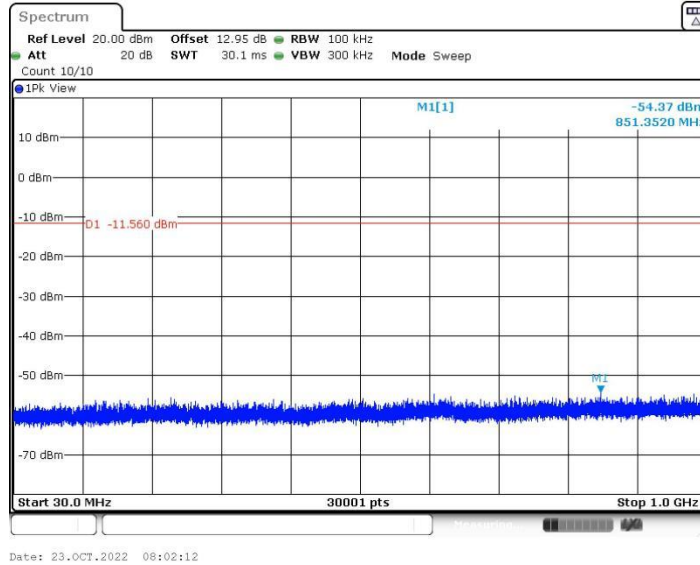
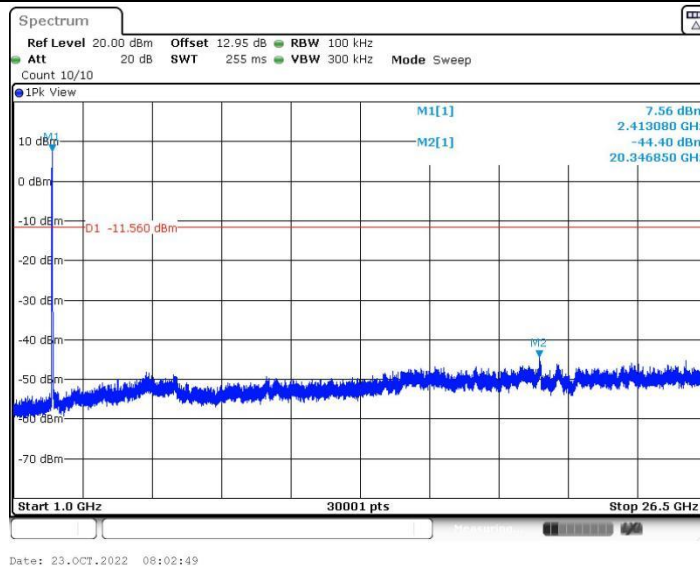




