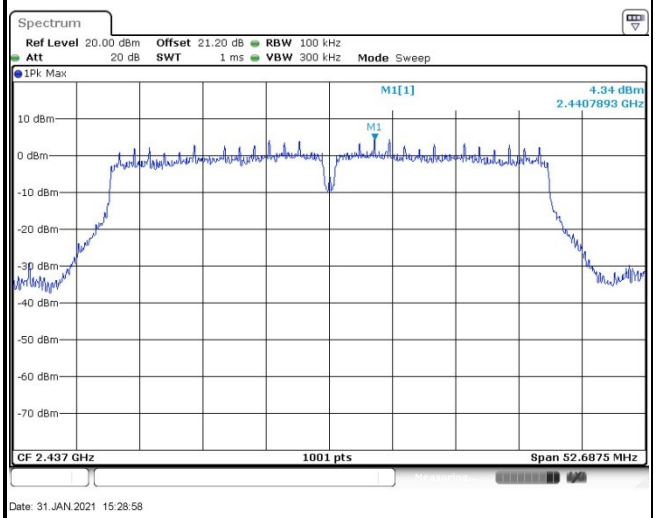
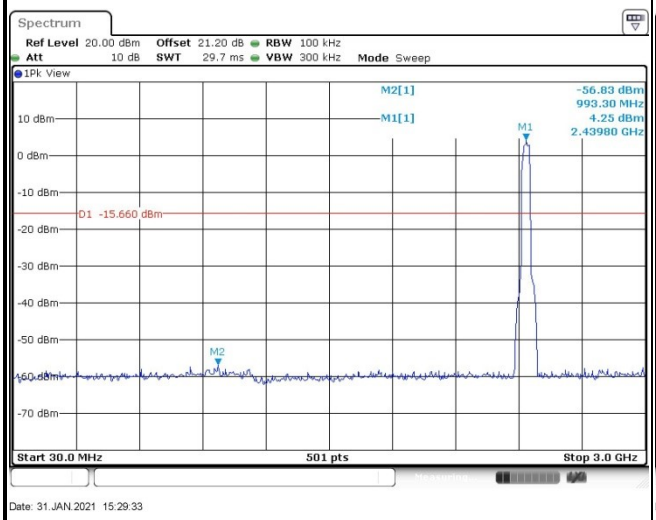
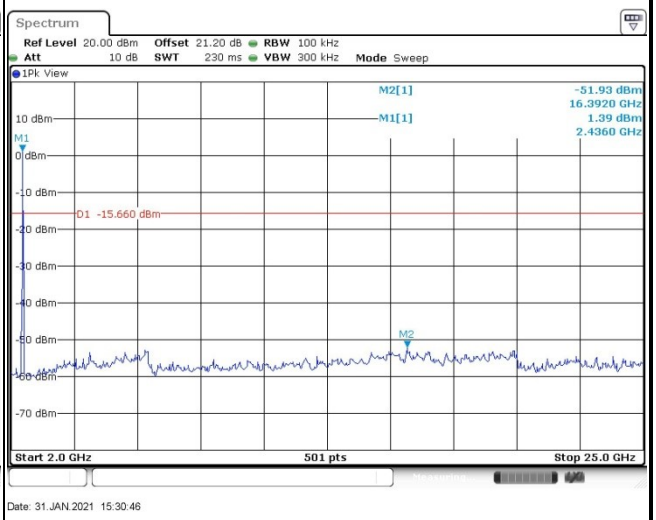
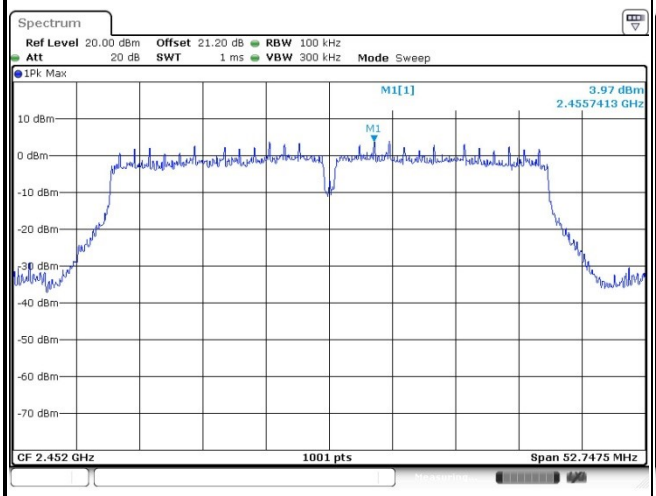
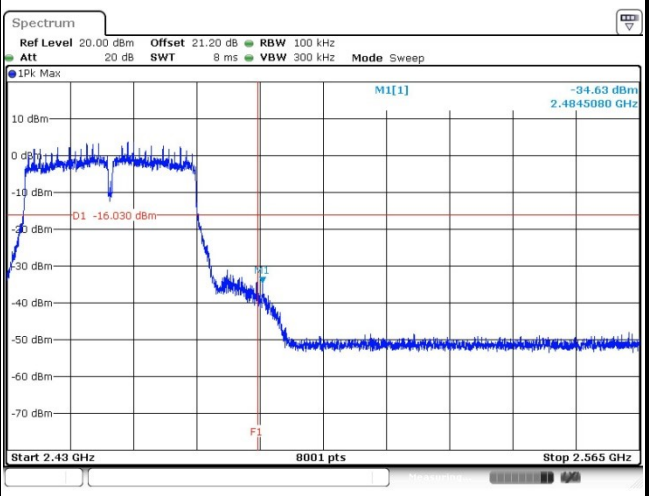
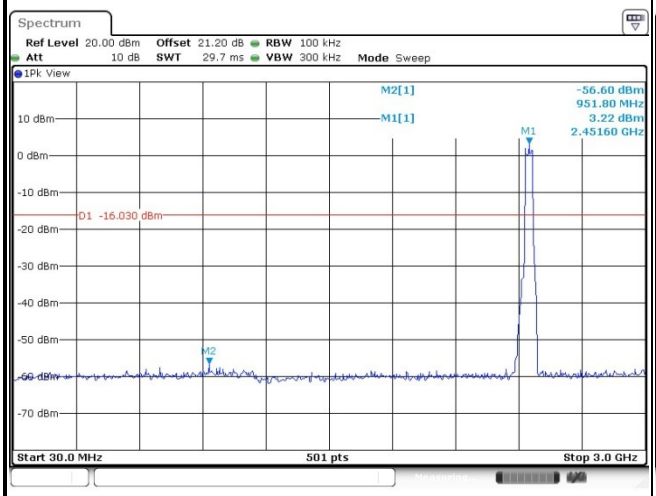
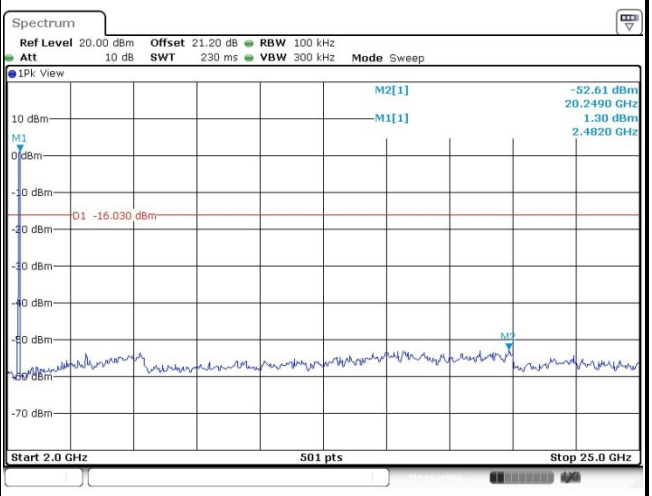
Test Mode :	802.11n HT40	Test Channel :	06

