

Test Mode: 802.11g

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	53.15	-3.86	49.29	74.00	-24.71	H	PK
4824.000	39.88	-3.86	36.02	54.00	-17.98	H	AV
7236.000	46.07	1.10	47.17	74.00	-26.83	H	PK
7236.000	32.05	1.10	33.15	54.00	-20.85	H	AV
4824.000	53.64	-3.86	49.78	74.00	-24.22	V	PK
4824.000	40.30	-3.86	36.44	54.00	-17.56	V	AV
7236.000	46.87	1.10	47.97	74.00	-26.03	V	PK
7236.000	33.19	1.10	34.29	54.00	-19.71	V	AV
Middle Channel-2437MHz							
4874.000	52.75	-3.74	49.01	74.00	-24.99	H	PK
4874.000	40.93	-3.74	37.19	54.00	-16.81	H	AV
7311.000	45.03	1.47	46.50	74.00	-27.5	H	PK
7311.000	32.92	1.47	34.39	54.00	-19.61	H	AV
4874.000	54.72	-3.74	50.98	74.00	-23.02	V	PK
4874.000	41.51	-3.74	37.77	54.00	-16.23	V	AV
7311.000	46.05	1.47	47.52	74.00	-26.48	V	PK
7311.000	32.98	1.47	34.45	54.00	-19.55	V	AV
High Channel-2462MHz							
4924.000	51.65	-3.59	48.06	74.00	-25.94	H	PK
4924.000	38.40	-3.59	34.81	54.00	-19.19	H	AV
7386.000	44.83	1.79	46.62	74.00	-27.38	H	PK
7386.000	32.38	1.79	34.17	54.00	-19.83	H	AV
4924.000	53.76	-3.59	50.17	74.00	-23.83	V	PK
4924.000	40.34	-3.59	36.75	54.00	-17.25	V	AV
7386.000	46.23	1.79	48.02	74.00	-25.98	V	PK
7386.000	33.60	1.79	35.39	54.00	-18.61	V	AV

Test Mode: 802.11n-HT20

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2412MHz							
4824.000	53.25	-3.86	49.39	74.00	-24.61	H	PK
4824.000	38.19	-3.86	34.33	54.00	-19.67	H	AV
7236.000	44.91	1.10	46.01	74.00	-27.99	H	PK
7236.000	32.09	1.10	33.19	54.00	-20.81	H	AV
4824.000	54.36	-3.86	50.50	74.00	-23.5	V	PK
4824.000	40.83	-3.86	36.97	54.00	-17.03	V	AV
7236.000	46.86	1.10	47.96	74.00	-26.04	V	PK
7236.000	33.42	1.10	34.52	54.00	-19.48	V	AV
Middle Channel-2437MHz							
4874.000	51.81	-3.74	48.07	74.00	-25.93	H	PK
4874.000	40.13	-3.74	36.39	54.00	-17.61	H	AV
7311.000	46.39	1.47	47.86	74.00	-26.14	H	PK
7311.000	30.75	1.47	32.22	54.00	-21.78	H	AV
4874.000	52.57	-3.74	48.83	74.00	-25.17	V	PK
4874.000	40.27	-3.74	36.53	54.00	-17.47	V	AV
7311.000	46.14	1.47	47.61	74.00	-26.39	V	PK
7311.000	32.85	1.47	34.32	54.00	-19.68	V	AV
High Channel-2462MHz							
4924.000	51.55	-3.59	47.96	74.00	-26.04	H	PK
4924.000	40.88	-3.59	37.29	54.00	-16.71	H	AV
7386.000	45.96	1.79	47.75	74.00	-26.25	H	PK
7386.000	33.75	1.79	35.54	54.00	-18.46	H	AV
4924.000	53.35	-3.59	49.76	74.00	-24.24	V	PK
4924.000	39.13	-3.59	35.54	54.00	-18.46	V	AV
7386.000	46.20	1.79	47.99	74.00	-26.01	V	PK
7386.000	33.01	1.79	34.8	54.00	-19.20	V	AV

Test Mode: 802.11n-HT40

Frequency	Reading	Correct	Result	Limit	Margin	Polar	Detector
(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	H/V	
Low Channel-2422MHz							
4844.000	50.90	-3.90	47.00	74.00	-27.00	H	PK
4824.000	35.90	-3.90	32.00	54.00	-22.00	H	AV
7266.000	44.13	1.06	45.19	74.00	-28.81	H	PK
7266.000	30.21	1.06	31.27	54.00	-22.73	H	AV
4844.000	51.87	-3.90	47.97	74.00	-26.03	V	PK
4824.000	37.07	-3.90	33.17	54.00	-20.83	V	AV
7266.000	46.46	1.06	47.52	74.00	-26.48	V	PK
7266.000	32.43	1.06	33.49	54.00	-20.51	V	AV
Middle Channel-2437MHz							
4874.000	50.18	-3.74	46.44	74.00	-27.56	H	PK
4874.000	35.53	-3.74	31.79	54.00	-22.21	H	AV
7311.000	42.53	1.47	44.00	74.00	-30.00	H	PK
7311.000	29.68	1.47	31.15	54.00	-22.85	H	AV
4874.000	51.39	-3.74	47.65	74.00	-26.35	V	PK
4874.000	37.6	-3.74	33.86	54.00	-20.14	V	AV
7311.000	43.43	1.47	44.90	74.00	-29.10	V	PK
7311.000	31.65	1.47	33.12	54.00	-20.88	V	AV
High Channel-2452MHz							
4904.000	50.30	-3.63	46.67	74.00	-27.33	H	PK
4904.000	37.02	-3.63	33.39	54.00	-20.61	H	AV
7356.000	43.28	1.62	44.90	74.00	-29.1	H	PK
7356.000	28.38	1.62	30.00	54.00	-24.00	H	AV
4904.000	52.49	-3.63	48.86	74.00	-25.14	V	PK
4904.000	38.48	-3.63	34.85	54.00	-19.15	V	AV
7356.000	45.83	1.62	47.45	74.00	-26.55	V	PK
7356.000	32.77	1.62	34.39	54.00	-19.61	V	AV

Note: Testing is carried out with frequency rang 9kHz to the tenth harmonics, which above 3th Harmonics are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.
The measurements greater than 20dB below the limit from 9kHz to 30MHz.

9. Out of Band Emissions

9.1 Standard Applicable

According to §15.247 (d) In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated 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. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. 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).

9.2 Test Procedure

According to the KDB 558074D01 v04, the band-edge radiated test method as follows:

Set span = wide enough to capture the peak level of the emission operating on the channel closest to the bandedge, as well as any modulation products which fall outside of the authorized band of operation (2310MHz to 2420MHz for low bandedge, 2460MHz to 2500MHz for the high bandedge)

RBW = 1MHz, VBW = 1MHz for peak value measured

RBW = 1MHz, VBW = 10Hz for average value measured

Sweep = auto; Detector function = peak/average; Trace = max hold

All the trace to stabilize, set the marker on the emission at the bandedge, or on the highest modulation product outside of the band, if this level is greater than that at the bandedge. Enable the marker-delta function, then use the marker-to-peak function to move the marker to the peak of the in-band emission. Those emission must comply with the 15.209 limit for fall in the restricted bands listed in section 15.205. Note that the method of measurement KDB publication number: 913591 may be used for the radiated bandedge measurements.

According to the KDB 558074 D01 V04, the conducted spurious emissions test method as follows:

1. Set start frequency to DTS channel edge frequency.
2. Set stop frequency so as to encompass the spectrum to be examined.
3. Set RBW = 100 kHz.
4. Set VBW \geq 300 kHz.
5. Detector = peak.
6. Trace Mode = max hold.
7. Sweep = auto couple.
8. Allow the trace to stabilize (this may take some time, depending on the extent of the span).
9. Use peak marker function to determine maximum amplitude of all unwanted emissions within any 100 kHz bandwidth.

Ensure that the amplitude of all unwanted emissions outside of the authorized frequency band (excluding restricted frequency bands) are attenuated by at least the minimum requirements specified in section 8.1. Report the three highest emissions relative to the limit.

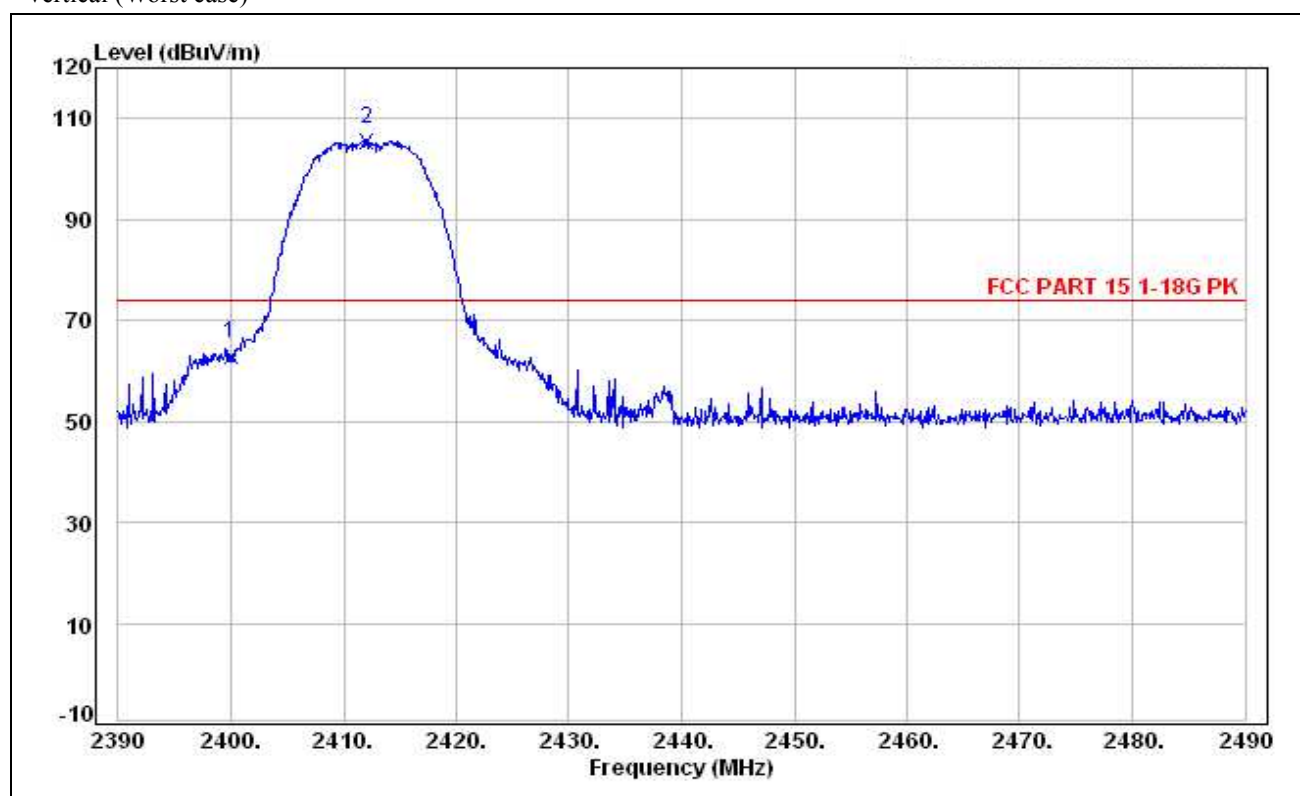
9.3 Environmental Conditions

Temperature:	23°C
Relative Humidity:	54%
ATM Pressure:	1011 mbar

9.4 Summary of Test Results/Plots

802.11b-Lowest Band edge

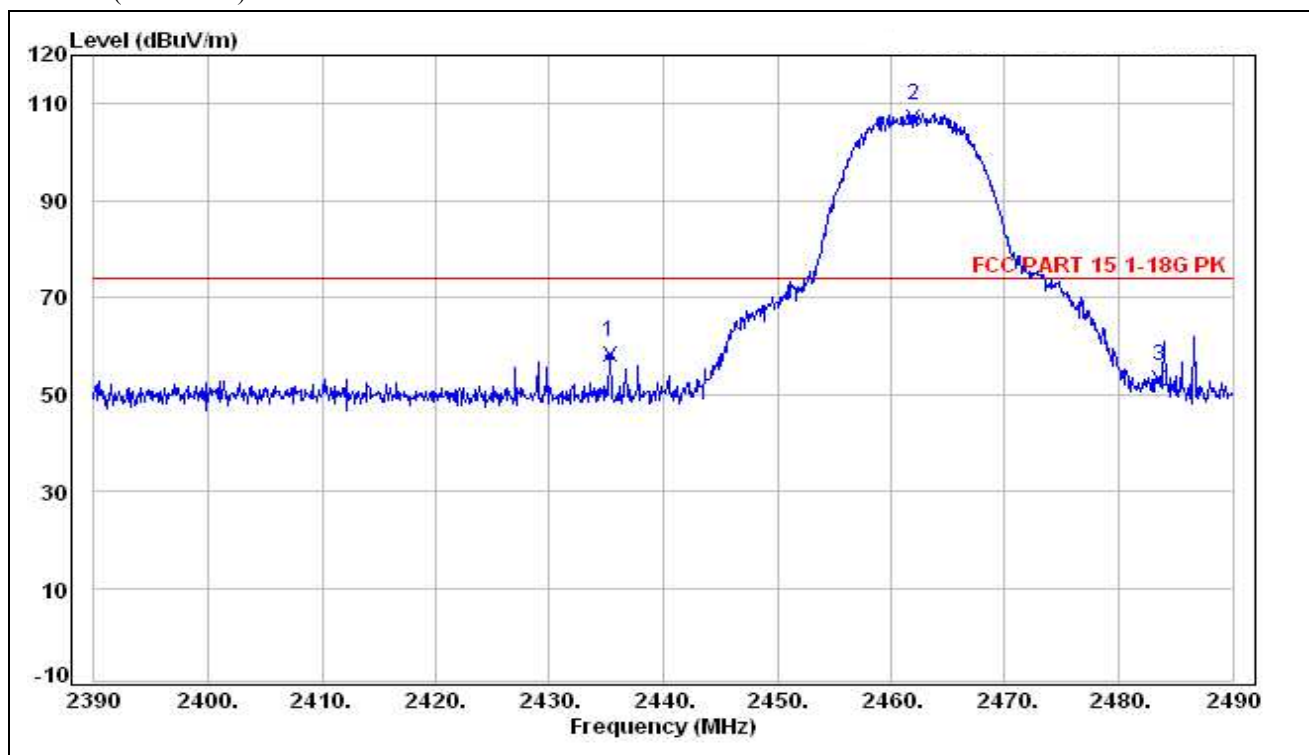
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2400.000	50.68	-3.35	47.33	54.00	-6.67	Average Detector
	2400.000	63.54	-3.35	60.19	74.00	-13.81	Peak Detector
2	2412.000	91.65	-4.29	87.36	/	/	Average Detector
	2412.000	106.30	-4.29	102.01	/	/	Peak Detector

802.11b-Highest Band edge

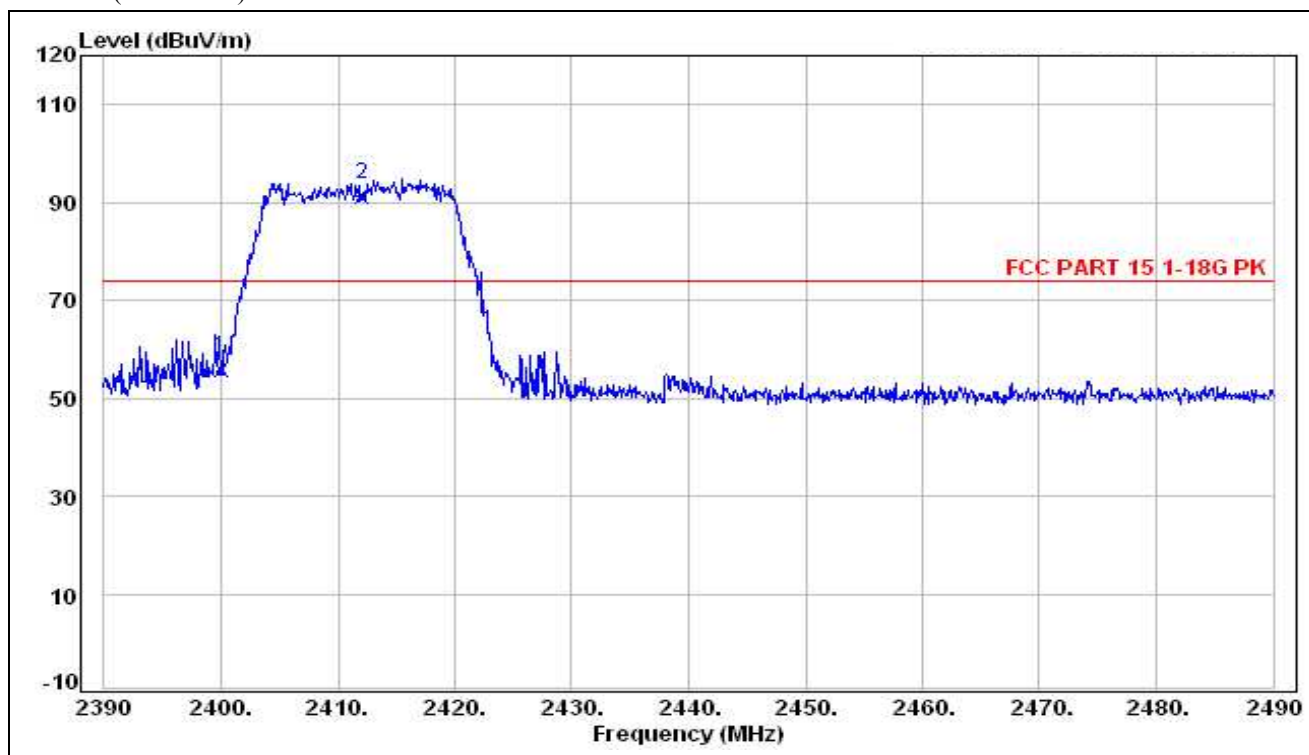
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2435.300	45.38	-3.29	42.09	54.00	-11.91	Average Detector
	2435.300	58.98	-3.29	55.69	74.00	-18.31	Peak Detector
2	2462.000	96.52	-3.29	93.23	/	/	Average Detector
	2462.000	108.05	-3.29	104.76	/	/	Peak Detector
3	2483.500	46.84	-3.20	43.64	54.00	-10.36	Average Detector
	2483.500	54.01	-3.20	50.81	74.00	-23.19	Peak Detector

