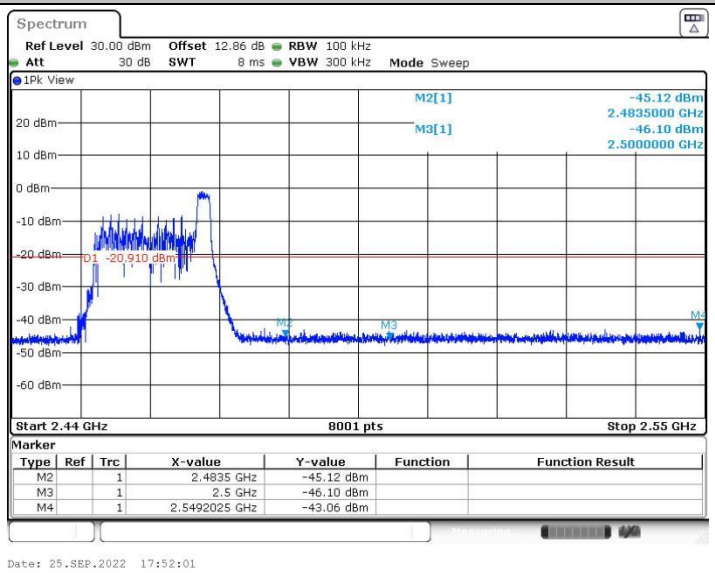
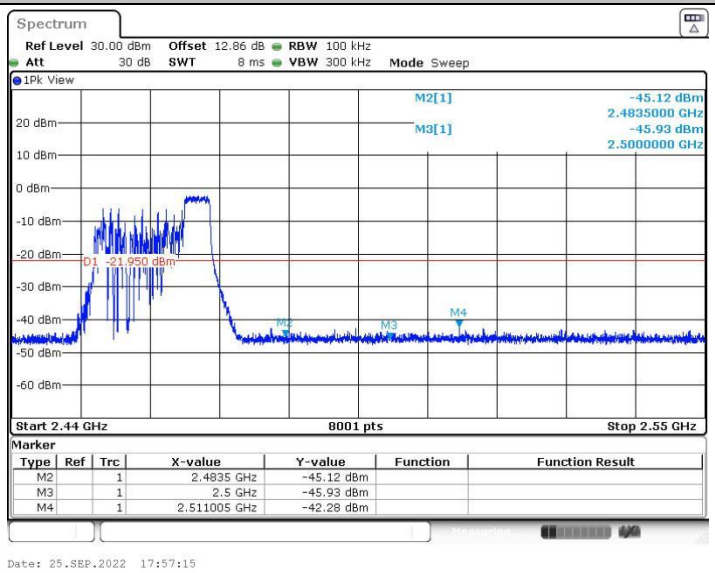
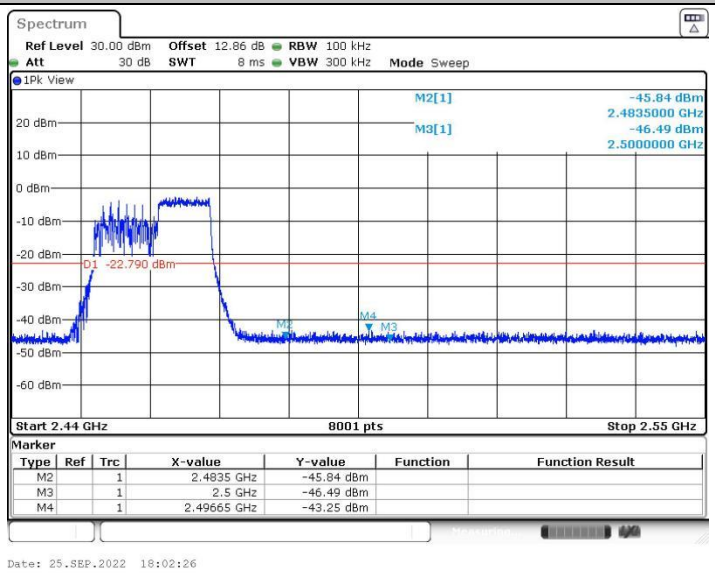
11AX20MIMO_Ant1_High_2462_26Tone_RU8



