FCC Part 15.247

TEST REPORT

For

Lightel Technologies

2210 Lind Ave SW, Suite 100 Renton, WA 98057

FCC ID: 2AVT9-DI30005000

Report Type	**Original Report**
Product Name:	**Digital fiber connector inspector**
Model Name:	**DI-5000**
Serial Model Name:	**DI-3000**
Report Number :	**RXZ200318001-00B**
Report Date :	**2020/08/10**
Reviewed By :	**Zeus Chen** Zeus Chen

Prepared By:

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Revision History

Revision	Report Number	Issue Date	Description
1.0	RXZ200318001-00B	2020/08/10	Original Report

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1 General Information

1.1 Product Description for Equipment under Test (EUT)

Applicant	**Lightel Technologies** 2210 Lind Ave SW, Suite 100 Renton, WA 98057
Manufacturer	**Lightel Technologies** 2210 Lind Ave SW, Suite 100 Renton, WA 98057
Brand Name	LIGHTEL
Product (Equipment)	Digital fiber connector inspector
Model Name	DI-5000
Serial Model Name	DI-3000
Model Discrepancy	Please see below table
Frequency Range	IEEE 802.11b/g/n HT20: 2412 - 2462 MHz; IEEE 802.11n HT40: 2422 - 2452 MHz
Number of Channels	IEEE 802.11b/g/n HT20: 11 Channels; IEEE 802.11n HT40: 9 Channels
Output Power	IEEE 802.11b: 12.26 dBm (0.0168 W) IEEE 802.11g: 20.24 dBm (0.1057 W) IEEE 802.11n HT20: 19.54 dBm (0.0899 W) IEEE 802.11n HT40: 19.02 dBm (0.0798 W)
Modulation Type	IEEE 802.11b: DSSS IEEE 802.11g/n HT 20/HT40: OFDM
Related Submittal(s)/Grant(s)	N/A
Received Date	Mar. 26, 2020
Date of Test	May 04, 2020 ~ Jun. 10, 2020

**All measurement and test data in this report was gathered from production sample serial number: 200318001 Assigned by BACL, Linkou Laboratory).*

Item	DI-3000	DI-5000
Firmware Version	v3.07.0302.1	v5.05. 0108.1
Cabinet Design	DI-3000 with autofocus switch	Same as DI-3000 but replace autofocus switch by function rotation switch

1.2 Operation Condition of EUT

Power Operation (Voltage Range)	☒ AC 120 V/60 Hz ☒ Adapter Brand: E.H Model: FYA05010US I/P: 100-240Vac, 0.6A O/P: 4.75-5.25Vdc ☐ By Power Cord.
	☒ DC Type ☐ DC Power ☒ Battery: Rechargeable Lithium Battery Brand Name: Panasonic Model: NCR18650B 4.2V, 1625mAh ☐ External from USB Cable ☐ External DC Adapter

1.3 Objective and Test Methodology

The Objective of this Test Report was to document the compliance of the Lightel Technologies. Appliance (Model(s): DI-5000; DI-3000) to the requirements of the following Standards:

- Part 2, Subpart J, Part 15, Subparts A and C, section 15.247 of the Federal Communication Commission's rules.
- ANSI C63.10-2013 of t American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices.

1.4 Measurement Uncertainty

Parameter	Expanded Measurement uncertainty
RF output power with Power Meter	± 1.488 dB
Occupied Channel Bandwidth	± 453.927 Hz
RF Conducted test with Spectrum	± 2.77 dB
AC Power Line Conducted Emission	± 2.66 dB
Radiated Below 1G	± 3.78 dB
Radiated Above 1G	± 4.29 dB

The test results with statement of conformity, the decision rules are based on the specifications and standards. The test results will not take the measurement uncertainty into account.

1.5 Test Environments and Test information

Item	Test Date	Temperature (°C)	Relative Humidity (%)	Test Engineer
Radiated (966B)	Jun. 10, 2020	22.6	59	Leo Cheng
Conducted (TH-02)	May 04, 2020 – May 13, 2020	18-22.1	49-53	Blake Wang
Conduction (Con-01)	Oct 08, 2020	23.5	56	Blake Wang

1.6 Test Facility

The Test site used by Bay Area Compliance Laboratories Corp. (Linkou Laboratory) to collect test data is located on

☒ No.6, Wende 2Rd., Guishan Dist., Taoyuan City 33382, Taiwan (R.O.C.).

Bay Area Compliance Laboratories Corp. (Linkou Laboratory) Lab is accredited to ISO 17025 by Taiwan Accreditation Foundation (TAF code: 3546) by Mutual Recognition Agreement (MRA). The test site has been approved by the FCC under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database. The FCC Registration No.: 0027578244. Designation No.: TW3546. The Test Firm Registration No.: 181430.

2 System Test Configuration

2.1 Test Channels and Description of Worst Test Configuration

The system was configured for testing in testing mode which was provided by manufacturer. No special accessory, No modification was made to the EUT and No special equipment used during test.

For Wi-Fi 2.4G mode, there are totally 11 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	**2412**	7	2442
2	2417	8	2447
3	**2422**	**9**	**2452**
4	2427	10	2457
5	2432	**11**	**2462**
6	**2437**	-	-

For 802.11b/g/n HT20: Channel **1**, **6** and **11** were tested. For 802.11n HT40: Channel **3**, **6** and **9** were tested.

The worst-case data rates are determined to be as follows for each mode based upon investigation by measuring the Peak power and PSD across all date rates bandwidths, and modulations. Radiated below 1G were tested worst output power.

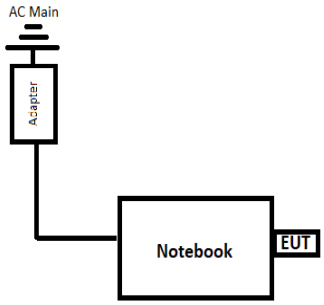
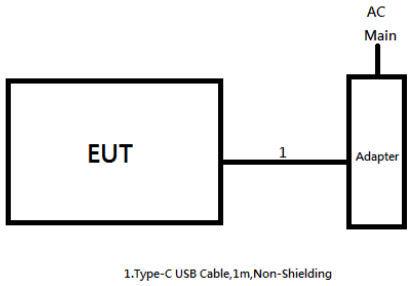
Modulation Used for Conformance Test			
Configuration	**NTX**	**Data Rate**	**Worst Data Rate**
802.11b	1	1-11 Mbps	1 Mbps
802.11g	1	6-54 Mbps	6 Mbps
802.11n HT 20	1	MCS 0-7	MCS 0
802.11n HT 40	1	MCS 0-7	MCS 0

Worst Case of Power Setting				
EUT Exercise Software		Command		
Configuration	**NTX**	**Low CH**	**Mid CH**	**High CH**
802.11b	1	30	28	28
802.11g	1	42	46	34
802.11n HT 20	1	41	44	39
802.11n HT 40	1	43	40	41

2.2 Support Equipment List and External Cable List

No.	Description	Manufacturer	Model Number	Serial Number
A	Notebook	DELL	Latitude E6410	PP27LA001
B	USB Cable	Chinazihui	TU-04050100-K	N/A
C	Adapter	E.H	FYA05010US	N/A

2.3 Block Diagram of Test Setup

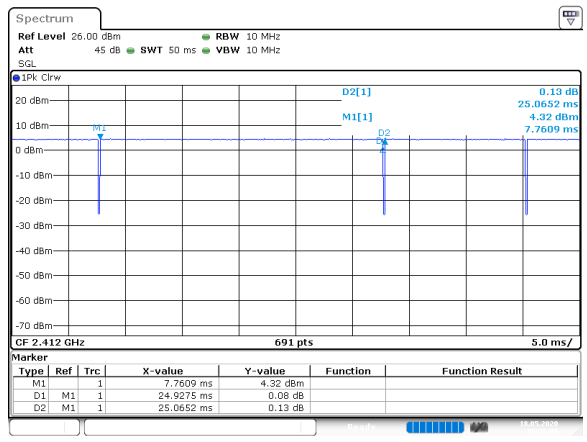
Conduction	Radiation
	

2.4 Duty Cycle

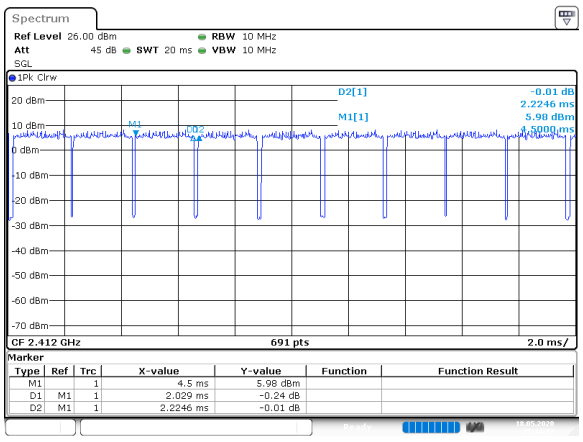
All measurements are to be performed with the EUT transmitting at 100% duty cycle at its maximum power control level; however, if 100% duty cycle cannot be achieved, measurements of duty cycle, x, and maximum power transmission duration, T, are required for each tested mode of operation.

Configuration	On Time (ms)	Period (ms)	Duty Cycle (%)	Duty Factor (dB)
802.11b	24.92	0.14	99.00	0.04
802.11g	2.03	0.19	91.00	0.41
802.11n HT20	1.89	0.19	91.00	0.41
802.11n HT40	0.90	0.16	85.00	0.71

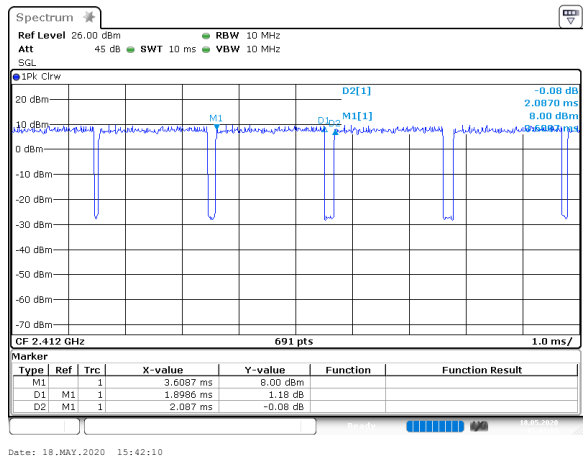
802.11b



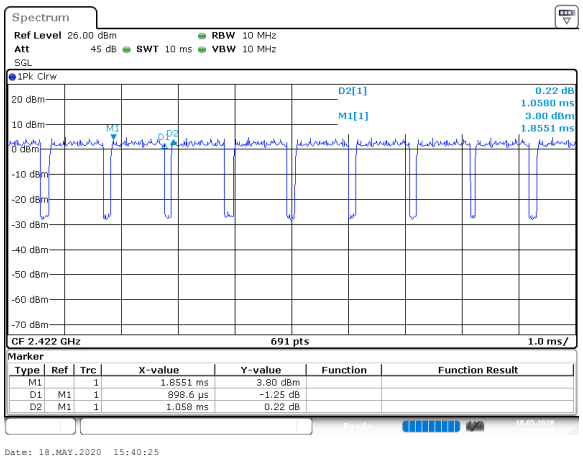
802.11g



802.11n HT20



802.11n HT40



**Note: Duty Factor = 10*log (1/Duty cycle)*

3 Summary of Test Results

FCC Rules	Description of Test	Result
§15.247(i), §1.1307, § 2.1093	RF Exposure	Compliance
§15.203	Antenna Requirement	Compliance
§15.207(a)	AC Line Conducted Emissions	Compliance
§15.205, §15.209, §15.247(d)	Spurious Emissions	Compliance
§15.247(a)(2)	6 dB Emission Bandwidth	Compliance
§15.247(b)(3)	Maximum Peak Output Power	Compliance
§15.247(d)	100 kHz Bandwidth of Frequency Band Edge	Compliance
§15.247(e)	Power Spectral Density	Compliance

4 FCC§15.247(i), §1.1307, § 2.1093 – RF Exposure

4.1 Applicable Standard

According to FCC §2.1093 and §1.1307(b) (1), systems operating under the provisions of this section shall be operated in a manner that ensure that the public is not exposed to radio frequency energy level in excess of the Commission's guideline.