802.11g-Lowest Band edge

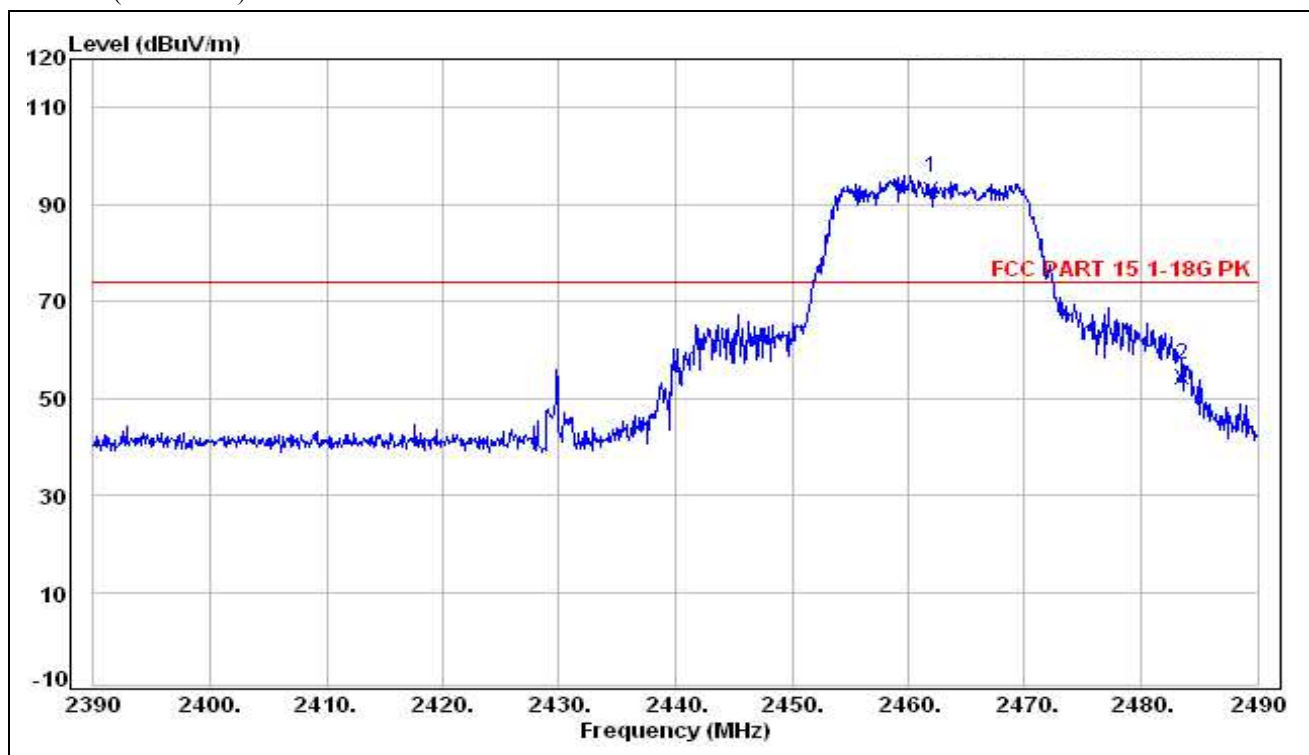
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2400.000	41.62	-3.69	37.93	54.00	-16.07	Average Detector
	2400.000	56.48	-3.69	52.79	74.00	-21.21	Peak Detector
2	2412.000	78.51	-3.49	75.02	/	/	Average Detector
	2412.000	92.03	-3.49	88.54	/	/	Peak Detector

802.11g-Highest Band edge

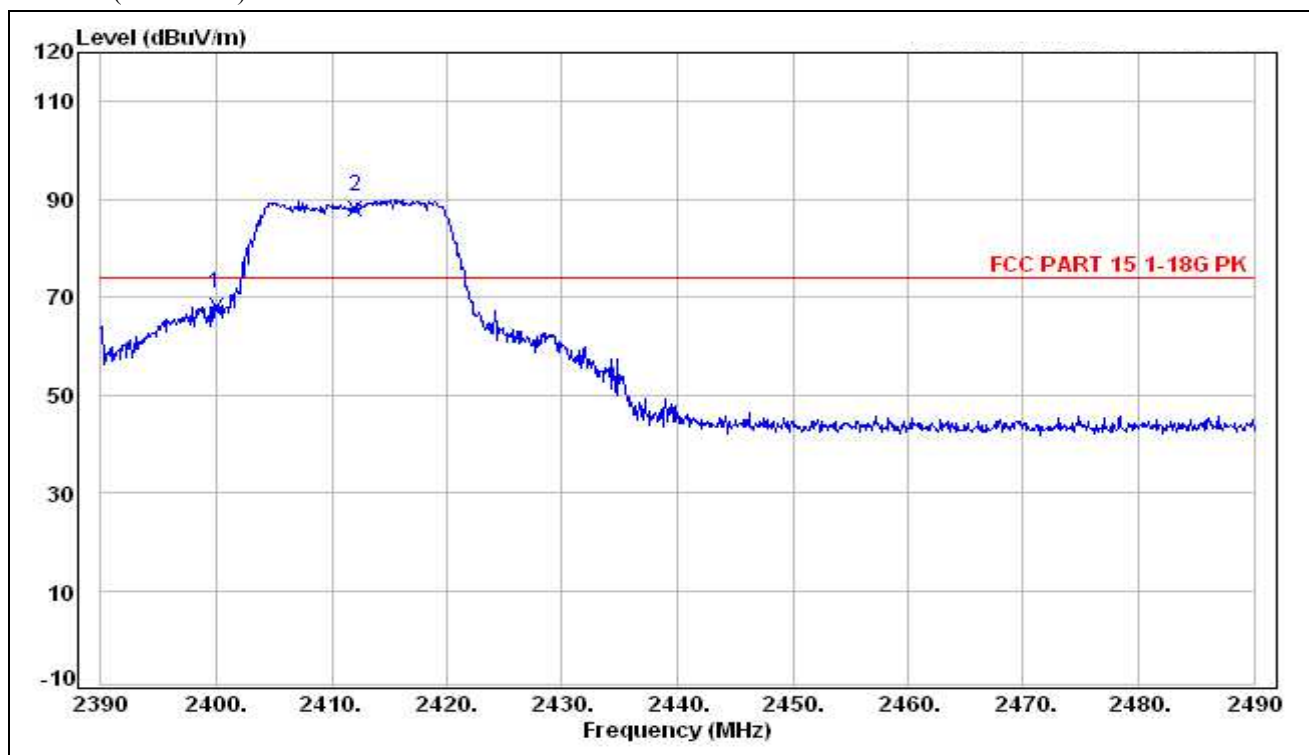
Vertical (Worst case)



No.	Frequency	Reading	Correct	Result	Limit	Margin	Remark
	(MHz)	(dBuV/m)	dB/m	(dBuV/m)	(dBuV/m)	(dB)	
1	2462.00	75.08	-3.28	71.80	/	/	Average Detector
	2462.00	93.60	-3.28	90.32	/	/	Peak Detector
2	2483.500	36.43	-3.20	33.23	54.00	-20.77	Average Detector
	2483.500	55.10	-3.20	51.90	74.00	-22.1	Peak Detector

802.11n-HT20-Lowest Band edge

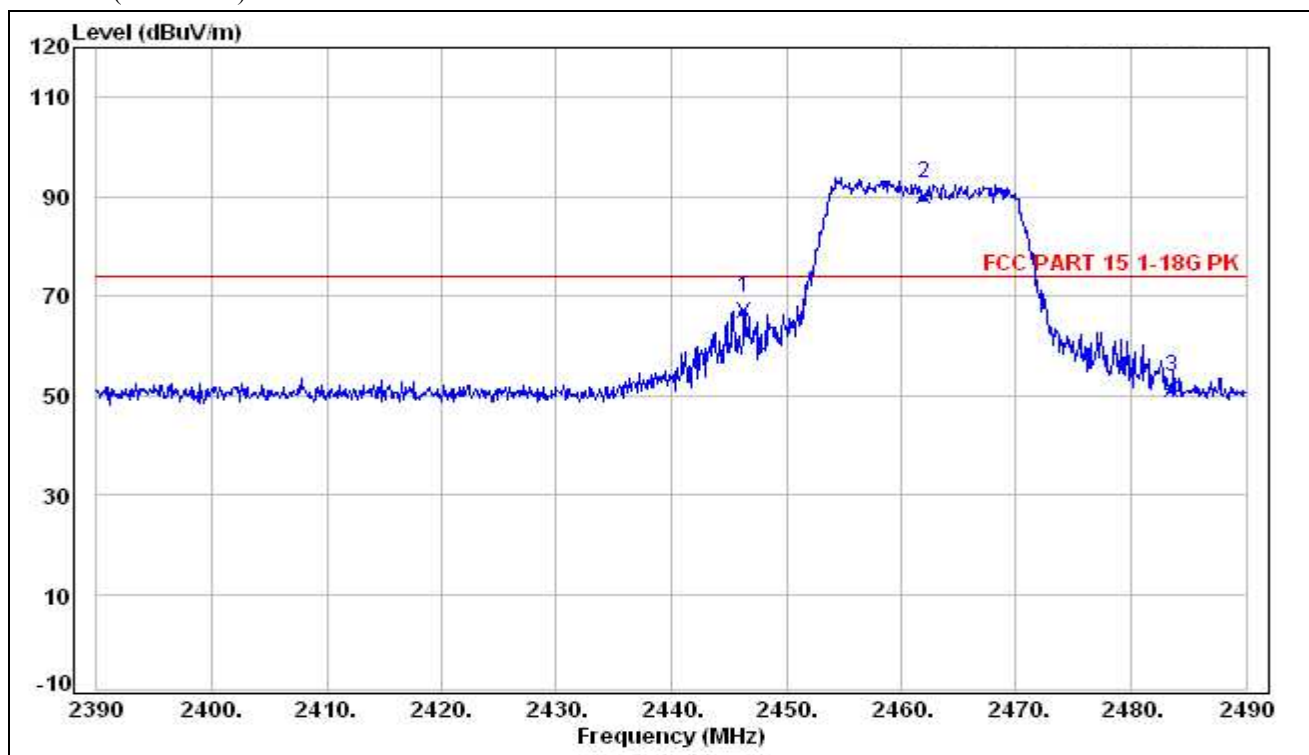
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2400.000	52.16	-3.69	48.46	54.00	-5.54	Average Detector
	2400.000	68.84	-3.69	65.15	74.00	-8.85	Peak Detector
2	2412.000	71.56	-3.49	68.07	/	/	Average Detector
	2412.000	88.91	-3.49	85.42	/	/	Peak Detector

802.11n-HT20-Highest Band edge

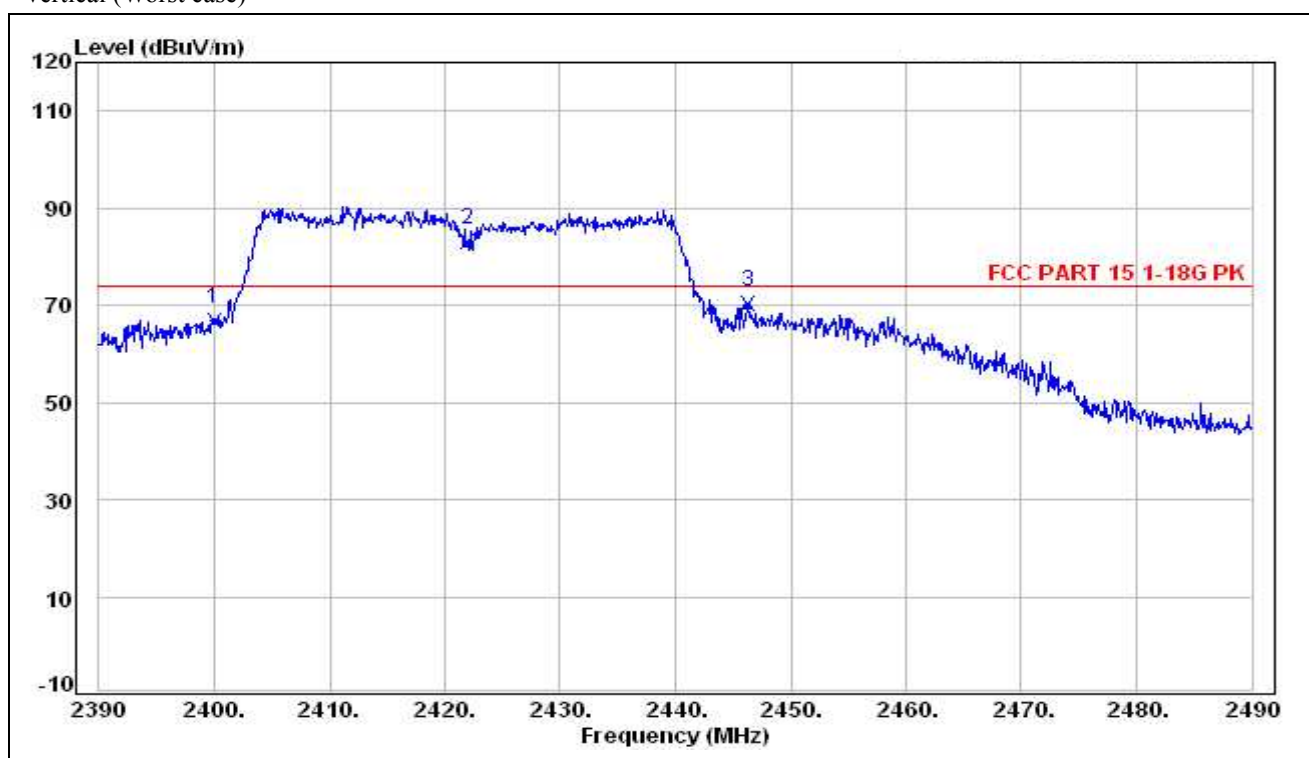
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2446.300	52.68	-3.28	49.40	54.00	-4.60	Average Detector
	2446.300	67.72	-3.28	64.44	74.00	-9.56	Peak Detector
2	2462.000	79.65	-3.28	76.37	/	/	Average Detector
	2462.000	90.78	-3.28	87.50	/	/	Peak Detector
3	2483.500	39.65	-3.20	36.45	54.00	-17.55	Average Detector
	2483.500	51.17	-3.20	47.97	74.00	-26.03	Peak Detector

