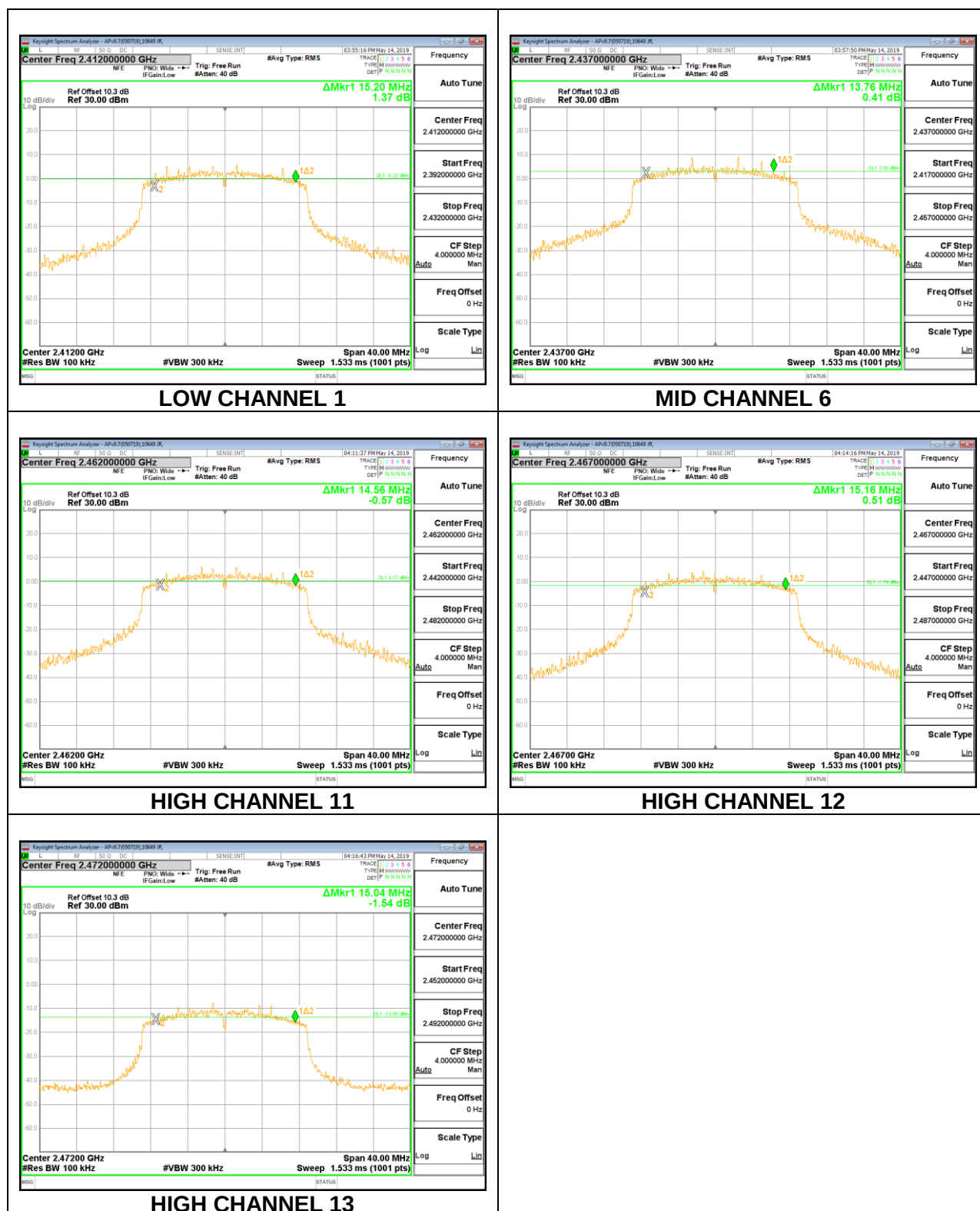




8.4. OUTPUT POWER

LIMITS

NCC LP0002 3.10.1.2(1)(C)

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 10.3 dB (including 10 dB pad and 0.3 dB cable) was entered as an offset in the power meter to allow for a gated peak reading of power.

DIRECTIONAL ANTENNA GAIN

For 1 TX:

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

Tested By:	10649 JR
Date:	5/20/2019

RESULTS

8.4.1. 802.11b MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-4.60	30.00	30	36	30.00
Mid 6	2437	-4.60	30.00	30	36	30.00
High 11	2462	-4.60	30.00	30	36	30.00
High 12	2467	-4.60	30.00	30	36	30.00
High 13	2472	-4.60	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	22.01	22.01	30.00	-7.99
Mid 6	2437	21.09	21.09	30.00	-8.91
High 11	2462	21.12	21.12	30.00	-8.88
High 12	2467	21.07	21.07	30.00	-8.93
High 13	2472	18.88	18.88	30.00	-11.12

8.4.2. 802.11g MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-4.60	30.00	30	36	30.00
Mid 6	2437	-4.60	30.00	30	36	30.00
High 11	2462	-4.60	30.00	30	36	30.00
High 12	2467	-4.60	30.00	30	36	30.00
High 13	2472	-4.60	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	22.66	22.66	30.00	-7.34
Mid 6	2437	23.79	23.79	30.00	-6.21
High 11	2462	23.43	23.43	30.00	-6.57
High 12	2467	22.83	22.83	30.00	-7.17
High 13	2472	13.47	13.47	30.00	-16.53

8.4.3. 802.11n HT20 MODE

Limits

Channel	Frequency (MHz)	Directional Gain (dBi)	FCC Power Limit (dBm)	ISED Power Limit (dBm)	ISED EIRP Limit (dBm)	Max Power (dBm)
Low 1	2412	-4.60	30.00	30	36	30.00
Mid 6	2437	-4.60	30.00	30	36	30.00
High 11	2462	-4.60	30.00	30	36	30.00
High 12	2467	-4.60	30.00	30	36	30.00
High 13	2472	-4.60	30.00	30	36	30.00

Results

Channel	Frequency (MHz)	Meas Power (dBm)	Total Corr'd Power (dBm)	Power Limit (dBm)	Margin (dB)
Low 1	2412	22.72	22.72	30.00	-7.28
Mid 6	2437	23.30	23.30	30.00	-6.70
High 11	2462	23.01	23.01	30.00	-6.99
High 12	2467	21.77	21.77	30.00	-8.23
High 13	2472	10.93	10.93	30.00	-19.07

8.5. AVERAGE POWER

LIMITS

None; for reporting purposes only

TEST PROCEDURE

The transmitter output is connected to a power meter.

The cable assembly insertion loss of 10.3 dB (including 10 dB pad and 0.3 dB cable) was entered as an offset in the power meter to allow for a gated average reading of power

RESULTS

Tested By:	10649 JR
Date:	5/20/2019

8.5.1. 802.11b MODE

Channel	Frequency (MHz)	Chain 0 Power (dBm)
Low 1	2412	18.98
Mid 6	2437	18.33
High 11	2462	18.27
High 12	2467	18.12
High 13	2472	16.02

8.5.2. 802.11g MODE

Channel	Frequency (MHz)	Chain 0 Power (dBm)
Low 1	2412	16.95
Mid 6	2437	17.79
High 11	2462	17.40
High 12	2467	15.43
High 13	2472	6.23

8.5.3. 802.11n HT20 MODE

Channel	Frequency (MHz)	Chain 0 Power (dBm)
Low 1	2412	16.60
Mid 6	2437	17.66
High 11	2462	17.21
High 12	2467	14.26
High 13	2472	3.23

8.6. POWER SPECTRAL DENSITY

LIMITS

NCC LP0002 3.10.1.6(2)(B)

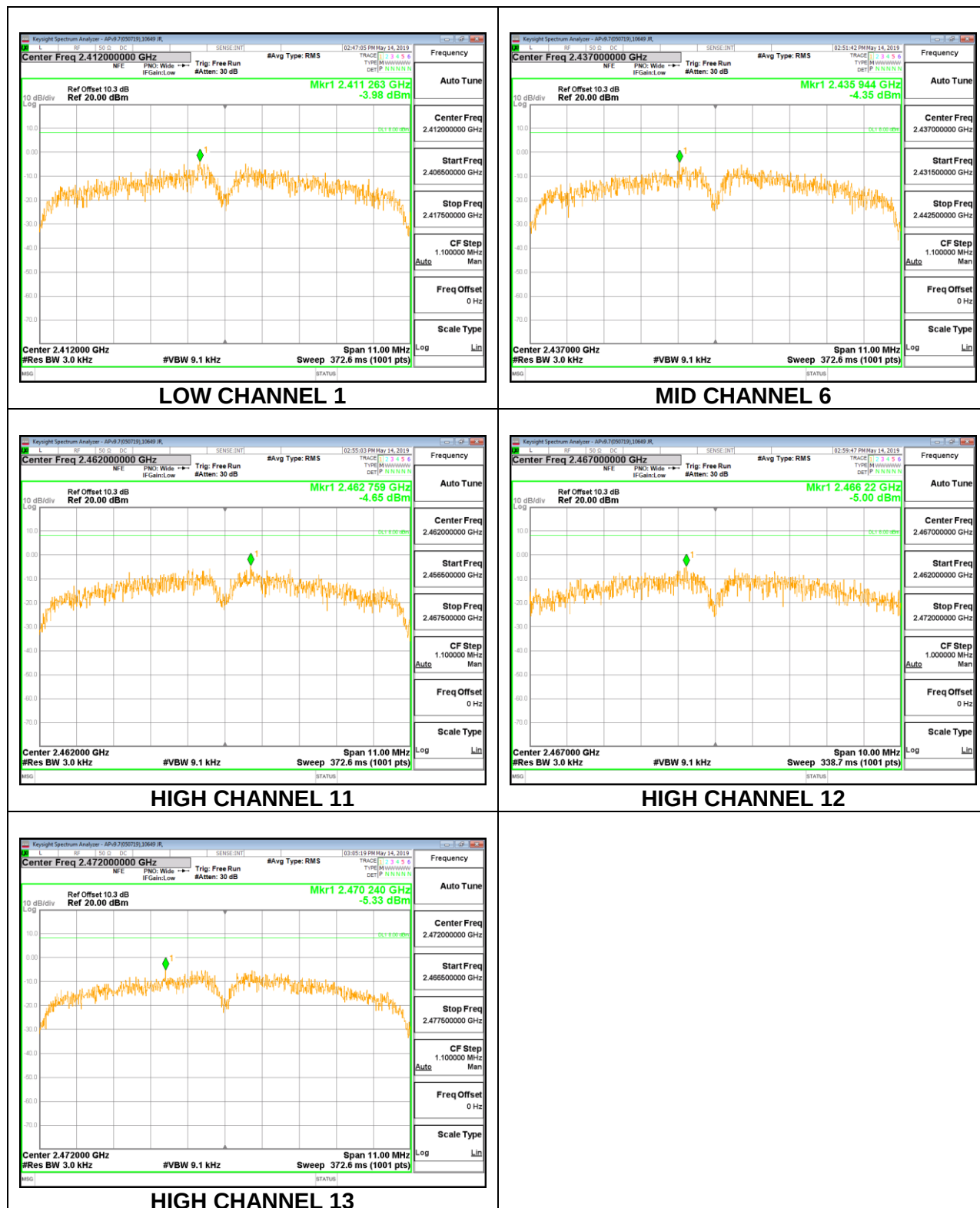
The power spectral density conducted from the transmitter to the antenna shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

