



Test Mode: TX / IEEE 802.11n HT20 MHz (CH Mid)

Tested by: Saber Huang

Ambient temperature: 24°C

Relative humidity: 52% RH

Date: June 5, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1504.000	52.31	-6.87	45.44	74.00	-28.56	V	Peak
1981.000	52.30	-5.12	47.18	74.00	-26.82	V	Peak
2971.000	48.05	-1.41	46.64	74.00	-27.36	V	Peak
3565.000	48.30	-0.25	48.05	74.00	-25.95	V	Peak
4303.000	41.00	2.66	43.66	74.00	-30.34	V	Peak
5779.000	41.66	5.99	47.65	74.00	-26.35	V	Peak
1189.000	54.30	-7.83	46.47	74.00	-27.53	H	Peak
1486.000	53.85	-6.91	46.94	74.00	-27.06	H	Peak
1981.000	52.68	-5.12	47.56	74.00	-26.44	H	Peak
2971.000	48.50	-1.41	47.09	74.00	-26.91	H	Peak
3574.000	46.56	-0.21	46.35	74.00	-27.65	H	Peak
3961.000	45.39	1.43	46.82	74.00	-27.18	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: Saber Huang

Ambient temperature: 24°C

Relative humidity: 52% RH

Date: June 5, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1486.000	55.14	-6.91	48.23	74.00	-25.77	V	Peak
1990.000	52.35	-5.06	47.29	74.00	-26.71	V	Peak
2854.000	44.59	-1.62	42.97	74.00	-31.03	V	Peak
3196.000	43.72	-1.03	42.69	74.00	-31.31	V	Peak
3556.000	47.67	-0.28	47.39	74.00	-26.61	V	Peak
4933.000	41.85	4.76	46.61	74.00	-27.39	V	Peak
1189.000	51.29	-7.83	43.46	74.00	-30.54	H	Peak
1486.000	54.80	-6.91	47.89	74.00	-26.11	H	Peak
1981.000	52.45	-5.12	47.33	74.00	-26.67	H	Peak
2971.000	47.73	-1.41	46.32	74.00	-27.68	H	Peak
3565.000	47.44	-0.25	47.19	74.00	-26.81	H	Peak
3970.000	44.41	1.46	45.87	74.00	-28.13	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).

**Combine with Antenna 0 and Antenna 1****Test Mode:** TX/ IEEE 802.11n HT40 MHz (CH Low)**Tested by:** Saber Huang**Ambient temperature:** 24°C**Relative humidity:** 52% RH**Date:** June 5, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1486.000	51.40	-6.91	44.49	74.00	-29.51	V	Peak
1981.000	51.82	-5.12	46.70	74.00	-27.30	V	Peak
2971.000	47.96	-1.41	46.55	74.00	-27.45	V	Peak
3556.000	46.24	-0.28	45.96	74.00	-28.04	V	Peak
3961.000	43.89	1.43	45.32	74.00	-28.68	V	Peak
4978.000	39.38	4.91	44.29	74.00	-29.71	V	Peak
1981.000	50.02	-5.12	44.90	74.00	-29.10	H	Peak
2539.000	44.24	-2.19	42.05	74.00	-31.95	H	Peak
2971.000	47.29	-1.41	45.88	74.00	-28.12	H	Peak
3565.000	43.89	-0.25	43.64	74.00	-30.36	H	Peak
4447.000	38.71	3.16	41.87	74.00	-32.13	H	Peak
5275.000	38.44	5.47	43.91	74.00	-30.09	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: Saber Huang

Ambient temperature: 24°C

Relative humidity: 52% RH

Date: June 5, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1486.000	54.21	-6.91	47.30	74.00	-26.70	V	Peak
1981.000	53.50	-5.12	48.38	74.00	-25.62	V	Peak
2971.000	45.91	-1.41	44.50	74.00	-29.50	V	Peak
3565.000	44.87	-0.25	44.62	74.00	-29.38	V	Peak
4897.000	39.65	4.64	44.29	74.00	-29.71	V	Peak
5662.000	40.73	5.94	46.67	74.00	-27.33	V	Peak
1189.000	54.87	-7.83	47.04	74.00	-26.96	H	Peak
1486.000	53.90	-6.91	46.99	74.00	-27.01	H	Peak
1981.000	51.39	-5.12	46.27	74.00	-27.73	H	Peak
2971.000	48.50	-1.41	47.09	74.00	-26.91	H	Peak
3565.000	47.10	-0.25	46.85	74.00	-27.15	H	Peak
3961.000	43.95	1.43	45.38	74.00	-28.62	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: Saber HuangAmbient temperature: 24°CRelative humidity: 52% RHDate: June 5, 2017

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1486.000	52.95	-6.91	46.04	74.00	-27.96	V	Peak
1981.000	52.50	-5.12	47.38	74.00	-26.62	V	Peak
2971.000	48.82	-1.41	47.41	74.00	-26.59	V	Peak
3565.000	47.04	-0.25	46.79	74.00	-27.21	V	Peak
3961.000	45.22	1.43	46.65	74.00	-27.35	V	Peak
5752.000	40.33	5.98	46.31	74.00	-27.69	V	Peak
1486.000	52.83	-6.91	45.92	74.00	-28.08	H	Peak
1981.000	51.31	-5.12	46.19	74.00	-27.81	H	Peak
2971.000	47.72	-1.41	46.31	74.00	-27.69	H	Peak
3565.000	47.38	-0.25	47.13	74.00	-26.87	H	Peak
3961.000	44.17	1.43	45.60	74.00	-28.40	H	Peak
5653.000	40.47	5.93	46.40	74.00	-27.60	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

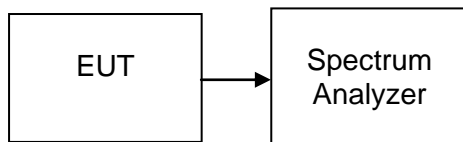
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	02/21/2017	02/20/2018

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	8532	9049	>500	PASS
Mid	2437	9025	9048		PASS
High	2462	8554	9046		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)		Limit (kHz)	Test Result
		Antenna 0	Antenna 1		
Low	2412	16350	16360	>500	PASS
Mid	2437	16350	16350		PASS
High	2462	16340	16360		PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Bandwidth (kHz)		Limit (kHz)	Test Result
		Antenna 0	Antenna 1		
Low	2412	17590	17610	>500	PASS
Mid	2437	17590	17600		PASS
High	2462	17590	17590		PASS

Test mode: IEEE 802.11n HT40 MHz

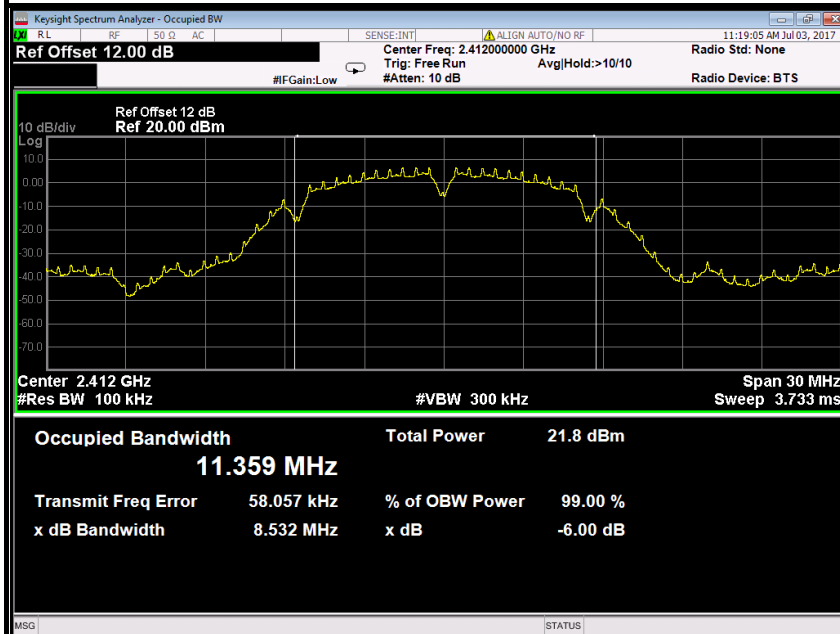
Channel	Frequency (MHz)	Bandwidth (kHz)		Limit (kHz)	Test Result
		Antenna 0	Antenna 1		
Low	2422	36380	36390	>500	PASS
Mid	2437	36370	36390		PASS
High	2452	36370	36390		PASS



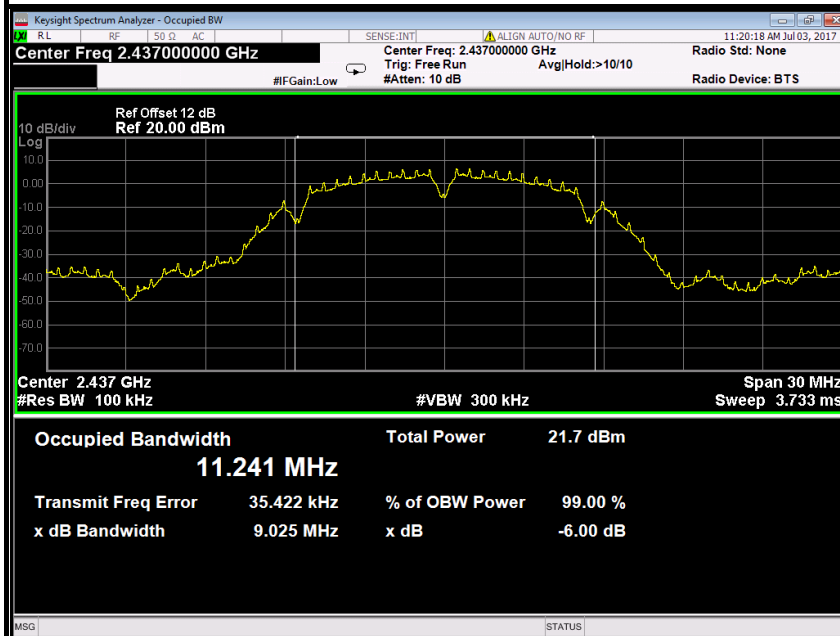
Test Plot

IEEE 802.11b mode (Antenna 0)

6dB Bandwidth (CH Low)

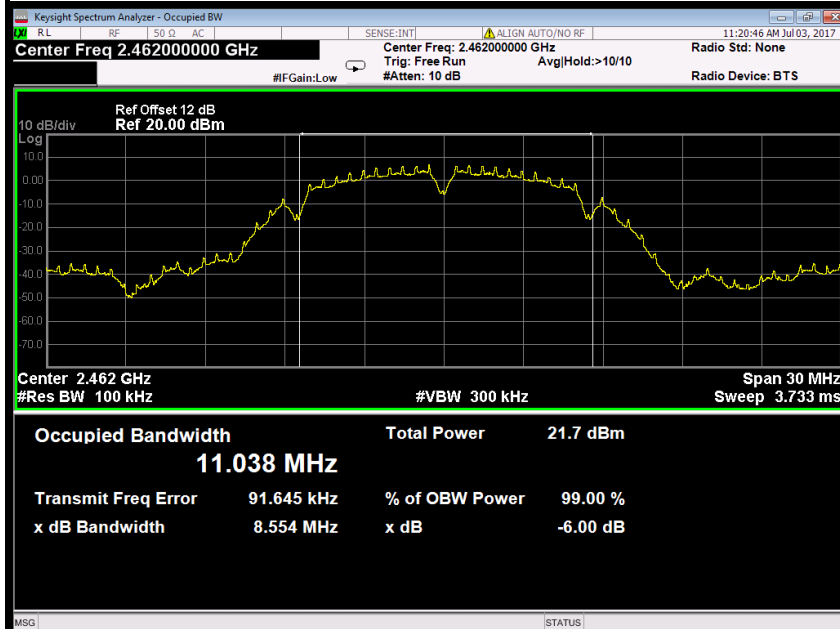


6dB Bandwidth (CH Mid)



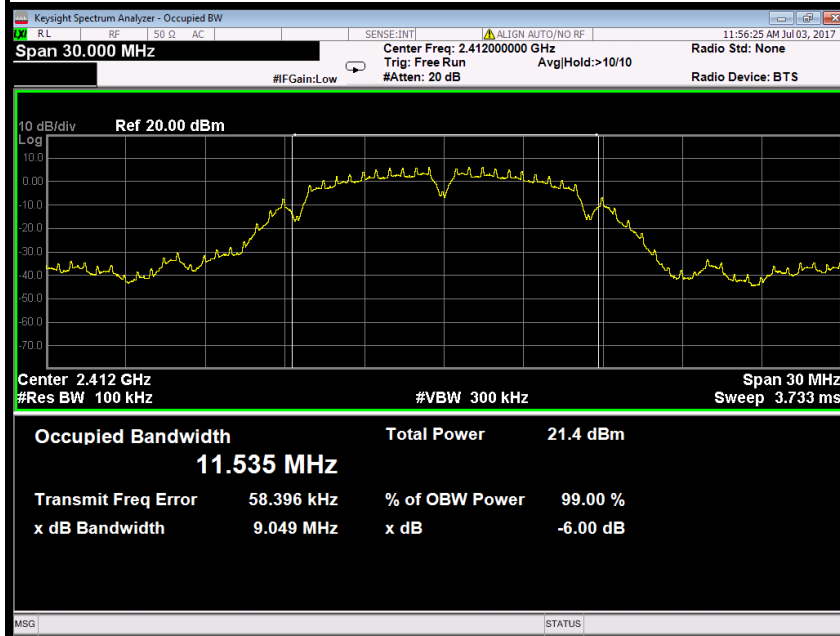


6dB Bandwidth (CH High)



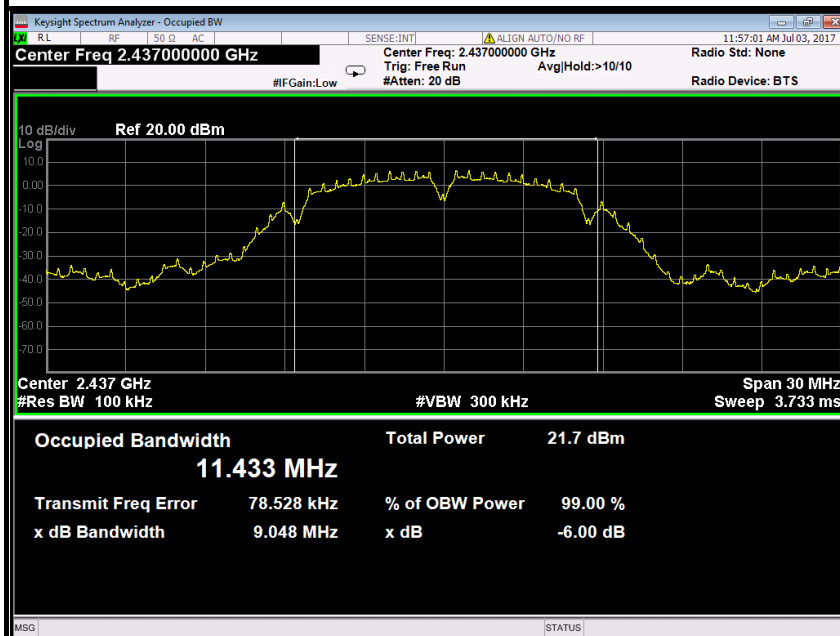
IEEE 802.11b mode (Antenna 1)

6dB Bandwidth (CH Low)

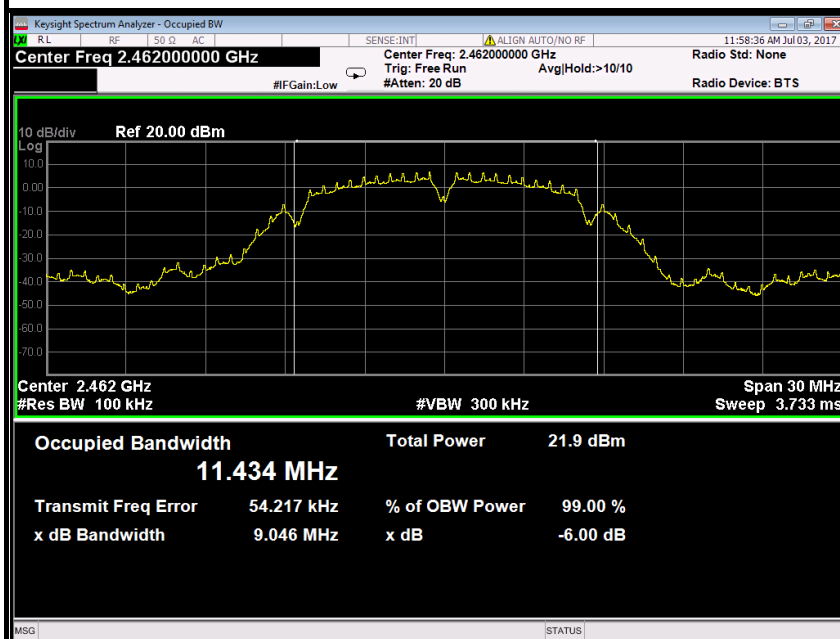




6dB Bandwidth (CH Mid)



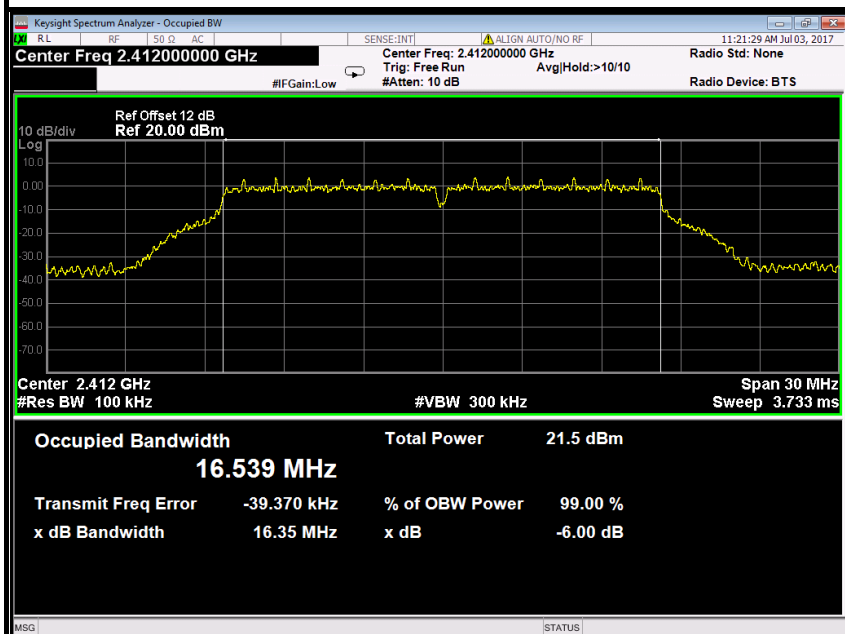
6dB Bandwidth (CH High)



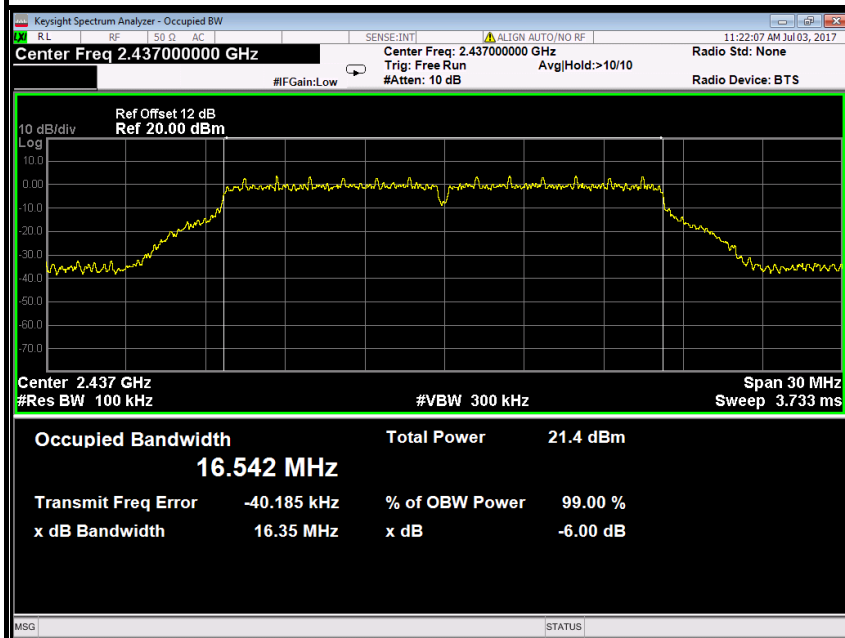


IEEE 802.11g mode (Antenna 0)

6dB Bandwidth (CH Low)

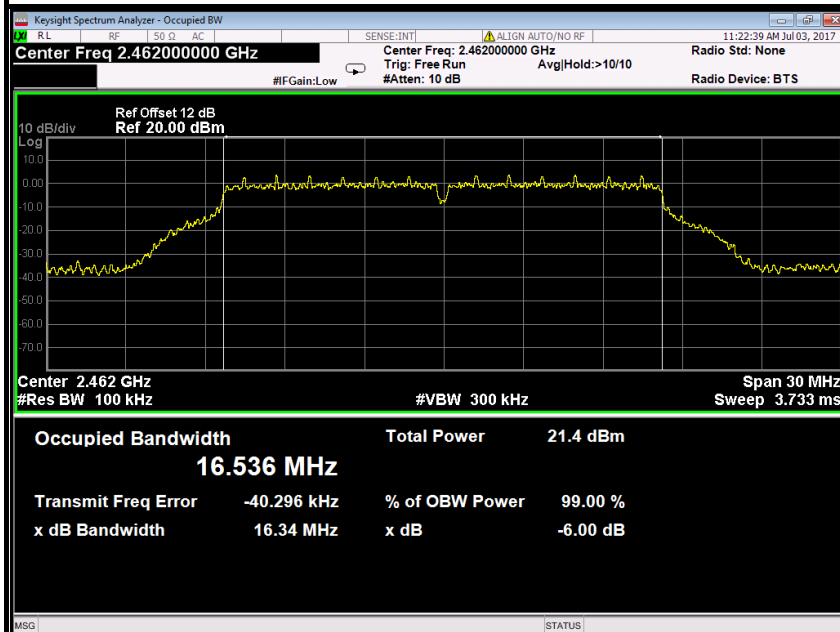


6dB Bandwidth (CH Mid)



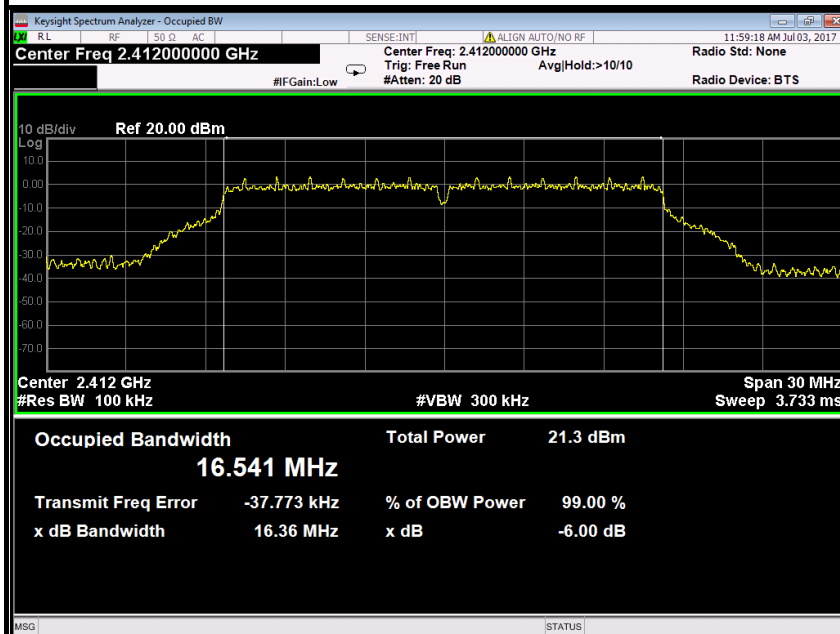


6dB Bandwidth (CH High)



