

5.6 Band Edge Measurement

5.6.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)
Spectrum analyzer	N9020A	Agilent	US46220101	15/09/11
Bilog Antenna	VULB9160	Schwarzbeck	VULB9160-3122	16/04/02
Antenna Master	JAC-3	DAE IL EMC	N/A	N/A
Antenna Turntable Controller	JAC-2	JAEMC	N/A	N/A
RF Cable_2m	Test No.1	Hubersunhner	N/A	16/01/14
RF Cable_10m	Test No.2	Hubersunhner	N/A	16/01/14
Loop Antenna	HFH2-Z2	Rohde & Schwarz	881056/6	16/01/06
Horn Antenna	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	BBHA 9120 D 234	15/09/15
RF Amplifier	PAM-118A	COM-POWER	551019	15/07/21
Antenna Master	N/A	AUDIX	N/A	15/09/17
Antenna Turntable Controller	ACT	AUDIX	N/A	15/09/17
RE Below 1 GHz CHAMBER	N/A	SY Corp.	N/A	N/A
RE Above 1 GHz CHAMBER	N/A	SY Corp.	N/A	15/09/17
AC Power Source	15001ix-CTS	California Instruments	56255/56256/56257	16/01/13

5.6.2 Test Limit

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

5.6.3 Test Procedure

The EUT is placed on a turntable, which is 0.8m above the ground plane.

The turntable shall be rotated for 360 degrees to determine the position of maximum emission level. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.

Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:

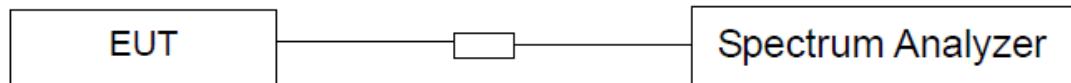
PEAK: RBW=VBW=1MHz / Sweep=AUTO

AVERAGE: RBW=1MHz / VBW=10Hz / Sweep=AUTO

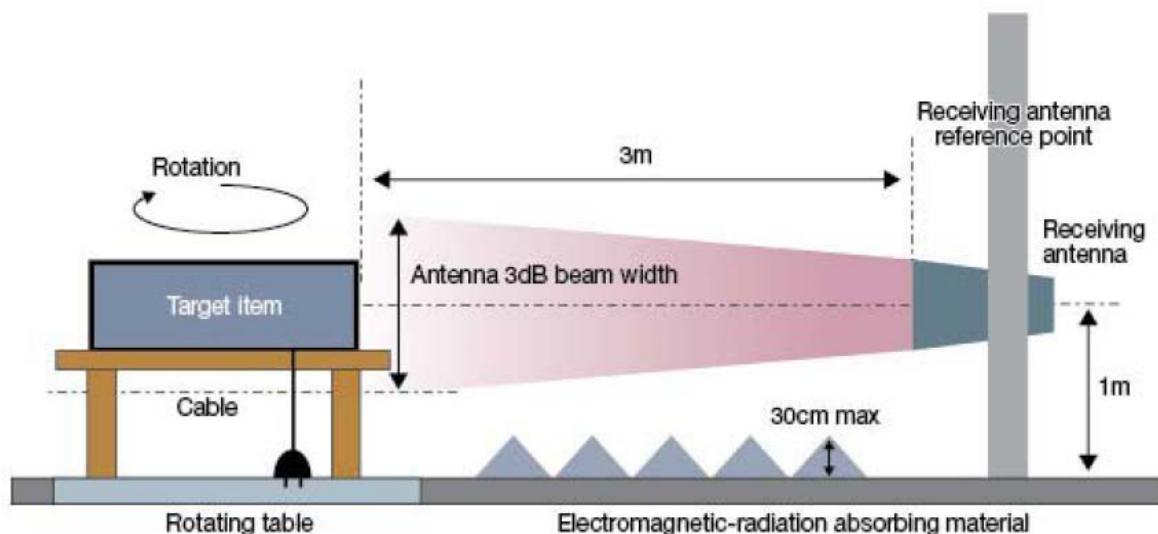
Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are measured.