11AX20MIMO_Ant1_High_2462_52Tone_RU40



11AX20MIMO_Ant1_High_2462_106Tone_RU54



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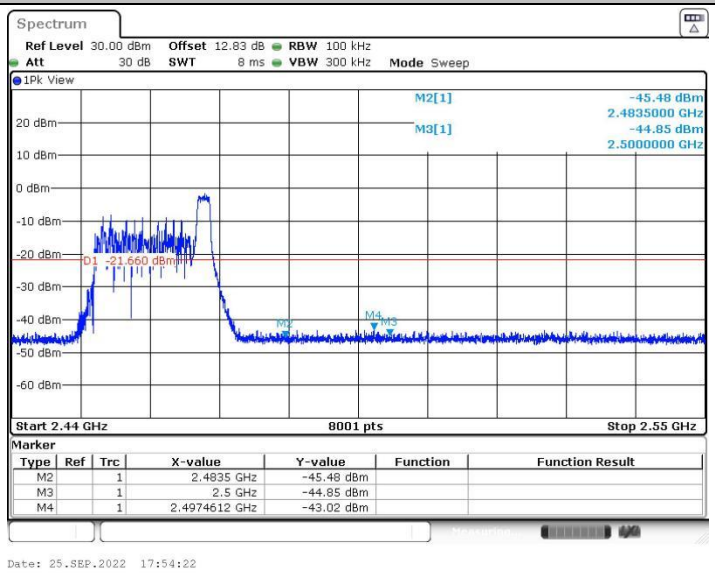

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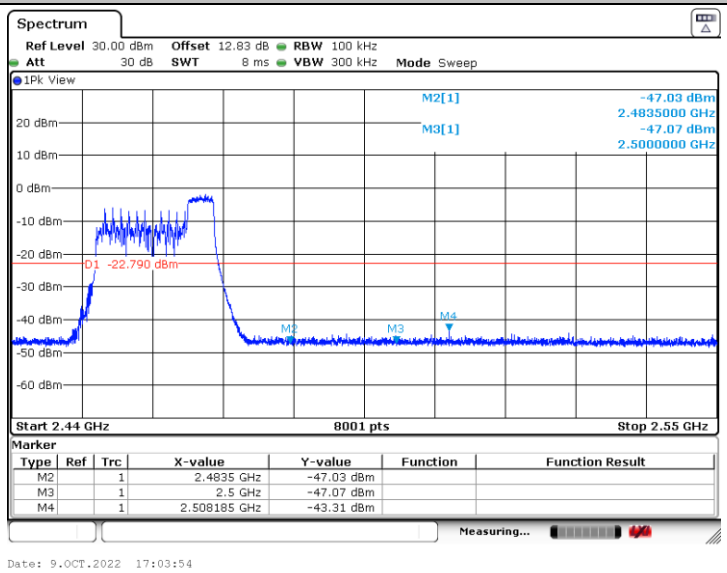

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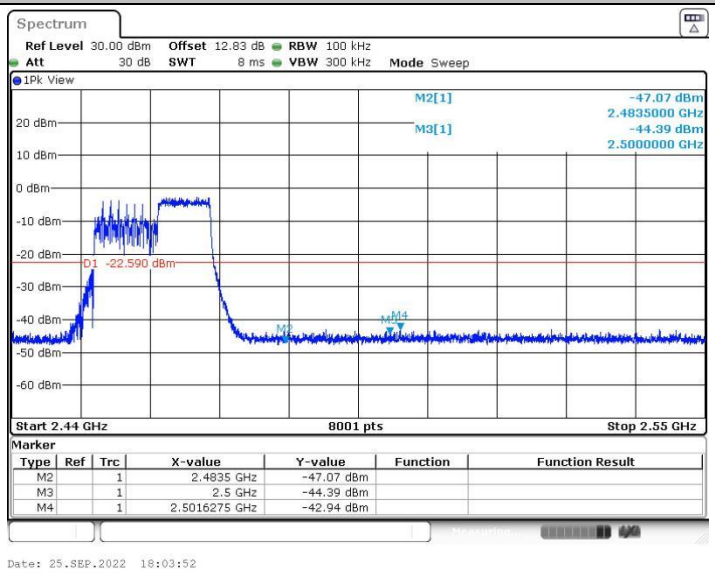
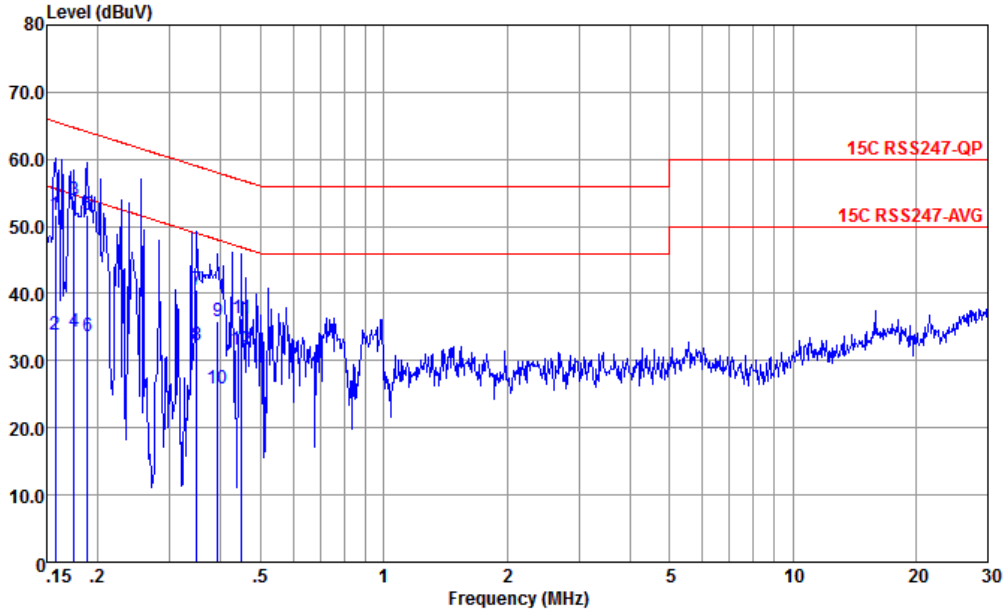


