

## 10.4. OUT-OF-BAND EMISSIONS

### LIMITS

FCC §15.247 (d)

In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required.

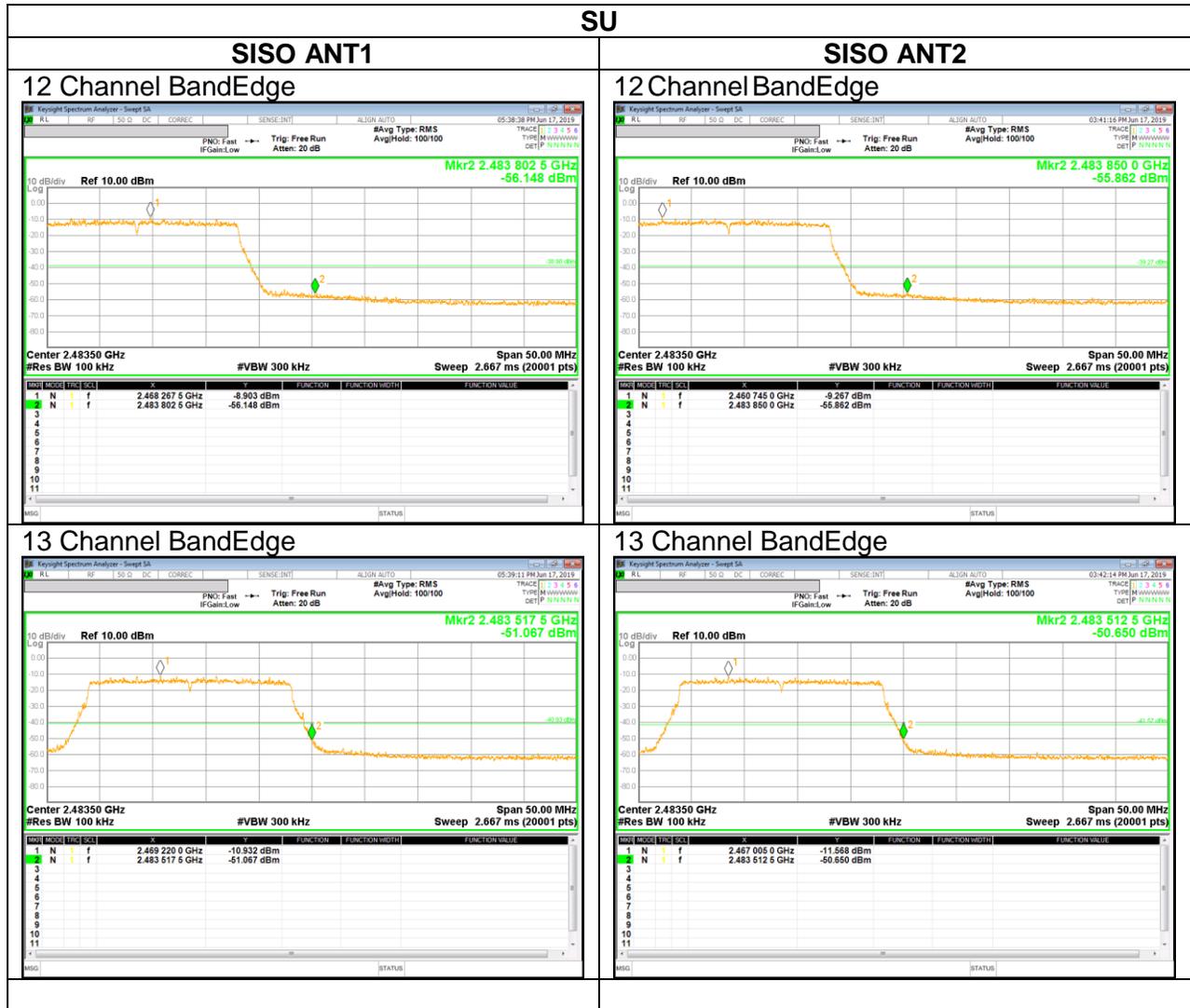
### TEST PROCEDURE

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.

