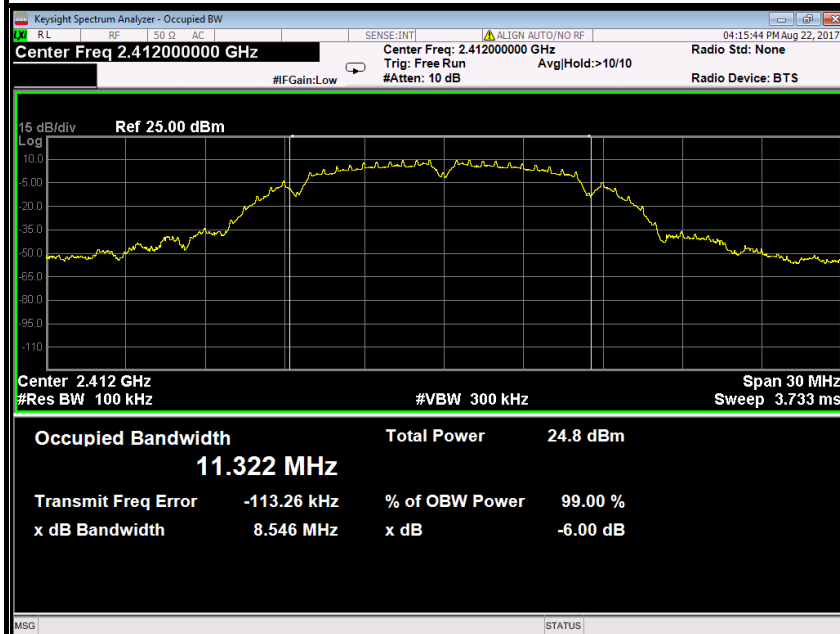




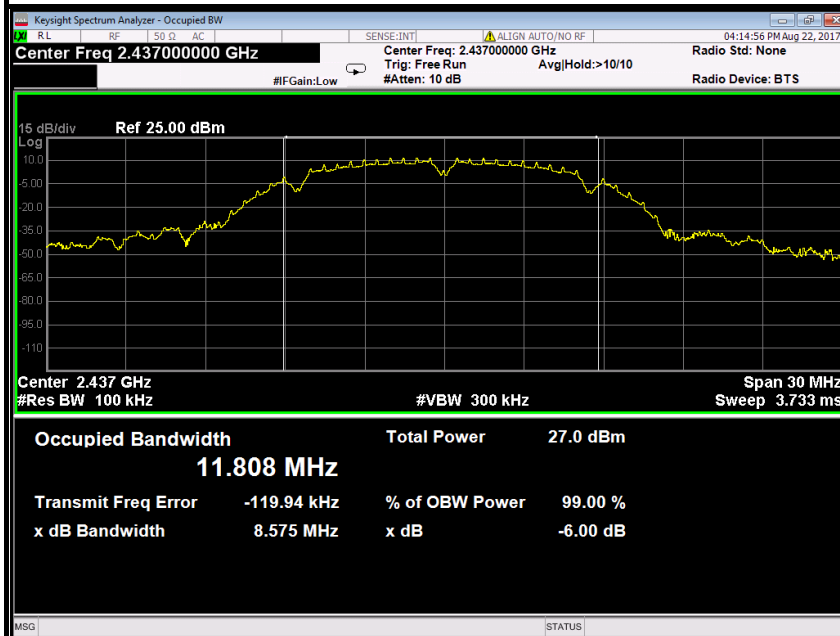
## Antenna 2

## IEEE 802.11b mode

## 6dB Bandwidth (CH Low)

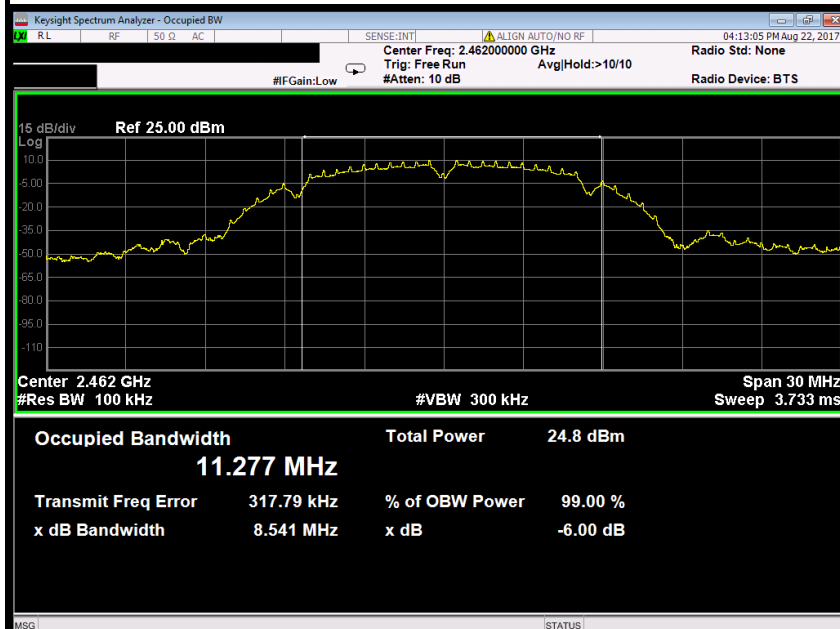


## 6dB Bandwidth (CH Mid)



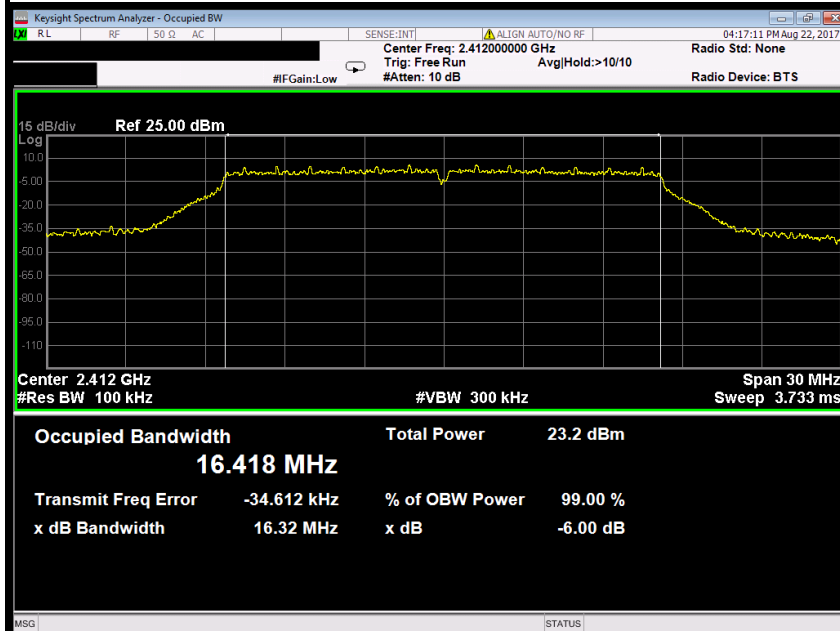


### 6dB Bandwidth (CH High)



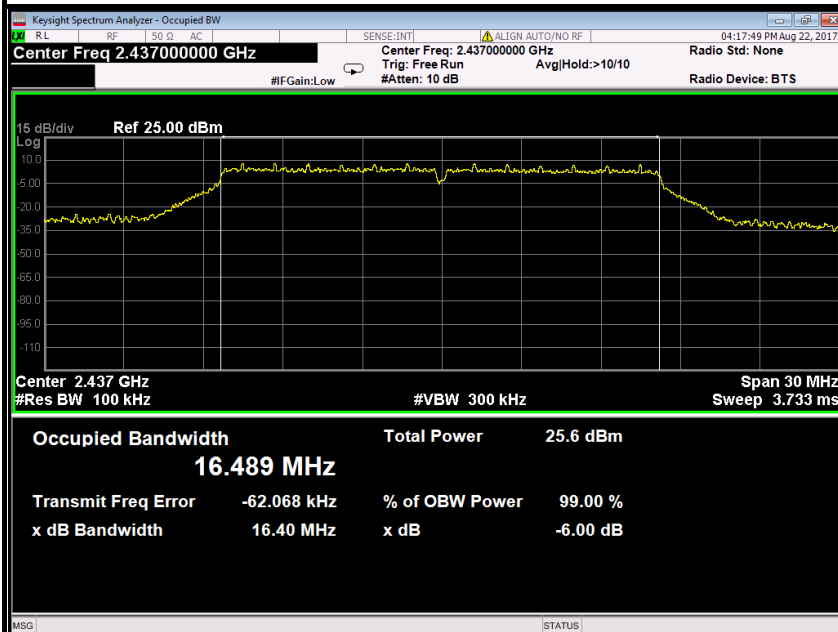
### IEEE 802.11g mode

### 6dB Bandwidth (CH Low)

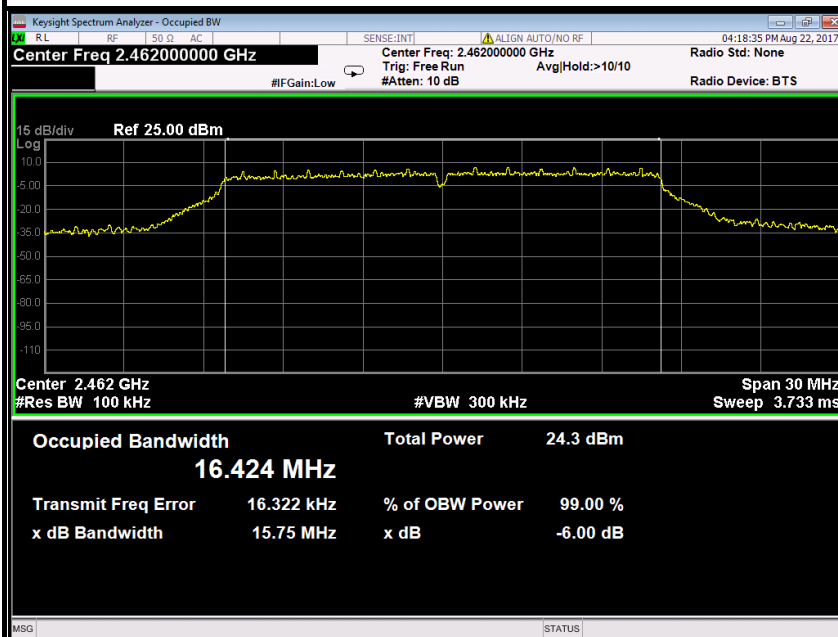




### 6dB Bandwidth (CH Mid)



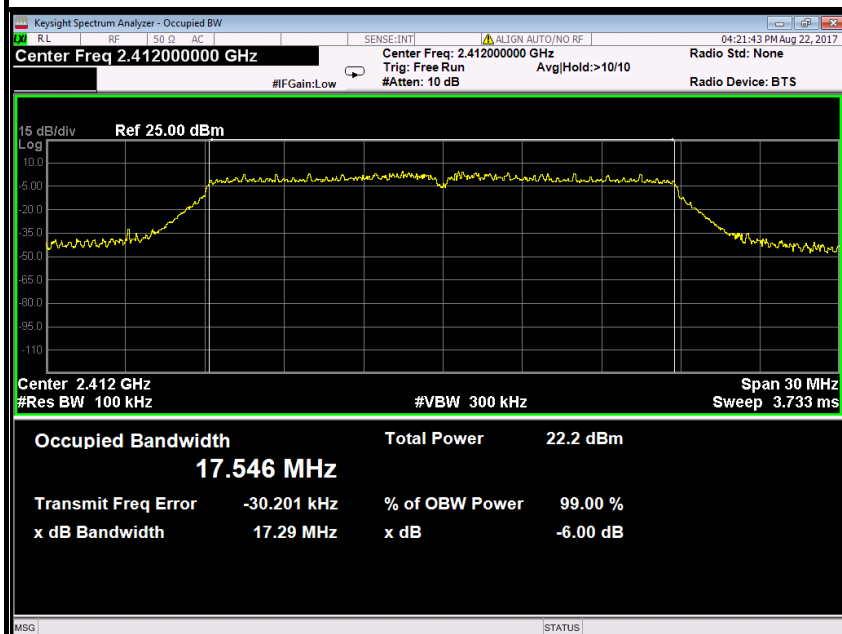
### 6dB Bandwidth (CH High)



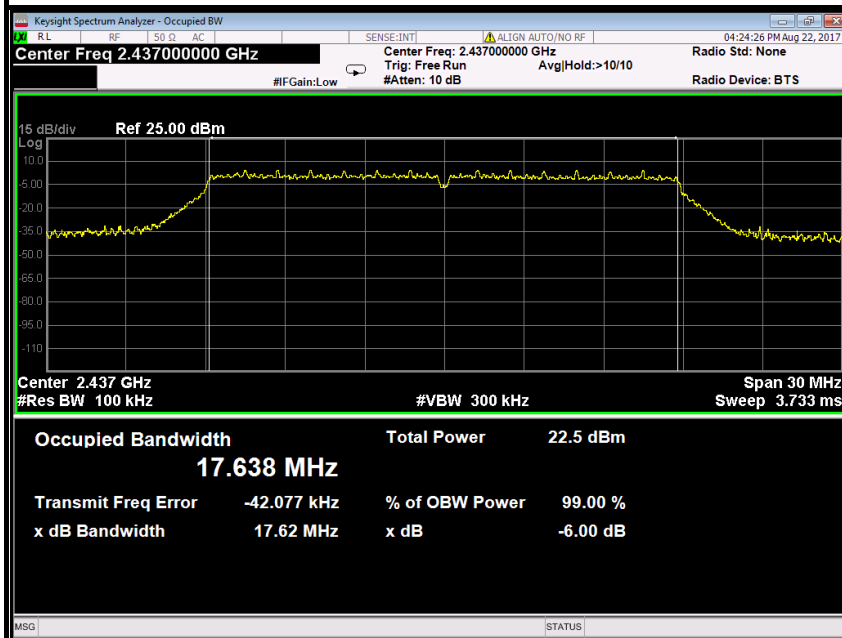


## IEEE 802.11n HT20 MHz mode

### 6dB Bandwidth (CH Low)

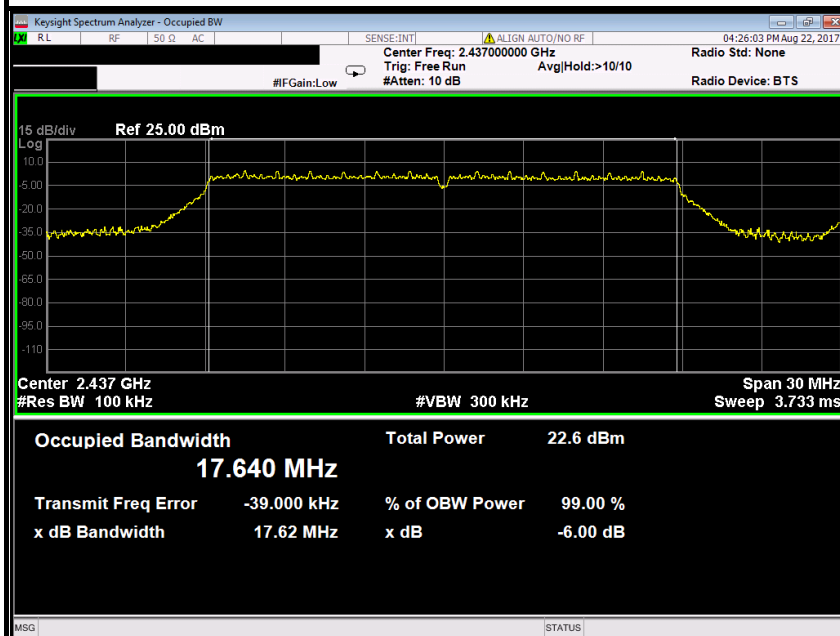


### 6dB Bandwidth (CH Mid)



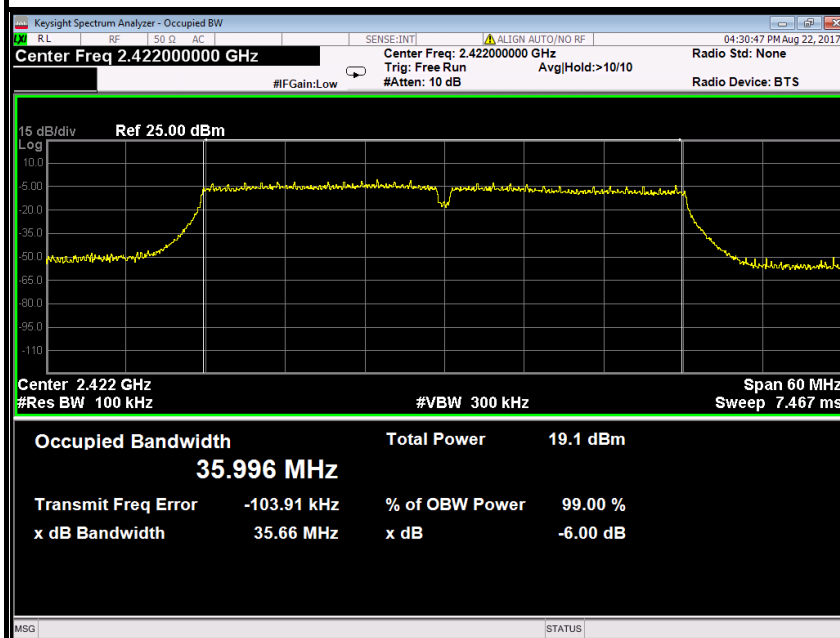


### 6dB Bandwidth (CH High)



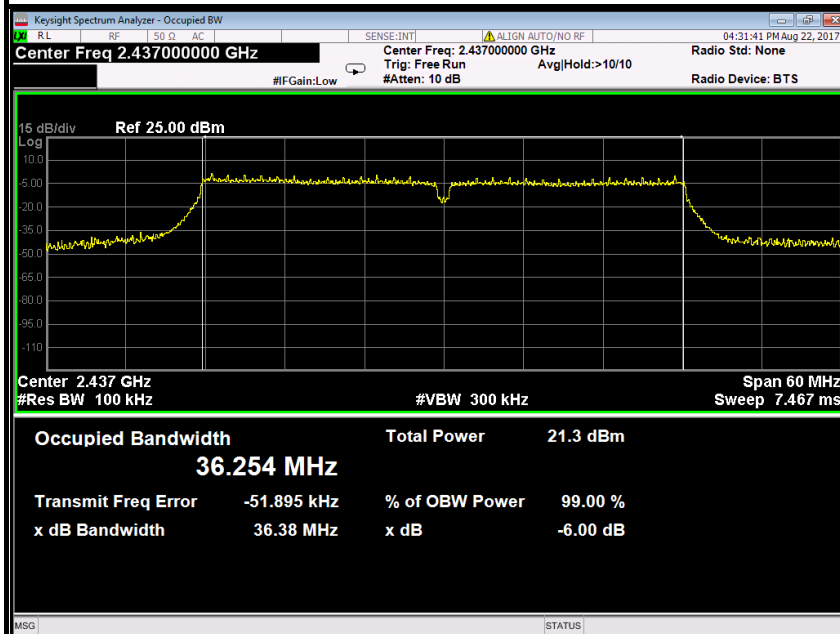
### IEEE 802.11n HT40 MHz mode

### 6dB Bandwidth (CH Low)

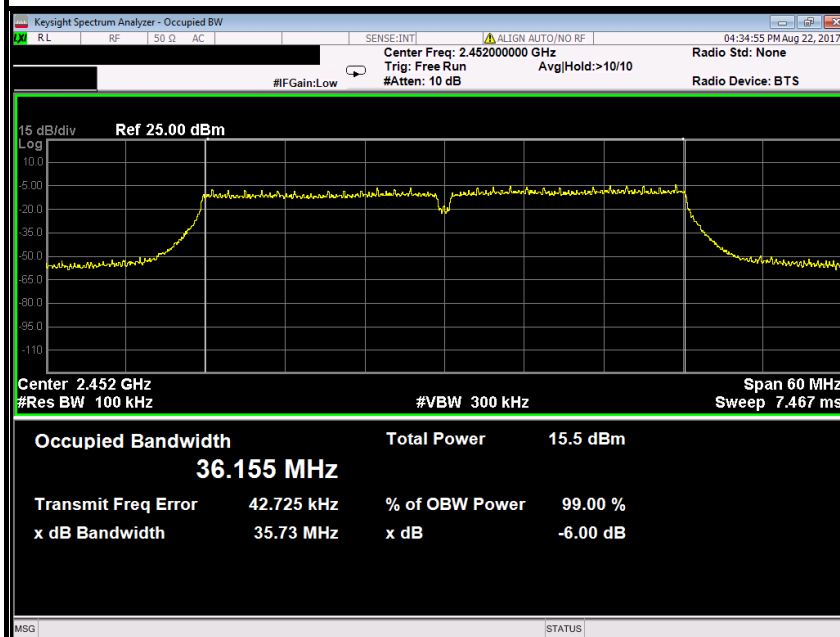




### 6dB Bandwidth (CH Mid)



### 6dB Bandwidth (CH High)





## 7.4. ANTENNA GAIN

### MEASUREMENT

The antenna gain of the complete system is calculated by the difference of radiated power in EIRP and the conducted power of the module. For normal WLAN devices, the DSSS mode is used.

### MEASUREMENT PARAMETERS

Measurement parameter	
Detector	Peak
Sweep time	Auto
Resolution bandwidth	3 MHz
Video bandwidth	3 MHz
Trace-Mode	Max hold

### LIMITS

FCC	IC
Antenna Gain	
6 dBi	



## TEST RESULTS

### Antenna 0

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 2412MHz	Middle channel 2437MHz	Highest channel 2462MHz
Conducted power [dBm/MHz] Measured with DSSS modulation		11.14	13.22	10.30
Radiated power [dBm/MHz] Measured with DSSS modulation		13.26	15.38	12.87
Gain [dBi] Calculated		2.12	2.16	2.57
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)		

### Antenna 1

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 2412MHz	Middle channel 2437MHz	Highest channel 2462MHz
Conducted power [dBm/MHz] Measured with DSSS modulation		9.88	9.84	10.61
Radiated power [dBm/MHz] Measured with DSSS modulation		11.69	12.79	12.97
Gain [dBi] Calculated		1.81	2.95	2.36
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)		

### Antenna 2

T <sub>nom</sub>	V <sub>nom</sub>	Lowest channel 2412MHz	Middle channel 2437MHz	Highest channel 2462MHz
Conducted power [dBm/MHz] Measured with DSSS modulation		10.92	13.03	10.45
Radiated power [dBm/MHz] Measured with DSSS modulation		13.29	15.85	13.16
Gain [dBi] Calculated		2.37	2.82	2.71
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)		





## 7.5. PEAK OUTPUT POWER

### 7.5.1. LIMITS

The maximum peak output power of the intentional radiator shall not exceed the following:

1. According to §15.247(b)(3), for systems using digital modulation in the bands of 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz: 1 Watt.
2. According to §15.247(b)(4), the conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

### 7.5.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Power Meter	Anritsu	ML2495A	1204003	02/21/2017	02/20/2018
Power Sensor	Anritsu	MA2411B	1126150	02/21/2017	02/20/2018

### 7.5.3. TEST PROCEDURES (please refer to measurement standard)

#### 9.1.1 RBW $\geq$ DTS bandwidth

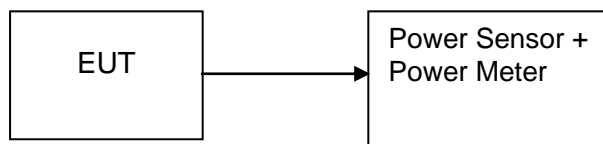
This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the *DTS bandwidth*.

- a) Set the RBW  $\geq$  DTS bandwidth.
- b) Set VBW  $\geq$  3 RBW.
- c) Set span  $\geq$  3 x RBW
- d) Sweep time = auto couple.
- e) Detector = peak.
- f) Trace mode = max hold.
- g) Allow trace to fully stabilize.
- h) Use peak marker function to determine the peak amplitude level.

#### 9.1.2 PKPM1 Peak power meter method

The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall utilize a fast-responding diode detector.

### 7.5.4. TEST SETUP



**7.5.5. TEST RESULTS***No non-compliance noted***Test Data****Test mode: IEEE 802.11b**

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)			Peak / AVG	Limit (W)	Result
		Antenna 0	Antenna 1	Antenna	Antenna 0	Antenna 1	Antenna 2			
Low	2412	21.60	20.27	21.46	0.14454	0.10641	0.13996	Peak	1	PASS
Mid	2437	23.94	20.44	23.75	0.24774	0.11066	0.23714			PASS
High	2462	20.78	21.13	20.97	0.11967	0.12972	0.12503			PASS
Low	2412	18.67	18.82	19.10	0.07362	0.07621	0.08128	AVG	1	PASS
Mid	2437	21.01	21.11	21.45	0.12618	0.12912	0.13964			PASS
High	2462	18.30	18.90	18.79	0.06761	0.07762	0.07568			PASS

**Test mode: IEEE 802.11g**

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)			Peak / AVG	Limit (W)	Result
		Antenna 0	Antenna 1	Antenna	Antenna 0	Antenna 1	Antenna 2			
Low	2412	20.48	23.77	23.28	0.11169	0.23823	0.21281	Peak	1	PASS
Mid	2437	25.74	23.69	25.97	0.37497	0.23388	0.39537			PASS
High	2462	20.80	21.40	21.90	0.12023	0.13804	0.15488			PASS
Low	2412	17.22	17.50	17.75	0.05272	0.05623	0.05957	AVG	1	PASS
Mid	2437	19.94	19.86	20.08	0.09863	0.09683	0.10186			PASS
High	2462	17.18	17.41	17.58	0.05224	0.05508	0.05728			PASS

**Test mode: IEEE 802.11n HT20 MHz**

Channel	Frequency (MHz)	Output Power (dBm)				Output Power (W)	Peak / AVG	Limit (W)	Result
		Antenna 0	Antenna 1	Antenna 2	Total				
Low	2412	18.57	20.01	19.69	24.24	0.26529	Peak	1	PASS
Mid	2437	21.89	19.91	20.77	25.70	0.37187			PASS
High	2462	20.37	20.52	18.92	24.77	0.29960			PASS
Low	2412	13.54	13.90	13.07	18.29	0.06742	AVG	1	PASS
Mid	2437	16.99	16.63	16.69	21.54	0.14270			PASS
High	2462	13.26	13.53	13.09	18.07	0.06410			PASS



Test mode: IEEE 802.11n HT40 MHz

Channel	Frequency (MHz)	Output Power (dBm)				Output Power (W)	Peak / AVG	Limit (W)	Result
		Antenna 0	Antenna 1	Antenna 2	Total				
Low	2422	15.25	17.55	14.95	20.85	0.12164	Peak	1	PASS
Mid	2437	20.71	22.32	20.41	26.00	0.39827			PASS
High	2452	16.15	15.55	17.16	21.11	0.12910			PASS
Low	2422	11.61	11.86	11.08	16.30	0.04266	AVG	1	PASS
Mid	2437	15.59	16.38	16.23	20.85	0.12165			PASS
High	2452	11.77	11.84	10.11	16.08	0.04056			PASS



## 7.6. BAND EDGES MEASUREMENT

### 7.6.1. LIMITS

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 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. 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) (see Section 15.205(c)).