802.11n-HT40-Lowest Band edge

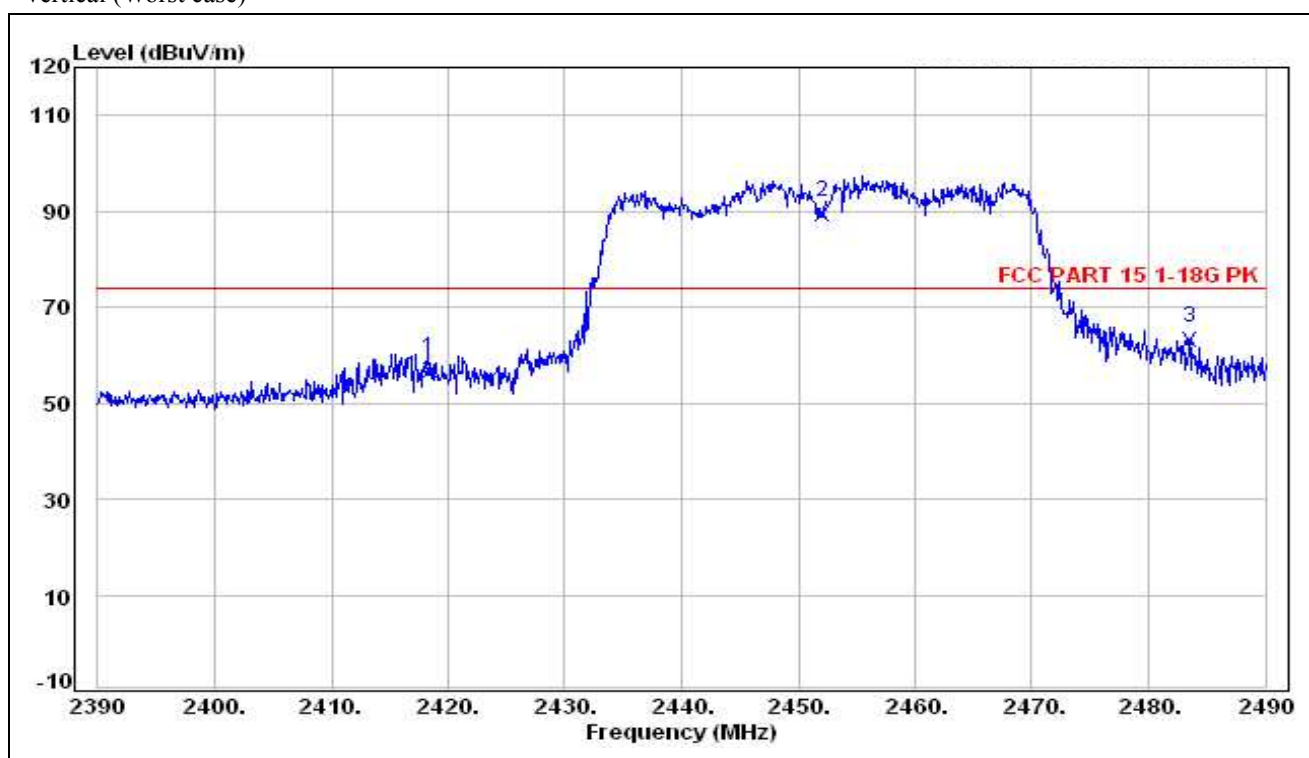
Vertical (Worst case)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2400.000	52.86	-3.69	49.17	54.00	-4.83	Average Detector
	2400.000	67.66	-3.69	63.97	74.00	10.03	Peak Detector
2	2422.000	68.43	-3.49	64.94	/	/	Average Detector
	2422.000	83.77	-3.49	80.28	/	/	Peak Detector
3	2446.000	52.85	-3.46	49.39	54.00	-4.61	Average Detector
	2446.000	71.04	-3.46	67.58	74.00	-6.42	Peak Detector

802.11n-HT40-Highest Band edge

Vertical (Worst case)



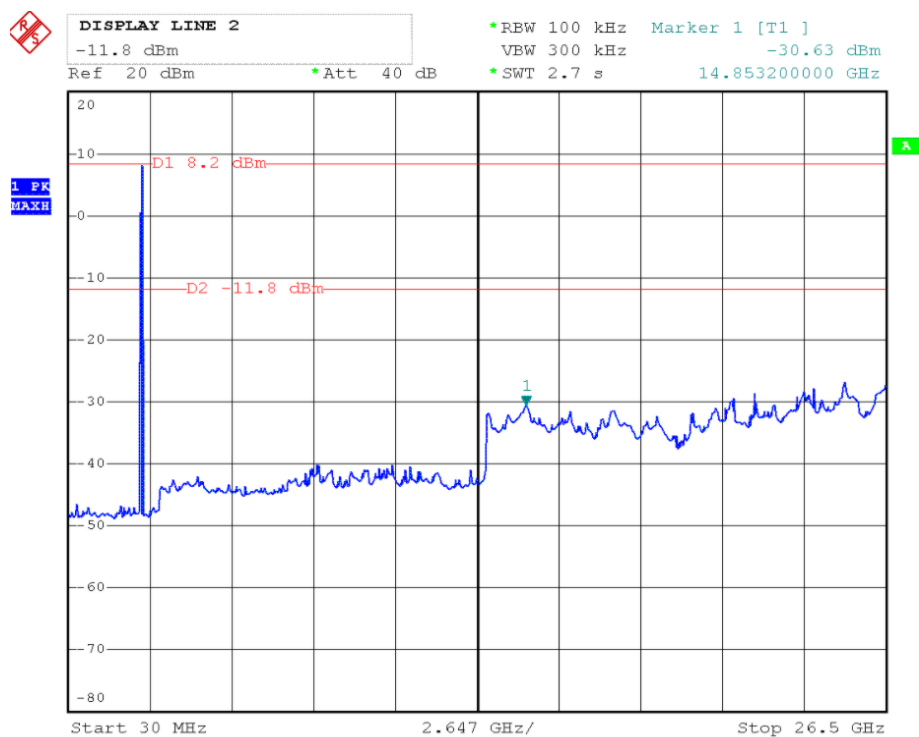
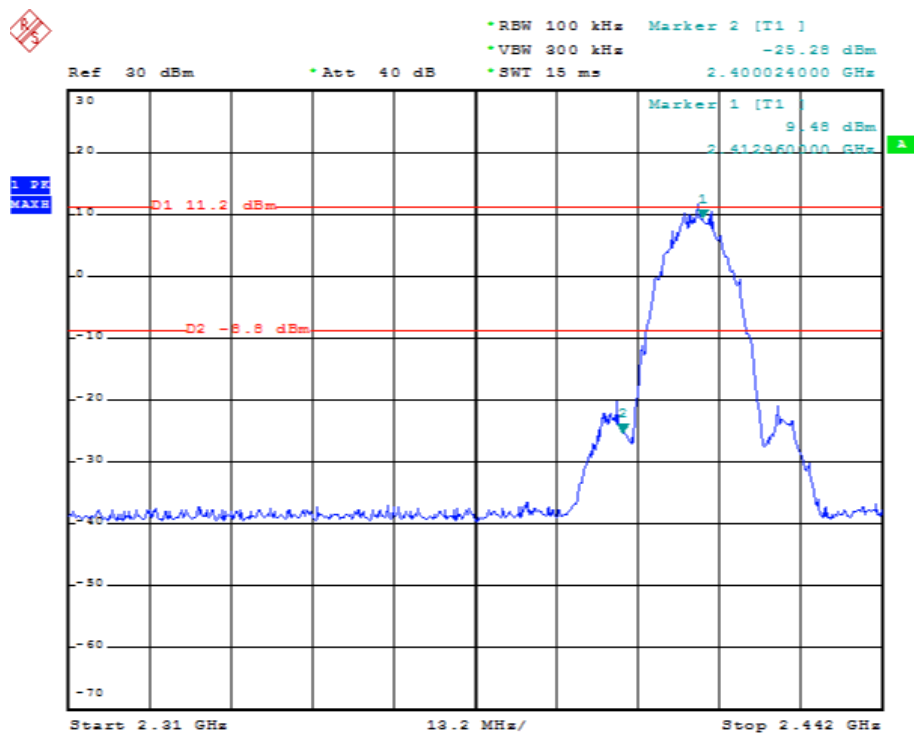
No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2418.400	42.28	-3.35	38.93	54.00	-15.07	Average Detector
	2418.400	57.60	-3.35	54.25	74.00	-19.75	Peak Detector
2	2452.000	74.21	-3.20	71.01	/	/	Average Detector
	2452.000	90.36	-3.20	87.16	/	/	Peak Detector
3	2483.500	46.85	-3.20	43.65	54.00	-10.35	Average Detector
	2483.500	63.95	-3.20	60.75	74.00	-13.25	Peak Detector

Antenna 1

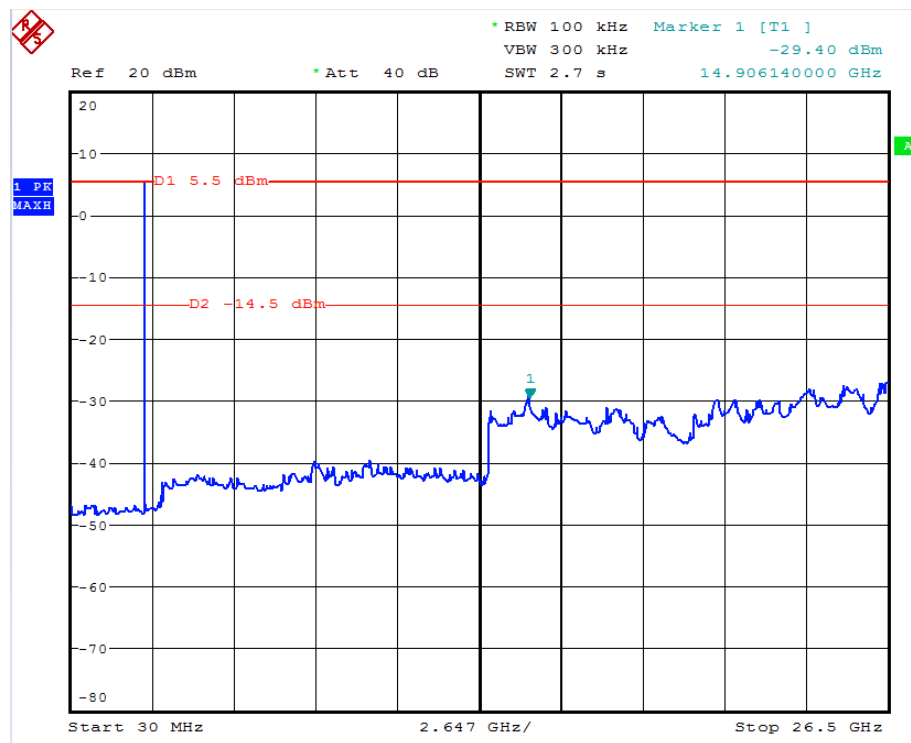
Out-of-Band and Spurious Emission (Conducted)

