

10.3. OUTPUT POWER

LIMITS

FCC §15.247
IC RSS-247 §5.4 (4)

For systems using digital modulation in the 902–928 MHz, 2400–2483.5 MHz, and 5725–5850 MHz bands: 1 Watt, based on the use of antennas with directional gains that do not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.1 dB (including 10 dB pad and 0.1 dB cable) was entered as an offset in the power meter to allow for direct reading of power.

Duty cycle correction factor is already added to the average output power results for duty cycle factor < 98%. (802.11g, 802.11n mode)

DIRECTIONAL ANTENNA GAIN

The TX chains are correlated and the antenna gain is unequal among the chains.
The directional gain is:

2.4GHz

Chain 0 Antenna Gain [dBi]	Chain 1 Antenna Gain [dBi]	Correlated Chains Directional Gain [dBi]
1.80	2.80	5.32

- IEEE 802.11b Mode is not supported MIMO operation. So can't transmit on two antennas as the same time.

RESULTS

10.3.1. 802.11b MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency [MHz]	Directional Gain Primary [dBi]	Directional Gain Secondary [dBi]	FCC Power Limit [dBm]	IC Power Limit [dBm]	IC EIRP Limit [dBm]	Max Power [dBm]
1	2412	1.8	2.8	30.00	30.00	36.00	30.00
6	2437	1.8	2.8	30.00	30.00	36.00	30.00
11	2462	1.8	2.8	30.00	30.00	36.00	30.00
12	2467	1.8	2.8	30.00	30.00	36.00	30.00
13	2472	1.8	2.8	30.00	30.00	36.00	30.00

Duty Cycle CF [dB]	0.00	Included in Calculations of Corr'd Power
---------------------------	------	---

Results

Channel	Frequency [MHz]	Primary Meas Power [dBm]	Secondary Meas Power [dBm]	Maximum Power [dBm]	Power Limit [dBm]	Margin [dB]
1	2412	12.85	13.46	13.46	30.00	-16.54
6	2437	13.20	13.38	13.38	30.00	-16.62
11	2462	13.03	13.20	13.20	30.00	-16.80
12	2467	12.72	13.04	13.04	30.00	-16.96
13	2472	12.74	13.00	13.00	30.00	-17.00
Worst				13.46		

10.3.2. 802.11g MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency [MHz]	Directional Gain [dBi]	FCC Power Limit [dBm]	IC Power Limit [dBm]	IC EIRP Limit [dBm]	Max Power EIRP Limit [dBm]
1	2412	5.32	30.00	30.00	36.00	30.00
2	2417	5.32	30.00	30.00	36.00	30.00
6	2437	5.32	30.00	30.00	36.00	30.00
10	2457	5.32	30.00	30.00	36.00	30.00
11	2462	5.32	30.00	30.00	36.00	30.00
12	2467	5.32	30.00	30.00	36.00	30.00
13	2472	5.32	30.00	30.00	36.00	30.00

Duty Cycle CF [dB]	0.22	Included in Calculations of Corr'd Power
---------------------------	------	---

Results

Channel	Frequency [MHz]	Primary Meas Power [dBm]	Secondary Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Margin [dB]
1	2412	16.03	15.51	18.79	30.00	-11.21
2	2417	17.41	17.12	20.28	30.00	-9.72
6	2437	16.72	17.06	19.90	30.00	-10.10
10	2457	16.59	16.58	19.60	30.00	-10.40
11	2462	14.24	13.65	16.97	30.00	-13.03
12	2467	11.07	10.69	13.89	30.00	-16.11
13	2472	3.27	3.01	6.15	30.00	-23.85
Worst				20.28		

10.3.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency [MHz]	Directional Gain [dBi]	FCC Power Limit [dBm]	IC Power Limit [dBm]	IC EIRP Limit [dBm]	Max Power EIRP Limit [dBm]
1	2412	5.32	30.00	30.00	36.00	30.00
2	2417	5.32	30.00	30.00	36.00	30.00
6	2437	5.32	30.00	30.00	36.00	30.00
10	2457	5.32	30.00	30.00	36.00	30.00
11	2462	5.32	30.00	30.00	36.00	30.00
12	2467	5.32	30.00	30.00	36.00	30.00
13	2472	5.32	30.00	30.00	36.00	30.00

Duty Cycle CF [dB]	0.24	Included in Calculations of Corr'd Power
---------------------------	------	---

Results

Channel	Frequency [MHz]	Primary Meas Power [dBm]	Secondary Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Margin [dB]
1	2412	12.82	13.04	15.94	30.00	-14.06
2	2417	16.95	16.89	19.93	30.00	-10.07
6	2437	17.00	16.83	19.93	30.00	-10.07
10	2457	16.47	16.63	19.56	30.00	-10.44
11	2462	12.44	12.68	15.57	30.00	-14.43
12	2467	10.30	10.48	13.40	30.00	-16.60
13	2472	1.49	1.62	4.57	30.00	-25.43
Worst				19.93		

10.3.4. 802.11n HT40 MODE IN THE 2.4 GHz BAND

Limits

Channel	Frequency [MHz]	Directional Gain [dBi]	FCC Power Limit [dBm]	IC Power Limit [dBm]	IC EIRP Limit [dBm]	Max Power EIRP Limit [dBm]
3	2422	5.32	30.00	30.00	36.00	30.00
4	2427	5.32	30.00	30.00	36.00	30.00
5	2432	5.32	30.00	30.00	36.00	30.00
6	2437	5.32	30.00	30.00	36.00	30.00
7	2442	5.32	30.00	30.00	36.00	30.00
8	2447	5.32	30.00	30.00	36.00	30.00
9	2452	5.32	30.00	30.00	36.00	30.00
10	2457	5.32	30.00	30.00	36.00	30.00
11	2462	5.32	30.00	30.00	36.00	30.00

Duty Cycle CF [dB]	0.46	Included in Calculations of Corr'd Power
---------------------------	------	---

Results

Channel	Frequency [MHz]	Primary Meas Power [dBm]	Secondary Meas Power [dBm]	Total Corr'd Power [dBm]	Power Limit [dBm]	Margin [dB]
3	2422	9.84	10.41	13.14	30.00	-16.86
4	2427	10.55	11.28	13.94	30.00	-16.06
5	2432	13.05	12.91	15.99	30.00	-14.01
6	2437	12.84	13.03	15.95	30.00	-14.05
7	2442	12.85	13.04	15.96	30.00	-14.04
8	2447	10.77	10.97	13.88	30.00	-16.12
9	2452	9.72	10.03	12.89	30.00	-17.11
10	2457	8.46	7.86	11.18	30.00	-18.82
11	2462	0.86	1.07	3.98	30.00	-26.02
Worst				15.99		

10.4. PSD

LIMITS

FCC §15.247
 IC RSS-247 §5.2 (2)

The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

TEST PROCEDURE

Power Spectral Density was performed utilizing the “Method AVGPSD-1(802.11 b mode), AVGPSD-2(802.11 g/n mode)” under KDB558074 D01 DTS Meas Guidance v03r05

