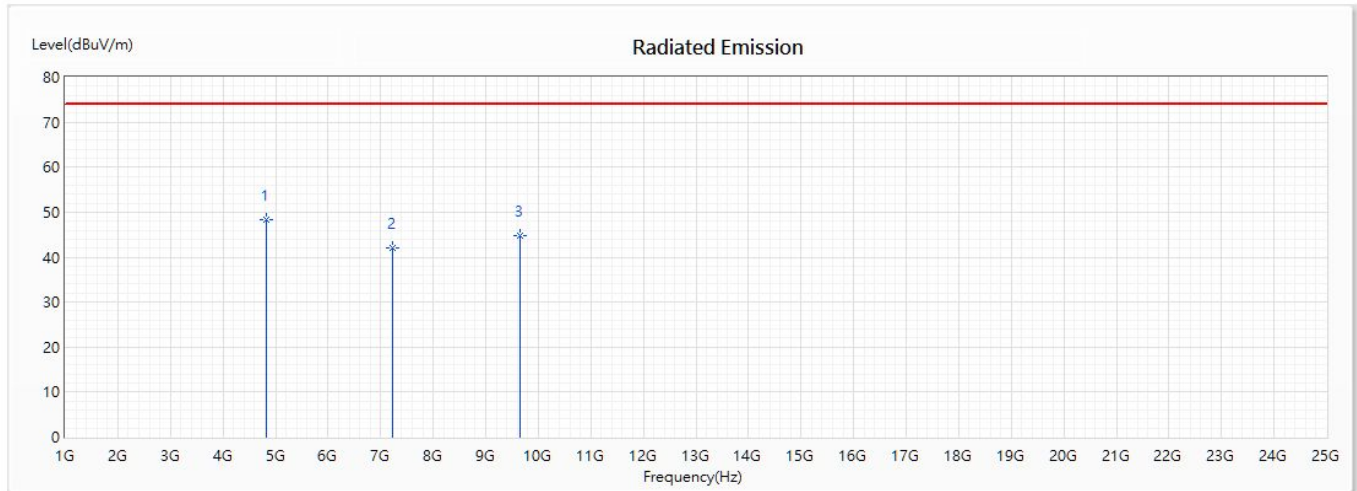
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4824	45.16	74.00	-28.84	57.15	-11.99	PK
2	7236	42.47	74.00	-31.53	55.43	-12.96	PK
3	9648	44.85	74.00	-29.15	57.95	-13.10	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Vertical



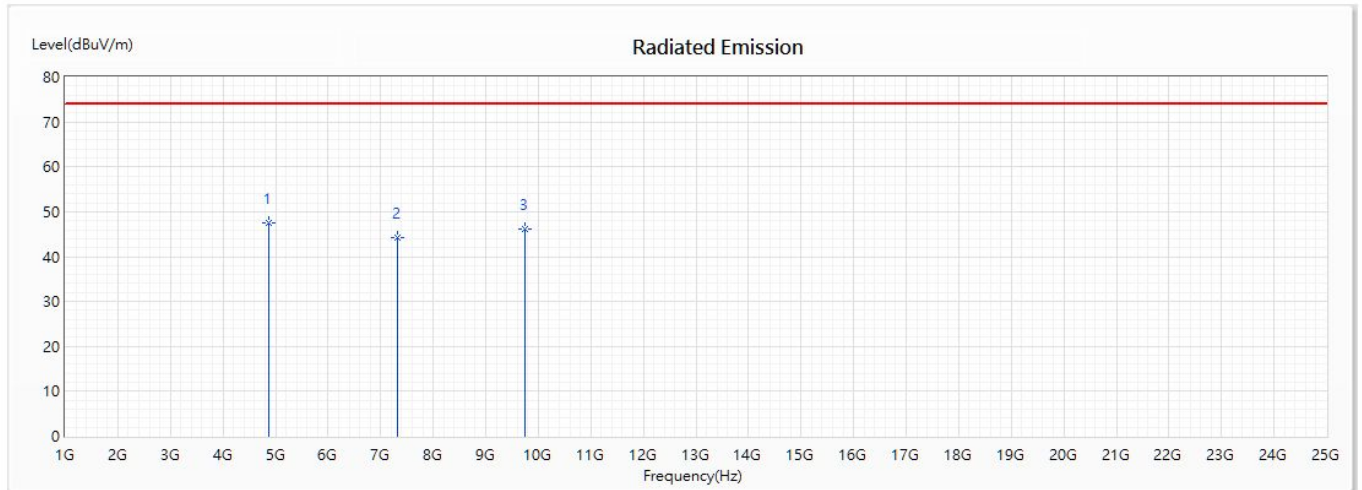
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4824	48.27	74.00	-25.73	60.26	-11.99	PK
2	7236	41.93	74.00	-32.07	54.89	-12.96	PK
3	9648	44.82	74.00	-29.18	57.92	-13.10	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz)

Horizontal



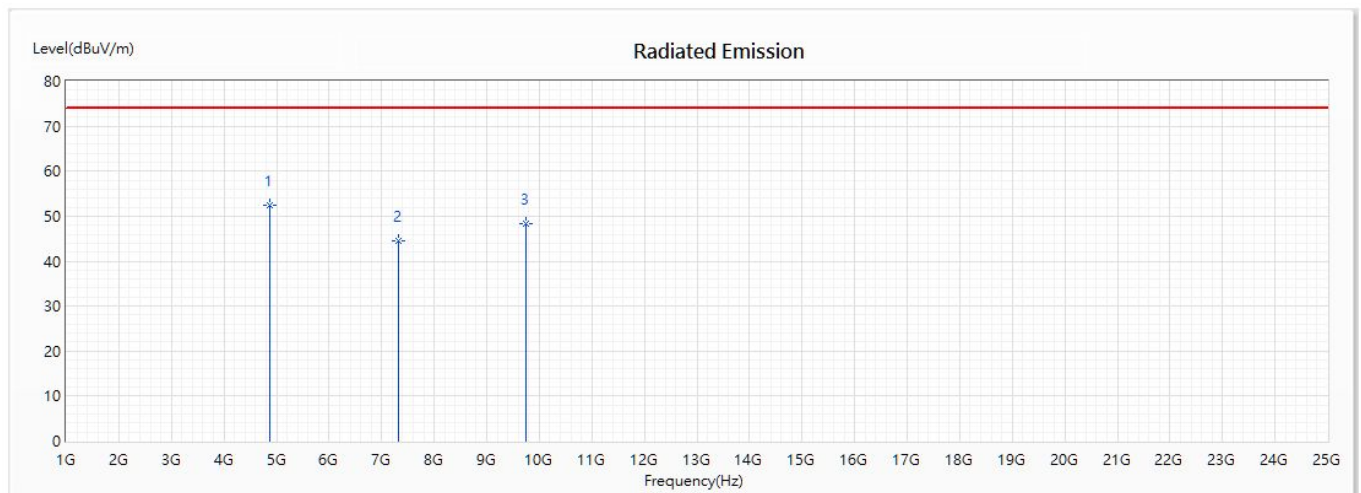
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4874	47.61	74.00	-26.39	59.25	-11.64	PK
2	7311	44.15	74.00	-29.85	57.63	-13.48	PK
3	9748	46.23	74.00	-27.77	58.62	-12.39	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz)

Vertical



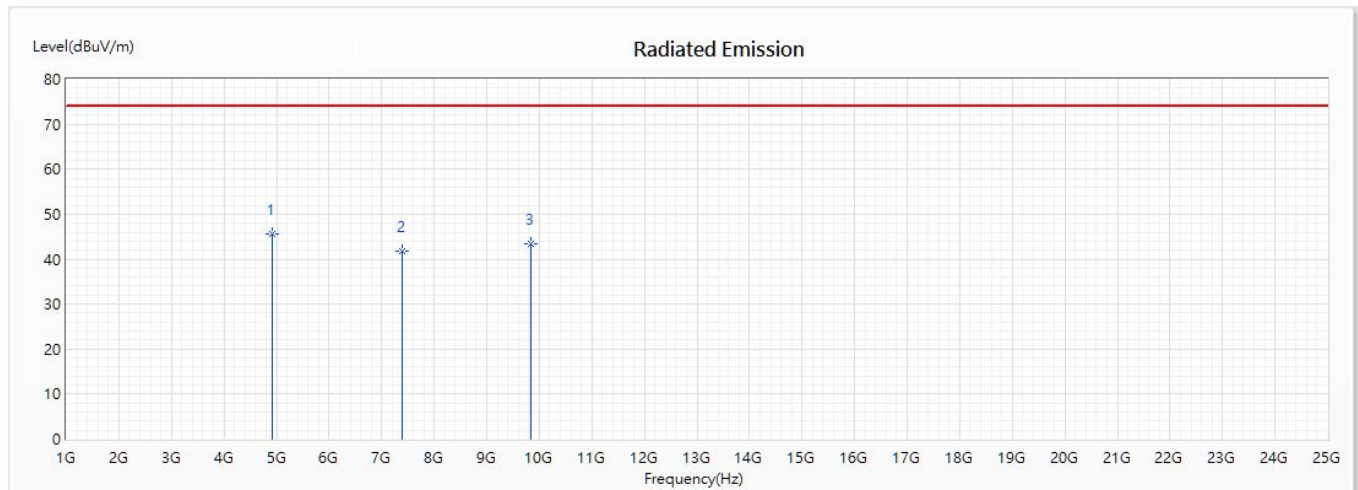
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4874	52.34	74.00	-21.66	63.98	-11.64	PK
2	7311	44.56	74.00	-29.44	58.04	-13.48	PK
3	9748	48.23	74.00	-25.77	60.62	-12.39	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462 MHz)

Horizontal



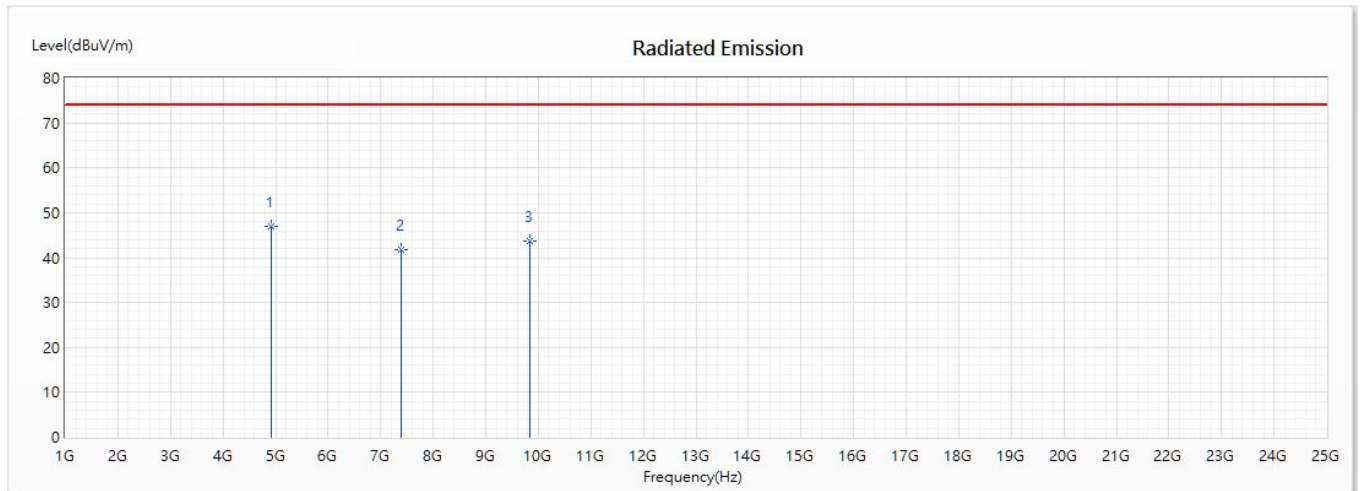
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4924	45.47	74.00	-28.53	56.71	-11.24	PK
2	7386	41.89	74.00	-32.11	55.99	-14.10	PK
3	9848	43.47	74.00	-30.53	56.91	-13.44	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : Harmonic Radiated Emission Data
 Test Date : 2020/05/19
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462 MHz)

Vertical



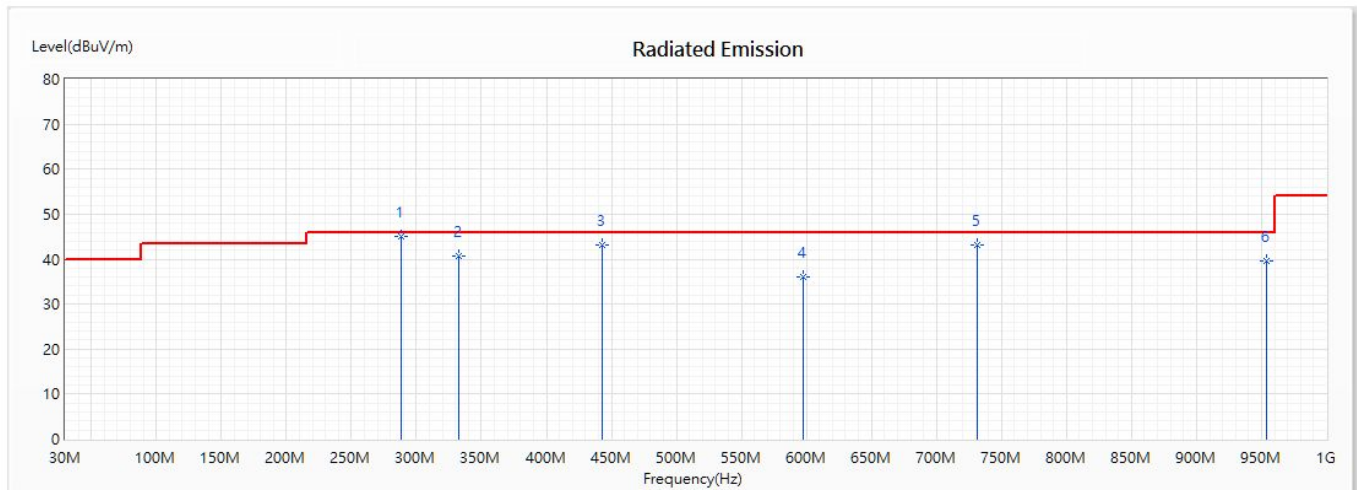
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	4924	47.07	74.00	-26.93	58.31	-11.24	PK
2	7386	41.66	74.00	-32.34	55.76	-14.10	PK
3	9848	43.78	74.00	-30.22	57.22	-13.44	PK

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The average measurement was not performed when the peak measured data under the limit of average detection.
5. The emission levels of other frequencies are very lower than the limit and not show in test report.

Product : Industrial WiFi module
 Test Item : General Radiated Emission Data
 Test Date : 2020/06/17
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Horizontal



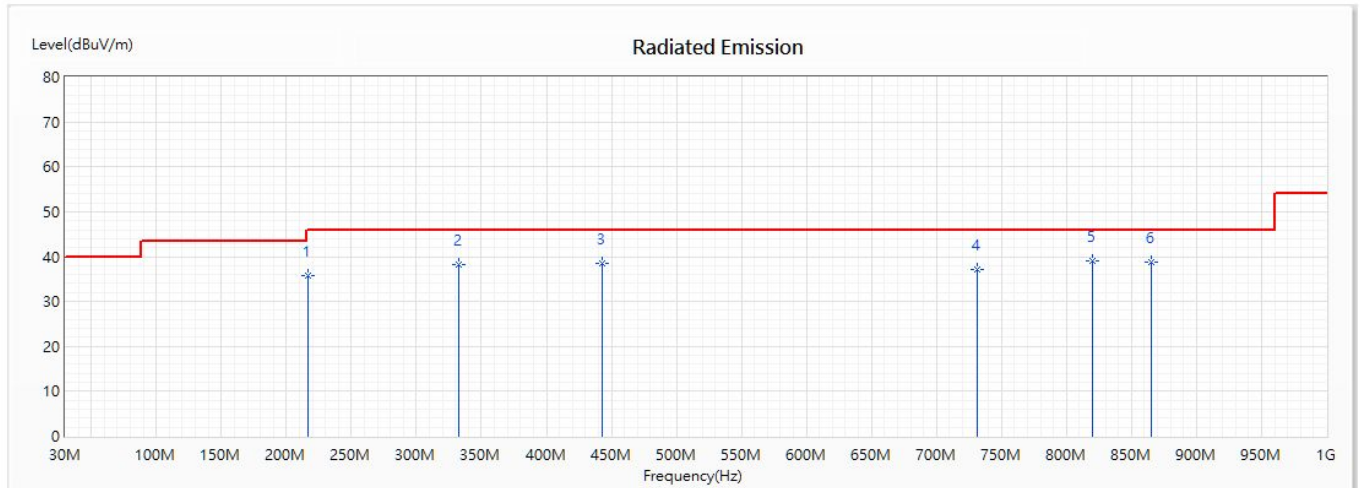
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
* 1	288.261	45.08	46.00	-0.92	56.00	-10.92	QP
2	332.246	40.69	46.00	-5.31	48.39	-7.70	QP
3	443.304	43.21	46.00	-2.79	46.76	-3.55	QP
4	597.942	36.05	46.00	-9.95	36.30	-0.25	QP
5	731.493	43.06	46.00	-2.94	43.90	-0.84	QP
6	953.609	39.52	46.00	-6.48	41.70	-2.18	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Industrial WiFi module
 Test Item : General Radiated Emission Data
 Test Date : 2020/06/17
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2437 MHz)

Vertical



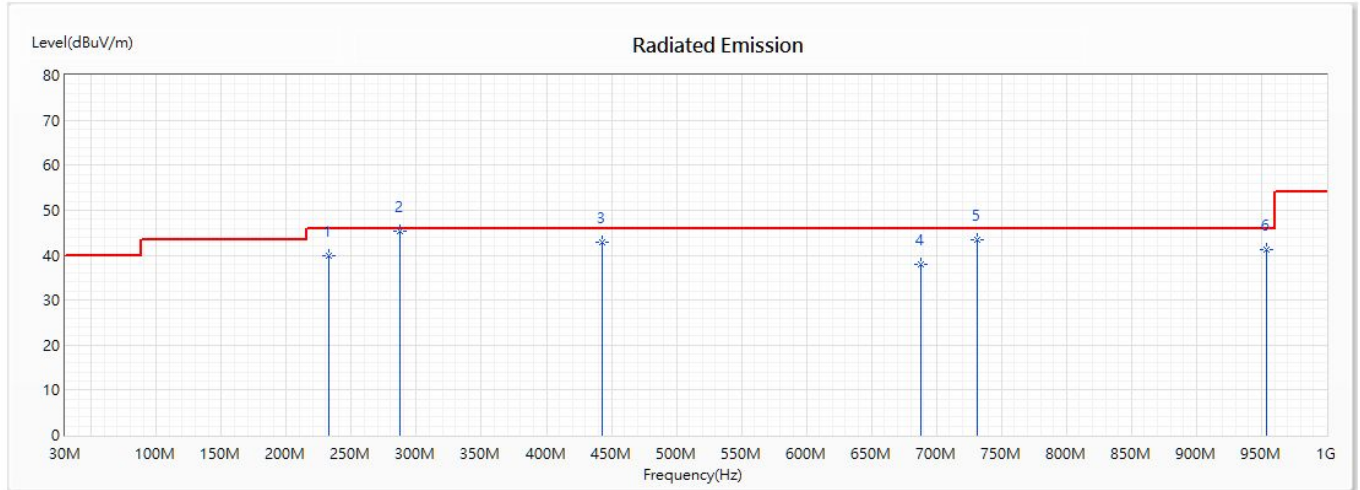
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	216.971	35.71	46.00	-10.29	47.38	-11.67	QP
2	332.246	38.25	46.00	-7.75	45.95	-7.70	QP
3	443.304	38.55	46.00	-7.45	42.10	-3.55	QP
4	731.493	37.19	46.00	-8.81	38.03	-0.84	QP
* 5	820.058	38.92	46.00	-7.08	41.78	-2.86	QP
6	865.043	38.64	46.00	-7.36	40.76	-2.12	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Industrial WiFi module
 Test Item : General Radiated Emission Data
 Test Date : 2020/06/17
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Horizontal



