
8.7. CONDUCTED SPURIOUS EMISSIONS

LIMITS

FCC §15.247 (d)

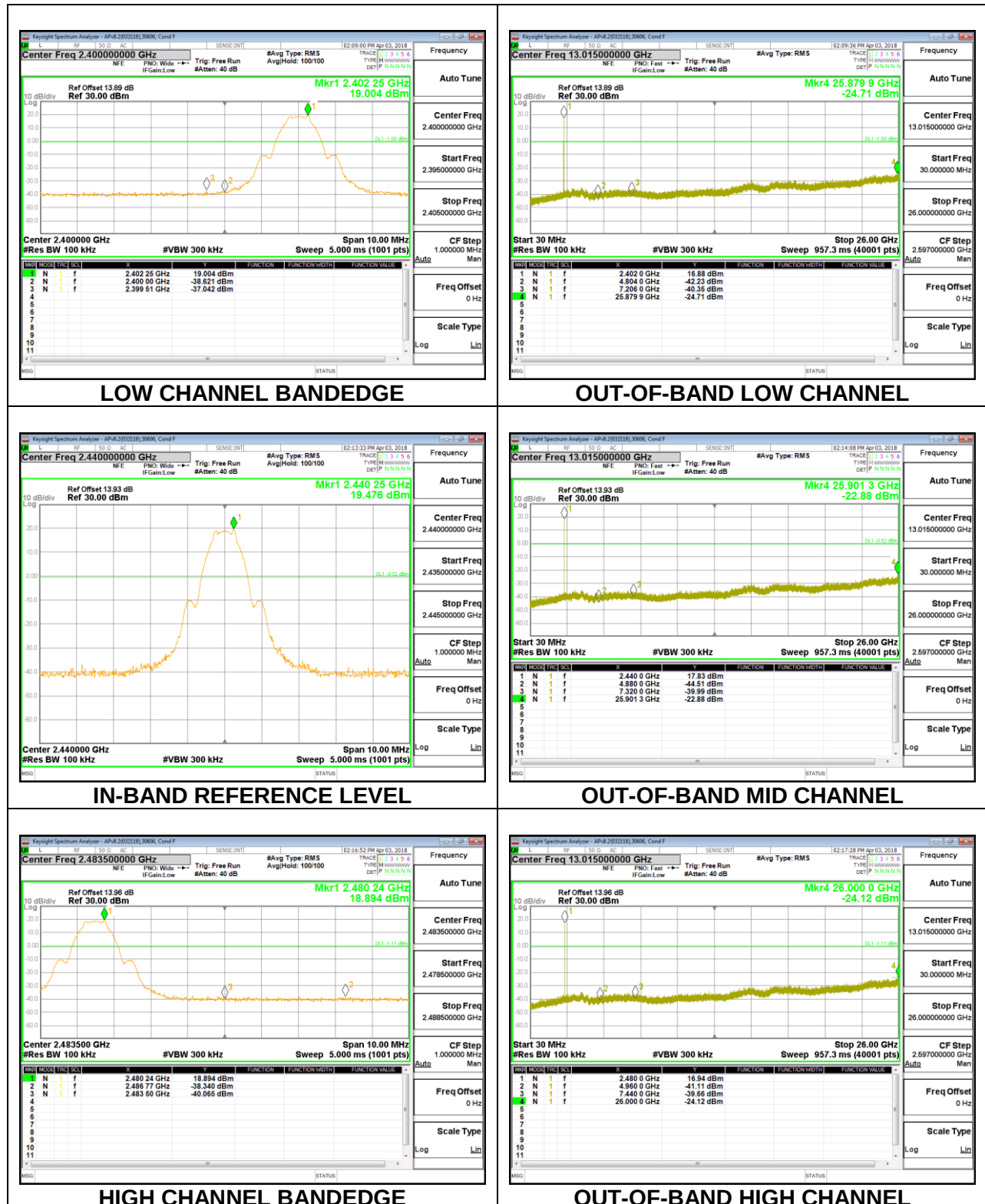
RSS-247 5.5

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

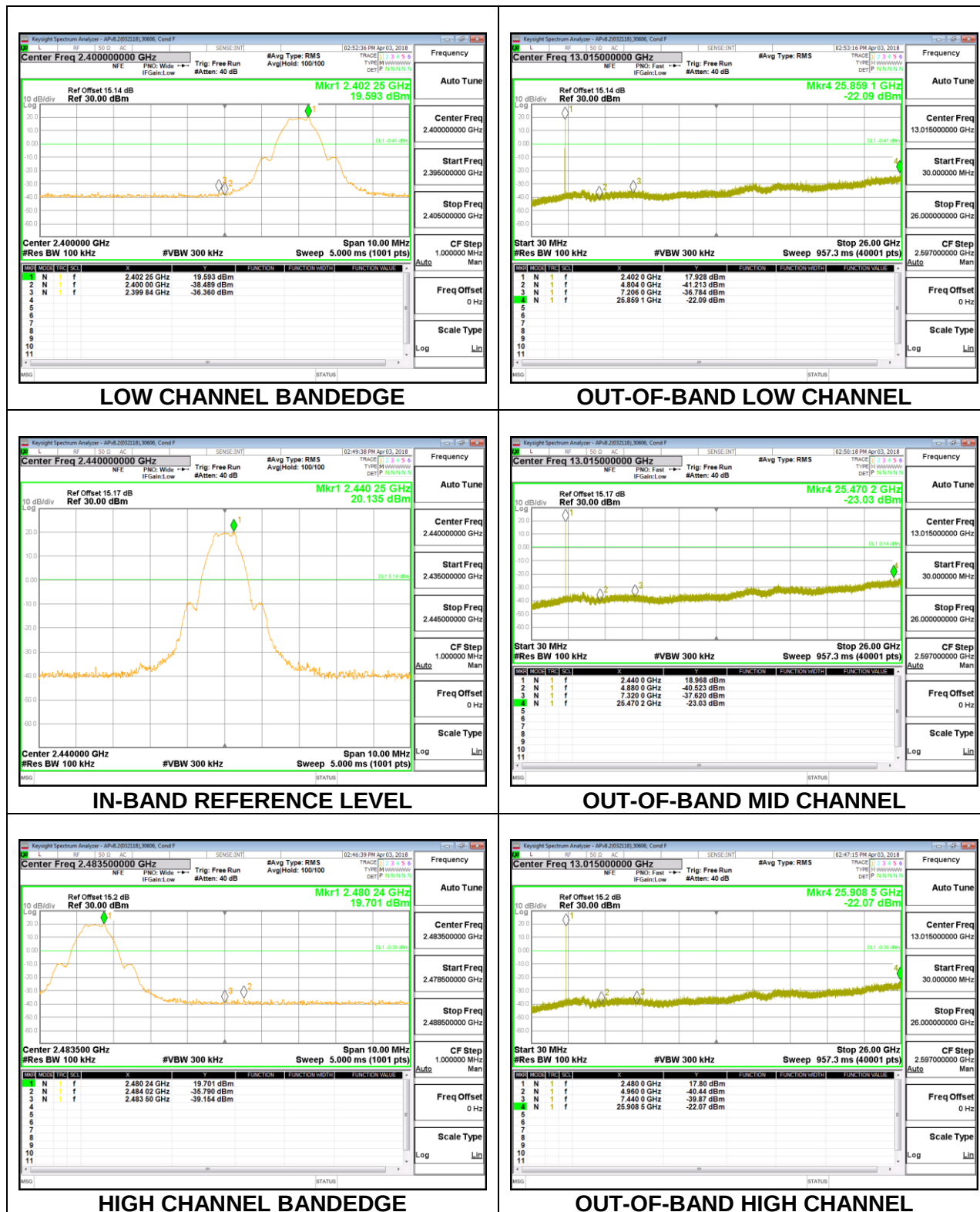
RESULTS

8.7.1. HIGH POWER BLE (1Mbps)

Antenna 4

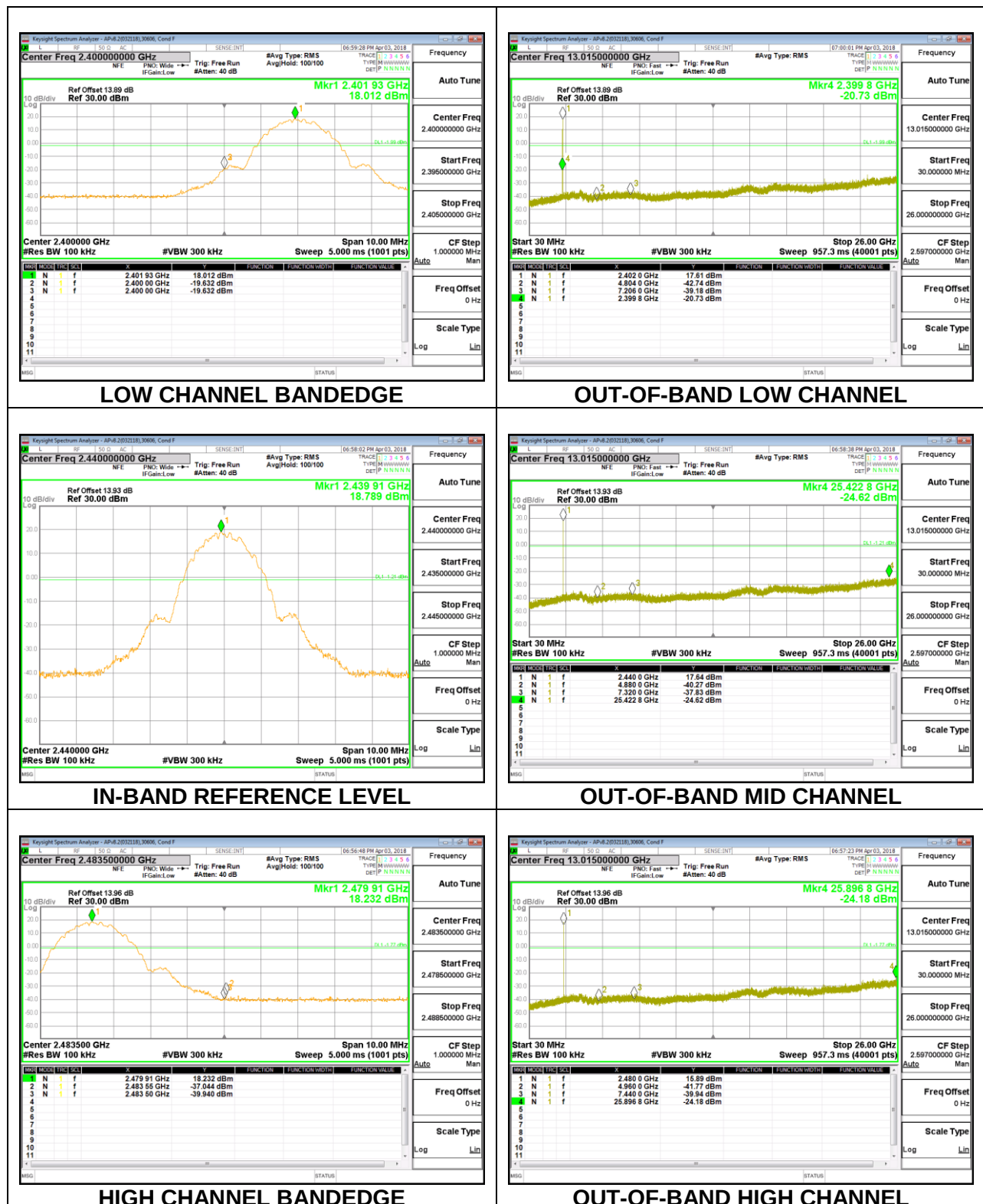


Antenna 3

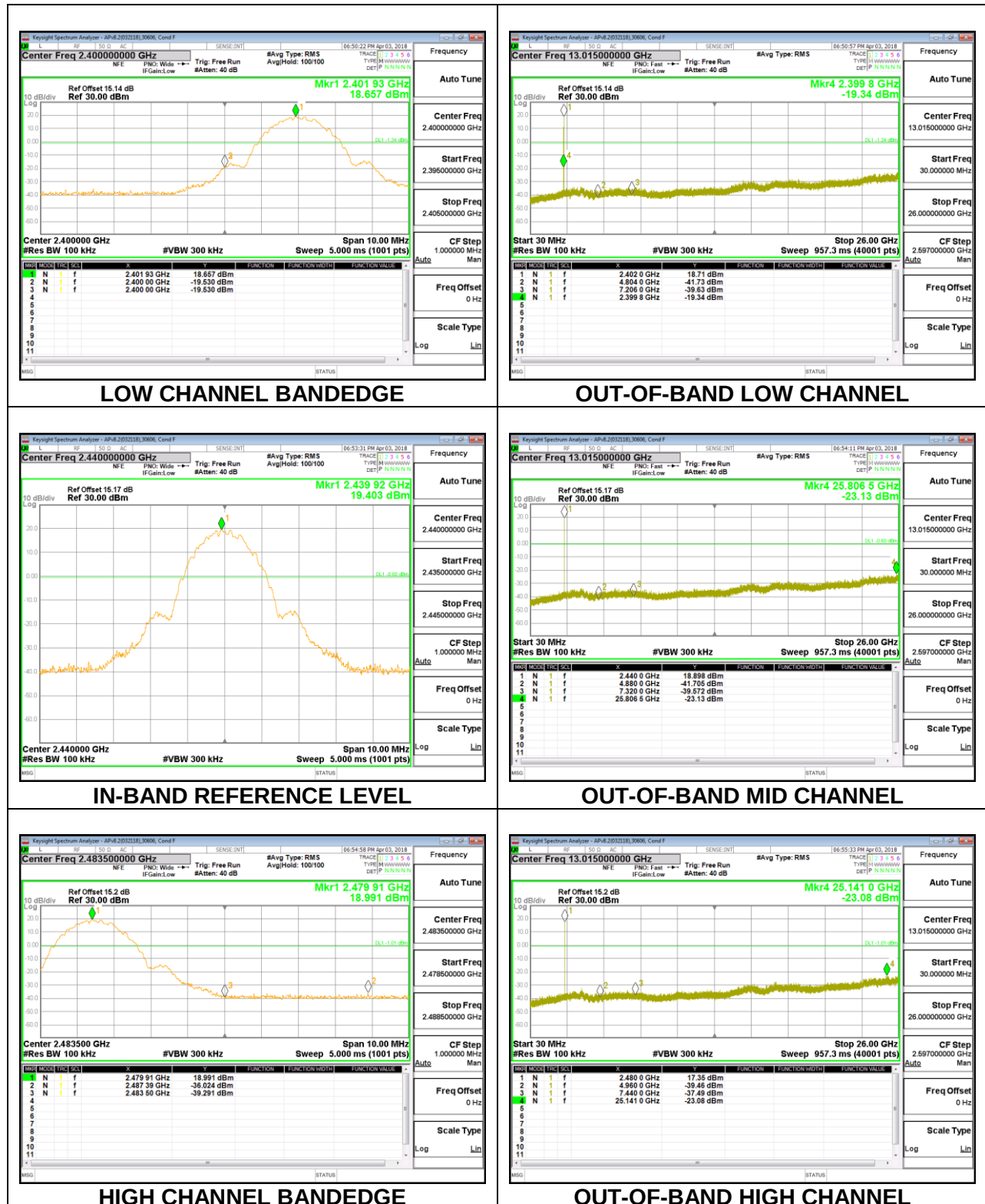


8.7.2. HIGH POWER BLE (2Mbps)

Antenna 4

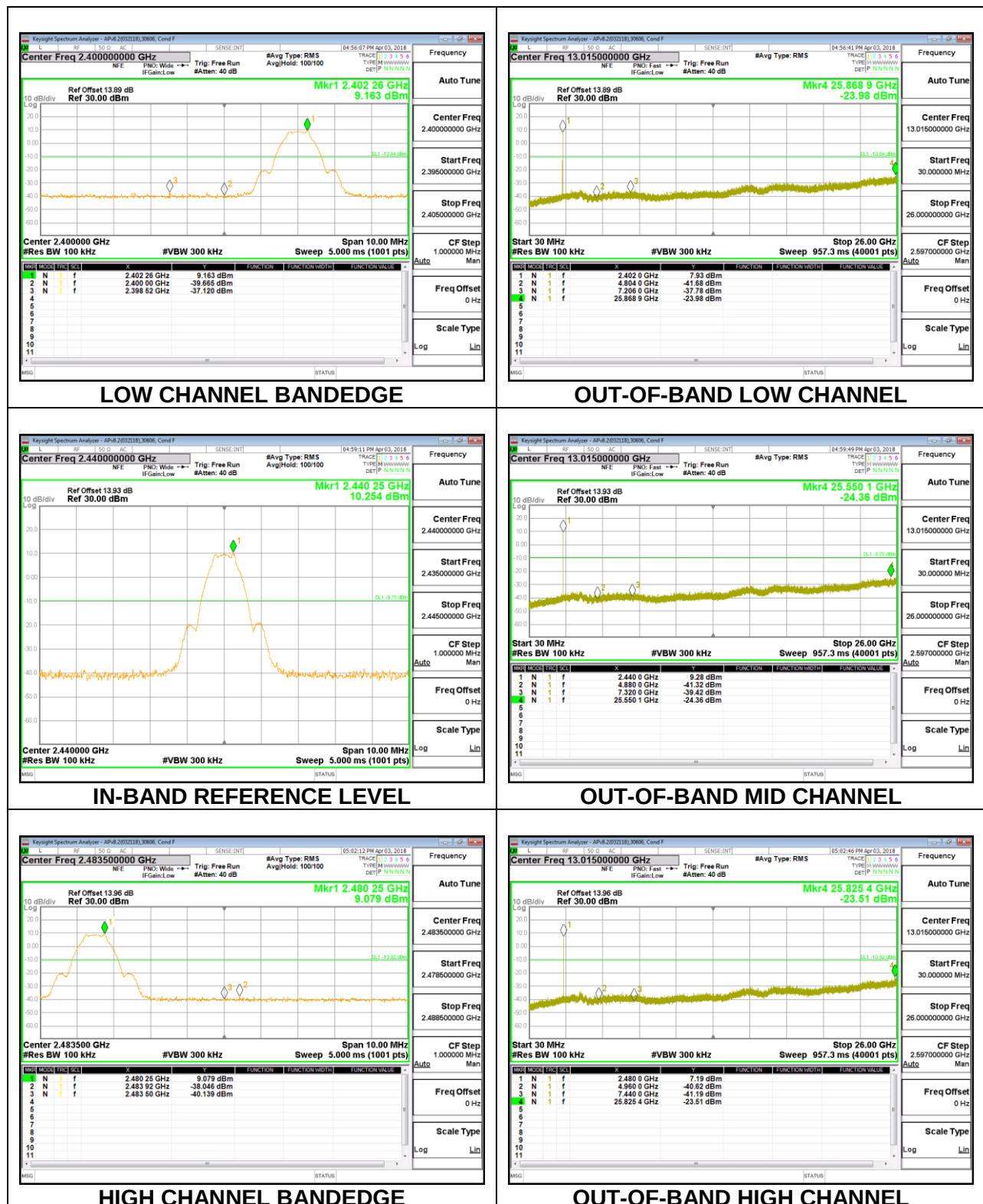


Antenna 3

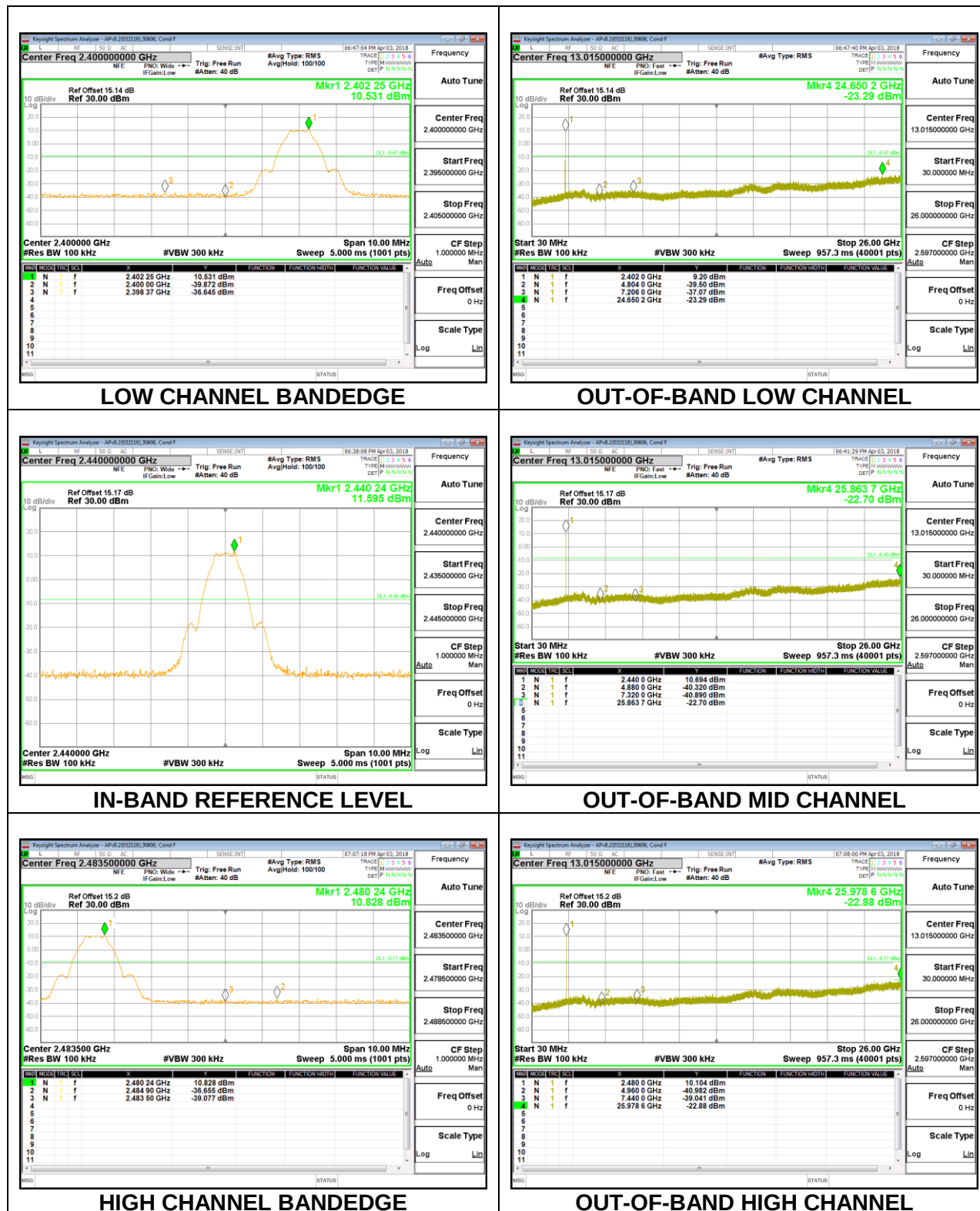


8.7.3. LOW POWER BLE (1Mbps)

Antenna 4

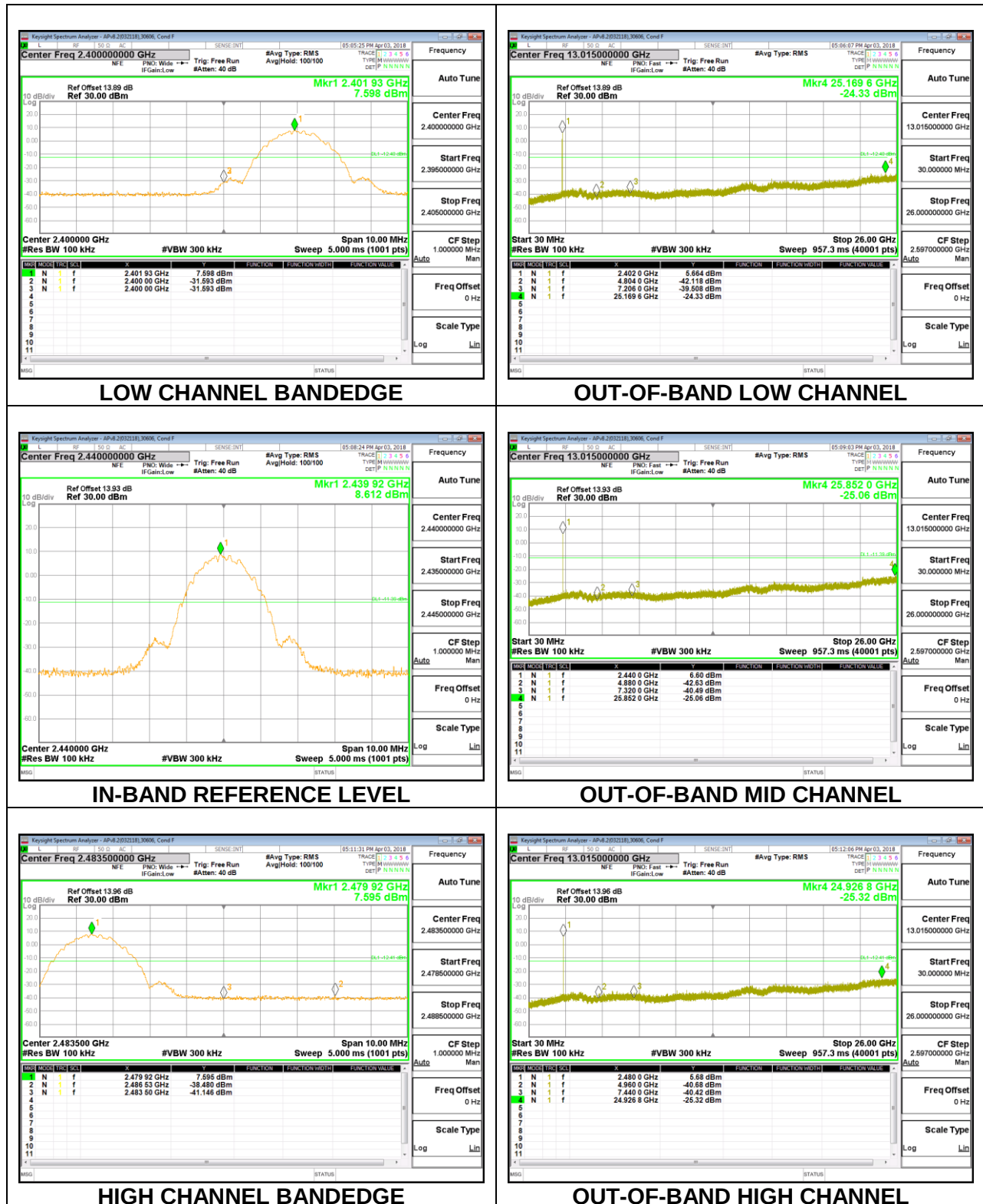


Antenna 3