RESULTS

10.4.1. 802.11b MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	Primary Antenna 1 [dBm]	Secondary Antenna 2 [dBm]	Total PSD [dBm]	Limit [dBm]	Margin [dB]
1	2412	-13.86	-12.35	-12.35	8.00	-20.35
6	2437	-12.65	-15.22	-12.65	8.00	-20.65
11	2462	-15.77	-13.96	-13.96	8.00	-21.96
12	2467	-16.00	-15.24	-15.24	8.00	-23.24
13	2472	-15.63	-15.61	-15.61	8.00	-23.61

Duty Cycle CF [dB]	0.00	Included in Calculations of PPSD
---------------------------	------	---

10.4.2. 802.11g MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	Primary Antenna 1 [dBm]	Secondary Antenna 2 [dBm]	Total PSD [dBm]	Limit [dBm]	Margin [dB]
1	2412	-16.19	-18.00	-13.77	8.00	-21.77
2	2417	-15.70	-15.30	-12.26	8.00	-20.26
6	2437	-16.75	-15.16	-12.65	8.00	-20.65
10	2457	-11.46	-15.53	-9.81	8.00	-17.81
11	2462	-11.21	-19.10	-10.34	8.00	-18.34
12	2467	-5.20	-22.06	-4.89	8.00	-12.89
13	2472	-24.21	-30.17	-23.01	8.00	-31.01

Duty Cycle CF [dB]	0.22	Included in Calculations of PPSD
---------------------------	------	---

10.4.3. 802.11n HT20 MODE IN THE 2.4 GHz BAND

Channel	Frequency [MHz]	Chain 0 Meas [dBm]	Chain 1 Meas [dBm]	Total PSD [dBm]	Limit [dBm]	Margin [dB]
1	2412	-16.47	-20.03	-14.65	8.00	-22.65
2	2417	-16.82	-16.25	-13.27	8.00	-21.27
6	2437	-16.40	-16.27	-13.08	8.00	-21.08
10	2457	-14.35	-16.43	-12.01	8.00	-20.01
11	2462	-12.14	-20.43	-11.30	8.00	-19.30
12	2467	-5.43	-22.32	-5.10	8.00	-13.10
13	2472	-28.39	-31.72	-26.49	8.00	-34.49

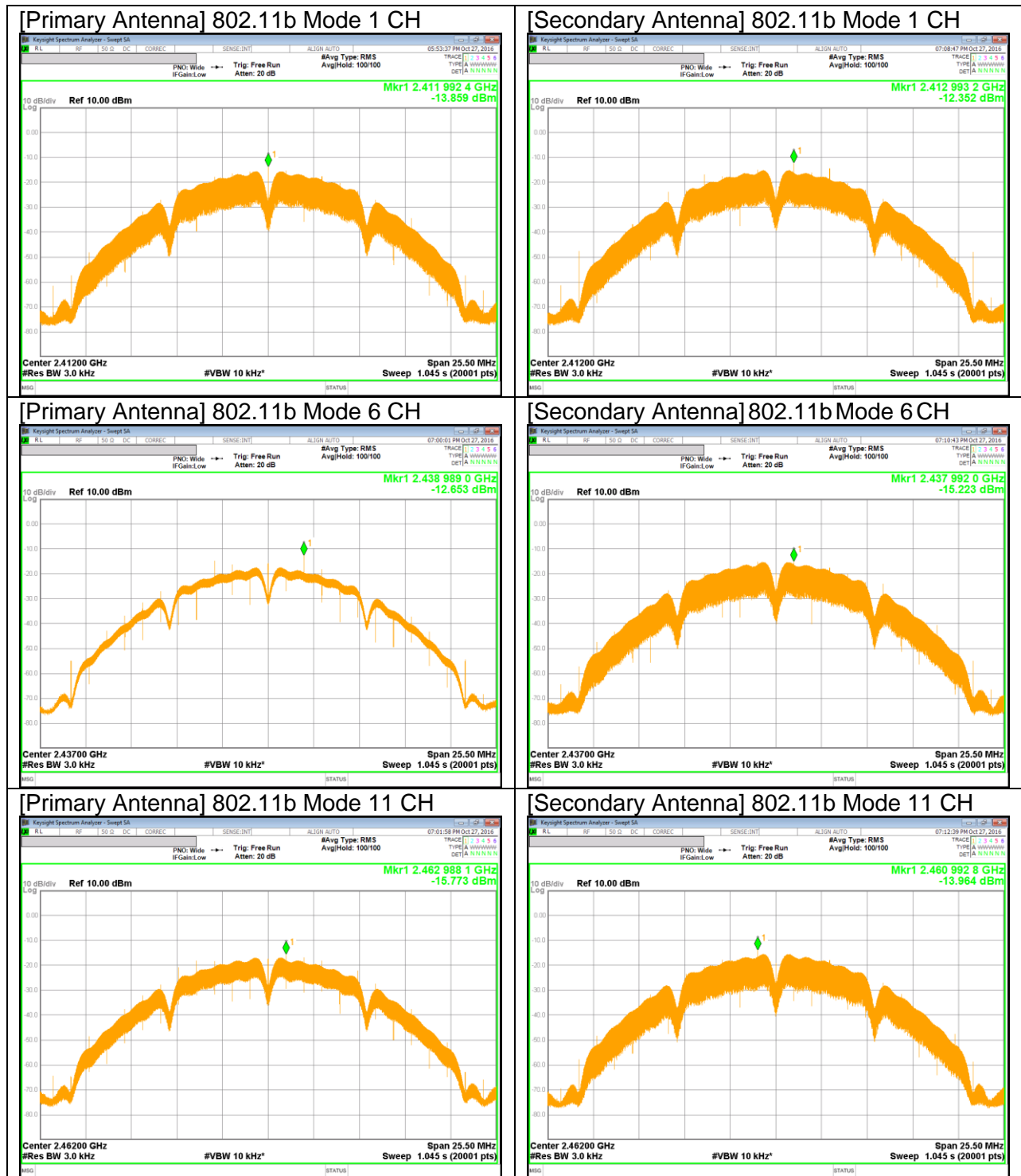
Duty Cycle CF [dB]	0.24	Included in Calculations of PPSD
---------------------------	------	---

