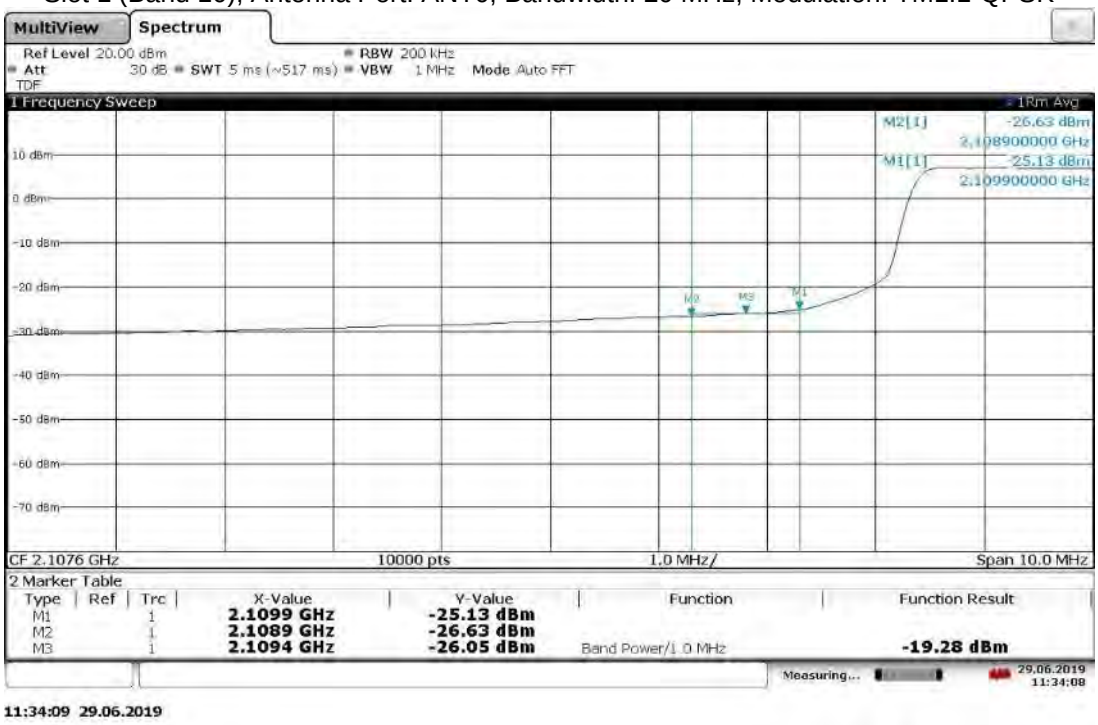
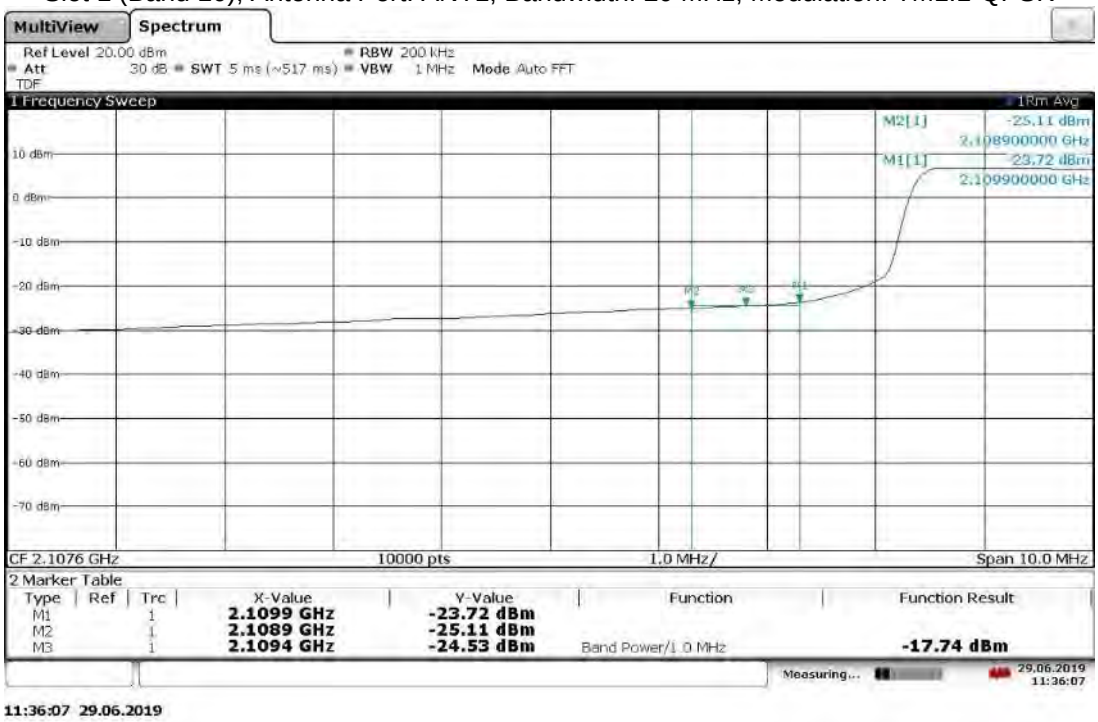
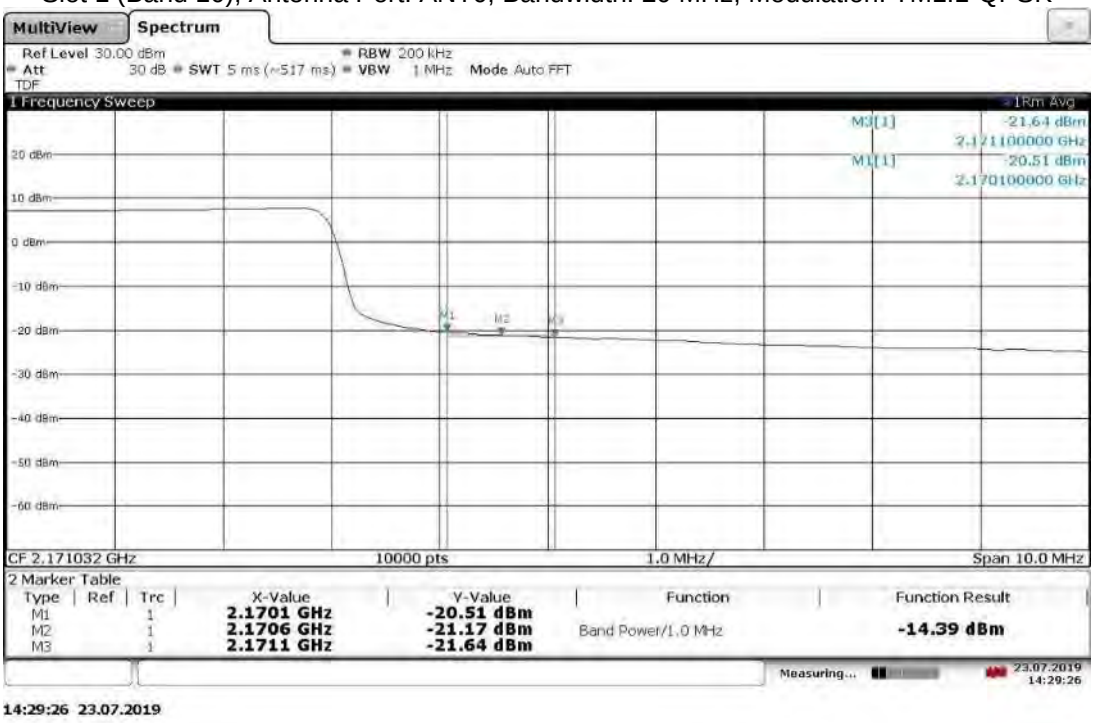
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



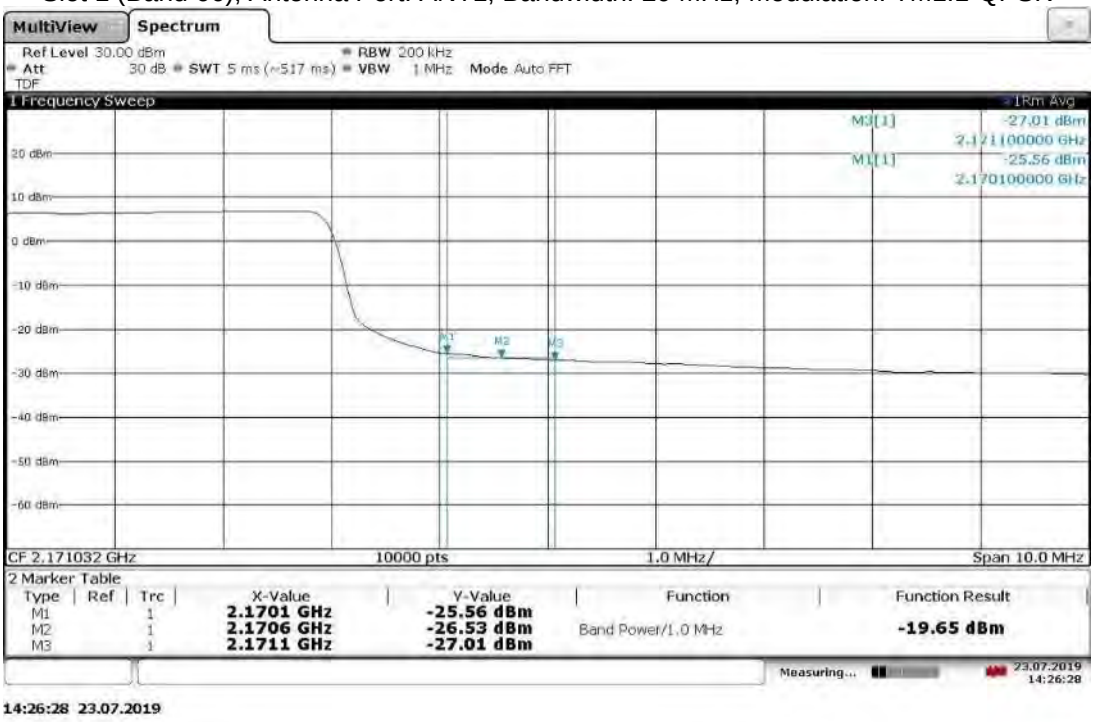
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



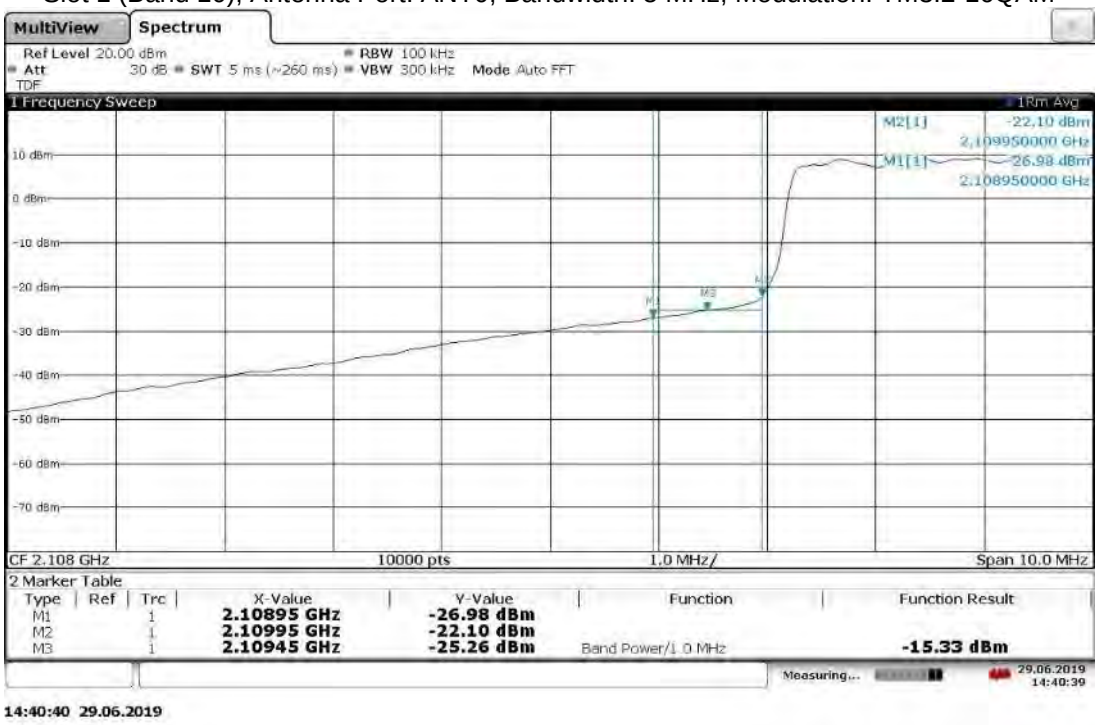
Band Edge Compliant, Upper Band Edge, 2160 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



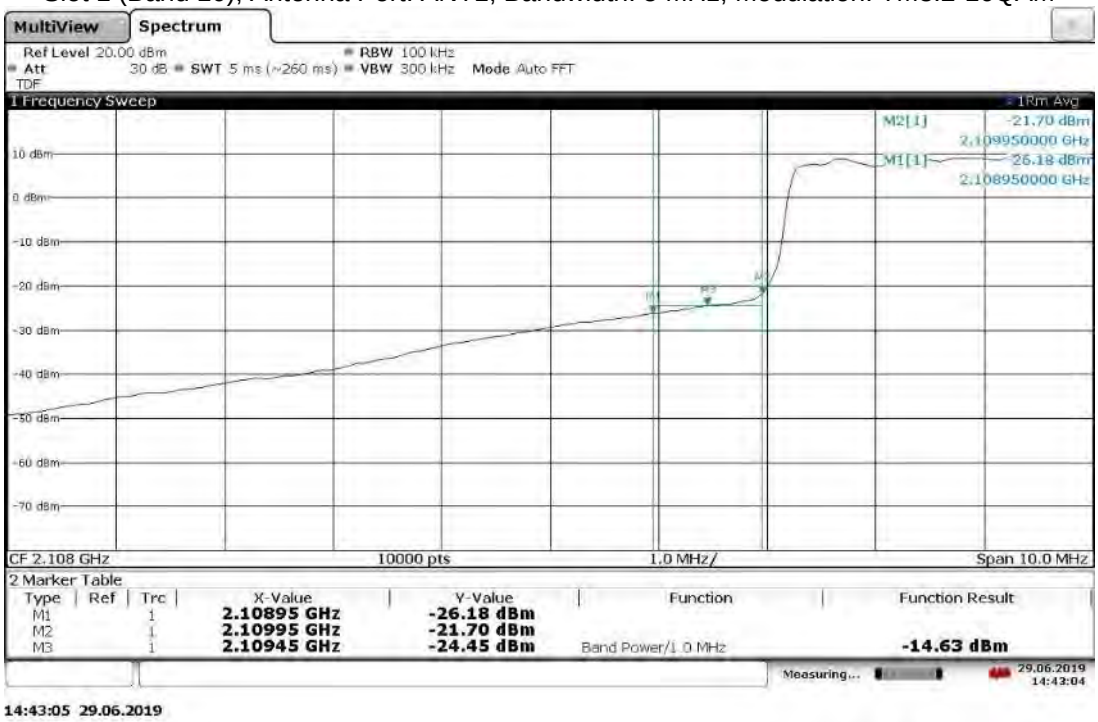
Band Edge Compliant, Upper Band Edge, 2160 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



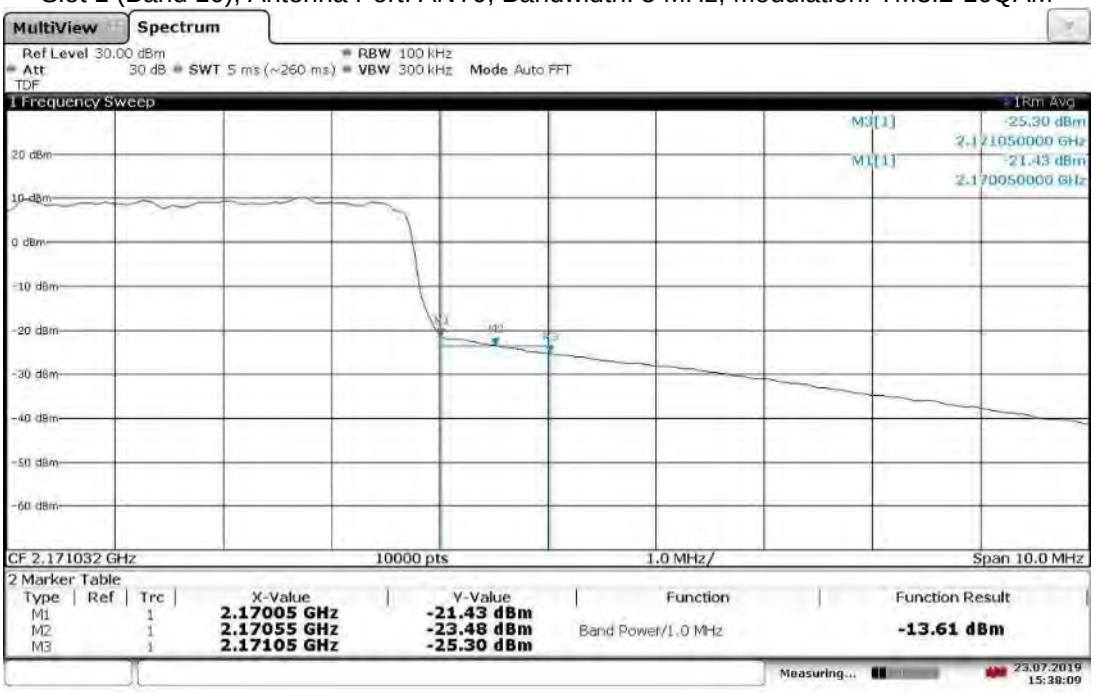
Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



Band Edge Compliant, Lower Band Edge, 2112.5MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM

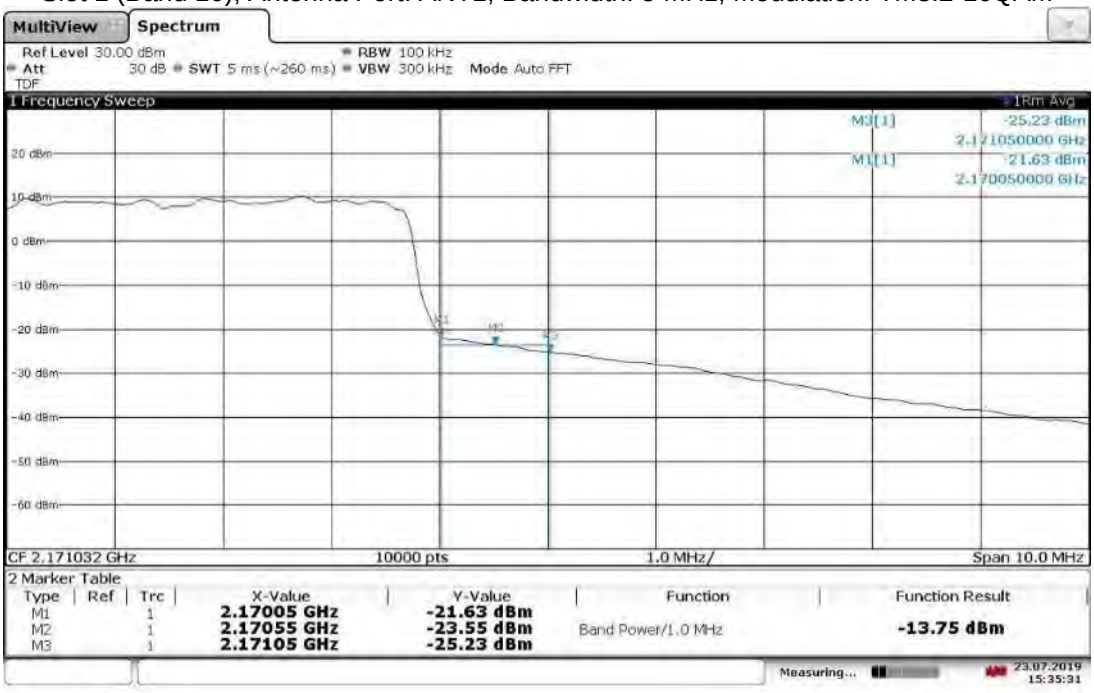


Band Edge Compliant, Upper Band Edge, 2167.5 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



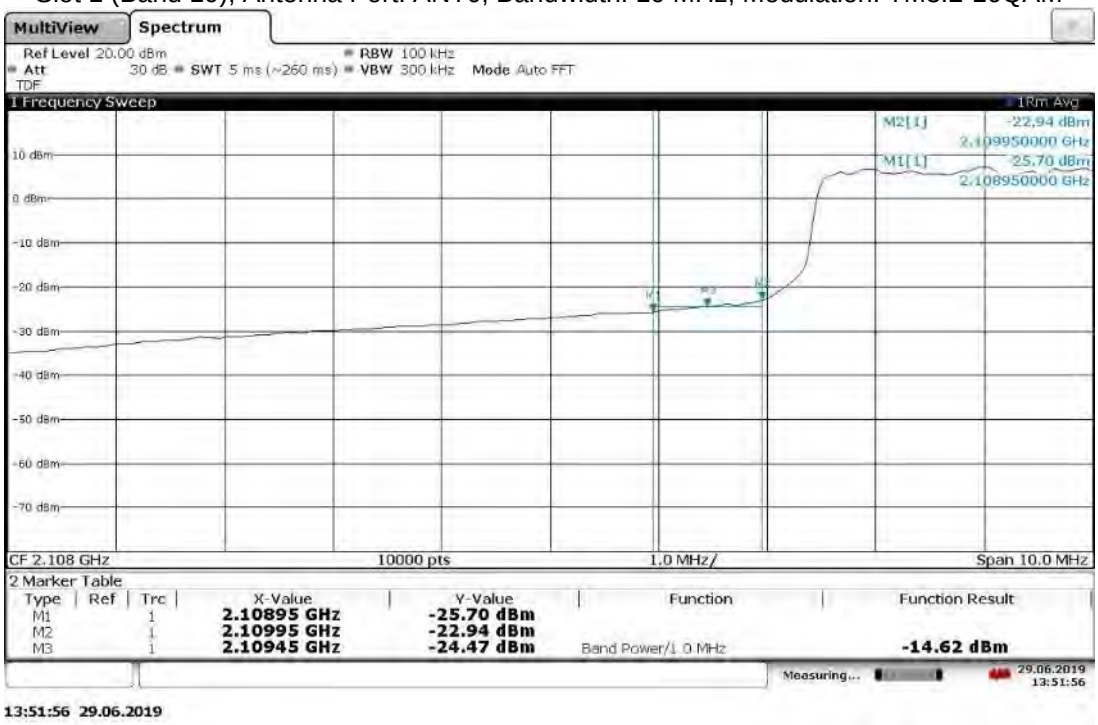
15:38:09 23.07.2019

Band Edge Compliant, Upper Band Edge, 2167.5 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM

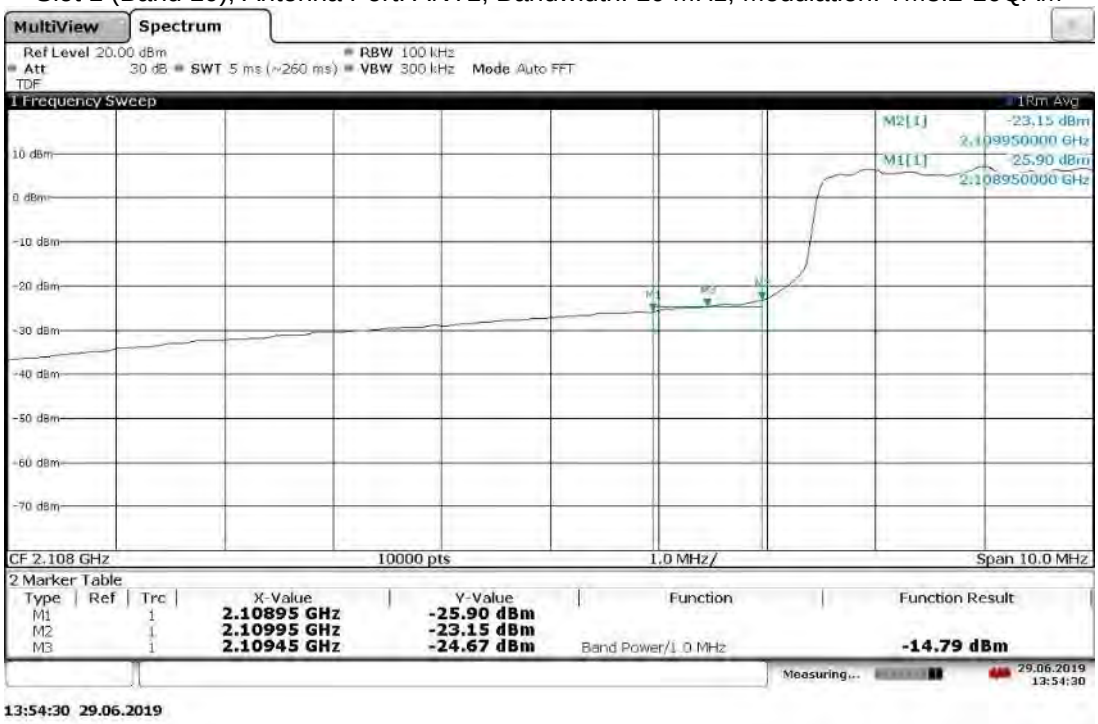


15:35:31 23.07.2019

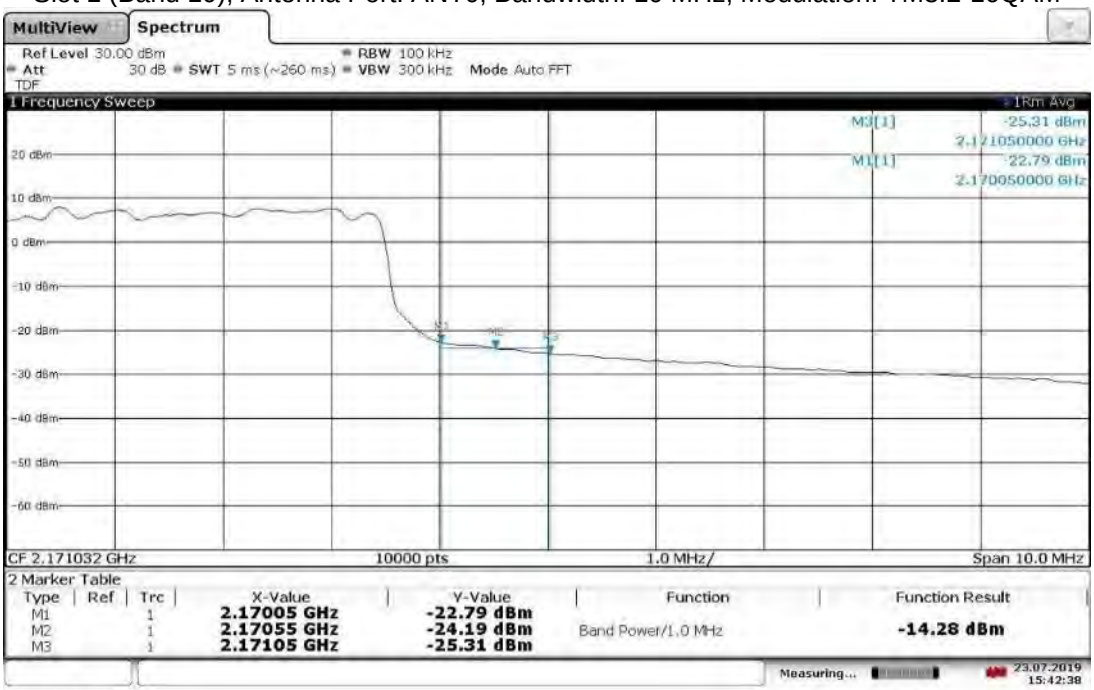
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM

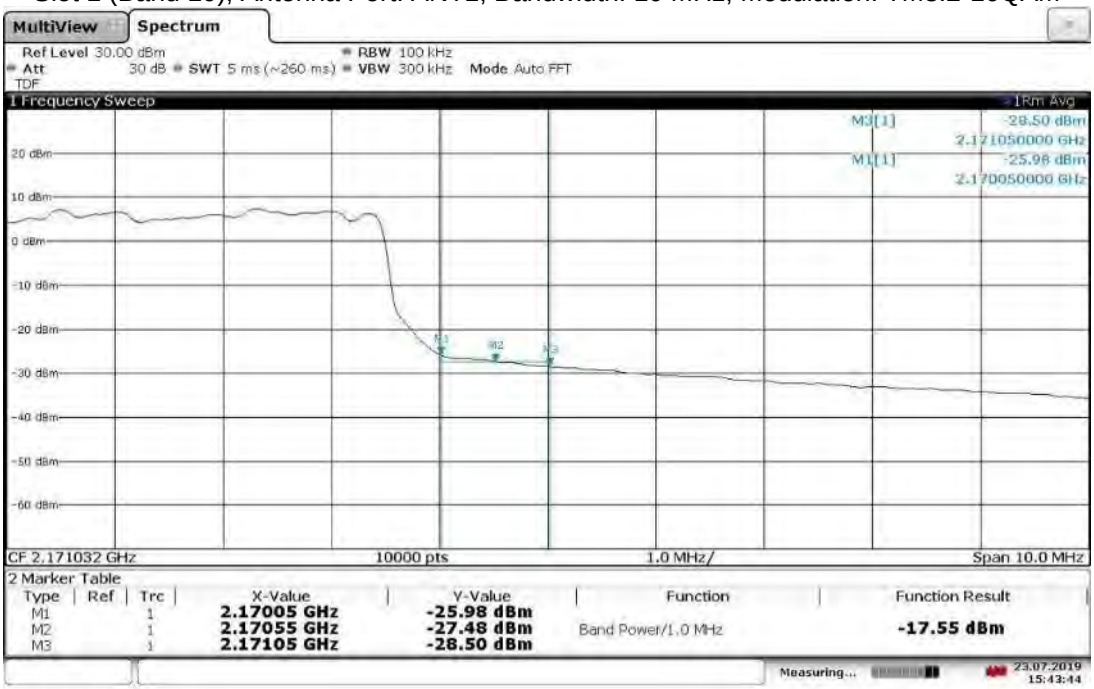


Band Edge Compliant, Upper Band Edge, 2165 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



15:42:38 23.07.2019

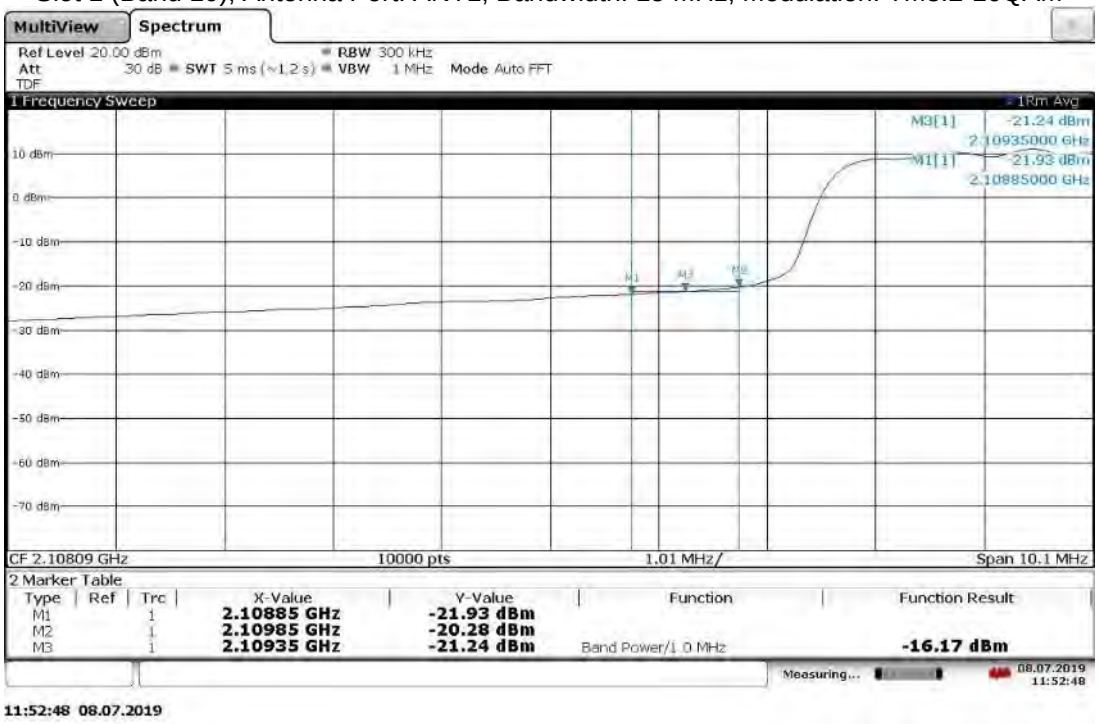
Band Edge Compliant, Upper Band Edge, 2165 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



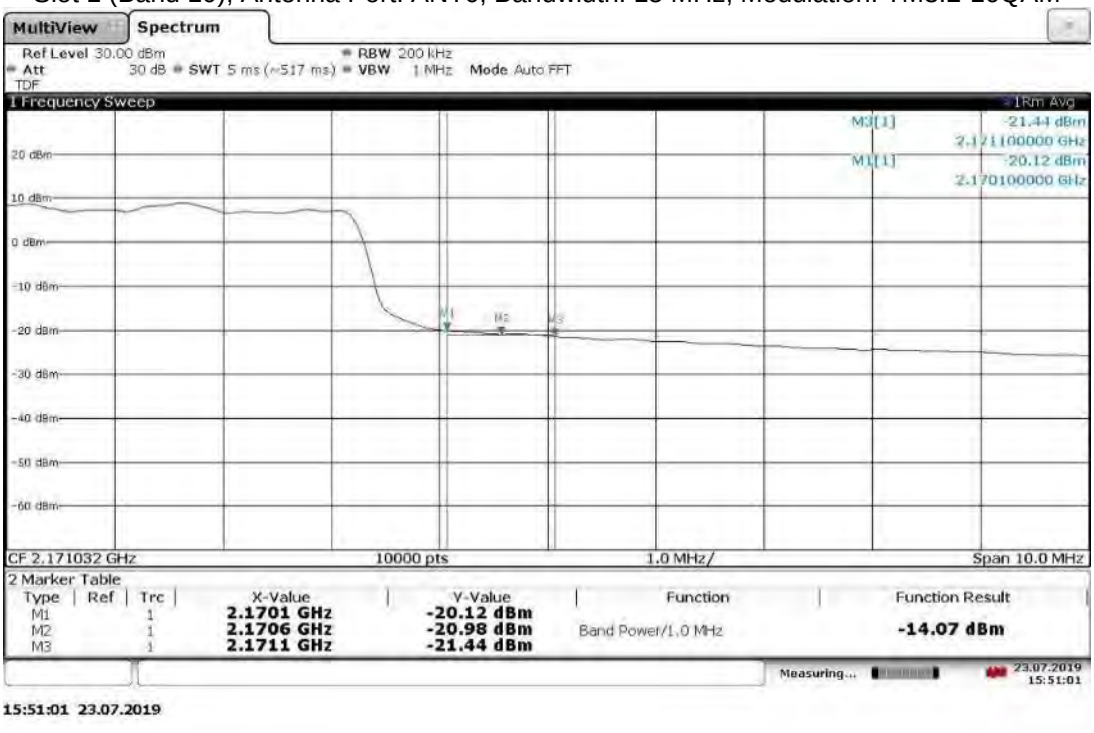
15:43:45 23.07.2019

Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth:15 MHz, Modulation: TM3.2-16QAM

