

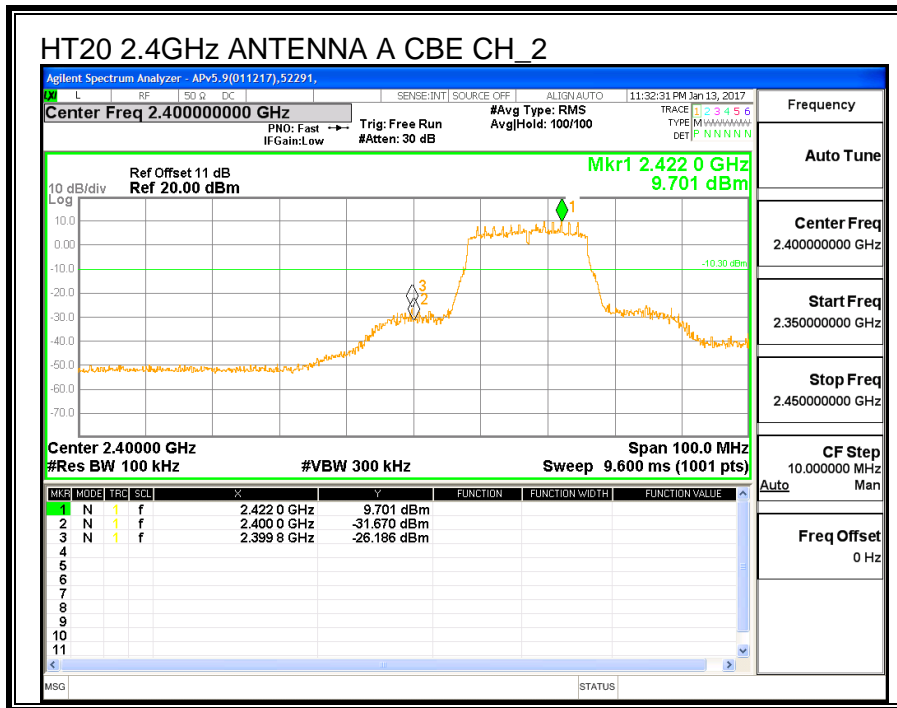
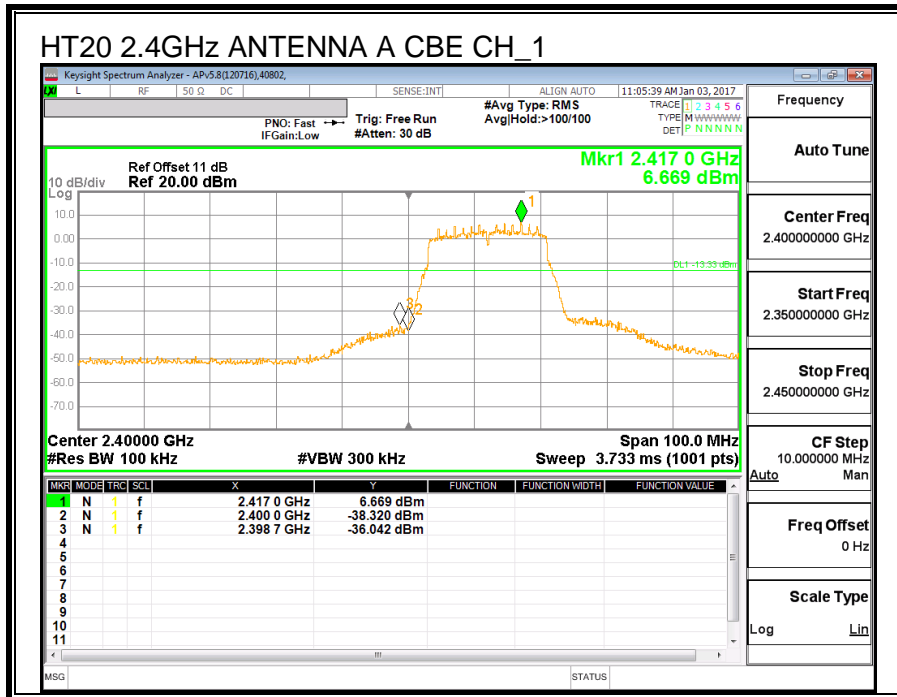
8.4.6. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

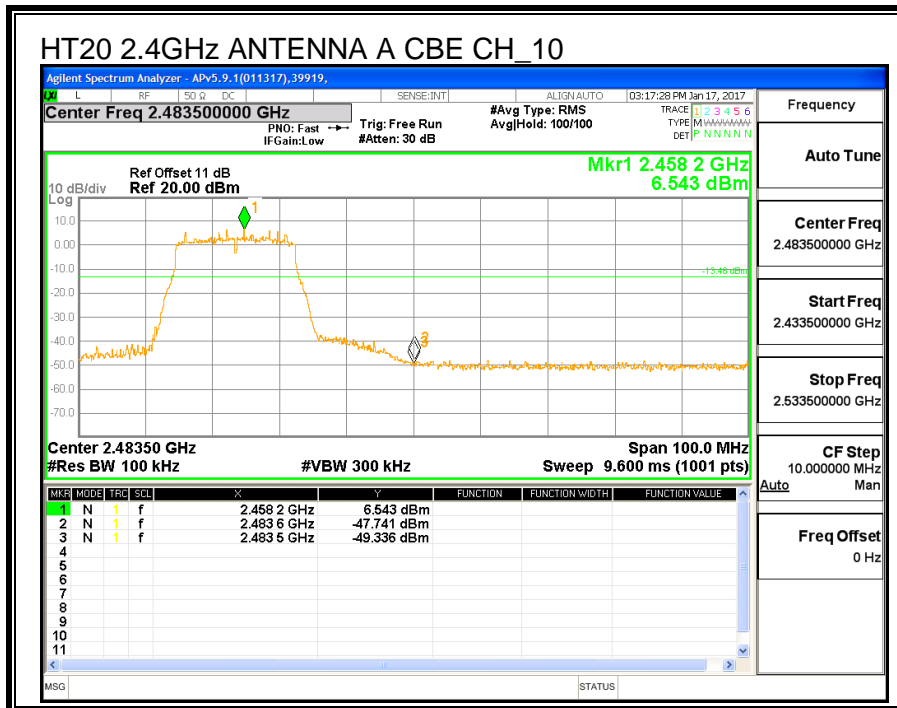
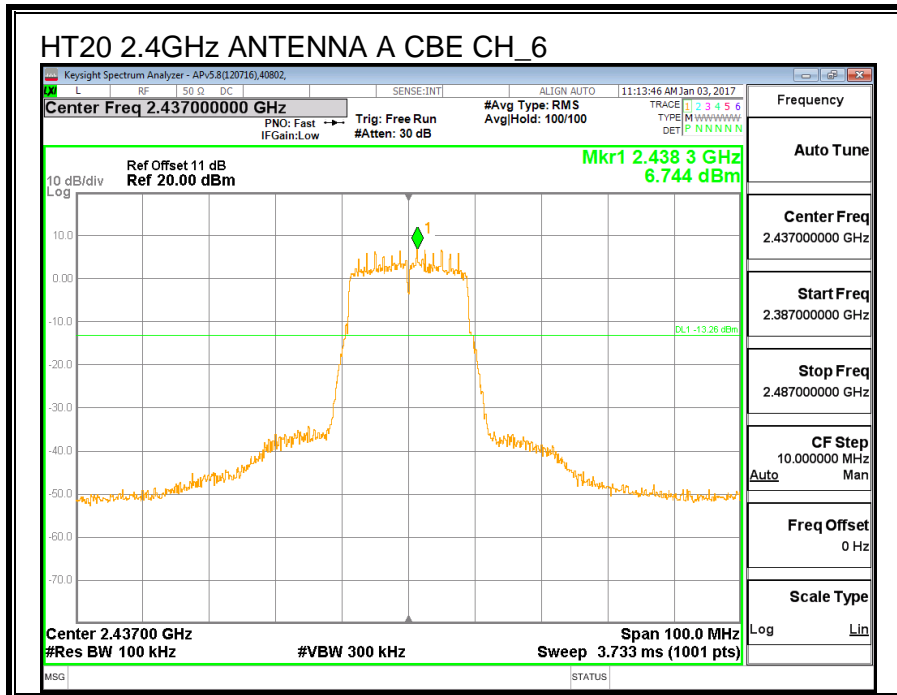
LIMITS

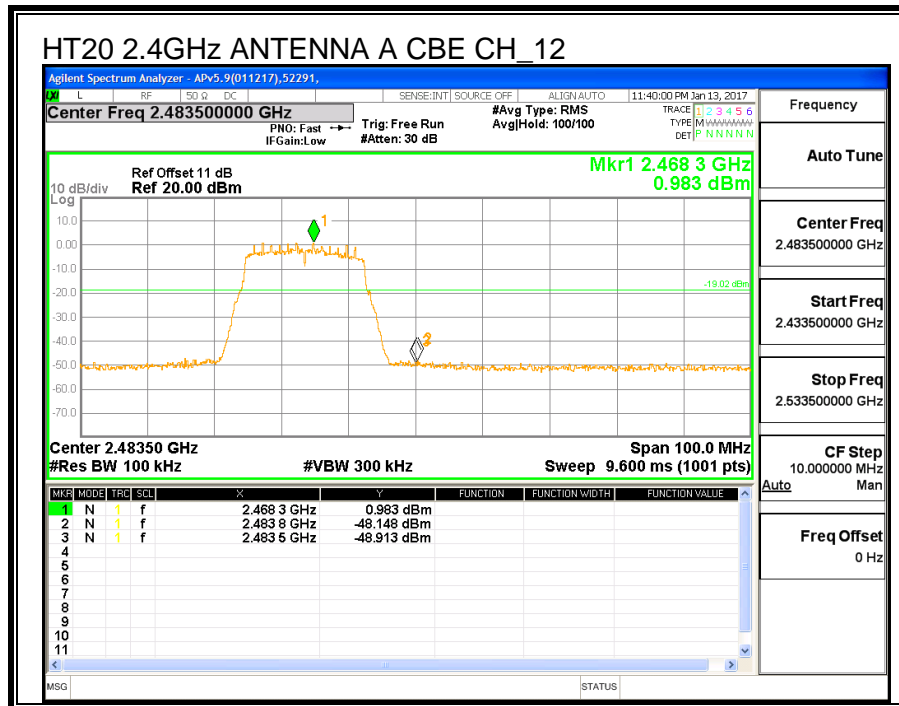
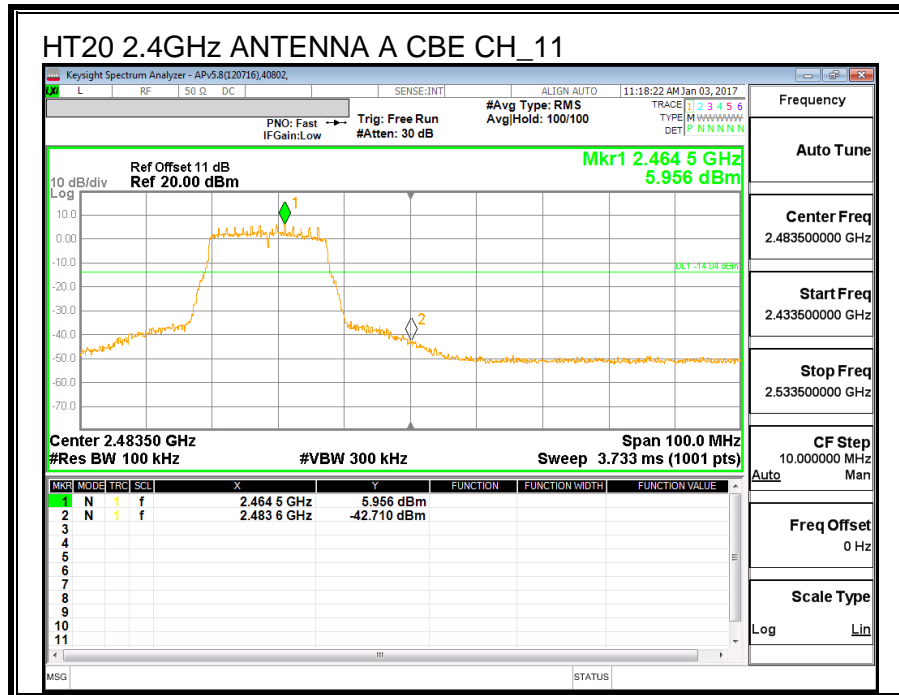
FCC §15.247 (d)

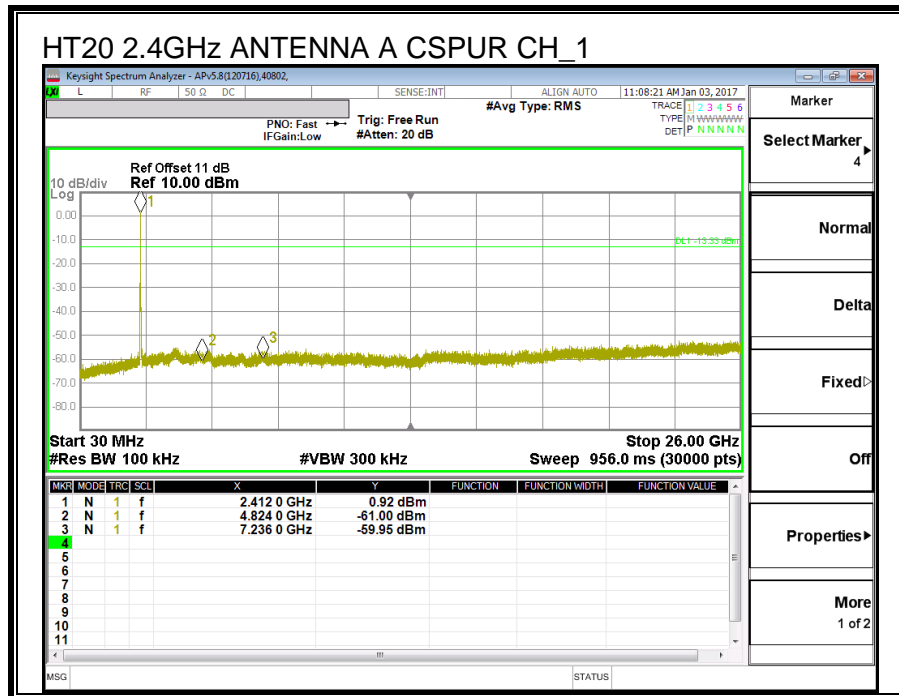
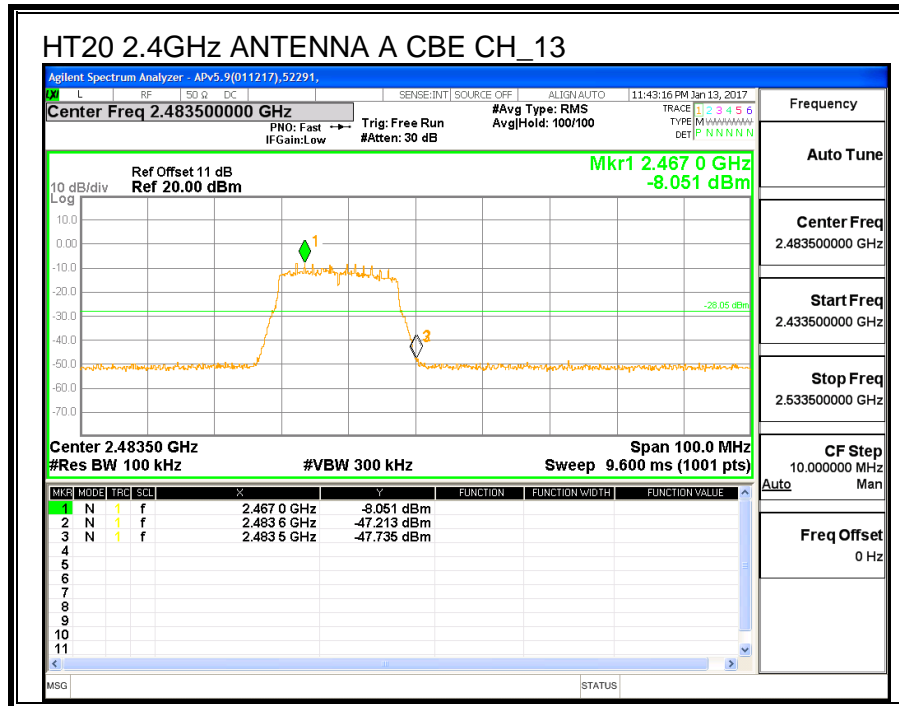
IC RSS-247 (5.5)

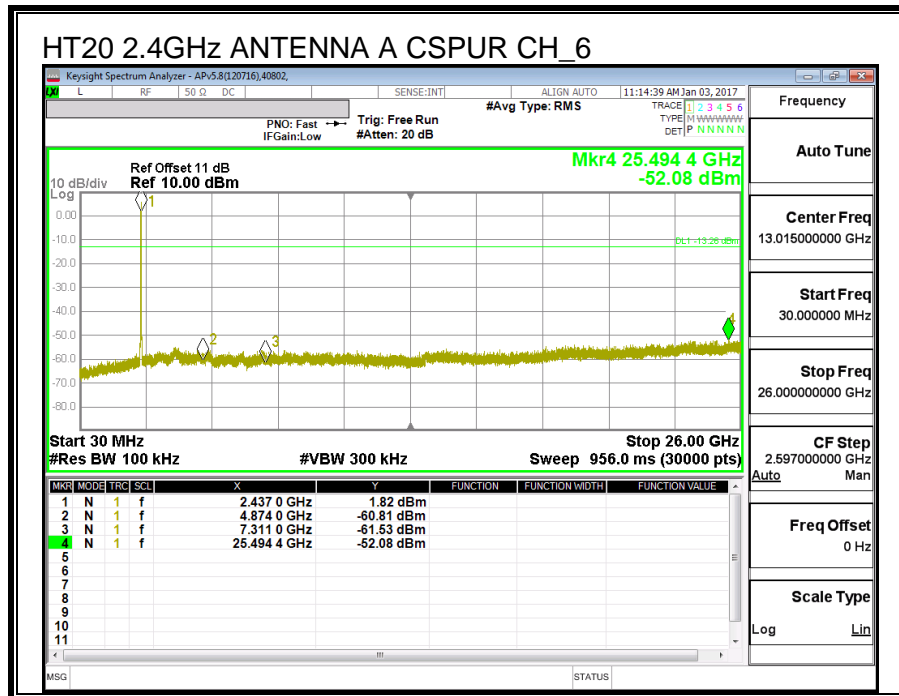
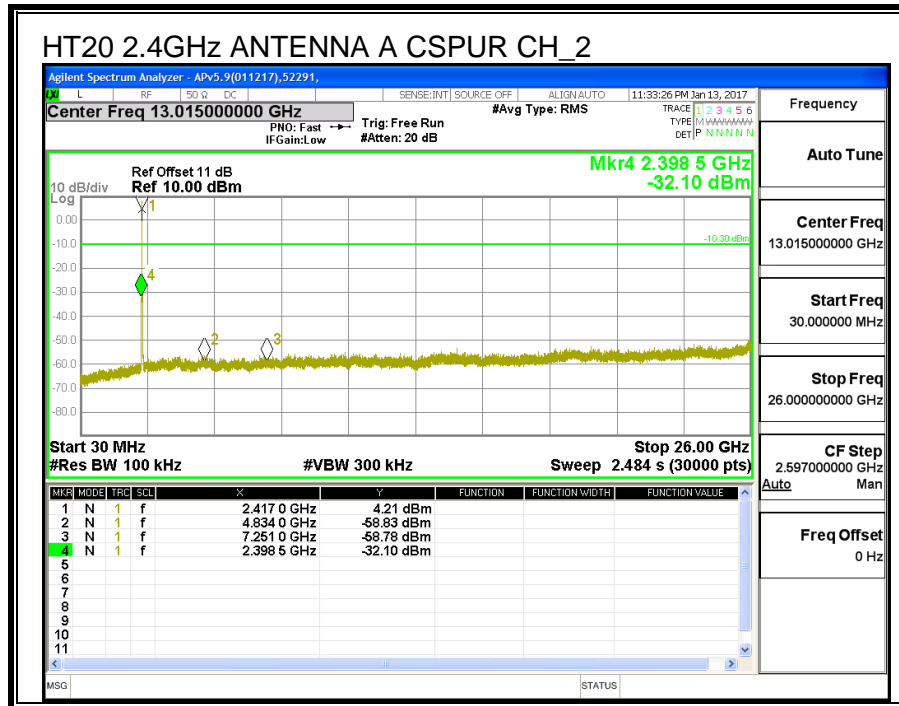
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

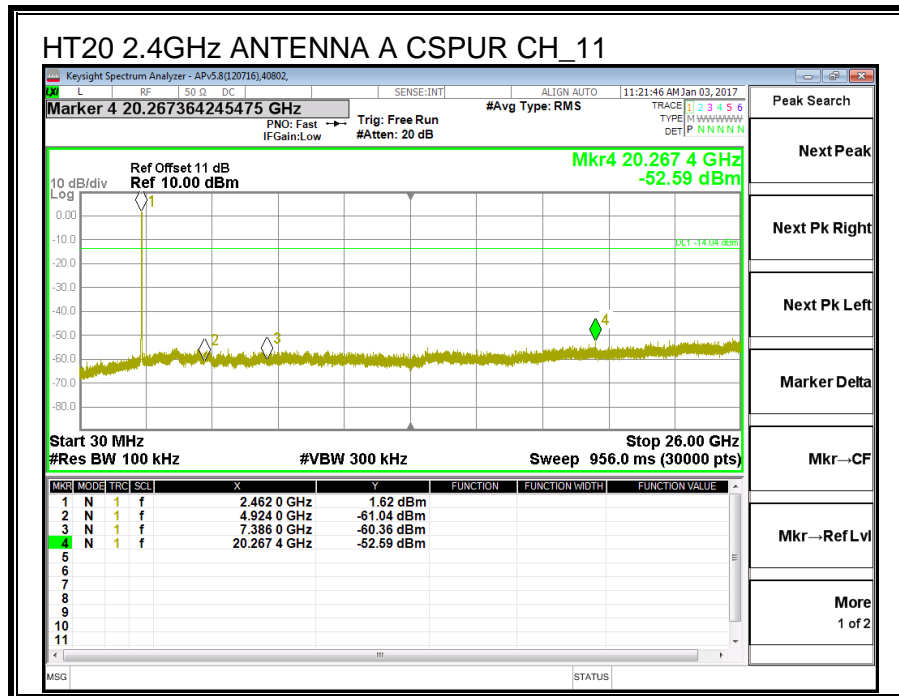
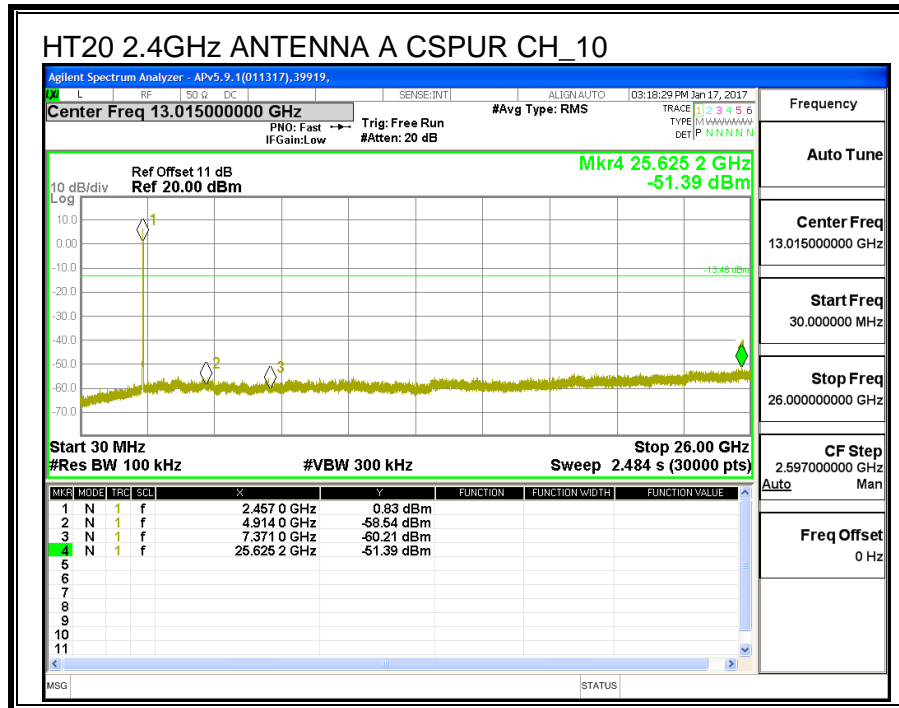


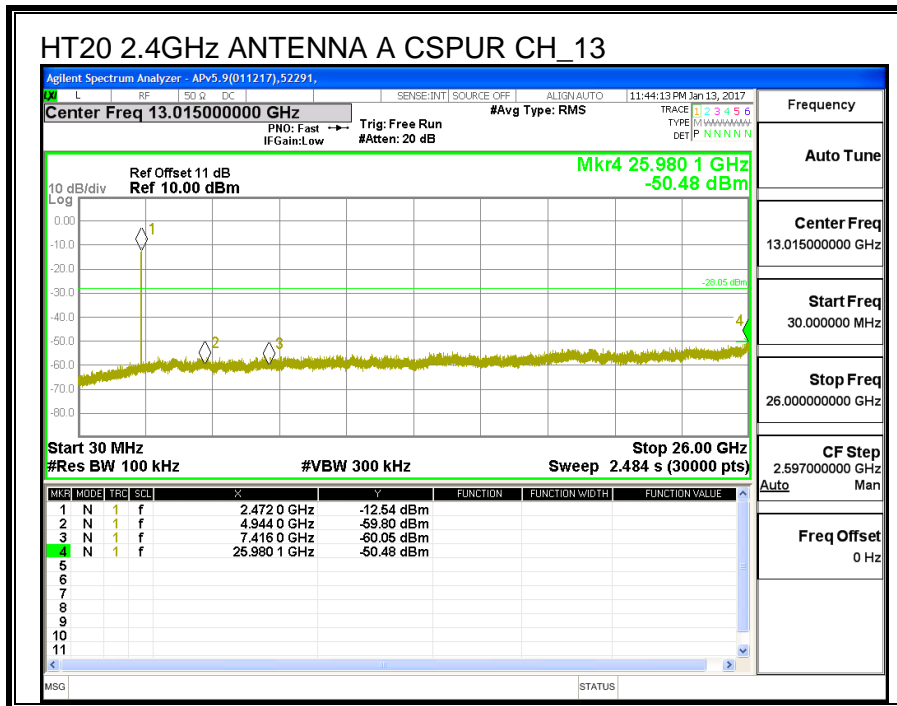
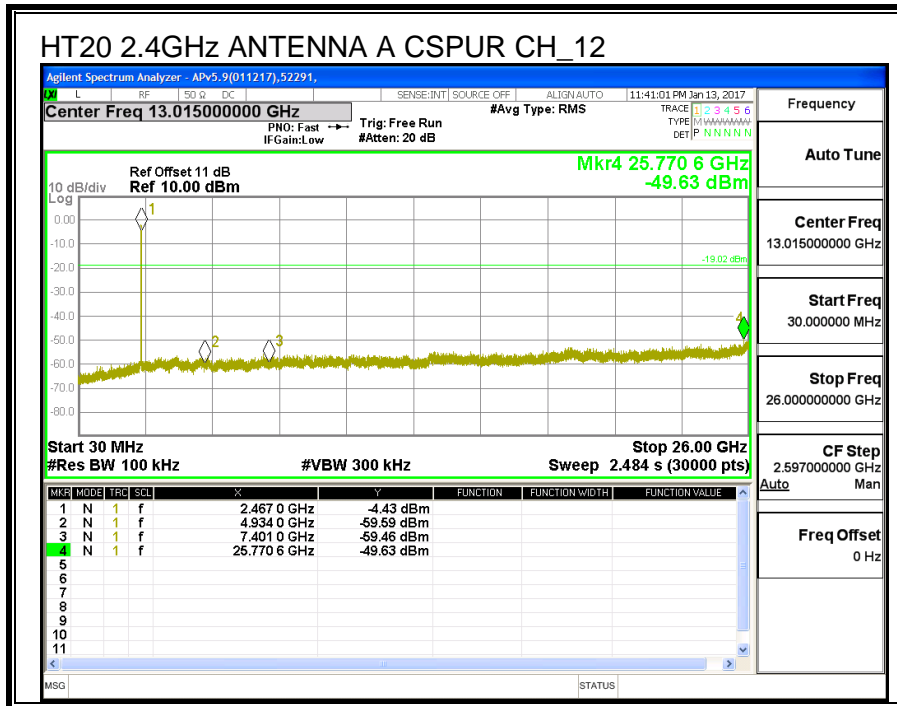












8.5. 11n HT20 ANTENNA B SISO MODE IN THE 2.4GHz BAND

8.5.1. 6 dB BANDWIDTH

LIMITS

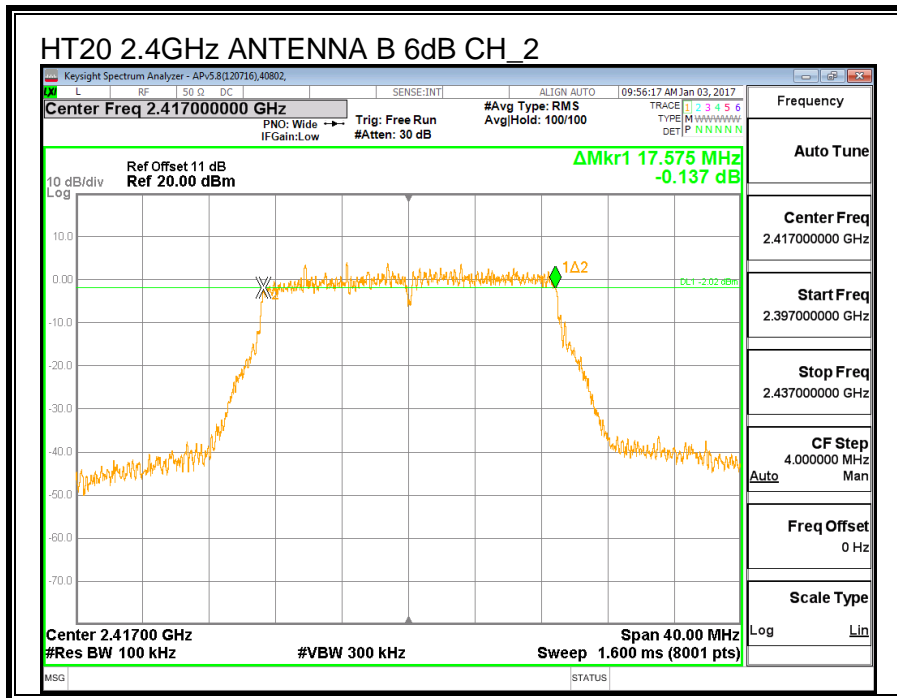
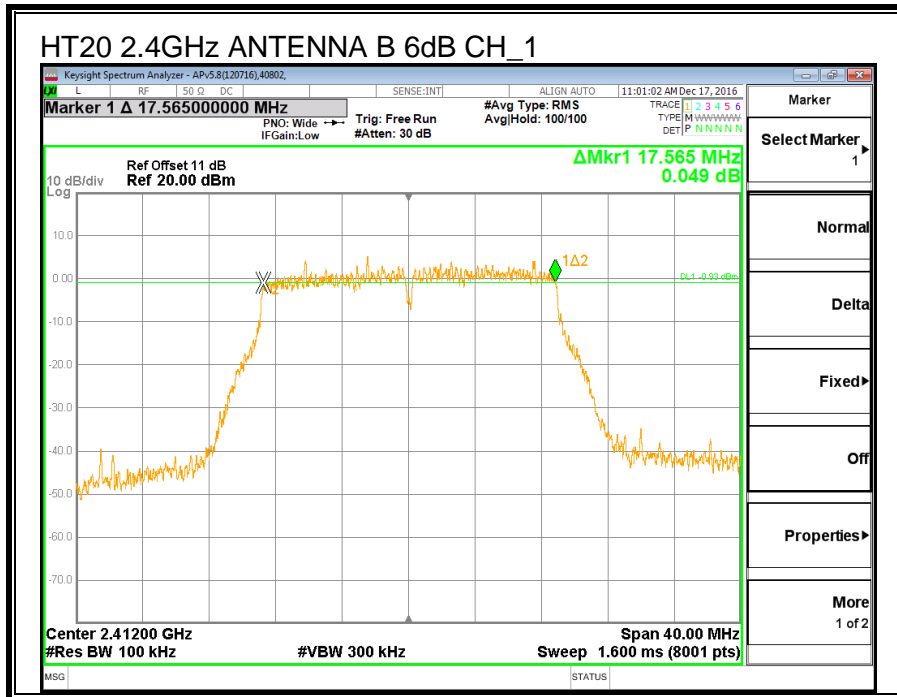
FCC §15.247 (a) (2)

