



Appendix C. Radiated Spurious Emission

2.4GHz 2400~2483.5MHz

WIFI 802.11b (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2388.435	46.54	-27.46	74	42.21	27.39	9.64	32.7	328	319	P	H
		2388.435	38.62	-15.38	54	34.29	27.39	9.64	32.7	328	319	A	H
		2412	102.87	-	-	98.5	27.41	9.66	32.7	328	319	P	H
		2412	101.1	-	-	96.73	27.41	9.66	32.7	328	319	A	H
		2388.12	46.99	-27.01	74	42.66	27.39	9.64	32.7	100	237	P	V
		2387.91	39.18	-14.82	54	34.85	27.39	9.64	32.7	100	237	A	V
		2412	102.94	-	-	98.57	27.41	9.66	32.7	100	237	P	V
		2412	101.07	-	-	96.7	27.41	9.66	32.7	100	237	A	V
802.11b CH 06 2437MHz		2389.8	43.89	-30.11	74	39.56	27.39	9.64	32.7	316	316	P	H
		2389.94	33.41	-20.59	54	29.08	27.39	9.64	32.7	316	316	A	H
		2437	103.3	-	-	98.87	27.44	9.69	32.7	316	316	P	H
		2437	101.37	-	-	96.94	27.44	9.69	32.7	316	316	A	H
		2483.5	46.16	-27.84	74	41.63	27.48	9.75	32.7	316	316	P	H
		2483.69	36.19	-17.81	54	31.66	27.48	9.75	32.7	316	316	A	H
		2347.38	43.8	-30.2	74	39.56	27.35	9.59	32.7	100	237	P	V
		2389.94	34.28	-19.72	54	29.95	27.39	9.64	32.7	100	237	A	V
		2437	103.71	-	-	99.28	27.44	9.69	32.7	100	237	P	V
		2437	101.91	-	-	97.48	27.44	9.69	32.7	100	237	A	V
		2483.62	46.85	-27.15	74	42.32	27.48	9.75	32.7	100	237	P	V
	2483.5	36.85	-17.15	54	32.32	27.48	9.75	32.7	100	237	A	V	
802.11b CH 11 2462MHz		2462	104.48	-	-	100	27.46	9.72	32.7	311	315	P	H
		2462	102.6	-	-	98.12	27.46	9.72	32.7	311	315	A	H
		2483.52	49.78	-24.22	74	45.25	27.48	9.75	32.7	311	315	P	H
		2487.04	42.89	-11.11	54	38.35	27.49	9.75	32.7	311	315	A	H
		2462	104.76	-	-	100.28	27.46	9.72	32.7	100	238	P	V
		2462	102.99	-	-	98.51	27.46	9.72	32.7	100	238	A	V
		2486.68	49.88	-24.12	74	45.34	27.49	9.75	32.7	100	238	P	V



