

Test Mode: TX / IEEE 802.11n HT20 MHz (CH Mid)Tested by: Eve WangAmbient temperature: 24°CRelative humidity: 52% RHDate: March 18, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
2242.000	47.49	-3.67	43.82	74.00	-30.18	V	Peak
2917.000	46.44	-1.51	44.93	74.00	-29.07	V	Peak
3772.000	44.81	0.63	45.44	74.00	-28.56	V	Peak
4879.000	47.33	4.59	51.92	74.00	-22.08	V	Peak
6040.000	42.44	6.14	48.58	74.00	-25.42	V	Peak
7309.000	45.88	8.30	54.18	74.00	-19.82	V	Peak
7309.000	39.09	8.30	47.39	54.00	-6.61	V	AVG
2242.000	46.89	-3.67	43.22	74.00	-30.78	H	Peak
2809.000	45.98	-1.70	44.28	74.00	-29.72	H	Peak
3196.000	45.88	-1.03	44.85	74.00	-29.15	H	Peak
4672.000	43.92	3.91	47.83	74.00	-26.17	H	Peak
4879.000	44.21	4.59	48.80	74.00	-25.20	H	Peak
5257.000	43.91	5.44	49.35	74.00	-24.65	H	Peak

REMARKS:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Test Mode: TX / EEE 802.11n HT20 MHz (CH High)Tested by: Eve WangAmbient temperature: 24°CRelative humidity: 52% RHDate: March 18, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1252.000	50.09	-7.60	42.49	74.00	-31.51	V	Peak
4402.000	44.20	3.01	47.21	74.00	-26.79	V	Peak
4924.000	45.37	4.73	50.10	74.00	-23.90	V	Peak
5176.000	43.71	5.29	49.00	74.00	-25.00	V	Peak
6220.000	42.89	6.44	49.33	74.00	-24.67	V	Peak
7381.000	44.07	8.44	52.51	74.00	-21.49	V	Peak
7381.000	39.82	8.44	48.26	54.00	-5.74	V	AVG
1342.000	50.21	-7.27	42.94	74.00	-31.06	H	Peak
2800.000	46.18	-1.72	44.46	74.00	-29.54	H	Peak
4366.000	43.83	2.88	46.71	74.00	-27.29	H	Peak
4870.000	43.56	4.56	48.12	74.00	-25.88	H	Peak
6994.000	42.53	7.69	50.22	74.00	-23.78	H	Peak
7741.000	42.98	9.14	52.12	74.00	-21.88	H	Peak
7741.000	38.82	9.14	47.96	54.00	-6.04	H	AVG

REMARKS:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

**Combine with Antenna 0 and Antenna 1****Test Mode:** TX/ IEEE 802.11n HT40 MHz (CH Low)**Tested by:** Eve Wang**Ambient temperature:** 24°C**Relative humidity:** 52% RH**Date:** March 18, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
2089.000	47.33	-4.51	42.82	74.00	-31.18	V	Peak
2800.000	46.61	-1.72	44.89	74.00	-29.11	V	Peak
3673.000	45.87	0.21	46.08	74.00	-27.92	V	Peak
4861.000	44.90	4.53	49.43	74.00	-24.57	V	Peak
5419.000	43.45	5.73	49.18	74.00	-24.82	V	Peak
5581.000	44.91	5.90	50.81	74.00	-23.19	V	Peak
1612.000	47.87	-6.67	41.20	74.00	-32.80	H	Peak
2521.000	47.27	-2.22	45.05	74.00	-28.95	H	Peak
3826.000	44.76	0.86	45.62	74.00	-28.38	H	Peak
4843.000	44.05	4.47	48.52	74.00	-25.48	H	Peak
5086.000	43.99	5.13	49.12	74.00	-24.88	H	Peak
7948.000	42.37	9.55	51.92	74.00	-22.08	H	Peak

REMARKS:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Test Mode: TX / IEEE 802.11n HT40 MHz (CH Mid)Tested by: Eve WangAmbient temperature: 24°CRelative humidity: 52% RHDate: March 18, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
3727.000	44.74	0.44	45.18	74.00	-28.82	V	Peak
4879.000	47.13	4.59	51.72	74.00	-22.28	V	Peak
5572.000	42.92	5.90	48.82	74.00	-25.18	V	Peak
6562.000	42.43	6.99	49.42	74.00	-24.58	V	Peak
7309.000	42.37	8.30	50.67	74.00	-23.33	V	Peak
7930.000	42.02	9.51	51.53	74.00	-22.47	V	Peak
1504.000	47.71	-6.87	40.84	74.00	-33.16	H	Peak
4870.000	44.03	4.56	48.59	74.00	-25.41	H	Peak
5626.000	43.13	5.92	49.05	74.00	-24.95	H	Peak
6697.000	42.22	7.21	49.43	74.00	-24.57	H	Peak
7336.000	42.29	8.36	50.65	74.00	-23.35	H	Peak
7714.000	42.72	9.09	51.81	74.00	-22.19	H	Peak

REMARKS:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).

Test Mode: TX/ IEEE 802.11n HT40 MHz (CH High)Tested by: Eve WangAmbient temperature: 24°CRelative humidity: 52% RHDate: March 18, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
2233.000	48.20	-3.72	44.48	74.00	-29.52	V	Peak
4906.000	45.49	4.67	50.16	74.00	-23.84	V	Peak
5284.000	43.04	5.49	48.53	74.00	-25.47	V	Peak
5725.000	42.66	5.96	48.62	74.00	-25.38	V	Peak
6985.000	42.42	7.68	50.10	74.00	-23.90	V	Peak
7543.000	42.52	8.76	51.28	74.00	-22.72	V	Peak
1657.000	47.03	-6.58	40.45	74.00	-33.55	H	Peak
4609.000	43.87	3.71	47.58	74.00	-26.42	H	Peak
4870.000	44.03	4.56	48.59	74.00	-25.41	H	Peak
5626.000	43.13	5.92	49.05	74.00	-24.95	H	Peak
6697.000	42.22	7.21	49.43	74.00	-24.57	H	Peak
7336.000	42.29	8.36	50.65	74.00	-23.35	H	Peak

REMARKS:

1. Measuring frequencies from 1 GHz to the 10th harmonic of highest fundamental frequency.
2. Radiated emissions measured in frequency above 1000MHz were made with an instrument using peak/average detector mode.
3. Average test would be performed if the peak result were greater than the average limit or as required by the applicant.
4. Data of measurement within this frequency range shown "---" in the table above means the reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
5. Measurements above show only up to 6 maximum emissions noted, or would be lesser, with "N/A" remark, if no specific emissions from the EUT are recorded (ie: margin>20dB from the applicable limit) and considered that's already beyond the background noise floor.
6. Margin (dB) = Remark result (dBuV/m) – Average limit (dBuV/m).



7.3. 6dB BANDWIDTH MEASUREMENT

7.3.1. LIMITS

According to §15.247(a) (2), systems using digital modulation techniques may operate in the 902 - 928 MHz, 2400 - 2483.5 MHz. The minimum 6 dB bandwidth shall be at least 500 kHz.

7.3.2. TEST INSTRUMENTS

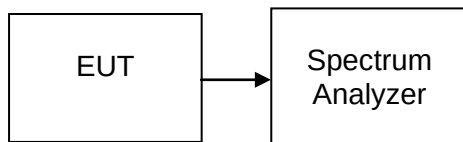
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2017	02/20/2018

7.3.3. TEST PROCEDURES (please refer to measurement standard)

8.1 Option 2:

The automatic bandwidth measurement capability of an instrument may be employed using the X dB bandwidth mode with X set to 6 dB, if the functionality described above (i.e., RBW = 100 kHz, VBW $\geq$ 3 RBW, peak detector with maximum hold) is implemented by the instrumentation function. When using this capability, care shall be taken so that the bandwidth measurement is not influenced by any intermediate power nulls in the fundamental emission that might be $\geq$ 6 dB.

7.3.4. TEST SETUP



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

Channel	Frequency (MHz)	Bandwidth (kHz)		Limit (kHz)	Test Result
		Antenna 0	Antenna 1		
Low	2412	8115	8109	>500	PASS
Mid	2437	8116	8120		PASS
High	2462	8114	8113		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)		Limit (kHz)	Test Result
		Antenna 0	Antenna 1		
Low	2412	15110	15120	>500	PASS
Mid	2437	15120	15120		PASS
High	2462	15120	15130		PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Bandwidth (kHz)		Limit (kHz)	Test Result
		Antenna 0	Antenna 1		
Low	2412	15120	15710	>500	PASS
Mid	2437	15120	15680		PASS
High	2462	15110	15710		PASS

Test mode: IEEE 802.11n HT40 MHz

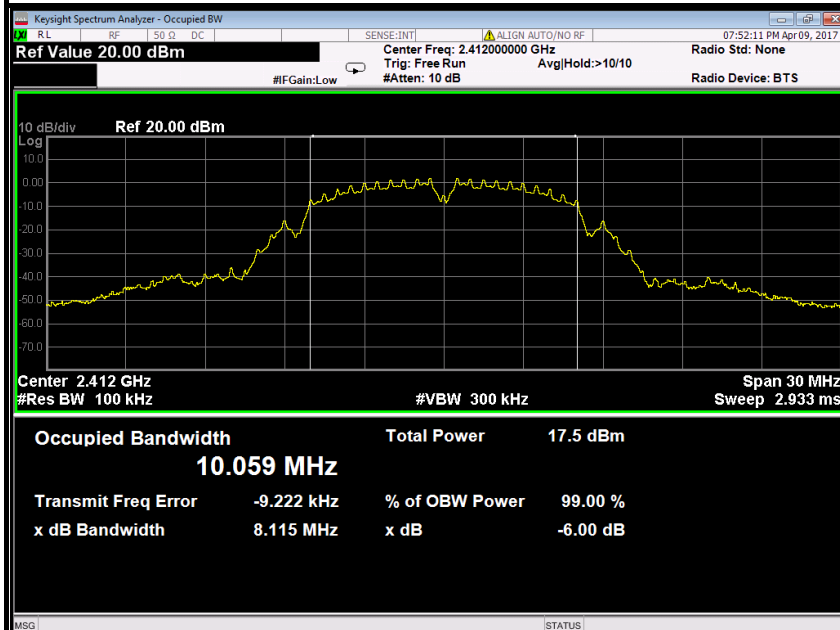
Channel	Frequency (MHz)	Bandwidth (kHz)		Limit (kHz)	Test Result
		Antenna 0	Antenna 1		
Low	2422	36360	36380	>500	PASS
Mid	2437	36370	36390		PASS
High	2452	36300	36410		PASS



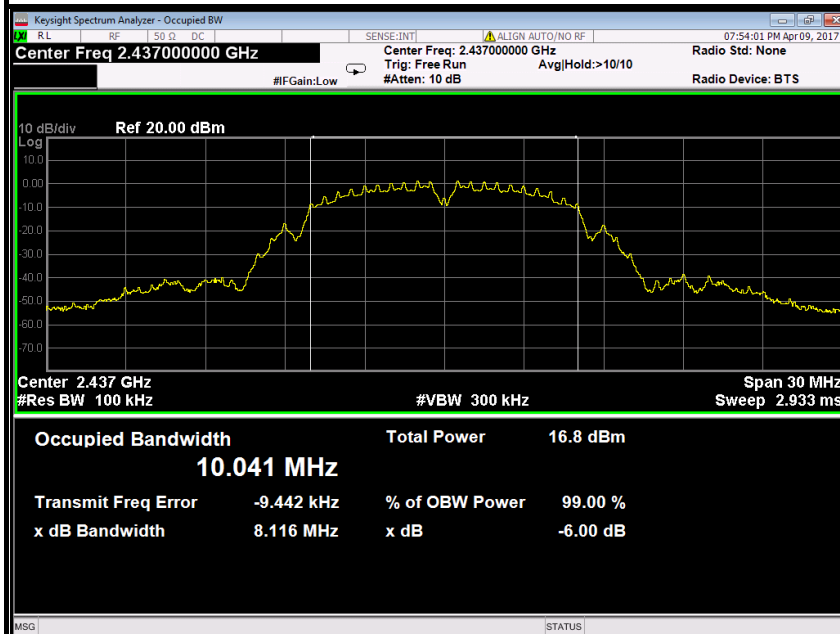
Test Plot

IEEE 802.11b mode (Antenna 0)

6dB Bandwidth (CH Low)

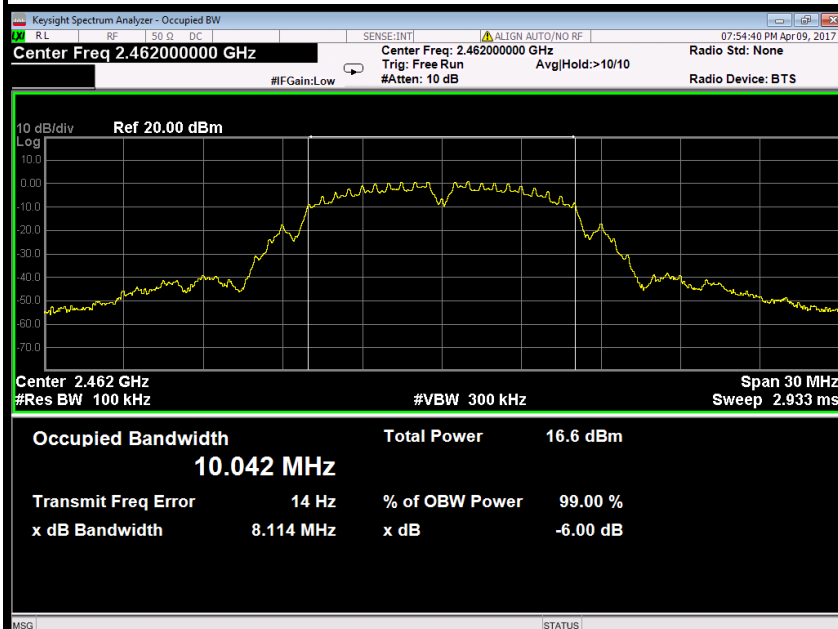


6dB Bandwidth (CH Mid)



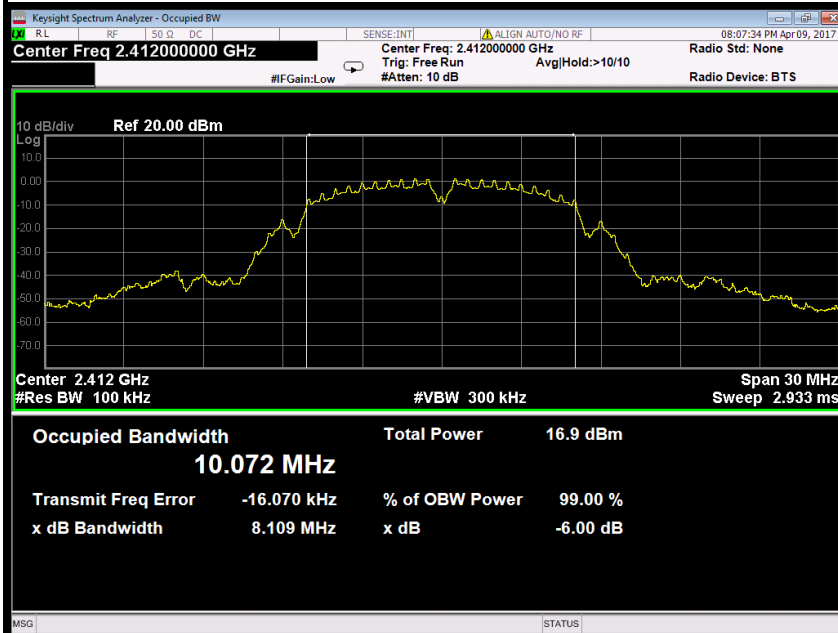


6dB Bandwidth (CH High)



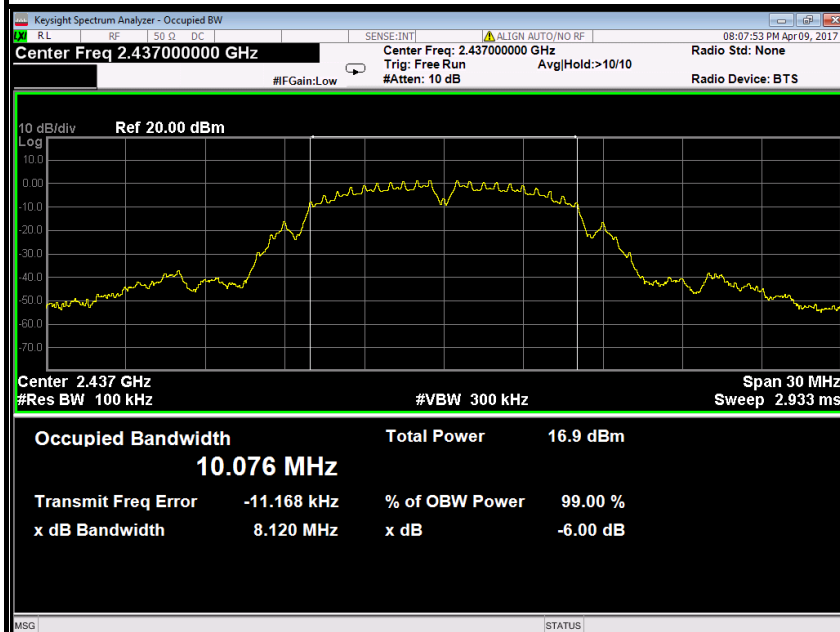
IEEE 802.11b mode (Antenna 1)

6dB Bandwidth (CH Low)

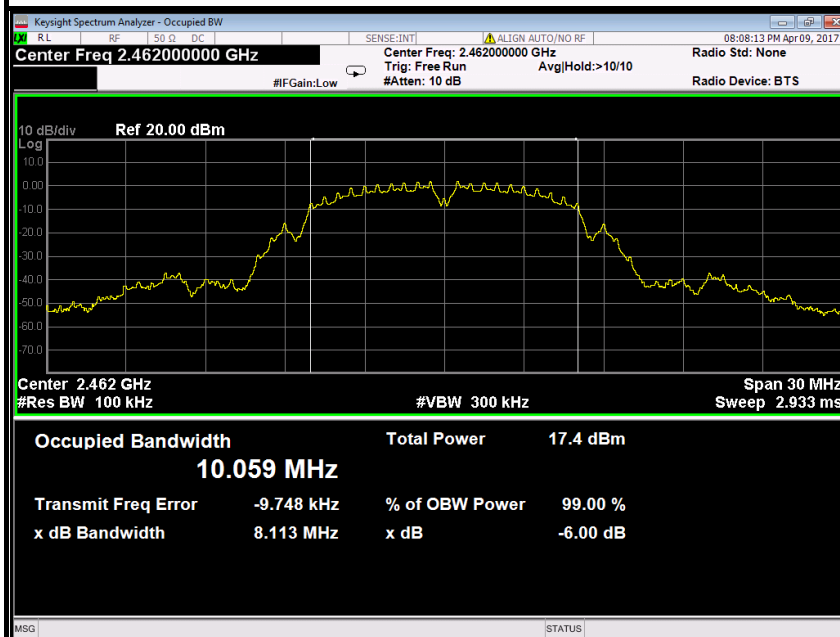




6dB Bandwidth (CH Mid)



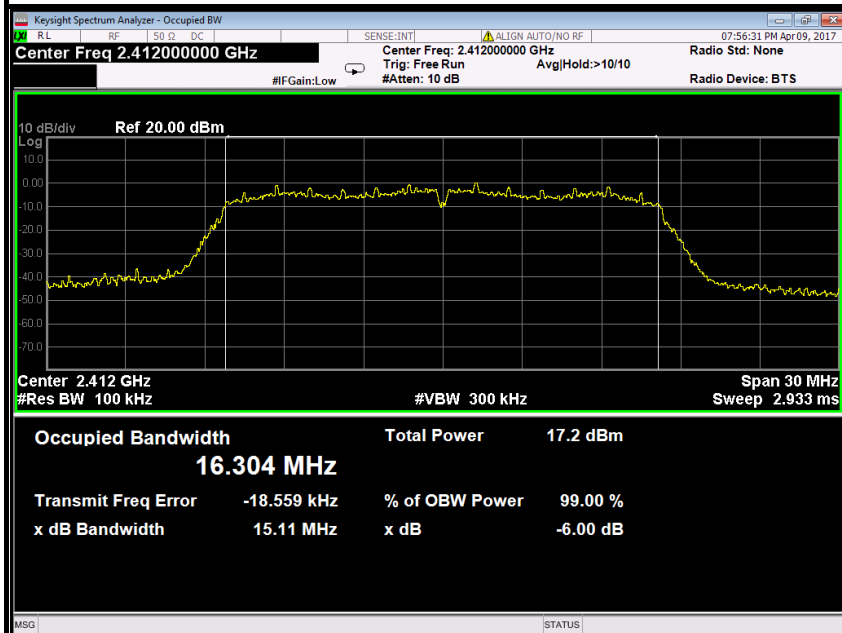
6dB Bandwidth (CH High)



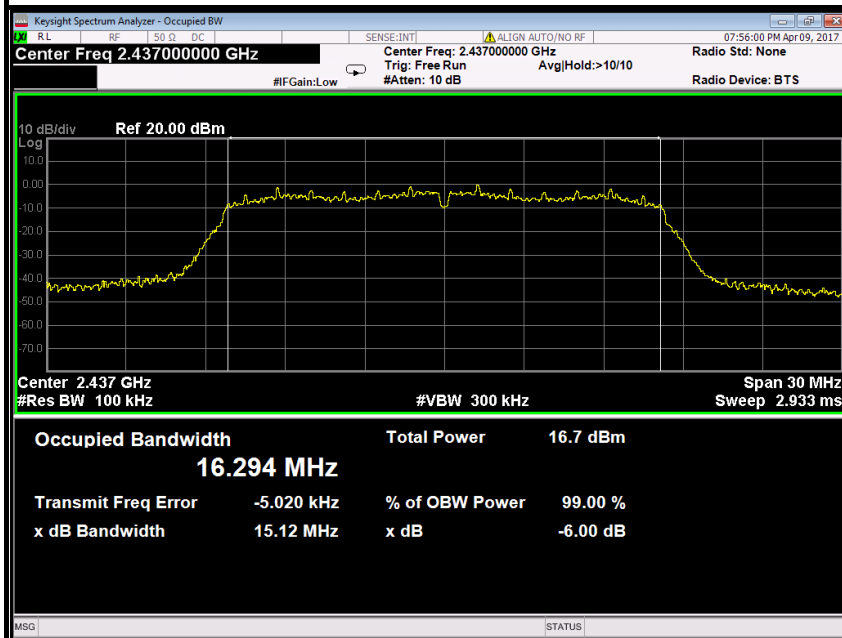


IEEE 802.11g mode (Antenna 0)

6dB Bandwidth (CH Low)

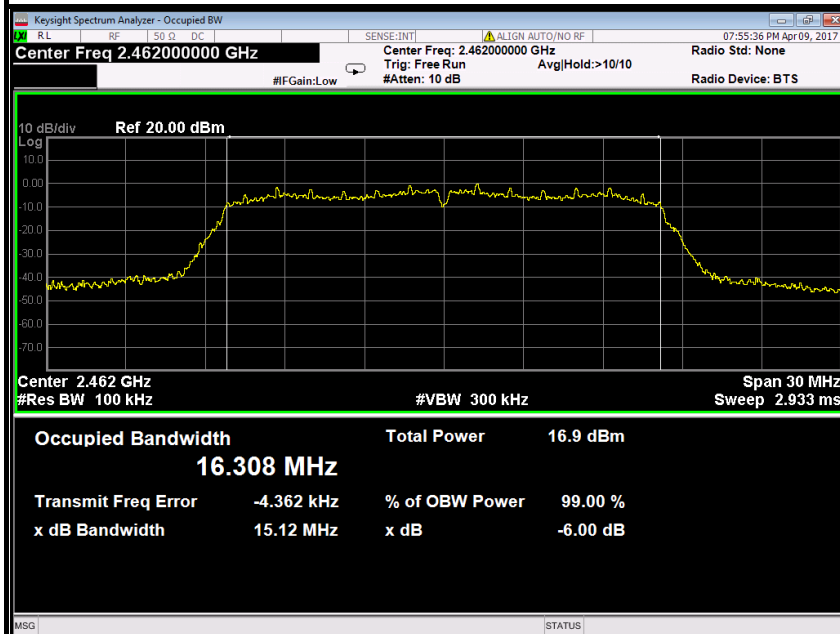


6dB Bandwidth (CH Mid)