802.11b

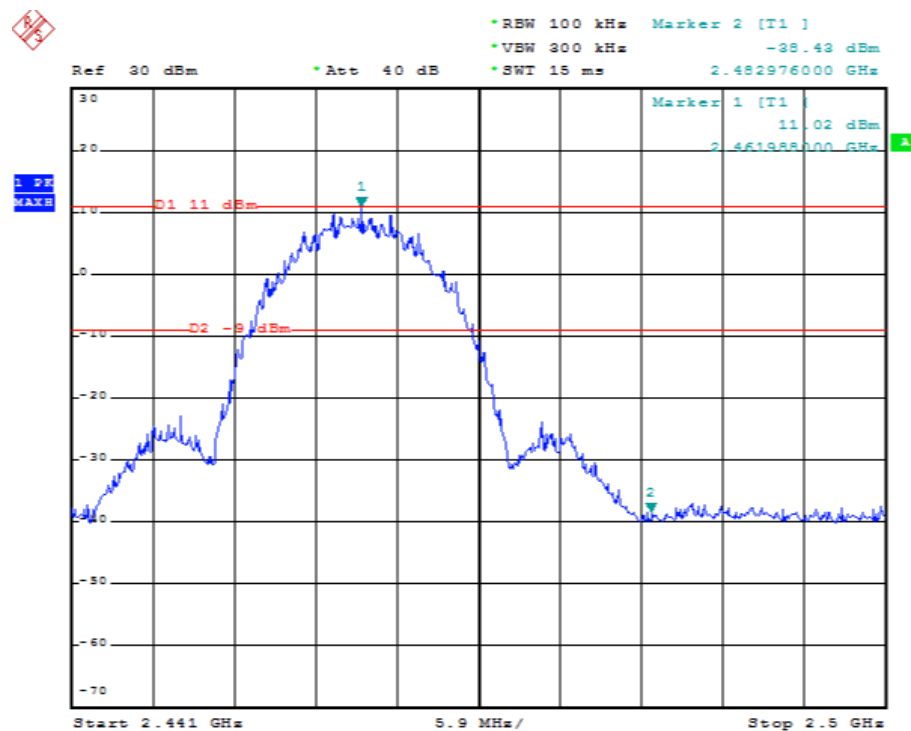
Low Channel

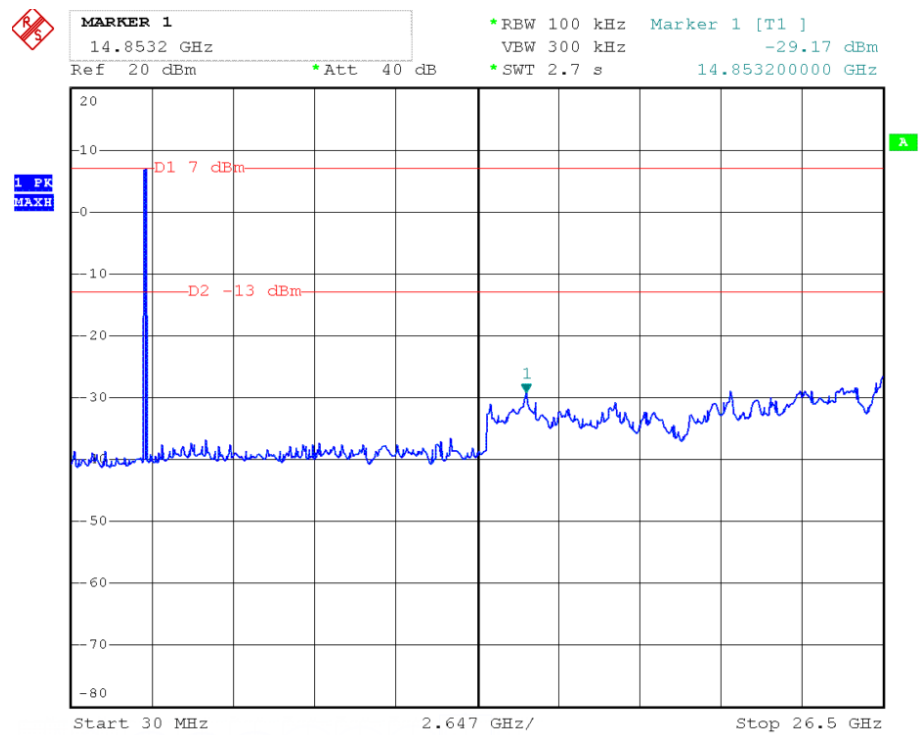


Middle Channel

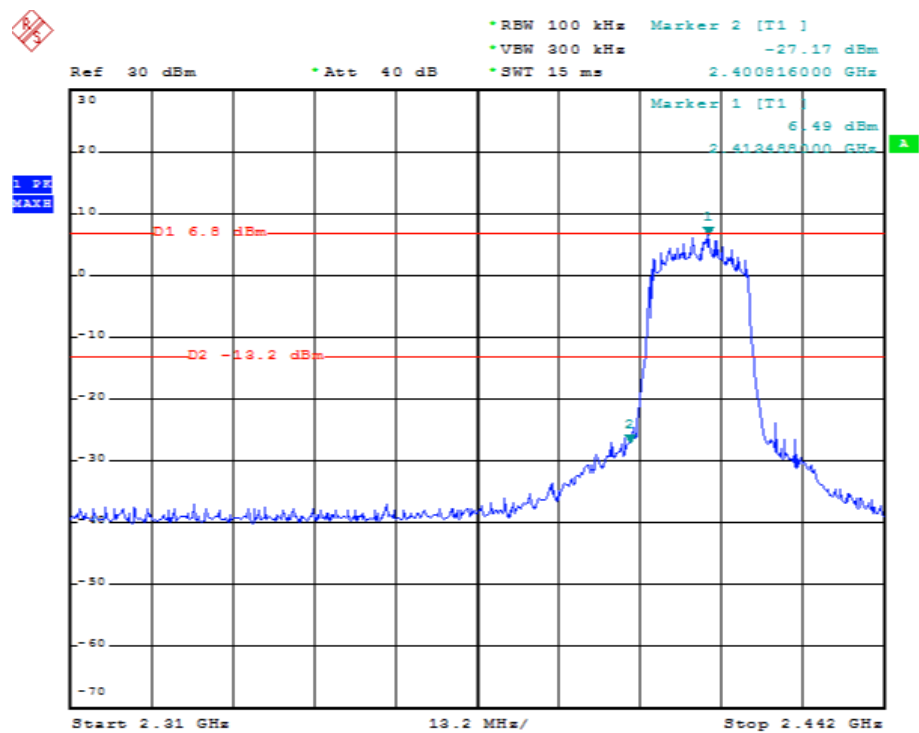


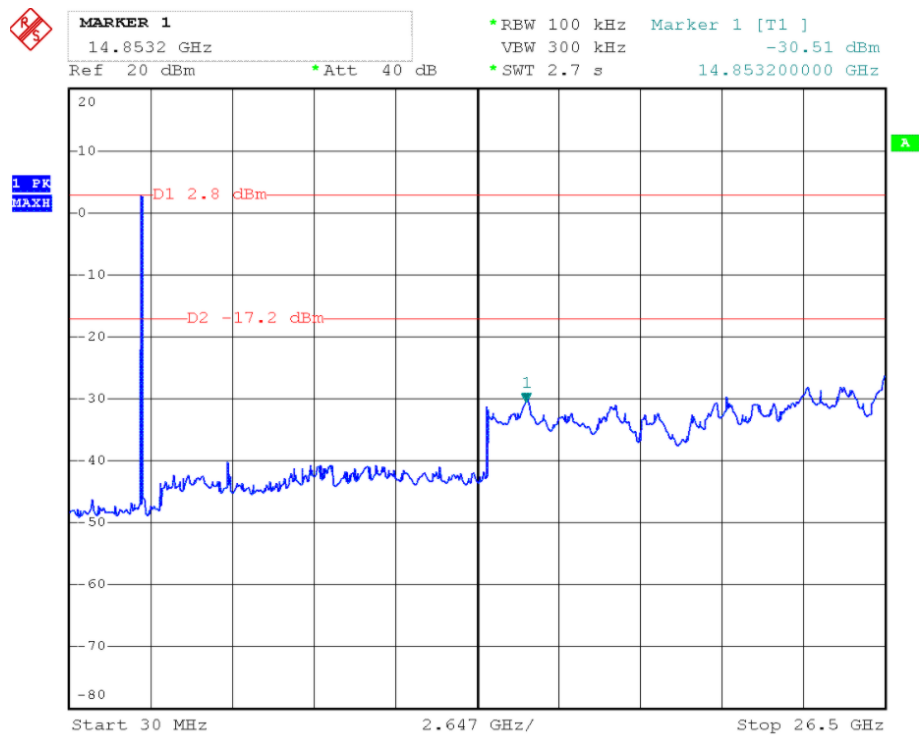
High Channel



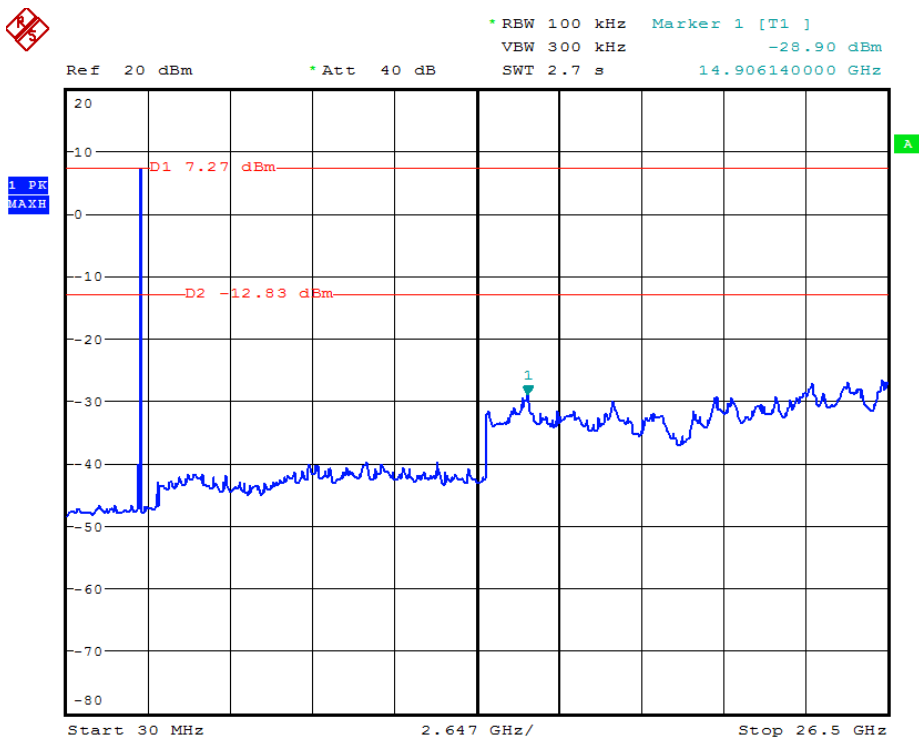


802.11g
Low Channel

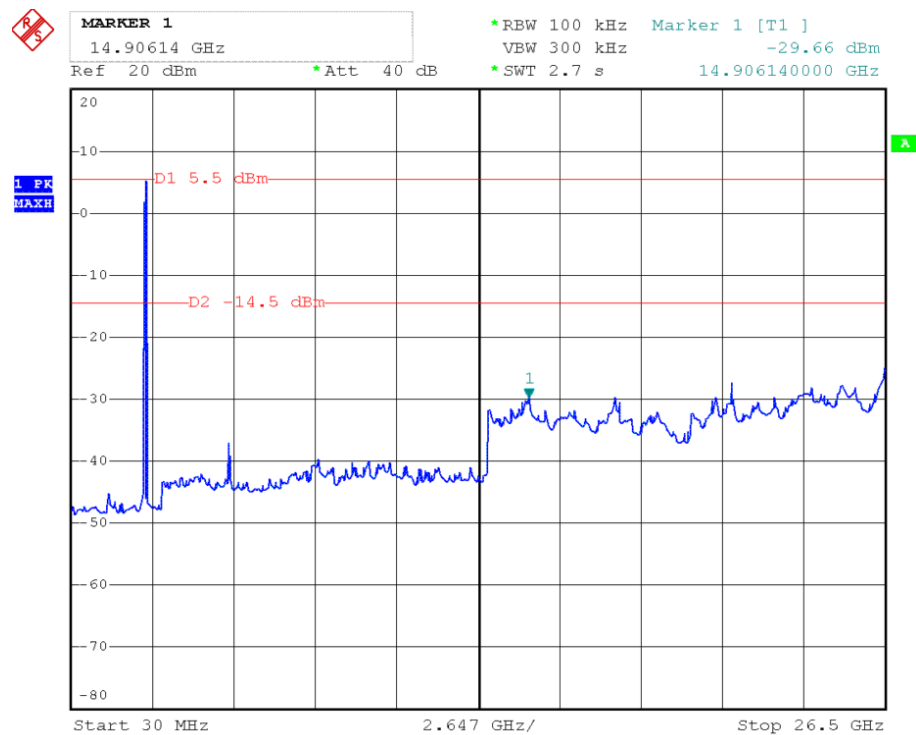
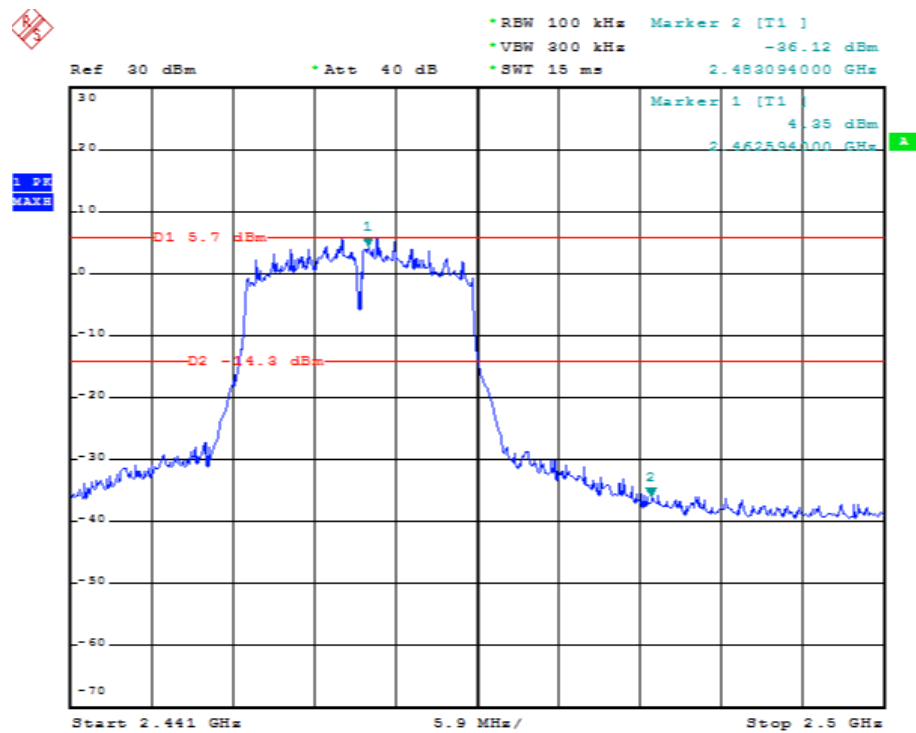




Middle Channel

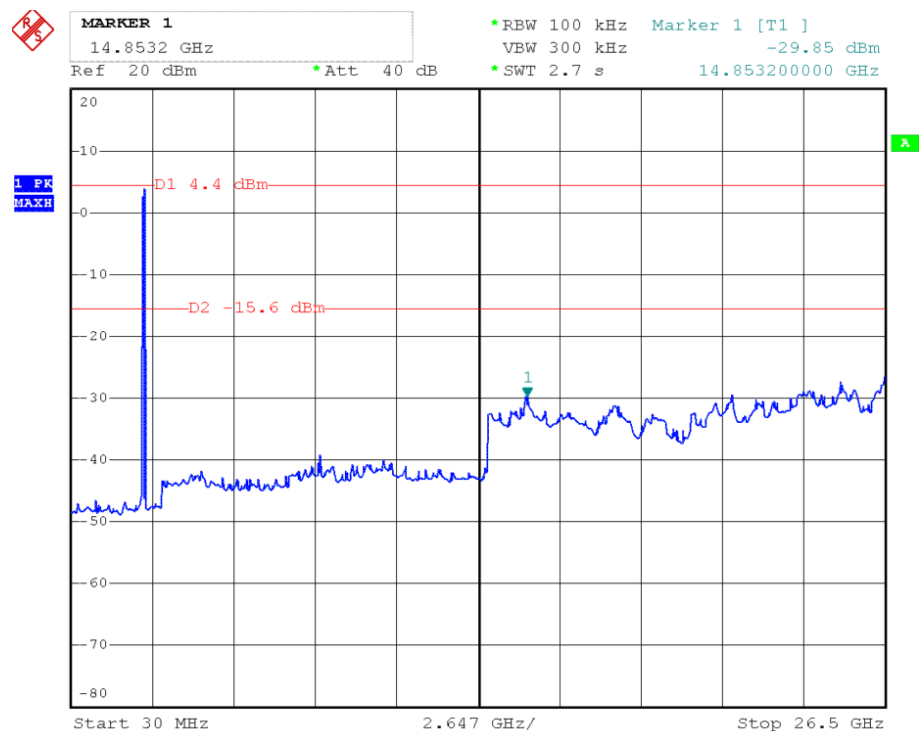
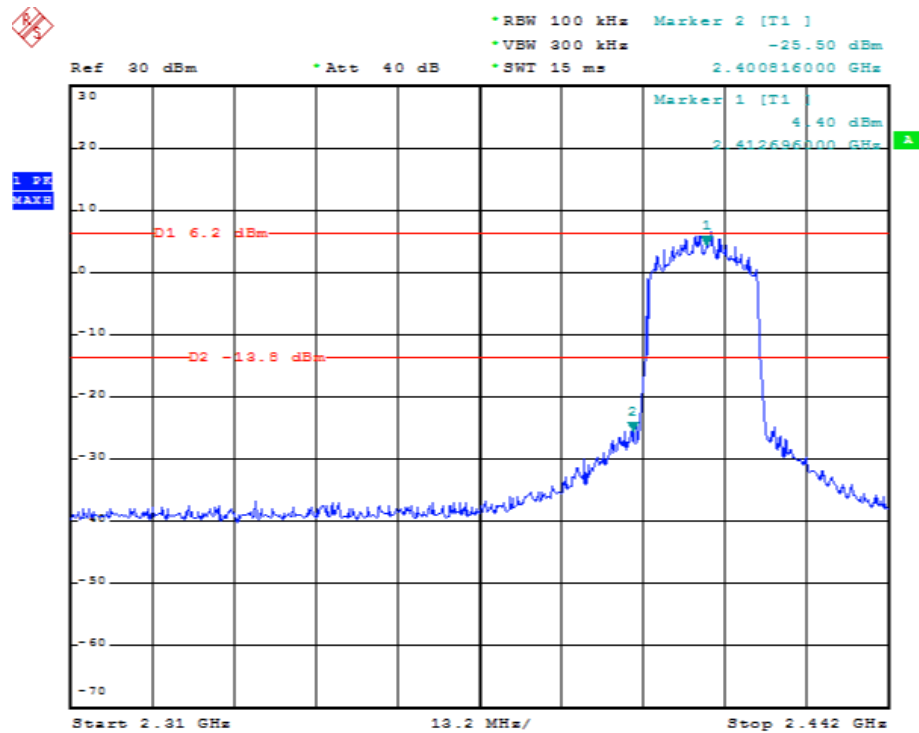


