



FCC Part 15.247

TEST REPORT

For

Datahoist, Inc.

8920 Business Park Drive #250, AUSTIN, TX 78759 USA

FCC ID: 2AR8LSOTL5LTE

Report Type Original Report	Product Type: Elevator IOT Machine
Report Producer :	Himiko Chen <i>Himiko Chen</i>
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Note: This test report is prepared for the customer shown above and for the device described herein. It may not be duplicated or used in part without prior written consent from Bay Area Compliance Laboratories Corp. (Taiwan)

Revision History

Revision	Report Number	Issue Date	Description	Author/Revised by
1.0	RLK181206004-01-00B	2019/04/15	Original Report	Himiko Chen

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1 General Information

1.1 Product Description for Equipment under Test (EUT)

Applicant	Datahoist, Inc. 8920 Business Park Drive #250, AUSTIN, TX 78759 USA
Manufacturer	AAEON Technology Inc. 5F, No. 135, Lane 235, Pao Chiao Rd., Hsin-Tien Dist., New Taipei City 23145, Taiwan, R.O.C
Brand(Trade) Name	
Product (Equipment)	Elevator IOT Machine
Model Name	SOTL5-lte
Series Model Name	xSOTL5x (x - Where x may be any combination of alphanumeric characters or "-" or blank.)
EUT Function	IEEE 802.11 b/g/n HT20 + BT4.1
Frequency Range	IEEE 802.11 b/g/n HT20 mode: 2412 ~ 2462 MHz BLE mode : 2402 ~ 2480 MHz
Number of Channels	IEEE 802.11 b/g/n HT20/HT40 mode: 11 Channels BLE mode : 40 Channels
Output Power	IEEE 802.11b mode: 16.63 dBm (0.0460 W) IEEE 802.11g mode: 22.50 dBm (0.1778 W) IEEE 802.11n HT20 mode: 22.46 dBm (0.1761 W) BLE mode: 5.47 dBm (0.0035 W)
Received Date	Dec. 06, 2018.
Date of Test	Jan. 19, 2019 ~ Apr. 15, 2019
Modulation Type	IEEE 802.11b mode: DSSS IEEE 802.11g/n HT 20 mode: OFDM BLE mode : GFSK
Related Submittal(s)/Grant(s)	FCC Part 15.247 DSS with FCC ID : 2AR8LSOTL5LTE FCC Part 24E/27 PCB with FCC ID : 2AR8LSOTL5LTE

*All measurement and test data in this report was gathered from production sample serial number: 181206004-01 (Assigned by BACL, Taiwan).

1.2 Operation Condition of EUT

Power Operation (Voltage Range)	☒ AC 120V/60Hz ☐ Adapter ☒ By Power Cord. <i>Brand Name: MW</i> <i>Model: IRM-30-12</i> <i>I/P: 100-240Vac,0.75A</i> <i>O/P: 12Vdc,2.5A</i>
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1.3 Objective and Test Methodology

The Objective of this Test Report was to document the compliance of the Datahoist, Inc. Appliance (Model: SOTL5-lte; xSOTL5x (x - Where x may be any combination of alphanumeric characters or "-" or blank.)) 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 the 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	± 0.55 dB
Occupied Channel Bandwidth	± 4.45 %
RF Conducted test with Spectrum	± 1.45 dB
AC Power Line Conducted Emission	± 4.64 dB
Radiated Below 1G	± 5.83 dB
Radiated Above 1G-18G	± 5.35 dB
Radiated Above 18G-40G	± 4.49 dB

1.5 Test Facility

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

☒ 70, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

☒ 68-3, Lane 169, Sec. 2, Datong Road, Xizhi Dist., New Taipei City 22183, Taiwan, R.O.C.

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.: 974454. Designation No.: TW3180

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 BLE, there are totally 40 channels.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	20	2442
1	2404	--	--
2	2406	--	--
3	2408	37	2476
--	--	38	2478
19	2440	39	2480

For BLE: Channel 0, 19 and 39 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 data rates bandwidths, and modulations.

Radiated below 1G were tested worst output power mode.

Modulation Used for Conformance Test			
Configuration	NTX	Data Rate	Worst Data Rate
802.11b mode	1	1-11 Mbps	1 Mbps
802.11g mode	1	6-54 Mbps	6 Mbps
802.11n HT 20 mode	1	MCS 0-7	MCS 0
BLE mode	1	125 kbps-1 Mbps	1 Mbps

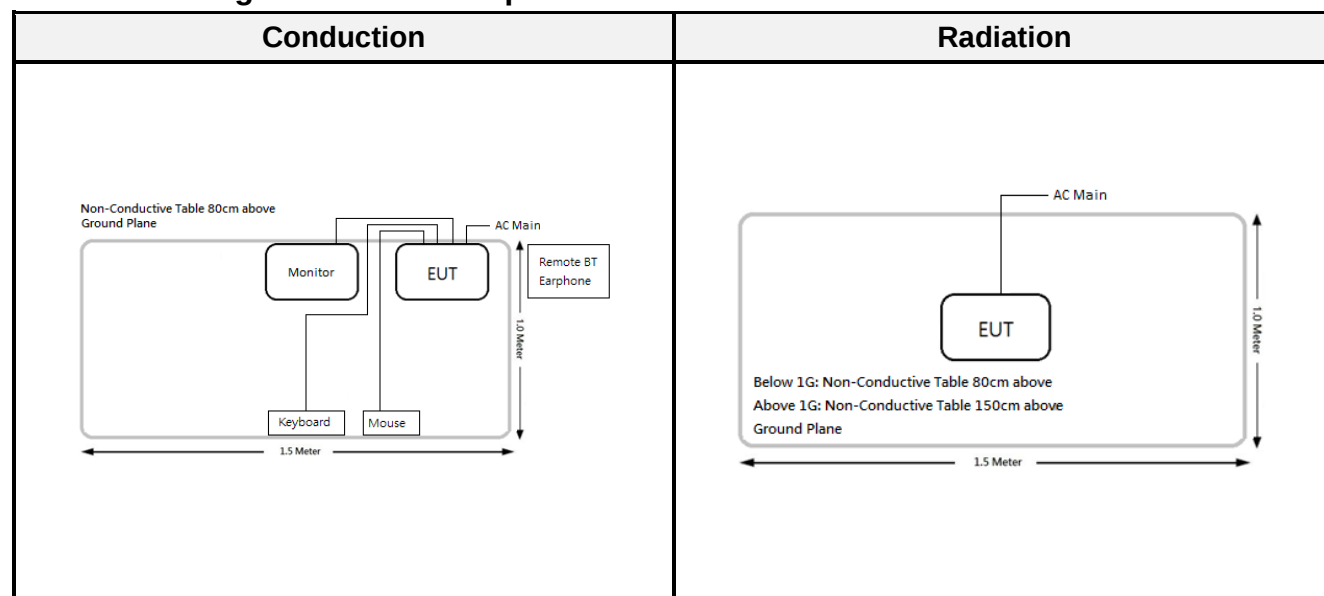
Worst Case of Power Setting				
EUT Exercise Software		RFTestTool		
Configuration	NTX	Low CH	Mid CH	High CH
802.11b mode	1	Default	Default	Default
802.11g mode	1	Default	Default	Default
802.11n HT 20 mode	1	Default	Default	Default
BLE mode	1	Default	Default	Default

2.2 Support Equipment List and External Cable List

No.	Description	Manufacturer	Model Number	BSMI	FCC ID / DoC
A	Monitor	DELL	P2415Q	N/A	NA
B	Keyboard	aibo	JSKJ-8831	D31921	DoC
C	Mouse	aibo	8733	D31921	DoC
D	BT Earphone	HB	HBQ i7	NA	DoC
E	AP Router	D-Link	DIR-880L	N/A	DoC

No.	Cable Description	Shielded Type	Ferrite Core	Length
1	HDIM Cable	Non-Shielded	NA	1.8m
2	USB Cable	Non-Shielded	NA	1.5m
3	USB Cable	Non-Shielded	NA	1.5m

2.3 Block Diagram of Test Setup

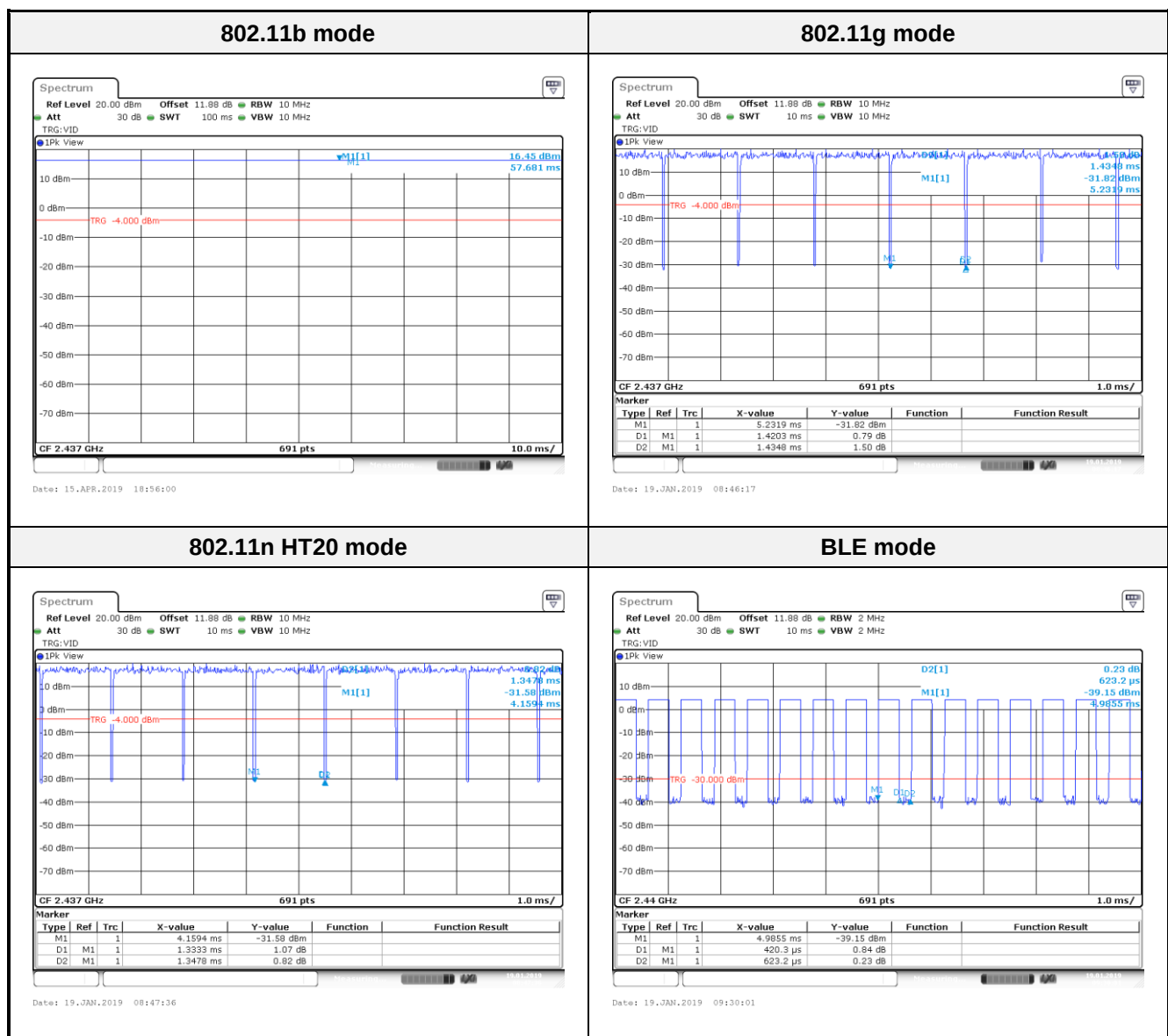


2.4 Duty Cycle

According to KDB 558074 D01 15.247 Meas Guidance v05r01:

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 mode	100	100	100.00	0.00
802.11g mode	1.42	1.43	99.30	0.03
802.11n HT20 mode	1.33	1.34	99.25	0.03
BLE mode	0.42	0.62	67.74	1.69



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

3 Summary of Test Results

FCC Rules	Description of Test	Result
§15.247(i), §1.1310, §2.1091	Maximum Permissible Exposure (MPE)	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), §1.1310, § 2.1091 - Maximum Permissible Exposure (MPE)

4.1 Applicable Standard

According to subpart 15.247(i) and subpart §1.1310, systems operating under the provisions of this section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

Limits for Maximum Permissible Exposure (MPE) (§1.1310, §2.1091)

(B) Limits for General Population/Uncontrolled Exposure				
Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm ²)	Averaging Time (minutes)
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500	/	/	f/1500	30
1500–100,000	/	/	1.0	30

f = frequency in MHz; * = Plane-wave equivalent power density;

According to §1.1310 and §2.1091 RF exposure is calculated.

Calculated Formulary: Predication of MPE limit at a given distance

$S = PG/4\pi R^2$ = power density (in appropriate units, e.g. mW/cm²);

P = power input to the antenna (in appropriate units, e.g., mW);

G = power gain of the antenna in the direction of interest relative to an isotropic radiator, the power gain factor, is normally numeric gain;

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm);

For simultaneously transmit system, the calculated power density should comply with:

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

4.2 RF Exposure Evaluation Result

MPE evaluation:

Mode	Frequency Range (MHz)	Antenna Gain		Target Power		Evaluation Distance (cm)	Power Density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(numeric)	(dBm)	(mW)			
LTE B2	1850-1910	2.58	1.811	23.00	199.526	20	0.0719	1
LTE B4	1710-1755	2.58	1.811	22.00	158.489	20	0.0571	1
LTE B12	699-716	1.15	1.303	24.00	251.189	20	0.0651	0.466
BR+EDR	2402-2480	4	2.512	-4.00	0.398	20	0.0002	1
BLE	2402-2480	4	2.512	6.00	3.981	20	0.0020	1
Wi-Fi 2.4G	2412-2462	4	2.512	23.00	199.526	20	0.0997	1

Wi-Fi 2.4G and LTE B2 can transmit simultaneously:

$$=S_{\text{Wi-Fi 2.4G}}/S_{\text{limit-Wi-Fi 2.4G}} + S_{\text{LTE B12}}/S_{\text{limit-LTE B12}} = (0.0997/1) + (0.0651/0.466) = 0.0997 + 0.1397 = 0.2394 < 1.0$$

Result: MPE evaluation meet 20 cm the requirement of standard.

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

Manufacturer	Model	Antenna Type	Antenna Gain	Result
Aristotle	RFA-25-JP19-70-165	PIFA Antenna	4	Compliance

The EUT has an internal antenna arrangement, which was permanently attached, fulfill the requirement of this section.

6 FCC §15.207 - AC Line Conducted Emissions

6.1 Applicable Standard

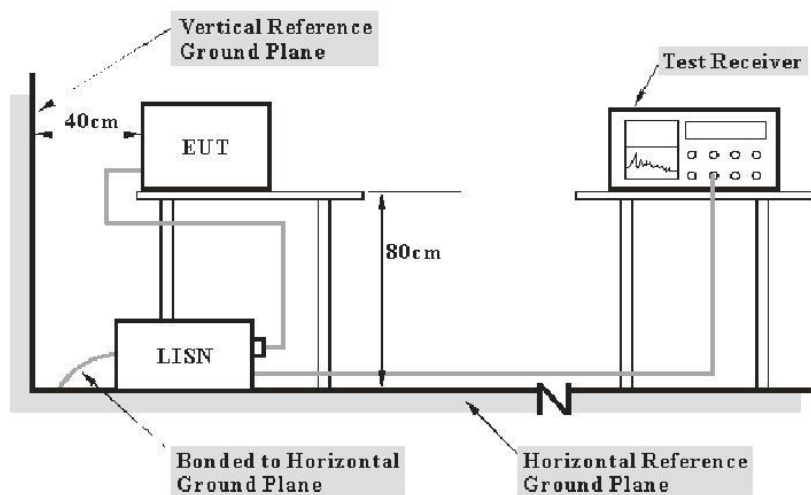
According to FCC §15.207

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 μ H/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.