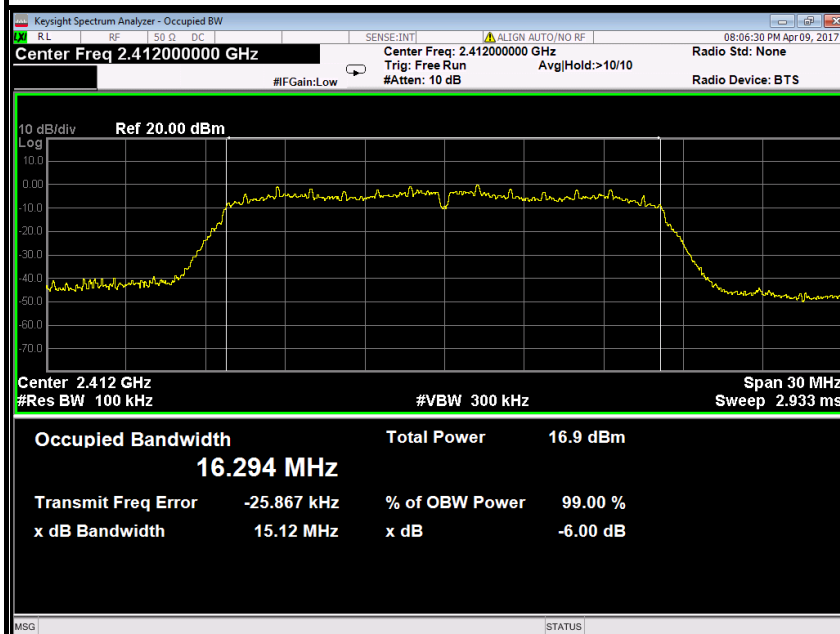


6dB Bandwidth (CH High)



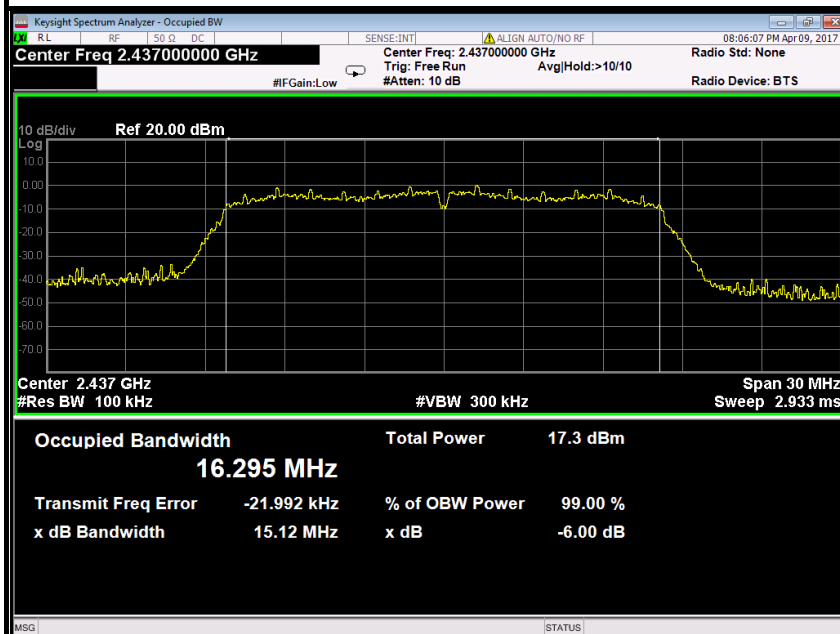
IEEE 802.11g mode (Antenna 1)

6dB Bandwidth (CH Low)

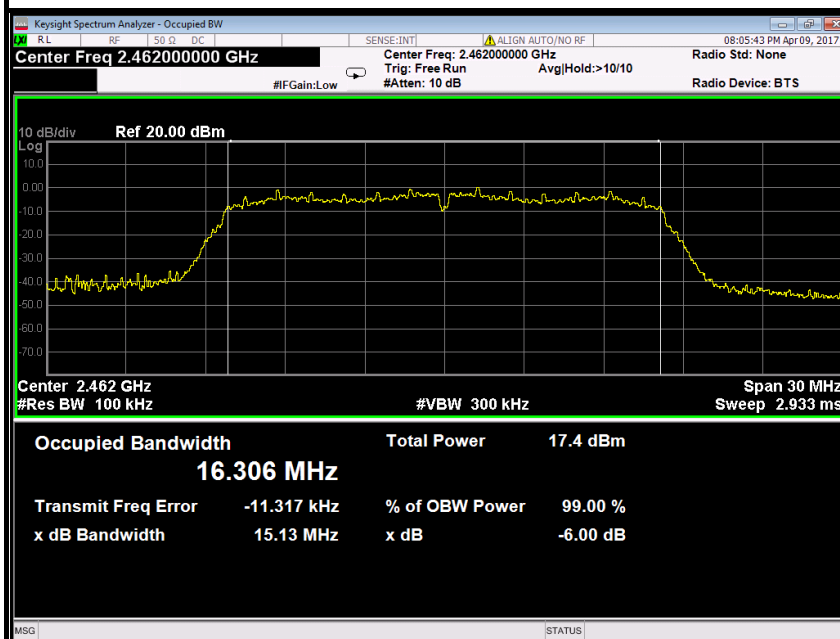




6dB Bandwidth (CH Mid)



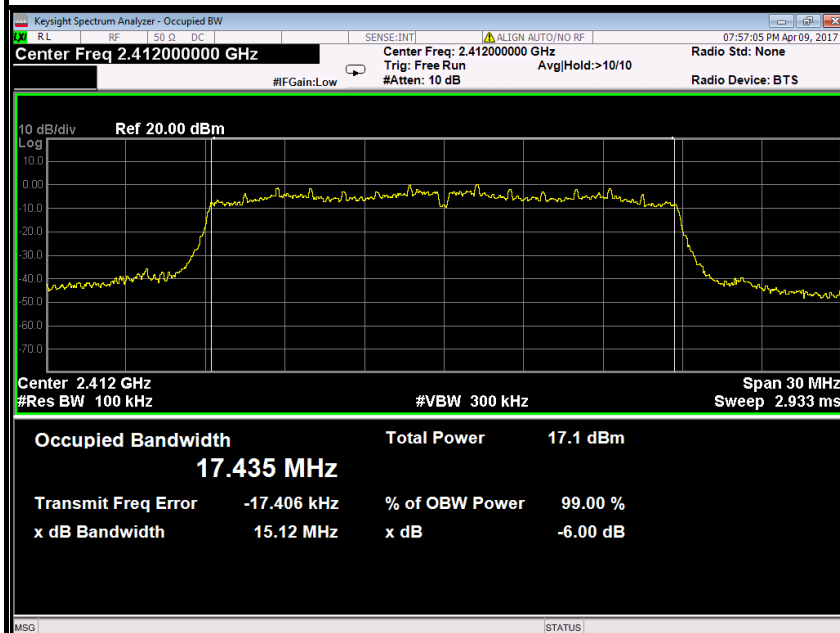
6dB Bandwidth (CH High)



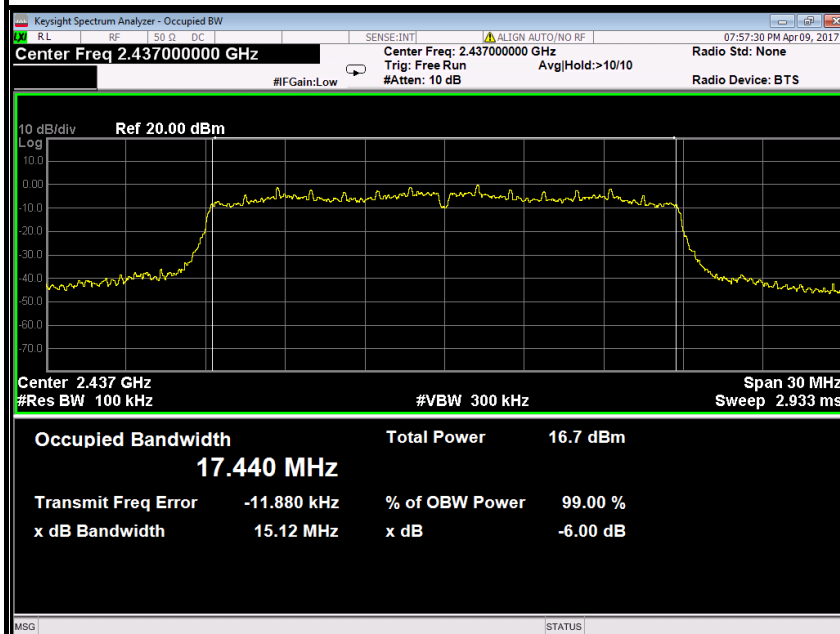


IEEE 802.11n HT20 MHz mode (Antenna 0)

6dB Bandwidth (CH Low)

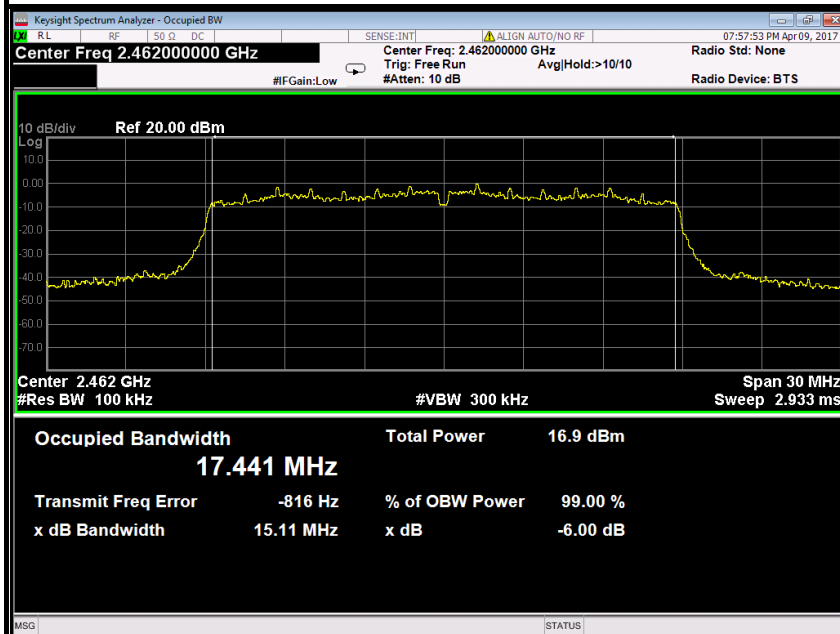


6dB Bandwidth (CH Mid)



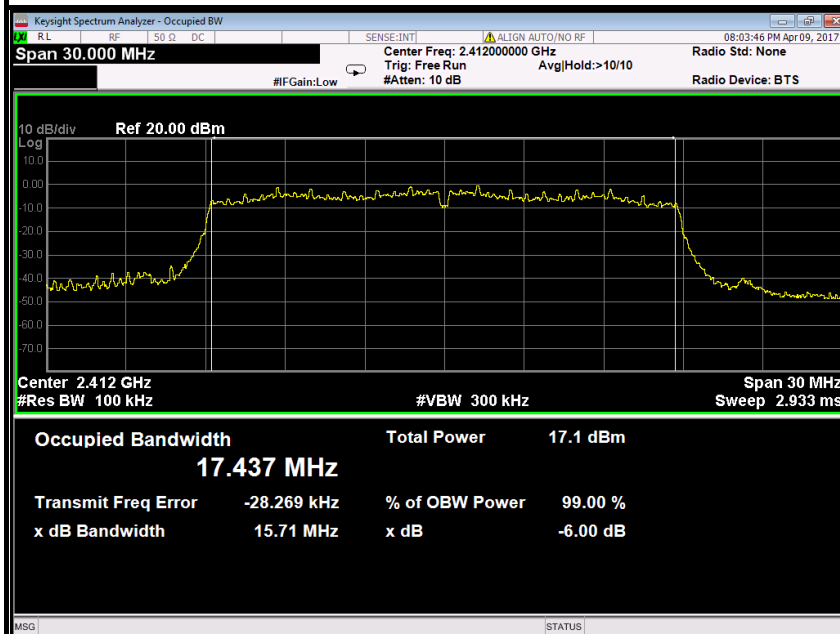


6dB Bandwidth (CH High)



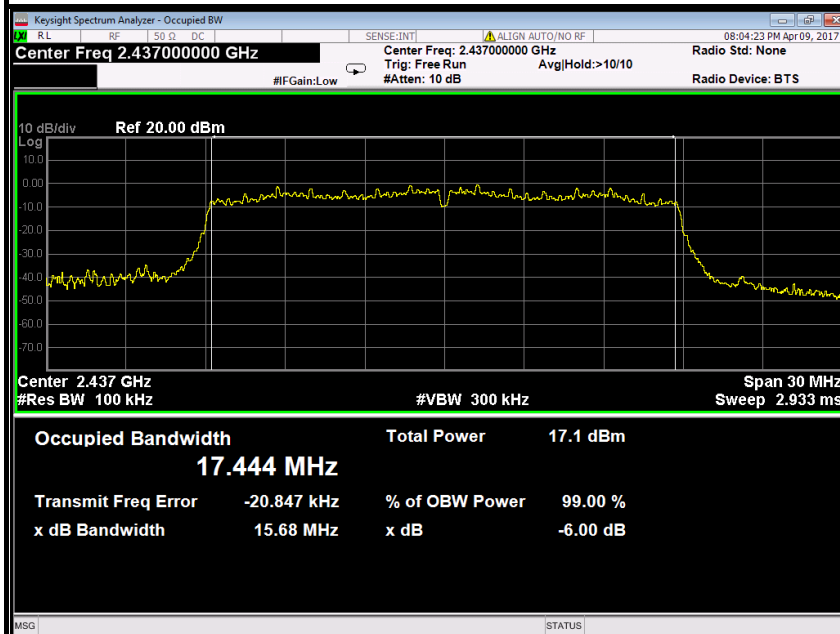
IEEE 802.11n HT20 MHz mode (Antenna 1)

6dB Bandwidth (CH Low)

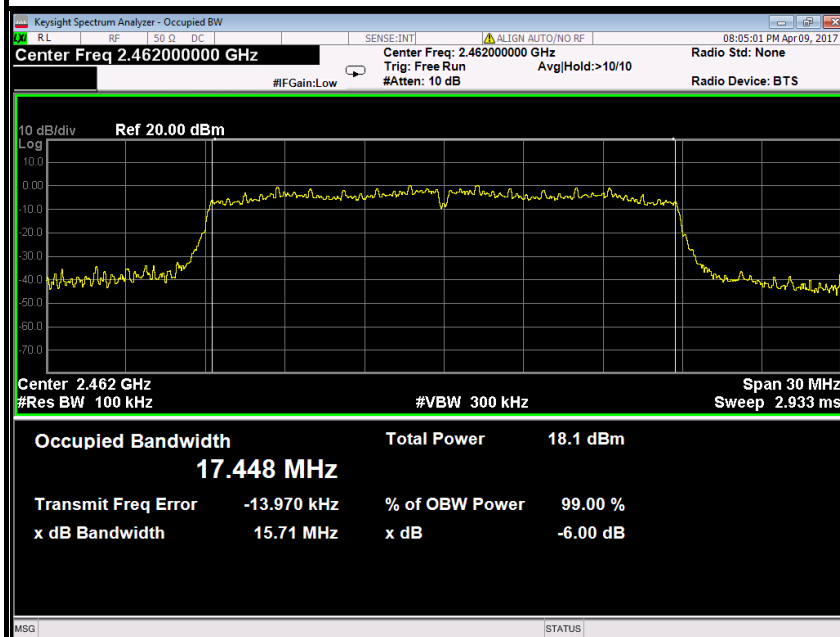




6dB Bandwidth (CH Mid)



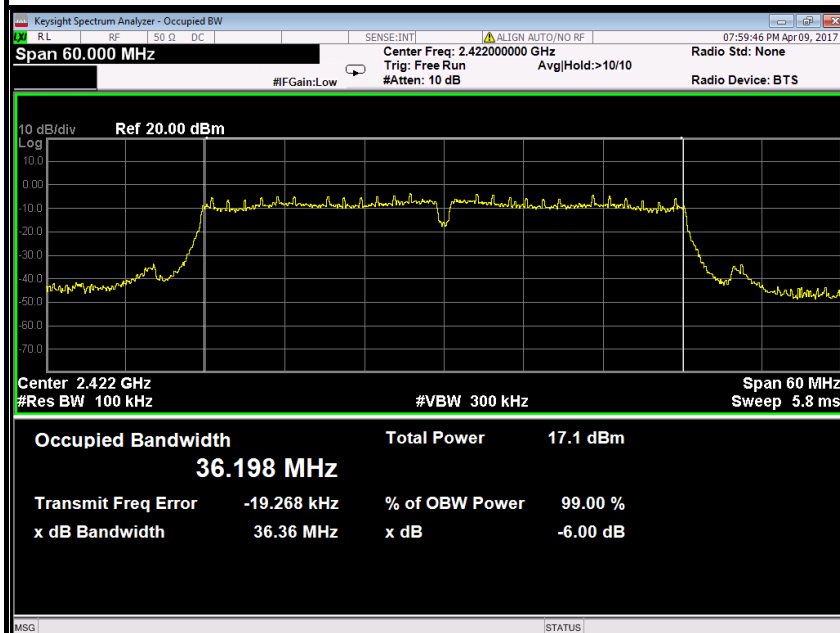
6dB Bandwidth (CH High)



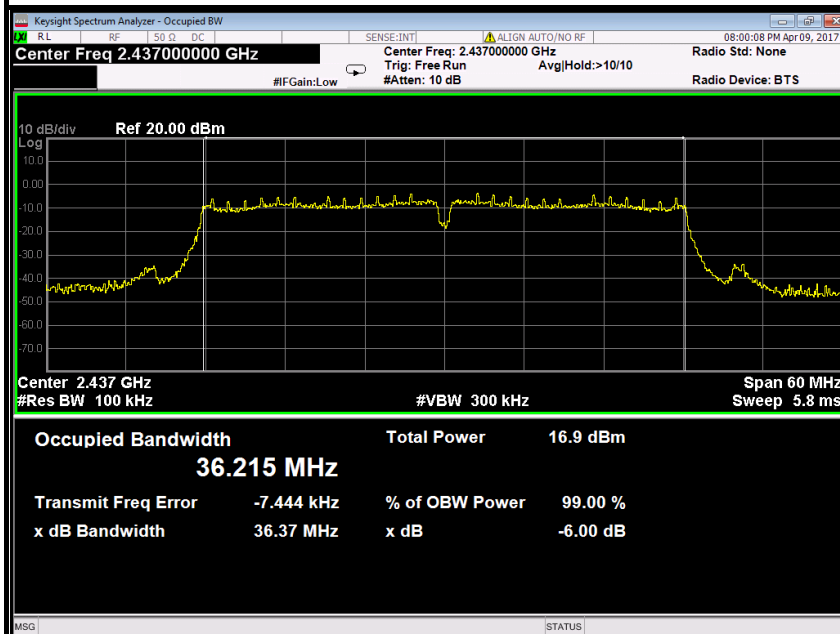


IEEE 802.11n HT40 MHz mode (Antenna 0)

6dB Bandwidth (CH Low)

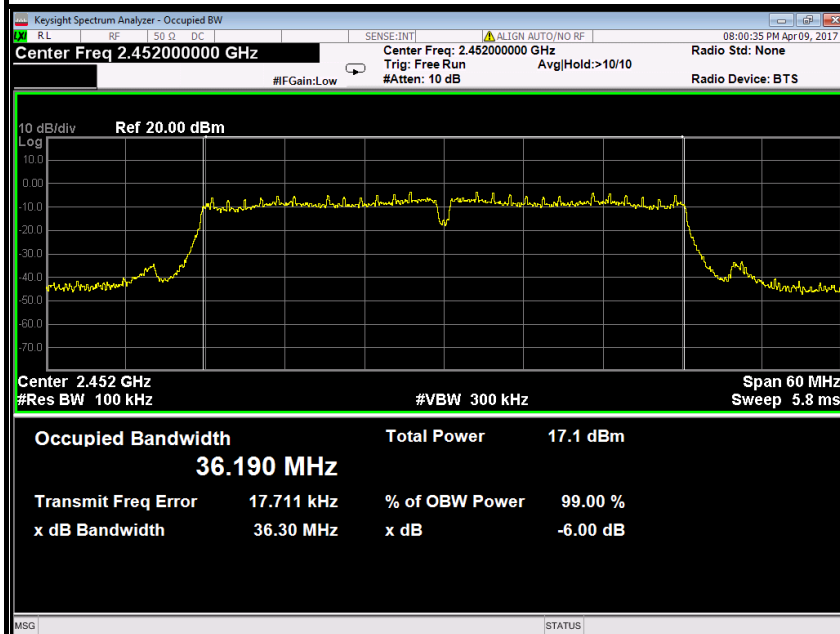


6dB Bandwidth (CH Mid)



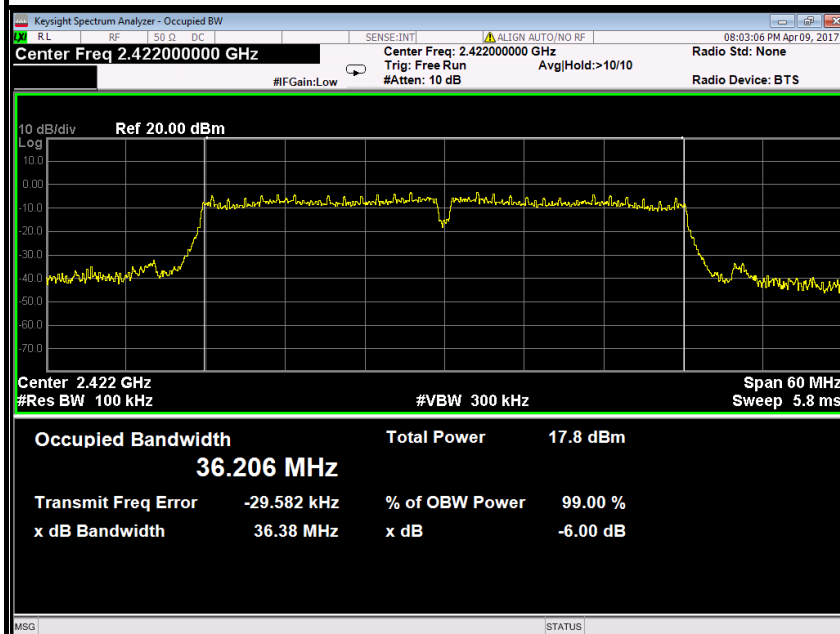


6dB Bandwidth (CH High)



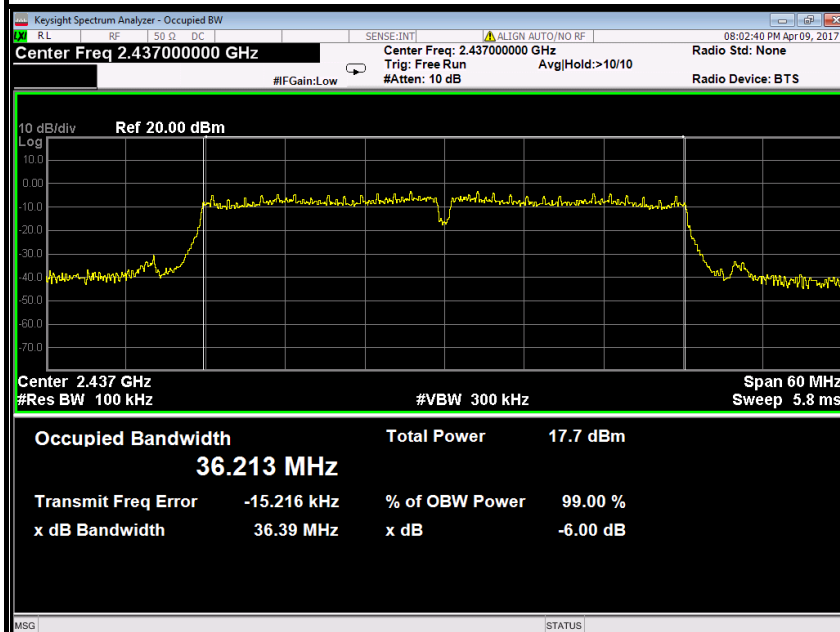
IEEE 802.11n HT40 MHz mode (Antenna 1)

6dB Bandwidth (CH Low)

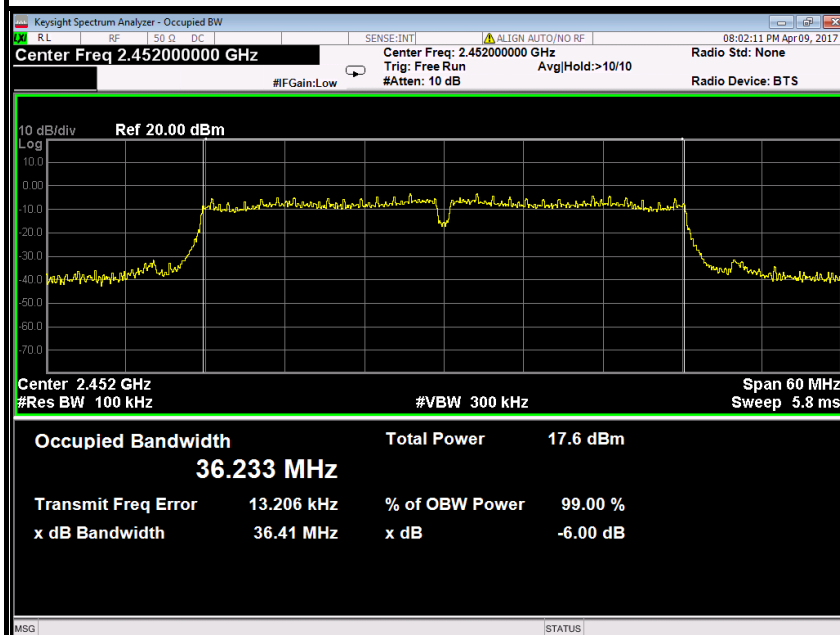




6dB Bandwidth (CH Mid)



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_{nom}	V_{nom}	Lowest channel 2412MHz	Middle channel 2437MHz	Highest channel 2462MHz
Conducted power [dBm/MHz] Measured with DSSS modulation		8.32	9.37	10.11
Radiated power [dBm/MHz] Measured with DSSS modulation		10.21	11.43	12.65
Gain [dBi] Calculated		1.89	2.06	2.54
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)		

Antenna 1

T_{nom}	V_{nom}	Lowest channel 2412MHz	Middle channel 2437MHz	Highest channel 2462MHz
Conducted power [dBm/MHz] Measured with DSSS modulation		7.12	6.82	7.20
Radiated power [dBm/MHz] Measured with DSSS modulation		9.16	8.67	9.87
Gain [dBi] Calculated		2.04	1.85	2.67
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

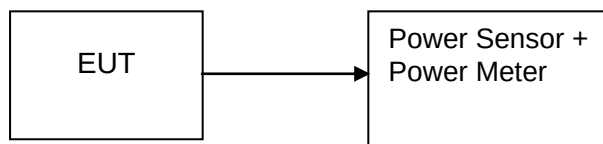
This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the *DTS bandwidth*.

