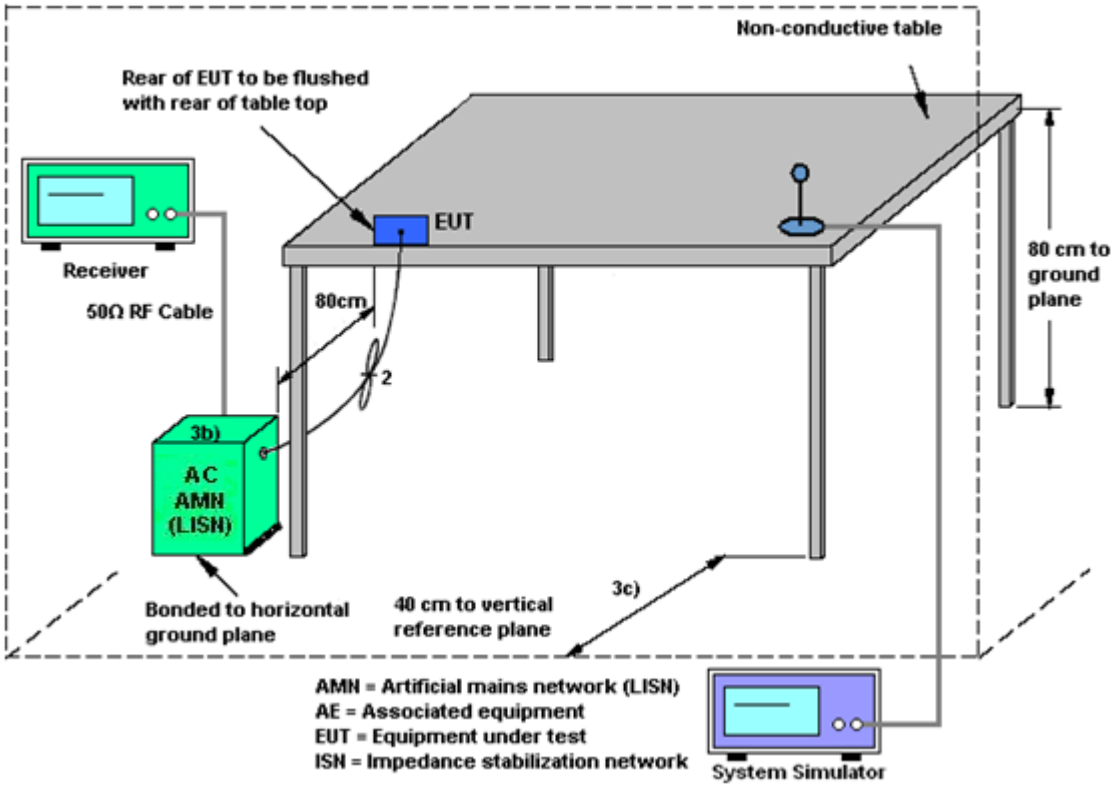
3.6.4 Test Setup



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>

	Ant. 1 (dBi)	Ant. 2 (dBi)	DG for Power (dBi)	DG for PSD (dBi)	Power Limit Reduction (dB)	PSD Limit Reduction (dB)
2.4 GHz	-2.00	-2.00	-2.00	1.01	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. 16, 2010	May 02, 2020~ May 10, 2020	Apr. 15, 2021	Conducted (TH01-SZ)
Pulse Power Senor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 26, 2019	May 02, 2020~ May 10, 2020	Dec. 25, 2020	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 26, 2019	May 02, 2020~ May 10, 2020	Dec. 25, 2020	Conducted (TH01-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Apr. 17, 2020	May 22, 2020	Apr. 16, 2021	Radiation (03CH02-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 29, 2019	May 22, 2020	May 28, 2020	Radiation (03CH02-SZ)
Bilog Antenna	TeseQ	CBL6112D	35407	30MHz-2GHz	Jul. 19, 2019	May 22, 2020	Jul. 18, 2020	Radiation (03CH02-SZ)
Double Ridge Horn Antenna	ETS-Lindgren	3117	00119436	1GHz~18GHz	Aug. 27, 2019	May 22, 2020	Aug. 26, 2020	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	TTA1840-35-HG	1871923	18GHz~40GHz	Jul. 22, 2019	May 22, 2020	Jul. 21, 2020	Radiation (03CH02-SZ)
SHF-EHF Horn	com-power	AH-840	101071	18Ghz-40GHz	Apr. 17, 2020	May 22, 2020	Apr. 16, 2021	Radiation (03CH02-SZ)
LF Amplifier	Burgeon	BPA-530	102211	0.01~3000Mhz	Oct. 18, 2019	May 22, 2020	Oct. 17, 2020	Radiation (03CH02-SZ)
HF Amplifier	MITEQ	AMF-7D-00101800-30-10P-R	1943528	1GHz~18GHz	Oct. 18, 2019	May 22, 2020	Oct. 17, 2020	Radiation (03CH02-SZ)
HF Amplifier	KEYSIGHT	83017A	MY53270105	0.5GHz~26.5Ghz	Oct. 18, 2019	May 22, 2020	Oct. 17, 2020	Radiation (03CH02-SZ)
AC Power Source	Chroma	61601	616010002470	N/A	NCR	May 22, 2020	NCR	Radiation (03CH02-SZ)
Turn Table	Chaintek	T-200	N/A	0~360 degree	NCR	May 22, 2020	NCR	Radiation (03CH02-SZ)
Antenna Mast	Chaintek	MBS-400	N/A	1 m~4 m	NCR	May 22, 2020	NCR	Radiation (03CH02-SZ)
EMI Receiver	R&S	ESR7	101630	9kHz~7GHz;	Dec. 26, 2019	May 19, 2020	Dec. 25, 2020	Conduction (CO01-SZ)
AC LISN	EMCO	3816/2SH	00103912	9kHz~30MHz	Oct. 17, 2019	May 19, 2020	Oct. 16, 2020	Conduction (CO01-SZ)
AC LISN (for auxiliary equipment)	EMCO	3816/2SH	00103892	9kHz~30MHz	Oct. 17, 2019	May 19, 2020	Oct. 16, 2020	Conduction (CO01-SZ)
AC Power Source	Chroma	61602	616020000891	100Vac~250Vac	Jul. 23, 2019	May 19, 2020	Jul. 22, 2020	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**

