



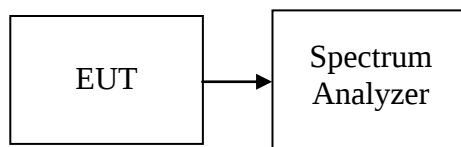
7.6 SPURIOUS EMISSIONS

7.6.1 Conducted Measurement

LIMIT

According to §15.247(d), in any 100 kHz bandwidth outside the frequency bands in which the spread spectrum intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 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)).

Test Configuration



TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer. Set the RBW=100 kHz and VBW= 300 kHz. Investigate the frequency from 30 MHz to 26 GHz with L, M and H channels separately.

TEST RESULTS

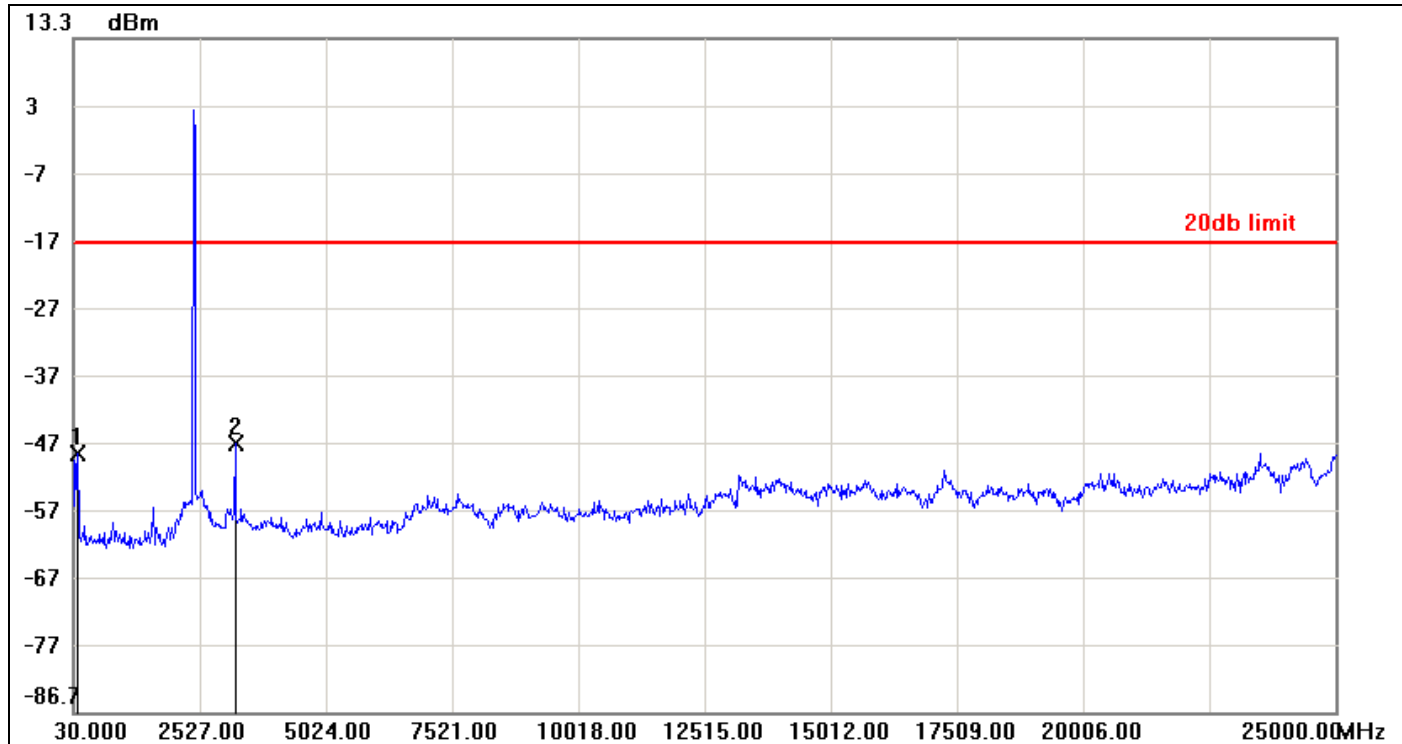
No non-compliance noted.



Test Plot

IEEE 802.11b mode / Chain 0

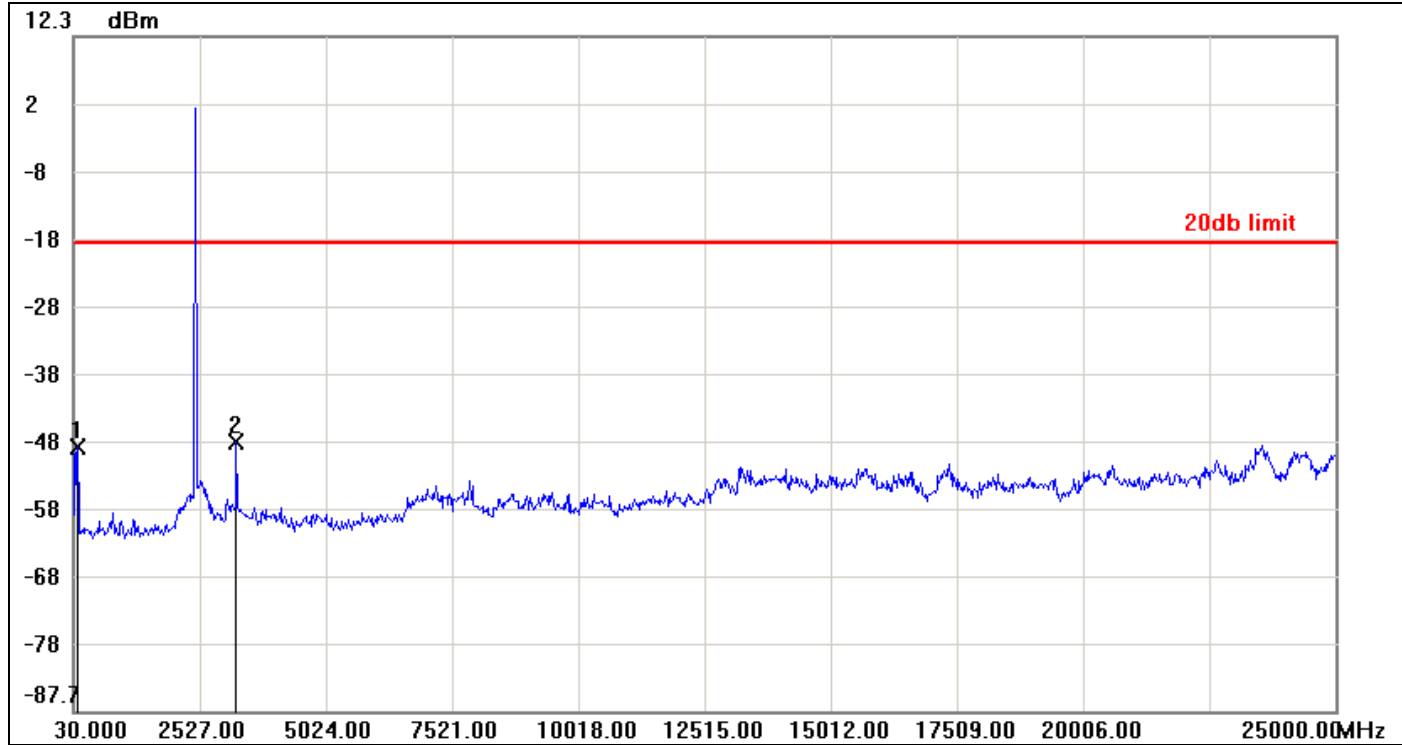
CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	104.9100	-48.26	-17.06	-31.20
2	3226.1600	-46.78	-17.06	-29.72



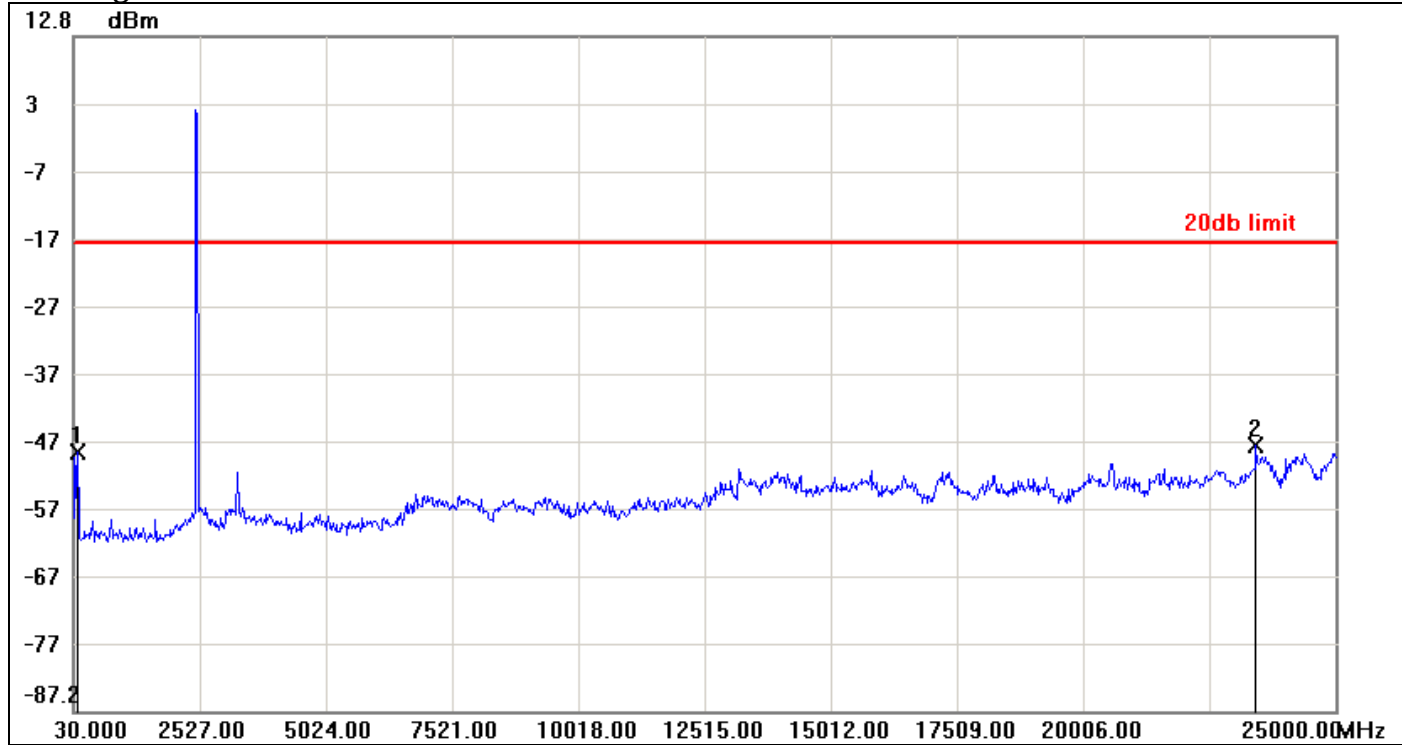
CH Mid



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	104.9100	-48.51	-18.20	-30.31
2	3251.1300	-47.69	-18.20	-29.49



CH High



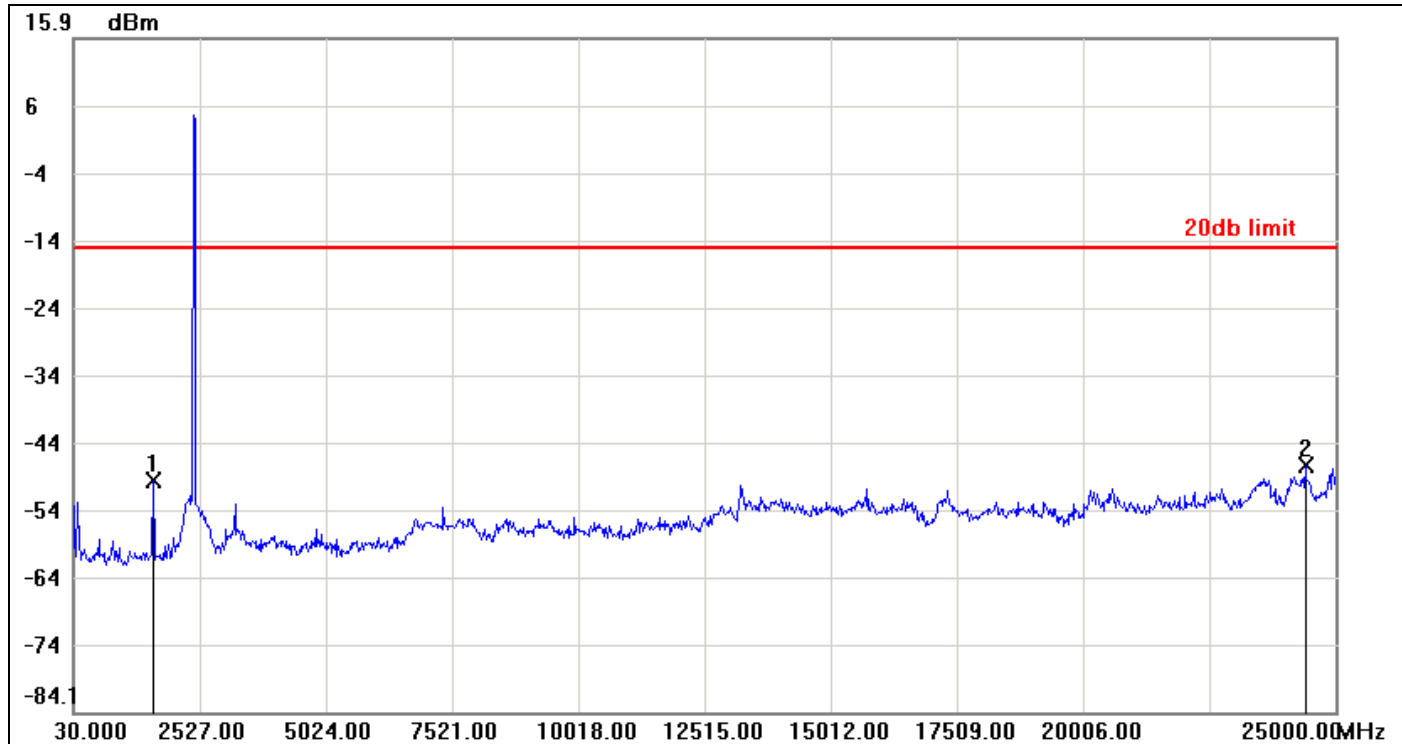
No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	104.9100	-48.78	-17.68	-31.10
2	23426.8900	-47.86	-17.68	-30.18



