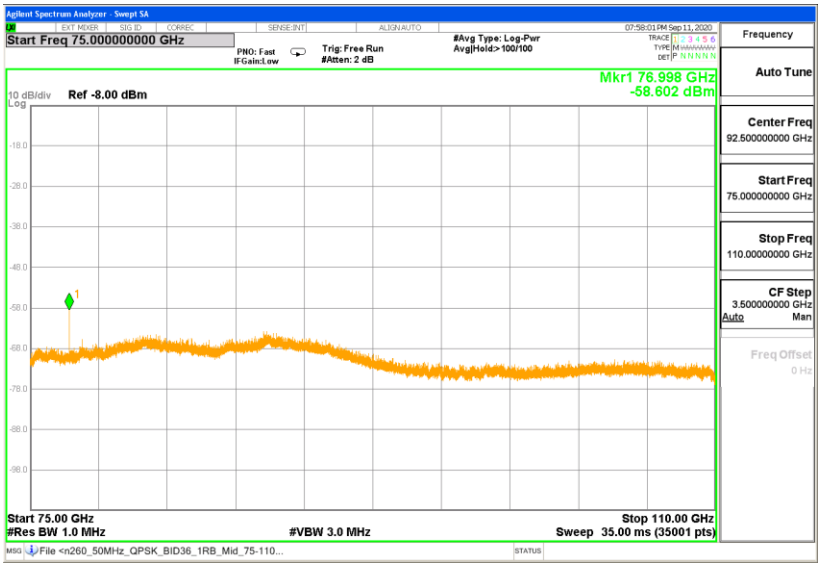
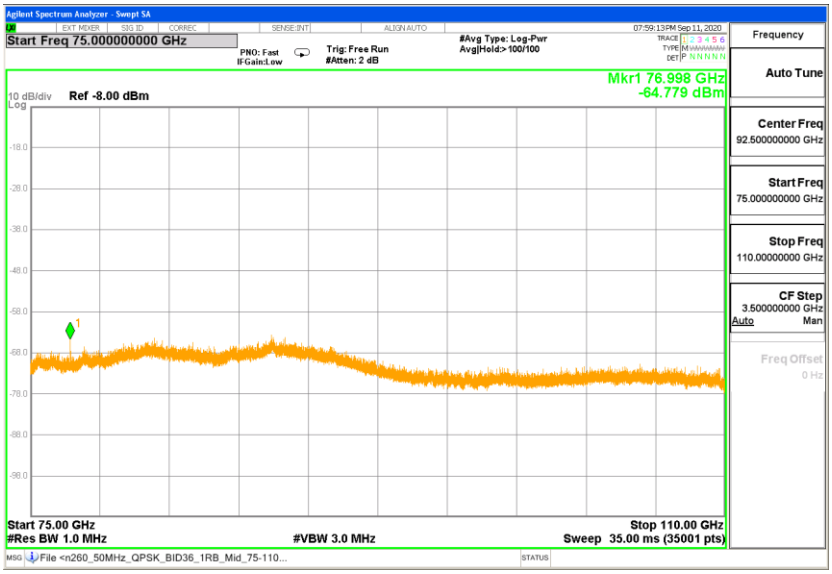
75-110 GHz – n260, ANT M2
Horizontal



75-110 GHz – n260, ANT M2
Vertical



Emissions detected using Peak Detection. Avg EIRP was measured.

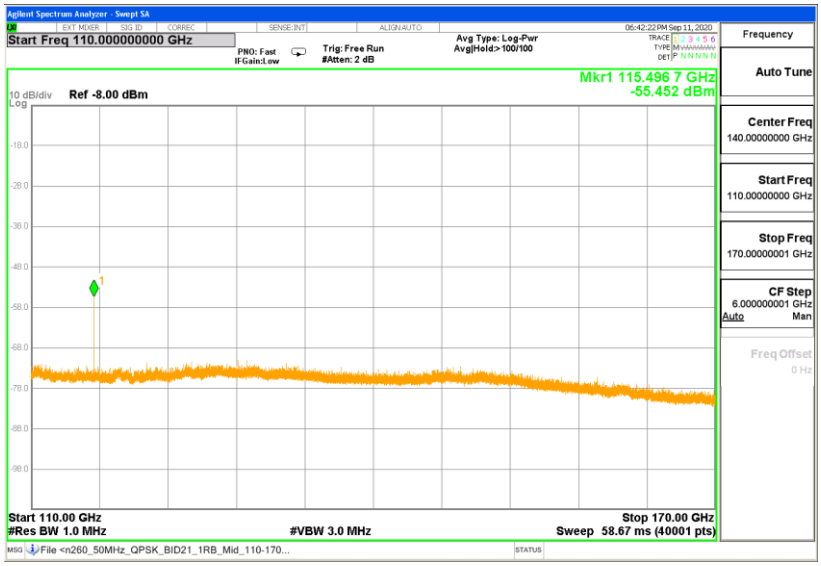
75-110 GHz n260

EIRP Results

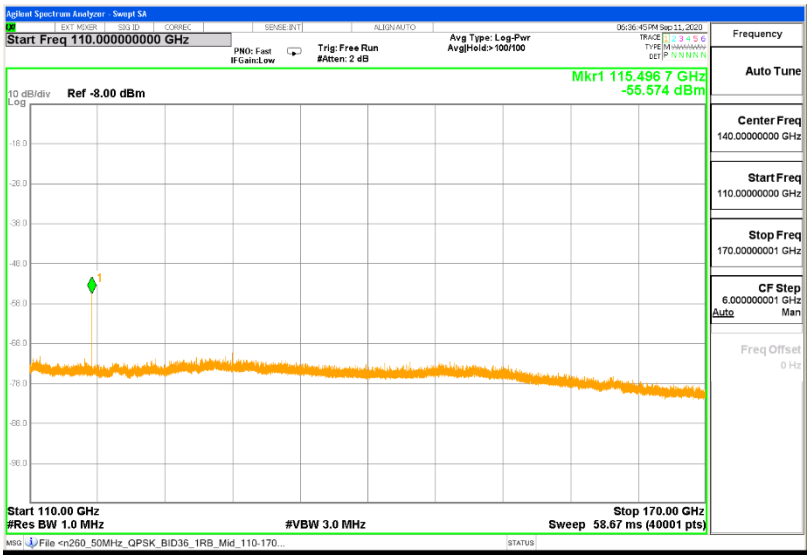
Antenna	Freq.	Meas. Distance	Rx Ant. Polarity	Corrected Avg EIRP	TRP Limit	Margin
	(GHz)	(m)	H/V	(dBm)	(dBm)	(dB)
M1	76.998	1	H	-44.84	-13	-31.84
M1	76.998	1	V	-49.43	-13	-36.43
M2	76.998	1	H	-30.36	-13	-17.36
M2	76.998	1	V	-42.64	-13	-29.64

8.4.8. RADIATED EMISSIONS 110-170 GHz n260

110-170 GHz – n260, ANT M1
Horizontal

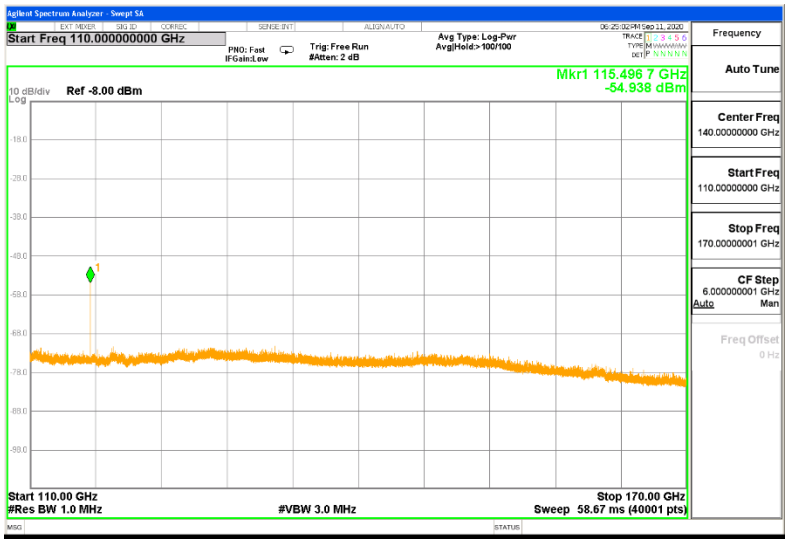


110-170 GHz – n260, ANT M1
Vertical

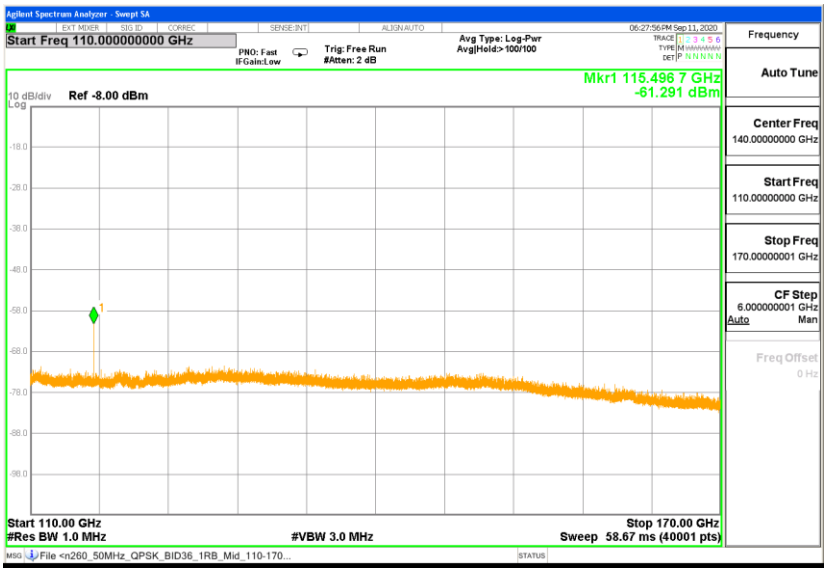


Emissions detected using Peak Detection. Avg EIRP was measured.

110-170 GHz – n260, ANT M2
Horizontal



110-170 GHz – n260, ANT M2
Vertical



Emissions detected using Peak Detection. Avg EIRP was measured.