**RESULTS**

**10.4.1. 802.11ax HE20 MODE IN THE 2.4 GHz BAND**





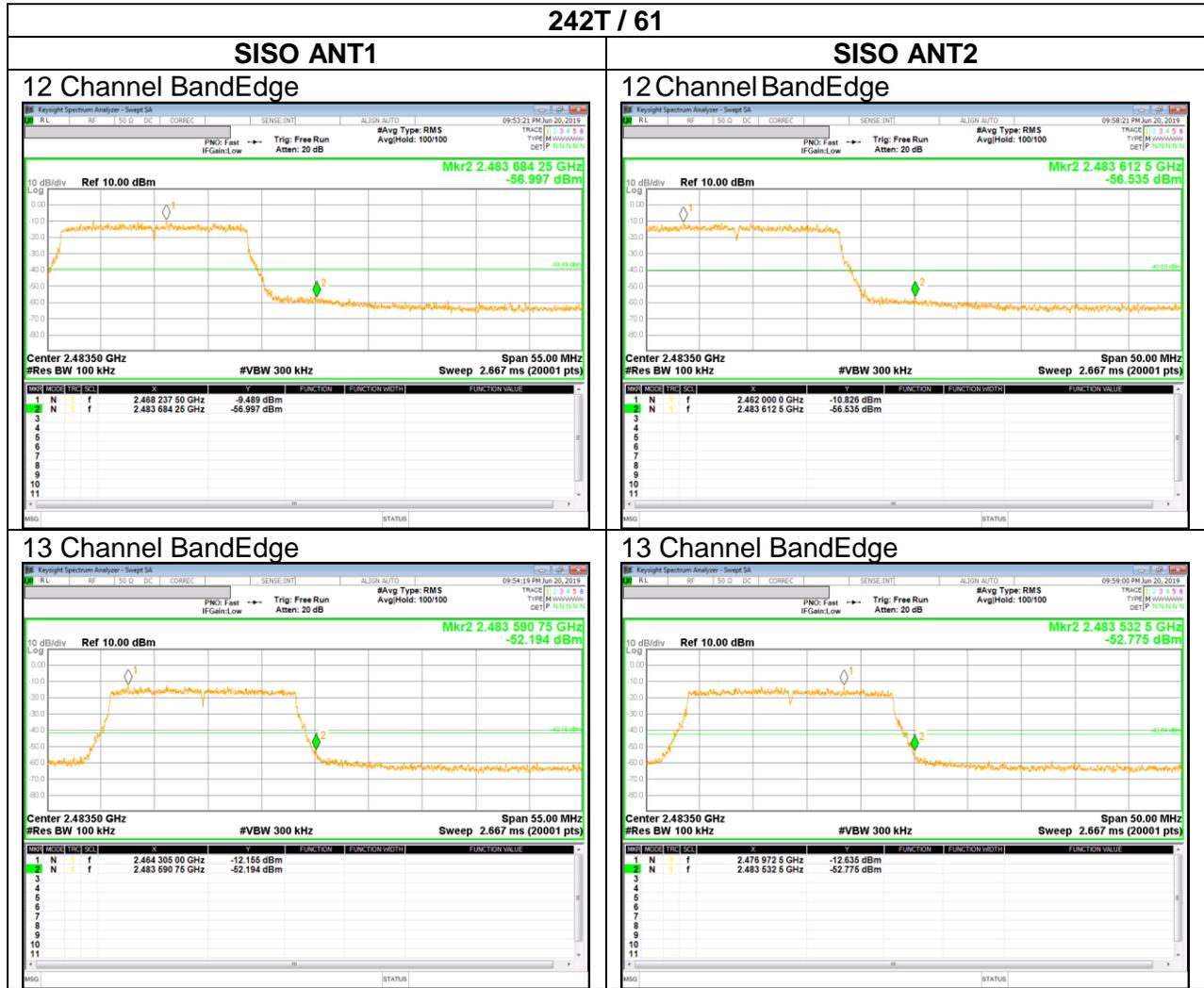
SU



242T / Low: 61, Mid(Ref): 61, High: 61

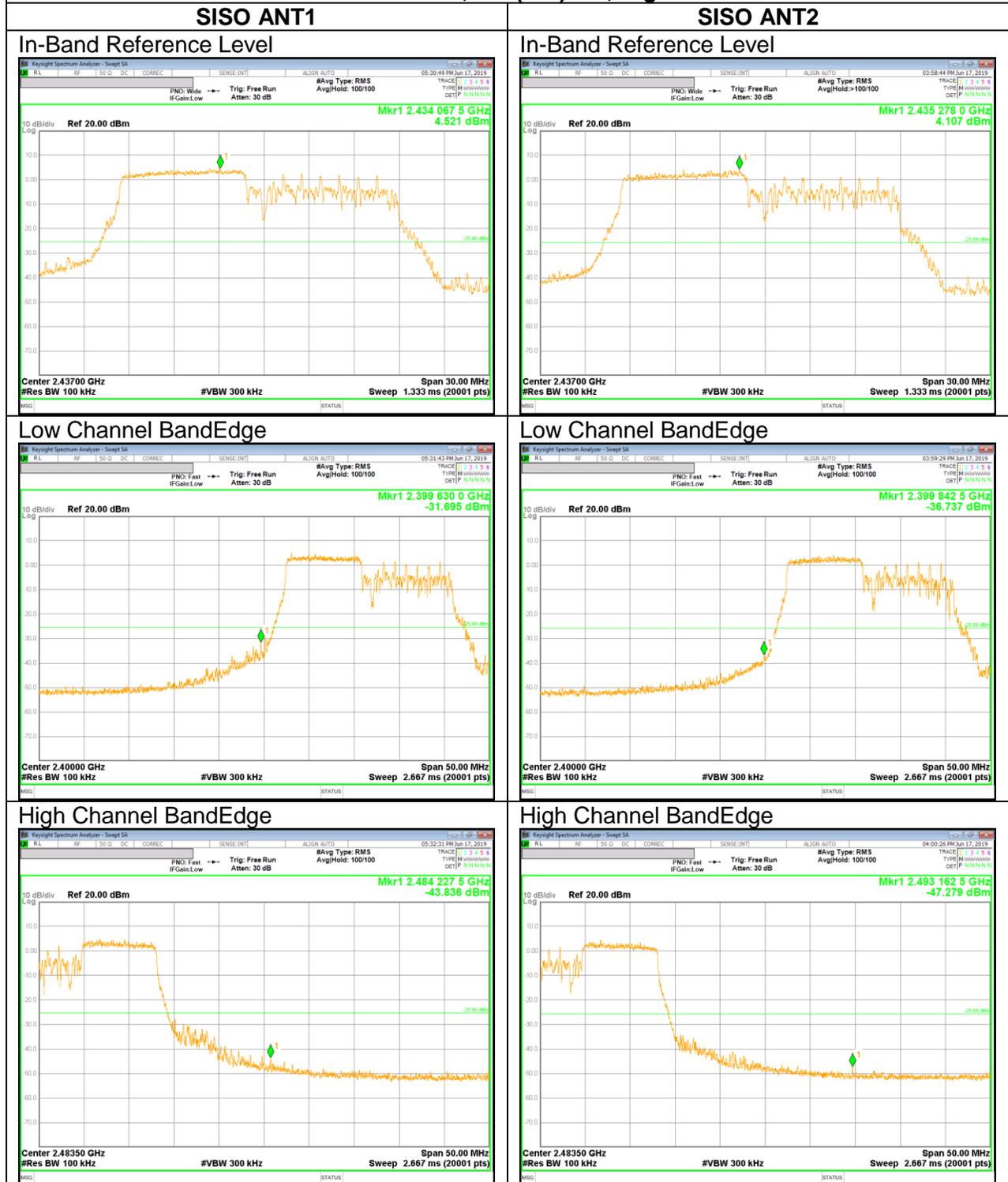


242T / 61

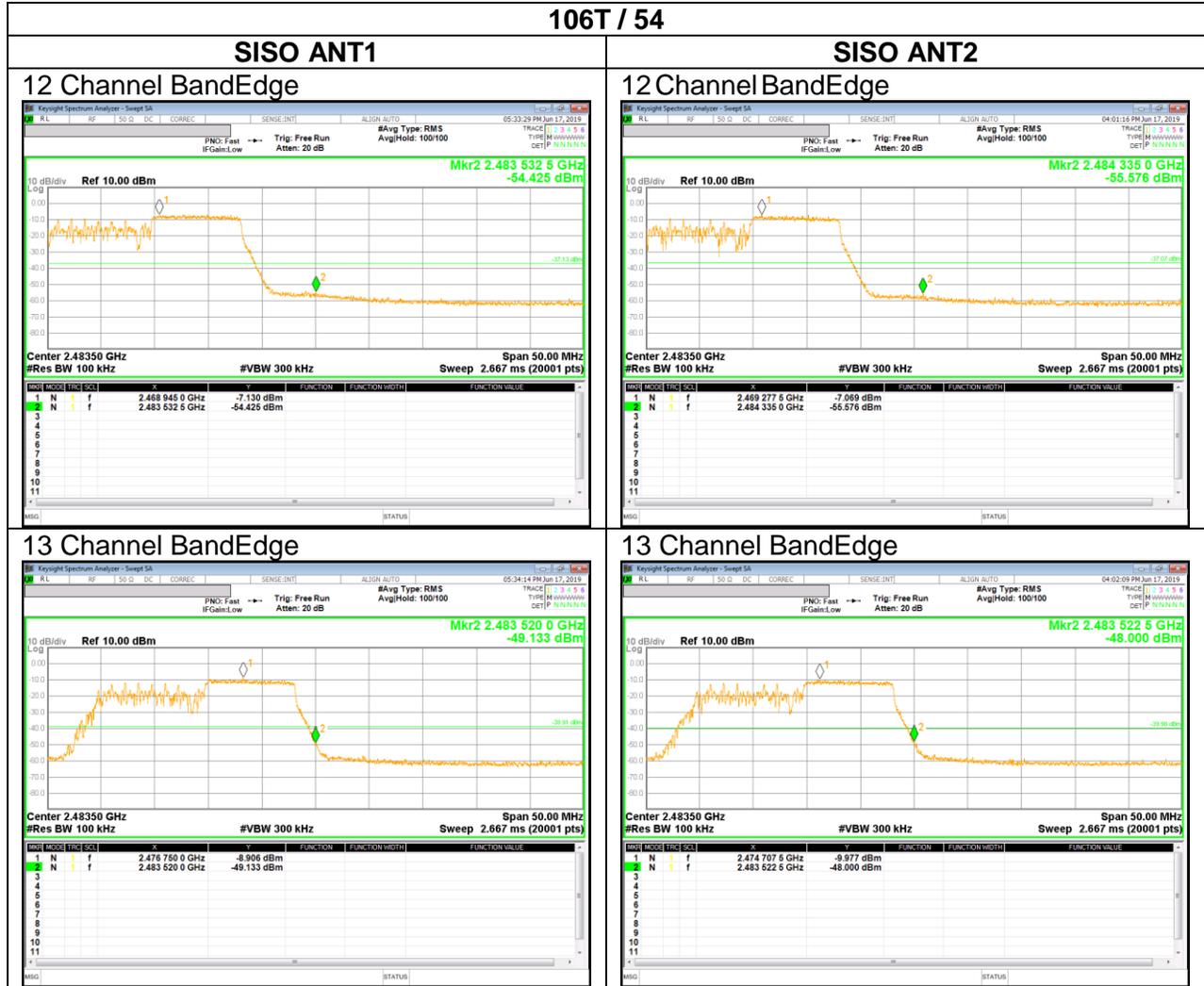


NOTE : Conducted band edge test results of SU mode is worse than Full RU(262T) mode. Also output power level of SU mode is higher than Full RU(242T) mode. So radiated band edge test results of Full RU(262T) mode were covered by SU mode results.