Test Plot

IEEE 802.11b mode / Chain 1

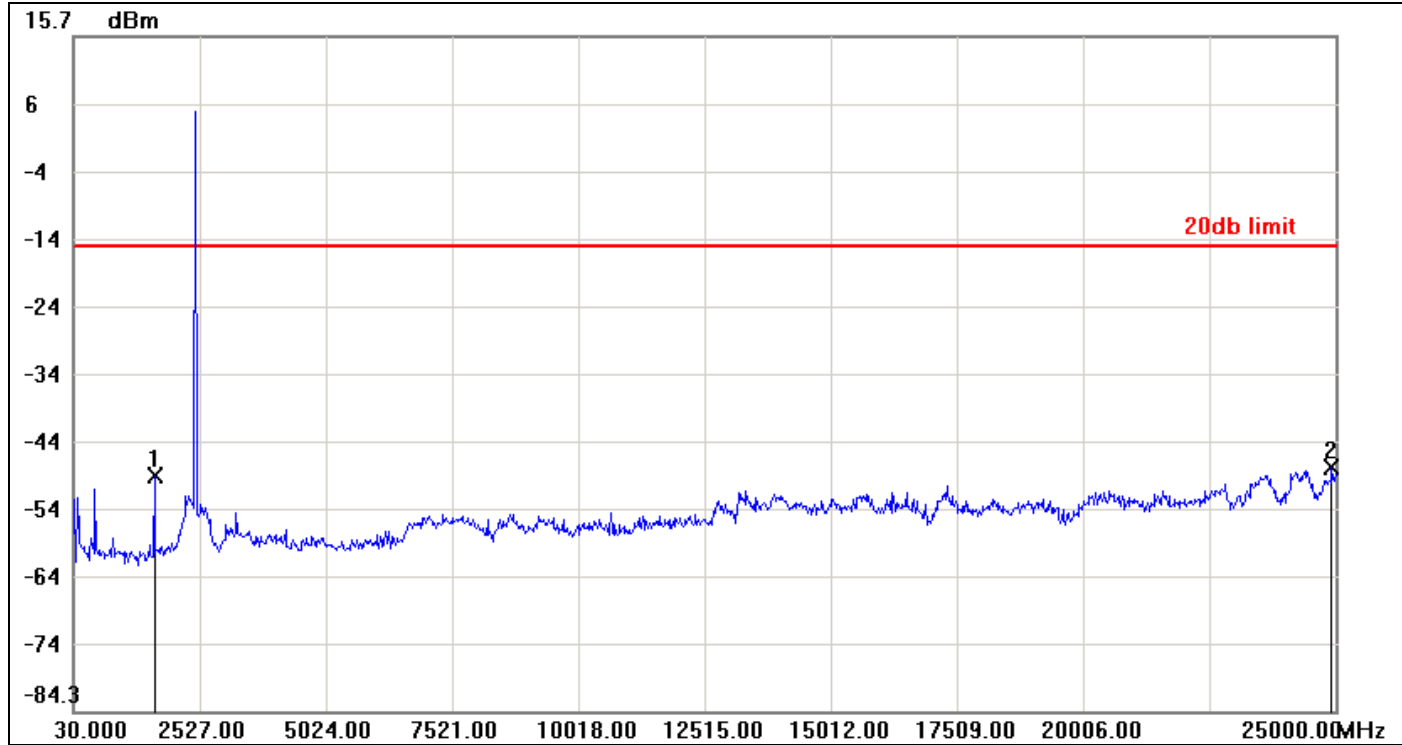
CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	1603.1100	-49.61	-15.17	-34.44
2	24400.7200	-47.55	-15.17	-32.38



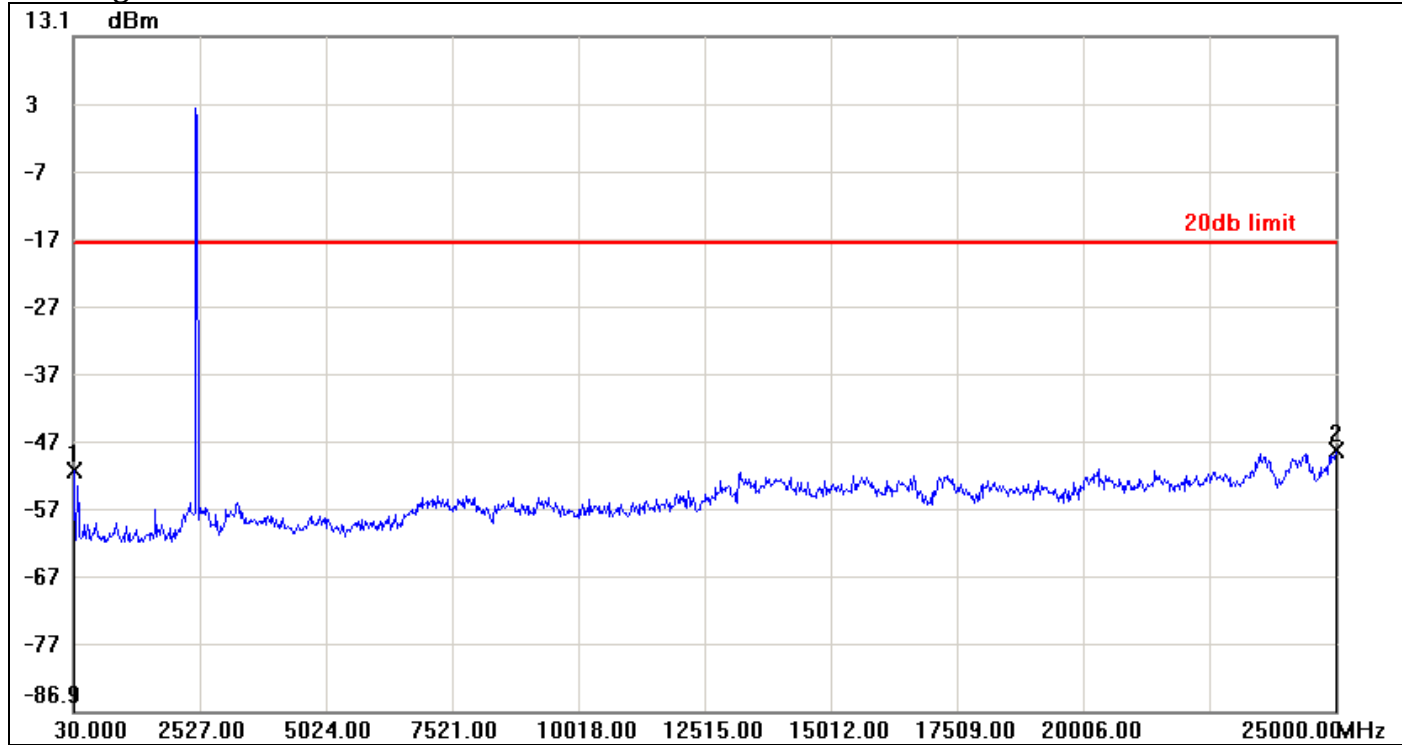
CH Mid



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	1628.0800	-49.53	-15.44	-34.09
2	24925.0900	-48.22	-15.44	-32.78



CH High

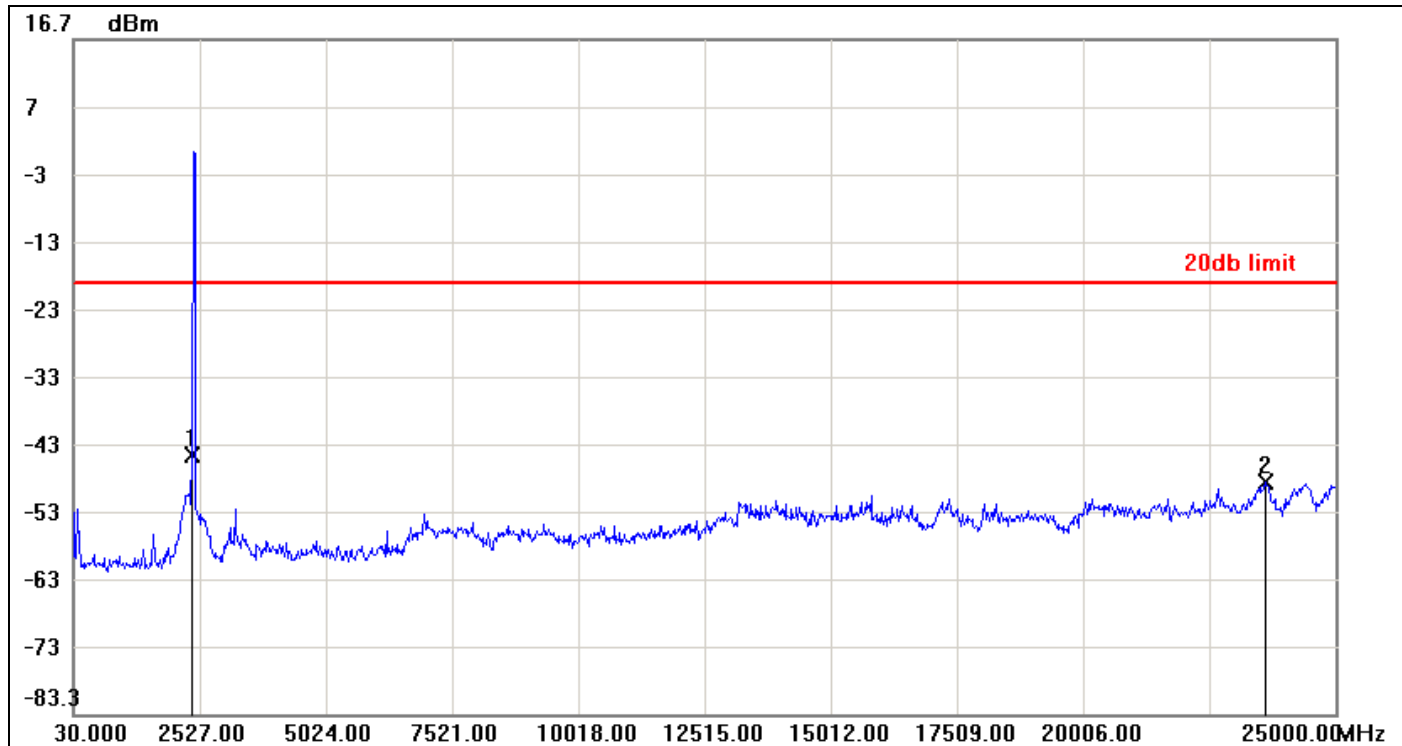


No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	30.0000	-51.22	-17.61	-33.61
2	25000.0000	-48.24	-17.61	-30.63



IEEE 802.11g mode / Chain 0

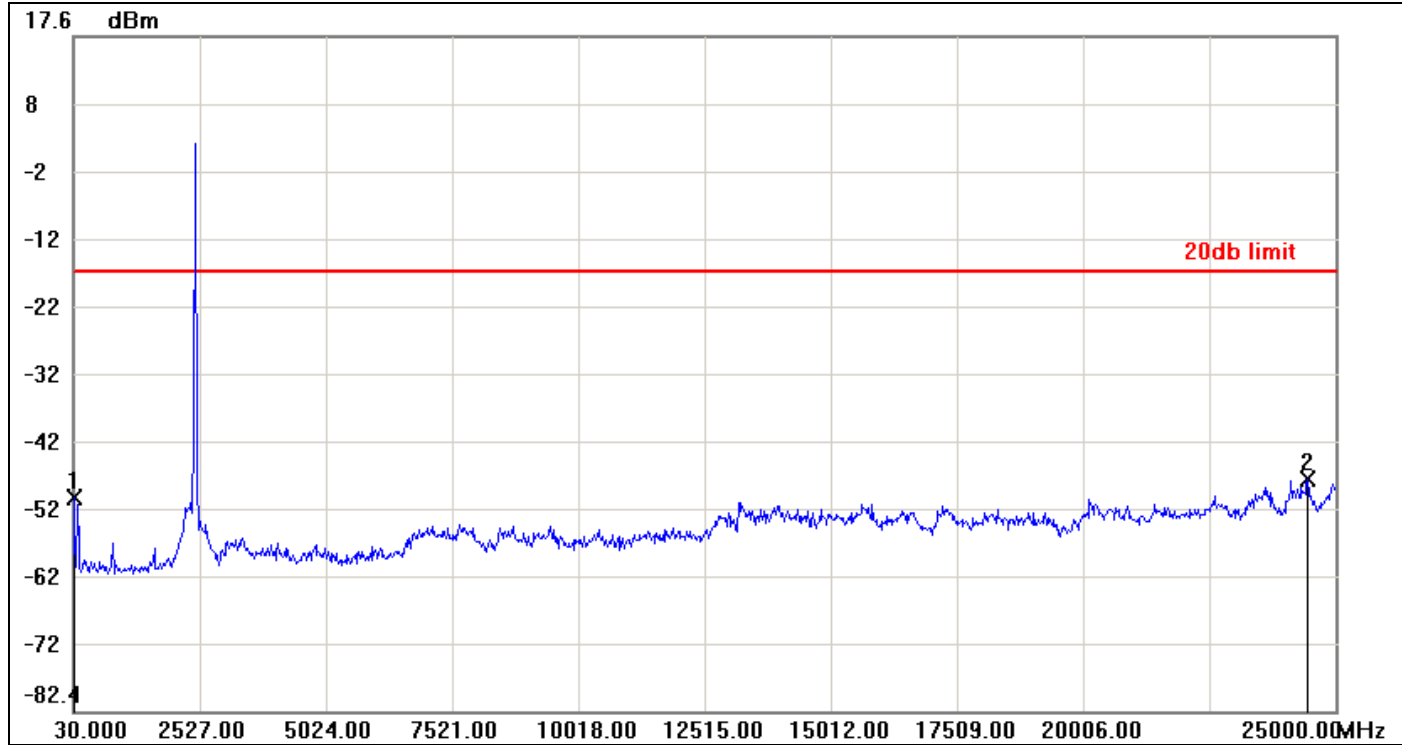
CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-44.94	-19.47	-25.47
2	23601.6800	-48.86	-19.47	-29.39