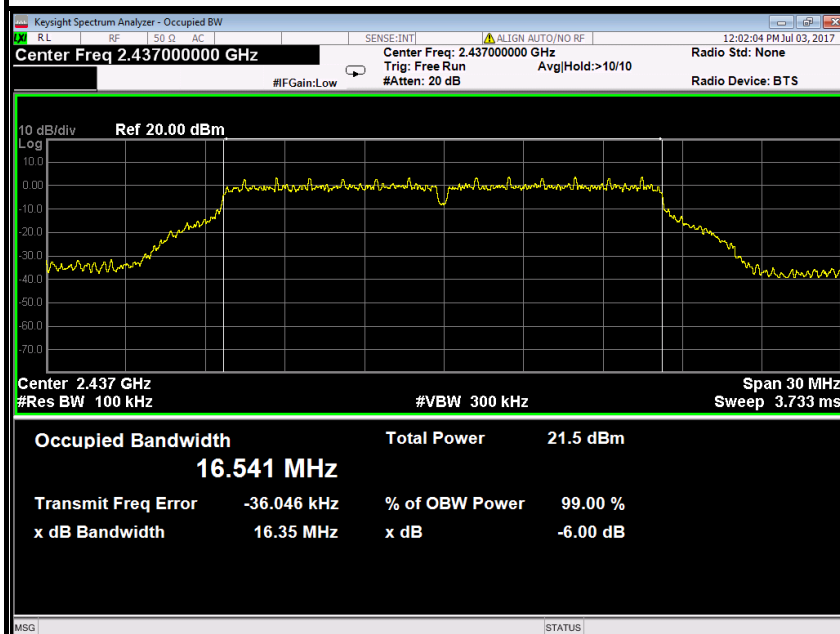
IEEE 802.11g mode (Antenna 1)

6dB Bandwidth (CH Low)

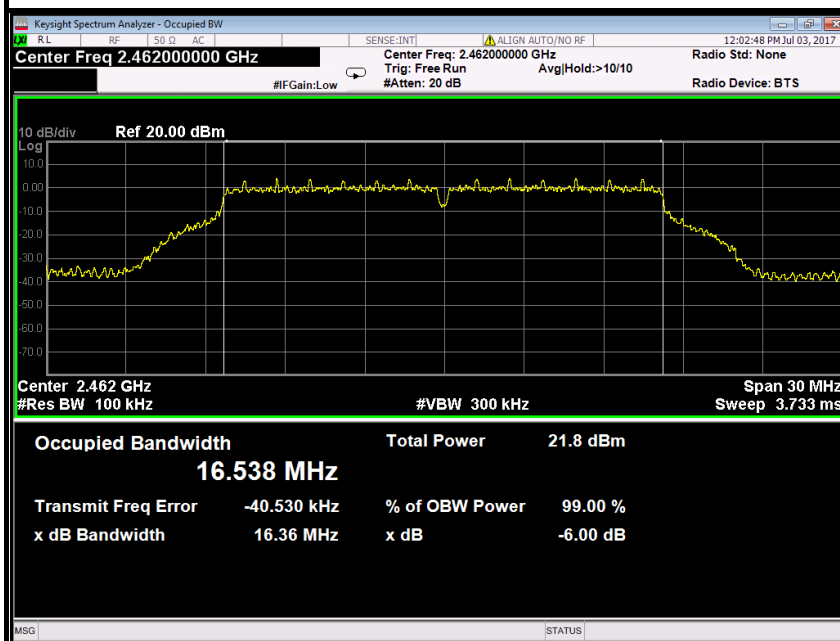




6dB Bandwidth (CH Mid)



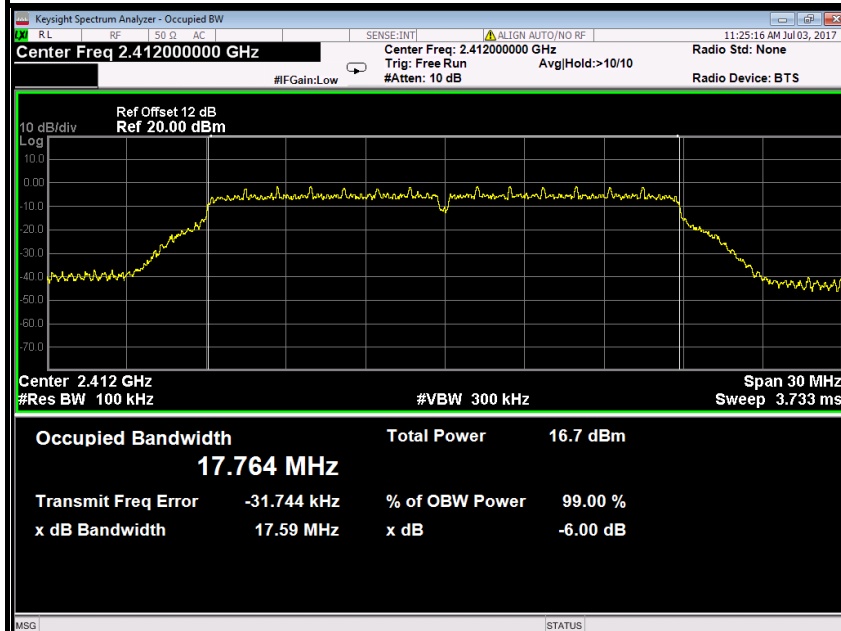
6dB Bandwidth (CH High)



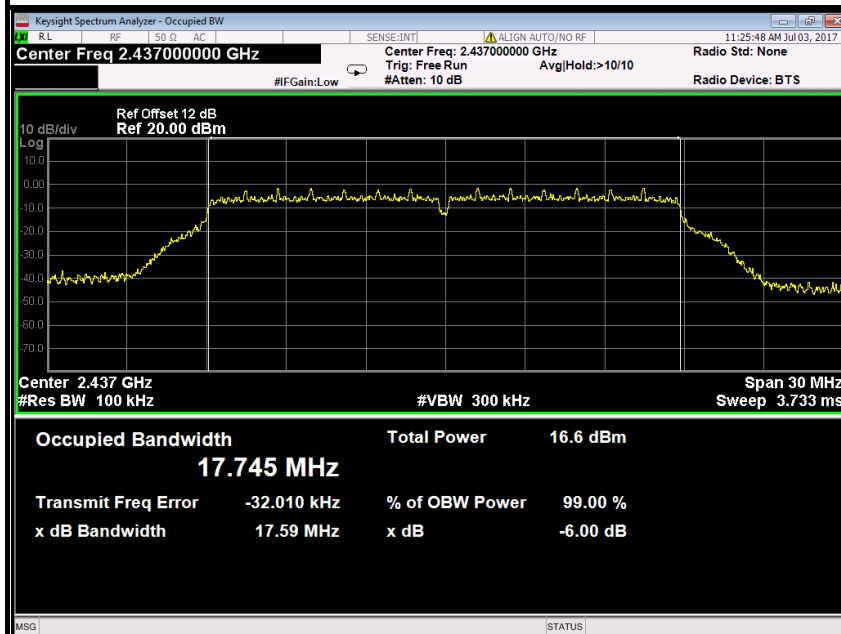


IEEE 802.11n HT20 MHz mode (Antenna 0)

6dB Bandwidth (CH Low)

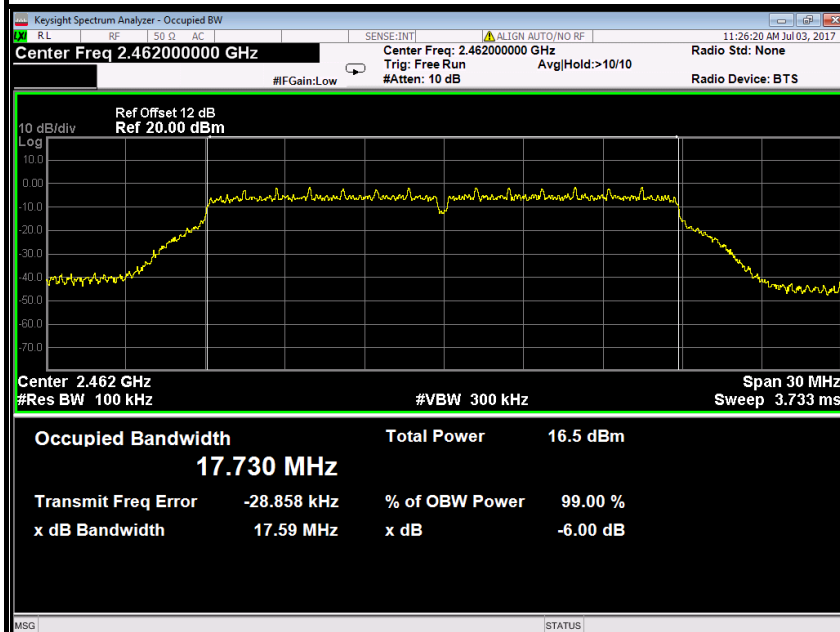


6dB Bandwidth (CH Mid)



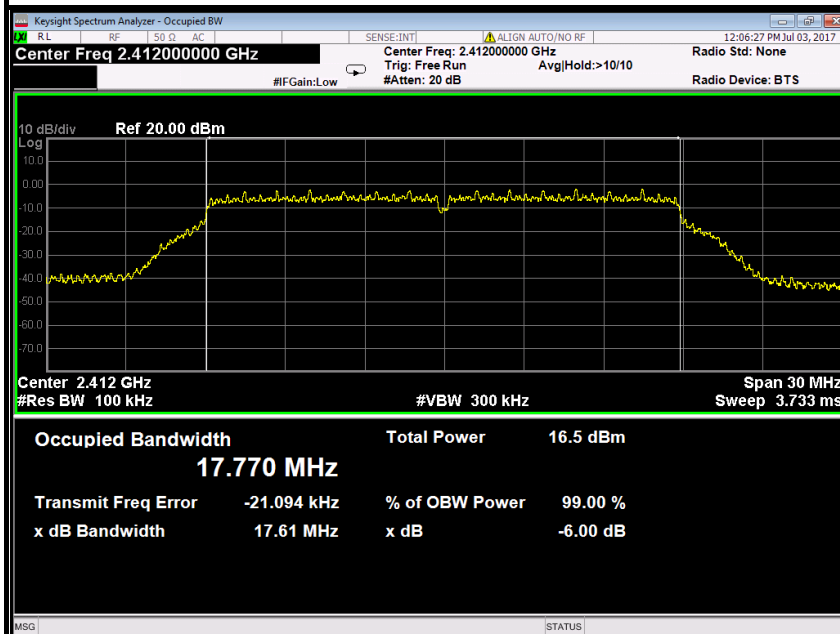


6dB Bandwidth (CH High)



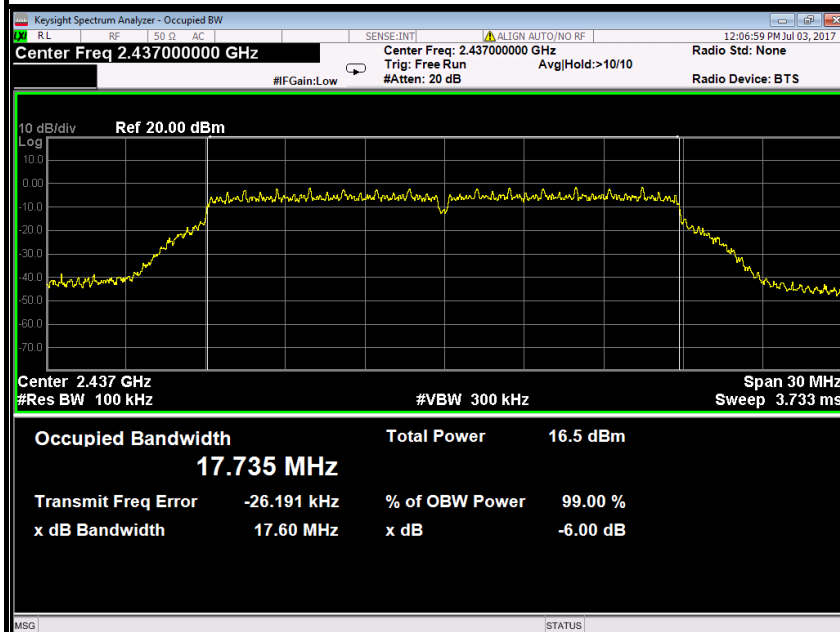
IEEE 802.11n HT20 MHz mode (Antenna 1)

6dB Bandwidth (CH Low)

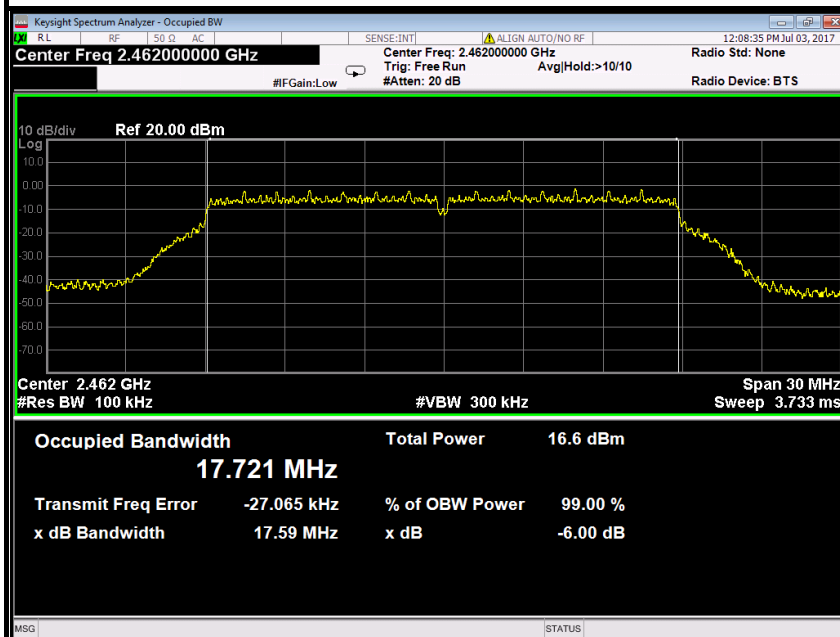




6dB Bandwidth (CH Mid)



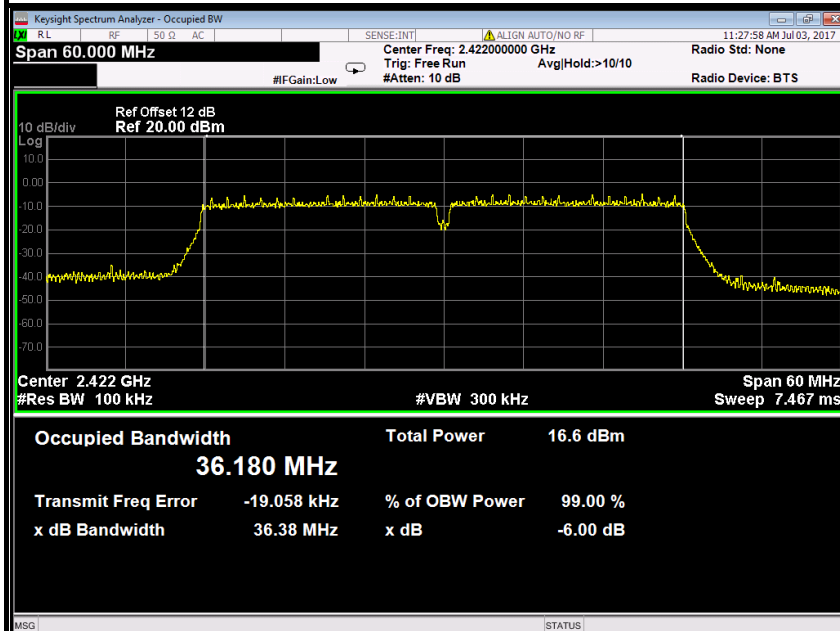
6dB Bandwidth (CH High)



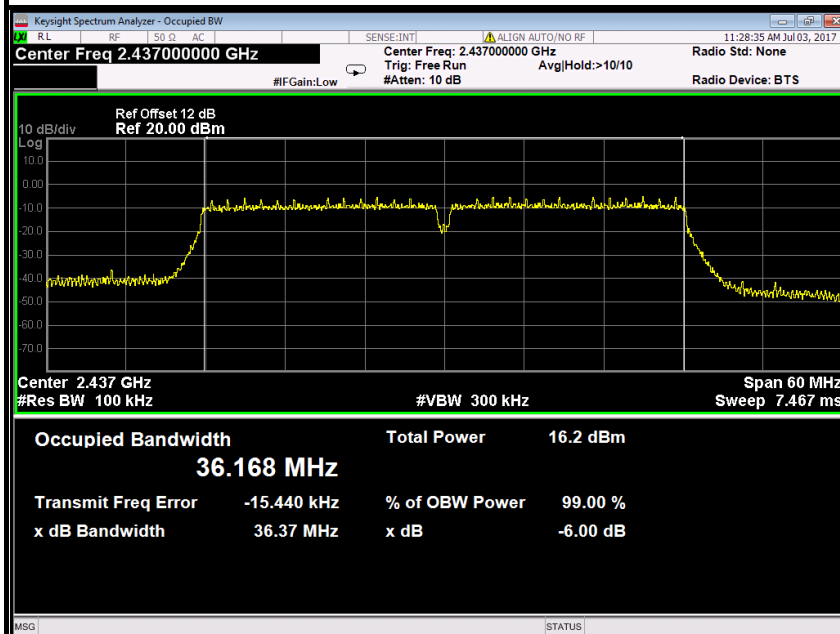


IEEE 802.11n HT40 MHz mode (Antenna 0)

6dB Bandwidth (CH Low)

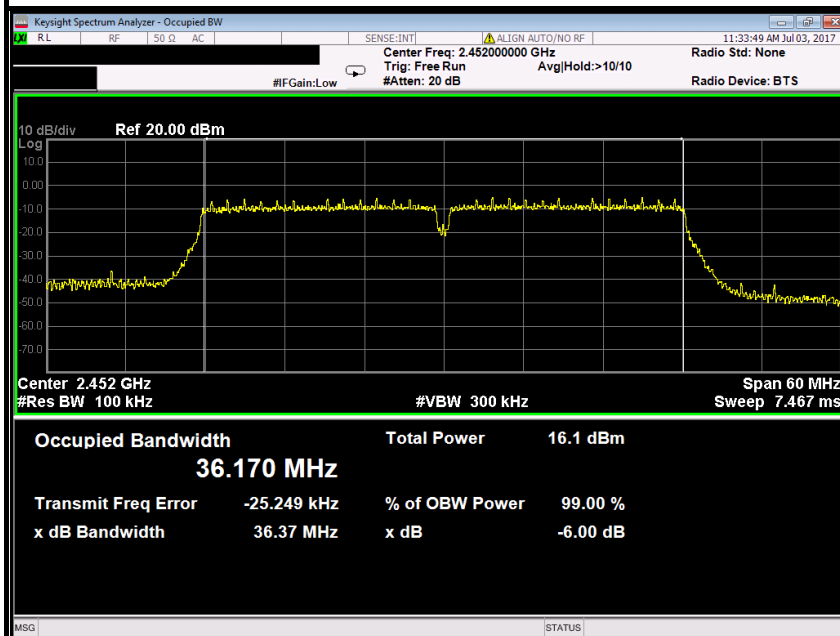


6dB Bandwidth (CH Mid)



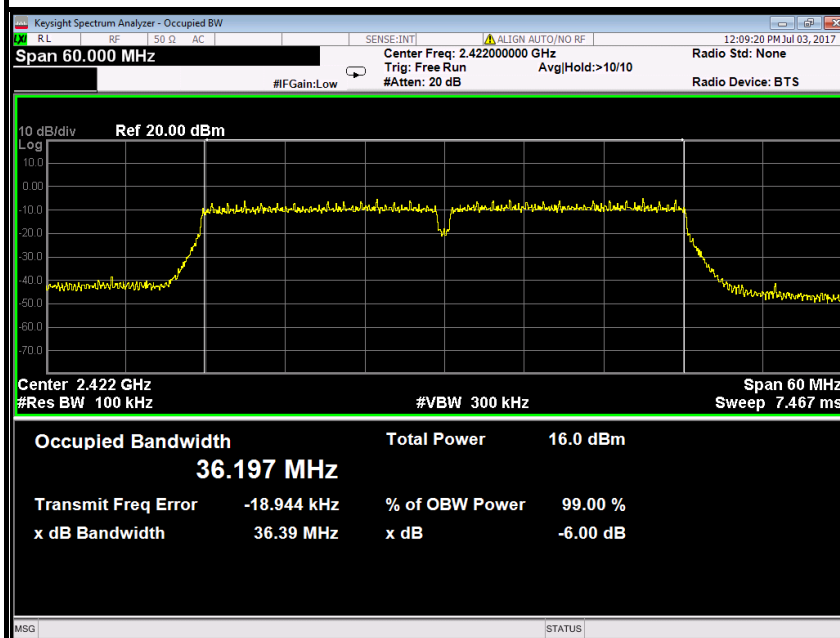


6dB Bandwidth (CH High)



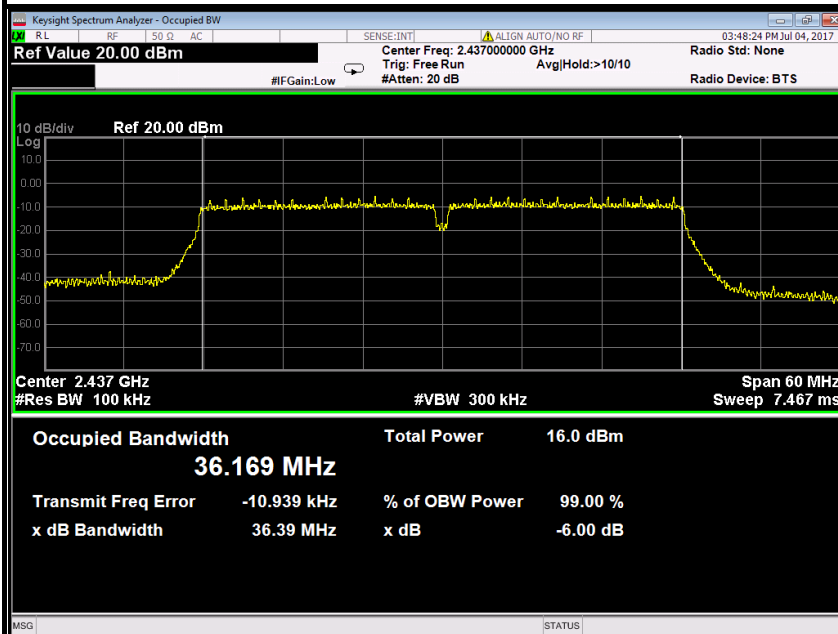
IEEE 802.11n HT40 MHz mode (Antenna 1)

6dB Bandwidth (CH Low)

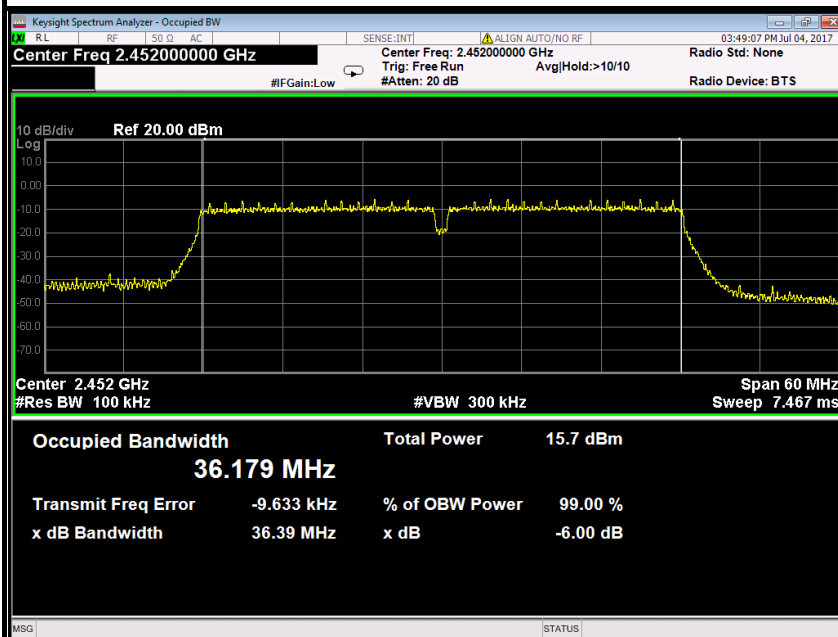




6dB Bandwidth (CH Mid)



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		2.38	1.85	2.02
Radiated power [dBm/MHz] Measured with DSSS modulation		5.32	4.74	4.92
Gain [dBi] Calculated		2.94	2.89	2.90
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		2.11	2.11	2.00
Radiated power [dBm/MHz] Measured with DSSS modulation		5.00	5.03	4.93
Gain [dBi] Calculated		2.89	2.92	2.93
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

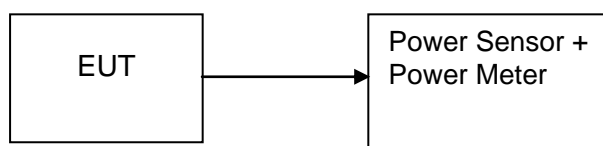
This procedure shall be used when the measurement instrument has available a resolution bandwidth that is greater than the *DTS bandwidth*.