High Channel

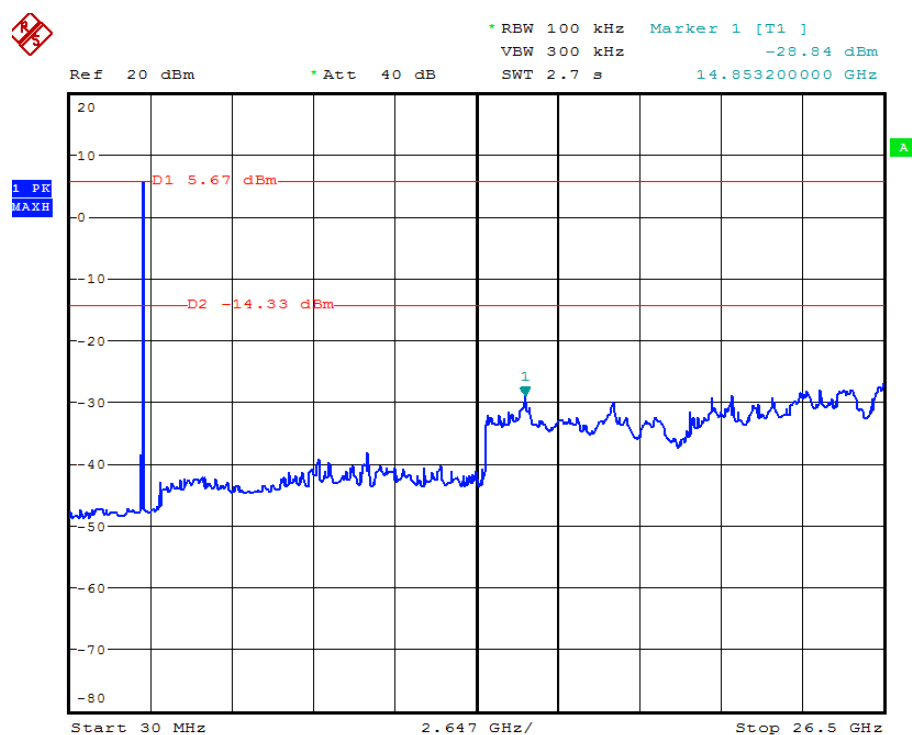


11n-HT20

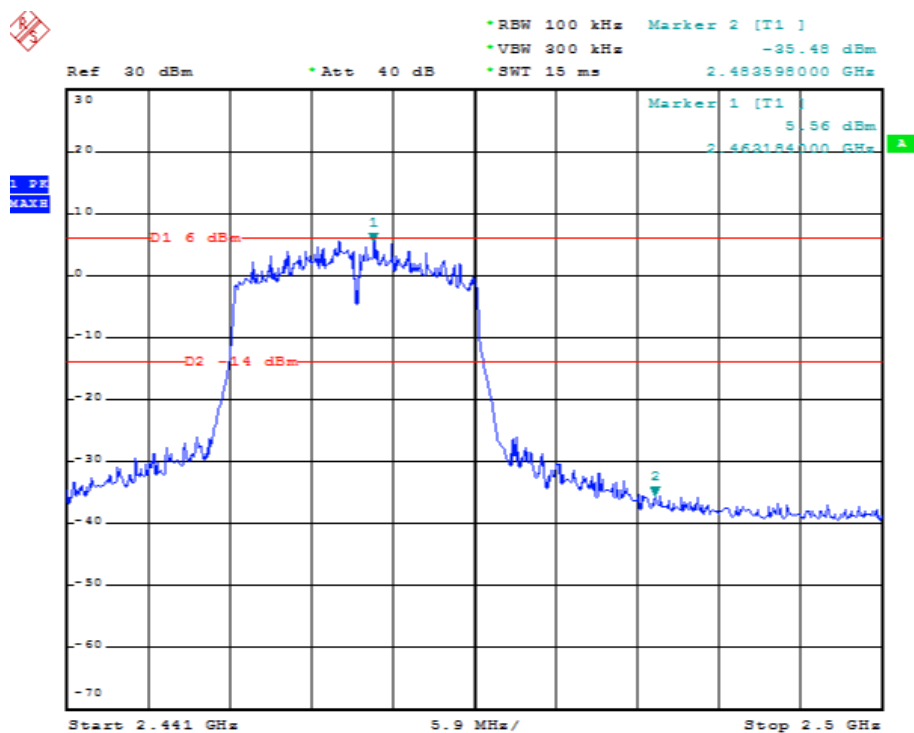
Low Channel

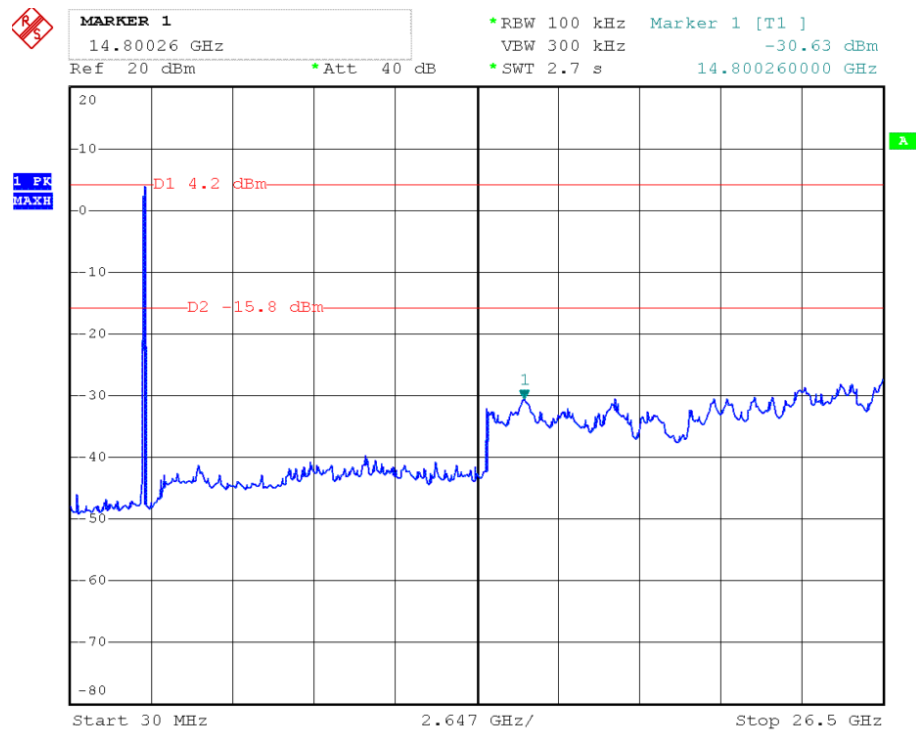


Middle Channel

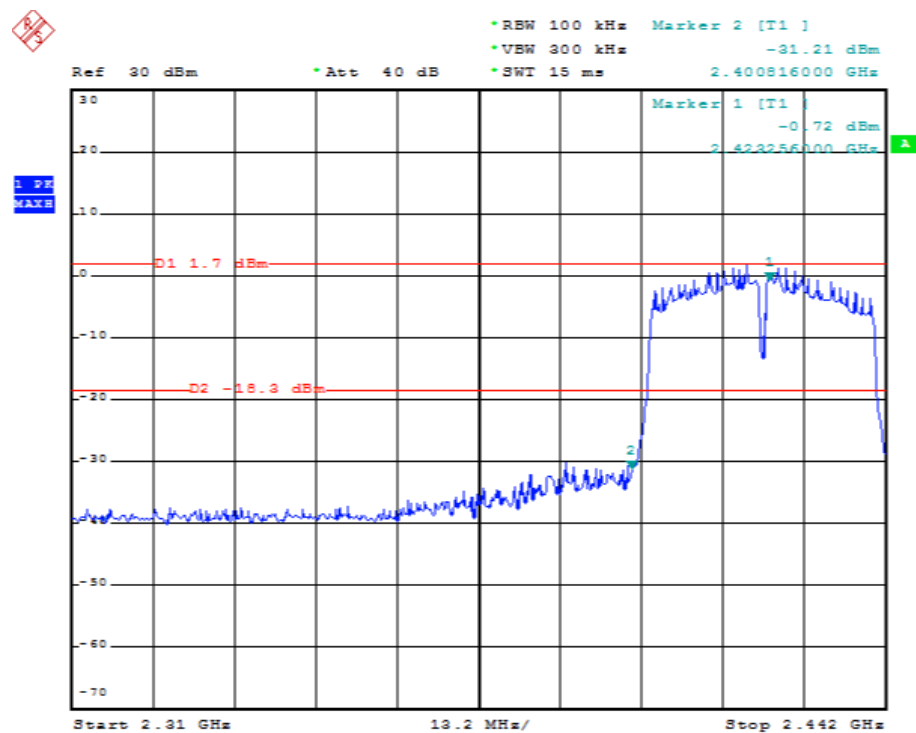


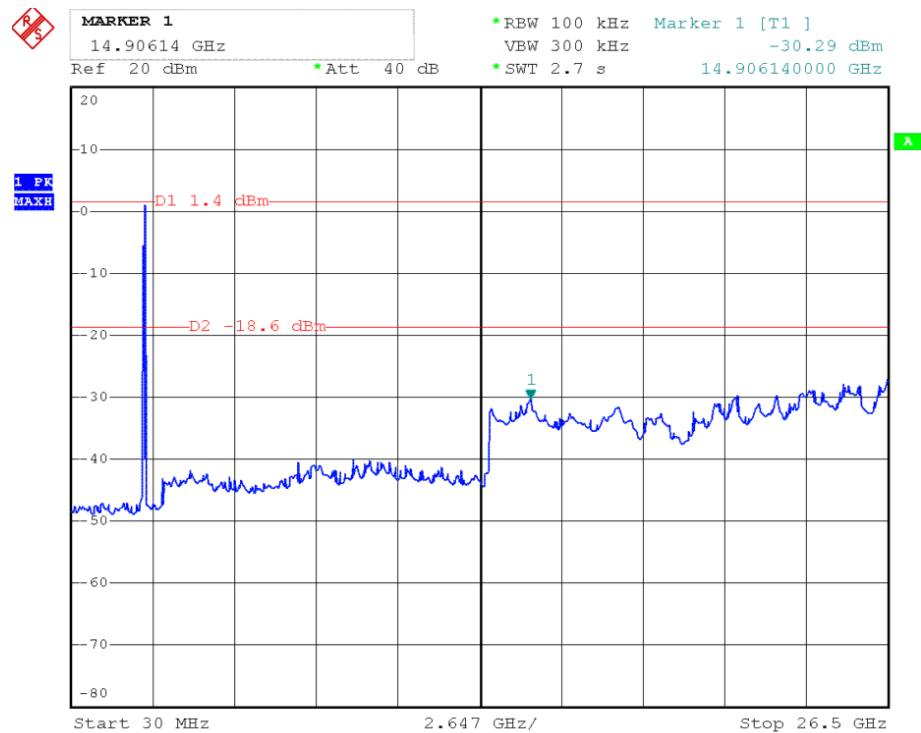
High Channel



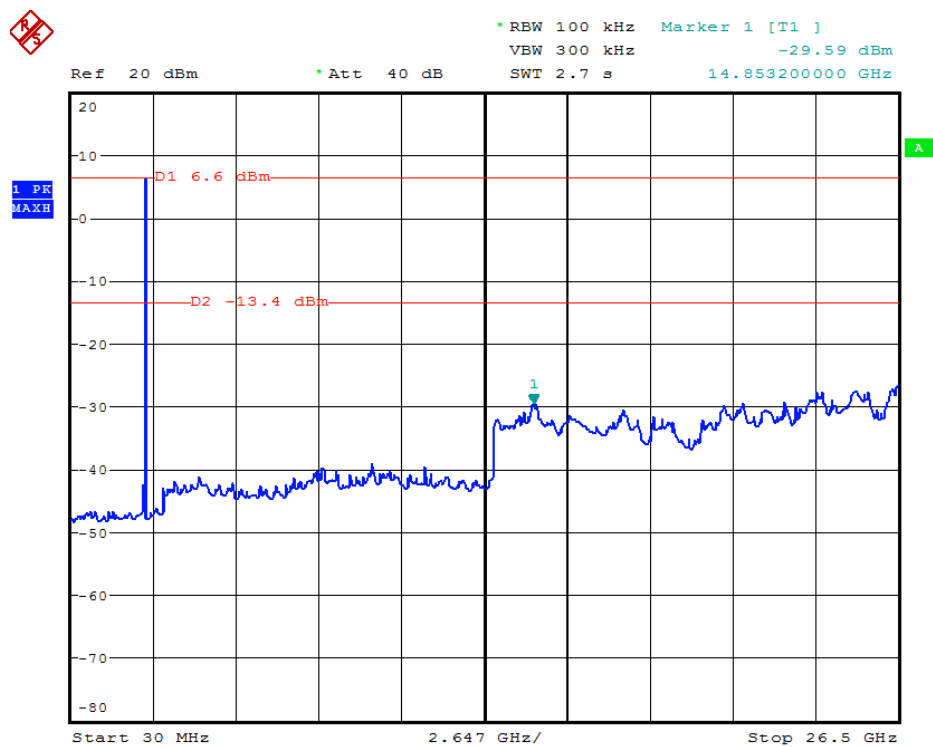


11n-HT40
Low Channel

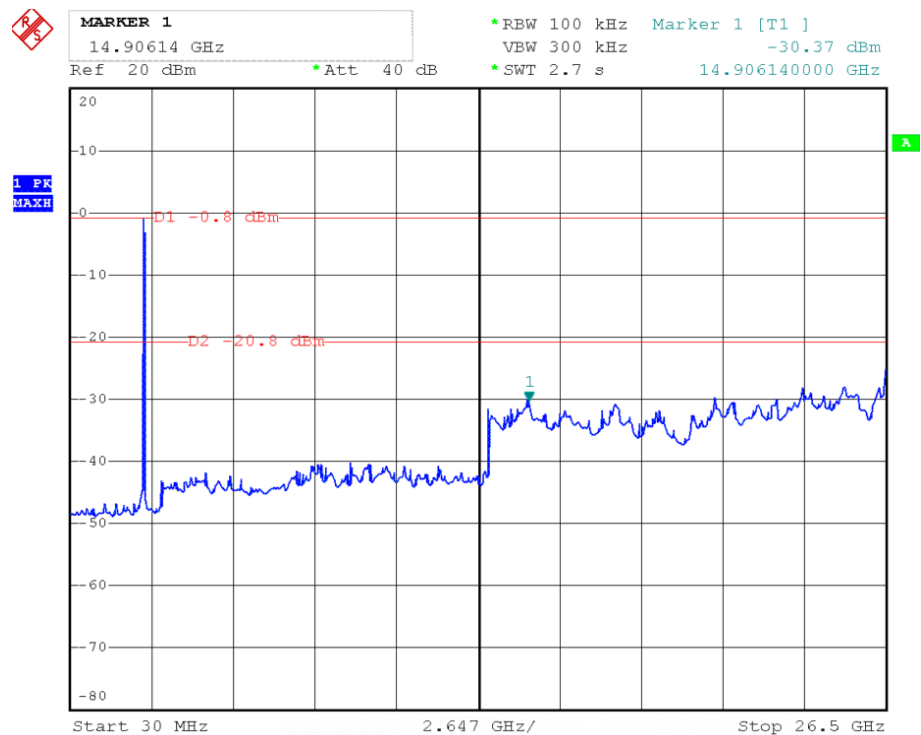
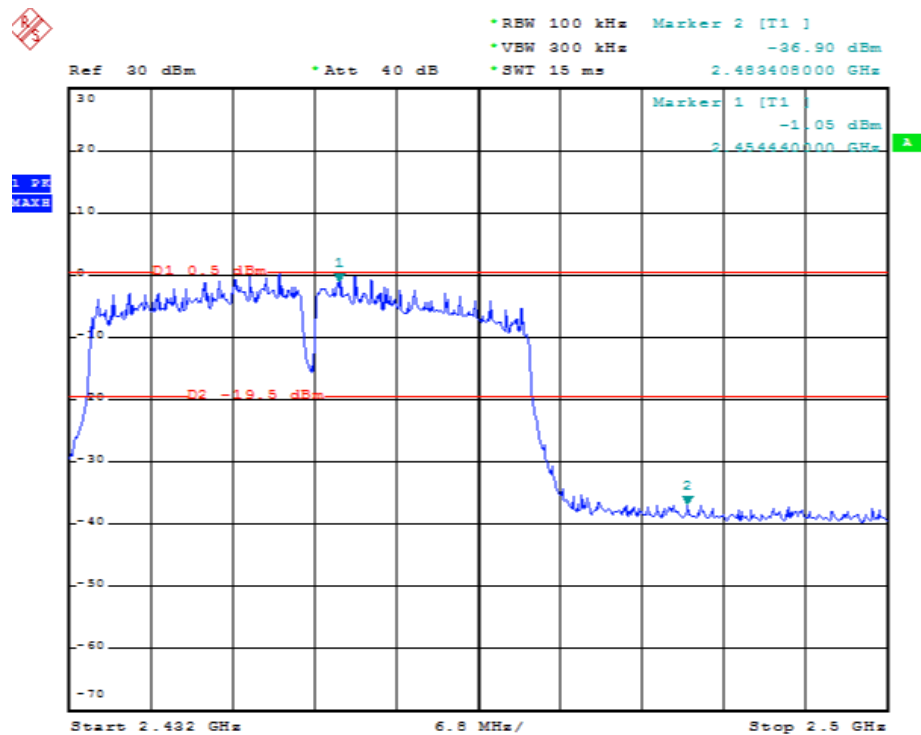




Middle Channel



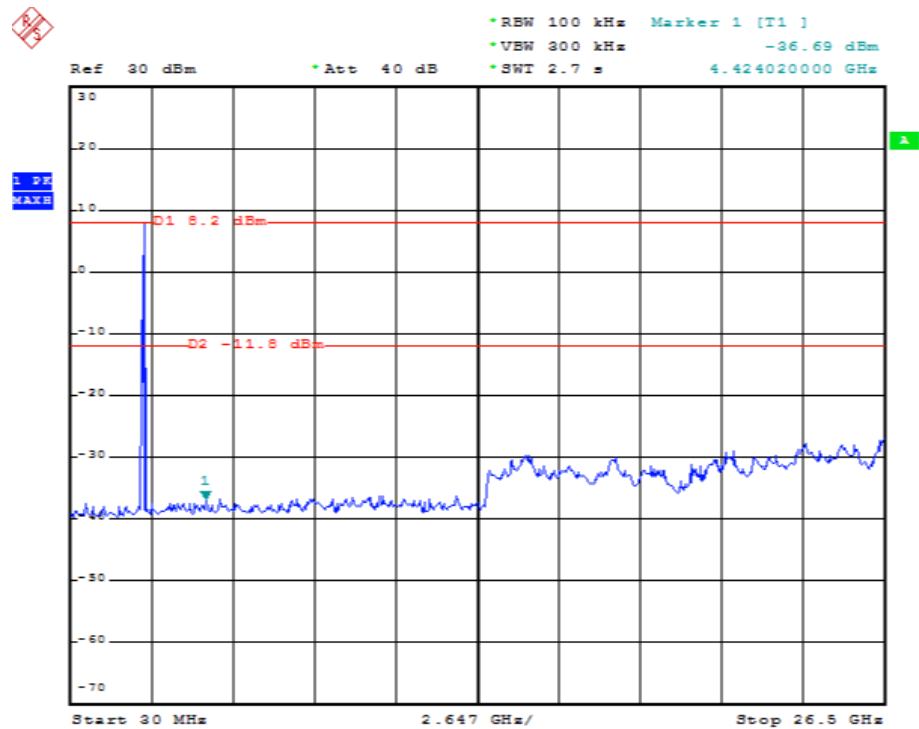
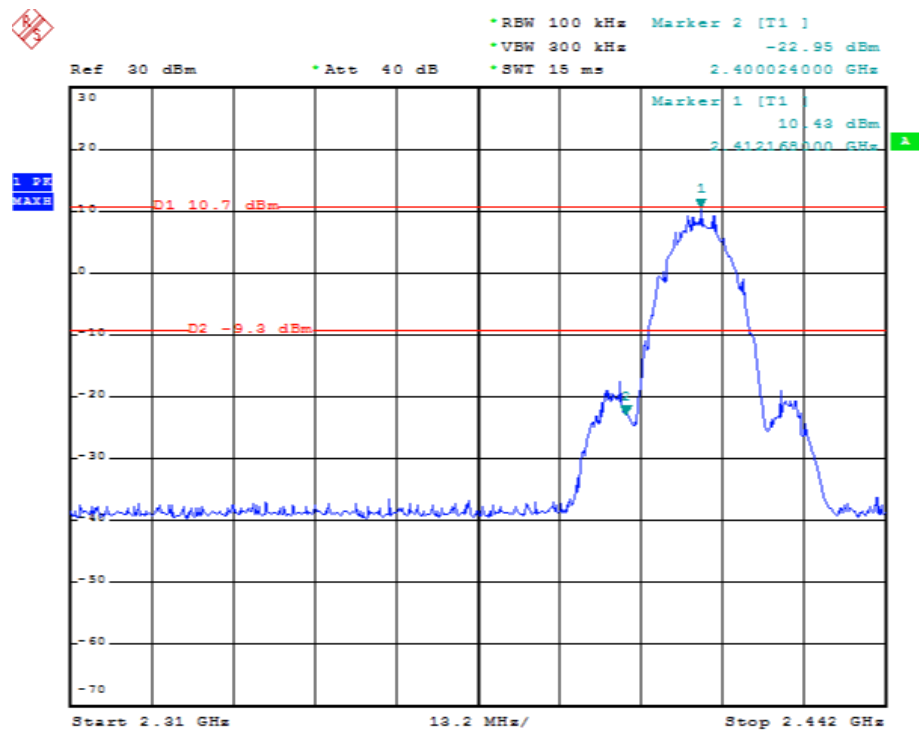
High Channel



