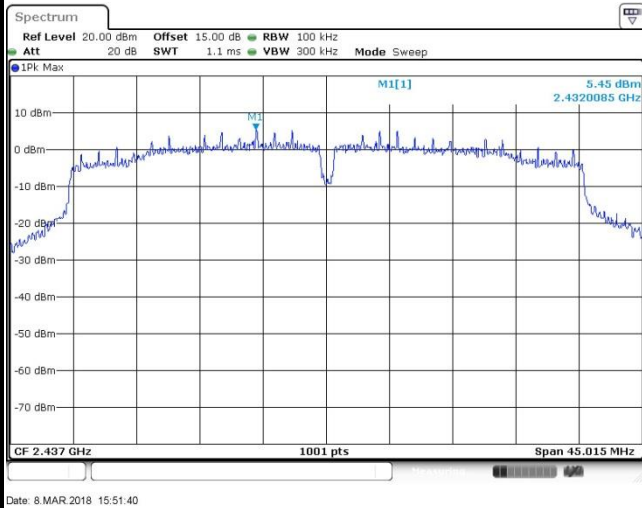


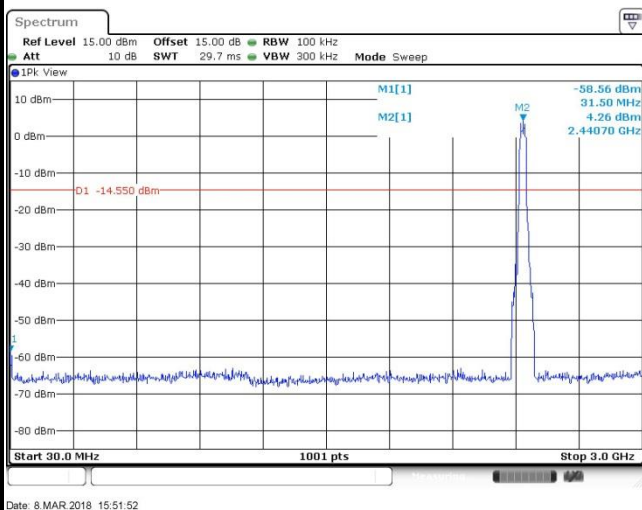


Test Mode :	802.11n HT40	Test Channel :	06
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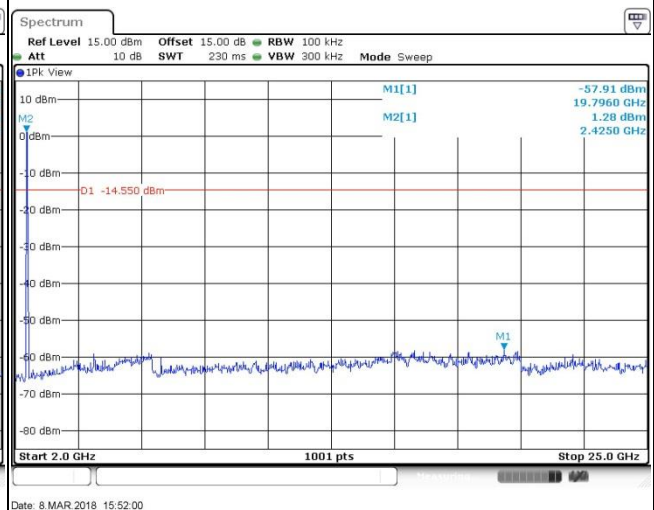
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



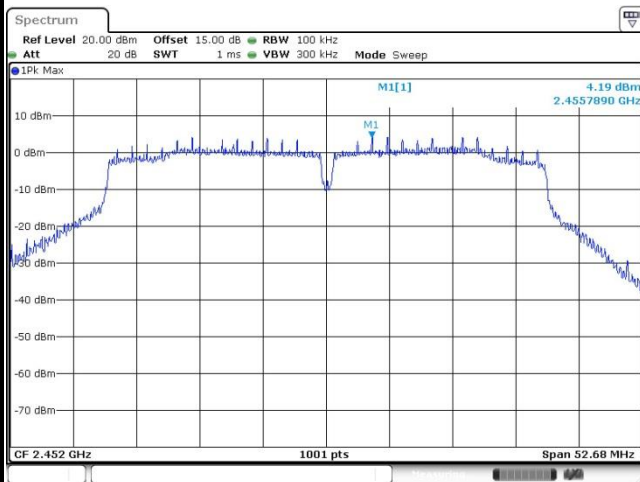
Spurious Emission 2GHz~25GHz





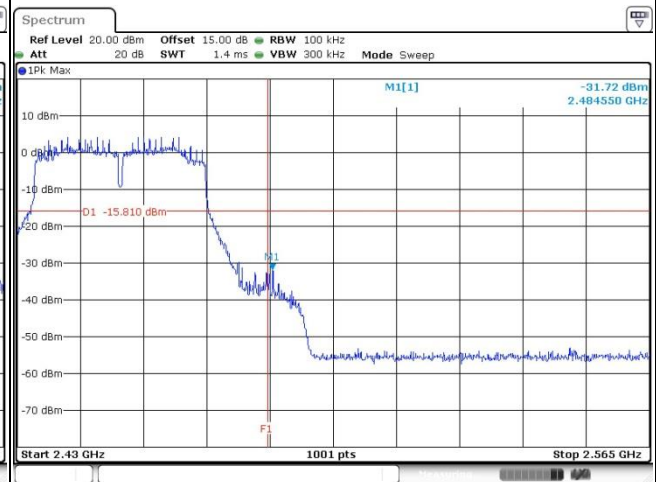
Test Mode :	802.11n HT40	Test Channel :	09
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100kHz PSD reference Level



