

7.5. Conducted Band Edge and Out-of-Band Emissions

7.5.1. Test Limit

The limit for out-of-band spurious emissions at the band edge is 20dB below the fundamental emission level, as determined from the in-band power measurement of the DTS channel performed in a 100kHz bandwidth per the PSD procedure (Section 9.1).

7.5.2. Test Procedure Used

KDB 558074 D01v03r02 – Section 11.2 & Section 11.3

7.5.3. Test Setting

1. Reference level measurement

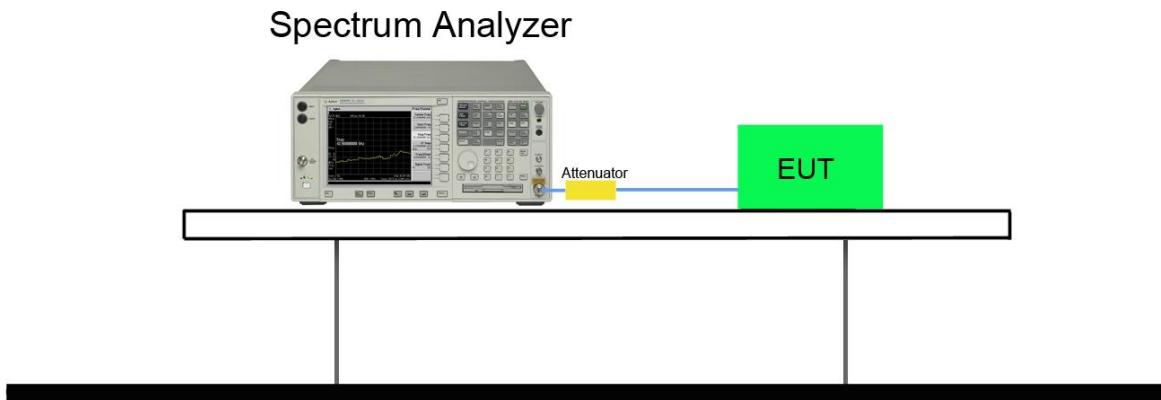
- (a) Set instrument center frequency to DTS channel center frequency
- (b) Set the span to \geq 1.5 times the DTS bandwidth
- (c) Set the RBW = 100 kHz
- (d) Set the VBW \geq 3 x RBW
- (e) Detector = peak
- (f) Sweep time = auto couple
- (g) Trace mode = max hold
- (h) Allow trace to fully stabilize

2. Emission level measurement

- (a) Set the center frequency and span to encompass frequency range to be measured
- (b) RBW = 100kHz
- (c) VBW = 300kHz
- (d) Detector = Peak
- (e) Number of sweep points \geq 2 x Span/RBW
- (f) Trace mode = max hold
- (g) Sweep time = auto couple

(h) The trace was allowed to stabilize

7.5.4. Test Setup



7.5.5. Test Result

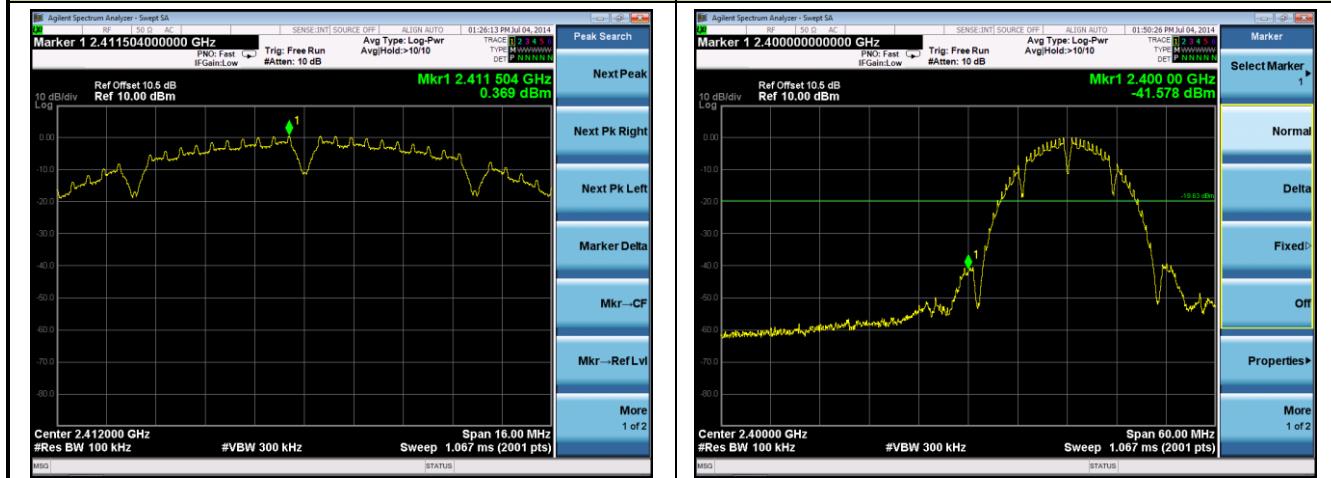
Test Mode	Data Rate (Mbps)	Channel No.	Frequency (MHz)	Limit	Result
802.11b	1	01	2412	20dBc	Pass
802.11b	1	06	2437	20dBc	Pass
802.11b	1	11	2462	20dBc	Pass
802.11g	6	01	2412	20dBc	Pass
802.11g	6	06	2437	20dBc	Pass
802.11g	6	11	2462	20dBc	Pass
802.11n-HT20	6.5	01	2412	20dBc	Pass
802.11n-HT20	6.5	06	2437	20dBc	Pass
802.11n-HT20	6.5	11	2462	20dBc	Pass
802.11n-HT40	13.5	03	2422	20dBc	Pass
802.11n-HT40	13.5	06	2437	20dBc	Pass
802.11n-HT40	13.5	09	2452	20dBc	Pass

