Test Mode: TX / IEEE 802.11g (CH High) **Tested by:** Fade Zhong

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 8, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1954.000	47.88	-5.29	42.59	74.00	-31.41	V	Peak
2224.000	48.30	-3.77	44.53	74.00	-29.47	V	Peak
2503.000	44.77	-2.25	42.52	74.00	-31.48	V	Peak
2818.000	44.66	-1.69	42.97	74.00	-31.03	V	Peak
3241.000	43.19	-0.96	42.23	74.00	-31.77	V	Peak
3619.000	42.51	-0.02	42.49	74.00	-31.51	V	Peak
2134.000	46.02	-4.27	41.75	74.00	-32.25	H	Peak
2503.000	45.54	-2.25	43.29	74.00	-30.71	H	Peak
2836.000	43.27	-1.66	41.61	74.00	-32.39	H	Peak
3205.000	42.77	-1.02	41.75	74.00	-32.25	H	Peak
3808.000	42.44	0.78	43.22	74.00	-30.78	H	Peak
5149.000	41.83	5.25	47.08	74.00	-26.92	H	Peak

Remark:

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).

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Combine with Antenna 0 and Antenna 1

Test Mode: TX / IEEE 802.11n HT20 MHz (CH Low) **Tested by:** Fade Zhong

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 8, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1207.000	51.23	-7.76	43.47	74.00	-30.53	V	Peak
1927.000	49.21	-5.46	43.75	74.00	-30.25	V	Peak
2224.000	51.51	-3.77	47.74	74.00	-26.26	V	Peak
2521.000	46.22	-2.22	44.00	74.00	-30.00	V	Peak
2935.000	44.97	-1.48	43.49	74.00	-30.51	V	Peak
5347.000	41.16	5.60	46.76	74.00	-27.24	V	Peak
1207.000	51.55	-7.76	43.79	74.00	-30.21	H	Peak
1738.000	52.97	-6.40	46.57	74.00	-27.43	H	Peak
2233.000	47.39	-3.72	43.67	74.00	-30.33	H	Peak
2548.000	45.27	-2.17	43.10	74.00	-30.90	H	Peak
2809.000	43.36	-1.70	41.66	74.00	-32.34	H	Peak
5023.000	41.40	5.02	46.42	74.00	-27.58	H	Peak

Remark:

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).

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Test Mode: TX / IEEE 802.11n HT20 MHz (CH Mid) **Tested by:** Fade Zhong

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 8, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1216.000	49.17	-7.73	41.44	74.00	-32.56	V	Peak
1909.000	50.87	-5.58	45.29	74.00	-28.71	V	Peak
2224.000	50.57	-3.77	46.80	74.00	-27.20	V	Peak
2431.000	47.19	-2.64	44.55	74.00	-29.45	V	Peak
2917.000	44.40	-1.51	42.89	74.00	-31.11	V	Peak
3205.000	43.93	-1.02	42.91	74.00	-31.09	V	Peak
1216.000	49.17	-7.73	41.44	74.00	-32.56	H	Peak
1909.000	50.87	-5.58	45.29	74.00	-28.71	H	Peak
2224.000	50.57	-3.77	46.80	74.00	-27.20	H	Peak
2431.000	47.19	-2.64	44.55	74.00	-29.45	H	Peak
2917.000	44.40	-1.51	42.89	74.00	-31.11	H	Peak
3205.000	43.93	-1.02	42.91	74.00	-31.09	H	Peak

Remark:

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).

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Test Mode: TX / EEE 802.11n HT20 MHz (CH High) **Tested by:** Fade Zhong

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 8, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1198.000	49.48	-7.80	41.68	74.00	-32.32	V	Peak
1909.000	55.44	-5.58	49.86	74.00	-24.14	V	Peak
2134.000	52.57	-4.27	48.30	74.00	-25.70	V	Peak
2215.000	50.62	-3.82	46.80	74.00	-27.20	V	Peak
2467.000	47.09	-2.44	44.65	74.00	-29.35	V	Peak
2935.000	45.39	-1.48	43.91	74.00	-30.09	V	Peak
1216.000	48.59	-7.73	40.86	74.00	-33.14	H	Peak
1909.000	52.64	-5.58	47.06	74.00	-26.94	H	Peak
2134.000	46.71	-4.27	42.44	74.00	-31.56	H	Peak
2557.000	44.61	-2.16	42.45	74.00	-31.55	H	Peak
2809.000	43.09	-1.70	41.39	74.00	-32.61	H	Peak
3259.000	42.92	-0.92	42.00	74.00	-32.00	H	Peak

Remark:

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).

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Combine with Antenna 0 and Antenna 1

Test Mode: TX/ IEEE 802.11n HT40 MHz (CH Low) **Tested by:** Fade Zhong

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 8, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1216.000	49.62	-7.73	41.89	74.00	-32.11	V	Peak
1945.000	51.36	-5.35	46.01	74.00	-27.99	V	Peak
2134.000	50.33	-4.27	46.06	74.00	-27.94	V	Peak
2440.000	45.07	-2.59	42.48	74.00	-31.52	V	Peak
2908.000	44.16	-1.53	42.63	74.00	-31.37	V	Peak
3763.000	43.42	0.59	44.01	74.00	-29.99	V	Peak
1216.000	54.31	-7.73	46.58	74.00	-27.42	H	Peak
2242.000	45.40	-3.67	41.73	74.00	-32.27	H	Peak
2503.000	45.19	-2.25	42.94	74.00	-31.06	H	Peak
2827.000	43.86	-1.67	42.19	74.00	-31.81	H	Peak
3196.000	42.29	-1.03	41.26	74.00	-32.74	H	Peak
5050.000	41.59	5.07	46.66	74.00	-27.34	H	Peak

Remark:

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).

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Test Mode: TX / IEEE 802.11n HT40 MHz (CH Mid) **Tested by:** Fade Zhong

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 8, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1207.000	49.37	-7.76	41.61	74.00	-32.39	V	Peak
1909.000	51.59	-5.58	46.01	74.00	-27.99	V	Peak
2134.000	50.29	-4.27	46.02	74.00	-27.98	V	Peak
2431.000	46.09	-2.64	43.45	74.00	-30.55	V	Peak
2827.000	44.20	-1.67	42.53	74.00	-31.47	V	Peak
5428.000	41.70	5.74	47.44	74.00	-26.56	V	Peak
1207.000	50.11	-7.76	42.35	74.00	-31.65	H	Peak
1909.000	51.76	-5.58	46.18	74.00	-27.82	H	Peak
2224.000	45.54	-3.77	41.77	74.00	-32.23	H	Peak
2512.000	44.77	-2.24	42.53	74.00	-31.47	H	Peak
3214.000	43.15	-1.00	42.15	74.00	-31.85	H	Peak
5086.000	42.35	5.13	47.48	74.00	-26.52	H	Peak

Remark:

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).

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Test Mode: TX / IEEE 802.11n HT40 MHz (CH High) **Tested by:** Fade Zhong

Ambient temperature: 24°C **Relative humidity:** 52% RH **Date:** April 8, 2018

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Antenna Pole (V/H)	Remark
1207.000	48.27	-7.76	40.51	74.00	-33.49	V	Peak
1954.000	47.19	-5.29	41.90	74.00	-32.10	V	Peak
2134.000	50.47	-4.27	46.20	74.00	-27.80	V	Peak
2503.000	44.96	-2.25	42.71	74.00	-31.29	V	Peak
2953.000	44.80	-1.44	43.36	74.00	-30.64	V	Peak
5581.000	40.84	5.90	46.74	74.00	-27.26	V	Peak
1207.000	49.53	-7.76	41.77	74.00	-32.23	H	Peak
1909.000	55.19	-5.58	49.61	74.00	-24.39	H	Peak
2134.000	46.89	-4.27	42.62	74.00	-31.38	H	Peak
2530.000	45.27	-2.21	43.06	74.00	-30.94	H	Peak
2809.000	43.98	-1.70	42.28	74.00	-31.72	H	Peak
5140.000	41.28	5.23	46.51	74.00	-27.49	H	Peak

Remark:

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).

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

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

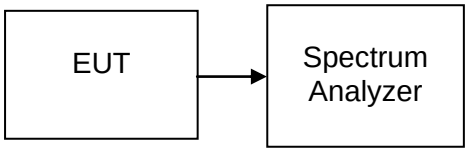
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Spectrum Analyzer	Agilent	N9010A	MY52221469	01/27/2018	01/26/2019

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 ≥ 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 ≥ 6 dB.

7.3.4. TEST SETUP



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

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	9597	9121	>500	PASS
Mid	2437	9120	9117		PASS
High	2462	9109	9095		PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Bandwidth (kHz)		Limit (kHz)	Test Result
		Antenna 0	Antenna 1		
Low	2412	16300	16070	>500	PASS
Mid	2437	16080	16300		PASS
High	2462	16070	16070		PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Bandwidth (kHz)		Limit (kHz)	Test Result
		Antenna 0	Antenna 1		
Low	2412	16500	16580	>500	PASS
Mid	2437	16510	16580		PASS
High	2462	16780	16370		PASS

Test mode: IEEE 802.11n HT40 MHz

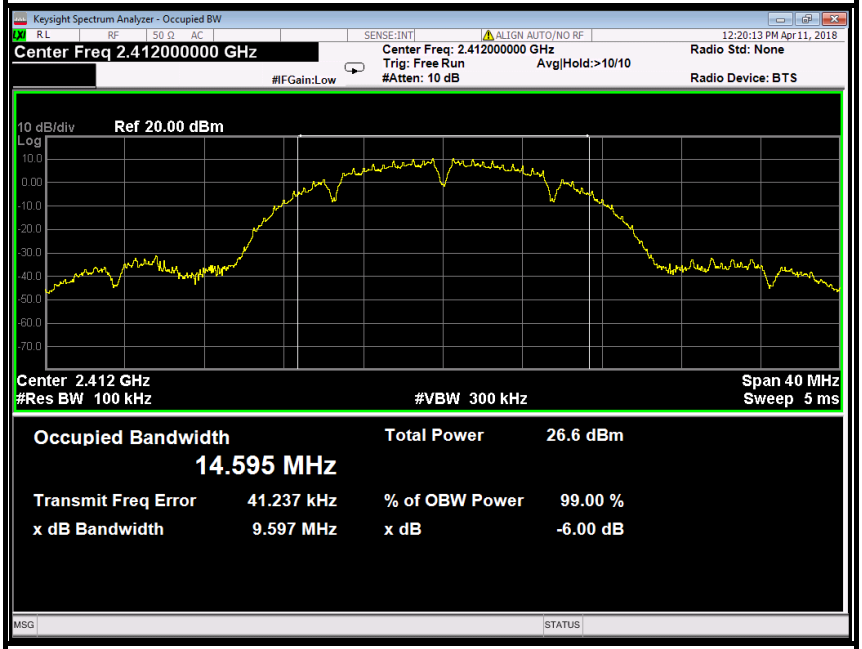
Channel	Frequency (MHz)	Bandwidth (kHz)		Limit (kHz)	Test Result
		Antenna 0	Antenna 1		
Low	2422	35220	35200	>500	PASS
Mid	2437	35230	35190		PASS
High	2452	35230	35200		PASS

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

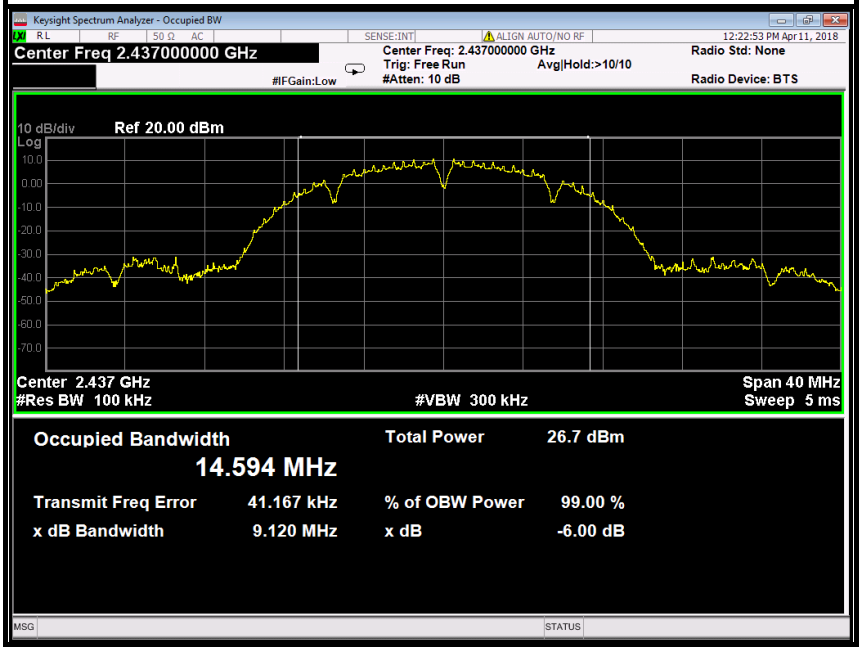
Test Plot
Antenna 0

IEEE 802.11b mode

6dB Bandwidth (CH Low)

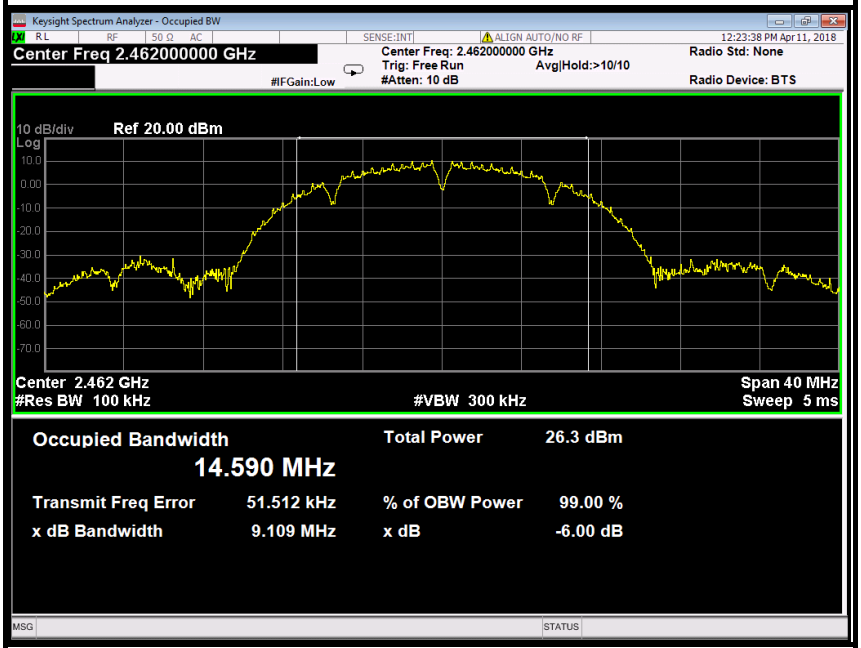


6dB Bandwidth (CH Mid)



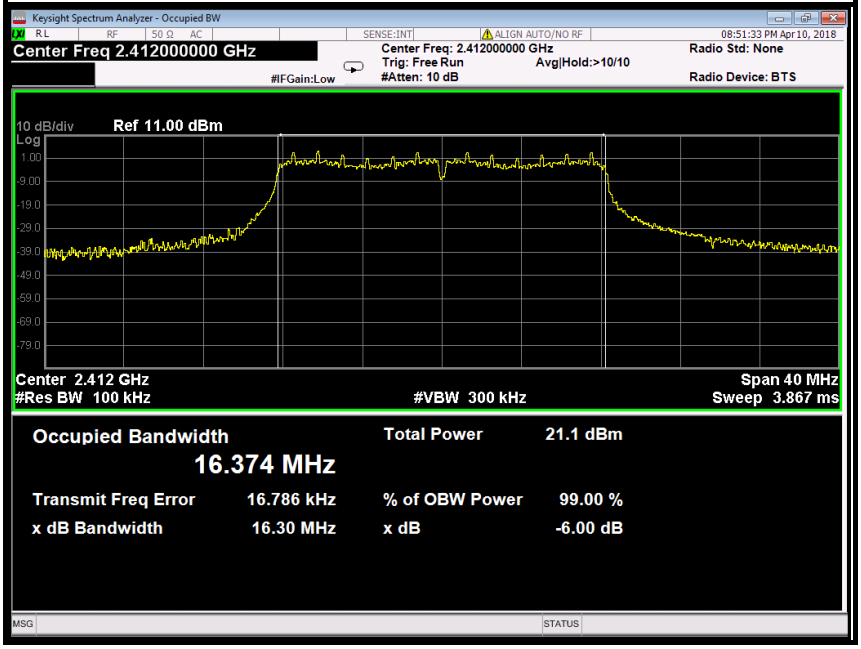
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

6dB Bandwidth (CH High)



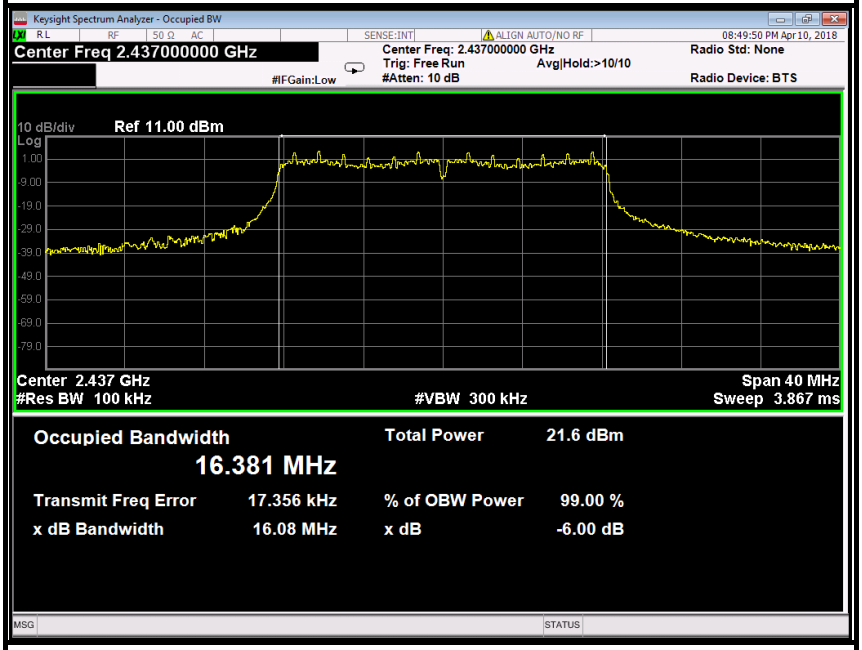
IEEE 802.11g mode

6dB Bandwidth (CH Low)

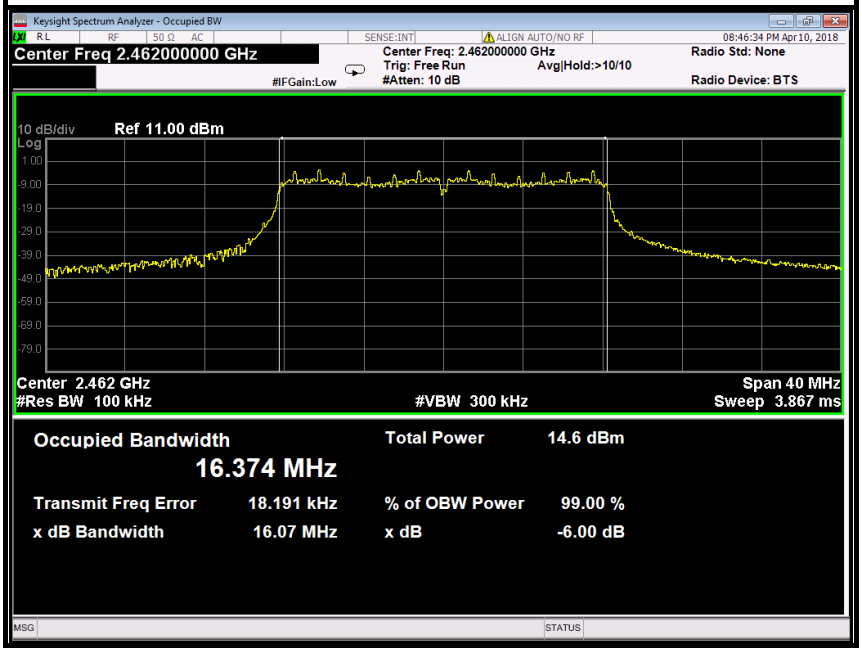


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

6dB Bandwidth (CH Mid)



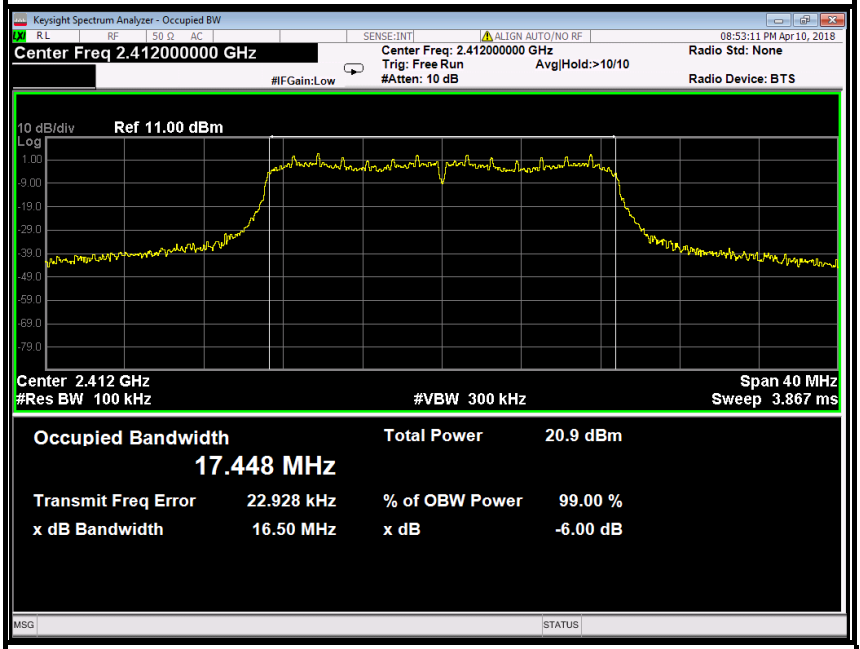
6dB Bandwidth (CH High)