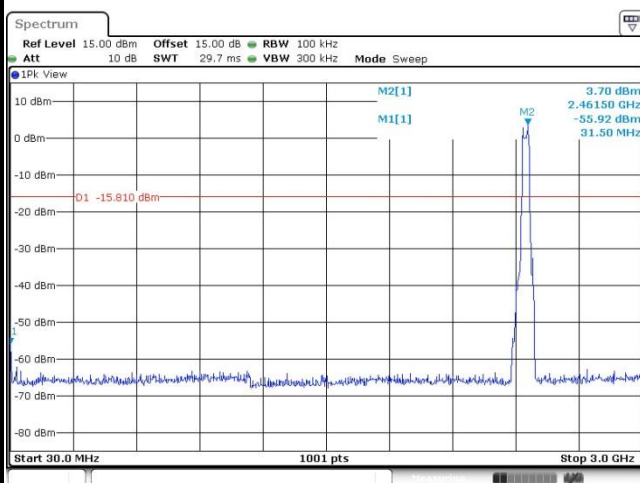
Date: 8 MAR 2018 15:55:16

High Channel Plot



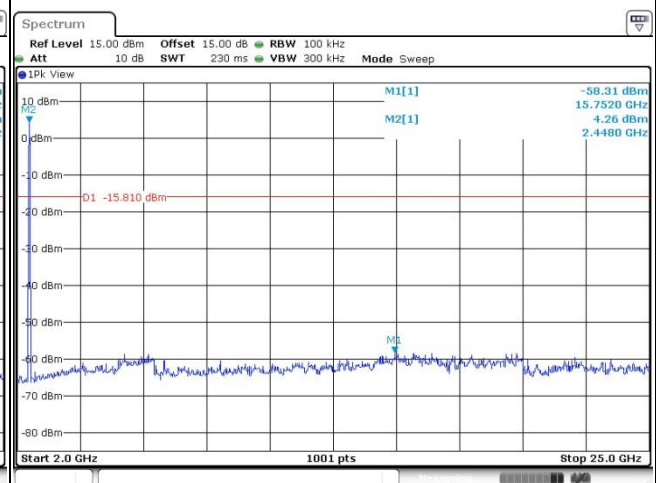
Date: 8 MAR 2018 15:55:29

Spurious Emission 30MHz~3GHz



Date: 8 MAR 2018 15:56:34

Spurious Emission 2GHz~25GHz

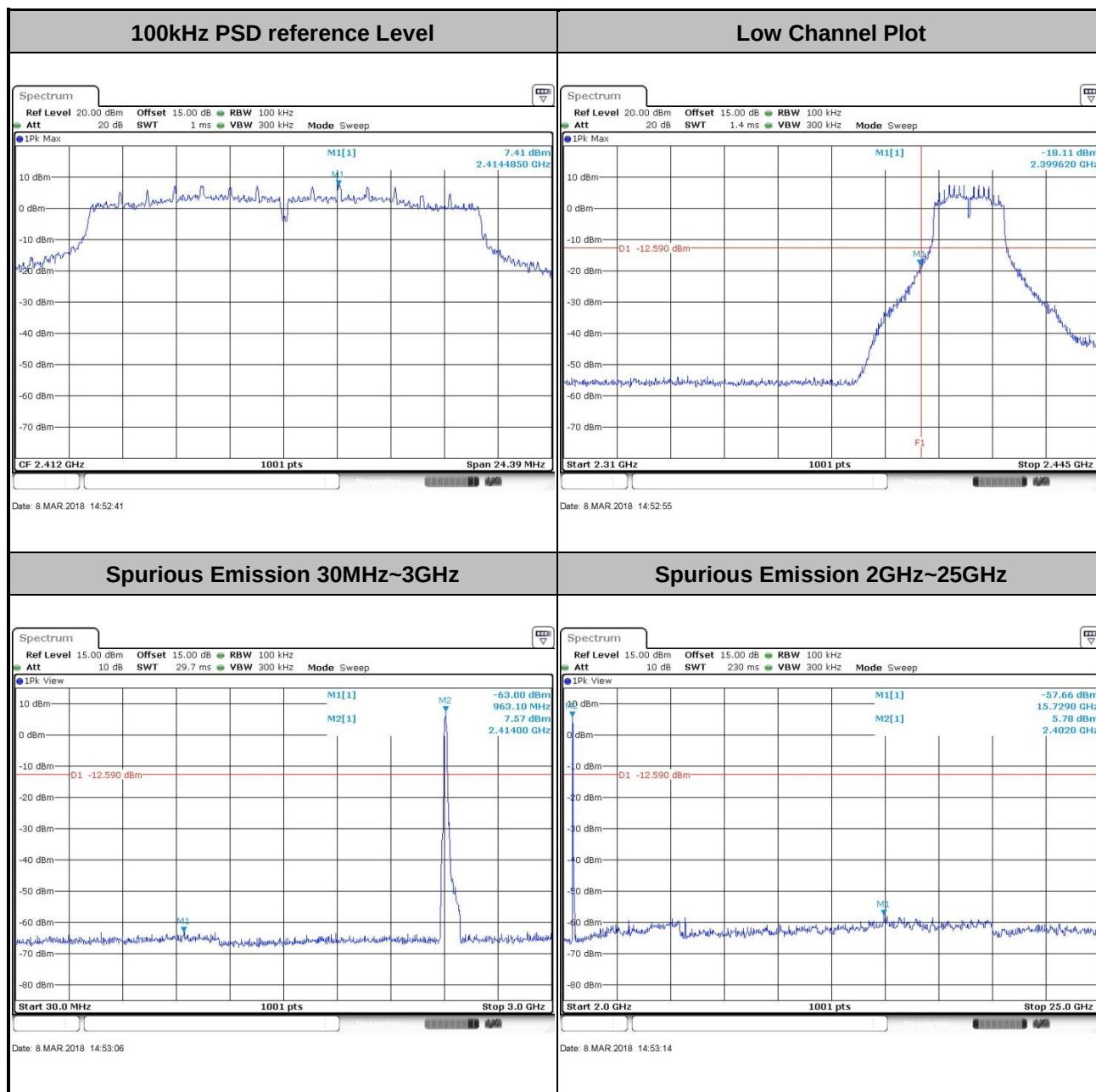


Date: 8 MAR 2018 15:55:46



Number of TX = 2, Ant. 2 (Measured)

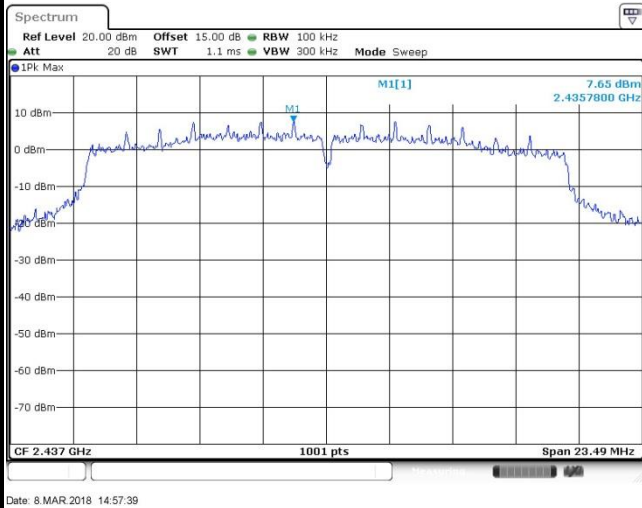
Test Mode :	802.11n HT20	Test Channel :	01
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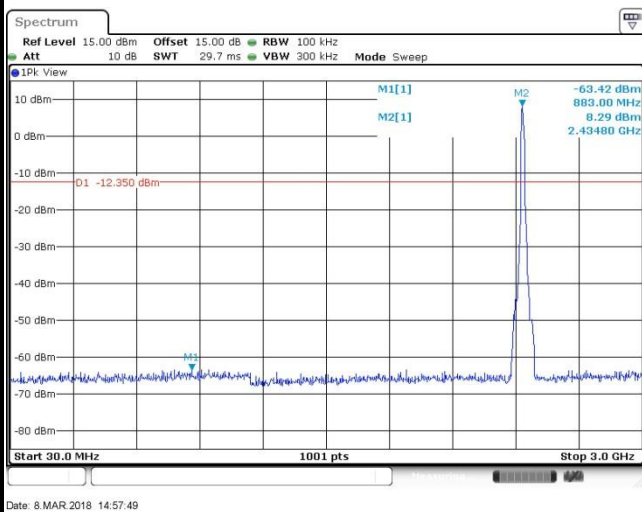


Test Mode :	802.11n HT20	Test Channel :	06
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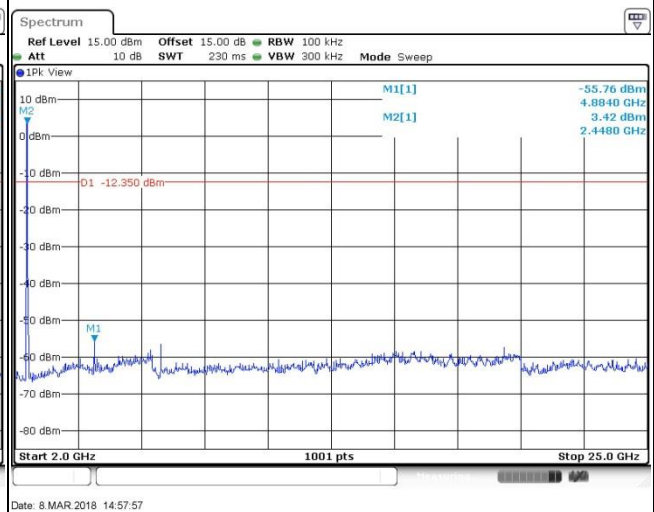
100kHz PSD reference Level



Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

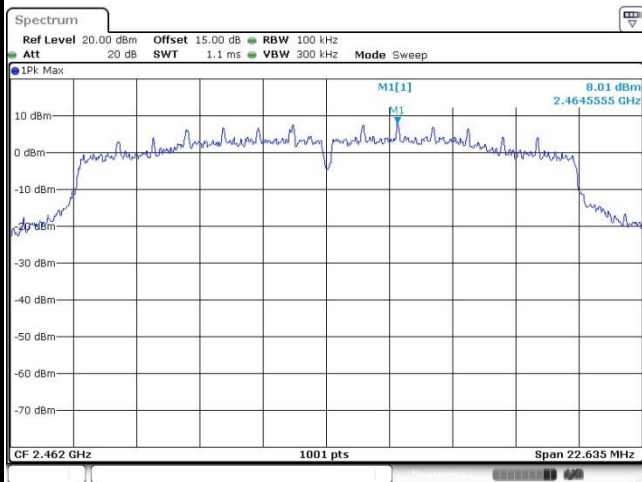




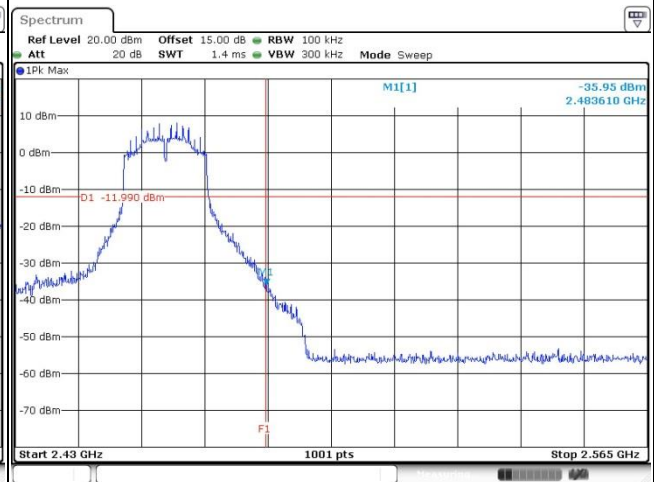
Test Mode : 802.11n HT20

Test Channel : 11

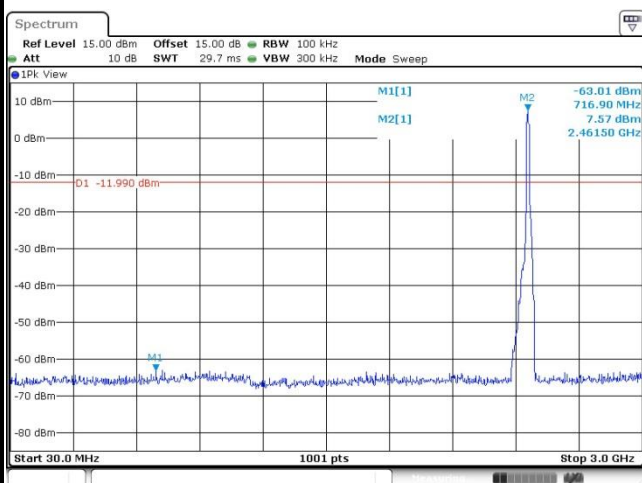
100kHz PSD reference Level



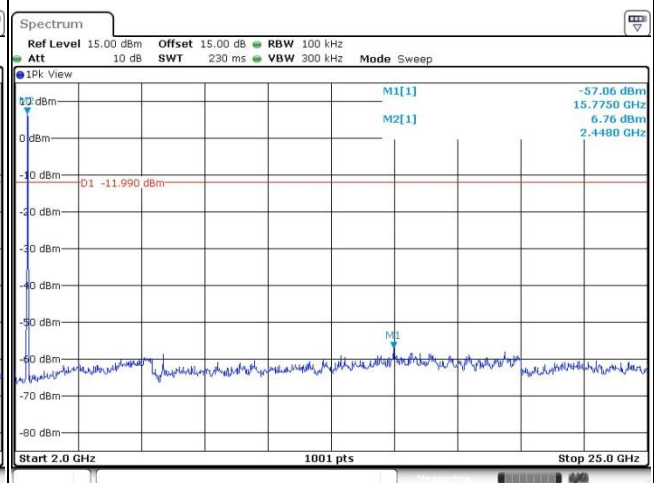
High Channel Plot

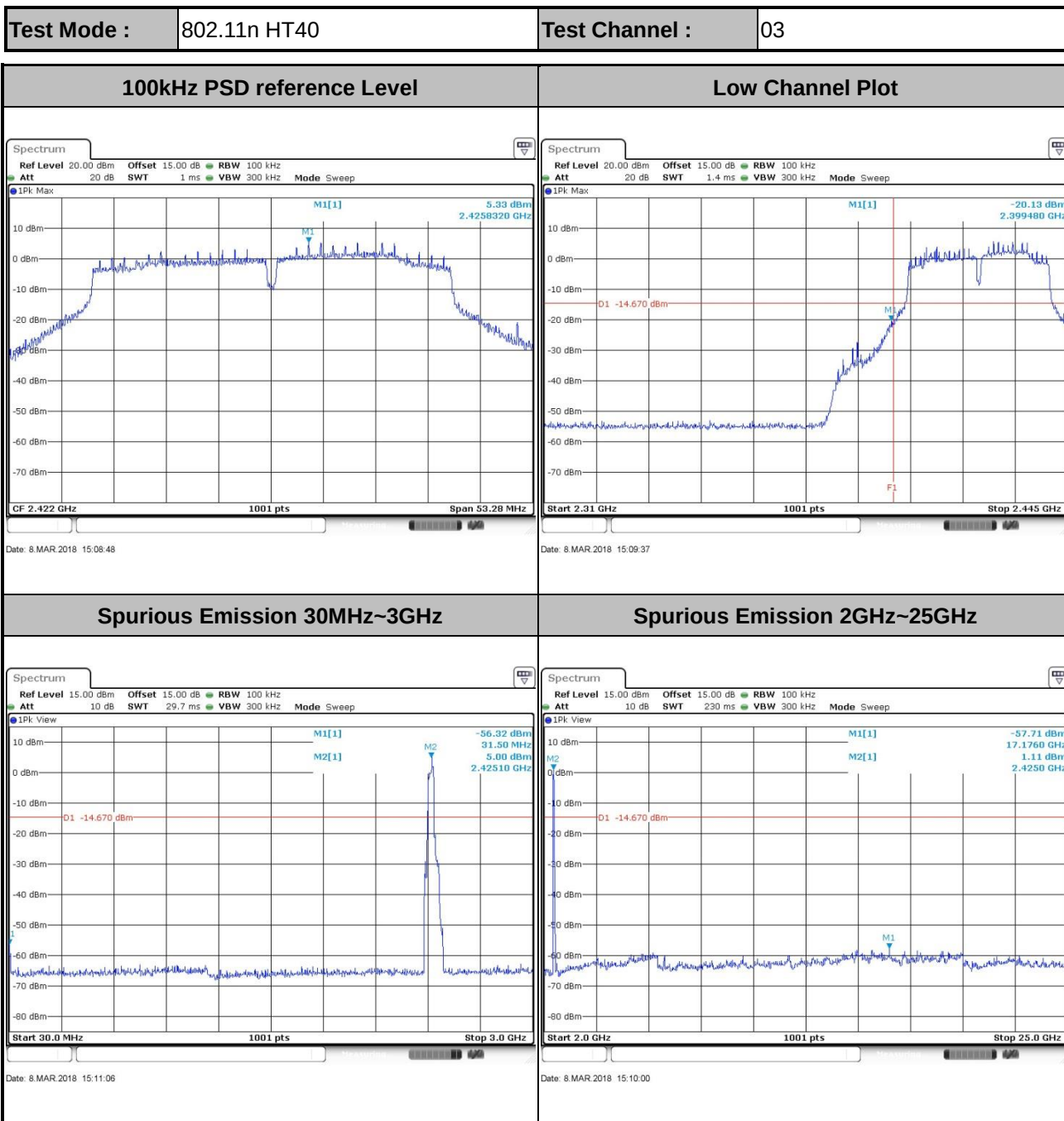


Spurious Emission 30MHz~3GHz



Spurious Emission 2GHz~25GHz

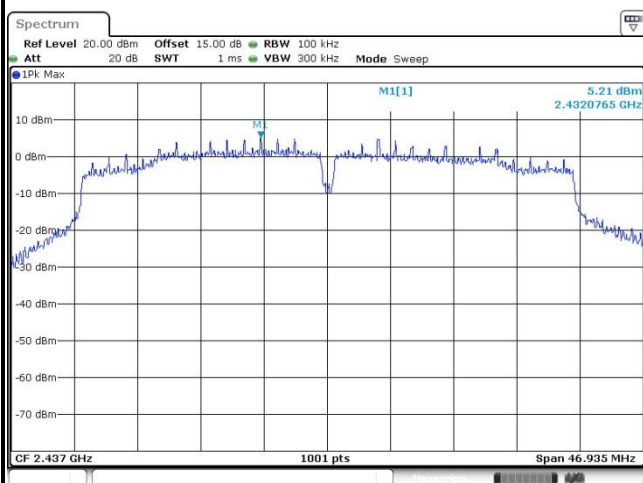






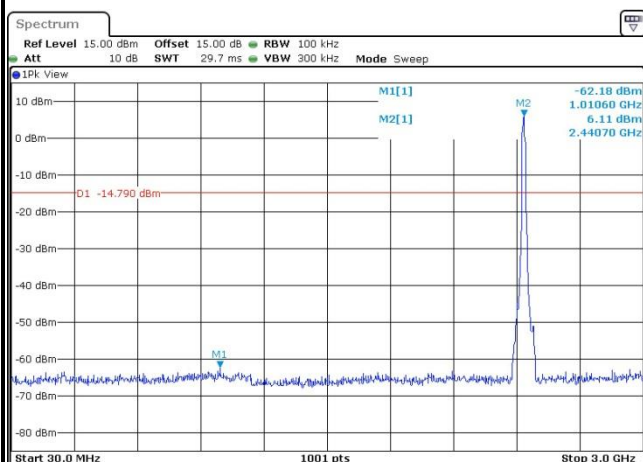
Test Mode :	802.11n HT40	Test Channel :	06
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100kHz PSD reference Level