5.6.4 Test SET-UP (Block Diagram of Configuration)

(a) Conducted Emission Test Set-Up, Frequency above 1000MHz



(b) Radiated Emission Test Set-Up, Frequency above 1000MHz



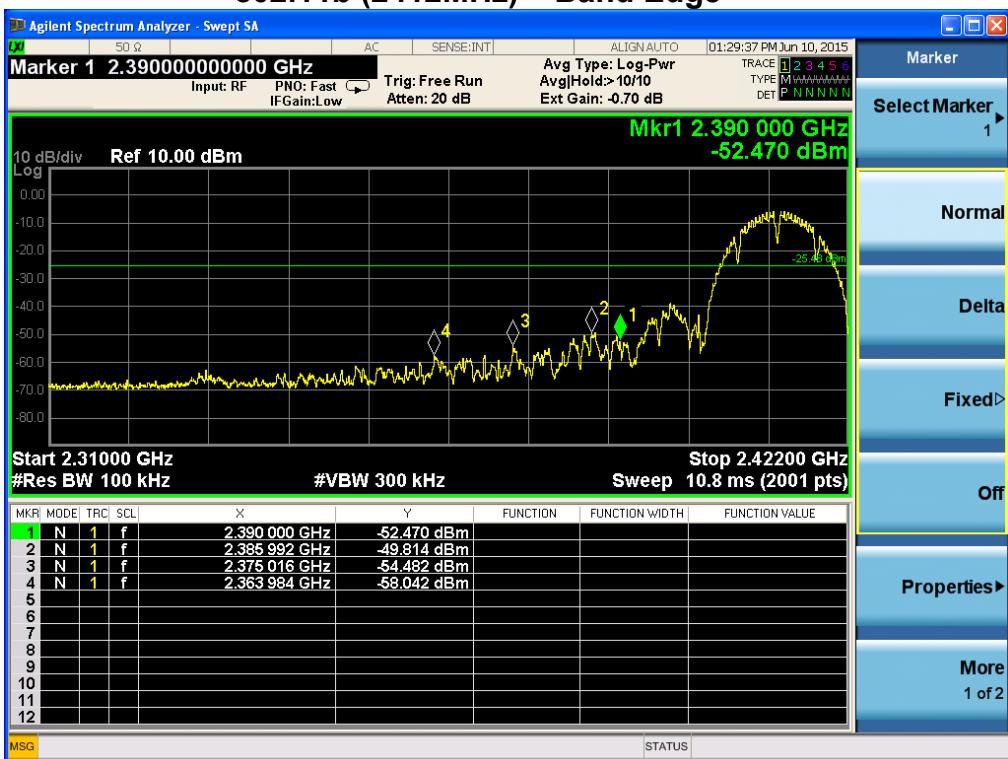
5.6.5 Test Result

5.6.5.1 Conducted Band Edges

802.11b (2412MHz) – PSD Level



802.11b (2412MHz) – Band Edge



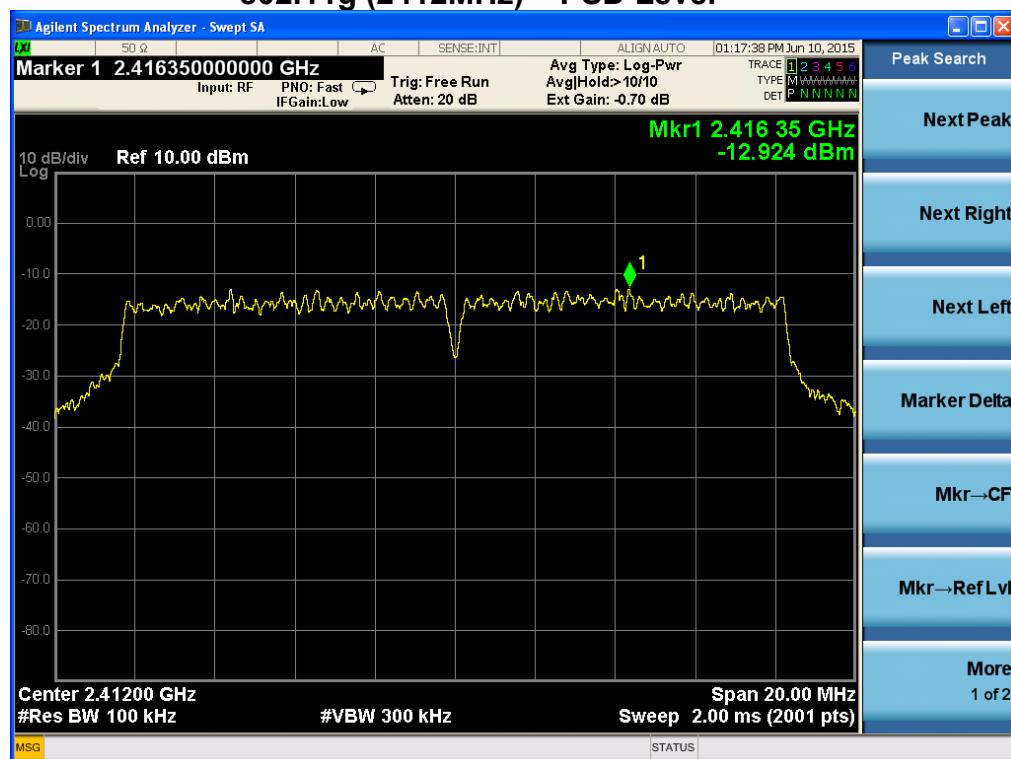
802.11b (2462MHz) – PSD Level



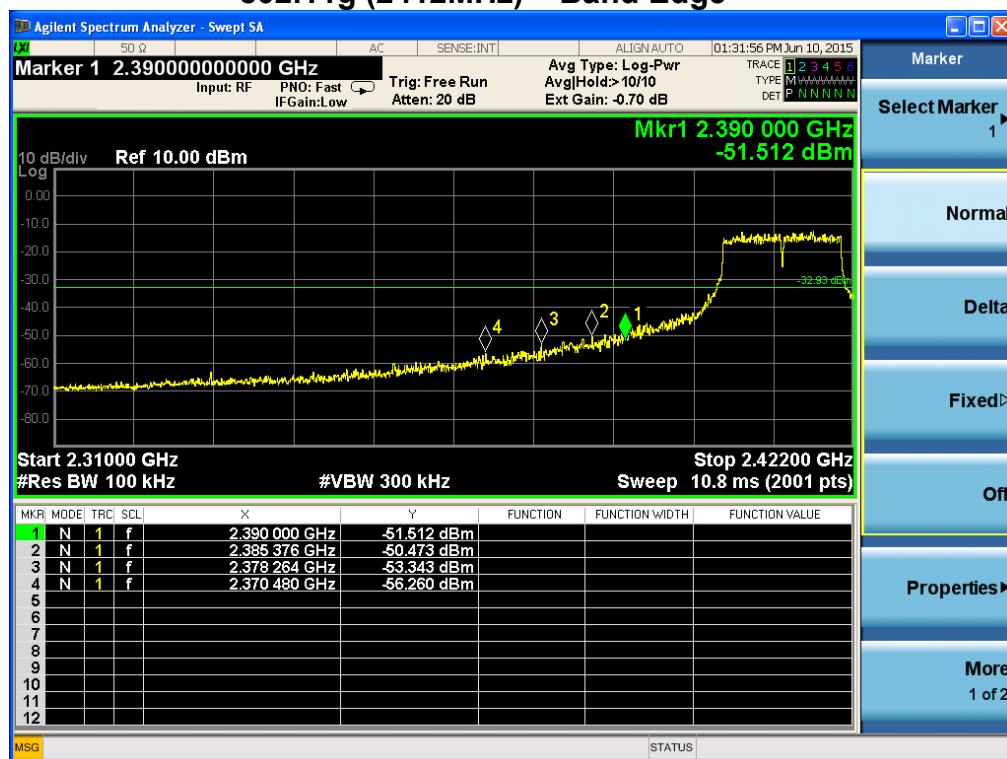
802.11b (2462MHz) – Band Edge



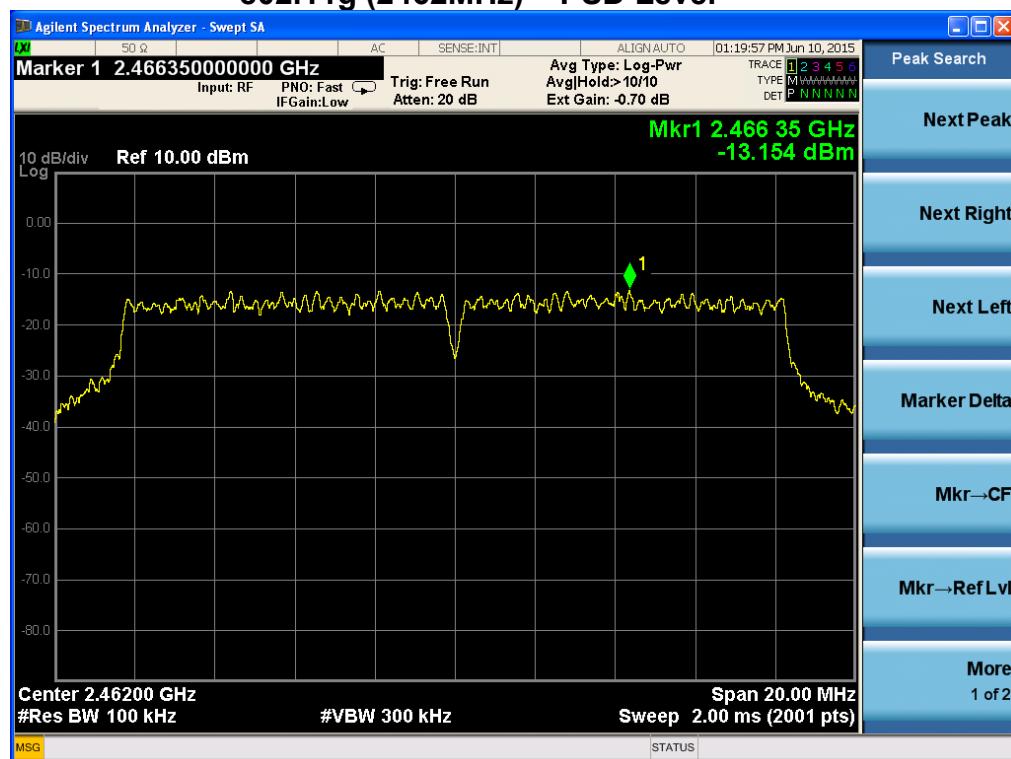
802.11g (2412MHz) – PSD Level



802.11g (2412MHz) – Band Edge



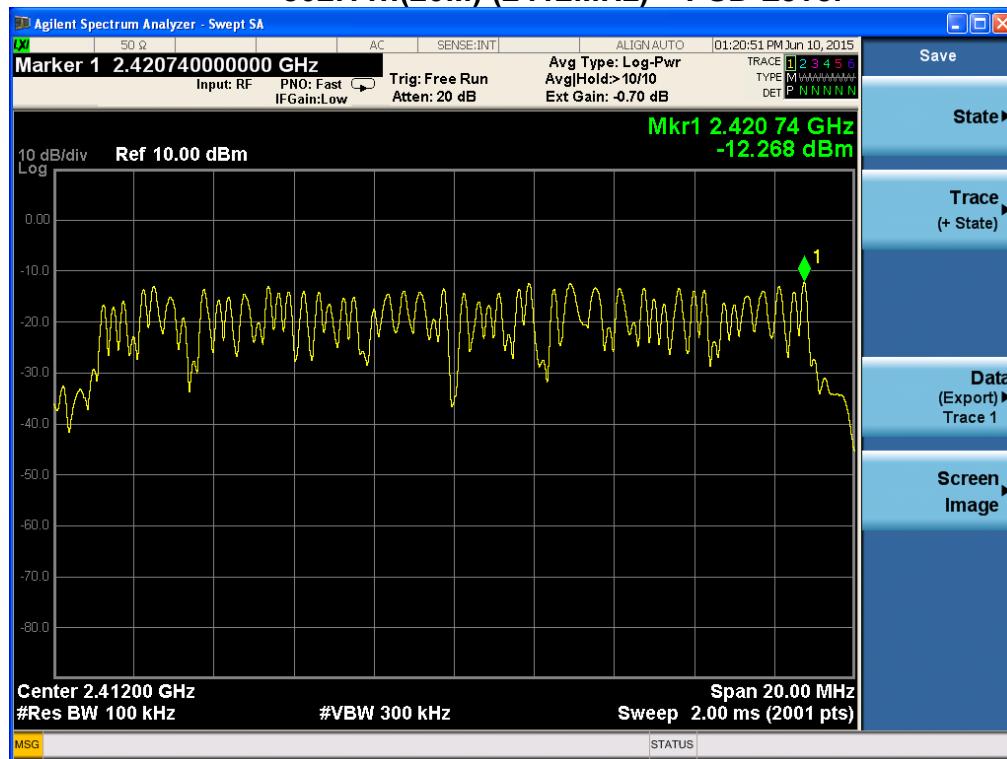
802.11g (2462MHz) – PSD Level



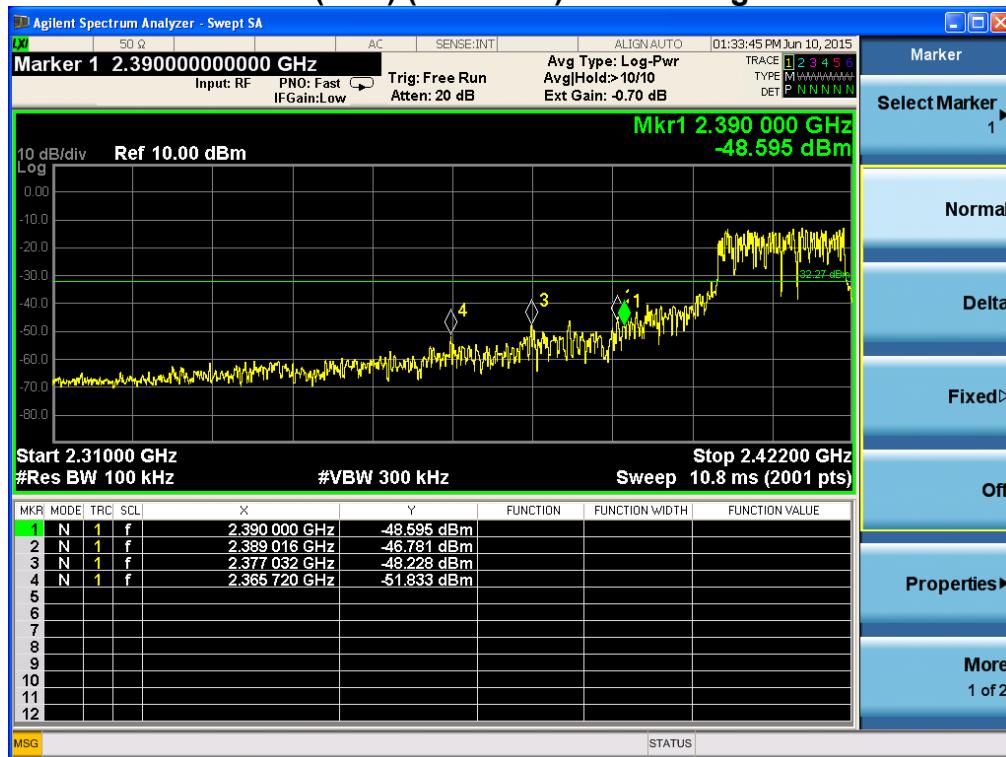
802.11g (2462MHz) – Band Edge



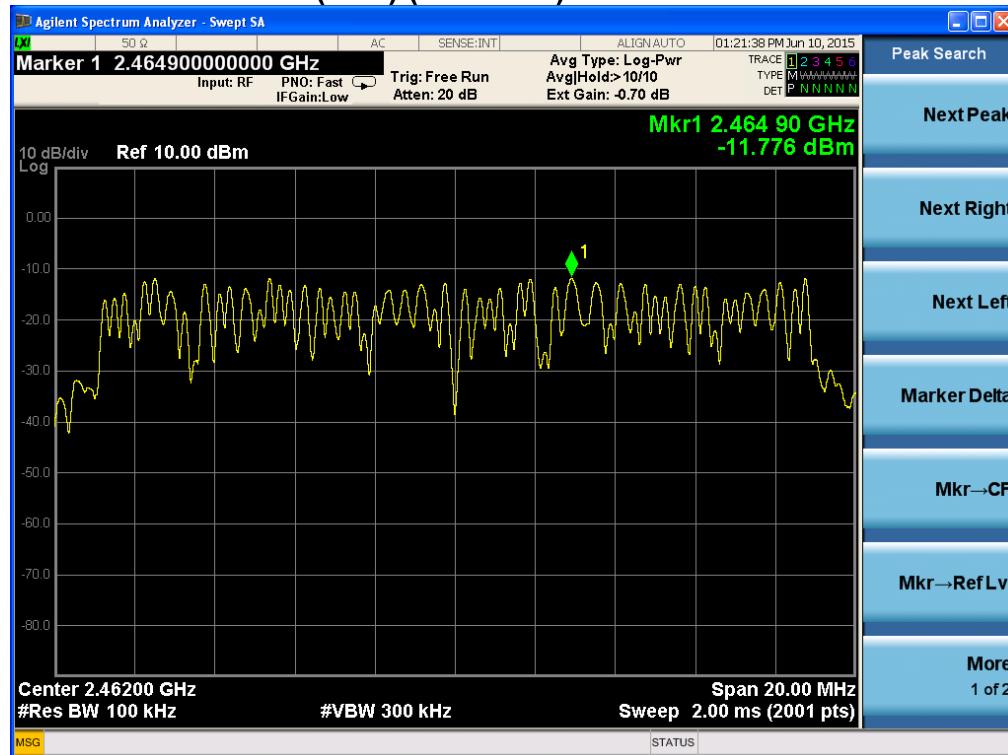
802.11n(20M) (2412MHz) – PSD Level



802.11n(20M) (2412MHz) – Band Edge



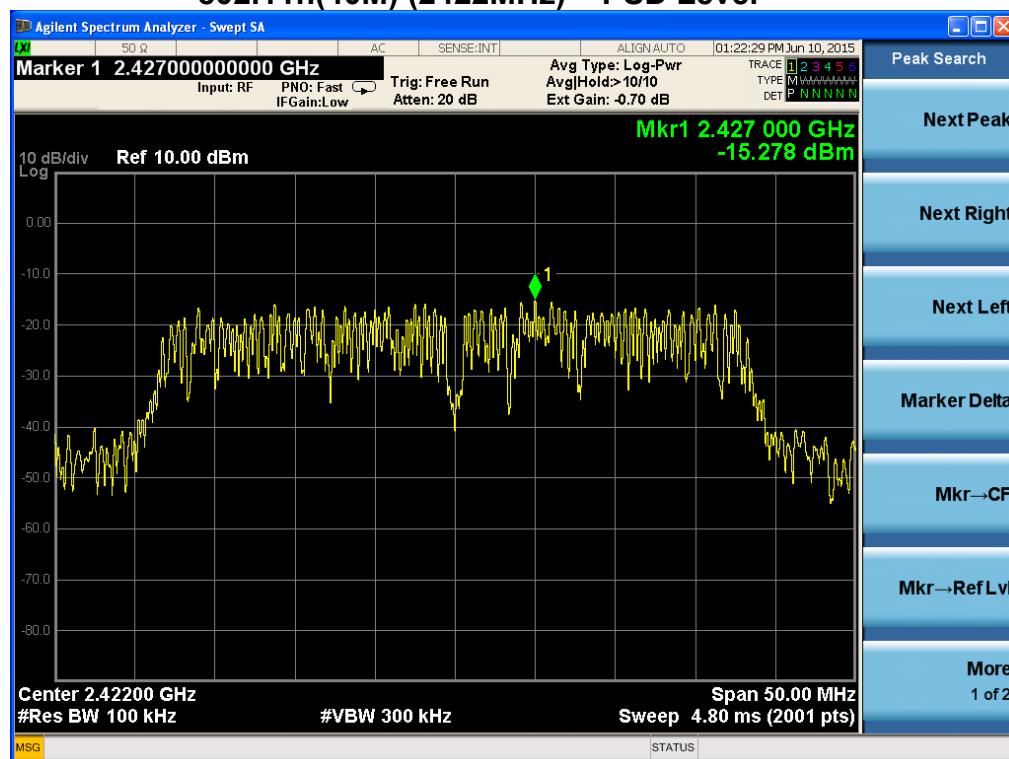
802.11n(20M) (2462MHz) – PSD Level



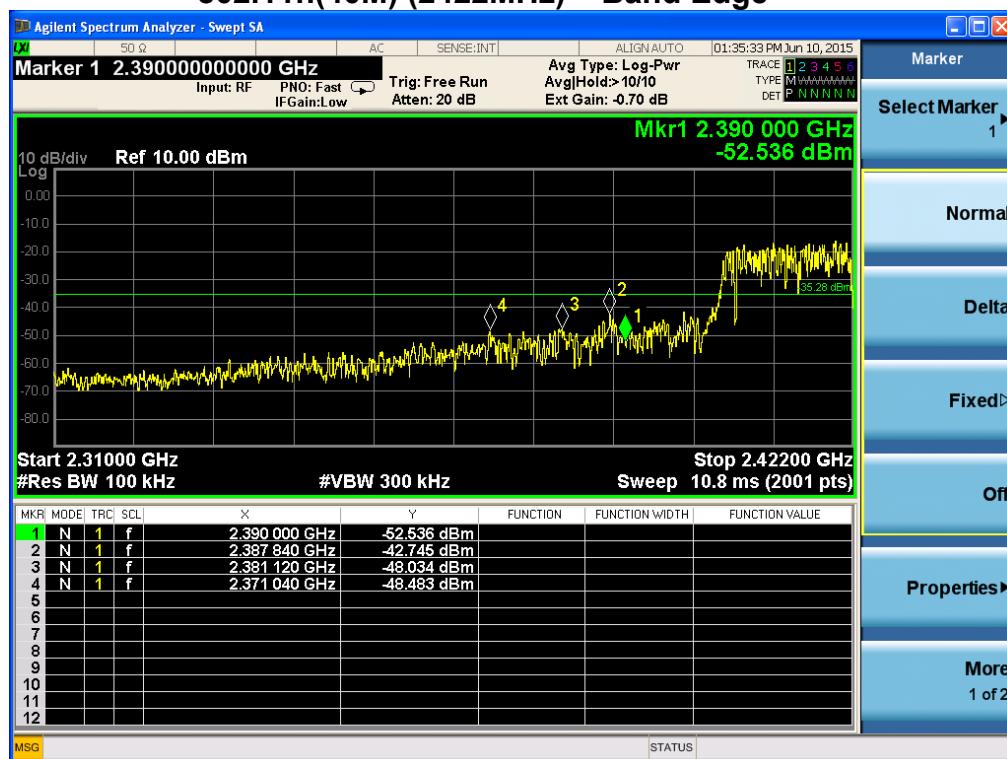
802.11n(20M) (2462MHz) – Band Edge



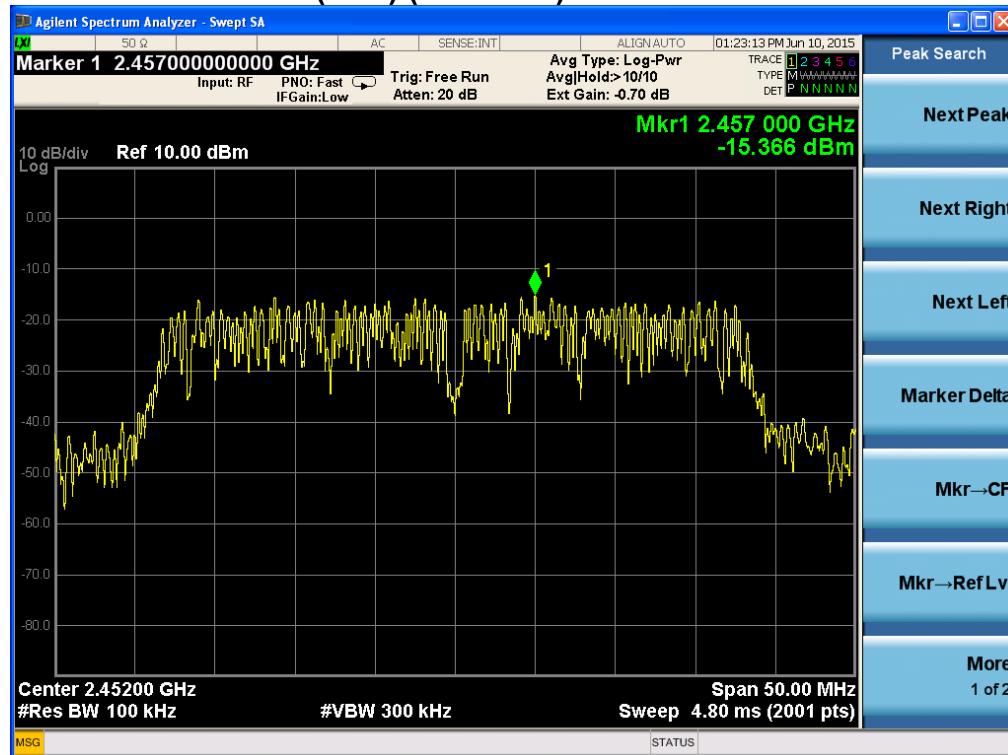
802.11n(40M) (2422MHz) – PSD Level



802.11n(40M) (2422MHz) – Band Edge



802.11n(40M) (2452MHz) – PSD Level



- Peak Search
- Next Peak
- Next Right
- Next Left
- Marker Delta
- Mkr→CF
- Mkr→Ref Lvl
- More 1 of 2

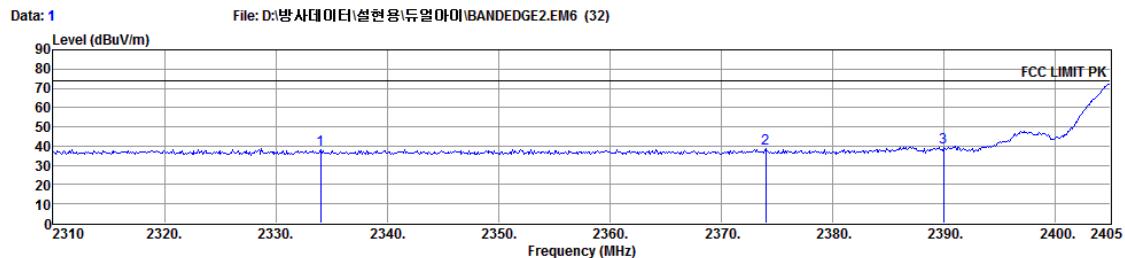
802.11n(40M) (2452MHz) – Band Edge



- Display
- Annotation▶
- Title▶
- Graticule On Off
- Display Line -35.37 dBm On Off
- System Display Settings

5.6.5.2 Radiated Band Edges

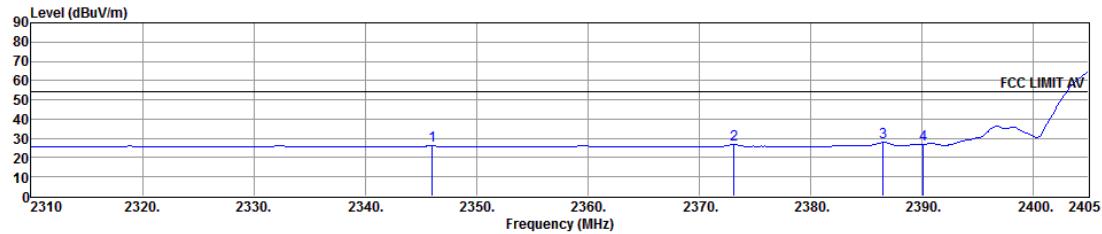
802.11b (2412MHz) – Horizontal



Site : SVSWR Chamber
Condition: FCC LIMIT PK 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11b_F1
memo :

Freq	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark
	Level	Factor	Factor	Loss	Level	Line	Limit	cm	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2334.04	47.97	26.67	40.97	4.58	38.25	74.00	-35.75	---
2	2374.03	48.18	26.72	41.00	4.60	38.50	74.00	-35.50	---
3	2389.99	49.04	26.74	41.01	4.61	39.38	74.00	-34.62	---

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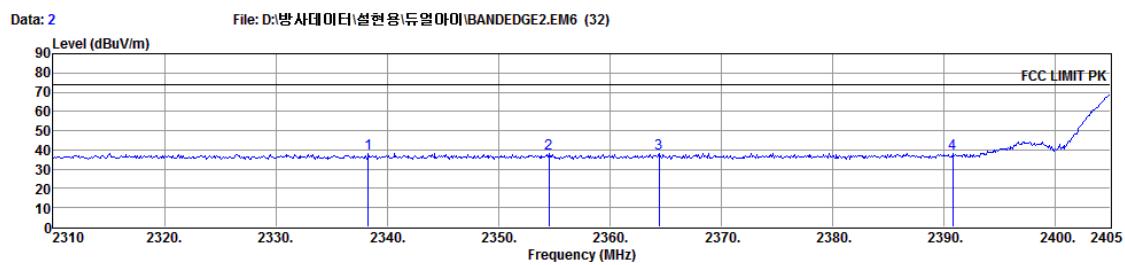
Site : SVSWR Chamber
Condition: FCC LIMIT AV 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11b_F1
memo :

Freq	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark
	Level	Factor	Factor	Loss	Level	Line	Limit	cm	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2346.01	35.80	26.68	40.98	4.59	26.09	54.00	-27.91	---
2	2373.18	36.51	26.72	41.00	4.60	26.83	54.00	-27.17	---
3	2386.57	37.60	26.74	41.01	4.61	27.94	54.00	-26.06	---
4	2390.18	36.46	26.74	41.01	4.61	26.80	54.00	-27.20	---

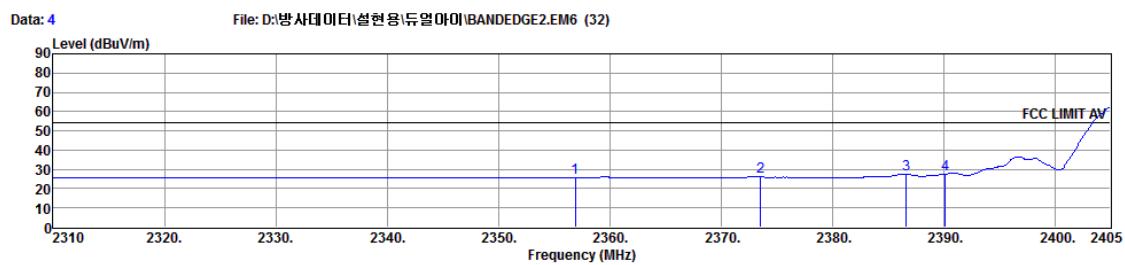
802.11b (2412MHz) – Vertical



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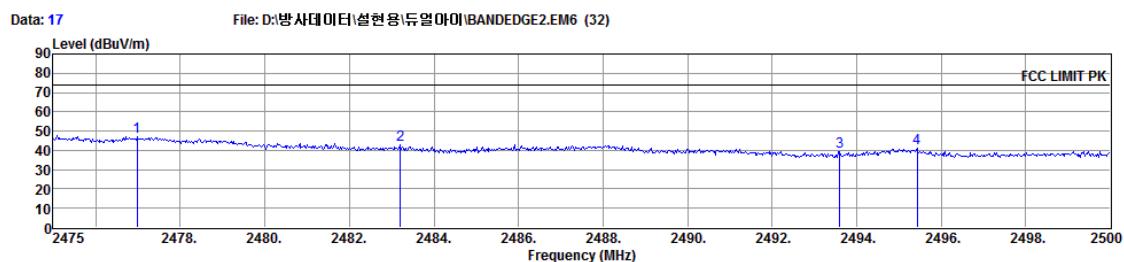
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802.11b (2462MHz) – Horizontal



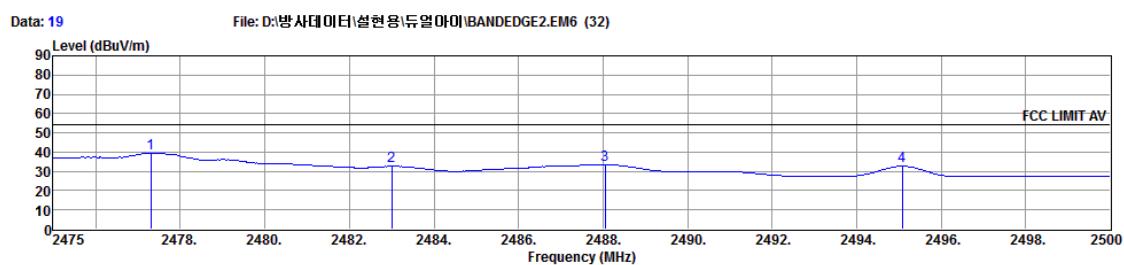
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Freq	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark		
	Level	Factor	Factor	Loss	Level	Line	Limit				
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg	
1	2476.98	56.59	26.85	41.07	4.66	47.03	74.00	-26.97	---	---	Peak
2	2483.20	52.38	26.86	41.07	4.66	42.83	74.00	-31.17	---	---	Peak
3	2493.60	49.08	26.87	41.08	4.67	39.54	74.00	-34.46	---	---	Peak
4	2495.43	50.73	26.87	41.08	4.67	41.19	74.00	-32.81	---	---	Peak



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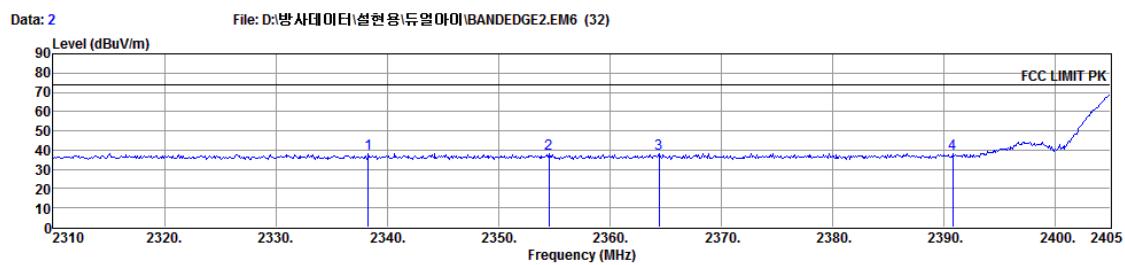


Freq	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark		
	Level	Factor	Factor	Loss	Level	Line	Limit				
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg	
1	2477.30	49.04	26.85	41.07	4.66	39.48	54.00	-14.52	---	---	Average
2	2483.00	42.19	26.86	41.07	4.66	32.64	54.00	-21.36	---	---	Average
3	2488.05	43.06	26.87	41.07	4.66	33.52	54.00	-20.48	---	---	Average
4	2495.08	42.21	26.87	41.08	4.67	32.67	54.00	-21.33	---	---	Average

802.11b (2462MHz) – Vertical



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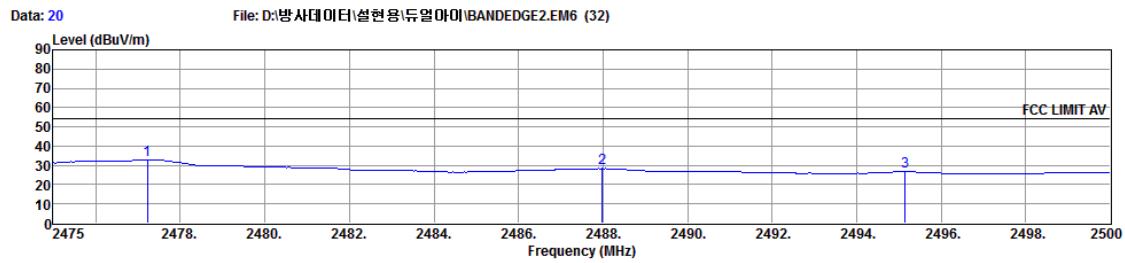


Site : SVSWR Chamber
Condition: FCC LIMIT PK 3m BBHA9120D517_2014 VERTICAL
eut : i TOUCH POP V2
mode : 802.11b_F1
memo :

Freq	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark
	Level	Factor	Factor	Loss	Level	Line	Limit		
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2338.31	47.84	26.67	40.97	4.58	38.12	74.00	-35.88	---
2	2354.56	47.55	26.69	40.98	4.59	37.85	74.00	-36.15	---
3	2364.44	47.91	26.71	40.99	4.60	38.23	74.00	-35.77	---
4	2390.85	47.73	26.74	41.01	4.61	38.07	74.00	-35.93	---