According to KDB 447498 D01 General RF Exposure Guidance v06

The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] ·

[√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR, where

1. f(GHz) is the RF channel transmit frequency in GHz.
2. Power and distance are rounded to the nearest mW and mm before calculation.
3. The result is rounded to one decimal place for comparison.
4. 3.0 and 7.5 are referred to as the numeric thresholds in the step 2 below

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm, and for transmission frequencies between 100 MHz and 6 GHz. When the minimum test separation distance is < 5 mm, a distance of 5 mm according to 4.1 f) is applied to determine SAR test exclusion.

4.2 RF Exposure Evaluation Result

RF Exposure Evaluation:

Frequency (MHz)	Turn-up Power		Evaluation Distance (mm)	SAR Exclusion Result	Extremity SAR Exclusion Limit (10g SAR)
	(dBm)	(mW)			
2412-2462	10.09	10.209	5	4.5904	7.5

Result: SAR evaluation is not necessary.

5 FCC §15.203 - Antenna Requirements

5.1 Applicable Standard

According to § 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the user of a standard antenna jack or electrical connector is prohibited.

And according to FCC 47 CFR section 15.247 (b), if the transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna does not exceed 6dBi

5.2 Antenna List and Details

Model	Antenna Type	Antenna Gain	Result
PCB Antenna	LIGHTEL	PCBANT-A01	1.50 dBi

6 FCC §15.207 - AC Line Conducted Emissions

6.1 Applicable Standard

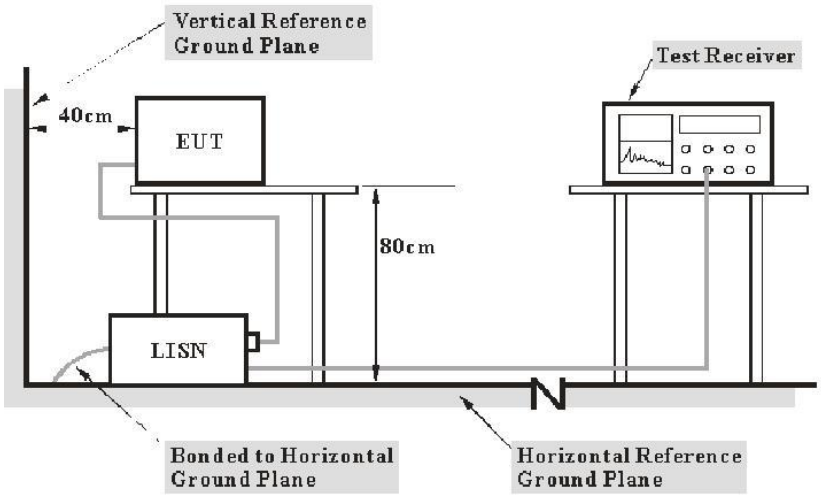
According to FCC §15.207,

For an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 µH/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequencies ranges.

Frequency (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56 Note 1	56 to 46 Note 2
0.5-5	56	46
5-30	60	50

Note 1: Decreases with the logarithm of the frequency. Note 2: A linear average detector is required

6.2 EUT Setup and Test Procedure



Note: 1. Support units were connected to second LISN.
2. Both of LISNs (AMN) 80 cm from EUT and at the least 80 cm from other units and other metal planes support units.

The setup of EUT is according with per ANSI C63.10-2013 measurement procedure. The specification used was with the FCC Part 15.207 limits

The EMI test receiver was set to investigate the spectrum from 150 kHz to 30 MHz. During the conducted emission test, the EMI test receiver was set with the following configurations

Frequency Range	Receiver RBW
150 kHz - 30 MHz	9 kHz

During the conducted emission test, the adapter was connected to the outlet of the LISN. Maximizing procedure was performed on the six (6) highest emissions of the EUT. All data was recorded in the Quasi-peak and average detection mode.

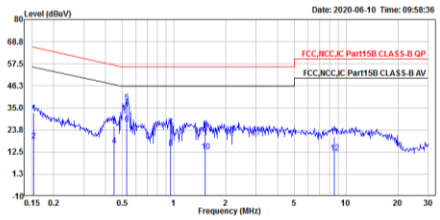
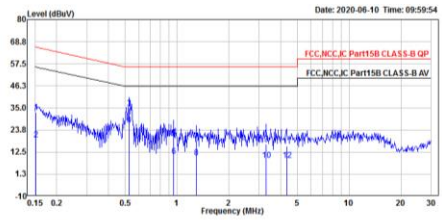
6.3 Test Equipment List and Details

Description	Manufacture	Model	Serial No.	Cal. Date.	Cal. Due.
AC Line Conduction Room (CON-01)					
LISN	Rohde & Schwarz	ENV216	100010	2019/09/02	2020/09/01
EMI Test Receiver	Rohde & Schwarz	ESR3	102448	2019/06/27	2020/06/23
Pulse Limiter	SCHWARZBECK	VSTD 9561-F	00432	2019/08/28	2020/08/27
RF Cable	EMCI	EMCCFD300-BM-BM-8000	180526	2019/08/08	2020/08/07
Software	Audix	e3 v9	E3LK-03	N.C.R	N.C.R

***Statement of Traceability:** The testing equipment's listed above have finished the calibration by Electronics Testing Center, Taiwan (ETC) or other laboratories which were accredited by TAF or equivalent organizations. The calibration result could be traceable to the International System of Units (SI).*

6.4 Test Result

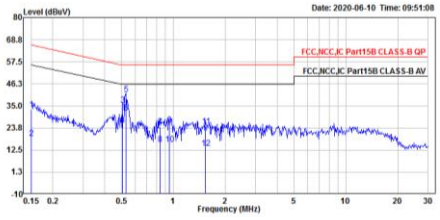
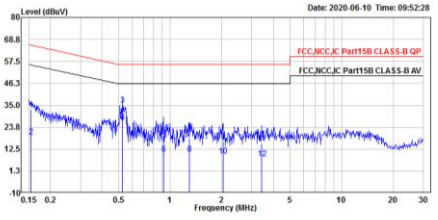
DI-5000:

Line	Neutral
	

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	
1	0.152	12.65	32.59	19.94	65.87	-33.28	QP
2	0.152	-1.79	18.15	19.94	55.87	-37.72	Average
3	0.450	5.77	25.73	19.96	56.87	-31.14	QP
4	0.450	-4.21	15.75	19.96	46.87	-31.12	Average
5	0.532	17.79	37.75	19.96	56.00	-18.25	QP
6	0.532	6.70	26.66	19.96	46.00	-19.34	Average
7	0.960	5.48	25.44	19.96	56.00	-30.56	QP
8	0.960	-5.52	14.44	19.96	46.00	-31.56	Average
9	1.524	4.45	24.43	19.98	56.00	-31.57	QP
10	1.524	-7.25	12.73	19.98	46.00	-33.27	Average
11	8.519	0.07	20.15	20.08	60.00	-39.85	QP
12	8.519	-7.97	12.11	20.08	50.00	-37.89	Average

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	
1	0.151	12.93	32.88	19.95	65.93	-33.05	QP
2	0.151	-1.18	18.77	19.95	55.93	-37.16	Average
3	0.528	14.86	34.83	19.97	56.00	-21.17	QP
4	0.528	6.45	26.42	19.97	46.00	-19.58	Average
5	0.960	-0.29	19.69	19.98	56.00	-36.31	QP
6	0.960	-9.72	10.26	19.98	46.00	-35.74	Average
7	1.300	-1.88	18.10	19.98	56.00	-37.90	QP
8	1.300	-10.36	9.62	19.98	46.00	-36.38	Average
9	3.301	-3.44	16.58	20.02	56.00	-39.42	QP
10	3.301	-11.74	8.28	20.02	46.00	-37.72	Average
11	4.328	-4.45	15.59	20.04	56.00	-40.41	QP
12	4.328	-11.70	8.34	20.04	46.00	-37.66	Average

DI-3000:

Line	Neutral
	

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	
1	0.150	13.30	33.24	19.94	66.00	-32.76	QP
2	0.150	-1.53	18.41	19.94	56.00	-37.59	Average
3	0.508	15.43	35.39	19.96	56.00	-20.61	QP
4	0.508	5.24	25.20	19.96	46.00	-20.80	Average
5	0.532	21.04	41.00	19.96	56.00	-15.00	QP
6	0.532	11.39	31.35	19.96	46.00	-14.65	Average
7	0.838	4.25	24.21	19.96	56.00	-31.79	QP
8	0.838	-4.57	15.39	19.96	46.00	-30.61	Average
9	0.945	5.40	25.36	19.96	56.00	-30.64	QP
10	0.945	-4.34	15.62	19.96	46.00	-30.38	Average
11	1.536	4.53	24.51	19.98	56.00	-31.49	QP
12	1.536	-6.46	13.52	19.98	46.00	-32.48	Average

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	
1	0.155	12.90	32.85	19.95	65.74	-32.89	QP
2	0.155	-0.95	19.00	19.95	55.74	-36.74	Average
3	0.528	15.08	35.05	19.97	56.00	-20.95	QP
4	0.528	6.43	26.40	19.97	46.00	-19.60	Average
5	0.915	-0.66	19.32	19.98	56.00	-36.68	QP
6	0.915	-10.00	9.98	19.98	46.00	-36.02	Average
7	1.289	-1.89	18.09	19.98	56.00	-37.91	QP
8	1.289	-9.85	10.13	19.98	46.00	-35.87	Average
9	2.030	-3.46	16.54	20.00	56.00	-39.46	QP
10	2.030	-10.90	9.10	20.00	46.00	-36.90	Average
11	3.408	-4.56	15.47	20.03	56.00	-40.53	QP
12	3.408	-12.20	7.83	20.03	46.00	-38.17	Average

Note1: Transmit mode

Note2:

Level = Read Level + Factor

Over Limit (Margin) = Level – Limit Line

Factor = (LISN, ISN, PLC or current probe) Factor + Cable Loss + Attenuator

7 FCC §15.209, §15.205, §15.247(d) – Spurious Emissions

7.1 Applicable Standard

As per FCC §15.35(d): Unless otherwise specified, on any frequency or frequencies above 1000 MHz, the radiated emission limits are based on the use of measurement instrumentation employing an average detector function. Unless otherwise specified, measurements above 1000 MHz shall be performed using a minimum resolution bandwidth of 1MHz.

As Per FCC §15.205(a) except as show in paragraph (d) of this section, only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	GHz
0.090-0.110	13.36-13.41	399.9-410	4.5-5.15
0.495-0.505	16.42-16.423	608-614	5.35-5.46
2.1735-2.1905	16.69475-16.69525	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

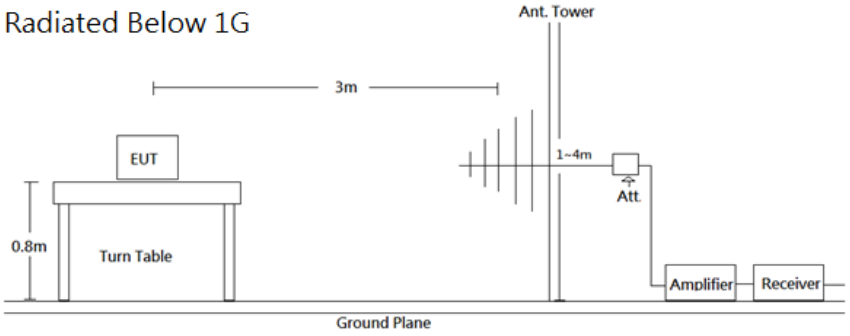
As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

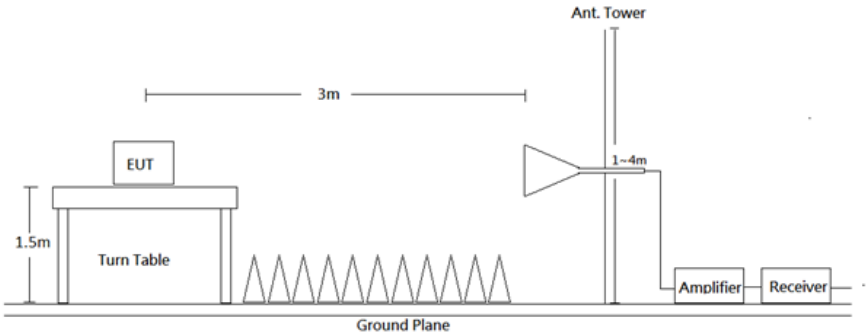
Frequency (MHz)	Field Strength (micro volts/meter)	Measurement Distance (meters)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100**	3
88 - 216	150**	3
216 - 960	200**	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

As per FCC §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 a radiated 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c).