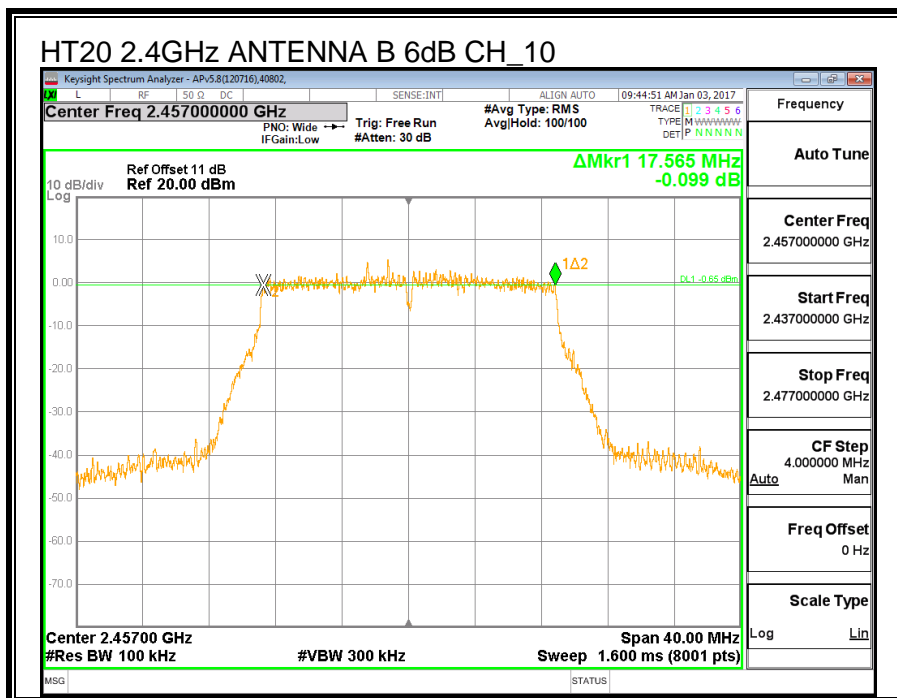
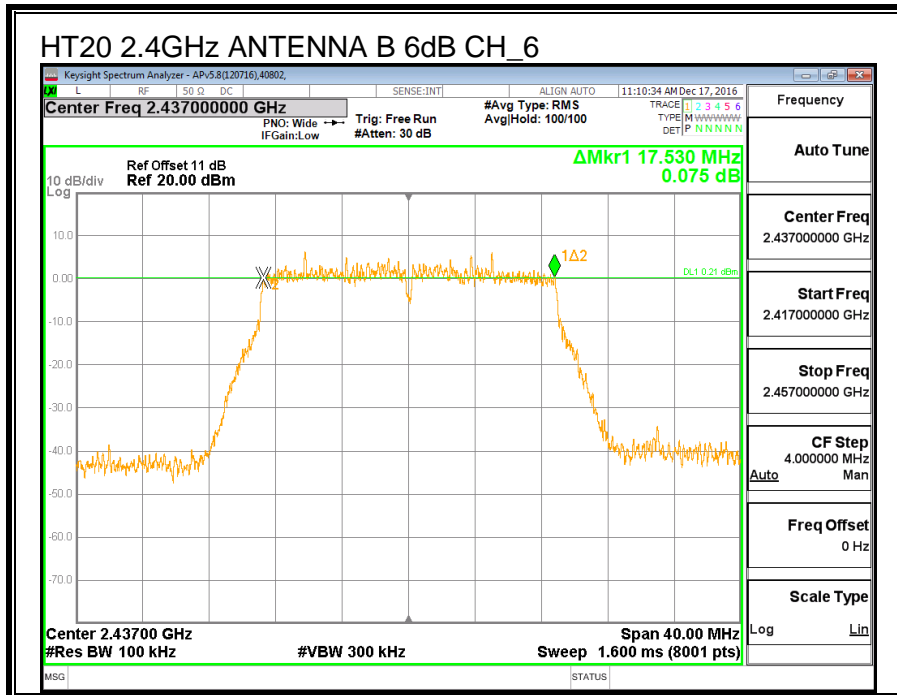
IC RSS-247 (5.2) (1)

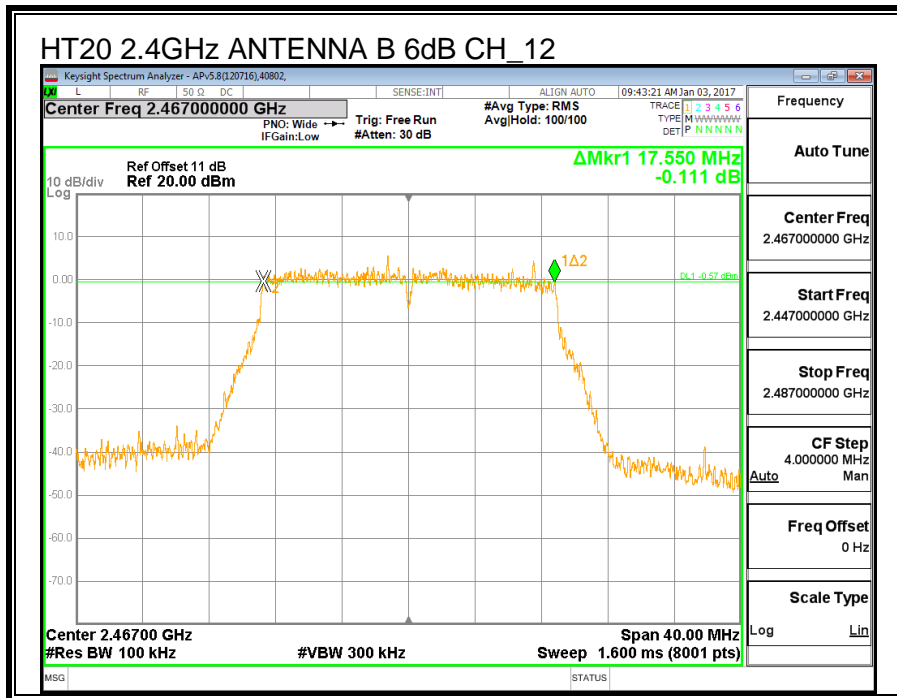
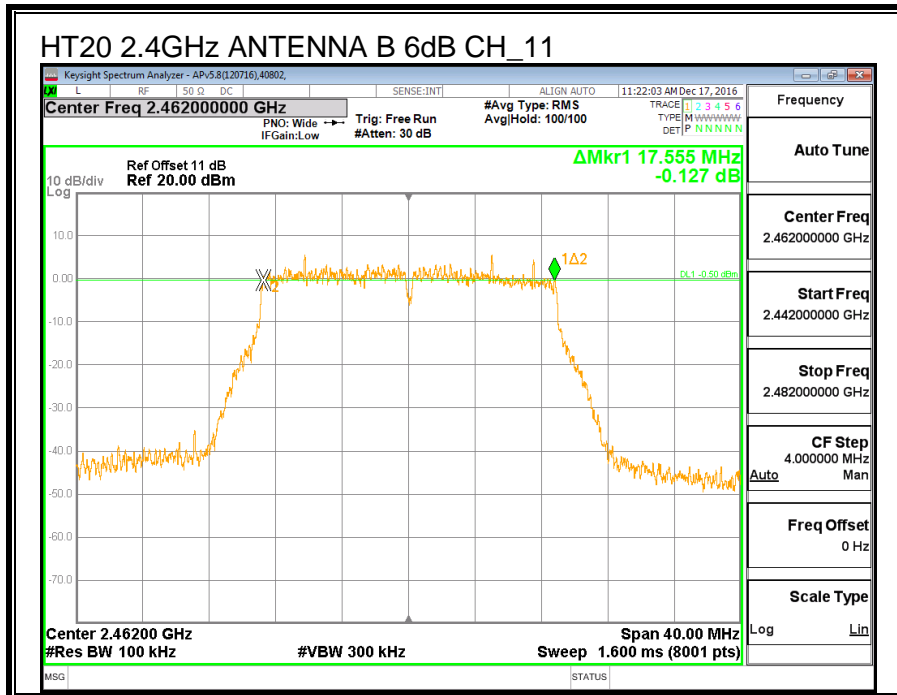
The minimum 6 dB bandwidth shall be at least 500 kHz.

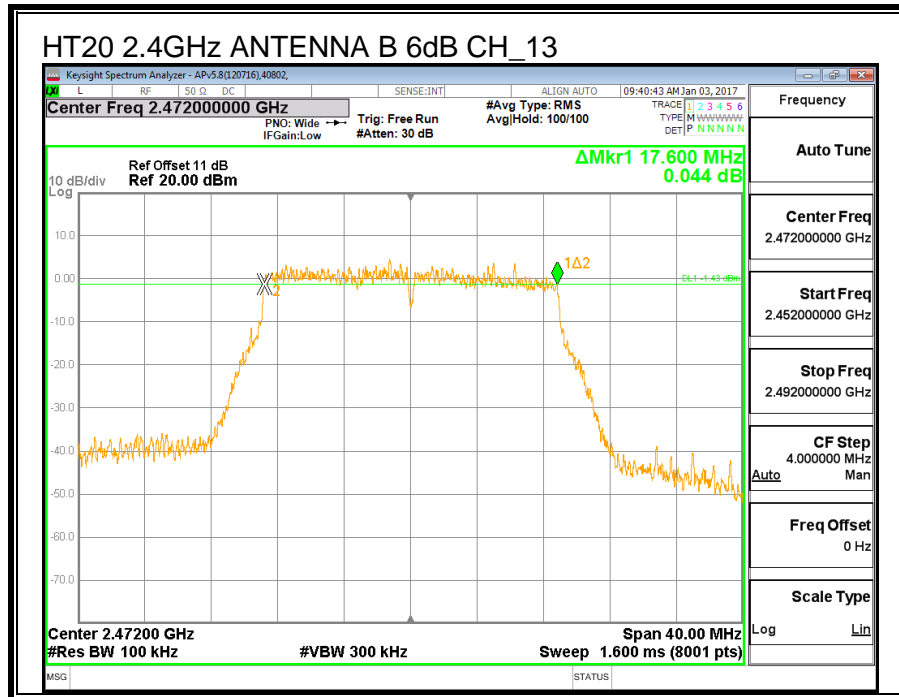
RESULTS

Channel	Frequency	6 dB BW ANTENNA B (MHz)	Minimum Limit (MHz)
Low_1	2412	17.565	0.5
Low_2	2417	17.575	0.5
Middle_6	2437	17.530	0.5
High_10	2457	17.565	0.5
High_11	2462	17.555	0.5
High_12	2467	17.550	0.5
High_13	2472	17.600	0.5









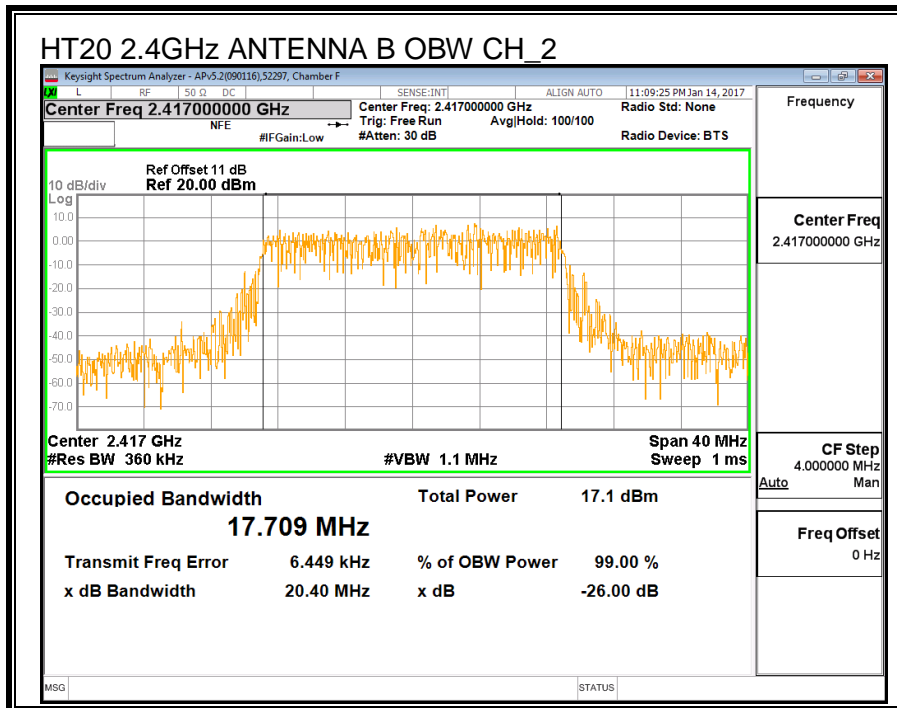
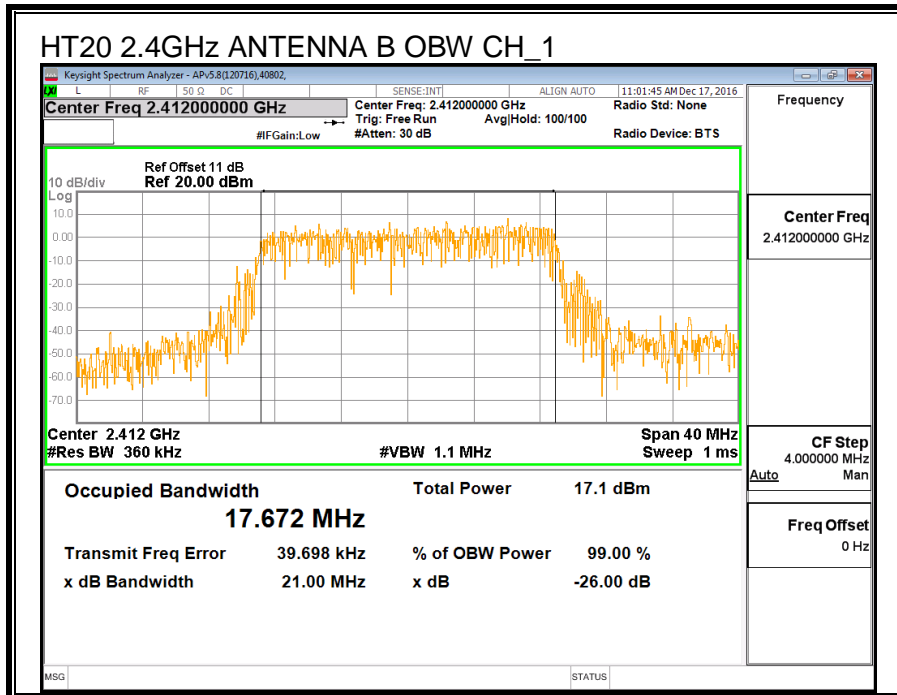
8.5.2. 99% BANDWIDTH

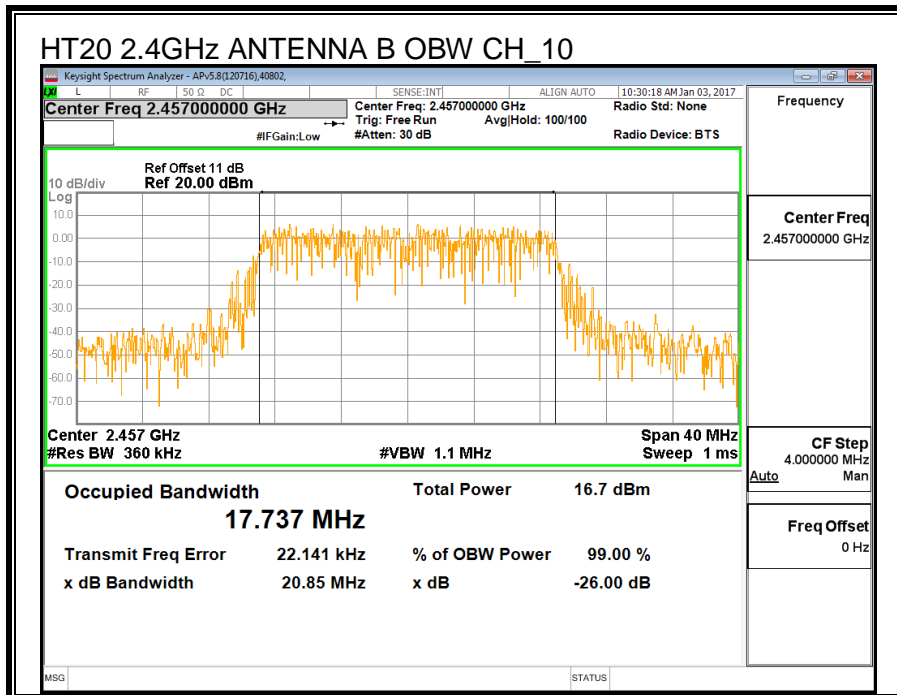
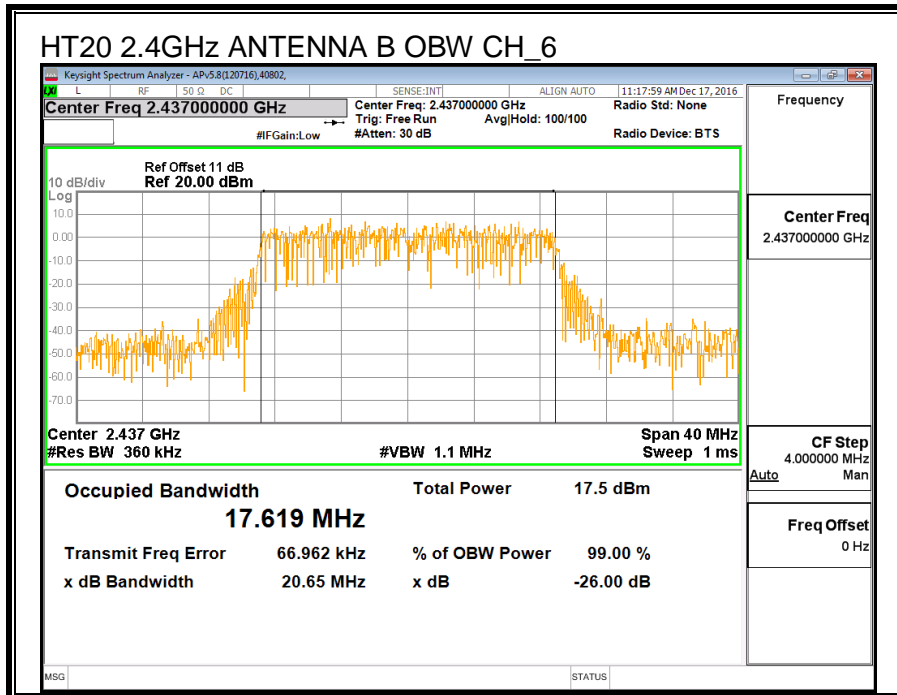
LIMITS

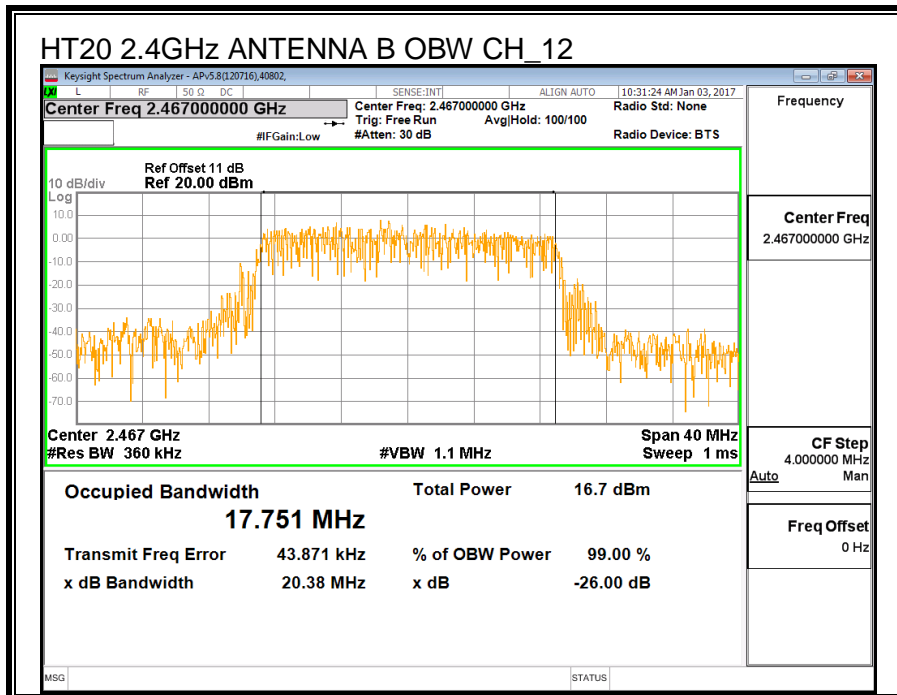
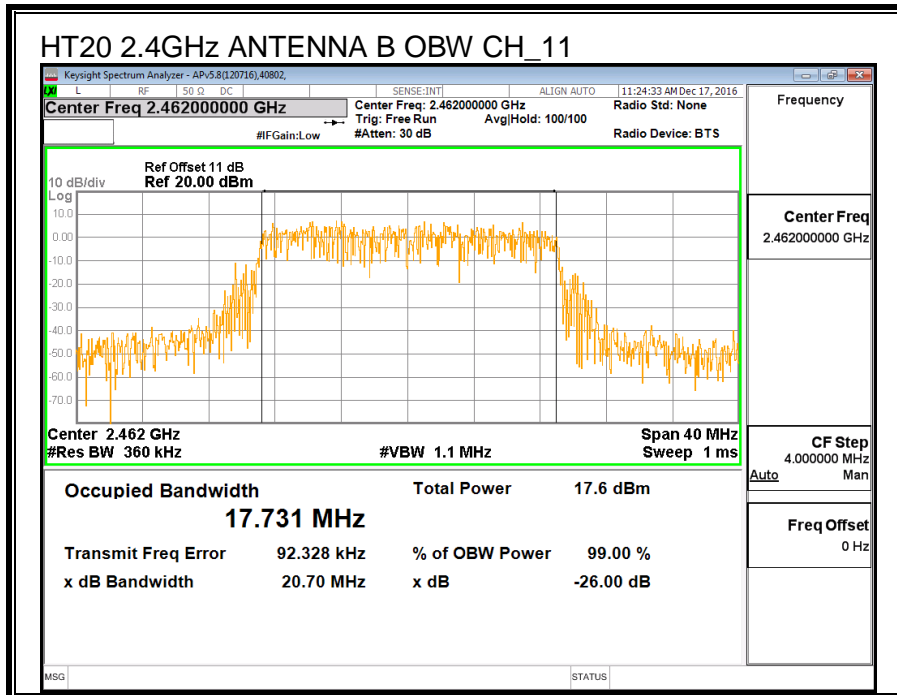
None; for reporting purposes only.

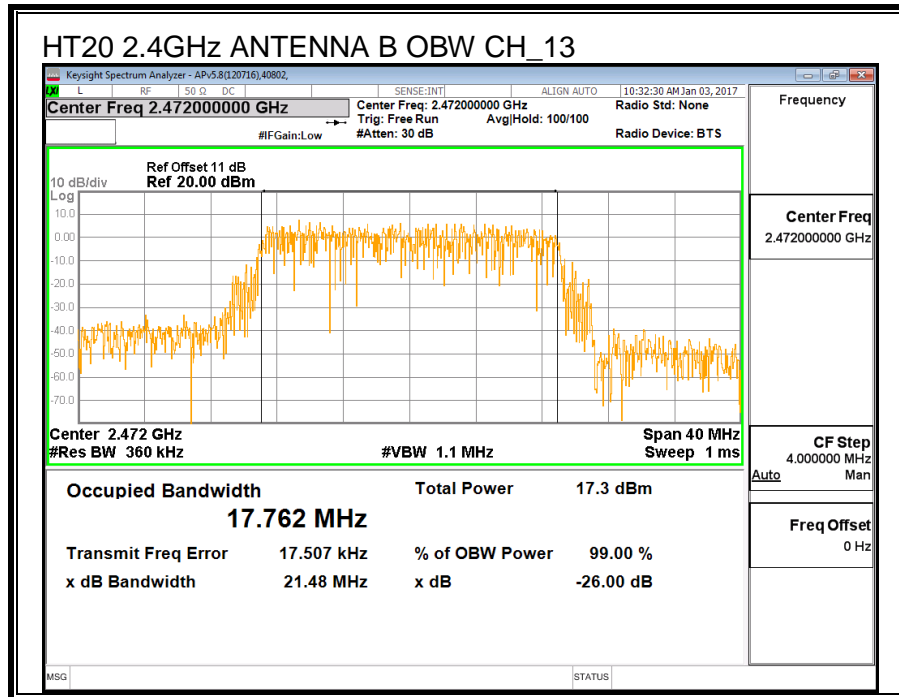
RESULTS

Channel	Frequency (MHz)	99% Bandwidth ANTENNA B (MHz)
Low_1	2412	17.672
Low_2	2417	17.709
Middle_6	2437	17.619
High_10	2457	17.737
High_11	2462	17.731
High_12	2467	17.751
High_13	2472	17.762









8.5.3. AVERAGE POWER

ID:	52291	Date:	1/20/16
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LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Power ANTENNA B (MHz)
Low_1	2412	13.82
Low_2	2417	18.72
Middle_6	2437	18.62
High_10	2457	17.89
High_11	2462	13.50
High_12	2467	11.18
High_13	2472	2.9

8.5.4. OUTPUT POWER

ID:	44353	Date:	1/31/17
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LIMITS

FCC §15.247(b) (3)

IC RSS-247 (5.4) (4)

For systems using digital modulation in the 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.

DIRECTIONAL ANTENNA GAIN

There is only one transmitter output therefore the directional gain is equal to the antenna gain.

RESULTS

	(MHz)	(dBi)	Limit (dBm)	Limit (dBm)	Limit (dBm)	(dBm)
Low_1	2412	-0.01	30.00	30	36	30.00
Low_2	2417	-0.01	30.00	30	36	30.00
Mid_6	2437	-0.01	30.00	30	36	30.00
High_10	2457	-0.01	30.00	30	36	30.00
High_11	2462	-0.01	30.00	30	36	30.00
High_12	2467	-0.01	30.00	30	36	30.00
High_13	2472	-0.01	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low_1	2412	23.95	23.95	30.00	-6.05
Low_2	2417	25.81	25.81	30.00	-4.19
Mid_6	2437	25.88	25.88	30.00	-4.12
High_10	2457	25.77	25.77	30.00	-4.23
High_11	2462	24.14	24.14	30.00	-5.86
High_12	2467	21.87	21.87	30.00	-8.13
High_13	2472	10.56	10.56	30.00	-19.44

8.5.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 (5.2) (2)

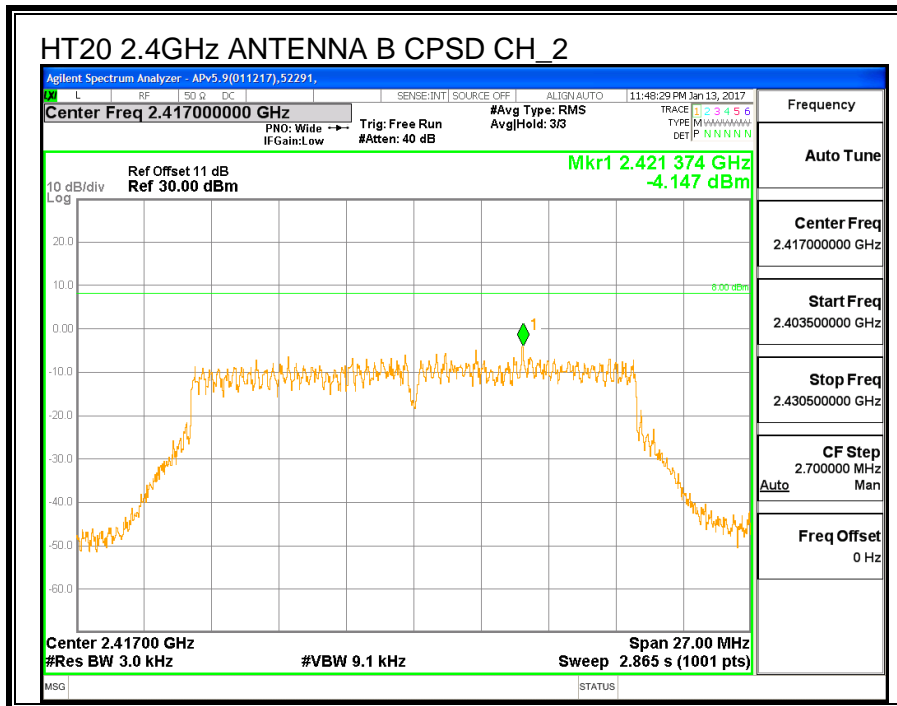
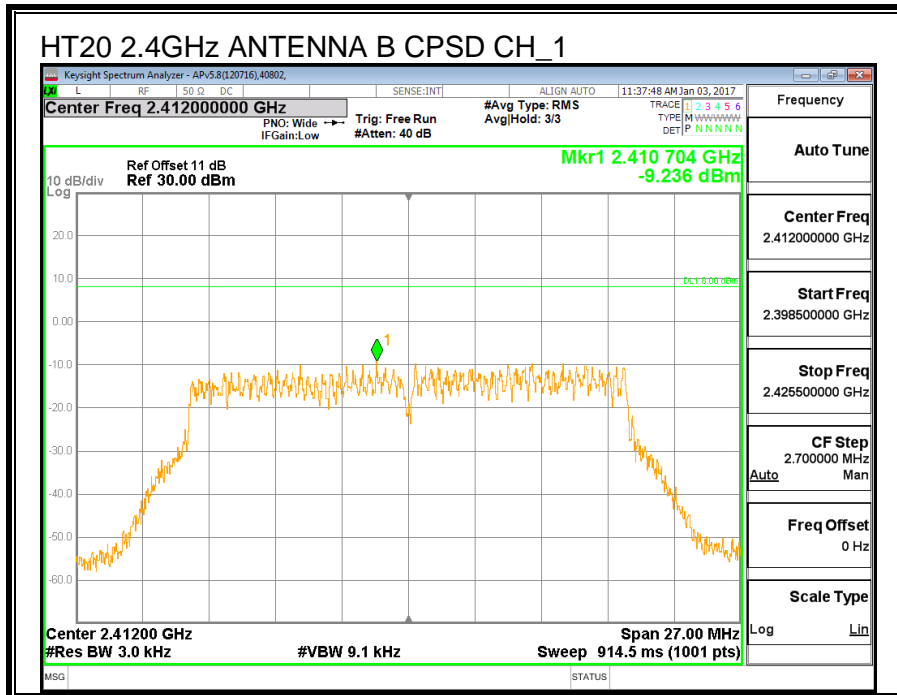
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