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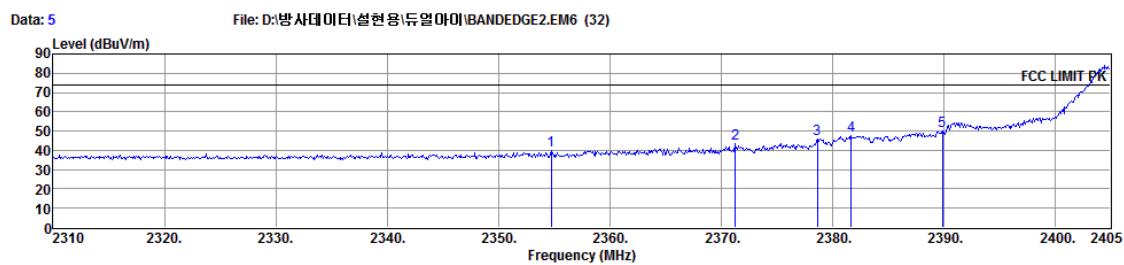
Site : SVSWR Chamber
Condition: FCC LIMIT AV 3m BBHA9120D517_2014 VERTICAL
eut : i TOUCH POP V2
mode : 802.11b_F3
memo :

Freq	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark
	Level	Factor	Factor	Loss	Level	Line	Limit		
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2477.23	42.59	26.85	41.07	4.66	33.03	54.00	-20.97	---
2	2487.98	37.88	26.87	41.07	4.66	28.34	54.00	-25.66	---
3	2495.15	36.23	26.87	41.08	4.67	26.69	54.00	-27.31	---

802.11g (2412MHz) – Horizontal



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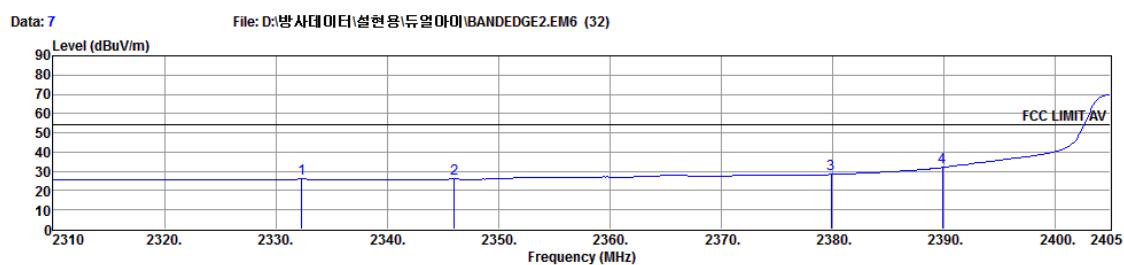


Site : SVSWR Chamber
Condition: FCC LIMIT PK 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11g_F1
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Loss	Level	Line	Limit			
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2354.75	49.61	26.69	40.98	4.59	39.91	74.00	-34.09	---	---
2	2371.28	52.95	26.72	40.99	4.60	43.28	74.00	-30.72	---	---
3	2378.69	55.79	26.73	41.00	4.60	46.12	74.00	-27.88	---	---
4	2381.73	57.41	26.73	41.00	4.61	47.75	74.00	-26.25	---	---
5	2389.90	59.43	26.74	41.01	4.61	49.77	74.00	-24.23	---	---



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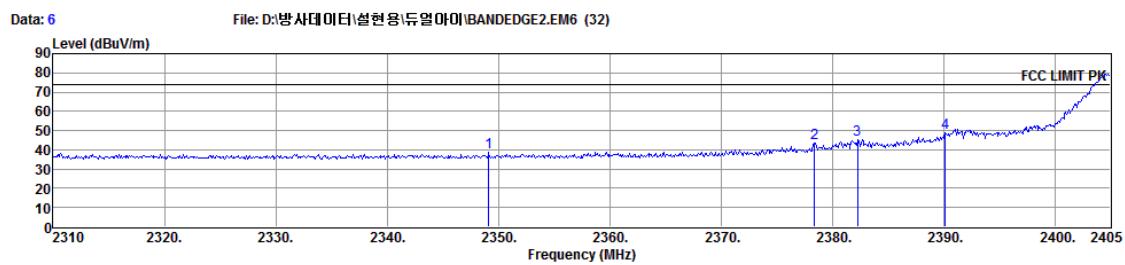
Site : SVSWR Chamber
Condition: FCC LIMIT AV 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11g_F1
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Loss	Level	Line	Limit			
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2332.33	35.86	26.67	40.97	4.58	26.14	54.00	-27.86	---	---
2	2346.01	35.81	26.68	40.98	4.59	26.10	54.00	-27.90	---	---
3	2379.92	38.00	26.73	41.00	4.61	28.34	54.00	-25.66	---	---
4	2389.90	41.61	26.74	41.01	4.61	31.95	54.00	-22.05	---	---

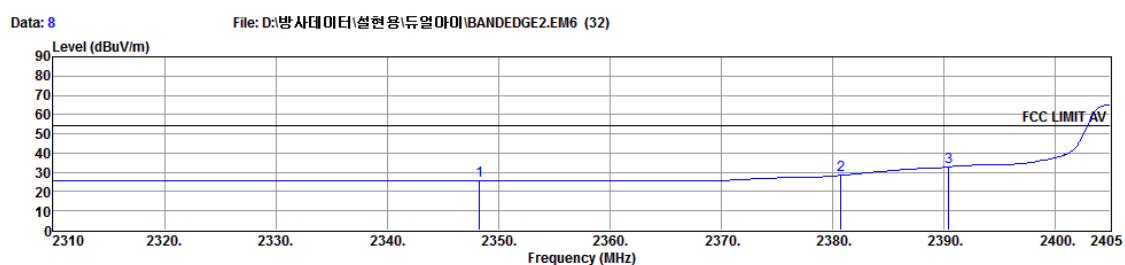
802.11g (2412MHz) – Vertical



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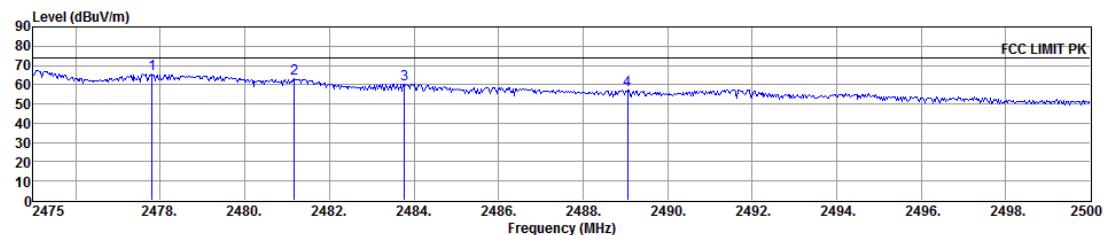


802.11g (2462MHz) – Horizontal



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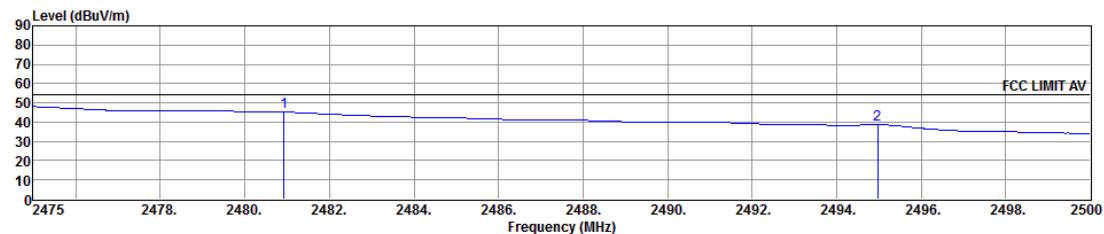
Site : SVSWR Chamber
Condition: FCC LIMIT PK 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11g_F3
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2477.80	75.03	26.85	41.07	4.66	65.47	74.00	-8.53	---	---
2	2481.18	72.52	26.86	41.07	4.66	62.97	74.00	-11.03	---	---
3	2483.78	69.90	26.86	41.07	4.66	60.35	74.00	-13.65	---	---
4	2489.05	66.58	26.87	41.07	4.66	57.04	74.00	-16.96	---	---



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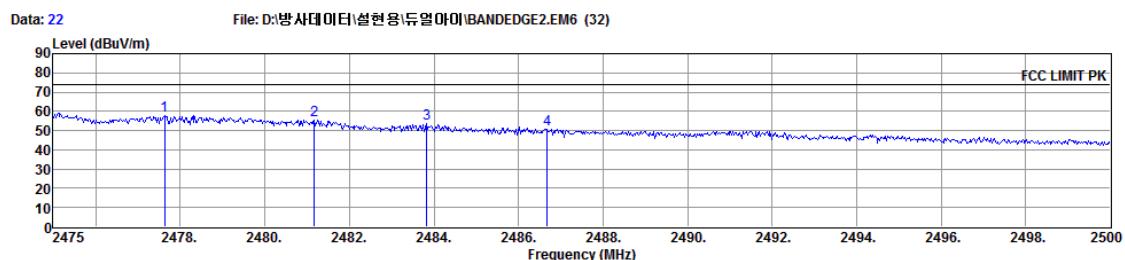
Site : SVSWR Chamber
Condition: FCC LIMIT AV 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11g_F3
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2480.93	54.70	26.86	41.07	4.66	45.15	54.00	-8.85	---	---
2	2494.98	48.21	26.87	41.08	4.67	38.67	54.00	-15.33	---	---

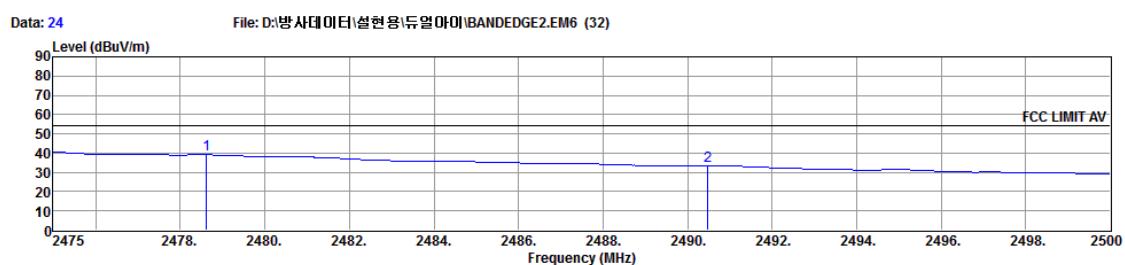
802.11g (2462MHz) – Vertical



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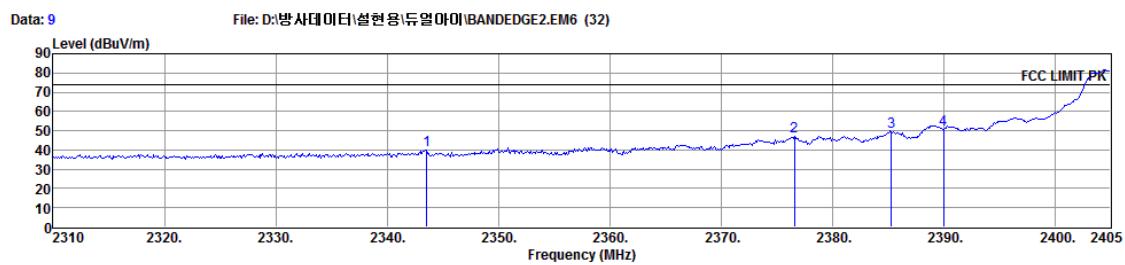
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802.11n(20M) (2412MHz) – Horizontal



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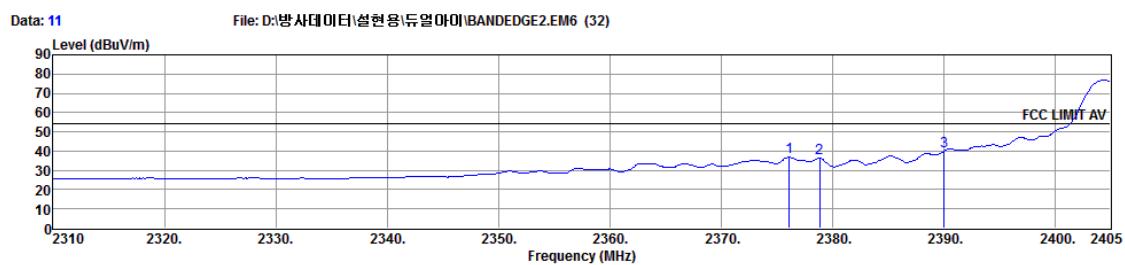


Site : SVSWR Chamber
Condition: FCC LIMIT PK 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11n(20M)_F1
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2343.54	49.35	26.68	40.98	4.59	39.64	74.00	-34.36	---	---
2	2376.60	56.65	26.72	41.00	4.60	46.97	74.00	-27.03	---	---
3	2385.34	58.89	26.73	41.00	4.61	49.23	74.00	-24.77	---	---
4	2389.99	60.45	26.74	41.01	4.61	50.79	74.00	-23.21	---	---



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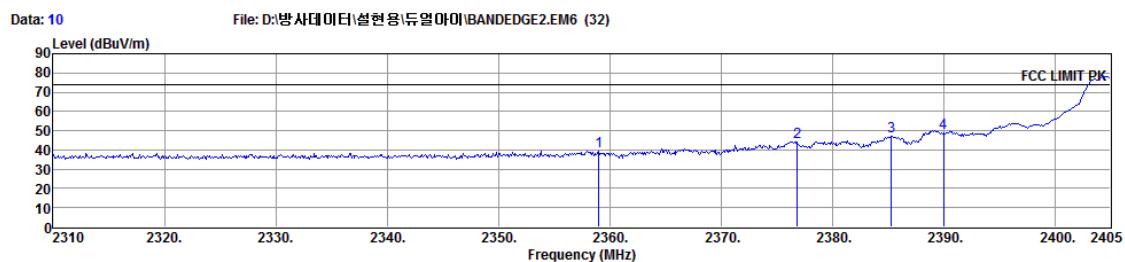
Site : SVSWR Chamber
Condition: FCC LIMIT AV 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11n(20M)_F1
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2376.12	46.43	26.72	41.00	4.60	36.75	54.00	-17.25	---	---
2	2378.88	45.90	26.73	41.00	4.60	36.23	54.00	-17.77	---	---
3	2390.09	49.80	26.74	41.01	4.61	40.14	54.00	-13.86	---	---