### 7.6.2. TEST INSTRUMENTS

Radiated Emission Test Site 966 (2)					
Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
PSA Series Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2017	02/20/2018
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	02/21/2017	02/20/2018
Amplifier	EMEC	EM330	060661	03/18/2017	03/17/2018
High Noise Amplifier	Agilent	8449B	3008A01838	02/21/2017	02/20/2018
Loop Antenna	COM-POWER	AL-130	121044	09/25/2016	09/24/2017
Bilog Antenna	SCHAFFNER	CBL6143	5082	02/21/2017	02/20/2018
Horn Antenna	SCHWARZBECK	BBHA9120	D286	02/27/2018	02/27/2018
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	02/27/2018	02/27/2018
Turn Table	N/A	N/A	N/A	N.C.R	N.C.R
Antenna Tower	SUNOL	TLT2	N/A	N.C.R	N.C.R
Controller	Sunol Sciences	SC104V	022310-1	N.C.R	N.C.R
Controller	CT	N/A	N/A	N.C.R	N.C.R
Temp. / Humidity Meter	Anymetre	JR913	N/A	02/21/2017	02/20/2018
Test S/W	FARAD	LZ-RF / CCS-SZ-3A2			

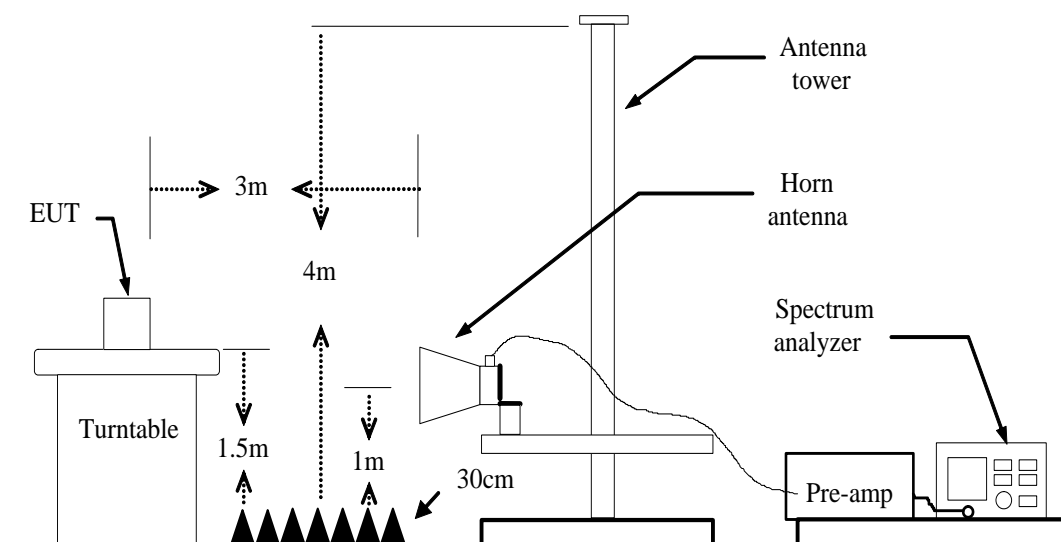
- NOTE:** 1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.  
2. The FCC Site Registration number is 101879.  
3. N.C.R = No Calibration Required.



### 7.6.3. TEST PROCEDURES (please refer to measurement standard)

1. The EUT is placed on a turntable, which is 1.5m above the ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is varied from 1m to 4m to find out the highest emission.
4. Set the spectrum analyzer in the following setting in order to capture the lower and upper band-edges of the emission:
  - (a) PEAK: RBW=1MHz / VBW=3MHz / Sweep=AUTO
  - (b) AVERAGE: RBW=1MHz / VBW=1/T / Sweep=AUTO / Detector=PEAK
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are

### 7.6.4. TEST SETUP



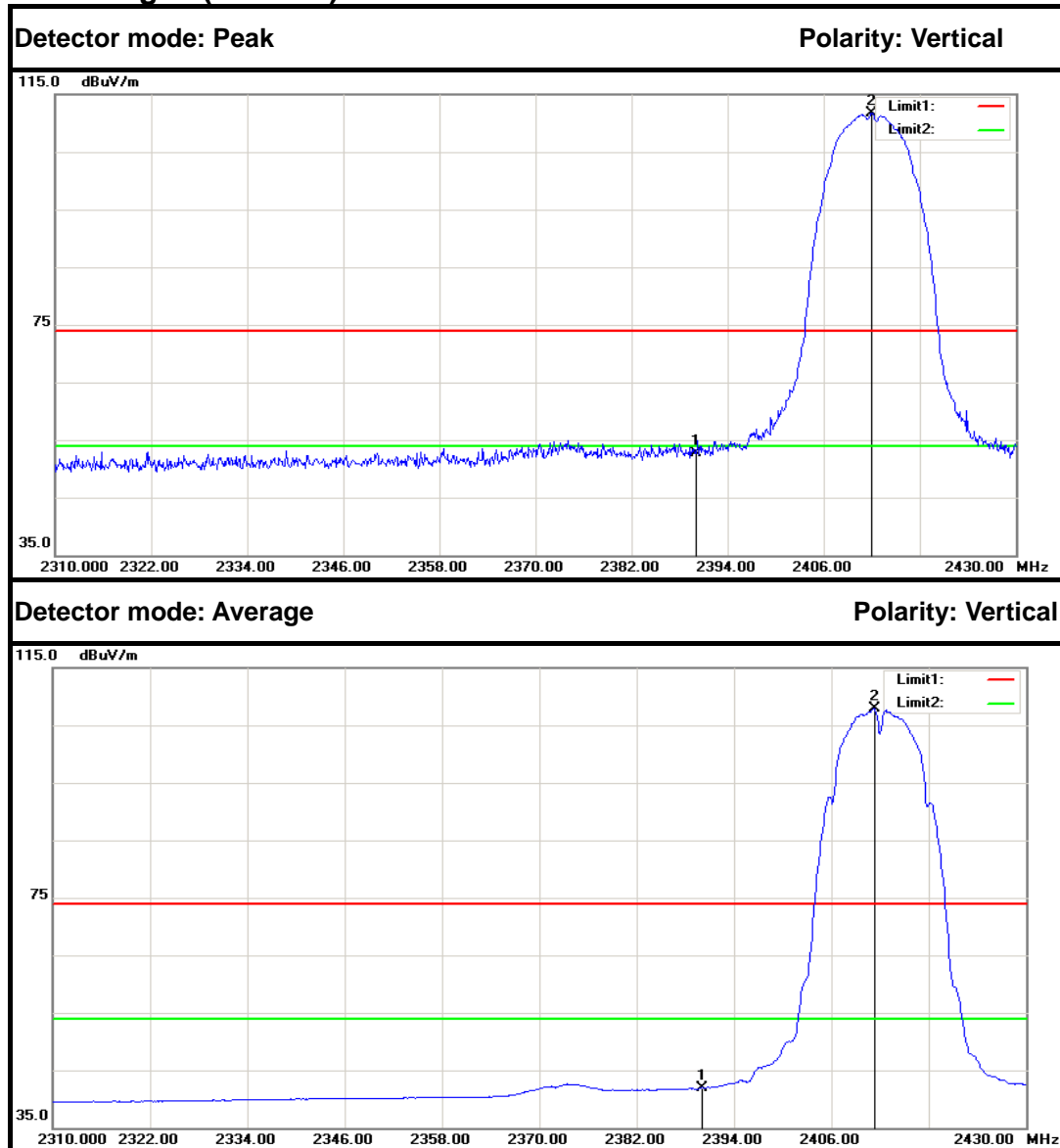


## 7.6.5. TEST RESULTS

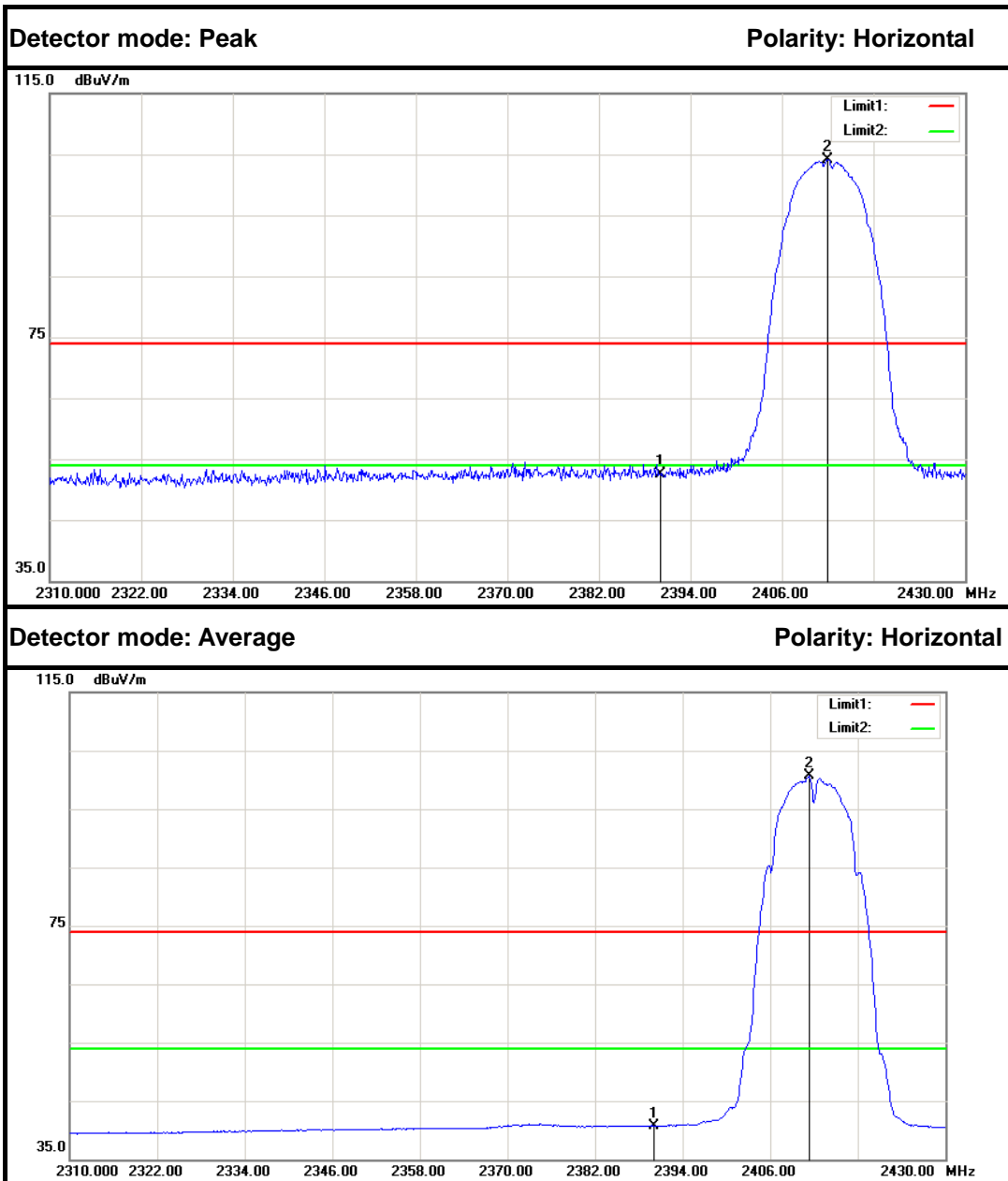
### Test Plot

IEEE 802.11b mode (Antenna 0)

Band Edges (CH Low)



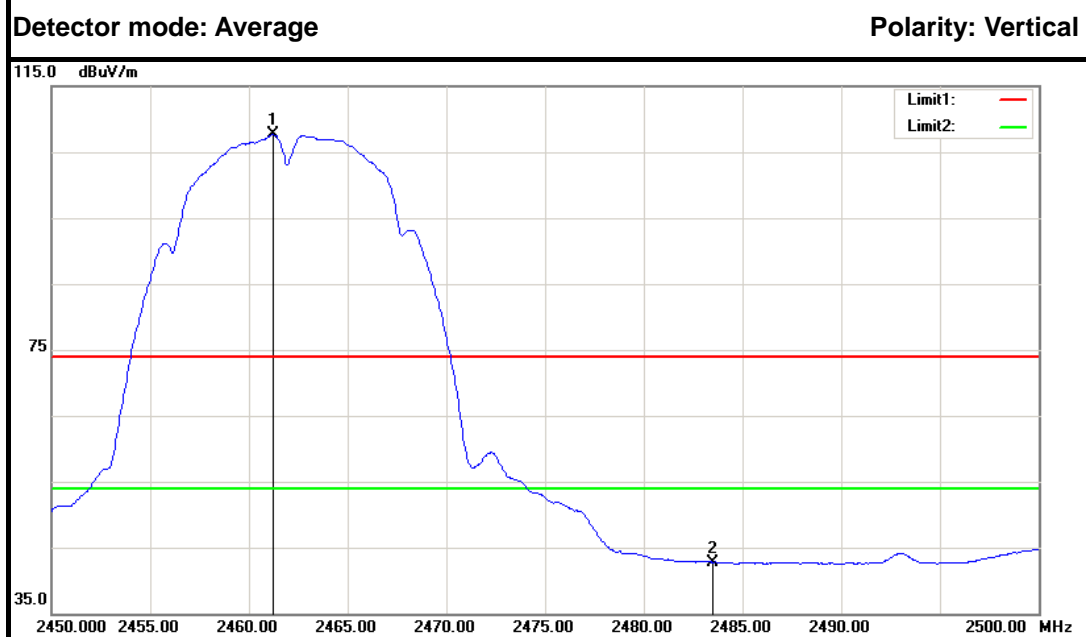
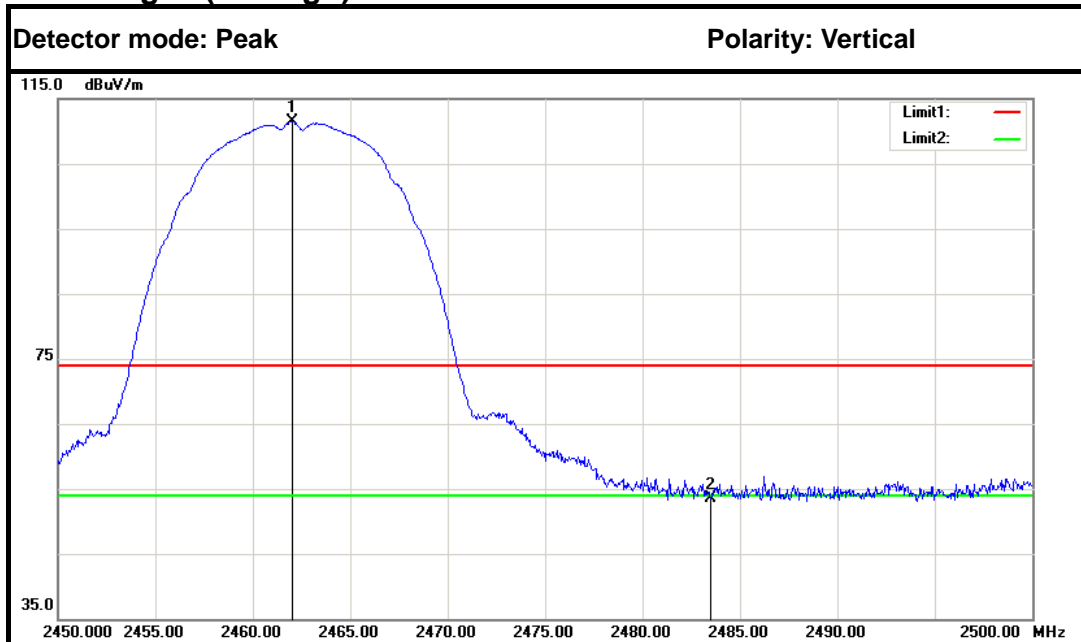
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	55.54	-2.86	52.68	74.00	-21.32	Peak	Vertical
2	2412.000	114.52	-2.74	111.78	---	---	Peak	Vertical
1	2390.000	44.86	-2.86	42.00	54.00	-12.00	Average	Vertical
2	2411.280	110.66	-2.75	107.91	---	---	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	55.32	-2.86	52.46	74.00	-21.54	Peak	Horizontal
2	2412.000	106.89	-2.74	104.15	---	---	Peak	Horizontal
1	2390.000	43.61	-2.86	40.75	54.00	-13.25	Average	Horizontal
2	2411.280	103.36	-2.75	100.61	---	---	Average	Horizontal

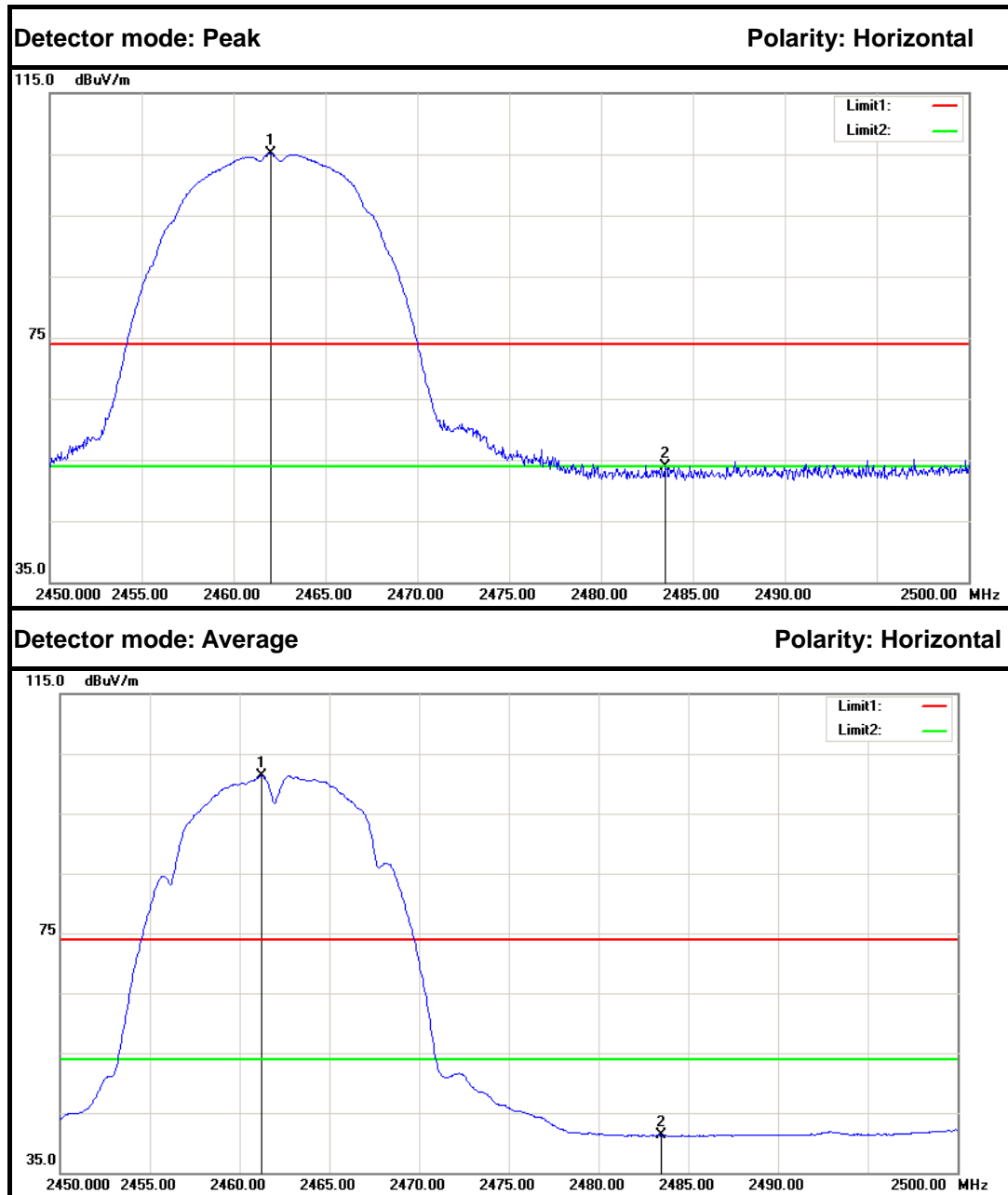


### Band Edges (CH High)



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2462.000	113.98	-2.47	111.51	---	---	Peak	Vertical
2	2483.500	55.94	-2.35	53.59	74.00	-20.41	Peak	Vertical
1	2461.200	110.11	-2.47	107.64	---	---	Average	Vertical
2	2483.500	45.15	-2.35	42.80	54.00	-11.20	Average	Vertical



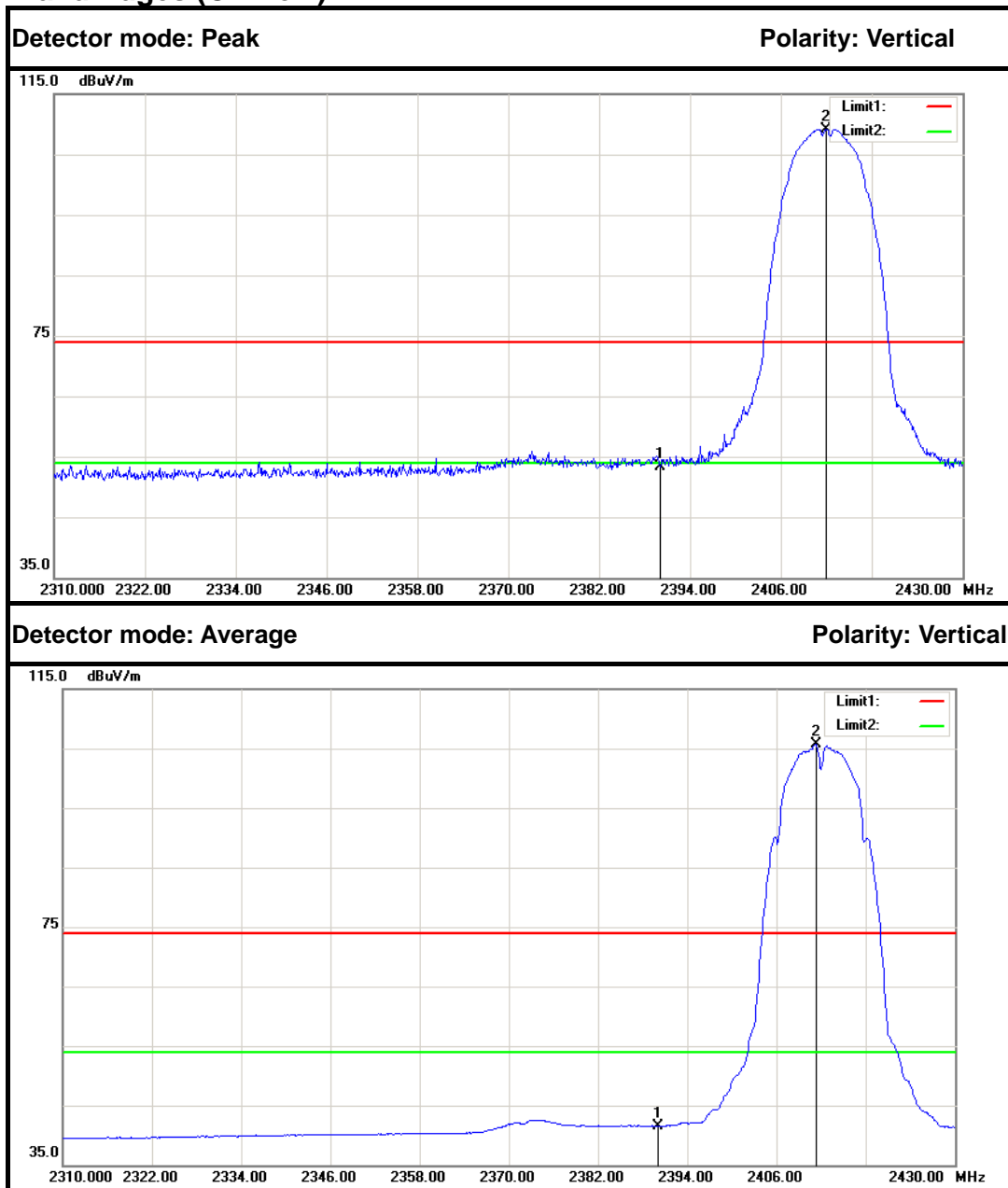


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2462.050	107.64	-2.47	105.17	---	---	Peak	Horizontal
2	2483.500	56.23	-2.35	53.88	74.00	-20.12	Peak	Horizontal
1	2461.250	103.73	-2.47	101.26	---	---	Average	Horizontal
2	2483.500	43.61	-2.35	41.26	54.00	-12.74	Average	Horizontal



IEEE 802.11b mode (Antenna 1)

Band Edges (CH Low)

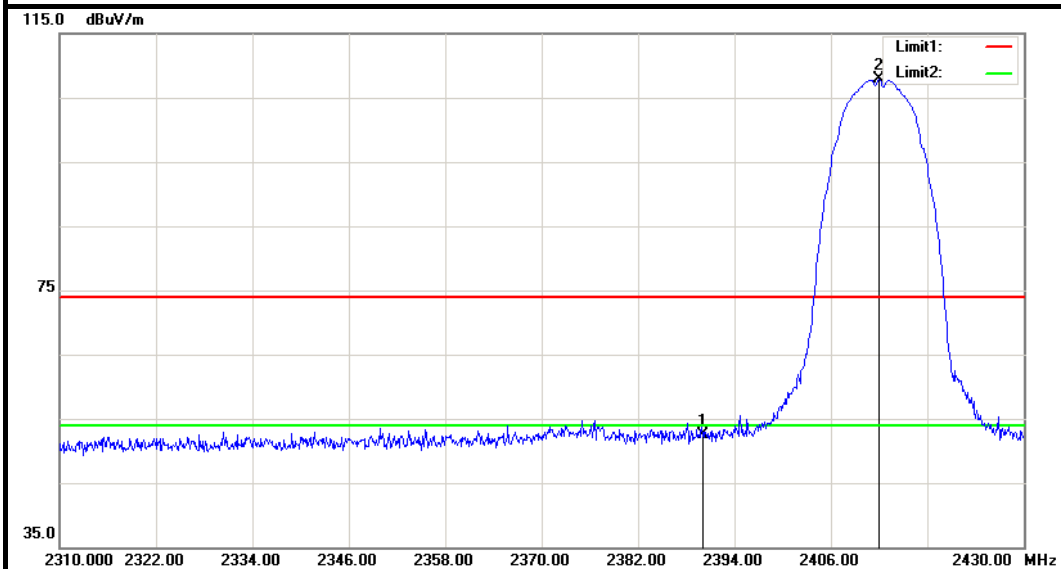


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	56.11	-2.86	53.25	74.00	-20.75	Peak	Vertical
2	2412.000	111.93	-2.74	109.19	---	---	Peak	Vertical
1	2390.000	44.40	-2.86	41.54	54.00	-12.46	Average	Vertical
2	2411.280	108.36	-2.75	105.61	---	---	Average	Vertical



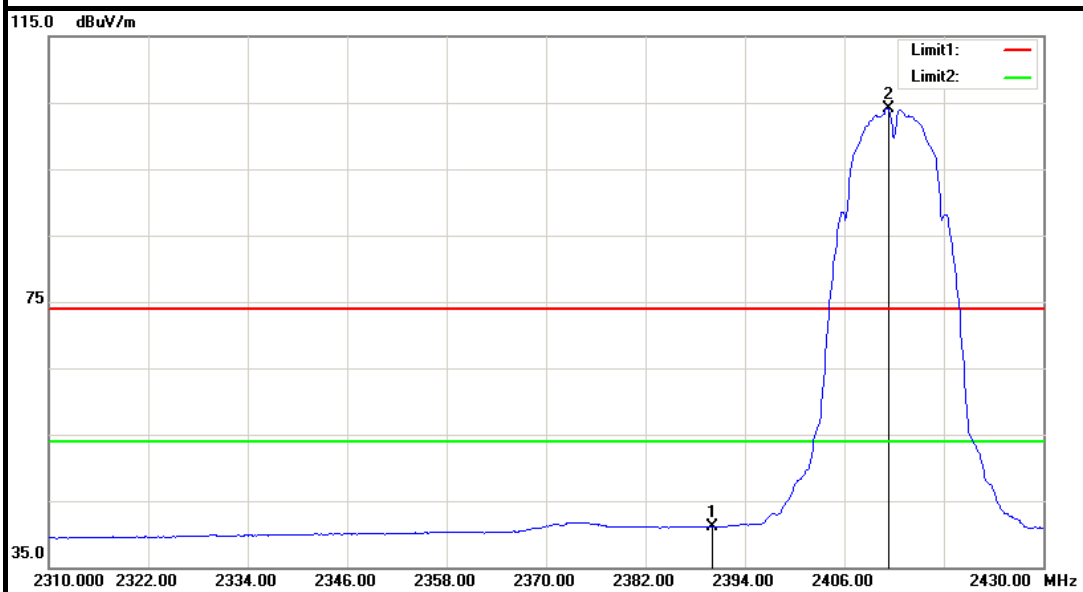
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