RESULTS

8.6.1. 802.11b MODE

PSD Results

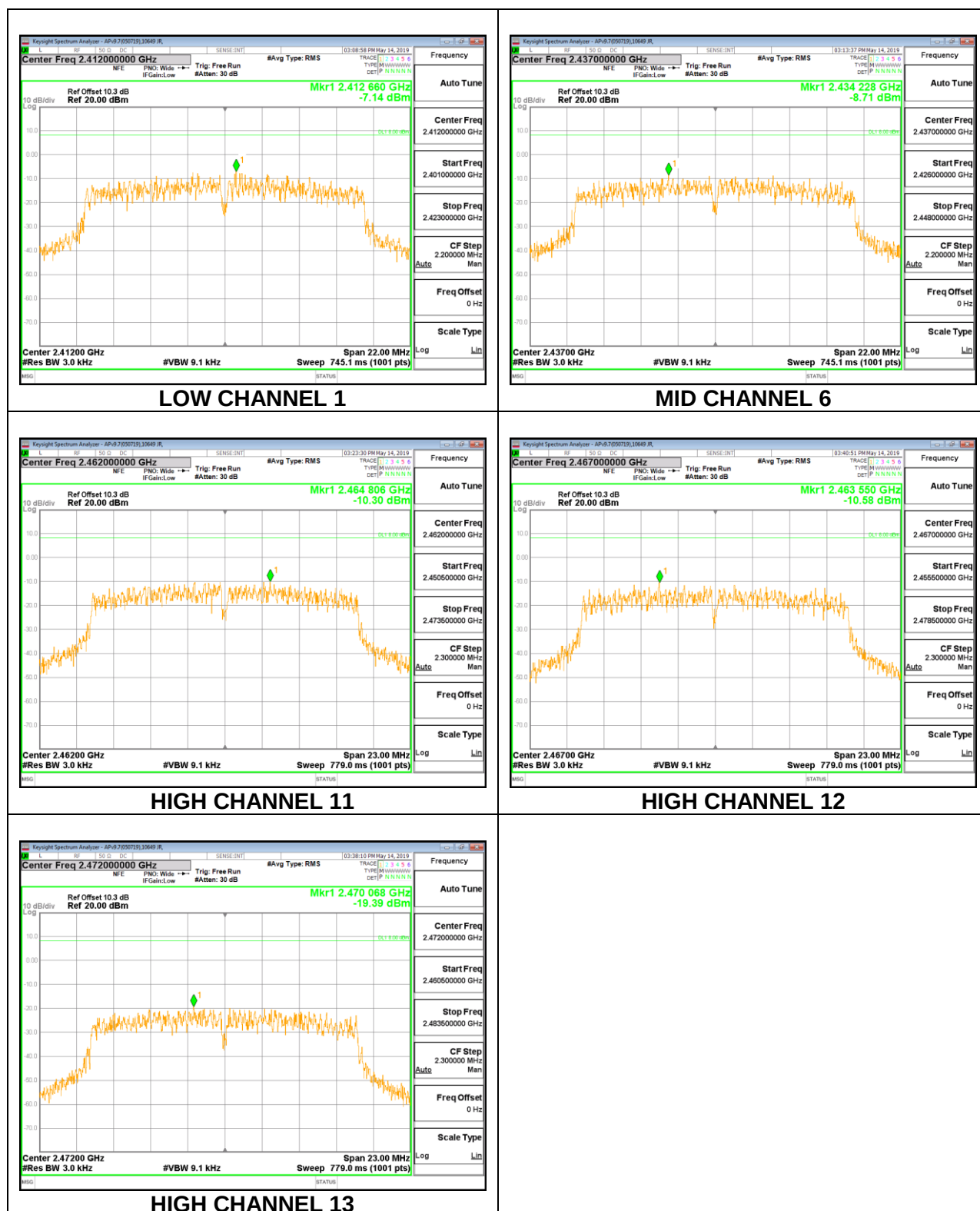
Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-3.98	-3.98	8.0	-12.0
Mid 6	2437	-4.35	-4.35	8.0	-12.4
High 11	2462	-4.65	-4.65	8.0	-12.7
High 12	2467	-5.00	-5.00	8.0	-13.0
High 13	2472	-5.33	-5.33	8.0	-13.3



8.6.2. 802.11g MODE

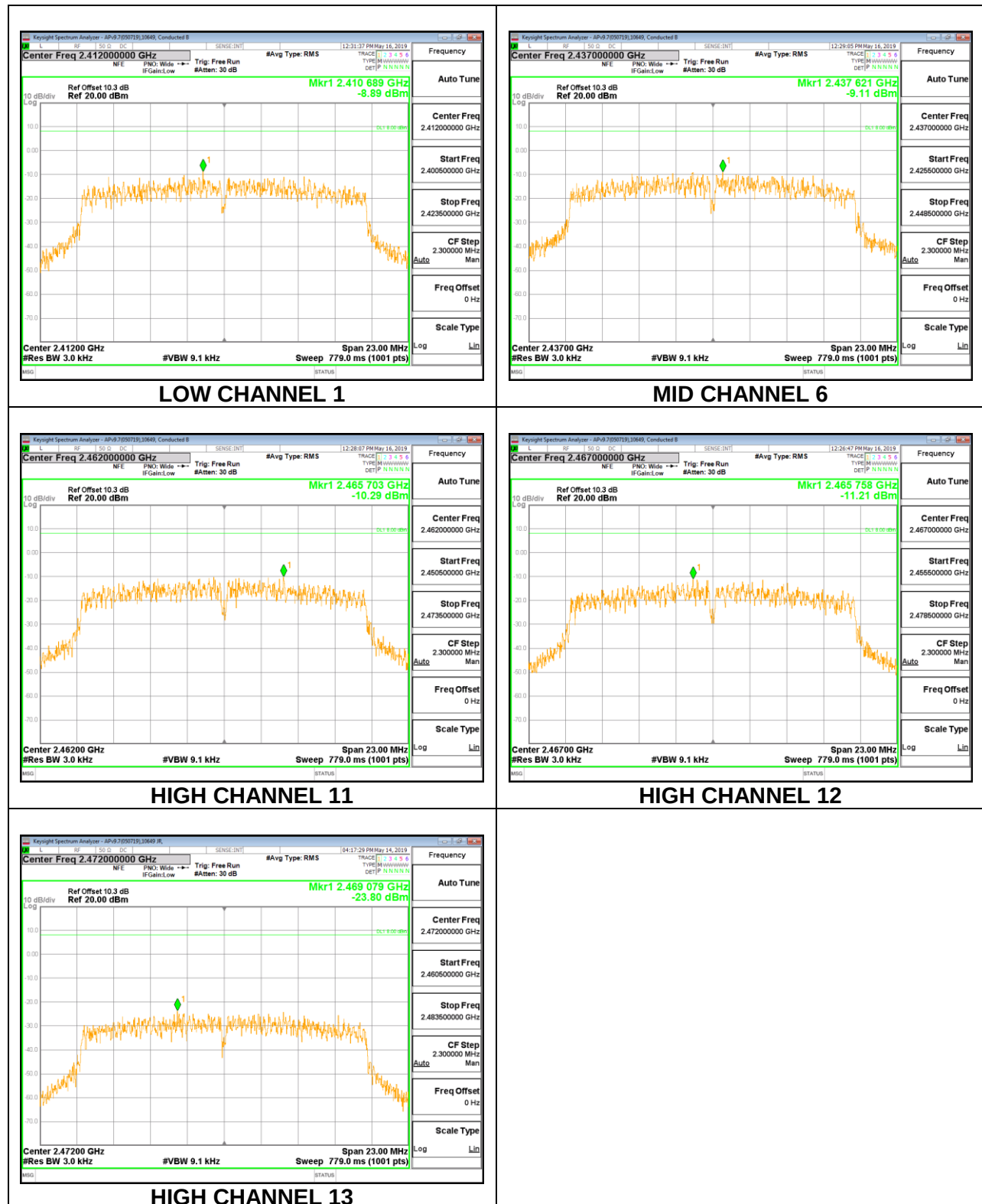
PSD Results

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-7.14	-7.14	8.0	-15.1
Mid 6	2437	-8.71	-8.71	8.0	-16.7
High 11	2462	-10.30	-10.30	8.0	-18.3
High 12	2467	-10.58	-10.58	8.0	-18.6
High 13	2472	-19.39	-19.39	8.0	-27.4