11N20SISO_Ant1_2412_30~1000

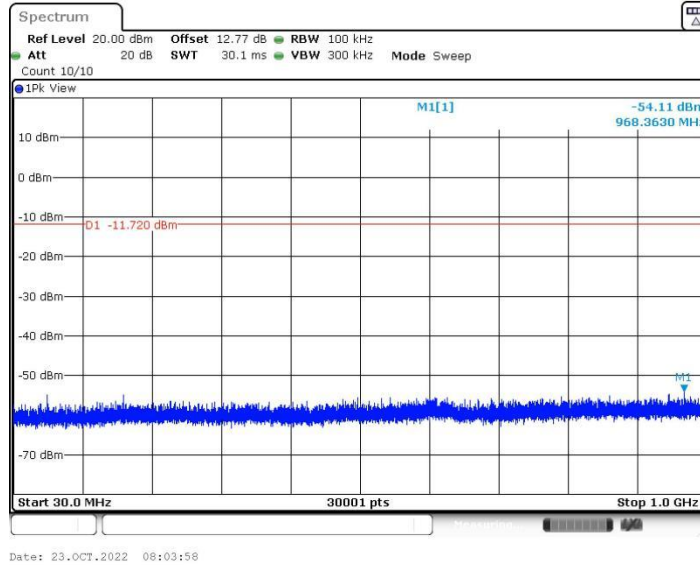


11N20SISO_Ant1_2412_1000~26500

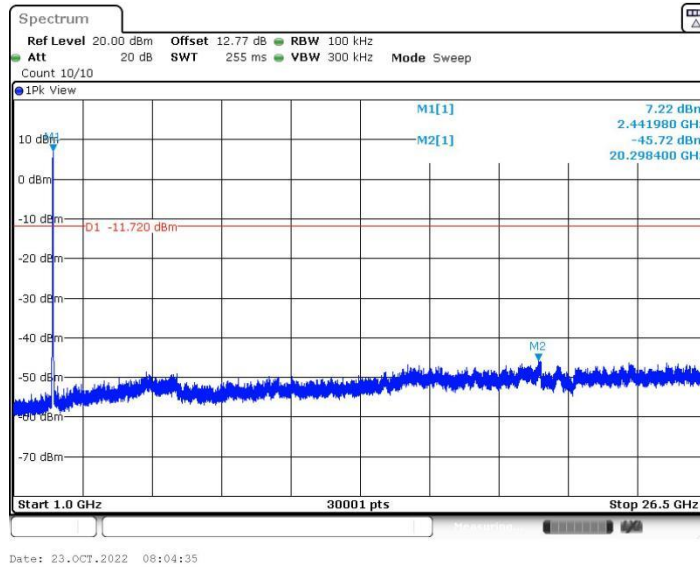




11N20SISO_Ant1_2437_30~1000

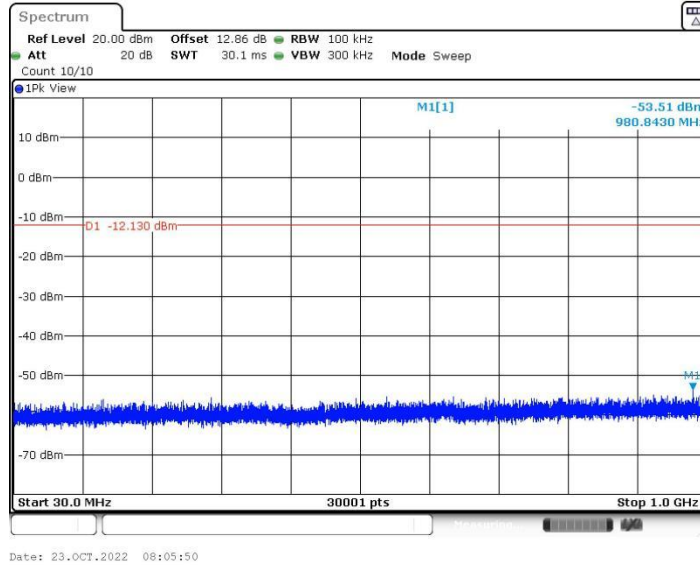


11N20SISO_Ant1_2437_1000~26500

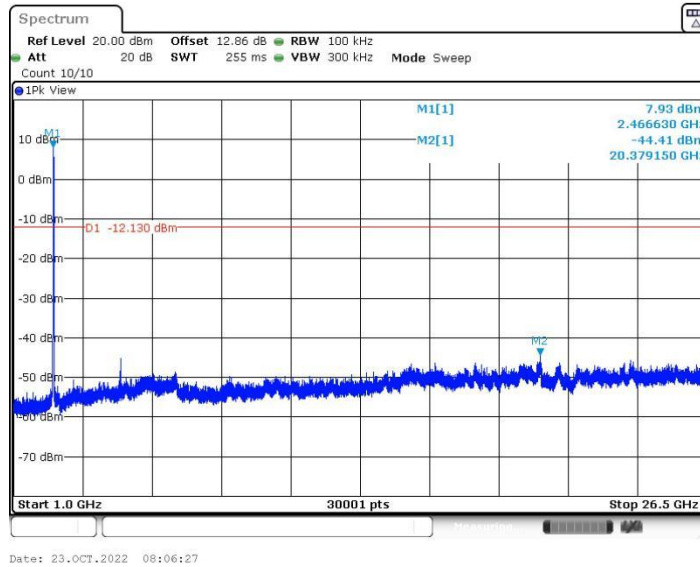




11N20SISO_Ant1_2462_30~1000

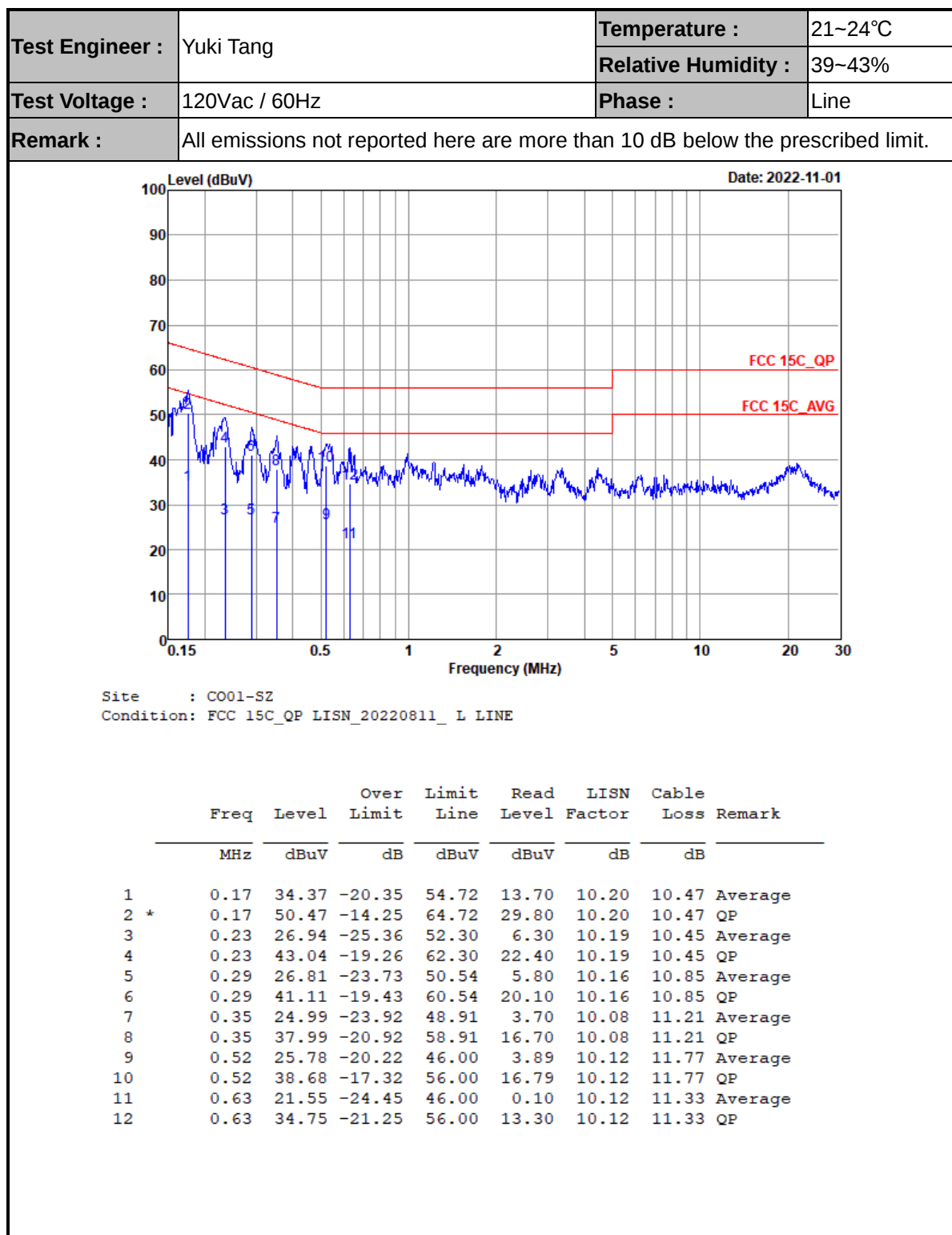


11N20SISO_Ant1_2462_1000~26500

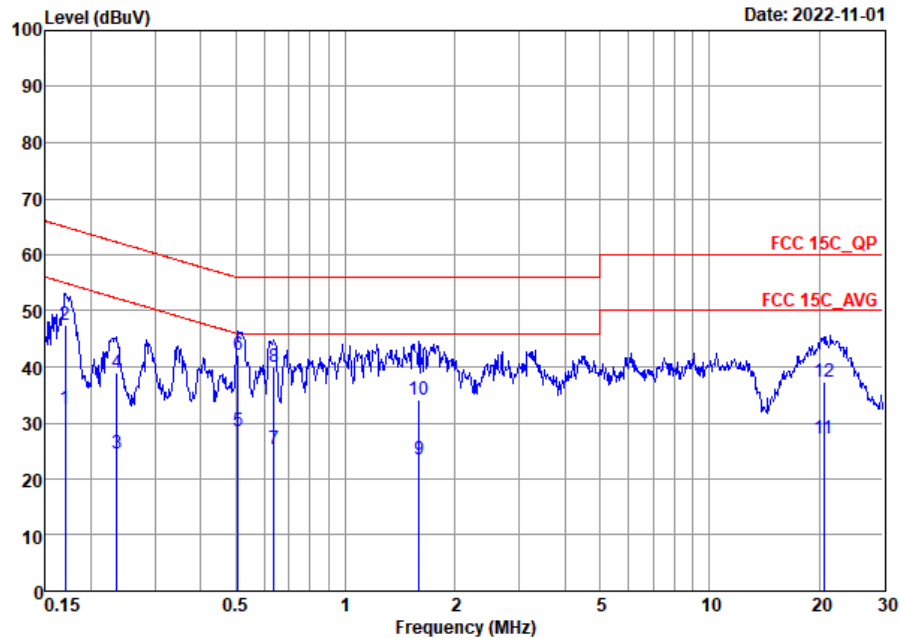




Appendix B. AC Conducted Emission Test Results



Test Engineer :	Yuki Tang	Temperature :	21~24°C
		Relative Humidity :	39~43%
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 20220811 N NEUTRAL

	Freq	Level	Over	Limit	Read	LISN	Cable	
	MHz	dBuV	Limit	Line	Level	Factor	Loss	Remark
			dB	dBuV	dBuV	dB	dB	
1	0.17	32.44	-22.50	54.94	11.60	10.31	10.53	Average
2	0.17	47.34	-17.60	64.94	26.50	10.31	10.53	QP
3	0.24	24.41	-27.85	52.26	3.70	10.26	10.45	Average