		2483.52	43.22	-10.78	54	38.69	27.48	9.75	32.7	100	238	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	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	45.34	-28.66	74	54.33	31.14	12.01	52.14	211	306	P	H
		4824	46.86	-27.14	74	55.85	31.14	12.01	52.14	303	283	P	V
802.11b CH 06 2437MHz		4874	44.91	-29.09	74	53.67	31.3	12.04	52.1	205	298	P	H
		7311	49.13	-24.87	74	50.61	36.15	14.16	51.79	-	-	P	H
		4874	45.09	-28.91	74	53.85	31.3	12.04	52.1	317	275	P	V
		7311	49.68	-24.32	74	51.16	36.15	14.16	51.79	-	-	P	V
802.11b CH 11 2462MHz		4924	43.66	-30.34	74	52.19	31.46	12.07	52.06	-	-	P	H
		7386	47.9	-26.1	74	49.18	36.21	14.21	51.7	-	-	P	H
		4924	44.76	-29.24	74	53.29	31.46	12.07	52.06	-	-	P	V
		7386	48.85	-25.15	74	50.13	36.21	14.21	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 Ant. 1	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	59.69	-14.31	74	55.36	27.39	9.64	32.7	286	220	P	H
		2389.8	48.78	-5.22	54	44.45	27.39	9.64	32.7	286	220	A	H
		2412	104.97	-	-	100.6	27.41	9.66	32.7	286	220	P	H
		2412	97.91	-	-	93.54	27.41	9.66	32.7	286	220	A	H
		2390	62.92	-11.08	74	58.59	27.39	9.64	32.7	190	265	P	V
		2389.8	51.99	-2.01	54	47.66	27.39	9.64	32.7	190	265	A	V
		2412	107.85	-	-	103.48	27.41	9.66	32.7	190	265	P	V
		2412	100.98	-	-	96.61	27.41	9.66	32.7	190	265	A	V
802.11g CH 06 2437MHz		2388.26	45.27	-28.73	74	40.94	27.39	9.64	32.7	292	314	P	H
		2389.94	34.92	-19.08	54	30.59	27.39	9.64	32.7	292	314	A	H
		2437	105.1	-	-	100.67	27.44	9.69	32.7	292	314	P	H
		2437	98.17	-	-	93.74	27.44	9.69	32.7	292	314	A	H
		2483.5	49.1	-24.9	74	44.57	27.48	9.75	32.7	292	314	P	H
		2483.5	38.68	-15.32	54	34.15	27.48	9.75	32.7	292	314	A	H
		2389.38	46.67	-27.33	74	42.34	27.39	9.64	32.7	171	265	P	V
		2389.94	36.13	-17.87	54	31.8	27.39	9.64	32.7	171	265	A	V
		2437	106.11	-	-	101.68	27.44	9.69	32.7	171	265	P	V
		2437	99.47	-	-	95.04	27.44	9.69	32.7	171	265	A	V
		2483.76	51.84	-22.16	74	47.31	27.48	9.75	32.7	171	265	P	V
	2483.55	39.98	-14.02	54	35.45	27.48	9.75	32.7	171	265	A	V	
802.11g CH 11 2462MHz		2462	106.22	-	-	101.74	27.46	9.72	32.7	345	146	P	H
		2462	99.49	-	-	95.01	27.46	9.72	32.7	345	146	A	H
		2483.84	62.04	-11.96	74	57.51	27.48	9.75	32.7	345	146	P	H
		2483.52	49.9	-4.1	54	45.37	27.48	9.75	32.7	345	146	A	H
		2462	108.22	-	-	103.74	27.46	9.72	32.7	169	76	P	V
		2462	101.53	-	-	97.05	27.46	9.72	32.7	169	76	A	V
		2483.88	63	-11	74	58.47	27.48	9.75	32.7	169	76	P	V
		2483.52	51.72	-2.28	54	47.19	27.48	9.75	32.7	169	76	A	V



Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.
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**2.4GHz 2400~2483.5MHz
WIFI 802.11g (Harmonic @ 3m)**