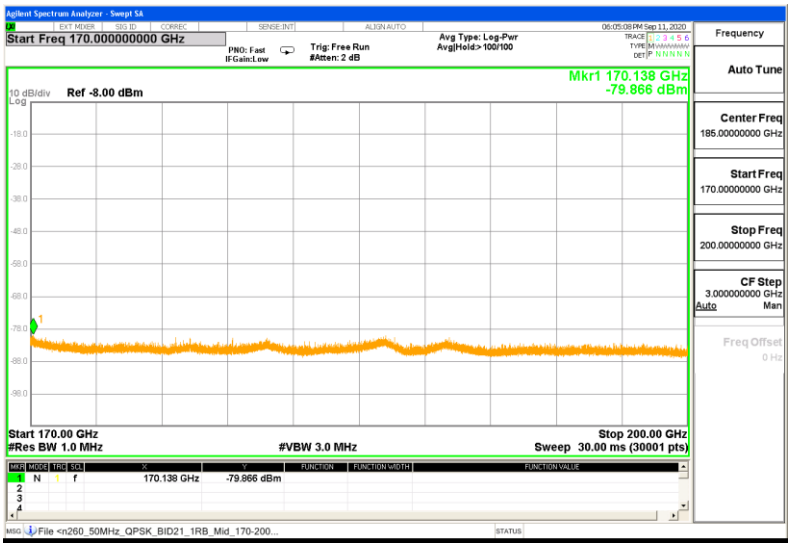
110-170 GHz n260

EIRP Results

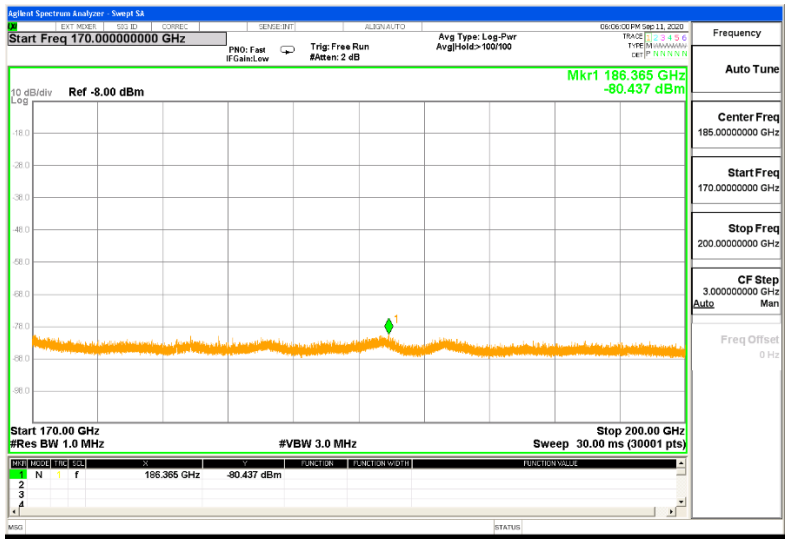
Antenna	Freq.	Meas. Distance	Rx Ant. Polarity	Corrected Avg EIRP	TRP Limit	Margin
	(GHz)	(m)	H/V	(dBm)	(dBm)	(dB)
M1	115.50	1	H	-33.10	-13	-20.10
M1	115.50	1	V	-41.97	-13	-28.97
M2	115.50	1	H	-36.47	-13	-23.47
M2	115.50	1	V	-27.12	-13	-14.12

8.4.9. RADIATED EMISSIONS 170-200 GHz n260

170-200 GHz – n260, ANT M1
Horizontal



170-200 GHz – n260, ANT M1
Vertical



No Emission using Peak Detection.

170-200 GHz – n260, ANT M2
Horizontal

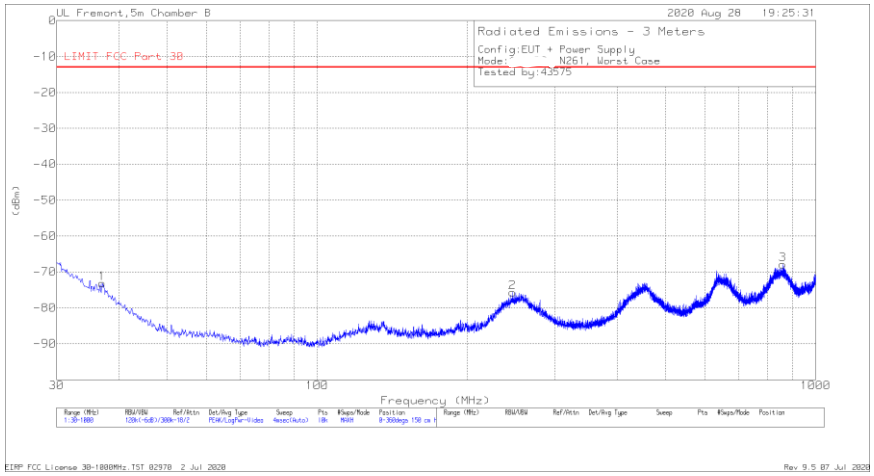
170-200 GHz – n260, ANT M2
Vertical

No Emission using Peak Detection.

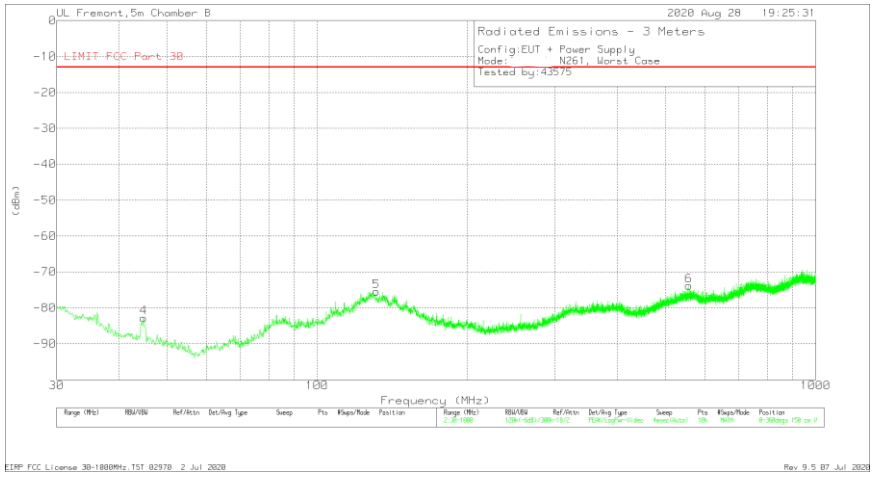
8.4.10. RADIATED EMISSIONS 30 MHz - 1 GHz n261

30MHz-1000MHz – n261, ANT M1

Horizontal



Vertical



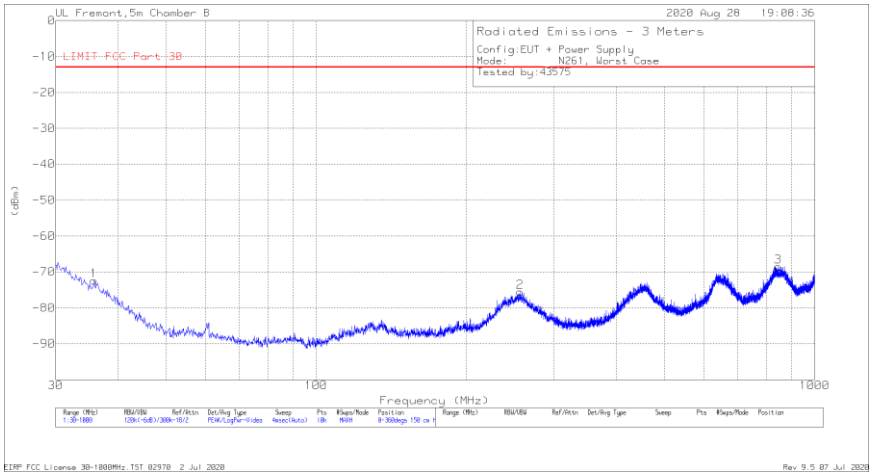
Trace Markers

Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T407 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT FCC Part 30 (dBm/MHz)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	36.984	-79.31	Pk	22	-31.3	15.4	-73.21	-13	-60.21	0-360	150	H
4	44.841	-74.89	Pk	16.3	-31.2	7	-82.79	-13	-69.79	0-360	150	V
5	131.365	-79.35	Pk	19.5	-30.4	14.8	-75.45	-13	-62.45	0-360	150	V
2	246.698	-79.13	Pk	17.5	-29.8	15.7	-75.73	-13	-62.73	0-360	150	H
6	556.613	-78.27	Pk	24.1	-28.9	9.3	-73.77	-13	-60.77	0-360	150	V
3	859.253	-79.59	Pk	27.7	-27.2	11.2	-67.89	-13	-54.89	0-360	150	H

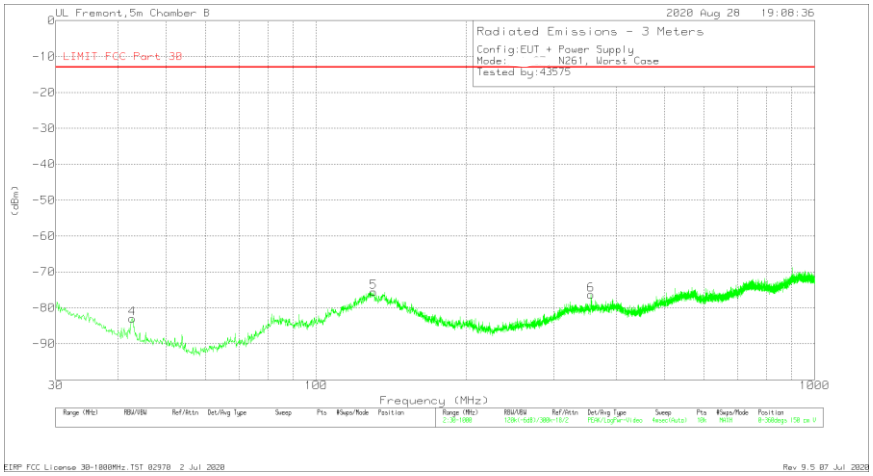
Pk - Peak detector
Rev 9.5 07 Jul 2020

30MHz-1000MHz – n261, ANT M2

Horizontal



Vertical



Trace Markers

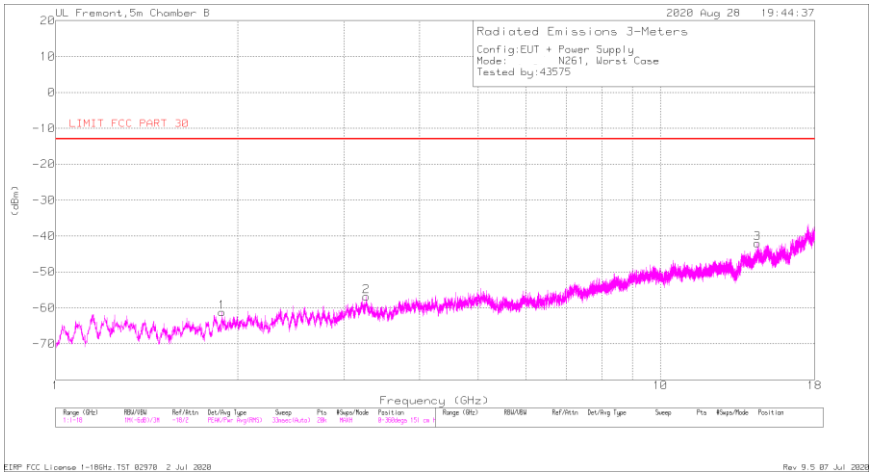
Marker	Frequency (MHz)	Meter Reading (dBm)	Det	AF T407 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT FCC Part 30 (dBm/MHz)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	35.82	-79	Pk	22.8	-31.4	15.2	-72.4	-13	-59.4	0-360	150	H
4	42.707	-76.02	Pk	17.7	-31.2	6.5	-83.02	-13	-70.02	0-360	150	V
5	130.298	-79.83	Pk	19.5	-30.4	15.2	-75.53	-13	-62.53	0-360	150	V
2	256.495	-79.42	Pk	17.5	-29.8	16.2	-75.52	-13	-62.52	0-360	150	H
6	356.017	-77.49	Pk	20.5	-29.4	10.1	-76.29	-13	-63.29	0-360	150	V
3	845.479	-79.91	Pk	27.7	-27.4	11.1	-68.51	-13	-55.51	0-360	150	H

