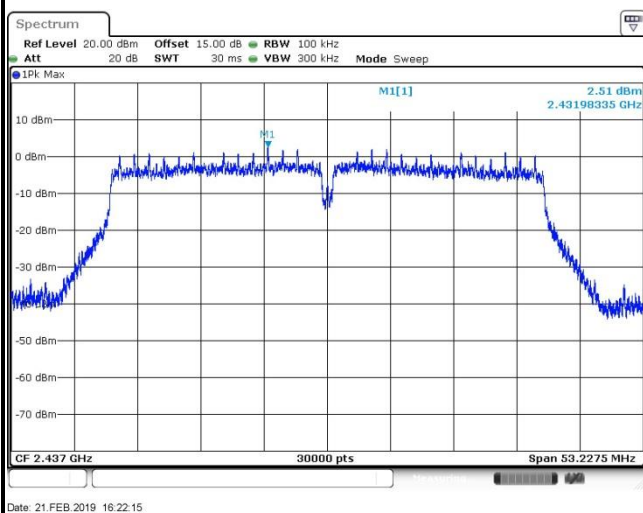


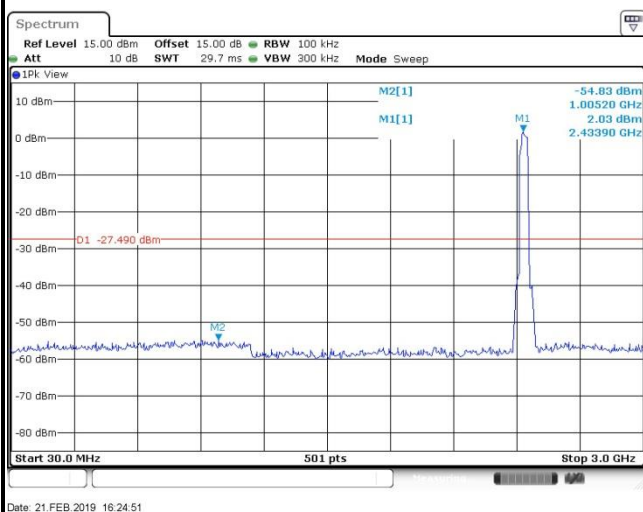


Test Mode :	802.11n HT40	Test Channel :	06
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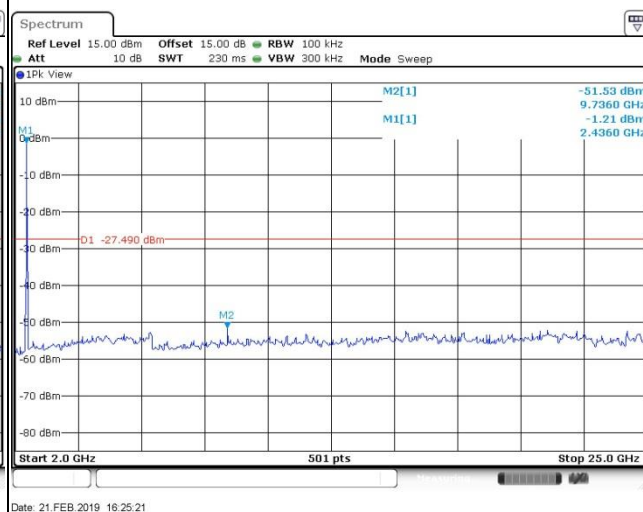
100kHz PSD reference Level