100kHz PSD reference Level	Channel Plot
	

Spurious Emission 30MHz~3GHz	Spurious Emission 2GHz~25GHz
	

Test Mode :	802.11n HT40	Test Channel :	09

100kHz PSD reference Level	Channel Plot
	
Spurious Emission 30MHz~3GHz	**Spurious Emission 2GHz~25GHz**
	

3.5 Radiated Band Edges and Spurious Emission Measurement

3.5.1 Limit of Radiated band edge and Spurious Emission Measurement

In any 100 kHz bandwidth outside the intentional radiator frequency band, all harmonics/spurious must be at least 20 dB below the highest emission level within the authorized band. If the output power of this device was measured by spectrum analyzer, the attenuation under this paragraph shall be 30 dB instead of 20 dB. In addition, radiated emissions which fall in the restricted bands must also comply with the limits as below.

Frequency (MHz)	Field Strength (microvolts/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

3.5.2 Measuring Instruments

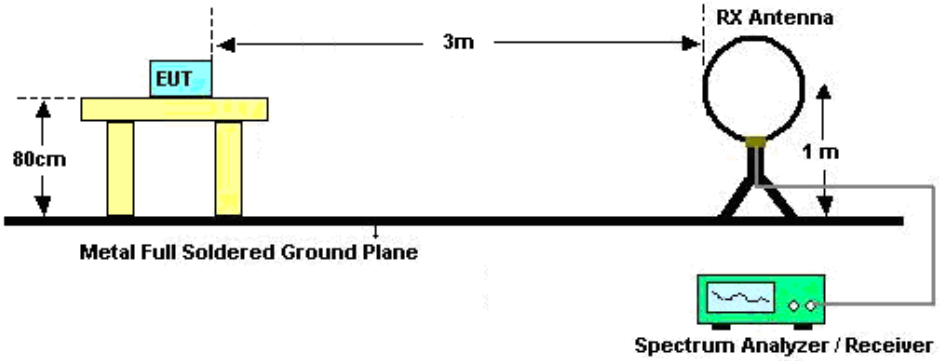
The measuring equipment is listed in the section 4 of this test report.

3.5.3 Test Procedures

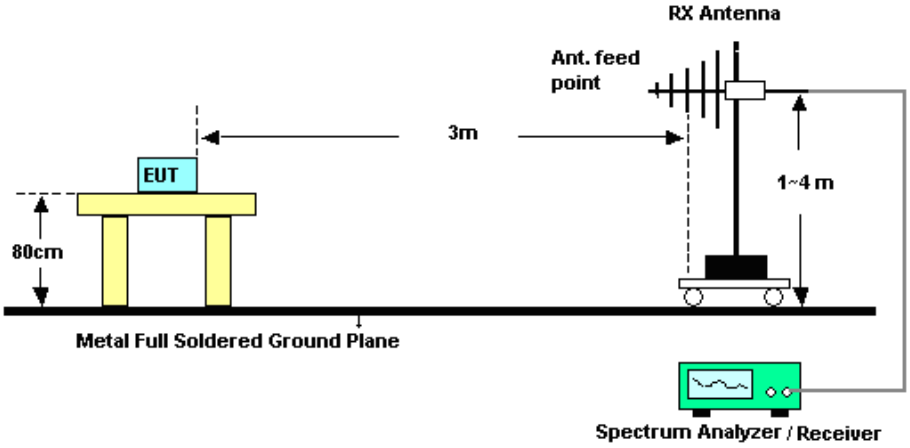
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level.
3. The EUT was placed on a turntable with 0.8 meter for frequency below 1GHz and 1.5 meter for frequency above 1GHz respectively above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. Corrected Reading: Antenna Factor + Cable Loss + Read Level - Preamp Factor = Level
6. For testing below 1GHz, if the emission level of the EUT in peak mode was 3 dB lower than the limit specified, then peak values of EUT will be reported, otherwise, the emissions will be repeated one by one using the CISPR quasi-peak method and reported.
7. For testing above 1GHz, the emission level of the EUT in peak mode was 20dB lower than average limit (that means the emission level in average mode also complies with the limit in average mode), then peak values of EUT will be reported, otherwise, the emissions will be measured in average mode again and reported.
8. Use the following spectrum analyzer settings:
   (1) Span shall wide enough to fully capture the emission being measured;
   (2) Set RBW=100 kHz for f < 1 GHz; VBW ≥ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
   (3) Set RBW = 1 MHz, VBW= 3MHz for f ≥ 1 GHz for peak measurement.
   For average measurement:
   - VBW = 10 Hz, when duty cycle is no less than 98 percent.
   - VBW ≥ 1/T, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

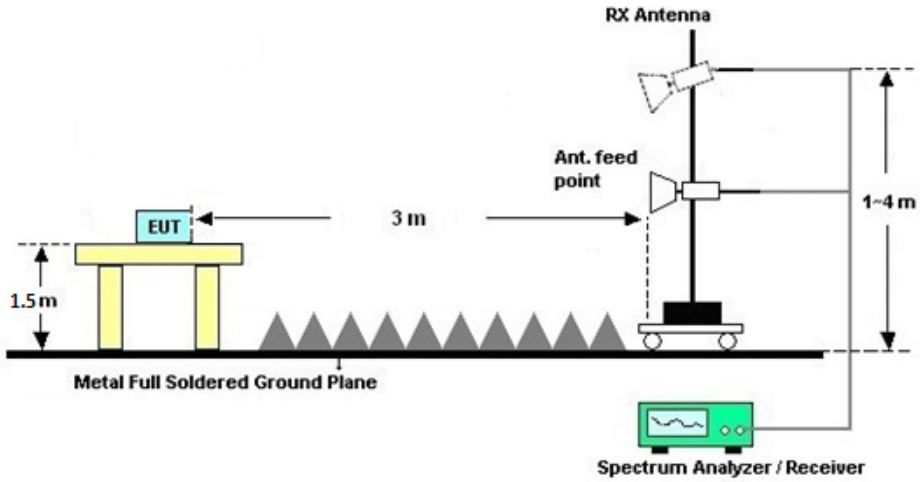
For radiated emissions below 30MHz



For radiated emissions from 30MHz to 1GHz



For radiated emissions above 1GHz



3.5.5 Test Results of Radiated Spurious Emissions (9kHz ~ 30MHz)

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line was not reported.

There is a comparison data of both open-field test site and semi-Anechoic chamber, and the result came out very similar.

3.5.6 Test Result of Radiated Spurious at Band Edges

Please refer to Appendix C.

3.5.7 Duty Cycle

Please refer to Appendix D.

3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix C.

3.6 AC Conducted Emission Measurement

3.6.1 Limit of AC Conducted Emission

For equipment 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.