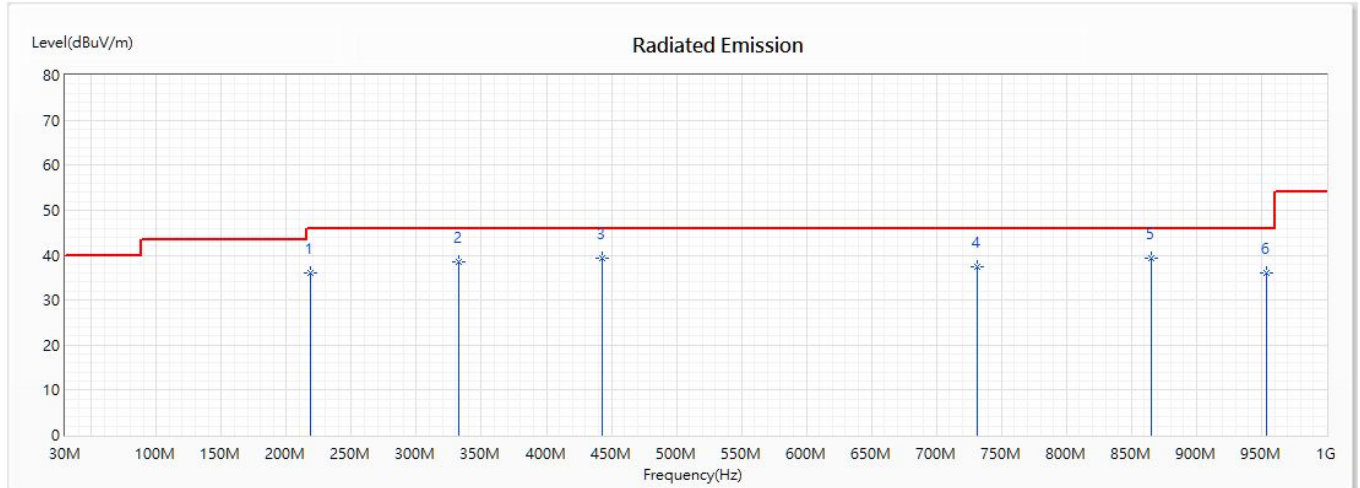
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	232.435	39.88	46.00	-6.12	51.28	-11.40	QP
* 2	287.261	45.26	46.00	-0.74	56.28	-11.02	QP
3	443.304	42.90	46.00	-3.10	46.45	-3.55	QP
4	687.913	37.92	46.00	-8.08	40.97	-3.05	QP
5	731.493	43.37	46.00	-2.63	44.21	-0.84	QP
6	953.609	41.14	46.00	-4.86	43.32	-2.18	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Industrial WiFi module
 Test Item : General Radiated Emission Data
 Test Date : 2020/06/17
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2437 MHz)

Vertical



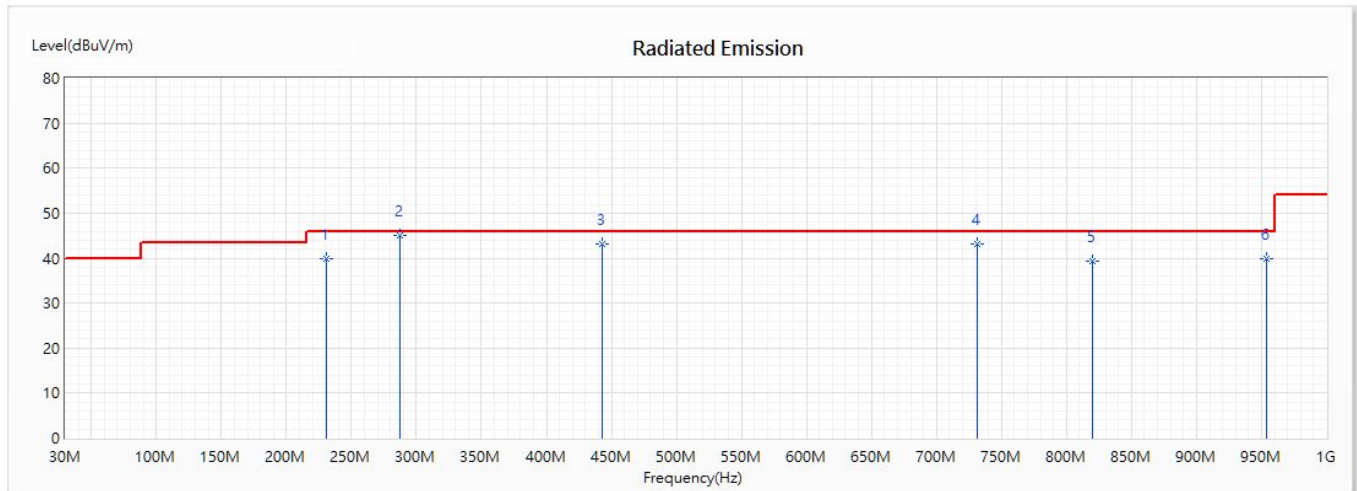
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	218.377	36.02	46.00	-9.98	47.68	-11.66	QP
2	332.246	38.47	46.00	-7.53	46.17	-7.70	QP
* 3	443.304	39.38	46.00	-6.62	42.93	-3.55	QP
4	731.493	37.34	46.00	-8.66	38.18	-0.84	QP
5	865.043	39.23	46.00	-6.77	41.35	-2.12	QP
6	953.609	36.14	46.00	-9.86	38.32	-2.18	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Industrial WiFi module
 Test Item : General Radiated Emission Data
 Test Date : 2020/06/17
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz)

Horizontal



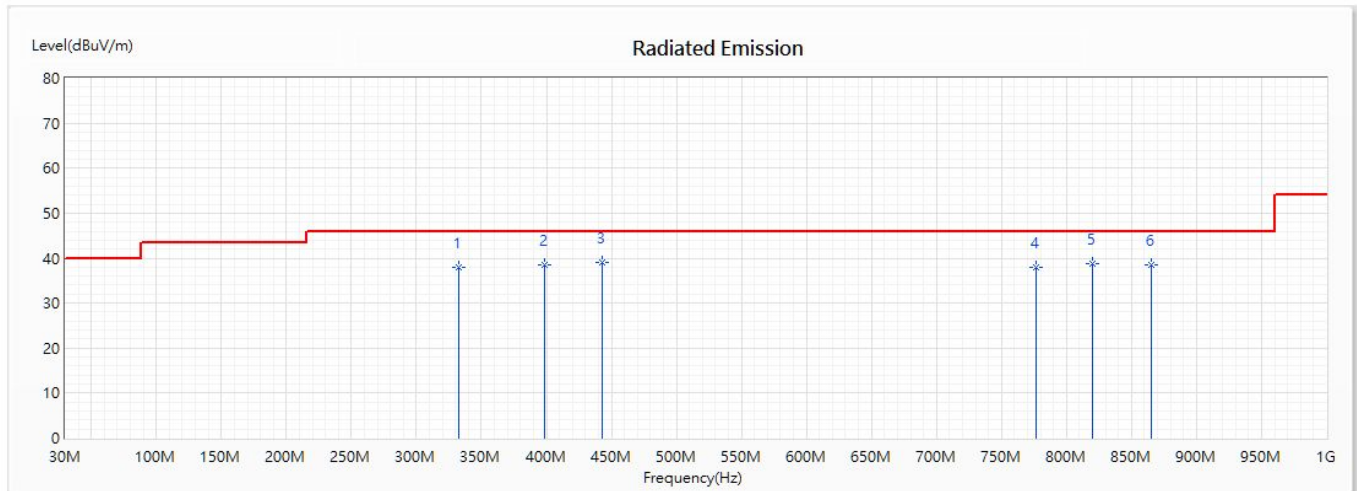
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	231.029	39.98	46.00	-6.02	51.25	-11.27	QP
* 2	287.261	45.16	46.00	-0.84	56.18	-11.02	QP
3	443.304	43.07	46.00	-2.93	46.62	-3.55	QP
4	731.493	43.13	46.00	-2.87	43.97	-0.84	QP
5	820.058	39.38	46.00	-6.62	42.24	-2.86	QP
6	953.609	39.90	46.00	-6.10	42.08	-2.18	QP

Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

Product : Industrial WiFi module
 Test Item : General Radiated Emission Data
 Test Date : 2020/06/17
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2437 MHz)

Vertical



No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	332.246	38.03	46.00	-7.97	45.73	-7.70	QP
2	398.319	38.45	46.00	-7.55	45.66	-7.21	QP
* 3	443.304	39.09	46.00	-6.91	42.64	-3.55	QP
4	776.478	38.07	46.00	-7.93	40.27	-2.20	QP
5	820.058	38.84	46.00	-7.16	41.70	-2.86	QP
6	865.043	38.54	46.00	-7.46	40.66	-2.12	QP

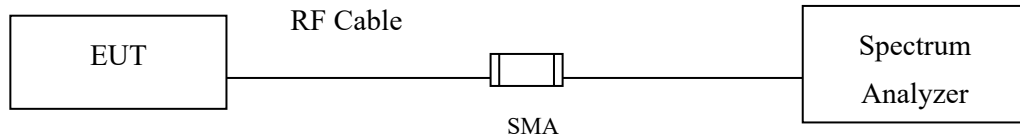
Note:

1. All Readings below 1GHz are Quasi-Peak, above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. Correct Factor = Antenna factor + Cable loss – Amplifier gain.
4. The emission levels of other frequencies are very lower than the limit and not show in test report.
5. No emission found between lowest internal used/generated frequency to 30MHz.

5. RF antenna conducted test

5.1. Test Setup

RF antenna Conducted Measurement:



5.2. Limits

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

5.3. Test Procedure

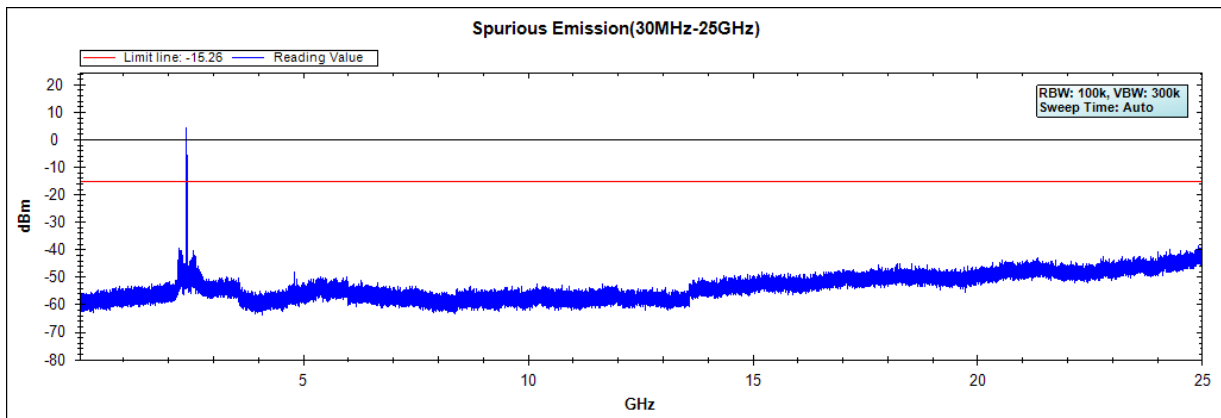
The EUT was tested according to C63.10:2013 Section 11.11 for compliance to FCC 47CFR 15.247 requirements.

Set RBW = 100 kHz, Set VBW > RBW, scan up through 10th harmonic.

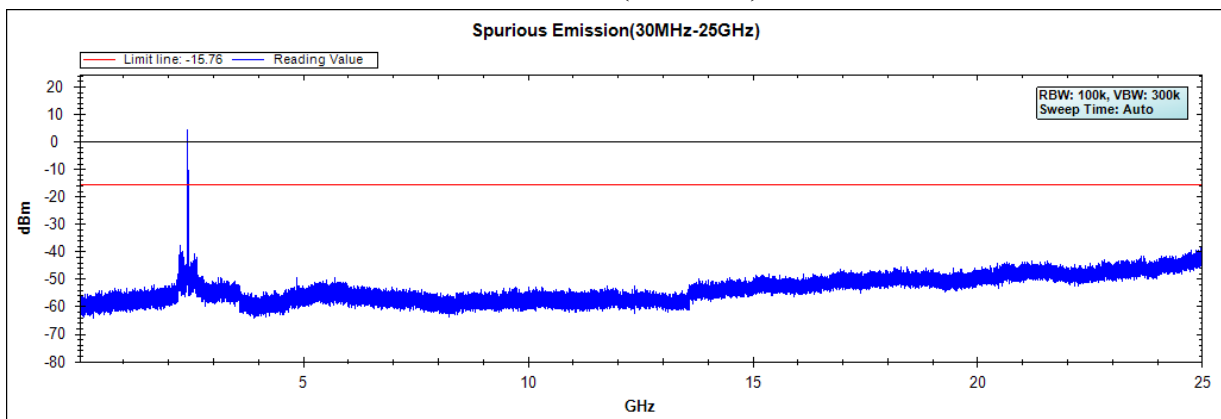
5.4. Test Result of RF antenna conducted test

Product : Industrial WiFi module
Test Item : RF antenna conducted test
Test Date : 2020/05/11
Test Mode : Mode 1: Transmit (802.11b 1Mbps)

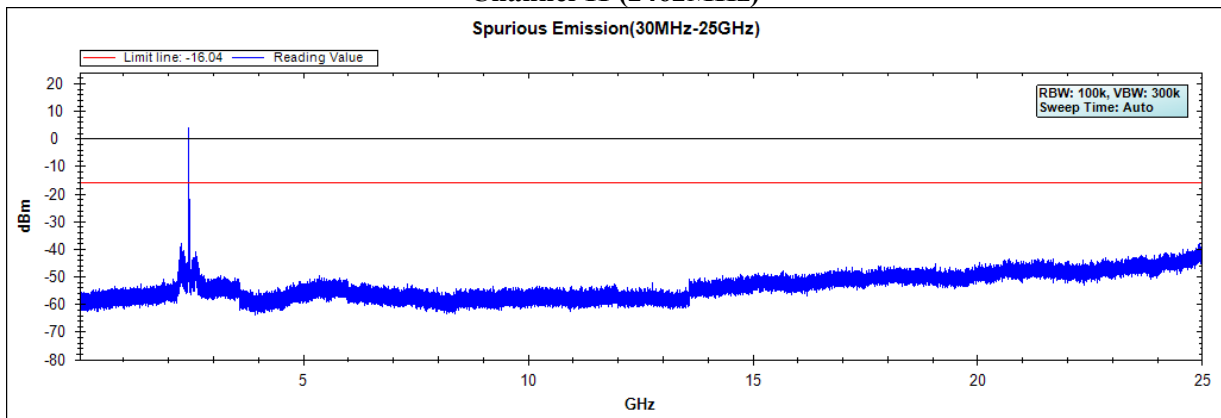
Channel 01 (2412MHz)



Channel 06 (2437MHz)



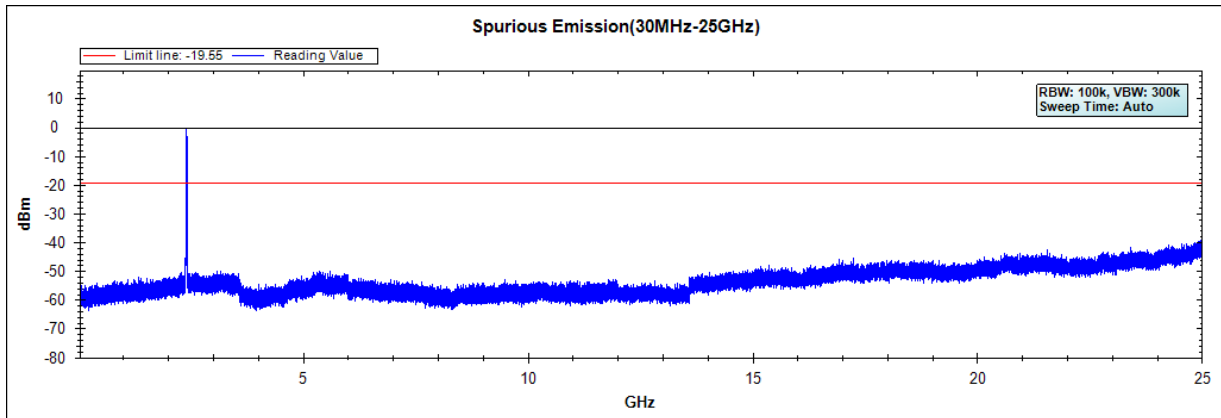
Channel 11 (2462MHz)



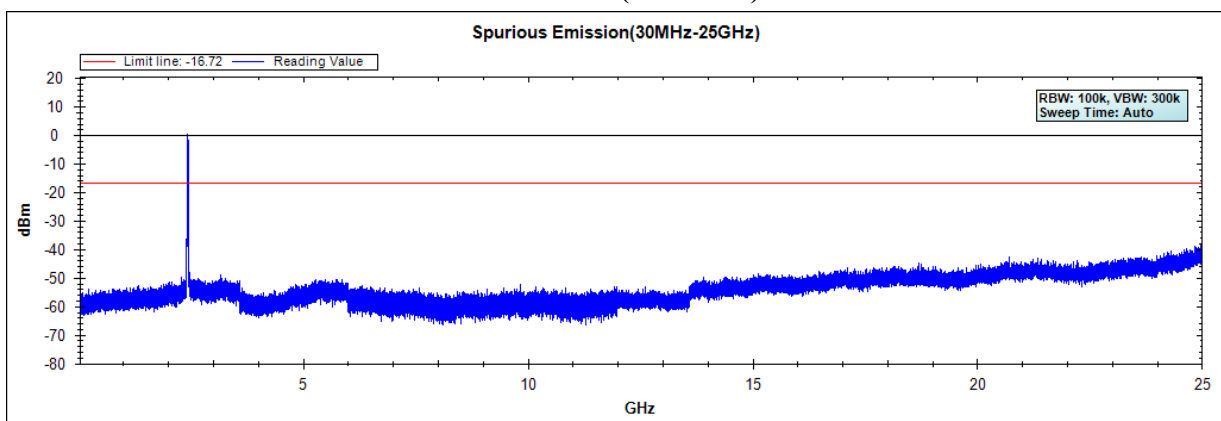
Note: The above test pattern is synthesized by multiple of the frequency range.