Pk - Peak detector
Rev 9.5 07 Jul 2020

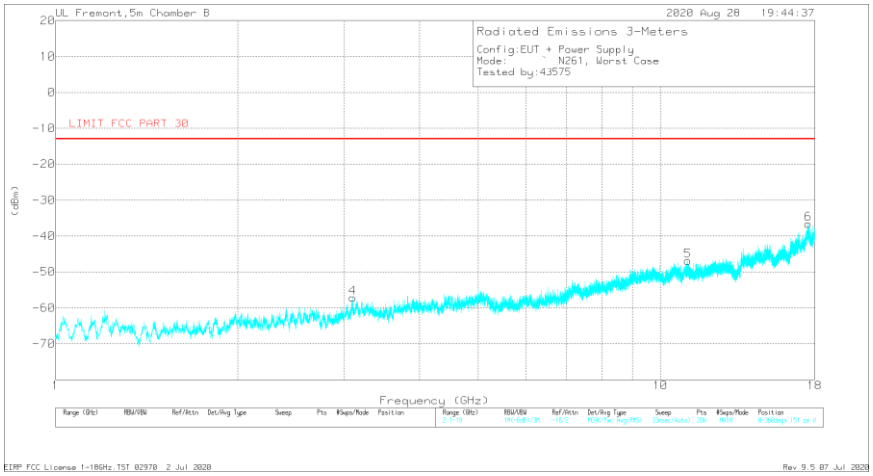
8.4.11. RADIATED EMISSIONS 1-18 GHz n261

1GHz – 18GHz – N261, ANT M1

Horizontal



Vertical



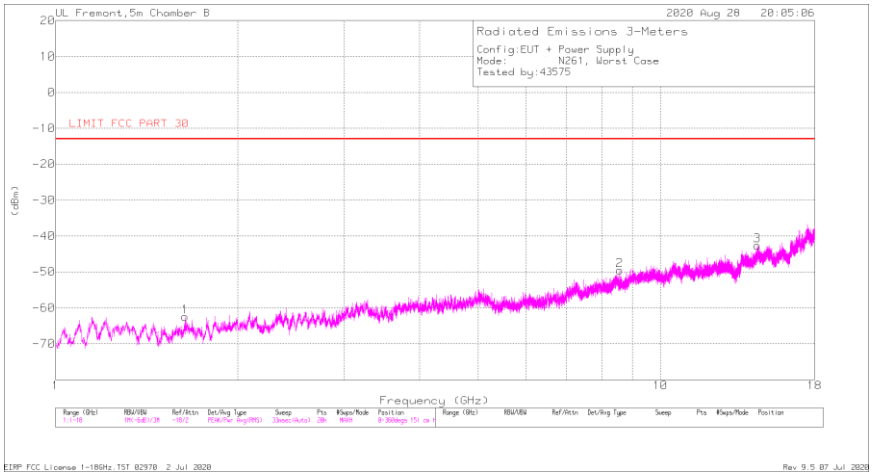
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT FCC Part 30 (dBm/MHz)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.88574	-68.13	Pk	26.1	-30	10.8	-61.23	-13	-48.23	0-360	151	H
4	3.10046	-69.86	Pk	30.5	-28.4	10.6	-57.16	-13	-44.16	0-360	151	V
2	3.26366	-70.38	Pk	31.4	-28.3	10.4	-56.88	-13	-43.88	0-360	151	H
5	11.10956	-74.85	Pk	39.2	-19.7	8.4	-46.95	-13	-33.95	0-360	151	V
3	14.48253	-73.06	Pk	41.5	-21.3	10.9	-41.96	-13	-28.96	0-360	151	H
6	17.58009	-75.51	Pk	43	-15.8	11.7	-36.61	-13	-23.61	0-360	151	V

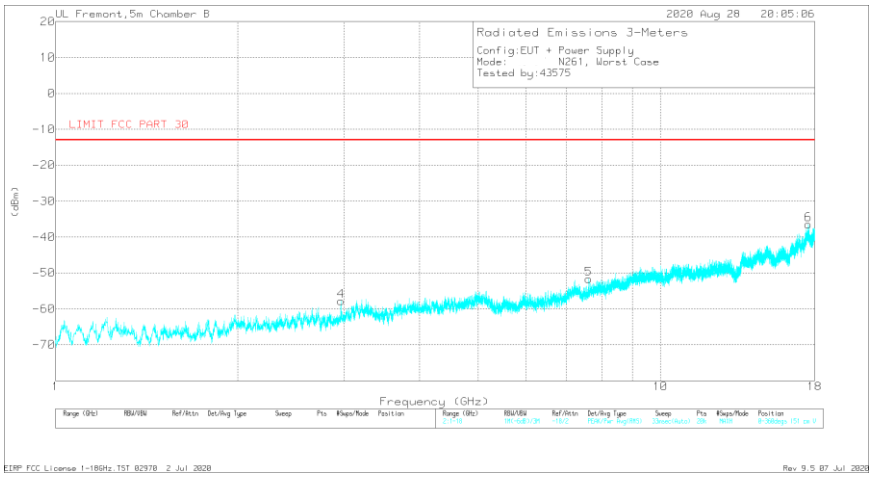
Pk - Peak detector
Rev 9.5 07 Jul 2020

1GHz – 18GHz – N261, ANT M2

Horizontal



Vertical



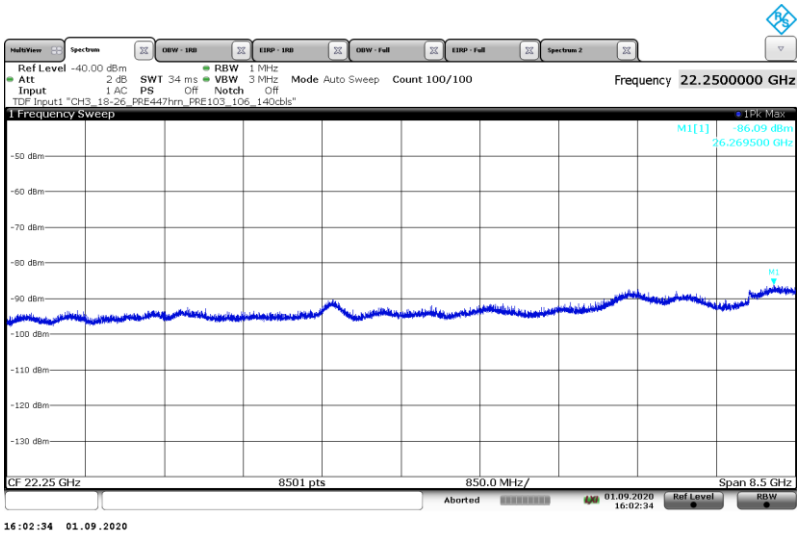
Trace Markers

Marker	Frequency (GHz)	Meter Reading (dBm)	Det	AF T962 (dB/m)	Amp/Cbl (dB)	Amp/Cbl (dB)	Corrected Reading (dBm)	LIMIT FCC Part 30 (dBm/MHz)	Margin (dB)	Azimuth (Degs)	Height (cm)	Polarity
1	1.63583	-67.49	Pk	25	-30.5	10.5	-62.49	-13	-49.49	0-360	151	H
4	2.96445	-68.41	Pk	29.6	-28.6	9.6	-57.81	-13	-44.81	0-360	151	V
5	7.60738	-72.48	Pk	37	-23.7	7.5	-51.68	-13	-38.68	0-360	151	V
2	8.57048	-72.88	Pk	37.4	-22.3	8.2	-49.58	-13	-36.58	0-360	151	H
3	14.46723	-73.59	Pk	41.4	-21.4	11	-42.59	-13	-29.59	0-360	151	H
6	17.56989	-74.85	Pk	42.9	-15.9	11.4	-36.45	-13	-23.45	0-360	151	V

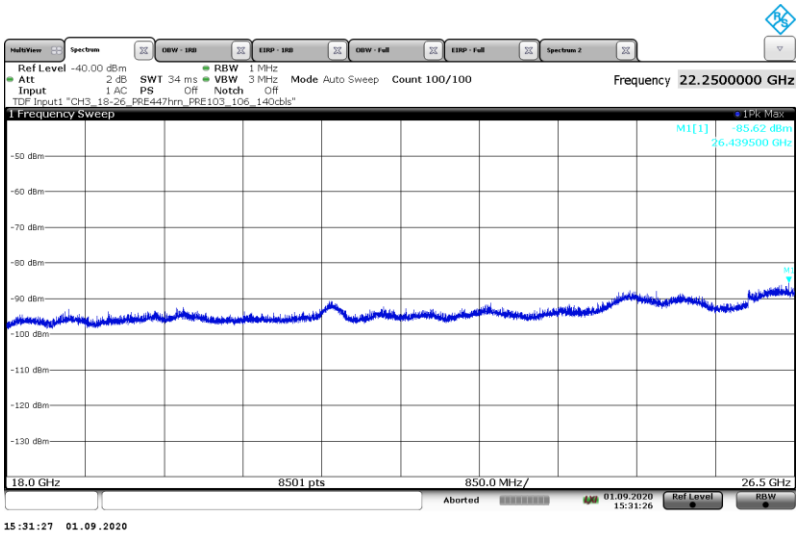
Pk - Peak detector
Rev 9.5 07 Jul 2020

8.4.12. RADIATED EMISSIONS 18-26.5 GHz n261

18-26.5 GHz – N261, ANT M1
Horizontal

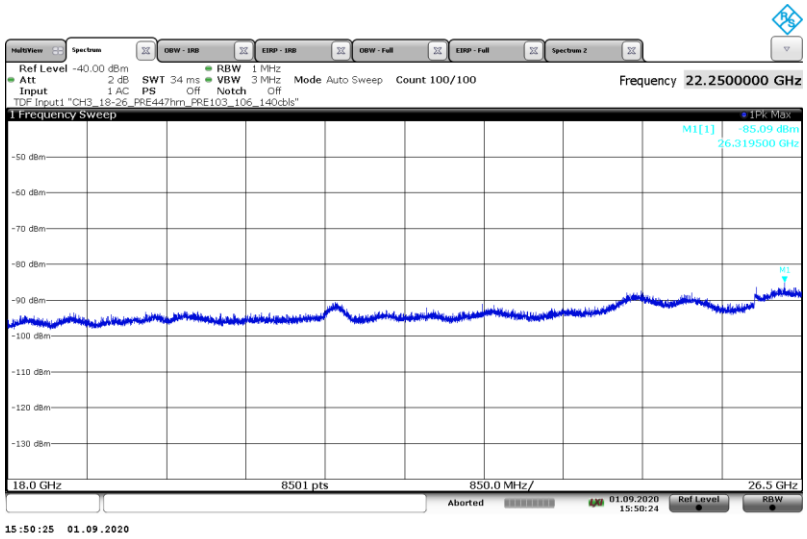


18-26.5 GHz – N261, ANT M1
Vertical

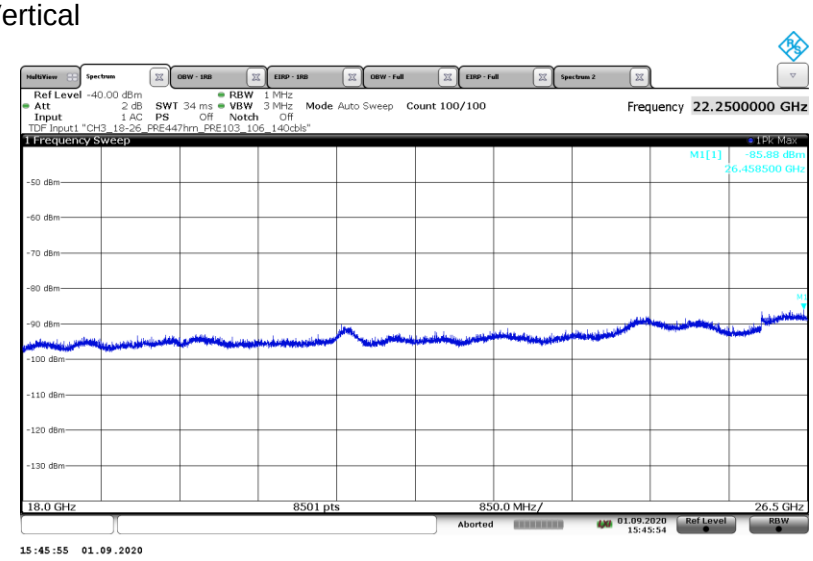


No Emission using Peak Detection.