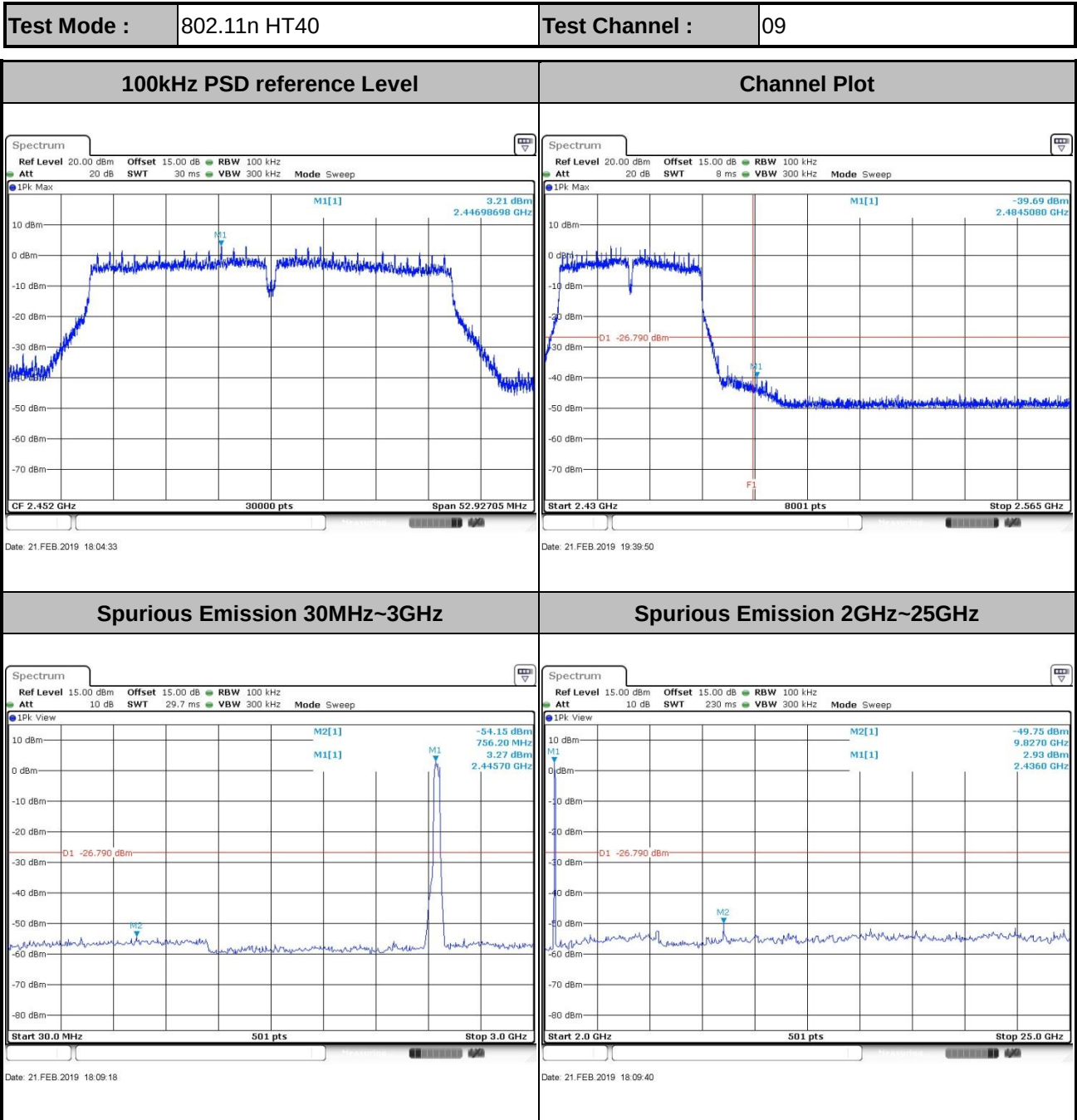


Spurious Emission 30MHz~3GHz



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

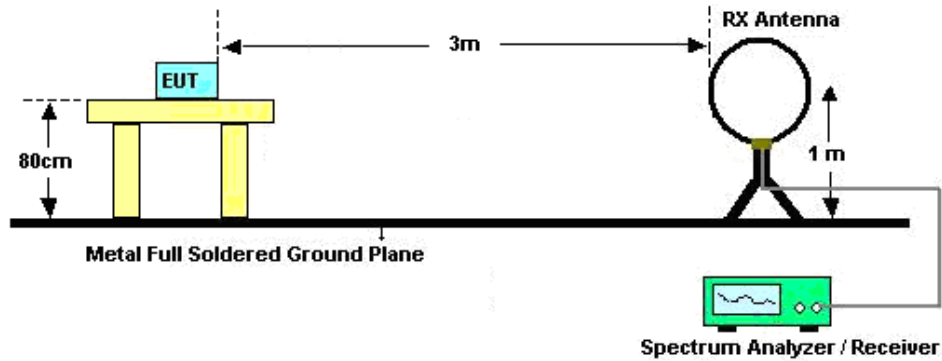
1. The testing follows ANSI C63.10-2013 clause 11.11 & 11.12
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better 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 $\geq$ 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:

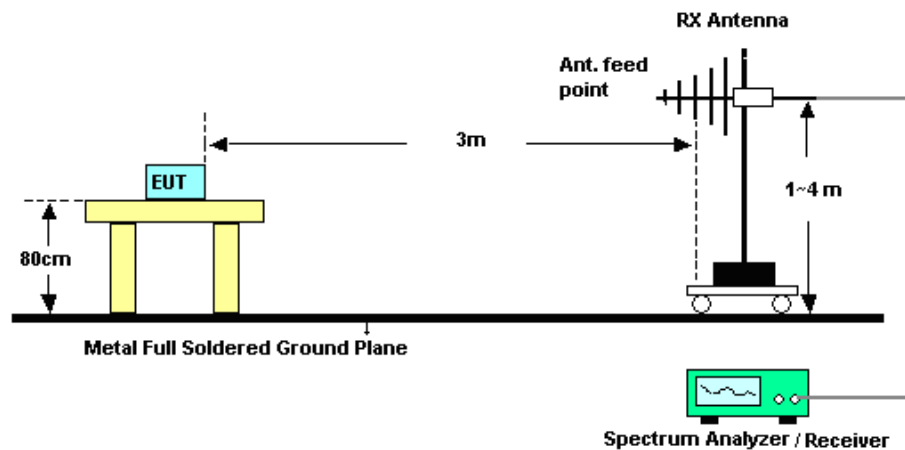
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

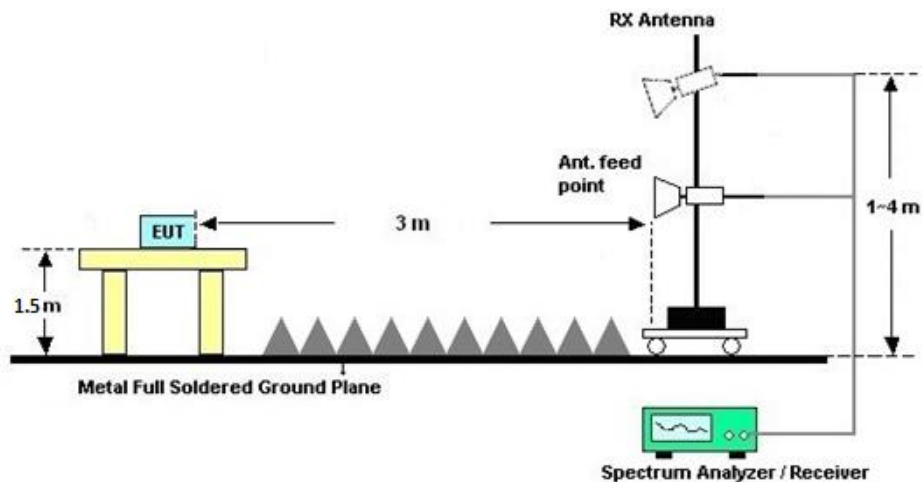
For radiated emissions below 30MHz



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.