Channel	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 30MHz. 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.
Conduction Room					
LISN	Rohde & Schwarz	ENV216	101612	2018/02/22	2019/02/21
LISN	Rohde & Schwarz	ENV216	101248	2018/06/27	2019/06/26
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2018/10/23	2019/10/22
Pulse Limiter	Rohde & Schwarz	ESH3Z2	TXZEM104	2018/08/03	2019/08/02
RF Cable	EMEC	EM-CB5D	001	2018/07/02	2019/07/01
Software	AUDIX	e3	V9.150826k	N.C.R	N.C.R

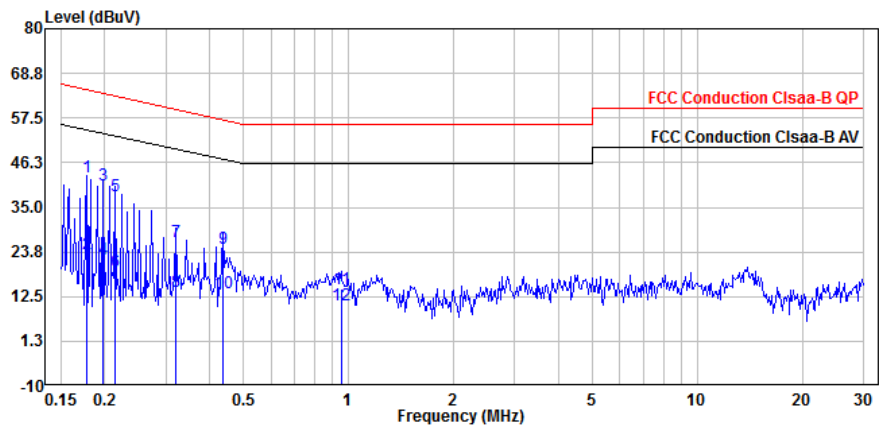
***Statement of Traceability:** The testing equipment's listed above have finished the calibration by Electronics Testing Center, Taiwan (ETC) or other laboratories which were accredited by TAF or equivalent organizations. The calibration result could be traceable to the International System of Units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

6.4 Test Environmental Conditions

Temperature:	24~25 °C	Relative Humidity:	42~45 %
ATM Pressure:	1010hPa	Test Engineer:	Ray Huang
Test Date:	2019-02-01		

6.5 AC Line Conducted Emission Test Plot and Data

Mode: AC 120V/60 Hz, Wi-Fi mode, Line



	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	
1	0.177	22.66	42.52	19.86	64.61	-22.09	QP
2	0.177	3.41	23.27	19.86	54.61	-31.34	Average
3	0.198	20.77	40.63	19.86	63.68	-23.05	QP
4	0.198	2.03	21.89	19.86	53.68	-31.79	Average
5	0.215	18.03	37.89	19.86	63.02	-25.13	QP
6	0.215	-1.06	18.80	19.86	53.02	-34.22	Average
7	0.320	6.58	26.45	19.87	59.71	-33.26	QP
8	0.320	-6.13	13.74	19.87	49.71	-35.97	Average
9	0.436	4.88	24.75	19.87	57.13	-32.38	QP
10	0.436	-6.40	13.47	19.87	47.13	-33.66	Average
11	0.952	-5.54	14.36	19.90	56.00	-41.64	QP
12	0.952	-9.60	10.30	19.90	46.00	-35.70	Average

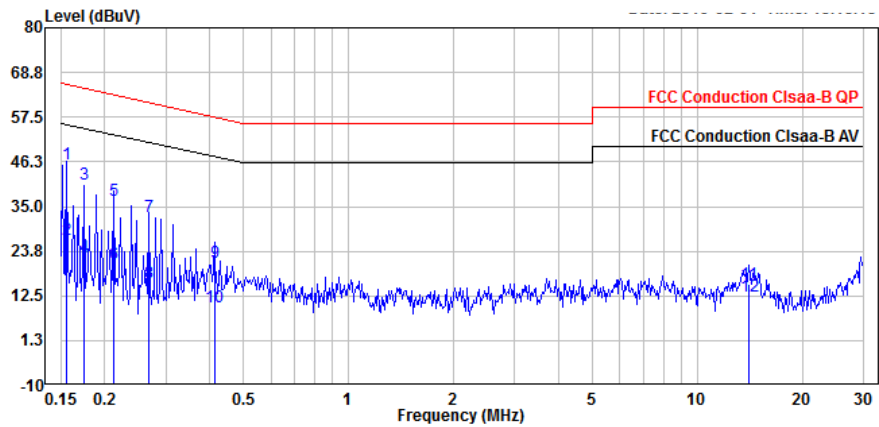
Note:

Level = Read Level + Factor

Over Limit (Margin) = Level – Limit Line

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

Mode: AC 120V/60 Hz, Wi-Fi mode, Neutral



	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	
1	0.156	25.99	45.86	19.87	65.67	-19.81	QP
2	0.156	6.67	26.54	19.87	55.67	-29.13	Average
3	0.175	20.85	40.71	19.86	64.74	-24.03	QP
4	0.175	2.48	22.34	19.86	54.74	-32.40	Average
5	0.213	16.52	36.38	19.86	63.09	-26.71	QP
6	0.213	0.61	20.47	19.86	53.09	-32.62	Average
7	0.268	12.42	32.29	19.87	61.17	-28.88	QP
8	0.268	-4.14	15.73	19.87	51.17	-35.44	Average
9	0.413	1.06	20.92	19.86	57.60	-36.68	QP
10	0.413	-10.16	9.70	19.86	47.60	-37.90	Average
11	14.074	-4.74	15.42	20.16	60.00	-44.58	QP
12	14.074	-7.78	12.38	20.16	50.00	-37.62	Average

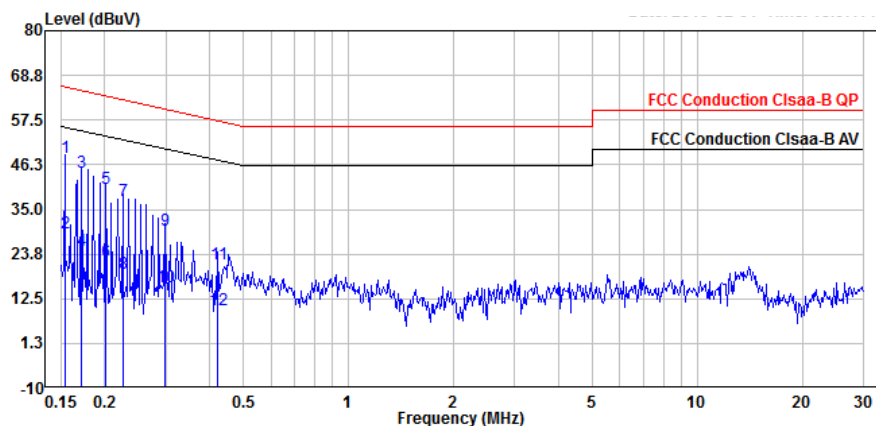
Note:

Level = Read Level + Factor

Over Limit (Margin) = Level – Limit Line

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

Mode: AC 120V/60 Hz, BLE mode, Line



	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	
1	0.154	28.18	48.05	19.87	65.80	-17.75	QP
2	0.154	9.20	29.07	19.87	55.80	-26.73	Average
3	0.172	24.46	44.33	19.87	64.88	-20.55	QP
4	0.172	4.64	24.51	19.87	54.88	-30.37	Average
5	0.201	20.37	40.23	19.86	63.55	-23.32	QP
6	0.201	2.21	22.07	19.86	53.55	-31.48	Average
7	0.225	17.23	37.09	19.86	62.63	-25.54	QP
8	0.225	-0.97	18.89	19.86	52.63	-33.74	Average
9	0.298	9.92	29.79	19.87	60.31	-30.52	QP
10	0.298	-4.29	15.58	19.87	50.31	-34.73	Average
11	0.423	1.52	21.39	19.87	57.40	-36.01	QP
12	0.423	-10.33	9.54	19.87	47.40	-37.86	Average

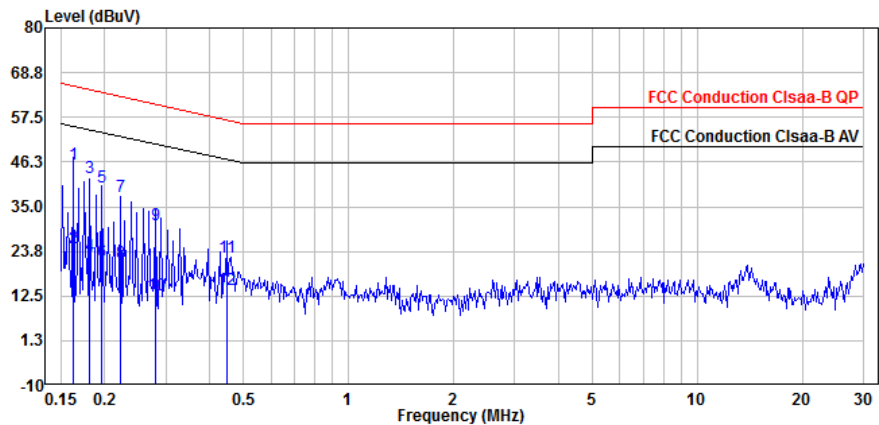
Note:

$Level = Read\ Level + Factor$

$Over\ Limit\ (Margin) = Level - Limit\ Line$

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

Mode: AC 120V/60 Hz, BLE mode, Neutral



1

	Freq	Read Level	Level	Factor	Limit Line	Over Limit	Remark
	MHz	dBuV	dBuV	dB	dBuV	dB	
1	0.162	25.73	45.60	19.87	65.34	-19.74	QP
2	0.162	4.85	24.72	19.87	55.34	-30.62	Average
3	0.182	22.38	42.24	19.86	64.41	-22.17	QP
4	0.182	2.71	22.57	19.86	54.41	-31.84	Average
5	0.197	20.00	39.86	19.86	63.75	-23.89	QP
6	0.197	1.48	21.34	19.86	53.75	-32.41	Average
7	0.222	17.52	37.38	19.86	62.76	-25.38	QP
8	0.222	1.08	20.94	19.86	52.76	-31.82	Average
9	0.279	10.51	30.38	19.87	60.84	-30.46	QP
10	0.279	-7.07	12.80	19.87	50.84	-38.04	Average
11	0.447	2.56	22.42	19.86	56.93	-34.51	QP
12	0.447	-5.86	14.00	19.86	46.93	-32.93	Average

Note:

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

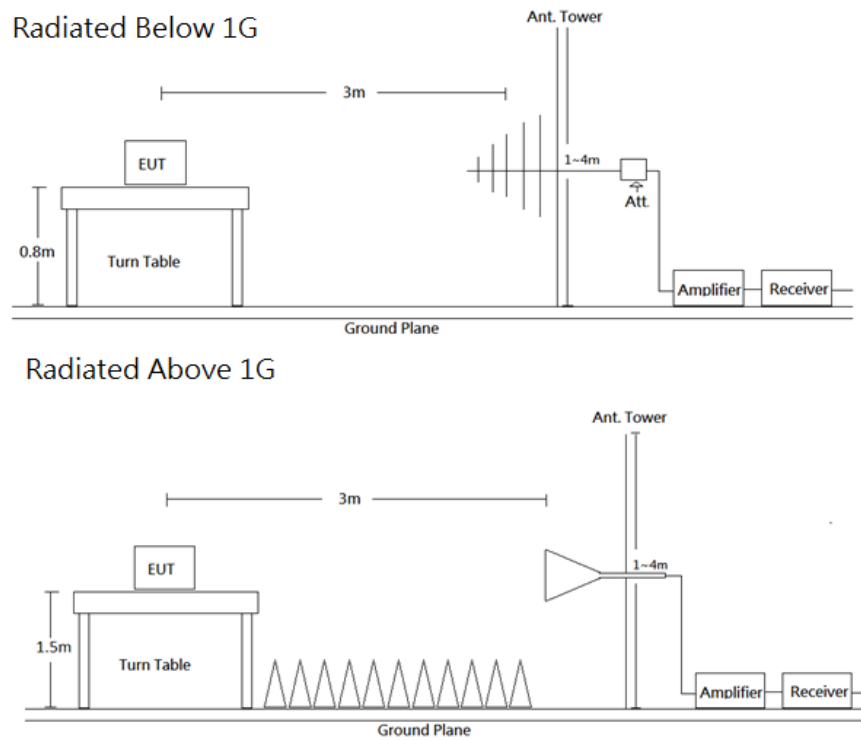
As per FCC §15.209(a): Except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

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	Detector	Duty cycle	Measurement method
30-1000 MHz	120 kHz	/	QP	-	QP
Above 1 GHz	1 MHz	3 MHz	PK	-	PK
	1 MHz	3 MHz	RMS	>98%	Ave
	1 MHz	1/T	PK	<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.
966A Room					
Bilog Antenna with 6 dB Attenuator	SUNOL SCIENCES & MINI-CIRCUITS	JB6/UNAT-6+	A050115/15542_01	2018/12/11	2019/12/10
Horn Antenna	EMCO	3115	9311-4158	2018/04/20	2019/04/19
Horn Antenna	ETS-Lindgren	3116	62638	2018/08/29	2019/08/28
Preamplifier	Sonoma	310N	130602	2018/07/04	2019/07/03
Preamplifier	EM Electronics Corp.	EM01G18G	060657	2018/12/07	2019/12/06
Microwave Preamplifier	EM Electronics Corporation	EM18G40G	060656	2019/01/11	2020/01/10
EMI Test Receiver	Rohde & Schwarz	ESR7	101419	2018/10/23	2019/10/22
Spectrum Analyzer	Spectrum Analyzer	FSV40	101435	2018/02/12	2019/02/13
Micro flex Cable	UTIFLEX	FSCM 64639 / (2M)	93D0127	2018/07/31	2019/07/30
Micro flex Cable	UTIFLEX	UFA210A-1-3149-300300	MFR64639 226389-001	2018/11/16	2019/11/15
Micro flex Cable	ROSNOL	K1K50-UP0264-K1K50-450CM	160309-1	2018/03/05	2019/03/04
Micro flex Cable	ROSNOL	K1K50-UP0264-K1K50-80CM	160309-2	2019/01/16	2020/01/15
Turn Table	Champro	TT-2000	060772-T	N.C.R	N.C.R
Antenna Tower	Champro	AM-BS-4500-B	060772-A	N.C.R	N.C.R
Controller	Champro	EM1000	60772	N.C.R	N.C.R
Software	AUDIX	e3	E3LK-01	N.C.R	N.C.R
Conducted Room					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2018/11/22	2019/11/21
Cable	WOKEN	SFL402	S02-160323-07	2018/02/12	2019/02/11

***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 Environmental Conditions

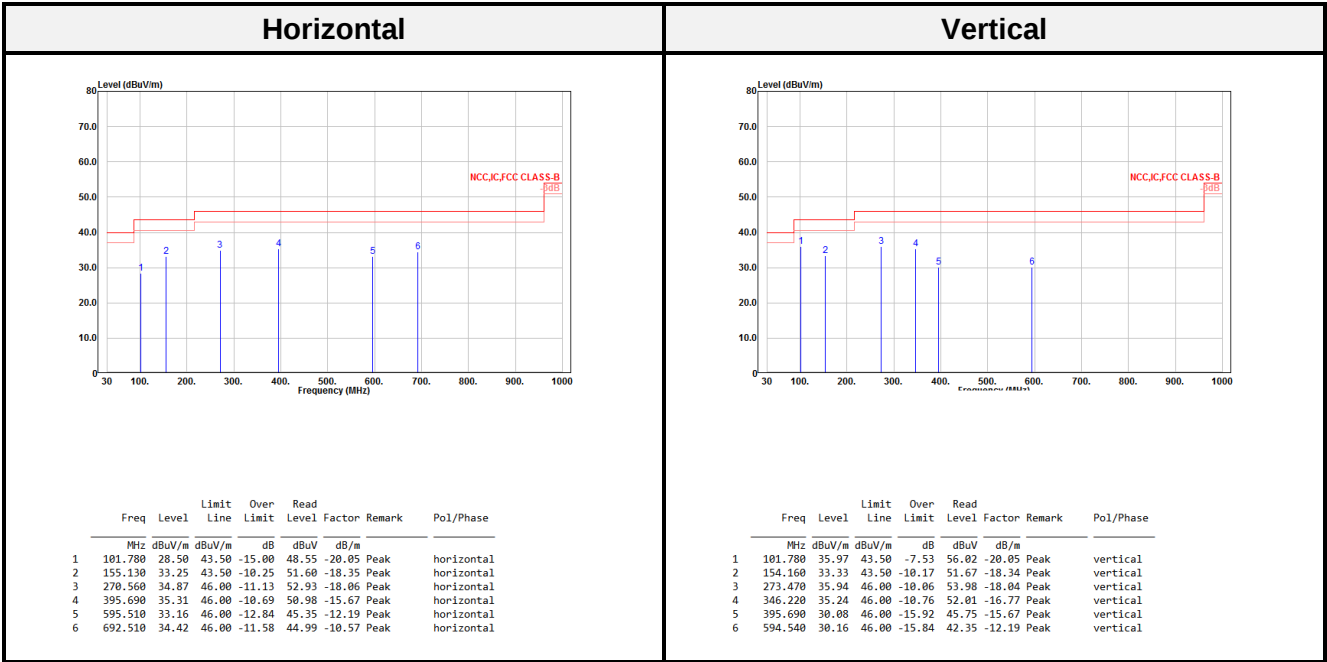
Temperature:	24~26 °C	Relative Humidity:	54~56 %
ATM Pressure:	1014hPa	Test Engineer:	Leo Chang
Conducted Test Date:	2019-01-19~2019-01-22	Radiated Test Date:	2019-01-25