18-26.5 GHz – N261, ANT M2
Horizontal



18-26.5 GHz – N261, ANT M2
Vertical

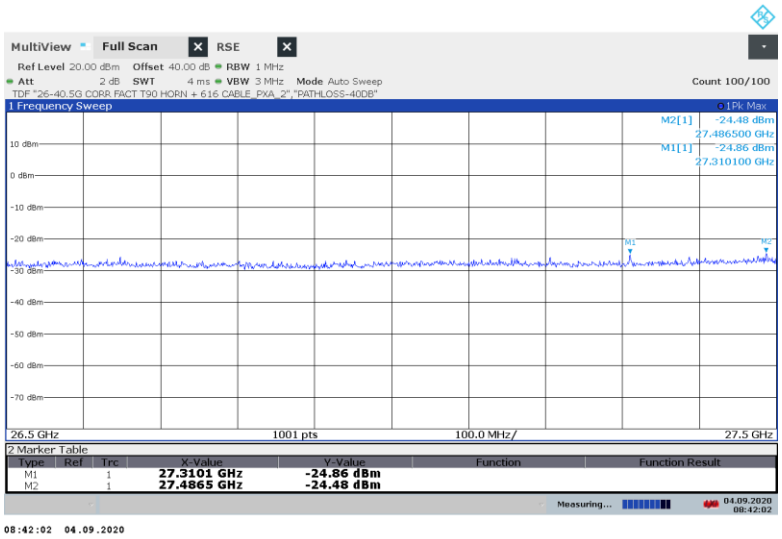


No Emission using Peak Detection.

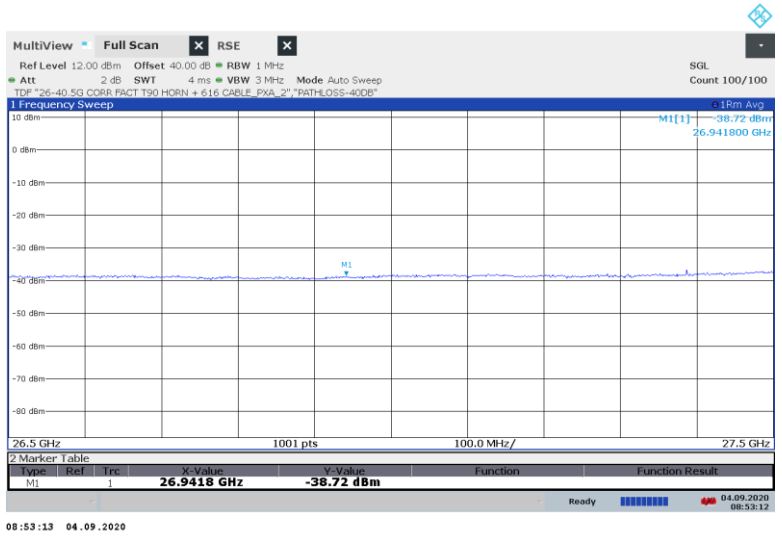
8.4.13. RADIATED EMISSIONS 26.5-27.5 GHz n261

Note: 27.5-28.35 GHz covered by Fundamental and BE measurements.

26.5-27.5 GHz – N261 ANT M1
Horizontal

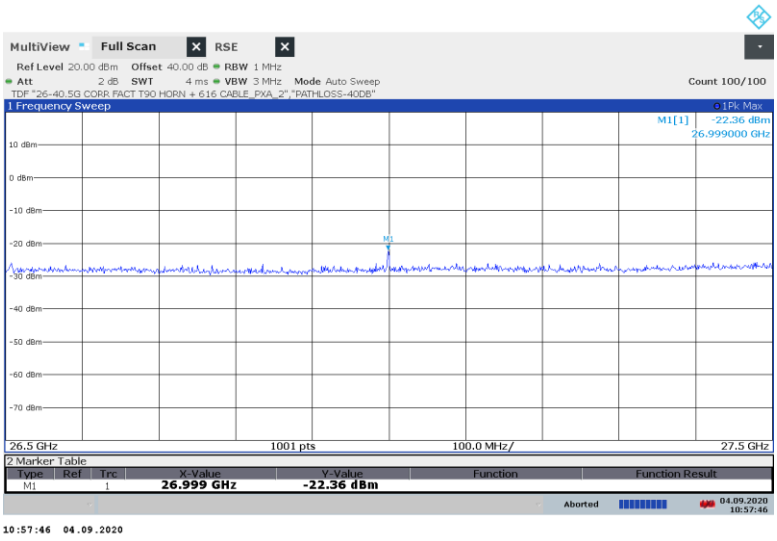


26.5-27.5 GHz – N261 ANT M1
Vertical



Emission detected using Peak Detection. Avg EIRP was measured.

26.5-27.5 GHz – N261, ANT M2
Horizontal



26.5-27.5 GHz – N261, ANT M2
Vertical

Emission detected using Peak Detection. Avg EIRP was measured.

26.5-27.5 GHz n261

EIRP RESULTS, 1CC

Antenna	Freq.	Meas. Distance	Rx Ant. Polarity	Corrected Avg EIRP	TRP Limit	Margin
		(m)	H/V	(dBm)	(dBm)	(dB)
M1	27.310	3	H	-34.03	-13.00	-21.03
M2	26.999	3	H	-28.46	-13.00	-15.46

26.5-27.5 GHz – N261, ANT M1, 2CC

Emissions detected using Peak Detection. Avg EIRP was measured on highest emission.

EIRP RESULTS, 2CC

Worst case configuration:
SISO-DUAL_QPSK_(50 MHz +50 MHz)_Low CH_RB Offset 1/15 (1RB-M)

Highest emission in this band was investigated.

Antenna	Freq.	Meas. Distance	Rx Ant. Polarity	Corrected Avg EIRP	TRP Limit	Margin
	(GHz)	(m)	H/V	(dBm)	(dBm)	(dB)
M1	27.4745	3	V	-18.58	-13	-5.58

26.5-27.5 GHz – N261, ANT M2, 2CC

Emissions detected using Peak Detection. Avg EIRP and TRP were measured on highest emission.

EIRP RESULTS, 2CC

Worst case configuration:
SISO-DUAL_QPSK_(100 MHz + 100 MHz)_Low CH_RB Offset 1/32 (1RB-M)

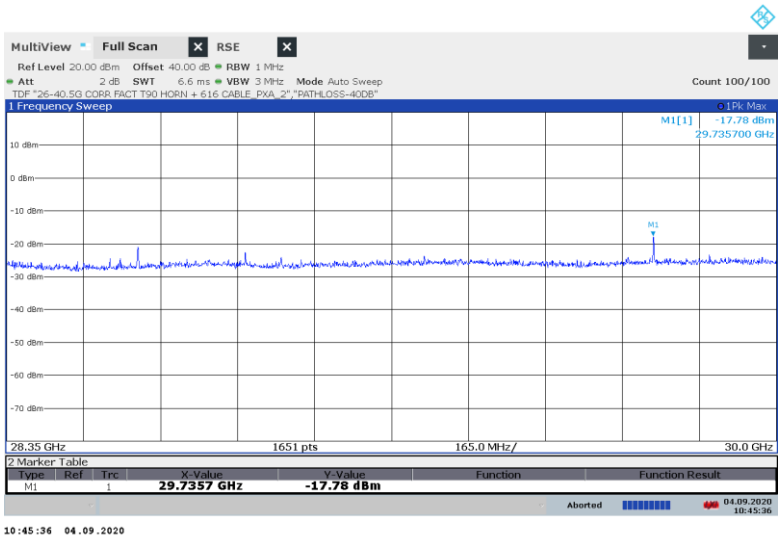
Highest emission in this band was investigated.

Antenna	Freq.	Meas. Distance	Rx Ant. Polarity	Corrected Avg EIRP	Meas. TRP	TRP Limit	Margin
	(GHz)	(m)	H/V	(dBm)	(dBm)	(dBm)	(dB)
M2	27.4496	3	H	-13.19	-	-13	-0.19
M2	27.4496	3	-	-	-20.18	-13	-7.18

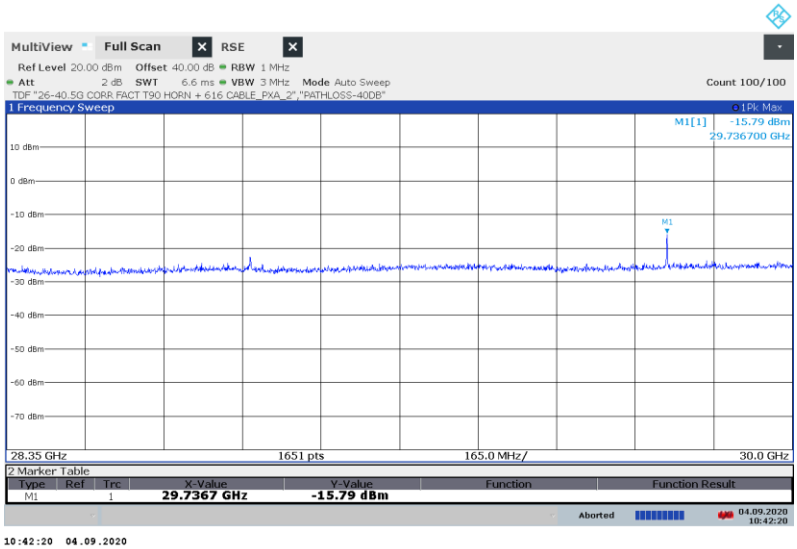
8.4.14. RADIATED EMISSIONS 28.35-30 GHz n261

Note: 27.5-28.35 GHz covered by Fundamental and BE measurements.

28.35-30 GHz – N261, ANT M1
Horizontal

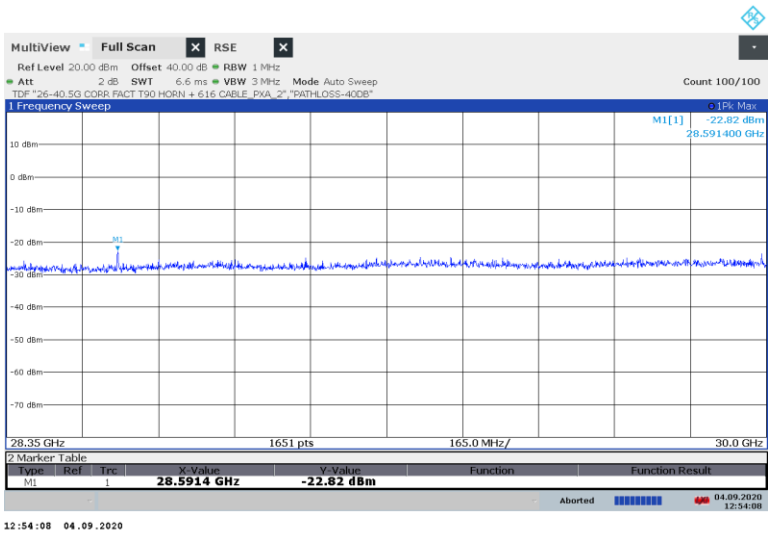


28.35-30 GHz – N261, ANT M1
Vertical

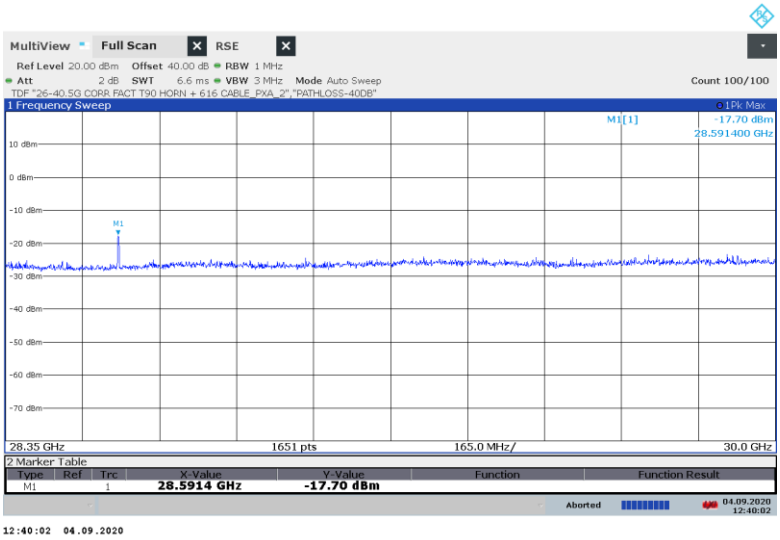


Emissions detected using Peak Detection. Avg EIRP was measured.