Product : Industrial WiFi module
Test Item : RF Antenna Conducted Spurious
Test Date : 2020/05/11
Test Mode : Mode 2: Transmit (802.11g 6Mbps)

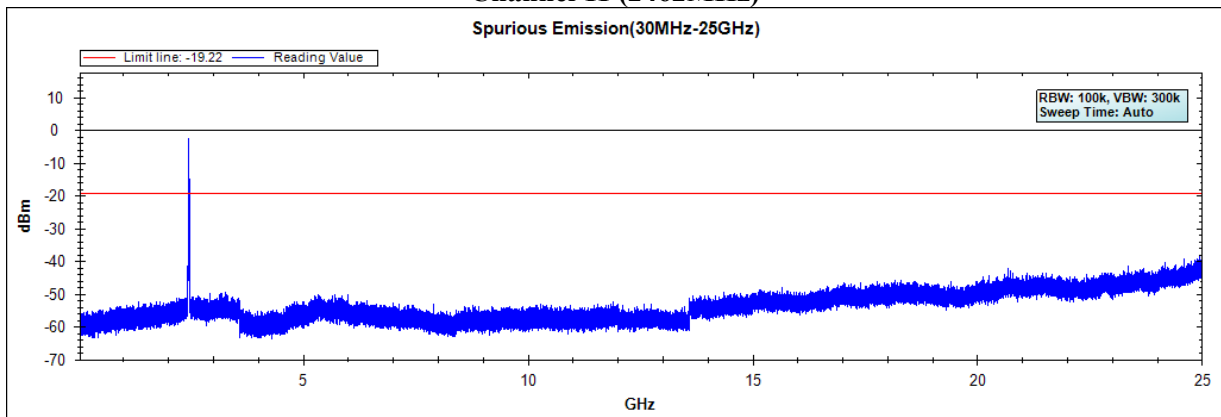
Channel 01 (2412MHz)



Channel 06 (2437MHz)



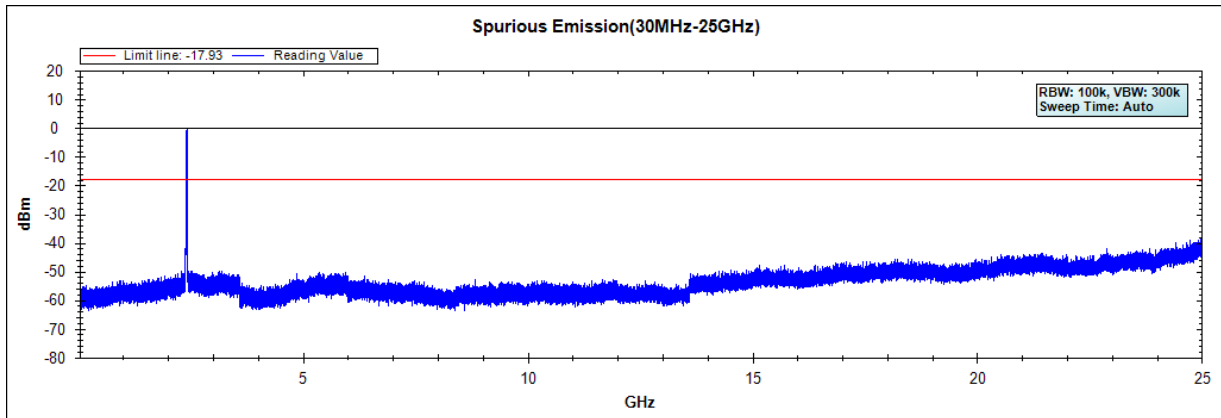
Channel 11 (2462MHz)



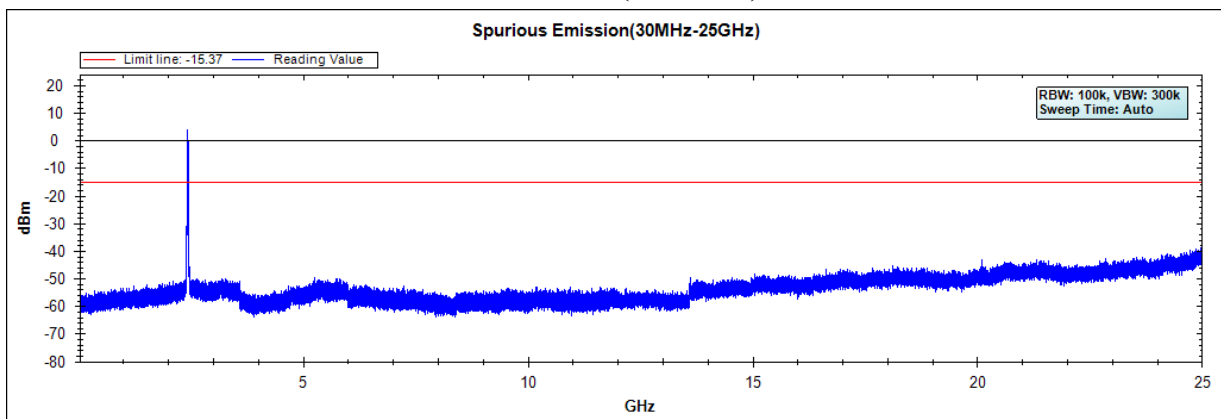
Note: The above test pattern is synthesized by multiple of the frequency range.

Product : Industrial WiFi module
Test Item : RF Antenna Conducted Spurious
Test Date : 2020/05/11
Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

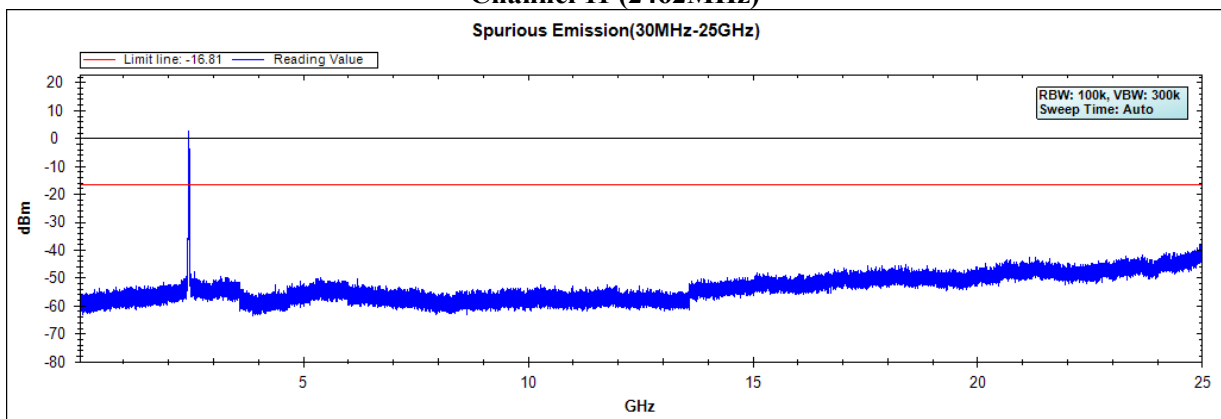
Channel 01 (2412MHz)



Channel 06 (2437MHz)



Channel 11 (2462MHz)

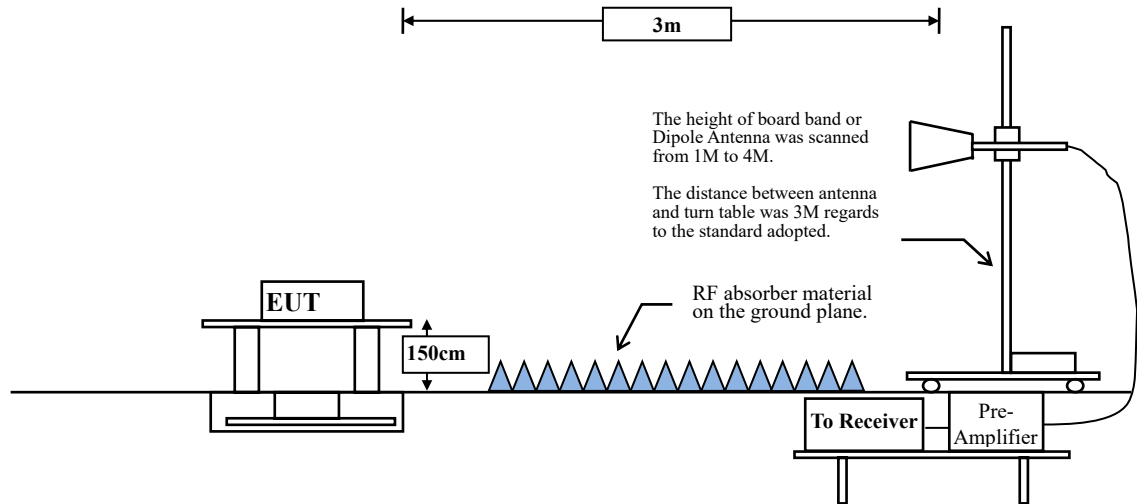


Note: The above test pattern is synthesized by multiple of the frequency range.

6. Band Edge

6.1. Test Setup

RF Radiated Measurement:



6.2. Limits

According to FCC Section 15.247(d). In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in Section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).

6.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013 and tested according to C63.10:2013 Section 11.12.1 for compliance to FCC 47CFR 15.247 requirements.

The EUT is placed on a turn table which is 1.5 meter above ground. The turn table is rotated 360 degrees to determine the position of the maximum emission level. The EUT was positioned such that the distance from antenna to the EUT was 3 meters.

The antenna is scanned from 1 meter to 4 meters to find out the maximum emission level. This is repeated for both horizontal and vertical polarization of the antenna. In order to find the maximum emission, all of the interface cables were manipulated according to ANSI C63.10:2013 on radiated measurement.

RBW and VBW Parameter setting:

According to C63.10 Section 11.12.2.4 Peak measurement procedure.

RBW = as specified in Table 1.

$VBW \geq 3 \times RBW$.

Table 1 —RBW as a function of frequency

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

According to C63.10 Section 11.12.2.5 Average measurement procedure.

RBW = 1MHz.

VBW = 10Hz, when duty cycle $\geq 98\%$

$VBW \geq 1/T$, when duty cycle $< 98\%$

(T refers to the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.)

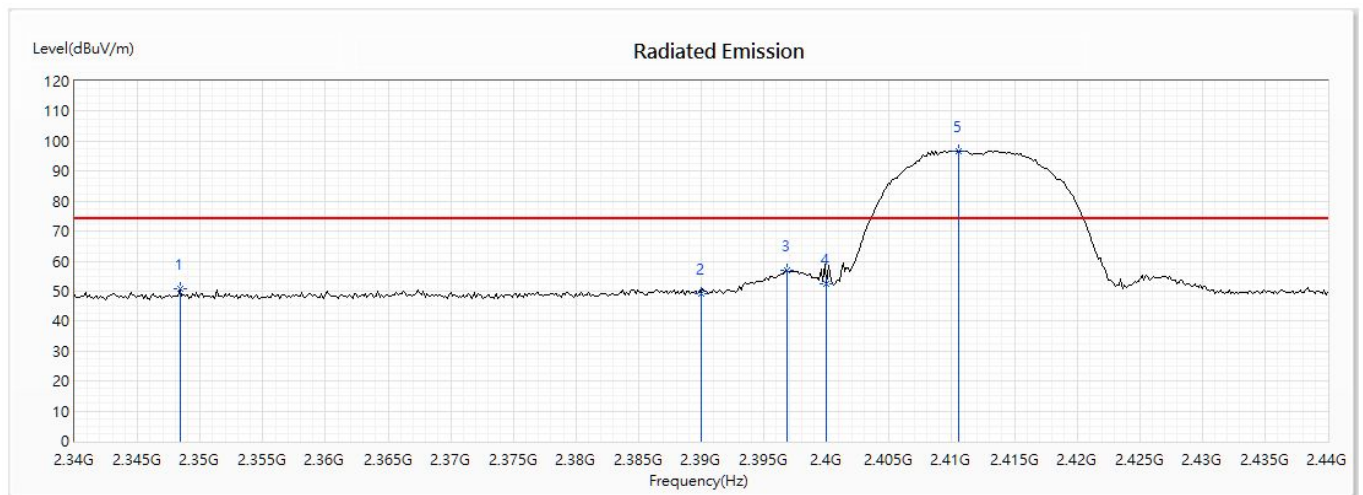
2.4GHz band	Duty Cycle (%)	T (ms)	1/T (Hz)	VBW (Hz)
802.11b	100.00	--	--	10
802.11g	97.93	2.0580	486	500
802.11n20	97.04	1.8986	527	1000

Note: Duty Cycle Refer to Section 9.

6.4. Test Result of Band Edge

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Horizontal



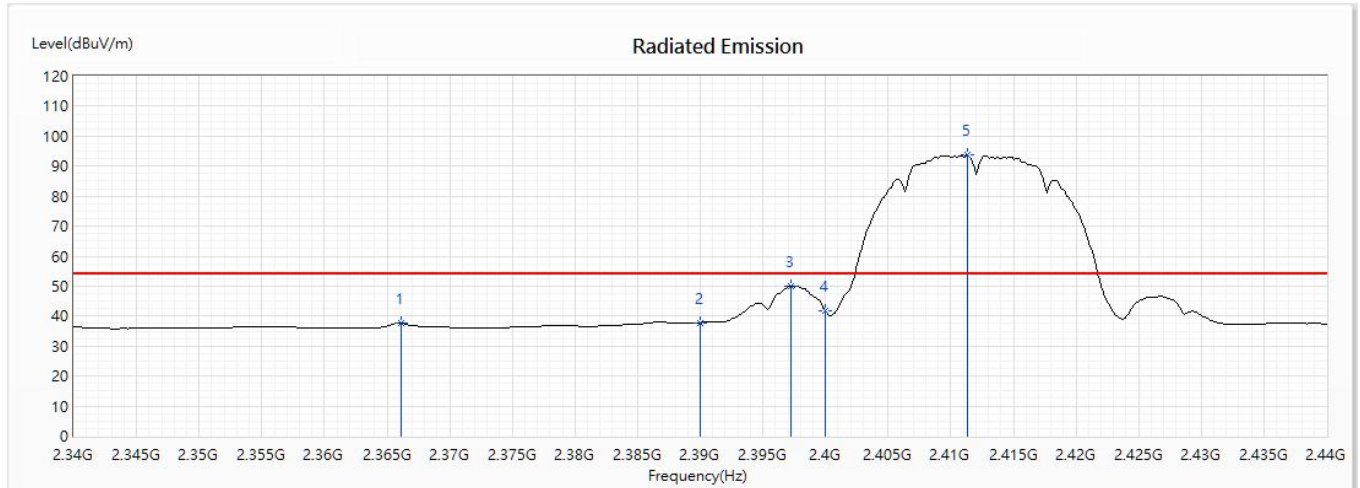
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2348.406	50.67	74.00	-23.33	38.00	12.67	PK
2	2390	48.96	74.00	-25.04	36.07	12.89	PK
3	2396.812	56.92	74.00	-17.08	43.98	12.94	PK
4	2400	52.52	74.00	-21.48	39.56	12.96	PK
! 5	2410.58	96.75	74.00	22.75	83.72	13.03	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Horizontal

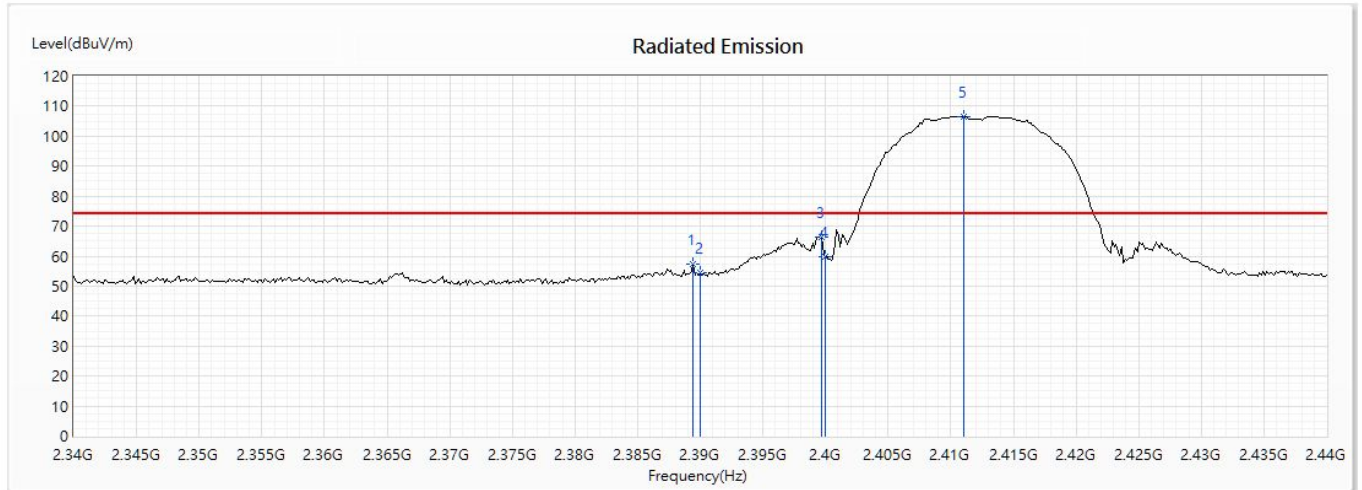


Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Vertical



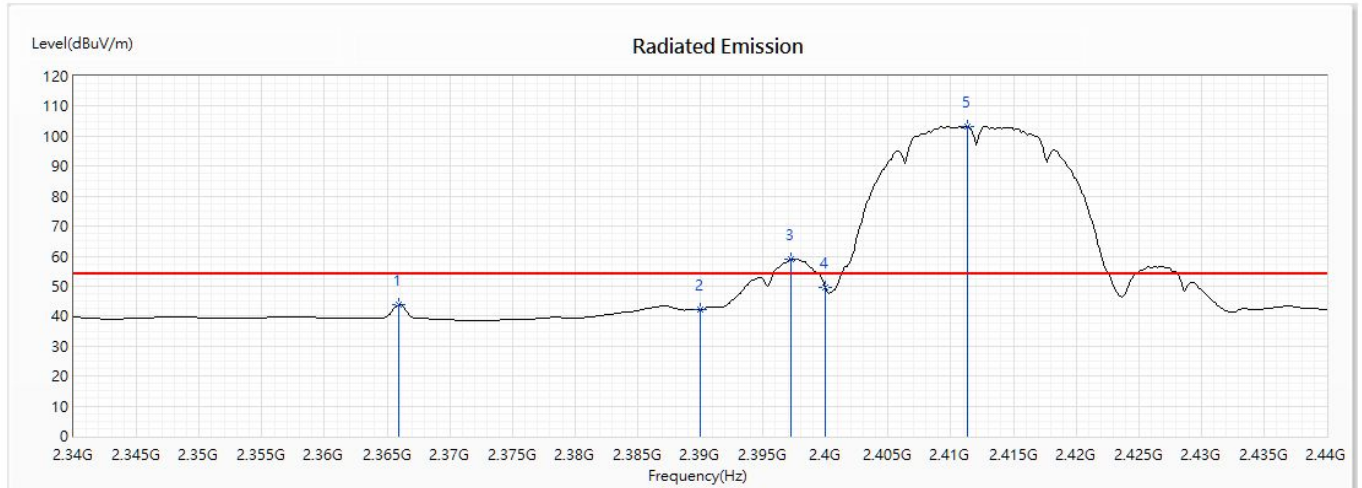
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2389.42	57.20	74.00	-16.80	44.31	12.89	PK
2	2390	54.55	74.00	-19.45	41.66	12.89	PK
3	2399.71	66.52	74.00	-7.48	53.56	12.96	PK
4	2400	59.63	74.00	-14.37	46.67	12.96	PK
! 5	2411.014	106.53	74.00	32.53	93.50	13.03	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2412MHz)

Vertical



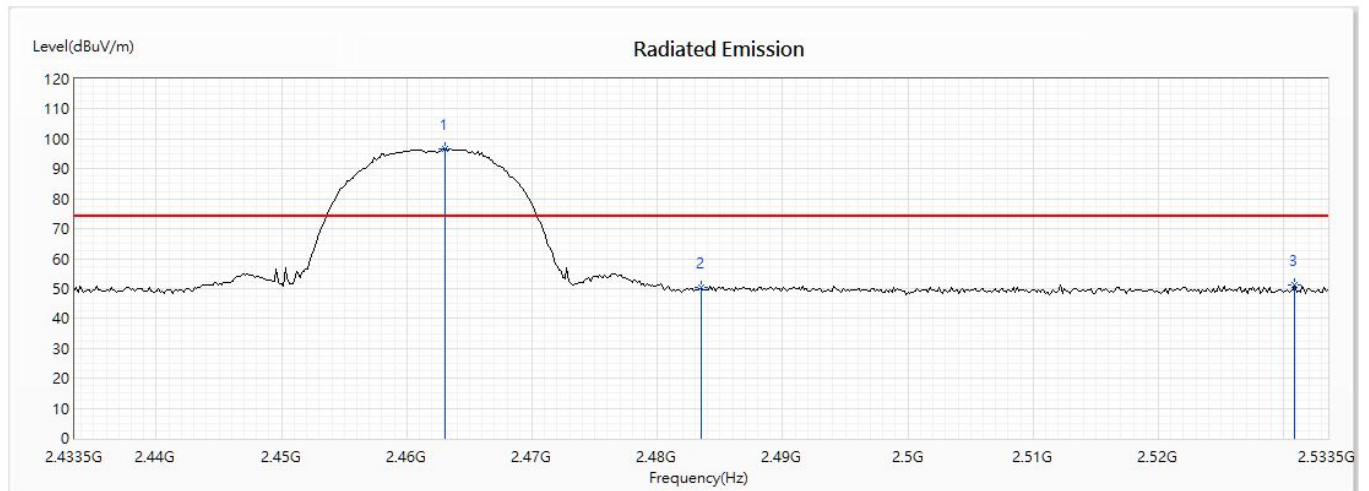
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2365.942	43.70	54.00	-10.30	30.93	12.77	AV
2	2390	42.03	54.00	-11.97	29.14	12.89	AV
! 3	2397.246	59.00	54.00	5.00	46.06	12.94	AV
4	2400	49.42	54.00	-4.58	36.46	12.96	AV
! 5	2411.304	103.37	54.00	49.37	90.33	13.04	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