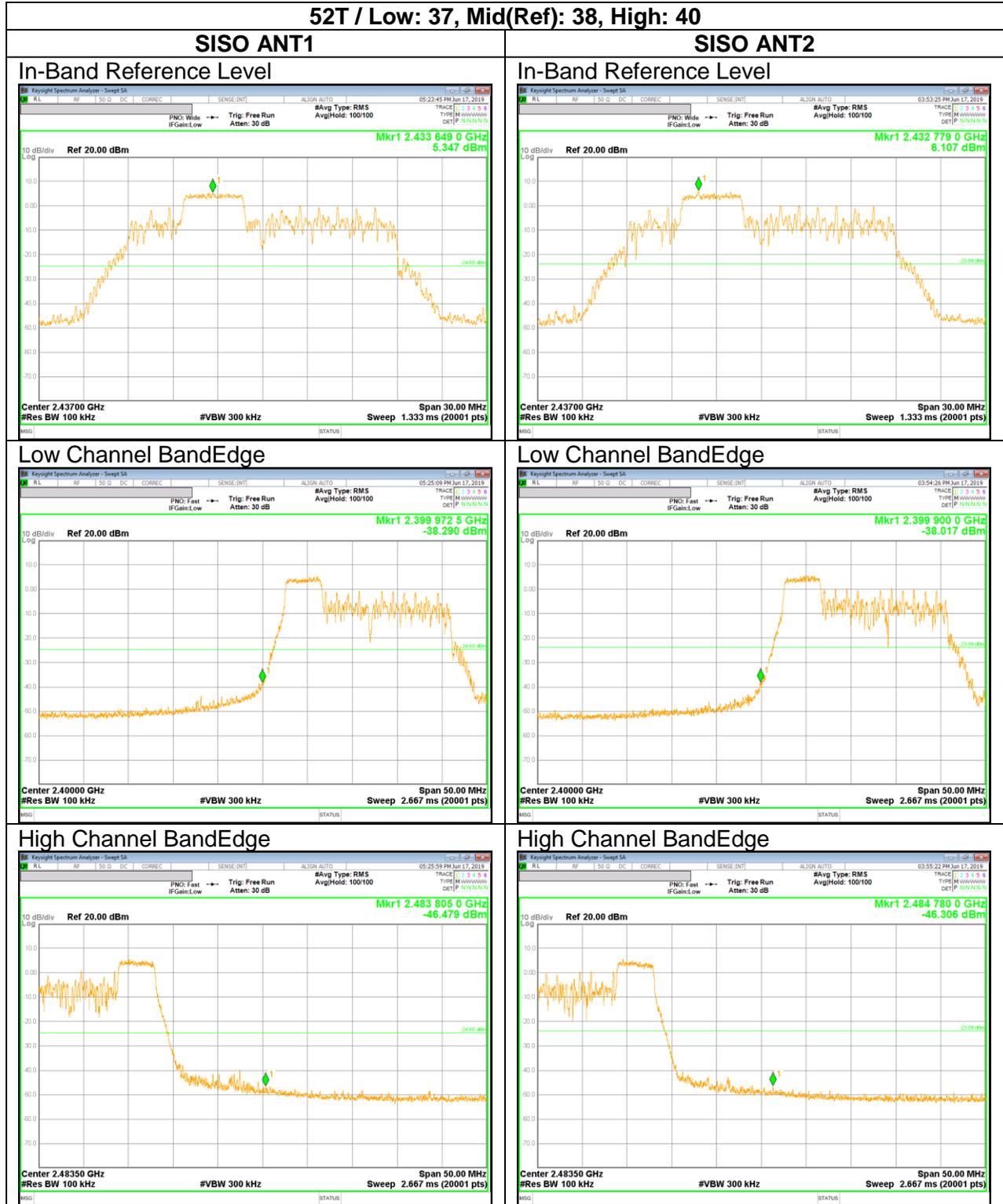
106T / Low: 53, Mid(Ref): 53, High: 54

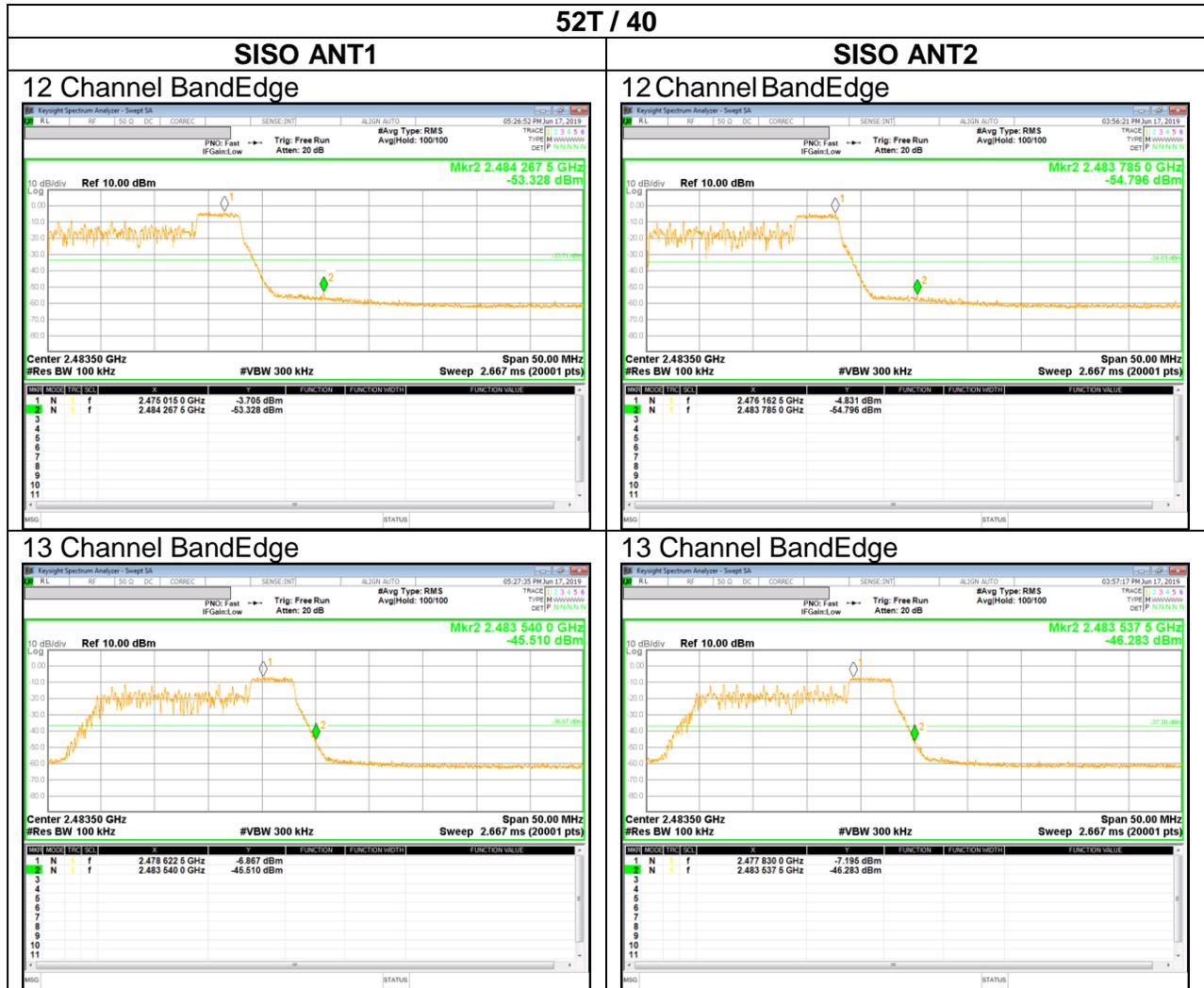


106T / 54

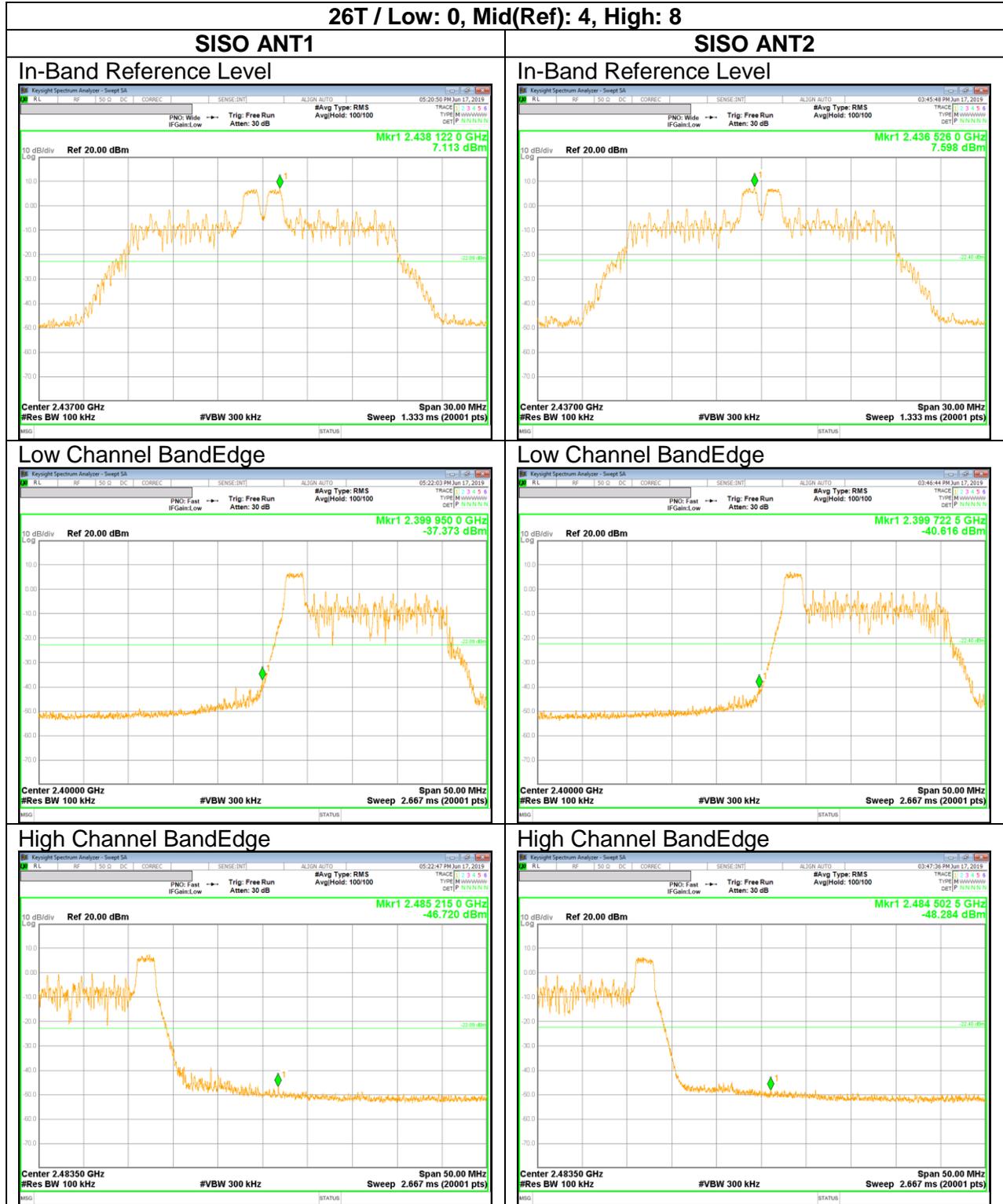


52T / Low: 37, Mid(Ref): 38, High: 40





26T / Low: 0, Mid(Ref): 4, High: 8



26T / 8



26T / Low: 0, Mid: 4 High: 4



## 11. RADIATED TEST RESULTS

### LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
0.009 – 0.490	2400 / F (kHz)	300
0.490 – 1.705	24000 / F (kHz)	30
1.705 – 30.0	30	30
30 – 88	100**	3
88 - 216	150**	3
216 – 960	200**	3
Above 960	500	3

\*\* Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g. §§ 15.231 and 15.241.

## **TEST PROCEDURE**

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 150 cm for 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 measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor for average measurements. (Restricted bandedge, Final detection of spurious harmonic emissions)

Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

The spectrum from 1 GHz to 26 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.  
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