- 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 (Antenna 0)**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	18.35	0.06839	Peak	1	PASS
Mid	2437	19.39	0.08690			PASS
High	2462	20.13	0.10304			PASS
Low	2412	16.12	0.04093	AVG	1	PASS
Mid	2437	17.06	0.05082			PASS
High	2462	17.57	0.05715			PASS

Test mode: IEEE 802.11b (Antenna 1)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	17.15	0.05188	Peak	1	PASS
Mid	2437	16.85	0.04842			PASS
High	2462	17.23	0.05284			PASS
Low	2412	12.73	0.01875	AVG	1	PASS
Mid	2437	12.69	0.01858			PASS
High	2462	12.58	0.01811			PASS

Test mode: IEEE 802.11g (Antenna 0)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	22.46	0.17620	Peak	1	PASS
Mid	2437	21.69	0.14757			PASS
High	2462	21.72	0.14859			PASS
Low	2412	12.83	0.01919	AVG	1	PASS
Mid	2437	13.51	0.02244			PASS
High	2462	13.26	0.02118			PASS



Test mode: IEEE 802.11g (Antenna 1)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	22.53	0.17906	Peak	1	PASS
Mid	2437	22.47	0.17660			PASS
High	2462	22.18	0.16520			PASS
Low	2412	13.02	0.02004	AVG	1	PASS
Mid	2437	13.25	0.02113			PASS
High	2462	12.81	0.01910			PASS

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

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	Peak / AVG	Limit (W)	Result
		Antenna 0	Antenna 1	Total				
Low	2412	20.46	22.64	24.70	0.29483	Peak	1	PASS
Mid	2437	20.41	22.38	24.52	0.28288			PASS
High	2462	20.91	22.35	24.70	0.29510			PASS
Low	2412	12.25	12.27	15.27	0.03365	AVG	1	PASS
Mid	2437	11.38	12.55	15.01	0.03173			PASS
High	2462	10.94	12.31	14.69	0.02944			PASS

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

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	Peak / AVG	Limit (W)	Result
		Antenna 0	Antenna 1	Total				
Low	2422	19.29	20.97	23.22	0.20994	Peak	1	PASS
Mid	2437	19.28	21.23	23.37	0.21746			PASS
High	2452	19.53	20.85	23.25	0.21136			PASS
Low	2422	9.91	11.61	13.85	0.02428	AVG	1	PASS
Mid	2437	9.86	11.53	13.79	0.02391			PASS
High	2452	9.97	11.18	13.63	0.02305			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	E4446A	US44300399	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	02/28/2017	02/27/2018
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	02/28/2017	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.

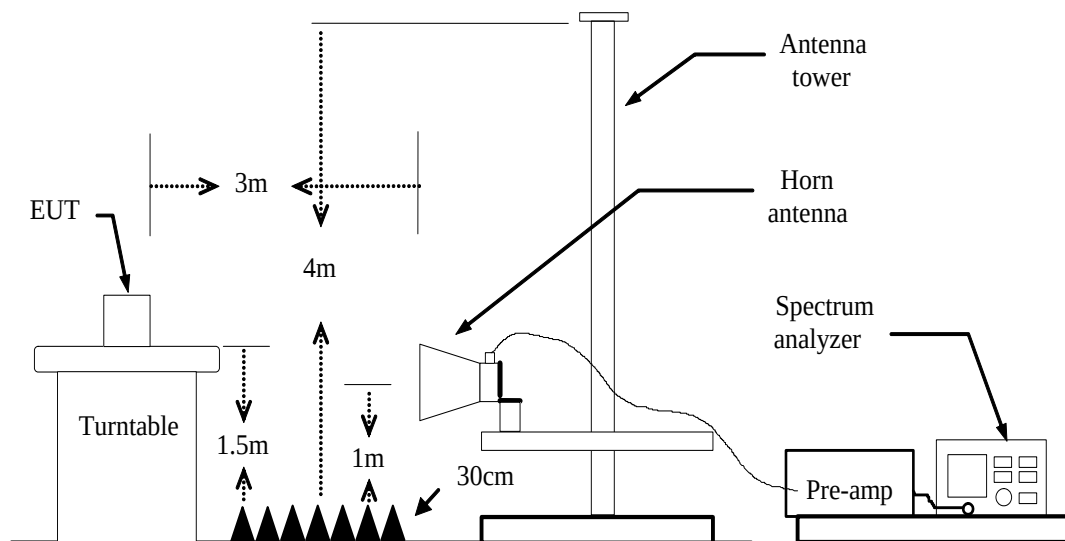
3. N.C.R = No Calibration Required.



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=10Hz / Sweep=AUTO / Detector=PEAK
5. Repeat the procedures until all the PEAK and AVERAGE versus POLARIZATION are

7.6.4. TEST SETUP



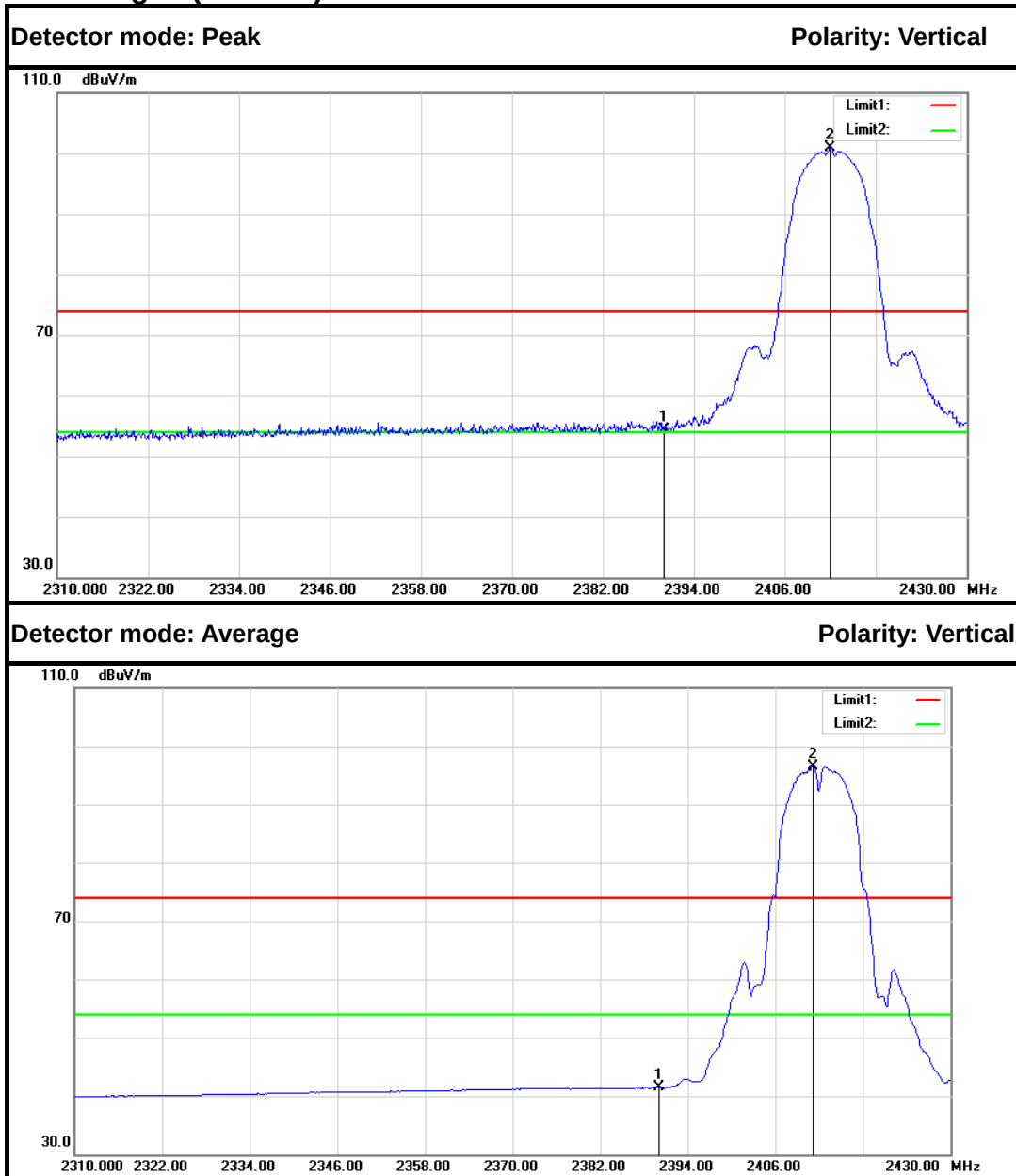


7.6.5. TEST RESULTS

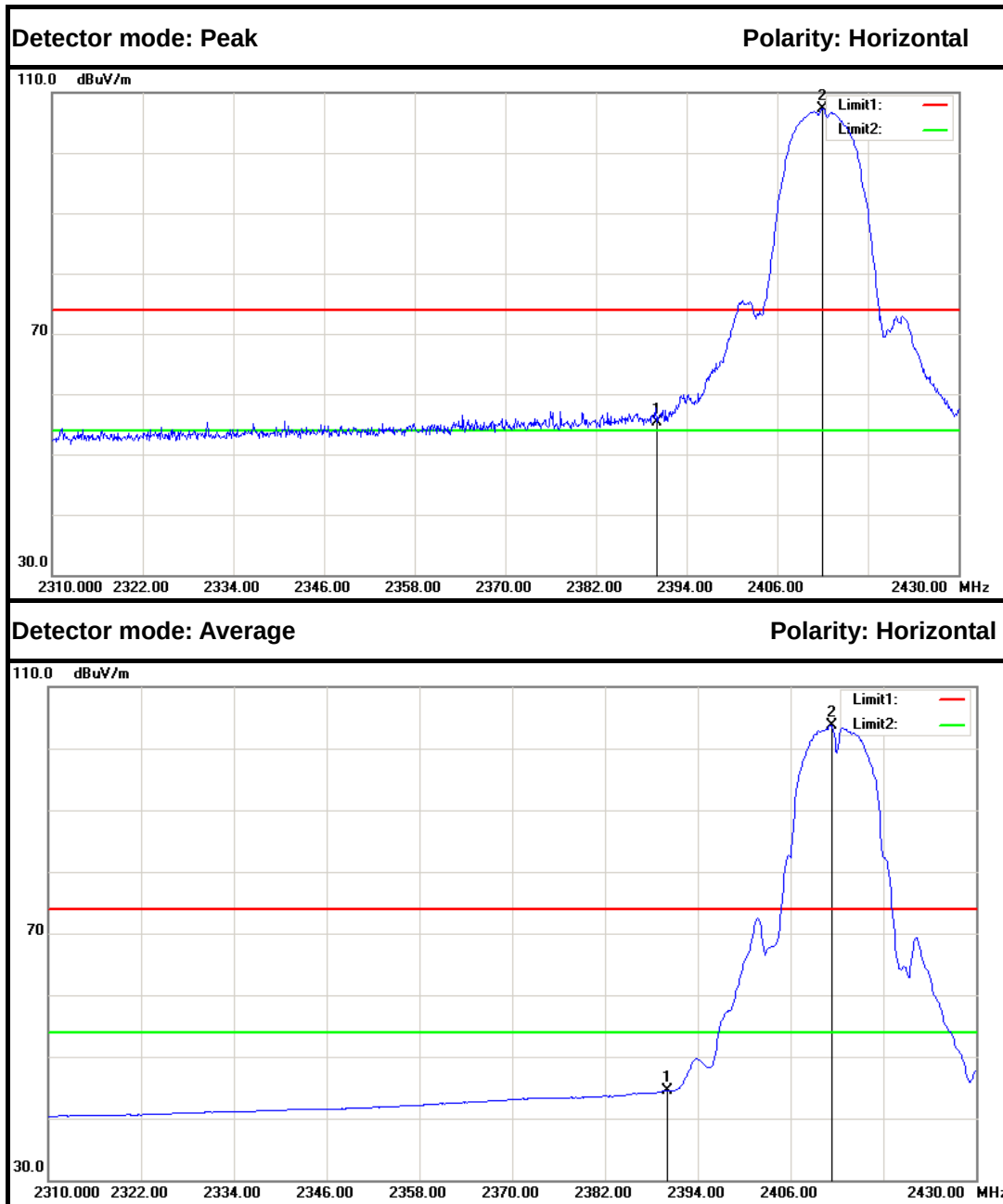
Test Plot

IEEE 802.11b mode (Antenna 0)

Band Edges (CH Low)



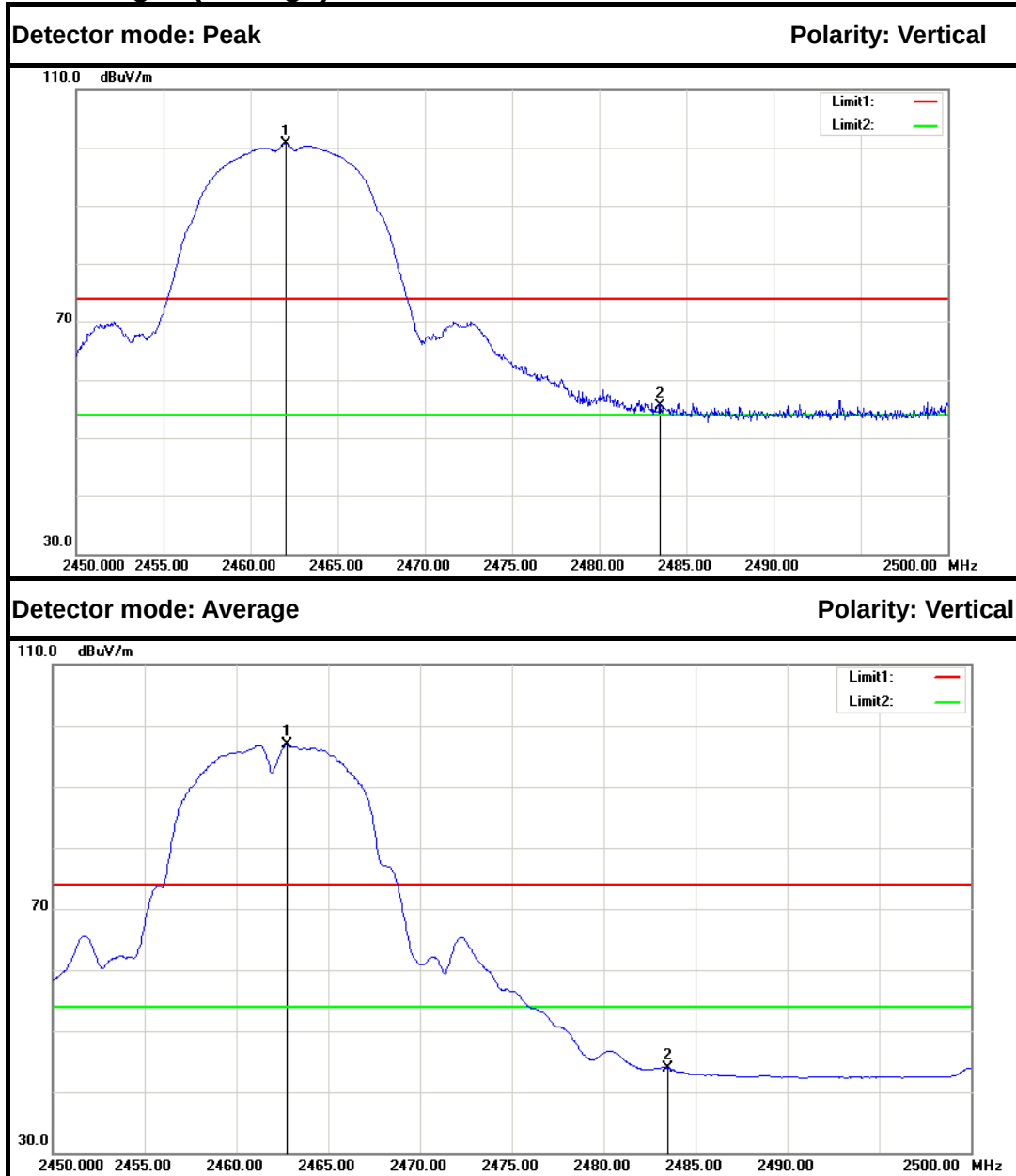
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	57.20	-2.86	54.34	74.00	-19.66	Peak	Vertical
2.	2412.000	103.66	-2.74	100.92	---	---	Peak	Vertical
1.	2390.000	44.36	-2.86	41.50	54.00	-12.50	Average	Vertical
2.	2411.160	99.34	-2.75	96.59	---	---	Average	Vertical



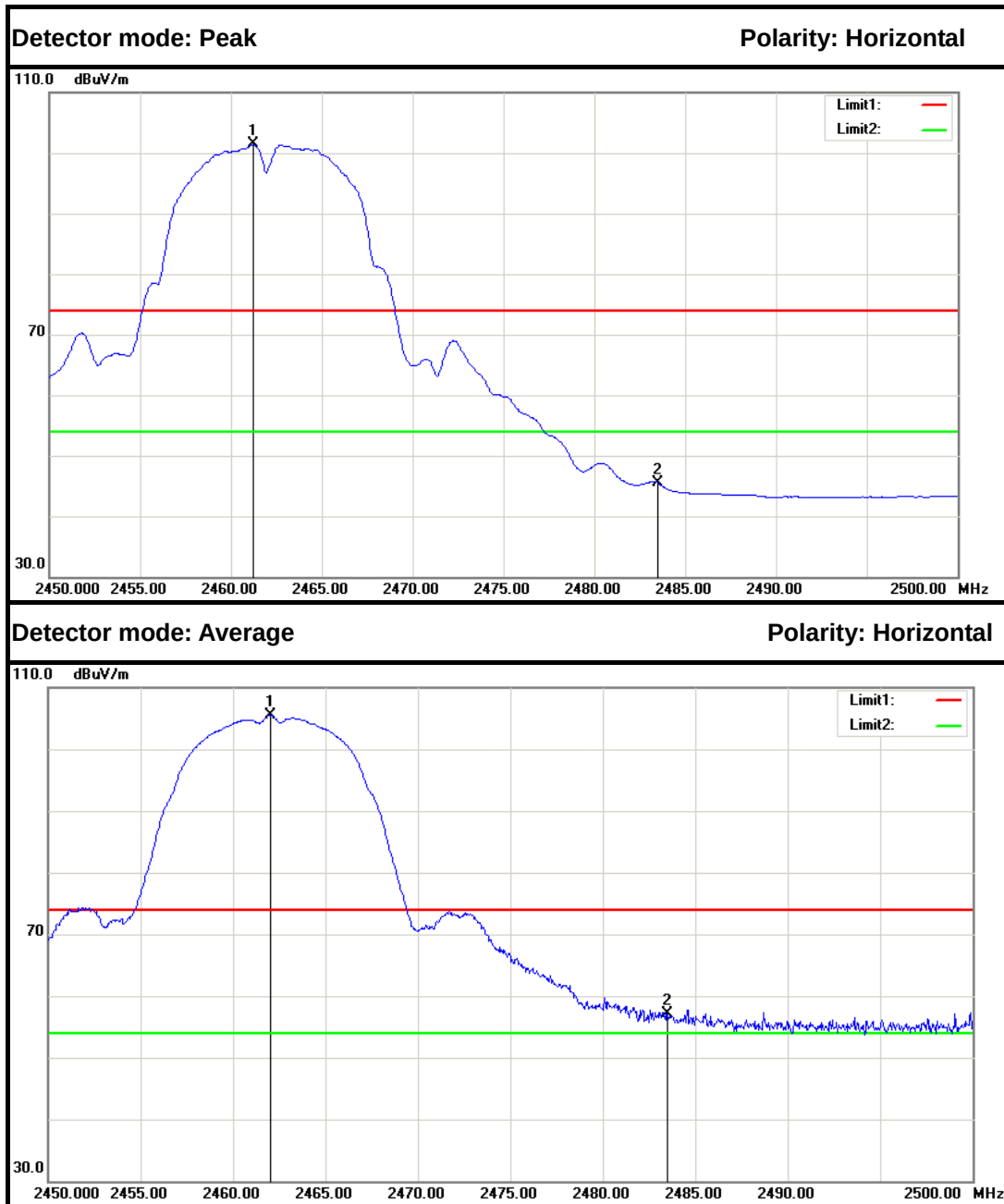
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	58.18	-2.86	55.32	74.00	-18.68	Peak	Horizontal
2.	2412.000	110.04	-2.74	107.30	---	---	Peak	Horizontal
1.	2390.000	47.42	-2.86	44.56	54.00	-9.44	Average	Horizontal
2.	2411.280	106.49	-2.75	103.74	---	---	Average	Horizontal



Band Edges (CH High)