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

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

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

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

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

Measuring Uncertainty for a Level of Confidence of 95% (U = 2Uc(y))	**4.4dB**

Appendix A. Conducted Test Results

Appendix A. Test Result of Conducted Test Items

Test Engineer:	Zeng meng hui	Temperature:	21~25	°C
Test Date:	2020/5/02~2020/5/10	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	13.54	13.49	8.07	8.07	0.50	Pass
11b	1Mbps	2	6	2437	13.64	13.64	8.07	8.05	0.50	Pass
11b	1Mbps	2	11	2462	13.59	13.64	8.07	8.07	0.50	Pass
11g	6Mbps	2	1	2412	16.68	16.58	15.54	15.32	0.50	Pass
11g	6Mbps	2	6	2437	16.68	16.58	15.52	15.44	0.50	Pass
11g	6Mbps	2	11	2462	16.63	16.58	15.36	15.70	0.50	Pass
HT20	MCS0	2	1	2412	17.83	17.78	16.00	15.10	0.50	Pass
HT20	MCS0	2	6	2437	17.88	17.78	16.52	15.94	0.50	Pass
HT20	MCS0	2	11	2462	17.83	17.78	15.96	15.96	0.50	Pass
HT40	MCS0	2	3	2422	36.46	36.26	35.12	35.08	0.50	Pass
HT40	MCS0	2	6	2437	36.46	36.36	35.12	35.68	0.50	Pass
HT40	MCS0	2	9	2452	36.56	36.36	35.36	35.68	0.50	Pass

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 2	SUM	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	Ant 1	Ant 2	
11b	1Mbps	2	1	2412	20.55	20.52	23.55	30.00		-2.00		21.55		36.00		Pass
11b	1Mbps	2	6	2437	20.54	20.40	23.48	30.00		-2.00		21.48		36.00		Pass
11b	1Mbps	2	11	2462	20.52	20.67	23.61	30.00		-2.00		21.61		36.00		Pass
11g	6Mbps	2	1	2412	21.64	21.18	24.43	30.00		-2.00		22.43		36.00		Pass
11g	6Mbps	2	6	2437	21.59	21.13	24.38	30.00		-2.00		22.38		36.00		Pass
11g	6Mbps	2	11	2462	21.63	21.55	24.60	30.00		-2.00		22.60		36.00		Pass
HT20	MCS0	2	1	2412	21.51	21.26	24.40	30.00		-2.00		22.40		36.00		Pass
HT20	MCS0	2	6	2437	21.54	21.14	24.35	30.00		-2.00		22.35		36.00		Pass
HT20	MCS0	2	11	2462	21.55	21.62	24.60	30.00		-2.00		22.60		36.00		Pass
HT40	MCS0	2	3	2422	21.73	21.44	24.60	30.00		-2.00		22.60		36.00		Pass
HT40	MCS0	2	6	2437	21.73	21.25	24.51	30.00		-2.00		22.51		36.00		Pass
HT40	MCS0	2	9	2452	21.66	21.19	24.44	30.00		-2.00		22.44		36.00		Pass

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

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	19.00	18.50	21.77	30.00		-2.00		19.77		36.00		Pass
11b	1Mbps	2	6	2437	19.00	18.60	21.81	30.00		-2.00		19.81		36.00		Pass
11b	1Mbps	2	11	2462	19.00	18.80	21.91	30.00		-2.00		19.91		36.00		Pass
11g	6Mbps	2	1	2412	17.60	17.00	20.32	30.00		-2.00		18.32		36.00		Pass
11g	6Mbps	2	6	2437	17.60	17.00	20.32	30.00		-2.00		18.32		36.00		Pass
11g	6Mbps	2	11	2462	17.50	17.40	20.46	30.00		-2.00		18.46		36.00		Pass
HT20	MCS0	2	1	2412	17.50	17.20	20.36	30.00		-2.00		18.36		36.00		Pass
HT20	MCS0	2	6	2437	17.60	17.10	20.37	30.00		-2.00		18.37		36.00		Pass
HT20	MCS0	2	11	2462	17.50	17.40	20.46	30.00		-2.00		18.46		36.00		Pass
HT40	MCS0	2	3	2422	16.20	15.80	19.01	30.00		-2.00		17.01		36.00		Pass
HT40	MCS0	2	6	2437	16.20	15.70	18.97	30.00		-2.00		16.97		36.00		Pass
HT40	MCS0	2	9	2452	16.10	15.60	18.87	30.00		-2.00		16.87		36.00		Pass