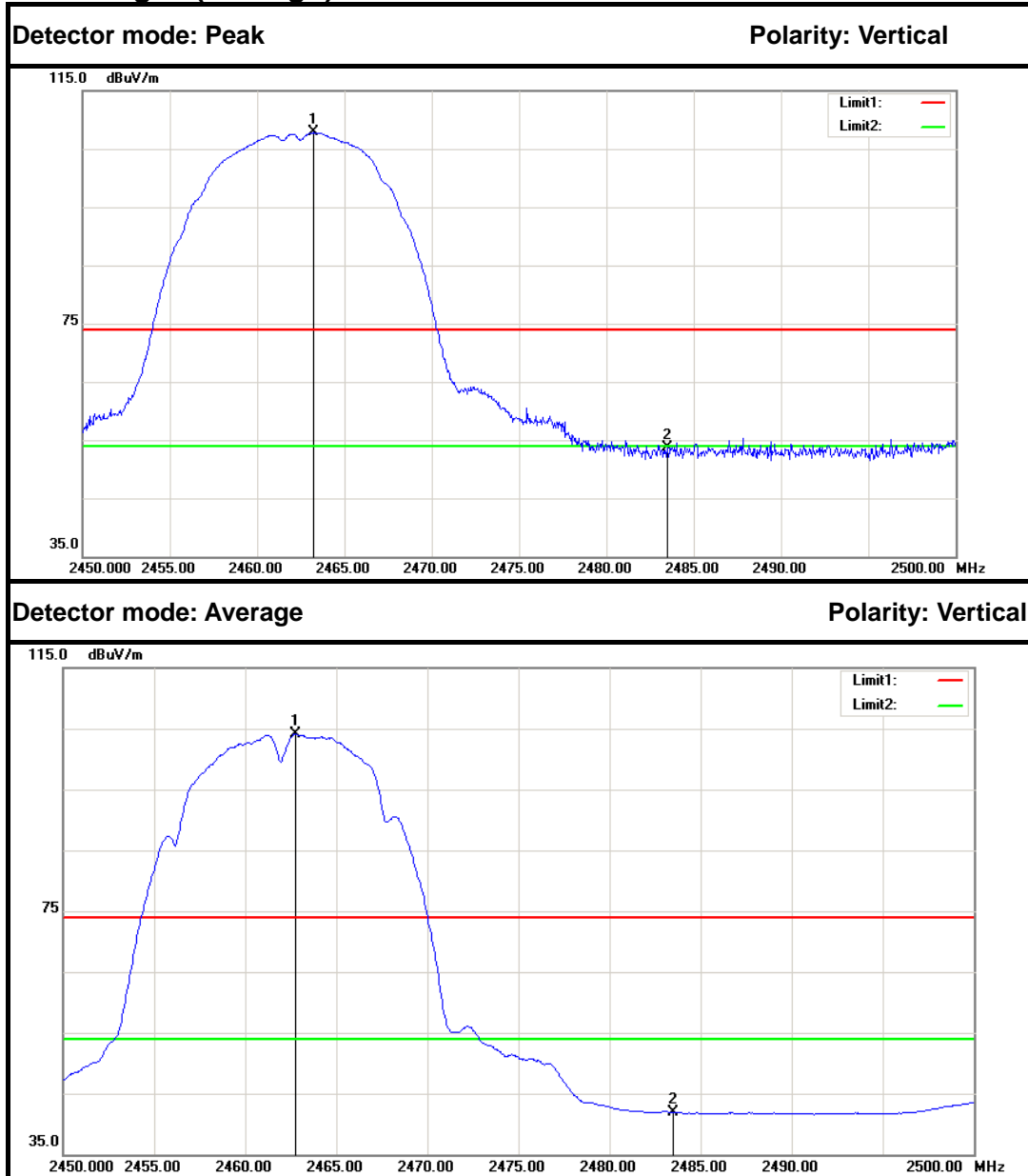
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	55.31	-2.86	52.45	74.00	-21.55	Peak	Horizontal
2	2412.000	110.65	-2.74	107.91	---	---	Peak	Horizontal
1	2390.000	43.93	-2.86	41.07	54.00	-12.93	Average	Horizontal
2	2411.280	106.92	-2.75	104.17	---	---	Average	Horizontal



### Band Edges (CH High)

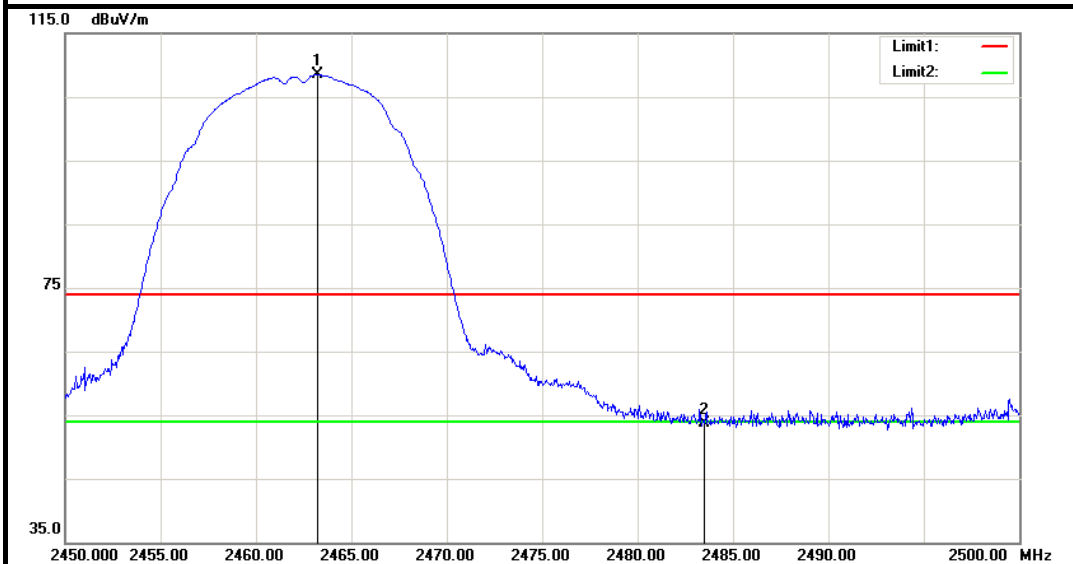


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2463.200	110.30	-2.46	107.84	---	---	Peak	Vertical
2	2483.500	56.06	-2.35	53.71	74.00	-20.29	Peak	Vertical
1	2462.750	106.55	-2.46	104.09	---	---	Average	Vertical
2	2483.500	44.17	-2.35	41.82	54.00	-12.18	Average	Vertical



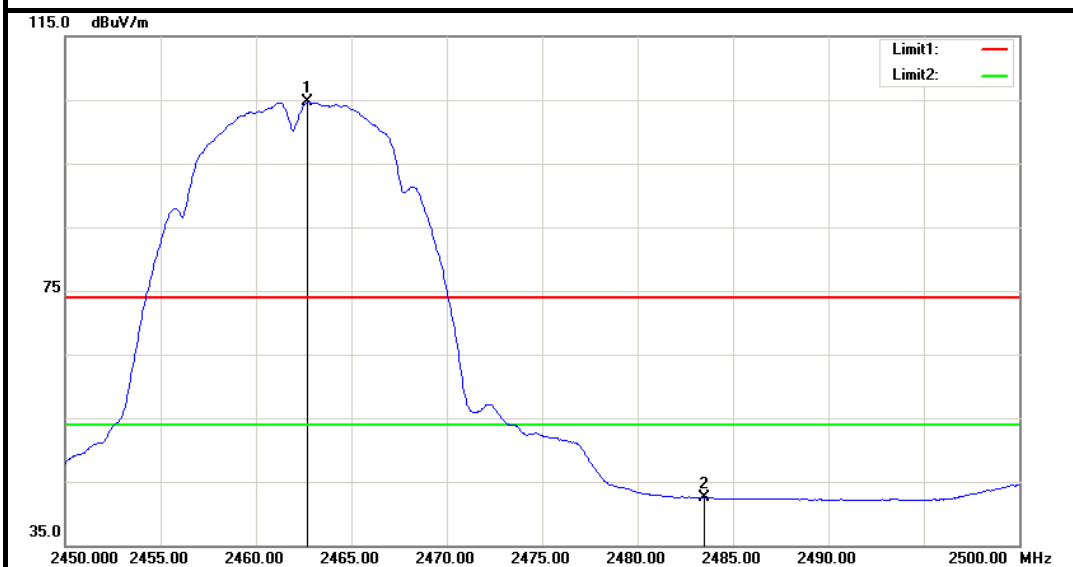
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

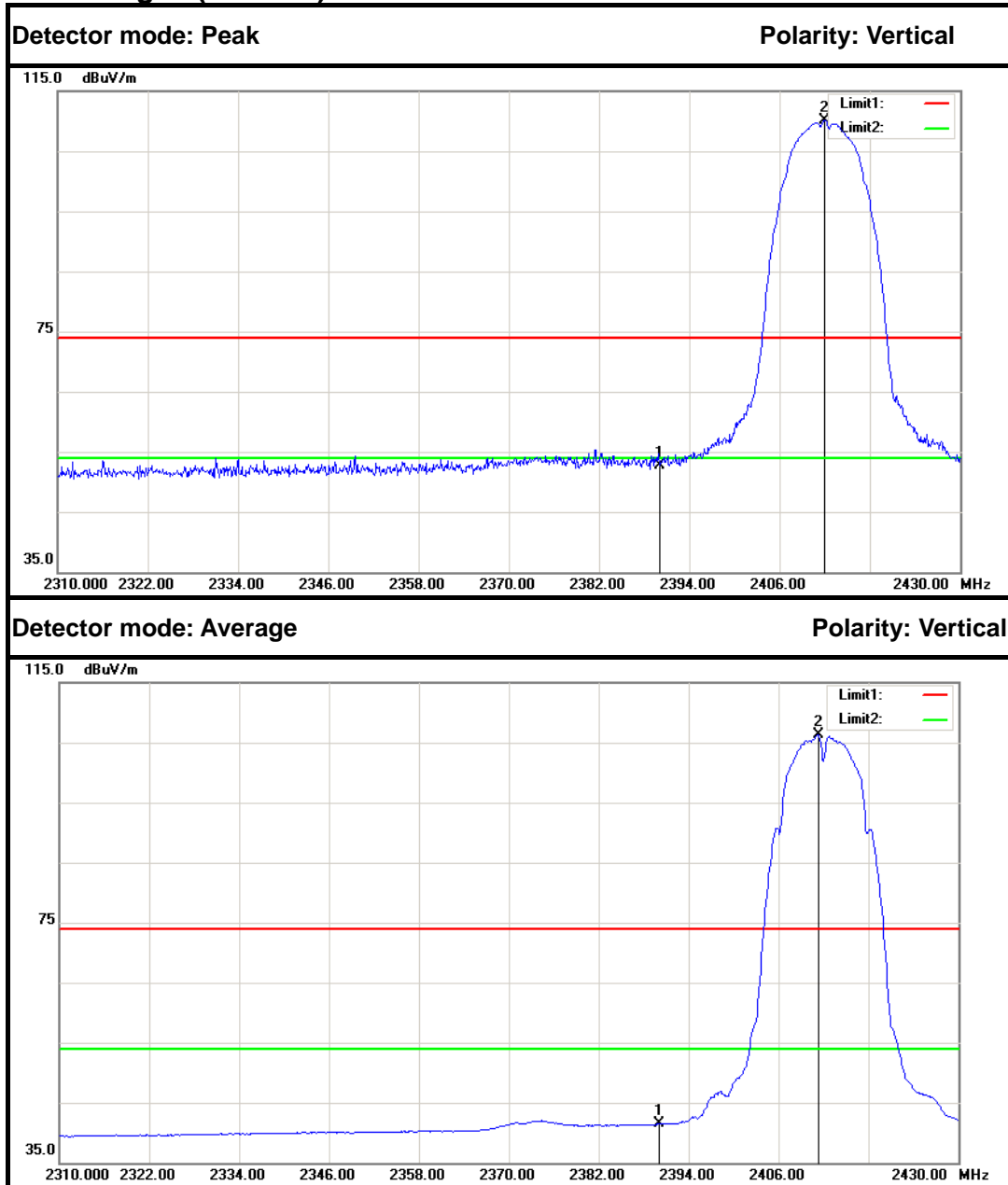
Polarity: Horizontal



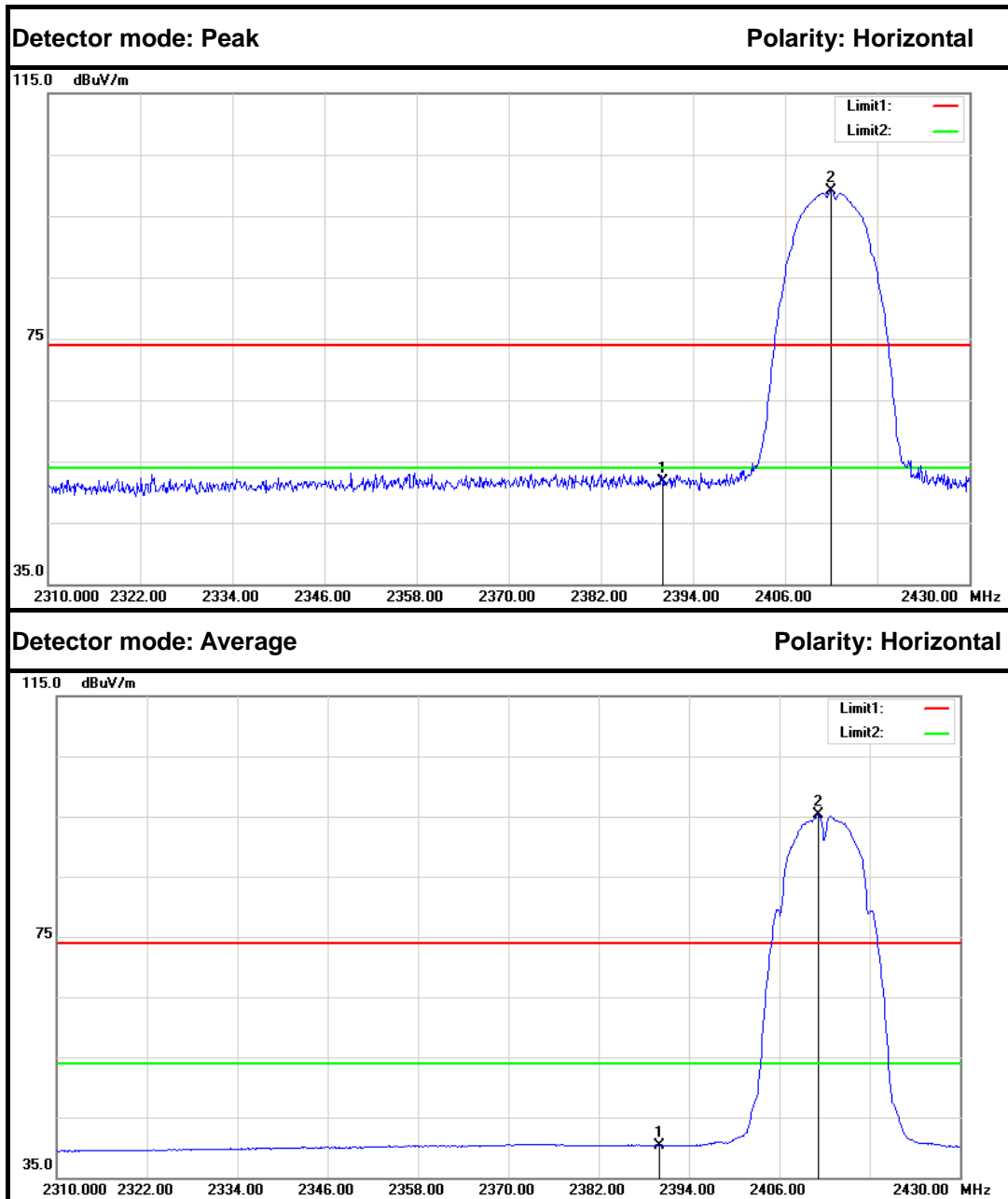
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2463.200	110.92	-2.46	108.46	---	---	Peak	Horizontal
2	2483.500	56.03	-2.35	53.68	74.00	-20.32	Peak	Horizontal
1	2462.700	107.09	-2.46	104.63	---	---	Average	Horizontal
2	2483.500	44.91	-2.35	42.56	54.00	-11.44	Average	Horizontal



IEEE 802.11b mode (Antenna 2)  
Band Edges (CH Low)



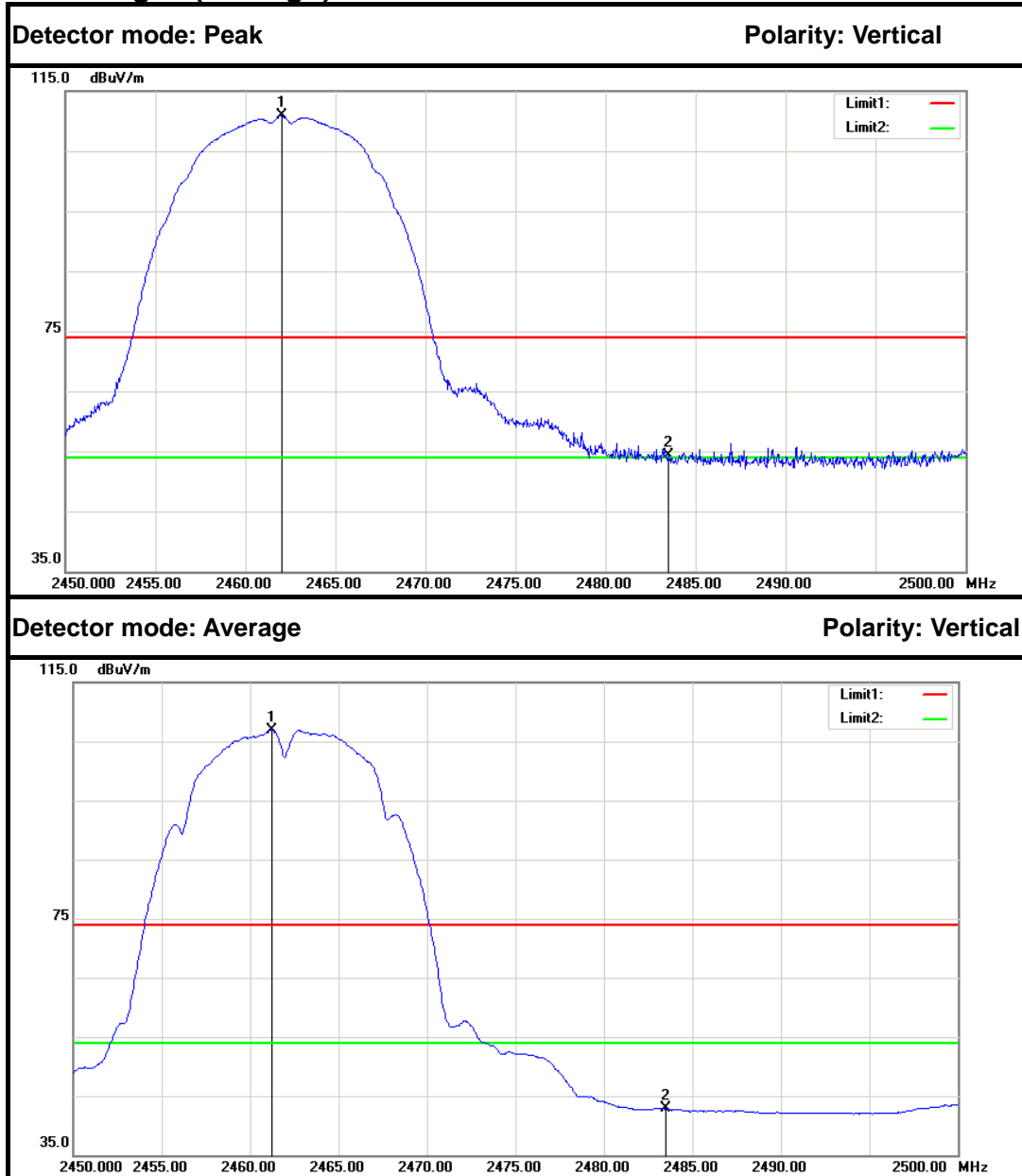
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	55.51	-2.86	52.65	74.00	-21.35	Peak	Vertical
2	2412.000	112.93	-2.74	110.19	---	---	Peak	Vertical
1	2390.000	44.31	-2.86	41.45	54.00	-12.55	Average	Vertical
2	2411.280	109.02	-2.75	106.27	---	---	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	54.50	-2.86	51.64	74.00	-22.36	Peak	Horizontal
2	2412.000	101.92	-2.74	99.18	---	---	Peak	Horizontal
1	2390.000	43.17	-2.86	40.31	54.00	-13.69	Average	Horizontal
2	2411.160	98.07	-2.75	95.32	---	---	Average	Horizontal



### Band Edges (CH High)



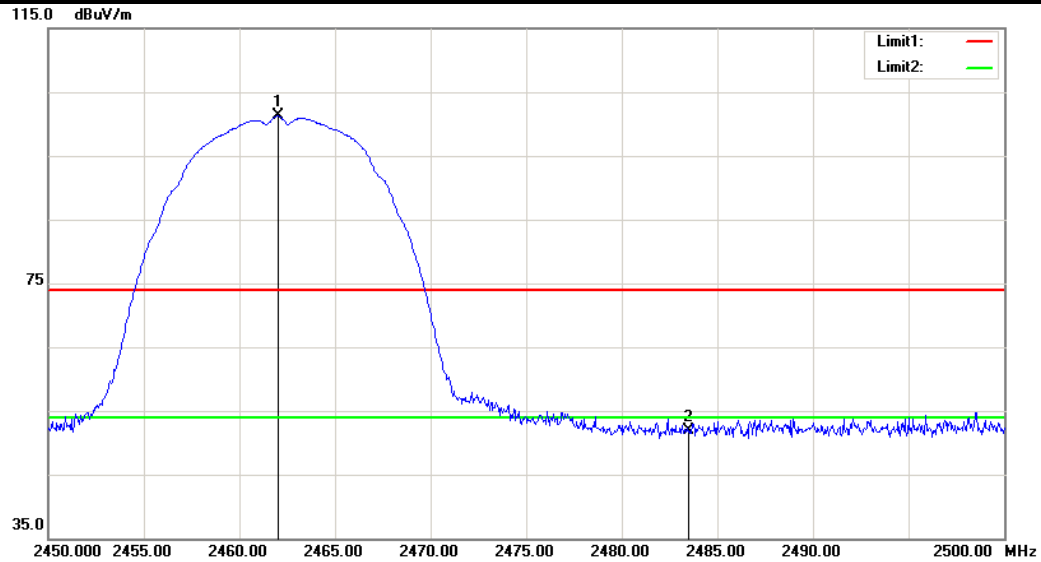
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2462.000	113.35	-2.47	110.88	---	---	Peak	Vertical
2	2483.500	56.67	-2.35	54.32	74.00	-19.68	Peak	Vertical
1	2461.200	109.39	-2.47	106.92	---	---	Average	Vertical
2	2483.500	45.21	-2.35	42.86	54.00	-11.14	Average	Vertical





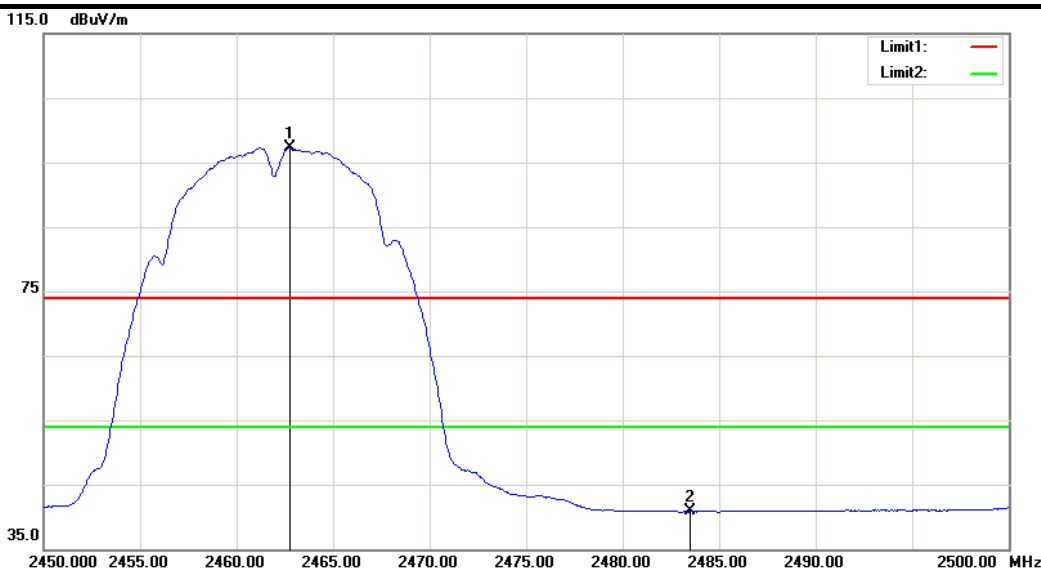
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal

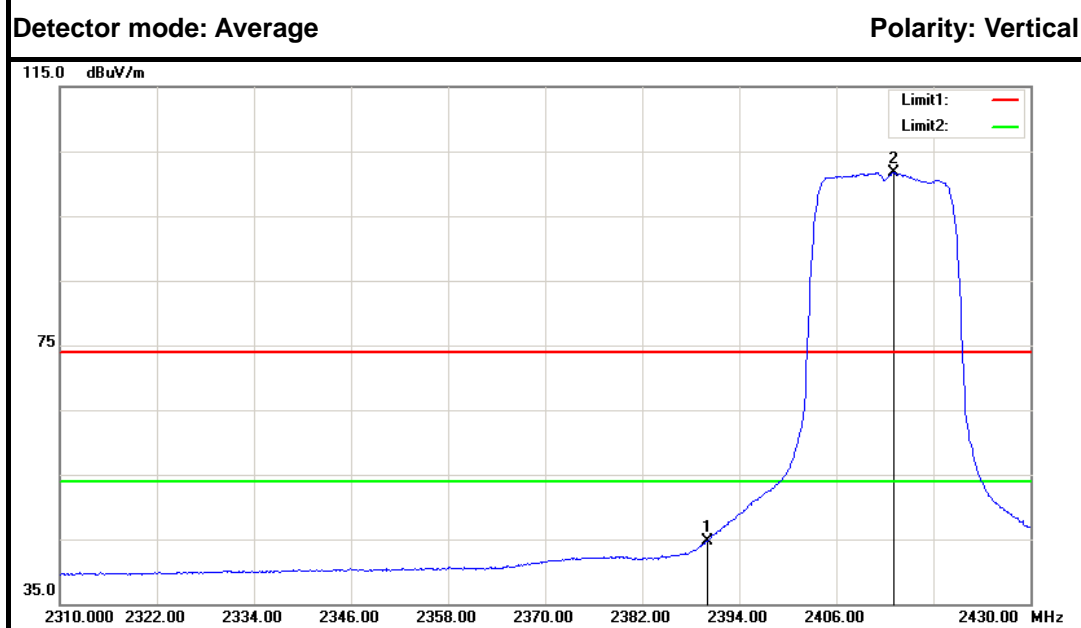
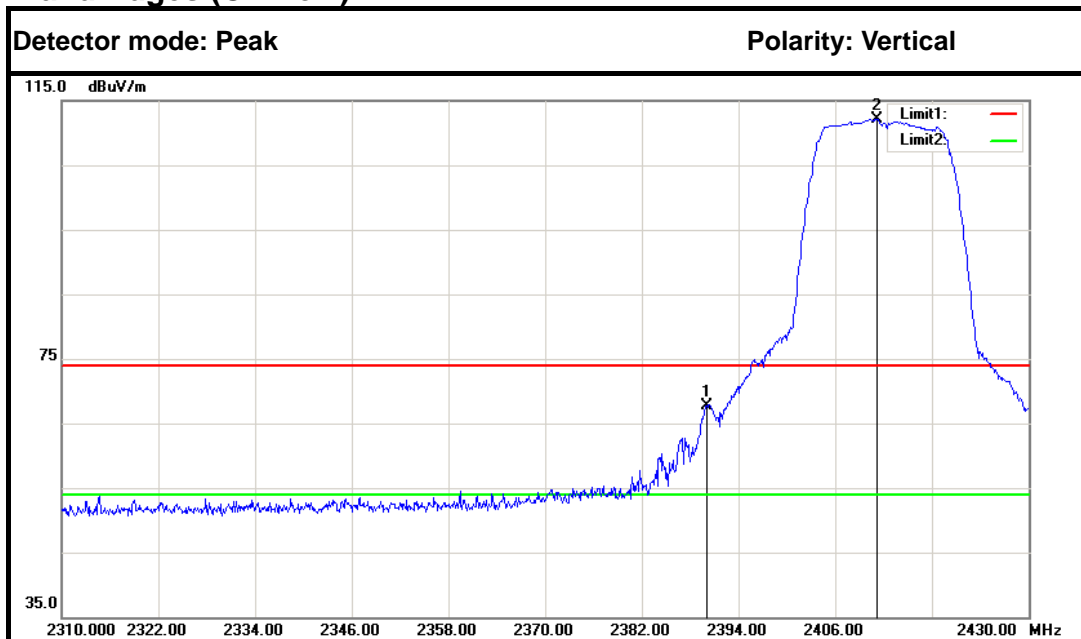