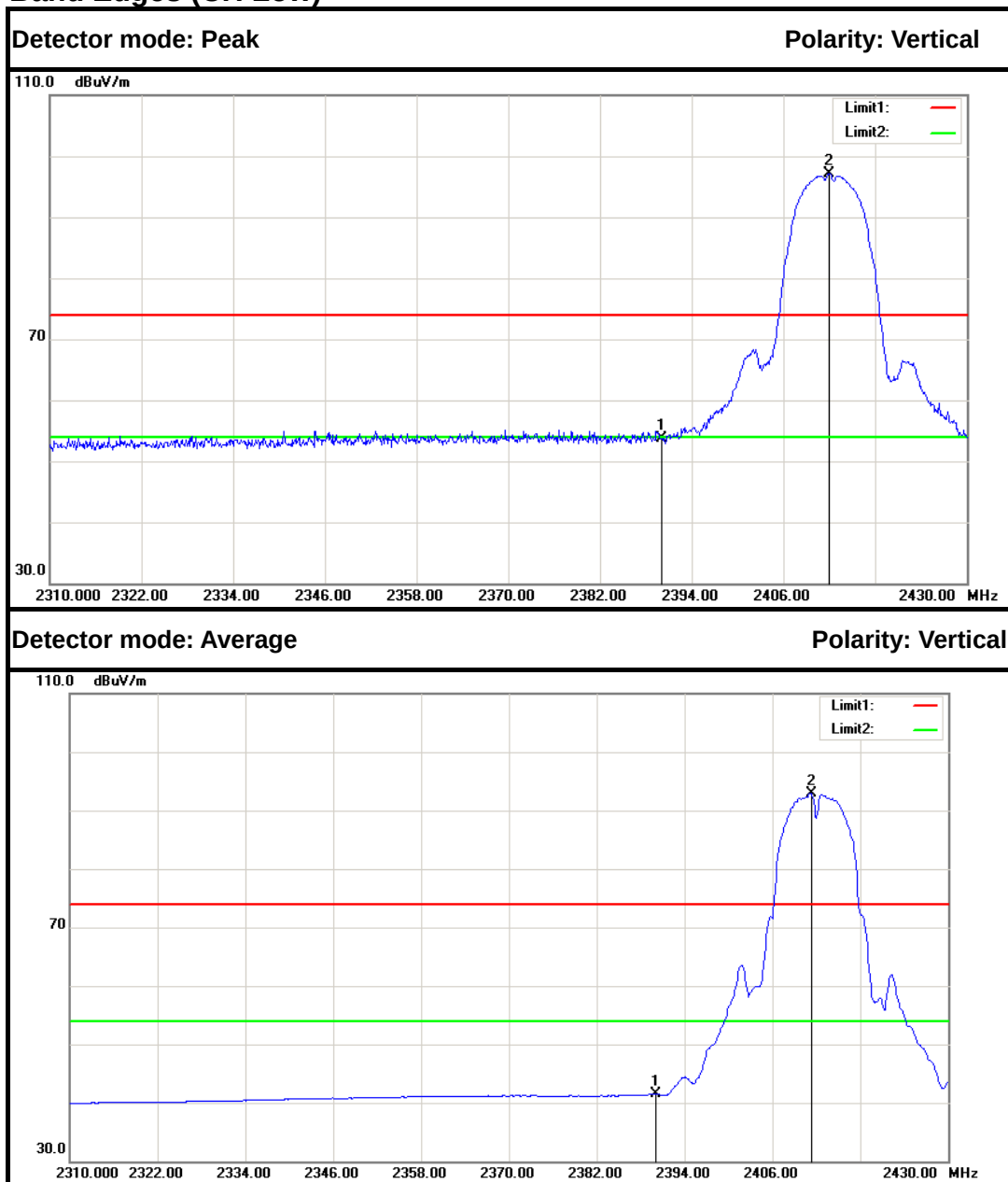
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2462.000	103.23	-2.47	100.76	---	---	Peak	Vertical
2.	2483.500	57.76	-2.35	55.41	74.00	-18.59	Peak	Vertical
1.	2462.750	99.36	-2.46	96.90	---	---	Average	Vertical
2.	2483.500	46.29	-2.35	43.94	54.00	-10.06	Average	Vertical



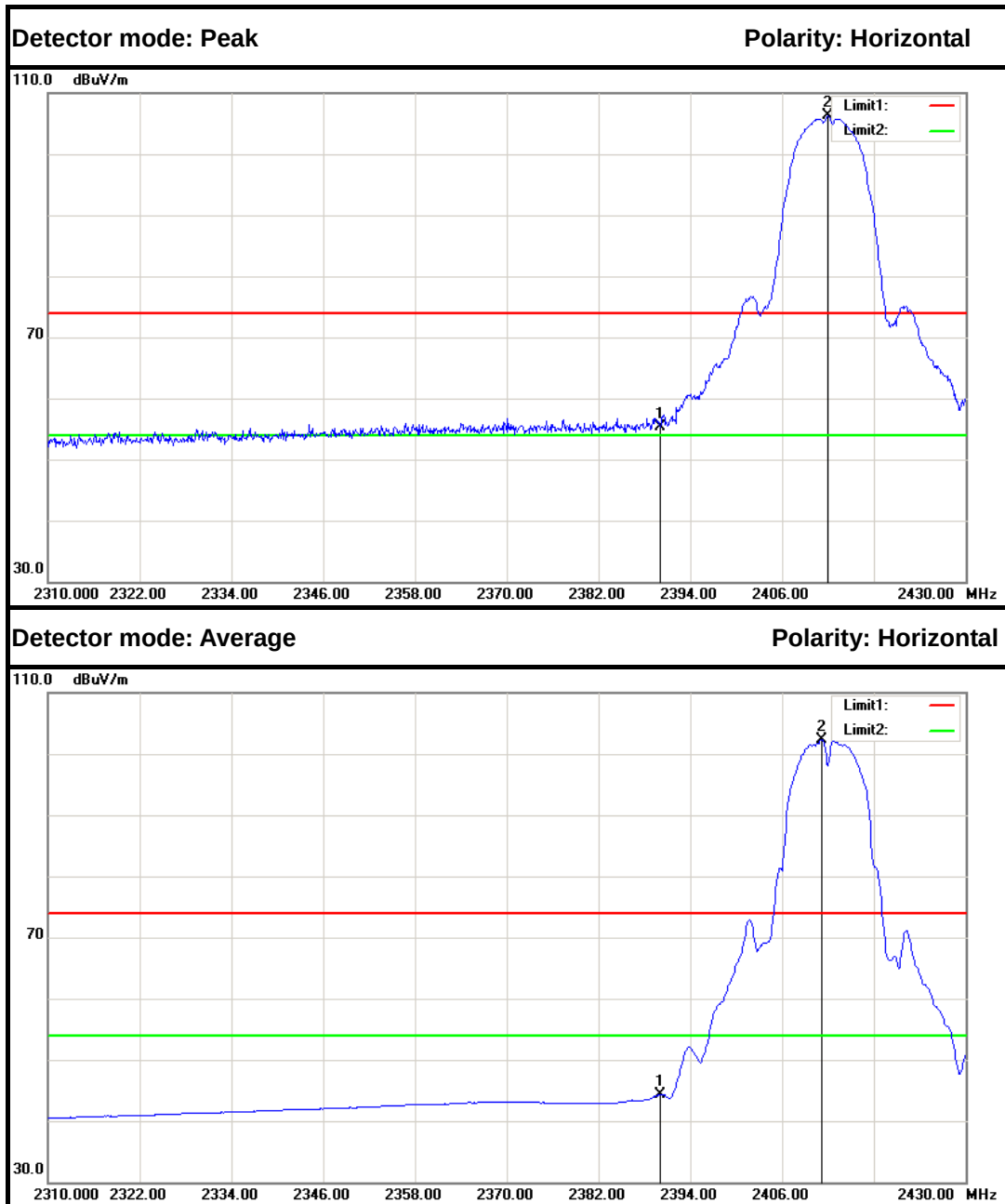
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2461.250	103.91	-2.47	101.44	---	---	Peak	Horizontal
2.	2483.500	47.86	-2.35	45.51	54.00	-8.49	Peak	Horizontal
1.	2462.050	108.02	-2.47	105.55	---	---	Average	Horizontal
2.	2483.500	59.50	-2.35	57.15	74.00	-16.85	Average	Horizontal



IEEE 802.11b mode (Antenna 1)
Band Edges (CH Low)



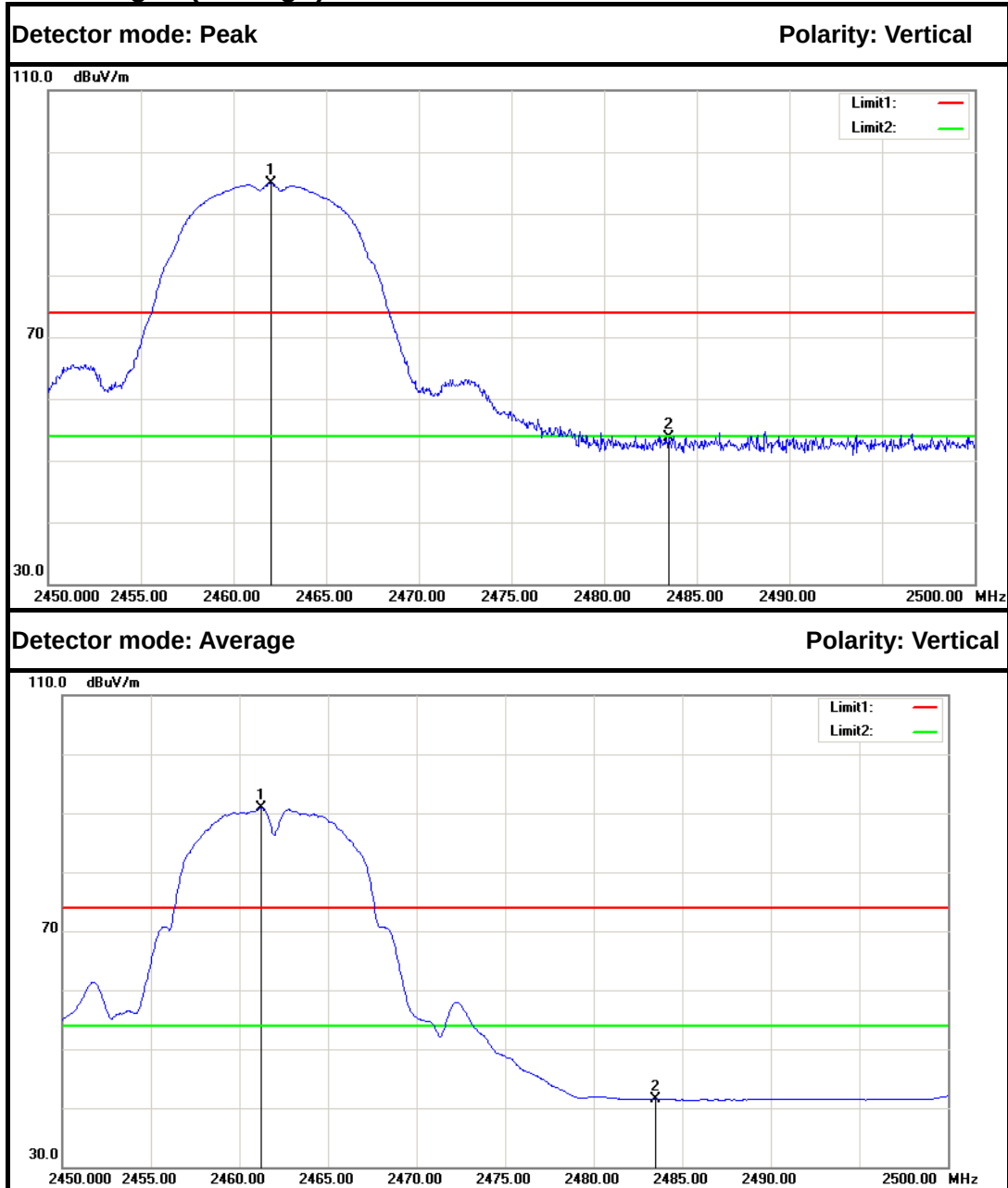
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	56.50	-2.86	53.64	74.00	-20.36	Peak	Vertical
2.	2412.000	99.91	-2.74	97.17	---	---	Peak	Vertical
1.	2390.000	44.36	-2.86	41.50	54.00	-12.50	Average	Vertical
2.	2411.280	95.72	-2.75	92.97	---	---	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	58.25	-2.86	55.39	74.00	-18.61	Peak	Horizontal
2.	2412.000	108.97	-2.74	106.23	---	---	Peak	Horizontal
1.	2390.000	47.15	-2.86	44.29	54.00	-9.71	Average	Horizontal
2.	2411.160	105.15	-2.75	102.40	---	---	Average	Horizontal



Band Edges (CH High)

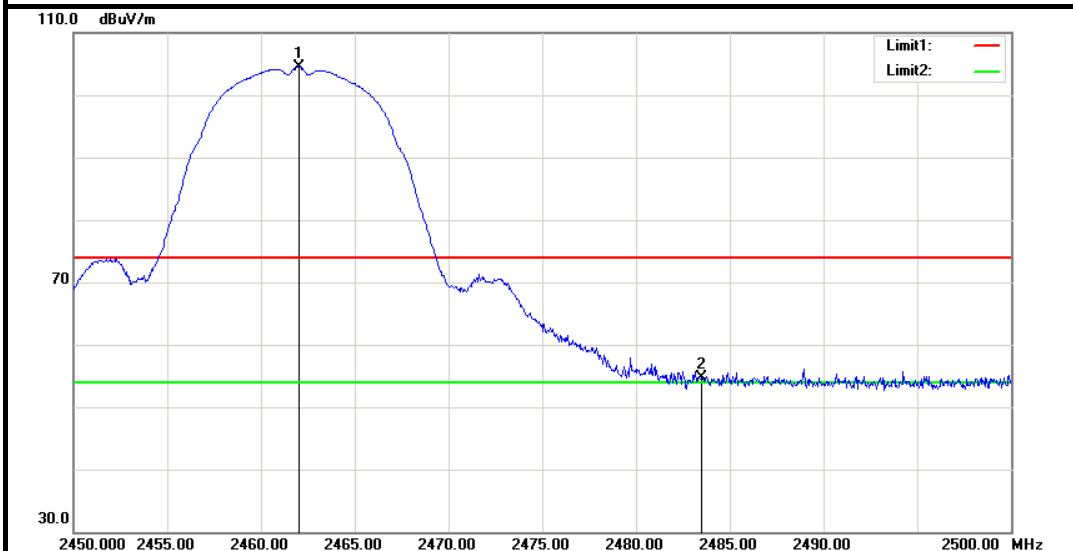


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2462.000	97.47	-2.47	95.00	---	---	Peak	Vertical
2.	2483.500	56.04	-2.35	53.69	74.00	-20.31	Peak	Vertical
1.	2461.200	93.35	-2.47	90.88	---	---	Average	Vertical
2.	2483.500	43.85	-2.35	41.50	54.00	-12.50	Average	Vertical



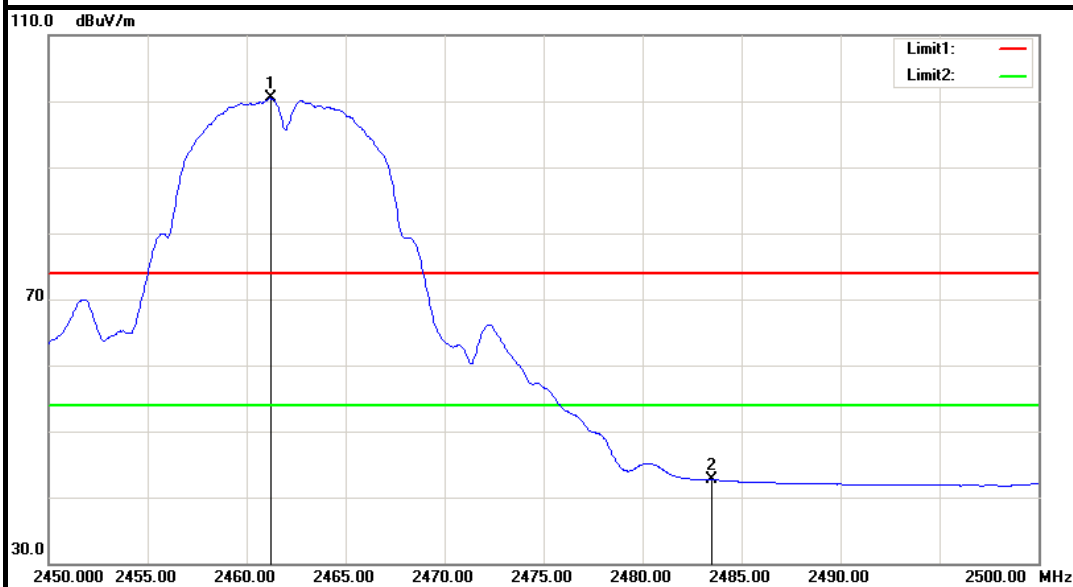
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

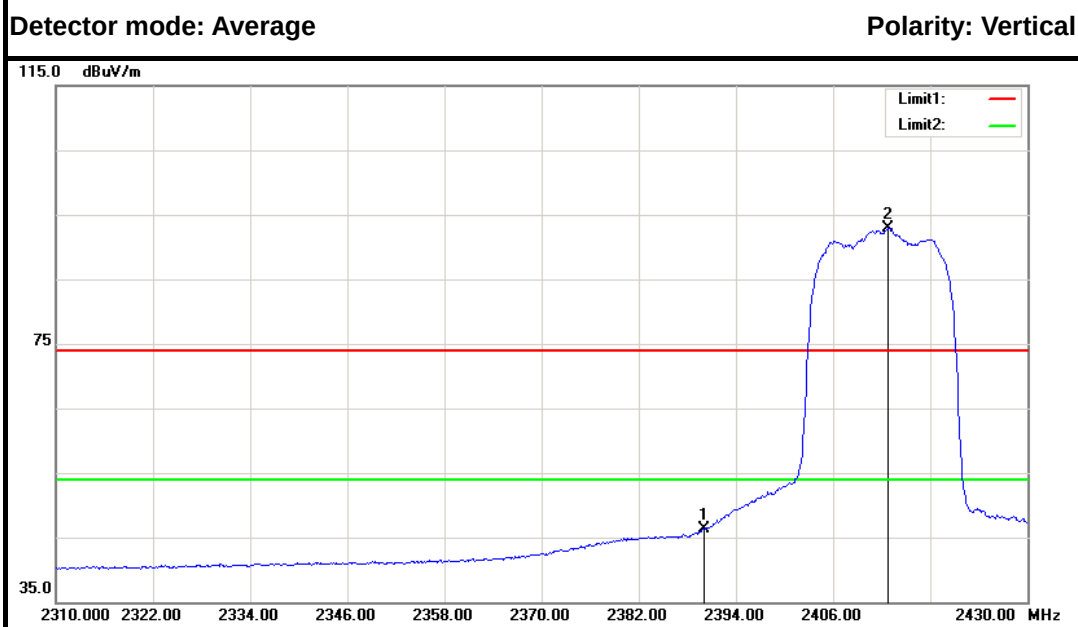
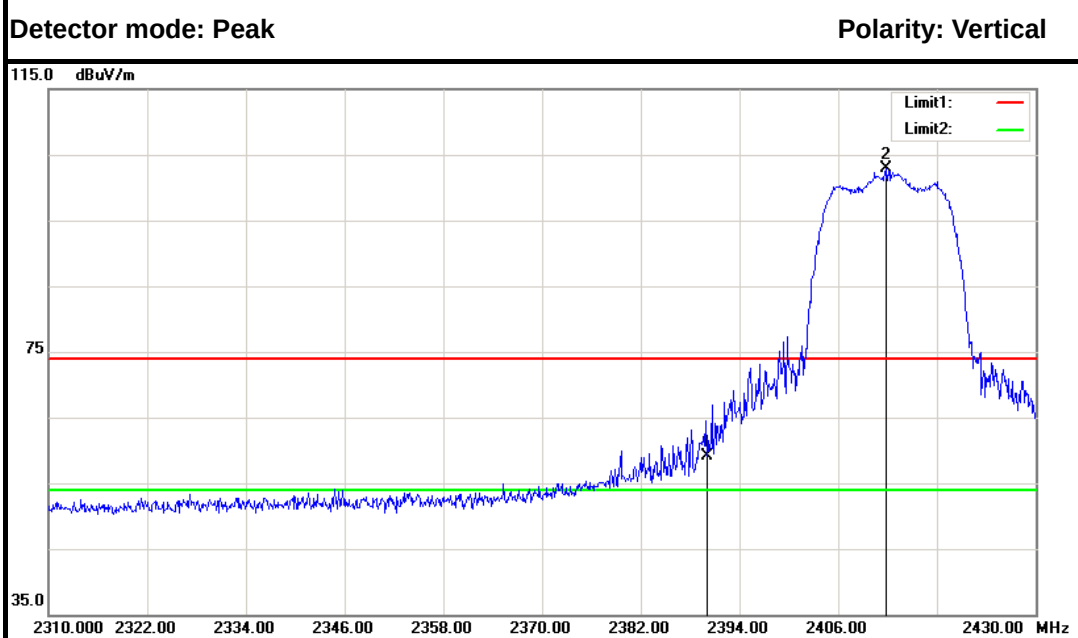
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2462.000	106.97	-2.47	104.50	---	---	Peak	Horizontal
2.	2483.500	57.11	-2.35	54.76	74.00	-19.24	Peak	Horizontal
1.	2461.200	102.89	-2.47	100.42	---	---	Average	Horizontal
2.	2483.500	44.98	-2.35	42.63	54.00	-11.37	Average	Horizontal



IEEE 802.11g mode (Antenna 0)
Band Edges (CH Low)

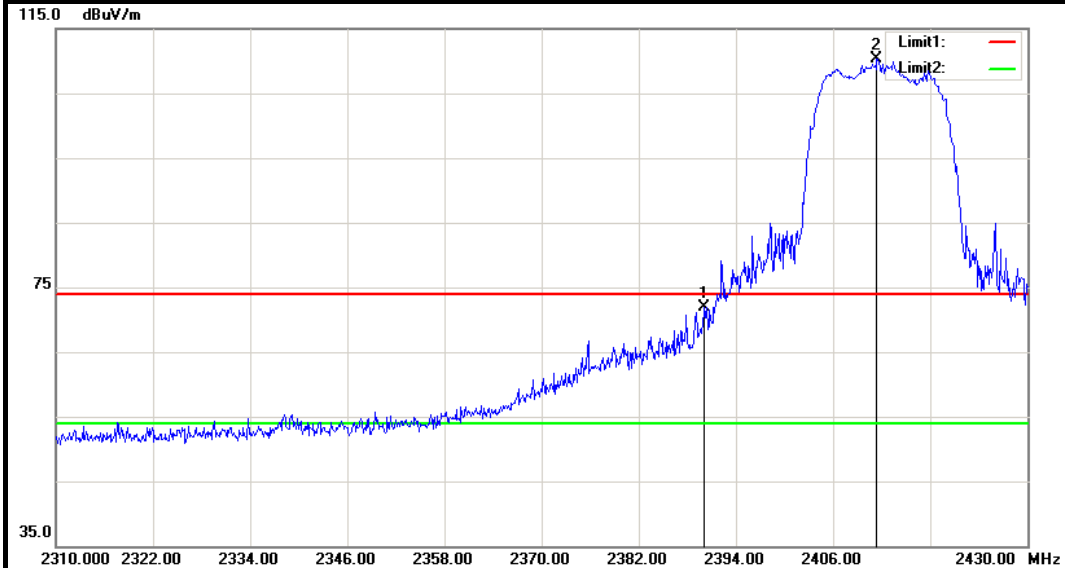


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	61.90	-2.86	59.04	74.00	-14.96	Peak	Vertical
2.	2411.880	105.59	-2.74	102.85	---	---	Peak	Vertical
1.	2390.000	49.26	-2.86	46.40	54.00	-7.60	Average	Vertical
2.	2412.840	95.70	-2.74	92.96	---	---	Average	Vertical



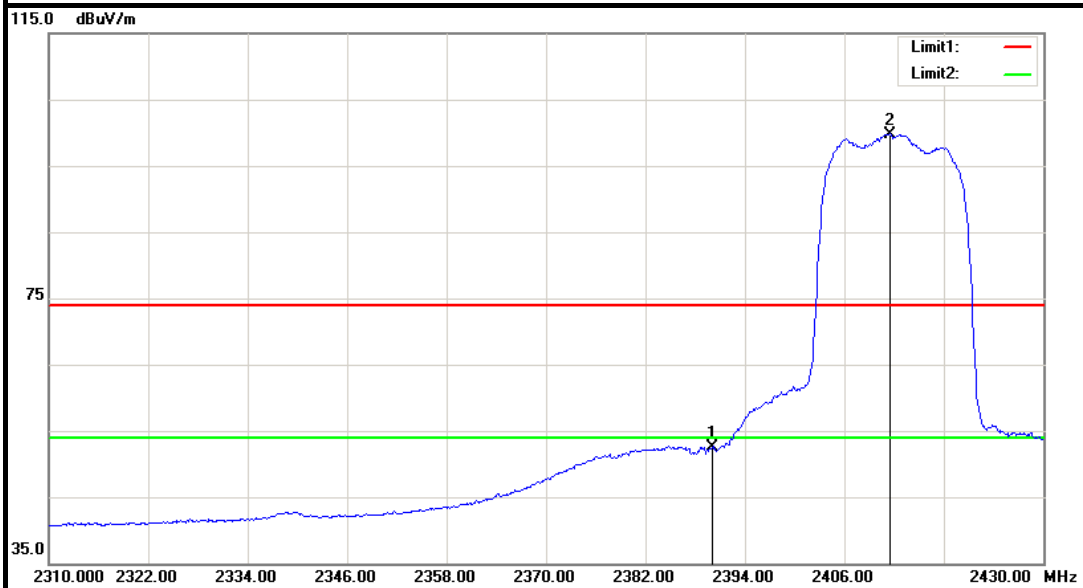
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