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

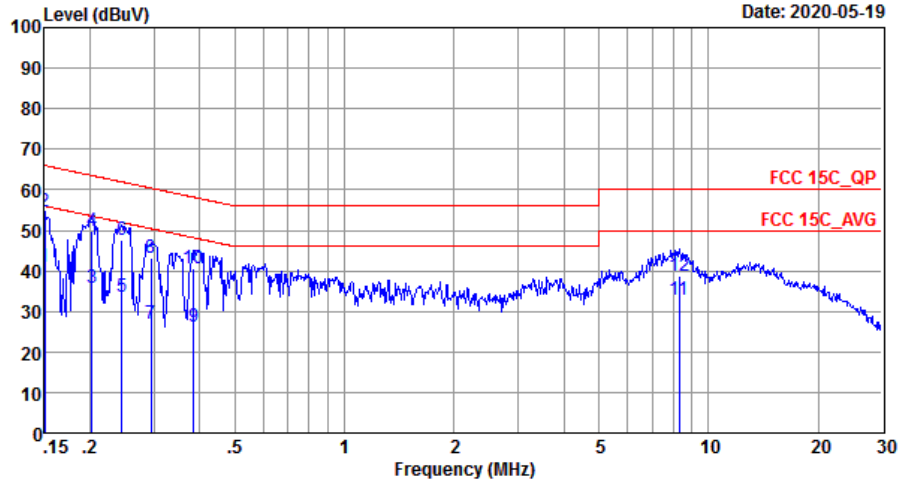
TEST RESULTS DATA
Peak Power Spectral Density

2.4GHz Band												
Mod.	Data Rate	NTX	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	-7.85	-7.19	-4.18	1.01		8.00		Pass
11b	1Mbps	2	6	2437	-7.66	-7.42	-4.41	1.01		8.00		Pass
11b	1Mbps	2	11	2462	-7.13	-7.40	-4.12	1.01		8.00		Pass
11g	6Mbps	2	1	2412	-9.46	-10.25	-6.45	1.01		8.00		Pass
11g	6Mbps	2	6	2437	-8.25	-8.82	-5.24	1.01		8.00		Pass
11g	6Mbps	2	11	2462	-9.42	-9.18	-6.17	1.01		8.00		Pass
HT20	MCS0	2	1	2412	-9.32	-9.69	-6.31	1.01		8.00		Pass
HT20	MCS0	2	6	2437	-8.94	-9.33	-5.93	1.01		8.00		Pass
HT20	MCS0	2	11	2462	-9.97	-9.19	-6.18	1.01		8.00		Pass
HT40	MCS0	2	3	2422	-12.48	-13.51	-9.47	1.01		8.00		Pass
HT40	MCS0	2	6	2437	-12.91	-12.79	-9.78	1.01		8.00		Pass
HT40	MCS0	2	9	2452	-11.74	-12.75	-8.73	1.01		8.00		Pass

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

Appendix B. AC Conducted Emission Test Results

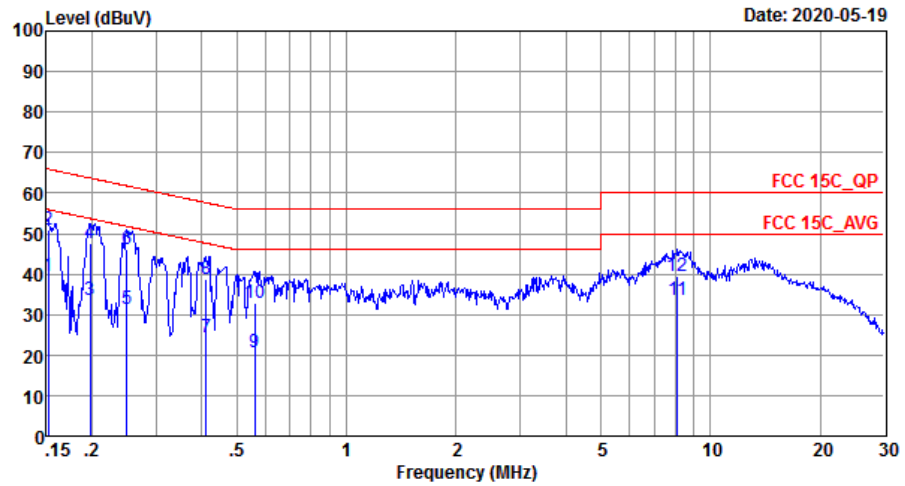
Test Engineer :	Doom Wu	Temperature :	22~25℃
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Line