Appendix B. AC Conducted Emission Test Results

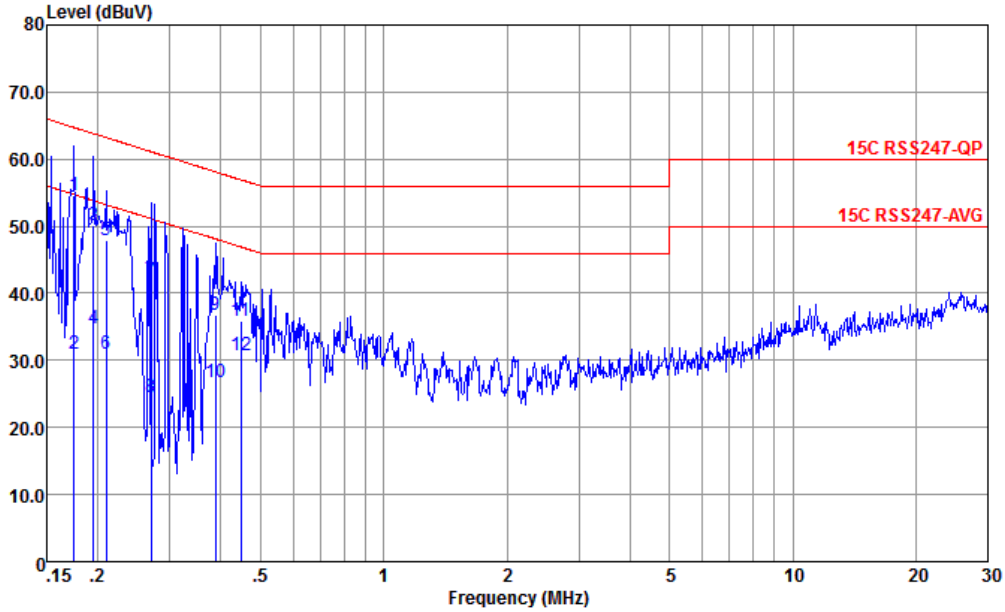
Test Engineer :	Amos	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Line
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : 15C RSS247-QP LISN-060105-LINE LINE

		Freq MHz	Level dBuV	Over Limit dB	Limit Line dBuV	Read Level dBuV	LISN Factor dB	Cable Loss dB	Remark
1		0.157	51.69	-13.91	65.60	41.20	0.06	10.43	QP
2		0.157	33.79	-21.81	55.60	23.30	0.06	10.43	Average
3	*	0.175	53.97	-10.75	64.72	43.51	0.04	10.42	QP
4		0.175	34.27	-20.45	54.72	23.81	0.04	10.42	Average
5		0.188	51.65	-12.46	64.11	41.20	0.03	10.42	QP
6		0.188	33.75	-20.36	54.11	23.30	0.03	10.42	Average
7		0.348	40.56	-18.44	59.00	30.21	0.03	10.32	QP
8		0.348	32.26	-16.74	49.00	21.91	0.03	10.32	Average
9		0.393	35.81	-22.18	57.99	25.50	0.01	10.30	QP
10		0.393	25.91	-22.08	47.99	15.60	0.01	10.30	Average
11		0.449	36.34	-20.55	56.89	26.10	-0.01	10.25	QP
12		0.449	31.64	-15.25	46.89	21.40	-0.01	10.25	Average

Test Engineer :	Amos	**Temperature :**	25.3~26.2℃
		Relative Humidity :	38~40%
Test Voltage :	120Vac / 60Hz	**Phase :**	Neutral
Remark :	All emissions not reported here are more than 10 dB below the prescribed limit.		