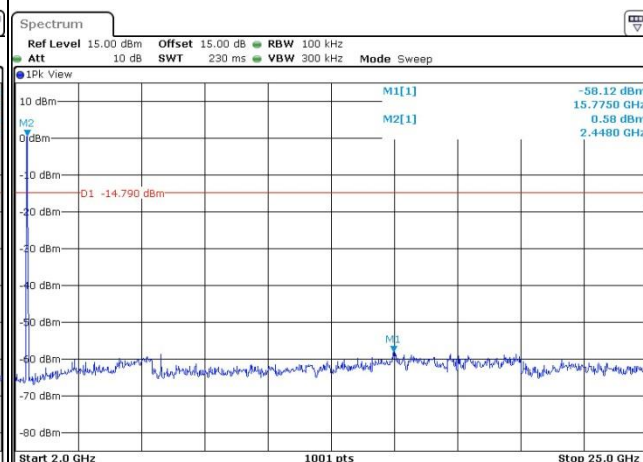
Date: 8 MAR 2018 15:31:37

Spurious Emission 30MHz~3GHz

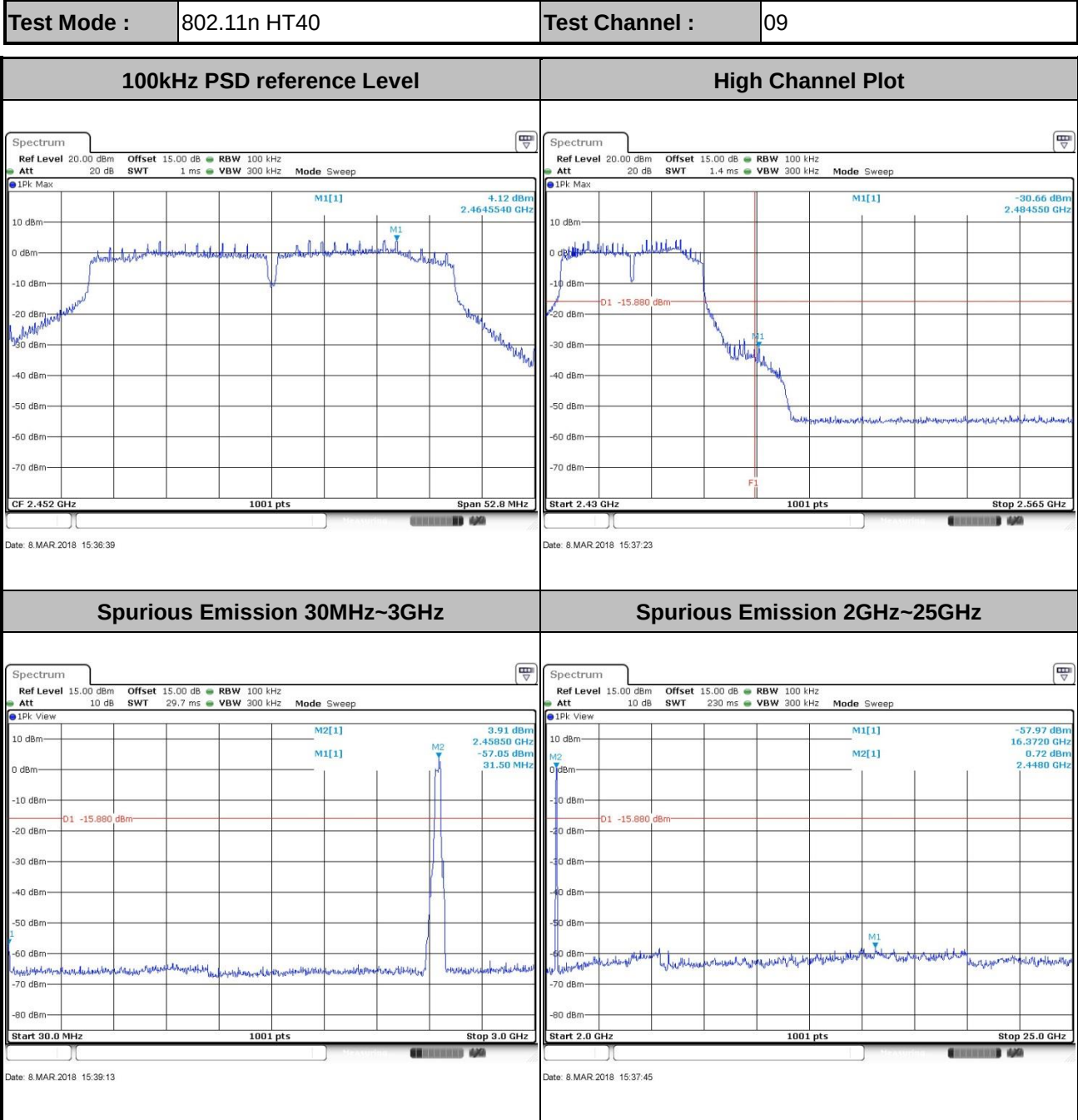


Date: 12 APR 2018 15:38:47

Spurious Emission 2GHz~25GHz



Date: 8 MAR 2018 15:32:13



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

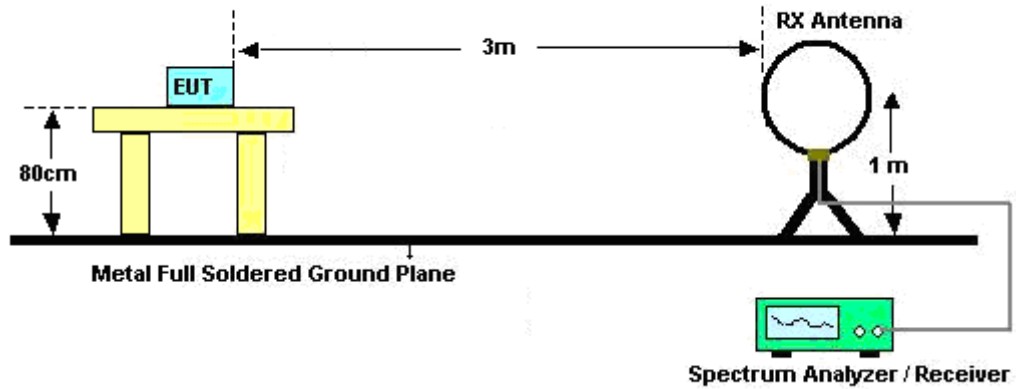
1. The testing follows FCC KDB Publication No. 558074 D01 DTS Meas. Guidance v04.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test 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:

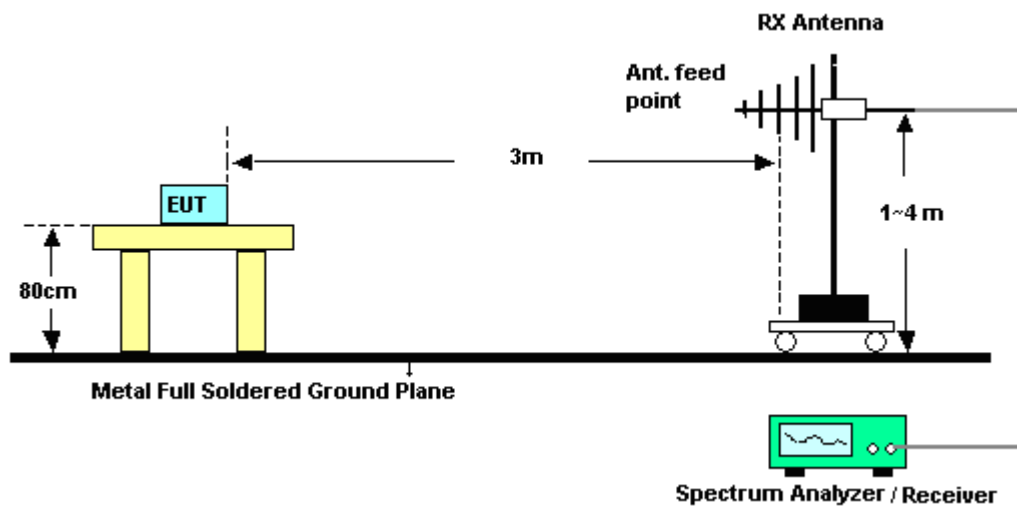
 - VBW = 10 Hz, when duty cycle is no less than 98 percent.
 - VBW $\geq 1/T$, when duty cycle is less than 98 percent where T is the minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

