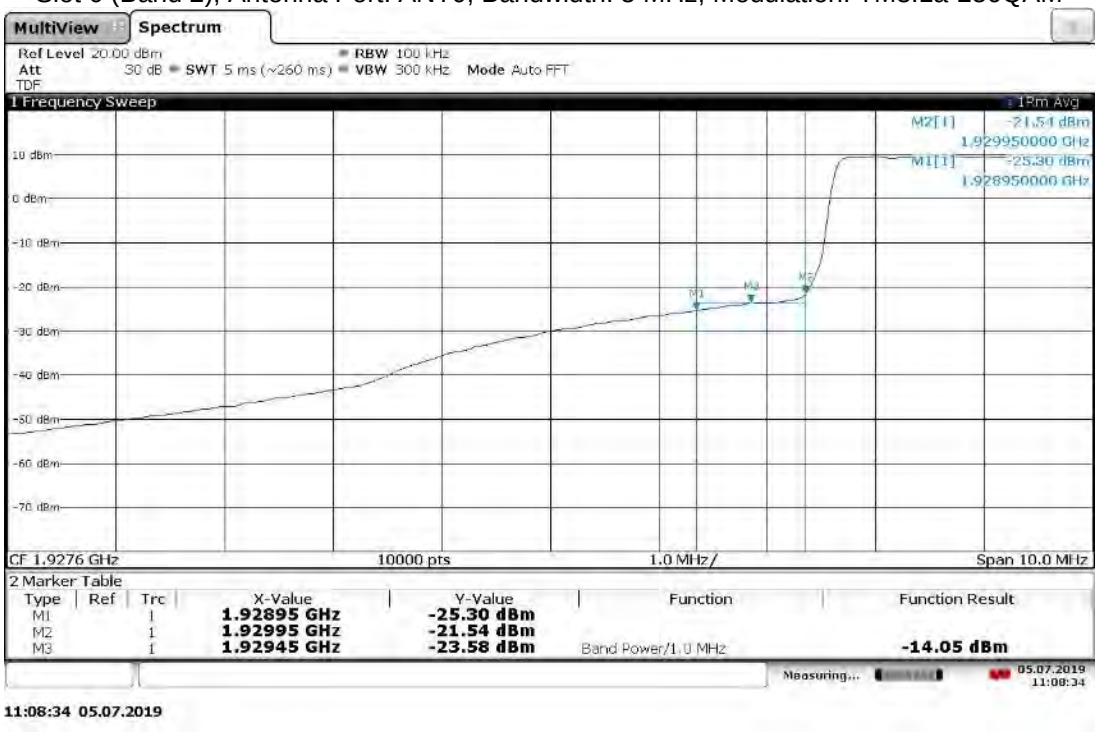
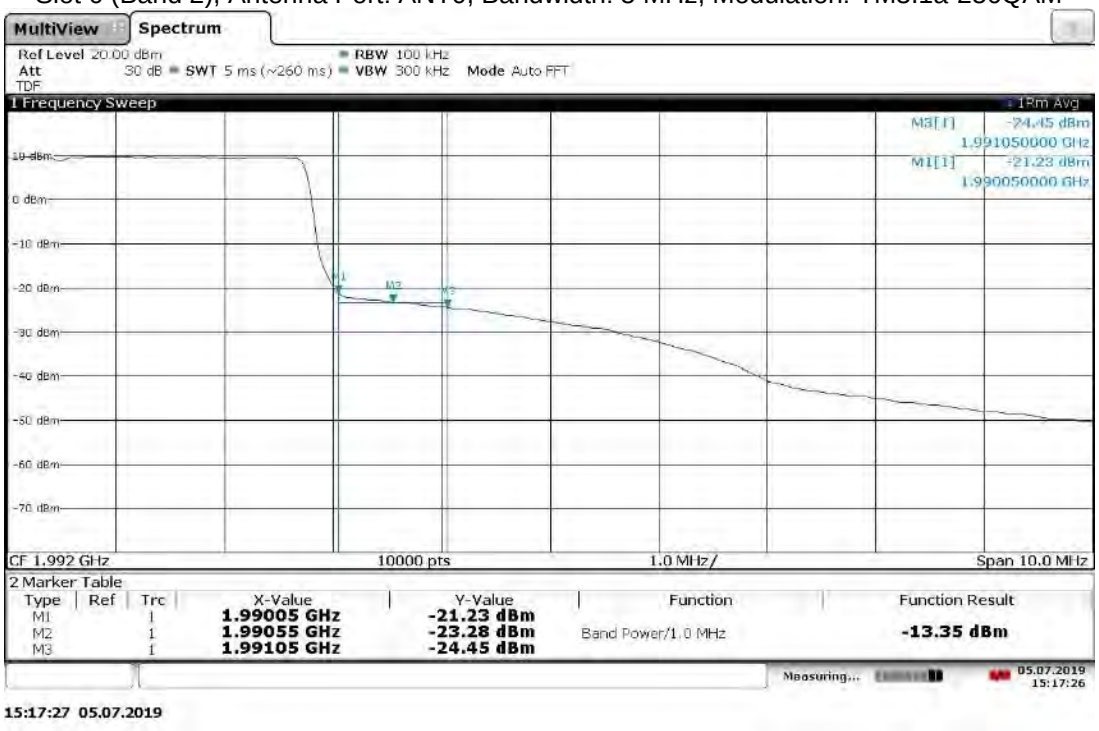
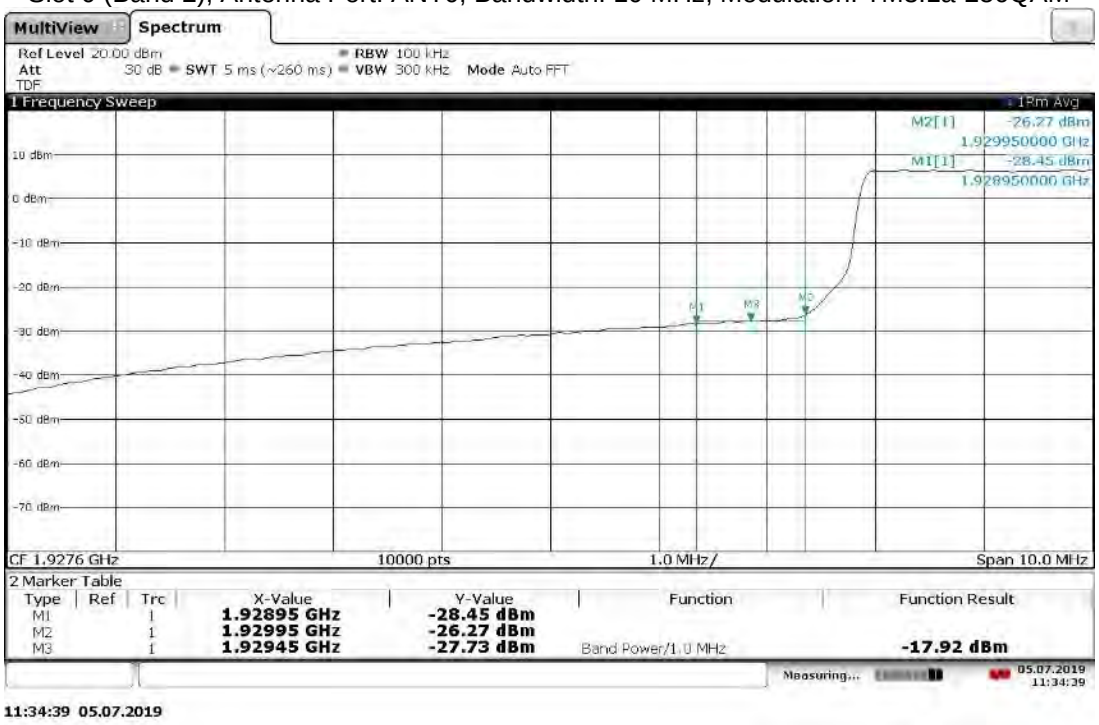
Band Edge Compliant, Lower Band Edge, 1932.5 MHz
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



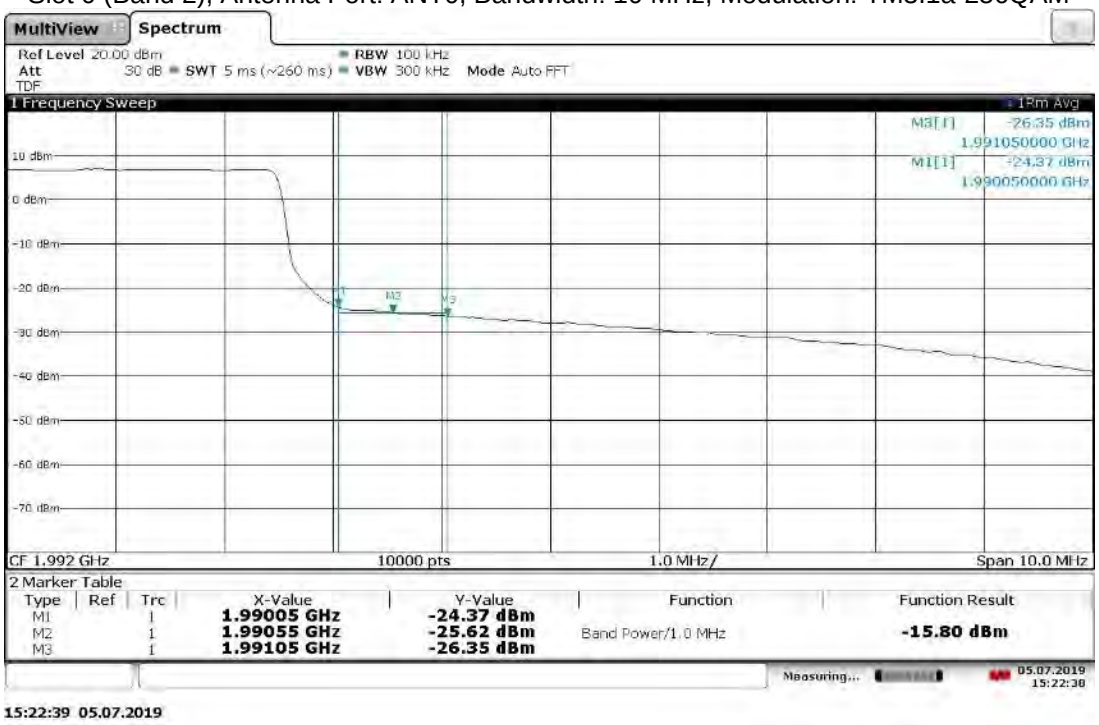
Band Edge Compliant, Upper Band Edge, 1987.5 MHz
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



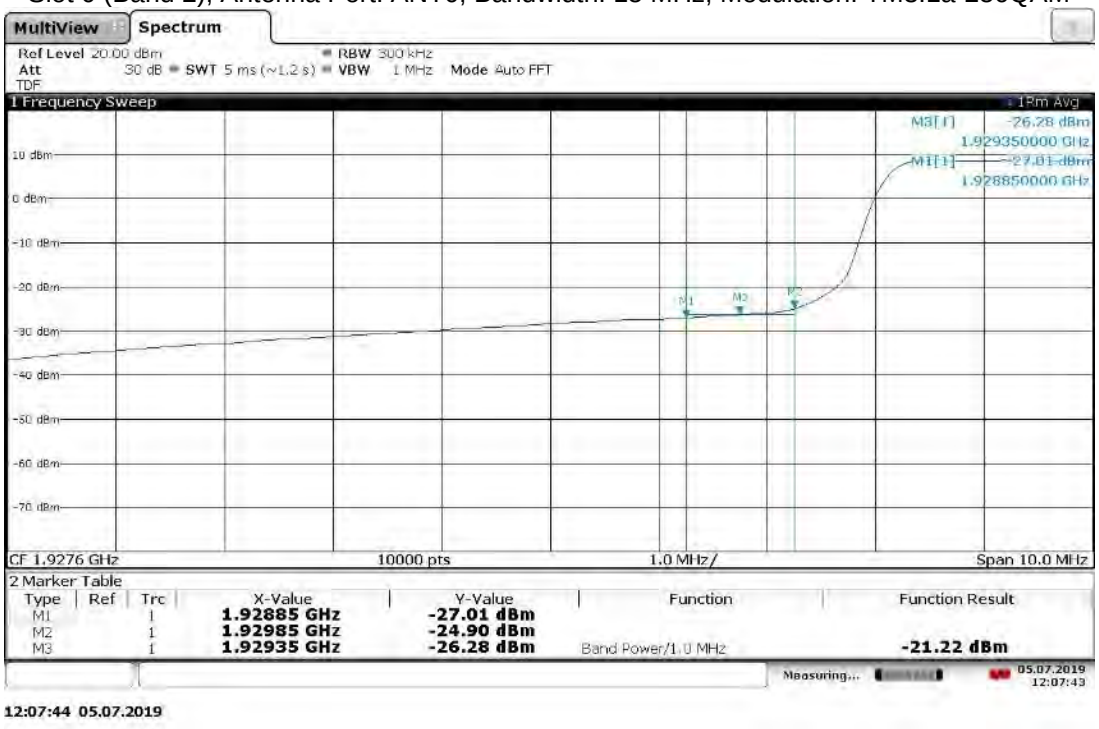
Band Edge Compliant, Lower Band Edge, 1935 MHz
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



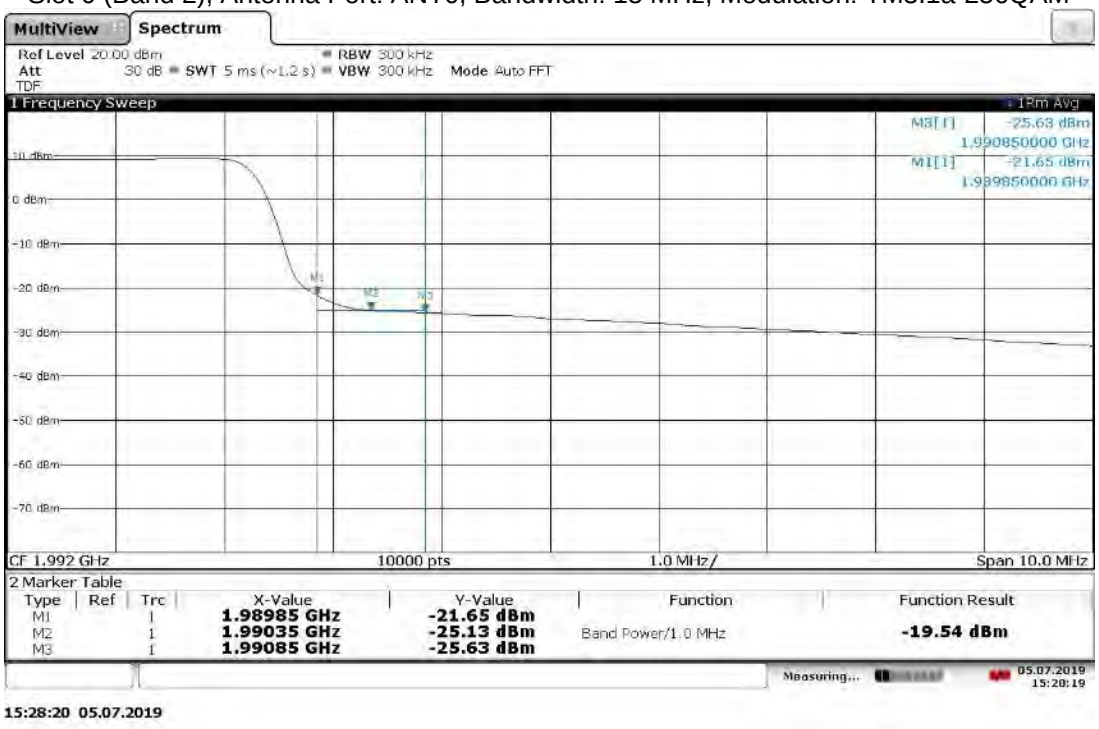
Band Edge Compliant, Upper Band Edge, 1985 MHz
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



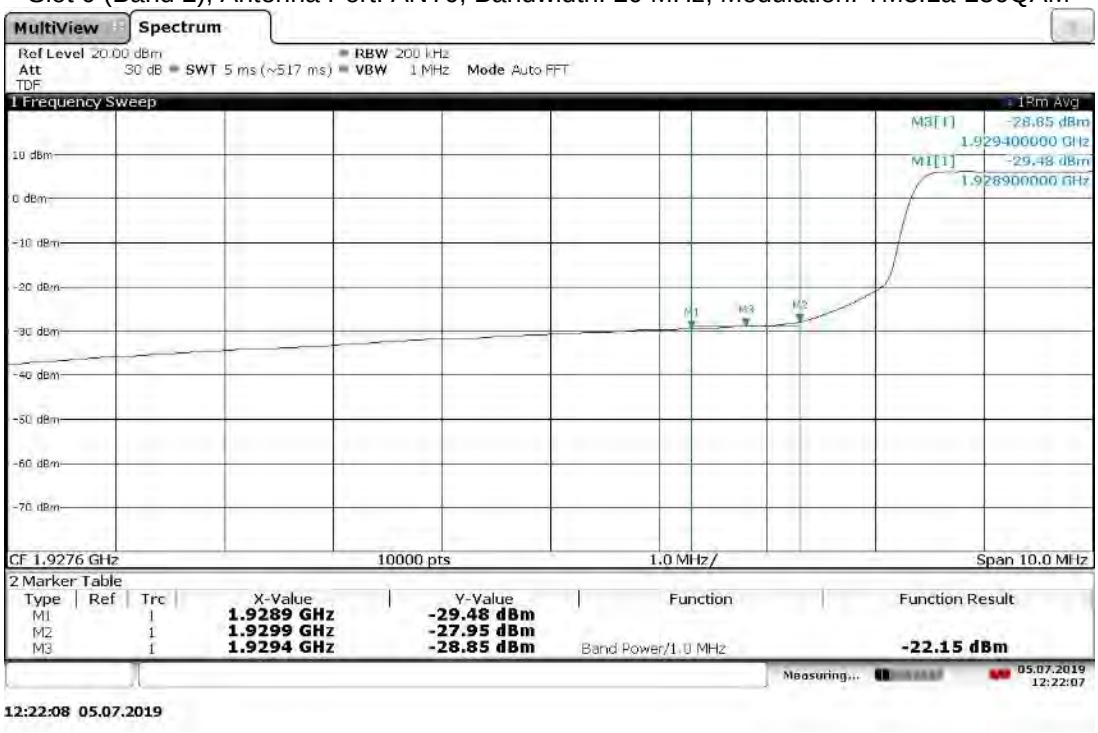
Band Edge Compliant, Lower Band Edge,1937.5MHz
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



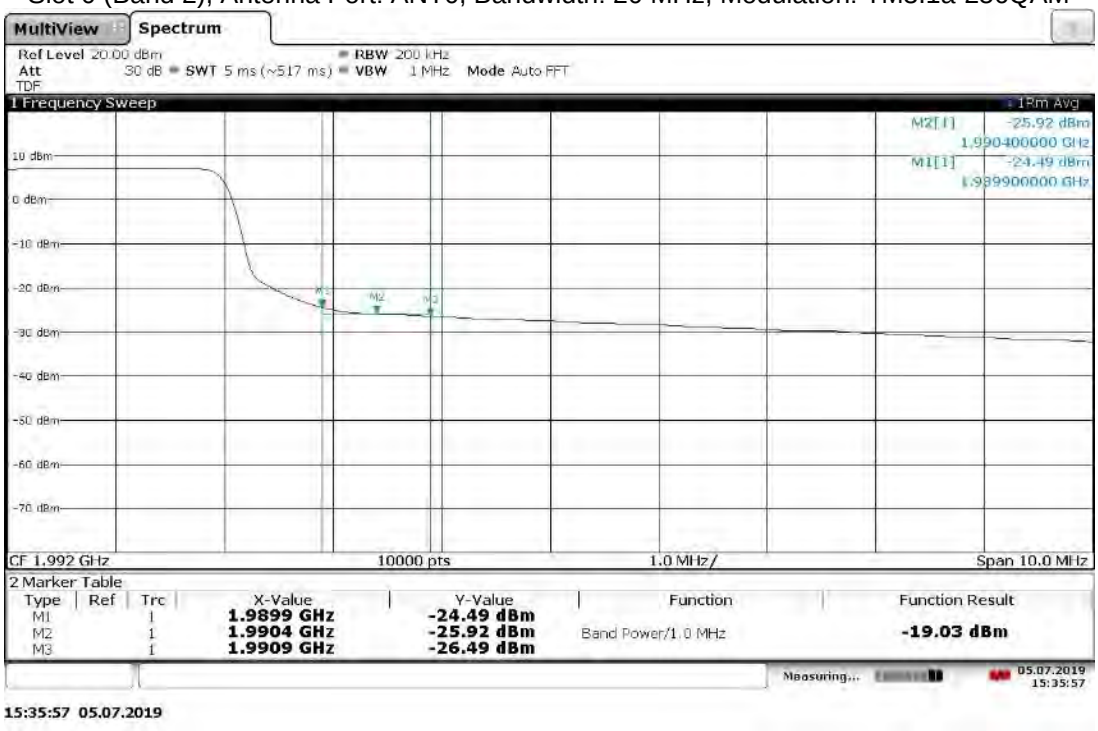
Band Edge Compliant, Upper Band Edge, 1982.5 MHz
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



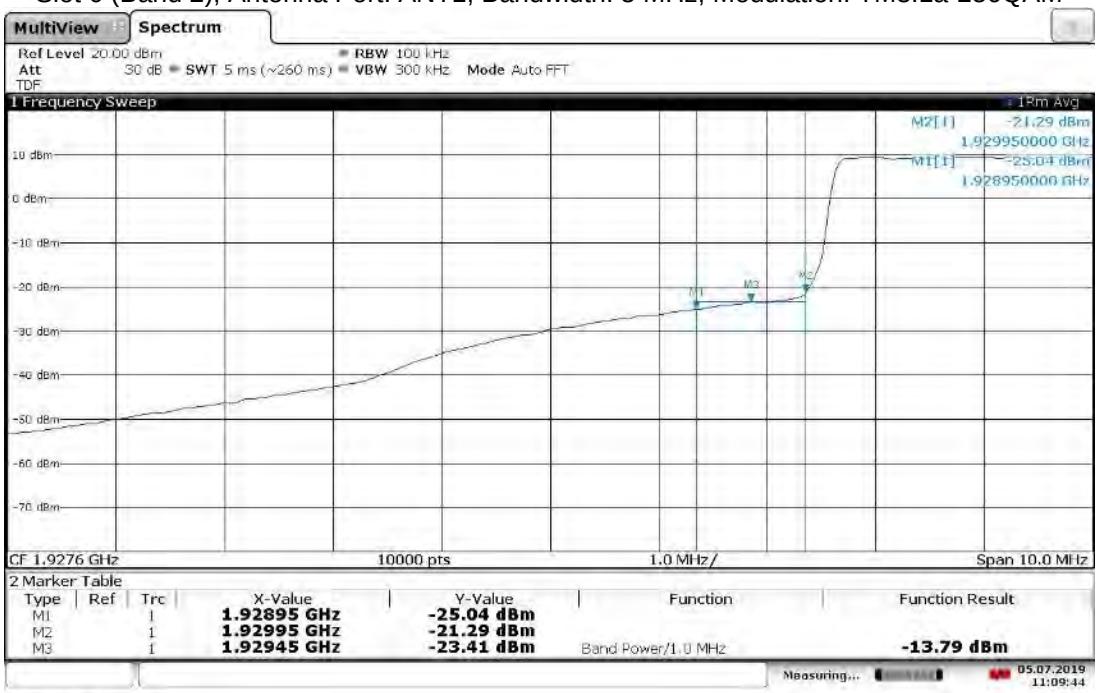
Band Edge Compliant, Lower Band Edge, 1940 MHz
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



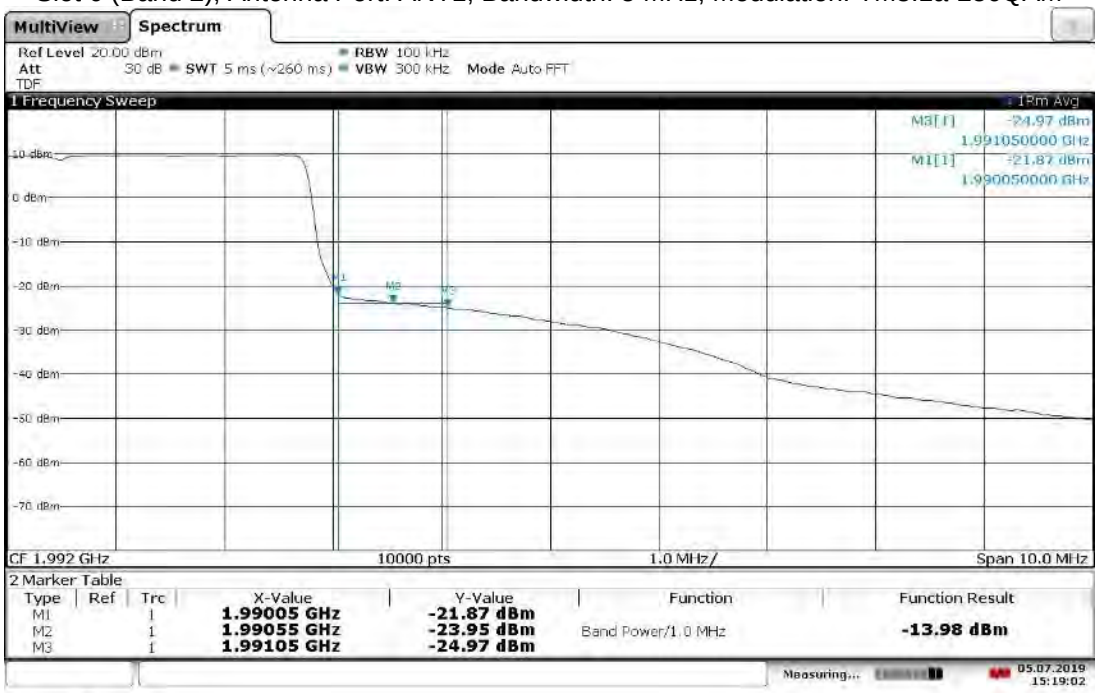
Band Edge Compliant, Upper Band Edge, 1980 MHz
Slot 0 (Band 2), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



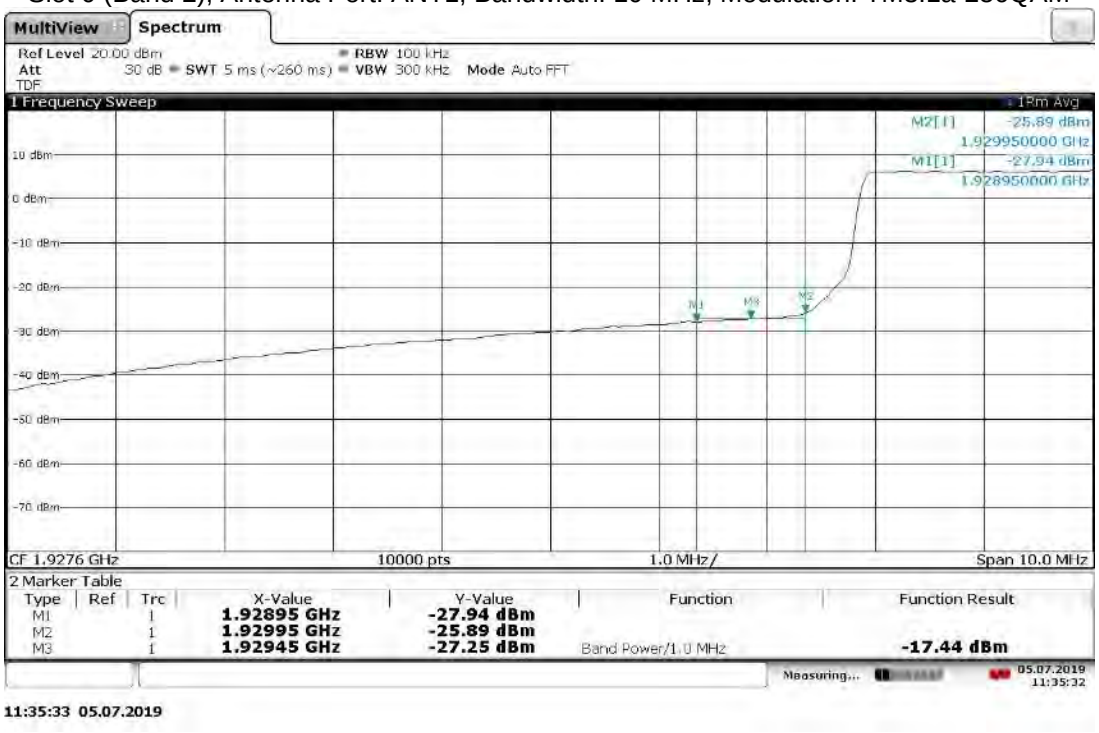
Band Edge Compliant, Lower Band Edge, 1932.5 MHz
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Upper Band Edge, 1987.5 MHz
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM

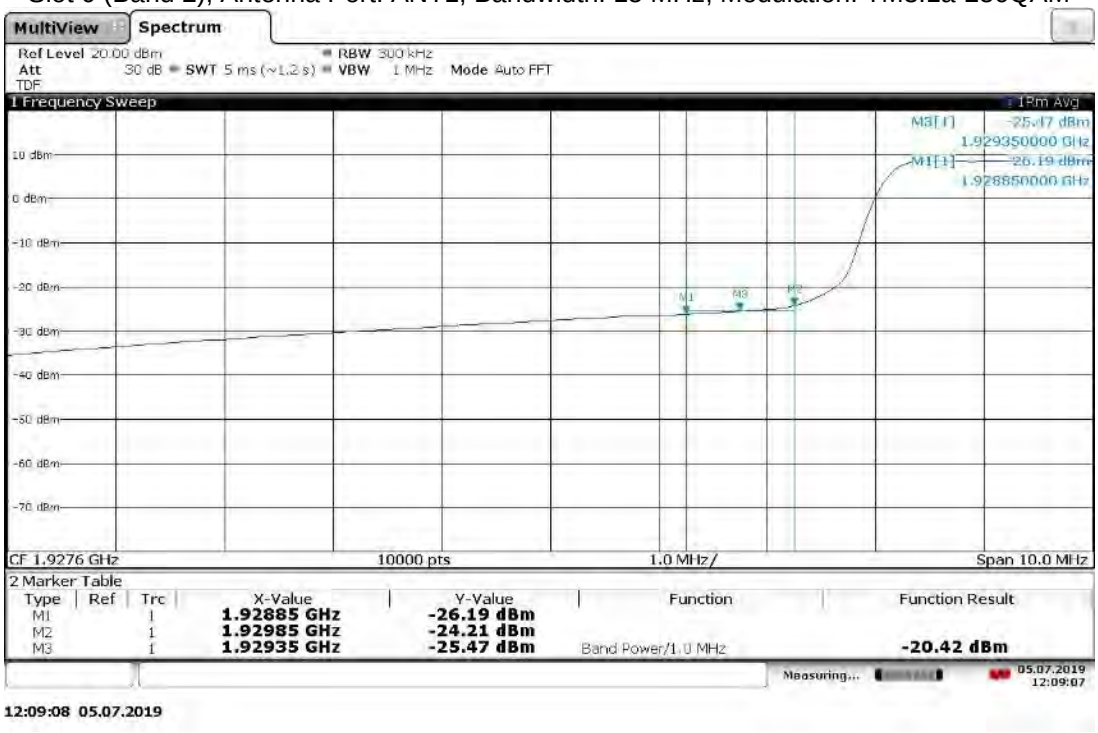


Band Edge Compliant, Lower Band Edge, 1935 MHz
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM

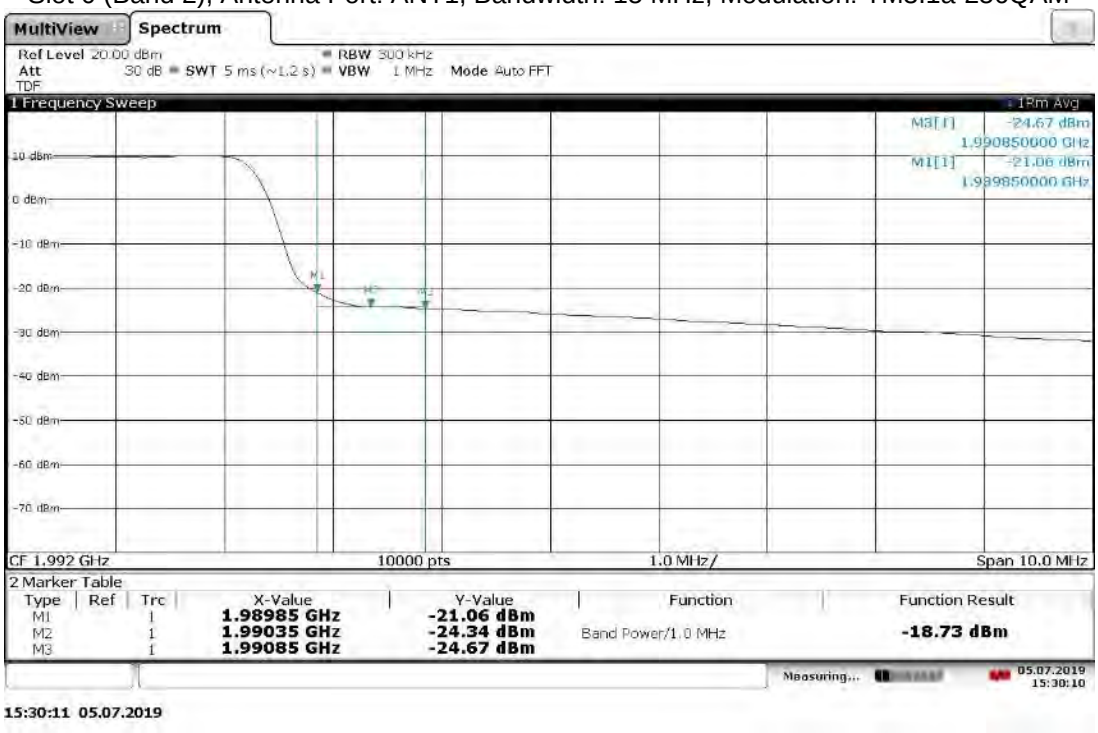


Band Edge Compliant, Upper Band Edge, 1985 MHz
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM

Band Edge Compliant, Lower Band Edge, 1937.5 MHz
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM

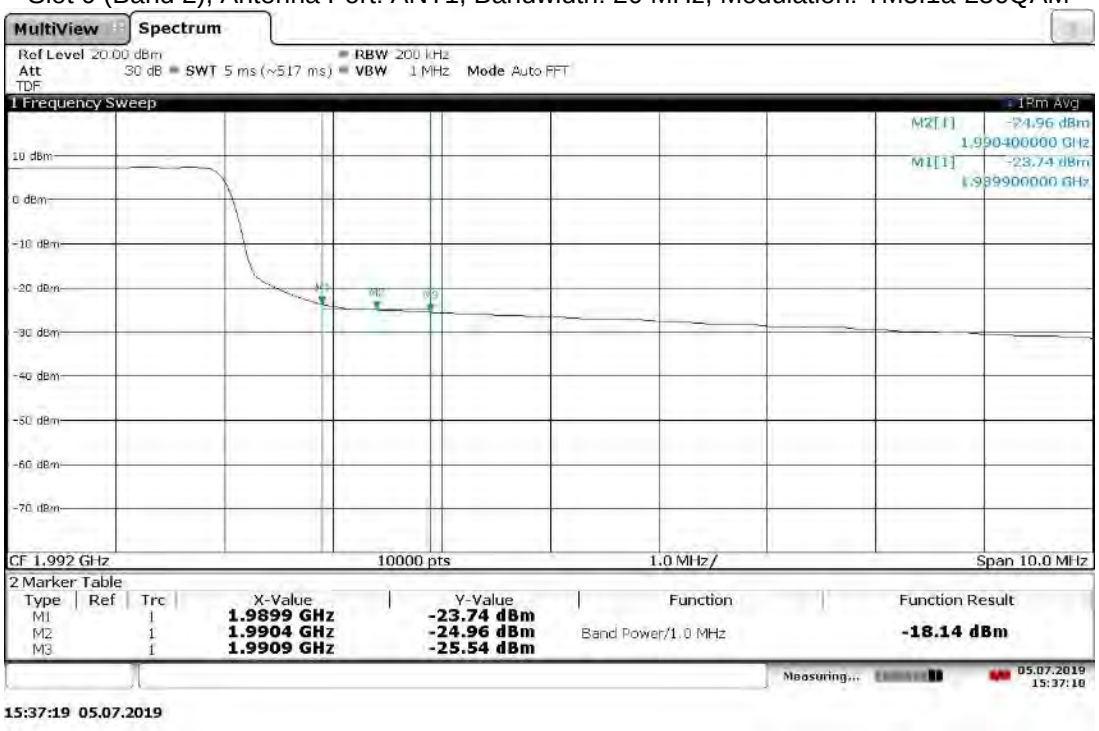


Band Edge Compliant, Upper Band Edge, 1982.5 MHz
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Lower Band Edge, 1940 MHz
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM

Band Edge Compliant, Upper Band Edge, 1980 MHz
Slot 0 (Band 2), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



Test Personnel:	Kouma Sinn KPS	Test Date:	06/29/2019, 07/05/2019
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 24	Limit Applied:	See report section 9.3
Input Voltage:	48 VDC (POE)		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	23, 22 ºC
		Relative Humidity:	60, 73 %
		Atmospheric Pressure:	1000, 1013 mbars

Deviations, Additions, or Exclusions: None

10 Frequency Stability

10.1 Method

Tests are performed in accordance with ANSI C63.26 and CFR47 FCC Parts 2.1055 and 24.

TEST SITE: Safety Lab

10.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	02/01/2019	02/01/2020
CBLHF2012-2M-1'	2m 9kHz-40GHz Coaxial Cable - SET1	Huber & Suhner	SF102	252675001	02/01/2019	02/01/2020
ROS005-1'	Signal and Spectrum Analyzer	Rohde &Schwarz	FSW43	100646	10/15/2018	10/15/2019
DS40'	Temp, humidity, pressure gauge	Digi Sense	68000-49	181717625	11/06/2018	11/06/2019
148012'	Temp/Humidity Chamber	Envirotronics	SH27C	08015563S11263	11/21/2018	11/21/2019
148013'	Temp/Humidity Chamber	Envirotronics	SH27C	08015563S11264	09/26/2018	09/26/2019

Software Utilized:

Name	Manufacturer	Version
None	--	--

10.3 Results:

The sample tested was found to Comply.

§24.235 Frequency stability – The frequency stability shall be sufficient to ensure that the fundamental emission stays within the authorized frequency block. The occupied bandwidth measurement was used to make sure the lower and upper frequencies of the occupied bandwidth remains within the assigned band of 1930-1990 MHz MHz.