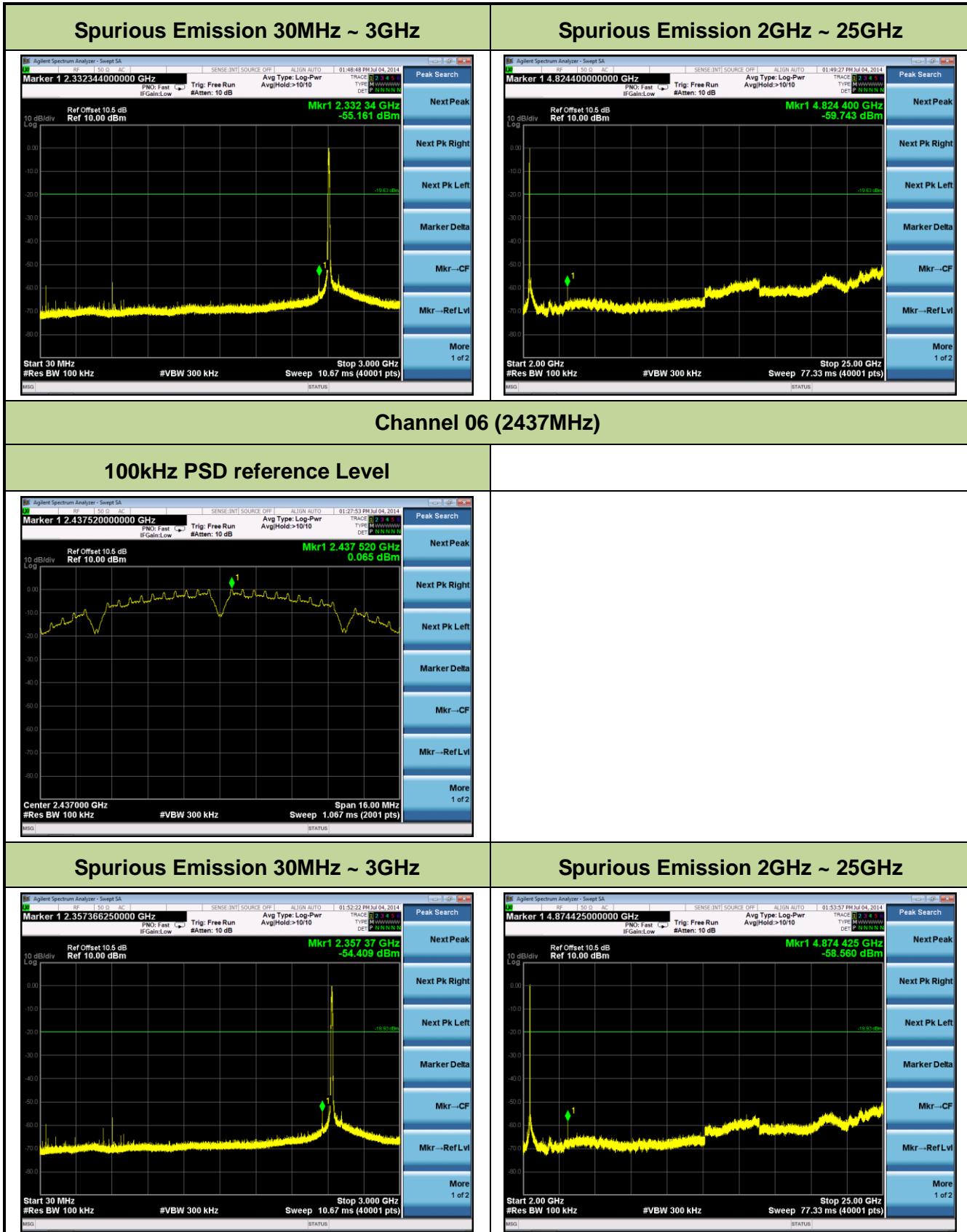
802.11b Out-of-Band Emissions

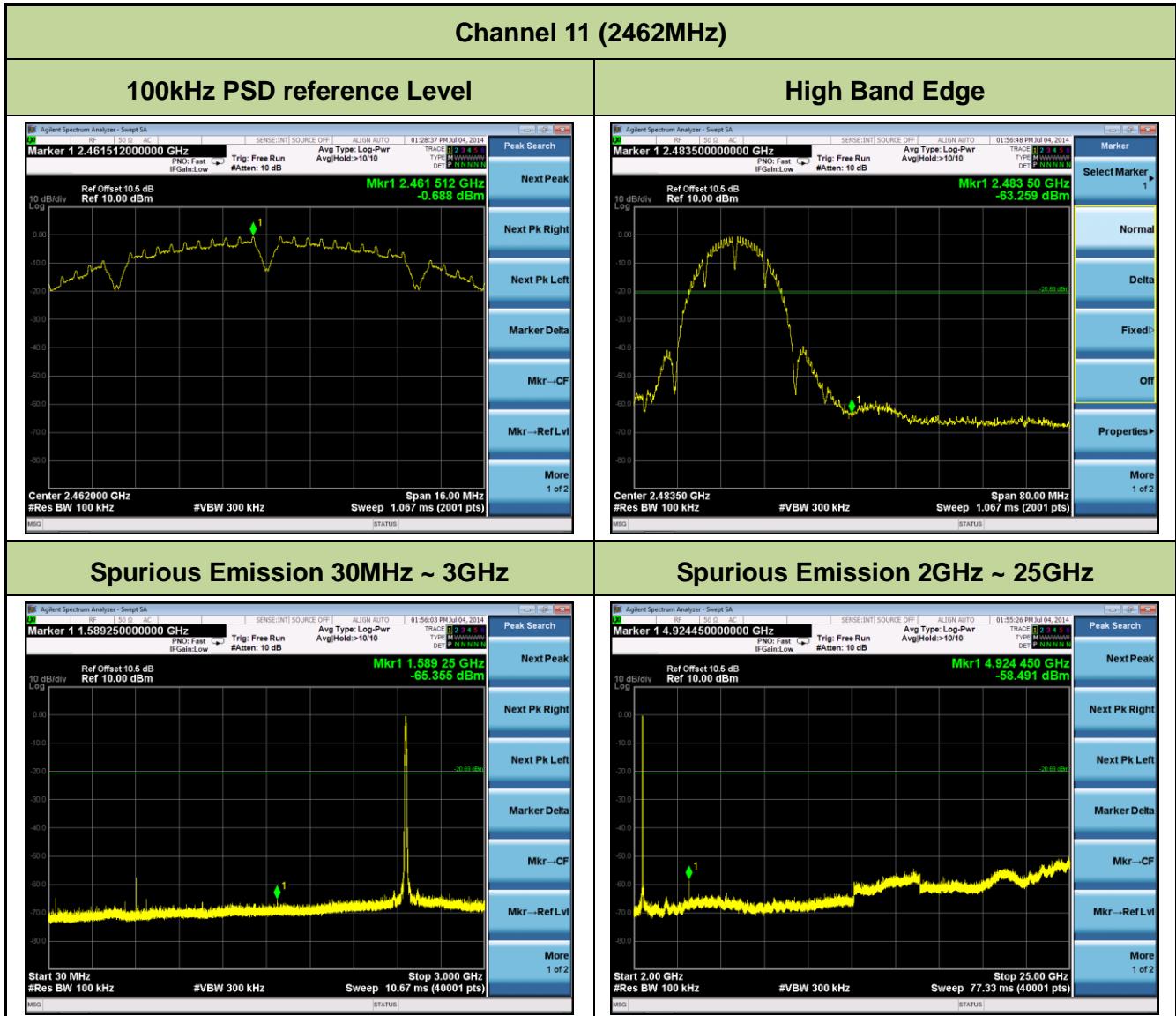
Channel 01 (2412MHz)

100kHz PSD reference Level

Low Band Edge



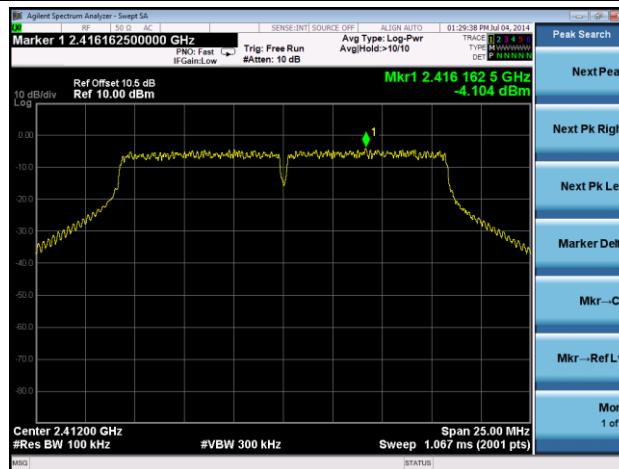




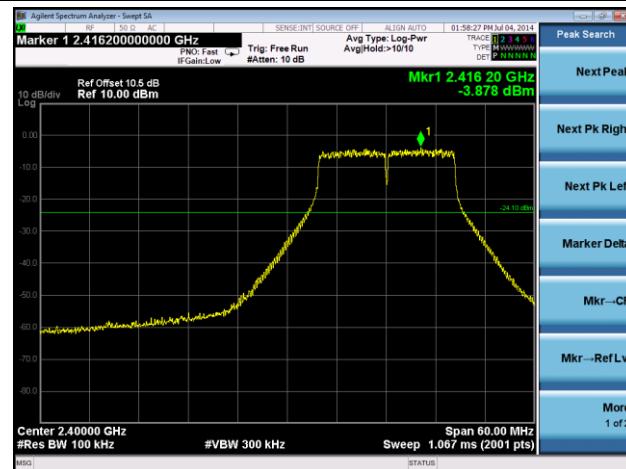
802.11g Out-of-Band Emissions

Channel 01 (2412MHz)