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2462.050	103.72	-2.47	101.25	---	---	Peak	Horizontal
2	2483.500	54.18	-2.35	51.83	74.00	-22.17	Peak	Horizontal
1	2462.750	99.72	-2.46	97.26	---	---	Average	Horizontal
2	2483.500	43.20	-2.35	40.85	54.00	-13.15	Average	Horizontal

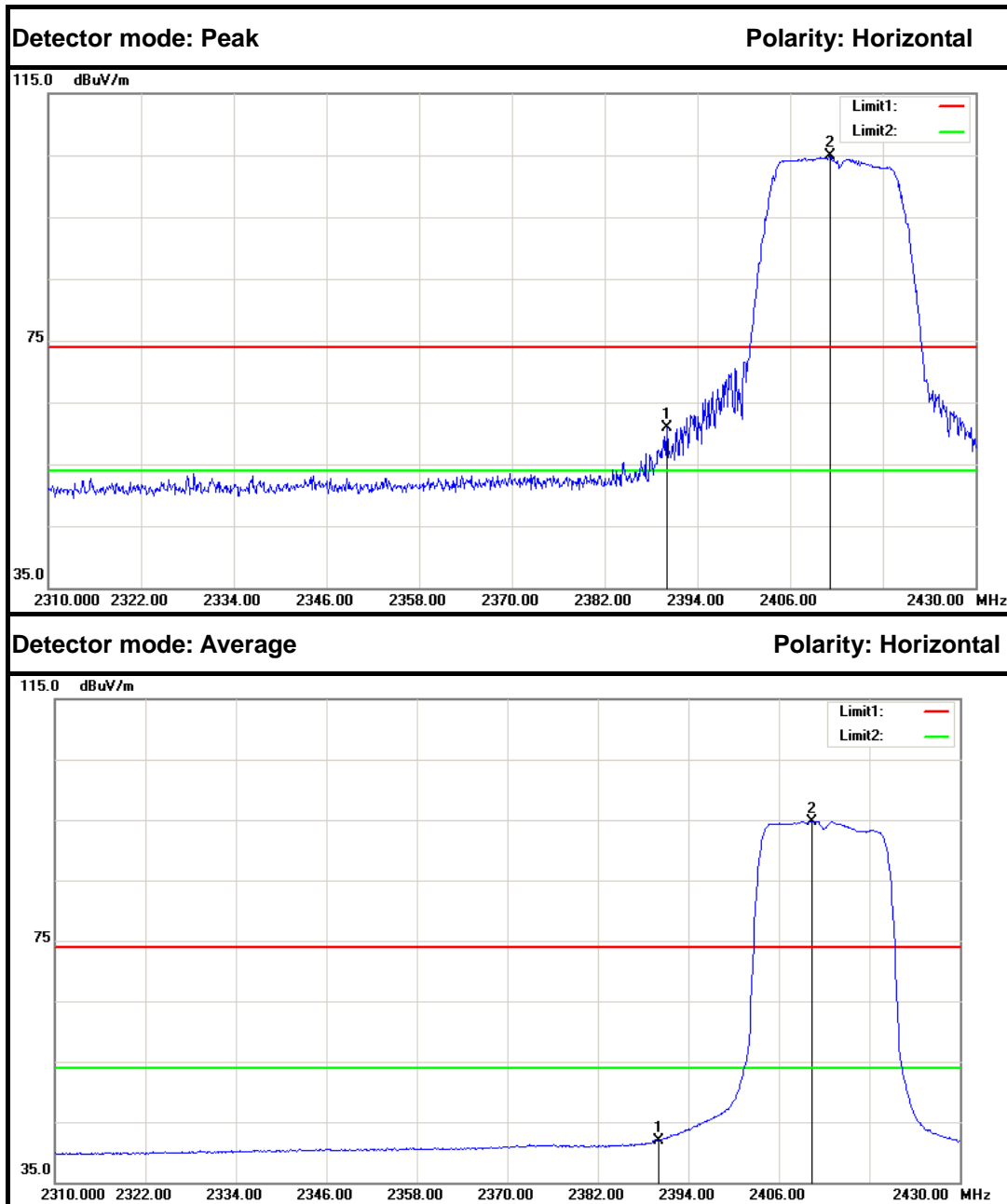


IEEE 802.11g mode (Antenna 0)

Band Edges (CH Low)



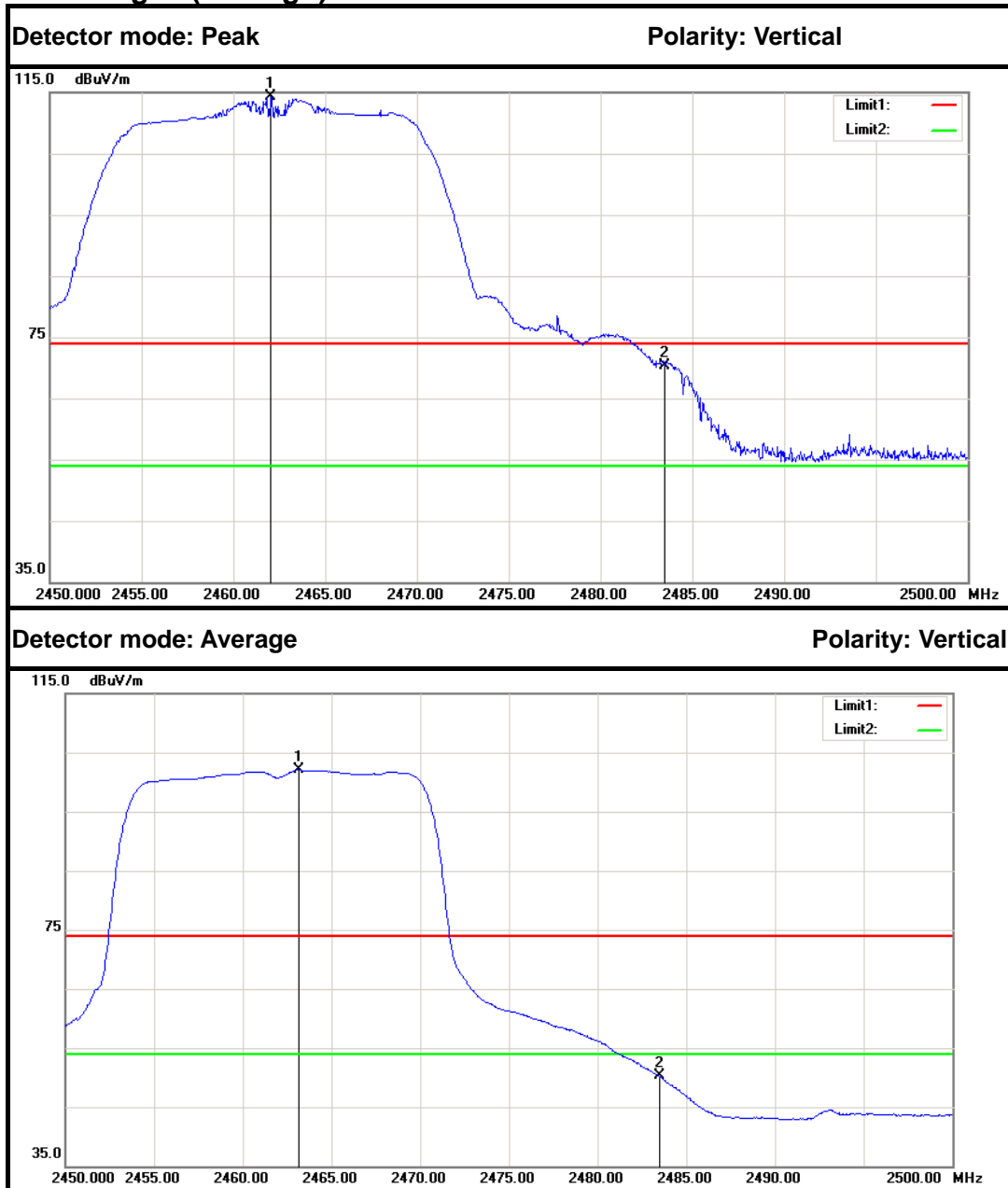
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	70.47	-2.86	67.61	74.00	-6.39	Peak	Vertical
2	2411.160	114.91	-2.75	112.16	---	---	Peak	Vertical
1	2390.000	47.61	-2.86	44.75	54.00	-9.25	Average	Vertical
2	2413.080	104.42	-2.74	101.68	---	---	Average	Vertical



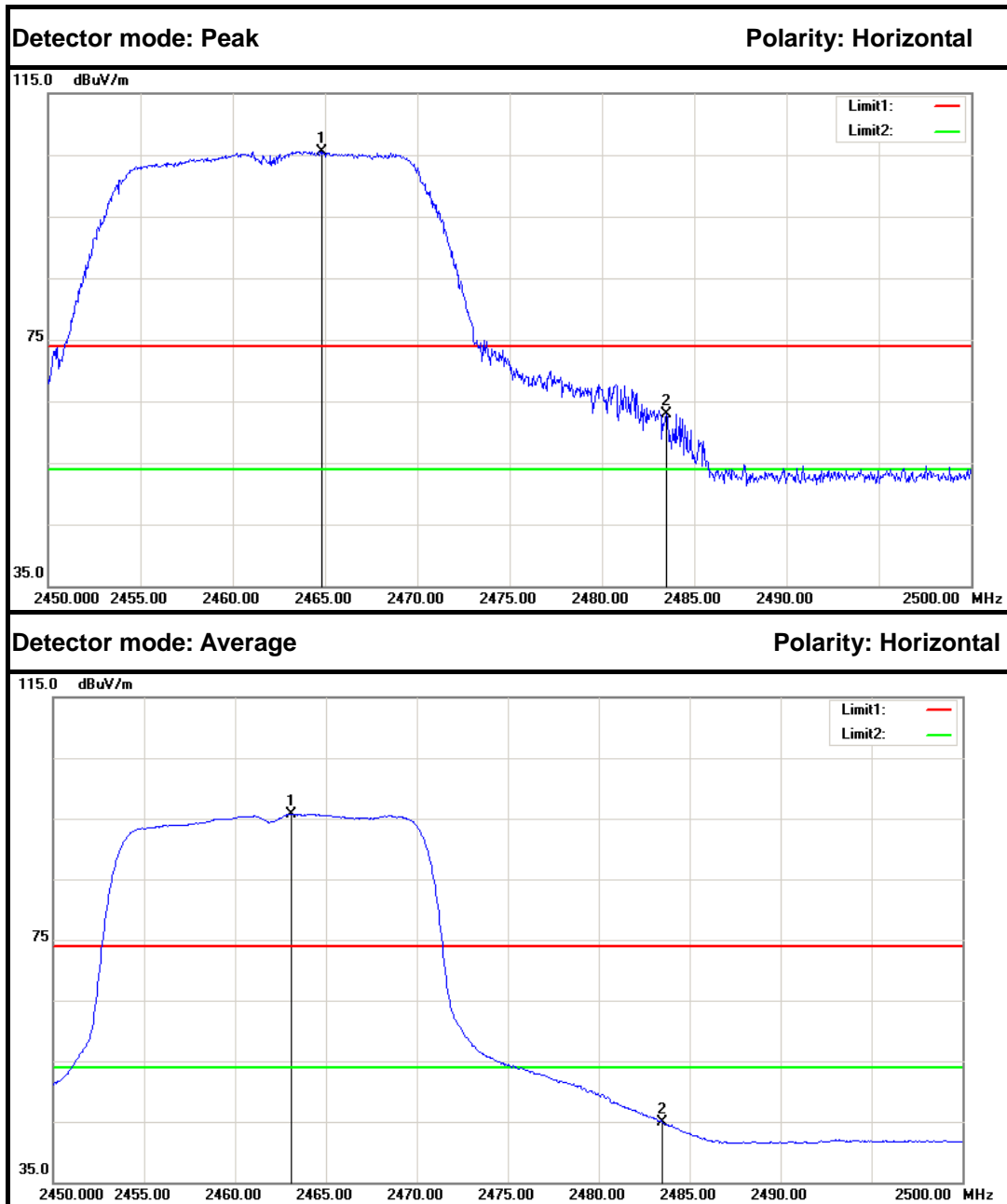
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	63.71	-2.86	60.85	74.00	-13.15	Peak	Horizontal
2	2411.160	107.63	-2.75	104.88	---	---	Peak	Horizontal
1	2390.000	44.79	-2.86	41.93	54.00	-12.07	Average	Horizontal
2	2410.320	97.48	-2.75	94.73	---	---	Average	Horizontal



### Band Edges (CH High)



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2462.050	116.72	-2.47	114.25	---	---	Peak	Vertical
2	2483.500	72.74	-2.35	70.39	74.00	-3.61	Peak	Vertical
1	2463.150	104.52	-2.46	102.06	---	---	Average	Vertical
2	2483.500	52.55	-2.35	50.20	54.00	-3.80	Average	Vertical

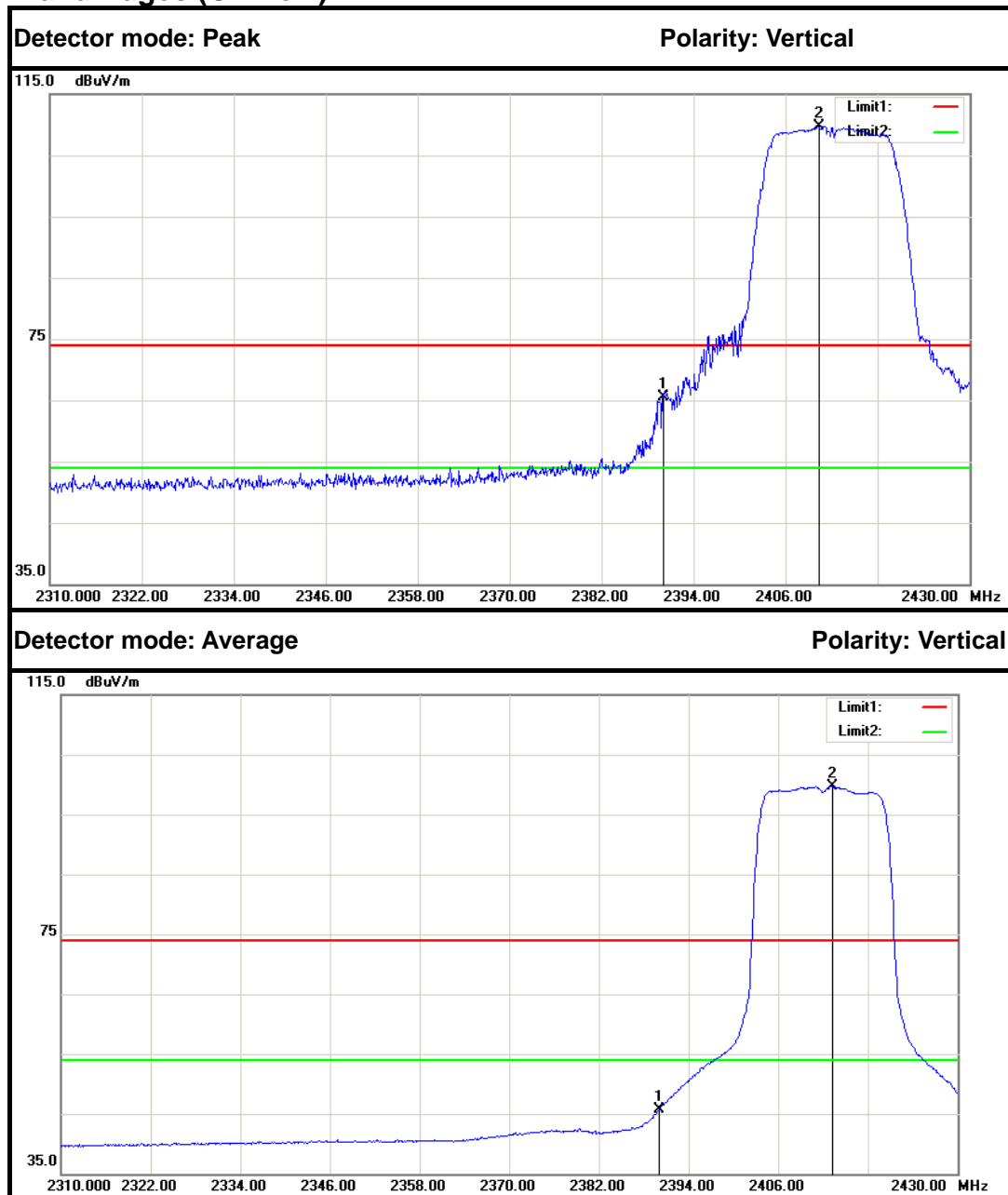


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2464.800	108.02	-2.45	105.57	---	---	Peak	Horizontal
2	2483.500	65.20	-2.35	62.85	74.00	-11.15	Peak	Horizontal
1	2463.100	98.24	-2.46	95.78	---	---	Average	Horizontal
2	2483.500	47.25	-2.35	44.90	54.00	-9.10	Average	Horizontal



IEEE 802.11g mode (Antenna 1)

Band Edges (CH Low)

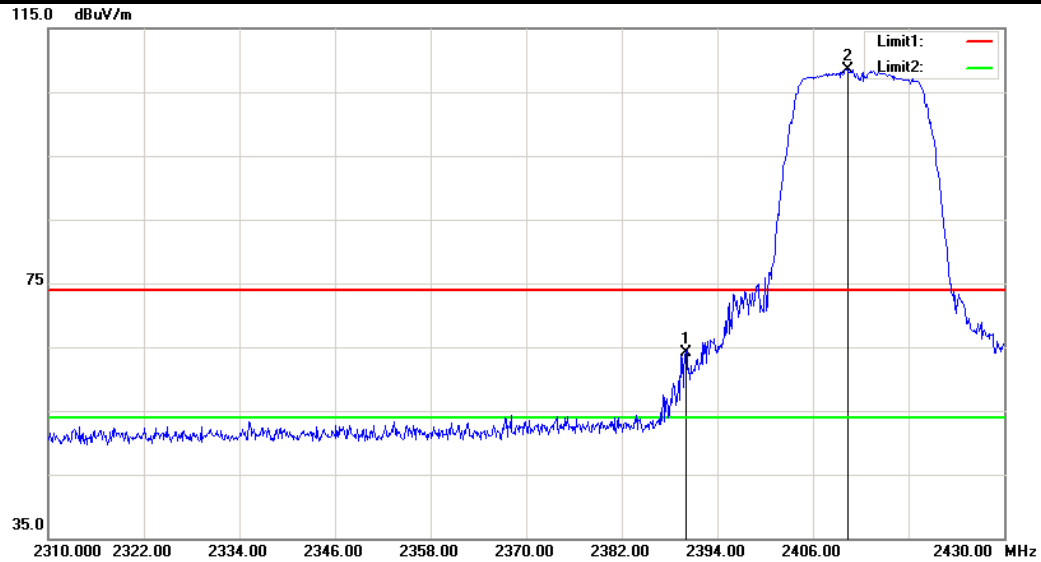


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	68.38	-2.86	65.52	74.00	-8.48	Peak	Vertical
2	2410.320	112.55	-2.75	109.80	---	---	Peak	Vertical
1	2390.000	48.52	-2.86	45.66	54.00	-8.34	Average	Vertical
2	2413.200	102.50	-2.74	99.76	---	---	Average	Vertical



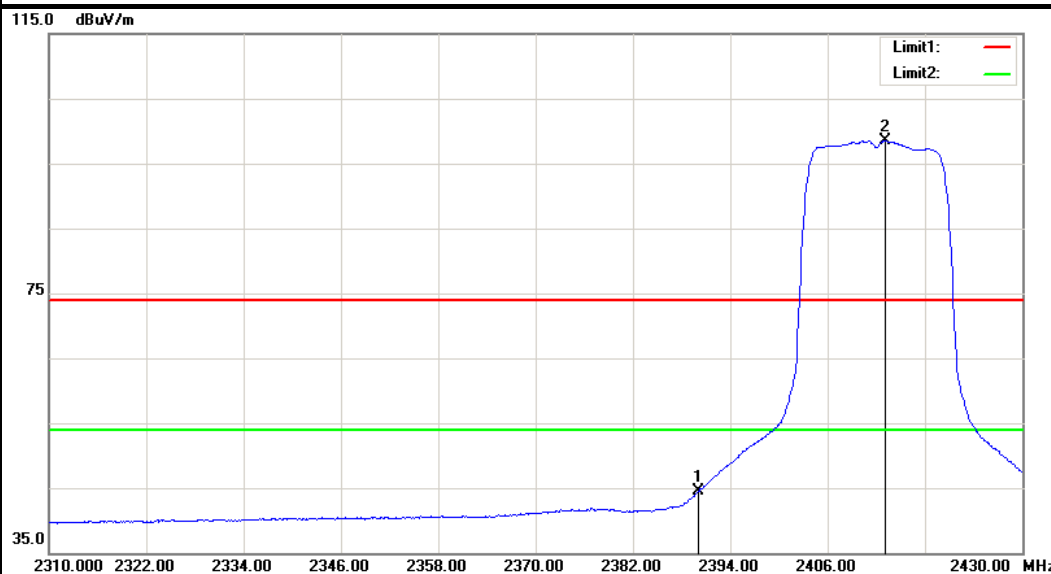
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

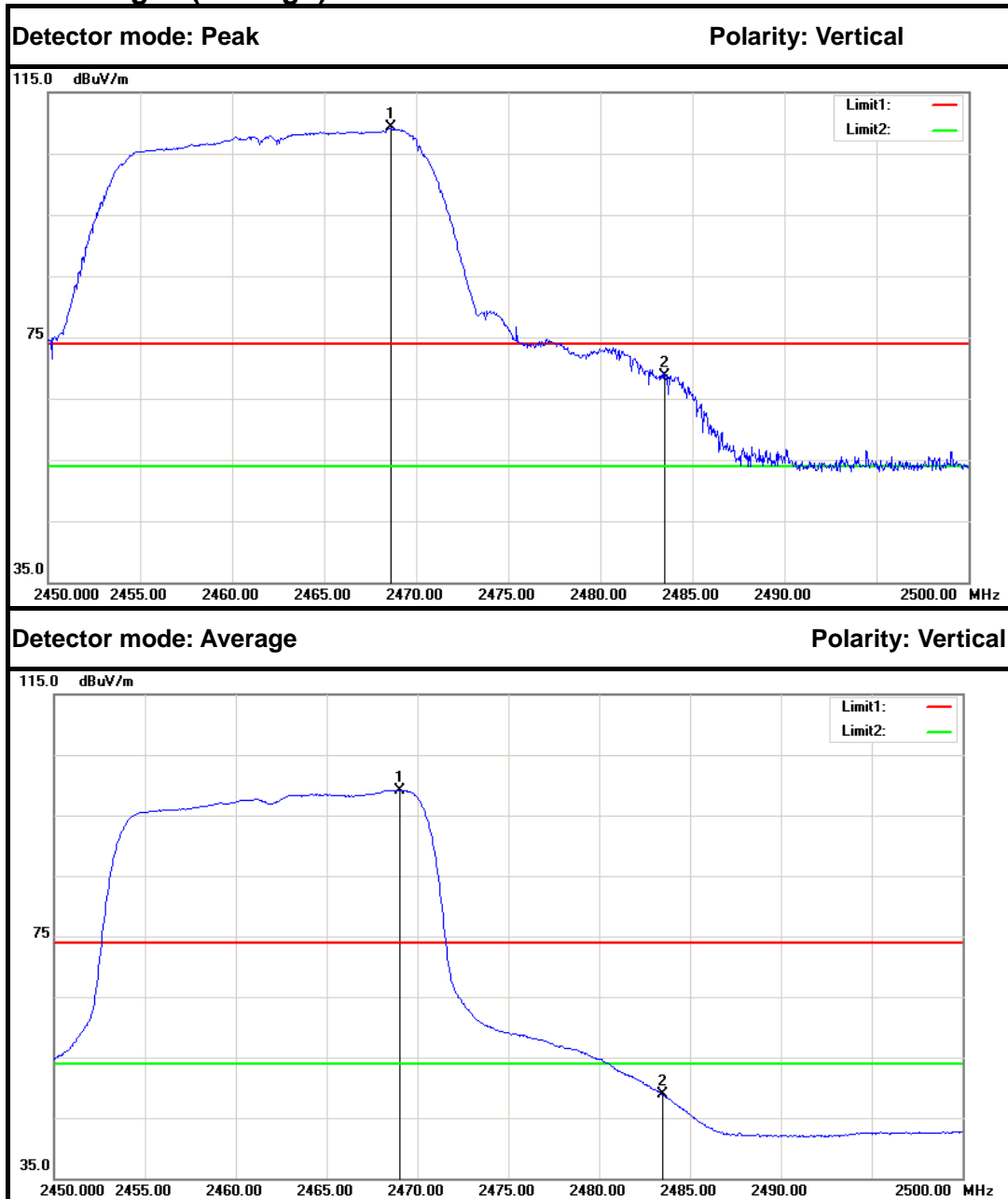
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	66.96	-2.86	64.10	74.00	-9.90	Peak	Horizontal
2	2410.320	111.27	-2.75	108.52	---	---	Peak	Horizontal
1	2390.000	47.28	-2.86	44.42	54.00	-9.58	Average	Horizontal
2	2413.080	101.28	-2.74	98.54	---	---	Average	Horizontal

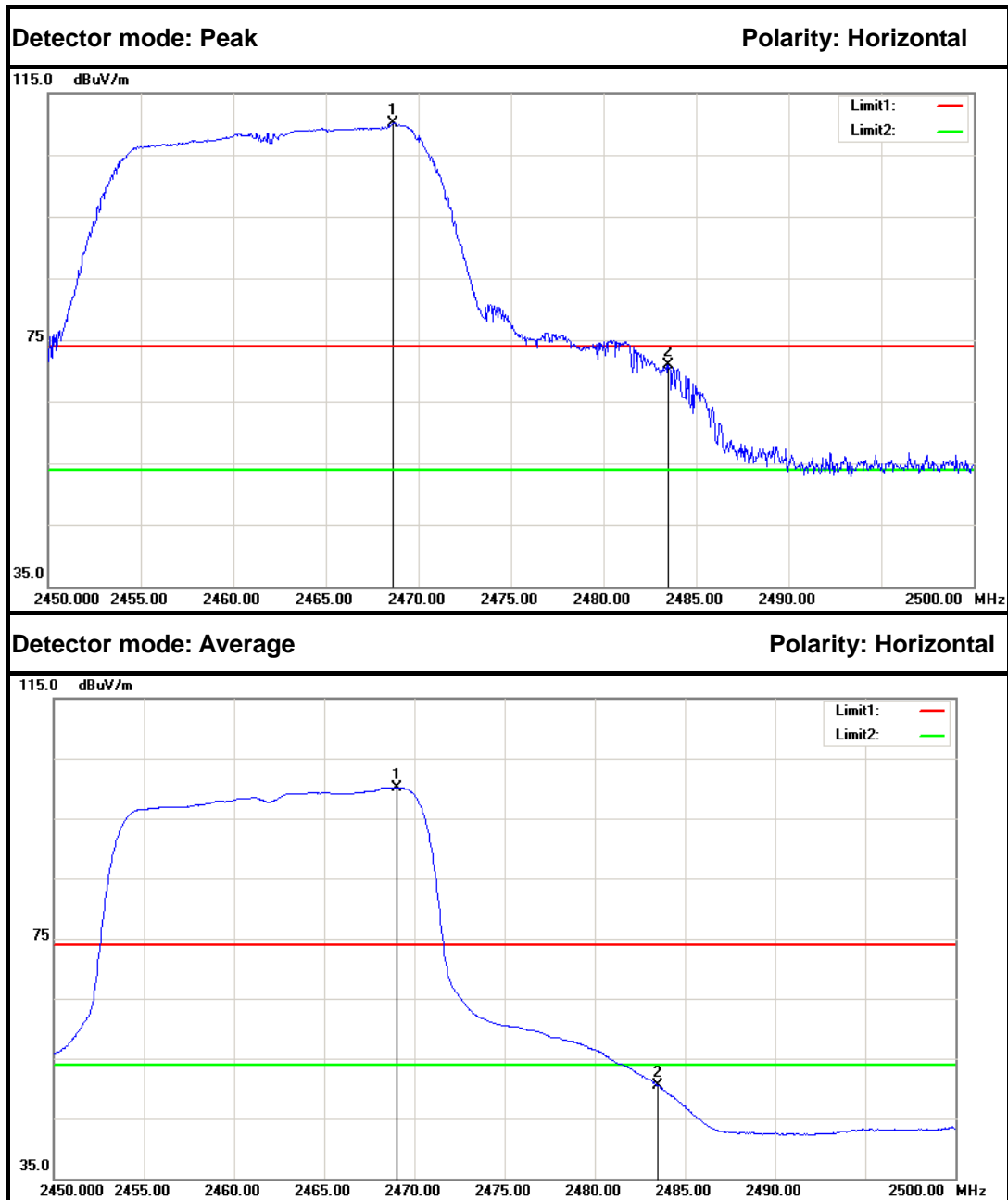


### Band Edges (CH High)



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2468.650	111.68	-2.43	109.25	---	---	Peak	Vertical
2	2483.500	70.98	-2.35	68.63	74.00	-5.37	Peak	Vertical
1	2469.000	101.62	-2.43	99.19	---	---	Average	Vertical
2	2483.500	51.20	-2.35	48.85	54.00	-5.15	Average	Vertical