Frequency stability over temperature

Band 2, Modulation: QPSK, Bandwidth: 5MHz, Antenna Port: ANT1 , Channel: Low 1932.5 MHz

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.93023112	-5.25E-06	-2.71989E-06	-0.03	2.5
-20	1.93022647	-6E-07	-3.10844E-07	0.00	2.5
-10	1.93022515	7.2E-07	3.73013E-07	0.00	2.5
0	1.9302257	-1.7E-07	-8.80726E-08	0.00	2.5
10	1.93023446	8.59E-06	4.45026E-06	0.04	2.5
20	1.93022587	0	0	0.00	--
30	1.93023457	8.7E-06	4.50724E-06	0.05	2.5
40	1.93023269	6.82E-06	3.53327E-06	0.04	2.5
50	1.93023088	5.01E-06	2.59555E-06	0.03	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.93475689	-3.18E-06	-1.64362E-06	-0.02	2.5
-20	1.93475078	2.93E-06	1.5144E-06	0.02	2.5
-10	1.93474906	4.65E-06	2.40341E-06	0.02	2.5
0	1.93475484	1.13E-06	5.84054E-07	0.01	2.5
10	1.93475558	1.87E-06	9.66531E-07	0.01	2.5
20	1.93475371	0	0	0.00	--
30	1.93475215	-1.56E-06	-8.06304E-07	-0.01	2.5
40	1.93475414	4.3E-07	2.22251E-07	0.00	2.5
50	1.93475287	-8.4E-07	-4.34164E-07	0.00	2.5

Frequency stability over temperature

Band 2, Modulation: QPSK, Bandwidth: 5MHz, Antenna Port: ANT1 , Channel: High 1987.5 MHz

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.98520836	1.131E-05	5.6971E-06	0.06	2.5
-20	1.98521552	4.15E-06	2.09045E-06	0.02	2.5
-10	1.9852071	1.257E-05	6.33179E-06	0.06	2.5
0	1.98522453	4.86E-06	2.44809E-06	0.02	2.5
10	1.98522166	1.99E-06	1.00241E-06	0.01	2.5
20	1.98521967	0	0	0.00	--
30	1.98522243	2.76E-06	1.39027E-06	0.01	2.5
40	1.98522392	4.25E-06	2.14082E-06	0.02	2.5
50	1.98521973	6E-08	3.02234E-08	0.00	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.98976449	-2.12E-05	-1.06546E-05	-0.11	2.5
-20	1.98976817	-2.488E-05	-1.25041E-05	-0.13	2.5
-10	1.98974846	-5.17E-06	-2.59833E-06	-0.03	2.5
0	1.9897573	1.401E-05	7.04111E-06	0.07	2.5
10	1.98975025	6.96E-06	3.49794E-06	0.03	2.5
20	1.98974329	0	0	0.00	--
30	1.98975251	9.22E-06	4.63376E-06	0.05	2.5
40	1.9897508	7.51E-06	3.77436E-06	0.04	2.5
50	1.98973996	-3.33E-06	-1.67358E-06	-0.02	2.5

Frequency stability over temperature

Band 2, Modulation: QPSK, Bandwidth: 20MHz, Antenna Port: ANT1 , Channel: Low 1940 MHz

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.93106454	8.54E-06	4.42241E-06	0.04	2.5
-20	1.93110619	-3.311E-05	-1.71459E-05	-0.17	2.5
-10	1.93108669	-1.361E-05	-7.04789E-06	-0.07	2.5
0	1.93106022	-1.286E-05	-6.65951E-06	-0.07	2.5
10	1.93107728	4.2E-06	2.17496E-06	0.02	2.5
20	1.93107308	0	0	0.00	--
30	1.93109127	1.819E-05	9.41963E-06	0.09	2.5
40	1.9310781	5.02E-06	2.59959E-06	0.03	2.5
50	1.93105985	-1.323E-05	-6.85111E-06	-0.07	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.94899448	-1.615E-05	-8.28639E-06	-0.08	2.5
-20	1.94897228	6.05E-06	3.10419E-06	0.03	2.5
-10	1.94897261	5.72E-06	2.93487E-06	0.03	2.5
0	1.94893296	-4.537E-05	-2.32789E-05	-0.23	2.5
10	1.948967	-1.133E-05	-5.8133E-06	-0.06	2.5
20	1.94897833	0	0	0.00	--
30	1.94896661	-1.172E-05	-6.01341E-06	-0.06	2.5
40	1.94895422	-2.411E-05	-1.23706E-05	-0.12	2.5
50	1.94894563	-3.27E-05	-1.6778E-05	-0.17	2.5

Frequency stability over temperature

Band 2, Modulation: QPSK, Bandwidth: 20MHz, Antenna Port: ANT1 , Channel: High 1980 MHz

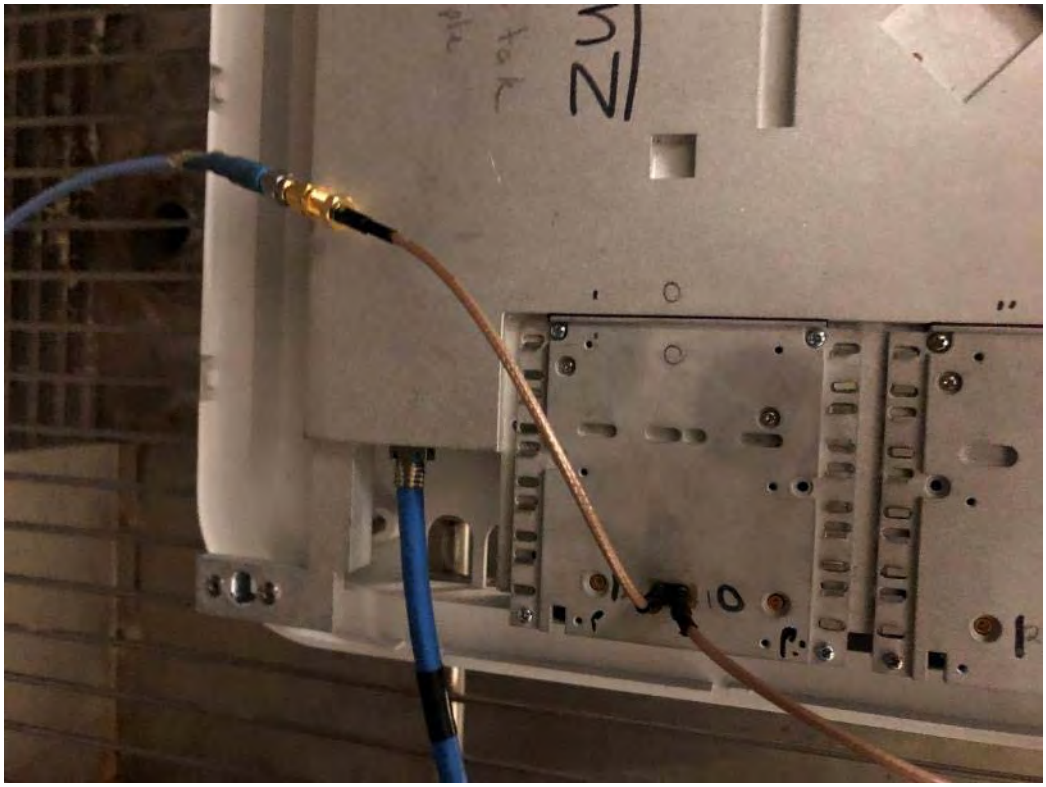
Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.9709834	3.727E-05	1.8909E-05	0.19	2.5
-20	1.97100518	1.549E-05	7.85887E-06	0.08	2.5
-10	1.97102559	-4.92E-06	-2.49617E-06	-0.02	2.5
0	1.9710247	4.03E-06	2.04463E-06	0.02	2.5
10	1.97103146	1.079E-05	5.47432E-06	0.05	2.5
20	1.97102067	0	0	0.00	--
30	1.9710363	1.563E-05	7.9299E-06	0.08	2.5
40	1.9710329	1.223E-05	6.20491E-06	0.06	2.5
50	1.97102831	7.64E-06	3.87616E-06	0.04	2.5

Upper Edge of Occupied Bandwidth

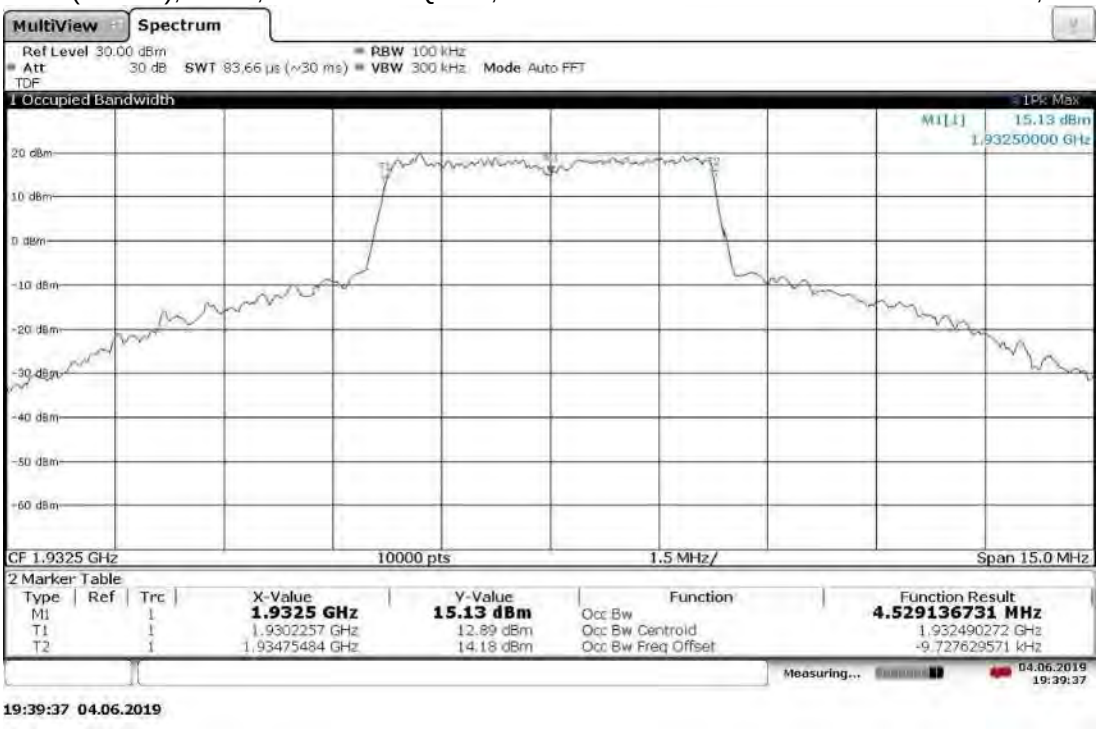
Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	1.98894208	-5.99E-06	-3.01166E-06	-0.03	2.5
-20	1.98894187	-5.78E-06	-2.90608E-06	-0.03	2.5
-10	1.988967	-3.091E-05	-1.5541E-05	-0.16	2.5
0	1.98895996	2.387E-05	1.20014E-05	0.12	2.5
10	1.98890845	-2.764E-05	-1.38969E-05	-0.14	2.5
20	1.98893609	0	0	0.00	--
30	1.98892668	-9.41E-06	-4.73117E-06	-0.05	2.5
40	1.98892411	-1.198E-05	-6.02332E-06	-0.06	2.5
50	1.98893157	-4.52E-06	-2.27257E-06	-0.02	2.5

10.4 Setup Photographs:

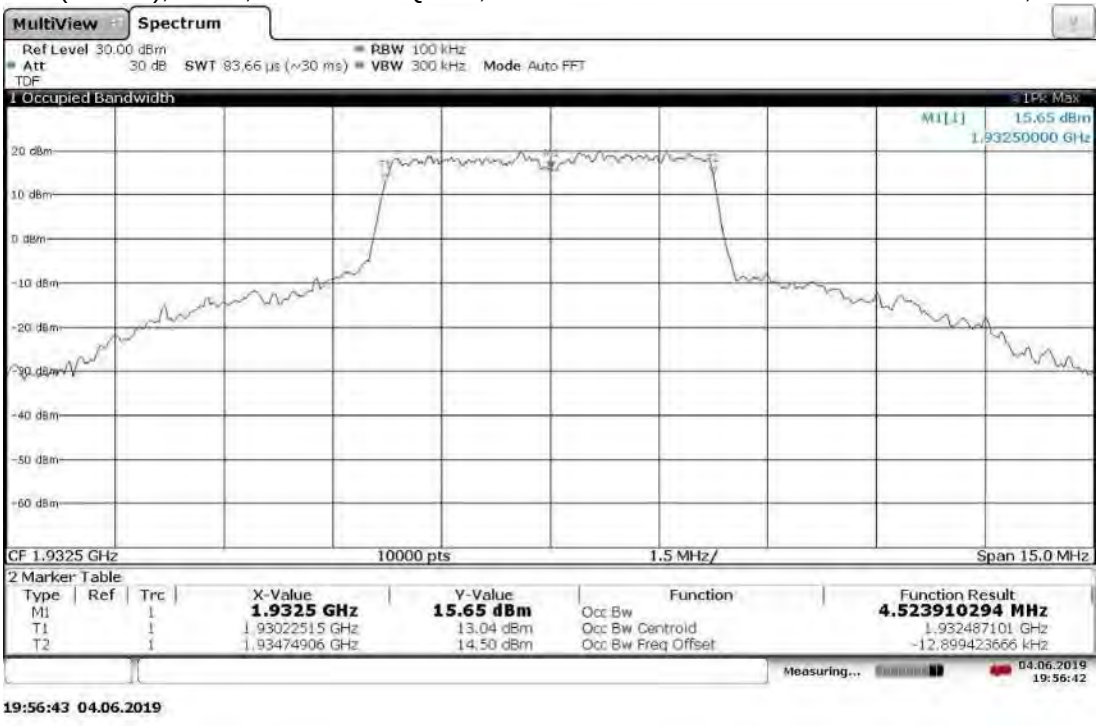


10.5 Plots/Data:

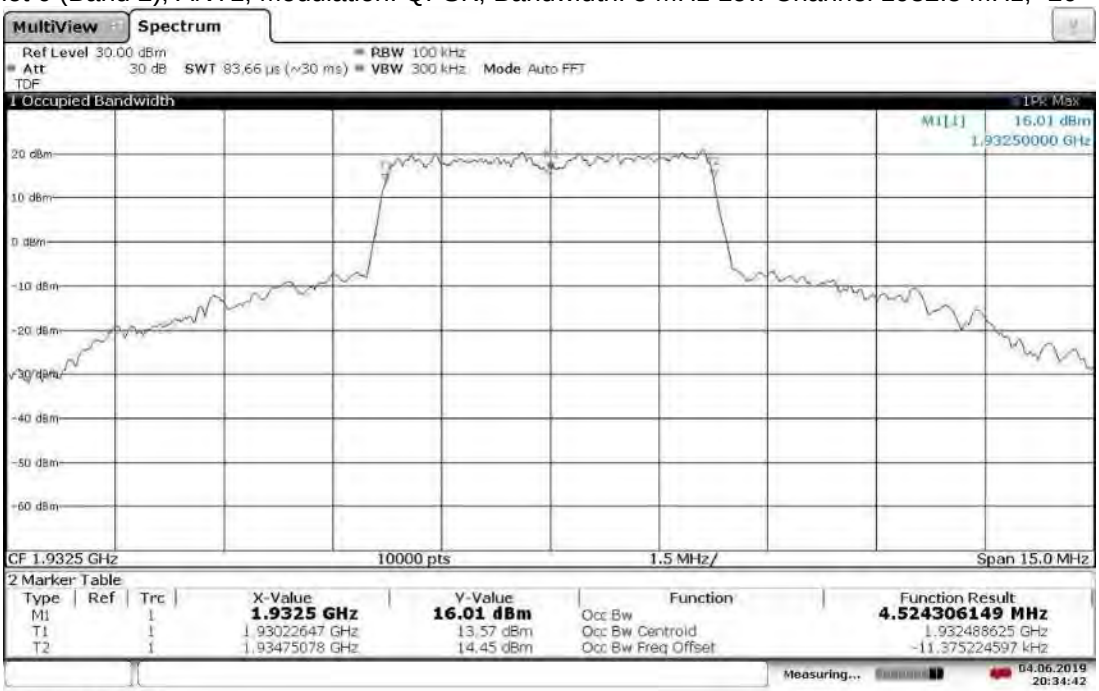
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 1932.5 MHz, 0 ºC



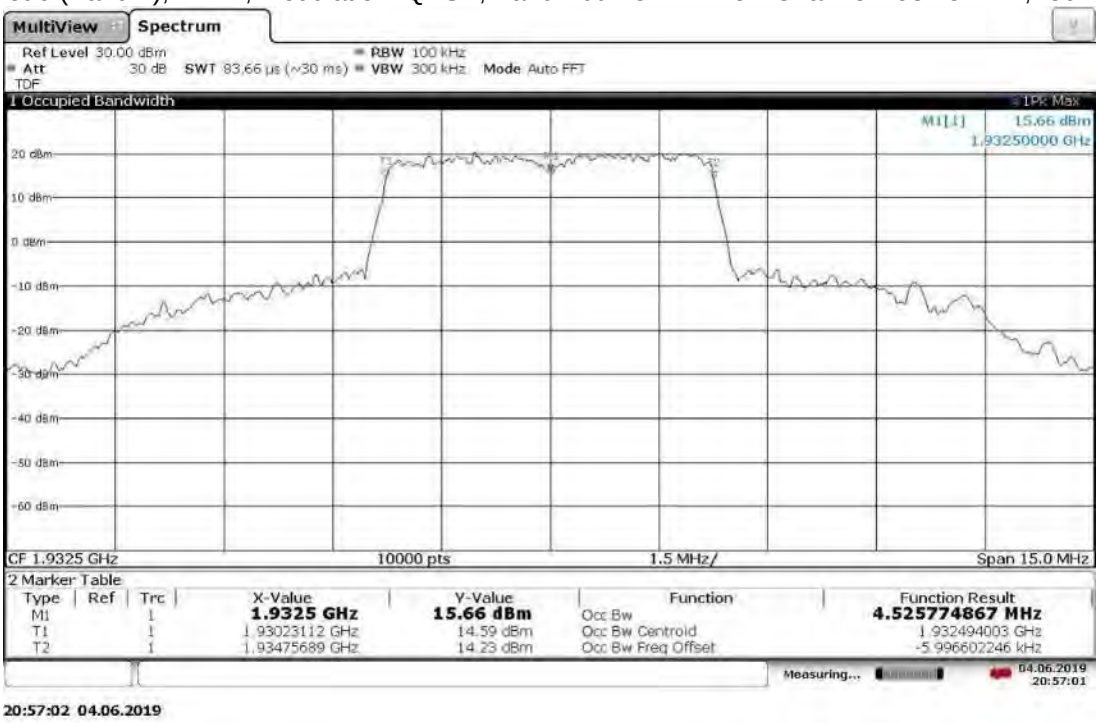
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 1932.5 MHz, -10 ºC



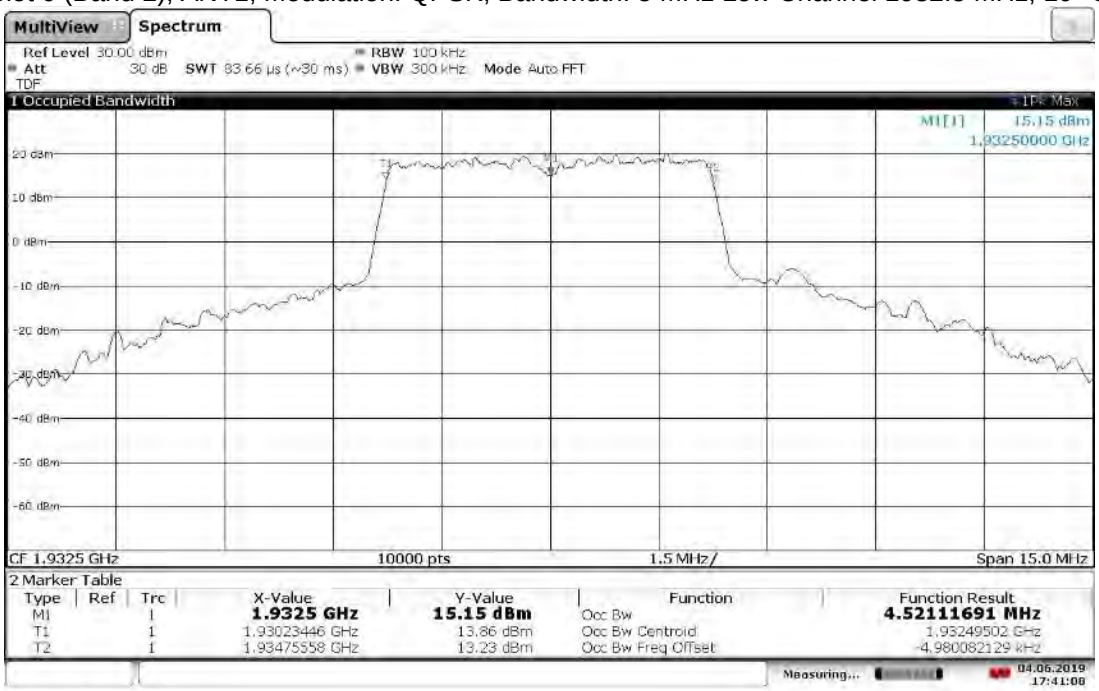
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 1932.5 MHz, -20 ºC



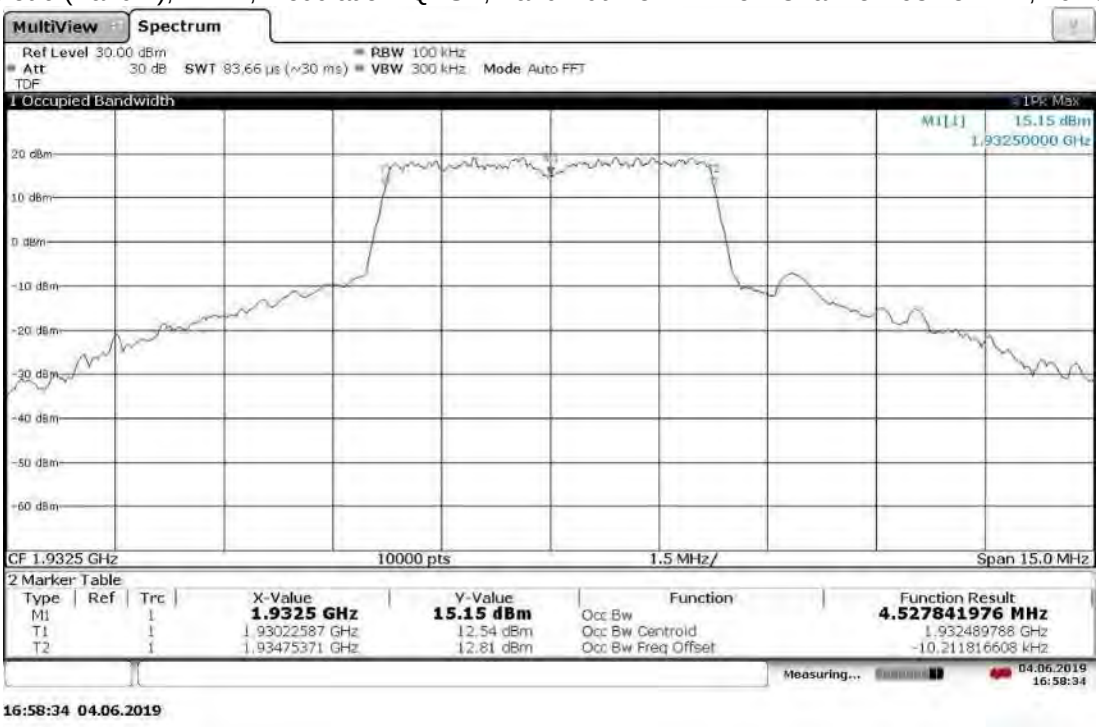
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 1932.5 MHz, -30 ºC



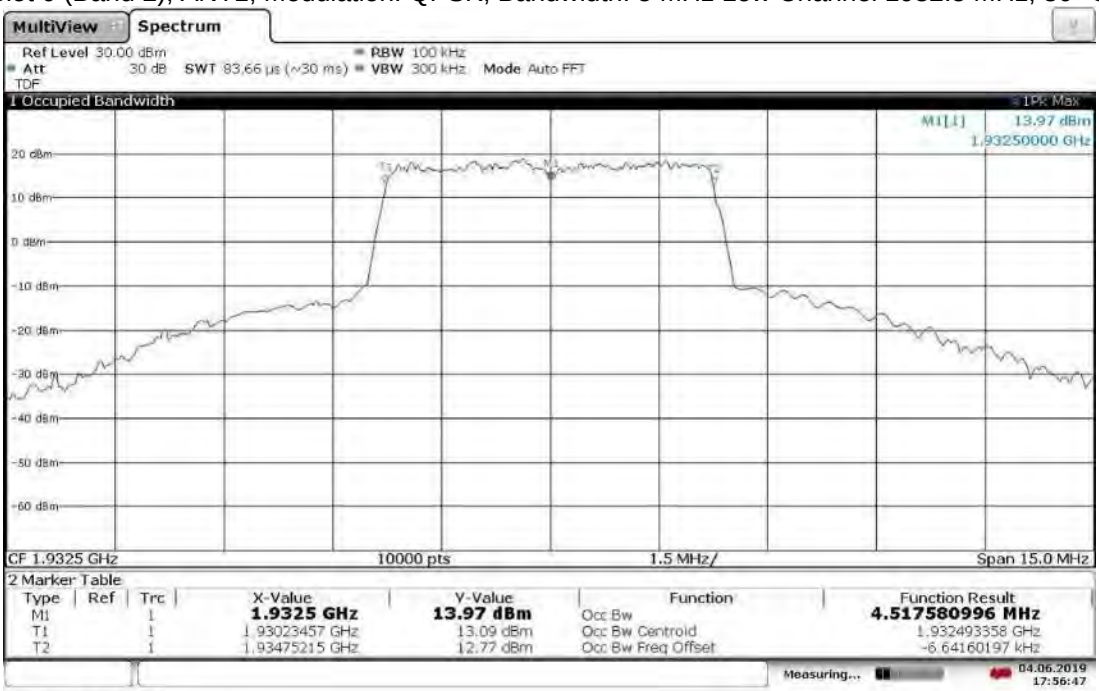
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 1932.5 MHz, 10 ºC



Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 1932.5 MHz, 20 ºC



Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 1932.5 MHz, 30 ºC



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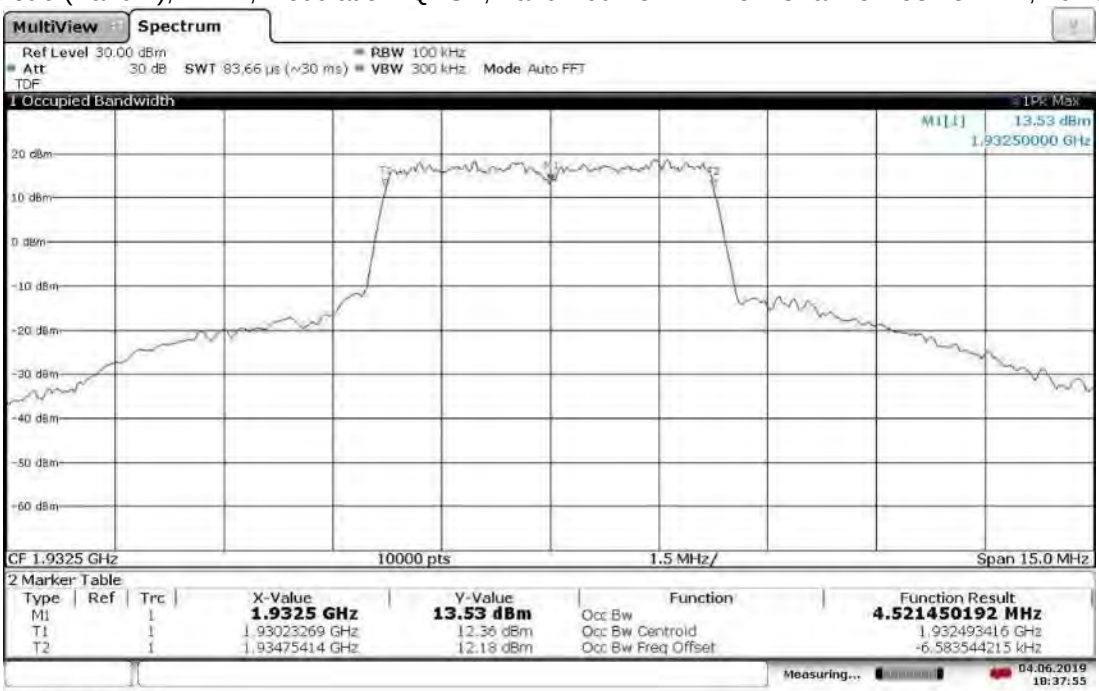
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 1932.5 MHz, 40 ºC



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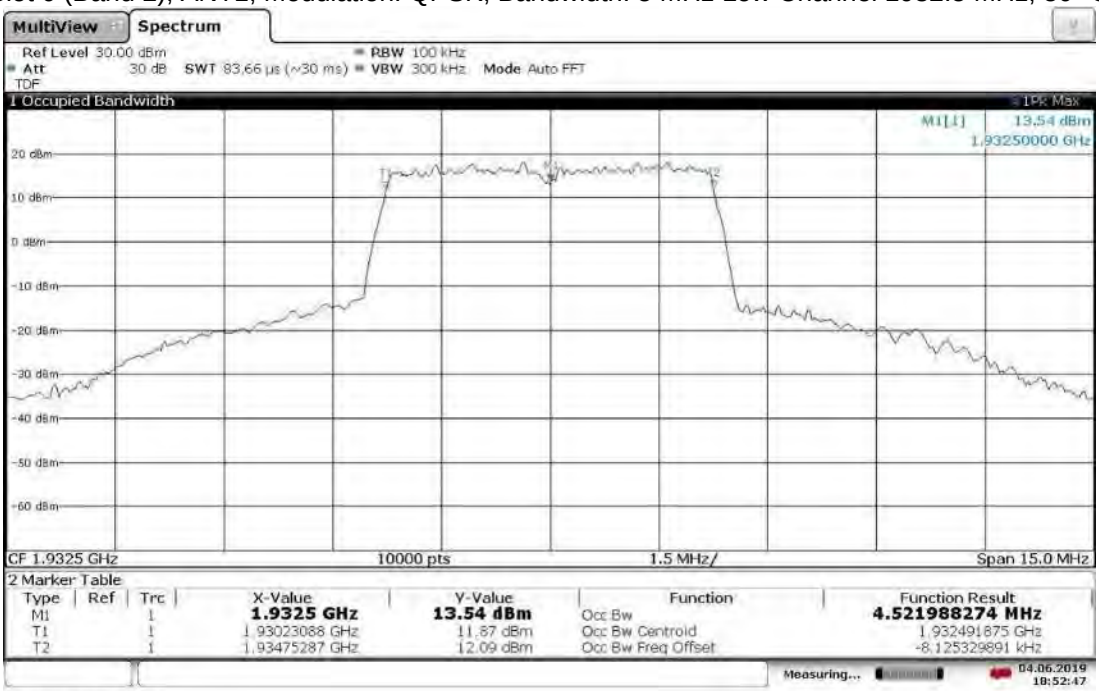
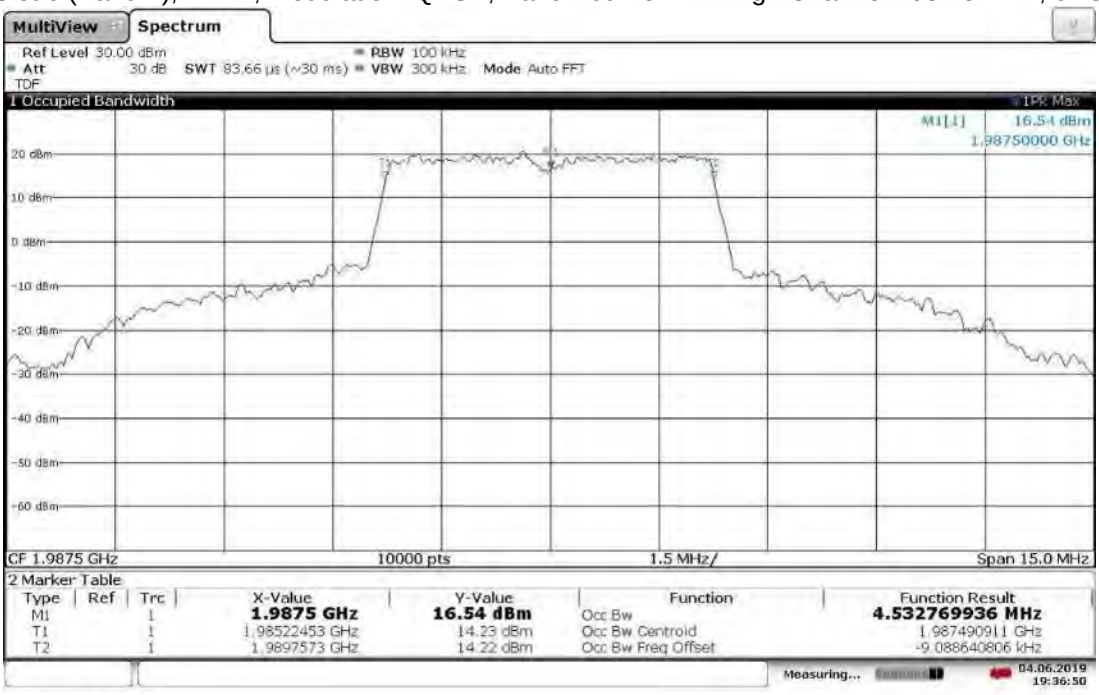
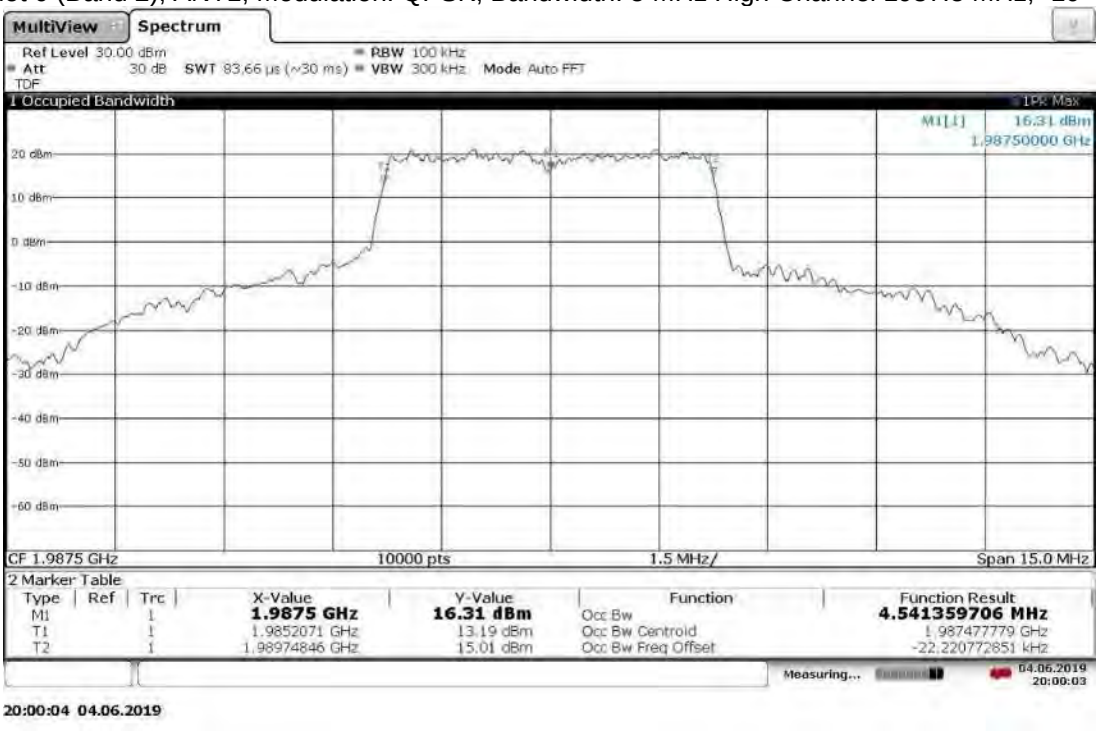
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 1932.5 MHz, 50 ºC



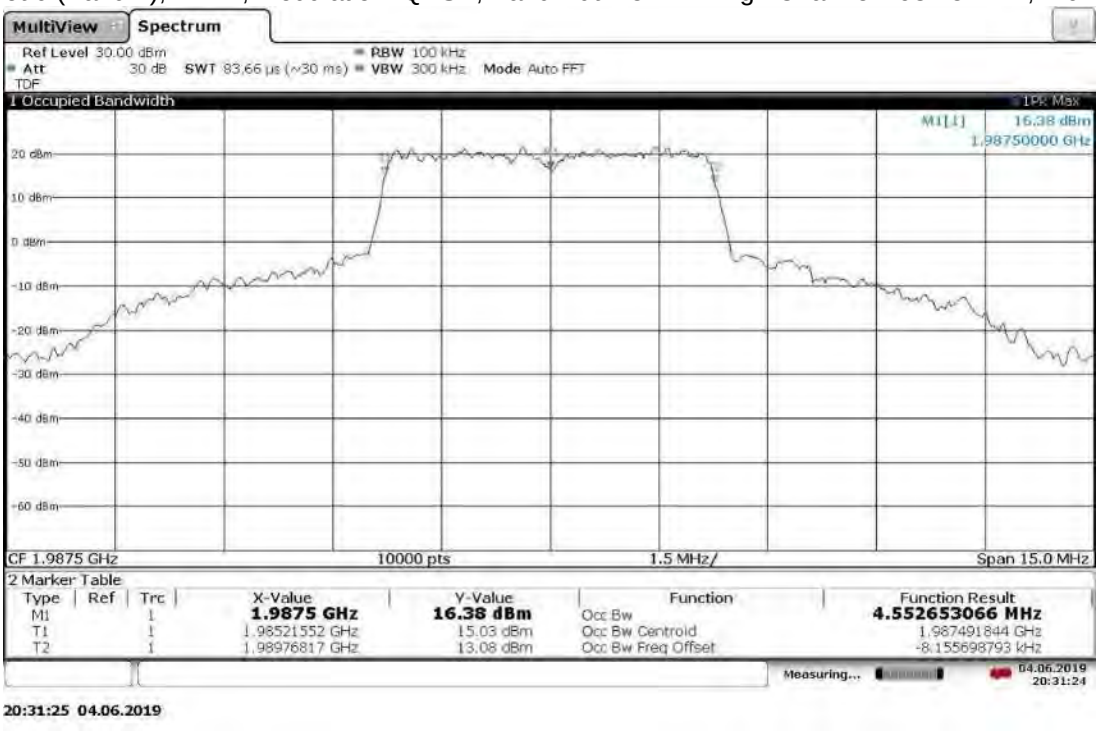
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz High Channel 1987.5 MHz, 0 ºC



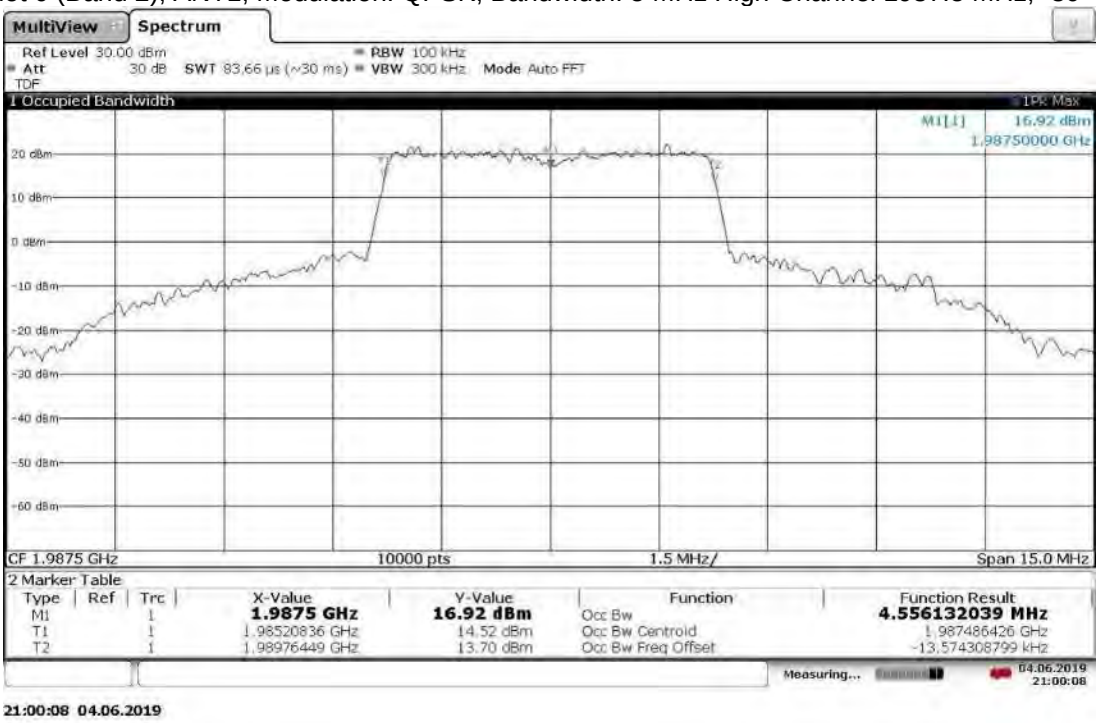
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz High Channel 1987.5 MHz, -10 ºC



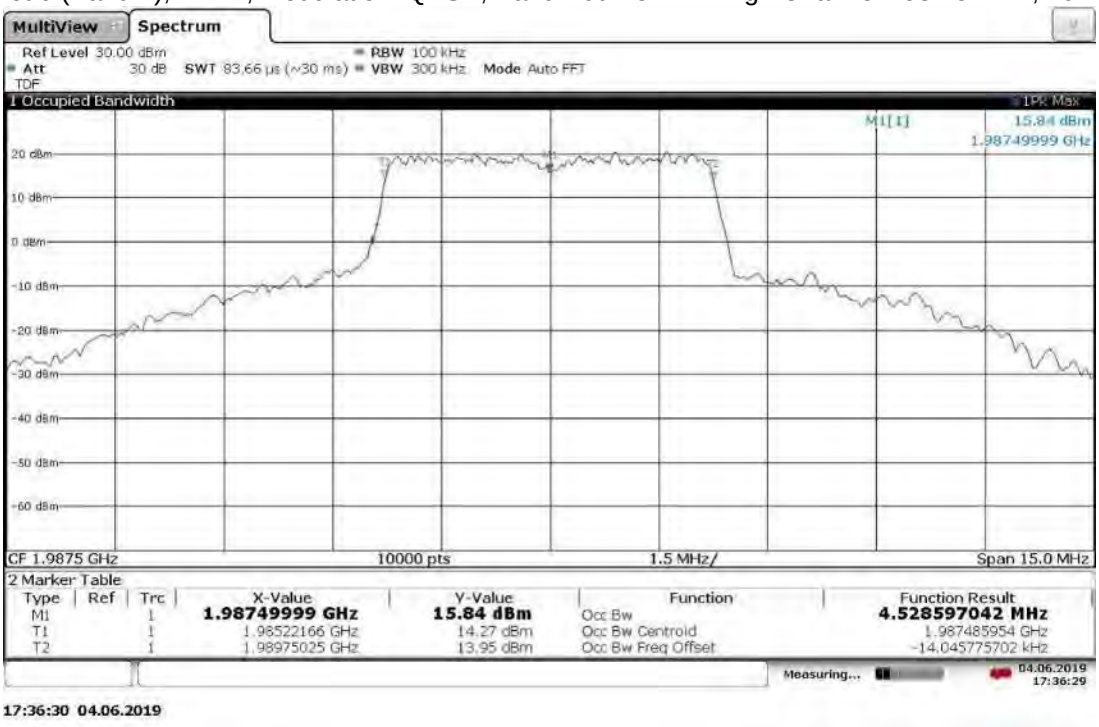
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz High Channel 1987.5 MHz, -20 ºC



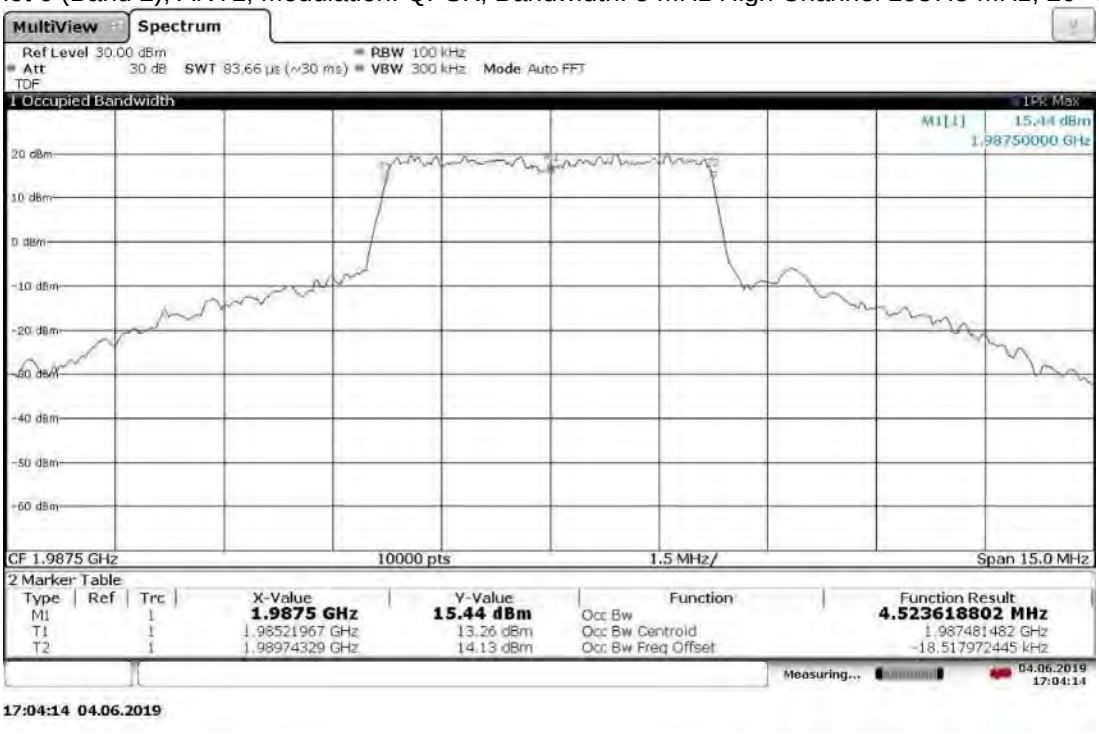
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz High Channel 1987.5 MHz, -30 ºC