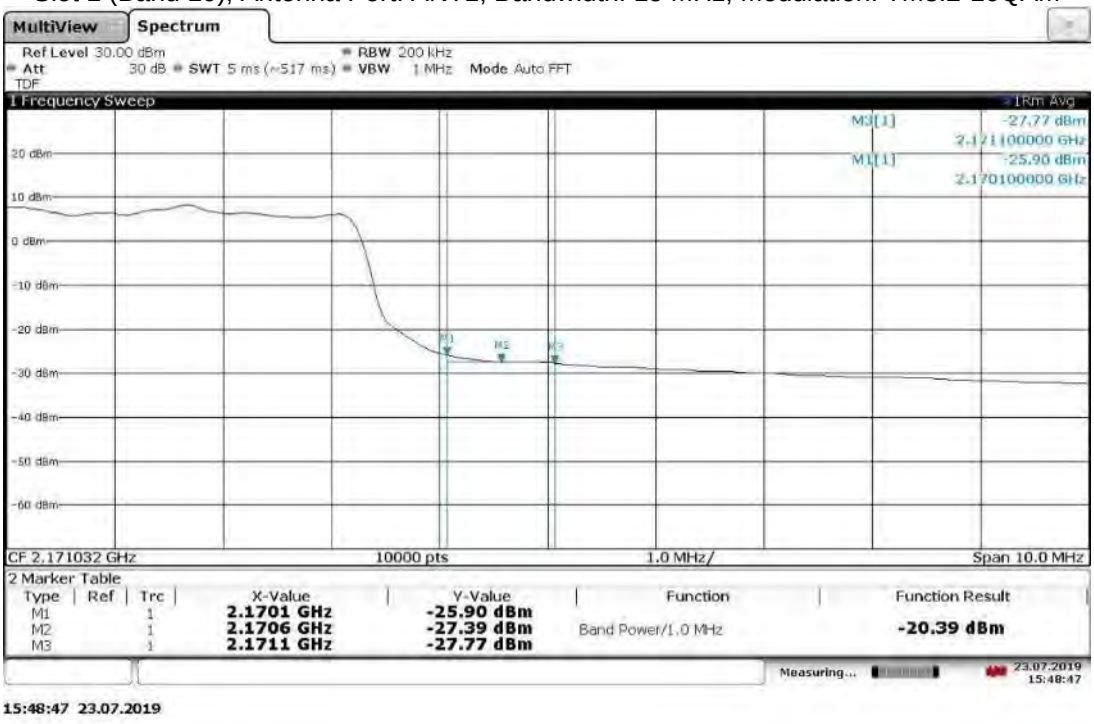
Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



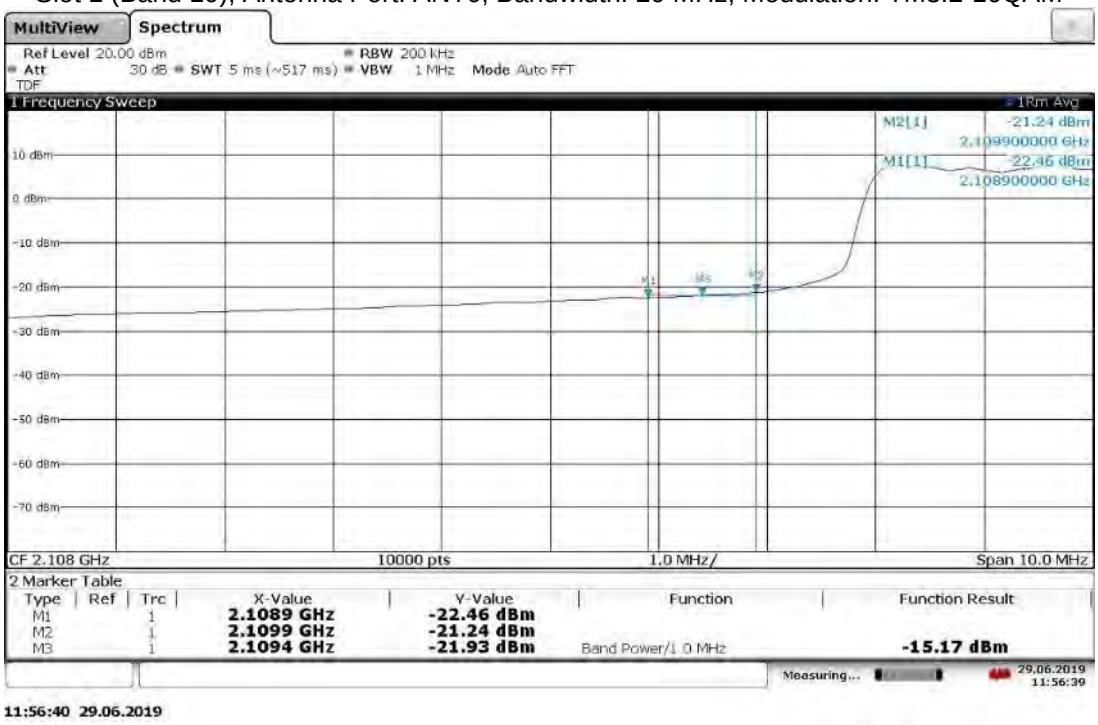
Band Edge Compliant, Upper Band Edge, 2162.5 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



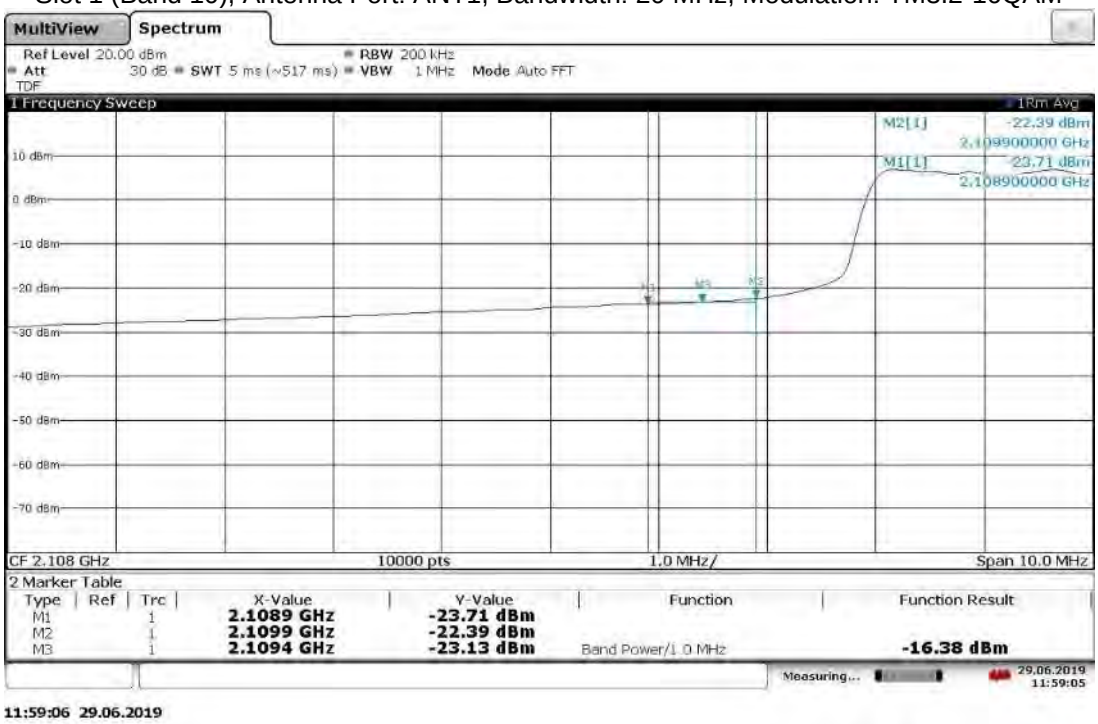
Band Edge Compliant, Upper Band Edge, 2162.5 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



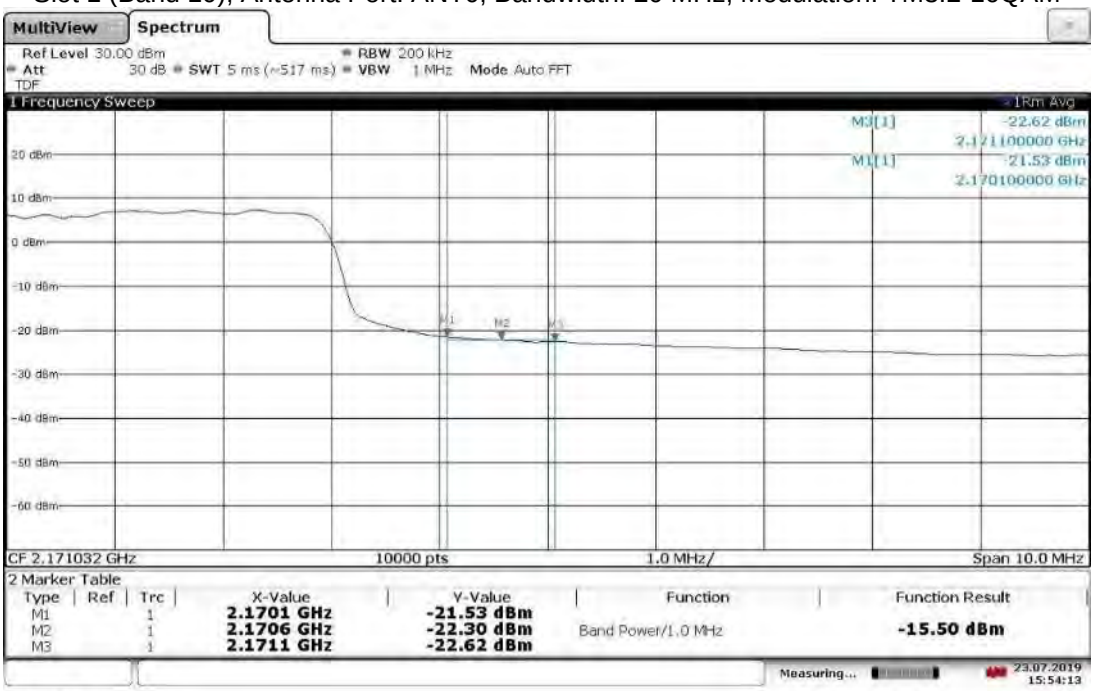
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM

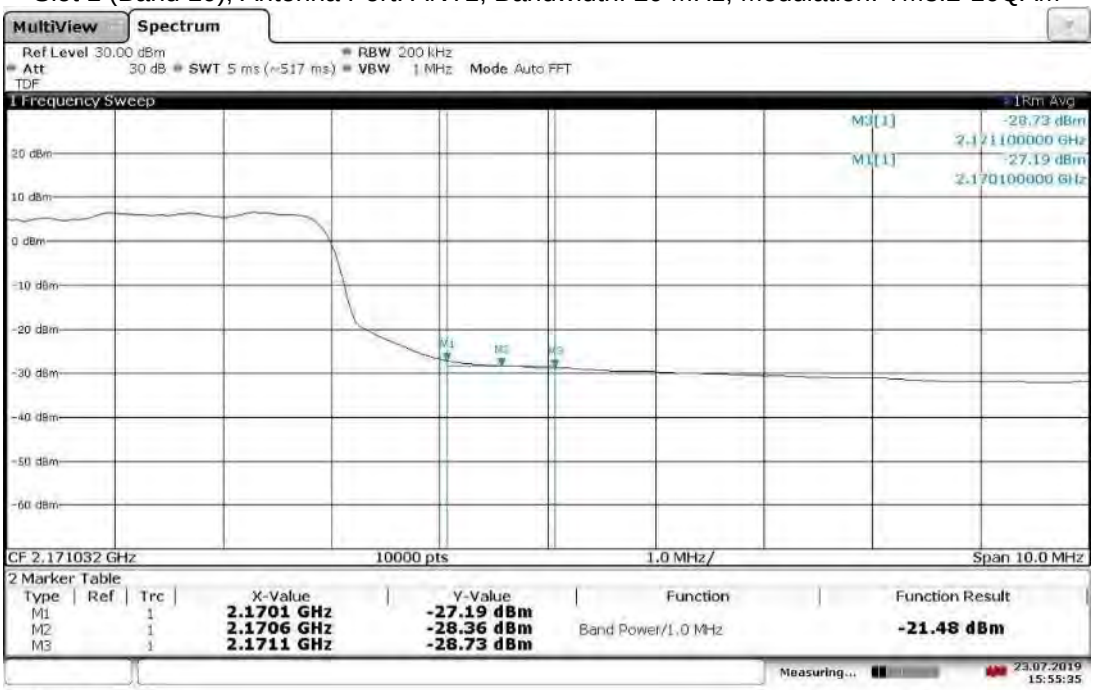


Band Edge Compliant, Upper Band Edge, 2160 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



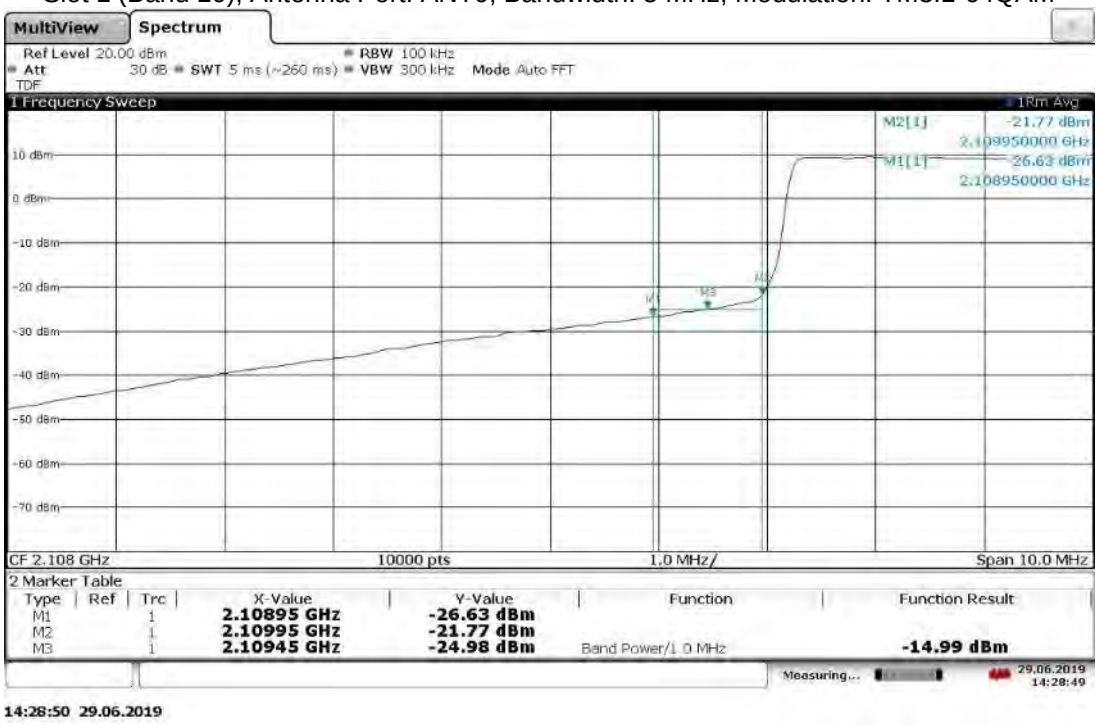
15:54:13 23.07.2019

Band Edge Compliant, Upper Band Edge, 2160 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM

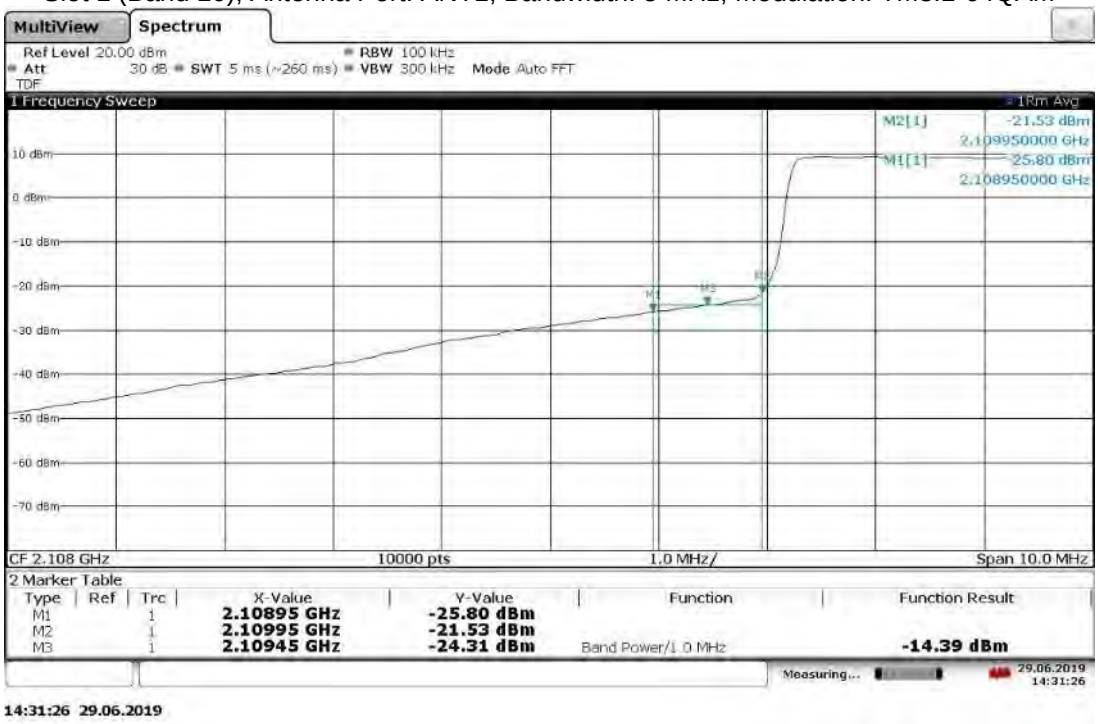


15:55:36 23.07.2019

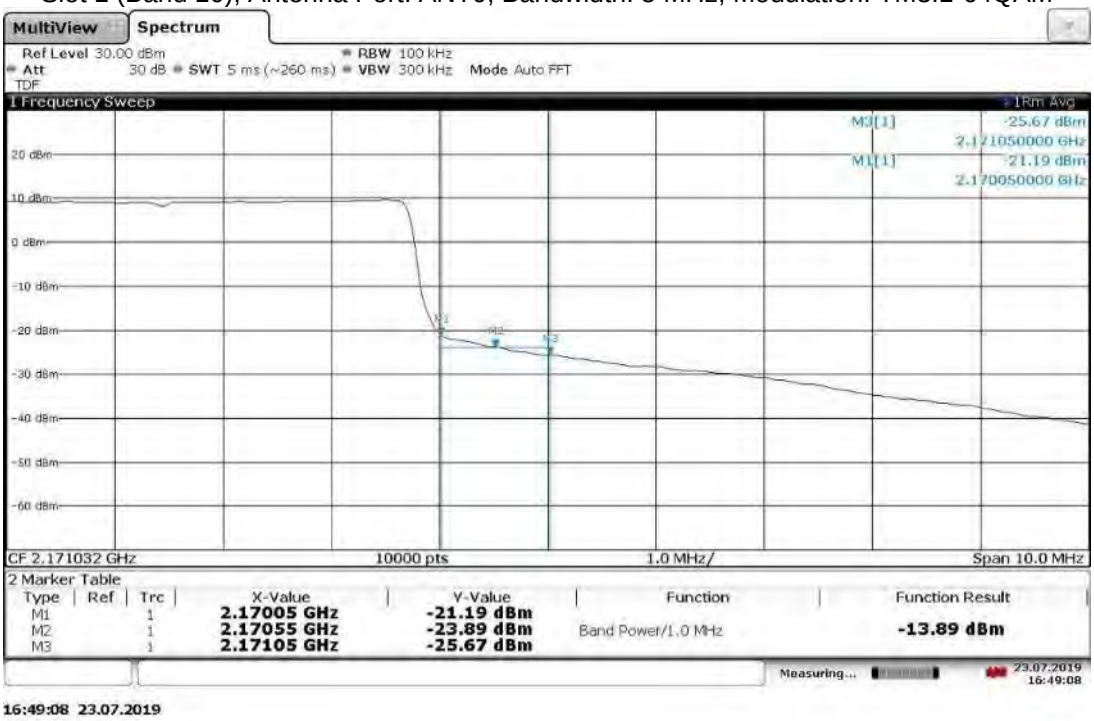
Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



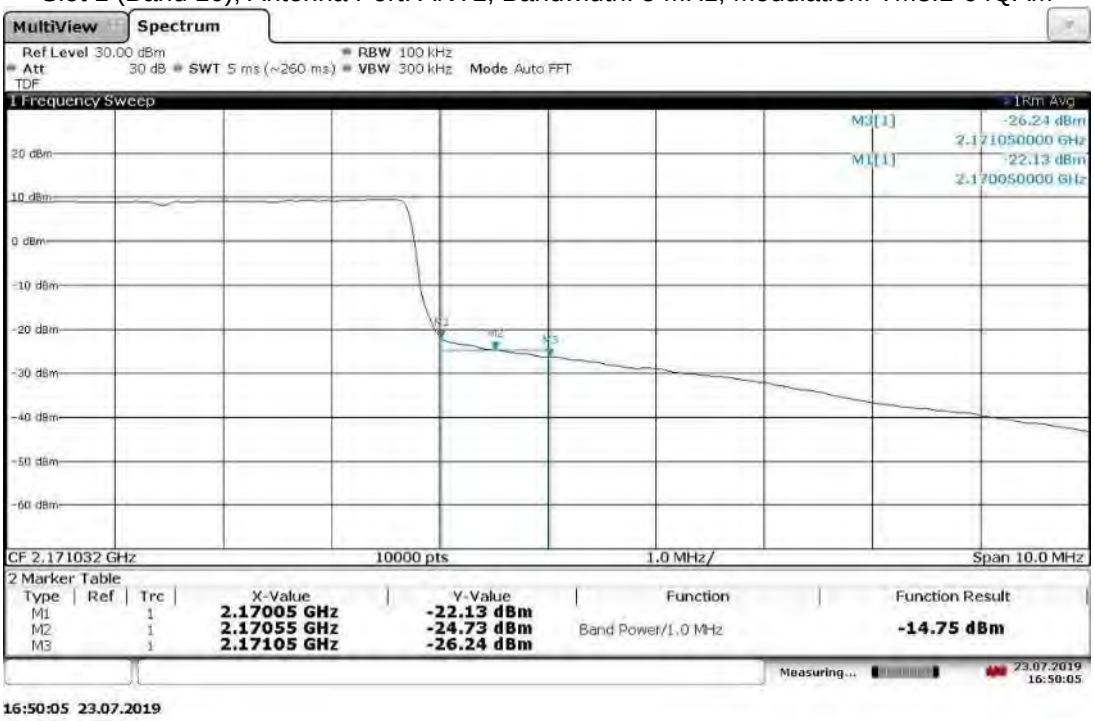
Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



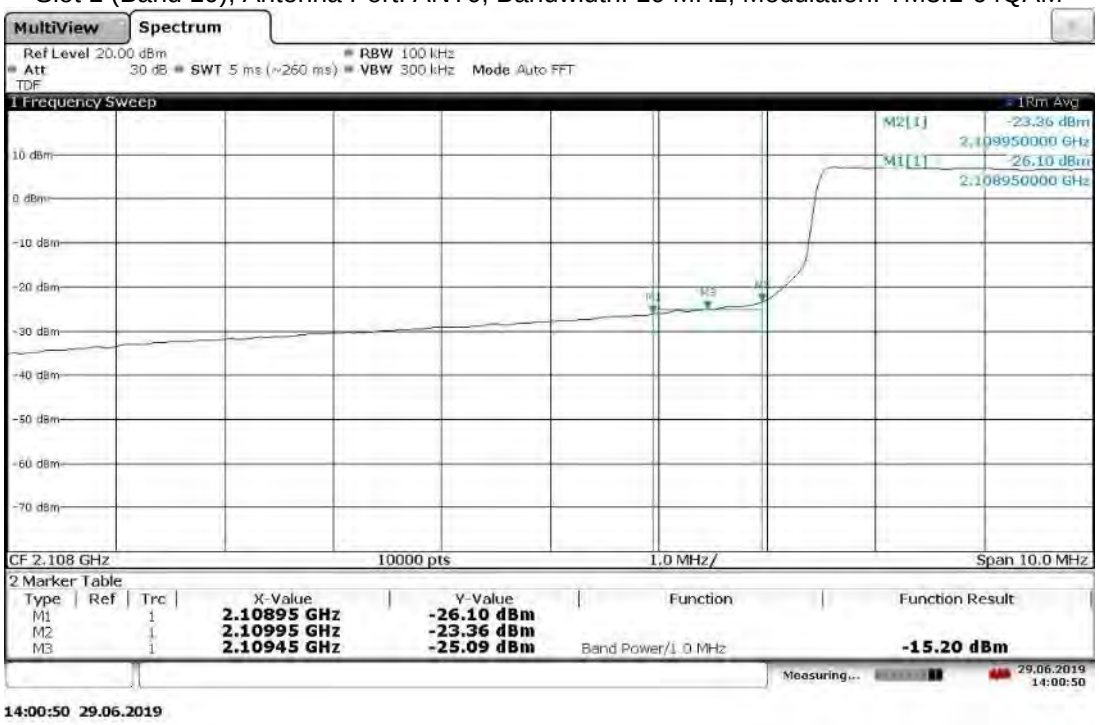
Band Edge Compliant, Upper Band Edge, 2167.5 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



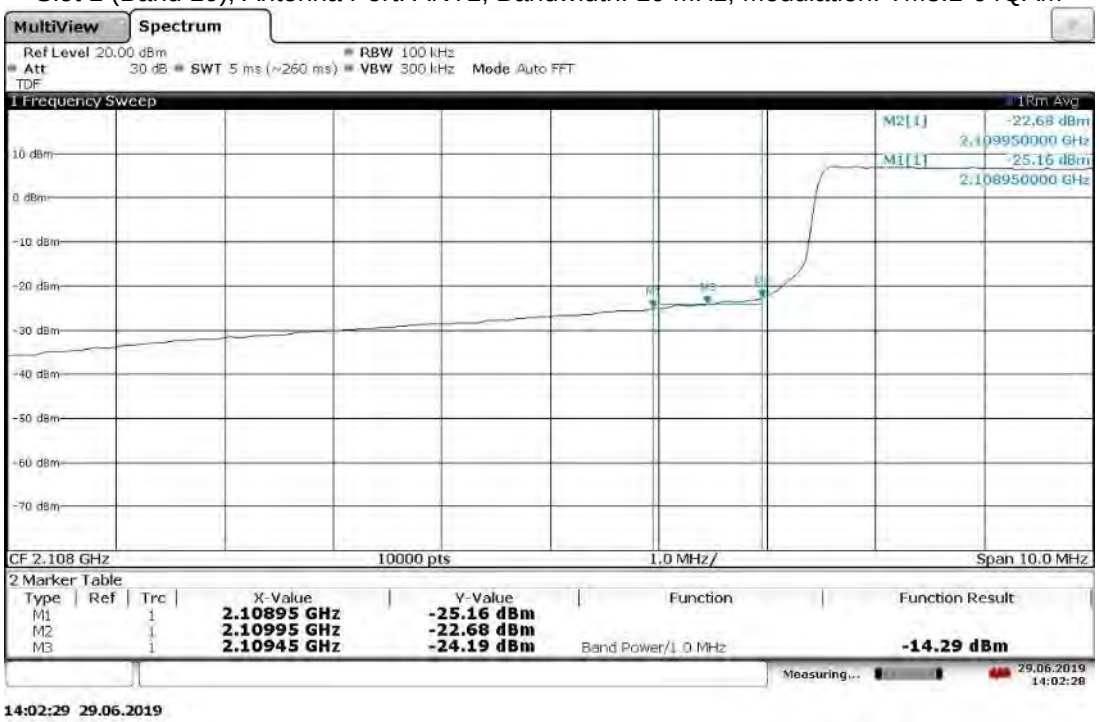
Band Edge Compliant, Upper Band Edge, 2167.5 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



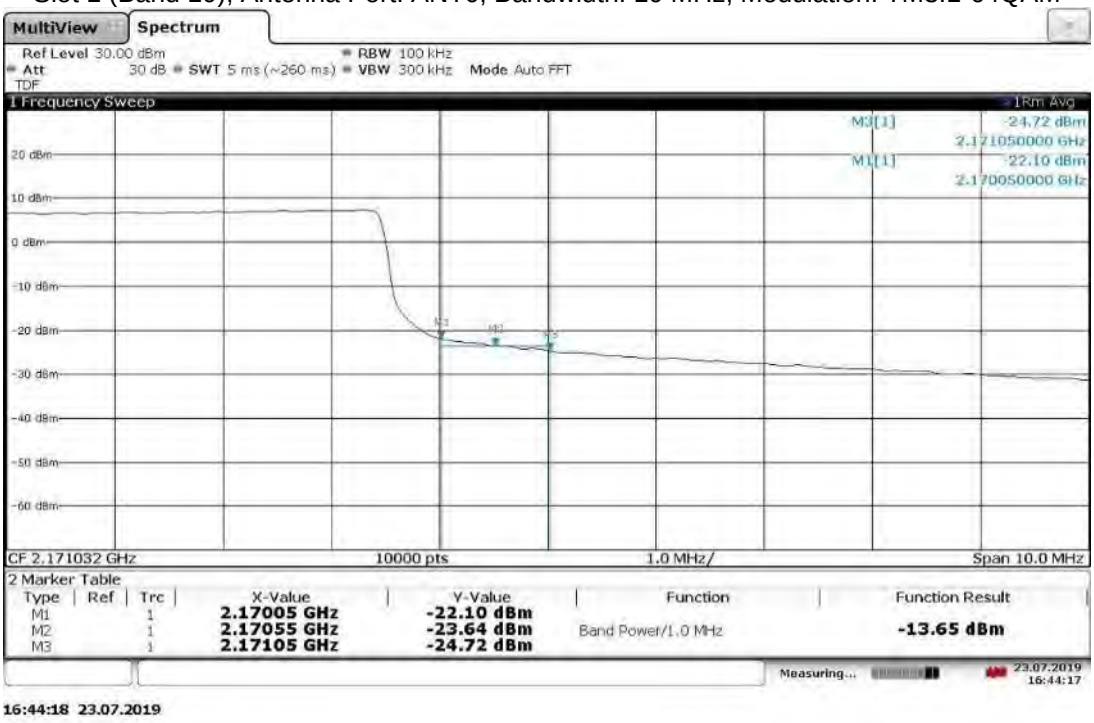
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



Band Edge Compliant, Upper Band Edge, 2165 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM

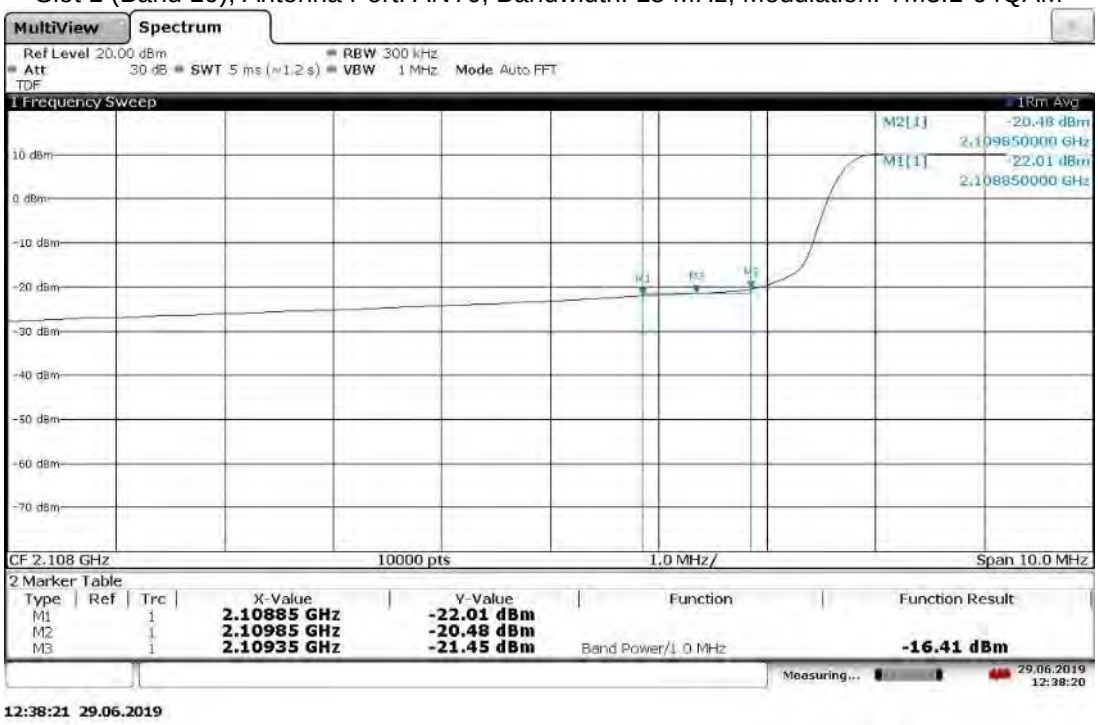


16:44:18 23.07.2019

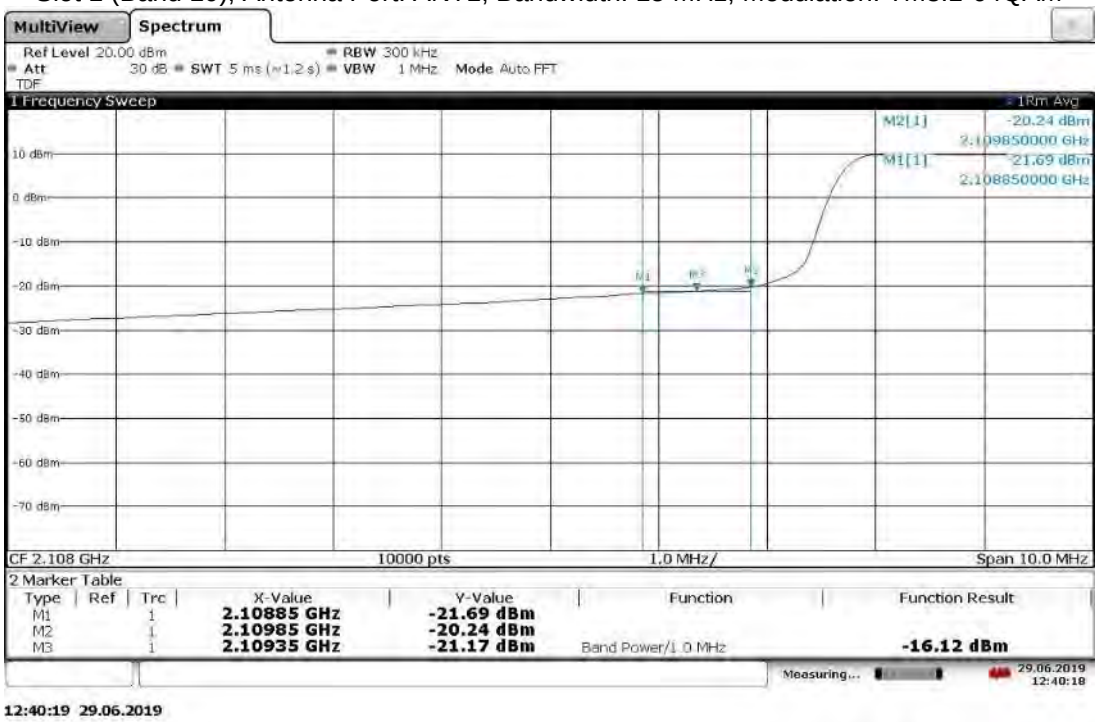
Band Edge Compliant, Upper Band Edge, 2165 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM

16:42:34 23.07.2019

Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



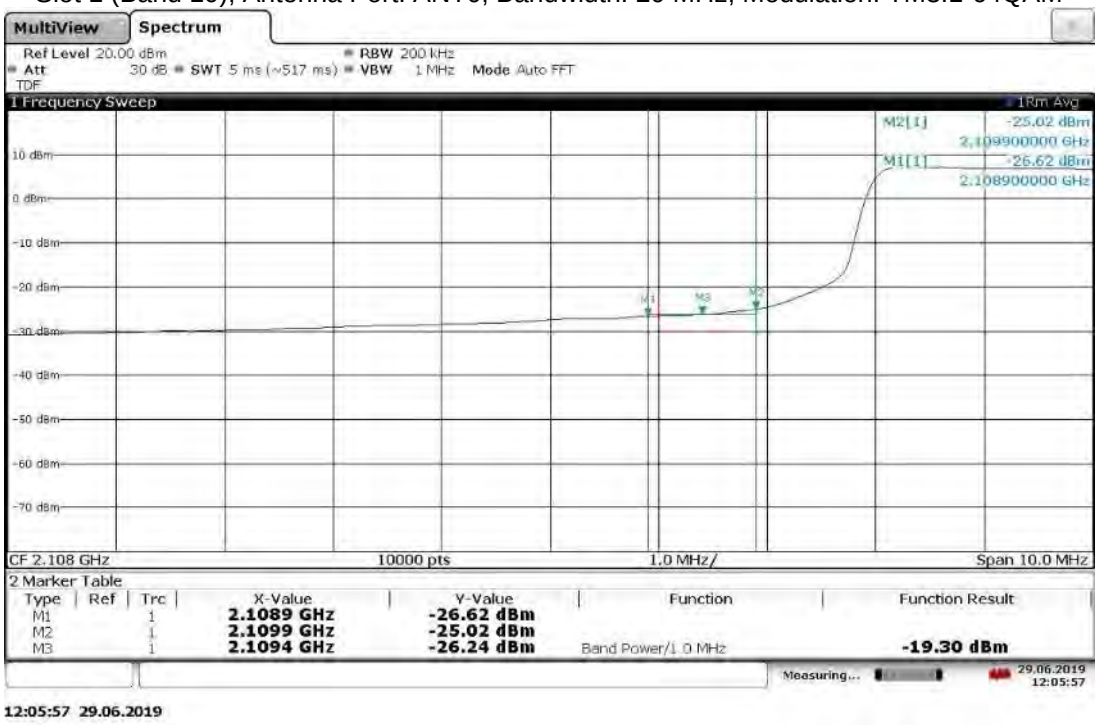
Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



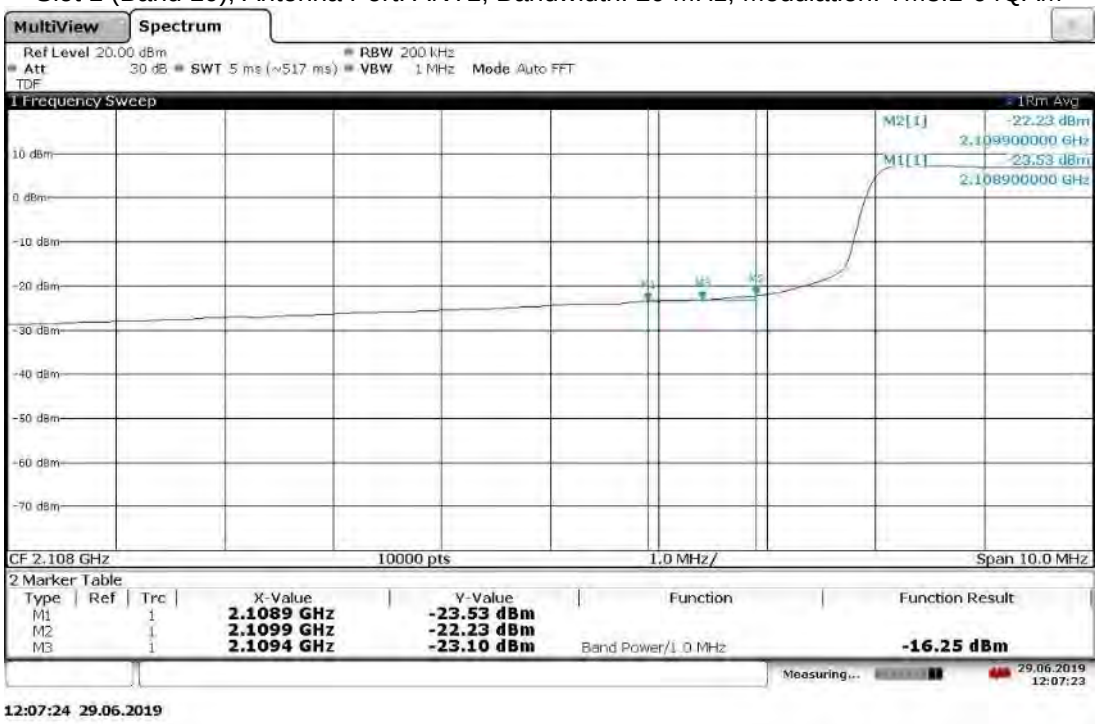
Band Edge Compliant, Upper Band Edge, 2162.5 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM

Band Edge Compliant, Upper Band Edge, 2162.5 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM

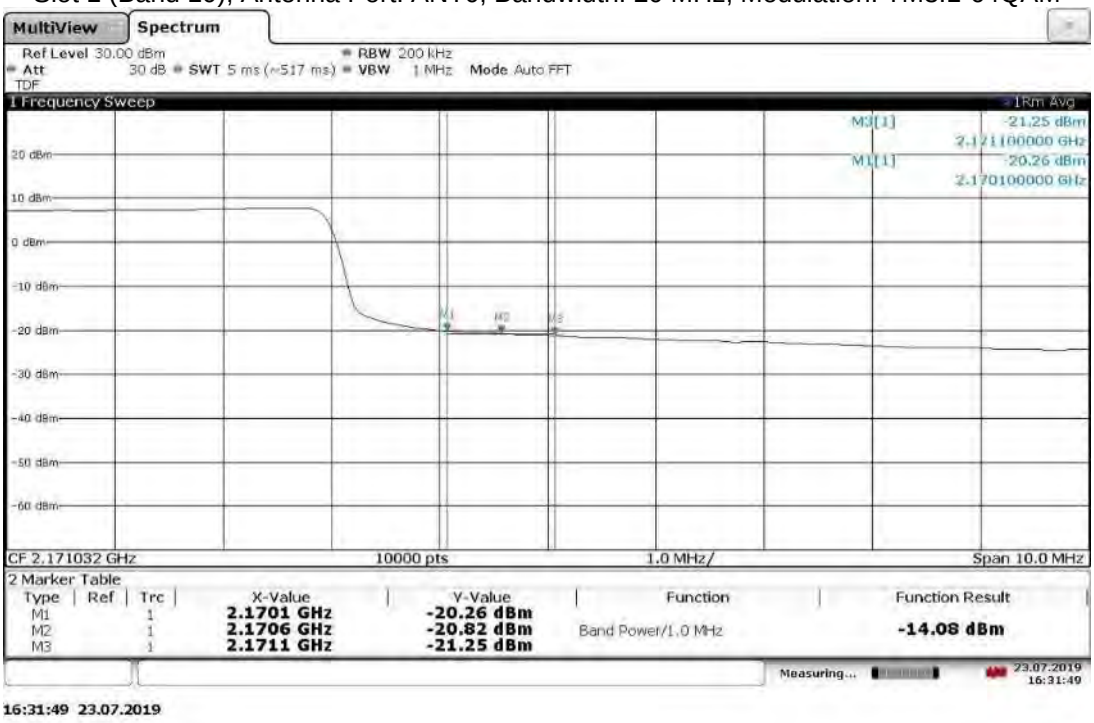
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



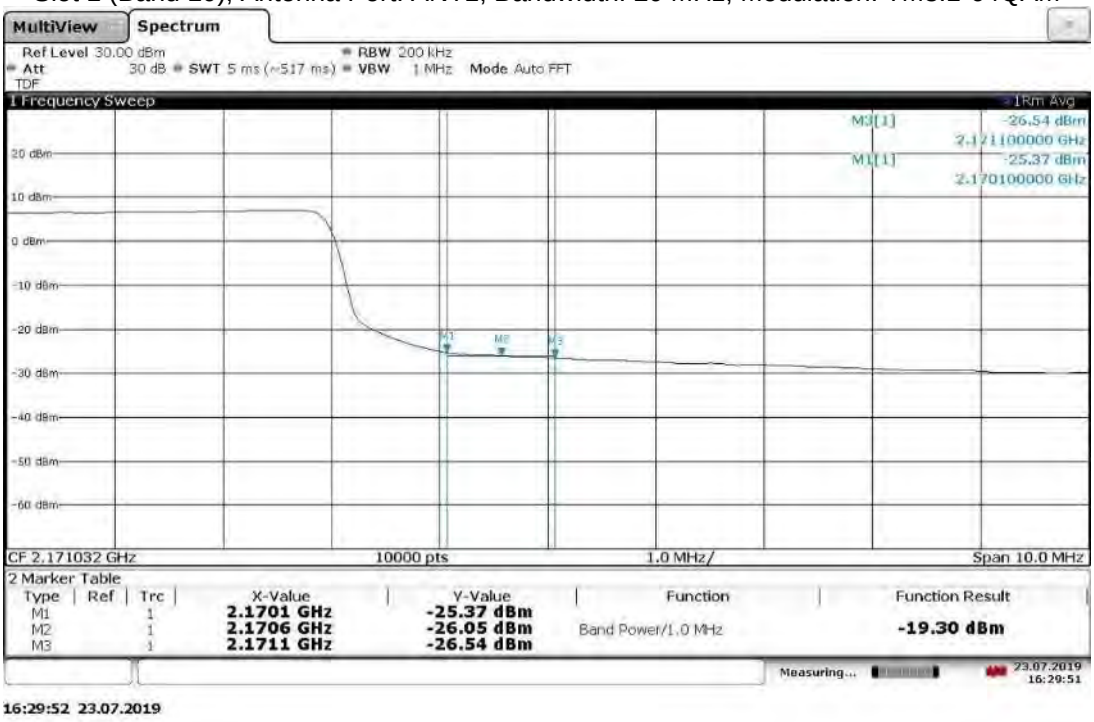
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



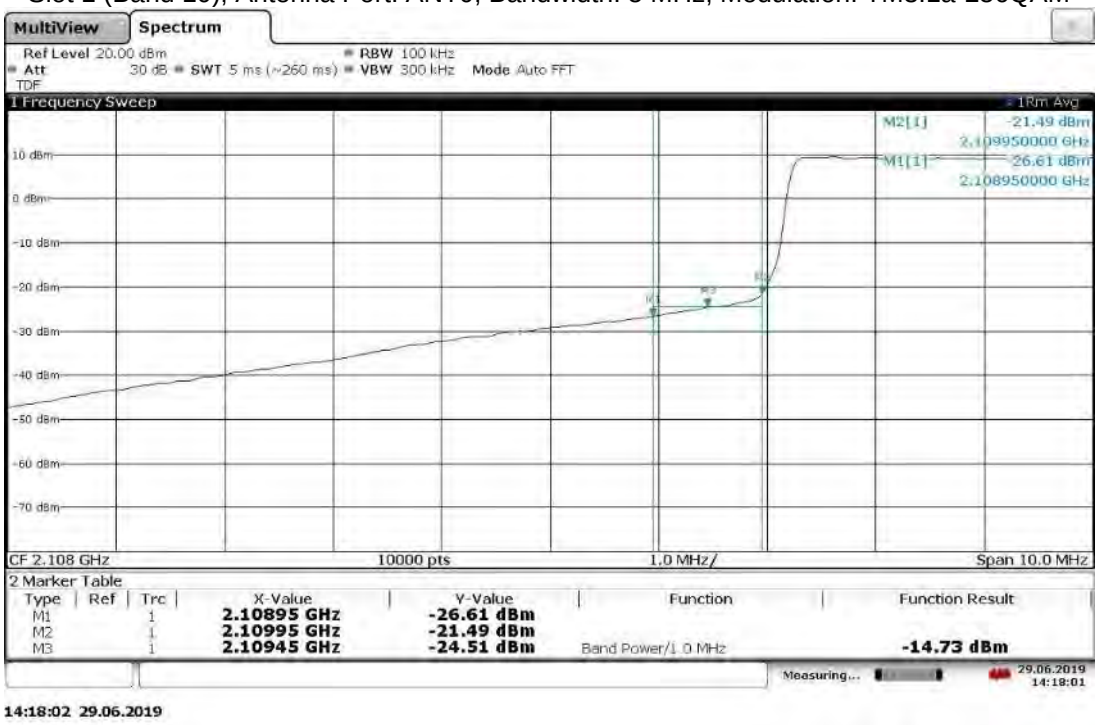
Band Edge Compliant, Upper Band Edge, 2160 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



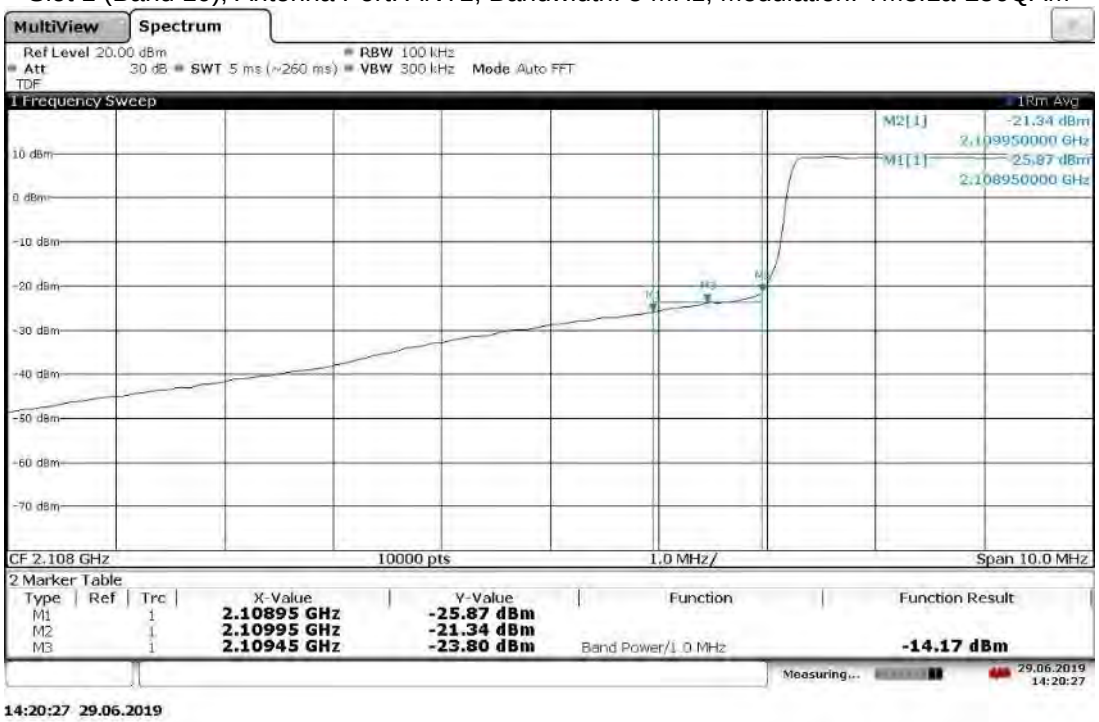
Band Edge Compliant, Upper Band Edge, 2160 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



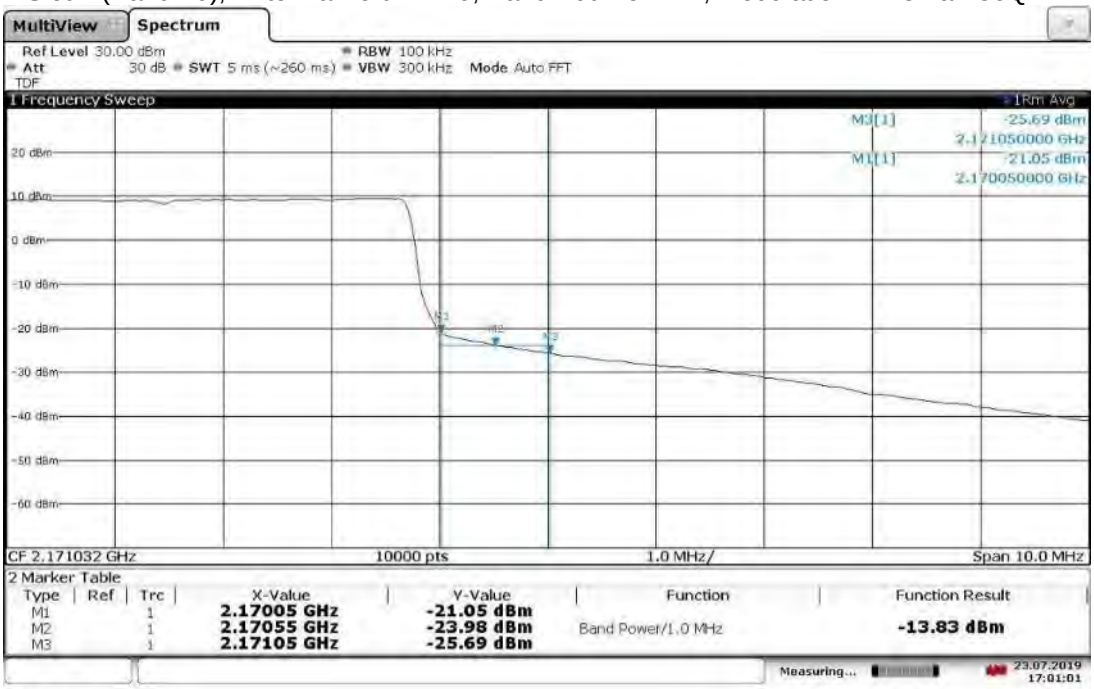
Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM

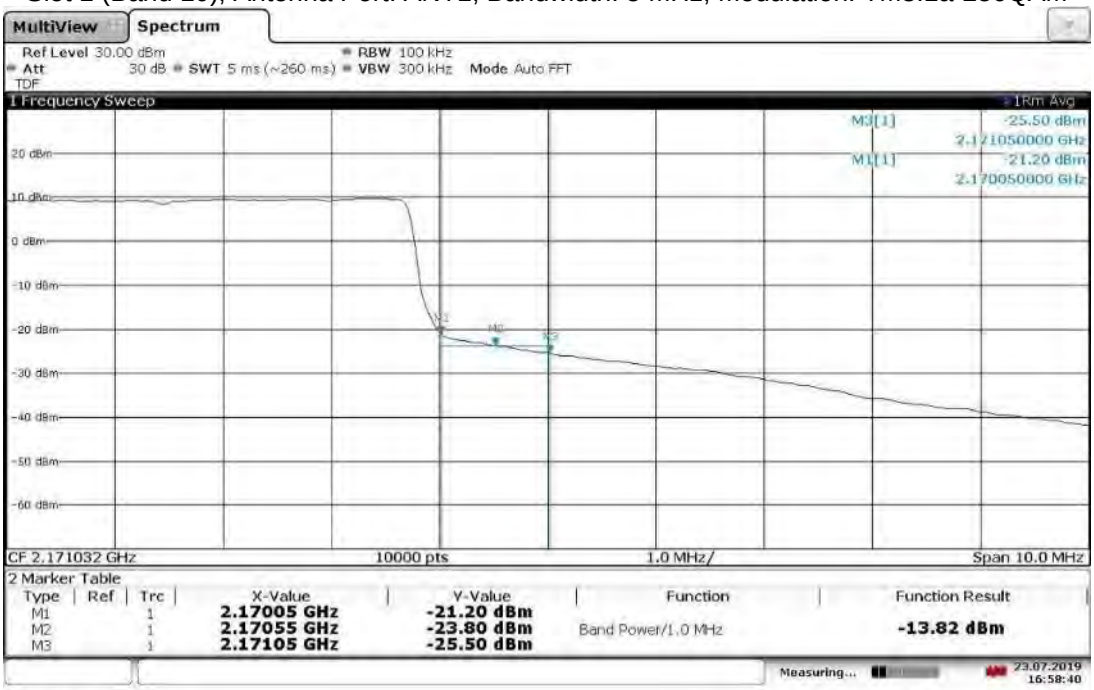


Band Edge Compliant, Upper Band Edge, 2167.5 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



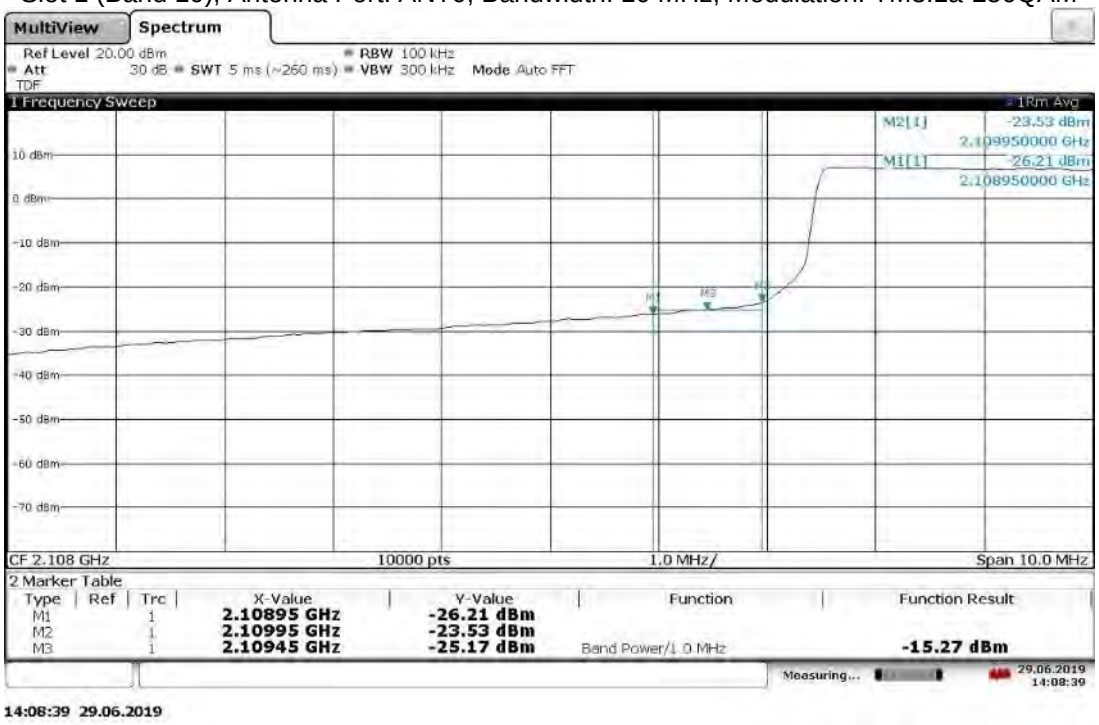
17:01:01 23.07.2019

Band Edge Compliant, Upper Band Edge, 2167.5 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM

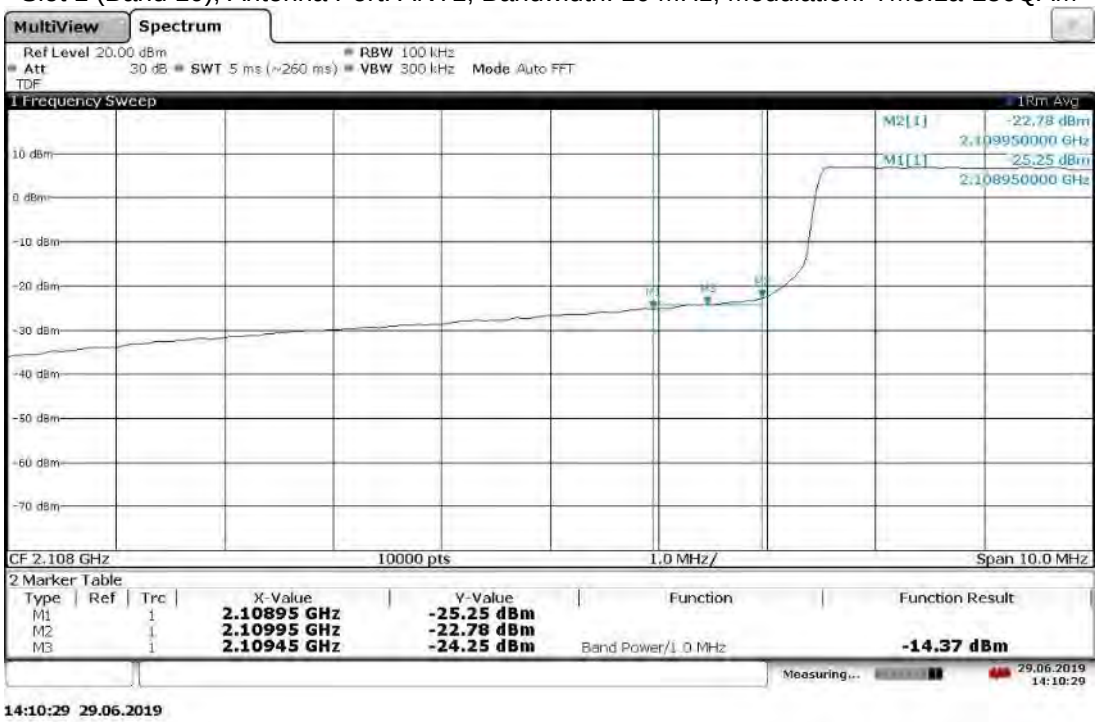


16:58:40 23.07.2019

Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



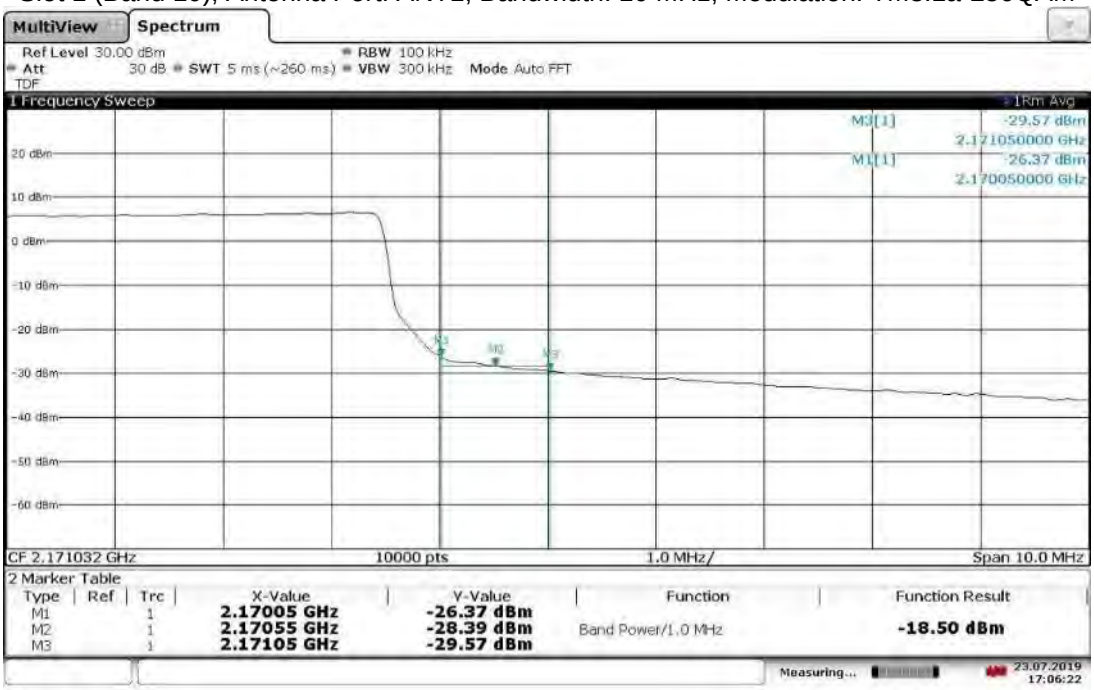
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Upper Band Edge, 2165 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM

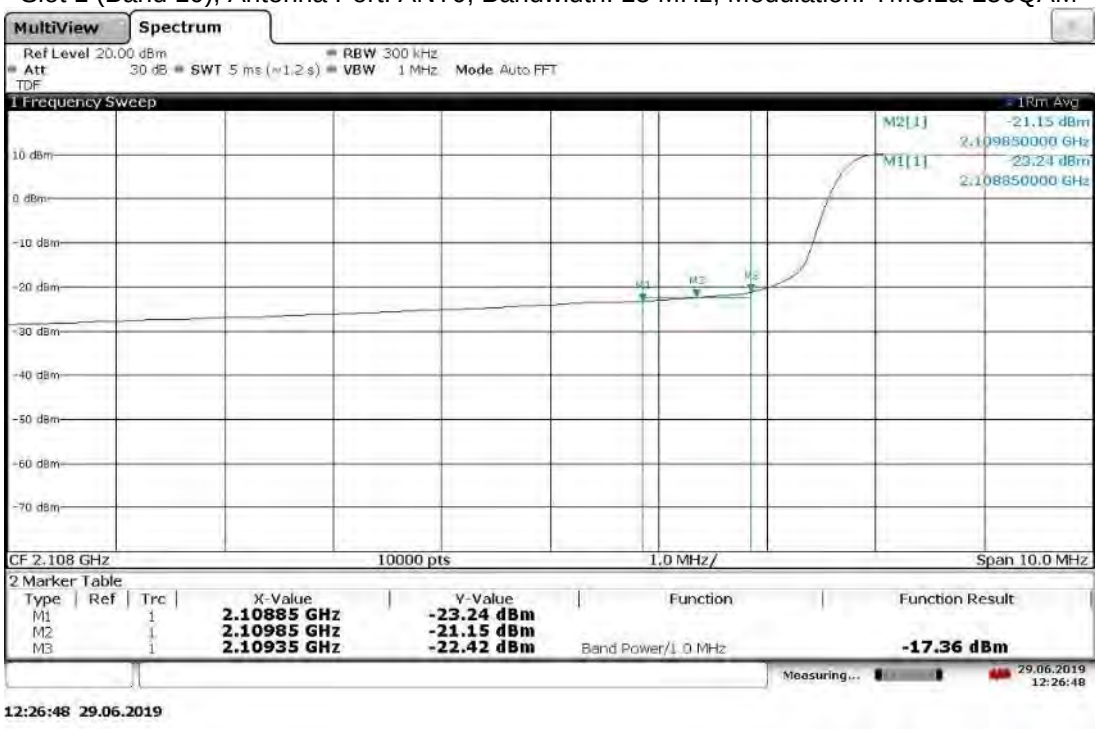
17:05:01 23.07.2019

Band Edge Compliant, Upper Band Edge, 2165 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM

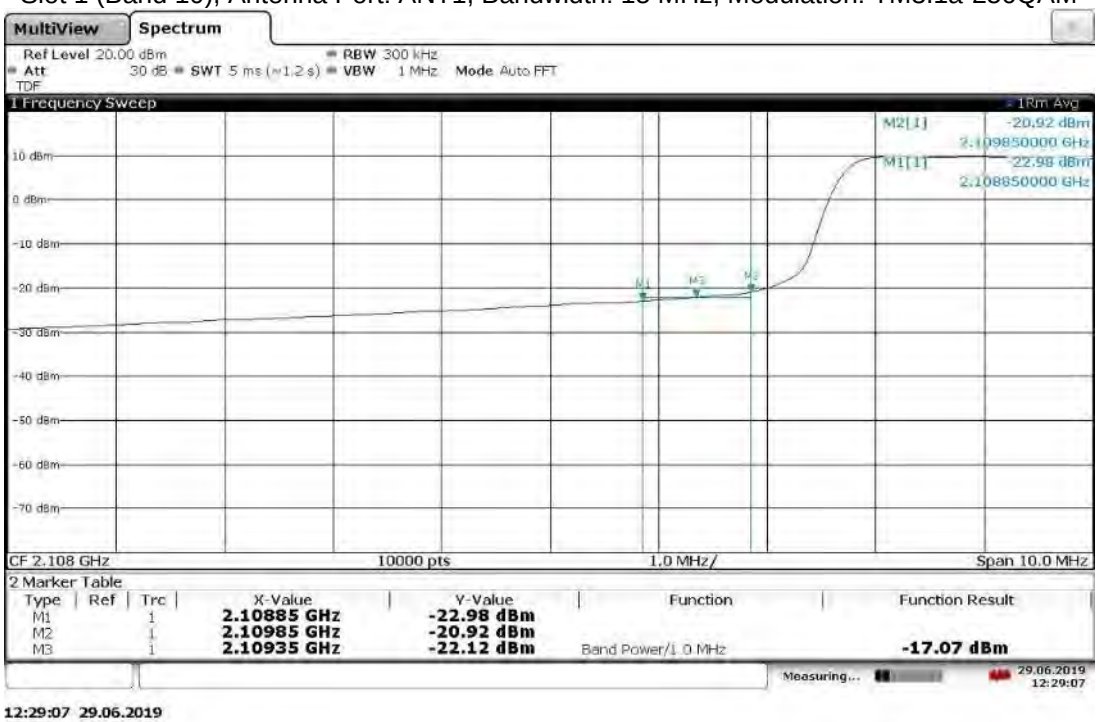


17:06:22 23.07.2019

Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



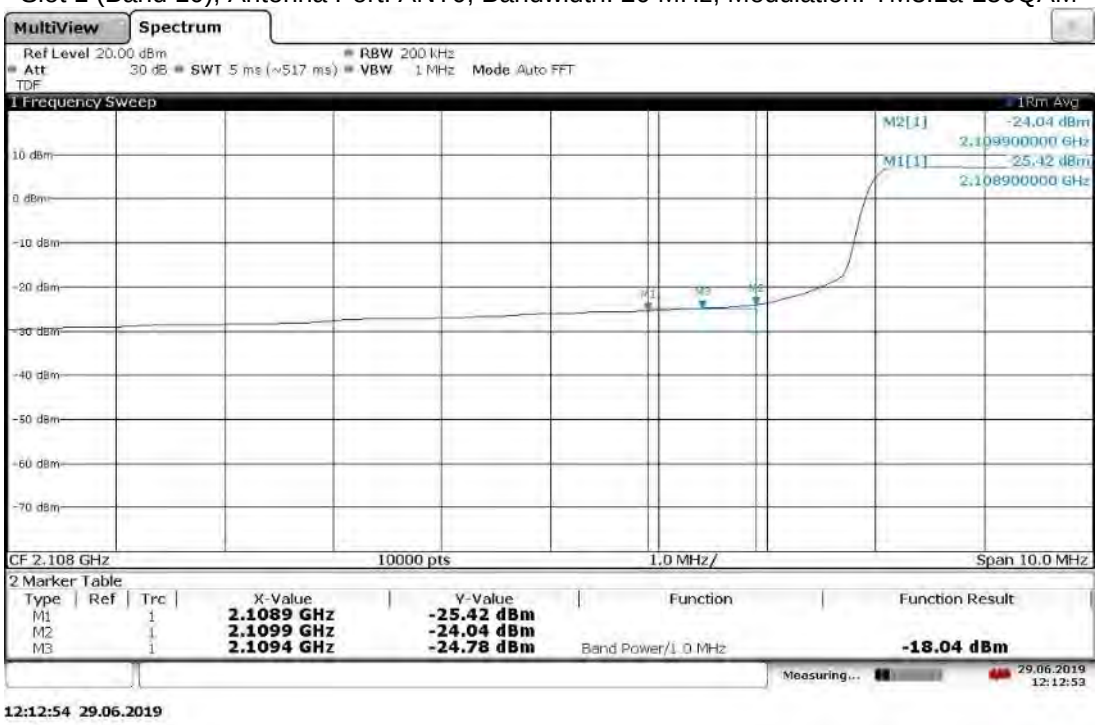
Band Edge Compliant, Upper Band Edge, 2162.5 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM

17:20:13 23.07.2019

Band Edge Compliant, Upper Band Edge, 2162.5 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM

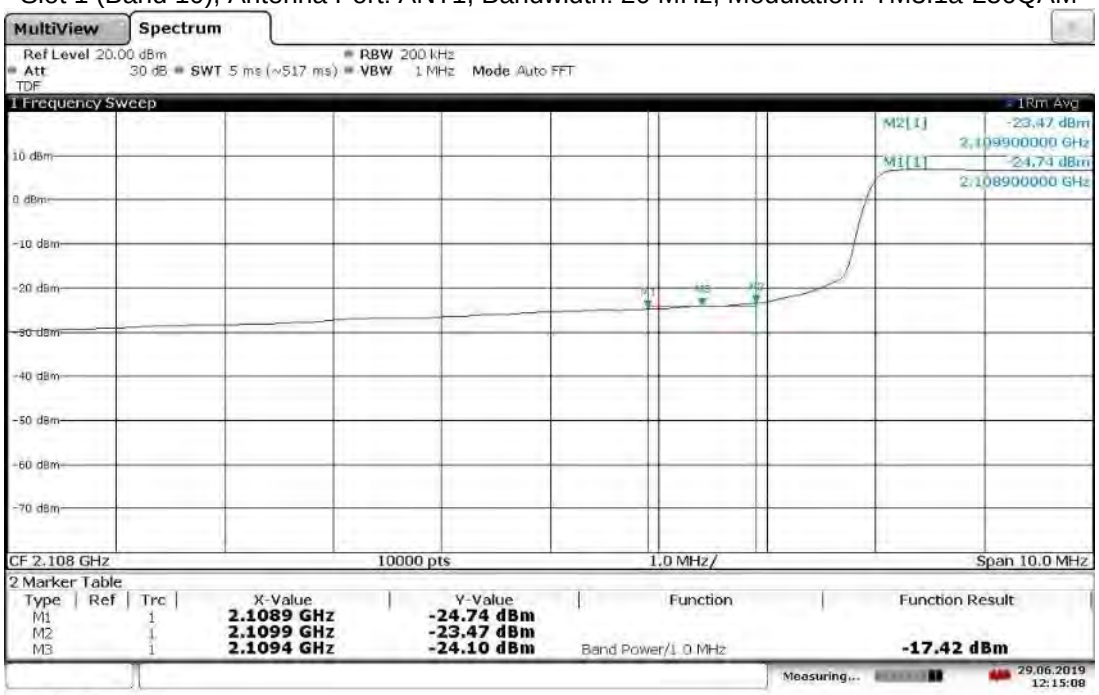
17:19:14 23.07.2019

Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



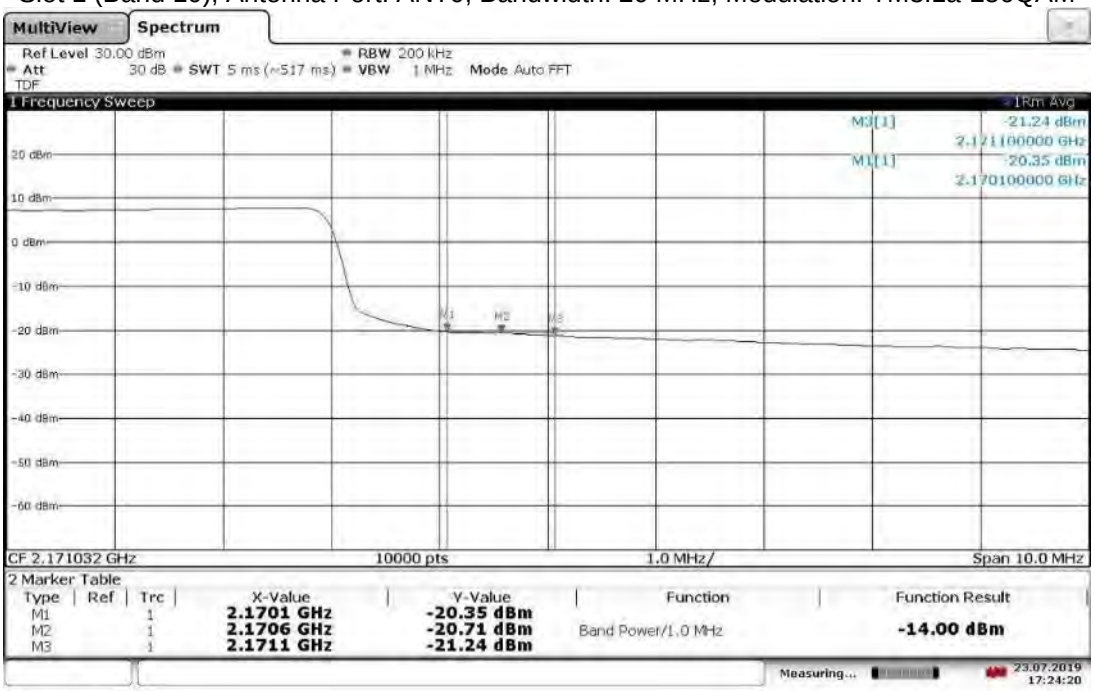
12:12:54 29.06.2019

Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



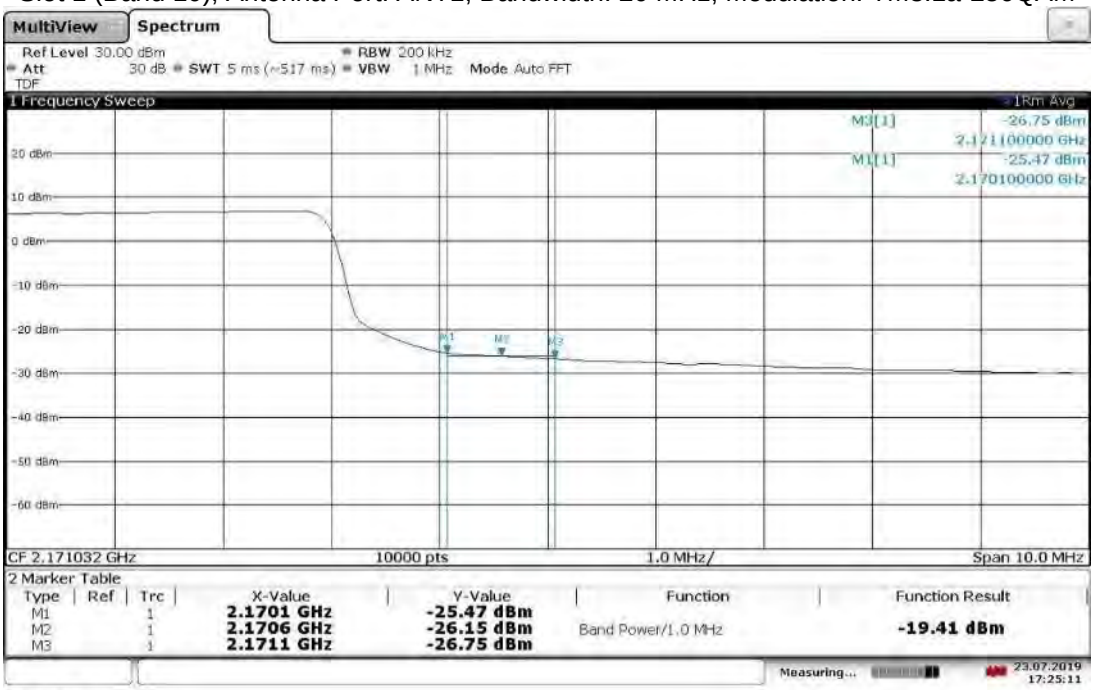
12:15:09 29.06.2019

Band Edge Compliant, Upper Band Edge, 2160 MHz
Slot 1 (Band 10), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



17:24:21 23.07.2019

Band Edge Compliant, Upper Band Edge, 2160 MHz
Slot 1 (Band 10), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



17:25:12 23.07.2019

Test Personnel:	Kouma Sinn KPS	Test Date:	06/29/2019, 07/23/2019,
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 27	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, 21 ºC
		Relative Humidity:	60, 71 %
		Atmospheric Pressure:	1000, 1001 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 27.

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
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.

§27.54 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 2110-2170MHz.

Frequency stability over temperature

Band 10, Modulation: QPSK, Bandwidth: 5MHz, Antenna Port: ANT0, Channel: Low 2112.5 MHz

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.11022395	-1.3E-07	-6.16048E-08	0.00	2.5
-20	2.1102097	1.412E-05	6.69123E-06	0.07	2.5
-10	2.11021135	1.247E-05	5.90933E-06	0.06	2.5
0	2.11020495	-1.887E-05	-8.94218E-06	-0.09	2.5
10	2.11022012	-3.7E-06	-1.75337E-06	-0.02	2.5
20	2.11022382	0	0	0.00	--
30	2.11023141	7.59E-06	3.59677E-06	0.04	2.5
40	2.11023162	7.8E-06	3.69629E-06	0.04	2.5
50	2.11021941	-4.41E-06	-2.08983E-06	-0.02	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.11476472	-1.198E-05	-5.66496E-06	-0.06	2.5
-20	2.11477104	-1.83E-05	-8.65349E-06	-0.09	2.5
-10	2.11476442	-1.168E-05	-5.5231E-06	-0.06	2.5
0	2.11475651	3.77E-06	1.78271E-06	0.02	2.5
10	2.11476442	1.168E-05	5.5231E-06	0.06	2.5
20	2.11475274	0	0	0.00	--
30	2.11474839	-4.35E-06	-2.05698E-06	-0.02	2.5
40	2.11474277	-9.97E-06	-4.7145E-06	-0.05	2.5
50	2.11475095	-1.79E-06	-8.46435E-07	-0.01	2.5

Frequency stability over temperature

Band 10, Modulation: QPSK, Bandwidth: 5MHz, Antenna Port: ANT0, High Channel 2167.5 MHz

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.16522411	-5.02E-06	-2.31847E-06	-0.02	2.5
-20	2.16521254	6.55E-06	3.0251E-06	0.03	2.5
-10	2.16521625	2.84E-06	1.31165E-06	0.01	2.5
0	2.1652107	-8.39E-06	-3.8749E-06	-0.04	2.5
10	2.16521275	-6.34E-06	-2.92811E-06	-0.03	2.5
20	2.16521909	0	0	0.00	--
30	2.16521271	-6.38E-06	-2.94658E-06	-0.03	2.5
40	2.16521636	-2.73E-06	-1.26084E-06	-0.01	2.5
50	2.16521479	-4.3E-06	-1.98594E-06	-0.02	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.16975162	6.74E-06	3.10634E-06	0.03	2.5
-20	2.1697455	1.286E-05	5.92693E-06	0.06	2.5
-10	2.16974657	1.179E-05	5.43378E-06	0.05	2.5
0	2.16975744	-9.2E-07	-4.2401E-07	0.00	2.5
10	2.16975119	-7.17E-06	-3.30452E-06	-0.03	2.5
20	2.16975836	0	0	0.00	--
30	2.16976021	1.85E-06	8.5263E-07	0.01	2.5
40	2.1697535	-4.86E-06	-2.23988E-06	-0.02	2.5
50	2.16976264	4.28E-06	1.97257E-06	0.02	2.5

Frequency stability over temperature

Band 10, Modulation: QPSK, Bandwidth: 20MHz, Antenna Port: ANT0, Low Channel 2120MHz

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.11103921	-1.281E-05	-6.06814E-06	-0.06	2.5
-20	2.11103434	-7.94E-06	-3.7612E-06	-0.04	2.5
-10	2.11101582	1.058E-05	5.01178E-06	0.05	2.5
0	2.11101778	-8.62E-06	-4.08332E-06	-0.04	2.5
10	2.11101906	-7.34E-06	-3.47698E-06	-0.03	2.5
20	2.1110264	0	0	0.00	--
30	2.11103017	3.77E-06	1.78586E-06	0.02	2.5
40	2.1110037	-2.27E-05	-1.07531E-05	-0.11	2.5
50	2.11104222	1.582E-05	7.49398E-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	2.12896528	-1.05E-06	-4.93198E-07	0.00	2.5
-20	2.12895493	9.3E-06	4.36832E-06	0.04	2.5
-10	2.12896158	2.65E-06	1.24474E-06	0.01	2.5
0	2.12894598	-1.825E-05	-8.57224E-06	-0.09	2.5
10	2.12897296	8.73E-06	4.10059E-06	0.04	2.5
20	2.12896423	0	0	0.00	--
30	2.1289039	-6.033E-05	-2.83377E-05	-0.28	2.5
40	2.12891087	-5.336E-05	-2.50638E-05	-0.25	2.5
50	2.12893826	-2.597E-05	-1.21984E-05	-0.12	2.5

Frequency stability over temperature

Band 10, Modulation: QPSK, Bandwidth: 20MHz, Antenna Port: ANT0, High Channel 2160 MHz

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.15102682	-5.3E-06	-2.46395E-06	-0.02	2.5
-20	2.15102672	-5.2E-06	-2.41746E-06	-0.02	2.5
-10	2.15101856	2.96E-06	1.37609E-06	0.01	2.5
0	2.1510309	9.38E-06	4.36072E-06	0.04	2.5
10	2.15102871	7.19E-06	3.3426E-06	0.03	2.5
20	2.15102152	0	0	0.00	--
30	2.15101357	-7.95E-06	-3.69592E-06	-0.04	2.5
40	2.15100921	-1.231E-05	-5.72286E-06	-0.06	2.5
50	2.15100372	-1.78E-05	-8.27514E-06	-0.08	2.5

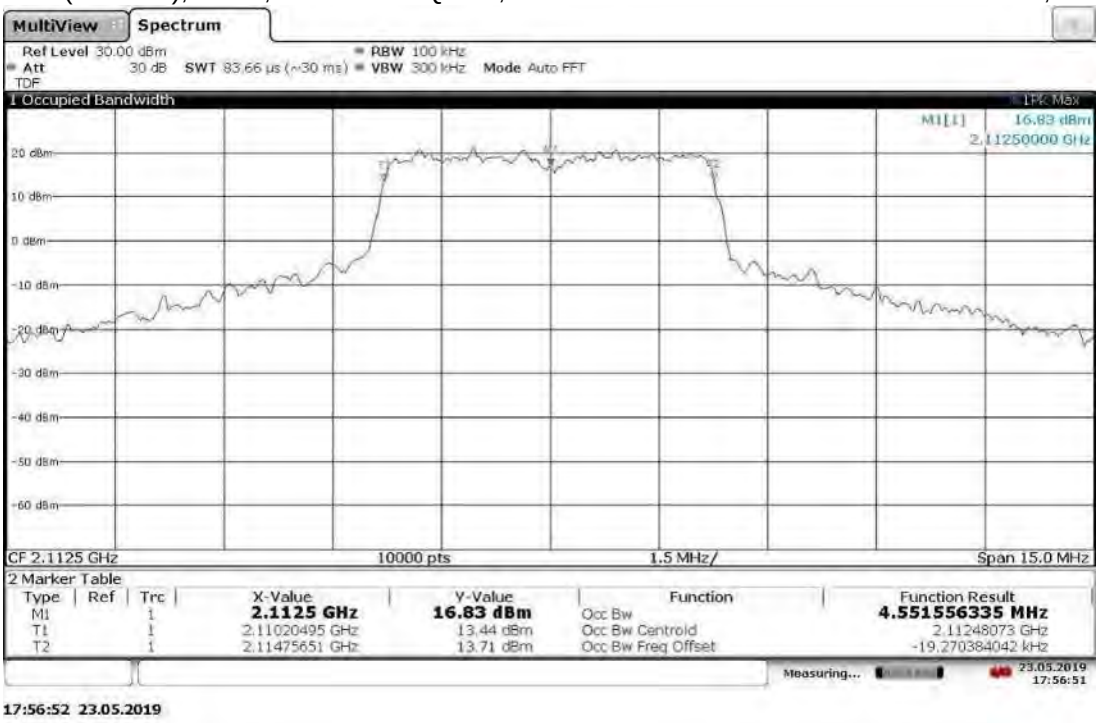
Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.16895258	-1.95E-06	-8.99052E-07	-0.01	2.5
-20	2.16895041	2.2E-07	1.01432E-07	0.00	2.5
-10	2.1689519	-1.27E-06	-5.85537E-07	-0.01	2.5
0	2.16894634	-4.29E-06	-1.97792E-06	-0.02	2.5
10	2.16895193	1.3E-06	5.99368E-07	0.01	2.5
20	2.16895063	0	0	0.00	--
30	2.16894897	-1.66E-06	-7.65347E-07	-0.01	2.5
40	2.16895722	6.59E-06	3.03834E-06	0.03	2.5
50	2.1689681	1.747E-05	8.05459E-06	0.08	2.5

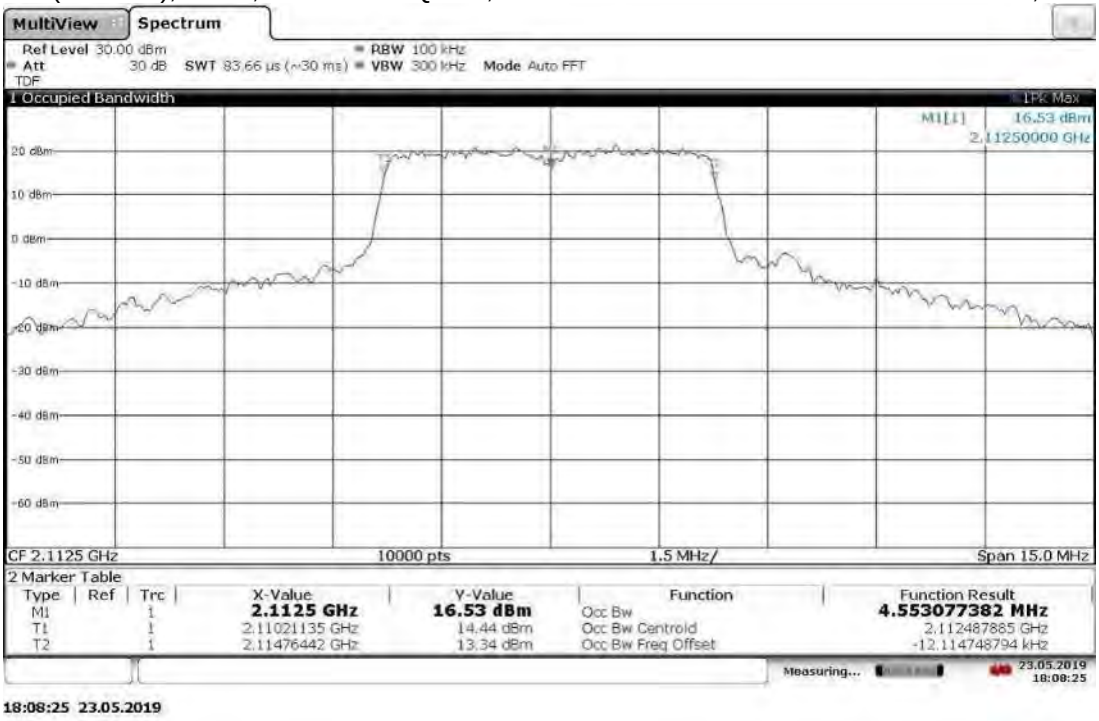
10.4 Setup Photographs:

10.5 Plots/Data:

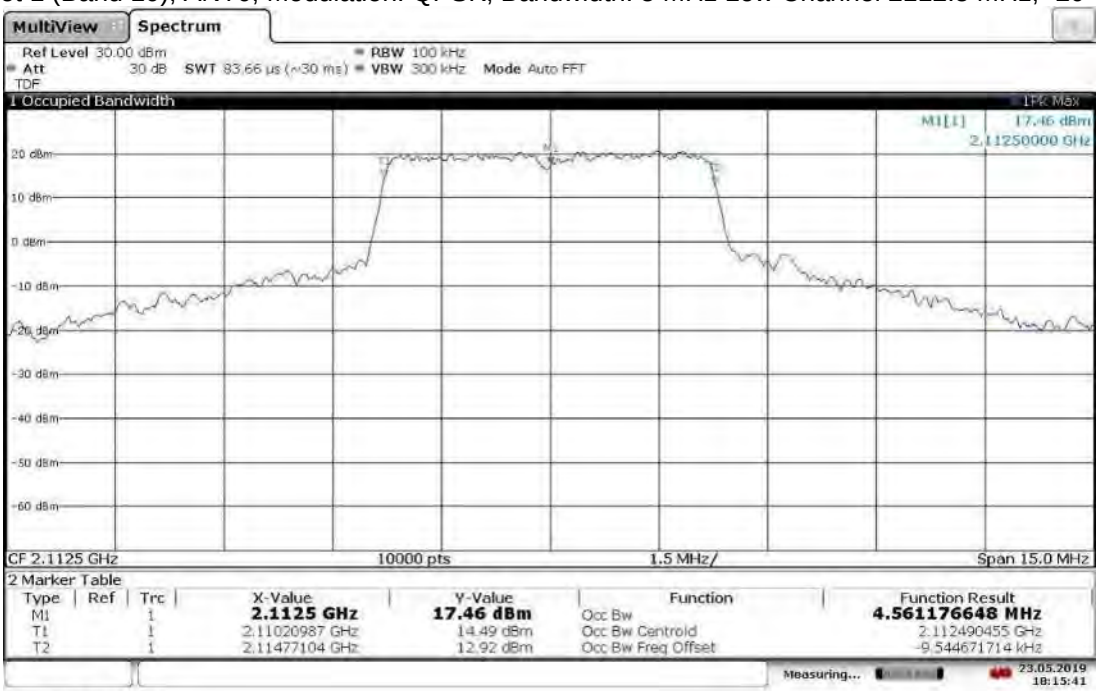
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 0 ºC



Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, -10 ºC

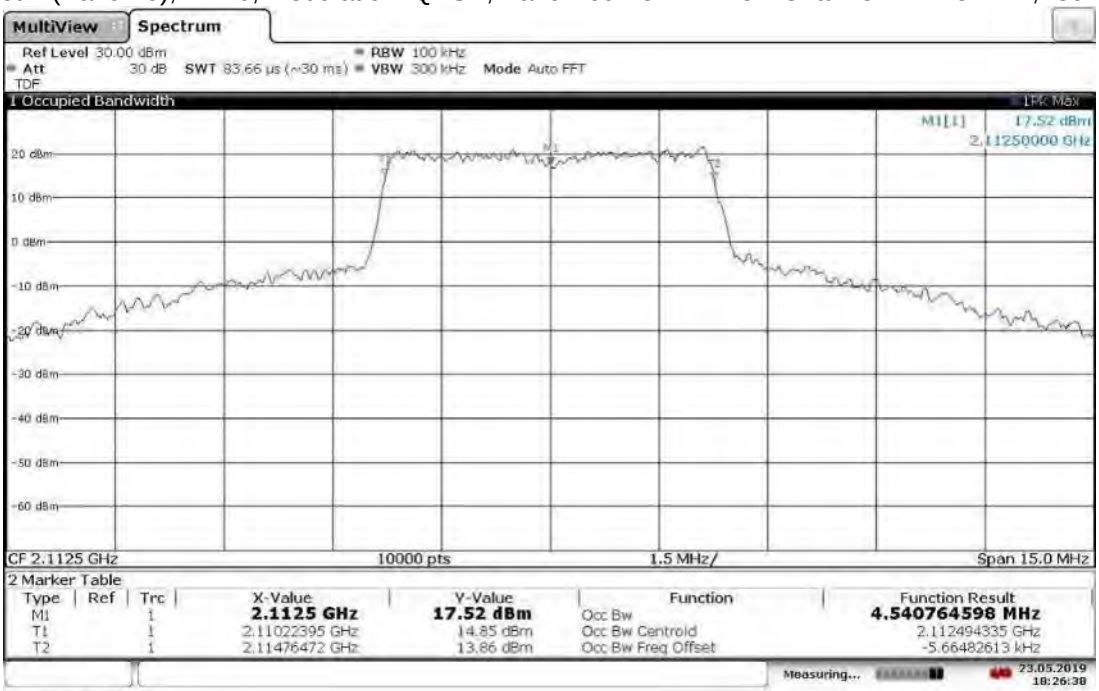


Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, -20 ºC



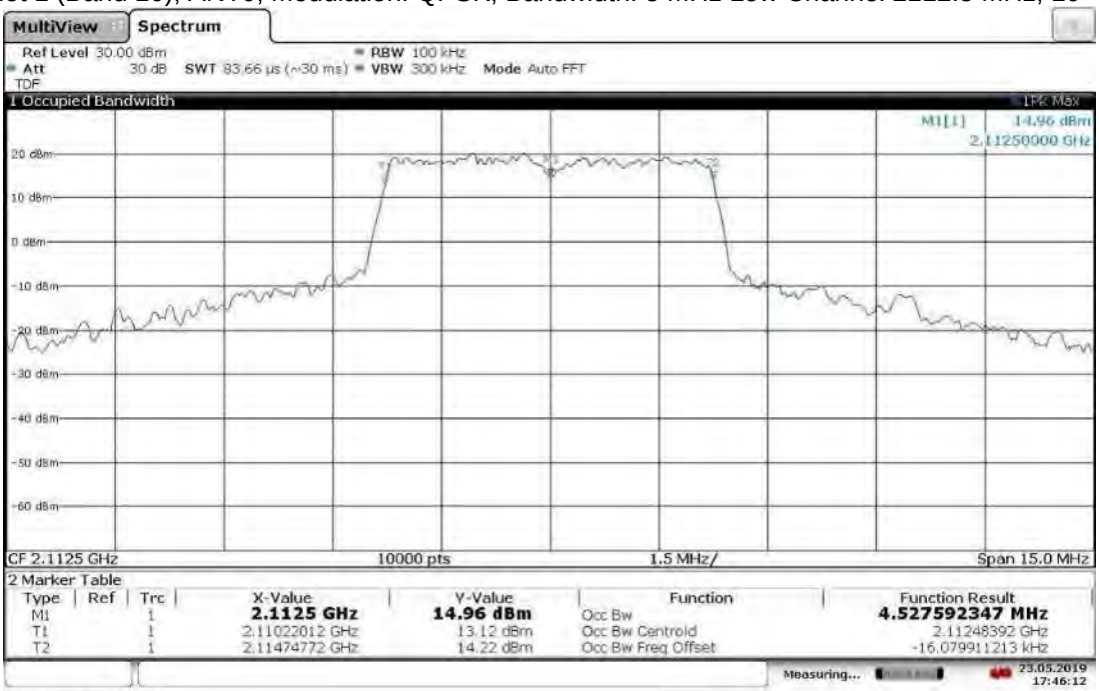
18:15:42 23.05.2019

Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, -30 ºC

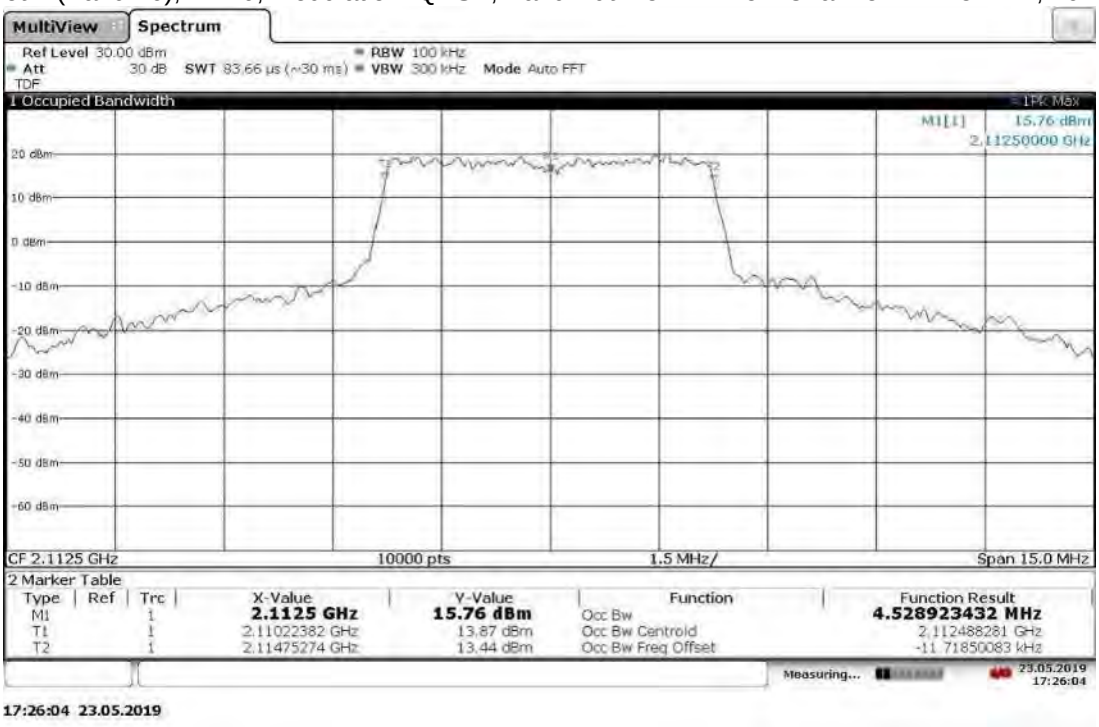


18:26:38 23.05.2019

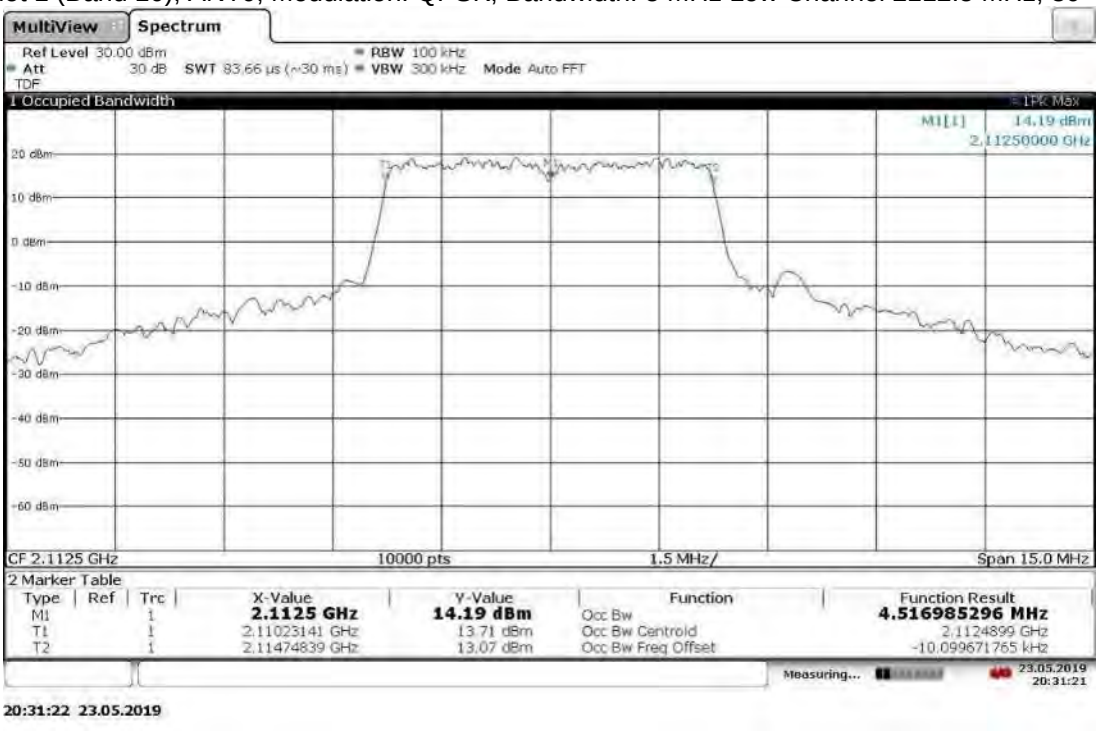
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 10 ºC