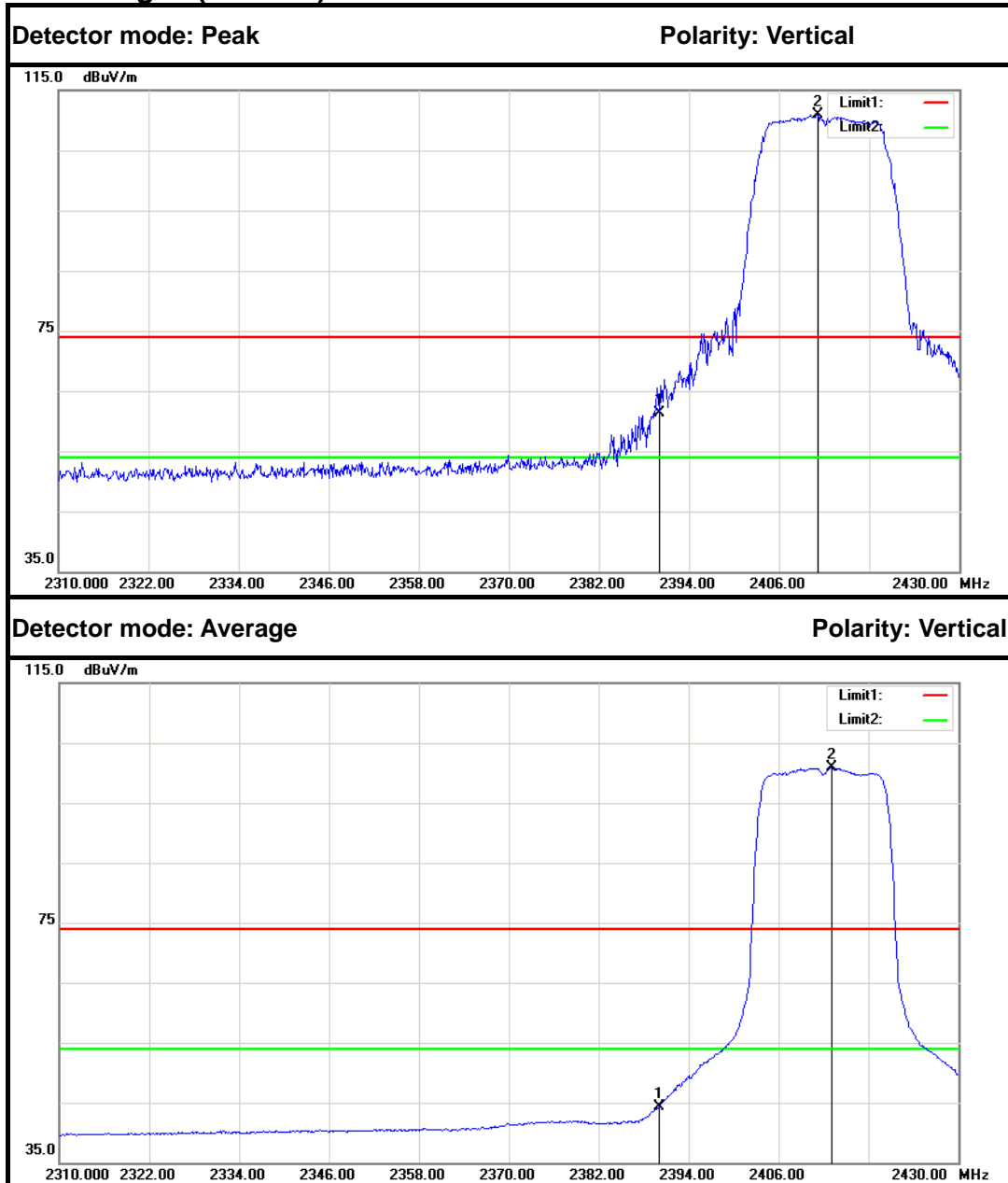


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2468.600	112.54	-2.43	110.11	---	---	Peak	Horizontal
2	2483.500	73.22	-2.35	70.87	74.00	-3.13	Peak	Horizontal
1	2469.000	102.60	-2.43	100.17	---	---	Average	Horizontal
2	2483.500	52.90	-2.35	50.55	54.00	-3.45	Average	Horizontal

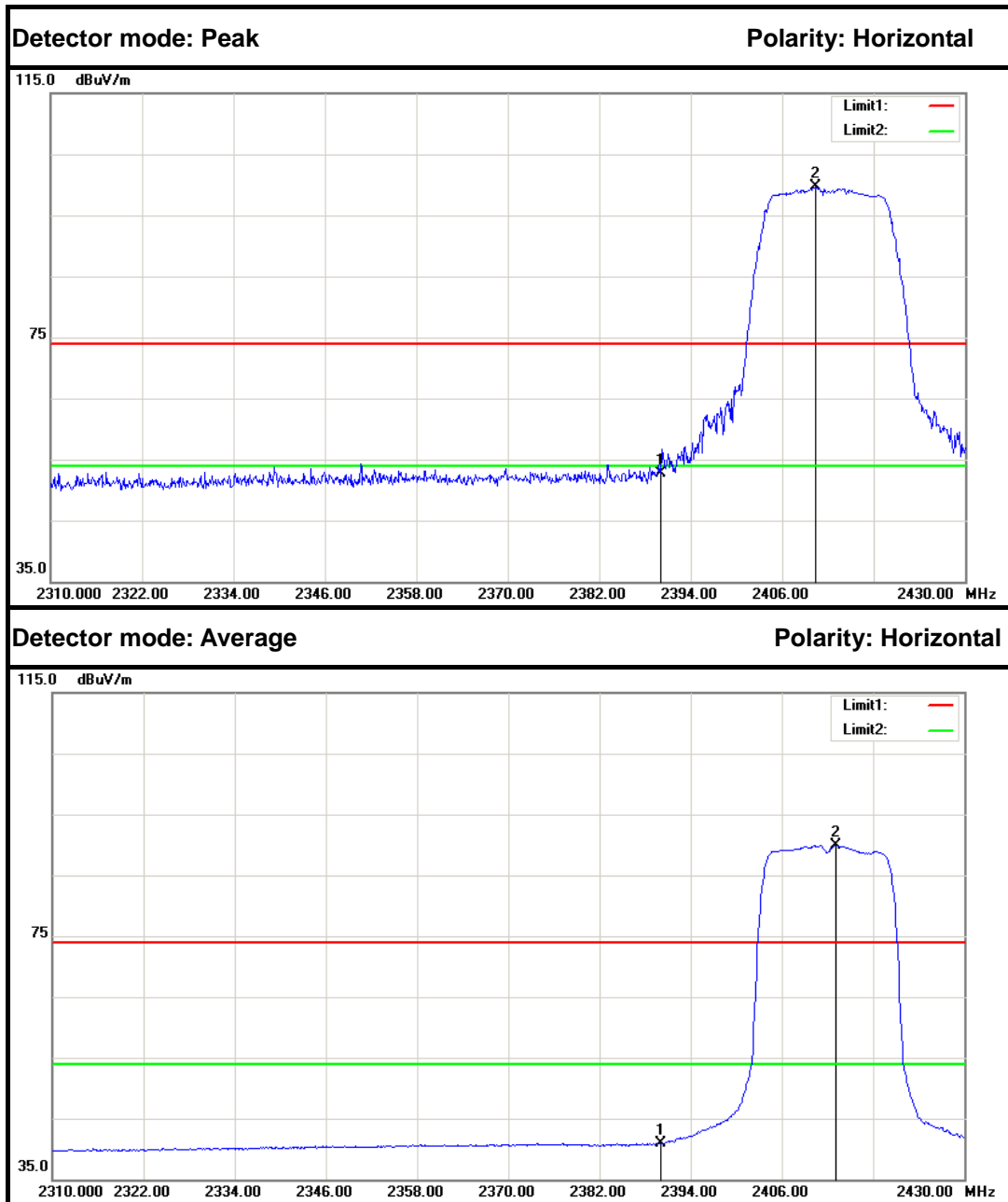


IEEE 802.11g mode (Antenna 2)

Band Edges (CH Low)



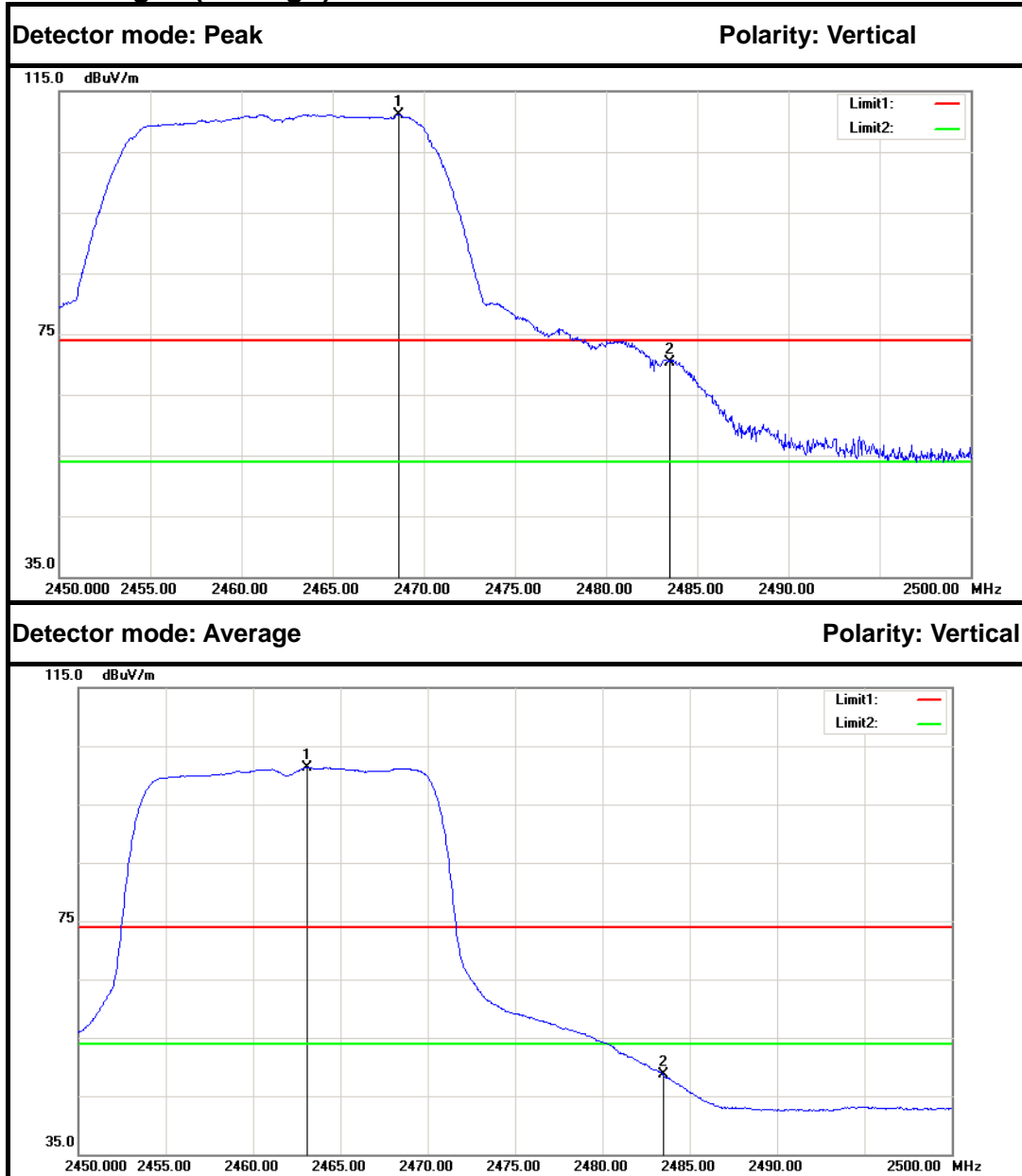
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	64.23	-2.86	61.37	74.00	-12.63	Peak	Vertical
2	2411.160	113.69	-2.75	110.94	---	---	Peak	Vertical
1	2390.000	47.23	-2.86	44.37	54.00	-9.63	Average	Vertical
2	2413.080	103.64	-2.74	100.90	---	---	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	55.60	-2.86	52.74	74.00	-21.26	Peak	Horizontal
2	2410.320	102.36	-2.75	99.61	---	---	Peak	Horizontal
1	2390.000	43.72	-2.86	40.86	54.00	-13.14	Average	Horizontal
2	2413.080	92.68	-2.74	89.94	---	---	Average	Horizontal



### Band Edges (CH High)

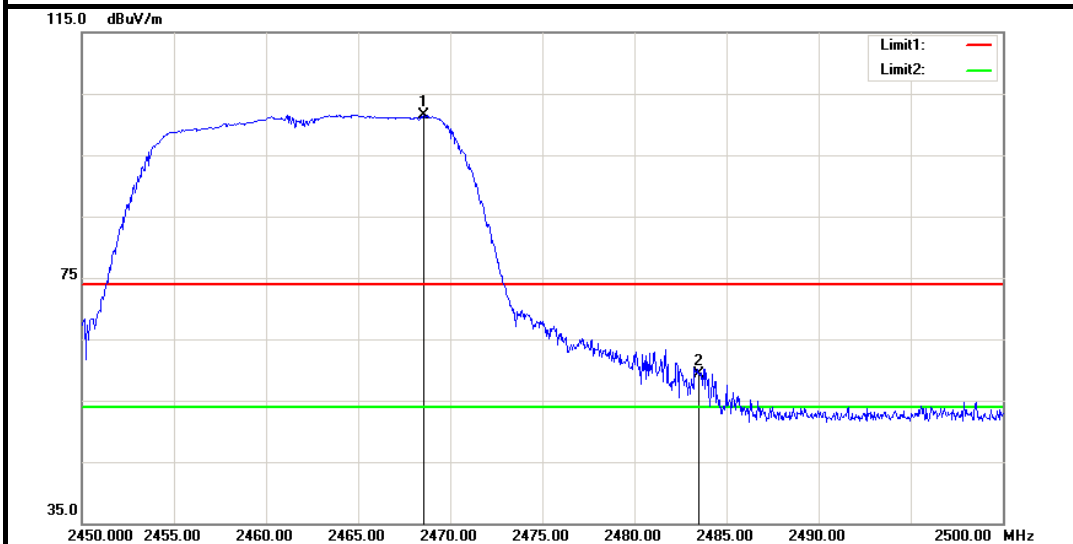


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2468.650	113.56	-2.43	111.13	---	---	Peak	Vertical
2	2483.500	72.67	-2.35	70.32	74.00	-3.68	Peak	Vertical
1	2463.100	103.80	-2.46	101.34	---	---	Average	Vertical
2	2483.500	50.98	-2.35	48.63	54.00	-5.37	Average	Vertical



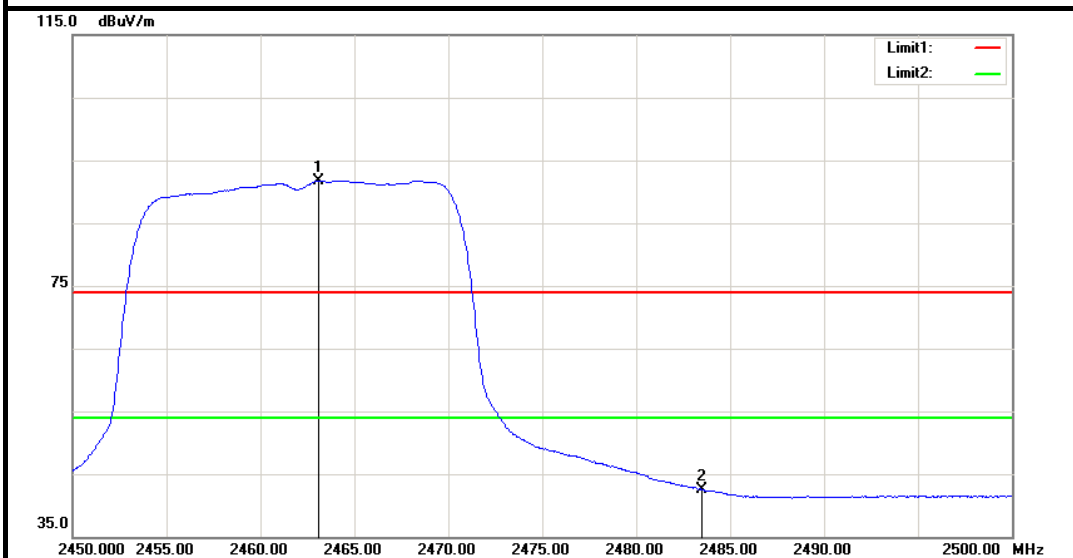
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

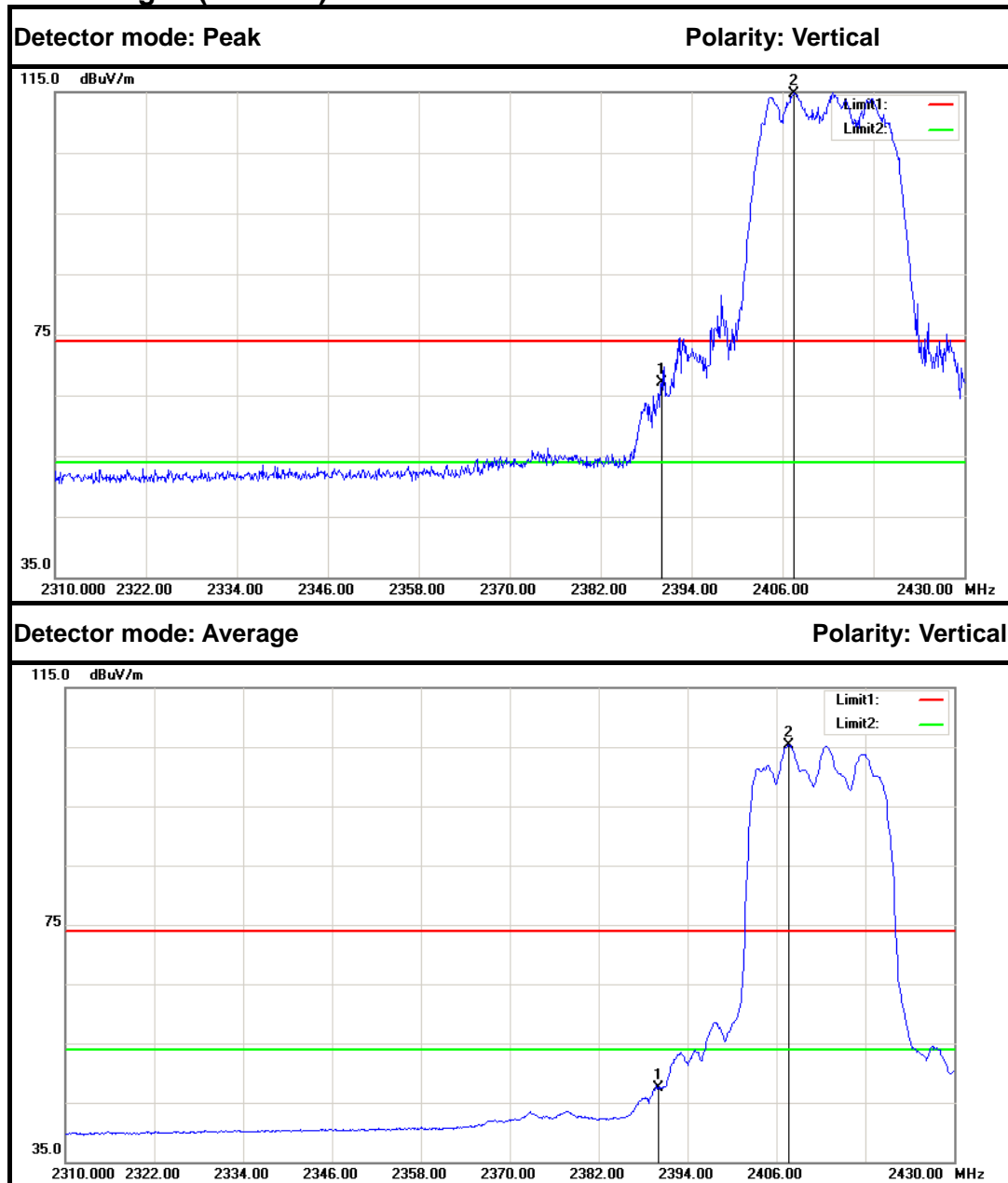
Polarity: Horizontal



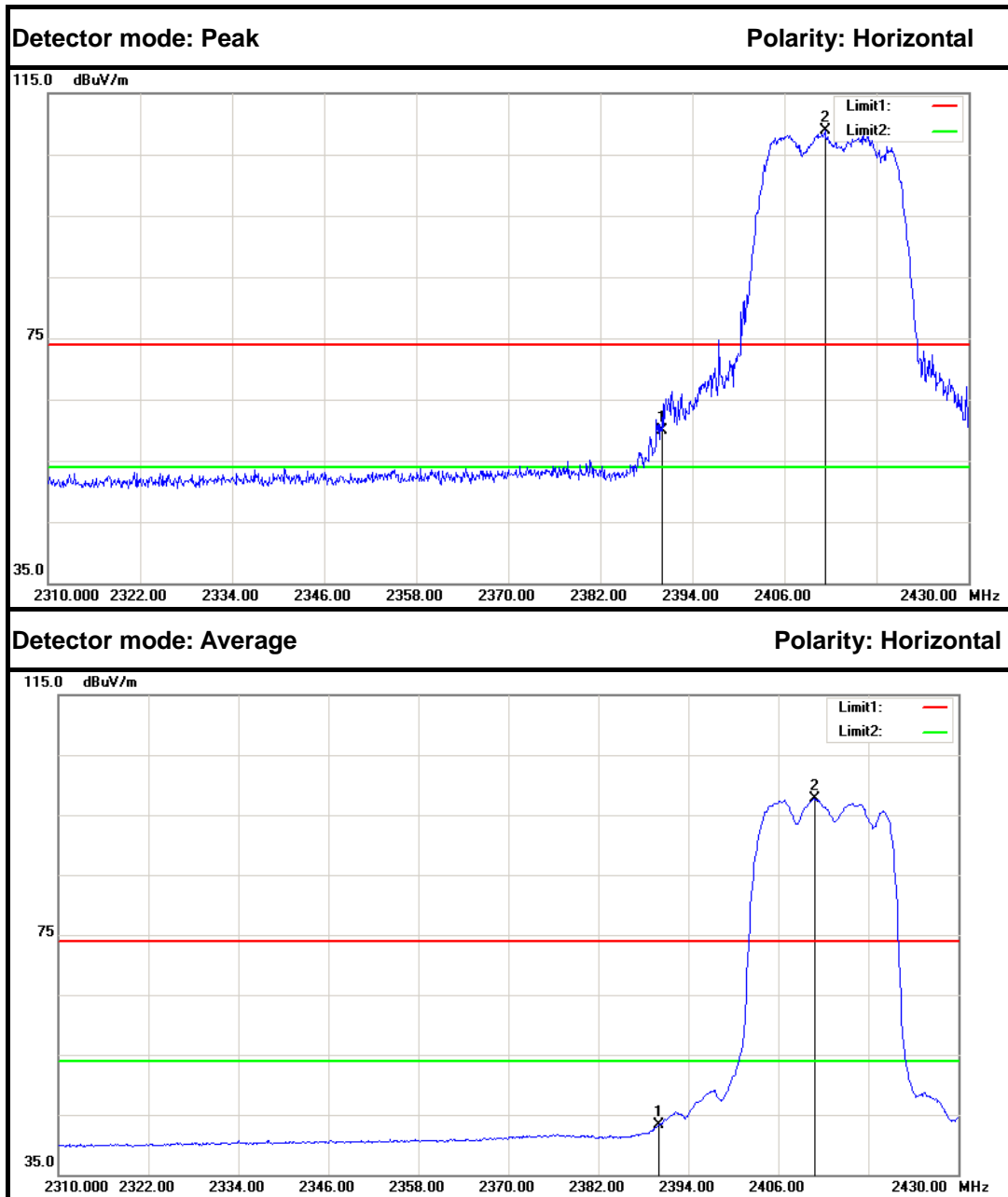
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2468.550	104.03	-2.43	101.60	---	---	Peak	Horizontal
2	2483.500	61.64	-2.35	59.29	74.00	-14.71	Peak	Horizontal
1	2463.100	94.20	-2.46	91.74	---	---	Average	Horizontal
2	2483.500	44.83	-2.35	42.48	54.00	-11.52	Average	Horizontal



IEEE 802.11n HT20 MHz mode (Combine with Antenna 0 and Antenna 1 and Antenna 2))  
Band Edges (CH Low)



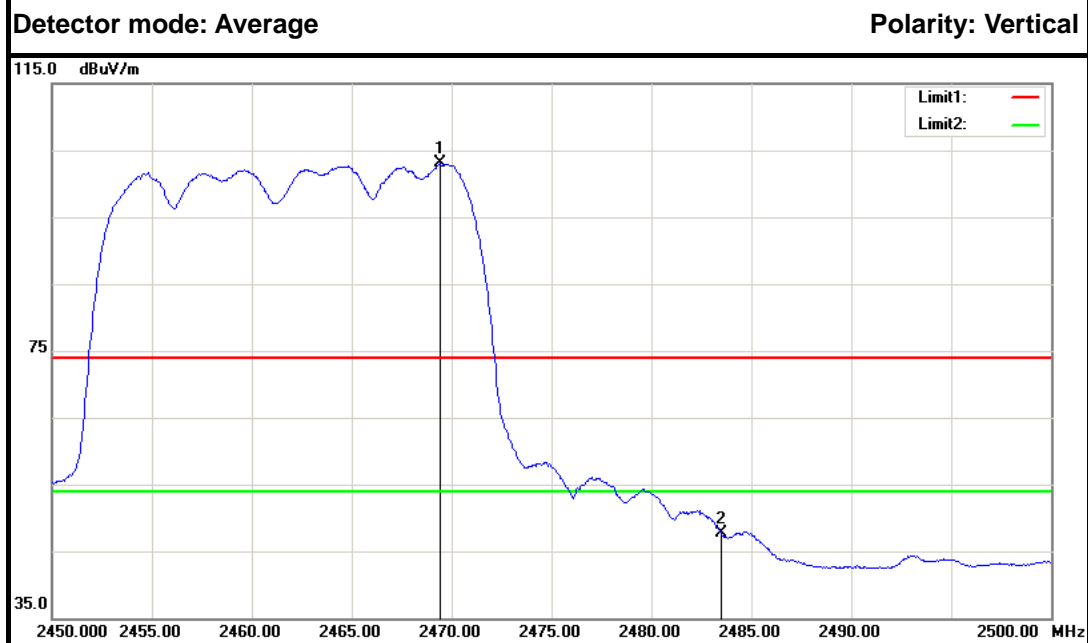
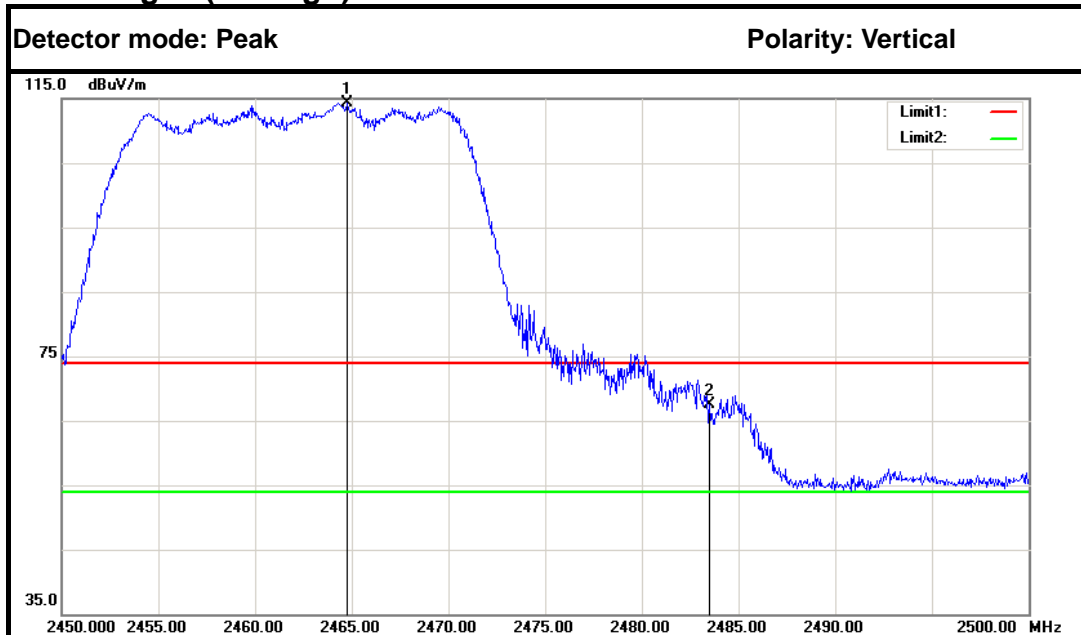
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	69.96	-2.86	67.10	74.00	-6.90	Peak	Vertical
2	2407.560	117.57	-2.77	114.80	---	---	Peak	Vertical
1	2390.000	50.40	-2.86	47.54	54.00	-6.46	Average	Vertical
2	2407.680	108.13	-2.77	105.36	---	---	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	62.85	-2.86	59.99	74.00	-14.01	Peak	Horizontal
2	2411.323	111.68	-2.75	108.93	---	---	Peak	Horizontal
1	2390.000	46.06	-2.86	43.20	54.00	-10.80	Average	Horizontal
2	2410.856	100.41	-2.75	97.66	---	---	Average	Horizontal



