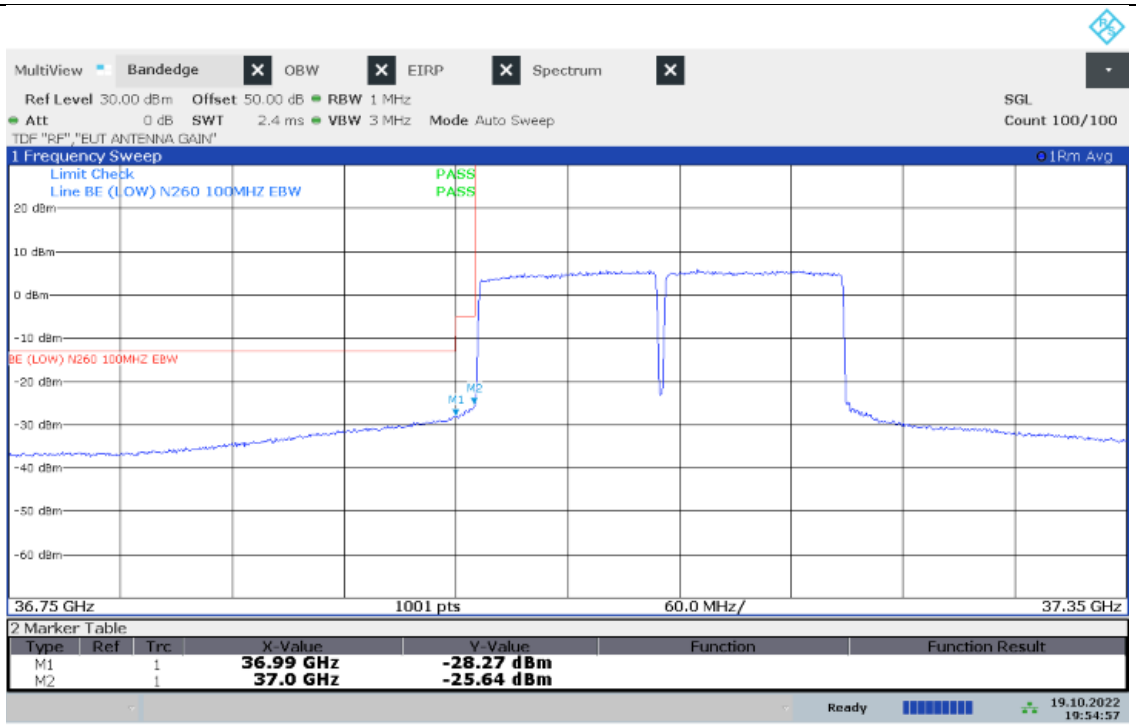
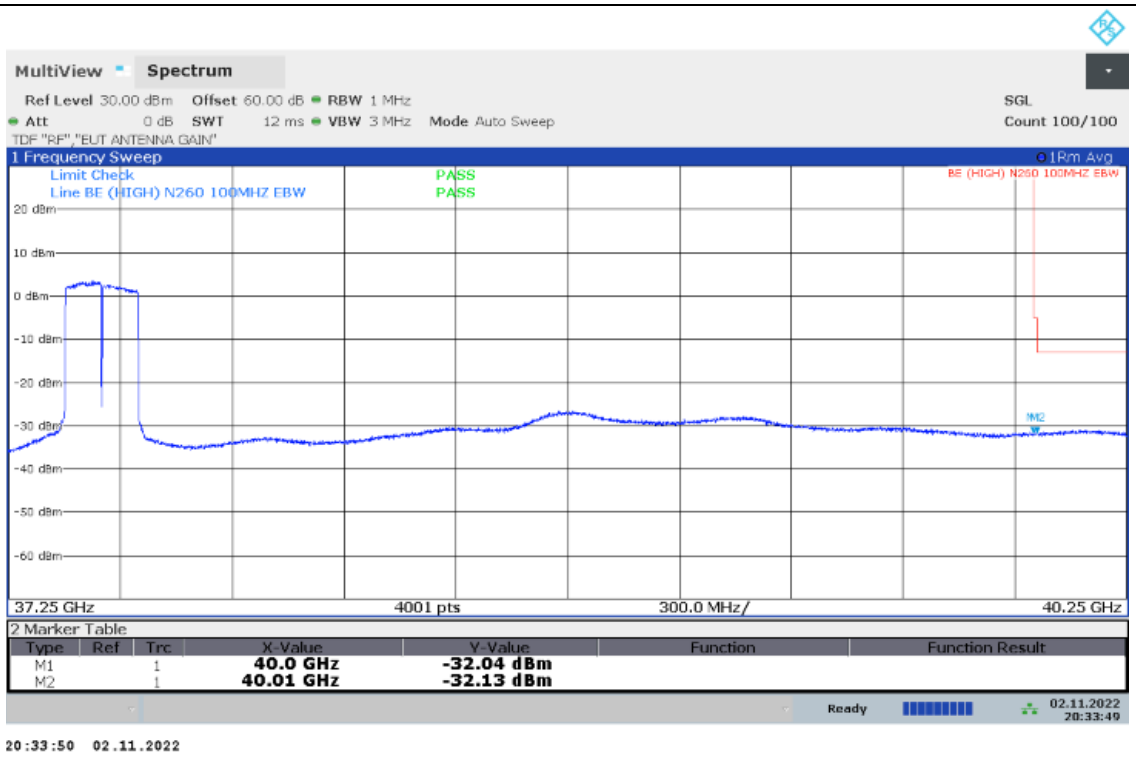
16QAM MCS16 2CC