Frequency of Emission (MHz)	Conducted Limit (dBμV)	
	Quasi-Peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

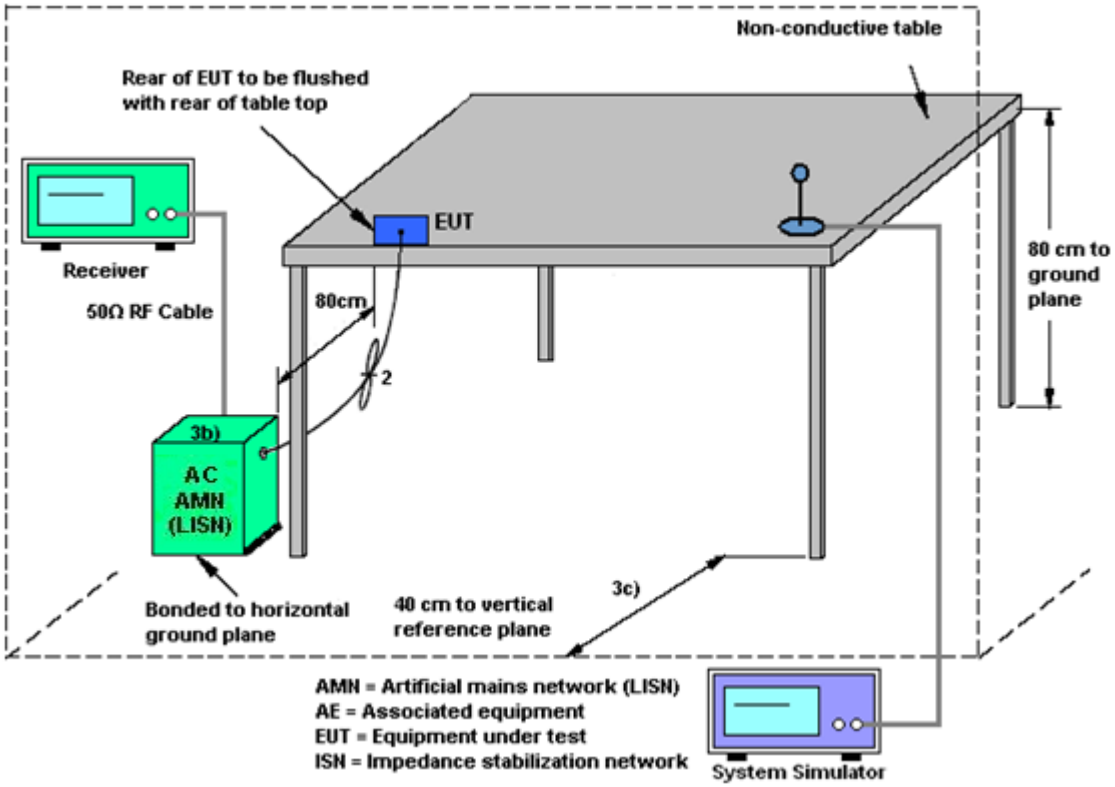
3.6.2 Measuring Instruments

The measuring equipment is listed in the section 4 of this test report.

3.6.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room, and it was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network (LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF bandwidth = 9kHz) with Maximum Hold Mode.

3.6.4 Test Setup



3.6.5 Test Result of AC Conducted Emission

Please refer to Appendix B.

3.7 Antenna Requirements

3.7.1 Standard Applicable

If directional gain of transmitting Antennas is greater than 6dBi, the power shall be reduced by the same level in dB comparing to gain minus 6dBi. 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 rule.

3.7.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.7.3 Antenna Gain

The antenna peak gain of EUT is less than 6 dBi. Therefore, it is not necessary to reduce maximum peak output power limit.

4 List of Measuring Equipment

Instrument	Manufacturer	Model No.	Serial No.	Characteristics	Calibration Date	Test Date	Due Date	Remark
Spectrum Analyzer	R&S	FSV40	101078	10Hz~40GHz	Apr. 17, 2020	Jan. 31, 2021	Apr. 16, 2021	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 25, 2020	Jan. 31, 2021	Dec. 24, 2021	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 25, 2020	Jan. 31, 2021	Dec. 24, 2021	Conducted (TH01-SZ)
EMI Test Receiver&SA	KEYSIGHT	N9038A	MY54450083	20Hz~8.4GHz	Apr. 17, 2020	Feb. 27, 2021	Apr. 16, 2021	Radiation (03CH03-SZ)
EXA Spectrum Anaiyzer	KEYSIGHT	N9010A	MY55150246	10Hz~44GHz;	Apr. 17, 2020	Feb. 27, 2021	Apr. 16, 2021	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	Jun. 22, 2020	Feb. 27, 2021	Jun. 21, 2021	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35408	30MHz-2GHz	Jun. 22, 2020	Feb. 27, 2021	Jun. 21, 2021	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1355	1GHz~18GHz	Apr. 30, 2020	Feb. 27, 2021	Apr. 29, 2021	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 21. 2020	Feb. 27, 2021	Jul. 20, 2021	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 23, 2020	Feb. 27, 2021	Apr. 22, 2021	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102210	0.01Hz ~3000MHz	Oct. 17, 2020	Feb. 27, 2021	Oct. 16, 2021	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-	1943528	1GHz~18GHz	Oct. 17, 2020	Feb. 27, 2021	Oct. 16, 2021	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Dec. 25, 2020	Feb. 27, 2021	Dec. 24, 2021	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	Feb. 27, 2021	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Feb. 27, 2021	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Feb. 27, 2021	NCR	Radiation (03CH03-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 25, 2020	Feb. 02, 2021	Dec. 24, 2021	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2 LISN	00103912	9kHz~30MHz	Dec. 25, 2020	Feb. 02, 2021	Dec. 24, 2021	Conduction (CO01-SZ)
AC LISN (for auxiliary	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 15, 2020	Feb. 02, 2021	Oct. 14, 2021	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 21, 2020	Feb. 02, 2021	Jul. 20, 2021	Conduction (CO01-SZ)

NCR: No Calibration Required

5 Uncertainty of Evaluation

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI 63.10-2013. All the measurement uncertainty value were shown with a coverage K=2 to indicate 95% level of confidence. The measurement data show herein meets or exceeds the CISPR measurement uncertainty values specified in CISPR 16-4-2 and can be compared directly to specified limit to determine compliance.

Uncertainty of Conducted Emission Measurement (150kHz ~ 30MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**2.7 dB**

Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0 dB**

Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.9 dB**

Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**5.0 dB**

Appendix A. Conducted Test Results

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Liu Qiu Qiu	Temperature:	21~25	°C
Test Date:	2021/1/31	Relative Humidity:	51~54	%

TEST RESULTS DATA
Average Output Power

2.4GHz Band												
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			DG (dBi)		EIRP Power (dBm)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	1	1	2412	19.70	-		-2.00	-	17.70	-	Pass
11b	1Mbps	1	6	2437	20.60	-		-2.00	-	18.60	-	Pass
11b	1Mbps	1	11	2462	19.80	-		-2.00	-	17.80	-	Pass
11g	6Mbps	1	1	2412	18.90	-		-2.00	-	16.90	-	Pass
11g	6Mbps	1	6	2437	19.90	-		-2.00	-	17.90	-	Pass
11g	6Mbps	1	11	2462	18.10	-		-2.00	-	16.10	-	Pass
HT20	MCS0	1	1	2412	18.00	-		-2.00	-	16.00	-	Pass
HT20	MCS0	1	6	2437	20.00	-		-2.00	-	18.00	-	Pass
HT20	MCS0	1	11	2462	18.30	-		-2.00	-	16.30	-	Pass
HT40	MCS0	1	3	2422	16.00	-	-	-2.00	-	14.00	-	Pass
HT40	MCS0	1	6	2437	17.10	-		-2.00	-	15.10	-	Pass
HT40	MCS0	1	9	2452	15.80	-		-2.00	-	13.80	-	Pass
VHT20	MCS0	1	1	2412	17.90	-		-2.00	-	15.90	-	Pass
VHT20	MCS0	1	6	2437	19.90	-		-2.00	-	17.90	-	Pass
VHT20	MCS0	1	11	2462	18.10	-		-2.00	-	16.10	-	Pass
VHT40	MCS0	1	3	2422	15.80	-		-2.00	-	13.80	-	Pass
VHT40	MCS0	1	6	2437	17.00	-		-2.00	-	15.00	-	Pass
VHT40	MCS0	1	9	2452	15.70	-		-2.00	-	13.70	-	Pass

Note: Measured power (dBm) has offset with cable loss.