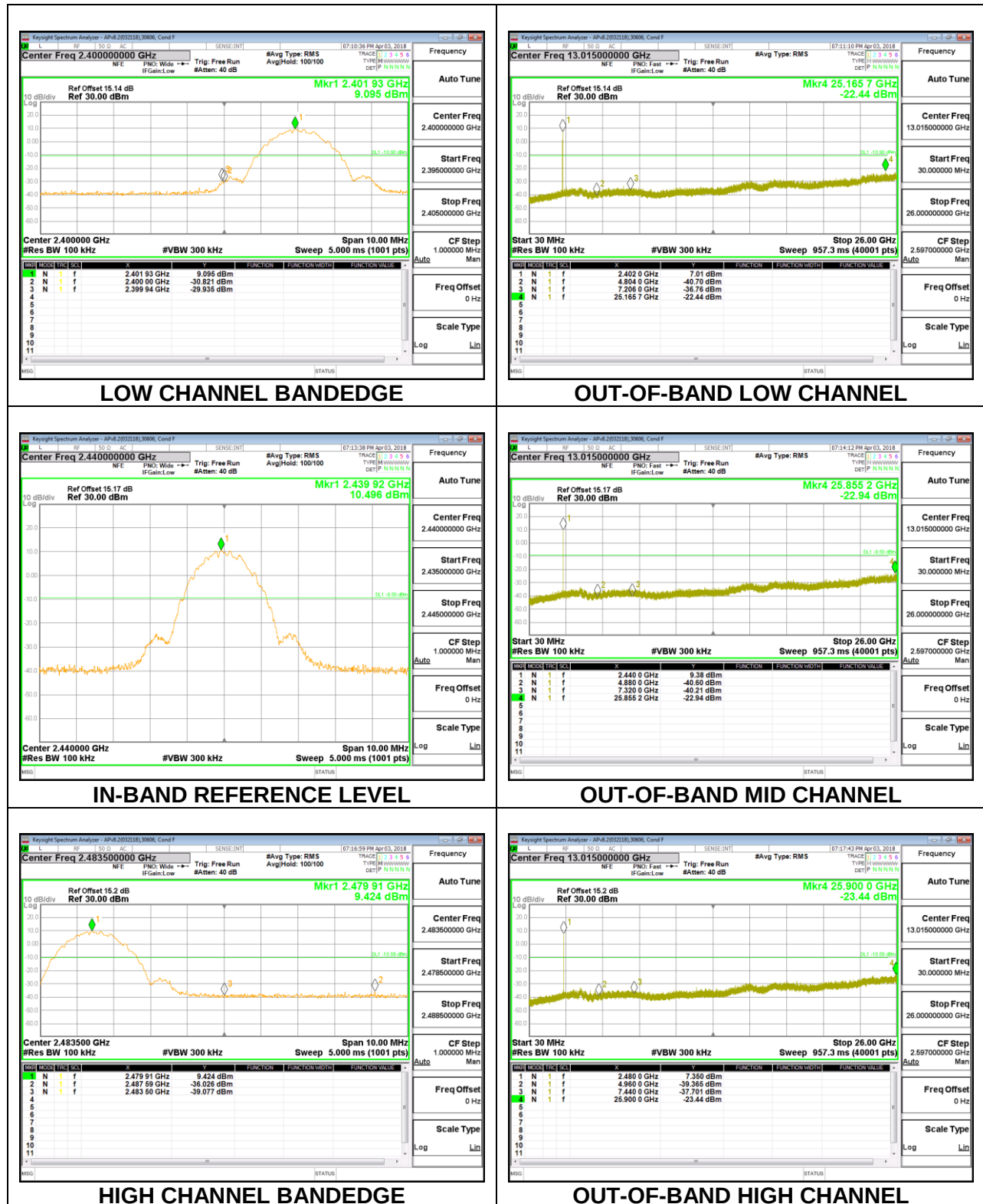


8.7.4. LOW POWER BLE (2Mbps)

Antenna 4



Antenna 3



9. RADIATED TEST RESULTS

9.1. LIMITS AND PROCEDURE

LIMITS

FCC §15.205 and §15.209

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
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.

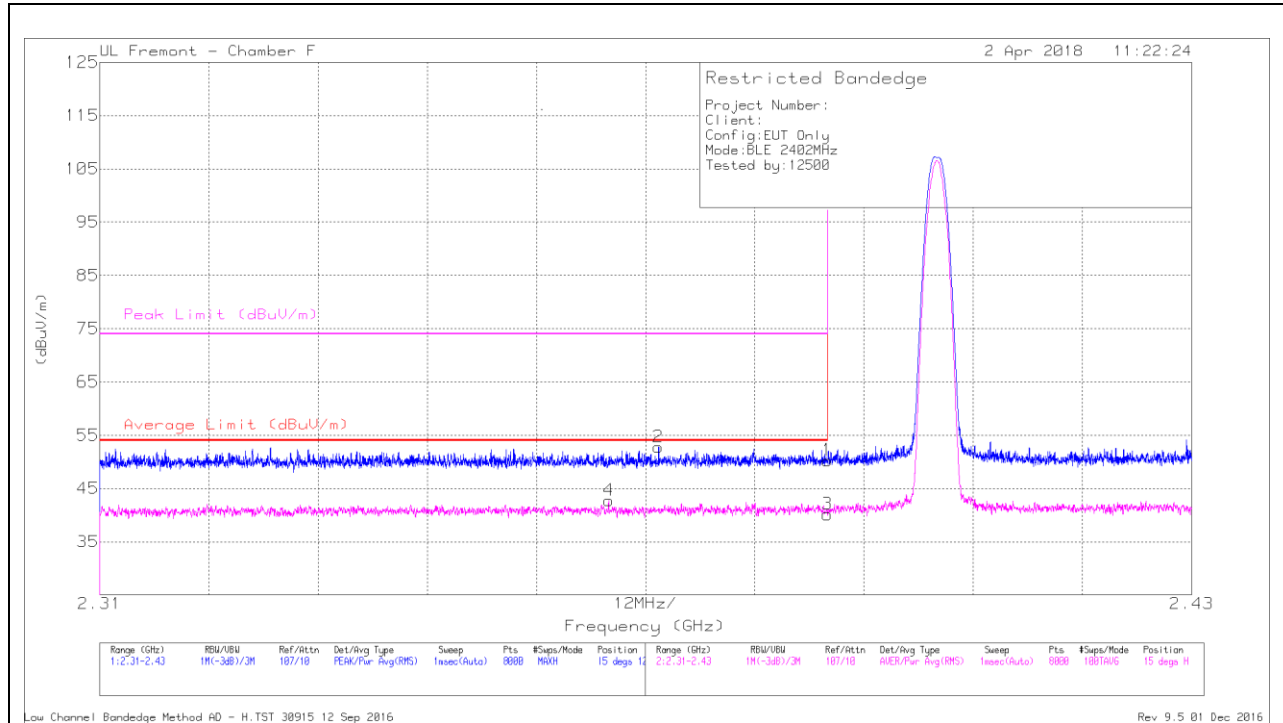
9.2. TRANSMITTER ABOVE 1 GHz

9.2.1. HIGH POWER BLE (1Mbps)

Antenna 4

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



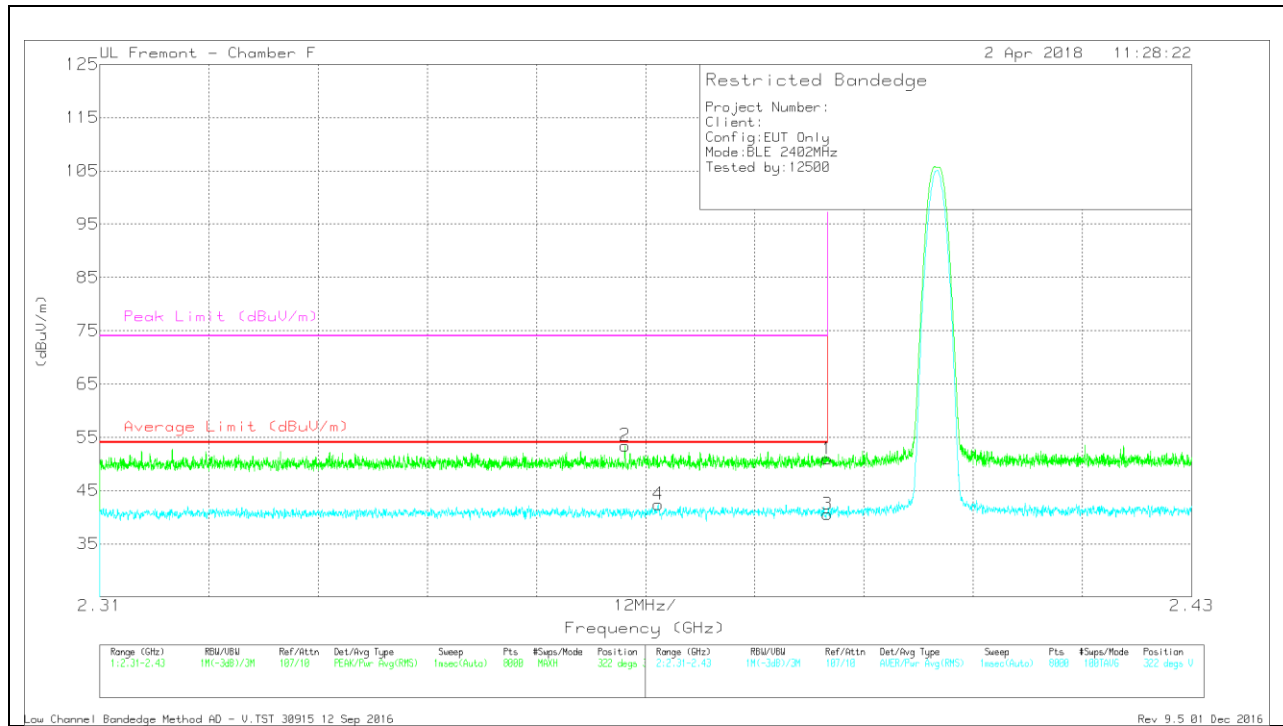
Marker	Frequenc y (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/P ad (dB)	Correcte d Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	38.95	Pk	31.9	-20.6	50.25	-	-	74	-23.75	15	122	H
2	* 2.371	41.58	Pk	31.8	-20.6	52.78	-	-	74	-21.22	15	122	H
3	* 2.39	28.84	RMS	31.9	-20.6	40.14	54	-13.86	-	-	15	122	H
4	* 2.366	31.64	RMS	31.8	-20.7	42.74	54	-11.26	-	-	15	122	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 T119 (dBm)	Amp/CbI/Filt/P ad (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	39.61	Pk	31.9	-20.6	50.91	-	-	74	-23.09	322	388	V
2	* 2.368	42.2	Pk	31.8	-20.6	53.4	-	-	74	-20.6	322	388	V
3	* 2.39	29.22	RMS	31.9	-20.6	40.52	54	-13.48	-	-	322	388	V
4	* 2.371	31.22	RMS	31.8	-20.6	42.42	54	-11.58	-	-	322	388	V