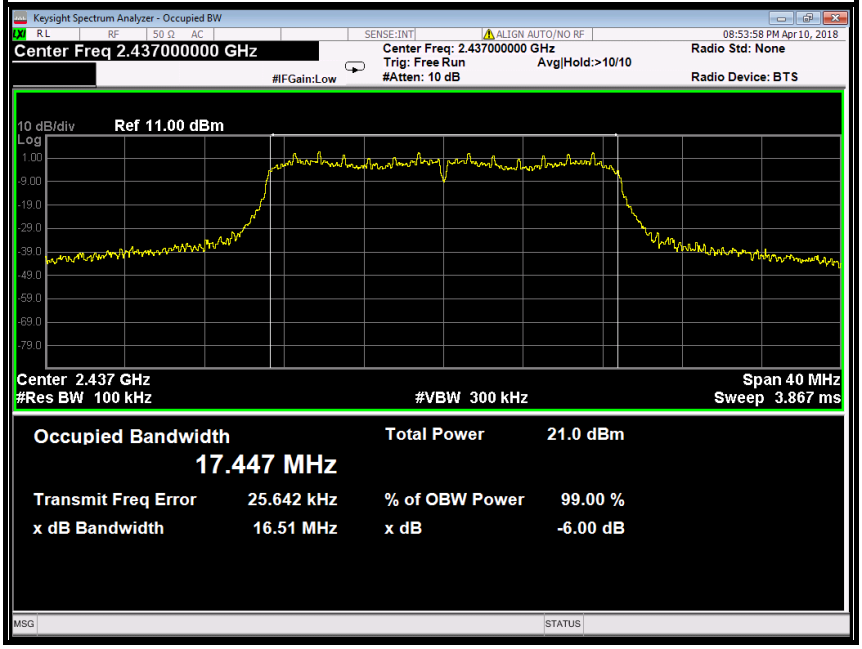
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

IEEE 802.11n HT20 MHz mode

6dB Bandwidth (CH Low)

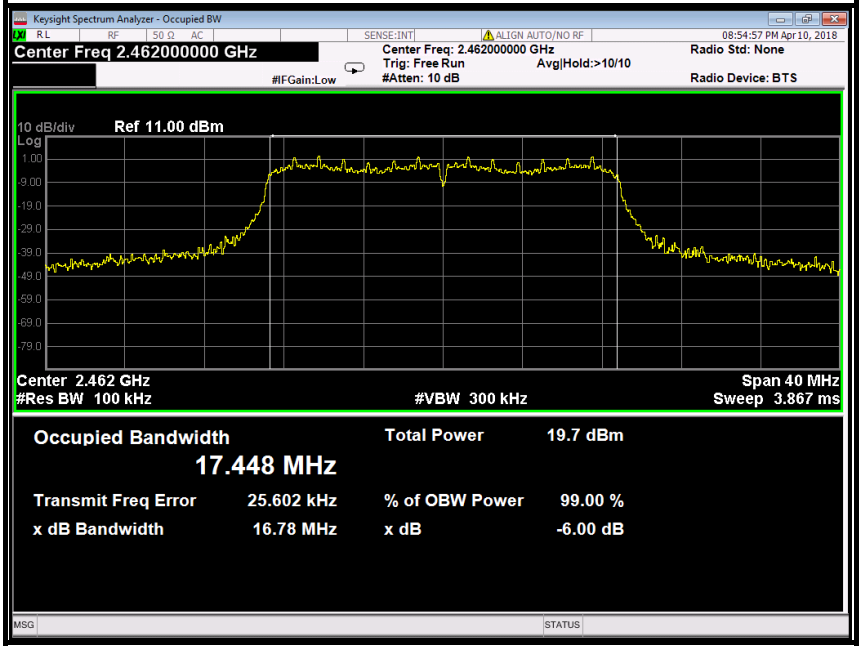


6dB Bandwidth (CH Mid)



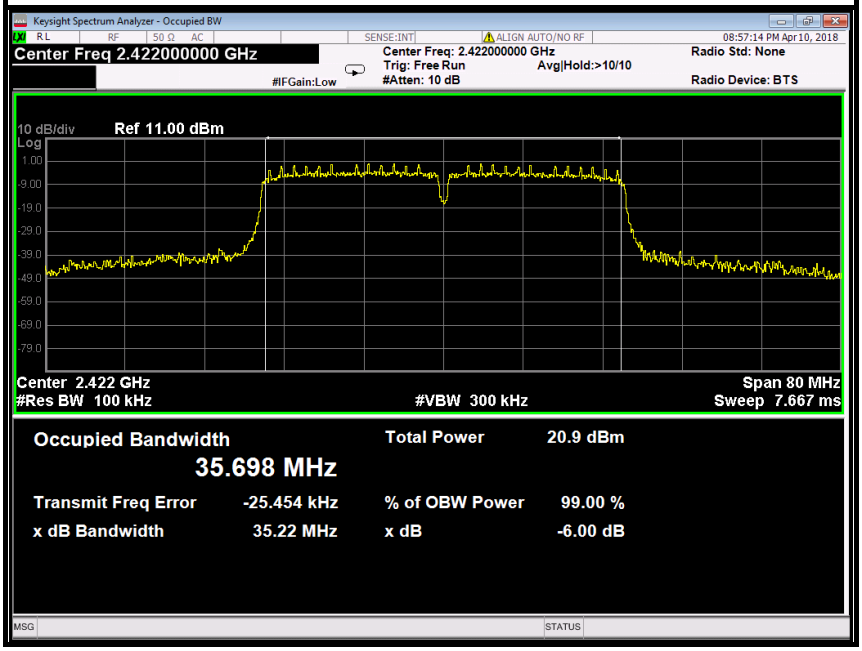
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

6dB Bandwidth (CH High)



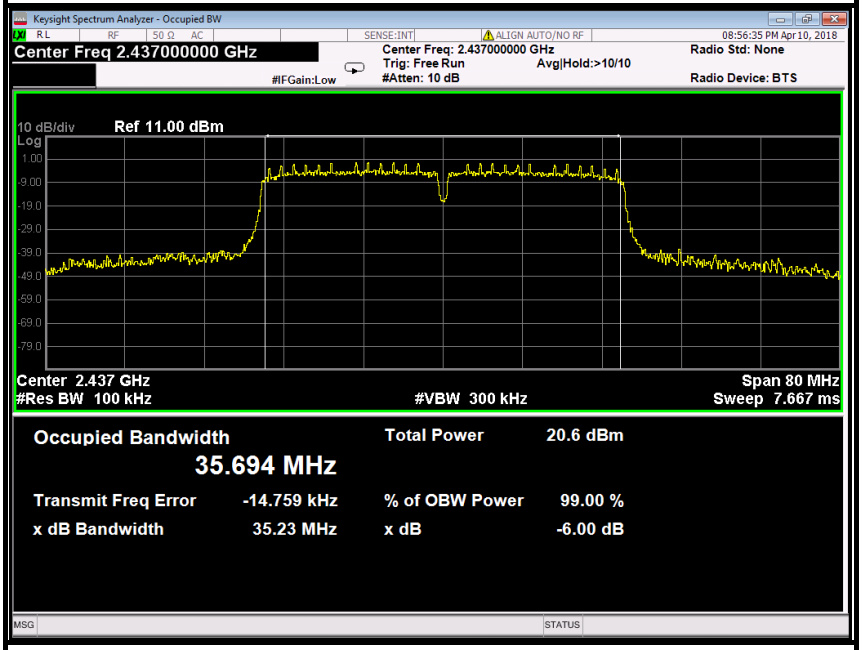
IEEE 802.11n HT40 MHz mode

6dB Bandwidth (CH Low)

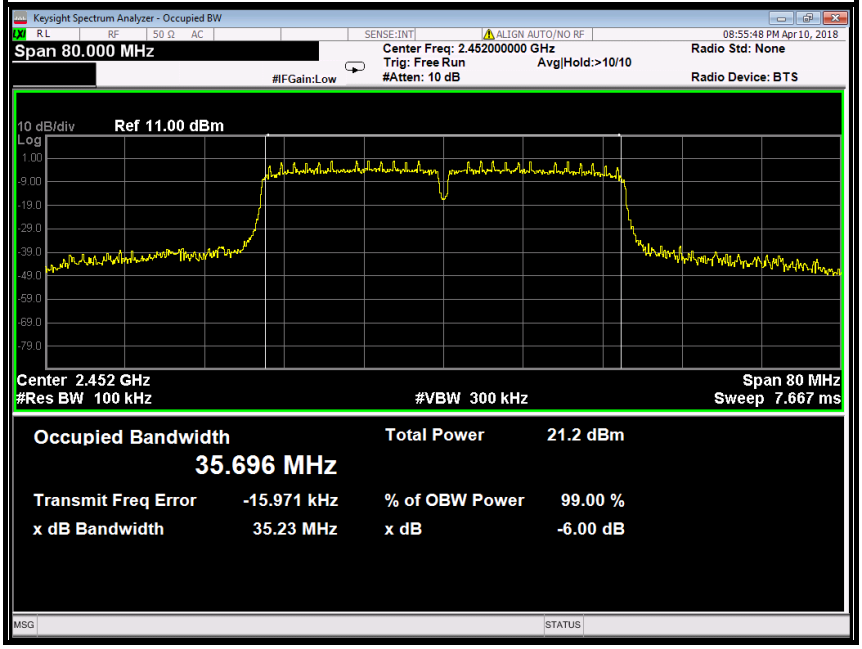


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)

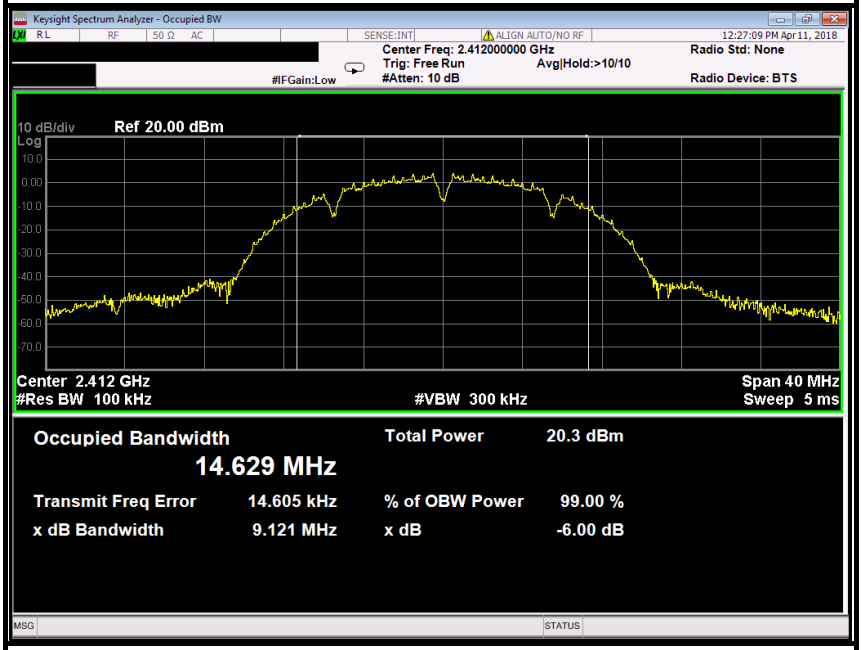


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

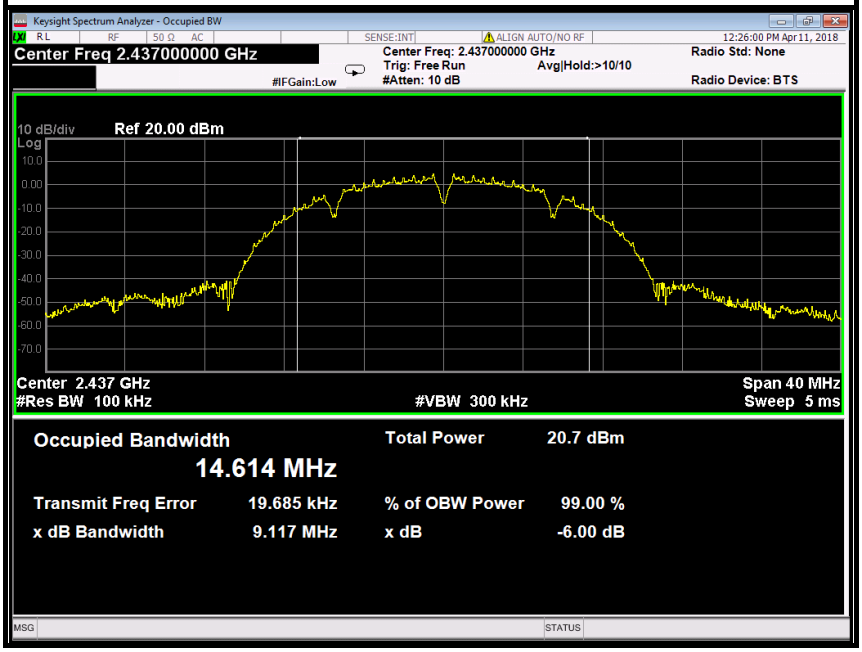
Antenna 1

IEEE 802.11b mode

6dB Bandwidth (CH Low)

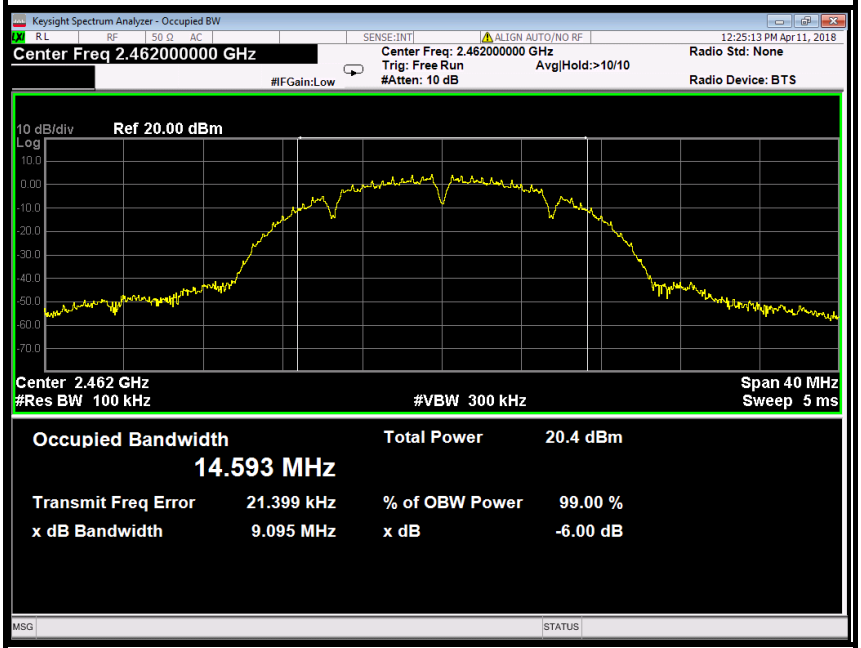


6dB Bandwidth (CH Mid)



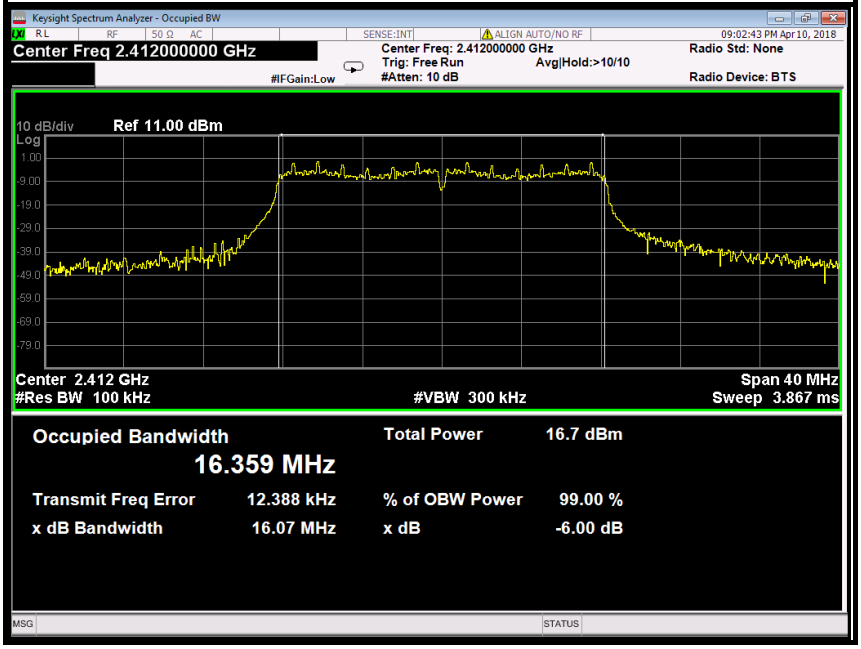
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

6dB Bandwidth (CH High)



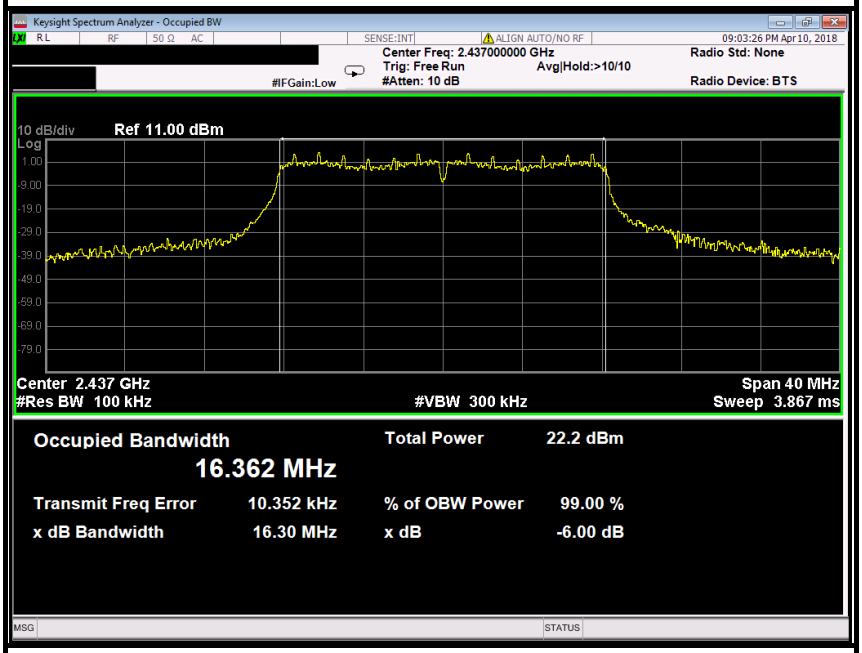
IEEE 802.11g mode

6dB Bandwidth (CH Low)

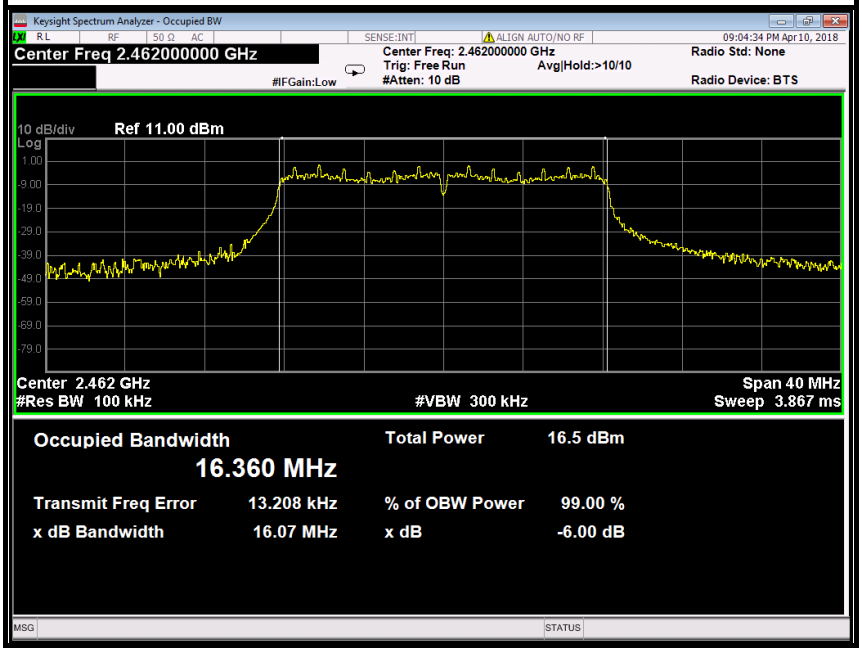


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

6dB Bandwidth (CH Mid)



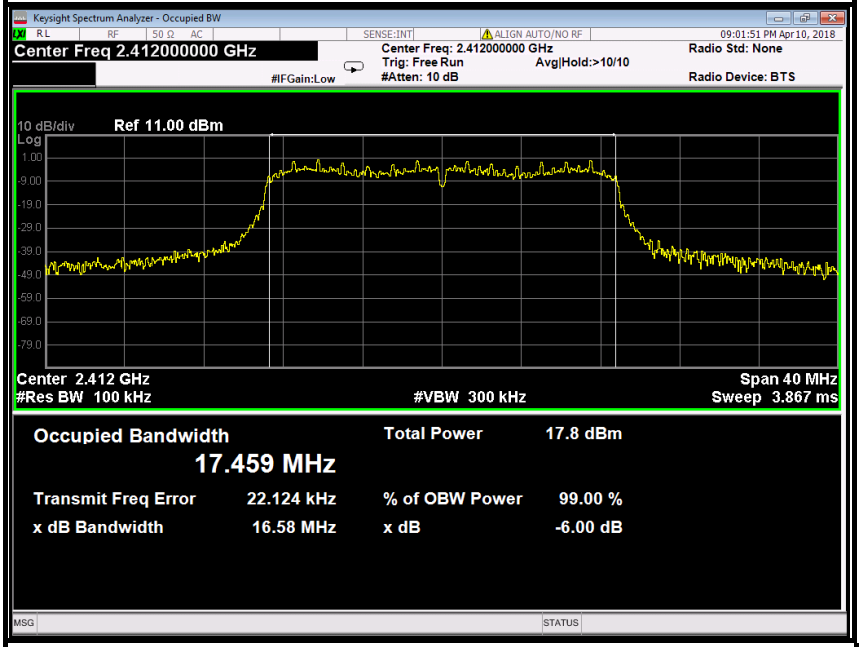
6dB Bandwidth (CH High)