802.11n(20M) (2412MHz) – Vertical



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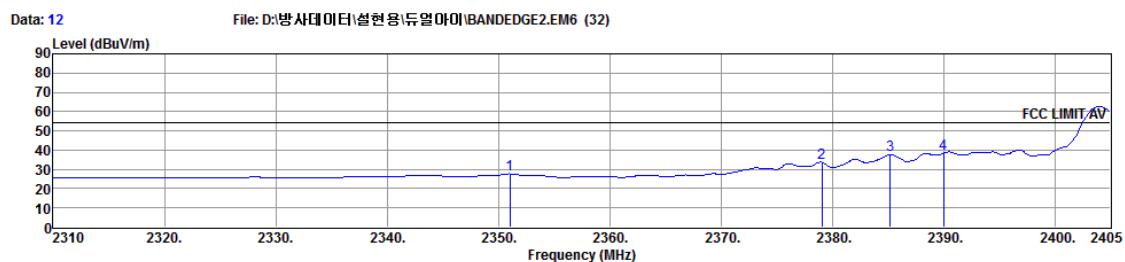


Site : SVSWR Chamber
Condition: FCC LIMIT PK 3m BBHA9120D517_2014 VERTICAL
eut : i TOUCH POP V2
mode : 802.11n(20M)_F1
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2359.02	49.02	26.70	40.99	4.59	39.32	74.00	-34.68	---	---
2	2376.88	53.89	26.72	41.00	4.60	44.21	74.00	-29.79	---	---
3	2385.34	56.70	26.73	41.00	4.61	47.04	74.00	-26.96	---	---
4	2389.99	58.26	26.74	41.01	4.61	48.60	74.00	-25.40	---	---



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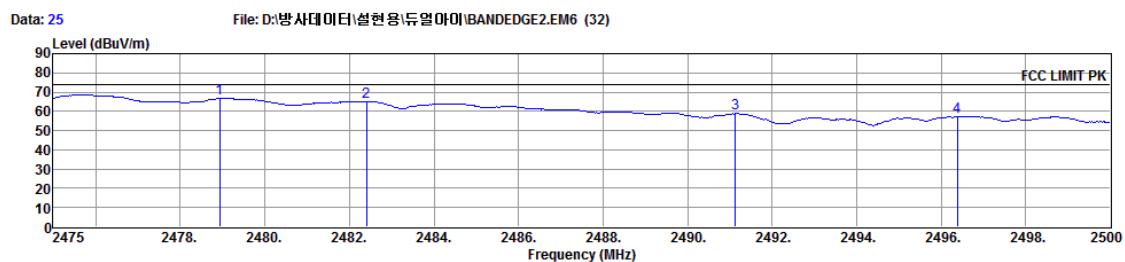
Site : SVSWR Chamber
Condition: FCC LIMIT AV 3m BBHA9120D517_2014 VERTICAL
eut : i TOUCH POP V2
mode : 802.11n(20M)_F1
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2351.04	37.39	26.69	40.98	4.59	27.69	54.00	-26.31	---	---
2	2379.07	43.30	26.73	41.00	4.60	33.63	54.00	-20.37	---	---
3	2385.24	47.50	26.73	41.00	4.61	37.84	54.00	-16.16	---	---
4	2389.99	47.98	26.74	41.01	4.61	38.32	54.00	-15.68	---	---

802.11n(20M) (2462MHz) – Horizontal



BWS TECH INC

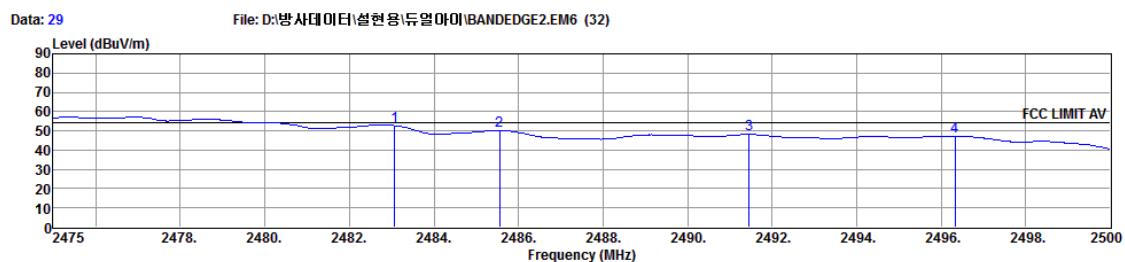


Site : SVSWR Chamber
Condition: FCC LIMIT PK 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11n(20M)_F3
memo :

	Freq	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark
		Level	Factor	Factor	Cable Loss	Level	Line	Limit	cm	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2478.93	76.27	26.85	41.07	4.66	66.71	74.00	-7.29	---	---
2	2482.40	74.74	26.86	41.07	4.66	65.19	74.00	-8.81	---	---
3	2491.13	68.70	26.87	41.07	4.67	59.17	74.00	-14.83	---	---
4	2496.38	66.81	26.88	41.08	4.67	57.28	74.00	-16.72	---	---



BWS TECH INC



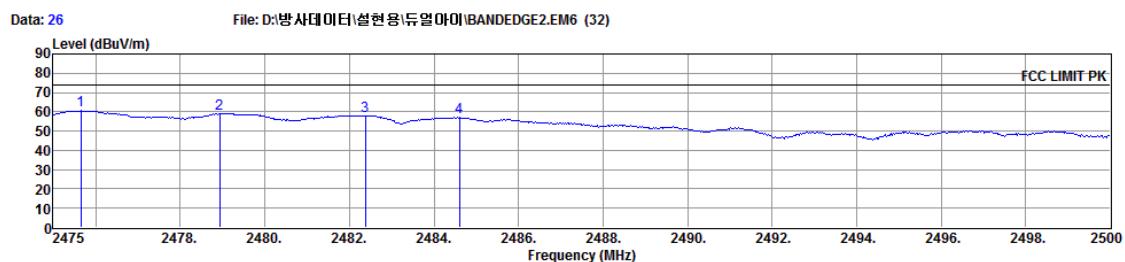
Site : SVSWR Chamber
Condition: FCC LIMIT AV 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11n(20M)_F3
memo :

	Freq	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark
		Level	Factor	Factor	Cable Loss	Level	Line	Limit	cm	
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2483.08	62.24	26.86	41.07	4.66	52.69	54.00	-1.31	---	---
2	2485.55	59.69	26.86	41.07	4.66	50.14	54.00	-3.86	---	---
3	2491.45	57.68	26.87	41.07	4.67	48.15	54.00	-5.85	---	---
4	2496.33	56.86	26.88	41.08	4.67	47.33	54.00	-6.67	---	---

802.11n(20M) (2462MHz) – Vertical



BWS TECH INC

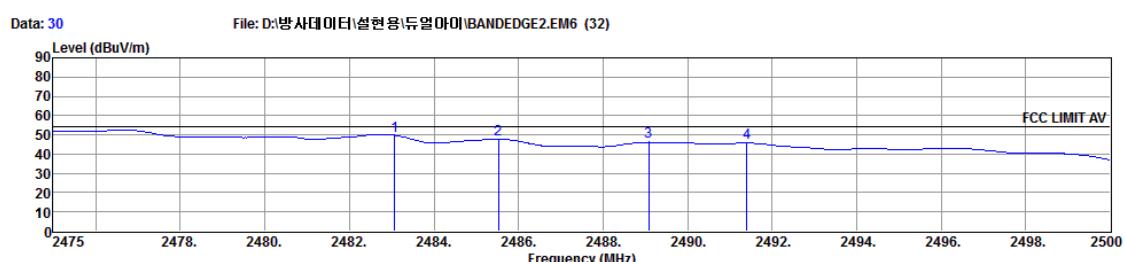


Site : SVSWR Chamber
Condition: FCC LIMIT PK 3m BBHA9120D517_2014 VERTICAL
eut : i TOUCH POP V2
mode : 802.11n(20M)_F3
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2475.65	70.06	26.85	41.06	4.66	60.51	74.00	-13.49	---	---
2	2478.93	68.49	26.85	41.07	4.66	58.93	74.00	-15.07	---	---
3	2482.38	67.66	26.86	41.07	4.66	58.11	74.00	-15.89	---	---
4	2484.60	66.50	26.86	41.07	4.66	56.95	74.00	-17.05	---	---



BWS TECH INC



Site : SVSWR Chamber
Condition: FCC LIMIT AV 3m BBHA9120D517_2014 VERTICAL
eut : i TOUCH POP V2
mode : 802.11n(20M)_F3
memo :

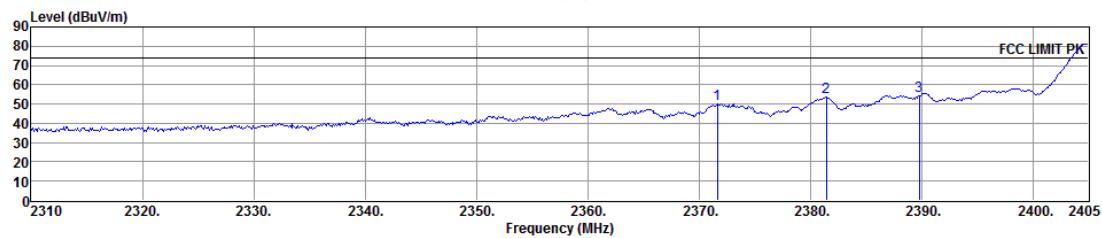
	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2483.08	59.27	26.86	41.07	4.66	49.72	54.00	-4.28	---	---
2	2485.53	57.26	26.86	41.07	4.66	47.71	54.00	-6.29	---	---
3	2489.08	55.73	26.87	41.07	4.66	46.19	54.00	-7.81	---	---
4	2491.40	55.29	26.87	41.07	4.67	45.76	54.00	-8.24	---	---

802.11n(40M) (2422MHz) – Horizontal



BWS TECH INC

Data: 13 File: D:\방사테이터\설현용\듀얼아이\BANDEDGE2.EM6 (32)



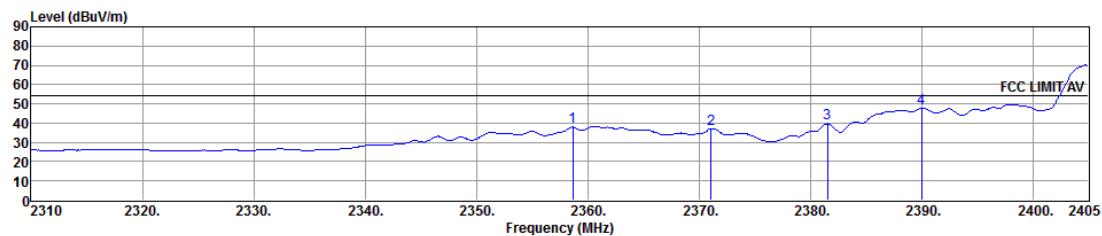
Site : SVSWR Chamber
Condition: FCC LIMIT PK 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11n(40M)_F1
memo :

Freq	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark		
	Level	Factor	Factor	Loss	Level	Line	Limit	dB	cm	deg	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB				
1	2371.66	59.67	26.72	40.99	4.60	50.00	74.00	-24.00	---	---	Peak
2	2381.44	63.14	26.73	41.00	4.61	53.48	74.00	-20.52	---	---	Peak
3	2389.80	63.62	26.74	41.01	4.61	53.96	74.00	-20.04	---	---	Peak



BWS TECH INC

Data: 15 File: D:\방사테이터\설현용\듀얼아이\BANDEDGE2.EM6 (32)



Site : SVSWR Chamber
Condition: FCC LIMIT AV 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11n(40M)_F1
memo :

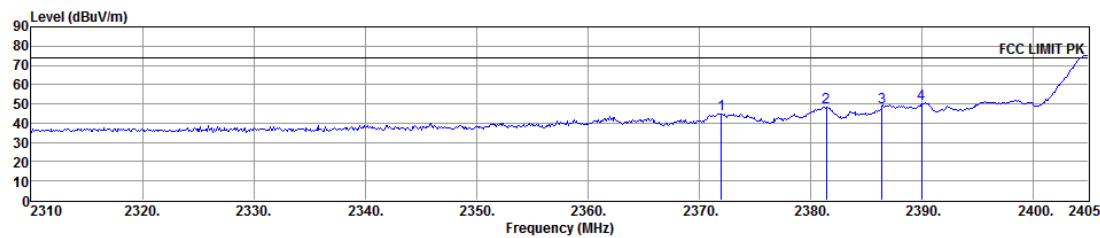
Freq	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark		
	Level	Factor	Factor	Loss	Level	Line	Limit	dB	cm	deg	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB				
1	2358.64	47.70	26.70	40.99	4.59	38.00	54.00	-16.00	---	---	Average
2	2371.09	46.79	26.72	40.99	4.60	37.12	54.00	-16.88	---	---	Average
3	2381.54	49.30	26.73	41.00	4.61	39.64	54.00	-14.36	---	---	Average
4	2389.99	57.55	26.74	41.01	4.61	47.89	54.00	-6.11	---	---	Average

802.11n(40M) (2422MHz) – Vertical



BWS TECH INC

Data: 14 File: D:\방사테이터\설현용\듀얼아이\BANDEDGE2.EM6 (32)



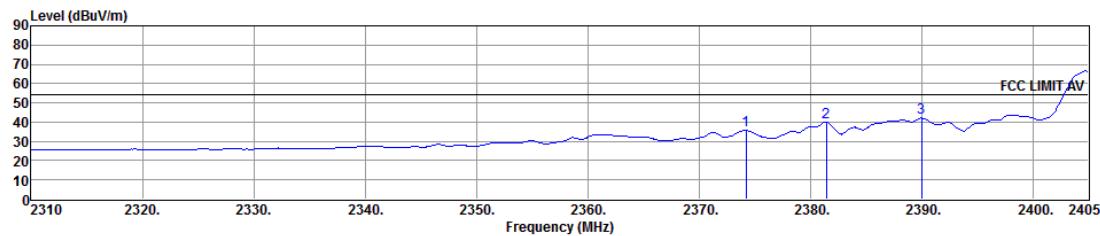
Site : SVSWR Chamber
Condition: FCC LIMIT PK 3m BBHA9120D517_2014 VERTICAL
eut : i TOUCH POP V2
mode : 802.11n(40M)_F1
memo :

