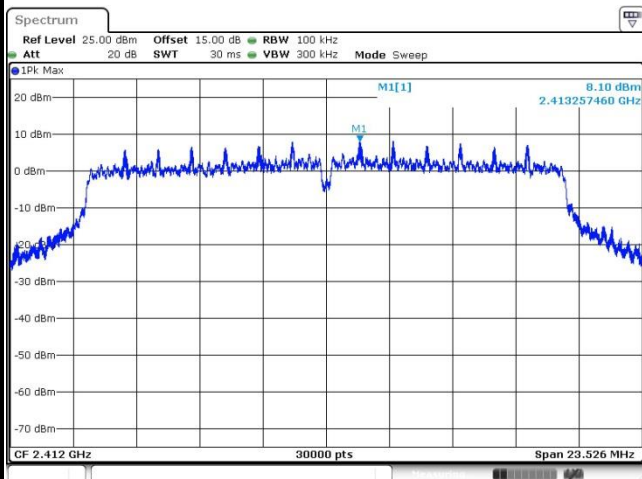




Test Mode : 802.11n HT20

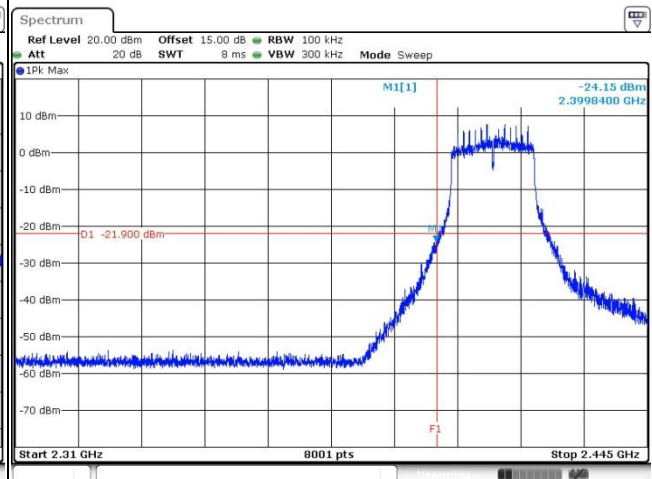
Test Channel : 01

100kHz PSD reference Level



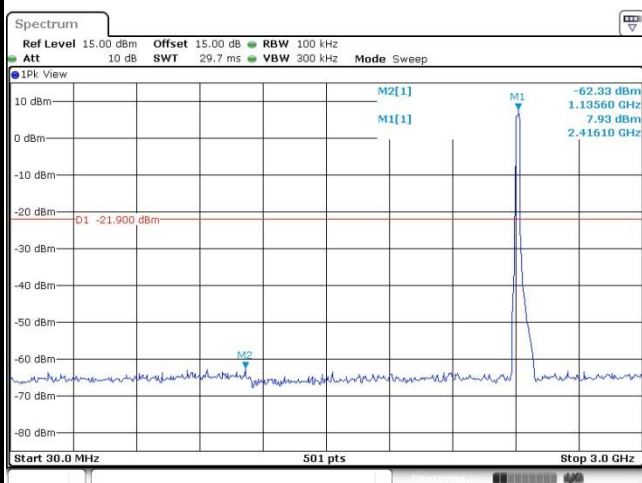
Date: 11.MAY.2019 16:25:29

Channel Plot



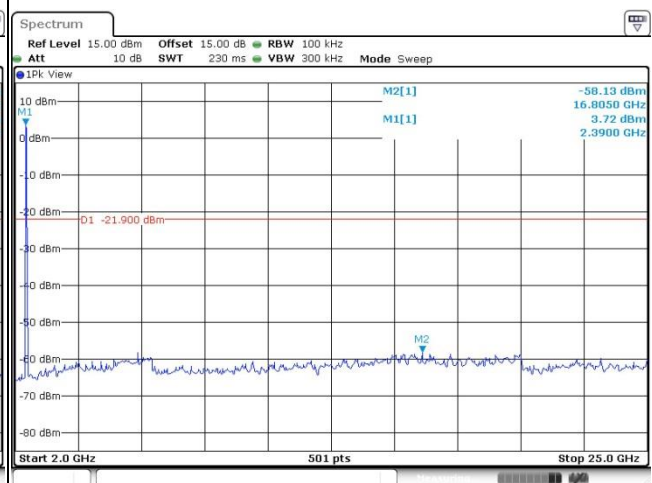
Date: 11.MAY.2019 16:25:53

Spurious Emission 30MHz~3GHz



Date: 11.MAY.2019 16:26:36

Spurious Emission 2GHz~25GHz

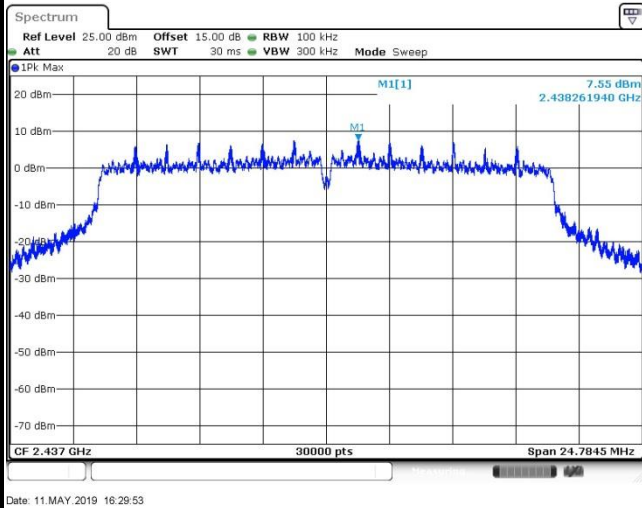


Date: 11.MAY.2019 16:26:51

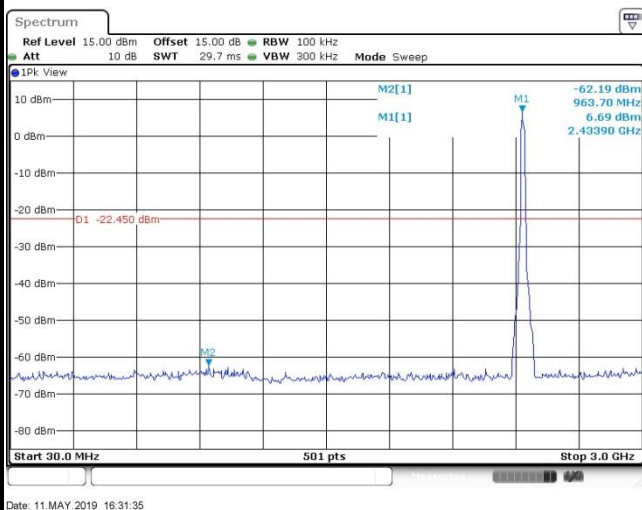


Test Mode :	802.11n HT20	Test Channel :	06
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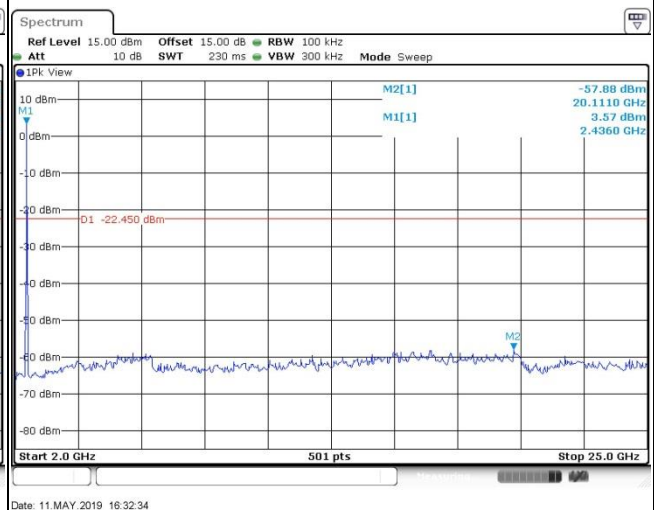
100kHz PSD reference Level