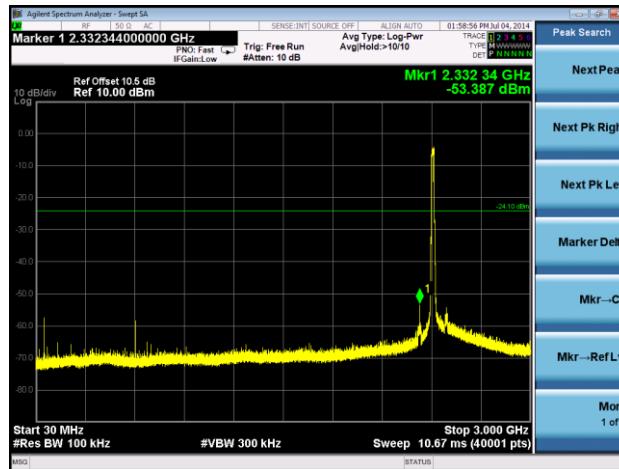
100kHz PSD reference Level



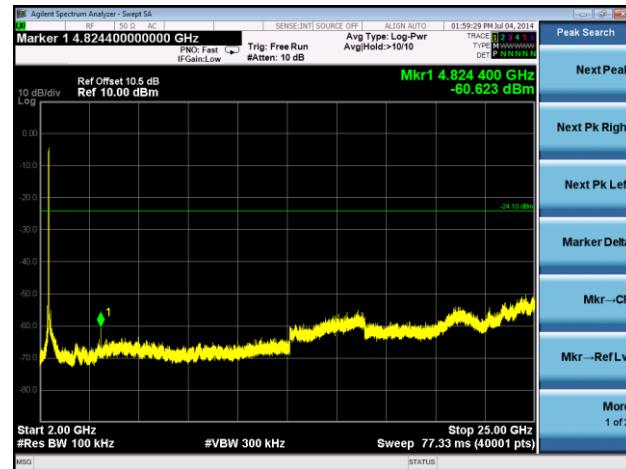
Low Band Edge



Spurious Emission 30MHz ~ 3GHz

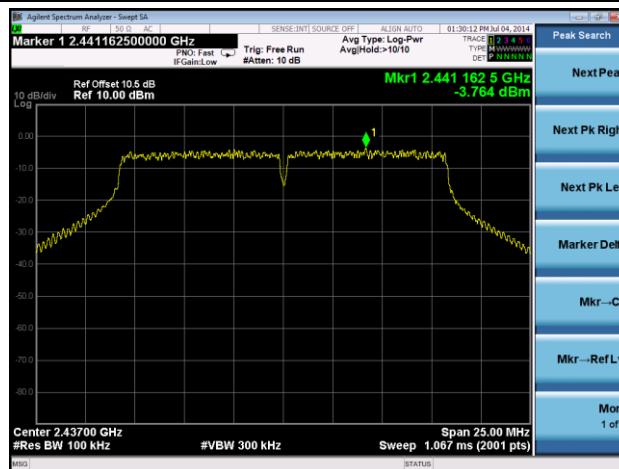


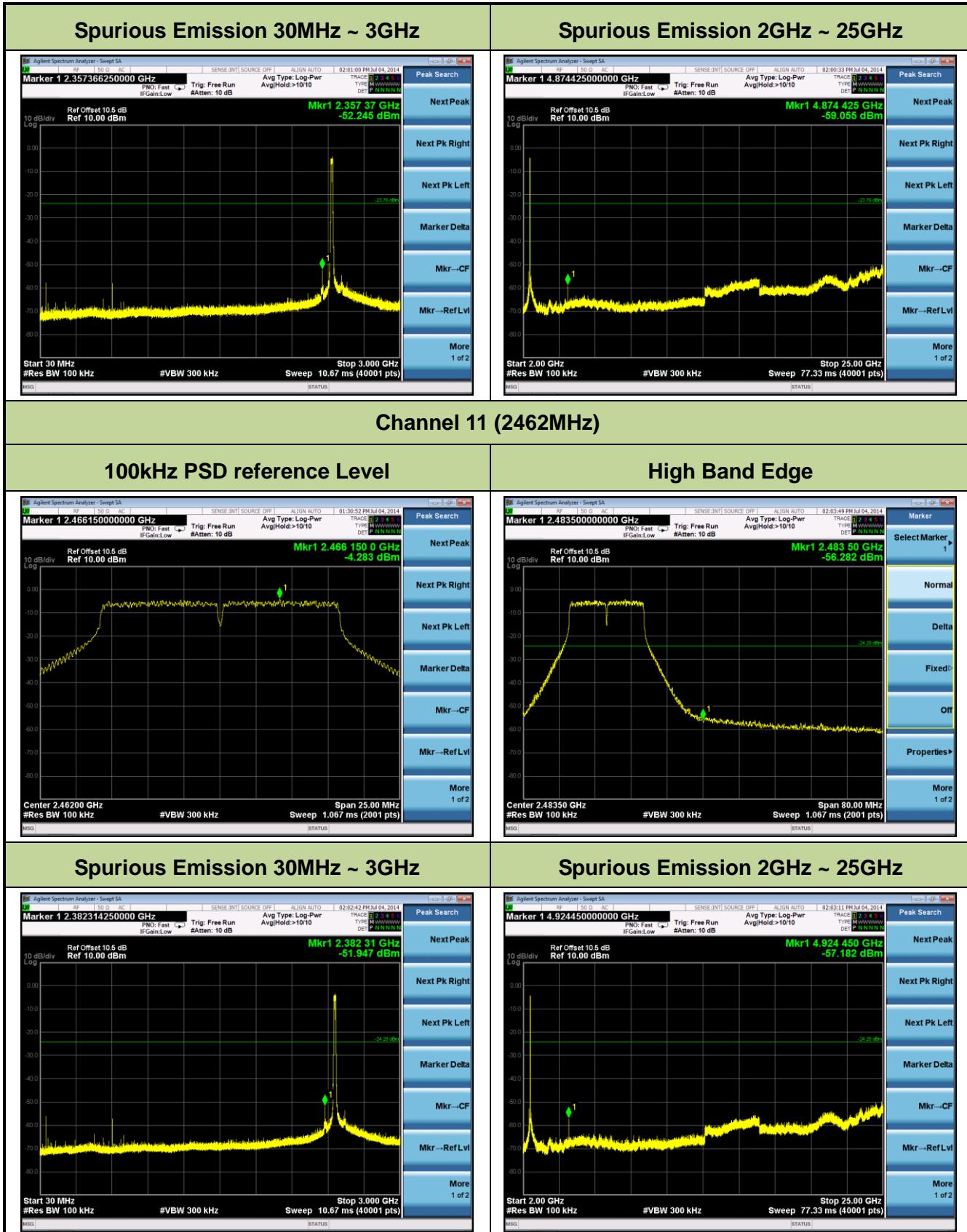
Spurious Emission 2GHz ~ 25GHz

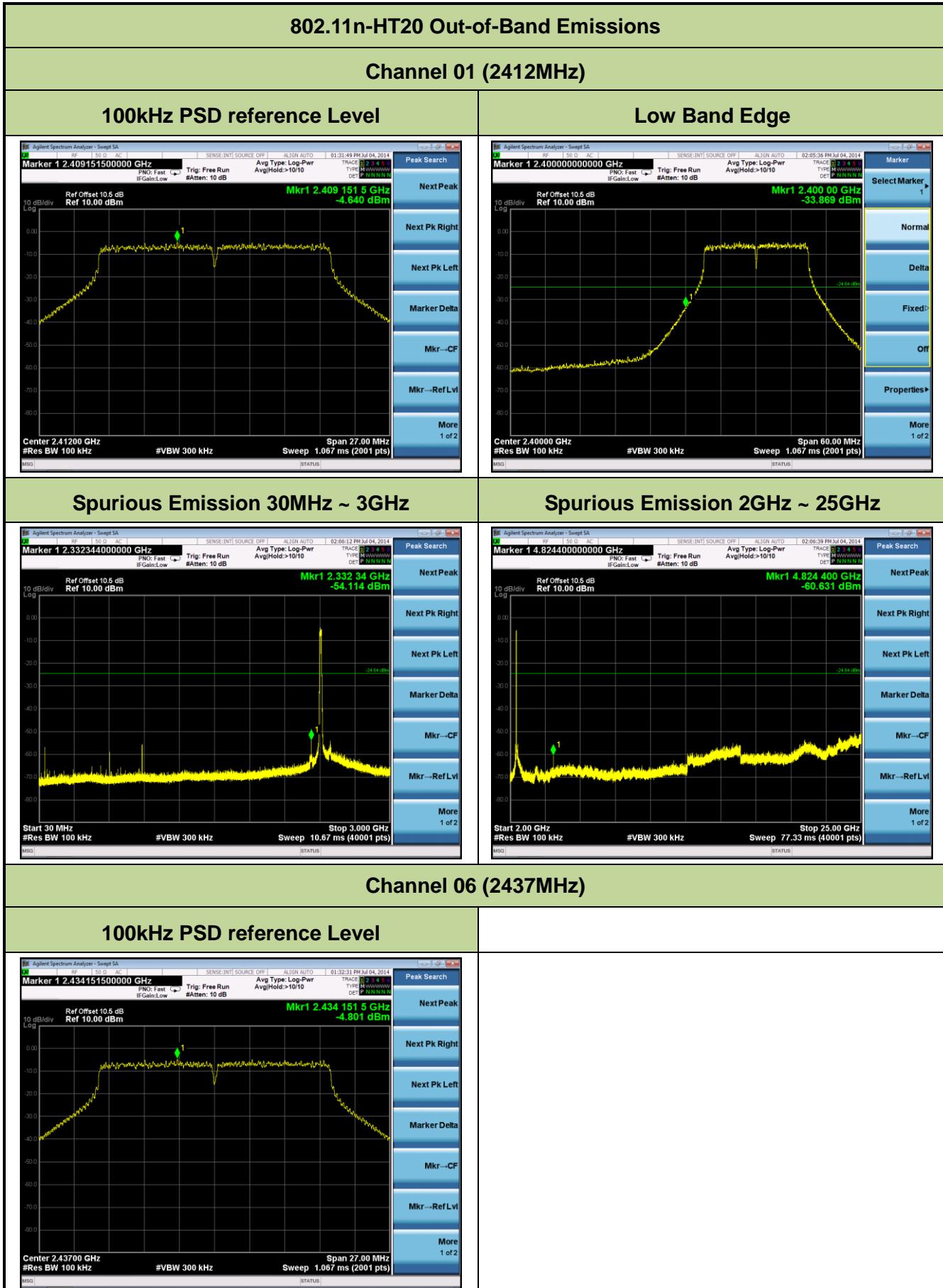


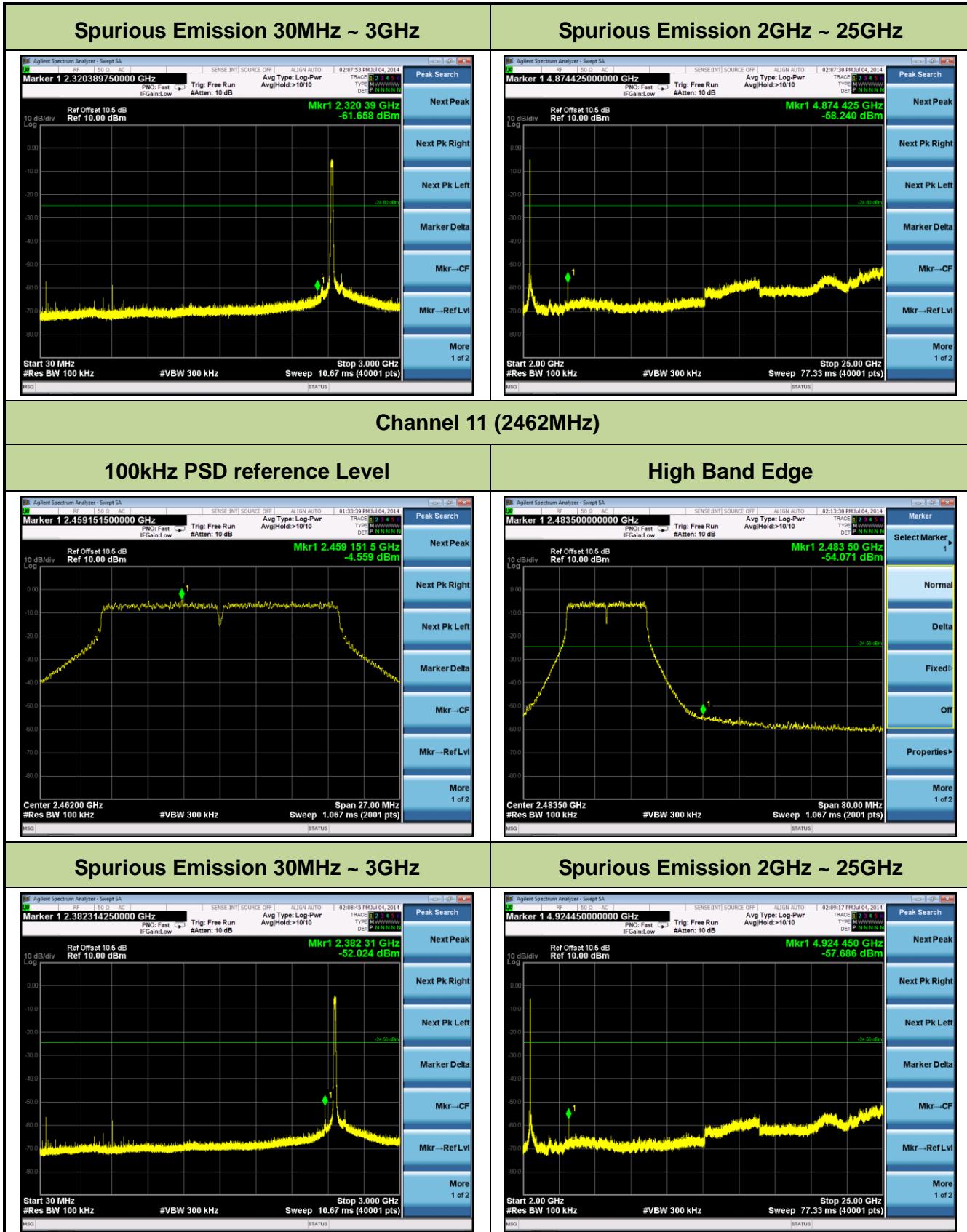
Channel 06 (2437MHz)

100kHz PSD reference Level









802.11n-HT40 Out-of-Band Emissions

Channel 03 (2422MHz)