28.35-30 GHz – N261, ANT M2
Horizontal



28.35-30 GHz – N261, ANT M2
Vertical



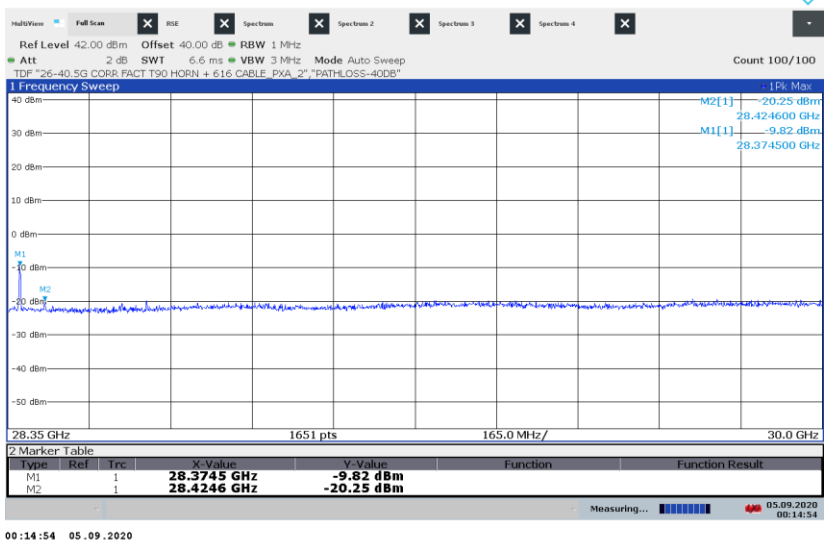
Emissions detected using Peak Detection. Avg EIRP was measured.

28.35-30 GHz n261

EIRP Results

Antenna	Freq.	Meas. Distance	Rx Ant. Polarity	Corrected Avg EIRP	TRP Limit	Margin
		(m)	H/V	(dBm)	(dBm)	(dB)
M1	29.737	3	H	-19.55	-13.00	-6.55
M1	29.737	3	V	-28.35	-13.00	-15.35
M2	28.591	3	H	-30.01	-13.00	-17.01
M2	28.591	3	V	-22.00	-13.00	-9.00

28.35-30 GHz – N261, ANT M1, 2CC



Emissions detected using Peak Detection. Avg EIRP was measured on highest emission.

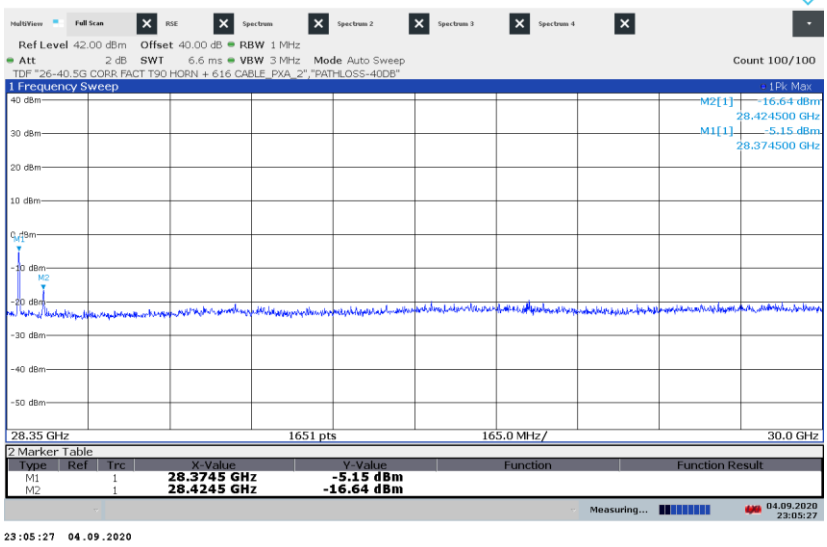
EIRP RESULTS, 2CC

Worst case configuration:
SISO-DUAL_QPSK_(50 MHz +50 MHz)_High CH_RB Offset 1/15 (1RB-M)

Highest emission in this band was investigated.

Antenna	Freq.	Meas. Distance	Rx Ant. Polarity	Corrected Avg EIRP	TRP Limit	Margin
	(GHz)	(m)	H/V	(dBm)	(dBm)	(dB)
M1	28.3741	3	H	-20.19	-13	-7.19

28.35-30 GHz – N261, ANT M2, 2CC



Emissions detected using Peak Detection. Avg EIRP and TRP were measured on highest emission.

EIRP RESULTS, 2CC

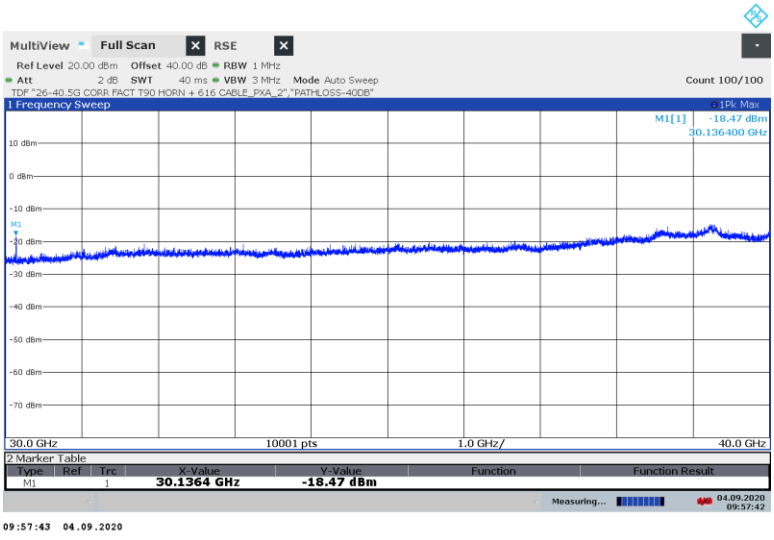
Worst case configuration:
SISO-DUAL_QPSK_(50 MHz + 50 MHz)_High CH_RB Offset 1/15 (1RB-M)

Highest emission in this band was investigated.

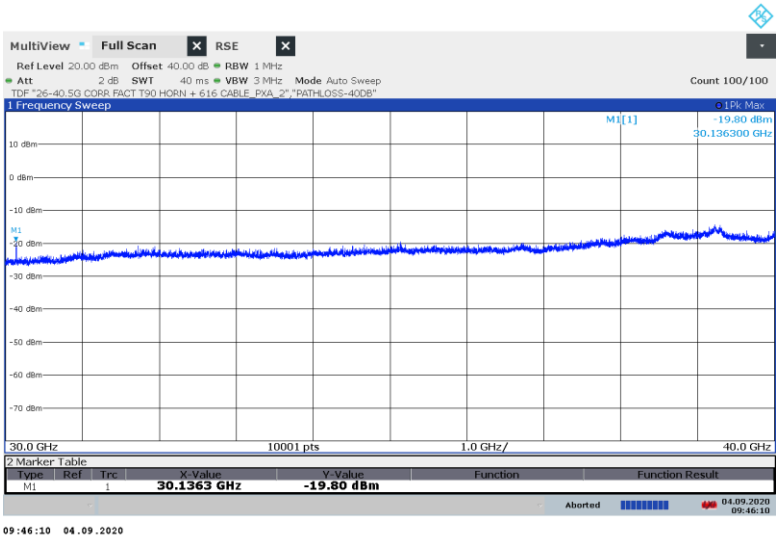
Antenna	Freq.	Meas. Distance	Rx Ant. Polarity	Corrected Avg EIRP	Meas. TRP	TRP Limit	Margin
	(GHz)	(m)	H/V	(dBm)	(dBm)	(dBm)	(dB)
M2	28.3741	3	H	-13.88	-	-13	-0.88
M2	28.3741	3	-	-	-20.36	-13	-7.36

8.4.15. RADIATED EMISSIONS 30-40 GHz n261

30-40 GHz – N261, ANT M1
Horizontal

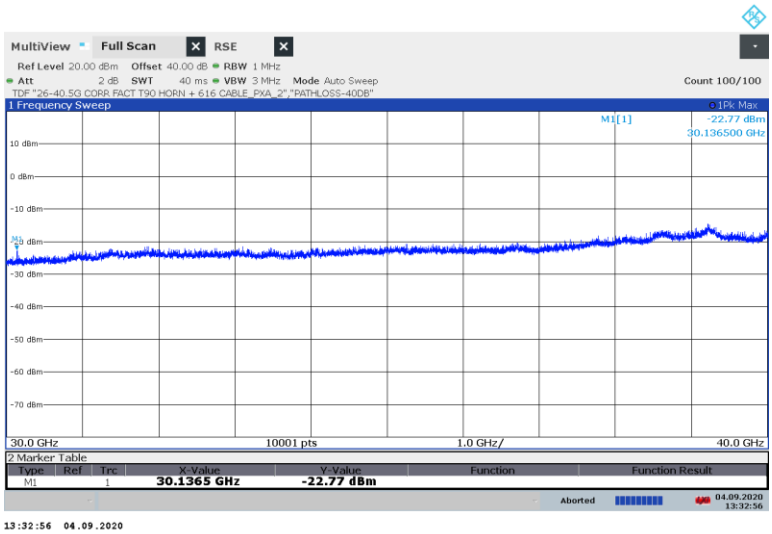


30-40 GHz – N261, ANT M1
Vertical

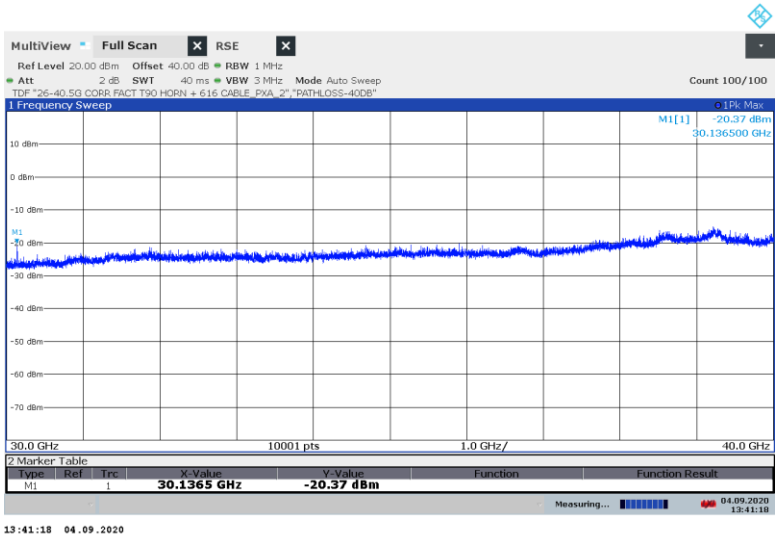


Emissions detected using Peak Detection. Avg EIRP was measured.