### Band Edges (CH High)



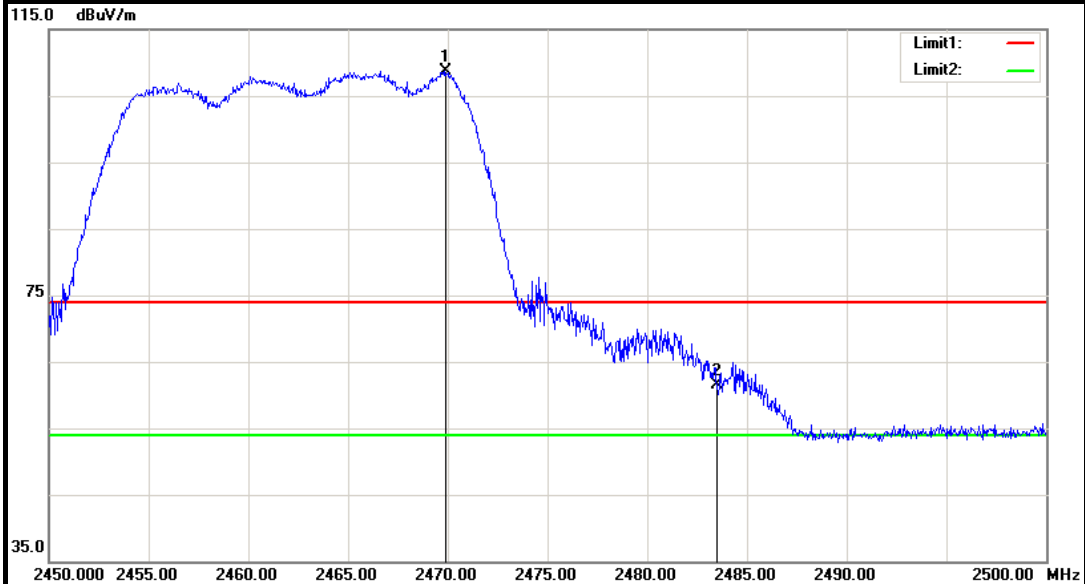
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2464.786	116.72	-2.45	114.27	---	---	Peak	Vertical
2	2483.500	69.94	-2.35	67.59	74.00	-6.41	Peak	Vertical
1	2469.483	105.51	-2.43	103.08	---	---	Average	Vertical
2	2483.500	50.13	-2.35	47.78	54.00	-6.22	Average	Vertical





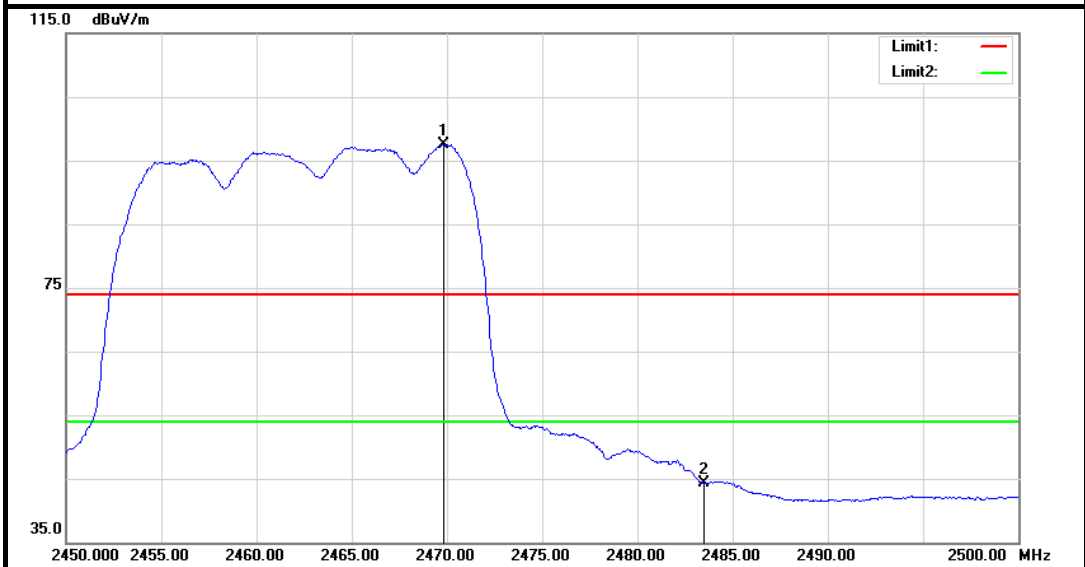
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

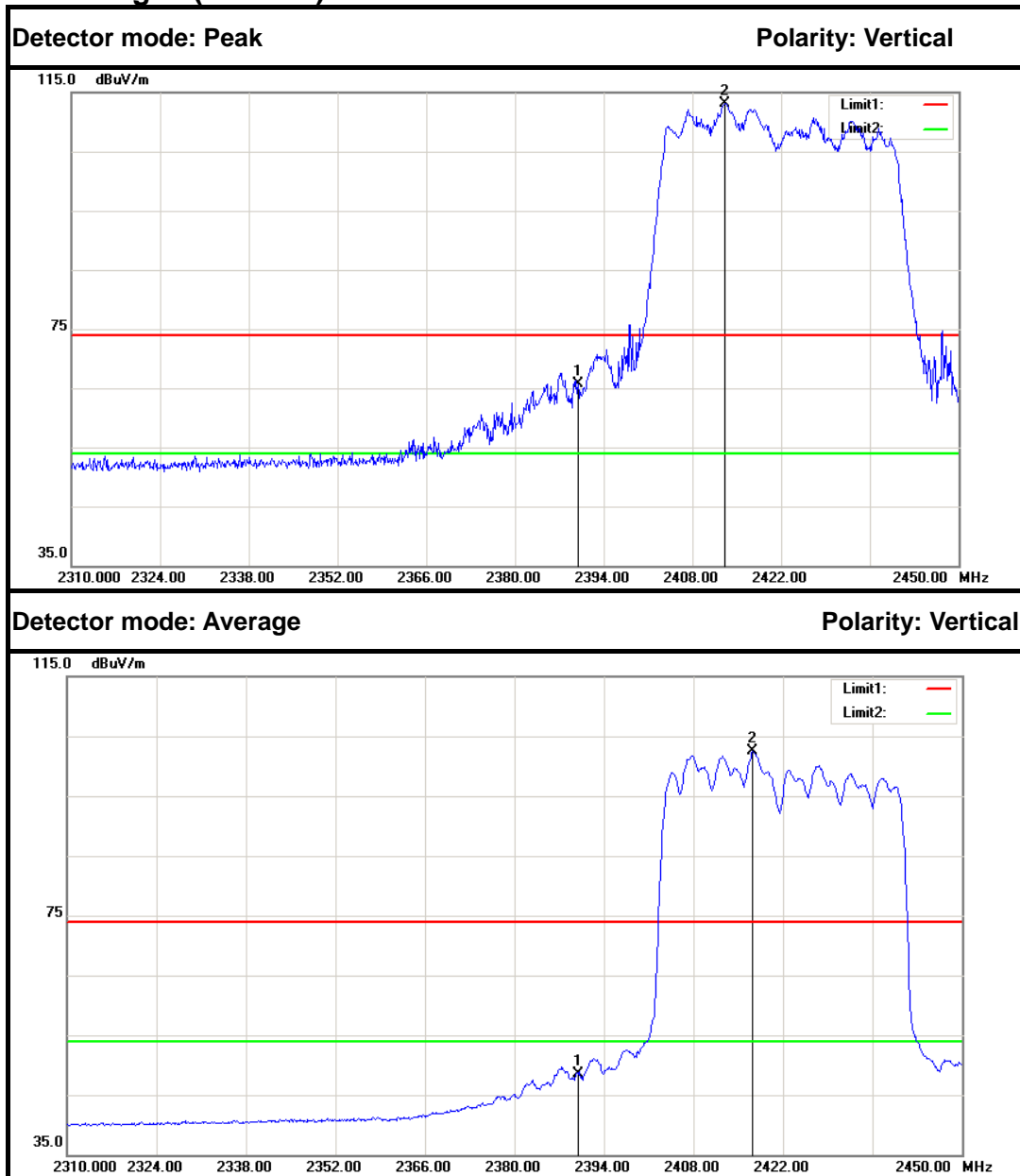
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2469.872	111.16	-2.43	108.73	---	---	Peak	Horizontal
2	2483.500	63.95	-2.35	61.60	74.00	-12.40	Peak	Horizontal
1	2469.900	99.96	-2.42	97.54	---	---	Average	Horizontal
2	2483.500	46.58	-2.35	44.23	54.00	-9.77	Average	Horizontal



IEEE 802.11n HT40 MHz mode (Combine with Antenna 0 and Antenna 1 and Antenna 2)  
Band Edges (CH Low)

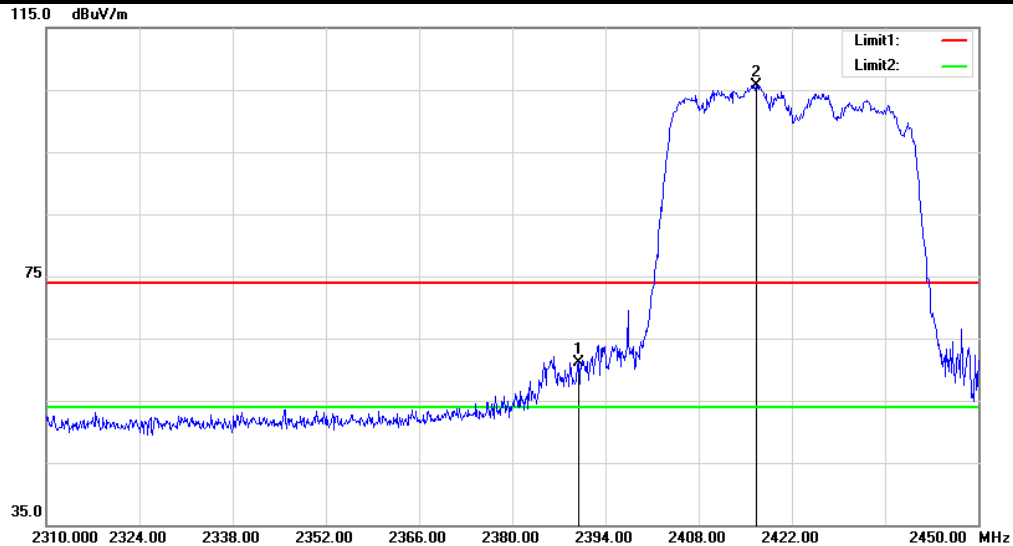


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	68.53	-2.86	65.67	74.00	-8.33	Peak	Vertical
2	2413.191	115.85	-2.74	113.11	---	---	Peak	Vertical
1	2390.000	51.32	-2.86	48.46	54.00	-5.54	Average	Vertical
2	2417.315	105.22	-2.71	102.51	---	---	Average	Vertical



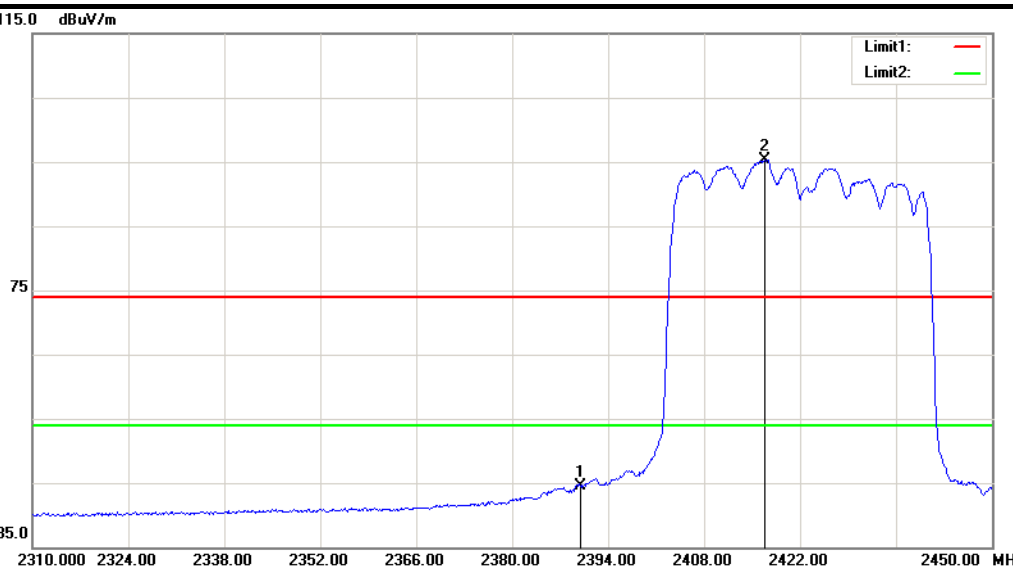
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

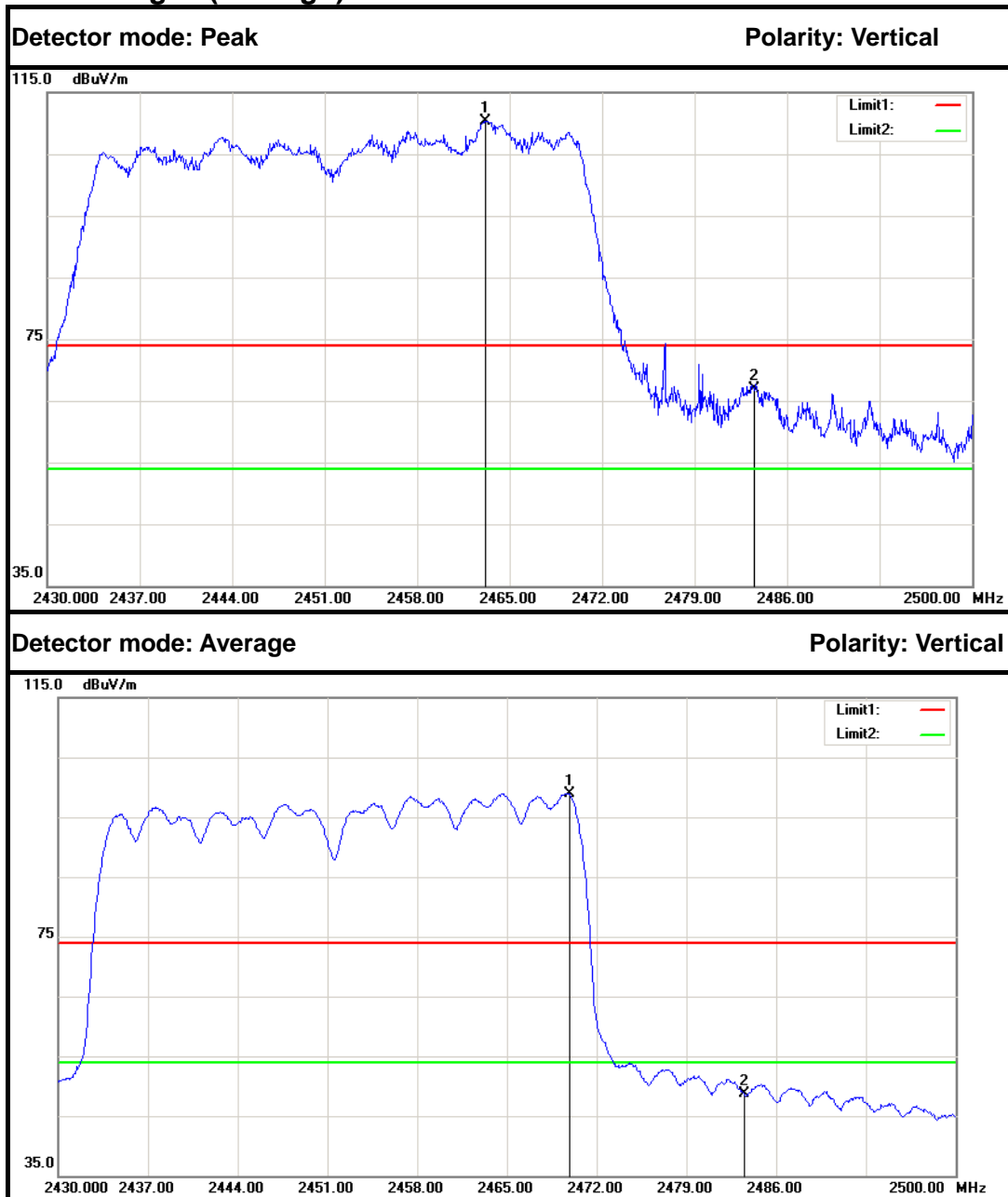
Polarity: Horizontal



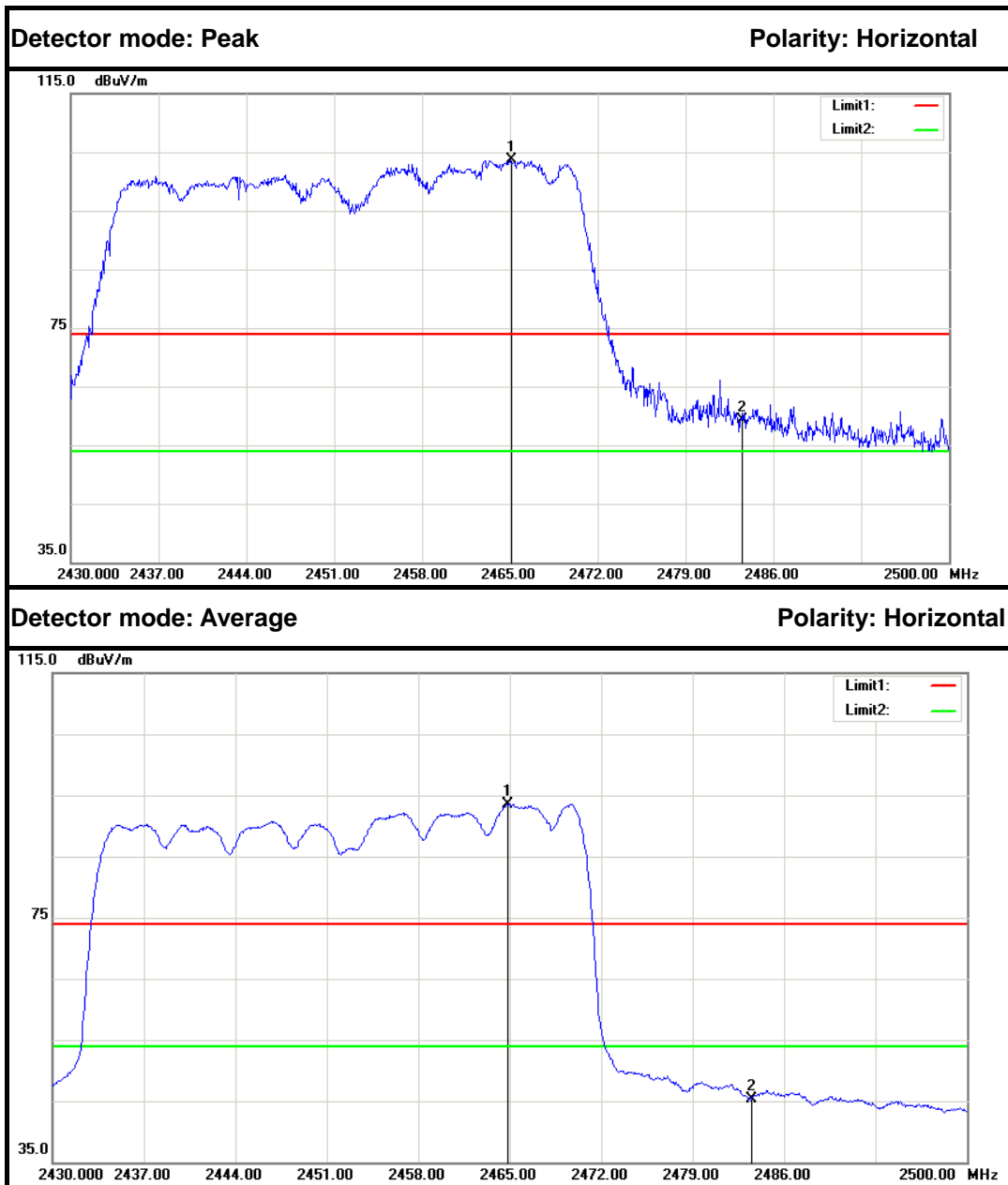
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	63.95	-2.86	61.09	74.00	-12.91	Peak	Horizontal
2	2416.770	108.47	-2.72	105.75	---	---	Peak	Horizontal
1	2390.000	47.36	-2.86	44.50	54.00	-9.50	Average	Horizontal
2	2416.848	98.07	-2.72	95.35	---	---	Average	Horizontal



### Band Edges (CH High)



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2463.191	112.80	-2.46	110.34	---	---	Peak	Vertical
2	2483.500	69.24	-2.35	66.89	74.00	-7.11	Peak	Vertical
1	2469.883	101.41	-2.42	98.99	---	---	Average	Vertical
2	2483.500	51.08	-2.35	48.73	54.00	-5.27	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2465.136	106.19	-2.45	103.74	---	---	Peak	Horizontal
2	2483.500	61.70	-2.35	59.35	74.00	-14.65	Peak	Horizontal
1	2464.903	96.03	-2.45	93.58	---	---	Average	Horizontal
2	2483.500	47.62	-2.35	45.27	54.00	-8.73	Average	Horizontal



## 7.7. PEAK POWER SPECTRAL DENSITY MEASUREMENT

### 7.7.1. LIMITS

According to §15.247(e), for digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

According to §15.247(f), the digital modulation operation of the hybrid system, with the frequency hopping turned off, shall comply with the power density requirements of paragraph (d) of this section.

### 7.7.2. TEST INSTRUMENTS

Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2017	02/20/2018

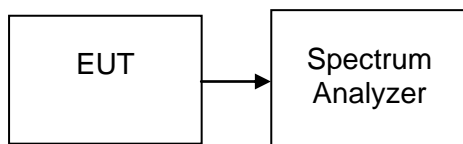
### 7.7.3. TEST PROCEDURES (please refer to measurement standard)

§15.247(e) specifies a conducted power spectral density (PSD) limit of 8 dBm in any 3 kHz band segment within the fundamental EBW during any time interval of continuous transmission. The same method as used to determine the conducted output power shall be used to determine the power spectral density (i.e., if peak-detected fundamental power was measured then use the peak PSD procedure and if average fundamental power was measured then use the average PSD procedure).

### 10.2 Method PKPSD (peak PSD)

1. Set analyzer center frequency to DTS channel center frequency.
2. Set the span to 1.5 times the DTS bandwidth.
3. Set the RBW to:  $3 \text{ kHz} \leq \text{RBW} \leq 100 \text{ kHz}$ .
4. Set the VBW  $\geq 3 \times \text{RBW}$ .
5. Detector = peak.
6. Sweep time = auto couple.
7. Trace mode = max hold.
8. Allow trace to fully stabilize.
9. Use the peak marker function to determine the maximum amplitude level within the RBW.
10. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat.