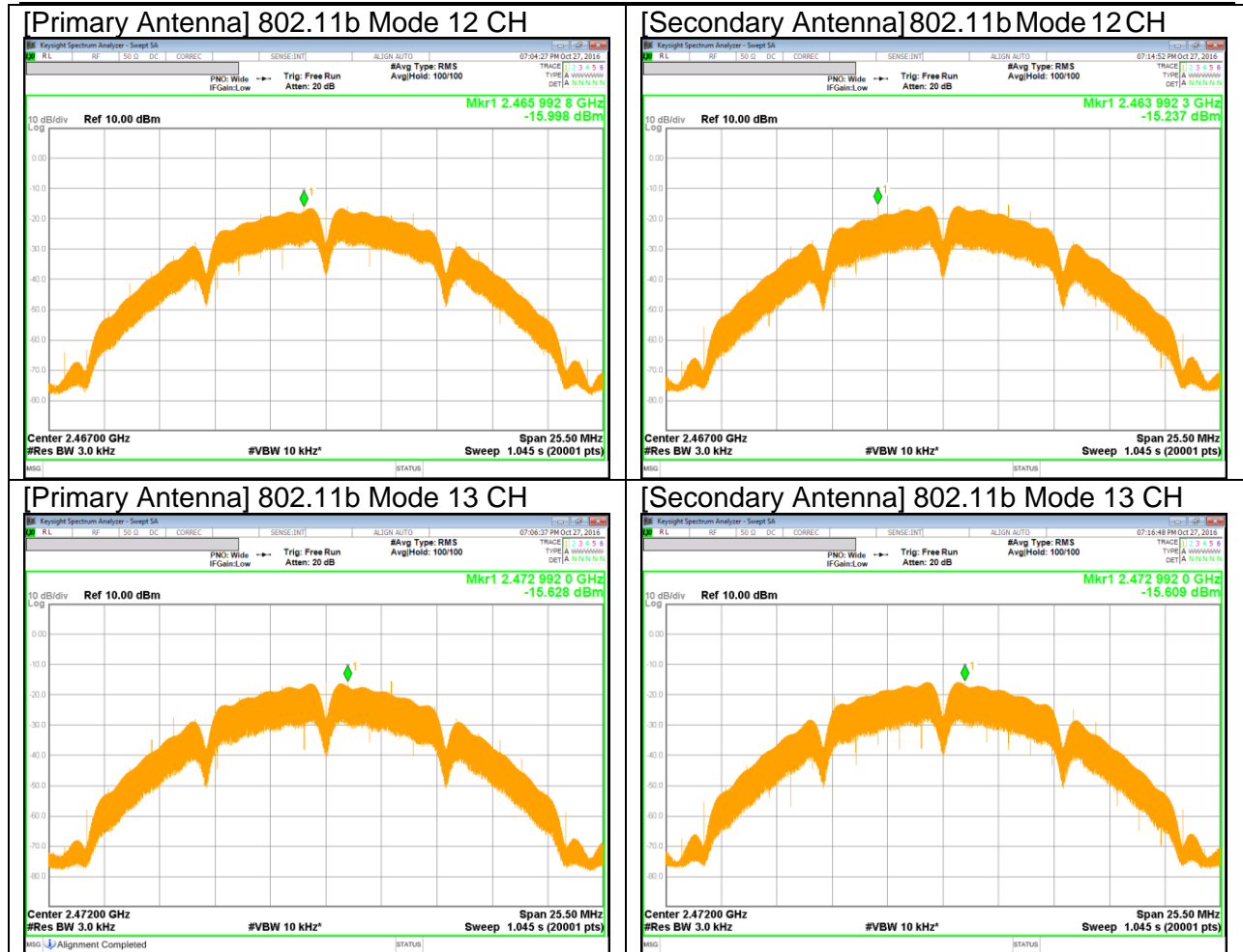
10.4.4. 802.11n HT40 MODE IN THE 2.4 GHz BAND

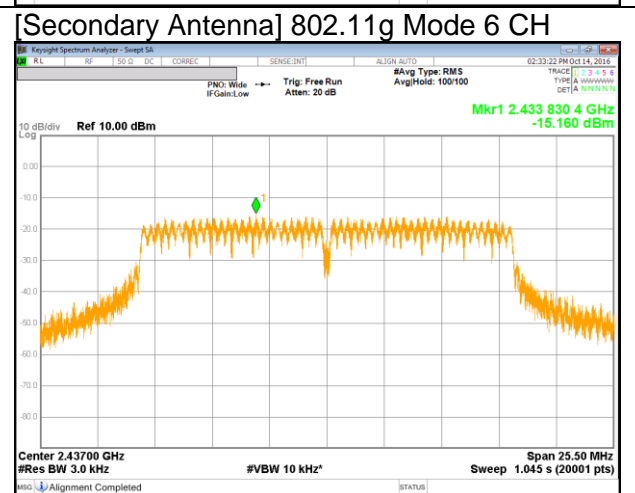
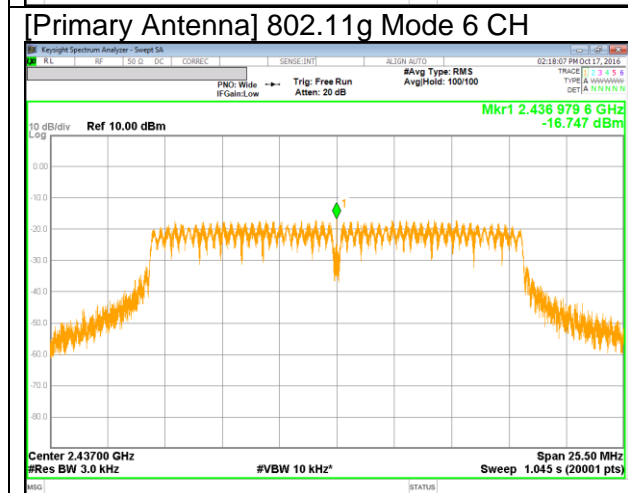
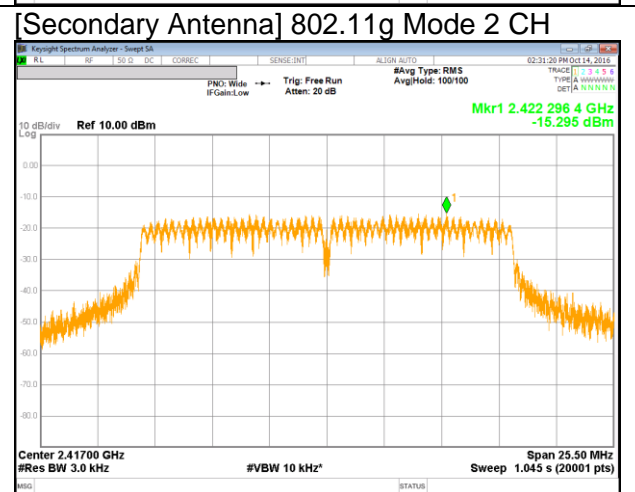
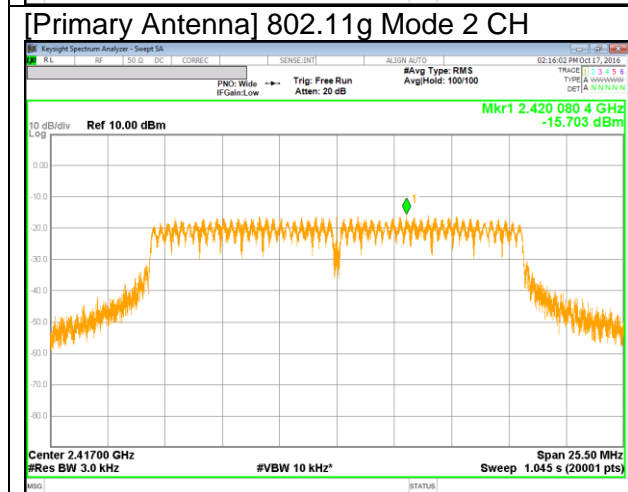
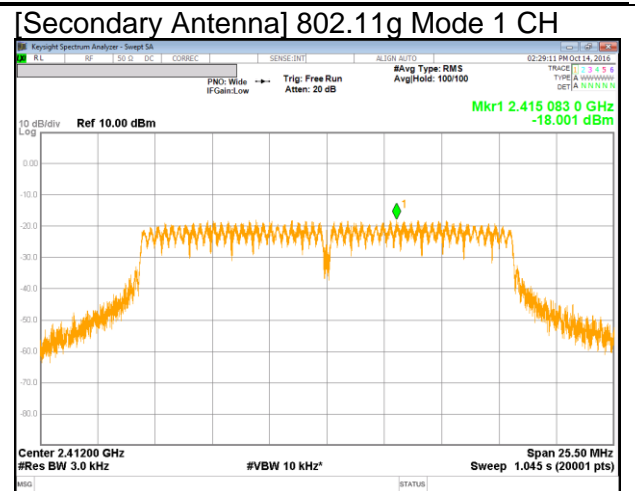
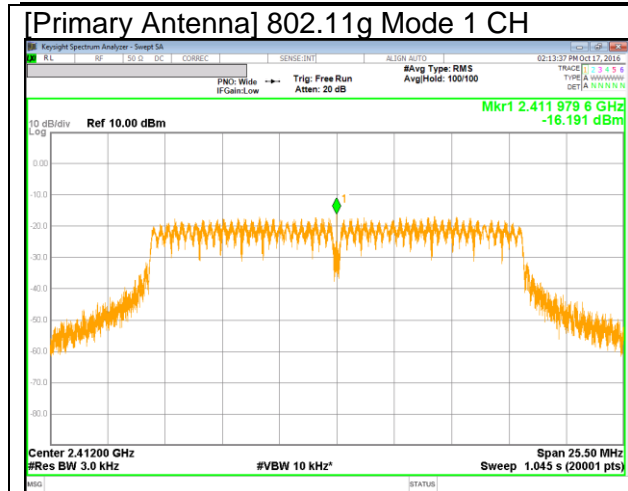
Channel	Frequency [MHz]	Chain 0 Meas [dBm]	Chain 1 Meas [dBm]	Total PSD [dBm]	Limit [dBm]	Margin [dB]
3	2422	-19.37	-25.92	-18.04	8.00	-26.04
4	2427	-18.69	-24.27	-17.62	8.00	-25.62
5	2432	-17.51	-22.77	-16.37	8.00	-24.37
6	2437	-18.12	-22.57	-16.33	8.00	-24.33
7	2442	-18.74	-22.91	-16.87	8.00	-24.87
8	2447	-19.36	-25.06	-17.87	8.00	-25.87
9	2452	-14.05	-25.71	-13.31	8.00	-21.31
10	2457	-14.45	-25.97	-13.69	8.00	-21.69
11	2462	-25.54	-34.87	-24.60	8.00	-32.60