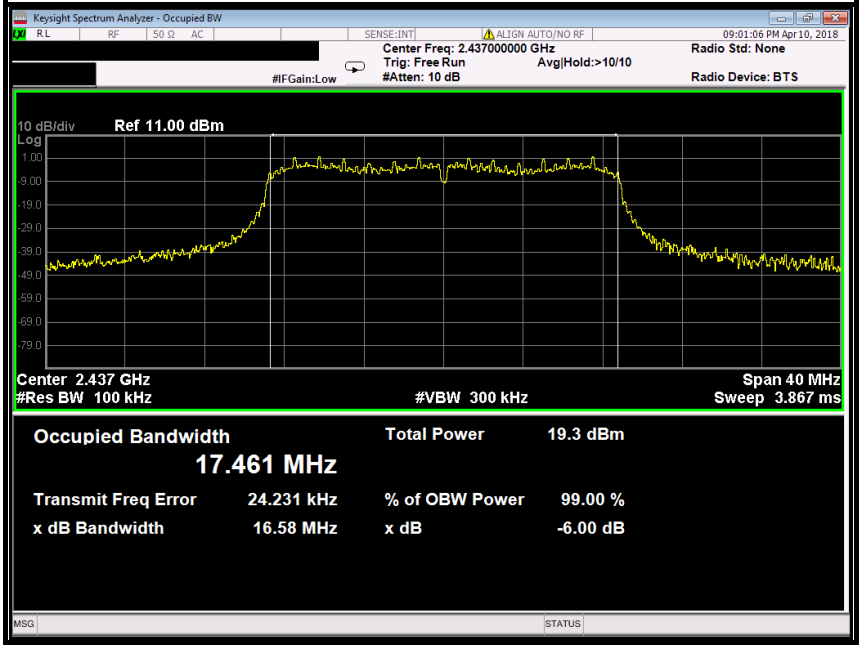
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

IEEE 802.11n HT20 MHz mode

6dB Bandwidth (CH Low)

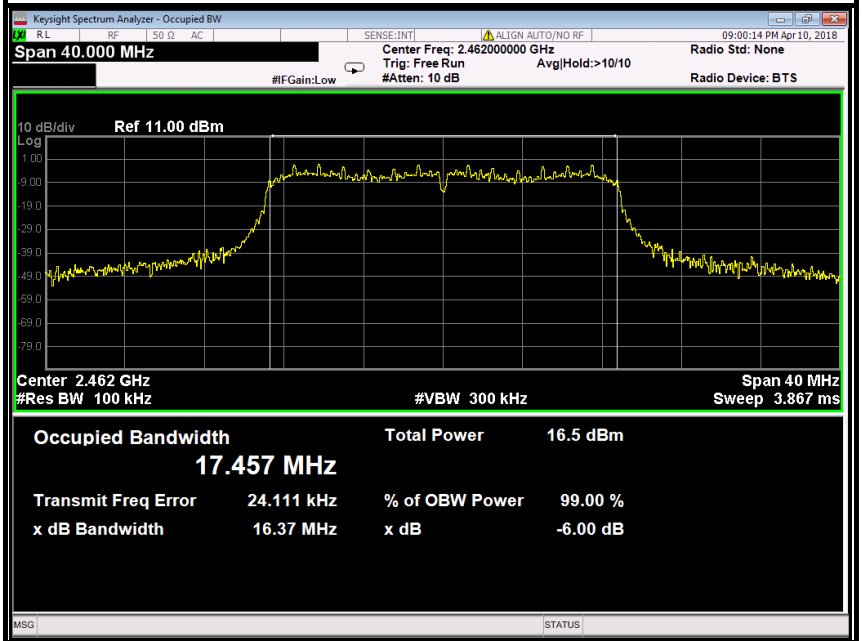


6dB Bandwidth (CH Mid)



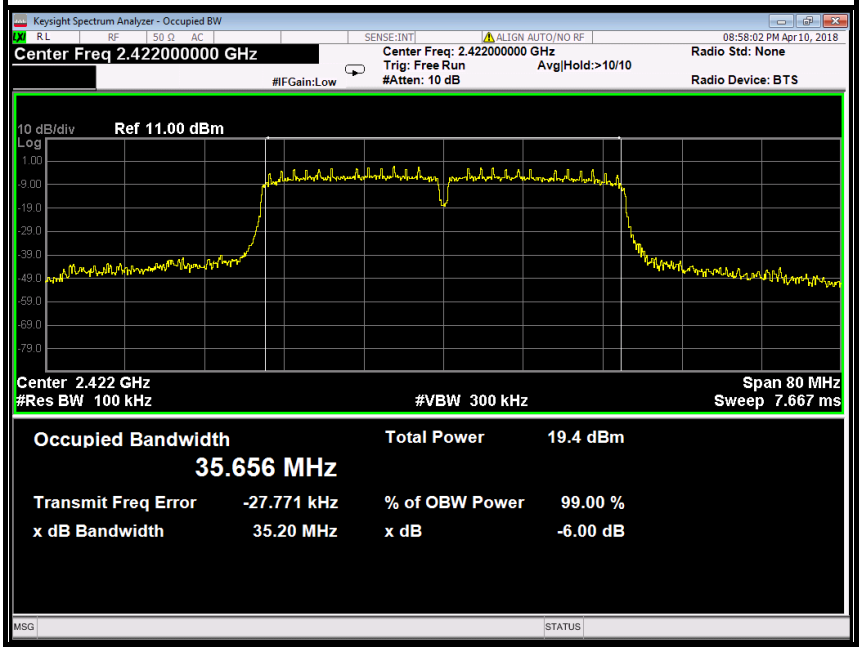
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

6dB Bandwidth (CH High)



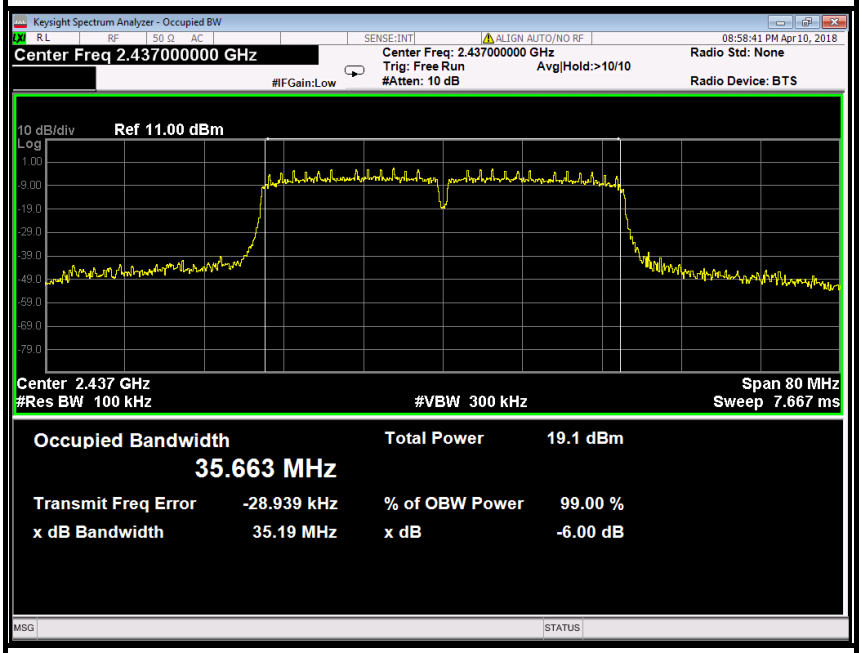
IEEE 802.11n HT40 MHz mode

6dB Bandwidth (CH Low)

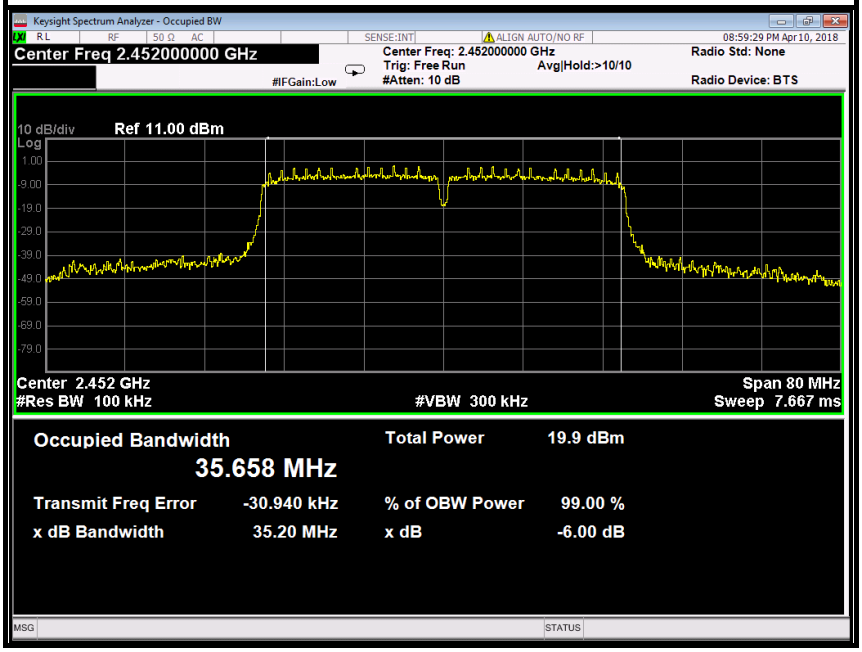


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

6dB Bandwidth (CH Mid)



6dB Bandwidth (CH High)



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

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	

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

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		8.64	15.83	8.79
Radiated power [dBm/MHz] Measured with DSSS modulation		10.83	18.28	11.34
Gain [dBi] Calculated		2.19	2.45	2.55
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		8.71	15.63	8.60
Radiated power [dBm/MHz] Measured with DSSS modulation		10.85	17.76	10.83
Gain [dBi] Calculated		2.14	2.13	2.23
Measurement uncertainty		± 1.5 dB (cond.) / ± 3 dB (rad.)		

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

7.5. 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

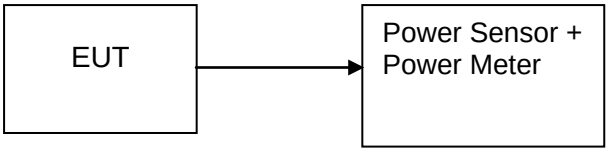
Name of Equipment	Manufacturer	Model	Serial Number	Last Calibration	Calibration Due
Power Meter	Anritsu	ML2495A	1204003	01/27/2018	01/26/2019
Power Sensor	Anritsu	MA2411B	1126150	01/27/2018	01/26/2019
RF Control Nunit	tonscend	JS0806-2	N/A	N/A	N/A
Test SW	tonscend	Js1120-2			

7.5.3. TEST PROCEDURES (please refer to measurement standard)

9.2.3.2 Method AVGPM-G (Measurement using a gated RF average power meter)

Alternatively, measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since this measurement is made only during the ON time of the transmitter, no duty cycle correction is required.

7.5.4. TEST SETUP



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

7.5.5. TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	AVG	Limit (W)	Result
		Antenna 0	Antenna 1	Total				
Low	2412	18.46	18.31	21.40	0.13791	AVG	1	PASS
Mid	2437	25.43	25.23	28.34	0.68257			PASS
High	2462	18.38	18.19	21.30	0.13478			PASS

Test mode: IEEE 802.11g

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	AVG	Limit (W)	Result
		Antenna 0	Antenna 1	Total				
Low	2412	16.38	16.23	19.32	0.08543	AVG	1	PASS
Mid	2437	25.89	25.53	28.72	0.74542			PASS
High	2462	16.02	16.39	19.22	0.08355			PASS

Test mode: IEEE 802.11n HT20 MHz

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	AVG	Limit (W)	Result
		Antenna 0	Antenna 1	Total				
Low	2412	19.23	18.89	22.07	0.16120	AVG	1	PASS
Mid	2437	25.58	25.86	28.73	0.74689			PASS
High	2462	18.87	18.45	21.68	0.14707			PASS

Test mode: IEEE 802.11n HT40 MHz

Channel	Frequency (MHz)	Output Power (dBm)			Output Power (W)	AVG	Limit (W)	Result
		Antenna 0	Antenna 1	Total				
Low	2412	18.82	18.23	21.55	0.14274	AVG	1	PASS
Mid	2437	25.52	25.56	28.55	0.71620			PASS
High	2462	18.34	18.45	21.41	0.13822			PASS

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

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 in 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	01/27/2018	01/26/2019
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI	100783	01/27/2018	01/26/2019
Amplifier	EMEC	EM330	060661	01/27/2018	01/26/2019
High Noise Amplifier	Agilent	8449B	3008A01838	01/27/2018	01/26/2019
Loop Antenna	COM-POWER	AL-130	121044	01/30/2018	01/29/2019
Bilog Antenna	SCHAFFNER	CBL6143	5082	02/21/2018	02/20/2019
Horn Antenna	SCHWARZBECK	BBHA9120	D286	01/27/2018	01/26/2019
Board-Band Horn Antenna	Schwarzbeck	BBHA 9170	9170-497	01/24/2018	01/23/2019
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	01/29/2018	01/28/2019
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.

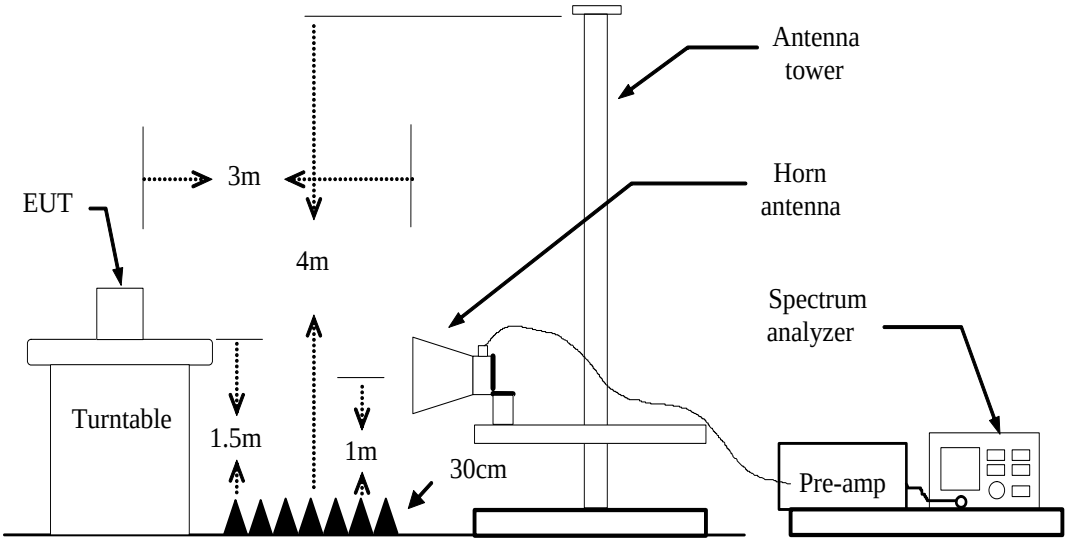
3. N.C.R = No Calibration Required.

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

7.6.3. TEST PROCEDURES (please refer to measurement standard)

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

7.6.4. TEST SETUP



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

7.6.5. TEST RESULTS

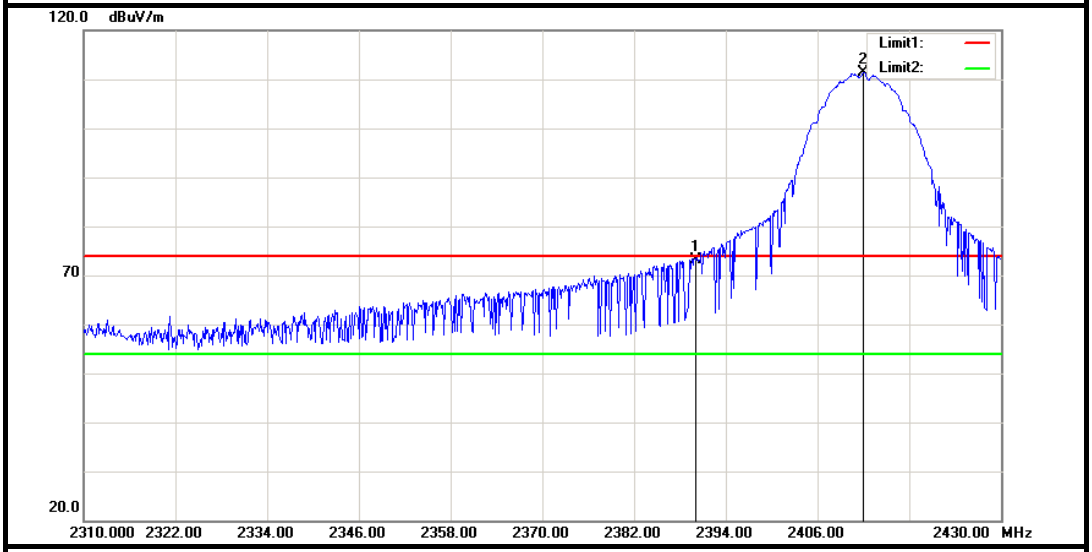
Test Plot

Combine with Antenna 0 and Antenna 1

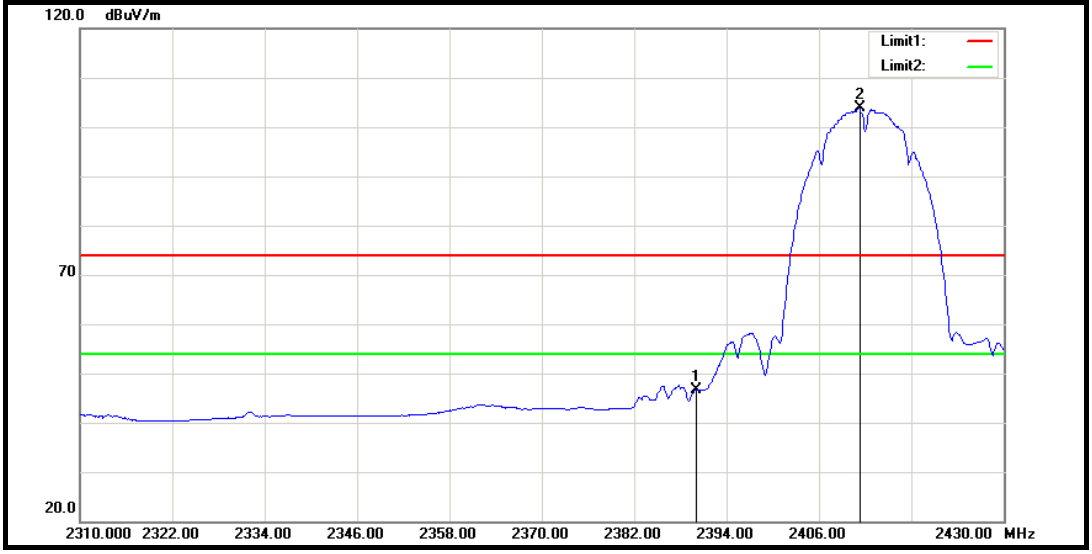
IEEE 802.11b mode

Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**



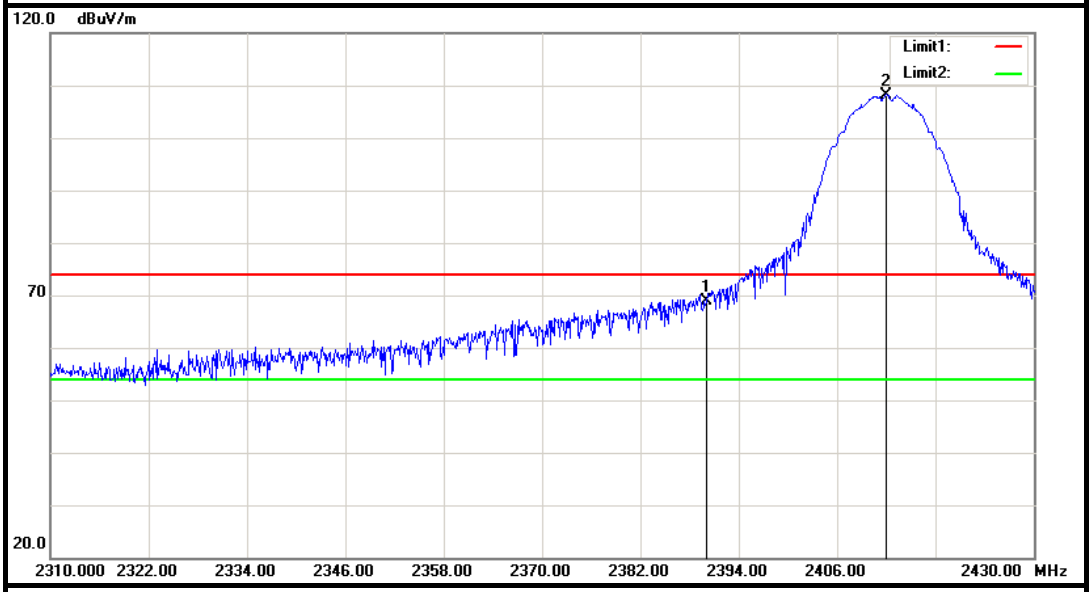
Detector mode: Average **Polarity: Vertical**