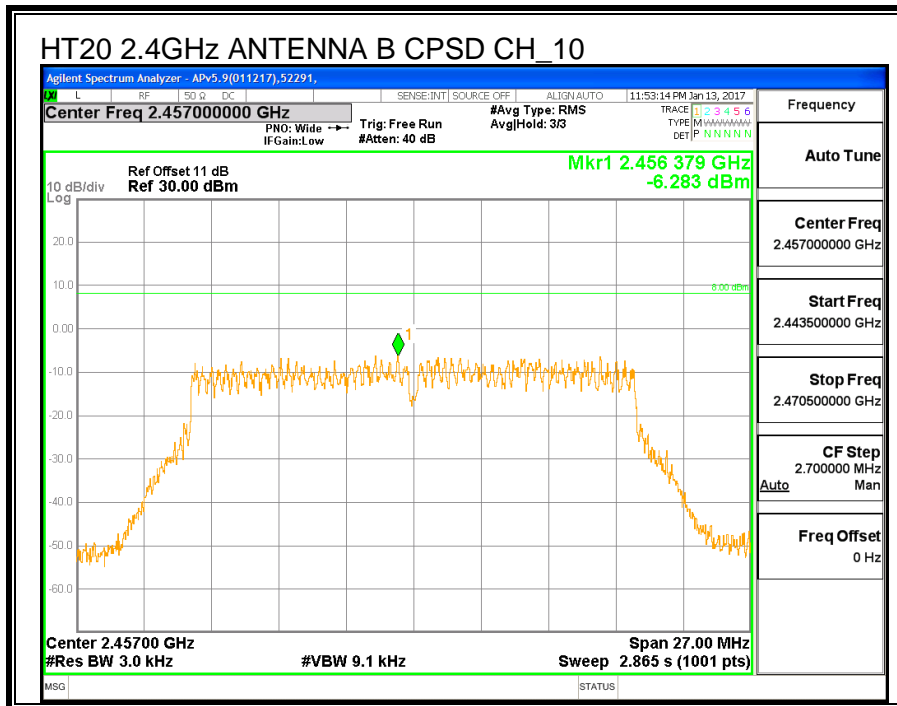
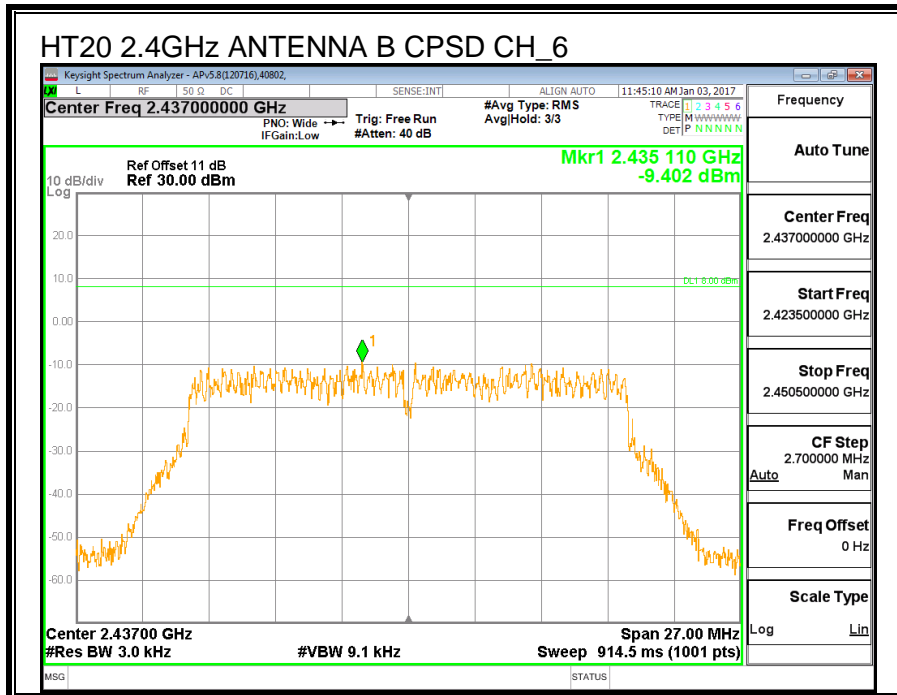
RESULTS

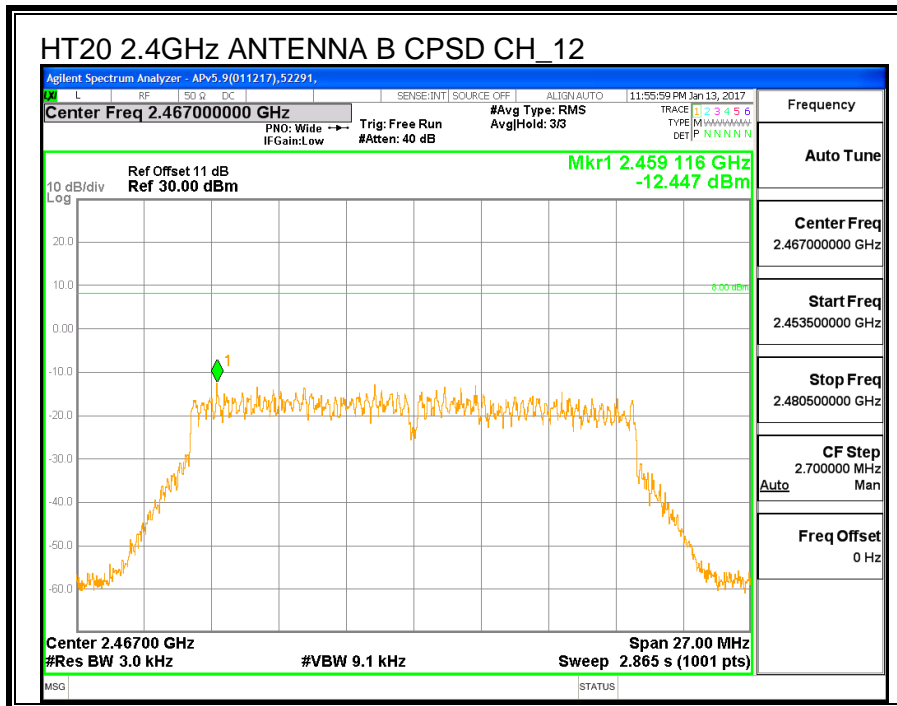
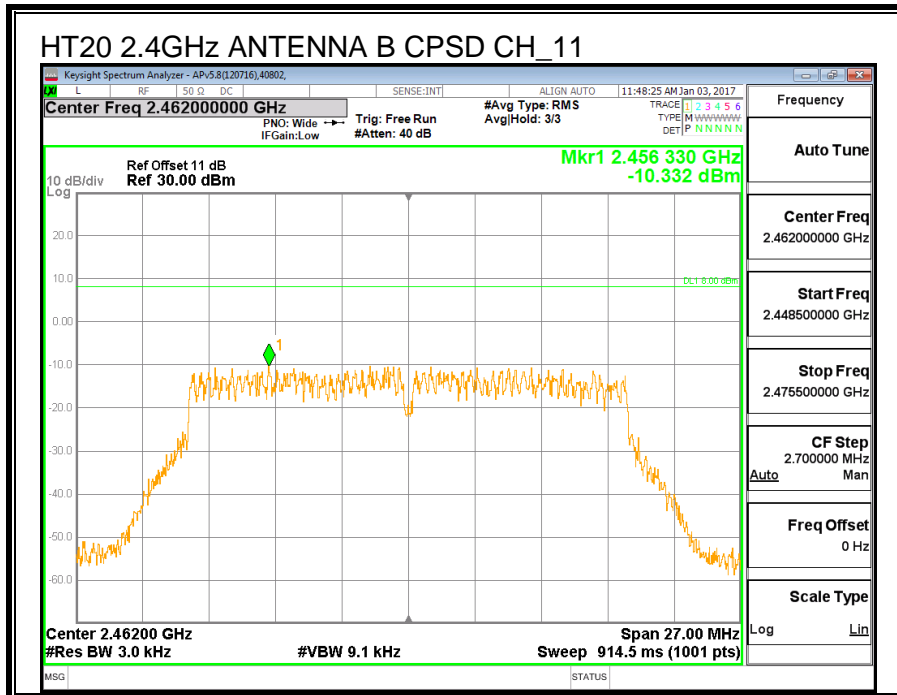
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD
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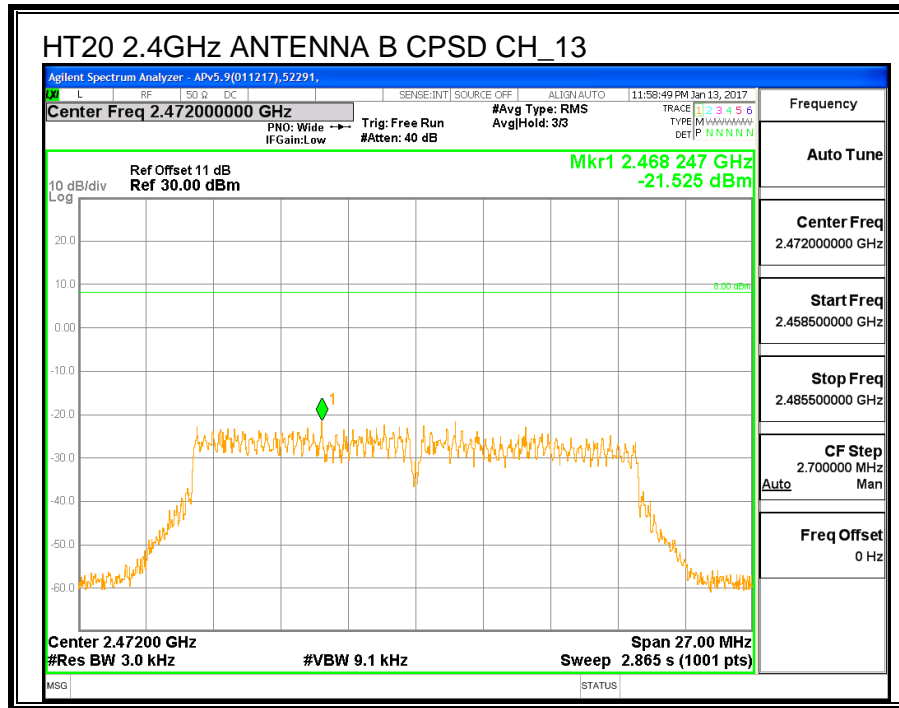
PSD Results

Channel	Frequency (MHz)	Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low_1	2412	-9.236	-9.236	8.0	-17.2
Low_2	2417	-4.147	-4.147	8.0	-12.1
Mid	2437	-9.402	-9.402	8.0	-17.4
High_10	2457	-6.283	-6.283	8.0	-14.3
High_11	2462	-10.332	-10.332	8.0	-18.3
High_12	2467	-12.447	-12.447	8.0	-20.4
High_13	2472	-21.525	-21.525	8.0	-29.5









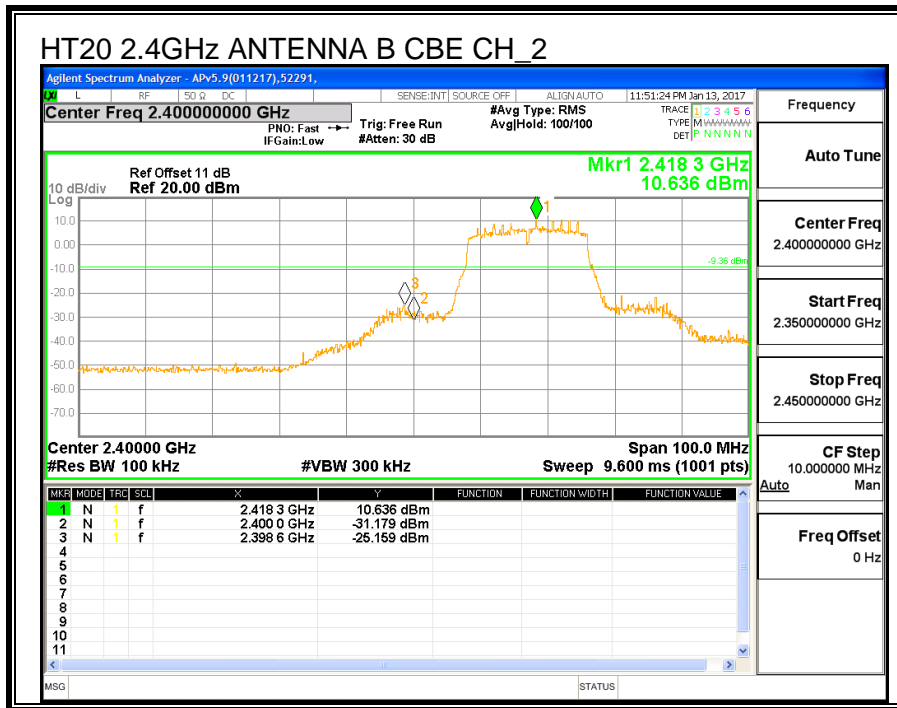
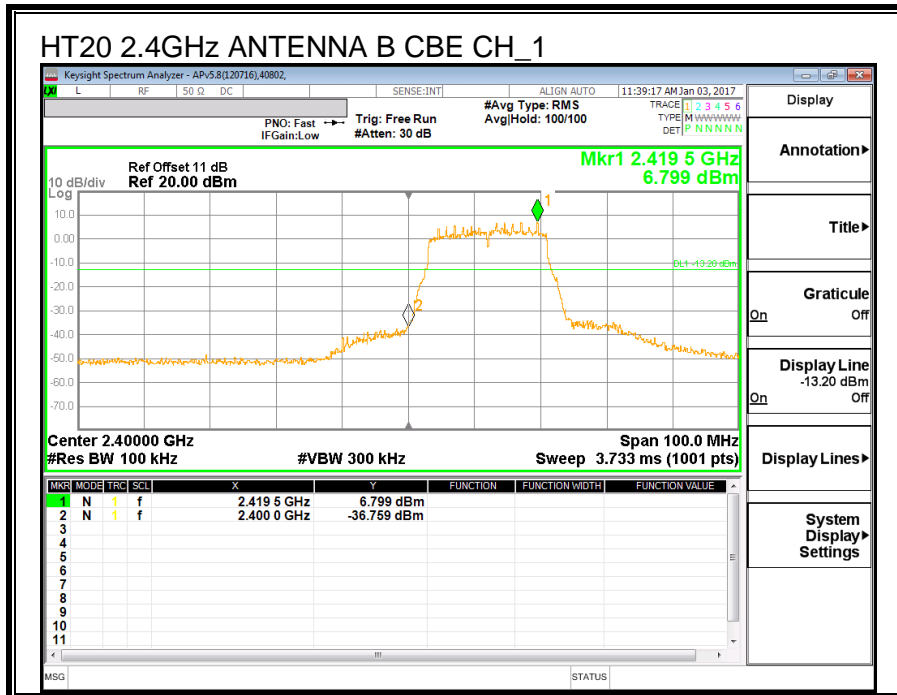
8.5.6. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

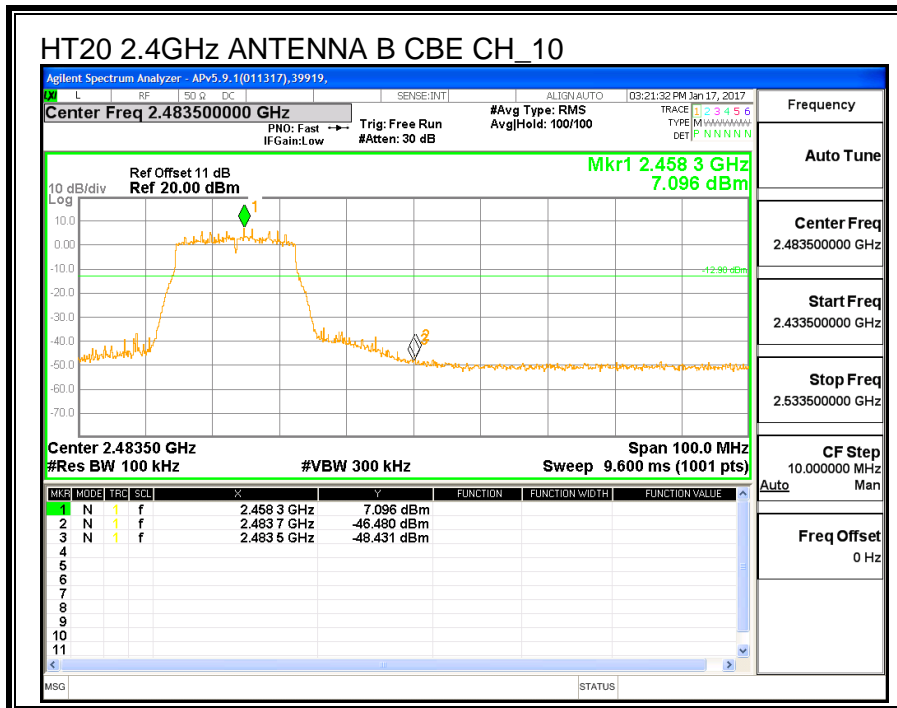
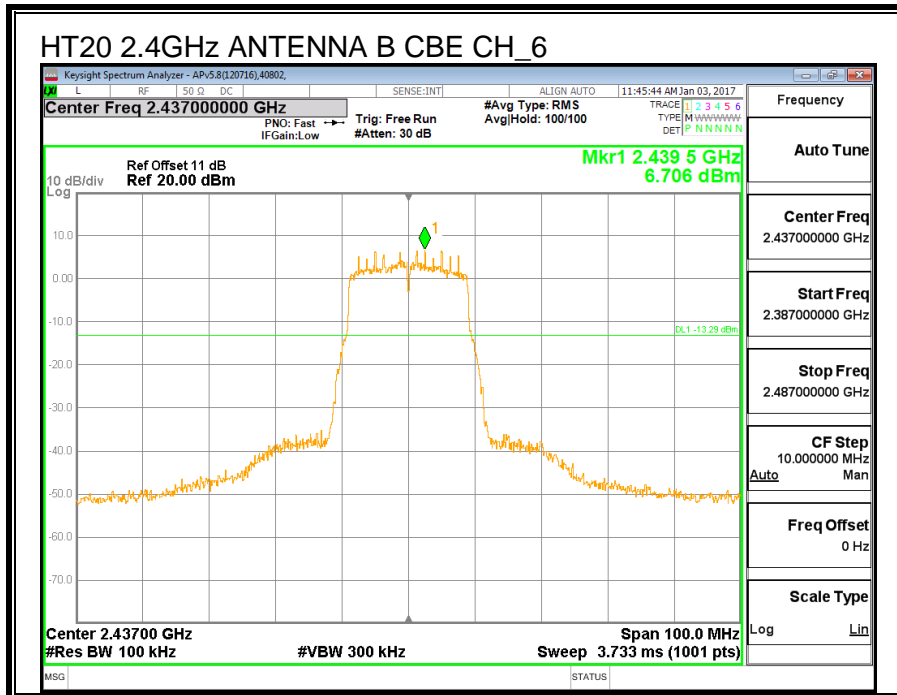
LIMITS

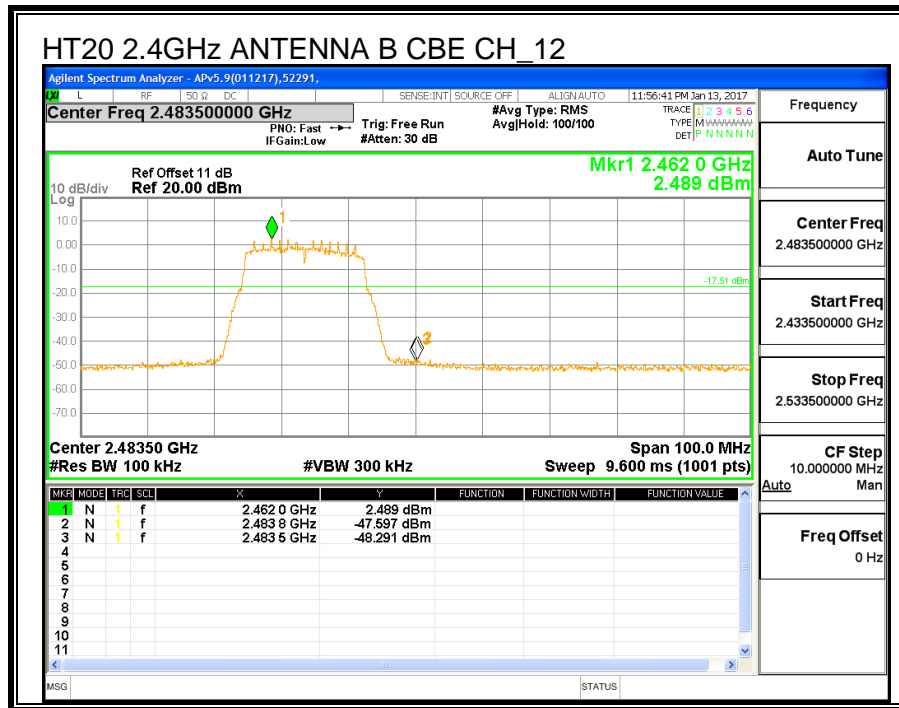
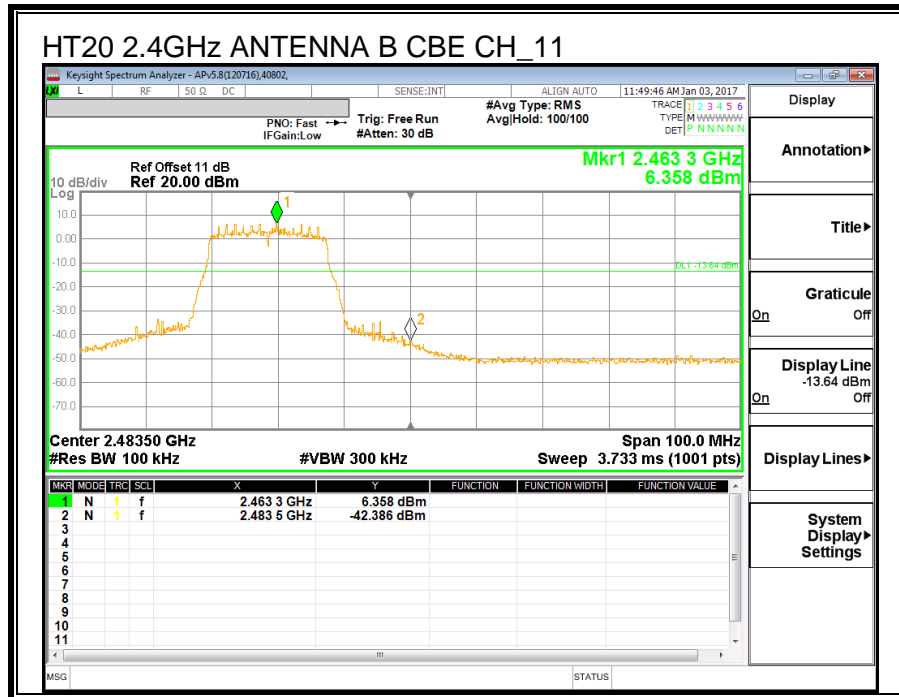
FCC §15.247 (d)

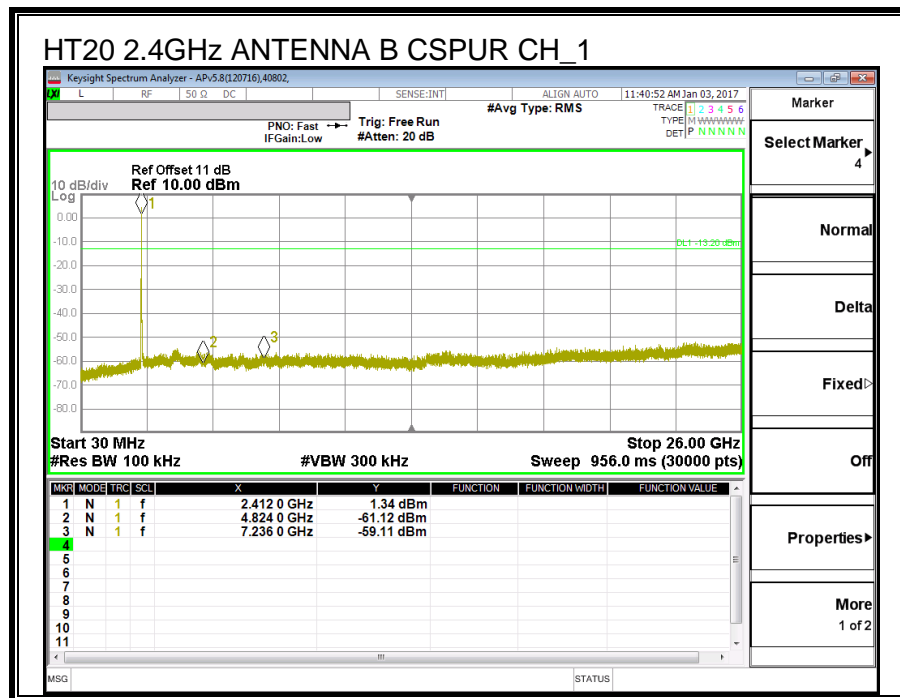
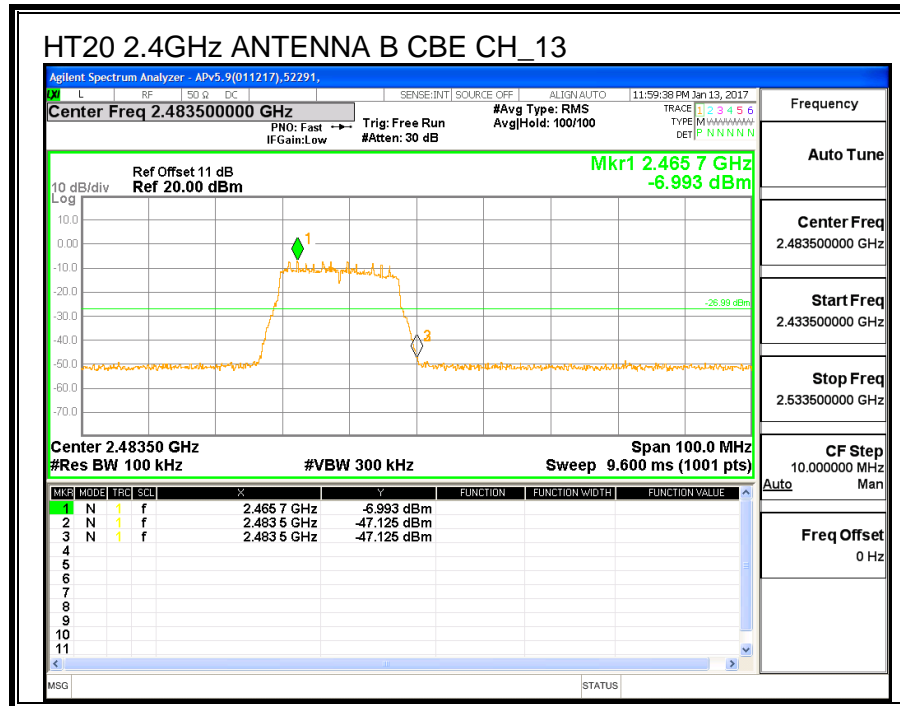
IC RSS-247 (5.5)

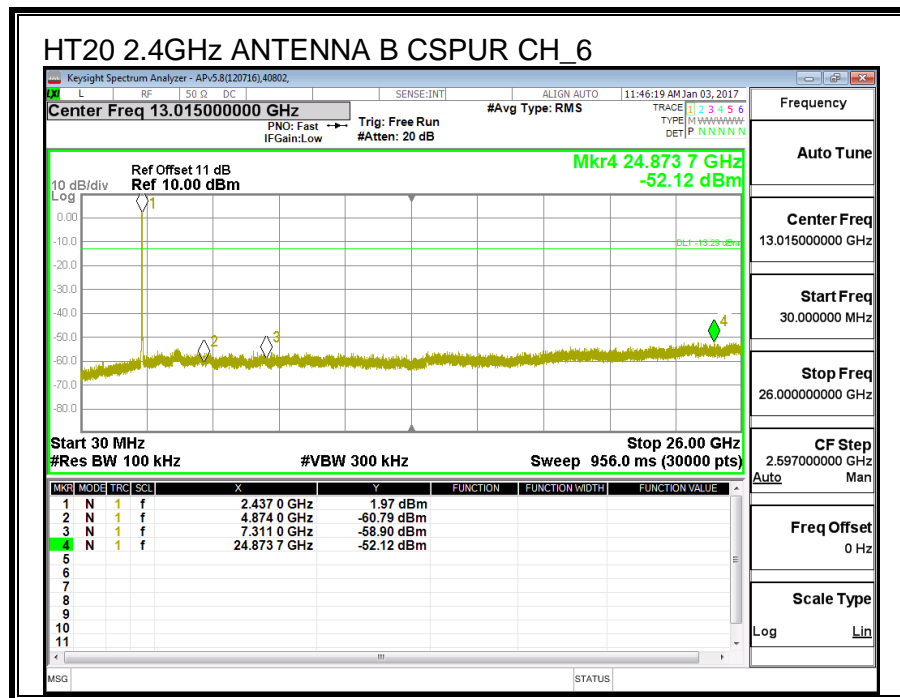
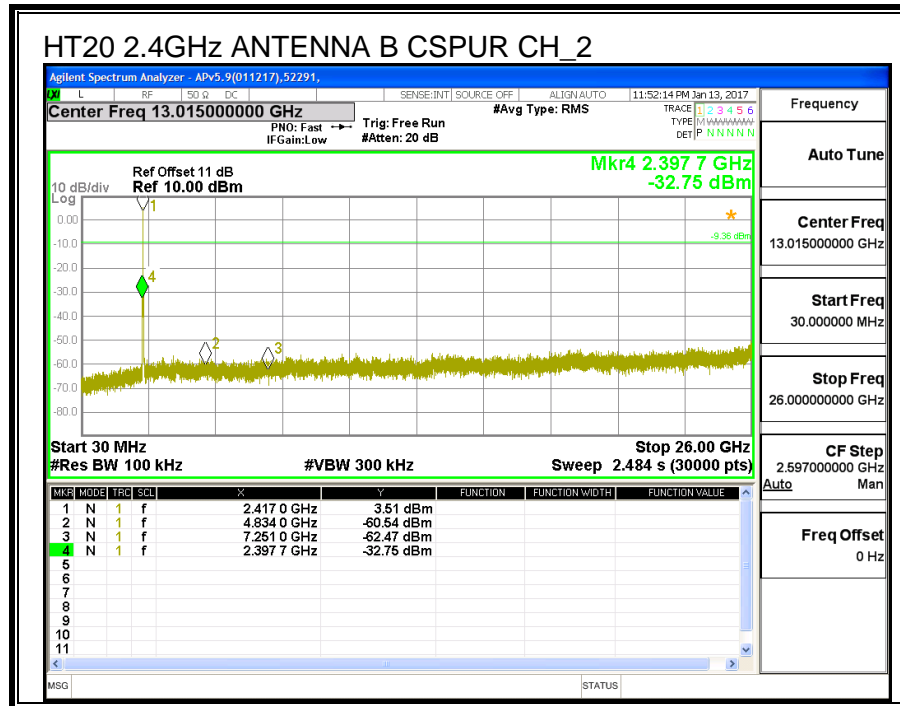
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

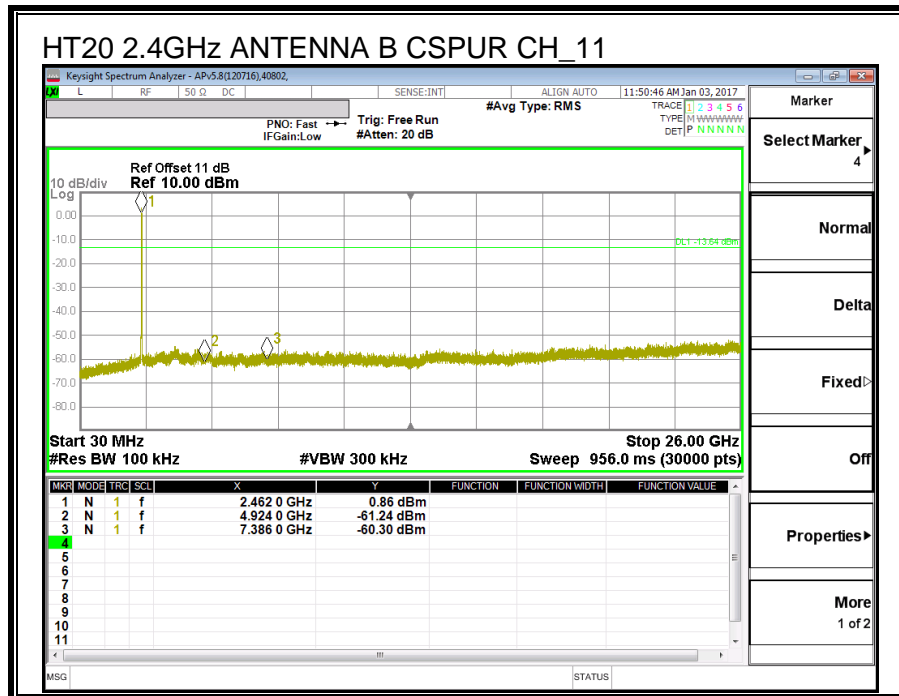
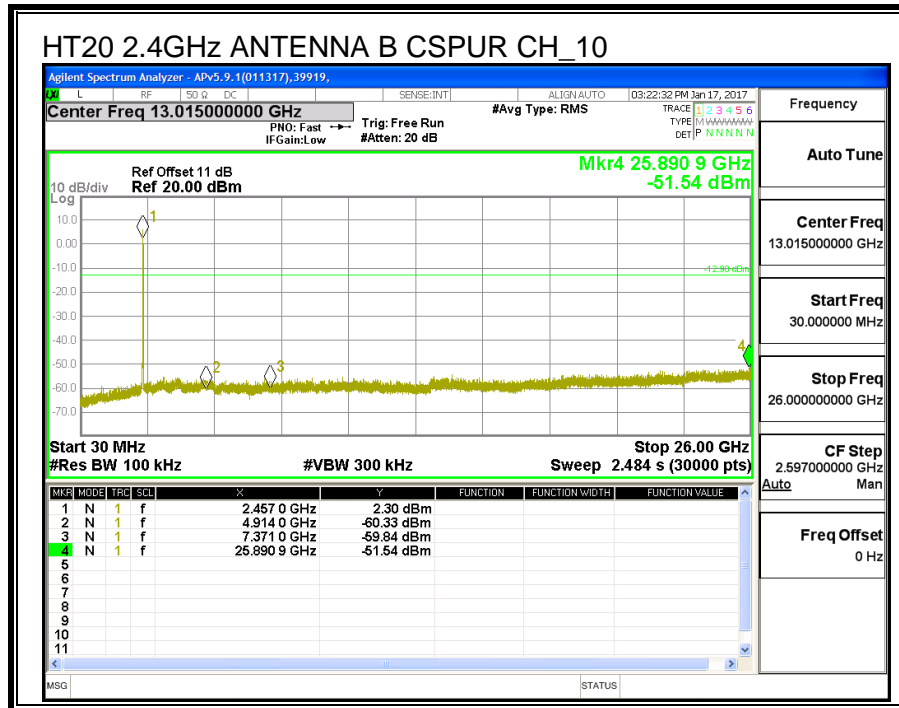