- 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	18.08	0.06427	Peak	1	PASS
Mid	2437	18.24	0.06668			PASS
High	2462	18.38	0.06887			PASS
Low	2412	15.02	0.03177	AVG	1	PASS
Mid	2437	15.18	0.03296			PASS
High	2462	15.42	0.03483			PASS

Test mode: IEEE 802.11b (Antenna 1)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	17.98	0.06281	Peak	1	PASS
Mid	2437	17.98	0.06281			PASS
High	2462	17.61	0.05768			PASS
Low	2412	15.04	0.03192	AVG	1	PASS
Mid	2437	15.04	0.03192			PASS
High	2462	14.71	0.02958			PASS

Test mode: IEEE 802.11g (Antenna 0)

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	16.37	0.04335	Peak	1	PASS
Mid	2437	16.78	0.04764			PASS
High	2462	16.76	0.04742			PASS
Low	2412	9.92	0.00982	AVG	1	PASS
Mid	2437	10.36	0.01086			PASS
High	2462	10.28	0.01067			PASS

**Test mode: IEEE 802.11g (Antenna 1)**

Channel	Frequency (MHz)	Output Power (dBm)	Output Power (W)	Peak / AVG	Limit (W)	Result
Low	2412	16.86	0.04853	Peak	1	PASS
Mid	2437	16.94	0.04943			PASS
High	2462	16.79	0.04775			PASS
Low	2412	11.25	0.01334	AVG	1	PASS
Mid	2437	11.37	0.01371			PASS
High	2462	11.27	0.01340			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	16.32	17.14	19.76	0.09462	Peak	1	PASS
Mid	2437	16.67	17.17	19.94	0.09857			PASS
High	2462	17.24	17.79	20.53	0.11308			PASS
Low	2412	9.81	10.60	13.23	0.02105	AVG	1	PASS
Mid	2437	10.14	10.37	13.27	0.02122			PASS
High	2462	10.25	10.59	13.43	0.02205			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	17.05	17.24	20.16	0.10367	Peak	1	PASS
Mid	2437	17.64	17.93	20.80	0.12016			PASS
High	2452	16.98	17.43	20.22	0.10522			PASS
Low	2422	10.58	10.53	13.57	0.02273	AVG	1	PASS
Mid	2437	10.68	10.46	13.58	0.02281			PASS
High	2452	10.50	10.41	13.47	0.02221			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.

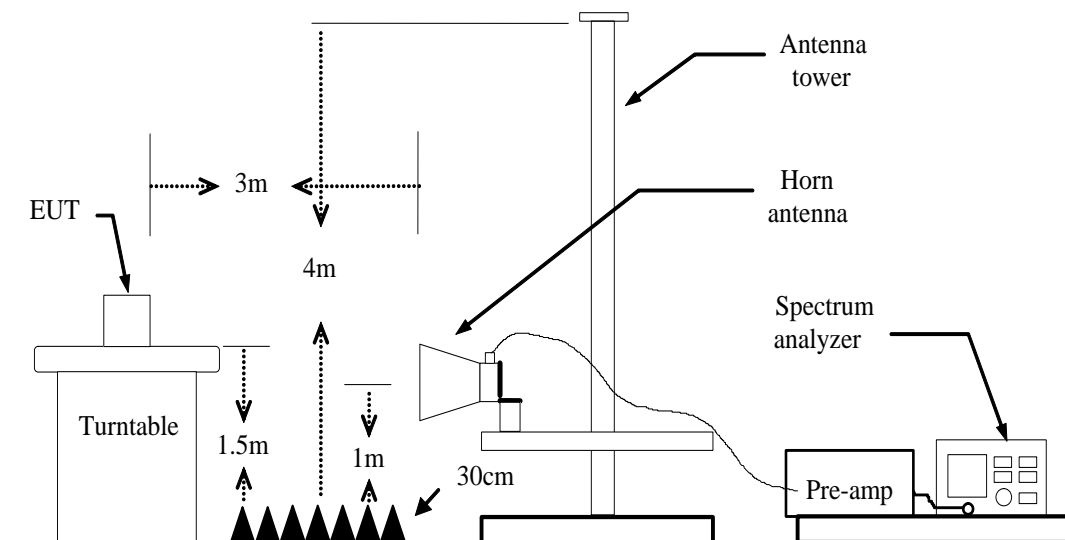
3. N.C.R = No Calibration Required.



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

7.6.4. TEST SETUP



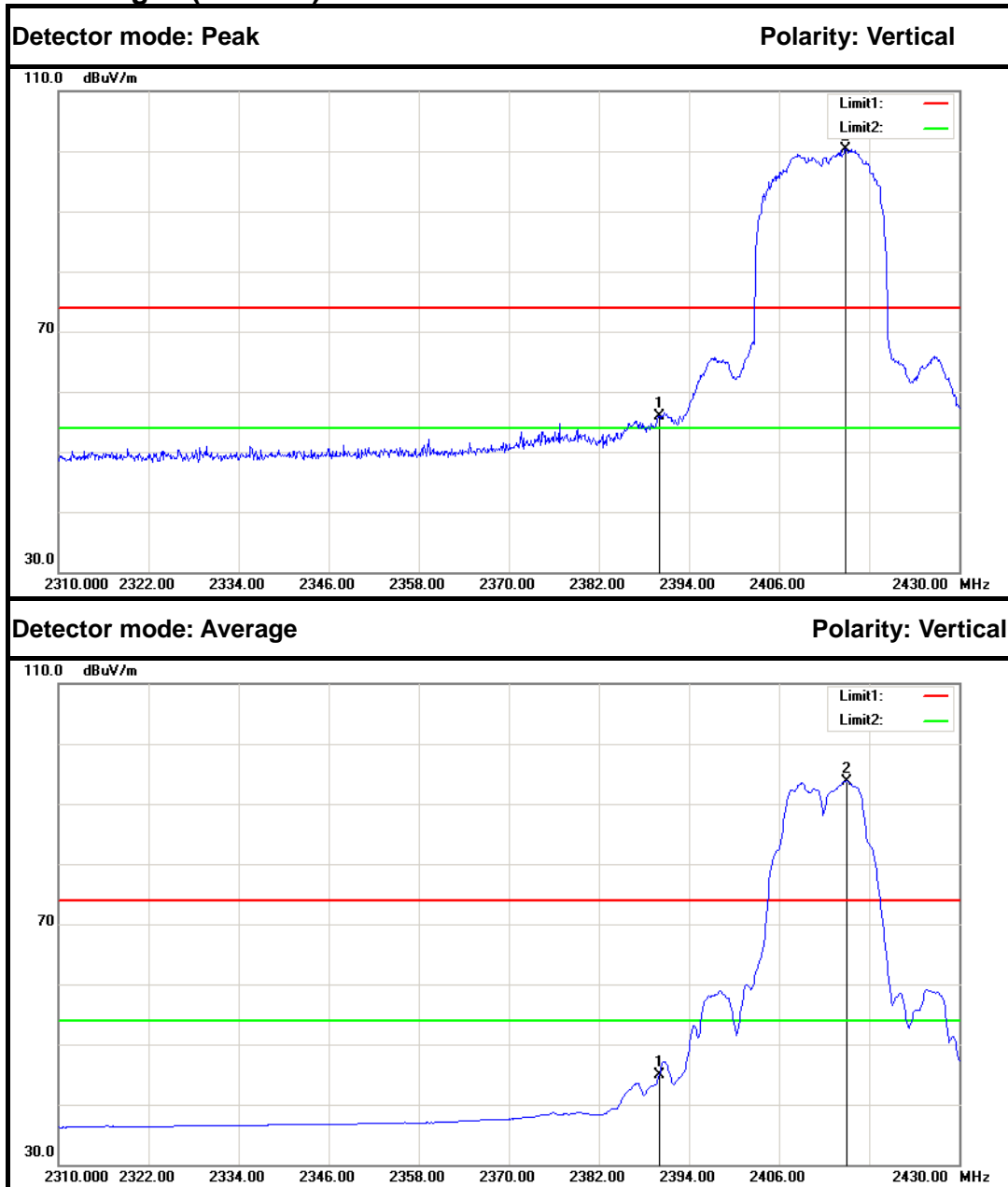


7.6.5. TEST RESULTS

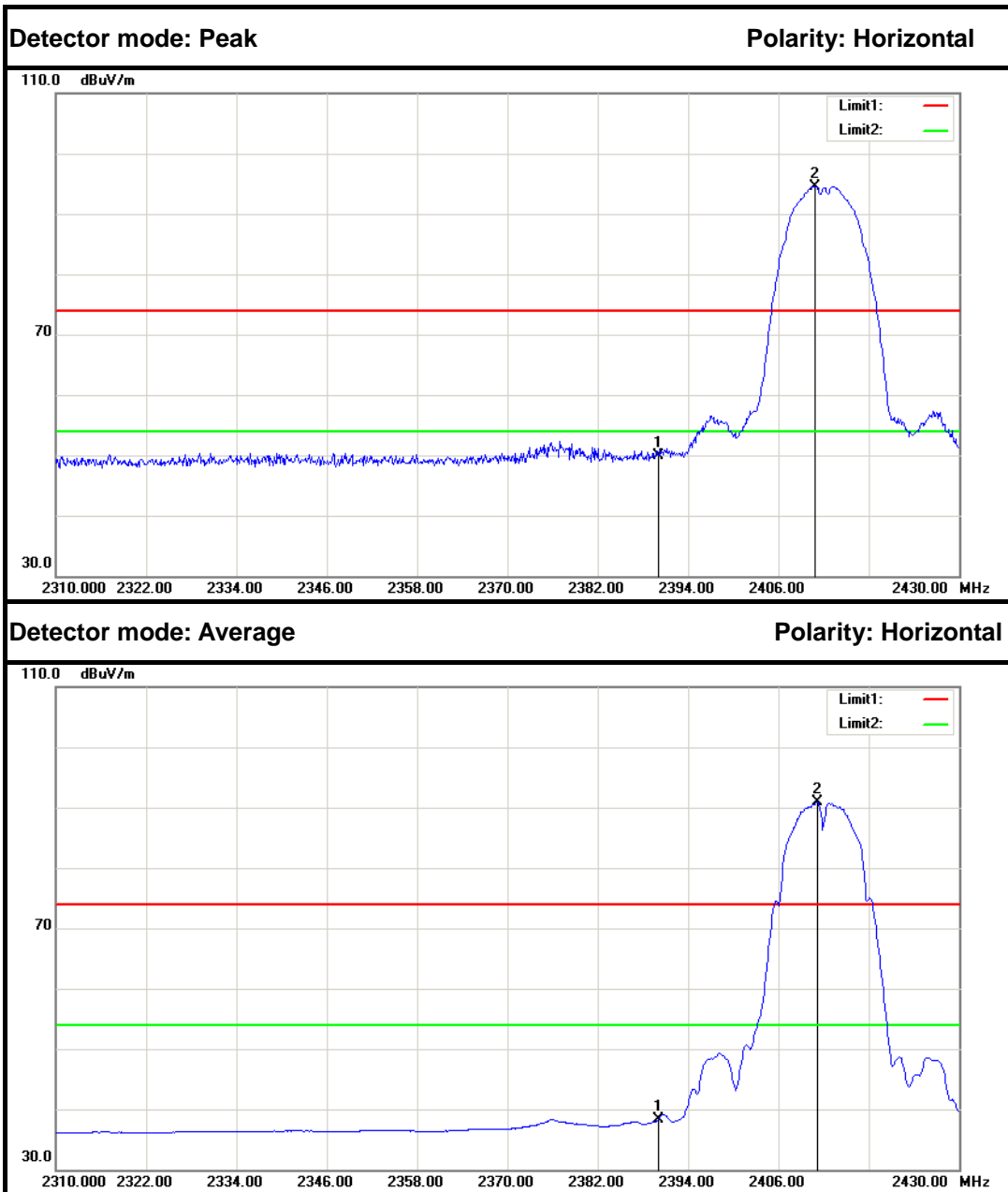
Test Plot

IEEE 802.11b mode (Antenna 0)

Band Edges (CH Low)



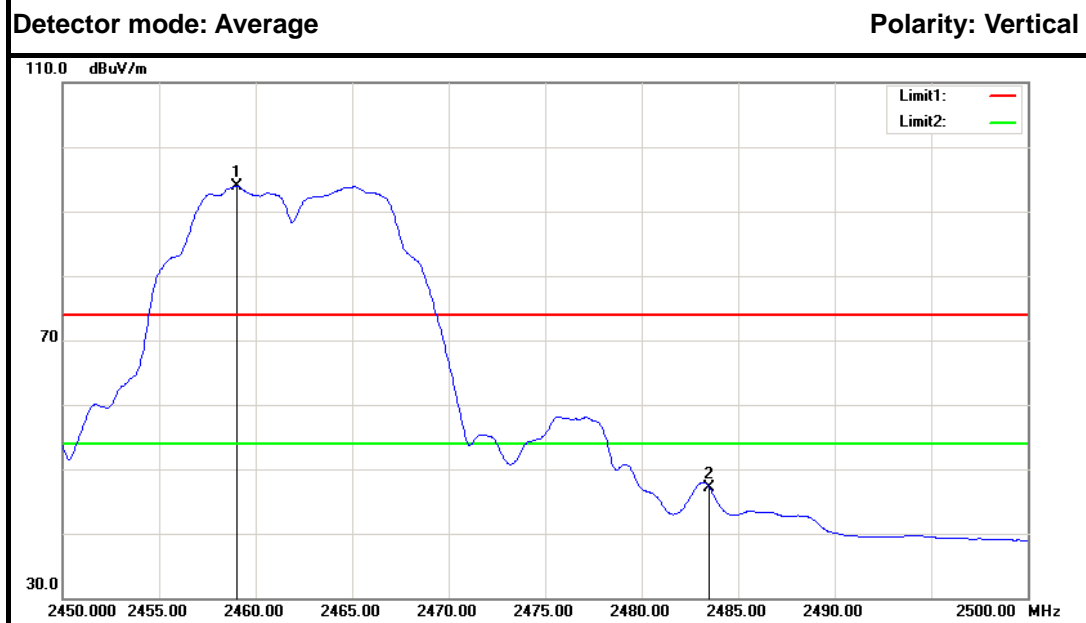
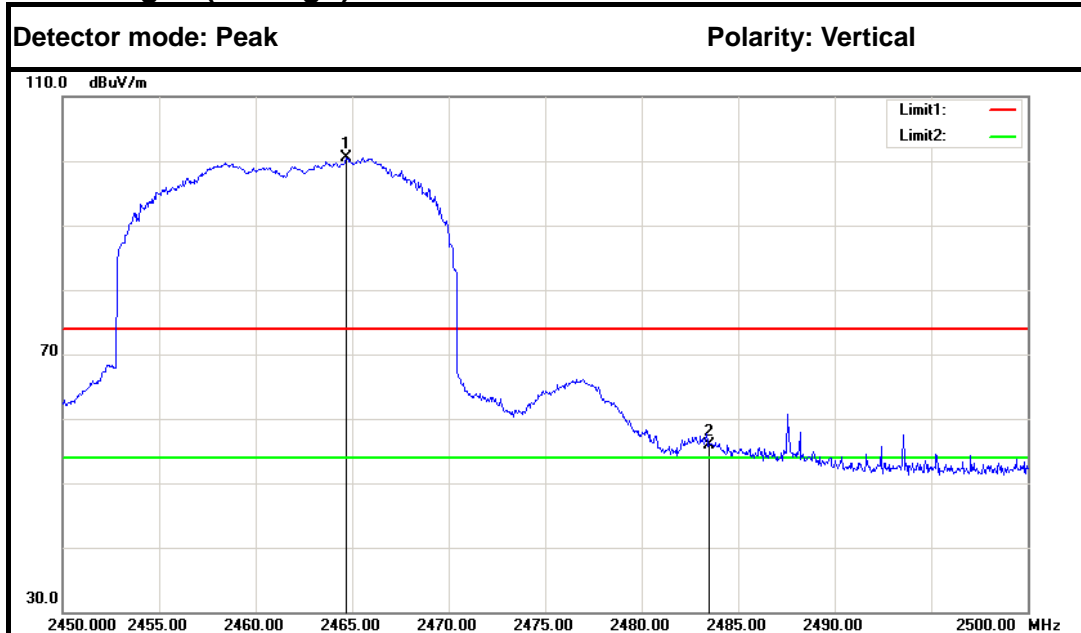
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	58.67	-2.86	55.81	74.00	-18.19	Peak	Vertical
2	2414.880	103.13	-2.73	100.40	---	---	Peak	Vertical
1	2390.000	47.84	-2.86	44.98	54.00	-9.02	Average	Vertical
2	2415.000	96.53	-2.73	93.80	---	---	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	52.82	-2.86	49.96	74.00	-24.04	Peak	Horizontal
2	2410.800	97.34	-2.75	94.59	---	---	Peak	Horizontal
1	2390.000	41.17	-2.86	38.31	54.00	-15.69	Average	Horizontal
2	2411.160	93.72	-2.75	90.97	---	---	Average	Horizontal



Band Edges (CH High)

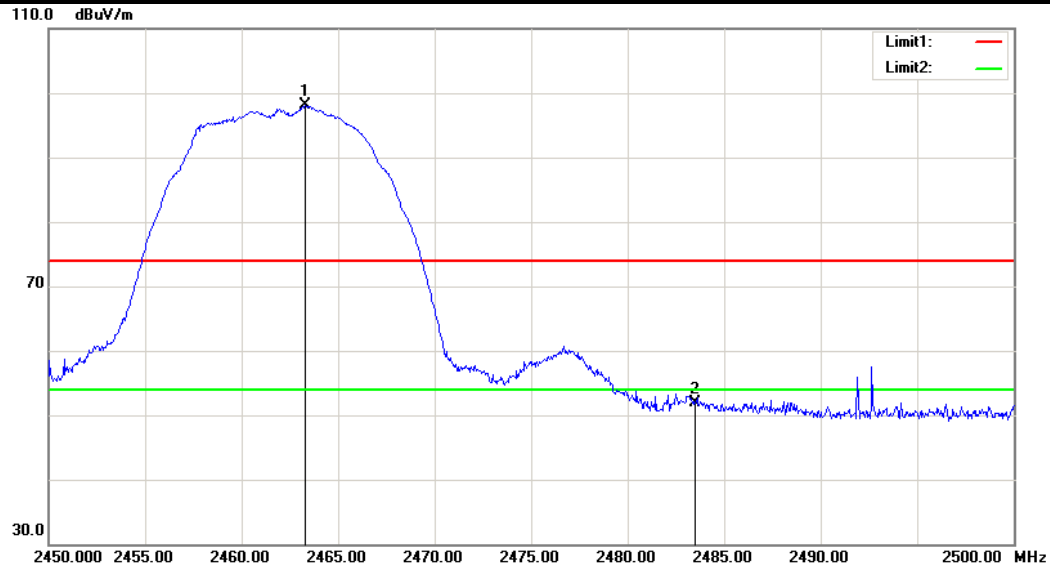


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2464.700	102.90	-2.45	100.45	---	---	Peak	Vertical
2	2483.500	58.18	-2.35	55.83	74.00	-18.17	Peak	Vertical
1	2459.050	96.40	-2.48	93.92	---	---	Average	Vertical
2	2483.500	49.53	-2.35	47.18	54.00	-6.82	Average	Vertical



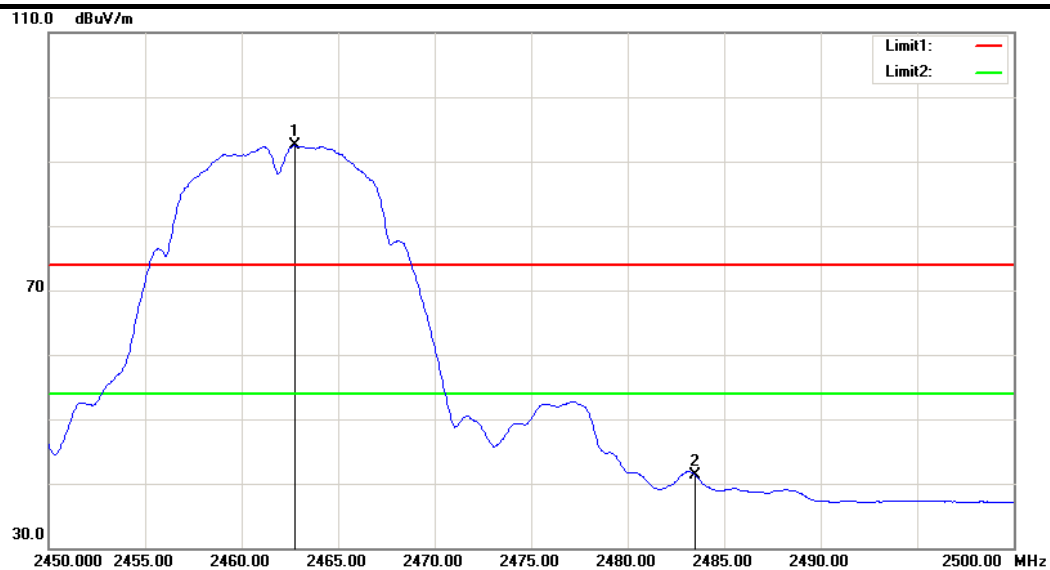
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal

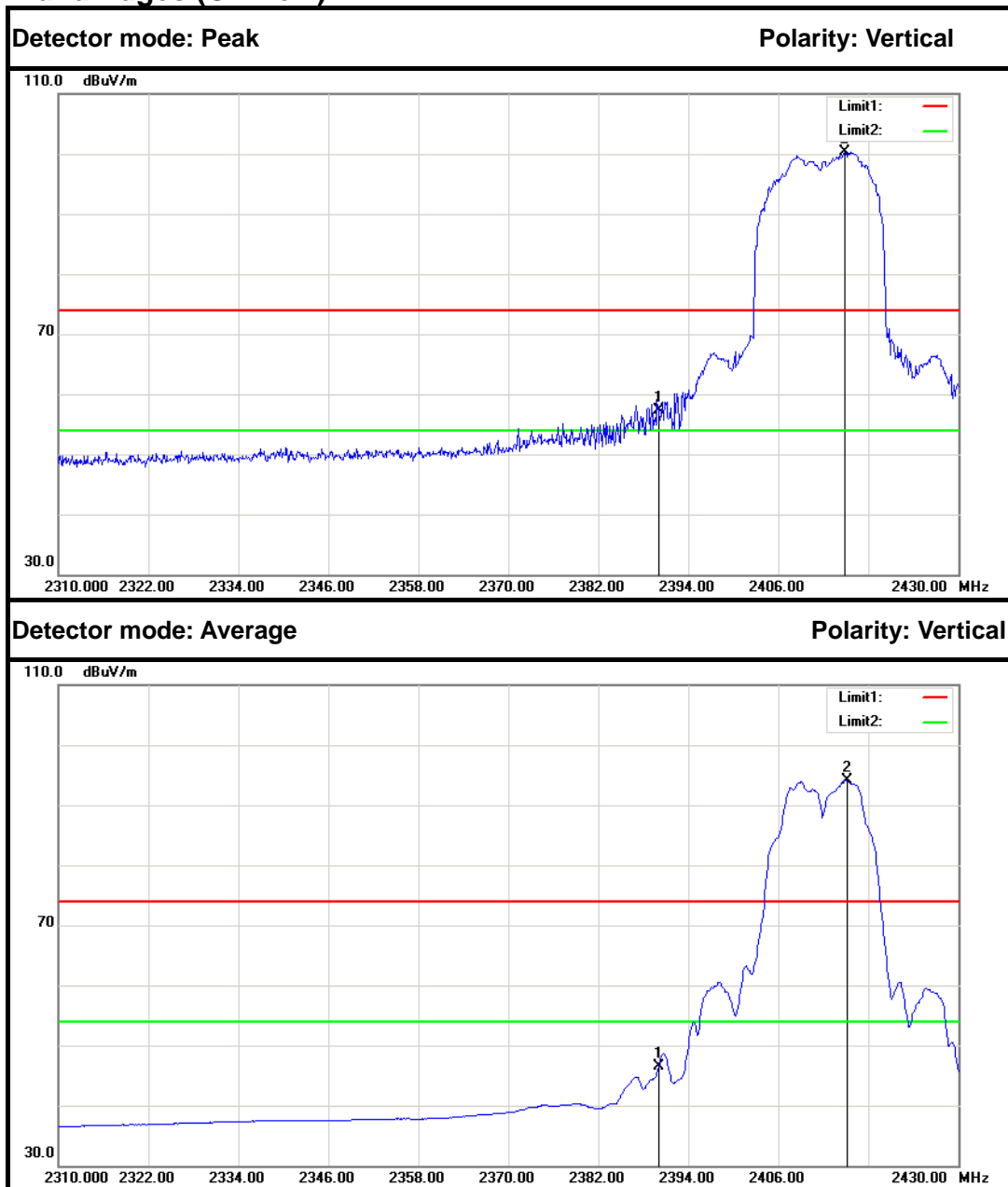


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2463.300	100.52	-2.46	98.06	---	---	Peak	Horizontal
2	2483.500	54.18	-2.35	51.83	74.00	-22.17	Peak	Horizontal
1	2462.750	94.88	-2.46	92.42	---	---	Average	Horizontal
2	2483.500	43.65	-2.35	41.30	54.00	-12.70	Average	Horizontal