7.2 EUT Setup and Test Procedure





Radiated emission tests were performed in the 3 meters chamber test site, using the setup accordance with the ANSI C63.10-2013. The specification used was the FCC Part 15.209 and FCC 15.247 Limits.

The system was investigated from 30 MHz to 26.5 GHz. During the radiated emission test, the EMI test receiver was set with the following configurations measurement method 6.3 in ANSI C63.10.

Frequency Range	RBW	VBW	Duty cycle	Measurement method
30-1000 MHz	120 kHz	/	-	QP
Above 1 GHz	1 MHz	3 MHz	-	PK
	1 MHz	10 Hz	>98%	Ave
	1 MHz	1/T	<98%	Ave

Maximizing procedure was performed on the highest emissions to ensure that the EUT complied with all installation combinations. All data was recorded in the Quasi-peak detector mode from 30 MHz to 1 GHz and PK and average detector modes for frequencies above 1 GHz.

7.3 Test Equipment List and Details

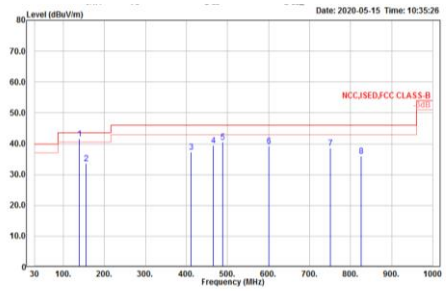
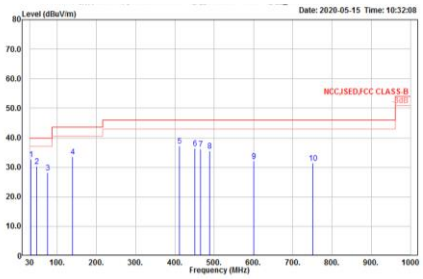
Description	Manufacture	Model	Serial No.	Cal. Date.	Cal. Due.
Radiation 3M Room (966A)					
Active Loop	EMCO	6502	0001-3322	2020/03/16	2021/03/15
Bilog Antenna/6 dB Attenuator	SUNOL SCIENCES & EMEC /EMCI	JB3/N-6-06	A111513/AT-N0668	2020/03/19	2021/03/18
Horn Antenna	ETS-Lindgren	3115	00109141	2019/07/05	2020/07/04
Horn Antenna	ETS-Lindgren	3160-09	00123852	2019/07/11	2020/07/10
Preamplifier	A.H. Systems	PAM-0118	470	2020/03/16	2021/03/15
Preamplifier	A.H. Systems	PAM-1840VH	174	2020/03/25	2021/03/24
Signal and Spectrum Analyzer	Rohde & Schwarz	FSV40	101456	2019/07/12	2020/07/11
Microflex Cable (1m)	EMCI	EMC106-SM-SM-2000	180515	2019/08/07	2020/08/06
Microflex Cable (2m)	MTJ	H0919	00000-MT28A-100	2019/08/07	2020/08/06
Microflex Cable (8m)	UTIFLEX	UFA210A-1-3149-300300	MFR 64639 232490-001	2019/08/07	2020/08/06
Turn Table	Chaintek	T-200-S-1	003501	N.C.R	N.C.R
Antenna Tower	Chaintek	MBD-400-1	003504	N.C.R	N.C.R
Controller	Chaintek	3000-1	003507	N.C.R	N.C.R
Software	Audix	e3 v9	E3LK-01	N.C.R	N.C.R
Conducted Room(TH-02)					
Signal Analyzer	Rohde & Schwarz	FSV40-N	102248	2019/09/11	2020/09/10
RF Cable	MTJ	MT40S	MT40S-001	Each Use	/

***Statement of Traceability:** The testing equipment's listed above have finished the calibration by Electronics Testing Center, Taiwan (ETC) or other laboratories which were accredited by TAF or equivalent organizations. The calibration result could be traceable to the International System of Units (SI).*

7.4 Test Result

Transmitting mode (Pre-scan with three orthogonal axis, and worse case as Y axis)

Below 1G (30 MHz-1 GHz) test the output power worst mode

Horizontal	Vertical
	

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	138.640	41.52	43.50	-1.98	61.40	-19.88	QP
2	155.130	33.52	43.50	-9.98	54.20	-20.68	Peak
3	412.180	37.22	46.00	-8.78	55.08	-17.86	Peak
4	465.530	39.47	46.00	-6.53	56.14	-16.67	Peak
5	487.840	40.61	46.00	-5.39	56.78	-16.17	Peak
6	600.360	39.21	46.00	-6.79	53.71	-14.50	Peak
7	750.710	38.69	46.00	-7.31	50.90	-12.21	Peak
8	825.400	35.91	46.00	-10.09	47.00	-11.09	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1	33.880	32.81	40.00	-7.19	44.65	-11.84	Peak
2	47.460	30.35	40.00	-9.65	52.45	-22.10	Peak
3	75.590	28.26	40.00	-11.74	52.88	-24.62	Peak
4	138.640	33.52	43.50	-9.98	53.40	-19.88	Peak
5	412.180	37.30	46.00	-8.70	55.16	-17.86	Peak
6	450.010	36.39	46.00	-9.61	53.40	-17.01	Peak
7	465.530	36.20	46.00	-9.80	52.87	-16.67	Peak
8	487.840	35.63	46.00	-10.37	51.80	-16.17	Peak
9	600.360	32.04	46.00	-13.96	46.54	-14.50	Peak
10	750.710	31.51	46.00	-14.49	43.72	-12.21	Peak

Note1: Transmit mode

Note2:

Level = Read Level + Factor

Over Limit = Level – Limit

Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported

Above 1G (1 GHz-26.5 GHz)

802.11b mode:

Low CH

Horizontal

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2383.808	39.61	54.00	-14.39	49.34	-9.73	Average
2383.808	52.75	74.00	-21.25	62.48	-9.73	Peak
2411.920	100.04	54.00			-9.65	Average
2411.920	103.21	74.00			-9.65	Peak
4824.000	50.55	54.00	-3.45	53.59	-3.04	Average
4824.000	52.83	74.00	-21.17	55.87	-3.04	Peak
7236.000	33.51	54.00	-20.49	29.69	3.82	Average
7236.000	48.11	74.00	-25.89	44.29	3.82	Peak

Vertical

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2383.248	36.49	54.00	-17.51	46.22	-9.73	Average
2383.248	50.47	74.00	-23.53	60.20	-9.73	Peak
2412.032	94.09	54.00			-9.65	Average
2412.032	97.33	74.00			-9.65	Peak
4824.000	53.11	54.00	-0.89	56.15	-3.04	Average
4824.000	54.87	74.00	-19.13	57.91	-3.04	Peak
7236.000	36.42	54.00	-17.58	32.60	3.82	Average
7236.000	48.77	74.00	-25.23	44.95	3.82	Peak

Middle CH

Horizontal

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2360.820	39.28	54.00	-14.72	49.09	-9.81	Average
2360.820	50.96	74.00	-23.04	60.77	-9.81	Peak
2437.050	98.34	54.00			-9.57	Average
2437.050	101.54	74.00			-9.57	Peak
2514.006	38.55	54.00	-15.45	47.85	-9.30	Average
2514.006	52.05	74.00	-21.95	61.35	-9.30	Peak
4874.000	51.49	54.00	-2.51	54.37	-2.88	Average
4874.000	53.64	74.00	-20.36	56.52	-2.88	Peak
7311.000	33.85	54.00	-20.15	29.87	3.98	Average
7311.000	47.47	74.00	-26.53	43.49	3.98	Peak

Vertical

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2384.052	36.46	54.00	-17.54	46.19	-9.73	Average
2384.052	49.92	74.00	-24.08	59.65	-9.73	Peak
2436.808	94.01	54.00			-9.57	Average
2436.808	97.17	74.00			-9.57	Peak
2539.416	37.17	54.00	-16.83	46.36	-9.19	Average
2539.416	50.85	74.00	-23.15	60.04	-9.19	Peak
4874.000	53.31	54.00	-0.69	56.19	-2.88	Average
4874.000	55.28	74.00	-18.72	58.16	-2.88	Peak
7311.000	34.63	54.00	-19.37	30.65	3.98	Average
7311.000	48.93	74.00	-25.07	44.95	3.98	Peak

High CH

Horizontal

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2461.900	99.09	54.00			-9.50	Average
2461.900	102.47	74.00			-9.50	Peak
2487.400	40.30	54.00	-13.70	49.71	-9.41	Average
2487.400	53.93	74.00	-20.07	63.34	-9.41	Peak
4924.000	52.70	54.00	-1.30	55.36	-2.66	Average
4924.000	54.53	74.00	-19.47	57.19	-2.66	Peak
7386.000	33.90	54.00	-20.10	29.78	4.12	Average
7386.000	47.70	74.00	-26.30	43.58	4.12	Peak

Vertical

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2461.900	92.21	54.00			-9.50	Average
2461.900	95.35	74.00			-9.50	Peak
2485.900	37.35	54.00	-16.65	46.77	-9.42	Average
2485.900	51.45	74.00	-22.55	60.87	-9.42	Peak
4924.000	53.29	54.00	-0.71	55.95	-2.66	Average
4924.000	55.11	74.00	-18.89	57.77	-2.66	Peak
7386.000	35.38	54.00	-18.62	31.26	4.12	Average
7386.000	48.56	74.00	-25.44	44.44	4.12	Peak

802.11g mode:

Low CH

Horizontal

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2389.632	53.09	54.00	-0.91	62.80	-9.71	Average
2389.632	70.92	74.00	-3.08	80.63	-9.71	Peak
2410.240	96.09	54.00			-9.66	Average
2410.240	106.49	74.00			-9.66	Peak
4824.000	47.23	54.00	-6.77	50.27	-3.04	Average
4824.000	58.60	74.00	-15.40	61.64	-3.04	Peak
7236.000	33.81	54.00	-20.19	29.99	3.82	Average
7236.000	48.44	74.00	-25.56	44.62	3.82	Peak

Vertical

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2389.968	44.77	54.00	-9.23	54.48	-9.71	Average
2389.968	60.69	74.00	-13.31	70.40	-9.71	Peak
2410.240	90.47	54.00			-9.66	Average
2410.240	100.65	74.00			-9.66	Peak
4824.000	49.94	54.00	-4.06	52.98	-3.04	Average
4824.000	59.68	74.00	-14.32	62.72	-3.04	Peak
7236.000	33.97	54.00	-20.03	30.15	3.82	Average
7236.000	48.97	74.00	-25.03	45.15	3.82	Peak

Middle CH

Horizontal

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2387.440	42.63	54.00	-11.37	52.35	-9.72	Average
2387.440	56.40	74.00	-17.60	66.12	-9.72	Peak
2442.616	99.02	54.00			-9.55	Average
2442.616	109.51	74.00			-9.55	Peak
2487.386	42.58	54.00	-11.42	51.99	-9.41	Average
2487.386	58.26	74.00	-15.74	67.67	-9.41	Peak
4874.000	50.73	54.00	-3.27	53.61	-2.88	Average
4874.000	63.62	74.00	-10.38	66.50	-2.88	Peak
7311.000	39.59	54.00	-14.41	35.61	3.98	Average
7311.000	54.81	74.00	-19.19	50.83	3.98	Peak

Vertical

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2389.376	38.48	54.00	-15.52	48.19	-9.71	Average
2389.376	50.96	74.00	-23.04	60.67	-9.71	Peak
2442.858	94.84	54.00			-9.55	Average
2442.858	105.18	74.00			-9.55	Peak
2487.628	38.86	54.00	-15.14	48.26	-9.40	Average
2487.628	54.80	74.00	-19.20	64.20	-9.40	Peak
4874.000	53.19	54.00	-0.81	56.07	-2.88	Average
4874.000	64.93	74.00	-9.07	67.81	-2.88	Peak
7311.000	41.90	54.00	-12.10	37.92	3.98	Average
7311.000	57.63	74.00	-16.37	53.65	3.98	Peak