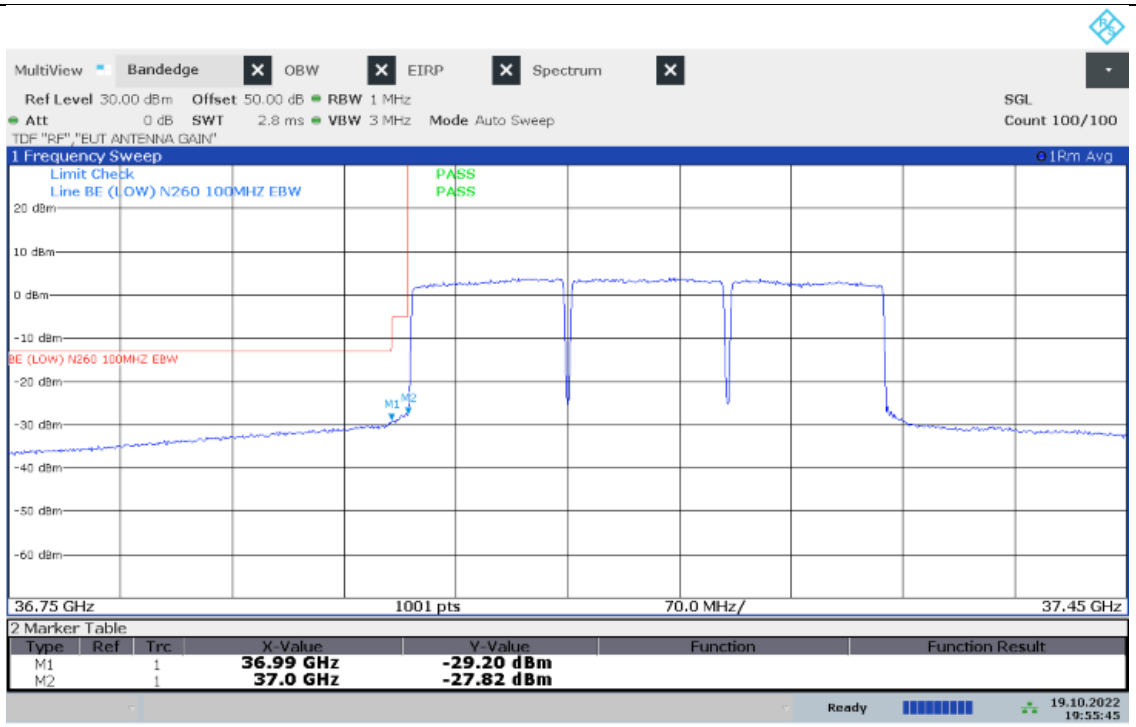


Low Channel

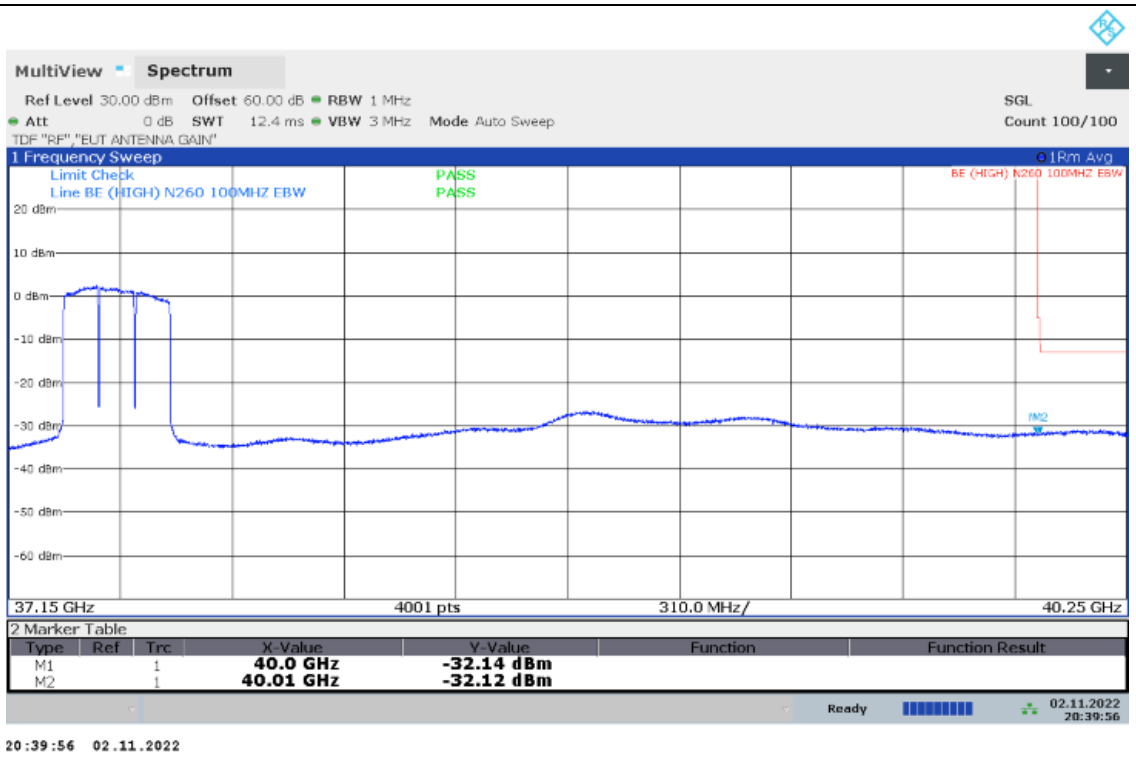


High Channel

16QAM MCS16 3CC



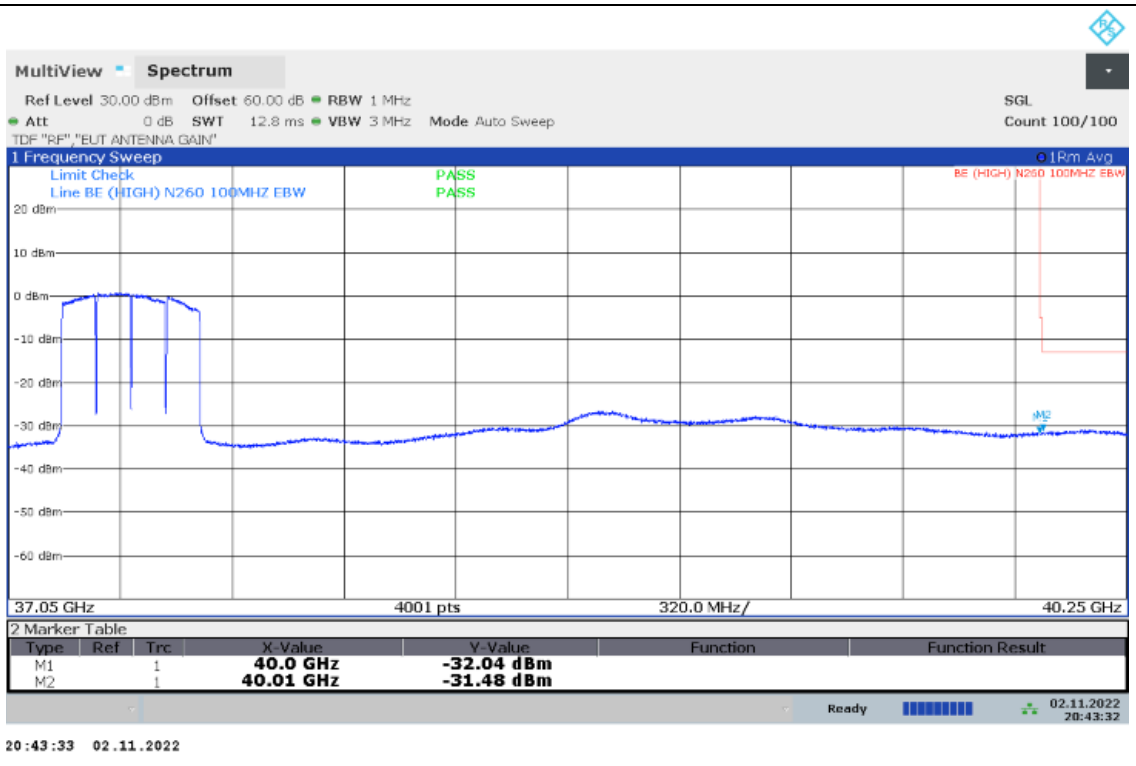
Low Channel



High Channel

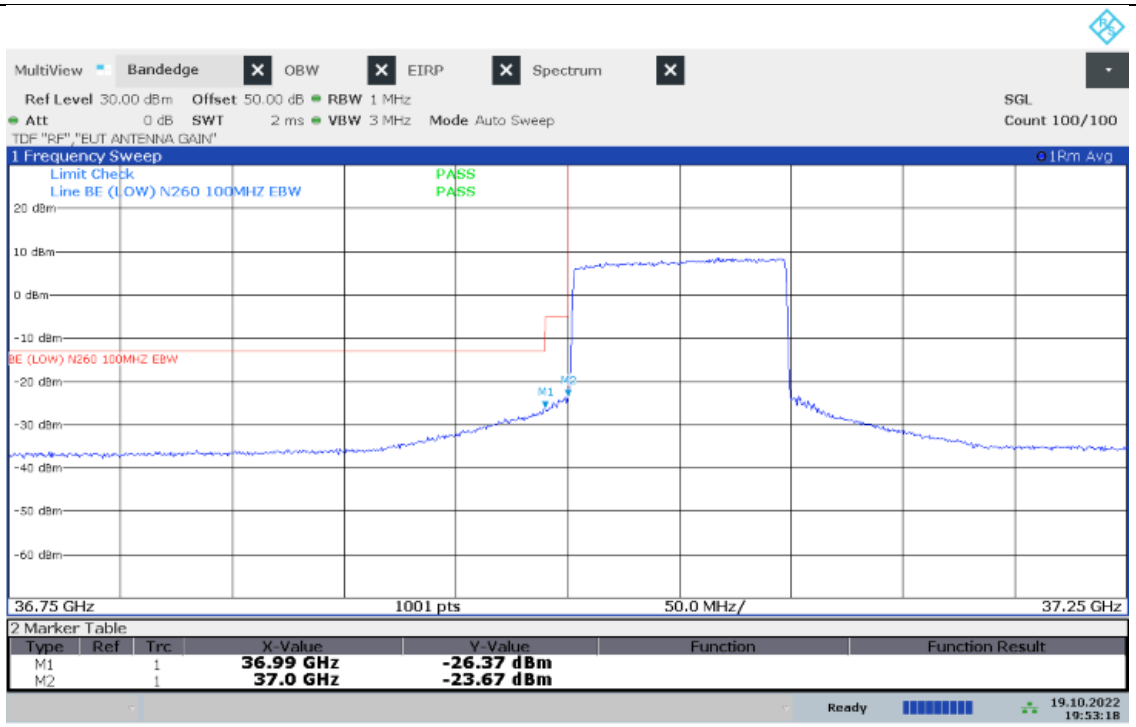
16QAM MCS16 4CC

Low Channel

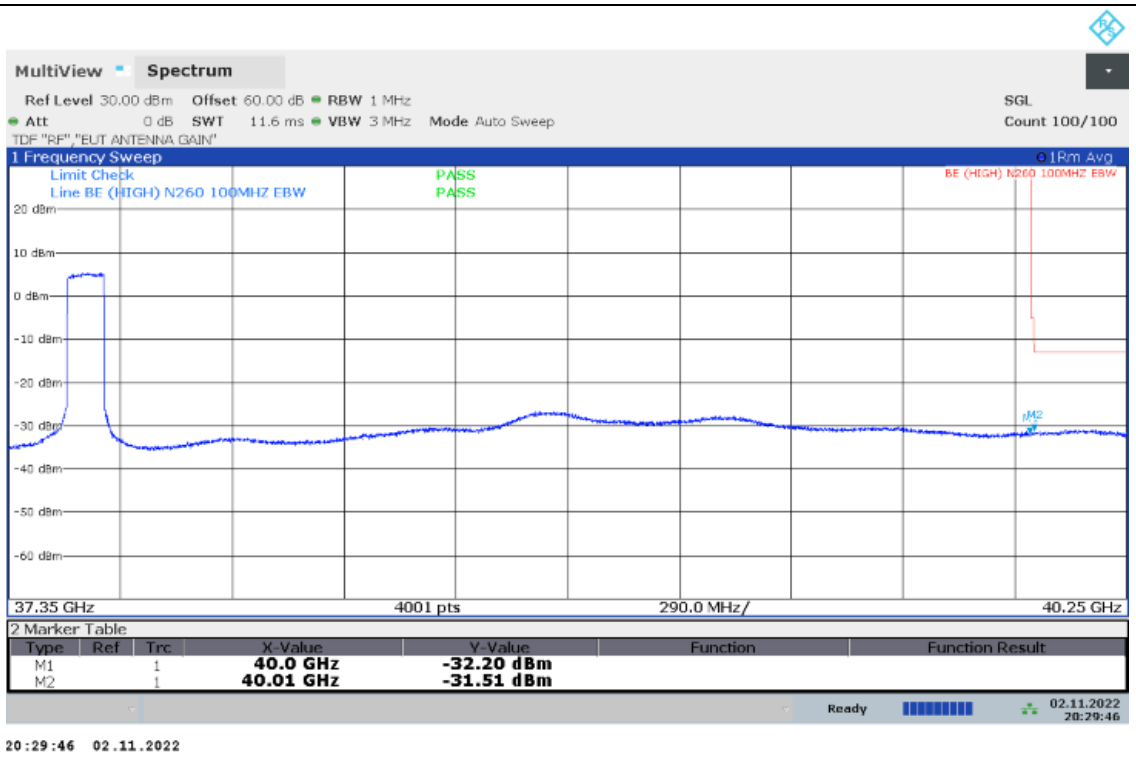


High Channel

64QAM MCS17 1CC

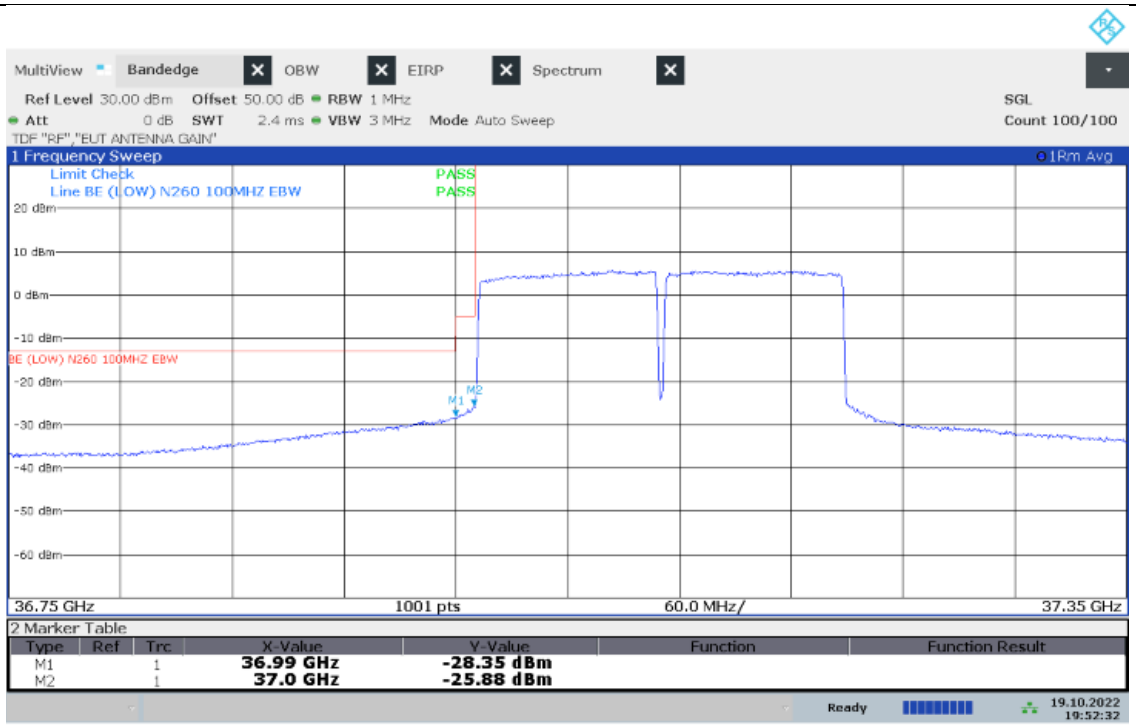


Low Channel



High Channel

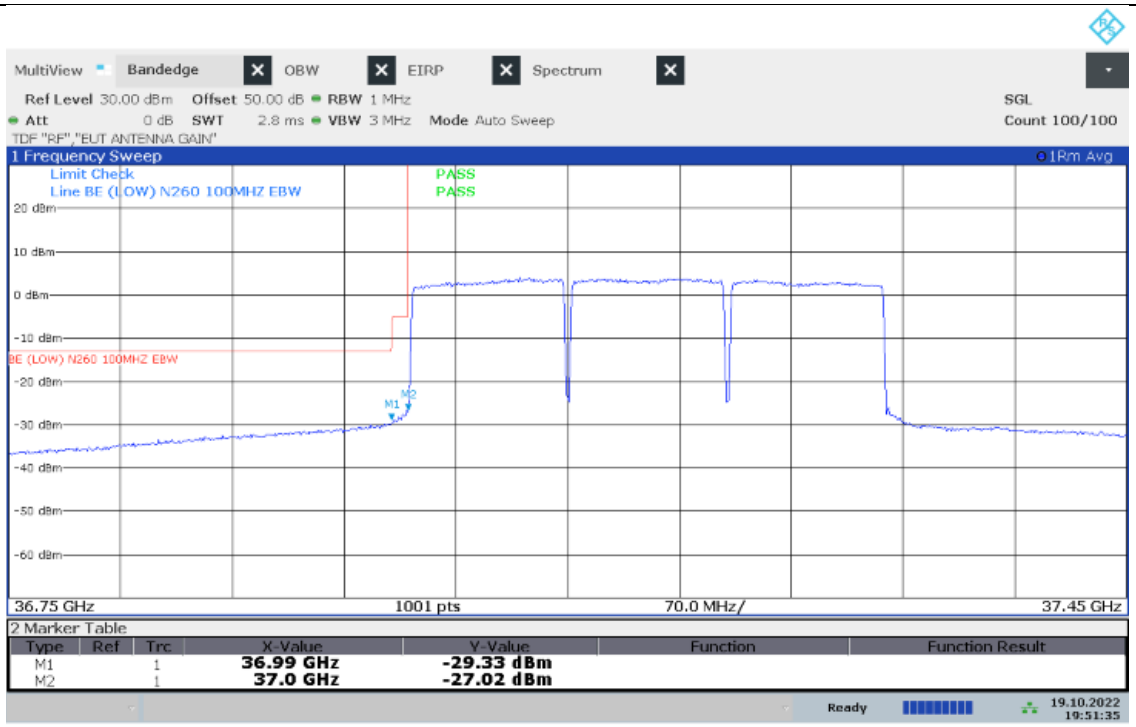
64QAM MCS17 2CC



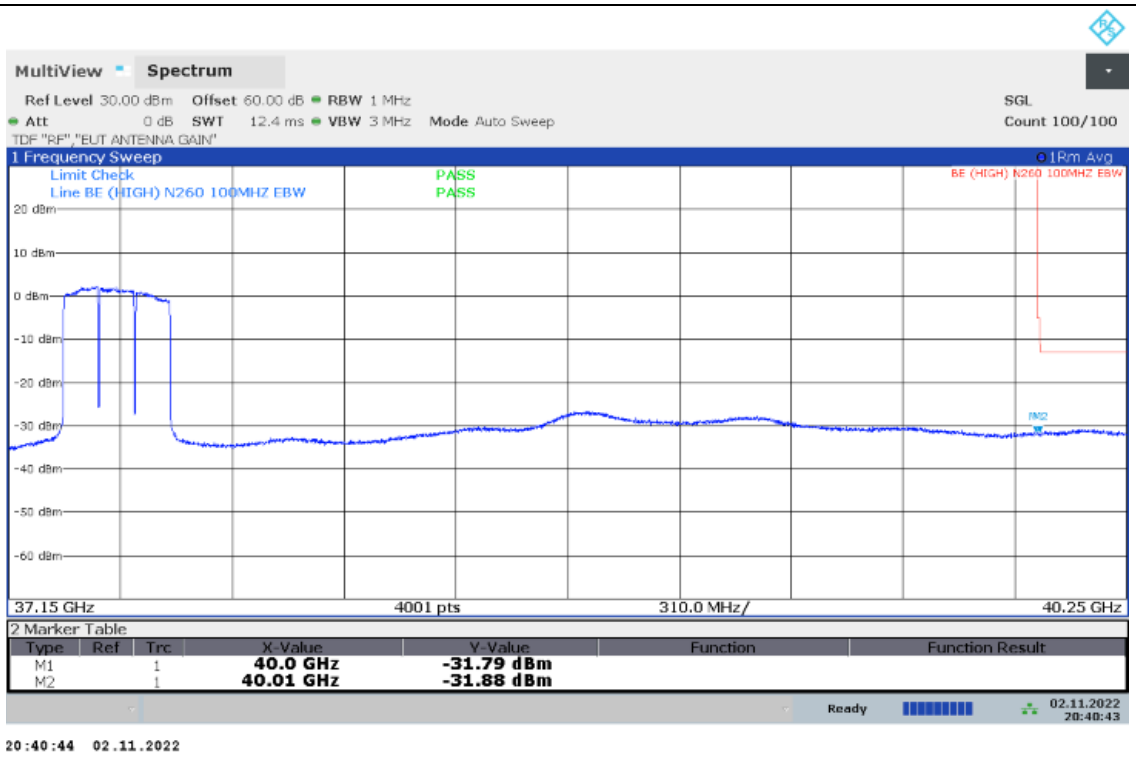
Low Channel

High Channel

64QAM MCS17 3CC



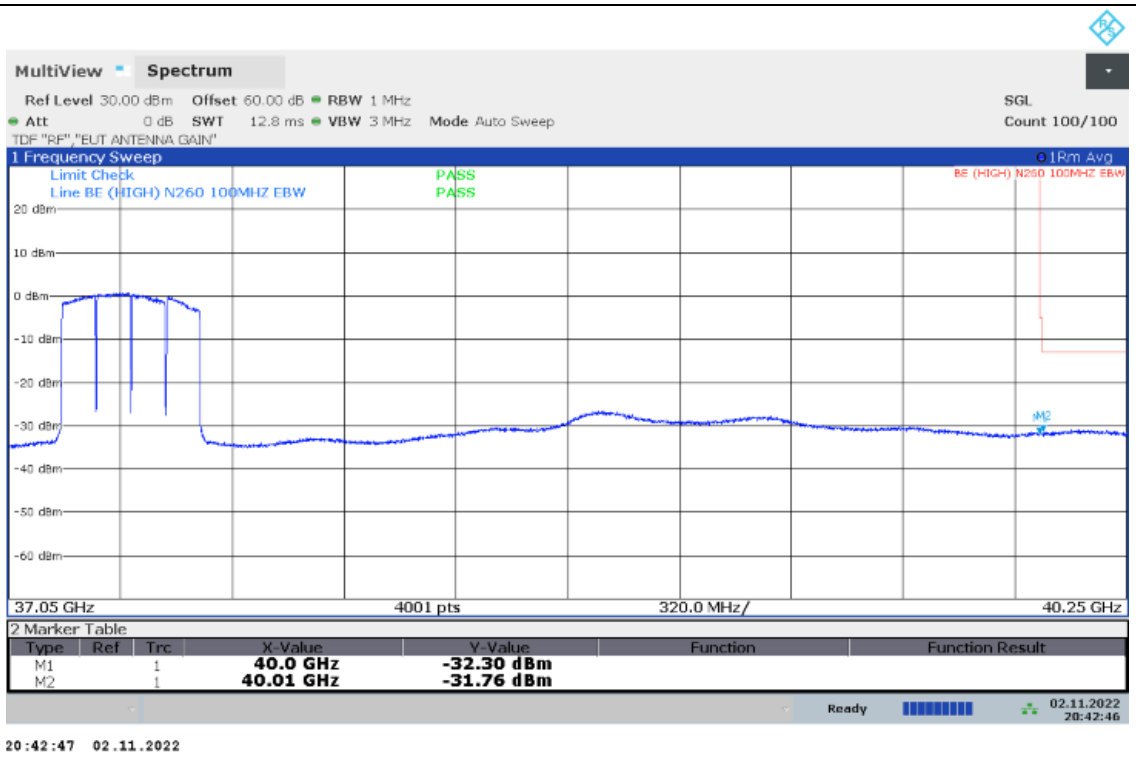
Low Channel



High Channel

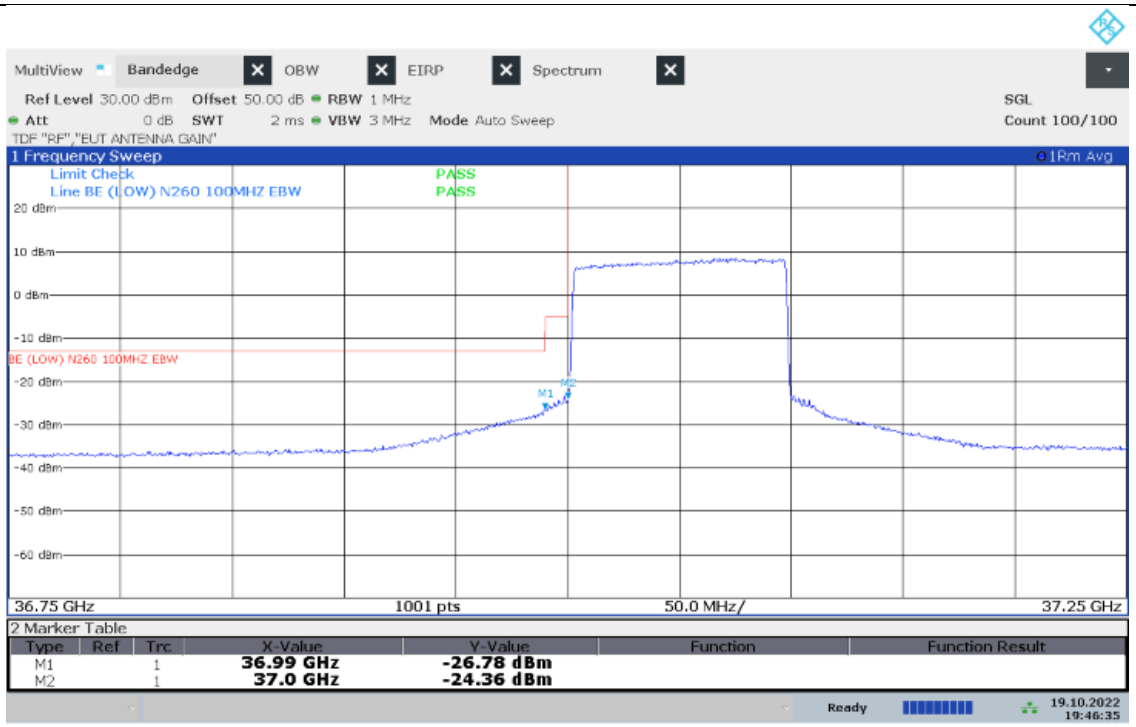
64QAM MCS17 4CC

Low Channel

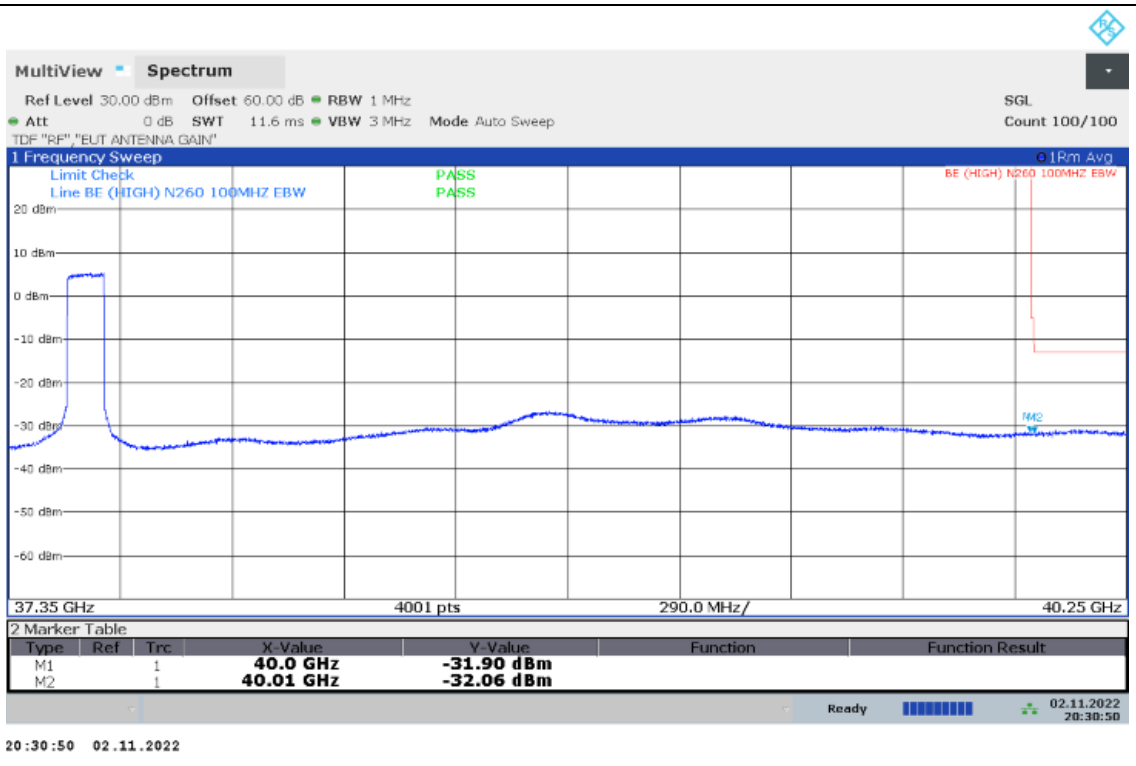


High Channel

64QAM MCS28 1CC



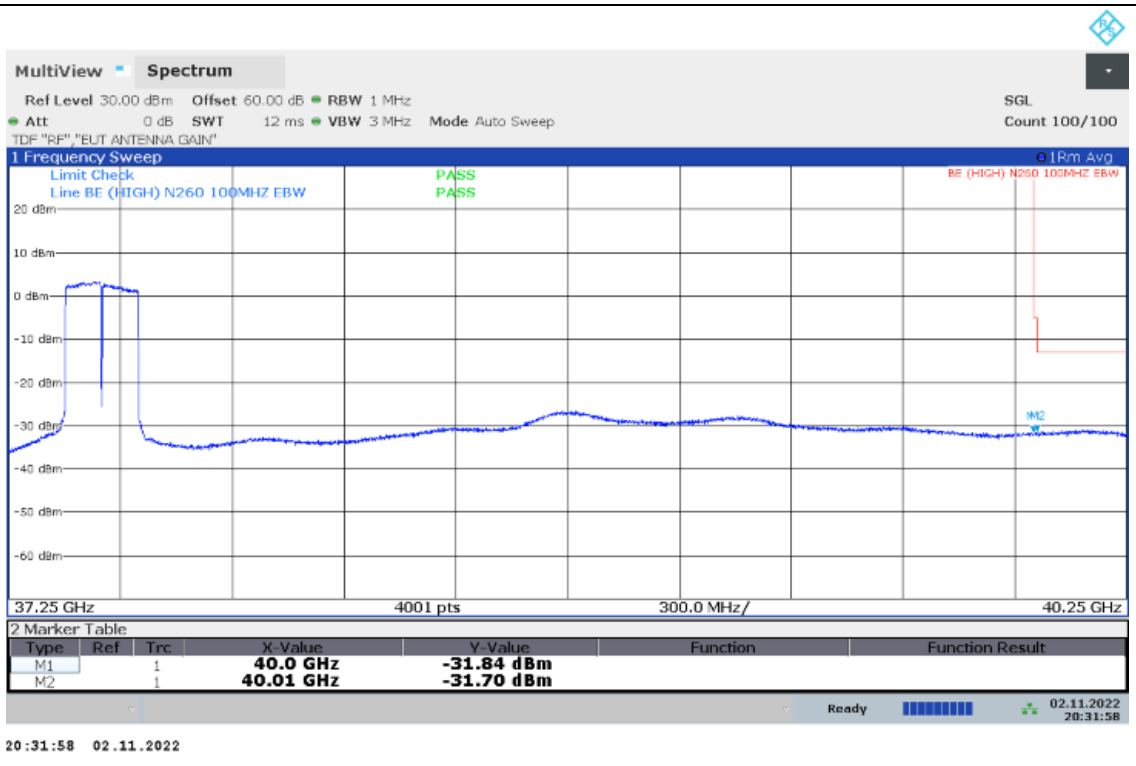
Low Channel



High Channel

64QAM MCS28 2CC

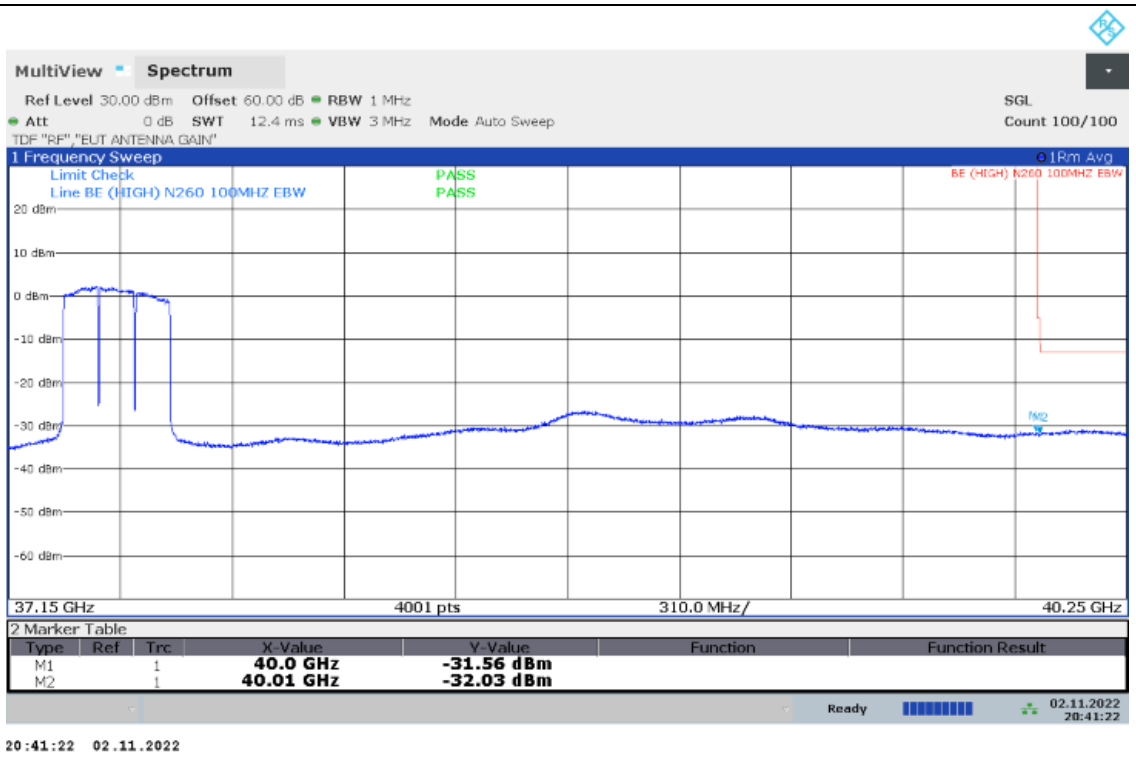
Low Channel



High Channel

64QAM MCS28 3CC

Low Channel



High Channel

64QAM MCS28 4CC

Low Channel

High Channel

8.6. RADIATED SPURIOUS EMISSIONS

RULE PART(S)

FCC: §2.1051, §30.203

LIMIT

30.203 - (a) The conductive power or the total radiated power of any emission outside a licensee's frequency block shall be −13 dBm/MHz or lower.

TEST PROCEDURE

KDB 842590 D01 Upper Microwave Flexible Use Service v01 Section 4.4.2 and Section 4.4.3. ANSI C63.26-2015 Clause 5.5.4 and Annex C.5.2.

All radiated spurious emissions were measured as EIRP or TRP to compare with the §30.203 TRP limits to demonstrate compliance.

RSE was investigated below 1 GHz at a height of 0.8 meters. RSE was investigated from 1 – 200 GHz at a height of 1.5 meters.

Plots below 18 GHz are corrected field strength levels, measured at 3-meter test distance. The average EIRP reported below is calculated per section 5.2.7 of ANSI C63.26-2015 which states: EIRP (dBm) = E (dBµV/m) + 20log(D) − 104.8; where D is the measurement distance (in the far field region) in m. The field strength E is calculated E (dBµV/m) = Spectrum Analyzer Level (dBm) + Antenna Factor (dB/m) + Cable Loss (dB) + 107. All appropriate Antenna Factor and Cable Loss have been applied in the spectrum analyzer for each measurement.

RSEs above 18 GHz were measured at the appropriate far field distances listed in Section 8.1. RSEs from 18 – 50 GHz were measured using a spectrum analyzer or EMI receiver with an internal preamplifier when applicable. Emissions above 50 GHz were measured using a downconverter with spectrum analyzer, while an external LNA was used when applicable.

EIRP of RSE was calculated using the equations on ANSI C63.26-2015 Annex C.5.2. The total correction factor of cable loss, horn antenna gain, harmonic mixer loss, LNA gain, and far-field path loss were calculated using equations C.8 and C.9 and pre-loaded into the spectrum analyzer.

Sample calculation of EIRP:

Total Correction Factor = Cable Loss (dB) – Horn Ant Gain (dBi) + Mixer Loss (dB) – LNA Gain (dB) + Path Loss (dB)
= 4 – 23 + 12 – 30 + 71
= 34 dB

EIRP = $P_{measured}$ (dBm), where Total Correction Factor preloaded.

Worse-Case Configuration

Testing was performed at the channel that yields the highest power for each CC configuration. All testing was performed at the maximum power setting that the device can support as worst-case.

All pre-scans performed using Peak detection. Where the measured average EIRP value exceeds the limit, a TRP measurement is made, otherwise the Peak or average EIRP value is compared with the §30.203 TRP limits to demonstrate compliance.

RESULTS

See the following pages.

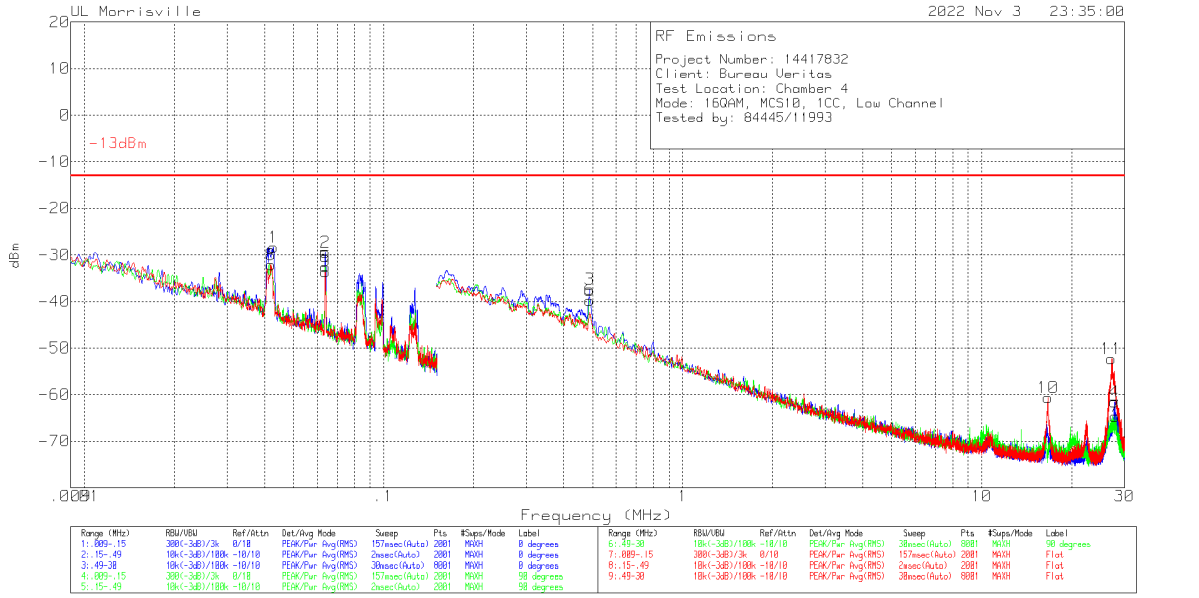
TESTED BY

Below 18 GHz Test Site: Chamber 2, Chamber 4
Employee IDs: 84445
Test Dates: 2022-10-26 to 2022-11-02

Above 18 GHz Test Site: Chamber 3
Employee IDs: 23854, 84445
Test Dates: 2022-10-24 to 2022-11-02

8.6.1. RADIATED EMISSIONS 0.009-30 MHz

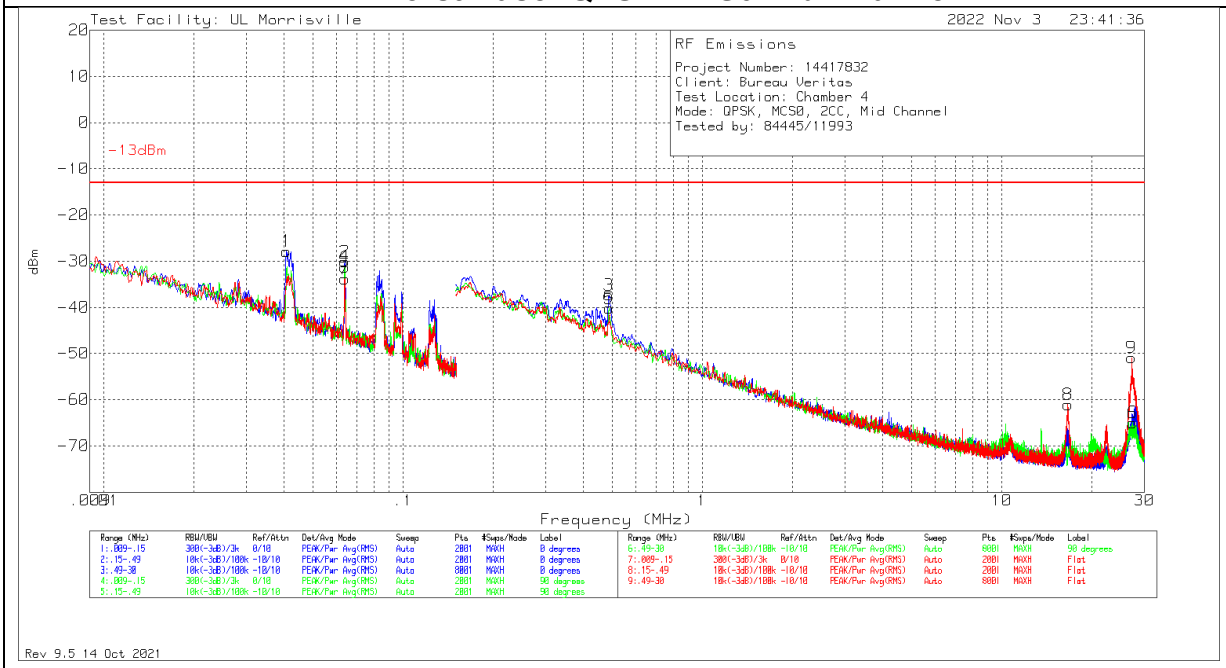
1CC Worst Case: 16QAM MCS10 Low Channel



Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0079 (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Loop Angle
8	.04202	-56.11	Pk	12.2	0	11.8	-32.11	-13	-19.11	0-360	Flat
1	.04287	-52.31	Pk	12.2	0	11.8	-28.31	-13	-15.31	0-360	0 degs
5	.06388	-55.89	Pk	11.5	.1	11.8	-32.49	-13	-19.49	0-360	90 degs
9	.06388	-57.05	Pk	11.5	.1	11.8	-33.65	-13	-20.65	0-360	Flat
2	.06395	-52.79	Pk	11.5	.1	11.8	-29.39	-13	-16.39	0-360	0 degs
6	.48839	-62.7	Pk	11	.1	11.8	-39.8	-13	-26.8	0-360	90 degs
3	.49	-60.3	Pk	11	.1	11.8	-37.4	-13	-24.4	0-360	0 degs
10	16.63675	-83.81	Pk	10.6	.8	11.8	-60.61	-13	-47.61	0-360	Flat
11	27.16147	-74.08	Pk	9	1	11.8	-52.28	-13	-39.28	0-360	Flat
4	27.70744	-83.23	Pk	8.9	1	11.8	-61.53	-13	-48.53	0-360	0 degs
7	27.86607	-86.28	Pk	8.8	1	11.8	-64.68	-13	-51.68	0-360	90 degs

Pk - Peak detector

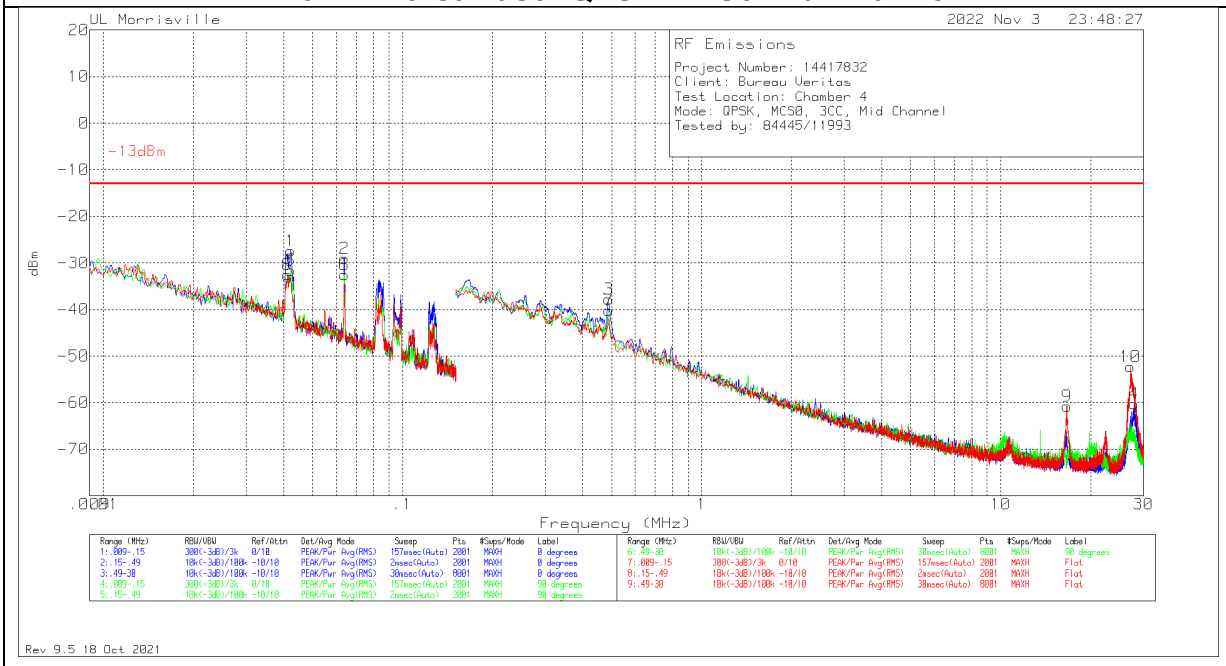
2CC Worst Case: QPSK MCS0 Mid Channel



Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0079 (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Loop Angle
1	.04081	-51.98	Pk	12.3	0	11.8	-27.88	-13	-14.88	0-360	0 degs
4	.06388	-54.68	Pk	11.5	.1	11.8	-31.28	-13	-18.28	0-360	90 degs
7	.06388	-57.2	Pk	11.5	.1	11.8	-33.8	-13	-20.8	0-360	Flat
2	.06395	-53.5	Pk	11.5	.1	11.8	-30.1	-13	-17.1	0-360	0 degs
3	.48762	-60.25	Pk	11	.1	11.8	-37.35	-13	-24.35	0-360	0 degs
5	.48839	-63.15	Pk	11	.1	11.8	-40.25	-13	-27.25	0-360	90 degs
8	16.62938	-84.26	Pk	10.6	.8	11.8	-61.06	-13	-48.06	0-360	Flat
9	27.16147	-72.69	Pk	9	1	11.8	-50.89	-13	-37.89	0-360	Flat
6	27.40126	-86.66	Pk	8.9	1	11.8	-64.96	-13	-51.96	0-360	90 degs

Pk - Peak detector

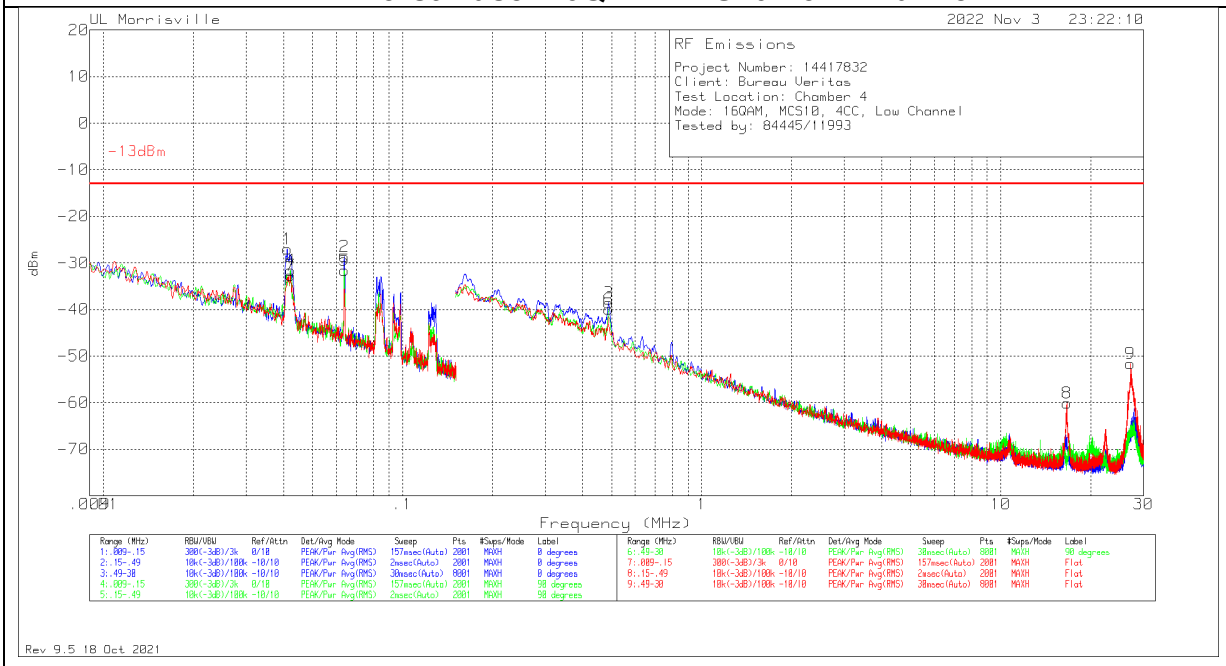
3CC Worst Case: QPSK MCS0 Mid Channel



Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0079 (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Loop Angle
8	.04131	-56.67	Pk	12.3	0	11.8	-32.57	-13	-19.57	0-360	Flat
1	.04223	-51.44	Pk	12.2	0	11.8	-27.44	-13	-14.44	0-360	0 degs
5	.0423	-55.62	Pk	12.2	0	11.8	-31.62	-13	-18.62	0-360	90 degs
2	.06388	-52.43	Pk	11.5	.1	11.8	-29.03	-13	-16.03	0-360	0 degs
6	.06388	-55.89	Pk	11.5	.1	11.8	-32.49	-13	-19.49	0-360	90 degs
3	.48856	-60.72	Pk	11	.1	11.8	-37.82	-13	-24.82	0-360	0 degs
7	.49	-63.06	Pk	11	.1	11.8	-40.16	-13	-27.16	0-360	90 degs
9	16.63675	-84.02	Pk	10.6	.8	11.8	-60.82	-13	-47.82	0-360	Flat
10	27.15778	-74.13	Pk	9	1	11.8	-52.33	-13	-39.33	0-360	Flat
4	27.89189	-81.84	Pk	8.8	1	11.8	-60.24	-13	-47.24	0-360	0 degs

Pk - Peak detector

4CC Worst Case: 16QAM MCS10 Low Channel

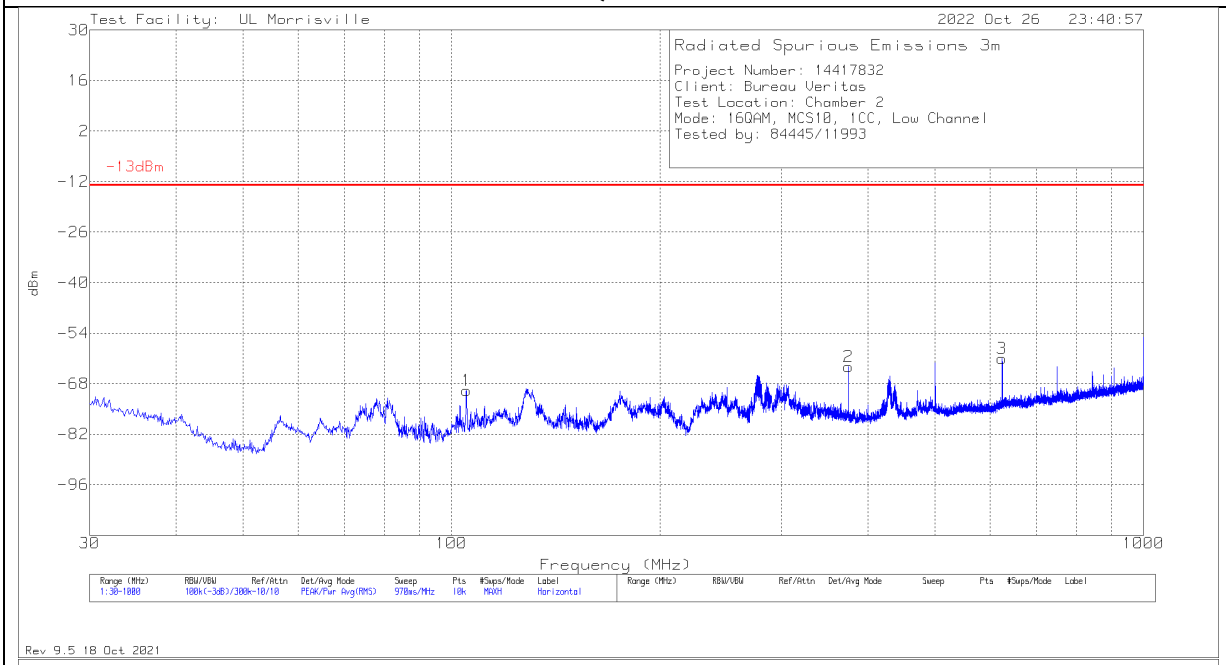


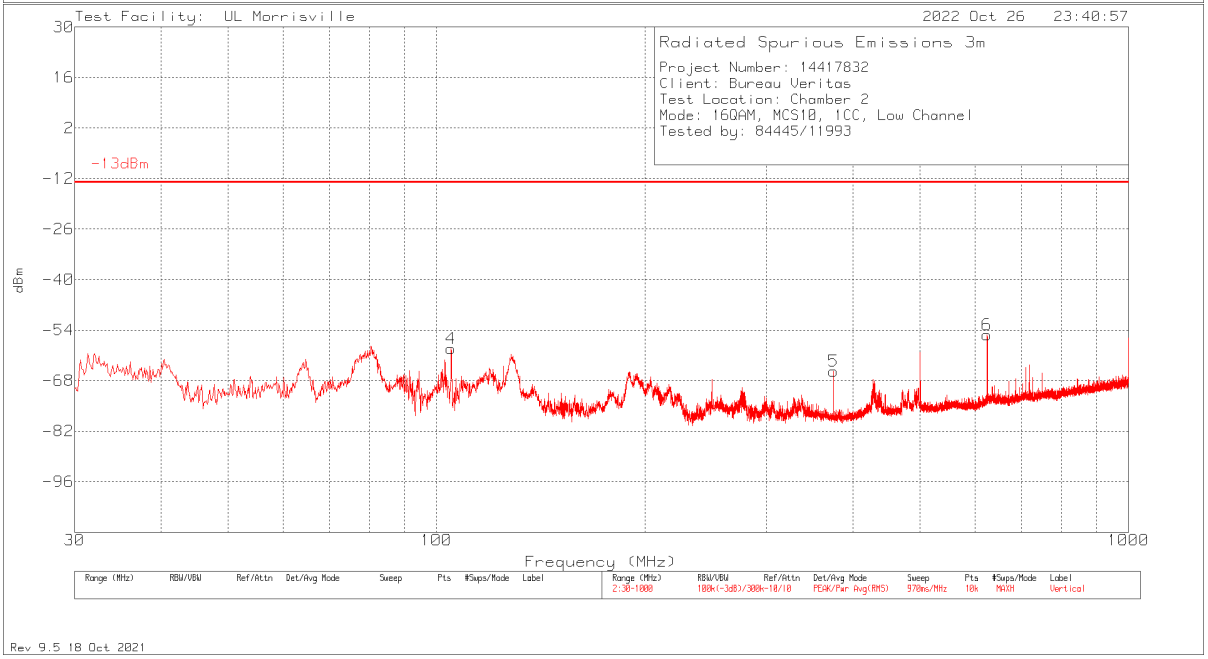
Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0079 (dB/m)	Gain/Loss (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	PK Margin (dB)	Azimuth (Degs)	Loop Angle
1	.04116	-51.13	Pk	12.3	0	11.8	-27.03	-13	-14.03	0-360	0 degs
4	.04223	-55.54	Pk	12.2	0	11.8	-31.54	-13	-18.54	0-360	90 degs
7	.04223	-56.62	Pk	12.2	0	11.8	-32.62	-13	-19.62	0-360	Flat
5	.06388	-55.03	Pk	11.5	.1	11.8	-31.63	-13	-18.63	0-360	90 degs
2	.06395	-52.09	Pk	11.5	.1	11.8	-28.69	-13	-15.69	0-360	0 degs
3	.49	-61.54	Pk	11	.1	11.8	-38.64	-13	-25.64	0-360	0 degs
6	.49	-62.77	Pk	11	.1	11.8	-39.87	-13	-26.87	0-360	90 degs
8	16.622	-83.32	Pk	10.6	.8	11.8	-60.12	-13	-47.12	0-360	Flat
9	27.16516	-73.45	Pk	9	1	11.8	-51.65	-13	-38.65	0-360	Flat

Pk - Peak detector

8.6.2. RADIATED EMISSIONS 30-1000 MHz

1CC Worst Case: 16QAM MCS10 Low Channel

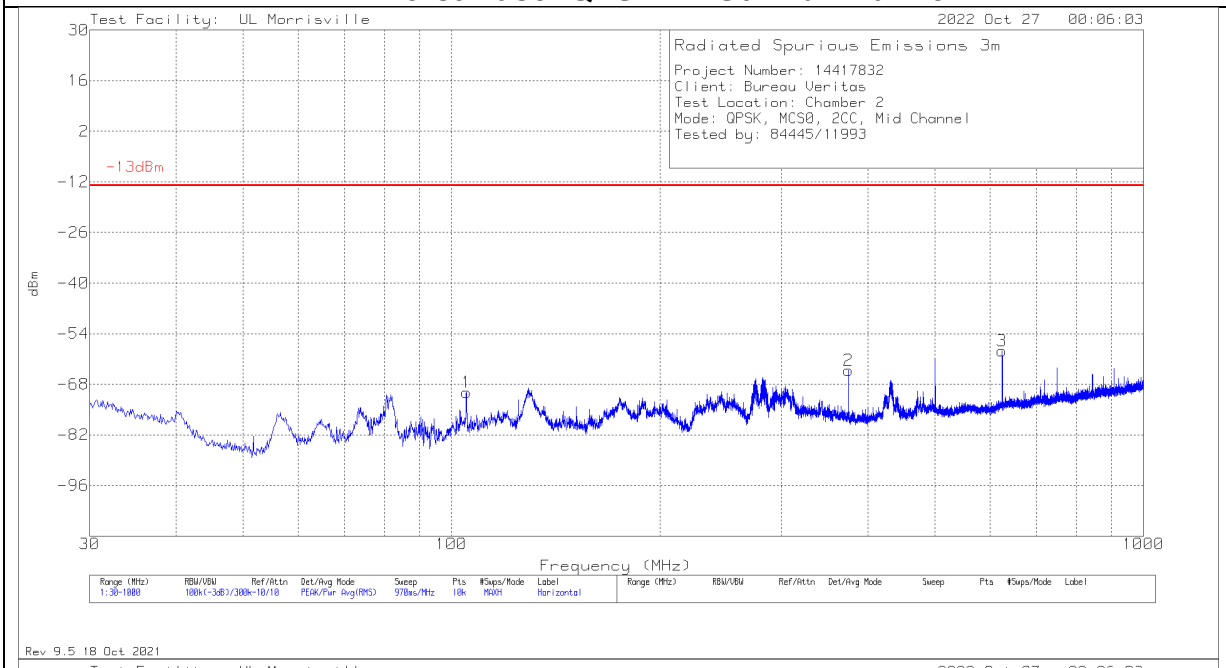


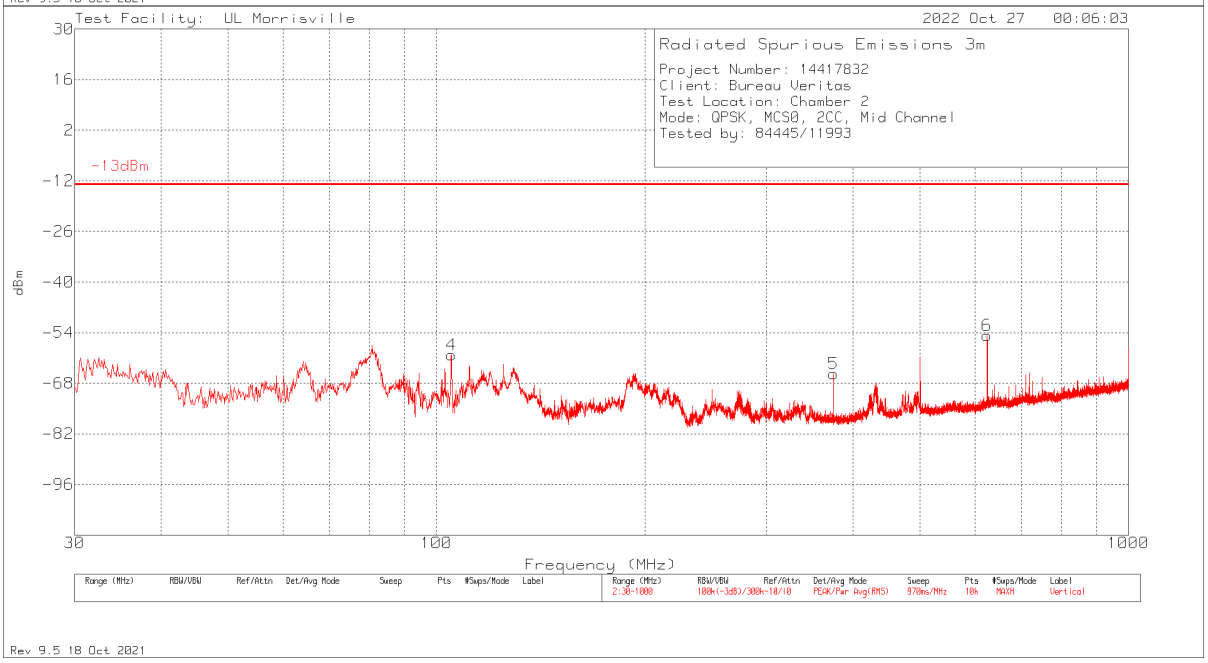


Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Gain/Loss (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	104.981	-56.59	Pk	17.8	-30.3	.2	9.7	-59.19	-13	-46.19	0-360	101	V
1	105.078	-67.17	Pk	17.8	-30.4	.2	9.7	-69.87	-13	-56.87	0-360	299	H
2	374.932	-66.14	Pk	20.9	-28.2	.4	9.7	-63.34	-13	-50.34	0-360	101	H
5	375.029	-68.21	Pk	20.9	-28.2	.4	9.7	-65.41	-13	-52.41	0-360	101	V
3	624.998	-69.23	Pk	25.3	-27.3	.5	9.7	-61.03	-13	-48.03	0-360	299	H
6	624.998	-63.48	Pk	25.3	-27.3	.5	9.7	-55.28	-13	-42.28	0-360	101	V