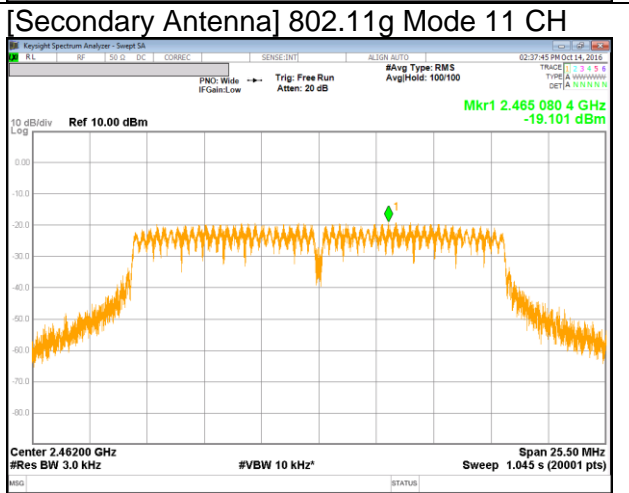
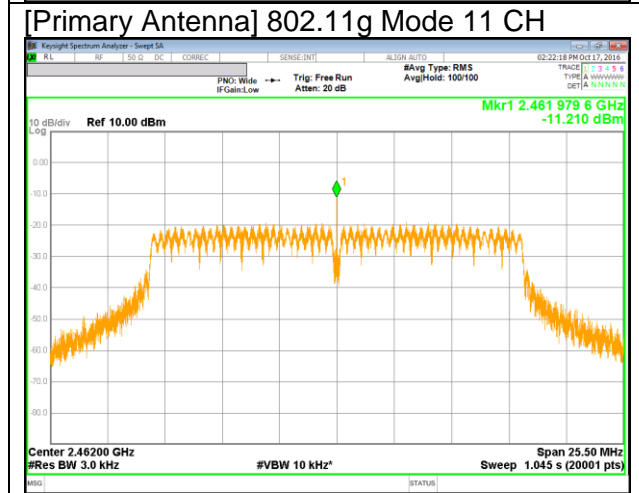
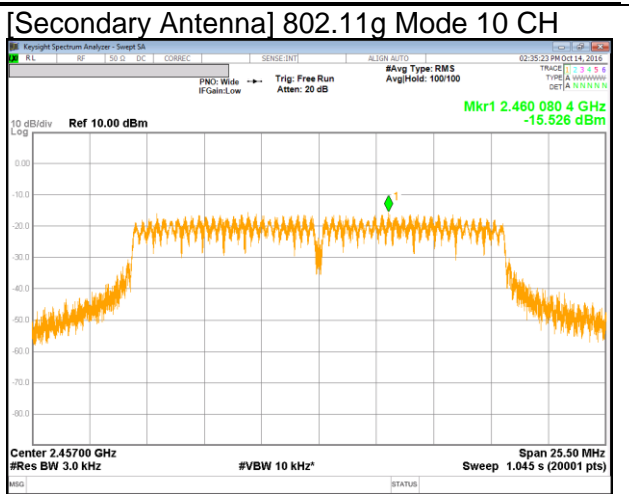
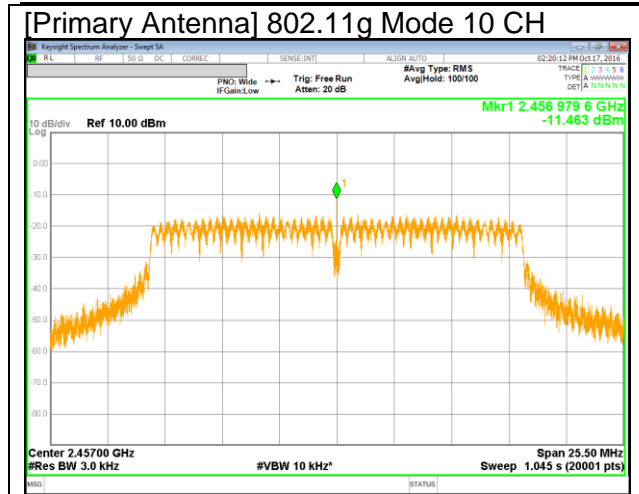
Duty Cycle CF [dB]	0.46	Included in Calculations of PPSD
---------------------------	------	---