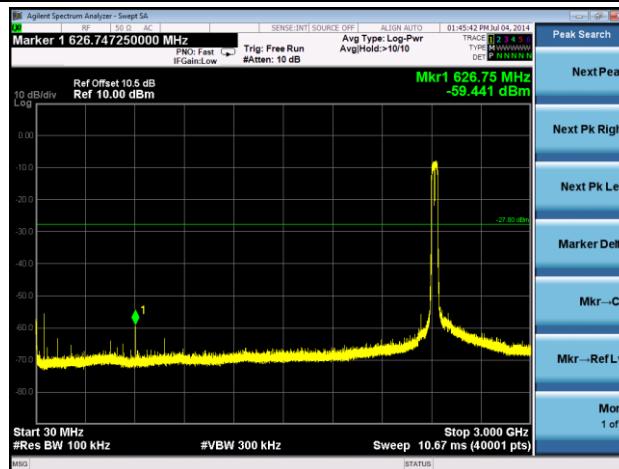
100kHz PSD reference Level



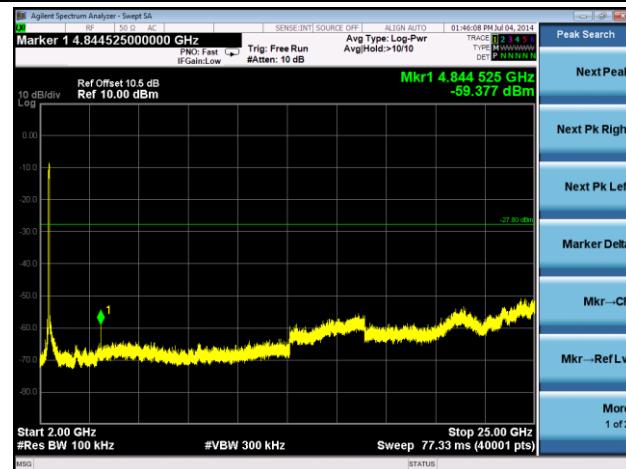
Low Band Edge



Spurious Emission 30MHz ~ 3GHz

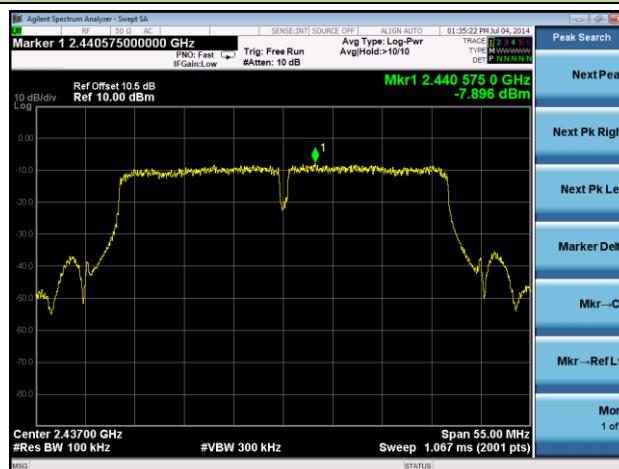


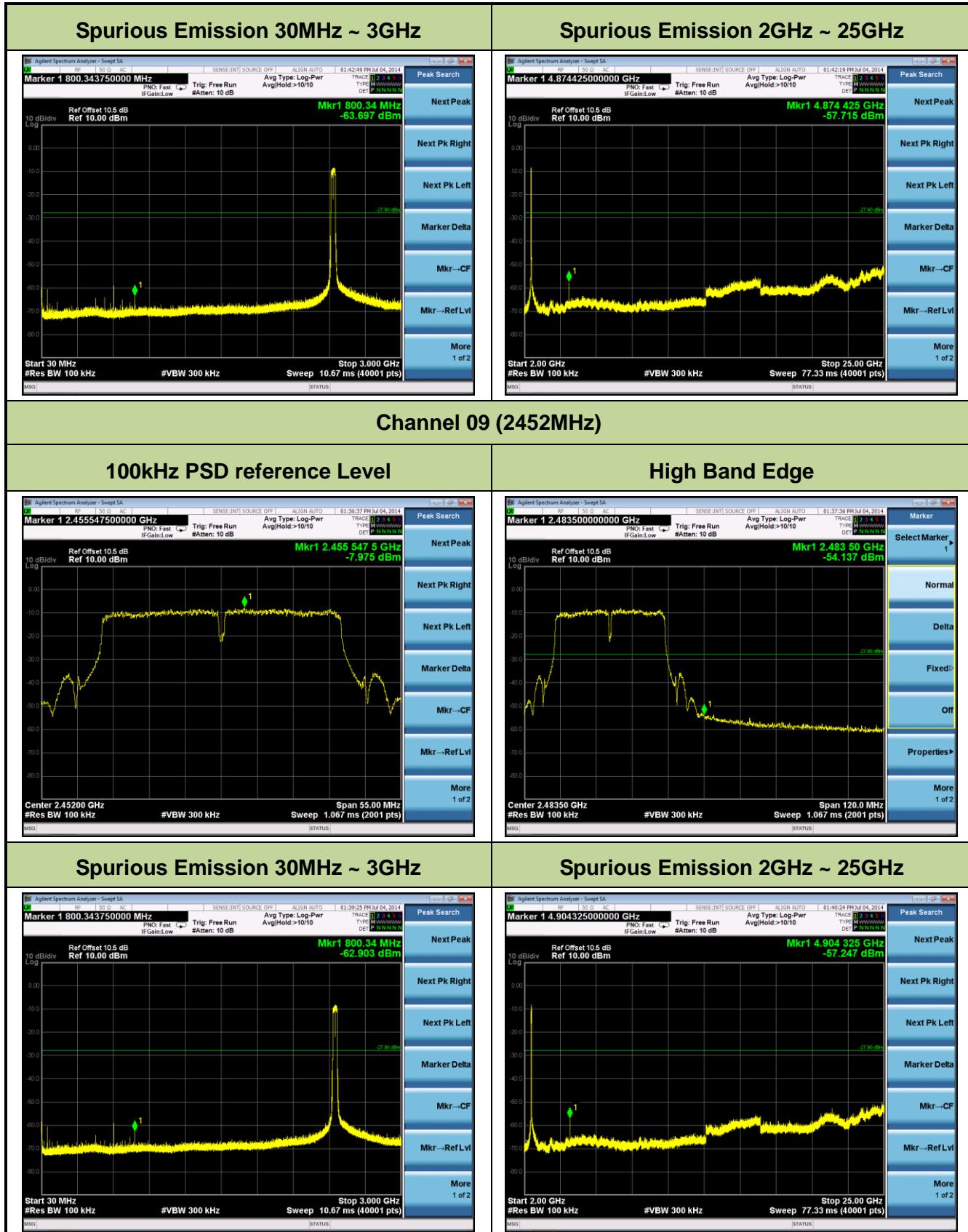
Spurious Emission 2GHz ~ 25GHz



Channel 06 (2437MHz)

100kHz PSD reference Level





7.6. Radiated Spurious Emission Measurement

7.6.1. Test Limit

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47 CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [V/m]	Measured Distance [Meters]
0.009 – 0.490	2400/F (kHz)	300
0.490 – 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

7.6.2. Test Procedure Used

KDB 558074 D01v03r02 – Section 12.2.3 (quasi-peak measurements)

KDB 558074 D01v03r02 – Section 12.2.4 (peak power measurements)

KDB 558074 D01v03r02 – Section 12.2.5 (average power measurements)

7.6.3. Test Setting

Peak Field Strength Measurements per Section 12.2.4 of KDB 558074 D01v03r02

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = as specified in Table 1
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple

6. Trace mode = max hold
7. Trace was allowed to stabilize

Table 1—RBW as a function of frequency

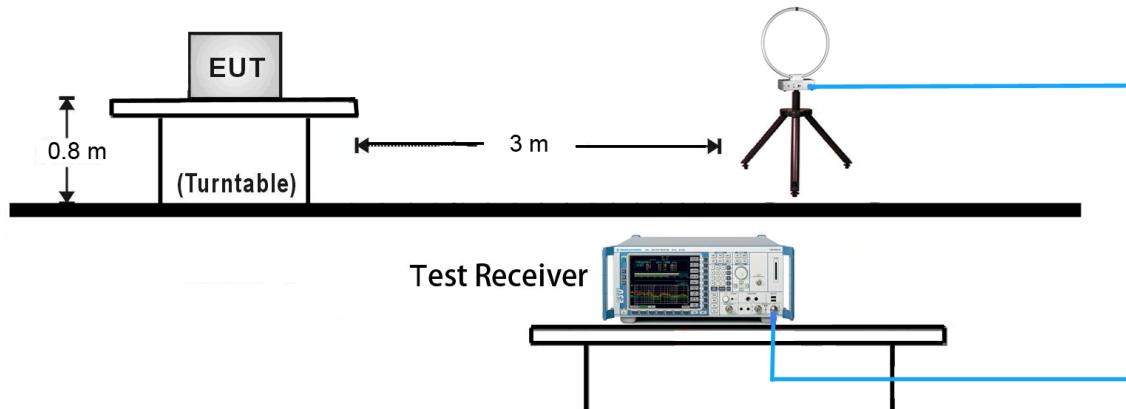
Frequency	RBW
9 ~ 150 kHz	200 ~ 300 Hz
0.15 ~ 30 MHz	9 ~ 10 kHz
30 ~ 1000 MHz	100 ~ 120 kHz
> 1000 MHz	1 MHz

Average Field Strength Measurements per Section 12.2.5.3 of KDB 558074 D01v03r02

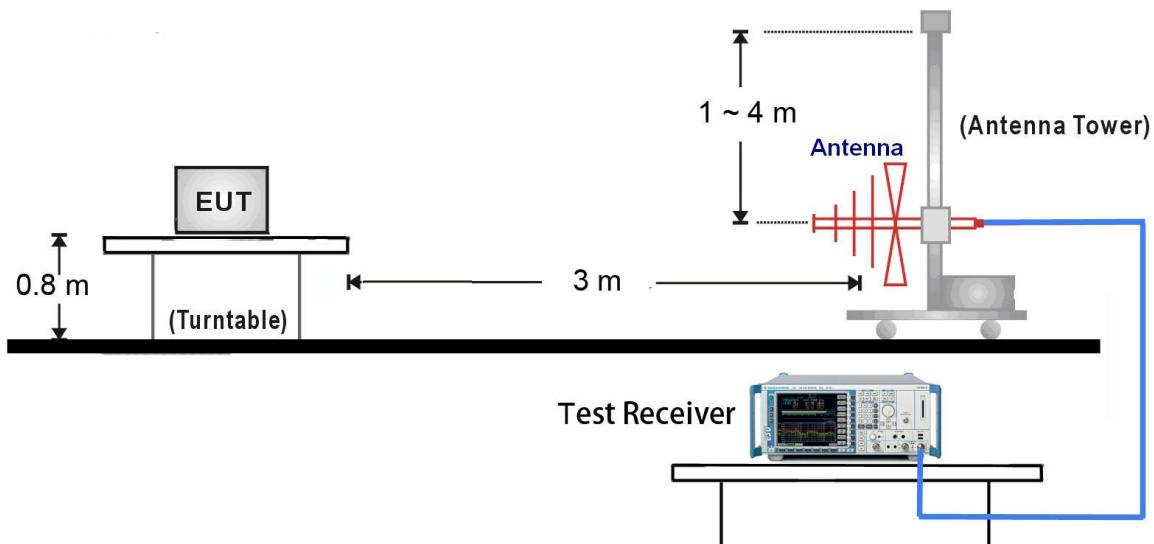
1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW $\geq 1/T$
4. De As an alternative, the instrument may be set to linear detector mode. Ensure that video filtering is applied in linear voltage domain (rather than in a log or dB domain). Some instruments require linear display mode in order to accomplish this. Others have a setting for Average-VBW Type, which can be set to “Voltage” regardless of the display mode
5. Detector = Peak
6. Sweep time = auto
7. Trace mode = max hold
8. Allow max hold to run for at least 50 times (1/duty cycle) traces

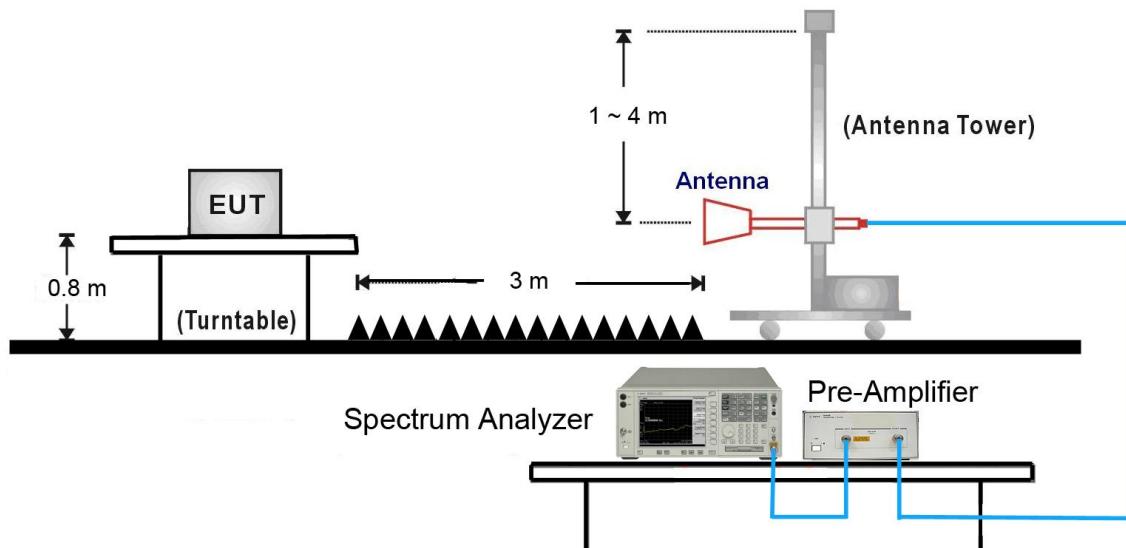
7.6.4. Test Setup

9kHz ~ 30MHz Test Setup:



30MHz ~ 1GHz Test Setup:



1GHz ~ 25GHz Test Setup:

7.6.5. Test Result

Test Mode:	802.11n-HT20	Test Site:	AC1
Test Channel:	11	Test Engineer:	Roy Cheng
Remark:	1. Average measurement was not performed if peak level lower than average limit. 2. The worst case of Radiated Spurious Emission. 3. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report.		