TEST RESULTS DATA
Peak Output Power

2.4GHz Band										
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak Conducted Power (dBm)	Conducted Power Limit (dBm)	DG (dBi)	EIRP Power (dBm)	EIRP Power Limit (dBm)	Pass /Fail
					Ant 1	Ant 1	Ant 1	Ant 1	Ant 1	
11b	1Mbps	1	1	2412	21.55	30.00	-2.00	19.55	36.00	Pass
11b	1Mbps	1	6	2437	22.33	30.00	-2.00	20.33	36.00	Pass
11b	1Mbps	1	11	2462	21.60	30.00	-2.00	19.60	36.00	Pass
11g	6Mbps	1	1	2412	22.85	30.00	-2.00	20.85	36.00	Pass
11g	6Mbps	1	6	2437	24.00	30.00	-2.00	22.00	36.00	Pass
11g	6Mbps	1	11	2462	22.23	30.00	-2.00	20.23	36.00	Pass
HT20	MCS0	1	1	2412	22.18	30.00	-2.00	20.18	36.00	Pass
HT20	MCS0	1	6	2437	24.02	30.00	-2.00	22.02	36.00	Pass
HT20	MCS0	1	11	2462	22.34	30.00	-2.00	20.34	36.00	Pass
HT40	MCS0	1	3	2422	21.65	30.00	-2.00	19.65	36.00	Pass
HT40	MCS0	1	6	2437	22.56	30.00	-2.00	20.56	36.00	Pass
HT40	MCS0	1	9	2452	21.53	30.00	-2.00	19.53	36.00	Pass
VHT20	MCS0	1	1	2412	22.03	30.00	-2.00	20.03	36.00	Pass
VHT20	MCS0	1	6	2437	24.00	30.00	-2.00	22.00	36.00	Pass
VHT20	MCS0	1	11	2462	22.16	30.00	-2.00	20.16	36.00	Pass
VHT40	MCS0	1	3	2422	21.55	30.00	-2.00	19.55	36.00	Pass
VHT40	MCS0	1	6	2437	22.43	30.00	-2.00	20.43	36.00	Pass
VHT40	MCS0	1	9	2452	21.50	30.00	-2.00	19.50	36.00	Pass

Note: Measured power (dBm) has offset with cable loss.

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	99% Occupied BW (MHz)	6dB BW (MHz)	6dB BW Limit (MHz)	Pass/Fail
					Ant 1	Ant 1		
11b	1Mbps	1	1	2412	14.14	8.05	0.50	Pass
11b	1Mbps	1	6	2437	14.04	8.07	0.50	Pass
11b	1Mbps	1	11	2462	14.09	8.07	0.50	Pass
11g	6Mbps	1	1	2412	17.33	15.45	0.50	Pass
11g	6Mbps	1	6	2437	17.08	15.50	0.50	Pass
11g	6Mbps	1	11	2462	17.28	15.49	0.50	Pass
HT20	MCS0	1	1	2412	18.58	15.96	0.50	Pass
HT20	MCS0	1	6	2437	18.13	16.52	0.50	Pass
HT20	MCS0	1	11	2462	18.23	16.14	0.50	Pass
HT40	MCS0	1	3	2422	36.46	35.68	0.50	Pass
HT40	MCS0	1	6	2437	36.56	35.13	0.50	Pass
HT40	MCS0	1	9	2452	36.56	35.17	0.50	Pass

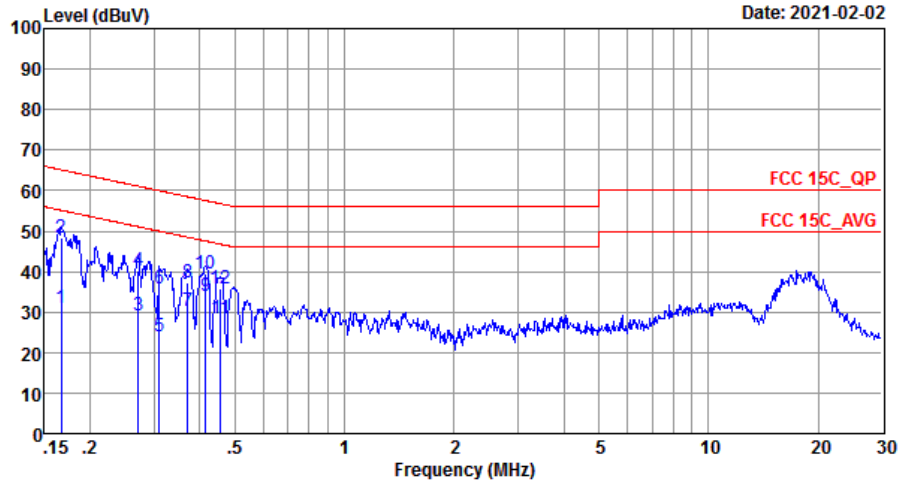
TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band								
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)	DG (dBi)	Peak PSD Limit (dBm/3kHz)	Pass/Fail
					Ant 1	Ant 1	Ant 1	
11b	1Mbps	1	1	2412	-6.89	-2.00	8.00	Pass
11b	1Mbps	1	6	2437	-6.87	-2.00	8.00	Pass
11b	1Mbps	1	11	2462	-5.84	-2.00	8.00	Pass
11g	6Mbps	1	1	2412	-6.89	-2.00	8.00	Pass
11g	6Mbps	1	6	2437	-7.58	-2.00	8.00	Pass
11g	6Mbps	1	11	2462	-7.24	-2.00	8.00	Pass
HT20	MCS0	1	1	2412	-6.24	-2.00	8.00	Pass
HT20	MCS0	1	6	2437	-5.41	-2.00	8.00	Pass
HT20	MCS0	1	11	2462	-7.46	-2.00	8.00	Pass
HT40	MCS0	1	3	2422	-10.63	-2.00	8.00	Pass
HT40	MCS0	1	6	2437	-11.06	-2.00	8.00	Pass
HT40	MCS0	1	9	2452	-10.58	-2.00	8.00	Pass

Measured power density (dBm) has offset with cable loss.