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.

Note : Emission was pre-scanned from 9KHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).  
Per FCC part 15.31(o), test results were not reported.

Although these tests were performed other than open area test site, adequate comparison measurements were confirmed against 30 m open are test site.  
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

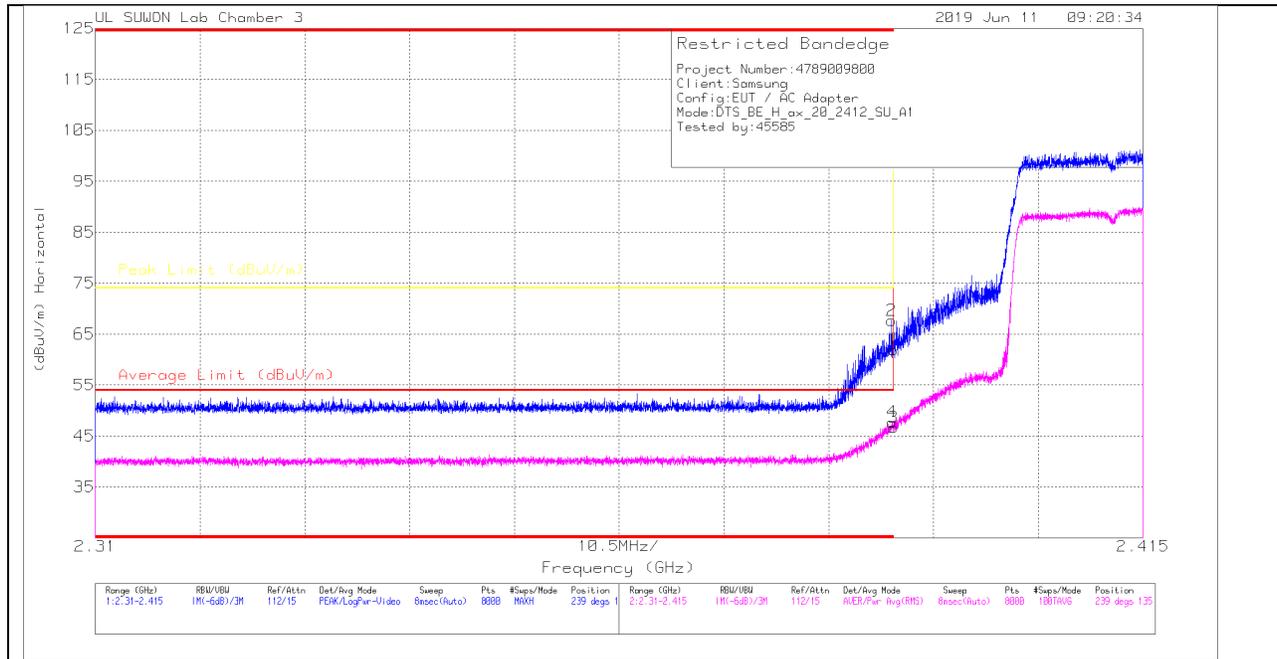
## 11.1. TRANSMITTER ABOVE 1 GHz\_SISO

### 11.1.1. TX ABOVE 1 GHz 802.11ax HE20 MODE IN THE 2.4 GHz BAND

#### RESTRICTED BANDEDGE (LOW CHANNEL)

SU mode (ANT\_1)

#### HORIZONTAL PEAK AND AVERAGE PLOT



#### HORIZONTAL DATA

#### Trace Markers

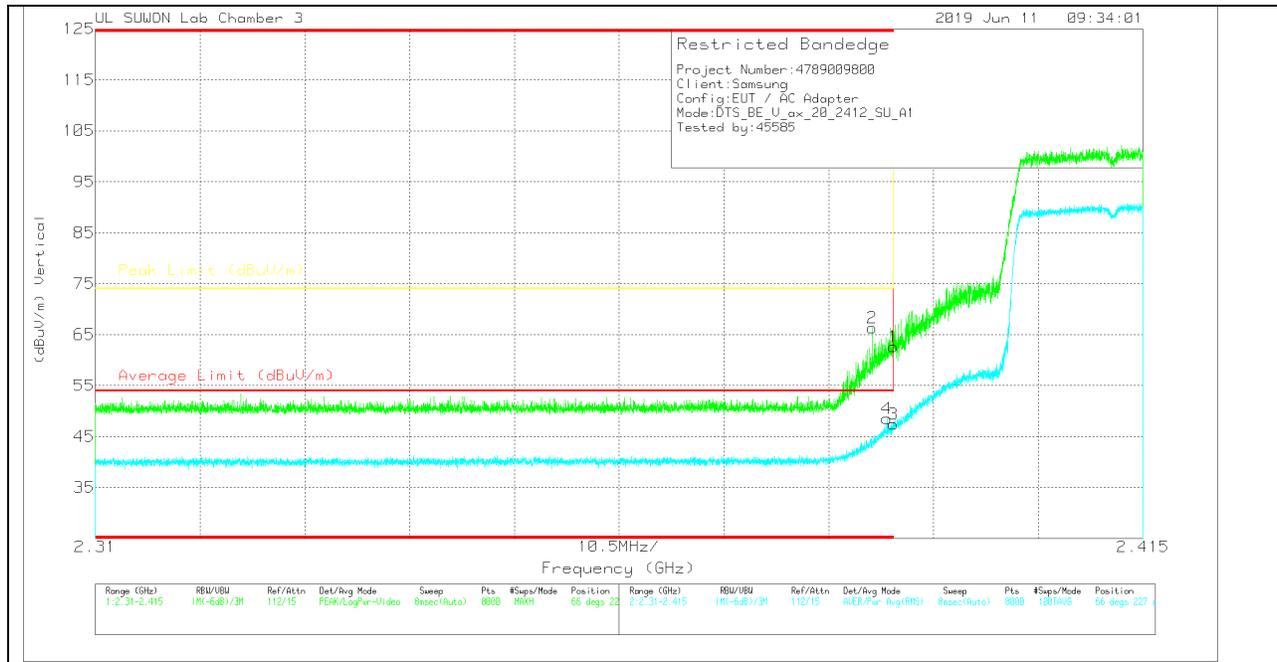
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	10dB[dB]	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	53.67	Pk	31.7	-23.4	0	61.97	-	-	74	-12.03	239	135	H
2	* 2.39	59.36	Pk	31.7	-23.4	0	67.66	-	-	74	-6.34	239	135	H
3	* 2.39	38.39	RMS	31.7	-23.4	0	46.69	54	-7.31	-	-	239	135	H
4	* 2.39	39.44	RMS	31.7	-23.4	0	47.74	54	-6.26	-	-	239	135	H