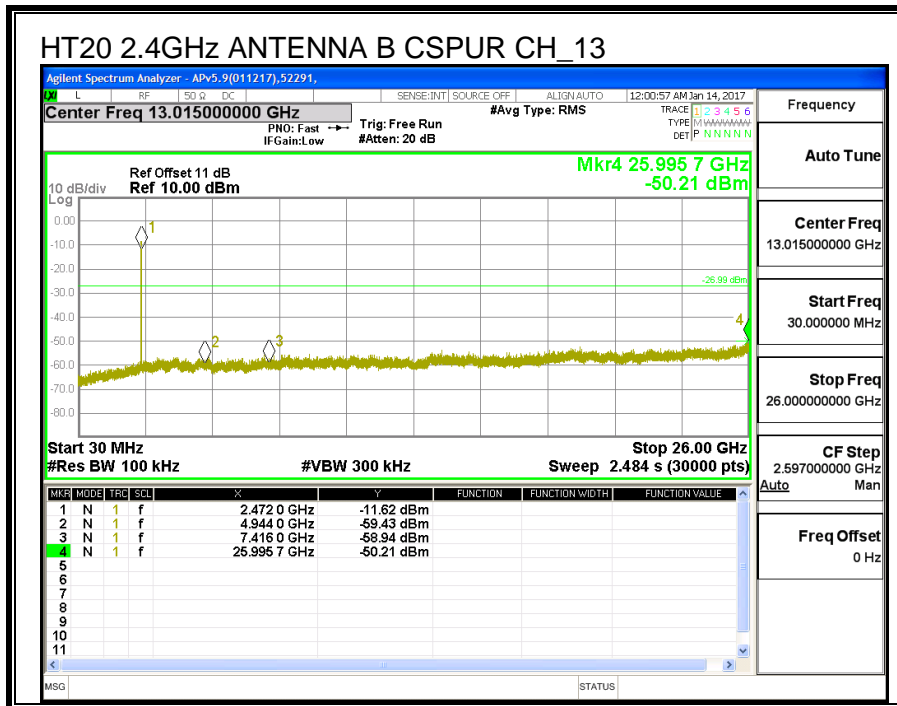
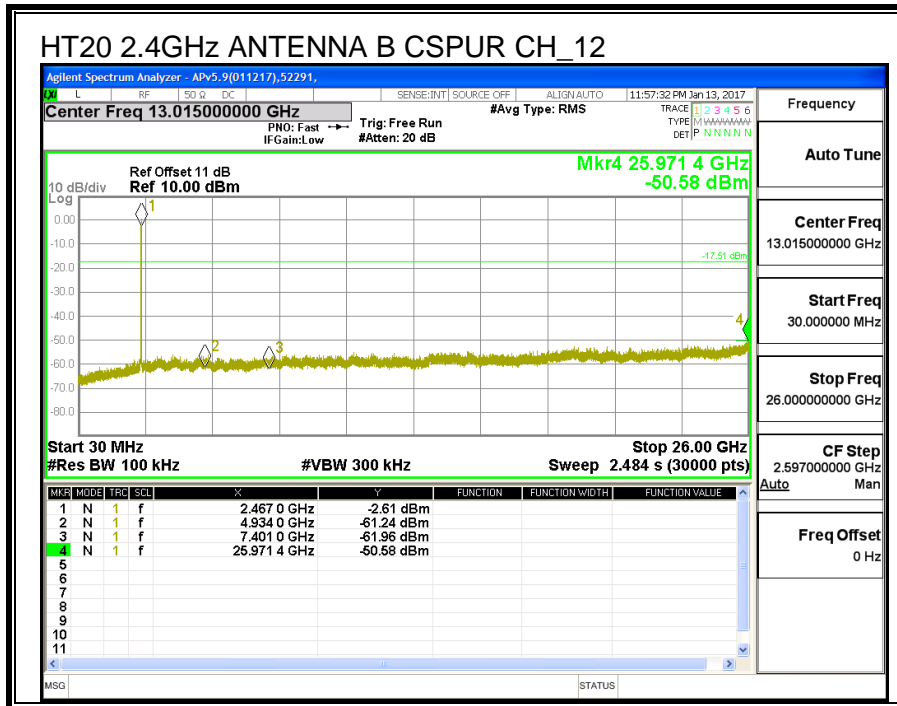












8.6. 11n HT20 2TX CDD MIMO MODE IN THE 2.4GHz BAND

8.6.1. 6 dB BANDWIDTH

LIMITS

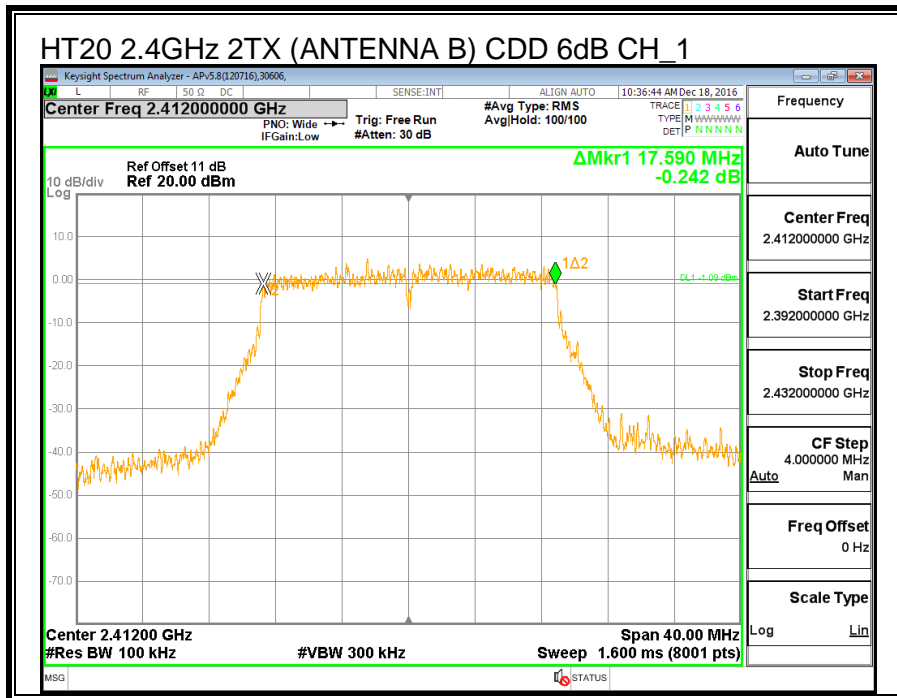
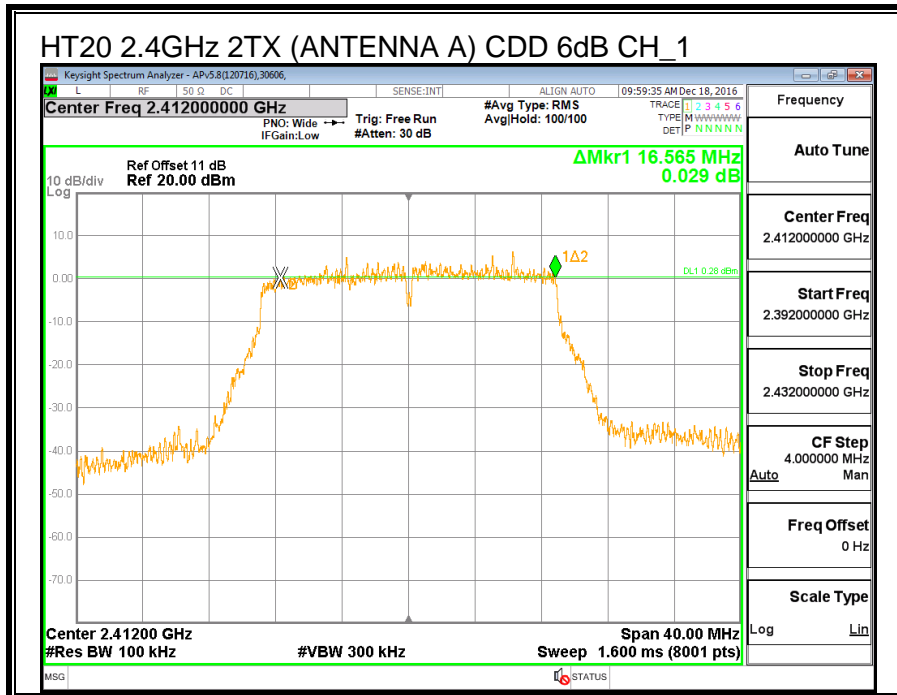
FCC §15.247 (a) (2)

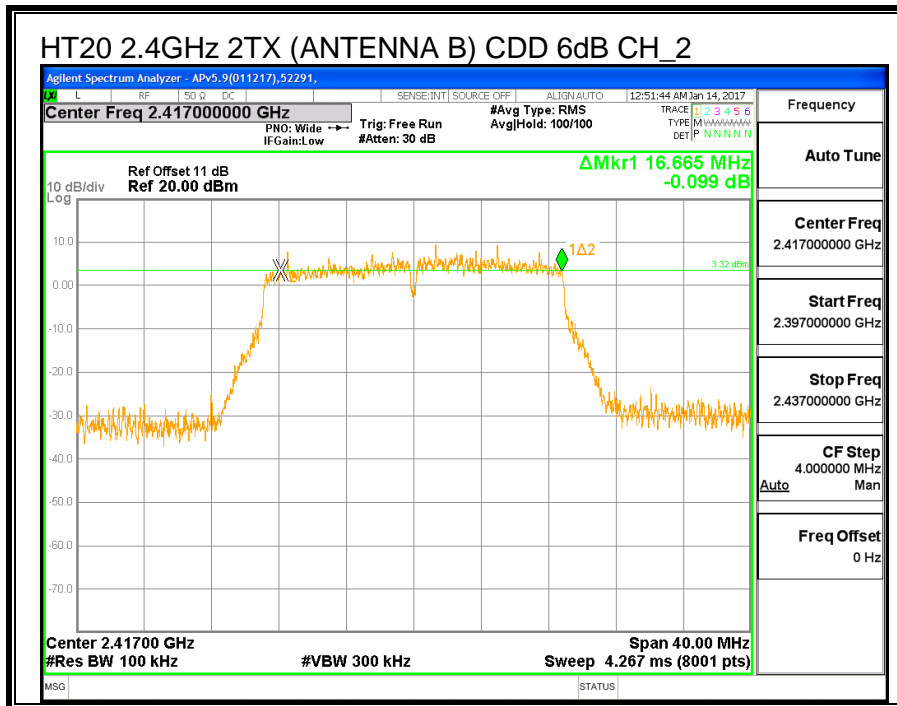
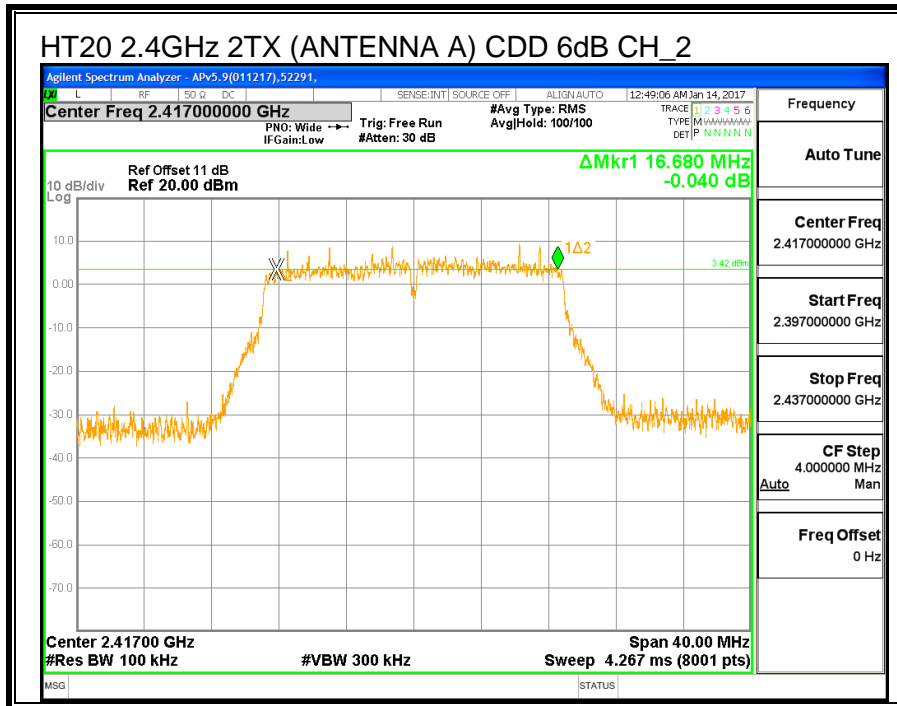
IC RSS-247 (5.2) (1)

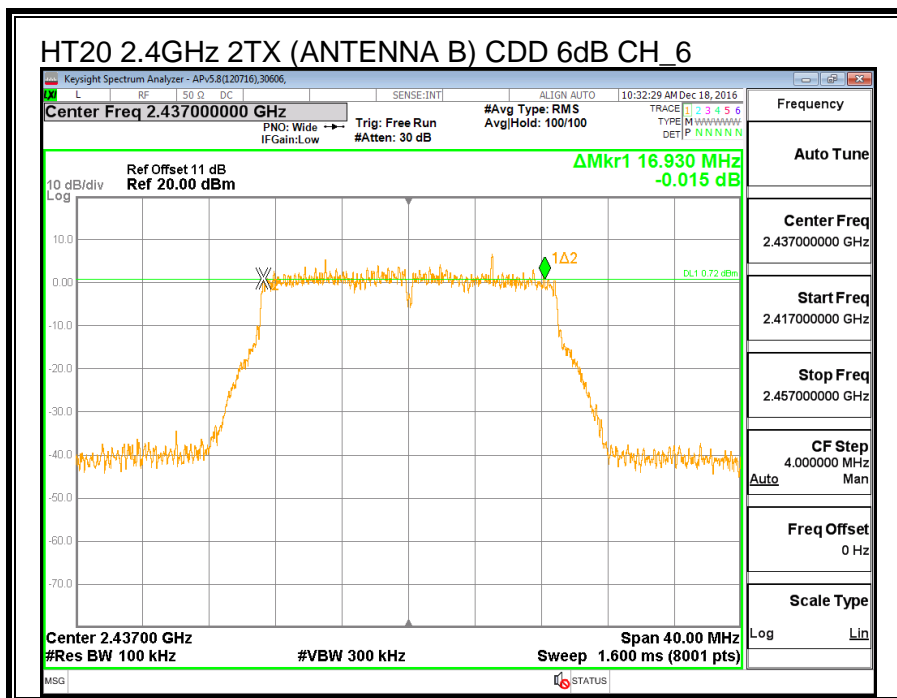
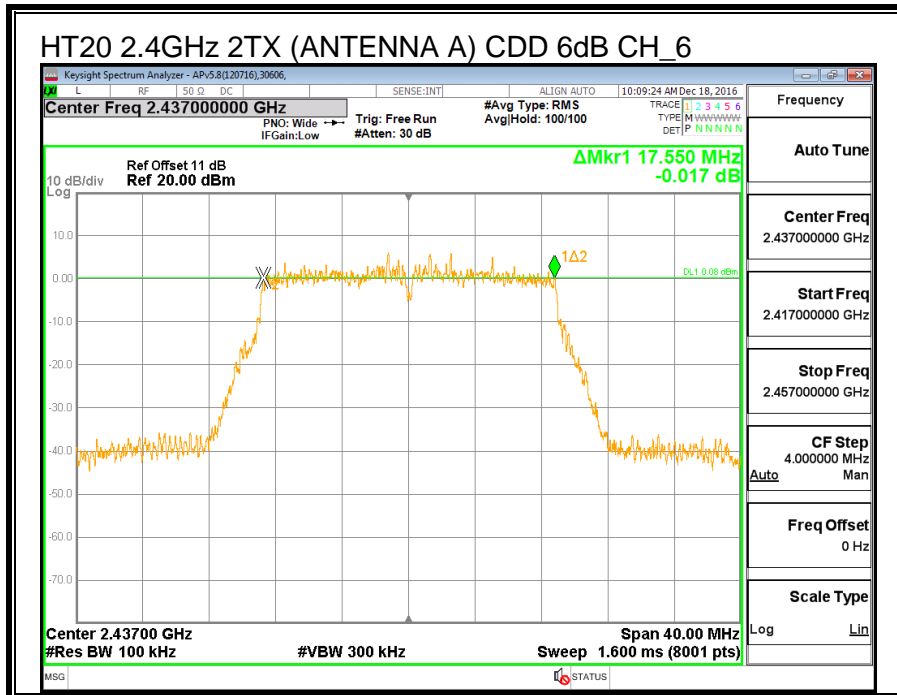
The minimum 6 dB bandwidth shall be at least 500 kHz.

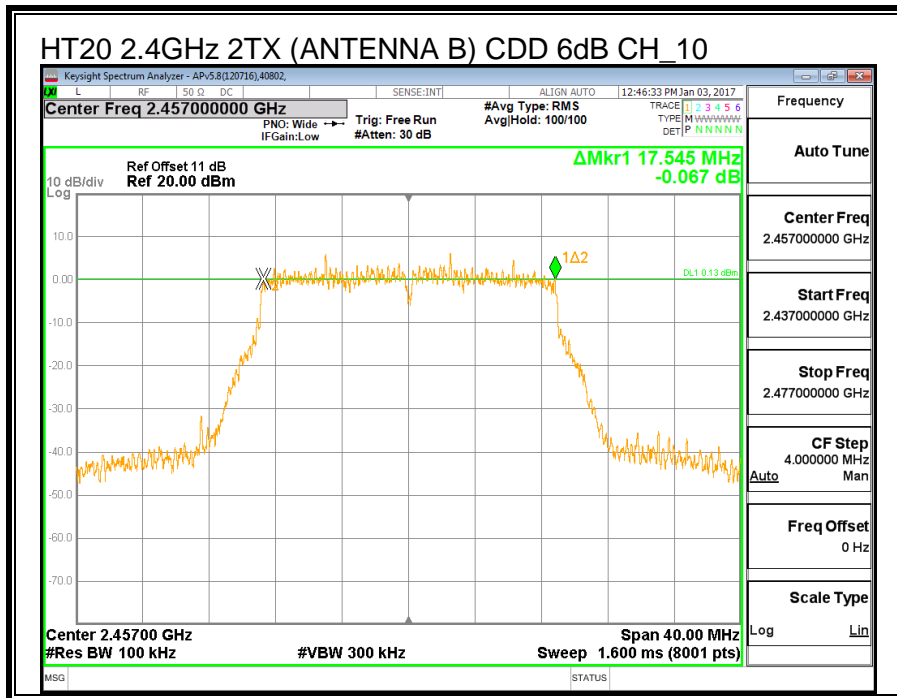
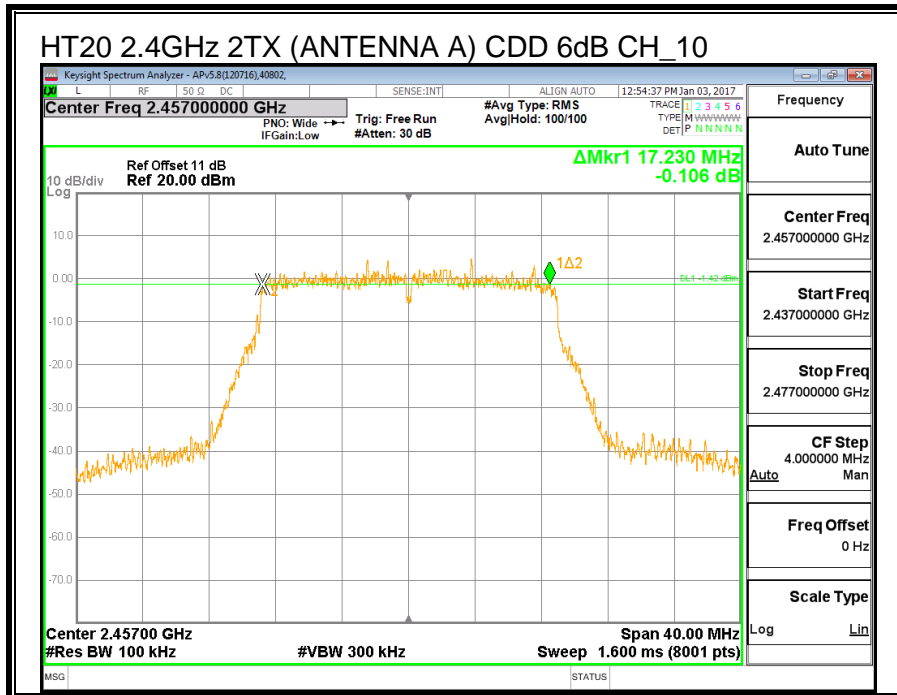
RESULTS

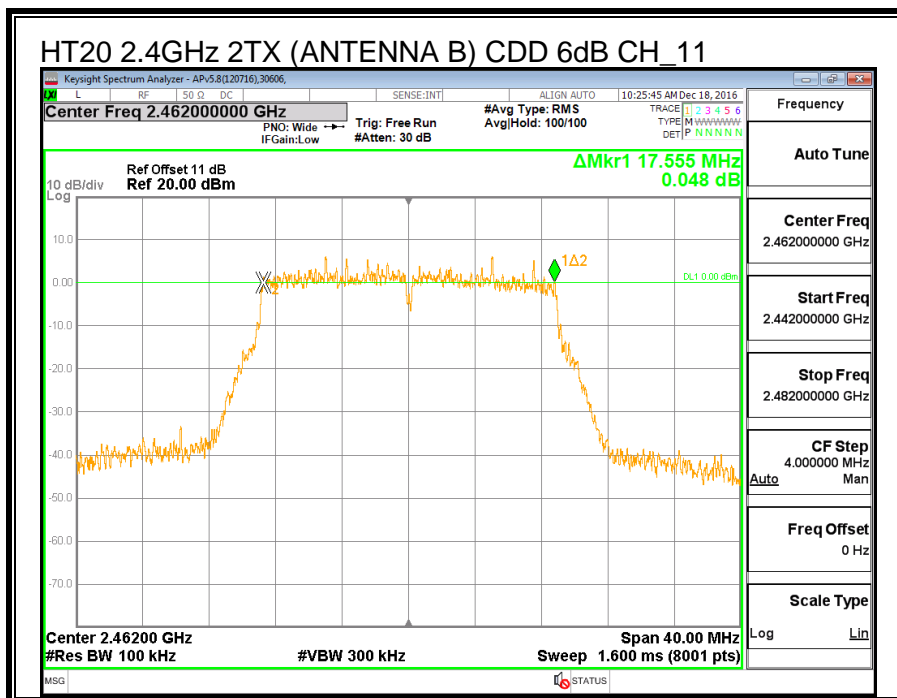
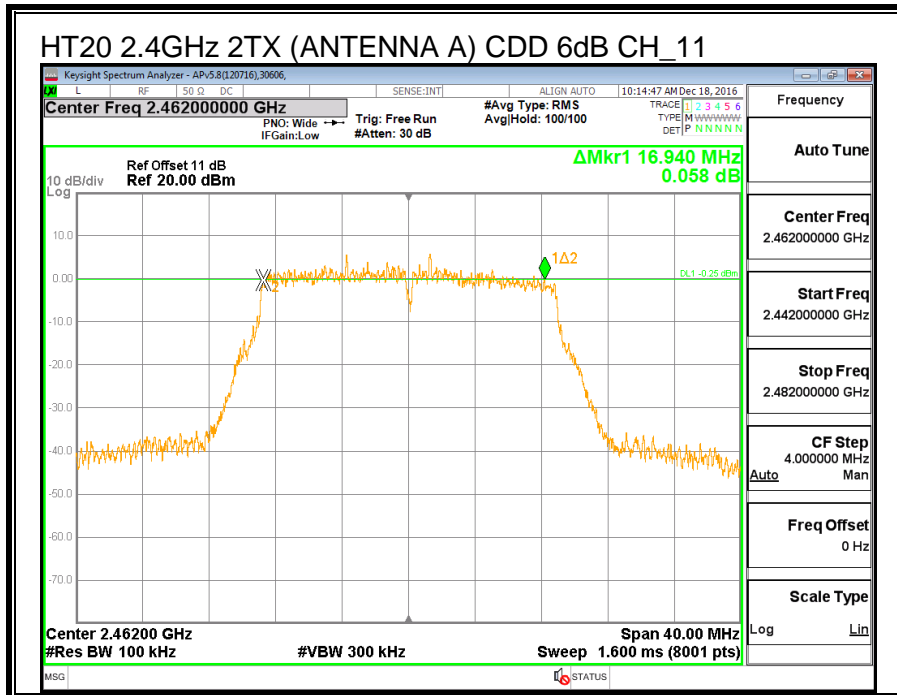
Channel	Frequency	6 dB BW ANTENNA A (MHz)	6 dB BW ANTENNA B (MHz)	Minimum Limit (MHz)
Low_1	2412	16.565	17.590	0.5
Low_2	2417	16.680	16.665	0.5
Middle_6	2437	17.550	16.930	0.5
High_10	2457	17.230	17.545	0.5
High_11	2462	16.940	17.555	0.5
High_12	2467	17.655	17.575	0.5
High_13	2472	17.295	17.560	0.5

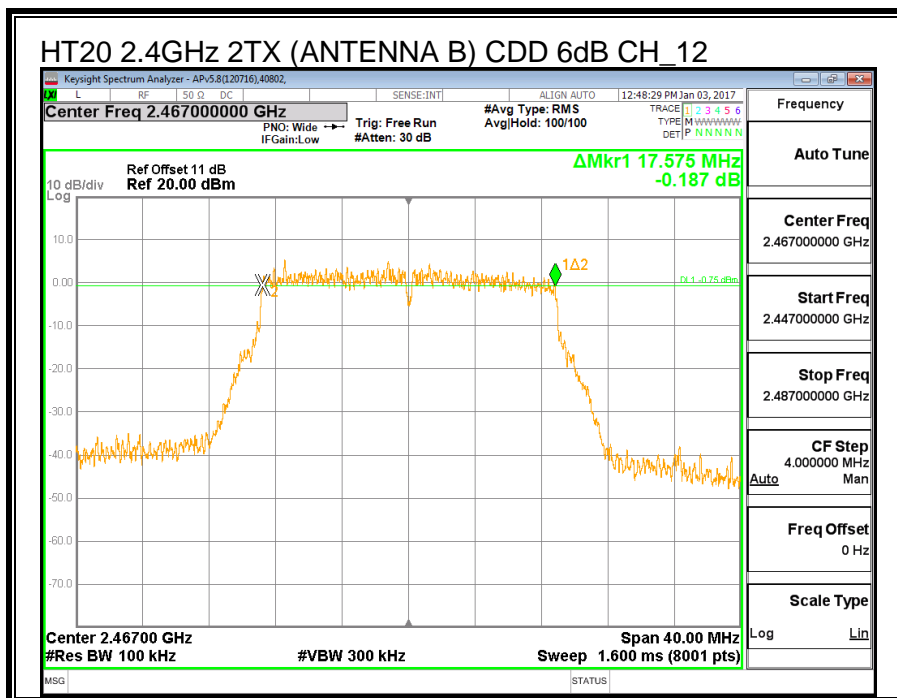
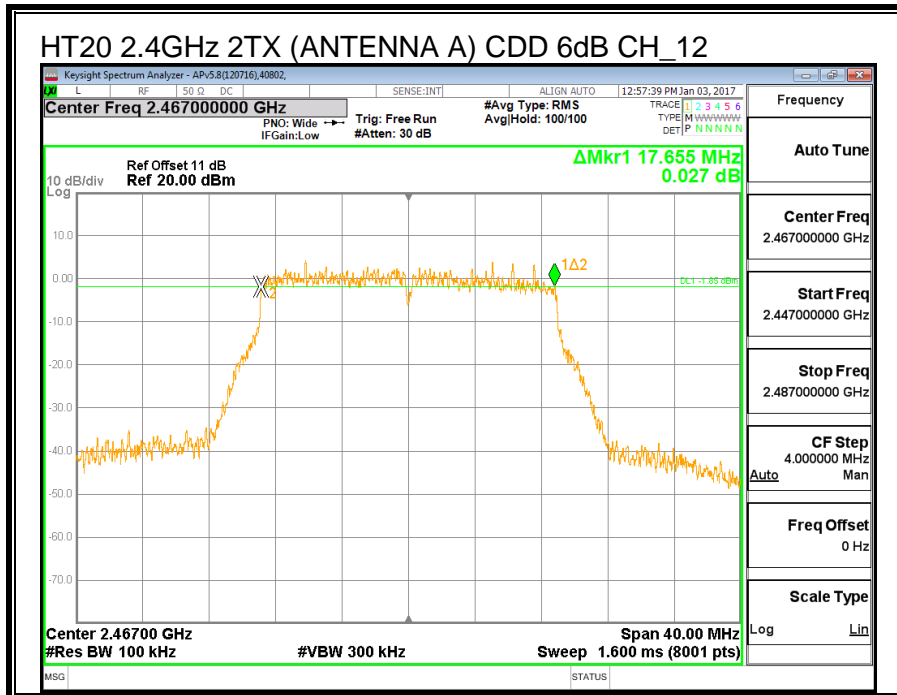


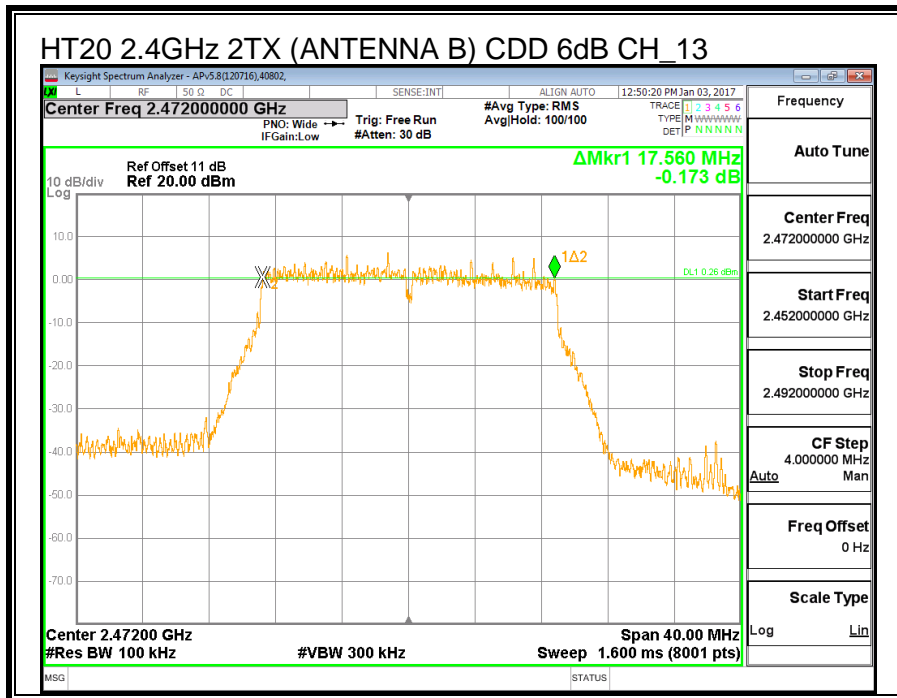
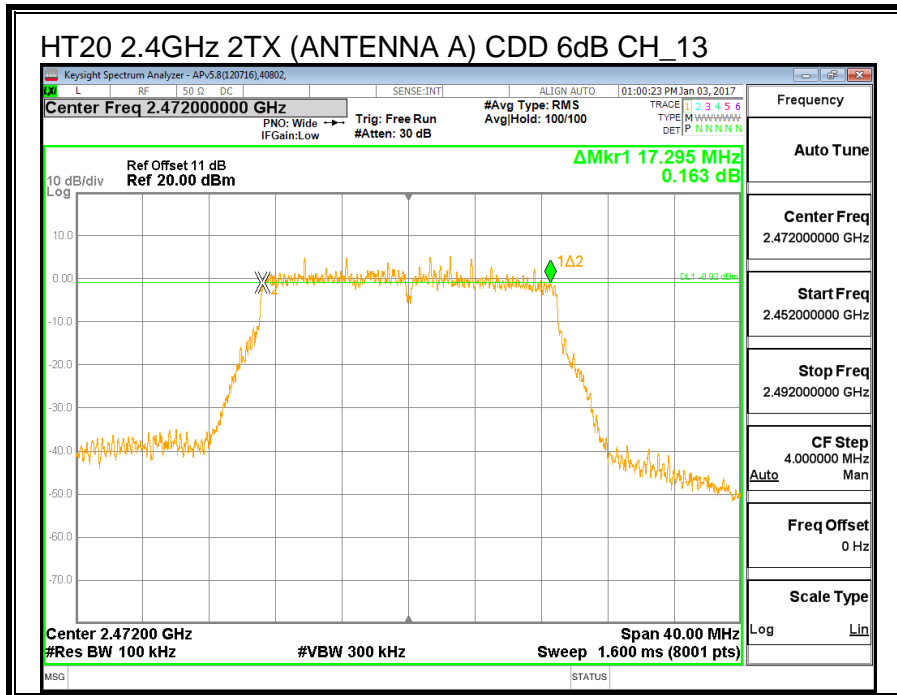