Mark	Frequency (MHz)	Reading Level (dB μ V)	Factor (dB)	Measure Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
*	3442.0	34.8	3.5	38.3	78.2	-39.9	Peak	Horizontal
	4924.0	33.9	6.7	40.7	74.0	-33.3	Peak	Horizontal
*	5206.0	34.7	6.9	41.6	78.2	-36.6	Peak	Horizontal
	7386.0	34.1	14.1	48.2	74.0	-25.8	Peak	Horizontal
*	3442.0	34.9	3.5	38.4	78.2	-39.8	Peak	Vertical
	4924.0	34.8	6.7	41.5	74.0	-32.5	Peak	Vertical
*	5206.0	34.5	6.9	41.4	78.2	-36.8	Peak	Vertical
	7386.0	33.7	14.1	47.8	74.0	-26.2	Peak	Vertical

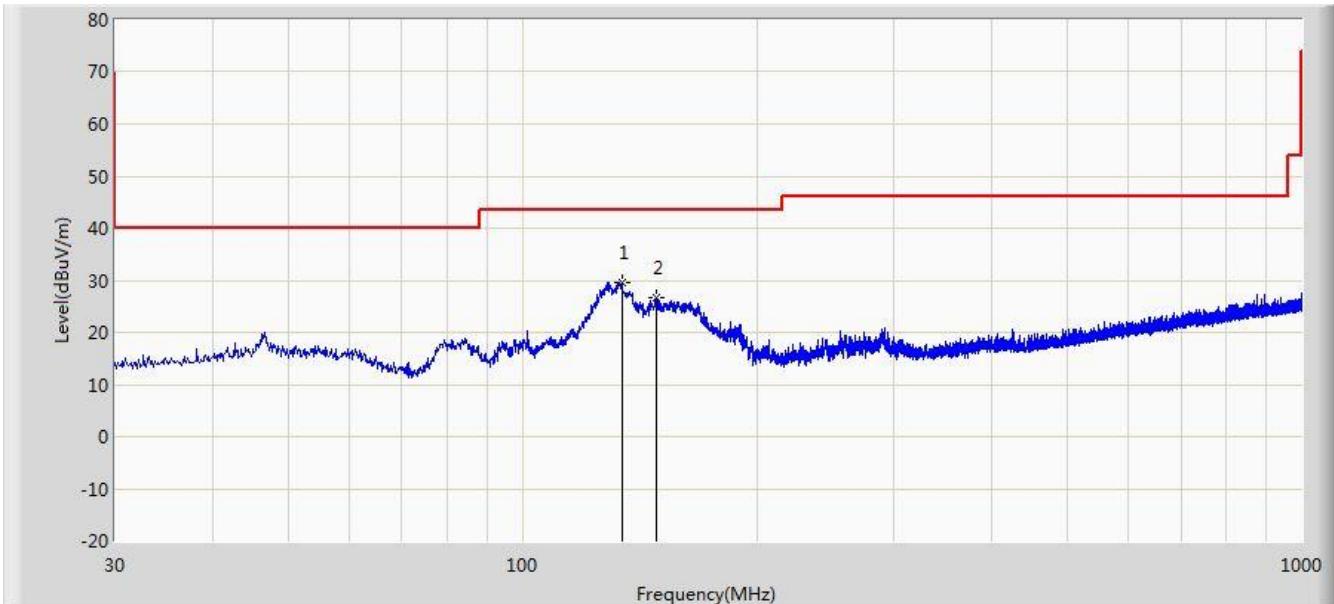
Note 1: “*” is not in restricted band, its limit is 20dBc of the fundamental emission level (98.2dB μ V/m).

Note 2: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m) – Pre_Amplifier Gain (dB)

The worst case of Radiated Emission below 1GHz:

Engineer: Milo Li	
Site: AC1	Time: 2014/07/05 - 16:12
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: VULB9162_0.03-8GHz	Polarity: Horizontal
EUT: Tablet PC	Power: AC 120V/60Hz
Worst Case Mode: 802.11n-HT40 Channel 2437MHz	

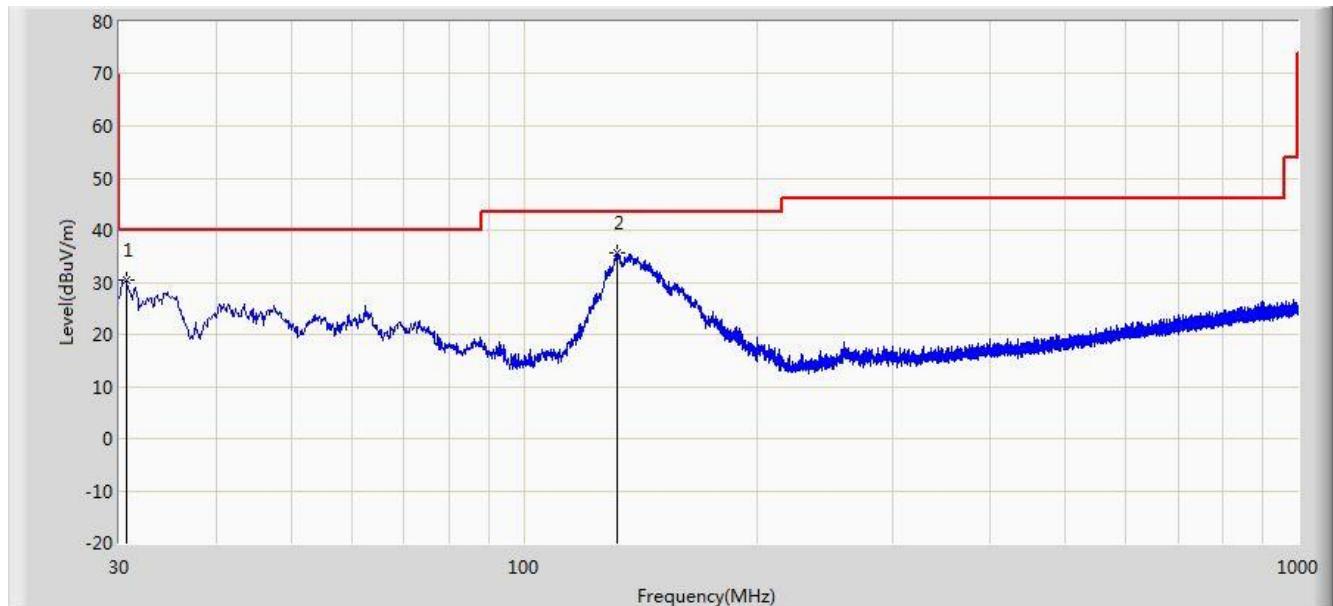


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			134.275	29.423	19.965	-14.077	43.500	9.459	PK
2	*		148.704	26.631	17.474	-16.869	43.500	9.157	PK

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Engineer: Milo Li	
Site: AC1	Time: 2014/07/05 - 16:17
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: VULB9162_0.03-8GHz	Polarity: Vertical
EUT: Tablet PC	Power: AC 120V/60Hz
Worst Case Mode: 802.11n-HT40 Channel 2437MHz	



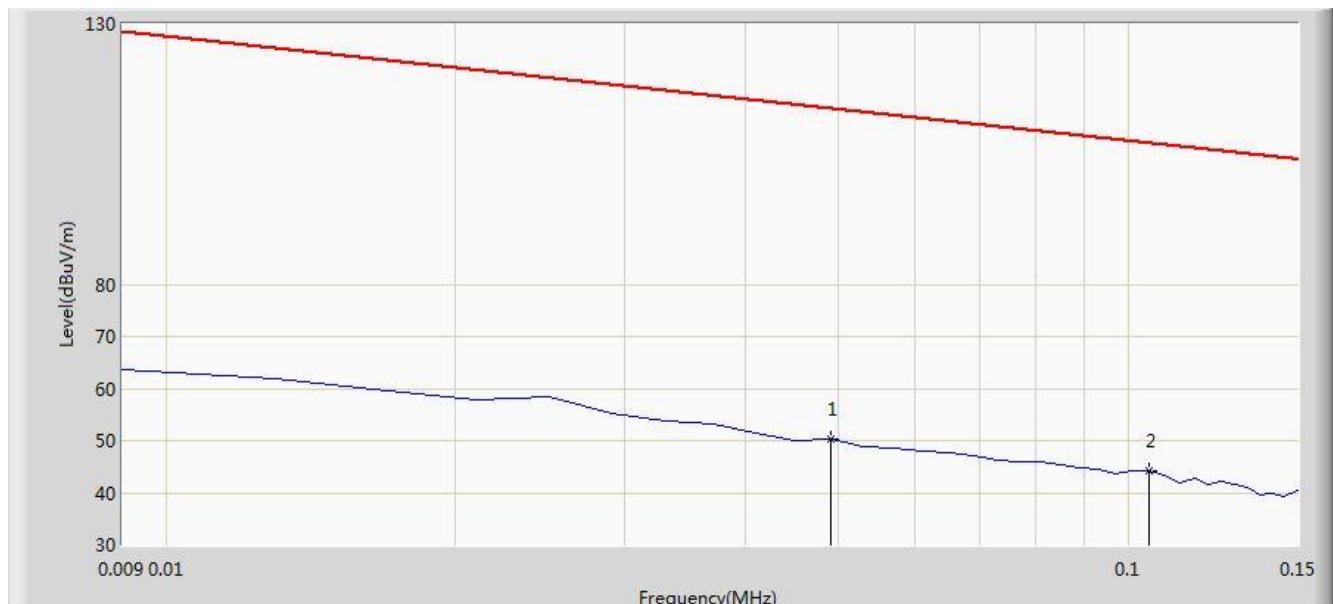
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	30.606	30.375	18.364	-9.625	40.000	12.011	PK
2			131.850	35.533	25.896	-7.967	43.500	9.637	PK

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Engineer: Roy Cheng	
Site: AC1	Time: 2014/07/04 - 16:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: FMZB1519_0.009-30MHz	Polarity: Face On
EUT: Tablet PC	Power: AC 120V/60Hz

Note: There is the ambient noise within frequency range 9kHz~30MHz.