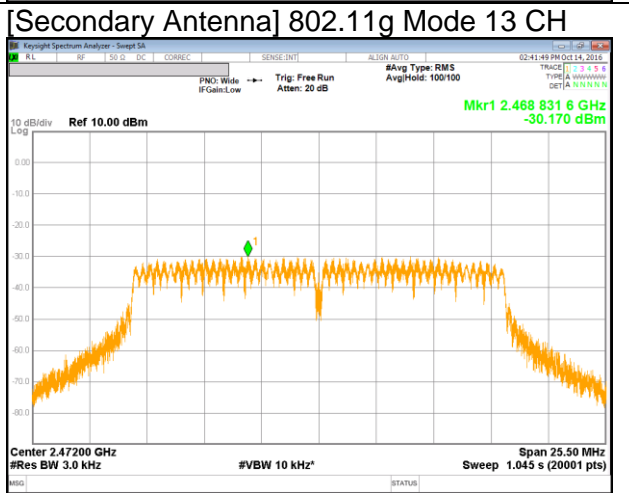
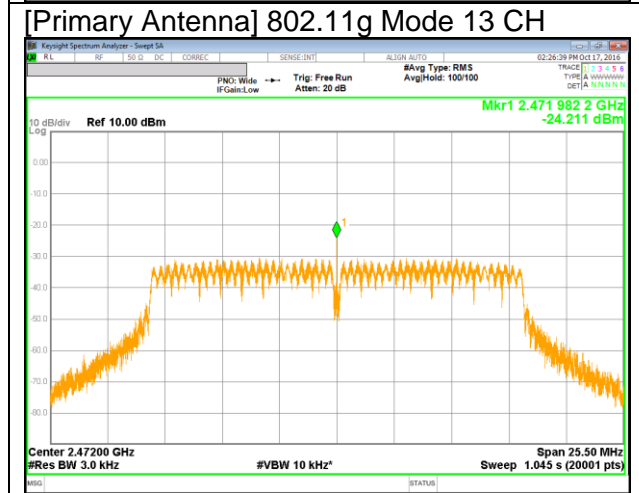
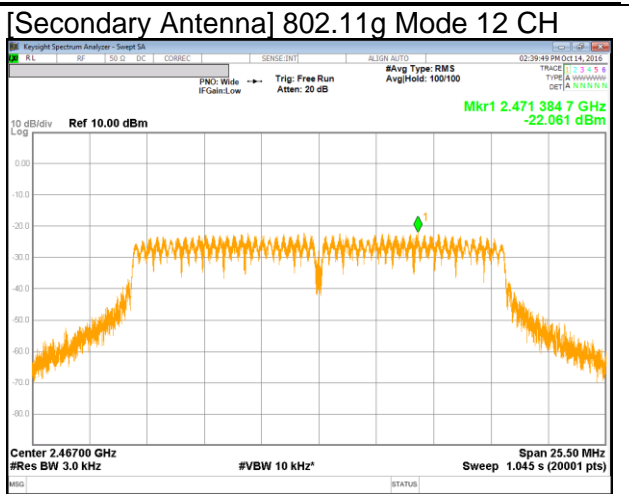
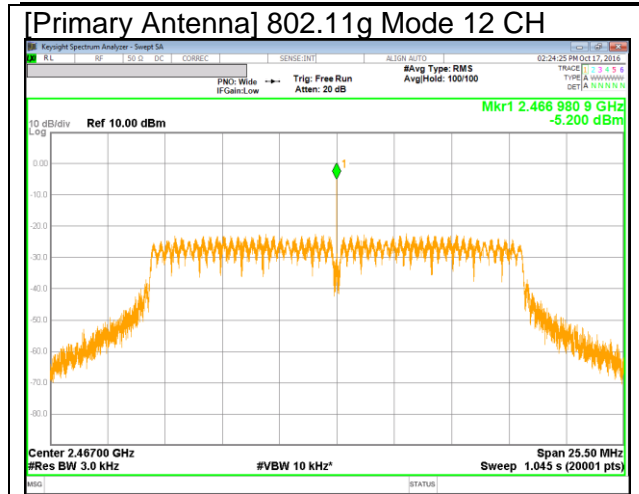
10.4.5. PSD PLOTS