Site : CO01-KS
Condition : 15C RSS247-QP LISN-060105-NEUTRAL NEUTRAL

	Freq	Level	Over Limit	Limit Line	Read Level	LISN Factor	Cable Loss	Remark
	MHz	dBuV	dB	dBuV	dBuV	dB	dB	
1 *	0.175	54.67	-10.05	64.72	44.21	0.04	10.42	QP
2	0.175	31.07	-23.65	54.72	20.61	0.04	10.42	Average
3	0.195	50.07	-13.73	63.80	39.60	0.05	10.42	QP
4	0.195	34.77	-19.03	53.80	24.30	0.05	10.42	Average
5	0.209	47.95	-15.28	63.23	37.50	0.04	10.41	QP
6	0.209	31.05	-22.18	53.23	20.60	0.04	10.41	Average
7	0.270	41.84	-19.28	61.12	31.49	-0.02	10.37	QP
8	0.270	24.54	-26.58	51.12	14.19	-0.02	10.37	Average
9	0.387	36.84	-21.28	58.12	26.60	-0.07	10.31	QP
10	0.387	26.84	-21.28	48.12	16.60	-0.07	10.31	Average
11	0.447	35.78	-21.15	56.93	25.59	-0.07	10.26	QP
12	0.447	30.81	-16.12	46.93	20.62	-0.07	10.26	Average

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

Note: All modes had been tested and only the worst channel test data of each bandwidth shown in the report.

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Harmonic @ 3m)

WIFI Ant.	Note -	Frequency -	Level --	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
4+6	-	(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 06 2437MHz		4875	40.85	-33.15	74	58.91	34.14	9.52	61.72	300	0	P	H
		7305	49.4	-24.6	74	63.71	35.7	11.69	61.7	300	0	P	H
		4875	41.67	-32.33	74	59.73	34.14	9.52	61.72	100	0	P	V
		7305	55.09	-18.91	74	69.4	35.7	11.69	61.7	100	145	P	V
		7305	50.88	-3.12	54	65.19	35.7	11.69	61.7	100	145	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.	Note	Frequency	Level	Over Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
4+6		(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 11 2462MHz	*	2464	107.31	-	-	100.95	32.37	6.7	32.71	206	41	P	H
	*	2464	99.49	-	-	93.13	32.37	6.7	32.71	206	41	A	H
		2483.5	62.58	-11.42	74	56.06	32.43	6.73	32.64	206	41	P	H
		2483.5	50.15	-3.85	54	43.63	32.43	6.73	32.64	206	41	A	H
	*	2458	108.81	-	-	102.45	32.37	6.7	32.71	100	110	P	V
	*	2462	100.77	-	-	94.41	32.37	6.7	32.71	100	110	A	V
		2483.62	62.34	-11.66	74	55.82	32.43	6.73	32.64	100	110	P	V
		2483.5	50.76	-3.24	54	44.24	32.43	6.73	32.64	100	110	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. 4+6	Note - -	Frequency - (MHz)	Level - (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11g CH 11 2462MHz		4920	41.32	-32.68	74	59.27	34.1	9.58	61.63	300	0	P	H
		7380	44.92	-29.08	74	59.21	35.7	11.71	61.7	300	0	P	H
		4920	41.46	-32.54	74	59.41	34.1	9.58	61.63	100	0	P	V
		7380	45.11	-28.89	74	59.4	35.7	11.71	61.7	100	0	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 802.11 ax HE20 Full (Band Edge @ 3m)

WIFI Ant. 4+6	Note - -	Frequency - (MHz)	Level - (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
8802.11ax HE20 Full CH 11 2462MHz	*	2466	106.92	-	-	100.56	32.37	6.7	32.71	209	37	P	H
	*	2468	97.51	-	-	91.08	32.37	6.7	32.64	209	37	A	H
		2484.16	62.56	-11.44	74	56.04	32.43	6.73	32.64	209	37	P	H
		2483.56	49.45	-4.55	54	42.93	32.43	6.73	32.64	209	37	A	H
	*	2464	108.86	-	-	102.5	32.37	6.7	32.71	100	110	P	V
	*	2464	98.58	-	-	92.22	32.37	6.7	32.71	100	110	A	V
		2485	63.3	-10.7	74	56.78	32.43	6.73	32.64	100	110	P	V
		2483.5	50.73	-3.27	54	44.21	32.43	6.73	32.64	100	110	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 802.11 ax HE20 Full (Harmonic @ 3m)

WIFI Ant. 4+6	Note - -	Frequency - (MHz)	Level - (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Full CH 11 2462MHz		4920	42.22	-31.78	74	60.17	34.1	9.58	61.63	300	0	P	H
		7380	44.06	-29.94	74	58.35	35.7	11.71	61.7	300	0	P	H
		4920	40.81	-33.19	74	58.76	34.1	9.58	61.63	100	0	P	V
		7380	42.96	-31.04	74	57.25	35.7	11.71	61.7	100	0	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 802.11ax HE20 Partial 52 (Band Edge @ 3m)

WIFI Ant. 4+6	Note - -	Frequency - (MHz)	Level - (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE20 Partial 52/40 CH 11 2462MHz		2468	103.98	-	-	97.55	32.37	6.7	32.64	207	34	P	H
		2468	93.32	-	-	86.89	32.37	6.7	32.64	207	34	A	H
		2483.56	54.57	-19.43	74	48.05	32.43	6.73	32.64	207	34	P	H
		2489.02	43.48	-10.52	54	36.87	32.5	6.75	32.64	207	34	A	H
		2468	105.54	-	-	99.11	32.37	6.7	32.64	113	107	P	V
		2468	94.9	-	-	88.47	32.37	6.7	32.64	113	107	A	V
		2486.8	54.69	-19.31	74	48.17	32.43	6.73	32.64	113	107	P	V
		2487.82	43.63	-10.37	54	37.02	32.5	6.75	32.64	113	107	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 802.11 ax HE40 Full (Band Edge @ 3m)