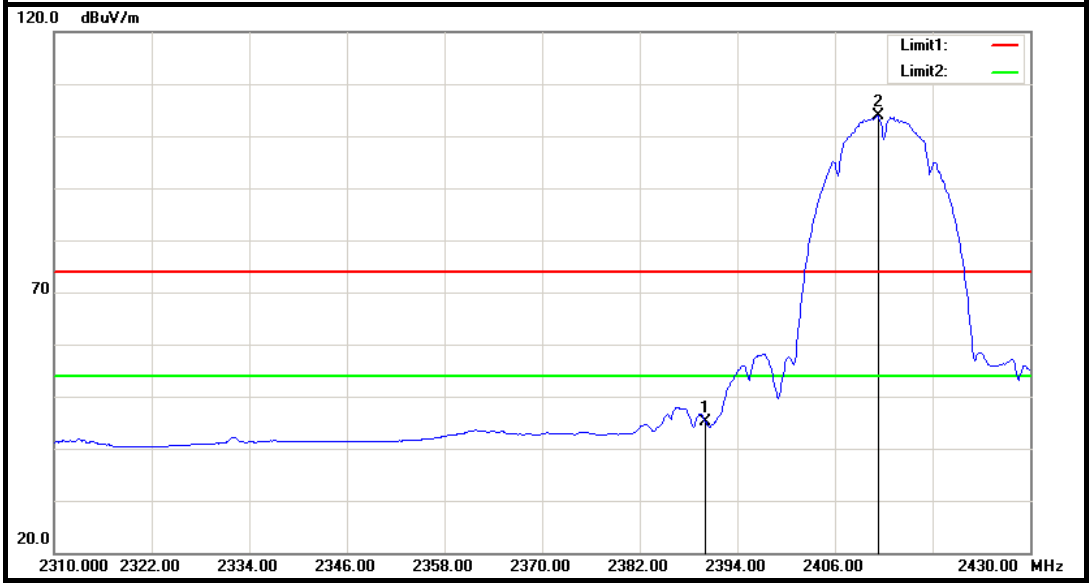
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	75.94	-2.86	73.08	74.00	-0.92	Peak	Vertical
2	2412.000	114.06	-2.74	111.32	---	---	Peak	Vertical
1	2390.000	49.51	-2.86	46.65	54.00	-7.35	Average	Vertical
2	2411.280	106.56	-2.75	103.81	---	---	Average	Vertical

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**

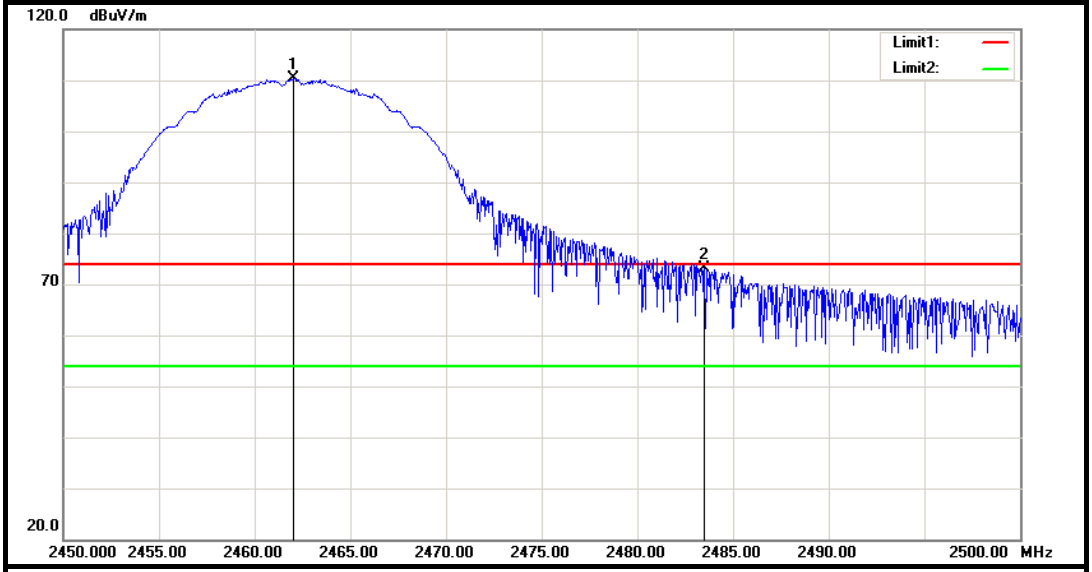


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	71.81	-2.86	68.95	74.00	-5.05	Peak	Horizontal
2	2412.000	110.99	-2.74	108.25	---	---	Peak	Horizontal
1	2390.000	47.91	-2.86	45.05	54.00	-8.95	Average	Horizontal
2	2411.280	106.59	-2.75	103.84	---	---	Average	Horizontal

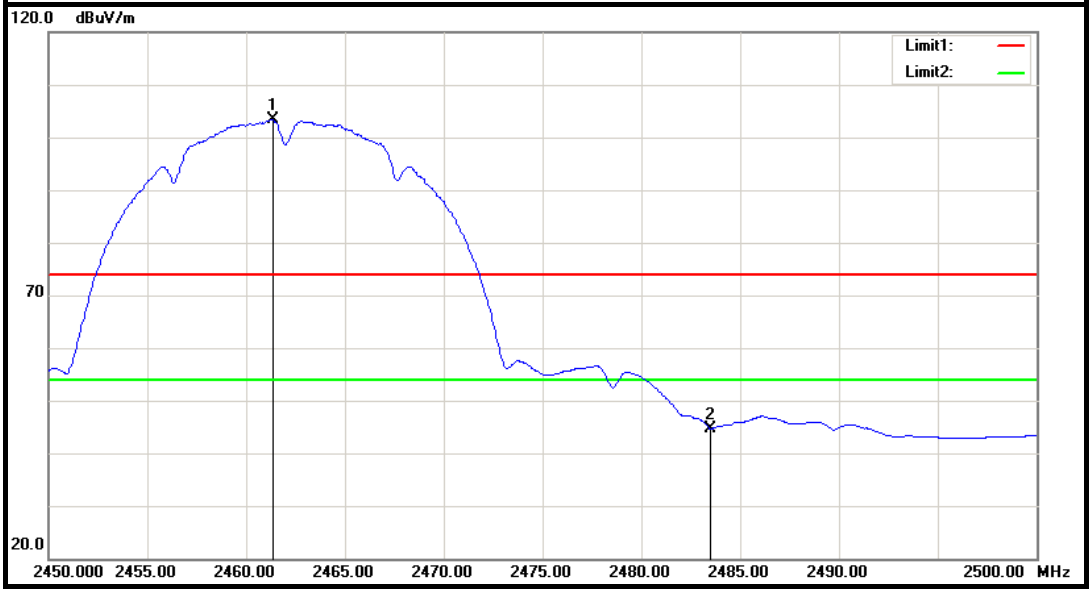
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



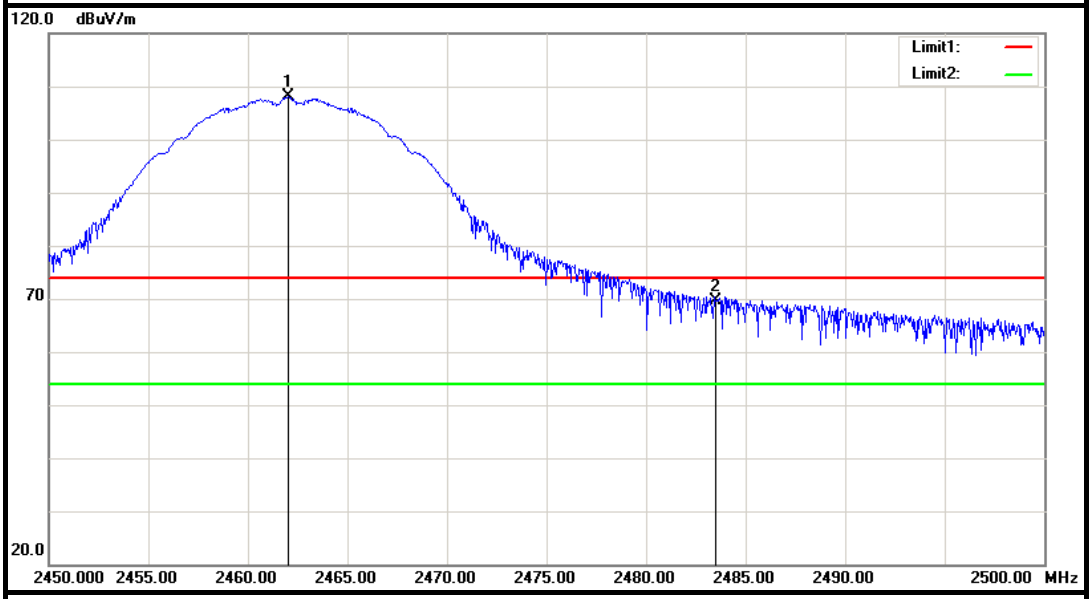
Detector mode: Average **Polarity: Vertical**



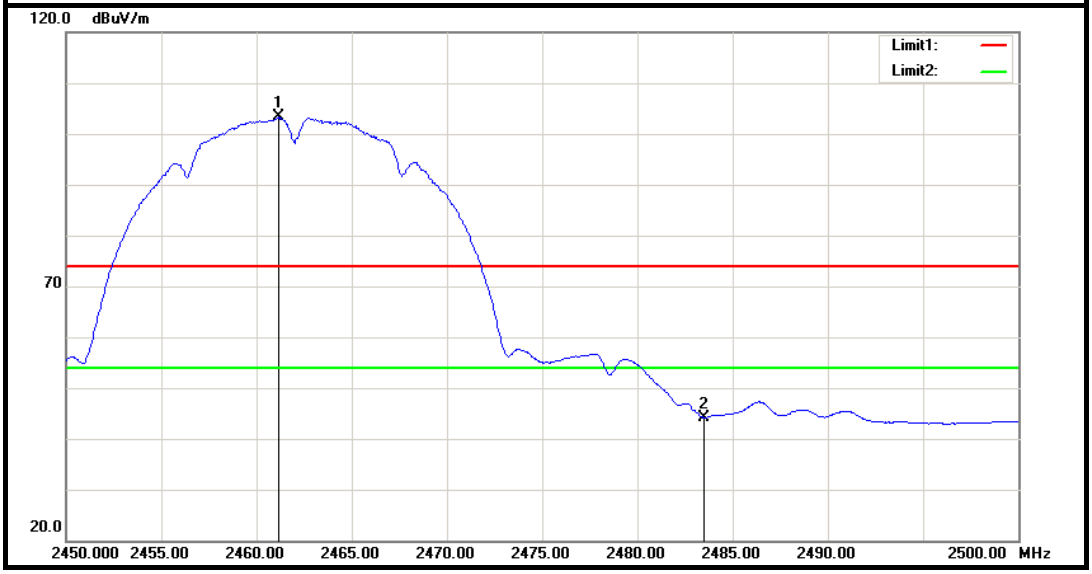
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2462.050	112.95	-2.47	110.48	---	---	Peak	Vertical
2	2483.500	75.46	-2.35	73.11	74.00	-0.89	Peak	Vertical
1	2461.350	105.77	-2.47	103.30	---	---	Average	Vertical
2	2483.500	46.89	-2.35	44.54	54.00	-9.46	Average	Vertical

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**

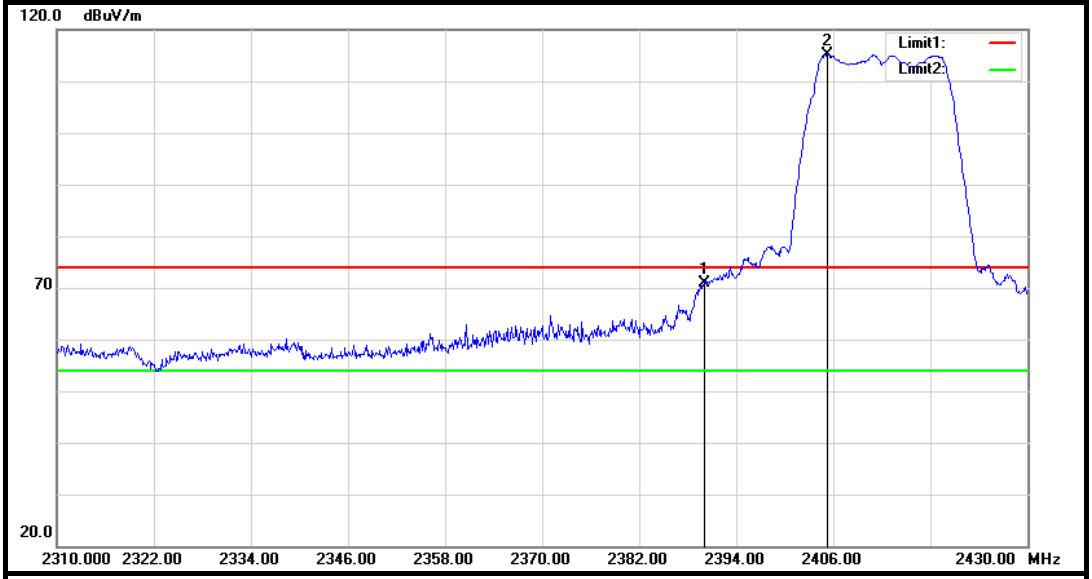


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2462.000	110.48	-2.47	108.01	---	---	Peak	Horizontal
2	2483.500	71.88	-2.35	69.53	74.00	-4.47	Peak	Horizontal
1	2461.150	105.74	-2.47	103.27	---	---	Average	Horizontal
2	2483.500	46.49	-2.35	44.14	54.00	-9.86	Average	Horizontal

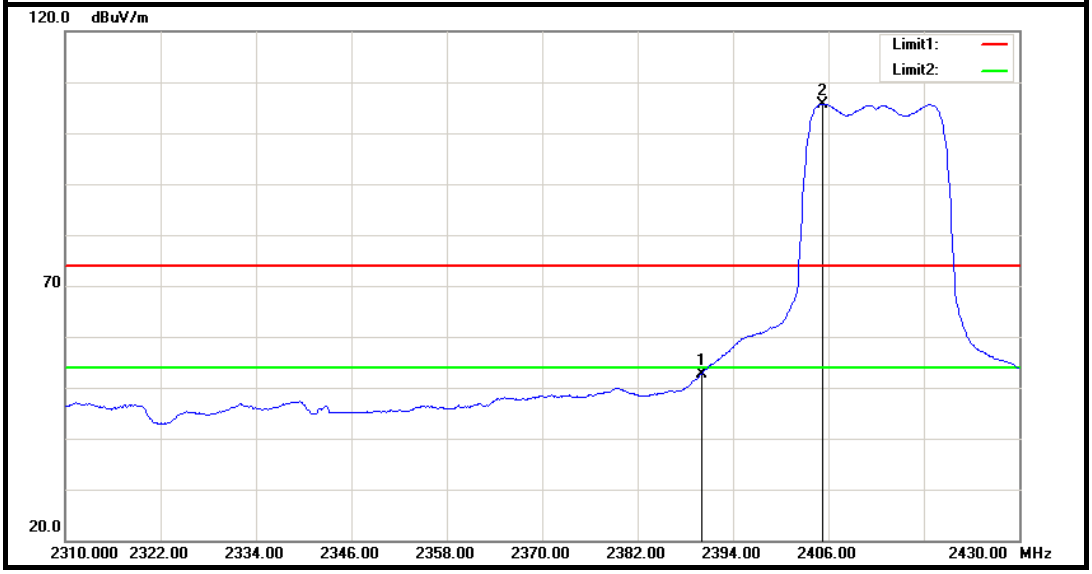
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

IEEE 802.11g mode
Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**



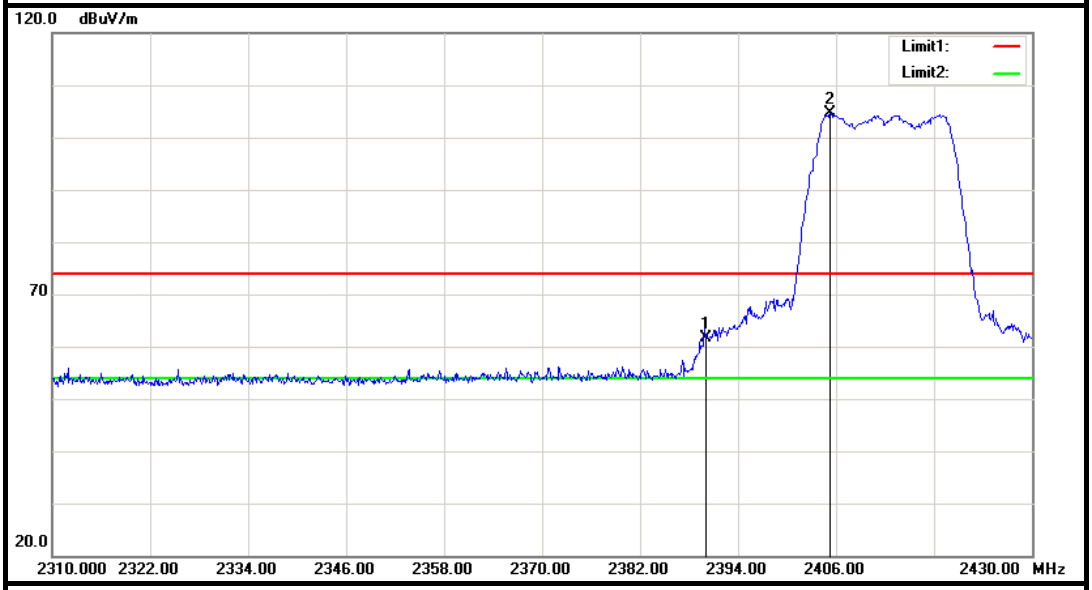
Detector mode: Average **Polarity: Vertical**



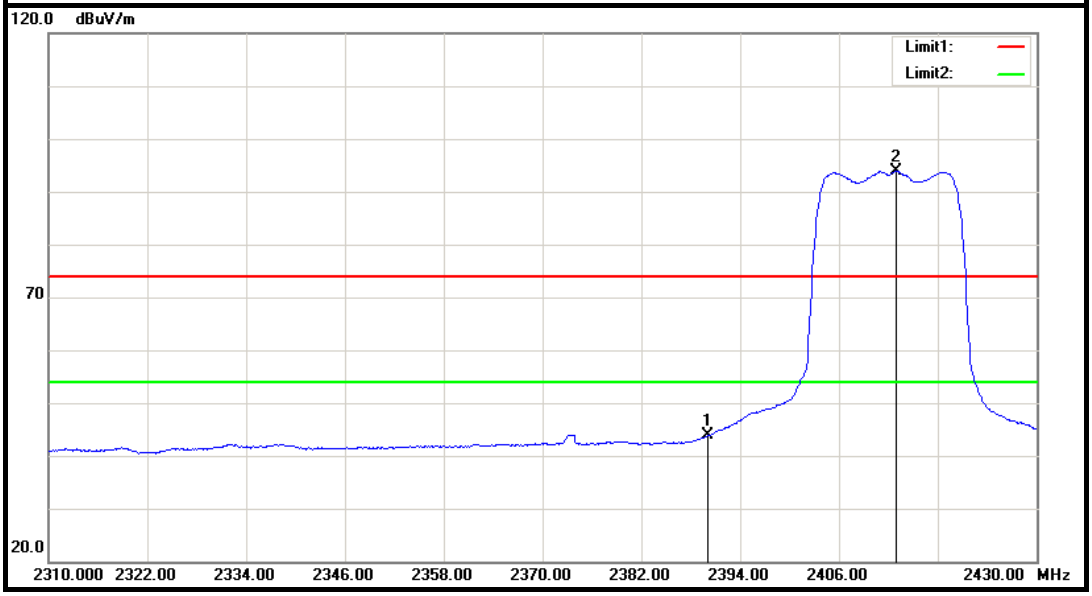
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	73.77	-2.86	70.91	74.00	-3.09	Peak	Vertical
2	2405.280	117.98	-2.78	115.20	---	---	Peak	Vertical
1	2390.000	56.48	-2.86	53.62	54.00	-0.38	Average	Vertical
2	2405.280	109.50	-2.78	106.72	---	---	Average	Vertical

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**

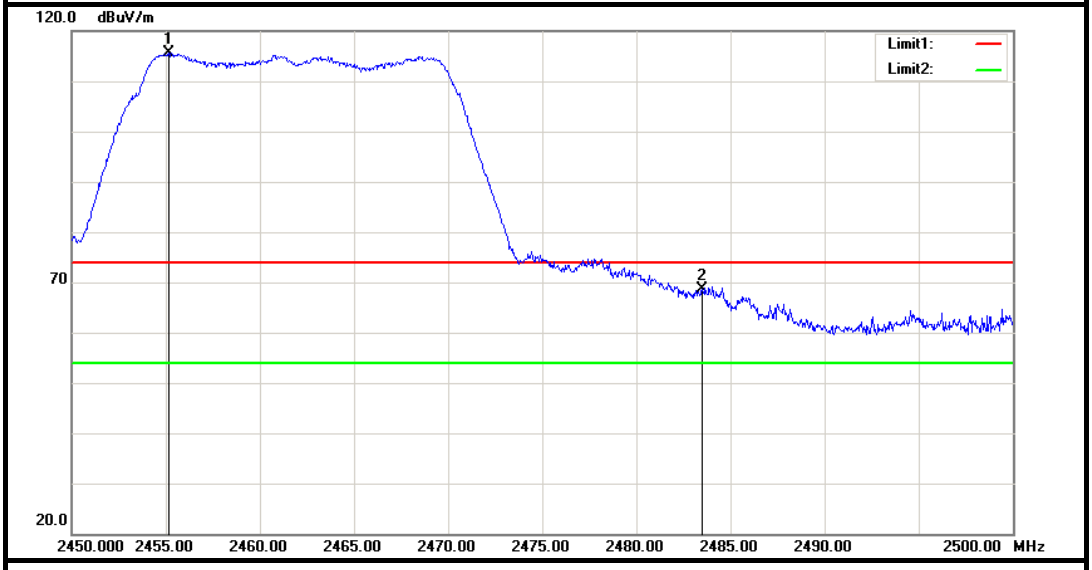


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	64.55	-2.86	61.69	74.00	-12.31	Peak	Horizontal
2	2405.280	107.36	-2.78	104.58	---	---	Peak	Horizontal
1	2390.000	46.68	-2.86	43.82	54.00	-10.18	Average	Horizontal
2	2412.960	96.63	-2.74	93.89	---	---	Average	Horizontal