30-40 GHz – N261, ANT M2
Horizontal



30-40 GHz – N261, ANT M2
Vertical



Emissions detected using Peak Detection. Avg EIRP was measured.

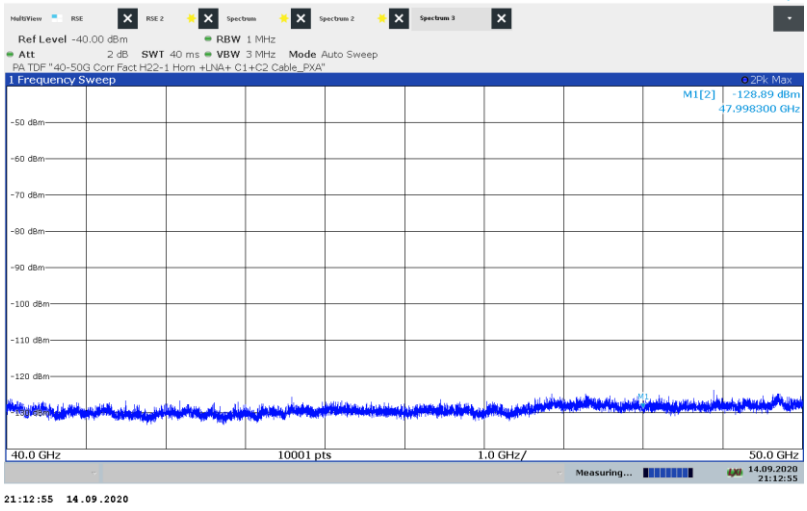
30-40 GHz n261

EIRP Results

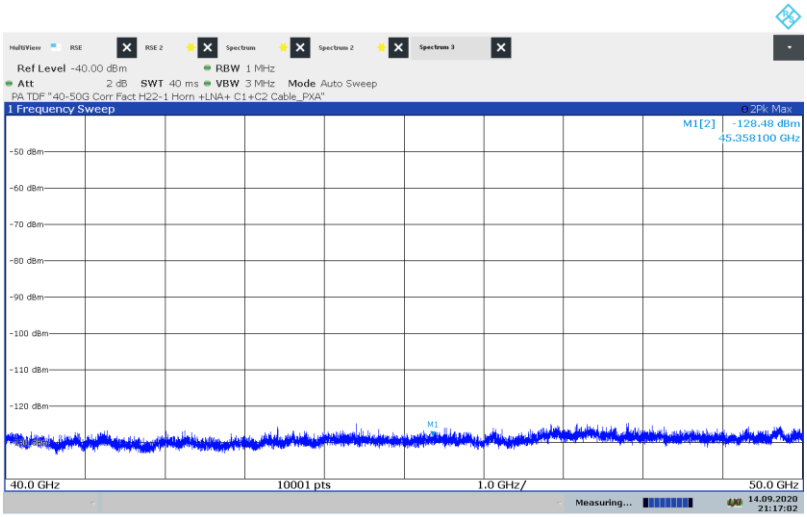
Antenna	Freq.	Meas. Distance	Rx Ant. Polarity	Corrected Avg EIRP	TRP Limit	Margin
	(GHz)	(m)	H/V	(dBm)	(dBm)	(dB)
M1	30.137	3	H	-24.05	-13	-11.05
M1	30.137	3	V	-19.56	-13	-6.56
M2	30.137	3	H	-24.35	-13	-11.35
M2	30.137	3	V	-27.87	-13	-14.87

8.4.16. RADIATED EMISSIONS 40-50 GHz n261

40-50 GHz – n261, ANT M1
Horizontal

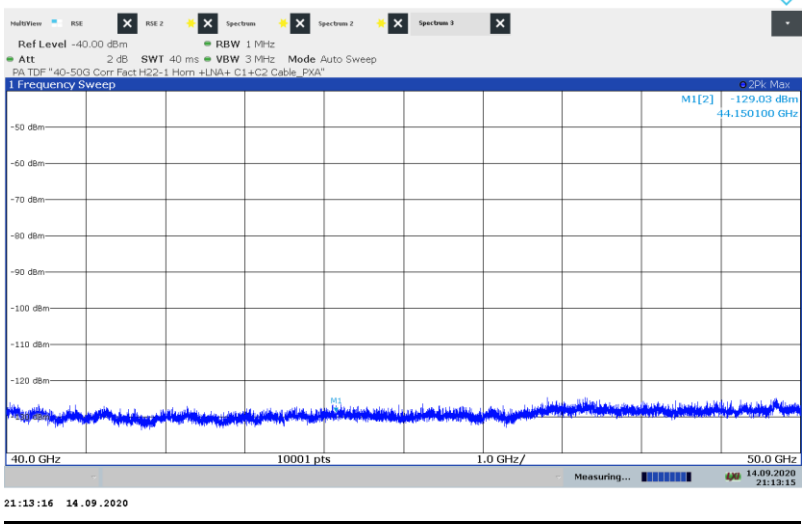


40-50 GHz – n261, ANT M1
Vertical

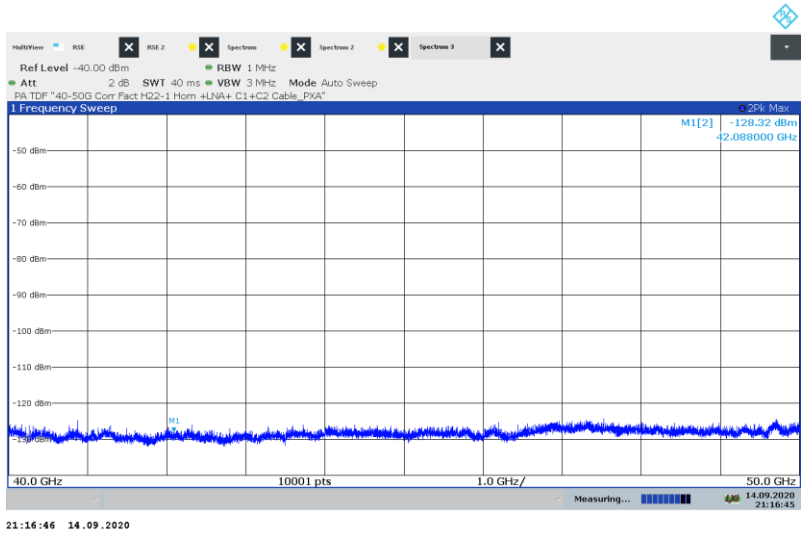


No Emission using Peak Detection.

40-50 GHz – n261, ANT M2
Horizontal



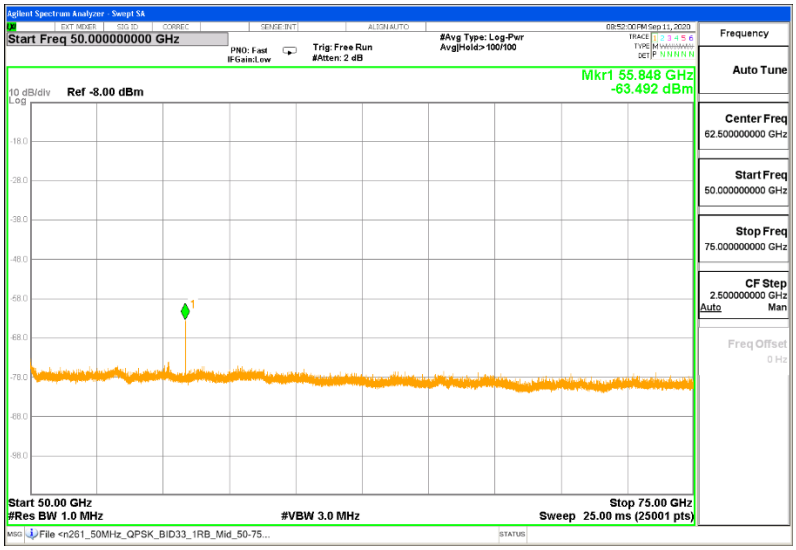
40-50 GHz – n261, ANT M2
Vertical



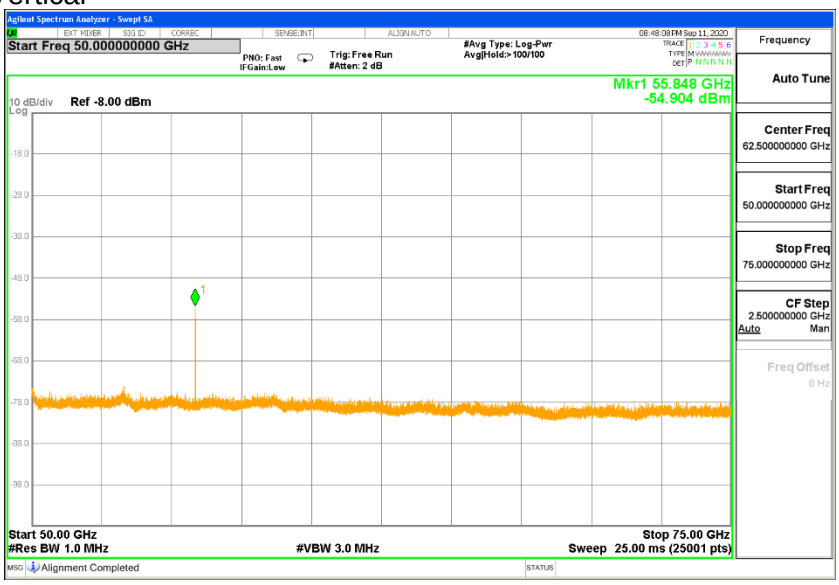
No Emission using Peak Detection.