IEEE 802.11b mode (Antenna 1)

Band Edges (CH Low)

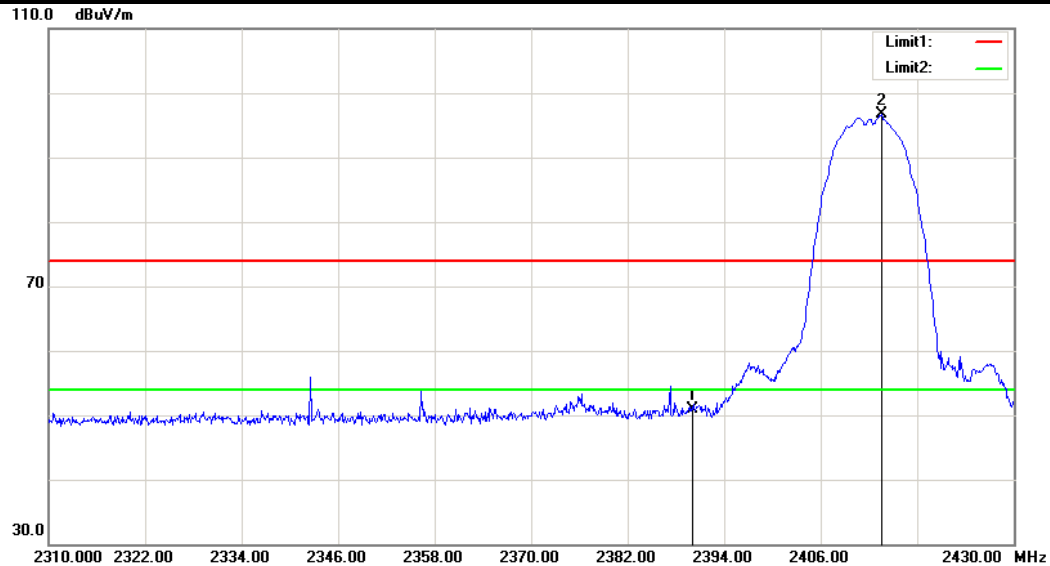


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	60.18	-2.86	57.32	74.00	-16.68	Peak	Vertical
2	2414.880	103.00	-2.73	100.27	---	---	Peak	Vertical
1	2390.000	49.32	-2.86	46.46	54.00	-7.54	Average	Vertical
2	2415.120	96.90	-2.73	94.17	---	---	Average	Vertical



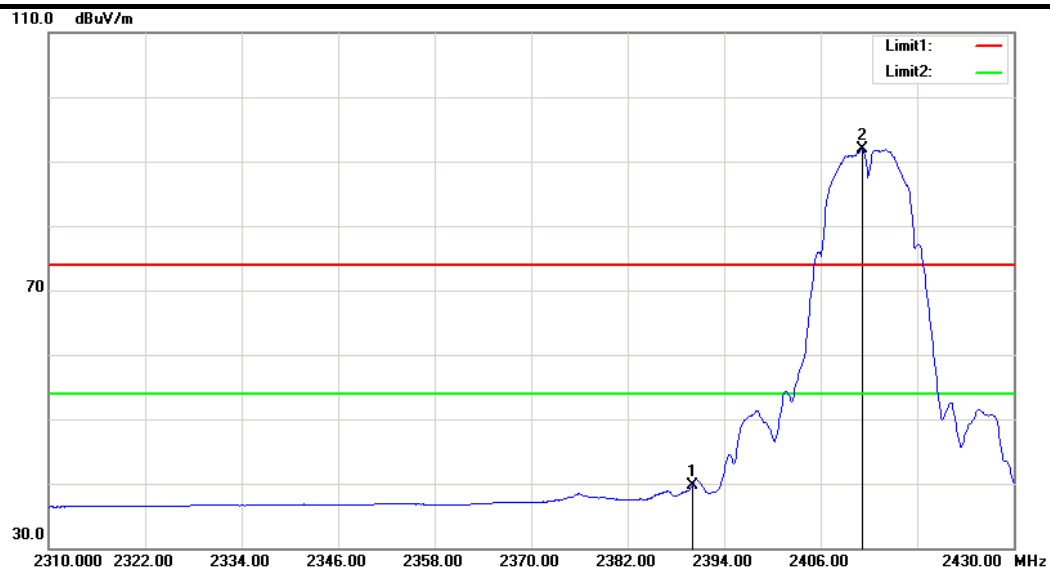
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

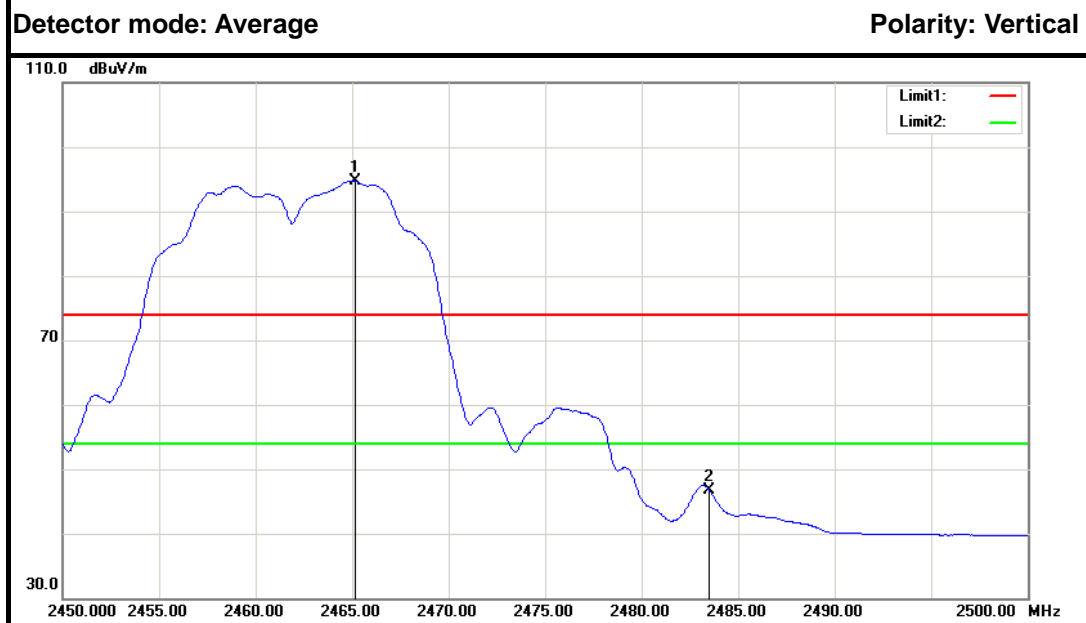
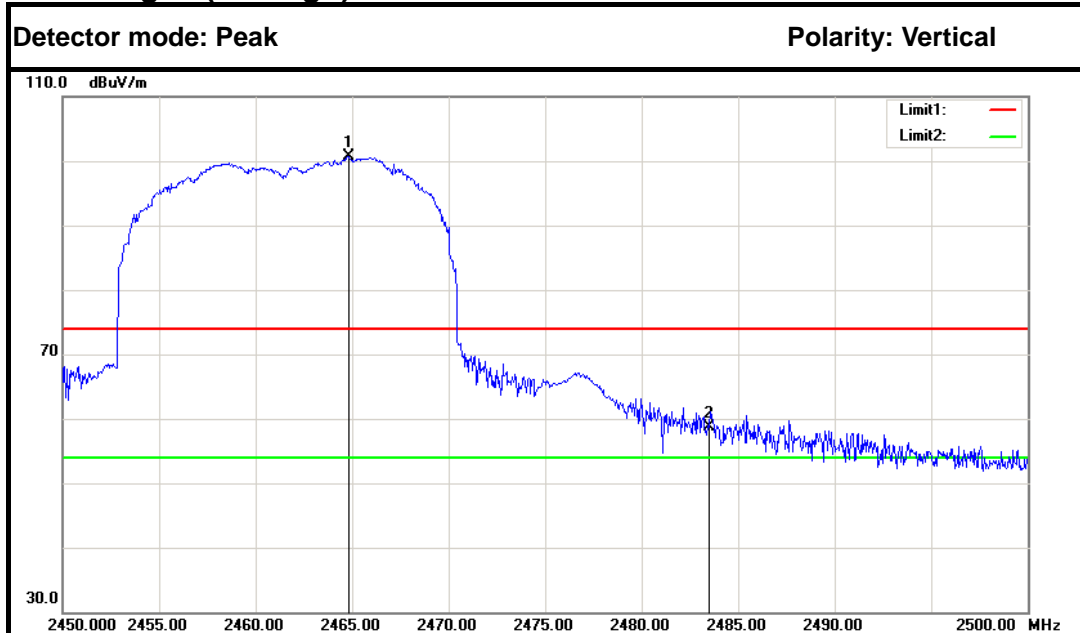
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	53.82	-2.86	50.96	74.00	-23.04	Peak	Horizontal
2	2413.560	99.34	-2.73	96.61	---	---	Peak	Horizontal
1	2390.000	42.60	-2.86	39.74	54.00	-14.26	Average	Horizontal
2	2411.160	94.68	-2.75	91.93	---	---	Average	Horizontal



Band Edges (CH High)

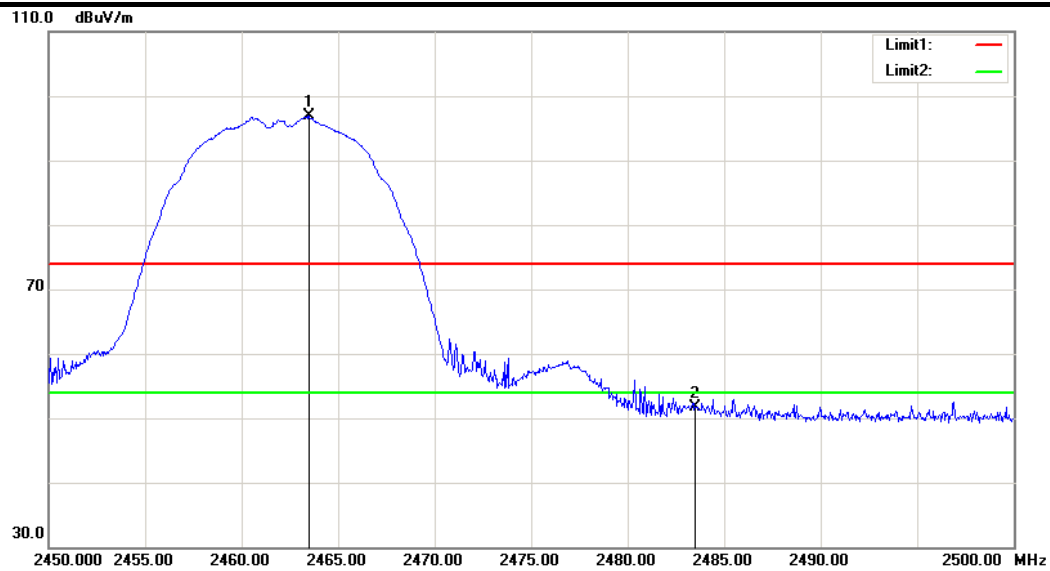


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2464.800	103.18	-2.45	100.73	---	---	Peak	Vertical
2	2483.500	60.96	-2.35	58.61	74.00	-15.39	Peak	Vertical
1	2465.150	97.16	-2.45	94.71	---	---	Average	Vertical
2	2483.500	49.13	-2.35	46.78	54.00	-7.22	Average	Vertical



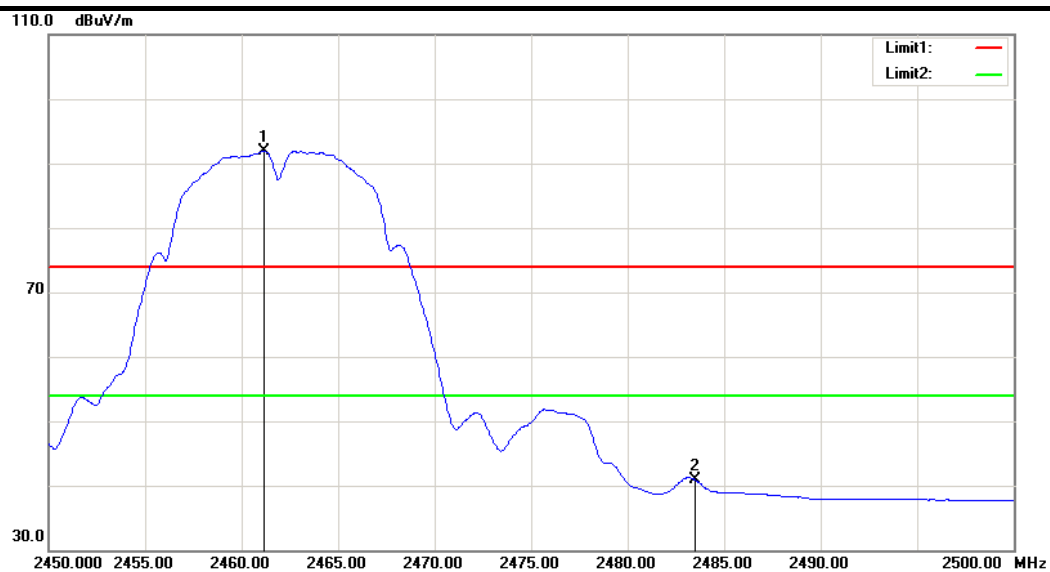
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal

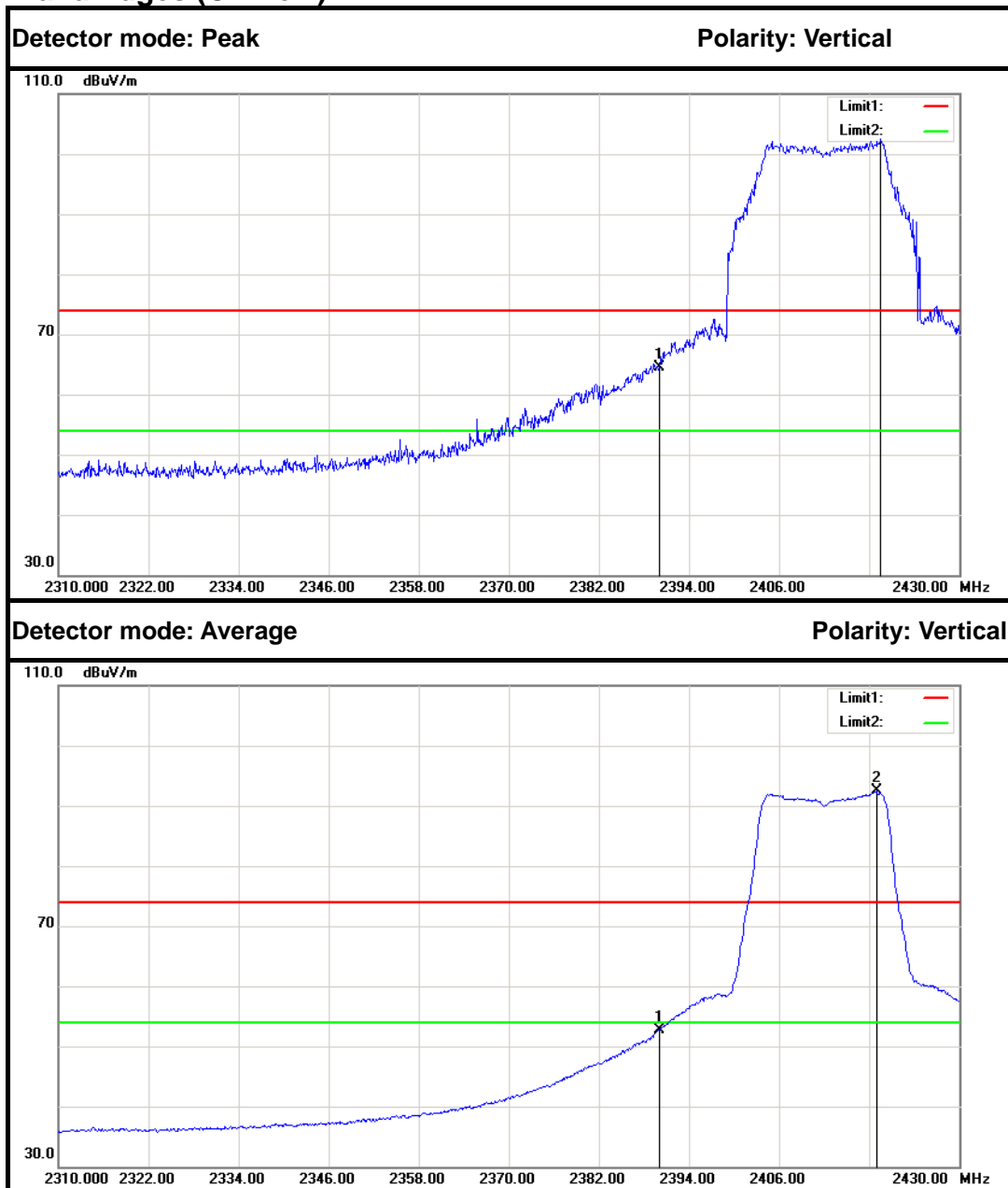


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2463.500	99.33	-2.46	96.87	---	---	Peak	Horizontal
2	2483.500	54.06	-2.35	51.71	74.00	-22.29	Peak	Horizontal
1	2461.150	94.40	-2.47	91.93	---	---	Average	Horizontal
2	2483.500	43.23	-2.35	40.88	54.00	-13.12	Average	Horizontal



IEEE 802.11g mode (Antenna 0)

Band Edges (CH Low)

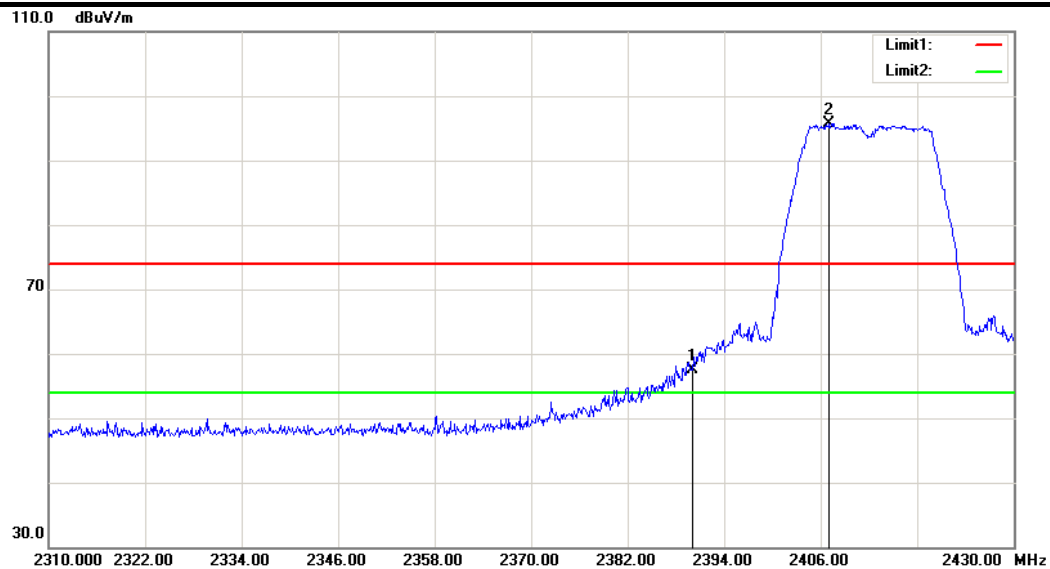


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	67.33	-2.86	64.47	74.00	-9.53	Peak	Vertical
2	2419.560	105.21	-2.70	102.51	---	---	Peak	Vertical
1	2390.000	55.55	-2.86	52.69	54.00	-1.31	Average	Vertical
2	2418.960	95.15	-2.70	92.45	---	---	Average	Vertical



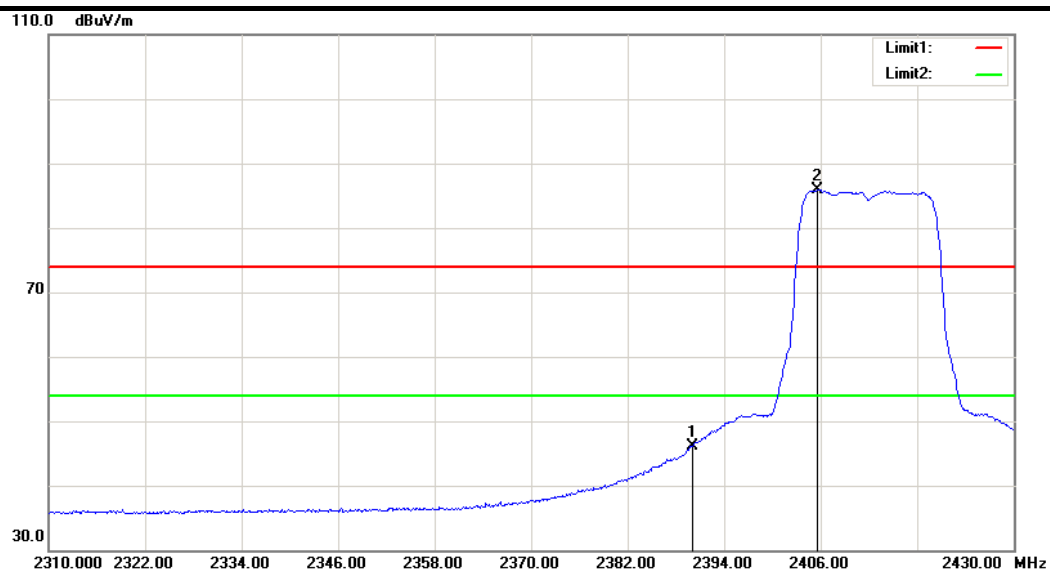
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