### 7.7.4. TEST SETUP



**7.7.5. TEST RESULTS***No non-compliance noted***Test Data****Test mode: IEEE 802.11b**

Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Test Result
		Antenna 0	Antenna 1	Antenna 2		
Low	2412	-3.518	-3.691	-3.032	8	PASS
Mid	2437	-1.353	-1.127	-2.097		PASS
High	2462	-3.530	-3.082	-2.821		PASS

**Test mode: IEEE 802.11g**

Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Test Result
		Antenna 0	Antenna 1	Antenna 2		
Low	2412	-7.839	-7.470	-7.306	8	PASS
Mid	2437	-4.868	-4.240	-4.441		PASS
High	2462	-6.996	-7.119	-7.109		PASS

**Test mode: IEEE 802.11n HT20 MHz (Combine with Antenna 0 and Antenna 1 and Antenna 2)**

Channel	Frequency (MHz)	PPSD (dBm)				Limit (dBm)	Test Result
		Antenna 0	Antenna 1	Antenna 2	Total		
Low	2412	-9.828	-8.834	-8.413	-4.214	6.23	PASS
Mid	2437	-8.289	-7.196	-7.412	-2.836		PASS
High	2462	-11.456	-9.394	-11.603	-5.924		PASS

**Test mode: IEEE 802.11n HT40 MHz (Combine with Antenna 0 and Antenna 1 and Antenna 2)**

Channel	Frequency (MHz)	PPSD (dBm)				Limit (dBm)	Test Result
		Antenna 0	Antenna 1	Antenna 2	Total		
Low	2422	-12.229	-11.579	-12.855	-7.419	6.23	PASS
Mid	2437	-11.005	-10.205	-10.227	-5.692		PASS
High	2452	-14.410	-15.446	-15.966	-10.454		PASS



## Test Plot

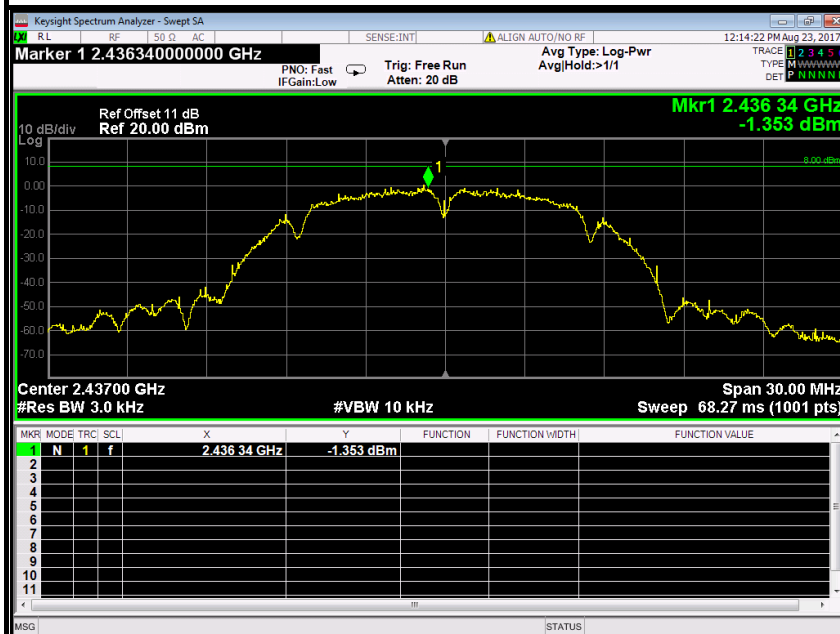
### Antenna 0

### IEEE 802.11b mode

#### PPSD (CH Low)



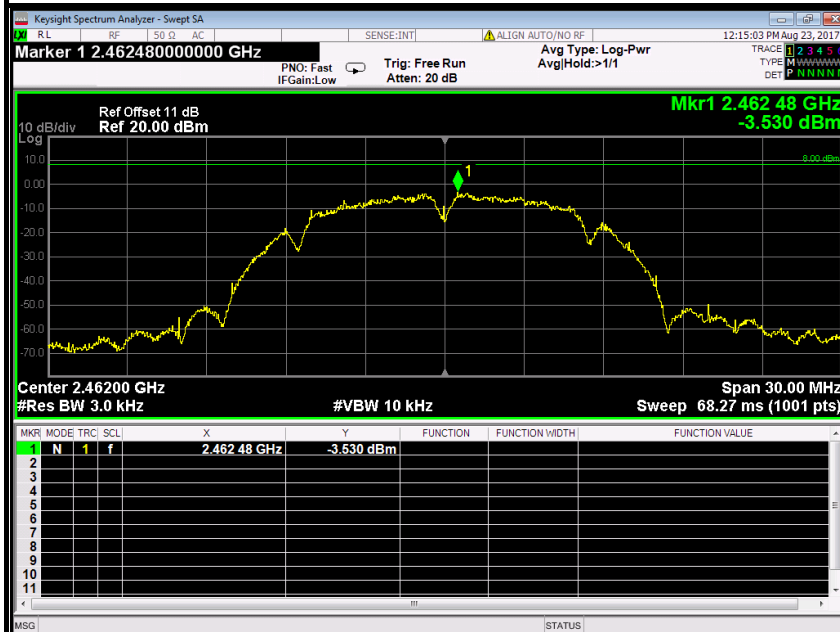
#### PPSD (CH Mid)





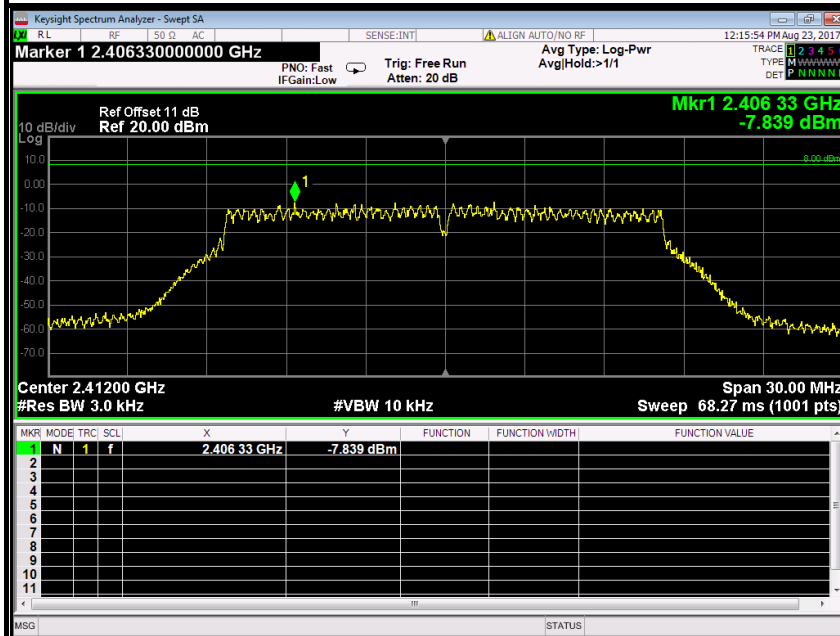


### PPSD (CH High)



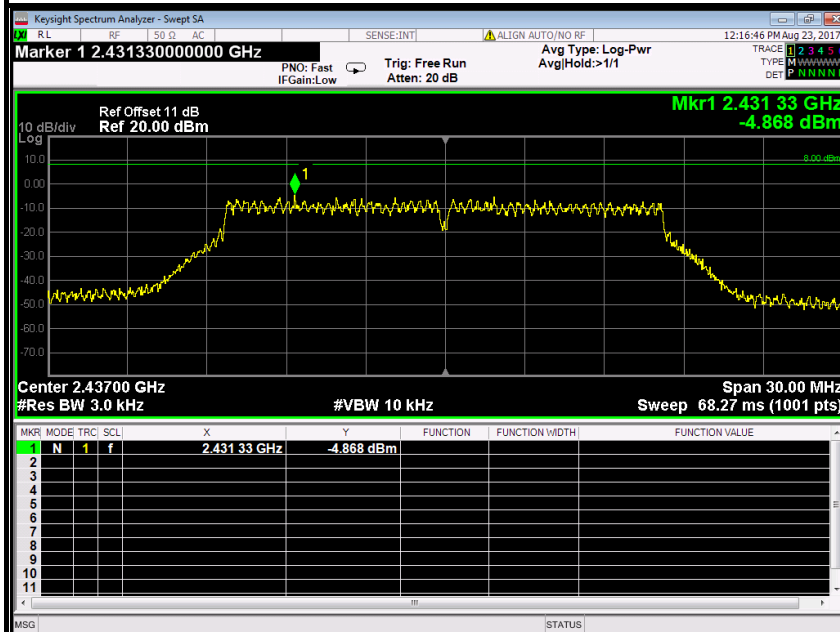
### IEEE 802.11g mode

### PPSD (CH Low)

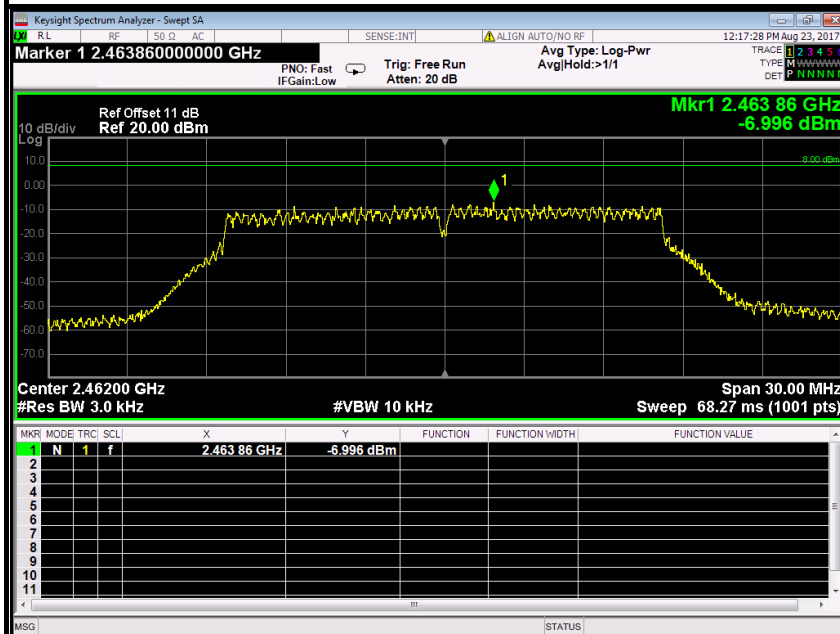




### PPSD (CH Mid)



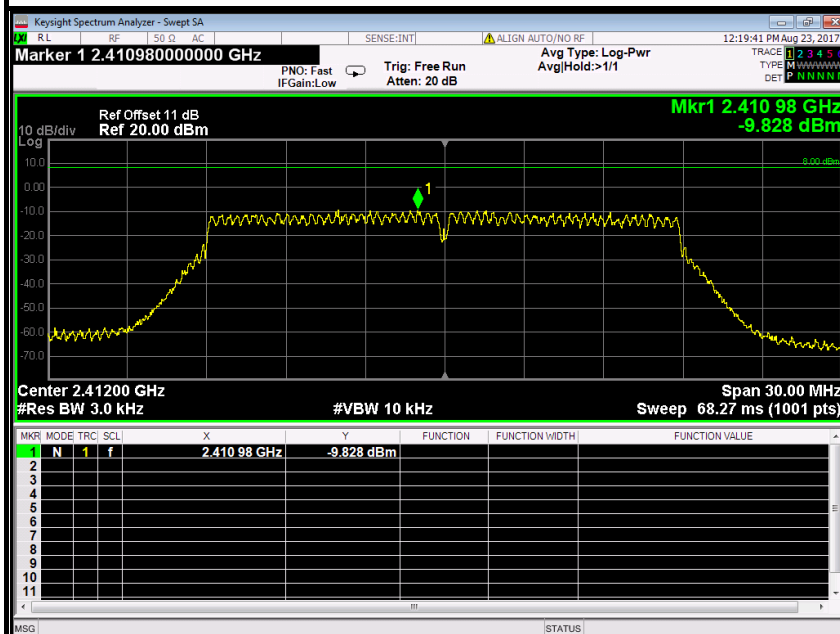
### PPSD (CH High)