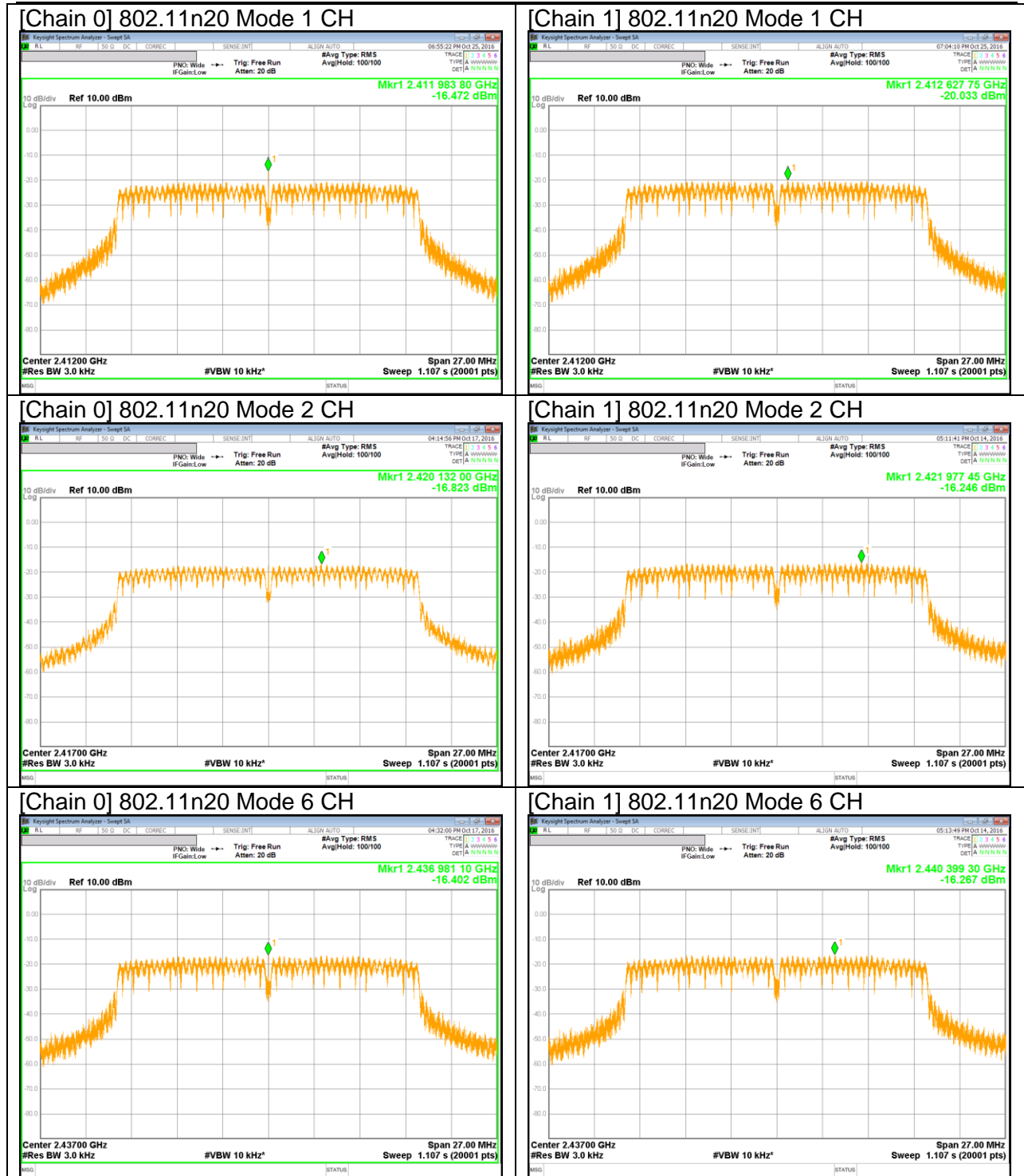


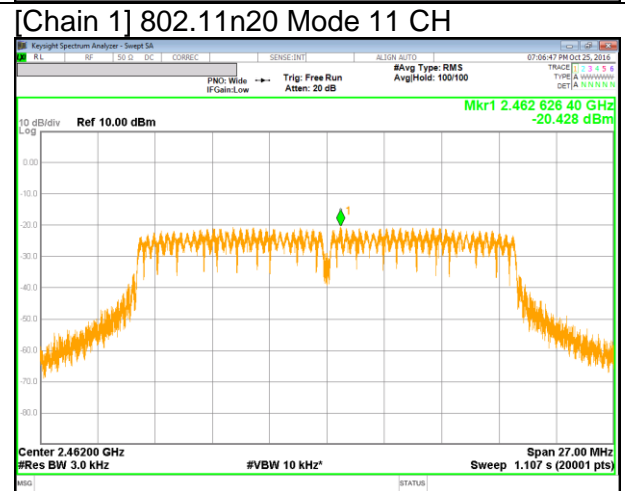
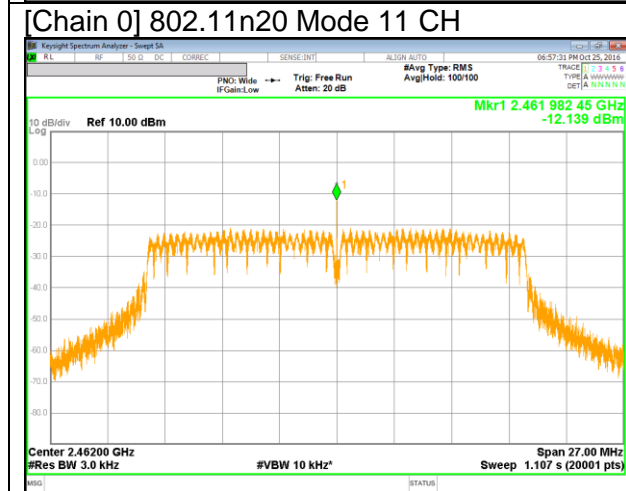
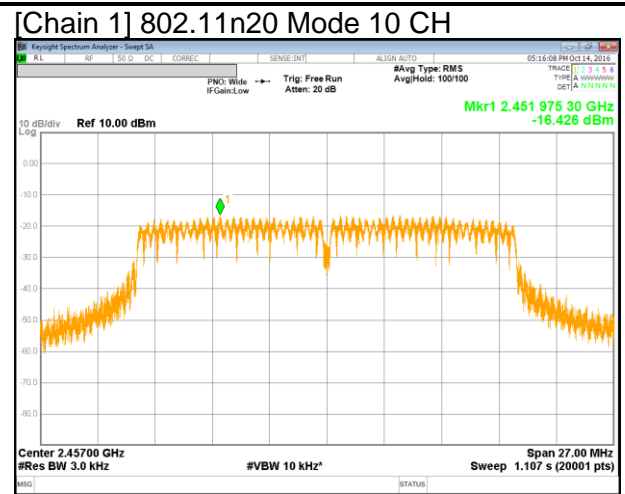
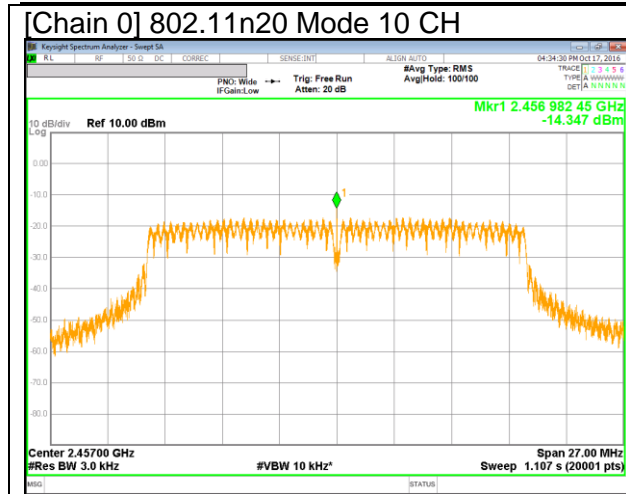