Site : CO01-SZ
Condition: FCC 15C_QP LISN_20190719_L LINE

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.15	41.04	-14.96	56.00	31.00	0.03	10.01	Average
2	*	0.15	54.64	-11.36	66.00	44.60	0.03	10.01	QP
3		0.20	35.64	-17.85	53.49	25.60	0.03	10.01	Average
4		0.20	49.74	-13.75	63.49	39.70	0.03	10.01	QP
5		0.24	33.74	-18.21	51.95	23.70	0.03	10.01	Average
6		0.24	47.54	-14.41	61.95	37.50	0.03	10.01	QP
7		0.29	27.04	-23.37	50.41	17.00	0.03	10.01	Average
8		0.29	43.24	-17.17	60.41	33.20	0.03	10.01	QP
9		0.39	26.24	-21.93	48.17	16.20	0.03	10.01	Average
10		0.39	40.64	-17.53	58.17	30.60	0.03	10.01	QP
11		8.32	33.02	-16.98	50.00	22.50	0.29	10.23	Average
12		8.32	38.72	-21.28	60.00	28.20	0.29	10.23	QP

Test Engineer :	Doom Wu	Temperature :	22~25℃
		Relative Humidity :	50~55%
Test Voltage :	120Vac / 60Hz	Phase :	Neutral



Site : CO01-SZ
Condition: FCC 15C_QP LISN_20190719_N NEUTRAL

		Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
		MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1		0.15	39.34	-16.57	55.91	29.30	0.03	10.01	Average
2	*	0.15	51.04	-14.87	65.91	41.00	0.03	10.01	QP
3		0.20	33.54	-20.17	53.71	23.50	0.03	10.01	Average
4		0.20	47.54	-16.17	63.71	37.50	0.03	10.01	QP
5		0.25	31.54	-20.24	51.78	21.50	0.03	10.01	Average
6		0.25	46.24	-15.54	61.78	36.20	0.03	10.01	QP
7		0.41	24.34	-23.25	47.59	14.30	0.02	10.02	Average
8		0.41	38.64	-18.95	57.59	28.60	0.02	10.02	QP
9		0.56	20.58	-25.42	46.00	10.50	0.02	10.06	Average
10		0.56	32.98	-23.02	56.00	22.90	0.02	10.06	QP
11		8.11	33.53	-16.47	50.00	23.19	0.11	10.23	Average
12		8.11	39.33	-20.67	60.00	28.99	0.11	10.23	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+2		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2388.01	51.27	-22.73	74	46.38	27.7	7.54	30.35	100	292	P	H
		2388.12	40.49	-13.51	54	35.6	27.7	7.54	30.35	100	292	A	H
	*	2412	108.54	-	-	103.69	27.67	7.54	30.36	100	292	P	H
	*	2412	104.71	-	-	99.86	27.67	7.54	30.36	100	292	A	H
		2374.26	49.56	-24.44	74	44.63	27.77	7.51	30.35	323	56	P	V
		2388.22	39.02	-14.98	54	34.13	27.7	7.54	30.35	323	56	A	V
	*	2412	98.99	-	-	94.14	27.67	7.54	30.36	323	56	P	V
	*	2412	96.41	-	-	91.56	27.67	7.54	30.36	323	56	A	V
802.11b CH 06 2437MHz		2388.96	49.88	-24.12	74	44.99	27.7	7.54	30.35	100	297	P	H
		2389.94	40.17	-13.83	54	35.29	27.7	7.54	30.36	100	297	A	H
	*	2437	108.97	-	-	104.2	27.6	7.54	30.37	100	297	P	H
	*	2437	104.98	-	-	100.21	27.6	7.54	30.37	100	297	A	H
		2484.6	49.86	-24.14	74	45.25	27.47	7.53	30.39	100	297	P	H
		2483.5	40.09	-13.91	54	35.48	27.47	7.53	30.39	100	297	A	H
		2337.02	49.78	-24.22	74	44.73	27.9	7.48	30.33	318	34	P	V
		2389.8	38.87	-15.13	54	33.99	27.7	7.54	30.36	318	34	A	V
	*	2437	99.8	-	-	95.03	27.6	7.54	30.37	318	34	P	V
	*	2437	97.19	-	-	92.42	27.6	7.54	30.37	318	34	A	V
		2497.55	49.06	-24.94	74	44.53	27.4	7.53	30.4	318	34	P	V
		2484.04	38.69	-15.31	54	34.08	27.47	7.53	30.39	318	34	A	V