3.5.4 Test Setup

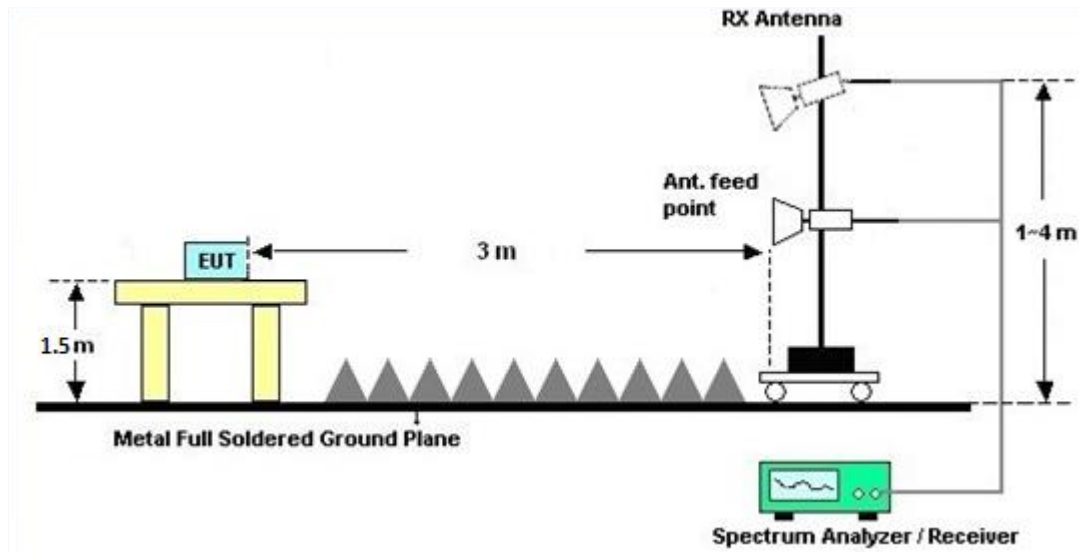
For radiated emissions below 30MHz



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 B.

3.5.7 Duty Cycle

Please refer to Appendix C.

3.5.8 Test Result of Radiated Spurious Emission (30MHz ~ 10th Harmonic)

Please refer to Appendix B.

3.6 Antenna Requirements

3.6.1 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. For the fixed point-to-point operation, the power shall be reduced by one dB for every 3 dB that the directional gain of the Antenna exceeds 6 dBi. 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.

3.6.2 Antenna Anti-Replacement Construction

An embedded-in antenna design is used.

3.6.3 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	Ant. 2	DG for Power	DG for PSD	Power Limit Reduction	PSD Limit Reduction
	(dBi)	(dBi)	(dBi)	(dBi)	(dB)	(dB)
2.4 GHz	2.21	1.51	2.21	4.88	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. 20, 2017	Mar. 08, 2018~ Apr. 12, 2018	Apr. 19, 2018	Conducted (TH01-SZ)
Pulse Power Sensor	Anritsu	MA2411B	1207253	30MHz~40GHz	Dec. 26, 2017	Mar. 08, 2018~ Apr. 12, 2018	Dec. 25, 2018	Conducted (TH01-SZ)
Power Meter	Anritsu	ML2495A	1218010	50MHz Bandwidth	Dec. 26, 2017	Mar. 08, 2018~ Apr. 12, 2018	Dec. 25, 2018	Conducted (TH01-SZ)
EMI Test Receiver	R&S	ESR7	101404	9kHz~7GHz	Apr. 20, 2017	Apr. 04, 2018	Apr. 19, 2018	Radiation (03CH04-SZ)
EXA Spectrum Analyzer	KEYSIGHT	N9010A	MY55150213	10Hz~44GHz	Apr. 20, 2017	Apr. 04, 2018	Apr. 19, 2018	Radiation (03CH04-SZ)
Loop Antenna	R&S	HFH2-Z2	100354	9kHz~30MHz	May 14, 2017	Apr. 04, 2018	May 13, 2018	Radiation (03CH04-SZ)
Bilog Antenna	TeseQ	CBL6111D	41909	30MHz~1GHz	May 16, 2017	Apr. 04, 2018	May 15, 2018	Radiation (03CH04-SZ)
Double Ridge Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-1285	1GHz~18GHz	Dec. 13, 2017	Apr. 04, 2018	Dec. 12, 2018	Radiation (03CH04-SZ)
Horn Antenna	SCHWARZBECK	BBHA9170	9170#679	15GHz~40GHz	May 17, 2017	Apr. 04, 2018	May 16, 2018	Radiation (03CH04-SZ)
Amplifier	Burgeon	BPA-530	102211	0.01Hz~3000MHz	Oct.19, 2017	Apr. 04, 2018	Oct 18, 2018	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	AMF-7D-0010 1800-30-10P-R	1989346	1GHz~18GHz	Jul. 27, 2017	Apr. 04, 2018	Jul. 26, 2018	Radiation (03CH04-SZ)
HF Amplifier	MITEQ	TTA1840-35-H G	1988315	18GHz~40GHz	Jul.27, 2017	Apr. 04, 2018	Jul.26, 2018	Radiation (03CH04-SZ)
Amplifier	Agilent Technologies	83017A	MY53270156	500MHz~26.5GHz	Apr. 20, 2017	Apr. 04, 2018	Apr. 19, 2018	Radiation (03CH04-SZ)
AC Power Source	Chroma	61601	N/A	N/A	NCR	Apr. 04, 2018	NCR	Radiation (03CH04-SZ)
Turn Table	EM	EM1000	N/A	0~360 degree	NCR	Apr. 04, 2018	NCR	Radiation (03CH04-SZ)
Antenna Mast	EM	EM1000	N/A	1 m~4 m	NCR	Apr. 04, 2018	NCR	Radiation (03CH04-SZ)

NCR: No Calibration Required



5 Uncertainty of Evaluation

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

Measuring Uncertainty for a Level of Confidence of 95% ($U = 2Uc(y)$)	4.8dB
--	-------

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% ($U = 2Uc(y)$)	4.3dB
--	-------

Report Number : FR820812C

Test Engineer:	Wilson chen	Temperature:	24~26	°C
Test Date:	2018/3/8 ~ 2018/4/12	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	1	1	2412	13.94	14.04	10.19	10.13	0.50	Pass
11b	1Mbps	1	6	2437	14.14	14.24	10.15	10.17	0.50	Pass
11b	1Mbps	1	11	2462	14.19	14.29	10.07	10.09	0.50	Pass
11g	6Mbps	1	1	2412	17.68	17.98	15.45	15.45	0.50	Pass
11g	6Mbps	1	6	2437	17.38	17.63	15.17	15.43	0.50	Pass
11g	6Mbps	1	11	2462	17.53	17.48	15.17	15.09	0.50	Pass
HT20	MCS0	2	1	2412	18.83	19.33	16.90	16.26	0.50	Pass
HT20	MCS0	2	6	2437	18.73	18.88	15.11	15.66	0.50	Pass
HT20	MCS0	2	11	2462	18.78	18.98	15.17	15.09	0.50	Pass
HT40	MCS0	2	3	2422	36.66	36.46	35.21	35.52	0.50	Pass
HT40	MCS0	2	6	2437	36.06	36.16	33.77	31.29	0.50	Pass
HT40	MCS0	2	9	2452	36.46	36.66	35.13	35.21	0.50	Pass

TEST RESULTS DATA
Peak Output Power

2.4GHz Band																
Mod.	Data Rate	N _{TX}	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	1	1	2412	21.20	21.13		30.00	30.00	2.21	1.51	23.41	22.64	36.00	36.00	Pass
11b	1Mbps	1	6	2437	22.41	22.35		30.00	30.00	2.21	1.51	24.62	23.86	36.00	36.00	Pass
11b	1Mbps	1	11	2462	20.97	20.92		30.00	30.00	2.21	1.51	23.18	22.43	36.00	36.00	Pass
11g	6Mbps	1	1	2412	22.43	22.37		30.00	30.00	2.21	1.51	24.64	23.88	36.00	36.00	Pass
11g	6Mbps	1	6	2437	22.34	22.28		30.00	30.00	2.21	1.51	24.55	23.79	36.00	36.00	Pass
11g	6Mbps	1	11	2462	22.02	21.97		30.00	30.00	2.21	1.51	24.23	23.48	36.00	36.00	Pass
HT20	MCS0	2	1	2412	19.85	19.76	22.82	30.00		2.21		25.03		36.00		Pass
HT20	MCS0	2	6	2437	22.46	22.27	25.38	30.00		2.21		27.59		36.00		Pass
HT20	MCS0	2	11	2462	20.41	20.35	23.39	30.00		2.21		25.60		36.00		Pass
HT40	MCS0	2	3	2422	18.87	18.55	21.72	30.00		2.21		23.93		36.00		Pass
HT40	MCS0	2	6	2437	21.22	20.89	24.07	30.00		2.21		26.28		36.00		Pass
HT40	MCS0	2	9	2452	16.83	16.59	19.72	30.00		2.21		21.93		36.00		Pass