4	0.24	38.91	-23.35	62.26	18.20	10.26	10.45	QP
5	0.51	28.52	-17.48	46.00	6.51	10.19	11.82	Average
6 *	0.51	42.12	-13.88	56.00	20.11	10.19	11.82	QP
7	0.64	25.22	-20.78	46.00	3.70	10.23	11.29	Average
8	0.64	39.92	-16.08	56.00	18.40	10.23	11.29	QP
9	1.59	23.47	-22.53	46.00	3.00	10.23	10.24	Average
10	1.59	34.27	-21.73	56.00	13.80	10.23	10.24	QP
11	20.59	27.26	-22.74	50.00	7.11	9.80	10.35	Average
12	20.59	37.36	-22.64	60.00	17.21	9.80	10.35	QP

Note:

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



Appendix C. Radiated Spurious Emission

Test Engineer :	Zhaohui Liang	Temperature :	24~25°C
		Relative Humidity :	48~49%

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2387.175	47.16	-26.84	74	39.81	32.25	7.8	32.7	171	226	P	H
		2388.645	37.79	-16.21	54	30.43	32.26	7.8	32.7	171	226	A	H
		2412	101.52	—	—	94.11	32.31	7.8	32.7	171	226	P	H
		2412	99.77	—	—	92.36	32.31	7.8	32.7	171	226	A	H