802.11b CH 11 2462MHz	*	2462	108.36	-	-	103.67	27.53	7.54	30.38	100	297	P	H
	*	2462	103.49	-	-	98.8	27.53	7.54	30.38	100	297	A	H
		2485.6	49.97	-24.03	74	45.36	27.47	7.53	30.39	100	297	P	H
		2483.52	40.11	-13.89	54	35.5	27.47	7.53	30.39	100	297	A	H
	*	2462	99.34	-	-	94.65	27.53	7.54	30.38	307	16	P	V
	*	2462	96.49	-	-	91.8	27.53	7.54	30.38	307	16	A	V
		2487.76	49	-25	74	44.46	27.4	7.53	30.39	307	16	P	V
		2483.52	38.5	-15.5	54	33.89	27.47	7.53	30.39	307	16	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	39.03	-34.97	74	52.39	31.15	9.86	54.37	185	255	P	H
		4824	39.02	-34.98	74	52.38	31.15	9.86	54.37	189	153	P	V
802.11b CH 06 2437MHz		4874	38.71	-35.29	74	52.05	31.13	9.88	54.35	165	106	P	H
		7311	44.59	-29.41	74	50.82	36.4	11.88	54.51	174	100	P	H
		4874	37.88	-36.12	74	51.22	31.13	9.88	54.35	177	261	P	V
		7311	44.94	-29.06	74	51.17	36.4	11.88	54.51	121	61	P	V
802.11b CH 11 2462MHz		4924	38.94	-35.06	74	52.13	31.23	9.91	54.33	150	285	P	H
		7386	44.54	-29.46	74	50.83	36.3	12.01	54.6	155	274	P	H
		4924	38.95	-35.05	74	52.14	31.23	9.91	54.33	142	85	P	V
		7386	43.88	-30.12	74	50.17	36.3	12.01	54.6	178	145	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		2389.8	56.27	-17.73	74	51.39	27.7	7.54	30.36	100	91	P	H
		2390	47.27	-6.73	54	42.39	27.7	7.54	30.36	100	91	A	H
	*	2412	109.36	-	-	104.51	27.67	7.54	30.36	100	91	P	H
	*	2412	102.2	-	-	97.35	27.67	7.54	30.36	100	91	A	H
		2390	53.32	-20.68	74	48.44	27.7	7.54	30.36	101	11	P	V
		2390	43.22	-10.78	54	38.34	27.7	7.54	30.36	101	11	A	V
	*	2412	103.3	-	-	98.45	27.67	7.54	30.36	101	11	P	V
	*	2412	96.6	-	-	91.75	27.67	7.54	30.36	101	11	A	V
802.11g CH 06 2437MHz		2388.26	50.38	-23.62	74	45.49	27.7	7.54	30.35	144	139	P	H
		2389.94	40.64	-13.36	54	35.76	27.7	7.54	30.36	144	139	A	H
	*	2437	108.65	-	-	103.88	27.6	7.54	30.37	144	139	P	H
	*	2437	101.54	-	-	96.77	27.6	7.54	30.37	144	139	A	H
		2483.69	50.51	-23.49	74	45.9	27.47	7.53	30.39	144	139	P	H
		2483.5	39.45	-14.55	54	34.84	27.47	7.53	30.39	144	139	P	H
		2371.46	49.85	-24.15	74	44.92	27.77	7.51	30.35	107	91	P	V
		2389.8	38.93	-15.07	54	34.05	27.7	7.54	30.36	107	91	A	V
	*	2437	97.98	-	-	93.21	27.6	7.54	30.37	107	91	P	V
	*	2437	91.01	-	-	86.24	27.6	7.54	30.37	107	91	A	V
		2484.11	49.27	-24.73	74	44.66	27.47	7.53	30.39	107	91	P	V
		2484.25	38.64	-15.36	54	34.03	27.47	7.53	30.39	107	91	A	V

802.11g CH 11 2462MHz	*	2462	109	-	-	104.31	27.53	7.54	30.38	227	166	P	H
	*	2462	100.82	-	-	96.13	27.53	7.54	30.38	227	166	A	H
		2483.8	56.66	-17.34	74	52.05	27.47	7.53	30.39	227	166	P	H
		2483.52	43.72	-10.28	54	39.11	27.47	7.53	30.39	227	166	A	H
	*	2462	104.87	-	-	100.18	27.53	7.54	30.38	304	115	P	V
	*	2462	98.48	-	-	93.79	27.53	7.54	30.38	304	115	A	V
		2484.96	50.8	-23.2	74	46.19	27.47	7.53	30.39	304	115	P	V
		2483.52	40.21	-13.79	54	35.6	27.47	7.53	30.39	304	115	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	37.74	-36.26	74	51.1	31.15	9.86	54.37	118	203	P	H
		4824	38.27	-35.73	74	51.63	31.15	9.86	54.37	172	146	P	V
802.11g CH 06 2437MHz		4874	38.1	-35.9	74	51.44	31.13	9.88	54.35	189	156	P	H
		7311	44.66	-29.34	74	50.89	36.4	11.88	54.51	145	198	P	H
		4874	38.26	-35.74	74	51.6	31.13	9.88	54.35	196	163	P	V
		7311	44.63	-29.37	74	50.86	36.4	11.88	54.51	193	191	P	V
802.11g CH 11 2462MHz		4924	38.32	-35.68	74	51.51	31.23	9.91	54.33	116	208	P	H
		7386	44.66	-29.34	74	50.95	36.3	12.01	54.6	194	234	P	H
		4924	38.32	-35.68	74	51.51	31.23	9.91	54.33	158	247	P	V
		7386	43.9	-30.1	74	50.19	36.3	12.01	54.6	166	38	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)
		2389.8	57.79	-16.21	74	52.91	27.7	7.54	30.36	131	98	P	H
		2389.90	47.88	-6.12	54	43	27.7	7.54	30.36	131	98	A	H
802.11n	*	2412	109.28	-	-	104.43	27.67	7.54	30.36	131	98	P	H
HT20	*	2412	101.2	-	-	96.35	27.67	7.54	30.36	131	98	A	H
CH 01		2389	52.51	-21.49	74	47.62	27.7	7.54	30.35	103	20	P	V
2412MHz		2389	42.66	-11.34	54	37.77	27.7	7.54	30.35	103	20	A	V
	*	2412	100.89	-	-	96.04	27.67	7.54	30.36	103	20	P	V
	*	2412	93.88	-	-	89.03	27.67	7.54	30.36	103	20	A	V
		2388.4	50.73	-23.27	74	45.84	27.7	7.54	30.35	110	8	P	H
		2389.66	42.08	-11.92	54	37.19	27.7	7.54	30.35	110	8	A	H
	*	2437	109.83	-	-	105.06	27.6	7.54	30.37	110	8	P	H
	*	2437	103.58	-	-	98.81	27.6	7.54	30.37	110	8	A	H
802.11n		2483.55	50.01	-23.99	74	45.4	27.47	7.53	30.39	110	8	P	H
HT20		2483.76	41.33	-12.67	54	36.72	27.47	7.53	30.39	110	8	A	H
CH 06		2389.24	50.16	-23.84	74	45.27	27.7	7.54	30.35	117	330	P	V
2437MHz		2389.52	40.17	-13.83	54	35.28	27.7	7.54	30.35	117	330	A	V
	*	2437	105.31	-	-	100.54	27.6	7.54	30.37	117	330	P	V
	*	2437	97.84	-	-	93.07	27.6	7.54	30.37	117	330	A	V
		2488.87	49.31	-24.69	74	44.77	27.4	7.53	30.39	117	330	P	V
		2484.95	39.91	-14.09	54	35.3	27.47	7.53	30.39	117	330	A	V