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

TEST RESULTS DATA
Average Output Power

2.4GHz Band									
Mod.	Data Rate	N _{TX}	CH.	Freq. (MHz)	Duty Factor (dB)		Average Conducted Power (dBm)		
					Ant 1	Ant 2	Ant 1	Ant 2	SUM
11b	1Mbps	1	1	2412	0.10	0.10	18.75	18.65	
11b	1Mbps	1	6	2437	0.10	0.10	20.07	19.95	
11b	1Mbps	1	11	2462	0.10	0.10	18.37	18.23	
11g	6Mbps	1	1	2412	0.10	0.10	17.23	17.22	
11g	6Mbps	1	6	2437	0.10	0.10	17.29	17.16	
11g	6Mbps	1	11	2462	0.10	0.10	16.98	16.88	
HT20	MCS0	2	1	2412	0.10	0.10	14.31	14.15	17.24
HT20	MCS0	2	6	2437	0.10	0.10	17.50	17.41	20.47
HT20	MCS0	2	11	2462	0.10	0.10	15.12	14.95	18.05
HT40	MCS0	2	3	2422	0.10	0.10	13.98	13.81	16.91
HT40	MCS0	2	6	2437	0.10	0.10	16.71	16.64	19.69
HT40	MCS0	2	9	2452	0.10	0.10	11.81	11.68	14.76

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	1	1	2412	-3.77	-3.79	-	2.21	1.51	8.00	8.00	Pass
11b	1Mbps	1	6	2437	-3.69	-3.39		2.21	1.51	8.00	8.00	Pass
11b	1Mbps	1	11	2462	-3.87	-3.57		2.21	1.51	8.00	8.00	Pass
11g	6Mbps	1	1	2412	-7.40	-7.94		2.21	1.51	8.00	8.00	Pass
11g	6Mbps	1	6	2437	-8.11	-8.00		2.21	1.51	8.00	8.00	Pass
11g	6Mbps	1	11	2462	-7.60	-6.88		2.21	1.51	8.00	8.00	Pass
HT20	MCS0	2	1	2412	-6.44	-5.87	-2.86	4.88		8.00		Pass
HT20	MCS0	2	6	2437	-7.00	-6.04	-3.03	4.88		8.00		Pass
HT20	MCS0	2	11	2462	-5.93	-7.16	-2.92	4.88		8.00		Pass
HT40	MCS0	2	3	2422	-10.01	-9.86	-6.85	4.88		8.00		Pass
HT40	MCS0	2	6	2437	-8.42	-9.86	-5.41	4.88		8.00		Pass
HT40	MCS0	2	9	2452	-9.87	-11.55	-6.86	4.88		8.00		Pass

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



Appendix B. 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		(MHz)	(dBμV/m)	(dB)	(dBμV/m)	(dBμV)	(dB/m)	(dB)	(dB)	(cm)	(deg)	(P/A)	(H/V)
802.11b CH 01 2412MHz		2389.905	58.4	-15.6	74	54.28	27.7	4.78	28.36	206	9	P	H
		2389.905	53.51	-0.49	54	49.39	27.7	4.78	28.36	206	9	A	H
	*	2412	109.53	-	-	105.42	27.69	4.78	28.36	206	9	P	H
	*	2412	106.67	-	-	102.56	27.69	4.78	28.36	206	9	A	H
		2388.75	57.69	-16.31	74	53.69	27.7	4.78	28.48	359	291	P	V
		2389.8	46.22	-7.78	54	42.1	27.7	4.78	28.36	359	291	A	V
	*	2412	102.21	-	-	98.1	27.69	4.78	28.36	359	291	P	V
	*	2412	99.2	-	-	95.09	27.69	4.78	28.36	359	291	A	V
802.11b CH 06 2437MHz		2388.68	53.42	-20.58	74	49.42	27.7	4.78	28.48	197	6	P	H
		2388.54	47.75	-6.25	54	43.75	27.7	4.78	28.48	197	6	A	H
	*	2437	111.85	-	-	107.61	27.66	4.82	28.24	197	6	P	H
	*	2437	108.64	-	-	104.4	27.66	4.82	28.24	197	6	A	H
		2483.5	58.15	-15.85	74	53.68	27.63	4.85	28.01	197	6	P	H
		2485.79	52.99	-1.01	54	48.52	27.63	4.85	28.01	197	6	A	H
		2388.12	49.88	-24.12	74	45.88	27.7	4.78	28.48	319	263	P	V
		2388.68	44.18	-9.82	54	40.18	27.7	4.78	28.48	319	263	A	V
	*	2437	106.36	-	-	102.12	27.66	4.82	28.24	319	263	P	V
	*	2437	103.3	-	-	99.06	27.66	4.82	28.24	319	263	A	V
		2483.55	52.66	-21.34	74	48.19	27.63	4.85	28.01	319	263	P	V
		2485.65	48.01	-5.99	54	43.54	27.63	4.85	28.01	319	263	A	V



802.11b CH 11 2462MHz	*	2462	108.82	-	-	104.49	27.64	4.82	28.13	197	5	P	H
	*	2462	105.95	-	-	101.62	27.64	4.82	28.13	197	5	A	H
		2487.76	56.88	-17.12	74	52.43	27.61	4.85	28.01	197	5	P	H
		2488	53.44	-0.56	54	48.99	27.61	4.85	28.01	197	5	A	H
	*	2462	103.93	-	-	99.6	27.64	4.82	28.13	314	264	P	V
	*	2462	100.79	-	-	96.46	27.64	4.82	28.13	314	264	A	V
		2485.12	52.97	-21.03	74	48.5	27.63	4.85	28.01	314	264	P	V
		2487.8	45.54	-8.46	54	41.09	27.61	4.85	28.01	314	264	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)	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	50.68	-23.32	74	71.56	31.76	5.55	58.19	141	214	P	H
		4824	45.63	-28.37	74	66.51	31.76	5.55	58.19	152	260	P	V
802.11b CH 06 2437MHz		4874	42.92	-31.08	74	63.49	31.88	5.65	58.1	114	148	P	H
		7311	44.66	-29.34	74	58.44	36.88	7.26	57.92	189	238	P	H
		4874	39.13	-34.87	74	59.7	31.88	5.65	58.1	114	148	P	V
		7311	45.08	-28.92	74	58.86	36.88	7.26	57.92	189	238	P	V
802.11b CH 11 2462MHz		4924	38.13	-35.87	74	58.29	32	5.86	58.02	185	287	P	H
		7386	44.5	-29.5	74	57.74	37.21	7.2	57.65	189	238	P	H
		4924	38.3	-35.7	74	58.73	31.73	5.86	58.02	185	287	P	V
		7386	42.71	-31.29	74	56.88	36.28	7.2	57.65	189	238	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)	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		2389.485	57.64	-16.36	74	53.64	27.7	4.78	28.48	119	14	P	H
		2389.8	46.07	-7.93	54	41.95	27.7	4.78	28.36	119	14	A	H
	*	2412	112.66	-	-	108.55	27.69	4.78	28.36	119	14	P	H
	*	2412	102.73	-	-	98.62	27.69	4.78	28.36	119	14	A	H
		2389.59	51.86	-22.14	74	47.86	27.7	4.78	28.48	354	255	P	V
		2389.8	42.36	-11.64	54	38.24	27.7	4.78	28.36	354	255	A	V
	*	2412	106.48	-	-	102.37	27.69	4.78	28.36	354	255	P	V
	*	2412	98.76	-	-	94.65	27.69	4.78	28.36	354	255	A	V
802.11g CH 06 2437MHz		2389.52	49.48	-24.52	74	45.48	27.7	4.78	28.48	119	14	P	H
		2389.94	40.21	-13.79	54	36.09	27.7	4.78	28.36	119	14	A	H
	*	2437	112.61	-	-	108.37	27.66	4.82	28.24	119	14	P	H
	*	2437	103.64	-	-	99.4	27.66	4.82	28.24	119	14	A	H
		2484.6	54.82	-19.18	74	50.35	27.63	4.85	28.01	119	14	P	H
		2484.39	43.29	-10.71	54	38.82	27.63	4.85	28.01	119	14	A	H
		2389.38	48.33	-25.67	74	44.33	27.7	4.78	28.48	358	258	P	V
		2389.1	37.96	-16.04	54	33.96	27.7	4.78	28.48	358	258	A	V
	*	2437	106.61	-	-	102.37	27.66	4.82	28.24	358	258	P	V
	*	2437	98.87	-	-	94.63	27.66	4.82	28.24	358	258	A	V
		2487.47	49.48	-24.52	74	45.01	27.63	4.85	28.01	358	258	P	V
		2483.97	40.08	-13.92	54	35.61	27.63	4.85	28.01	358	258	A	V