High CH

Horizontal

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2467.700	96.43	54.00			-9.47	Average
2467.700	107.21	74.00			-9.47	Peak
2483.500	51.37	54.00	-2.63	60.79	-9.42	Average
2483.500	73.03	74.00	-0.97	82.45	-9.42	Peak
4924.000	45.16	54.00	-8.84	47.82	-2.66	Average
4924.000	57.65	74.00	-16.35	60.31	-2.66	Peak
7386.000	34.78	54.00	-19.22	30.66	4.12	Average
7386.000	48.74	74.00	-25.26	44.62	4.12	Peak

Vertical

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2467.800	90.77	54.00			-9.47	Average
2467.800	101.63	74.00			-9.47	Peak
2483.500	42.07	54.00	-11.93	51.49	-9.42	Average
2483.500	59.68	74.00	-14.32	69.10	-9.42	Peak
4924.000	51.54	54.00	-2.46	54.20	-2.66	Average
4924.000	58.67	74.00	-15.33	61.33	-2.66	Peak
7386.000	34.50	54.00	-19.50	30.38	4.12	Average
7386.000	47.79	74.00	-26.21	43.67	4.12	Peak

802.11n HT20 mode:

Low CH

Horizontal

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2389.968	53.07	54.00	-0.93	62.78	-9.71	Average
2389.968	72.53	74.00	-1.47	82.24	-9.71	Peak
2408.560	95.39	54.00			-9.66	Average
2408.560	105.35	74.00			-9.66	Peak
4824.000	45.61	54.00	-8.39	48.65	-3.04	Average
4824.000	57.61	74.00	-16.39	60.65	-3.04	Peak
7236.000	34.31	54.00	-19.69	30.49	3.82	Average
7236.000	48.91	74.00	-25.09	45.09	3.82	Peak

Vertical

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2389.968	44.04	54.00	-9.96	53.75	-9.71	Average
2389.968	63.48	74.00	-10.52	73.19	-9.71	Peak
2409.232	89.23	54.00			-9.66	Average
2409.232	99.30	74.00			-9.66	Peak
4824.000	49.56	54.00	-4.44	52.60	-3.04	Average
4824.000	60.06	74.00	-13.94	63.10	-3.04	Peak
7236.000	33.76	54.00	-20.24	29.94	3.82	Average
7236.000	48.74	74.00	-25.26	44.92	3.82	Peak

Middle CH

Horizontal

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2382.842	42.37	54.00	-11.63	52.10	-9.73	Average
2382.842	57.66	74.00	-16.34	67.39	-9.73	Peak
2441.164	98.68	54.00			-9.56	Average
2441.164	108.74	74.00			-9.56	Peak
2485.934	42.61	54.00	-11.39	52.03	-9.42	Average
2485.934	58.37	74.00	-15.63	67.79	-9.42	Peak
4874.000	50.33	54.00	-3.67	53.21	-2.88	Average
4874.000	65.03	74.00	-8.97	67.91	-2.88	Peak
7311.000	40.62	54.00	-13.38	36.64	3.98	Average
7311.000	56.18	74.00	-17.82	52.20	3.98	Peak

Vertical

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2383.568	38.39	54.00	-15.61	48.12	-9.73	Average
2383.568	51.03	74.00	-22.97	60.76	-9.73	Peak
2441.164	94.75	54.00			-9.56	Average
2441.164	104.82	74.00			-9.56	Peak
2487.628	39.15	54.00	-14.85	48.55	-9.40	Average
2487.628	54.51	74.00	-19.49	63.91	-9.40	Peak
4874.000	52.97	54.00	-1.03	55.85	-2.88	Average
4874.000	67.12	74.00	-6.88	70.00	-2.88	Peak
7311.000	43.18	54.00	-10.82	39.20	3.98	Average
7311.000	59.30	74.00	-14.70	55.32	3.98	Peak

High CH

Horizontal

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2466.700	95.11	54.00			-9.48	Average
2466.700	105.47	74.00			-9.48	Peak
2483.600	50.49	54.00	-3.51	59.91	-9.42	Average
2483.600	73.57	74.00	-0.43	82.99	-9.42	Peak
4924.000	45.05	54.00	-8.95	47.71	-2.66	Average
4924.000	51.71	74.00	-22.29	54.37	-2.66	Peak
7386.000	34.19	54.00	-19.81	30.07	4.12	Average
7386.000	47.81	74.00	-26.19	43.69	4.12	Peak

Vertical

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2455.400	89.20	54.00			-9.51	Average
2455.400	99.45	74.00			-9.51	Peak
2483.500	40.43	54.00	-13.57	49.85	-9.42	Average
2483.500	61.58	74.00	-12.42	71.00	-9.42	Peak
4924.000	49.73	54.00	-4.27	52.39	-2.66	Average
4924.000	56.87	74.00	-17.13	59.53	-2.66	Peak
7386.000	33.75	54.00	-20.25	29.63	4.12	Average
7386.000	48.36	74.00	-25.64	44.24	4.12	Peak

802.11n HT40 mode:

Low CH

Horizontal

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2388.012	53.25	54.00	-0.75	62.96	-9.71	Average
2388.012	69.21	74.00	-4.79	78.92	-9.71	Peak
2418.900	90.48	54.00			-9.62	Average
2418.900	101.46	74.00			-9.62	Peak
4844.000	45.88	54.00	-8.12	48.85	-2.97	Average
4844.000	53.24	74.00	-20.76	56.21	-2.97	Peak
7266.000	33.83	54.00	-20.17	29.93	3.90	Average
7266.000	48.02	74.00	-25.98	44.12	3.90	Peak

Vertical

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2388.012	46.81	54.00	-7.19	56.52	-9.71	Average
2388.012	63.58	74.00	-10.42	73.29	-9.71	Peak
2418.900	87.21	54.00			-9.62	Average
2418.900	98.29	74.00			-9.62	Peak
4844.000	49.86	54.00	-4.14	52.83	-2.97	Average
4844.000	55.75	74.00	-18.25	58.72	-2.97	Peak
7266.000	33.71	54.00	-20.29	29.81	3.90	Average
7266.000	47.63	74.00	-26.37	43.73	3.90	Peak

Middle CH

Horizontal

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2388.892	50.69	54.00	-3.31	60.40	-9.71	Average
2388.892	66.02	74.00	-7.98	75.73	-9.71	Peak
2445.762	93.83	54.00			-9.54	Average
2445.762	104.58	74.00			-9.54	Peak
2483.998	53.21	54.00	-0.79	62.63	-9.42	Average
2483.998	70.35	74.00	-3.65	79.77	-9.42	Peak
4874.000	46.44	54.00	-7.56	49.32	-2.88	Average
4874.000	57.54	74.00	-16.46	60.42	-2.88	Peak
7311.000	33.37	54.00	-20.63	29.39	3.98	Average
7311.000	48.20	74.00	-25.80	44.22	3.98	Peak

Vertical

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2389.134	43.51	54.00	-10.49	53.22	-9.71	Average
2389.134	58.24	74.00	-15.76	67.95	-9.71	Peak
2445.762	90.30	54.00			-9.54	Average
2445.762	100.89	74.00			-9.54	Peak
2484.240	44.83	54.00	-9.17	54.25	-9.42	Average
2484.240	61.42	74.00	-12.58	70.84	-9.42	Peak
4874.000	50.74	54.00	-3.26	53.62	-2.88	Average
4874.000	60.05	74.00	-13.95	62.93	-2.88	Peak
7311.000	37.58	54.00	-16.42	33.60	3.98	Average
7311.000	52.51	74.00	-21.49	48.53	3.98	Peak

High CH

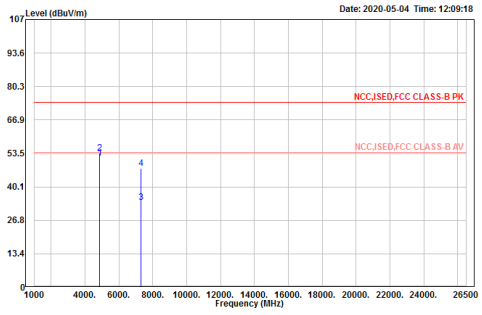
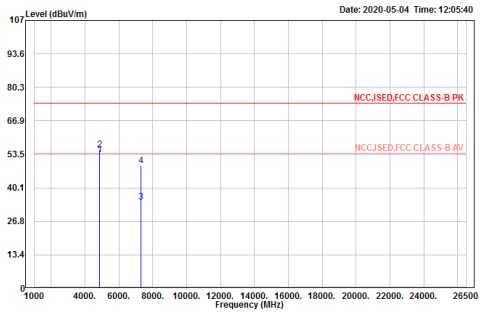
Horizontal

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2455.640	91.79	54.00			-9.51	Average
2455.640	102.02	74.00			-9.51	Peak
2484.680	53.60	54.00	-0.40	63.02	-9.42	Average
2484.680	69.90	74.00	-4.10	79.32	-9.42	Peak
4904.000	45.18	54.00	-8.82	47.94	-2.76	Average
4904.000	52.06	74.00	-21.94	54.82	-2.76	Peak
7356.000	34.33	54.00	-19.67	30.27	4.06	Average
7356.000	48.53	74.00	-25.47	44.47	4.06	Peak

Vertical

Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2444.240	87.40	54.00			-9.55	Average
2444.240	97.16	74.00			-9.55	Peak
2483.720	43.54	54.00	-10.46	52.96	-9.42	Average
2483.720	60.11	74.00	-13.89	69.53	-9.42	Peak
4904.000	52.98	54.00	-1.02	55.74	-2.76	Average
4904.000	55.90	74.00	-18.10	58.66	-2.76	Peak
7356.000	34.37	54.00	-19.63	30.31	4.06	Average
7356.000	49.06	74.00	-24.94	45.00	4.06	Peak

Above 1G (1 GHz-26.5 GHz): The worst mode: IEEE 802.11b Middle Channel

Horizontal	Vertical
	

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 !	4874.000	51.49	54.00	-2.51	54.37	-2.88	Average
2	4874.000	53.64	74.00	-20.36	56.52	-2.88	Peak
3	7311.000	33.85	54.00	-20.15	29.87	3.98	Average
4	7311.000	47.47	74.00	-26.53	43.49	3.98	Peak

	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
	MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
1 !	4874.000	53.31	54.00	-0.69	56.19	-2.88	Average
2 !	4874.000	55.28	74.00	-18.72	58.16	-2.88	Peak
3 !	7311.000	34.63	54.00	-19.37	30.65	3.98	Average
4	7311.000	48.93	74.00	-25.07	44.95	3.98	Peak

Note1: Transmit mode

Note2:

Level = Read Level + Factor

Over Limit = Level – Limit

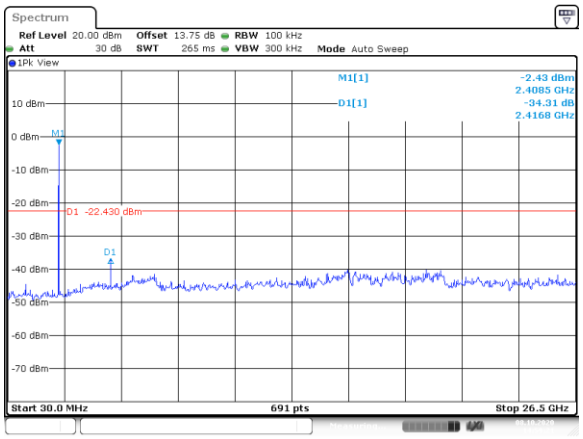
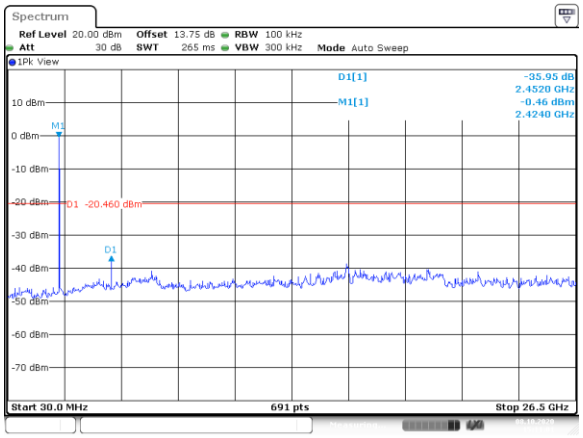
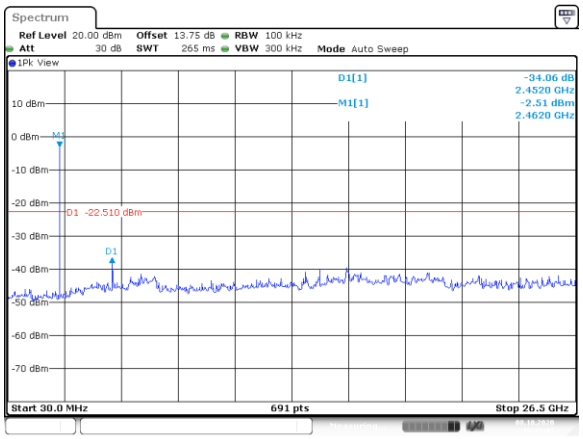
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