Pk - Peak detector

2CC Worst Case: QPSK MCS0 Mid Channel

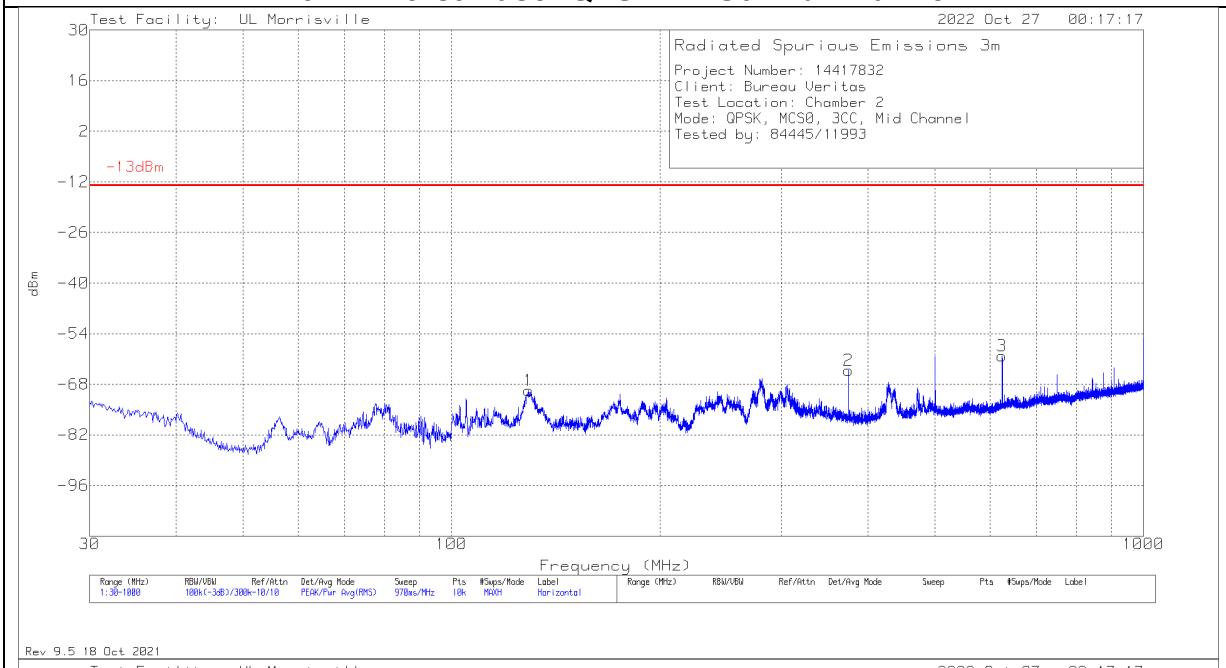


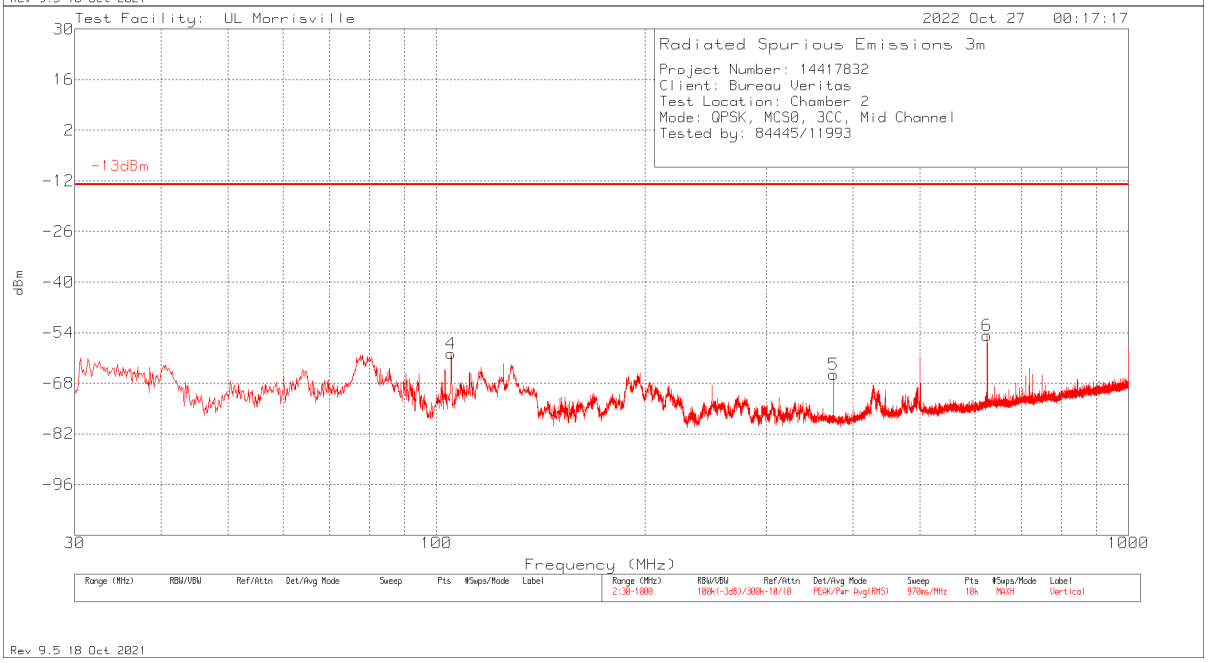


Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Gain/Loss (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	105.078	-67.62	Pk	17.8	-30.4	.2	9.7	-70.32	-13	-57.32	0-360	299	H
4	105.078	-57.45	Pk	17.8	-30.4	.2	9.7	-60.15	-13	-47.15	0-360	101	V
2	374.932	-66.97	Pk	20.9	-28.2	.4	9.7	-64.17	-13	-51.17	0-360	101	H
5	374.932	-68.23	Pk	20.9	-28.2	.4	9.7	-65.43	-13	-52.43	0-360	101	V
3	624.998	-66.99	Pk	25.3	-27.3	.5	9.7	-58.79	-13	-45.79	0-360	299	H
6	624.998	-63	Pk	25.3	-27.3	.5	9.7	-54.8	-13	-41.8	0-360	101	V

Pk - Peak detector

3CC Worst Case: QPSK MCS0 Mid Channel

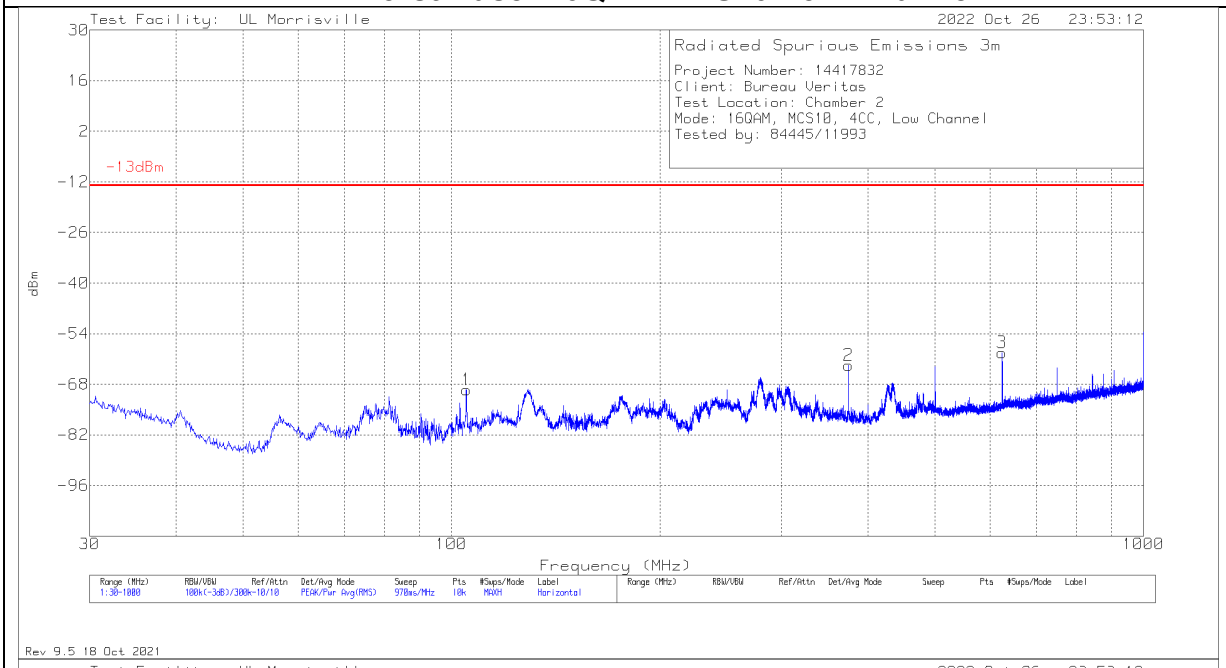


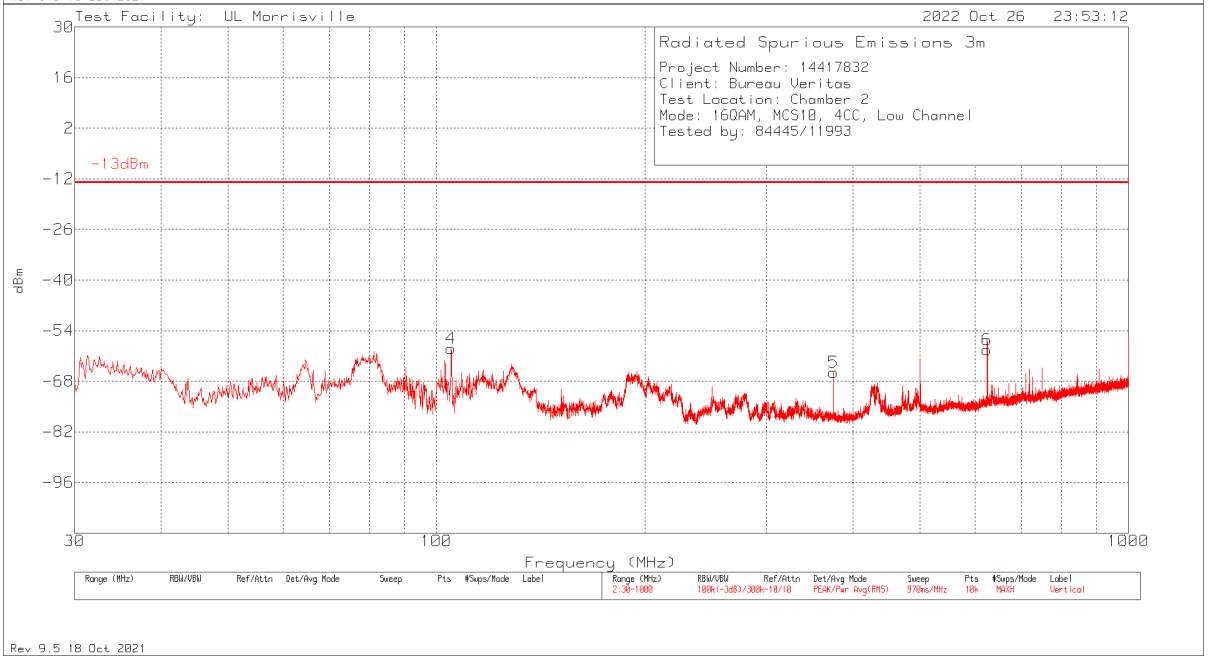


Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Gain/Loss (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	104.981	-57.22	Pk	17.8	-30.3	.2	9.7	-59.82	-13	-46.82	0-360	101	V
1	129.231	-69.38	Pk	19.9	-30.2	.3	9.7	-69.68	-13	-56.68	0-360	199	H
5	374.932	-68.38	Pk	20.9	-28.2	.4	9.7	-65.58	-13	-52.58	0-360	101	V
2	375.029	-66.92	Pk	20.9	-28.2	.4	9.7	-64.12	-13	-51.12	0-360	101	H
3	624.998	-68.43	Pk	25.3	-27.3	.5	9.7	-60.23	-13	-47.23	0-360	399	H
6	624.998	-62.91	Pk	25.3	-27.3	.5	9.7	-54.71	-13	-41.71	0-360	101	V

Pk - Peak detector

4CC Worst Case: 16QAM MCS10 Low Channel



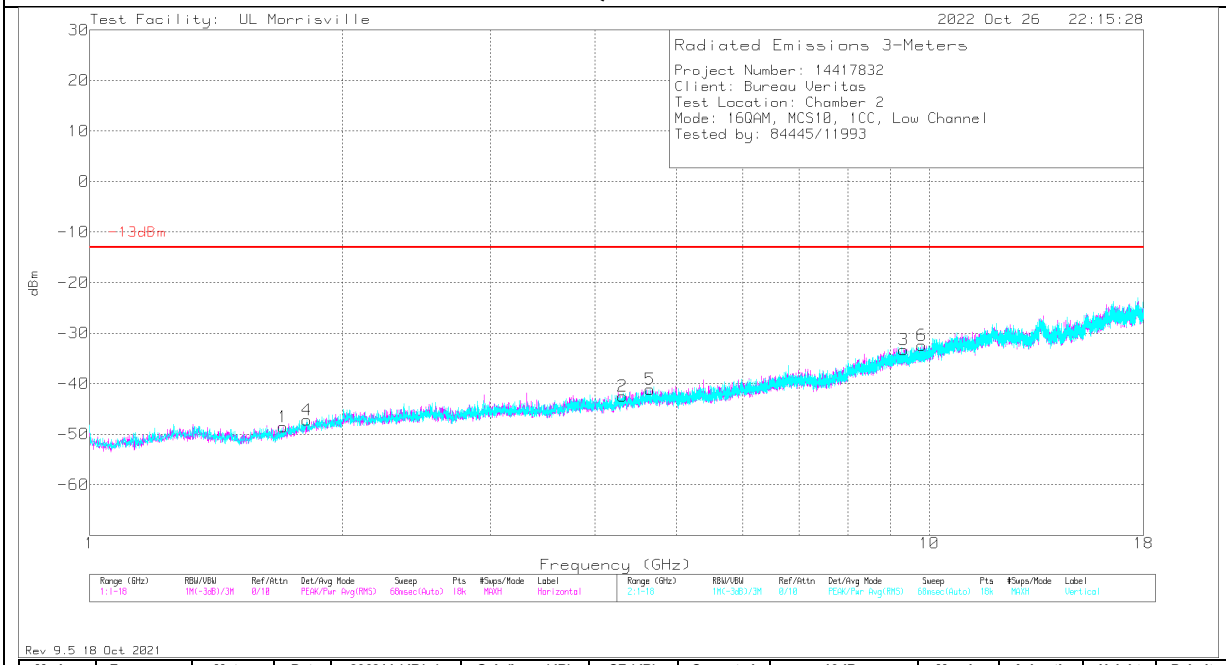


Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AT0074 (dB/m)	Gain/Loss (dB)	Filter (dB)	Conversion Factor (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
4	104.981	-56.28	Pk	17.8	-30.3	.2	9.7	-58.88	-13	-45.88	0-360	101	V
1	105.078	-66.77	Pk	17.8	-30.4	.2	9.7	-69.47	-13	-56.47	0-360	299	H
2	374.932	-65.49	Pk	20.9	-28.2	.4	9.7	-62.69	-13	-49.69	0-360	101	H
5	374.932	-68.29	Pk	20.9	-28.2	.4	9.7	-65.49	-13	-52.49	0-360	101	V
6	624.901	-67.52	Pk	25.3	-27.2	.5	9.7	-59.22	-13	-46.22	0-360	101	V
3	624.998	-67.41	Pk	25.3	-27.3	.5	9.7	-59.21	-13	-46.21	0-360	299	H

Pk - Peak detector

8.6.3. RADIATED EMISSIONS 1-18 GHz

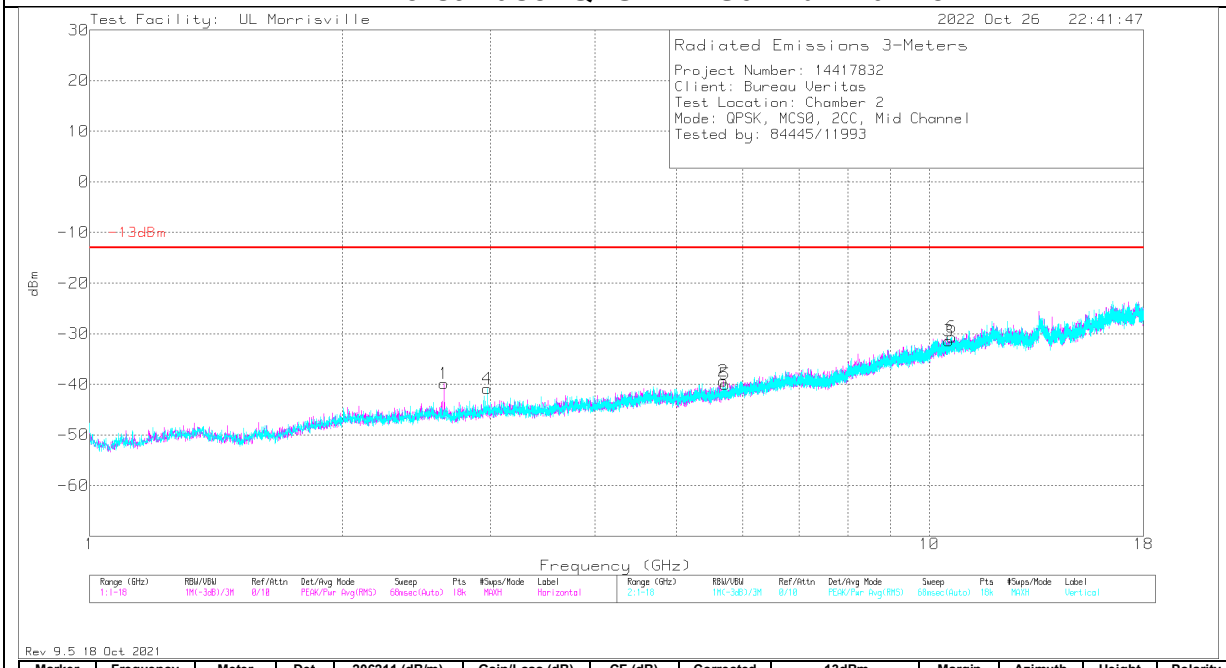
1CC Worst Case: 16QAM MCS10 Low Channel



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.69889	-64.69	Pk	28.7	-24.4	11.8	-48.59	-13	-35.59	0-360	101	H
4	1.81506	-64.74	Pk	30	-24.3	11.8	-47.24	-13	-34.24	0-360	300	V
2	4.31217	-66.41	Pk	33.5	-21.4	11.8	-42.51	-13	-29.51	0-360	300	H
5	4.64839	-65.53	Pk	34.2	-21.6	11.8	-41.13	-13	-28.13	0-360	101	V
3	9.32339	-65.58	Pk	36.4	-15.9	11.8	-33.28	-13	-20.28	0-360	201	H
6	9.80694	-65.65	Pk	36.8	-15.4	11.8	-32.45	-13	-19.45	0-360	300	V

Pk - Peak detector

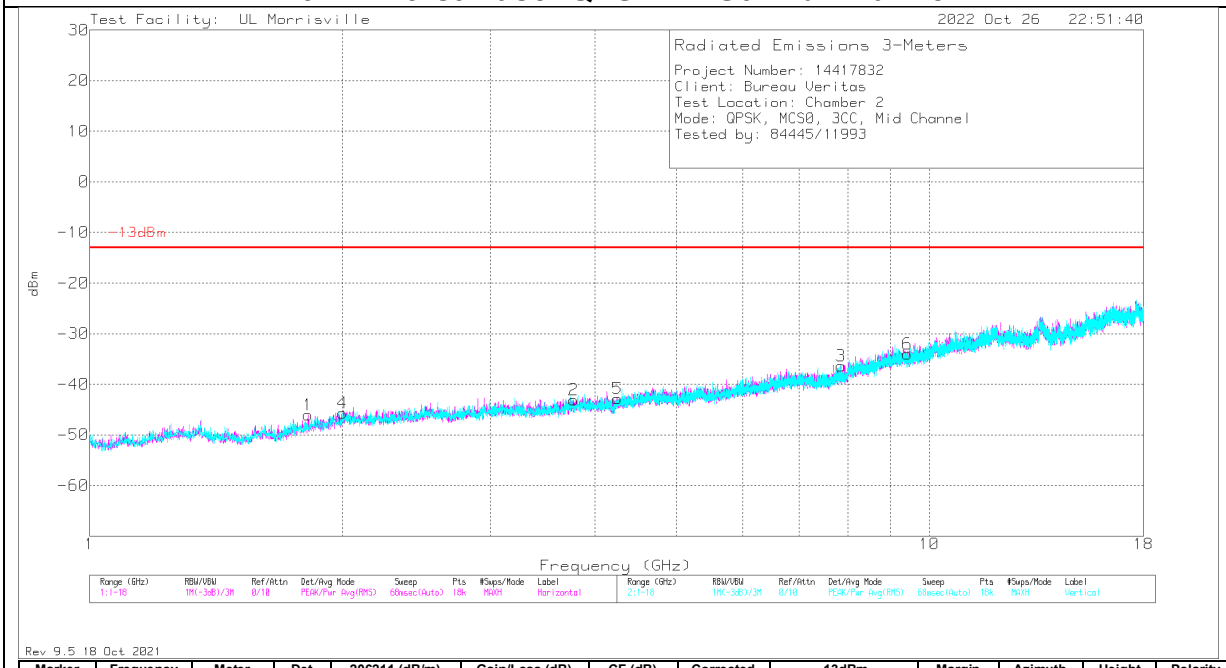
2CC Worst Case: QPSK MCS0 Mid Channel



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	2.64333	-60.31	Pk	32.1	-23.5	11.8	-39.91	-13	-26.91	0-360	199	H
4	2.97672	-61.97	Pk	32.7	-23.4	11.8	-40.87	-13	-27.87	0-360	200	V
2	5.68066	-65.37	Pk	34.5	-20.3	11.8	-39.37	-13	-26.37	0-360	101	H
5	5.7175	-65.64	Pk	34.5	-20.7	11.8	-40.04	-13	-27.04	0-360	200	V
3	10.54738	-66.05	Pk	37.5	-14.7	11.8	-31.45	-13	-18.45	0-360	300	H
6	10.63333	-65.56	Pk	37.6	-14.5	11.8	-30.66	-13	-17.66	0-360	101	V

Pk - Peak detector

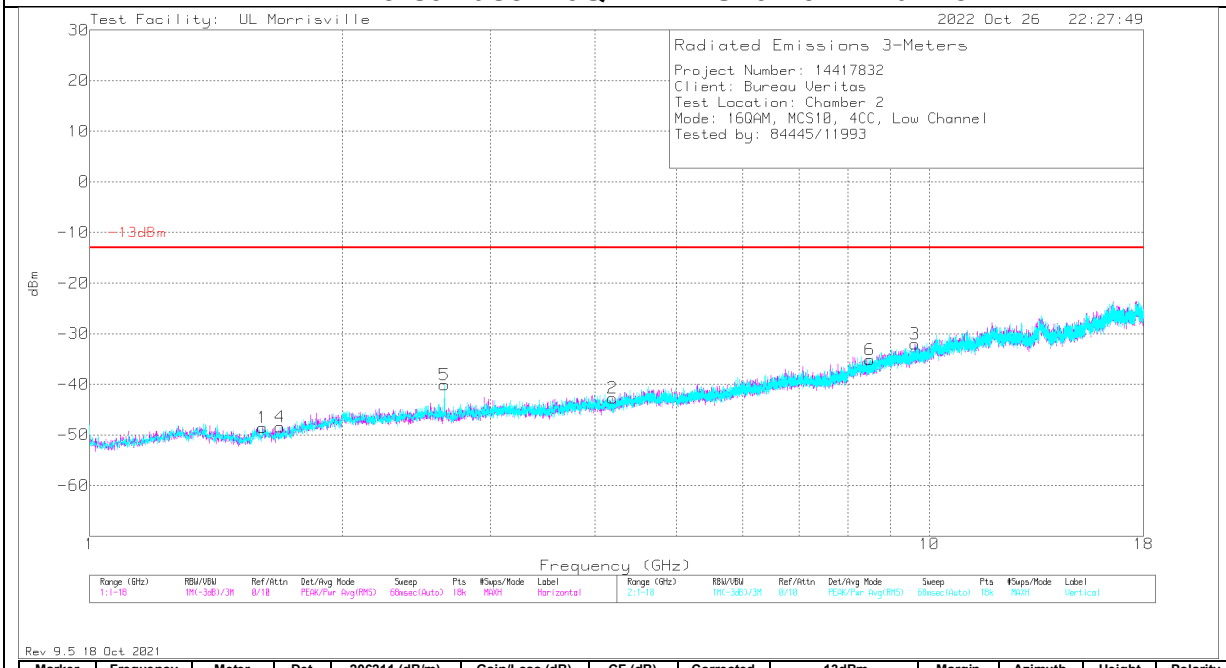
3CC Worst Case: QPSK MCS0 Mid Channel



Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.81978	-63.47	Pk	30.1	-24.5	11.8	-46.07	-13	-33.07	0-360	299	H
4	2.00111	-64.85	Pk	31.4	-24	11.8	-45.65	-13	-32.65	0-360	101	V
2	3.76911	-65.7	Pk	33.4	-22.6	11.8	-43.1	-13	-30.1	0-360	101	H
5	4.25078	-66.76	Pk	33.3	-21.2	11.8	-42.86	-13	-29.86	0-360	299	V
3	7.85383	-66.7	Pk	35.8	-17.3	11.8	-36.4	-13	-23.4	0-360	200	H
6	9.42255	-66.08	Pk	36.5	-16.3	11.8	-34.08	-13	-21.08	0-360	200	V

Pk - Peak detector

4CC Worst Case: 16QAM MCS10 Low Channel

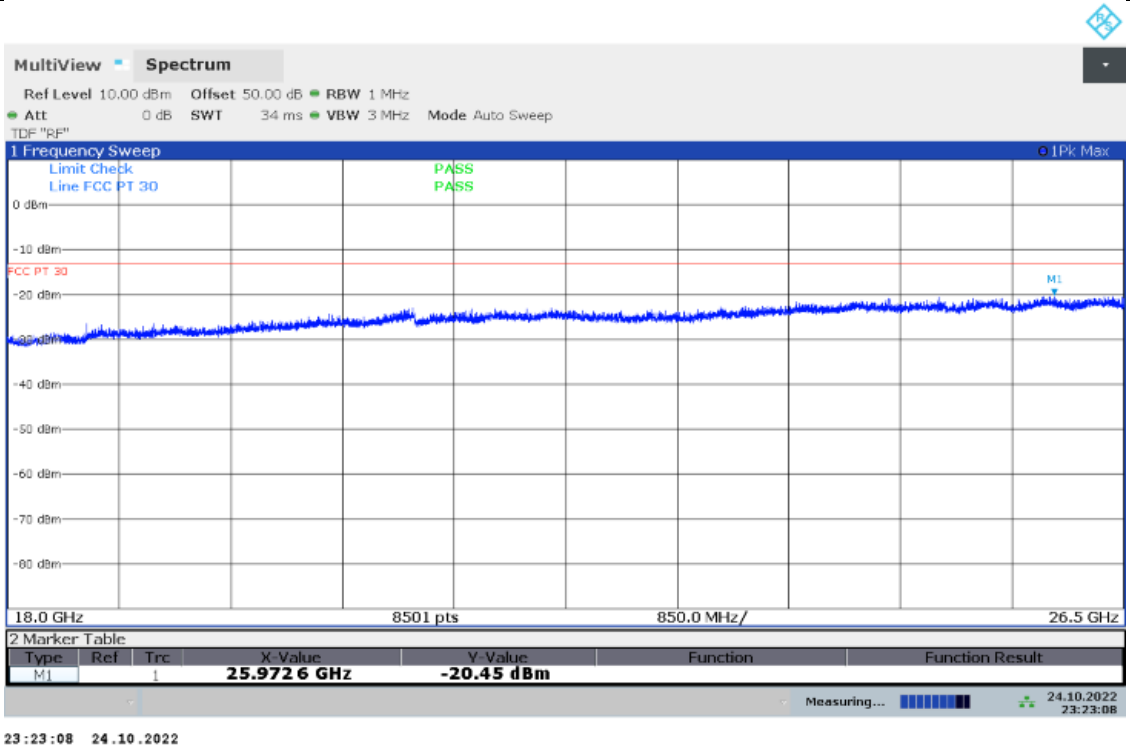


Marker	Frequency (GHz)	Meter Reading (dBm)	Det	206211 (dB/m)	Gain/Loss (dB)	CF (dB)	Corrected Reading dBm	-13dBm	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.60728	-64.33	Pk	28.6	-24.6	11.8	-48.53	-13	-35.53	0-360	100	H
4	1.68567	-64.25	Pk	28.7	-24.7	11.8	-48.45	-13	-35.45	0-360	201	V
5	2.64522	-60.53	Pk	32.1	-23.5	11.8	-40.13	-13	-27.13	0-360	201	V
2	4.19694	-65.47	Pk	33.2	-22.3	11.8	-42.77	-13	-29.77	0-360	200	H
6	8.50266	-66.03	Pk	35.9	-16.8	11.8	-35.13	-13	-22.13	0-360	201	V
3	9.6105	-65.2	Pk	36.7	-15.4	11.8	-32.1	-13	-19.1	0-360	300	H

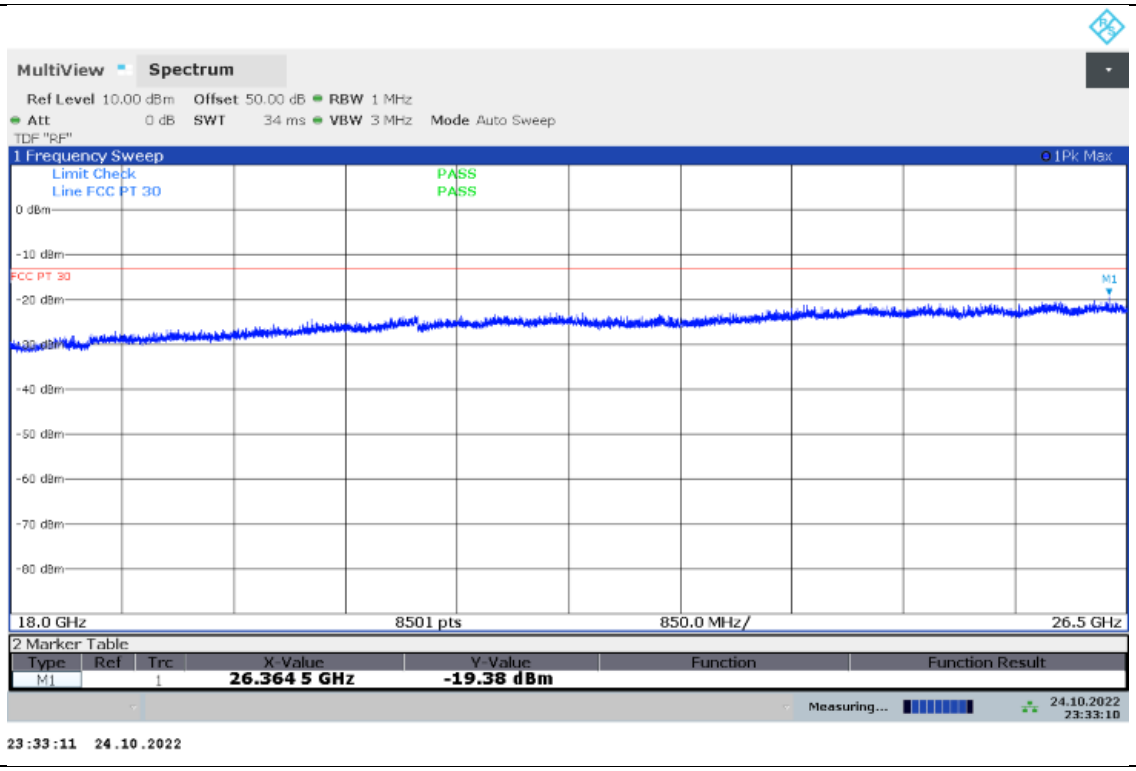
Pk - Peak detector

8.6.4. RADIATED EMISSIONS 18-26.5 GHz

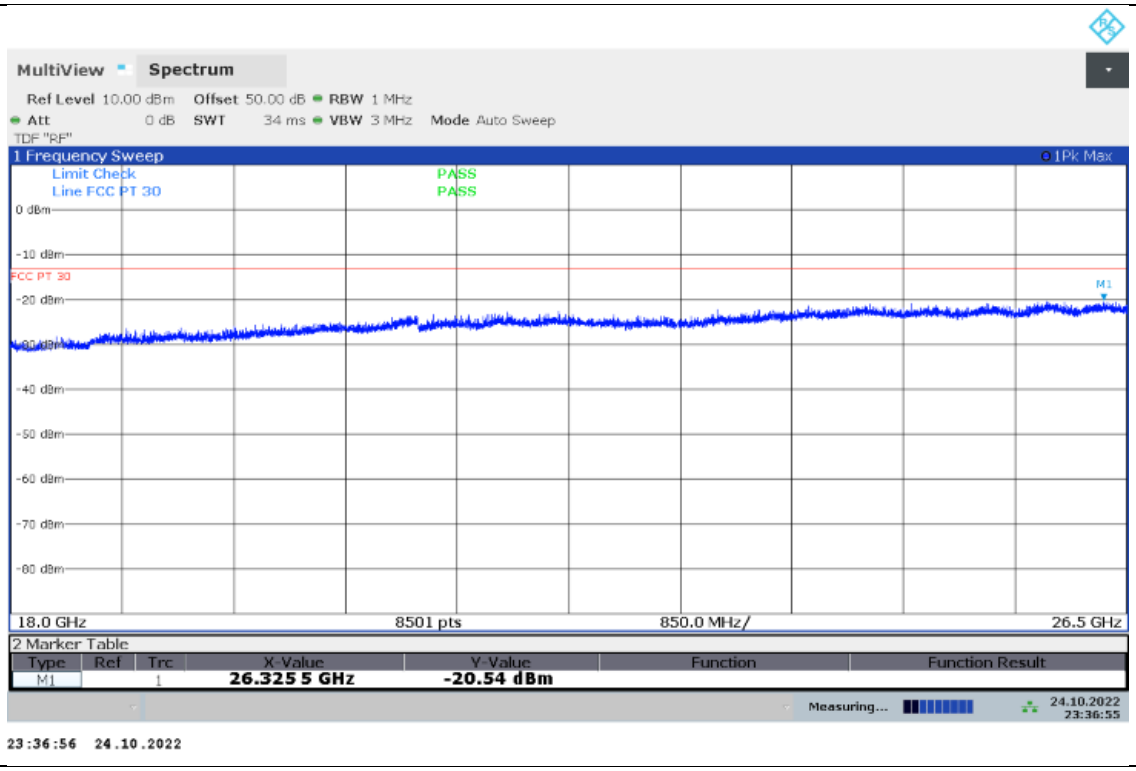
1CC Worst Case: 16QAM MCS10 Low Channel – Horizontal