Freq	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark
	Level	Factor	Factor	Loss	Level	Line	Limit	cm	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2372.04	54.45	26.72	41.00	4.60	44.77	74.00	-29.23	---
2	2381.44	58.06	26.73	41.00	4.61	48.40	74.00	-25.60	---
3	2386.48	58.12	26.74	41.01	4.61	48.46	74.00	-25.54	---
4	2389.99	59.57	26.74	41.01	4.61	49.91	74.00	-24.09	---



BWS TECH INC

Data: 16 File: D:\방사테이터\설현용\듀얼아이\BANDEDGE2.EM6 (32)



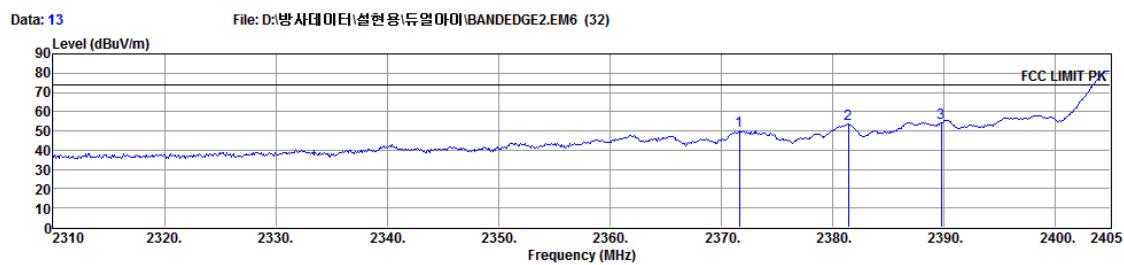
Site : SVSWR Chamber
Condition: FCC LIMIT AV 3m BBHA9120D517_2014 VERTICAL
eut : i TOUCH POP V2
mode : 802.11n(40M)_F1
memo :

Freq	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark
	Level	Factor	Factor	Loss	Level	Line	Limit	cm	
MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2374.22	45.31	26.72	41.00	4.60	35.63	54.00	-18.37	---
2	2381.44	49.78	26.73	41.00	4.61	40.12	54.00	-13.88	---
3	2389.99	51.76	26.74	41.01	4.61	42.10	54.00	-11.90	---

802.11n(40M) (2452MHz) – Horizontal



BWS TECH INC

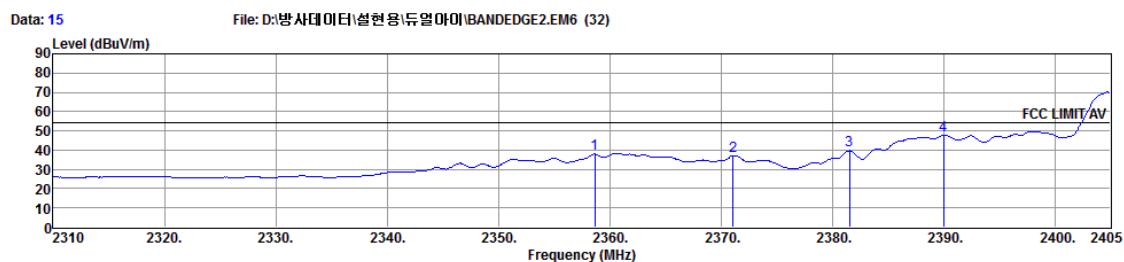


Site : SVSWR Chamber
Condition: FCC LIMIT PK 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11n(40M)_F1
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Loss	Level	Line	Limit			
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2371.66	59.67	26.72	40.99	4.60	50.00	74.00	-24.00	---	---
2	2381.44	63.14	26.73	41.00	4.61	53.48	74.00	-20.52	---	---
3	2389.80	63.62	26.74	41.01	4.61	53.96	74.00	-20.04	---	---



BWS TECH INC



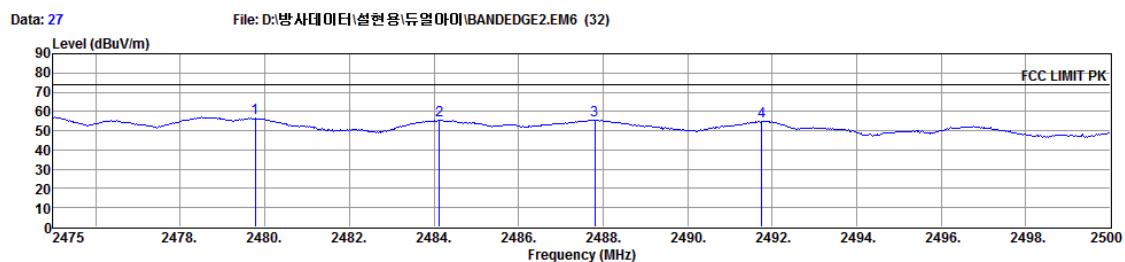
Site : SVSWR Chamber
Condition: FCC LIMIT AV 3m BBHA9120D517_2014 HORIZONTAL
eut : i TOUCH POP V2
mode : 802.11n(40M)_F1
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Loss	Level	Line	Limit			
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2358.64	47.70	26.70	40.99	4.59	38.00	54.00	-16.00	---	---
2	2371.09	46.79	26.72	40.99	4.60	37.12	54.00	-16.88	---	---
3	2381.54	49.30	26.73	41.00	4.61	39.64	54.00	-14.36	---	---
4	2389.99	57.55	26.74	41.01	4.61	47.89	54.00	-6.11	---	---

802.11n(40M) (2452MHz) – Vertical



BWS TECH INC

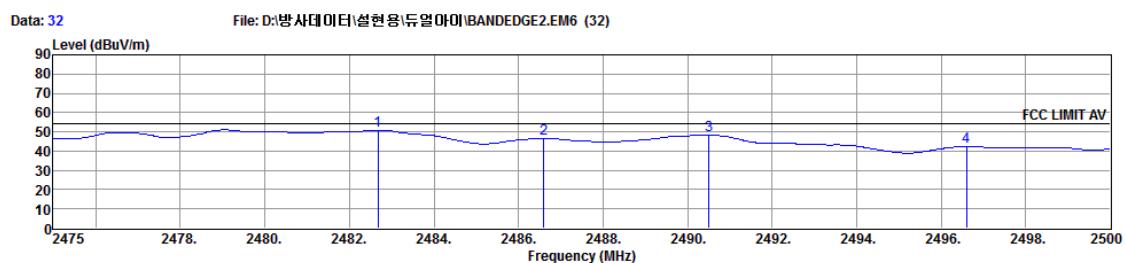


Site : SVSWR Chamber
Condition: FCC LIMIT PK 3m BBHA9120D517_2014 VERTICAL
eut : i TOUCH POP V2
mode : 802.11n(40M)_F3
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2479.78	66.07	26.85	41.07	4.66	56.51	74.00	-17.49	---	---
2	2484.13	64.86	26.86	41.07	4.66	55.31	74.00	-18.69	---	---
3	2487.80	65.00	26.86	41.07	4.66	55.45	74.00	-18.55	---	---
4	2491.75	64.43	26.87	41.07	4.67	54.90	74.00	-19.10	---	---



BWS TECH INC



Site : SVSWR Chamber
Condition: FCC LIMIT AV 3m BBHA9120D517_2014 VERTICAL
eut : i TOUCH POP V2
mode : 802.11n(40M)_F3
memo :

	ReadAntenna		Preamp	Cable	Limit	Over	A/Pos	T/Pos	Remark	
	Freq	Level	Factor	Factor	Loss	Level	Line	Limit		
	MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	cm	deg
1	2482.68	60.48	26.86	41.07	4.66	50.93	54.00	-3.07	---	---
2	2486.60	56.19	26.86	41.07	4.66	46.64	54.00	-7.36	---	---
3	2490.50	57.88	26.87	41.07	4.66	48.34	54.00	-5.66	---	---
4	2496.60	51.88	26.88	41.08	4.67	42.35	54.00	-11.65	---	---

5.7 Antenna Application

5.7.1 Antenna Requirement

Standard	Requirement
FCC CRF Part 15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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 provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

Antenna Type	Frequency	Antenna Gain	Limit
Chip Antenna	2.4 GHz	5.52 dBi	≤6 dBi

5.7.2 Result

PASS

5.8 Conducted Emission

5.8.1 Test Equipment

EQUIPMENT	MODEL	MANUFACTURE	SERIAL NUMBER	Calibration Due date (year/month/date)
LISN	ENV216	ROHDE & SCHWARZ	100324	16/01/12
LISN	FCC-LISN-50-50-2-02	FCC	03074	16/01/12
#2 Conducted Cable_2.7m	N/A	N/A	N/A	16/01/14
Test Receiver	ESPI	ROHDE & SCHWARZ	100063	16/01/12
CE CHAMBER	N/A	SY Corp.	N/A	15/09/17
AC Power Source	15001ix-CTS	California Instruments	56255/56256/56257	16/01/13

5.8.2 Test Limit

For equipment that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table.

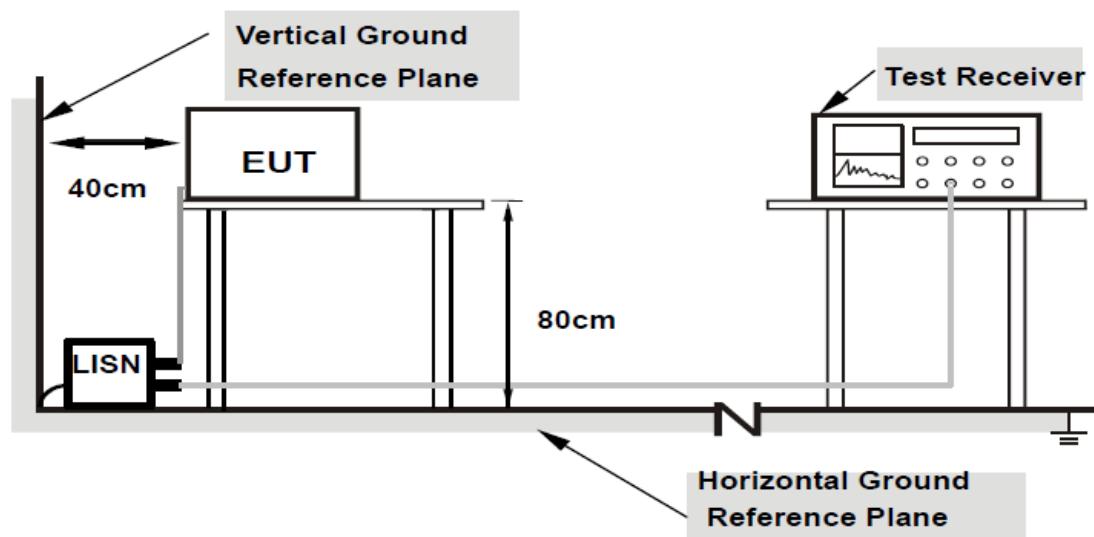
Frequency of emission(MHz)	Conducted limit(dB μ V)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

5.8.3 Test Procedures

1. The EUT was placed 0.4 meter from the conducting wall of the shielding room was kept at least 80 centimeters from any other grounded conducting surface.
2. Connect EUT to the power mains through a line impedance stabilization network(LISN).
3. All the support units are connecting to the other LISN.
4. The LISN provides 50 ohm coupling impedance for the measuring instrument.
5. The FCC states that a 50 ohm, 50 microhenry LISN should be used.
6. Both sides of AC line were checked for maximum conducted interference.
7. The frequency range from 150 kHz to 30 MHz was searched.
8. Set the test-receiver system to Peak Detect Function and specified bandwidth (IF Bandwidth = 9kHz) with Maximum Hold Mode. Then measurement is also conducted by Average Detector and Quasi-Peak Detector Function respectively.