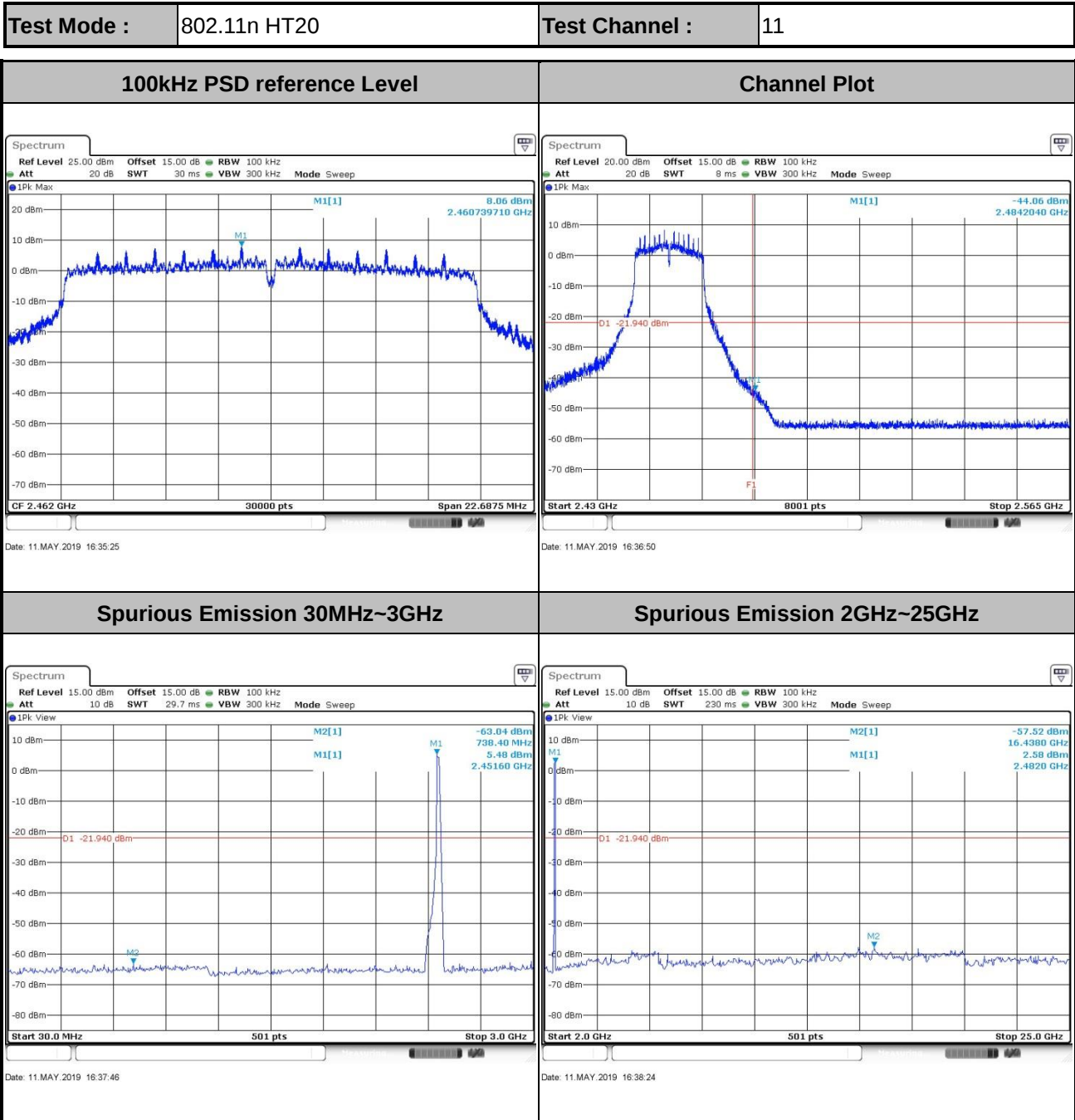


Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz



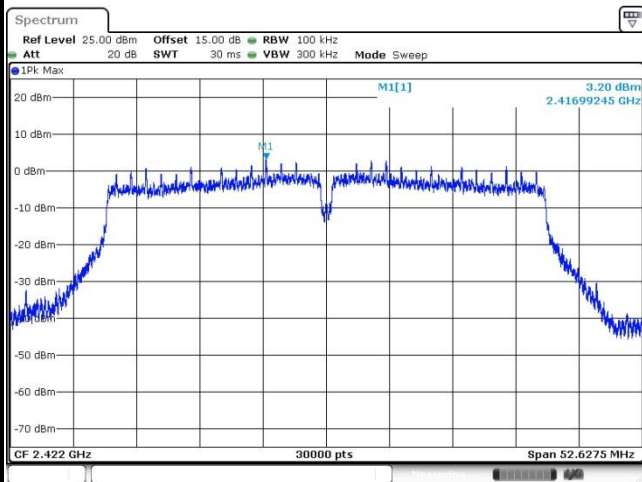




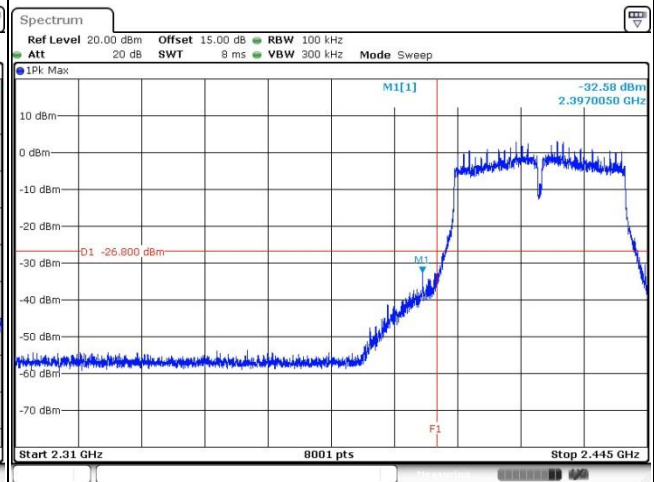
Test Mode : 802.11n HT40

Test Channel : 03

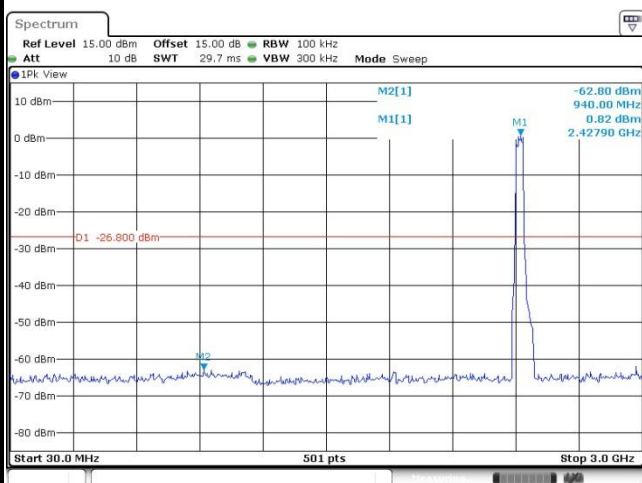
100kHz PSD reference Level



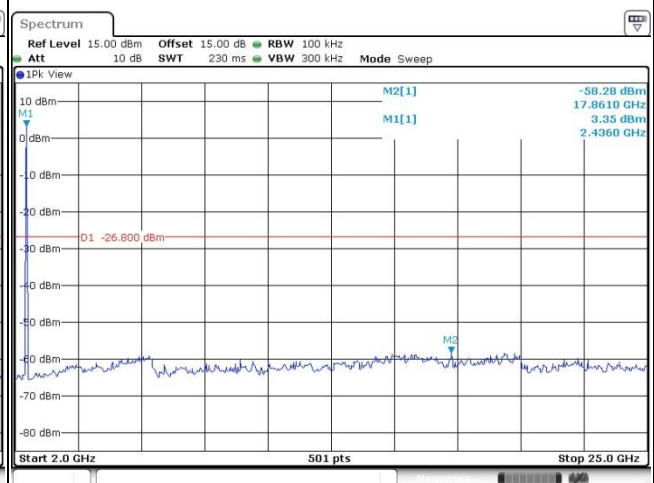
Channel Plot



Spurious Emission 30MHz~3GHz



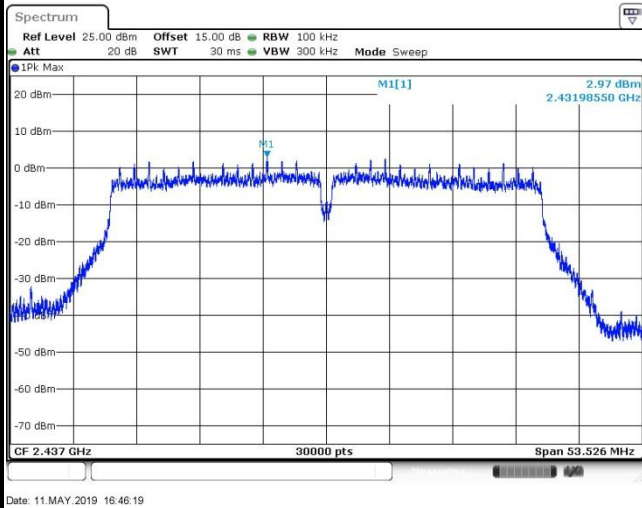
Spurious Emission 2GHz~25GHz



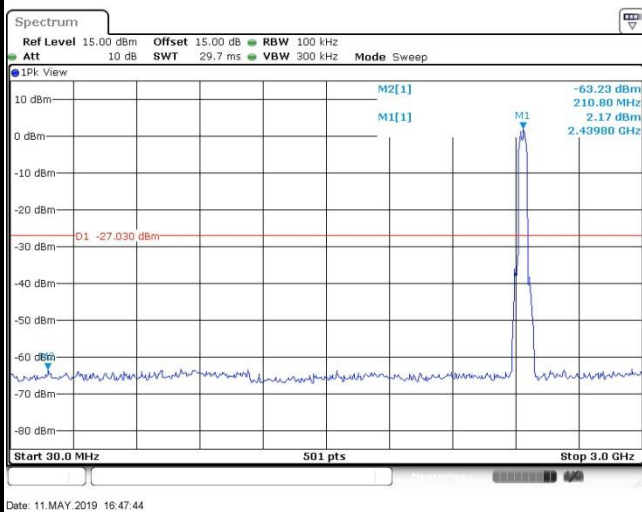


Test Mode :	802.11n HT40	Test Channel :	06
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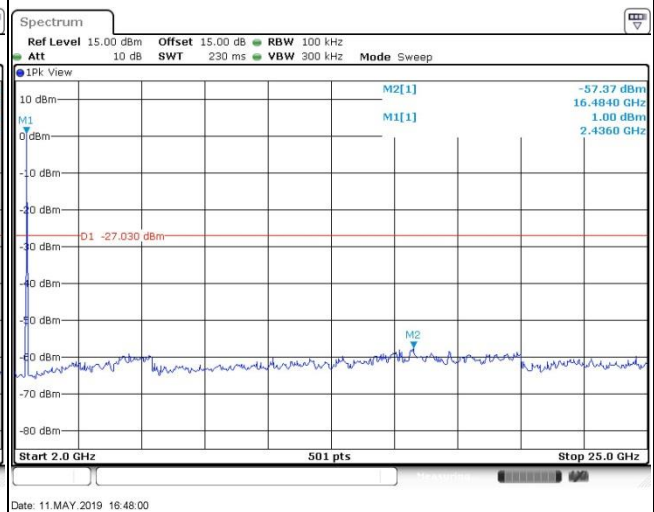
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

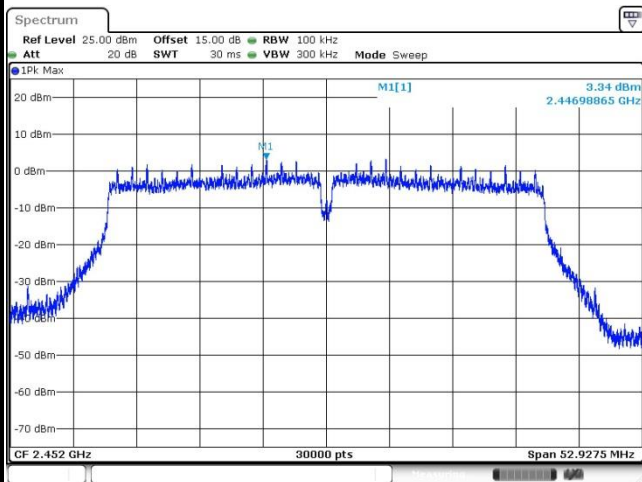