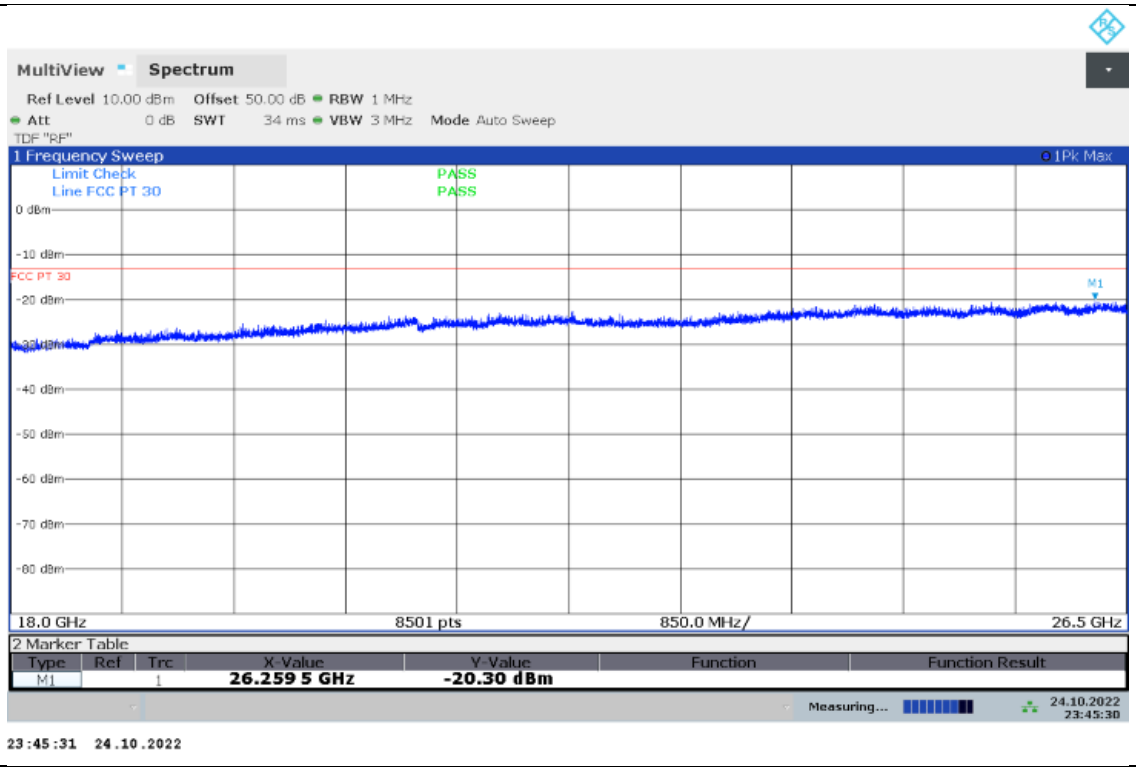
1CC Worst Case: 16QAM MCS10 Low Channel – Vertical



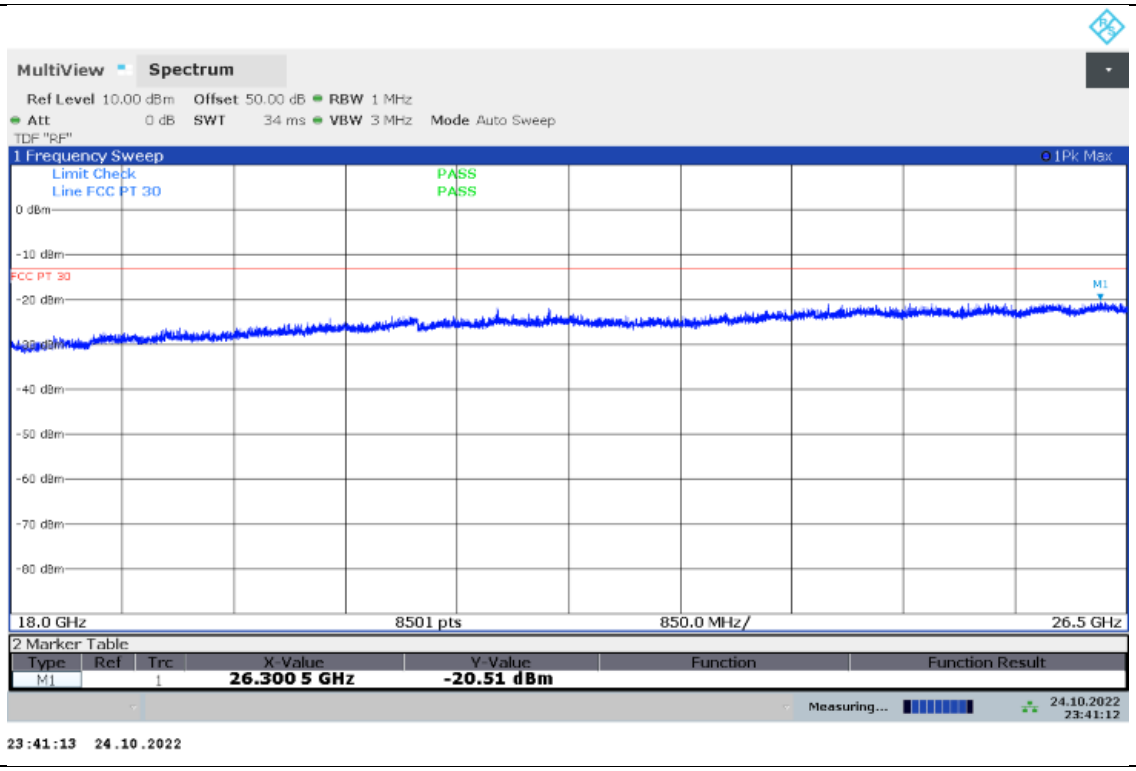
2CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



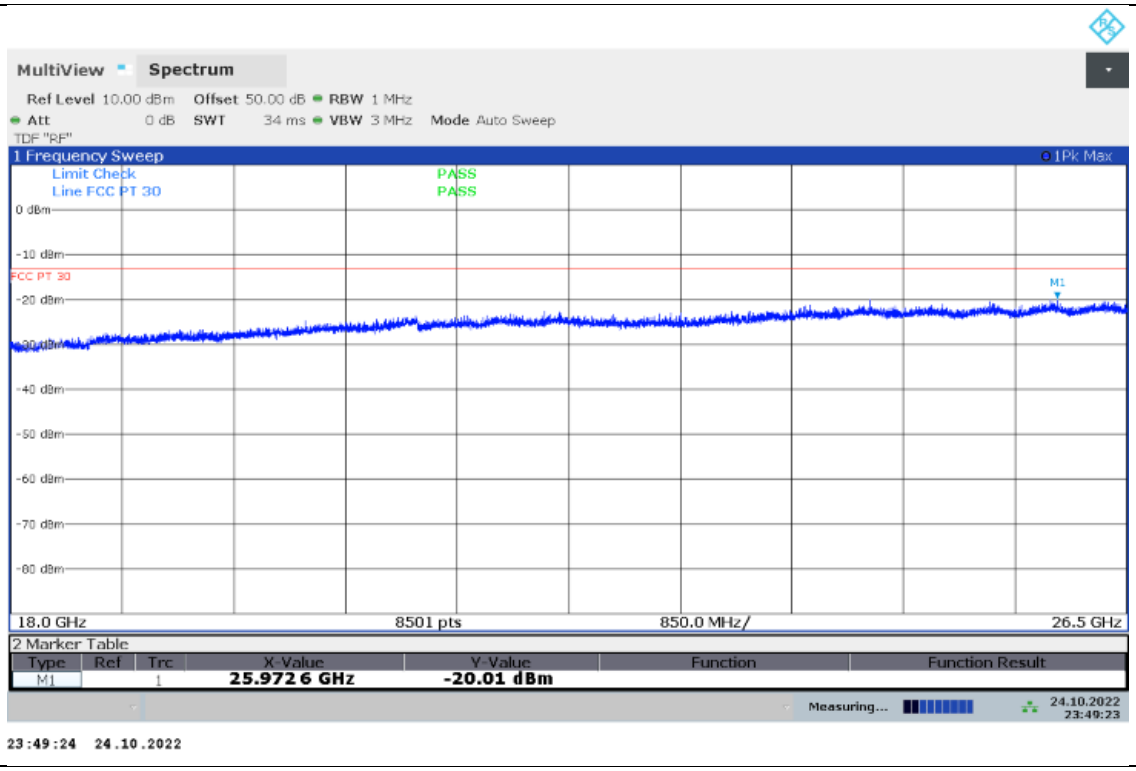
2CC Worst Case: QPSK MCS0 Mid Channel – Vertical



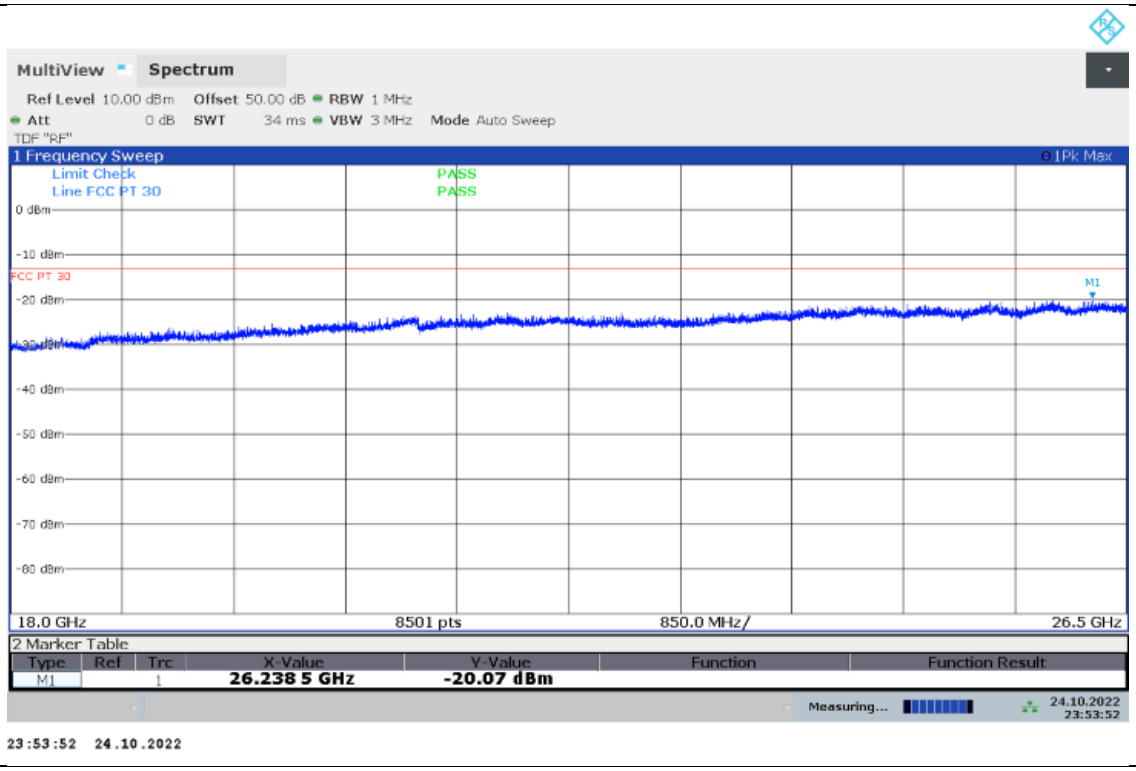
3CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



3CC Worst Case: QPSK MCS0 Mid Channel – Vertical

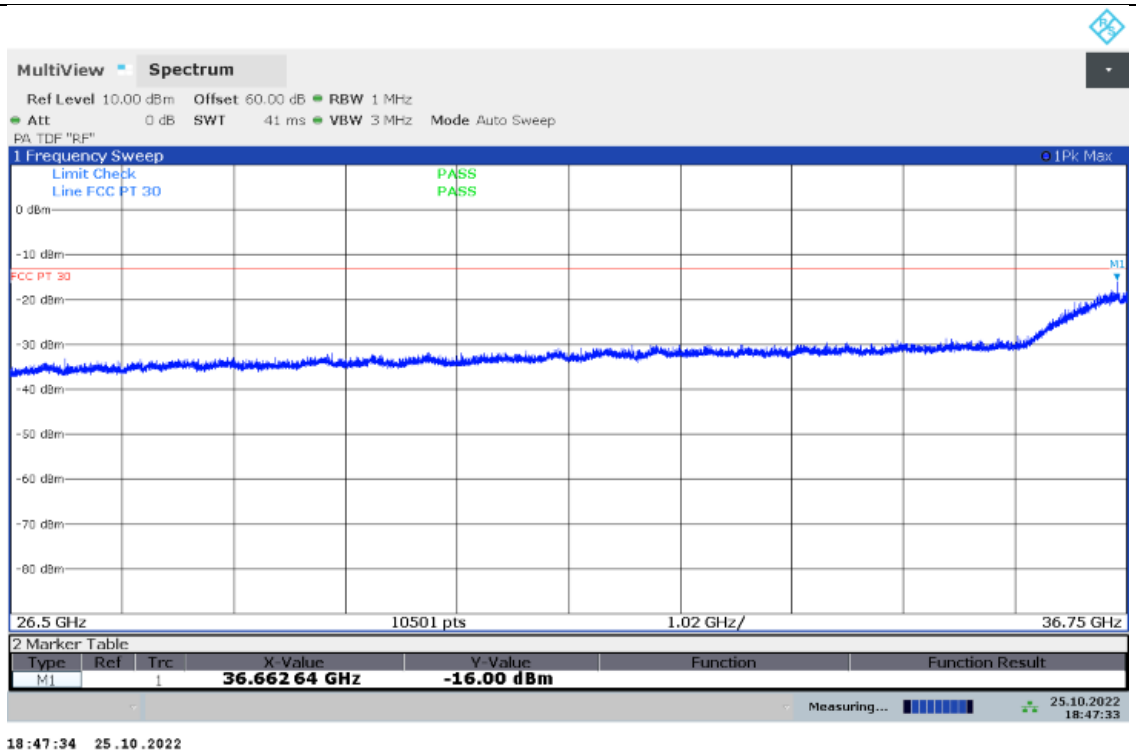


4CC Worst Case: 16QAM MCS10 Low Channel – Horizontal



4CC Worst Case: 16QAM MCS10 Low Channel – Vertical

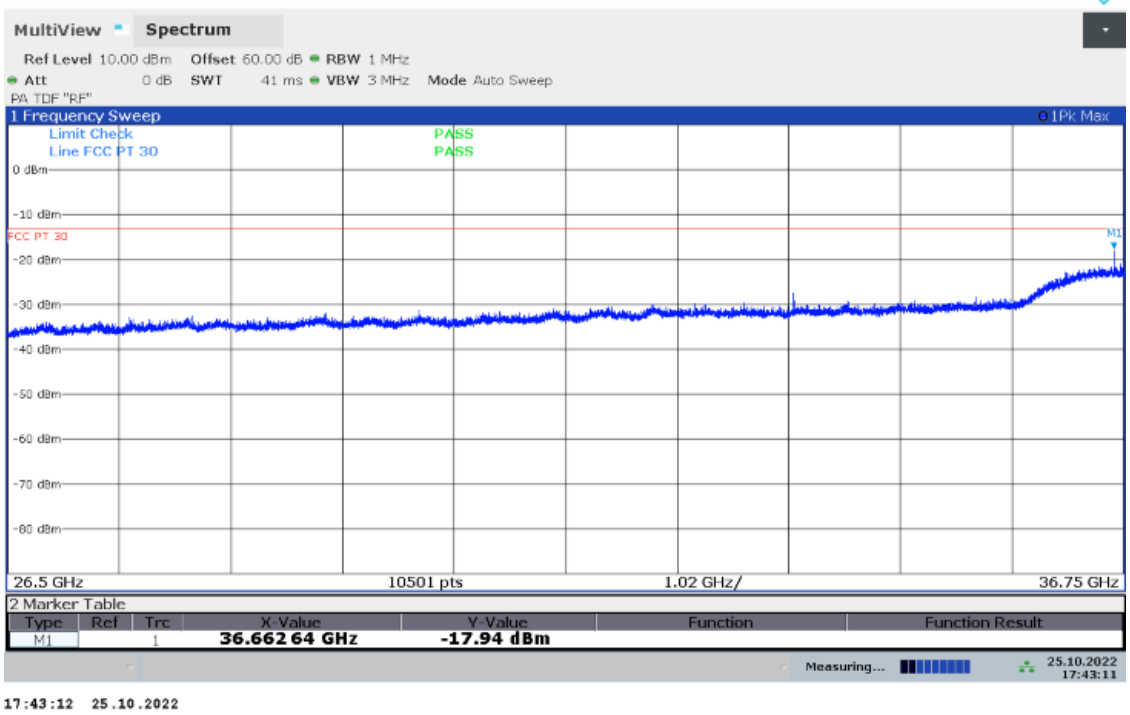
8.6.5. RADIATED EMISSIONS 26.5-40 GHz



Trace Markers

Frequency (GHz)	Meas. Distance (m)	Rx Ant Polarity (H/V)	Corrected Avg EIRP (dBm)	TRP Limit (dBm)	Margin (dB)
36.663	3	H	-19.44	-13	-6.44

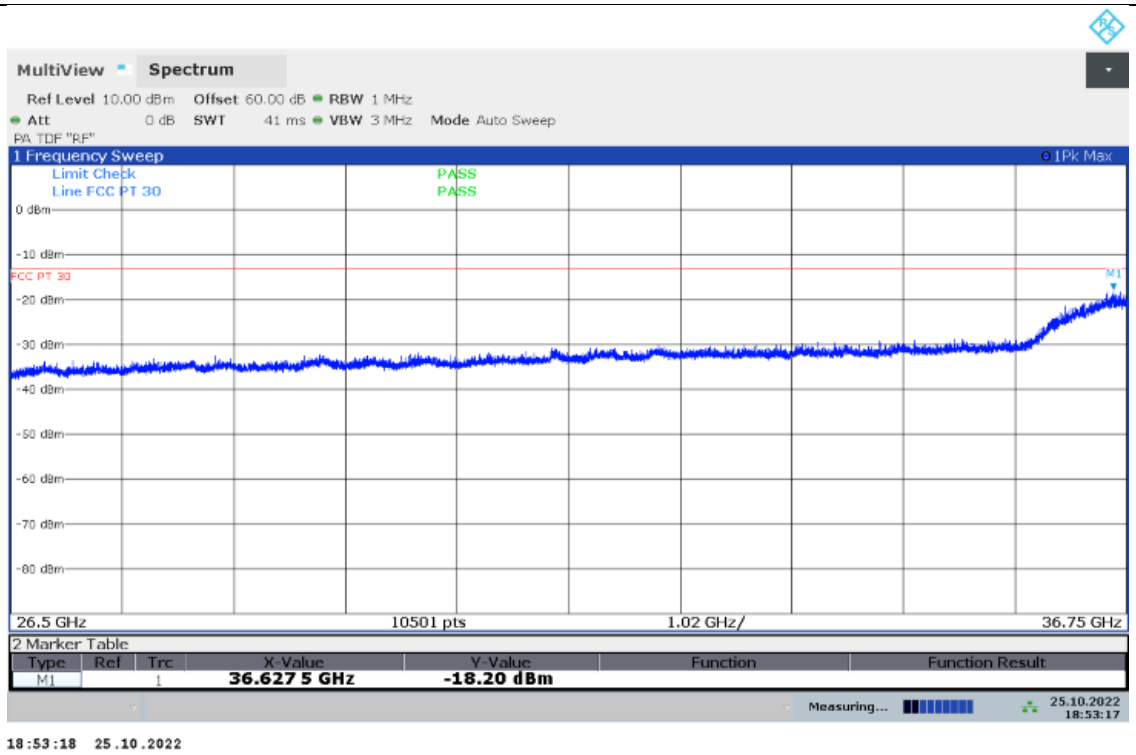
1CC Worst Case: 16QAM MCS10 Low Channel – Horizontal



Trace Markers

Frequency (GHz)	Meas. Distance (m)	Rx Ant Polarity (H/V)	Corrected Avg EIRP (dBm)	TRP Limit (dBm)	Margin (dB)
36.662	3	V	-21.01	-13	-8.01

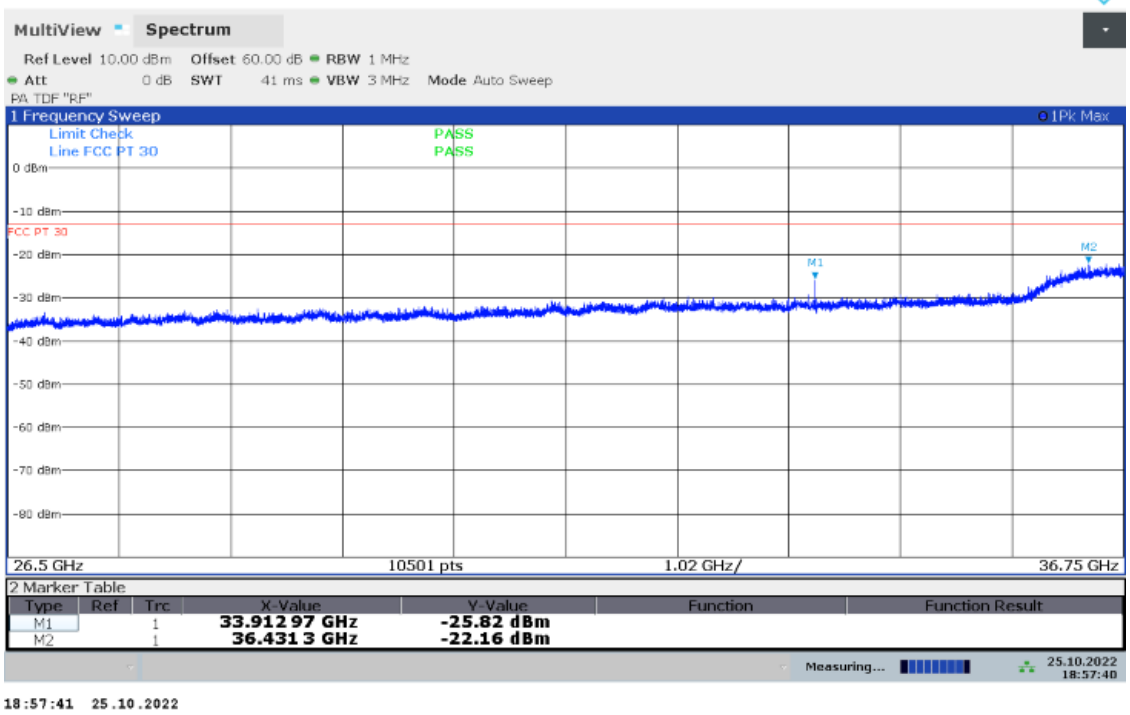
1CC Worst Case: 16QAM MCS10 Low Channel – Vertical



Trace Markers

Frequency (GHz)	Meas. Distance (m)	Rx Ant Polarity (H/V)	Corrected Avg EIRP (dBm)	TRP Limit (dBm)	Margin (dB)
36.639	3	H	-23.49	-13	-10.49

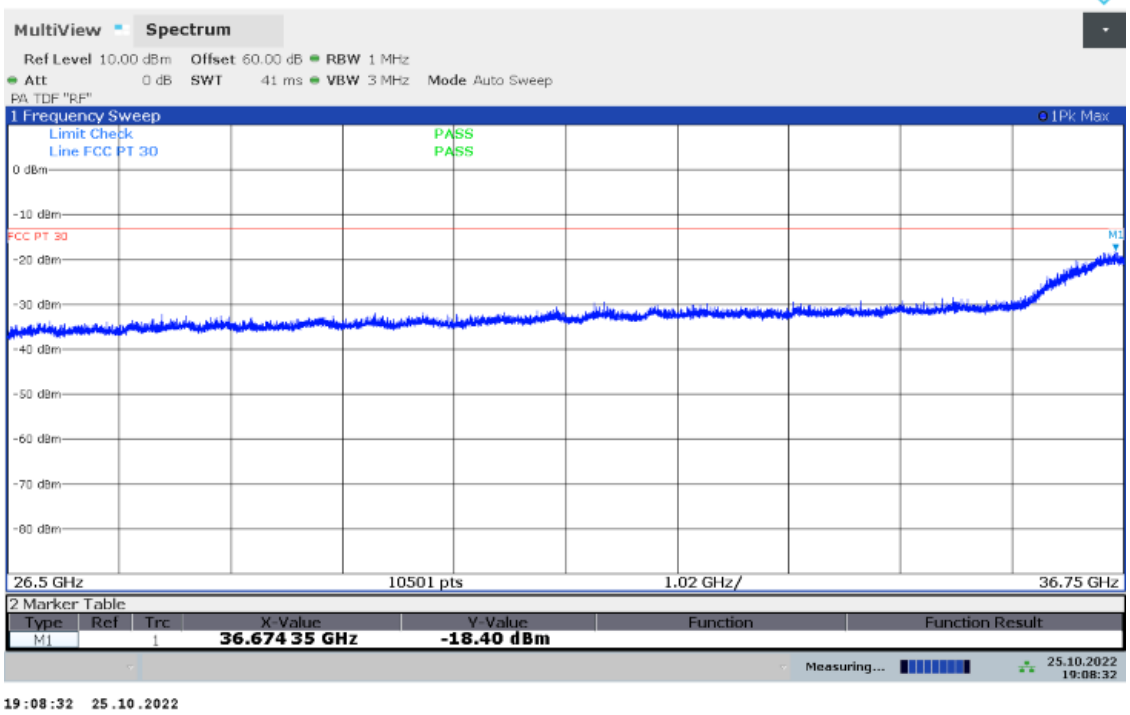
2CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



Trace Markers

Frequency (GHz)	Meas. Distance (m)	Rx Ant Polarity (H/V)	Corrected Avg EIRP (dBm)	TRP Limit (dBm)	Margin (dB)
36.628	3	V	-24.48	-13	-11.48

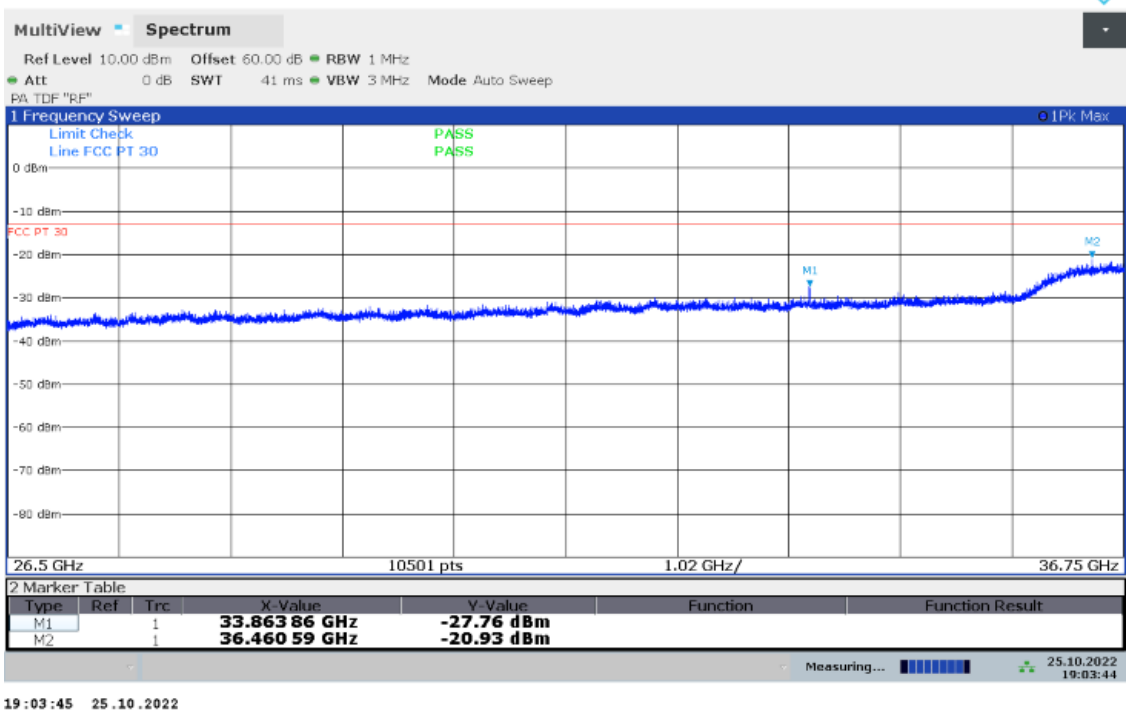
2CC Worst Case: QPSK MCS0 Mid Channel – Vertical



Trace Markers

Frequency (GHz)	Meas. Distance (m)	Rx Ant Polarity (H/V)	Corrected Avg EIRP (dBm)	TRP Limit (dBm)	Margin (dB)
36.606	3	H	-23.69	-13	-10.69

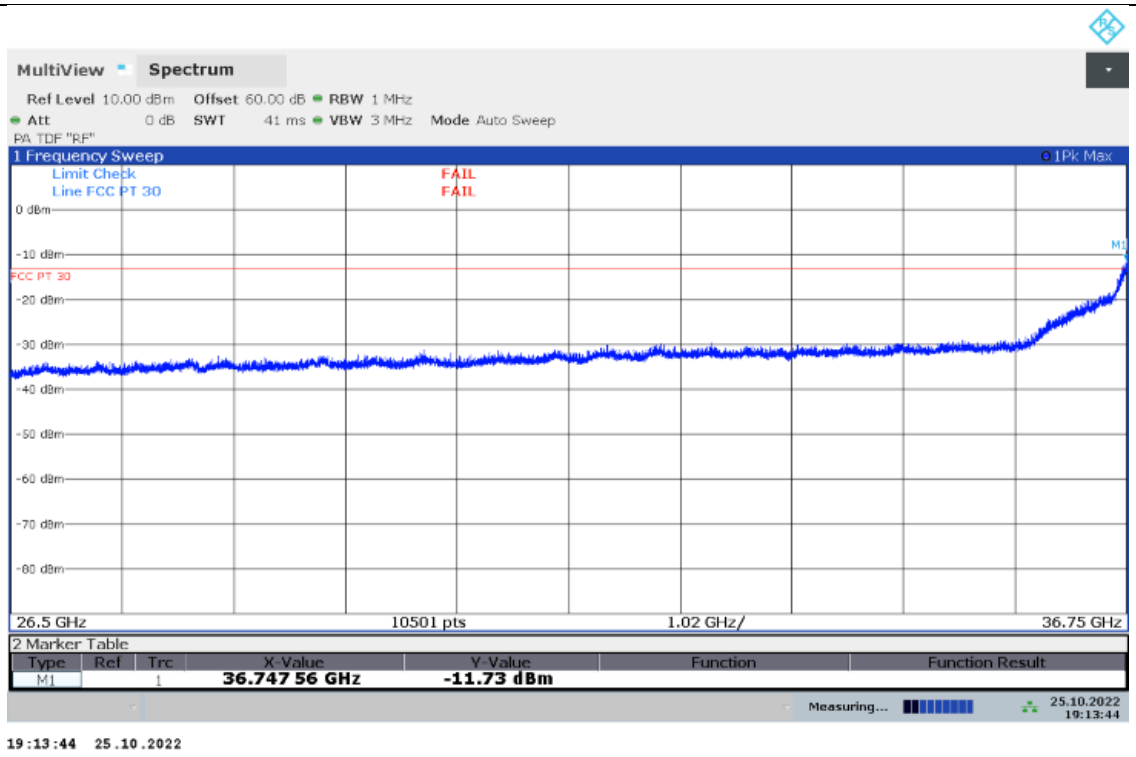
3CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