Appendix B. AC Conducted Emission Test Results

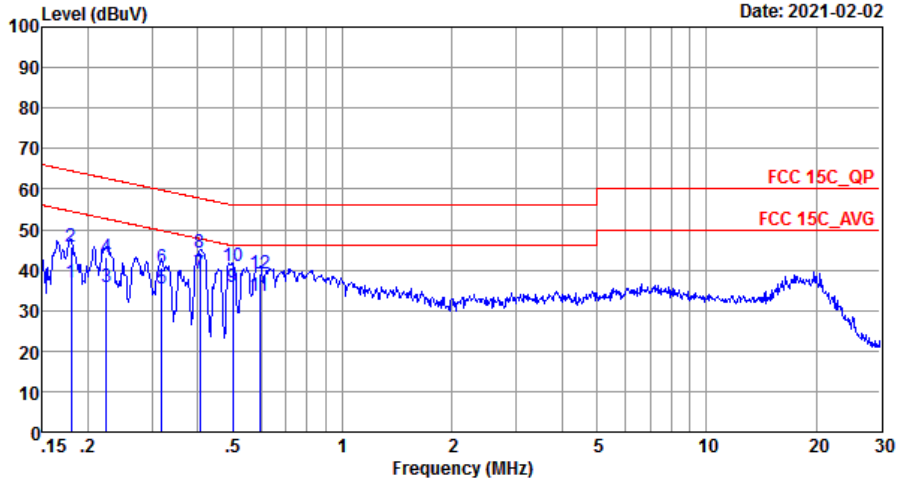
Test Engineer :	Xie YuQiang	**Temperature :**	22~25℃
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_20200719_L LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.17	31.14	-23.98	55.12	21.10	0.03	10.01	Average
2		0.17	48.34	-16.78	65.12	38.30	0.03	10.01	QP
3		0.27	29.04	-22.03	51.07	19.00	0.03	10.01	Average
4		0.27	40.04	-21.03	61.07	30.00	0.03	10.01	QP
5		0.31	23.84	-26.13	49.97	13.80	0.03	10.01	Average
6		0.31	35.64	-24.33	59.97	25.60	0.03	10.01	QP
7		0.37	30.34	-18.13	48.47	20.30	0.03	10.01	Average
8		0.37	37.14	-21.33	58.47	27.10	0.03	10.01	QP
9	*	0.41	33.85	-13.70	47.55	23.80	0.03	10.02	Average
10		0.41	39.55	-18.00	57.55	29.50	0.03	10.02	QP
11		0.46	28.56	-18.20	46.76	18.50	0.02	10.04	Average
12		0.46	35.96	-20.80	56.76	25.90	0.02	10.04	QP

Test Engineer :	Xie YuQiang	Temperature :	22~25℃
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-SZ
Condition: FCC 15C_QP LISN_20200719_N NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.18	37.04	-17.46	54.50	27.00	0.03	10.01	Average
2		0.18	45.74	-18.76	64.50	35.70	0.03	10.01	QP
3		0.22	35.74	-16.92	52.66	25.70	0.03	10.01	Average
4		0.22	43.04	-19.62	62.66	33.00	0.03	10.01	QP
5		0.32	35.54	-14.21	49.75	25.50	0.03	10.01	Average
6		0.32	40.54	-19.21	59.75	30.50	0.03	10.01	QP
7	*	0.41	39.23	-8.50	47.73	29.20	0.02	10.01	Average
8		0.41	44.33	-13.40	57.73	34.30	0.02	10.01	QP
9		0.50	35.68	-10.33	46.01	25.60	0.02	10.06	Average
10		0.50	40.78	-15.23	56.01	30.70	0.02	10.06	QP
11		0.59	33.49	-12.51	46.00	23.40	0.02	10.07	Average
12		0.59	39.19	-16.81	56.00	29.10	0.02	10.07	QP

Note:

1. Level(dBμV) = Read Level(dBμV) + LISN Factor(dB) + Cable Loss(dB)
2. Over Limit(dB) = Level(dBμV) – Limit Line(dBμV)

Appendix C. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2389.695	51.14	-22.86	74	52.83	26.98	4.91	33.58	179	162	P	H
		2387.385	42.53	-11.47	54	44.22	26.98	4.91	33.58	179	162	A	H
	*	2412	108.78	-	-	110.41	27	4.93	33.56	179	162	P	H
	*	2412	105.85	-	-	107.48	27	4.93	33.56	179	162	A	H
		2388.33	52.44	-21.56	74	54.13	26.98	4.91	33.58	221	113	P	V
		2387.28	42.24	-11.76	54	43.93	26.98	4.91	33.58	221	113	A	V
	*	2412	105.13	-	-	106.76	27	4.93	33.56	221	113	P	V
	*	2412	102.98	-	-	104.61	27	4.93	33.56	221	113	A	V
802.11b CH 06 2437MHz		2365.16	49.12	-24.88	74	50.93	26.93	4.84	33.58	176	159	P	H
		2389.94	39.35	-14.65	54	41.02	26.98	4.91	33.56	176	159	A	H
	*	2437	108.4	-	-	109.94	27.04	4.96	33.54	176	159	P	H
	*	2437	105.22	-	-	106.76	27.04	4.96	33.54	176	159	A	H
		2497.41	49.95	-24.05	74	51.34	27.1	5.01	33.5	176	159	P	H
		2483.69	39.87	-14.13	54	41.31	27.08	4.99	33.51	176	159	A	H
		2385.74	49.31	-24.69	74	51	26.98	4.91	33.58	216	104	P	V
		2389.94	39.28	-14.72	54	40.95	26.98	4.91	33.56	216	104	A	V
	*	2437	105.3	-	-	106.84	27.04	4.96	33.54	216	104	P	V
	*	2437	101.7	-	-	103.24	27.04	4.96	33.54	216	104	A	V
		2497.2	50.95	-23.05	74	52.34	27.1	5.01	33.5	216	104	P	V
		2483.97	39.71	-14.29	54	41.15	27.08	4.99	33.51	216	104	A	V