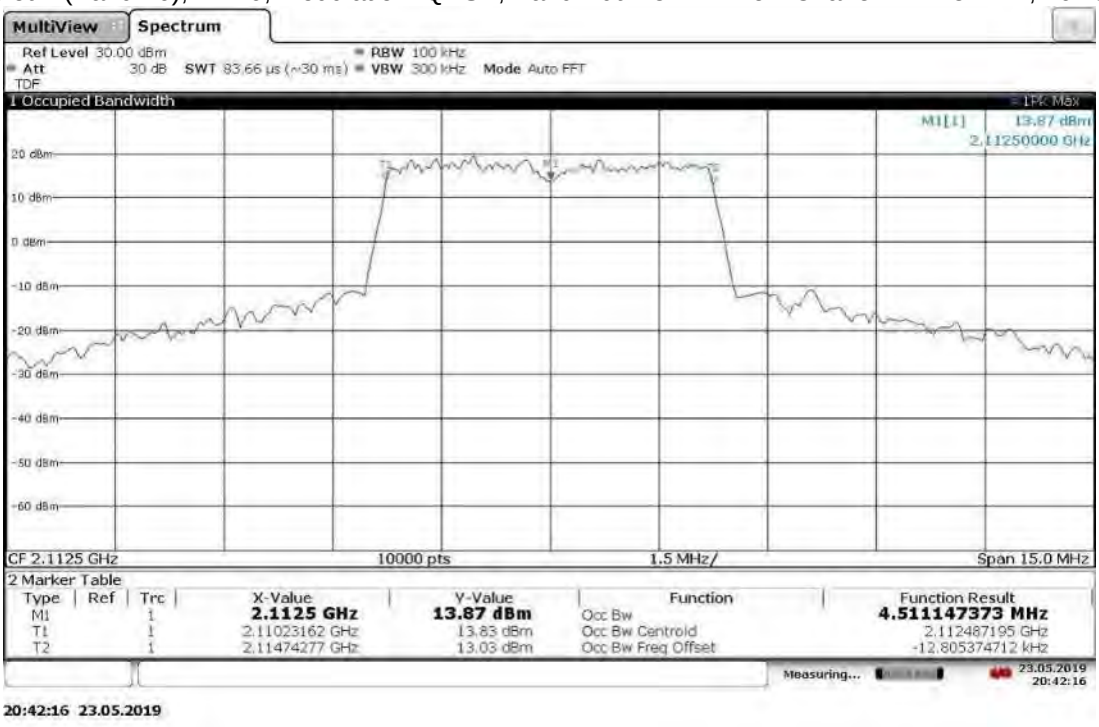
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 20 ºC



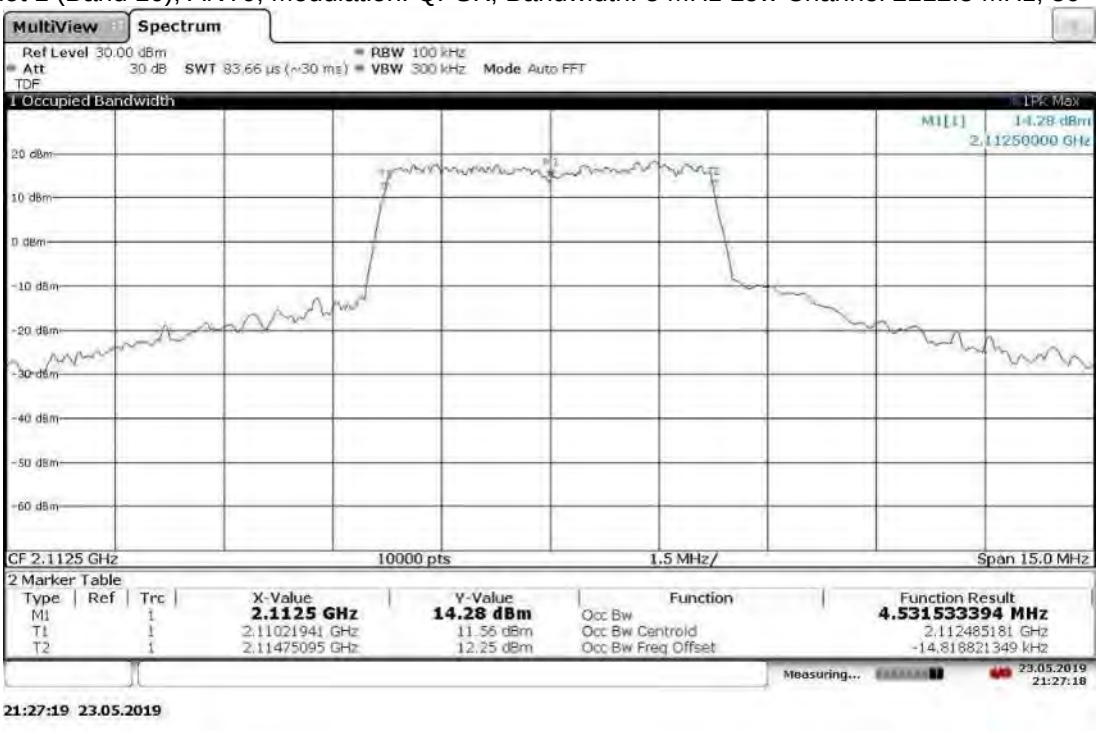
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 30 ºC



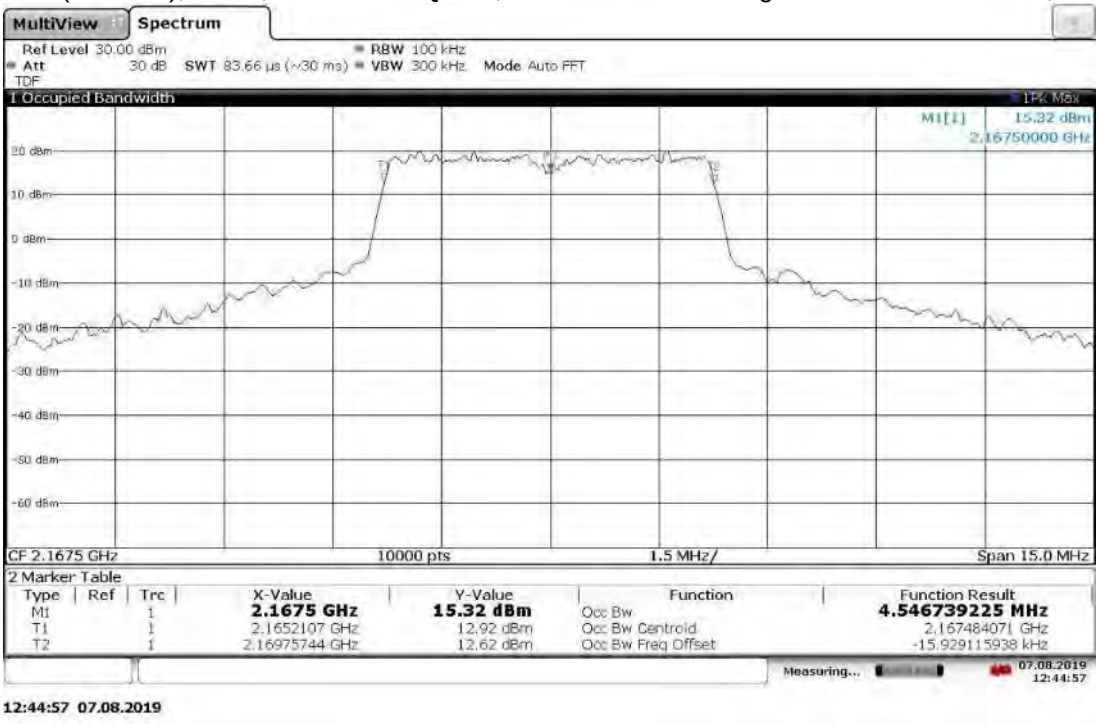
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Chanel 2112.5 MHz, 40 ºC



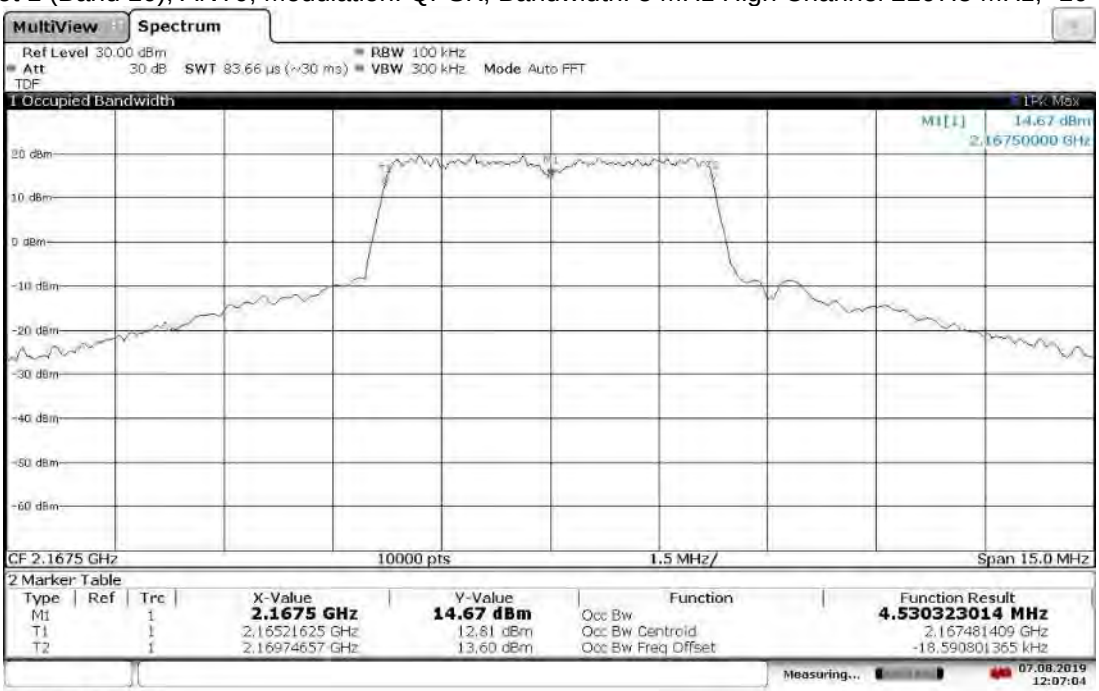
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 50 ºC



Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2167.5 MHz, 0 ºC

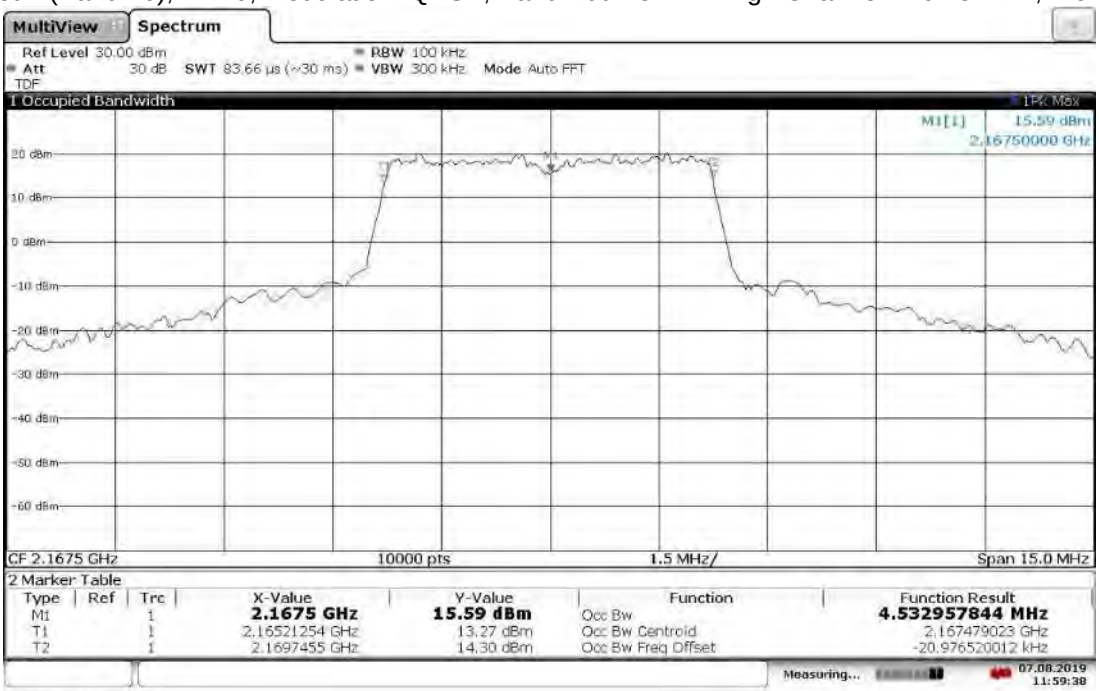


Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2167.5 MHz, -10 ºC



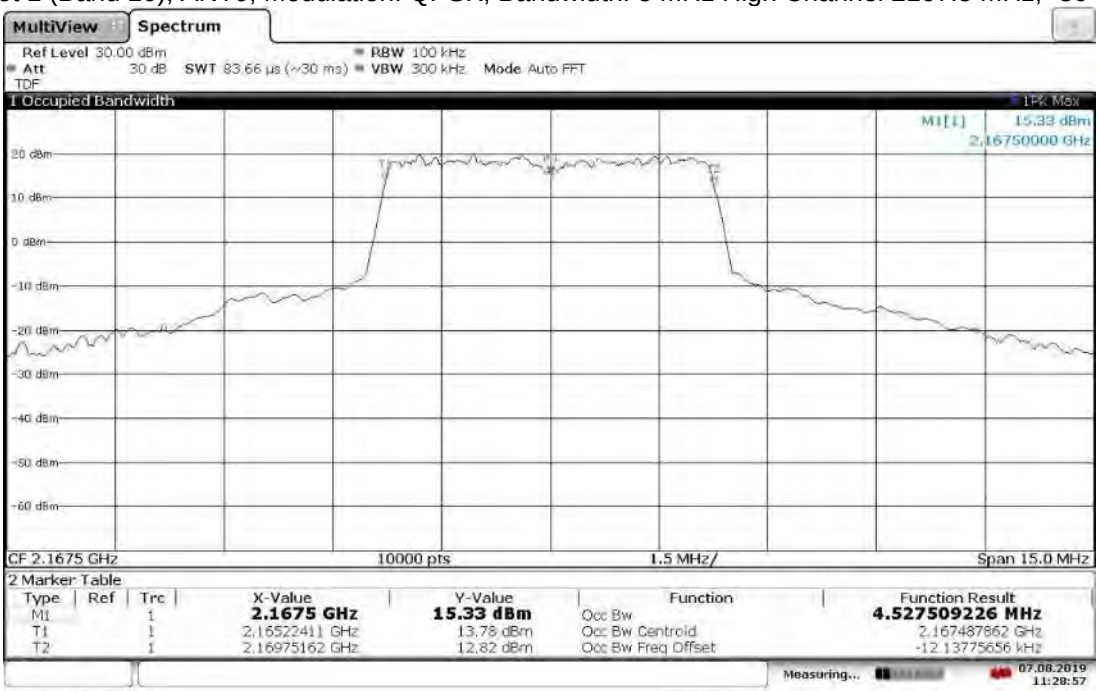
12:07:04 07.08.2019

Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2167.5 MHz, -20 ºC



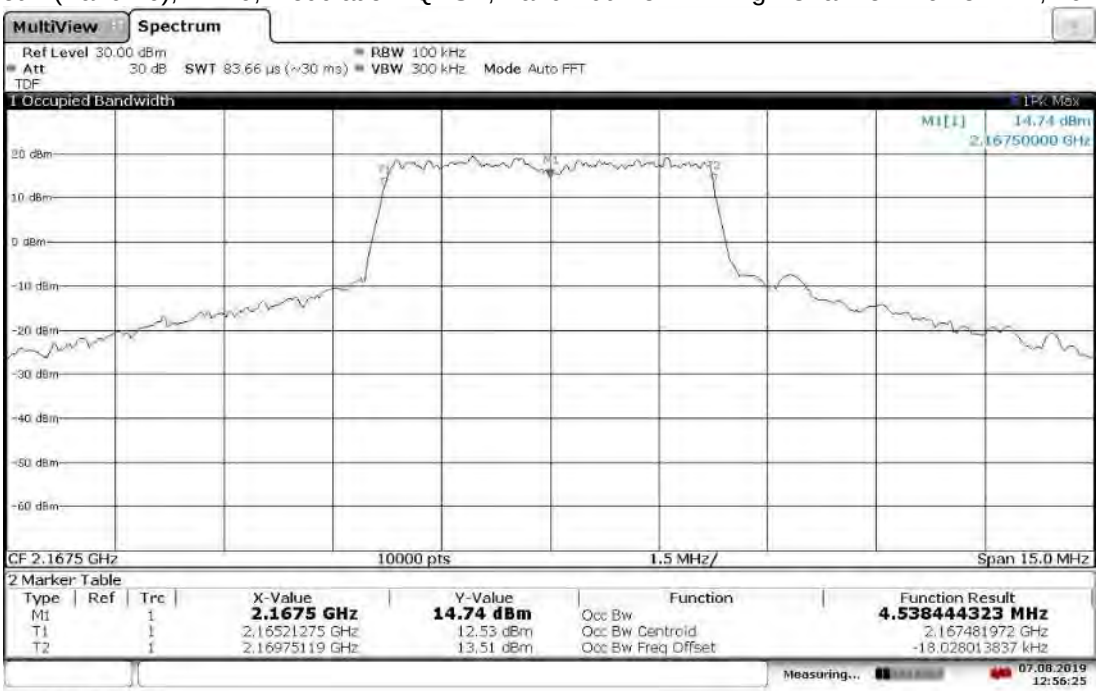
11:59:38 07.08.2019

Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2167.5 MHz, -30 ºC



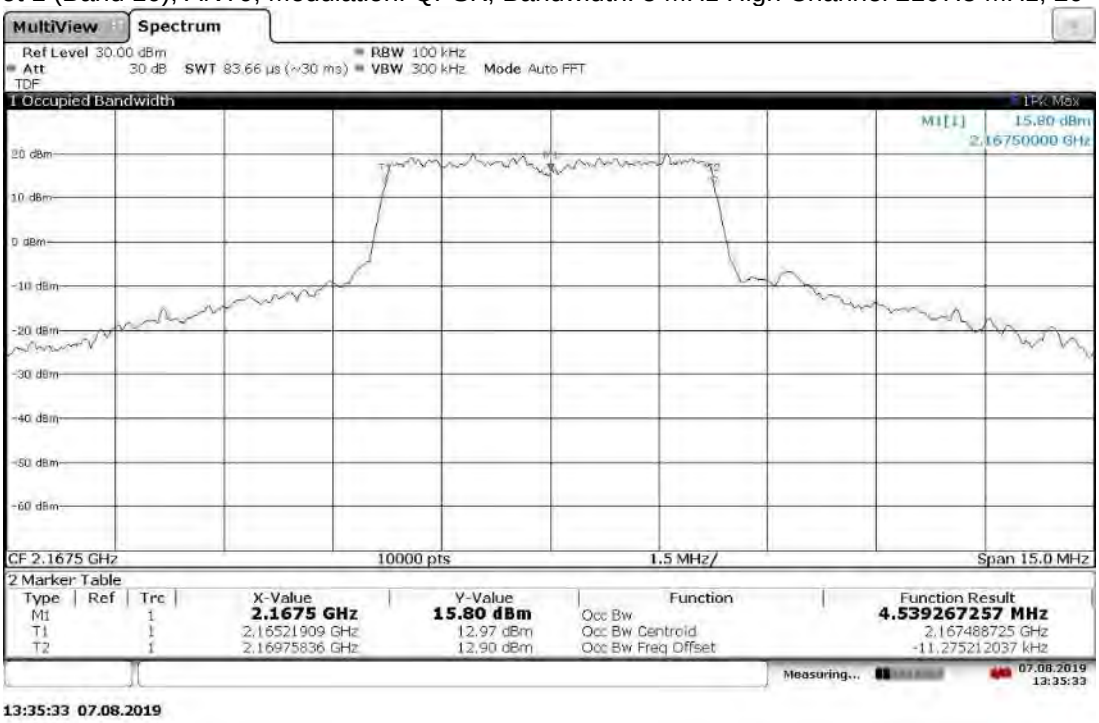
11:28:58 07.08.2019

Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2167.5 MHz, 10 ºC



12:56:25 07.08.2019

Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2167.5 MHz, 20 ºC

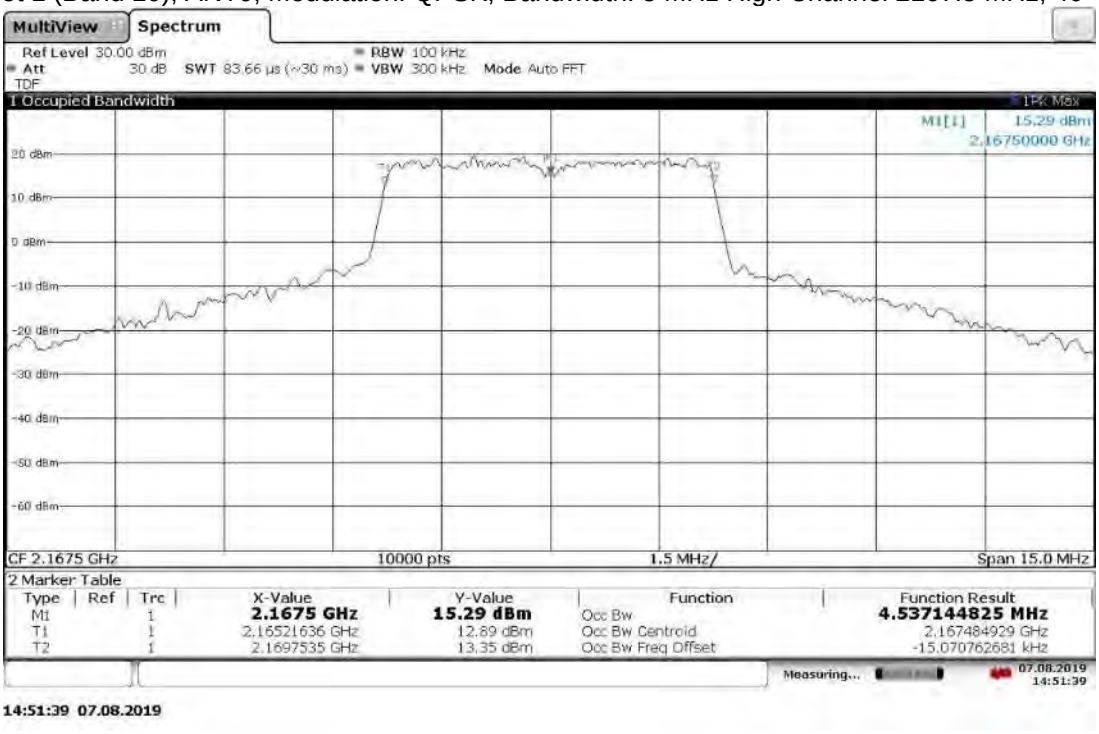


13:35:33 07.08.2019

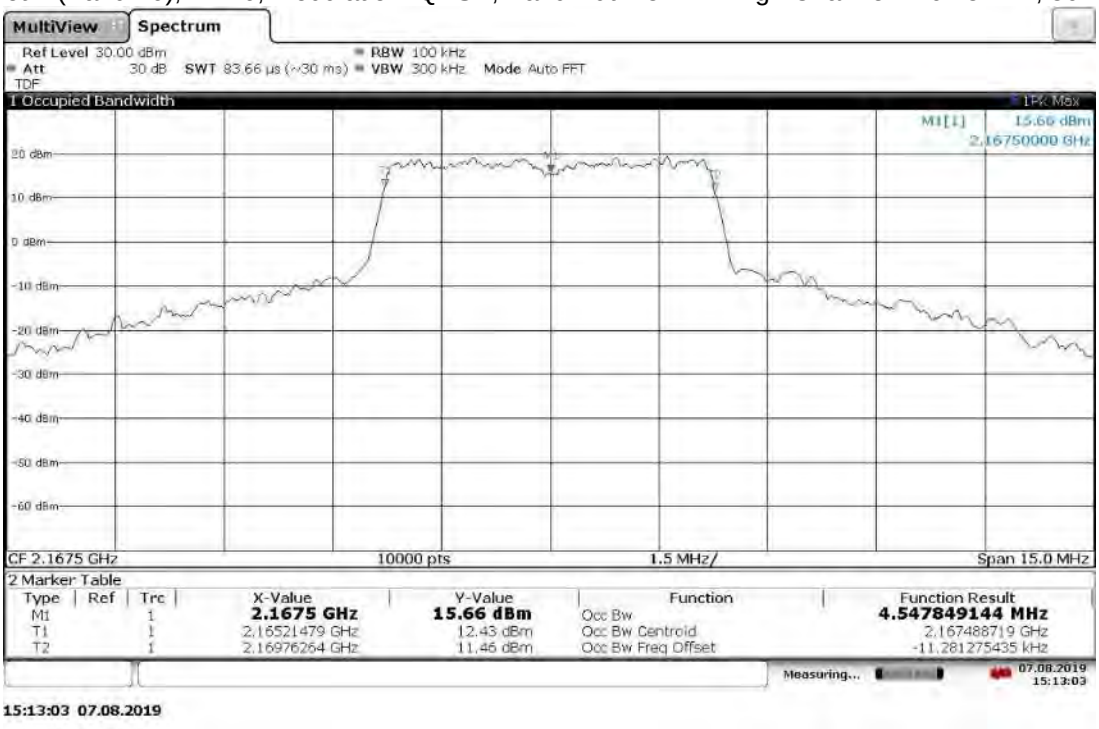
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2167.5 MHz, 30 ºC

13:53:43 07.08.2019

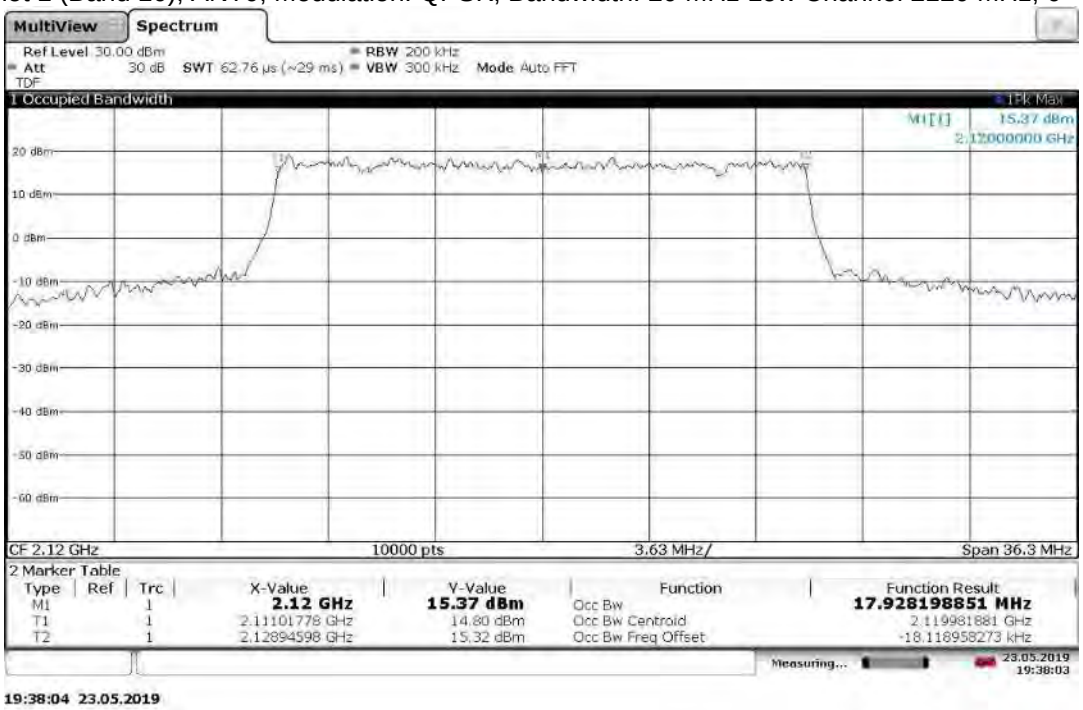
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2167.5 MHz, 40 ºC



Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2167.5MHz, 50 ºC

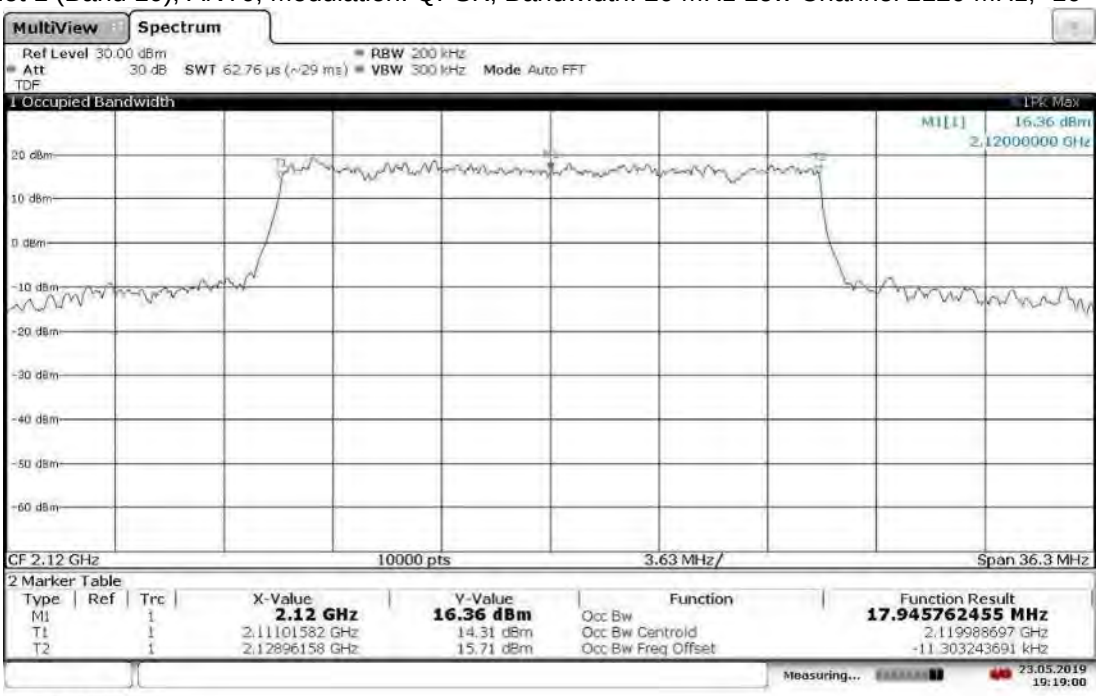


Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, 0 ºC



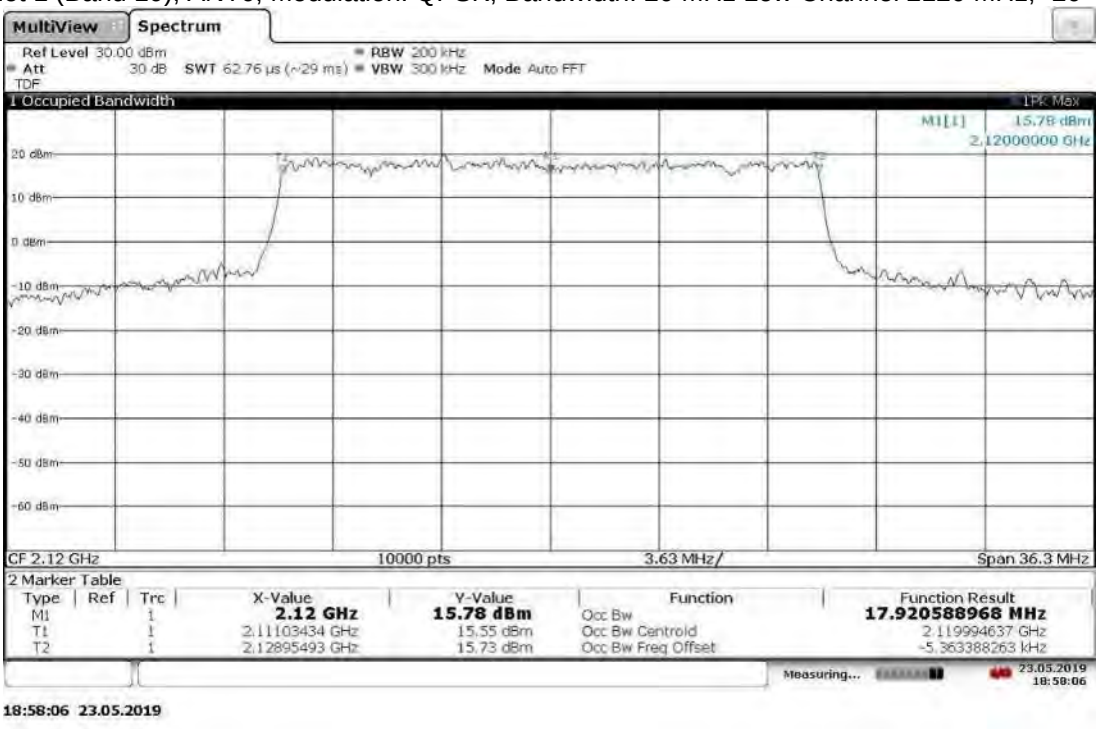
19:38:04 23.05.2019

Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, -10 ºC

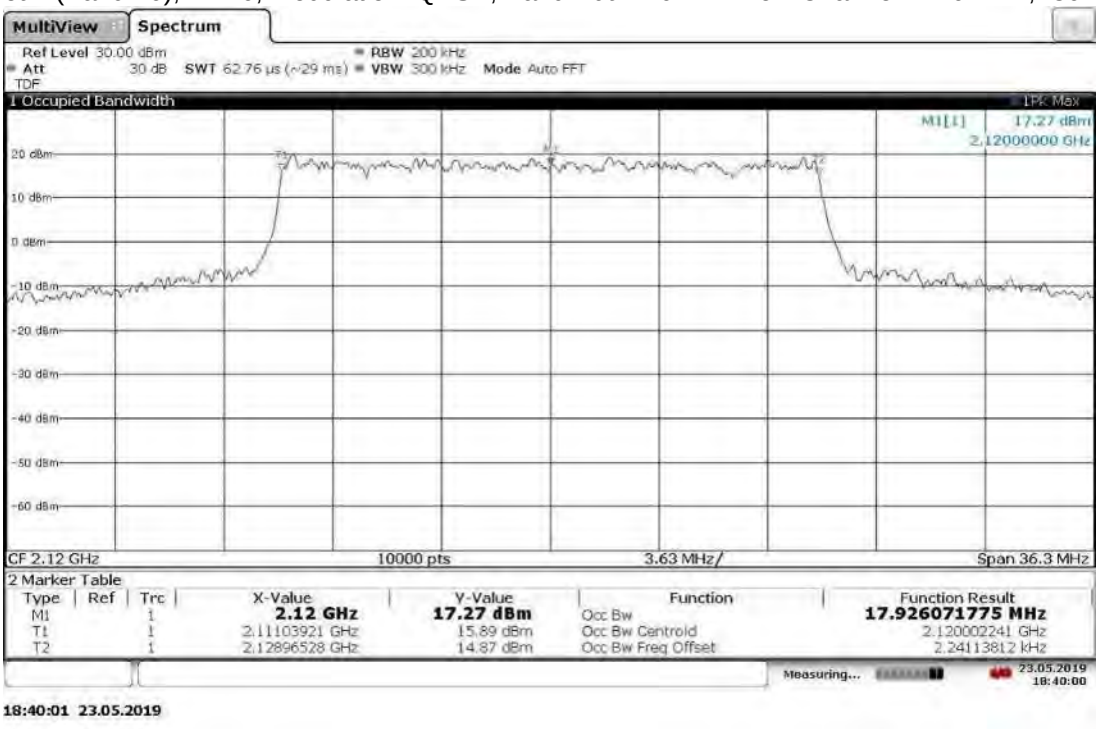


19:19:01 23.05.2019

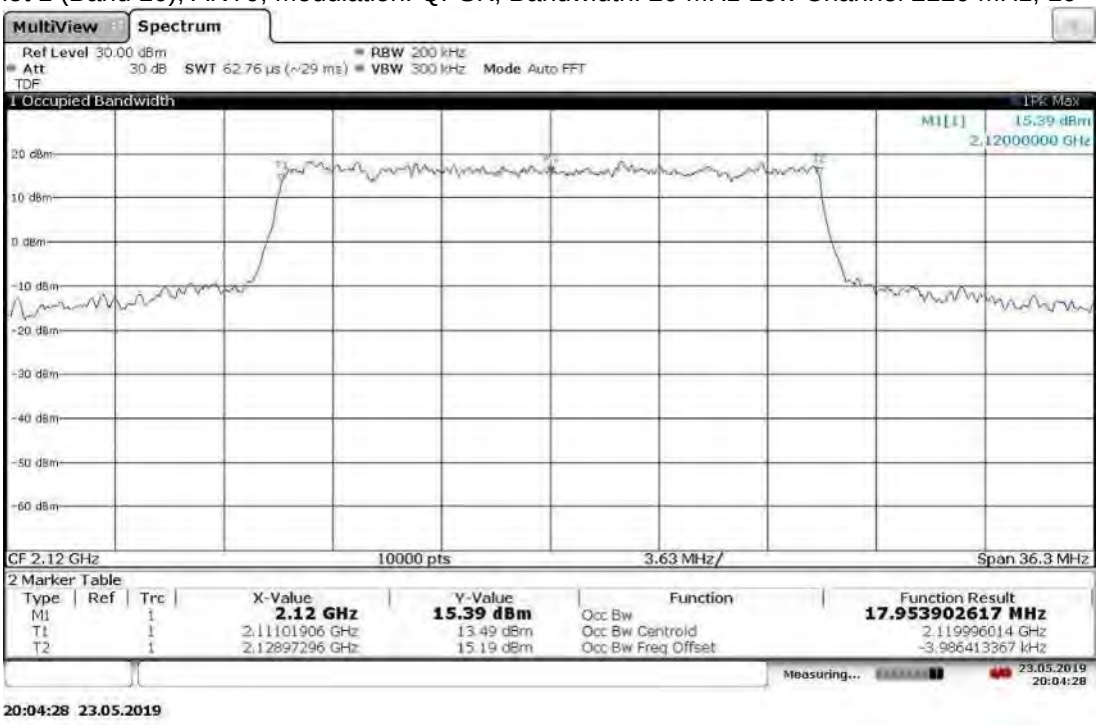
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, -20 ºC