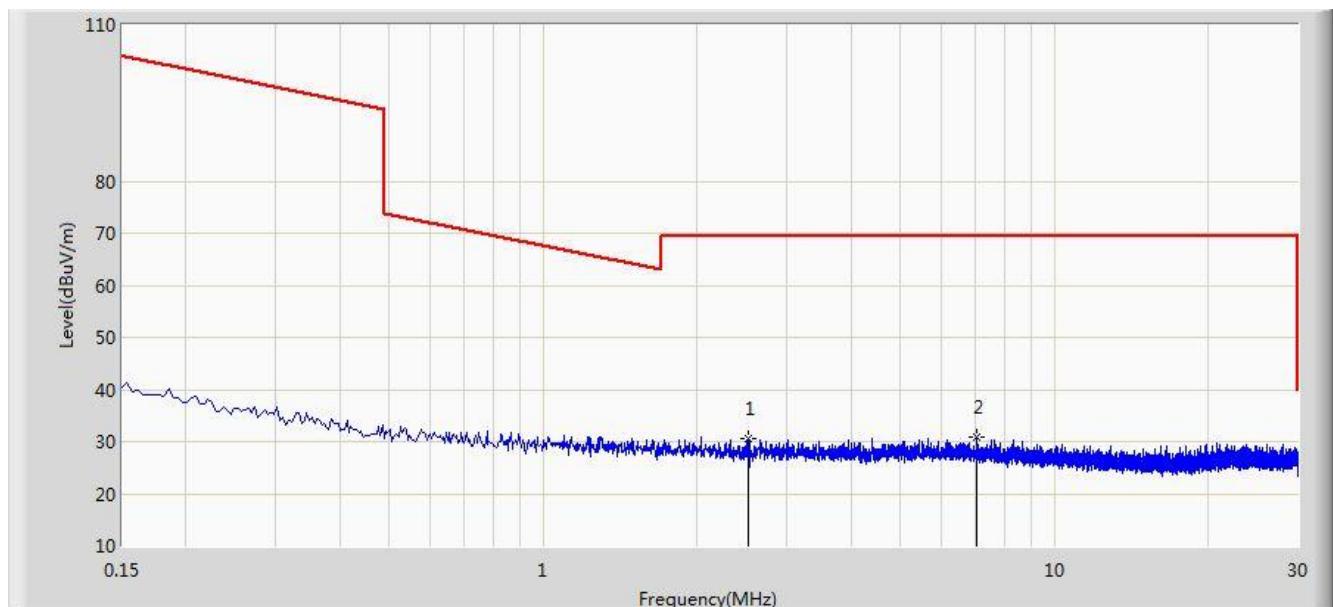
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			0.049	50.367	29.861	-63.422	113.789	20.505	PK
2	*		0.105	44.143	23.996	-63.029	107.173	20.147	PK

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Engineer: Roy Cheng	
Site: AC1	Time: 2014/07/04 - 16:41
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: FMZB1519_0.009-30MHz	Polarity: Face On
EUT: Tablet PC	Power: AC 120V/60Hz

Note: There is the ambient noise within frequency range 9kHz~30MHz.



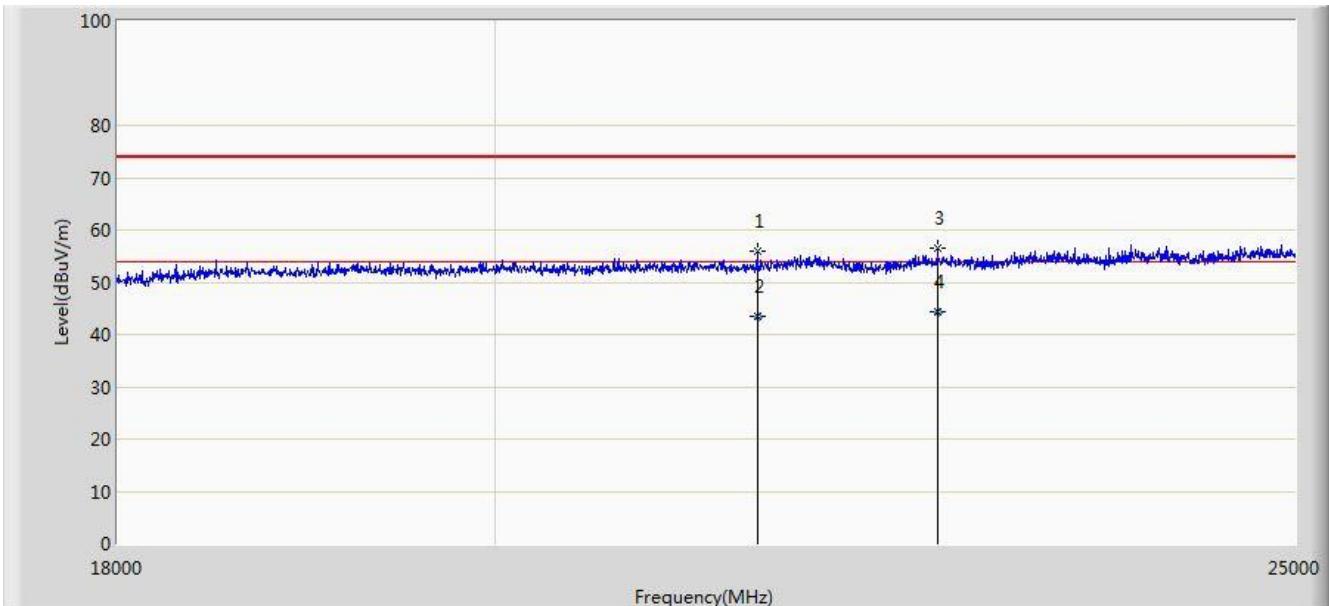
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2.513	30.495	10.336	-39.005	69.500	20.159	PK
2	*		7.041	30.974	10.579	-38.526	69.500	20.395	PK

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Engineer: Roy Cheng	
Site: AC1	Time: 2014/07/04 - 17:39
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9170_18-40GHz	Polarity: Horizontal
EUT: Tablet PC	Power: AC 120V/60Hz

Note: There is the ambient noise within frequency range 18 ~ 25GHz.



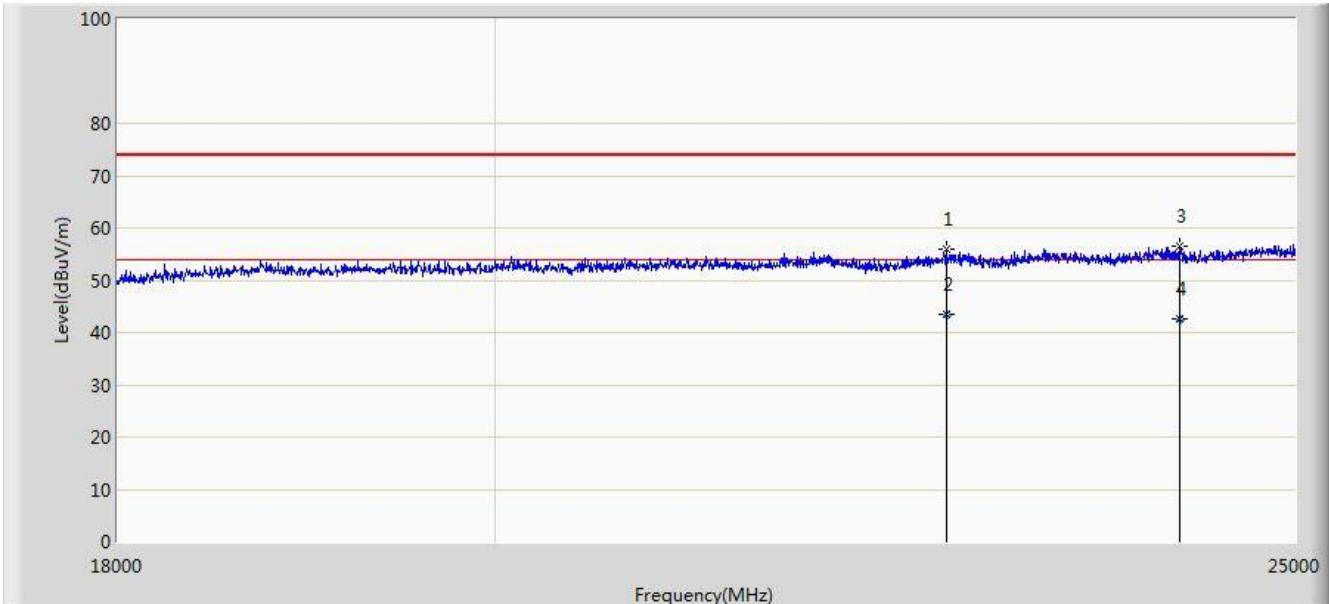
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			21517.500	55.869	17.883	-18.131	74.000	37.986	PK
2			21517.650	43.351	5.365	-10.649	54.000	37.986	AV
3			22630.500	56.509	18.223	-17.491	74.000	38.286	PK
4	*		22630.540	44.310	6.024	-9.690	54.000	38.286	AV

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Engineer: Roy Cheng	
Site: AC1	Time: 2014/07/04 - 17:43
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9170_18-40GHz	Polarity: Vertical
EUT: Tablet PC	Power: AC 120V/60Hz

Note: There is the ambient noise within frequency range 18 ~ 25GHz.



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			22686.500	55.811	17.457	-18.189	74.000	38.354	PK
2	*		22686.540	43.598	5.244	-10.402	54.000	38.354	AV
3			24205.500	56.430	17.607	-17.570	74.000	38.823	PK
4			24205.658	42.518	3.695	-11.482	54.000	38.823	AV

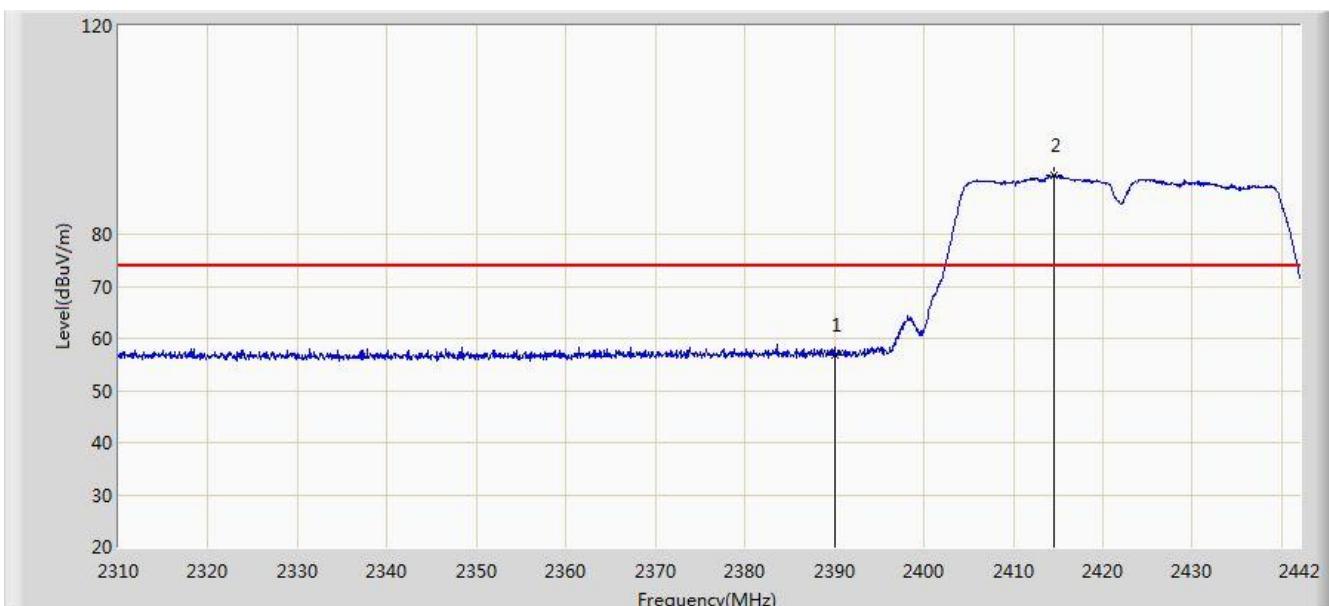
Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