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

Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00205959	10dB(dB)	DC Corr (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	54.34	Pk	31.7	-23.4	0	62.64	-	-	74	-11.36	66	227	V
2	* 2.388	58.04	Pk	31.7	-23.4	0	66.34	-	-	74	-7.66	66	227	V
3	* 2.39	39.1	RMS	31.7	-23.4	0	47.4	54	-6.6	-	-	66	227	V
4	* 2.389	40.2	RMS	31.7	-23.4	0	48.5	54	-5.5	-	-	66	227	V

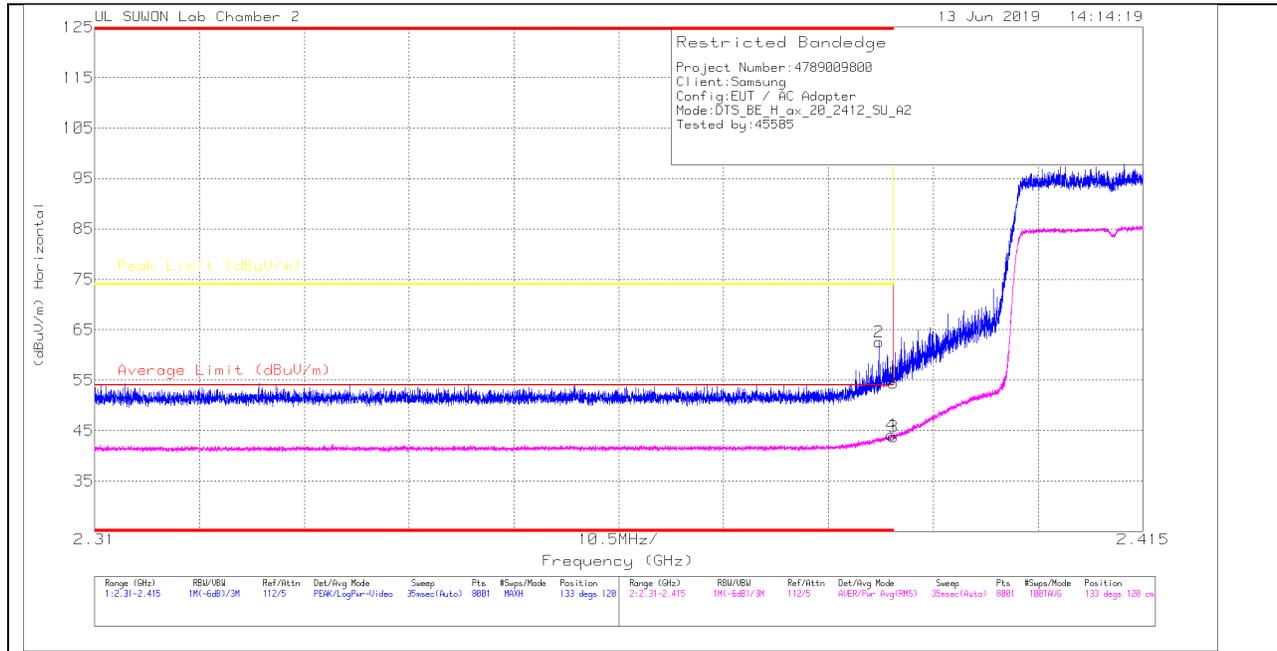
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

SU mode (ANT\_2)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

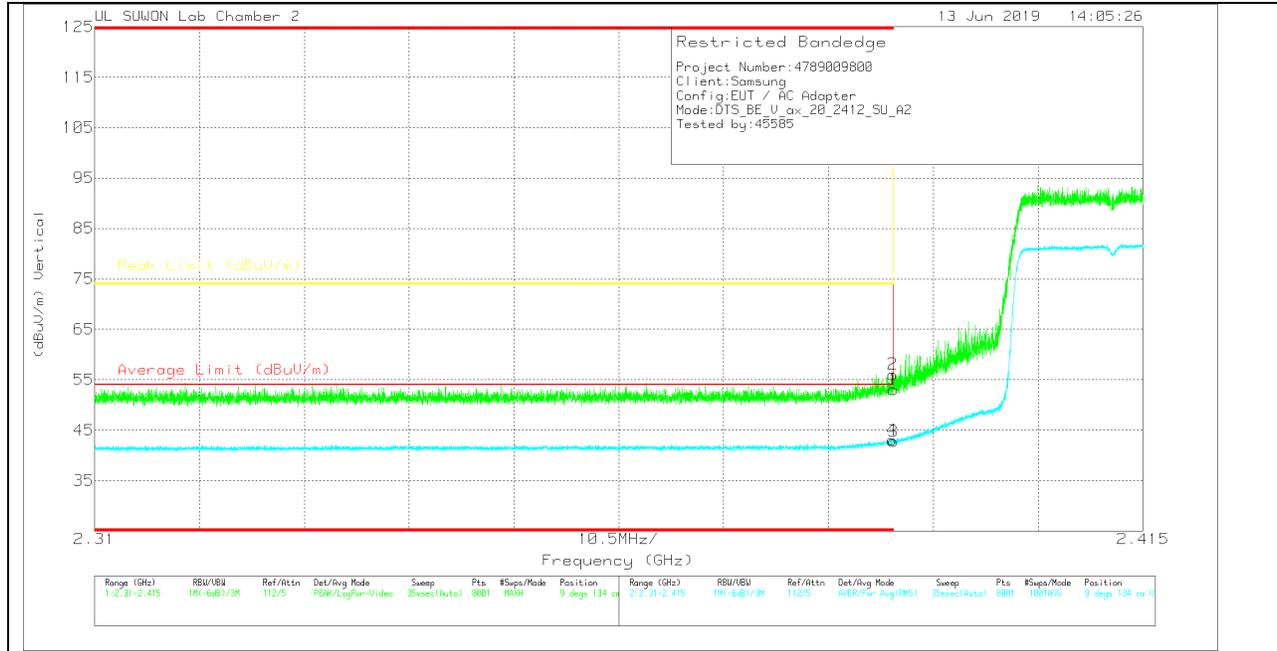
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1	* 2.39	43.63	Pk	31.6	-20.8	0	54.43	-	-	74	-19.57	133	120	H
2	* 2.389	51.72	Pk	31.6	-20.8	0	62.52	-	-	74	-11.48	133	120	H
3	* 2.39	33.01	RMS	31.6	-20.8	0	43.81	54	-10.19	-	-	133	120	H
4	* 2.39	33.32	RMS	31.6	-20.8	0	44.12	54	-9.88	-	-	133	120	H

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Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

**Trace Markers**

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB(dB)	DC Corr (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	42.31	Pk	31.6	-20.8	0	53.11	-	-	74	-20.89	9	134	V
2	* 2.39	45.28	Pk	31.6	-20.8	0	56.08	-	-	74	-17.92	9	134	V
3	* 2.39	31.99	RMS	31.6	-20.8	0	42.79	54	-11.21	-	-	9	134	V
4	* 2.39	32.28	RMS	31.6	-20.8	0	43.08	54	-10.92	-	-	9	134	V