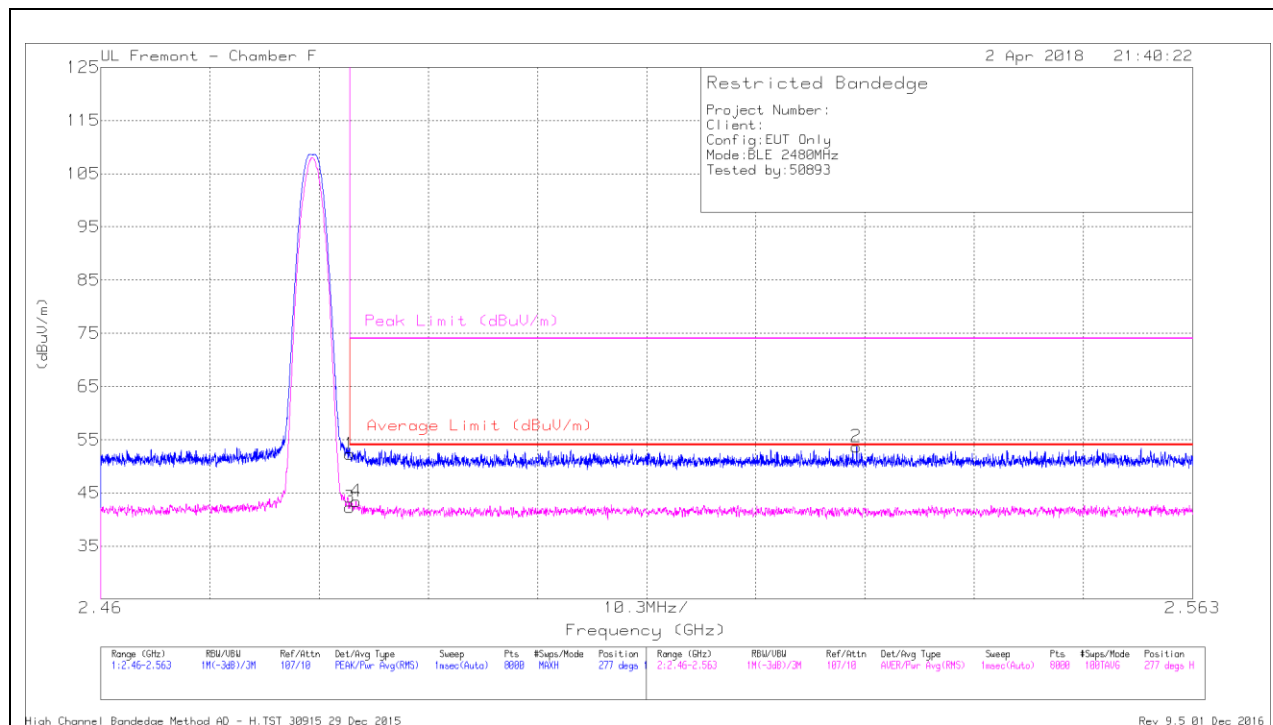
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



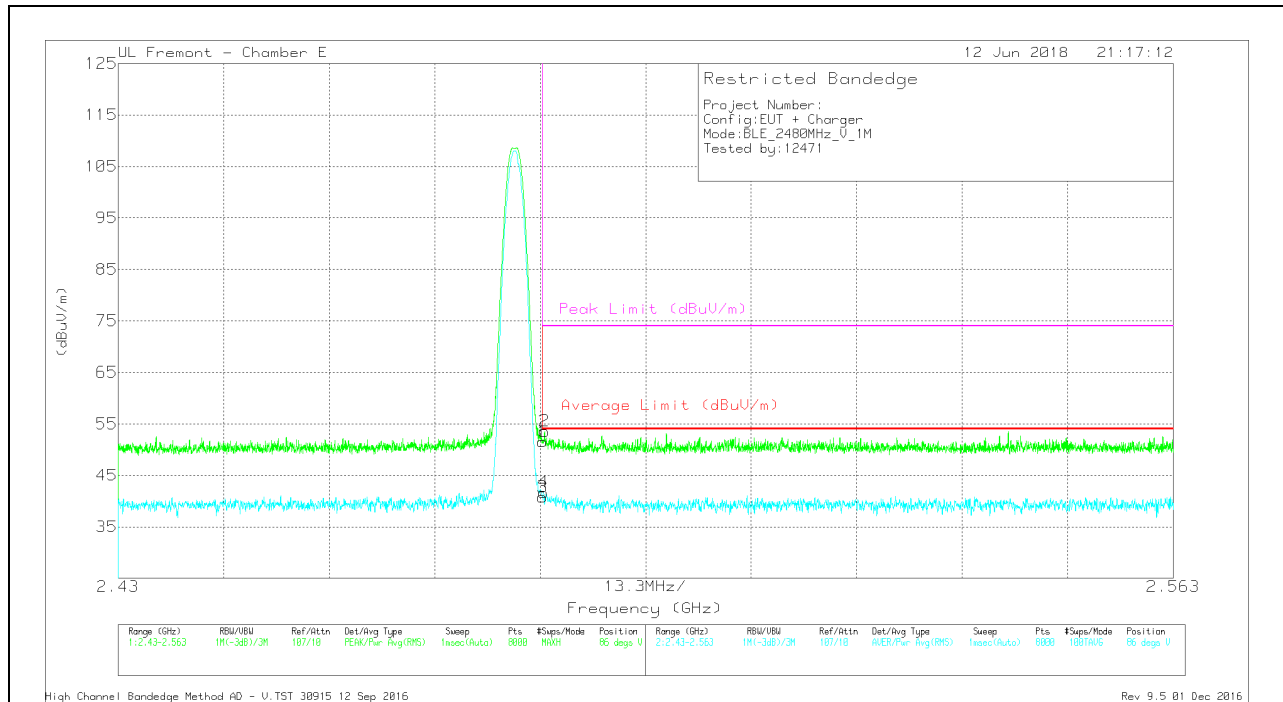
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/P ad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.85	Pk	32.1	-20.7	52.25	-	-	74	-21.75	277	124	H
2	2.531	42.17	Pk	32.2	-20.7	53.67	-	-	74	-20.33	277	124	H
3	* 2.484	30.87	RMS	32.1	-20.7	42.27	54	-11.73	-	-	277	124	H
4	* 2.484	31.89	RMS	32.2	-20.7	43.39	54	-10.61	-	-	277	124	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 T346 (dB/m)	Amp/Cbl/Filt/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	41.76	Pk	32.1	-22.3	51.56	-	-	74	-22.44	86	352	V
2	* 2.484	43.77	Pk	32.1	-22.3	53.57	-	-	74	-20.43	86	352	V
3	* 2.484	30.97	RMS	32.1	-22.3	40.77	54	-13.23	-	-	86	352	V
4	* 2.484	31.91	RMS	32.1	-22.3	41.71	54	-12.29	-	-	86	352	V

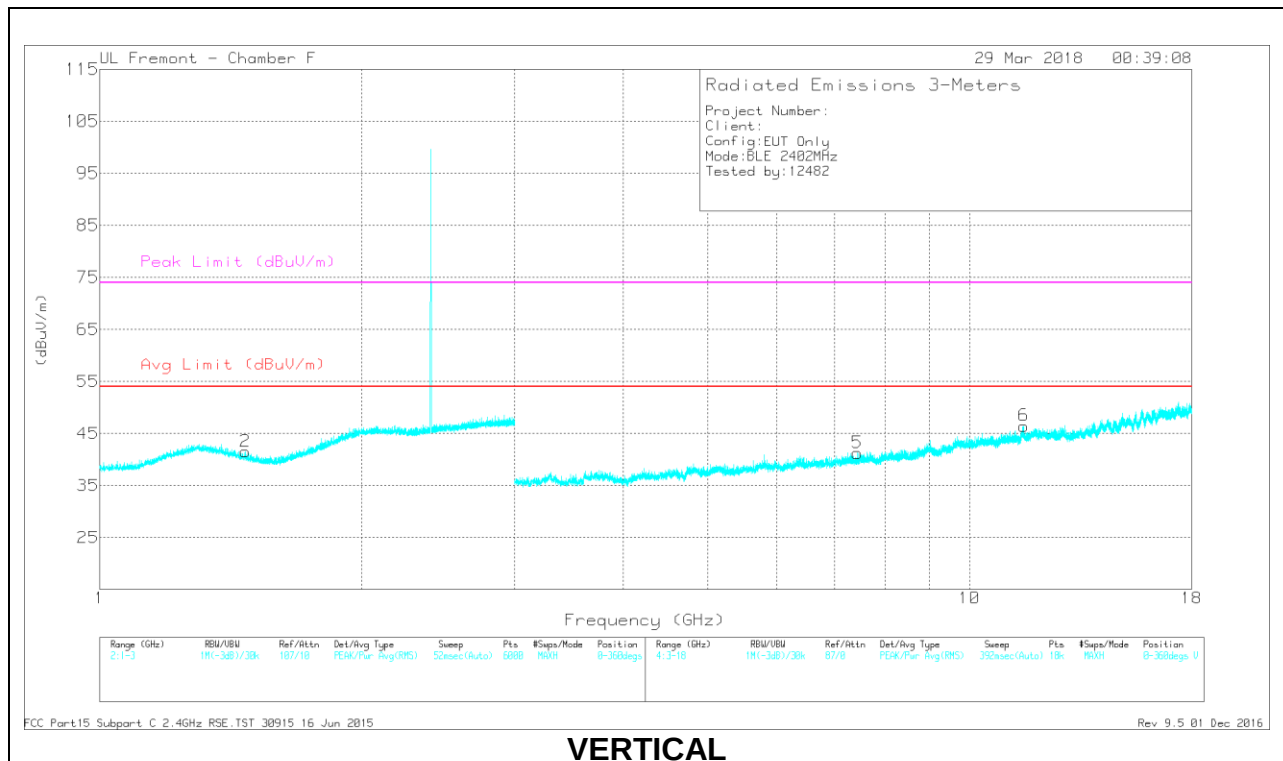
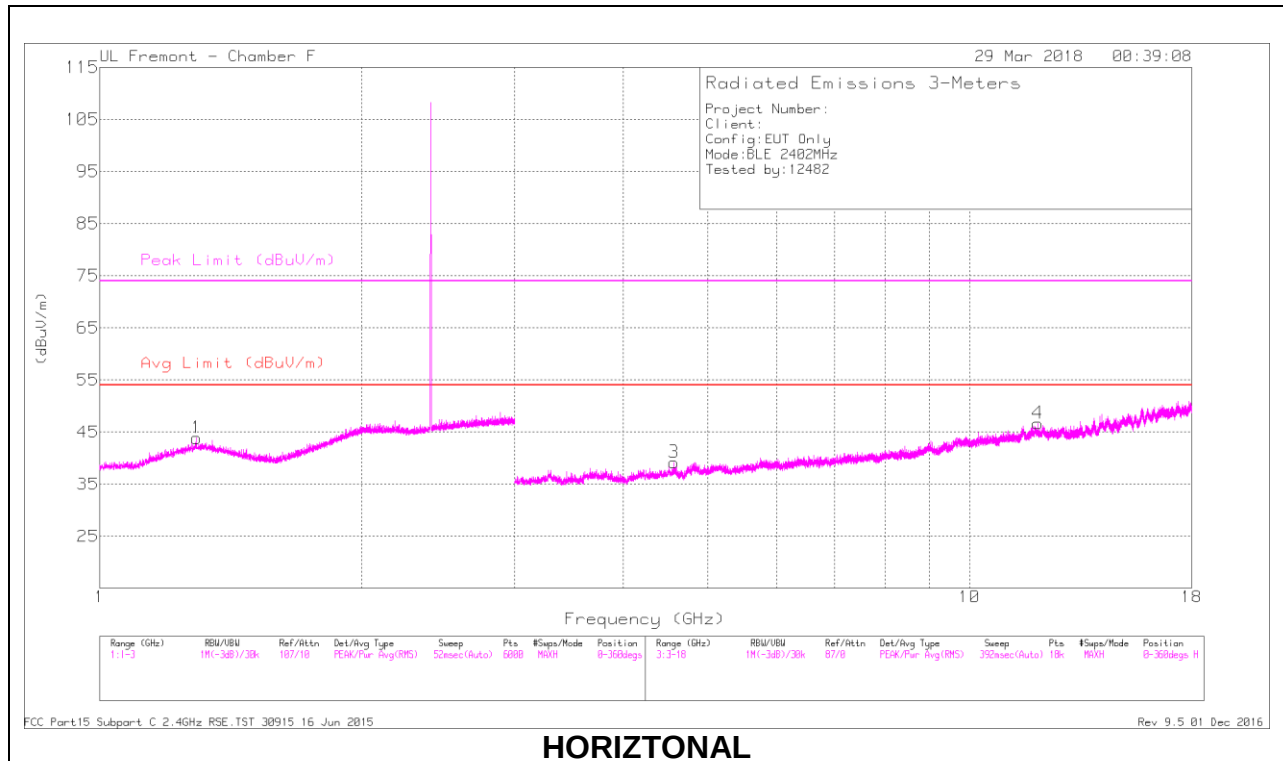
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