		2389.065	48.29	-25.71	74	40.93	32.26	7.8	32.7	325	266	P	V
		2389.065	38.52	-15.48	54	31.16	32.26	7.8	32.7	325	266	A	V
		2412	103.66	—	—	96.25	32.31	7.8	32.7	325	266	P	V
		2412	102.05	—	—	94.64	32.31	7.8	32.7	325	266	A	V
802.11b CH 06 2437MHz		2375.8	48.12	-25.88	74	40.9	32.23	7.69	32.7	123	316	P	H
		2389.8	36.21	-17.79	54	28.85	32.26	7.8	32.7	123	316	A	H
		2437	96.83	—	—	89.33	32.36	7.84	32.7	123	316	P	H
		2437	95.04	—	—	87.54	32.36	7.84	32.7	123	316	A	H
		2494.54	47.48	-26.52	74	39.81	32.49	7.88	32.7	123	316	P	H
		2484.11	36.12	-17.88	54	28.47	32.47	7.88	32.7	123	316	A	H
		2342.76	47.2	-26.8	74	40.17	32.15	7.58	32.7	251	242	P	V
		2387.7	36.21	-17.79	54	28.86	32.25	7.8	32.7	251	242	A	V
		2437	100.22	—	—	92.72	32.36	7.84	32.7	251	242	P	V
		2437	98.6	—	—	91.1	32.36	7.84	32.7	251	242	A	V
		2485.65	47.71	-26.29	74	40.06	32.47	7.88	32.7	251	242	P	V
		2484.46	36.15	-17.85	54	28.5	32.47	7.88	32.7	251	242	A	V