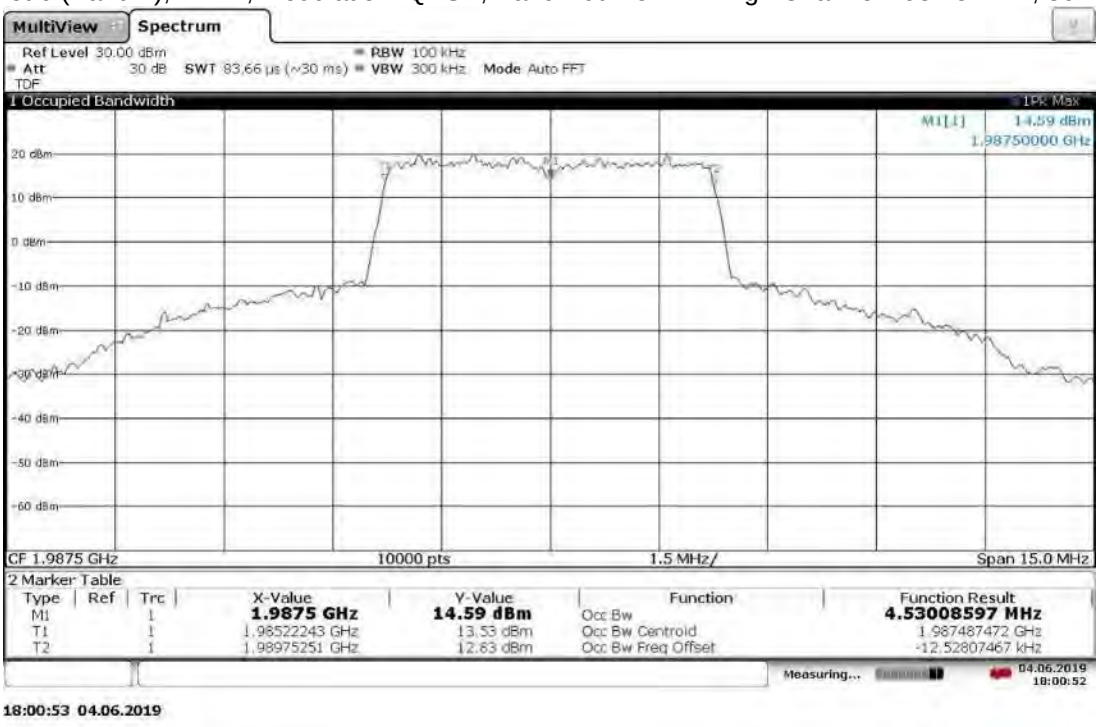
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz High Channel 1987.5 MHz, 10 ºC



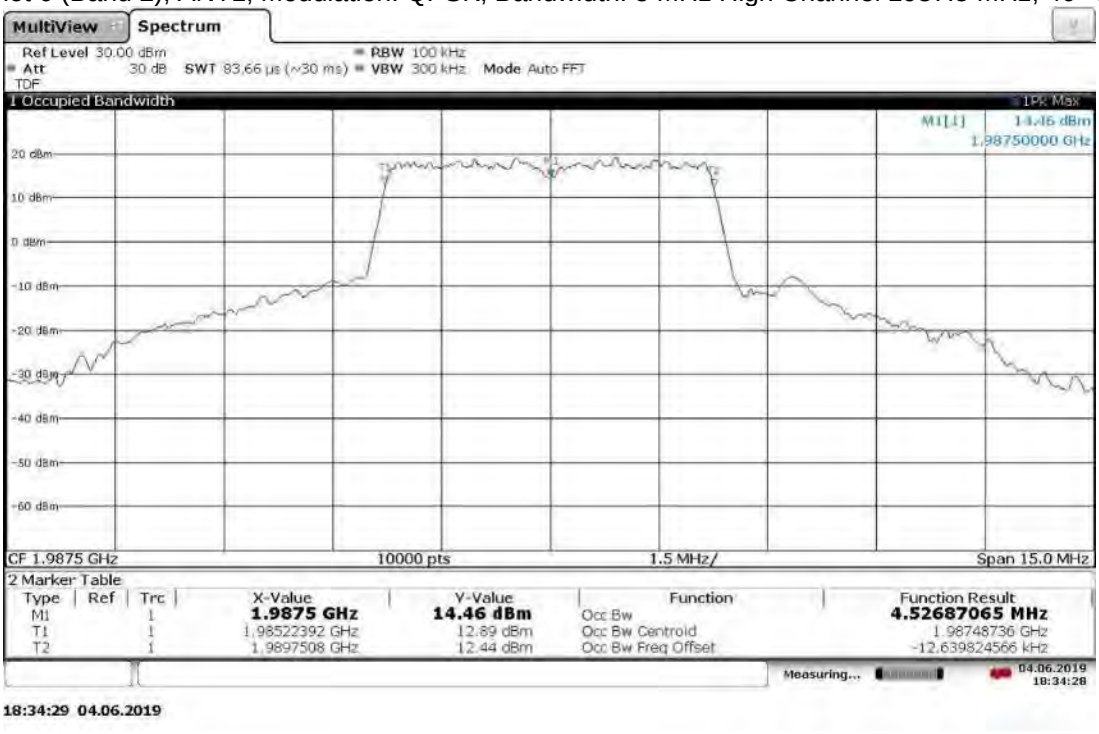
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz High Channel 1987.5 MHz, 20 ºC



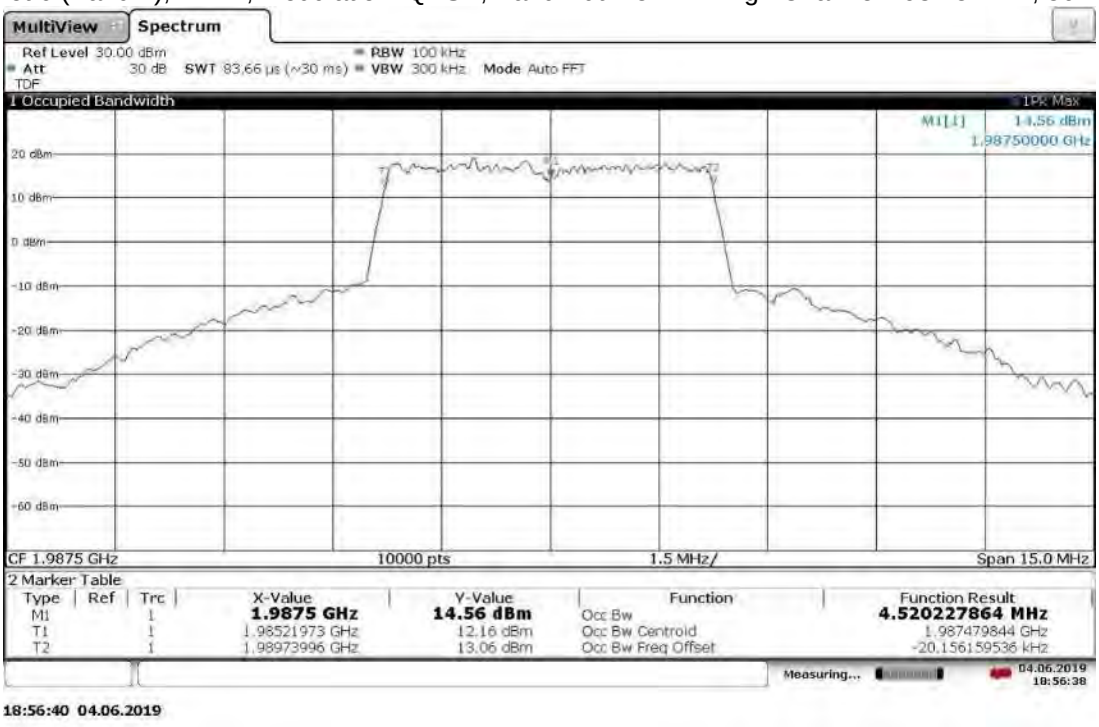
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz High Channel 1987.5 MHz, 30 ºC



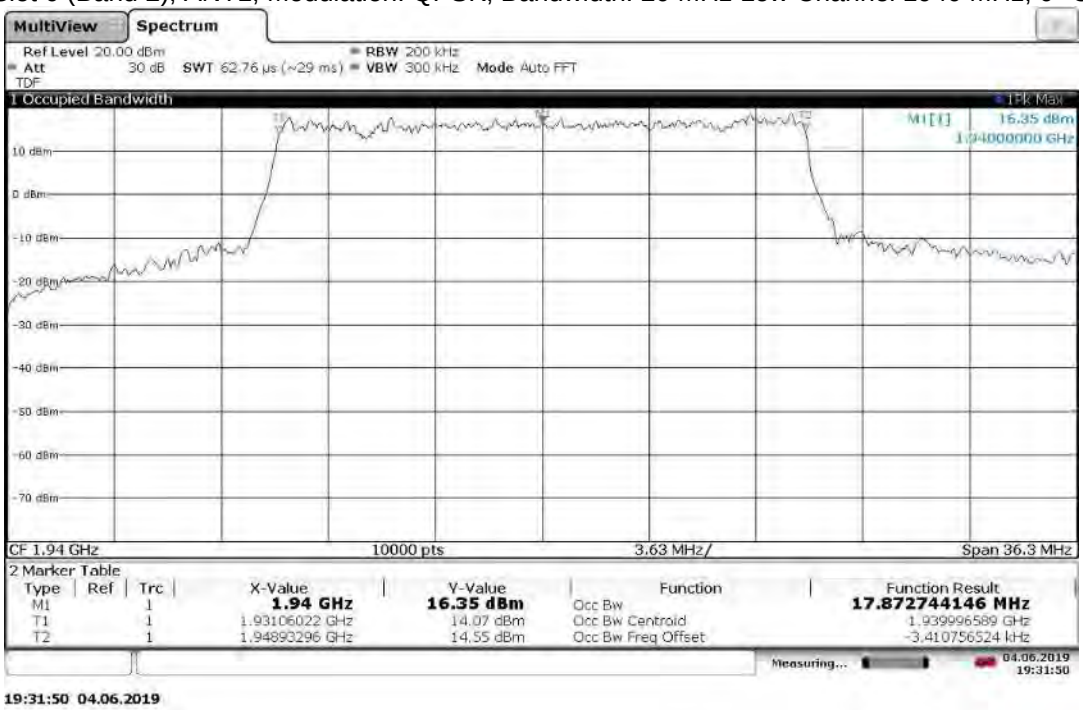
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz High Channel 1987.5 MHz, 40 ºC



Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz High Channel 1987.5 MHz, 50 ºC



Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 1940 MHz, 0 ºC

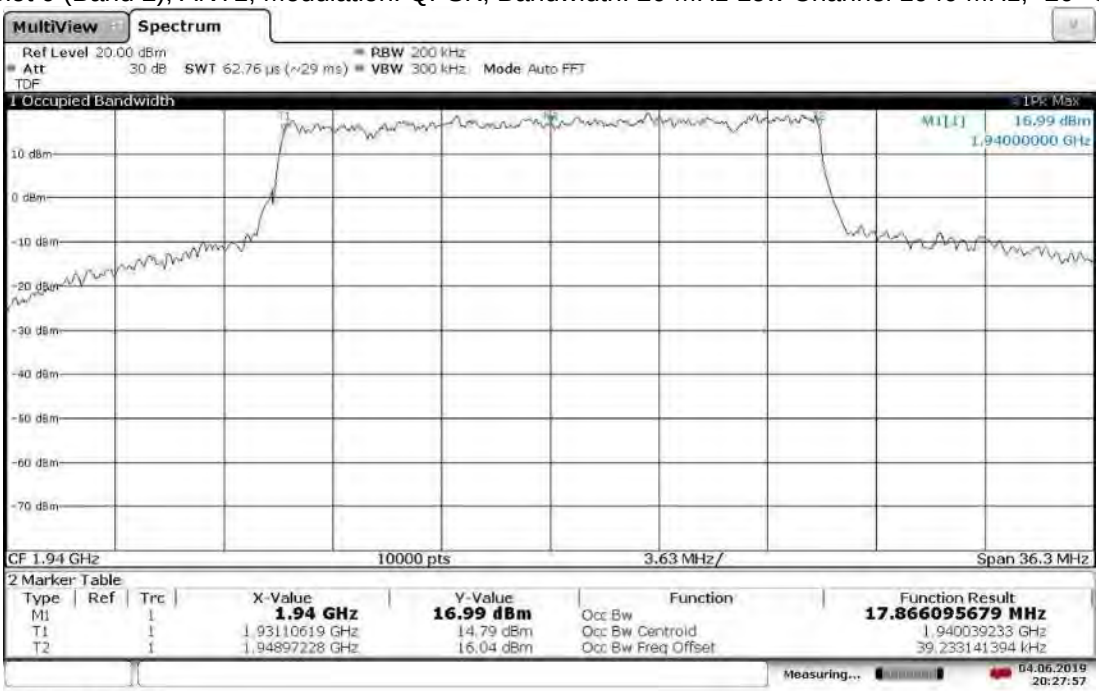


19:31:50 04.06.2019

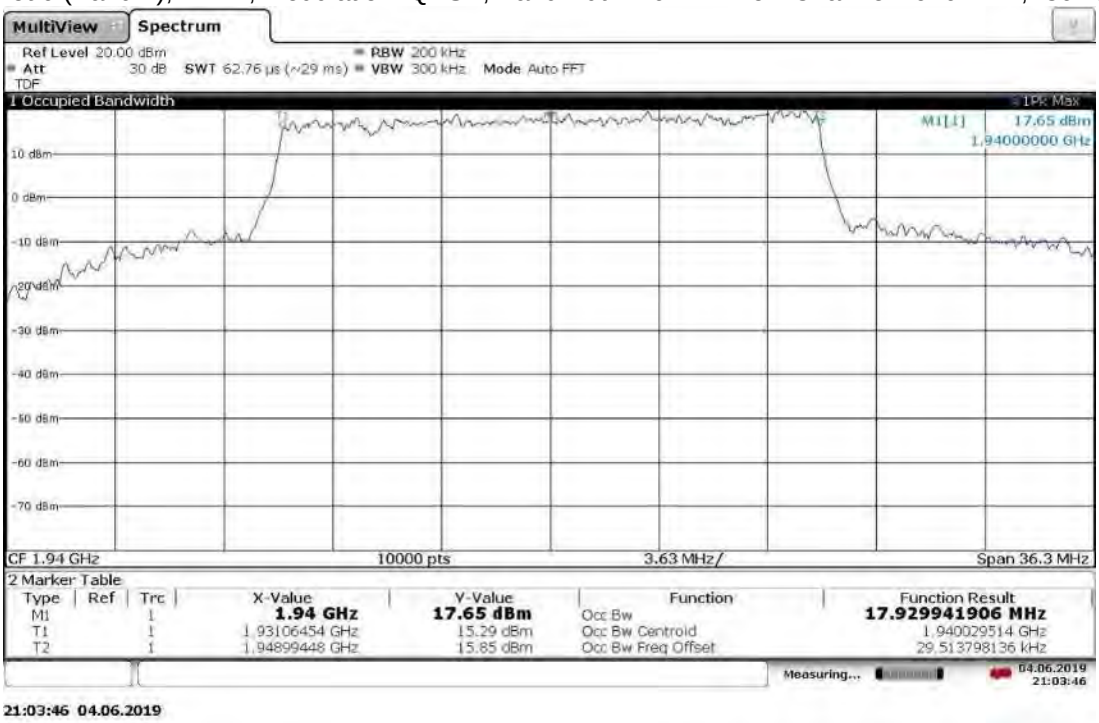
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 1940 MHz, -10 ºC

20:03:35 04.06.2019

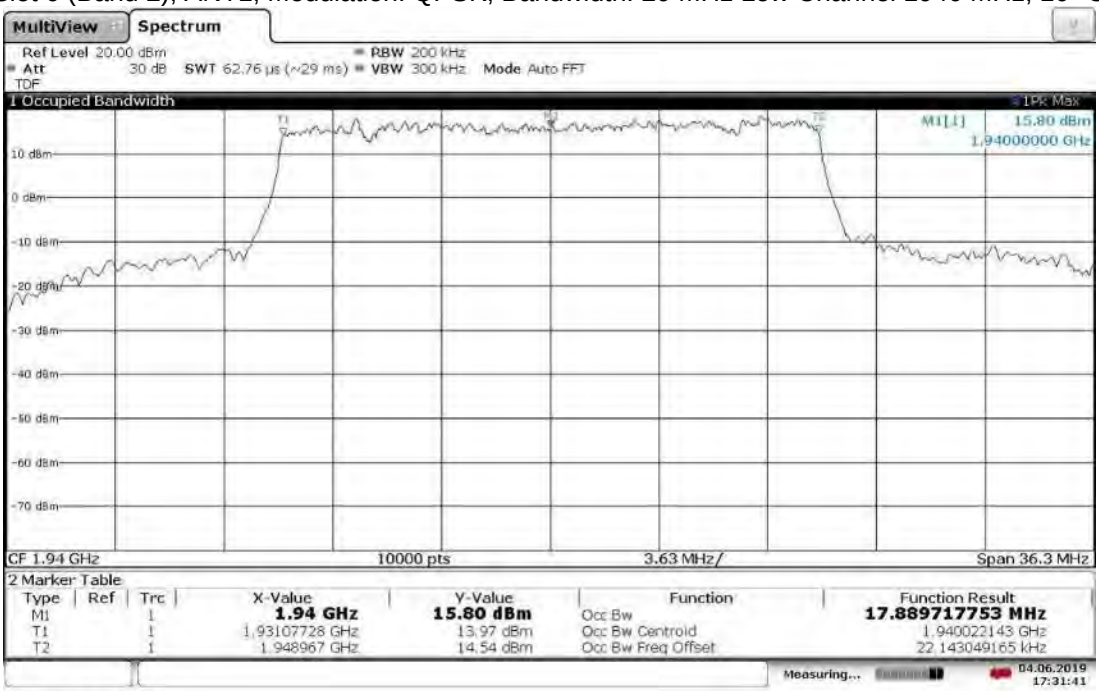
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 1940 MHz, -20 ºC



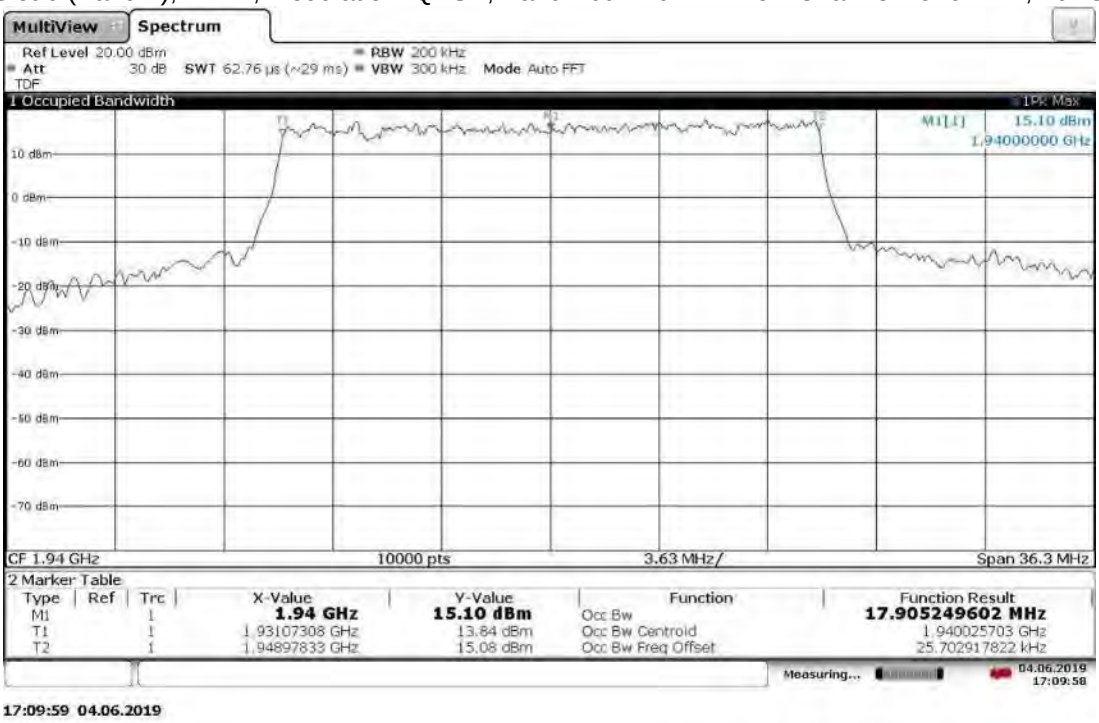
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 1940 MHz, -30 ºC



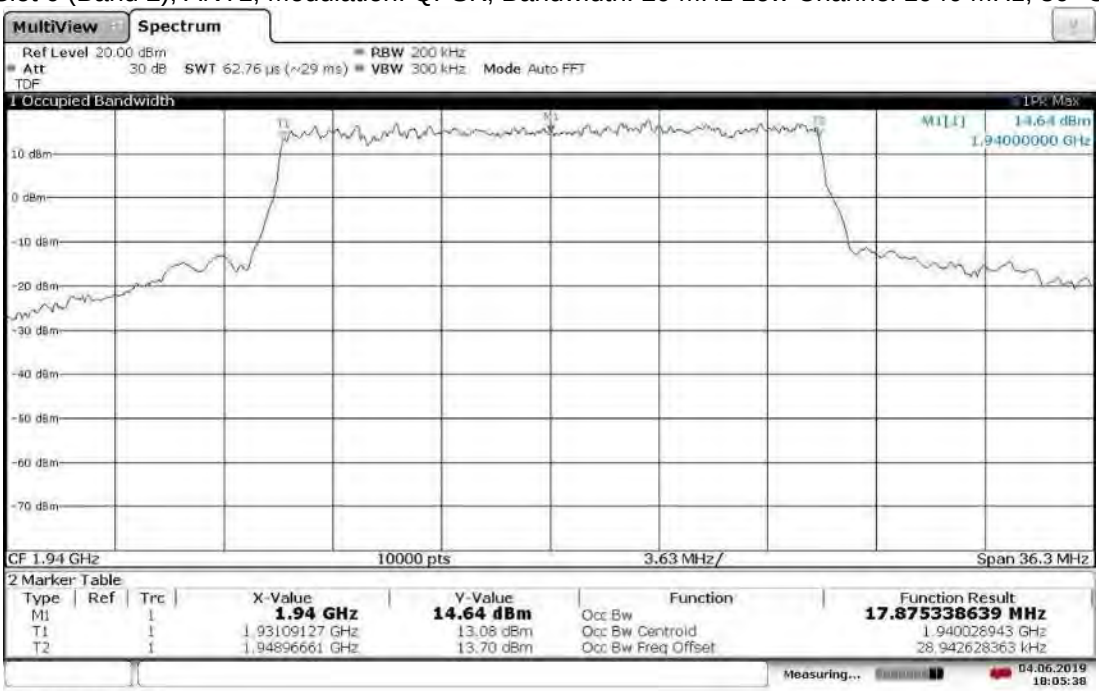
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 1940 MHz, 10 ºC



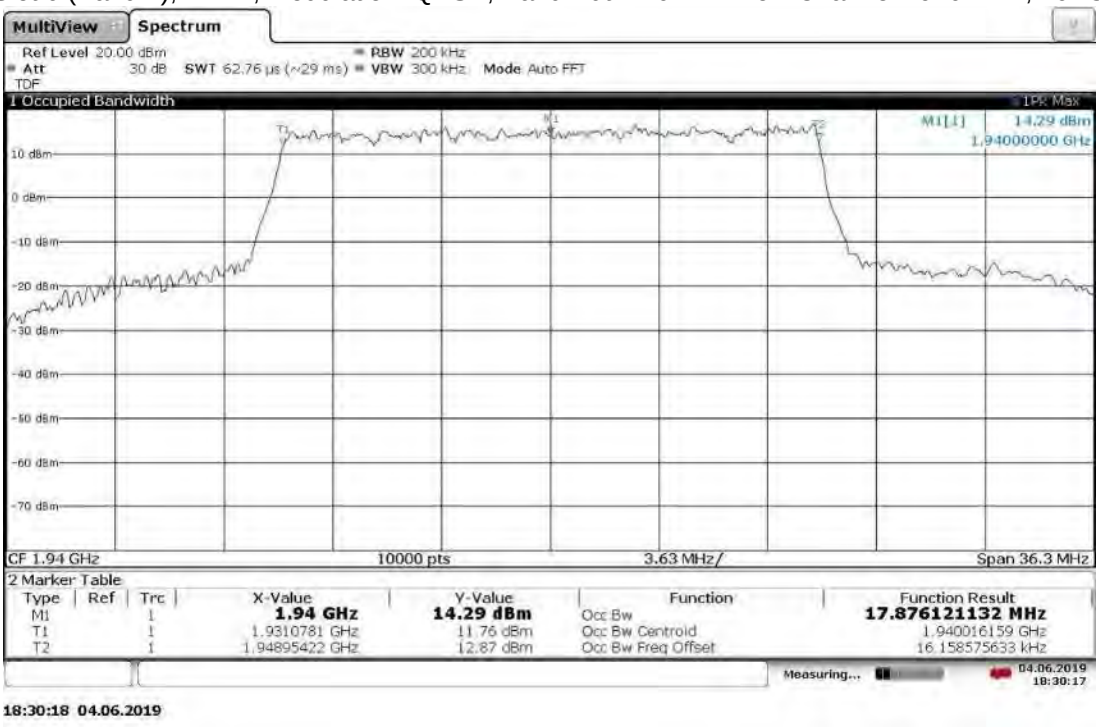
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 1940 MHz, 20 ºC



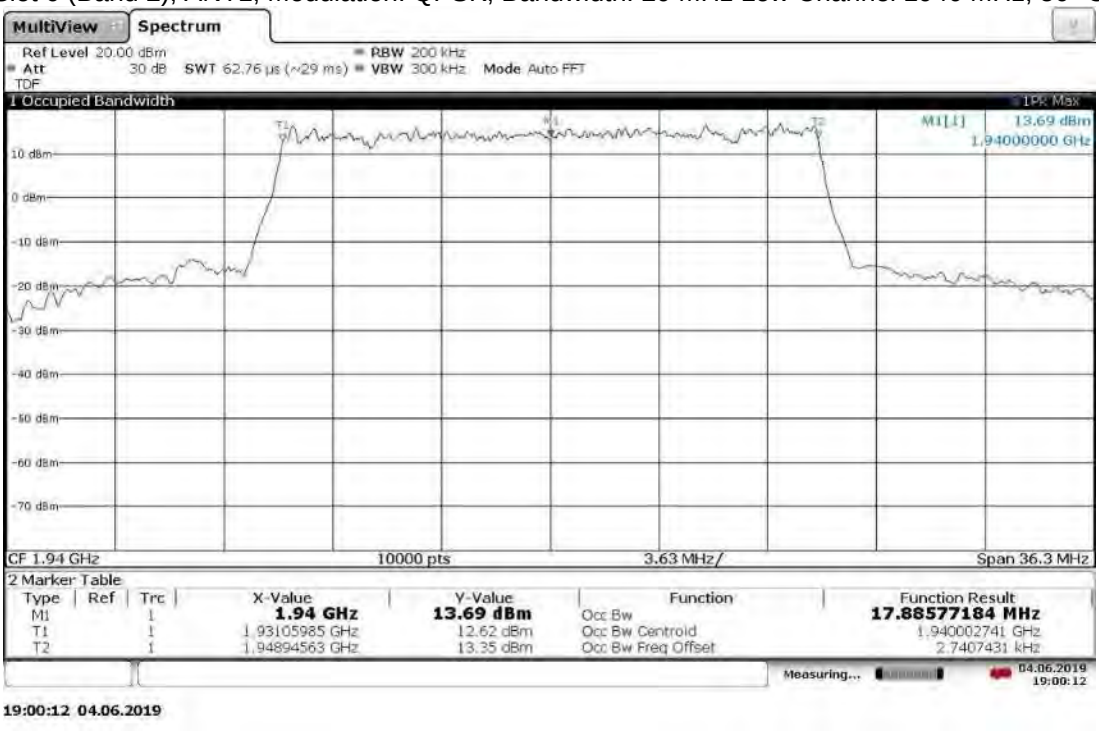
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 1940 MHz, 30 ºC



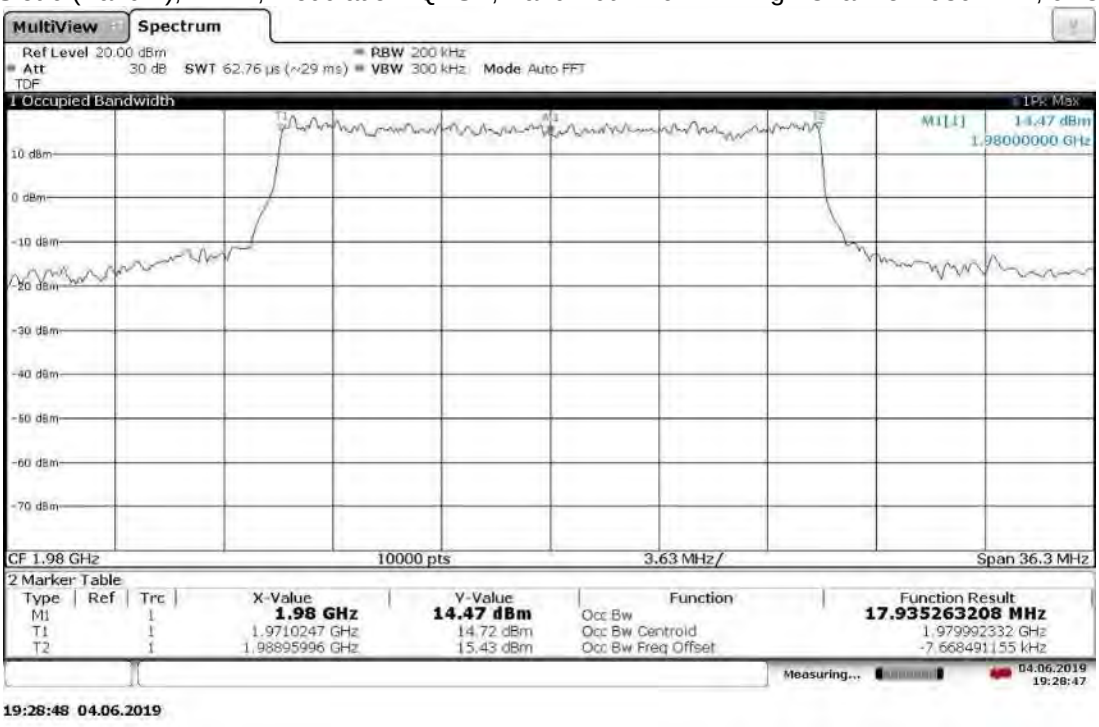
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 1940 MHz, 40 ºC



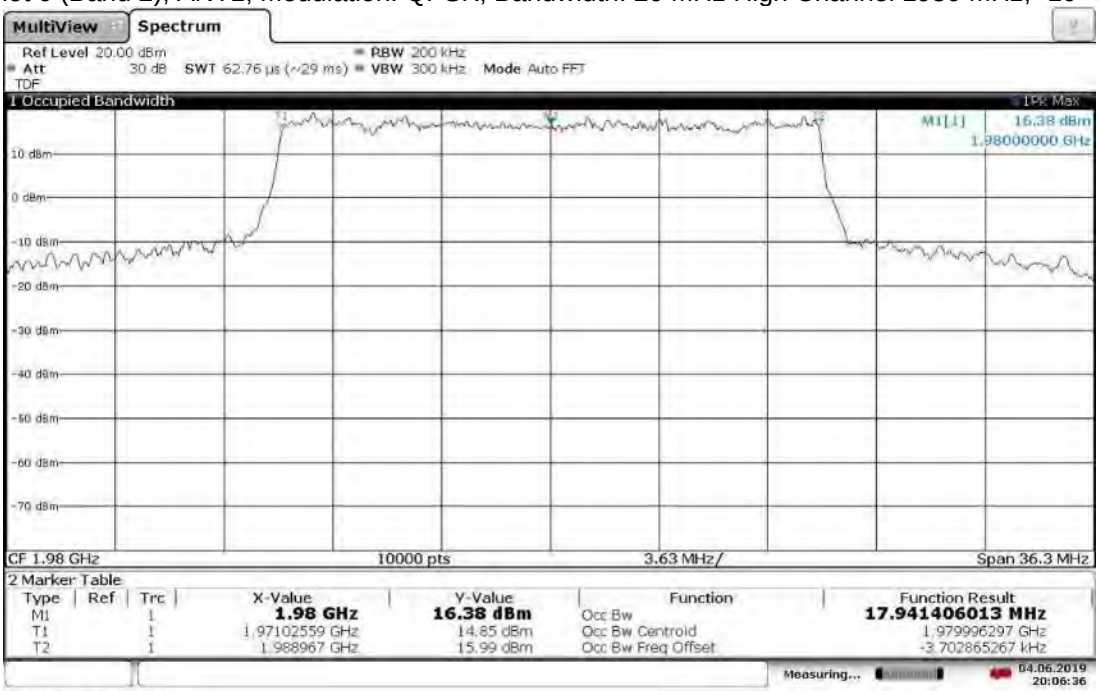
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 1940 MHz, 50 ºC



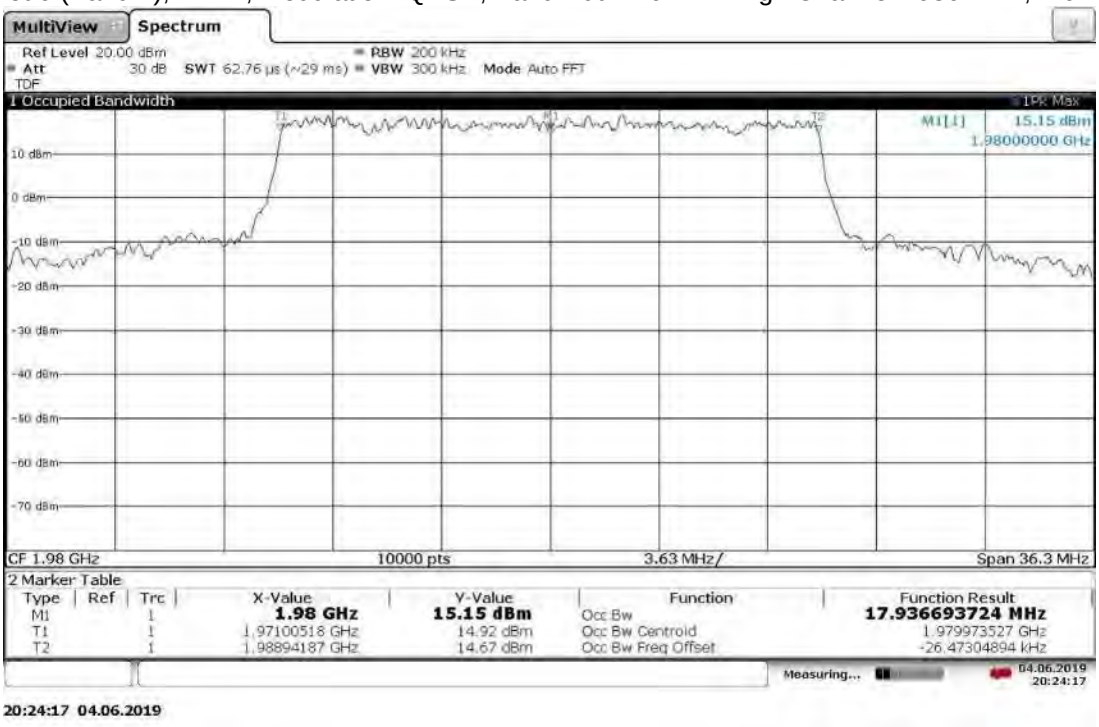
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz High Channel 1980 MHz, 0 ºC



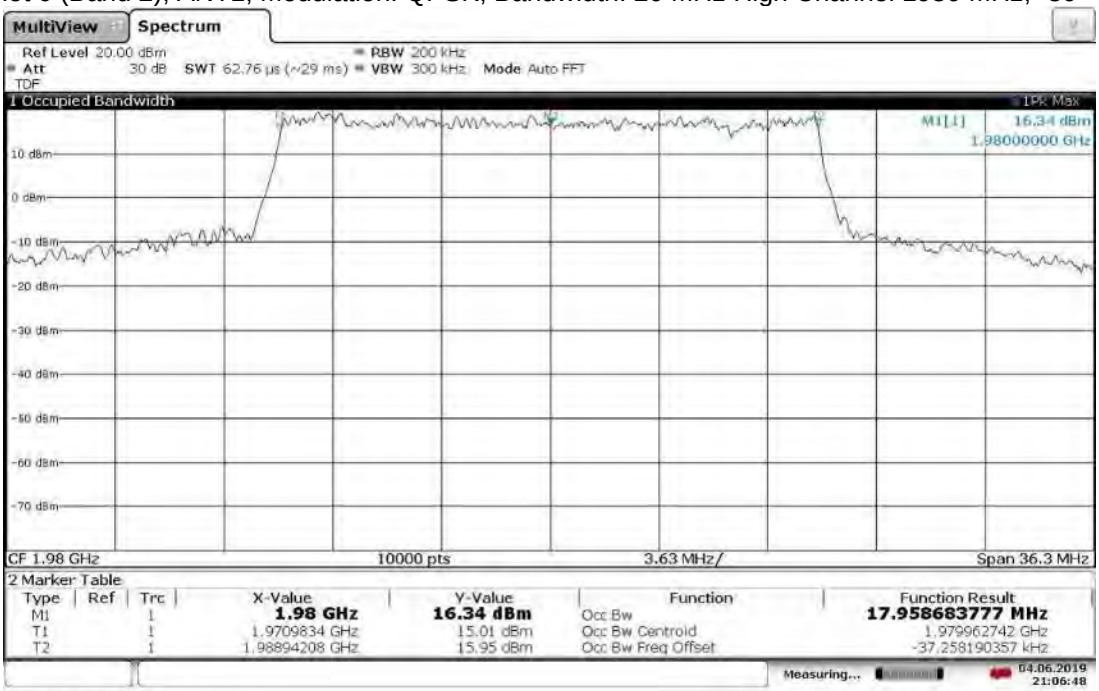
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz High Channel 1980 MHz, -10 ºC



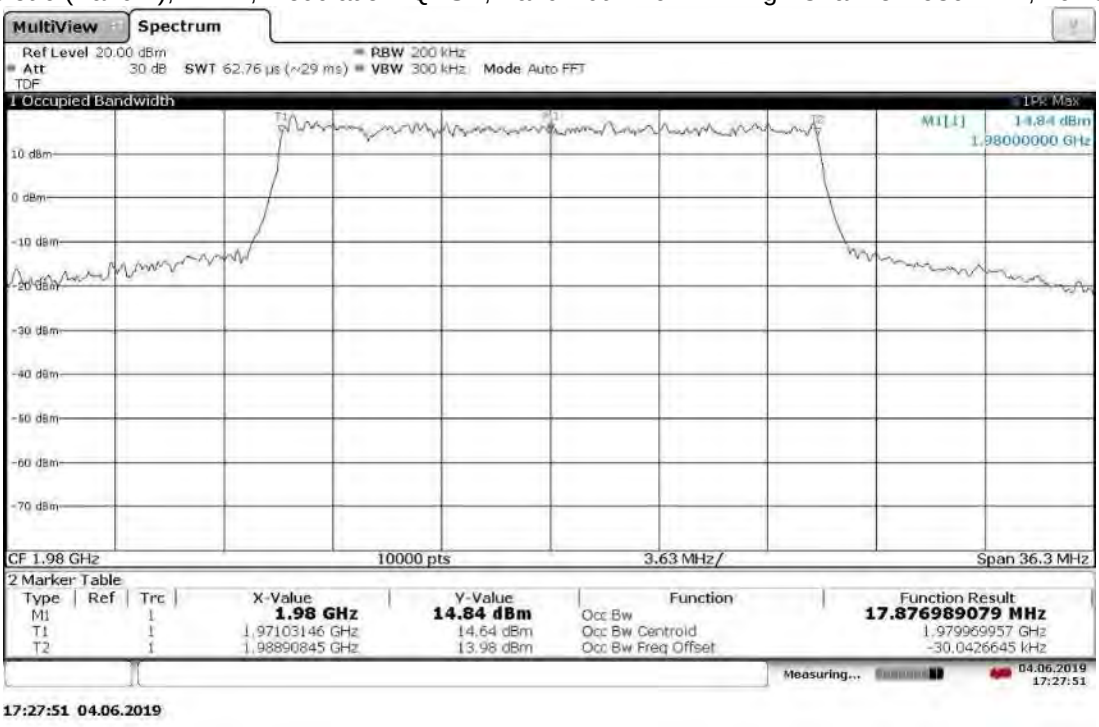
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz High Channel 1980 MHz, -20 ºC



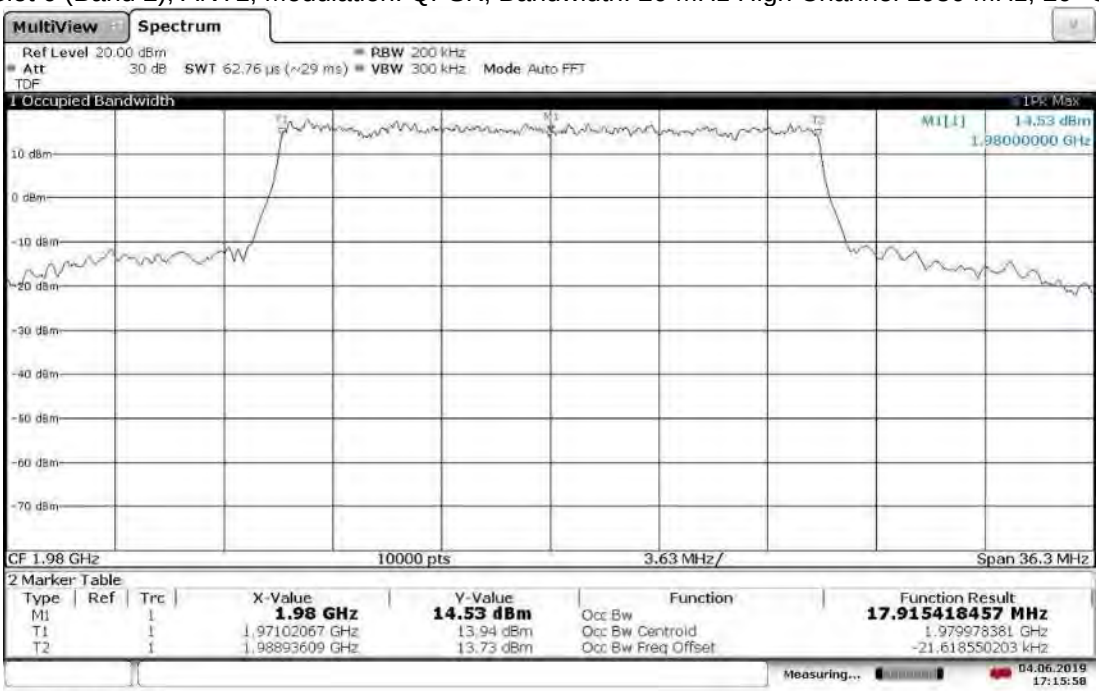
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz High Channel 1980 MHz, -30 ºC



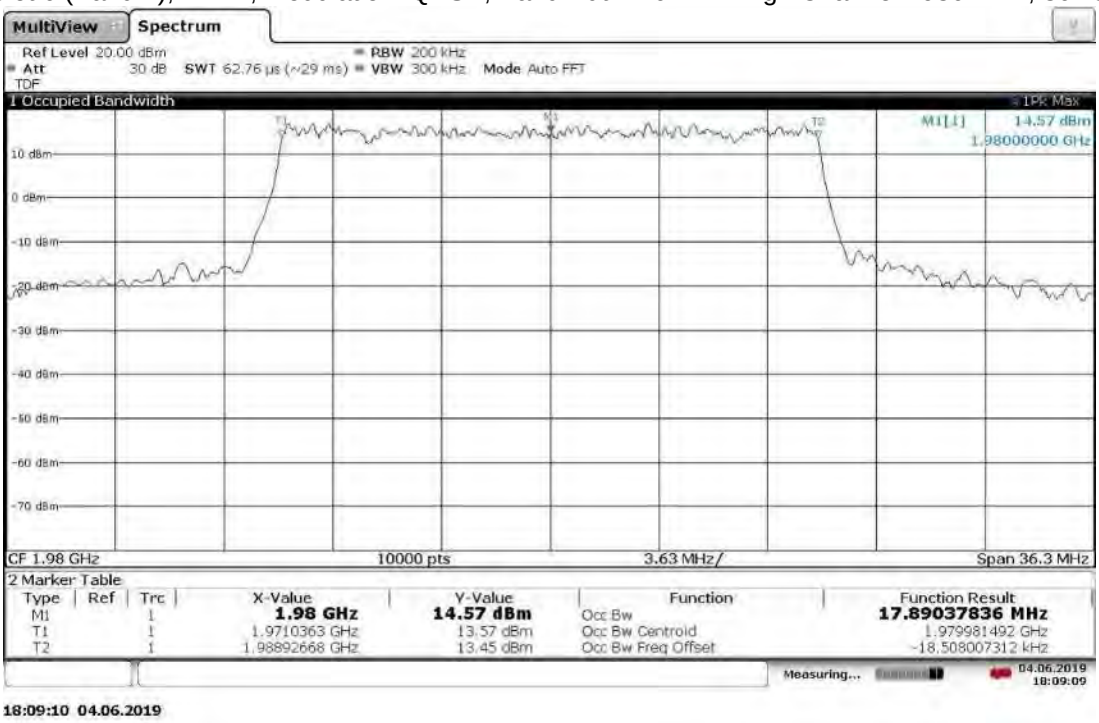
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz High Channel 1980 MHz, 10 ºC