5.8.4 Block Diagram of Test Setup



5.8.5 Test Result

802.11b - H

Conducted Test Report

BWS TECH EMC Team

BWS TECH INC.
EMI Measurement Test Report
Device Under Test DUALI
Operating Conditions H
Operator Name
Test Specification
Comment WLAN_B MODE

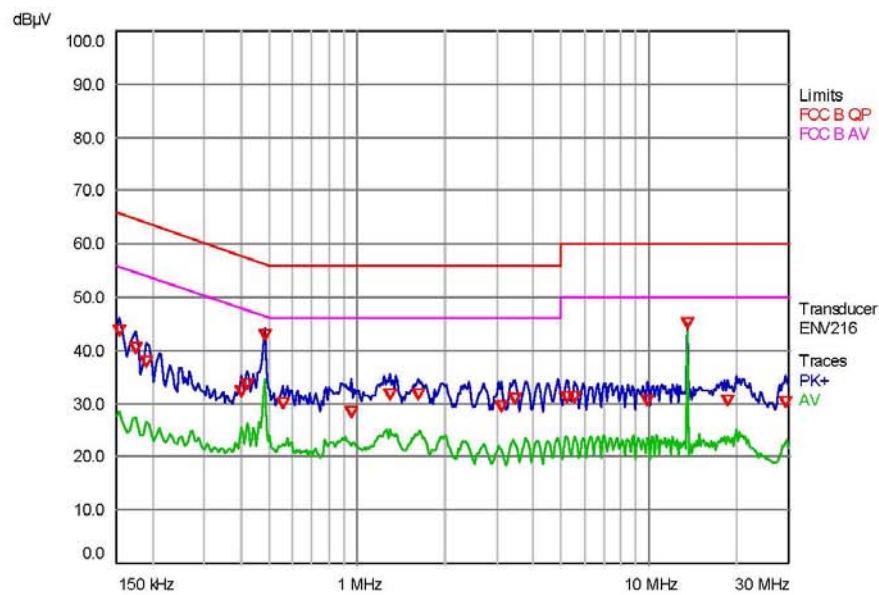
Scan Settings (3 Ranges)

Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	500 kHz	4 kHz	9 kHz (6dB)	50 ms	20 dB	On
500 kHz	5 MHz	4 kHz	9 kHz (6dB)	20 ms	20 dB	On
5 MHz	30 MHz	4 kHz	9 kHz (6dB)	10 ms	20 dB	On

Final Measurement

Detectors: QP, AV
Peaks: 1 Meas Time: 1 s
Acc. Margin: 6 dB

Pre-measurement Graph



Conducted Test Report

BWS TECH EMC Team

Final Measurement Results

Trace	Frequency (MHz)	Level (dB μ V)	Limit (dB μ V)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 QP	0.154	42.81	65.78	-22.97		
1 QP	0.174	39.50	64.77	-25.27		
1 QP	0.19	36.97	64.04	-27.07		
1 QP	0.402	31.21	57.81	-26.60		
1 QP	0.422	32.65	57.41	-24.76		
1 QP	0.482	41.87	56.30	-14.43		
1 QP	0.556	29.08	56.00	-26.92		
1 QP	0.952	27.49	56.00	-28.51		
1 QP	1.292	30.64	56.00	-25.36		
1 QP	1.616	30.80	56.00	-25.20		
1 QP	3.12	28.42	56.00	-27.58		
1 QP	3.46	30.02	56.00	-25.98		
1 QP	5.212	30.27	60.00	-29.73		
1 QP	5.576	30.03	60.00	-29.97		
1 QP	9.888	29.74	60.00	-30.26		
1 QP	13.56	44.03	60.00	-15.97		
1 QP	18.528	29.54	60.00	-30.46		
1 QP	29.312	29.45	60.00	-30.55		

* = limit exceeded

802.11b - N

Conducted Test Report

BWS TECH EMC Team

BWS TECH INC.
EMI Measurement Test Report

Device Under Test DUALI
Operating Conditions N
Operator Name
Test Specification WLAN_B
Comment

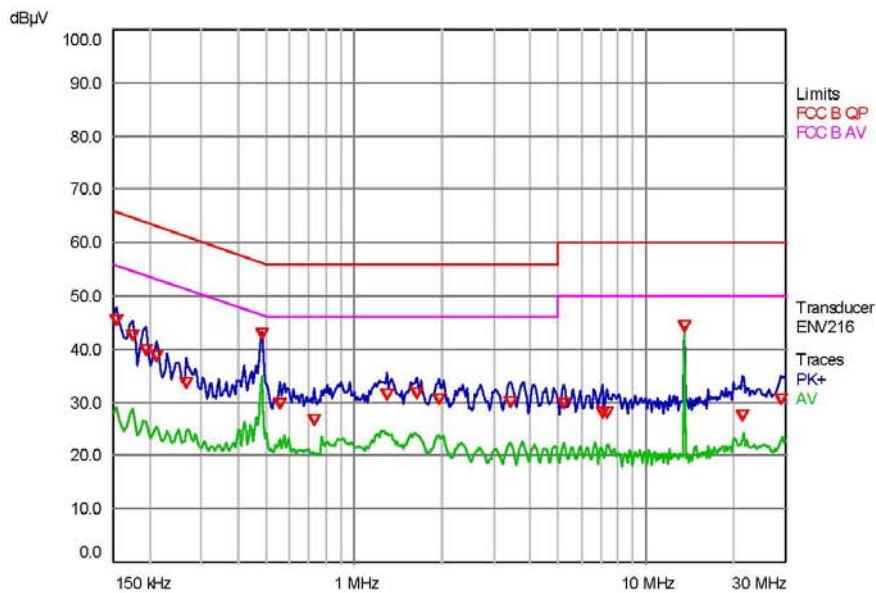
Scan Settings (3 Ranges)

Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	500 kHz	4 kHz	9 kHz (6dB)	50 ms	20 dB	On
500 kHz	5 MHz	4 kHz	9 kHz (6dB)	20 ms	20 dB	On
5 MHz	30 MHz	4 kHz	9 kHz (6dB)	10 ms	20 dB	On

Final Measurement

Detectors: QP, AV
Peaks: 1 Meas Time: 1 s
Acc. Margin: 6 dB

Pre-measurement Graph



Conducted Test Report

BWS TECH EMC Team

Final Measurement Results

Trace	Frequency (MHz)	Level (dB μ V)	Limit (dB μ V)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 QP	0.154	44.29	65.78	-21.49		
1 QP	0.174	41.52	64.77	-23.25		
1 QP	0.194	38.95	63.86	-24.91		
1 QP	0.21	37.66	63.21	-25.55		
1 QP	0.266	32.64	61.24	-28.60		
1 QP	0.482	41.98	56.30	-14.32		
1 QP	0.556	28.77	56.00	-27.23		
1 QP	0.728	25.81	56.00	-30.19		
1 QP	1.292	30.33	56.00	-25.67		
1 QP	1.636	30.64	56.00	-25.36		
1 QP	1.964	29.56	56.00	-26.44		
1 QP	3.42	29.18	56.00	-26.82		
1 QP	5.232	28.71	60.00	-31.29		
1 QP	7.076	27.03	60.00	-32.97		
1 QP	7.388	27.04	60.00	-32.96		
1 QP	13.56	43.30	60.00	-16.70		
1 QP	21.34	26.63	60.00	-33.37		
1 QP	29.084	29.72	60.00	-30.28		

* = limit exceeded

802.11g - H

Conducted Test Report

BWS TECH EMC Team

BWS TECH INC.
EMI Measurement Test Report

Device Under Test DUALI
Operating Conditions HOT
Operator Name
Test Specification WLAN_G
Comment

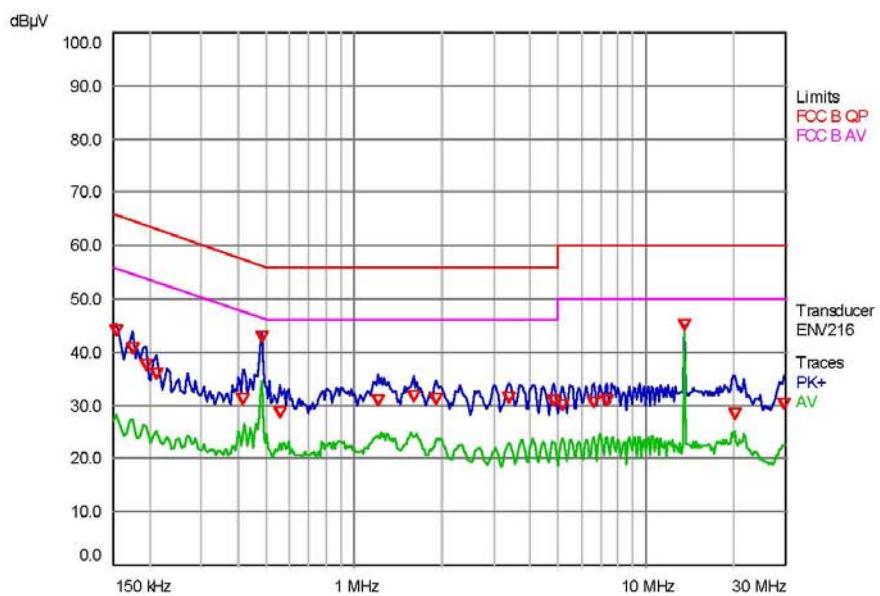
Scan Settings (3 Ranges)

Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	500 kHz	4 kHz	9 kHz (6dB)	50 ms	20 dB	On
500 kHz	5 MHz	4 kHz	9 kHz (6dB)	20 ms	20 dB	On
5 MHz	30 MHz	4 kHz	9 kHz (6dB)	10 ms	20 dB	On

Final Measurement

Detectors: QP, AV
Peaks: 1 Meas Time: 1 s
Acc. Margin: 6 dB

Pre-measurement Graph



Conducted Test Report

BWS TECH EMC Team

Final Measurement Results

Trace	Frequency (MHz)	Level (dB μ V)	Limit (dB μ V)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 QP	0.154	43.07	65.78	-22.71		
1 QP	0.174	39.78	64.77	-24.99		
1 QP	0.194	36.52	63.86	-27.34		
1 QP	0.21	35.03	63.21	-28.18		
1 QP	0.418	30.29	57.49	-27.20		
1 QP	0.482	41.97	56.30	-14.33		
1 QP	0.56	27.69	56.00	-28.31		
1 QP	1.212	29.98	56.00	-26.02		
1 QP	1.596	30.72	56.00	-25.28		
1 QP	1.904	30.13	56.00	-25.87		
1 QP	3.384	30.35	56.00	-25.65		
1 QP	4.844	29.86	56.00	-26.14		
1 QP	5.148	29.08	60.00	-30.92		
1 QP	6.632	29.47	60.00	-30.53		
1 QP	7.324	29.77	60.00	-30.23		
1 QP	13.56	44.05	60.00	-15.95		
1 QP	20.224	27.35	60.00	-32.65		
1 QP	29.484	29.22	60.00	-30.78		

* = limit exceeded

802.11g - N

Conducted Test Report

BWS TECH EMC Team

BWS TECH INC.
EMI Measurement Test Report

Device Under Test DUALI
Operating Conditions N
Operator Name
Test Specification WLAN_G
Comment

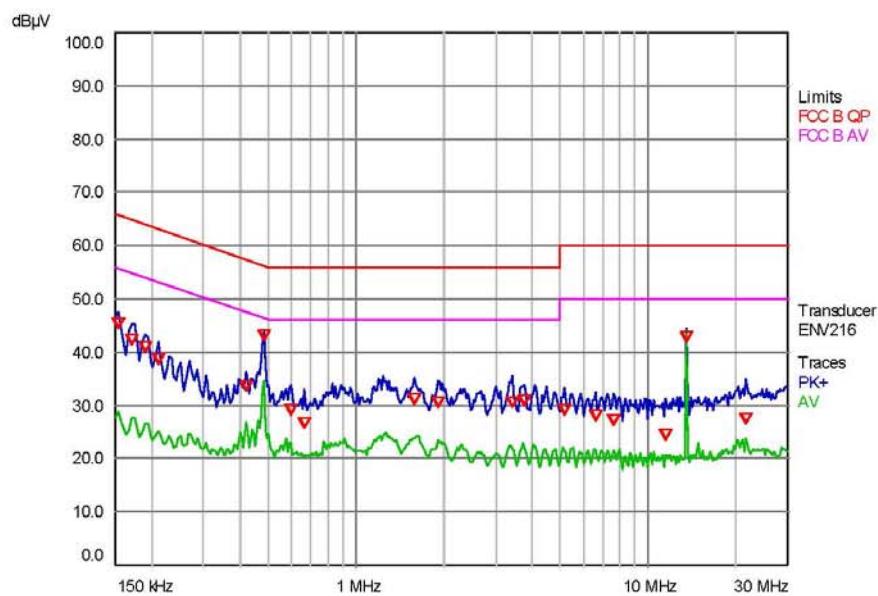
Scan Settings (3 Ranges)

Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	500 kHz	4 kHz	9 kHz (6dB)	50 ms	20 dB	On
500 kHz	5 MHz	4 kHz	9 kHz (6dB)	20 ms	20 dB	On
5 MHz	30 MHz	4 kHz	9 kHz (6dB)	10 ms	20 dB	On

Final Measurement

Detectors: QP, AV
Peaks: 1 Meas Time: 1 s
Acc. Margin: 6 dB

Pre-measurement Graph



Conducted Test Report

BWS TECH EMC Team

Final Measurement Results

Trace	Frequency (MHz)	Level (dB μ V)	Limit (dB μ V)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 QP	0.154	44.45	65.78	-21.33		
1 QP	0.17	41.28	64.96	-23.68		
1 QP	0.19	39.88	64.04	-24.16		
1 QP	0.21	37.70	63.21	-25.51		
1 QP	0.422	32.62	57.41	-24.79		
1 QP	0.482	42.07	56.30	-14.23		
1 QP	0.596	28.10	56.00	-27.90		
1 QP	0.664	25.71	56.00	-30.29		
1 QP	1.576	30.08	56.00	-25.92		
1 QP	1.904	29.61	56.00	-26.39		
1 QP	3.42	29.69	56.00	-26.31		
1 QP	3.768	29.79	56.00	-26.21		
1 QP	5.152	28.29	60.00	-31.71		
1 QP	6.612	27.08	60.00	-32.92		
1 QP	7.644	26.14	60.00	-33.86		
1 QP	11.492	23.55	60.00	-36.45		
1 QP	13.56	41.91	60.00	-18.09		
1 QP	21.648	26.56	60.00	-33.44		

* = limit exceeded

802.11n(20M) - H

Conducted Test Report

BWS TECH EMC Team

BWS TECH INC.
EMI Measurement Test Report

Device Under Test DUALI
Operating Conditions H
Operator Name
Test Specification WLAN_N20
Comment