WIFI Ant. 4+6	Note - -	Frequency - (MHz)	Level - (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE40 Full CH 09 2452MHz	-	2349.39	53.95	-20.05	74	48.24	32.1	6.53	32.92	209	37	P	H
	-	2389.95	43.27	-10.73	54	37.2	32.3	6.61	32.84	209	37	A	H
	*	2458	104.99	-	-	98.63	32.37	6.7	32.71	209	37	P	H
	*	2460	95.18	-	-	88.82	32.37	6.7	32.71	209	37	A	H
	-	2486.08	61.63	-12.37	74	55.11	32.43	6.73	32.64	209	37	P	H
		2483.5	50.39	-3.61	54	43.87	32.43	6.73	32.64	209	37	A	H
	-	2389.95	53.87	-20.13	74	47.8	32.3	6.61	32.84	112	110	P	V
	-	2389.95	43.5	-10.5	54	37.43	32.3	6.61	32.84	112	110	A	V
	*	2434	106.05	-	-	99.86	32.3	6.66	32.77	112	110	P	V
	*	2436	97.24	-	-	91.05	32.3	6.66	32.77	112	110	A	V
	-	2483.92	59.13	-14.87	74	52.61	32.43	6.73	32.64	112	110	P	V
	-	2483.5	47.75	-6.25	54	41.23	32.43	6.73	32.64	112	110	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 802.11 ax HE40 Full (Harmonic @ 3m)

WIFI Ant. 4+6	Note - -	Frequency - (MHz)	Level - (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11ax HE40 Full CH 09 2452MHz		4905	41.05	-32.95	74	59.06	34.1	9.56	61.67	300	0	P	H
		7350	43.2	-30.8	74	57.49	35.7	11.71	61.7	300	0	P	H
		4905	40.47	-33.53	74	58.48	34.1	9.56	61.67	100	0	P	V
		7350	43.03	-30.97	74	57.32	35.7	11.71	61.7	100	0	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	Path	Preamp	Ant	Table	Peak	Pol.
Ant.	-	-	-	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
4+6	-	(MHz)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11b LF		30.97	21.53	-18.47	40	28.08	25.09	0.76	32.4	-	-	P	H
		99.84	16.03	-27.47	43.5	30.92	16.04	1.47	32.4	-	-	P	H
		187.14	18.76	-24.74	43.5	34.09	15.06	2.01	32.4	-	-	P	H
		389.87	21.1	-24.9	46	28.93	21.62	2.95	32.4	-	-	P	H
		702.21	28.04	-17.96	46	29.73	26.75	3.96	32.4	-	-	P	H
		769.14	28.95	-17.05	46	29.3	27.74	4.13	32.22	-	-	P	H
		67.83	28.57	-11.43	40	48.12	12.36	0.93	32.84	-	-	P	V
		97.9	23.67	-19.83	43.5	39.41	15.81	1.32	32.87	-	-	P	V
		250.19	20.01	-25.99	46	32	18.65	2.13	32.77	-	-	P	V
		325.85	20.78	-25.22	46	31.48	19.74	2.43	32.87	-	-	P	V
		661.47	27.53	-18.47	46	30.48	26.54	3.48	32.97	-	-	P	V
		875.84	30.19	-15.81	46	29.04	29.24	3.99	32.08	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												

CO-location

2.4GHz 2400~2483.5MHz

WIFI 802.11b CH06 Tx + Part 96-LTE_B48_BW_20M Link (Band Edge @ 3m)

WIFI Ant. 4+6	Note	Frequency (MHz)	Level (dBµV/m)	Over Limit (dB)	Limit Line (dBµV/m)	Read Level (dBµV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 06 2437MHz	-	2335.61	55.45	-18.55	74	49.78	32.1	6.53	32.96	262	39	P	H
	-	2389.69	44.55	-9.45	54	38.52	32.3	6.61	32.88	262	39	A	H
	-	2494.54	55.04	-18.96	74	48.36	32.5	6.75	32.57	262	39	P	H
		2485.72	45.45	-8.55	54	38.93	32.43	6.73	32.64	262	39	A	H
	*	2436	109.27	-	-	103.08	32.3	6.66	32.77	262	39	P	H
	*	2436	106.74	-	-	100.55	32.3	6.66	32.77	262	39	A	H
	-	2379.16	54.42	-19.58	74	48.49	32.23	6.58	32.88	100	119	P	V
	-	2389.56	44.78	-9.22	54	38.75	32.3	6.61	32.88	100	119	A	V
	-	2490.16	54.76	-19.24	74	48.15	32.5	6.75	32.64	100	119	P	V
		2489.5	45.56	-8.44	54	38.95	32.5	6.75	32.64	100	119	A	V
	*	2436	110.59	-	-	104.4	32.3	6.66	32.77	100	119	P	V
	*	2438	108.33	-	-	102.12	32.3	6.68	32.77	100	119	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 CH06 Tx + Part 96-LTE_B48_BW_20M Link (Harmonic @ 3m)