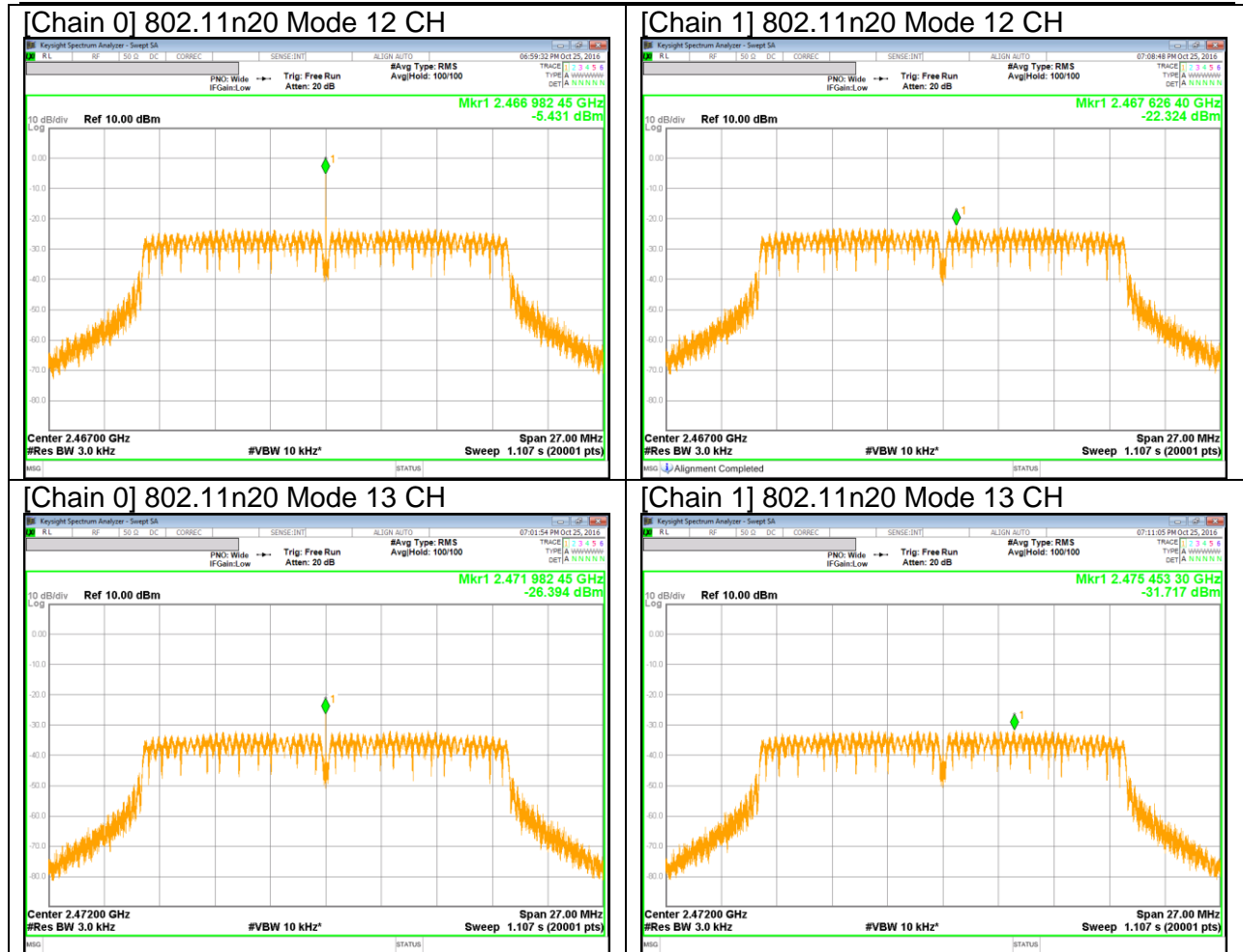


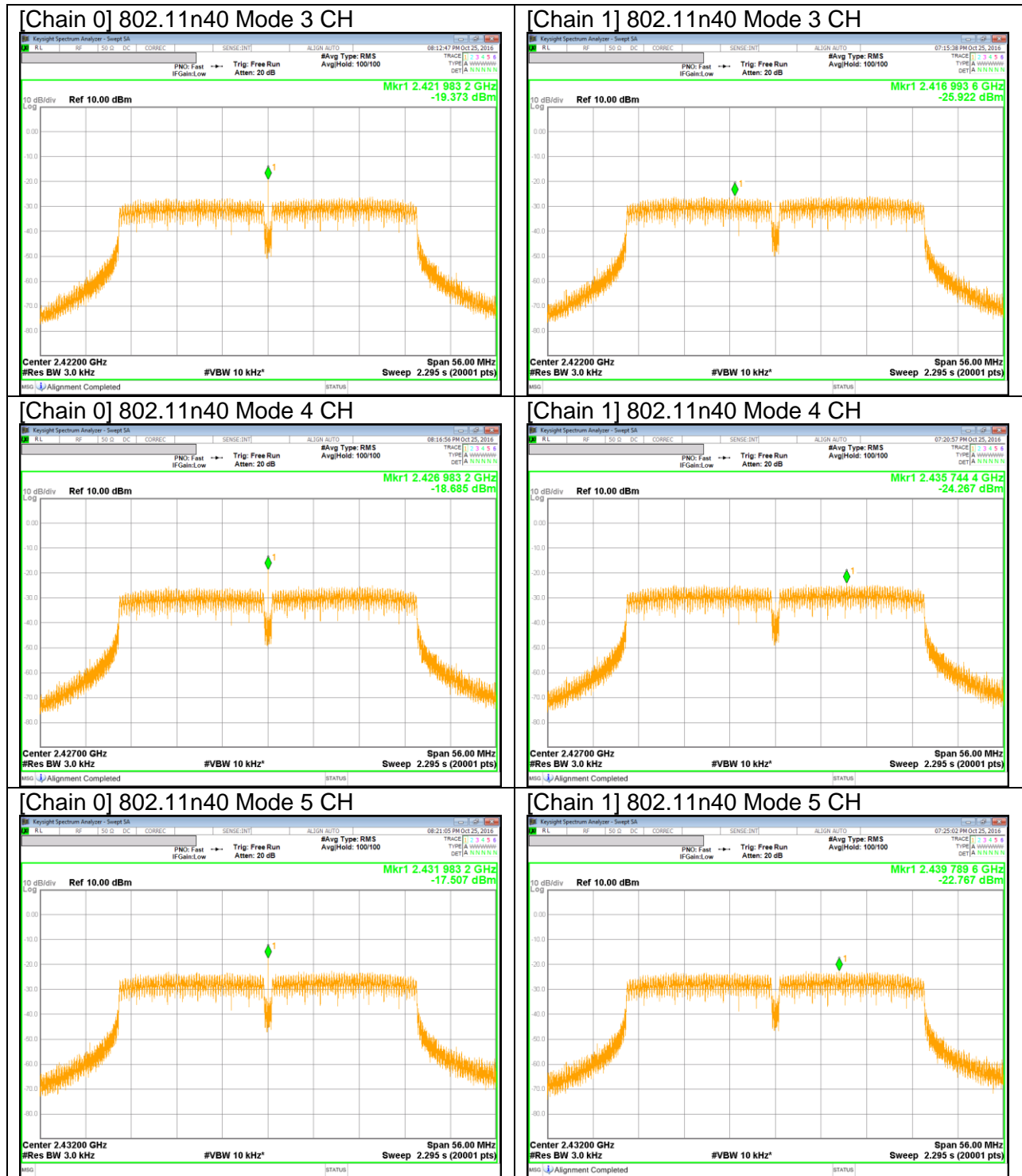


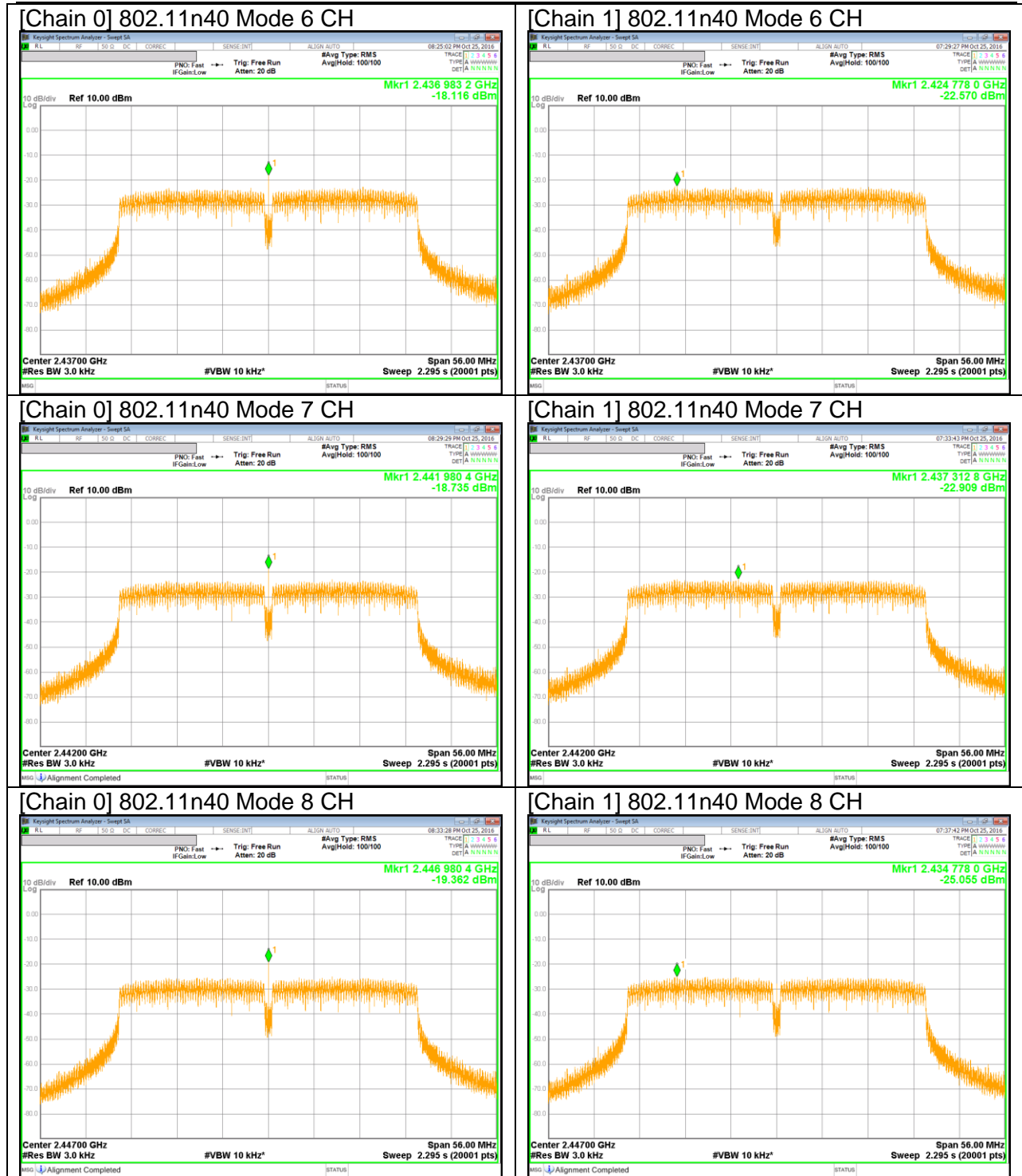


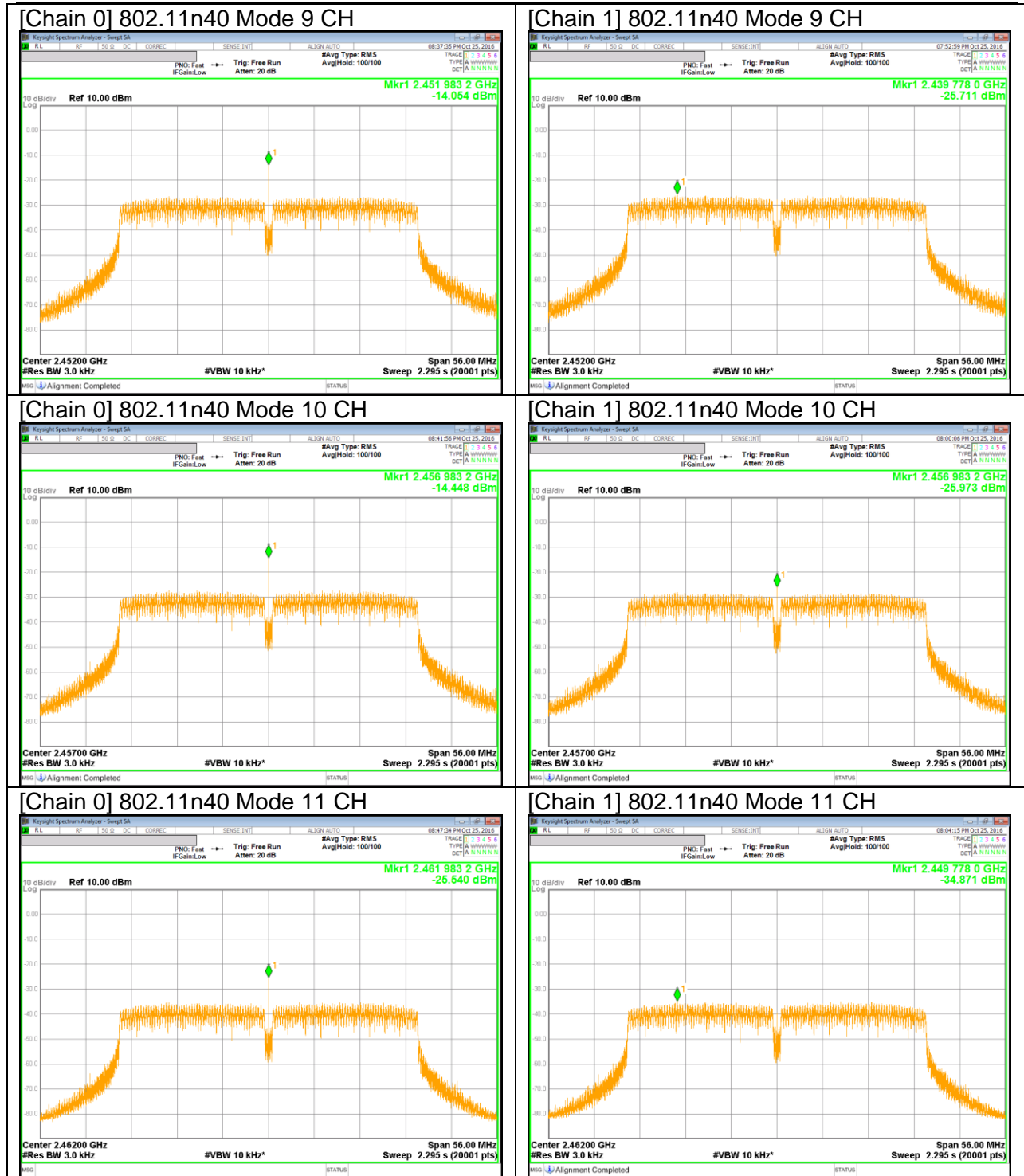












10.5. OUT-OF-BAND EMISSIONS

LIMITS

FCC §15.247 (d)
IC RSS-247 §5.5

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.

TEST PROCEDURE

The transmitter output is connected to a spectrum analyzer with RBW = 100 kHz, VBW = 300 kHz, peak detector, and max hold. Measurements utilizing these settings are made of the in-band reference level, bandedge (where measurements to the general radiated limits will not be made) and out-of-band emissions.