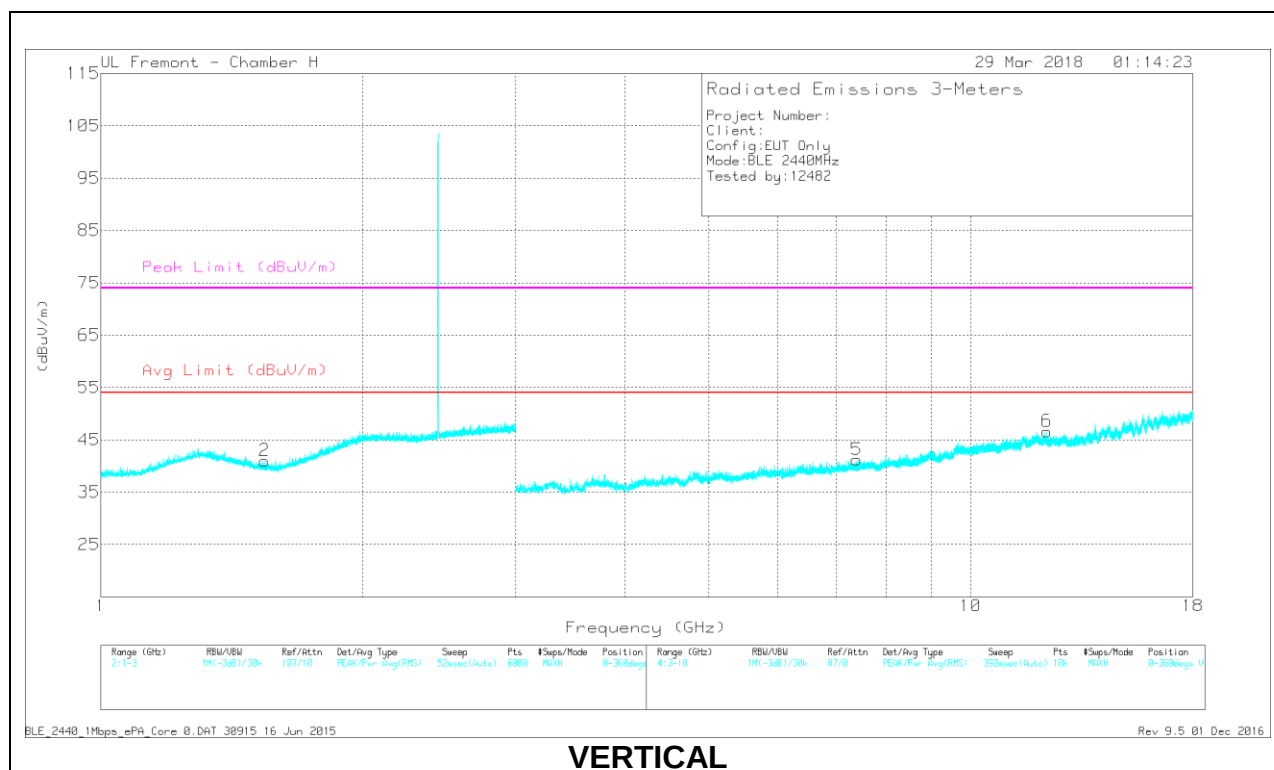
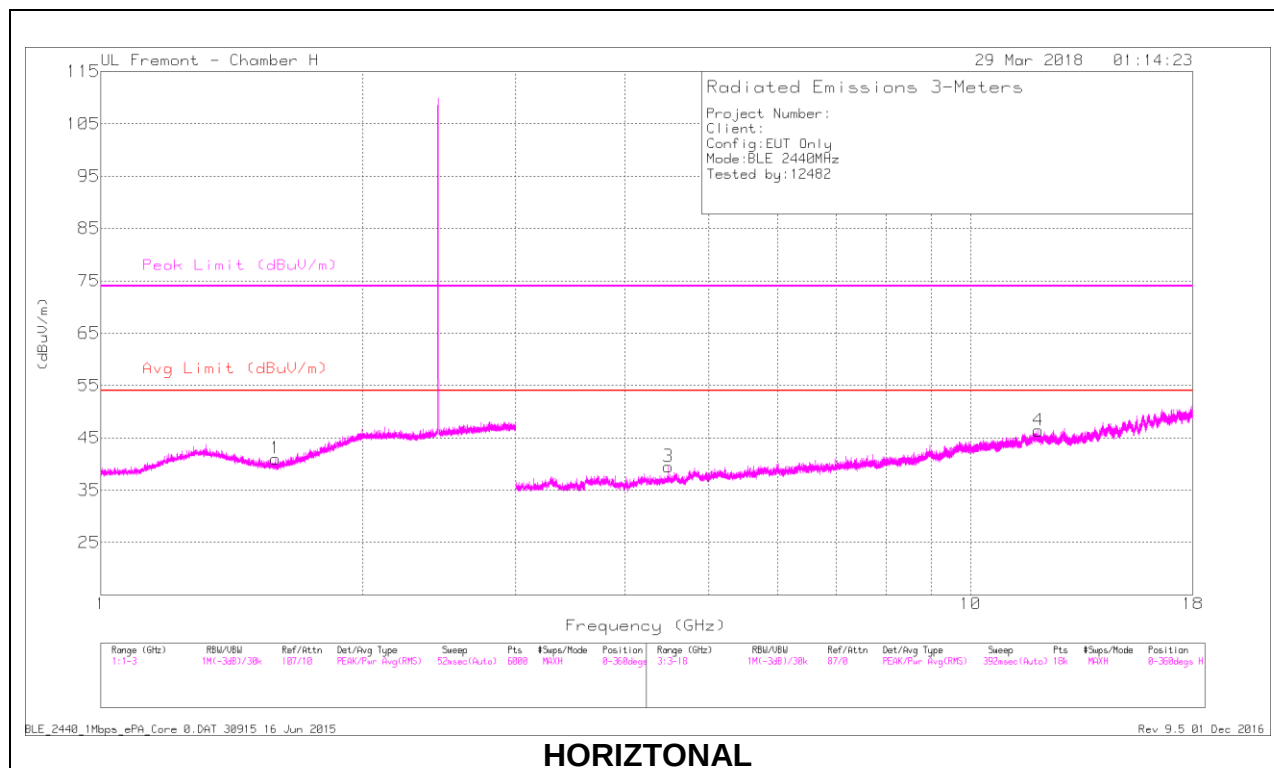
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.292	41.86	PK2	30	-22	49.86	-	-	74	-24.14	183	353	H
	* 1.292	30	MAv1	30	-22	38	54	-16	-	-	183	353	H
2	* 1.469	42.2	PK2	28.1	-21.7	48.6	-	-	74	-25.4	232	226	V
	* 1.472	29.96	MAv1	28.1	-21.7	36.36	54	-17.64	-	-	232	226	V
3	* 4.572	38.2	PK2	34.1	-27.3	45	-	-	74	-29	176	354	H
	* 4.573	26.83	MAv1	34.1	-27.3	33.63	54	-20.37	-	-	176	354	H
4	* 11.98	35.38	PK2	39.2	-22.2	52.38	-	-	74	-21.62	162	126	H
	* 11.982	23.74	MAv1	39.2	-22.2	40.74	54	-13.26	-	-	162	126	H
5	* 7.428	36.85	PK2	36	-25.3	47.55	-	-	74	-26.45	212	345	V
	* 7.43	25.01	MAv1	36	-25.2	35.81	54	-18.19	-	-	212	345	V
6	* 11.538	35.07	PK2	38.5	-20.4	53.17	-	-	74	-20.83	314	375	V
	* 11.535	23.16	MAv1	38.5	-20.4	41.26	54	-12.74	-	-	314	375	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL RESULTS



RADIATED EMISSIONS

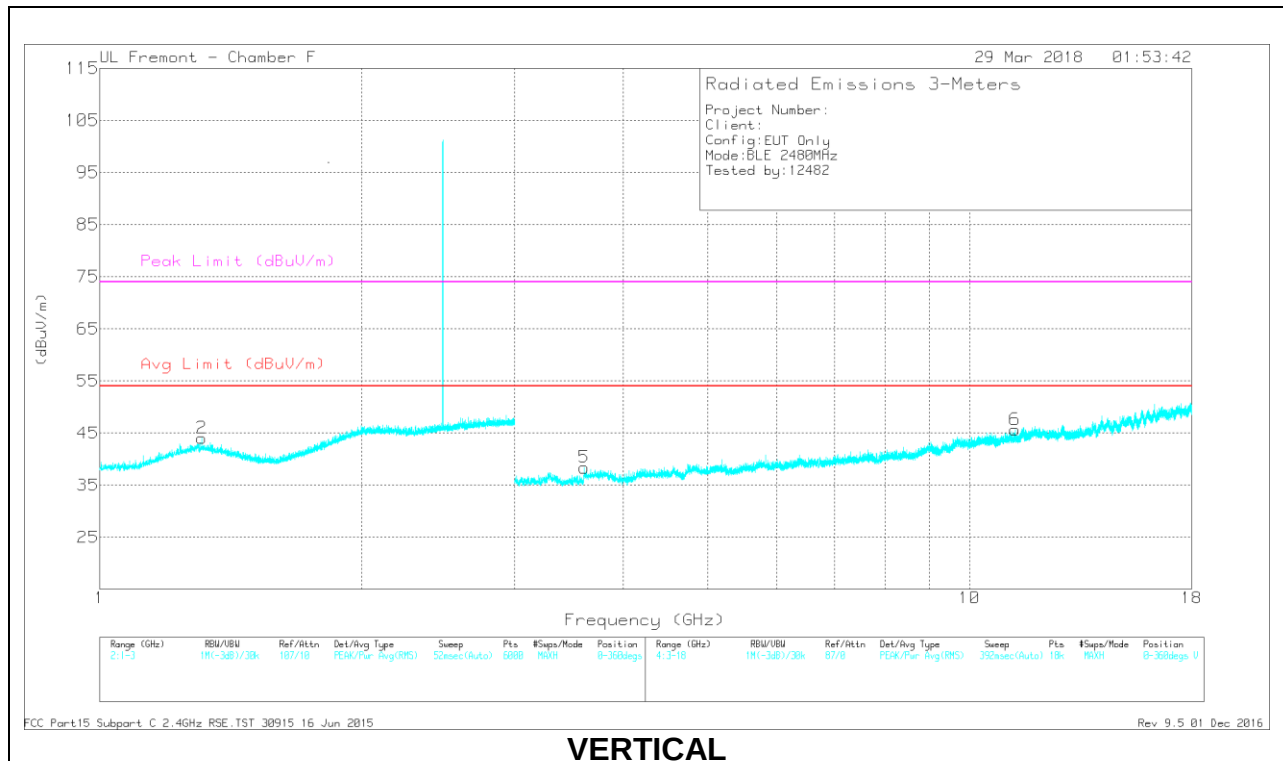
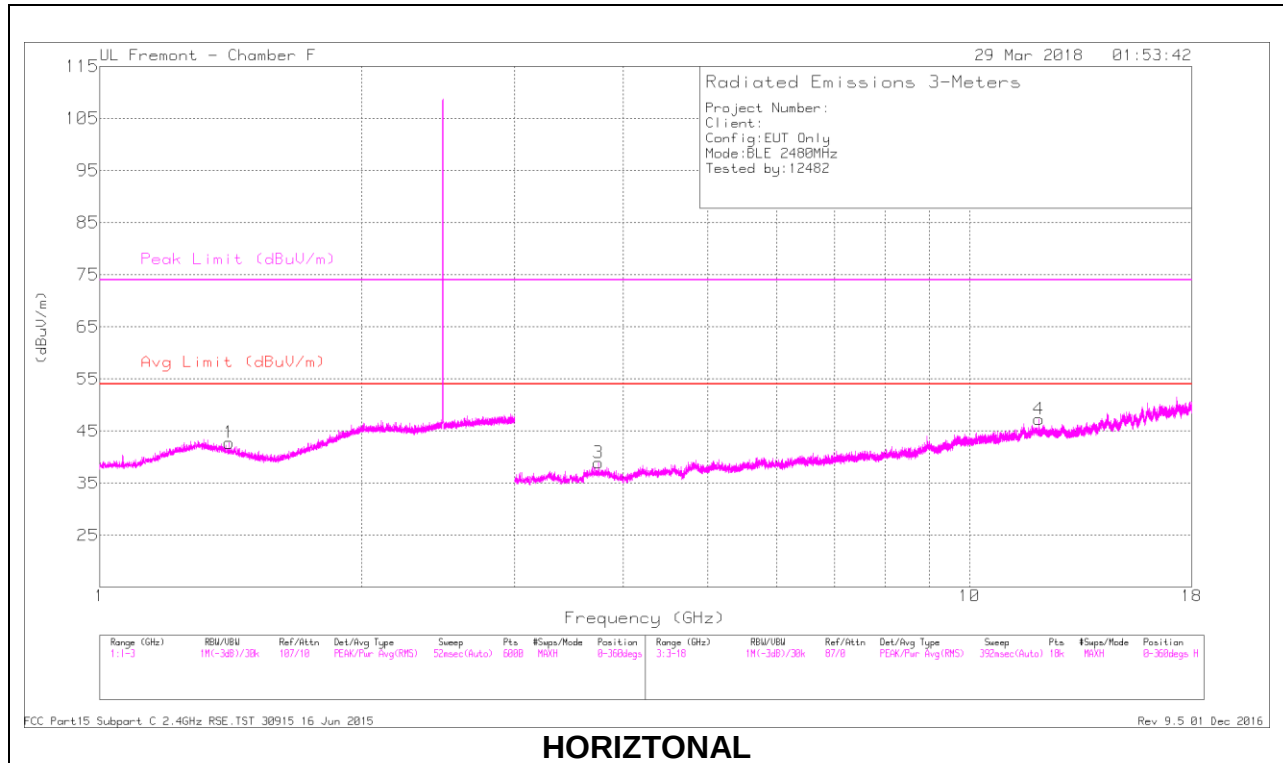
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.589	42.18	PK2	27.3	-21.7	47.78	-	-	74	-26.22	145	397	H
	* 1.586	29.96	MAv1	27.3	-21.7	35.56	54	-18.44	-	-	145	397	H
2	* 1.541	42.24	PK2	27.5	-21.7	48.04	-	-	74	-25.96	178	328	V
	* 1.543	29.91	MAv1	27.5	-21.7	35.71	54	-18.29	-	-	178	328	V
4	* 11.964	35.76	PK2	39.2	-22	52.96	-	-	74	-21.04	86	386	H
	* 11.962	23.79	MAv1	39.2	-22	40.99	54	-13.01	-	-	86	386	H
5	* 7.4	36.13	PK2	36	-25.2	46.93	-	-	74	-27.07	34	351	V
	* 7.397	24.9	MAv1	36	-25.2	35.7	54	-18.3	-	-	34	351	V
6	* 12.235	35.39	PK2	38.8	-21.8	52.39	-	-	74	-21.61	86	121	V
	* 12.232	23.83	MAv1	38.8	-21.8	40.83	54	-13.17	-	-	86	121	V
3	4.493	38.67	PK2	34.1	-28.1	44.67	-	-	-	-	91	262	H