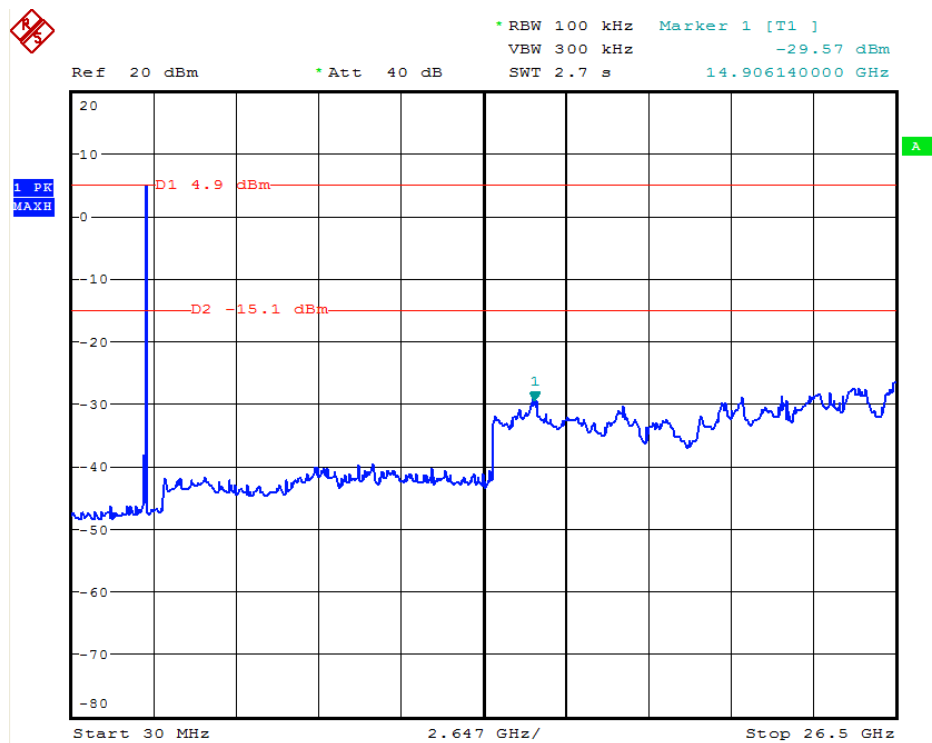
Antenna 2

802.11b

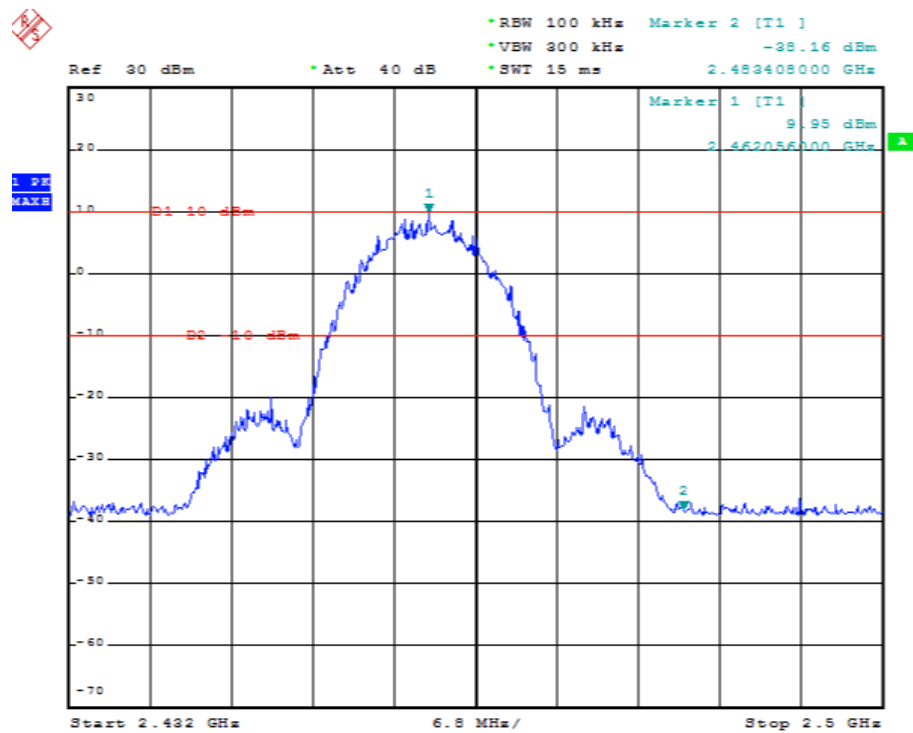
Low Channel

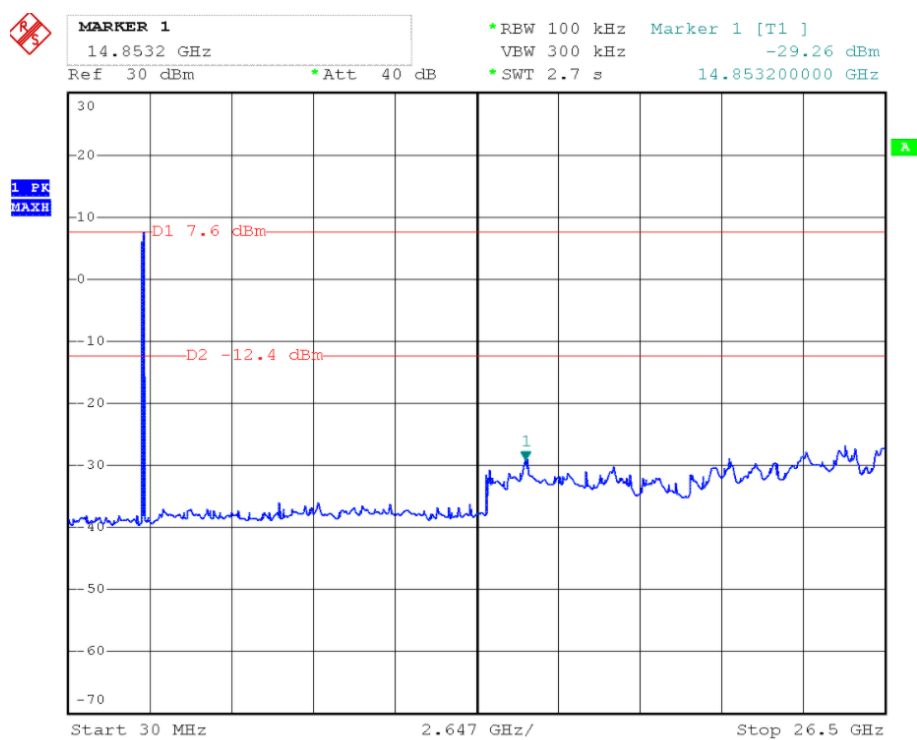


Middle Channel

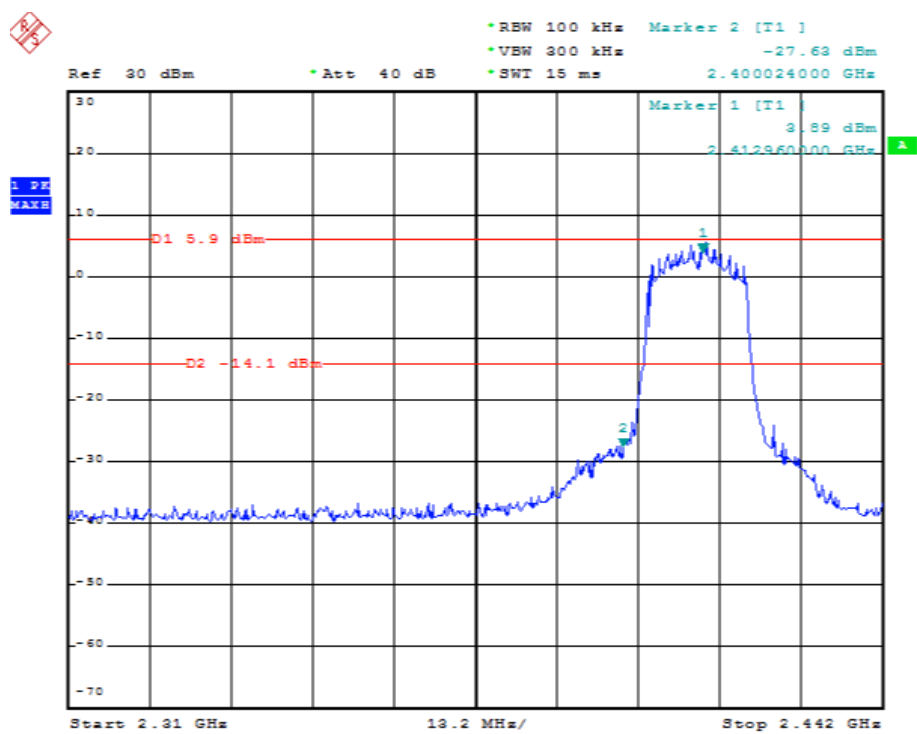


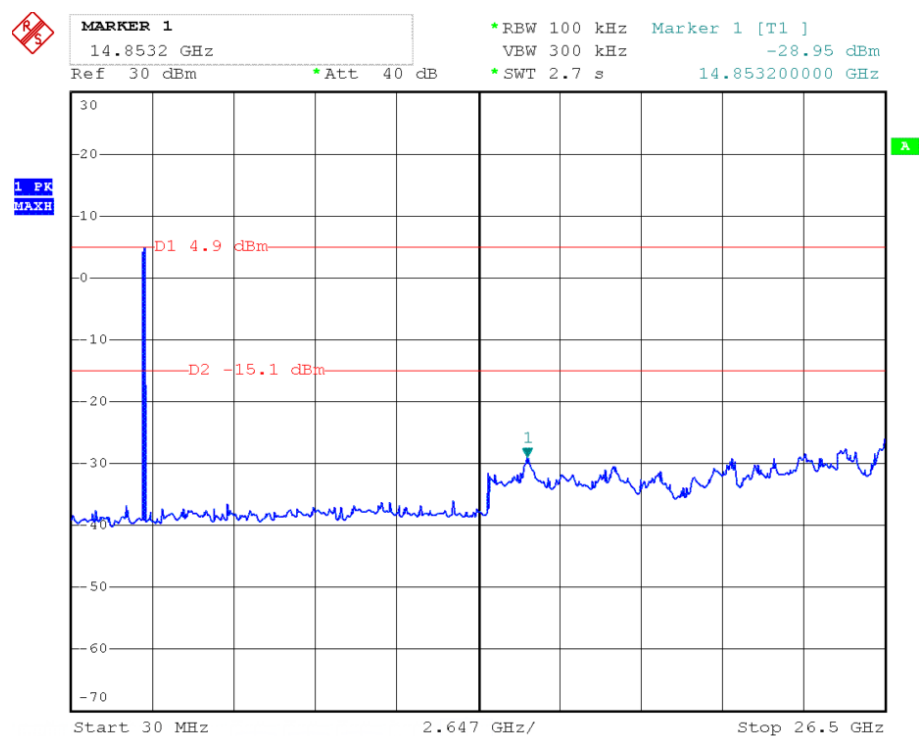
High Channel



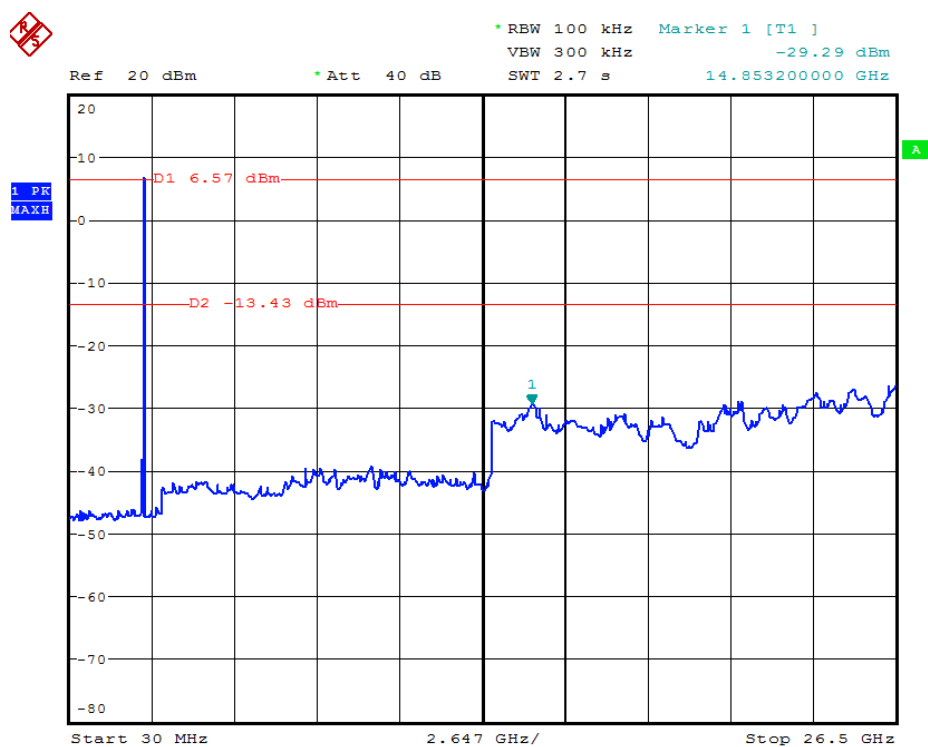


802.11g
Low Channel

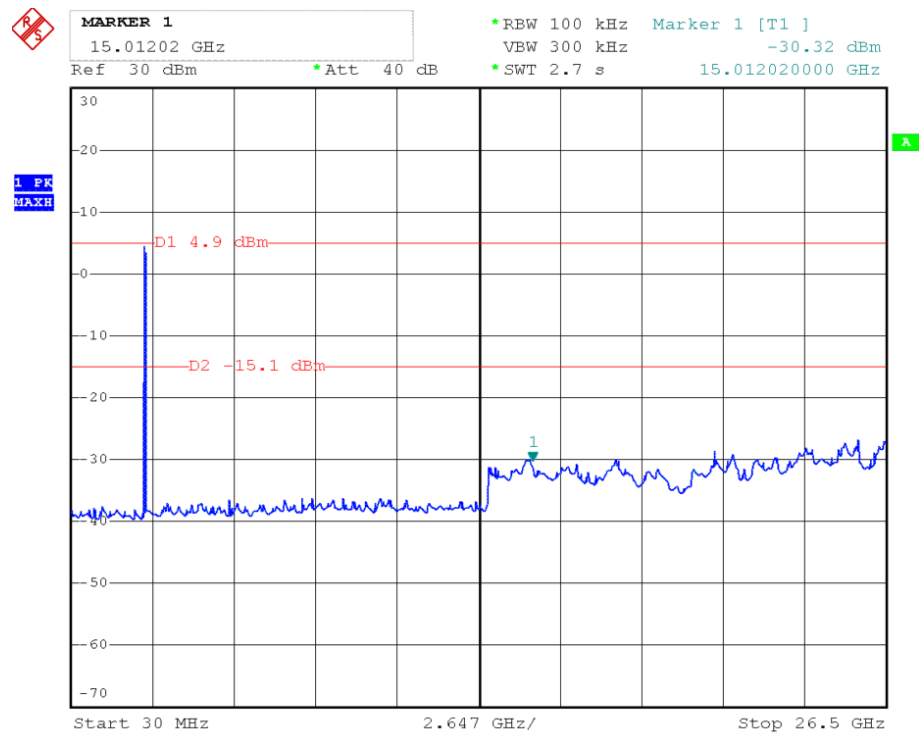
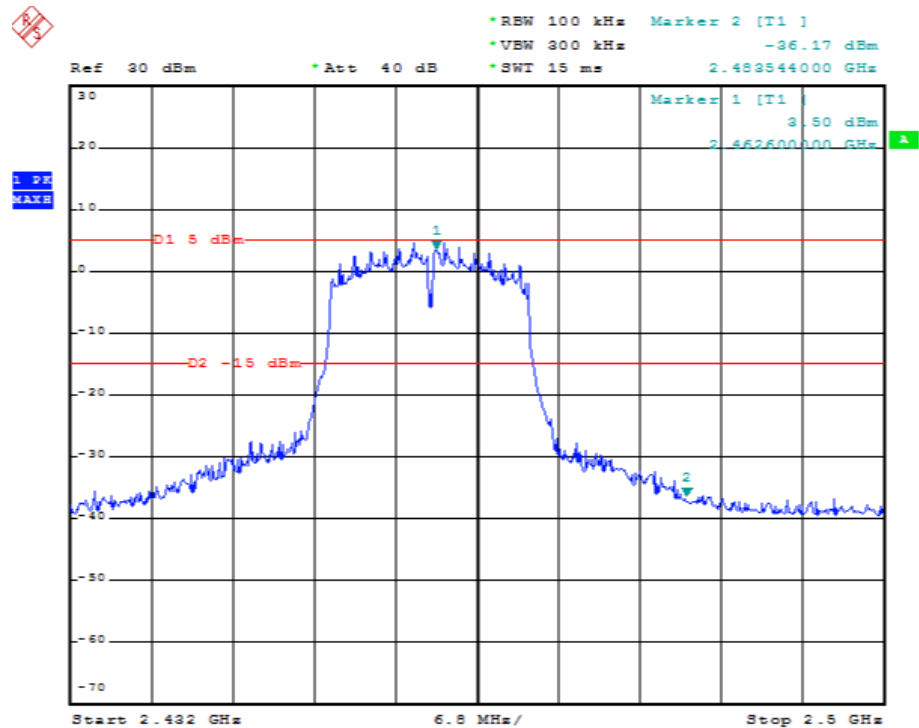