Spurious emissions more than 20 dB below the limit were not reported

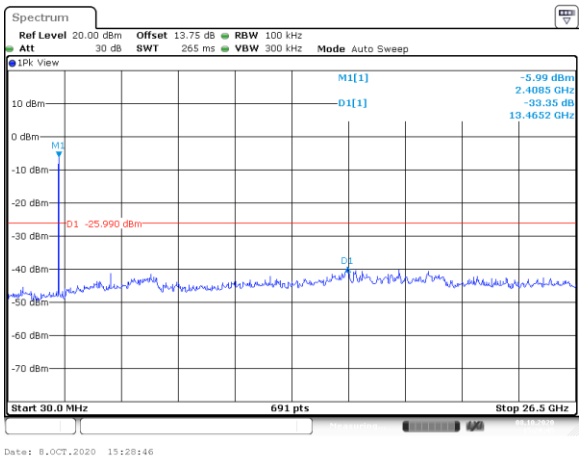
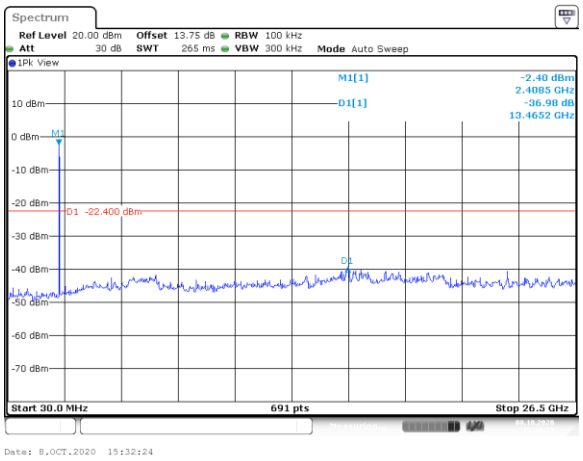
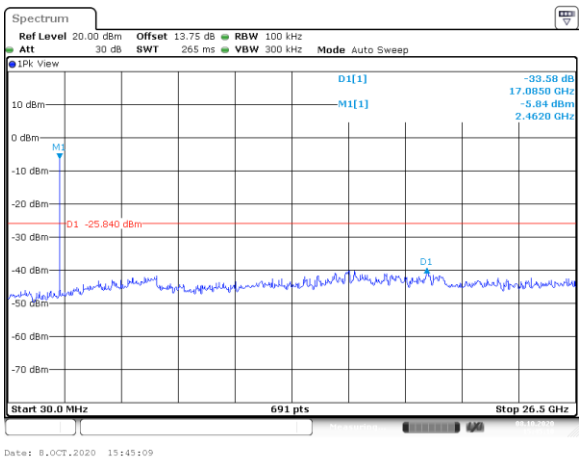
Conducted Spurious Emissions:

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
802.11b mode				
Low	2412	34.31	≥ 20	Compliance
Mid	2437	35.95	≥ 20	Compliance
High	2462	34.06	≥ 20	Compliance
802.11g mode				
Low	2412	33.35	≥ 20	Compliance
Mid	2437	36.98	≥ 20	Compliance
High	2462	33.58	≥ 20	Compliance
802.11n HT20 mode				
Low	2412	33.94	≥ 20	Compliance
Mid	2437	37.50	≥ 20	Compliance
High	2462	34.31	≥ 20	Compliance
802.11n HT40 mode				
Low	2422	32.70	≥ 20	Compliance
Mid	2437	23.16	≥ 20	Compliance
High	2452	30.25	≥ 20	Compliance

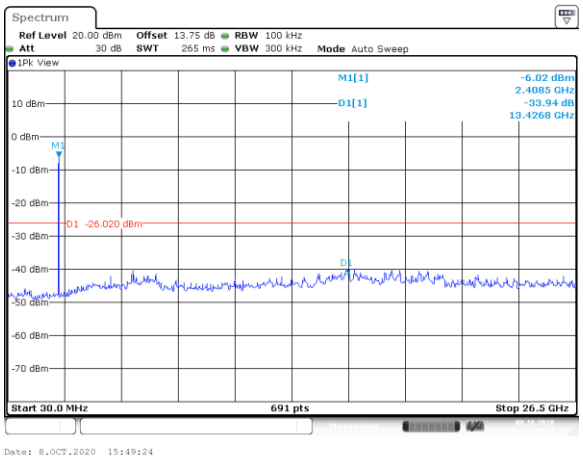
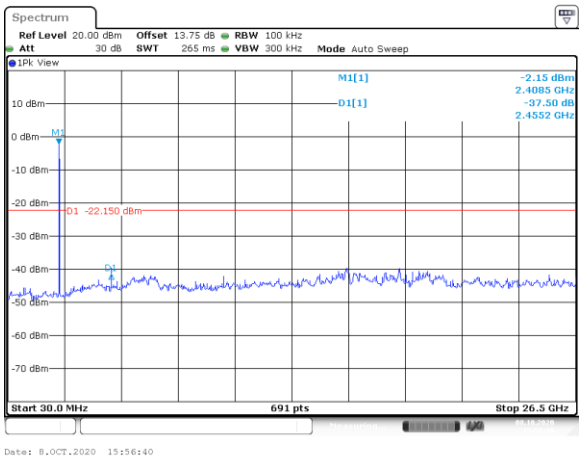
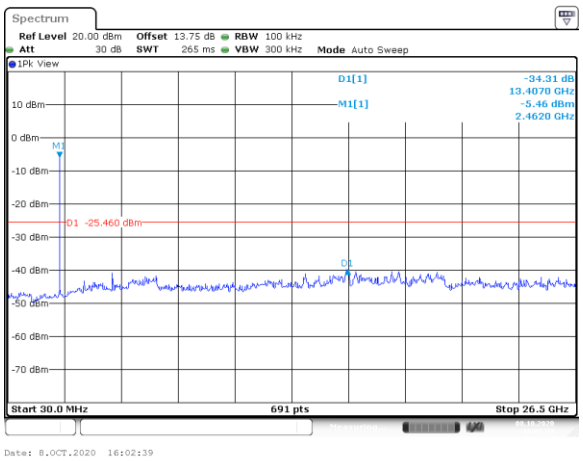
802.11b mode

Low CH	Middle CH
	
High CH	**-**
	-

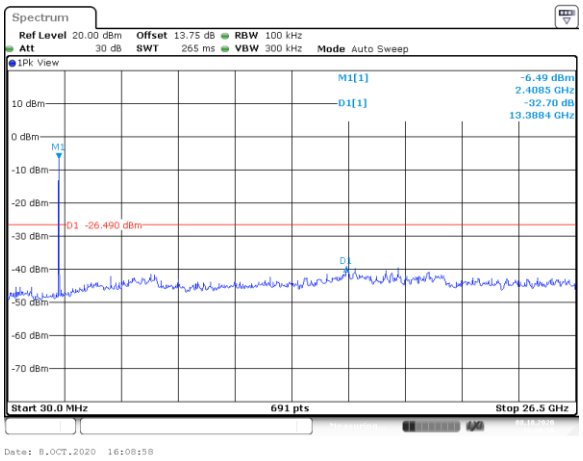
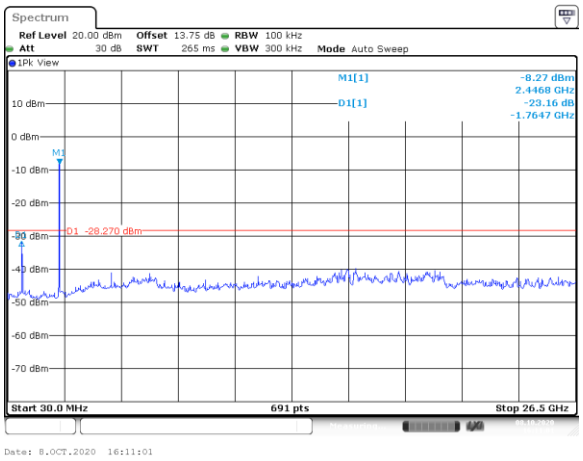
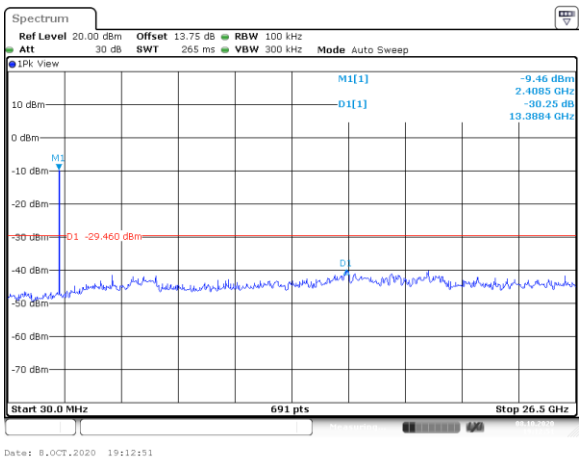
802.11g mode

Low CH	Middle CH
	
High CH	**-**
	-

802.11n HT20 mode:

Low CH	Middle CH
	
High CH	**-**
	-

802.11n HT40 Mode

Low CH	Middle CH
	
High CH	**-**
	-

8 FCC §15.247(a)(2) – 6 dB Emission Bandwidth

8.1 Applicable Standard

According to FCC §15.247(a) (2),

Systems using digital modulation techniques may operate in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

8.2 Test Procedure

According to ANSI C63.10-2013, the steps for the first option are as follows:

(1) Set RBW = 100 kHz. (2) Set the VBW ≥ [3 × RBW]. (3) Detector = peak. (4) Trace mode = max hold.

(5) Sweep = auto couple. (6) Allow the trace to stabilize. (7) Measure the maximum width of the emission that is constrained by the frequencies associated with the two outermost amplitude points (upper and lower frequencies) that are attenuated by 6 dB relative to the maximum level measured in the fundamental emission.