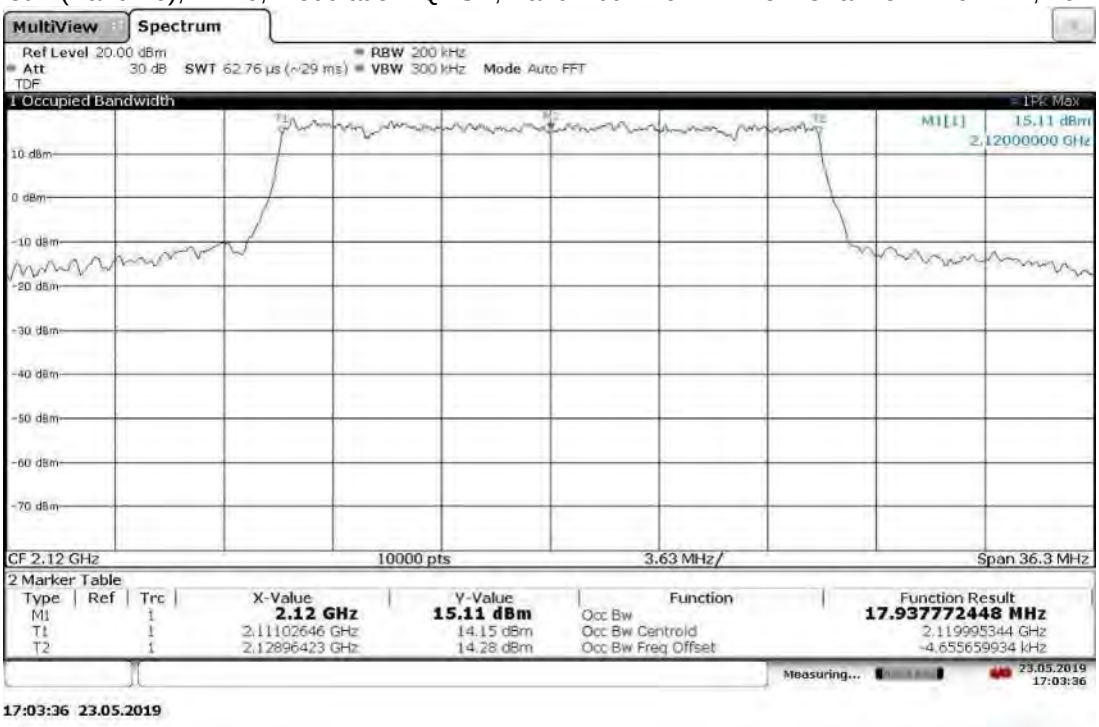
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, -30 ºC



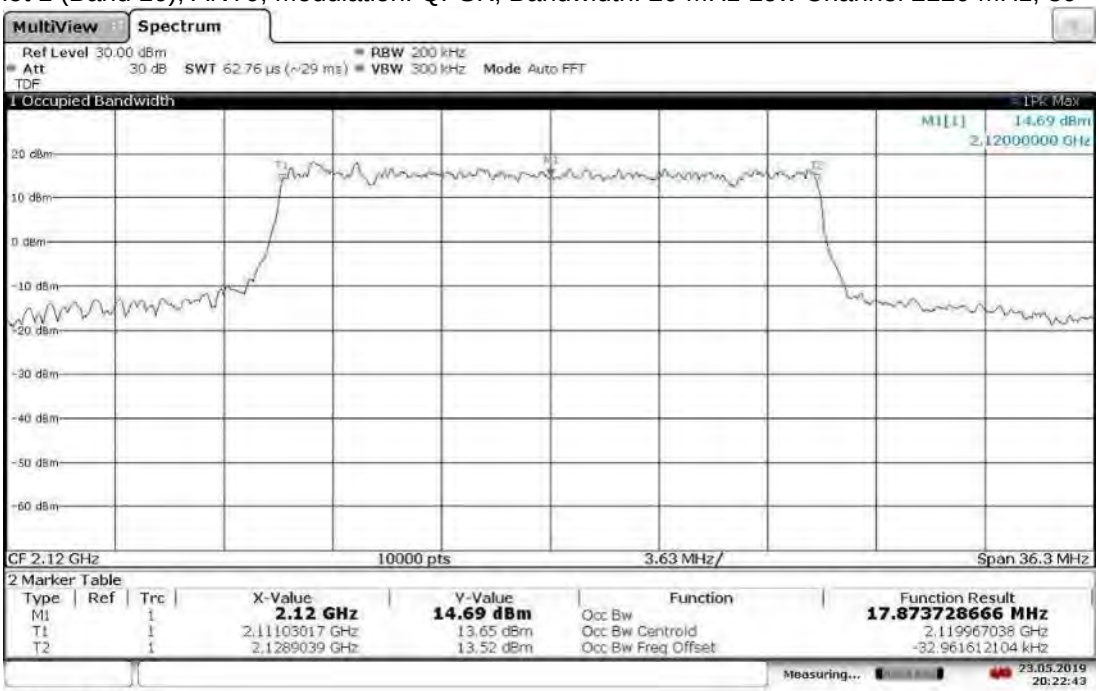
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, 10 ºC



Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, 20 ºC

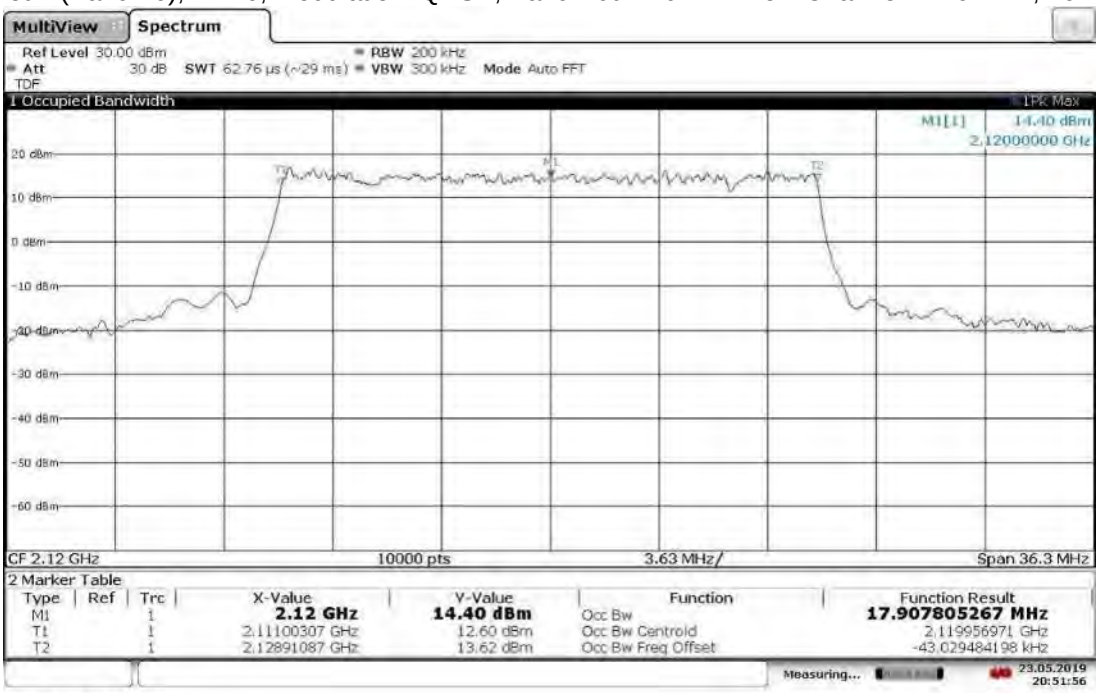


Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, 30 ºC



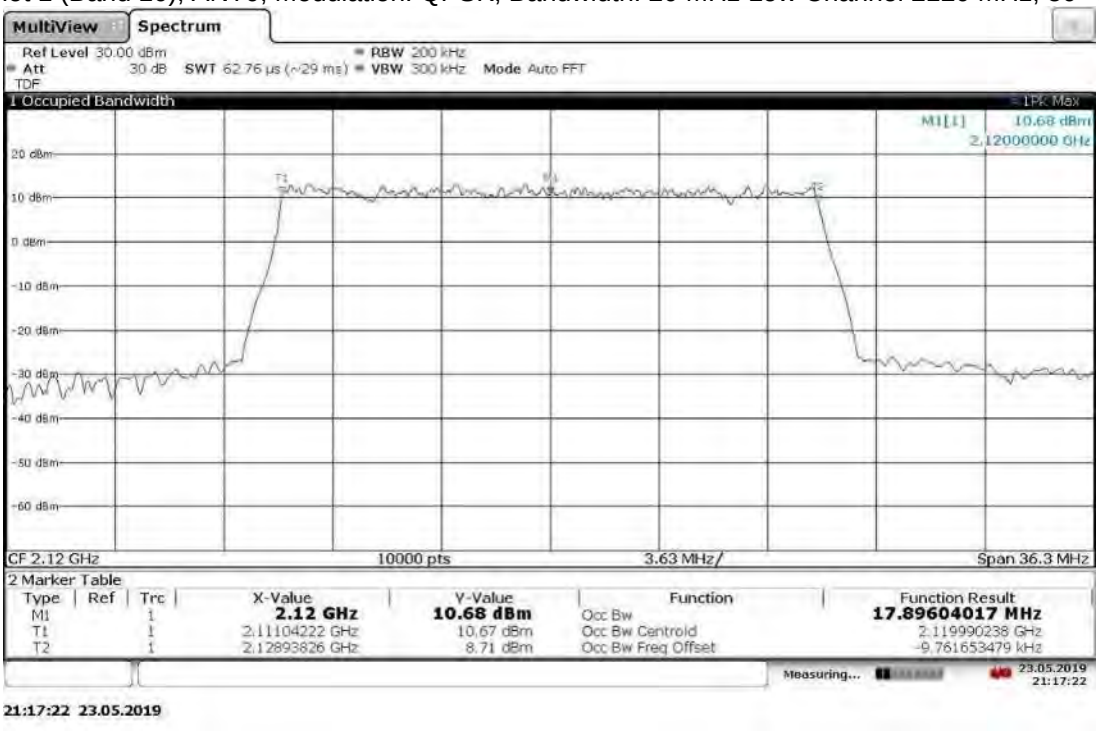
20:22:44 23.05.2019

Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, 40 ºC

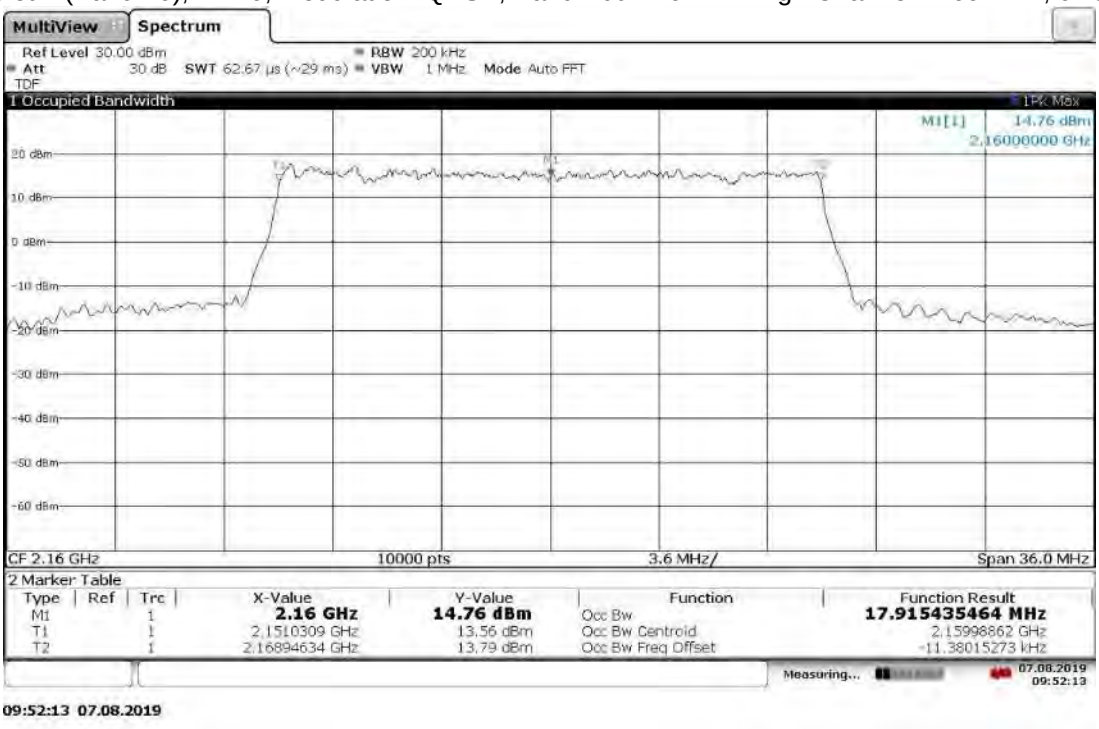


20:51:57 23.05.2019

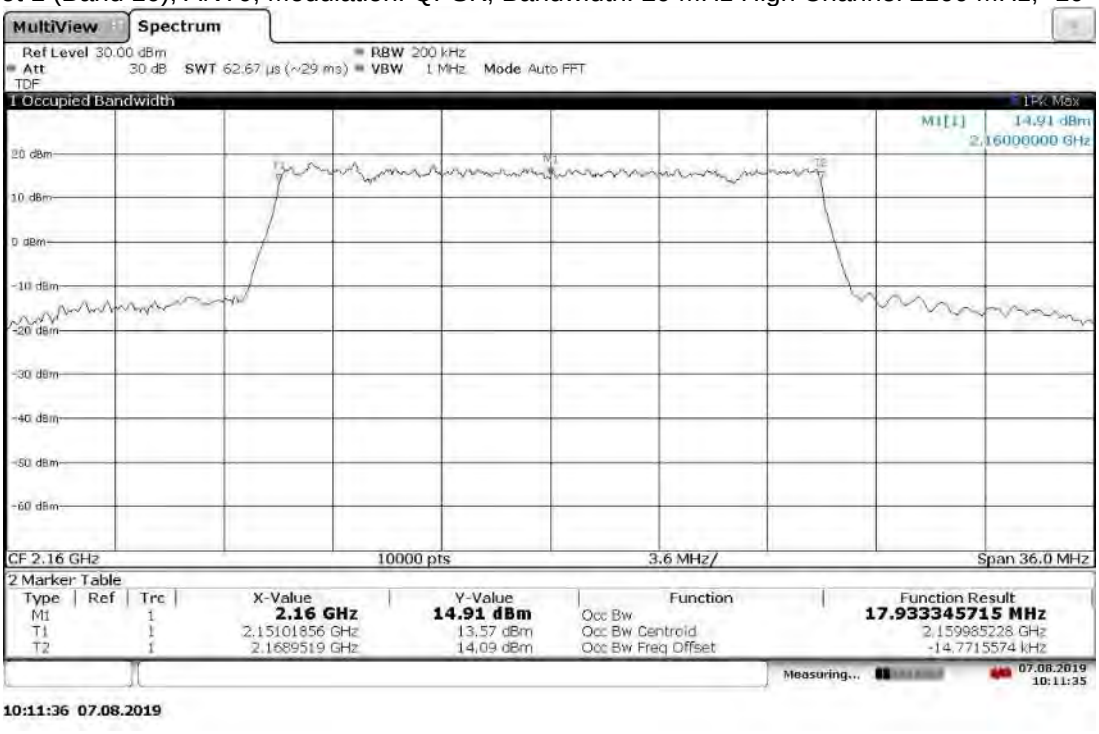
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, 50 ºC



Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2160 MHz, 0 ºC

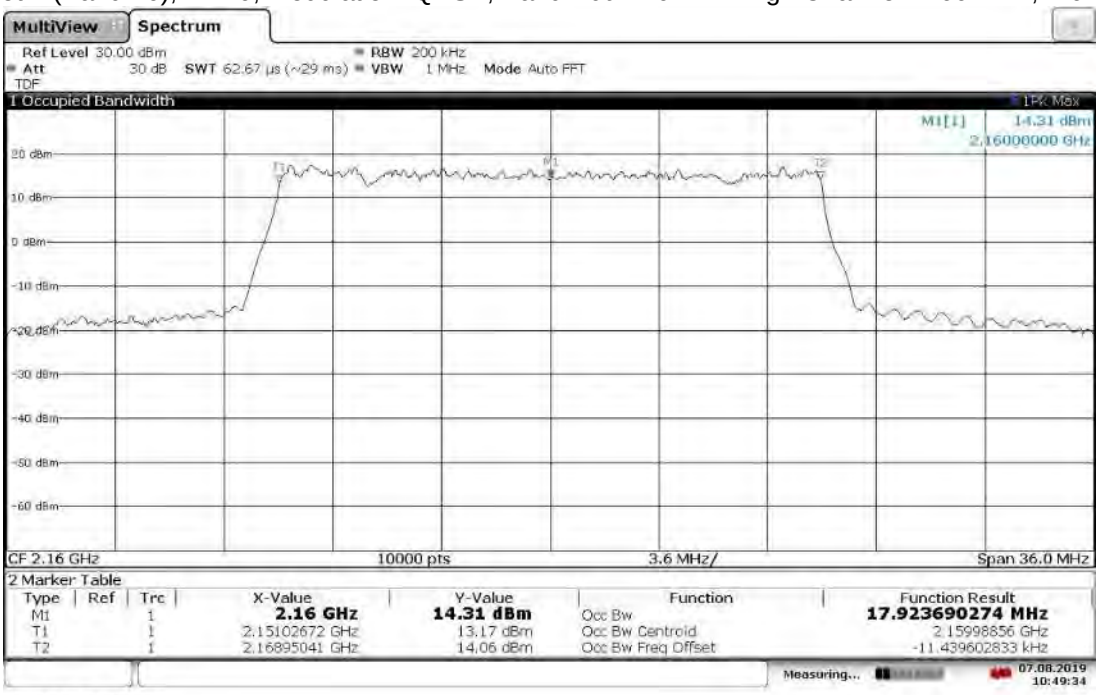


Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2160 MHz, -10 ºC



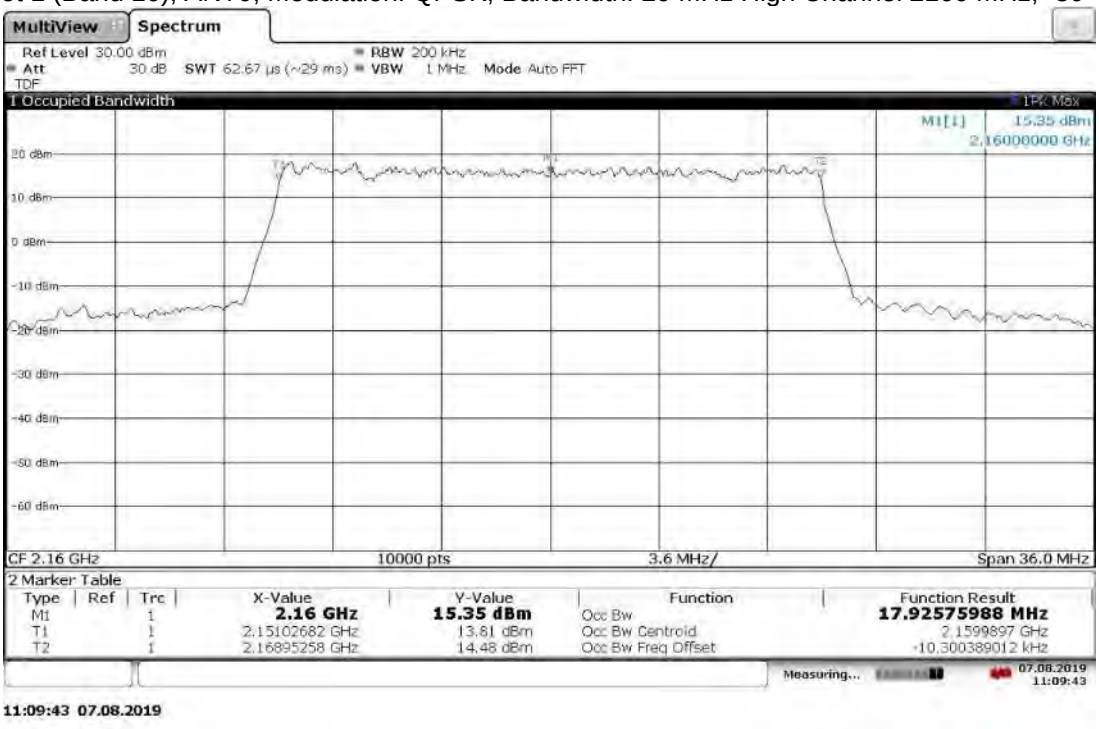
10:11:36 07.08.2019

Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2160 MHz, -20 ºC

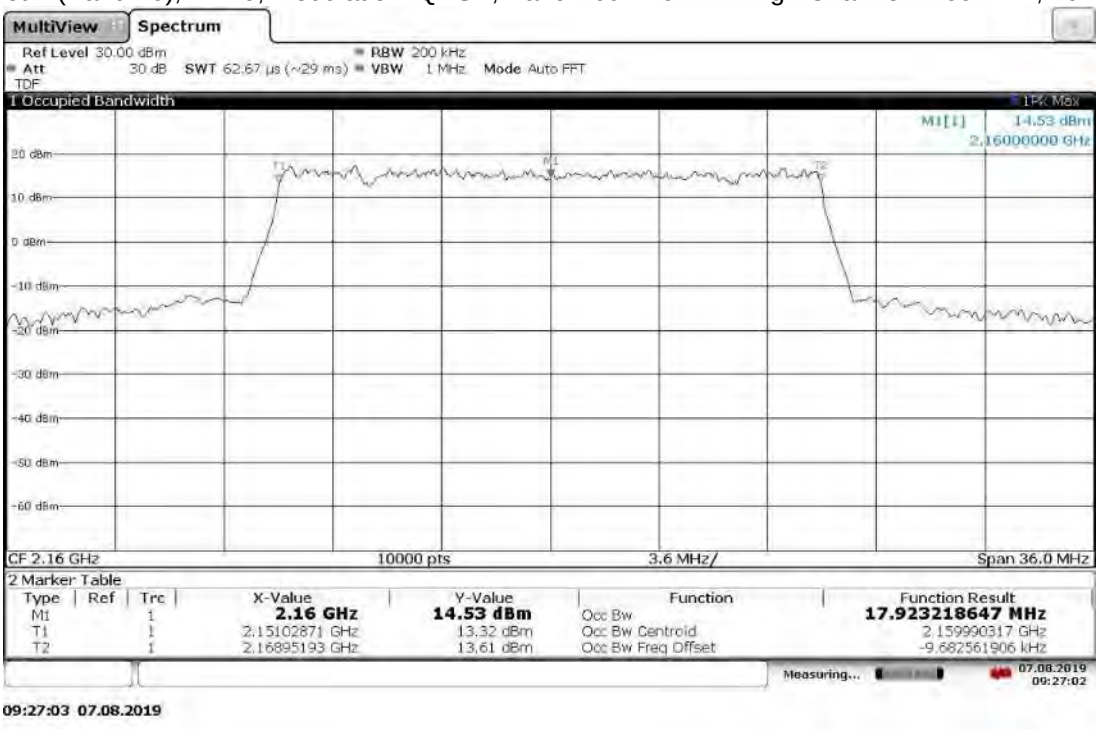


10:49:35 07.08.2019

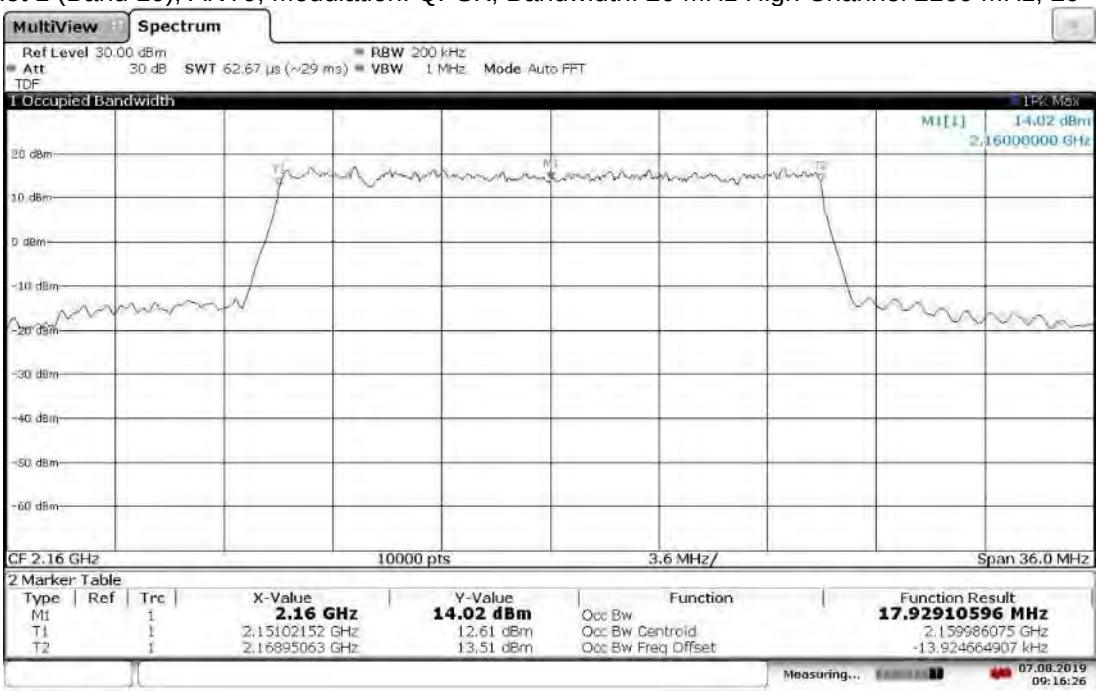
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2160 MHz, -30 ºC



Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2160 MHz, 10 ºC

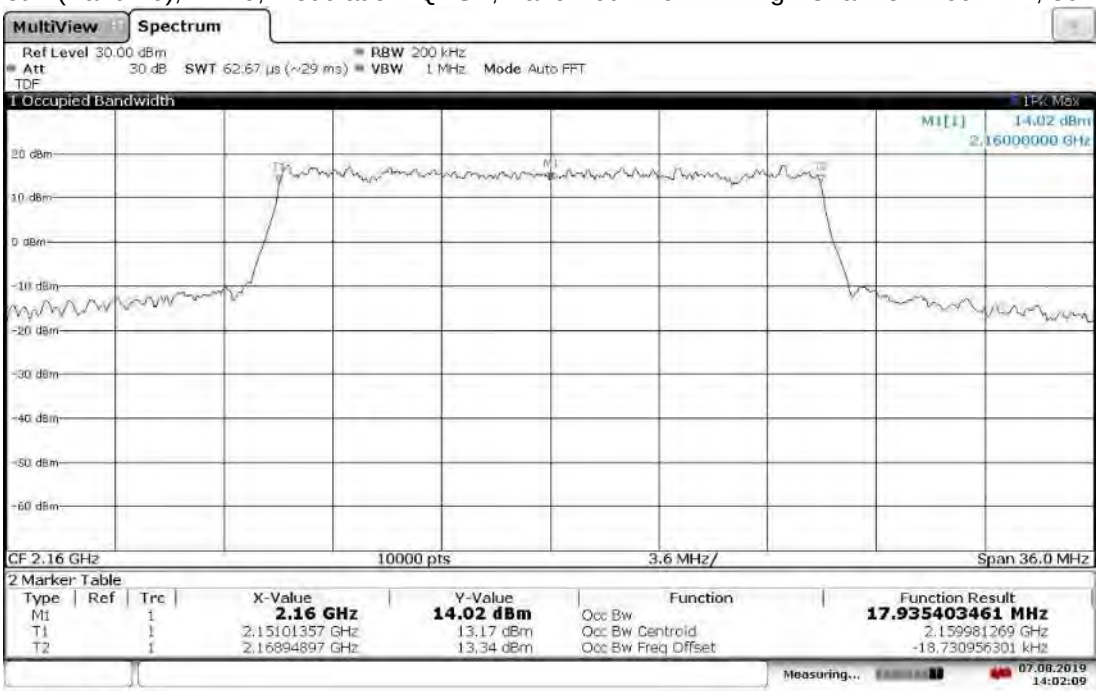


Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2160 MHz, 20 ºC



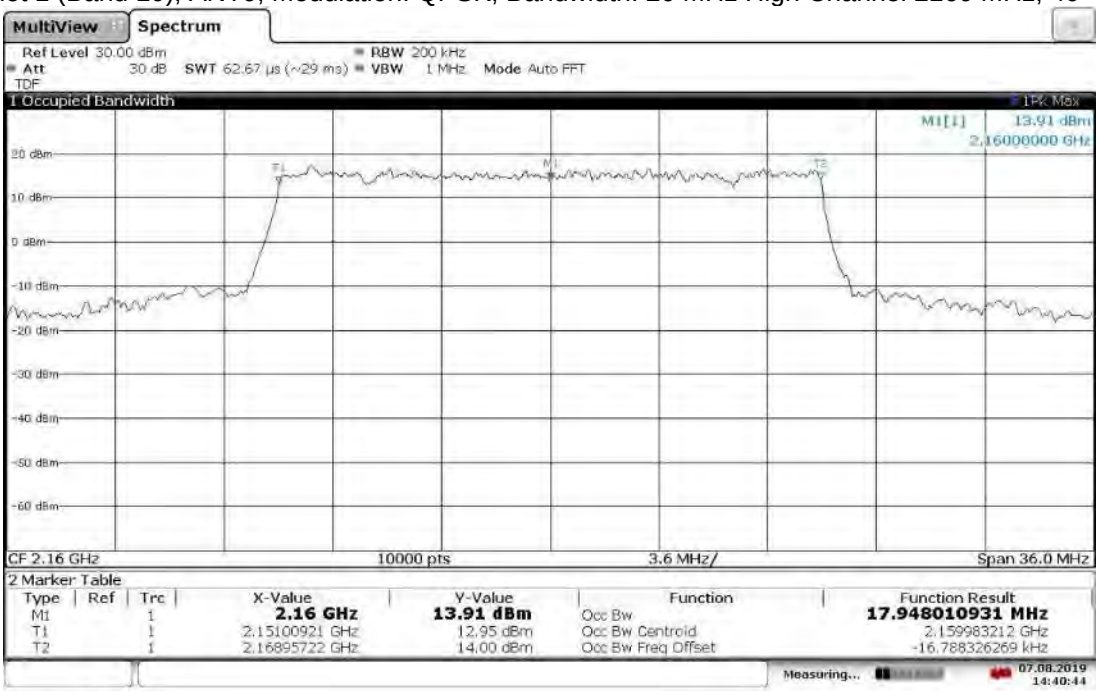
09:16:26 07.08.2019

Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2160 MHz, 30 ºC



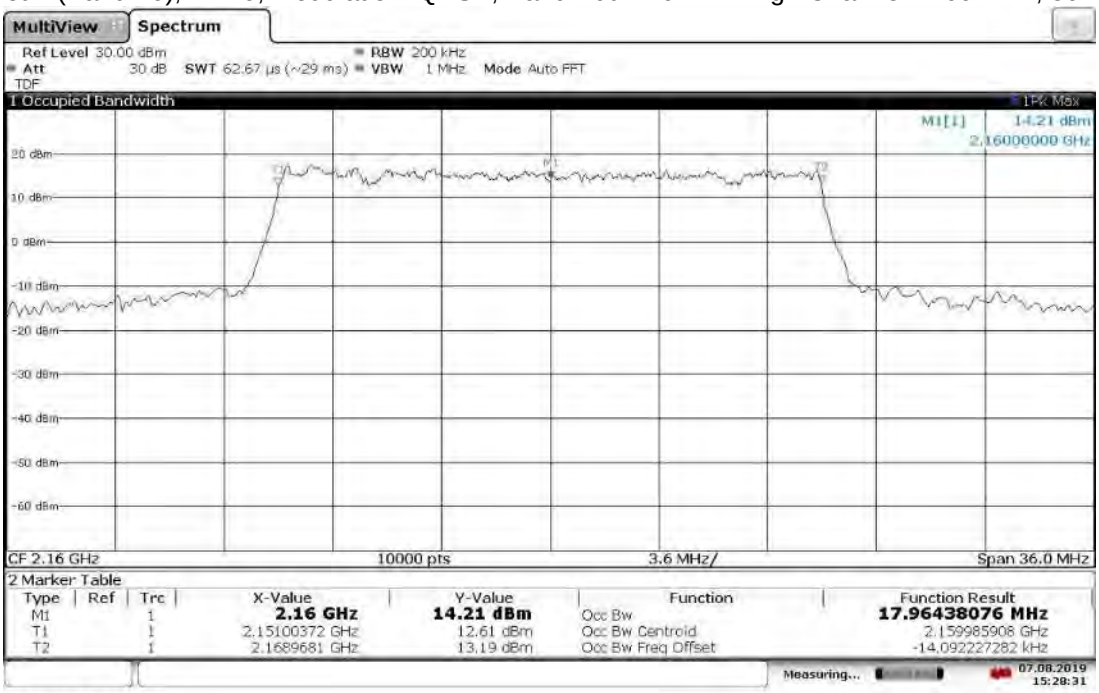
14:02:10 07.08.2019

Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2160 MHz, 40 ºC



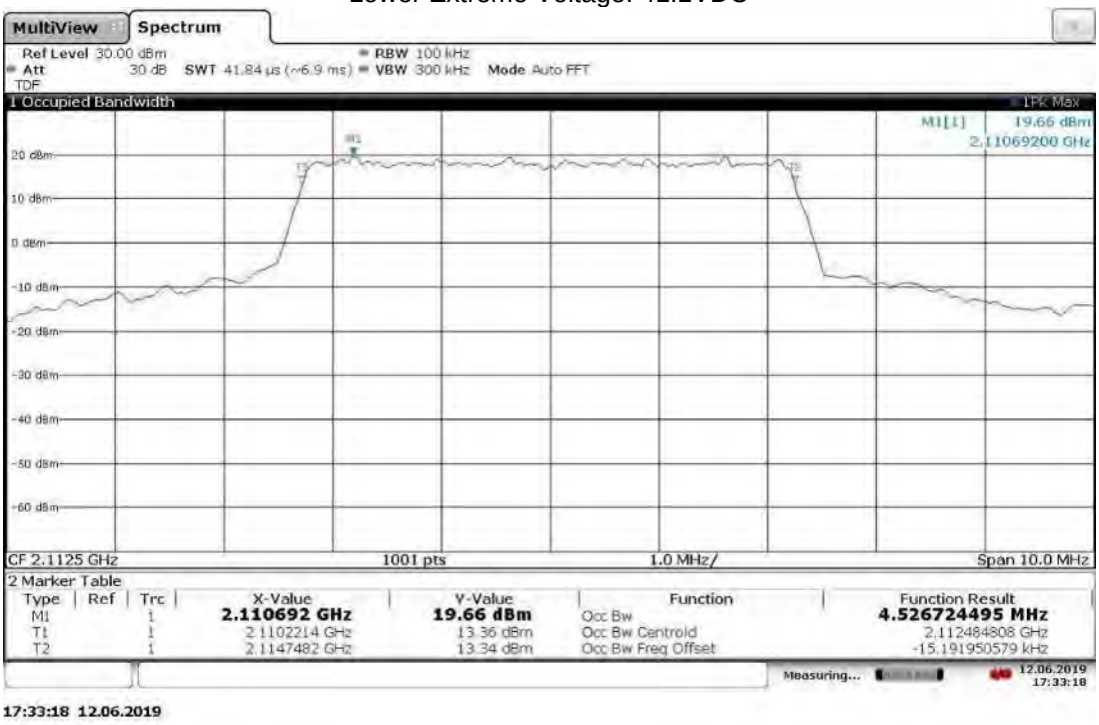
14:40:45 07.08.2019

Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2160 MHz, 50 ºC

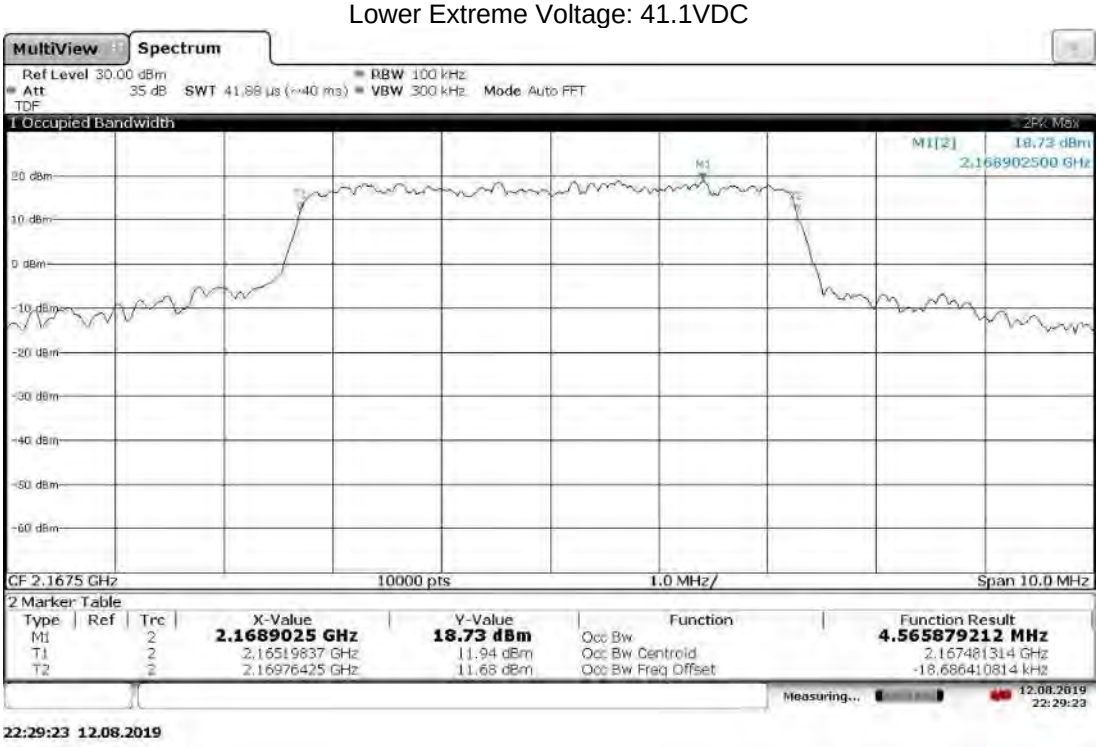


15:28:32 07.08.2019

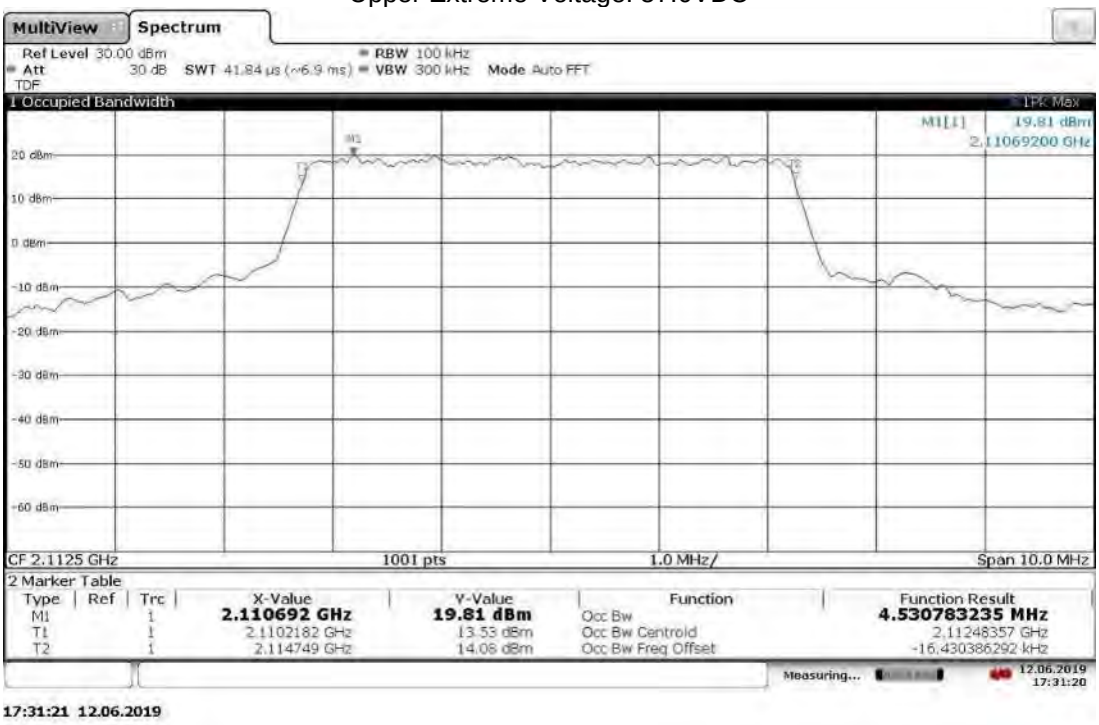
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz, Low Channel 2112.5 MHz, Lower Extreme Voltage: 41.1VDC



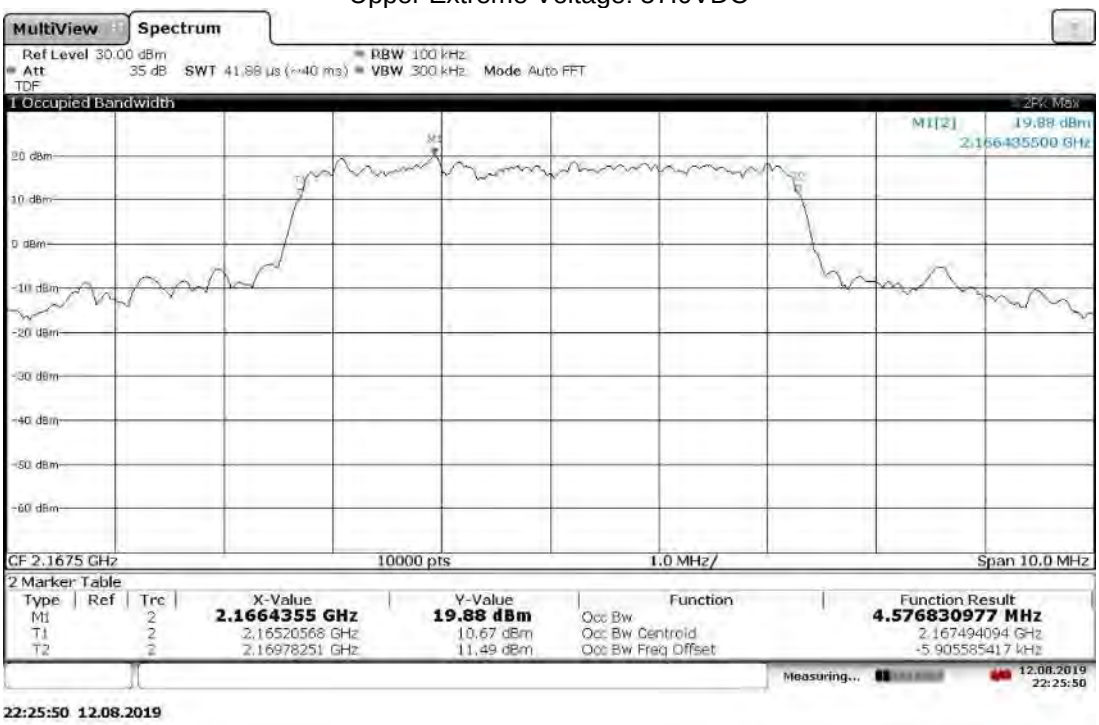
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz, High Channel 2167.5 MHz, Lower Extreme Voltage: 41.1VDC



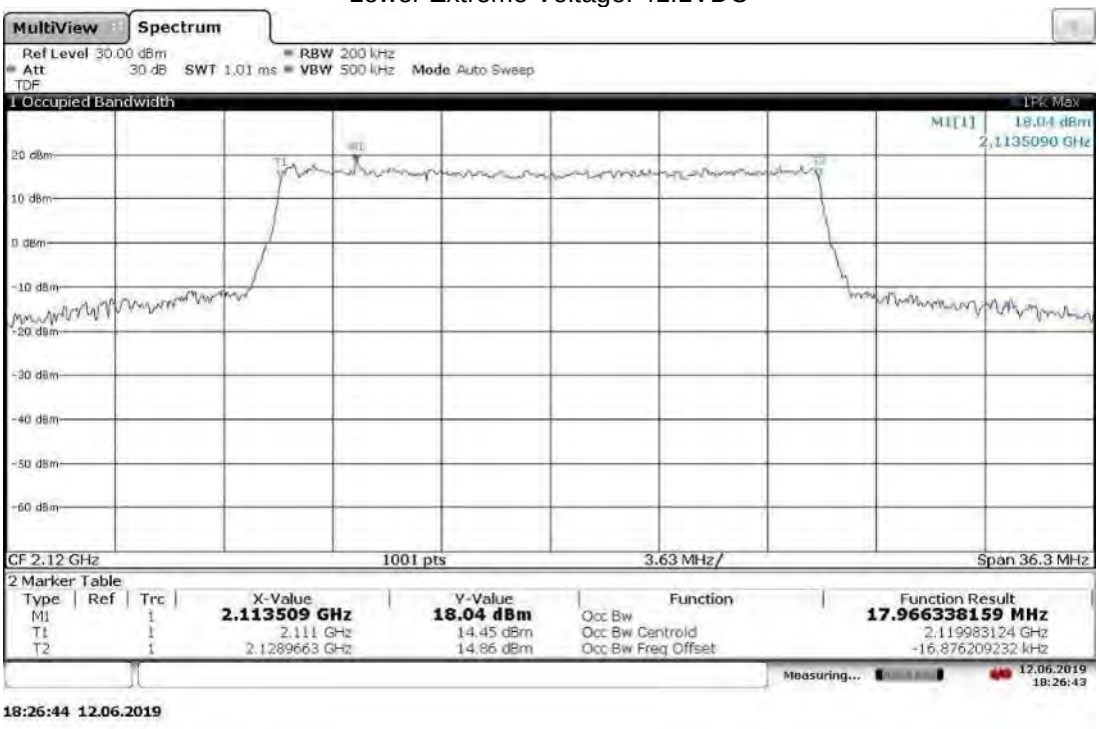
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz, Low Channel 2112.5 MHz, Upper Extreme Voltage: 57.0VDC



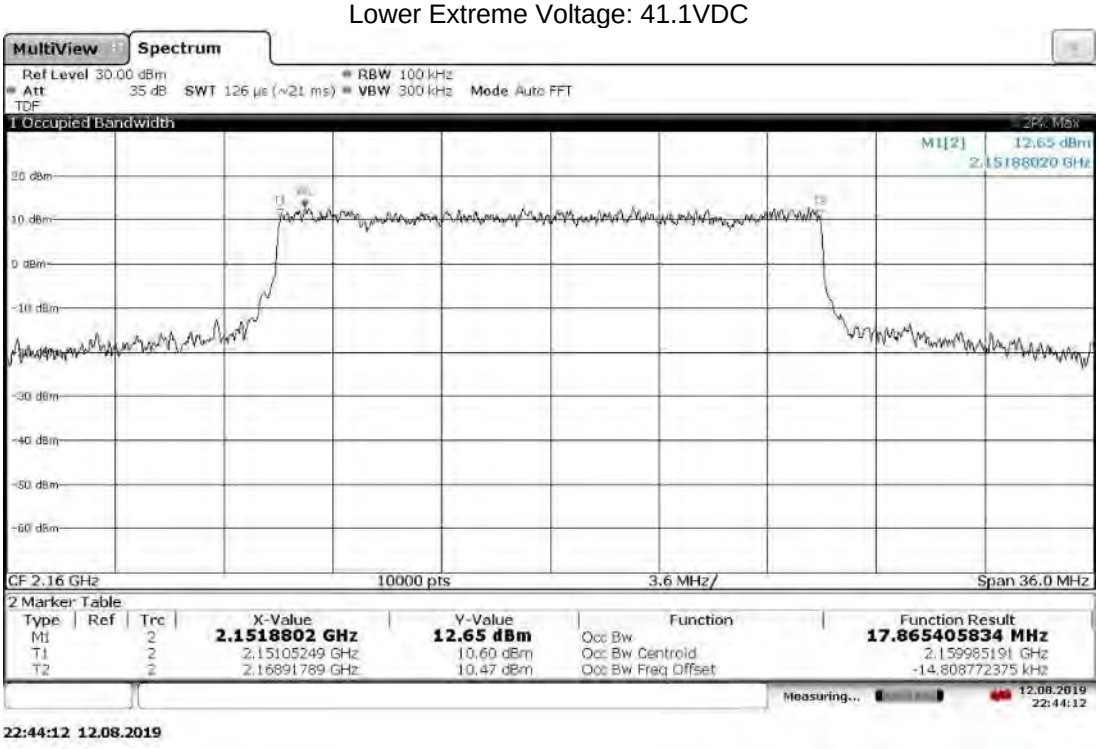
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 5 MHz, High Channel 2167.5 MHz, Upper Extreme Voltage: 57.0VDC



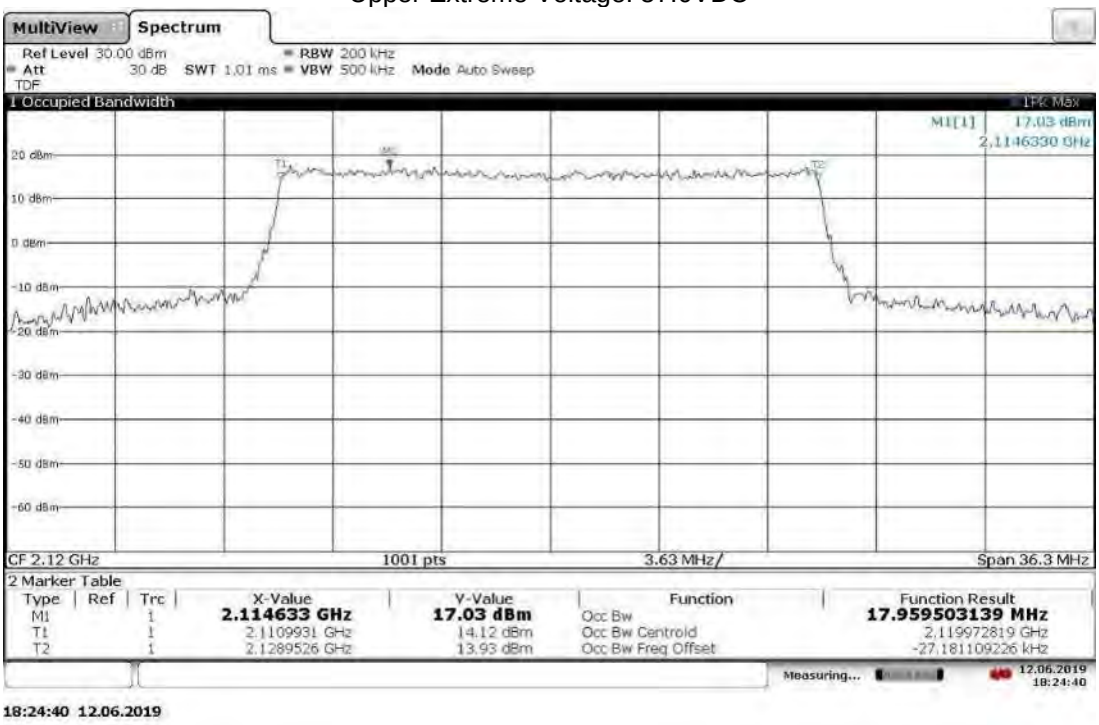
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz, Low Channel 2120 MHz, Lower Extreme Voltage: 41.1VDC



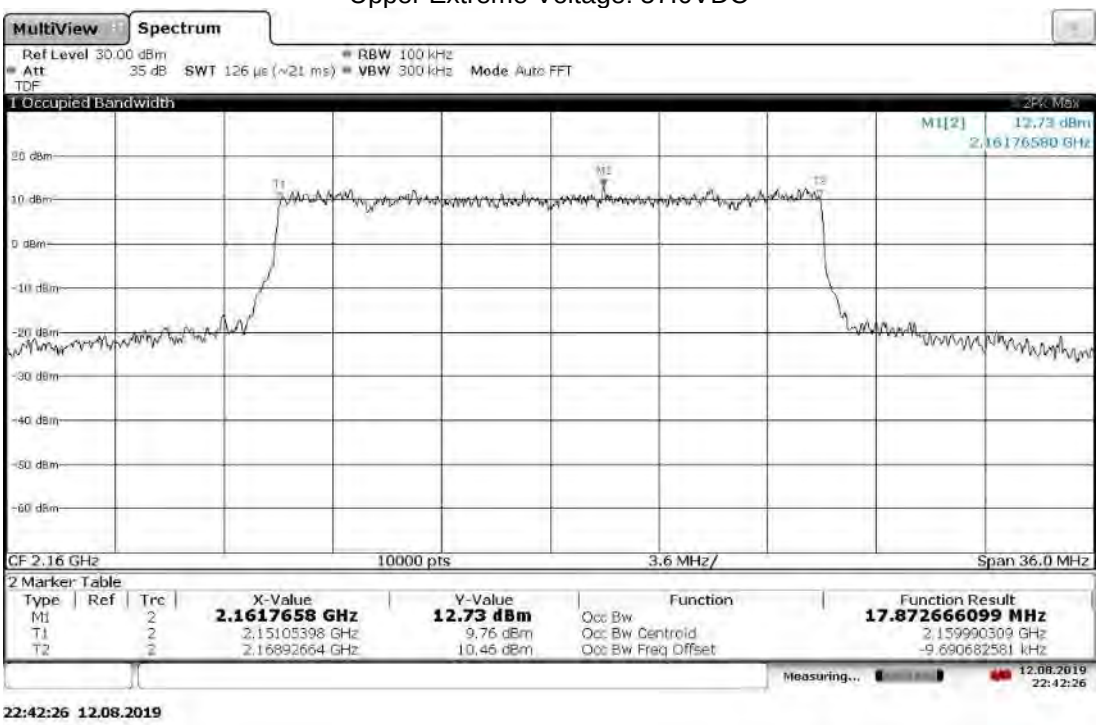
Slot 1 (Band 10), ANT0, Modulation: QPSK, Bandwidth: 20 MHz, High Channel 2160 MHz, Lower Extreme Voltage: 41.1VDC



Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 20 MHz, Low Channel 2120 MHz, Upper Extreme Voltage: 57.0VDC



Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 20 MHz, High Channel 2160 MHz, Upper Extreme Voltage: 57.0VDC



Test Personnel:	Kouma Sinn KPS	Test Date:	05/23/2019, 07/08/2019
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 27	Limit Applied:	See report section 10.3
Input Voltage:	See plots		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	N/A
		Relative Humidity:	N/A
		Atmospheric Pressure:	N/A

Deviations, Additions, or Exclusions: None

11 Transmitter spurious emissions

11.1 Method

Tests are performed in accordance with ANSI C63.26, CFR47 FCC Parts 2.1051, 2.1053, 2.1057, and 27.

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
PRE10	30-1000MHz pre-amp	ITS	PRE10	PRE10	01/22/2019	01/22/2020
145-410'	Cables 145-420 145-421 145-422 145-406	Huber + Suhner	10m Track A Cables	multiple	07/22/2019	07/22/2020
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	07/22/2019	07/22/2020
BONN001	1-18GHz low noise pre-amp	Bonn	BLMA 0118-M	1811749	07/11/2019	07/11/2020
145145	Broadband Hybrid Antenna 30 MHz - 3 GHz	Sunol Sciences Corp.	JB3	A122313	06/12/2019	06/12/2020
CBLSHF102'	Cable, SMA - SMA, 9kHz-40GHz (Cable Kit 5)	Sucoflex (Huber Suhn	104PE	CBLSHF102	09/13/2018	09/13/2019
PRE8'	PREAMPLFIER 1- 40 GHz	MITEQ	NSP4000-NF	507145	10/25/2018	10/25/2019
ROS005-1	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	10/15/2018	10/15/2019
REA006'	18GHz High Pass Filter	Reactel, Inc	7HS-18G/40G K11	(06)1	04/23/2019	04/23/2020
REA004'	3GHz High Pass Filter	Reactel, Inc	7HSX-3G/18G-S11	06-1	02/25/2019	02/25/2020
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	10/26/2018	10/26/2019
HORN3'	HORN ANTENNA	EMCO	3115	9610-4980	05/30/2019	05/30/2020
DAV001'	Weather Station	Davis Instruments	7400	PE80519A61	01/23/2019	01/23/2020

Software Utilized:

Name	Manufacturer	Version
BAT-EMC	Nexio	3.18.0.16
EMI Boxborough.xls	Intertek	08/27/2010

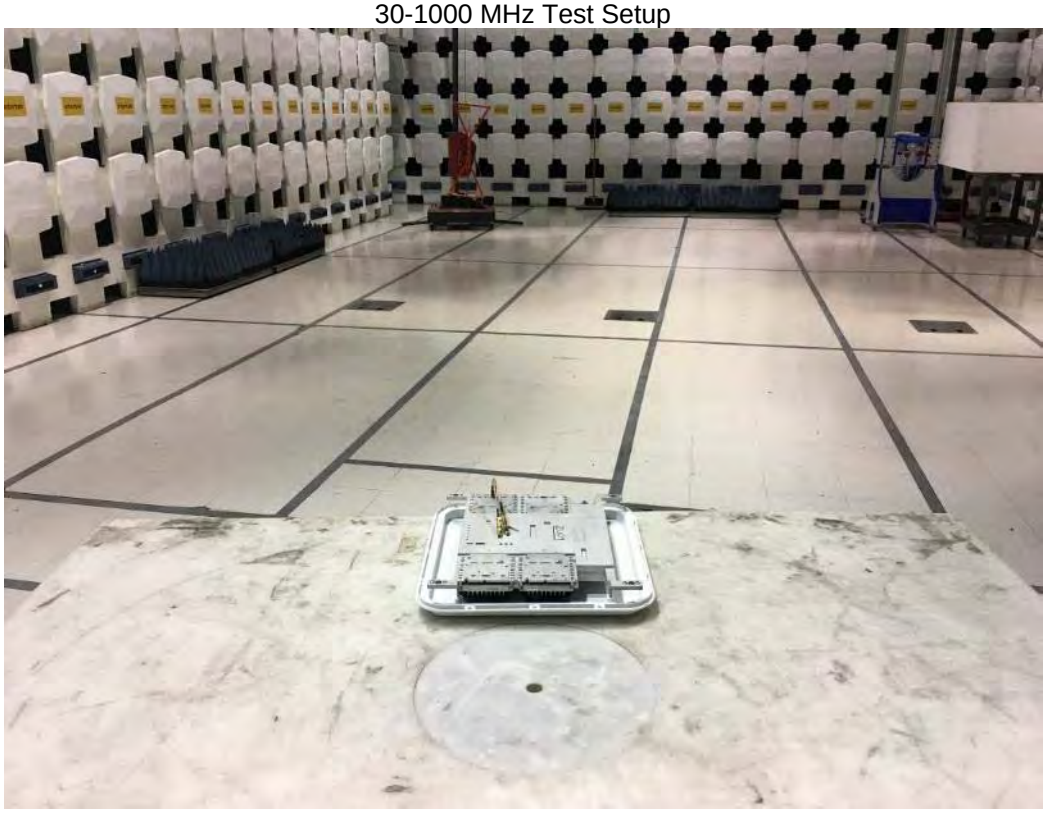
11.3 Results:

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.