Test Mode : 802.11n HT40

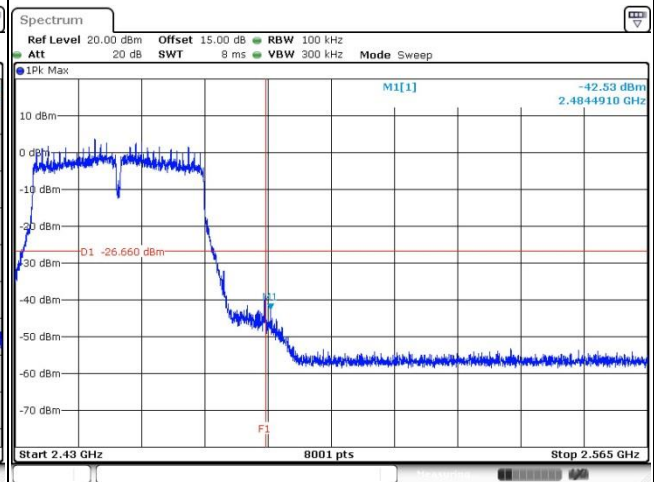
Test Channel : 09

100kHz PSD reference Level



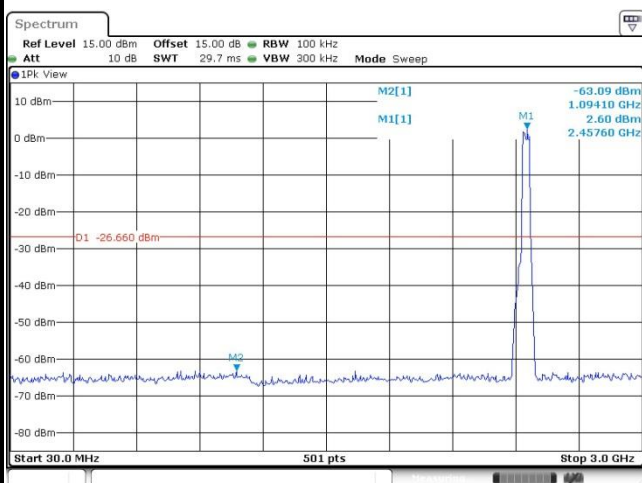
Date: 11.MAY.2019 16:50:25

Channel Plot



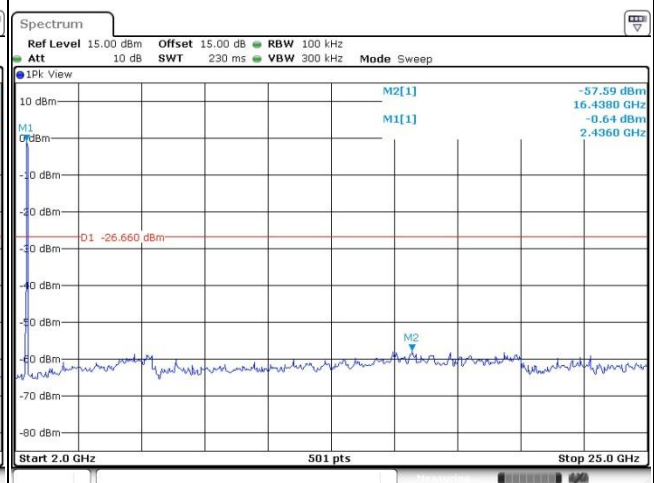
Date: 11.MAY.2019 16:50:39

Spurious Emission 30MHz~3GHz



Date: 11.MAY.2019 16:51:02

Spurious Emission 2GHz~25GHz



Date: 11.MAY.2019 16:51:22

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

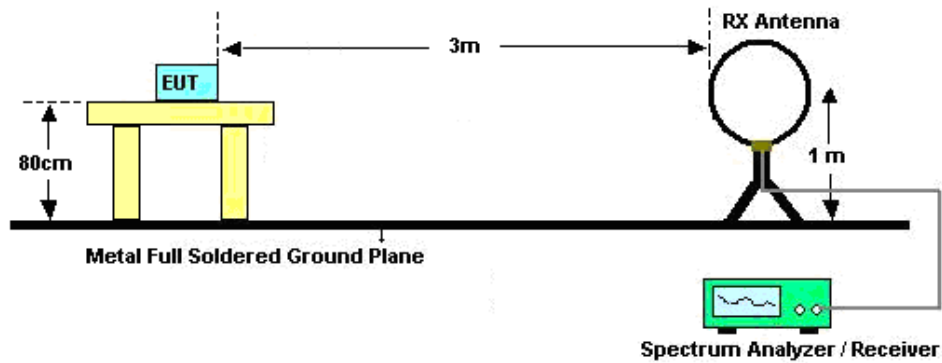
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better 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 $\geq$ RBW; Sweep = auto; Detector function = peak; Trace = max hold;
 - (3) Set RBW = 1 MHz, VBW= 3MHz for $f \geq 1$ GHz for peak measurement.