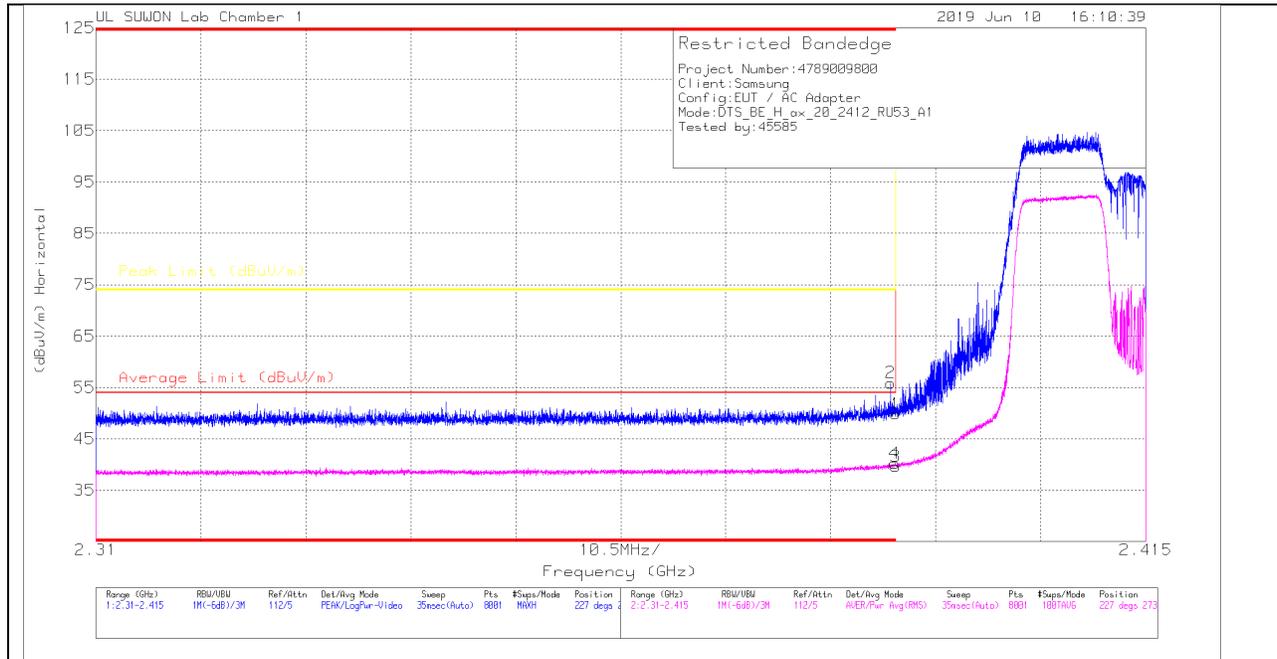
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

106T RU mode (ANT\_1 / RU offset 53)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

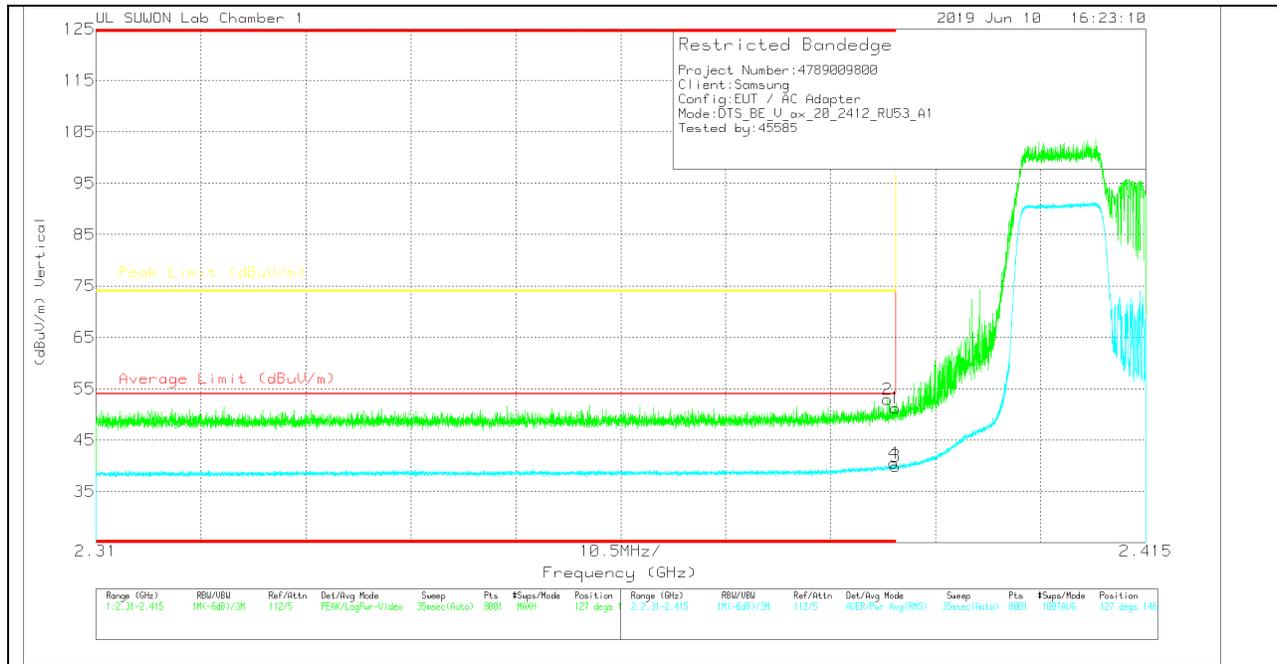
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	43.68	Pk	31.7	-25.5	0	49.88	-	-	74	-24.12	227	273	H
2	* 2.38947	49.7	Pk	31.7	-25.5	0	55.9	-	-	74	-18.1	227	273	H
3	* 2.39	33.44	RMS	31.7	-25.5	0	39.64	54	-14.36	-	-	227	273	H
4	* 2.38989	34.04	RMS	31.7	-25.5	0	40.24	54	-13.76	-	-	227	273	H

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

Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB(dB)	DC Corr (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	45.04	Pk	31.7	-25.5	0	51.24	-	-	74	-22.76	127	146	V
2	* 2.38918	46.69	Pk	31.7	-25.5	0	52.89	-	-	74	-21.11	127	146	V
3	* 2.39	33.74	RMS	31.7	-25.5	0	39.94	54	-14.06	-	-	127	146	V
4	* 2.3898	34.27	RMS	31.7	-25.5	0	40.47	54	-13.53	-	-	127	146	V

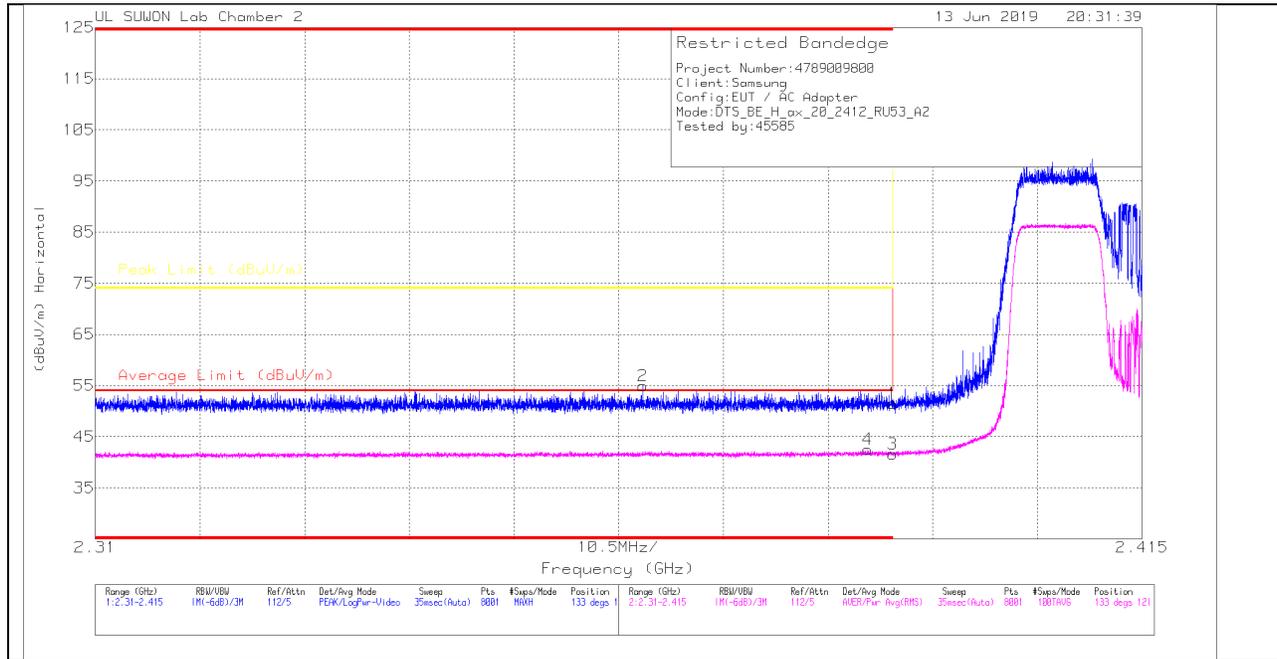
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

106T RU mode (ANT\_2 / RU offset 53)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