7.5 Radiated Emission Test Plot and Data

Wi-Fi Mode:

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

Below 1G (30 MHz-1 GHz) test the output power worst mode: 802.11g High Channel



Result = Reading + Correct Factor

Margin = Result – 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							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2388.960	36.83	54.00	-17.17	45.34	-8.51	Average	2385.264	39.13	54.00	-14.87	47.65	-8.52	Average
2388.960	50.10	74.00	-23.90	58.61	-8.51	Peak	2385.264	51.64	74.00	-22.36	60.16	-8.52	Peak
2411.248	97.71			106.19	-8.48	Average	2411.248	102.77			111.25	-8.48	Average
2411.248	100.43			108.91	-8.48	Peak	2411.248	104.77			113.25	-8.48	Peak
1978.000	29.83	54.00	-24.17	39.60	-9.77	Average	1978.000	29.14	54.00	-24.86	38.91	-9.77	Average
1978.000	62.60	74.00	-11.40	72.37	-9.77	Peak	1978.000	62.18	74.00	-11.82	71.95	-9.77	Peak
2773.000	30.83	54.00	-23.17	37.88	-7.05	Average	2773.000	28.70	54.00	-25.30	35.97	-7.27	Average
2773.000	56.76	74.00	-17.24	63.81	-7.05	Peak	2773.000	56.75	74.00	-17.25	63.80	-7.05	Peak
3565.000	29.30	54.00	-24.70	33.33	-4.03	Average	3565.000	32.19	54.00	-21.81	36.15	-3.96	Average
3565.000	51.55	74.00	-22.45	55.58	-4.03	Peak	3565.000	57.02	74.00	-16.98	61.05	-4.03	Peak
4824.000	30.14	54.00	-23.86	30.89	-0.75	Average	4824.000	36.21	54.00	-17.79	36.79	-0.58	Average
4824.000	43.07	74.00	-30.93	43.82	-0.75	Peak	4824.000	45.11	74.00	-28.89	45.69	-0.58	Peak
5146.000	31.24	54.00	-22.76	32.16	-0.92	Average	5146.000	31.26	54.00	-22.74	32.20	-0.94	Average
5146.000	52.92	74.00	-21.08	53.84	-0.92	Peak	5146.000	56.04	74.00	-17.96	56.99	-0.95	Peak
7236.000	34.42	54.00	-19.58	32.42	2.00	Average	7236.000	39.97	54.00	-14.03	37.97	2.00	Average
7236.000	45.80	74.00	-28.20	43.80	2.00	Peak	7236.000	49.34	74.00	-24.66	47.34	2.00	Peak

Middle CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2386.320	36.20	54.00	-17.80	44.72	-8.52	Average	2385.120	37.45	54.00	-16.55	45.97	-8.52	Average
2386.320	49.41	74.00	-24.59	57.93	-8.52	Peak	2385.120	50.33	74.00	-23.67	58.85	-8.52	Peak
2436.240	97.42			105.82	-8.40	Average	2436.240	101.44			109.84	-8.40	Average
2436.240	100.10			108.50	-8.40	Peak	2436.240	104.13			112.53	-8.40	Peak
2494.560	36.74	54.00	-17.26	44.96	-8.22	Average	2547.360	37.24	54.00	-16.76	45.32	-8.08	Average
2494.560	50.18	74.00	-23.82	58.40	-8.22	Peak	2547.360	50.29	74.00	-23.71	58.37	-8.08	Peak
1978.000	29.87	54.00	-24.13	39.68	-9.81	Average	1978.000	28.85	54.00	-25.15	38.66	-9.81	Average
1978.000	62.74	74.00	-11.26	72.55	-9.81	Peak	1978.000	62.17	74.00	-11.83	71.98	-9.81	Peak
2773.000	30.79	54.00	-23.21	37.84	-7.05	Average	2773.000	28.79	54.00	-25.21	35.84	-7.05	Average
2773.000	56.32	74.00	-17.68	63.37	-7.05	Peak	2773.000	56.87	74.00	-17.13	63.92	-7.05	Peak
3565.000	29.47	54.00	-24.53	33.50	-4.03	Average	3565.000	33.18	54.00	-20.82	37.21	-4.03	Average
3565.000	51.67	74.00	-22.33	55.70	-4.03	Peak	3565.000	57.42	74.00	-16.58	61.45	-4.03	Peak
4874.000	31.88	54.00	-22.12	32.55	-0.67	Average	4874.000	38.31	54.00	-15.69	38.98	-0.67	Average
4874.000	46.04	74.00	-27.96	46.71	-0.67	Peak	4874.000	47.26	74.00	-26.74	47.93	-0.67	Peak
5146.000	31.23	54.00	-22.77	32.15	-0.92	Average	5146.000	32.24	54.00	-21.76	33.16	-0.92	Average
5146.000	53.35	74.00	-20.65	54.27	-0.92	Peak	5146.000	56.91	74.00	-17.09	57.83	-0.92	Peak
7311.000	37.78	54.00	-16.22	35.33	2.45	Average	7311.000	42.38	54.00	-11.62	40.12	2.26	Average
7311.000	47.94	74.00	-26.06	45.49	2.45	Peak	7311.000	49.87	74.00	-24.13	47.61	2.26	Peak

High CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2462.976	97.53			105.83	-8.30	Average	2462.976	100.00			108.30	-8.30	Average
2462.976	100.16			108.46	-8.30	Peak	2462.976	102.60			110.90	-8.30	Peak
2547.256	37.65	54.00	-16.35	45.73	-8.08	Average	2535.202	38.48	54.00	-15.52	46.59	-8.11	Average
2547.256	50.82	74.00	-23.18	58.90	-8.08	Peak	2535.202	51.37	74.00	-22.63	59.48	-8.11	Peak
1978.000	30.12	54.00	-23.88	39.93	-9.81	Average	1978.000	29.13	54.00	-24.87	38.94	-9.81	Average
1978.000	63.27	74.00	-10.73	73.08	-9.81	Peak	1978.000	62.43	74.00	-11.57	72.24	-9.81	Peak
2773.000	31.05	54.00	-22.95	38.10	-7.05	Average	2773.000	29.35	54.00	-24.65	36.40	-7.05	Average
2773.000	57.67	74.00	-16.33	64.72	-7.05	Peak	2773.000	57.24	74.00	-16.76	64.29	-7.05	Peak
3565.000	30.12	54.00	-23.88	34.02	-3.90	Average	3565.000	32.27	54.00	-21.73	36.30	-4.03	Average
3565.000	51.45	74.00	-22.55	55.35	-3.90	Peak	3565.000	57.14	74.00	-16.86	61.17	-4.03	Peak
4924.000	32.98	54.00	-21.02	33.56	-0.58	Average	4924.000	39.17	54.00	-14.83	39.75	-0.58	Average
4924.000	44.23	74.00	-29.77	44.81	-0.58	Peak	4924.000	46.23	74.00	-27.77	46.81	-0.58	Peak
5146.000	32.05	54.00	-21.95	32.97	-0.92	Average	5146.000	31.29	54.00	-22.71	32.21	-0.92	Average
5146.000	52.99	74.00	-21.01	53.91	-0.92	Peak	5146.000	57.93	74.00	-16.07	58.85	-0.92	Peak
7386.000	37.13	54.00	-16.87	34.51	2.62	Average	7375.000	49.34	74.00	-24.66	46.76	2.58	Peak
7386.000	47.51	74.00	-26.49	44.89	2.62	Peak	7386.000	41.19	54.00	-12.81	38.61	2.58	Average

802.11g mode:

Low CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2389.968	42.90	54.00	-11.10	51.41	-8.51	Average	2390.000	47.90	54.00	-6.10	56.41	-8.51	Average
2389.968	62.49	74.00	-11.51	71.00	-8.51	Peak	2390.000	69.23	74.00	-4.77	77.74	-8.51	Peak
2410.352	91.28			99.76	-8.48	Average	2407.776	94.70			103.18	-8.48	Average
2410.352	101.92			110.40	-8.48	Peak	2407.776	105.25			113.73	-8.48	Peak
1978.000	29.84	54.00	-24.16	39.65	-9.81	Average	1978.000	29.31	54.00	-24.69	39.12	-9.81	Average
1978.000	62.85	74.00	-11.15	72.66	-9.81	Peak	1978.000	62.24	74.00	-11.76	72.05	-9.81	Peak
2773.000	30.86	54.00	-23.14	37.91	-7.05	Average	2773.000	28.74	54.00	-25.26	35.79	-7.05	Average
2773.000	57.99	74.00	-16.01	65.04	-7.05	Peak	2773.000	56.64	74.00	-17.36	63.69	-7.05	Peak
3565.000	29.51	54.00	-24.49	33.54	-4.03	Average	3565.000	32.26	54.00	-21.74	36.29	-4.03	Average
3565.000	51.42	74.00	-22.58	55.45	-4.03	Peak	3565.000	56.94	74.00	-17.06	60.97	-4.03	Peak
4824.000	30.06	54.00	-23.94	30.81	-0.75	Average	4824.000	29.54	54.00	-24.46	30.29	-0.75	Average
4824.000	43.78	74.00	-30.22	44.53	-0.75	Peak	4824.000	43.85	74.00	-30.15	44.60	-0.75	Peak
5146.000	31.17	54.00	-22.83	32.09	-0.92	Average	5146.000	31.44	54.00	-22.56	32.36	-0.92	Average
5146.000	53.25	74.00	-20.75	54.17	-0.92	Peak	5146.000	56.12	74.00	-17.88	57.04	-0.92	Peak
7236.000	32.57	54.00	-21.43	30.57	2.00	Average	7236.000	33.98	54.00	-20.02	31.98	2.00	Average
7236.000	46.80	74.00	-27.20	44.80	2.00	Peak	7236.000	49.94	74.00	-24.06	47.94	2.00	Peak

Middle CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2388.480	37.58	54.00	-16.42	46.10	-8.52	Average	2388.240	38.98	54.00	-15.02	47.50	-8.52	Average
2388.480	52.46	74.00	-21.54	60.98	-8.52	Peak	2388.240	53.39	74.00	-20.61	61.91	-8.52	Peak
2430.720	91.11			99.52	-8.41	Average	2435.280	94.70			103.10	-8.40	Average
2430.720	101.75			110.16	-8.41	Peak	2435.280	105.09			113.49	-8.40	Peak
2502.000	36.97	54.00	-17.03	45.17	-8.20	Average	2539.680	37.90	54.00	-16.10	46.01	-8.11	Average
2502.000	50.72	74.00	-23.28	58.92	-8.20	Peak	2539.680	51.01	74.00	-22.99	59.12	-8.11	Peak
1978.000	29.90	54.00	-24.10	39.71	-9.81	Average	1978.000	29.21	54.00	-24.79	39.02	-9.81	Average
1978.000	63.03	74.00	-10.97	72.84	-9.81	Peak	1978.000	63.87	74.00	-10.13	73.68	-9.81	Peak
2773.000	30.58	54.00	-23.42	37.63	-7.05	Average	2773.000	28.75	54.00	-25.25	35.80	-7.05	Average
2773.000	56.62	74.00	-17.38	63.67	-7.05	Peak	2773.000	57.35	74.00	-16.65	64.40	-7.05	Peak
3565.000	29.35	54.00	-24.65	33.38	-4.03	Average	3565.000	32.26	54.00	-21.74	36.29	-4.03	Average
3565.000	51.87	74.00	-22.13	55.90	-4.03	Peak	3565.000	57.32	74.00	-16.68	61.35	-4.03	Peak
4874.000	29.99	54.00	-24.01	30.66	-0.67	Average	4874.000	30.86	54.00	-23.14	31.53	-0.67	Average
4874.000	45.17	74.00	-28.83	45.84	-0.67	Peak	4874.000	44.25	74.00	-29.75	44.92	-0.67	Peak
5146.000	31.28	54.00	-22.72	32.20	-0.92	Average	5146.000	31.35	54.00	-22.65	32.30	-0.95	Average
5146.000	52.89	74.00	-21.11	53.81	-0.92	Peak	5146.000	56.80	74.00	-17.20	57.75	-0.95	Peak
7311.000	32.14	54.00	-21.86	29.88	2.26	Average	7311.000	34.90	54.00	-19.10	32.64	2.26	Average
7311.000	46.14	74.00	-27.86	43.88	2.26	Peak	7311.000	49.80	74.00	-24.20	47.54	2.26	Peak

High CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2457.782	89.67			97.99	-8.32	Average	2460.232	93.09			101.40	-8.31	Average
2457.782	100.24			108.56	-8.32	Peak	2460.232	103.60			111.91	-8.31	Peak
2483.500	42.03	54.00	-11.97	50.28	-8.25	Average	2483.500	44.53	54.00	-9.47	52.78	-8.25	Average
2483.500	64.21	74.00	-9.79	72.46	-8.25	Peak	2483.500	68.20	74.00	-5.80	76.45	-8.25	Peak
1978.000	29.86	54.00	-24.14	39.67	-9.81	Average	1978.000	28.95	54.00	-25.05	38.76	-9.81	Average
1978.000	62.99	74.00	-11.01	72.80	-9.81	Peak	1978.000	64.20	74.00	-9.80	74.01	-9.81	Peak
2773.000	31.28	54.00	-22.72	38.33	-7.05	Average	2773.000	28.70	54.00	-25.30	35.75	-7.05	Average
2773.000	56.69	74.00	-17.31	63.74	-7.05	Peak	2773.000	56.25	74.00	-17.75	63.30	-7.05	Peak
3565.000	30.26	54.00	-23.74	34.29	-4.03	Average	3565.000	32.28	54.00	-21.72	36.31	-4.03	Average
3565.000	51.67	74.00	-22.33	55.70	-4.03	Peak	3565.000	57.71	74.00	-16.29	61.74	-4.03	Peak
4924.000	30.06	54.00	-23.94	30.64	-0.58	Average	4924.000	31.87	54.00	-22.13	32.45	-0.58	Average
4924.000	43.42	74.00	-30.58	44.00	-0.58	Peak	4924.000	43.85	74.00	-30.15	44.43	-0.58	Peak
5146.000	32.11	54.00	-21.89	33.06	-0.95	Average	5146.000	31.16	54.00	-22.84	32.08	-0.92	Average
5146.000	53.31	74.00	-20.69	54.26	-0.95	Peak	5146.000	55.73	74.00	-18.27	56.65	-0.92	Peak
7386.000	34.42	54.00	-19.58	31.80	2.62	Average	7386.000	37.14	54.00	-16.86	34.52	2.62	Average
7386.000	48.60	74.00	-25.40	45.98	2.62	Peak	7386.000	53.17	74.00	-20.83	50.55	2.62	Peak

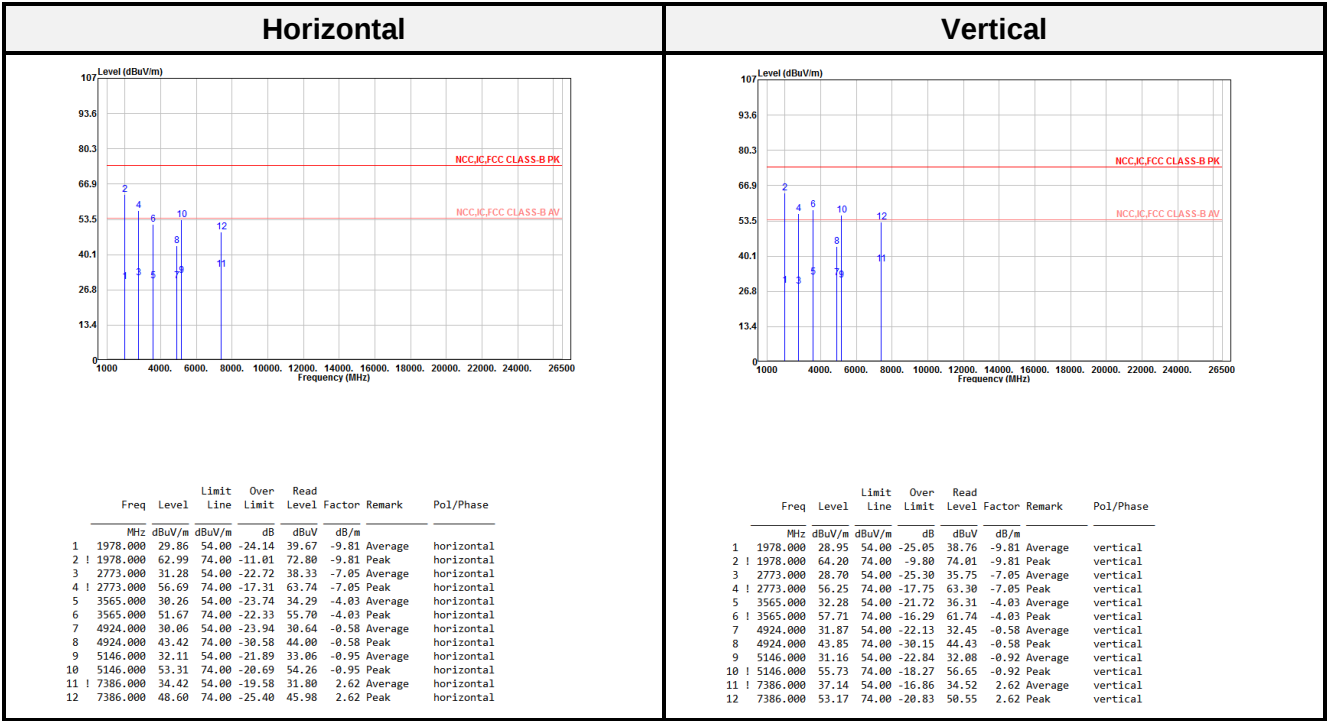
802.11n HT20 mode:

Low CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2389.184	42.98	54.00	-11.02	51.49	-8.51	Average	2390.000	52.19	54.00	-1.81	60.70	-8.51	Average
2389.184	68.08	74.00	-5.92	76.59	-8.51	Peak	2390.000	73.90	74.00	-0.10	82.41	-8.51	Peak
2409.792	90.62			99.10	-8.48	Average	2407.104	94.98			103.46	-8.48	Average
2409.792	102.47			110.95	-8.48	Peak	2407.104	105.92			114.40	-8.48	Peak
1978.000	29.90	54.00	-24.10	39.71	-9.81	Average	1978.000	28.97	54.00	-25.03	38.78	-9.81	Average
1978.000	62.33	74.00	-11.67	72.14	-9.81	Peak	1978.000	61.72	74.00	-12.28	71.53	-9.81	Peak
2773.000	30.85	54.00	-23.15	37.90	-7.05	Average	2773.000	28.74	54.00	-25.26	35.79	-7.05	Average
2773.000	57.14	74.00	-16.86	64.19	-7.05	Peak	2773.000	56.50	74.00	-17.50	63.55	-7.05	Peak
3565.000	28.88	54.00	-25.12	32.91	-4.03	Average	3565.000	32.19	54.00	-21.81	36.22	-4.03	Average
3565.000	52.91	74.00	-21.09	56.94	-4.03	Peak	3565.000	57.19	74.00	-16.81	61.22	-4.03	Peak
4824.000	29.78	54.00	-24.22	30.53	-0.75	Average	4824.000	30.96	54.00	-23.04	31.71	-0.75	Average
4824.000	43.88	74.00	-30.12	44.63	-0.75	Peak	4824.000	43.96	74.00	-30.04	44.71	-0.75	Peak
5146.000	30.22	54.00	-23.78	31.14	-0.92	Average	5146.000	31.24	54.00	-22.76	32.16	-0.92	Average
5146.000	53.00	74.00	-21.00	53.92	-0.92	Peak	5146.000	56.32	74.00	-17.68	57.24	-0.92	Peak
7236.000	31.87	54.00	-22.13	29.87	2.00	Average	7236.000	35.53	54.00	-18.47	33.53	2.00	Average
7236.000	45.49	74.00	-28.51	43.49	2.00	Peak	7236.000	51.98	74.00	-22.02	49.98	2.00	Peak

Middle CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2386.560	37.30	54.00	-16.70	45.82	-8.52	Average	2389.200	38.73	54.00	-15.27	47.24	-8.51	Average
2386.560	50.93	74.00	-23.07	59.45	-8.52	Peak	2389.200	55.74	74.00	-18.26	64.25	-8.51	Peak
2432.400	90.80	54.00			-8.41	Average	2434.560	94.29			102.69	-8.40	Average
2432.400	102.16	74.00			-8.41	Peak	2434.560	105.41			113.81	-8.40	Peak
2484.000	36.99	54.00	-17.01	45.24	-8.25	Average	2483.760	37.80	54.00	-16.20	46.05	-8.25	Average
2484.000	51.05	74.00	-22.95	59.30	-8.25	Peak	2483.760	52.24	74.00	-21.76	60.49	-8.25	Peak
1978.000	29.84	54.00	-24.16	39.65	-9.81	Average	1978.000	28.93	54.00	-25.07	38.74	-9.81	Average
1978.000	63.27	74.00	-10.73	73.08	-9.81	Peak	1978.000	62.11	74.00	-11.89	71.92	-9.81	Peak
2773.000	31.24	54.00	-22.76	38.29	-7.05	Average	2773.000	28.75	54.00	-25.25	35.80	-7.05	Average
2773.000	57.85	74.00	-16.15	64.90	-7.05	Peak	2773.000	56.77	74.00	-17.23	63.82	-7.05	Peak
3565.000	29.36	54.00	-24.64	33.39	-4.03	Average	3565.000	32.20	54.00	-21.80	36.23	-4.03	Average
3565.000	52.89	74.00	-21.11	56.92	-4.03	Peak	3565.000	57.56	74.00	-16.44	61.59	-4.03	Peak
4874.000	30.19	54.00	-23.81	30.86	-0.67	Average	4874.000	30.87	54.00	-23.13	31.54	-0.67	Average
4874.000	43.82	74.00	-30.18	44.49	-0.67	Peak	4874.000	44.32	74.00	-29.68	44.99	-0.67	Peak
5146.000	31.42	54.00	-22.58	32.34	-0.92	Average	5146.000	30.63	54.00	-23.37	31.58	-0.95	Average
5146.000	52.90	74.00	-21.10	53.82	-0.92	Peak	5146.000	56.64	74.00	-17.36	57.59	-0.95	Peak
7311.000	32.51	54.00	-21.49	30.25	2.26	Average	7311.000	36.77	54.00	-17.23	34.51	2.26	Average
7311.000	45.32	74.00	-28.68	43.06	2.26	Peak	7311.000	52.47	74.00	-21.53	50.21	2.26	Peak

High CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2464.250	90.19			98.49	-8.30	Average	2459.938	93.36			101.67	-8.31	Average
2464.250	102.38			110.68	-8.30	Peak	2459.938	105.53			113.84	-8.31	Peak
2484.046	43.96	54.00	-10.04	52.21	-8.25	Average	2484.340	47.86	54.00	-6.14	56.10	-8.24	Average
2484.046	70.12	74.00	-3.88	78.37	-8.25	Peak	2484.340	73.84	74.00	-0.16	82.08	-8.24	Peak
1978.000	29.85	54.00	-24.15	39.66	-9.81	Average	1978.000	29.10	54.00	-24.90	38.91	-9.81	Average
1978.000	63.06	74.00	-10.94	72.87	-9.81	Peak	1978.000	63.24	74.00	-10.76	73.05	-9.81	Peak
2773.000	30.79	54.00	-23.21	37.84	-7.05	Average	2773.000	28.75	54.00	-25.25	35.80	-7.05	Average
2773.000	56.44	74.00	-17.56	63.49	-7.05	Peak	2773.000	56.58	74.00	-17.42	63.63	-7.05	Peak
3565.000	29.34	54.00	-24.66	33.37	-4.03	Average	3565.000	32.25	54.00	-21.75	36.28	-4.03	Average
3565.000	52.90	74.00	-21.10	56.93	-4.03	Peak	3565.000	57.35	74.00	-16.65	61.38	-4.03	Peak
4924.000	29.93	54.00	-24.07	30.51	-0.58	Average	4924.000	30.63	54.00	-23.37	31.21	-0.58	Average
4924.000	44.06	74.00	-29.94	44.64	-0.58	Peak	4924.000	43.63	74.00	-30.37	44.21	-0.58	Peak
5146.000	31.68	54.00	-22.32	32.60	-0.92	Average	5146.000	31.75	54.00	-22.25	32.67	-0.92	Average
5146.000	52.60	74.00	-21.40	53.52	-0.92	Peak	5146.000	56.27	74.00	-17.73	57.19	-0.92	Peak
7386.000	33.19	54.00	-20.81	30.57	2.62	Average	7386.000	36.92	54.00	-17.08	34.30	2.62	Average
7386.000	47.51	74.00	-26.49	44.89	2.62	Peak	7386.000	52.51	74.00	-21.49	49.89	2.62	Peak

Above 1G (1 GHz-26.5 GHz): test the output power worst mode: 802.11g High Channel



Result = Reading + Correct Factor

Margin = Result – Limit

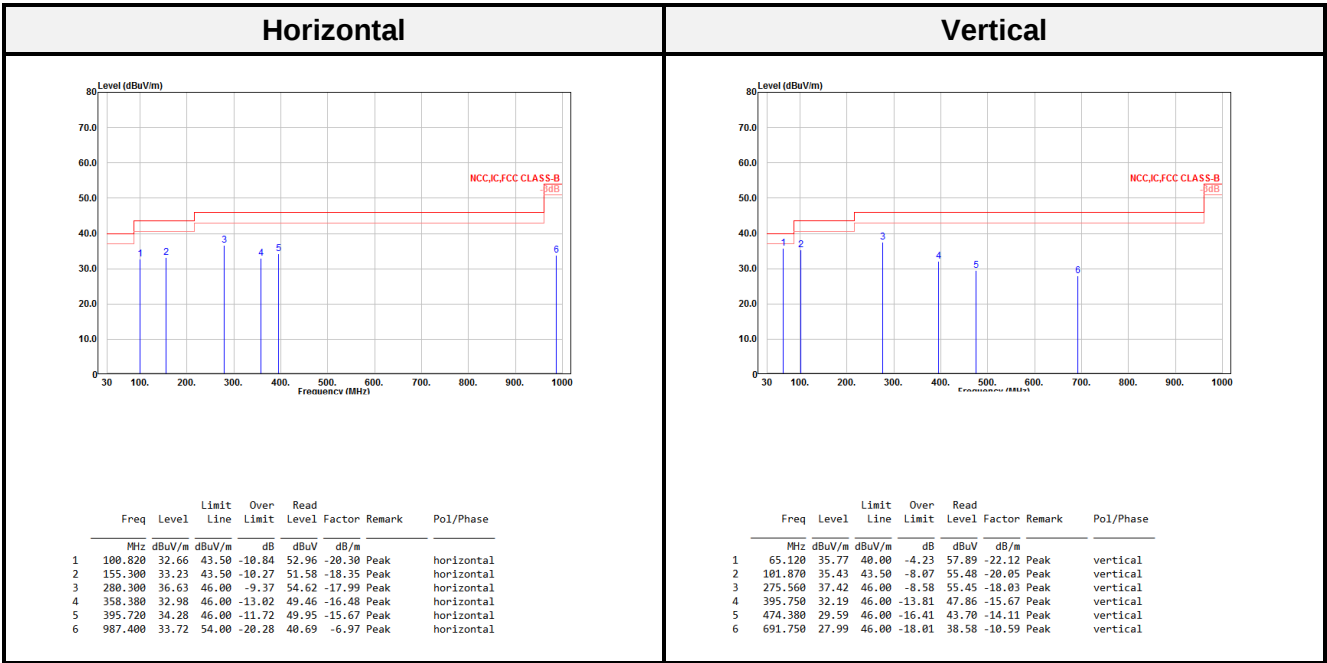
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

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

BLE Mode:

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

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



Result = Reading + Correct Factor

Margin = Result – 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)

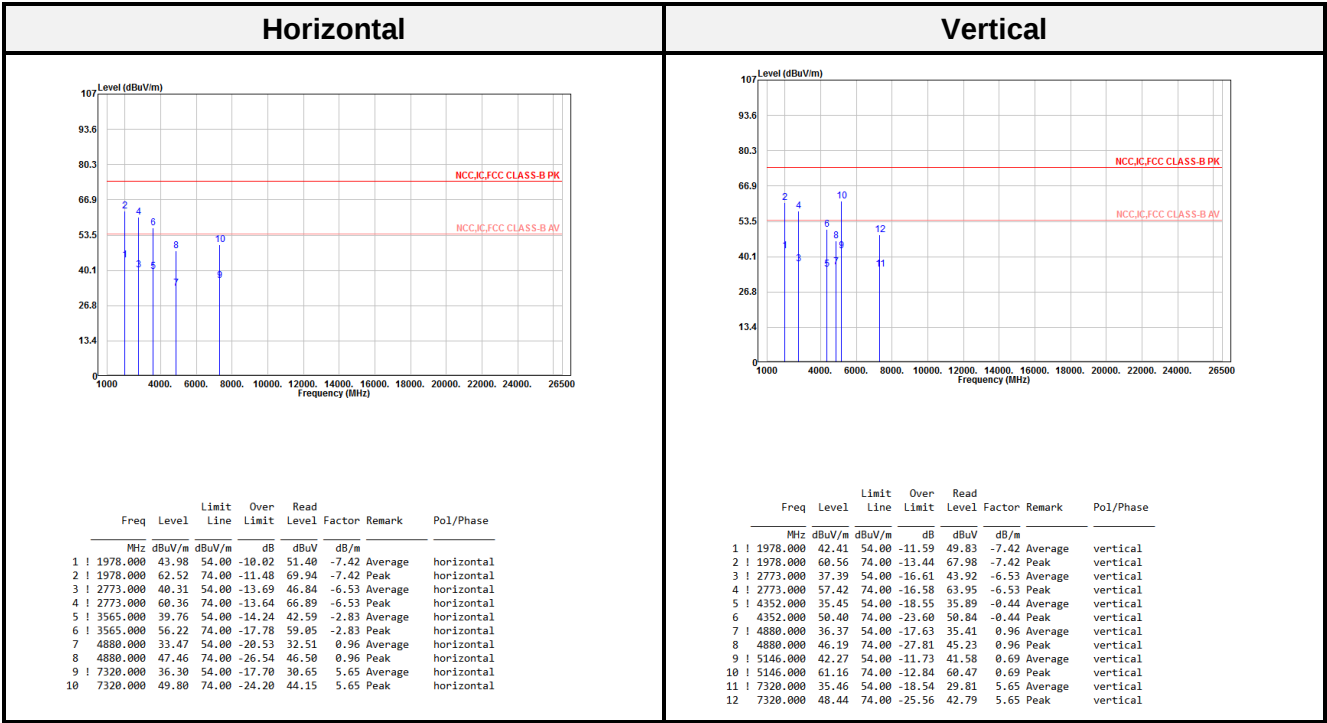
BLE mode:

Low CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2358.200	38.34	54.00	-15.66	45.74	-7.40	Average	2347.800	38.41	54.00	-15.59	45.81	-7.40	Average
2358.200	50.70	74.00	-23.30	58.10	-7.40	Peak	2347.800	51.87	74.00	-22.13	59.27	-7.40	Peak
2401.900	97.16			104.62	-7.46	Average	2402.300	101.94			109.40	-7.46	Average
2401.900	98.28			105.74	-7.46	Peak	2402.300	102.57			110.03	-7.46	Peak
1978.000	45.25	54.00	-8.75	52.67	-7.42	Average	1978.000	42.50	54.00	-11.50	49.92	-7.42	Average
1978.000	61.19	74.00	-12.81	68.61	-7.42	Peak	1978.000	60.85	74.00	-13.15	68.27	-7.42	Peak
2773.000	40.51	54.00	-13.49	47.04	-6.53	Average	2773.000	39.42	54.00	-14.58	45.95	-6.53	Average
2773.000	59.34	74.00	-14.66	65.87	-6.53	Peak	2773.000	55.32	74.00	-18.68	61.85	-6.53	Peak
3565.000	38.13	54.00	-15.87	40.96	-2.83	Average	4804.000	35.39	54.00	-18.61	34.65	0.74	Average
3565.000	54.93	74.00	-19.07	57.76	-2.83	Peak	4804.000	46.80	74.00	-27.20	46.06	0.74	Peak
4804.000	33.38	54.00	-20.62	32.64	0.74	Average	5146.000	42.51	54.00	-11.49	41.89	0.62	Average
4804.000	45.12	74.00	-28.88	44.38	0.74	Peak	5146.000	62.11	74.00	-11.89	61.49	0.62	Peak
7206.000	34.61	54.00	-19.39	29.39	5.22	Average	7206.000	35.44	54.00	-18.56	30.22	5.22	Average
7206.000	48.99	74.00	-25.01	43.77	5.22	Peak	7206.000	48.56	74.00	-25.44	43.34	5.22	Peak