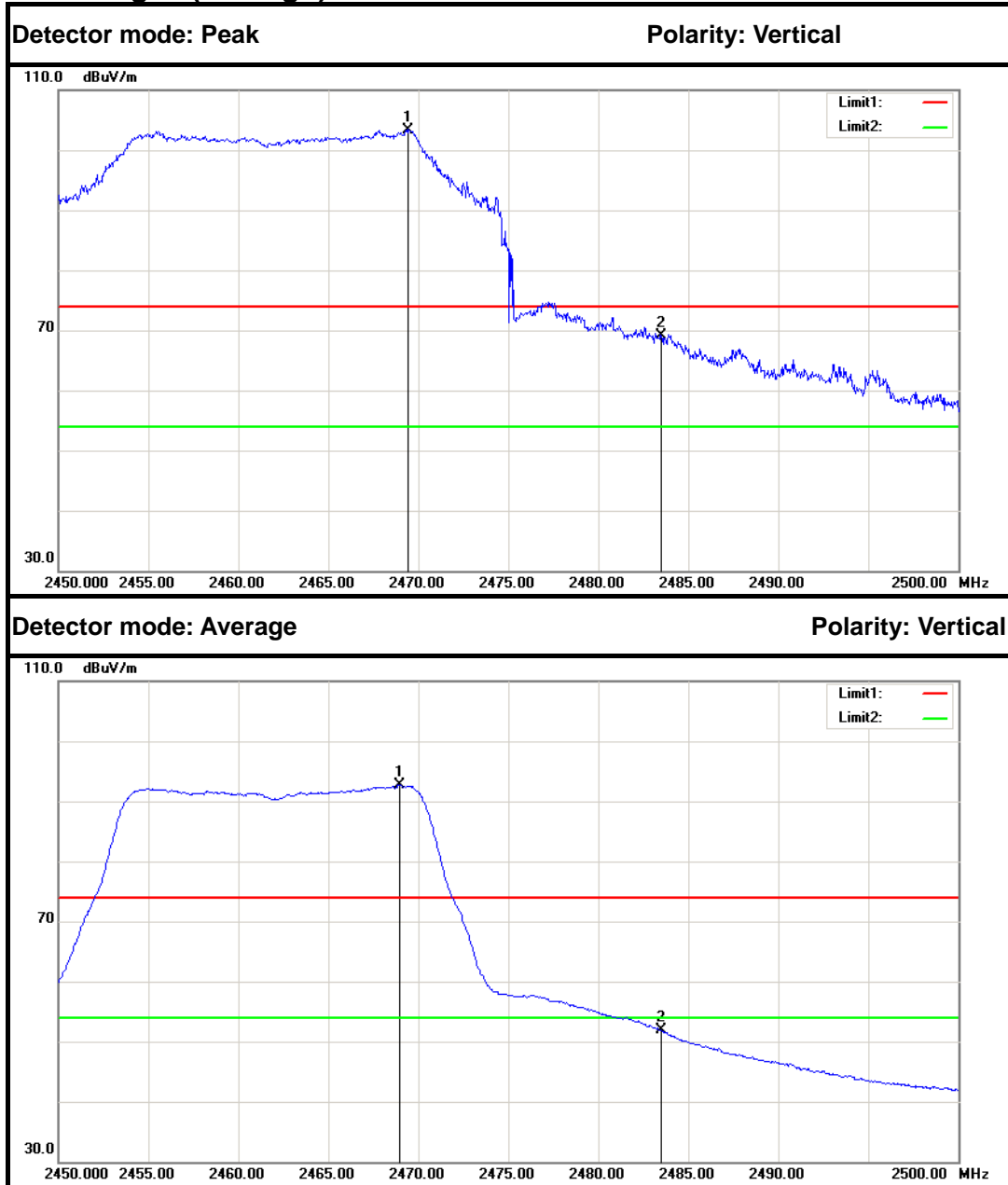
Polarity: Horizontal



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	60.43	-2.86	57.57	74.00	-16.43	Peak	Horizontal
2	2407.080	98.50	-2.77	95.73	---	---	Peak	Horizontal
1	2390.000	49.00	-2.86	46.14	54.00	-7.86	Average	Horizontal
2	2405.520	88.64	-2.78	85.86	---	---	Average	Horizontal



Band Edges (CH High)

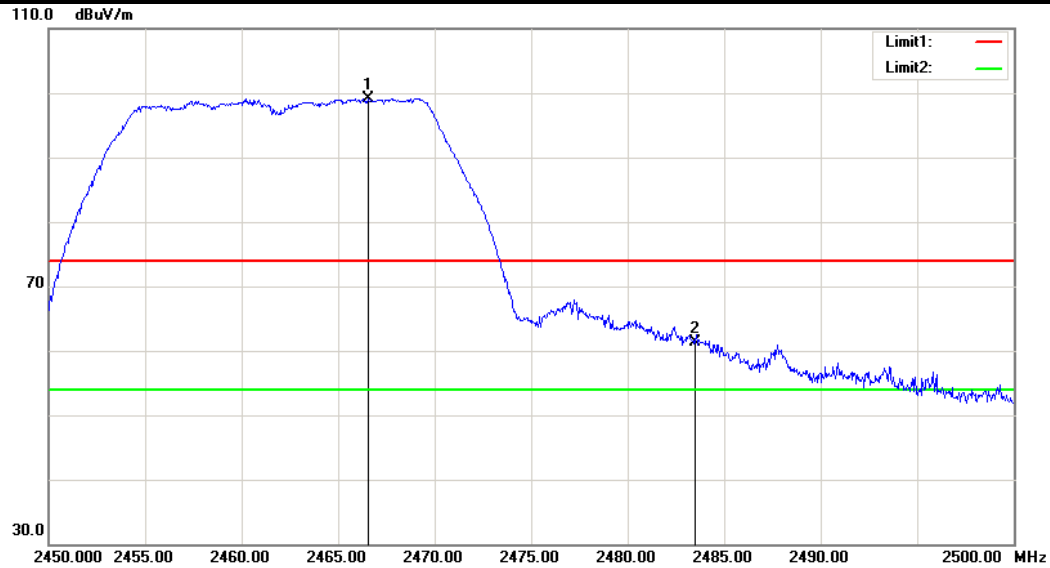


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2469.450	105.83	-2.43	103.40	---	---	Peak	Vertical
2	2483.500	71.37	-2.35	69.02	74.00	-4.98	Peak	Vertical
1	2468.950	95.14	-2.43	92.71	---	---	Average	Vertical
2	2483.500	54.16	-2.35	51.81	54.00	-2.19	Average	Vertical



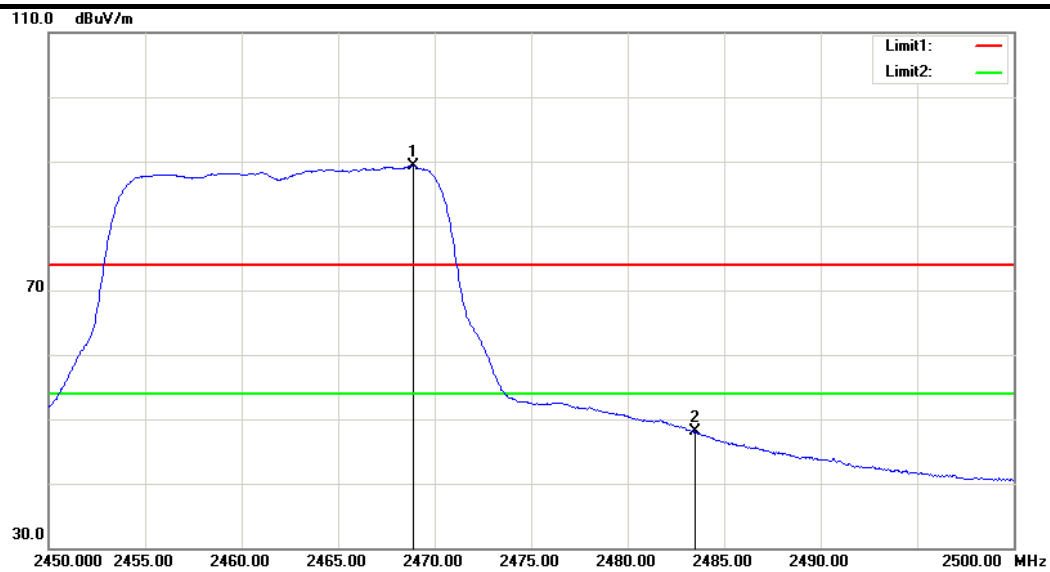
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

Polarity: Horizontal

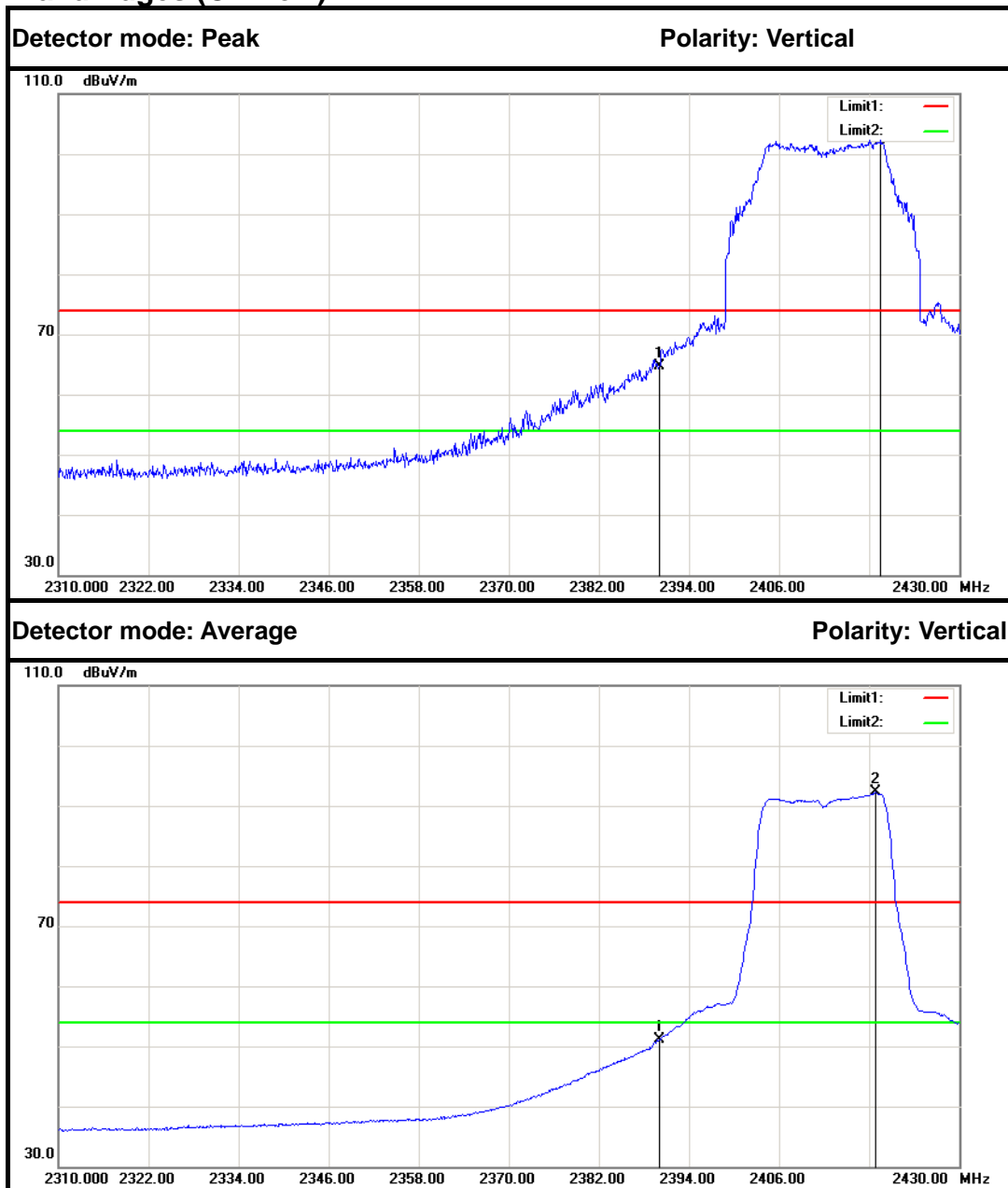


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2466.550	101.62	-2.44	99.18	---	---	Peak	Horizontal
2	2483.500	63.61	-2.35	61.26	74.00	-12.74	Peak	Horizontal
1	2466.900	91.69	-2.43	89.26	---	---	Average	Horizontal
2	2483.500	50.48	-2.35	48.13	54.00	-5.87	Average	Horizontal



IEEE 802.11g mode (Antenna 1)

Band Edges (CH Low)

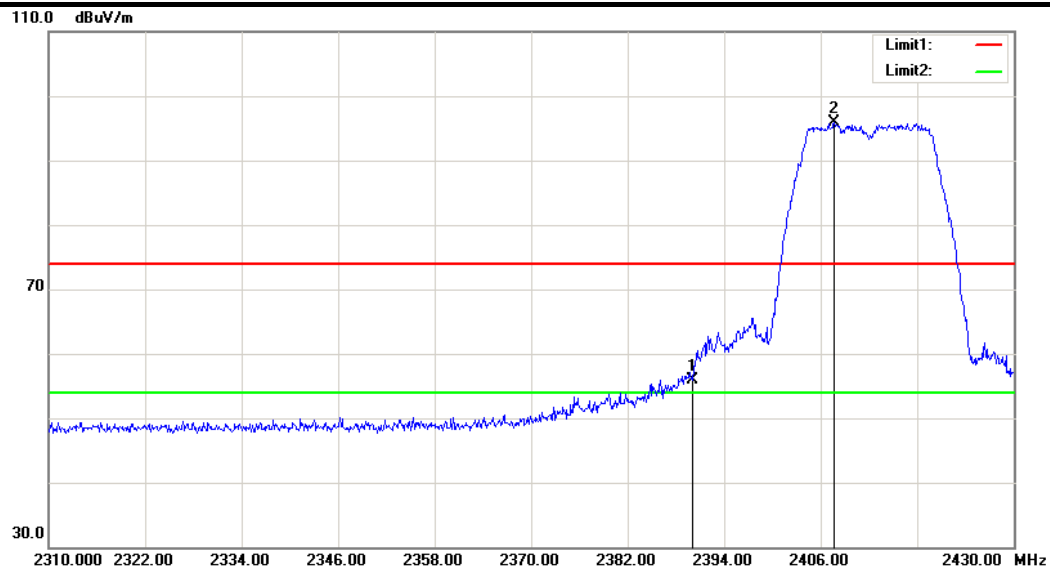


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	67.58	-2.86	64.72	74.00	-9.28	Peak	Vertical
2	2419.560	105.01	-2.70	102.31	---	---	Peak	Vertical
1	2390.000	53.87	-2.86	51.01	54.00	-2.99	Average	Vertical
2	2418.840	94.95	-2.70	92.25	---	---	Average	Vertical



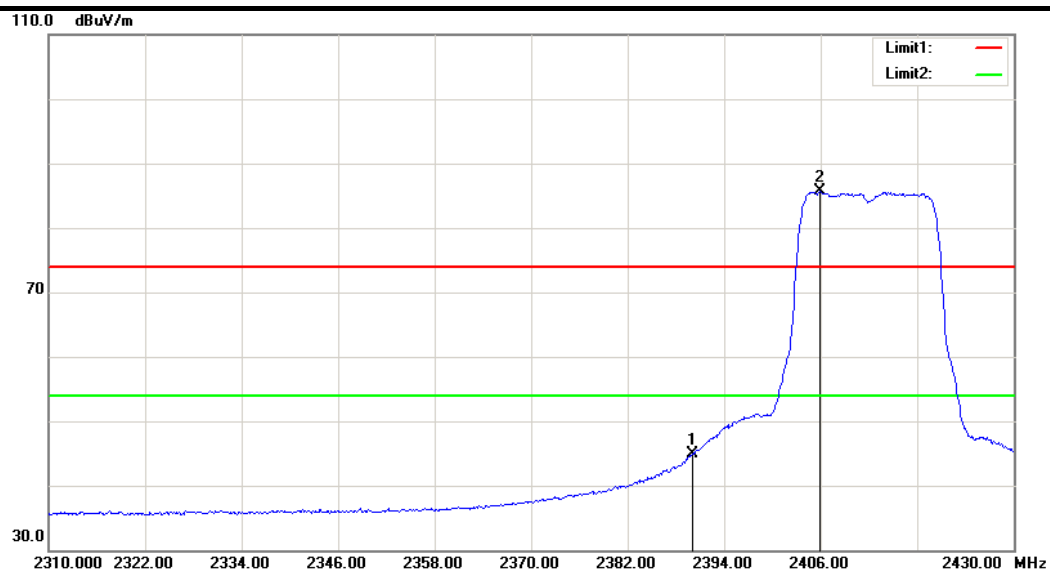
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

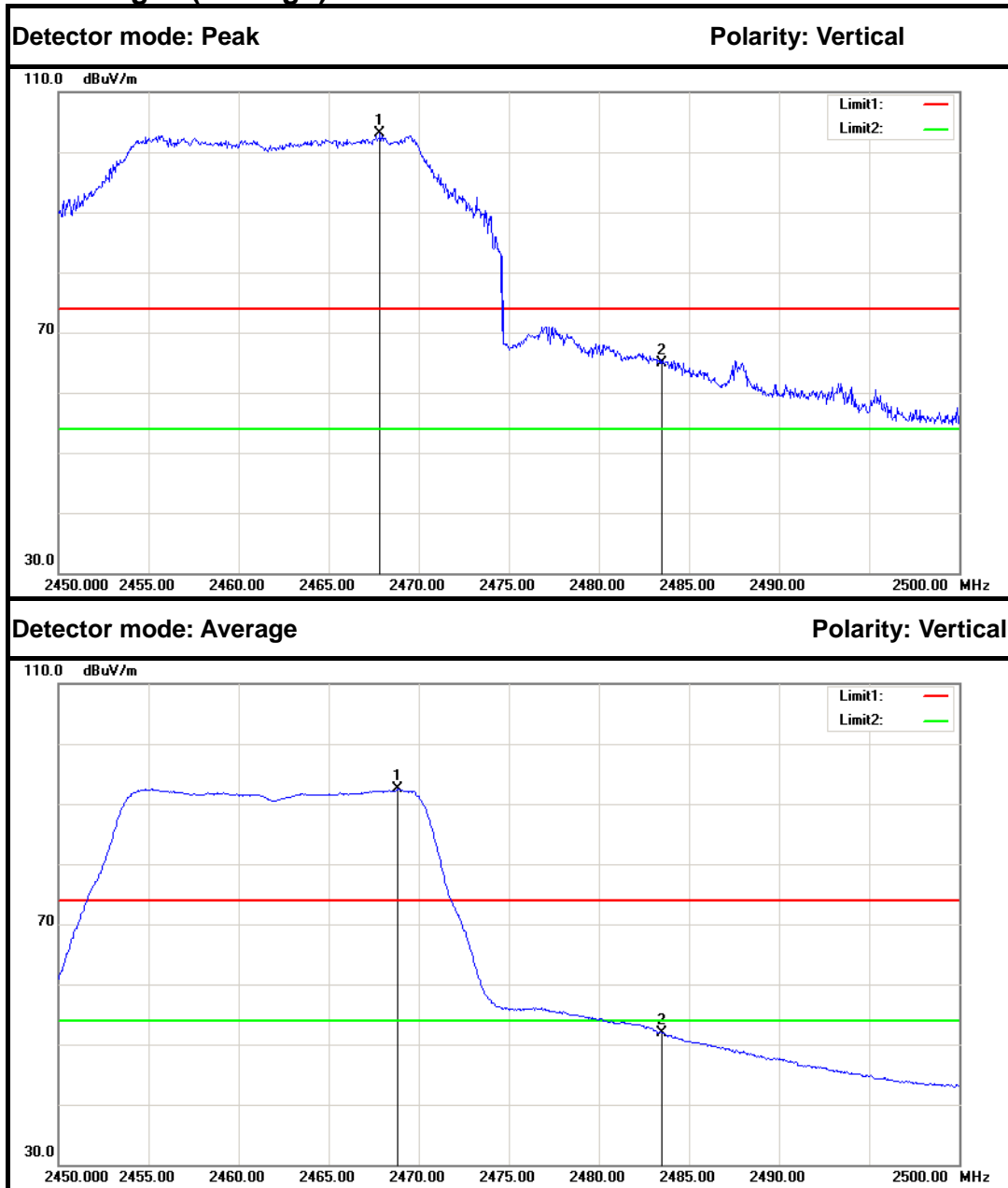
Polarity: Horizontal



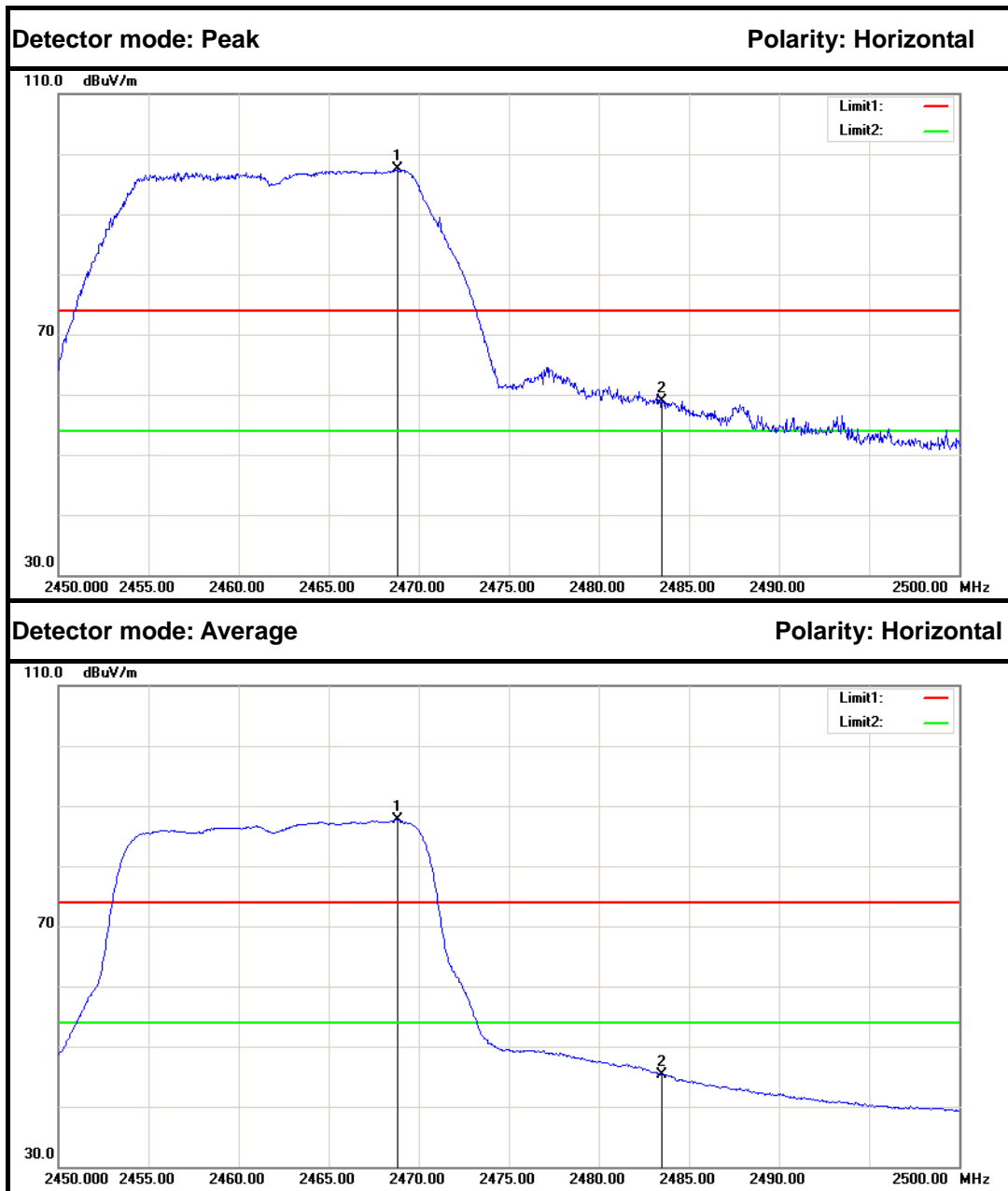
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	58.84	-2.86	55.98	74.00	-18.02	Peak	Horizontal
2	2407.680	98.68	-2.77	95.91	---	---	Peak	Horizontal
1	2390.000	47.79	-2.86	44.93	54.00	-9.07	Average	Horizontal
2	2405.880	88.42	-2.78	85.64	---	---	Average	Horizontal



Band Edges (CH High)