Horizontal



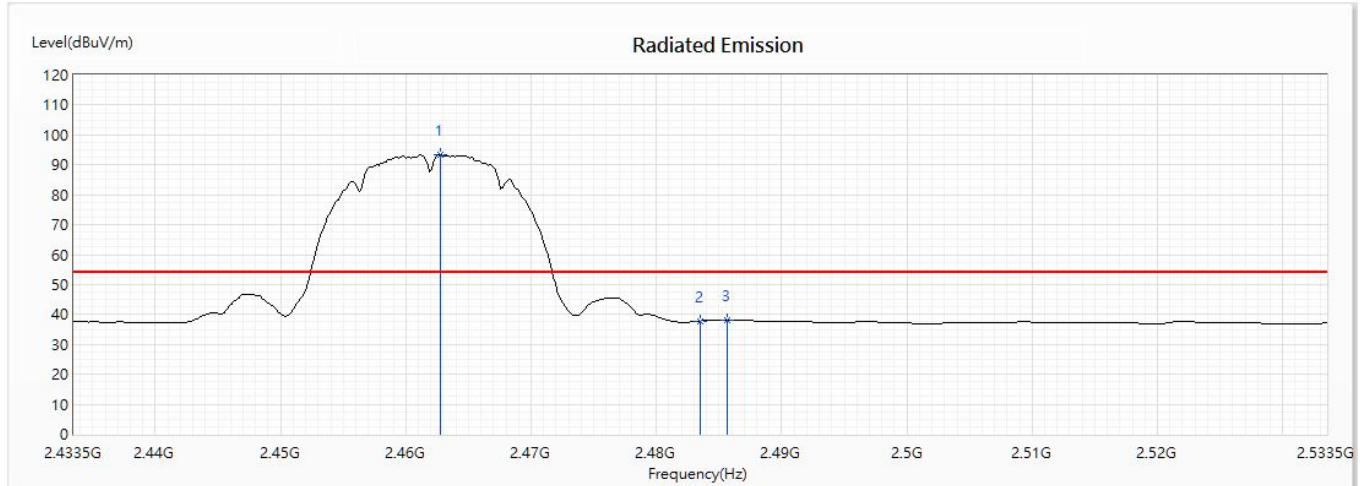
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2463.065	96.48	74.00	22.48	83.13	13.35	PK
2	2483.5	50.48	74.00	-23.52	37.10	13.38	PK
3	2530.891	51.29	74.00	-22.71	37.86	13.43	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

Horizontal



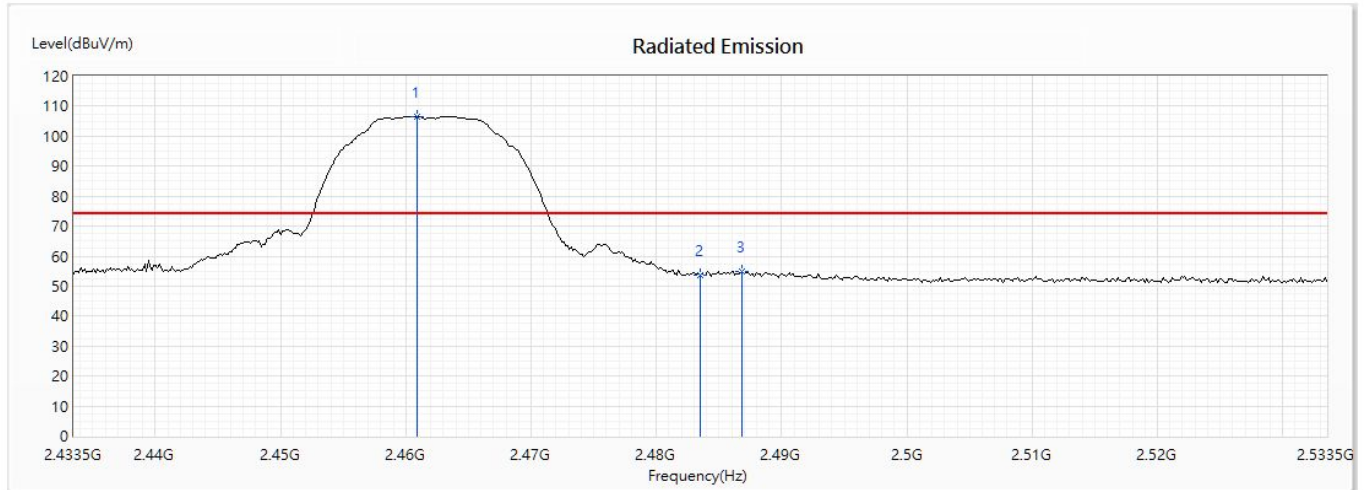
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2462.775	93.31	54.00	39.31	79.97	13.34	AV
2	2483.5	37.82	54.00	-16.18	24.44	13.38	AV
3	2485.674	38.24	54.00	-15.76	24.86	13.38	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

Vertical



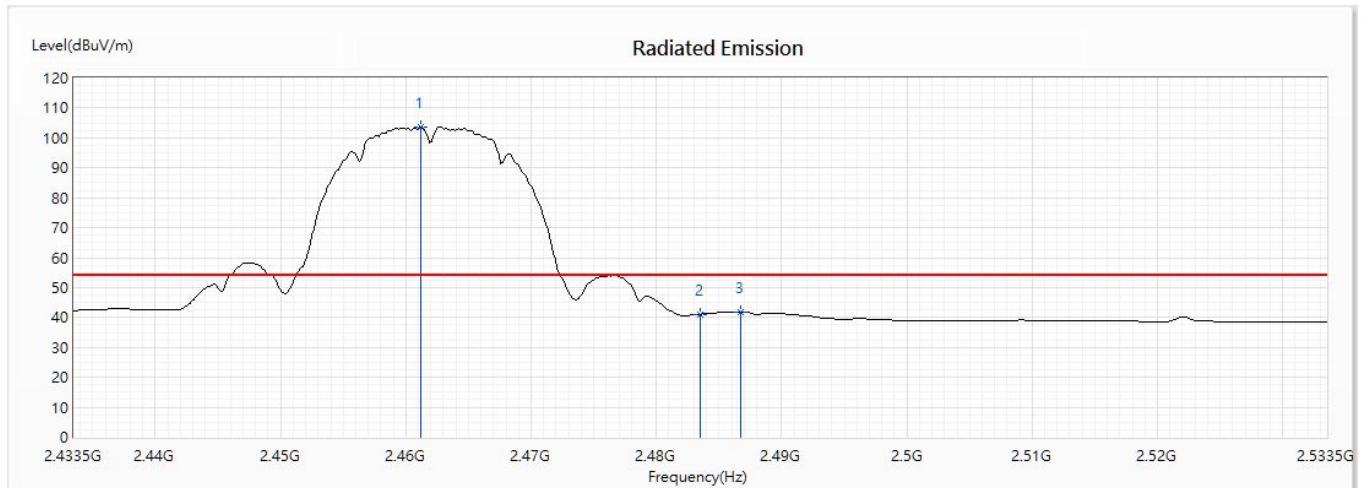
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2460.891	106.66	74.00	32.66	93.32	13.34	PK
2	2483.5	53.78	74.00	-20.22	40.40	13.38	PK
3	2486.833	54.90	74.00	-19.10	41.52	13.38	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 1: Transmit (802.11b 1Mbps) (2462MHz)

Vertical



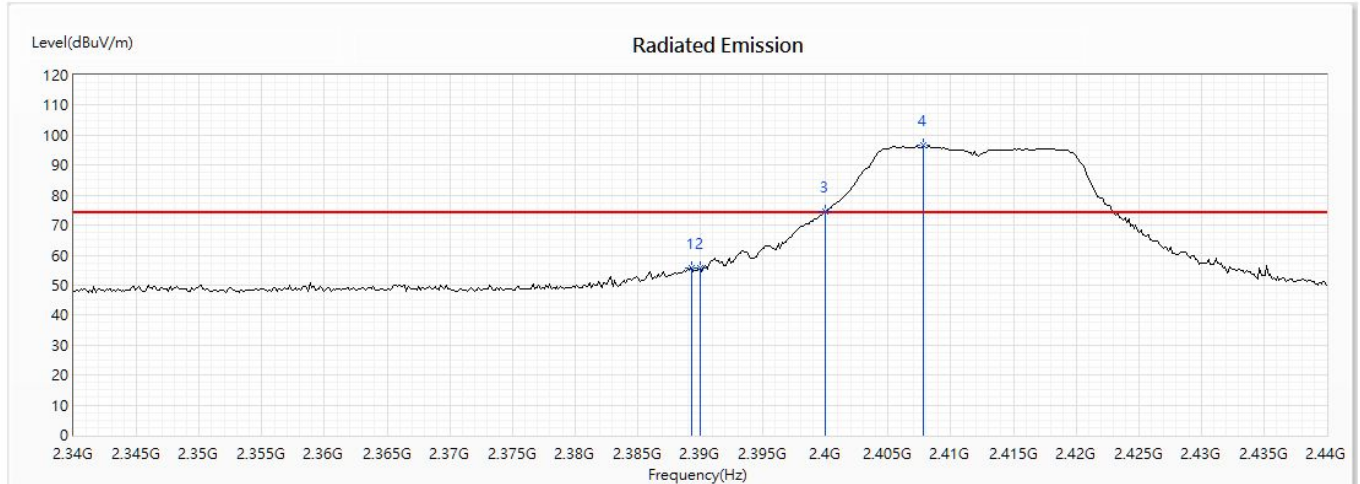
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2461.181	103.54	54.00	49.54	90.19	13.35	AV
2	2483.5	41.11	54.00	-12.89	27.73	13.38	AV
3	2486.688	41.93	54.00	-12.07	28.55	13.38	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Horizontal



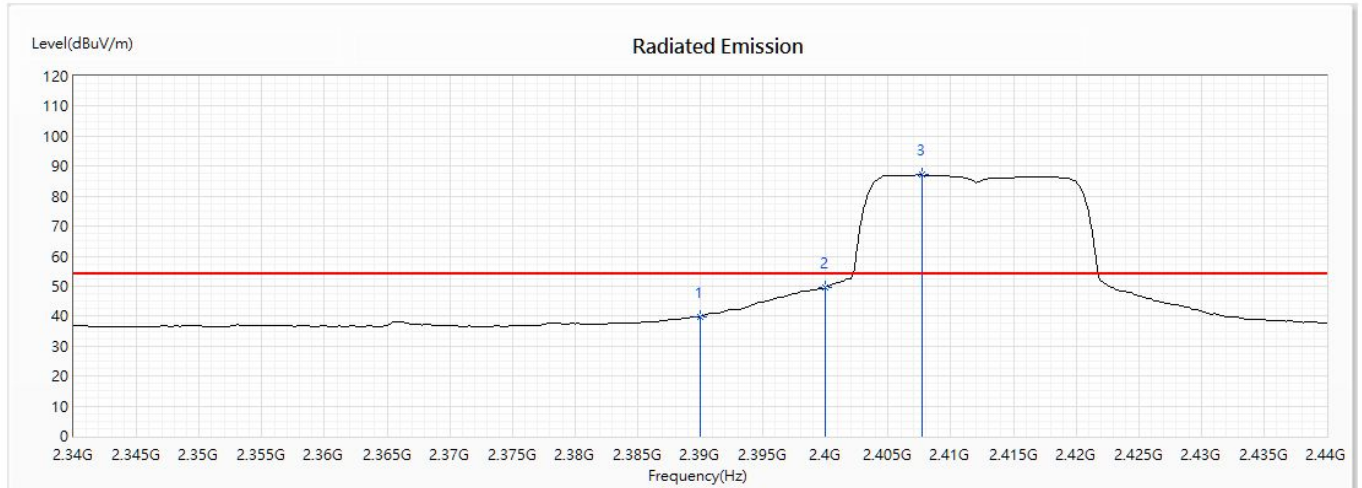
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2389.275	55.70	74.00	-18.30	42.81	12.89	PK
2	2390	55.57	74.00	-18.43	42.68	12.89	PK
! 3	2400	74.44	74.00	0.44	61.48	12.96	PK
! 4	2407.826	96.50	74.00	22.50	83.48	13.02	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Horizontal



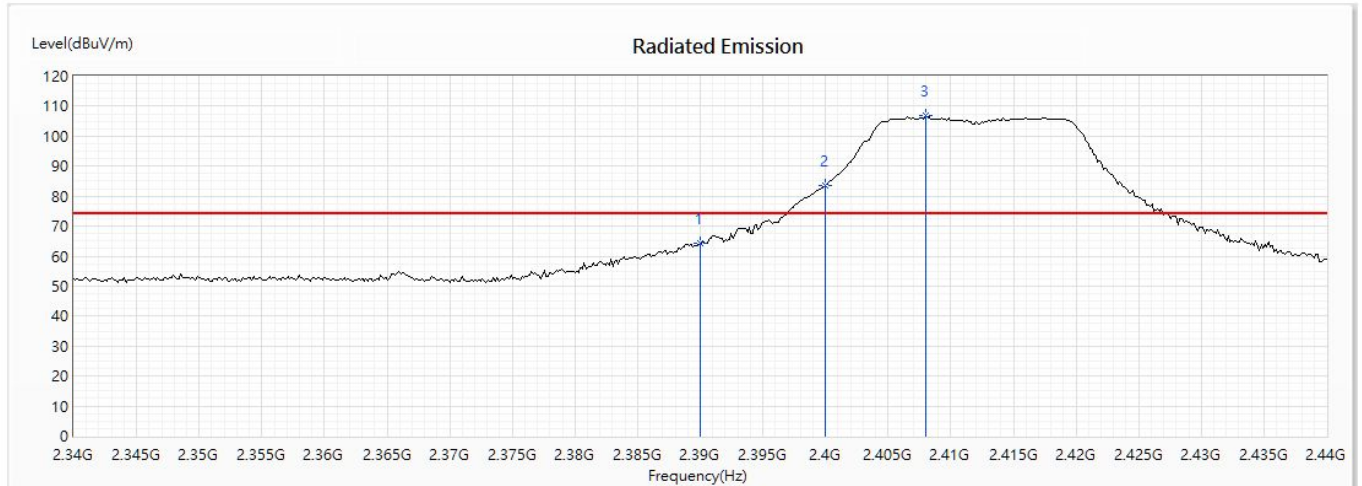
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2390	39.83	54.00	-14.17	26.94	12.89	AV
2	2400	49.66	54.00	-4.34	36.70	12.96	AV
! 3	2407.681	87.08	54.00	33.08	74.06	13.02	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Vertical



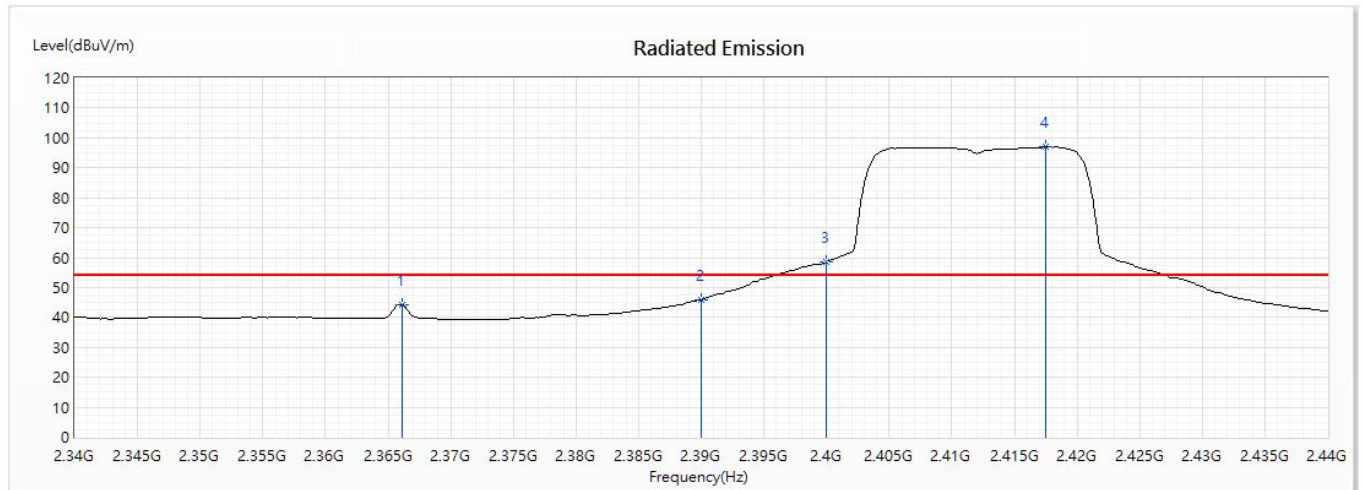
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2390	64.15	74.00	-9.85	51.26	12.89	PK
! 2	2400	83.62	74.00	9.62	70.66	12.96	PK
! 3	2407.971	106.98	74.00	32.98	93.96	13.02	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Vertical



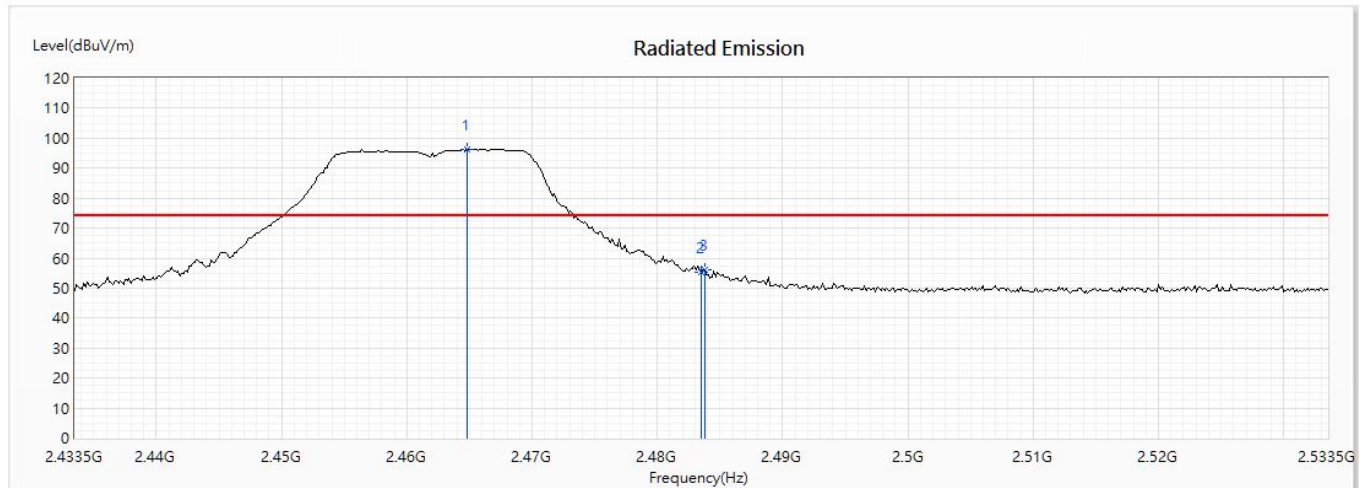
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2366.087	44.35	54.00	-9.65	31.58	12.77	AV
2	2390	45.85	54.00	-8.15	32.96	12.89	AV
! 3	2400	58.53	54.00	4.53	45.57	12.96	AV
! 4	2417.536	96.94	54.00	42.94	83.85	13.09	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

Horizontal



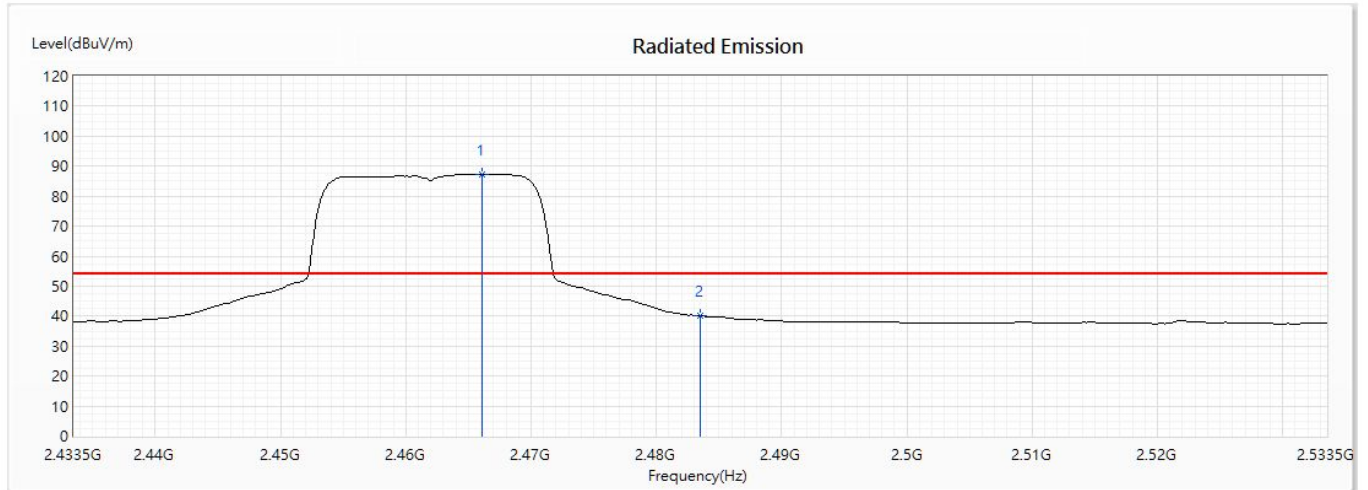
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2464.804	96.39	74.00	22.39	83.05	13.34	PK
2	2483.5	55.34	74.00	-18.66	41.96	13.38	PK
3	2483.79	56.17	74.00	-17.83	42.80	13.37	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