8.6.3. 802.11n HT20 MODE

Channel	Frequency (MHz)	Chain 0 Meas (dBm/ 3kHz)	Total Corr'd PSD (dBm/ 3kHz)	Limit (dBm/ 3kHz)	Margin (dB)
Low 1	2412	-8.89	-8.89	8.0	-16.9
Mid 6	2437	-9.11	-9.11	8.0	-17.1
High 11	2462	-10.29	-10.29	8.0	-18.3
High 12	2467	-11.21	-11.21	8.0	-19.2
High 13	2472	-23.80	-23.80	8.0	-31.8



8.7. CONDUCTED SPURIOUS EMISSIONS

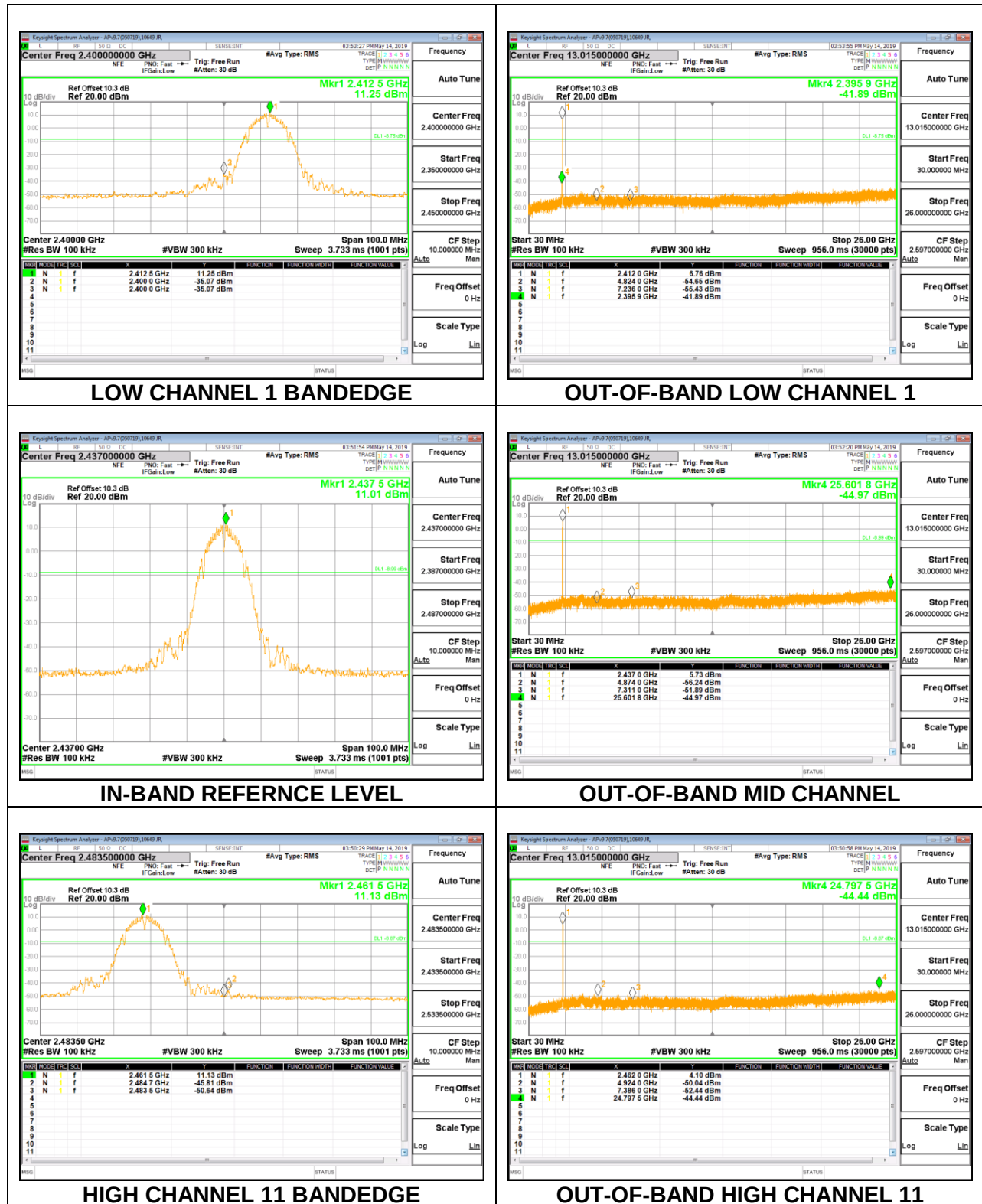
LIMITS

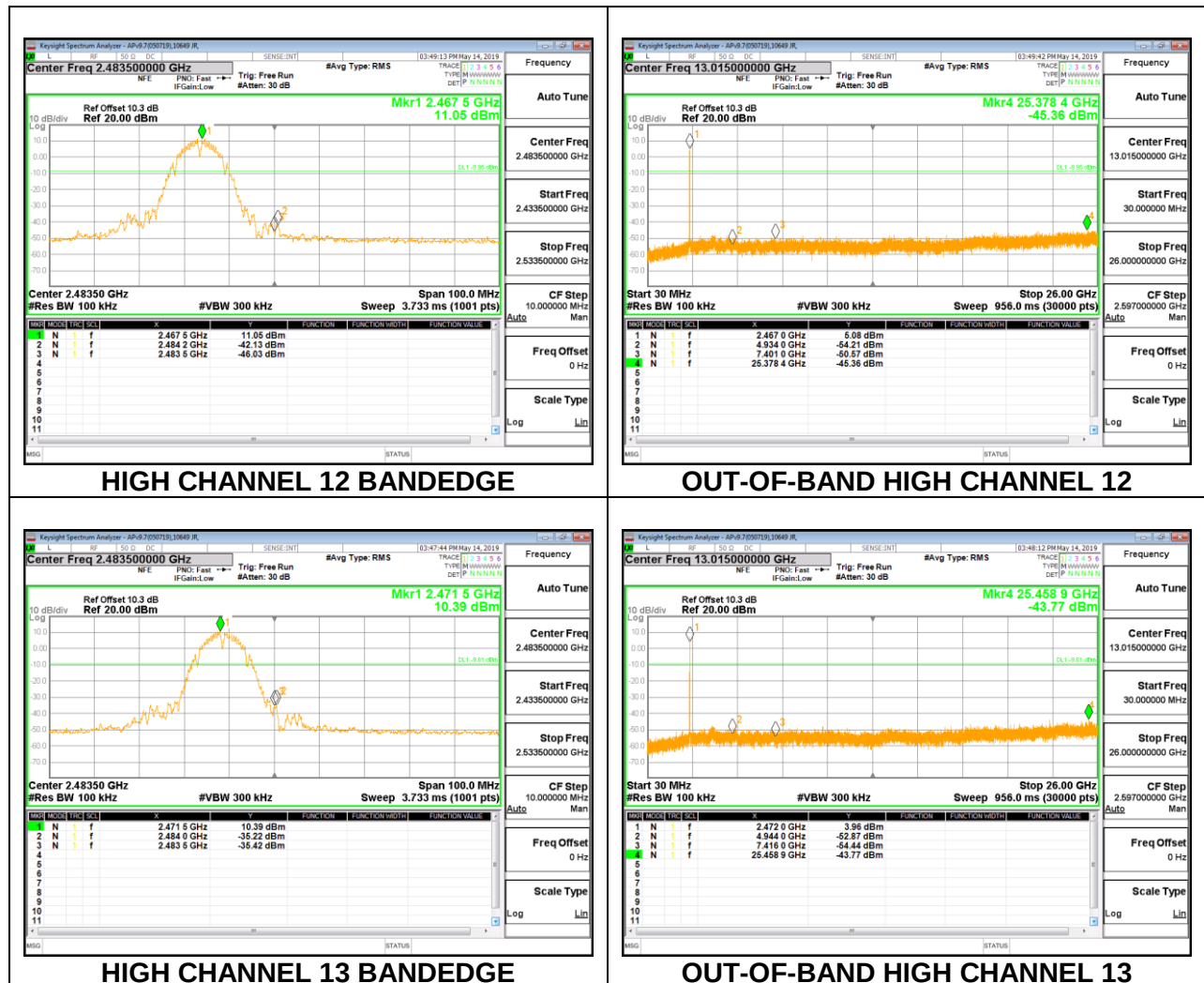
NCC LP0002 3.10.1.5(2)

Output power was measured based on the use of peak measurement, therefore the required attenuation is 20 dB.