8.3 Test Equipment List and Details

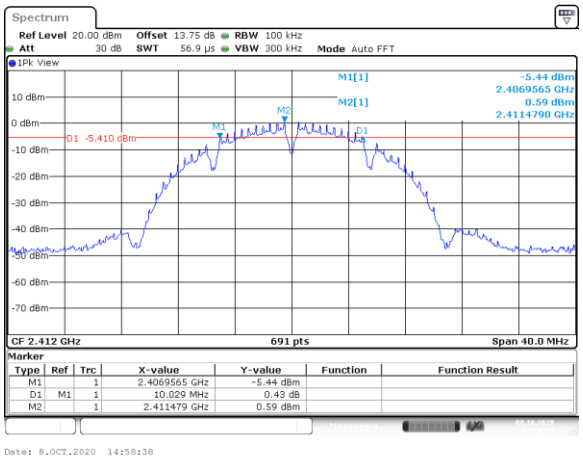
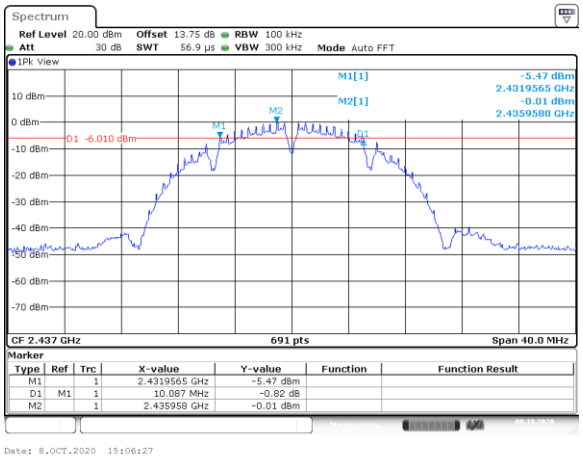
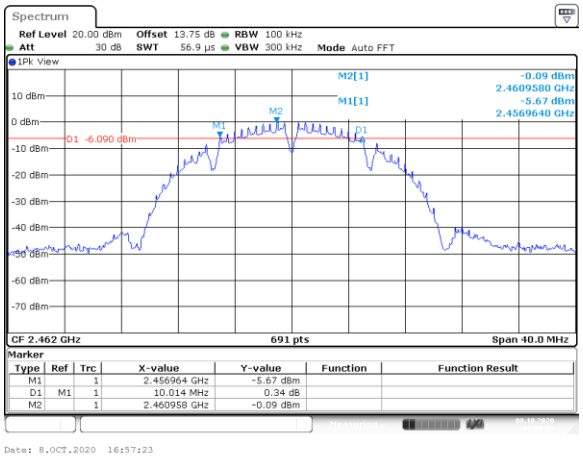
Description	Manufacture	Model	Serial No.	Cal. Date.	Cal. Due.
Conducted Room(TH-02)					
Signal Analyzer	Rohde & Schwarz	FSV40-N	102248	2019/09/11	2020/09/10
RF Cable	MTJ	MT40S	MT40S-001	Each Use	/

***Statement of Traceability:** The testing equipment's listed above have finished the calibration by Electronics Testing Center, Taiwan (ETC) or other laboratories which were accredited by TAF or equivalent organizations. The calibration result could be traceable to the International System of Units (SI).*

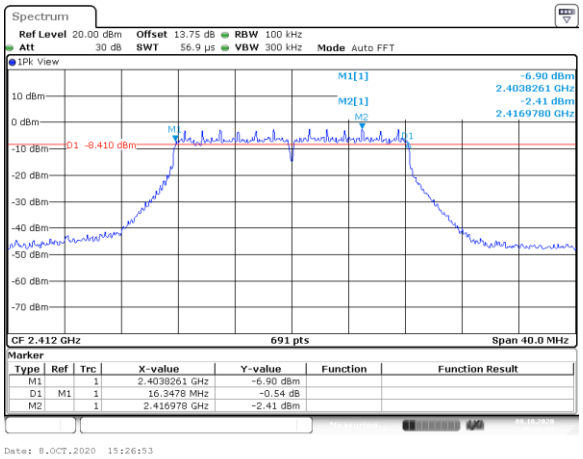
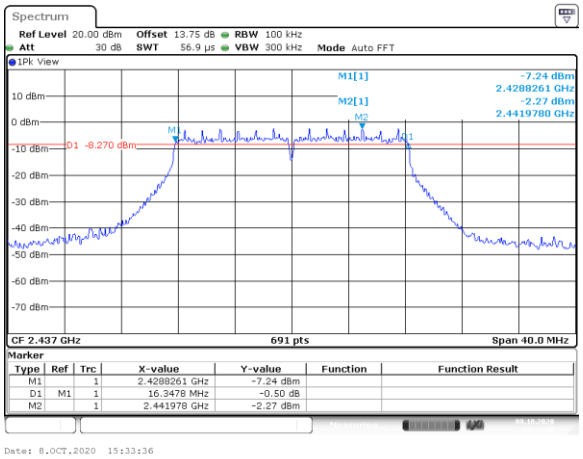
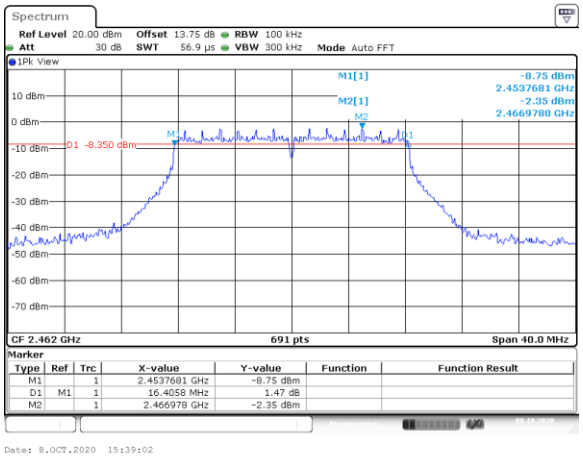
8.4 Test Results

Channel	Frequency (MHz)	6 dB BW (MHz)	6dB Limit (MHz)	Result
802.11b mode				
Low	2412	10.03	> 0.5	Compliance
Middle	2437	10.09	> 0.5	Compliance
High	2462	10.01	> 0.5	Compliance
802.11g mode				
Low	2412	16.35	> 0.5	Compliance
Middle	2437	16.35	> 0.5	Compliance
High	2462	16.41	> 0.5	Compliance
802.11n HT20 mode				
Low	2412	17.57	> 0.5	Compliance
Middle	2437	17.57	> 0.5	Compliance
High	2462	17.57	> 0.5	Compliance
802.11n HT40 mode				
Low	2422	35.25	> 0.5	Compliance
Middle	2437	35.36	> 0.5	Compliance
High	2452	35.13	> 0.5	Compliance

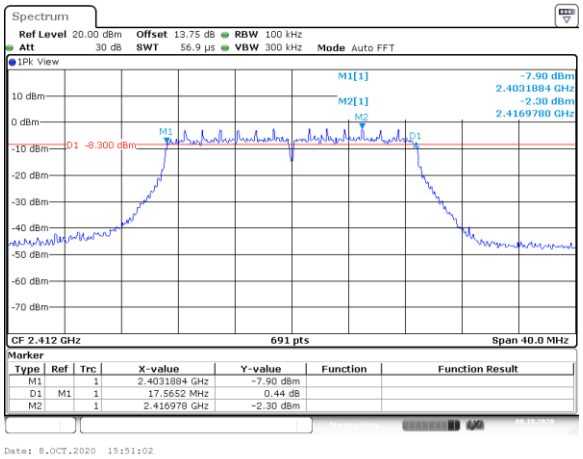
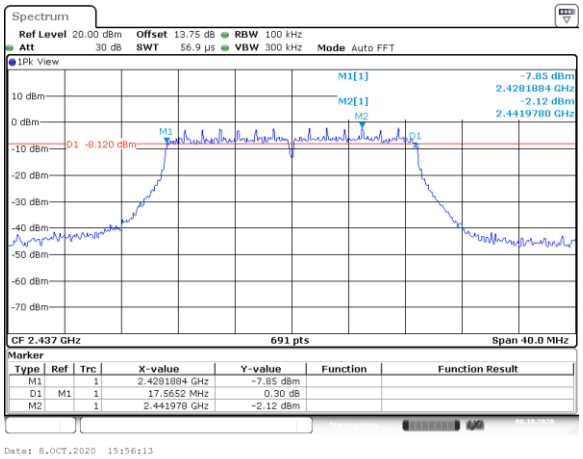
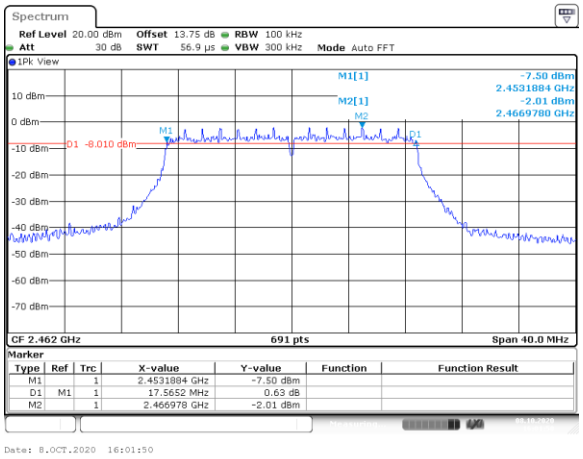
802.11b mode:

Low CH	Middle CH
	
High CH	**-**
	-

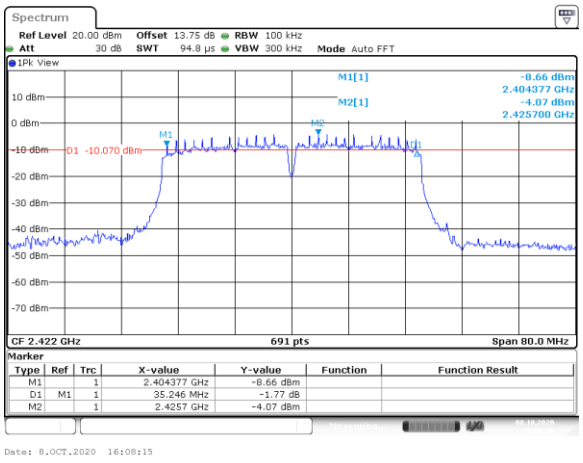
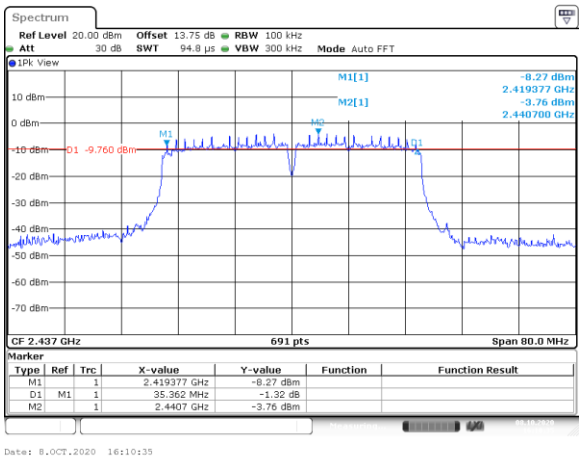
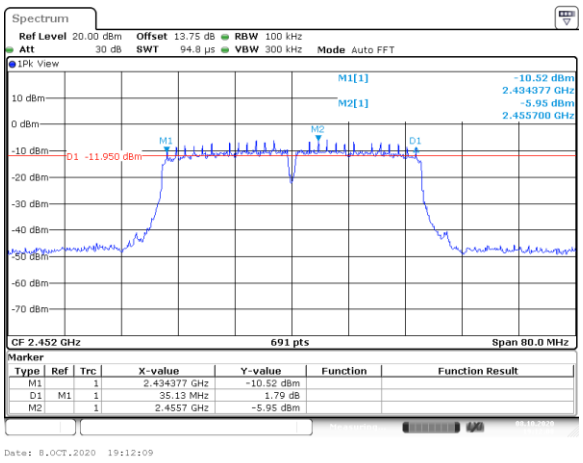
802.11g mode:

Low CH	Middle CH
	
High CH	**-**
	-

802.11n HT20 mode:

Low CH	Middle CH
	
High CH	**-**
	-

802.11n HT40 mode:

Low CH	Middle CH
	
High CH	**-**
	-

9 FCC §15.247(b) (3) – Maximum Output Power

9.1 Applicable Standard

According to FCC §15.247(b) (3),

Systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt.

As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power. Maximum Conducted Output Power is defined as the total transmit power delivered to all antennas and antenna elements averaged across all symbols in the signaling alphabet when the transmitter is operating at its maximum power control level. Power must be summed across all antennas and antenna elements. The average must not include any time intervals during which the transmitter is off or is transmitting at a reduced power level. If multiple modes of operation are possible (e.g., alternative modulation methods), the maximum conducted output power is the highest total transmit power occurring in any mode.

9.2 Test Procedure

(1) Place the EUT on a bench and set it in transmitting mode.

(2) Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to measuring equipment.

(3). Add a correction factor to the display.