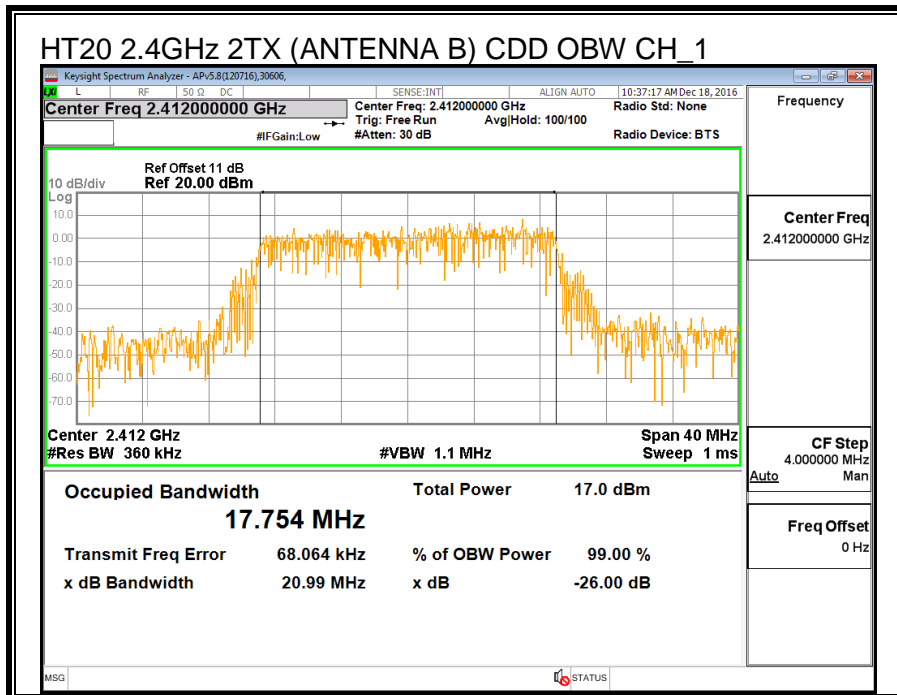
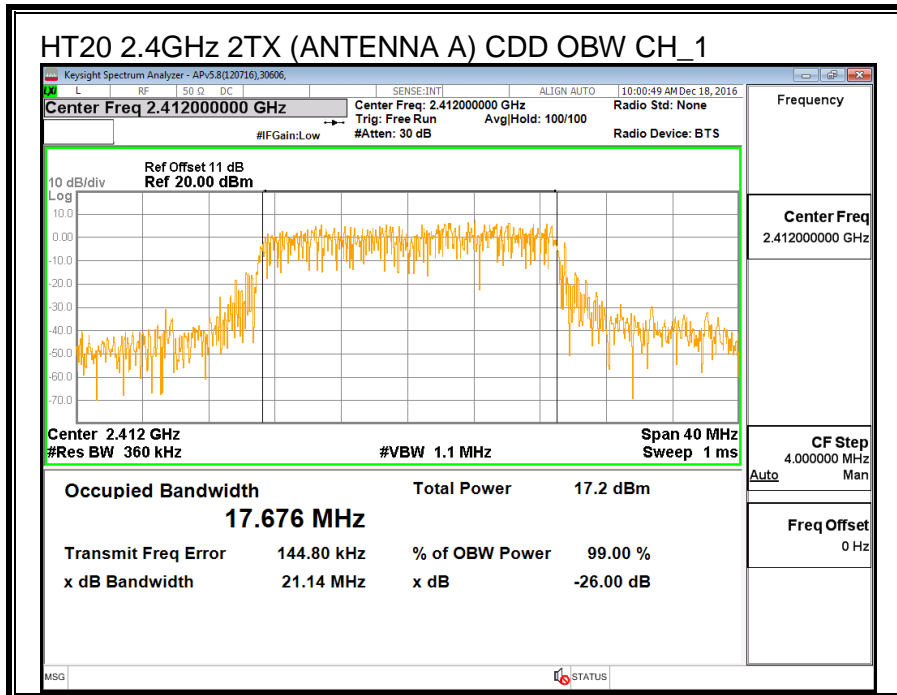
8.6.2. 99% BANDWIDTH

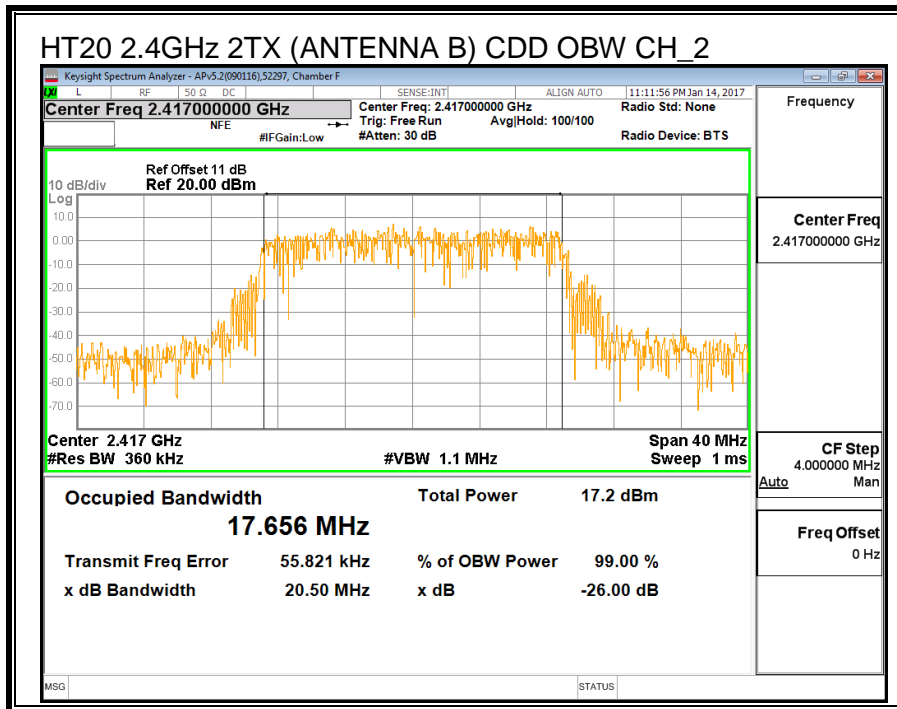
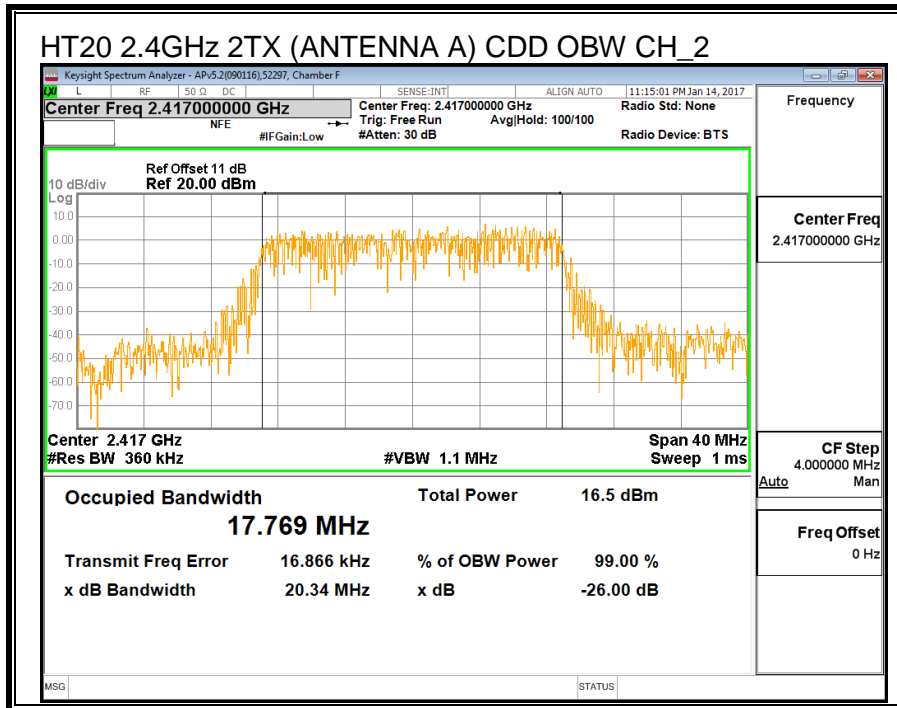
LIMITS

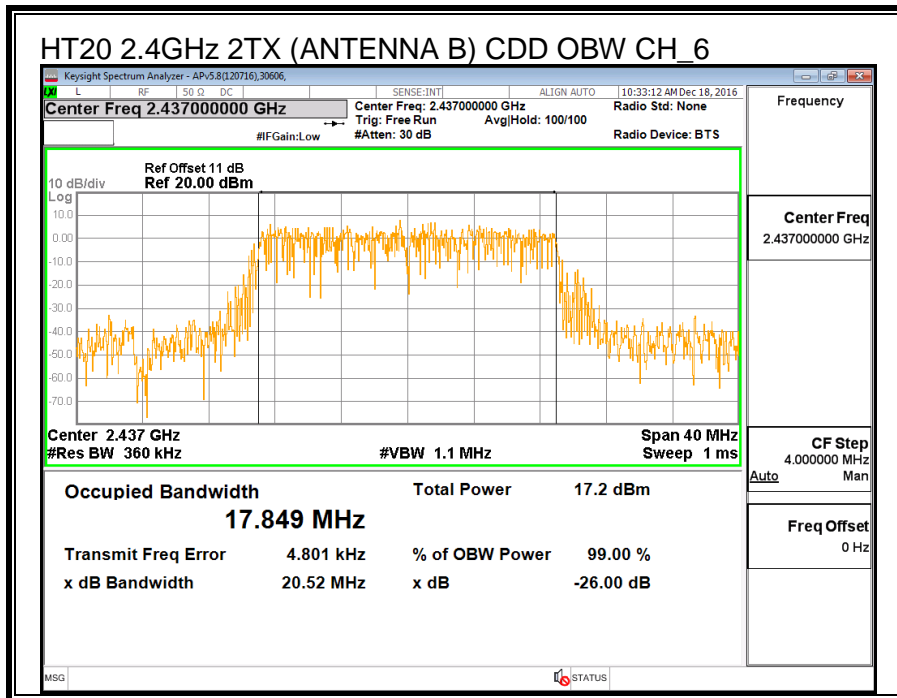
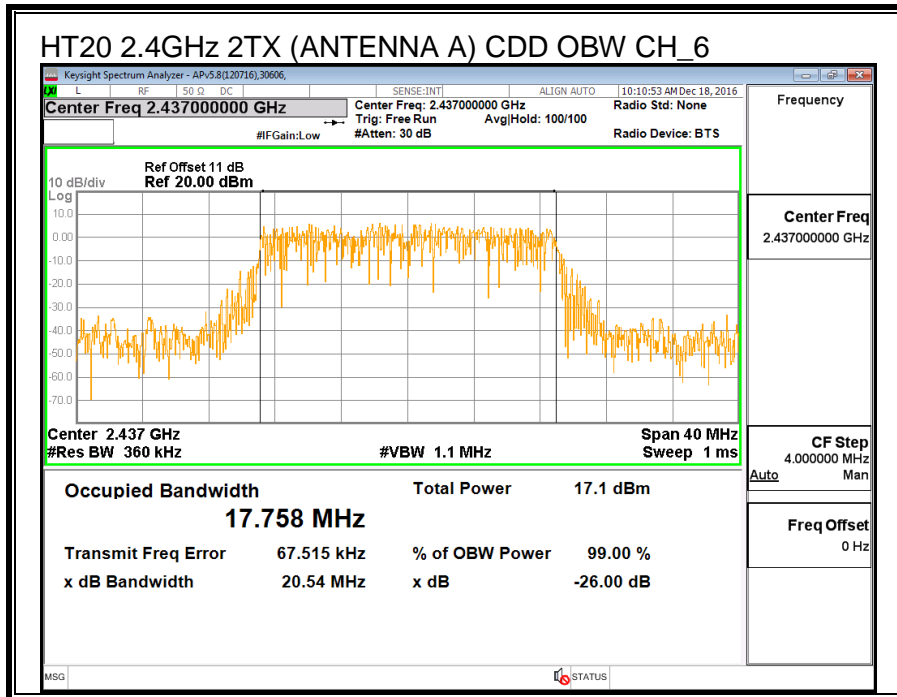
None; for reporting purposes only.

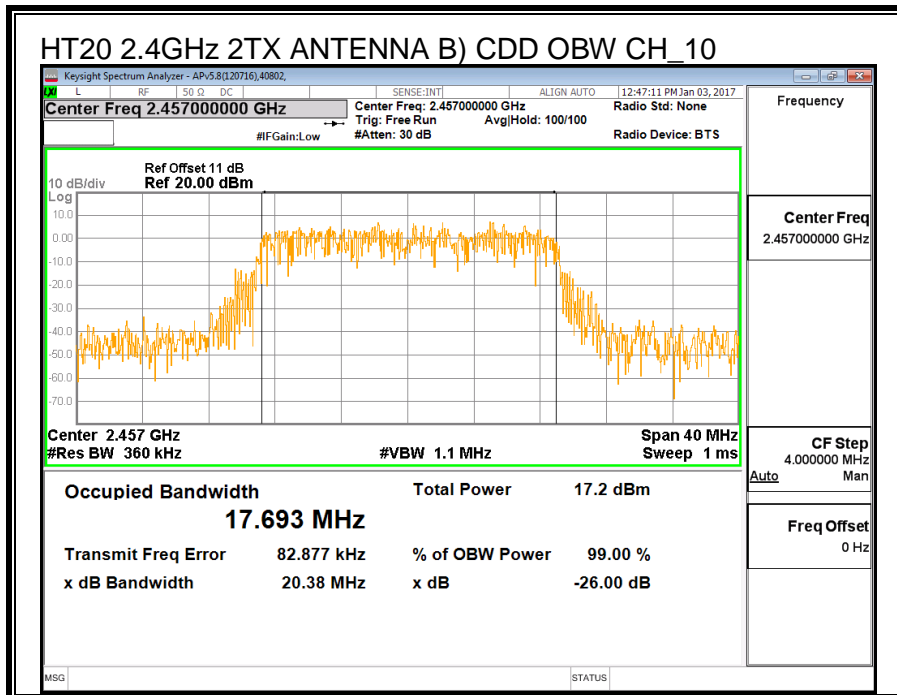
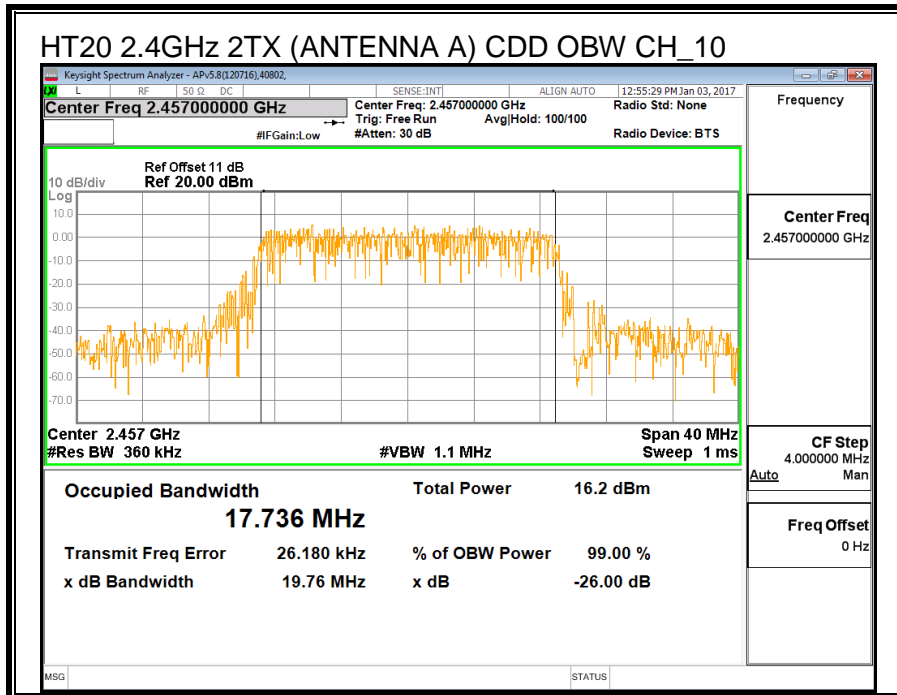
RESULTS

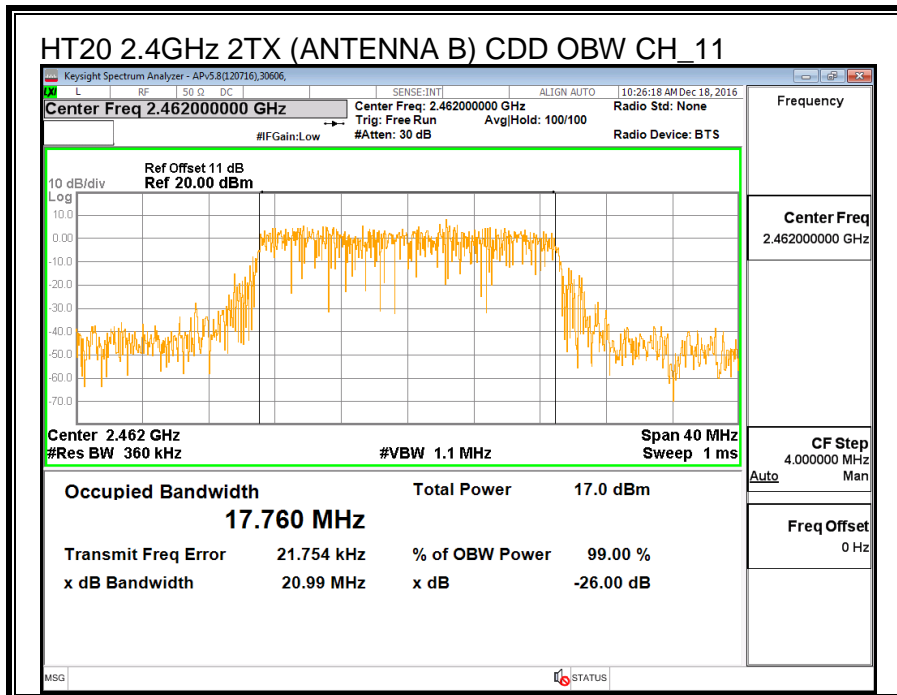
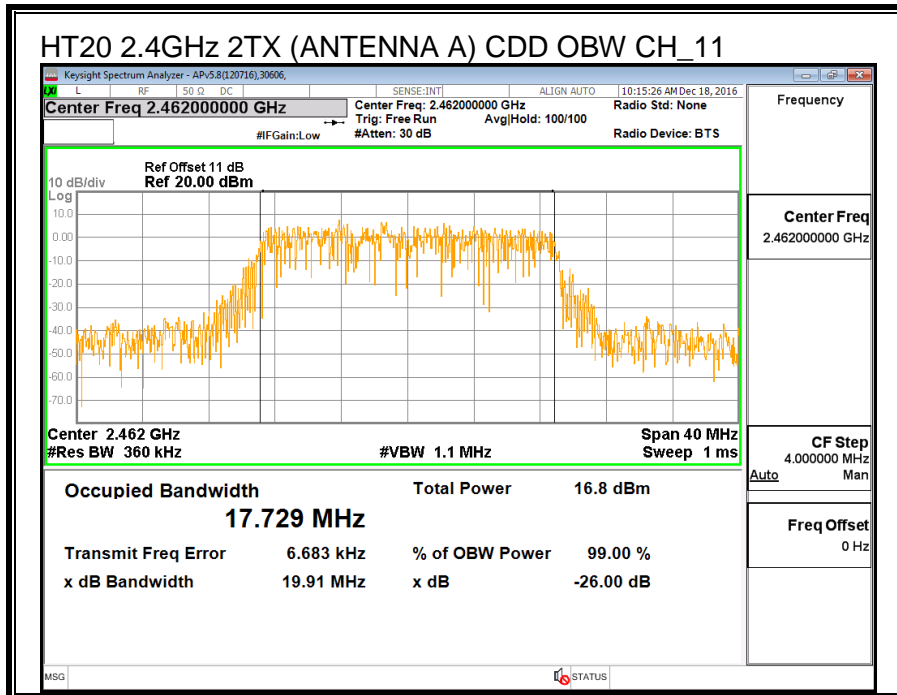
Channel	Frequency (MHz)	99% Bandwidth ANTENNA A (MHz)	99% Bandwidth ANTENNA B (MHz)
Low_1	2412	17.676	17.754
Low_2	2417	17.769	17.656
Middle_6	2437	17.758	17.849
High_10	2457	17.736	17.693
High_11	2462	17.729	17.760
High_12	2467	17.703	17.705
High_13	2472	17.708	17.731

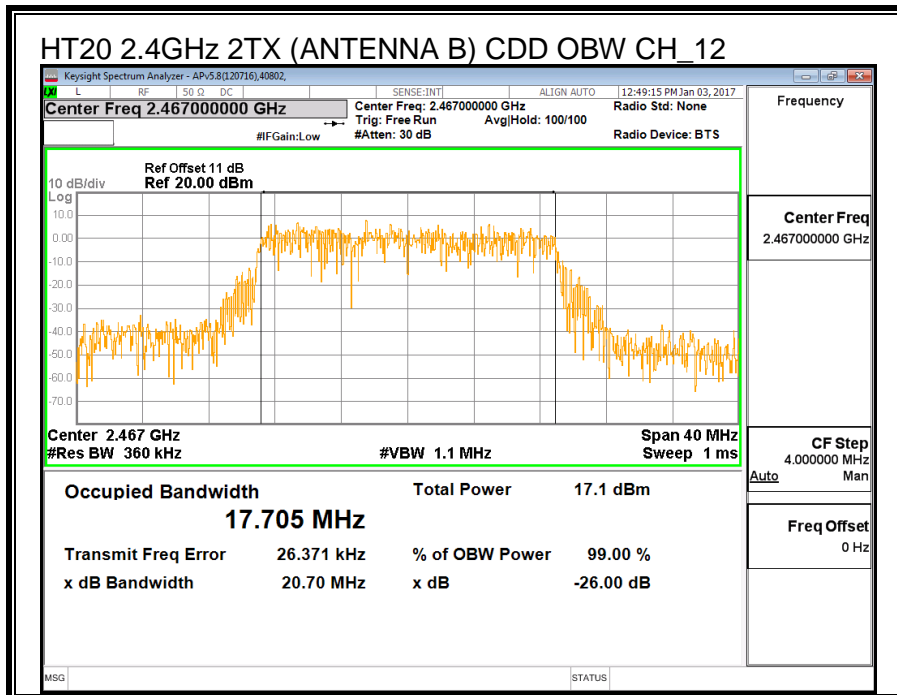
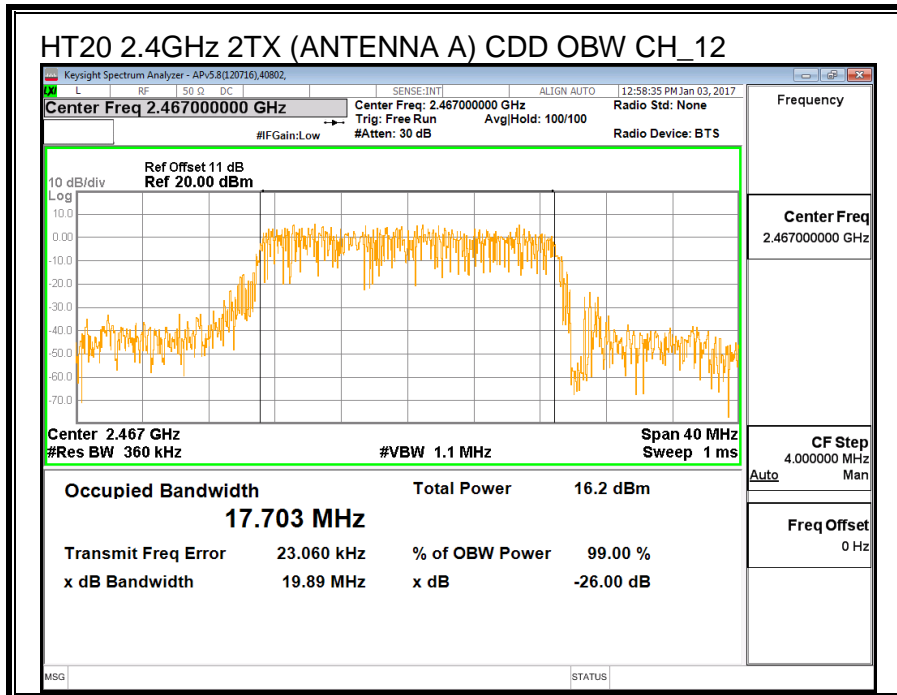


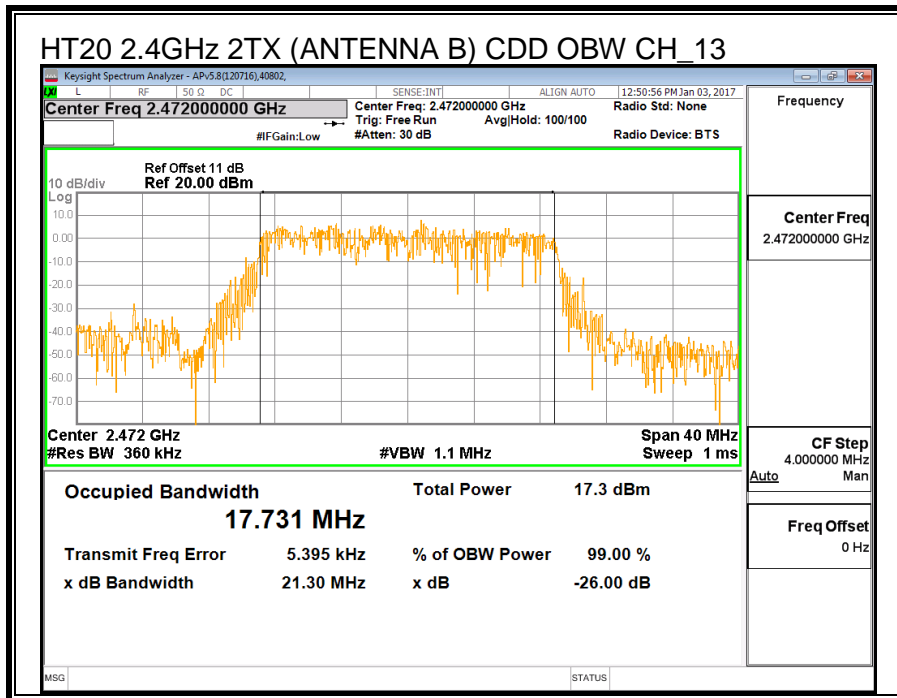
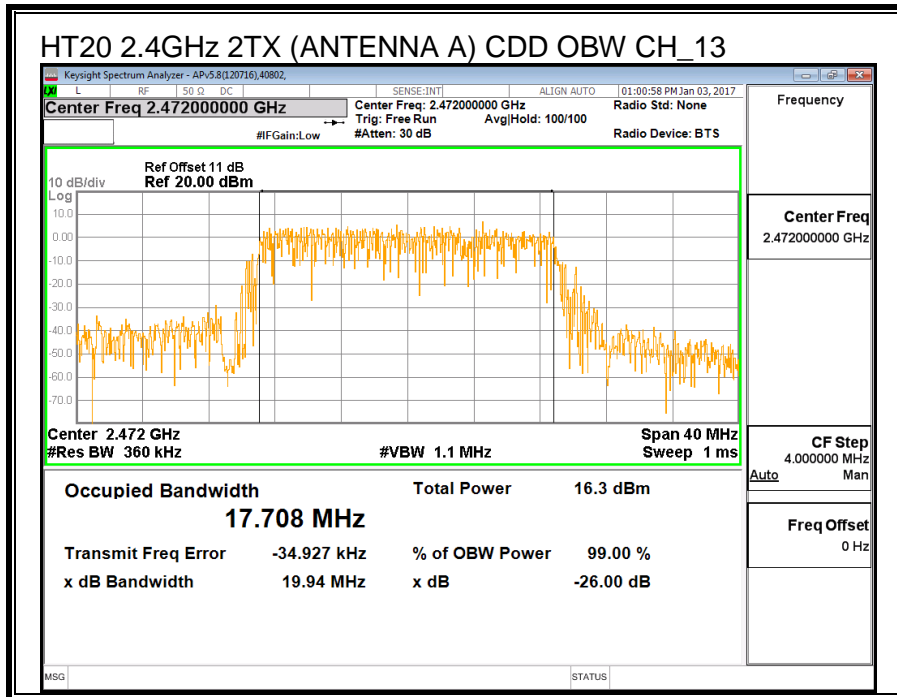












8.6.3. AVERAGE POWER

ID:	52291	Date:	1/20/16
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LIMITS

None; for reporting purposes only.

RESULTS

Channel	Frequency (MHz)	Power ANTENNA A (MHz)	Power ANTENNA B (MHz)
Low_1	2412	13.35	13.37
Low_2	2417	16.85	16.67
Middle_6	2437	16.60	16.81
High_10	2457	16.80	16.89
High_11	2462	12.30	12.29
High_12	2467	10.30	10.41
High_13	2472	-0.45	-0.32

8.6.4. OUTPUT POWER

ID:	44353	Date:	1/31/17
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LIMITS

FCC §15.247(b) (3)

IC RSS-247 (5.4) (4)

For systems using digital modulation in the 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.