Trace Markers

Frequency (GHz)	Meas. Distance (m)	Rx Ant Polarity (H/V)	Corrected Avg EIRP (dBm)	TRP Limit (dBm)	Margin (dB)
36.629	3	V	-24.40	-13	-11.40

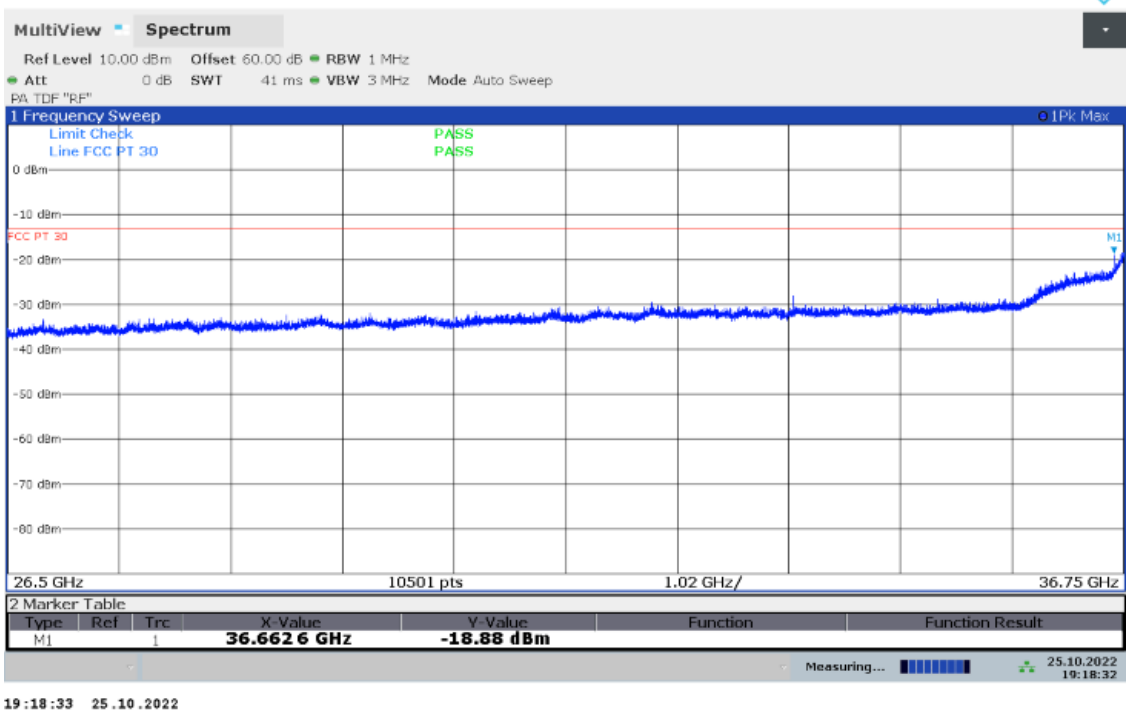
3CC Worst Case: QPSK MCS0 Mid Channel – Vertical



Trace Markers

Frequency (GHz)	Meas. Distance (m)	Rx Ant Polarity (H/V)	Corrected Avg EIRP (dBm)	TRP Limit (dBm)	Margin (dB)
36.663	3	H	-18.78	-13	-5.78

4CC Worst Case: 16QAM MCS10 Low Channel – Horizontal

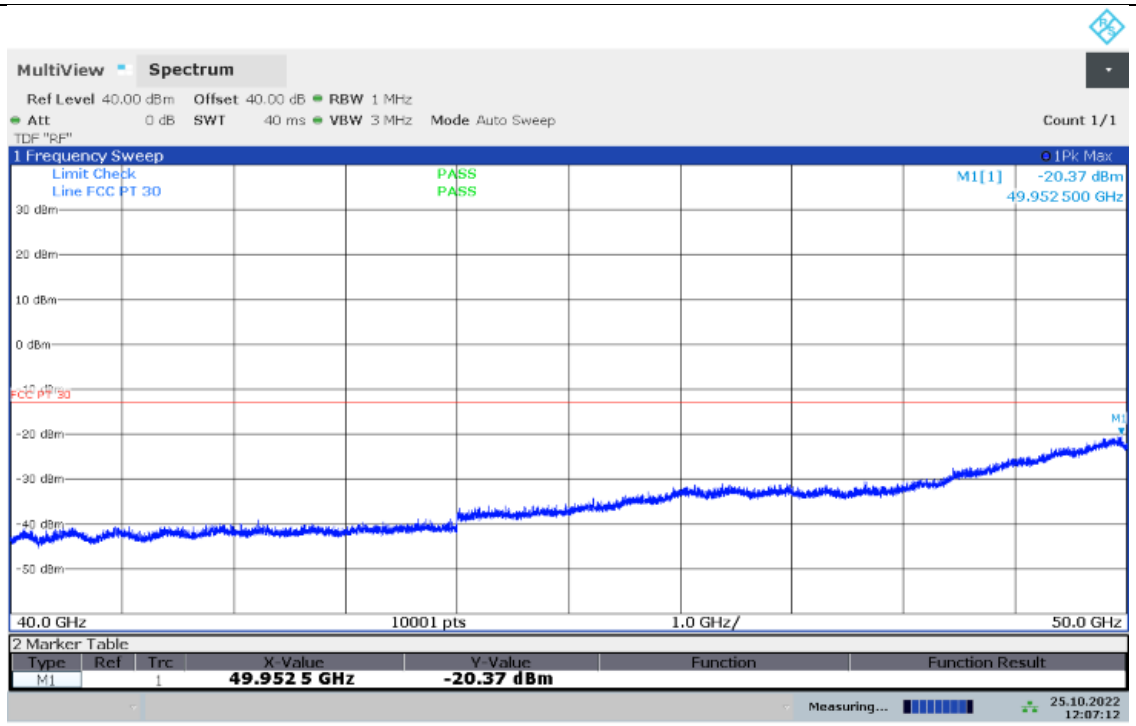


Trace Markers

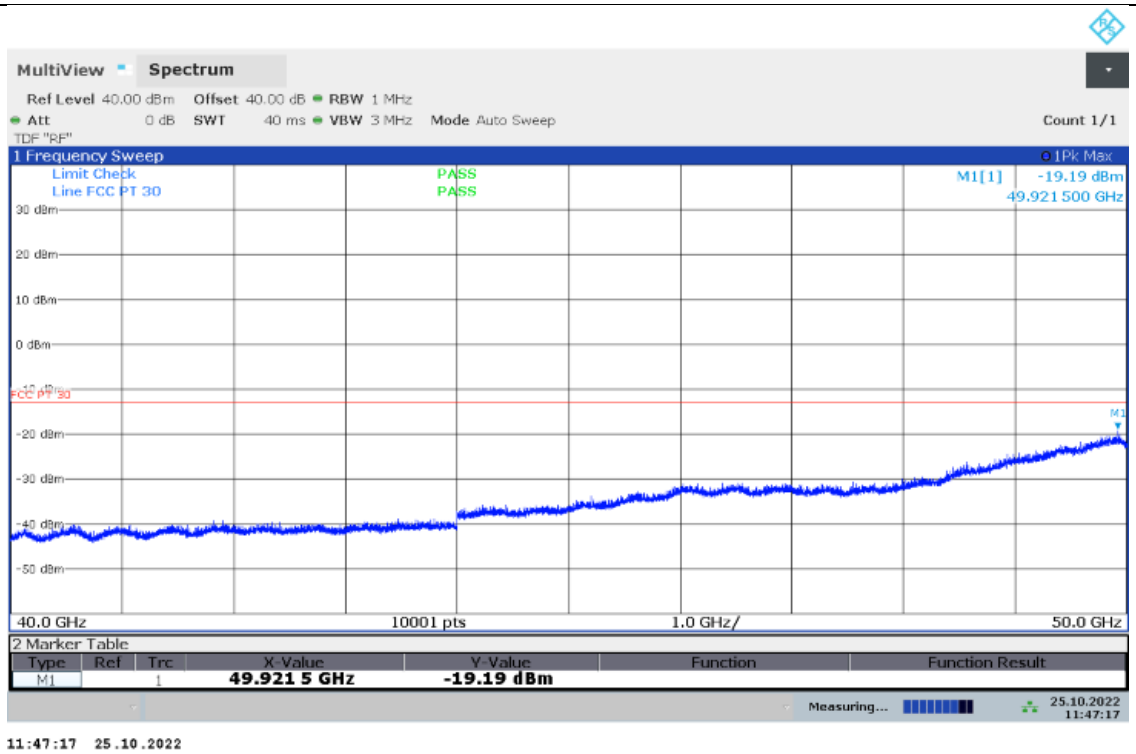
Frequency (GHz)	Meas. Distance (m)	Rx Ant Polarity (H/V)	Corrected Avg EIRP (dBm)	TRP Limit (dBm)	Margin (dB)
36.663	3	V	-23.57	-13	-10.57

4CC Worst Case: 16QAM MCS10 Low Channel – Vertical

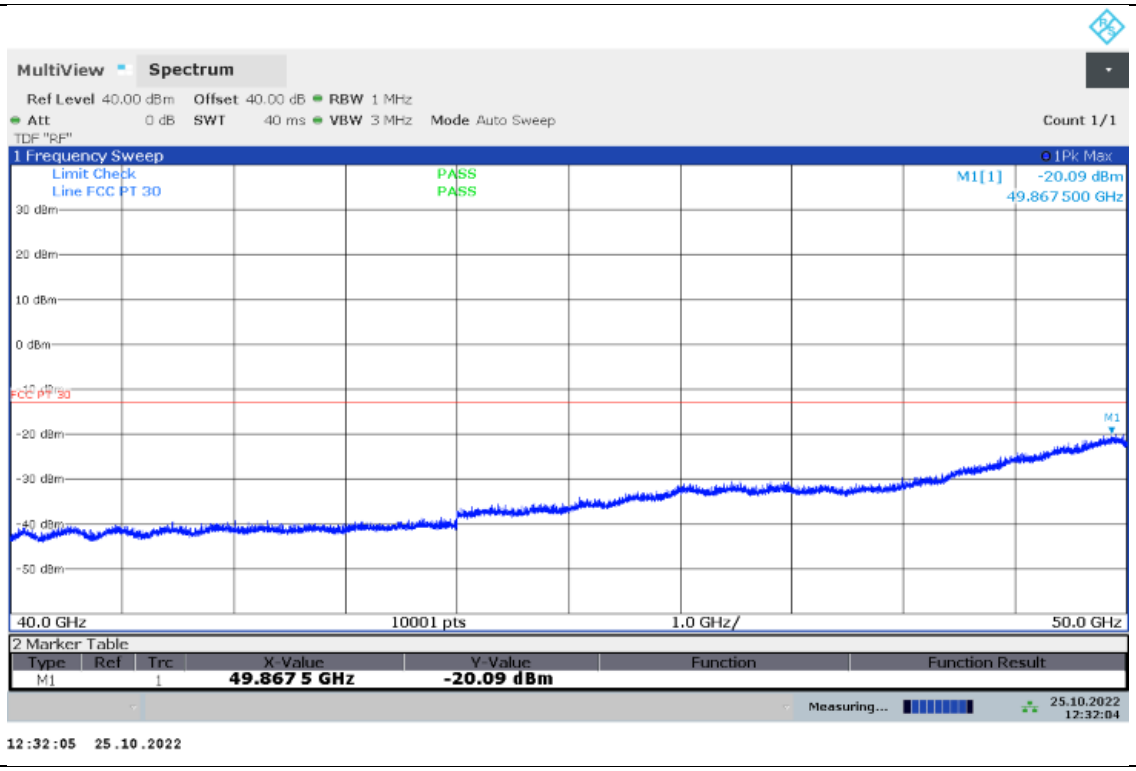
8.6.6. RADIATED EMISSIONS 40-50 GHz



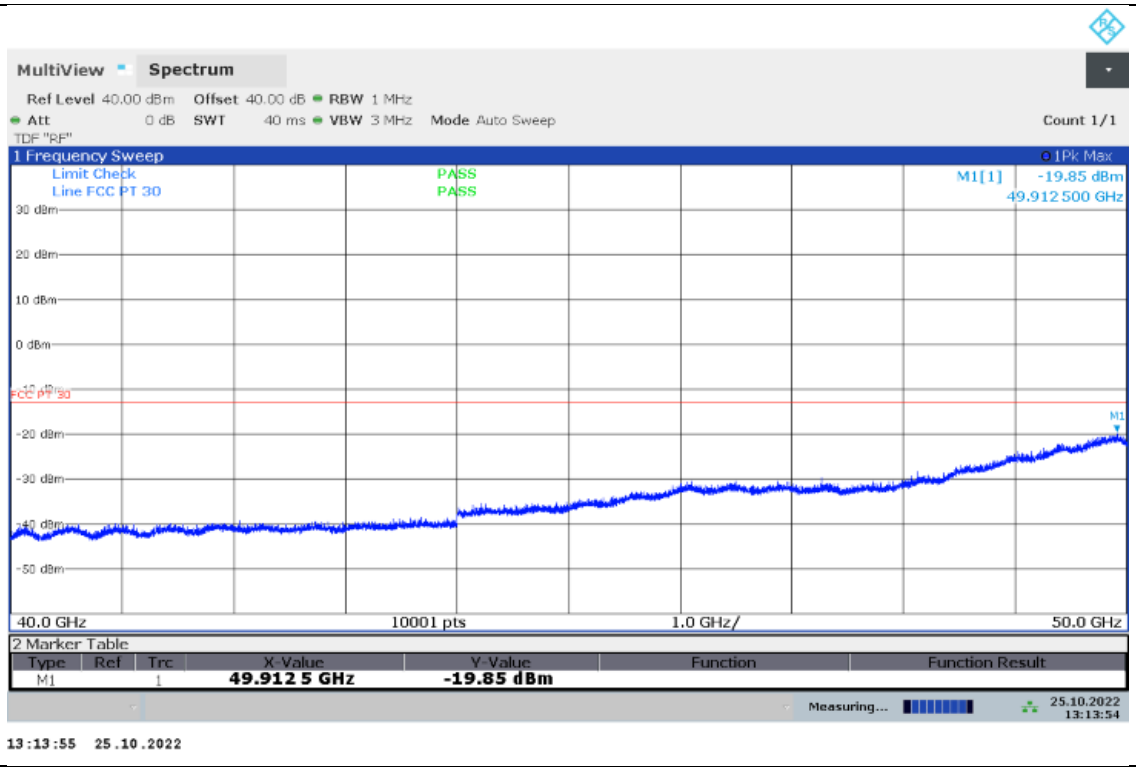
1CC Worst Case: 16QAM MCS10 Low Channel – Horizontal



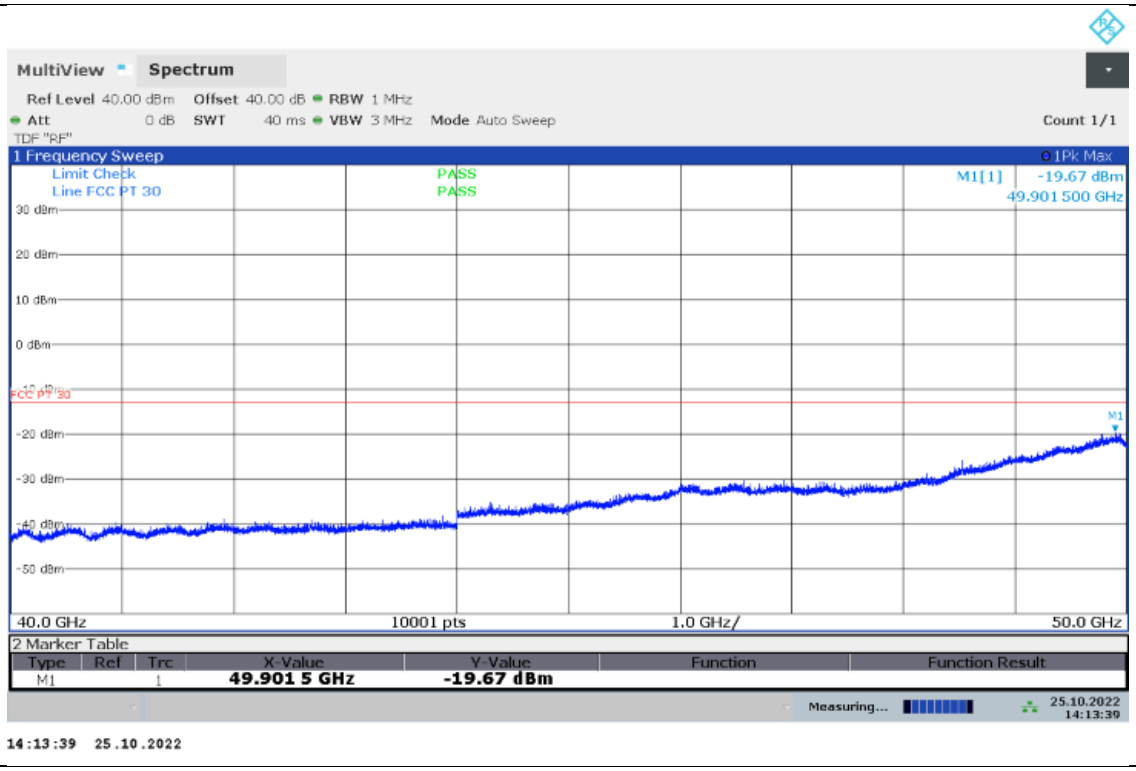
1CC Worst Case: 16QAM MCS10 Low Channel – Vertical



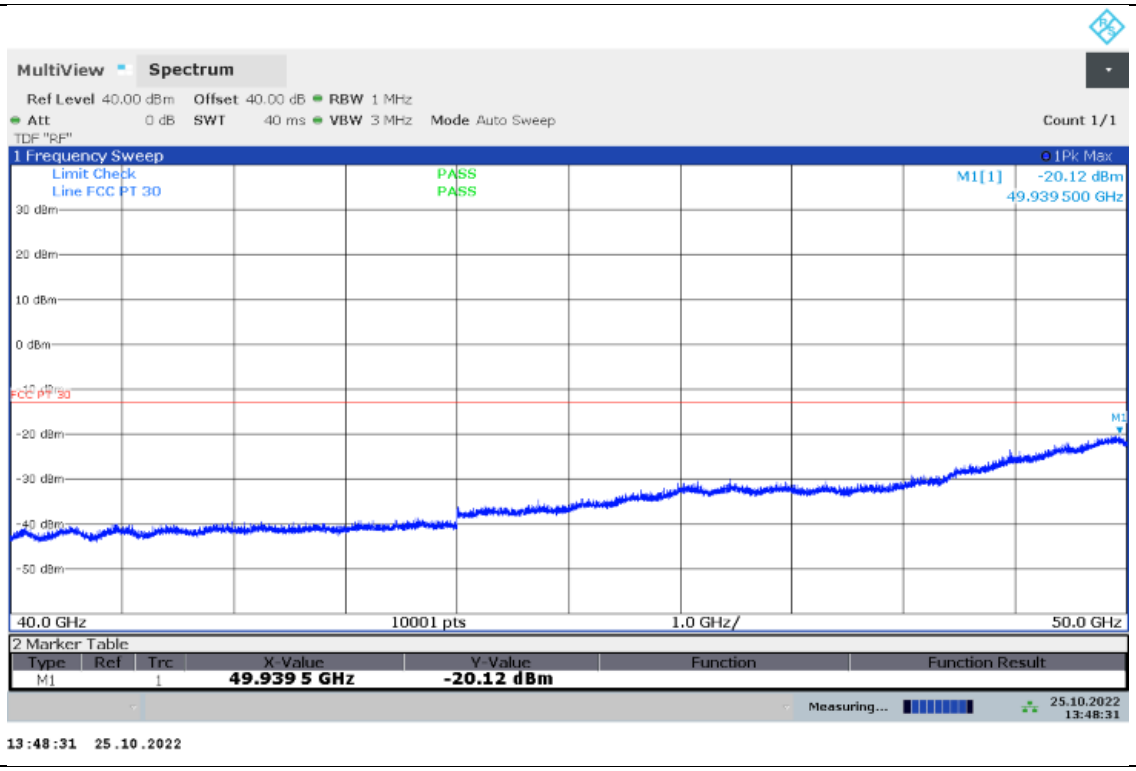
2CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



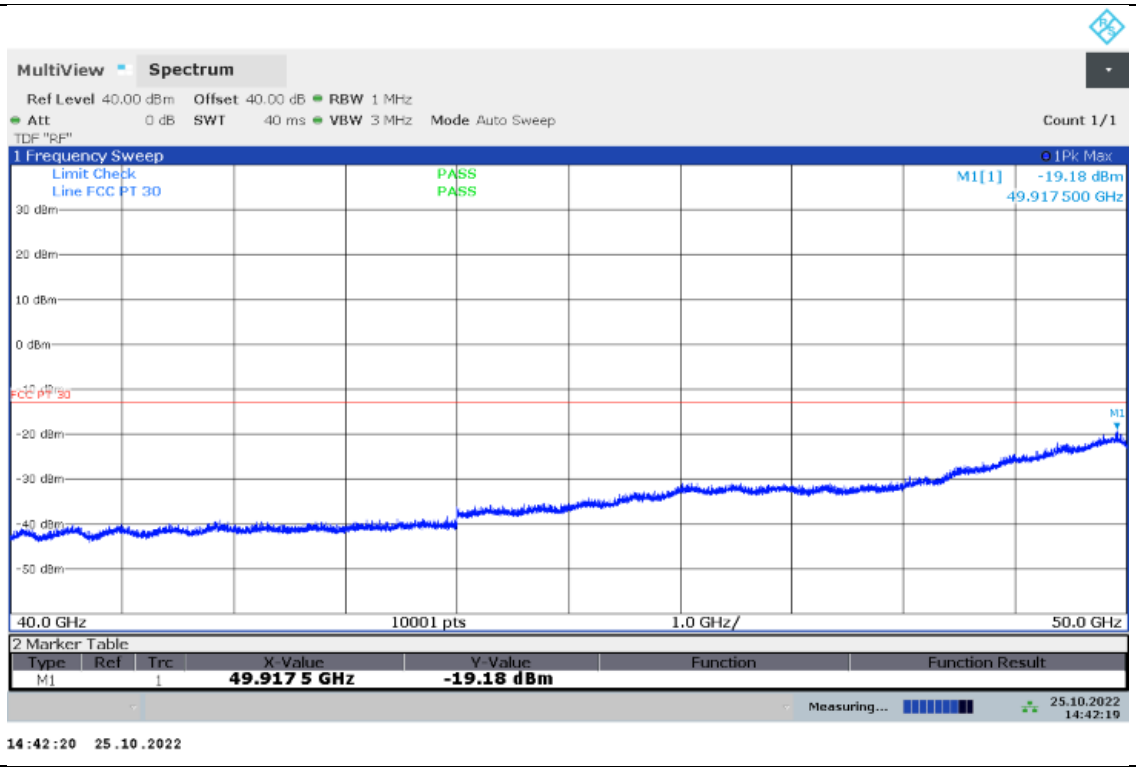
2CC Worst Case: QPSK MCS0 Mid Channel – Vertical



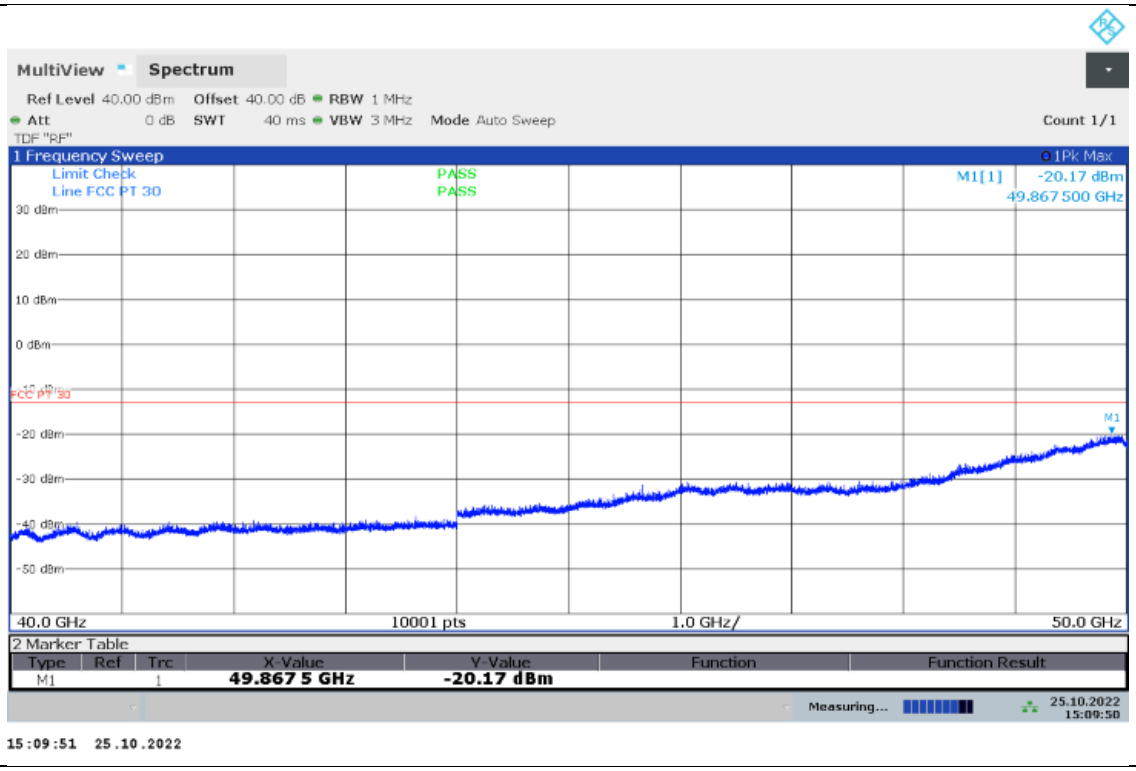
3CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



3CC Worst Case: QPSK MCS0 Mid Channel – Vertical

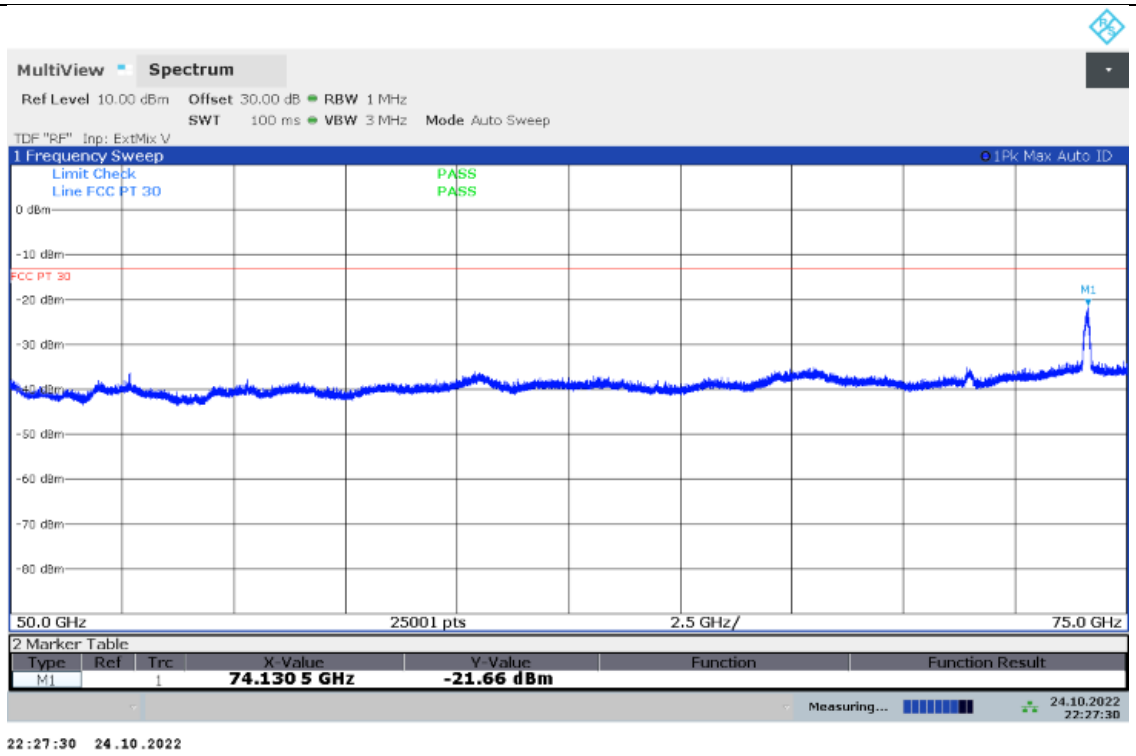


4CC Worst Case: 16QAM MCS10 Low Channel – Horizontal



4CC Worst Case: 16QAM MCS10 Low Channel – Vertical

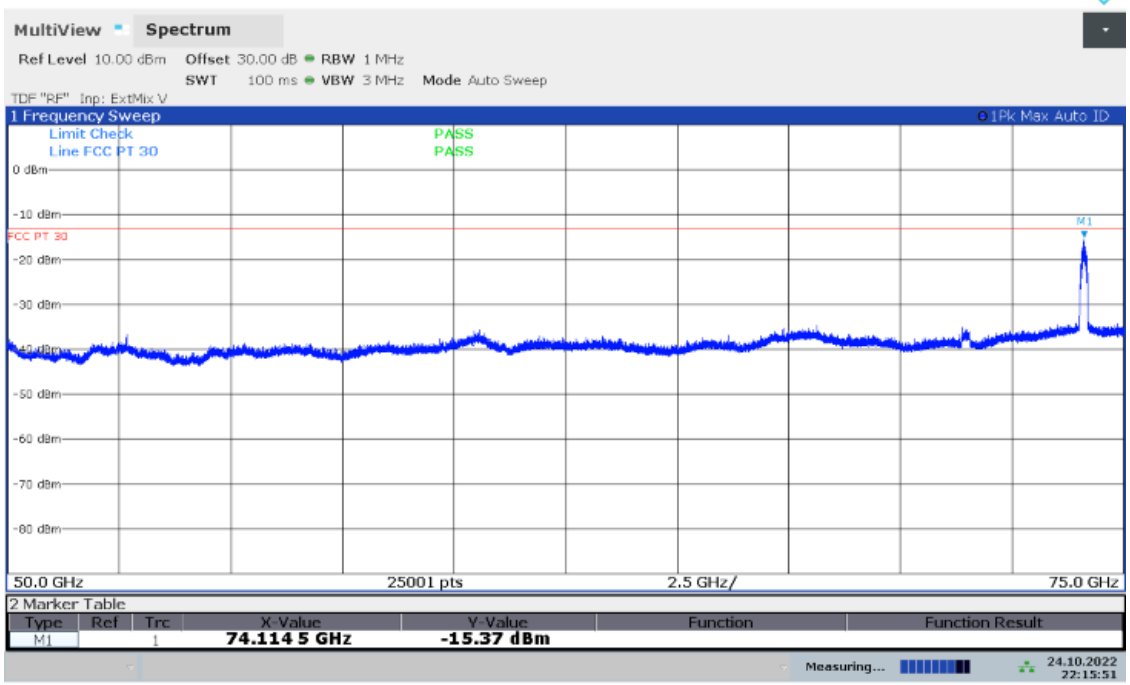
8.6.7. RADIATED EMISSIONS 50-75 GHz



Trace Markers

Frequency (GHz)	Meas. Distance (m)	Rx Ant Polarity (H/V)	Corrected Avg EIRP (dBm)	TRP Limit (dBm)	Margin (dB)
74.102	3	H	-29.07	-13	-16.07

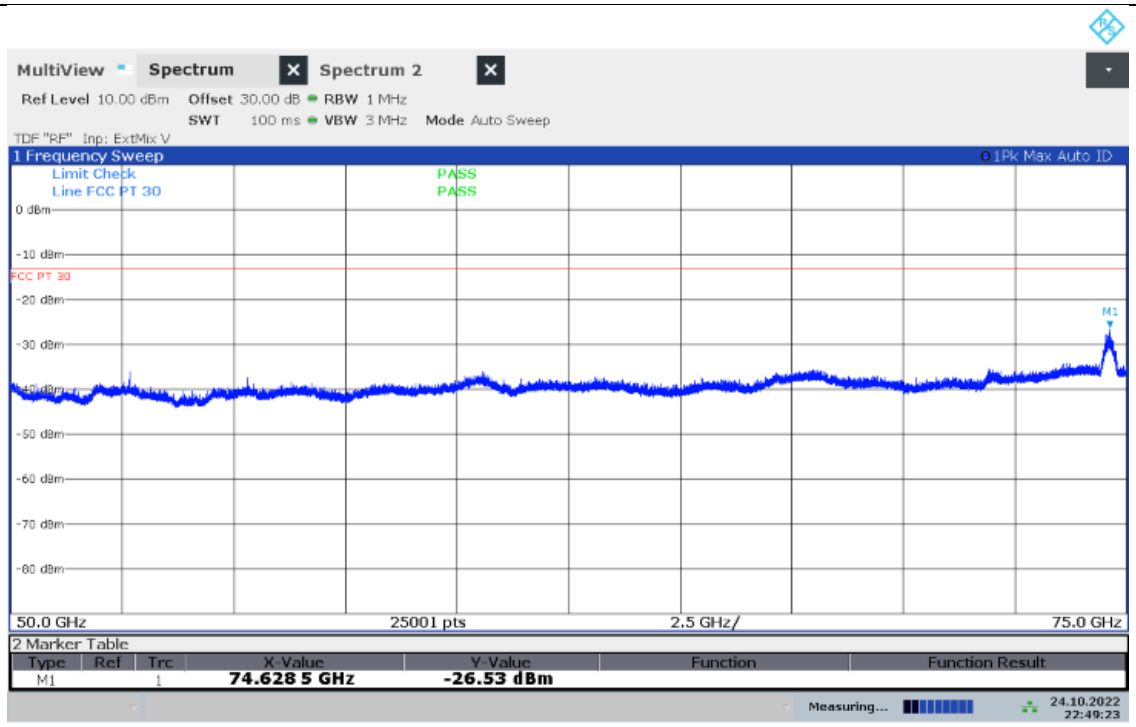
1CC Worst Case: 16QAM MCS10 Low Channel – Horizontal