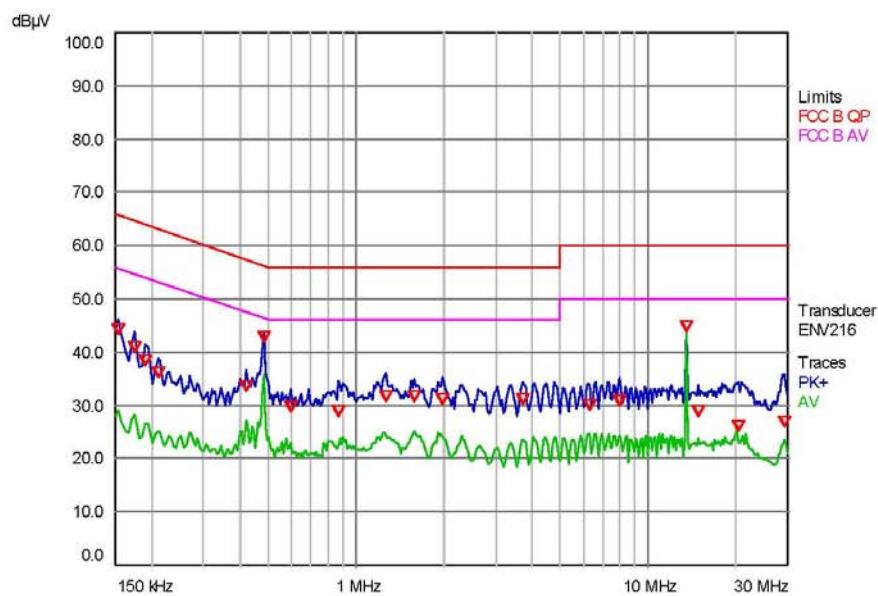
Scan Settings (3 Ranges)

Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	500 kHz	4 kHz	9 kHz (6dB)	50 ms	20 dB	On
500 kHz	5 MHz	4 kHz	9 kHz (6dB)	20 ms	20 dB	On
5 MHz	30 MHz	4 kHz	9 kHz (6dB)	10 ms	20 dB	On

Final Measurement

Detectors: QP, AV
Peaks: 1 Meas Time: 1 s
Acc. Margin: 6 dB

Pre-measurement Graph



Conducted Test Report

BWS TECH EMC Team

Final Measurement Results

Trace	Frequency (MHz)	Level (dB μ V)	Limit (dB μ V)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 QP	0.154	43.21	65.78	-22.57		
1 QP	0.174	39.97	64.77	-24.80		
1 QP	0.19	37.34	64.04	-26.70		
1 QP	0.21	35.31	63.21	-27.90		
1 QP	0.422	32.71	57.41	-24.70		
1 QP	0.482	41.96	56.30	-14.34		
1 QP	0.596	28.77	56.00	-27.23		
1 QP	0.872	27.84	56.00	-28.16		
1 QP	1.272	30.79	56.00	-25.21		
1 QP	1.58	30.72	56.00	-25.28		
1 QP	1.984	30.13	56.00	-25.87		
1 QP	3.732	30.06	56.00	-25.94		
1 QP	6.312	29.14	60.00	-30.86		
1 QP	8.024	29.90	60.00	-30.10		
1 QP	13.56	43.98	60.00	-16.02		
1 QP	14.764	28.01	60.00	-31.99		
1 QP	20.376	25.21	60.00	-34.79		
1 QP	29.192	25.99	60.00	-34.01		

* = limit exceeded

802.11n(20M) - N

Conducted Test Report

BWS TECH EMC Team

BWS TECH INC.
EMI Measurement Test Report

Device Under Test DUALI
Operating Conditions N
Operator Name
Test Specification WLAN_N20
Comment

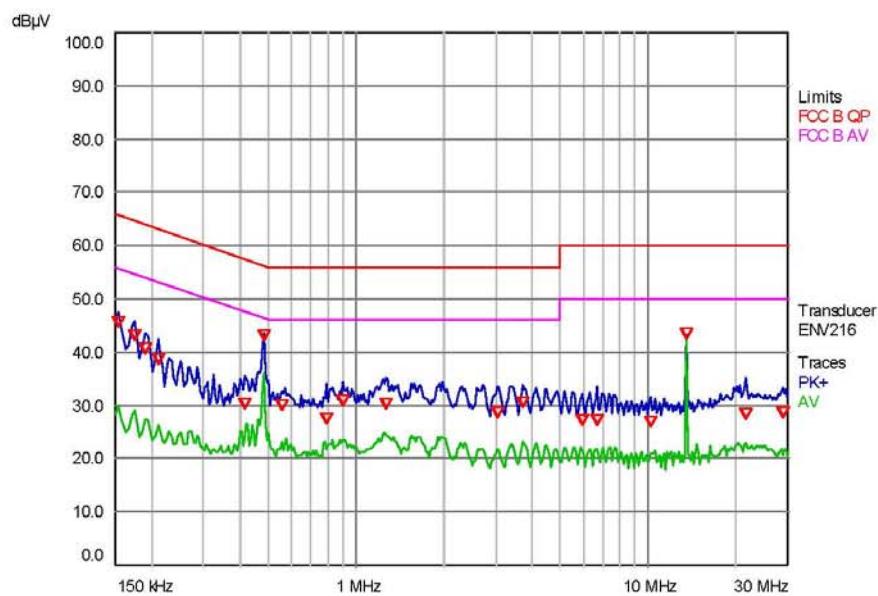
Scan Settings (3 Ranges)

Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	500 kHz	4 kHz	9 kHz (6dB)	50 ms	20 dB	On
500 kHz	5 MHz	4 kHz	9 kHz (6dB)	20 ms	20 dB	On
5 MHz	30 MHz	4 kHz	9 kHz (6dB)	10 ms	20 dB	On

Final Measurement

Detectors: QP, AV
Peaks: 1 Meas Time: 1 s
Acc. Margin: 6 dB

Pre-measurement Graph



Conducted Test Report

BWS TECH EMC Team

Final Measurement Results

Trace	Frequency (MHz)	Level (dB μ V)	Limit (dB μ V)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 QP	0.154	44.66	65.78	-21.12		
1 QP	0.174	42.14	64.77	-22.63		
1 QP	0.19	39.80	64.04	-24.24		
1 QP	0.21	37.68	63.21	-25.53		
1 QP	0.418	29.45	57.49	-28.04		
1 QP	0.482	42.10	56.30	-14.20		
1 QP	0.556	29.00	56.00	-27.00		
1 QP	0.792	26.57	56.00	-29.43		
1 QP	0.904	29.82	56.00	-26.18		
1 QP	1.268	29.42	56.00	-26.58		
1 QP	3.056	27.62	56.00	-28.38		
1 QP	3.732	29.47	56.00	-26.53		
1 QP	5.932	26.34	60.00	-33.66		
1 QP	6.684	26.19	60.00	-33.81		
1 QP	10.18	25.96	60.00	-34.04		
1 QP	13.56	42.32	60.00	-17.68		
1 QP	21.648	27.36	60.00	-32.64		
1 QP	28.968	27.73	60.00	-32.27		

* = limit exceeded

802.11n(40M) - H

Conducted Test Report

BWS TECH EMC Team

BWS TECH INC.
EMI Measurement Test Report

Device Under Test DUALI
Operating Conditions H
Operator Name
Test Specification WLAN_N40
Comment

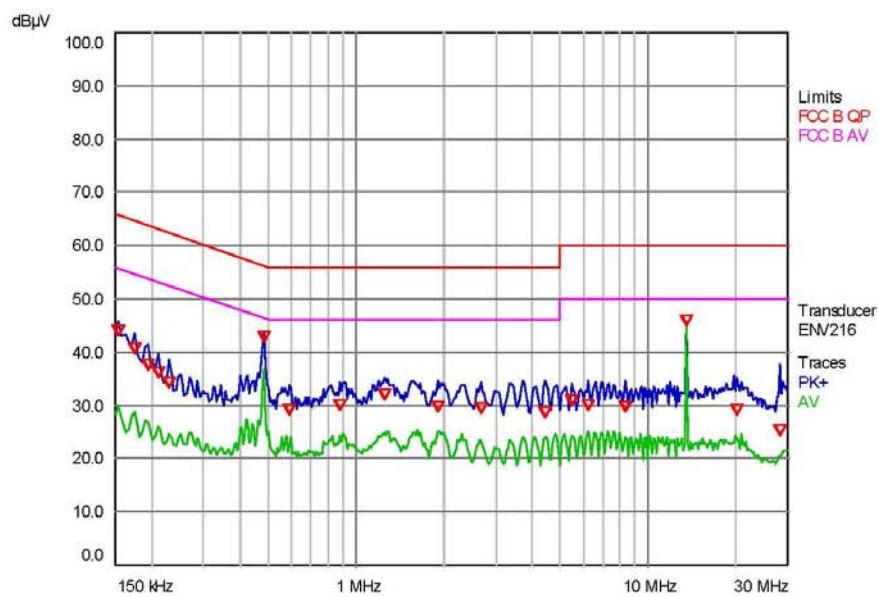
Scan Settings (3 Ranges)

Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	500 kHz	4 kHz	9 kHz (6dB)	50 ms	20 dB	On
500 kHz	5 MHz	4 kHz	9 kHz (6dB)	20 ms	20 dB	On
5 MHz	30 MHz	4 kHz	9 kHz (6dB)	10 ms	20 dB	On

Final Measurement

Detectors: QP, AV
Peaks: 1 Meas Time: 1 s
Acc. Margin: 6 dB

Pre-measurement Graph



Conducted Test Report

BWS TECH EMC Team

Final Measurement Results

Trace	Frequency (MHz)	Level (dB μ V)	Limit (dB μ V)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 QP	0.154	43.12	65.78	-22.66		
1 QP	0.174	39.75	64.77	-25.02		
1 QP	0.194	36.50	63.86	-27.36		
1 QP	0.21	35.10	63.21	-28.11		
1 QP	0.23	33.11	62.45	-29.34		
1 QP	0.482	41.77	56.30	-14.53		
1 QP	0.592	28.12	56.00	-27.88		
1 QP	0.88	29.14	56.00	-26.86		
1 QP	1.252	31.02	56.00	-24.98		
1 QP	1.908	28.75	56.00	-27.25		
1 QP	2.696	28.52	56.00	-27.48		
1 QP	4.448	27.61	56.00	-28.39		
1 QP	5.5	29.91	60.00	-30.09		
1 QP	6.216	29.15	60.00	-30.85		
1 QP	8.36	28.90	60.00	-31.10		
1 QP	13.56	44.88	60.00	-15.12		
2 AV	13.56	44.93	50.00	-5.07		
1 QP	20.088	28.13	60.00	-31.87		
1 QP	28.328	24.18	60.00	-35.82		

* = limit exceeded

802.11n(40M) - N

Conducted Test Report

BWS TECH EMC Team

BWS TECH INC.
EMI Measurement Test Report

Device Under Test DUALI
Operating Conditions N
Operator Name
Test Specification WLAN_N40
Comment

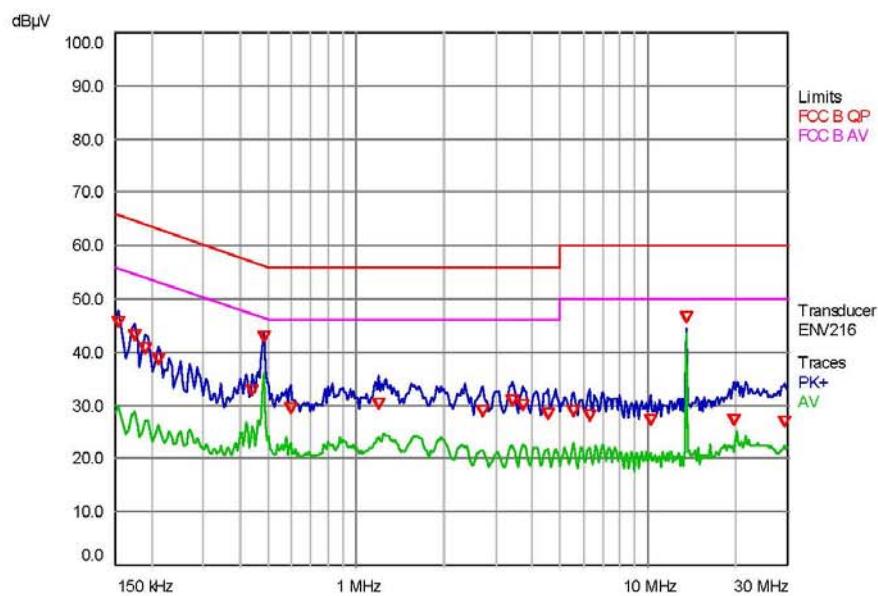
Scan Settings (3 Ranges)

Frequencies			Receiver Settings			
Start	Stop	Step	Res BW	M-Time	Atten	Preamp
150 kHz	500 kHz	4 kHz	9 kHz (6dB)	50 ms	20 dB	On
500 kHz	5 MHz	4 kHz	9 kHz (6dB)	20 ms	20 dB	On
5 MHz	30 MHz	4 kHz	9 kHz (6dB)	10 ms	20 dB	On

Final Measurement

Detectors: QP, AV
Peaks: 1 Meas Time: 1 s
Acc. Margin: 6 dB

Pre-measurement Graph



Conducted Test Report

BWS TECH EMC Team

Final Measurement Results

Trace	Frequency (MHz)	Level (dB μ V)	Limit (dB μ V)	Delta Limit (dB)	Delta Ref (dB)	Comment
1 QP	0.154	44.69	65.78	-21.09		
1 QP	0.174	42.23	64.77	-22.54		
1 QP	0.19	39.80	64.04	-24.24		
1 QP	0.21	37.81	63.21	-25.40		
1 QP	0.442	31.95	57.02	-25.07		
1 QP	0.482	41.97	56.30	-14.33		
1 QP	0.596	28.51	56.00	-27.49		
1 QP	1.196	29.32	56.00	-26.68		
1 QP	2.712	27.94	56.00	-28.06		
1 QP	3.448	29.92	56.00	-26.08		
1 QP	3.716	28.93	56.00	-27.07		
1 QP	4.536	27.44	56.00	-28.56		
1 QP	5.56	27.87	60.00	-32.13		
1 QP	6.312	27.11	60.00	-32.89		
1 QP	10.216	26.31	60.00	-33.69		
1 QP	13.56	45.62	60.00	-14.38		
1 QP	19.604	26.15	60.00	-33.85		
1 QP	29.332	26.06	60.00	-33.94		

* = limit exceeded