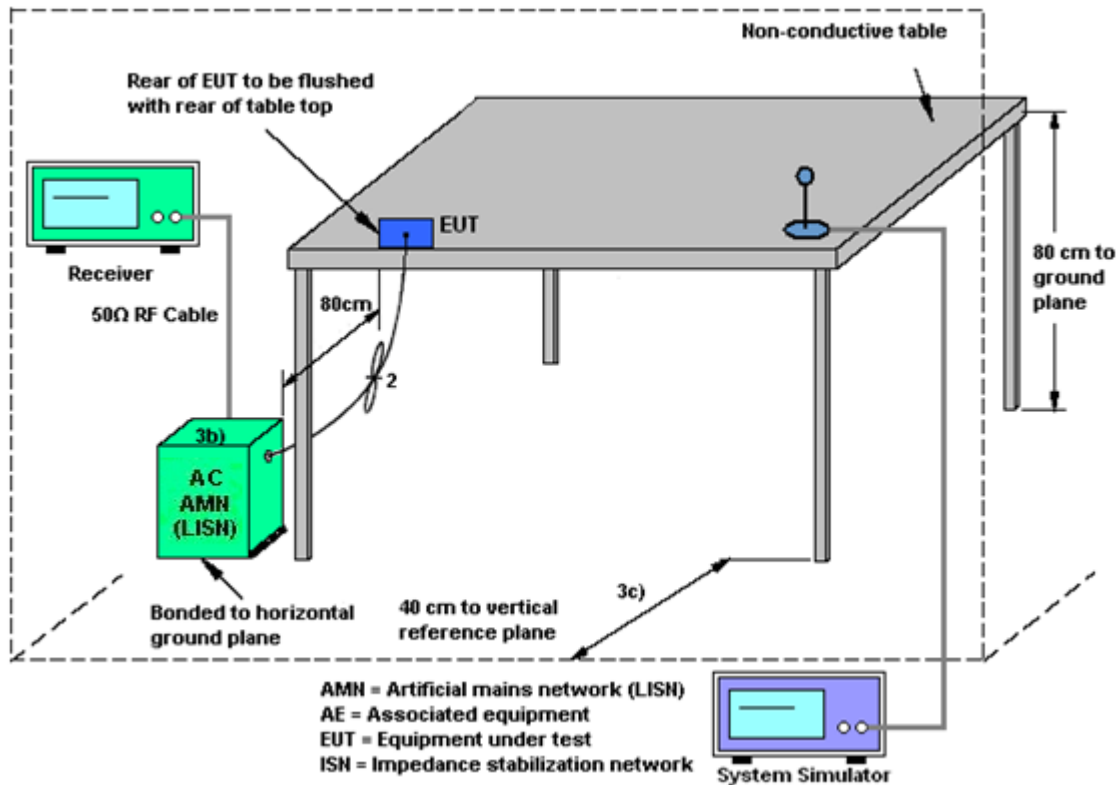
3.6.2 Measuring Instruments

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.

	Ant. 1 (dBi)	Ant. 2 (dBi)	Power (dBi)	PSD (dBi)	Reduction (dB)	Reduction (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	9kHz~40GHz	Apr. 19, 2018	Jan. 31, 2019~ Mar. 10, 2019	Apr. 18, 2019	Conducted (TH01-SZ)
Thermal Chamber	Ten Billion Hongzhangroup	LP-150U	H2014081 803	-40~+150°C	Dec. 22, 2018	Jan. 31, 2019~ Mar. 10, 2019	Dec. 21, 2019	Conducted (TH01-SZ)
DC Power Supply	GWINSTEK	AnritsuGPS-3 030D	EM882636	Max 30V	Apr. 19, 2018	Jan. 31, 2019~ Mar. 10, 2019	Apr. 18, 2019	Conducted (TH01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY551502 13	10Hz~44GHz	Apr. 19, 2018	Feb. 27, 2019	Apr. 18, 2019	Radiation (03CH02-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 14, 2018	Feb. 27, 2019	May 13, 2019	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz~2GHz	May 10, 2018	Feb. 27, 2019	May 09, 2019	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-135 5	1GHz~18GHz	Mar.29 2018	Feb. 27, 2019	Mar.28, 2019	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	TTA1840-35- HG	1871923	18GHz~40GHz	Jul.30, 2018	Feb. 27, 2019	Jul.29, 2019	Radiation (03CH02-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz~40GHz	Mar.30, 2018	Feb. 27, 2019	Mar.29, 2019	Radiation (03CH02-SZ)
LF Amplifier	Burgeon	BPA-530	102211	0.01~3000Mhz	Oct. 20, 2018	Feb. 27, 2019	Oct. 19, 2019	Radiation (03CH02-SZ)
Amplifier	Agilent	8449B	3008A010 23	1GHz~26.5GHz	Oct.20, 2018	Feb. 27, 2019	Oct 19, 2019	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010002 470	N/A	NCR	Feb. 27, 2019	NCR	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	Feb. 27, 2019	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	Feb. 27, 2019	NCR	Radiation (03CH02-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 23, 2018	Jan. 24, 2019	Dec. 22, 2019	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Oct. 18, 2018	Jan. 24, 2019	Oct. 17, 2019	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Dec. 23, 2018	Jan. 24, 2019	Dec. 22, 2019	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000 891	100Vac~250Vac	Jul. 18, 2018	Jan. 24, 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% ($U = 2Uc(y)$)	2.6 dB
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Uncertainty of Radiated Emission Measurement (30 MHz ~ 1000 MHz)

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	5.0 dB
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Uncertainty of Radiated Emission Measurement (18000 MHz ~ 40000 MHz)

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.4 dB
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Appendix A. Conducted Test Results

Report Number : FR8D2514-01C

Test Engineer:	Jensen Wu	Temperature:	24~26	°C
Test Date:	2019/1/31~2019/03/10	Relative Humidity:	50~53	%

TEST RESULTS DATA
6dB and 99% Occupied Bandwidth

2.4GHz Band										
Mod.	Data Rate	N _{TX}	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	13.94	13.74	8.07	8.05	0.50	Pass
11b	1Mbps	2	6	2437	14.14	13.89	8.07	8.07	0.50	Pass
11b	1Mbps	2	11	2462	14.09	13.94	8.07	8.07	0.50	Pass
11g	6Mbps	2	1	2412	16.63	16.58	15.13	15.12	0.50	Pass
11g	6Mbps	2	6	2437	16.73	16.58	15.64	15.72	0.50	Pass
11g	6Mbps	2	11	2462	16.73	16.63	15.35	15.70	0.50	Pass
HT20	MCS0	2	1	2412	17.83	17.78	15.13	15.68	0.50	Pass
HT20	MCS0	2	6	2437	17.88	17.88	16.76	16.52	0.50	Pass
HT20	MCS0	2	11	2462	17.88	17.93	15.96	15.96	0.50	Pass
HT40	MCS0	2	3	2422	36.56	36.26	35.13	35.08	0.50	Pass
HT40	MCS0	2	6	2437	36.56	36.36	35.33	35.48	0.50	Pass
HT40	MCS0	2	9	2452	36.46	36.46	35.13	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	19.40	18.70	22.07	30.00		-2.80		19.27		36.00		Pass
11b	1Mbps	2	6	2437	19.50	18.10	21.87	30.00		-2.80		19.07		36.00		Pass
11b	1Mbps	2	11	2462	19.00	17.70	21.41	30.00		-2.80		18.61		36.00		Pass
11g	6Mbps	2	1	2412	18.30	17.80	21.07	30.00		-2.80		18.27		36.00		Pass
11g	6Mbps	2	6	2437	18.40	17.20	20.85	30.00		-2.80		18.05		36.00		Pass
11g	6Mbps	2	11	2462	16.00	14.80	18.45	30.00		-2.80		15.65		36.00		Pass
HT20	MCS0	2	1	2412	18.20	17.80	21.01	30.00		-2.80		18.21		36.00		Pass
HT20	MCS0	2	6	2437	18.40	17.40	20.94	30.00		-2.80		18.14		36.00		Pass
HT20	MCS0	2	11	2462	16.00	14.90	18.50	30.00		-2.80		15.70		36.00		Pass
HT40	MCS0	2	3	2422	16.10	15.40	18.77	30.00		-2.80		15.97		36.00		Pass
HT40	MCS0	2	6	2437	16.60	15.50	19.10	30.00		-2.80		16.30		36.00		Pass
HT40	MCS0	2	9	2452	14.00	13.70	16.86	30.00		-2.80		14.06		36.00		Pass
VHT20	MCS0	2	1	2412	18.00	17.70	20.86	30.00		-2.80		18.06		36.00		Pass
VHT20	MCS0	2	6	2437	18.30	17.30	20.84	30.00		-2.80		18.04		36.00		Pass
VHT20	MCS0	2	11	2462	15.90	14.80	18.40	30.00		-2.80		15.60		36.00		Pass
VHT40	MCS0	2	3	2422	16.00	15.30	18.67	30.00		-2.80		15.87		36.00		Pass
VHT40	MCS0	2	6	2437	16.40	15.30	18.90	30.00		-2.80		16.10		36.00		Pass
VHT40	MCS0	2	9	2452	13.90	13.60	16.76	30.00		-2.80		13.96		36.00		Pass