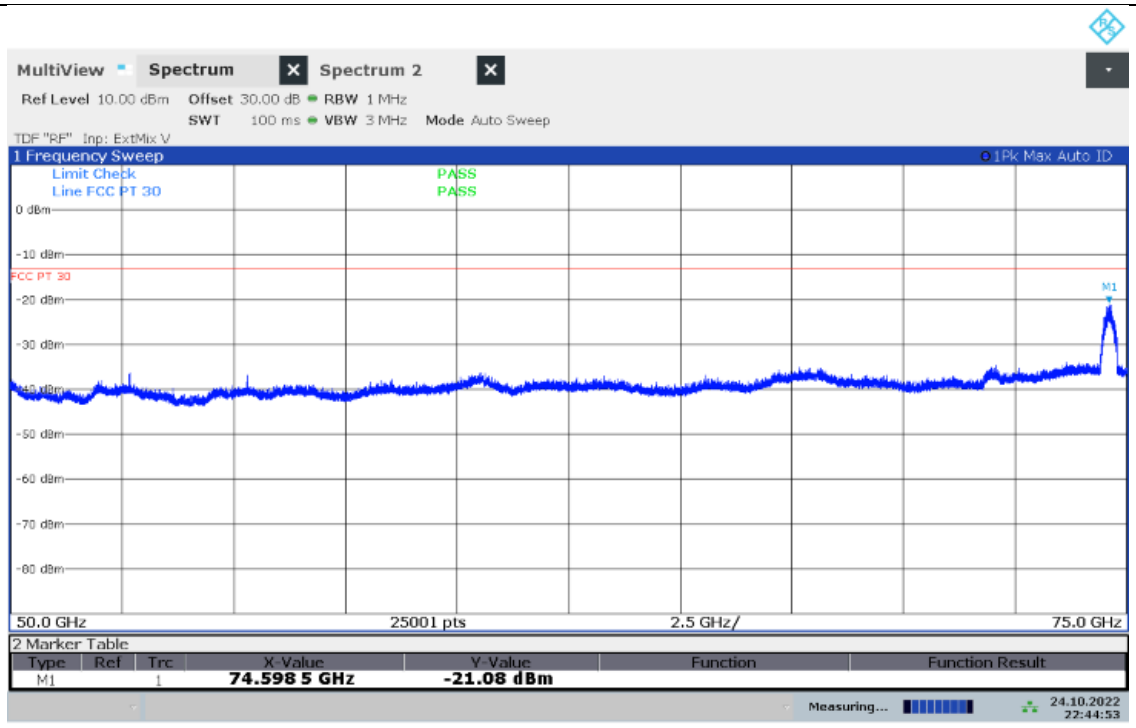
Trace Markers

Frequency (GHz)	Meas. Distance (m)	Rx Ant Polarity (H/V)	Corrected Avg EIRP (dBm)	TRP Limit (dBm)	Margin (dB)
74.102	3	V	-23.74	-13	-10.74

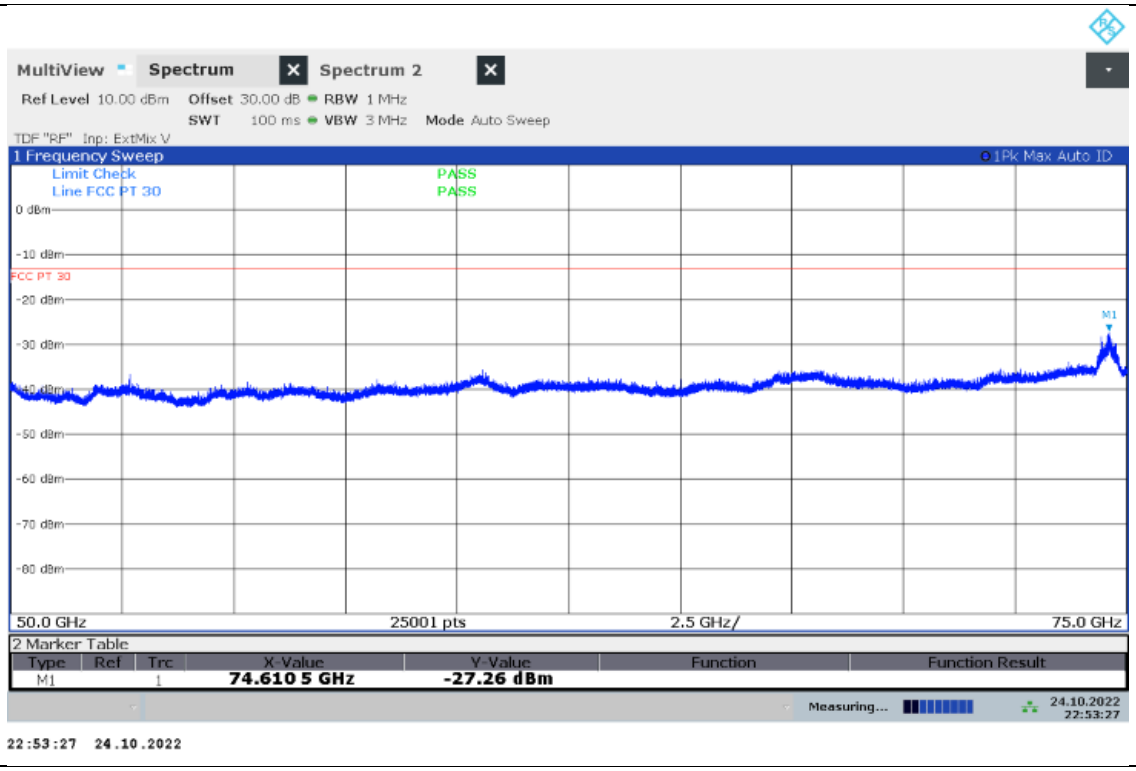
1CC Worst Case: 16QAM MCS10 Low Channel – Vertical



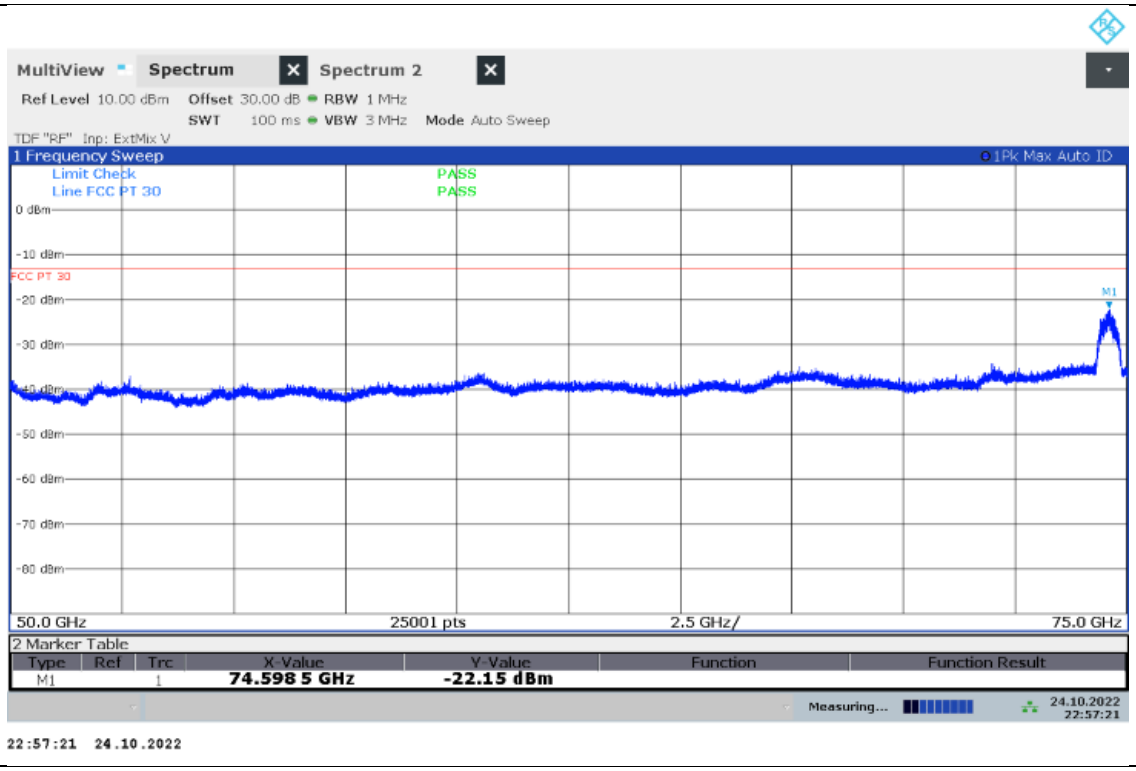
2CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



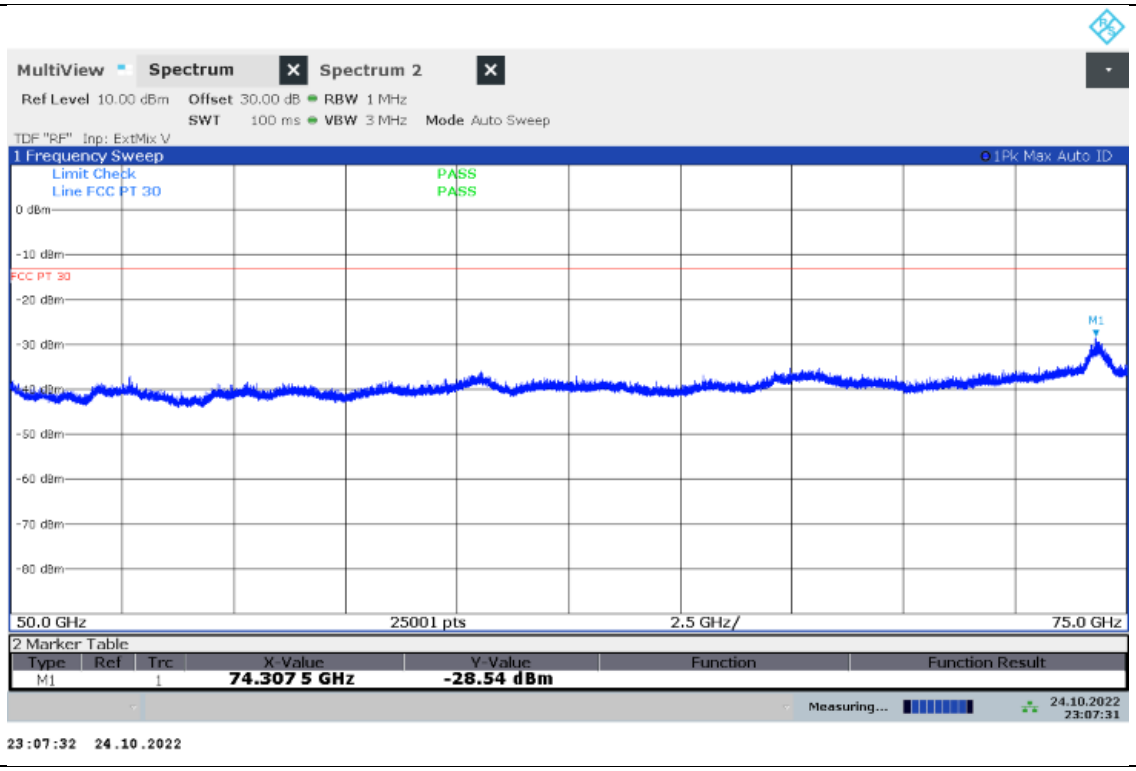
2CC Worst Case: QPSK MCS0 Mid Channel – Vertical



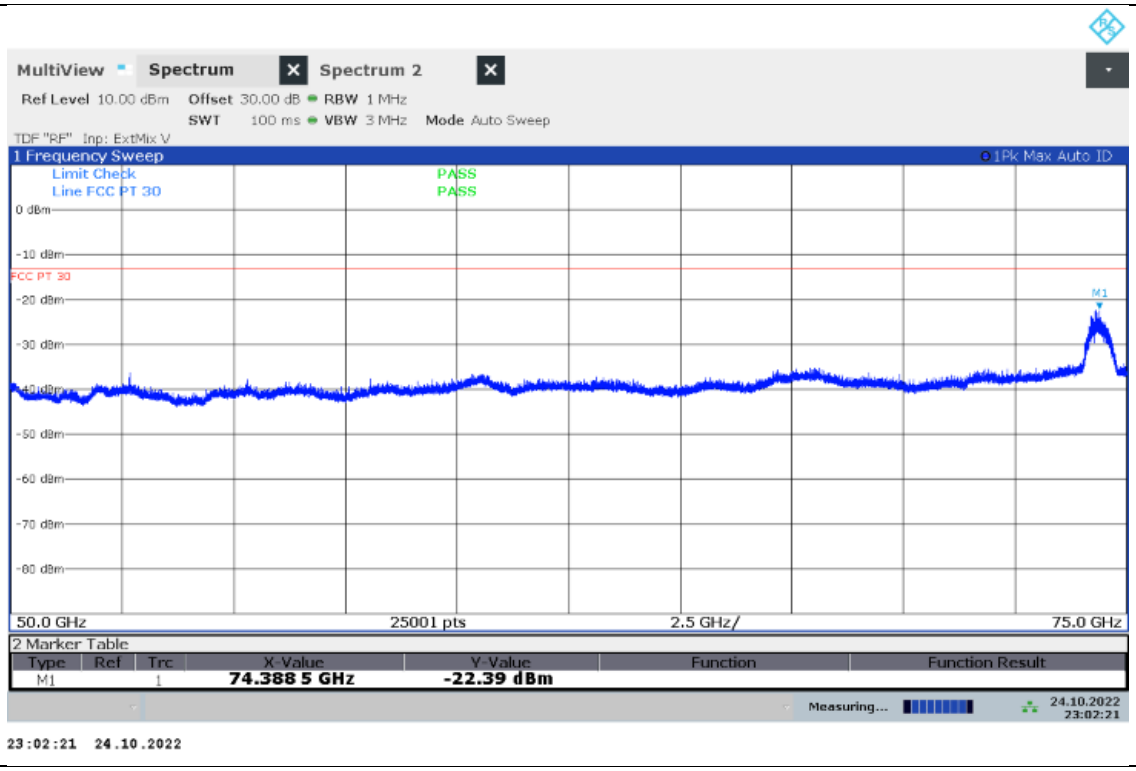
3CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



3CC Worst Case: QPSK MCS0 Mid Channel – Vertical

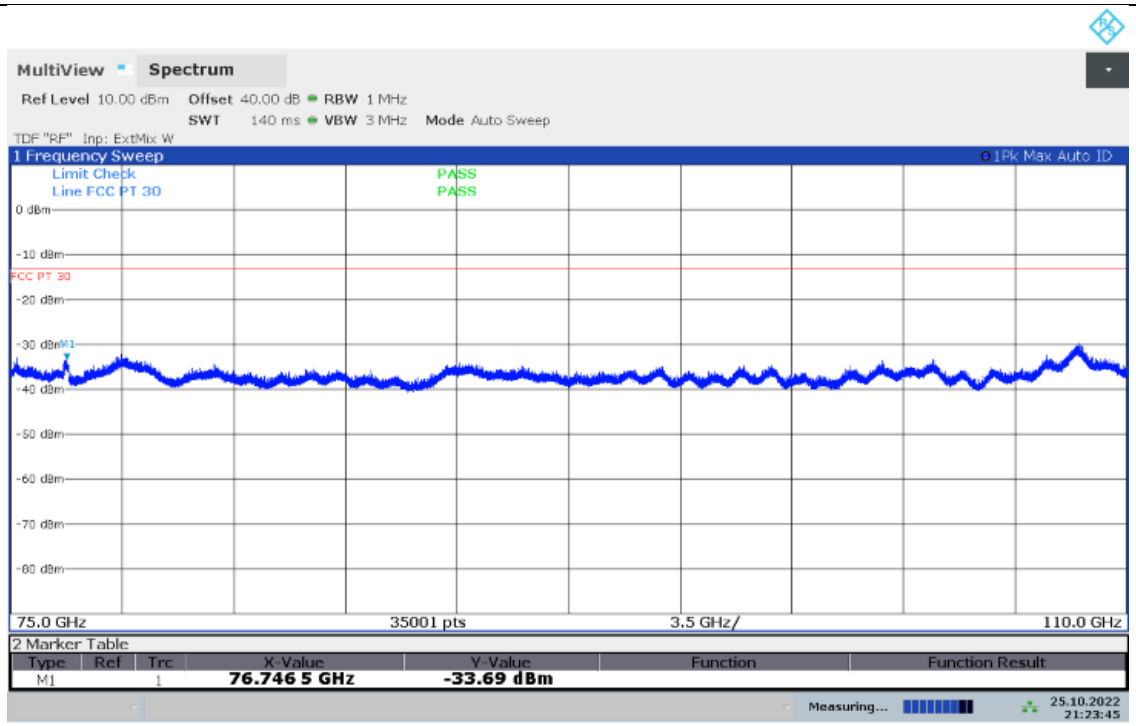


4CC Worst Case: 16QAM MCS10 Low Channel – Horizontal

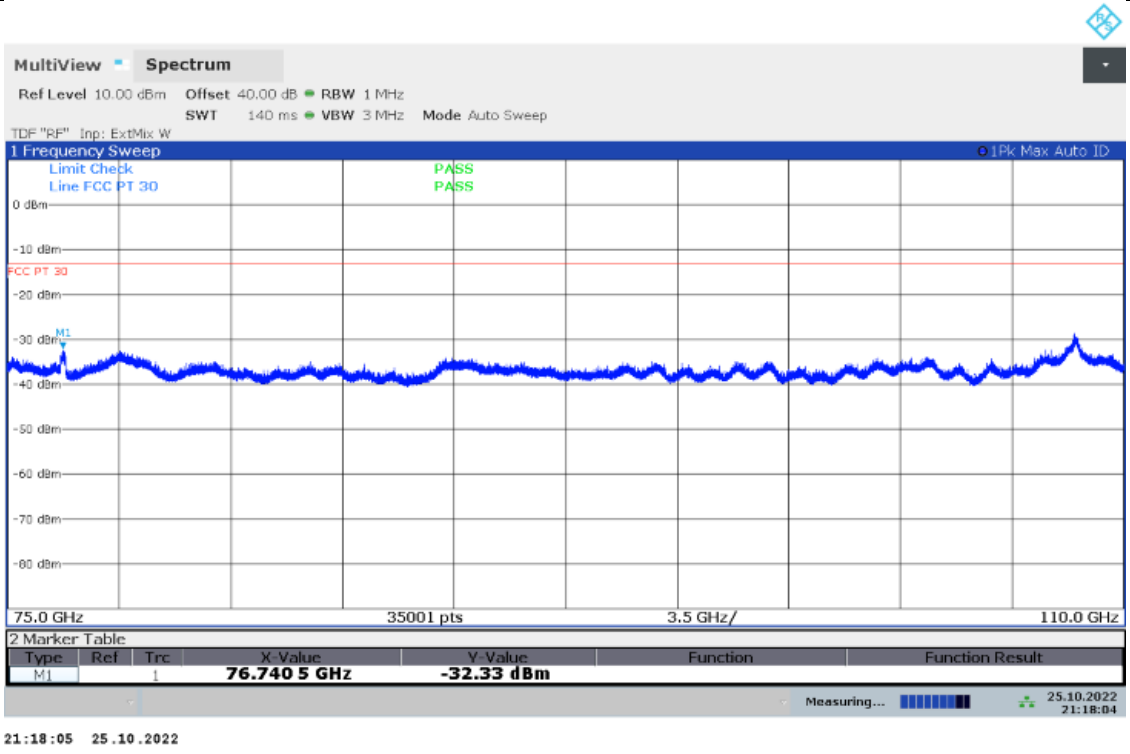


4CC Worst Case: 16QAM MCS10 Low Channel – Vertical

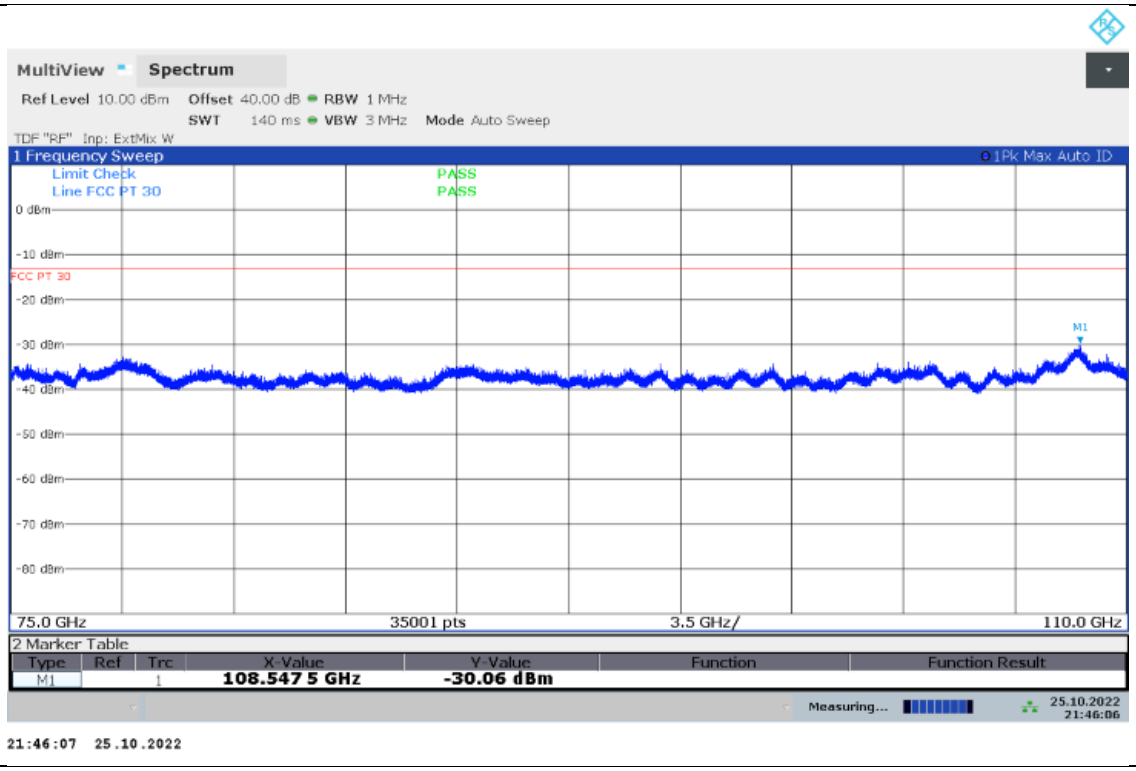
8.6.8. RADIATED EMISSIONS 75-110 GHz



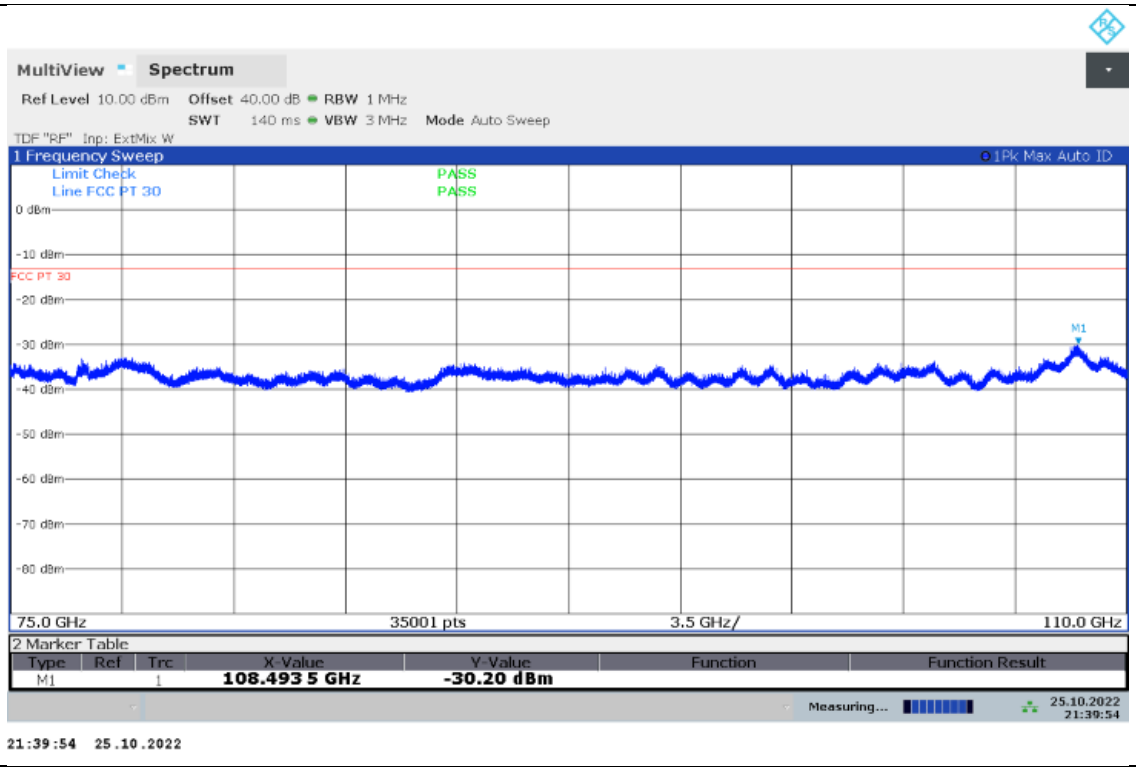
1CC Worst Case: 16QAM MCS10 Low Channel – Horizontal



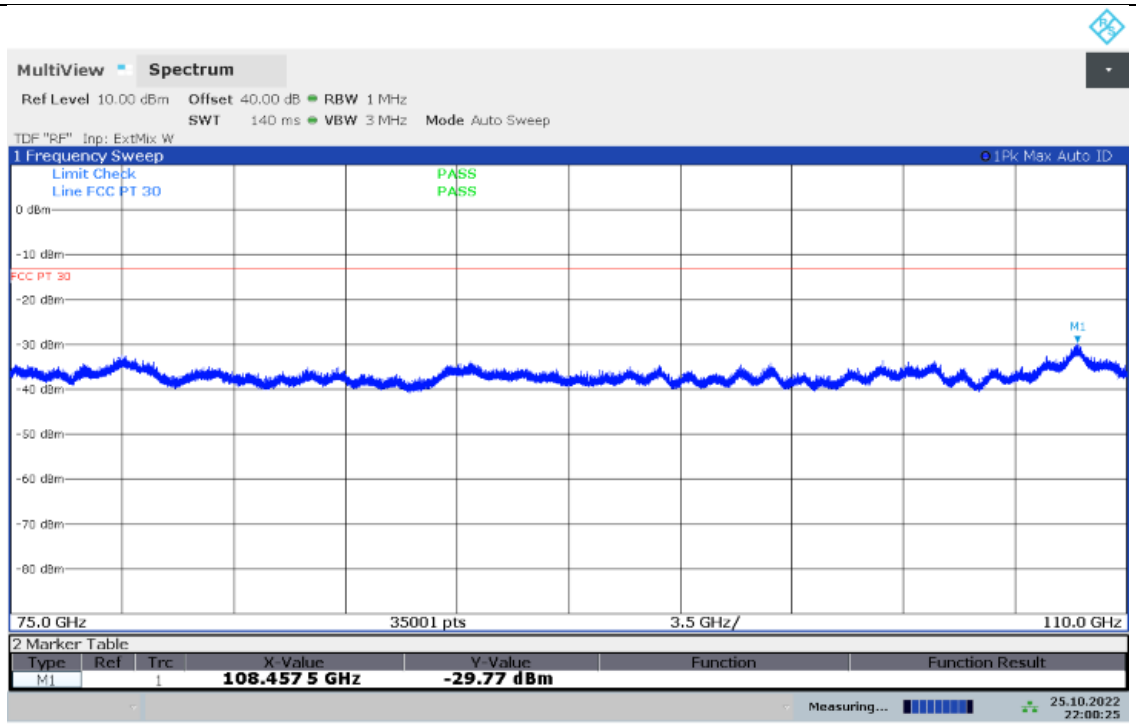
1CC Worst Case: 16QAM MCS10 Low Channel – Vertical



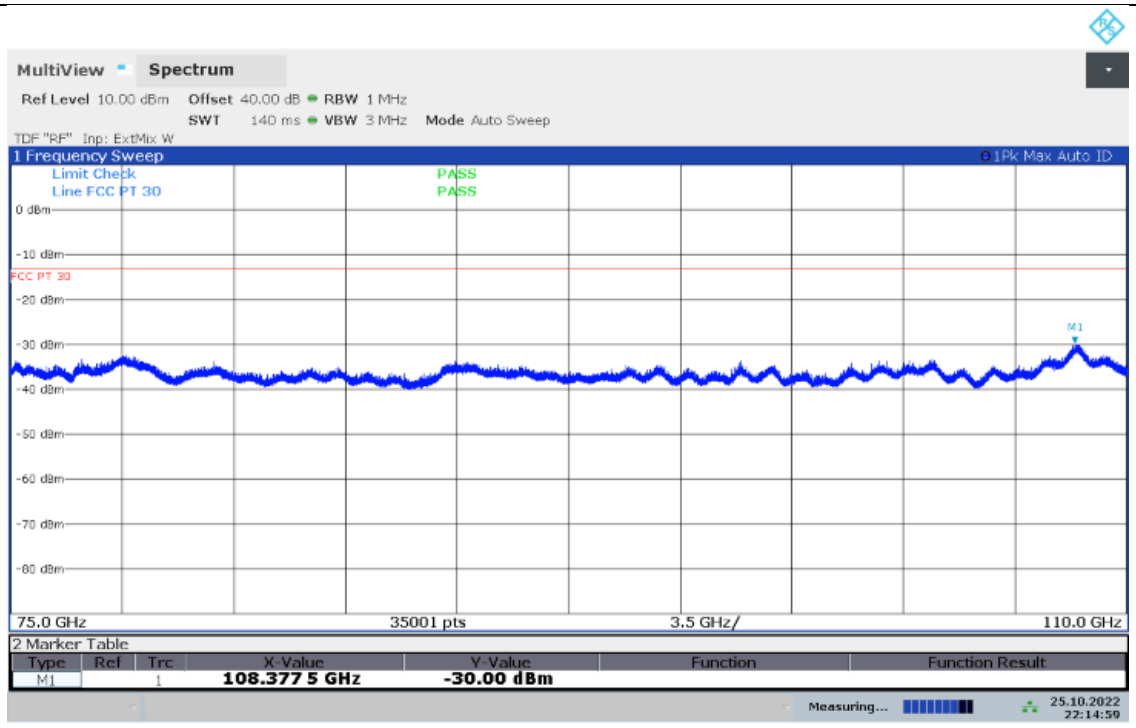
2CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



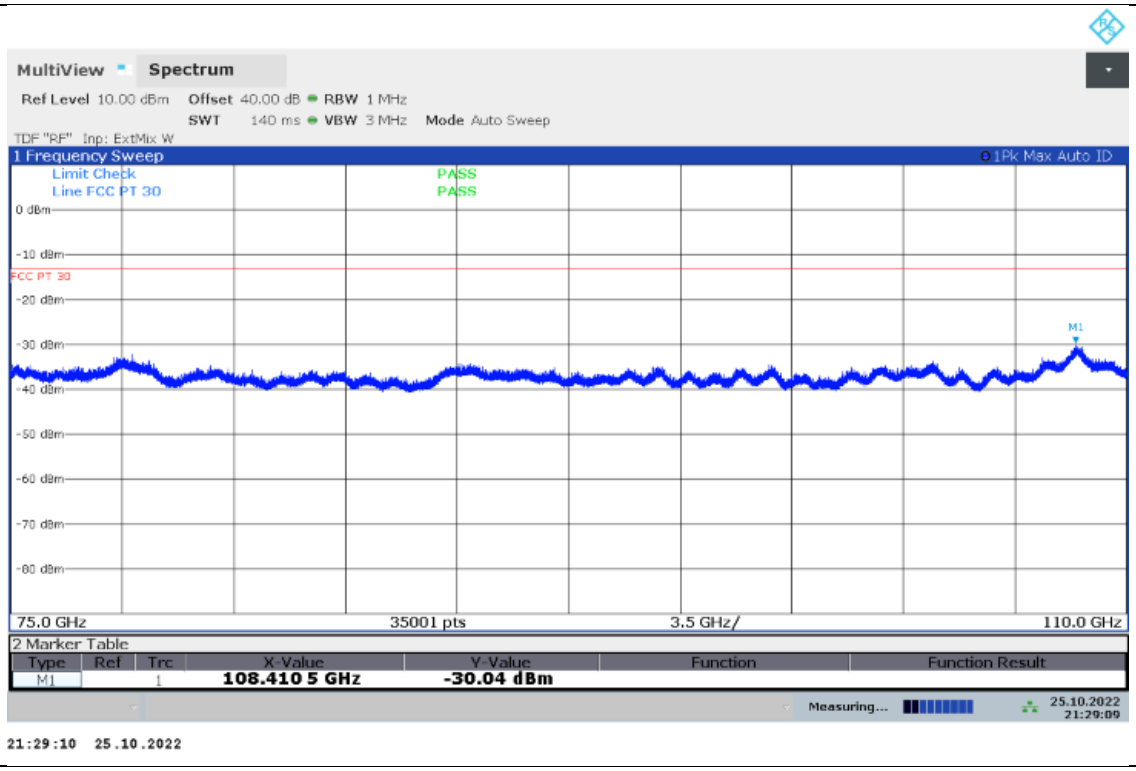
2CC Worst Case: QPSK MCS0 Mid Channel – Vertical