Horizontal



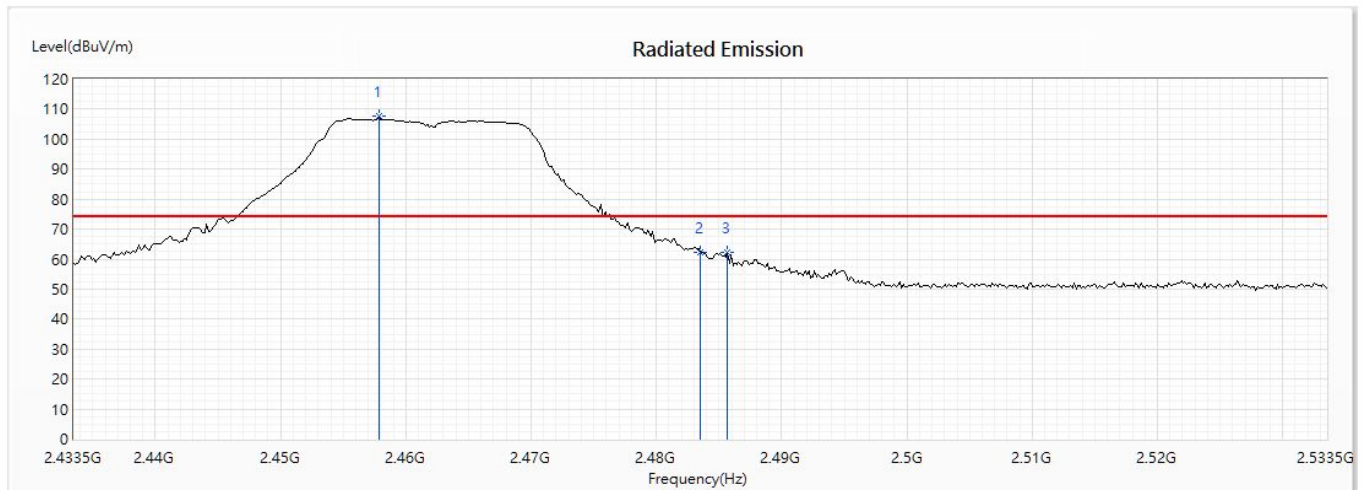
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2466.109	87.42	54.00	33.42	74.07	13.35	AV
2	2483.5	39.96	54.00	-14.04	26.58	13.38	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

Vertical



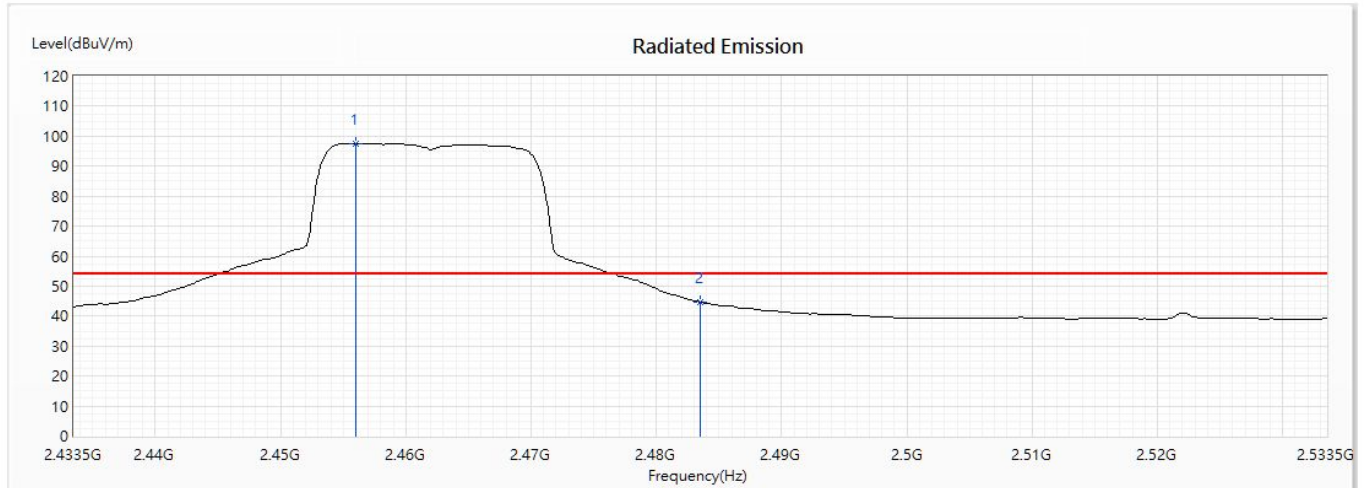
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2457.848	107.77	74.00	33.77	94.43	13.34	PK
2	2483.5	62.34	74.00	-11.66	48.96	13.38	PK
3	2485.674	62.36	74.00	-11.64	48.98	13.38	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2462MHz)

Vertical



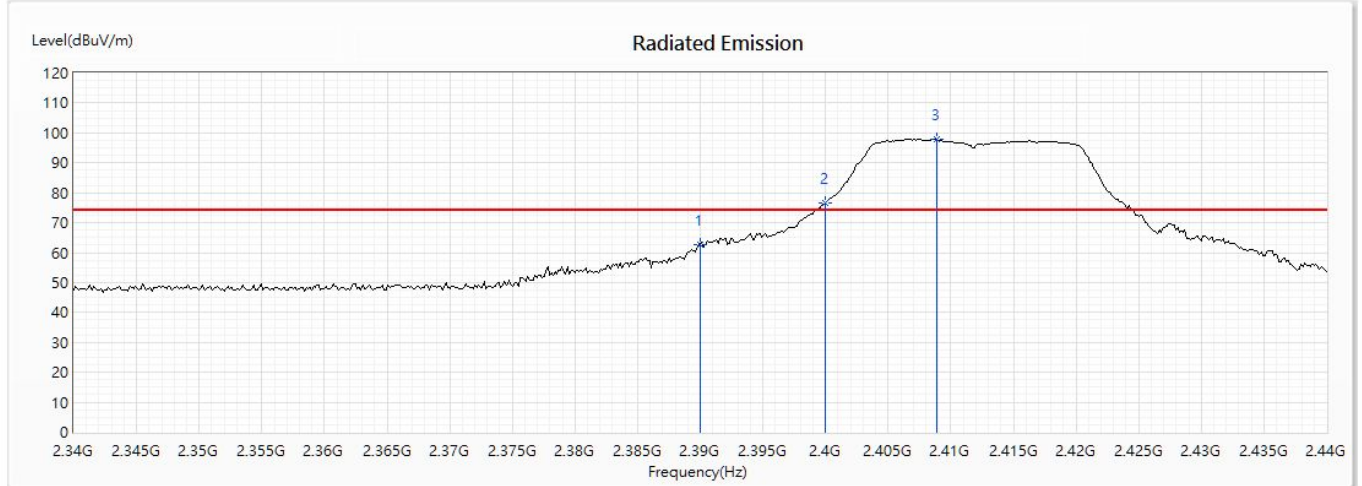
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2455.964	97.54	54.00	43.54	84.20	13.34	AV
2	2483.5	44.61	54.00	-9.39	31.23	13.38	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Horizontal



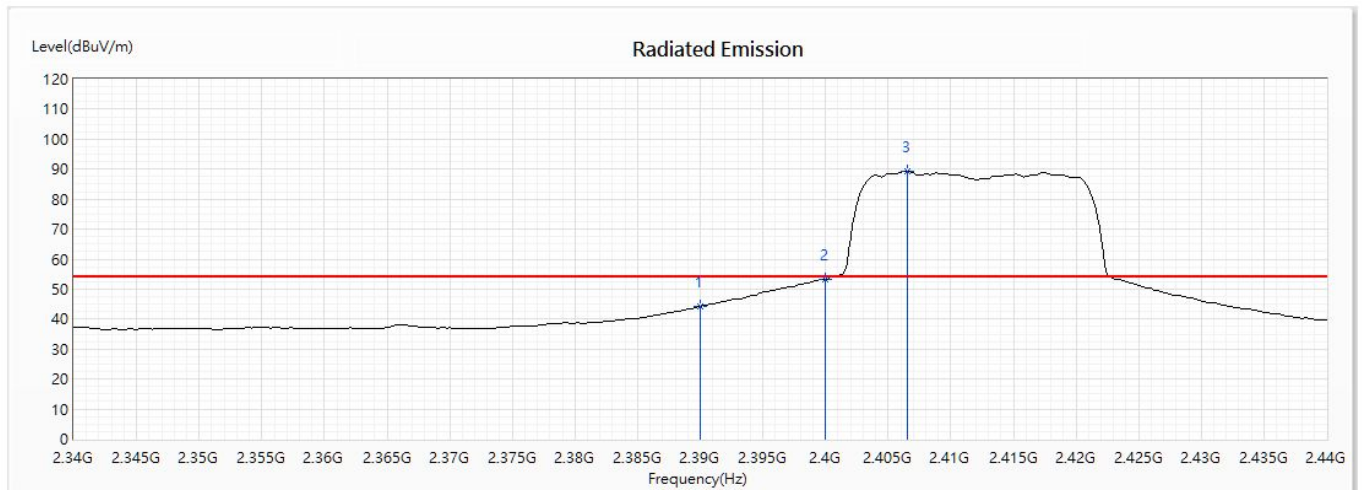
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2390	62.66	74.00	-11.34	49.77	12.89	PK
! 2	2400	76.67	74.00	2.67	63.71	12.96	PK
! 3	2408.841	98.07	74.00	24.07	85.05	13.02	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Horizontal



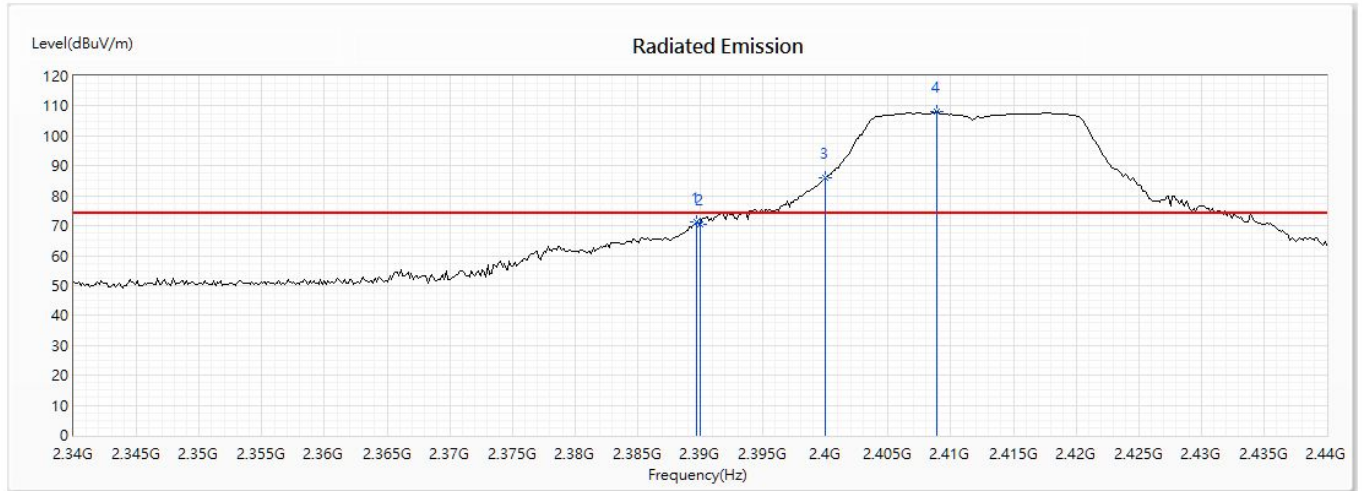
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2390	44.12	54.00	-9.88	31.23	12.89	AV
2	2400	53.41	54.00	-0.59	40.45	12.96	AV
! 3	2406.522	89.15	54.00	35.15	76.15	13.00	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Vertical



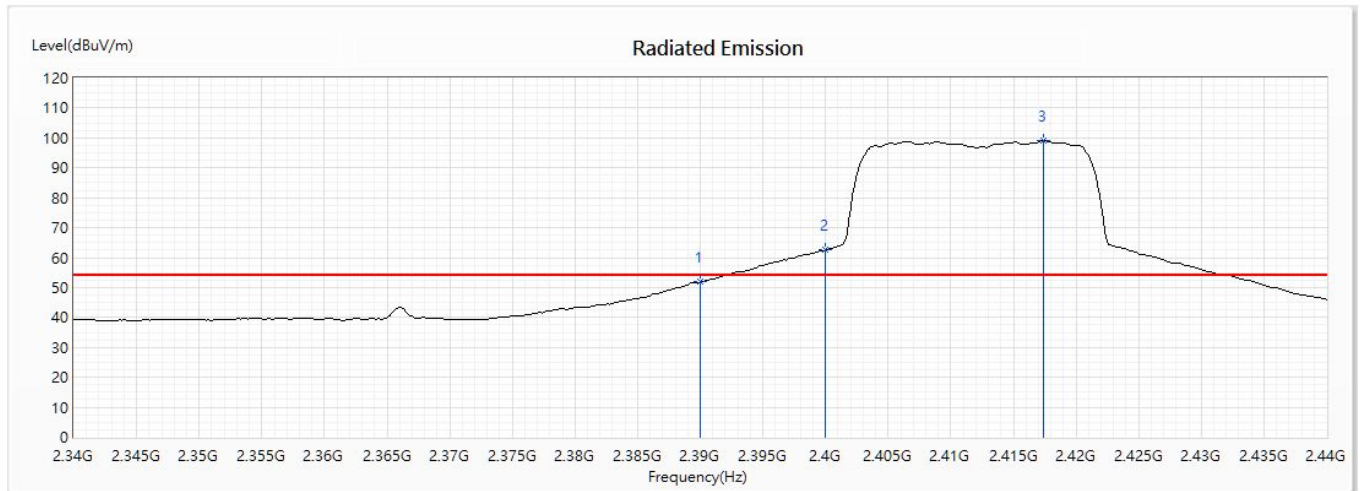
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2389.71	71.21	74.00	-2.79	58.32	12.89	PK
2	2390	70.28	74.00	-3.72	57.39	12.89	PK
! 3	2400	86.02	74.00	12.02	73.06	12.96	PK
! 4	2408.841	108.05	74.00	34.05	95.03	13.02	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2412MHz)

Vertical



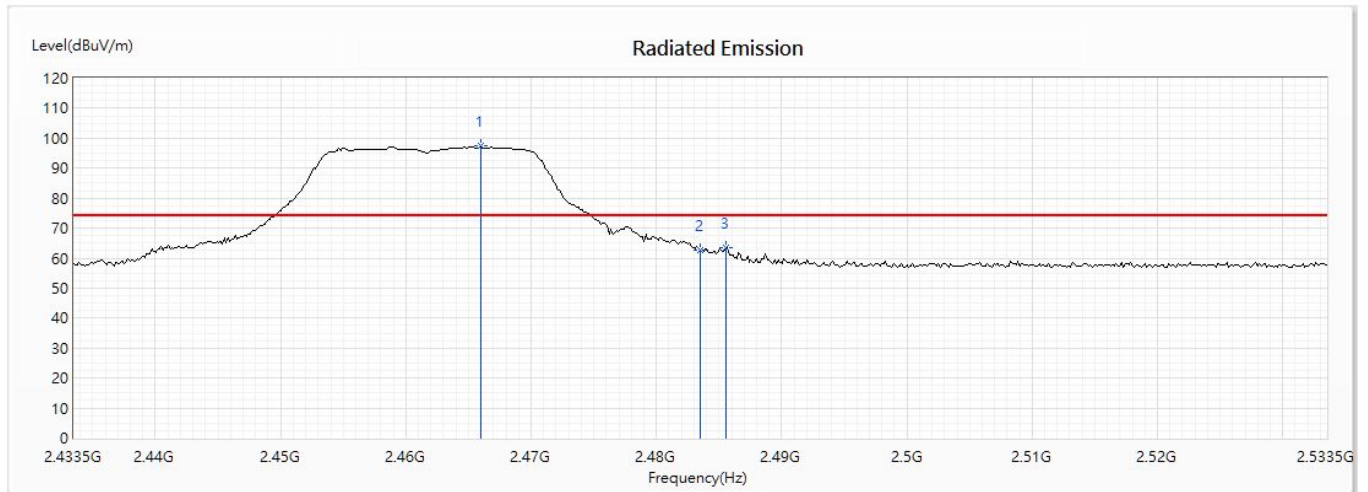
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
1	2390	51.85	54.00	-2.15	38.96	12.89	AV
! 2	2400	62.57	54.00	8.57	49.61	12.96	AV
! 3	2417.391	99.02	54.00	45.02	85.94	13.08	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

Horizontal



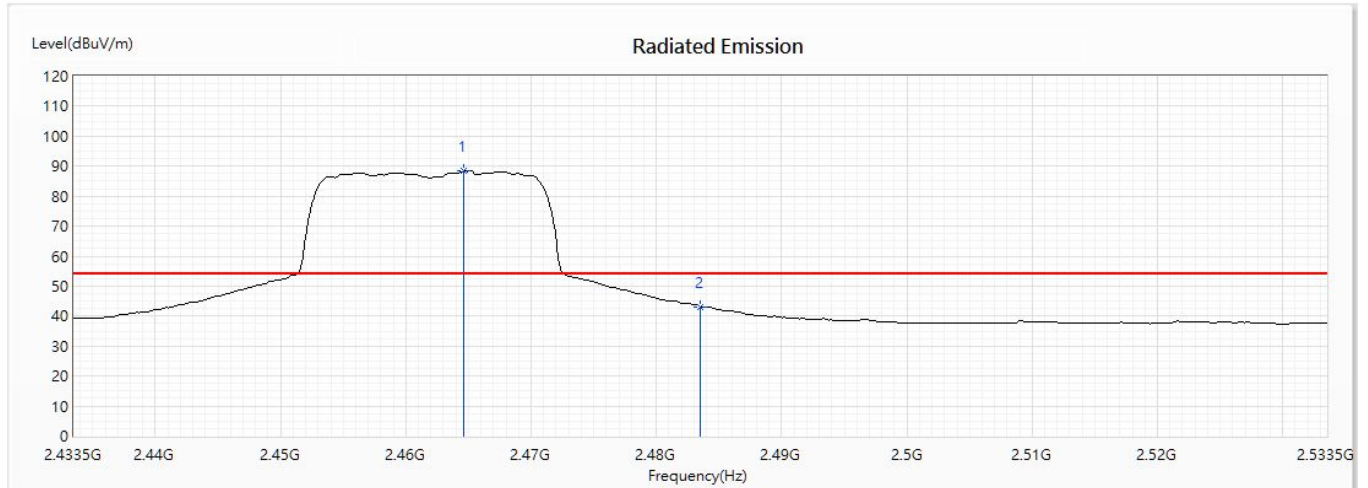
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2465.964	97.46	74.00	23.46	84.11	13.35	PK
2	2483.5	62.61	74.00	-11.39	49.23	13.38	PK
3	2485.529	63.62	74.00	-10.38	50.24	13.38	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