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

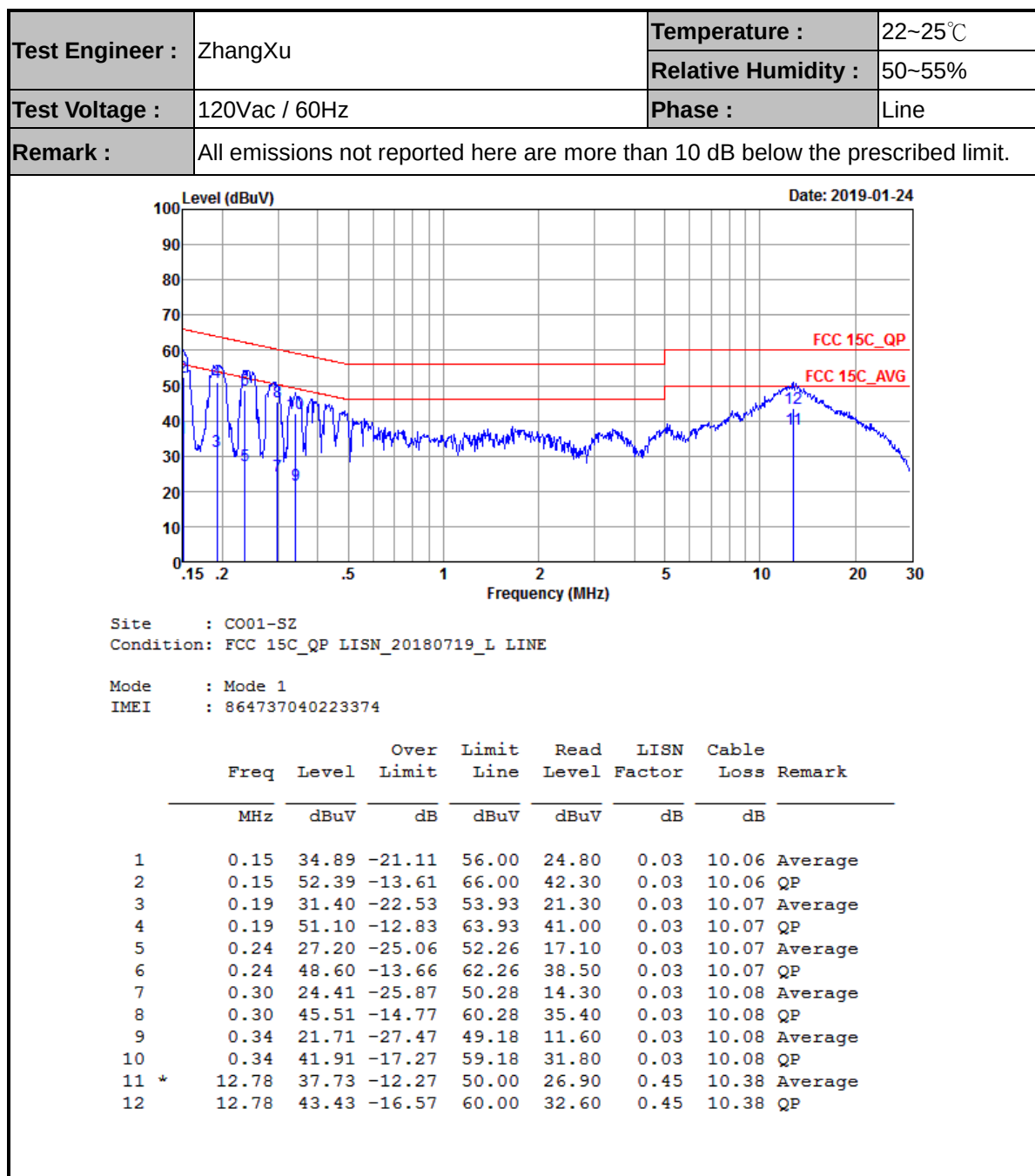
TEST RESULTS DATA
Peak Power Spectral Density

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	-6.62	-8.05	-3.61	0.11		8.00		Pass
11b	1Mbps	2	6	2437	-8.37	-7.41	-4.40	0.11		8.00		Pass
11b	1Mbps	2	11	2462	-7.25	-6.66	-3.65	0.11		8.00		Pass
11g	6Mbps	2	1	2412	-7.93	-10.04	-4.92	0.11		8.00		Pass
11g	6Mbps	2	6	2437	-6.93	-10.01	-3.92	0.11		8.00		Pass
11g	6Mbps	2	11	2462	-8.78	-10.09	-5.77	0.11		8.00		Pass
HT20	MCS0	2	1	2412	-7.23	-9.98	-4.22	0.11		8.00		Pass
HT20	MCS0	2	6	2437	-8.02	-9.14	-5.01	0.11		8.00		Pass
HT20	MCS0	2	11	2462	-8.46	-8.56	-5.45	0.11		8.00		Pass
HT40	MCS0	2	3	2422	-13.37	-12.32	-9.31	0.11		8.00		Pass
HT40	MCS0	2	6	2437	-11.90	-13.51	-8.89	0.11		8.00		Pass
HT40	MCS0	2	9	2452	-12.56	-11.94	-8.93	0.11		8.00		Pass