DIRECTIONAL ANTENNA GAIN

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

Antenna A	Antenna B	Uncorrelated Chains
Antenna	Antenna	Directional
Gain	Gain	Gain
(dBi)	(dBi)	(dBi)
1.00	-0.01	0.52

RESULTS

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	IC Power Limit (dBm)	IC EIRP Limit (dBm)	Max Power (dBm)
Low_1	2412	0.52	30.00	30	36	30.00
Low_2	2417	0.52	30.00	30	36	30.00
Mid	2437	0.52	30.00	30	36	30.00
High_10	2457	0.52	30.00	30	36	30.00
High_11	2462	0.52	30.00	30	36	30.00
High_12	2467	0.52	30.00	30	36	30.00
High_13	2472	0.52	30.00	30	36	30.00

Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd Power
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Results

Channel	Frequency (MHz)	Ant A Meas Power (dBm)	Ant B Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margi (dB)
Low_1	2412	21.98	22.98	25.52	30.00	-4.48
Low_2	2417	25.12	25.48	28.31	30.00	-1.69
Mid	2437	25.21	25.41	28.32	30.00	-1.68
High_10	2457	25.63	25.76	28.71	30.00	-1.29
High_11	2462	23.33	21.86	25.67	30.00	-4.33
High_12	2467	21.45	20.05	23.82	30.00	-6.18
High_13	2472	10.32	10.34	13.34	30.00	-16.66

8.6.5. POWER SPECTRAL DENSITY

LIMITS

FCC §15.247

IC RSS-247 (5.2) (2)

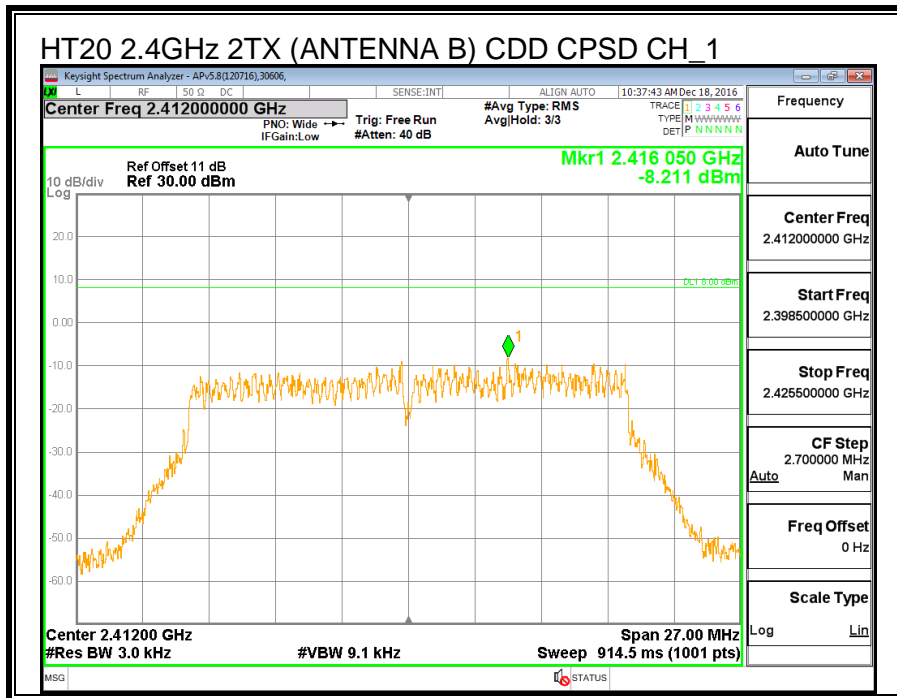
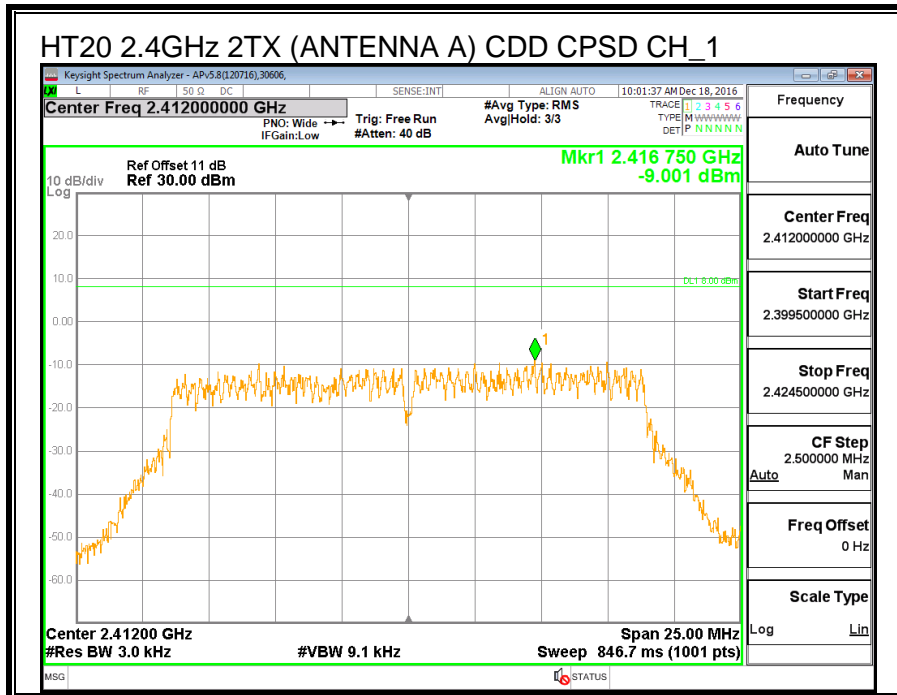
For digitally modulated systems, the power spectral density conducted from the intentional radiator to the antenna shall not be greater than 8 dBm in any 3 KHz band during any time interval of continuous transmissions.

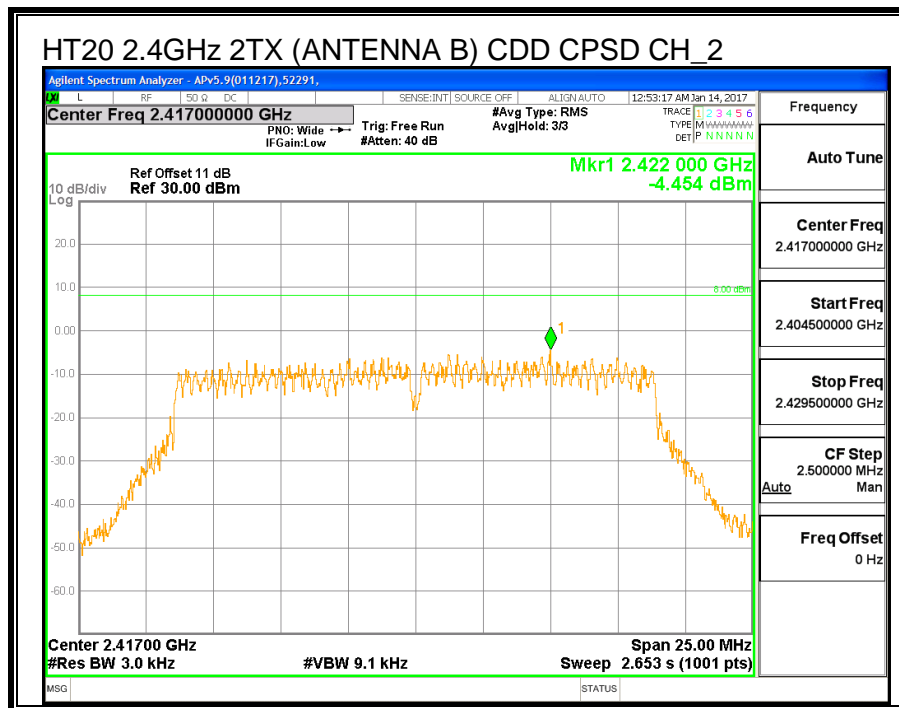
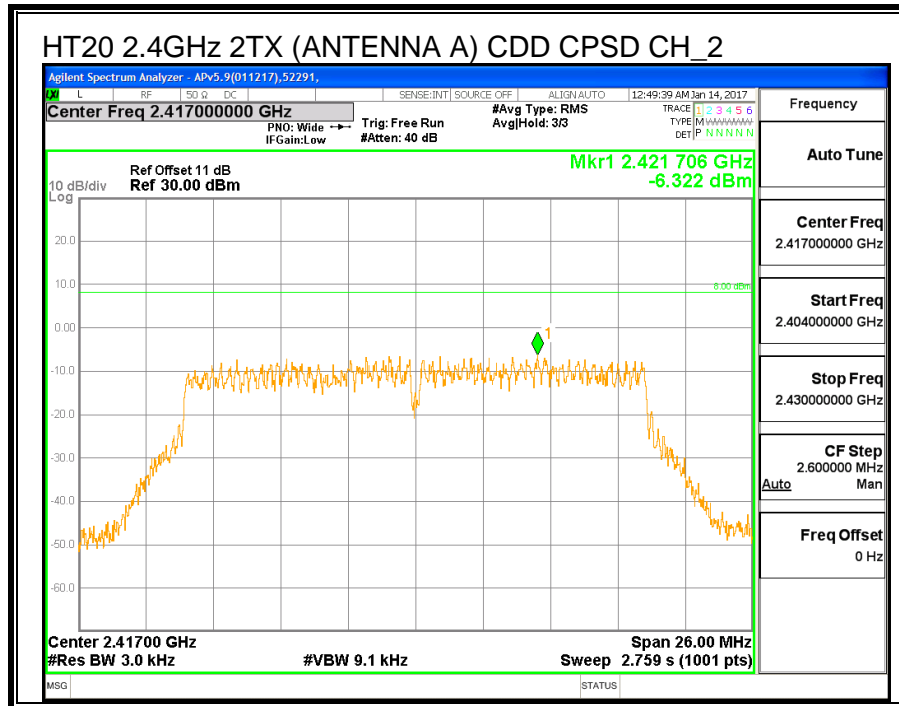
RESULTS

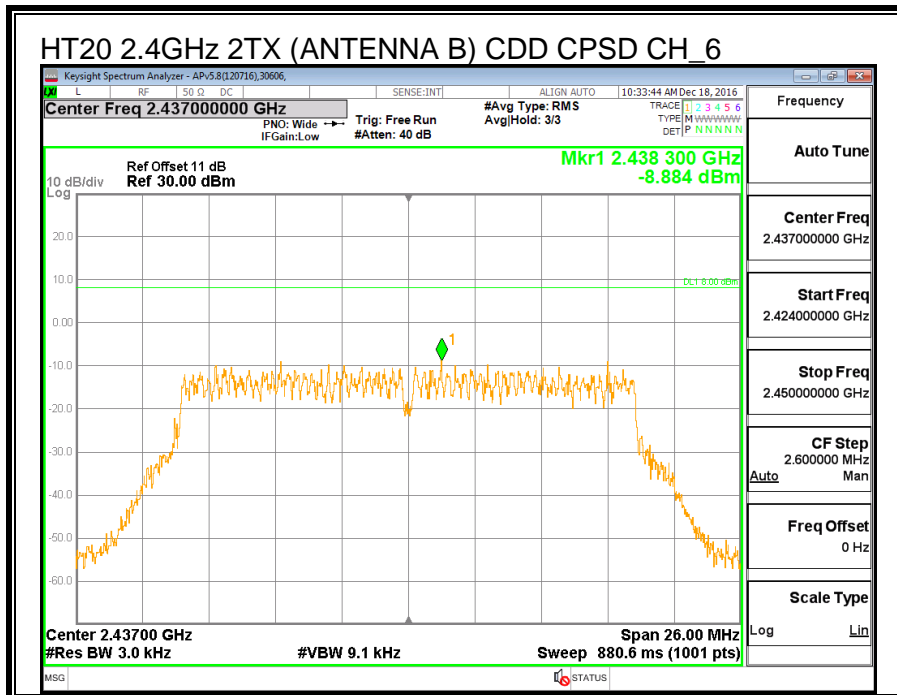
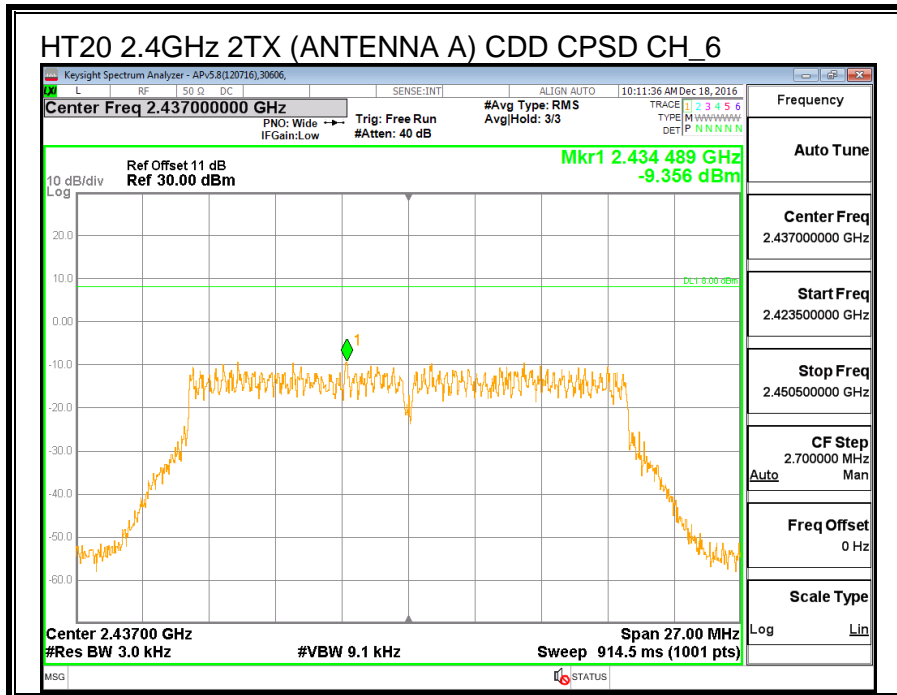
Duty Cycle CF (dB)	0.00	Included in Calculations of Corr'd PSD
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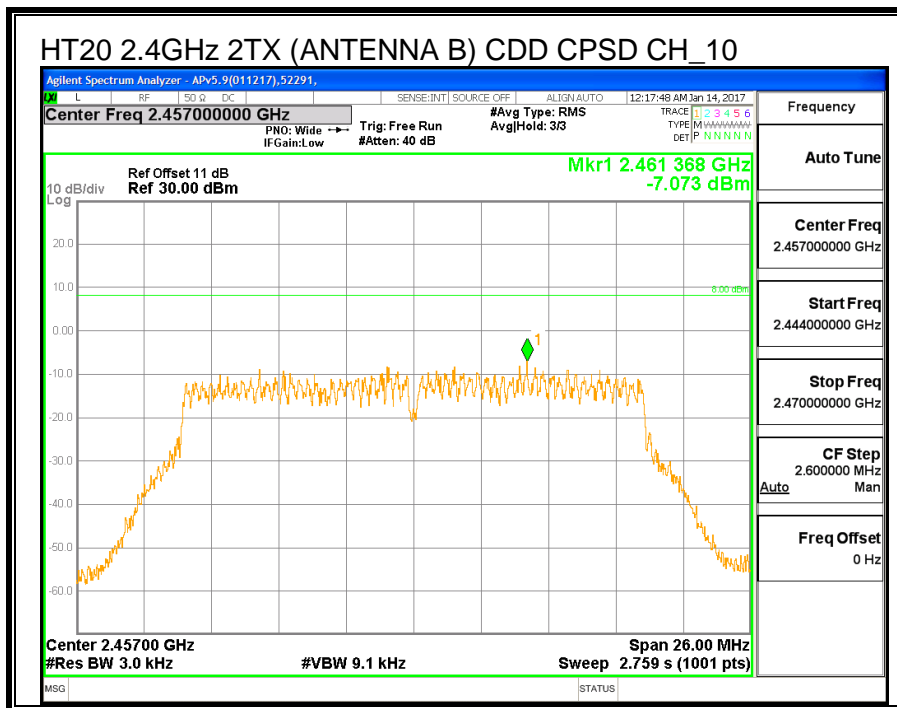
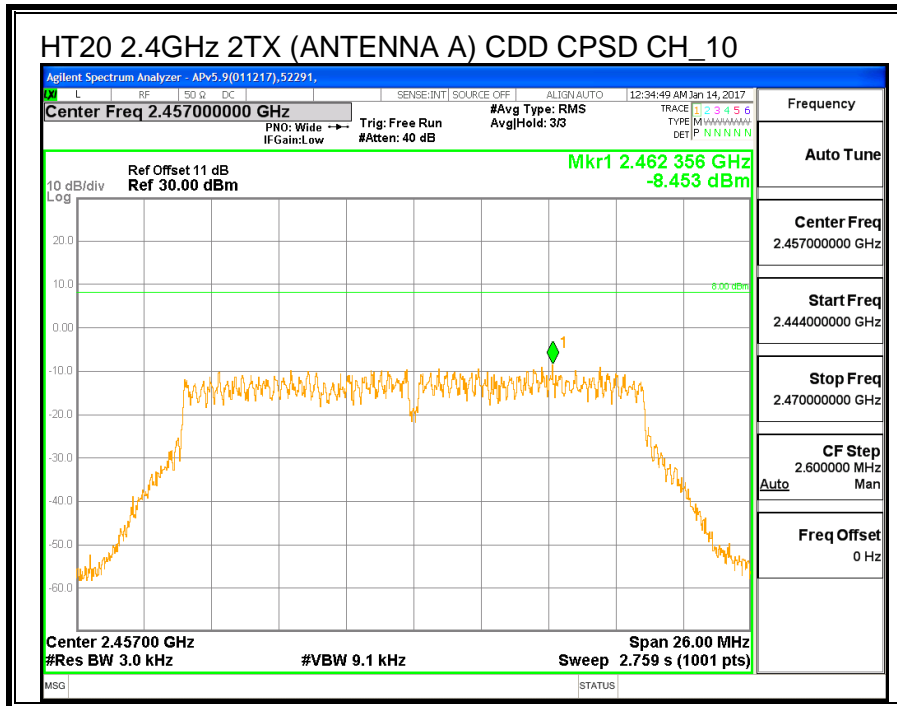
PSD Results

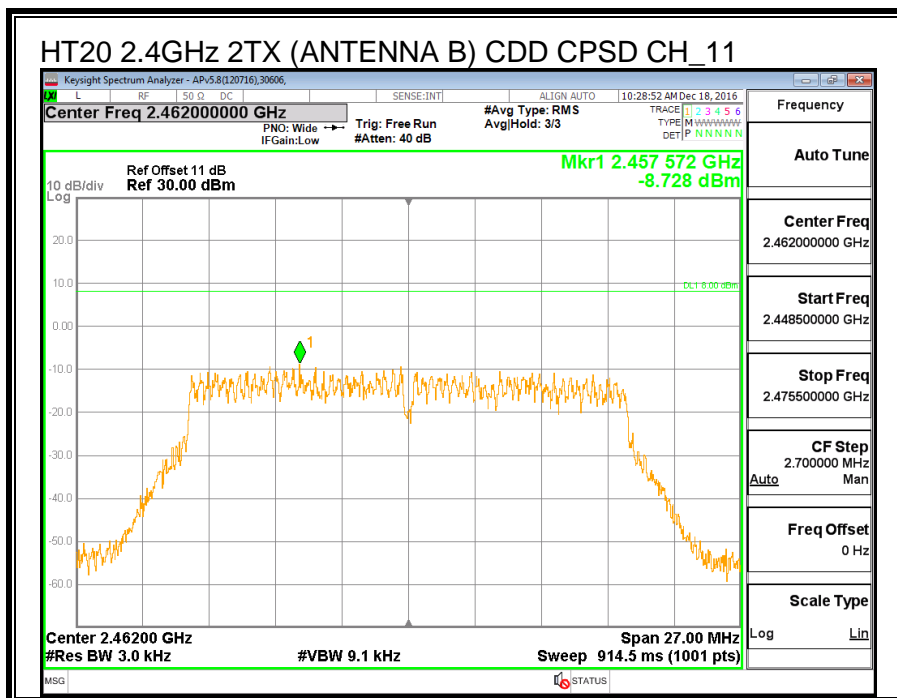
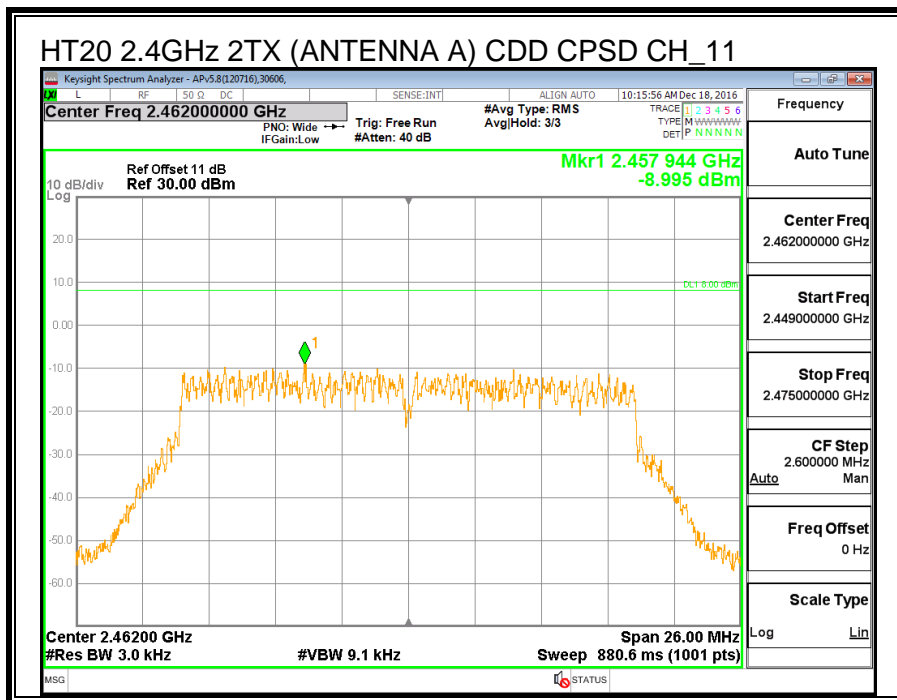
Channel	Frequency (MHz)	Ant A Meas (dBm)	Ant B Meas (dBm)	Total Corr'd PSD (dBm)	Limit (dBm)	Margin (dB)
Low	2412	-9.00	-8.21	-5.58	8.0	-13.6
Low_2	2417	-6.32	-4.45	-2.28	8.0	-10.3
Mid	2437	-9.36	-8.88	-6.10	8.0	-14.1
High_10	2457	-8.45	-7.07	-4.70	8.0	-12.7
High_11	2462	-9.00	-8.73	-5.85	8.0	-13.8
High_12	2467	-15.58	-15.28	-12.41	8.0	-20.4
High_13	2472	-25.20	-25.21	-22.20	8.0	-30.2

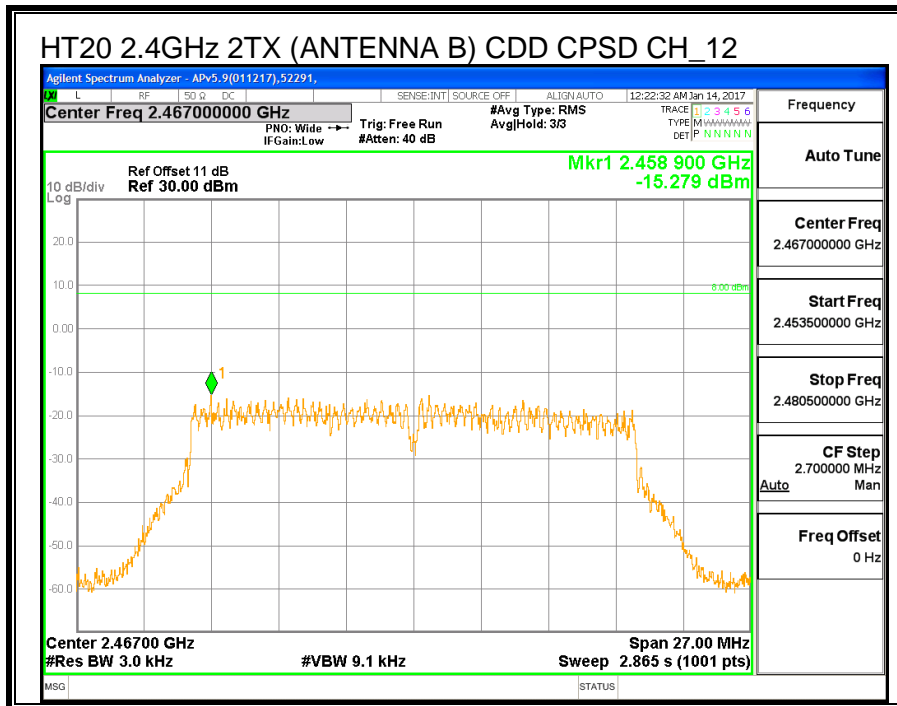
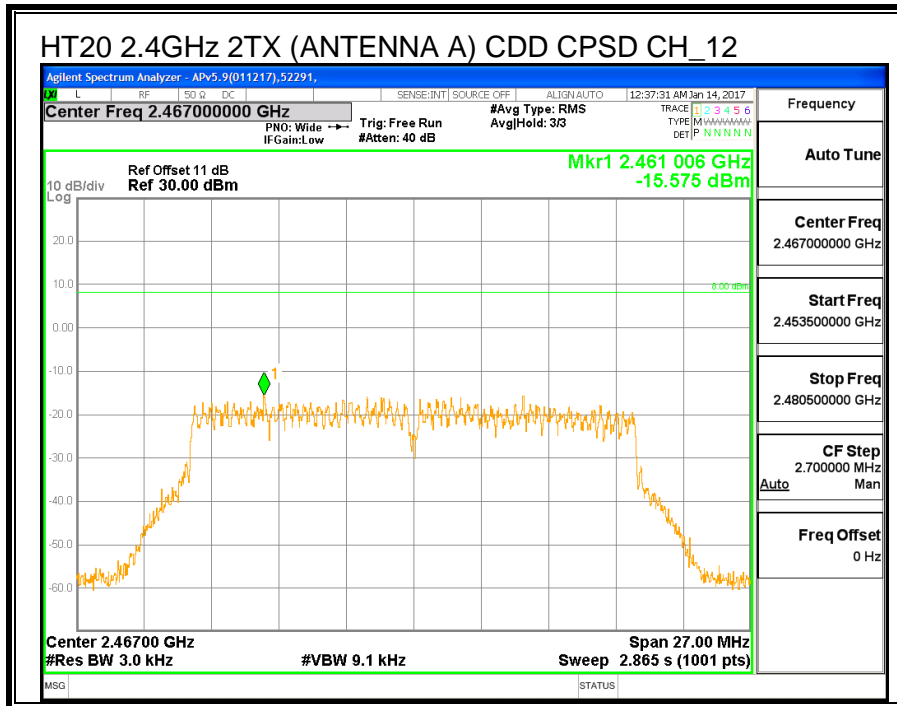


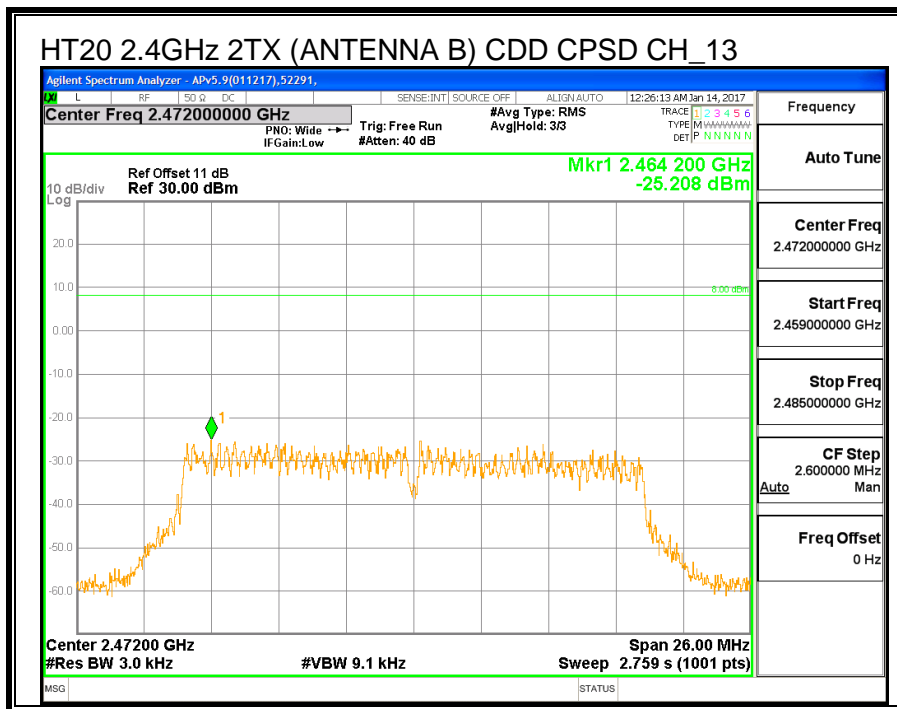
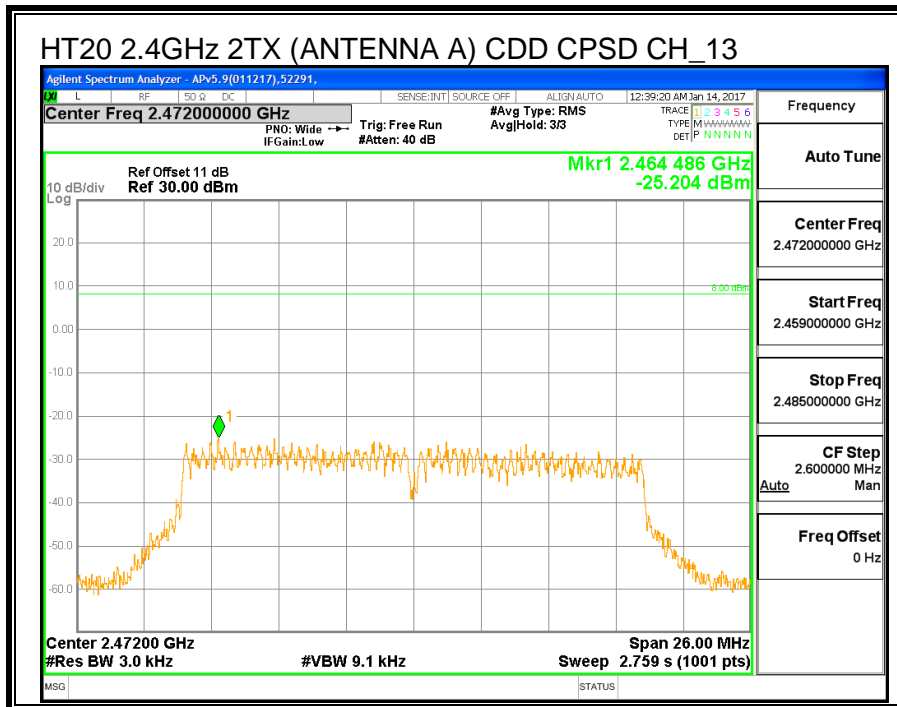












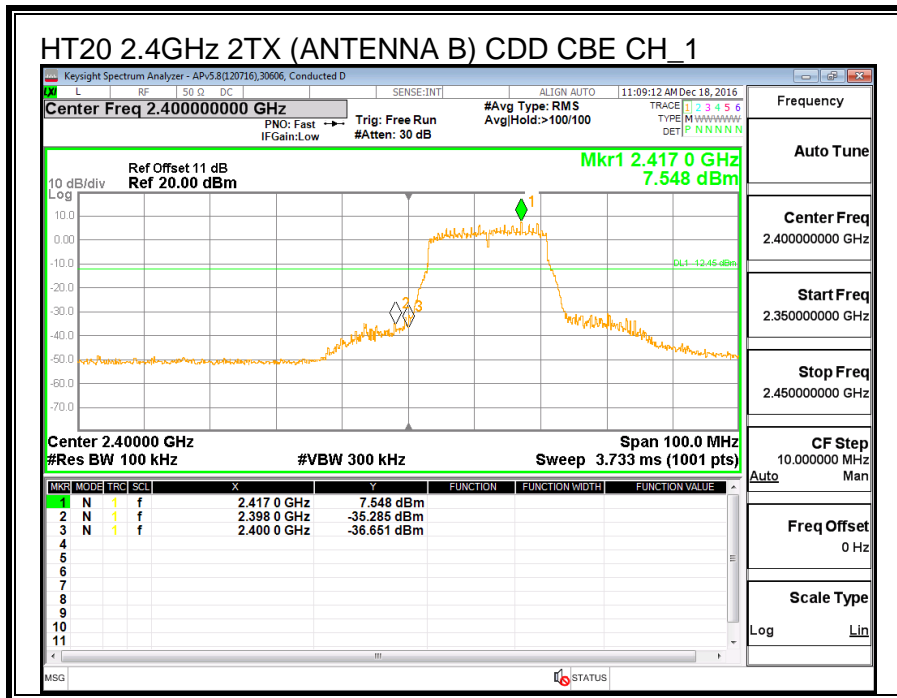
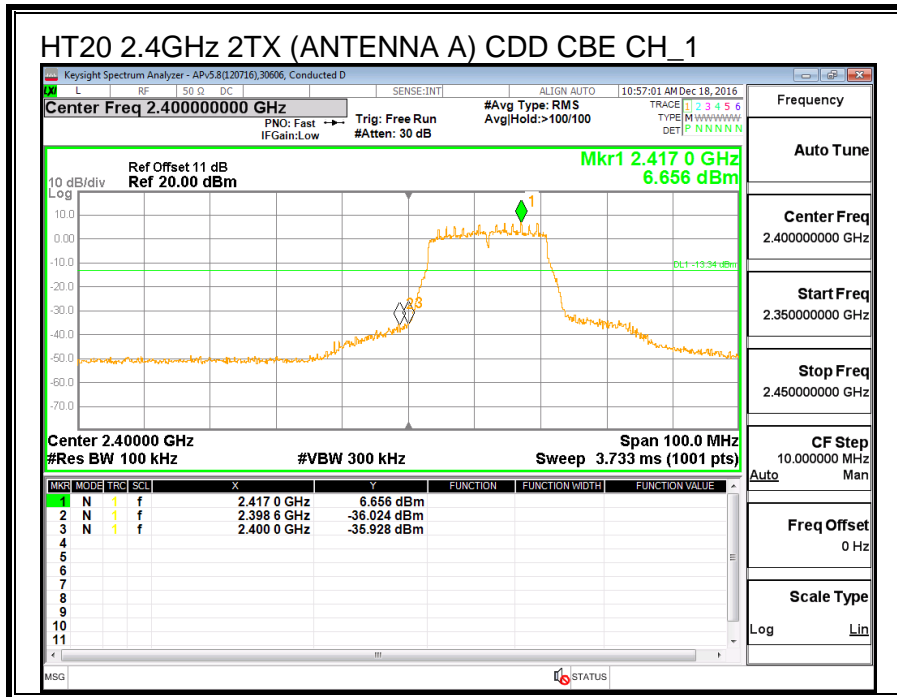
8.6.6. CONDUCTED BANDEDGE AND SPURIOUS EMISSIONS