WIFI Ant. 1	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	43.65	-30.35	74	52.64	31.14	12.01	52.14	-	-	P	H
		4824	43.44	-30.56	74	52.43	31.14	12.01	52.14	-	-	P	V
802.11g CH 06 2437MHz		4874	42.16	-31.84	74	50.92	31.3	12.04	52.1	-	-	P	H
		7311	48.66	-25.34	74	50.14	36.15	14.16	51.79	-	-	P	H
		4874	41.66	-32.34	74	50.42	31.3	12.04	52.1	-	-	P	V
		7311	48.94	-25.06	74	50.42	36.15	14.16	51.79	-	-	P	V
802.11g CH 11 2462MHz		4924	42.97	-31.03	74	51.5	31.46	12.07	52.06	-	-	P	H
		7386	47.88	-26.12	74	49.16	36.21	14.21	51.7	-	-	P	H
		4924	43.23	-30.77	74	51.76	31.46	12.07	52.06	-	-	P	V
		7386	49.55	-24.45	74	50.83	36.21	14.21	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 Ant. 1	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		2389.38	58.5	-15.5	74	54.17	27.39	9.64	32.7	288	220	P	H
		2389.905	47.2	-6.8	54	42.87	27.39	9.64	32.7	288	220	A	H
		2412	102.18	-	-	97.81	27.41	9.66	32.7	288	220	P	H
		2412	95.31	-	-	90.94	27.41	9.66	32.7	288	220	A	H
		2389.38	63.66	-10.34	74	59.33	27.39	9.64	32.7	189	266	P	V
		2389.905	51.47	-2.53	54	47.14	27.39	9.64	32.7	189	266	A	V
		2412	106.7	-	-	102.33	27.41	9.66	32.7	189	266	P	V
802.11n HT20 CH 06 2437MHz		2389.38	99.59	-	-	95.22	27.41	9.66	32.7	189	266	A	V
		2387.56	44.83	-29.17	74	40.5	27.39	9.64	32.7	281	220	P	H
		2389.94	34.91	-19.09	54	30.58	27.39	9.64	32.7	281	220	A	H
		2437	104.1	-	-	99.67	27.44	9.69	32.7	281	220	P	H
		2437	95.9	-	-	91.47	27.44	9.69	32.7	281	220	A	H
		2483.83	48.71	-25.29	74	44.18	27.48	9.75	32.7	281	220	P	H
		2484.04	38.28	-15.72	54	33.75	27.48	9.75	32.7	281	220	A	H
		2389.66	45.95	-28.05	74	41.62	27.39	9.64	32.7	185	266	P	V
		2389.8	37.07	-16.93	54	32.74	27.39	9.64	32.7	185	266	A	V
		2437	106.95	-	-	102.52	27.44	9.69	32.7	185	266	P	V
	2437	99.81	-	-	95.38	27.44	9.69	32.7	185	266	A	V	
802.11n HT20 CH 11 2462MHz		2486.07	52.41	-21.59	74	47.87	27.49	9.75	32.7	185	266	P	V
		2483.58	42.77	-11.23	54	38.24	27.48	9.75	32.7	185	266	A	V
		2462	102.02	-	-	97.54	27.46	9.72	32.7	278	223	P	H
		2462	94.56	-	-	90.08	27.46	9.72	32.7	278	223	A	H
		2484	58.17	-15.83	74	53.64	27.48	9.75	32.7	278	223	P	H
		2483.64	46.21	-7.79	54	41.68	27.48	9.75	32.7	278	223	A	H
		2462	106.12	-	-	101.64	27.46	9.72	32.7	187	267	P	V
	2462	98.64	-	-	94.16	27.46	9.72	32.7	187	267	A	V	
	2484	63.64	-10.36	74	59.11	27.48	9.75	32.7	187	267	P	V	
	2483.6	51.73	-2.27	54	47.2	27.48	9.75	32.7	187	267	A	V	



Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.
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2.4GHz 2400~2483.5MHz
WIFI 802.11n HT20 (Harmonic @ 3m)

WIFI Ant. 1	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	42.32	-31.68	74	51.31	31.14	12.01	52.14	-	-	P	H
		4824	42.63	-31.37	74	51.62	31.14	12.01	52.14	-	-	P	V
802.11n HT20 CH 06 2437MHz		4874	41.65	-32.35	74	50.41	31.3	12.04	52.1	-	-	P	H
		7311	48.32	-25.68	74	49.8	36.15	14.16	51.79	-	-	P	H
		4874	43.73	-30.27	74	52.49	31.3	12.04	52.1	-	-	P	V
		7311	48.88	-25.12	74	50.36	36.15	14.16	51.79	-	-	P	V
802.11n HT20 CH 11 2462MHz		4924	42.87	-31.13	74	51.4	31.46	12.07	52.06	-	-	P	H
		7386	48.39	-25.61	74	49.67	36.21	14.21	51.7	-	-	P	H
		4924	42.51	-31.49	74	51.04	31.46	12.07	52.06	-	-	P	V
		7386	50.05	-23.95	74	51.33	36.21	14.21	51.7	-	-	P	V