For average measurement:

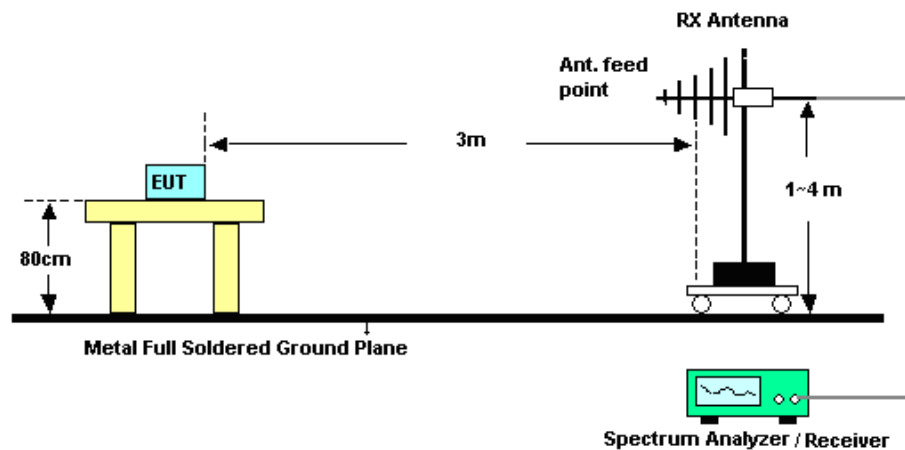
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

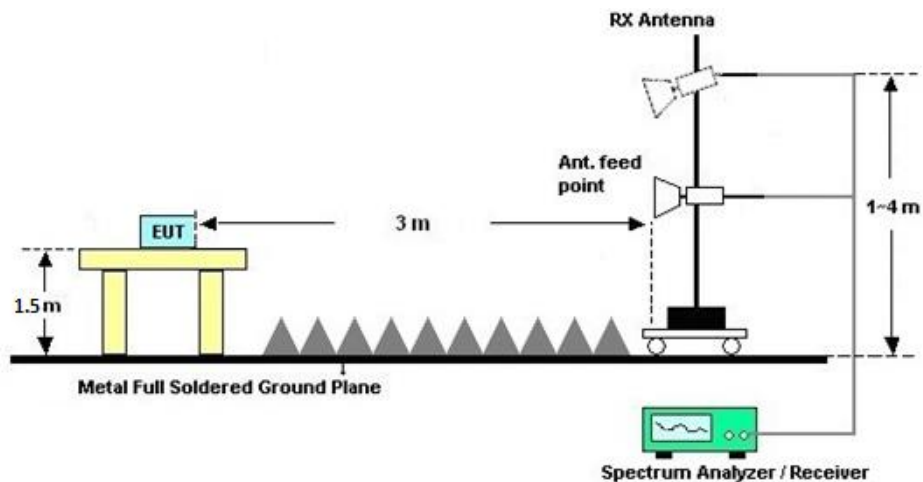
For radiated emissions below 30MHz



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 (dB μ V)	
	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.

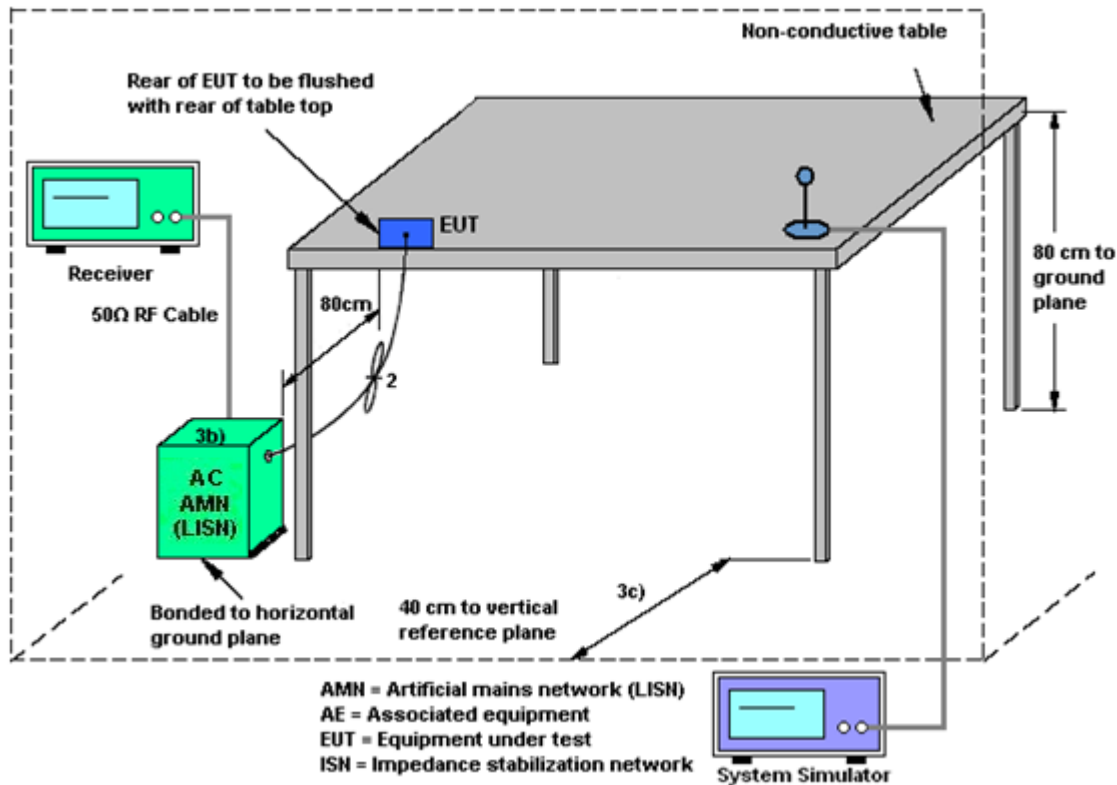
3.6.2 Measuring Instruments

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

<CDD Modes >

FCC KDB 662911 D01 Multiple Transmitter Output v02r01

For CDD transmissions, directional gain is calculated as

Directional gain = G_{ANT} + Array Gain, where Array Gain is as follows.

For power spectral density (PSD) measurements on all devices,

Array Gain = $10 \log(N_{ANT}/N_{SS}=1)$ dB.

For power measurements on IEEE 802.11 devices,

Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$.

Directional gain may be calculated by using the formulas applicable to equal gain antennas with G_{ANT} set equal to the gain of the antenna having the highest gain;

The EUT supports CDD mode.

For power, the directional gain G_{ANT} is set equal to the antenna having the highest gain, i.e., F)2)f)i).

For PSD, the directional gain calculation is following F)2)f)ii) of KDB 662911 D01 v02r01.

The power and PSD limit should be modified if the directional gain of EUT is over 6 dBi,

The directional gain "DG" is calculated as following table.

<CDD Modes>						
			DG for Power	DG for PSD	Power Limit Reduction	PSD Limit Reduction
	Ant. 1 (dBi)	Ant. 2 (dBi)	(dBi)	(dBi)	(dB)	(dB)
2.4 GHz	-2.80	3.00	-2.80	0.11	0.00	0.00

Power Limit Reduction = $DG(Power) - 6dBi$, (min = 0)

PSD Limit Reduction = $DG(PSD) - 6dBi$, (min = 0)



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. 18, 2019	May 06, 2019~ May 11, 2019	Apr. 17, 2020	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 22, 2018	May 06, 2019~ May 11, 2019	Dec. 21, 2019	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 22, 2018	May 06, 2019~ May 11, 2019	Dec. 21, 2019	Conducted (TH01-SZ)
EMI Test Receiver&SA	Agilent	N9038A	MY52260185	20Hz~26.5GHz	Aug. 30, 2018	May 08, 2019	Aug. 29, 2019	Radiation (03CH03-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Apr. 19, 2019	May 08, 2019	Apr. 18, 2020	Radiation (03CH03-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 29, 2018	May 08, 2019	May 28, 2020	Radiation (03CH03-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz~2GHz	Jun. 05, 2018	May 08, 2019	Jun. 04, 2019	Radiation (03CH03-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA 9120D	9120D-1285	1GHz~18GHz	Jan. 07, 2019	May 08, 2019	Jan. 06, 2020	Radiation (03CH03-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18GHz~40GHz	Mar. 30, 2019	May 08, 2019	Mar. 29, 2020	Radiation (03CH03-SZ)
Amplifier	Burgeon	BPA-530	102210	0.01Hz~3000MHz	Oct. 18, 2018	May 08, 2019	Oct. 17, 2019	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P-R	1943528	1GHz~18GHz	Oct. 18, 2018	May 08, 2019	Oct. 17, 2019	Radiation (03CH03-SZ)
Amplifier	Agilent Technologies	83017A	MY39501302	500MHz~26.5GHz	Dec. 23, 2018	May 08, 2019	Dec. 22, 2019	Radiation (03CH03-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 30, 2018	May 08, 2019	Jul. 30, 2019	Radiation (03CH03-SZ)
AC Power Source	Chroma	61601	616010001985	N/A	NCR	May 08, 2019	NCR	Radiation (03CH03-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	May 08, 2019	NCR	Radiation (03CH03-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	May 08, 2019	NCR	Radiation (03CH03-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 23, 2018	May 11, 2019	Dec. 22, 2019	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Oct. 18, 2018	May 11, 2019	Oct. 17, 2019	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Dec. 23, 2018	May 11, 2019	Dec. 22, 2019	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 18, 2018	May 11, 2019	Jul. 17, 2019	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% ($U = 2Uc(y)$)	2.6dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0dB
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Uncertainty of Radiated Emission Measurement (1000 MHz ~ 18000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.8dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.6dB
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Appendix A. Conducted Test Results