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

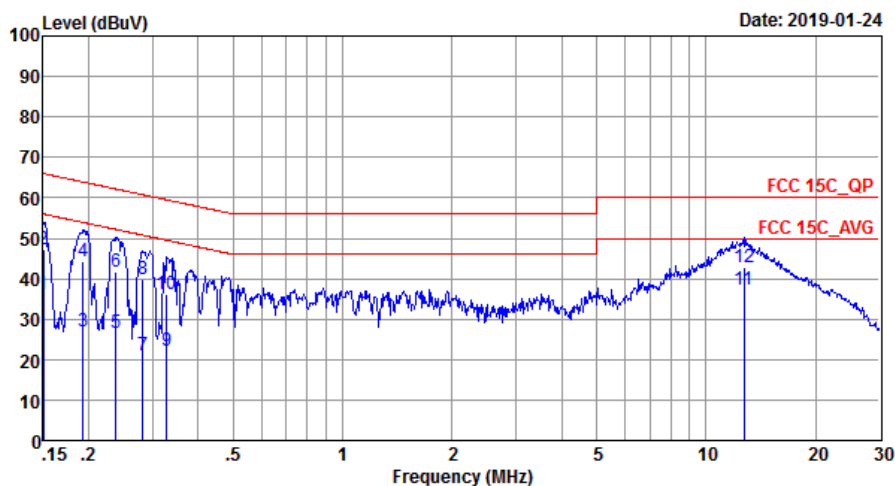


Appendix B. AC Conducted Emission Test Results





Test Engineer :	ZhangXu	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_20180719_N NEUTRAL

Mode : Mode 1
IMEI : 864737040223374

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1	0.15	36.19	-19.81	56.00	26.10	0.03	10.06	Average
2	0.15	47.39	-18.61	66.00	37.30	0.03	10.06	QP
3	0.19	26.80	-27.09	53.89	16.70	0.03	10.07	Average
4	0.19	44.30	-19.59	63.89	34.20	0.03	10.07	QP
5	0.24	26.40	-25.77	52.17	16.30	0.03	10.07	Average
6	0.24	41.70	-20.47	62.17	31.60	0.03	10.07	QP
7	0.28	21.01	-29.75	50.76	10.90	0.03	10.08	Average
8	0.28	40.01	-20.75	60.76	29.90	0.03	10.08	QP
9	0.33	22.11	-27.38	49.49	12.00	0.03	10.08	Average
10	0.33	36.21	-23.28	59.49	26.10	0.03	10.08	QP
11 *	12.72	37.24	-12.76	50.00	26.60	0.26	10.38	Average
12	12.72	42.84	-17.16	60.00	32.20	0.26	10.38	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		2370.59	47.44	-26.56	74	45.14	27.04	6.57	31.31	100	280	P	H
		2387.28	37.13	-16.87	54	34.75	27.09	6.57	31.28	100	280	A	H
	*	2412	105.62	-	-	103.14	27.14	6.6	31.26	100	280	P	H
	*	2412	103.29	-	-	100.81	27.14	6.6	31.26	100	280	A	H
		2370.69	46.7	-27.3	74	44.4	27.04	6.57	31.31	112	319	P	V
		2387.28	36.53	-17.47	54	34.15	27.09	6.57	31.28	112	319	A	V
	*	2412	100.61	-	-	98.13	27.14	6.6	31.26	112	319	P	V
	*	2412	98.33	-	-	95.85	27.14	6.6	31.26	112	319	A	V
802.11b CH 06 2437MHz		2385.46	46.89	-27.11	74	44.56	27.04	6.57	31.28	145	283	P	H
		2389.94	36.56	-17.44	54	34.15	27.09	6.6	31.28	145	283	A	H
	*	2437	106	-	-	103.39	27.24	6.63	31.26	145	283	P	H
	*	2437	103.47	-	-	100.86	27.24	6.63	31.26	145	283	A	H
		2484.04	47.99	-26.01	74	45.16	27.35	6.7	31.22	145	283	P	H
		2483.76	37.87	-16.13	54	35.04	27.35	6.7	31.22	145	283	A	H
		2365.02	46.66	-27.34	74	44.41	26.99	6.57	31.31	126	320	P	V
		2389.94	36.24	-17.76	54	33.83	27.09	6.6	31.28	126	320	A	V
	*	2437	102.72	-	-	100.11	27.24	6.63	31.26	126	320	P	V
	*	2437	100.16	-	-	97.55	27.24	6.63	31.26	126	320	A	V
		2483.76	47.4	-26.6	74	44.57	27.35	6.7	31.22	126	320	P	V
		2483.83	37.02	-16.98	54	34.19	27.35	6.7	31.22	126	320	A	V