802.11b CH 11 2462MHz	*	2462	108.81	-	-	110.3	27.06	4.98	33.53	123	163	P	H
	*	2462	105.66	-	-	107.15	27.06	4.98	33.53	123	163	A	H
		2487.28	52.64	-21.36	74	54.08	27.08	4.99	33.51	123	163	P	H
		2487.16	44.08	-9.92	54	45.52	27.08	4.99	33.51	123	163	A	H
	*	2462	106.57	-	-	108.06	27.06	4.98	33.53	216	104	P	V
	*	2462	103.43	-	-	104.92	27.06	4.98	33.53	216	104	A	V
		2486.64	52.36	-21.64	74	53.8	27.08	4.99	33.51	216	104	P	V
		2486.88	43.09	-10.91	54	44.53	27.08	4.99	33.51	216	104	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 01 2412MHz		4824	51.5	-22.5	74	71.02	30.85	7.11	57.48	165	41	P	H
		4824	50.37	-3.63	54	69.89	30.85	7.11	57.48	165	41	A	H
		4824	48.03	-25.97	74	67.55	30.85	7.11	57.48	169	357	P	V
		4824	45.93	-8.07	54	65.45	30.85	7.11	57.48	169	357	A	V
802.11b CH 06 2437MHz		4874	52.97	-21.03	74	72.31	30.99	7.19	57.52	168	41	P	H
		4874	50.99	-3.01	54	70.33	30.99	7.19	57.52	168	41	A	H
		7311	46.06	-27.94	74	59.96	36.26	8.76	58.92	174	100	P	H
		4874	49.77	-24.23	74	69.11	30.99	7.19	57.52	201	0	P	V
		4874	47.02	-6.98	54	66.36	30.99	7.19	57.52	201	0	A	V
		7311	46.32	-27.68	74	60.22	36.26	8.76	58.92	120	106	P	V
802.11b CH 11 2462MHz		4924	53.19	-20.81	74	72.4	31.12	7.22	57.55	161	39	P	H
		4924	50.43	-3.57	54	69.64	31.12	7.22	57.55	161	39	A	H
		7386	46.29	-27.71	74	59.75	36.55	8.95	58.96	145	274	P	H
		4924	49.77	-24.23	74	68.98	31.12	7.22	57.55	201	0	P	V
		4924	47.79	-6.21	54	67	31.12	7.22	57.55	201	0	A	V
		7386	45.24	-28.76	74	58.7	36.55	8.95	58.96	166	210	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		2389.905	58.24	-15.76	74	59.91	26.98	4.91	33.56	172	21	P	H
		2390	48.27	-5.73	54	49.94	26.98	4.91	33.56	172	21	A	H
	*	2412	108.78	-	-	110.41	27	4.93	33.56	172	21	P	H
	*	2412	100.36	-	-	101.99	27	4.93	33.56	172	21	A	H
		2390	57.16	-16.84	74	58.83	26.98	4.91	33.56	207	97	P	V
		2390	46.81	-7.19	54	48.48	26.98	4.91	33.56	207	97	A	V
	*	2412	107.47	-	-	109.1	27	4.93	33.56	207	97	P	V
	*	2412	99.53	-	-	101.16	27	4.93	33.56	207	97	A	V
802.11g CH 06 2437MHz		2388.82	50.3	-23.7	74	51.99	26.98	4.91	33.58	201	163	P	H
		2389.8	40.24	-13.76	54	41.91	26.98	4.91	33.56	201	163	A	H
	*	2437	109.5	-	-	111.04	27.04	4.96	33.54	201	163	P	H
	*	2437	101.61	-	-	103.15	27.04	4.96	33.54	201	163	A	H
		2485.79	50.64	-23.36	74	52.08	27.08	4.99	33.51	201	163	P	H
		2483.5	40.94	-13.06	54	42.38	27.08	4.99	33.51	201	163	A	H
		2371.32	49.62	-24.38	74	51.36	26.96	4.88	33.58	202	118	P	V
		2389.94	39.92	-14.08	54	41.59	26.98	4.91	33.56	202	118	A	V
	*	2437	108.39	-	-	109.93	27.04	4.96	33.54	202	118	P	V
	*	2437	100.73	-	-	102.27	27.04	4.96	33.54	202	118	A	V
		2484.32	52.38	-21.62	74	53.82	27.08	4.99	33.51	202	118	P	V
		2483.5	40.77	-13.23	54	42.21	27.08	4.99	33.51	202	118	A	V

802.11g CH 11 2462MHz	*	2462	108.22	-	-	109.71	27.06	4.98	33.53	120	152	P	H
	*	2462	100.49	-	-	101.98	27.06	4.98	33.53	120	152	A	H
		2483.64	58.13	-15.87	74	59.57	27.08	4.99	33.51	120	152	P	H
		2483.52	49.01	-4.99	54	50.45	27.08	4.99	33.51	120	152	A	H
	*	2462	107.04	-	-	108.53	27.06	4.98	33.53	202	117	P	V
	*	2462	99.57	-	-	101.06	27.06	4.98	33.53	202	117	A	V
		2484.24	57.32	-16.68	74	58.76	27.08	4.99	33.51	202	117	P	V
		2483.52	47.06	-6.94	54	48.5	27.08	4.99	33.51	202	117	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g		4824	48.89	-25.11	74	68.41	30.85	7.11	57.48	169	44	P	H
CH 01		4824	39.11	-14.89	54	58.63	30.85	7.11	57.48	169	44	A	H
2412MHz		4824	47.01	-26.99	74	66.53	30.85	7.11	57.48	201	0	P	V
		4874	50.98	-23.02	74	70.32	30.99	7.19	57.52	112	229	P	H
802.11g		4874	40.62	-13.38	54	59.96	30.99	7.19	57.52	112	229	A	H
CH 06		7311	47.1	-26.9	74	61	36.26	8.76	58.92	174	100	P	H
2437MHz		4874	47.41	-26.59	74	66.75	30.99	7.19	57.52	201	0	P	V
		7311	46.89	-27.11	74	60.79	36.26	8.76	58.92	120	106	P	V
		4924	47.94	-26.06	74	67.15	31.12	7.22	57.55	133	180	P	H
802.11g		7386	47.64	-26.36	74	61.1	36.55	8.95	58.96	145	274	P	H
CH 11		4924	45.4	-28.6	74	64.61	31.12	7.22	57.55	201	0	P	V
2462MHz		7386	46.5	-27.5	74	59.96	36.55	8.95	58.96	166	210	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		2389.485	62.25	-11.75	74	63.94	26.98	4.91	33.58	121	20	P	H
		2390	50.66	-3.34	54	52.33	26.98	4.91	33.56	121	20	A	H
802.11n	*	2412	107.56	-	-	109.19	27	4.93	33.56	121	20	P	H
HT20	*	2412	99.05	-	-	100.68	27	4.93	33.56	121	20	A	H
CH 01		2389.065	59	-15	74	60.69	26.98	4.91	33.58	206	124	P	V
2412MHz		2390	48.56	-5.44	54	50.23	26.98	4.91	33.56	206	124	A	V
	*	2412	106.42	-	-	108.05	27	4.93	33.56	206	124	P	V
	*	2412	99.17	-	-	100.8	27	4.93	33.56	206	124	A	V
		2389.8	51.18	-22.82	74	52.85	26.98	4.91	33.56	123	150	P	H
		2389.94	40.68	-13.32	54	42.35	26.98	4.91	33.56	123	150	A	H
	*	2437	109.82	-	-	111.36	27.04	4.96	33.54	123	150	P	H
	*	2437	101.64	-	-	103.18	27.04	4.96	33.54	123	150	A	H
802.11n		2484.32	51.87	-22.13	74	53.31	27.08	4.99	33.51	123	150	P	H
HT20		2483.5	41.5	-12.5	54	42.94	27.08	4.99	33.51	123	150	A	H
CH 06		2375.1	49.59	-24.41	74	51.33	26.96	4.88	33.58	227	83	P	V
2437MHz		2389.94	40.13	-13.87	54	41.8	26.98	4.91	33.56	227	83	A	V
	*	2437	108.78	-	-	110.32	27.04	4.96	33.54	227	83	P	V
	*	2437	100.73	-	-	102.27	27.04	4.96	33.54	227	83	A	V
		2484.81	50.86	-23.14	74	52.3	27.08	4.99	33.51	227	83	P	V
		2483.5	40.67	-13.33	54	42.11	27.08	4.99	33.51	227	83	A	V