Report Number : FR942205C

Test Engineer:	Jensen Wu	Temperature:	21~25	°C
Test Date:	2019/5/11	Relative Humidity:	51~54	%

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 2	Ant 1	Ant 2		
11b	1Mbps	2	1	2412	13.74	13.64	8.05	8.07	0.50	Pass
11b	1Mbps	2	6	2437	13.99	13.69	8.07	8.07	0.50	Pass
11b	1Mbps	2	11	2462	13.94	13.99	8.07	8.07	0.50	Pass
11g	6Mbps	2	1	2412	16.58	16.58	15.30	15.44	0.50	Pass
11g	6Mbps	2	6	2437	16.73	16.63	15.52	15.66	0.50	Pass
11g	6Mbps	2	11	2462	16.73	16.53	15.34	15.70	0.50	Pass
HT20	MCS0	2	1	2412	17.83	17.78	15.12	15.68	0.50	Pass
HT20	MCS0	2	6	2437	17.88	17.78	15.96	16.52	0.50	Pass
HT20	MCS0	2	11	2462	17.93	17.68	15.98	15.12	0.50	Pass
HT40	MCS0	2	3	2422	36.36	36.36	35.12	35.08	0.50	Pass
HT40	MCS0	2	6	2437	36.66	36.56	36.28	35.68	0.50	Pass
HT40	MCS0	2	9	2452	36.46	36.36	35.12	35.28	0.50	Pass

TEST RESULTS DATA
Average Output Power

2.4GHz Band																
Mod.	Data Rate	NTX	CH.	Freq. (MHz)	Average Conducted Power (dBm)			Conducted Power Limit (dBm)		DG (dBi)		EIRP Power (dBm)		EIRP Power Limit (dBm)		Pass /Fail
					Ant 1	Ant 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	19.70	19.50	22.61	30.00		-2.80		19.81		36.00		Pass
11b	1Mbps	2	6	2437	19.30	18.90	22.11	30.00		-2.80		19.31		36.00		Pass
11b	1Mbps	2	11	2462	19.30	18.80	22.07	30.00		-2.80		19.27		36.00		Pass
11g	6Mbps	2	1	2412	18.50	18.30	21.41	30.00		-2.80		18.61		36.00		Pass
11g	6Mbps	2	6	2437	18.40	17.70	21.07	30.00		-2.80		18.27		36.00		Pass
11g	6Mbps	2	11	2462	18.60	18.00	21.32	30.00		-2.80		18.52		36.00		Pass
HT20	MCS0	2	1	2412	18.50	18.40	21.46	30.00		-2.80		18.66		36.00		Pass
HT20	MCS0	2	6	2437	18.50	17.80	21.17	30.00		-2.80		18.37		36.00		Pass
HT20	MCS0	2	11	2462	18.60	18.10	21.37	30.00		-2.80		18.57		36.00		Pass
HT40	MCS0	2	3	2422	15.80	15.10	18.47	30.00		-2.80		15.67		36.00		Pass
HT40	MCS0	2	6	2437	15.70	15.00	18.37	30.00		-2.80		15.57		36.00		Pass
HT40	MCS0	2	9	2452	15.80	15.30	18.57	30.00		-2.80		15.77		36.00		Pass

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

TEST RESULTS DATA
Peak Power Spectral Density

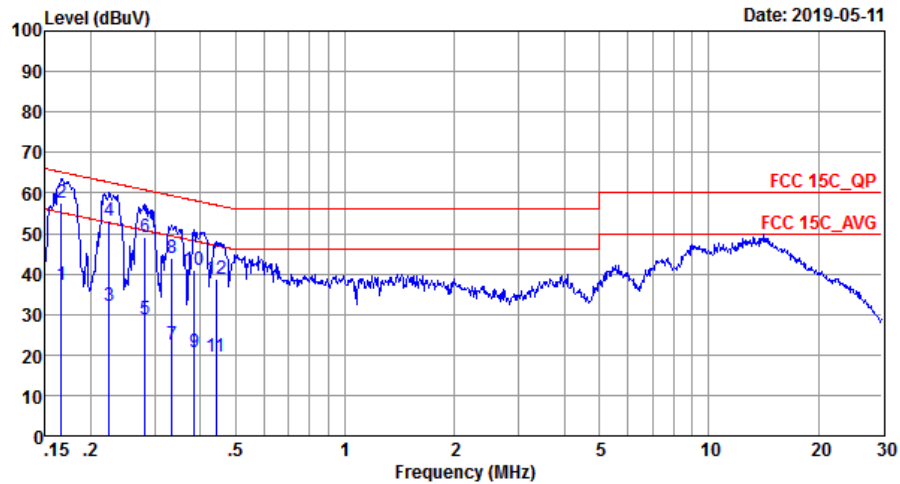
2.4GHz Band												
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Peak PSD (dBm/3kHz)			DG (dBi)		Peak PSD Limit (dBm/3kHz)		Pass/Fail
					Ant 1	Ant 2	Worse + 3.01	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	-6.19	-6.04	-3.03	0.11		8.00		Pass
11b	1Mbps	2	6	2437	-7.25	-7.13	-4.12	0.11		8.00		Pass
11b	1Mbps	2	11	2462	-6.97	-5.51	-2.50	0.11		8.00		Pass
11g	6Mbps	2	1	2412	-8.40	-7.94	-4.93	0.11		8.00		Pass
11g	6Mbps	2	6	2437	-8.08	-9.47	-5.07	0.11		8.00		Pass
11g	6Mbps	2	11	2462	-7.52	-8.63	-4.51	0.11		8.00		Pass
HT20	MCS0	2	1	2412	-6.36	-9.04	-3.35	0.11		8.00		Pass
HT20	MCS0	2	6	2437	-8.04	-8.99	-5.03	0.11		8.00		Pass
HT20	MCS0	2	11	2462	-7.59	-7.84	-4.58	0.11		8.00		Pass
HT40	MCS0	2	3	2422	-11.91	-12.94	-8.90	0.11		8.00		Pass
HT40	MCS0	2	6	2437	-11.27	-13.07	-8.26	0.11		8.00		Pass
HT40	MCS0	2	9	2452	-11.39	-11.81	-8.38	0.11		8.00		Pass

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



Appendix B. AC Conducted Emission Test Results

Test Engineer :	Dalin Liu	Temperature :	22~25°C
		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.		