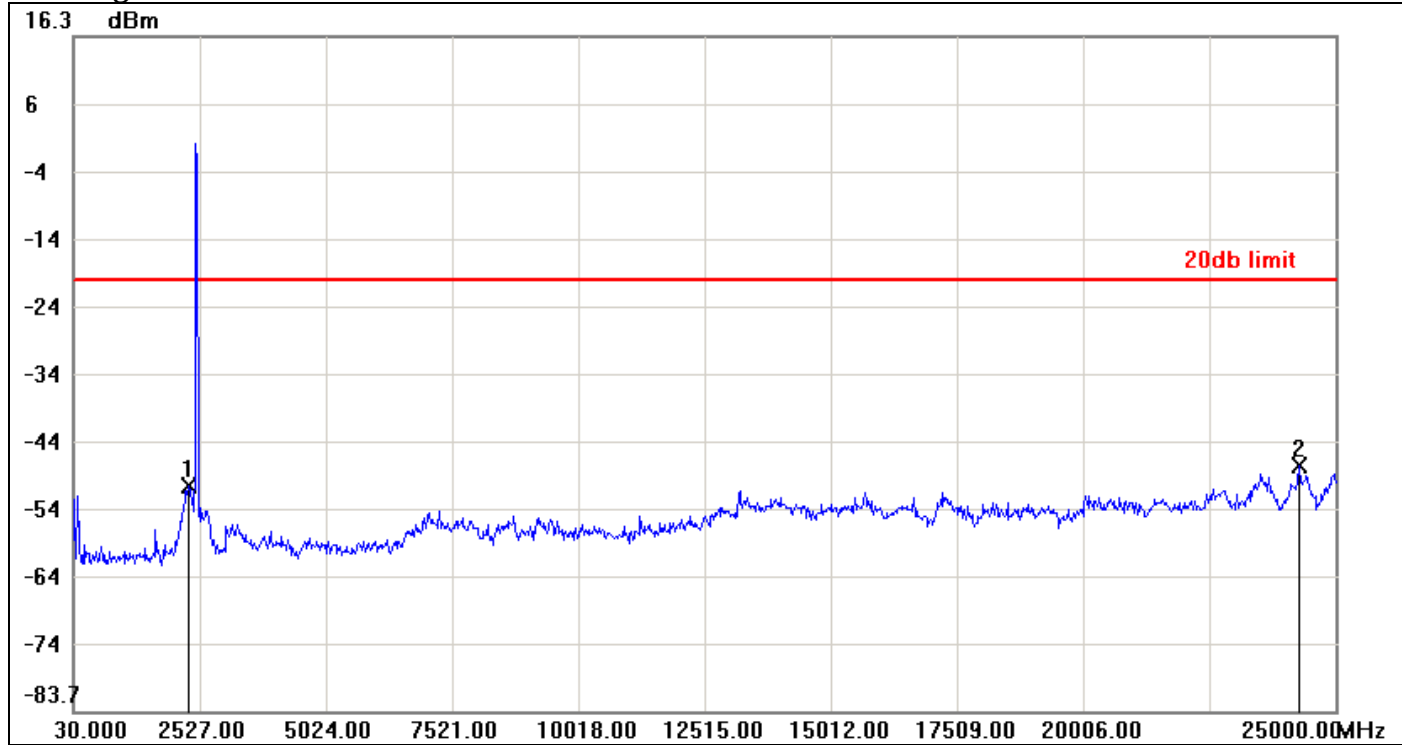
CH Mid



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	30.0000	-50.84	-17.29	-33.55
2	24450.6600	-48.12	-17.29	-30.83



CH High

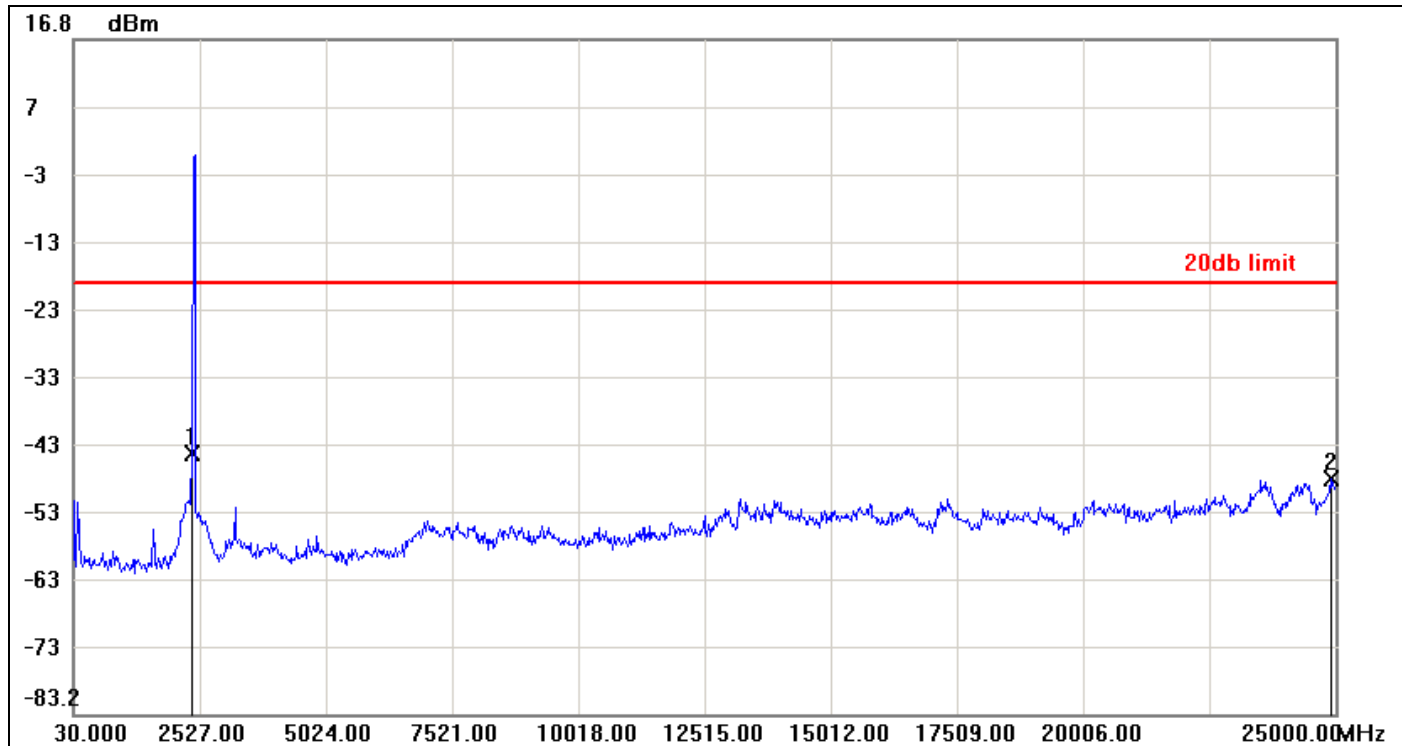


No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2302.2700	-50.32	-19.90	-30.42
2	24275.8700	-47.29	-19.90	-27.39



IEEE 802.11g mode / Chain 1

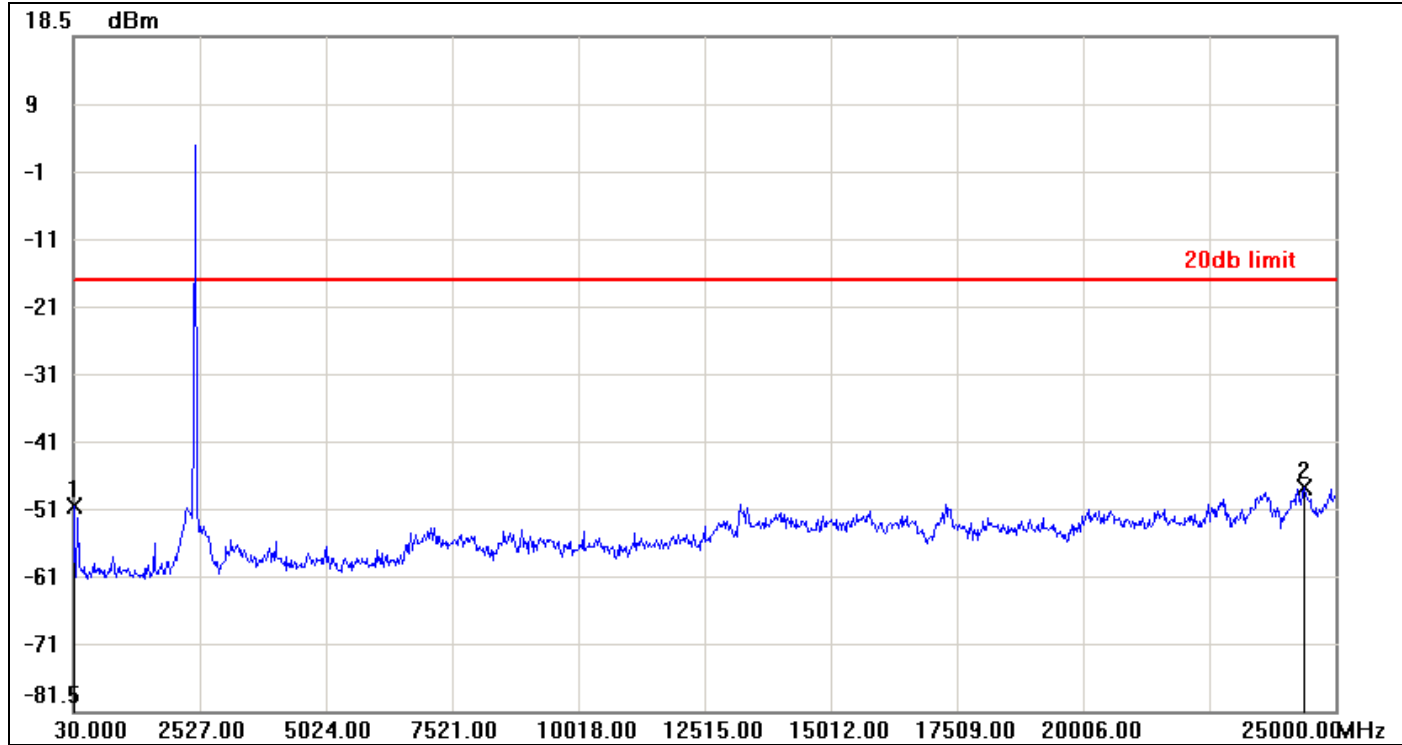
CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-44.58	-19.35	-25.23
2	24900.1200	-48.22	-19.35	-28.87



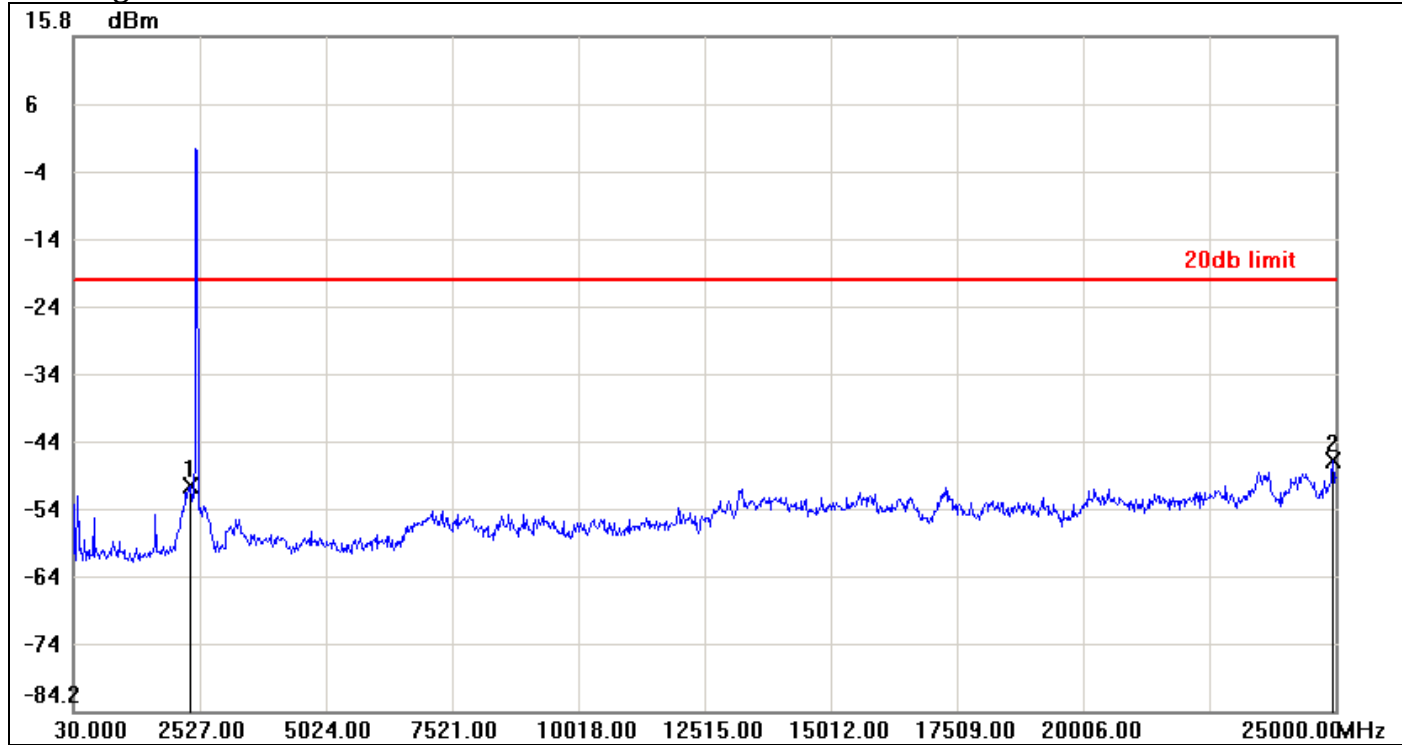
CH Mid



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	30.0000	-51.19	-17.69	-33.50
2	24375.7500	-48.45	-17.69	-30.76