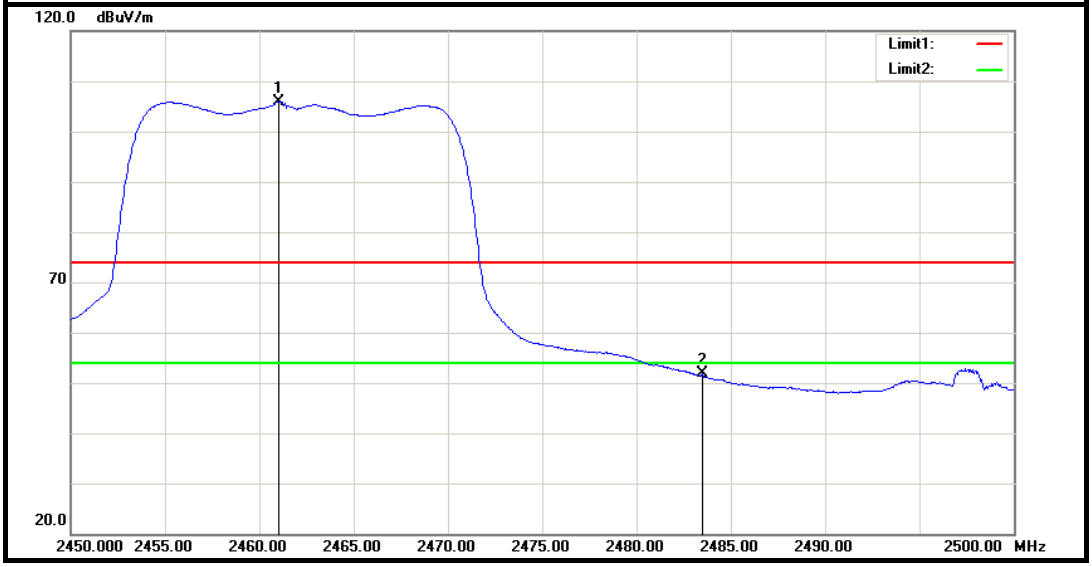
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



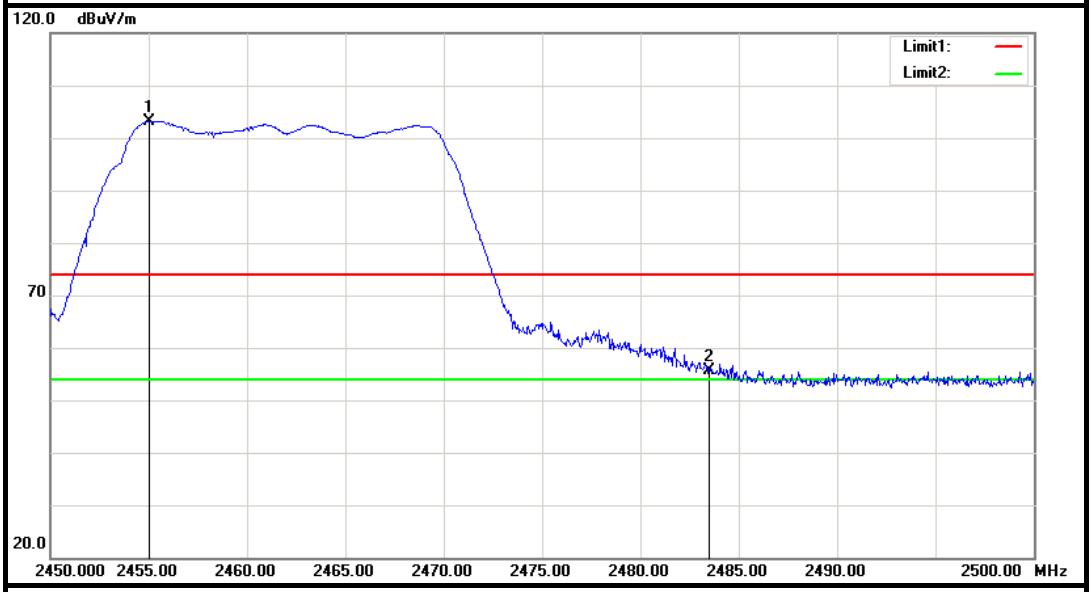
Detector mode: Average **Polarity: Vertical**



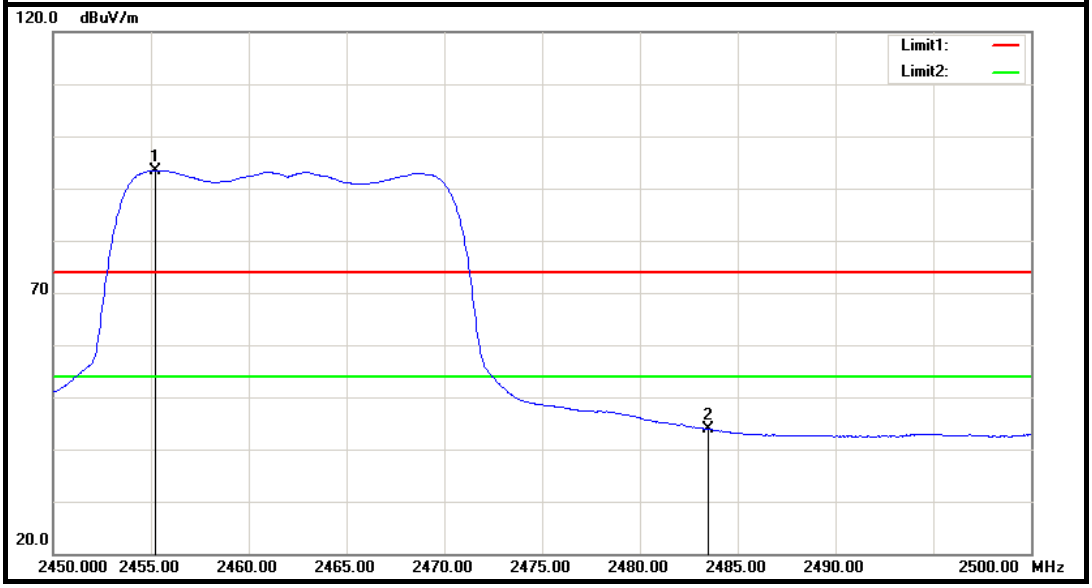
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2455.150	118.20	-2.51	115.69	---	---	Peak	Vertical
2	2483.500	71.00	-2.35	68.65	74.00	-5.35	Peak	Vertical
1	2461.000	108.30	-2.47	105.83	---	---	Average	Vertical
2	2483.500	54.15	-2.35	51.80	54.00	-2.20	Average	Vertical

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



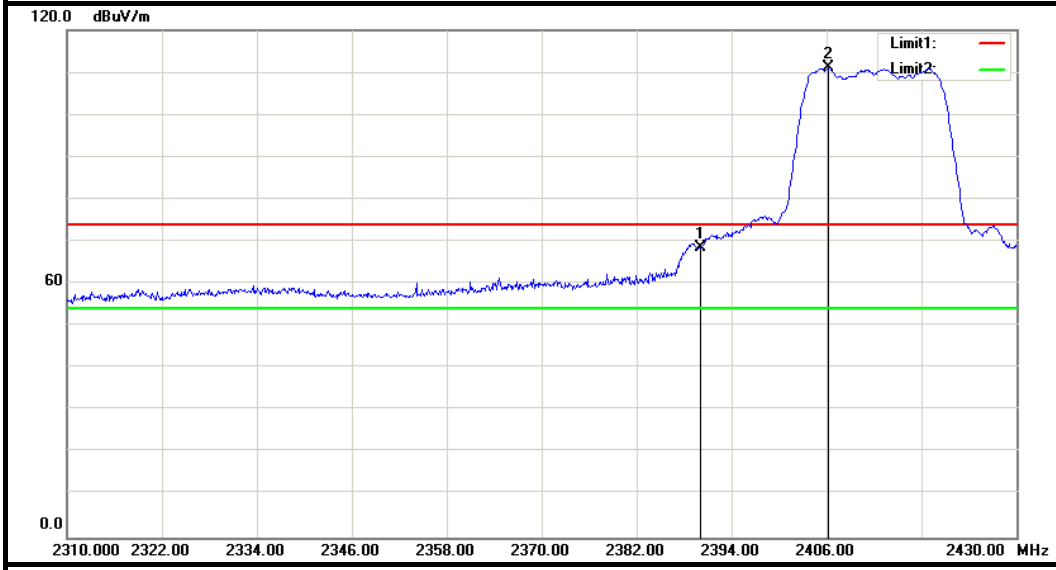
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2455.050	105.63	-2.51	103.12	---	---	Peak	Horizontal
2	2483.500	57.87	-2.35	55.52	74.00	-18.48	Peak	Horizontal
1	2455.250	96.00	-2.51	93.49	---	---	Average	Horizontal
2	2483.500	46.16	-2.35	43.81	54.00	-10.19	Average	Horizontal

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

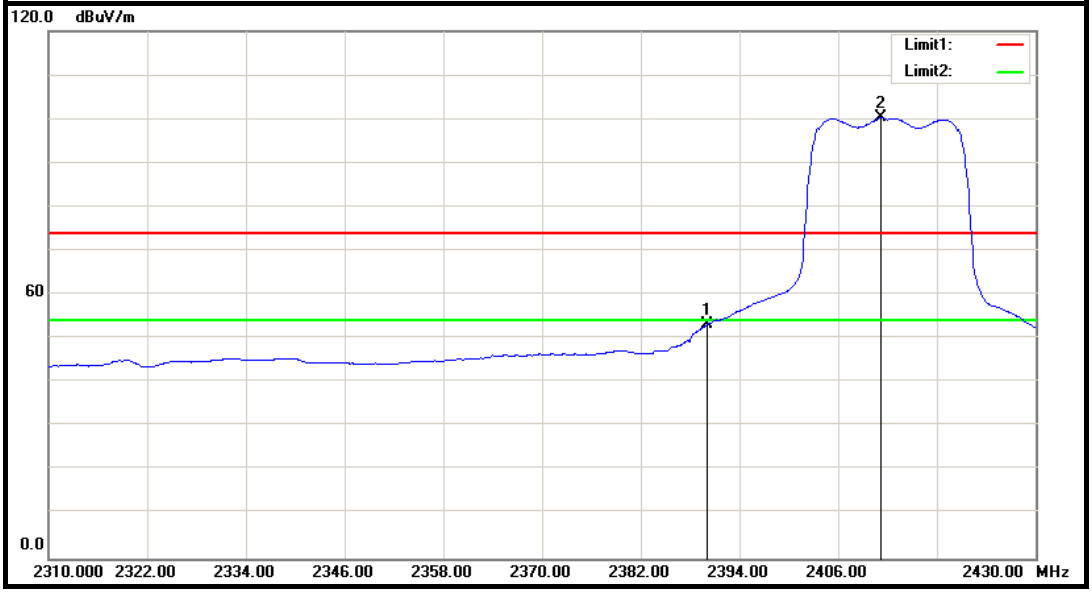
IEEE 802.11n HT20 MHz mode

Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**



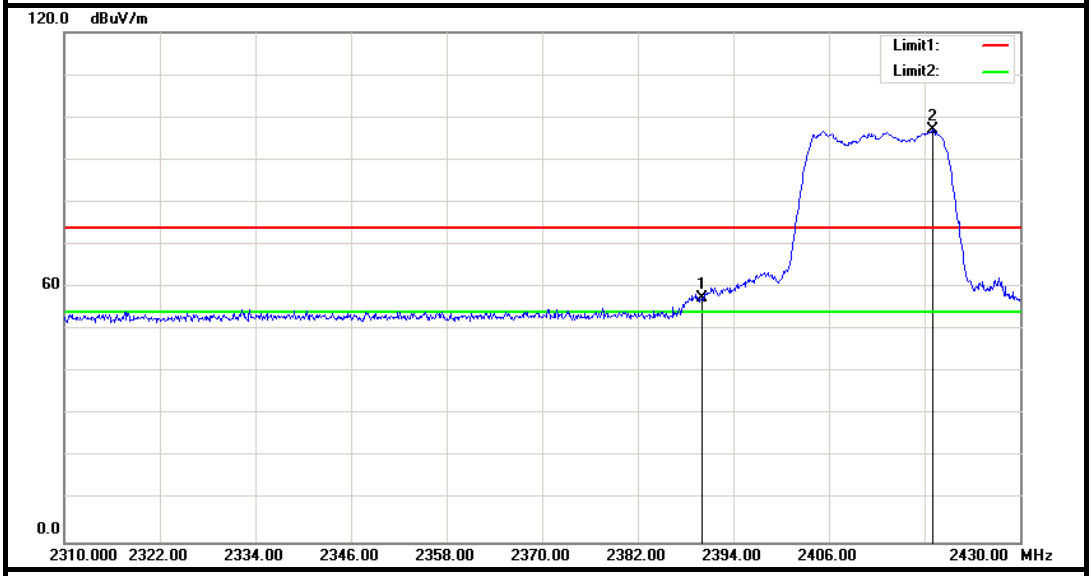
Detector mode: Average **Polarity: Vertical**



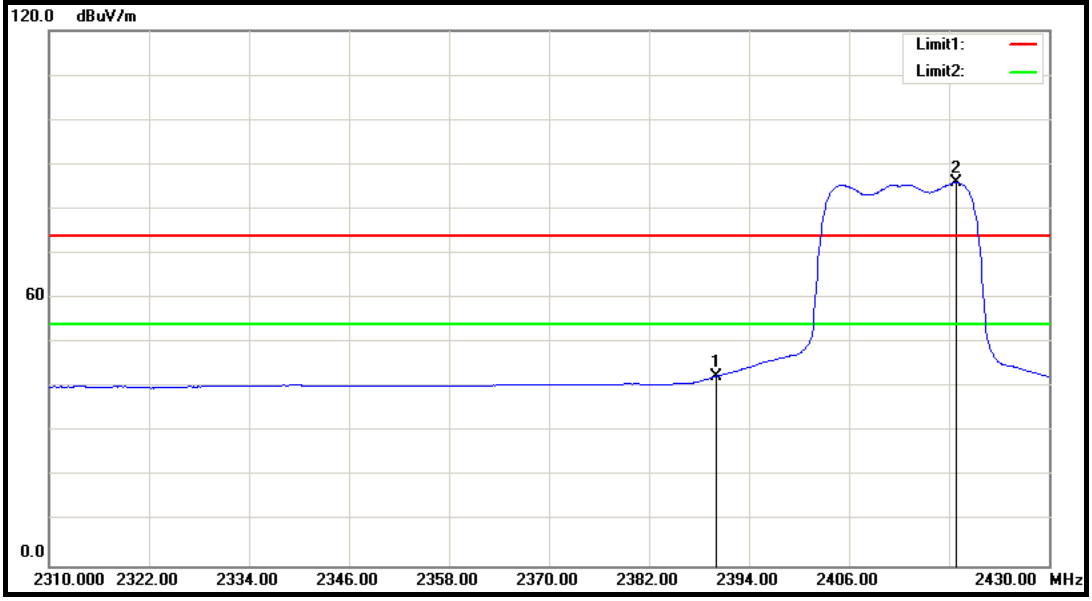
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	71.38	-2.86	68.52	74.00	-5.48	Peak	Vertical
2	2406.240	113.84	-2.77	111.07	---	---	Peak	Vertical
1	2390.000	56.07	-2.86	53.21	54.00	-0.79	Average	Vertical
2	2411.160	102.99	-2.75	100.24	---	---	Average	Vertical

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**

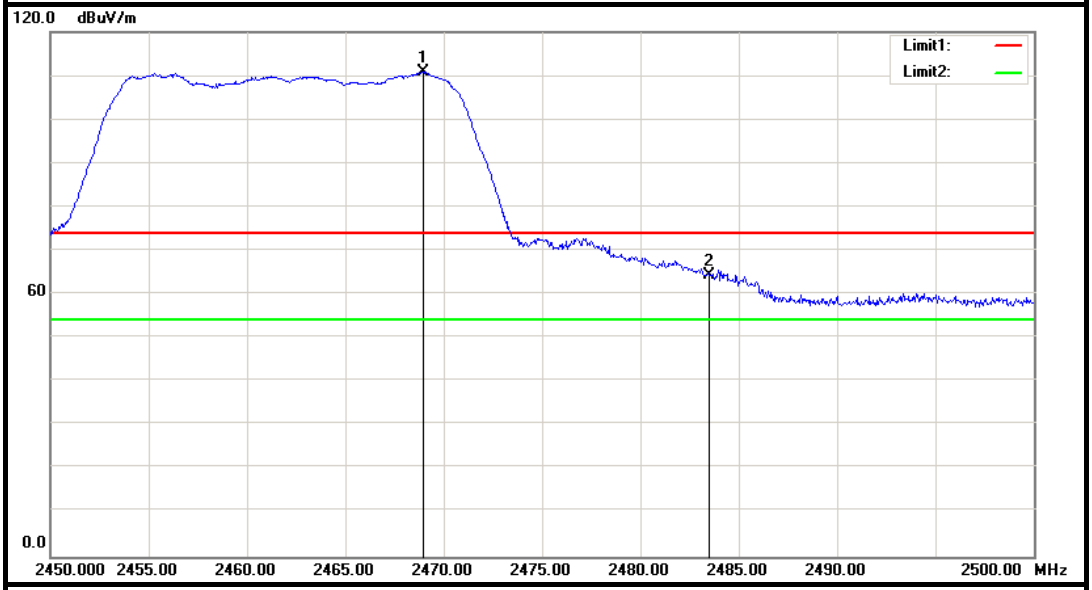


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	60.25	-2.86	57.39	74.00	-16.61	Peak	Horizontal
2	2418.960	99.68	-2.70	96.98	---	---	Peak	Horizontal
1	2390.000	45.38	-2.86	42.52	54.00	-11.48	Average	Horizontal
2	2418.840	88.59	-2.70	85.89	---	---	Average	Horizontal

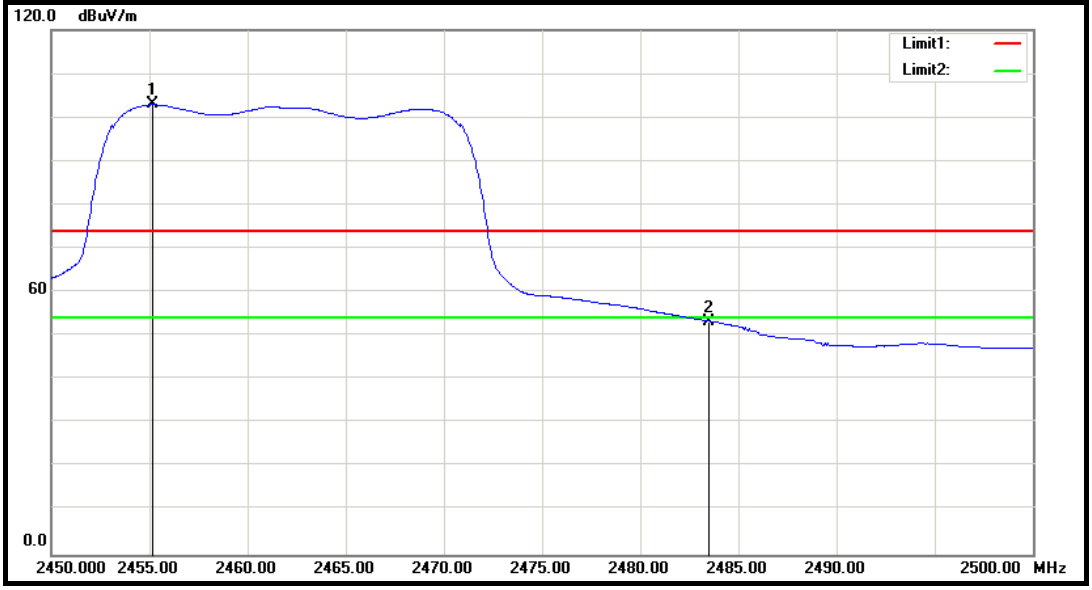
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



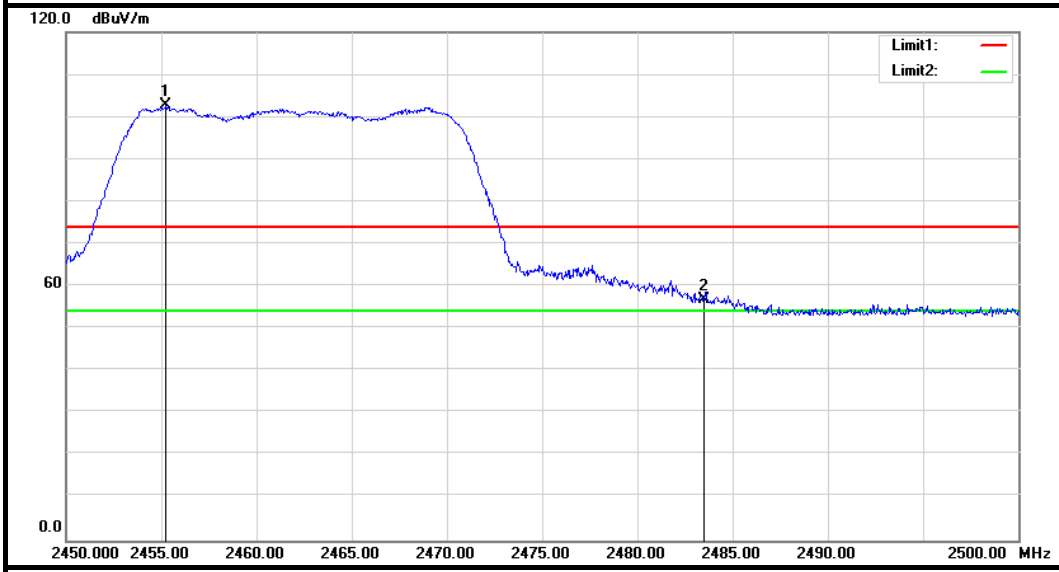
Detector mode: Average **Polarity: Vertical**



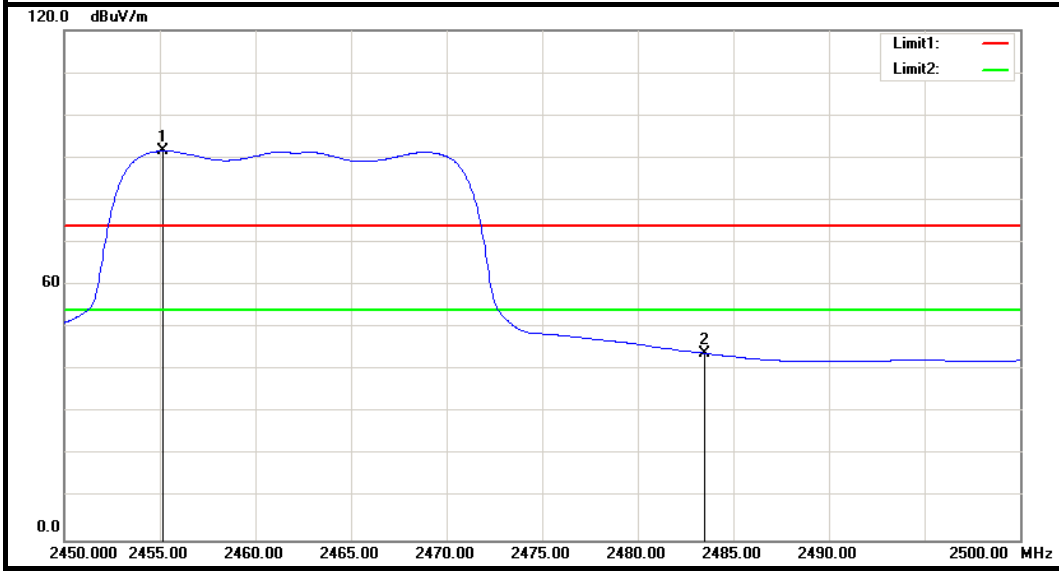
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2468.950	113.26	-2.43	110.83	---	---	Peak	Vertical
2	2483.500	66.68	-2.35	64.33	74.00	-9.67	Peak	Vertical
1	2455.150	105.44	-2.51	102.93	---	---	Average	Vertical
2	2483.500	55.75	-2.35	53.40	54.00	-0.60	Average	Vertical