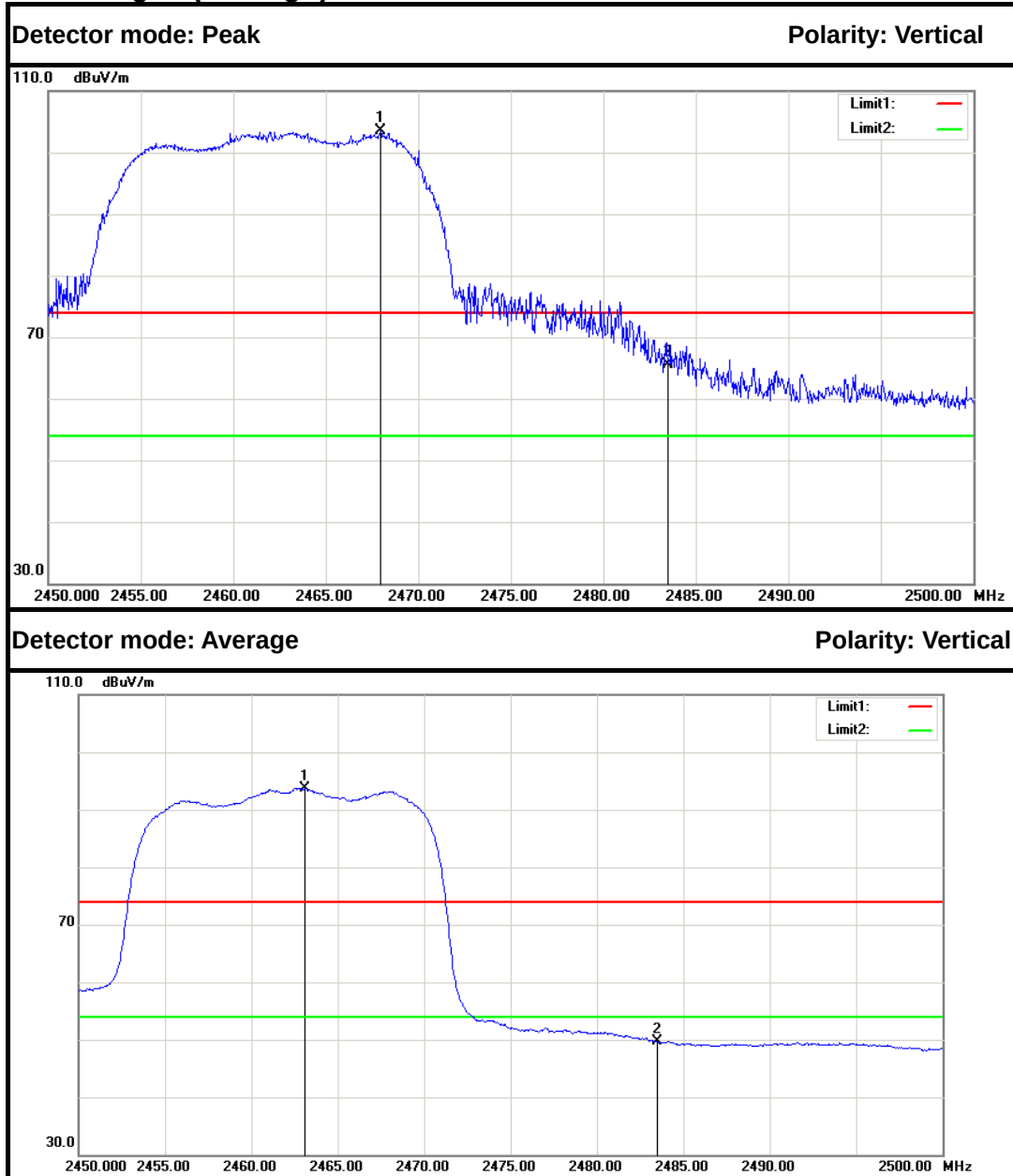
Polarity: Horizontal



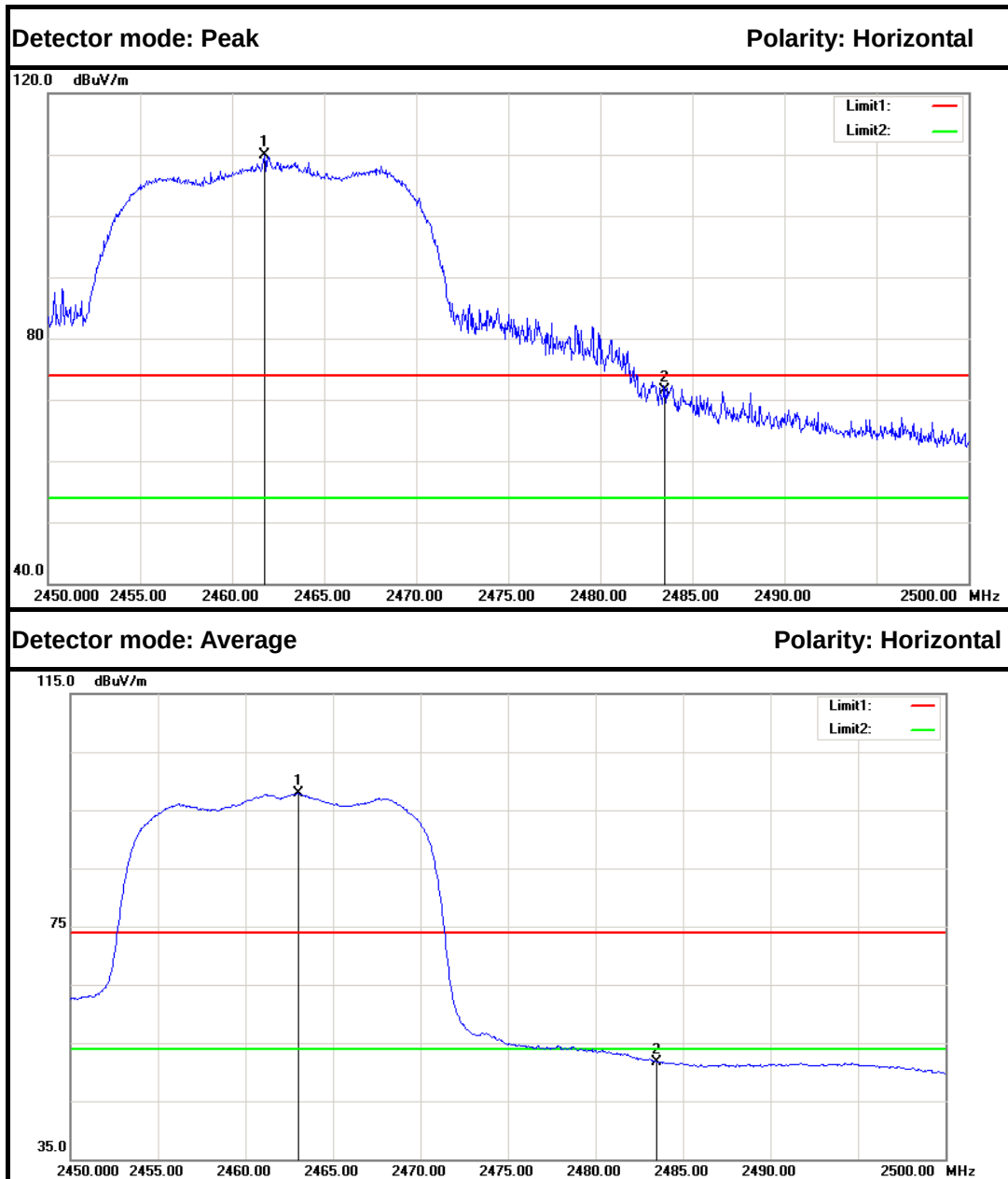
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	74.83	-2.86	71.97	74.00	-2.03	Peak	Horizontal
2.	2411.400	113.04	-2.75	110.29	---	---	Peak	Horizontal
1.	2390.000	55.38	-2.86	52.52	54.00	-1.48	Average	Horizontal
2.	2411.520	102.54	-2.74	99.80	---	---	Average	Horizontal



Band Edges (CH High)



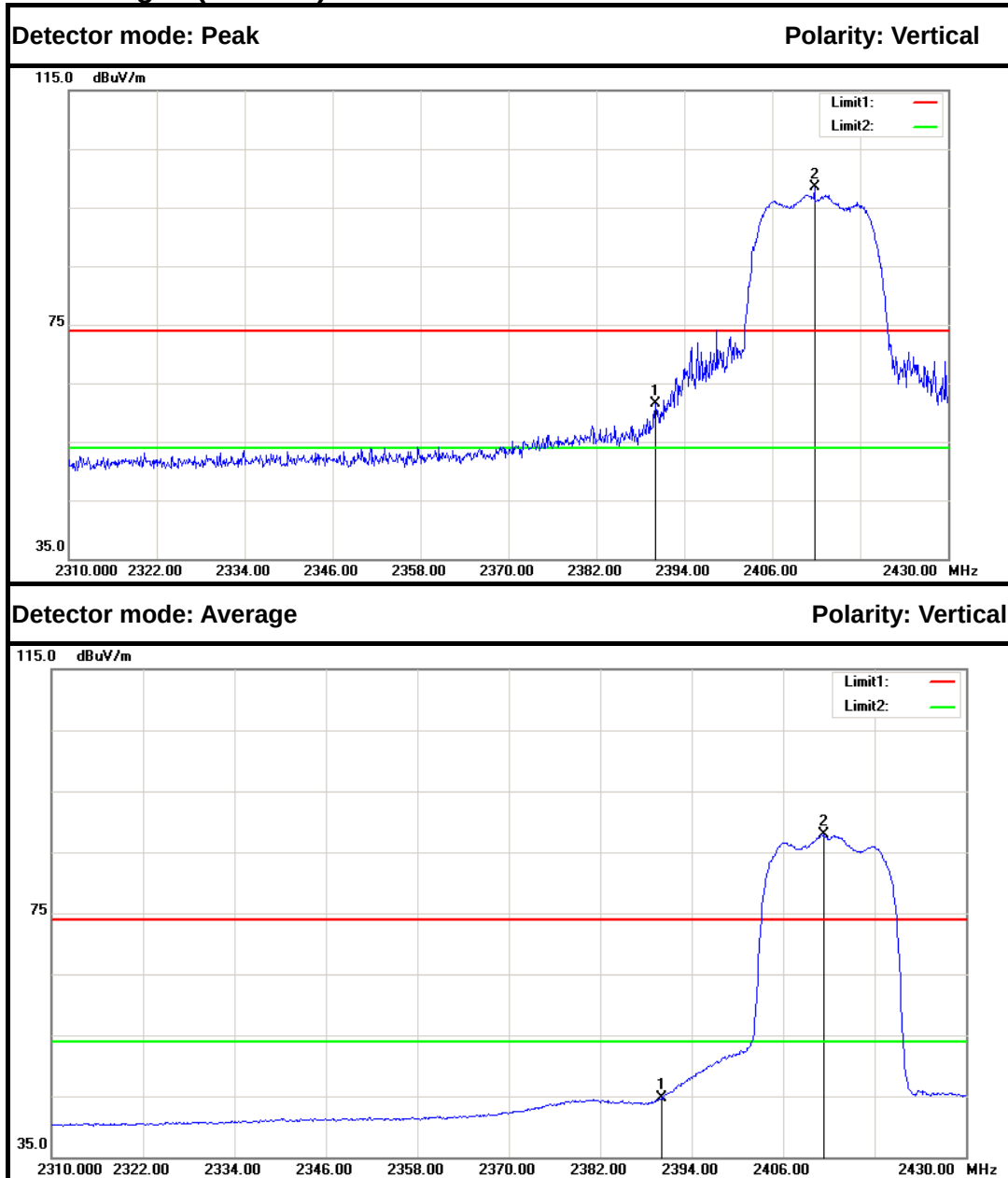
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2467.950	105.86	-2.44	103.42	---	---	Peak	Vertical
2.	2483.500	67.79	-2.35	65.44	74.00	-8.56	Peak	Vertical
1.	2463.100	96.15	-2.46	93.69	---	---	Average	Vertical
2.	2483.500	51.97	-2.35	49.62	54.00	-4.38	Average	Vertical



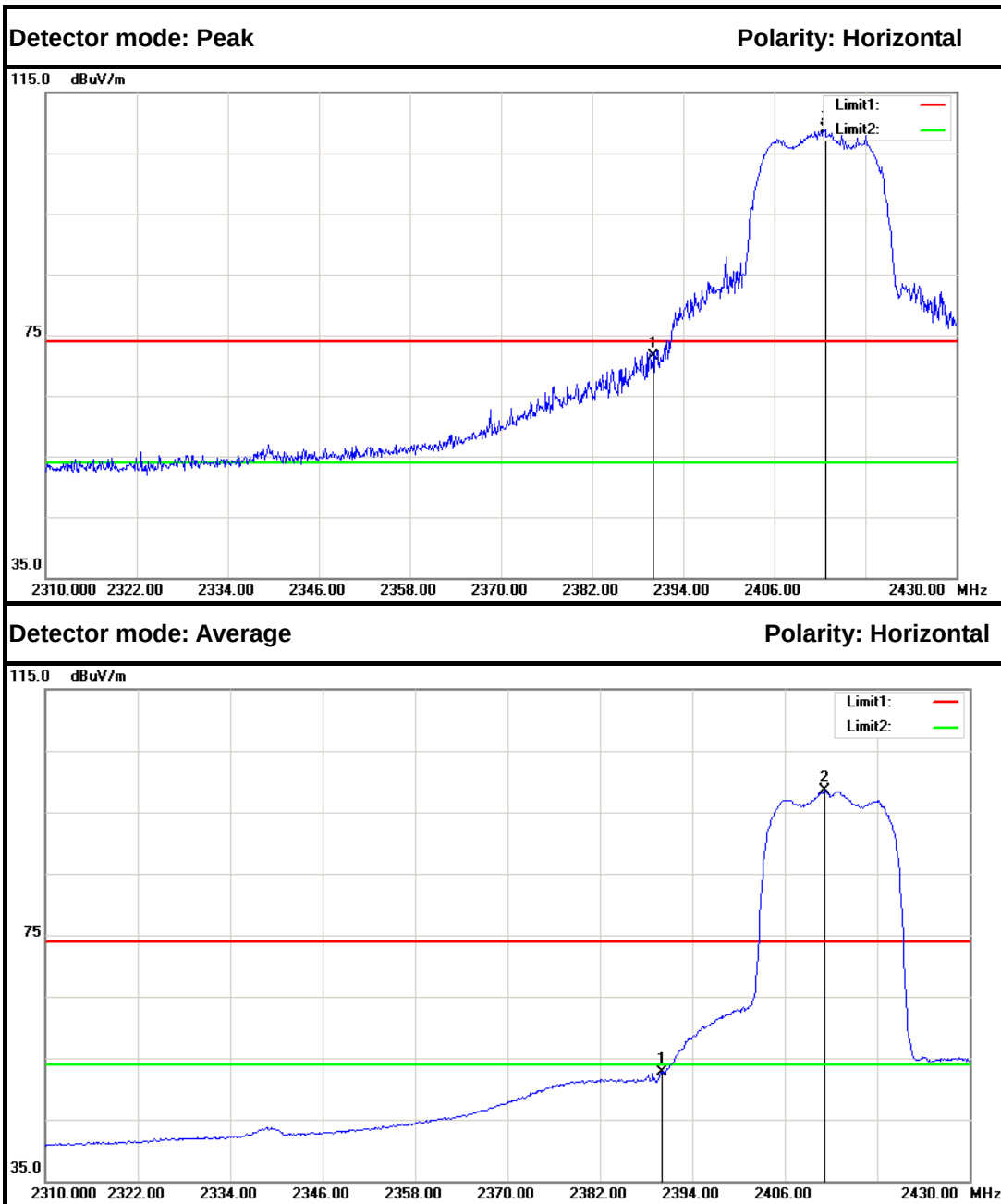
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2461.750	112.28	-2.47	109.81	---	---	Peak	Horizontal
2.	2483.500	73.78	-2.35	71.43	74.00	-2.57	Peak	Horizontal
1.	2463.000	100.43	-2.46	97.97	---	---	Average	Horizontal
2.	2483.500	54.12	-2.35	51.77	54.00	-2.23	Average	Horizontal



IEEE 802.11g mode (Antenna 1)
Band Edges (CH Low)



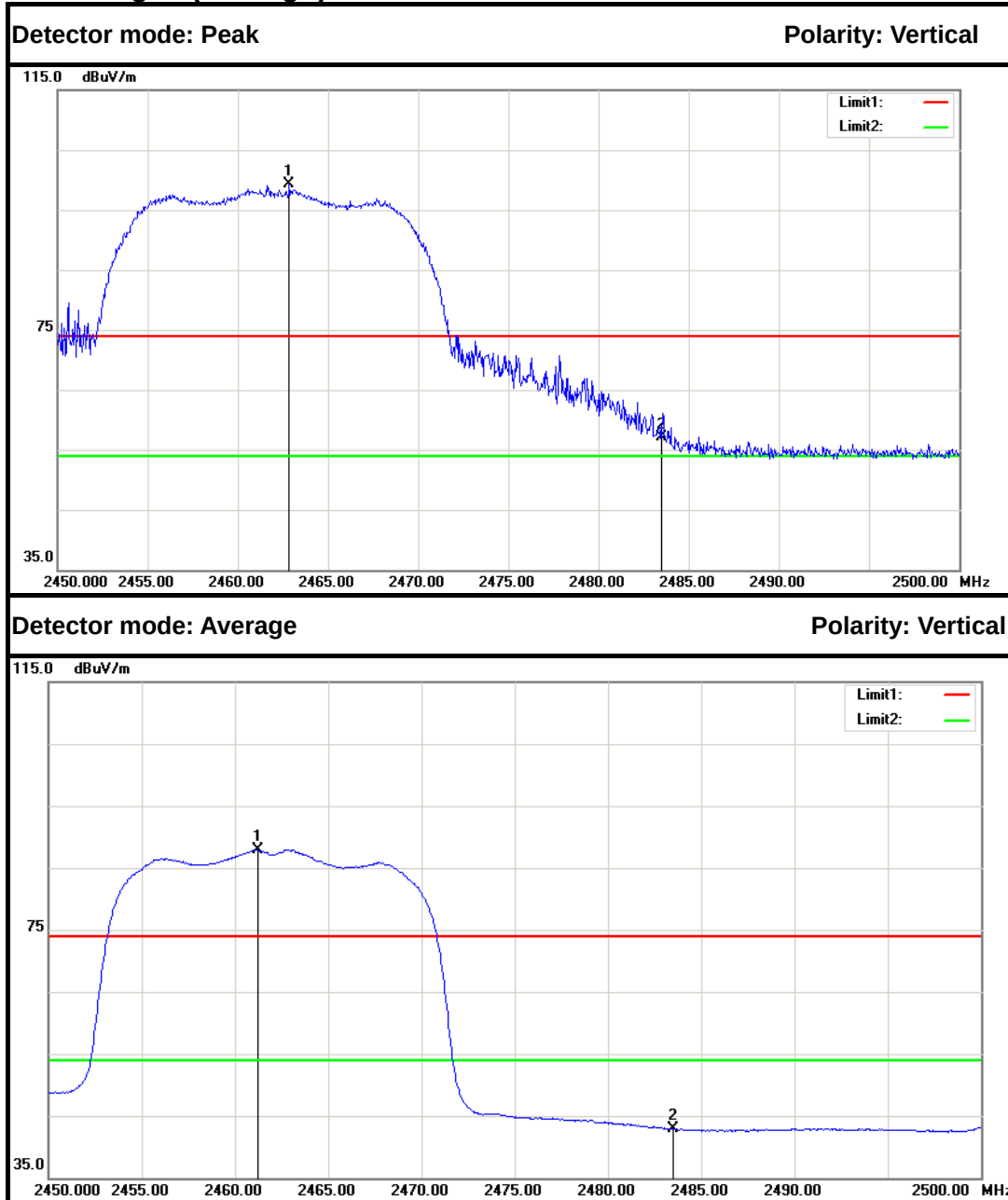
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	64.38	-2.86	61.52	74.00	-12.48	Peak	Vertical
2.	2411.760	101.27	-2.74	98.53	---	---	Peak	Vertical
1.	2390.000	47.49	-2.86	44.63	54.00	-9.37	Average	Vertical
2.	2411.280	90.59	-2.75	87.84	---	---	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	74.38	-2.86	71.52	74.00	-2.48	Peak	Horizontal
2.	2412.720	111.62	-2.74	108.88	---	---	Peak	Horizontal
1.	2390.000	55.54	-2.86	52.68	54.00	-1.32	Average	Horizontal
2.	2411.160	101.33	-2.75	98.58	---	---	Average	Horizontal



Band Edges (CH High)

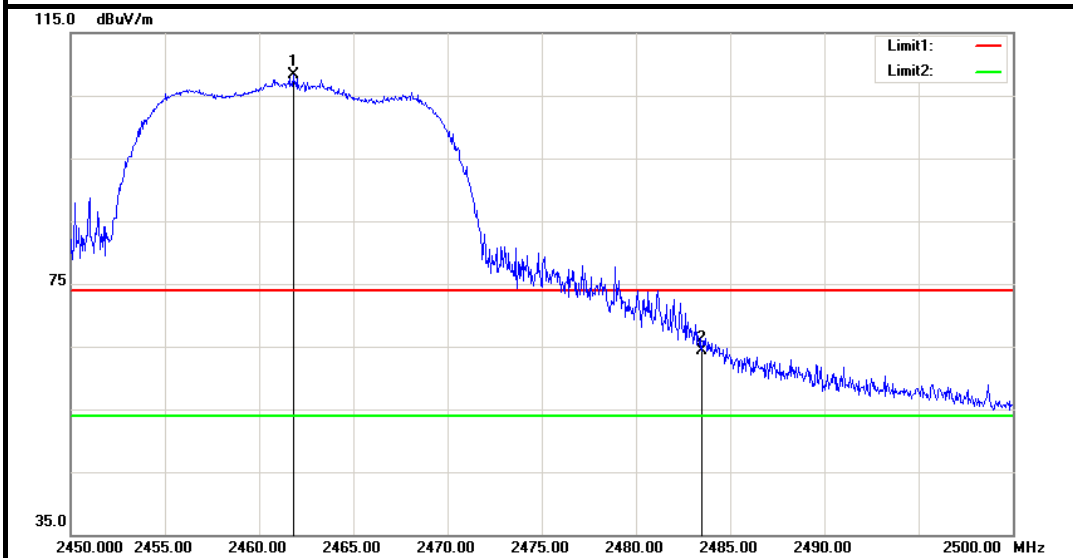


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2462.850	101.70	-2.46	99.24	---	---	Peak	Vertical
2.	2483.500	59.47	-2.35	57.12	74.00	-16.88	Peak	Vertical
1.	2461.250	90.45	-2.47	87.98	---	---	Average	Vertical
2.	2483.500	45.30	-2.35	42.95	54.00	-11.05	Average	Vertical



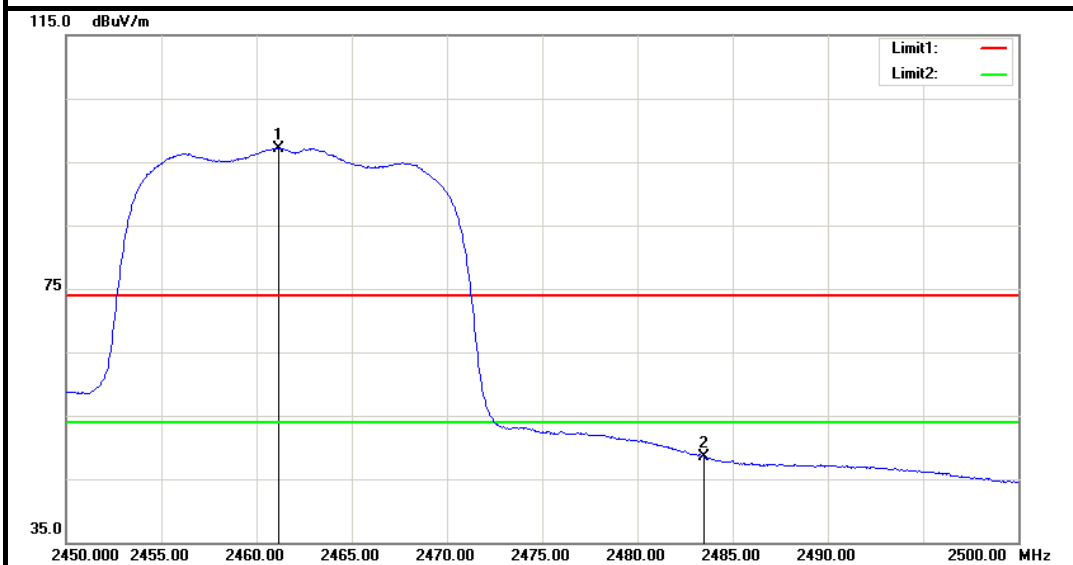
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