Middle CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2381.040	38.41	54.00	-15.59	45.83	-7.42	Average	2311.920	38.54	54.00	-15.46	45.89	-7.35	Average
2381.040	50.61	74.00	-23.39	58.03	-7.42	Peak	2311.920	50.84	74.00	-23.16	58.19	-7.35	Peak
2439.840	95.39			102.89	-7.50	Average	2439.840	99.99			107.49	-7.50	Average
2439.840	96.06			103.56	-7.50	Peak	2439.840	101.08			108.58	-7.50	Peak
2491.200	38.21	54.00	-15.79	45.71	-7.50	Average	2517.120	38.51	54.00	-15.49	46.00	-7.49	Average
2491.200	51.04	74.00	-22.96	58.54	-7.50	Peak	2517.120	51.55	74.00	-22.45	59.04	-7.49	Peak
1978.000	43.98	54.00	-10.02	51.40	-7.42	Average	1978.000	42.41	54.00	-11.59	49.83	-7.42	Average
1978.000	62.52	74.00	-11.48	69.94	-7.42	Peak	1978.000	60.56	74.00	-13.44	67.98	-7.42	Peak
2773.000	40.31	54.00	-13.69	46.84	-6.53	Average	2773.000	37.39	54.00	-16.61	43.92	-6.53	Average
2773.000	60.36	74.00	-13.64	66.89	-6.53	Peak	2773.000	57.42	74.00	-16.58	63.95	-6.53	Peak
3565.000	39.76	54.00	-14.24	42.59	-2.83	Average	4352.000	35.45	54.00	-18.55	35.89	-0.44	Average
3565.000	56.22	74.00	-17.78	59.05	-2.83	Peak	4352.000	50.40	74.00	-23.60	50.84	-0.44	Peak
4880.000	33.47	54.00	-20.53	32.51	0.96	Average	4880.000	36.37	54.00	-17.63	35.41	0.96	Average
4880.000	47.46	74.00	-26.54	46.50	0.96	Peak	4880.000	46.19	74.00	-27.81	45.23	0.96	Peak
7320.000	36.30	54.00	-17.70	30.65	5.65	Average	5146.000	42.27	54.00	-11.73	41.58	0.69	Average
7320.000	49.80	74.00	-24.20	44.15	5.65	Peak	5146.000	61.16	74.00	-12.84	60.47	0.69	Peak
							7320.000	35.46	54.00	-18.54	29.81	5.65	Average
							7320.000	48.44	74.00	-25.56	42.79	5.65	Peak

High CH													
Horizontal							Vertical						
Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark	Freq	Level	Limit Line	Over Limit	Read Level	Factor	Remark
MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m		MHz	dBuV/m	dBuV/m	dB	dBuV	dB/m	
2479.760	90.84			98.32	-7.48	Average	2479.760	98.40			105.88	-7.48	Average
2479.760	91.93			99.41	-7.48	Peak	2479.760	98.43			105.91	-7.48	Peak
2528.320	38.55	54.00	-15.45	46.03	-7.48	Average	2528.320	38.71	54.00	-15.29	46.19	-7.48	Average
2528.320	51.43	74.00	-22.57	58.91	-7.48	Peak	2528.320	51.38	74.00	-22.62	58.86	-7.48	Peak
1978.000	39.46	54.00	-14.54	46.88	-7.42	Average	1978.000	41.16	54.00	-12.84	48.58	-7.42	Average
1978.000	62.39	74.00	-11.61	69.81	-7.42	Peak	1978.000	56.64	74.00	-17.36	64.06	-7.42	Peak
2773.000	39.51	54.00	-14.49	46.04	-6.53	Average	2773.000	35.77	54.00	-18.23	42.30	-6.53	Average
2773.000	59.35	74.00	-14.65	65.88	-6.53	Peak	2773.000	51.11	74.00	-22.89	57.64	-6.53	Peak
3565.000	36.87	54.00	-17.13	39.70	-2.83	Average	3565.000	39.16	54.00	-14.84	41.91	-2.75	Average
3565.000	56.01	74.00	-17.99	58.84	-2.83	Peak	3565.000	56.76	74.00	-17.24	59.51	-2.75	Peak
4960.000	33.32	54.00	-20.68	32.32	1.00	Average	4960.000	36.53	54.00	-17.47	35.53	1.00	Average
4960.000	45.22	74.00	-28.78	44.22	1.00	Peak	4960.000	47.74	74.00	-26.26	46.74	1.00	Peak
5146.000	36.26	54.00	-17.74	35.57	0.69	Average	5146.000	41.60	54.00	-12.40	40.98	0.62	Average
5146.000	52.56	74.00	-21.44	51.87	0.69	Peak	5146.000	58.65	74.00	-15.35	58.03	0.62	Peak
7440.000	35.61	54.00	-18.39	29.50	6.11	Average	7440.000	36.98	54.00	-17.02	30.87	6.11	Average
7440.000	47.80	74.00	-26.20	41.69	6.11	Peak	7440.000	46.91	74.00	-27.09	40.80	6.11	Peak

Above 1G (1 GHz-26.5 GHz): test the output power worst mode: Middle Channel



Result = Reading + Correct Factor

Margin = Result – Limit

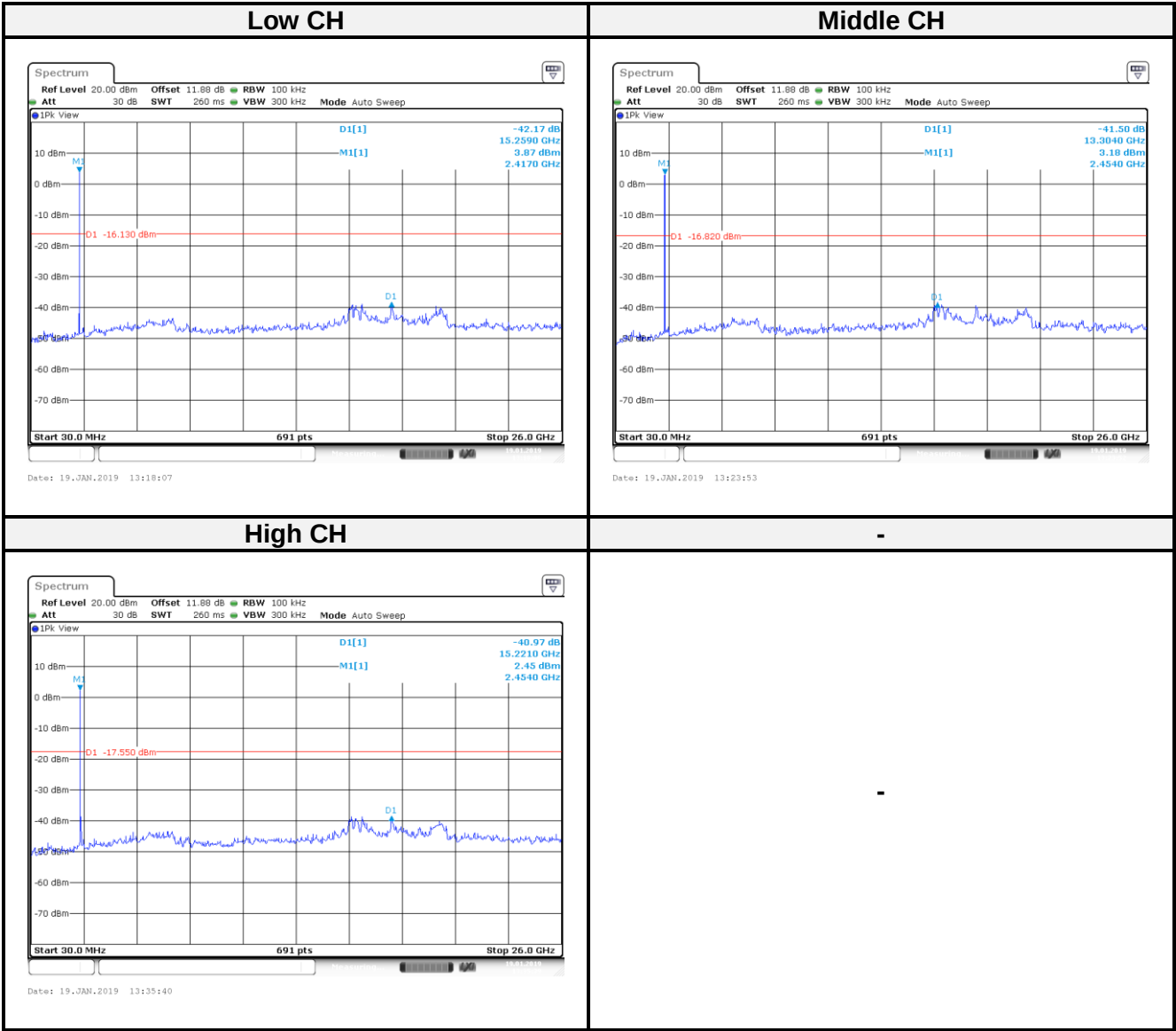
Correct Factor = Antenna Factor + Cable Loss – Amplifier Gain

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

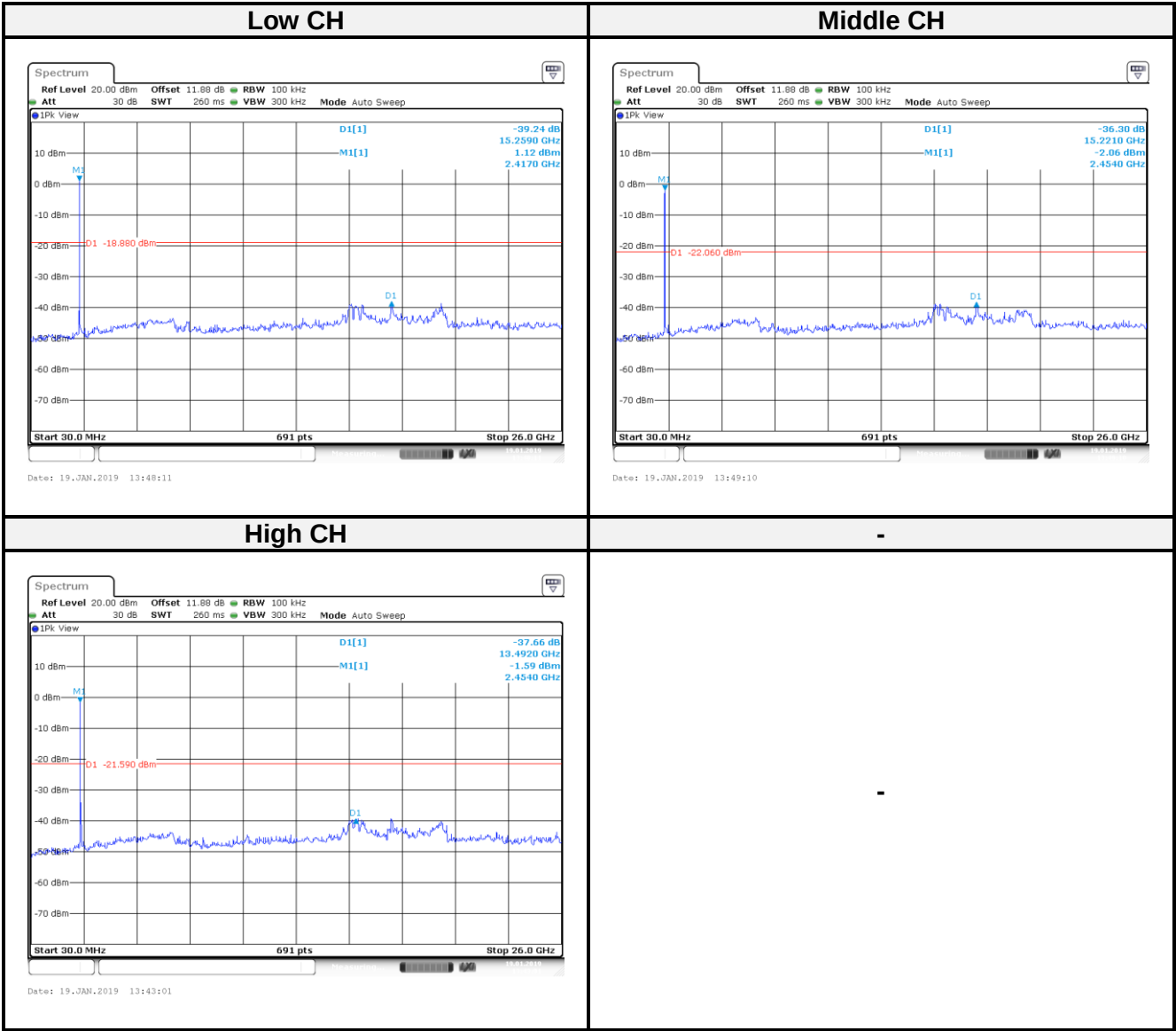
Conducted Spurious Emissions:

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
802.11b mode				
Low	2412	42.17	≥ 20	Compliance
Mid	2437	41.50	≥ 20	Compliance
High	2462	40.97	≥ 20	Compliance
802.11g mode				
Low	2412	39.24	≥ 20	Compliance
Mid	2437	36.30	≥ 20	Compliance
High	2462	37.66	≥ 20	Compliance
802.11n HT20 mode				
Low	2412	38.84	≥ 20	Compliance
Mid	2437	35.92	≥ 20	Compliance
High	2462	38.06	≥ 20	Compliance
BLE mode				
Low	2402	42.18	≥ 20	Compliance
Mid	2440	41.38	≥ 20	Compliance
High	2480	39.79	≥ 20	Compliance

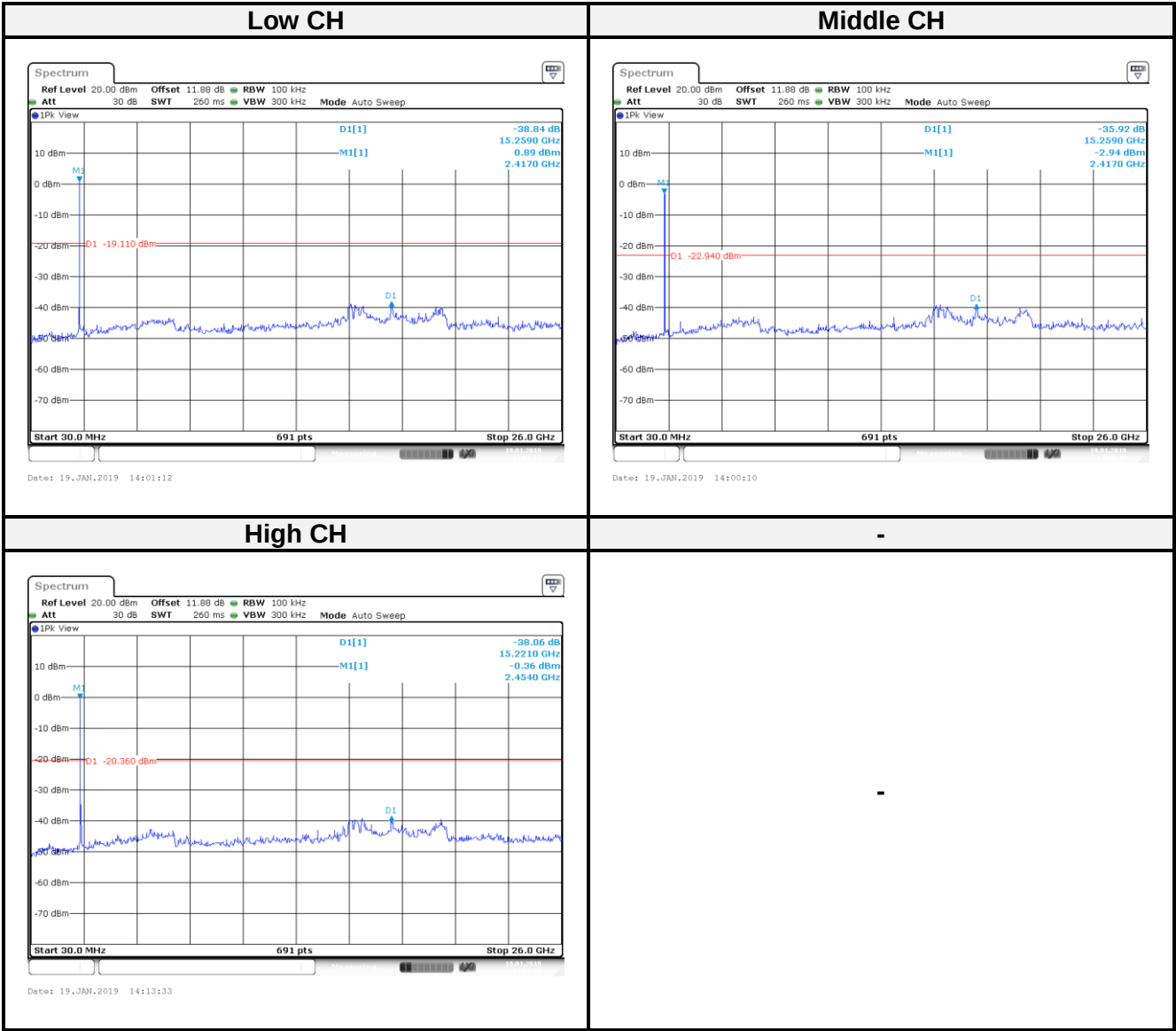
802.11b mode:



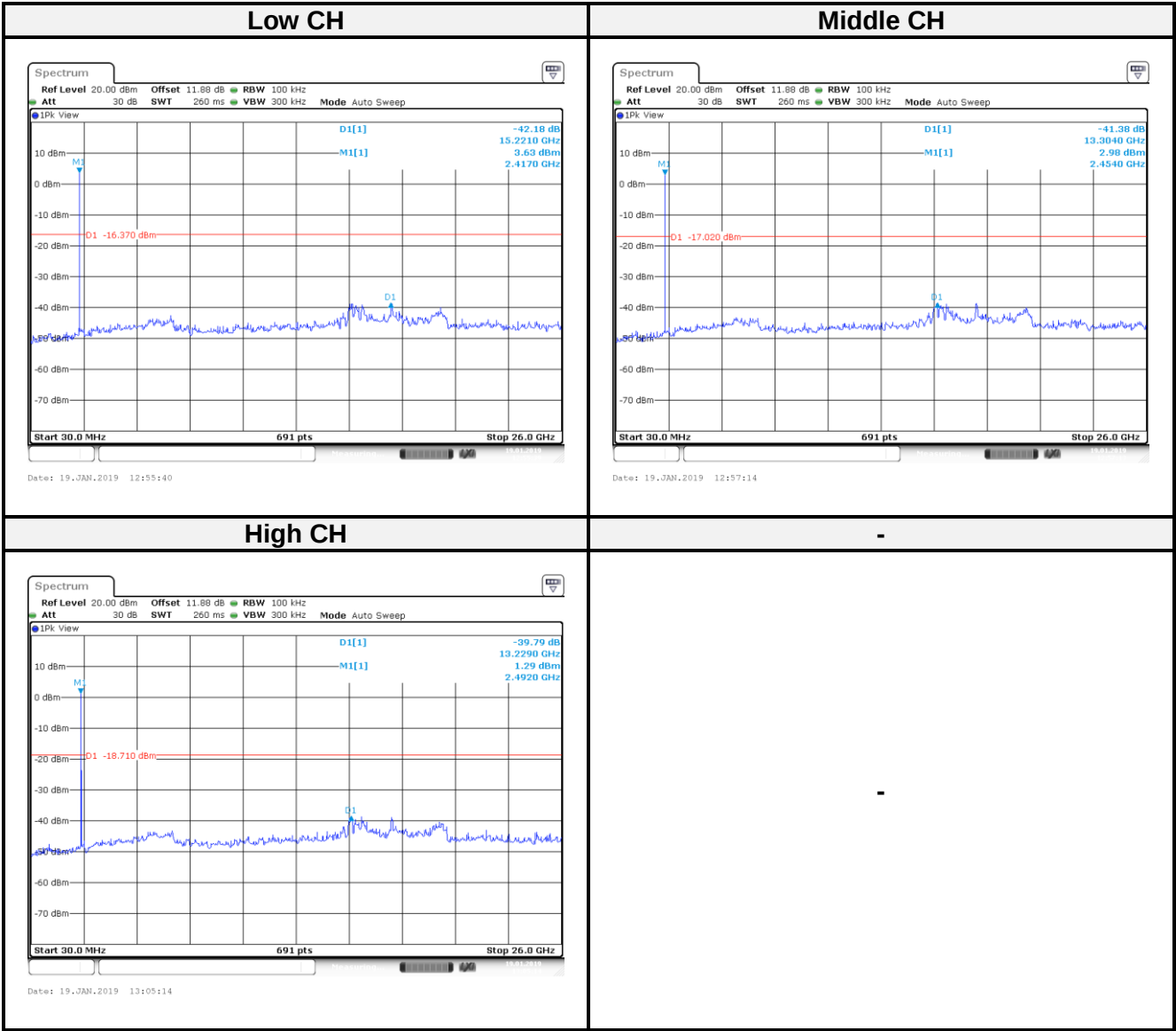
802.11g mode:



802.11n HT20 mode:



BLE mode:



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 $\geq [3 \times \text{RBW}]$. (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					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2018/11/14	2019/11/13
Cable	WOKEN	SFL402	S02-160323-07	2018/02/12	2019/02/11

***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).

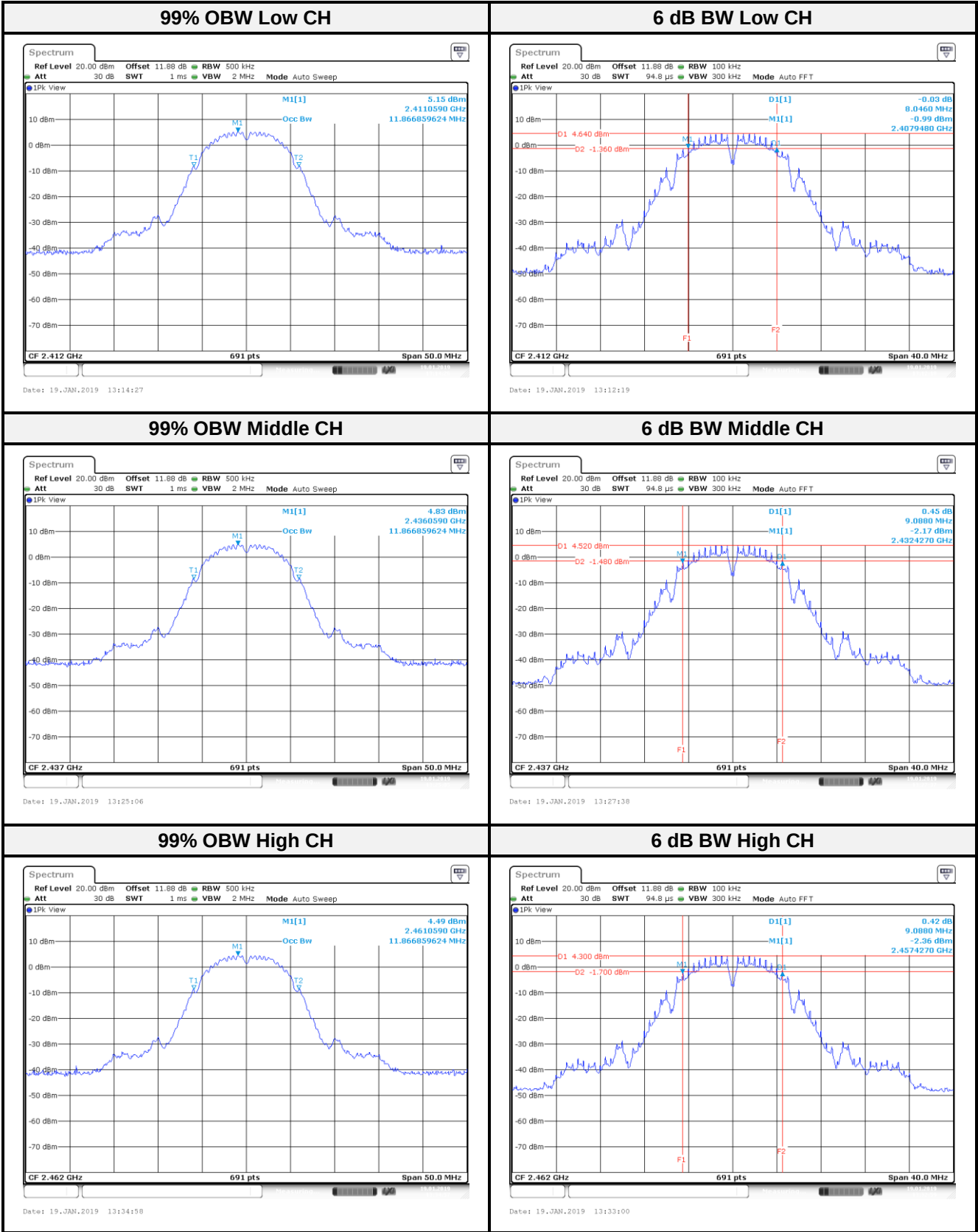
8.4 Test Environmental Conditions

Temperature:	24~26 °C	Relative Humidity:	54~56 %
ATM Pressure:	1015hPa	Test Engineer:	Eric Lee
Conducted Test Date:	2019-01-19~2019-01-22	-	-

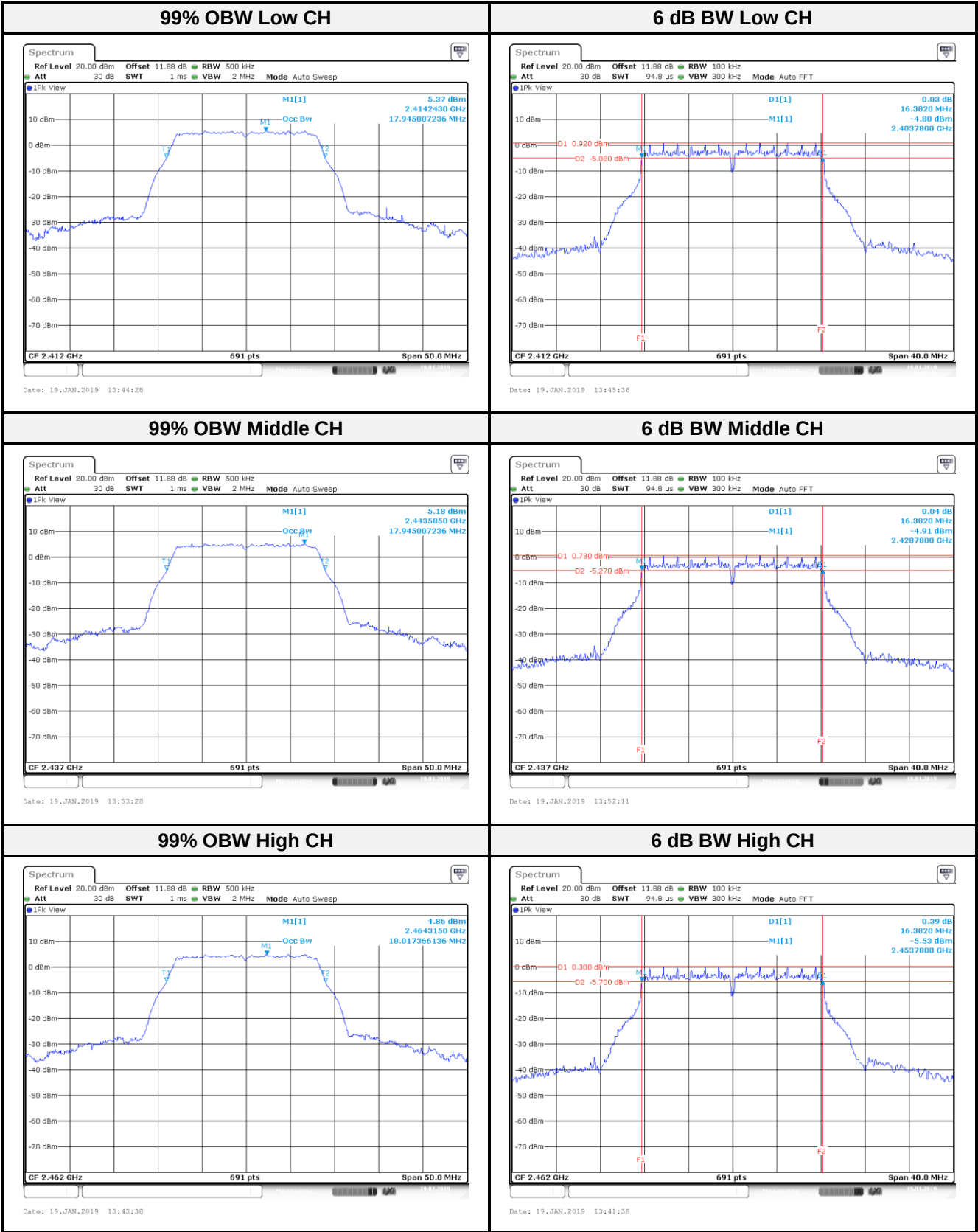
8.5 Test Results

Channel	Frequency (MHz)	99% OBW (MHz)	6 dB BW (MHz)	6dB Limit (MHz)	Result
802.11b mode					
Low	2412	11.87	8.05	> 0.5	Compliance
Middle	2437	11.87	9.09	> 0.5	Compliance
High	2462	11.87	9.09	> 0.5	Compliance
802.11g mode					
Low	2412	17.95	16.38	> 0.5	Compliance
Middle	2437	17.95	16.38	> 0.5	Compliance
High	2462	18.02	16.38	> 0.5	Compliance
802.11n HT20 mode					
Low	2412	19.03	17.66	> 0.5	Compliance
Middle	2437	19.10	17.66	> 0.5	Compliance
High	2462	19.10	17.60	> 0.5	Compliance
BLE mode					
Low	2402	1.05	0.73	> 0.5	Compliance
Middle	2440	1.05	0.73	> 0.5	Compliance
High	2480	1.05	0.73	> 0.5	Compliance

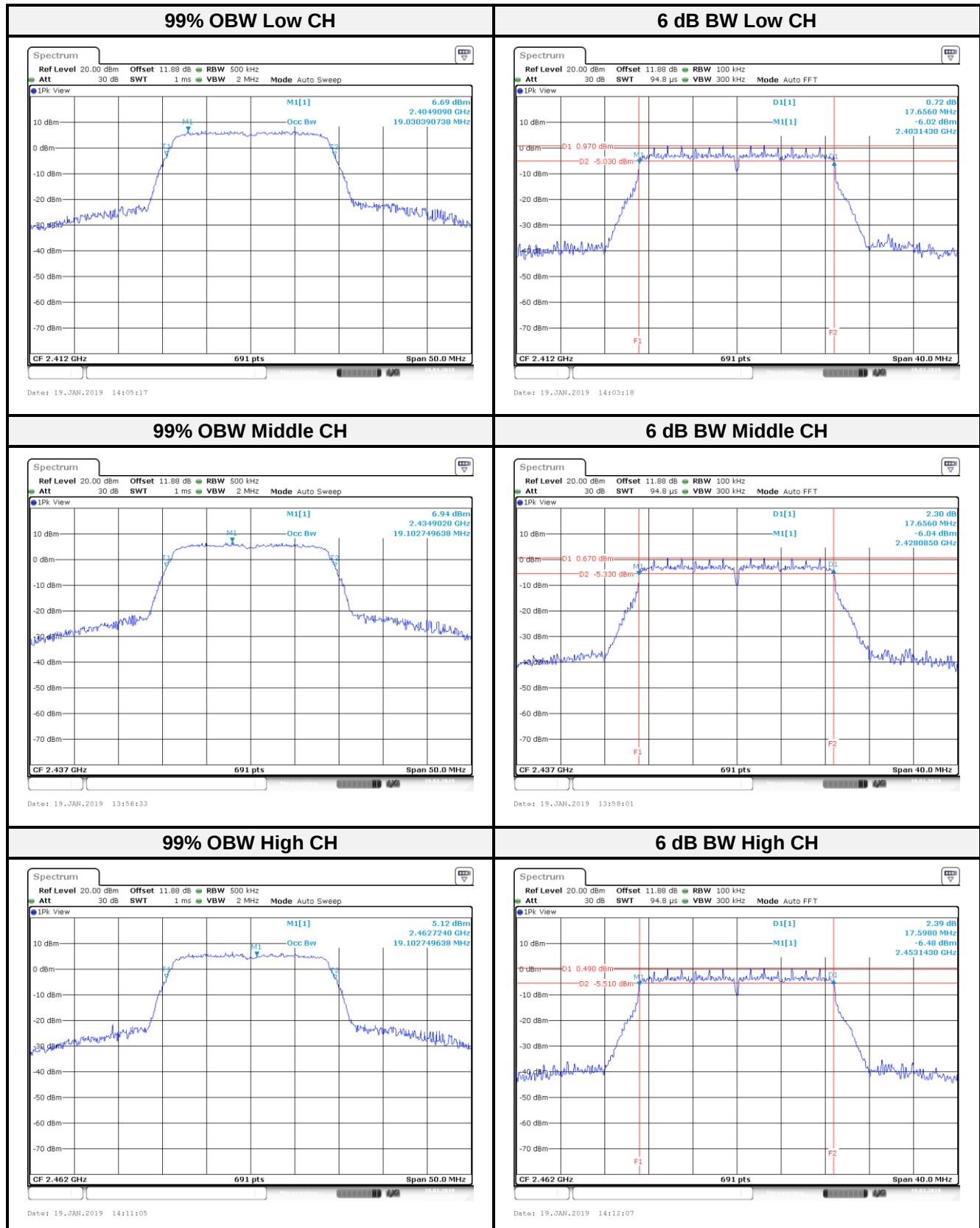
802.11b mode:



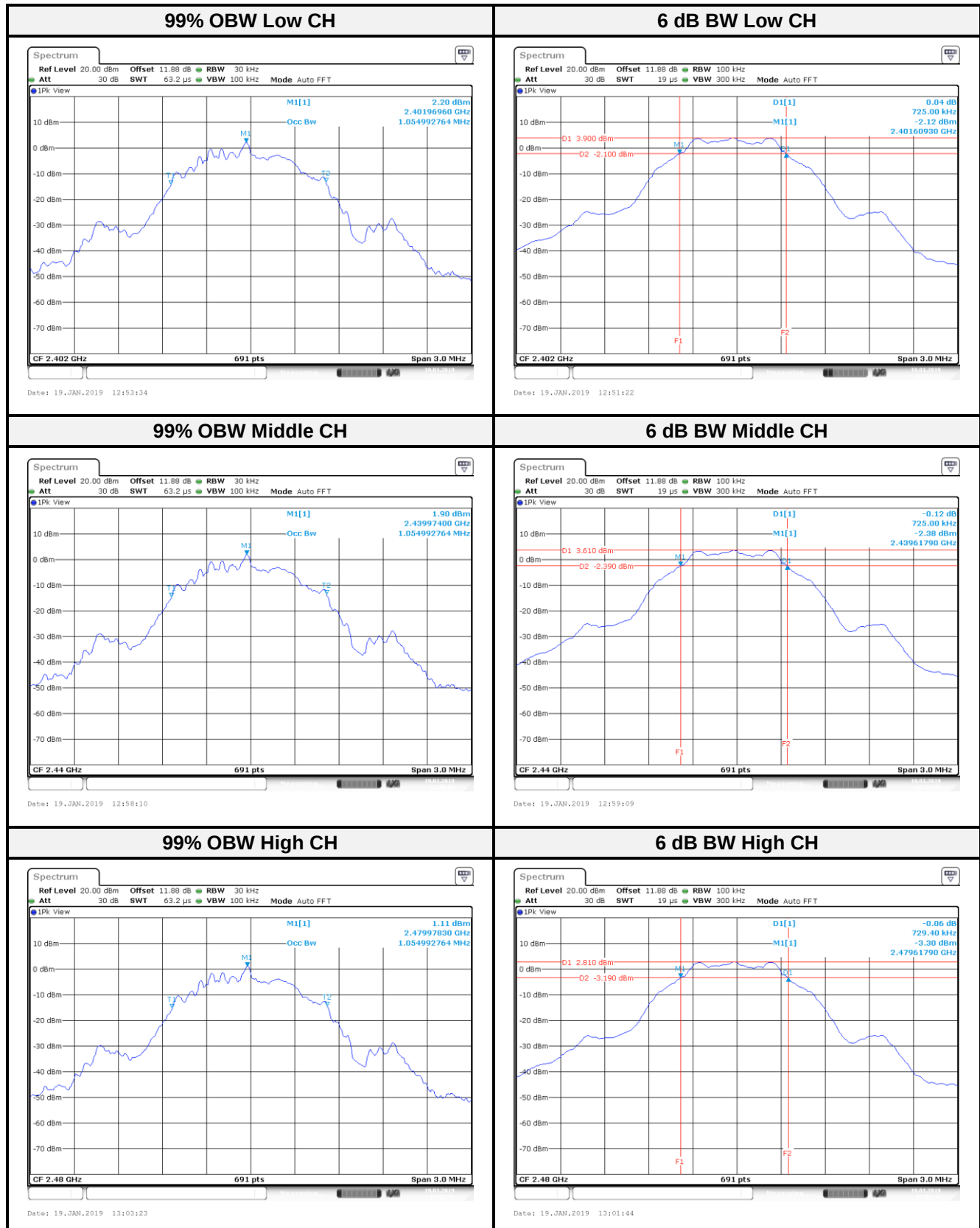
802.11g mode:



802.11n HT20 mode:



BLE mode:



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					
Power Sensor	Keysight	U2021XA	MY54080018	2018/03/07	2019/03/06
Cable	WOKEN	SFL402	S02-160323-07	2018/02/12	2019/02/11

***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 Environmental Conditions

Temperature:	24~26 °C	Relative Humidity:	54~56 %
ATM Pressure:	1015hPa	Test Engineer:	Eric Lee
Conducted Test Date:	2019-01-19~2019-01-22	-	-

9.5 Test Results

Channel	Frequency (MHz)	Peak Output Power (dBm)	Total Peak Output Power (W)	Limit (dBm)	Result
802.11b mode					
Low	2412	16.63	0.0460	30	Compliance
Middle	2437	16.42	0.0438	30	Compliance
High	2462	16.02	0.0399	30	Compliance
802.11g mode					
Low	2412	22.26	0.1682	30	Compliance
Middle	2437	22.31	0.1702	30	Compliance
High	2462	22.50	0.1778	30	Compliance
802.11n HT20 mode					
Low	2412	22.46	0.1761	30	Compliance
Middle	2437	22.42	0.1745	30	Compliance
High	2462	21.94	0.1563	30	Compliance
BLE mode					
Low	2402	5.32	0.0034	30	Compliance
Middle	2440	5.47	0.0035	30	Compliance
High	2480	4.90	0.0030	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					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2018/11/14	2019/11/13
Cable	WOKEN	SFL402	S02-160323-07	2018/02/12	2019/02/11

***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).

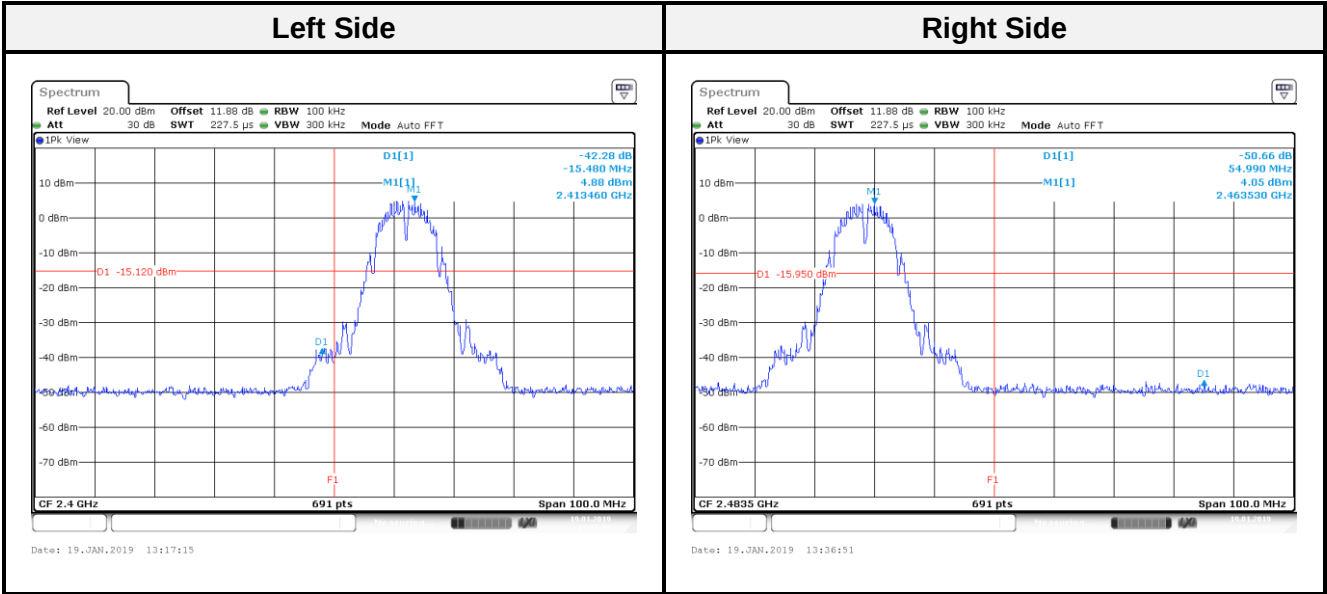
10.4 Test Environmental Conditions

Temperature:	24~26 °C	Relative Humidity:	54~56 %
ATM Pressure:	1015hPa	Test Engineer:	Eric Lee
Conducted Test Date:	2019-01-19~2019-01-22	-	-

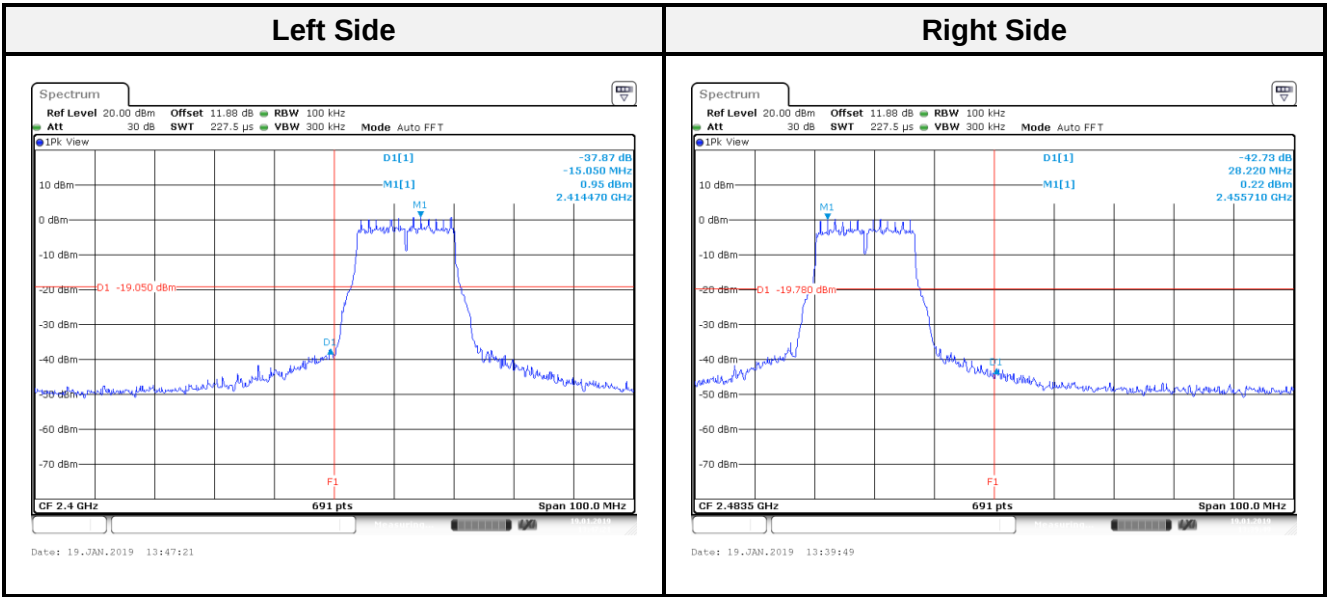
10.5 Test Results

Channel	Frequency (MHz)	Delta Peak to Band Emission (dBc)	Limit (dBc)	Result
802.11b mode				
Low	2412	42.28	≥ 20	Compliance
High	2462	50.66	≥ 20	Compliance
802.11g mode				
Low	2412	37.87	≥ 20	Compliance
High	2462	42.73	≥ 20	Compliance
802.11n HT20 mode				
Low	2412	37.11	≥ 20	Compliance
High	2462	43.05	≥ 20	Compliance
BLE mode				
Low	2402	52.32	≥ 20	Compliance
High	2480	50.04	≥ 20	Compliance

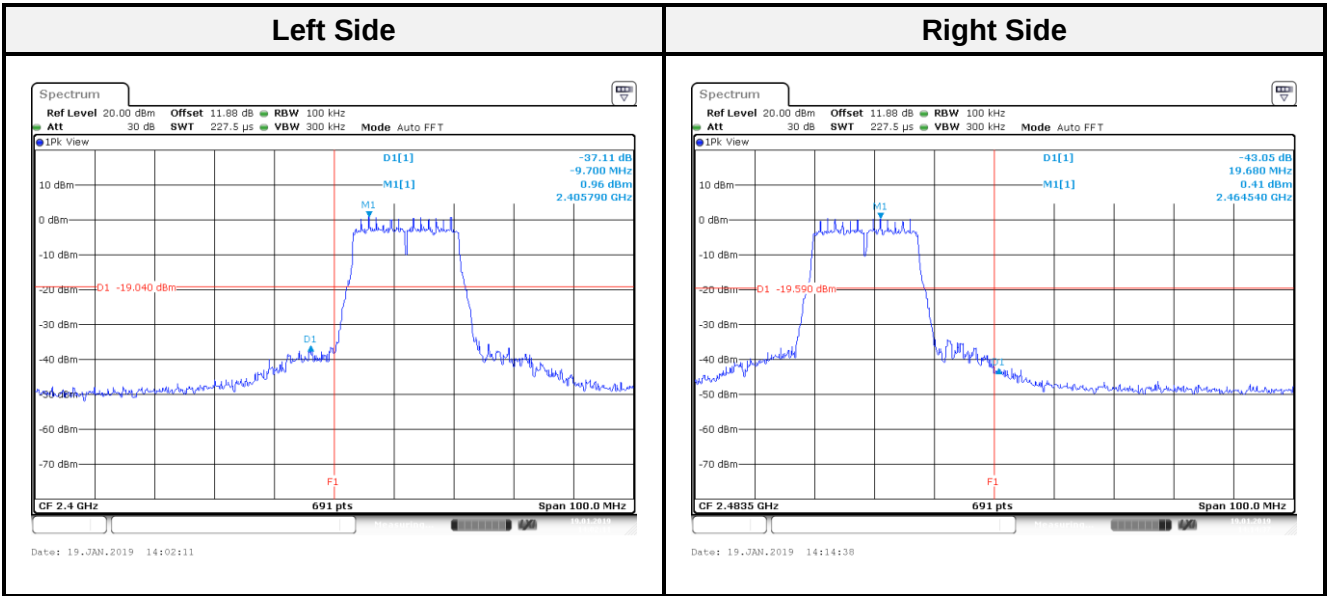
802.11b mode:



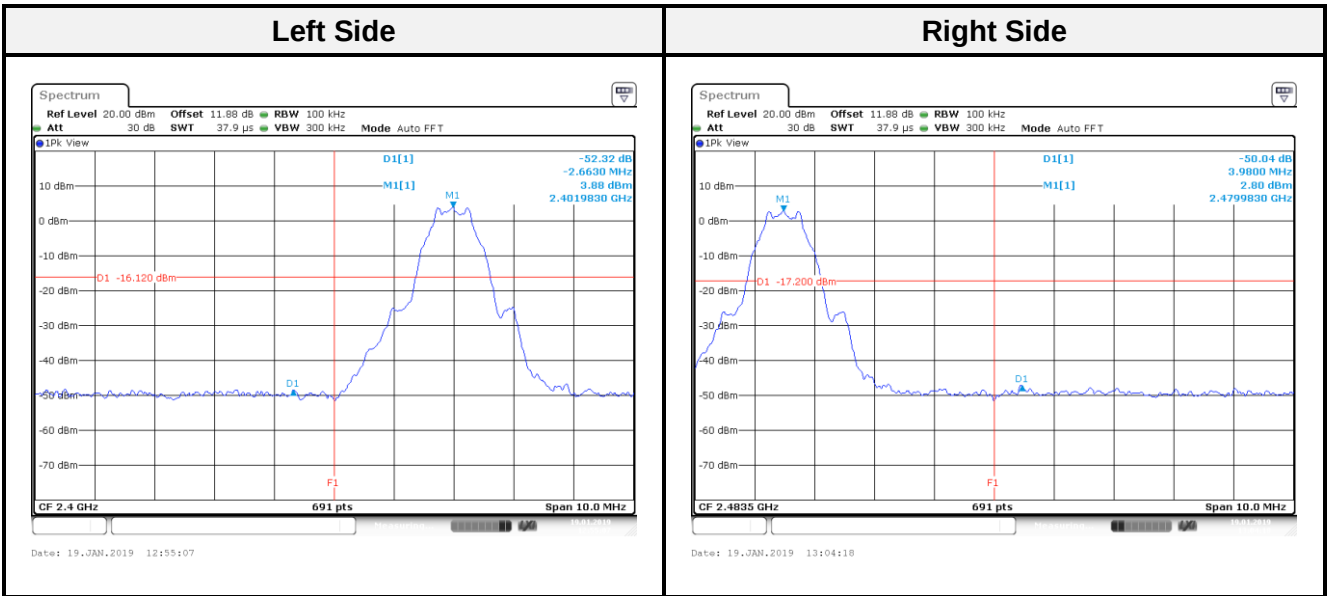
802.11g mode:



802.11n HT20 mode:



BLE mode:



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 $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$.
- (4) Set the VBW $\geq [3 \times \text{RBW}]$. (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					
Spectrum Analyzer	Rohde & Schwarz	FSV40	101140	2018/11/14	2019/11/13
Cable	WOKEN	SFL402	S02-160323-07	2018/02/12	2019/02/11

***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).

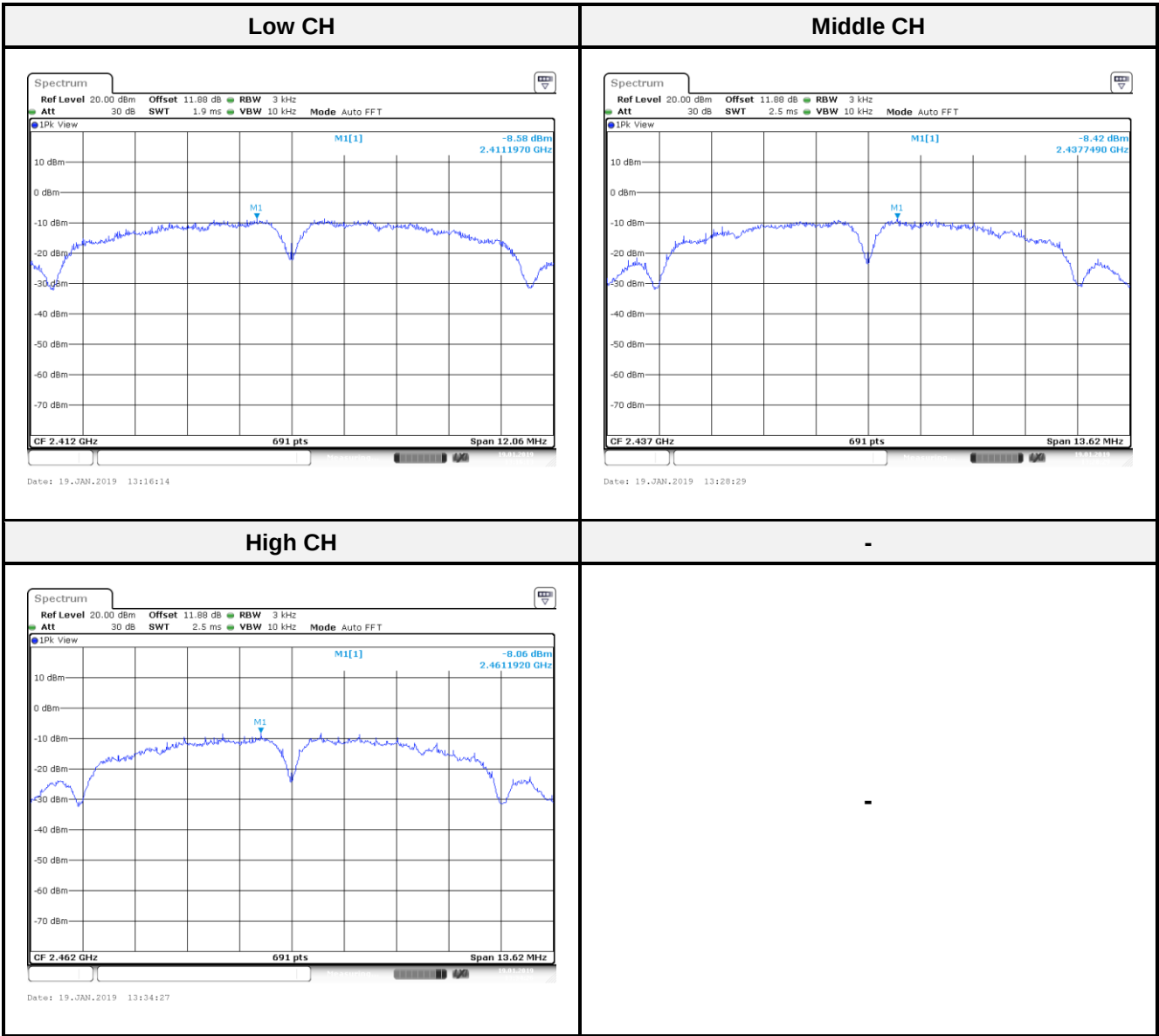
11.4 Test Environmental Conditions

Temperature:	24~26 °C	Relative Humidity:	54~56 %
ATM Pressure:	1015hPa	Test Engineer:	Eric Lee
Conducted Test Date:	2019-01-19~2019-01-22	-	-

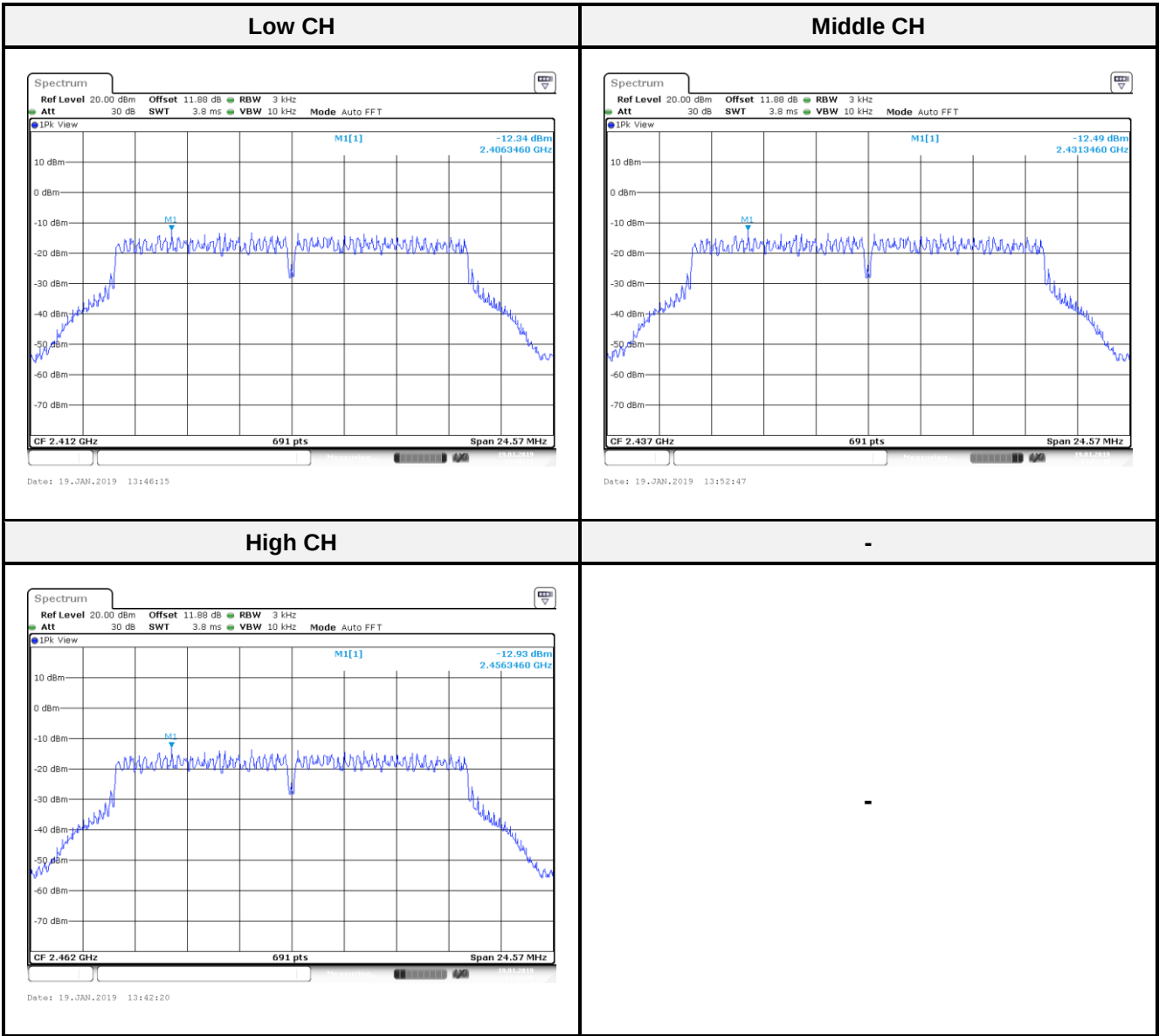
11.5 Test Results

Channel	Frequency (MHz)	PSD (dBm/3 kHz)	Limit (dBm/3 kHz)	Result
802.11b mode				
Low	2412	-8.58	8	Compliance
Middle	2437	-8.42	8	Compliance
High	2462	-8.06	8	Compliance
802.11g mode				
Low	2412	-12.34	8	Compliance
Middle	2437	-12.49	8	Compliance
High	2462	-12.93	8	Compliance
802.11n HT20 mode				
Low	2412	-12.14	8	Compliance
Middle	2437	-11.84	8	Compliance
High	2462	-12.75	8	Compliance
BLE mode				
Low	2402	-9.83	8	Compliance
Middle	2440	-9.98	8	Compliance
High	2480	-10.87	8	Compliance

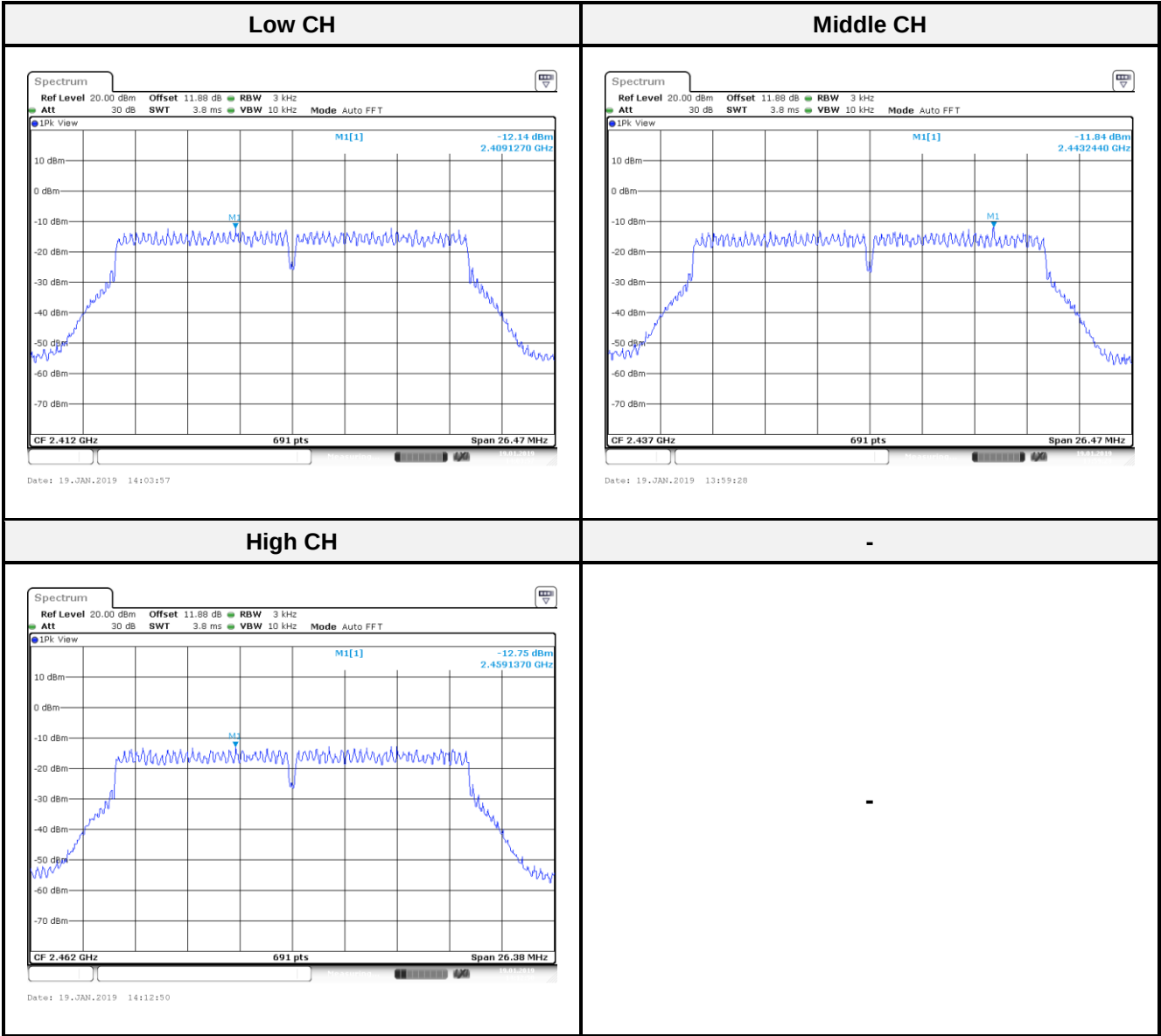
802.11b mode:



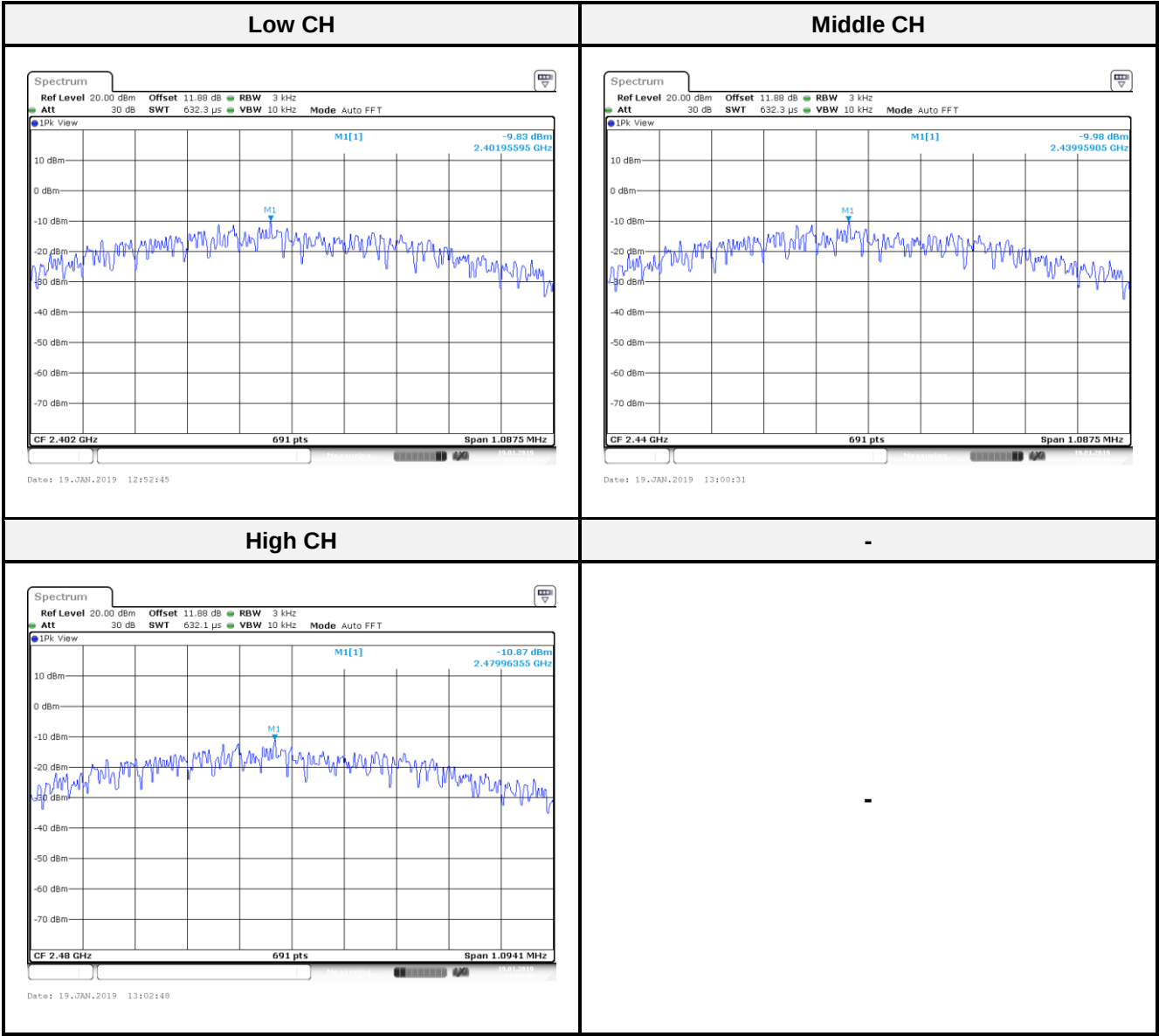
802.11g mode:



802.11n HT20 mode:



BLE mode:



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