802.11n HT20 CH 11 2462MHz	*	2462	107.76	-	-	109.25	27.06	4.98	33.53	100	154	P	H
	*	2462	99.84	-	-	101.33	27.06	4.98	33.53	100	154	A	H
		2483.52	59.64	-14.36	74	61.08	27.08	4.99	33.51	100	154	P	H
		2483.52	49.64	-4.36	54	51.08	27.08	4.99	33.51	100	154	A	H
	*	2462	107.07	-	-	108.56	27.06	4.98	33.53	222	98	P	V
	*	2462	99.27	-	-	100.76	27.06	4.98	33.53	222	98	A	V
		2483.72	58.1	-15.9	74	59.54	27.08	4.99	33.51	222	98	P	V
		2483.52	48.76	-5.24	54	50.2	27.08	4.99	33.51	222	98	A	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		4824	45.52	-28.48	74	65.04	30.85	7.11	57.48	145	274	P	H
		4824	41.78	-32.22	74	61.3	30.85	7.11	57.48	191	220	P	V
802.11n HT20 CH 06 2437MHz		4874	50.13	-23.87	74	69.47	30.99	7.19	57.52	112	229	P	H
		4874	40.51	-13.49	54	59.85	30.99	7.19	57.52	112	229	A	H
		7311	45.97	-28.03	74	59.87	36.26	8.76	58.92	174	100	P	H
		4874	44.3	-29.7	74	63.64	30.99	7.19	57.52	201	0	P	V
		7311	46.14	-27.86	74	60.04	36.26	8.76	58.92	120	106	P	V
802.11n HT20 CH 11 2462MHz		4924	44.91	-29.09	74	64.12	31.12	7.22	57.55	133	180	P	H
		7386	46.6	-27.4	74	60.06	36.55	8.95	58.96	145	274	P	H
		4924	40.41	-33.59	74	59.62	31.12	7.22	57.55	201	0	P	V
		7386	45.72	-28.28	74	59.18	36.55	8.95	58.96	166	210	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40 (Band Edge @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
		2389.52	58.33	-15.67	74	60.02	26.98	4.91	33.58	130	152	P	H
		2389.38	50.44	-3.56	54	52.13	26.98	4.91	33.58	130	152	A	H
	*	2422	103.43	-	-	105.01	27.02	4.94	33.54	130	152	P	H
	*	2422	95.43	-	-	97.01	27.02	4.94	33.54	130	152	A	H
802.11n		2484.46	51.31	-22.69	74	52.75	27.08	4.99	33.51	130	152	P	H
HT40		2483.5	42.49	-11.51	54	43.93	27.08	4.99	33.51	130	152	A	H
CH 03		2389.8	52.46	-21.54	74	54.13	26.98	4.91	33.56	138	10	P	V
2422MHz		2389.52	44.76	-9.24	54	46.45	26.98	4.91	33.58	138	10	A	V
	*	2422	98.13	-	-	99.71	27.02	4.94	33.54	138	10	P	V
	*	2422	90.01	-	-	91.59	27.02	4.94	33.54	138	10	A	V
		2484.39	50.7	-23.3	74	52.14	27.08	4.99	33.51	138	10	P	V
		2487.68	40.99	-13.01	54	42.39	27.1	5.01	33.51	138	10	A	V
		2389.66	52.8	-21.2	74	54.49	26.98	4.91	33.58	203	154	P	H
		2389.94	44.34	-9.66	54	46.01	26.98	4.91	33.56	203	154	A	H
	*	2437	104.65	-	-	106.19	27.04	4.96	33.54	203	154	P	H
	*	2437	96.83	-	-	98.37	27.04	4.96	33.54	203	154	A	H
802.11n		2483.69	59.81	-14.19	74	61.25	27.08	4.99	33.51	203	154	P	H
HT40		2483.5	48.61	-5.39	54	50.05	27.08	4.99	33.51	203	154	A	H
CH 06		2389.38	52.35	-21.65	74	54.04	26.98	4.91	33.58	227	85	P	V
2437MHz		2389.94	43.55	-10.45	54	45.22	26.98	4.91	33.56	227	85	A	V
	*	2437	103.01	-	-	104.55	27.04	4.96	33.54	227	85	P	V
	*	2437	95.11	-	-	96.65	27.04	4.96	33.54	227	85	A	V
		2483.83	57.73	-16.27	74	59.17	27.08	4.99	33.51	227	85	P	V
		2483.55	46.57	-7.43	54	48.01	27.08	4.99	33.51	227	85	A	V

		2375.66	49.89	-24.11	74	51.63	26.96	4.88	33.58	173	154	P	H
		2389.52	40.9	-13.1	54	42.59	26.98	4.91	33.58	173	154	A	H
	*	2452	103.47	-	-	105	27.04	4.96	33.53	173	154	P	H
	*	2452	94.93	-	-	96.46	27.04	4.96	33.53	173	154	A	H
802.11n		2483.5	57.58	-16.42	74	59.02	27.08	4.99	33.51	173	154	P	H
HT40		2483.5	50.87	-3.13	54	52.31	27.08	4.99	33.51	173	154	A	H
CH 09		2389.38	49.95	-24.05	74	51.64	26.98	4.91	33.58	221	96	P	V
2452MHz		2388.82	41.12	-12.88	54	42.81	26.98	4.91	33.58	221	96	A	V
	*	2452	101.83	-	-	103.36	27.04	4.96	33.53	221	96	P	V
	*	2452	94.16	-	-	95.69	27.04	4.96	33.53	221	96	A	V
		2483.5	57.29	-16.71	74	58.73	27.08	4.99	33.51	221	96	P	V
		2483.5	49.44	-4.56	54	50.88	27.08	4.99	33.51	221	96	A	V

Remark

1. No other spurious found.
2. All results are PASS against Peak and Average limit line.

2.4GHz 2400~2483.5MHz

WIFI 802.11n HT40 (Harmonic @ 3m)

WIFI Ant. 1	Note	Frequency (MHz)	Level (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n		4844	41.56	-32.44	74	61.01	30.9	7.14	57.49	129	172	P	H
HT40		7266	46.17	-27.83	74	60.19	36.14	8.75	58.91	200	360	P	H
CH 03		4844	39.85	-34.15	74	59.3	30.9	7.14	57.49	157	296	P	V
2422MHz		7266	46.28	-27.72	74	60.3	36.14	8.75	58.91	265	303	P	V
802.11n		4874	42.36	-31.64	74	61.7	30.99	7.19	57.52	163	309	P	H
HT40		7311	46.32	-27.68	74	60.22	36.26	8.76	58.92	285	151	P	H
CH 06		4874	40.43	-33.57	74	59.77	30.99	7.19	57.52	296	37	P	V
2437MHz		7311	46.34	-27.66	74	60.24	36.26	8.76	58.92	135	168	P	V
802.11n		4904	41.48	-32.52	74	60.73	31.08	7.21	57.54	199	203	P	H
HT40		7356	46.33	-27.67	74	59.97	36.43	8.87	58.94	112	72	P	H
CH 09		4904	40.19	-33.81	74	59.44	31.08	7.21	57.54	158	274	P	V
2452MHz		7356	46.59	-27.41	74	60.23	36.43	8.87	58.94	302	260	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												

Emission below 1GHz

2.4GHz WIFI 802.11b (LF)