Remark	1. No other spurious found. 2. All results are PASS against Peak and Average limit line.
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2.4GHz 2400~2483.5MHz

Emission below 1GHz

2.4GHz WIFI 802.11g (LF)

WIFI Ant.	Note	Frequency	Level	Margin	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
1		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
2.4GHz 802.11g LF		30	25.58	-14.42	40	31.59	25.86	0.53	32.4	-	-	P	H
		56.19	23.21	-16.79	40	41.89	12.97	0.75	32.4	-	-	P	H
		183.26	23.93	-19.57	43.5	38.92	15.76	1.38	32.13	-	-	P	H
		295.78	24.9	-21.1	46	34.99	19.83	1.79	31.71	-	-	P	H
		676.02	29.2	-16.8	46	30.72	26.57	2.71	30.8	-	-	P	H
		950.53	32.6	-13.4	46	29.72	31.15	3.23	31.5	-	-	P	H
		30	26.03	-13.97	40	32.04	25.86	0.53	32.4	-	-	P	V
		55.22	30.28	-9.72	40	48.73	13.21	0.74	32.4	-	-	P	V
		154.16	22.64	-20.86	43.5	36.66	16.9	1.27	32.19	-	-	P	V
		287.05	22.27	-23.73	46	32.62	19.61	1.76	31.72	-	-	P	V
		783.69	30.7	-15.3	46	30.26	28.77	2.91	31.24	-	-	P	V
		949.56	32.89	-13.11	46	30.02	31.14	3.23	31.5	-	-	P	V
Remark	1. No other spurious found. 2. All results are PASS against limit line.												



<Simultaneous transmission>

2.4GHz 2400~2483.5MHz

WIFI 802.11g (Band Edge @ 3m)

WIFI Ant.	Note	Frequency	Level	Margin Limit	Limit Line	Read Level	Antenna Factor	Path Loss	Preamp Factor	Ant Pos	Table Pos	Peak Avg.	Pol.
23		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11g CH 01 2412MHz & LTE Band13 Co-colation	*	2390	64.08	-9.92	74	59.75	27.39	9.64	32.7	300	140	P	H
	*	2389.8	49.82	-4.18	54	45.49	27.39	9.64	32.7	300	140	A	H
		2412	103.55	-	-	99.18	27.41	9.66	32.7	300	140	P	H
		2412	96.52	-	-	92.15	27.41	9.66	32.7	300	140	A	H
	*	2389.485	65.32	-8.68	74	60.99	27.39	9.64	32.7	192	103	P	V
	*	2389.8	51.77	-2.23	54	47.44	27.39	9.64	32.7	192	103	A	V
		2412	106.13	-	-	101.76	27.41	9.66	32.7	192	103	P	V
		2412	99.29	-	-	94.92	27.41	9.66	32.7	192	103	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. 23	Note	Frequency (MHz)	Level (dBμV/m)	Margin 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 01 2412MHz & LTE Band13 Co-colation		1559.5	42.3	-31.7	74	41.88	24.98	8.56	33.12	-	-	P	H
		2339.25	44.3	-29.7	74	40.08	27.34	9.58	32.7	-	-	P	H
		3119	42.03	-31.97	74	54.77	28.78	10.75	52.27	-	-	P	H
		4824	42.52	-31.48	74	51.51	31.14	12.01	52.14	-	-	P	H
		1559.5	43.38	-30.62	74	42.96	24.98	8.56	33.12	-	-	P	V
		2339.25	44.09	-29.91	74	39.87	27.34	9.58	32.7	-	-	P	V
		3119	42.3	-31.7	74	55.04	28.78	10.75	52.27	-	-	P	V
		4824	43.44	-30.56	74	52.43	31.14	12.01	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	Peak or Average
H/V	Horizontal or Vertical