802.11b CH 11 2462MHz		2462	96.57	—	—	89.01	32.42	7.84	32.7	145	317	P	H
		2462	95.28	—	—	87.72	32.42	7.84	32.7	145	317	A	H
		2499.08	47.29	-26.71	74	39.61	32.5	7.88	32.7	145	317	P	H
		2484.56	36.63	-17.37	54	28.98	32.47	7.88	32.7	145	317	A	H
		2462	101.07	—	—	93.51	32.42	7.84	32.7	245	240	P	V
		2462	99.44	—	—	91.88	32.42	7.84	32.7	245	240	A	V
		2484.6	47.89	-26.11	74	40.24	32.47	7.88	32.7	245	240	P	V
		2484.52	37.11	-16.89	54	29.46	32.47	7.88	32.7	245	240	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	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 01 2412MHz		4824	51.65	-22.35	74	57.88	34.83	11.08	52.14	232	236	P	H
		4824	47.72	-6.28	54	53.95	34.83	11.08	52.14	232	236	A	H
		4824	52.4	-21.6	74	58.63	34.83	11.08	52.14	269	37	P	V
		4824	49.13	-4.87	54	55.36	34.83	11.08	52.14	269	37	A	V
802.11b CH 06 2437MHz		4874	47.13	-26.87	74	53.46	33.73	12.04	52.1			P	H
		7311	47.54	-26.46	74	49.41	35.76	14.16	51.79			P	H
		4874	50.85	-23.15	74	57.18	33.73	12.04	52.1	242	77	P	V
		4874	45.32	-8.68	54	51.65	33.73	12.04	52.1	242	77	A	V
		7311	47.98	-26.02	74	49.85	35.76	14.16	51.79			P	V
802.11b CH 11 2462MHz		4924	49.77	-24.23	74	55.83	34.87	11.13	52.06			P	H
		7386	47.47	-26.53	74	49.68	36.35	13.14	51.7			P	H
		4924	51.09	-22.91	74	57.15	34.87	11.13	52.06	273	50	P	V
		4924	47.66	-6.34	54	53.72	34.87	11.13	52.06	273	50	A	V
		7386	47.06	-26.94	74	49.27	36.35	13.14	51.7			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	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 01 2412MHz		2389.905	61.07	-12.93	74	53.71	32.26	7.8	32.7	100	235	P	H
		2389.905	45.22	-8.78	54	37.86	32.26	7.8	32.7	100	235	A	H
		2412	102.73	—	—	95.32	32.31	7.8	32.7	100	235	P	H
		2412	95.69	—	—	88.28	32.31	7.8	32.7	100	235	A	H
		2389.905	61.61	-12.39	74	54.25	32.26	7.8	32.7	167	240	P	V
		2389.905	45.42	-8.58	54	38.06	32.26	7.8	32.7	167	240	A	V
		2412	104.47	—	—	97.06	32.31	7.8	32.7	167	240	P	V
		2412	97.95	—	—	90.54	32.31	7.8	32.7	167	240	A	V
802.11g CH 06 2437MHz		2384.62	47.12	-26.88	74	39.77	32.25	7.8	32.7	100	238	P	H
		2389.94	36.95	-17.05	54	29.59	32.26	7.8	32.7	100	238	A	H
		2437	102.45	—	—	94.95	32.36	7.84	32.7	100	238	P	H
		2437	95.39	—	—	87.89	32.36	7.84	32.7	100	238	A	H
		2483.9	46.7	-27.3	74	39.06	32.46	7.88	32.7	100	238	P	H
		2486.28	36.94	-17.06	54	29.29	32.47	7.88	32.7	100	238	A	H
		2389.24	47.07	-26.93	74	39.71	32.26	7.8	32.7	170	268	P	V
		2389.8	37.14	-16.86	54	29.78	32.26	7.8	32.7	170	268	A	V
		2437	106.75	—	—	99.25	32.36	7.84	32.7	170	268	P	V
		2437	99.02	—	—	91.52	32.36	7.84	32.7	170	268	A	V
		2499.09	47.1	-26.9	74	39.42	32.5	7.88	32.7	170	268	P	V
		2483.58	37.11	-16.89	54	29.47	32.46	7.88	32.7	170	268	A	V
802.11g CH 11 2462MHz		2462	103.28	—	—	95.72	32.42	7.84	32.7	100	234	P	H
		2462	95.92	—	—	88.36	32.42	7.84	32.7	100	234	A	H
		2484.36	55.91	-18.09	74	48.26	32.47	7.88	32.7	100	234	P	H
		2483.52	42.29	-11.71	54	34.65	32.46	7.88	32.7	100	234	A	H
		2462	104.83	—	—	97.27	32.42	7.84	32.7	161	241	P	V
		2462	97.77	—	—	90.21	32.42	7.84	32.7	161	241	A	V
		2484.16	58.01	-15.99	74	50.36	32.47	7.88	32.7	161	241	P	V
		2483.64	43.15	-10.85	54	35.51	32.46	7.88	32.7	161	241	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	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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 01 2412MHz		4824	46.69	-27.31	74	52.92	34.83	11.08	52.14			P	H