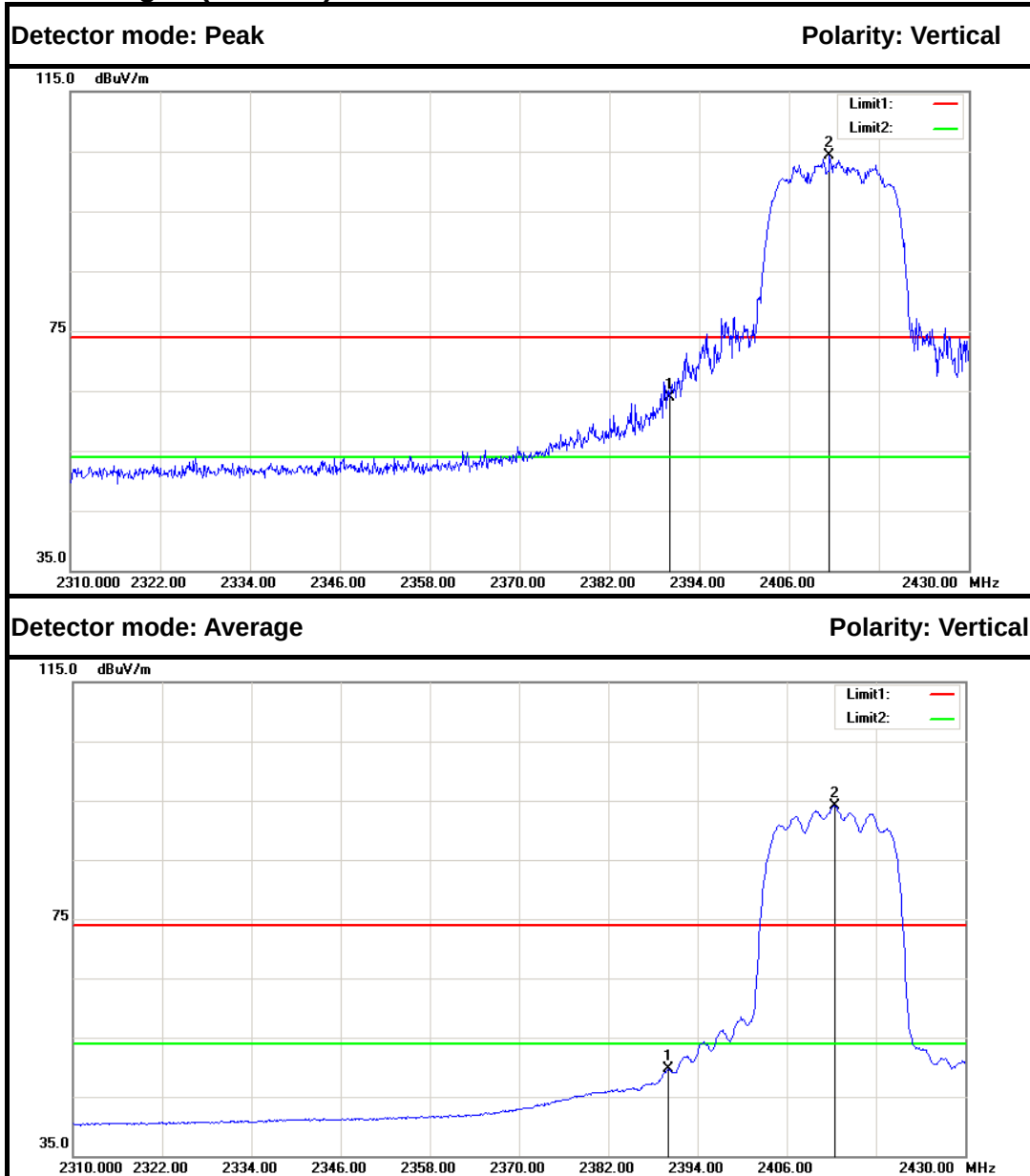
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2461.800	110.76	-2.47	108.29	---	---	Peak	Horizontal
2.	2483.500	66.69	-2.35	64.34	74.00	-9.66	Peak	Horizontal
1.	2461.150	99.65	-2.47	97.18	---	---	Average	Horizontal
2.	2483.500	50.85	-2.35	48.50	54.00	-5.50	Average	Horizontal



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

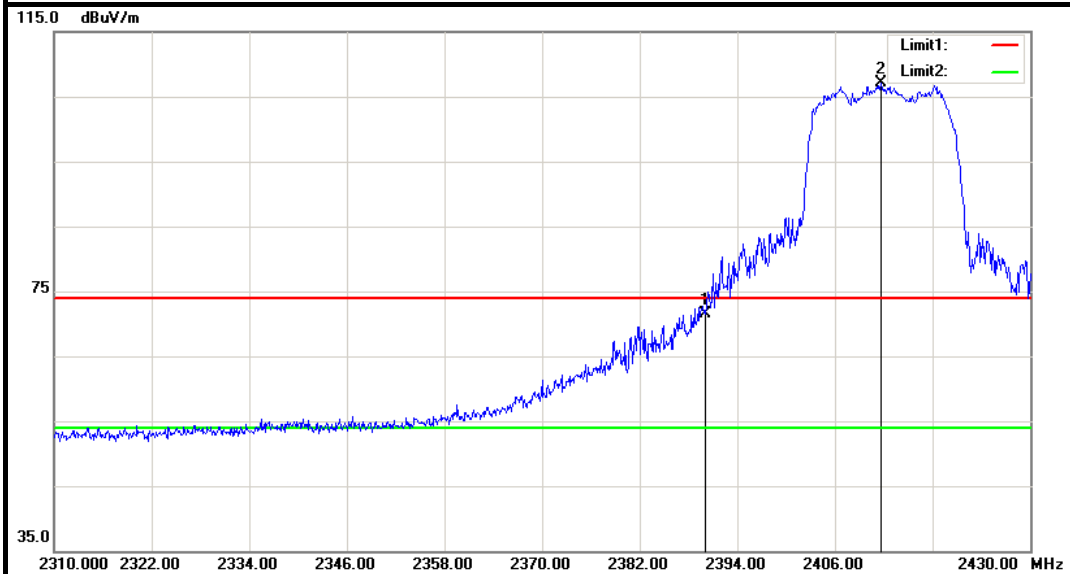


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	66.85	-2.86	63.99	74.00	-10.01	Peak	Vertical
2.	2411.400	107.06	-2.75	104.31	---	---	Peak	Vertical
1.	2390.000	52.49	-2.86	49.63	54.00	-4.37	Average	Vertical
2.	2412.480	96.81	-2.74	94.07	---	---	Average	Vertical



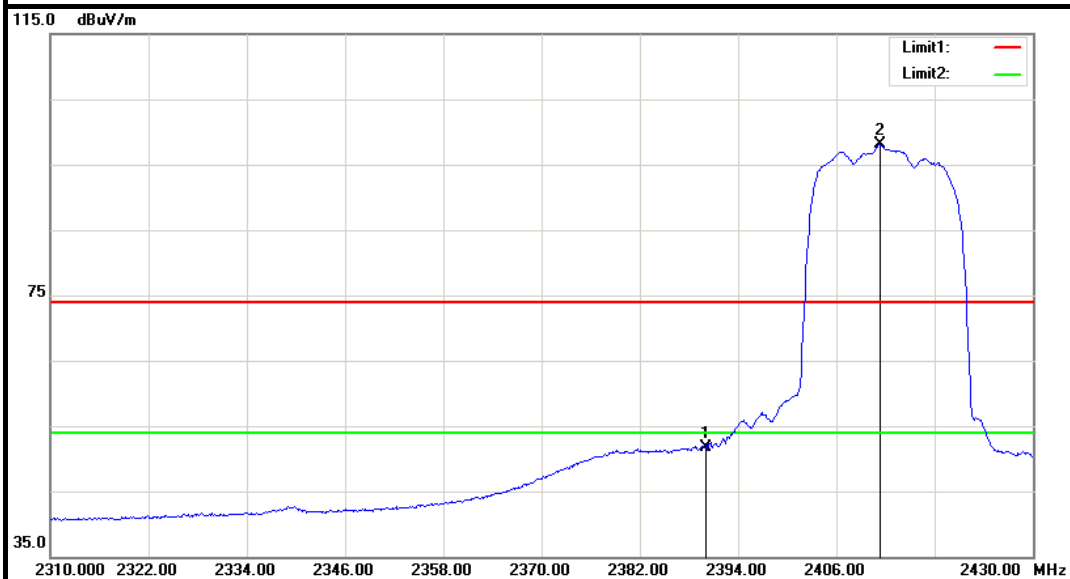
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

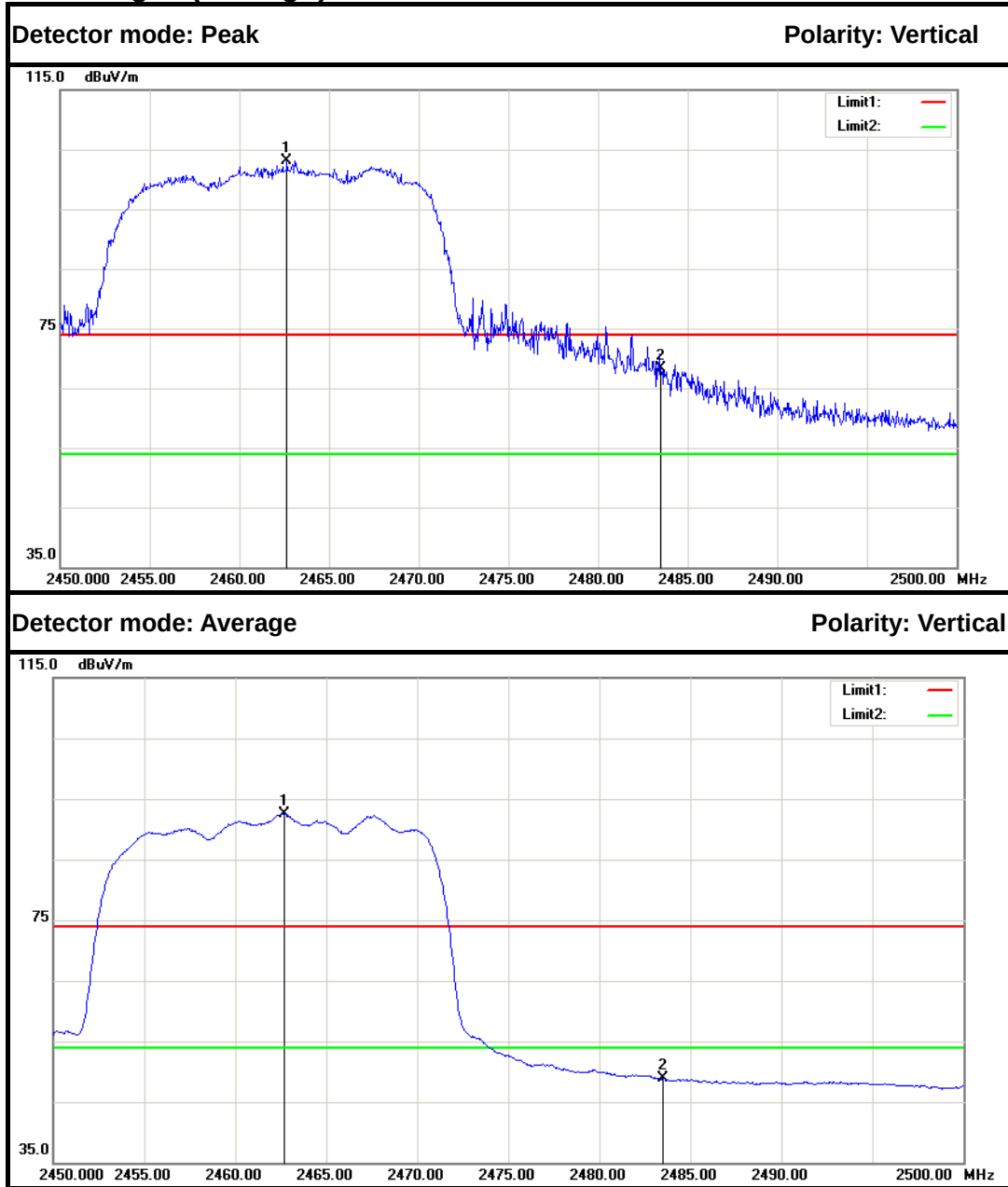
Polarity: Horizontal



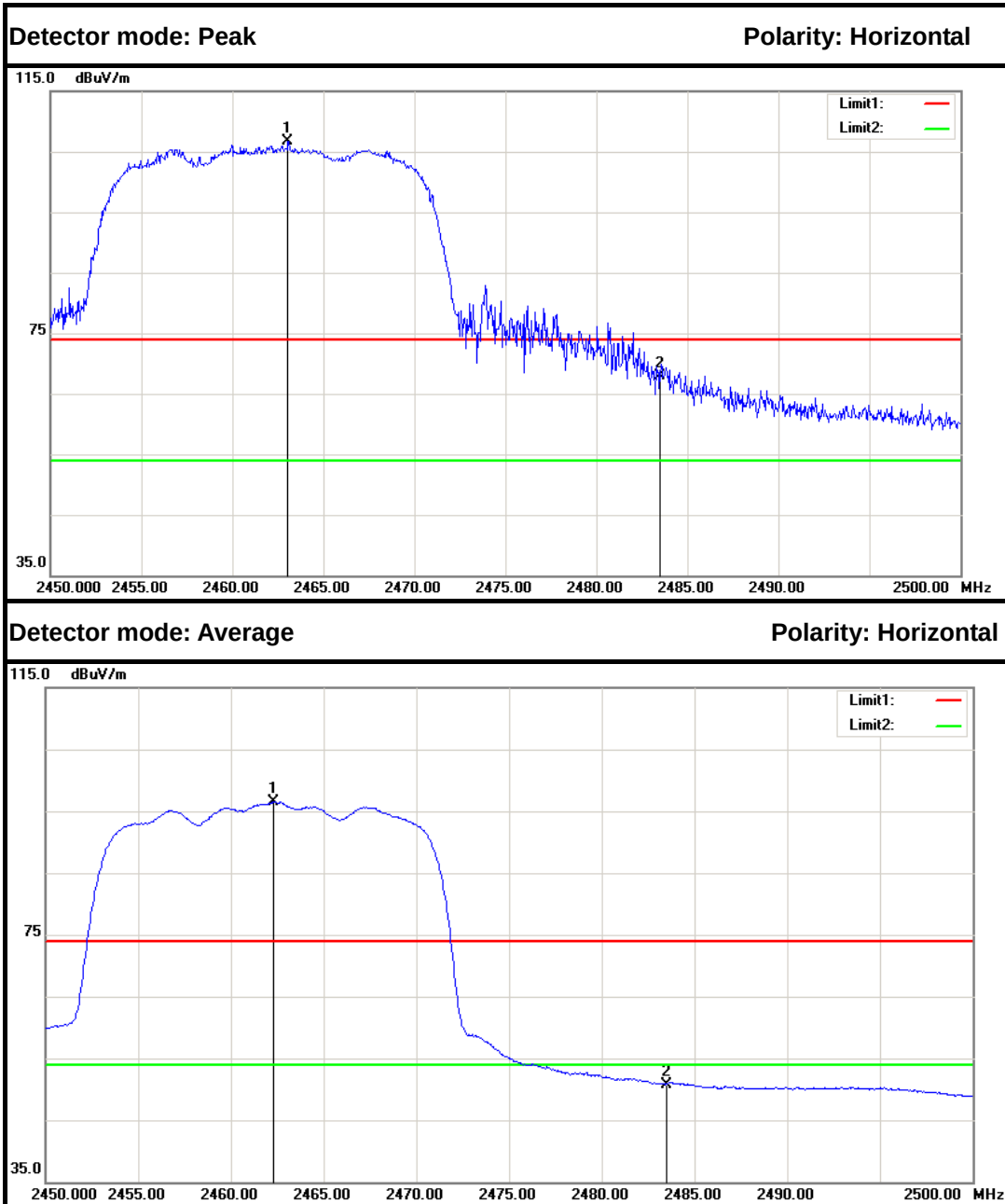
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	74.35	-2.86	71.49	74.00	-2.51	Peak	Horizontal
2.	2411.640	109.88	-2.74	107.14	---	---	Peak	Horizontal
1.	2390.000	54.56	-2.86	51.70	54.00	-2.30	Average	Horizontal
2.	2411.280	100.80	-2.75	98.05	---	---	Average	Horizontal



Band Edges (CH High)



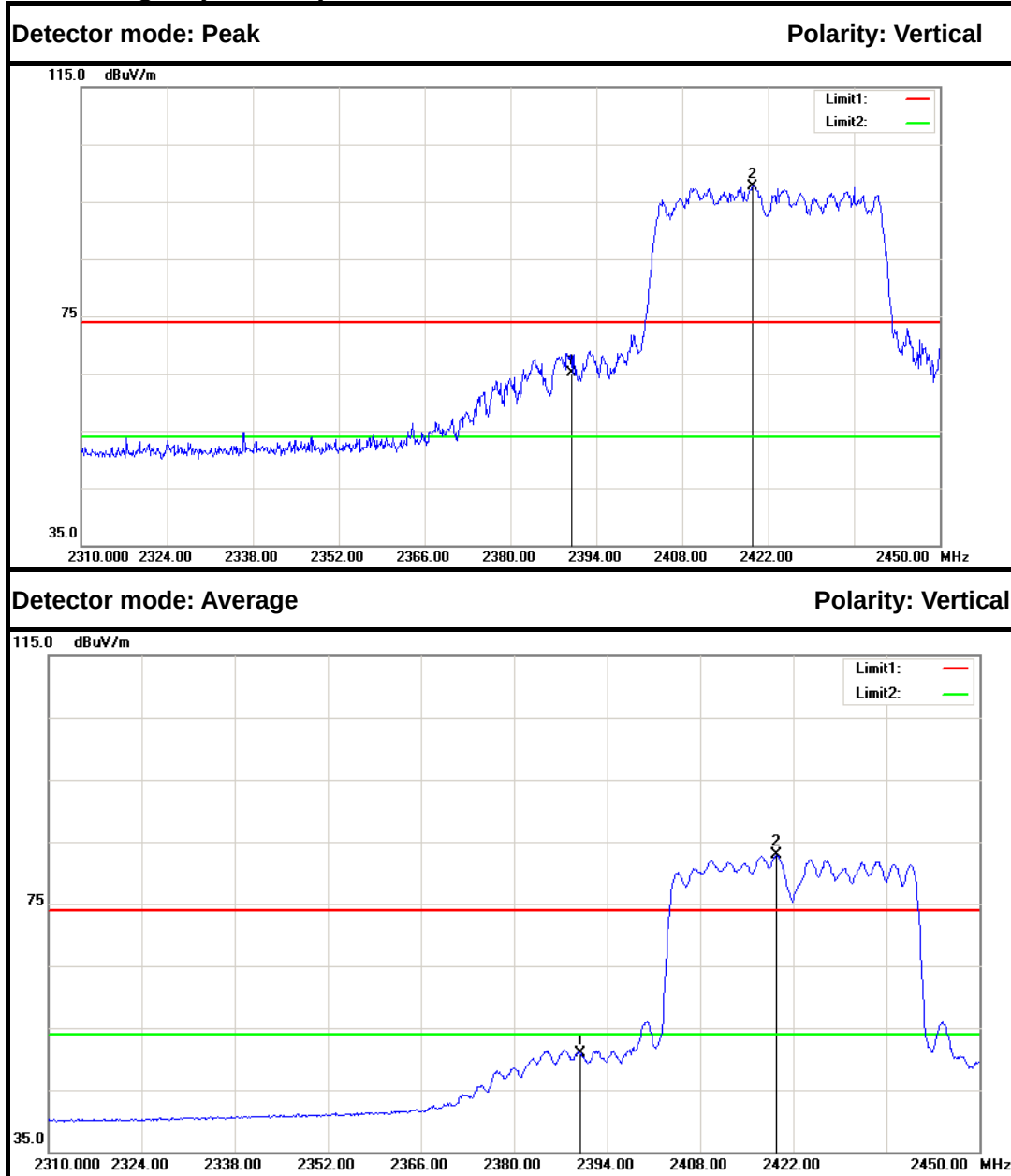
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2462.650	105.51	-2.46	103.05	---	---	Peak	Vertical
2.	2483.500	70.61	-2.35	68.26	74.00	-5.74	Peak	Vertical
1.	2462.700	94.97	-2.46	92.51	---	---	Average	Vertical
2.	2483.500	51.16	-2.35	48.81	54.00	-5.19	Average	Vertical



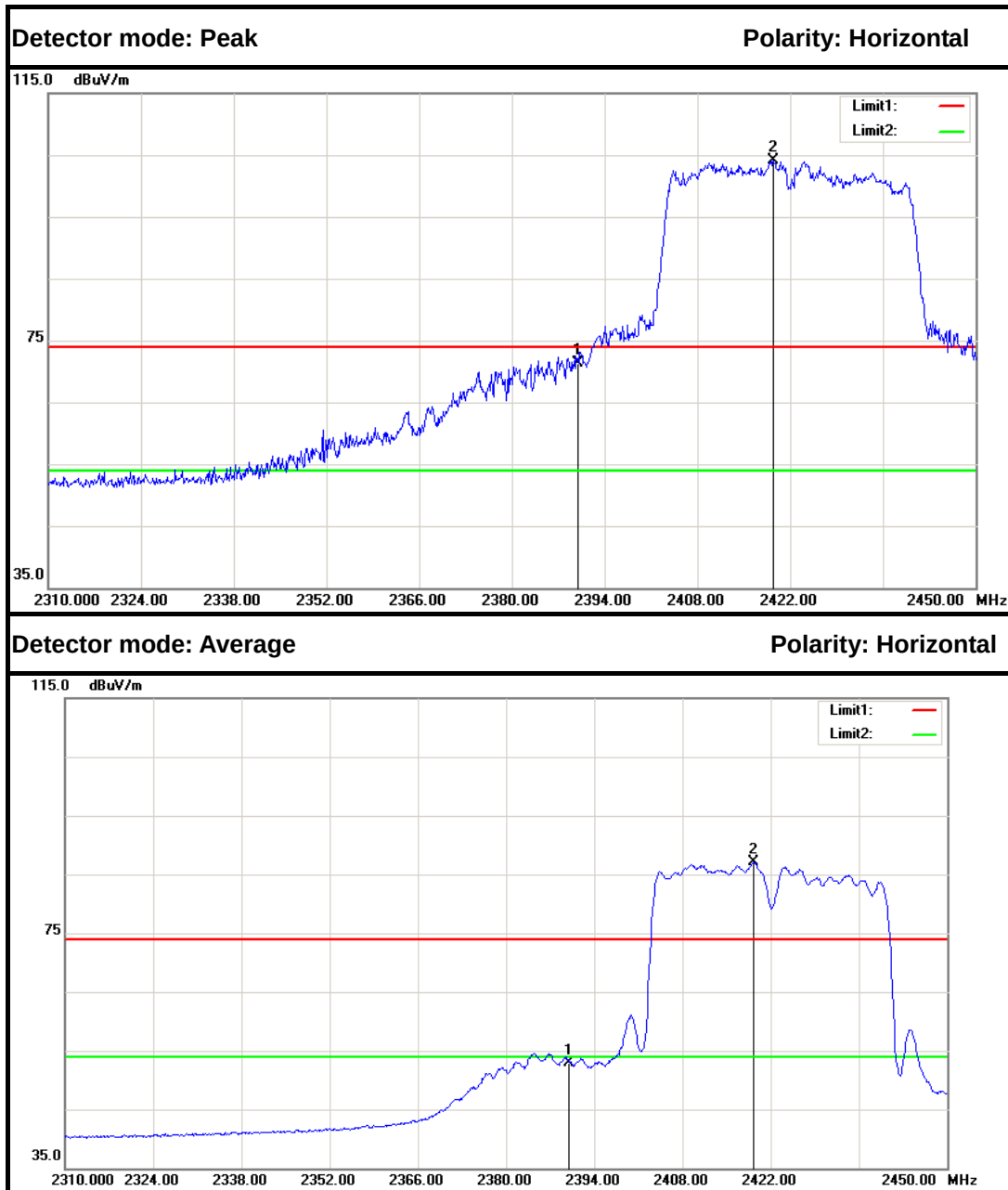
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2463.050	109.12	-2.46	106.66	---	---	Peak	Horizontal
2.	2483.500	70.27	-2.35	67.92	74.00	-6.08	Peak	Horizontal
1.	2462.300	98.95	-2.47	96.48	---	---	Average	Horizontal
2.	2483.500	53.15	-2.35	50.80	54.00	-3.20	Average	Horizontal