802.11b CH 11 2462MHz	*	2462	105.66	-	-	102.93	27.3	6.67	31.24	145	286	P	H
	*	2462	103.29	-	-	100.56	27.3	6.67	31.24	145	286	A	H
		2485.28	49.04	-24.96	74	46.21	27.35	6.7	31.22	145	286	P	H
		2485.8	38.84	-15.16	54	36.01	27.35	6.7	31.22	145	286	A	H
	*	2462	101.19	-	-	98.46	27.3	6.67	31.24	108	324	P	V
	*	2462	98.88	-	-	96.15	27.3	6.67	31.24	108	324	A	V
		2484.96	47.86	-26.14	74	45.03	27.35	6.7	31.22	108	324	P	V
		2486.2	37.79	-16.21	54	34.96	27.35	6.7	31.22	108	324	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	47.58	-26.42	74	63.99	31.42	9.65	57.48	185	255	P	H
		4824	47.05	-26.95	74	63.46	31.42	9.65	57.48	185	255	P	V
802.11b CH 06 2437MHz		4874	47.84	-26.16	74	64.14	31.51	9.71	57.52	165	106	P	H
		7311	47.41	-26.59	74	57.96	36.36	12.01	58.92	174	100	P	H
		4874	47.08	-26.92	74	63.38	31.51	9.71	57.52	165	106	P	V
		7311	49.09	-24.91	74	59.64	36.36	12.01	58.92	174	100	P	V
		7311	46.94	-7.06	54	57.49	36.36	12.01	58.92	174	100	A	V
802.11b CH 11 2462MHz		4924	47.66	-26.34	74	63.85	31.59	9.77	57.55	100	91	P	H
		7386	48.73	-25.27	74	58.96	36.65	12.08	58.96	155	274	P	H
		4924	51.21	-22.79	74	67.4	31.59	9.77	57.55	100	91	P	V
		4924	50.93	-3.07	54	67.12	31.59	9.77	57.55	100	91	A	V
		7386	49.38	-24.62	74	59.61	36.65	12.08	58.96	155	274	P	V
		7386	48.38	-5.62	54	58.61	36.65	12.08	58.96	155	274	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 (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		2390	52.04	-21.96	74	49.63	27.09	6.6	31.28	169	280	P	H
		2390	43.37	-10.63	54	40.96	27.09	6.6	31.28	169	280	A	H
	*	2412	107.54	-	-	105.06	27.14	6.6	31.26	169	280	P	H
	*	2412	100.88	-	-	98.4	27.14	6.6	31.26	169	280	A	H
		2390	50.37	-23.63	74	47.96	27.09	6.6	31.28	100	318	P	V
		2390	40.56	-13.44	54	38.15	27.09	6.6	31.28	100	318	A	V
	*	2412	103.86	-	-	101.38	27.14	6.6	31.26	100	318	P	V
	*	2412	97.33	-	-	94.85	27.14	6.6	31.26	100	318	A	V
802.11g CH 06 2437MHz		2388.26	47.39	-26.61	74	44.98	27.09	6.6	31.28	169	280	P	H
		2389.94	37.56	-16.44	54	35.15	27.09	6.6	31.28	169	280	A	H
	*	2437	108.88	-	-	106.27	27.24	6.63	31.26	169	280	P	H
	*	2437	101.63	-	-	99.02	27.24	6.63	31.26	169	280	A	H
		2484.25	49.32	-24.68	74	46.49	27.35	6.7	31.22	169	280	P	H
		2483.5	39.62	-14.38	54	36.79	27.35	6.7	31.22	169	280	A	H
		2340.94	47.42	-26.58	74	45.29	26.93	6.53	31.33	109	320	P	V
		2389.94	36.78	-17.22	54	34.37	27.09	6.6	31.28	109	320	A	V
	*	2437	103.92	-	-	101.31	27.24	6.63	31.26	109	320	P	V
	*	2437	97.11	-	-	94.5	27.24	6.63	31.26	109	320	A	V
		2483.5	49.23	-24.77	74	46.4	27.35	6.7	31.22	109	320	P	V
		2483.5	38.09	-15.91	54	35.26	27.35	6.7	31.22	109	320	A	V



802.11g CH 11 2462MHz	*	2462	107.13	-	-	104.4	27.3	6.67	31.24	166	278	P	H
	*	2462	100.1	-	-	97.37	27.3	6.67	31.24	166	278	A	H
		2484.64	58.53	-15.47	74	55.7	27.35	6.7	31.22	166	278	P	H
		2483.52	45.85	-8.15	54	43.02	27.35	6.7	31.22	166	278	A	H
	*	2462	100.82	-	-	98.09	27.3	6.67	31.24	109	320	P	V
	*	2462	95.38	-	-	92.65	27.3	6.67	31.24	109	320	A	V
		2484.76	53.15	-20.85	74	50.32	27.35	6.7	31.22	109	320	P	V
		2483.52	42.01	-11.99	54	39.18	27.35	6.7	31.22	109	320	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)	Preamplifier Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 01 2412MHz		4824	43.79	-30.21	74	60.2	31.42	9.65	57.48	185	255	P	H
		4824	42.08	-31.92	74	58.49	31.42	9.65	57.48	185	255	P	V
802.11g CH 06 2437MHz		4874	44.78	-29.22	74	61.08	31.51	9.71	57.52	165	106	P	H
		7311	47.15	-26.85	74	57.7	36.36	12.01	58.92	174	100	P	H
		4874	43.12	-30.88	74	59.42	31.51	9.71	57.52	165	106	P	V
		7311	48.93	-25.07	74	59.48	36.36	12.01	58.92	174	100	P	V
		7311	46.94	-7.06	54	57.49	36.36	12.01	58.92	174	100	A	V
802.11g CH 11 2462MHz		4924	43.44	-30.56	74	59.63	31.59	9.77	57.55	150	285	P	H
		7386	46.52	-27.48	74	56.75	36.65	12.08	58.96	155	274	P	H
		4924	42.08	-31.92	74	58.27	31.59	9.77	57.55	150	285	P	V
		7386	46.53	-27.47	74	56.76	36.65	12.08	58.96	155	274	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)	Preamplifier Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11n HT20 CH 01 2412MHz		2389.07	52.6	-21.4	74	50.19	27.09	6.6	31.28	311	280	P	H
		2390	43	-11	54	40.59	27.09	6.6	31.28	311	280	A	H
	*	2412	108.14	-	-	105.66	27.14	6.6	31.26	311	280	P	H
	*	2412	100.18	-	-	97.7	27.14	6.6	31.26	311	280	A	H
		2389.38	53.27	-20.73	74	50.86	27.09	6.6	31.28	310	250	P	V
		2390	42.81	-11.19	54	40.4	27.09	6.6	31.28	310	250	A	V
	*	2412	105.57	-	-	103.09	27.14	6.6	31.26	310	250	P	V
	*	2412	98.51	-	-	96.03	27.14	6.6	31.26	310	250	A	V
802.11n HT20 CH 06 2437MHz		2388.82	47.57	-26.43	74	45.16	27.09	6.6	31.28	100	287	P	H
		2389.94	37.49	-16.51	54	35.08	27.09	6.6	31.28	100	287	A	H
	*	2437	108.41	-	-	105.8	27.24	6.63	31.26	100	287	P	H
	*	2437	100.3	-	-	97.69	27.24	6.63	31.26	100	287	A	H
		2484.18	50.29	-23.71	74	47.46	27.35	6.7	31.22	100	287	P	H
		2483.5	39.62	-14.38	54	36.79	27.35	6.7	31.22	100	287	A	H
		2388.4	48.26	-25.74	74	45.85	27.09	6.6	31.28	310	250	P	V
		2389.94	37.32	-16.68	54	34.91	27.09	6.6	31.28	310	250	A	V
	*	2437	106.56	-	-	103.95	27.24	6.63	31.26	310	250	P	V
	*	2437	99.27	-	-	96.66	27.24	6.63	31.26	310	250	A	V
		2483.9	48.28	-25.72	74	45.45	27.35	6.7	31.22	310	250	P	V
		2483.5	38.75	-15.25	54	35.92	27.35	6.7	31.22	310	250	A	V