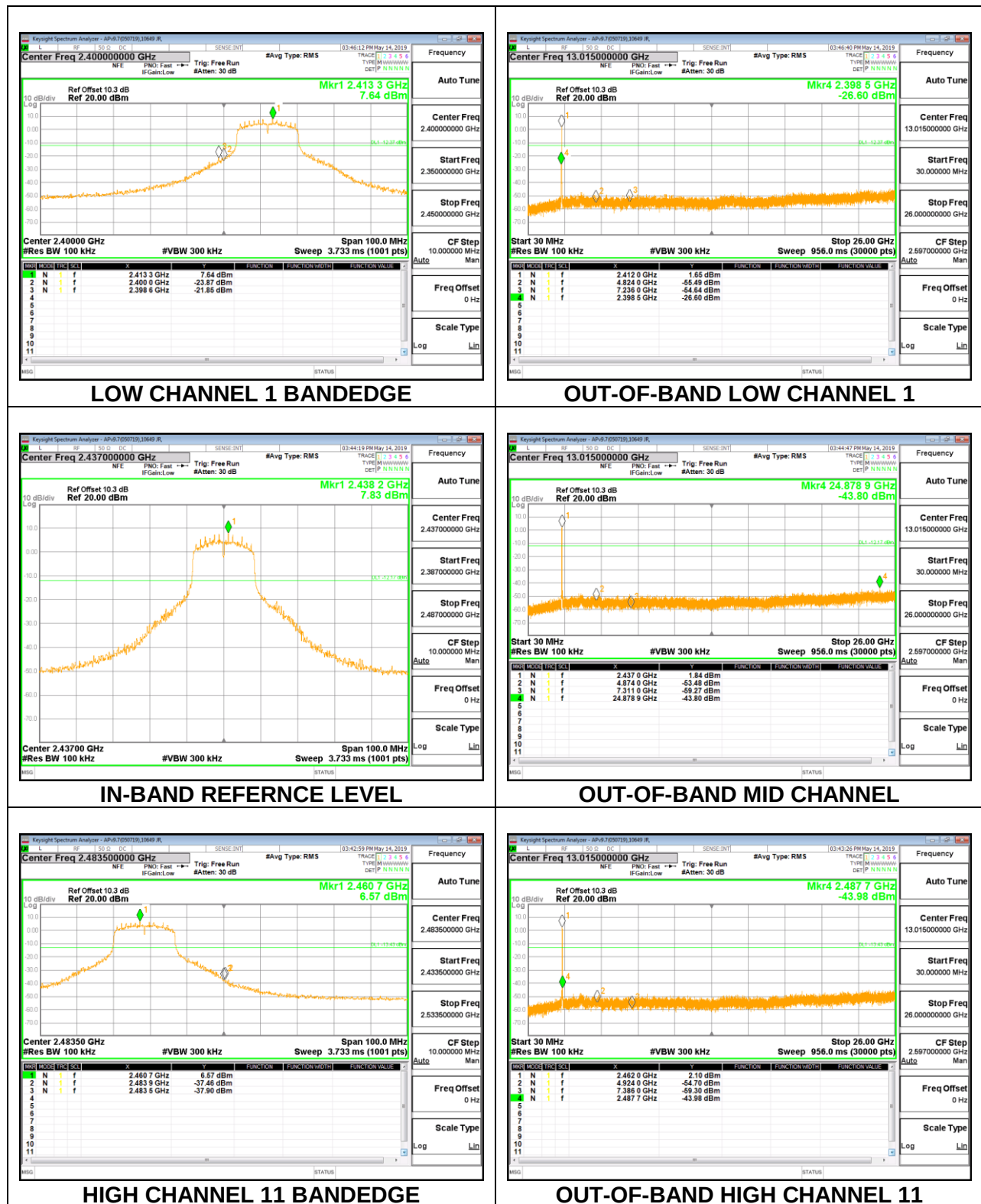
RESULTS

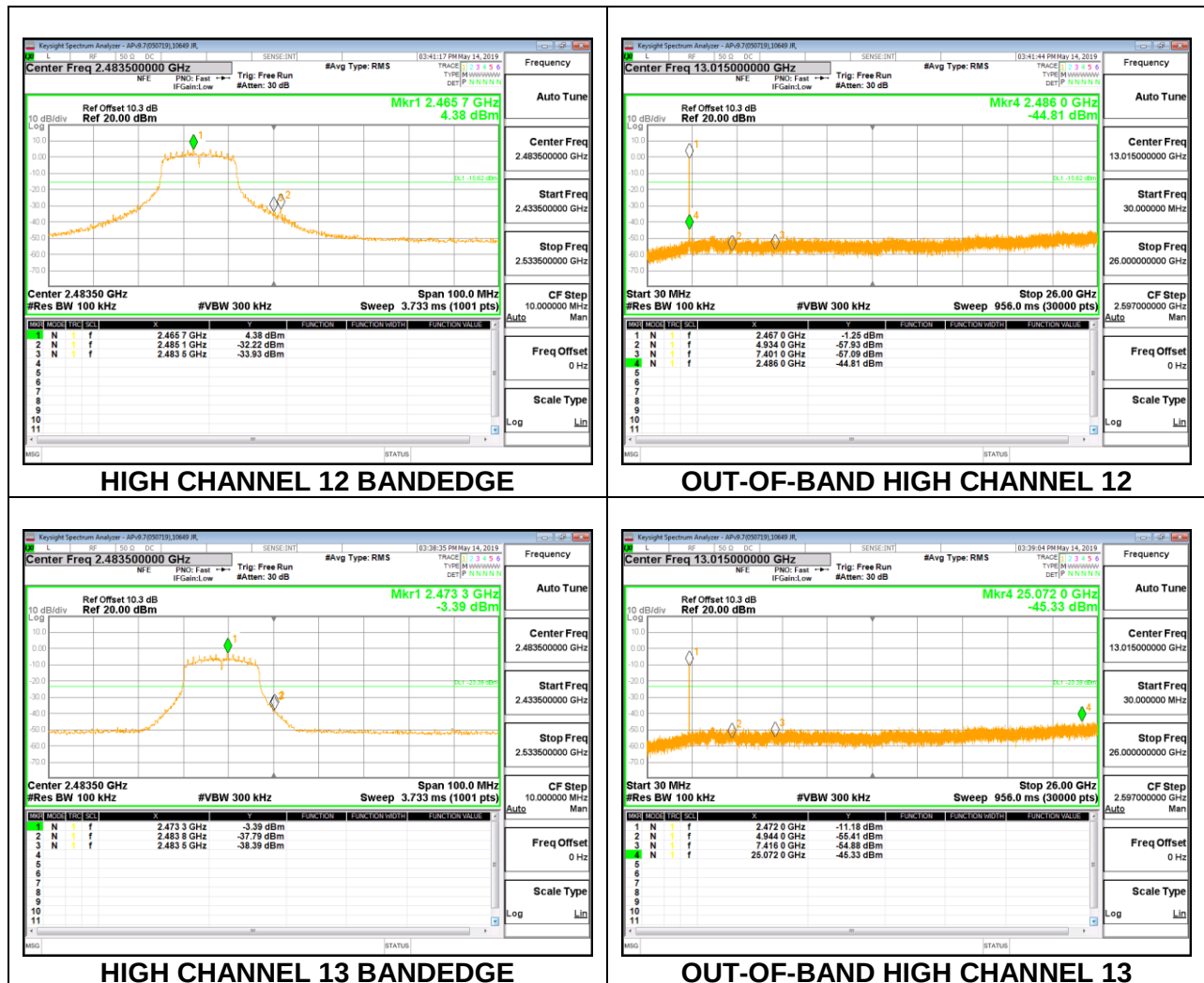
8.7.1. 802.11b MODE



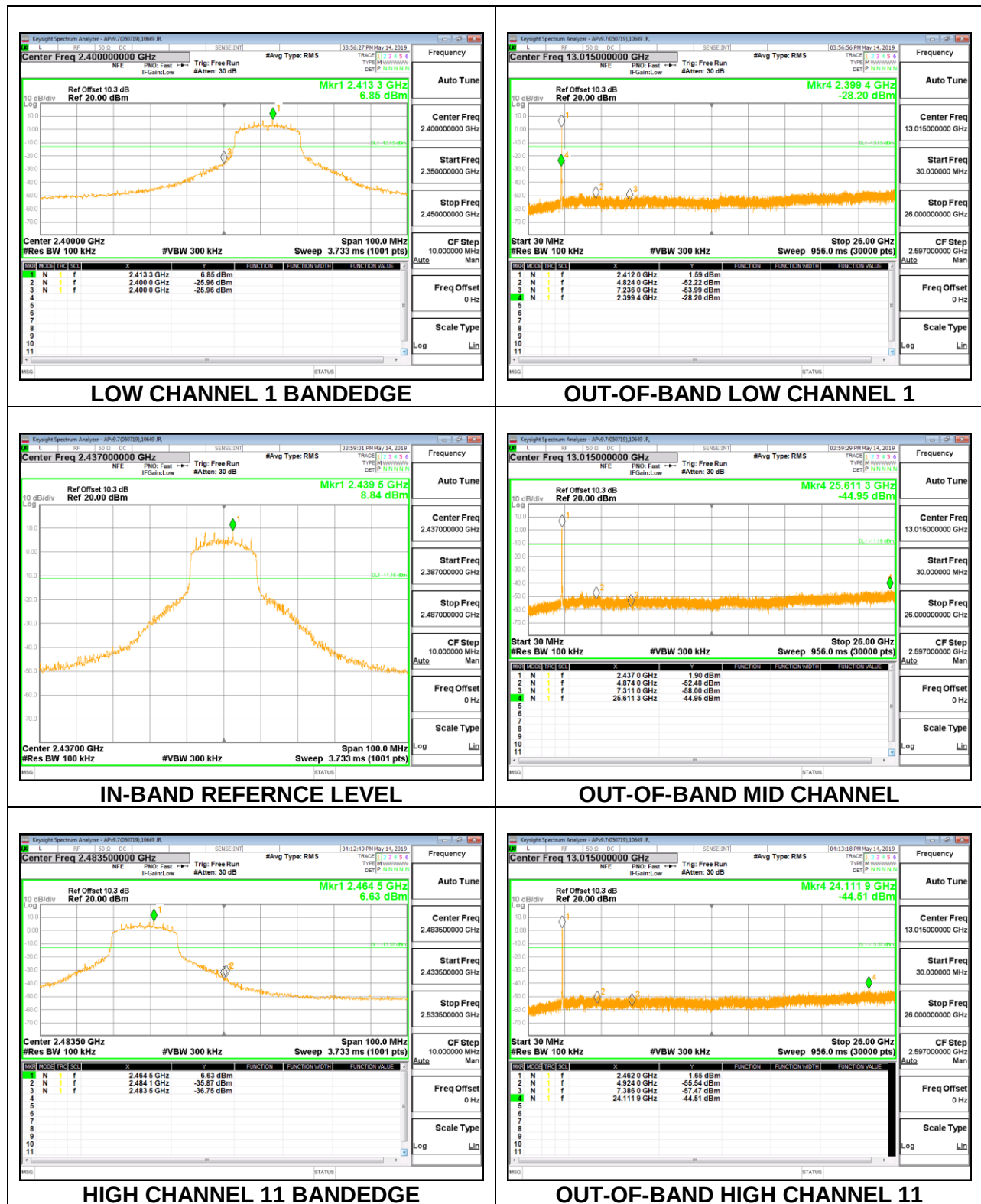


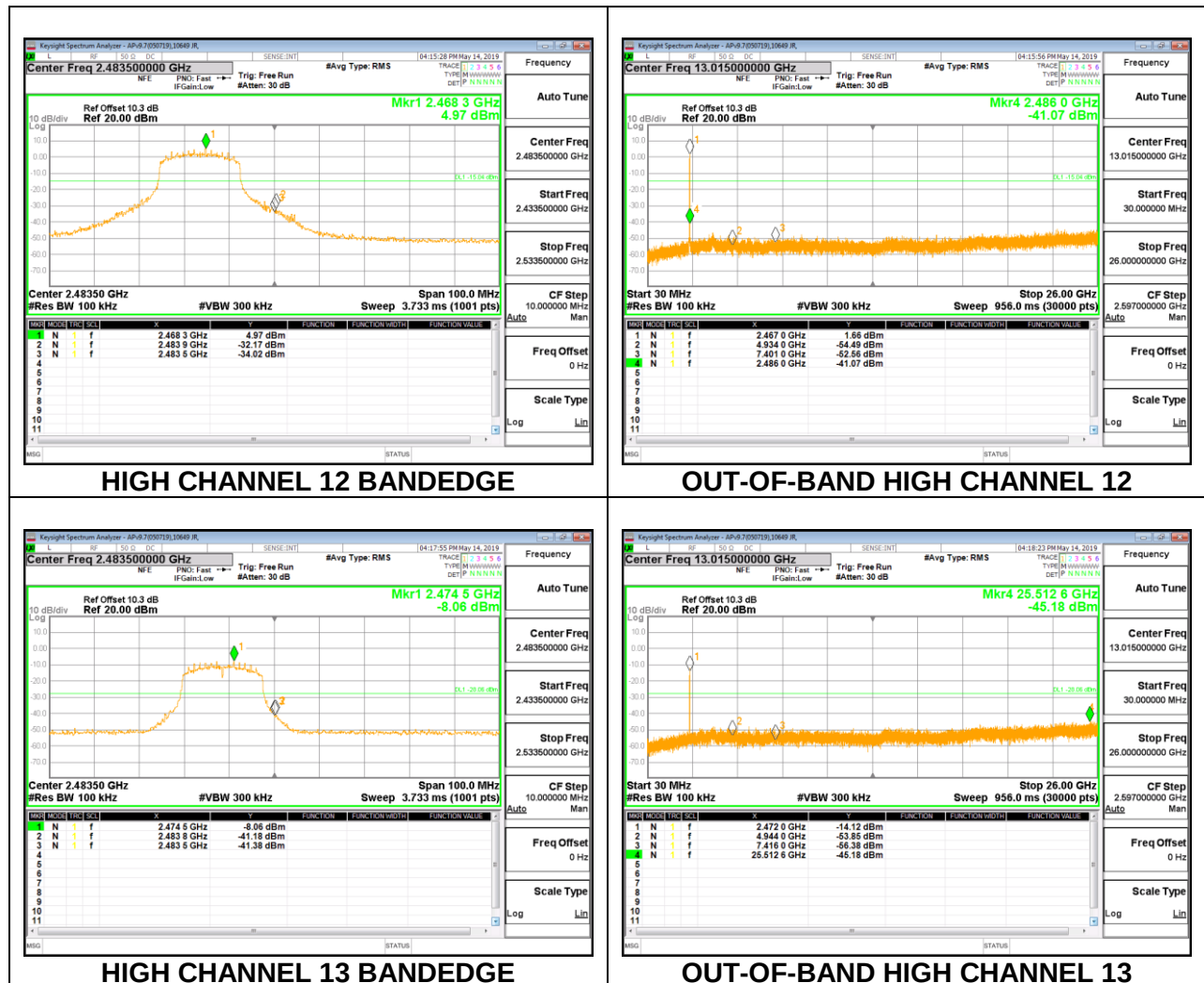
8.7.2. 802.11g MODE





8.7.3. 802.11n HT20 MODE





9. RADIATED TEST RESULTS

LIMITS

NCC LP0002 §2.7 and §2.8

Frequency Range (MHz)	Field Strength Limit (uV/m) at 3 m	Field Strength Limit (dBuV/m) at 3 m
0.009-0.490	2400/F(kHz) @ 300 m	-
0.490-1.705	24000/F(kHz) @ 30 m	-
1.705 - 30	30 @ 30m	-
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.

The spectrum from 1 GHz to 18 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band. Below 1GHz and above 18GHz emissions, the channel with the highest output power was tested.

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.

For below 30MHz testing, investigation was done on three antenna orientations (parallel, perpendicular, and ground-parallel), parallel and perpendicular are the worst orientations, therefore testing was performed on these two orientations only.

KDB 414788 Open Field Site(OFS) and Chamber Correlation Justification