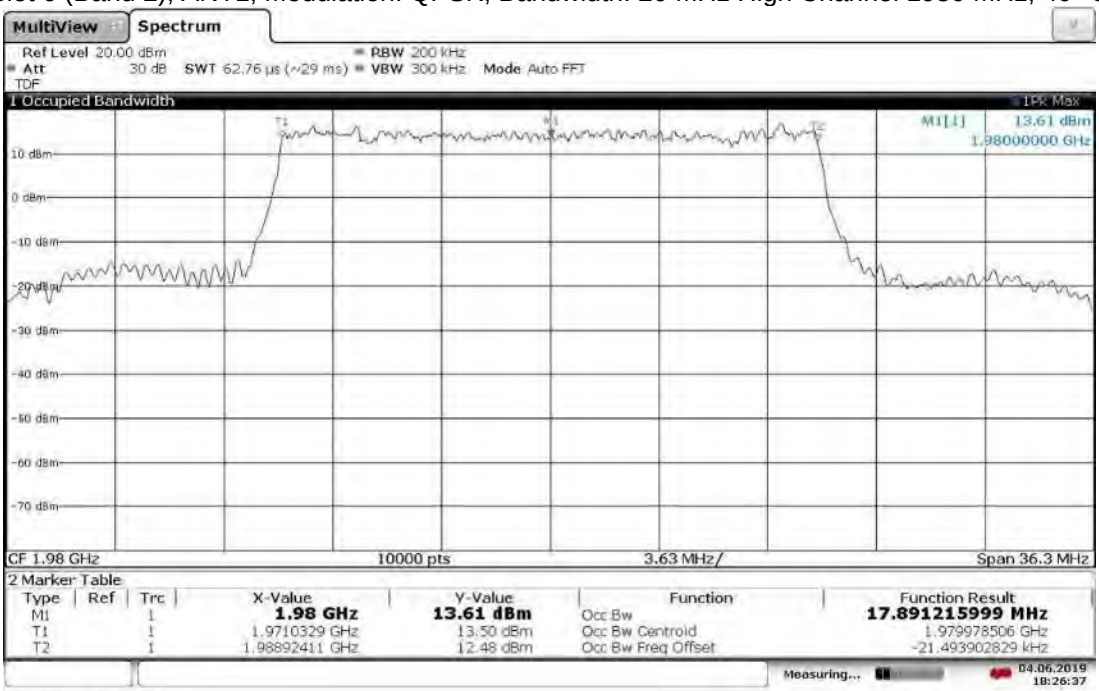
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz High Channel 1980 MHz, 20 ºC



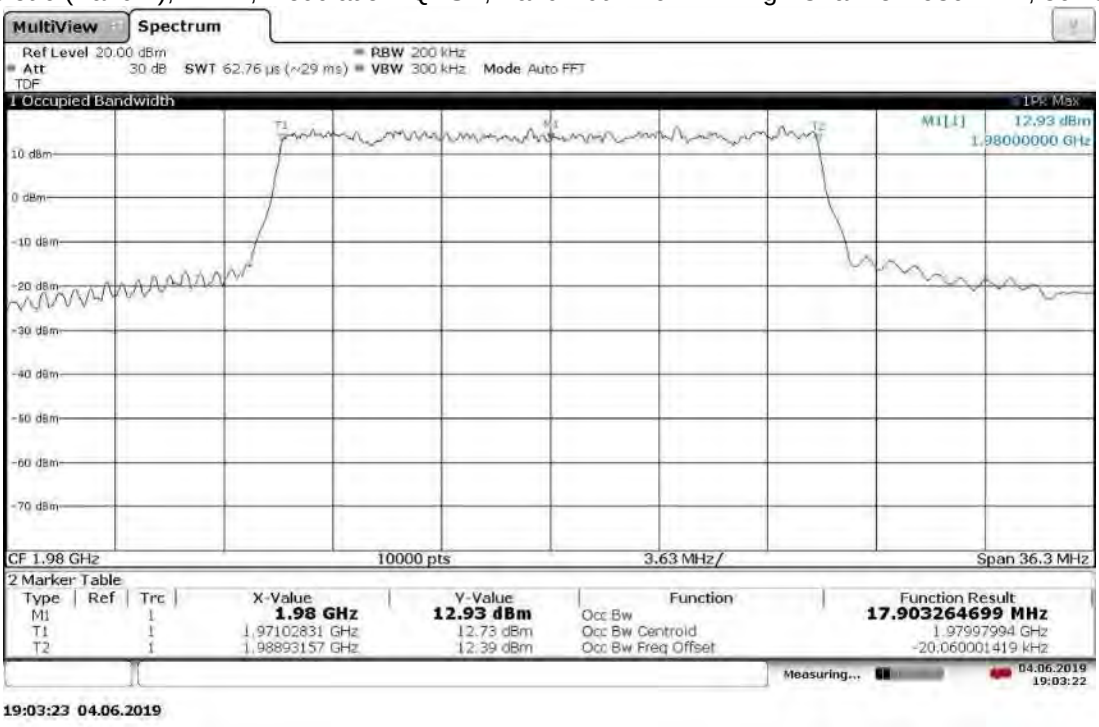
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz High Channel 1980 MHz, 30 ºC



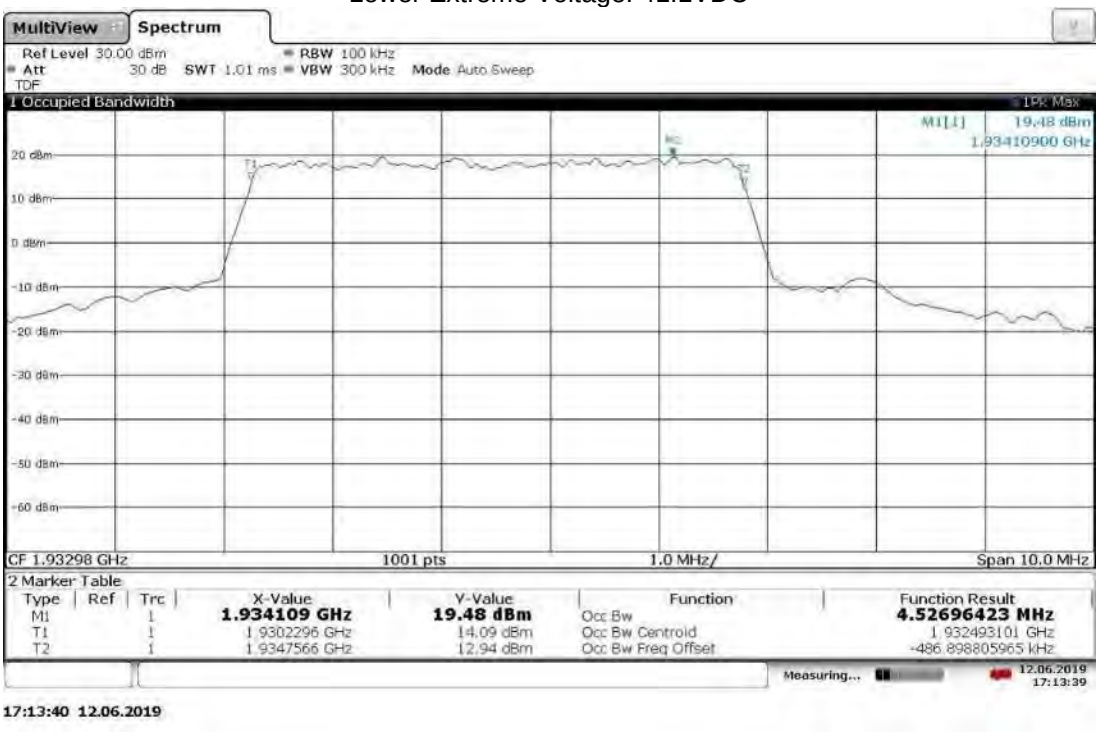
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz High Channel 1980 MHz, 40 ºC



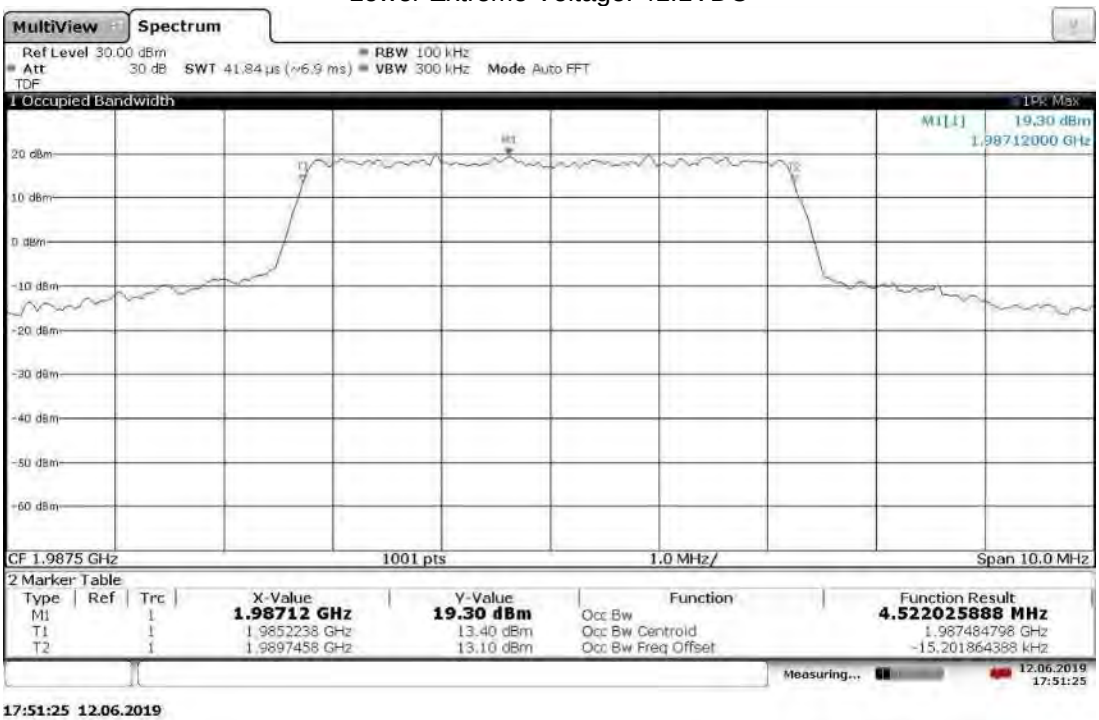
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz High Channel 1980 MHz, 50 ºC



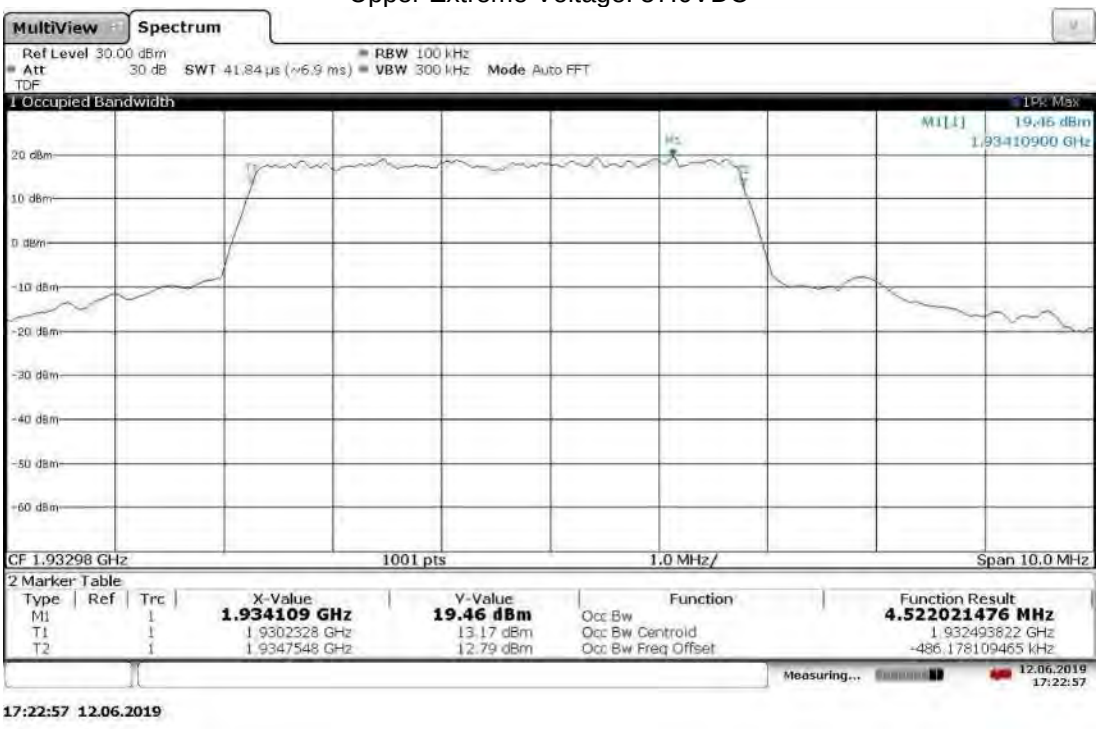
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz, Low Channel,
Lower Extreme Voltage: 41.1VDC



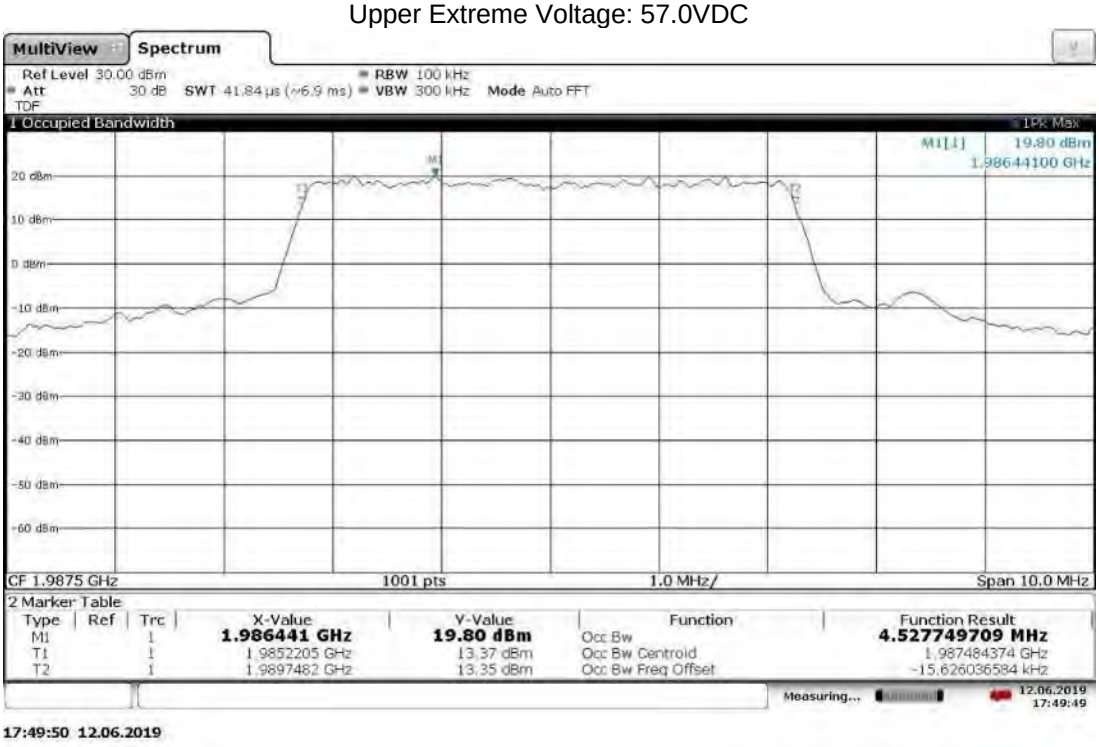
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz, High Channel,
Lower Extreme Voltage: 41.1VDC



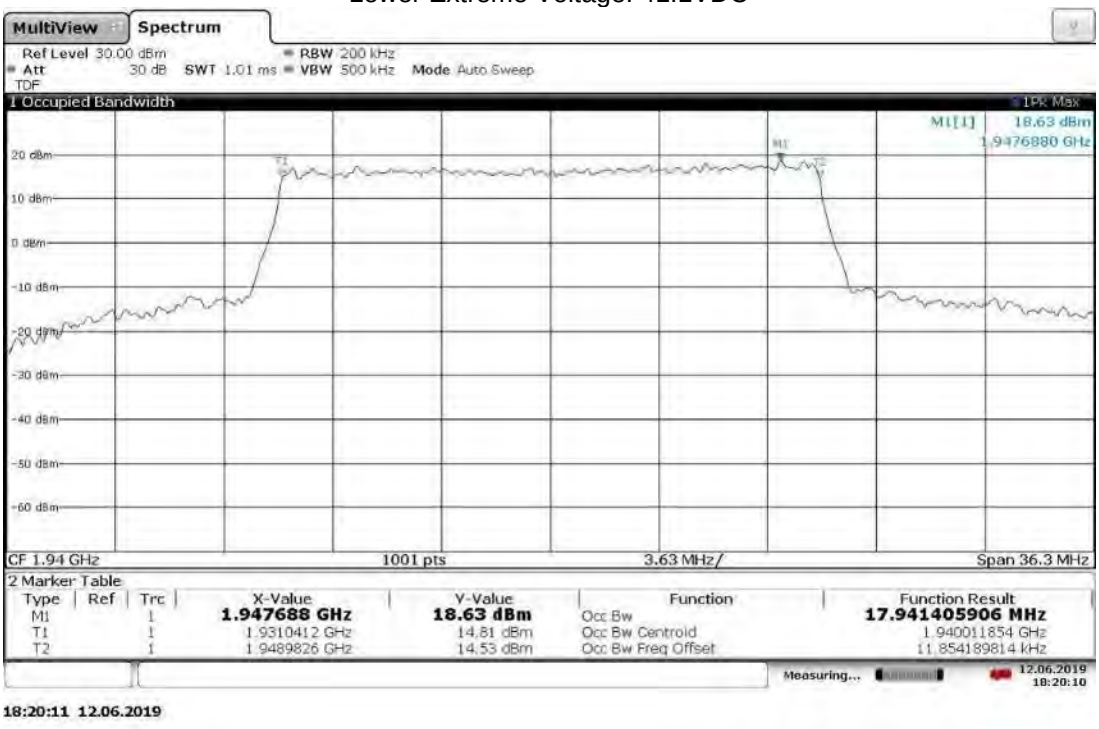
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz, Low Channel,
Upper Extreme Voltage: 57.0VDC



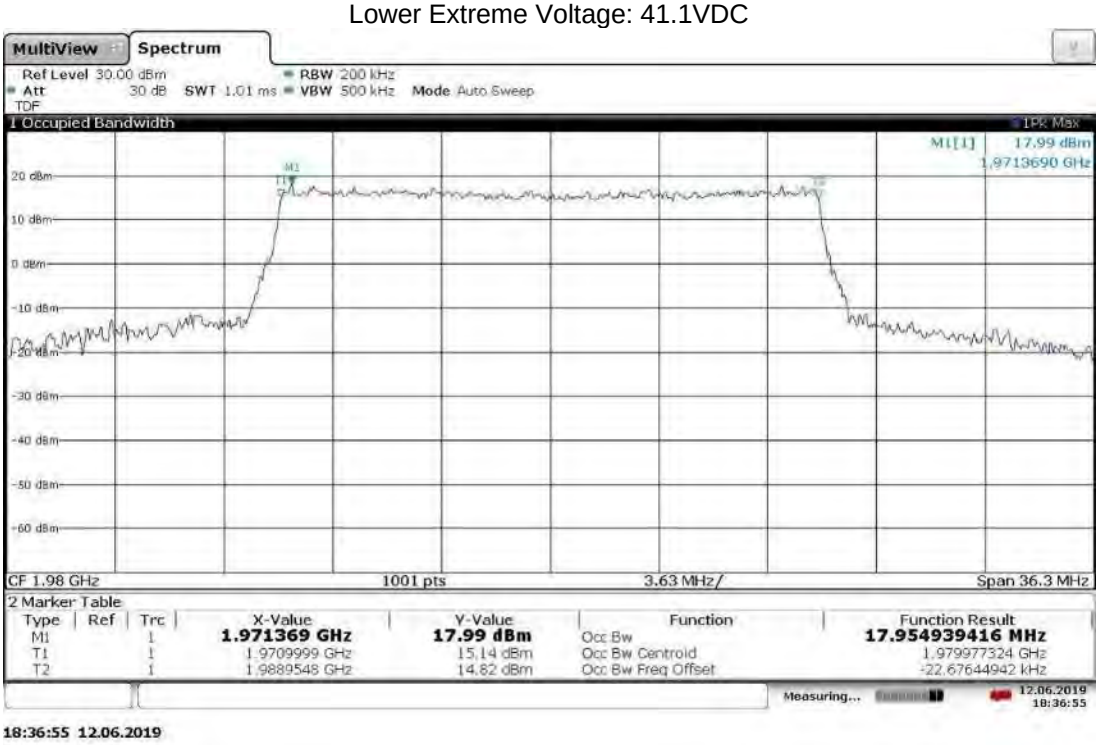
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz, High Channel,
Upper Extreme Voltage: 57.0VDC



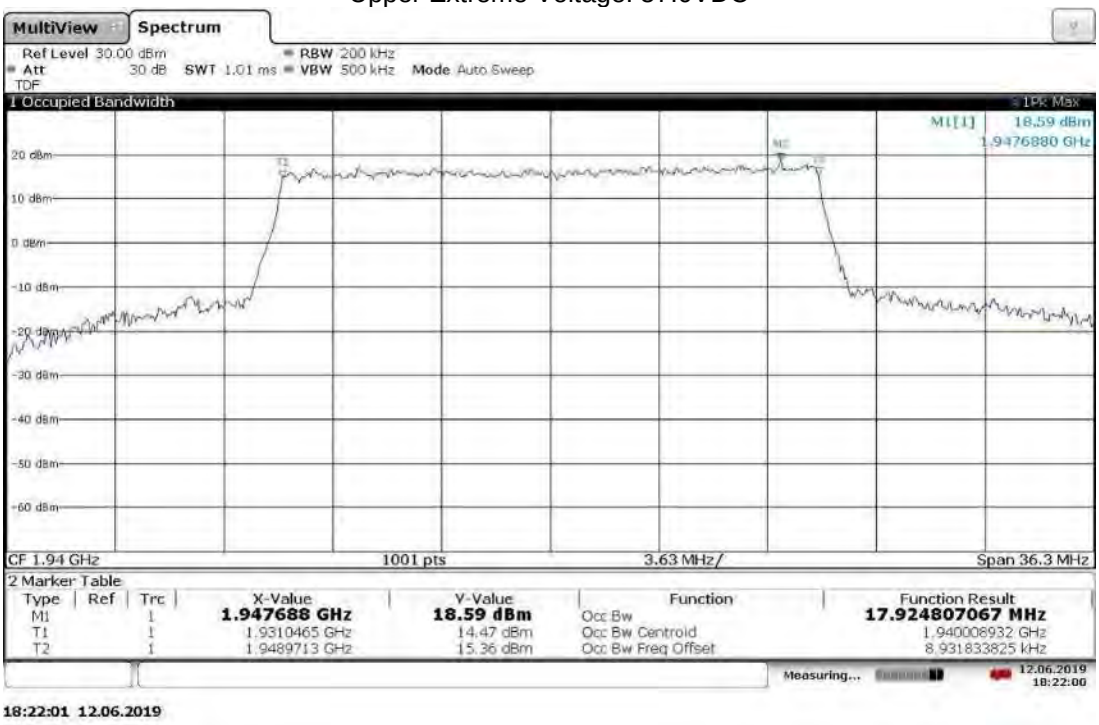
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz, Low Channel,
Lower Extreme Voltage: 41.1VDC



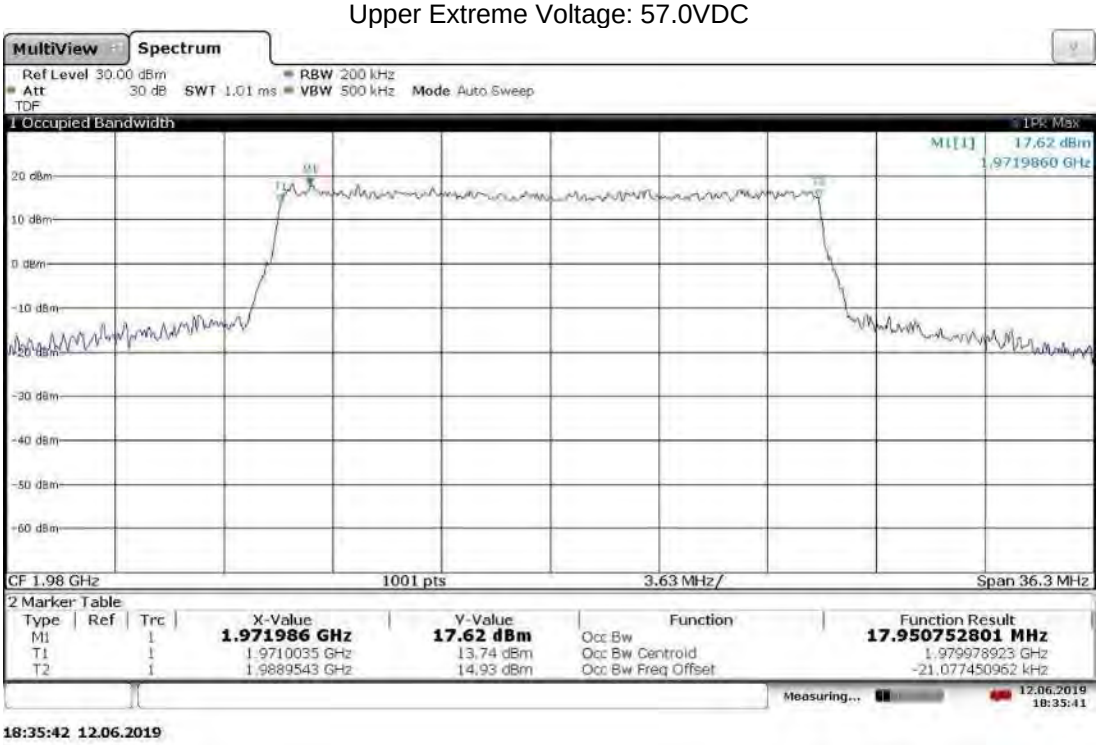
Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz, High Channel,
Lower Extreme Voltage: 41.1VDC



Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 20 MHz, Low Channel,
Upper Extreme Voltage: 57.0VDC



Slot 0 (Band 2), ANT1, Modulation: QPSK, Bandwidth: 5 MHz, High Channel,
Upper Extreme Voltage: 57.0VDC



Test Personnel:	Kouma Sinn KPS	Test Date:	05/23/2019, 06/04/2019, 06/12/2019
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 24	Limit Applied:	See report section 10.3
Input Voltage:	48VDC (POE)		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	06/12/2019: 22 ºC
		Relative Humidity:	06/12/2019: 41 %
		Atmospheric Pressure:	0612/2019: 1011 mbars

Deviations, Additions, or Exclusions: None

11 Transmitter spurious emissions

11.1 Method

Tests are performed in accordance with ANSI C63.26 and CFR47 FCC Parts 2.1051, 2.1053, 2.1057, and 24

TEST SITE: EMC Lab & 10m ALSE

The EMC Lab has one Semi-anechoic Chamber and one Shielded Chamber. AC Mains Power is available at 120, 230, and 277 Single Phase; 208, 400, and 480 3-Phase. Large reference ground-planes are installed in the general lab area to facilitate EMC work not requiring a shielded environment.

The 10m ALSE is 13m (Length) x 21m (Depth) x 10m (Height) with the effective size in terms of space from the tips of the absorber is 12m (Length) x 20m (Depth) x 8.5m (Height). This chamber achieves broadband performance using a unique arrangement of hybrid and ferrite tile absorber. This chamber has a built in 3m diameter turntable (Embedded type). The metal structure of the table makes electrical connection around the entire circumference of the turntable to the ground plane with a metal brush type connection. The turntable is located on one end of the chamber and the antennas are mounted 3 and 10 meters away at the other end of the chamber on the adjustable an Antenna Mast. The antenna mast is a non-conductive bore sighted type with remote control of antenna height and polarization. The Antenna Mast and the turntable can be remotely controlled through the controller located in the adjacent Control room. A Styrofoam table 80 cm high is used for table-top equipment.

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	4.6dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	5.3 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.5 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.2 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	5.0 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	5.0 dB	5.5 dB

As shown in the table above our radiated emissions U_{lab} is less than the corresponding U_{CISPR} reference value in CISPR 16-4-2 Table 1, hence the compliance of the product is only based on the measured value, and no measurement uncertainty correction is required, based on CISPR 22 and CISPR 11 (for 2006 and later revisions) Clause 11.

Sample Calculation

The field strength is calculated by adding the Antenna Factor and Cable Factor, and subtracting the Amplifier Gain (if any) from the measured reading. The basic equation with a sample calculation is as follows:

FS = RA + AF + CF - AG
Where FS = Field Strength in dBμV/m
RA = Receiver Amplitude (including preamplifier) in dBμV
CF = Cable Attenuation Factor in dB
AF = Antenna Factor in dB
AG = Amplifier Gain in dB

In the following table(s), the reading shown on the data table reflects the preamplifier gain. An example for the calculations in the following table is as follows.

Assume a receiver reading of 52.0 dBμV is obtained. The antenna factor of 7.4 dB and cable factor of 1.6 dB is added. The amplifier gain of 29 dB is subtracted, giving a field strength of 32 dBμV/m. This value in dBμV/m was converted to its corresponding level in μV/m.

RA = 52.0 dBμV
AF = 7.4 dB/m
CF = 1.6 dB
AG = 29.0 dB
FS = 32 dBμV/m

To convert from dBμV to μV or mV the following was used:

$UF = 10^{(NF / 20)}$ where UF = Net Reading in μV
NF = Net Reading in dBμV

Example:

FS = RA + AF + CF – AG = 52.0 + 7.4 + 1.6 – 29.0 = 32.0
$UF = 10^{(32\ dB\mu V / 20)}$ = 39.8 μV/m

Alternately, when BAT-EMC Emission Software is used, the “Level” includes all losses and gains and is compared directly in the “Margin” column to the “Limit”. The “Correction” includes Antenna Factor, Preamp, and Cable Loss. These are already accounted for in the “Level” column.

11.2 Test Equipment Used:

Test equipment used for antenna port conducted test

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	02/01/2019	02/01/2020
CBLHF2012-2M-1'	2m 9kHz-40GHz Coaxial Cable - SET1	Huber & Suhner	SF102	252675001	02/01/2019	02/01/2020
ROS005-1'	Signal and Spectrum Analyzer	Rohde &Schwarz	FSW43	100646	10/15/2018	10/15/2019
DS40'	Temp, humidity, pressure gauge	Digi Sense	68000-49	181717625	11/06/2018	11/06/2019

Software Utilized:

Name	Manufacturer	Version
None	--	--

Test equipment used for Radiated emissions

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	02/01/2019	02/01/2020
PRE11'	50dB gain pre-amp	Keith H	PRE11	PRE11	10/27/2018	10/27/2019
145-410'	Cables 145-420 145-421 145-422 145-406	Huber + Suhner	10m Track A Cables	multiple	07/25/2018	07/25/2019
145128'	EMI Receiver (20 Hz - 40 Ghz)	Rohde & Schwarz	ESIB 40	839283/001	03/28/2019	03/28/2020
145-416'	Cables 145-420 145-423 145-425 145-408	Huber + Suhner	3m Track B cables	multiple	07/25/2018	07/25/2019
BON001'	METER, POWER	Boonton	4232A	55601	01/23/2019	01/23/2020
145106'	Bilog Antenna (30MHz - 5GHz)	Sunol Sciences	JB5	A111003	06/18/2018	06/18/2019
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	10/26/2018	10/26/2019
CBLSHF102'	Cable, SMA - SMA, 9kHz-40GHz (Cable Kit 5)	Sucoflex (Huber Suhn	104PE	CBLSHF102	09/13/2018	09/13/2019
145108'	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESIB40	100209	06/06/2019	06/06/2020
PRE8'	PREAMPLFIER 1- 40 GHz	MITEQ	NSP4000-NF	507145	10/25/2018	10/25/2019

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	3.18.0.16

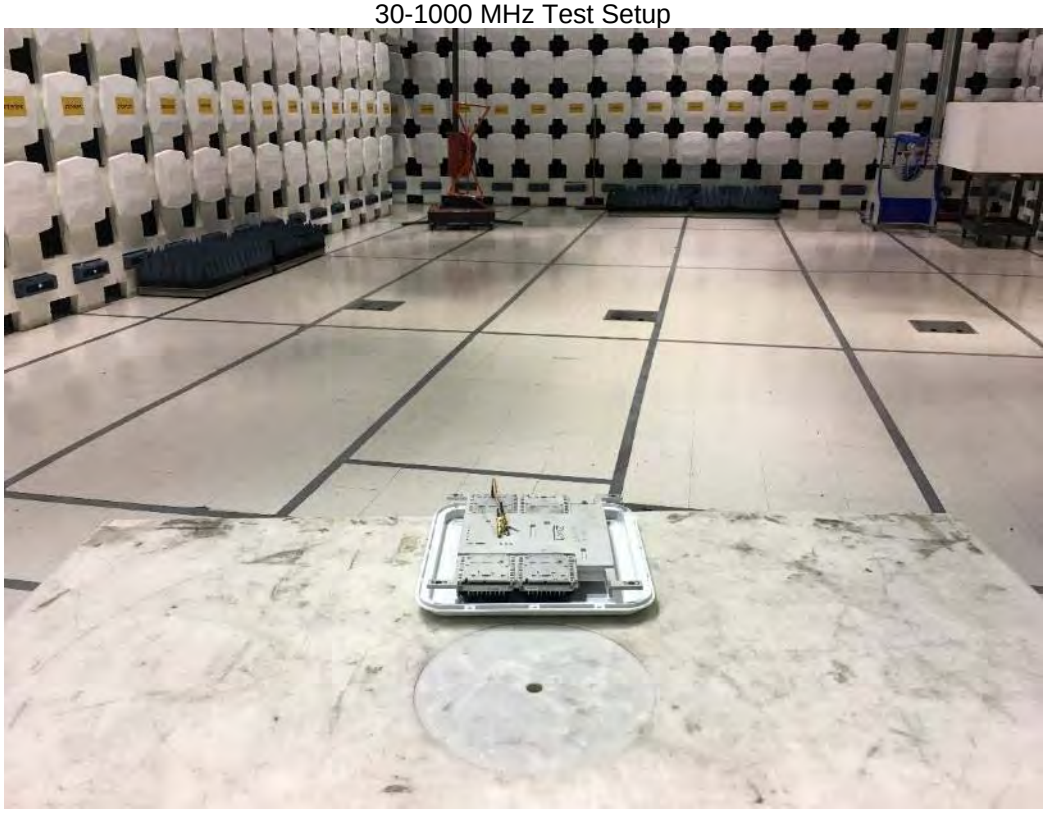
11.3 Results:

The sample tested was found to Comply. Where a resolution bandwidth of less than 1 MHz was used (in some cases, 120 kHz or 100 kHz), more than 10 dB margin to the limit is shown. Since the two antenna ports transmit uncorrelated data streams and use cross polarized antennas, no adjustments to the test results were applied due to MIMO operation, per KDB 662911.

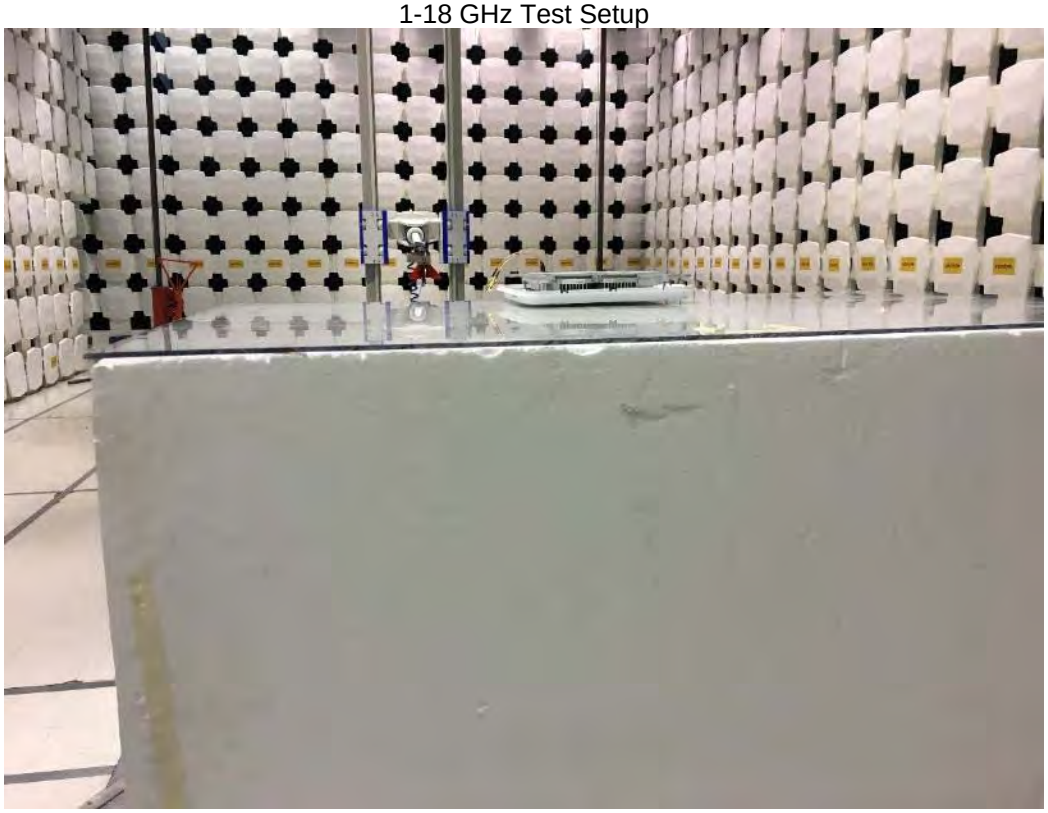
§24.238(a): The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.
(b) Measurement procedure. Compliance with these rules is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz or greater. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. A narrower resolution bandwidth is permitted in all cases to improve measurement accuracy provided the measured power is integrated over the full required measurement bandwidth (i.e. 1 MHz or 1 percent of emission bandwidth, as specified). The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

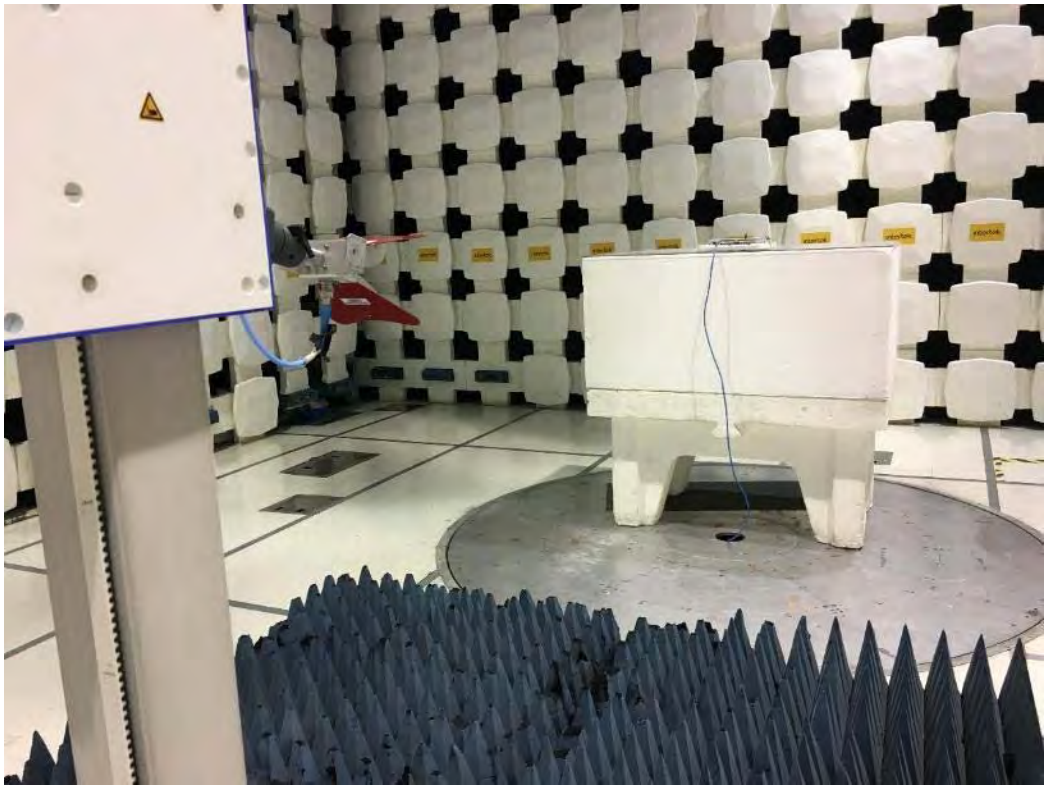
11.4 Setup Photographs:

30-1000 MHz Test Setup

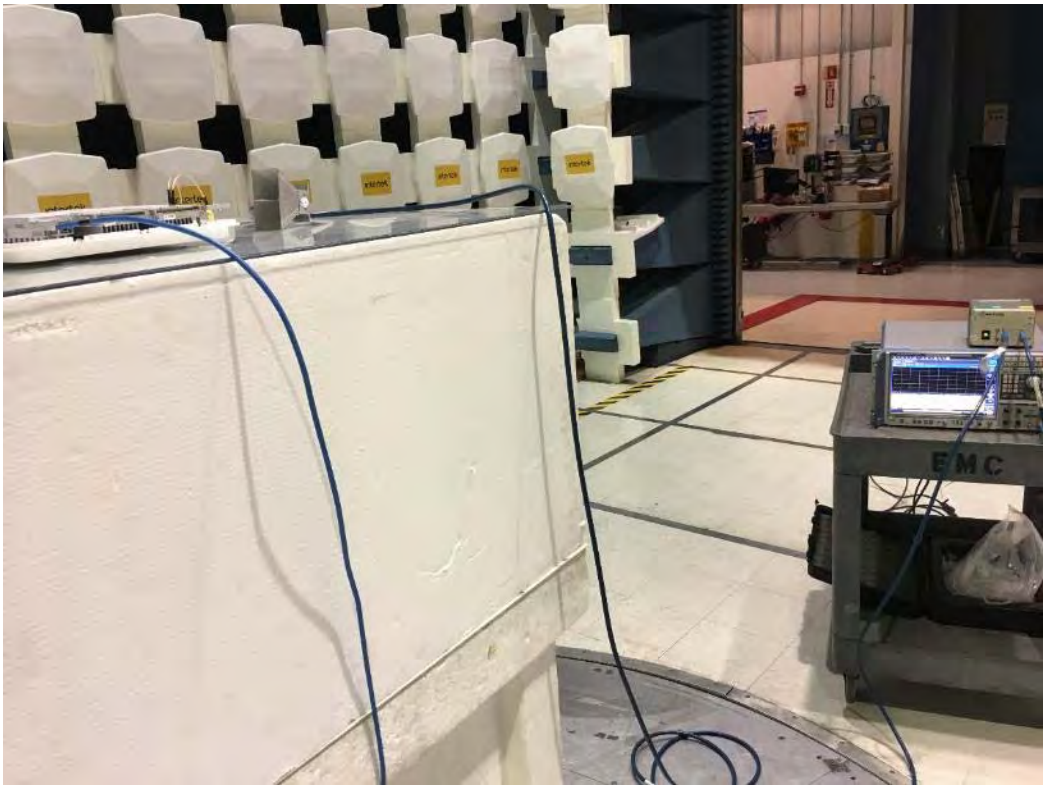


1-18 GHz Test Setup





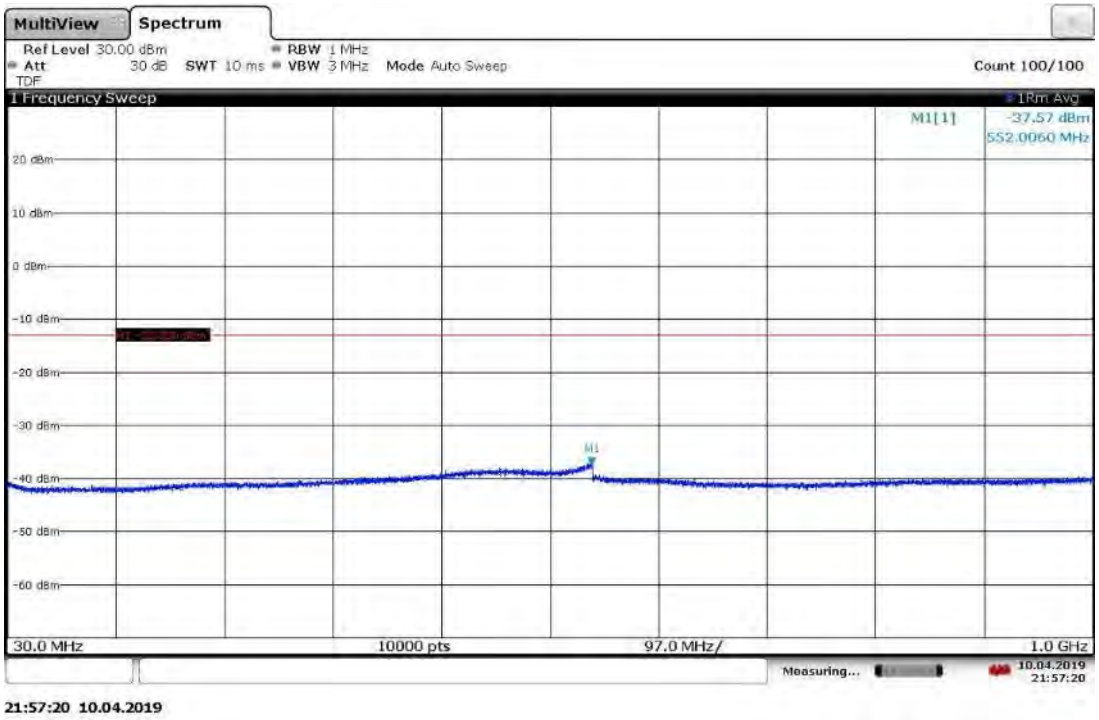
18-22 GHz



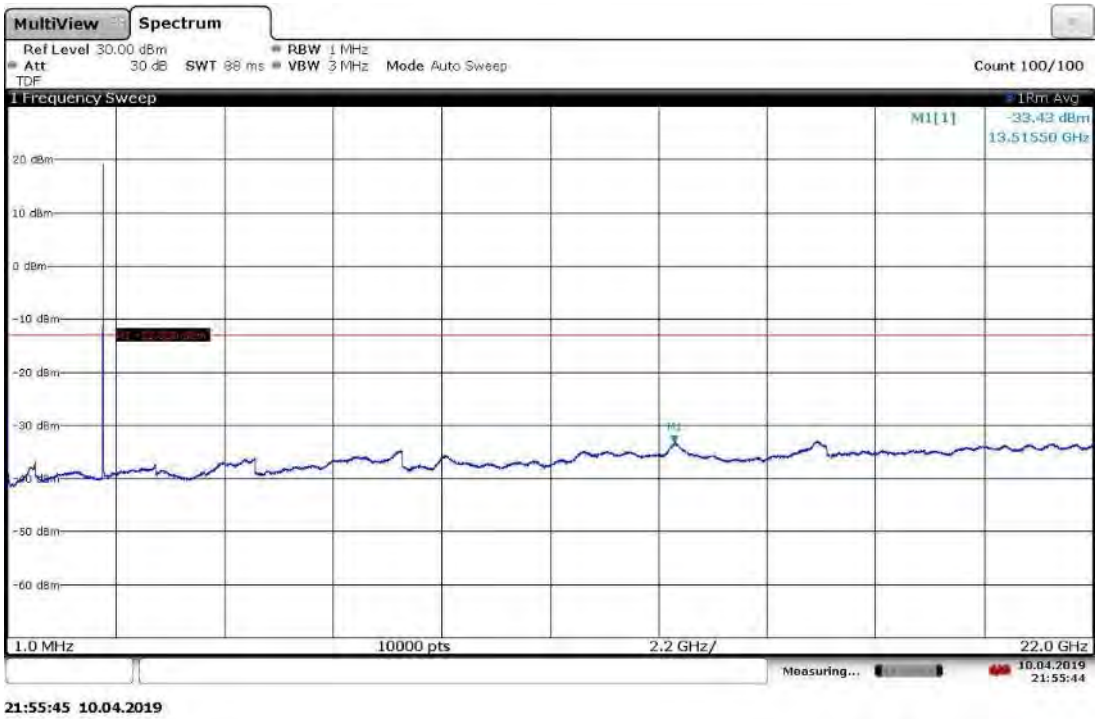
Antenna Port Conducted Test Setup

11.5 Plots/Data:

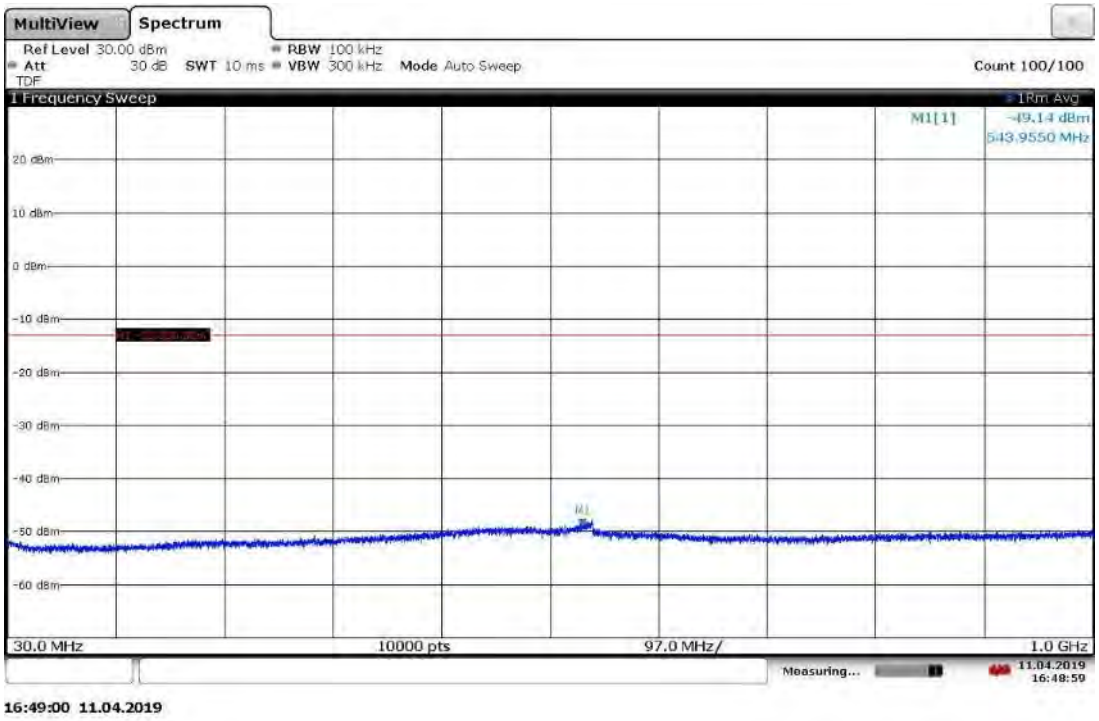
Slot 0 (Band 2), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Low Channel 1932.5 MHz 30MHz-1GHz



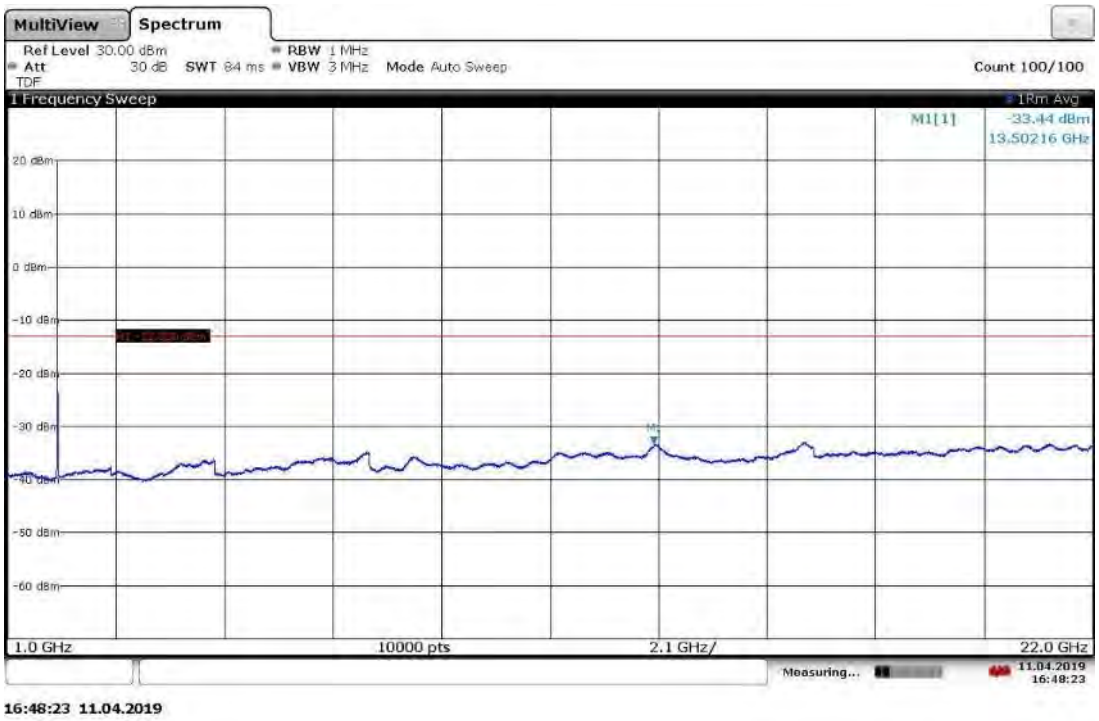
Slot 0 (Band 2), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Low Channel 1932.5 MHz 1-22 GHz



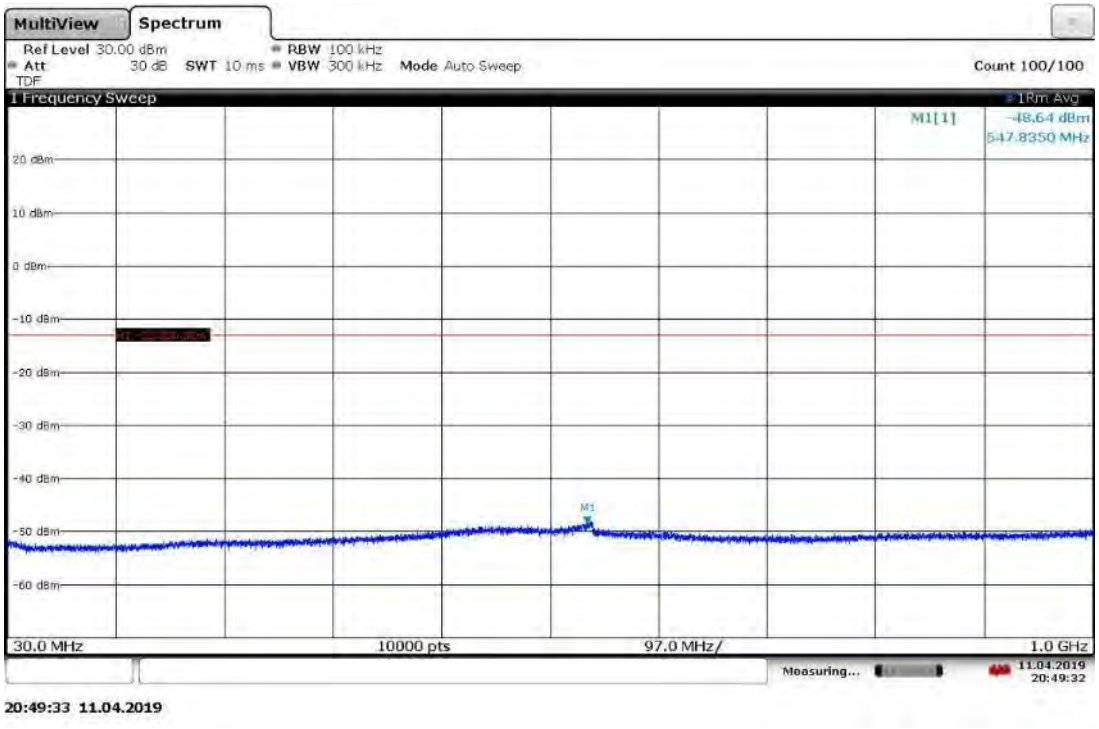
Slot 0 (Band 2), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Mid Channel 1960 MHz 30MHz-1GHz



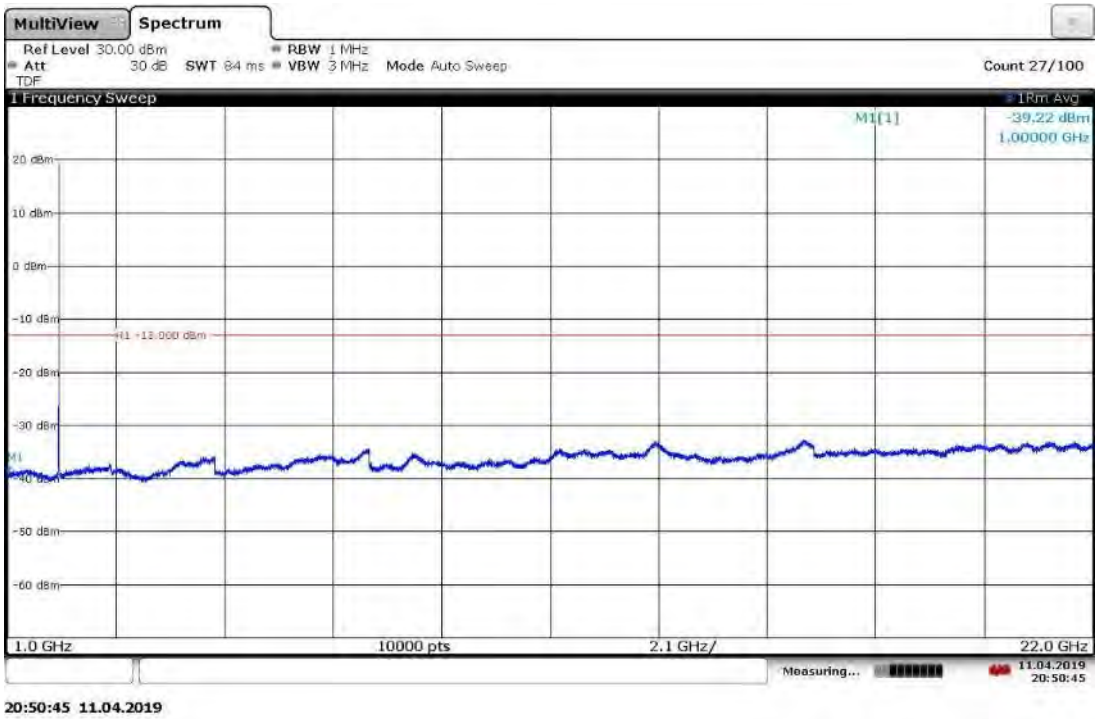
Slot 0 (Band 2), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Mid Channel 1960 MHz 1-22GHz



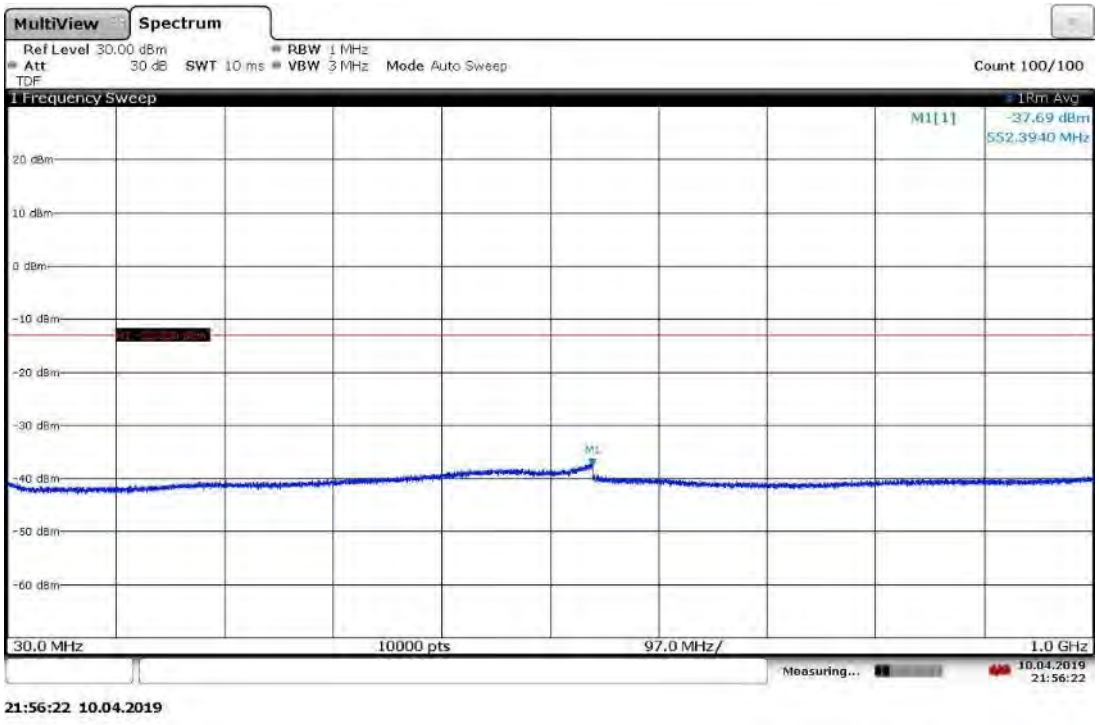
Slot 0 (Band 2), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, High Channel 1987.5 MHz 30MHz-1GHz



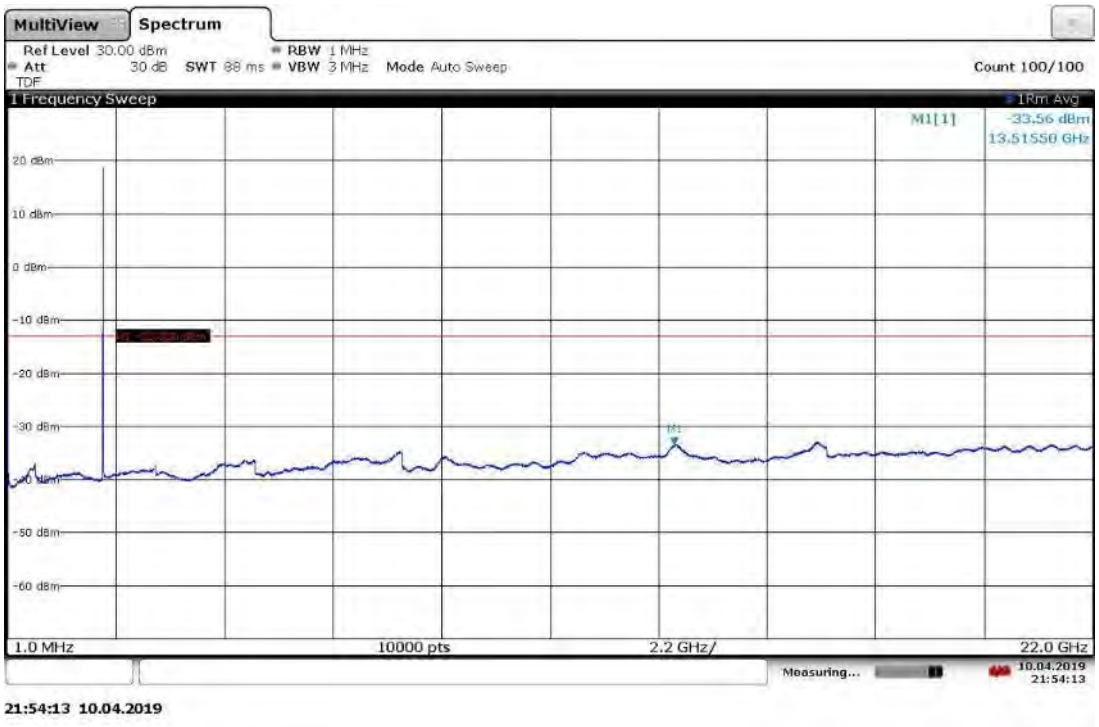
Slot 0 (Band 2), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, High Channel 1987.5 MHz 1-22GHz



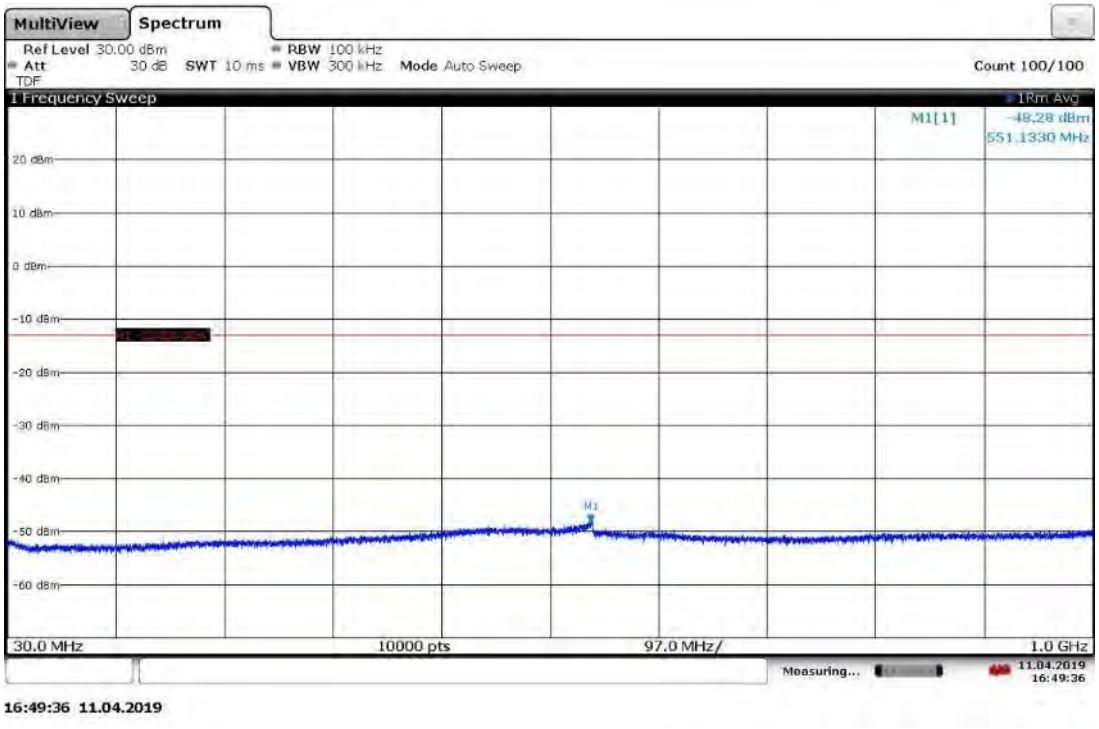
Slot 0 (Band 2), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Low Channel 1932.5 MHz 30MHz-1GHz



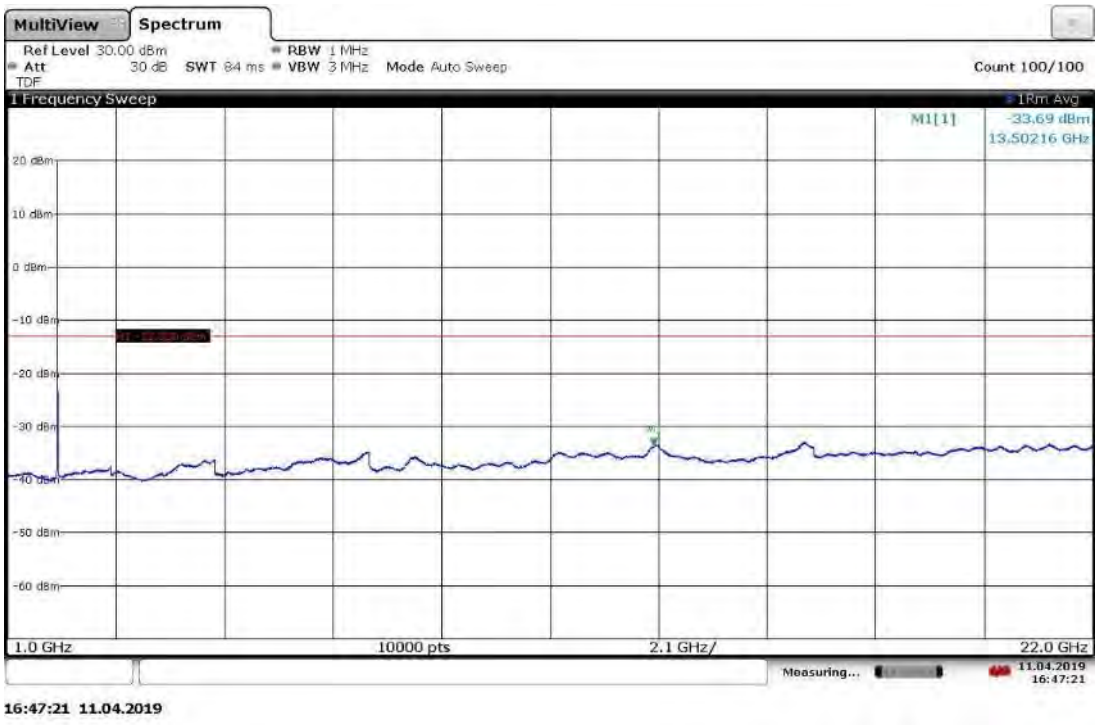
Slot 0 (Band 2), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Low Channel 1932.5 MHz 1-22GHz



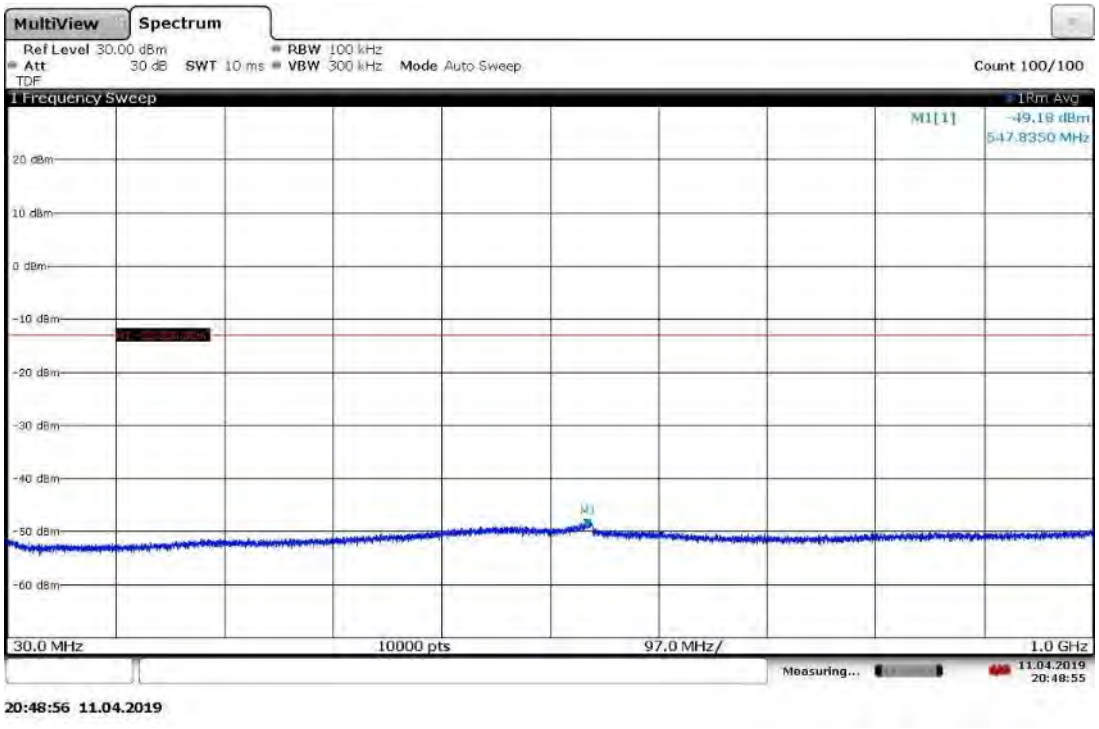
Slot 0 (Band 2), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Mid Channel 1960 MHz 30MHz-1GHz



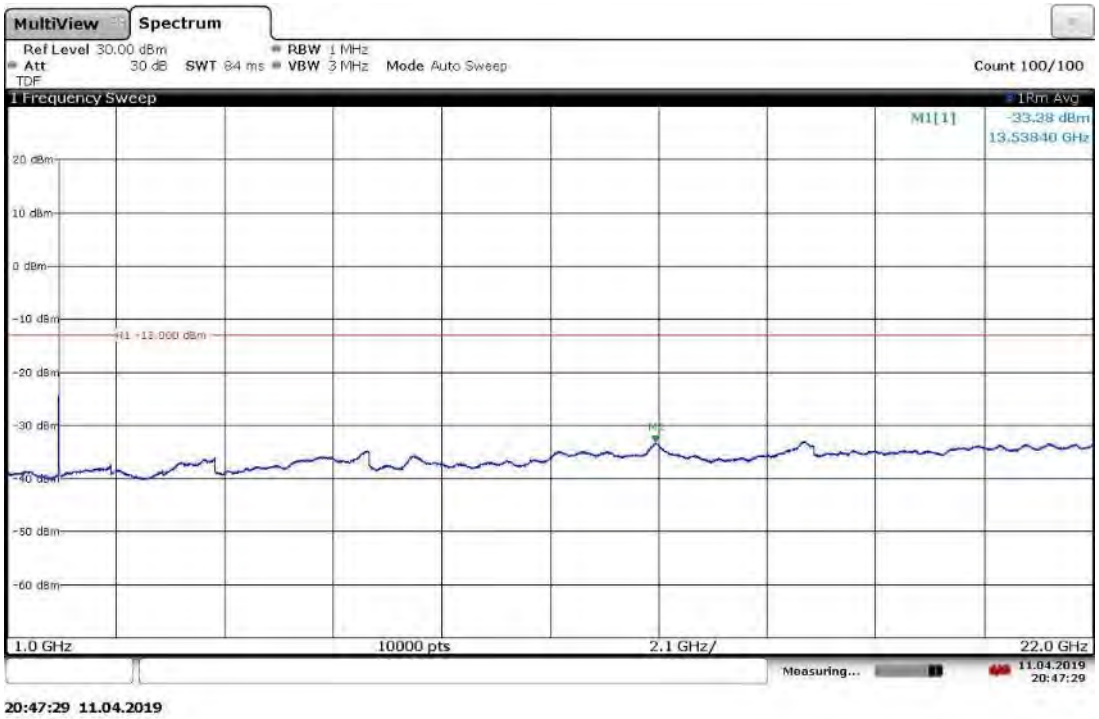
Slot 0 (Band 2), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Mid Channel 1960 MHz 1-22GHz



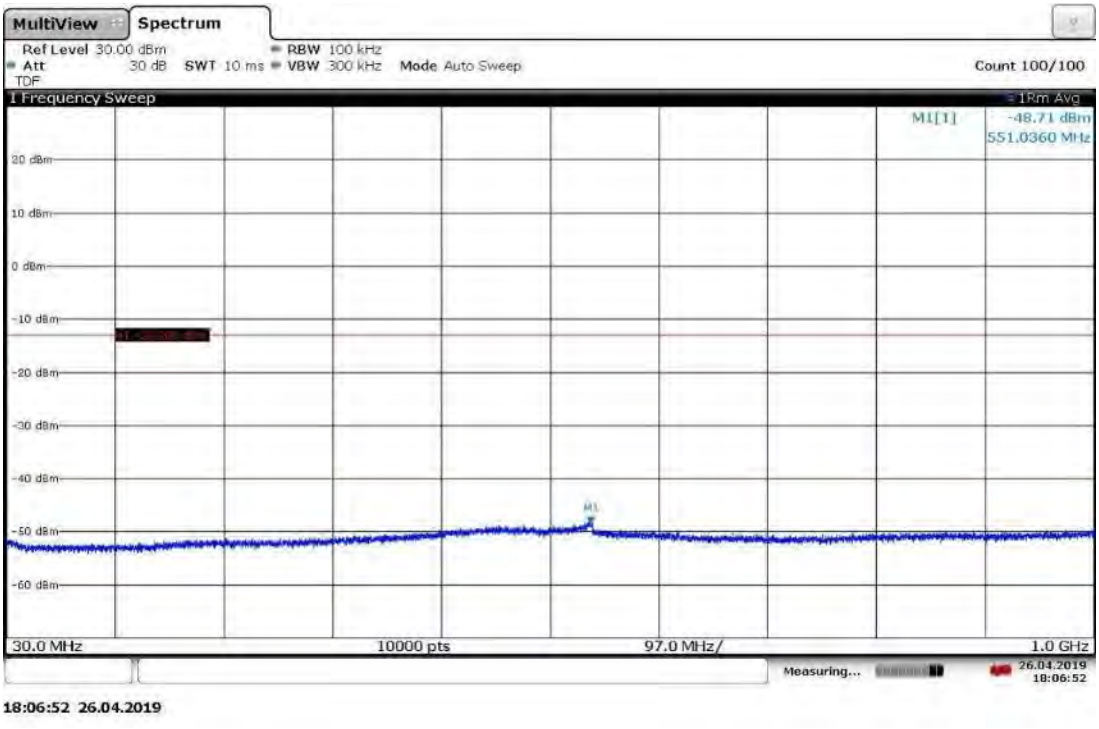
Slot 0 (Band 2), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, High Channel 1987.5 MHz 30MHz-1GHz



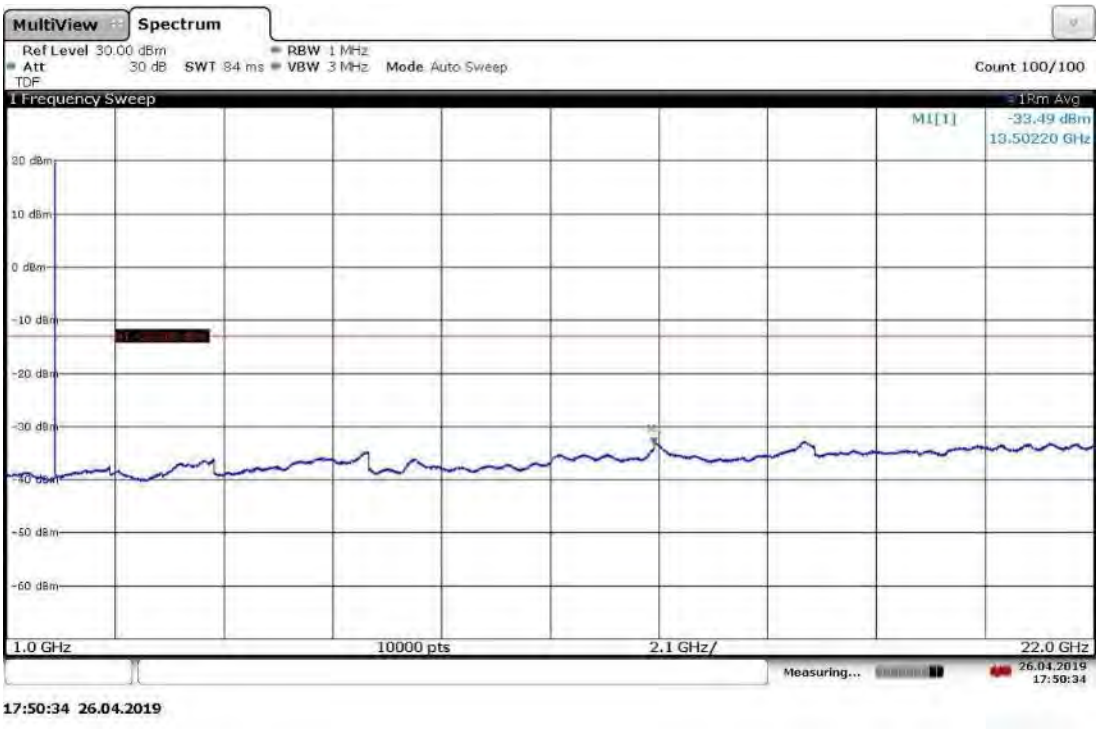
Slot 0 (Band 2), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, High Channel 1987.5 MHz 1-22GHz



Slot 0 (Band 2), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz

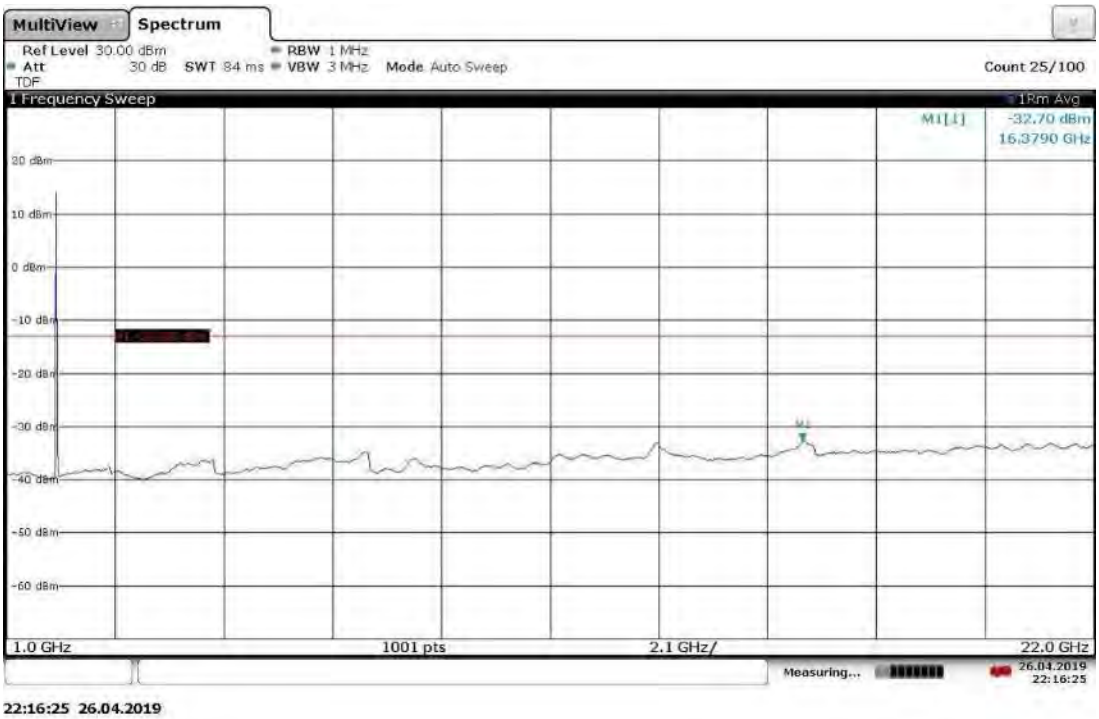


Slot 0 (Band 2), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz

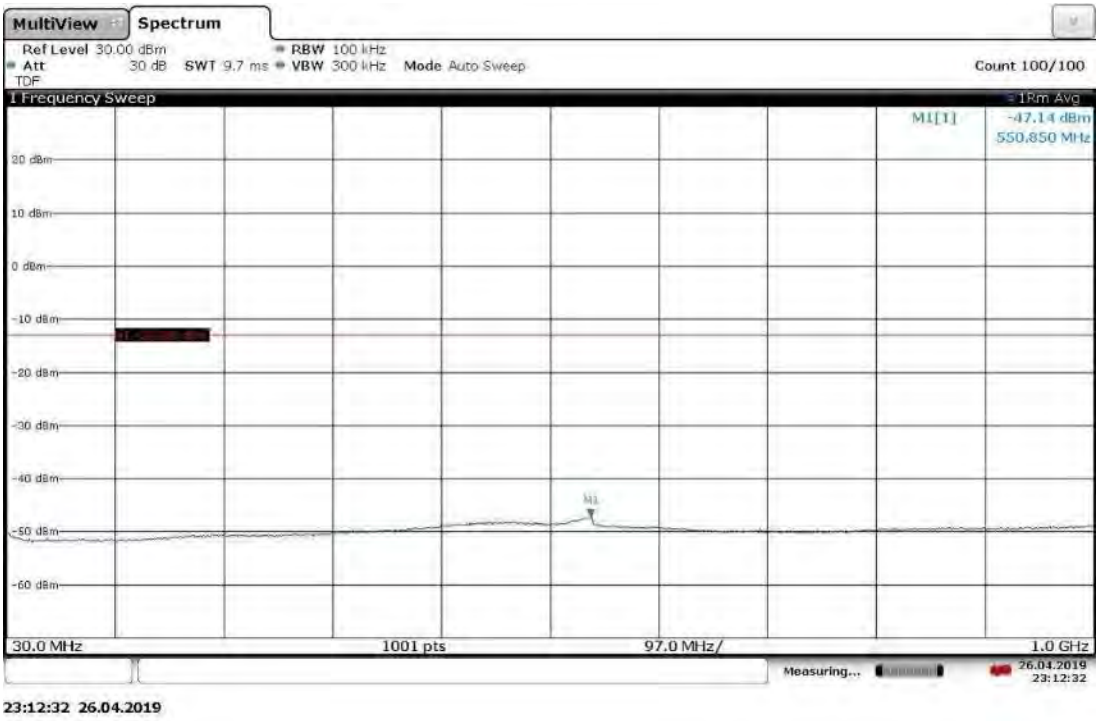


Slot 0 (Band 2), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz

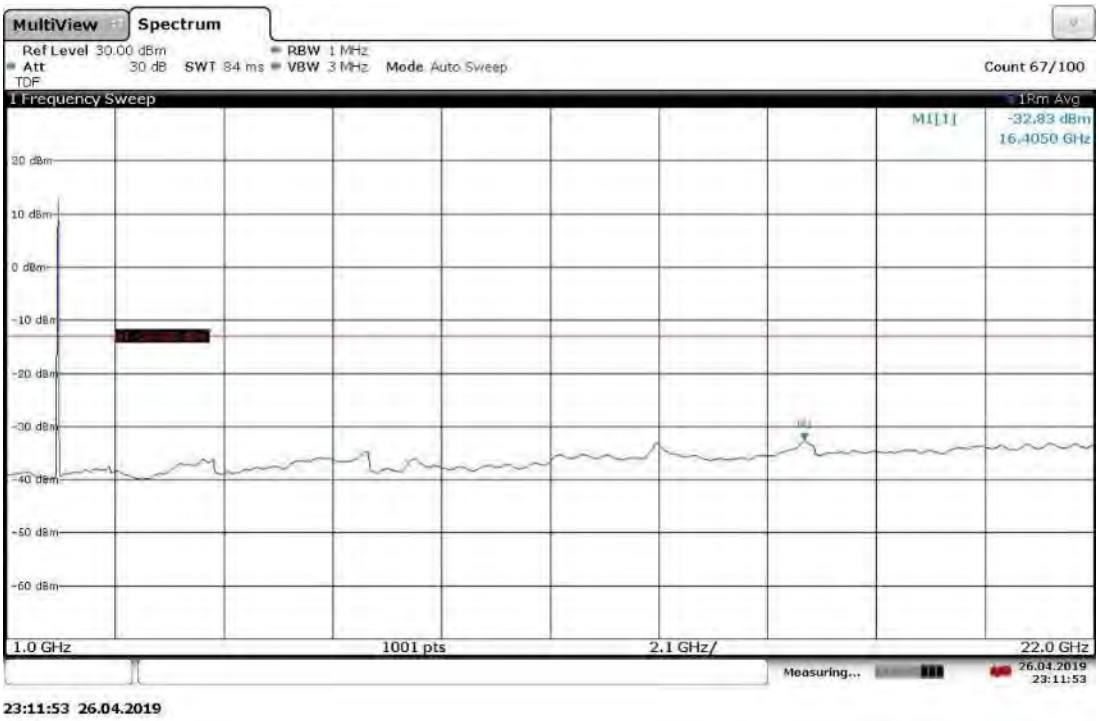
Slot 0 (Band 2), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