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		(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)

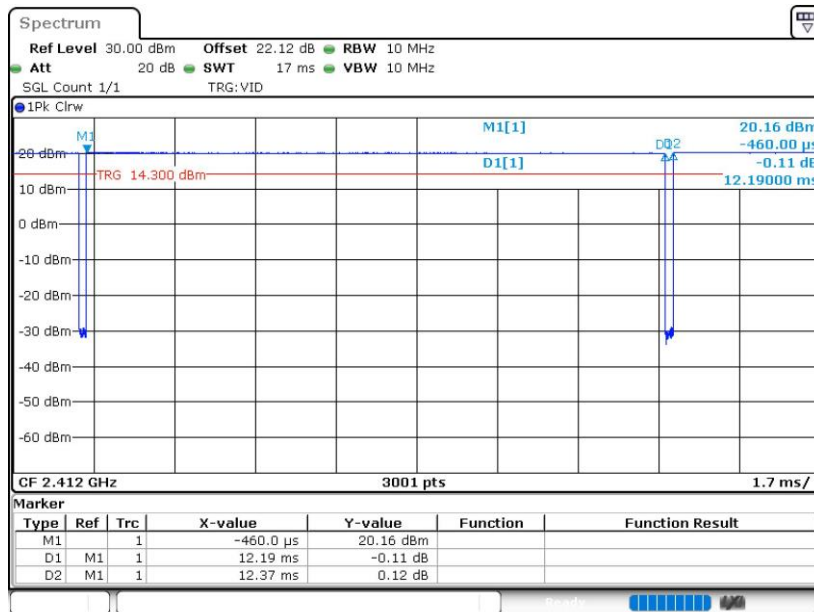
Both peak and average measured complies with the limit line, so test result is “PASS”.



Appendix D. Duty Cycle Plots

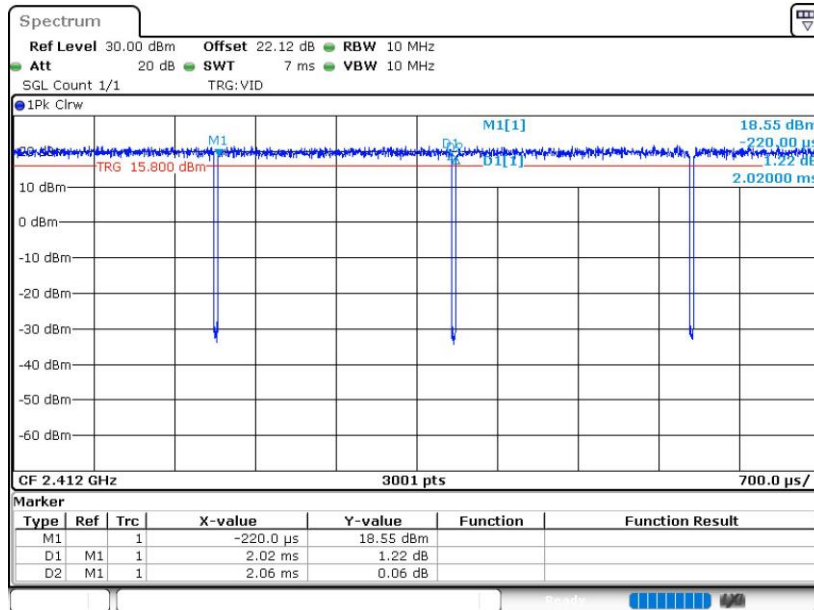
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
802.11b	98.54	-	-	10Hz
802.11g	98.06	-	-	10Hz
802.11n HT20	97.92	1.88	0.532	1KHz

802.11b





802.11g



802.11n HT20