Base on FCC 15.31 (f) (2): measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field.

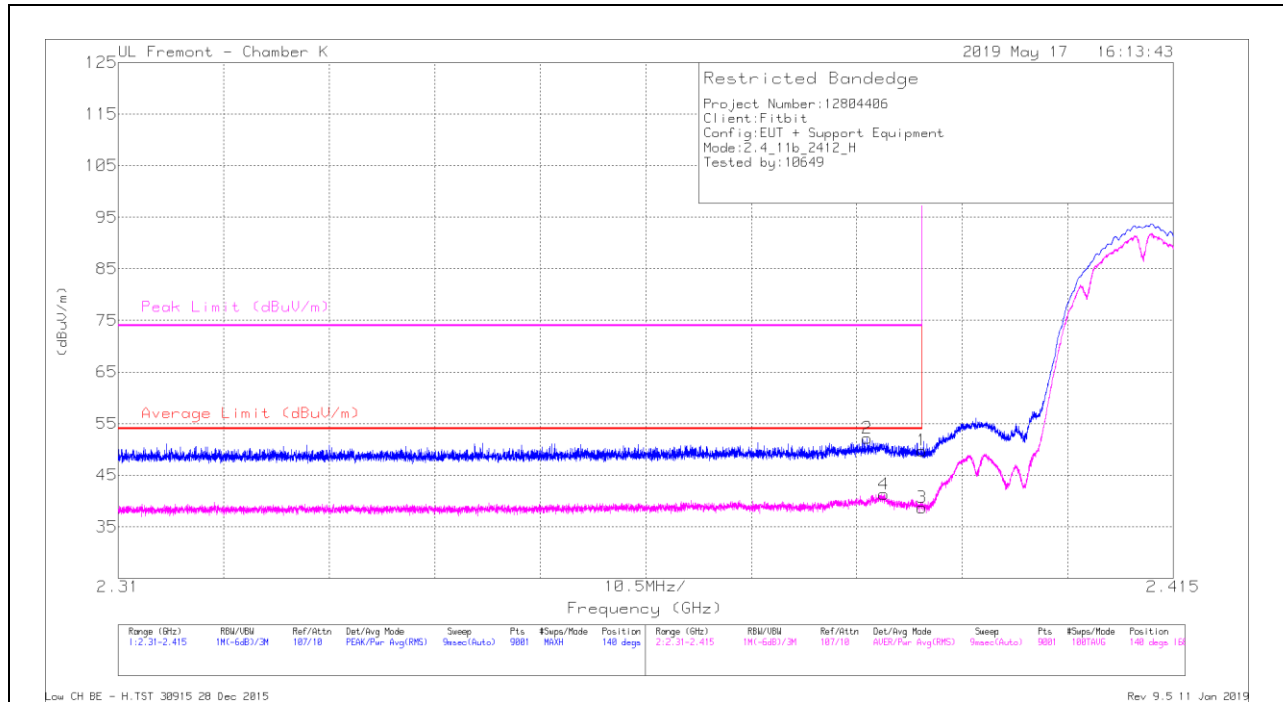
OFS and chamber correlation testing had been performed and chamber measured test result is the worst case test result.

9.1. TRANSMITTER ABOVE 1 GHz

9.1.1. TX ABOVE 1 GHz 802.11b MODE IN THE 2.4 GHz BAND

BANDEDGE (LOW CHANNEL, CH 1)

HORIZONTAL RESULT



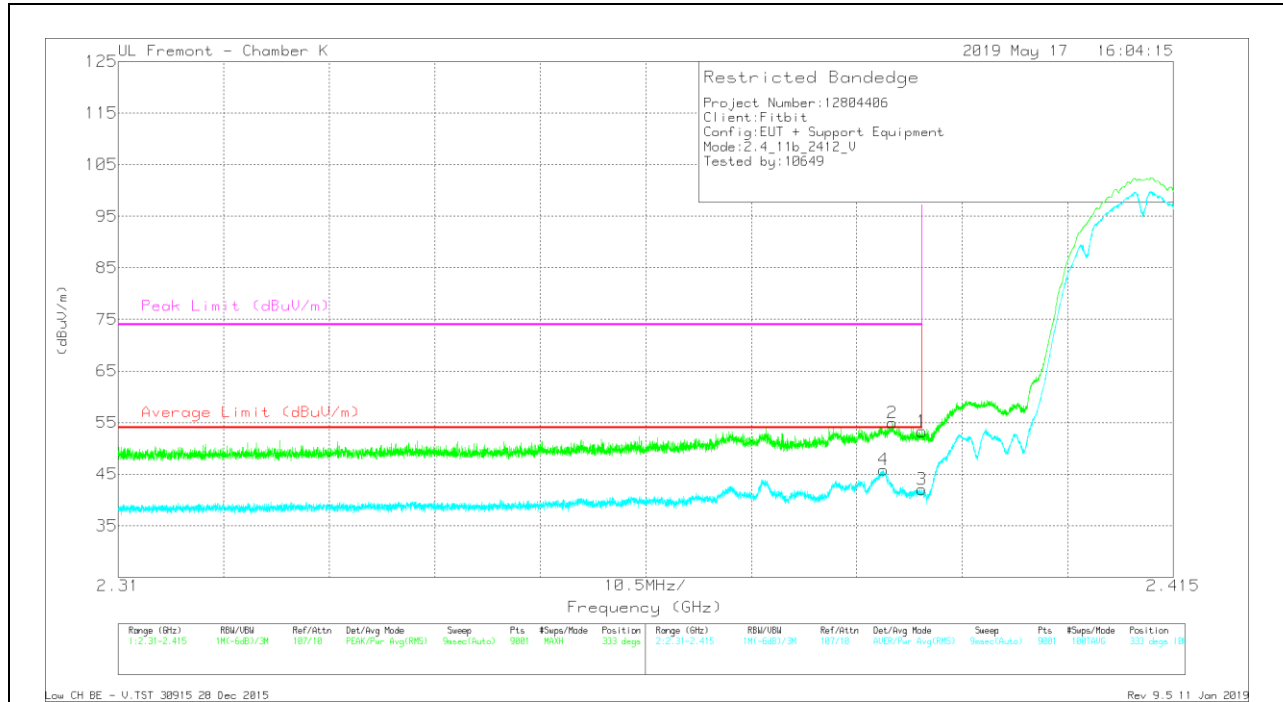
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Ftr /Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	42.17	Pk	32.3	-24.7	49.77	-	-	74	-24.23	140	168	H
2	* 2.385	44.45	Pk	32.3	-24.6	52.15	-	-	74	-21.85	140	168	H
3	* 2.39	31.1	RMS	32.3	-24.7	38.7	54	-15.3	-	-	140	168	H
4	* 2.386	33.59	RMS	32.3	-24.6	41.29	54	-12.71	-	-	140	168	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBUV)	Det	AF T863 (dBm)	Amp/Cbl/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	45.72	Pk	32.3	-24.7	53.32	-	-	74	-20.68	333	108	V
2	* 2.387	47.24	Pk	32.3	-24.6	54.94	-	-	74	-19.06	333	108	V
3	* 2.39	34.44	RMS	32.3	-24.7	42.04	54	-11.96	-	-	333	108	V
4	* 2.386	38.15	RMS	32.3	-24.6	45.85	54	-8.15	-	-	333	108	V