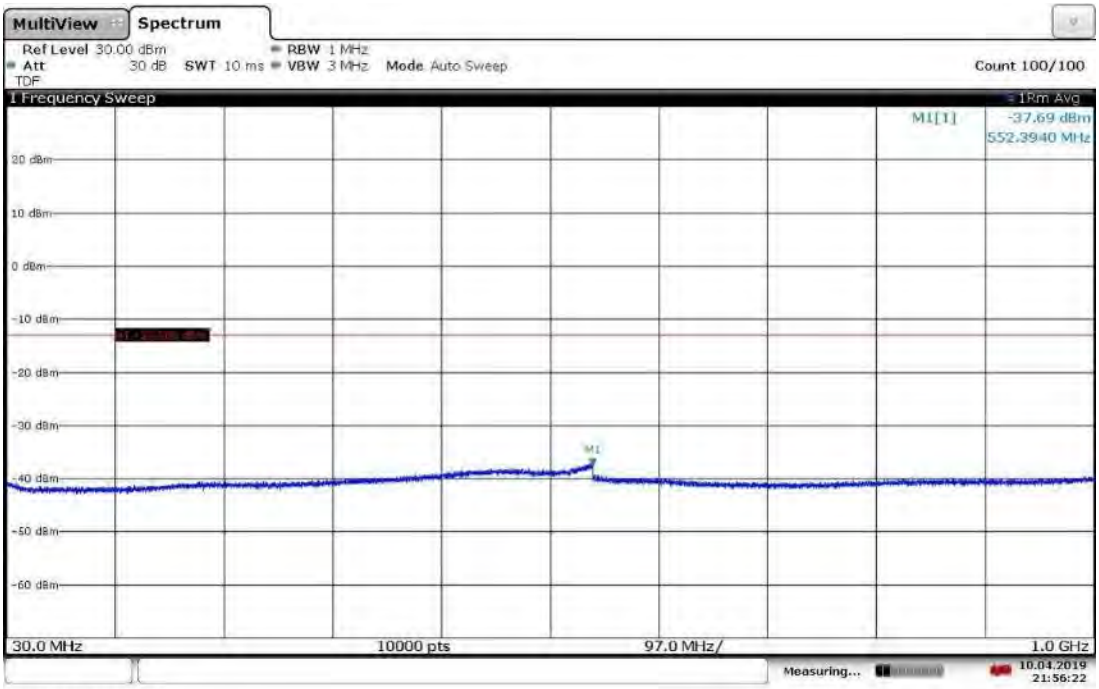
Slot 0 (Band 2), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



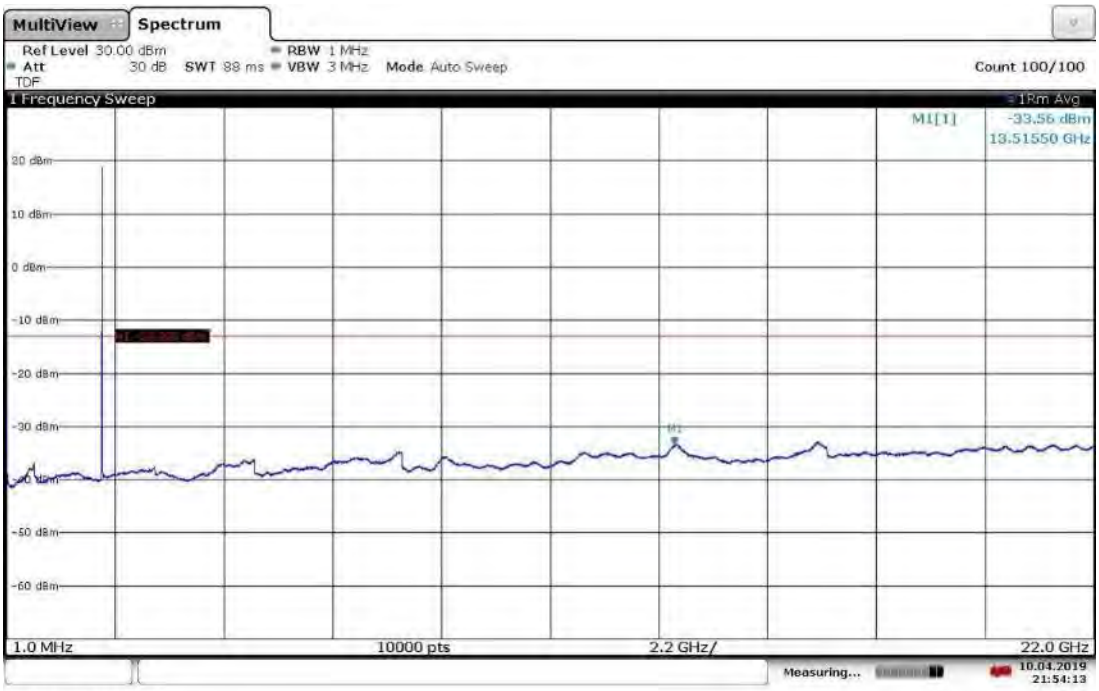
Slot 0 (Band 2), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



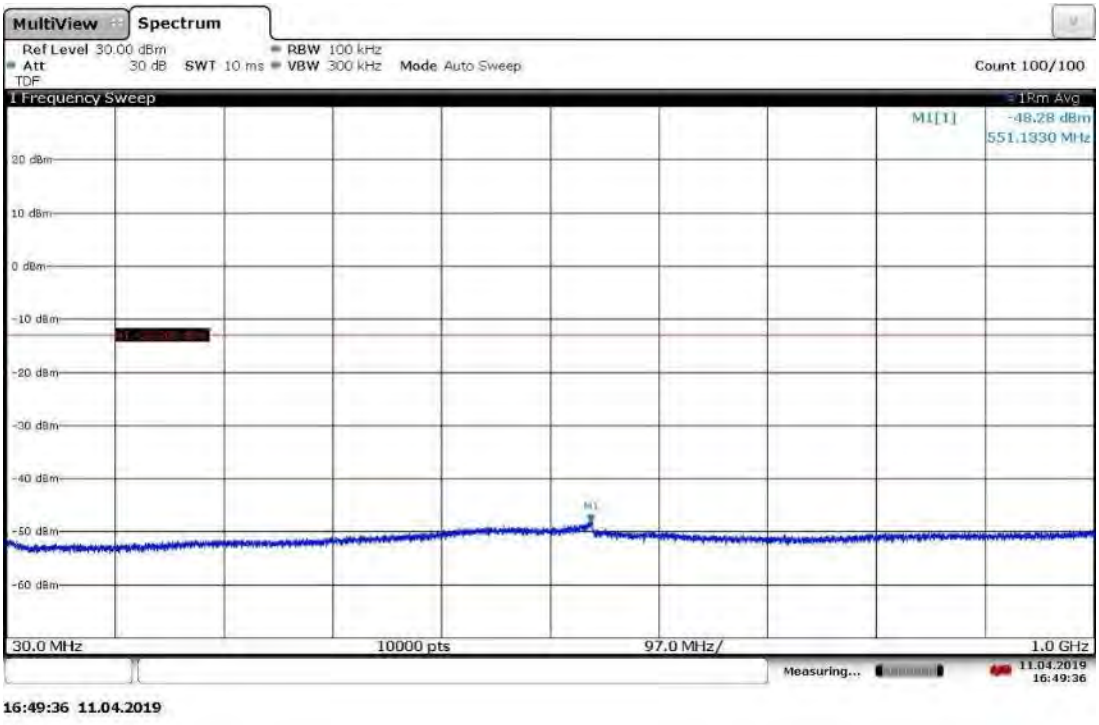
Slot 0 (Band 2), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



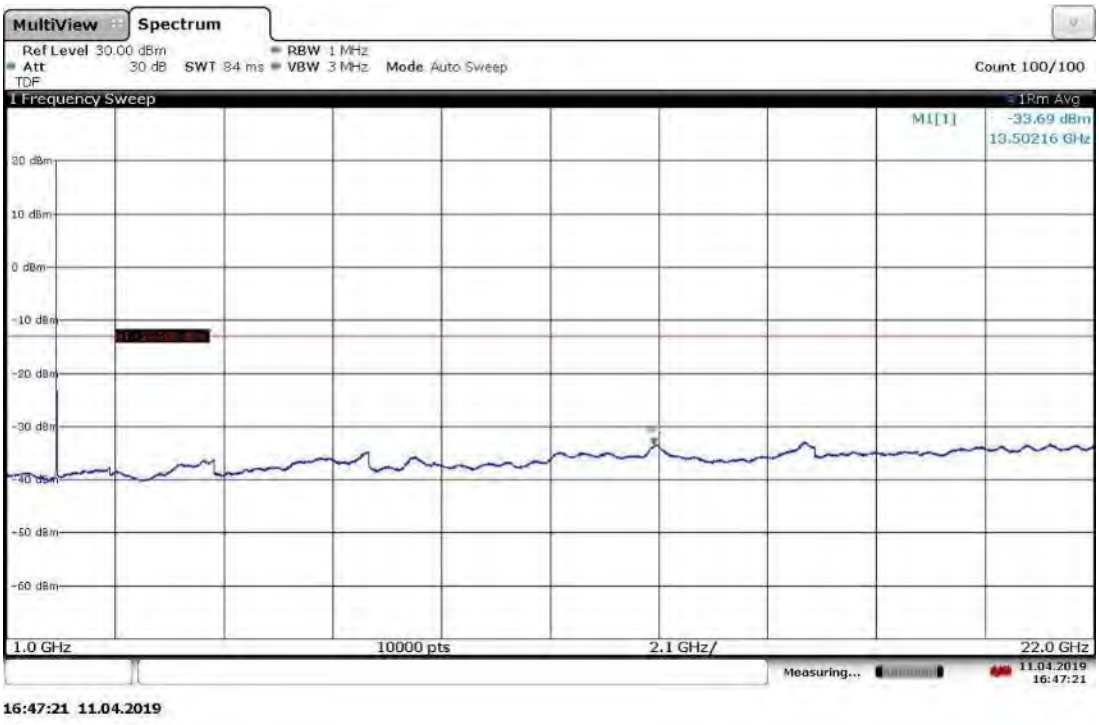
Slot 0 (Band 2), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



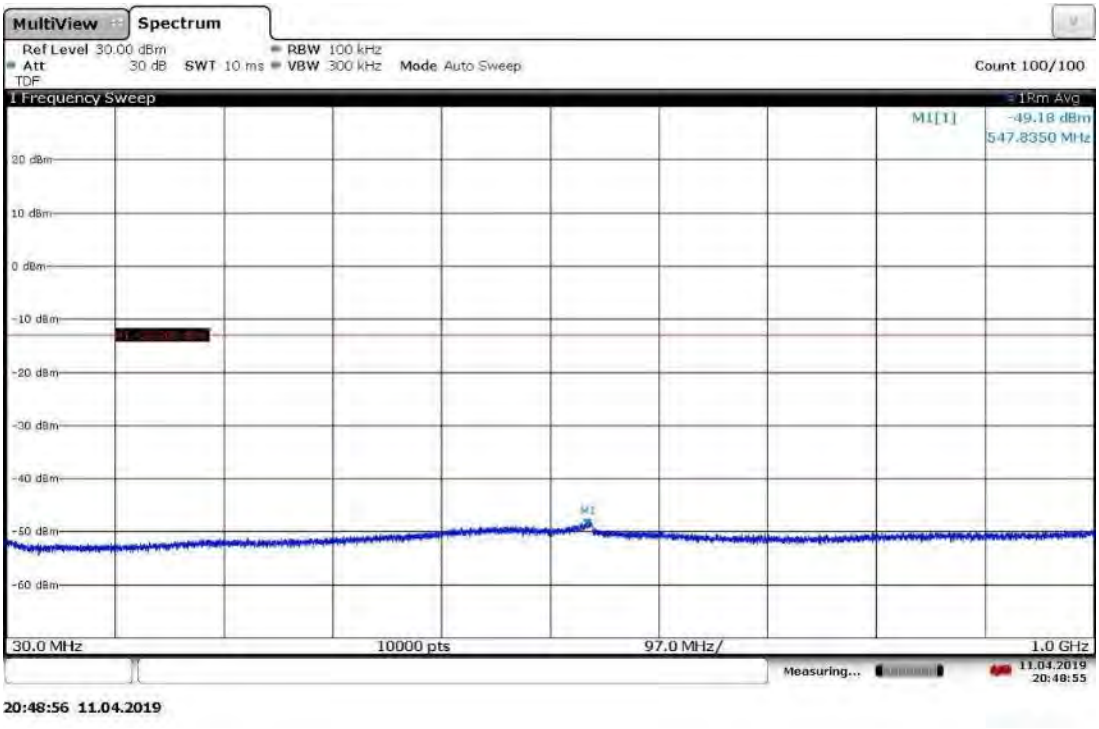
Slot 0 (Band 2), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



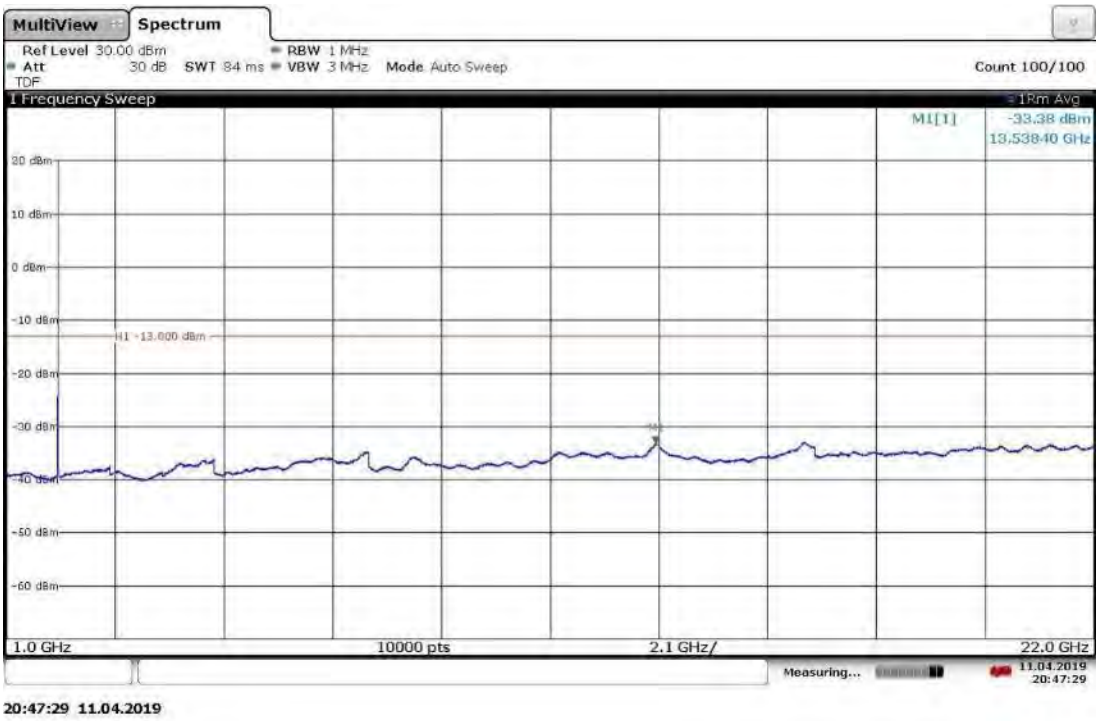
Slot 0 (Band 2), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



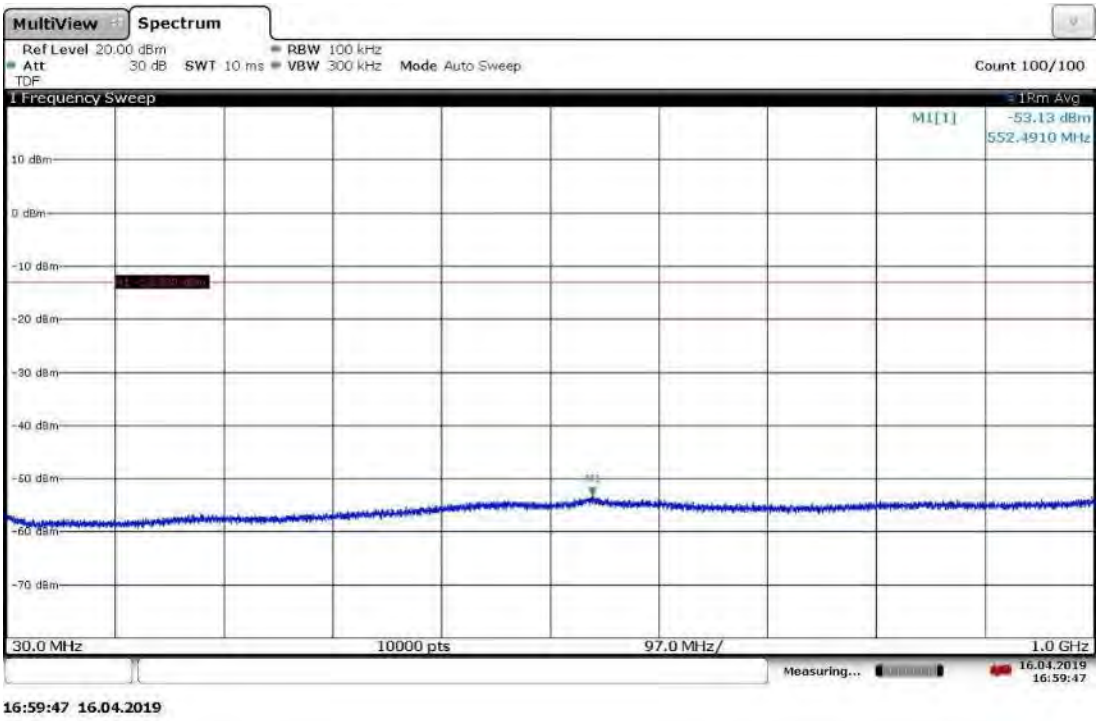
Slot 0 (Band 2), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



Slot 0 (Band 2), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz

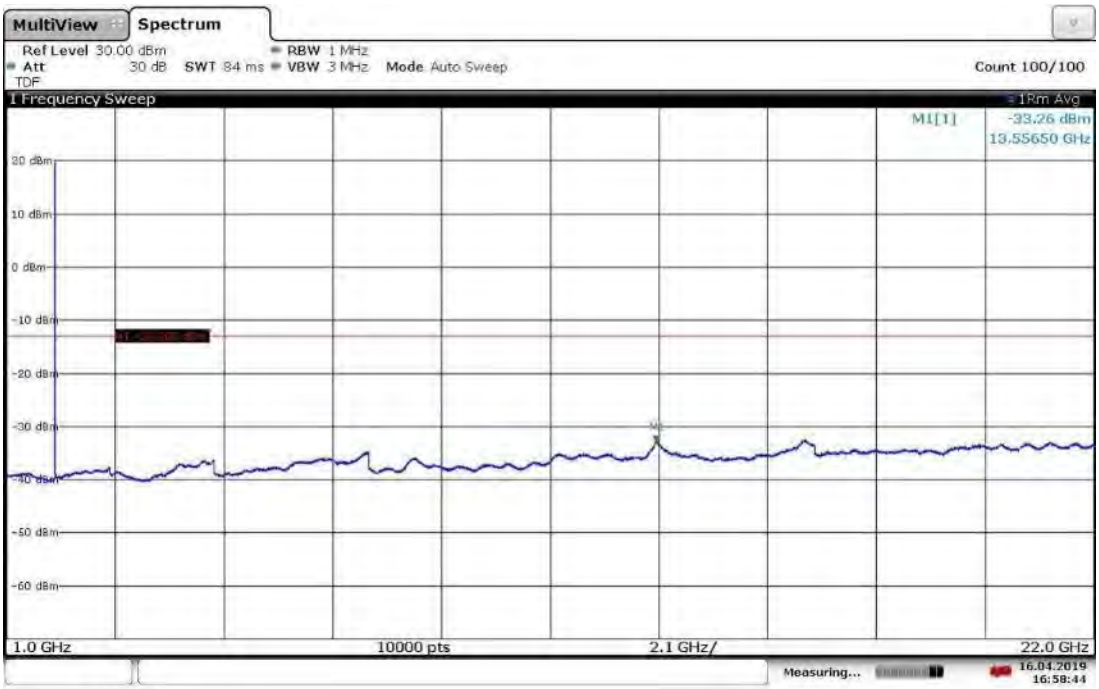


Slot 0 (Band 2), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



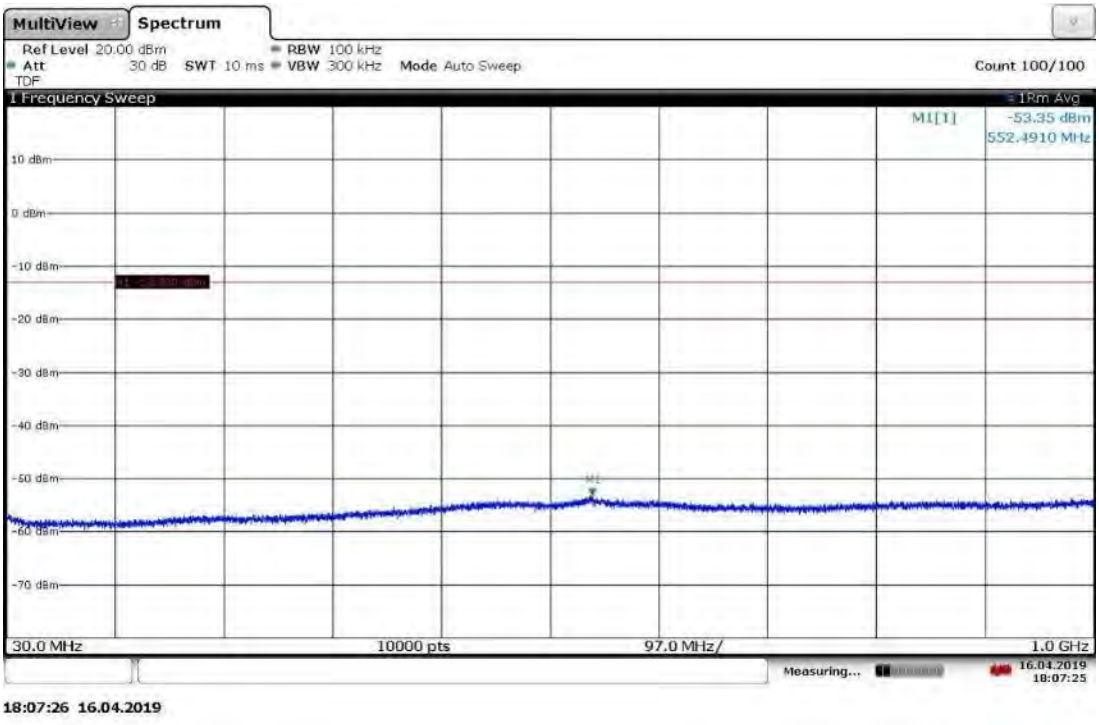
16:59:47 16.04.2019

Slot 0 (Band 2), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz

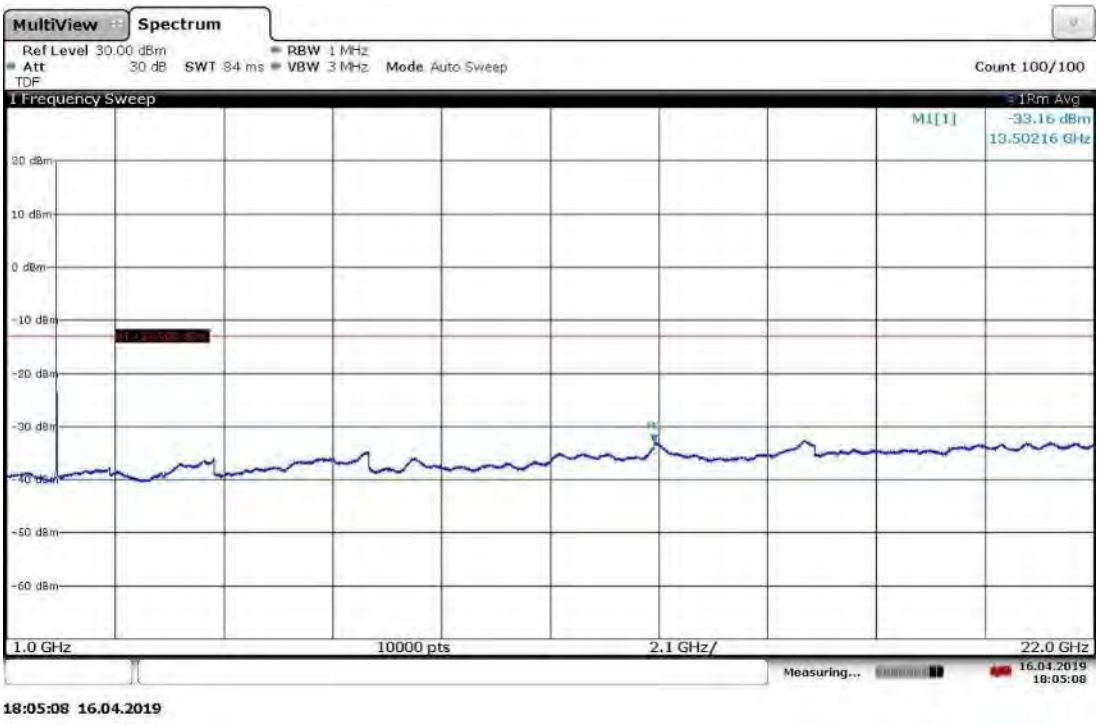


16:58:44 16.04.2019

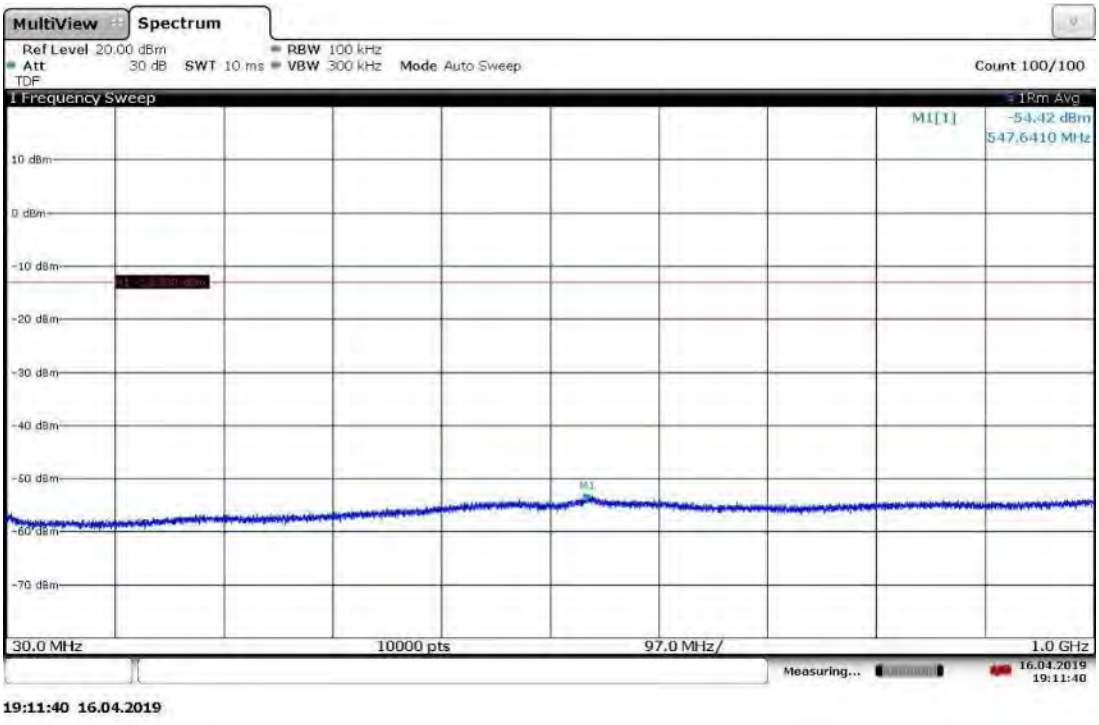
Slot 0 (Band 2), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



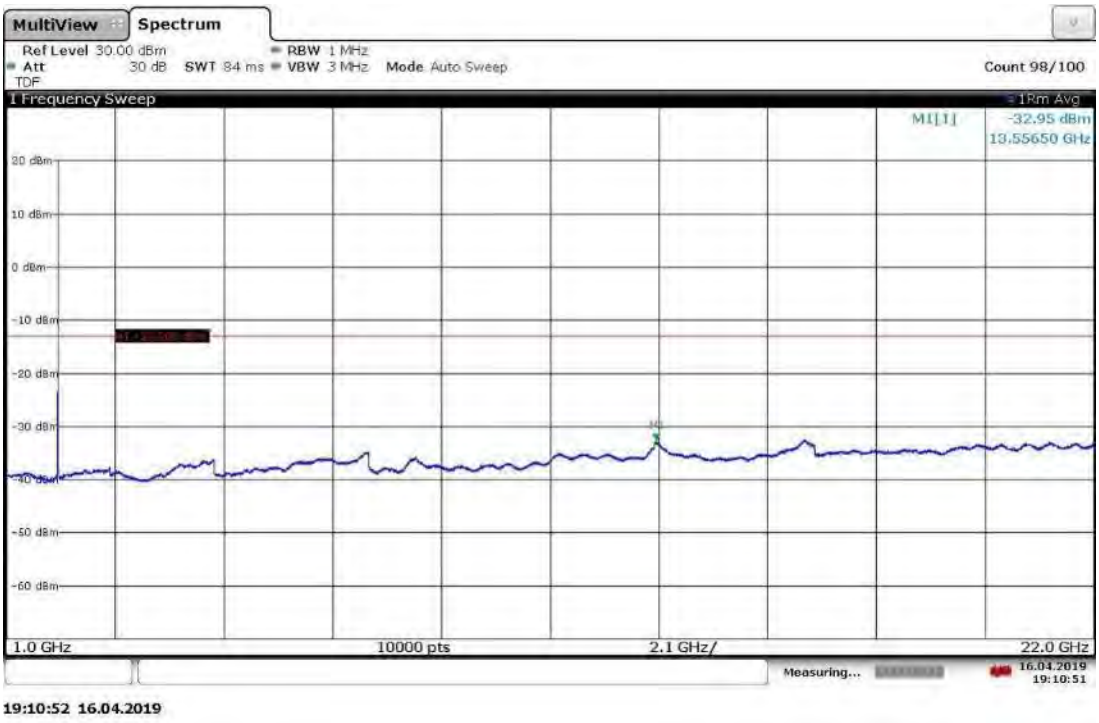
Slot 0 (Band 2), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



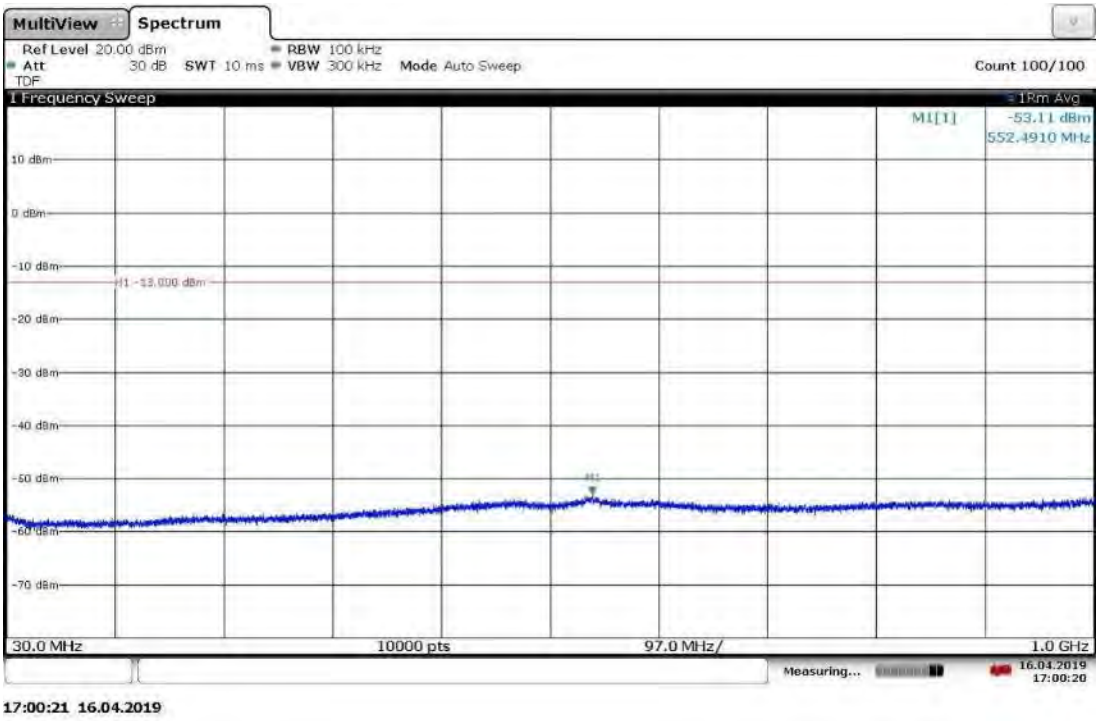
Slot 0 (Band 2), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



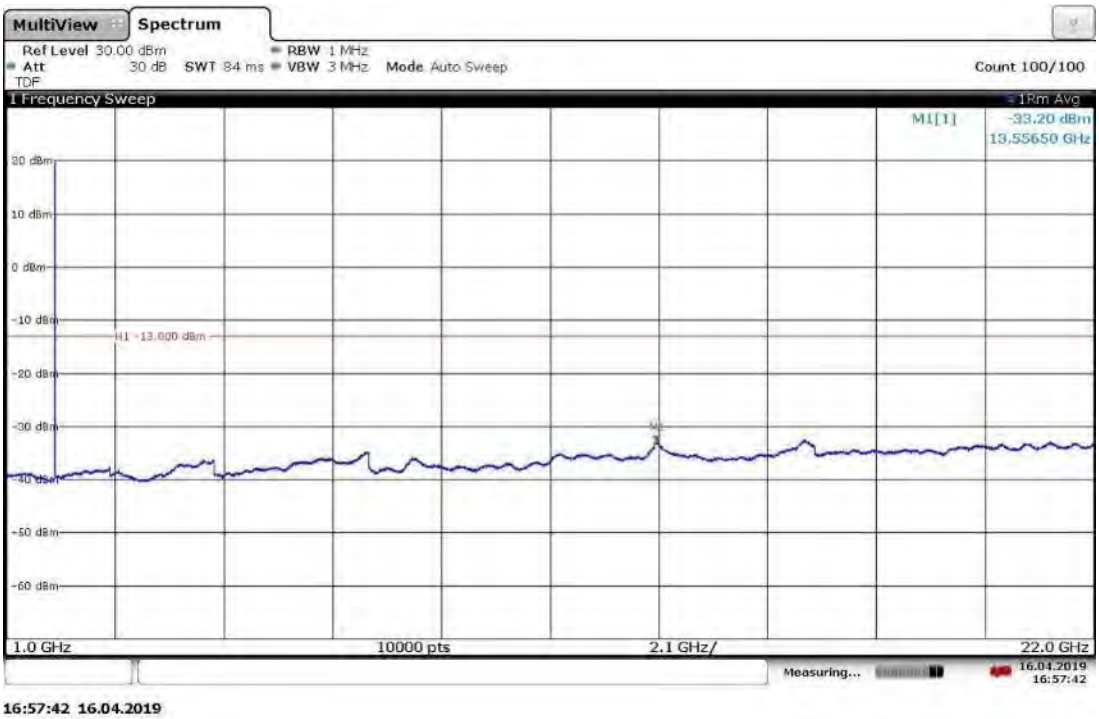
Slot 0 (Band 2), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



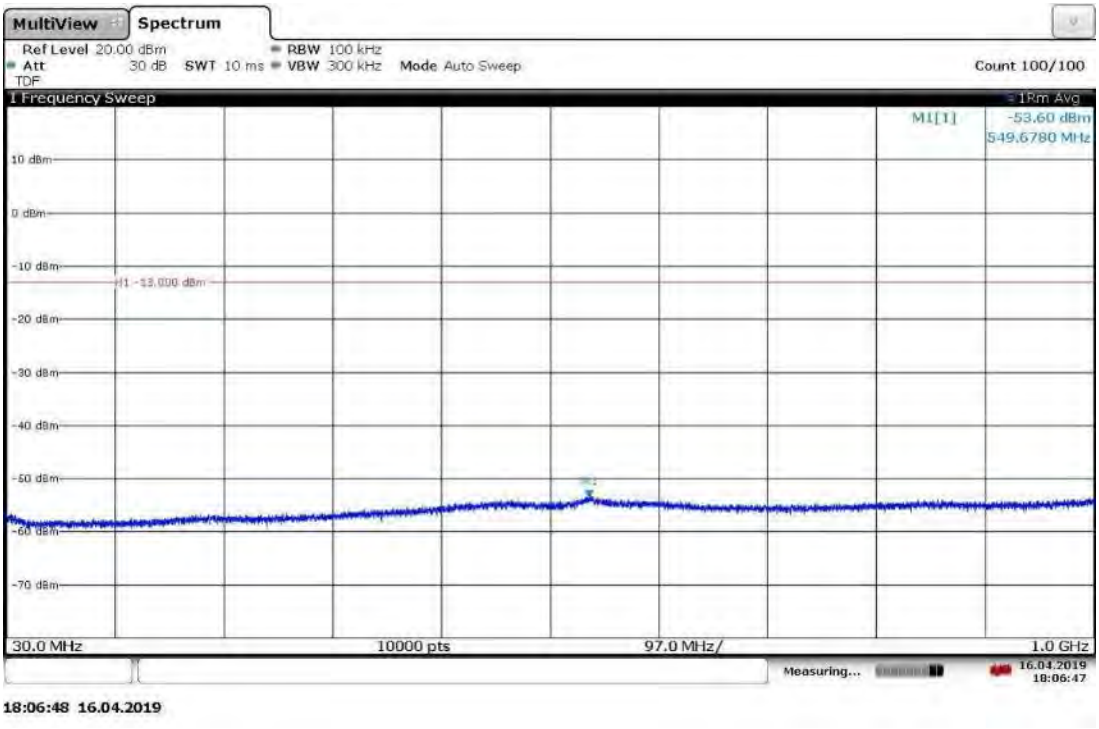
Slot 0 (Band 2), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



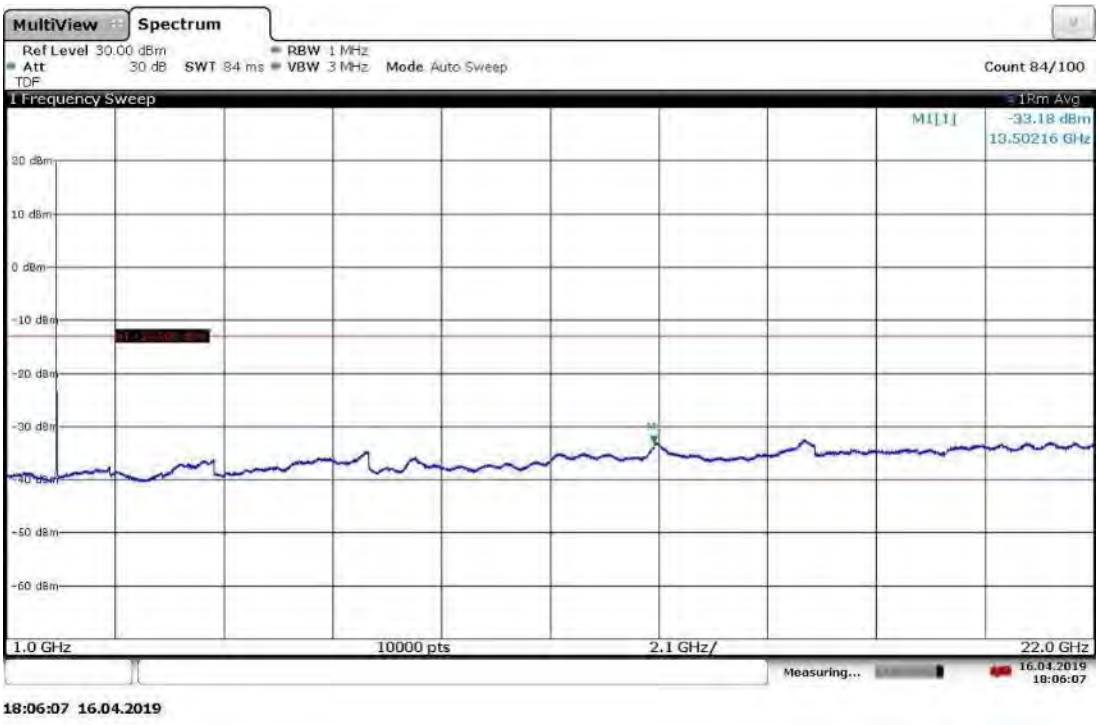
Slot 0 (Band 2), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