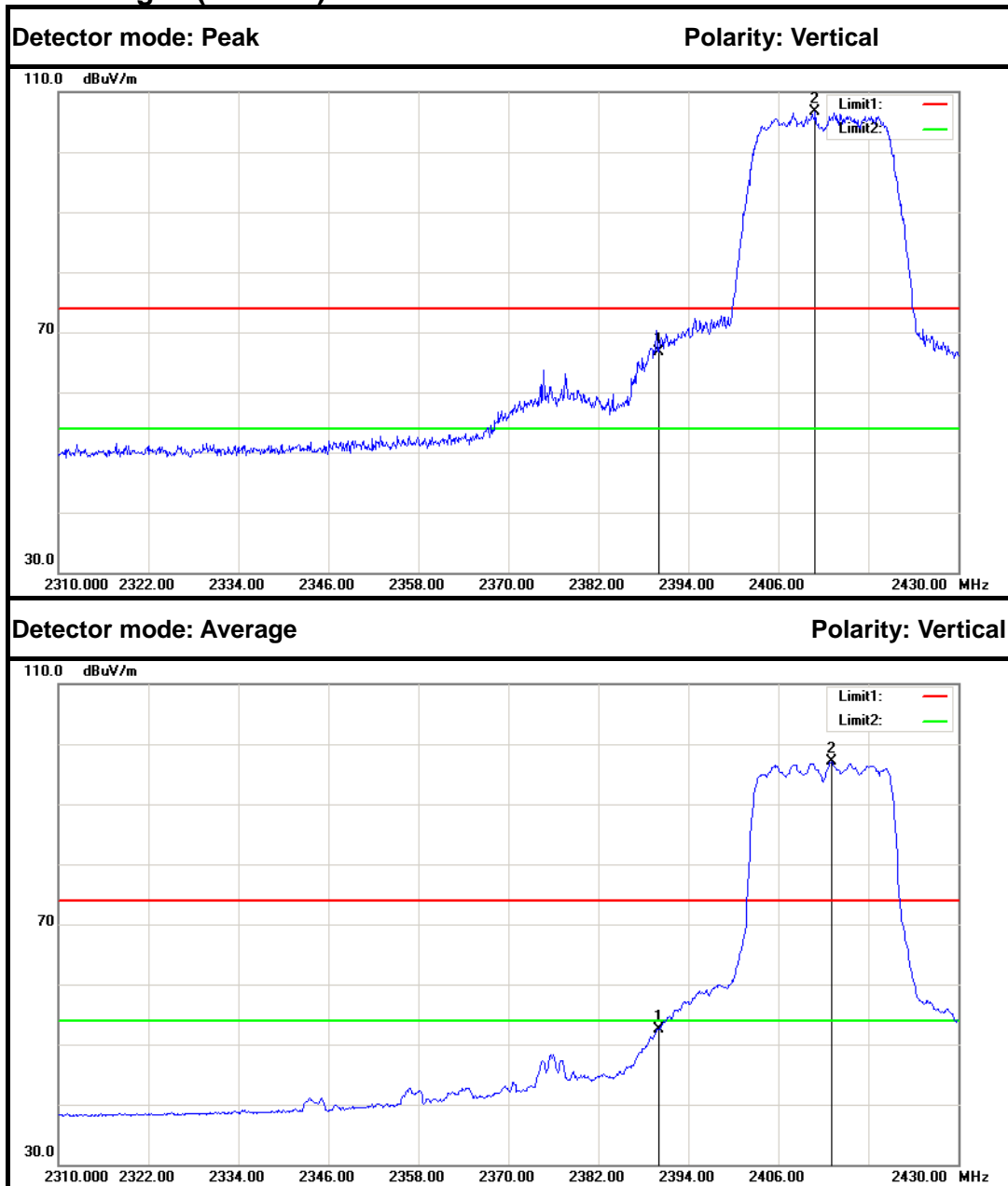
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2467.850	105.52	-2.44	103.08	---	---	Peak	Vertical
2	2483.500	67.20	-2.35	64.85	74.00	-9.15	Peak	Vertical
1	2468.850	94.95	-2.43	92.52	---	---	Average	Vertical
2	2483.500	54.28	-2.35	51.93	54.00	-2.07	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2468.850	99.84	-2.43	97.41	---	---	Peak	Horizontal
2	2483.500	61.19	-2.35	58.84	74.00	-15.16	Peak	Horizontal
1	2468.850	90.08	-2.43	87.65	---	---	Average	Horizontal
2	2483.500	47.57	-2.35	45.22	54.00	-8.78	Average	Horizontal



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

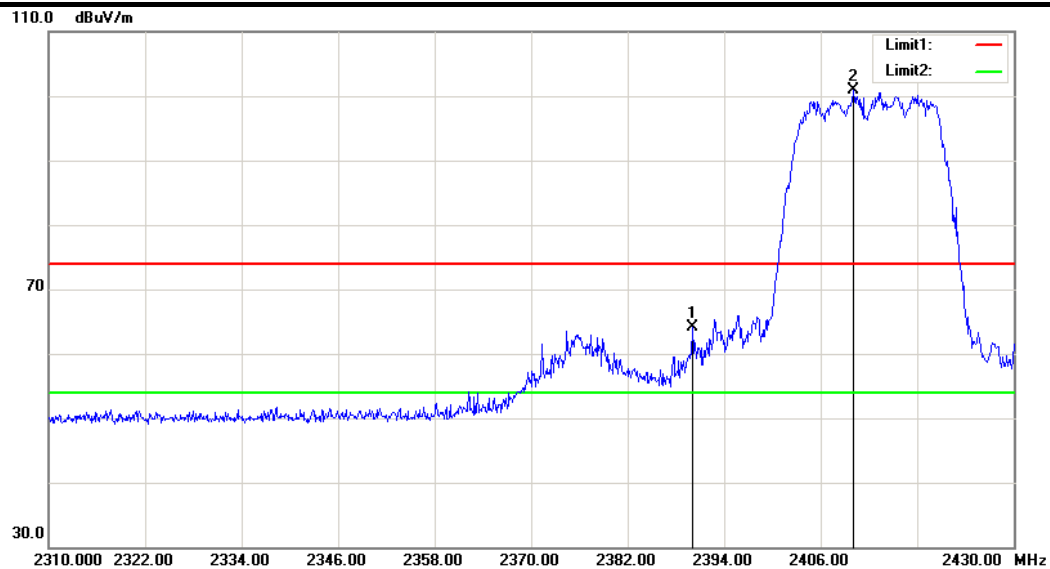


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	69.47	-2.86	66.61	74.00	-7.39	Peak	Vertical
2	2410.920	109.52	-2.75	106.77	---	---	Peak	Vertical
1	2390.000	55.32	-2.86	52.46	54.00	-1.54	Average	Vertical
2	2413.080	99.83	-2.74	97.09	---	---	Average	Vertical



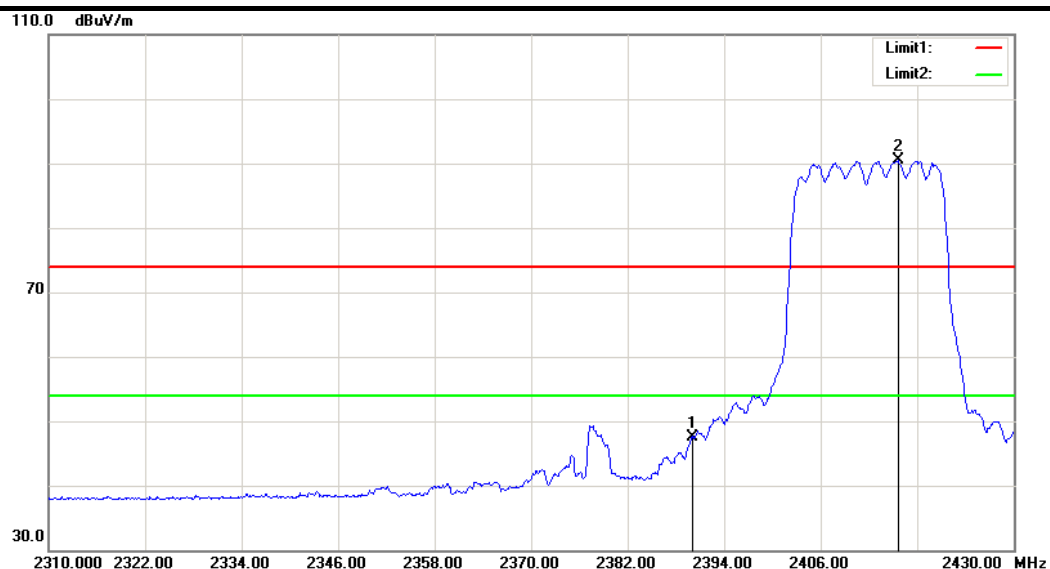
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

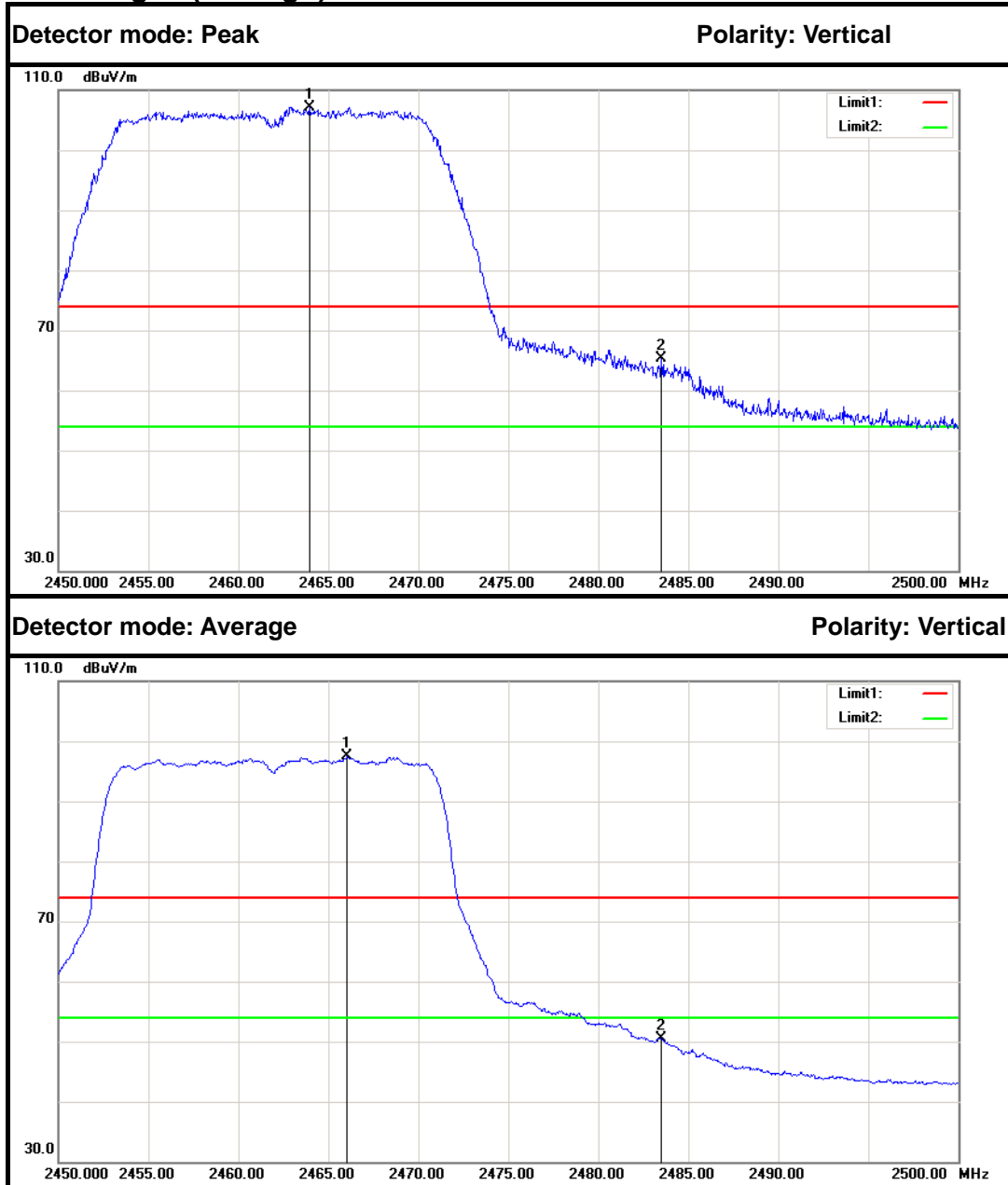
Polarity: Horizontal



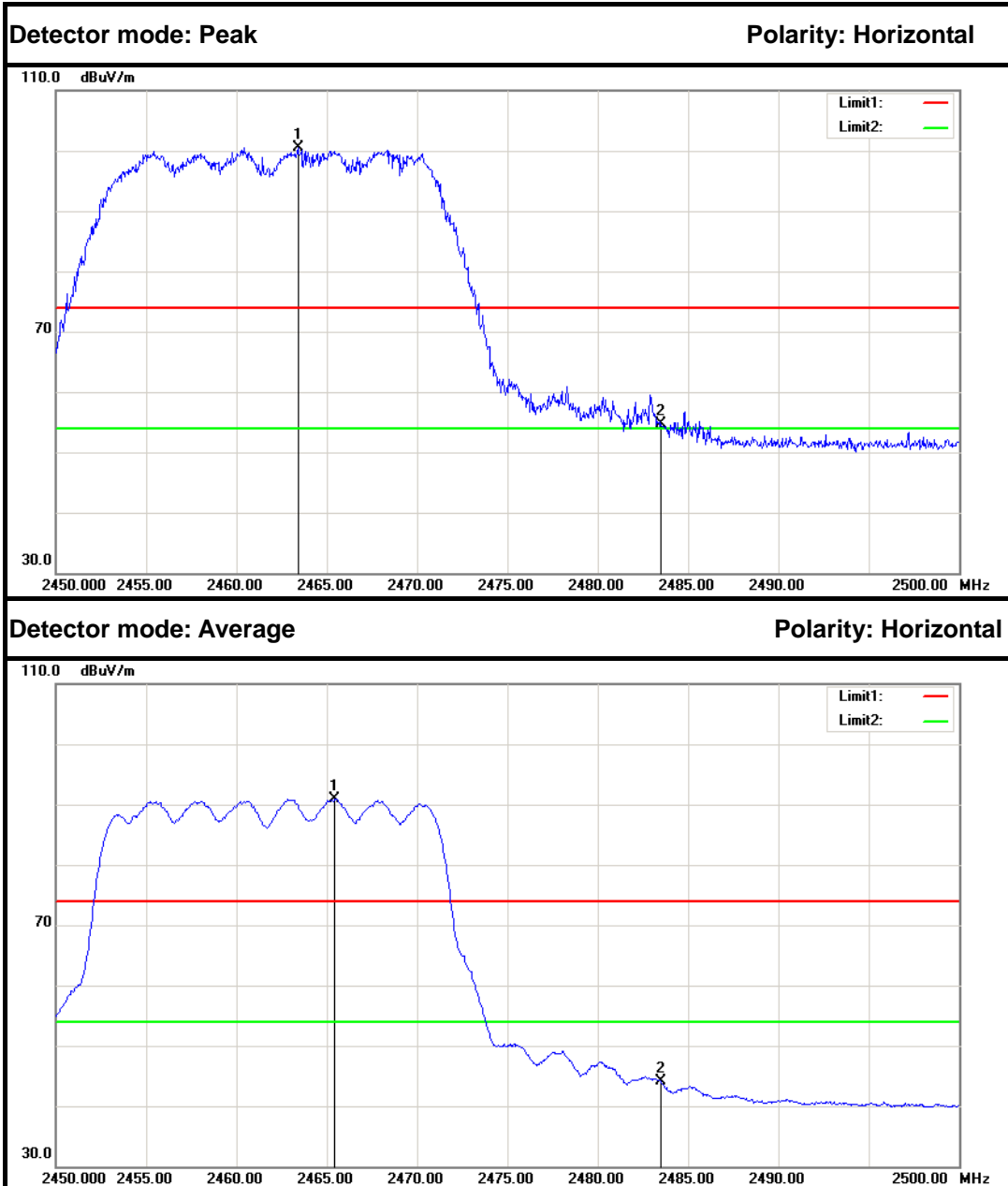
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	66.92	-2.86	64.06	74.00	-9.94	Peak	Horizontal
2	2410.080	103.62	-2.75	100.87	---	---	Peak	Horizontal
1	2390.000	50.46	-2.86	47.60	54.00	-6.40	Average	Horizontal
2	2415.600	93.19	-2.72	90.47	---	---	Average	Horizontal



Band Edges (CH High)



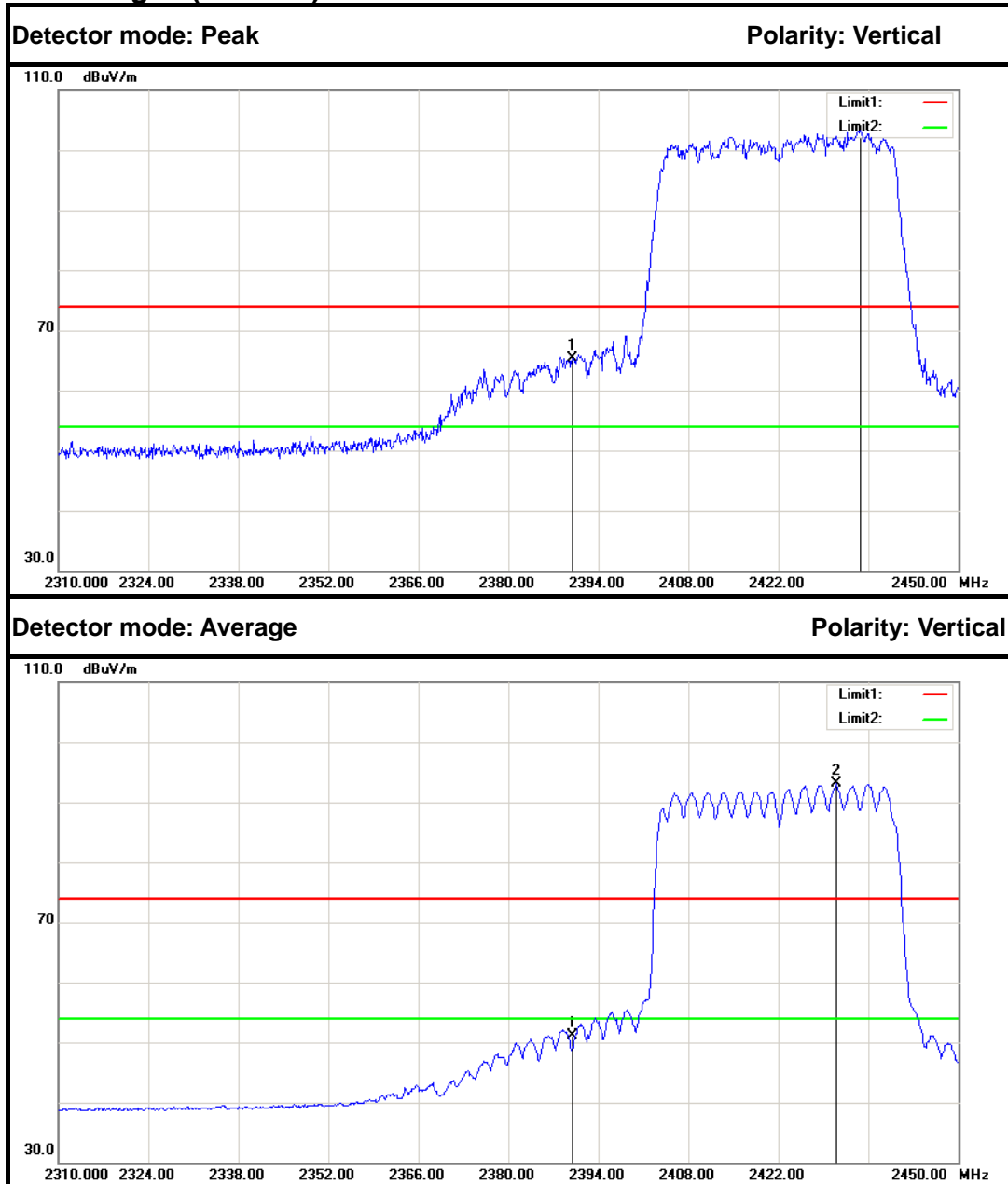
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2463.950	109.64	-2.46	107.18	---	---	Peak	Vertical
2	2483.500	67.68	-2.35	65.33	74.00	-8.67	Peak	Vertical
1	2466.050	99.93	-2.45	97.48	---	---	Average	Vertical
2	2483.500	52.78	-2.35	50.43	54.00	-3.57	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2463.400	103.05	-2.46	100.59	---	---	Peak	Horizontal
2	2483.500	57.03	-2.35	54.68	74.00	-19.32	Peak	Horizontal
1	2465.450	93.31	-2.45	90.86	---	---	Average	Horizontal
2	2483.500	46.44	-2.35	44.09	54.00	-9.91	Average	Horizontal



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

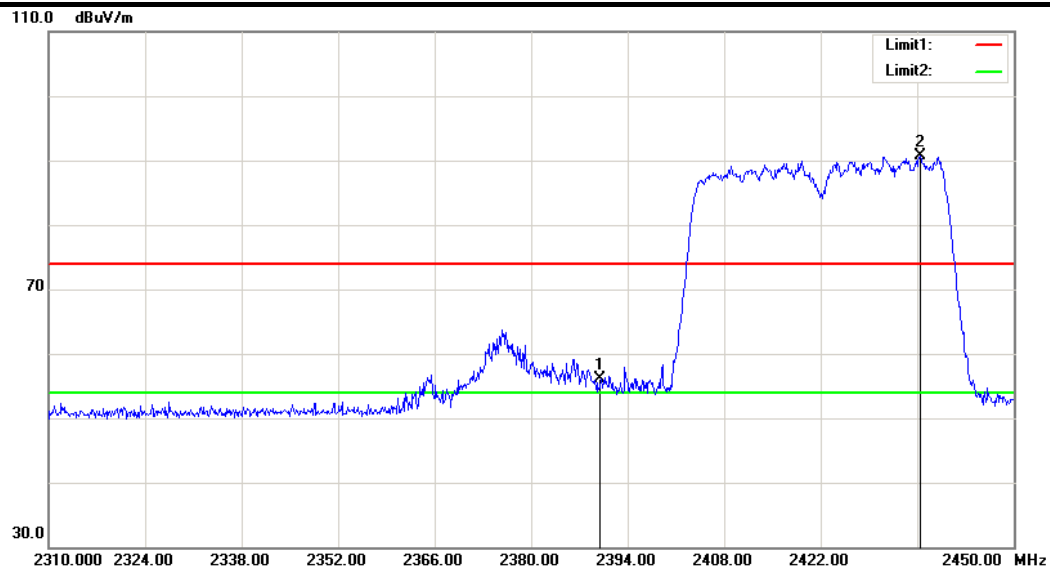


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	68.15	-2.86	65.29	74.00	-8.71	Peak	Vertical
2	2434.740	106.00	-2.62	103.38	---	---	Peak	Vertical
1	2390.000	53.98	-2.86	51.12	54.00	-2.88	Average	Vertical
2	2431.100	95.68	-2.64	93.04	---	---	Average	Vertical