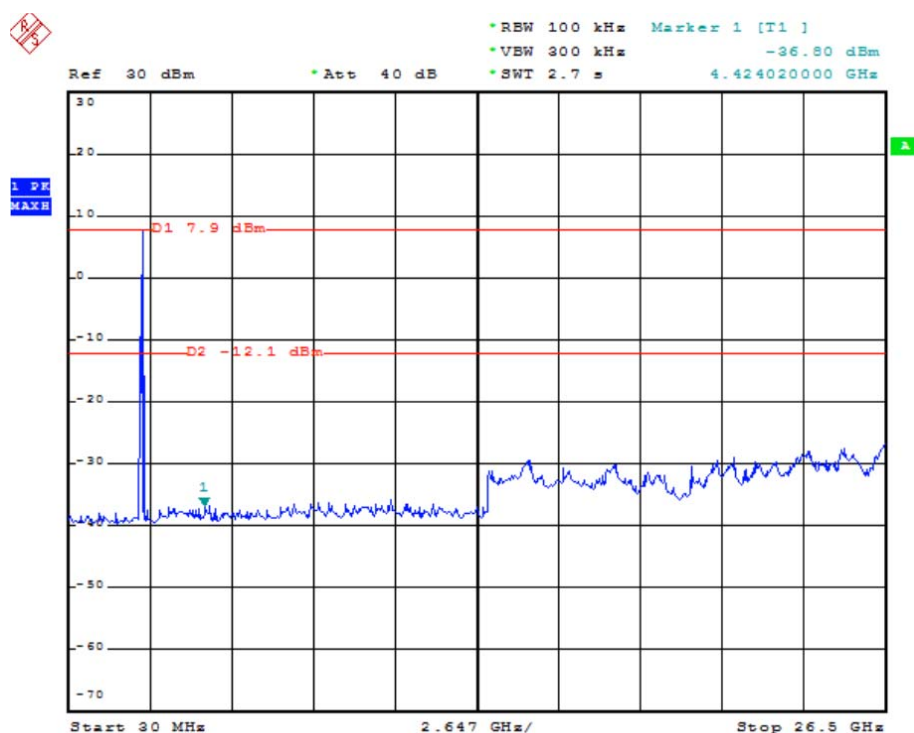
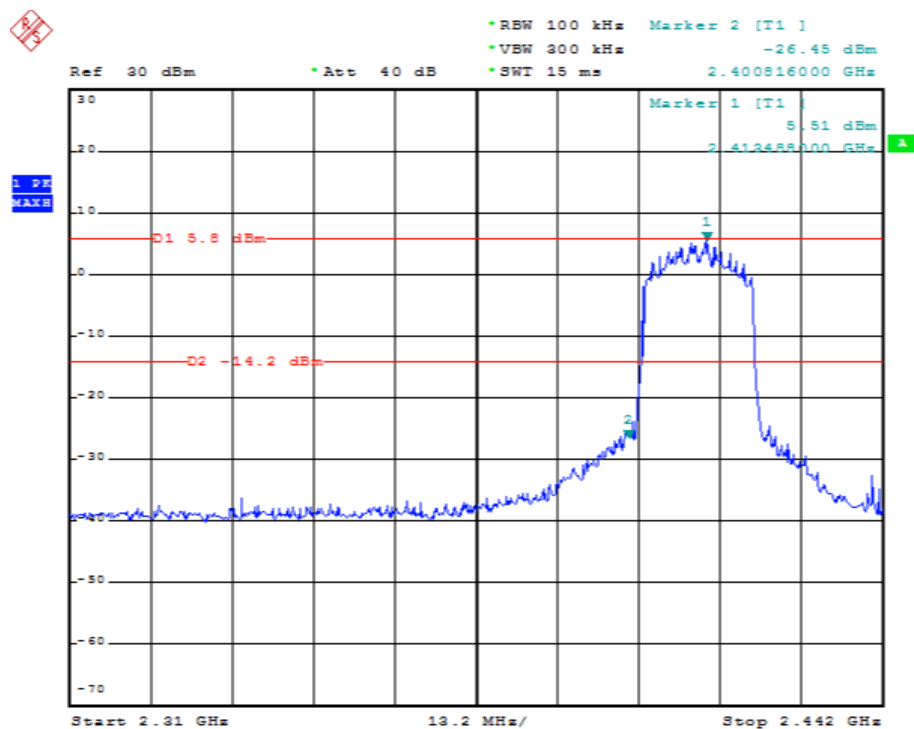