		4824	45.85	-28.15	74	52.08	34.83	11.08	52.14			P	V
802.11g CH 06 2437MHz		4874	47.78	-26.22	74	53.94	34.85	11.09	52.1			P	H
		7311	48.11	-25.89	74	50.5	36.32	13.08	51.79			P	H
		4874	48.31	-25.69	74	54.47	34.85	11.09	52.1			P	V
		7311	49.15	-24.85	74	51.54	36.32	13.08	51.79			P	V
802.11g CH 11 2462MHz		4924	46.3	-27.7	74	52.36	34.87	11.13	52.06			P	H
		7386	48.44	-25.56	74	50.65	36.35	13.14	51.7			P	H
		4924	47.41	-26.59	74	53.47	34.87	11.13	52.06			P	V
		7386	48.68	-25.32	74	50.89	36.35	13.14	51.7			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	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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)
802.11n HT20 CH 01 2412MHz		2389.905	62.2	-11.8	74	54.84	32.26	7.8	32.7	100	234	P	H
		2389.695	47.16	-6.84	54	39.8	32.26	7.8	32.7	100	234	A	H
		2412	102.87	—	—	95.46	32.31	7.8	32.7	100	234	P	H
		2412	95.38	—	—	87.97	32.31	7.8	32.7	100	234	A	H
		2389.905	63.93	-10.07	74	56.57	32.26	7.8	32.7	143	239	P	V
		2389.905	49.32	-4.68	54	41.96	32.26	7.8	32.7	143	239	A	V
		2412	105.04	—	—	97.63	32.31	7.8	32.7	143	239	P	V
		2412	97.81	—	—	90.4	32.31	7.8	32.7	143	239	A	V
802.11n HT20 CH 06 2437MHz		2387.84	47.48	-26.52	74	40.13	32.25	7.8	32.7	100	237	P	H
		2388.96	36.99	-17.01	54	29.63	32.26	7.8	32.7	100	237	A	H
		2437	102.57	—	—	95.07	32.36	7.84	32.7	100	237	P	H
		2437	94.75	—	—	87.25	32.36	7.84	32.7	100	237	A	H
		2490.41	46.63	-27.37	74	38.97	32.48	7.88	32.7	100	237	P	H
		2484.6	36.86	-17.14	54	29.21	32.47	7.88	32.7	100	237	A	H
		2389.66	46.69	-27.31	74	39.33	32.26	7.8	32.7	169	268	P	V
		2389.38	37.28	-16.72	54	29.92	32.26	7.8	32.7	169	268	A	V
		2437	106.91	—	—	99.41	32.36	7.84	32.7	169	268	P	V
		2437	99.14	—	—	91.64	32.36	7.84	32.7	169	268	A	V
		2484.53	47.32	-26.68	74	39.67	32.47	7.88	32.7	169	268	P	V
		2486.35	37.15	-16.85	54	29.5	32.47	7.88	32.7	169	268	A	V
802.11n HT20 CH 11 2462MHz		2462	102.03	—	—	94.47	32.42	7.84	32.7	100	234	P	H
		2462	94.99	—	—	87.43	32.42	7.84	32.7	100	234	A	H
		2483.56	59.07	-14.93	74	51.43	32.46	7.88	32.7	100	234	P	H
		2483.56	42.88	-11.12	54	35.24	32.46	7.88	32.7	100	234	A	H
		2462	103.97	—	—	96.41	32.42	7.84	32.7	187	249	P	V
		2462	96.7	—	—	89.14	32.42	7.84	32.7	187	249	A	V
		2483.52	59.83	-14.17	74	52.19	32.46	7.88	32.7	187	249	P	V
		2483.64	43.74	-10.26	54	36.1	32.46	7.88	32.7	187	249	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	Note	Frequency (MHz)	Level (dBμV/m)	Margin (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)
802.11n HT20 CH 01 2412MHz		4824	45.73	-28.27	74	51.96	34.83	11.08	52.14			P	H
		4824	46.12	-27.88	74	52.35	34.83	11.08	52.14			P	V
802.11n HT20 CH 06 2437MHz		4874	50.53	-23.47	74	56.69	34.85	11.09	52.1			P	H
		7311	47.29	-26.71	74	49.68	36.32	13.08	51.79			P	H
		4874	51.54	-22.46	74	57.7	34.85	11.09	52.1	328	38	P	V
		4874	42	-12	54	48.16	34.85	11.09	52.1	328	38	A	V
		7311	47.44	-26.56	74	49.83	36.32	13.08	51.79			P	V
802.11n HT20 CH 11 2462MHz		4924	45.9	-28.1	74	51.96	34.87	11.13	52.06			P	H
		7386	47.56	-26.44	74	49.77	36.35	13.14	51.7			P	H
		4924	46.2	-27.8	74	52.26	34.87	11.13	52.06			P	V
		7386	47.49	-26.51	74	49.7	36.35	13.14	51.7			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 HT20 (LF)