802.11g CH 11 2462MHz	*	2462	112.02	-	-	107.69	27.64	4.82	28.13	119	13	P	H
	*	2462	103.78	-	-	99.45	27.64	4.82	28.13	119	13	A	H
		2484.12	65.62	-8.38	74	61.15	27.63	4.85	28.01	119	13	P	H
		2483.64	52.78	-1.22	54	48.31	27.63	4.85	28.01	119	13	A	H
	*	2462	105.44	-	-	101.11	27.64	4.82	28.13	362	265	P	V
	*	2462	97.53	-	-	93.2	27.64	4.82	28.13	362	265	A	V
		2483.72	61.87	-12.13	74	57.4	27.63	4.85	28.01	362	265	P	V
		2483.72	45.48	-8.52	54	41.01	27.63	4.85	28.01	362	265	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	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	45.66	-28.34	74	66.54	31.76	5.55	58.19	140	214	P	H
		4824	41.97	-32.03	74	62.85	31.76	5.55	58.19	152	36	P	V
802.11g CH 06 2437MHz		4874	38.21	-35.79	74	58.78	31.88	5.65	58.1	114	148	P	H
		7311	44.14	-29.86	74	57.92	36.88	7.26	57.92	189	238	P	H
		4874	39.36	-34.64	74	60.2	31.61	5.65	58.1	157	148	P	V
		7311	42.83	-31.17	74	57.32	36.17	7.26	57.92	189	201	P	V
802.11g CH 11 2462MHz		4924	38.79	-35.21	74	58.95	32	5.86	58.02	185	287	P	H
		7386	45.34	-28.66	74	58.58	37.21	7.2	57.65	189	238	P	H
		4924	38.29	-35.71	74	58.45	32	5.86	58.02	158	325	P	V
		7386	45.25	-28.75	74	58.49	37.21	7.2	57.65	189	258	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)
802.11n HT20 CH 01 2412MHz		2389.275	67.86	-6.14	74	63.86	27.7	4.78	28.48	204	4	P	H
		2389.695	53.52	-0.48	54	49.52	27.7	4.78	28.48	204	4	A	H
	*	2412	112.92	-	-	108.81	27.69	4.78	28.36	204	4	P	H
	*	2412	105.04	-	-	100.93	27.69	4.78	28.36	204	4	A	H
		2388.33	57.35	-16.65	74	53.35	27.7	4.78	28.48	324	262	P	V
		2389.695	43.96	-10.04	54	39.96	27.7	4.78	28.48	324	262	A	V
	*	2412	104.74	-	-	100.63	27.69	4.78	28.36	324	262	P	V
	*	2412	96.89	-	-	92.78	27.69	4.78	28.36	324	262	A	V
802.11n HT20 CH 06 2437MHz		2389.94	63.17	-10.83	74	59.05	27.7	4.78	28.36	195	0	P	H
		2389.94	47.18	-6.82	54	43.06	27.7	4.78	28.36	195	0	A	H
	*	2437	116.45	-	-	112.21	27.66	4.82	28.24	195	0	P	H
	*	2437	108.96	-	-	104.72	27.66	4.82	28.24	195	0	A	H
		2485.79	62.9	-11.1	74	58.43	27.63	4.85	28.01	195	0	P	H
		2483.5	47.76	-6.24	54	43.29	27.63	4.85	28.01	195	0	A	H
		2389.52	49.5	-24.5	74	45.5	27.7	4.78	28.48	316	263	P	V
		2389.94	39.74	-14.26	54	35.62	27.7	4.78	28.36	316	263	A	V
	*	2437	107.58	-	-	103.34	27.66	4.82	28.24	316	263	P	V
	*	2437	99.65	-	-	95.41	27.66	4.82	28.24	316	263	A	V
		2485.37	54.16	-19.84	74	49.69	27.63	4.85	28.01	316	263	P	V
		2483.76	40.74	-13.26	54	36.27	27.63	4.85	28.01	316	263	A	V



802.11n HT20 CH 11 2462MHz	*	2462	112.9	-	-	108.57	27.64	4.82	28.13	123	42	P	H
	*	2462	104.4	-	-	100.07	27.64	4.82	28.13	123	42	A	H
		2483.52	67.35	-6.65	74	62.88	27.63	4.85	28.01	123	42	P	H
		2483.52	53.64	-0.36	54	49.17	27.63	4.85	28.01	123	42	A	H
	*	2462	105.77	-	-	101.44	27.64	4.82	28.13	315	266	P	V
	*	2462	98.22	-	-	93.89	27.64	4.82	28.13	315	266	A	V
		2484.52	65.37	-8.63	74	60.9	27.63	4.85	28.01	315	266	P	V
		2483.52	52.08	-1.92	54	47.61	27.63	4.85	28.01	315	266	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	41	-33	74	61.88	31.76	5.55	58.19	147	36	P	H
		4824	40.13	-33.87	74	61.01	31.76	5.55	58.19	158	320	P	V
802.11n HT20 CH 06 2437MHz		4874	39.45	-34.55	74	60.02	31.88	5.65	58.1	114	148	P	H
		7311	44.25	-29.75	74	58.03	36.88	7.26	57.92	189	238	P	H
		4874	39.34	-34.66	74	59.91	31.88	5.65	58.1	217	201	P	V
		7311	44.41	-29.59	74	58.19	36.88	7.26	57.92	100	140	P	V
		7386	45.43	-28.57	74	58.67	37.21	7.2	57.65	189	238	P	H
		4924	38.15	-35.85	74	58.31	32	5.86	58.02	150	269	P	V
		7386	44.54	-29.46	74	57.78	37.21	7.2	57.65	189	238	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		2387.42	61.75	-12.25	74	57.75	27.7	4.78	28.48	200	0	P	H
		2389.8	53.58	-0.42	54	49.46	27.7	4.78	28.36	200	0	A	H
	*	2422	111.87	-	-	107.66	27.67	4.78	28.24	200	0	P	H
	*	2422	104.13	-	-	99.92	27.67	4.78	28.24	200	0	A	H
		2486.14	53.14	-20.86	74	48.67	27.63	4.85	28.01	200	0	P	H
		2483.5	44.45	-9.55	54	39.98	27.63	4.85	28.01	200	0	A	H
		2389.1	53.58	-20.42	74	49.58	27.7	4.78	28.48	313	265	P	V
		2388.54	42.31	-11.69	54	38.31	27.7	4.78	28.48	313	265	A	V
	*	2422	102.39	-	-	98.14	27.67	4.82	28.24	313	265	P	V
	*	2422	94.55	-	-	90.3	27.67	4.82	28.24	313	265	A	V
		2487.05	48.58	-25.42	74	44.11	27.63	4.85	28.01	313	265	P	V
		2484.67	39.11	-14.89	54	34.64	27.63	4.85	28.01	313	265	A	V
802.11n HT40 CH 06 2437MHz		2388.68	64.3	-9.7	74	60.3	27.7	4.78	28.48	194	0	P	H
		2389.8	52.93	-1.07	54	48.81	27.7	4.78	28.36	194	0	A	H
	*	2437	113.47	-	-	109.23	27.66	4.82	28.24	194	0	P	H
	*	2437	105.58	-	-	101.34	27.66	4.82	28.24	194	0	A	H
		2483.5	64.42	-9.58	74	59.95	27.63	4.85	28.01	194	0	P	H
		2483.55	53.64	-0.36	54	49.17	27.63	4.85	28.01	194	0	A	H
		2389.66	51.58	-22.42	74	47.58	27.7	4.78	28.48	314	262	P	V
		2389.66	41.85	-12.15	54	37.85	27.7	4.78	28.48	314	262	A	V
	*	2437	103.43	-	-	99.19	27.66	4.82	28.24	314	262	P	V
	*	2437	95.79	-	-	91.55	27.66	4.82	28.24	314	262	A	V
		2483.62	57.07	-16.93	74	52.6	27.63	4.85	28.01	314	262	P	V
		2483.55	45.17	-8.83	54	40.7	27.63	4.85	28.01	314	262	A	V