WIFI Ant. 4+6	Note - -	Frequency - (MHz)	Level - (dBμV/m)	Over Limit (dB)	Limit Line (dBμV/m)	Read Level (dBμV)	Antenna Factor (dB/m)	Path Loss (dB)	Preamp Factor (dB)	Ant Pos (cm)	Table Pos (deg)	Peak Avg. (P/A)	Pol. (H/V)
802.11b CH 06 2437MHz	-	4875	41.88	-32.12	74	59.99	34.14	9.52	61.77	300	0	P	H
	-	7305	48.87	-25.13	74	63.54	35.7	11.69	62.06	300	0	P	H
	-	4875	43.4	-30.6	74	61.51	34.14	9.52	61.77	100	0	P	V
	-	7305	49.99	-24.01	74	64.66	35.7	11.69	62.06	100	0	P	V
Remark	1. No other spurious found. 2. All results are PASS against Peak and Average 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	Path	Preamp	Ant	Table	Peak	Pol.
Ant.	-	-	-	Limit	Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
4+6	-	(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. Path Loss(dB) = Cable loss(dB) + Filter loss(dB) + Attenuator loss(dB)
2. Level(dBμV/m) =

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

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

For Peak Limit @ 2390MHz:

1. Level(dBμV/m)

= Antenna Factor(dB/m) + Path 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) + Path 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)

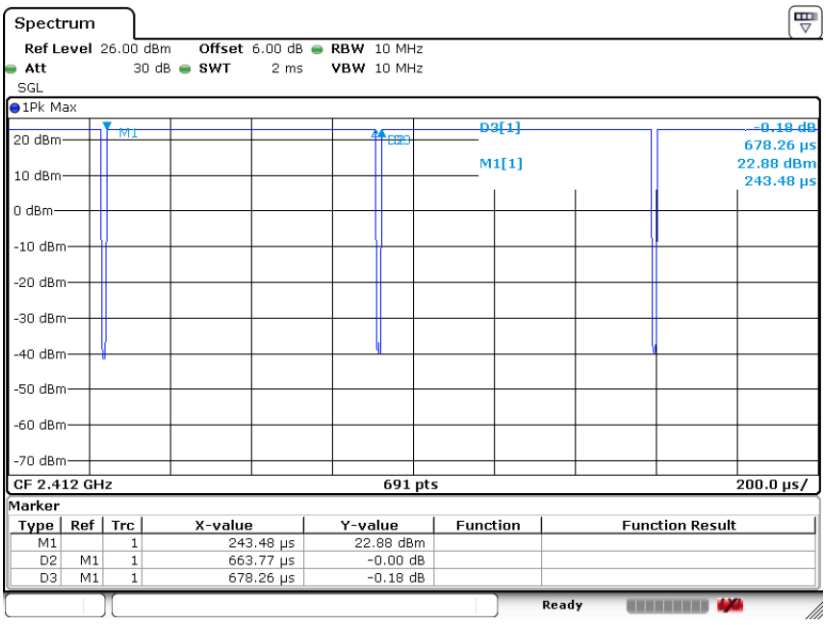
= -10.46(dB)