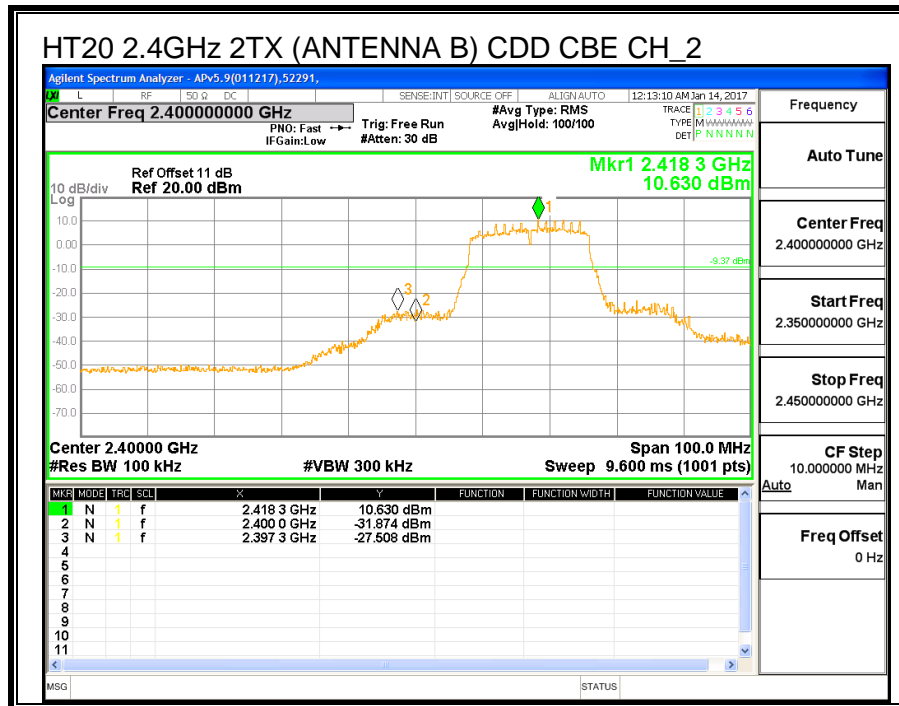
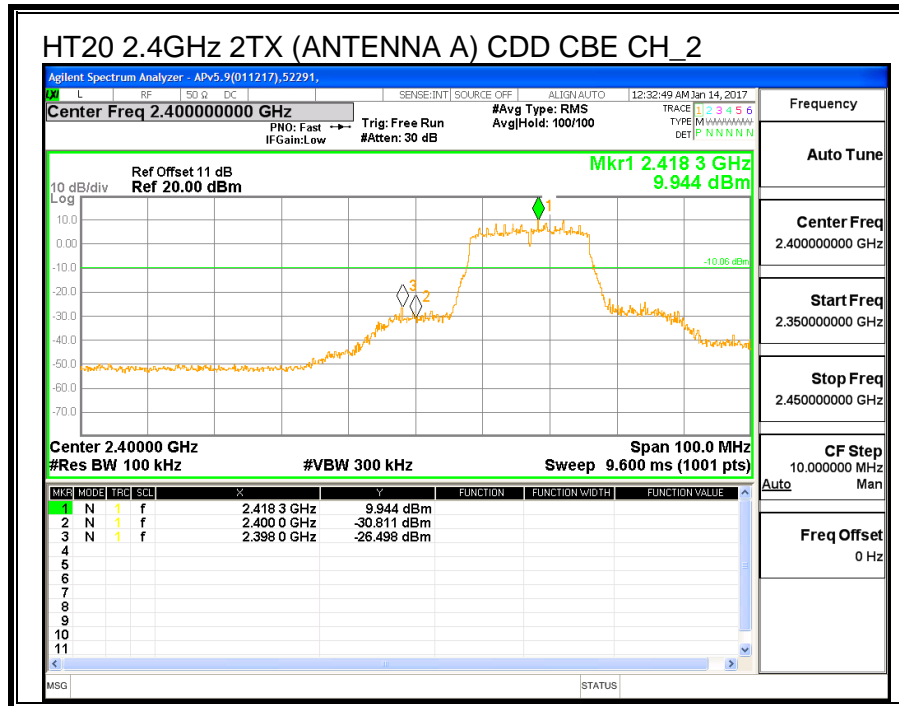
LIMITS

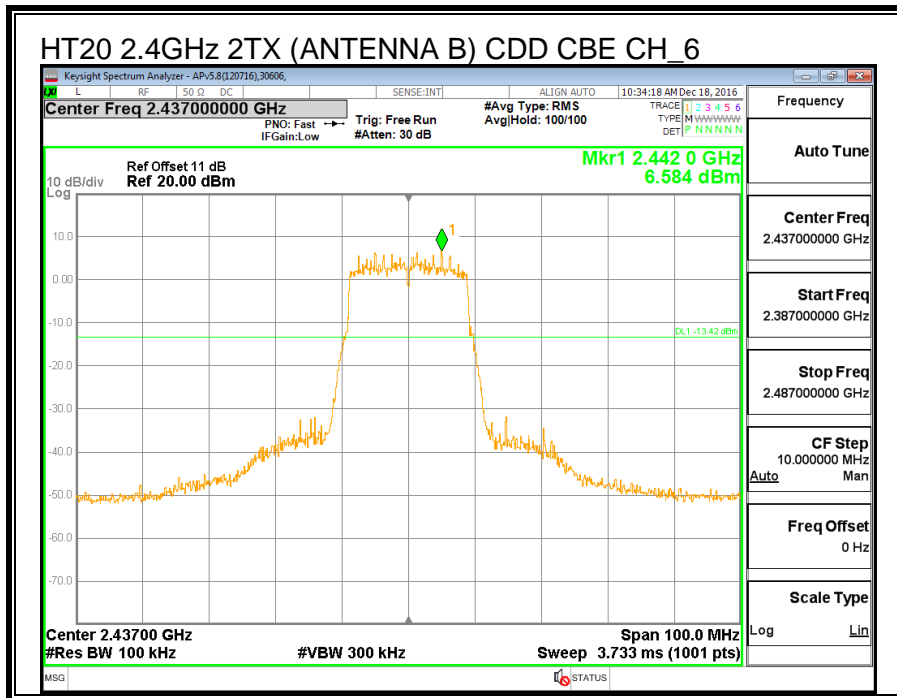
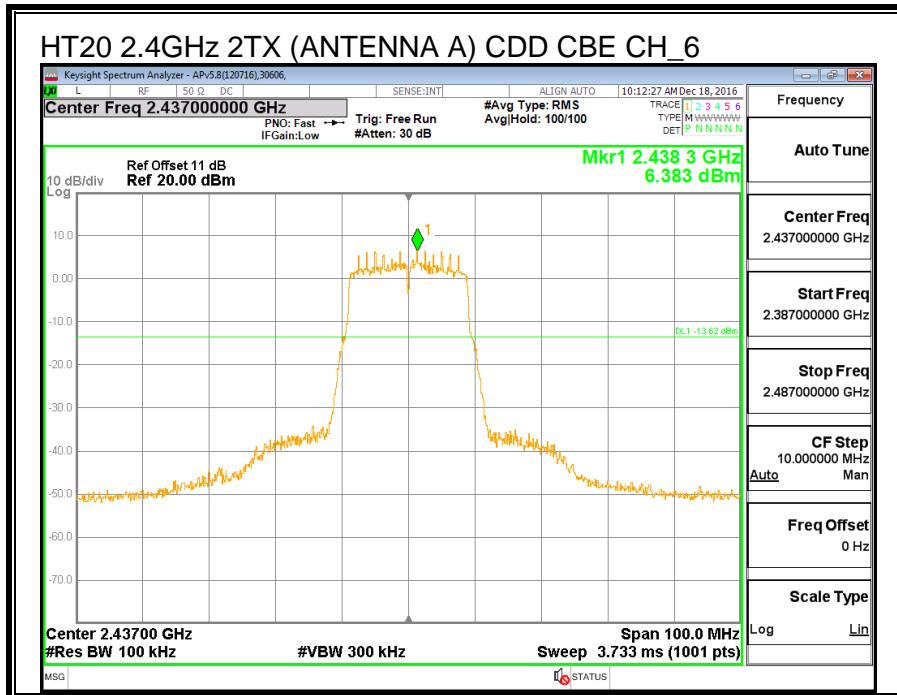
FCC §15.247 (d)

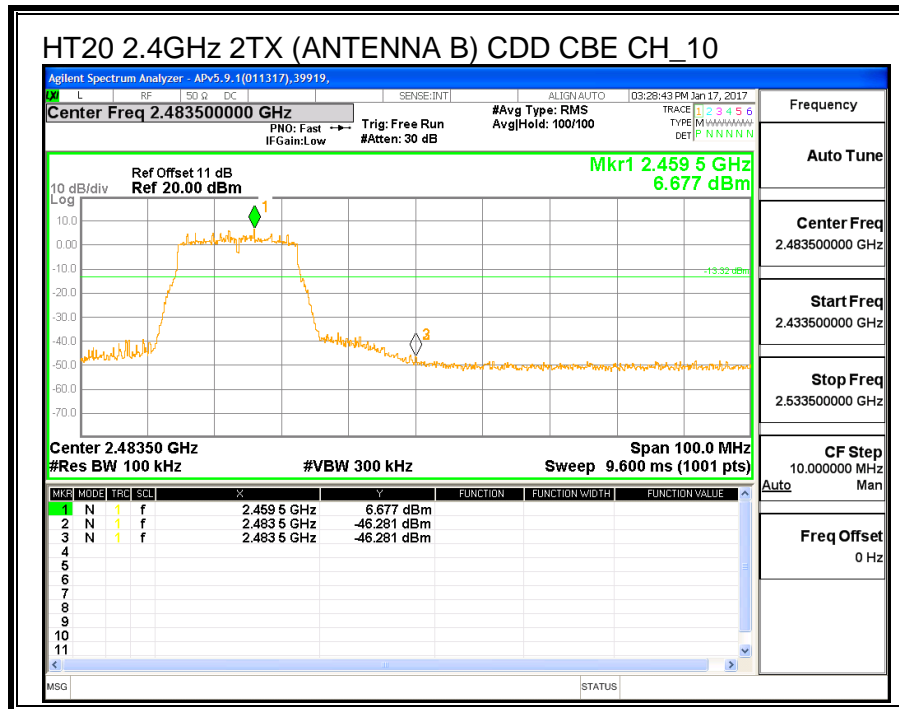
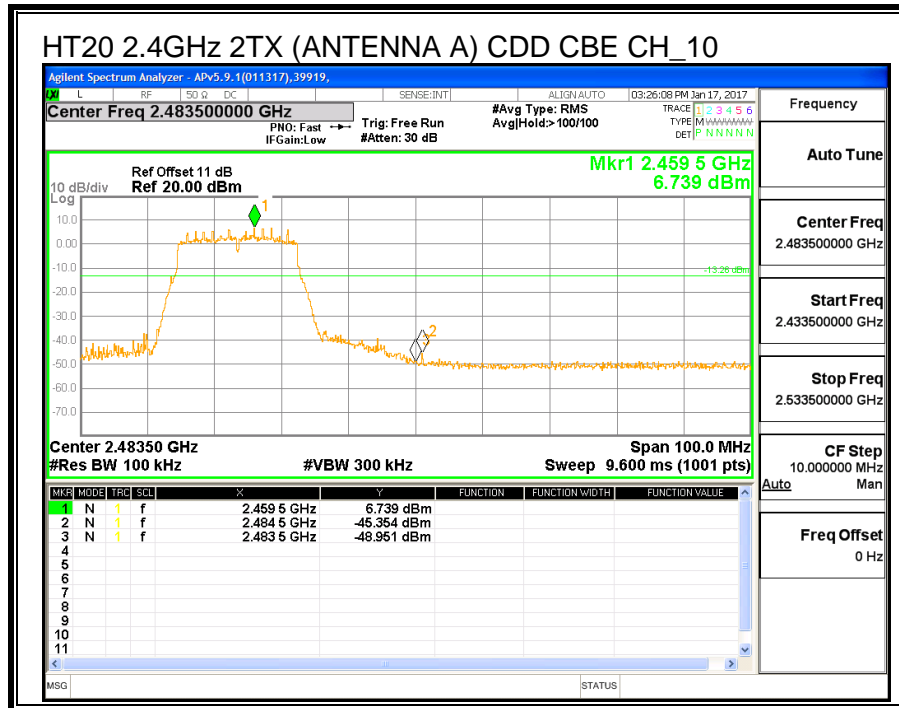
IC RSS-247 (5.5)

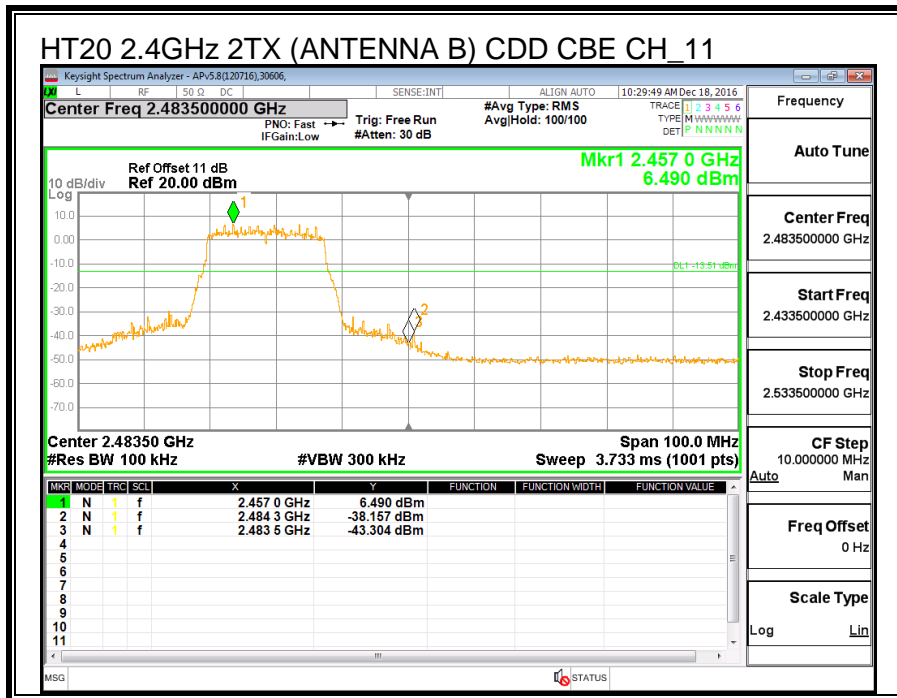
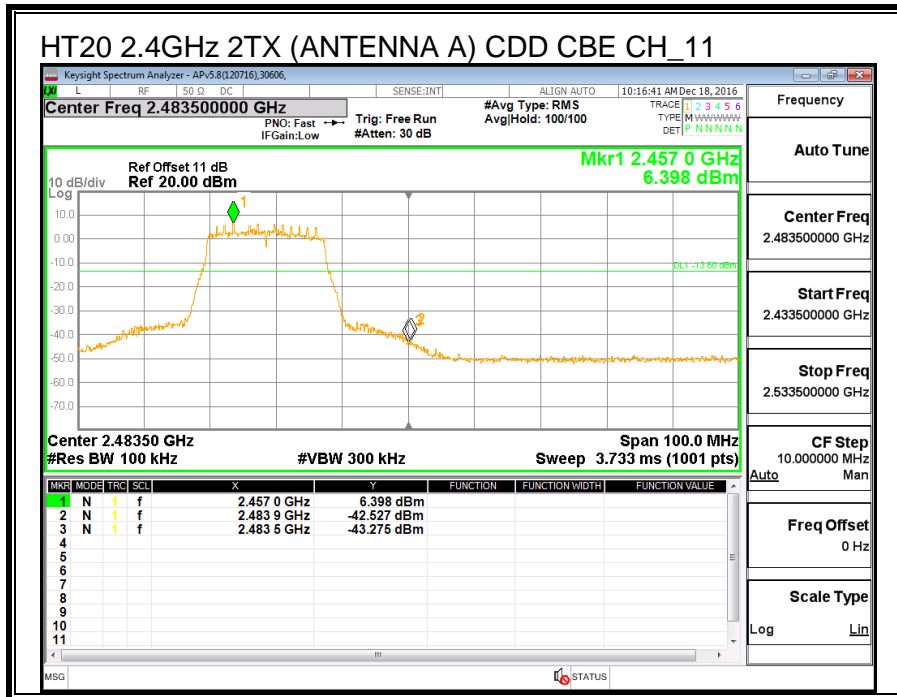
In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the 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.

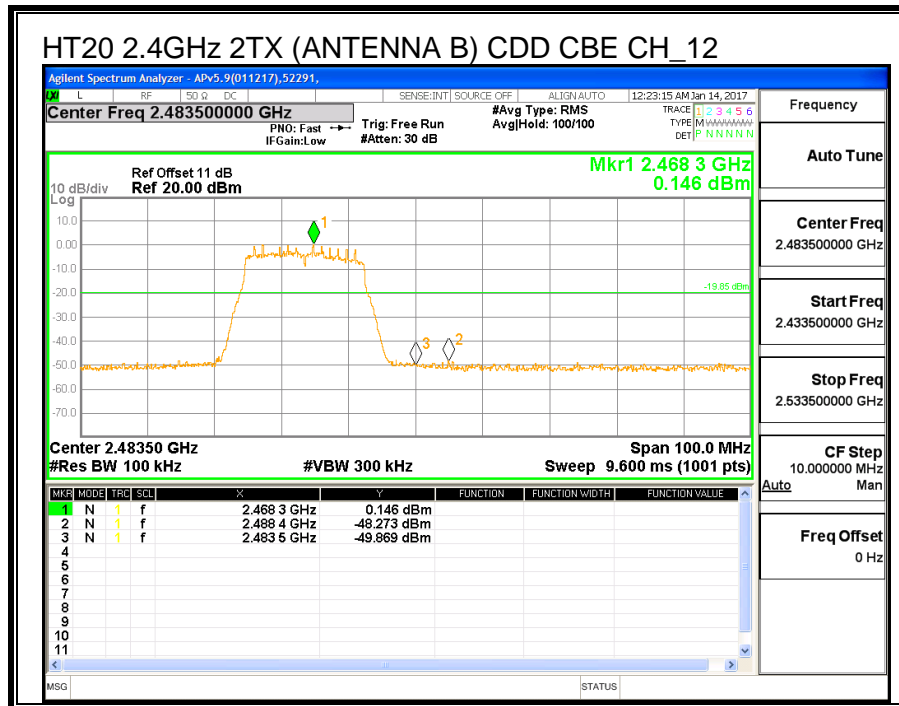
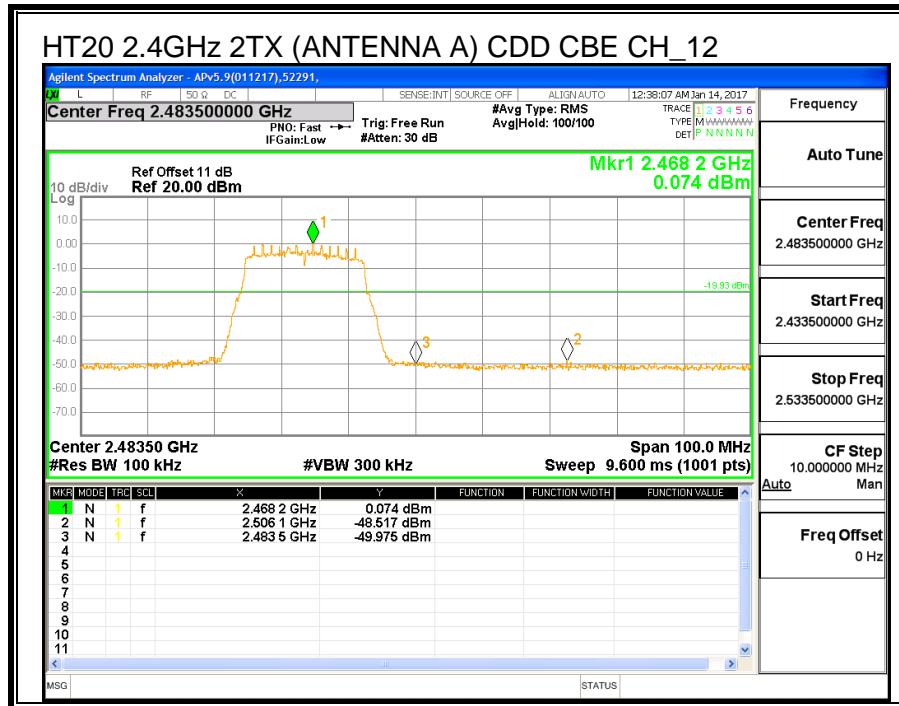


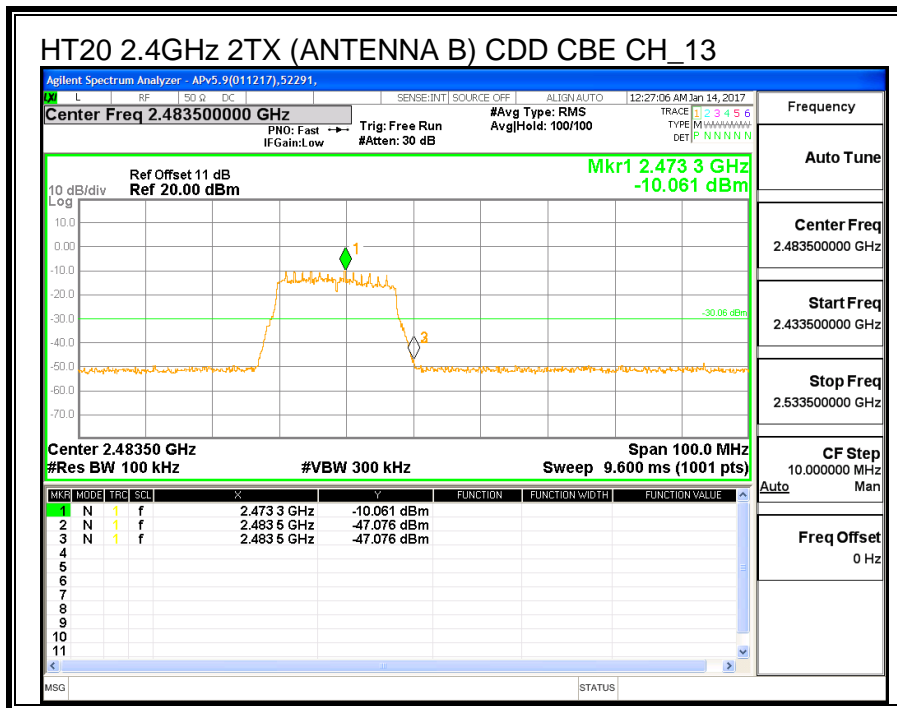
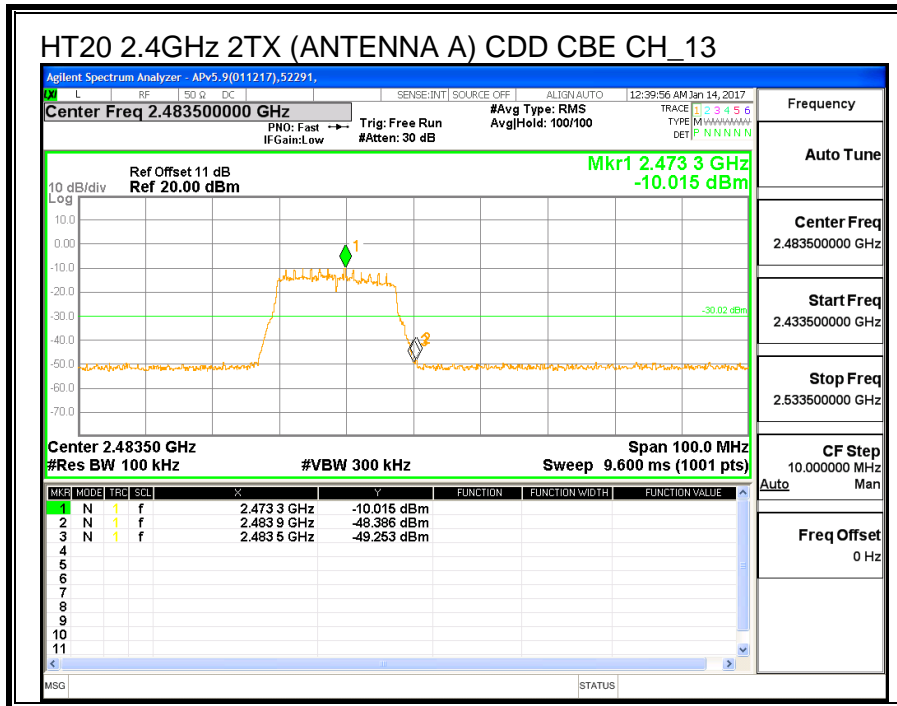


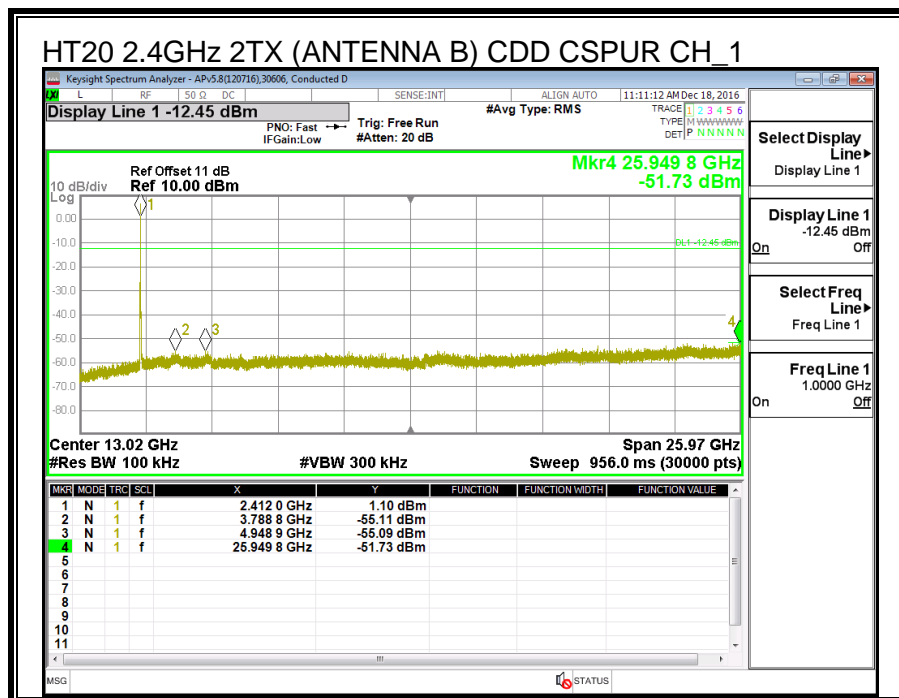
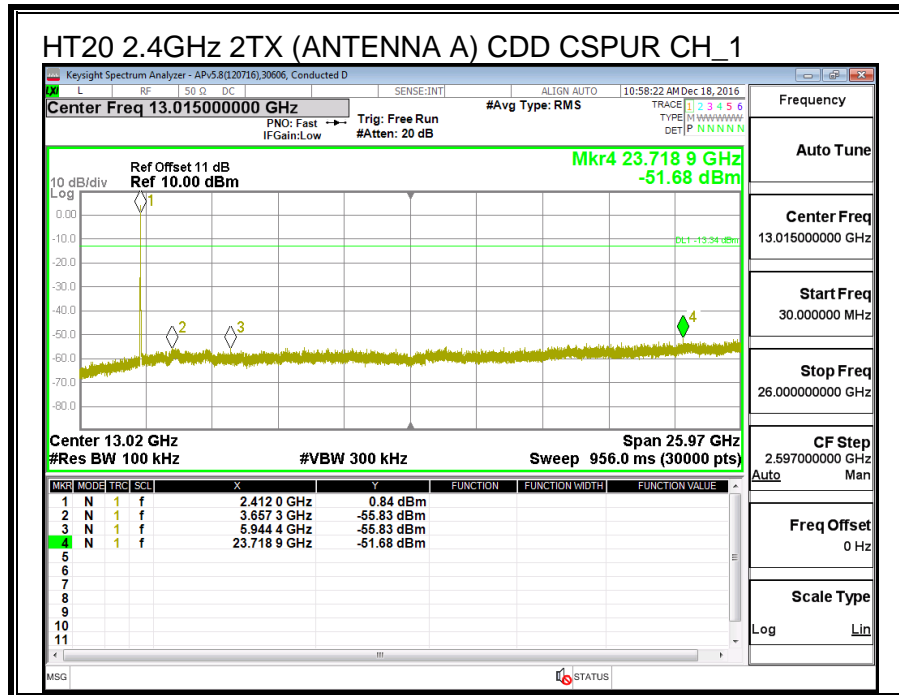


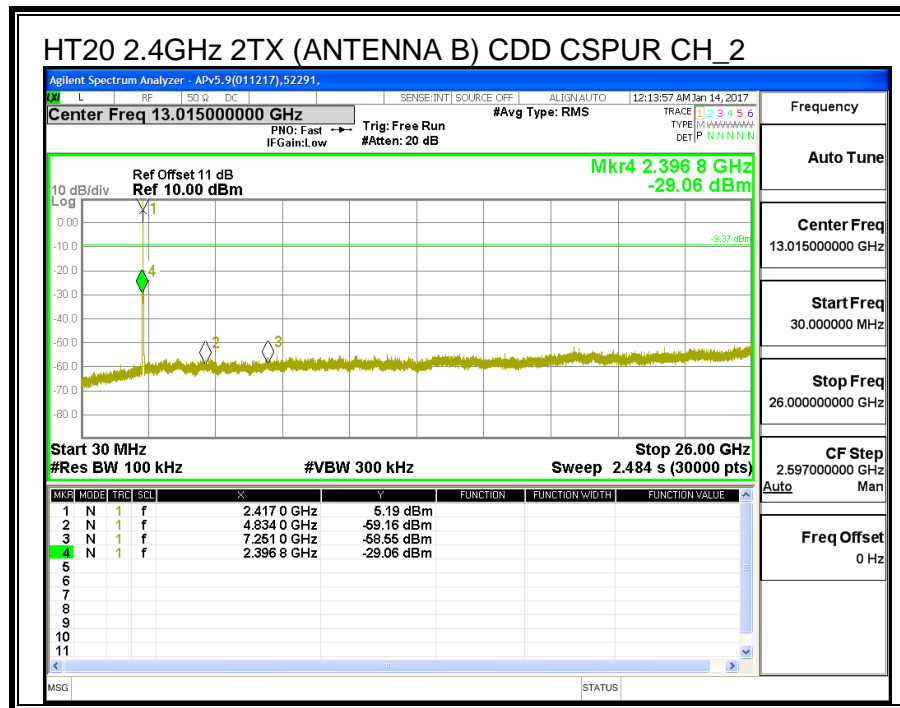
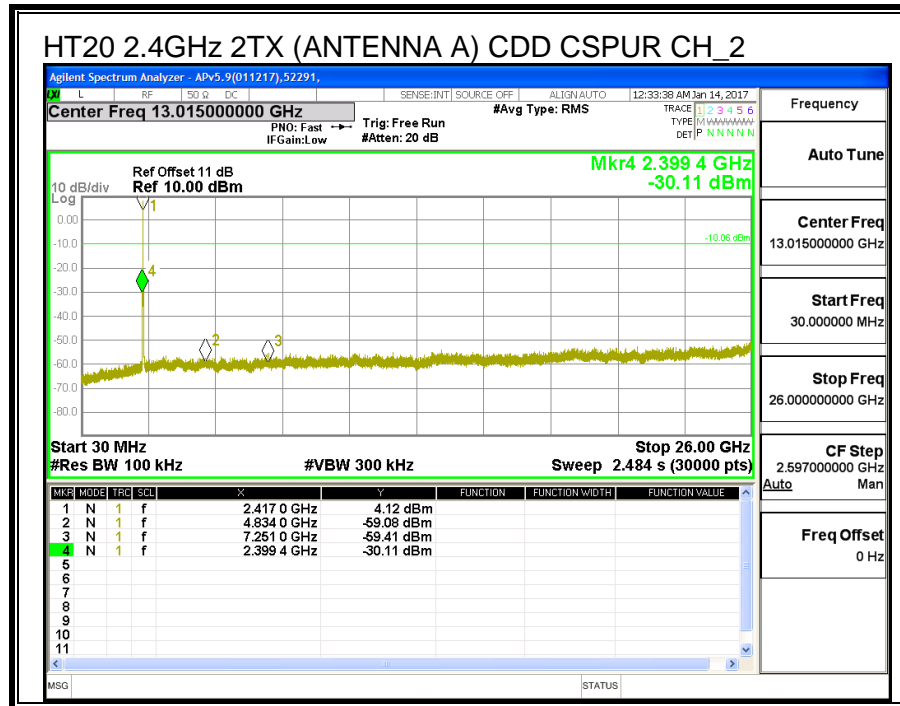