CH High

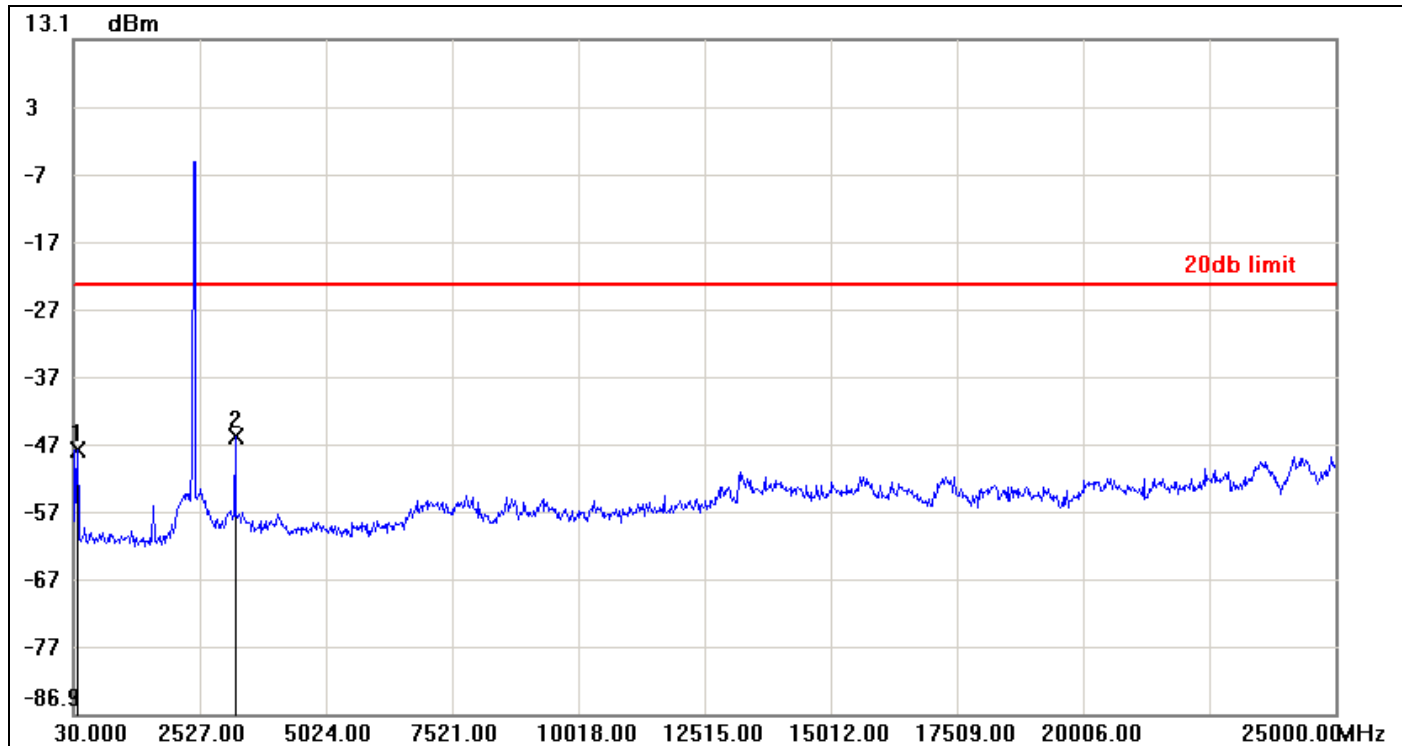


No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2352.2100	-50.81	-20.25	-30.56
2	24950.0600	-47.04	-20.25	-26.79



IEEE 802.11n HT 20 mode / Chain 0

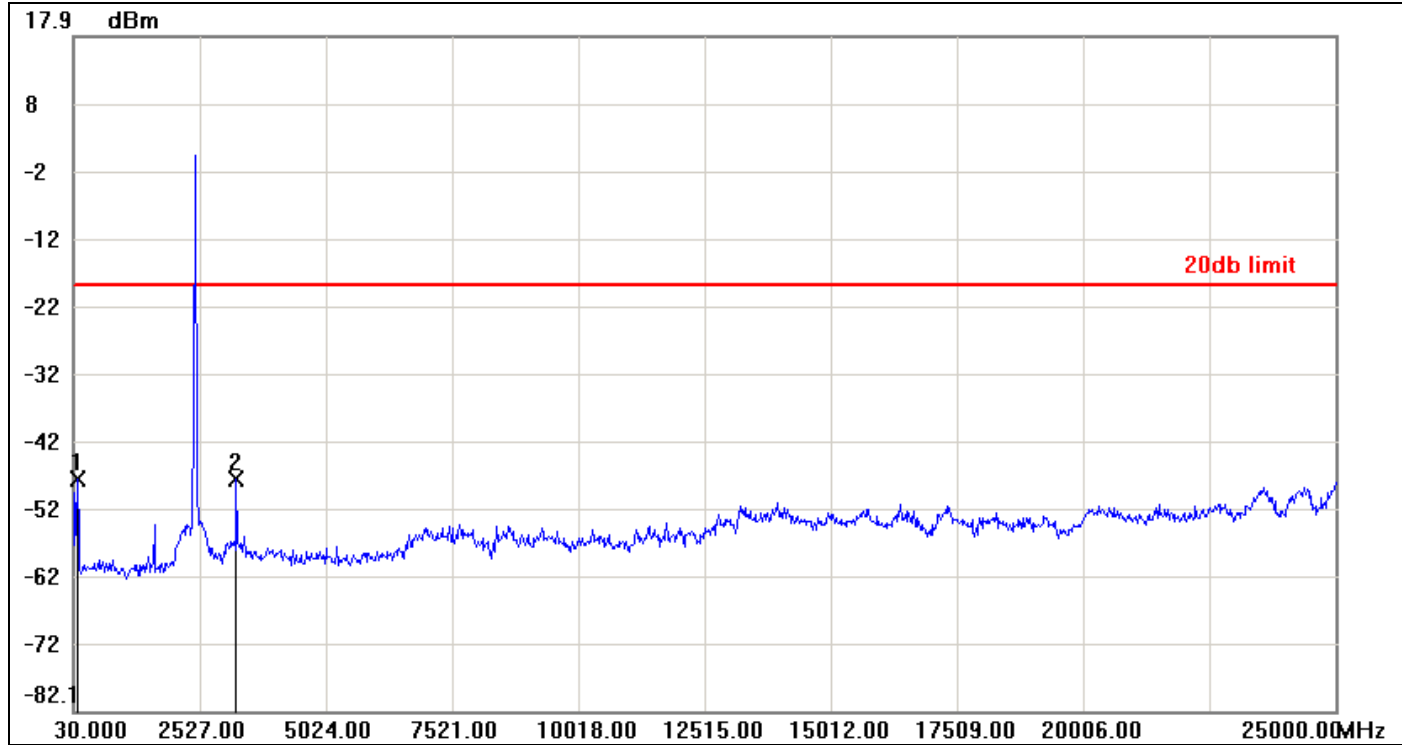
CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	104.9100	-47.67	-23.29	-24.38
2	3226.1600	-45.67	-23.29	-22.38



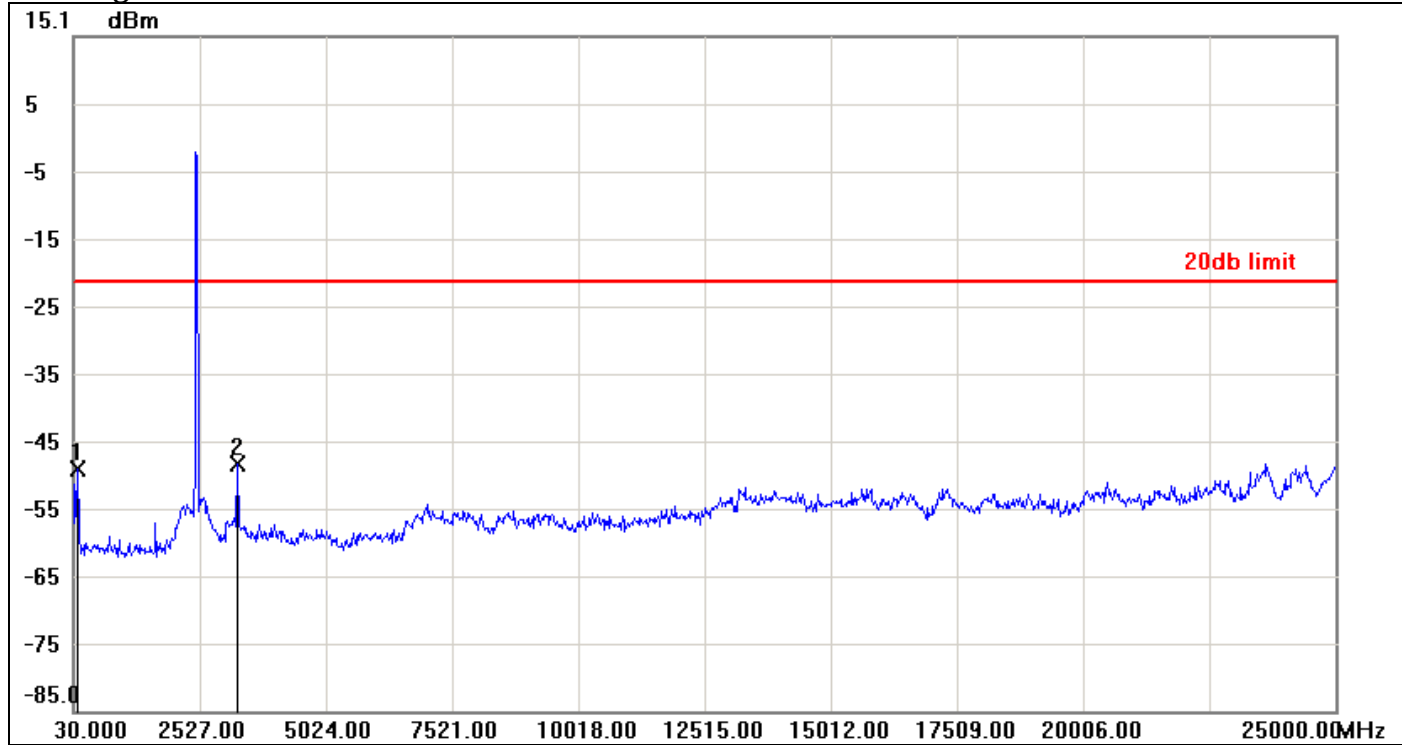
CH Mid



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	104.9100	-47.85	-19.00	-28.85
2	3251.1300	-47.80	-19.00	-28.80



CH High

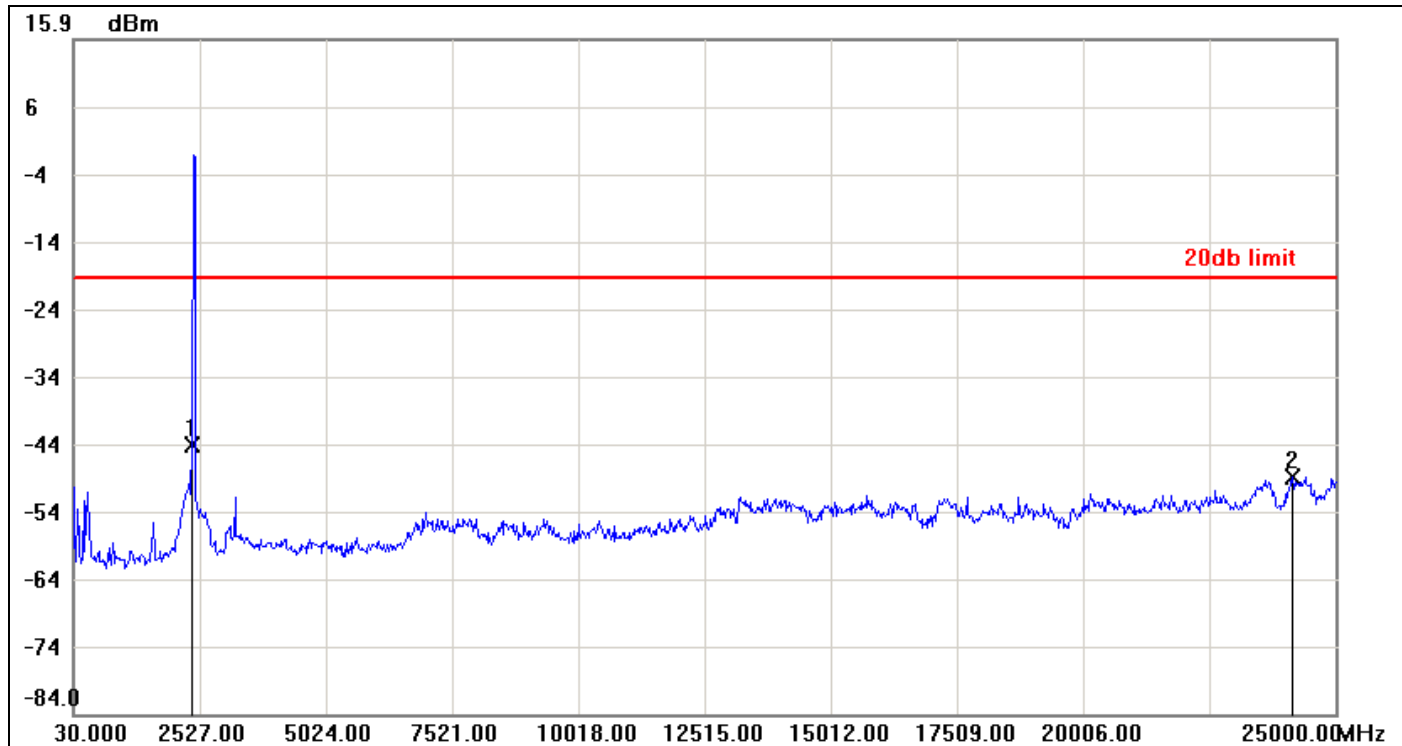


No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	104.9100	-49.05	-21.36	-27.69
2	3276.1000	-48.37	-21.36	-27.01