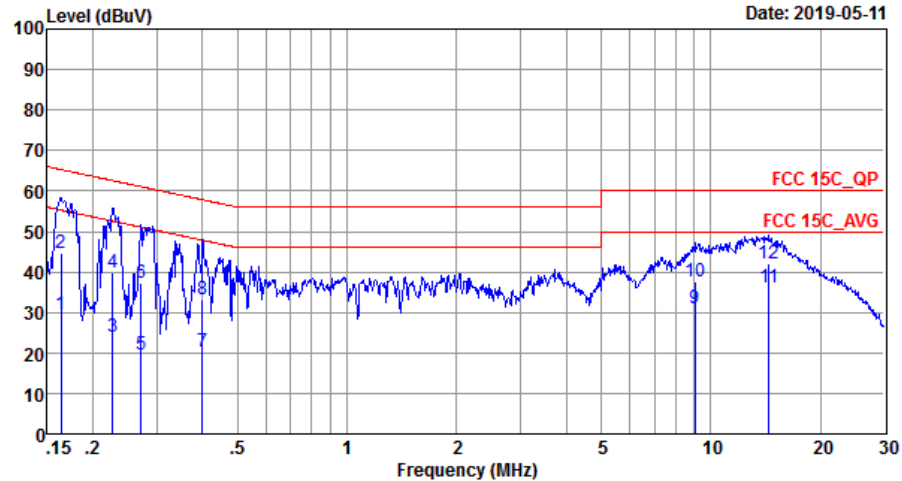
Site : CO01-SZ
Condition: FCC 15C_QP LISN_20180719_L LINE

Mode : Mode 1
IMEI : 990013610030764

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.17	37.39	-17.77	55.16	27.20	0.03	10.16	Average
2 *	0.17	57.69	-7.47	65.16	47.50	0.03	10.16	QP
3	0.22	32.09	-20.57	52.66	21.90	0.03	10.16	Average
4	0.22	52.99	-9.67	62.66	42.80	0.03	10.16	QP
5	0.28	28.90	-21.86	50.76	18.70	0.03	10.17	Average
6	0.28	49.00	-11.76	60.76	38.80	0.03	10.17	QP
7	0.33	22.40	-26.95	49.35	12.20	0.03	10.17	Average
8	0.33	43.80	-15.55	59.35	33.60	0.03	10.17	QP
9	0.39	20.80	-27.37	48.17	10.60	0.03	10.17	Average
10	0.39	41.10	-17.07	58.17	30.90	0.03	10.17	QP
11	0.44	19.60	-27.42	47.02	9.40	0.03	10.17	Average
12	0.44	38.60	-18.42	57.02	28.40	0.03	10.17	QP



Test Engineer :	Dalin Liu	Temperature :	22~25°C
		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_20180719_N NEUTRAL

Mode : Mode 1
IMEI : 990013610030764

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.16	29.39	-25.91	55.30	19.20	0.03	10.16	Average
2	0.16	44.69	-20.61	65.30	34.50	0.03	10.16	QP
3	0.23	24.09	-28.48	52.57	13.90	0.03	10.16	Average
4	0.23	39.99	-22.58	62.57	29.80	0.03	10.16	QP
5	0.27	19.60	-31.47	51.07	9.40	0.03	10.17	Average
6	0.27	37.20	-23.87	61.07	27.00	0.03	10.17	QP
7	0.40	20.19	-27.67	47.86	10.00	0.02	10.17	Average
8	0.40	33.19	-24.67	57.86	23.00	0.02	10.17	QP
9	9.06	30.89	-19.11	50.00	20.51	0.13	10.25	Average
10	9.06	37.59	-22.41	60.00	27.21	0.13	10.25	QP
11 *	14.44	36.18	-13.82	50.00	25.60	0.31	10.27	Average
12	14.44	41.98	-18.02	60.00	31.40	0.31	10.27	QP



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	Preamplifier Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2317.35	49.81	-24.19	74	51.18	27.94	6.73	36.04	131	148	P	H
		2390	38.64	-15.36	54	39.93	27.8	6.89	35.98	131	148	A	H
	*	2412	106.59	-	-	107.91	27.77	6.89	35.98	131	148	P	H
	*	2412	104.62	-	-	105.94	27.77	6.89	35.98	131	148	A	H
		2348.22	49.61	-24.39	74	50.94	27.88	6.81	36.02	183	21	P	V
		2389.17	38.31	-15.69	54	39.6	27.8	6.89	35.98	183	21	A	V
	*	2412	100.92	-	-	102.24	27.77	6.89	35.98	183	21	P	V
	*	2412	99.21	-	-	100.53	27.77	6.89	35.98	183	21	A	V
802.11b CH 06 2437MHz		2386.58	49.23	-24.77	74	50.54	27.8	6.89	36	147	144	P	H
		2389.94	38.26	-15.74	54	39.55	27.8	6.89	35.98	147	144	A	H
	*	2437	106.5	-	-	107.78	27.71	6.97	35.96	147	144	P	H
	*	2437	104.27	-	-	105.55	27.71	6.97	35.96	147	144	A	H
		2495.94	48.84	-25.16	74	50.06	27.63	7.05	35.9	147	144	P	H
		2484.04	38.27	-15.73	54	39.48	27.66	7.05	35.92	147	144	A	H
		2384.2	49.22	-24.78	74	50.58	27.83	6.81	36	224	316	P	V
		2389.66	38.08	-15.92	54	39.37	27.8	6.89	35.98	224	316	A	V
	*	2437	101.76	-	-	103.04	27.71	6.97	35.96	224	316	P	V
	*	2437	99.75	-	-	101.03	27.71	6.97	35.96	224	316	A	V
		2497.2	49.44	-24.56	74	50.66	27.63	7.05	35.9	224	316	P	V
		2484.11	38.06	-15.94	54	39.27	27.66	7.05	35.92	224	316	A	V



802.11b CH 11 2462MHz	*	2462	106.93	-	-	108.21	27.69	6.97	35.94	137	45	P	H
	*	2462	105.06	-	-	106.34	27.69	6.97	35.94	137	45	A	H
		2484	49.59	-24.41	74	50.8	27.66	7.05	35.92	137	45	P	H
		2483.52	39.56	-14.44	54	40.77	27.66	7.05	35.92	137	45	A	H
	*	2462	99.69	-	-	100.97	27.69	6.97	35.94	221	268	P	V
	*	2462	97.76	-	-	99.04	27.69	6.97	35.94	221	268	A	V
		2487.16	48.5	-25.5	74	49.71	27.66	7.05	35.92	221	268	P	V
		2483.64	38.1	-15.9	54	39.31	27.66	7.05	35.92	221	268	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+2	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	43.6	-30.4	74	59.56	31.12	10.4	57.48	145	274	P	H
		4824	43.46	-30.54	74	59.42	31.12	10.4	57.48	191	220	P	V
802.11b CH 06 2437MHz		4874	44.3	-29.7	74	60.2	31.17	10.45	57.52	112	229	P	H
		7311	48.64	-25.36	74	58.55	36.03	12.98	58.92	174	100	P	H
		4874	43.31	-30.69	74	59.21	31.17	10.45	57.52	154	360	P	V
		7311	48.37	-25.63	74	58.28	36.03	12.98	58.92	120	106	P	V
802.11b CH 11 2462MHz		4924	44.46	-29.54	74	60.24	31.22	10.55	57.55	133	180	P	H
		7386	48.61	-25.39	74	58.23	36.29	13.05	58.96	145	274	P	H
		4924	42.96	-31.04	74	58.74	31.22	10.55	57.55	154	360	P	V
		7386	48.33	-25.67	74	57.95	36.29	13.05	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+2	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		2388.86	54.23	-19.77	74	55.52	27.8	6.89	35.98	124	151	P	H
		2389.28	43.32	-10.68	54	44.61	27.8	6.89	35.98	124	151	A	H
	*	2412	106.07	-	-	107.39	27.77	6.89	35.98	124	151	P	H
	*	2412	99.73	-	-	101.05	27.77	6.89	35.98	124	151	A	H
		2389.8	52.86	-21.14	74	54.15	27.8	6.89	35.98	206	307	P	V
		2390	41.67	-12.33	54	42.96	27.8	6.89	35.98	206	307	A	V
	*	2412	102.91	-	-	104.23	27.77	6.89	35.98	206	307	P	V
	*	2412	96.47	-	-	97.79	27.77	6.89	35.98	206	307	A	V
802.11g CH 06 2437MHz		2352.28	47.53	-26.47	74	50.68	27.85	5.02	36.02	120	150	P	H
		2389.94	36.81	-17.19	54	39.93	27.8	5.06	35.98	120	150	A	H
	*	2437	105.27	-	-	108.4	27.71	5.12	35.96	120	150	P	H
	*	2437	97.84	-	-	100.97	27.71	5.12	35.96	120	150	A	H
		2486.35	47.94	-26.06	74	51.01	27.66	5.19	35.92	120	150	P	H
		2483.55	37.18	-16.82	54	40.25	27.66	5.19	35.92	120	150	A	H
		2350.74	47.6	-26.4	74	50.72	27.88	5.02	36.02	225	244	P	V
		2389.8	36.35	-17.65	54	39.47	27.8	5.06	35.98	225	244	A	V
	*	2437	101.29	-	-	104.42	27.71	5.12	35.96	225	244	P	V
	*	2437	94.71	-	-	97.84	27.71	5.12	35.96	225	244	A	V
		2483.83	46.81	-27.19	74	49.88	27.66	5.19	35.92	225	244	P	V
		2483.55	36.38	-17.62	54	39.45	27.66	5.19	35.92	225	244	A	V