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**



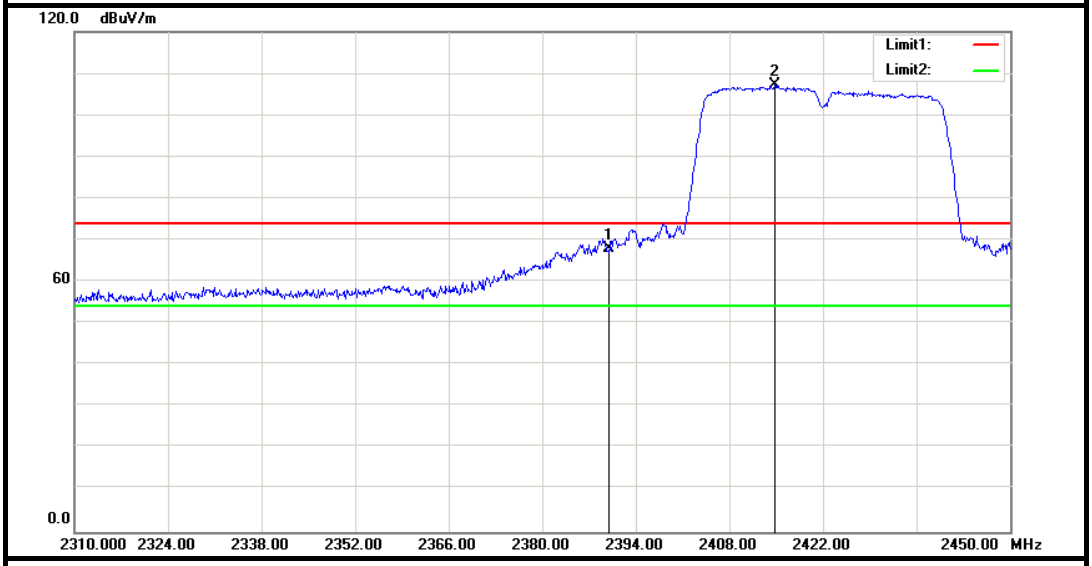
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2455.250	105.22	-2.51	102.71	---	---	Peak	Horizontal
2	2483.500	59.29	-2.35	56.94	74.00	-17.06	Peak	Horizontal
1	2455.150	94.13	-2.51	91.62	---	---	Average	Horizontal
2	2483.500	46.37	-2.35	44.02	54.00	-9.98	Average	Horizontal

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

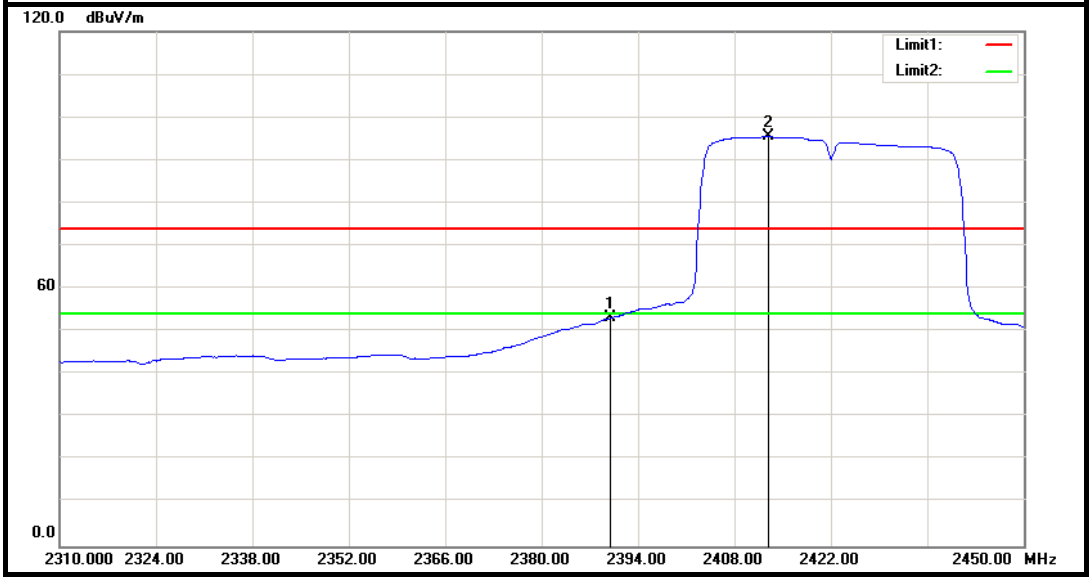
IEEE 802.11n HT40 MHz mode

Band Edges (CH Low)

Detector mode: Peak **Polarity: Vertical**



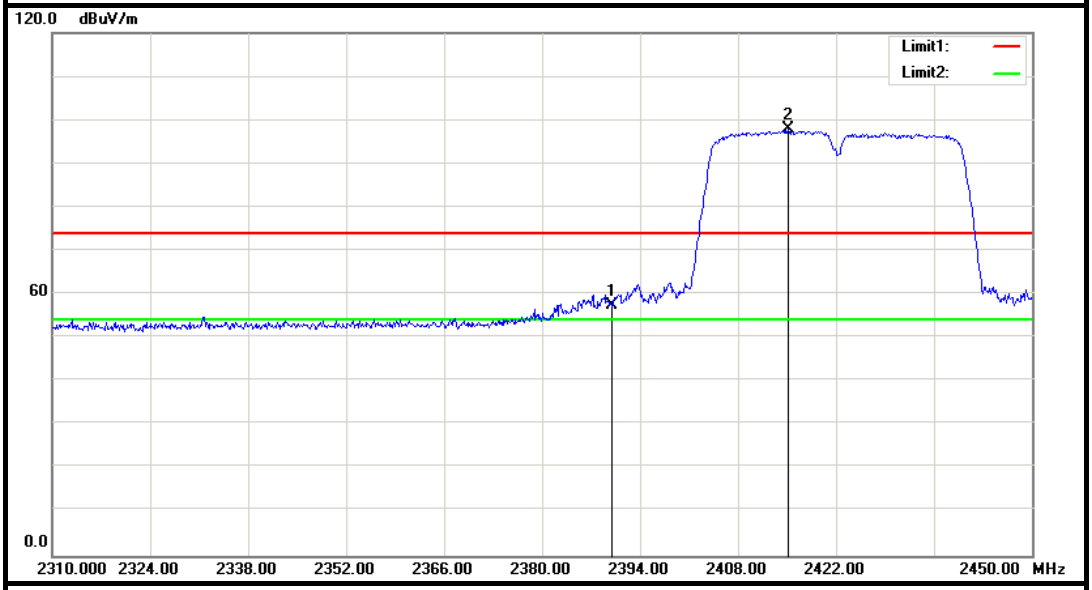
Detector mode: Average **Polarity: Vertical**



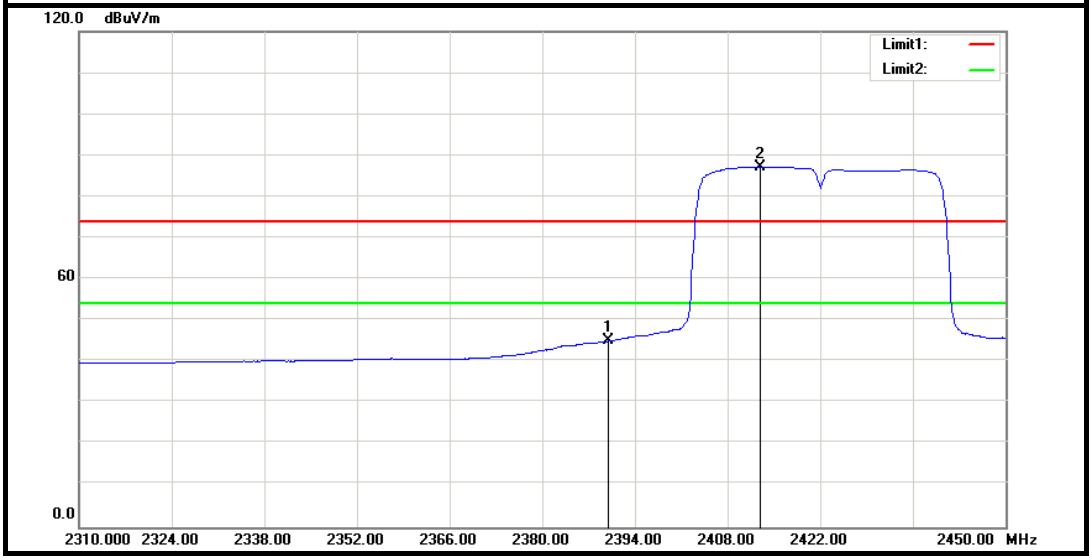
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	70.84	-2.86	67.98	74.00	-6.02	Peak	Vertical
2	2414.860	110.06	-2.73	107.33	---	---	Peak	Vertical
1	2390.000	56.05	-2.86	53.19	54.00	-0.81	Average	Vertical
2	2414.440	102.68	-2.73	99.95	---	---	Average	Vertical

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Detector mode: Peak **Polarity: Horizontal**



Detector mode: Average **Polarity: Horizontal**

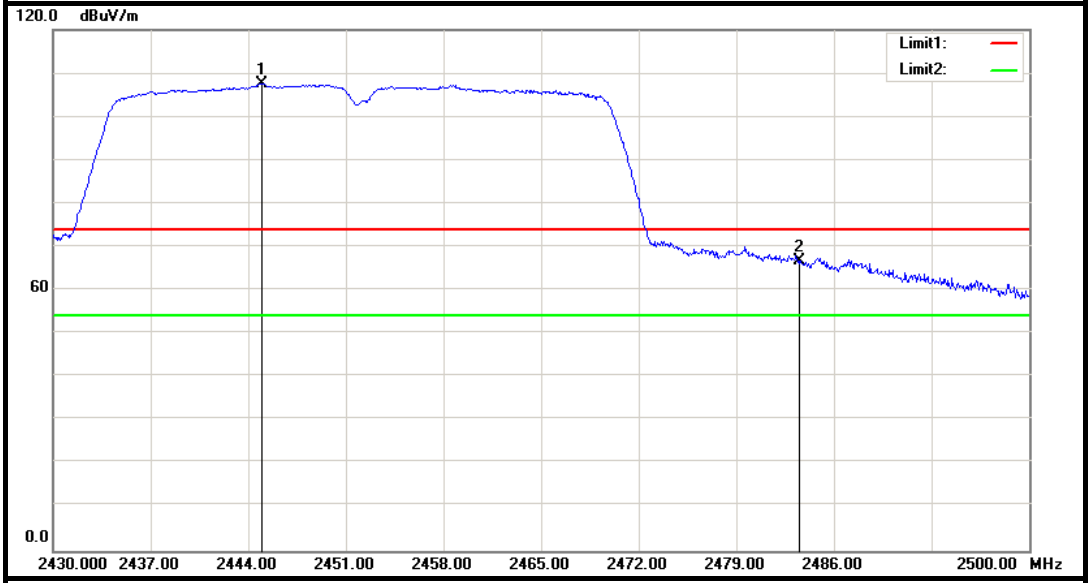


No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2390.000	60.42	-2.86	57.56	74.00	-16.44	Peak	Horizontal
2	2415.140	100.53	-2.72	97.81	---	---	Peak	Horizontal
1	2390.000	47.99	-2.86	45.13	54.00	-8.87	Average	Horizontal
2	2412.900	89.98	-2.74	87.24	---	---	Average	Horizontal

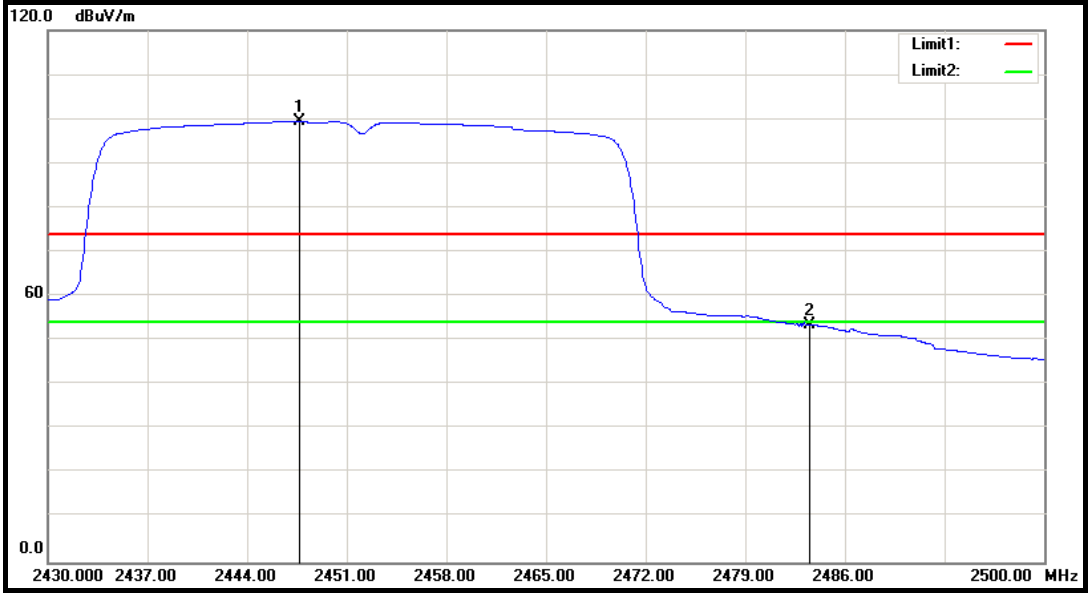
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Band Edges (CH High)

Detector mode: Peak **Polarity: Vertical**



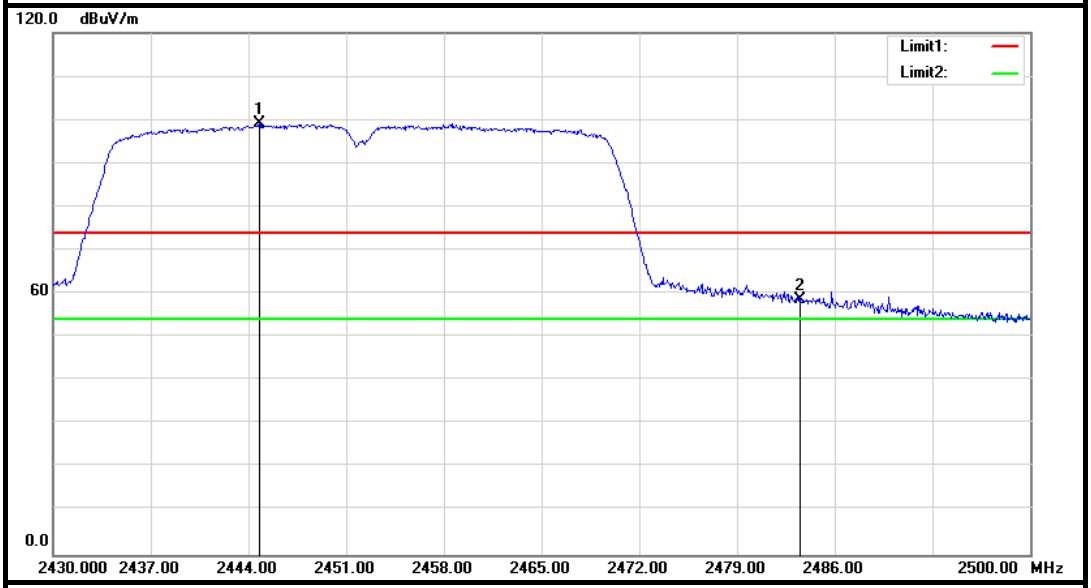
Detector mode: Average **Polarity: Vertical**



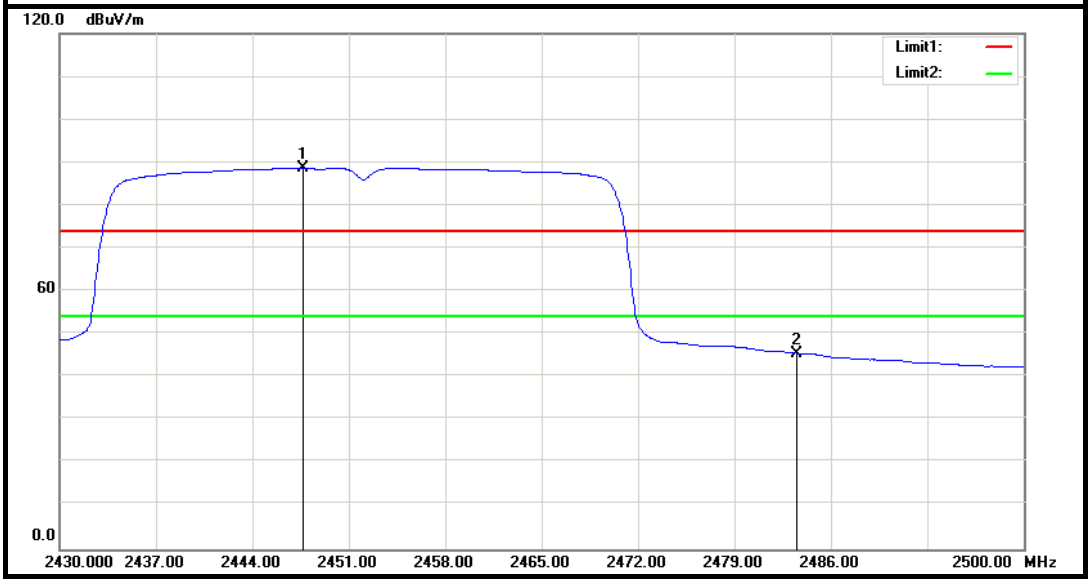
No.	Frequency (MHz)	Reading (dB)	Factor (dB/m)	Result (dB/m)	Limit (dB/m)	Margin (dB)	Remark	Antenna Polar
1	2444.980	110.17	-2.56	107.61	---	---	Peak	Vertical
2	2483.500	69.15	-2.35	66.80	74.00	-7.20	Peak	Vertical
1	2447.640	101.98	-2.55	99.43	---	---	Average	Vertical
2	2483.500	55.84	-2.35	53.49	54.00	-0.51	Average	Vertical

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

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	2444.770	101.71	-2.56	99.15	---	---	Peak	Horizontal
2	2483.500	61.05	-2.35	58.70	74.00	-15.30	Peak	Horizontal
1	2447.640	91.25	-2.55	88.70	---	---	Average	Horizontal
2	2483.500	47.94	-2.35	45.59	54.00	-8.41	Average	Horizontal

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

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	01/27/2018	01/26/2019

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).

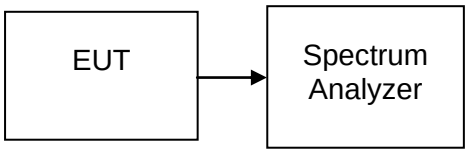
10.3 Method AVGPSD-1 (trace averaging with EUT transmitting at full power throu ghout each sweep)

This procedure may be used when the maximum (average) conducted output pow er was used to demonstrate compliance to the output power limit. This is the bas eline method for determining the maximum (average) conducted PSD level. If the i nstrument has an RMS power averaging detector, it must be used; otherwise, use the sample detector. The EUT must be configured to transmit continuously (duty cycle $\geqslant$ 98%); otherwise sweep triggering/signal gating must be implemented to e nsure that measurements are made only when the EUT is transmitting at its maxi mum power control level (no transmitter off time is to be considered)

1. Set analyzer center frequency to DTS channel center frequency.
2. Set span to at least 1.5 times the OBW.
3. Set RBW to: 3 kHz ≤ RBW ≤ 100 kHz.
4. Set the VBW ≥ 3 x RBW.
5. Detector = power averaging (RMS) or sample detector (when RMS not available).
6. Sweep time = auto couple.
7. Employ trace averaging (RMS) mode over a minimum of 100 traces.
8. Use the peak marker function to determine the maximum amplitude level.
9. If measured value exceeds limit, reduce RBW (no less than 3 kHz) and repeat (note that this may require zooming in on the emission of interest and reducing the span in order to meet the minimum measurement point requirement as the RBW is reduced).