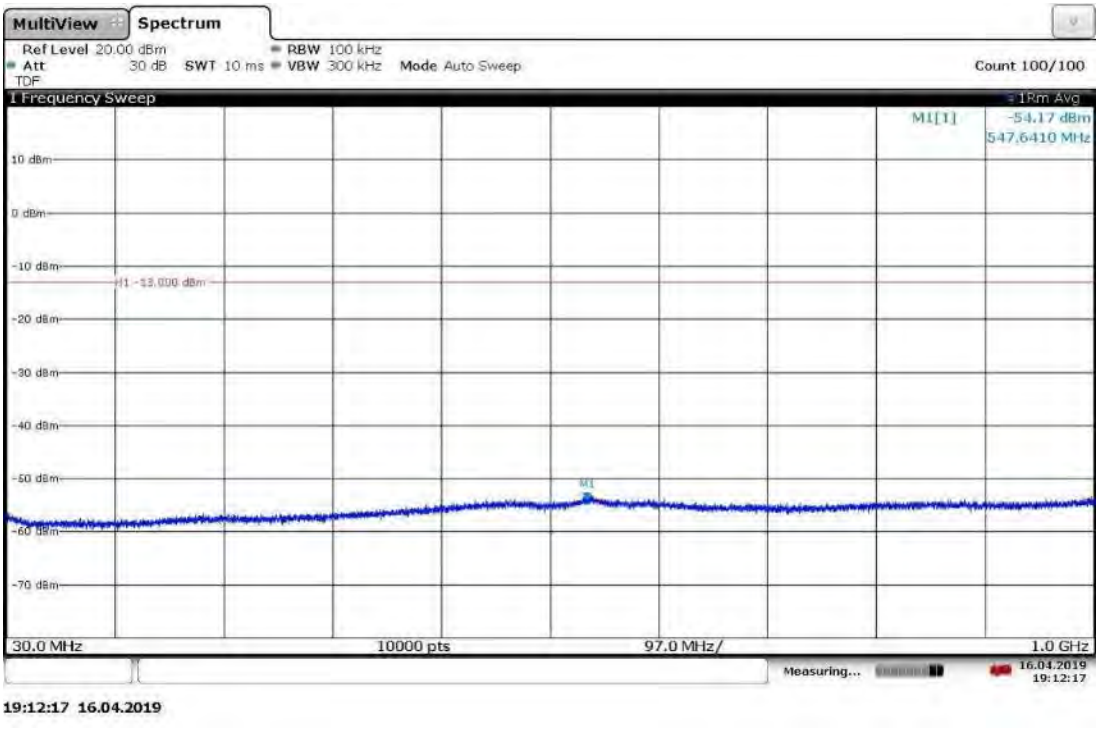
Slot 0 (Band 2), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



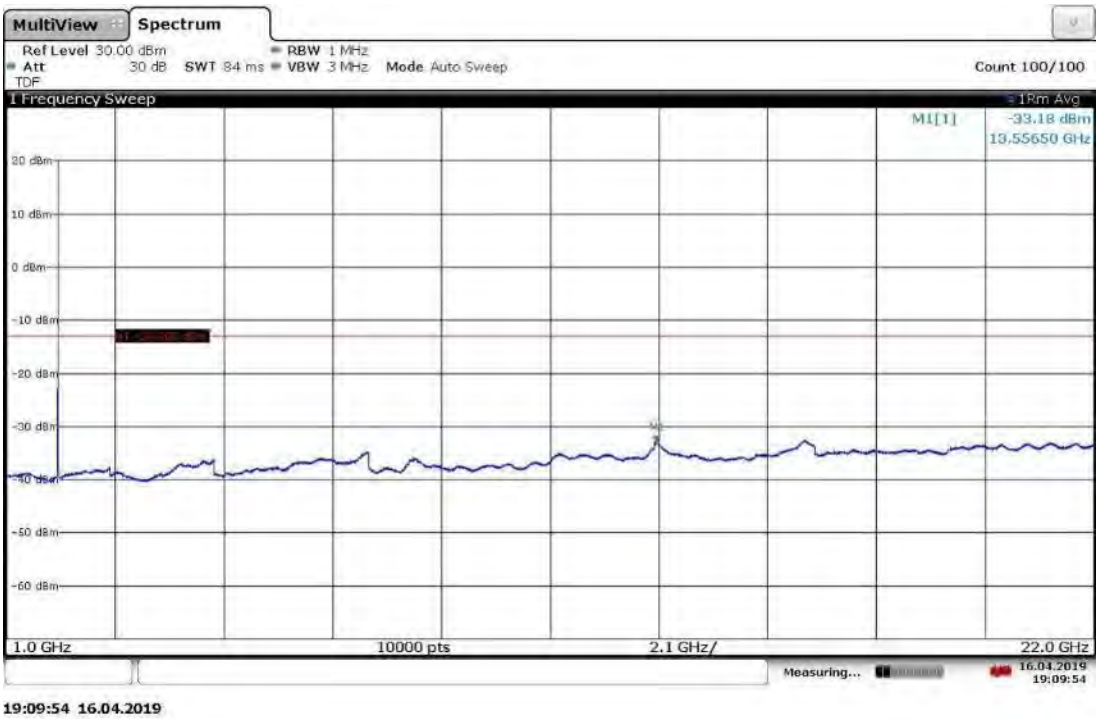
Slot 0 (Band 2), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



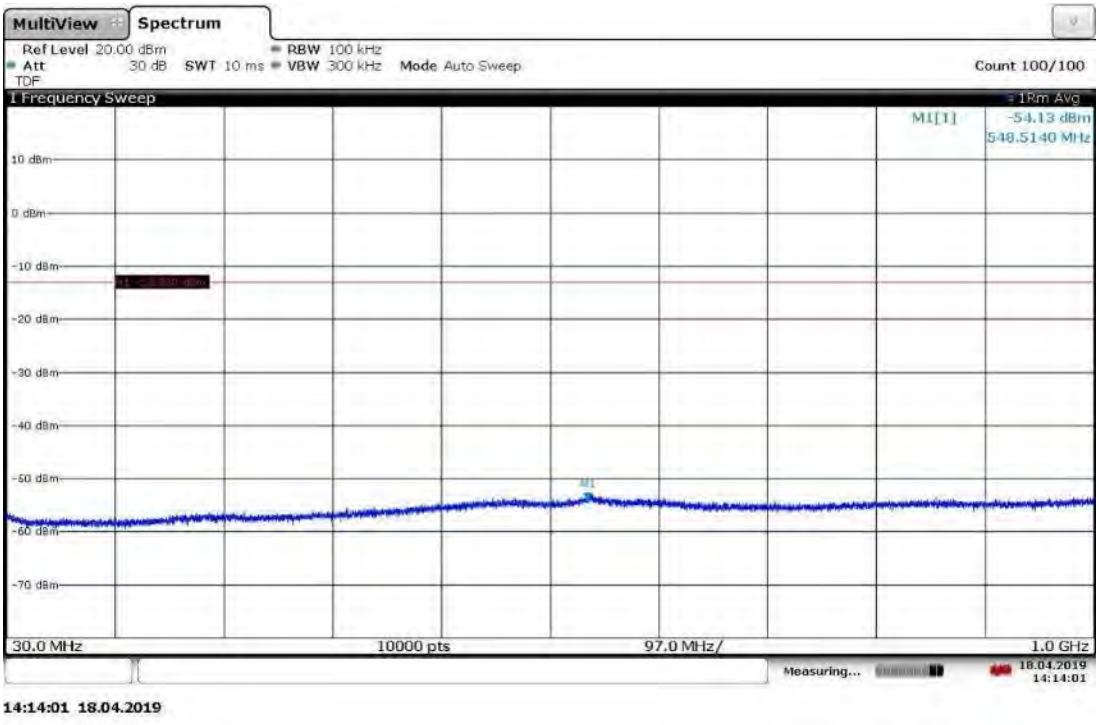
Slot 0 (Band 2), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



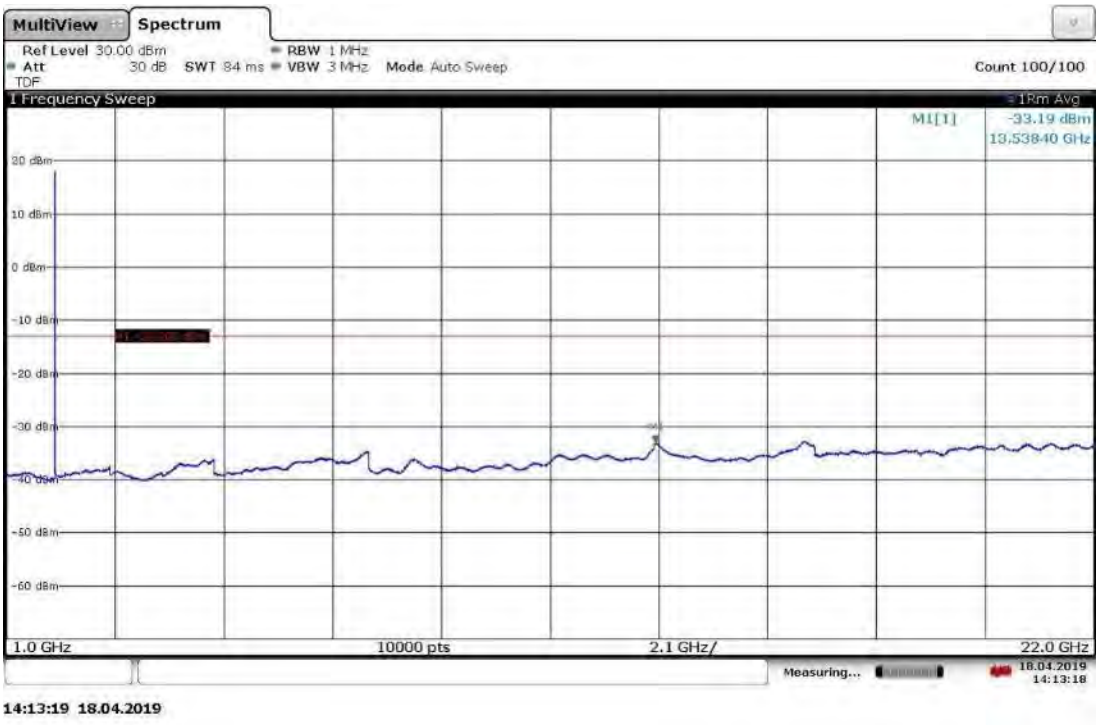
Slot 0 (Band 2), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



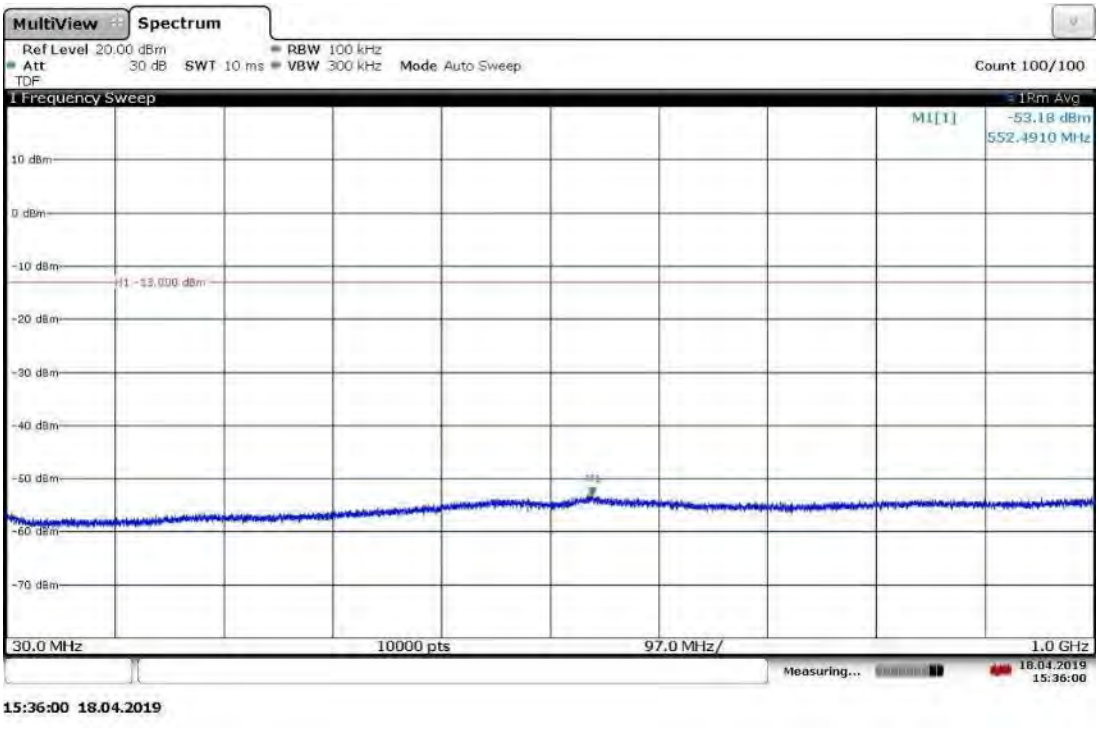
Slot 0 (Band 2), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



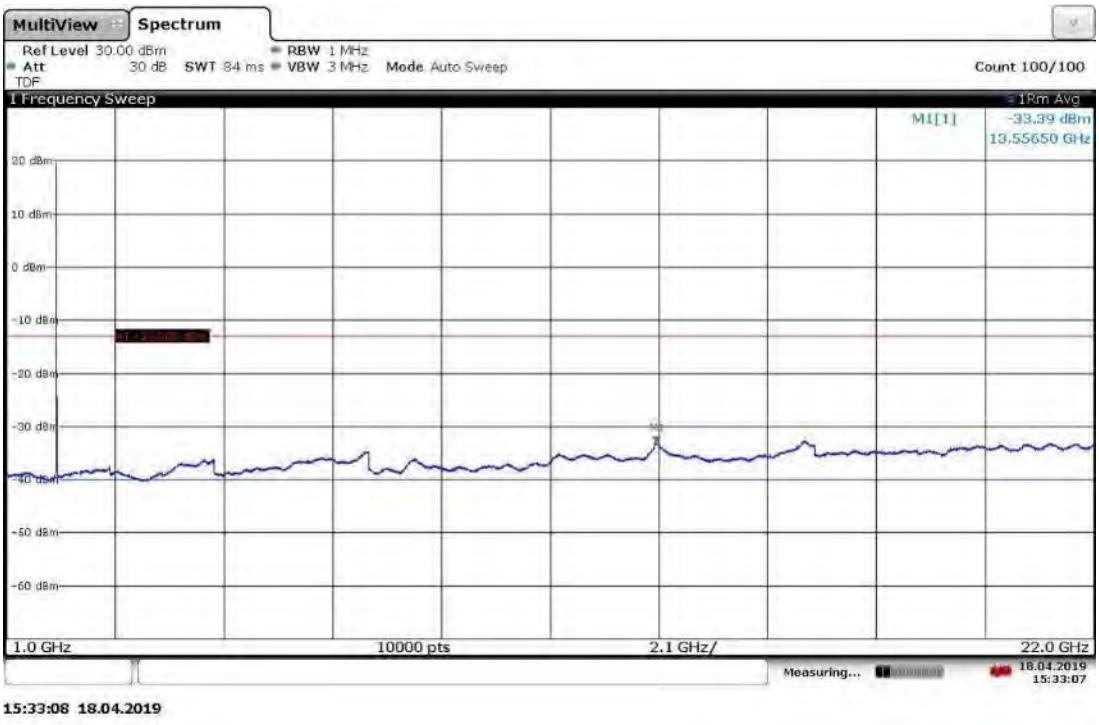
Slot 0 (Band 2), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



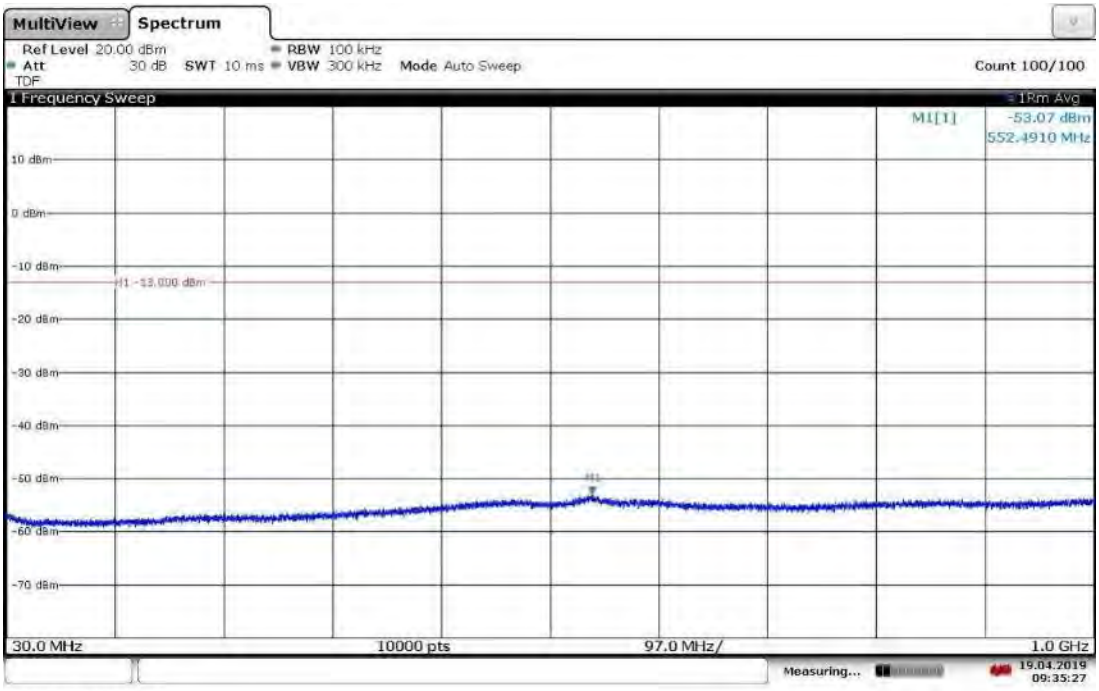
Slot 0 (Band 2), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



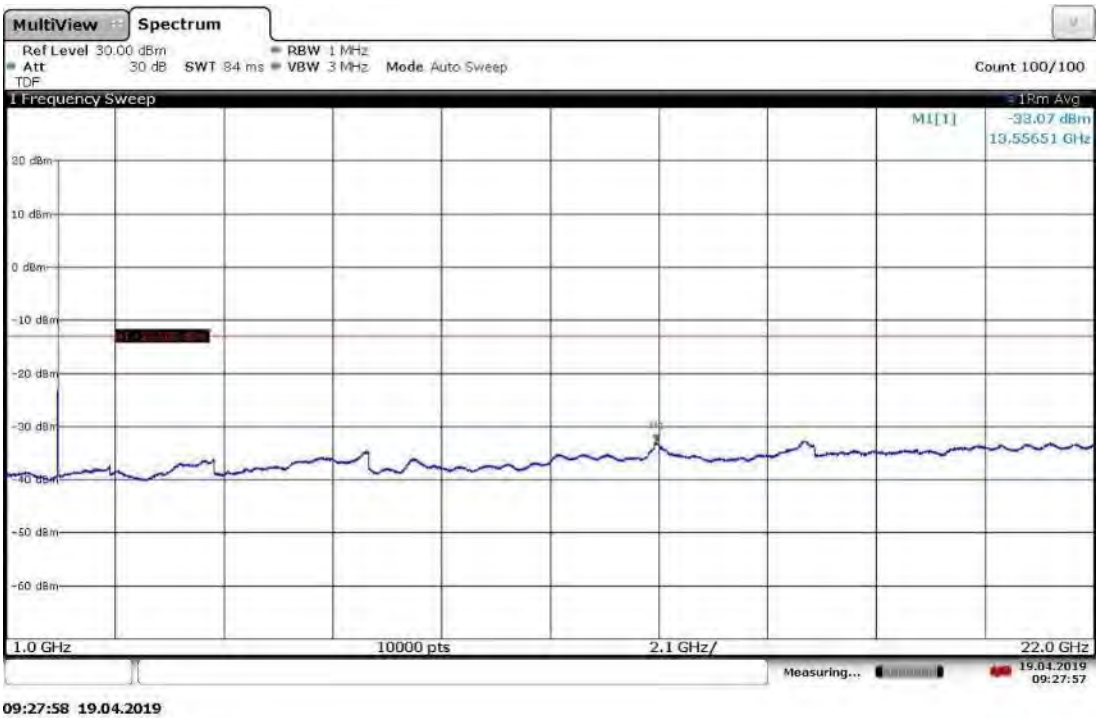
Slot 0 (Band 2), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



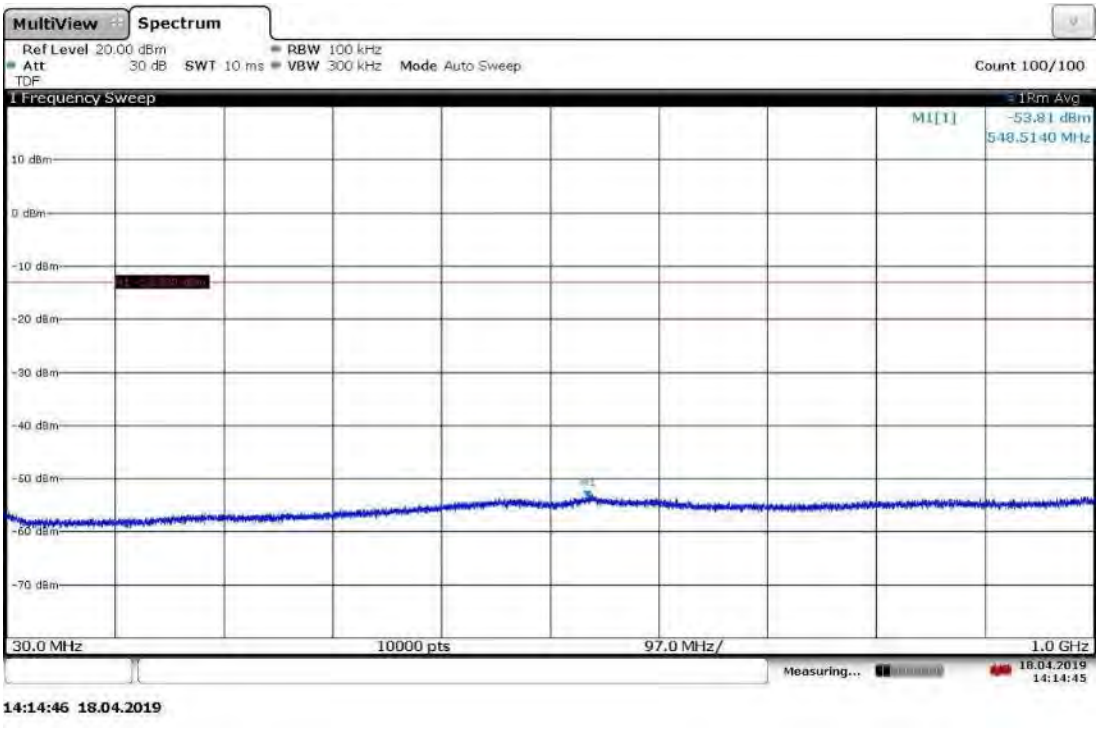
Slot 0 (Band 2), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



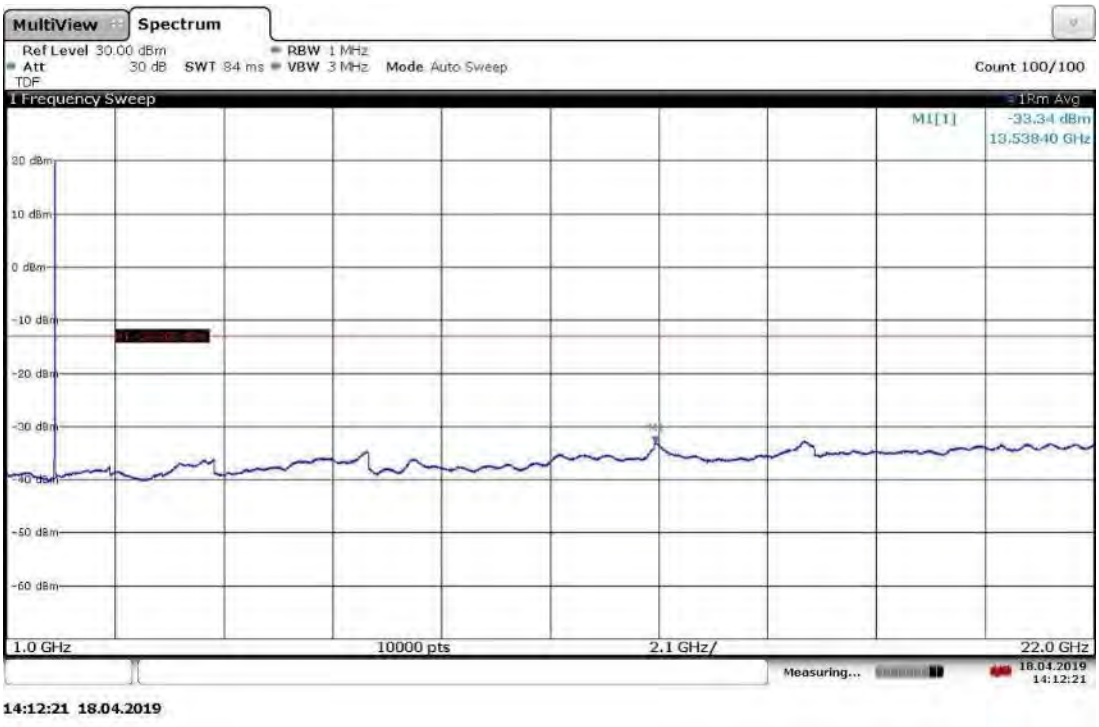
Slot 0 (Band 2), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



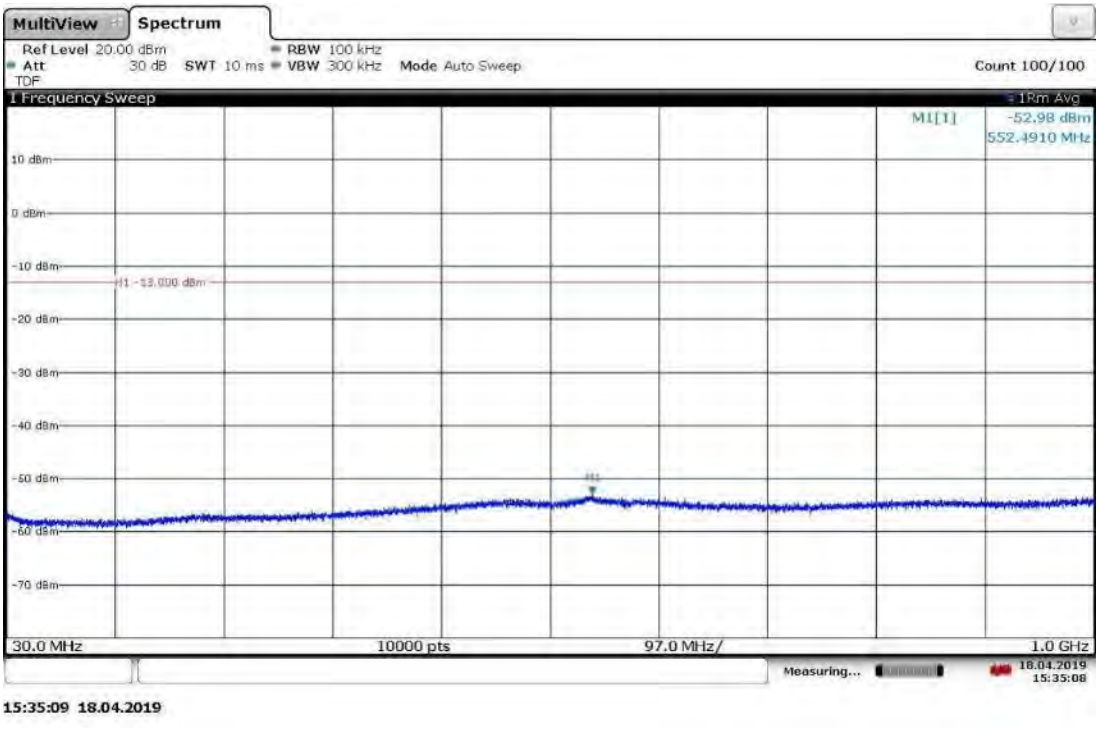
Slot 0 (Band 2), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



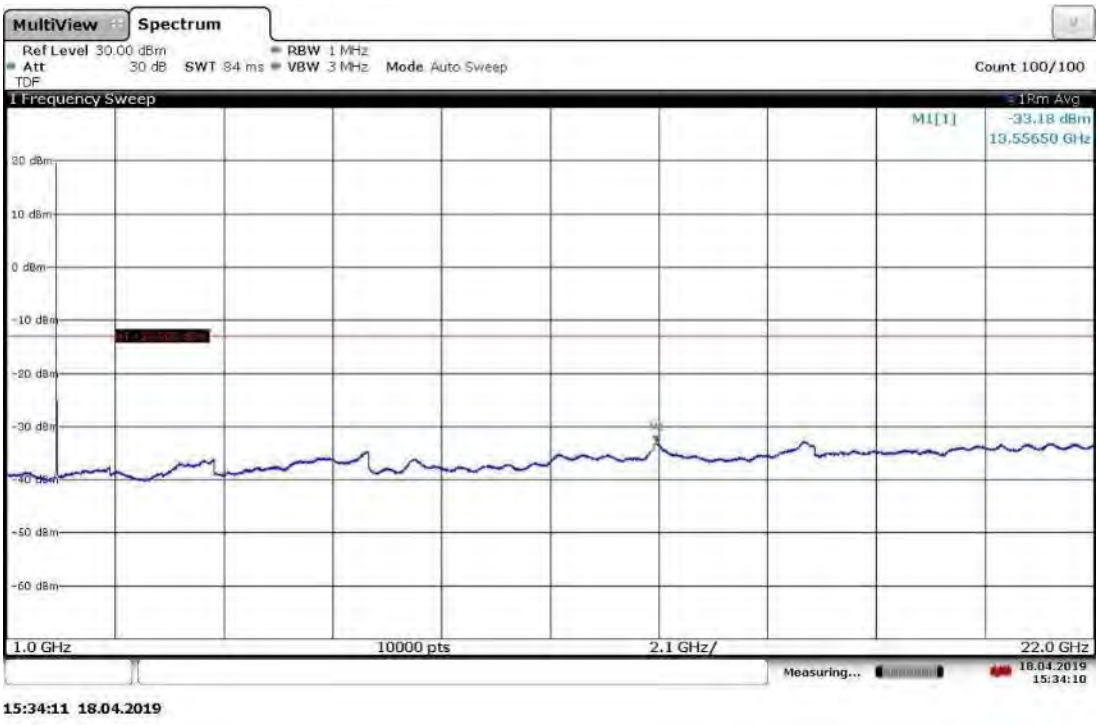
Slot 0 (Band 2), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



Slot 0 (Band 2), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



Slot 0 (Band 2), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz

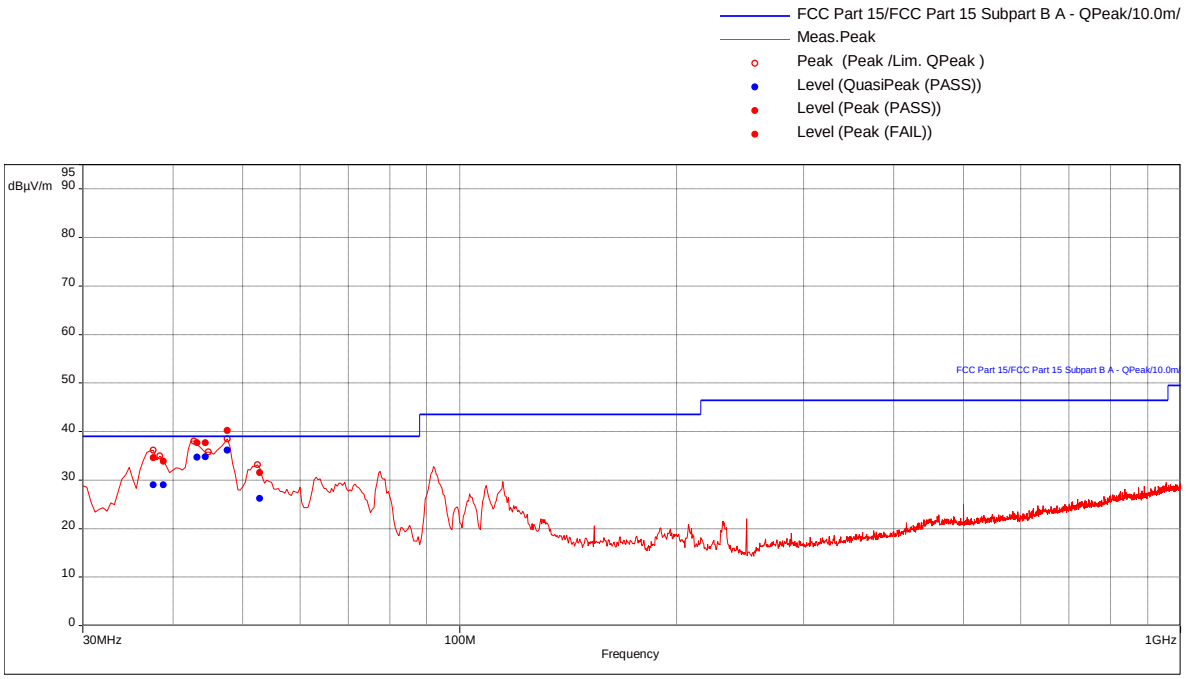


Radiated Emissions, 30-1000 MHz
Slot 0 (Band 2), Modulation: TM1.1-QPSK, Bandwidth 5 MHz, Transmit @ Low Channel

Test Information:

Date and Time	5/17/2019 8:32:51 PM
Client and Project Number	Commscope_G103866582
Engineer	Vathana Ven
Temperature	23 deg C
Humidity	50%
Atmospheric Pressure	995 mB
Comments	RE 30-1000MHz_Tx mode_TM1.1_5MHz BW_Low Channel_P=-4.75_Slot 0 Ant 0_Ant1

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
37.63157895	34.58	-50.22	-13.00	-37.22	336.00	3.06	Vertical	120000.00	-17.22
38.90526316	33.91	-50.89	-13.00	-37.89	336.00	1.72	Vertical	120000.00	-18.15
43.27368421	37.67	-47.13	-13.00	-34.13	350.00	1.00	Vertical	120000.00	-21.18
44.48421053	37.67	-47.13	-13.00	-34.13	357.00	1.00	Vertical	120000.00	-22.09
52.68421053	31.55	-53.25	-13.00	-40.25	335.00	2.03	Vertical	120000.00	-25.86
47.69473684	40.18	-44.62	-13.00	-31.62	343.00	1.00	Vertical	120000.00	-24.13

Level (dBm) calculated as follow:

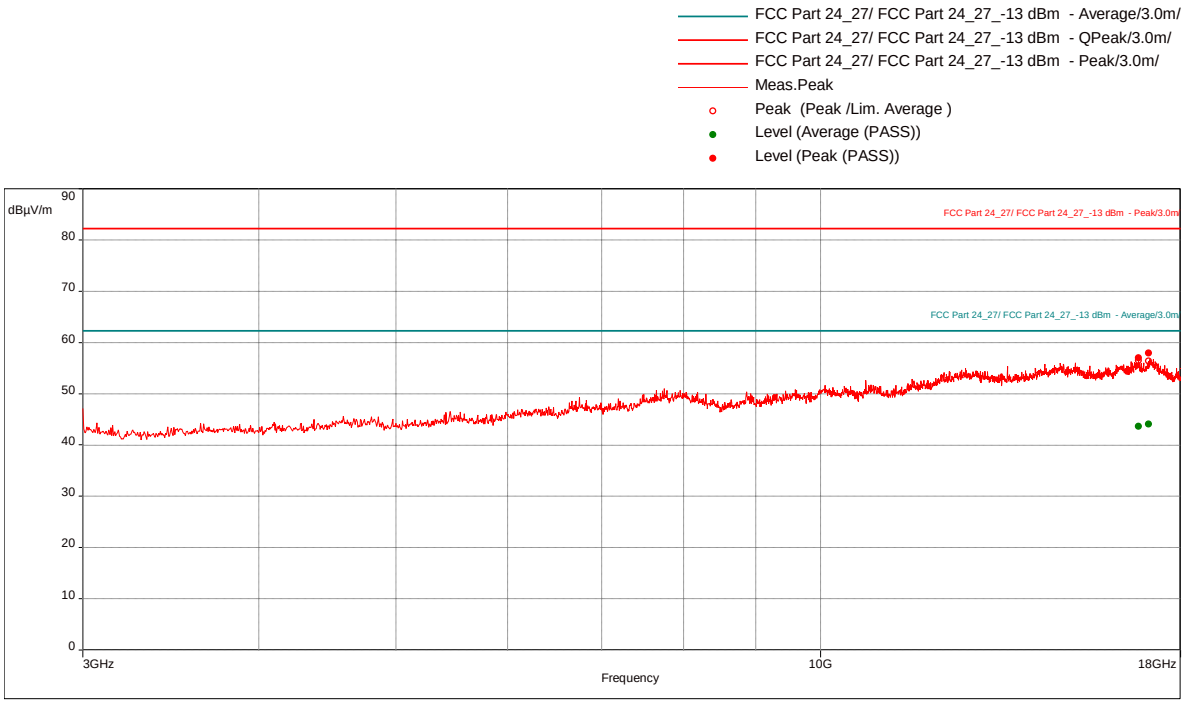
EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8 ; where D is the measurement distance (in the far field region) in m.

Radiated Emissions, 1-22 GHz
Slot 0 (Band 2), Modulation: TM1.1-QPSK, Bandwidth 5 MHz, Transmit @ Low Channel

Test Information:

Date and Time	5/24/2019 10:21:39 PM
Client and Project Number	CommScope_G103866582
Engineer	Vathana Ven
Temperature	23 deg C
Humidity	41%
Atmospheric Pressure	1007 mB
Comments	RE 3 to 18 GHz_TM1.1_Low Ch_5M BW_Slot 0_ANT0 & ANT1_P=-4.75

Graph:



Results:

Peak (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dB/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
16807.63158	56.99	-38.27	-13	-25.27	99.00	1.50	Horizontal	1000000.00	22.03
17079.73684	57.95	-37.31	-13	-24.31	342.00	1.00	Horizontal	1000000.00	21.87

Level (dBm) is caculated as follow :

EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8 ; where D is the measurement distance (in the far field region) in m.

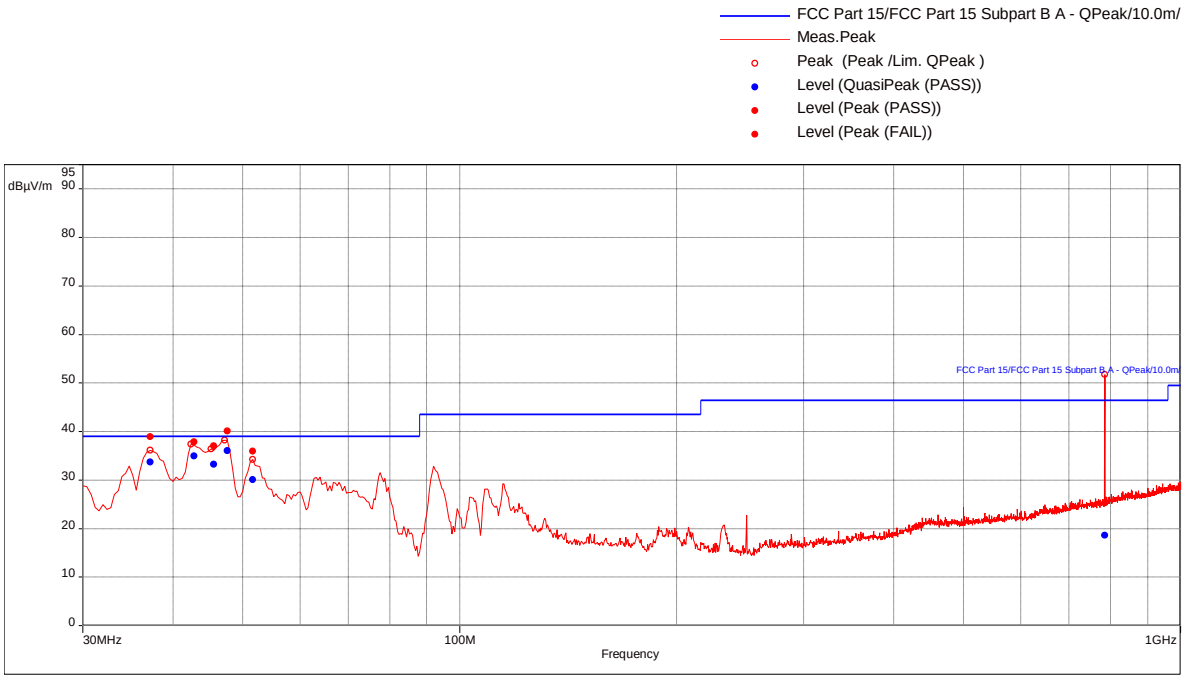
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions, 30-1000 MHz
Slot 0 (Band 2), Modulation: TM1.1-QPSK, Bandwidth 5 MHz, Transmit @ Mid Channel

Test Information:

Date and Time	5/17/2019 6:42:37 PM
Client and Project Number	Commscope_G103866582
Engineer	Vathana Ven
Temperature	23 deg C
Humidity	50%
Atmospheric Pressure	995 mB
Comments	RE 30-1000MHz_Tx mode_TM1.1_5MHz BW_Mid Channel_P=-4.0_Slot 0 Ant0 and Ant 1

Graph:



Results:

Peak (PASS) (5)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
37.389474	38.92	-45.88	-13	-32.88	344.00	1.37	Vertical	120000.00	-17.08
42.936842	37.81	-46.99	-13	-33.99	345.00	3.19	Vertical	120000.00	-20.93
45.642105	37.03	-47.77	-13	-34.77	313.00	1.00	Vertical	120000.00	-22.82
47.452632	40.12	-44.68	-13	-31.68	336.00	1.00	Vertical	120000.00	-23.99
51.568421	35.92	-48.88	-13	-35.88	341.00	1.59	Vertical	120000.00	-25.66
785.44211	25.27	-59.53	-13	-46.53	76.00	1.37	Vertical	120000.00	-8.26

Level (dBm) is caculated as follow:

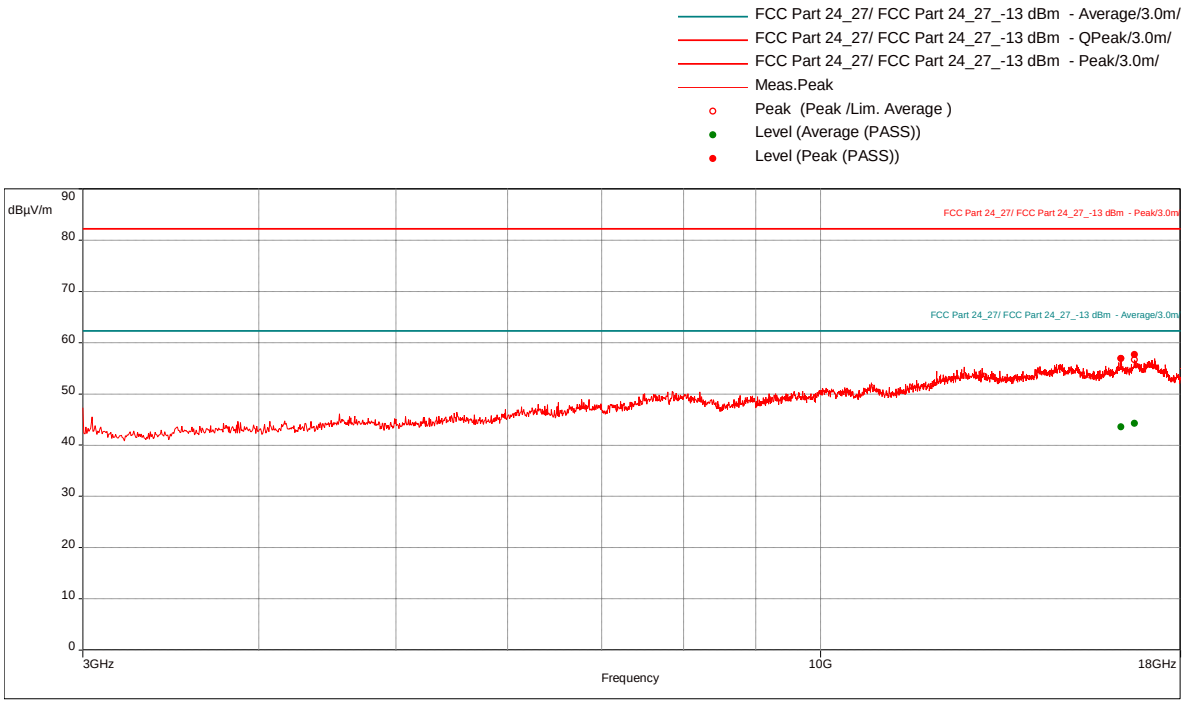
EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8 ; where D is the measurement distance (in the far field region) in m.