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/ Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.408	41.91	PK2	29	-21.8	49.11	-	-	74	-24.89	106	332	H
	* 1.408	29.87	MAv1	29	-21.8	37.07	54	-16.93	-	-	106	332	H
2	* 1.311	41.65	PK2	30	-21.9	49.75	-	-	74	-24.25	121	270	V
	* 1.312	29.96	MAv1	30	-21.9	38.06	54	-15.94	-	-	121	270	V
3	* 3.749	38.77	PK2	33.3	-28.9	43.17	-	-	74	-30.83	135	342	H
	* 3.749	28.15	MAv1	33.3	-28.9	32.55	54	-21.45	-	-	135	342	H
4	* 12.016	35.22	PK2	39.2	-22.3	52.12	-	-	74	-21.88	84	216	H
	* 12.016	24.39	MAv1	39.2	-22.3	41.29	54	-12.71	-	-	84	216	H
5	* 3.606	39.18	PK2	33.1	-28.8	43.48	-	-	74	-30.52	137	238	V
	* 3.607	27.29	MAv1	33.1	-28.8	31.59	54	-22.41	-	-	137	238	V
6	* 11.278	34.78	PK2	38.1	-21	51.88	-	-	74	-22.12	65	321	V
	* 11.278	23.76	MAv1	38.1	-21	40.86	54	-13.14	-	-	65	321	V

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

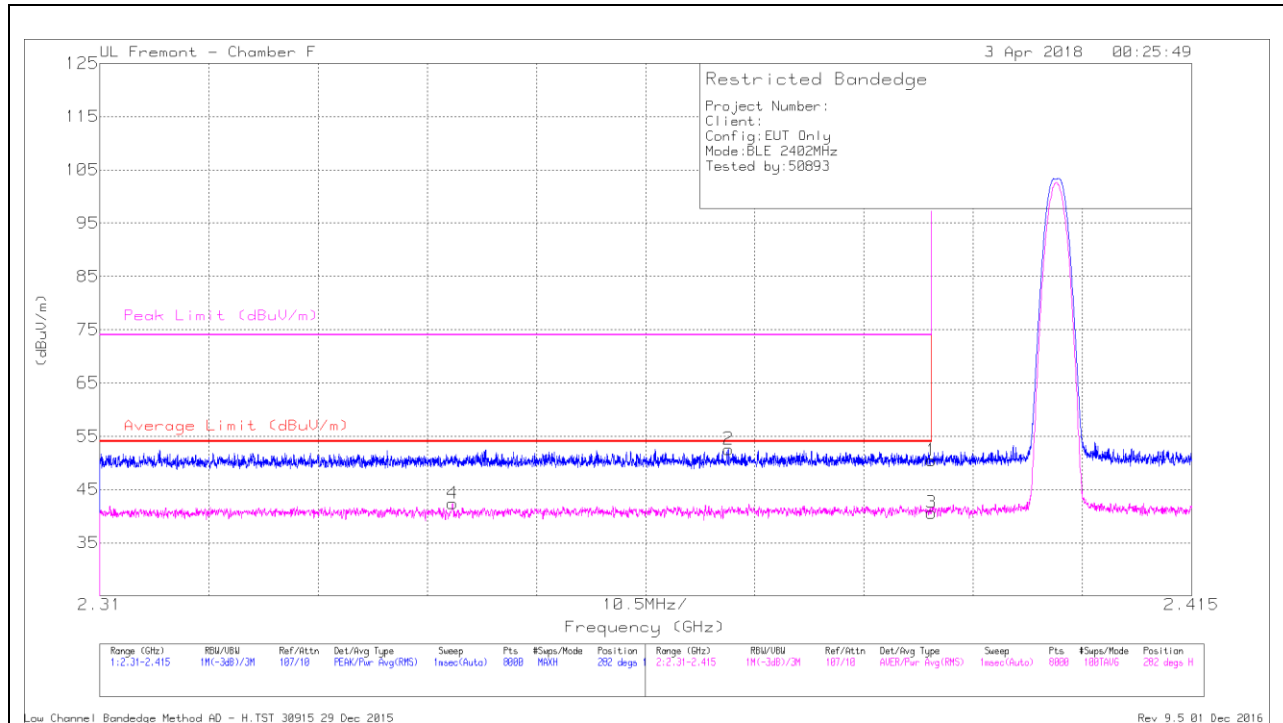
PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

Antenna 3

BANDEDGE (LOW CHANNEL)

HORIZONTAL RESULT



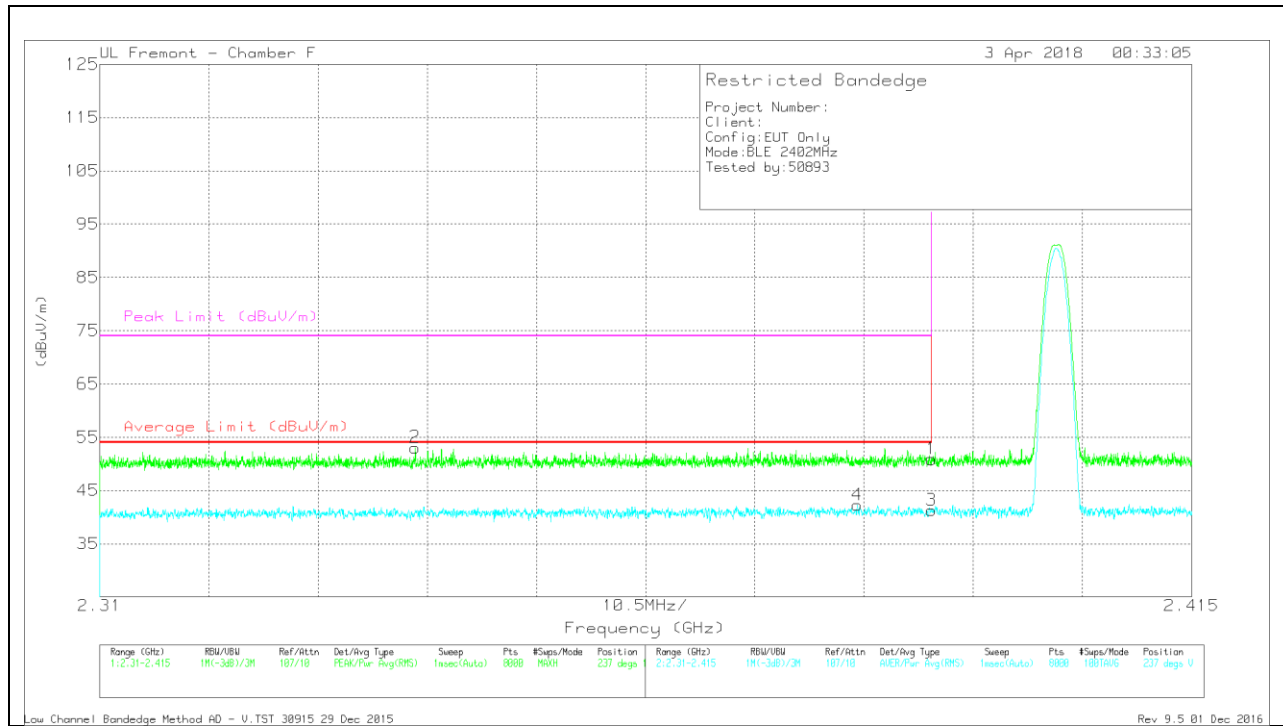
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/P ad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	39.17	Pk	31.9	-20.6	50.47	-	-	74	-23.53	282	146	H
2	* 2.37	41.37	Pk	31.8	-20.6	52.57	-	-	74	-21.43	282	146	H
3	* 2.39	29.33	RMS	31.9	-20.6	40.63	54	-13.37	-	-	282	146	H
4	* 2.344	31.37	RMS	31.7	-20.7	42.37	54	-11.63	-	-	282	146	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 T119 (dBm)	Amp/CbI/Filt/P ad (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	39.59	Pk	31.9	-20.6	50.89	-	-	74	-23.11	237	153	V
2	* 2.34	42.04	Pk	31.7	-20.7	53.04	-	-	74	-20.96	237	153	V
3	* 2.39	29.96	RMS	31.9	-20.6	41.26	54	-12.74	-	-	237	153	V
4	* 2.383	31.05	RMS	31.8	-20.6	42.25	54	-11.75	-	-	237	153	V

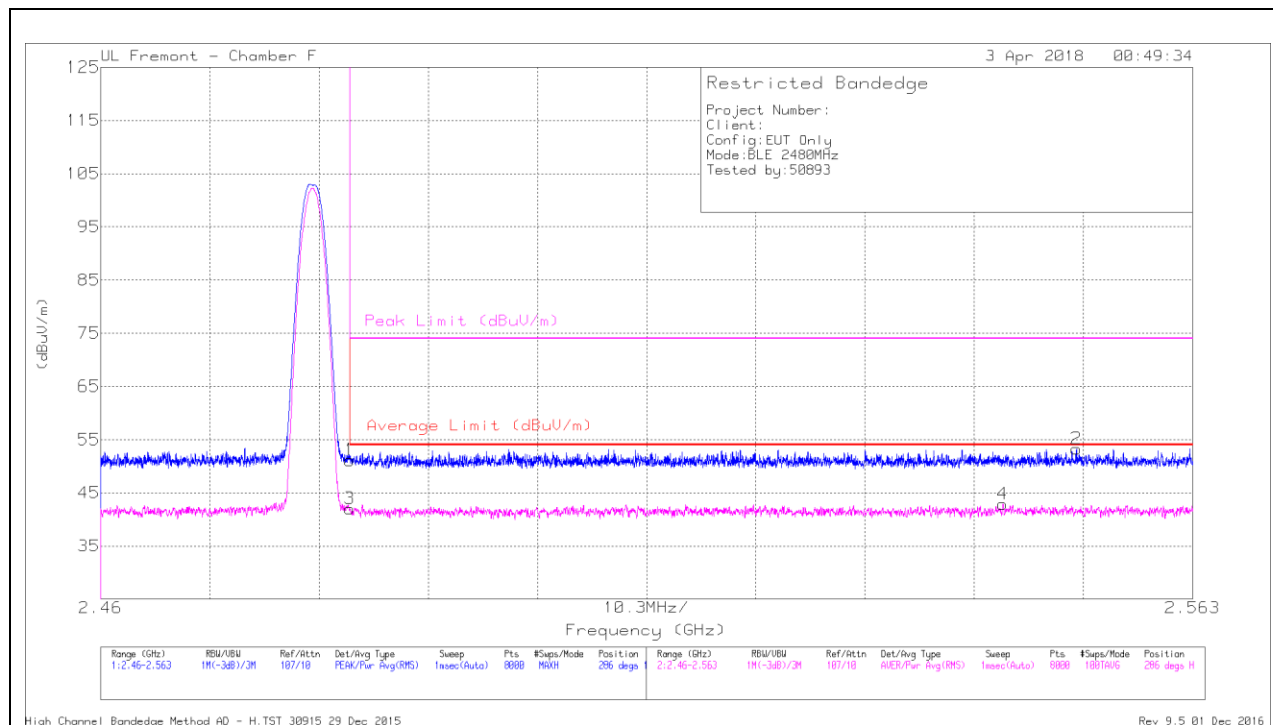
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

BANDEDGE (HIGH CHANNEL)