	*	2462	109.84	-	-	105.15	27.53	7.54	30.38	111	69	P	H
	*	2462	102.61	-	-	97.92	27.53	7.54	30.38	111	69	A	H
802.11n		2483.6	53.02	-20.98	74	48.41	27.47	7.53	30.39	111	69	P	H
HT20		2483.52	44.13	-9.87	54	39.52	27.47	7.53	30.39	111	69	A	H
CH 11	*	2462	103.23	-	-	98.54	27.53	7.54	30.38	100	14	P	V
2462MHz	*	2462	96.1	-	-	91.41	27.53	7.54	30.38	100	14	A	V
		2484.24	51.02	-22.98	74	46.41	27.47	7.53	30.39	100	14	P	V
		2483.68	41.91	-12.09	54	37.3	27.47	7.53	30.39	100	14	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	38.1	-35.9	74	51.46	31.15	9.86	54.37	108	166	P	H
		4824	38.22	-35.78	74	51.58	31.15	9.86	54.37	194	311	P	V
802.11n HT20 CH 06 2437MHz		4874	38.24	-35.76	74	51.58	31.13	9.88	54.35	131	18	P	H
		7311	46.28	-27.72	74	52.51	36.4	11.88	54.51	118	160	P	H
		4874	37.41	-36.59	74	50.75	31.13	9.88	54.35	189	237	P	V
		7311	44.28	-29.72	74	50.51	36.4	11.88	54.51	104	305	P	V
802.11n HT20 CH 11 2462MHz		4924	38.04	-35.96	74	51.23	31.23	9.91	54.33	182	291	P	H
		7386	43.57	-30.43	74	49.86	36.3	12.01	54.6	134	308	P	H
		4924	38.51	-35.49	74	51.7	31.23	9.91	54.33	122	94	P	V
		7386	44.04	-29.96	74	50.33	36.3	12.01	54.6	188	164	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)
		2387.28	51.26	-22.74	74	46.37	27.7	7.54	30.35	322	66	P	H
		2387.28	41.98	-12.02	54	37.09	27.7	7.54	30.35	322	66	A	H
	*	2422	102.88	-	-	98.08	27.63	7.54	30.37	322	66	P	H
	*	2422	95.23	-	-	90.43	27.63	7.54	30.37	322	66	A	H
802.11n		2492.72	48.99	-25.01	74	44.46	27.4	7.53	30.4	322	66	P	H
HT40		2485.44	39.43	-14.57	54	34.82	27.47	7.53	30.39	322	66	A	H
CH 03		2389.94	58.21	-15.79	74	53.33	27.7	7.54	30.36	322	60	P	V
2422MHz		2389.8	47.95	-6.05	54	43.07	27.7	7.54	30.36	322	60	A	V
	*	2422	98.65	-	-	93.85	27.63	7.54	30.37	322	60	P	V
	*	2422	91.34	-	-	86.54	27.63	7.54	30.37	322	60	A	V
		2484.74	49.28	-24.72	74	44.67	27.47	7.53	30.39	322	60	P	V
		2485.23	39.64	-14.36	54	35.03	27.47	7.53	30.39	322	60	A	V
		2388.26	49.28	-24.72	74	44.39	27.7	7.54	30.35	311	70	P	H
		2388.68	39.87	-14.13	54	34.98	27.7	7.54	30.35	311	70	A	H
	*	2437	102.58	-	-	97.81	27.6	7.54	30.37	311	70	P	H
	*	2437	95.3	-	-	90.53	27.6	7.54	30.37	311	70	A	H
802.11n		2491.18	49.35	-24.65	74	44.81	27.4	7.53	30.39	311	70	P	H
HT40		2483.76	39.57	-14.43	54	34.96	27.47	7.53	30.39	311	70	A	H
CH 06		2388.82	49.8	-24.2	74	44.91	27.7	7.54	30.35	248	101	P	V
2437MHz		2389.94	40.73	-13.27	54	35.85	27.7	7.54	30.36	248	101	A	V
	*	2437	99	-	-	94.23	27.6	7.54	30.37	248	101	P	V
	*	2437	95.48	-	-	90.71	27.6	7.54	30.37	248	101	A	V
		2493.21	48.7	-25.3	74	44.17	27.4	7.53	30.4	248	101	P	V
		2484.11	39.38	-14.62	54	34.77	27.47	7.53	30.39	248	101	A	V