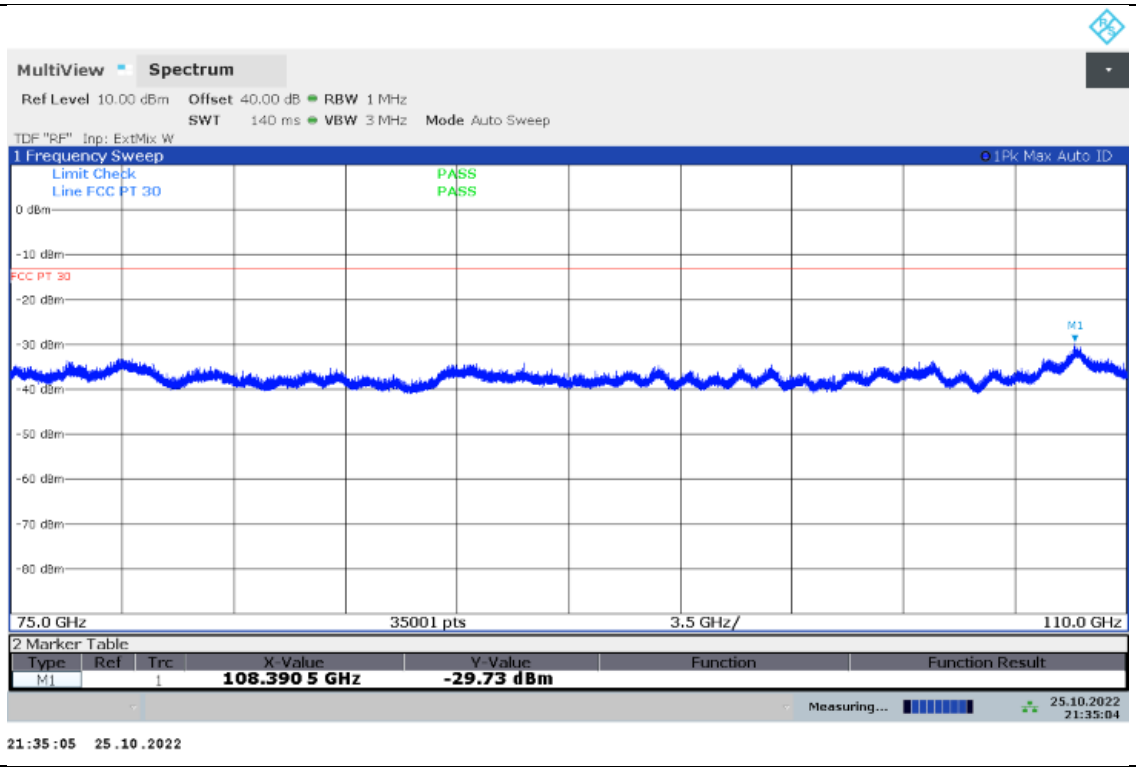
3CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



3CC Worst Case: QPSK MCS0 Mid Channel – Vertical

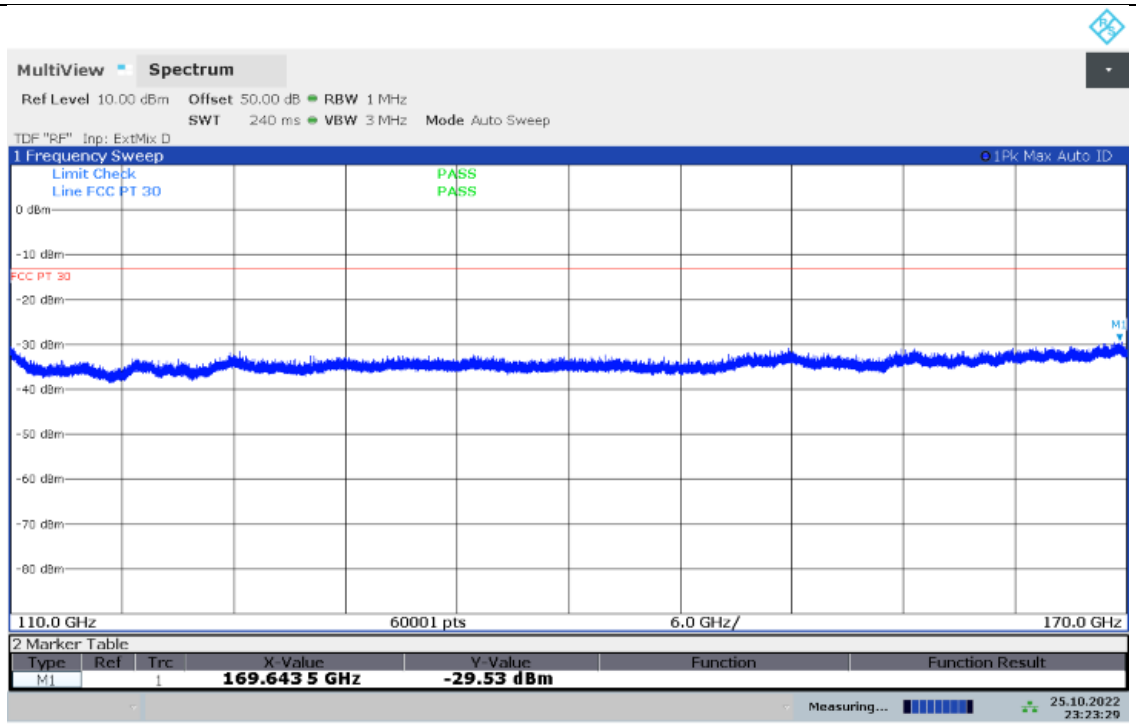


4CC Worst Case: 16QAM MCS10 Low Channel – Horizontal

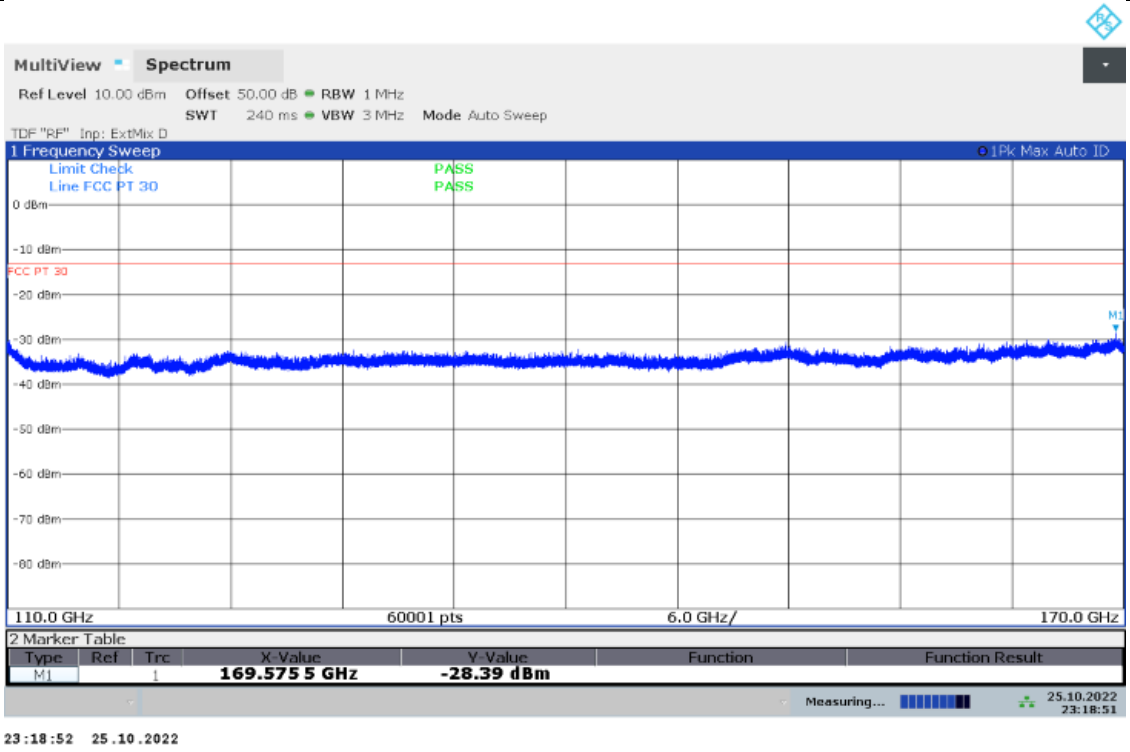


4CC Worst Case: 16QAM MCS10 Low Channel – Vertical

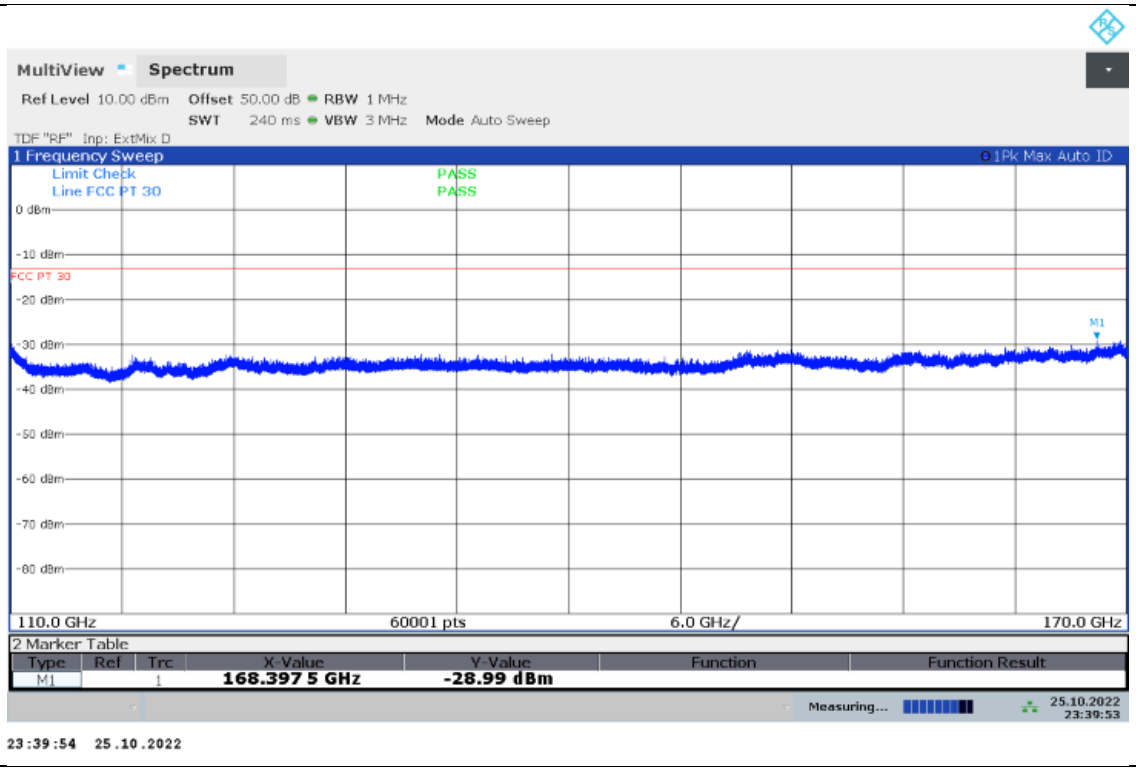
8.6.9. RADIATED EMISSIONS 110-170 GHz



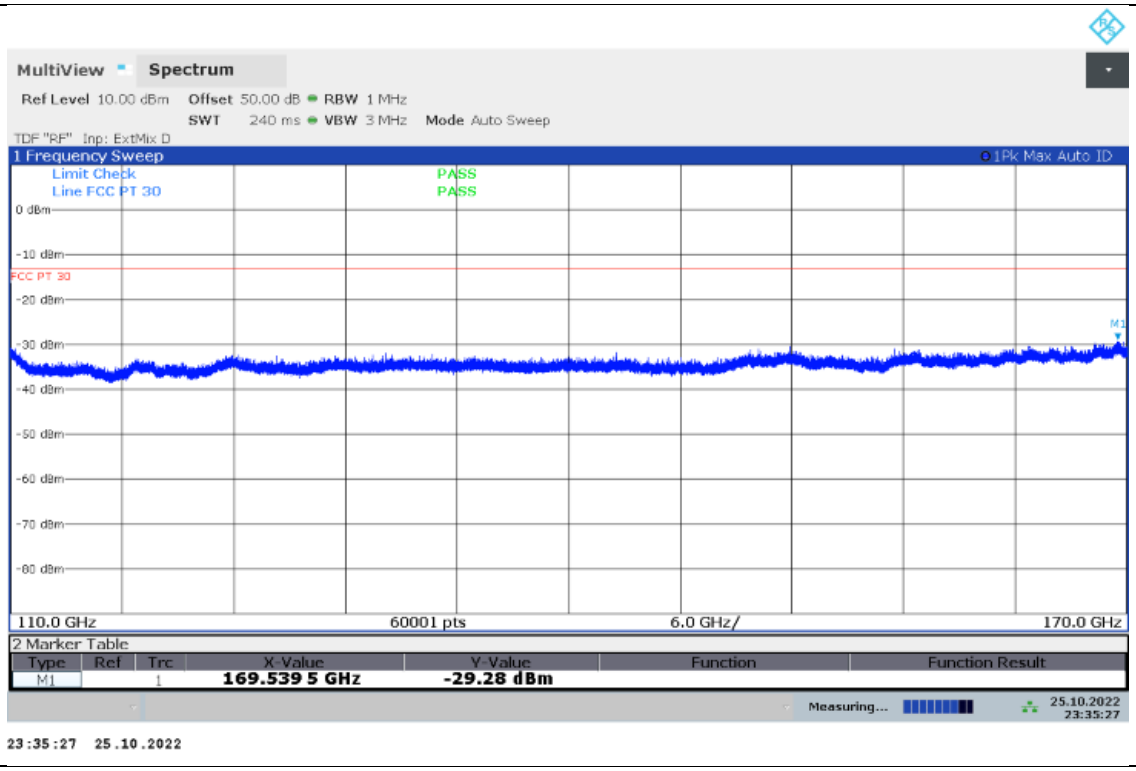
1CC Worst Case: 16QAM MCS10 Low Channel – Horizontal



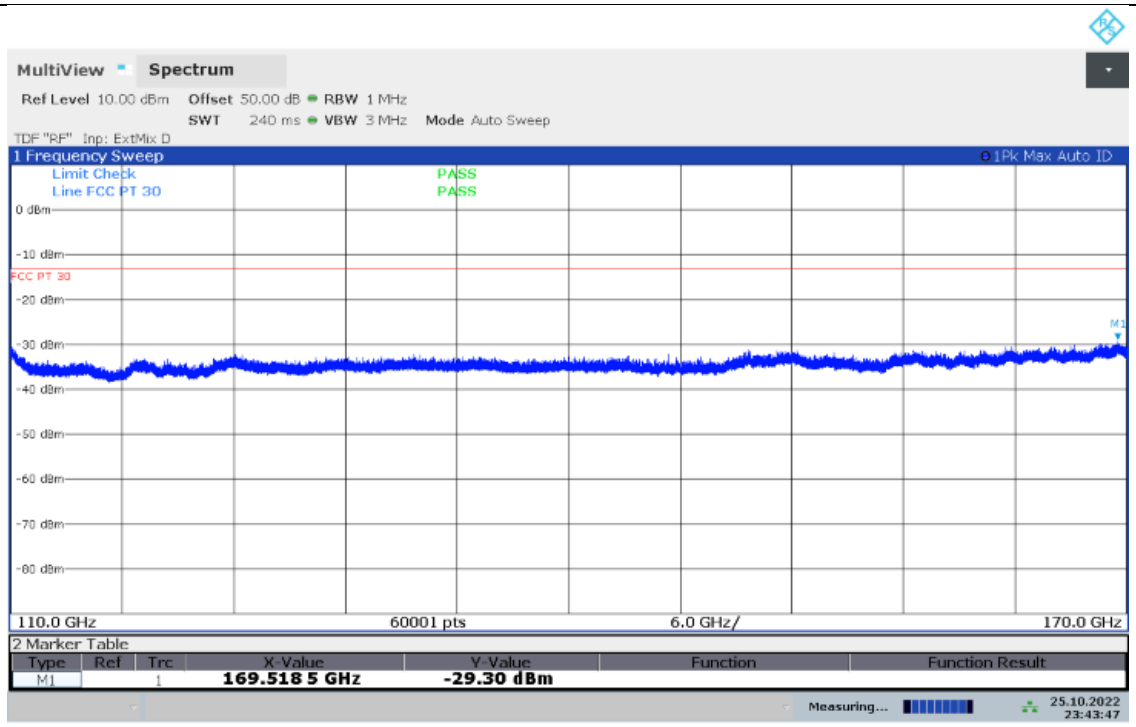
1CC Worst Case: 16QAM MCS10 Low Channel – Vertical



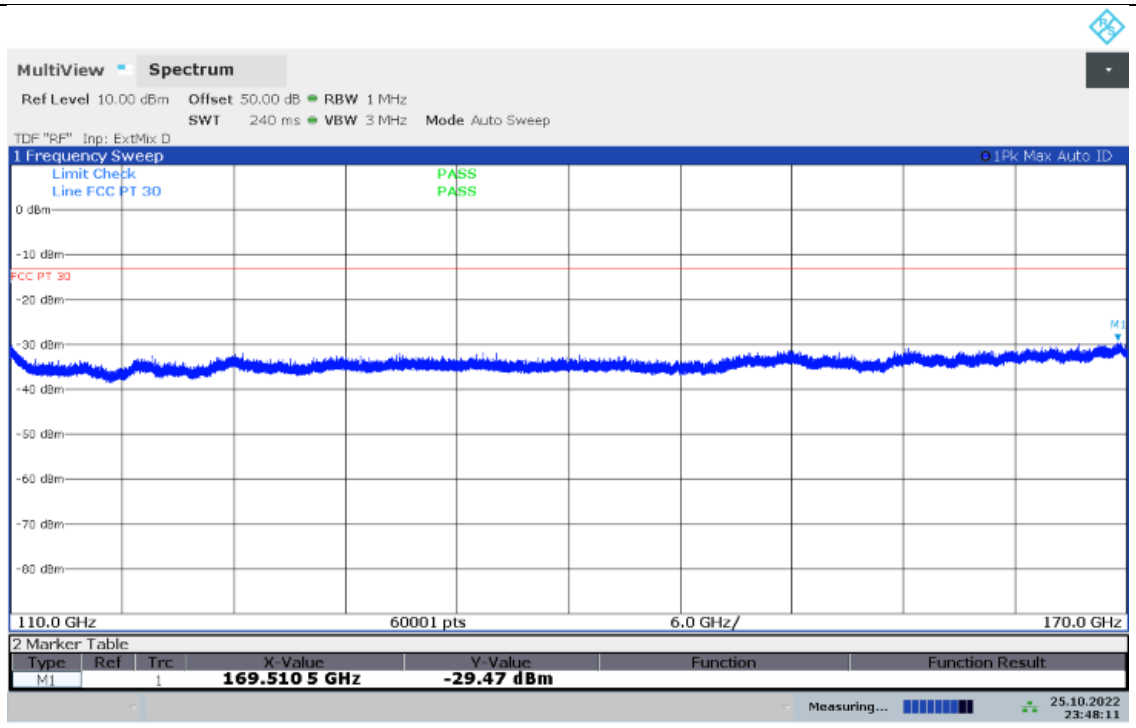
2CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



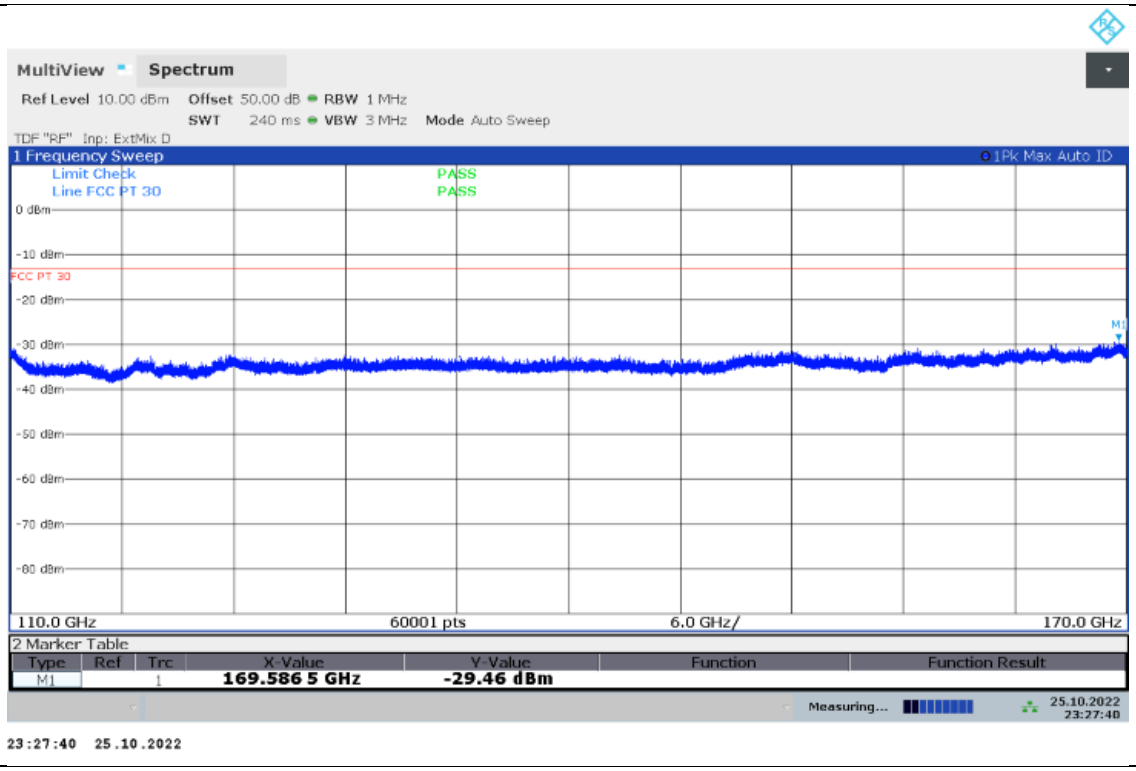
2CC Worst Case: QPSK MCS0 Mid Channel – Vertical



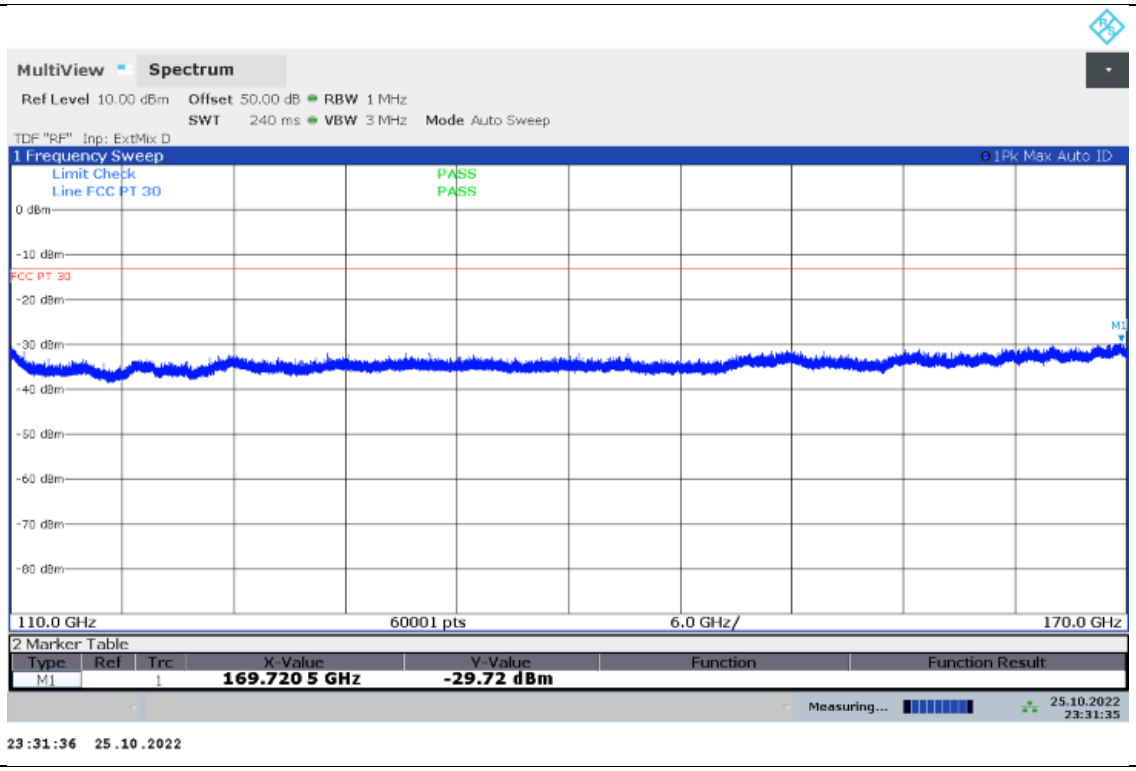
3CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



3CC Worst Case: QPSK MCS0 Mid Channel – Vertical

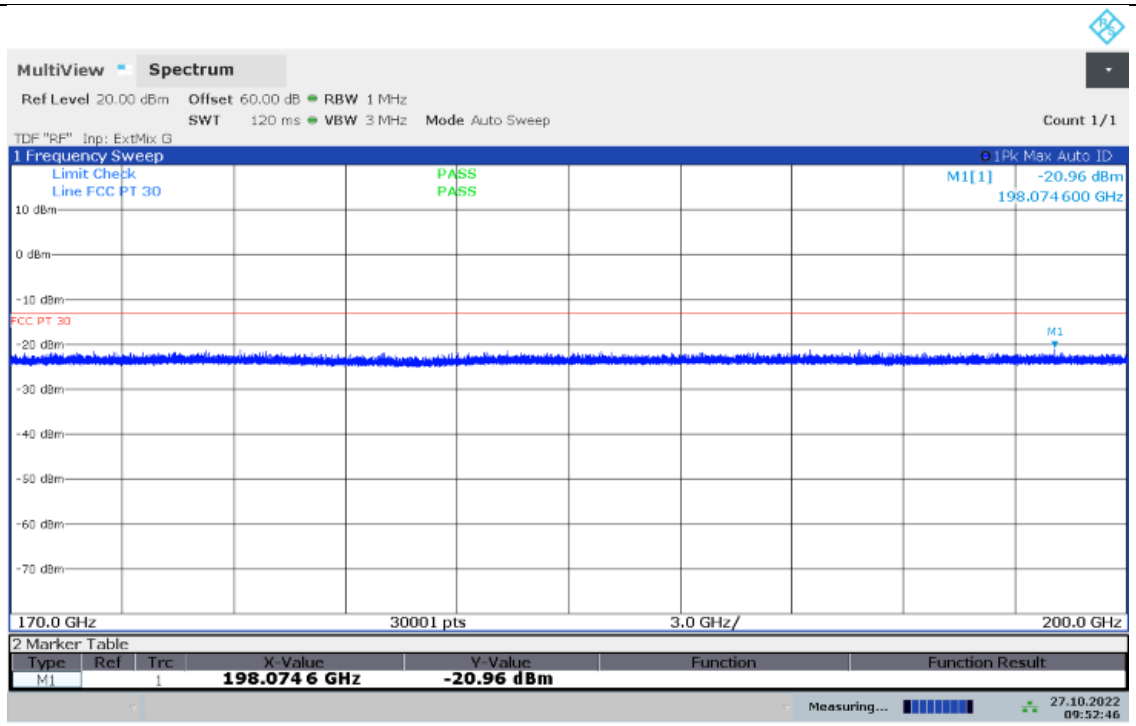


4CC Worst Case: 16QAM MCS10 Low Channel – Horizontal

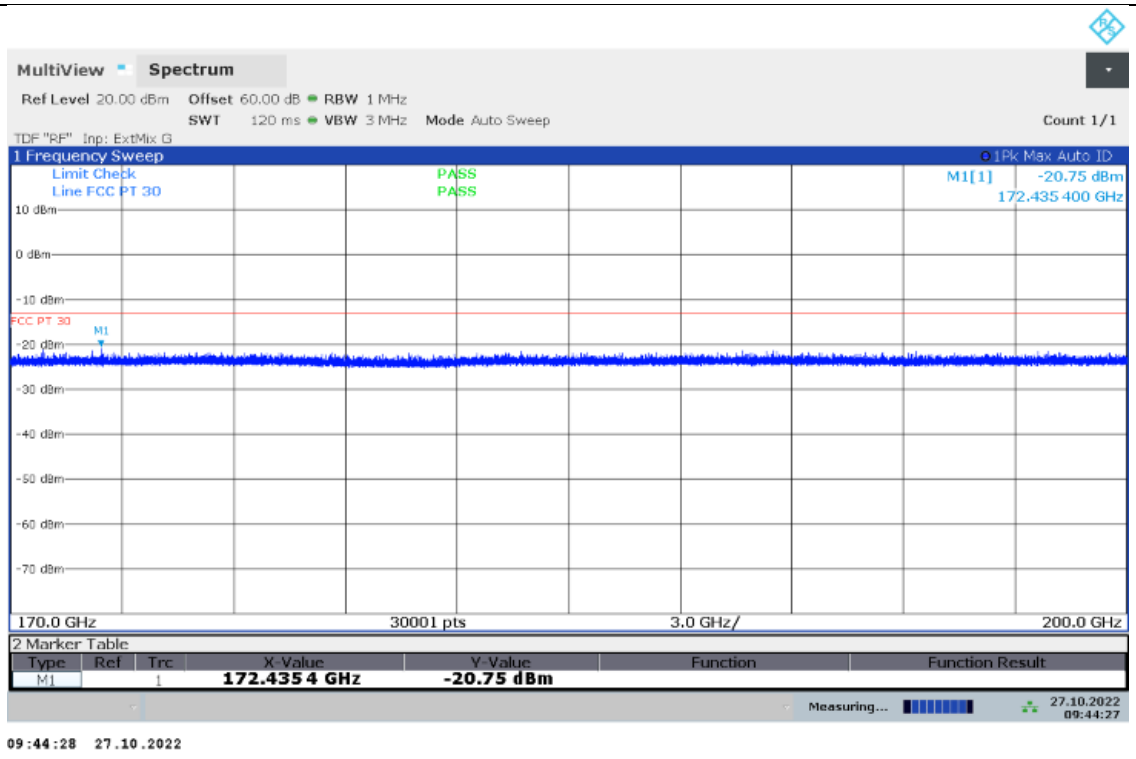


4CC Worst Case: 16QAM MCS10 Low Channel – Vertical

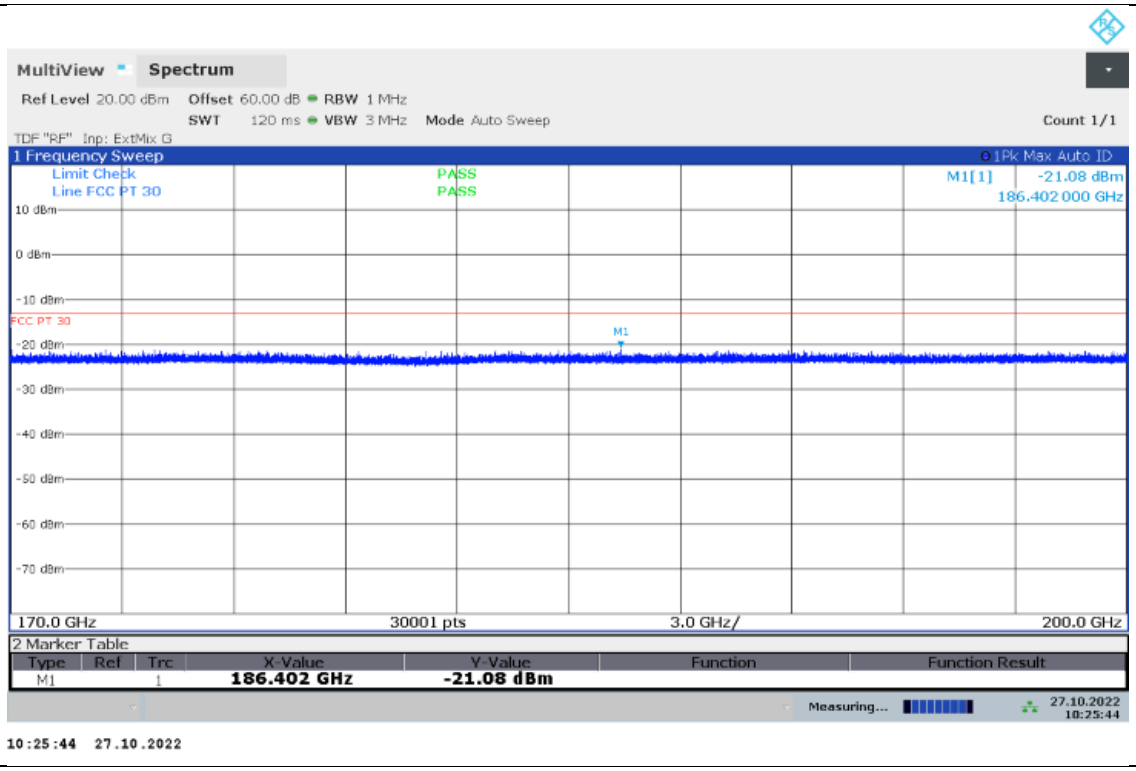
8.6.10. RADIATED EMISSIONS 170-200 GHz



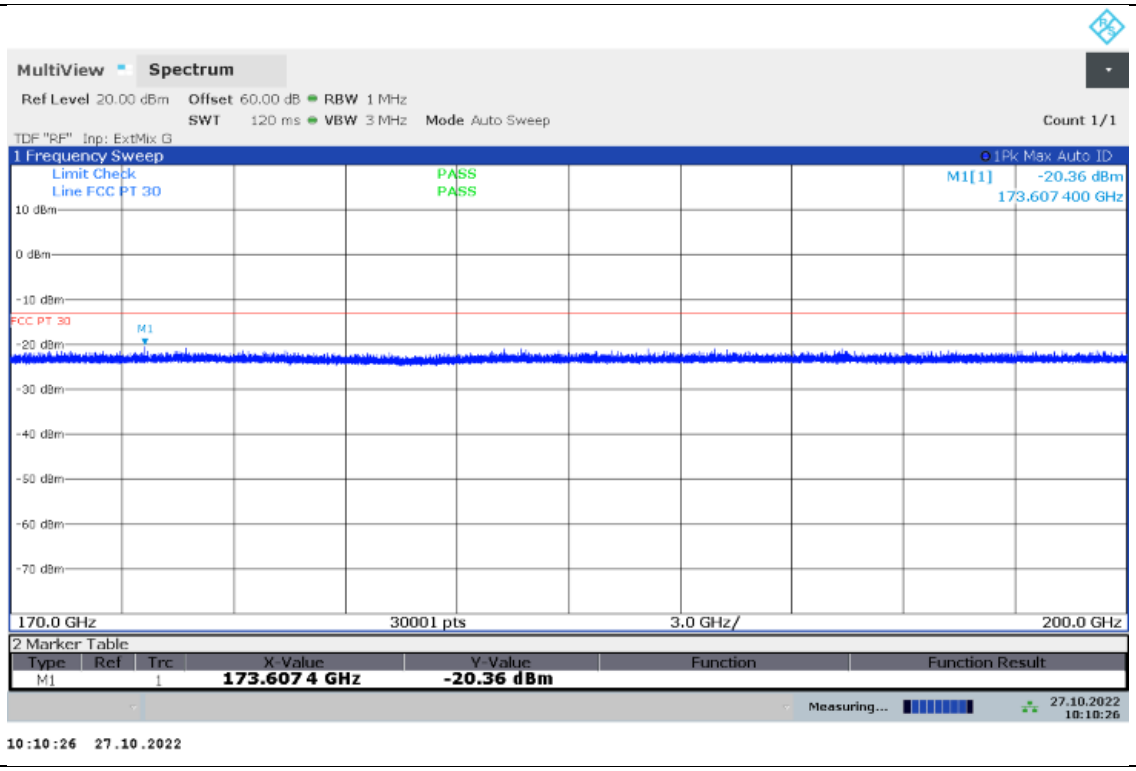
1CC Worst Case: 16QAM MCS10 Low Channel – Horizontal