802.11n HT20 CH 11 2462MHz	*	2462	108.09	-	-	105.36	27.3	6.67	31.24	100	108	P	H
	*	2462	100.78	-	-	98.05	27.3	6.67	31.24	100	108	A	H
		2483.6	57.63	-16.37	74	54.8	27.35	6.7	31.22	100	108	P	H
		2483.52	48.61	-5.39	54	45.78	27.35	6.7	31.22	100	108	A	H
	*	2462	100.91	-	-	98.18	27.3	6.67	31.24	300	61	P	V
	*	2462	94.1	-	-	91.37	27.3	6.67	31.24	300	61	A	V
		2483.88	53.27	-20.73	74	50.44	27.35	6.7	31.22	300	61	P	V
		2483.52	42.95	-11.05	54	40.12	27.35	6.7	31.22	300	61	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	42.88	-31.12	74	59.29	31.42	9.65	57.48	185	255	P	H
		4824	42.76	-31.24	74	59.17	31.42	9.65	57.48	185	255	P	V
802.11n HT20 CH 06 2437MHz		4874	45.47	-28.53	74	61.77	31.51	9.71	57.52	165	106	P	H
		7311	46.62	-27.38	74	57.17	36.36	12.01	58.92	174	75	P	H
		4874	42.91	-31.09	74	59.21	31.51	9.71	57.52	165	185	P	V
		7311	47.59	-26.41	74	58.14	36.36	12.01	58.92	174	100	P	V
802.11n HT20 CH 11 2462MHz		4924	41.19	-32.81	74	57.38	31.59	9.77	57.55	150	178	P	H
		7386	46.02	-27.98	74	56.25	36.65	12.08	58.96	155	274	P	H
		4924	40.97	-33.03	74	57.16	31.59	9.77	57.55	150	285	P	V
		7386	46.4	-27.6	74	56.63	36.65	12.08	58.96	185	75	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	57.48	-16.52	74	55.07	27.09	6.6	31.28	129	110	P	H
		2389.8	48.25	-5.75	54	45.84	27.09	6.6	31.28	129	110	A	H
	*	2422	104.68	-	-	102.12	27.19	6.63	31.26	129	110	P	H
	*	2422	98.45	-	-	95.89	27.19	6.63	31.26	129	110	A	H
		2485.44	49.88	-24.12	74	47.05	27.35	6.7	31.22	129	110	P	H
		2483.62	41.8	-12.2	54	38.97	27.35	6.7	31.22	129	110	A	H
		2389.8	50.87	-23.13	74	48.46	27.09	6.6	31.28	100	71	P	V
		2389.52	42.86	-11.14	54	40.45	27.09	6.6	31.28	100	71	A	V
	*	2422	98.17	-	-	95.61	27.19	6.63	31.26	100	71	P	V
	*	2422	92.31	-	-	89.75	27.19	6.63	31.26	100	71	A	V
		2488.73	46.84	-27.16	74	43.93	27.4	6.73	31.22	100	71	P	V
		2483.76	38.48	-15.52	54	35.65	27.35	6.7	31.22	100	71	A	V
802.11n HT40 CH 06 2437MHz		2389.24	53.72	-20.28	74	51.31	27.09	6.6	31.28	100	109	P	H
		2389.94	44.9	-9.1	54	42.49	27.09	6.6	31.28	100	109	A	H
	*	2437	105.41	-	-	102.8	27.24	6.63	31.26	100	109	P	H
	*	2437	99.02	-	-	96.41	27.24	6.63	31.26	100	109	A	H
		2483.69	57.49	-16.51	74	54.66	27.35	6.7	31.22	100	109	P	H
		2483.9	48.82	-5.18	54	45.99	27.35	6.7	31.22	100	109	A	H
		2389.52	48.3	-25.7	74	45.89	27.09	6.6	31.28	100	69	P	V
		2389.94	39.88	-14.12	54	37.47	27.09	6.6	31.28	100	69	A	V
	*	2437	98.06	-	-	95.45	27.24	6.63	31.26	100	69	P	V
	*	2437	92.09	-	-	89.48	27.24	6.63	31.26	100	69	A	V
		2485.3	49.7	-24.3	74	46.87	27.35	6.7	31.22	100	69	P	V
		2483.83	42.1	-11.9	54	39.27	27.35	6.7	31.22	100	69	A	V



802.11n HT40 CH 09 2452MHz		2344.58	46.72	-27.28	74	47.6	27.75	4.66	33.29	101	274	P	H
		2389.66	37.9	-16.1	54	38.7	27.7	4.78	33.28	101	274	A	H
	*	2452	103.96	-	-	104.71	27.66	4.82	33.23	101	274	P	H
	*	2452	97.71	-	-	98.46	27.66	4.82	33.23	101	274	A	H
		2483.5	59.21	-14.79	74	59.95	27.63	4.85	33.22	101	274	P	H
		2483.55	50.83	-3.17	54	51.57	27.63	4.85	33.22	101	274	A	H
		2368.1	45.86	-28.14	74	43.61	26.99	6.57	31.31	399	76	P	V
		2372.86	36.97	-17.03	54	34.67	27.04	6.57	31.31	399	76	A	V
	*	2452	96.65	-	-	93.98	27.24	6.67	31.24	399	76	P	V
	*	2452	89.94	-	-	87.27	27.24	6.67	31.24	399	76	A	V
		2483.83	52.51	-21.49	74	49.68	27.35	6.7	31.22	399	76	P	V
		2483.55	43.51	-10.49	54	40.68	27.35	6.7	31.22	399	76	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	40.65	-33.35	74	57.01	31.45	9.68	57.49	175	86	P	H
HT40		7266	46.41	-27.59	74	57.09	36.24	11.99	58.91	200	75	P	H
CH 03		4844	40.84	-33.16	74	57.2	31.45	9.68	57.49	150	350	P	V
2422MHz		7266	46.02	-27.98	74	56.7	36.24	11.99	58.91	200	360	P	V
802.11n		4874	40.82	-33.18	74	57.12	31.51	9.71	57.52	76	230	P	H
HT40		7311	45.41	-28.59	74	55.96	36.36	12.01	58.92	186	323	P	H
CH 06		4874	40.87	-33.13	74	57.17	31.51	9.71	57.52	165	230	P	V
2437MHz		7311	45.68	-28.32	74	56.23	36.36	12.01	58.92	186	78	P	V
802.11n		4904	40.75	-33.25	74	56.99	31.56	9.74	57.54	185	360	P	H
HT40		7356	46.54	-27.46	74	56.89	36.53	12.06	58.94	165	335	P	H
CH 09		4904	39.98	-34.02	74	56.22	31.56	9.74	57.54	150	360	P	V
2452MHz		7356	46.6	-27.4	74	56.95	36.53	12.06	58.94	165	89	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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11b LF		30	22.67	-17.33	40	29.99	24.4	0.25	31.97	-	-	P	H
		123.12	21.13	-22.37	43.5	33.71	17.91	1.15	31.64	-	-	P	H
		287.05	25.01	-20.99	46	35.43	19	1.81	31.23	-	-	P	H
		479.11	25.91	-20.09	46	31.77	23.02	2.38	31.26	-	-	P	H
		775.93	29.41	-16.59	46	31.61	25.88	3.1	31.18	100	81	P	H
		982.54	31.97	-22.03	54	32.53	27.24	3.53	31.33	-	-	P	H
		30	29.28	-10.72	40	36.6	24.4	0.25	31.97	100	94	P	V
		64.92	25.73	-14.27	40	44.13	12.7	0.8	31.9	-	-	P	V
		168.71	25.06	-18.44	43.5	39.52	15.66	1.35	31.47	-	-	P	V
		287.05	22.51	-23.49	46	32.93	19	1.81	31.23	-	-	P	V
		625.58	26.81	-19.19	46	30.7	24.6	2.76	31.25	-	-	P	V
		922.4	30.37	-15.63	46	31.48	26.7	3.43	31.24	-	-	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	Peak or Average
H/V	Horizontal or Vertical