IEEE 802.11n HT 20 mode / Chain 1

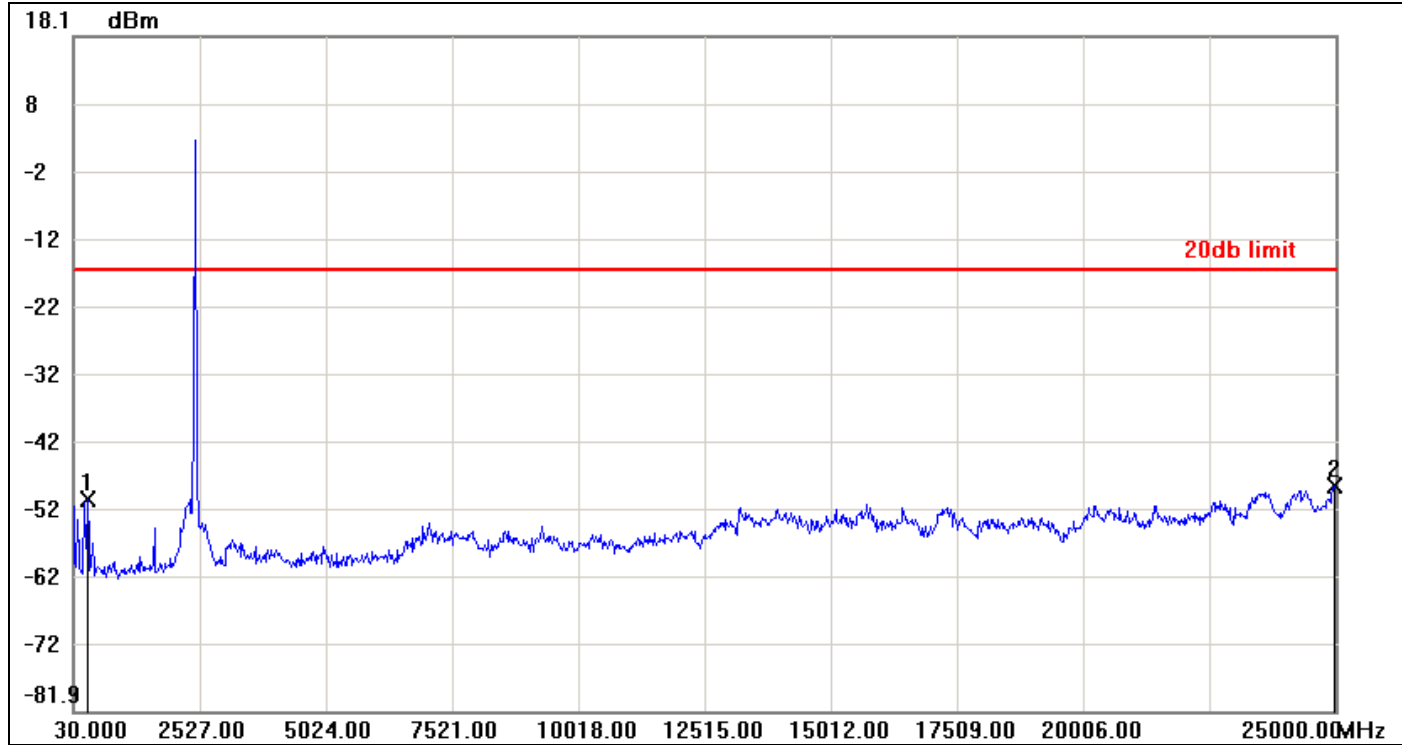
CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-44.21	-19.37	-24.84
2	24151.0200	-48.91	-19.37	-29.54



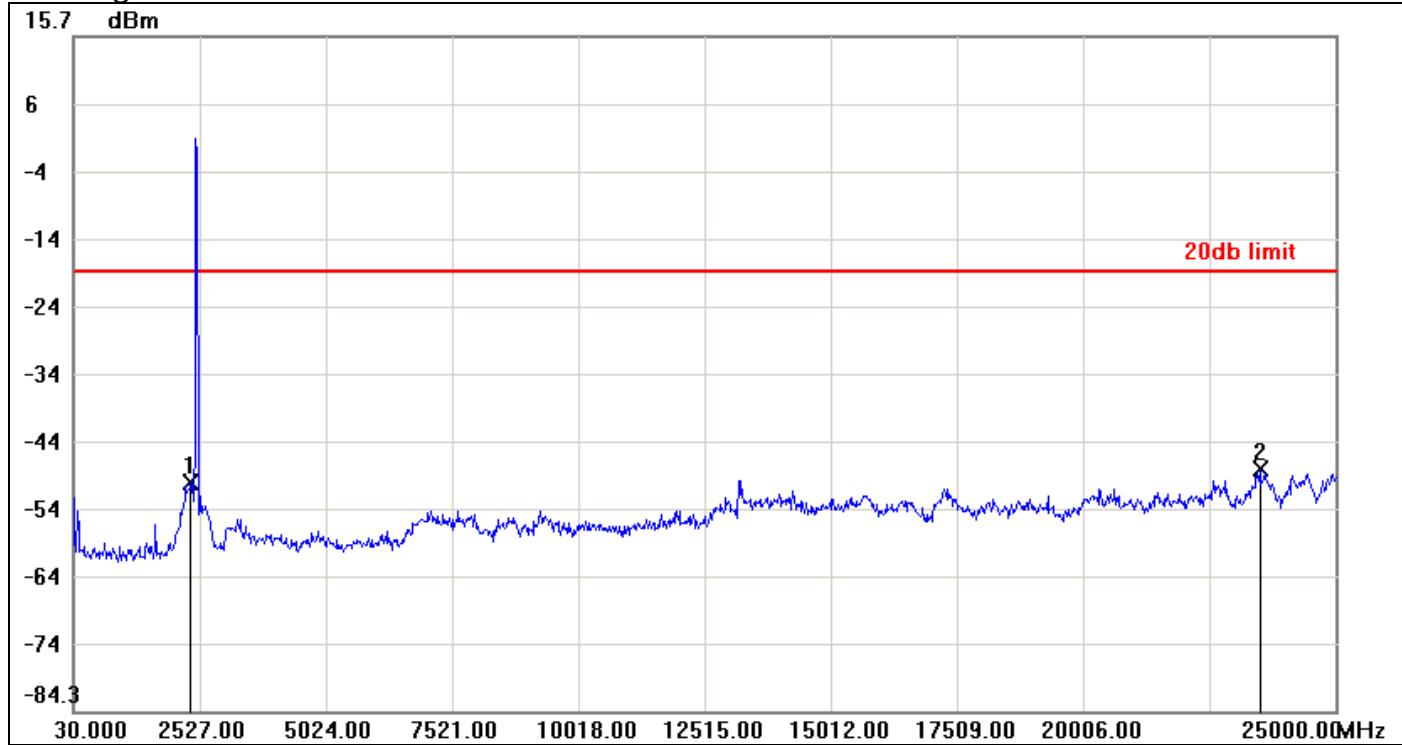
CH Mid



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	304.6700	-50.53	-16.47	-34.06
2	24975.0300	-48.53	-16.47	-32.06



CH High

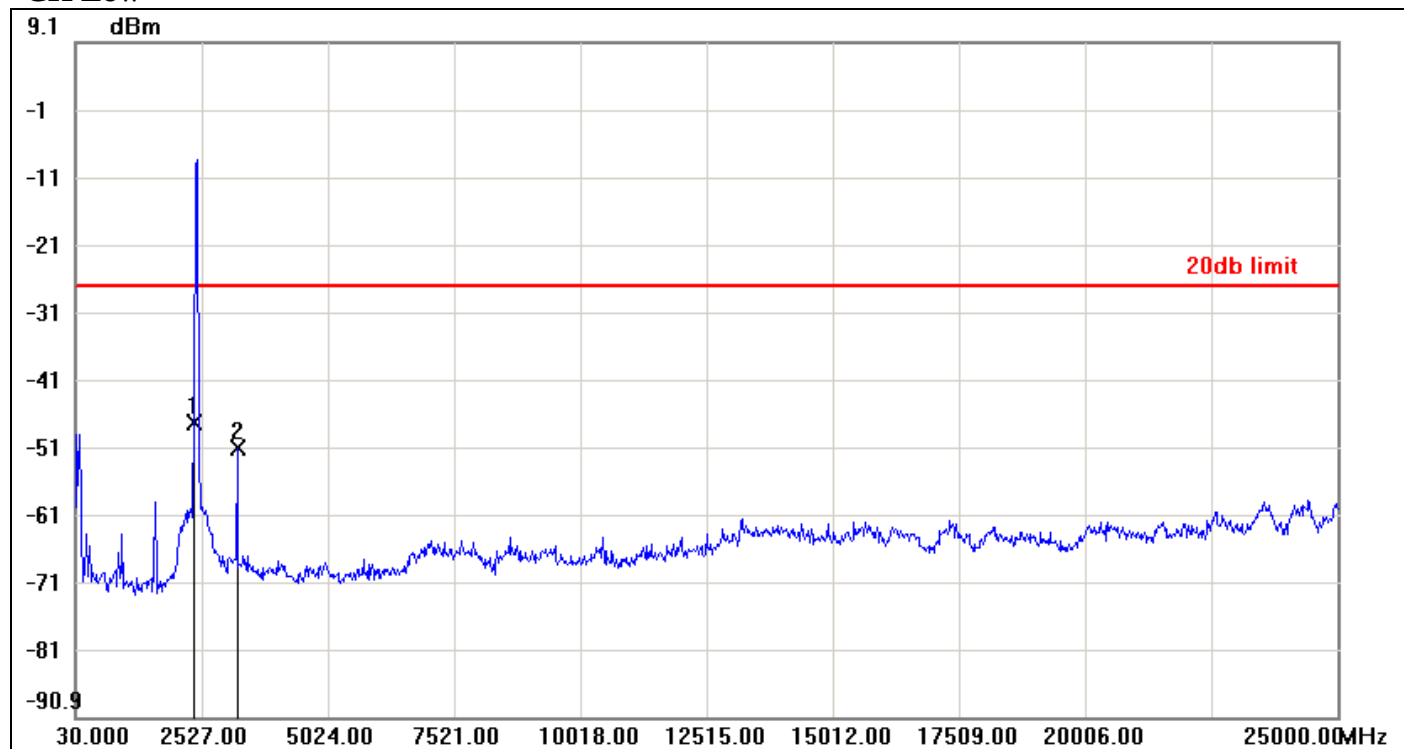


No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2352.2100	-50.38	-19.29	-31.09
2	23501.8000	-48.44	-19.29	-29.15