7.7. Radiated Restricted Band Edge Measurement

7.7.1. Test Result

Engineer: Roy Cheng	
Site: AC1	Time: 2014/07/06 - 15:45
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Tablet PC	Power: AC 120V/60Hz
Worst Case Mode: 802.11n-HT40 Channel 2422MHz	

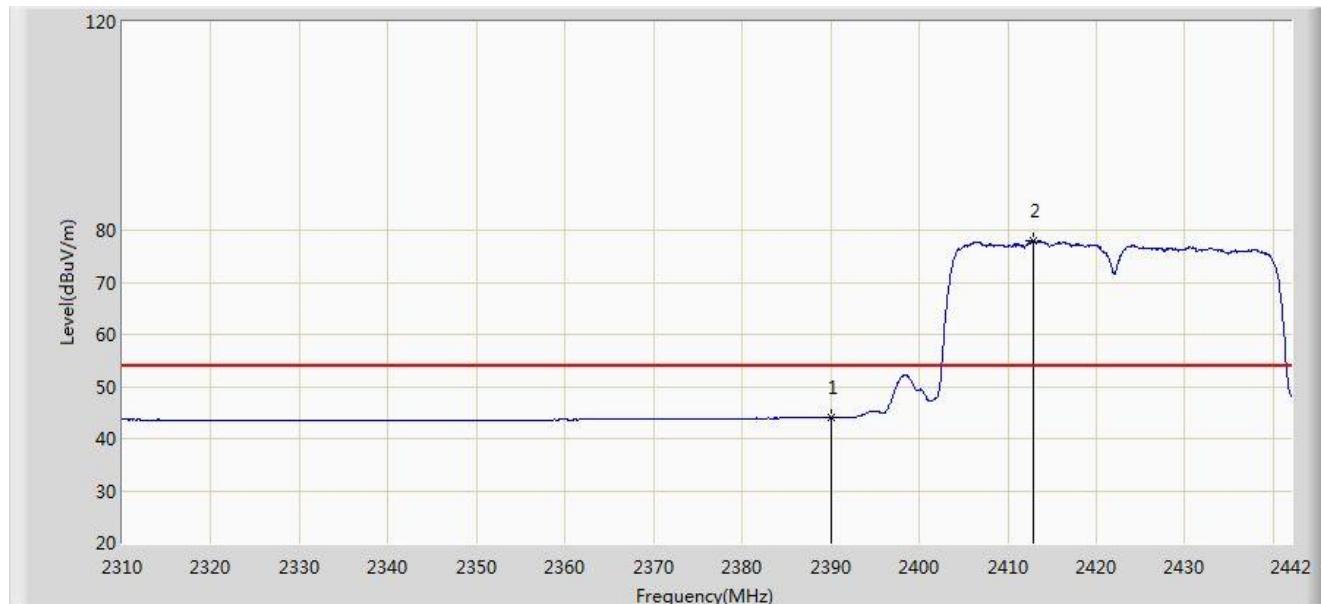


No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1			2390.000	56.676	25.992	-17.324	74.000	30.684	PK
2	*		2414.610	91.304	60.663	N/A	N/A	30.641	PK

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Engineer: Roy Cheng	
Site: AC1	Time: 2014/07/06 - 15:49
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Tablet PC	Power: AC 120V/60Hz
Worst Case Mode: 802.11n-HT40 Channel 2422MHz	

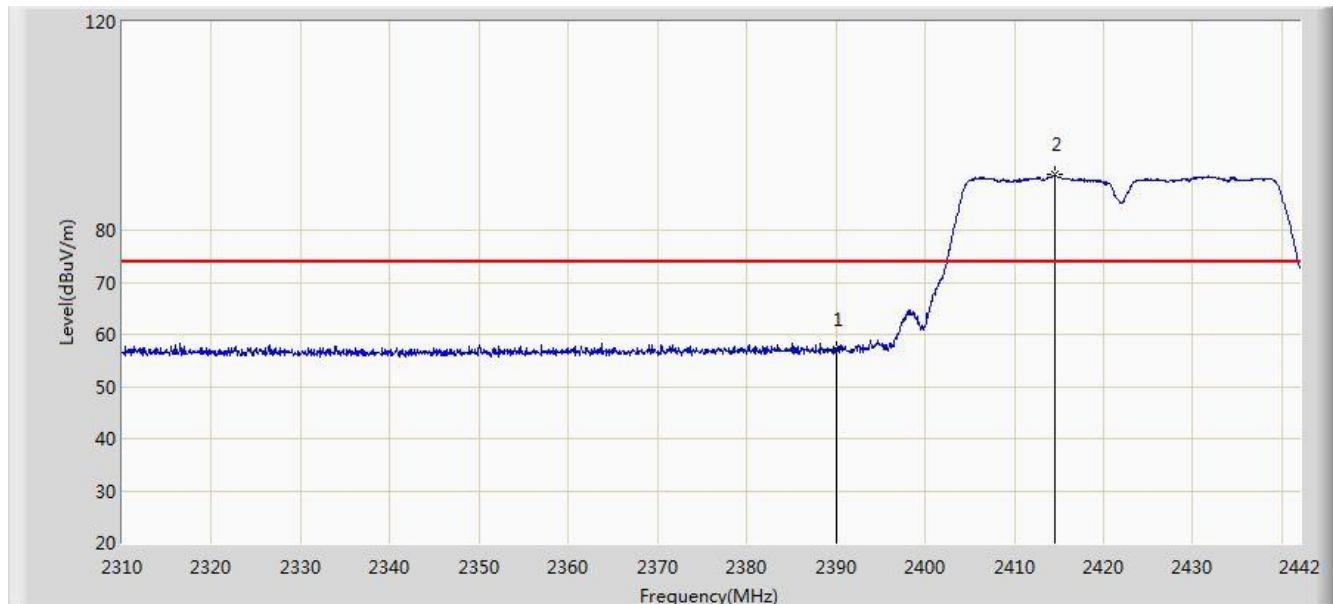


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	44.011	13.327	-9.989	54.000	30.684	AV
2	*		2412.828	78.000	47.357	N/A	N/A	30.644	AV

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Engineer: Roy Cheng	
Site: AC1	Time: 2014/07/06 - 15:51
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Tablet PC	Power: AC 120V/60Hz
Worst Case Mode: 802.11n-HT40 Channel 2422MHz	



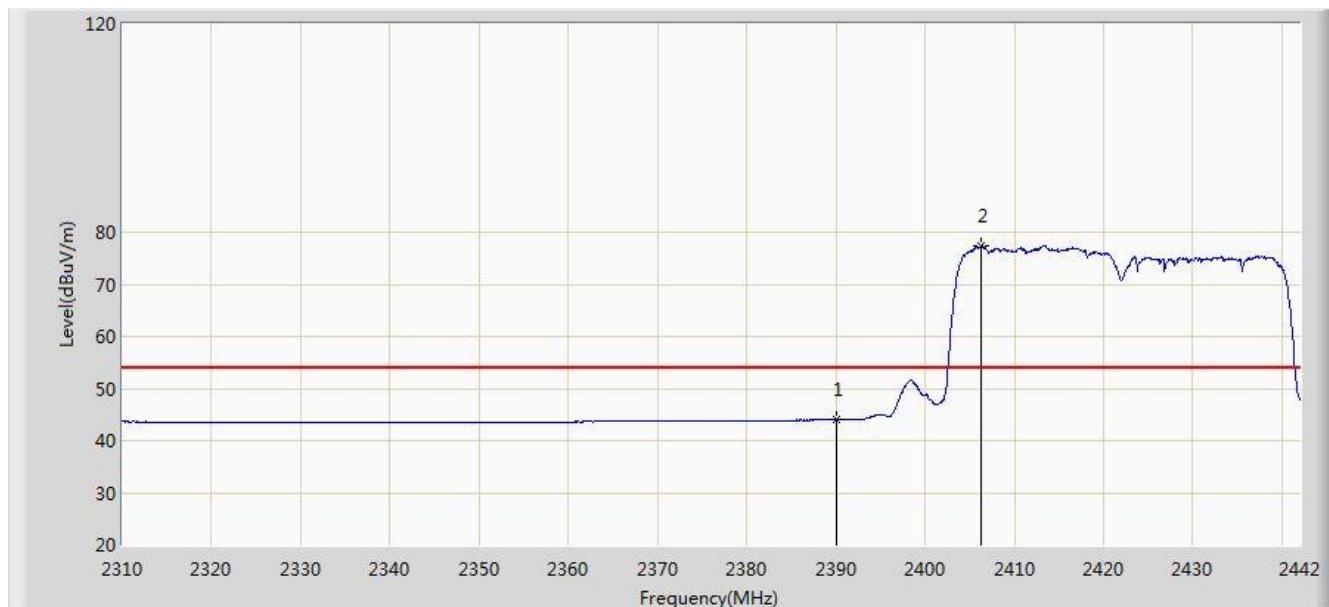
No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	56.992	26.308	-17.008	74.000	30.684	AV
2	*		2414.544	90.714	60.073	N/A	N/A	30.641	AV

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Engineer: Roy Cheng	
Site: AC1	Time: 2014/07/06 - 15:52
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Tablet PC	Power: AC 120V/60Hz

Worst Case Mode: 802.11n-HT40 Channel 2422MHz



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1			2390.000	43.950	13.266	-17.008	54.000	30.684	AV
2	*		2406.228	77.308	46.654	N/A	N/A	30.654	AV

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Engineer: Roy Cheng	
Site: AC1	Time: 2014/07/06 - 15:53
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Tablet PC	Power: AC 120V/60Hz
Worst Case Mode: 802.11n-HT40 Channel 2452MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1	*		2467.496	91.624	60.998	N/A	N/A	30.626	PK
2			2483.500	55.726	25.053	-18.274	74.000	30.673	PK
3			2485.210	58.163	27.485	-15.837	74.000	30.678	PK

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Engineer: Roy Cheng	
Site: AC1	Time: 2014/06/03 - 17:25
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Horizontal
EUT: Tablet PC	Power: AC 120V/60Hz
Worst Case Mode: 802.11n-HT40 Channel 2452MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1	*		2468.278	77.945	47.317	N/A	N/A	30.628	AV
2			2483.500	44.031	13.358	-9.969	54.000	30.673	AV

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Engineer: Roy Cheng	
Site: AC1	Time: 2014/07/06 - 15:54
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Tablet PC	Power: AC 120V/60Hz
Worst Case Mode: 802.11n-HT40 Channel 2452MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV/m)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV/m)	Factor (dB)	Type
1		*	2467.292	90.367	59.742	N/A	N/A	30.625	PK
2			2483.500	55.964	25.291	-18.036	74.000	30.673	PK
3			2493.846	58.410	27.707	-15.590	74.000	30.703	PK

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

Engineer: Roy Cheng	
Site: AC1	Time: 2014/07/06 - 15:55
Limit: FCC_Part15.209_RE(3m)	Margin: 0
Probe: BBHA9120D_1-18GHz	Polarity: Vertical
EUT: Tablet PC	Power: AC 120V/60Hz
Worst Case Mode: 802.11n-HT40 Channel 2452MHz	