9.3 Test Equipment List and Details

Description	Manufacture	Model	Serial No.	Cal. Date.	Cal. Due.
Conducted Room(TH-02)					
Signal Analyzer	Rohde & Schwarz	FSV40-N	102248	2019/09/11	2020/09/10
RF Cable	MTJ	MT40S	MT40S-001	Each Use	/
USB Wideband Power Sensor	Agilent	U2021XA	MY56120026	2019/09/06	2020/09/05

***Statement of Traceability:** The testing equipment's listed above have finished the calibration by Electronics Testing Center, Taiwan (ETC) or other laboratories which were accredited by TAF or equivalent organizations. The calibration result could be traceable to the International System of Units (SI).*

9.4 Test Results

Channel	Frequency (MHz)	Maximum Peak Output Power (dBm)	Maximum Peak Output Power (W)	Limit (dBm)	Result
802.11b mode:					
Low	2412	12.07	0.0161	30	Compliance
Middle	2437	12.13	0.0163	30	Compliance
High	2462	12.26	0.0168	30	Compliance
802.11g mode:					
Low	2412	19.92	0.0982	30	Compliance
Middle	2437	19.04	0.0802	30	Compliance
High	2462	20.24	0.1057	30	Compliance
802.11n HT20 mode:					
Low	2412	19.54	0.0899	30	Compliance
Middle	2437	19.39	0.0869	30	Compliance
High	2462	18.75	0.0750	30	Compliance
802.11n HT40 mode:					
Low	2422	18.36	0.0685	30	Compliance
Middle	2437	19.02	0.0798	30	Compliance
High	2452	18.32	0.0679	30	Compliance

Channel	Frequency (MHz)	Average Output Power (dBm)	Average Output Power (W)	Limit (dBm)	Result
802.11b mode:					
Low	2412	9.96	0.0099	30	Compliance
Middle	2437	9.93	0.0098	30	Compliance
High	2462	10.09	0.0102	30	Compliance
802.11g mode:					
Low	2412	9.77	0.0095	30	Compliance
Middle	2437	9.78	0.0095	30	Compliance
High	2462	9.65	0.0092	30	Compliance
802.11n HT20 mode:					
Low	2412	9.57	0.0091	30	Compliance
Middle	2437	9.72	0.0094	30	Compliance
High	2462	9.52	0.0090	30	Compliance
802.11n HT40 mode:					
Low	2422	9.50	0.0089	30	Compliance
Middle	2437	9.33	0.0086	30	Compliance
High	2452	9.26	0.0084	30	Compliance

10 FCC §15.247(d) – 100 kHz Bandwidth of Frequency Band Edge

10.1 Applicable Standard

According to FCC §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 a radiated 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, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB.

Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

10.2 Test Procedure

(1) Check the calibration of the measuring instrument using either an internal calibrator or a known signal from an external generator.
(2) Position the EUT without connection to measurement instrument. Turn on the EUT and connect its antenna terminal to measurement instrument via a low loss cable. Then set it to any one measured frequency within its operating range, and make sure the instrument is operated in its linear range.
(3) Set RBW to 100 kHz and VBW of spectrum analyzer to 300 kHz with a convenient frequency span including 100 kHz bandwidth from band edge.
(4) Measure the highest amplitude appearing on spectral display and set it as a reference level. Plot the graph with marking the highest point and edge frequency.

10.3 Test Equipment List and Details

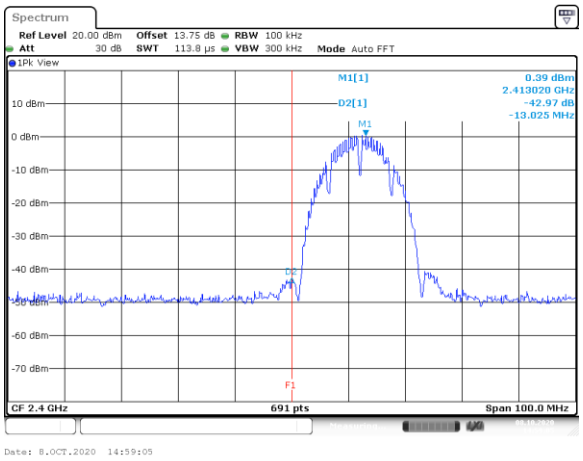
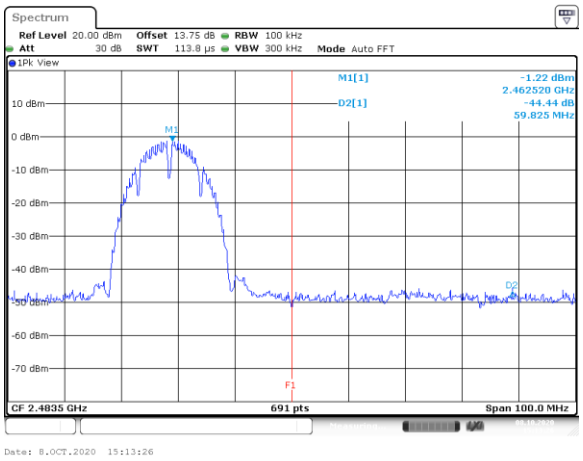
Description	Manufacture	Model	Serial No.	Cal. Date.	Cal. Due.
Conducted Room(TH-02)					
Signal Analyzer	Rohde & Schwarz	FSV40-N	102248	2019/09/11	2020/09/10
RF Cable	MTJ	MT40S	MT40S-001	Each Use	/

***Statement of Traceability:** The testing equipment's listed above have finished the calibration by Electronics Testing Center, Taiwan (ETC) or other laboratories which were accredited by TAF or equivalent organizations. The calibration result could be traceable to the International System of Units (SI).*

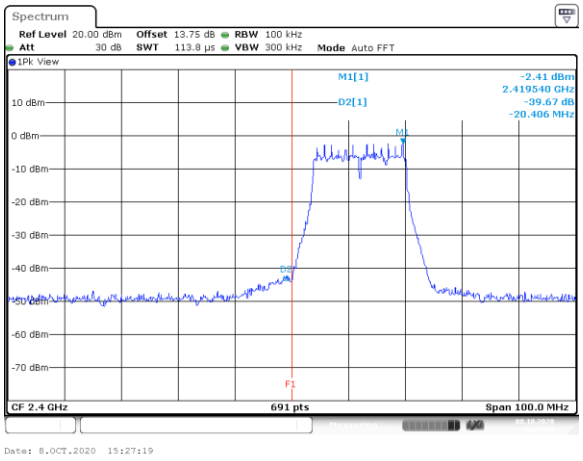
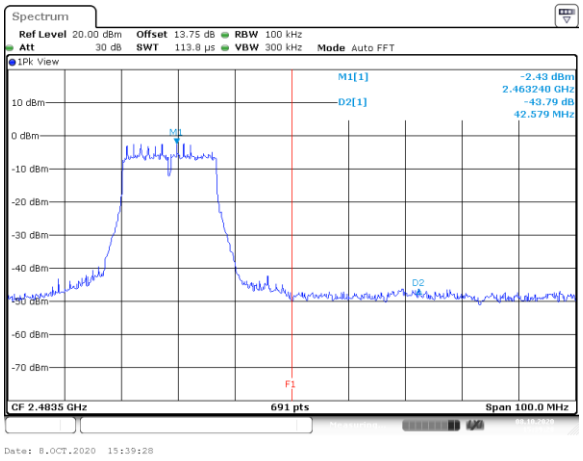
10.4 Test Results

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
802.11b mode				
Low	2412	42.97	≥ 20	Compliance
High	2462	44.44	≥ 20	Compliance
802.11g mode				
Low	2412	39.67	≥ 20	Compliance
High	2462	43.79	≥ 20	Compliance
802.11n HT20 mode				
Low	2412	38.16	≥ 20	Compliance
High	2462	42.70	≥ 20	Compliance
802.11n HT40 mode				
Low	2422	37.49	≥ 20	Compliance
High	2452	39.43	≥ 20	Compliance

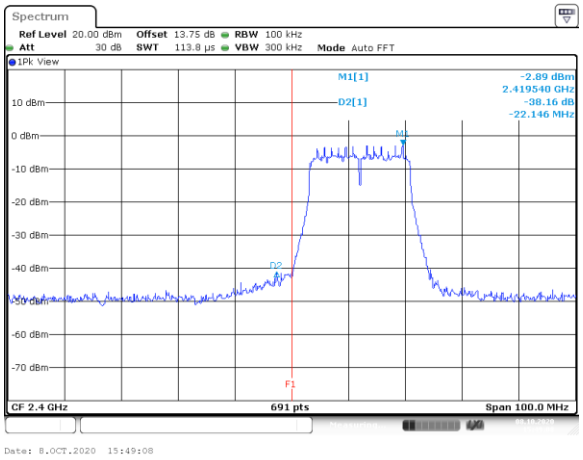
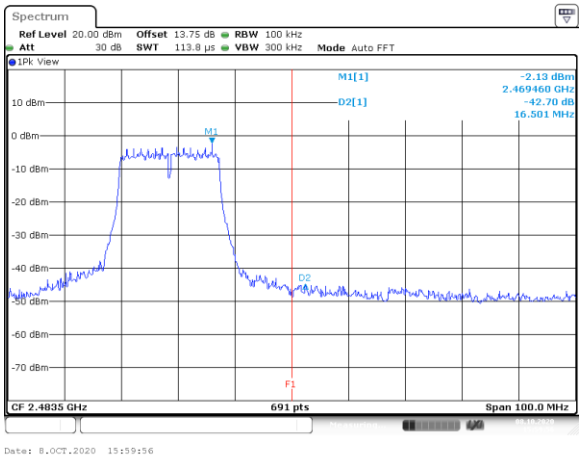
802.11b mode:

Left Side	Right Side
	

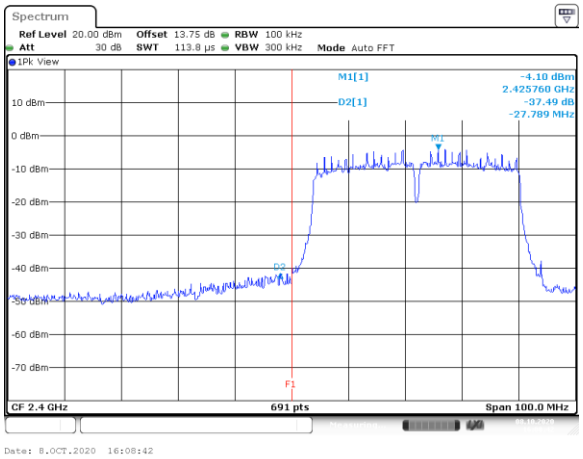
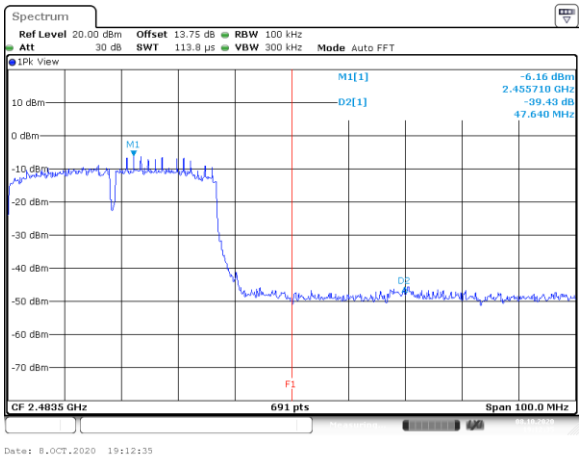
802.11g mode:

Left Side	Right Side
	

802.11n HT20 mode:

Left Side	Right Side
	

802.11n HT40 mode:

Left Side	Right Side
	

11 FCC §15.247(e) – Power Spectral Density

11.1 Applicable Standard

According to FCC §15.247(e),

For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission. This power spectral density shall be determined in accordance with the provisions of paragraph (b) of this section. The same method of determining the conducted output power shall be used to determine the power spectral density.

11.2 Test Procedure

According to ANSI C63.10-2013,

(1) Set analyzer center frequency to DTS channel center frequency.

(2) Set the span to 1.5 times the DTS bandwidth. (3) Set the RBW to 3 kHz ≤ RBW ≤ 100 kHz.

(4) Set the VBW ≥ [3 × RBW]. (5) Detector = peak. (6) Sweep time = auto couple.

(7) Trace mode = max hold. (8) Allow trace to fully stabilize.

(9) Use the peak marker function to determine the maximum amplitude level within the RBW.

(10) If measured value exceeds requirement, then reduce RBW (but no less than 3 kHz) and repeat.