IEEE 802.11n HT 40 mode / Chain 0

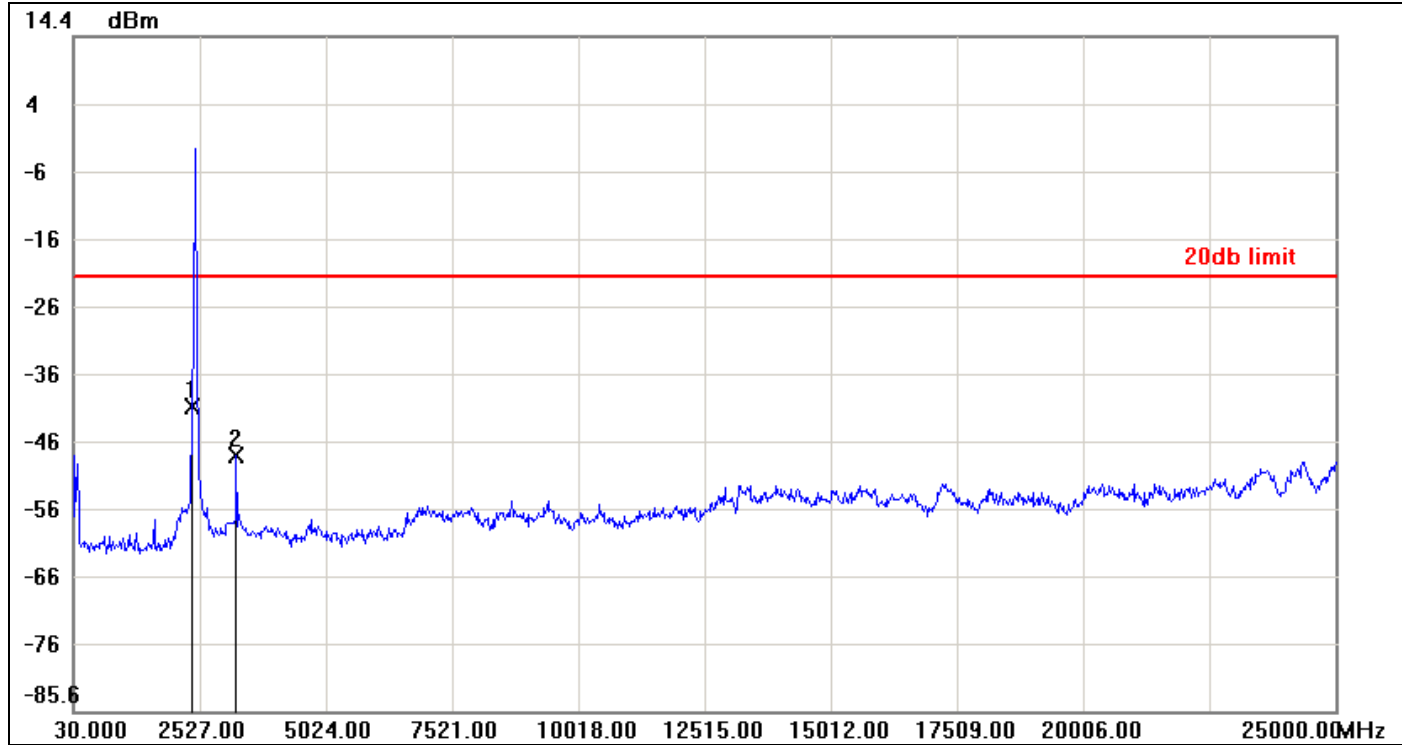
CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-47.37	-27.07	-20.30
2	3226.1600	-51.03	-27.07	-23.96



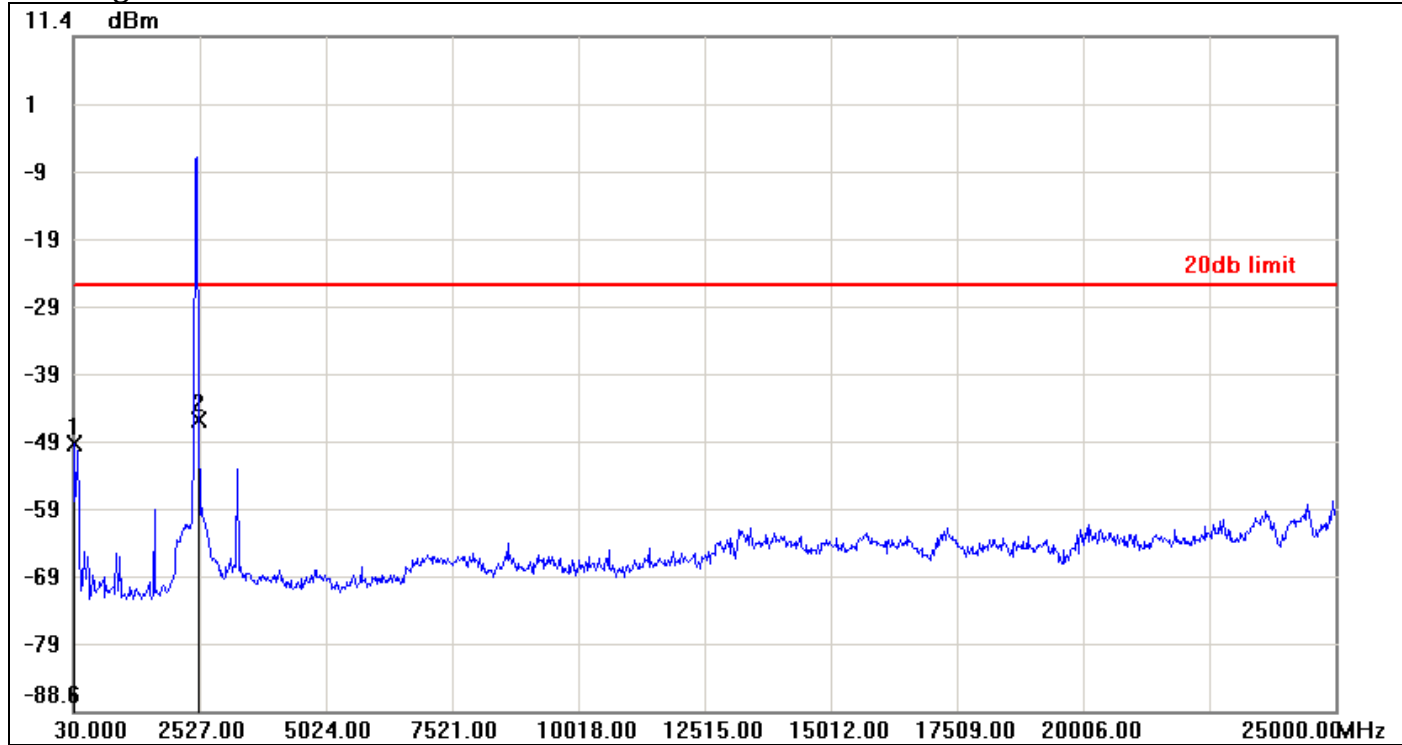
CH Mid



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-40.42	-21.17	-19.25
2	3251.1300	-47.62	-21.17	-26.45



CH High

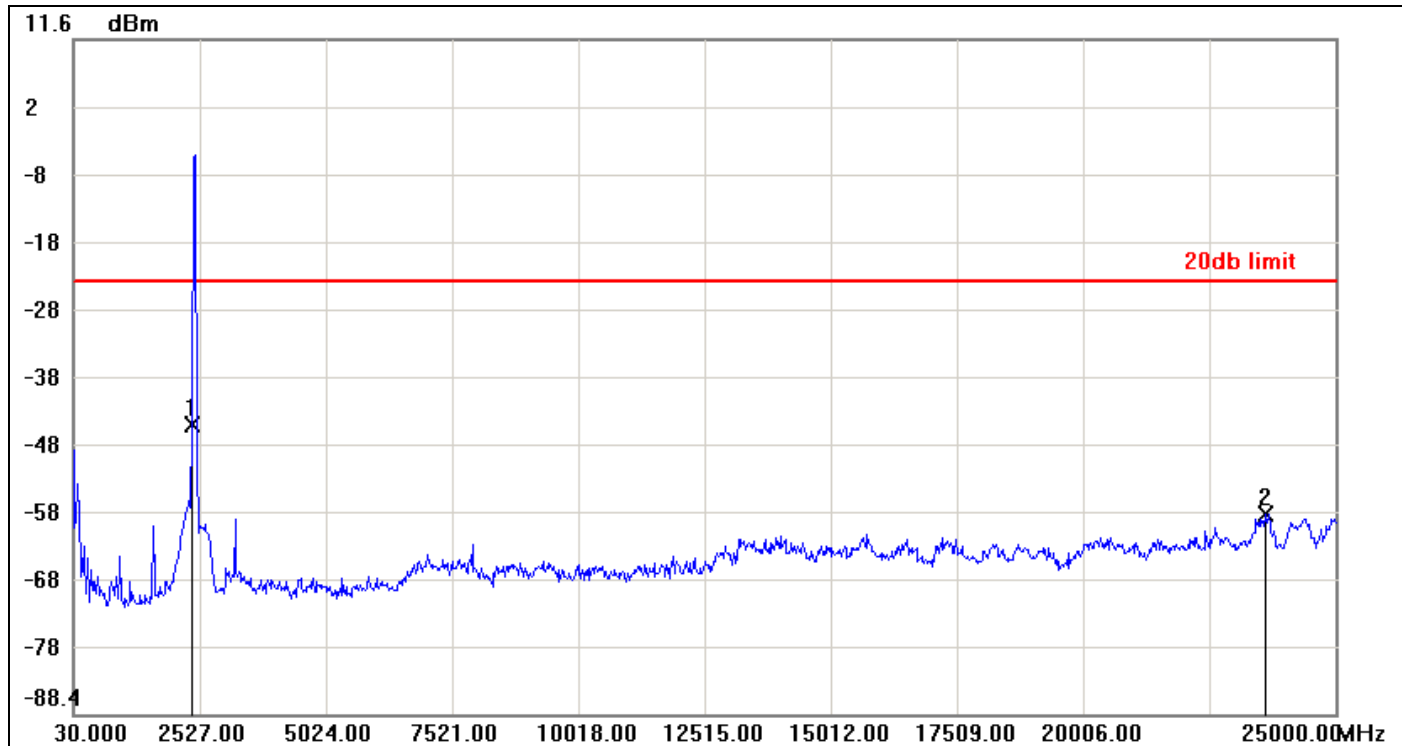


No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	30.0000	-49.09	-25.55	-23.54
2	2502.0300	-45.50	-25.55	-19.95



IEEE 802.11n HT 40 mode / Chain 1

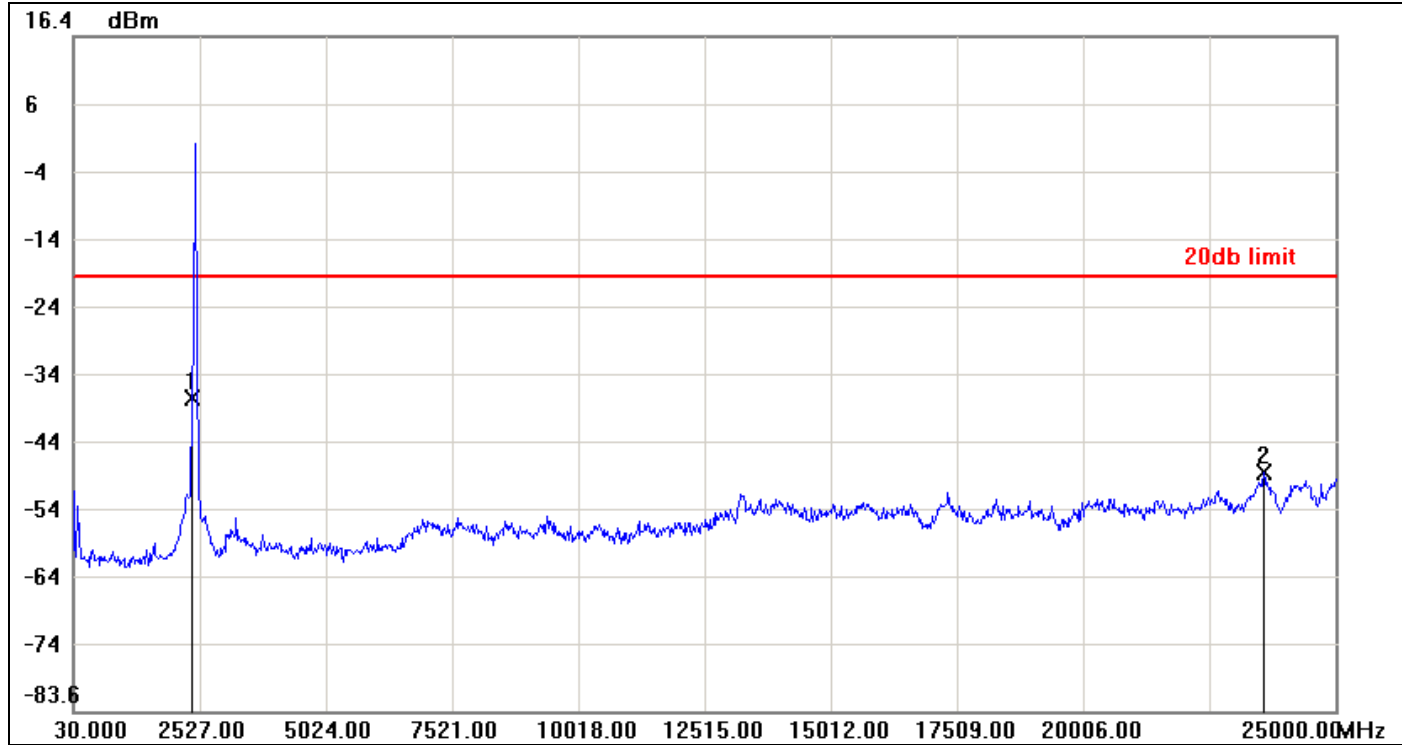
CH Low



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-45.46	-24.28	-21.18
2	23601.6800	-58.86	-24.28	-34.58