802.11n HT40 CH 09 2452MHz		2387.98	50.7	-23.3	74	46.7	27.7	4.78	28.48	192	0	P	H
		2389.94	40.8	-13.2	54	36.68	27.7	4.78	28.36	192	0	A	H
	*	2452	108.64	-	-	104.29	27.66	4.82	28.13	192	0	P	H
	*	2452	101.16	-	-	96.81	27.66	4.82	28.13	192	0	A	H
		2483.62	62.57	-11.43	74	58.1	27.63	4.85	28.01	192	0	P	H
		2483.5	53.68	-0.32	54	49.21	27.63	4.85	28.01	192	0	A	H
		2334.22	46.18	-27.82	74	42.45	27.77	4.66	28.7	380	252	P	V
		2389.66	36.44	-17.56	54	32.44	27.7	4.78	28.48	380	252	A	V
	*	2452	101.09	-	-	96.74	27.66	4.82	28.13	380	252	P	V
	*	2452	92.77	-	-	88.42	27.66	4.82	28.13	380	252	A	V
		2485.44	57.79	-16.21	74	53.32	27.63	4.85	28.01	380	252	P	V
		2483.55	46.3	-7.7	54	41.83	27.63	4.85	28.01	380	252	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	38.61	-35.39	74	59.32	31.8	5.65	58.16	100	254	P	H
HT40		7266	44.64	-29.36	74	58.63	36.75	7.29	58.03	200	214	P	H
CH 03		4844	37.7	-36.3	74	58.68	31.53	5.65	58.16	114	148	P	V
2422MHz		7266	44.06	-29.94	74	58.67	36.13	7.29	58.03	189	238	P	V
802.11n		4874	39.39	-34.61	74	59.96	31.88	5.65	58.1	114	148	P	H
HT40		7311	44.05	-29.95	74	57.83	36.88	7.26	57.92	189	238	P	H
CH 06		4874	38	-36	74	58.84	31.61	5.65	58.1	114	148	P	V
2437MHz		7311	43.1	-30.9	74	57.59	36.17	7.26	57.92	189	238	P	V
802.11n		4904	38.67	-35.33	74	58.99	31.96	5.76	58.04	152	149	P	H
HT40		7356	43.81	-30.19	74	57.26	37.08	7.23	57.76	180	225	P	H
CH 09		4904	37.31	-36.69	74	57.9	31.69	5.76	58.04	152	149	P	V
2452MHz		7356	43.66	-30.34	74	57.96	36.23	7.23	57.76	180	225	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 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)
2.4GHz 802.11n HT40 LF		30	24.16	-15.84	40	30.98	24.9	0.25	31.97	-	-	P	H
		206.54	38.3	-5.2	43.5	52.7	15.3	1.62	31.32	-	-	P	H
		273.47	40.9	-5.1	46	50.88	19.47	1.78	31.23	100	274	P	H
		363.68	38.69	-7.31	46	46.78	21	2.12	31.21	-	-	P	H
		546.04	38.82	-7.18	46	42.7	24.82	2.55	31.25	-	-	P	H
		937.92	40.54	-5.46	46	38.64	29.75	3.45	31.3	-	-	P	H
		30	25.13	-14.87	40	31.95	24.9	0.25	31.97	-	-	P	V
		194.9	27.88	-15.62	43.5	42.43	15.23	1.56	31.34	-	-	P	V
		353.01	37.34	-8.66	46	45.72	20.73	2.1	31.21	-	-	P	V
		460.68	37.66	-8.34	46	43.44	23.17	2.33	31.28	-	-	P	V
		600.36	38.32	-7.68	46	41.09	25.8	2.7	31.27	100	214	P	V
		837.04	34.32	-11.68	46	33.47	28.8	3.23	31.18	-	-	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”.

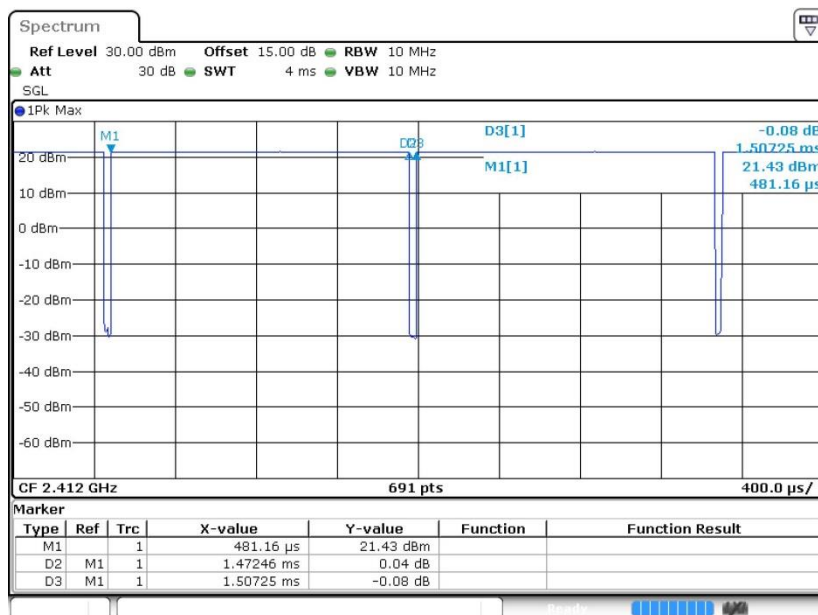


Appendix C. Duty Cycle Plots

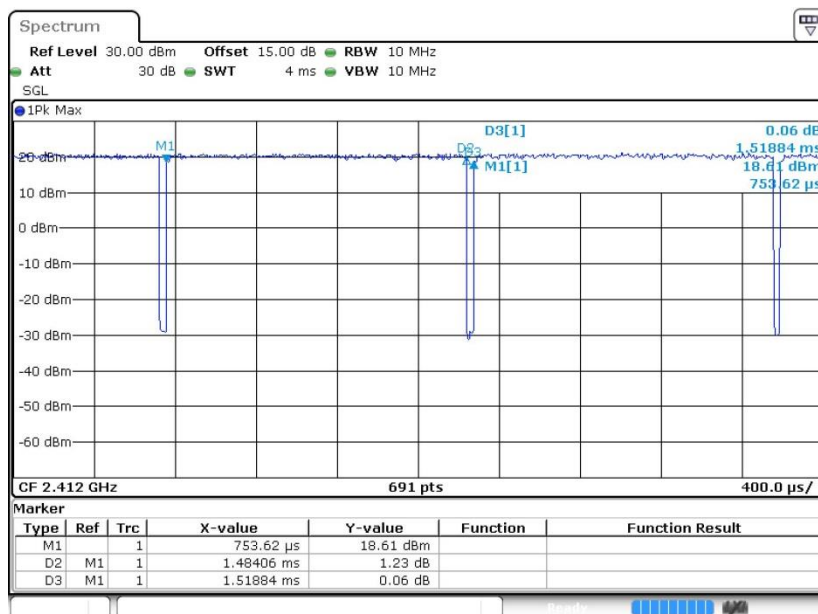
Band	Duty Cycle(%)	T(ms)	1/T(kHz)	VBW Setting
11b ANT1	97.69	1.472	0.679	1kHz
11g ANT1	97.71	1.484	0.674	1kHz
11n HT20 ANT1+2	97.62	1.486	0.673	1kHz
11n HT40 ANT1+2	97.72	1.490	0.671	1kHz



11b ANT1

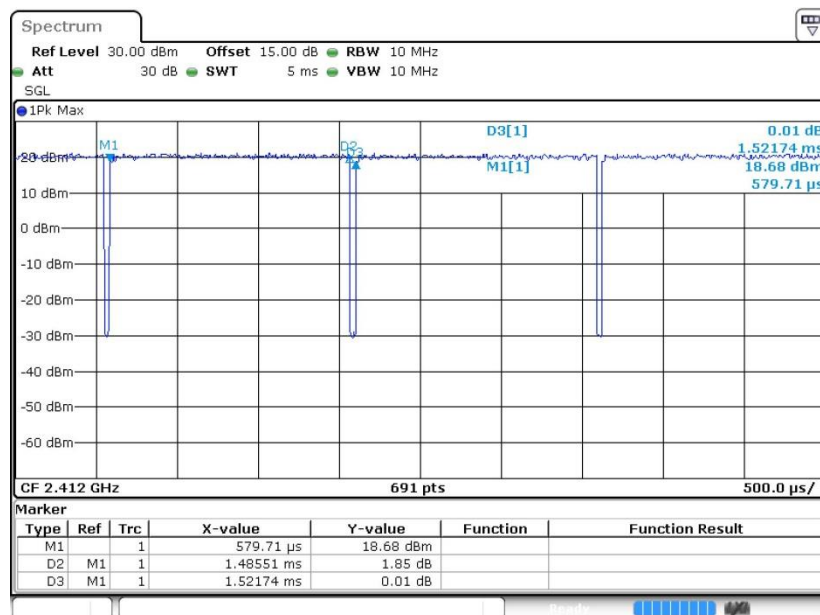


11g ANT1





11n HT20 ANT1+2



11n HT40 ANT1+2