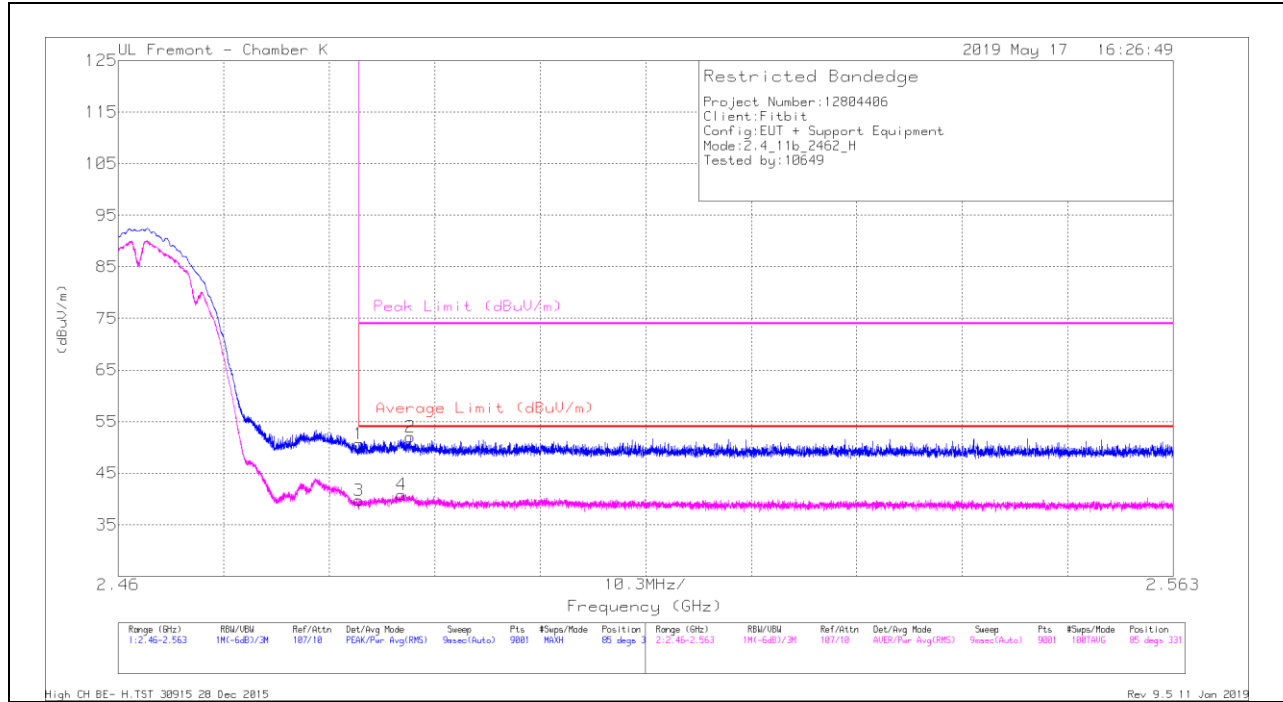
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL, CH 11)

HORIZONTAL RESULT



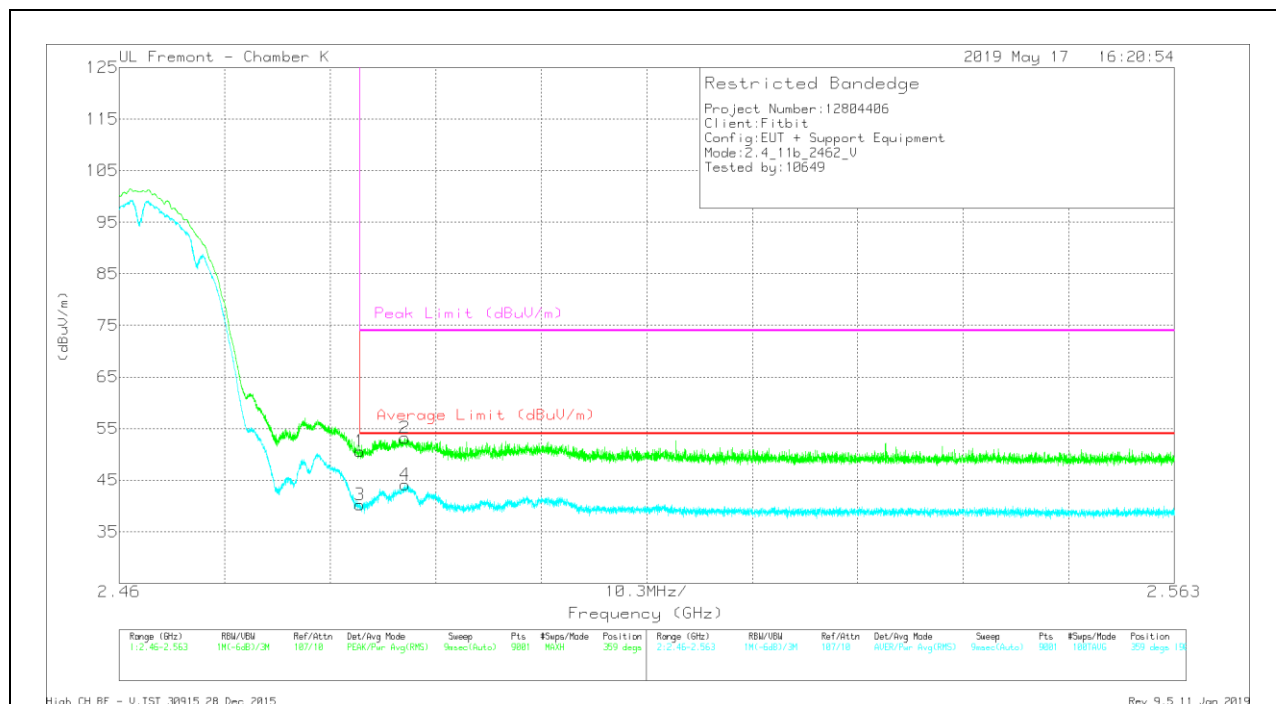
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Fitr /Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	42.85	Pk	32.6	-24.8	50.65	-	-	74	-23.35	85	331	H
2	* 2.489	44.22	Pk	32.6	-24.8	52.02	-	-	74	-21.98	85	331	H
3	* 2.484	31.89	RMS	32.6	-24.8	39.69	54	-14.31	-	-	85	331	H
4	* 2.488	33.03	RMS	32.6	-24.8	40.83	54	-13.17	-	-	85	331	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/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	42.8	Pk	32.6	-24.8	50.6	-	-	74	-23.4	359	190	V
2	* 2.488	45.39	Pk	32.6	-24.8	53.19	-	-	74	-20.81	359	190	V
3	* 2.484	32.42	RMS	32.6	-24.8	40.22	54	-13.78	-	-	359	190	V
4	* 2.488	36.32	RMS	32.6	-24.8	44.12	54	-9.88	-	-	359	190	V