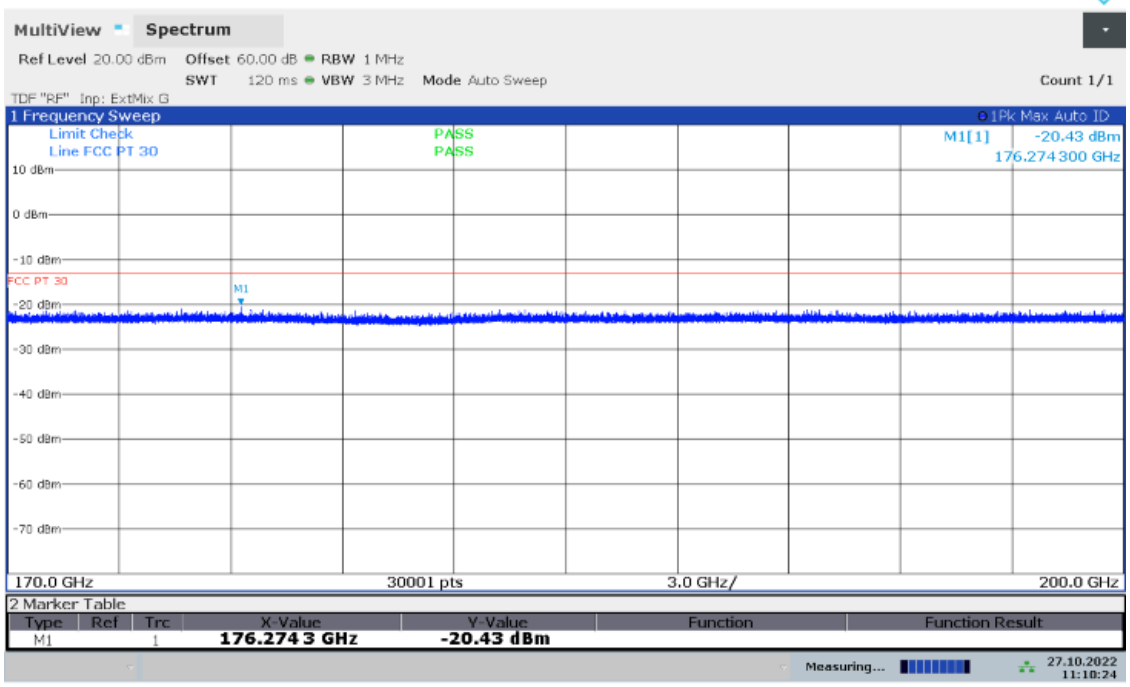
1CC Worst Case: 16QAM MCS10 Low Channel – Vertical



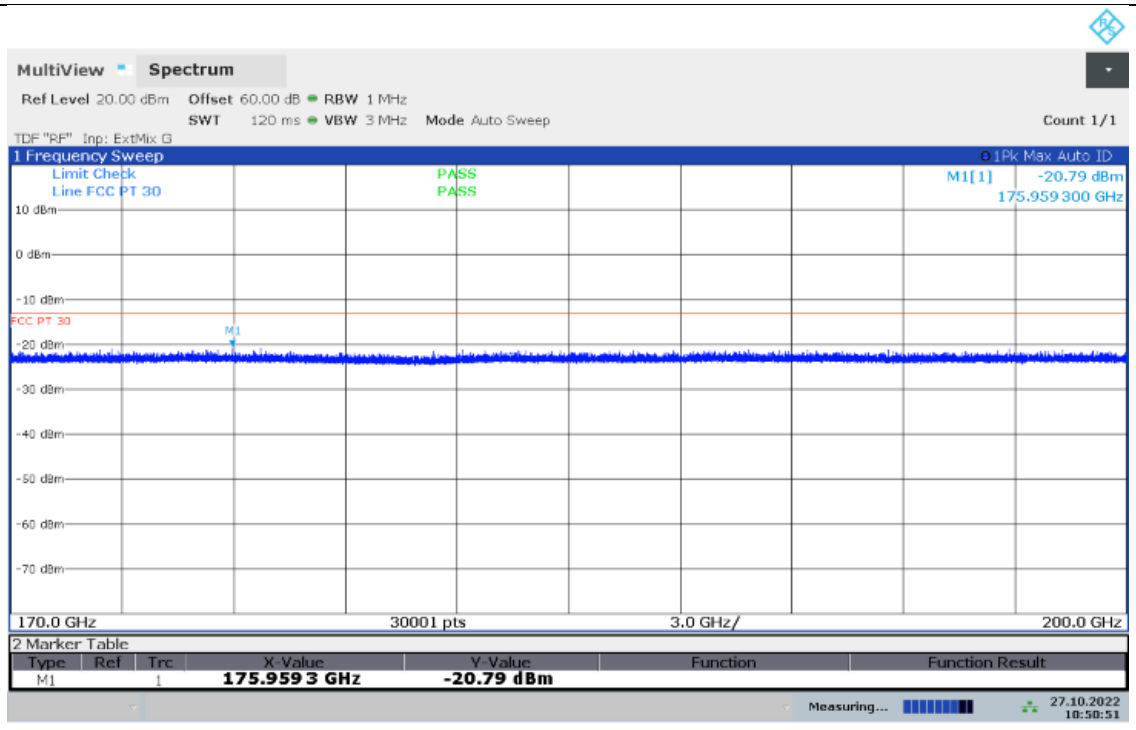
2CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



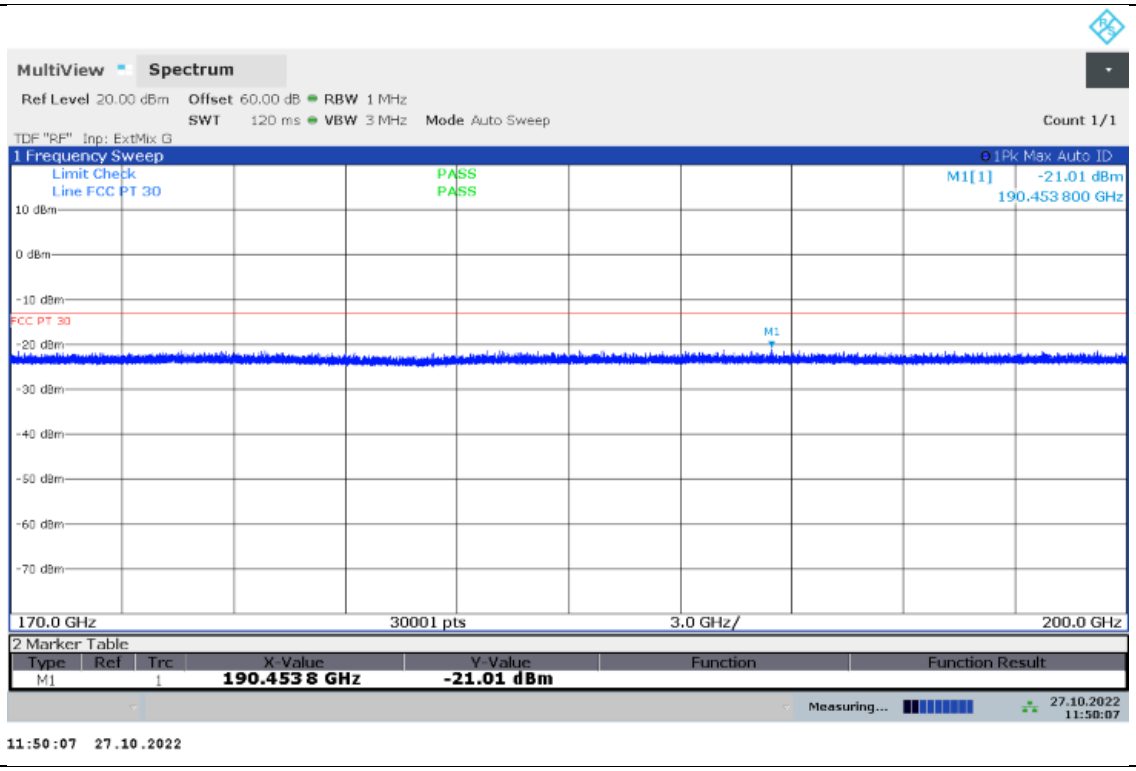
2CC Worst Case: QPSK MCS0 Mid Channel – Vertical



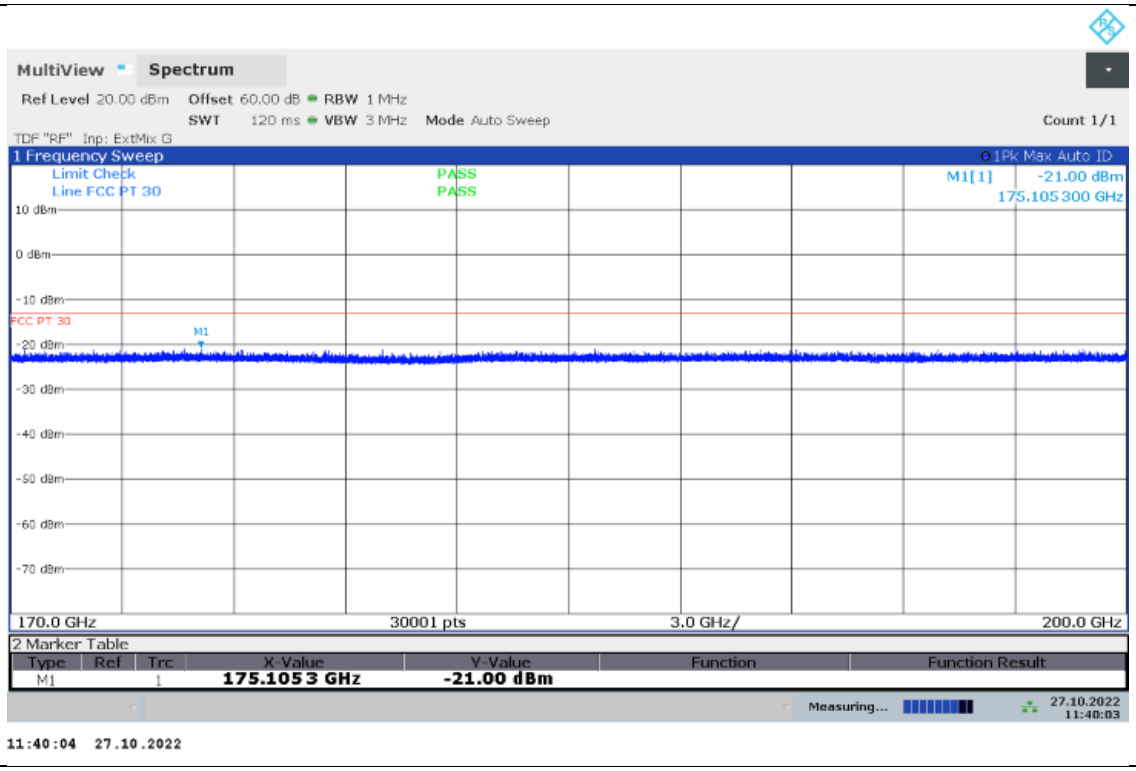
3CC Worst Case: QPSK MCS0 Mid Channel – Horizontal



3CC Worst Case: QPSK MCS0 Mid Channel – Vertical



4CC Worst Case: 16QAM MCS10 Low Channel – Horizontal



4CC Worst Case: 16QAM MCS10 Low Channel – Vertical

8.7. FREQUENCY STABILITY

RULE PART(S)

FCC: §2.1055

LIMIT

For reporting purposes only

TEST PROCEDURES

KDB 842590 D01 Upper Microwave Flexible Use Service v01 Section 4.5
ANSI C63.26-2015 Section 5.6

Test procedures for temperature variation:

a. Position the EUT in temperature/humidity chamber with power off.
b. Set chamber temperature to -30°C and stabilize the EUT for at least 30 minutes.
c. Record maximum change in frequency within one minute after powering the EUT.
d. Increase chamber temperature at 10°C intervals from -30°C to 50°C. Record maximum change in frequency at each temperature.
e. A period of at least 30 minutes is provided to allow stabilization of the equipment at each temperature level.

- Temp. = −30°C to +50°C

Test procedures for voltage variation:

a. Position the EUT in temperature/humidity chamber with power off.
b. Set chamber temperature to 20°C.
c. Record maximum frequency change within one minute after powering the EUT.
d. The primary supply voltage is varied from 85% to 115% of the nominal value for hand-carried, battery-powered equipment. primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

- Voltage = (85% - 115%)
  Nominal: 48.0 VDC; Low: 40.8 VDC; High: 55.2 VDC.

The measurements were performed using the CW modulation supported by the EUT.

RESULTS

See the following page.

TESTED BY

Employee IDs: 23854, 84445
Test Dates: 2022-11-03
Test Location: Conducted 1

RESULTS

Nominal Frequency:	37.3	GHz		
Nominal Voltage:	48	Vdc		
Temperature (°C)	Voltage (V)	Measured Frequency (Hz)	Measured Frequency (MHz)	Delta (kHz)
-30	48	37299100000	37299.1	-800.00
-20	48	37298700000	37298.7	-1200.00
-10	48	37298900000	37298.9	-1000.00
0	48	37299300000	37299.3	-600.00
10	48	37299500000	37299.5	-400.00
20	**48**	**37299900000**	37299.9	**Reference**
20	40.8	37299800000	37299.8	-100.00
20	55.2	37299800000	37299.8	-100.00
30	48	37299800000	37299.8	-100.00
40	48	37300000000	37300.0	100.00
50	48	37300000000	37300.0	100.00

9. SETUP PHOTOS

Please refer to report R14417832-EP1 for setup photos.

APPENDIX A

DOWNCONVERTER CERTIFICATE OF CONFORMANCE

Virginia Diodes, Inc
979 2nd St. SE
Suite 309
Charlottesville, VA 22902
Phone: 434-297-3257
Fax: 434-297-3258

Certificate of Conformance

To: UL LLC
2800 Perimeter Park Drive
Suite B
Morrisville, NC 27560
United States

From: Virginia Diodes, Inc
979 2nd St. SE
Suite 309
Charlottesville, VA 22902

Packing List No: 222401 **Today's Date:** 06/17/22
Shipping Date: 06/17/22 **PO Number:** 7202151257

Quantity Shipped	Unit	Description	Order-Job Number
1	EA	RETEST-WR15SAX-F WR15SAX-F / SN: SAX 820	220237-01
1	EA	RETEST-WR10SAX-F WR10SAX-F / SN: SAX 821	220237-02
1	EA	RETEST-WR6.5SAX-F WR6.5SAX / SN: SAX 822	220237-03
1	EA	RETEST-WR4.3SAX-F WR4.3SAX / SN: SAX 823	220237-04

The VDI product(s) in this shipment meet(s) the guidelines for performance specifications established in accordance with the corresponding Purchase Order. Data presented in the User Guide, where applicable, has been obtained in accordance with VDI's Quality Management System. All instruments, used to obtain data, which require calibration have been calibrated with equipment traceable to the National Institute of Standards and Technology (NIST) and through NIST to the International System of Units (SI).

Authorized Signature
Virginia Diodes, Inc

Page 1 of 1

18-26.5 GHz COM-POWER AH-826 HORN ANTENNA

Equipment:	Horn Antenna
Model:	AH-826
Serial Number:	10080010
Calibration Date:	1/20/2021
Antenna Polarization:	Horizontal
Calibration Distance:	3 meters

Frequency (GHz)	Gain (dBi)	AFE (dB/m)	Frequency (GHz)	Gain (dBi)	AFE (dB/m)
18	22.05	33.27	21.25	22.75	34.00
18.1	22.10	33.26	21.5	22.71	34.15
18.2	22.05	33.36	21.75	22.37	34.59
18.3	22.10	33.35	22	22.66	34.40
18.4	22.12	33.39	22.25	22.66	34.50
18.5	22.11	33.44	22.5	22.89	34.36
18.6	22.14	33.45	22.75	22.91	34.44
18.7	22.23	33.41	23	22.81	34.64
18.8	22.17	33.52	23.25	22.56	34.97
18.9	22.15	33.59	23.5	22.50	35.13
19	22.15	33.63	23.75	22.84	34.89
19.1	22.11	33.72	24	22.88	34.93
19.2	22.19	33.69	24.25	22.98	34.93
19.3	22.27	33.65	24.5	23.02	34.97
19.4	22.34	33.62	24.75	22.82	35.26
19.5	22.51	33.50	25	22.76	35.40
19.75	22.34	33.78	25.25	22.76	35.50
20	22.55	33.68	25.5	22.73	35.61
20.25	22.74	33.59	25.75	22.76	35.67
20.5	22.54	33.90	26	23.01	35.50
20.75	22.75	33.80	26.25	23.02	35.57
21	22.81	33.85	26.5	23.09	35.58

Calibration performed per:

ANSI C63.5: 2017 - Standard Site Method, Equations 1-6 [3-antenna procedure]

Corrected Reading (dBµV/m) = **Meter Reading** (dBµV) + **AFE**(dB/m)

26.5-40 GHz COM-POWER AH-640 HORN ANTENNA

Equipment:	Horn Antenna
Model:	AH-640
Serial Number:	091049
Calibration Date:	1/20/2021
Antenna Polarization:	Horizontal
Calibration Distance:	3 meters

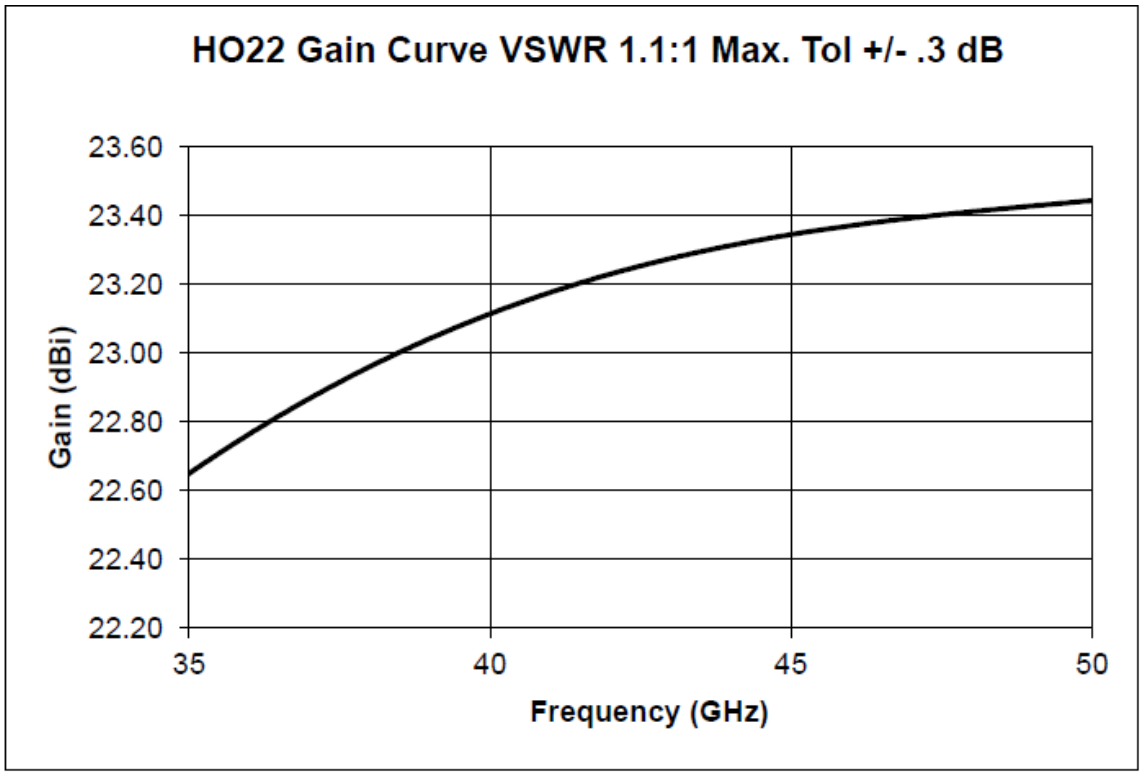
Frequency (GHz)	Isotropic Gain (dBi)	Antenna Factor (AFE) (dB/m)	Frequency (GHz)	Isotropic Gain (dBi)	Antenna Factor (AFE) (dB/m)
26.5	22.46	36.22	32	23.08	37.23
26.75	22.61	36.15	32.25	23.12	37.26
27	22.76	36.08	32.5	23.11	37.34
27.25	22.80	36.11	32.75	23.02	37.49
27.5	22.95	36.04	33	23.11	37.47
27.75	22.83	36.25	33.25	23.32	37.33
28	22.64	36.51	33.5	23.30	37.41
28.25	22.69	36.54	33.75	23.27	37.51
28.5	22.83	36.48	33.5	23.30	37.41
28.75	22.90	36.48	34	23.28	37.55
29	22.94	36.51	34.5	23.21	37.76
29.25	23.04	36.49	35	23.29	37.80
29.5	23.15	36.45	35.5	23.32	37.89
29.75	23.02	36.66	36	23.44	37.90
30	22.83	36.92	36.5	23.28	38.18
30.25	22.78	37.04	37	23.29	38.28
30.5	22.85	37.05	37.5	23.32	38.37
30.75	22.95	37.01	38	23.48	38.32
31	22.92	37.12	38.5	23.25	38.67
31.25	23.12	36.99	39	23.19	38.84
31.5	23.21	36.97	39.5	23.28	38.86
31.75	23.11	37.13	40	23.33	38.93

Calibration performed per:

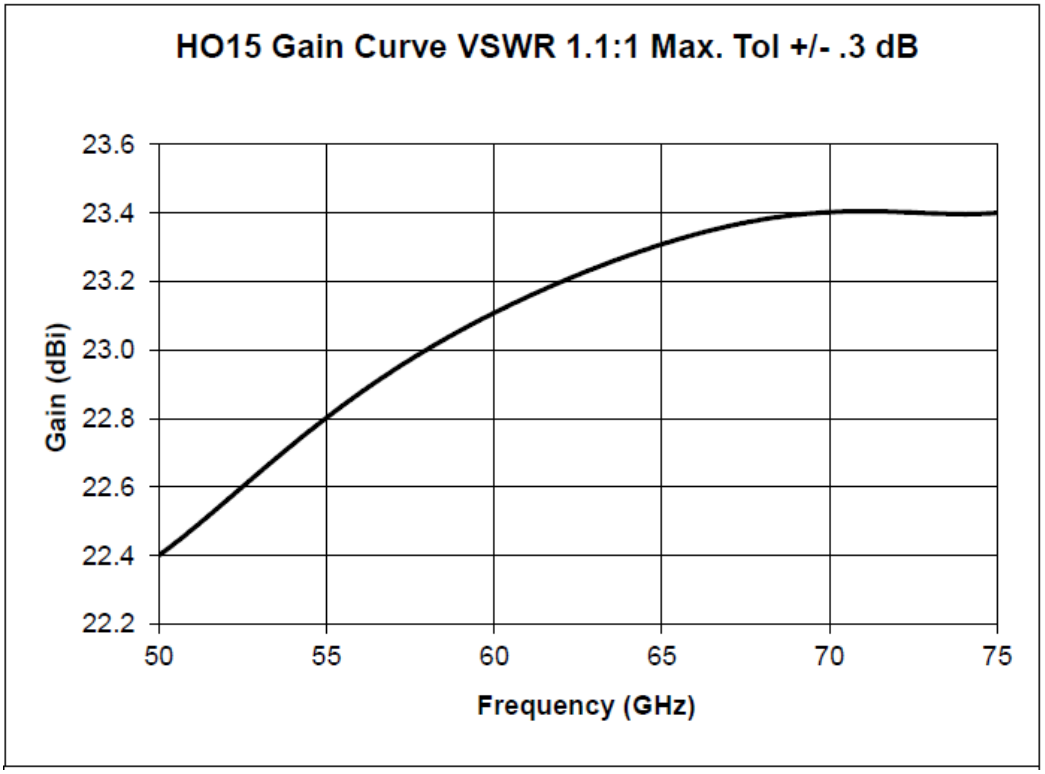
ANSI C63.5: 2006 - Standard Site Method, Equations 1-6 [3-antenna procedure]

Corrected Reading (dBµV/m) = **Meter Reading** (dBµV) + **AFE**(dB/m)

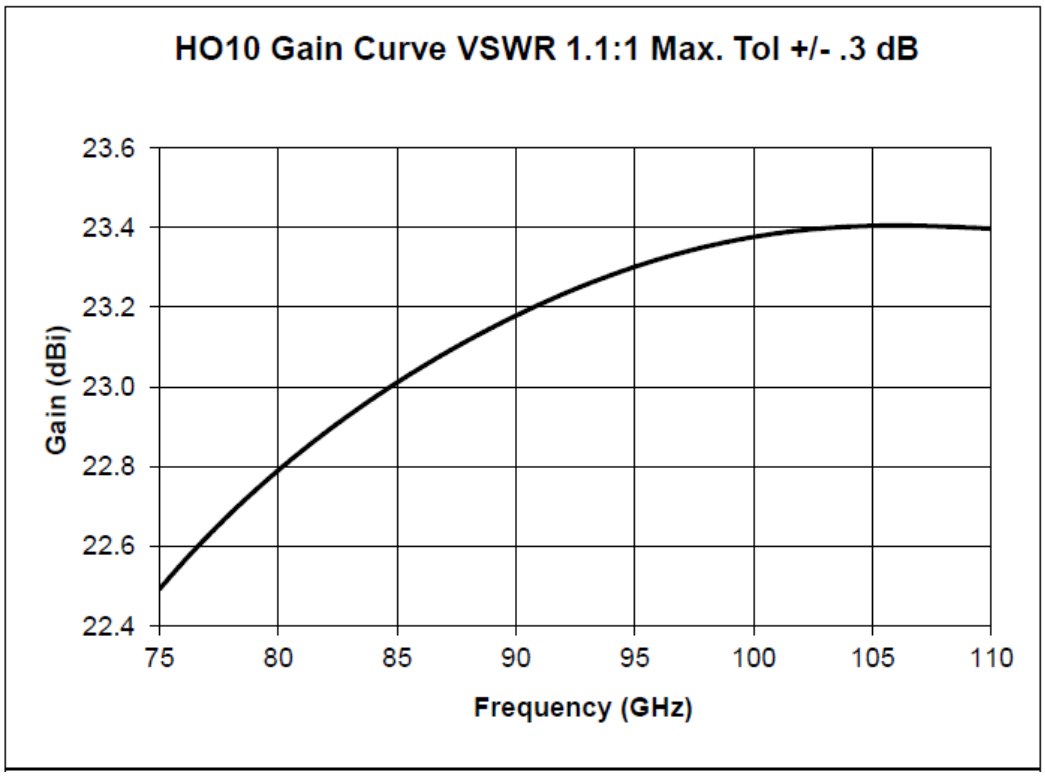
35-50 GHz CMI HO22R HORN ANTENNA



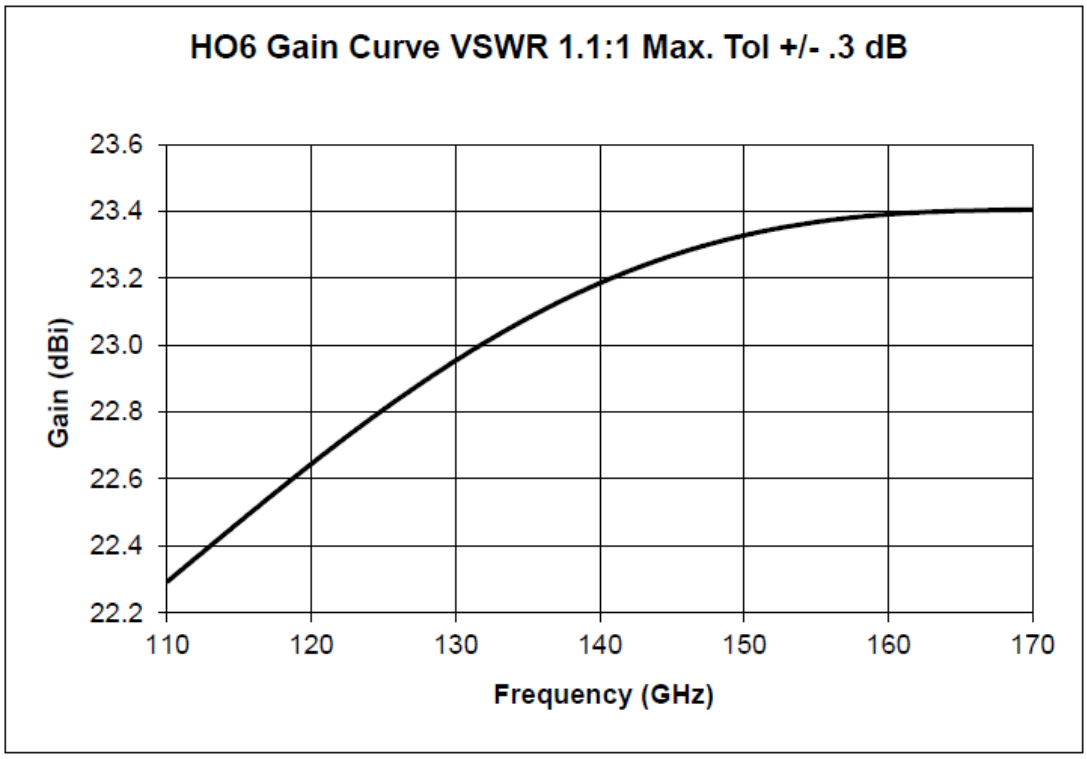
50-75 GHz CMI HO15R HORN ANTENNA



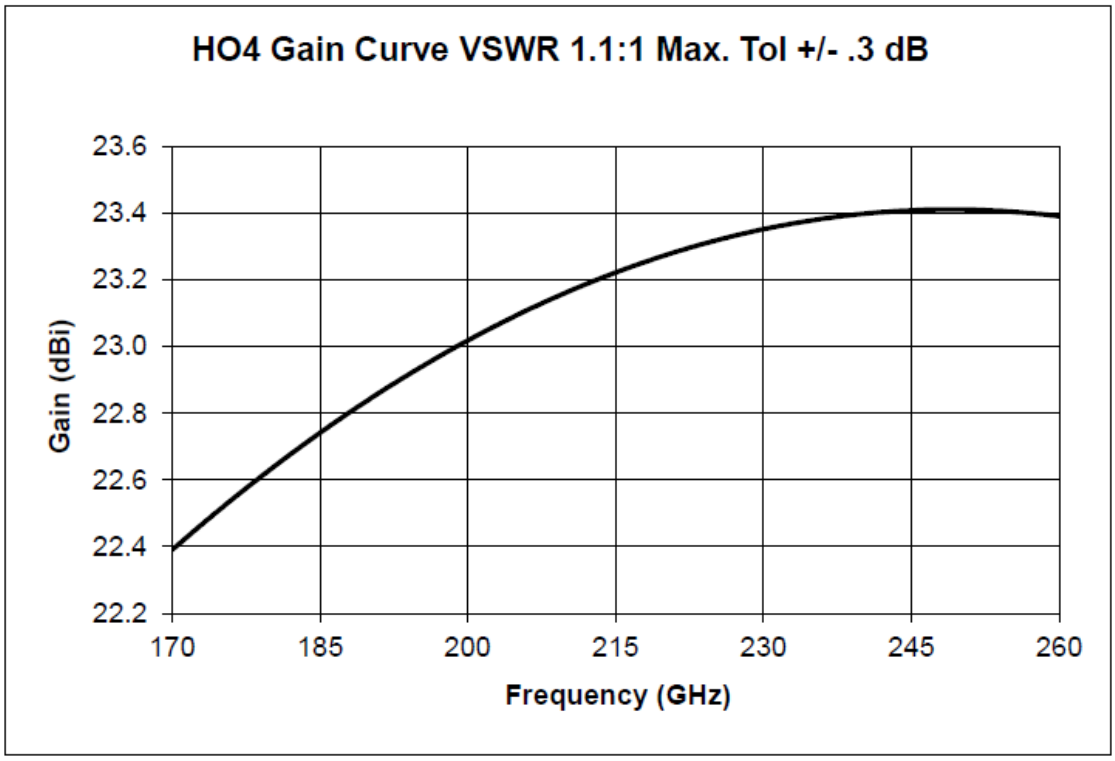
75-110 GHz CMI HO10R HORN ANTENNA



110-170 GHz CMI HO6 HORN ANTENNA



170-200 GHz CMI HO4 HORN ANTENNA



LABORATORY ACCREDITATION

Accredited Laboratory

A2LA has accredited

UL LLC

Research Triangle Park, North Carolina

for technical competence in the field of

Electrical Testing

This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 *General requirements for the competence of testing and calibration laboratories*. This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (*refer to joint ISO-ILAC-IAF Communiqué dated April 2017*).

Presented this 3rd day of May 2022.

Trace McInturff, Vice President, Accreditation Services
For the Accreditation Council
Certificate Number 0751.06
Valid to February 29, 2024

For the tests to which this accreditation applies, please refer to the laboratory's Electrical Scope of Accreditation.

END OF REPORT