WIFI	Note	Frequency	Level	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
					Line	Level	Factor	Loss	Factor	Pos	Pos	Avg.	
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11n HT20 LF		46.49	19.72	-20.28	40	33.45	19.62	1.61	34.96			P	H
		150.28	29.24	-14.26	43.5	42.63	18.98	2.33	34.7			P	H
		189.08	30.99	-12.51	43.5	46.45	16.63	2.61	34.7			P	H
		269.59	26.82	-19.18	46	40.21	18.18	3.09	34.66			P	H
		475.23	24.95	-21.05	46	32.96	23.06	3.43	34.5			P	H
		644.98	27.61	-18.39	46	32.23	26.23	3.66	34.51			P	H
		42.61	26.72	-13.28	40	40.67	19.48	1.5	34.93			P	V
		108.57	20.76	-22.74	43.5	37.87	15.61	2.06	34.78			P	V
		180.35	30.4	-13.1	43.5	45.44	17.16	2.5	34.7			P	V
		285.11	22.55	-23.45	46	35.37	18.66	3.15	34.63			P	V
		434.49	24.82	-21.18	46	33.56	22.34	3.42	34.5			P	V
		699.3	28.7	-17.3	46	32.28	27.08	3.74	34.4			P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



<Co-colation>

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 01 + LTE B13 Link Co-colation	*	2389.8	61.52	-12.48	74	54.16	32.26	7.8	32.7	100	186	P	H
	*	2389.905	46.65	-7.35	54	39.29	32.26	7.8	32.7	100	186	A	H
		2412	101.62	—	—	94.21	32.31	7.8	32.7	100	186	P	H
		2412	94.49	—	—	87.08	32.31	7.8	32.7	100	186	A	H
	*	2389.905	63.11	-10.89	74	55.75	32.26	7.8	32.7	100	232	P	V
	*	2389.905	48.28	-5.72	54	40.92	32.26	7.8	32.7	100	232	A	V
		2412	103.03	—	—	95.62	32.31	7.8	32.7	100	232	P	V
		2412	95.85	—	—	88.44	32.31	7.8	32.7	100	232	A	H
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	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Cable Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11n HT20 CH 01 + LTE B13 Link Co-colation		1559.5	44.11	-29.89	74	41.38	29.46	6.39	33.12			P	H
		2339.25	45.91	-28.09	74	38.88	32.15	7.58	32.7			P	H
		3119	43.34	-30.66	74	52.38	34.47	8.76	52.27			P	H
		4824	45.81	-28.19	74	52.04	34.83	11.08	52.14			P	H
		1559.5	44.23	-29.77	74	41.5	29.46	6.39	33.12			P	V
		2339.25	46.65	-27.35	74	39.62	32.15	7.58	32.7			P	V
		3119	44.4	-29.6	74	33.62	34.47	8.76	32.45			P	V
		4824	45.84	-28.16	74	52.07	34.83	11.08	52.14			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 Margin 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	Margin	Limit	Read	Antenna	Path	Preamp	Ant	Table	Peak	Pol.
Ant.					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. 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. Margin (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. Margin (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. Margin (dB)