HORIZONTAL RESULT



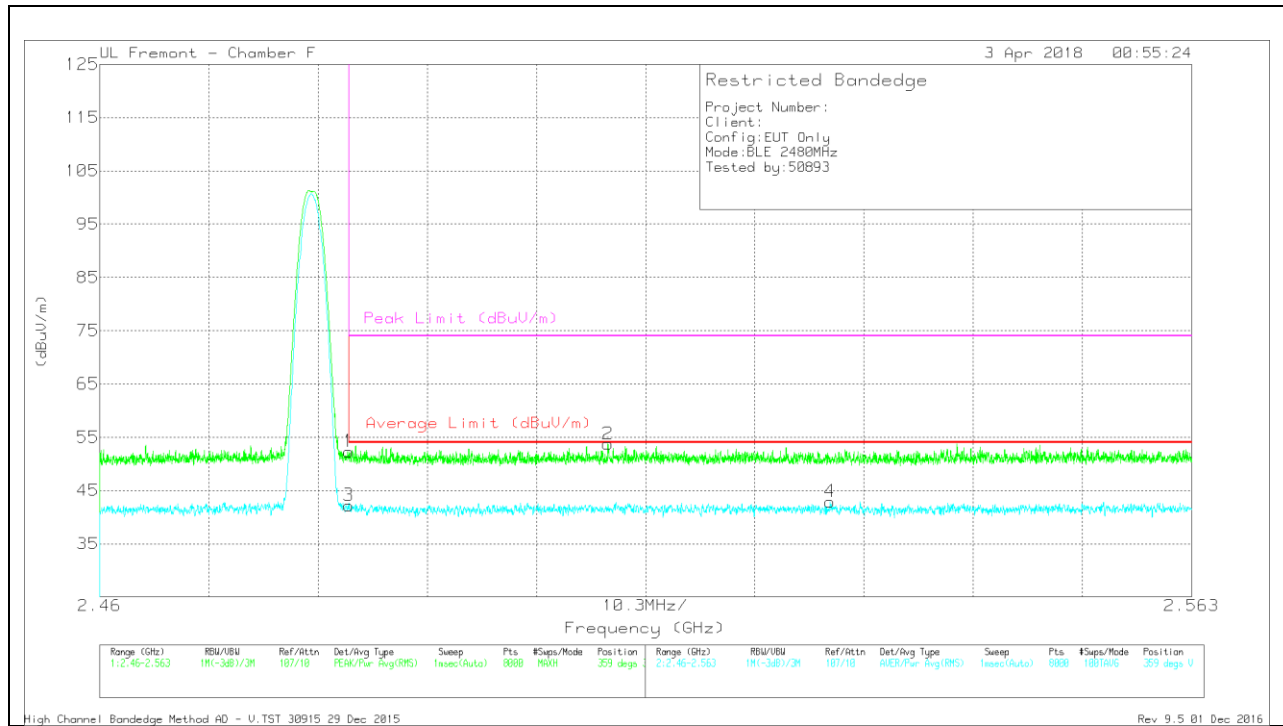
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/P ad (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	39.73	Pk	32.1	-20.7	51.13	-	-	74	-22.87	286	141	H
2	2.552	41.53	PK	32.2	-20.5	53.23	-	-	74	-20.77	286	141	H
3	* 2.484	30.59	RMS	32.1	-20.7	41.99	54	-12.01	-	-	286	141	H
4	2.545	31.35	RMS	32.2	-20.7	42.85	54	-11.15	-	-	286	141	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 T119 (dBm)	Amp/CbI/FiltriP ad (dB)	Corrected Reading (dBm)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.484	40.91	Pk	32.1	-20.7	52.31	-	-	74	-21.69	359	380	V
2	2.508	42.14	Pk	32.2	-20.6	53.74	-	-	74	-20.26	359	380	V
3	* 2.484	30.77	RMS	32.1	-20.7	42.17	54	-11.83	-	-	359	380	V
4	2.529	31.4	RMS	32.2	-20.7	42.9	54	-11.1	-	-	359	380	V

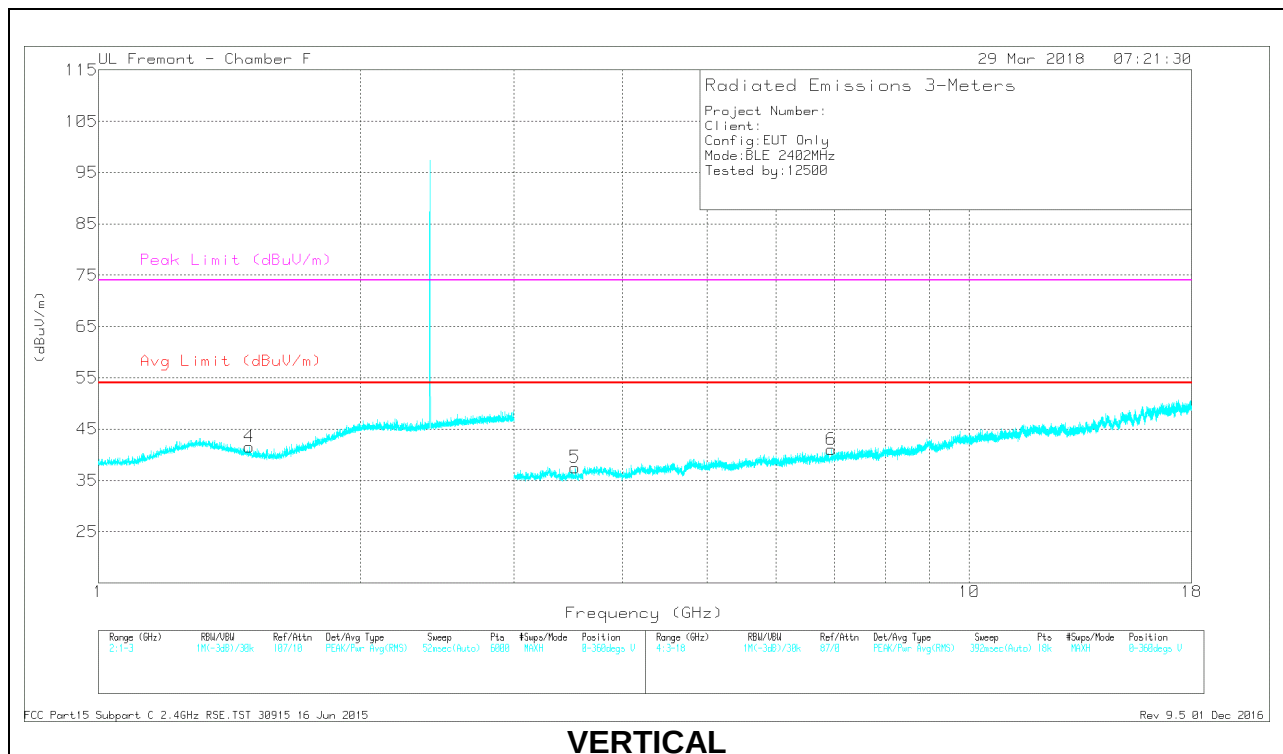
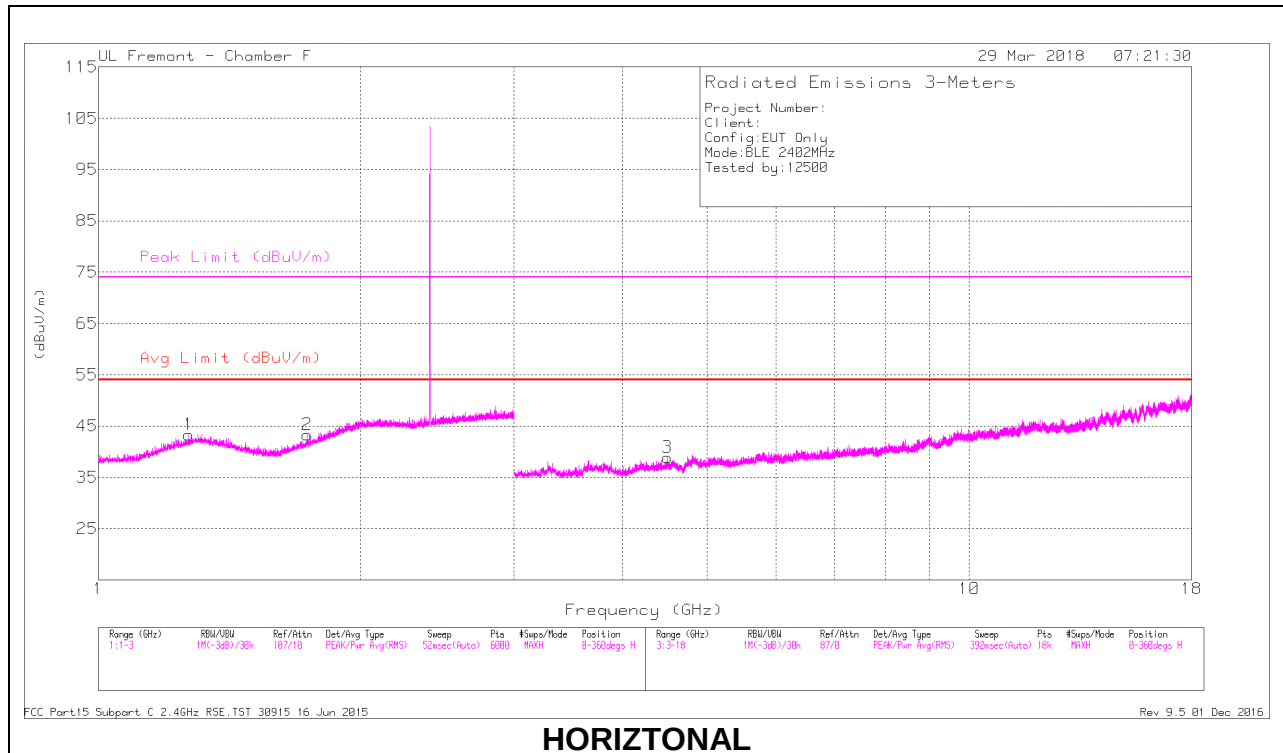
* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