802.11g CH 11 2462MHz	*	2462	105.68	-	-	108.81	27.69	5.12	35.94	100	32	P	H
	*	2462	98.94	-	-	102.07	27.69	5.12	35.94	100	32	A	H
		2483.72	56.09	-17.91	74	59.16	27.66	5.19	35.92	100	32	P	H
		2483.52	45.12	-8.88	54	48.19	27.66	5.19	35.92	100	32	A	H
	*	2462	101.56	-	-	104.69	27.69	5.12	35.94	221	245	P	V
	*	2462	94.32	-	-	97.45	27.69	5.12	35.94	221	245	A	V
		2484.4	50.8	-23.2	74	53.87	27.66	5.19	35.92	221	245	P	V
		2483.52	39.78	-14.22	54	42.85	27.66	5.19	35.92	221	245	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+2	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		4824	43.61	-30.39	74	59.57	31.12	10.4	57.48	145	274	P	H
		4824	43.8	-30.2	74	59.76	31.12	10.4	57.48	191	220	P	V
802.11g CH 06 2437MHz		4874	43.97	-30.03	74	59.87	31.17	10.45	57.52	112	229	P	H
		7311	48.8	-25.2	74	58.71	36.03	12.98	58.92	174	100	P	H
		4874	43.13	-30.87	74	59.03	31.17	10.45	57.52	154	360	P	V
		7311	48.03	-25.97	74	57.94	36.03	12.98	58.92	120	106	P	V
802.11g CH 11 2462MHz		4924	43.99	-30.01	74	59.77	31.22	10.55	57.55	133	180	P	H
		7386	48.3	-25.7	74	57.92	36.29	13.05	58.96	145	274	P	H
		4924	43.92	-30.08	74	59.7	31.22	10.55	57.55	154	360	P	V
		7386	49.16	-24.84	74	58.78	36.29	13.05	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+2	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		2390	53.53	-20.47	74	54.82	27.8	6.89	35.98	137	37	P	H
		2390	42.98	-11.02	54	44.27	27.8	6.89	35.98	137	37	A	H
	*	2412	105.44	-	-	106.76	27.77	6.89	35.98	137	37	P	H
	*	2412	98.73	-	-	100.05	27.77	6.89	35.98	137	37	A	H
		2389.07	51.22	-22.78	74	52.51	27.8	6.89	35.98	182	358	P	V
		2390	41.08	-12.92	54	42.37	27.8	6.89	35.98	182	358	A	V
	*	2412	101.35	-	-	102.67	27.77	6.89	35.98	182	358	P	V
	*	2412	94.81	-	-	96.13	27.77	6.89	35.98	182	358	A	V
802.11n HT20 CH 06 2437MHz		2369.08	48.28	-25.72	74	49.64	27.83	6.81	36	145	38	P	H
		2389.8	38.18	-15.82	54	39.47	27.8	6.89	35.98	145	38	A	H
	*	2437	105.5	-	-	106.78	27.71	6.97	35.96	145	38	P	H
	*	2437	97.41	-	-	98.69	27.71	6.97	35.96	145	38	A	H
		2485.16	48.65	-25.35	74	49.86	27.66	7.05	35.92	145	38	P	H
		2483.5	38.55	-15.45	54	39.76	27.66	7.05	35.92	145	38	A	H
		2315.32	48.93	-25.07	74	50.3	27.94	6.73	36.04	204	16	P	V
		2389.94	38.08	-15.92	54	39.37	27.8	6.89	35.98	204	16	A	V
	*	2437	101.36	-	-	102.64	27.71	6.97	35.96	204	16	P	V
	*	2437	94.3	-	-	95.58	27.71	6.97	35.96	204	16	A	V
		2485.58	49.2	-24.8	74	50.41	27.66	7.05	35.92	204	16	P	V
		2485.44	38.37	-15.63	54	39.58	27.66	7.05	35.92	204	16	A	V



802.11n HT20 CH 11 2462MHz	*	2462	105.36	-	-	106.64	27.69	6.97	35.94	141	36	P	H
	*	2462	97.91	-	-	99.19	27.69	6.97	35.94	141	36	A	H
		2483.68	54.83	-19.17	74	56.04	27.66	7.05	35.92	141	36	P	H
		2483.52	43.39	-10.61	54	44.6	27.66	7.05	35.92	141	36	A	H
	*	2462	102.59	-	-	103.87	27.69	6.97	35.94	201	353	P	V
	*	2462	95.21	-	-	96.49	27.69	6.97	35.94	201	353	A	V
		2484.04	54.06	-19.94	74	55.27	27.66	7.05	35.92	201	353	P	V
		2483.52	44.27	-9.73	54	45.48	27.66	7.05	35.92	201	353	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+2	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	43.71	-30.29	74	59.67	31.12	10.4	57.48	145	274	P	H
		4824	44.97	-29.03	74	60.93	31.12	10.4	57.48	191	220	P	V
802.11n HT20 CH 06 2437MHz		4874	43.45	-30.55	74	59.35	31.17	10.45	57.52	112	229	P	H
		7311	49.52	-24.48	74	59.43	36.03	12.98	58.92	174	100	P	H
		4874	43.14	-30.86	74	59.04	31.17	10.45	57.52	154	360	P	V
		7311	49.55	-24.45	74	59.46	36.03	12.98	58.92	120	106	P	V
802.11n HT20 CH 11 2462MHz		4924	42.96	-31.04	74	58.74	31.22	10.55	57.55	133	180	P	H
		7386	49.16	-24.84	74	58.78	36.29	13.05	58.96	145	274	P	H
		4924	43.98	-30.02	74	59.76	31.22	10.55	57.55	154	360	P	V
		7386	49.06	-24.94	74	58.68	36.29	13.05	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+2	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 HT40 CH 03 2422MHz		2389.94	54.72	-19.28	74	56.01	27.8	6.89	35.98	143	40	P	H
		2389.52	46.36	-7.64	54	47.65	27.8	6.89	35.98	143	40	A	H
	*	2422	101.4	-	-	102.73	27.74	6.89	35.96	143	40	P	H
	*	2422	95.01	-	-	96.34	27.74	6.89	35.96	143	40	A	H
		2483.69	49.44	-24.56	74	50.65	27.66	7.05	35.92	143	40	P	H
		2485.79	40.23	-13.77	54	41.44	27.66	7.05	35.92	143	40	A	H
		2389.94	55.58	-18.42	74	56.87	27.8	6.89	35.98	182	353	P	V
		2389.94	47.97	-6.03	54	49.26	27.8	6.89	35.98	182	353	A	V
	*	2422	97.95	-	-	99.28	27.74	6.89	35.96	182	353	P	V
	*	2422	91.65	-	-	92.98	27.74	6.89	35.96	182	353	A	V
		2486.21	49.97	-24.03	74	51.18	27.66	7.05	35.92	182	353	P	V
		2484.46	41.6	-12.4	54	42.81	27.66	7.05	35.92	182	353	A	V
802.11n HT40 CH 06 2437MHz		2354.1	49.47	-24.53	74	50.83	27.85	6.81	36.02	111	40	P	H
		2389.94	40.64	-13.36	54	41.93	27.8	6.89	35.98	111	40	A	H
	*	2437	100.97	-	-	102.25	27.71	6.97	35.96	111	40	P	H
	*	2437	94.32	-	-	95.6	27.71	6.97	35.96	111	40	A	H
		2483.62	51.83	-22.17	74	53.04	27.66	7.05	35.92	111	40	P	H
		2484.04	42.7	-11.3	54	43.91	27.66	7.05	35.92	111	40	A	H
		2325.68	48.96	-25.04	74	50.36	27.91	6.73	36.04	172	358	P	V
		2389.94	40.52	-13.48	54	41.81	27.8	6.89	35.98	172	358	A	V
	*	2437	96.66	-	-	97.94	27.71	6.97	35.96	172	358	P	V
	*	2437	90.27	-	-	91.55	27.71	6.97	35.96	172	358	A	V
		2486.07	52.01	-21.99	74	53.22	27.66	7.05	35.92	172	358	P	V
		2484.46	42.56	-11.44	54	43.77	27.66	7.05	35.92	172	358	A	V