Middle Channel

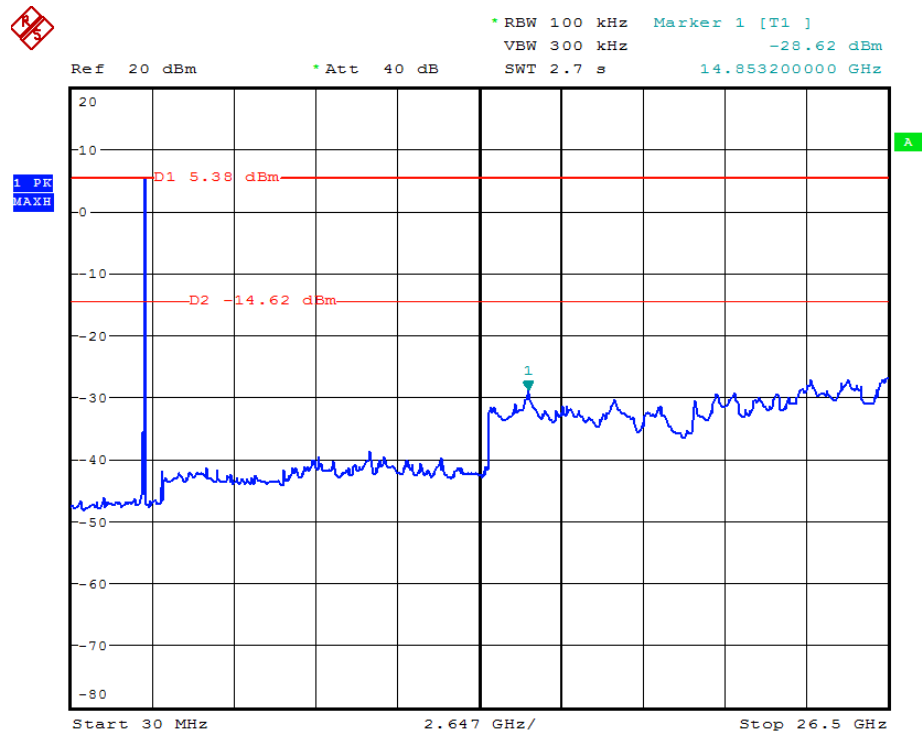


High Channel

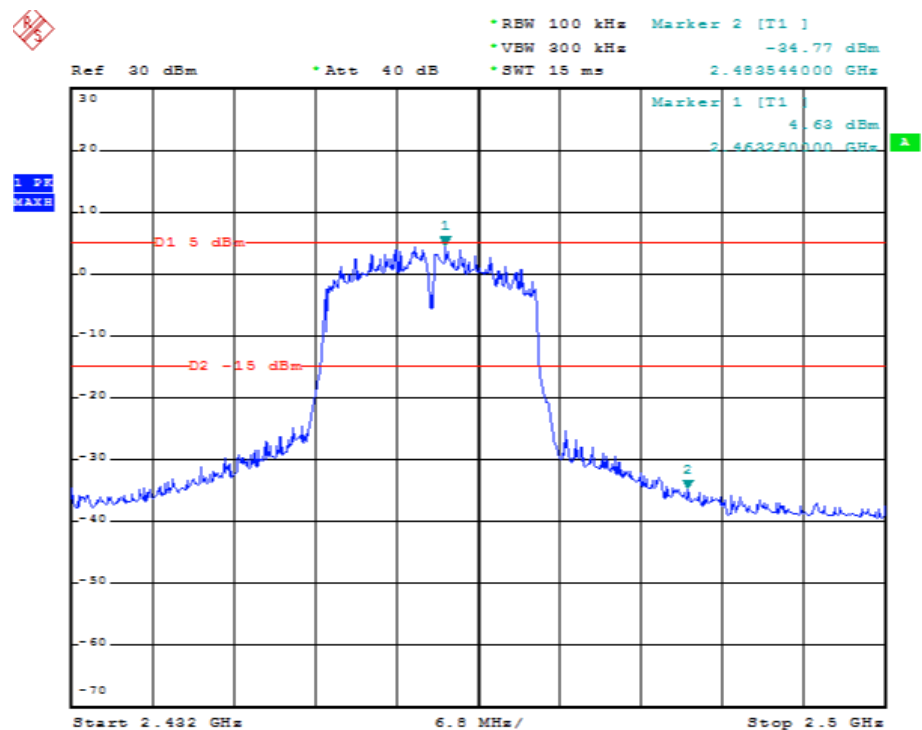


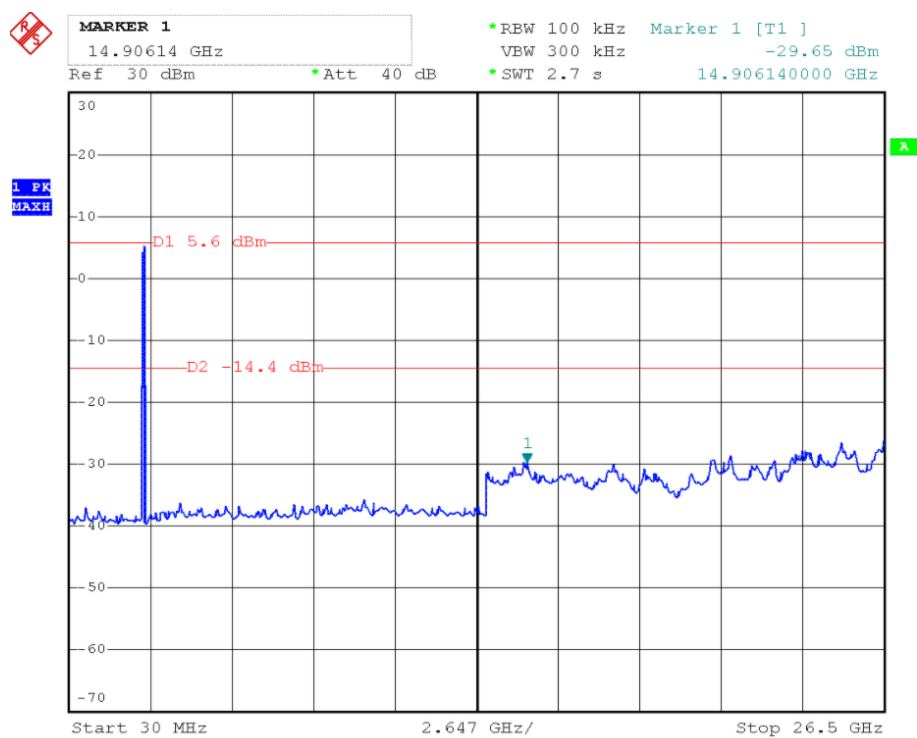
802.11n-HT20
Low Channel

Middle Channel

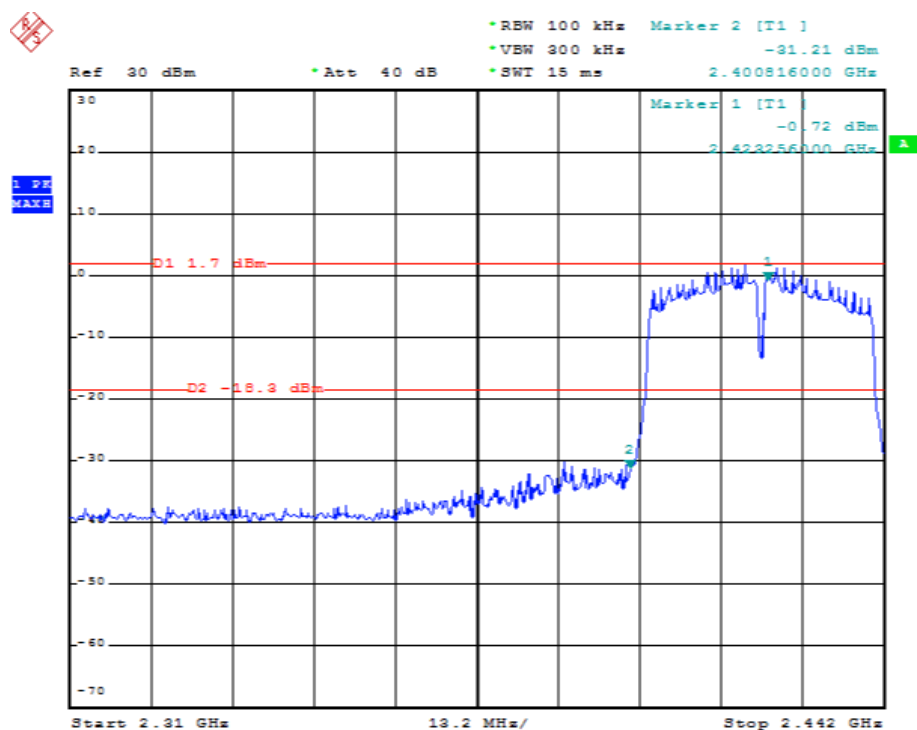


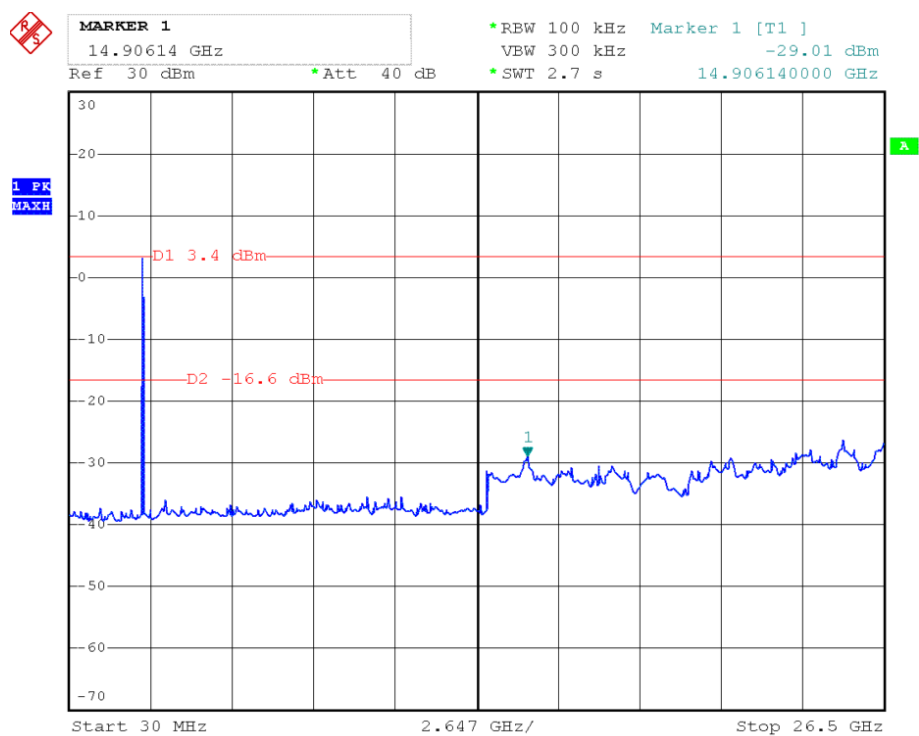
High Channel



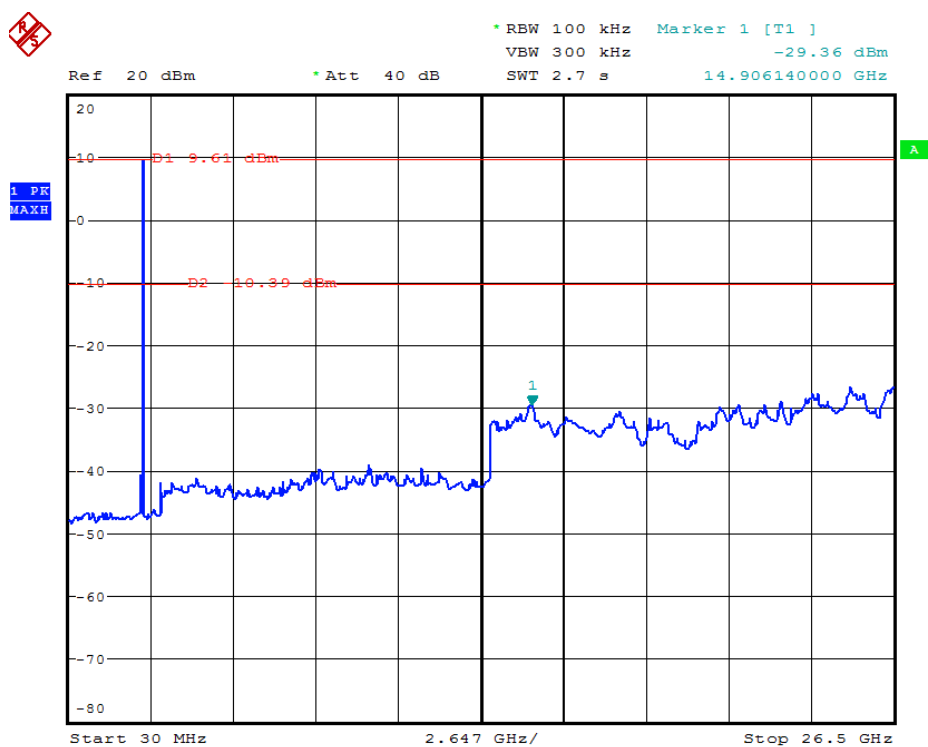


802.11n-HT40
Low Channel

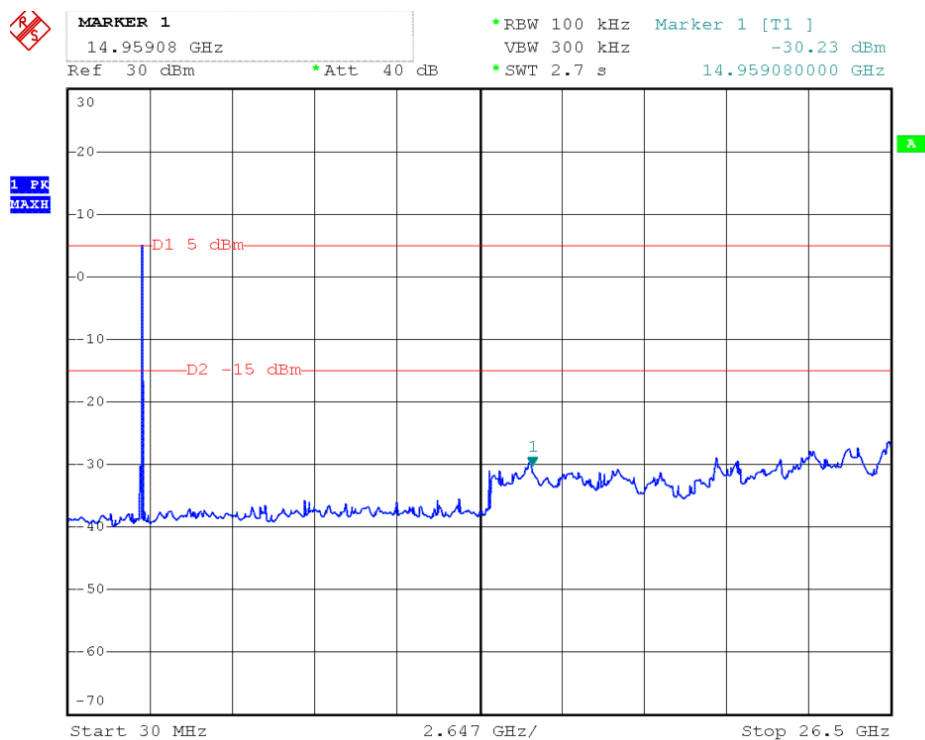
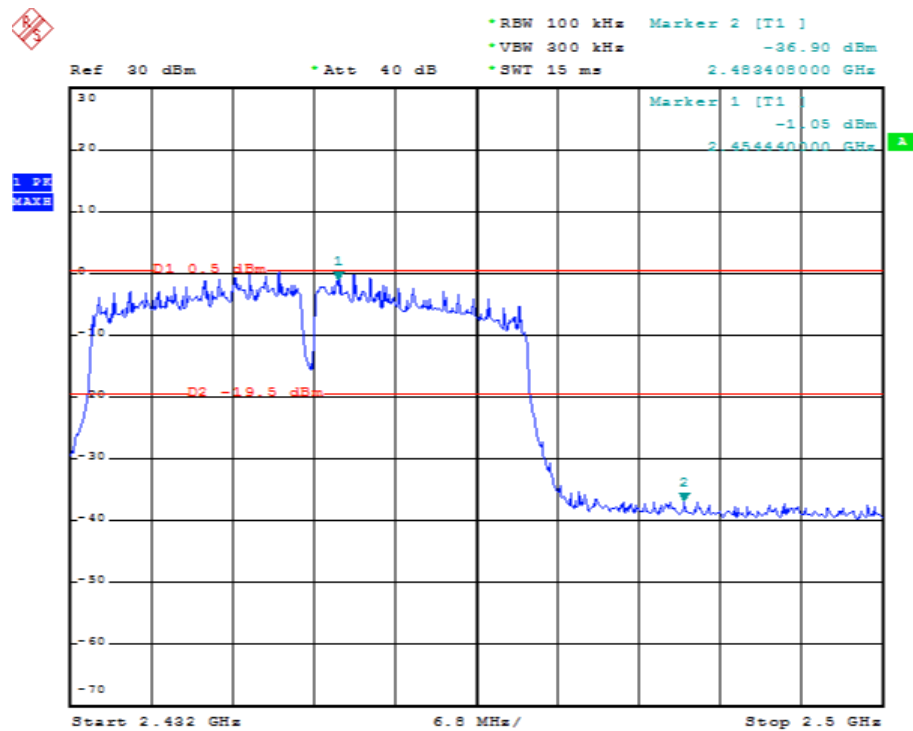




Middle Channel



High Channel



10. Conducted Emissions

10.1 Measurement Uncertainty

Base on NIS 81, The Treatment of Uncertainty in EMC Measurements, the best estimate of the uncertainty of any conducted emissions measurement is ± 2.88 dB.

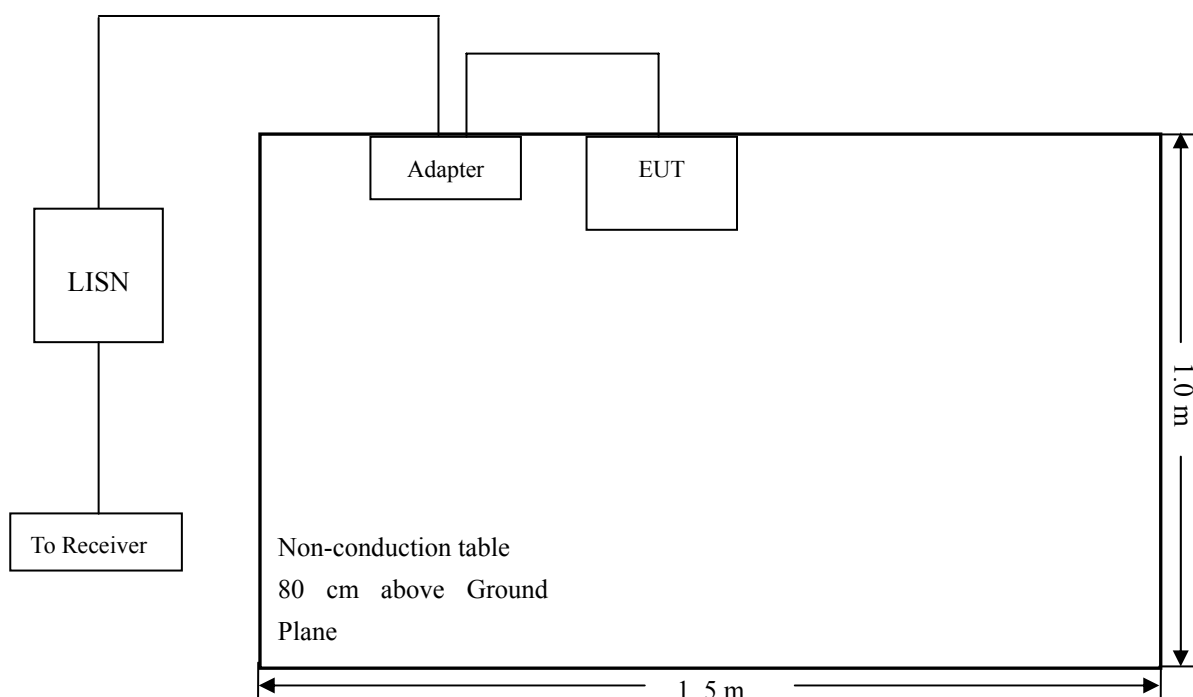
10.2 Test Procedure

The setup of EUT is according with per ANSI C63.4-2014 measurement procedure. The specification used was with the FCC Part 15.207 Limit.

The external I/O cables were draped along the test table and formed a bundle 30 to 40 cm long in the middle.

The spacing between the peripherals was 10 cm.

10.3 Basic Test Setup Block Diagram



10.4 Environmental Conditions

Temperature:	25 °C
Relative Humidity:	52%
ATM Pressure:	1012 mbar

10.5 Test Receiver Setup

During the conducted emission test, the test receiver was set with the following configurations:

Start Frequency	150 kHz
Stop Frequency	30 MHz
Sweep Speed	Auto
IF Bandwidth.....	10 kHz
Quasi-Peak Adapter Bandwidth	9 kHz
Quasi-Peak Adapter Mode	Normal

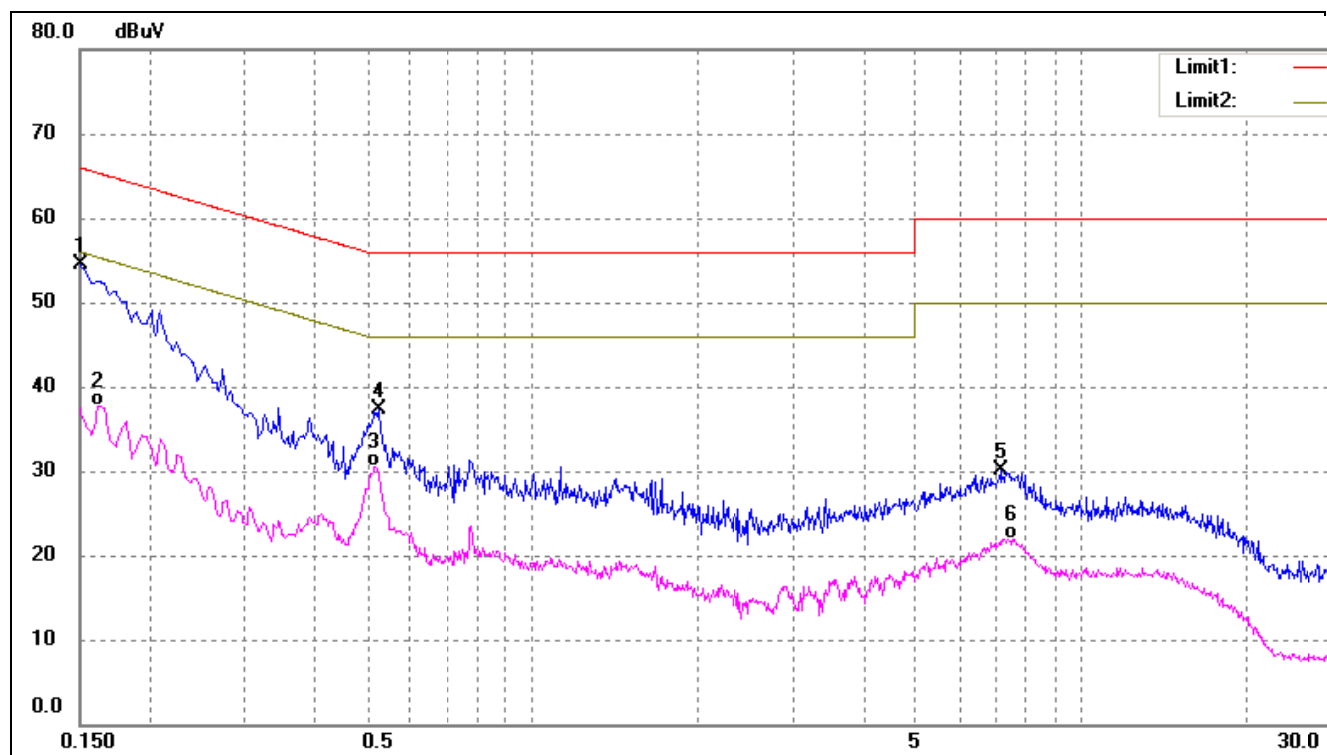
10.6 Summary of Test Results/Plots

According to the data in section 10.7, the EUT complied with the FCC Part 15.207 Conducted margin for this device, with the *worst* margin:

10.7 Conducted Emissions Test Data

Plot of Conducted Emissions Test Data

EUT: Wireless Router
 Tested Model: ARNEL904U1
 Operating Condition: Transmitting
 Comment: AC 120V/60Hz; Adapter DC12V/1A
 Test Specification: Neutral

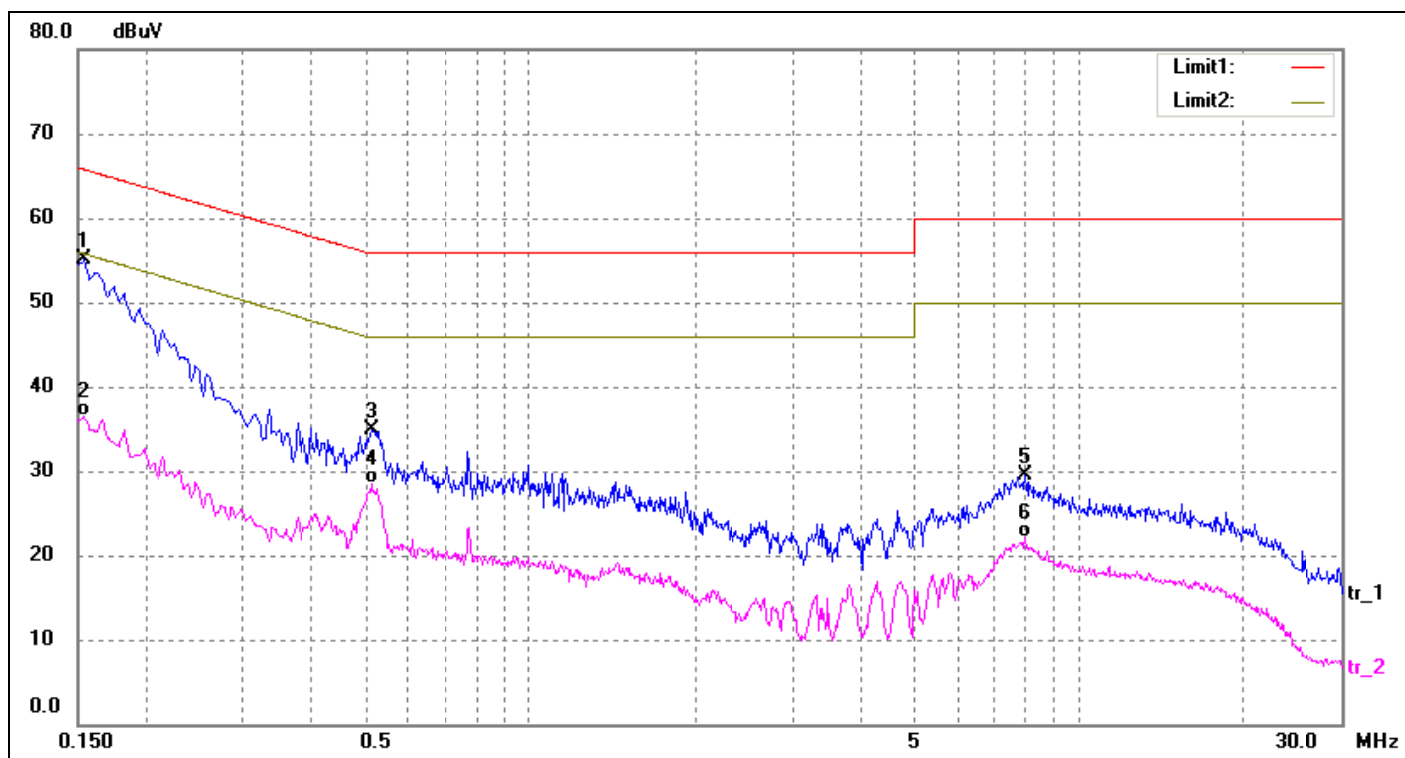


No.	Frequency	Reading	Correct	Result	Limit	Margin	Detector
	(MHz)	(dBuV)	(dB/m)	(dBuV)	(dBuV)	(dB)	
1	0.1500	44.57	9.85	54.42	66.00	-11.58	peak
2	0.1620	27.95	9.84	37.79	55.36	-17.57	AVG
3	0.5180	20.68	9.80	30.48	46.00	-15.52	AVG
4	0.5260	27.53	9.80	37.33	56.00	-18.67	peak
5	7.1140	20.48	9.60	30.08	60.00	-29.92	peak
6	7.5060	12.37	9.59	21.96	50.00	-28.04	AVG

Note:

1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.

EUT: Wireless Router
 Tested Model: ARNEL904U1
 Operating Condition: Transmitting
 Comment: AC 120V/60Hz; Adapter DC12V/1A
 Test Specification: Line



No.	Frequency (MHz)	Reading (dBuV)	Correct (dB/m)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1540	45.16	9.85	55.01	65.78	-10.77	peak
2	0.1540	26.65	9.85	36.50	55.78	-19.28	AVG
3	0.5140	25.12	9.80	34.92	56.00	-21.08	peak
4	0.5140	18.72	9.80	28.52	46.00	-17.48	AVG
5	7.9940	20.00	9.58	29.58	60.00	-30.42	peak
6	7.9940	12.60	9.58	22.18	50.00	-27.82	AVG

Note:

1. Result Level = Read Level + LISN Factor + Pulse Limiter Factor + Cable loss.
2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz), Step size: 4 kHz, Scan time: auto.

***** END OF REPORT *****