HARMONICS AND SPURIOUS EMISSIONS

LOW CHANNEL RESULTS



RADIATED EMISSIONS

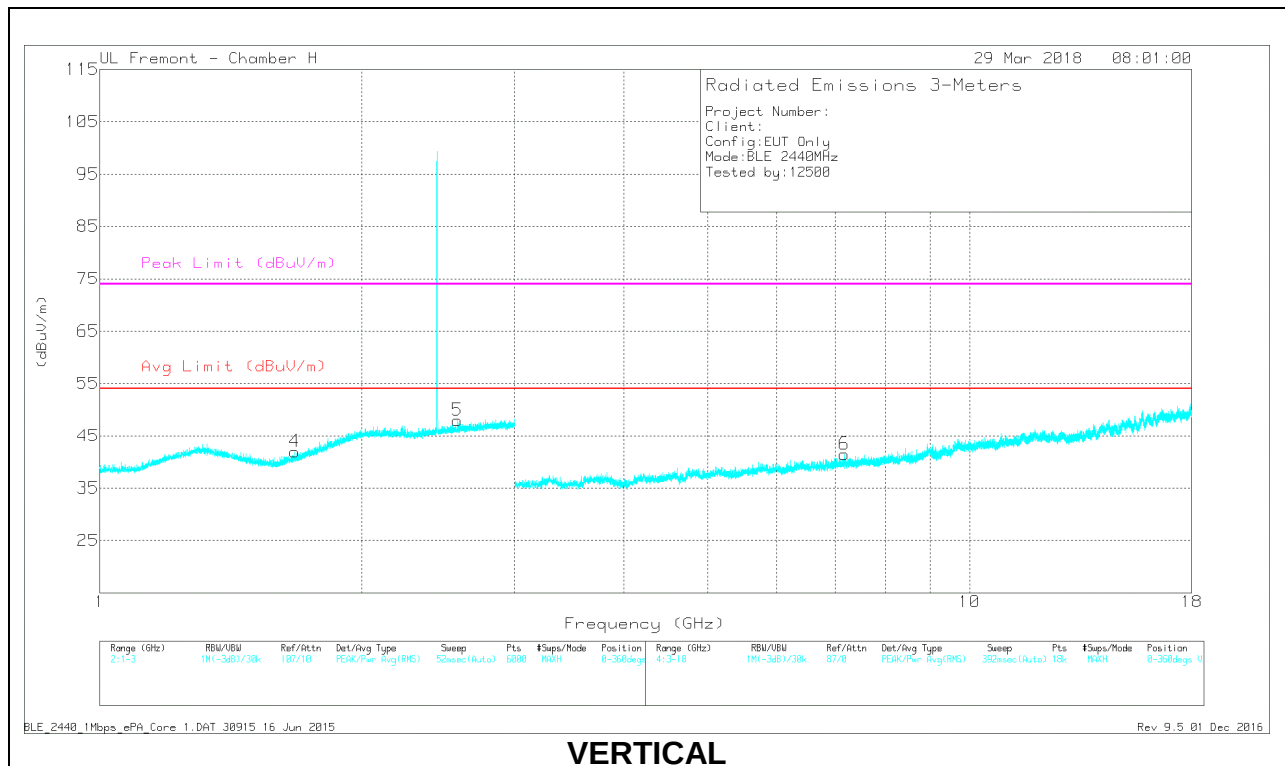
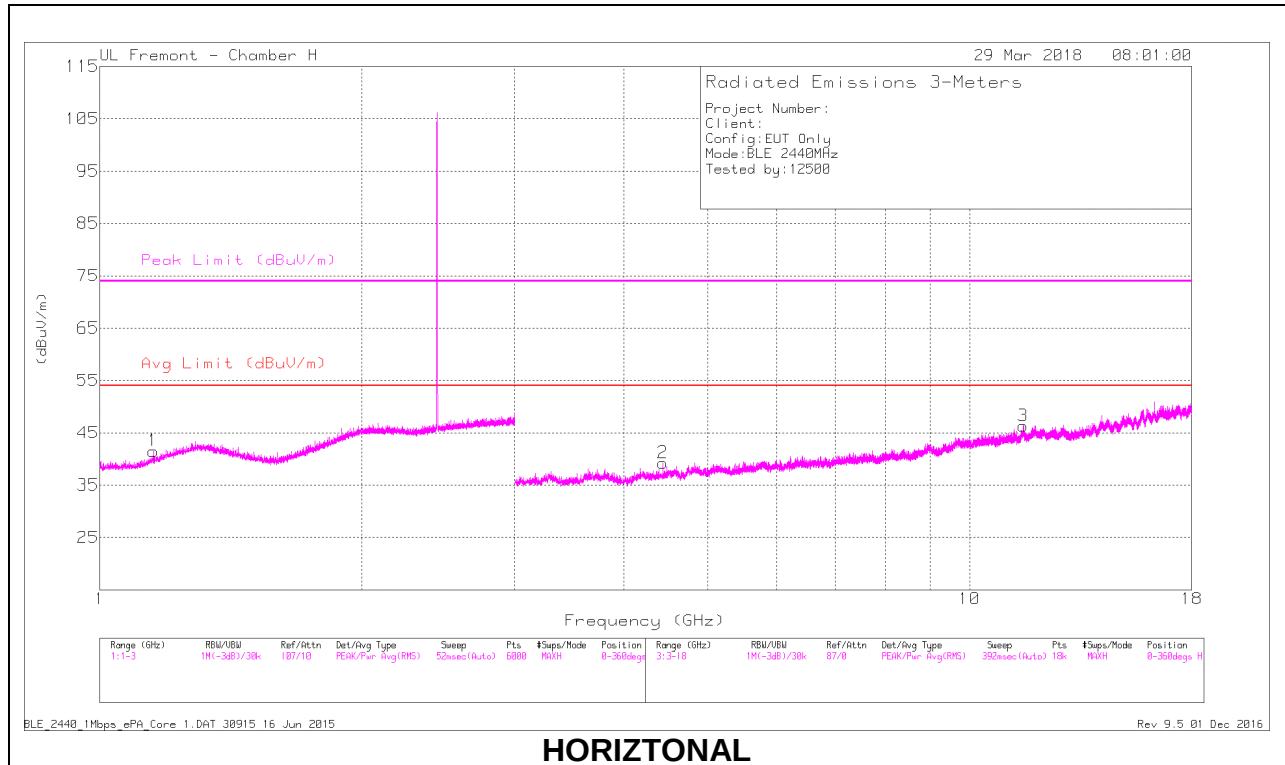
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.268	42.65	PK2	29.7	-22	50.35	-	-	74	-23.65	116	196	H
	* 1.27	30.11	MAv1	29.7	-22	37.81	54	-16.19	-	-	116	196	H
2	1.737	42.06	PK2	28.9	-21.2	49.76	-	-	-	-	78	365	H
4	* 1.492	41.85	PK2	27.8	-21.7	47.95	-	-	74	-26.05	142	188	V
	* 1.488	29.97	MAv1	27.9	-21.7	36.17	54	-17.83	-	-	142	188	V
3	* 4.504	38.51	PK2	34.1	-27.8	44.81	-	-	74	-29.19	311	115	H
	* 4.502	26.99	MAv1	34.1	-27.8	33.29	54	-20.71	-	-	311	115	H
5	* 3.529	40.24	PK2	33	-28.3	44.94	-	-	74	-29.06	80	324	V
	* 3.528	27.31	MAv1	33	-28.3	32.01	54	-21.99	-	-	80	324	V
6	6.941	37.26	PK2	35.7	-25.9	47.06	-	-	-	-	318	282	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

MID CHANNEL RESULTS



RADIATED EMISSIONS

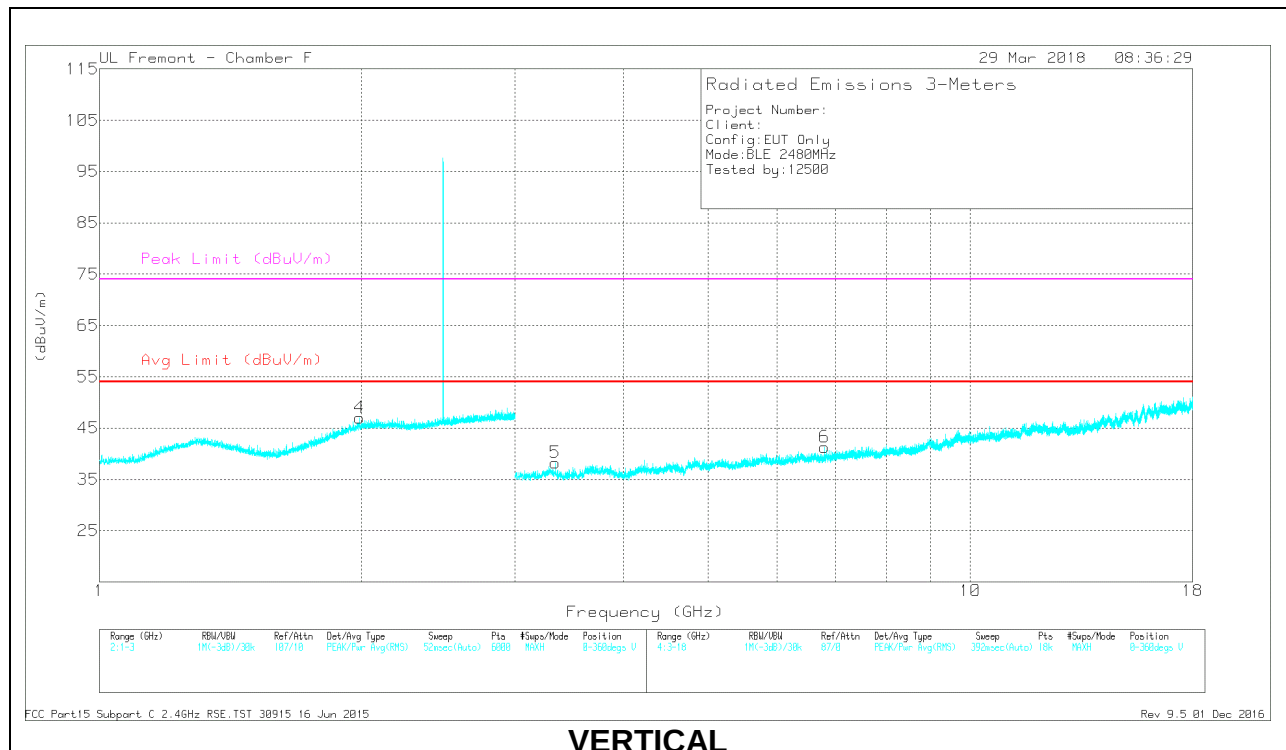
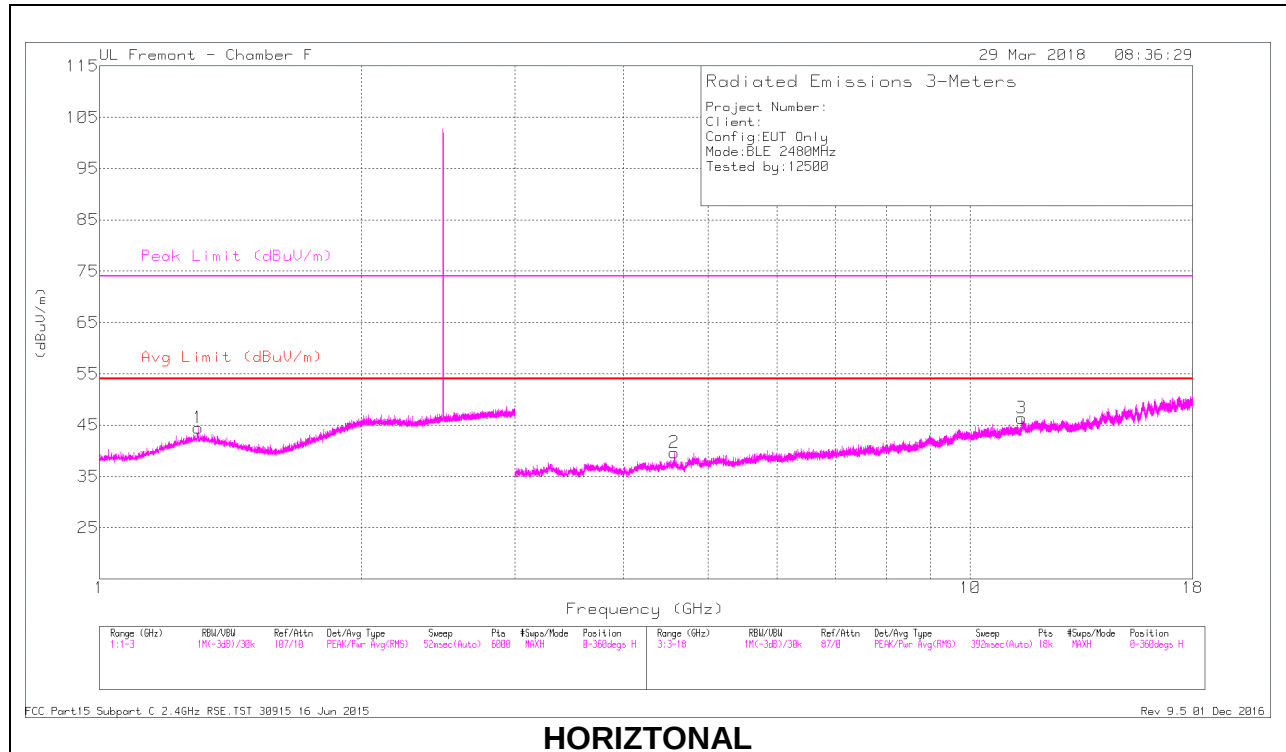
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Filtr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.151	42.57	PK2	27.8	-22.4	47.97	-	-	74	-26.03	105	102	H
	* 1.152	30.16	MAv1	27.9	-22.4	35.66	54	-18.34	-	-	105	102	H
4	* 1.674	41.82	PK2	28.1	-21.4	48.52	-	-	74	-25.48	242	141	V
	* 1.674	29.95	MAv1	28.1	-21.4	36.65	54	-17.35	-	-	242	141	V
3	* 11.516	35.19	PK2	38.5	-20.6	53.09	-	-	74	-20.91	357	260	H
	*11.516	24.86	MAv1	38.5	-20.6	42.76	54	-11.24	-	-	357	260	H
5	2.576	42.61	PK2	32.3	-20.6	54.31	-	-	-	-	262	390	V
2	4.441	39.15	PK2	33.9	-28.4	44.65	-	-	-	-	13	182	H
6	7.181	37.92	PK2	35.9	-25.7	48.12	-	-	-	-	110	234	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average

HIGH CHANNEL RESULTS



RADIATED EMISSIONS

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	AF T119 (dB/m)	Amp/Cbl/Fitr/Pad (dB)	Corrected Reading (dBuV/m)	Avg Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 1.299	42.97	PK2	30.1	-22	51.07	-	-	74	-22.93	109	155	H
	* 1.299	29.98	MAv1	30.1	-22	38.08	54	-15.92	-	-	109	155	H
4	1.988	42.01	PK2	32.2	-21.1	53.11	-	-	-	-	150	213	V
2	* 4.575	38.72	PK2	34.1	-27.3	45.52	-	-	74	-28.48	295	147	H
	* 4.576	26.84	MAv1	34.1	-27.3	33.64	54	-20.36	-	-	295	147	H
3	* 11.453	35.42	PK2	38.3	-21.6	52.12	-	-	74	-21.88	262	215	H
	* 11.455	23.56	MAv1	38.3	-21.6	40.26	54	-13.74	-	-	262	215	H
5	* 3.336	39.95	PK2	33.5	-28.6	44.85	-	-	74	-29.15	187	344	V
	* 3.334	27.58	MAv1	33.5	-28.6	32.48	54	-21.52	-	-	187	344	V
6	6.804	37.06	PK2	35.6	-26	46.66	-	-	-	-	342	113	V

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

PK2 - KDB558074 Method: Maximum Peak

MAv1 - KDB558074 Option 1 Maximum RMS Average