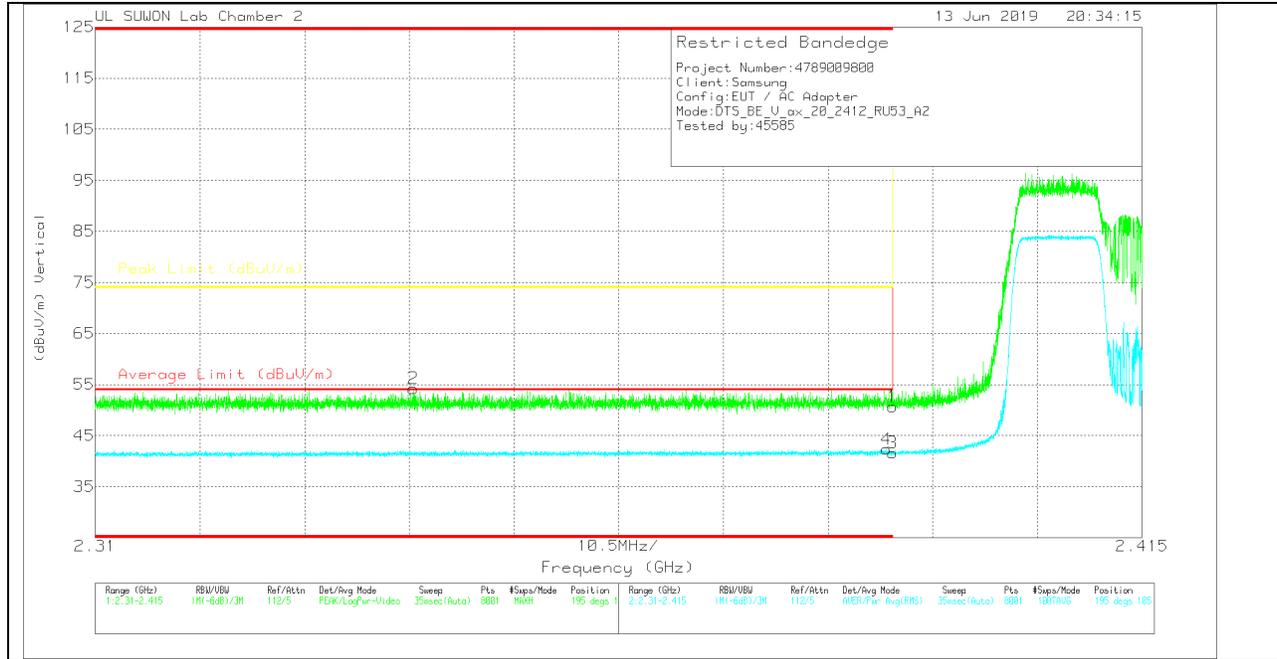
Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB(dB)	DC Corr (dB)	Corrected Reading (dBuV/m)	Average Limit (dBuV/m)	Margin (dB)	Peak Limit (dBuV/m)	PK Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	* 2.39	40.69	Pk	31.6	-20.8	0	51.49	-	-	74	-22.51	133	121	H
2	* 2.365	44.11	Pk	31.6	-20.8	0	54.91	-	-	74	-19.09	133	121	H
3	* 2.39	30.78	RMS	31.6	-20.8	0	41.58	54	-12.42	-	-	133	121	H
4	* 2.387	31.7	RMS	31.6	-20.8	0	42.5	54	-11.5	-	-	133	121	H

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

Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB(dB)	DC Corr (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	39.89	Pk	31.6	-20.8	0	50.69	-	-	74	-23.31	195	105	V
2	* 2.342	43.63	Pk	31.5	-20.9	0	54.23	-	-	74	-19.77	195	105	V
3	* 2.39	30.84	RMS	31.6	-20.8	0	41.64	54	-12.36	-	-	195	105	V
4	* 2.389	31.53	RMS	31.6	-20.8	0	42.33	54	-11.67	-	-	195	105	V

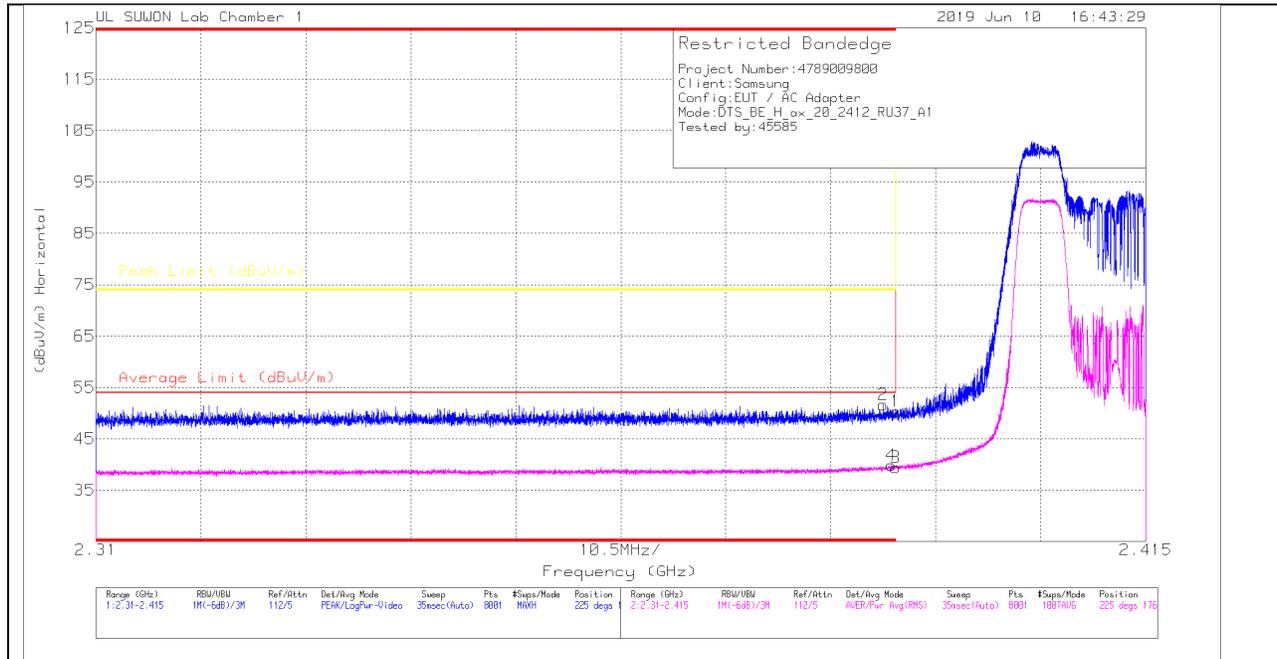
\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band

Pk - Peak detector

RMS - RMS detection

52T RU mode (ANT\_1 / RU offset 37)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

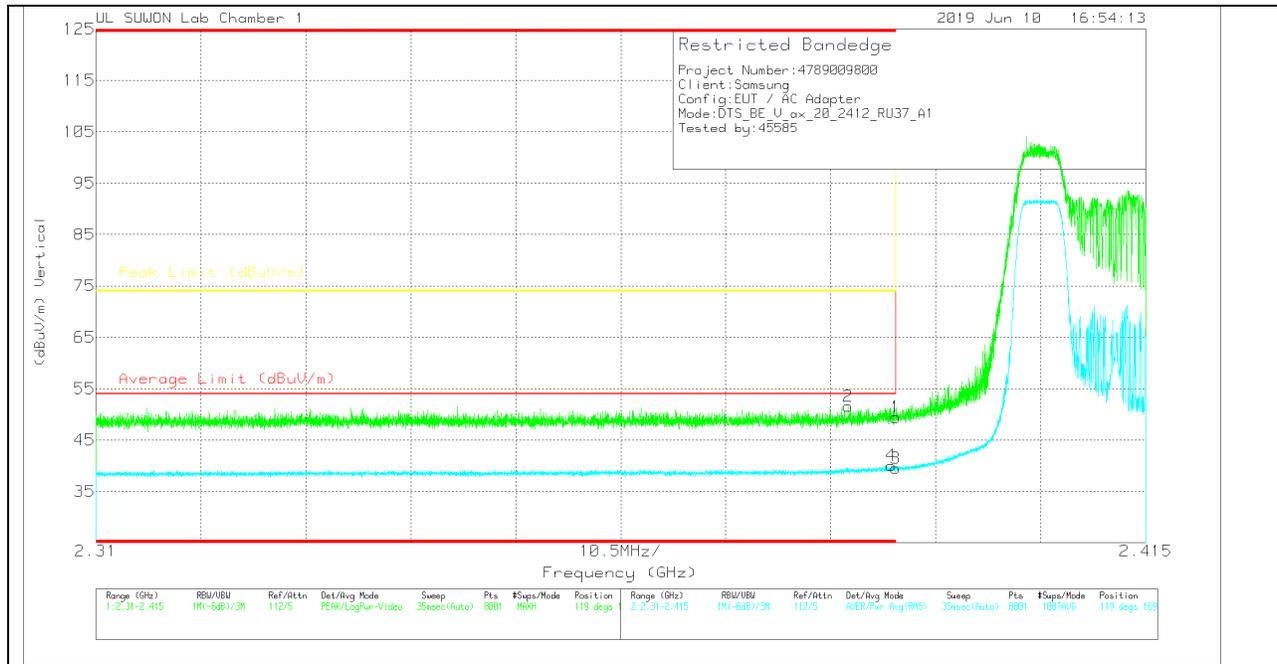
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1	* 2.39	44.18	Pk	31.7	-25.5	0	50.38	-	-	74	-23.62	225	176	H
2	* 2.38875	45.45	Pk	31.7	-25.5	0	51.65	-	-	74	-22.35	225	176	H
3	* 2.39	33.23	RMS	31.7	-25.5	0	39.43	54	-14.57	-	-	225	176	H
4	* 2.38955	33.66	RMS	31.7	-25.5	0	39.86	54	-14.14	-	-	225	176	H