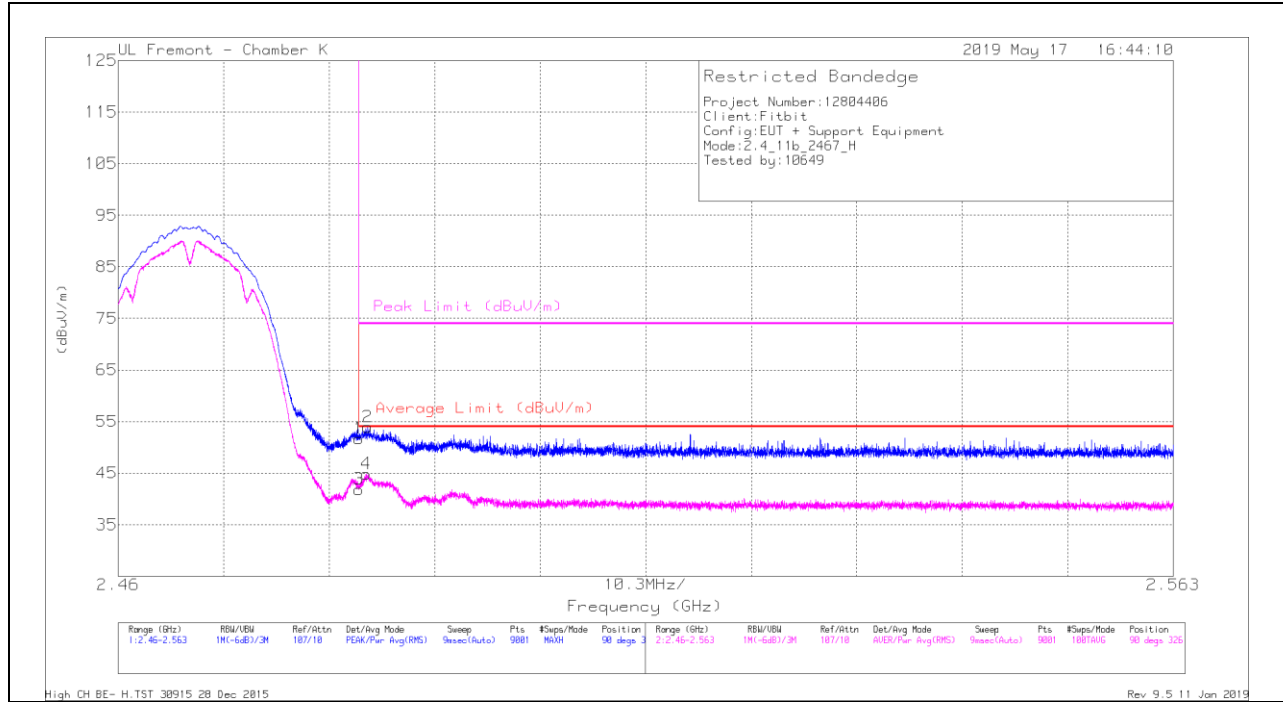
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL, CH 12)

HORIZONTAL RESULT



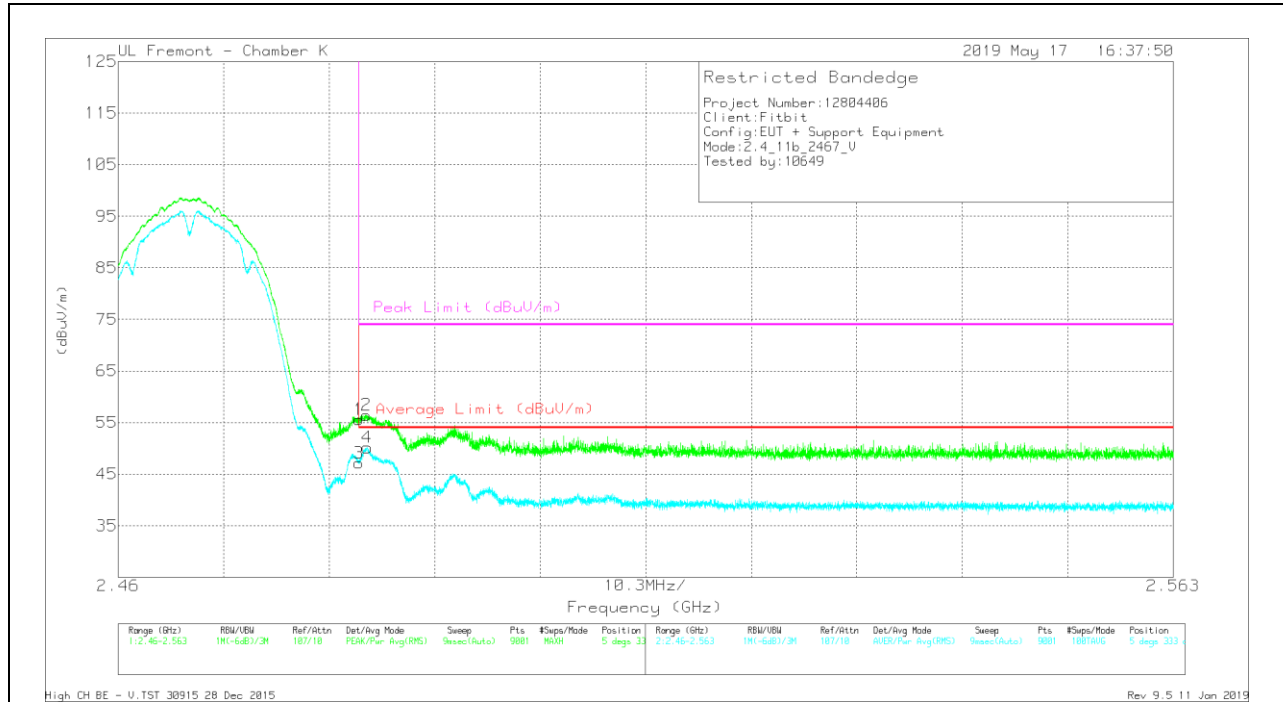
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/Fitr /Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	43.91	Pk	32.6	-24.8	51.71	-	-	74	-22.29	90	326	H
2	* 2.484	46.14	Pk	32.6	-24.8	53.94	-	-	74	-20.06	90	326	H
3	* 2.484	34.05	RMS	32.6	-24.8	41.85	54	-12.15	-	-	90	326	H
4	* 2.484	37.07	RMS	32.6	-24.8	44.87	54	-9.13	-	-	90	326	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Amp/Cbl/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	47.77	Pk	32.6	-24.8	55.57	-	-	74	-18.43	5	333	V
2	* 2.484	48.64	Pk	32.6	-24.8	56.44	-	-	74	-17.56	5	333	V
3	* 2.484	39.34	RMS	32.6	-24.8	47.14	54	-6.86	-	-	5	333	V
4	* 2.484	42.35	RMS	32.6	-24.8	50.15	54	-3.85	-	-	5	333	V

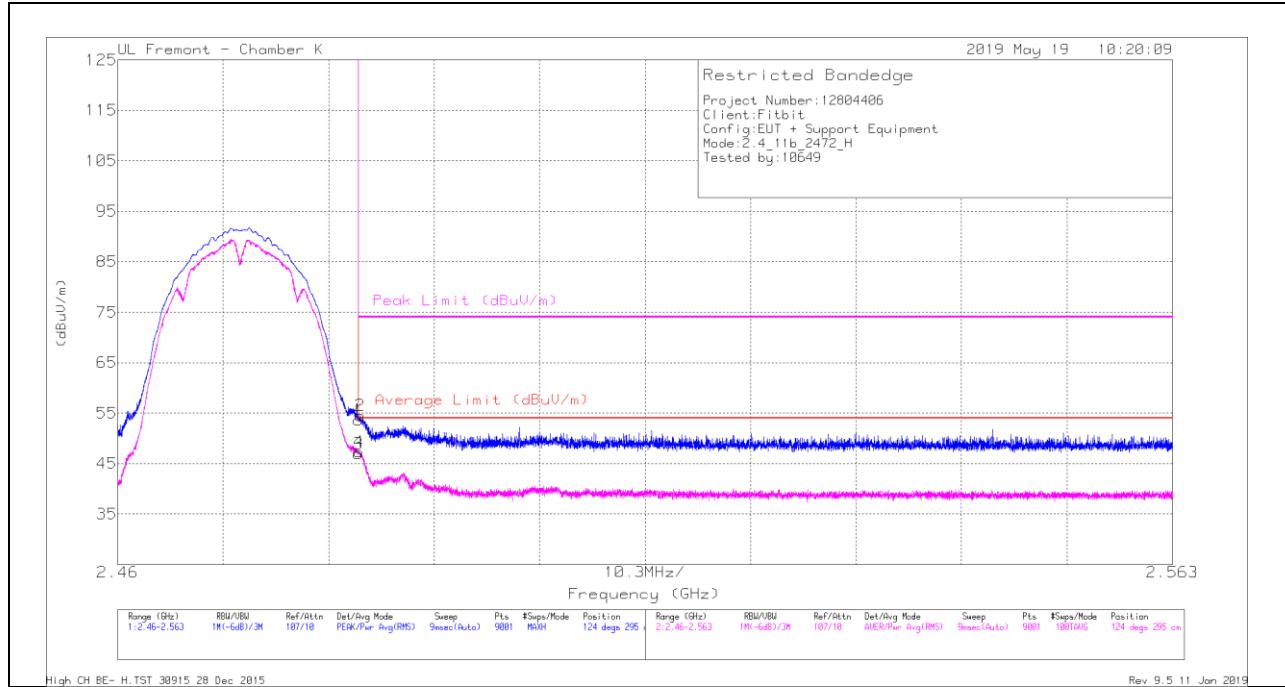
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL, CH 13)