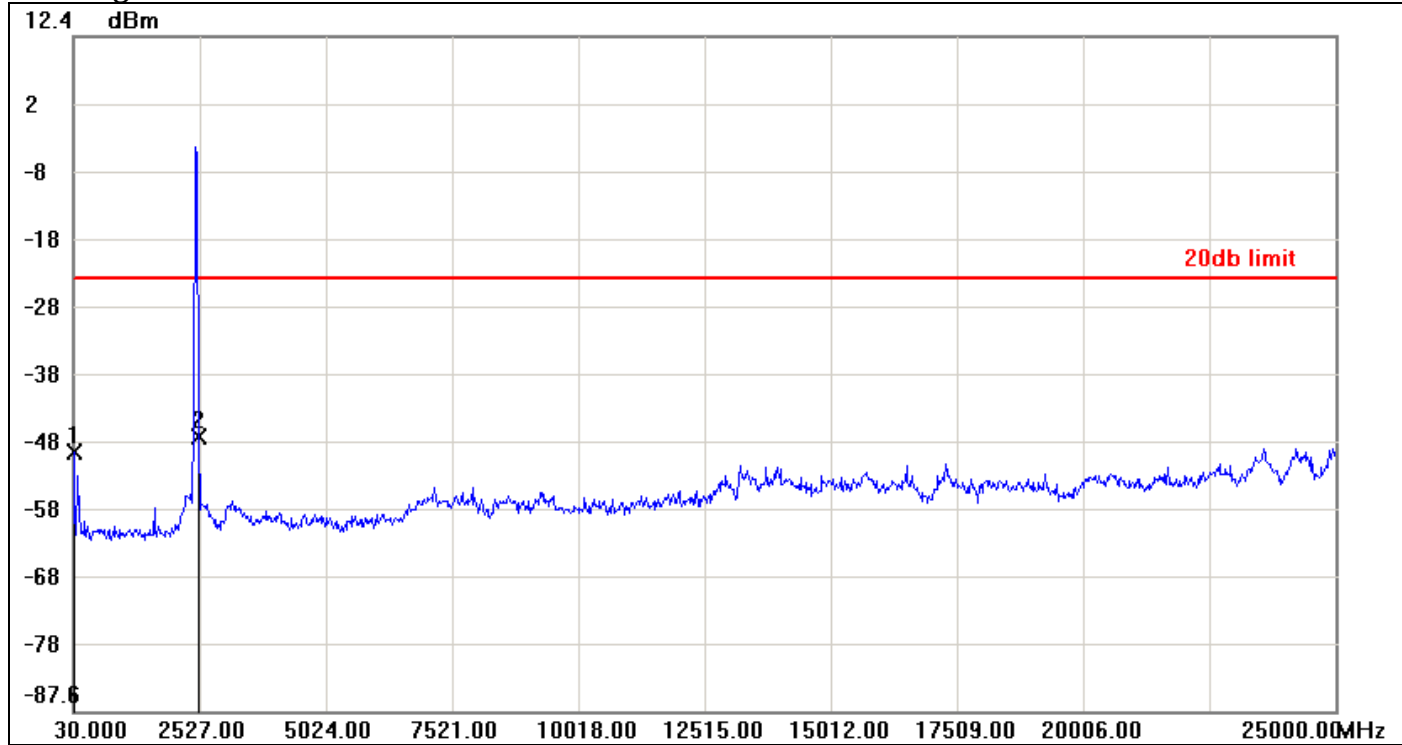
CH Mid



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	2377.1800	-37.30	-19.22	-18.08
2	23576.7100	-48.13	-19.22	-28.91



CH High



No.	Frequency(MHz)	Result(dBm)	Limit(dBm)	Margin(dBm)
1	30.0000	-49.27	-23.53	-25.74
2	2502.0300	-46.90	-23.53	-23.37



7.7 RADIATED EMISSIONS

LIMIT

1. According to §15.209(a), except as provided elsewhere in this Subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 – 30.0	30	30
30-88	100	3
88-216	150	3
216-960	200	3
Above 960	500	3

Remark: Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g., Sections 15.231 and 15.241.

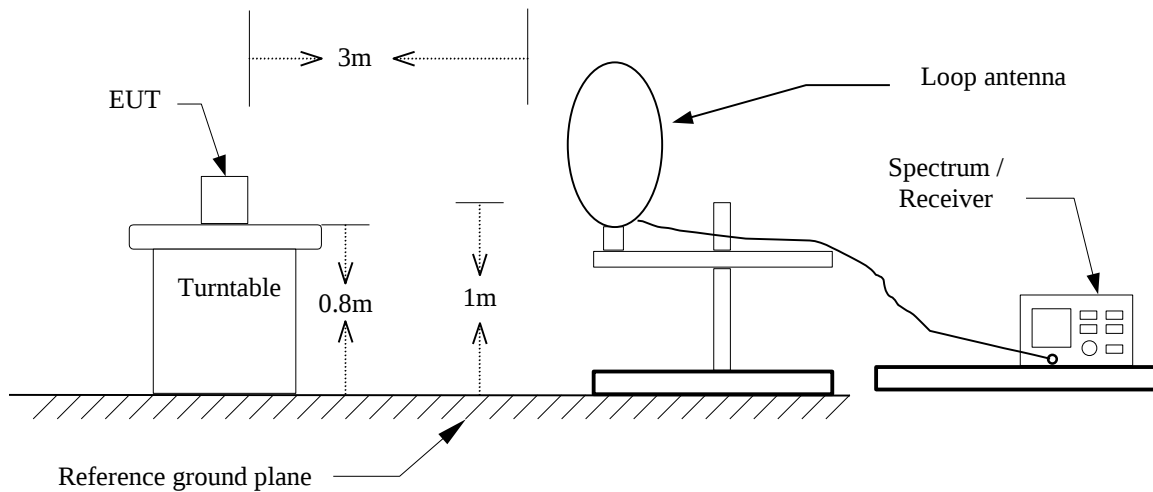
2. In the emission table above, the tighter limit applies at the band edges.

Frequency (MHz)	Field Strength (μV/m at 3-meter)	Field Strength (dBμV/m at 3-meter)
0.009 - 0.490	2400/F(kHz) +80	20LOG((2400/F(kHz))+80)
0.490 - 1.705	24000/F(kHz) +40	20LOG((24000/F(kHz))+40)
1.705 – 30.0	30	69.54
30-88	100	40
88-216	150	43.5
216-960	200	46
Above 960	500	54

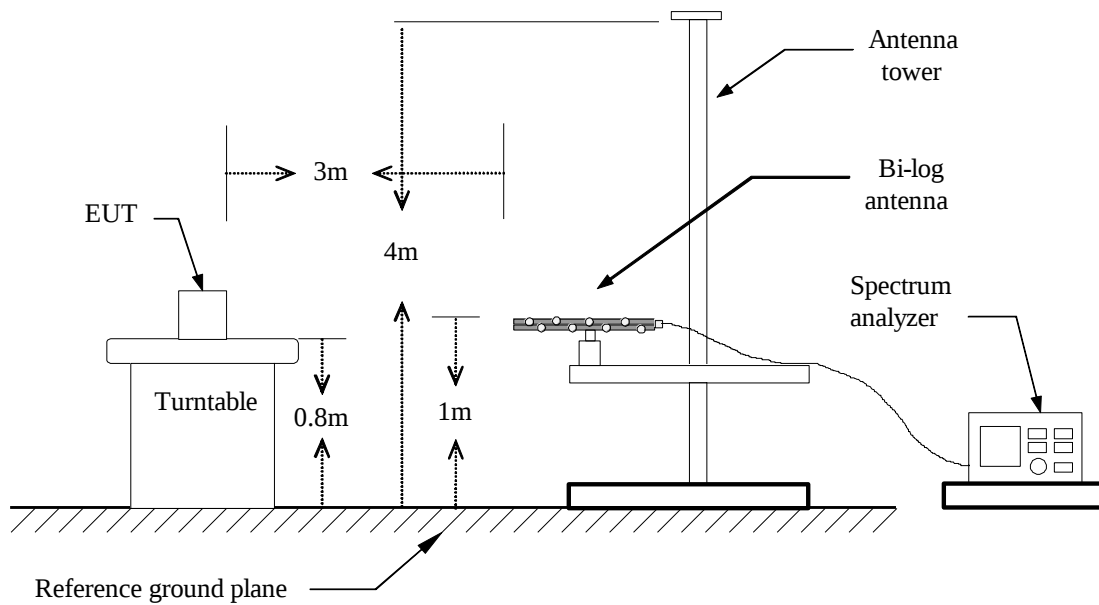


Test Configuration

9kHz ~ 30MHz

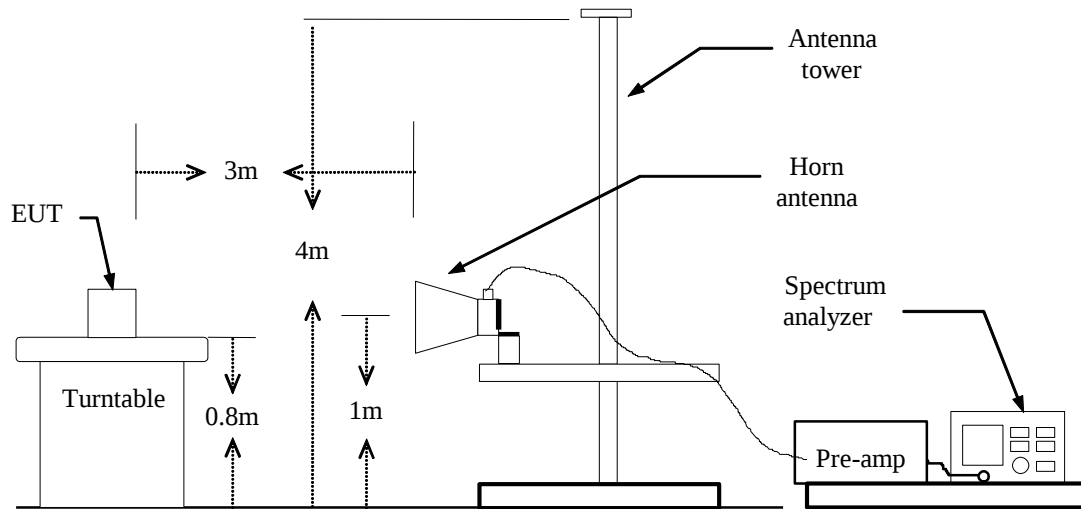


30MHz ~ 1GHz





Above 1 GHz





TEST PROCEDURE

1. The EUT is placed on a turntable, which is 1.5m above 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 emissions.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Set the spectrum analyzer in the following setting as:

Below 1GHz:

RBW=100kHz / VBW=300kHz / Sweep=AUTO

Above 1GHz:

(a) PEAK: RBW=VBW=1MHz / Sweep=AUTO

(b) AVERAGE: RBW=1MHz,
if duty cycle $\geq 98\%$, VBW=10Hz.
if duty cycle $< 98\%$ VBW=1/T.

IEEE 802.11b mode: $\geq 98\%$, VBW=10Hz

IEEE 802.11g mode: $\geq 89\%$, VBW=750Hz

IEEE 802.11n HT 20 MHz mode: $\geq 78\%$, VBW=1.5kHz

IEEE 802.11n HT 40 MHz mode: $\geq 65\%$, VBW=3kHz

7. Repeat above procedures until the measurements for all frequencies are complete.

TEST RESULTS

No non-compliance noted.

**Below 1GHz**

Operation Mode: Normal Link **Test Date:** June 10, 2015
Temperature: 27°C **Tested by:** Jason Lu
Humidity: 53% RH **Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
102.7500	46.42	-20.43	25.99	43.50	-17.51	peak	V
180.3500	44.41	-19.32	25.09	43.50	-18.41	peak	V
359.8000	46.45	-14.96	31.49	46.00	-14.51	peak	V
551.8600	40.20	-10.98	29.22	46.00	-16.78	peak	V
600.3600	35.36	-10.50	24.86	46.00	-21.14	peak	V
797.2700	34.55	-7.41	27.14	46.00	-18.86	peak	V
121.1800	44.23	-17.39	26.84	43.50	-16.66	peak	H
167.7400	47.73	-18.69	29.04	43.50	-14.46	peak	H
359.8000	52.00	-14.96	37.04	46.00	-8.96	peak	H
503.3600	40.70	-11.77	28.93	46.00	-17.07	peak	H
695.4200	39.89	-8.84	31.05	46.00	-14.95	peak	H
798.2400	42.96	-7.40	35.56	46.00	-10.44	peak	H

Remark:

1. No emission found between lowest internal used/generated frequency to 30MHz (9kHz~30MHz)
2. Radiated emissions measured in frequency range from 30 MHz to 1000MHz were made with an instrument using peak/quasi-peak detector mode.
3. 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.
4. $\text{Margin (dB)} = \text{Result (dBuV/m)} - \text{Limit (dBuV/m)}$.

**Above 1 GHz****Operation Mode:** TX / IEEE 802.11b / CH Low**Test Date:** June 9, 2015**Temperature:** 27°C**Tested by:** Jason Lu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1738.000	54.43	-4.96	49.47	74.00	-24.53	peak	V
4825.000	51.28	5.10	56.38	74.00	-17.62	peak	V
4825.000	45.02	5.10	50.12	54.00	-3.88	AVG	V
7235.000	40.39	12.71	53.10	74.00	-20.90	peak	V
7235.000	34.86	12.71	47.57	54.00	-6.43	AVG	V
4825.000	51.28	5.10	56.38	74.00	-17.62	peak	V
1858.000	54.47	-4.34	50.13	74.00	-23.87	peak	H
4825.000	54.50	5.10	59.60	74.00	-14.40	peak	H
4825.000	45.26	5.10	50.36	54.00	-3.64	AVG	H
7235.000	47.14	12.71	59.85	74.00	-14.15	peak	H
7235.000	35.97	12.71	48.68	54.00	-5.32	AVG	H
N/A							

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).

**Operation Mode:** TX / IEEE 802.11b / CH Mid**Test Date:** June 9, 2015**Temperature:** 27°C**Tested by:** Jason Lu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1768.000	54.44	-4.80	49.64	74.00	-24.36	peak	V
4875.000	50.77	5.24	56.01	74.00	-17.99	peak	V
4875.000	44.93	5.24	50.17	54.00	-3.83	AVG	V
7310.000	40.25	12.94	53.19	74.00	-20.81	peak	V
7310.000	34.27	12.94	47.21	54.00	-6.79	AVG	V
N/A							
1744.000	55.57	-4.93	50.64	74.00	-23.36	peak	H
4875.000	55.36	5.24	60.60	74.00	-13.40	peak	H
4875.000	45.2	5.24	50.44	54.00	-3.56	AVG	H
7310.000	50.02	12.94	62.96	74.00	-11.04	peak	H
7310.000	37.84	12.94	50.78	54.00	-3.22	AVG	H
N/A							

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).