		2338	49.68	-24.32	74	44.63	27.9	7.48	30.33	316	42	P	H
		2389.1	40.64	-13.36	54	35.75	27.7	7.54	30.35	316	42	A	H
	*	2452	103	-	-	98.24	27.6	7.54	30.38	316	42	P	H
	*	2452	96.9	-	-	92.14	27.6	7.54	30.38	316	42	A	H
802.11n		2484.18	52.9	-21.1	74	48.29	27.47	7.53	30.39	316	42	P	H
HT40		2484.6	43.42	-10.58	54	38.81	27.47	7.53	30.39	316	42	A	H
CH 09		2311.26	50.22	-23.78	74	45.09	27.97	7.48	30.32	317	44	P	V
2452MHz		2389.66	40.74	-13.26	54	35.85	27.7	7.54	30.35	317	44	A	V
	*	2452	100	-	-	95.24	27.6	7.54	30.38	317	44	P	V
	*	2452	94.04	-	-	89.28	27.6	7.54	30.38	317	44	A	V
		2483.76	53.22	-20.78	74	48.61	27.47	7.53	30.39	317	44	P	V
		2484.04	44.76	-9.24	54	40.15	27.47	7.53	30.39	317	44	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 (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	39.14	-34.86	74	52.42	31.2	9.88	54.36	150	350	P	H
HT40		7266	45.49	-28.51	74	51.76	36.4	11.81	54.48	200	360	P	H
CH 03		4844	38.29	-35.71	74	51.57	31.2	9.88	54.36	196	332	P	V
2422MHz		7266	44.99	-29.01	74	51.26	36.4	11.81	54.48	266	302	P	V
802.11n		4874	38.57	-35.43	74	51.91	31.13	9.88	54.35	160	211	P	H
HT40		7311	44.81	-29.19	74	51.04	36.4	11.88	54.51	136	18	P	H
CH 06		4874	38.26	-35.74	74	51.6	31.13	9.88	54.35	108	294	P	V
2437MHz		7311	45.12	-28.88	74	51.35	36.4	11.88	54.51	117	356	P	V
802.11n		4904	39.79	-34.21	74	53.05	31.17	9.9	54.33	150	360	P	H
HT40		7356	44.32	-29.68	74	50.54	36.4	11.94	54.56	165	335	P	H
CH 09		4904	38.06	-35.94	74	51.32	31.17	9.9	54.33	185	99	P	V
2452MHz		7356	44.26	-29.74	74	50.48	36.4	11.94	54.56	136	306	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 802.11n HT40 (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 802.11n HT40 LF		30	24.12	-15.88	40	30.06	24.8	0.56	31.3	163	187	P	H
		63.95	19.24	-20.76	40	37.8	12.12	0.82	31.5	-	-	P	H
		107.6	23.29	-20.21	43.5	37.2	16.6	1.07	31.58	-	-	P	H
		127	24.44	-19.06	43.5	37.34	17.43	1.16	31.49	-	-	P	H
		323.91	26.51	-19.49	46	35.98	19.98	1.9	31.35	-	-	P	H
		847.71	28.09	-17.91	46	27.54	28.74	3.2	31.39	-	-	P	H
		30	25.59	-14.41	40	31.53	24.8	0.56	31.3	141	228	P	V
		61.04	20.71	-19.29	40	39.63	11.88	0.8	31.6	-	-	P	V
		82.38	24.15	-15.85	40	41.08	13.68	0.94	31.55	-	-	P	V
		130.88	25.25	-18.25	43.5	38.09	17.45	1.19	31.48	-	-	P	V
		435.46	24.9	-21.1	46	31.61	22.55	2.22	31.48	-	-	P	V
		683.78	28.59	-17.41	46	30.8	26.55	2.83	31.59	-	-	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 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)