HORIZONTAL RESULT



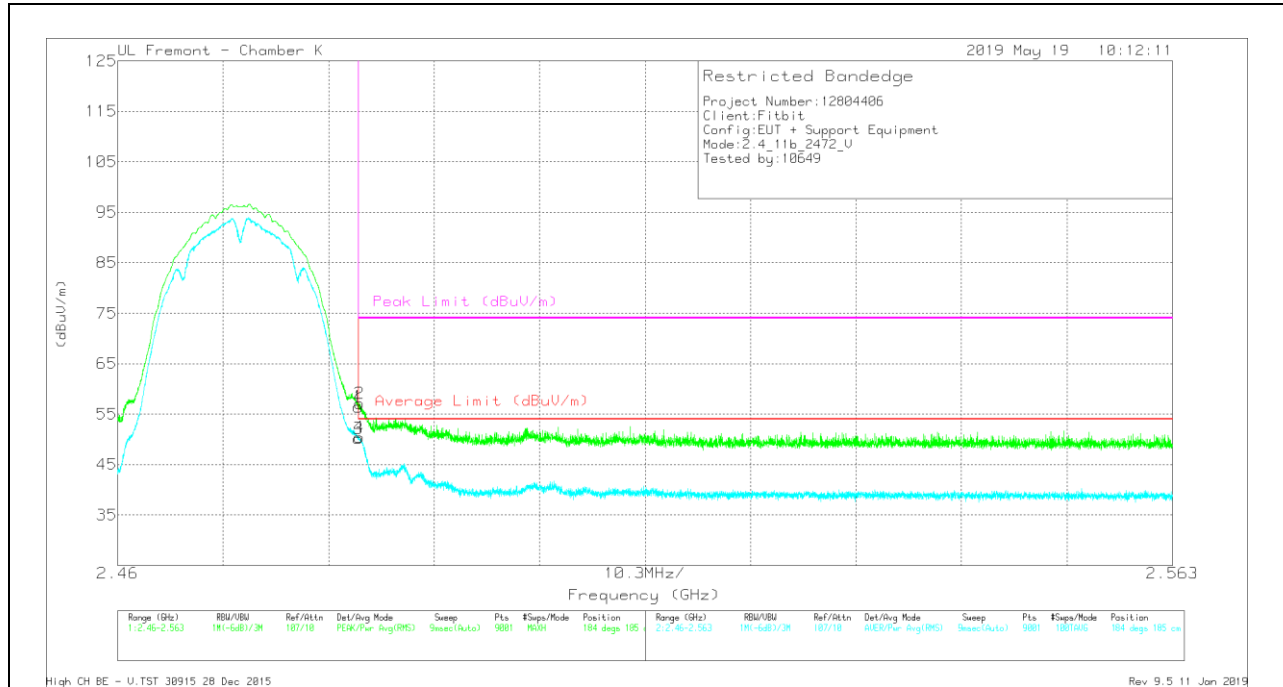
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dB/m)	Amp/Cbl/Fitr /Pad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	45.88	Pk	32.6	-24.8	53.68	-	-	74	-20.32	124	295	H
2	* 2.484	46.71	Pk	32.6	-24.8	54.51	-	-	74	-19.49	124	295	H
3	* 2.484	39.17	RMS	32.6	-24.8	46.97	54	-7.03	-	-	124	295	H
4	* 2.484	39.54	RMS	32.6	-24.8	47.34	54	-6.66	-	-	124	295	H

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

Pk - Peak detector

RMS - RMS detection

VERTICAL RESULT



Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T863 (dBm)	Ampl/Cbl/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	48.64	Pk	32.6	-24.8	56.44	-	-	74	-17.56	184	185	V
2	* 2.484	49.29	Pk	32.6	-24.8	57.09	-	-	74	-16.91	184	185	V
3	* 2.484	42.36	RMS	32.6	-24.8	50.16	54	-3.84	-	-	184	185	V
4	* 2.484	42.59	RMS	32.6	-24.8	50.39	54	-3.61	-	-	184	185	V

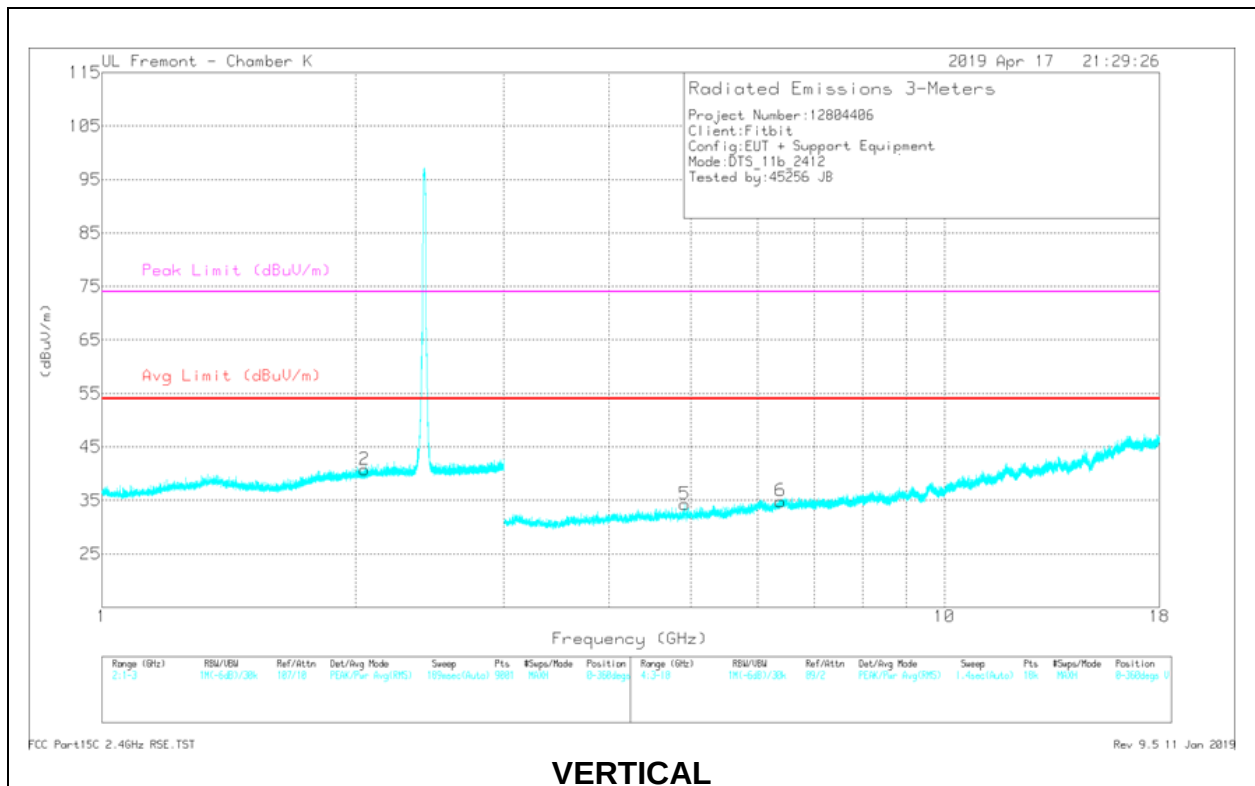
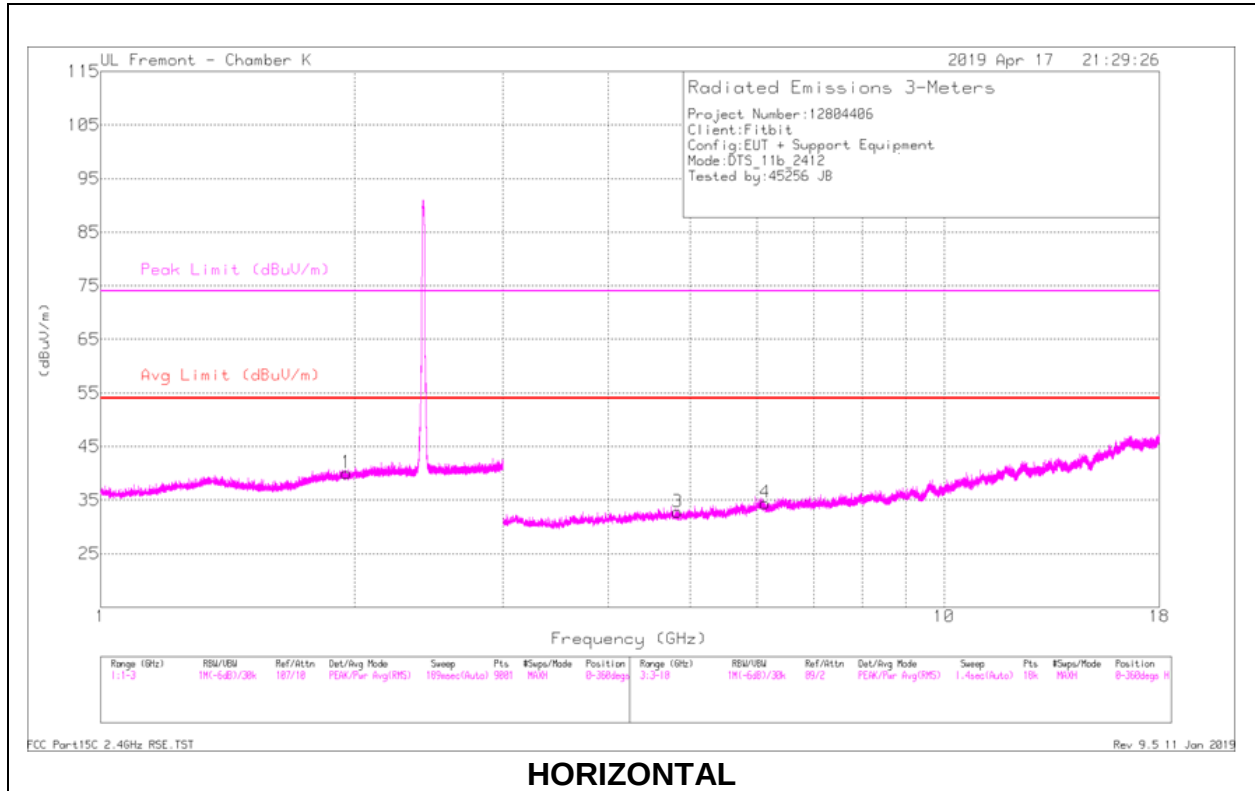
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL, CH 1 RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T344 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.957	33.45	Pk	30.8	-24.2	0	40.05	-	-	-	-	0-360	100	H
2	2.049	34.14	Pk	31.2	-24.6	0	40.74	-	-	-	-	0-360	200	V
3	* 4.827	36.23	PK2	34.1	-30.4	0	39.93	-	-	74	-34.07	311	243	H
	* 4.83	26.36	MAV1	34.1	-30.4	0	30.06	54	-23.94	-	-	311	243	H
4	6.14	26.78	Pk	35.3	-27.6	0	34.48	-	-	-	-	0-360	200	H
5	* 4.92	37.53	PK2	34.1	-30.6	0	41.03	-	-	74	-32.97	187	154	V
	* 4.919	27.07	MAV1	34.1	-30.6	0	30.57	54	-23.43	-	-	187	154	V
6	6.391	26.14	Pk	35.4	-26.7	0	34.84	-	-	-	-	0-360	101	V

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

Pk - Peak detector

PK2 - KDB558074 Method: Maximum Peak

MAV1 - KDB558074 Option 1 Maximum RMS Average