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)

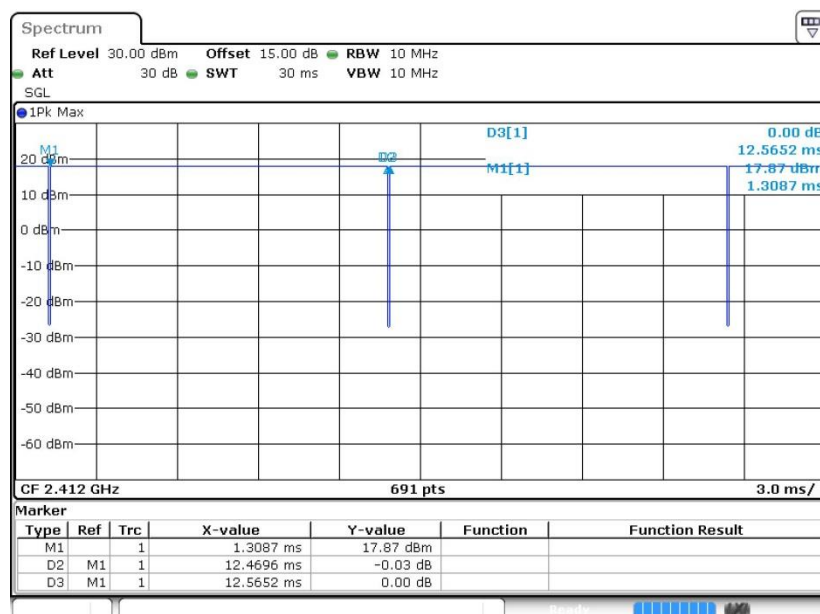
= -10.46(dB)

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

Appendix D. Duty Cycle Plots

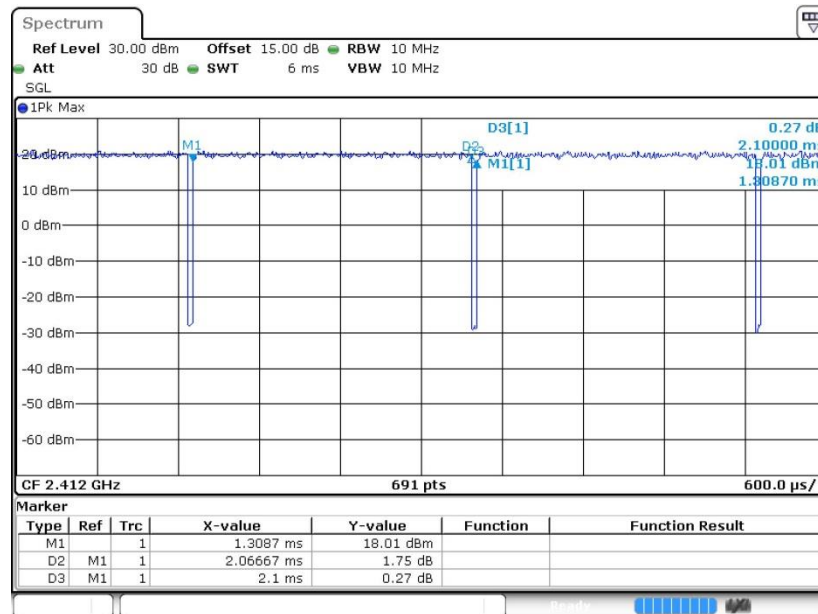
Antenna	Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
1+2	802.11b	99.24	-	-	10Hz
1+2	802.11g	98.41	-	-	10Hz
1+2	802.11n HT20	98.30	-	-	10Hz
1+2	802.11n HT40	94.98	0.946	1.0575	3KHz

802.11b

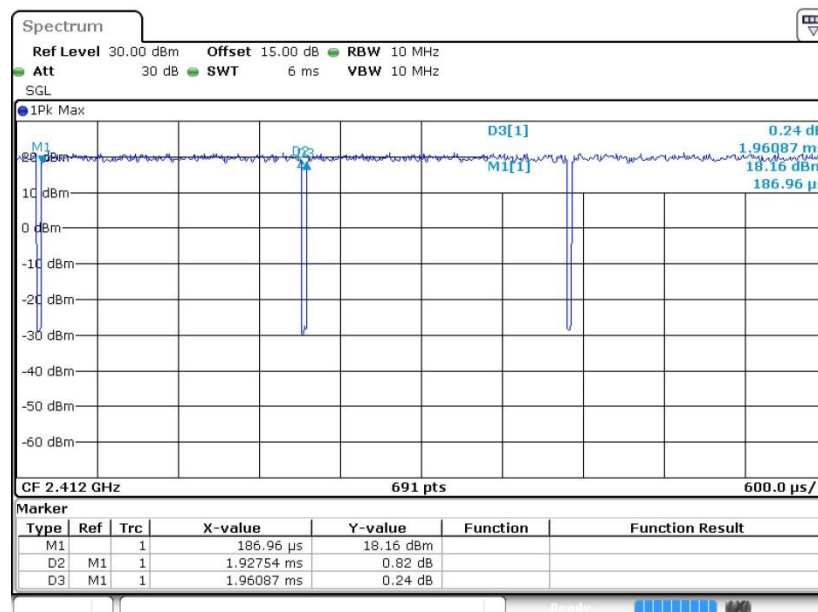




802.11g



802.11n HT20



802.11n HT40