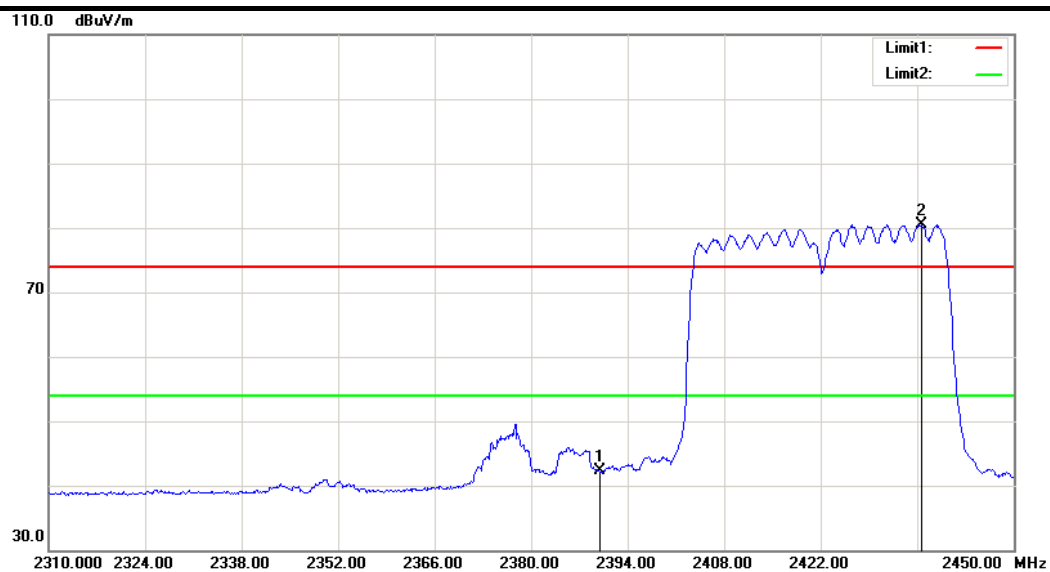
Detector mode: Peak

Polarity: Horizontal



Detector mode: Average

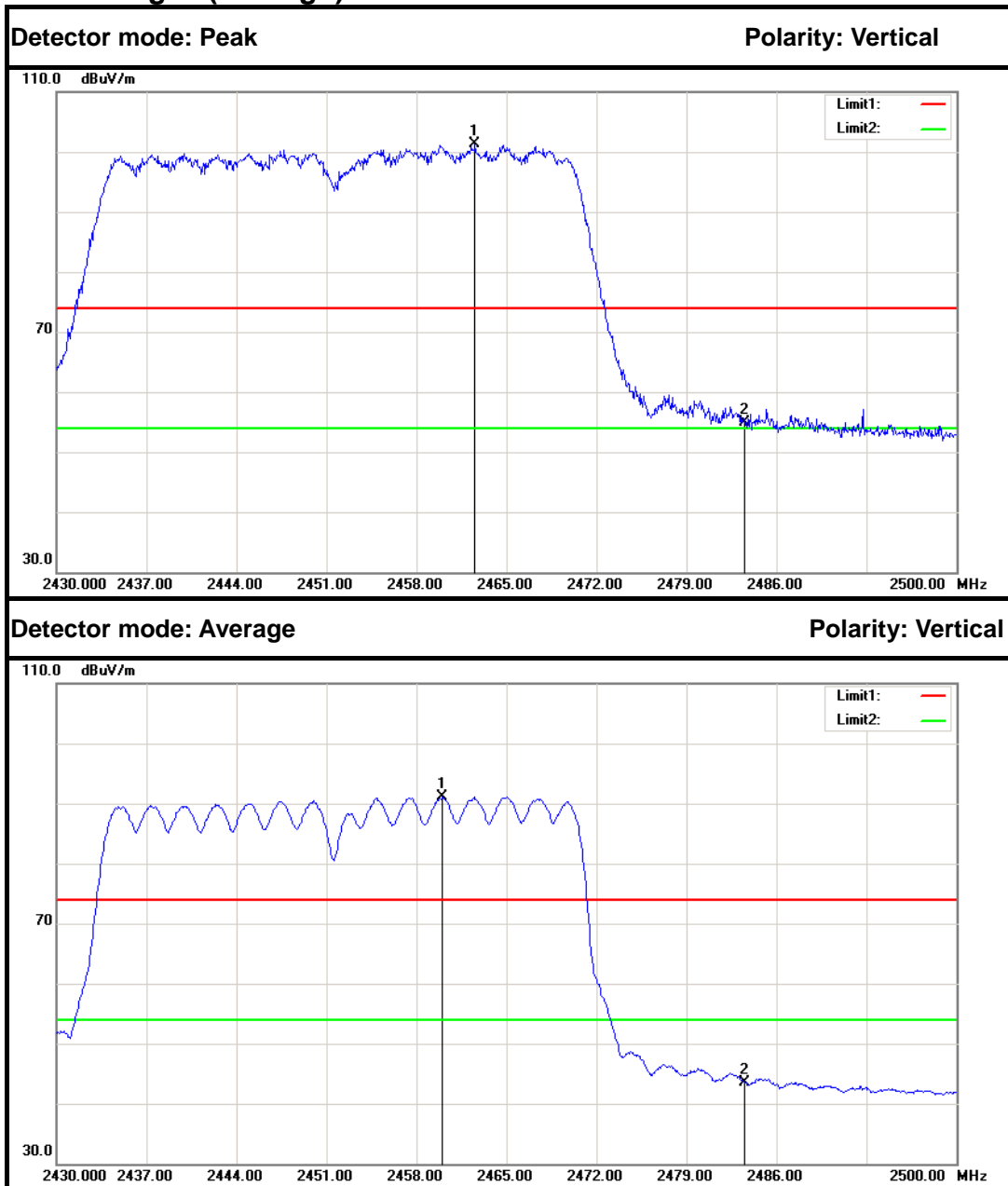
Polarity: Horizontal



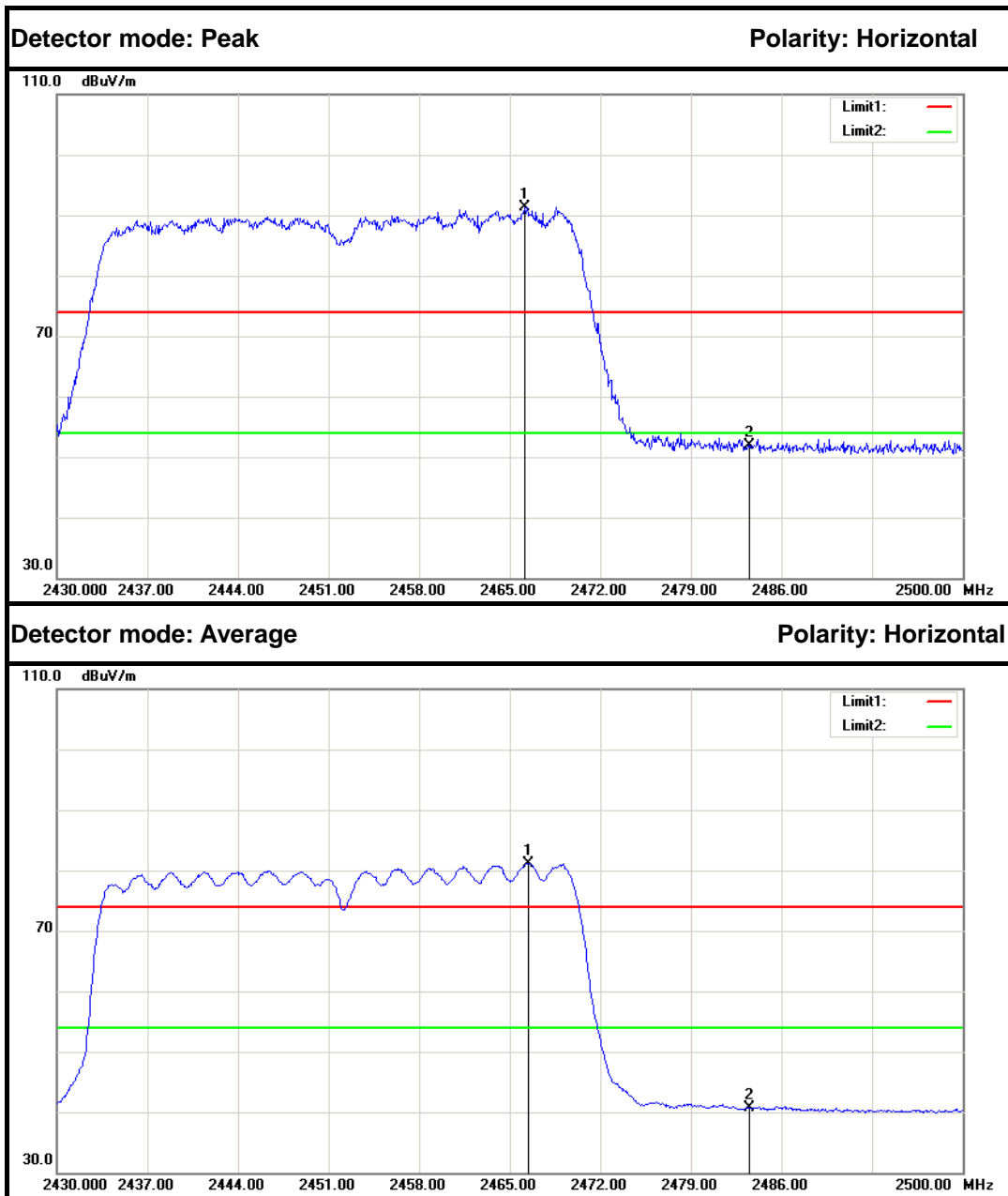
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	58.98	-2.86	56.12	74.00	-17.88	Peak	Horizontal
2	2436.420	93.24	-2.61	90.63	---	---	Peak	Horizontal
1	2390.000	45.26	-2.86	42.40	54.00	-11.60	Average	Horizontal
2	2436.560	83.19	-2.61	80.58	---	---	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	2462.550	103.80	-2.47	101.33	---	---	Peak	Vertical
2	2483.500	57.24	-2.35	54.89	74.00	-19.11	Peak	Vertical
1	2460.030	93.56	-2.48	91.08	---	---	Average	Vertical
2	2483.500	45.87	-2.35	43.52	54.00	-10.48	Average	Vertical



No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2466.120	93.83	-2.45	91.38	---	---	Peak	Horizontal
2	2483.500	54.18	-2.35	51.83	74.00	-22.17	Peak	Horizontal
1	2466.400	83.56	-2.44	81.12	---	---	Average	Horizontal
2	2483.500	43.04	-2.35	40.69	54.00	-13.31	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

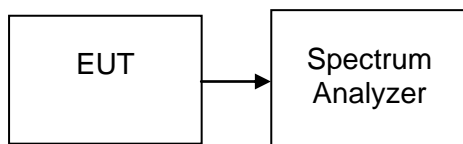
7.7.3. TEST PROCEDURES (please refer to measurement standard)

§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	-4.793	8	PASS
Mid	2437	-6.367		PASS
High	2462	-6.404		PASS

Test mode: IEEE 802.11b (Antenna 1)

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-5.824	8	PASS
Mid	2437	-6.987		PASS
High	2462	-5.145		PASS

Test mode: IEEE 802.11g (Antenna 0)

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-9.305	8	PASS
Mid	2437	-9.265		PASS
High	2462	-9.336		PASS

Test mode: IEEE 802.11g (Antenna 1)

Channel	Frequency (MHz)	PPSD (dBm)	Limit (dBm)	Test Result
Low	2412	-9.717	8	PASS
Mid	2437	-9.416		PASS
High	2462	-9.035		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	-14.806	-14.891	-11.838	8	PASS
Mid	2437	-13.266	-15.302	-11.155		PASS
High	2462	-14.590	-13.764	-11.147		PASS

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

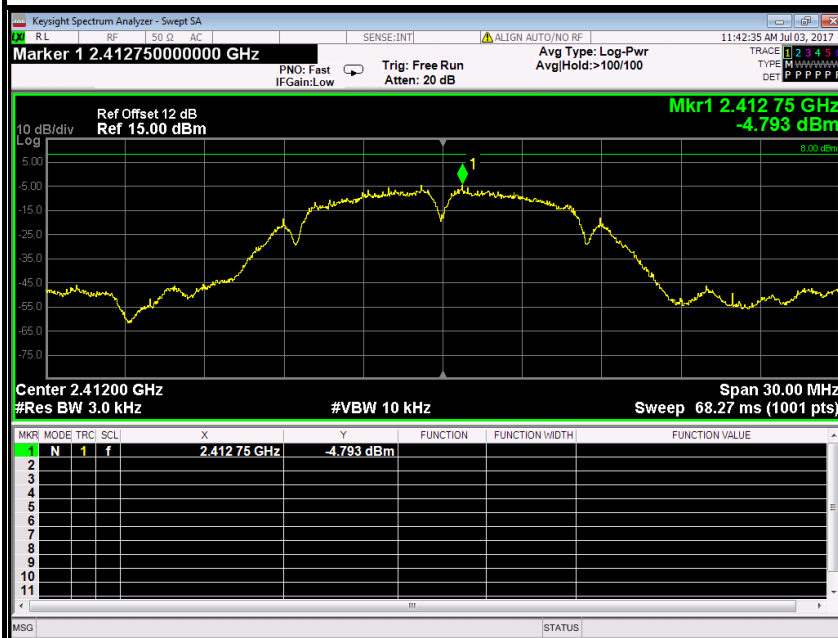
Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Test Result
		Antenna 0	Antenna 1	Total		
Low	2422	-16.343	-17.467	-13.858	8	PASS
Mid	2437	-16.515	-17.371	-13.912		PASS
High	2452	-16.182	-16.949	-13.538		PASS



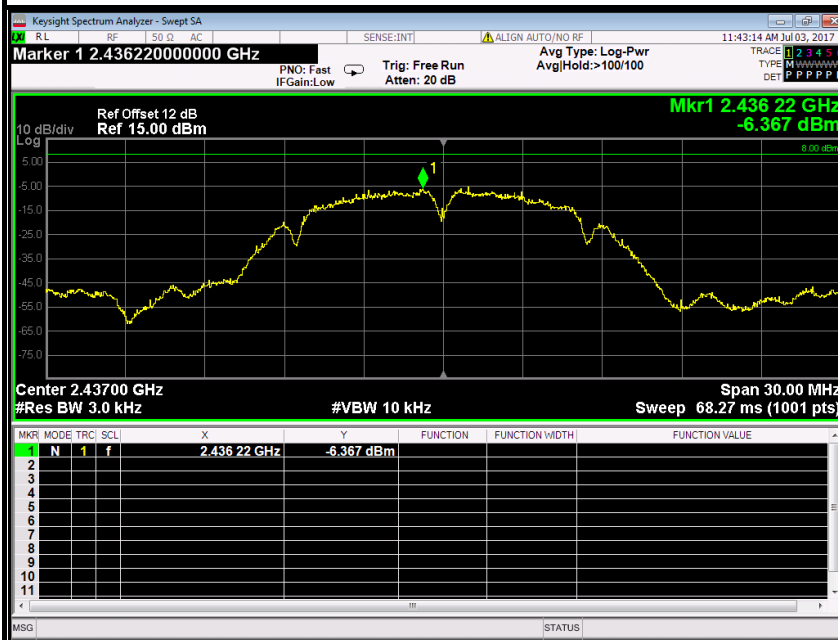
Test Plot

IEEE 802.11b mode (Antenna 0)

PPSD (CH Low)

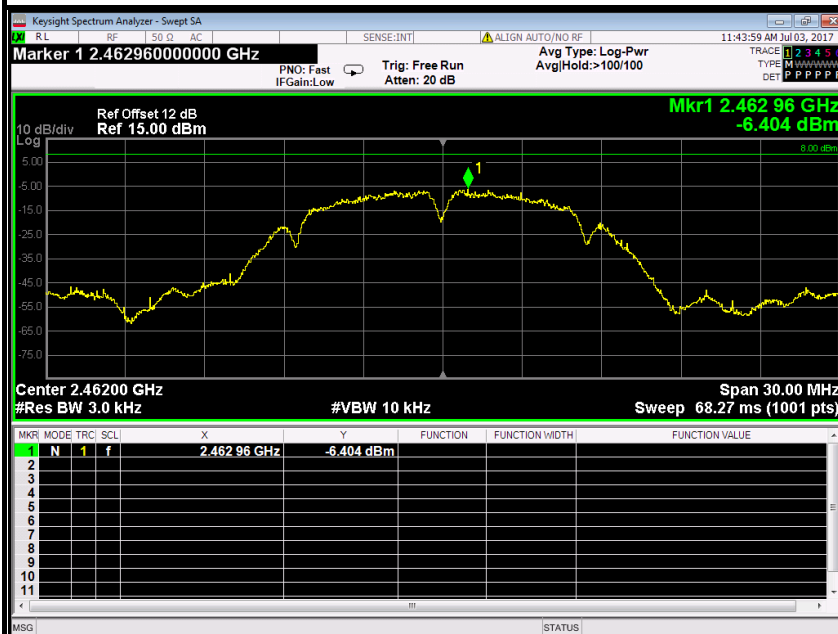


PPSD (CH Mid)



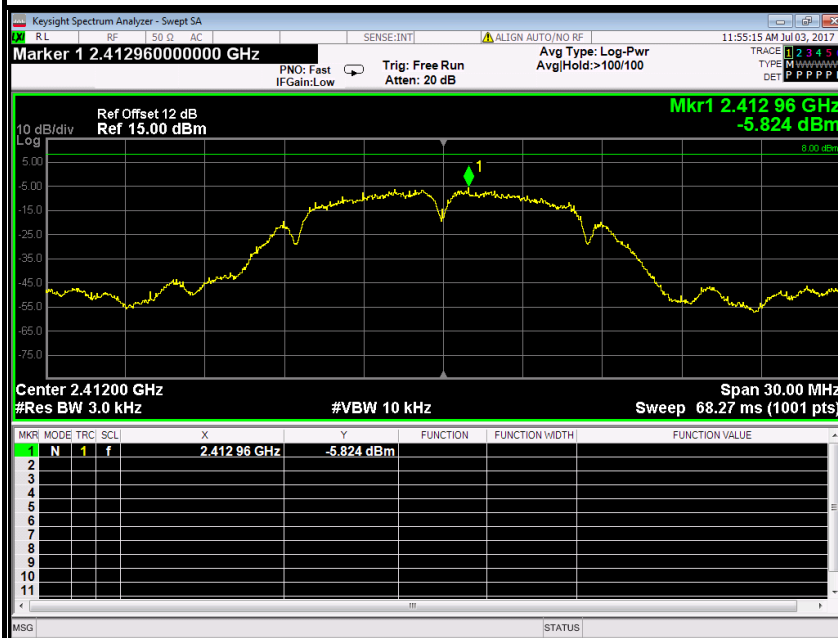


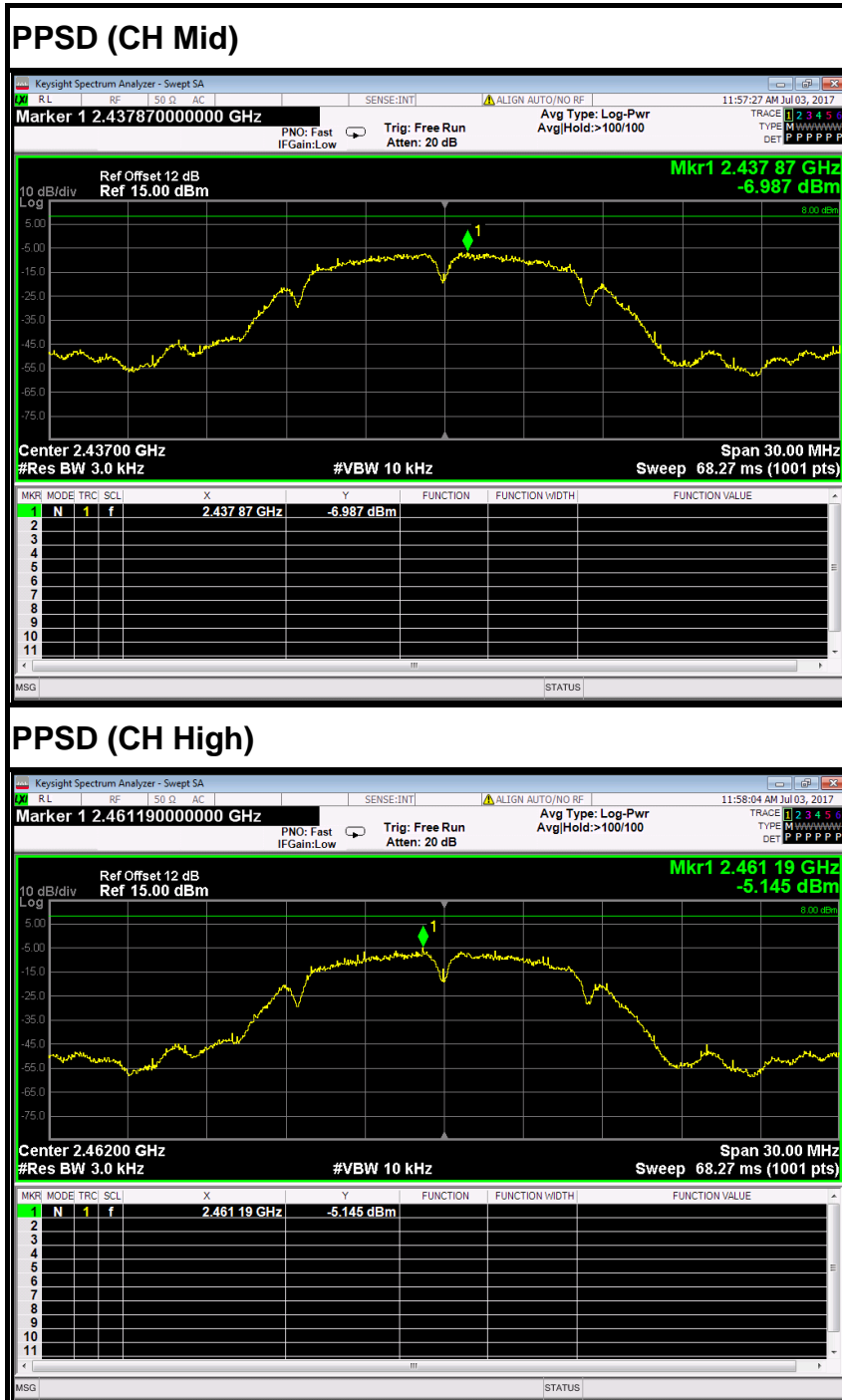
PPSD (CH High)



IEEE 802.11b mode (Antenna 1)

PPSD (CH Low)

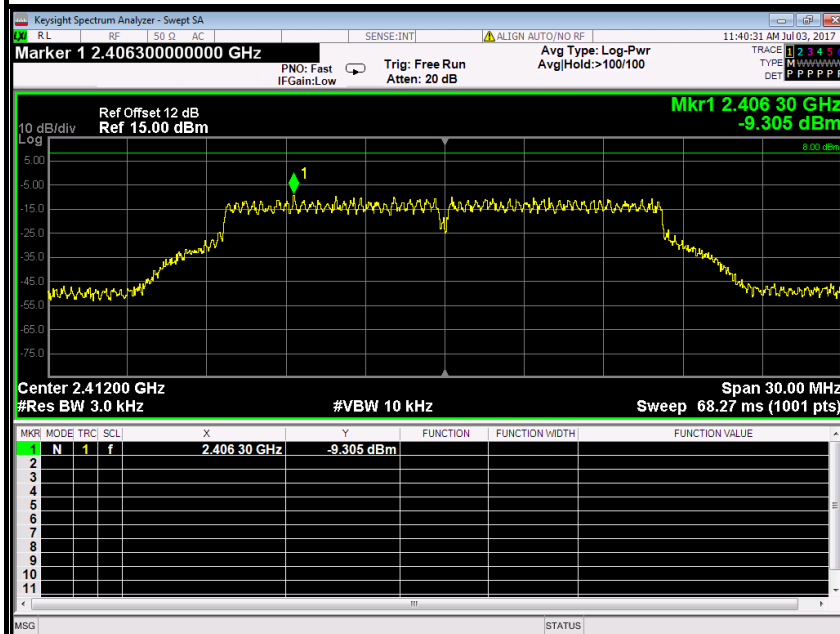




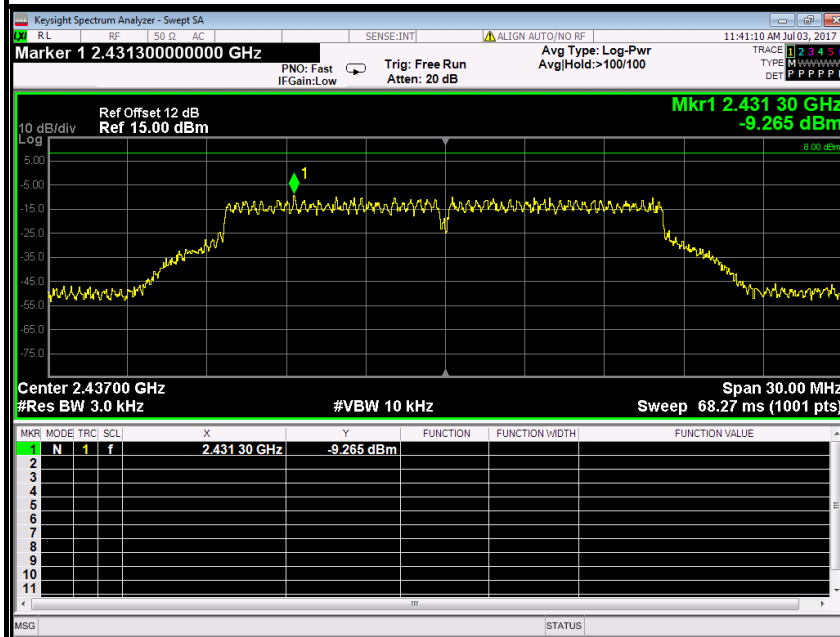


IEEE 802.11g mode (Antenna 0)

PPSD (CH Low)

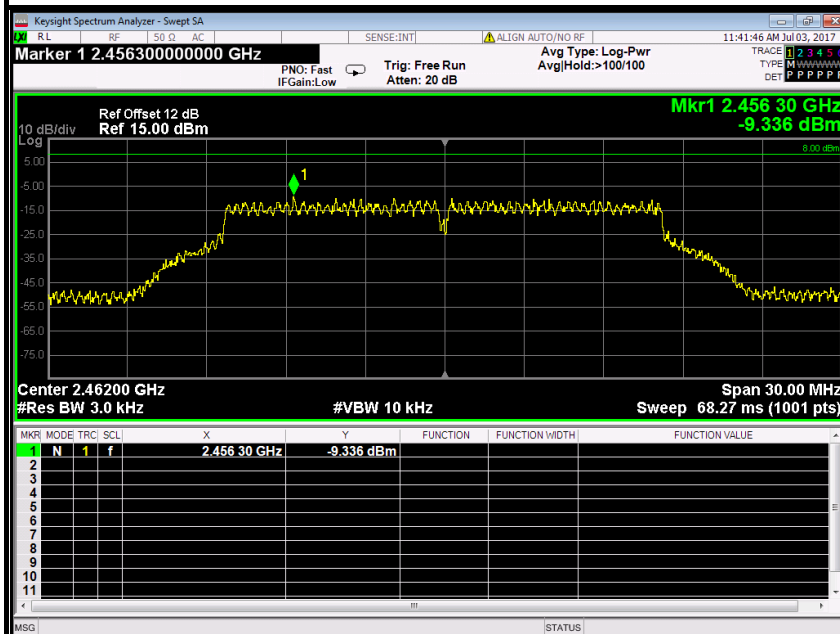


PPSD (CH Mid)