Horizontal



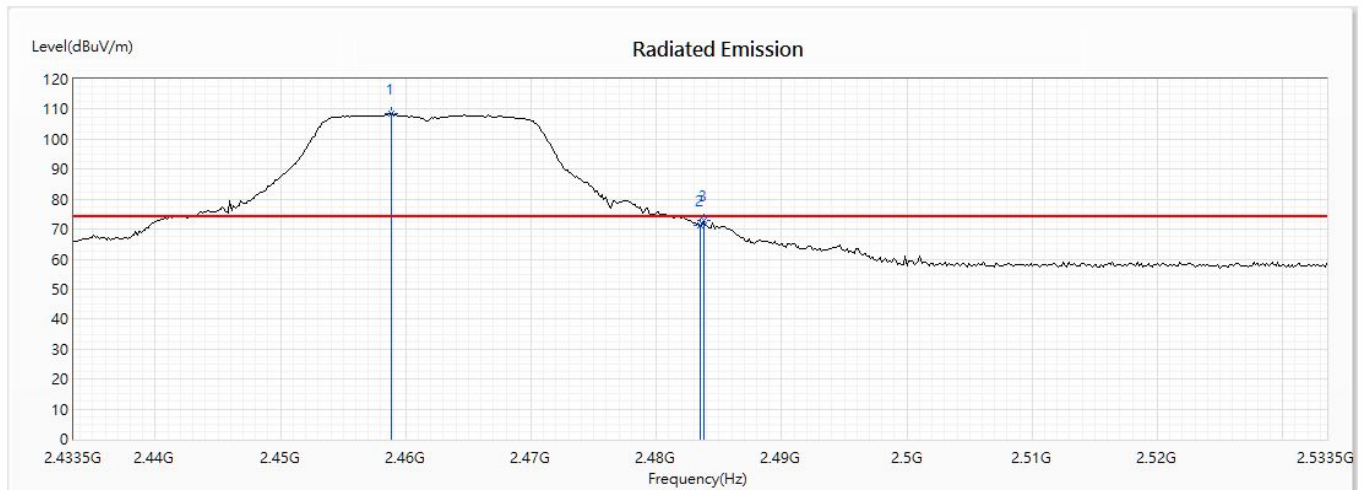
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2464.659	88.39	54.00	34.39	75.05	13.34	AV
2	2483.5	43.17	54.00	-10.83	29.79	13.38	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

Vertical



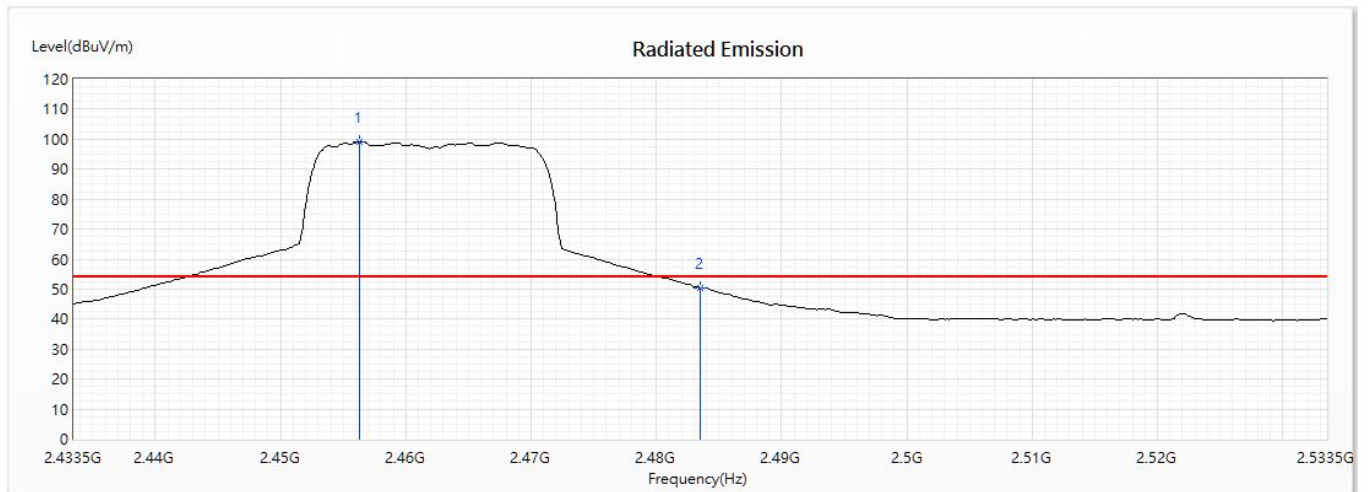
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2458.862	108.40	74.00	34.40	95.07	13.33	PK
2	2483.5	71.21	74.00	-2.79	57.83	13.38	PK
3	2483.79	72.88	74.00	-1.12	59.51	13.37	PK

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

Product : Industrial WiFi module
 Test Item : Band Edge Data
 Test Date : 2020/05/14
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW) (2462MHz)

Vertical



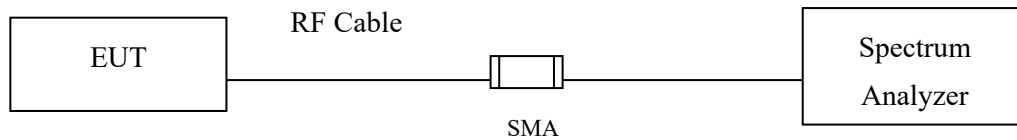
No	Frequency (MHz)	Emission Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Reading Level (dBuV)	Correct Factor (dB/m)	Detector Type
! 1	2456.254	99.08	54.00	45.08	85.75	13.33	AV
2	2483.5	50.24	54.00	-3.76	36.86	13.38	AV

Note:

1. All readings above 1GHz are performed with peak and/or average measurements as necessary.
2. Emission Level = Reading Level + Correct Factor.
3. The average measurement was not performed when the peak measured data under the limit of average detection.

7. 6dB Bandwidth

7.1. Test Setup



7.2. Limits

The minimum bandwidth shall be at least 500 kHz.

7.3. Test Procedure

The EUT was setup according to ANSI C63.4, 2014; tested according to ANSI C63.10 Section 11.8 for compliance to FCC 47CFR 15.247 requirements.

7.4. Test Result of 6dB Bandwidth

Product : Industrial WiFi module
 Test Item : 6dB Bandwidth Data
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	10150	>500	Pass
06	2437	10150	>500	Pass
11	2462	10000	>500	Pass

Figure Channel 01:

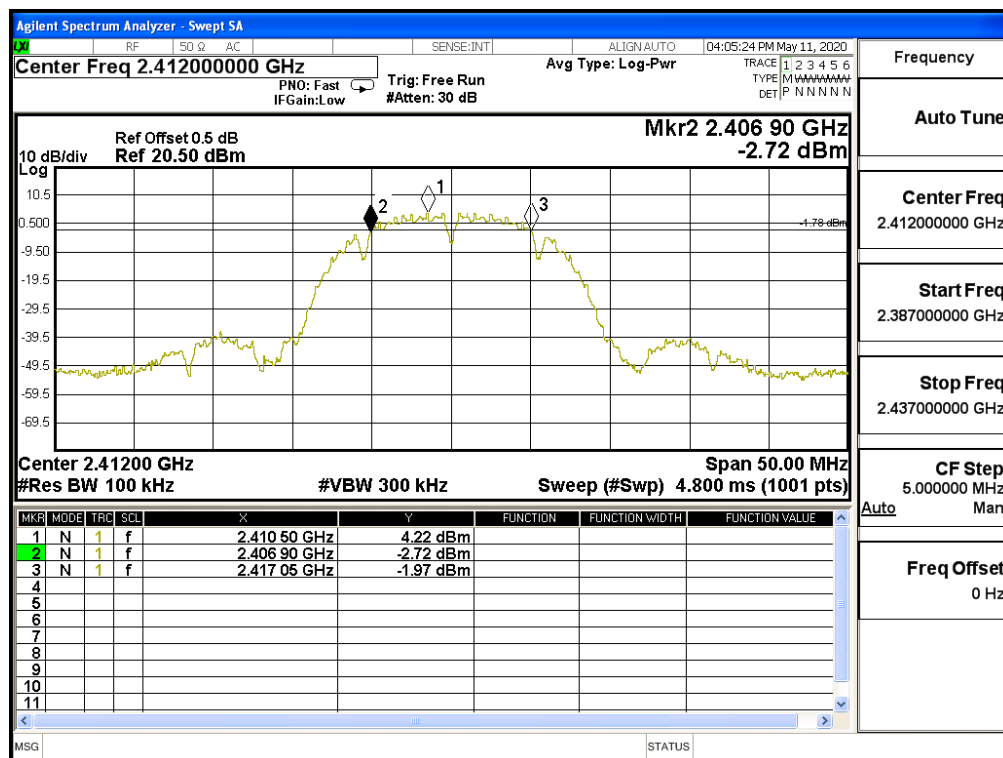


Figure Channel 06:

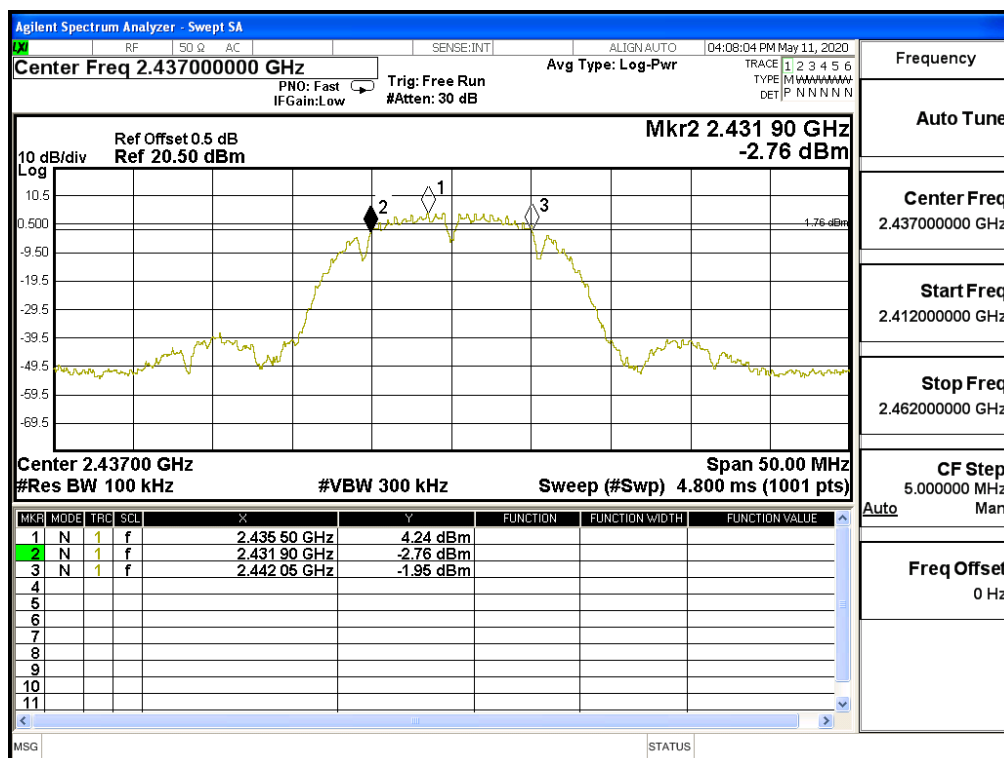
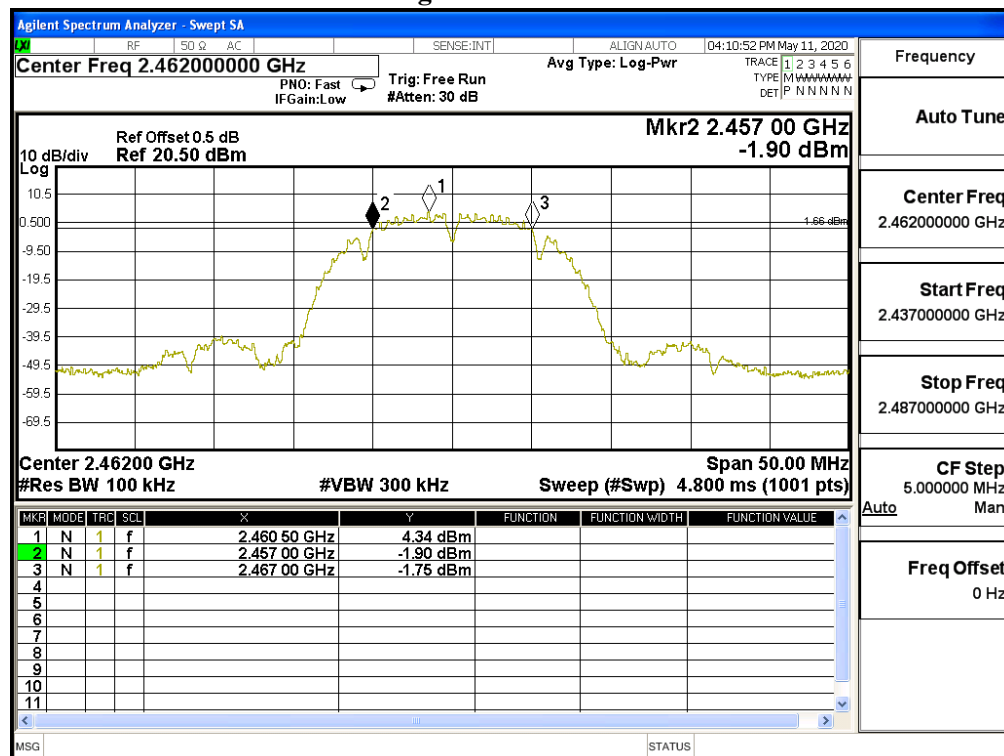


Figure Channel 11:



Product : Industrial WiFi module
 Test Item : 6dB Bandwidth Data
 Test Mode : Mode 2: Transmit (802.11g 6Mbps) (2412MHz)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	16400	>500	Pass
06	2437	16400	>500	Pass
11	2462	16400	>500	Pass

Figure Channel 01:

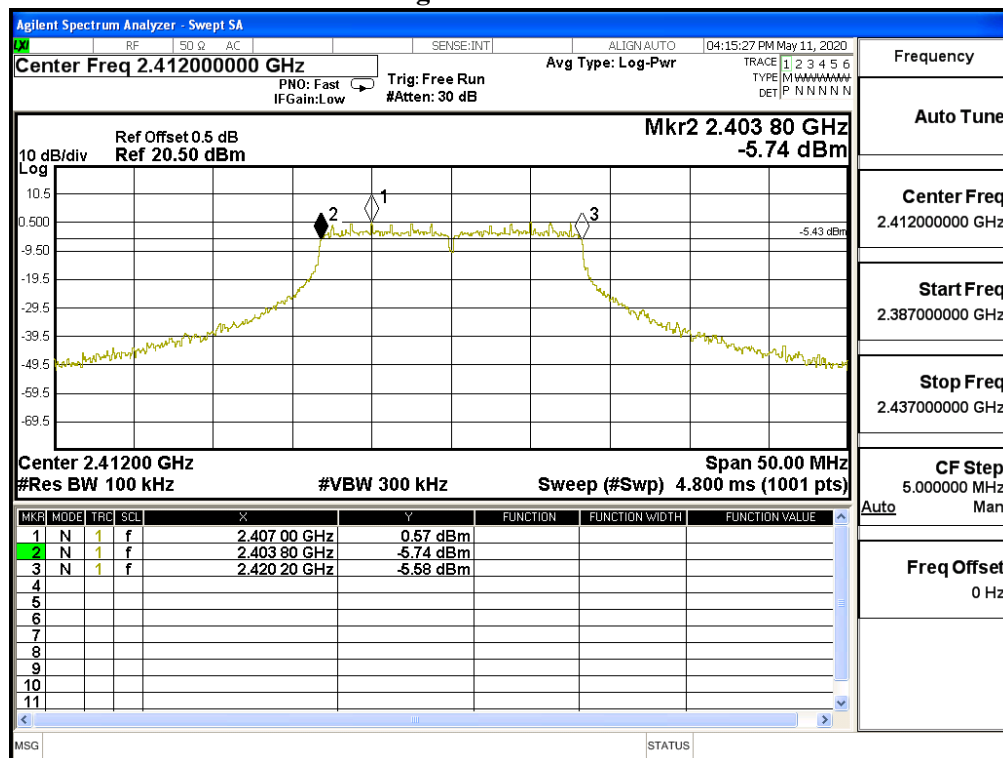


Figure Channel 06:

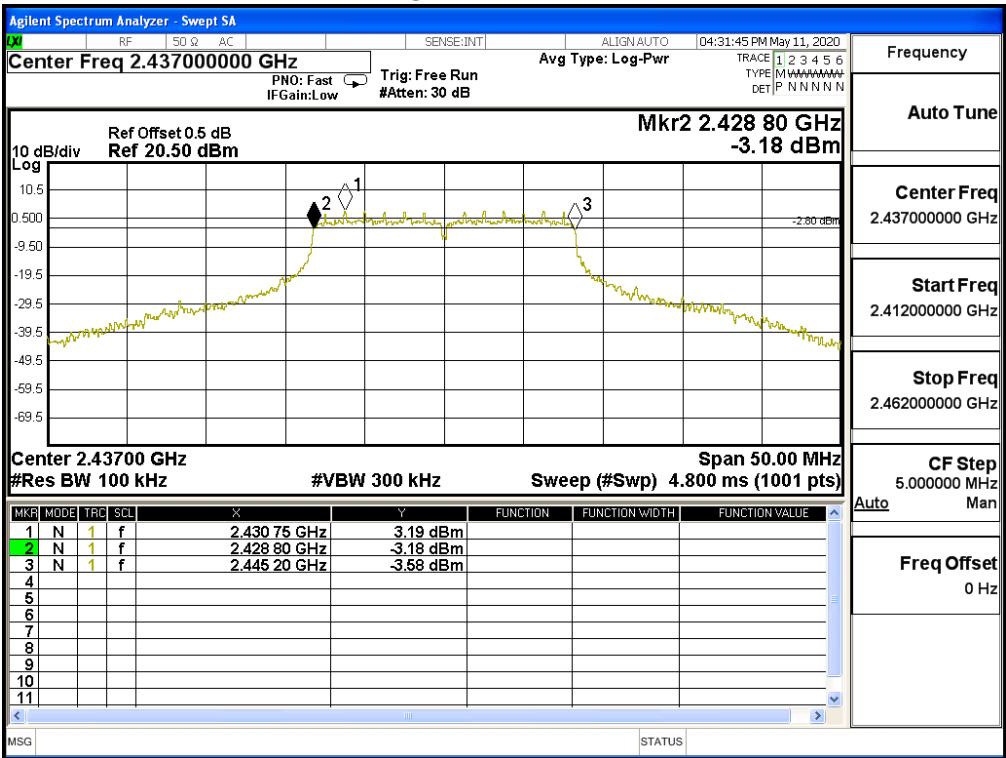
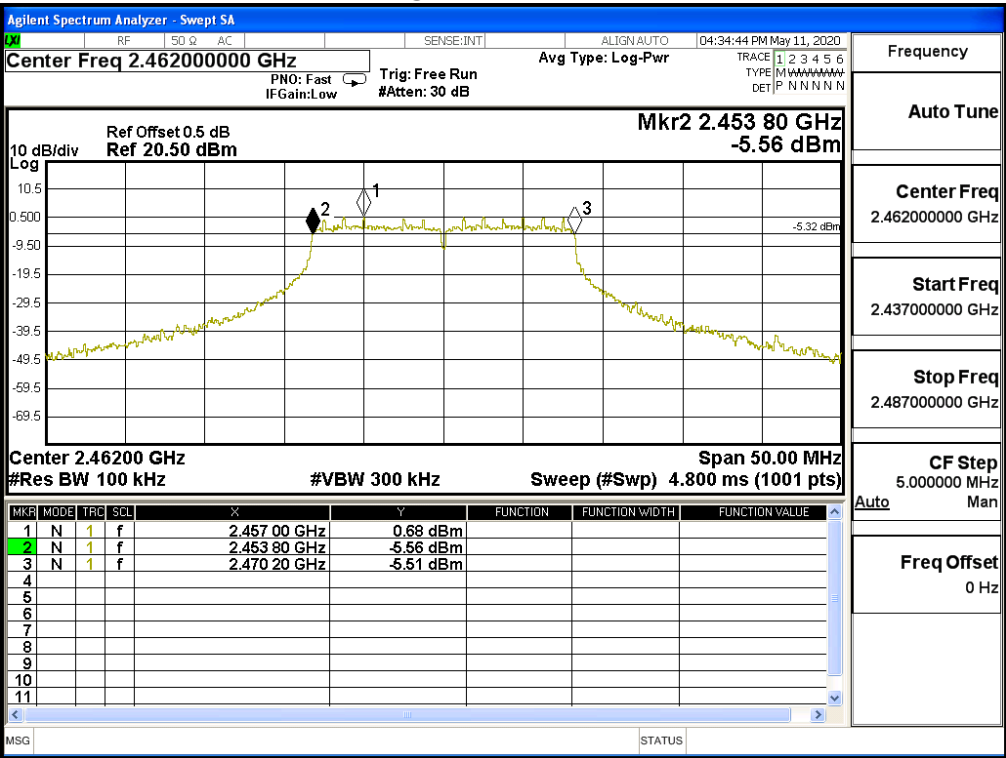