11.3 Test Equipment List and Details

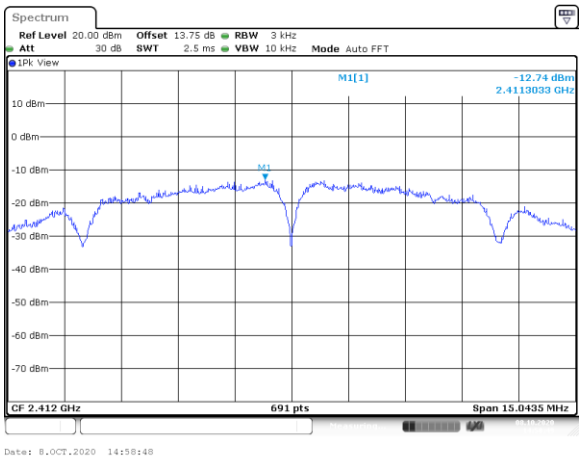
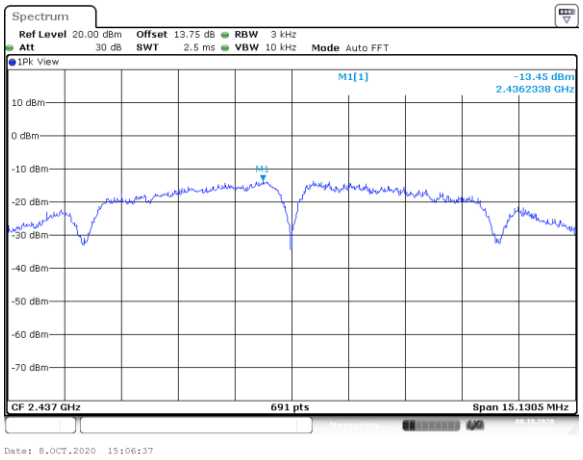
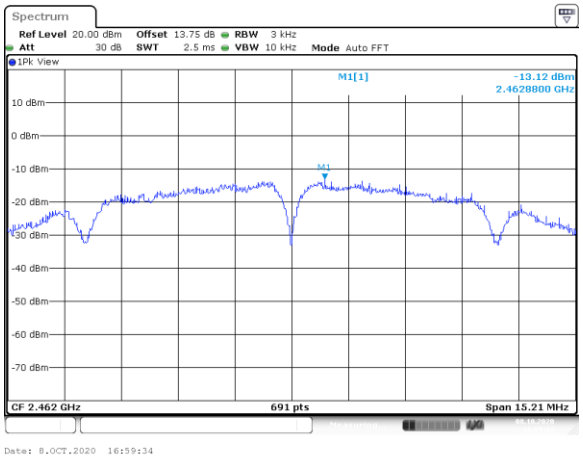
Description	Manufacture	Model	Serial No.	Cal. Date.	Cal. Due.
Conducted Room(TH-02)					
Signal Analyzer	Rohde & Schwarz	FSV40-N	102248	2019/09/11	2020/09/10
RF Cable	MTJ	MT40S	MT40S-001	Each Use	/

***Statement of Traceability:** The testing equipment's listed above have finished the calibration by Electronics Testing Center, Taiwan (ETC) or other laboratories which were accredited by TAF or equivalent organizations. The calibration result could be traceable to the International System of Units (SI).*

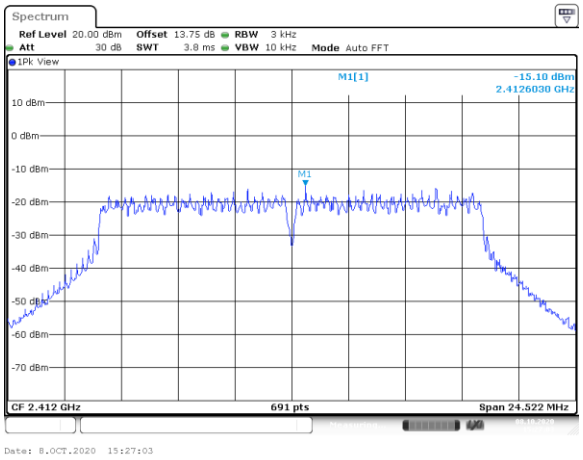
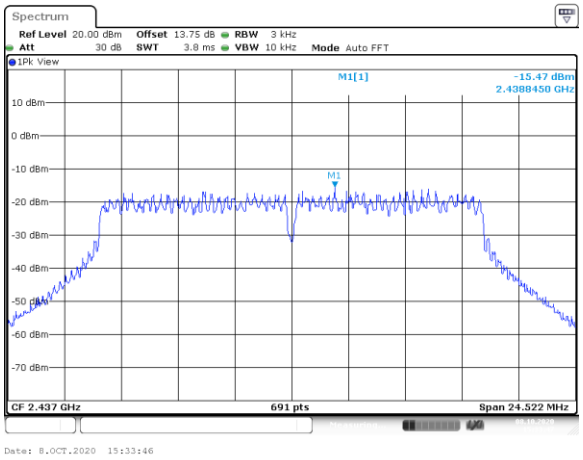
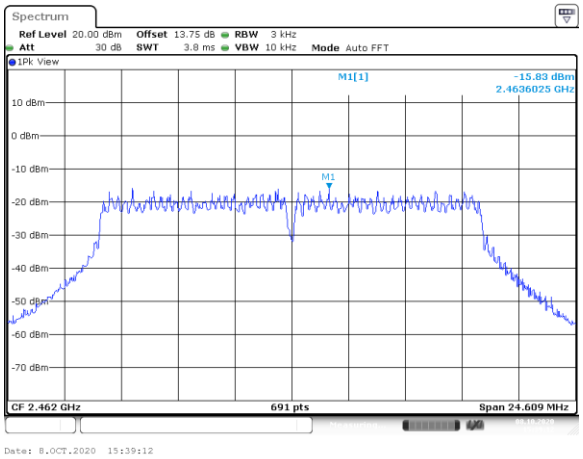
11.4 Test Results

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Result
802.11b mode				
Low	2412	-12.74	8	Compliance
Middle	2437	-13.45	8	Compliance
High	2462	-13.12	8	Compliance
802.11g mode				
Low	2412	-15.10	8	Compliance
Middle	2437	-15.47	8	Compliance
High	2462	-15.83	8	Compliance
802.11n HT20 mode				
Low	2412	-15.85	8	Compliance
Middle	2437	-15.72	8	Compliance
High	2462	-15.65	8	Compliance
802.11n HT40 mode				
Low	2422	-18.97	8	Compliance
Middle	2437	-16.77	8	Compliance
High	2452	-20.06	8	Compliance

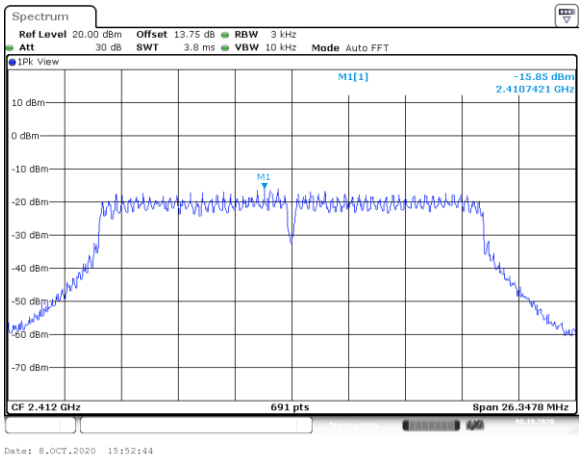
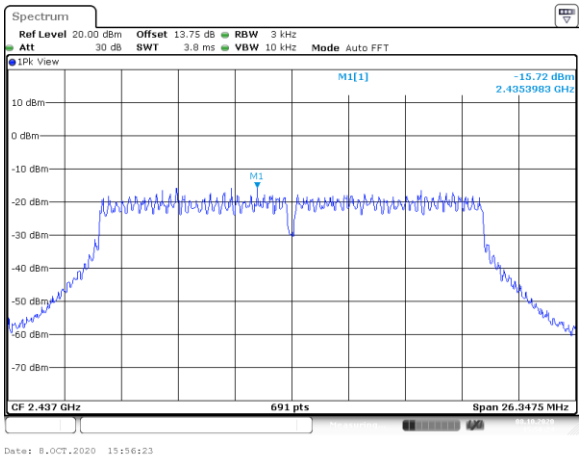
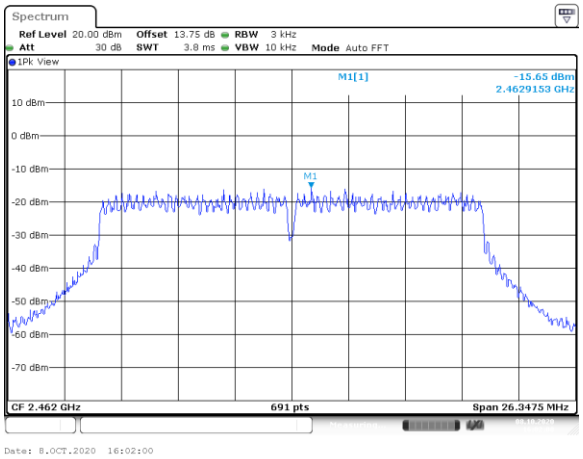
802.11b mode:

Low CH	Middle CH
	
High CH	**-**
	-

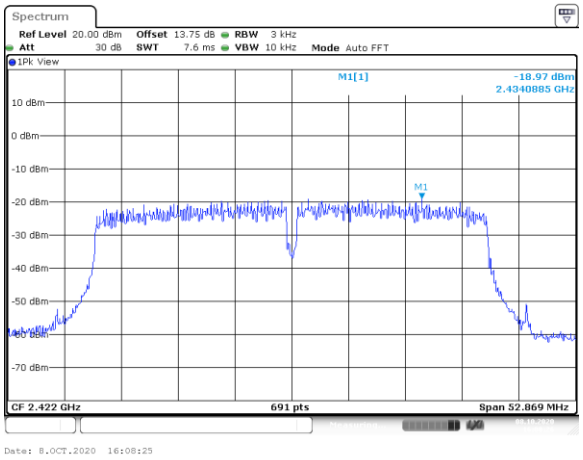
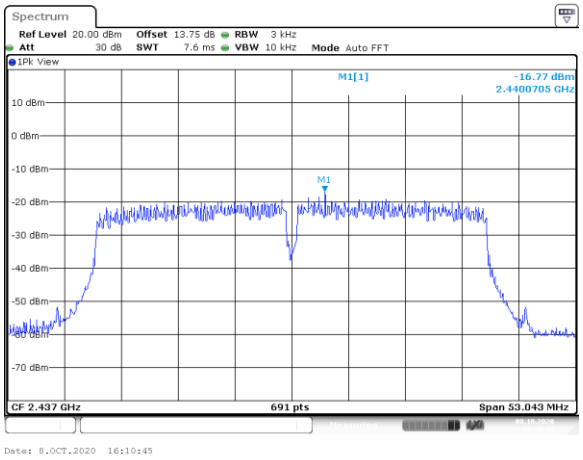
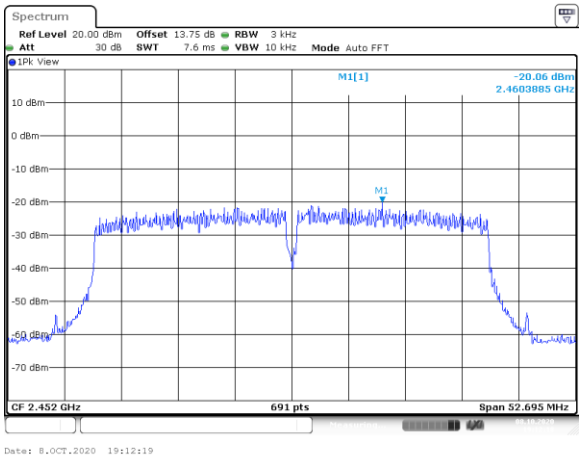
802.11g mode:

Low CH	Middle CH
	
High CH	**-**
	-

802.11n HT20 mode:

Low CH	Middle CH
	
High CH	**-**
	-

802.11n HT40 mode:

Low CH	Middle CH
	
High CH	**-**
	-

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