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



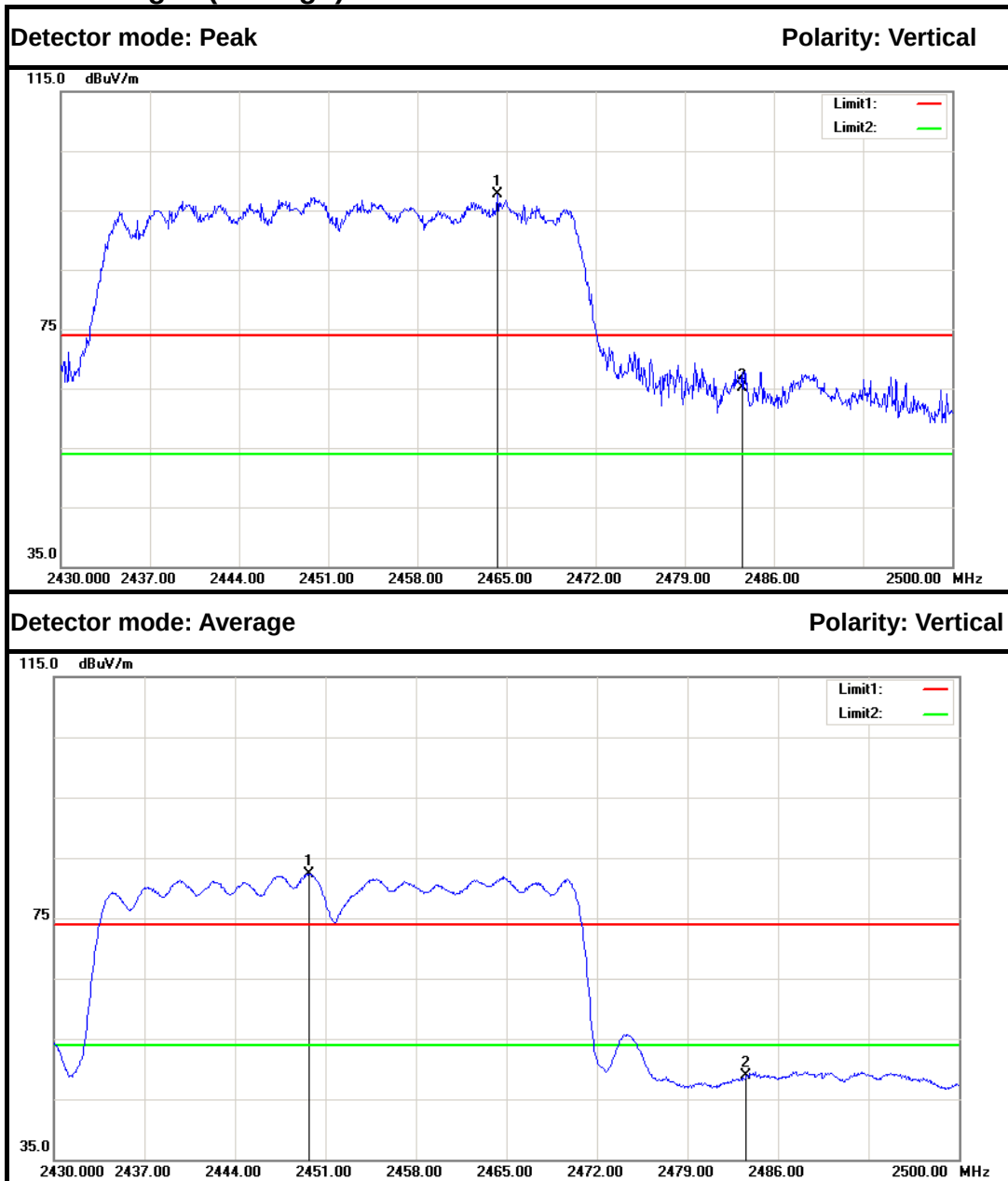
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	68.02	-2.86	65.16	74.00	-8.84	Peak	Vertical
2.	2419.480	100.33	-2.70	97.63	---	---	Peak	Vertical
1.	2390.000	53.81	-2.86	50.95	54.00	-3.05	Average	Vertical
2.	2419.480	85.56	-2.70	82.86	---	---	Average	Vertical



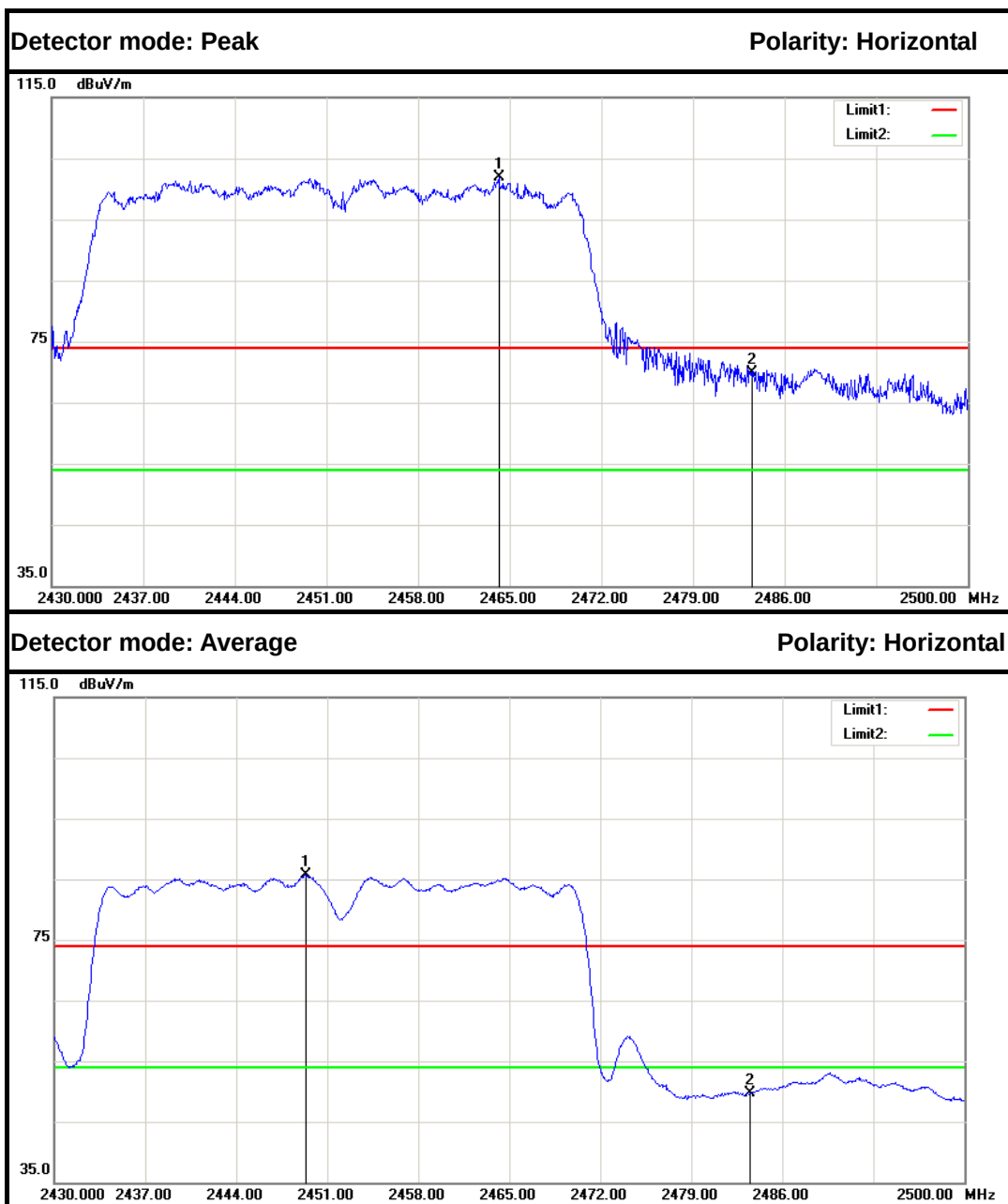
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2390.000	74.24	-2.86	71.38	74.00	-2.62	Peak	Horizontal
2.	2419.480	106.81	-2.70	104.11	---	---	Peak	Horizontal
1.	2390.000	55.84	-2.86	52.98	54.00	-1.02	Average	Horizontal
2.	2419.340	89.76	-2.70	87.06	---	---	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.	2464.300	100.24	-2.46	97.78	---	---	Peak	Vertical
2.	2483.500	67.48	-2.35	65.13	74.00	-8.87	Peak	Vertical
1.	2449.740	84.92	-2.54	82.38	---	---	Average	Vertical
2.	2483.500	51.17	-2.35	48.82	54.00	-5.18	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1.	2464.160	104.38	-2.46	101.92	---	---	Peak	Horizontal
2.	2483.500	72.26	-2.35	69.91	74.00	-4.09	Peak	Horizontal
1.	2449.320	88.29	-2.54	85.75	---	---	Average	Horizontal
2.	2483.500	52.08	-2.35	49.73	54.00	-4.27	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

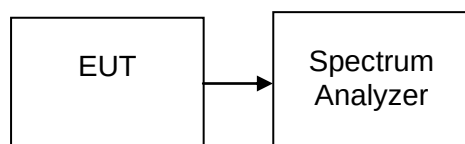
7.7.3. TEST PROCEDURES (please refer to measurement standard)

§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 (Antenna 0)**

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-7.84	8	PASS
Mid	2437	-7.66		PASS
High	2462	-7.14		PASS

Test mode: IEEE 802.11b (Antenna 1)

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-6.50	8	PASS
Mid	2437	-6.34		PASS
High	2462	-6.62		PASS

Test mode: IEEE 802.11g (Antenna 0)

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-12.51	8	PASS
Mid	2437	-12.36		PASS
High	2462	-12.43		PASS

Test mode: IEEE 802.11g (Antenna 1)

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-12.72	8	PASS
Mid	2437	-11.99		PASS
High	2462	-12.15		PASS

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

Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Test Result
		Antenna 0	Antenna 1	Total		
Low	2412	-12.57	-12.63	-9.59	8	PASS
Mid	2437	-13.08	-12.73	-9.89		PASS
High	2462	-12.31	-12.31	-9.30		PASS

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

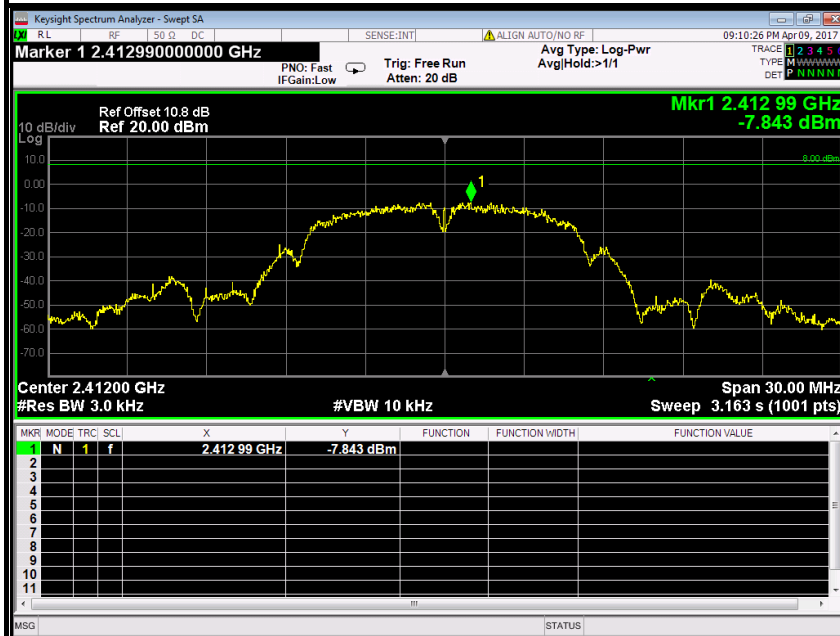
Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Test Result
		Antenna 0	Antenna 1	Total		
Low	2422	-14.57	-15.69	-12.08	8	PASS
Mid	2437	-15.10	-14.55	-11.80		PASS
High	2452	-14.89	-14.76	-11.82		PASS



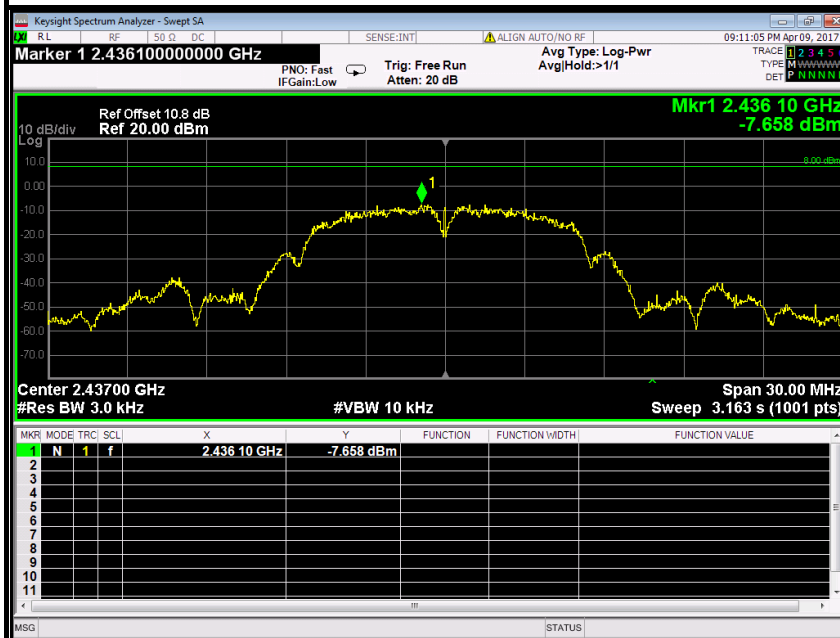
Test Plot

IEEE 802.11b mode (Antenna 0)

PPSD (CH Low)

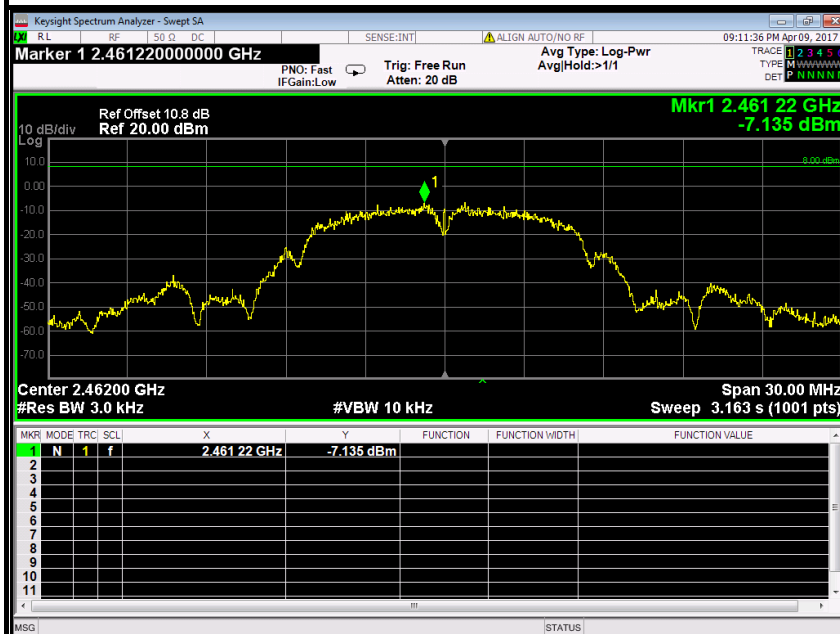


PPSD (CH Mid)



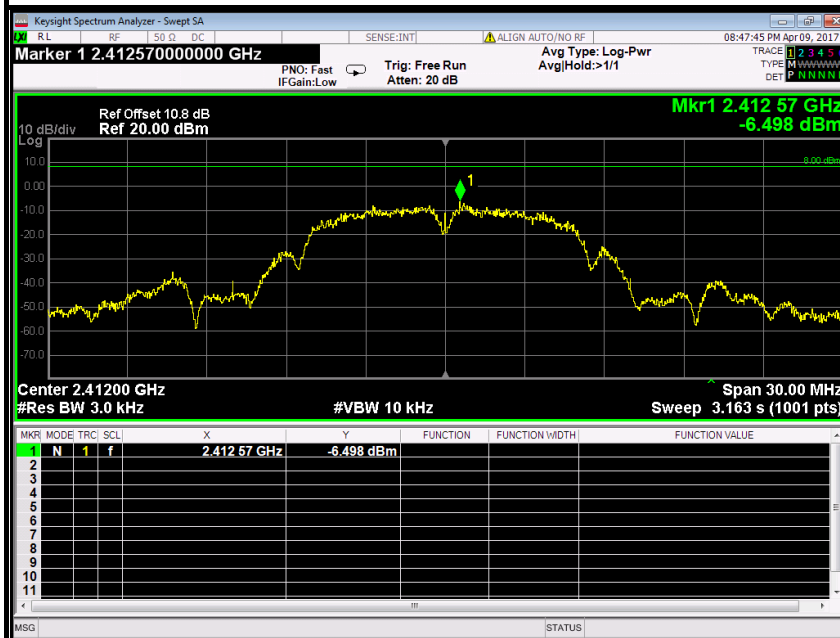


PPSD (CH High)



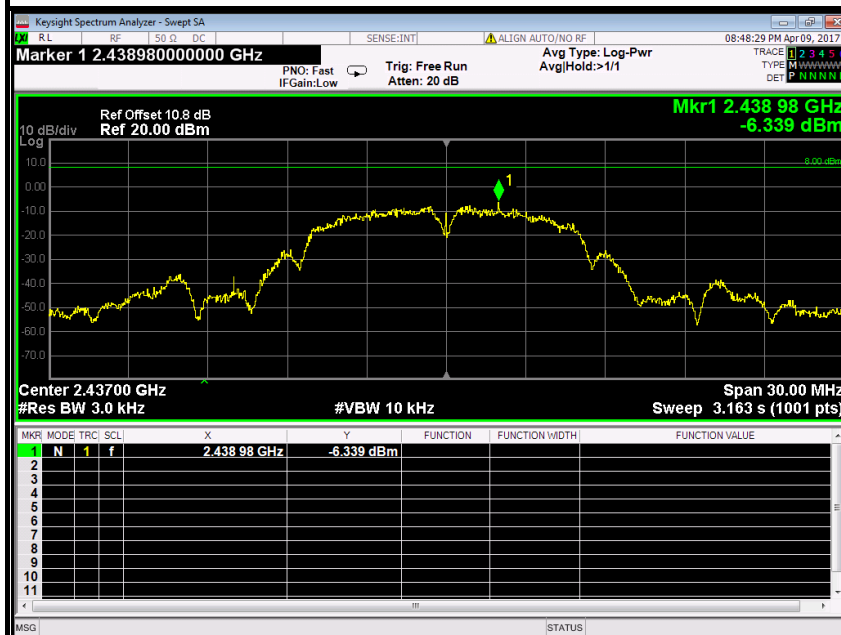
IEEE 802.11b mode (Antenna 1)

PPSD (CH Low)

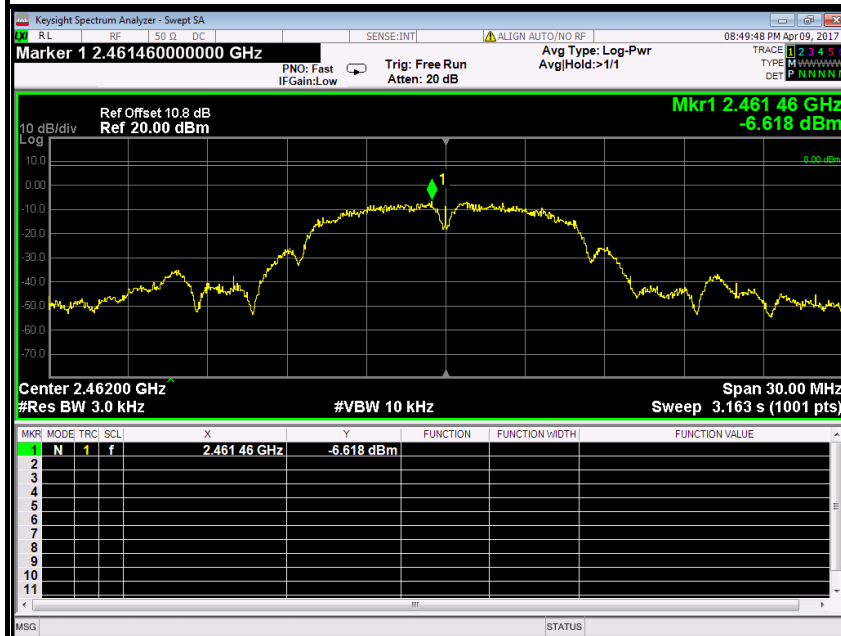




PPSD (CH Mid)



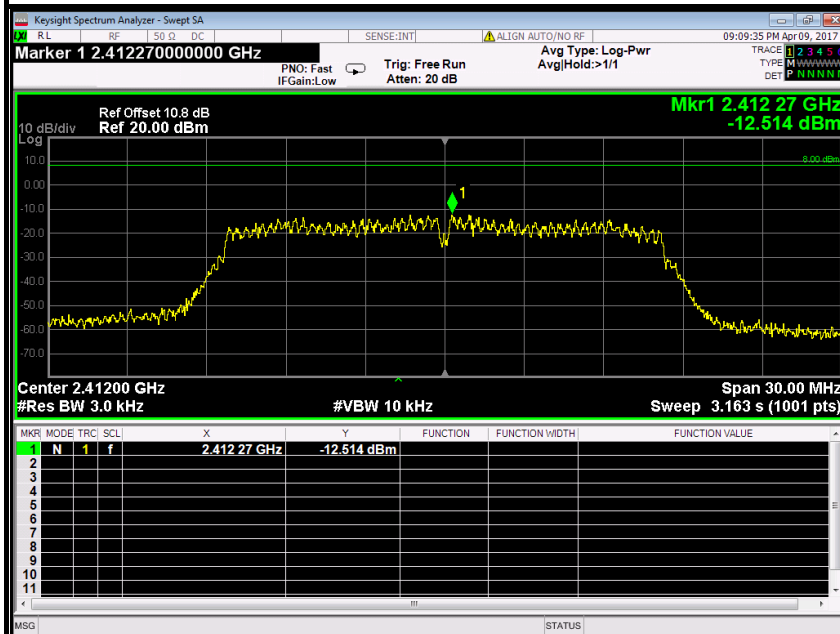
PPSD (CH High)



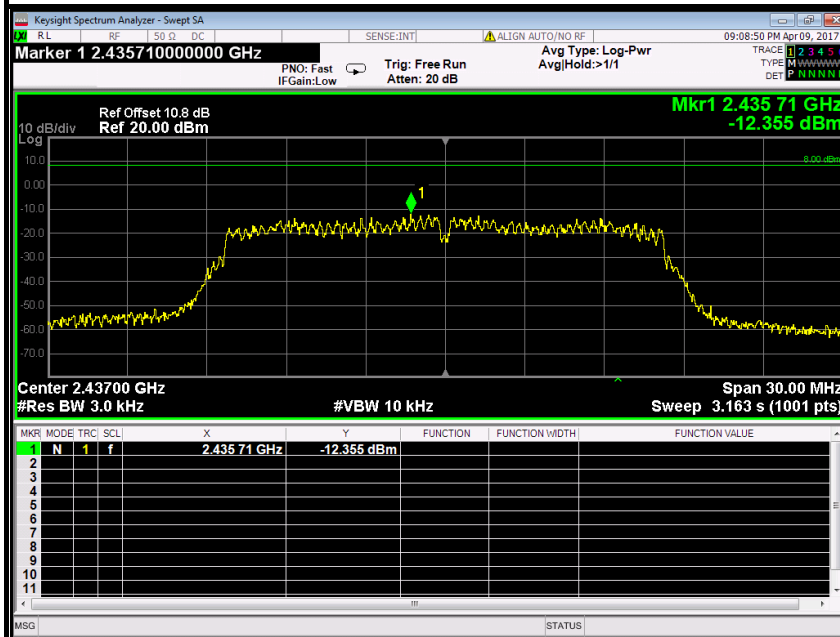


IEEE 802.11g mode (Antenna 0)

PPSD (CH Low)

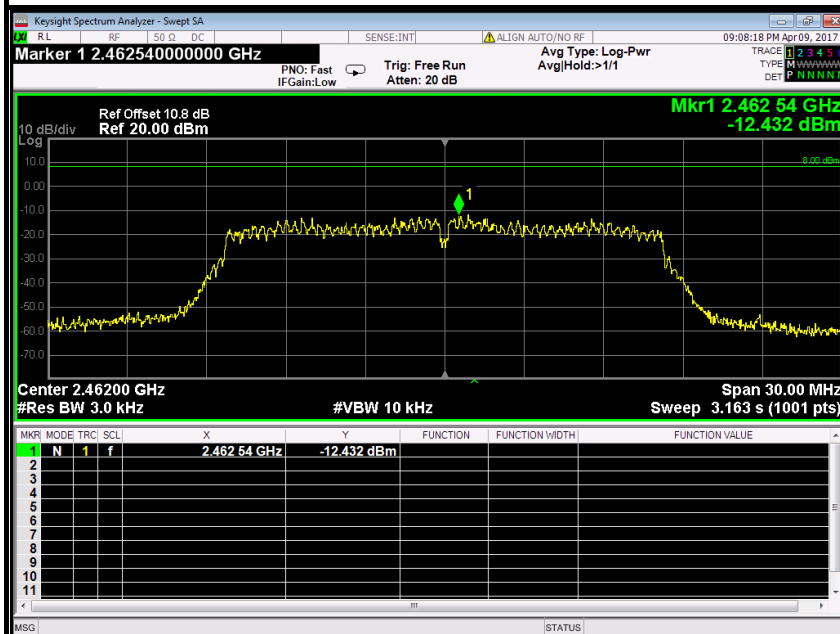


PPSD (CH Mid)