8.4.17. RADIATED EMISSIONS 50-75 GHz n261

50-75 GHz – N261, ANT M1
Horizontal

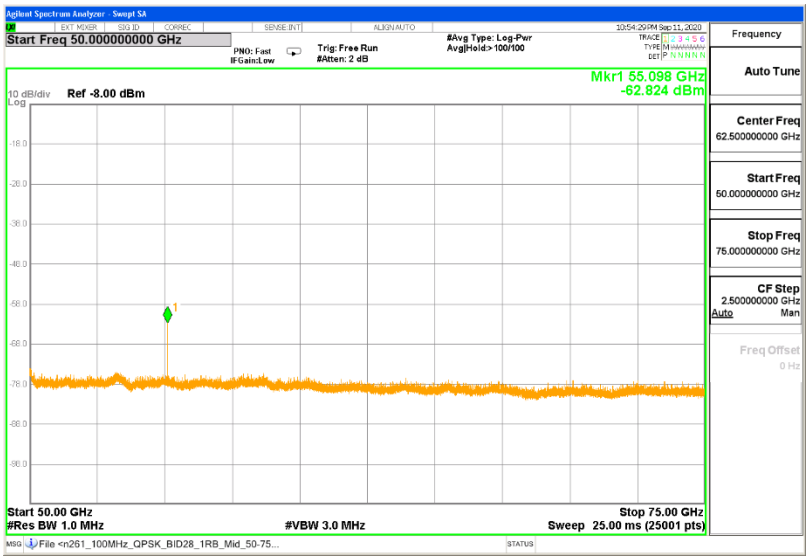


50-75 GHz – N261, ANT M1
Vertical

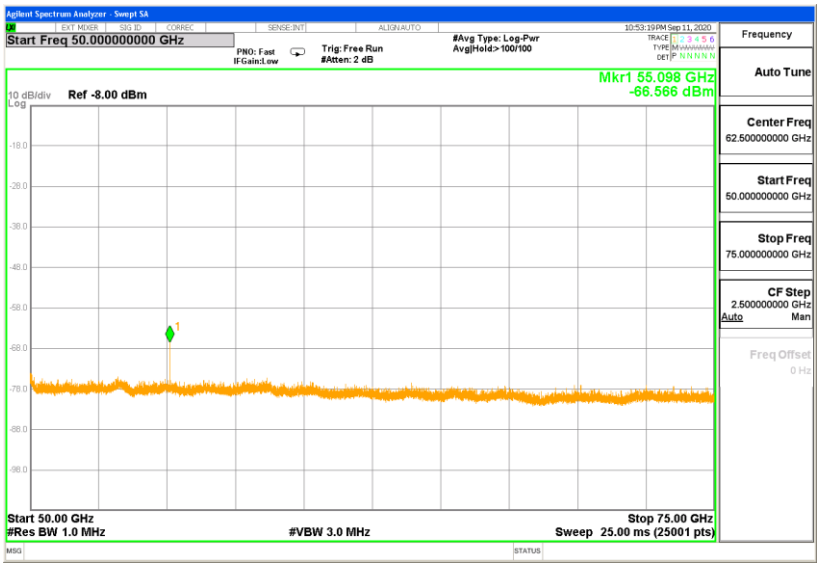


Emissions detected using Peak Detection. Avg EIRP was measured.

50-75 GHz – N261, ANT M2
Horizontal



50-75 GHz – N261, ANT M2
Vertical



Emissions detected using Peak Detection. Avg EIRP was measured.

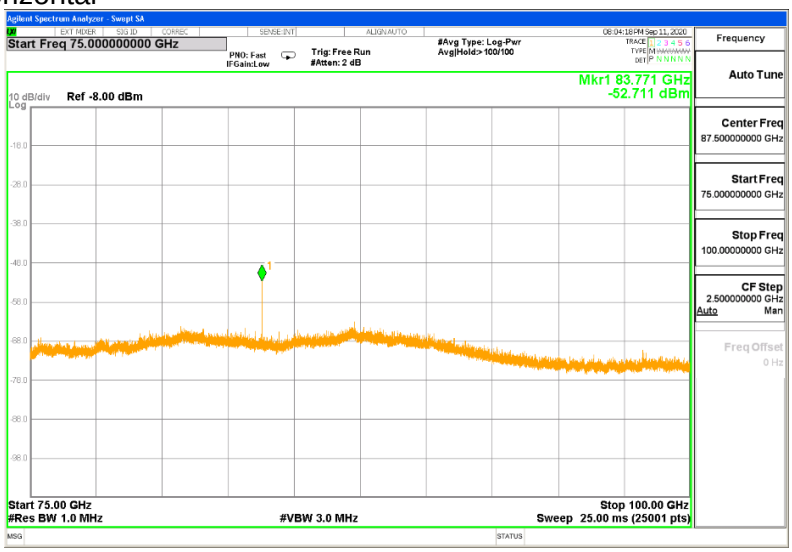
50-75 GHz n261

EIRP Results

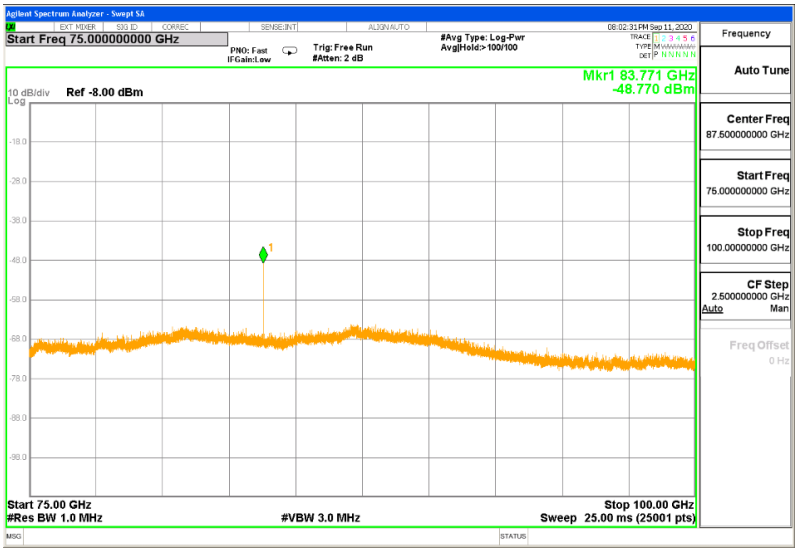
Antenna	Freq.	Meas. Distance	Rx Ant. Polarity	Corrected Avg EIRP	TRP Limit	Margin
	(GHz)	(m)	H/V	(dBm)	(dBm)	(dB)
M1	55.848	1.5	V	-46.88	-13	-33.88
M1	55.848	1.5	H	-32.88	-13	-19.88
M2	55.098	1.5	H	-42.18	-13	-29.18
M2	55.098	1.5	V	-47.67	-13	-34.67

8.4.18. RADIATED EMISSIONS 75-100 GHz n261

75-100 GHz – N261, ANT M1
Horizontal

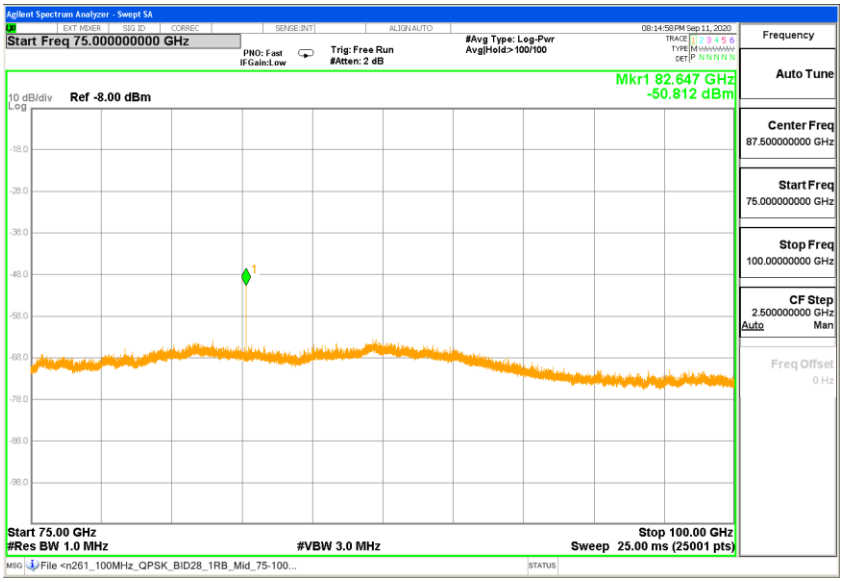


75-100 GHz – N261, ANT M1
Vertical

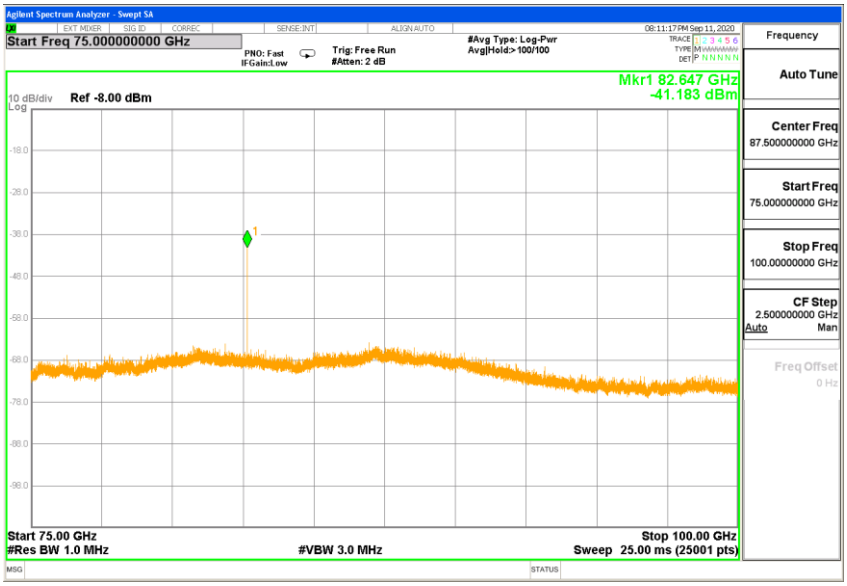


Emissions detected using Peak Detection. Avg EIRP was measured.

75-100 GHz – N261, ANT M2
Horizontal



75-100 GHz – N261, ANT M2
Vertical



Emissions detected using Peak Detection. Avg EIRP was measured.

75-100 GHz n261

EIRP Results

Antenna	Freq.	Meas. Distance	Rx Ant. Polarity	Corrected Avg EIRP	TRP Limit	Margin
	(GHz)	(m)	H/V	(dBm)	(dBm)	(dB)
M1	83.772	1	H	-36.62	-13	-23.62
M1	83.772	1	V	-38.28	-13	-25.28
M2	82.648	1	H	-36.50	-13	-23.50
M2	82.648	1	V	-21.40	-13	-8.40

8.5. 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: 3.8 VDC; Low: 3.23 VDC; High: 4.37 VDC.

The measurements were performed with the CW signal of the center frequency of n260 on antenna M1 and n261 bands on antenna M2, to represent Chipset 2 and Chipset 1 respectively.

RESULTS

See the following page.

TESTED BY:

Employee IDs: 19459 & 19437

RESULTS

			Antenna M1 _n260	
Input Voltage	**Environment**	**Freqency**	**Frequency**	**Delta**
	Temperature (ºC)	**(Hz)**	**(MHz)**	**(kHz)**
Normal	50	38504854644	38504.8546436	-25.022
Normal	40	38504809279	38504.8092792	-70.386
Normal	30	38504798123	38504.7981233	-81.542
Normal	***20***	***38504879666***	38504.8796656	***Reference***
Normal	10	38504929692	38504.9296916	50.026
Normal	0	38505068452	38505.0684517	188.786
Normal	-10	38505111609	38505.1116089	231.943
Normal	-20	38505173526	38505.1735256	293.860
Normal	-30	38505129692	38505.1296920	250.026
115%	20	38504822817	38504.8228168	-56.849
85%	20	38504819659	38504.8196586	-60.007

			Antenna M2 _n261	
Input Voltage	**Environment**	**Freqency**	**Frequency**	**Delta**
	Temperature (ºC)	**(Hz)**	**(MHz)**	**(kHz)**
Normal	50	27929923354	27929.9233540	21.086
Normal	40	27929836350	27929.8363500	-65.918
Normal	30	27929842621	27929.8426210	-59.647
Normal	***20***	***27929902268***	27929.9022680	***Reference***
Normal	10	27929994230	27929.9942300	91.962
Normal	0	27930047780	27930.0477800	145.512
Normal	-10	27930103314	27930.1033140	201.046
Normal	-20	27930111959	27930.1119590	209.691
Normal	-30	27930062529	27930.0625290	160.261
115%	20	27929910769	27929.9107690	8.501
85%	20	27929897462	27929.8974620	-4.806