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

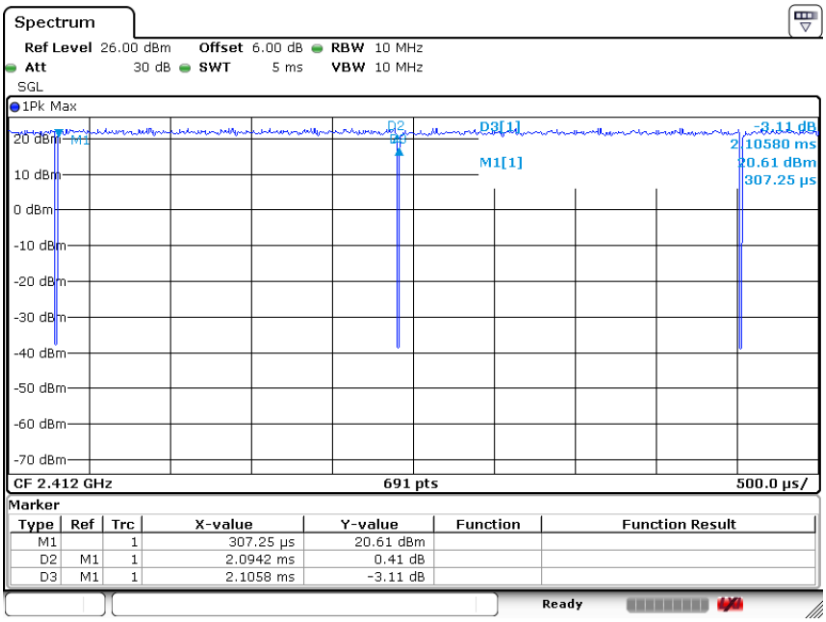
Appendix D. Duty Cycle Plots

Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	97.86	0.664	1.507	1.6KHz
802.11g	99.45	-	-	10Hz
802.11ax HE20	100	-	-	10HZ
802.11ax HE40	100	-	-	10HZ
802.11ax HE20 RU26	95.51	5.087	0.197	0.2KHz
802.11ax HE20 RU52	95.51	5.087	0.197	0.2KHz
802.11ax HE20 RU106	95.22	4.760	0.210	0.22KHz