Figure Channel 11:



Product : Industrial WiFi module
 Test Item : 6dB Bandwidth Data
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel No.	Frequency (MHz)	Measurement Level (kHz)	Required Limit (kHz)	Result
01	2412	17400	>500	Pass
06	2437	17300	>500	Pass
11	2462	17650	>500	Pass

Figure Channel 01:

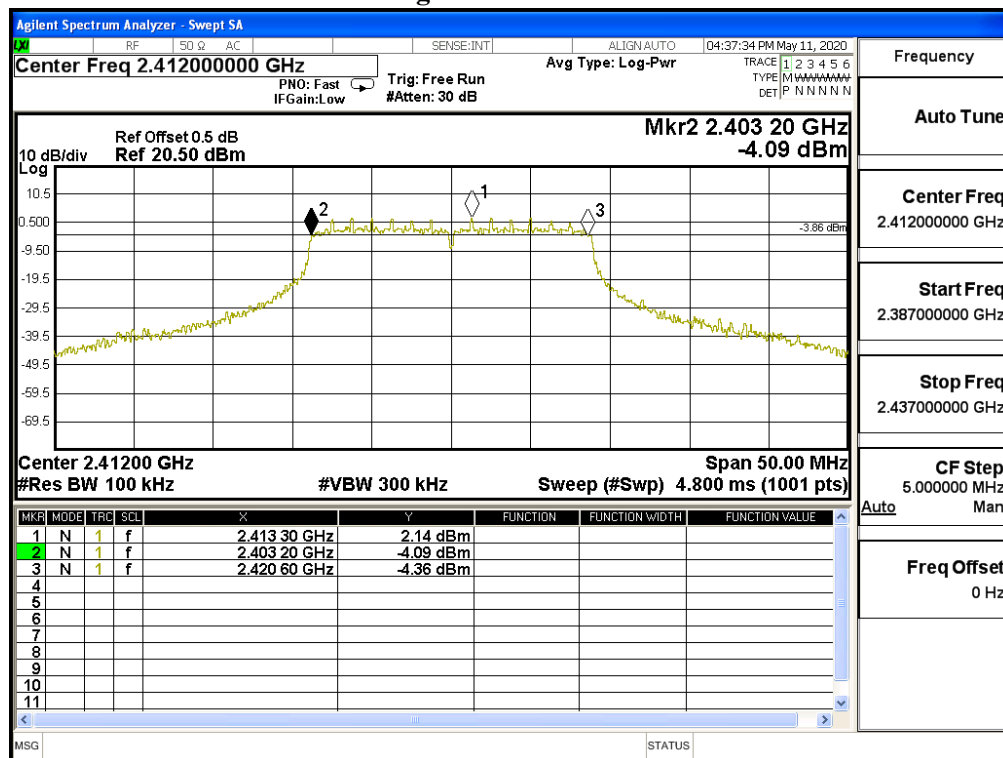


Figure Channel 06:

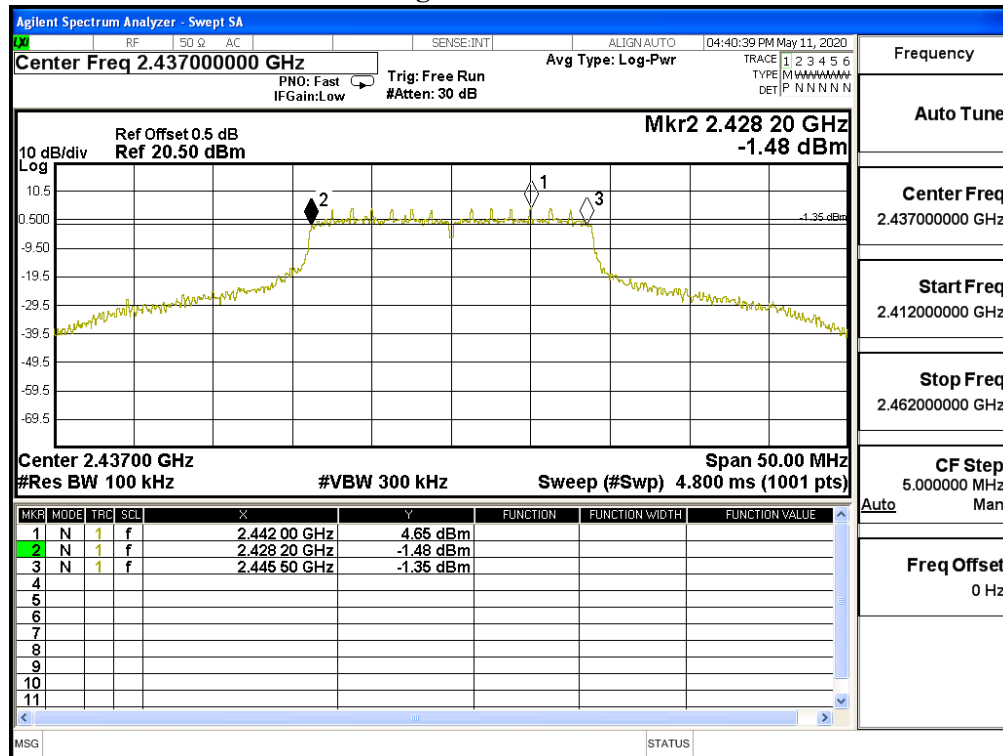
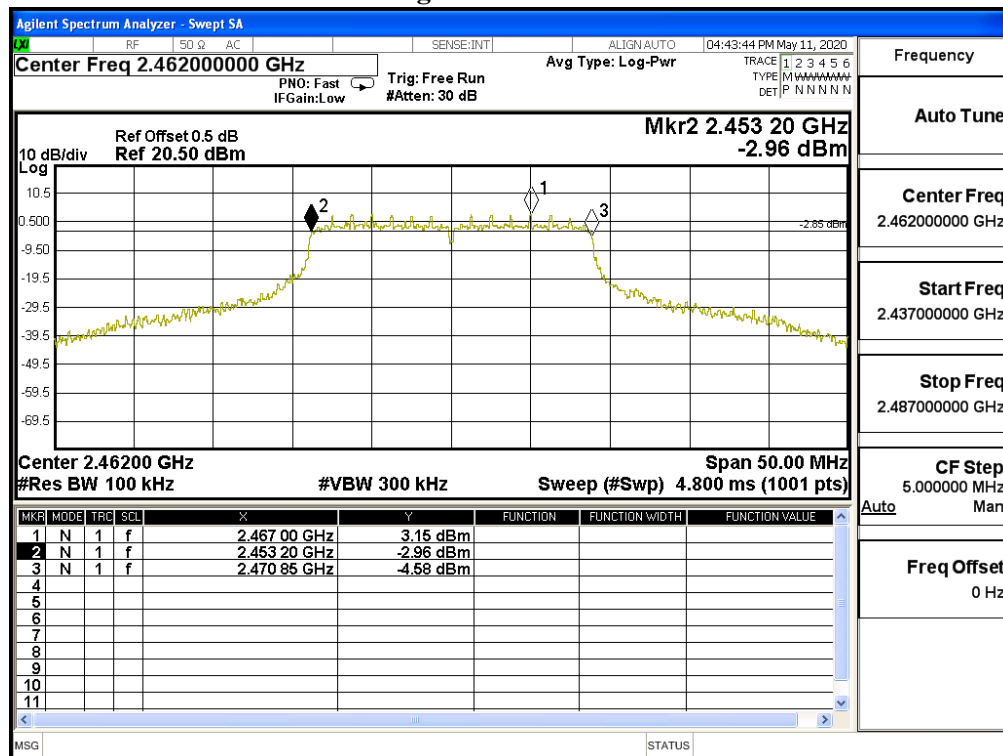
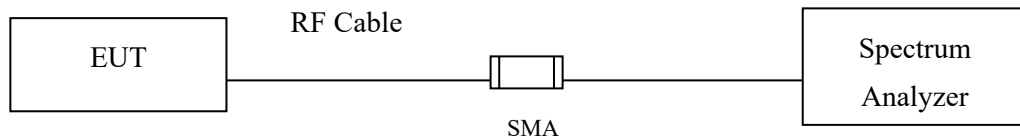


Figure Channel 11:



8. Power Density

8.1. Test Setup



8.2. Limits

The transmitted power density averaged over any 1 second interval shall not be greater +8dBm in any 3kHz bandwidth.

8.3. Test Procedure

The EUT was setup according to ANSI C63.10, 2013; tested according to DTS test procedure of KDB 558074 for compliance to FCC 47CFR 15.247 requirements.

The maximum power spectral density using C63.10 Section 11.10.2 Method PKPSD (peak PSD)

8.4. Test Result of Power Density

Product : Industrial WiFi module
 Test Item : Power Density Data
 Test Mode : Mode 1: Transmit (802.11b 1Mbps)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2412	4.740	$\leq 8\text{dBm}$	Pass
06	2437	4.240	$\leq 8\text{dBm}$	Pass
11	2462	3.950	$\leq 8\text{dBm}$	Pass

Figure Channel 01:

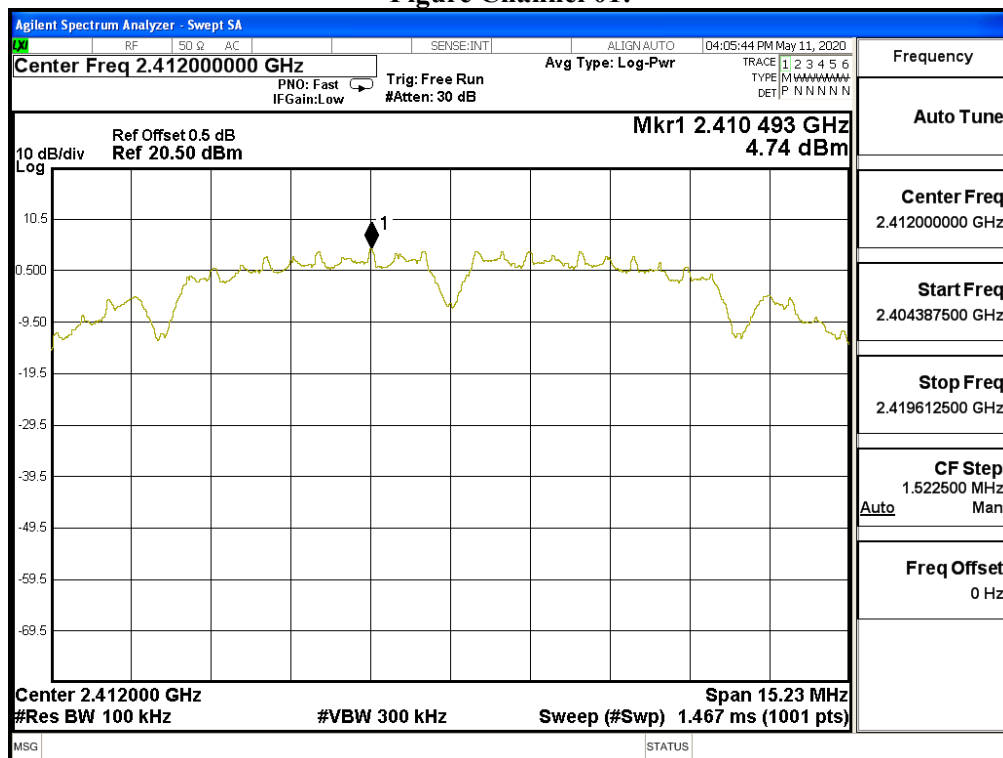


Figure Channel 06:

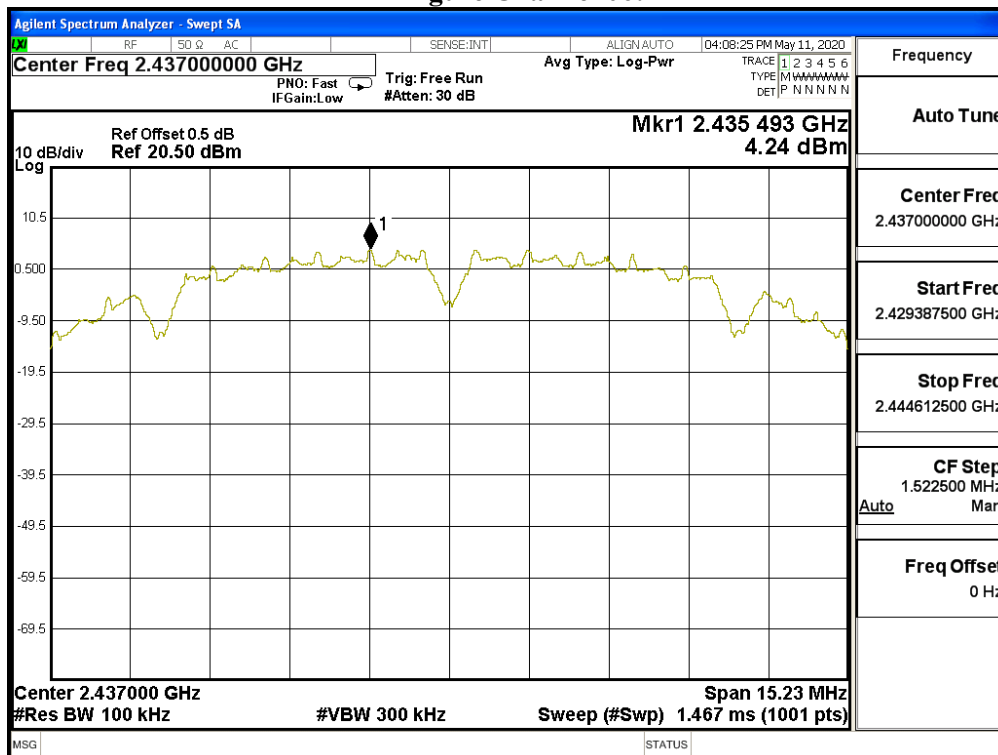
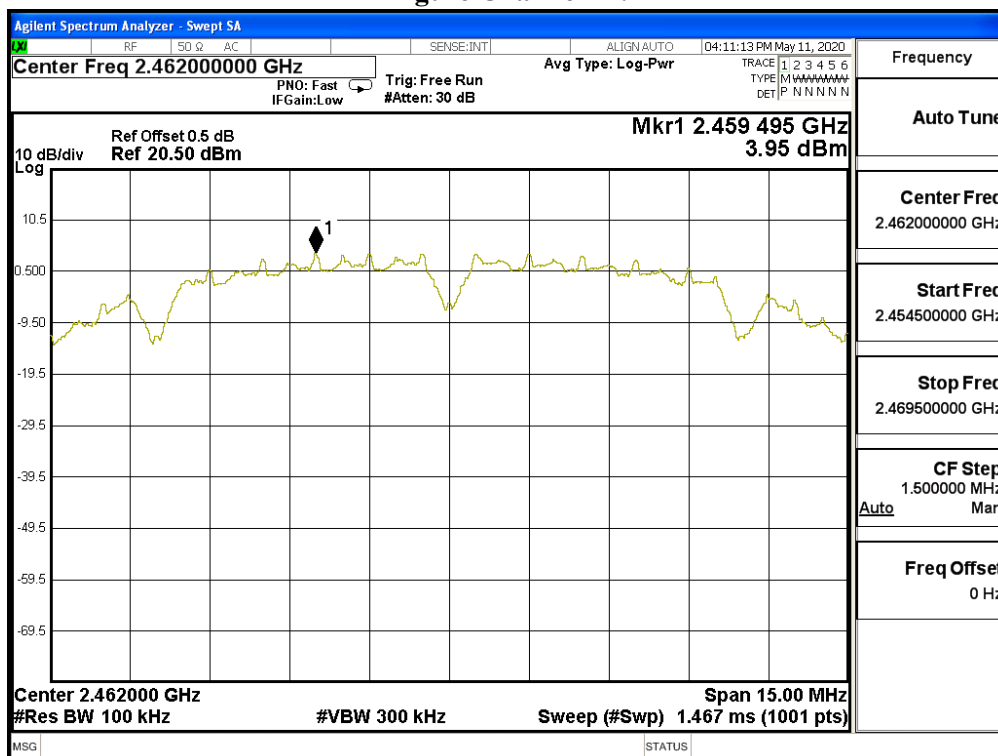


Figure Channel 11:



Product : Industrial WiFi module
 Test Item : Power Density Data
 Test Mode : Mode 2: Transmit (802.11g 6Mbps)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2412	0.450	$\leq 8\text{dBm}$	Pass
06	2437	3.280	$\leq 8\text{dBm}$	Pass
11	2462	0.780	$\leq 8\text{dBm}$	Pass

Figure Channel 01:

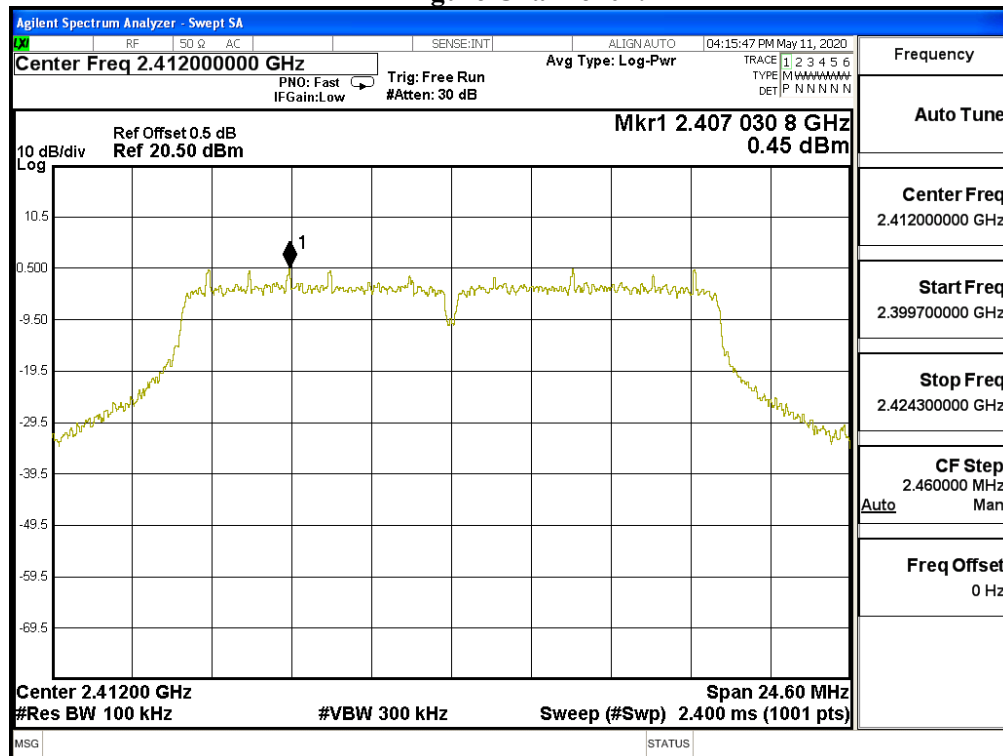


Figure Channel 06:

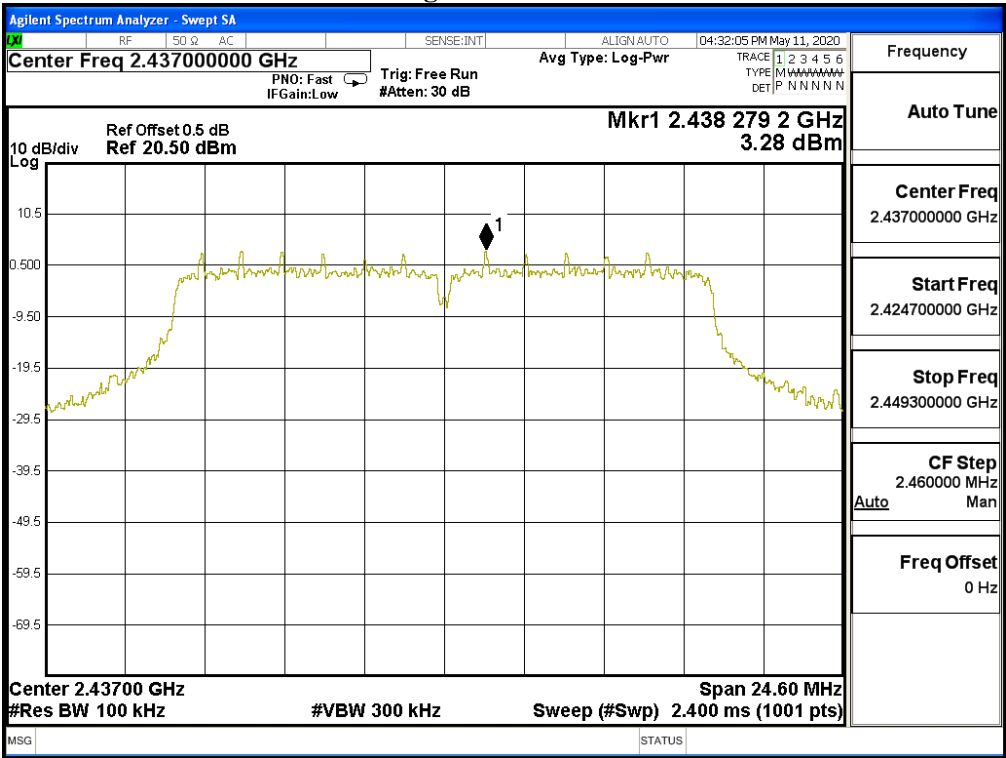
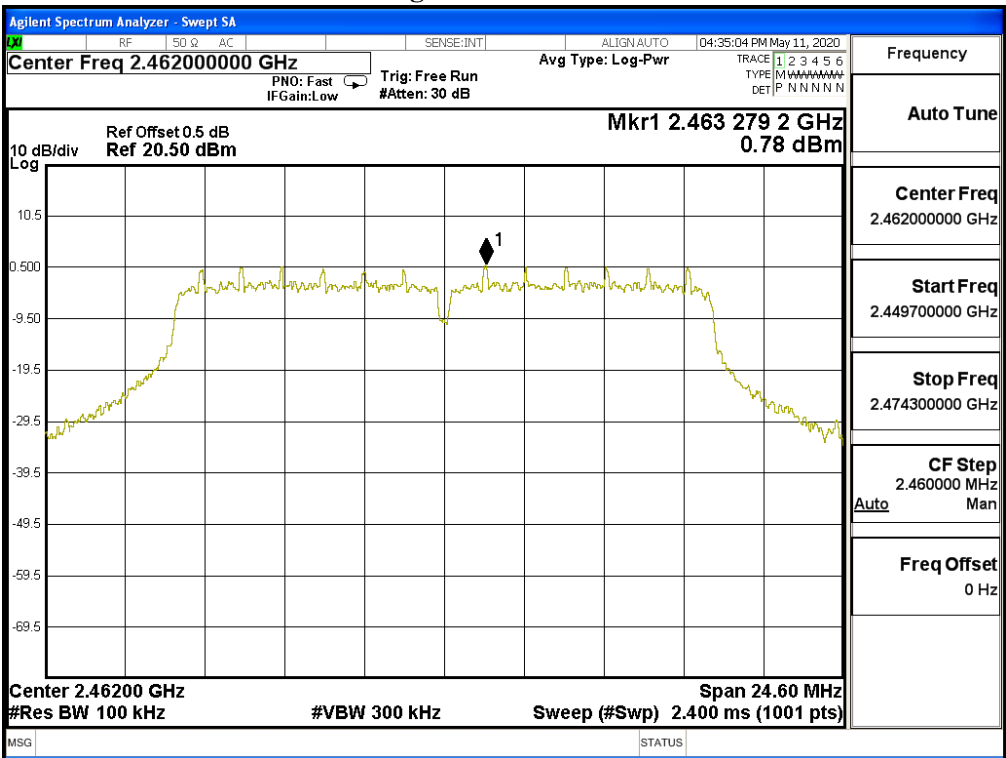


Figure Channel 11:



Product : Industrial WiFi module
 Test Item : Power Density Data
 Test Mode : Mode 3: Transmit (802.11n MCS0 7.2Mbps 20M-BW)

Channel No.	Frequency (MHz)	Measure Level (dBm)	Limit (dBm)	Result
01	2412	2.070	$\leq 8\text{dBm}$	Pass
06	2437	4.630	$\leq 8\text{dBm}$	Pass
11	2462	3.190	$\leq 8\text{dBm}$	Pass

Figure Channel 01:

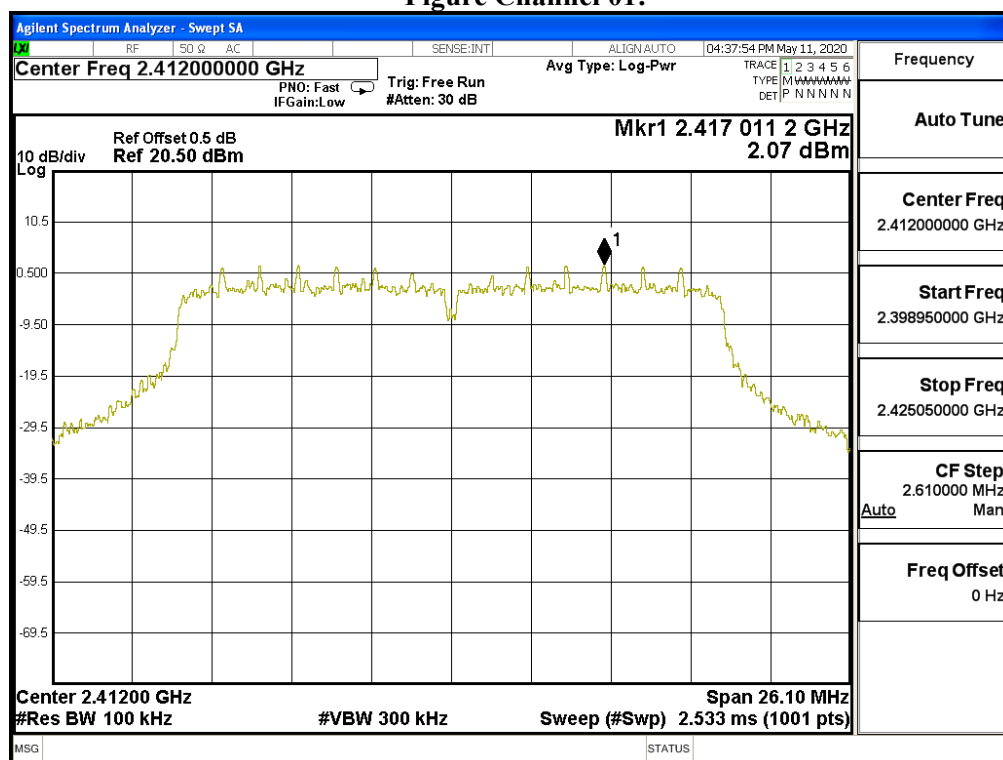


Figure Channel 06:

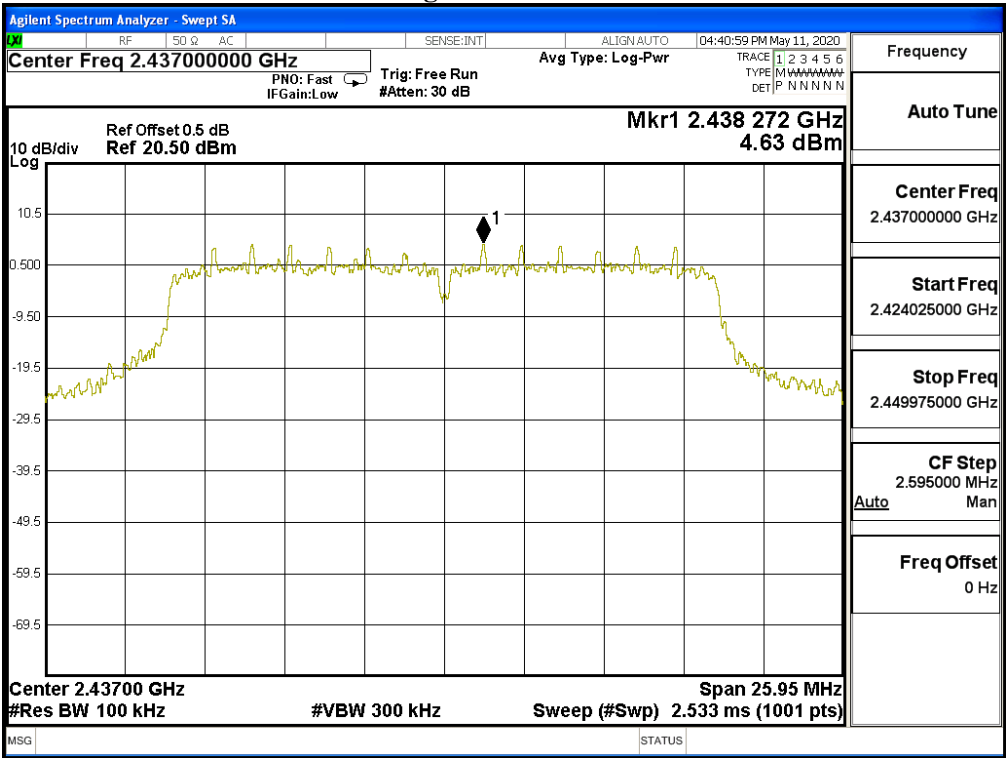
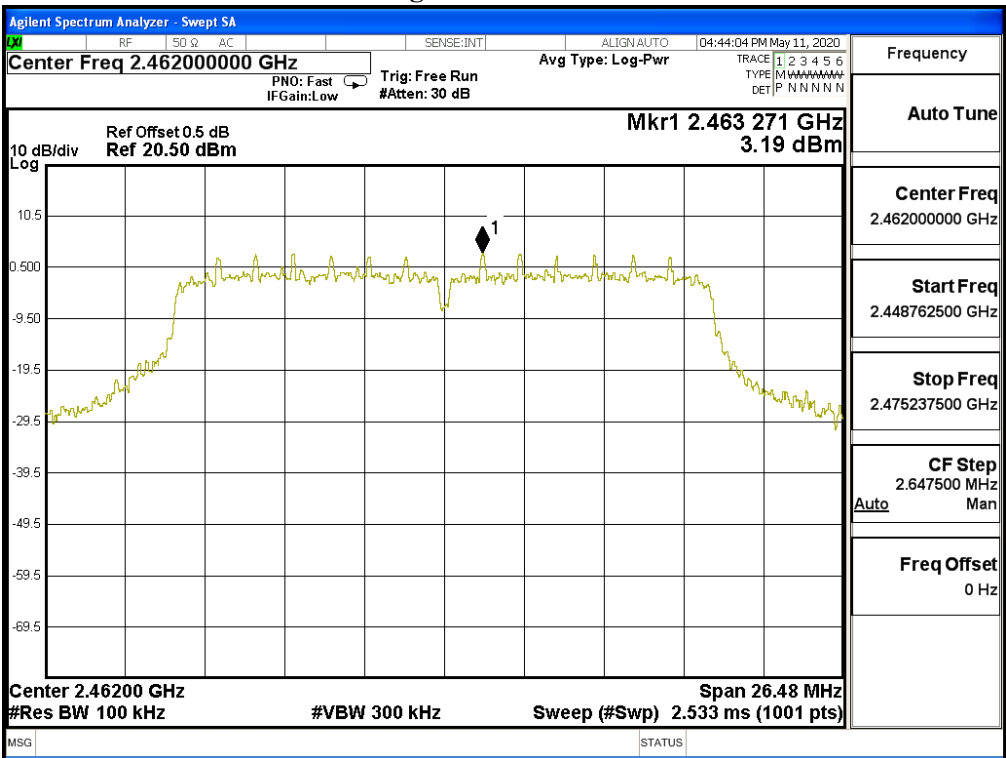
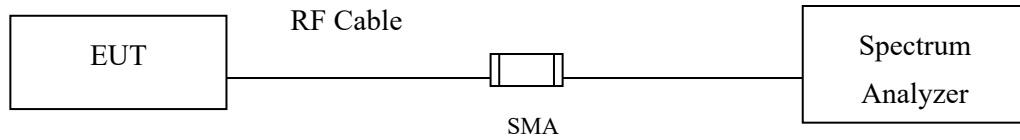


Figure Channel 11:



9. Duty Cycle

9.1. Test Setup



9.2. Test Procedure

The EUT was setup according to ANSI C63.10 2013; tested according to DTS test procedure of KDB558074 for compliance to FCC 47CFR 15.247 requirements.

9.3. Test Result of Duty Cycle

Product : Industrial WiFi module
 Test Item : Duty Cycle
 Test Mode : Transmit

Duty Cycle Formula:

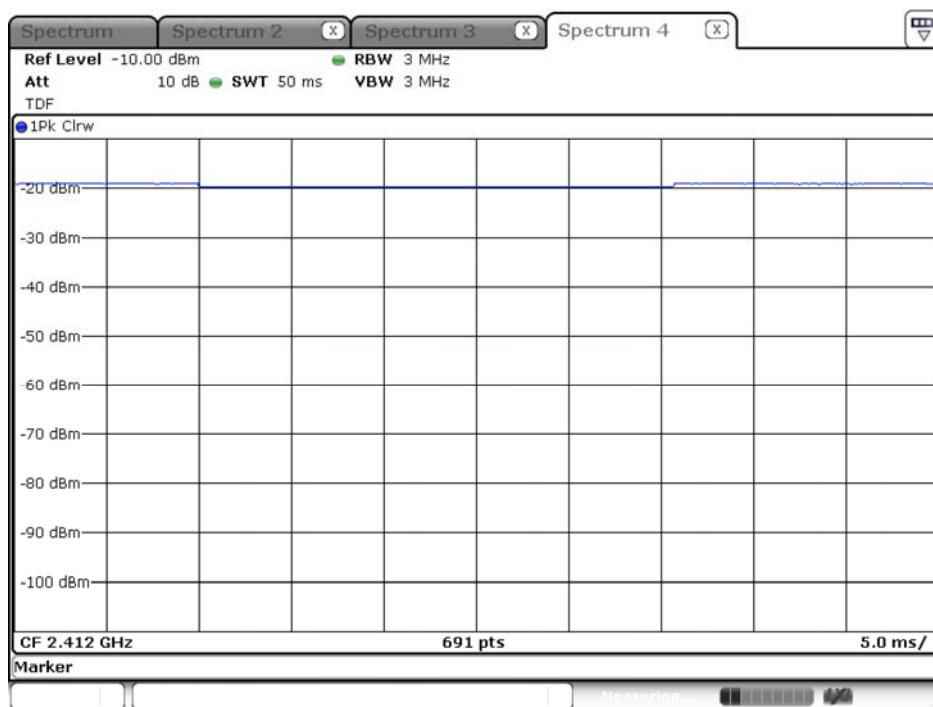
Duty Cycle = Ton / (Ton + Toff)

Duty Factor = 10 Log (1/Duty Cycle)

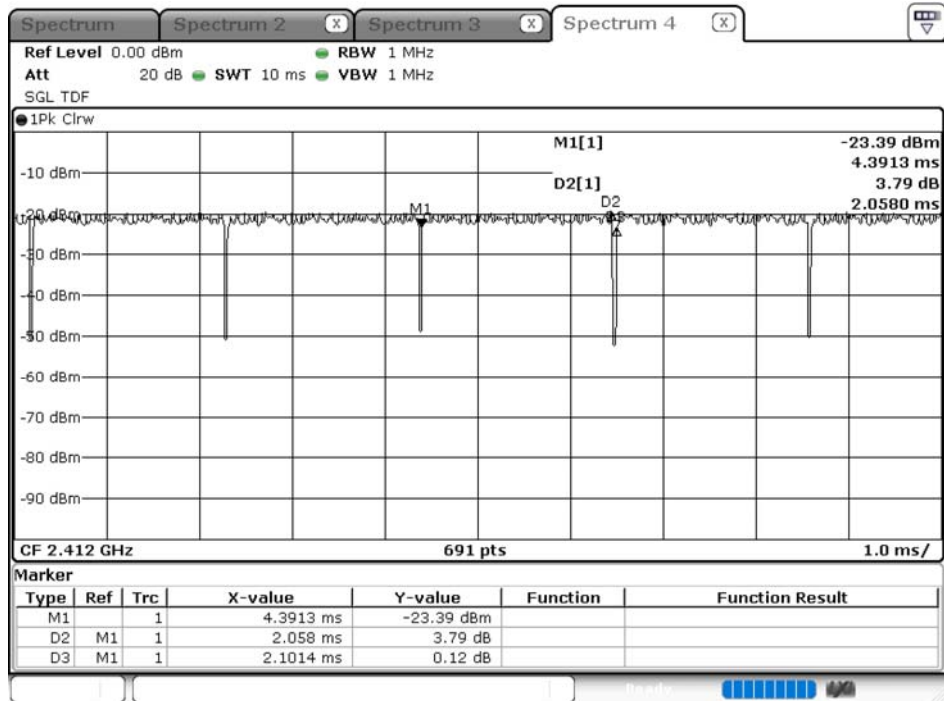
Results:

2.4GHz band	Ton (ms)	Ton + Toff (ms)	Duty Cycle (%)	Duty Factor (dB)
802.11b	--	--	100.00	0.00
802.11g	2.0580	2.1014	97.93	0.09
802.11n20	1.8986	1.9565	97.04	0.13

802.11b

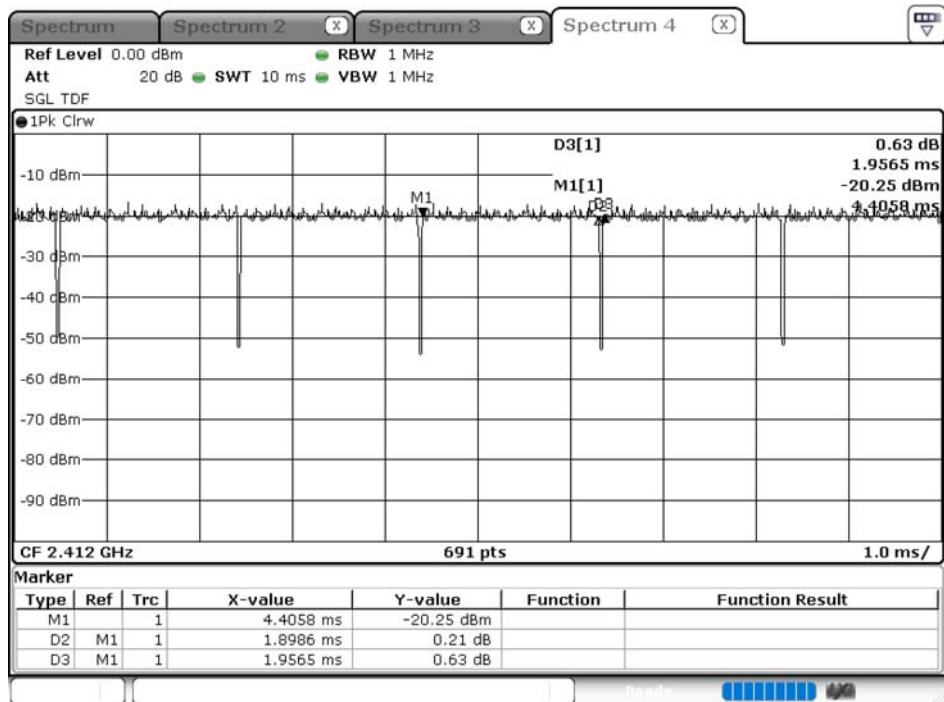


802.11g



Date: 15.MAY.2020 04:32:53

802.11n20



Date: 15.MAY.2020 04:41:40

10. EMI Reduction Method During Compliance Testing

No modification was made during testing.