No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V/m)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dB μ V/m)	Factor (dB)	Type
1	*		2467.904	76.739	46.112	N/A	N/A	30.627	AV
2			2483.500	43.728	13.055	-10.272	54.000	30.673	AV

Note: Measure Level (dB μ V/m) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + Antenna Factor (dB/m)

7.8. AC Conducted Emissions Measurement

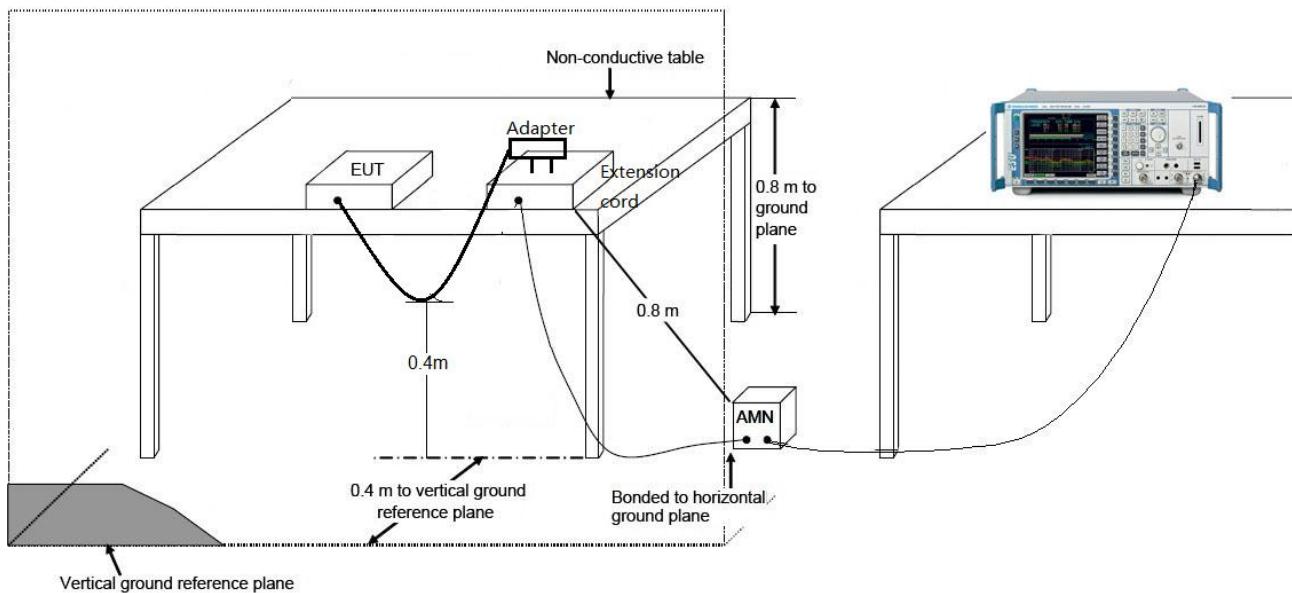
7.8.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 – 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

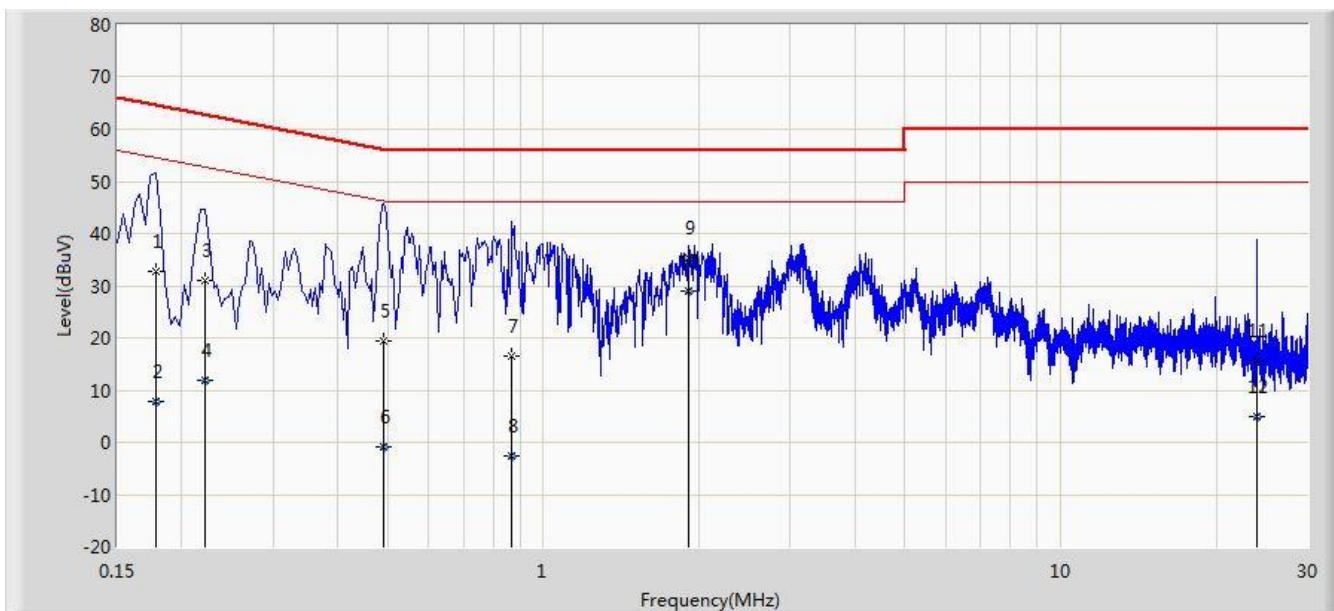
Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

7.8.2. Test Setup



7.8.3. Test Result

Tested By	Roy Cheng	Test Data	2014/07/08 - 15:29
Site	SR2	Power	AC 120V/60Hz
Limit	FCC_Part15.207_CE_Class B	Polarity	Line
AMN	LISN_101683-FILTER ON	Test Mode	Normal Operation

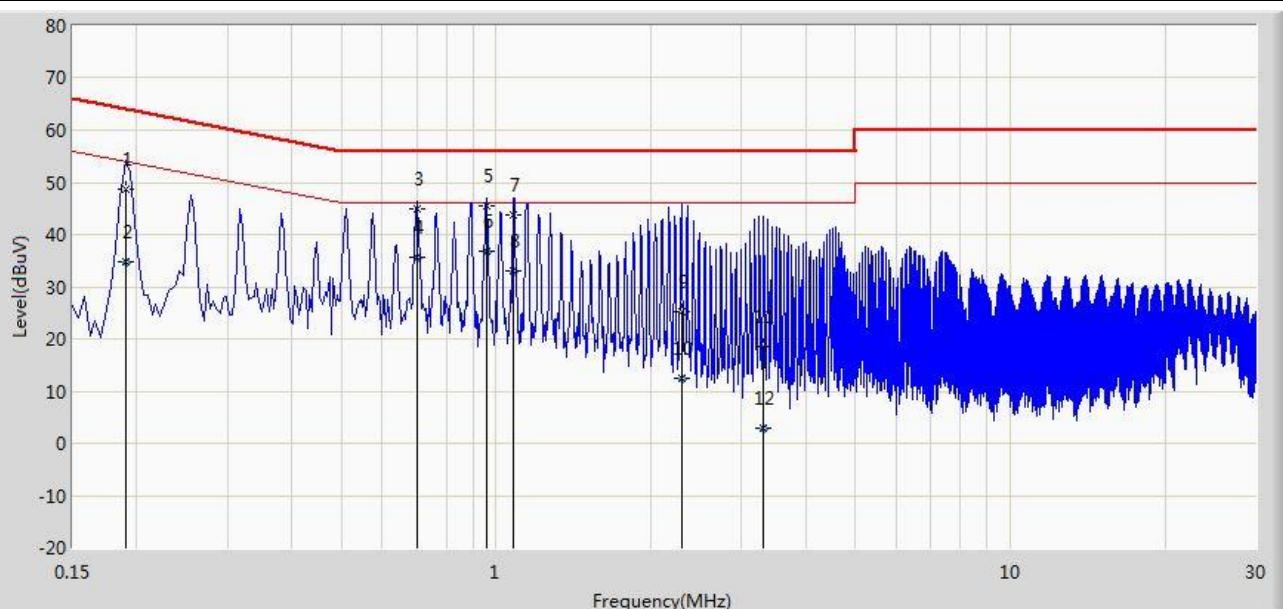


No	Flag	Mark	Frequency (MHz)	Measure Level (dBuV)	Reading Level (dBuV)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.178	32.873	22.815	-31.705	64.578	10.058	QP
2			0.178	7.750	-2.308	-46.828	54.578	10.058	AV
3	*		0.222	30.898	20.957	-31.846	62.744	9.941	QP
4			0.222	11.765	1.824	-40.979	52.744	9.941	AV
5			0.490	19.431	9.273	-36.737	56.168	10.158	QP
6			0.490	-0.810	-10.968	-46.978	46.168	10.158	AV
7			0.870	16.489	6.513	-39.511	56.000	9.976	QP
8			0.870	-2.553	-12.529	-48.553	46.000	9.976	AV
9			1.906	35.431	25.557	-20.569	56.000	9.875	QP
10			1.906	29.023	19.148	-16.977	46.000	9.875	AV
11			23.998	15.602	5.408	-44.398	60.000	10.194	QP
12			23.998	4.870	-5.324	-45.130	50.000	10.194	AV

Note: Measure Level (dB μ V) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

Tested By	Roy Cheng	Test Data	2014/07/08 - 15:29
Site	SR2	Power	AC 120V/60Hz
Limit	FCC_Part15.207_CE_Class B	Polarity	Neutral
AMN	LISN_101683-FILTER ON	Test Mode	Normal Operation



No	Flag	Mark	Frequency (MHz)	Measure Level (dB μ V)	Reading Level (dB μ V)	Over Limit (dB)	Limit (dBuV)	Factor (dB)	Type
1			0.190	48.575	38.547	-15.462	64.037	10.028	QP
2			0.190	34.844	24.816	-19.192	54.037	10.028	AV
3	*		0.702	44.833	34.759	-11.167	56.000	10.074	QP
4			0.702	35.690	25.617	-10.310	46.000	10.074	AV
5			0.958	45.483	35.551	-10.517	56.000	9.932	QP
6			0.958	36.864	26.933	-9.136	46.000	9.932	AV
7			1.082	43.797	33.891	-12.203	56.000	9.906	QP
8			1.082	33.090	23.185	-12.910	46.000	9.906	AV
9			2.290	25.294	15.428	-30.706	56.000	9.866	QP
10			2.290	12.472	2.606	-33.528	46.000	9.866	AV
11			3.310	18.599	8.700	-37.401	56.000	9.899	QP
12			3.310	2.892	-7.007	-43.108	46.000	9.899	AV

Note: Measure Level (dB μ V) = Reading Level (dB μ V) + Factor (dB)

Factor (dB) = Cable Loss (dB) + LISN Factor (dB)

8. CONCLUSION

The data collected relate only the item(s) tested and show that the **Tablet PC FCC ID: 2AA5TW7T** is in compliance with Part 15C of the FCC Rules.

The End