9. SETUP PHOTOS

Please refer to 13179110-EP20V1for setup photos

END OF REPORT

APPENDIX A

1. 50-75 GHz VDI WR15.0SAX

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
47173 Benicia Street
Fremont, CA 94538
United States

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

Packing List No: 201834 **Today's Date:** 06/02/20
Shipping Date: 06/02/20 **PO Number:** 7862016682

Quantity Shipped	Unit	Description	Order-Job Number
1	EA	VDIWR15.0SAX WR15SAX / SN: SAX 620	20141A-01

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

2. 75-110 GHz VDI WR10.0SAX

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 Verification Services Inc.
47173 Benicia Street
Fremont, CA 94538
United States

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

Packing List No: 201833 **Today's Date:** 06/03/20
Shipping Date: 06/02/20 **PO Number:** 7862016682

Quantity Shipped	Unit	Description	Order-Job Number
1	EA	VDIWR10.0SAX WR10SAX - Spectrum Analyzer Extension Module; SN: SAX 649.	20141C-01

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

3. 110-170 GHz VDI WR6.5SAX

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
47173 Benicia Street
Fremont, CA 94538
United States

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

Packing List No: 201155 **Today's Date:** 04/07/20
Shipping Date: 04/07/20 **PO Number:** 7862016203

Quantity Shipped	Unit	Description	Order-Job Number
1	EA	VDIWR6.5SAX WR6.5SAX / SN: SAX 624	20075D-01

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

4. 170-260 GHz VDI WR4.3SAX

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
47173 Benicia Street
Fremont, CA 94538
United States

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

Packing List No: 201728 **Today's Date:** 05/28/20
Shipping Date: 05/22/20 **PO Number:** 7862016682

Quantity Shipped	Unit	Description	Order-Job Number
1	EA	VDIWR4.3SAX WR15SAX / SN: SAX 651	20141E-01

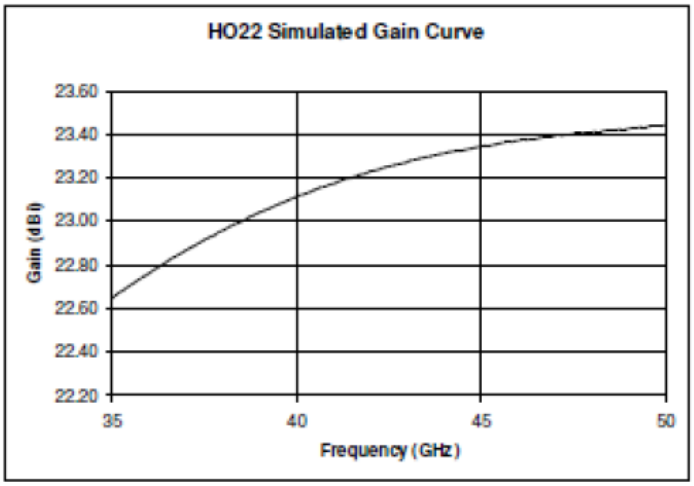
The VDI product(s) in this shipment meet(s) the guidelines for performance specifications established in accordance with the corresponding Purchase Order. Data presented in the User Guide, where applicable, has been obtained in accordance with VDI's Quality Management System. All instruments, used to 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).

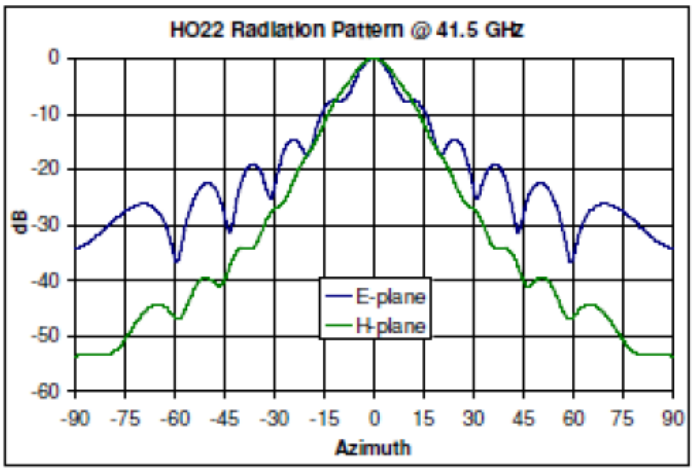
Authorized Signature
Virginia Diodes, Inc

Page 1 of 1

5. 35-50 GHz CMI HO22R HORN ANTENNA

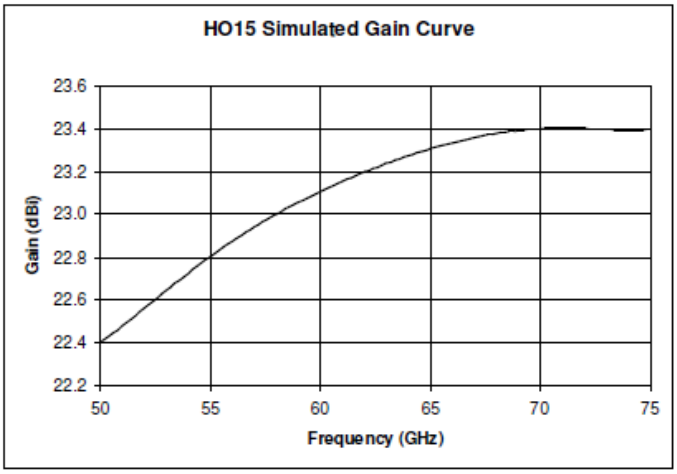
24 Boston Court
Longmont, CO 80501
303 651-0707 (P)
303 651-0706 (F)
www.custommicrowave.com

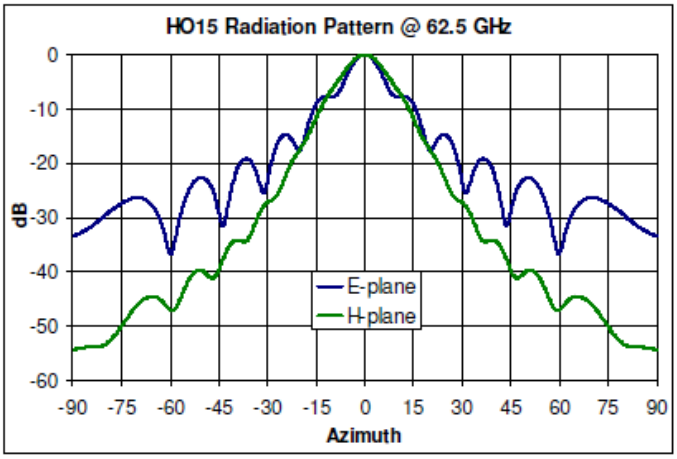




6. 50-75 GHz CMI HO15R HORN ANTENNA

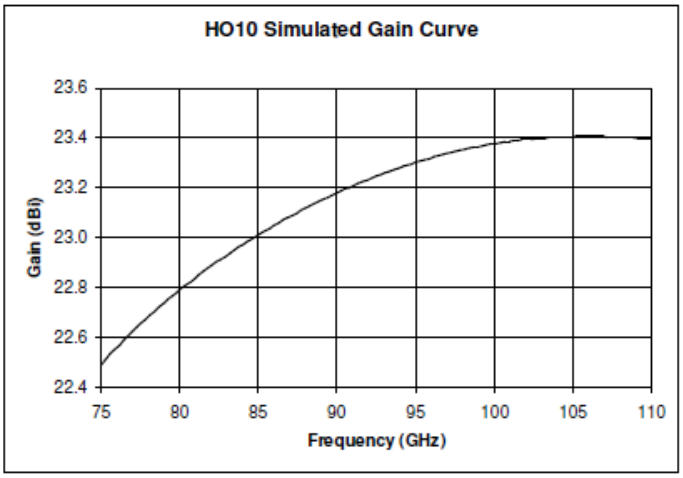
24 Boston Court
Longmont, CO 80501
303 651-0707(P)
303 651-0706(F)
www.custommicrowave.com

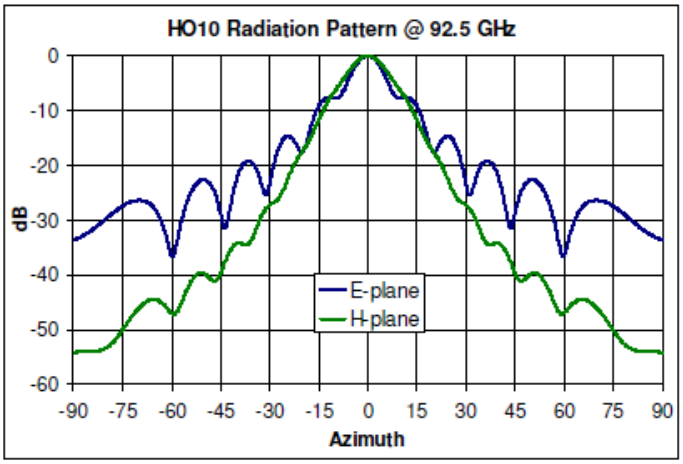




7. 75-110 GHz CMI HO10R HORN ANTENNA

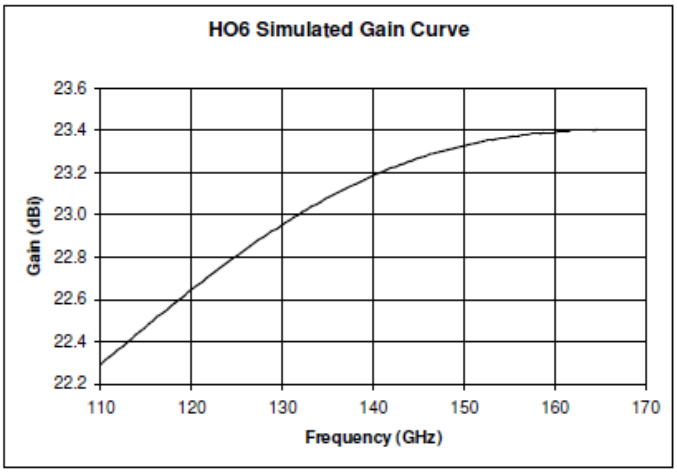
24 Boston Court
Longmont, CO 80501
303 651-0707(P)
303 651-0706(F)
www.custommicrowave.com

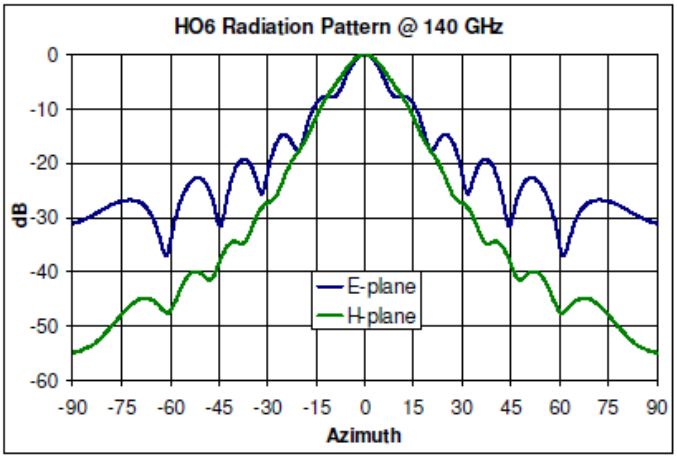




8. 110-170 GHz CMI HO6R HORN ANTENNA

24 Boston Court
Longmont, CO 80501
303 651-0707(P)
303 651-0706(F)
www.custommicrowave.com





9. 170-260 GHz CMI HO4R HORN ANTENNA

24 Boston Court
Longmont, CO 80501
303 651-0707(P)
303 651-0706(F)
www.custommicrowave.com