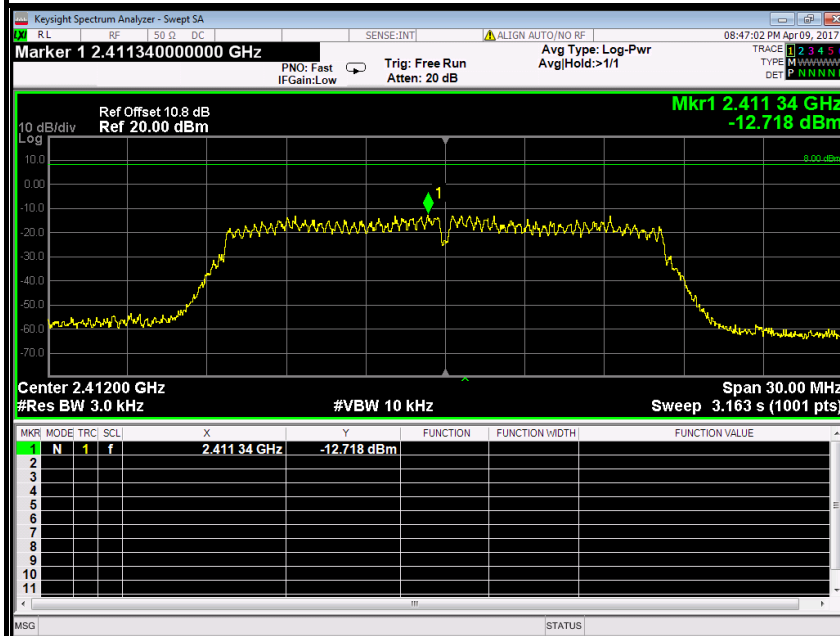


PPSD (CH High)



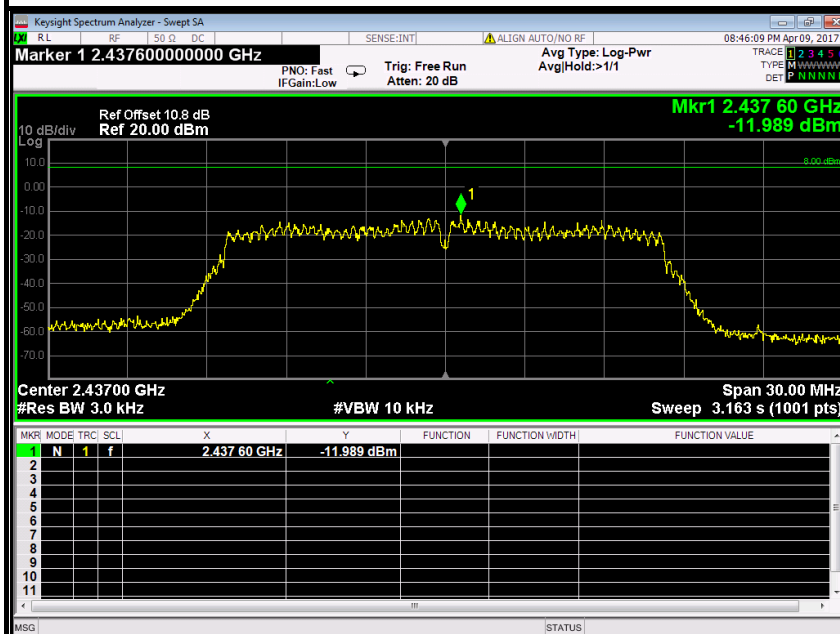
IEEE 802.11g mode (Antenna 1)

PPSD (CH Low)

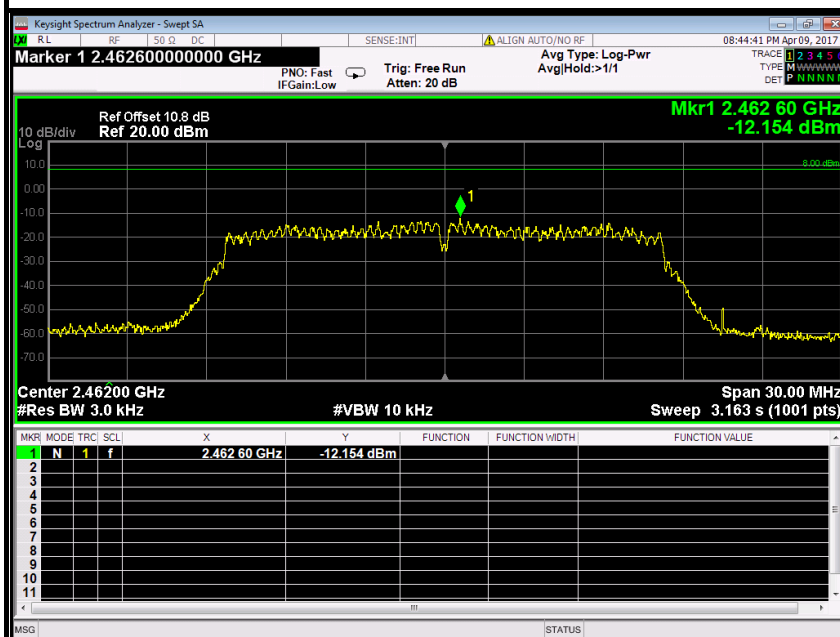




PPSD (CH Mid)



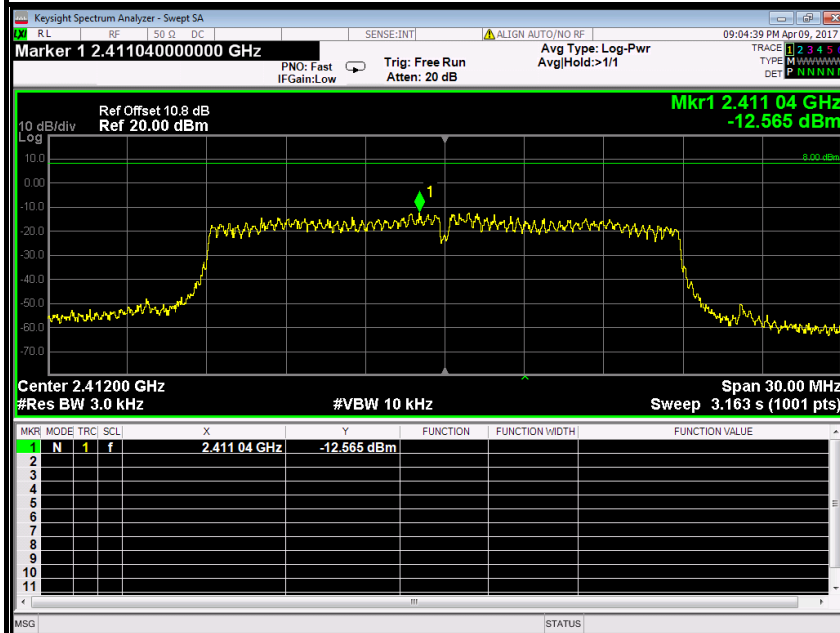
PPSD (CH High)



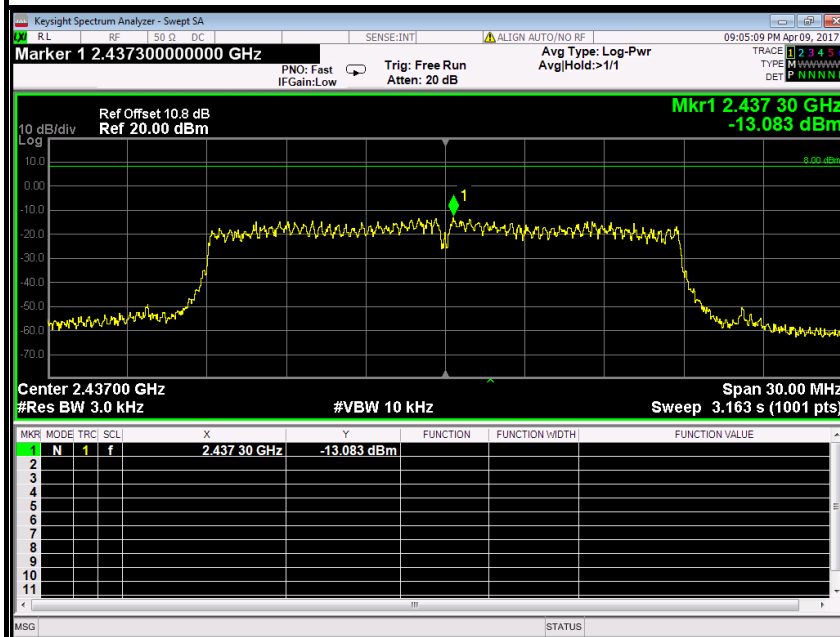


IEEE 802.11n HT20 MHz mode (Antenna 0)

PPSD (CH Low)

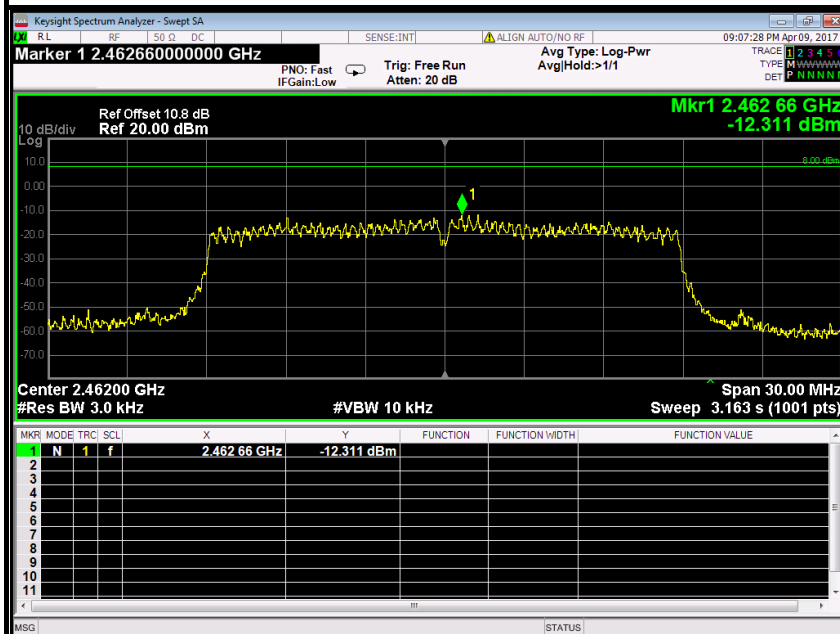


PPSD (CH Mid)



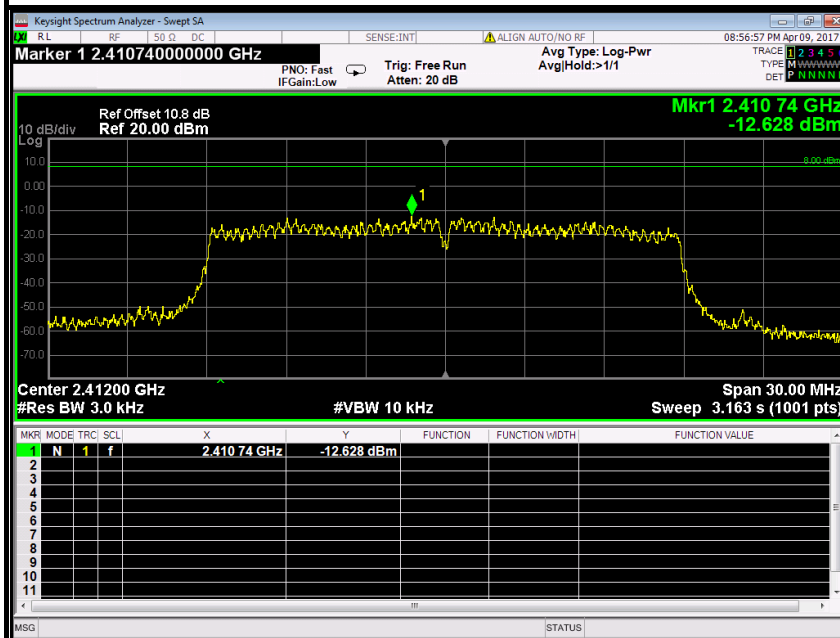


PPSD (CH High)



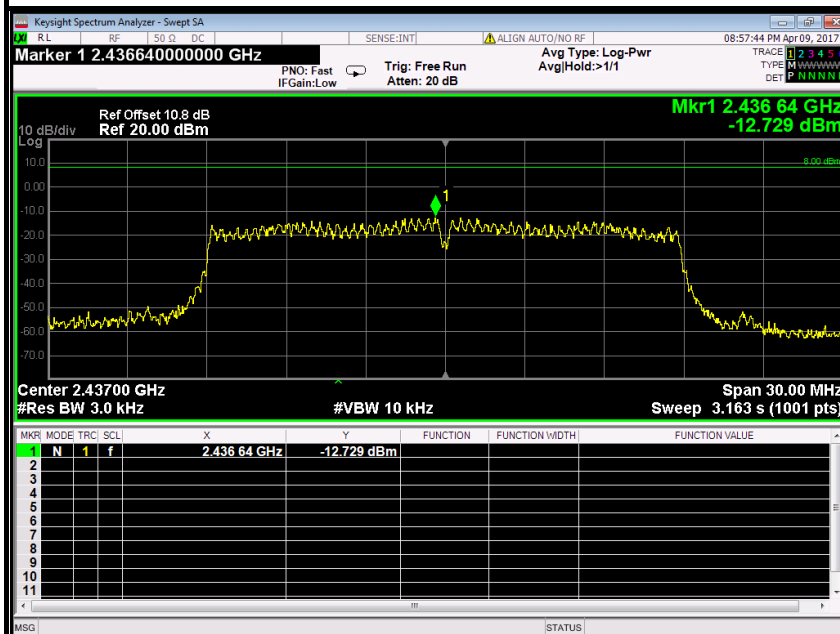
IEEE 802.11n HT20 MHz mode (Antenna 1)

PPSD (CH Low)

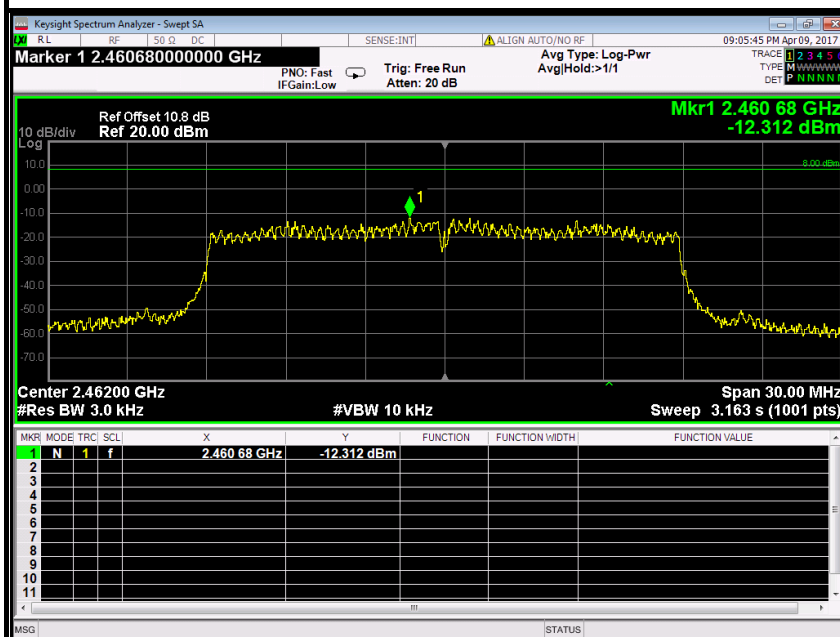




PPSD (CH Mid)



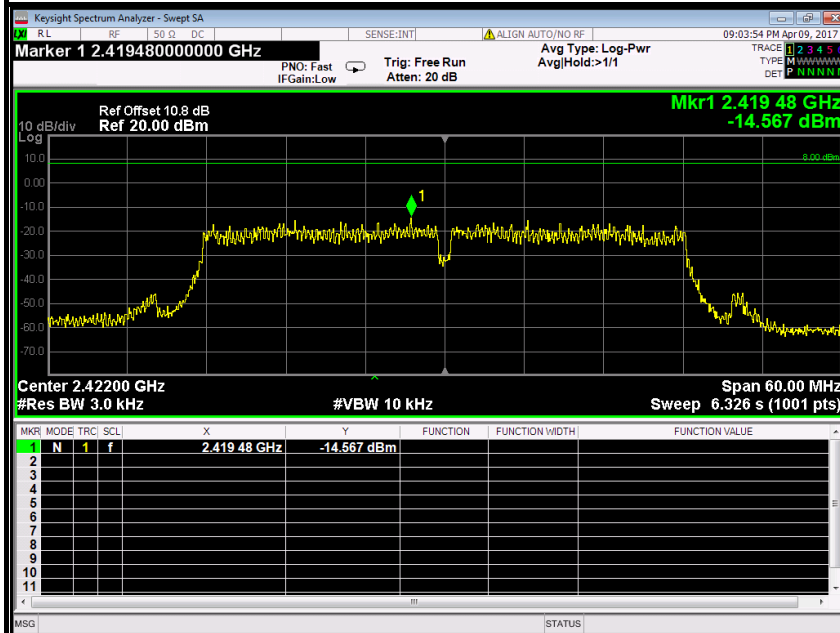
PPSD (CH High)



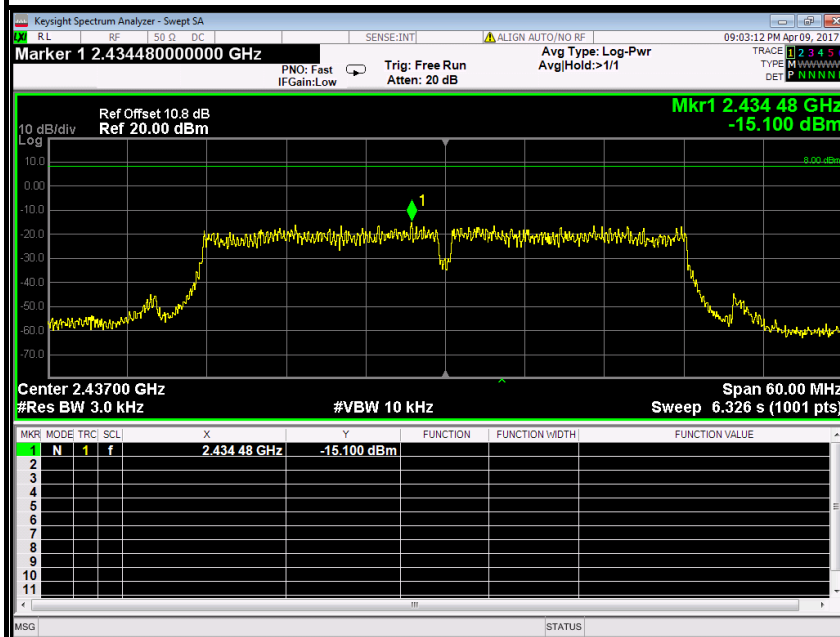


IEEE 802.11n HT40 MHz mode (Antenna 0)

PPSD (CH Low)

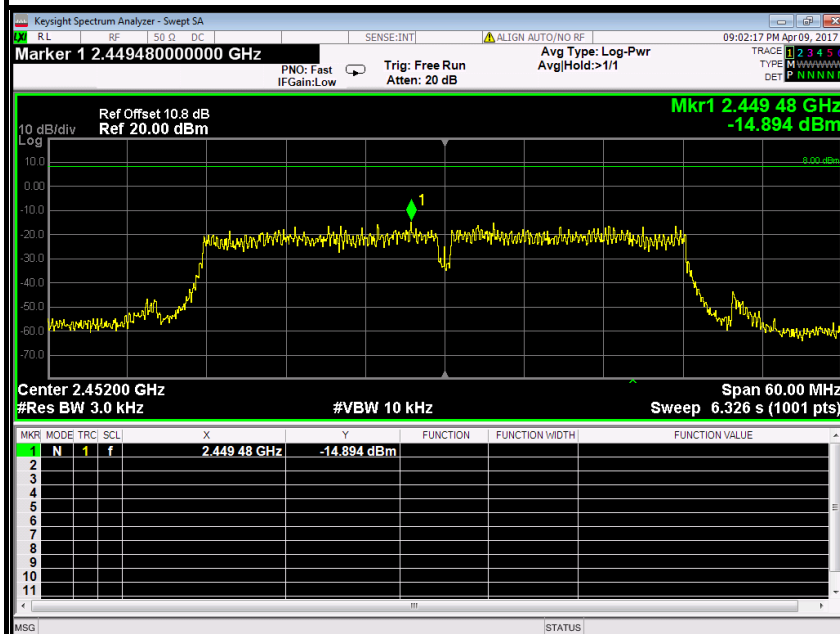


PPSD (CH Mid)



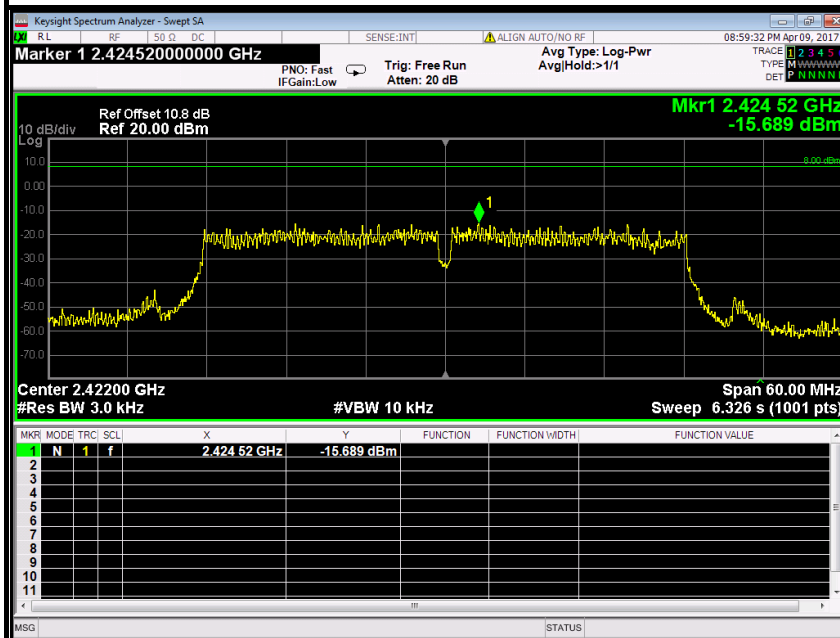


PPSD (CH High)



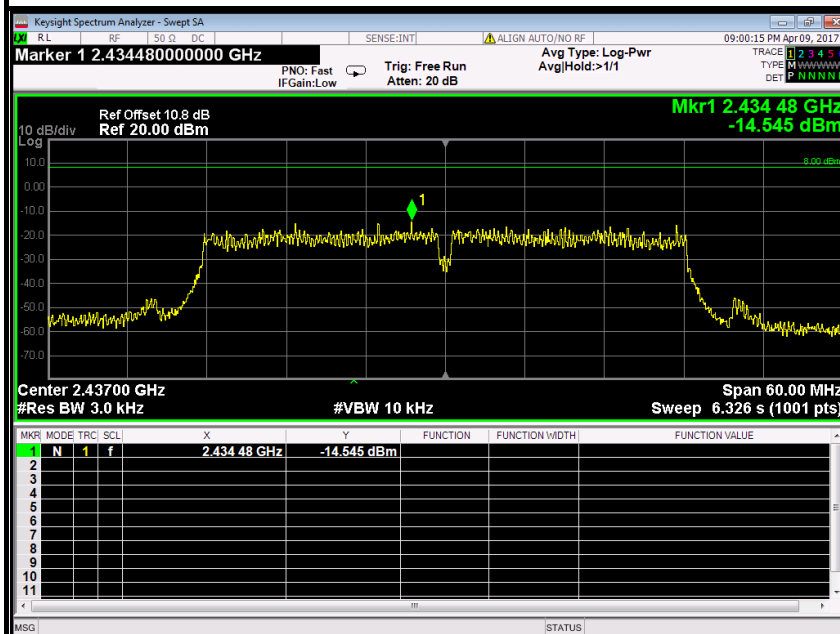
IEEE 802.11n HT40 MHz mode (Antenna 1)

PPSD (CH Low)





PPSD (CH Mid)



PPSD (CH High)