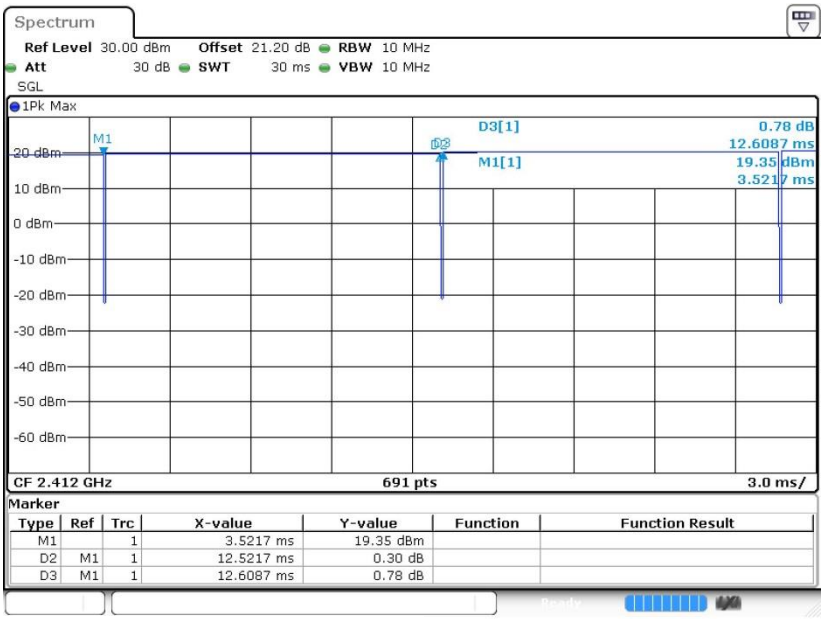
= -10.46(dB)

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

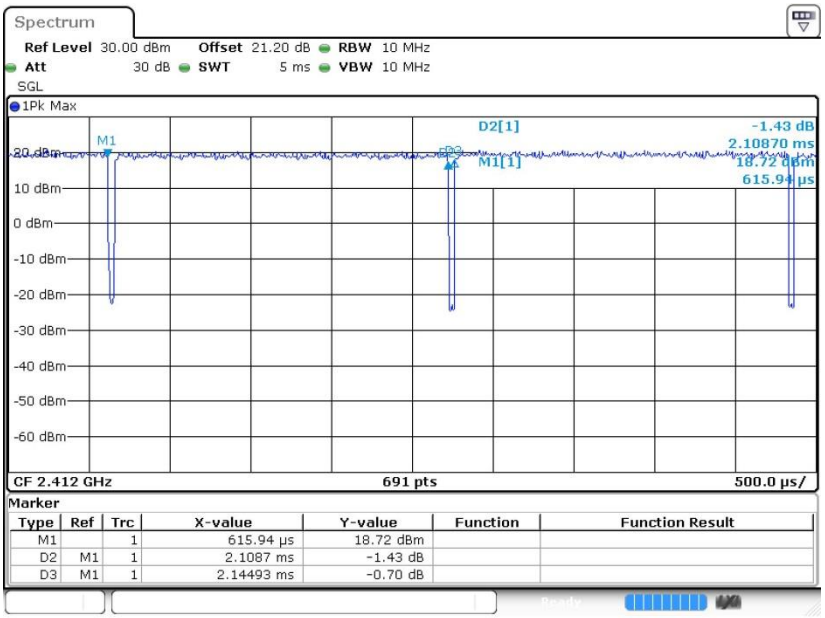
Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	99.31	-	-	10Hz
802.11g	98.31	-	-	10Hz
802.11n HT20	96.52	2.0073	0.498	1kHz
802.11n HT40	91.61	1.0449	0.957	1kHz

802.11b



802.11g



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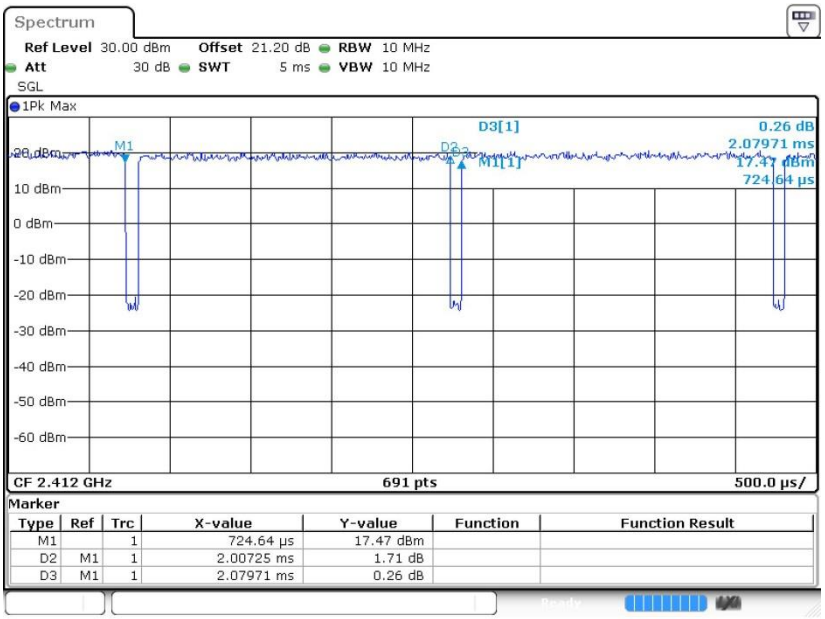

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