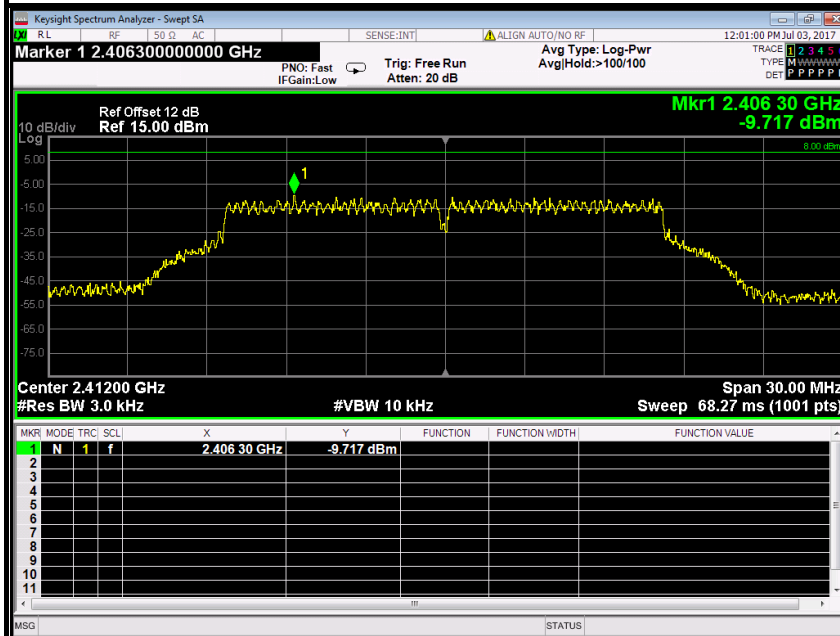


PPSD (CH High)



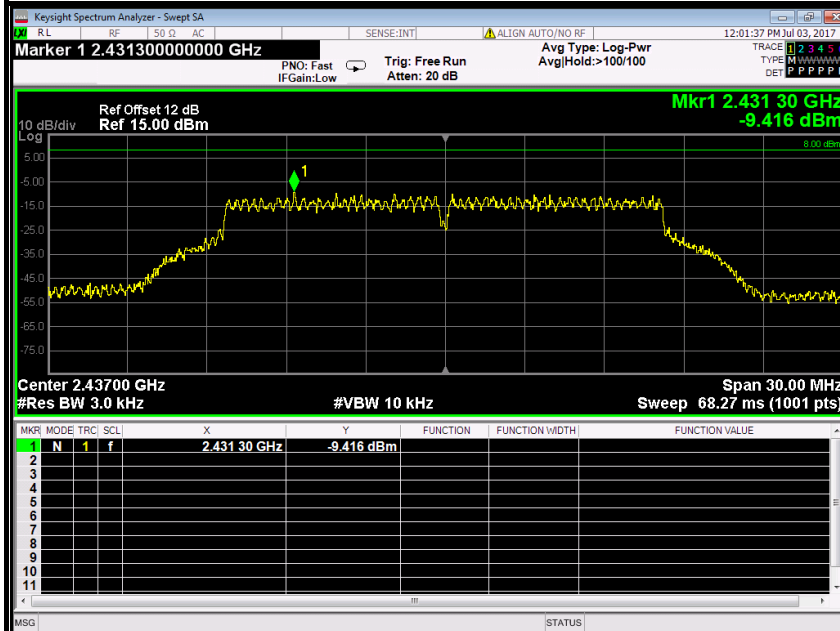
IEEE 802.11g mode (Antenna 1)

PPSD (CH Low)

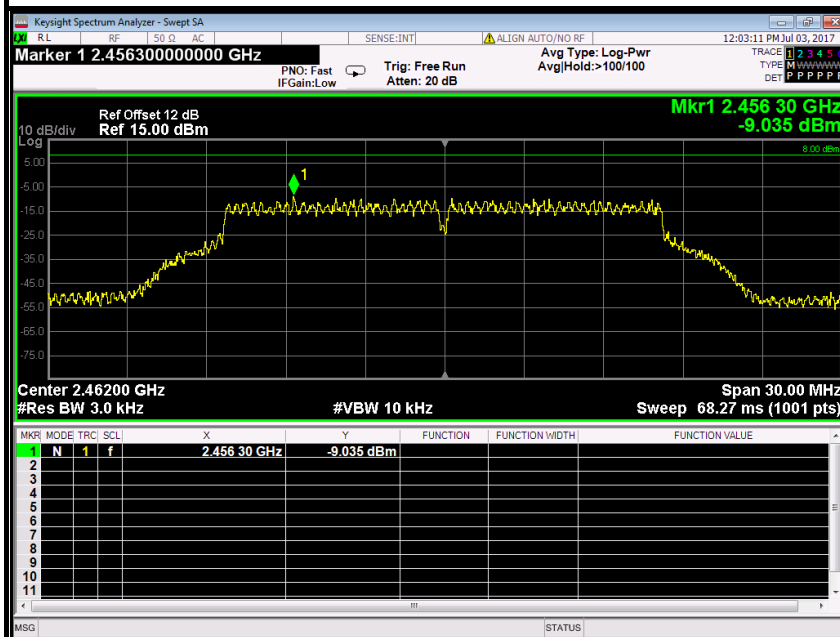




PPSD (CH Mid)



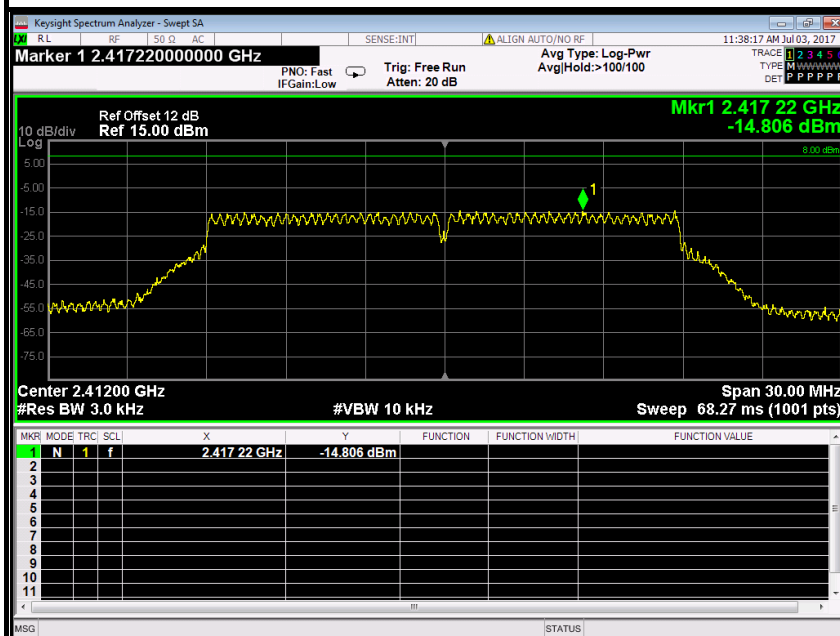
PPSD (CH High)



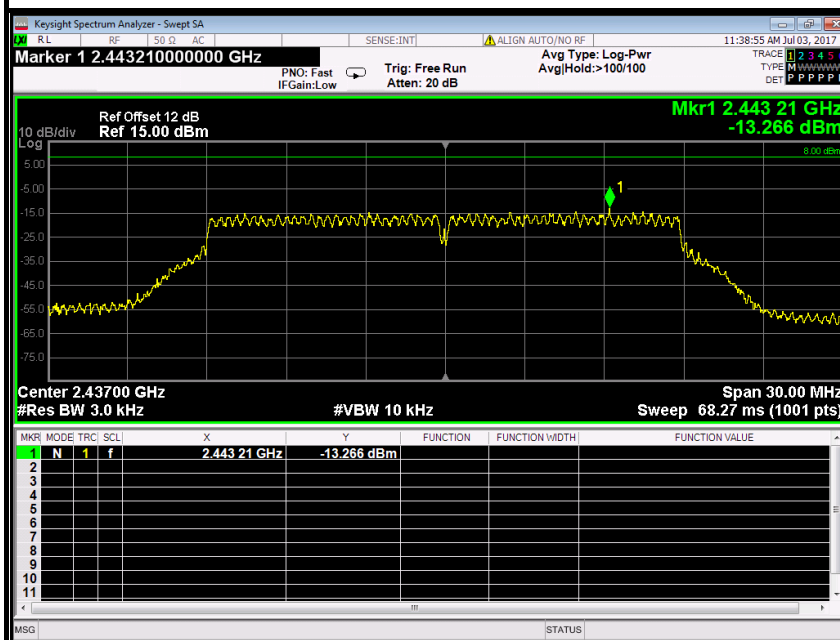


IEEE 802.11n HT20 MHz mode (Antenna 0)

PPSD (CH Low)

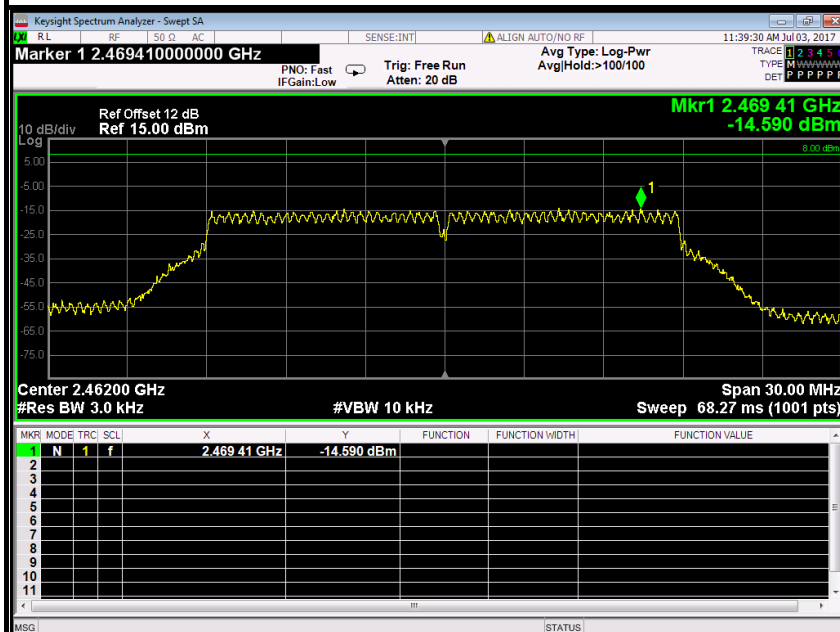


PPSD (CH Mid)



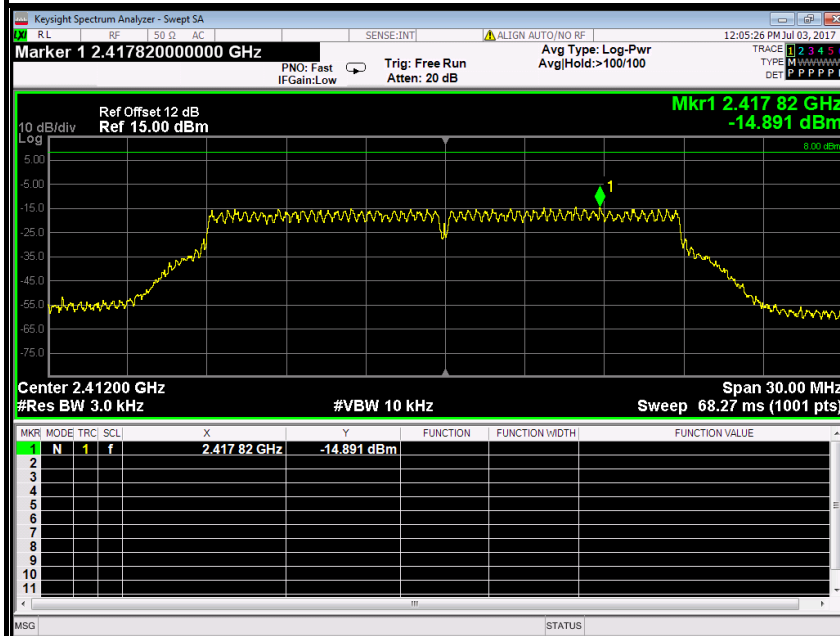


PPSD (CH High)



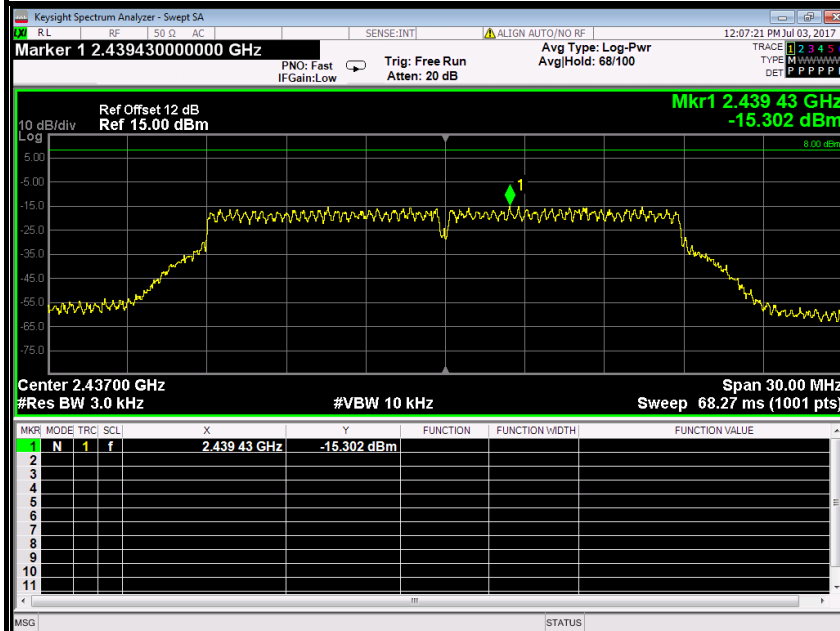
IEEE 802.11n HT20 MHz mode (Antenna 1)

PPSD (CH Low)

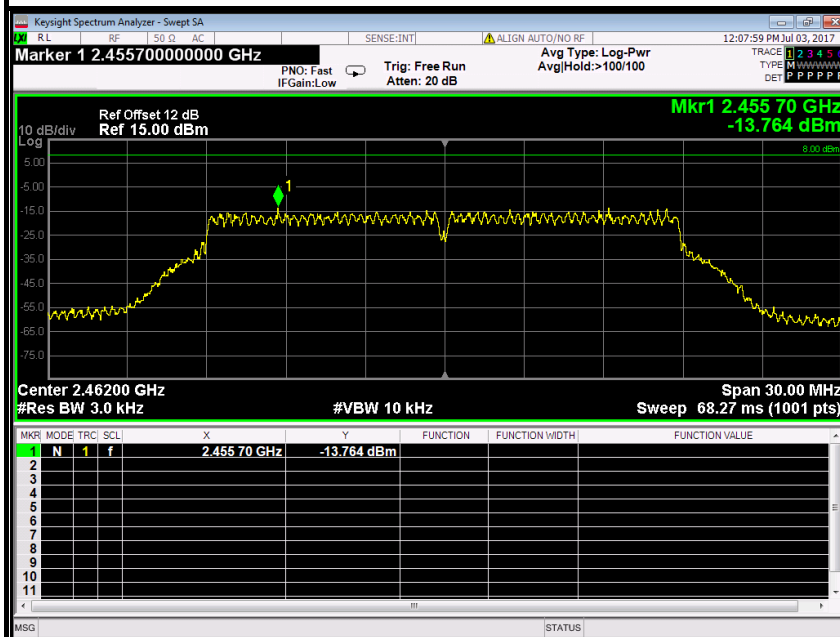




PPSD (CH Mid)



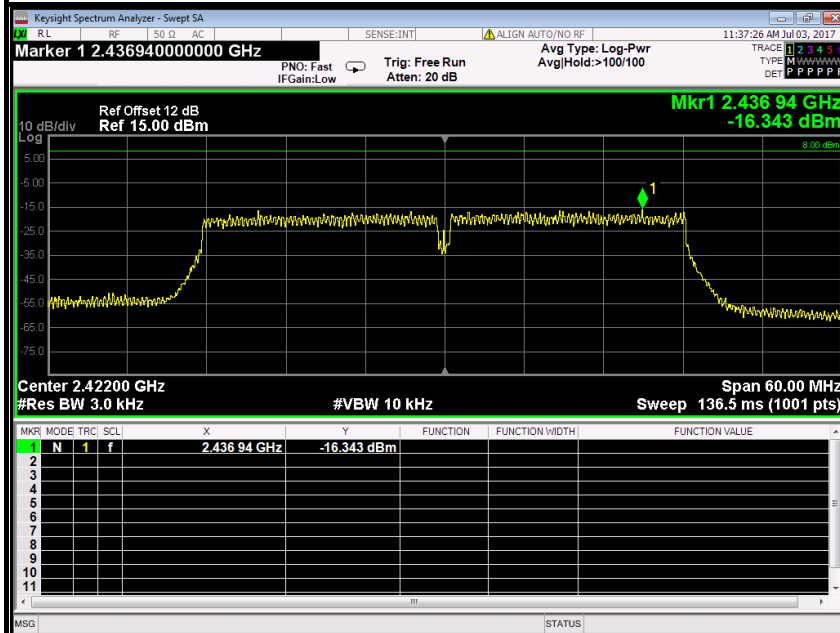
PPSD (CH High)



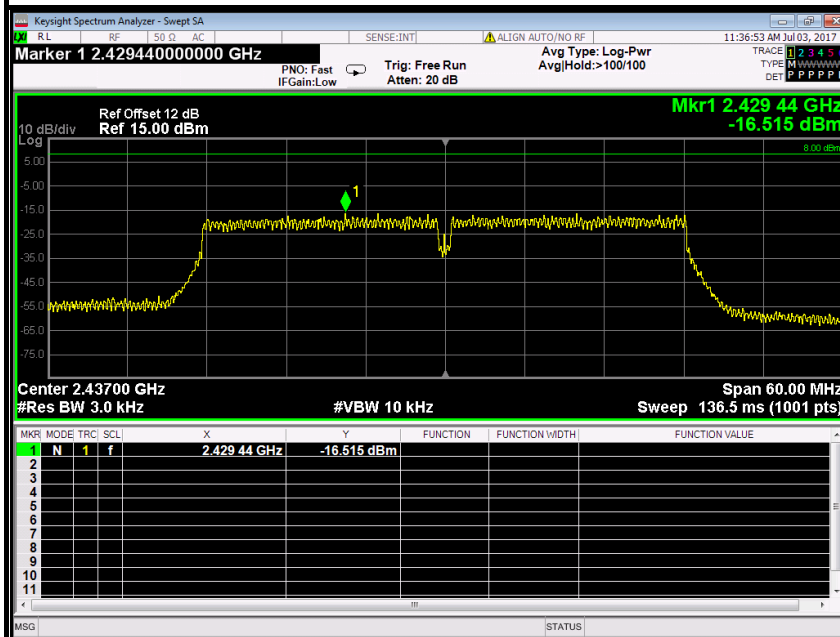


IEEE 802.11n HT40 MHz mode (Antenna 0)

PPSD (CH Low)

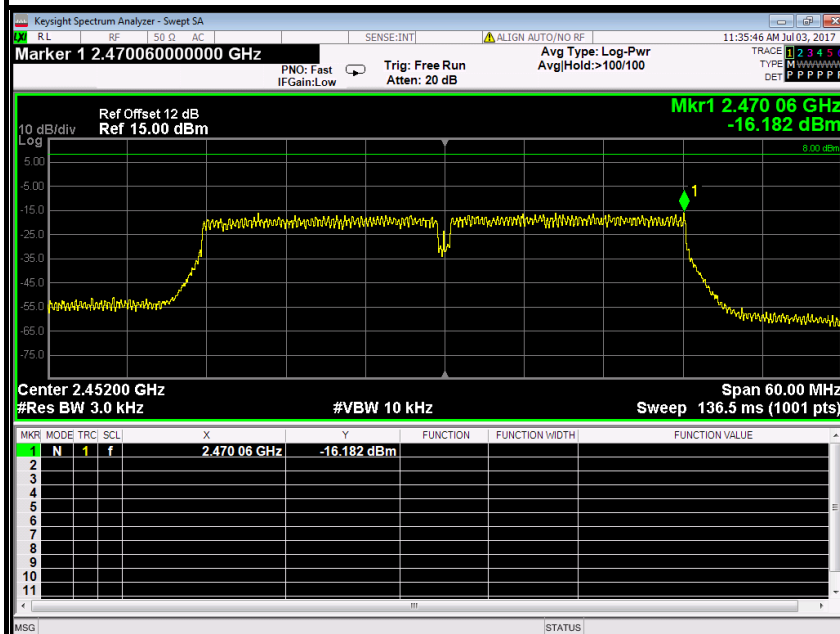


PPSD (CH Mid)



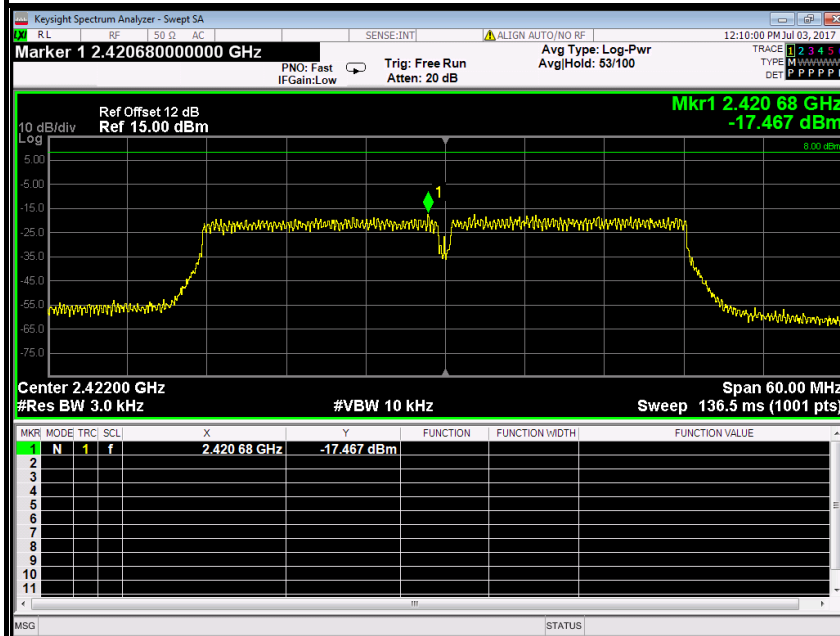


PPSD (CH High)



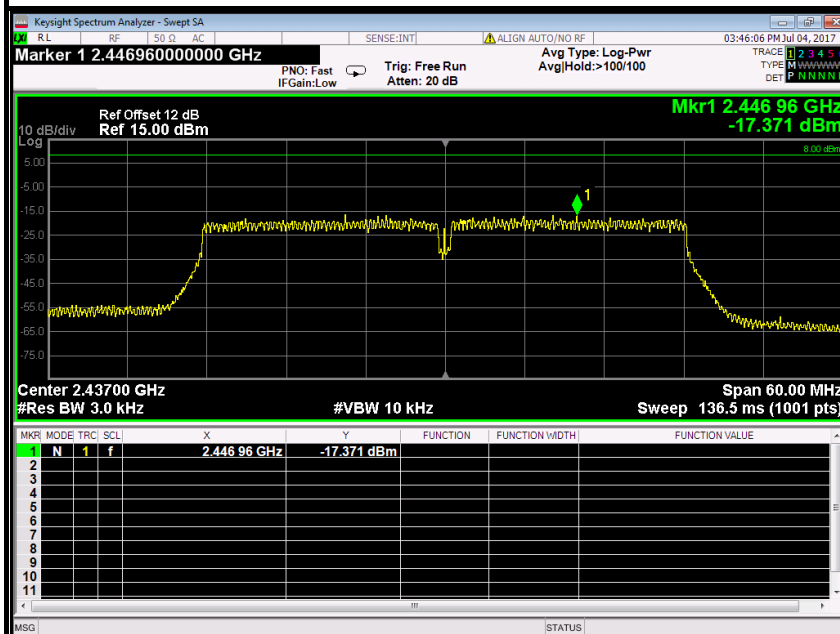
IEEE 802.11n HT40 MHz mode (Antenna 1)

PPSD (CH Low)





PPSD (CH Mid)



PPSD (CH High)