Radiated Emissions, 1-22 GHz
Slot 0 (Band 2), Modulation: TM1.1-QPSK, Bandwidth 5 MHz, Transmit @ Mid Channel

Test Information:

Date and Time	5/24/2019 10:51:24 PM
Client and Project Number	CommScope_G103866582
Engineer	Vathana Ven
Temperature	23 deg C
Humidity	41%
Atmospheric Pressure	1007 mB
Comments	RE 3 to 18 GHz_TM1.1_Mid Ch_5M BW_Slot 0_ANT0 & ANT1_P=-4.75

Graph:



Results:

Peak (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dB/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
16330.52632	56.89	-38.37	-13	-25.37	299.00	2.25	Horizontal	1000000.00	21.52
16695	57.68	-37.58	-13	-24.58	129.00	3.39	Vertical	1000000.00	22.31

Level (dBm) is calculated as follow:

EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8 ; where D is the measurement distance (in the far field region) in m.

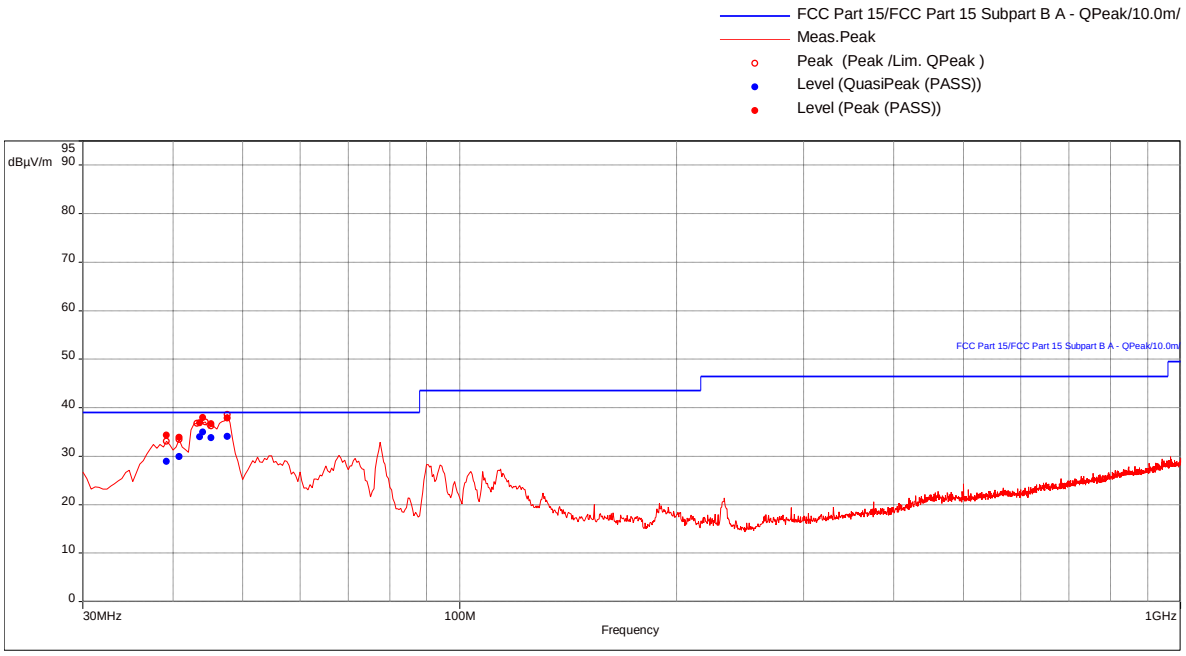
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions, 30-1000 MHz
Slot 0 (Band 2), Modulation: TM1.1-QPSK, Bandwidth 5 MHz, Transmit @ High Channel

Test Information:

Date and Time	5/17/2019 10:18:14 PM
Client and Project Number	Commscope_G103866582
Engineer	Vathana Ven
Temperature	23 deg C
Humidity	50%
Atmospheric Pressure	995 mB
Comments	RE 30-1000MHz_Tx mode_TM1.1_5MHz BW_High Channel_P=-4.0_Slot 0_ Ant 0_Ant1

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
39.1368421	34.30	-50.50	-13.00	-37.50	136.00	3.20	Vertical	120000.00	-18.32
40.8947368	33.90	-50.90	-13.00	-37.90	349.00	1.06	Vertical	120000.00	-19.53
43.4526315	36.88	-47.92	-13.00	-34.92	129.00	1.42	Vertical	120000.00	-21.32
44.1789473	37.96	-46.84	-13.00	-33.84	106.00	1.00	Vertical	120000.00	-21.88
45.1684210	36.71	-48.09	-13.00	-35.09	106.00	1.00	Vertical	120000.00	-22.55
47.7578947	37.83	-46.97	-13.00	-33.97	166.00	1.00	Vertical	120000.00	-24.16

Level (dBm) calculated as follow:

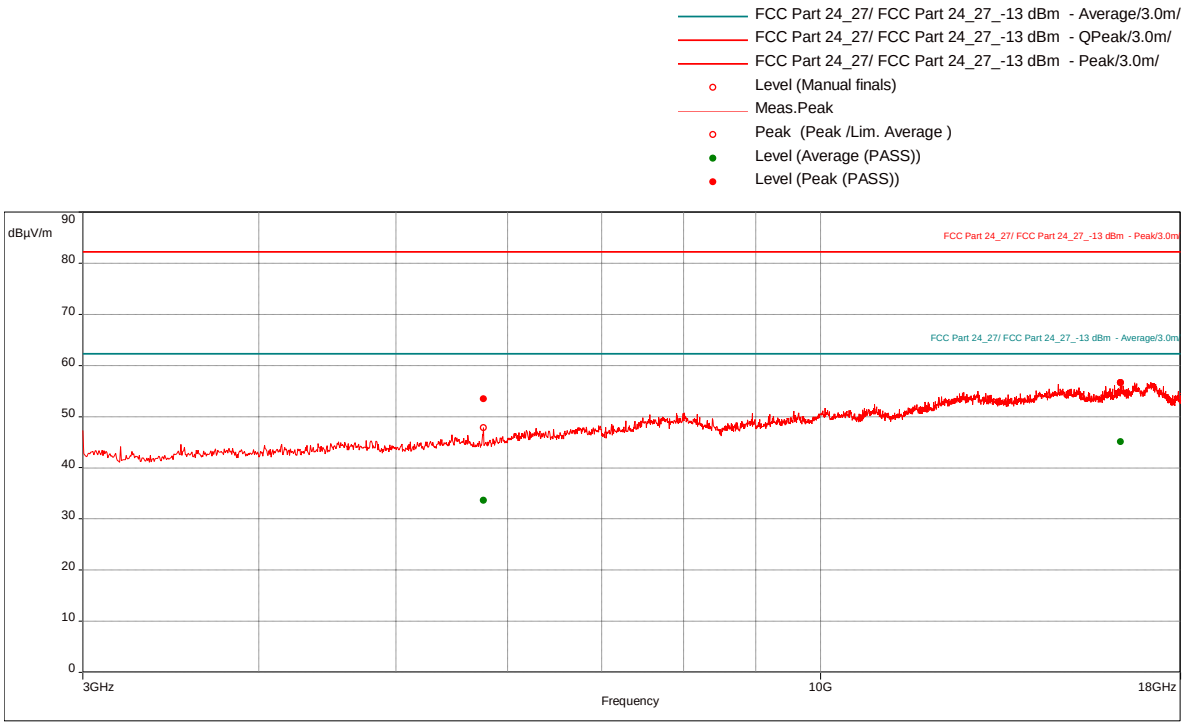
EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8 ; where D is the measurement distance (in the far field region) in m.

Radiated Emissions, 1-22 GHz
Slot 0 (Band 2), Modulation: TM1.1-QPSK, Bandwidth 5 MHz, Transmit @ High Channel

Test Information:

Date and Time	5/24/2019 9:31:56 PM
Client and Project Number	CommScope_G103866582
Engineer	Vathana Ven
Temperature	23 deg C
Humidity	41%
Atmospheric Pressure	1007 mB
Comments	RE 3 to 18 GHz_TM1.1_High Ch_5M BW_Slot 0_ANT0 & ANT1_P=-4.0

Graph:



Results:

Peak (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
5770.526316	53.49	-41.77	-13	-28.77	342.00	1.00	Vertical	1000000.00	8.91
16317.89474	56.60	-38.66	-13	-25.66	0.00	3.54	Horizontal	1000000.00	21.51

Level (dBm) is calculated as follow:

EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8; where D is the measurement distance (in the far field region) in m.

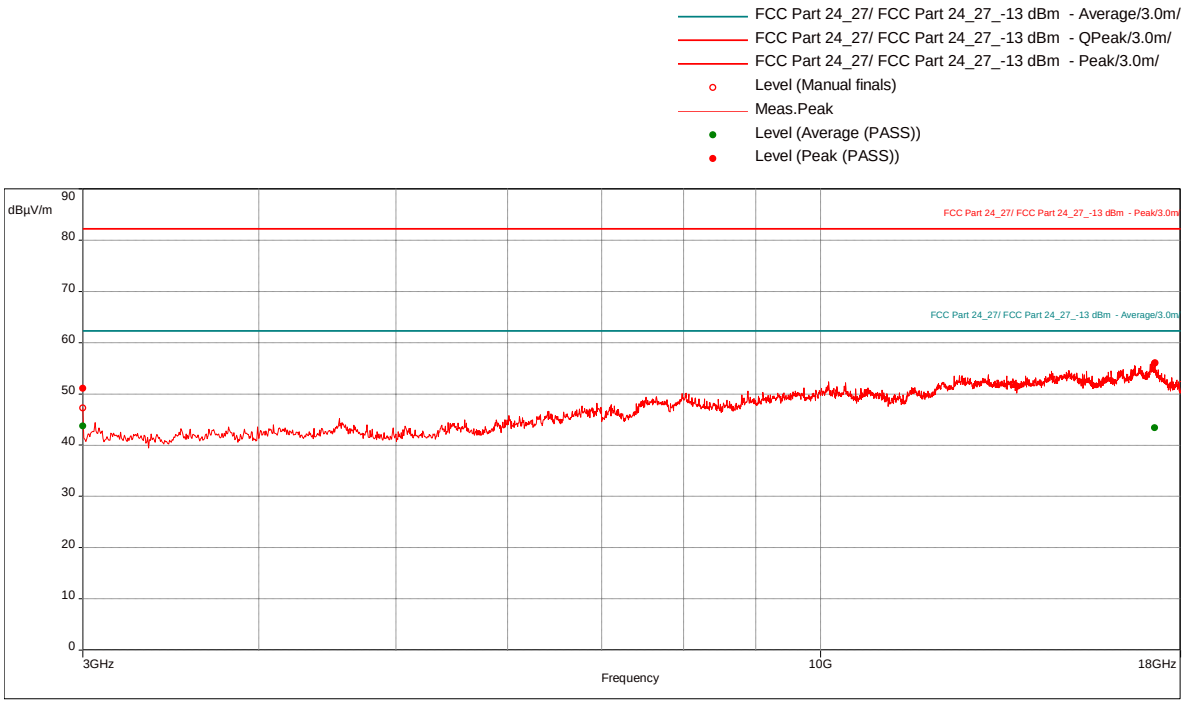
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions, 1-22 GHz
Slot 0 (Band 2), Modulation: TM3.2-16QAM, Bandwidth 5 MHz, Transmit @ Low Channel

Test Information:

Date and Time	6/1/2019 9:52:07 AM
Client and Project Number	CommScope_G103866582
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	48%
Atmospheric Pressure	1001 mB
Comments	3 to 18 GHz_TM3.2_Low Ch_5M BW_Slot_0_ANT0 (-3.0) & ANT1 (-3.0)

Graph:



Results:

Peak (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dB/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
3000	51.07	-44.19	-13	-31.19	276.00	1.85	Vertical	1000000.00	2.42
17262.368	56	-39.26	-13	-26.26	291.00	1.01	Vertical	1000000.00	21.49

Level (dBm) is calculated as follow:

EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8; where D is the measurement distance (in the far field region) in m.

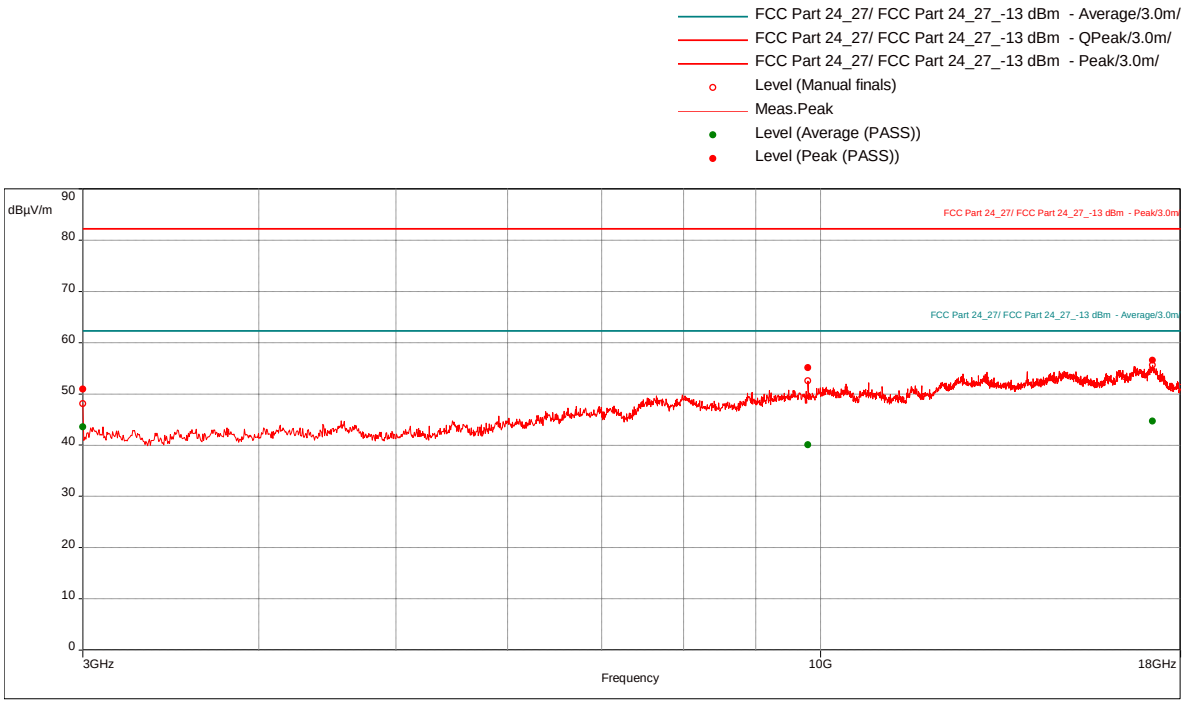
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions, 1-22 GHz
Slot 0 (Band 2), Modulation: TM3.2-16QAM, Bandwidth 5 MHz, Transmit @ Mid Channel

Test Information:

Date and Time	6/1/2019 10:14:07 AM
Client and Project Number	CommScope_G103866582
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	48%
Atmospheric Pressure	1001 mB
Comments	3 to 18 GHz_TM3.2_Mid Ch_5M BW_Slot 0_ANT0 (-4.25) & ANT1 (-4.25)

Graph:



Results:

Peak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dB/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
3000	50.94	-44.32	-13	-31.32	277.00	1.40	Vertical	1000000.00	2.42
9800.7895	55.11	-40.15	-13	-27.15	149.00	2.40	Vertical	1000000.00	13.87
17196.579	56.53	-38.73	-13	-25.73	276.00	2.85	Vertical	1000000.00	21.75

Level (dBm) is calculated as follow:

EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8; where D is the measurement distance (in the far field region) in m.

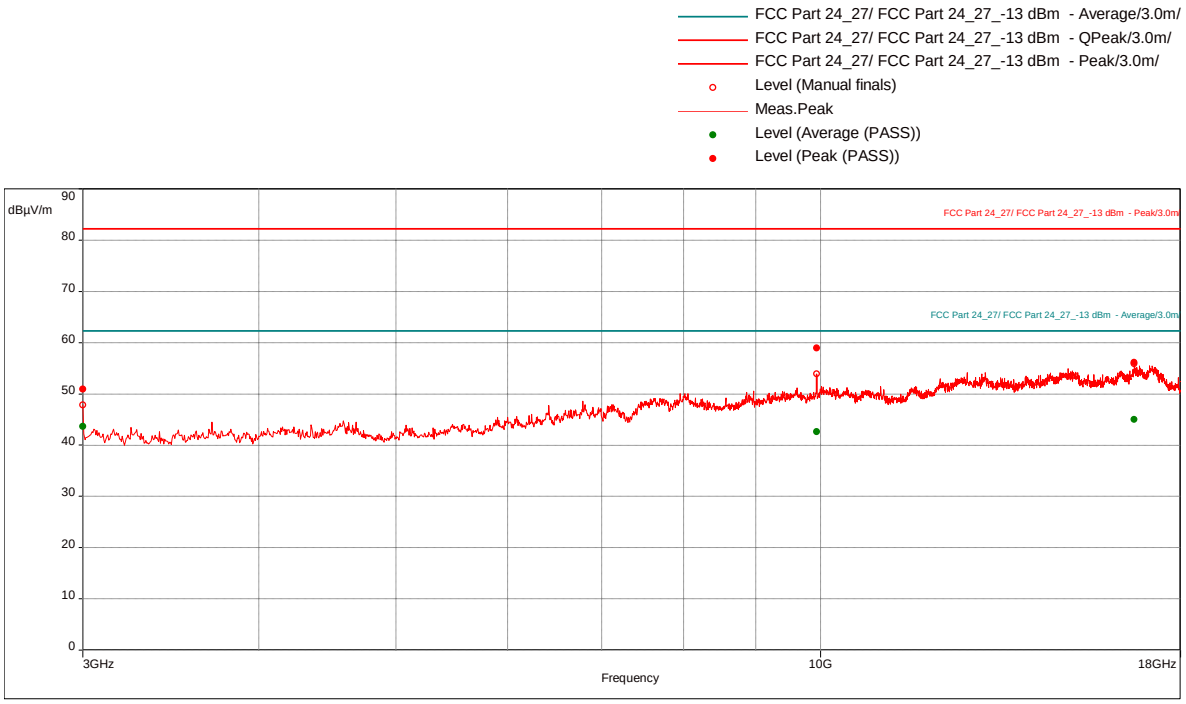
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions, 1-22 GHz
Slot 0 (Band 2), Modulation: TM3.2-16QAM, Bandwidth 5 MHz, Transmit @ High Channel

Test Information:

Date and Time	6/1/2019 10:39:21 AM
Client and Project Number	CommScope_G103866582
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	48%
Atmospheric Pressure	1001 mB
Comments	3 to 18 GHz_TM3.2_High Ch_5M BW_Slot 0_ANT0 (-3.25) & ANT1 (-3.25)

Graph:



Results:

Peak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dB/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
3000	50.94	-44.32	-13	-31.32	276.00	1.40	Vertical	1000000.00	2.42
9937.8947	58.96	-36.3	-13	-23.3	143.00	1.65	Vertical	1000000.00	14.19
16691.842	56.11	-39.15	-13	-26.15	25.00	2.30	Vertical	1000000.00	22.28

Level (dBm) is calculated as follow:

EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8; where D is the measurement distance (in the far field region) in m.

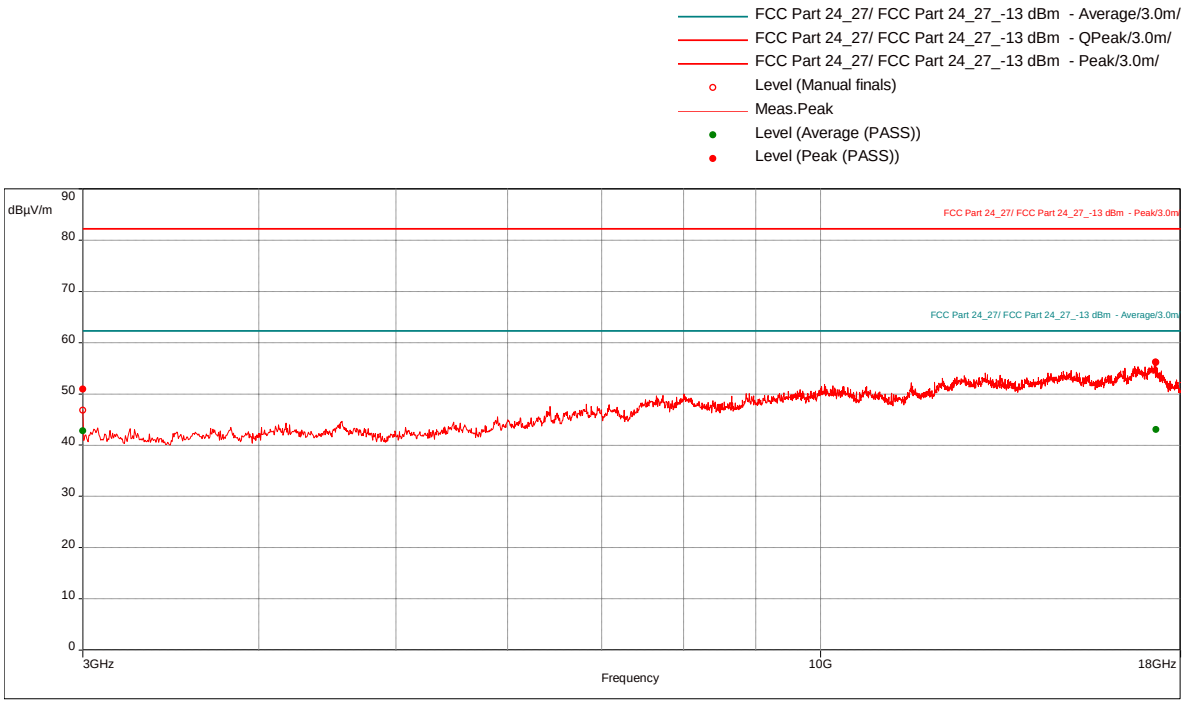
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions, 1-22 GHz
Slot 0 (Band 2), Modulation: TM3.1-64QAM, Bandwidth 5 MHz, Transmit @ Low Channel

Test Information:

Date and Time	6/1/2019 1:36:07 PM
Client and Project Number	CommScope_G103866582
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	48%
Atmospheric Pressure	1001 mB
Comments	3 to 18 GHz_TM3.1_Low Ch_5M BW_Slot 0_ANT0 (-3.75) & ANT1 (-3.5)

Graph:



Results:

Peak (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dB/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
3000	50.94	-44.32	-13	-31.32	278.00	1.85	Vertical	1000000.00	2.42
17288.684	56.12	-39.14	-13	-26.14	342.00	1.50	Horizontal	1000000.00	21.34

Level (dBm) is calculated as follow:

EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8; where D is the measurement distance (in the far field region) in m.

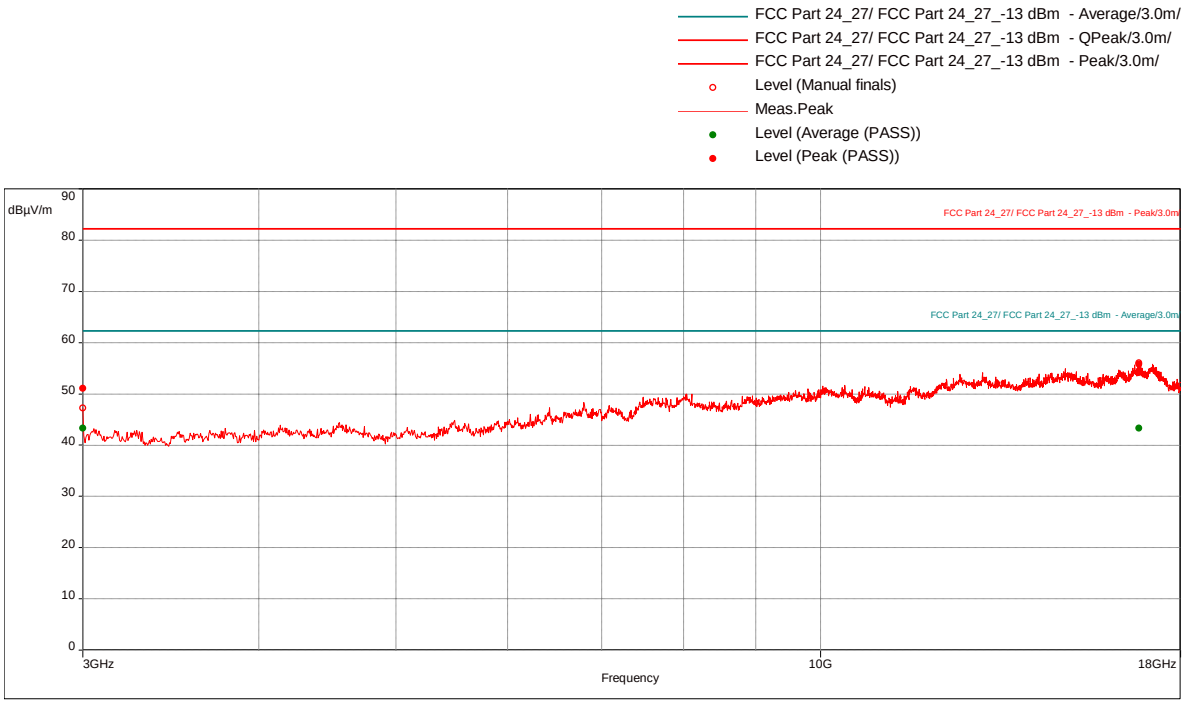
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions, 1-22 GHz
Slot 0 (Band 2), Modulation: TM3.1-64QAM, Bandwidth 5 MHz, Transmit @ Mid Channel

Test Information:

Date and Time	6/1/2019 1:56:38 PM
Client and Project Number	CommScope_G103866582
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	48%
Atmospheric Pressure	1001 mB
Comments	3 to 18 GHz_TM3.1_Mid Ch_5M BW_Slot 0_ANT0 (-5.0) & ANT1 (-5.0)

Graph:



Results:

Peak (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dB/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
3000	51.07	-44.19	-13	-31.19	277.00	3.98	Vertical	1000000.00	2.42
16815	55.8	-39.46	-13	-26.46	18.00	1.40	Horizontal	1000000.00	21.97

Level (dBm) is calculated as follow:

EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8; where D is the measurement distance (in the far field region) in m.

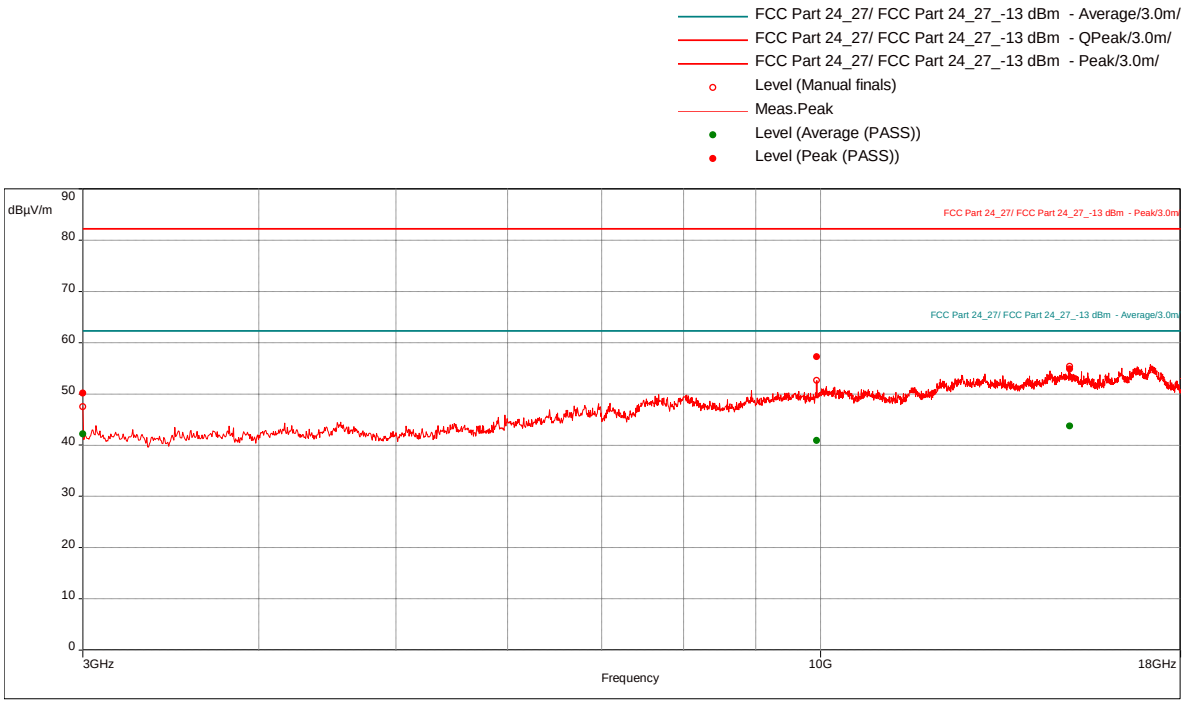
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions, 1-22 GHz
Slot 0 (Band 2), Modulation: TM3.1-64QAM, Bandwidth 5 MHz, Transmit @ High Channel

Test Information:

Date and Time	6/1/2019 2:16:43 PM
Client and Project Number	CommScope_G103866582
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	48%
Atmospheric Pressure	1001 mB
Comments	3 to 18 GHz_TM3.1_High_Ch_5M BW_Slot 0_ANT0 (-3.75) & ANT1 (-3.75)

Graph:



Results:

Peak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dB/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
3000	50.17	-45.09	-13	-32.09	276.00	1.00	Vertical	1000000.00	2.42
9941.0526	57.28	-37.98	-13	-24.98	144.00	1.95	Vertical	1000000.00	14.22
15020.263	54.88	-40.38	-13	-27.38	10.00	1.35	Vertical	1000000.00	21.44

Level (dBm) is calculated as follow:

EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8; where D is the measurement distance (in the far field region) in m.

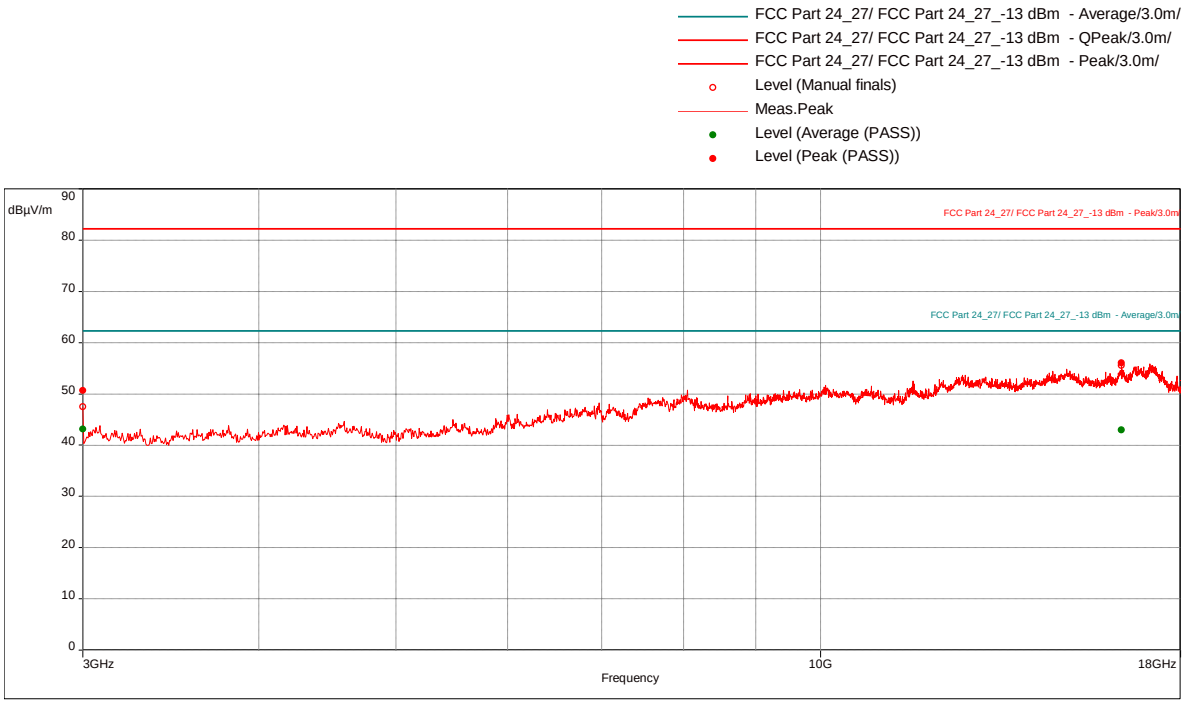
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm

Radiated Emissions, 1-22 GHz
Slot 0 (Band 2), Modulation: TM3.1a-256QAM, Bandwidth 5 MHz, Transmit @ Low Channel

Test Information:

Date and Time	6/1/2019 2:42:25 PM
Client and Project Number	CommScope_G103866582
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	48%
Atmospheric Pressure	1001 mB
Comments	3 to 18 GHz_TM3.1a_Low_Ch_5M BW_Slot 0_ANT0 (-3.75) & ANT1 (-3.75)

Graph:



Results:

Peak (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dB/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
3000	50.68	-44.58	-13	-31.58	276.00	1.85	Vertical	1000000.00	2.42
16342.368	56.04	-39.22	-13	-26.22	166.00	2.45	Vertical	1000000.00	21.53

Level (dBm) is calculated as follow:

EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8; where D is the measurement distance (in the far field region) in m.

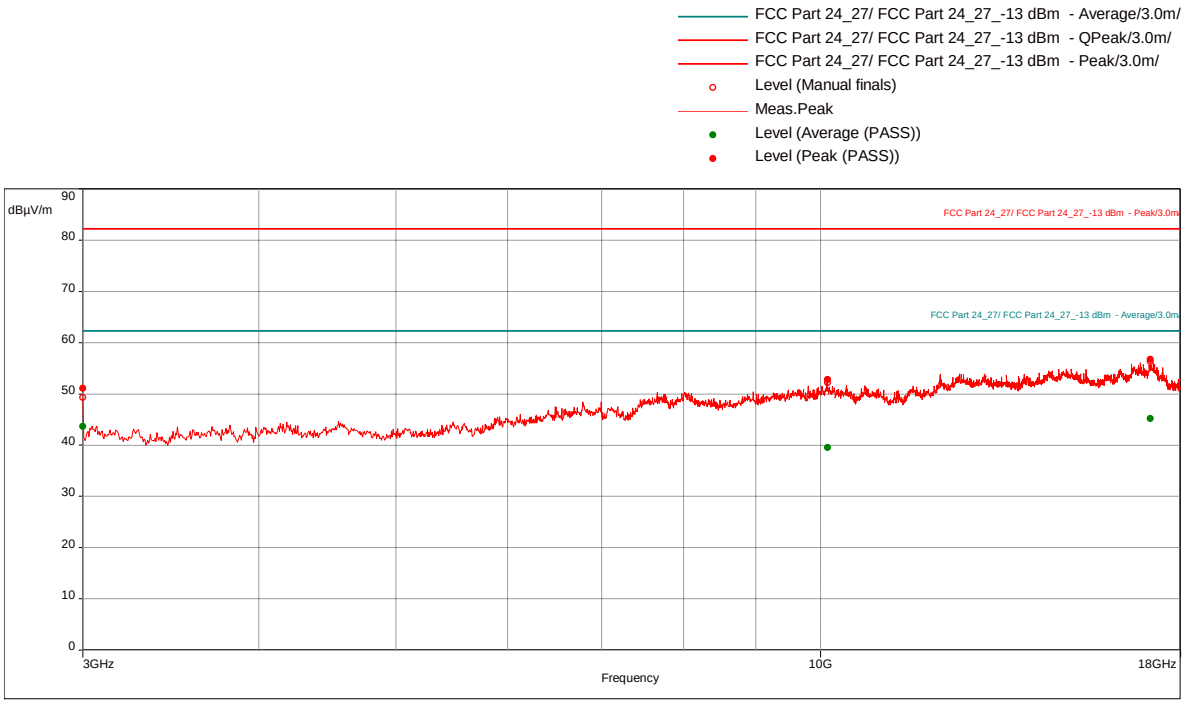
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm

Radiated Emissions, 1-22 GHz
Slot 0 (Band 2), Modulation: TM3.1a-256QAM, Bandwidth 5 MHz, Transmit @ Mid Channel

Test Information:

Date and Time	6/2/2019 8:25:23 AM
Client and Project Number	CommScope_G103866582
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	51 %
Atmospheric Pressure	997 mB
Comments	3 to 18 GHz_TM3.1a_Mid Ch_5M BW_Slot 0_ANT0 (-5.25 & ANT1 (-5.25)

Graph:



Results:

Peak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dB/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
3000	51.07	-44.19	-13	-31.19	276.00	1.15	Vertical	1000000.00	2.42
10115	52.79	-42.47	-13	-29.47	11.00	1.95	Vertical	1000000.00	15.14
17138.158	56.69	-38.57	-13	-25.57	298.00	2.60	Vertical	1000000.00	21.91

Level (dBm) is calculated as follow:

EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8; where D is the measurement distance (in the far field region) in m.

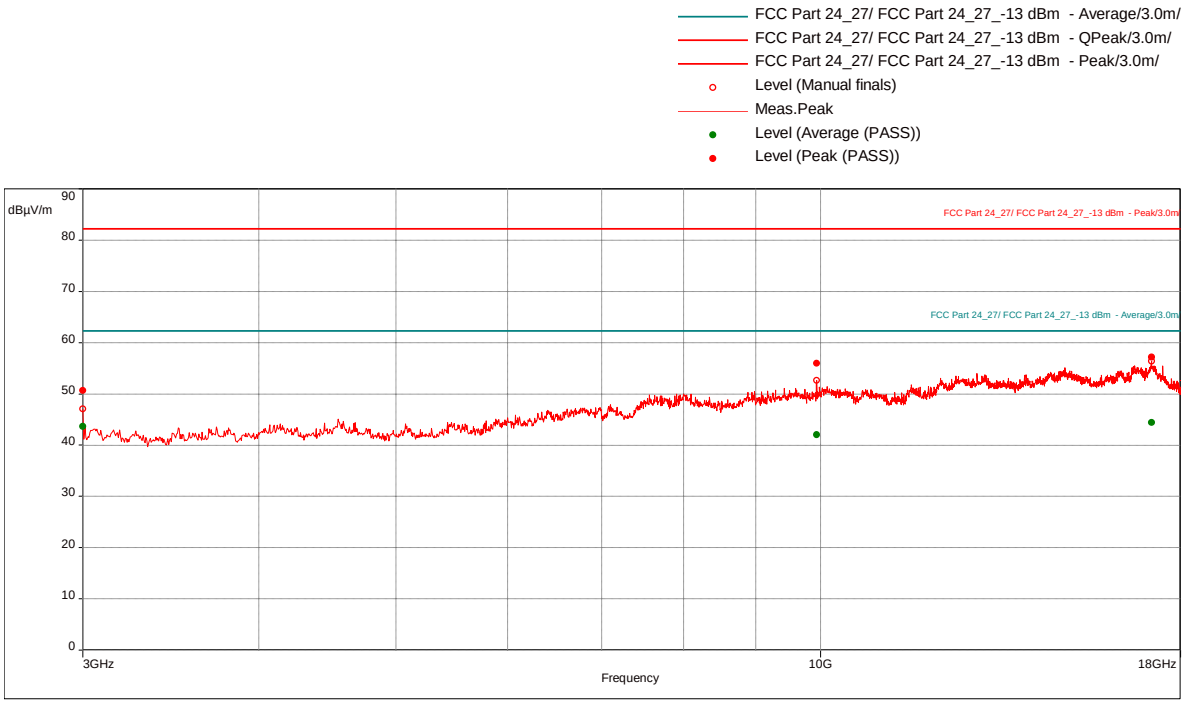
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm

Radiated Emissions, 1-22 GHz
Slot 0 (Band 2), Modulation: TM3.1a-256QAM, Bandwidth 5 MHz, Transmit @ High Channel

Test Information:

Date and Time	6/2/2019 8:50:17 AM
Client and Project Number	CommScope_G103866582
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	51 %
Atmospheric Pressure	997 mB
Comments	3 to 18 GHz_TM3.1a_High Ch_5M BW_Slot 0_ANT0 (-3.75) & ANT1 (-3.75)

Graph:



Results:

Peak (PASS) (3)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dB/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
3000	50.68	-44.58	-13	-31.58	279.00	3.98	Vertical	1000000.00	2.42
9938.4211	55.93	-39.33	-13	-26.33	143.00	2.25	Vertical	1000000.00	14.19
17172.105	57.16	-38.1	-13	-25.1	269.00	1.90	Horizontal	1000000.00	21.82

Level (dBm) is calculated as follow:

EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8; where D is the measurement distance (in the far field region) in m.

Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm.

		Test Date:	04/10/2019, 04/11/2019, 04/12/2019, 04/15/2019, 04/16/2019, 04/17/2019, 04/18/2019, 04/19/2019, 04/26/2019, 04/30/2019, 05/17/2019, 05/24/2019, 06/01/2019, 06/02/2019
Test Personnel:	Kouma Sinn KPS		
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 24	Limit Applied:	See report section 11.3
Input Voltage:	48 VDC (POE)		
		Ambient Temperature:	22, 23, 23, 23, 23, 22, 22, 22, 20, 22, 23, 23, 22, 22 ºC
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Relative Humidity:	21, 15, 26, 47, 20, 22, 23, 47, 42, 35, 5, 410, 40, 51 %
		Atmospheric Pressure:	1004, 1013, 1004, 980, 1001, 1011, 1014, 1000, 996, 1017, 995, 1007, 1001, 997 mbars

Deviations, Additions, or Exclusions: None

12 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	07/19/2019	103866582BOX-010a	KPS	NNA	Original Issue
1	08/07/2019	103866582BOX-010a	KPS	NNA	Added tabular frequency stability data and a note about antenna gain not being measured