= Level(dBμV/m) – Limit Line(dBμV/m)

= 43.54(dBμV/m) – 54(dBμV/m)

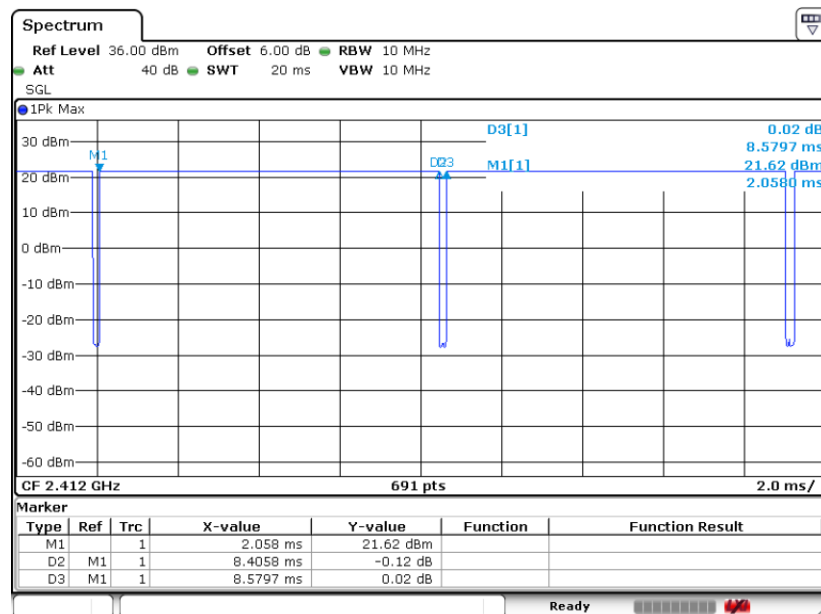
= -10.46(dB)

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

Appendix D. Duty Cycle Plots

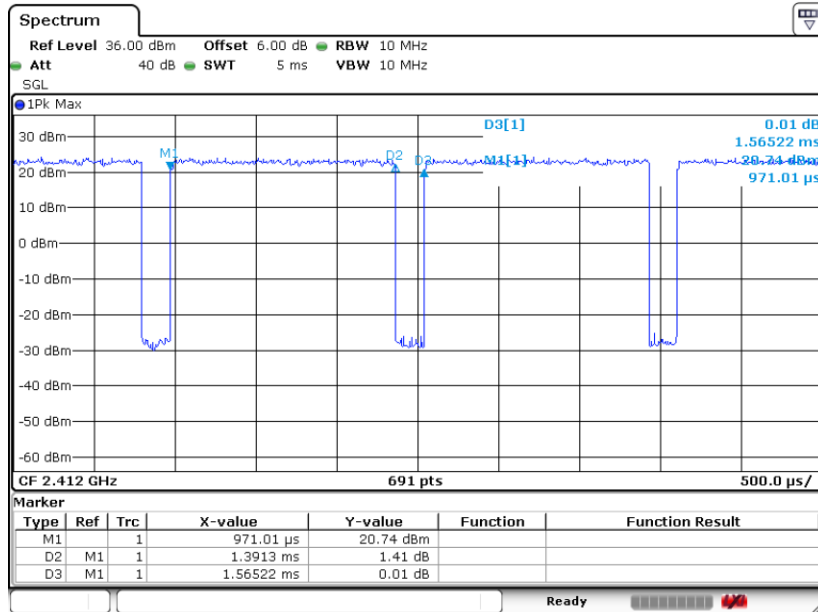
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	97.75	8.406	0.120	300Hz
802.11g	88.89	1.391	0.719	1KHz
802.11n HT20	88.18	1.297	0.771	1KHz

802.11b





802.11g





802.11n HT20