802.11n HT40 CH 09 2452MHz		2350.32	48.79	-25.21	74	50.12	27.88	6.81	36.02	117	37	P	H
		2344.02	39.95	-14.05	54	41.36	27.88	6.73	36.02	117	37	A	H
	*	2452	100.93	-	-	102.19	27.71	6.97	35.94	117	37	P	H
	*	2452	94.78	-	-	96.04	27.71	6.97	35.94	117	37	A	H
		2483.9	54.87	-19.13	74	56.08	27.66	7.05	35.92	117	37	P	H
		2483.69	46.33	-7.67	54	47.54	27.66	7.05	35.92	117	37	A	H
		2344.44	48.89	-25.11	74	50.3	27.88	6.73	36.02	151	357	P	V
		2355.36	39.88	-14.12	54	41.24	27.85	6.81	36.02	151	357	A	V
	*	2452	98.44	-	-	99.7	27.71	6.97	35.94	151	357	P	V
	*	2452	91.93	-	-	93.19	27.71	6.97	35.94	151	357	A	V
		2485.02	56.37	-17.63	74	57.58	27.66	7.05	35.92	151	357	P	V
		2484.81	45.99	-8.01	54	47.2	27.66	7.05	35.92	151	357	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+2	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	44.25	-29.75	74	60.16	31.13	10.45	57.49	129	172	P	H
HT40		7266	48.44	-25.56	74	58.47	35.93	12.95	58.91	200	360	P	H
CH 03		4844	44.1	-29.9	74	60.01	31.13	10.45	57.49	157	296	P	V
2422MHz		7266	49.37	-24.63	74	59.4	35.93	12.95	58.91	265	303	P	V
802.11n		4874	43.83	-30.17	74	59.73	31.17	10.45	57.52	163	309	P	H
HT40		7311	50.24	-23.76	74	60.15	36.03	12.98	58.92	285	151	P	H
CH 06		4874	43.34	-30.66	74	59.24	31.17	10.45	57.52	296	37	P	V
2437MHz		7311	48.4	-25.6	74	58.31	36.03	12.98	58.92	135	168	P	V
802.11n		4904	43.81	-30.19	74	59.65	31.2	10.5	57.54	199	203	P	H
HT40		7356	49.03	-24.97	74	58.77	36.19	13.01	58.94	112	72	P	H
CH 09		4904	44.12	-29.88	74	59.96	31.2	10.5	57.54	158	274	P	V
2452MHz		7356	48.9	-25.1	74	58.64	36.19	13.01	58.94	302	260	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.												



2.4GHz 2400~2483.5MHz

Emission below 1GHz

2.4GHz WIFI 802.11n HT40 (LF)

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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT40 LF	*	30	23.75	-16.25	40	31.39	24.3	0.56	32.5	152	63	P	H
		90.14	21.16	-22.34	43.5	37.68	14.6	0.98	32.1	-	-	P	H
		156.1	20.11	-23.39	43.5	34.43	16.27	1.3	31.89	-	-	P	H
		272.5	22.54	-23.46	46	33.38	19.32	1.73	31.89	-	-	P	H
		399.57	26.06	-19.94	46	33.95	21.7	2.12	31.71	-	-	P	H
		602.3	27.89	-18.11	46	31.85	24.71	2.68	31.35	-	-	P	H
	*	32.91	30.26	-9.74	40	39.43	22.53	0.6	32.3	108	51	P	V
		62.98	24.25	-15.75	40	43.42	12.42	0.81	32.4	-	-	P	V
		90.14	26.12	-17.38	43.5	42.64	14.6	0.98	32.1	-	-	P	V
		188.11	25.66	-17.84	43.5	40.72	15.36	1.4	31.82	-	-	P	V
		273.47	24.33	-21.67	46	35.21	19.27	1.74	31.89	-	-	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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b		2390	55.45	-18.55	74	54.51	32.22	4.58	35.86	103	308	P	H
CH 01													
2412MHz		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)

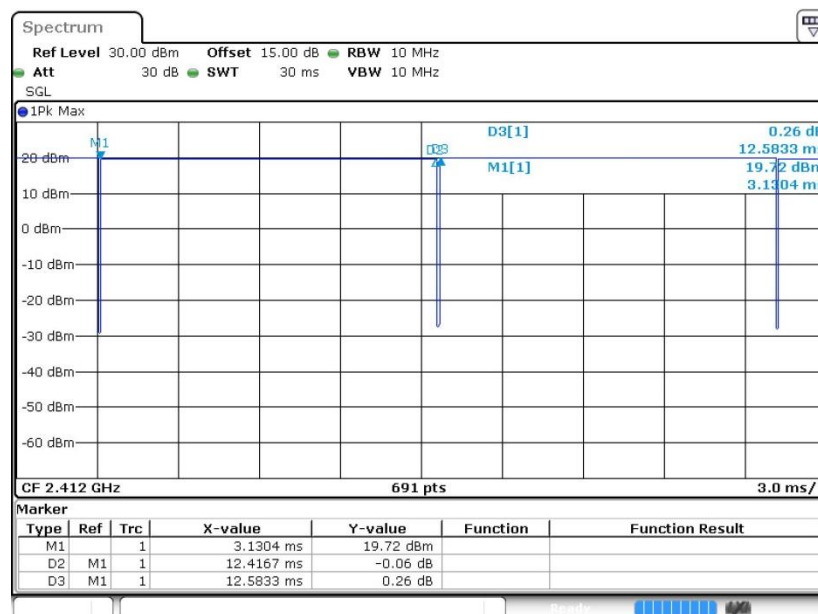
= -10.46(dB)

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

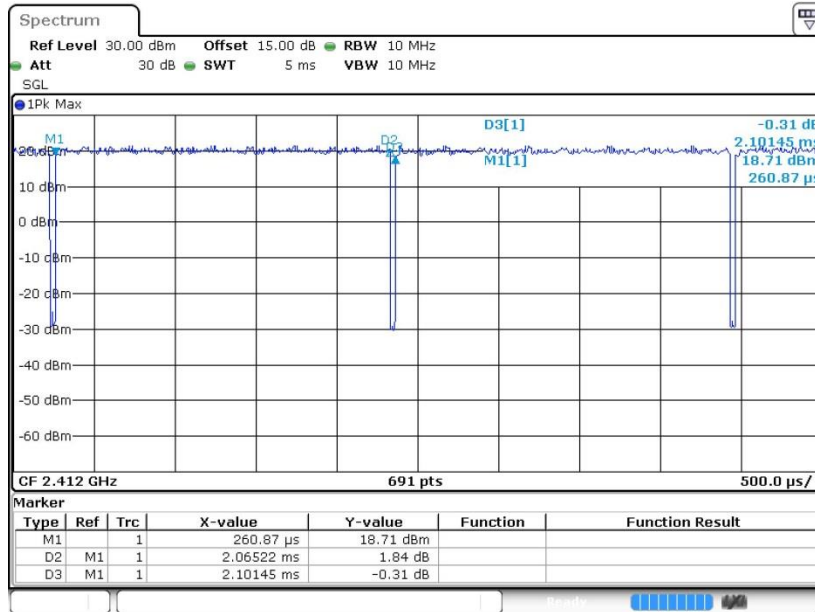
Appendix D. Duty Cycle Plots

Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2	802.11b	98.68	-	-	10Hz
1+2	802.11g	98.28	-	-	10Hz
1+2	802.11n HT20	98.16	-	-	10Hz
1+2	802.11n HT40	94.81	0.946	1.057	3kHz

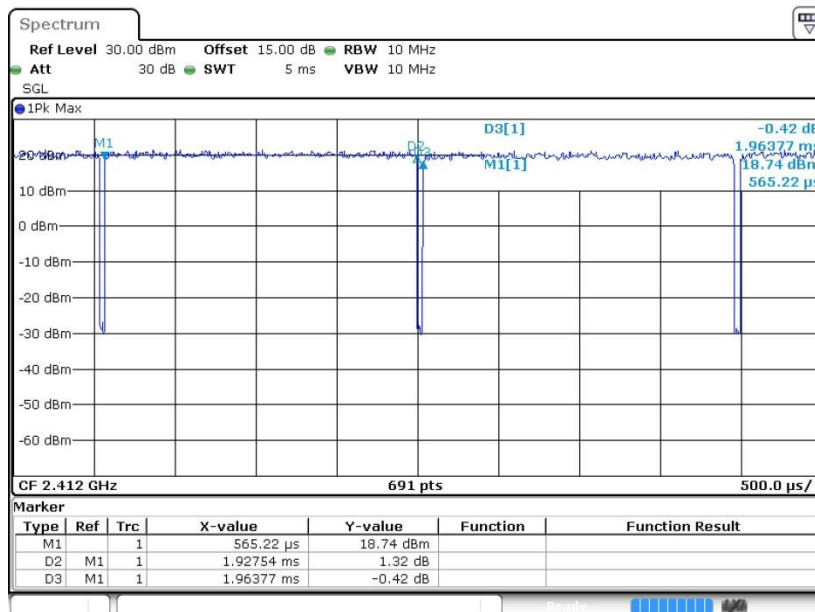
802.11b



802.11g



802.11n HT20



802.11n HT40