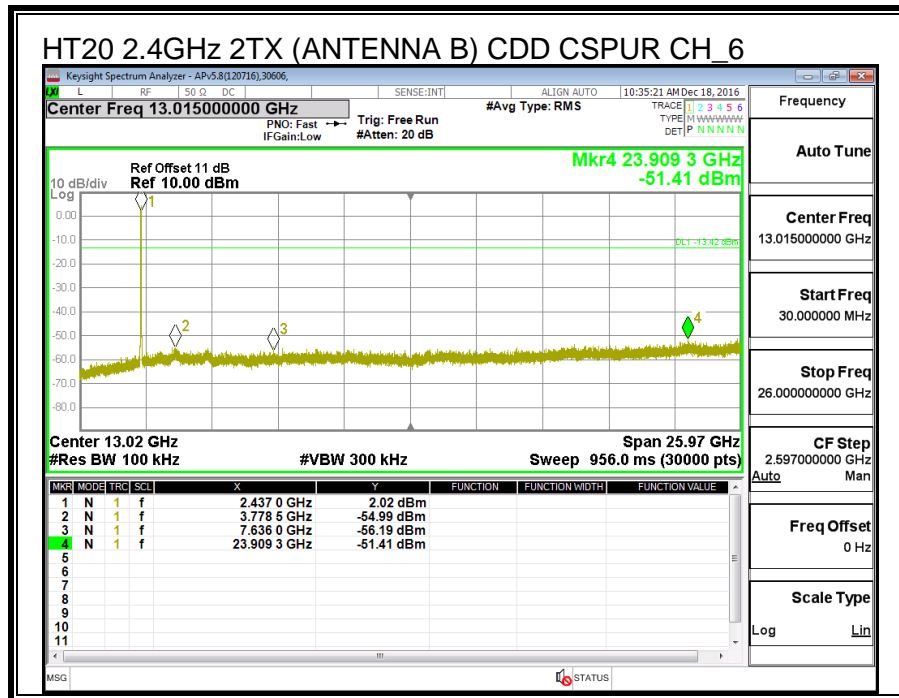
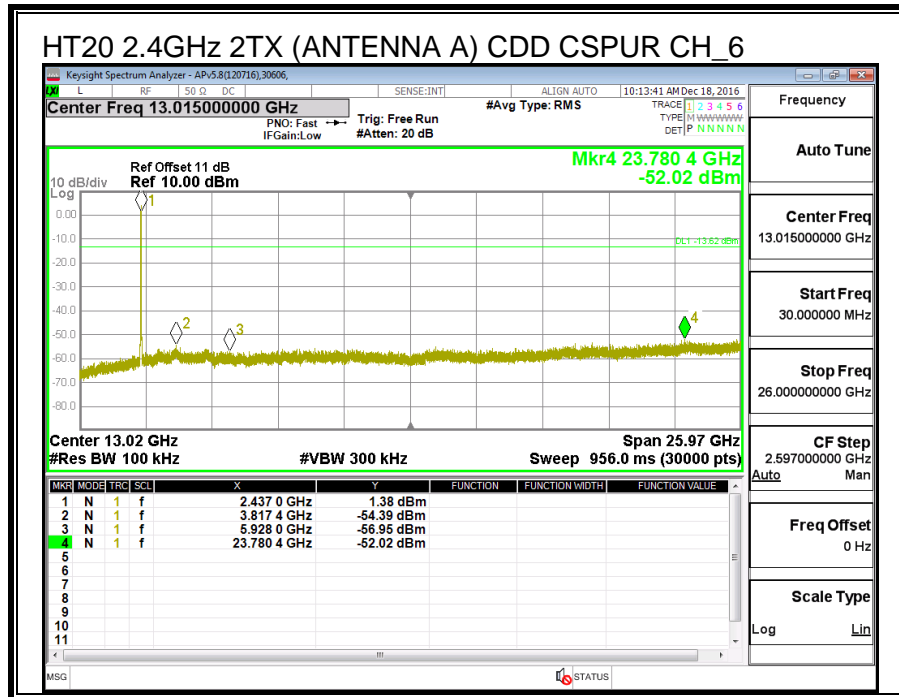


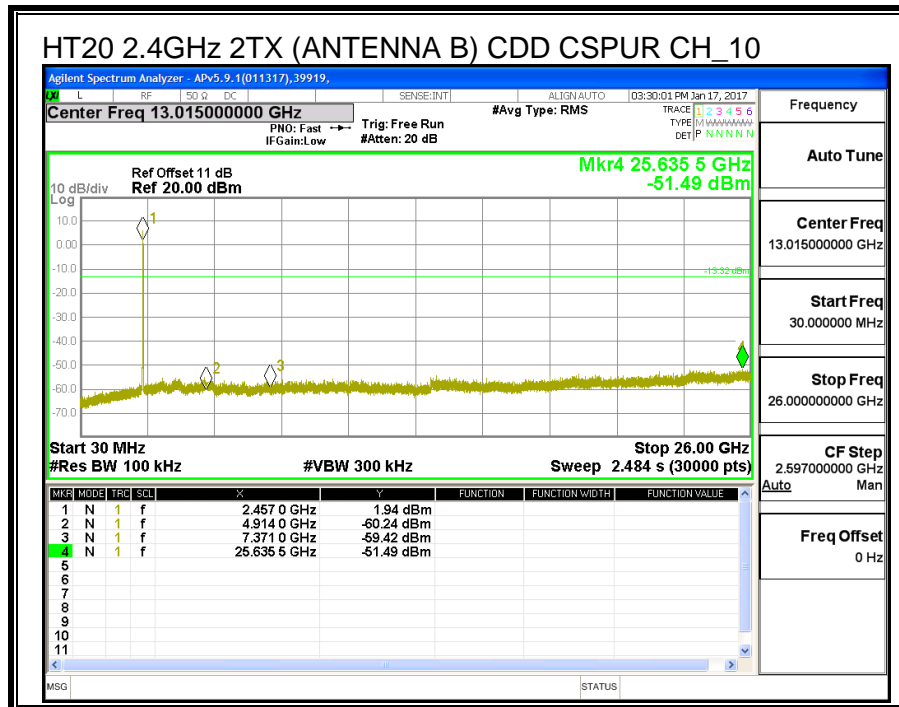
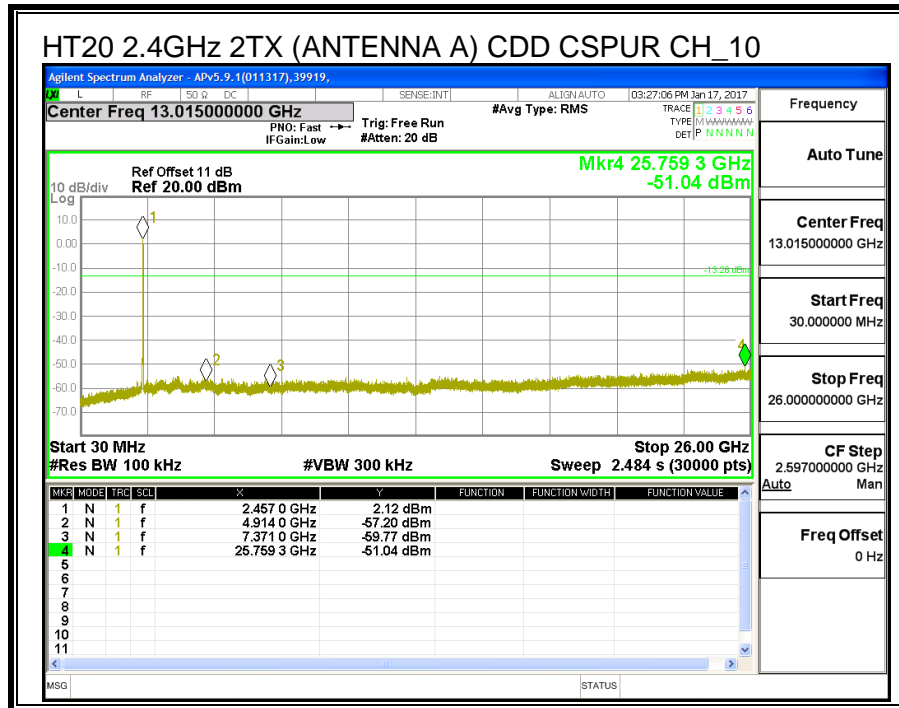


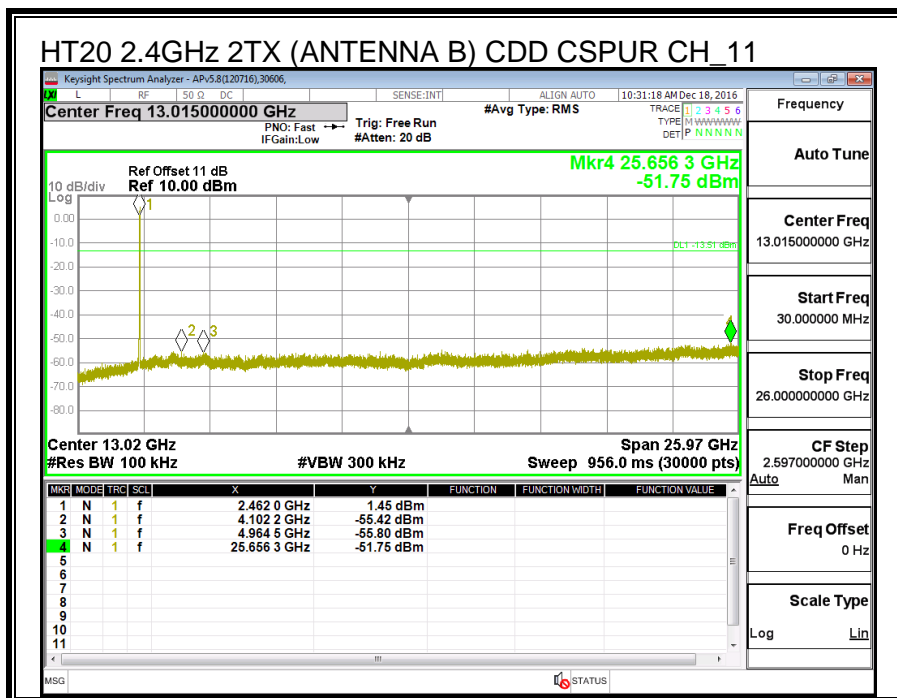
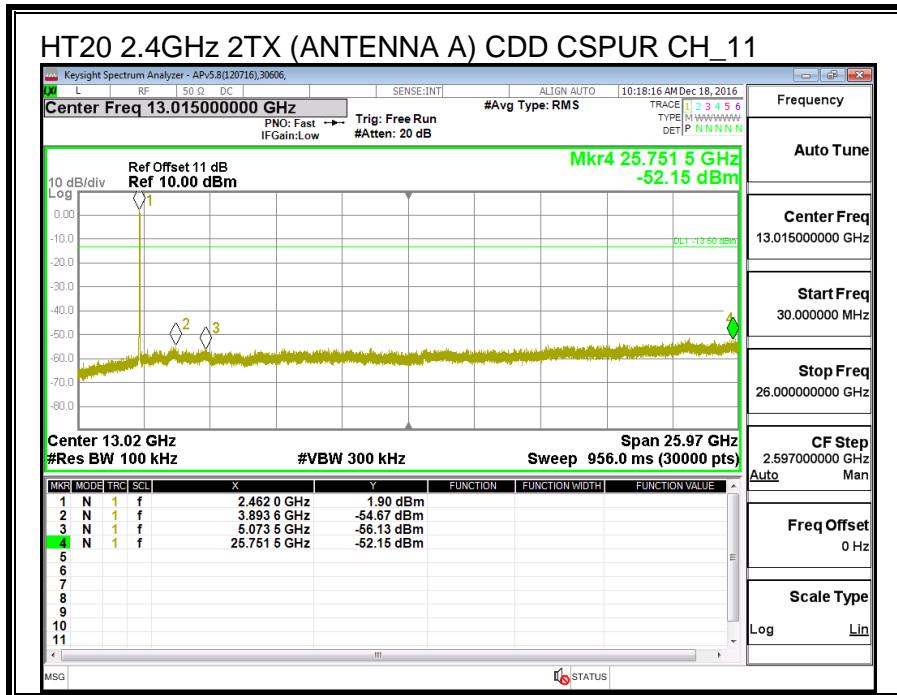


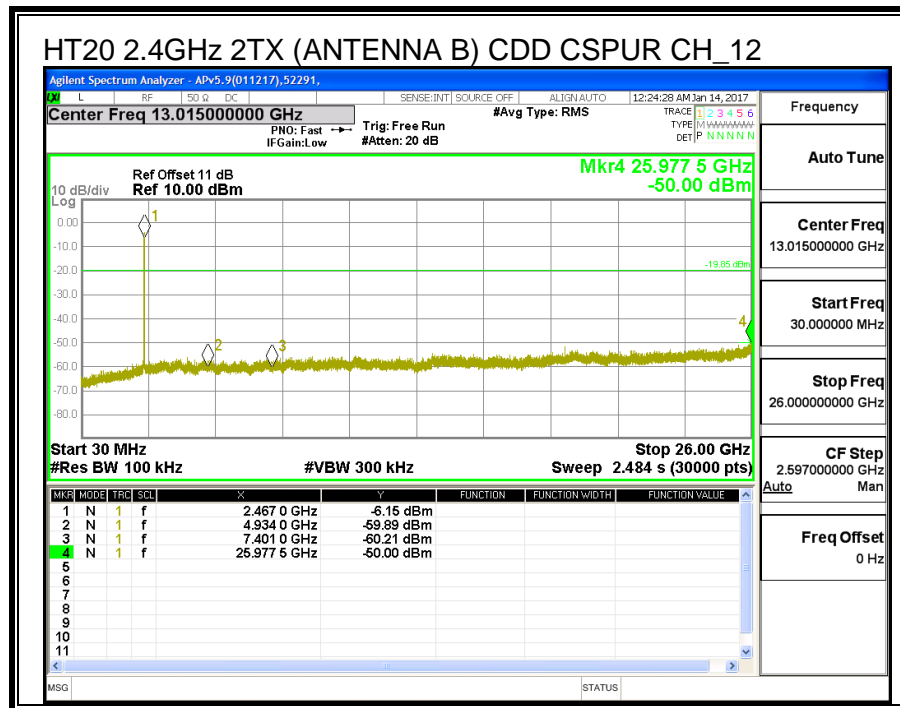
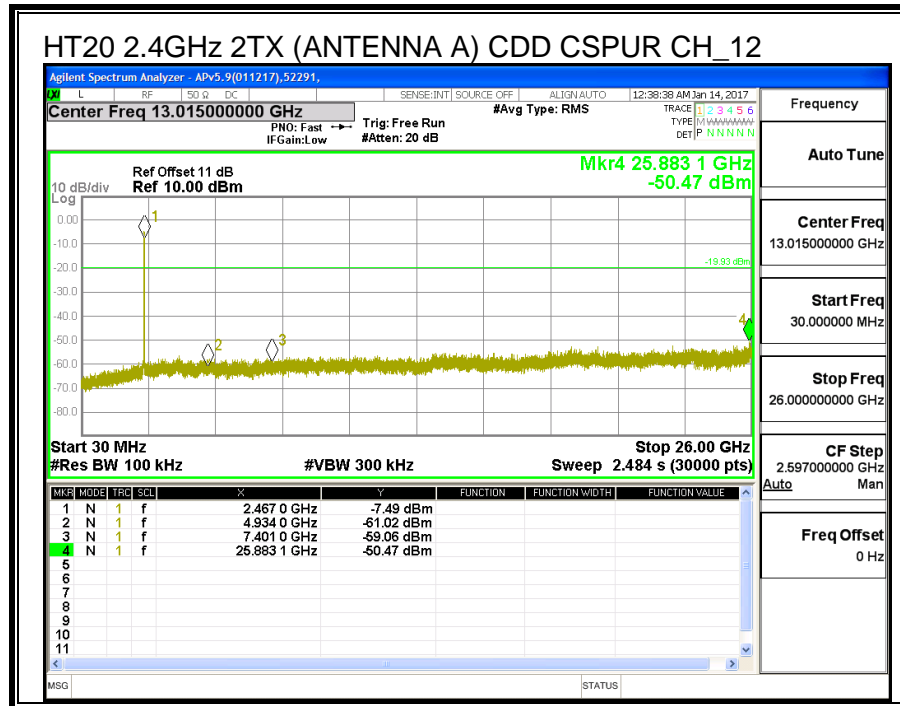


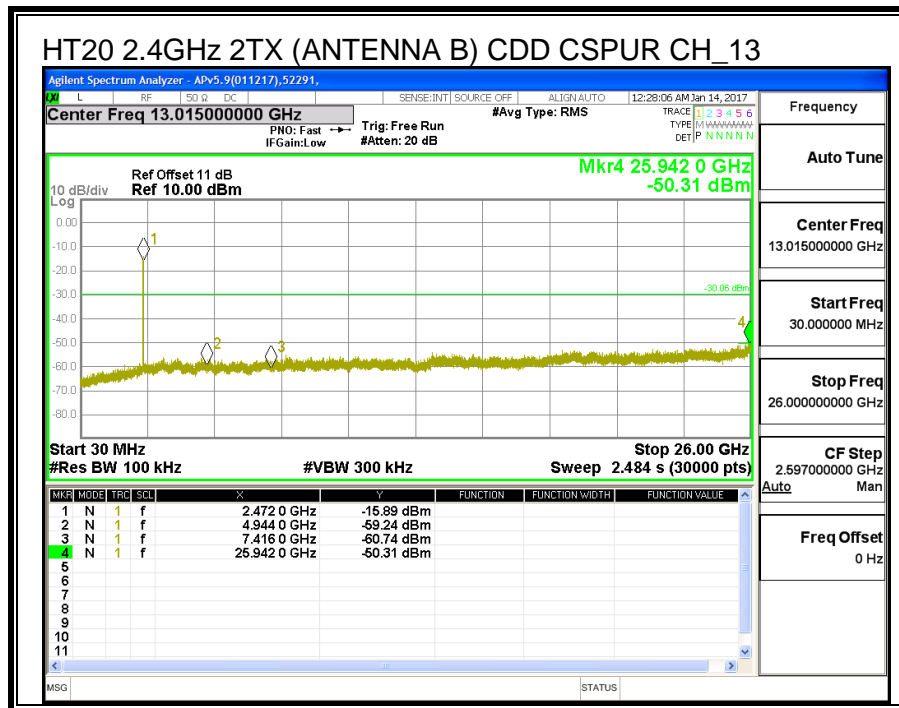
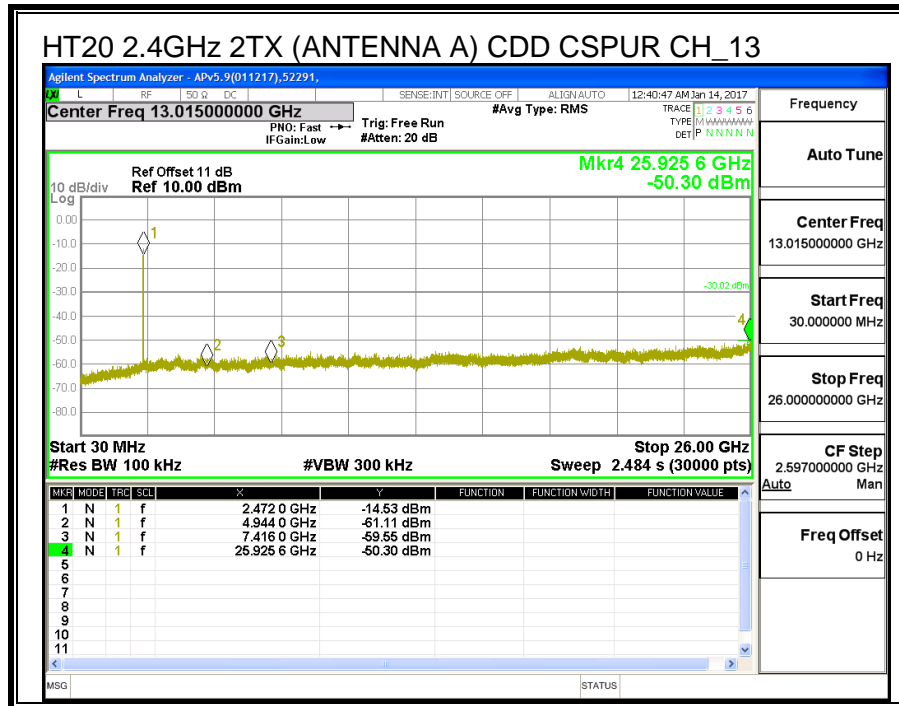












9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

IC RSS-GEN, Section 8.9 and 8.10.

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
30 - 88	100	40
88 - 216	150	43.5
216 - 960	200	46
Above 960	500	54

TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for measurement below 1GHz; 1.5 m above the ground plane for measurement above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

For pre-scans above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

For final measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and as applicable for average measurements.

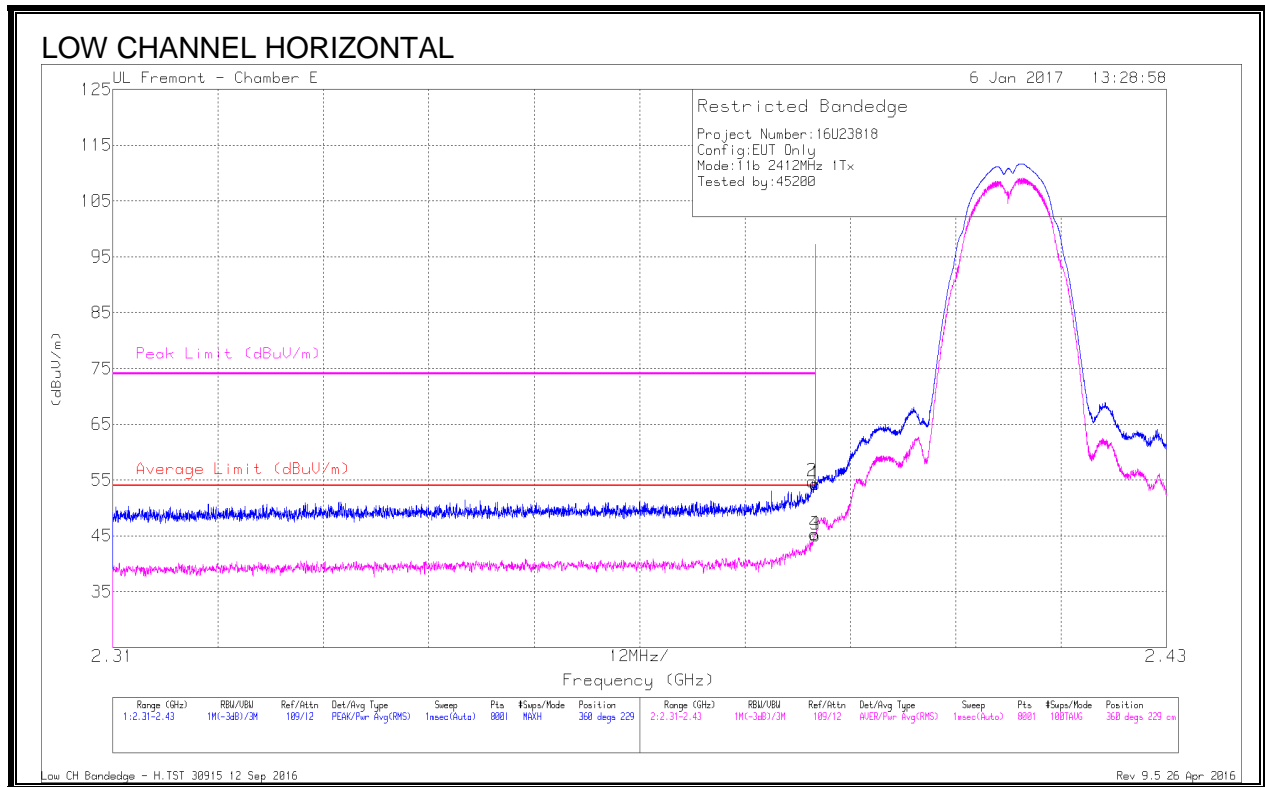
For 2.4 GHz band, the spectrum from 30 MHz to 1 GHz and from 18 GHz to 26 GHz is investigated with the transmitter set to the channel with the highest output power as worst case in each applicable band. The spectrum from 1 GHz to 18GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions

9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. 11b ANTENNA A SISO MODE IN THE 2.4GHz BAND

AUTHORIZED BANDEDGE (LOW CHANNEL, CH 1)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cb I/Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	41.9	Pk	32.1	-19.7	54.3	-	-	74	-19.7	360	229	H
2	* 2.39	42.39	Pk	32.1	-19.7	54.79	-	-	74	-19.21	360	229	H
3	* 2.39	32.74	RMS	32.1	-19.7	45.14	54	-8.86	-	-	360	229	H
4	* 2.39	32.94	RMS	32.1	-19.7	45.34	54	-8.66	-	-	360	229	H

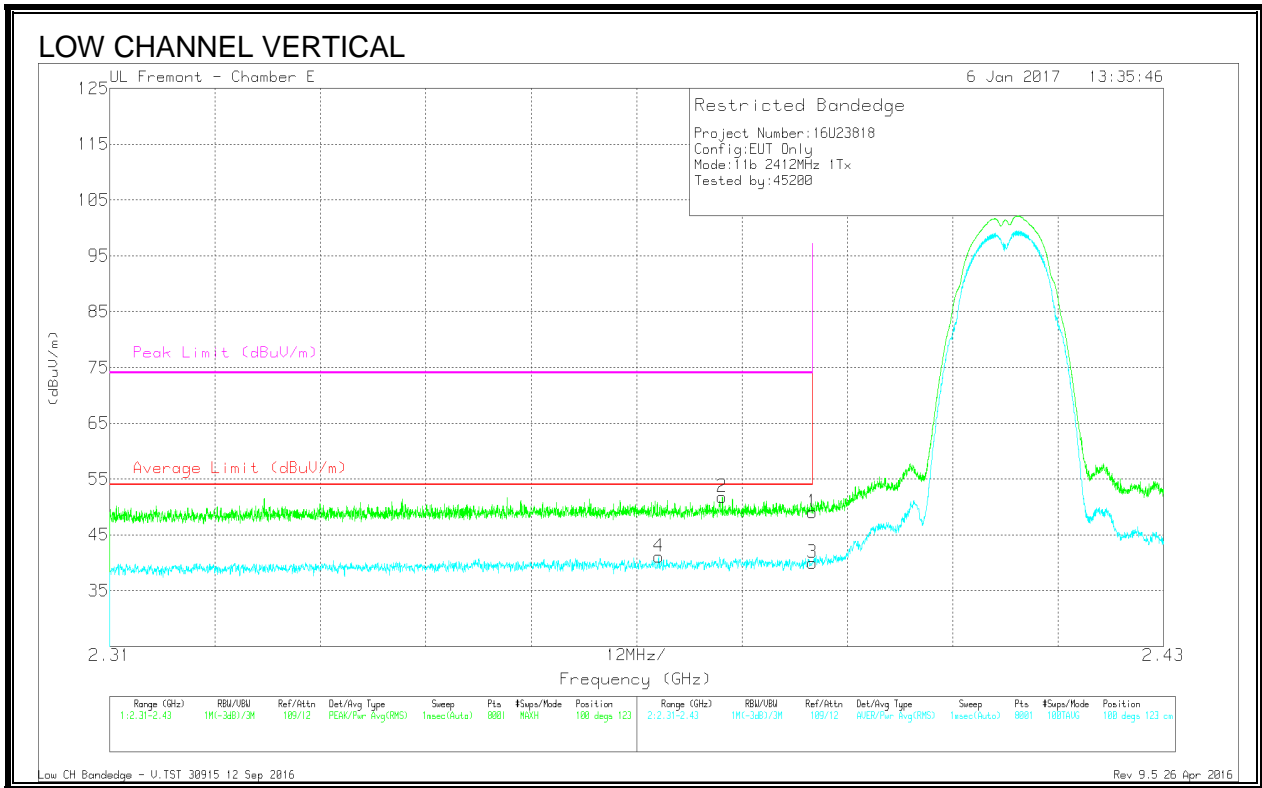
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

Low CH Bandedge - H.TST 30915 12 Sep 2016

Rev 9.5 26 Apr 2016



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cb I/Fitr/Pa d (dB)	Correct ed Readin g (dBuV/ m)	Averag e Limit (dBuV/ m)	Margin (dB)	Peak Limit (dBuV/ m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	* 2.373	28.77	RMS	32	-19.7	41.07	54	-12.93	-	-	100	123	V
2	* 2.38	39.37	Pk	32	-19.6	51.77	-	-	74	-22.23	100	123	V
1	* 2.39	36.62	Pk	32.1	-19.7	49.02	-	-	74	-24.98	100	123	V
3	* 2.39	27.61	RMS	32.1	-19.7	40.01	54	-13.99	-	-	100	123	V

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

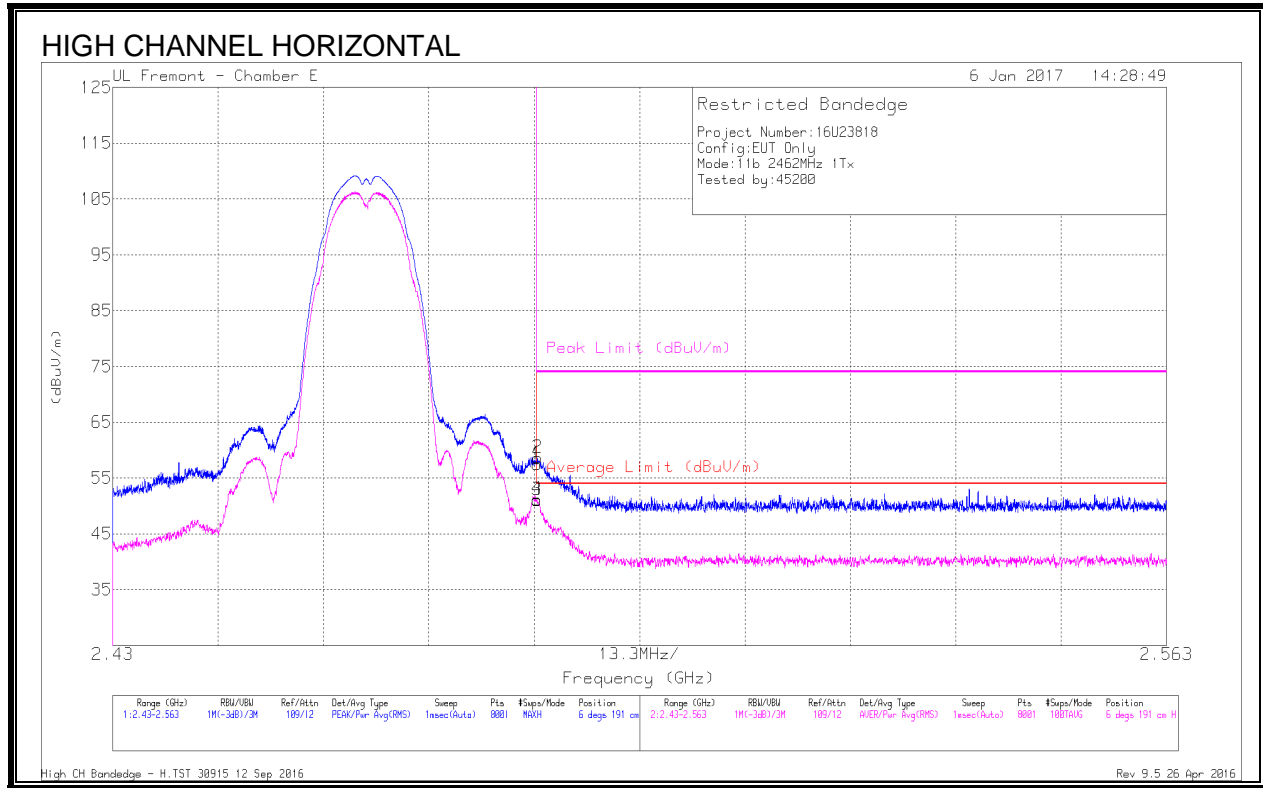
Pk - Peak detector

RMS - RMS detection

Low CH Bandedge - V.TST 30915 12 Sep 2016

Rev 9.5 26 Apr 2016

AUTHORIZED BANDEDGE (HIGH CHANNEL, CH 11)



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T711 (dB/m)	Amp/Cb I/Ftr/Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	44.93	Pk	32.3	-19.7	57.53	-	-	74	-16.47	6	191	H
2	* 2.484	45.97	Pk	32.3	-19.7	58.57	-	-	74	-15.43	6	191	H
3	* 2.484	38.49	RMS	32.3	-19.7	51.09	54	-2.91	-	-	6	191	H
4	* 2.484	38.51	RMS	32.3	-19.7	51.11	54	-2.89	-	-	6	191	H

* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

High CH Bandedge - H.TST 30915 12 Sep 2016

Rev 9.5 26 Apr 2016