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11b LF		48.43	23.48	-16.52	40	36.08	20.28	2.2	35.08	100	37	P	H
		121.18	23.98	-19.52	43.5	39.47	17.17	2.5	35.16	-	-	P	H
		149.31	26.34	-17.16	43.5	39.58	19.31	2.55	35.1	-	-	P	H
		359.8	26.66	-19.34	46	37.21	21.08	3.25	34.88	-	-	P	H
		607.15	29	-17	46	33.74	25.87	3.89	34.5	-	-	P	H
		983.51	31.35	-22.65	54	31.23	30.09	4.16	34.13	-	-	P	H
		47.46	31.79	-8.21	40	44.42	20.27	2.17	35.07	100	150	P	V
		98.87	27.51	-15.99	43.5	45.64	14.6	2.47	35.2	-	-	P	V
		156.1	33.44	-10.06	43.5	46.67	19.3	2.57	35.1	-	-	P	V
		560.59	33.02	-12.98	46	38.88	25.02	3.7	34.58	-	-	P	V
		607.15	32.62	-13.38	46	37.36	25.87	3.89	34.5	-	-	P	V
		981.57	31.41	-22.59	54	31.33	30.07	4.15	34.14	-	-	P	V

Remark

1. No other spurious found.
2. All results are PASS against limit line.

Note symbol

*	**Fundamental Frequency** which can be ignored. However, the level of any unwanted emissions shall not exceed the level of the fundamental frequency.
!	Test result is **over limit** line.
P/A	**P**eak or **A**verage
H/V	**H**orizontal or **V**ertical

A calculation example for radiated spurious emission is shown as below:

WIFI	Note	Frequency	Level	Over	Limit	Read	Antenna	Cable	Preamp	Ant	Table	Peak	Pol.
Ant.				Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
		2390	43.54	-10.46	54	42.6	32.22	4.58	35.86	103	308	A	H

1. Level(dBμV/m) =

Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

2. Over Limit(dB) = Level(dBμV/m) – Limit Line(dBμV/m)

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 54.51(dBμV) – 35.86 (dB)

= 55.45 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 55.45(dBμV/m) – 74(dBμV/m)

= -18.55(dB)

For Average Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Cable Loss(dB) + Read Level(dBμV) - Preamp Factor(dB)

= 32.22(dB/m) + 4.58(dB) + 42.6(dBμV) – 35.86 (dB)

= 43.54 (dBμV/m)

2. Over Limit(dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

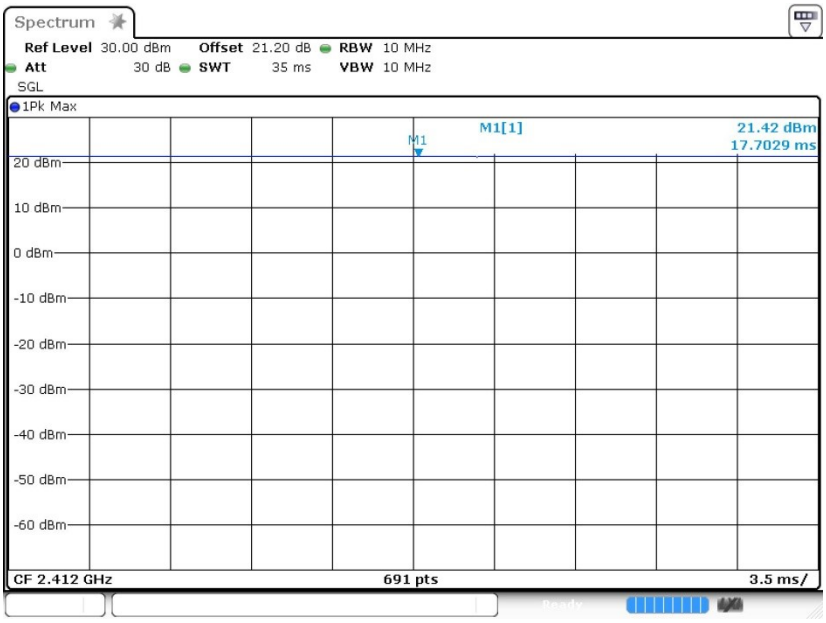
= -10.46(dB)

Both peak and average measured complies with the limit line, so test result is "PASS".

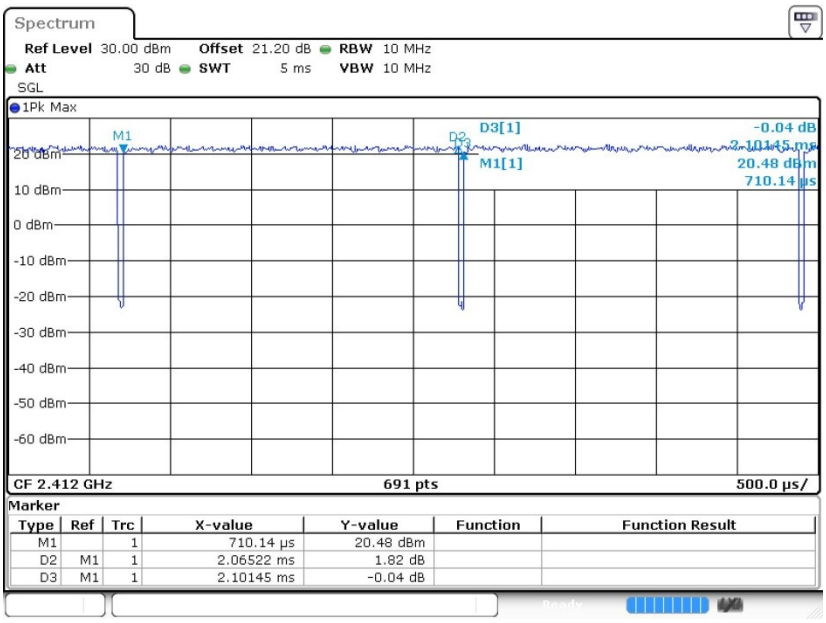
Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	100	-	-	10Hz
802.11g	98.28	-	-	10Hz
802.11n HT20	98.16	-	-	10Hz
802.11n HT40	94.91	0.946	1.057	3KHz

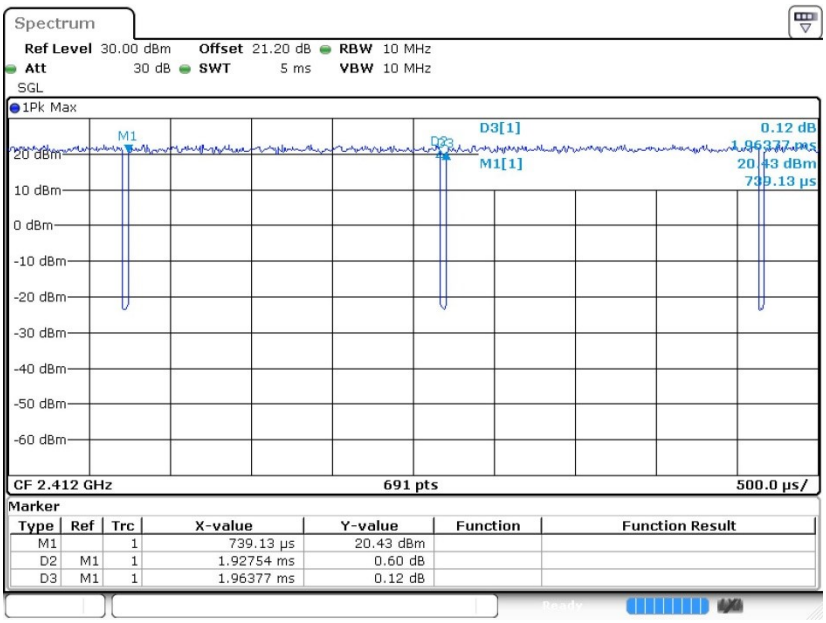
802.11b



802.11g



802.11n HT20



802.11n HT40