This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

7.7.4. TEST SETUP



7.7.5. TEST RESULTS

No non-compliance noted

Test Data

Test mode: IEEE 802.11b(Combine with Antenna 0 and Antenna 1)

Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Test Result
		Antenna 0	Antenna 1	Total		
Low	2412	-12.443	-12.499	-9.461	8.00	PASS
Mid	2437	-5.686	-5.947	-2.804		PASS
High	2462	-12.678	-13.256	-9.947		PASS

Test mode: IEEE 802.11g(Combine with Antenna 0 and Antenna 1)

Channel	Frequency (MHz)	PPSD (dBm)			Limit (dBm)	Test Result
		Antenna 0	Antenna 1	Total		
Low	2412	-16.430	-16.684	-13.545	8.00	PASS
Mid	2437	-6.782	-7.306	-4.026		PASS
High	2462	-17.309	-16.711	-13.989		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	-13.166	-14.312	-10.691	8.00	PASS
Mid	2437	-9.631	-8.614	-6.082		PASS
High	2462	-15.491	-15.016	-12.237		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	-16.812	-16.620	-13.705	8.00	PASS
Mid	2437	-10.431	-10.619	-7.514		PASS
High	2452	-17.667	-16.563	-14.070		PASS

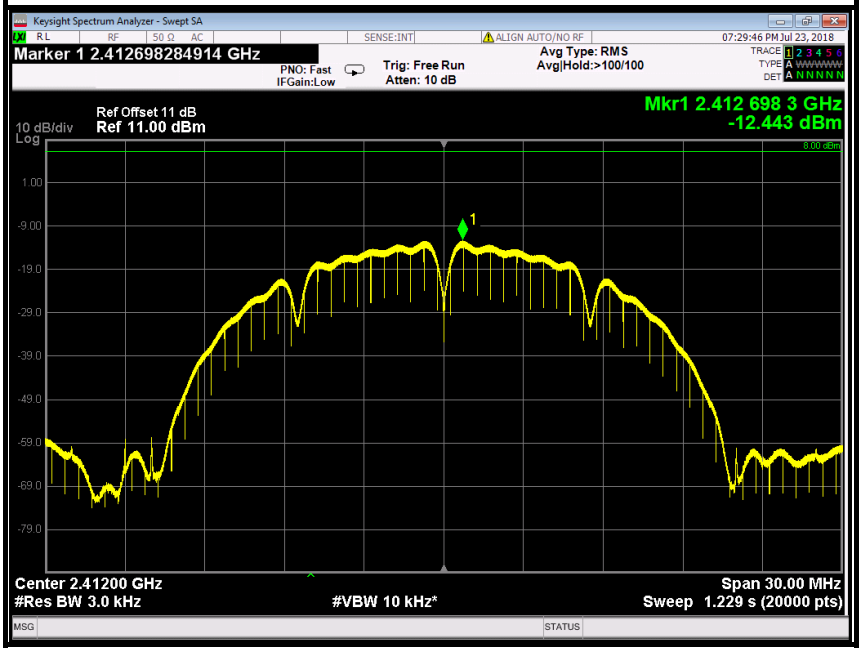
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

Test Plot

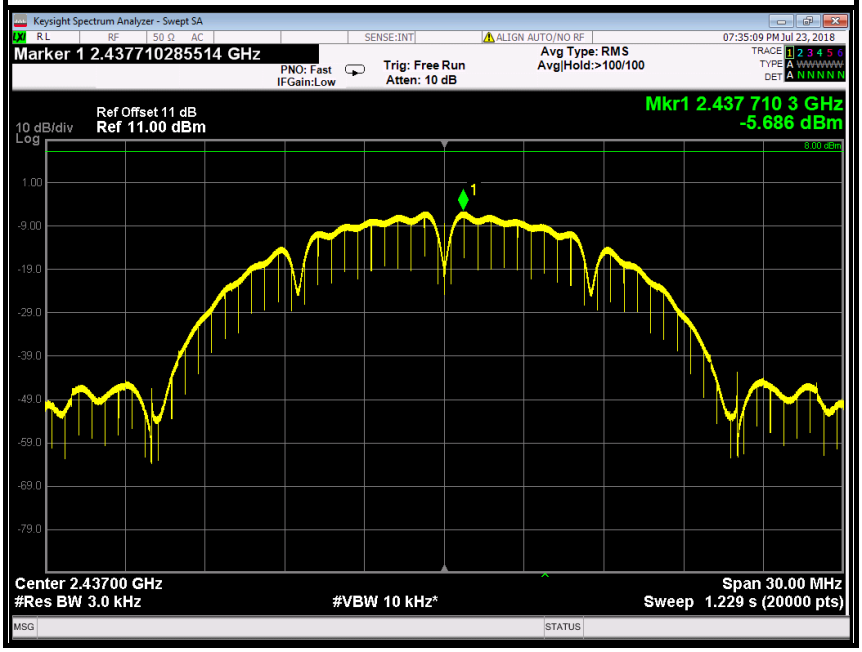
Antenna 0

IEEE 802.11b mode

PPSD (CH Low)

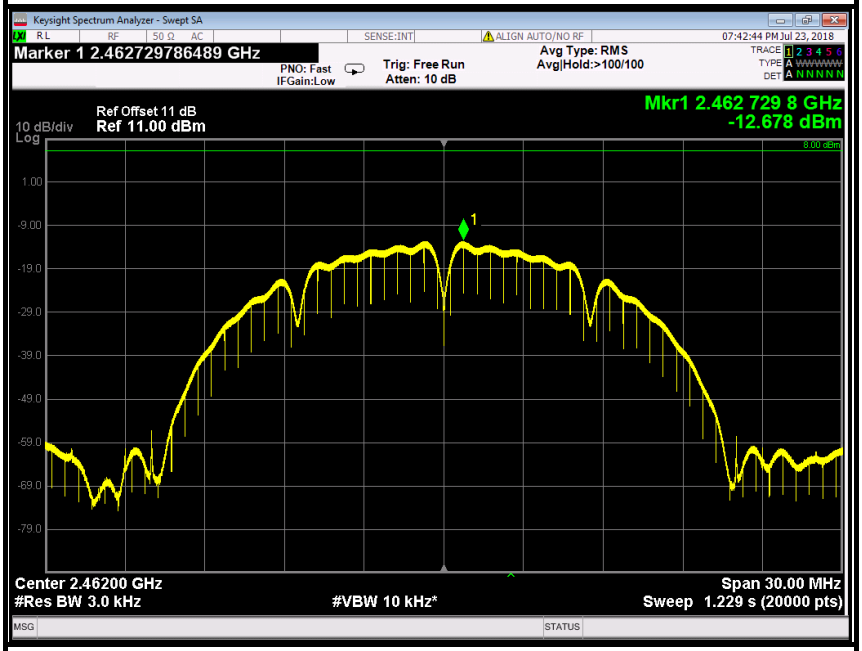


PPSD (CH Mid)



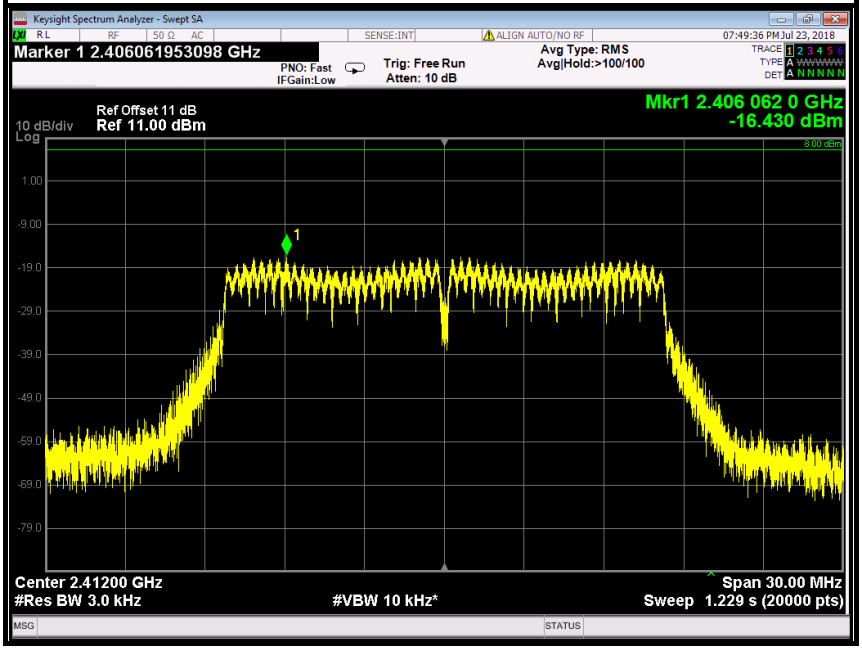
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

PPSD (CH High)



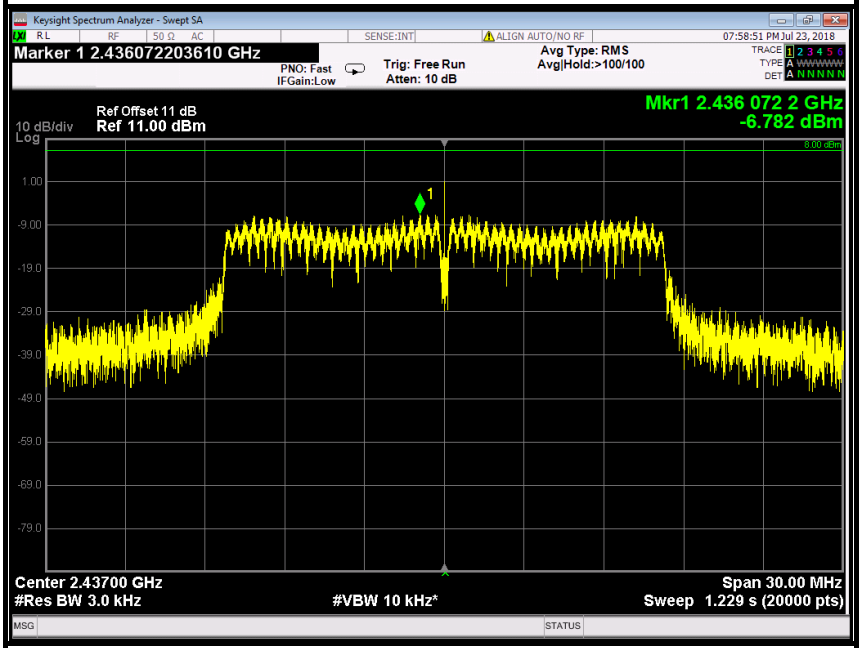
IEEE 802.11g mode

PPSD (CH Low)

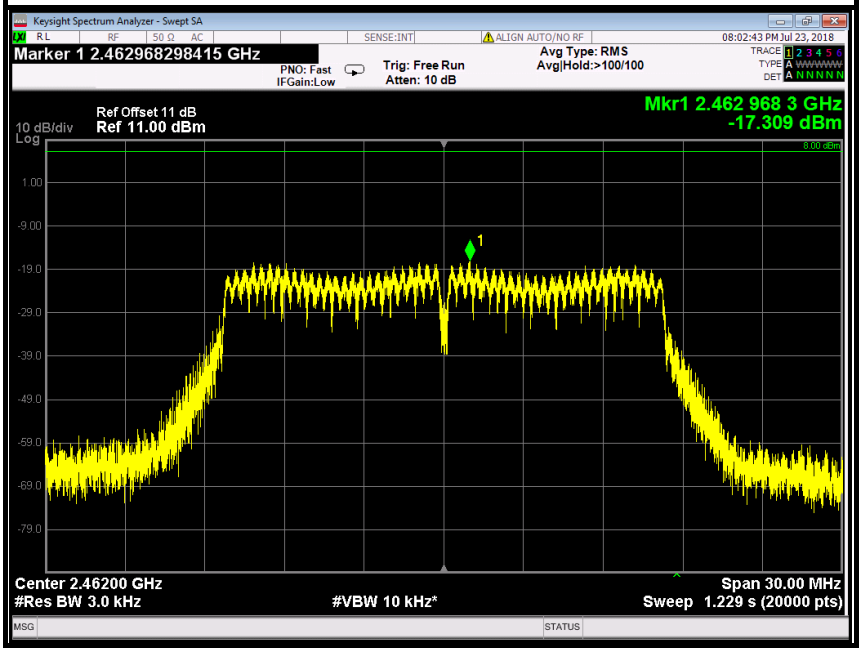


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

PPSD (CH Mid)



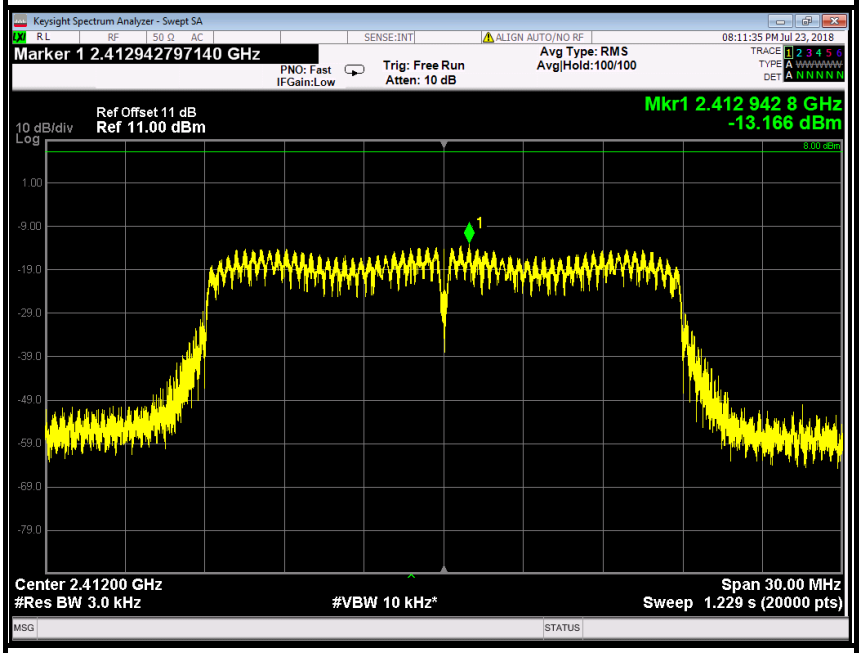
PPSD (CH High)



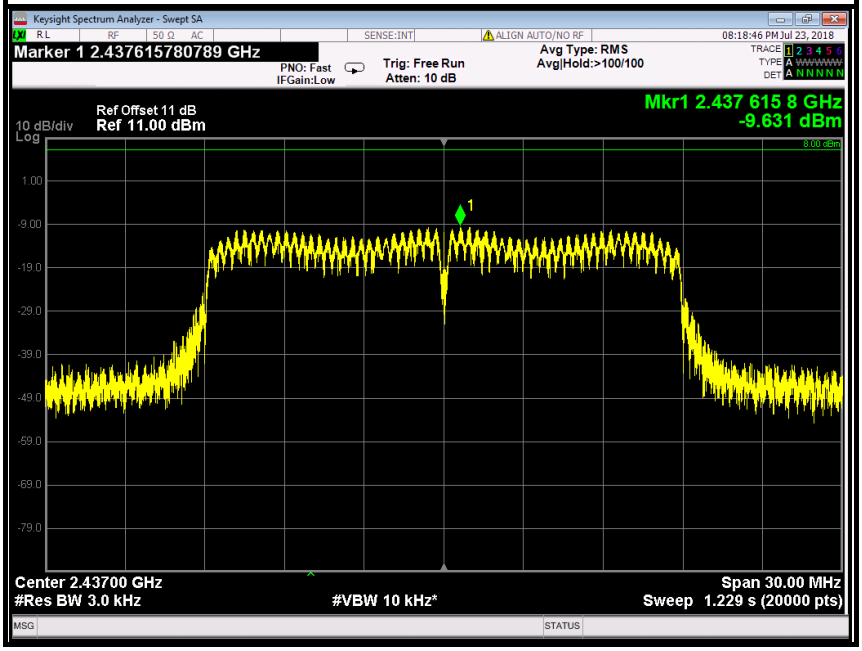
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

IEEE 802.11n HT20 MHz mode

PPSD (CH Low)

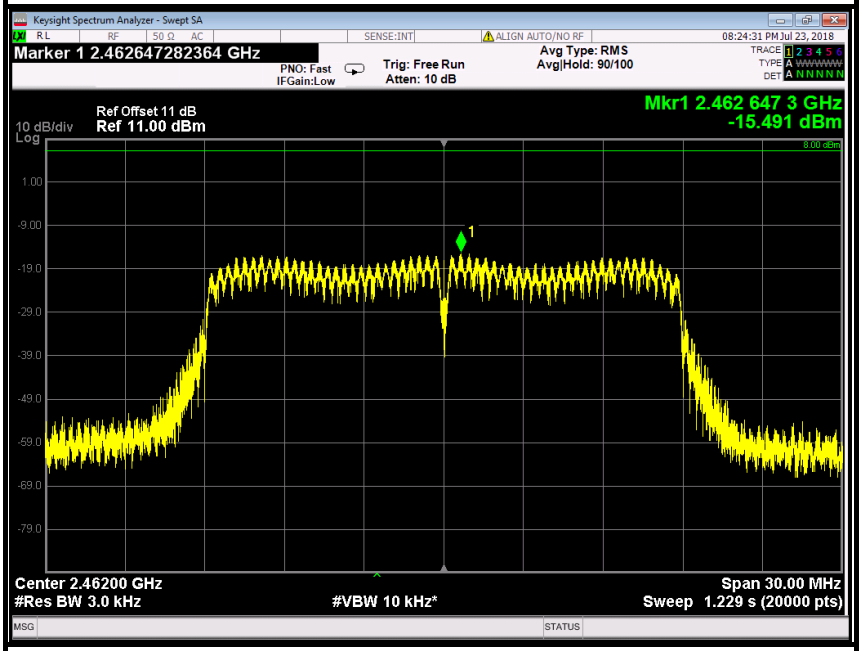


PPSD (CH Mid)



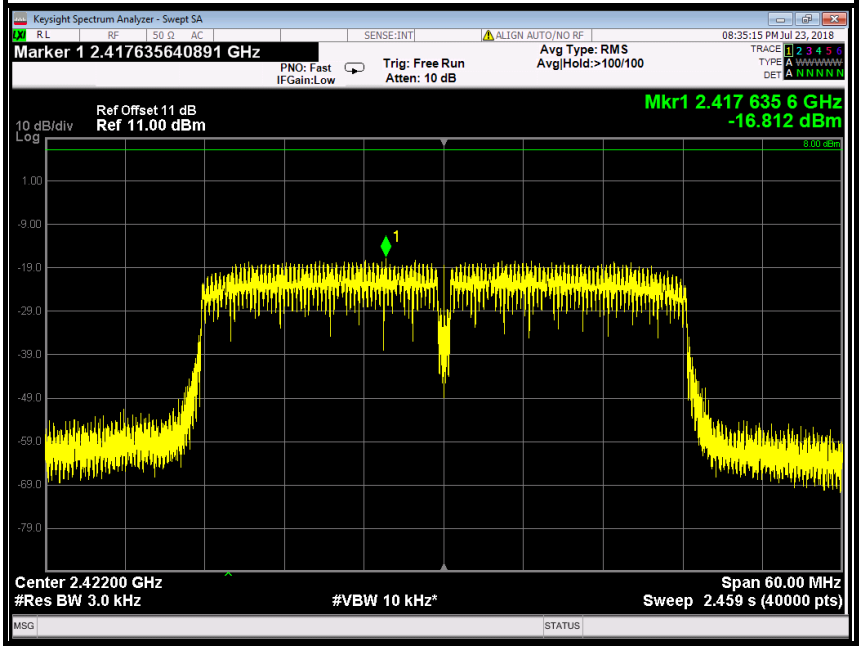
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

PPSD (CH High)



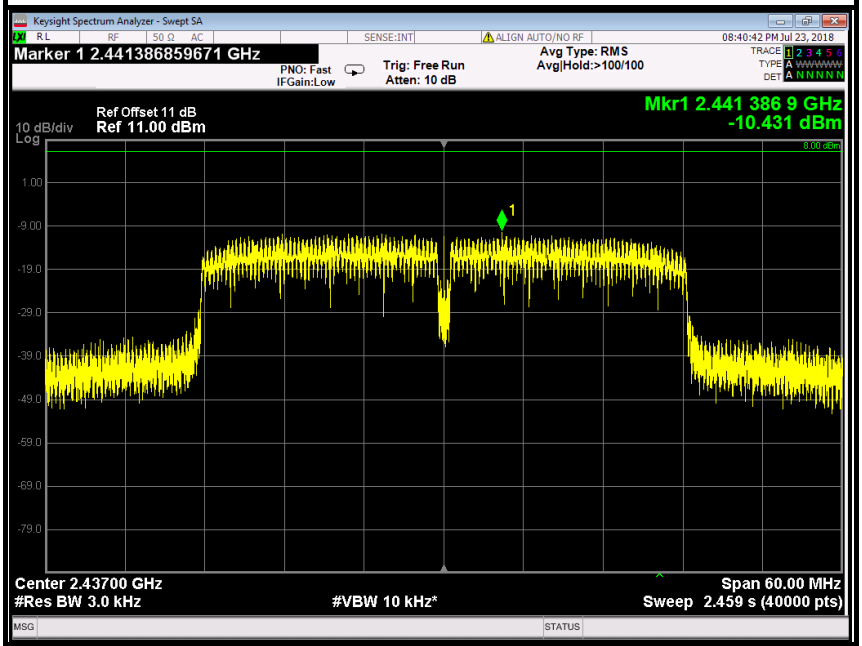
IEEE 802.11n HT40 MHz mode

PPSD (CH Low)

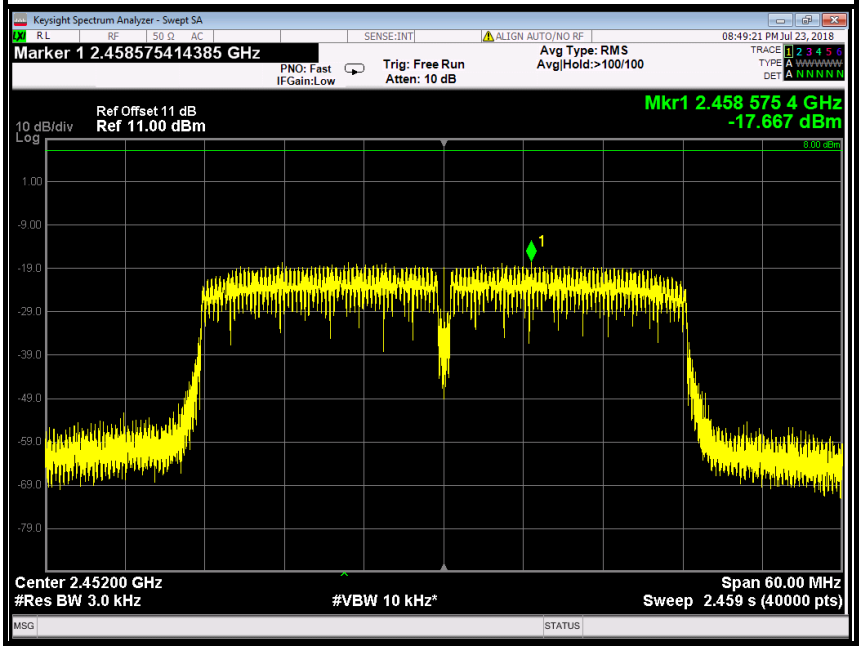


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

PPSD (CH Mid)



PPSD (CH High)