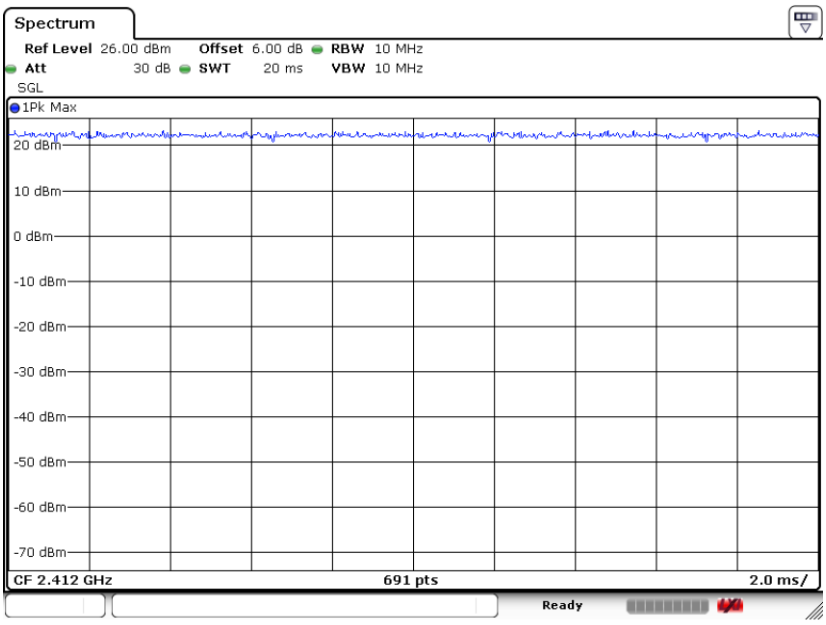
802.11b



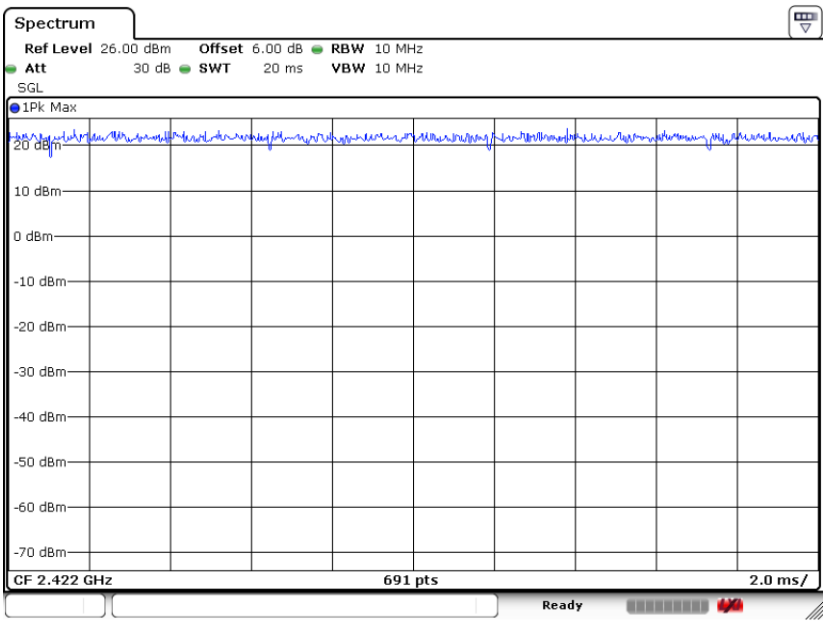
802.11g



802.11ax HE20



802.11ax HE40



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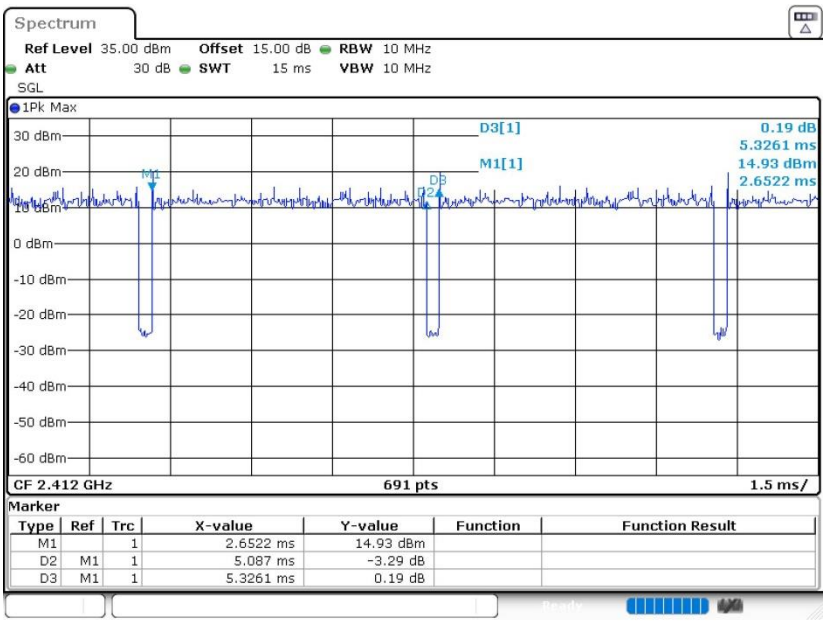

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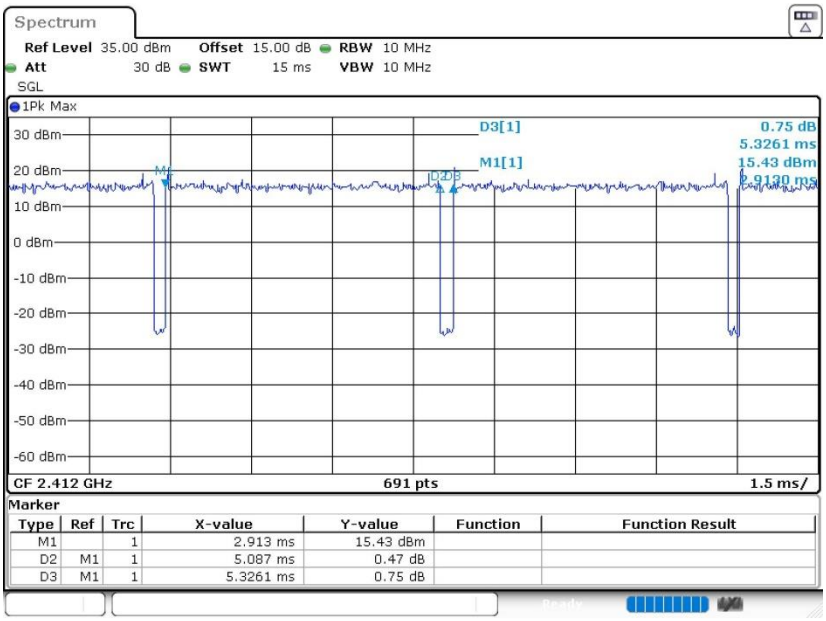
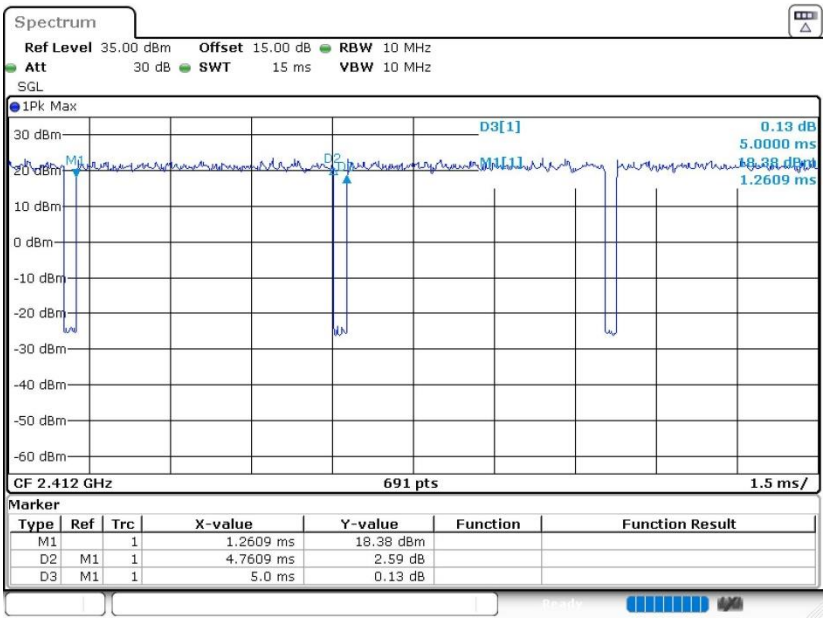
802.11ax HE20 RU106