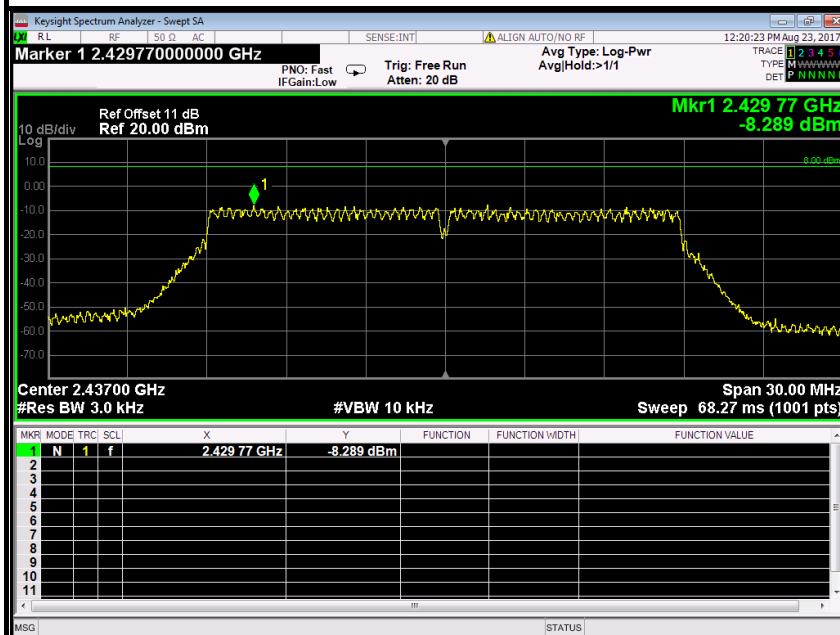


## IEEE 802.11n HT20 MHz mode

### PPSD (CH Low)

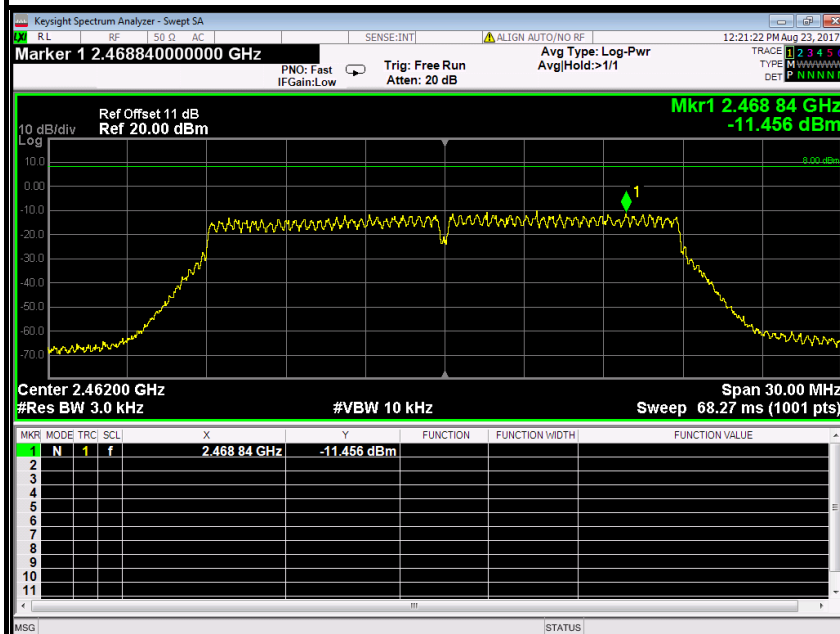


### PPSD (CH Mid)



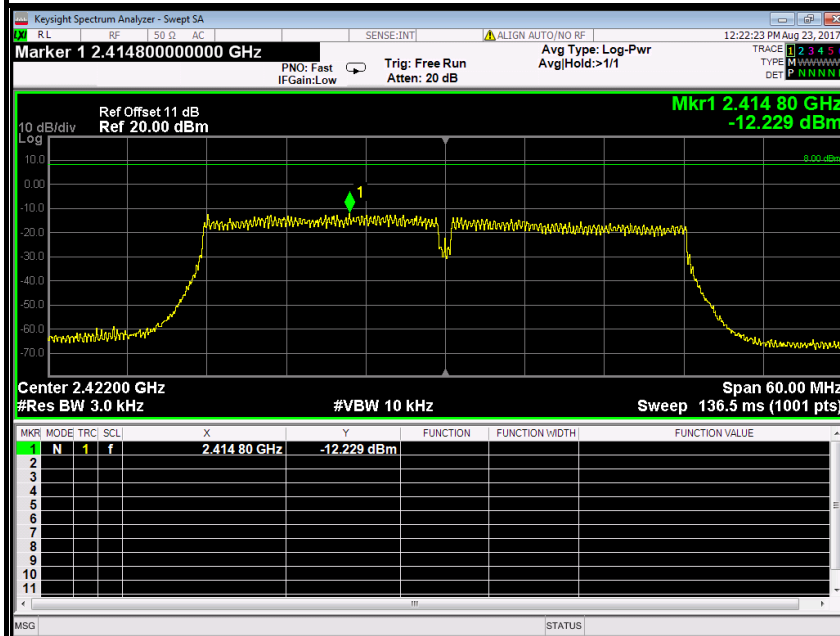


## PPSD (CH High)



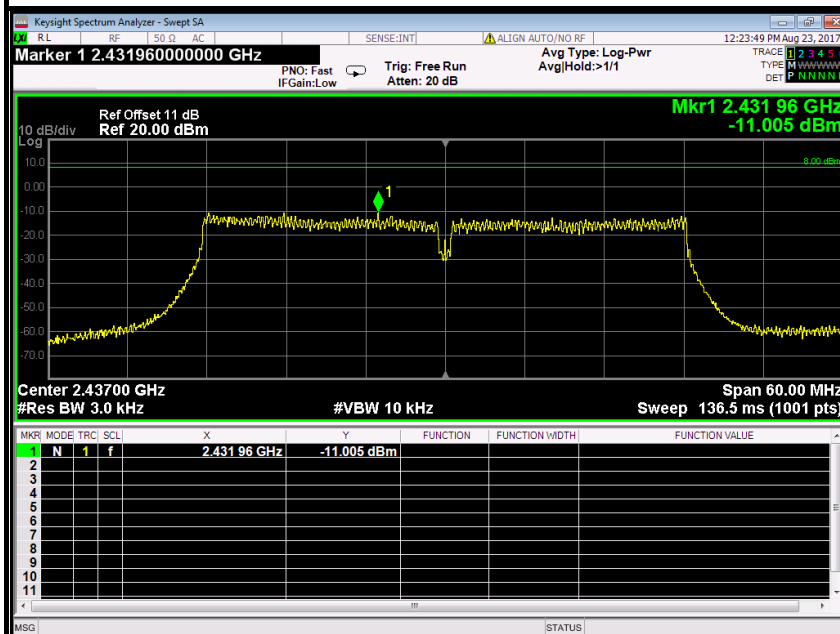
## IEEE 802.11n HT40 MHz mode

## PPSD (CH Low)

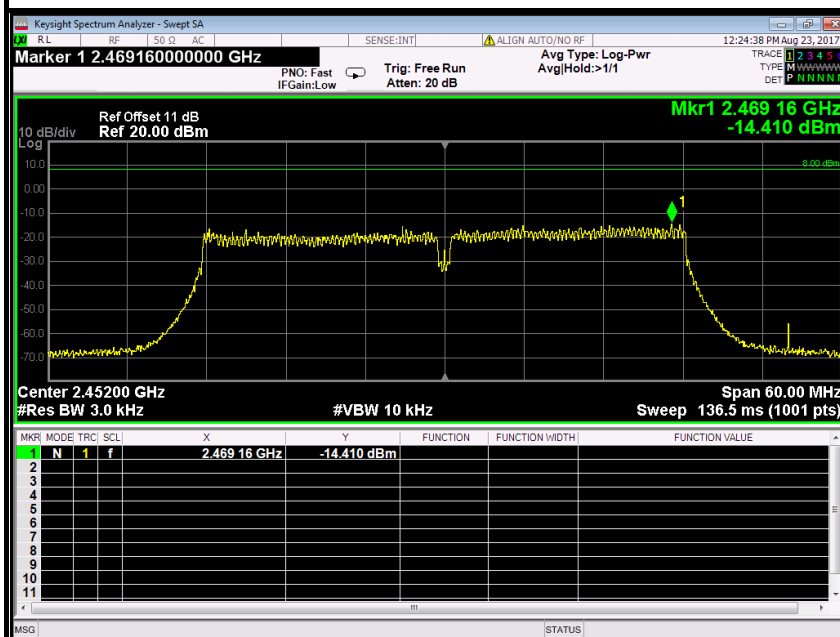




## PPSD (CH Mid)



## PPSD (CH High)

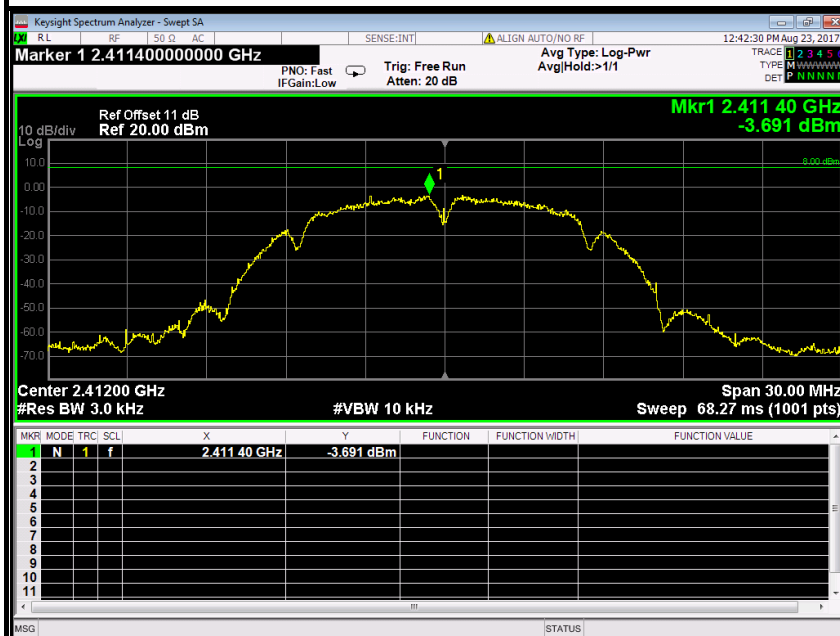




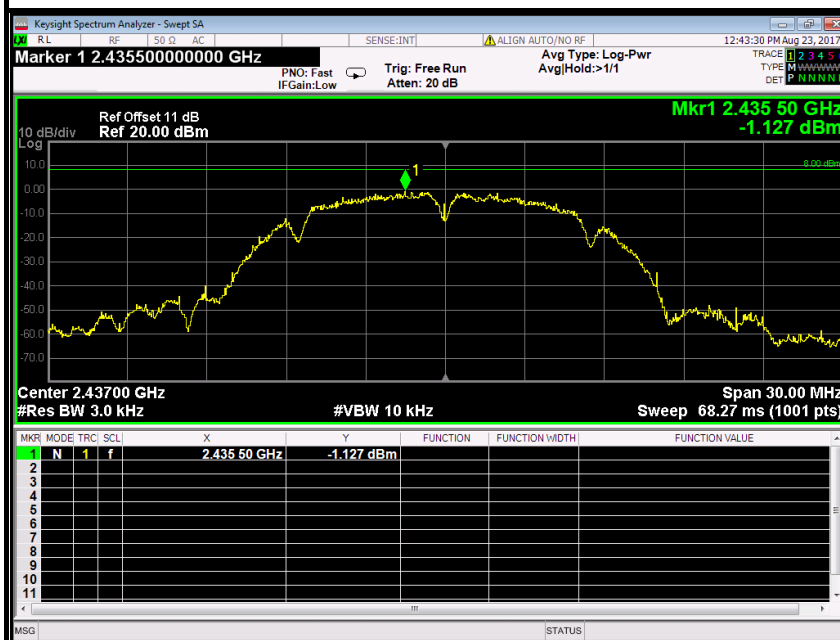
## Antenna 1

### IEEE 802.11b mode

#### PPSD (CH Low)

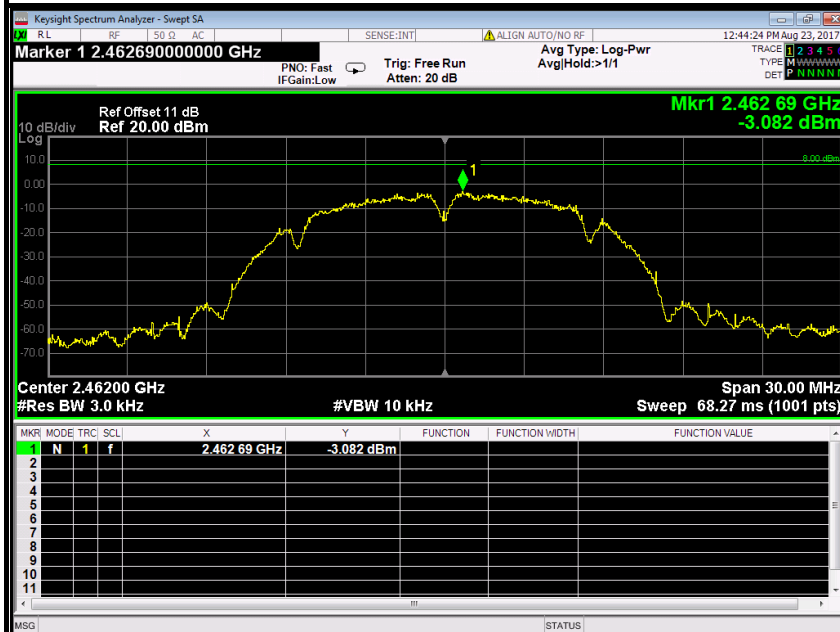


#### PPSD (CH Mid)



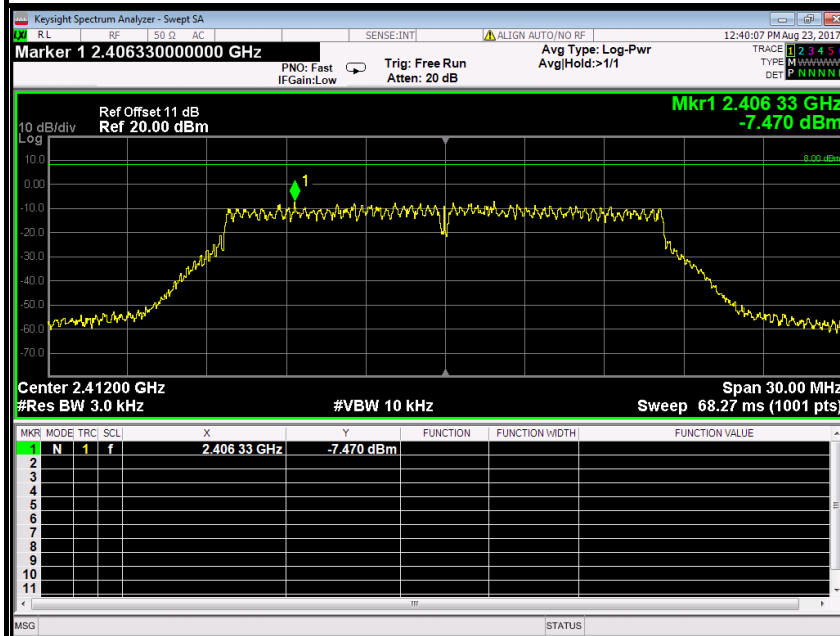


### PPSD (CH High)



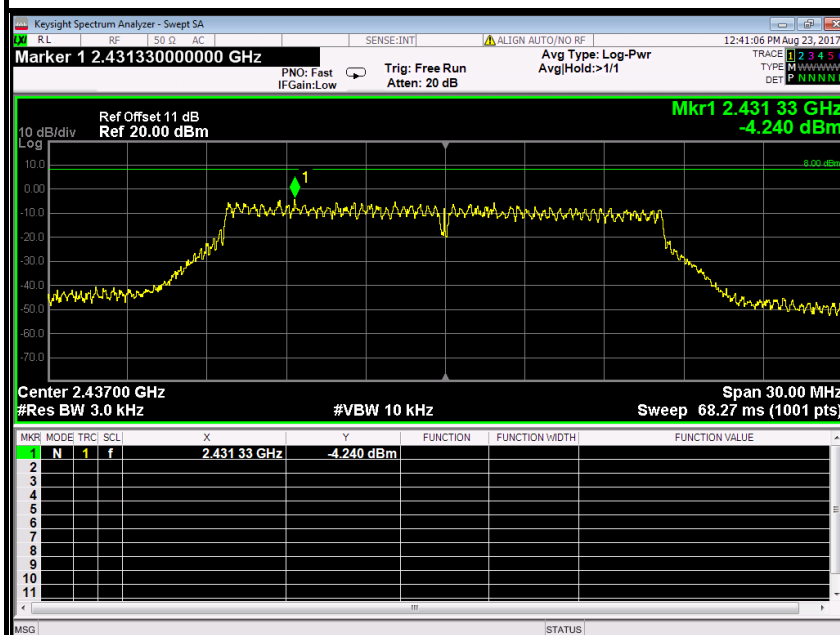
### IEEE 802.11g mode

### PPSD (CH Low)

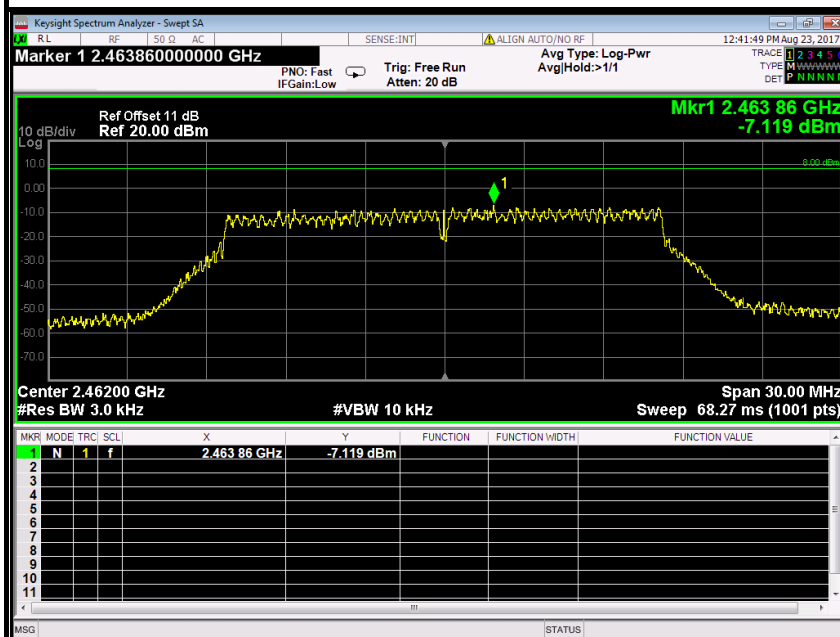




## PPSD (CH Mid)



## PPSD (CH High)

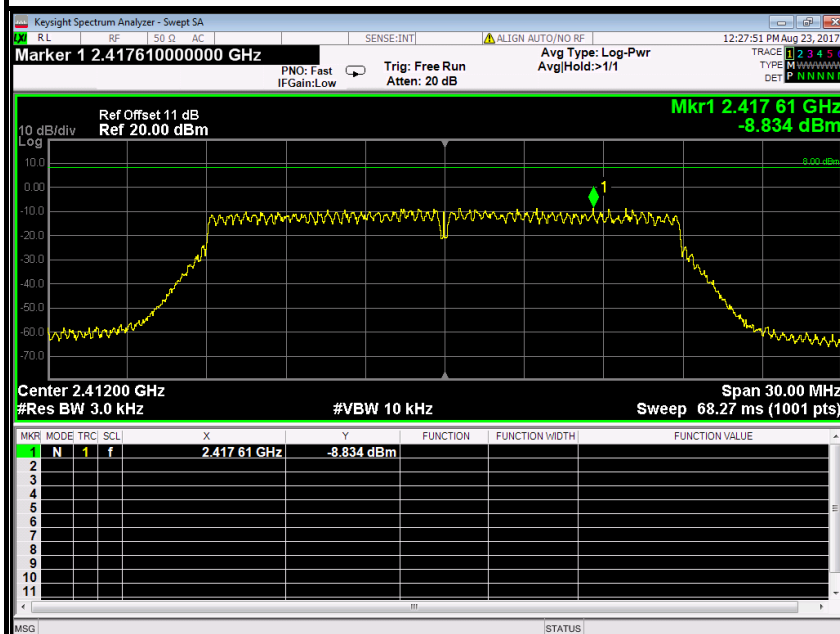




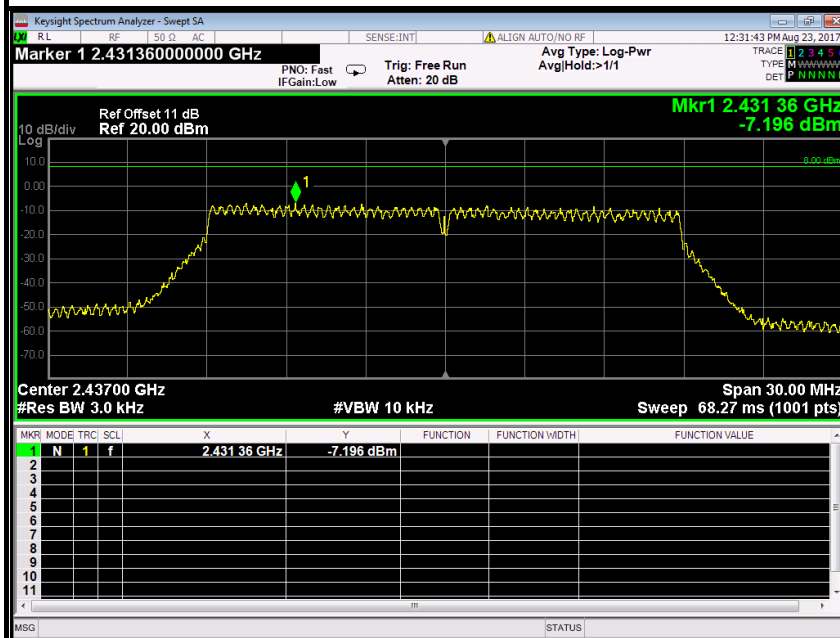


## IEEE 802.11n HT20 MHz mode

## PPSD (CH Low)

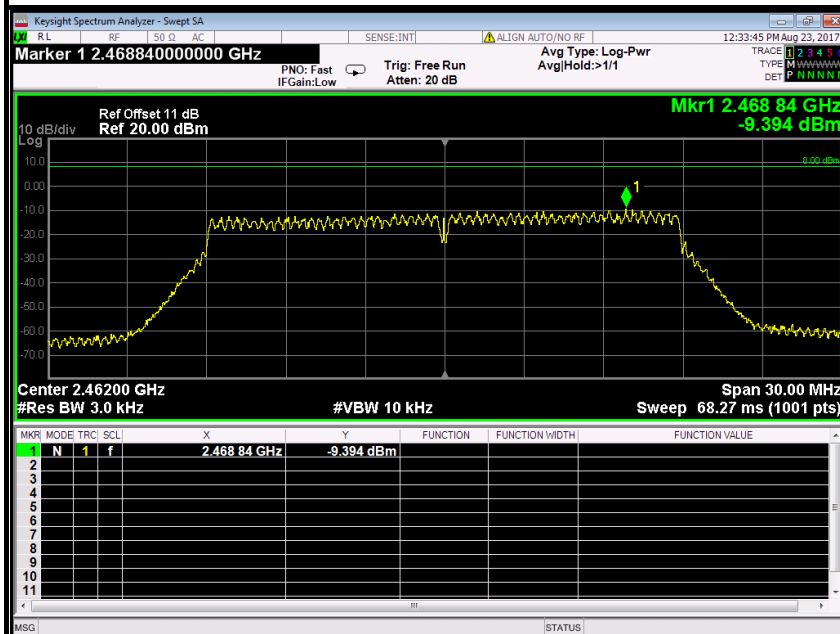


## PPSD (CH Mid)



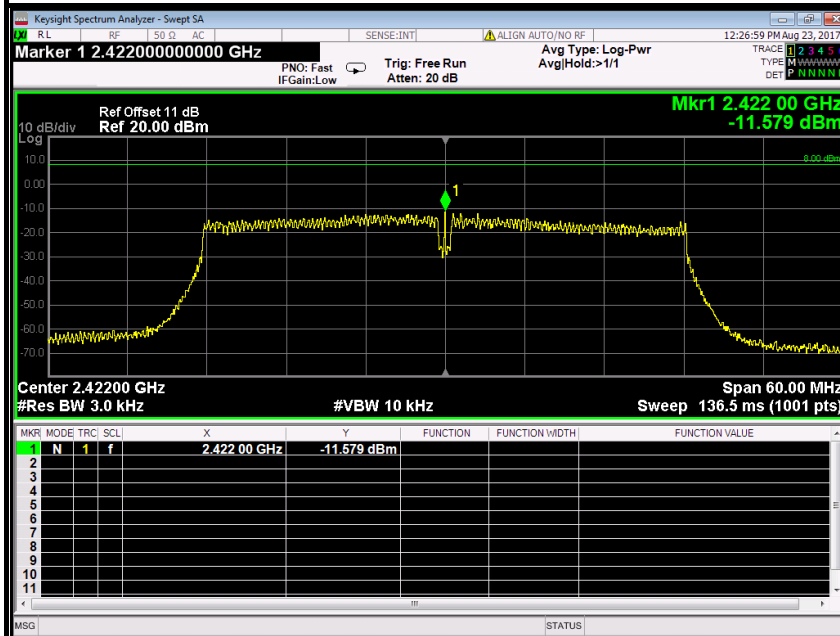


## PPSD (CH High)



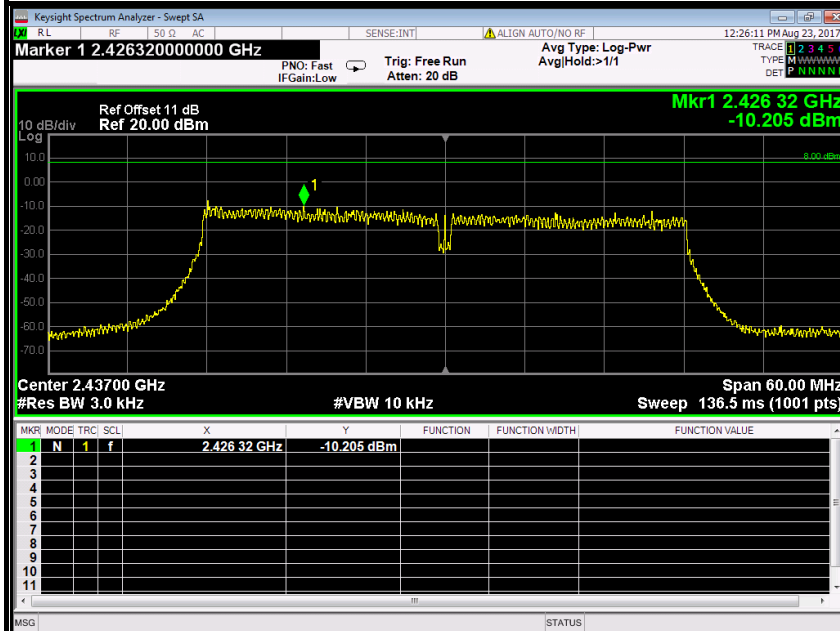
## IEEE 802.11n HT40 MHz mode

## PPSD (CH Low)

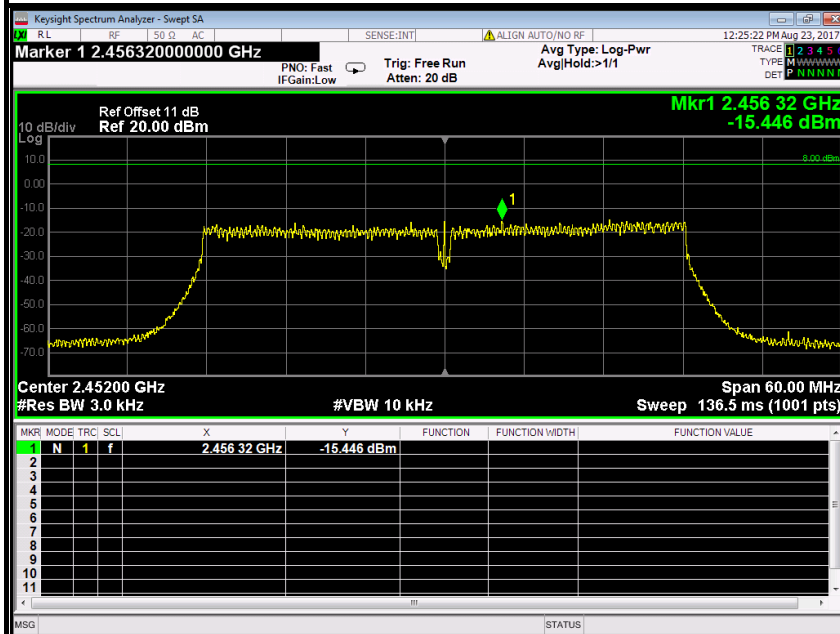




### PPSD (CH Mid)



### PPSD (CH High)

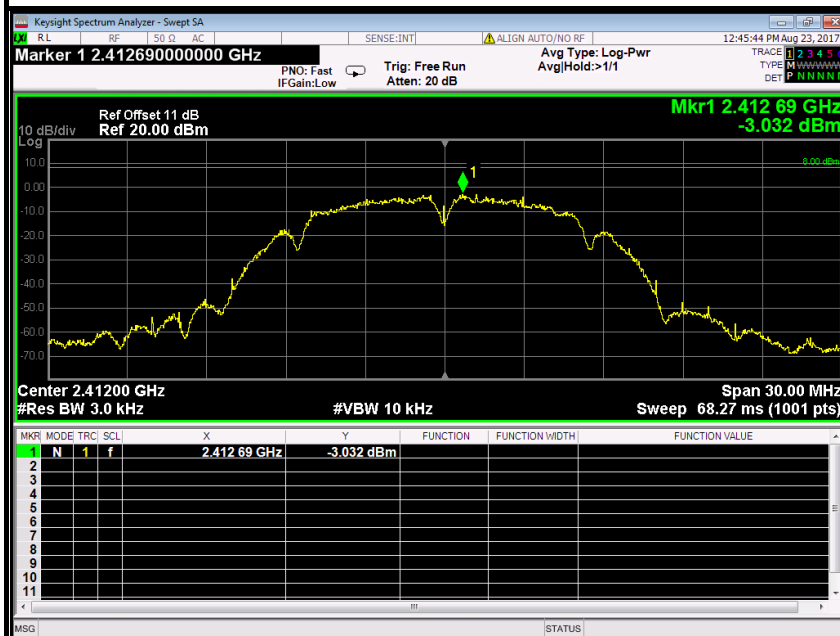




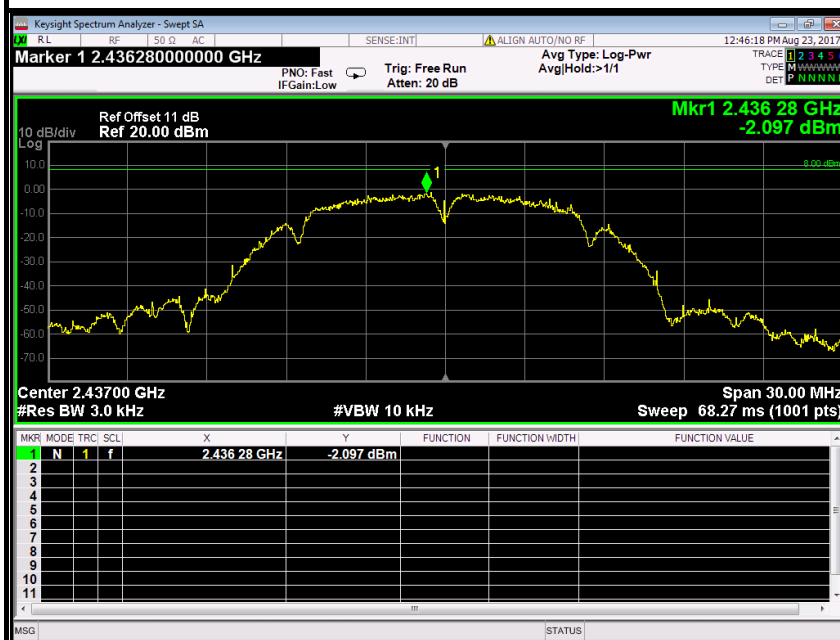
## Antenna 2

### IEEE 802.11b mode

#### PPSD (CH Low)

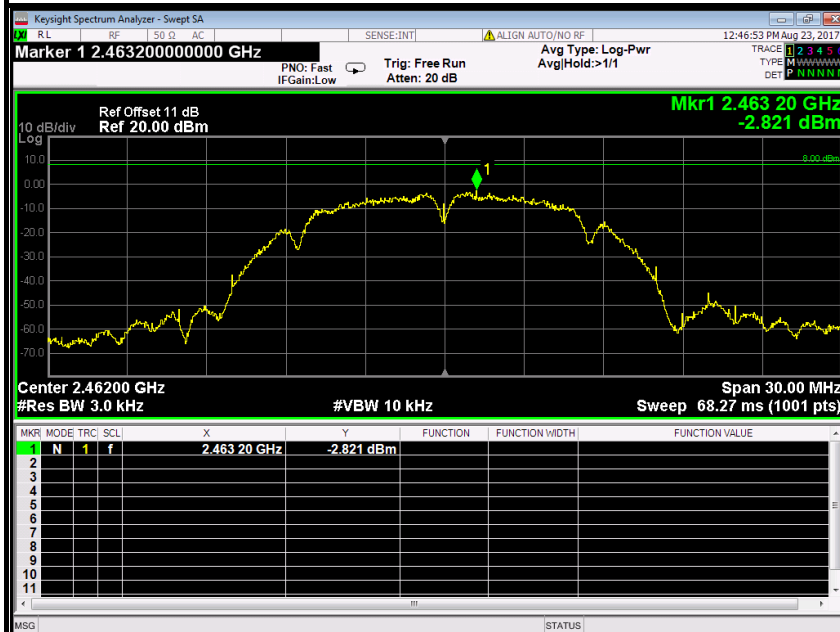


#### PPSD (CH Mid)



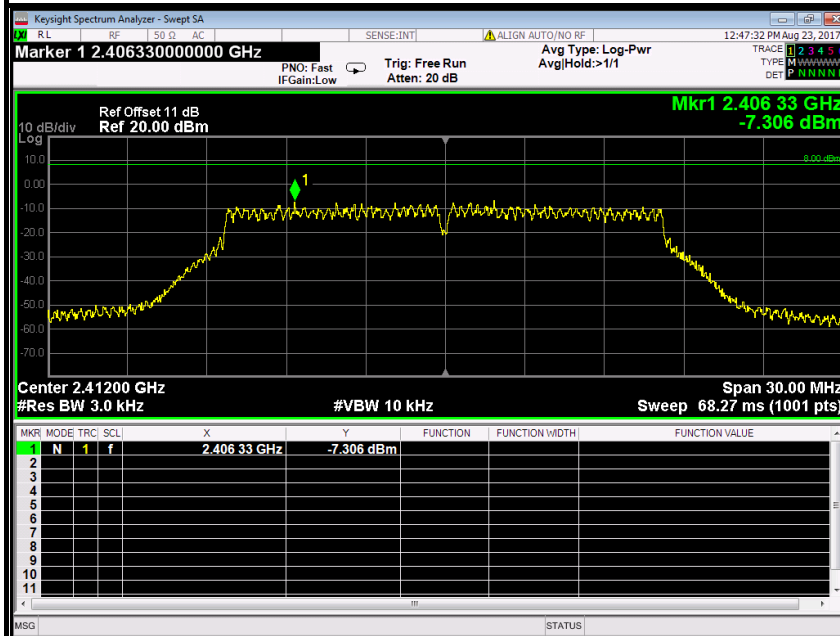


### PPSD (CH High)



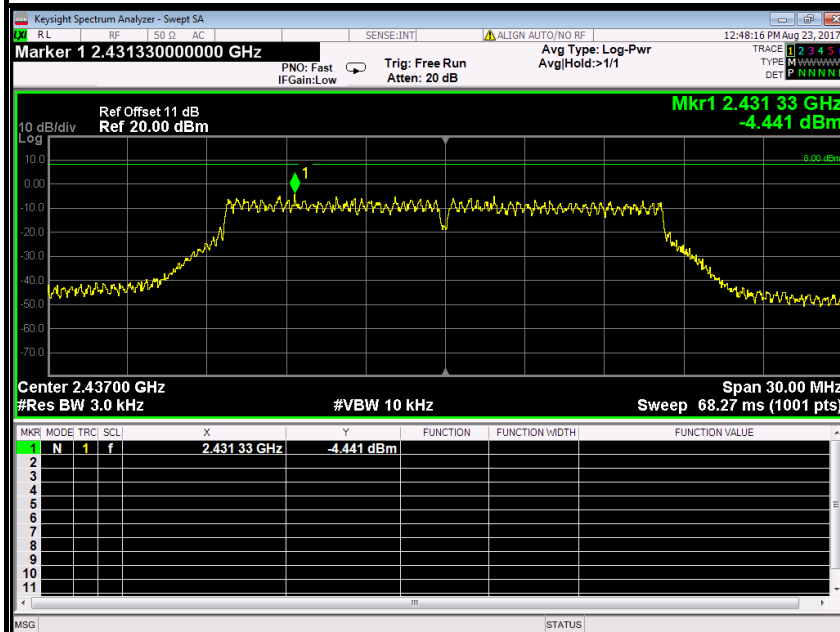
### IEEE 802.11g mode

### PPSD (CH Low)

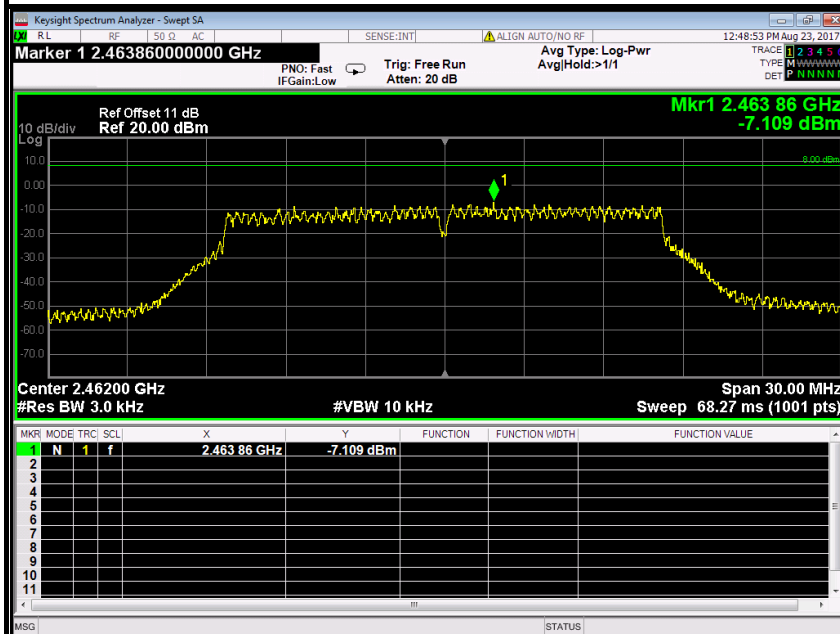




### PPSD (CH Mid)



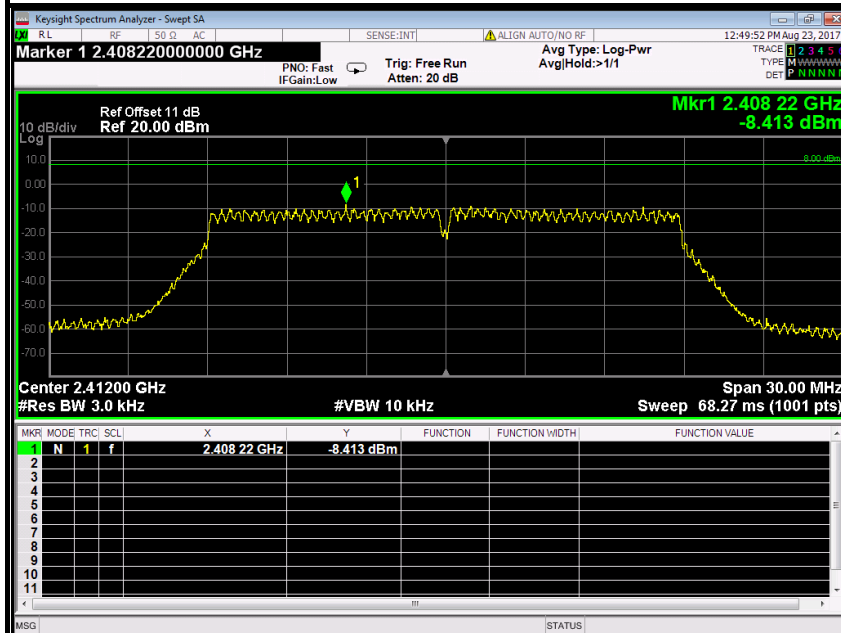
### PPSD (CH High)



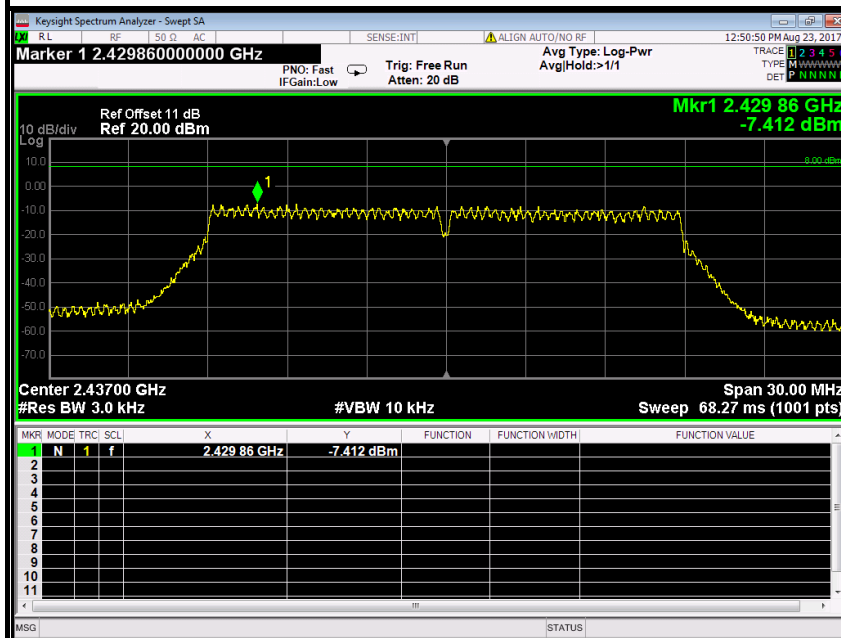


## IEEE 802.11n HT20 MHz mode

### PPSD (CH Low)

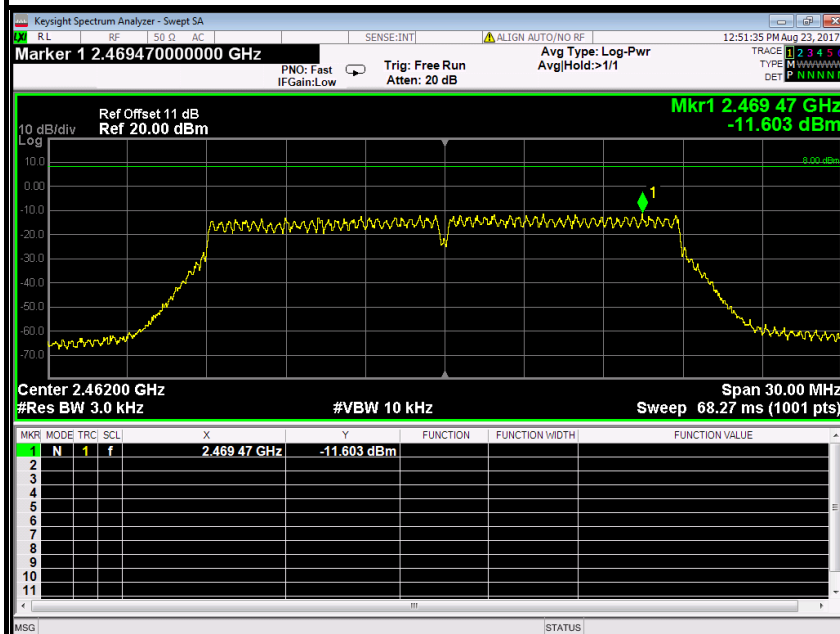


### PPSD (CH Mid)



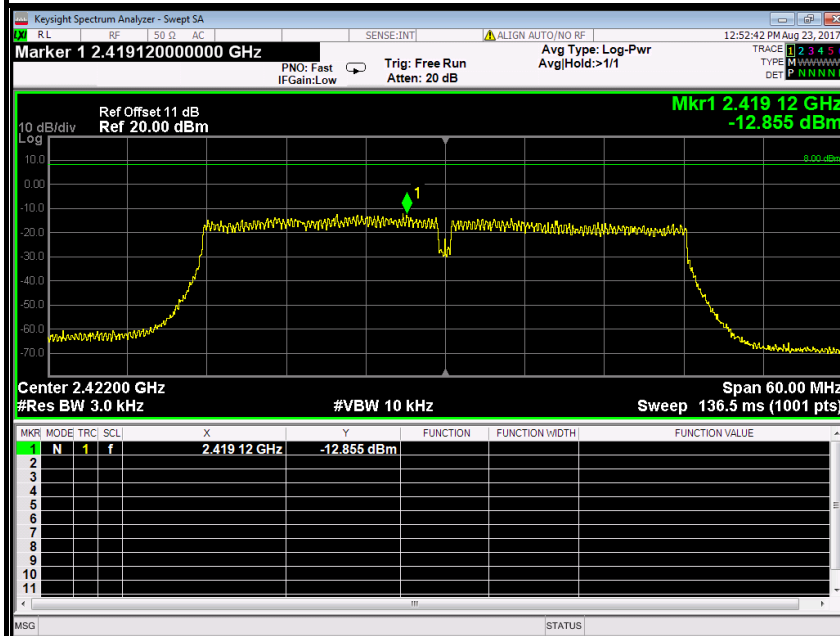


### PPSD (CH High)



### IEEE 802.11n HT40 MHz mode

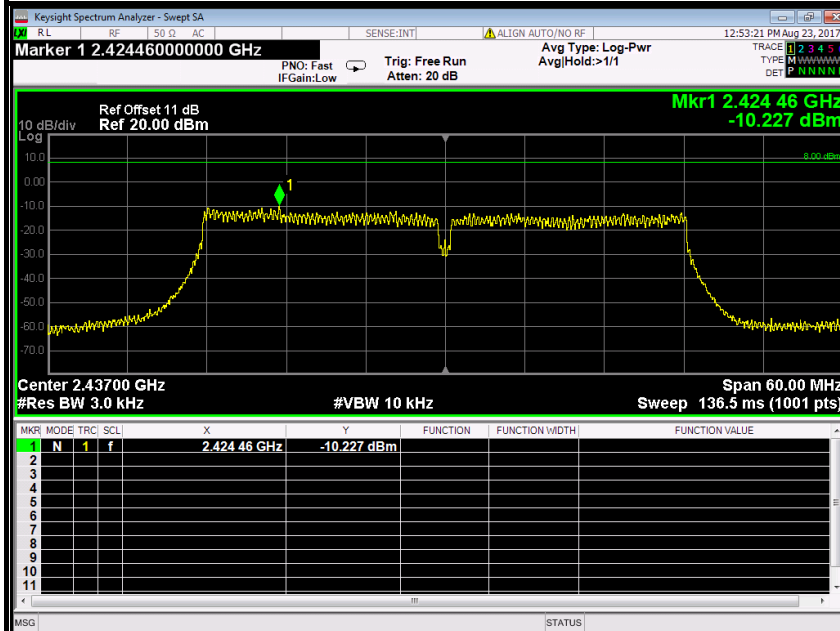
### PPSD (CH Low)







### PPSD (CH Mid)



### PPSD (CH High)