**Operation Mode:** TX / IEEE 802.11b / CH High**Test Date:** June 9, 2015**Temperature:** 27°C**Tested by:** Jason Lu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2034.000	53.96	-3.63	50.33	74.00	-23.67	peak	V
4925.000	55.97	5.37	61.34	74.00	-12.66	peak	V
4925.000	44.56	5.37	49.93	54.00	-4.07	AVG	V
7385.000	49.75	13.16	62.91	74.00	-11.09	peak	V
7385.000	37.05	13.16	50.21	54.00	-3.79	AVG	V
N/A							
2008.000	54.27	-3.61	50.66	74.00	-23.34	peak	H
4925.000	55.44	5.37	60.81	74.00	-13.19	peak	H
4925.000	45.4	5.37	50.77	54.00	-3.23	AVG	H
7385.000	44.22	13.16	57.38	74.00	-16.62	peak	H
7385.000	29.85	13.16	43.01	54.00	-10.99	AVG	H
N/A							

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).

**Operation Mode:** TX / IEEE 802.11g / CH Low**Test Date:** June 9, 2015**Temperature:** 27°C**Tested by:** Jason Lu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2082.000	55.22	-3.68	51.54	74.00	-22.46	peak	V
4830.000	46.11	5.11	51.22	74.00	-22.78	peak	V
7240.000	38.58	12.72	51.30	74.00	-22.70	peak	V
N/A							
1958.000	55.33	-3.82	51.51	74.00	-22.49	peak	H
4825.000	45.61	5.10	50.71	74.00	-23.29	peak	H
7240.000	37.50	12.72	50.22	74.00	-23.78	peak	H
N/A							

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).

**Operation Mode:** TX / IEEE 802.11g / CH Mid**Test Date:** June 9, 2015**Temperature:** 27°C**Tested by:** Jason Lu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1624.000	56.84	-5.55	51.29	74.00	-22.71	peak	V
4870.000	54.26	5.22	59.48	74.00	-14.52	peak	V
4870.000	44.89	5.22	50.11	54.00	-3.89	AVG	V
7305.000	48.42	12.92	61.34	74.00	-12.66	peak	V
7305.000	37.5	12.92	50.42	54.00	-3.57	AVG	V
N/A							
2034.000	56.12	-3.63	52.49	74.00	-21.51	peak	H
4870.000	53.23	5.22	58.45	74.00	-15.55	peak	H
4870.000	44.90	5.22	50.12	54.00	-3.88	AVG	H
7315.000	48.55	12.95	61.50	74.00	-12.50	peak	H
7315.000	37.55	12.95	50.50	54.00	-3.50	AVG	H
N/A							

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).

**Operation Mode:** TX / IEEE 802.11g / CH High**Test Date:** June 9, 2015**Temperature:** 27°C**Tested by:** Jason Lu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2096.000	54.33	-3.70	50.63	74.00	-23.37	peak	V
4915.000	44.33	5.34	49.67	74.00	-24.33	peak	V
7385.000	37.99	13.16	51.15	74.00	-22.85	peak	V
N/A							
1932.000	54.24	-3.95	50.29	74.00	-23.71	peak	H
4920.000	44.98	5.36	50.34	74.00	-23.66	peak	H
7390.000	37.95	13.18	51.13	74.00	-22.87	peak	H
V							

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).

**Operation Mode:** TX / IEEE 802.11n HT 20 mode / CH Low**Test Date:** June 9, 2015**Temperature:** 27°C**Tested by:** Jason Lu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2032.000	54.10	-3.63	50.47	74.00	-23.53	peak	V
4810.000	46.58	5.06	51.64	74.00	-22.36	peak	V
7230.000	38.62	12.69	51.31	74.00	-22.69	peak	V
N/A							
1964.000	54.06	-3.79	50.27	74.00	-23.73	peak	H
4820.000	45.60	5.09	50.69	74.00	-23.31	peak	H
7245.000	39.22	12.74	51.96	74.00	-22.04	peak	H
N/A							

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).

**Operation Mode:** TX / IEEE 802.11n HT 20 mode / CH Mid**Test Date:** June 9, 2015**Temperature:** 27°C**Tested by:** Jason Lu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1624.000	56.12	-5.55	50.57	74.00	-23.43	peak	V
4870.000	54.11	5.22	59.33	74.00	-14.67	peak	V
4870.000	45.04	5.22	50.26	54.00	-3.74	AVG	V
7305.000	50.29	12.92	63.21	74.00	-10.79	peak	V
7305.000	37.19	12.92	50.11	54.00	-3.89	AVG	V
N/A							
1860.000	54.41	-4.33	50.08	74.00	-23.92	peak	H
4885.000	50.84	5.26	56.10	74.00	-17.90	peak	H
4885.000	44.06	5.26	49.32	54.00	-4.68	AVG	H
7305.000	48.21	12.92	61.13	74.00	-12.87	peak	H
7305.000	37.75	12.92	50.67	54.00	-3.33	AVG	H
N/A							

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).

**Operation Mode:** TX / IEEE 802.11n HT 20 mode / CH High**Test Date:** June 9, 2015**Temperature:** 27°C**Tested by:** Jason Lu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2140.000	54.49	-3.48	51.01	74.00	-22.99	peak	V
4920.000	45.45	5.36	50.81	74.00	-23.19	peak	V
7395.000	38.38	13.19	51.57	74.00	-22.43	peak	V
N/A							
1942.000	54.43	-3.90	50.53	74.00	-23.47	peak	H
4935.000	44.83	5.40	50.23	74.00	-23.77	peak	H
7390.000	38.25	13.18	51.43	74.00	-22.57	peak	H
N/A							

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).

**Operation Mode:** TX / IEEE 802.11n HT 40 mode
/ CH Low**Test Date:** June 10, 2015**Temperature:** 27°C**Tested by:** Jason Lu**Humidity:** 53% RH**Polarity:** Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1976.000	54.21	-3.72	50.49	74.00	-23.51	peak	V
4805.000	43.96	5.05	49.01	74.00	-24.99	peak	V
N/A							
2012.000	55.03	-3.61	51.42	74.00	-22.58	peak	H
4845.000	43.22	5.15	48.37	74.00	-25.63	peak	H
7250.000	38.72	12.75	51.47	74.00	-22.53	peak	H
N/A							

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).



Operation Mode: TX / IEEE 802.11n HT 40 mode
/ CH Mid

Test Date: June 10, 2015

Temperature: 27°C

Tested by: Jason Lu

Humidity: 53% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
1634.000	56.74	-5.50	51.24	74.00	-22.76	peak	V
4870.000	50.69	5.22	55.91	74.00	-18.09	peak	V
4870.000	40.64	5.22	45.86	54.00	-8.14	AVG	V
7295.000	50.51	12.89	63.40	74.00	-10.60	peak	V
7295.000	37.94	12.89	50.83	54.00	-3.17	AVG	V
N/A							
2080.000	54.69	-3.68	51.01	74.00	-22.99	peak	H
4860.000	49.85	5.19	55.04	74.00	-18.96	peak	H
4860.000	40.35	5.19	45.54	54.00	-8.46	AVG	H
7295.000	53.74	12.89	66.63	74.00	-7.37	peak	H
7295.000	37.84	12.89	50.73	54.00	-3.27	AVG	H
N/A							

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).



Operation Mode: TX / IEEE 802.11n HT 40 mode
/ CH High

Test Date: June 10, 2015

Temperature: 27°C

Tested by: Jason Lu

Humidity: 53% RH

Polarity: Ver. / Hor.

Frequency (MHz)	Reading (dBuV)	Correction Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark	Ant. Pol. (H/V)
2152.000	53.67	-3.41	50.26	74.00	-23.74	peak	V
4900.000	43.15	5.30	48.45	74.00	-25.55	peak	V
N/A							
2100.000	54.83	-3.70	51.13	74.00	-22.87	peak	H
4910.000	43.34	5.33	48.67	74.00	-25.33	peak	H
7340.000	38.49	13.03	51.52	74.00	-22.48	peak	H
N/A							

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).



7.8 POWERLINE CONDUCTED EMISSIONS

LIMIT

According to §15.207(a), except as shown in paragraphs (b) and (c) of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies within the band 150 kHz to 30 MHz shall not exceed the limits in the following table, as measured using a 50 μ H/50 ohms line impedance stabilization network (LISN). Compliance with the provisions of this paragraph shall be based on the measurement of the radio frequency voltage between each power line and ground at the power terminal. The lower limit applies at the boundary between the frequency ranges.

Frequency Range (MHz)	Limits (dB μ V)	
	Quasi-peak	Average
0.15 to 0.50	66 to 56*	56 to 46*
0.50 to 5	56	46
5 to 30	60	50

* Decreases with the logarithm of the frequency.

Test Configuration

See test photographs attached in Appendix II for the actual connections between EUT and support equipment.

TEST PROCEDURE

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured were complete.

**TEST RESULTS**

The initial step in collecting conducted data is a spectrum analyzer peak scan of the measurement range. Significant peaks are then marked as shown on the following data page, and these signals are then quasi-peaked.

Test Data

Operation Mode: Normal Link **Test Date:** June 10, 2015
Temperature: 24°C **Tested by:** Sehni Hu
Humidity: 50% RH

Freq. (MHz)	QP Reading (dBuV)	AV Reading (dBuV)	Corr. factor (dB/m)	QP Result (dBuV/m)	AV Result (dBuV/m)	QP Limit (dBuV)	AV Limit (dBuV)	QP Margin (dB)	AV Margin (dB)	Note
0.1539	28.45	16.27	9.61	38.06	25.88	65.78	55.79	-27.72	-29.91	L1
0.2100	22.86	13.16	9.62	32.48	22.78	63.20	53.21	-30.72	-30.43	L1
0.5820	18.22	11.92	9.63	27.85	21.55	56.00	46.00	-28.15	-24.45	L1
0.7180	17.30	10.92	9.64	26.94	20.56	56.00	46.00	-29.06	-25.44	L1
1.0940	19.46	11.93	9.65	29.11	21.58	56.00	46.00	-26.89	-24.42	L1
25.3420	17.65	10.07	9.95	27.60	20.02	60.00	50.00	-32.40	-29.98	L1
0.1540	29.45	13.52	9.66	39.11	23.18	65.78	55.78	-26.67	-32.60	L2
0.1820	25.68	10.31	9.67	35.35	19.98	64.39	54.39	-29.04	-34.41	L2
0.4140	21.49	18.36	9.67	31.16	28.03	57.57	47.57	-26.41	-19.54	L2
0.5060	22.60	11.39	9.67	32.27	21.06	56.00	46.00	-23.73	-24.94	L2
0.6860	18.78	10.55	9.68	28.46	20.23	56.00	46.00	-27.54	-25.77	L2
21.8260	18.21	12.57	10.02	28.23	22.59	60.00	50.00	-31.77	-27.41	L2

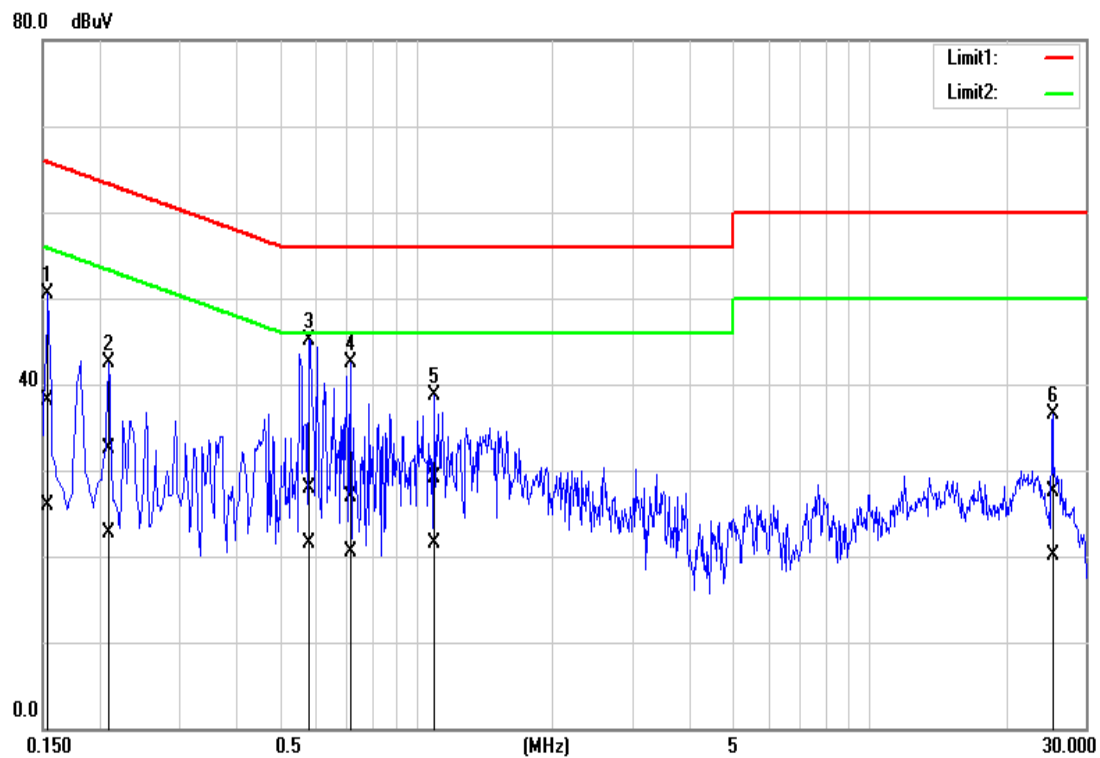
Remark:

1. Measuring frequencies from 0.15 MHz to 30MHz.
2. The emissions measured in frequency range from 0.15 MHz to 30MHz were made with an instrument using Quasi-peak detector and average detector.
3. The IF bandwidth of SPA between 0.15MHz and 30MHz was 10 kHz; the IF bandwidth of Test Receiver between 0.15MHz and 30MHz was 9 kHz;
4. L1 = Line One (Live Line) / L2 = Line Two (Neutral Line)



Test Plots

Conducted emissions (Line 1)



Conducted emissions (Line 2)