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

Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

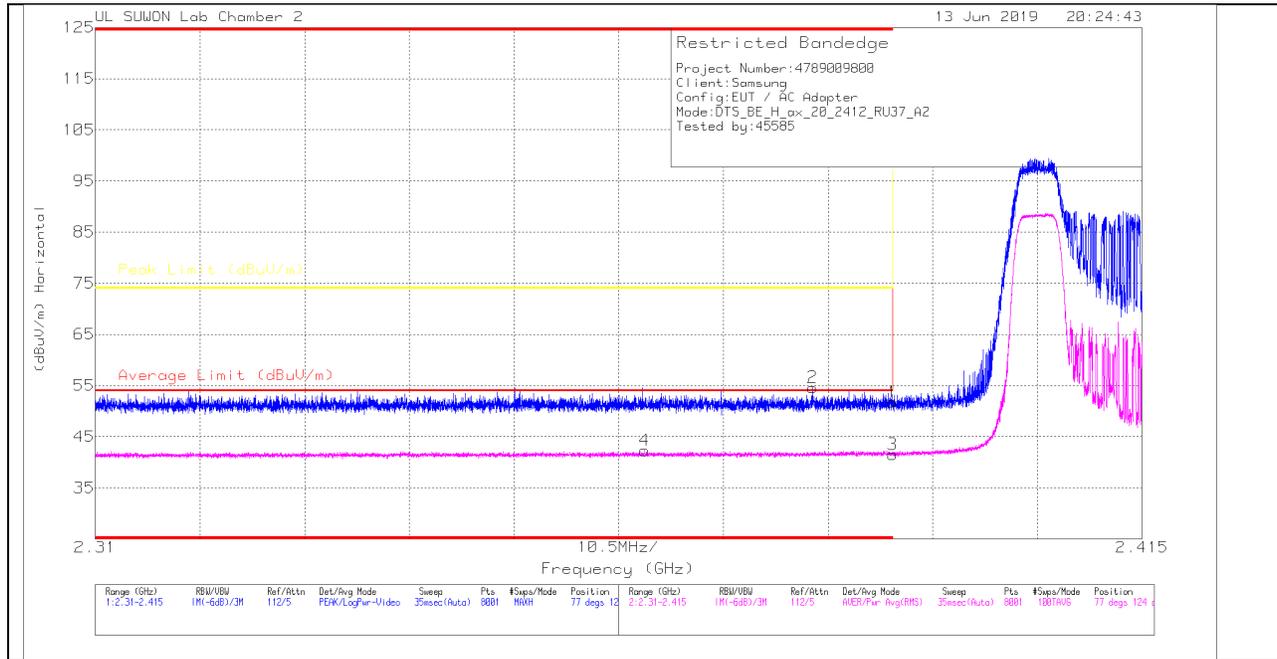
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168717	10dB[dB]	DC Corr (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	43.27	Pk	31.7	-25.5	0	49.47	-	-	74	-24.53	119	169	V
2	* 2.38525	45.35	Pk	31.7	-25.5	0	51.55	-	-	74	-22.45	119	169	V
3	* 2.39	33.3	RMS	31.7	-25.5	0	39.5	54	-14.5	-	-	119	169	V
4	* 2.38954	33.86	RMS	31.7	-25.5	0	40.06	54	-13.94	-	-	119	169	V

\* - indicates frequency in CFR47 Pt 15 / IC RSS-Restricted Band  
 Pk - Peak detector  
 RMS - RMS detection

52T RU mode (ANT\_2 / RU offset 37)

HORIZONTAL PEAK AND AVERAGE PLOT



HORIZONTAL DATA

Trace Markers

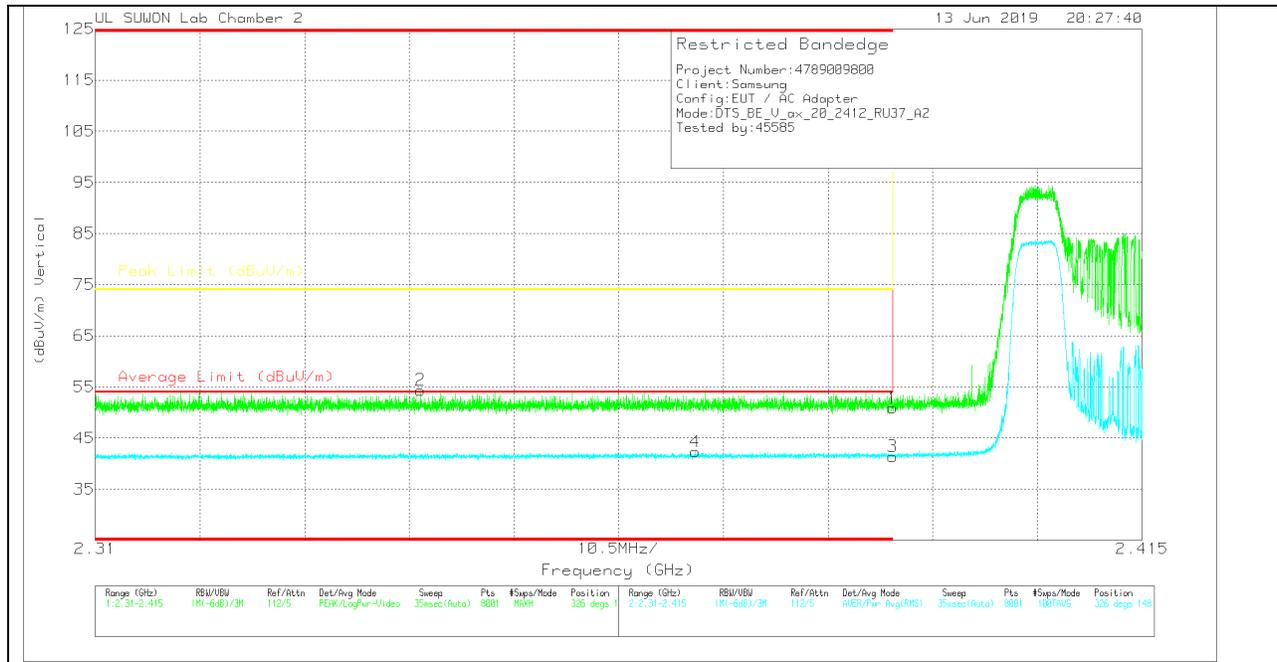
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1	* 2.39	40.95	Pk	31.6	-20.8	0	51.75	-	-	74	-22.25	77	124	H
2	* 2.382	43.82	Pk	31.6	-20.8	0	54.62	-	-	74	-19.38	77	124	H
3	* 2.39	30.73	RMS	31.6	-20.8	0	41.53	54	-12.47	-	-	77	124	H
4	* 2.365	31.5	RMS	31.6	-20.8	0	42.3	54	-11.7	-	-	77	124	H

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

Pk - Peak detector

RMS - RMS detection

**VERTICAL PEAK AND AVERAGE PLOT**



**VERTICAL DATA**

Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBuV)	Det	3117_00168724	10dB(dB)	DC Corr (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	40.07	Pk	31.6	-20.8	0	50.87	-	-	74	-23.13	326	148	V
2	* 2.343	43.76	Pk	31.5	-20.9	0	54.36	-	-	74	-19.64	326	148	V
3	* 2.39	30.61	RMS	31.6	-20.8	0	41.41	54	-12.59	-	-	326	148	V
4	* 2.37	31.53	RMS	31.6	-20.8	0	42.33	54	-11.67	-	-	326	148	V

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

Pk - Peak detector

RMS - RMS detection