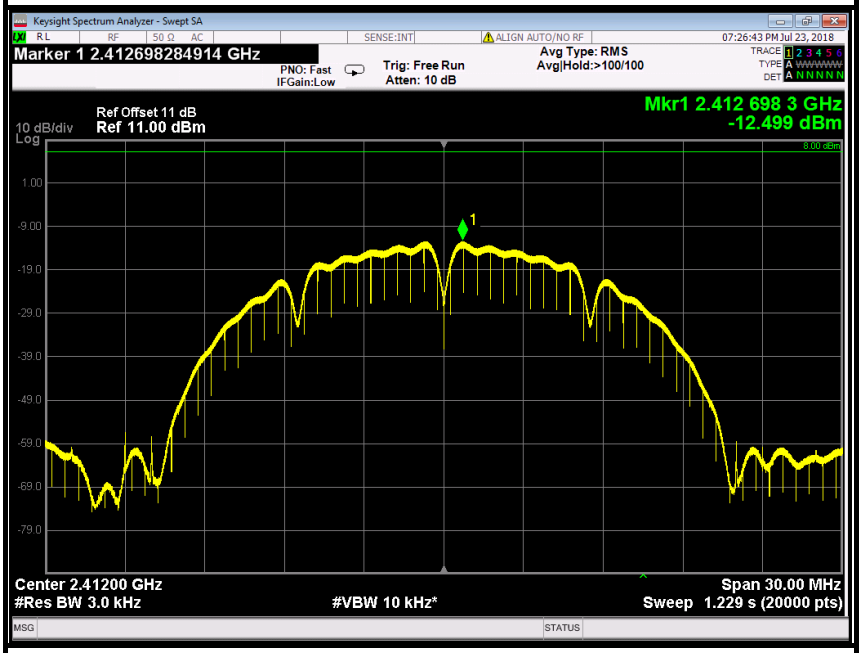


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

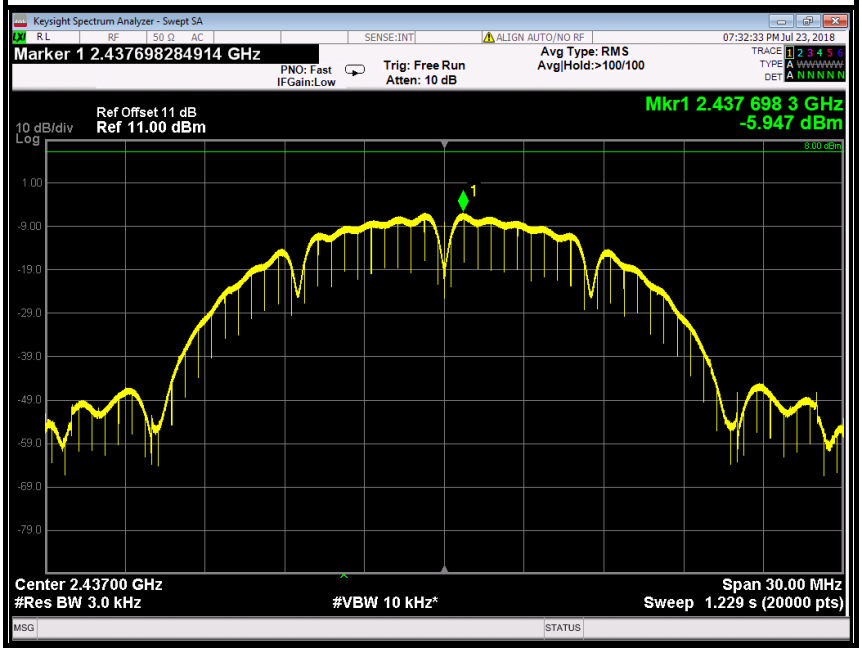
Antenna 1

IEEE 802.11b mode

PPSD (CH Low)

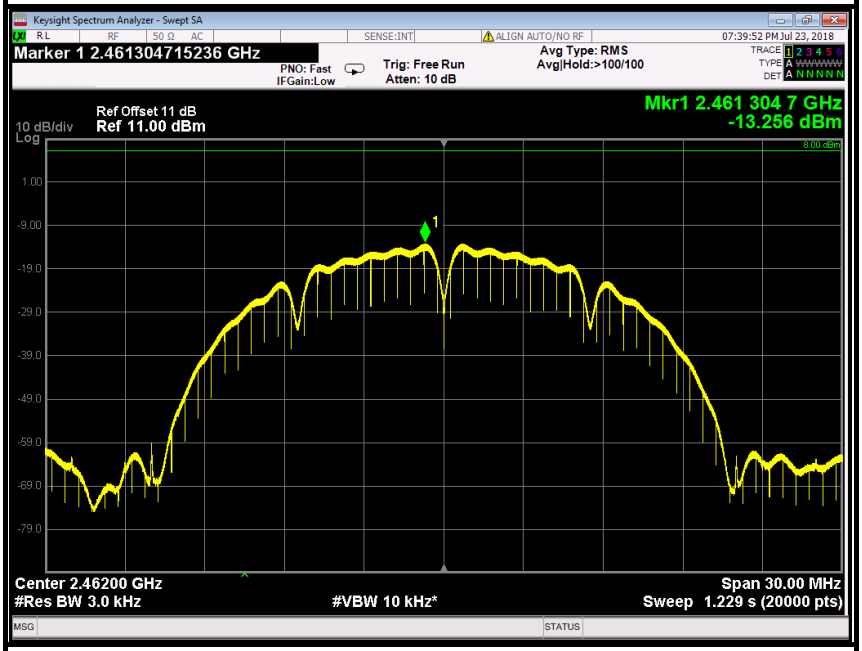


PPSD (CH Mid)



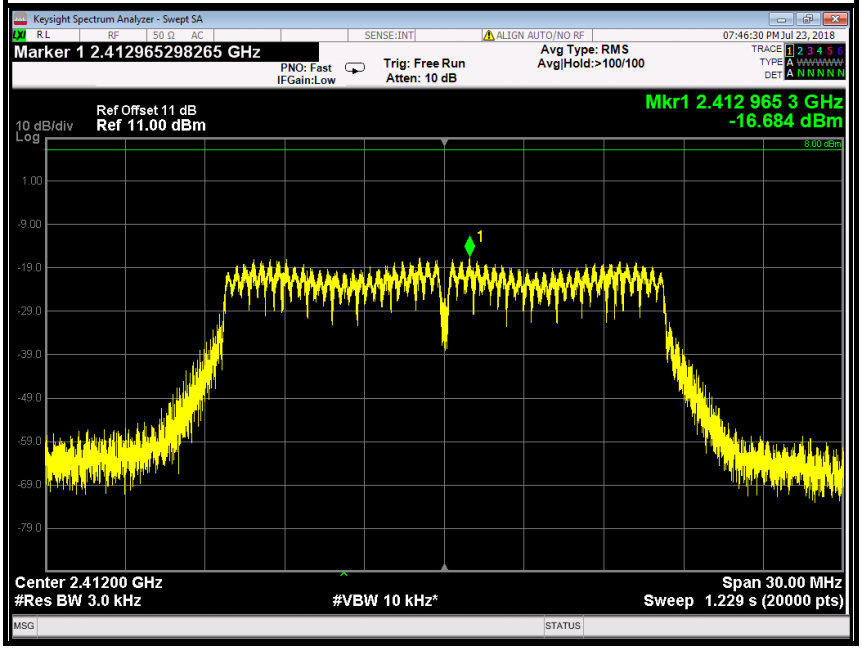
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

PPSD (CH High)



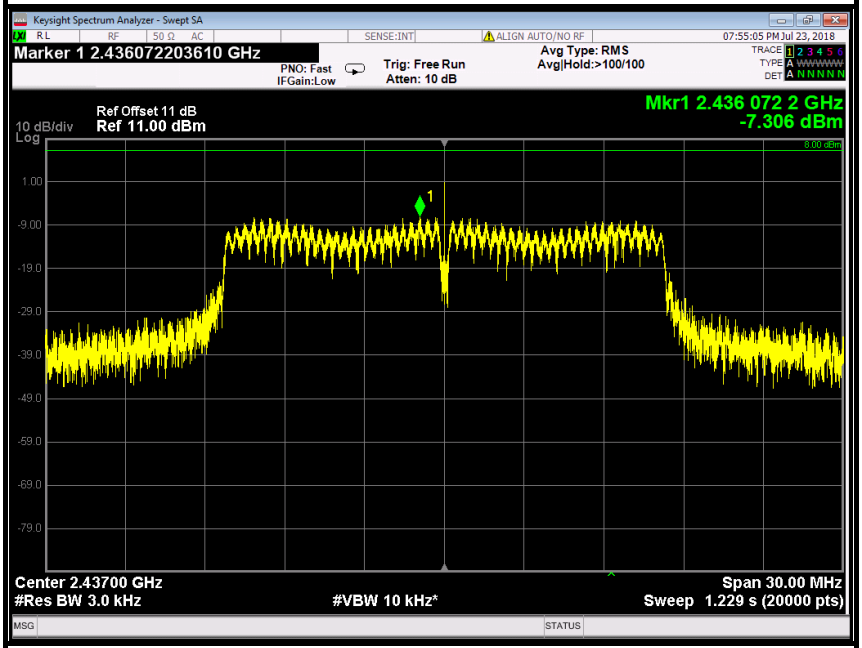
IEEE 802.11g mode

PPSD (CH Low)

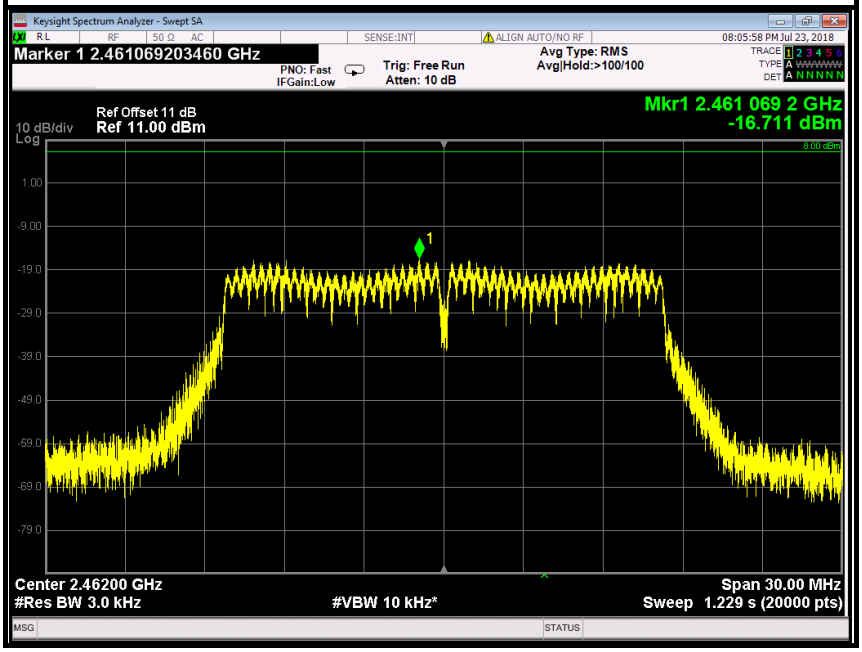


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

PPSD (CH Mid)



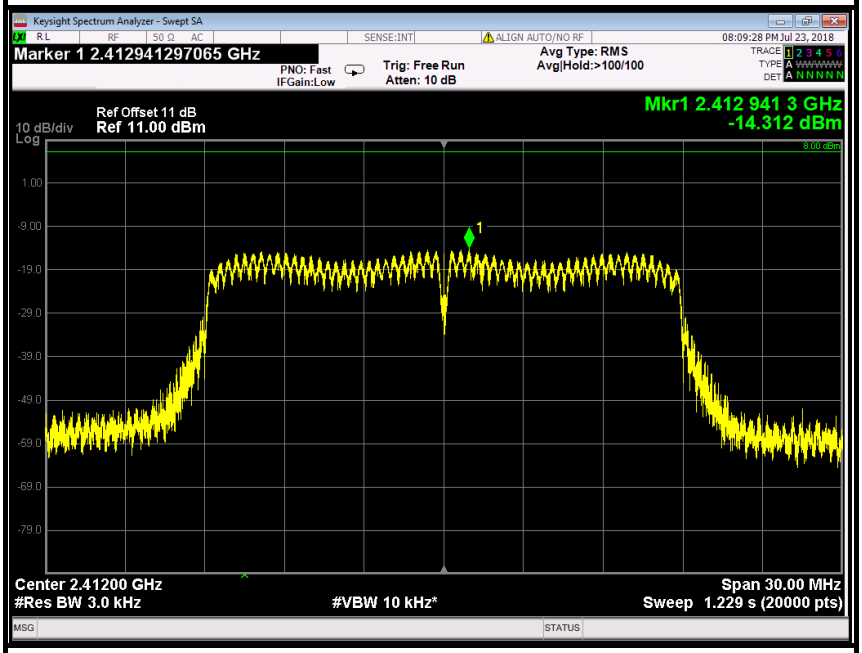
PPSD (CH High)



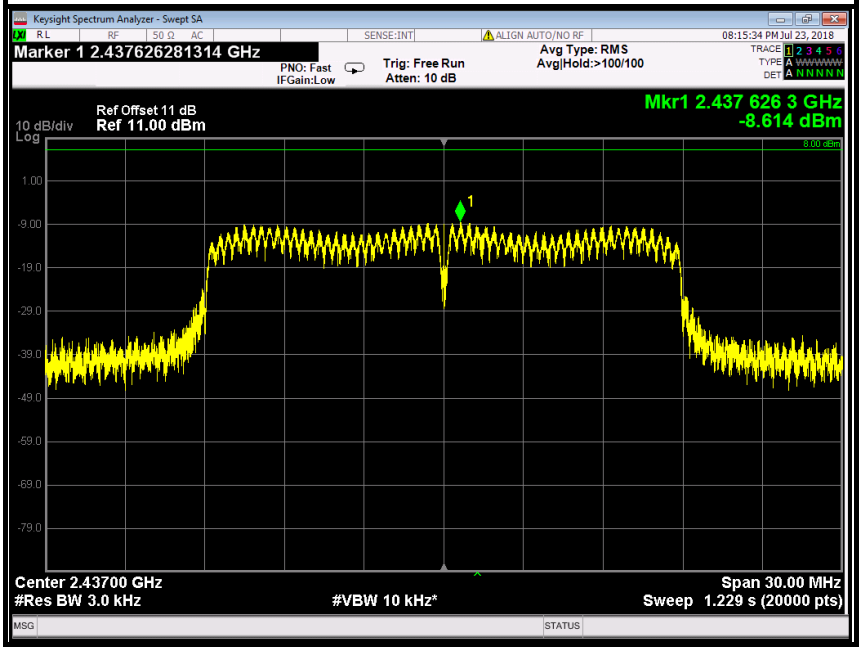
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

IEEE 802.11n HT20 MHz mode

PPSD (CH Low)

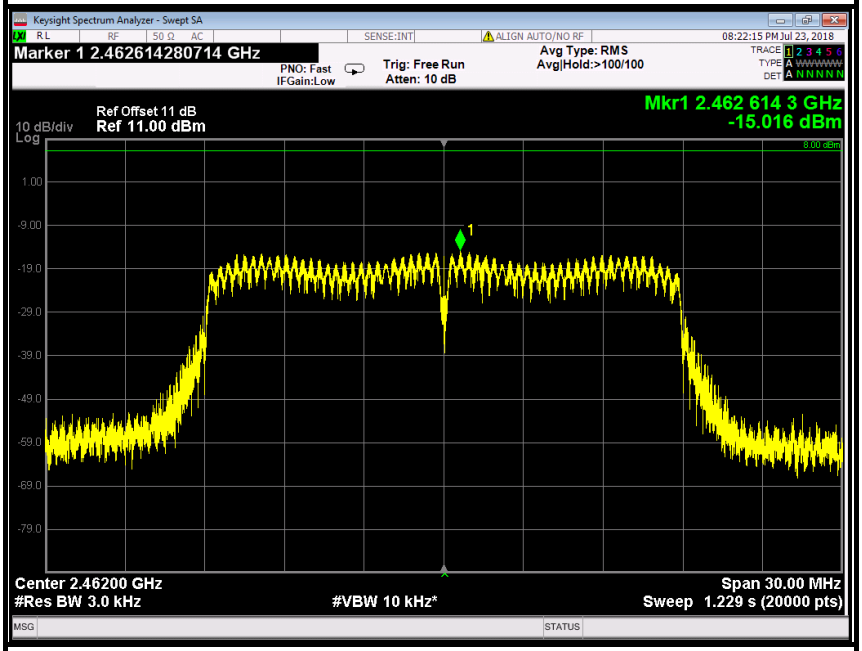


PPSD (CH Mid)



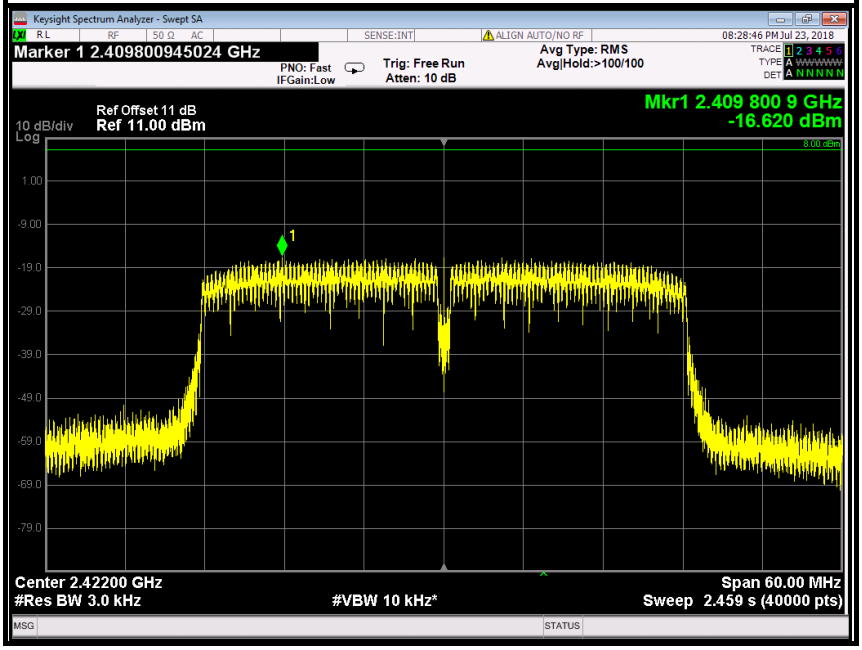
This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

PPSD (CH High)



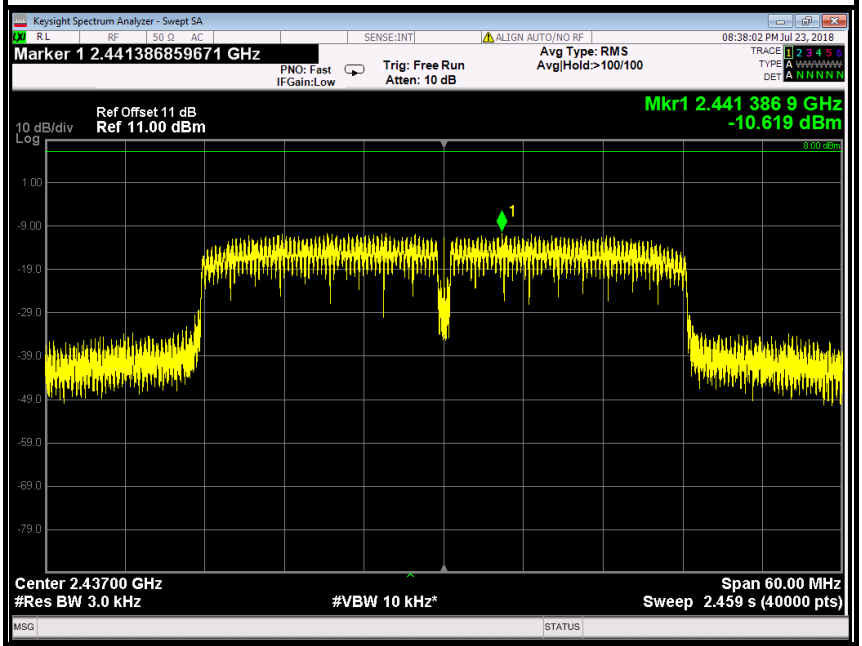
IEEE 802.11n HT40 MHz mode

PPSD (CH Low)

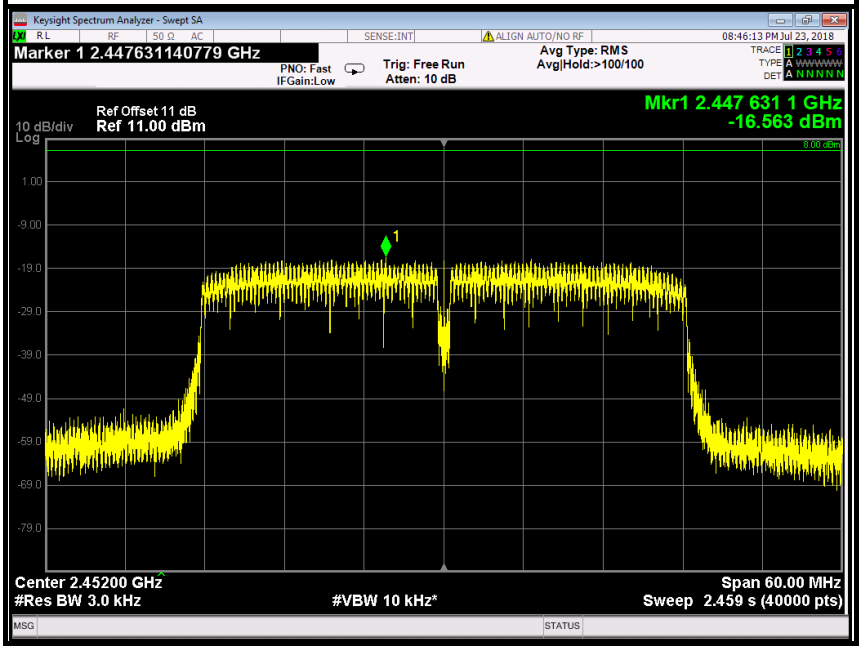


This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.

PPSD (CH Mid)



PPSD (CH High)



This report shall not be reproduced except in full, without the written approval of Compliance Certification Services (Shenzhen) Inc.