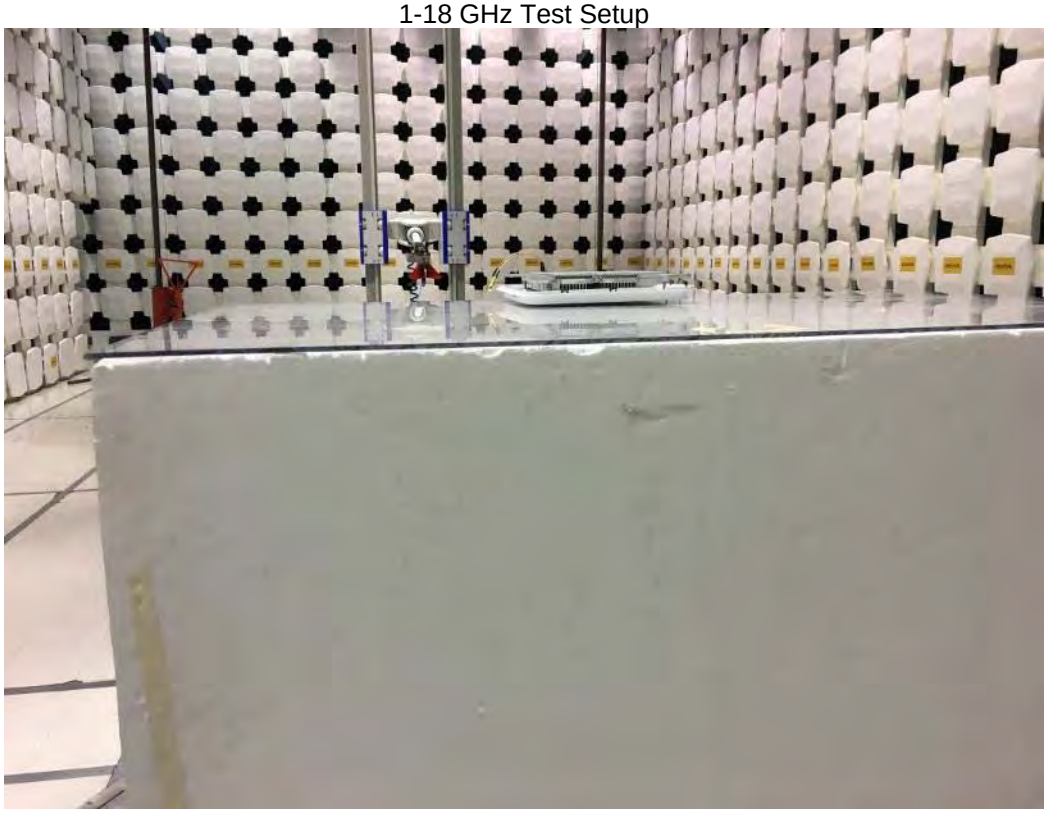
§27.53(h): The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

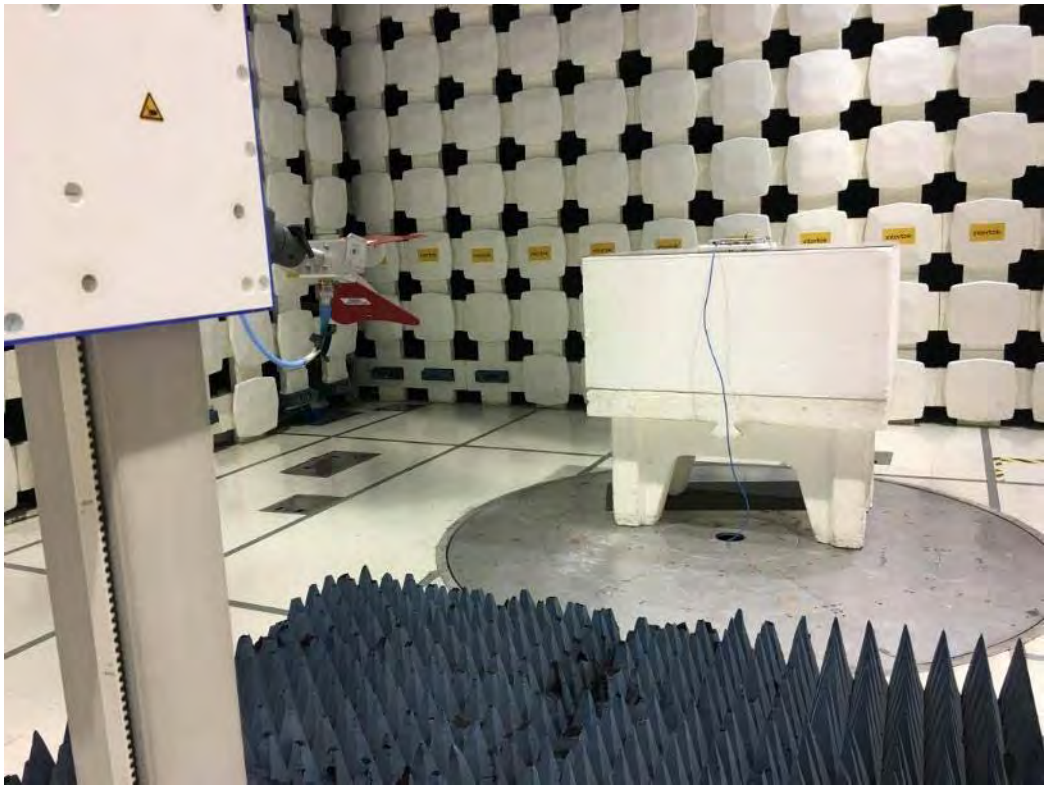
11.4 Setup Photographs:

30-1000 MHz Test Setup

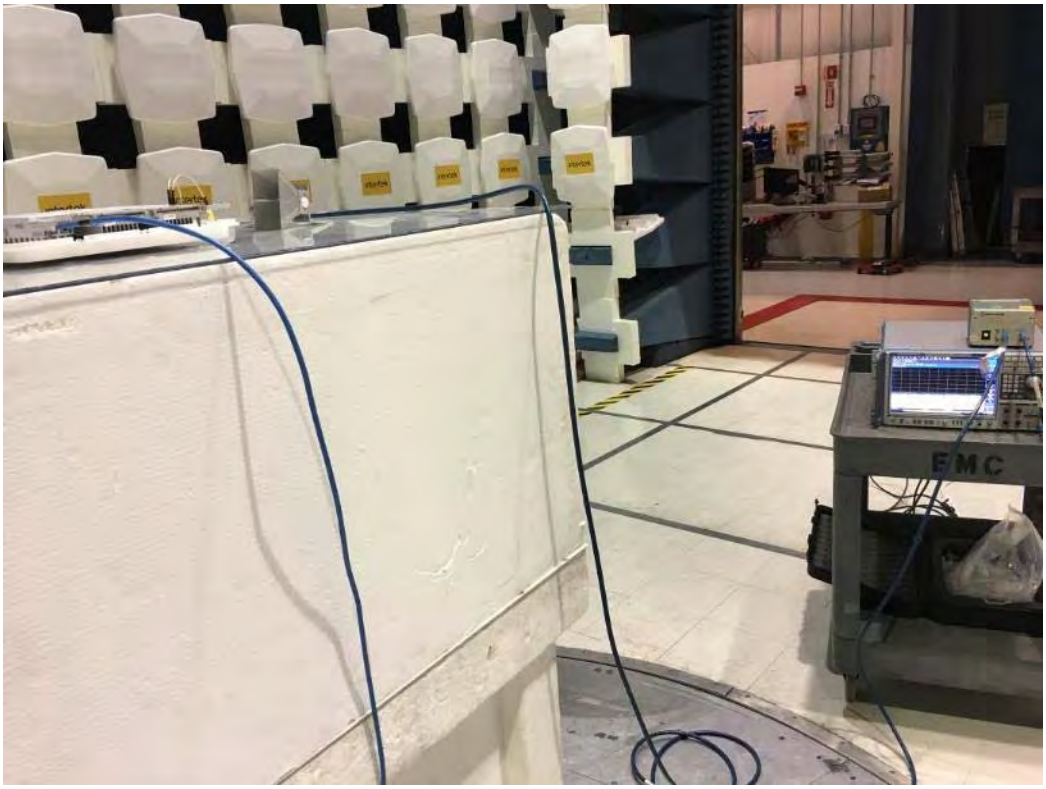


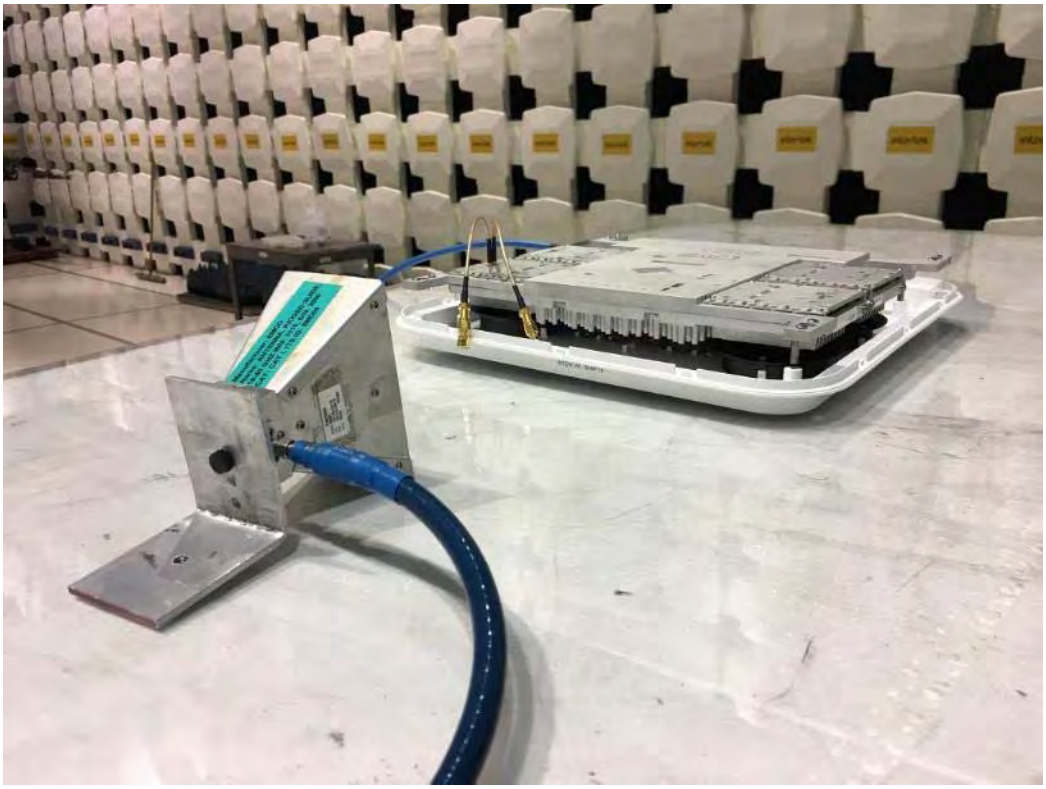
1-18 GHz Test Setup





18-22 GHz

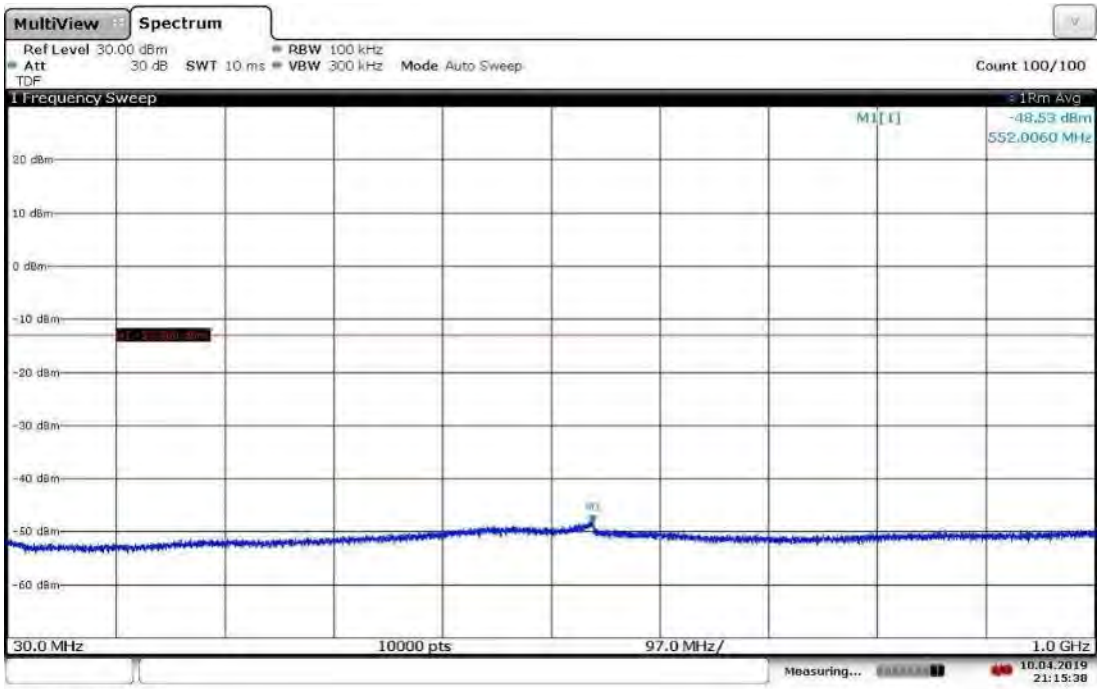




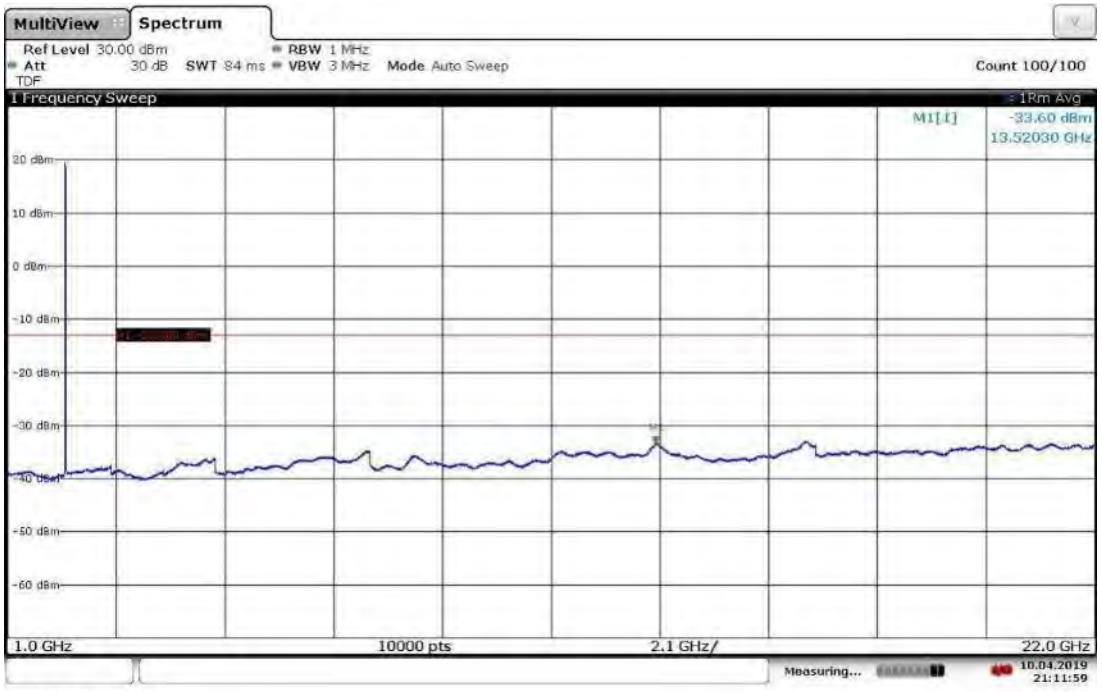
Antenna Port Conducted Test Setup

11.5 Plots/Data:

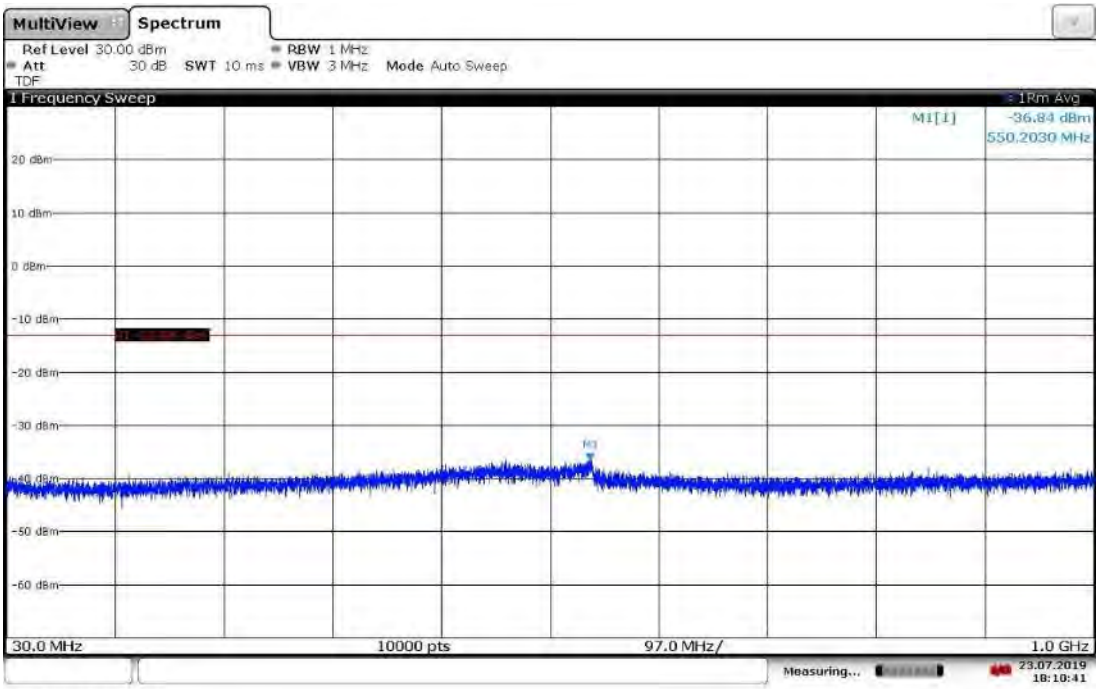
Slot 1 (Band 10), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



Slot 1 (Band 10), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Low Channel 1-22GHz

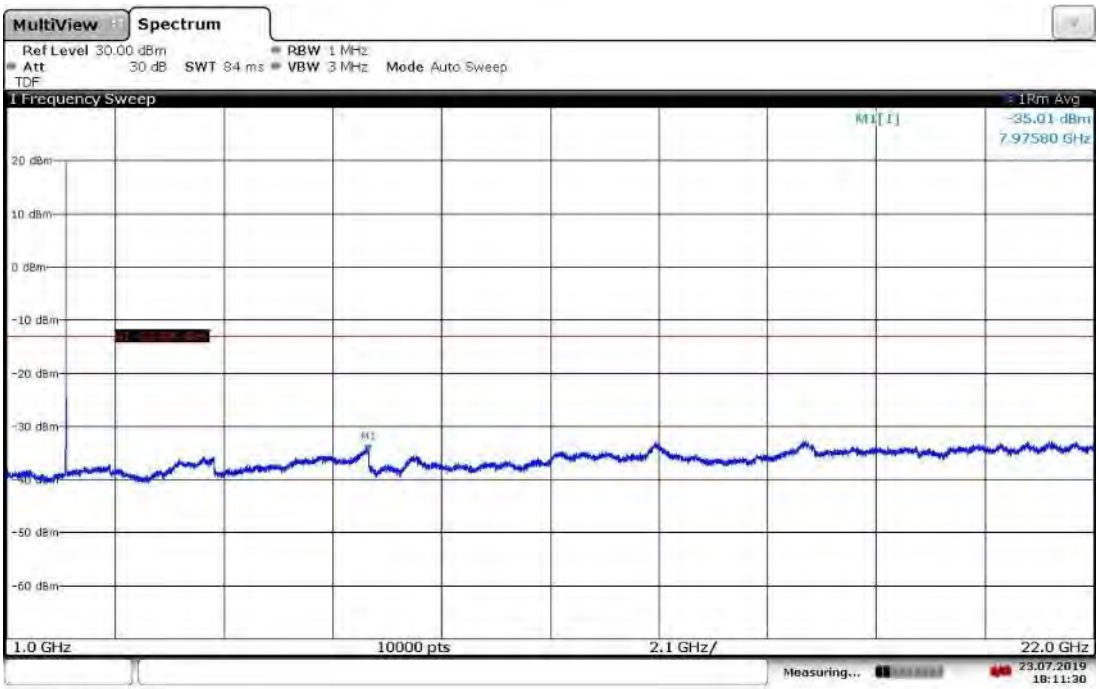


Slot 1 (Band 10), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



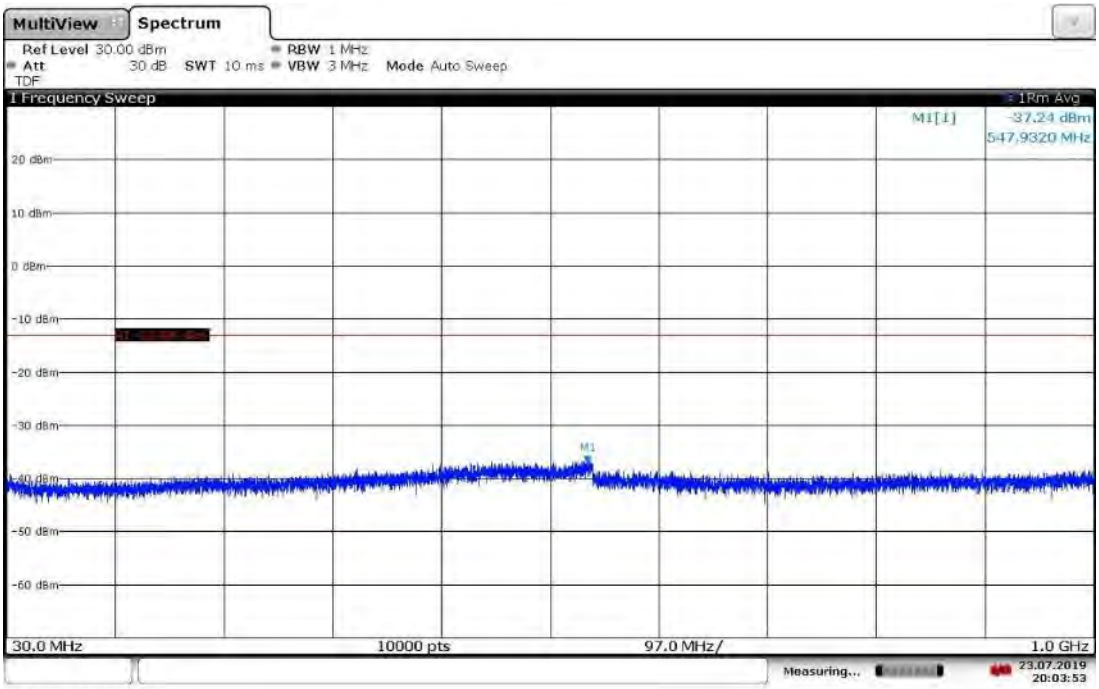
18:10:41 23.07.2019

Slot 1 (Band 10), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Mid Channel 1-22GHz



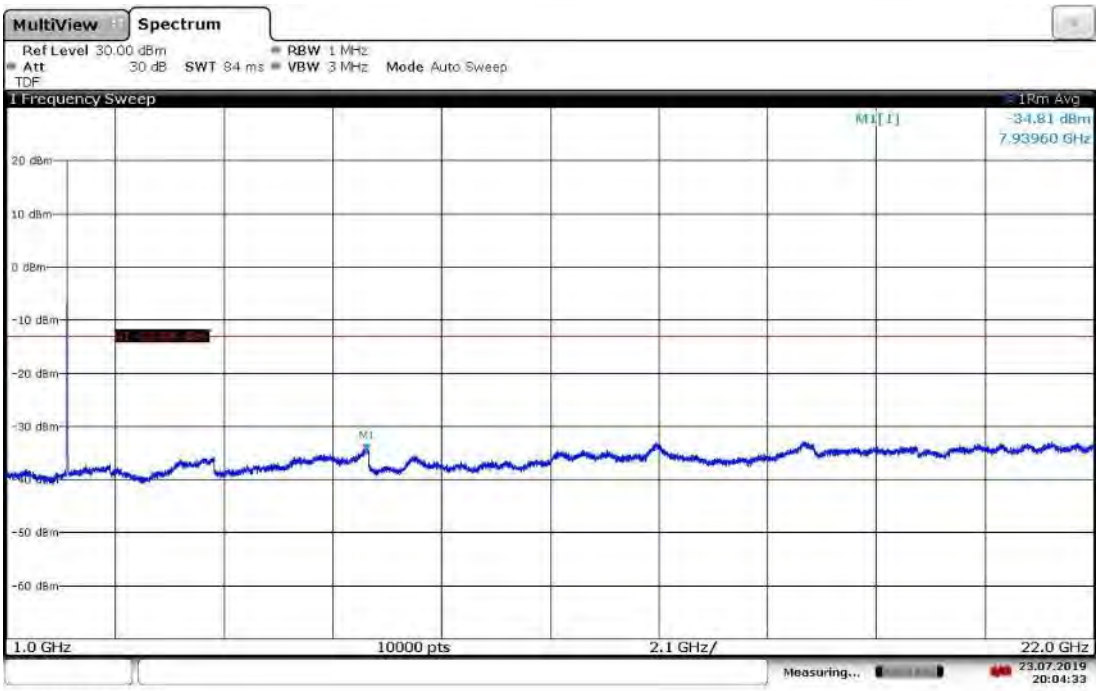
18:11:30 23.07.2019

Slot 1 (Band 10), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



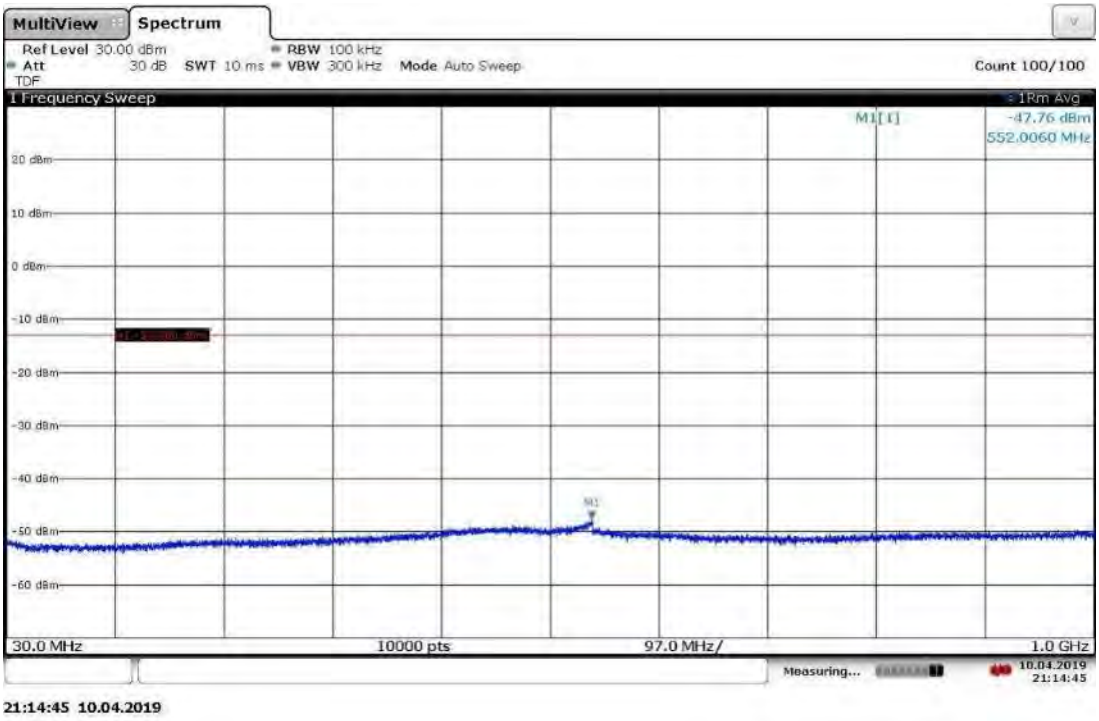
20:03:54 23.07.2019

Slot 1 (Band 66), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, High Channel 1-22GHz



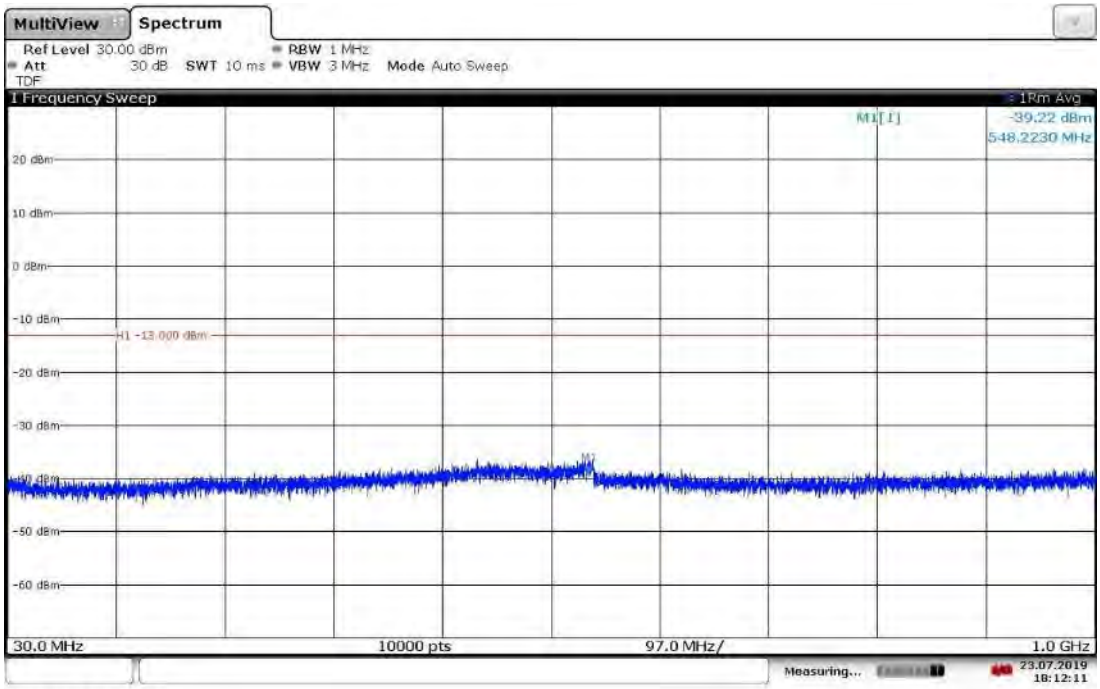
20:04:34 23.07.2019

Slot 1 (Band 10), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz

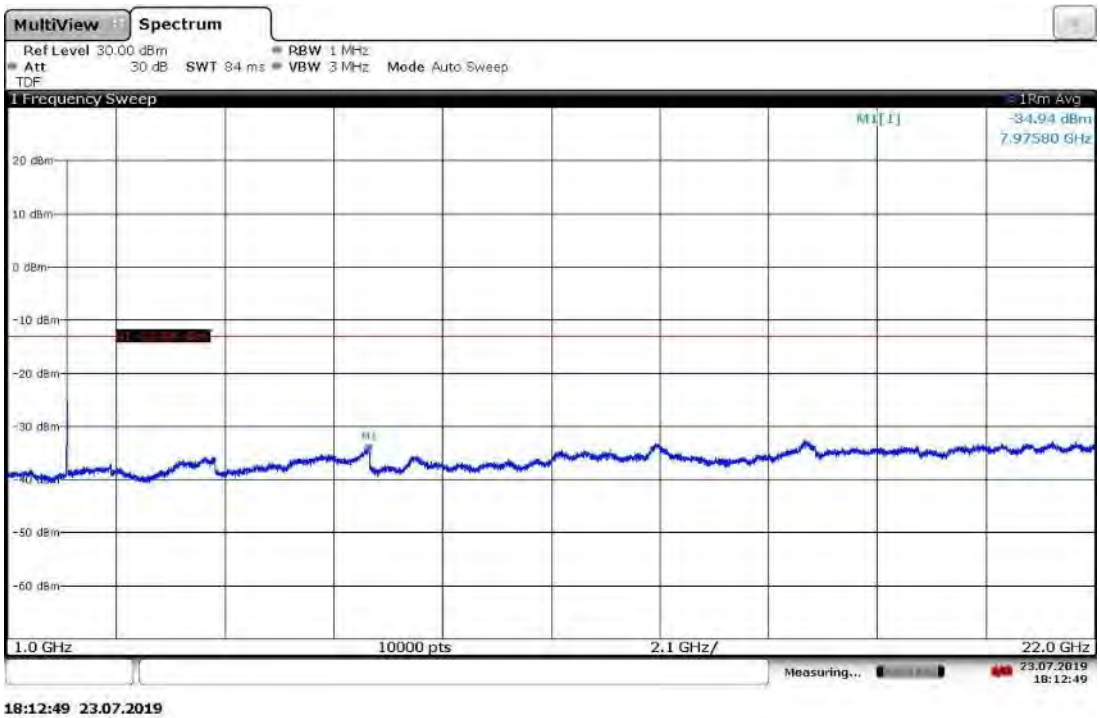


Slot 1 (Band 10), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Low Channel 1-22GHz

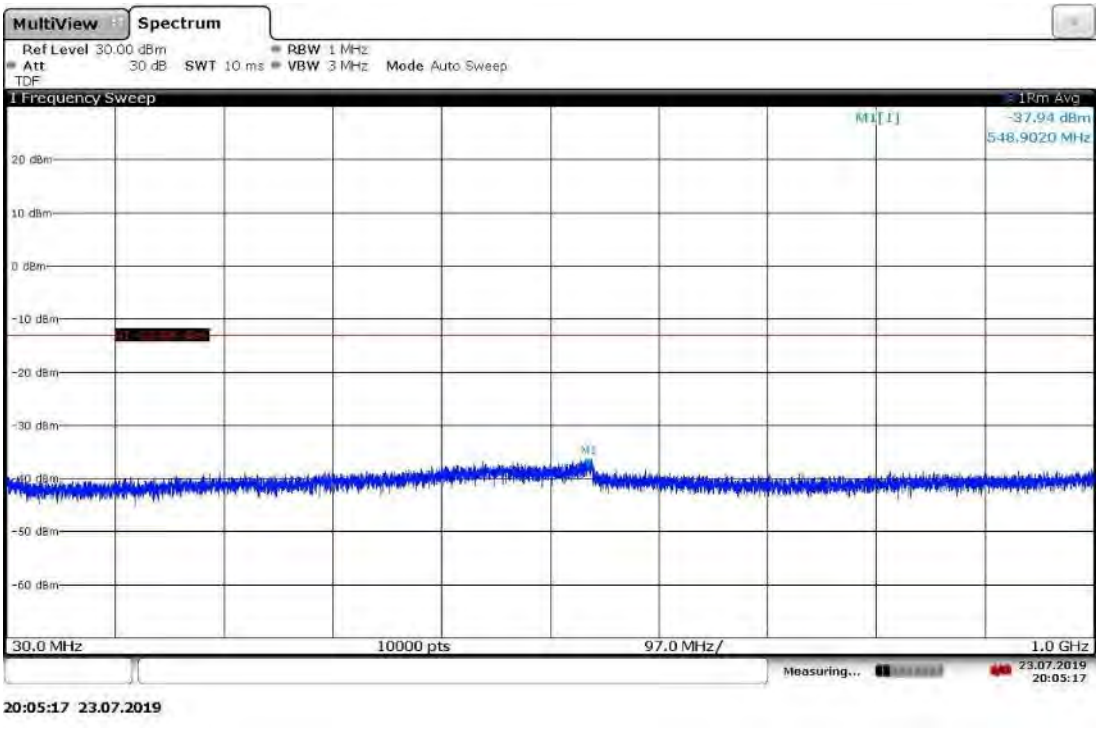
Slot 1 (Band 10), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



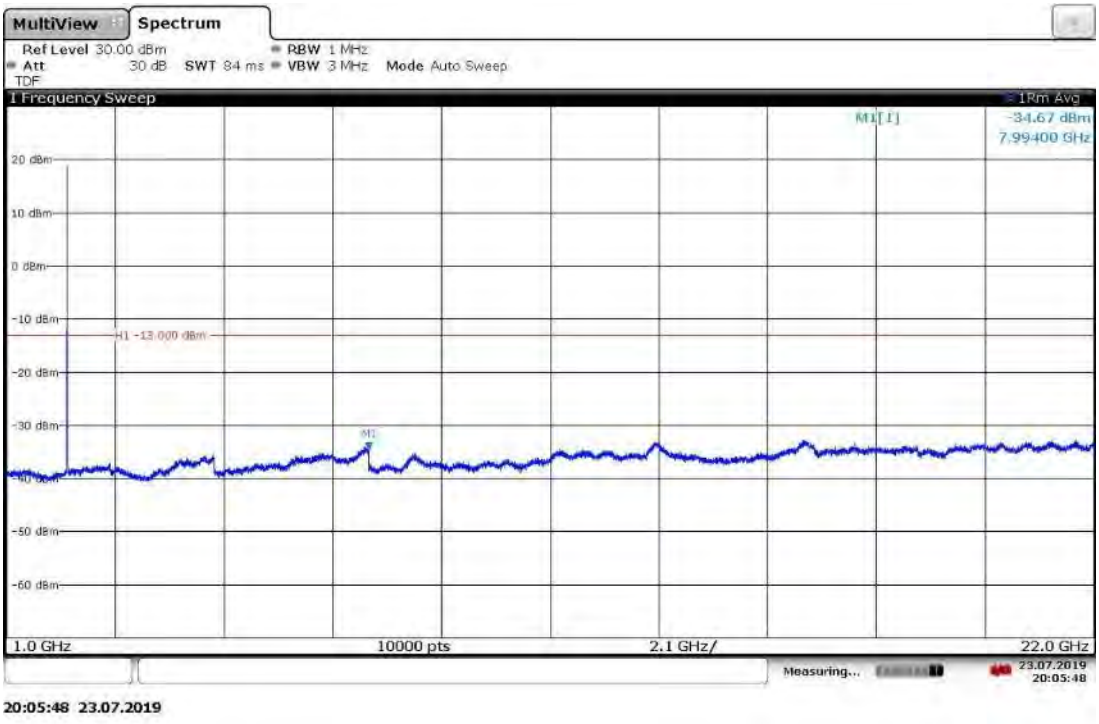
Slot 1 (Band 10), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Mid Channel 1-22GHz



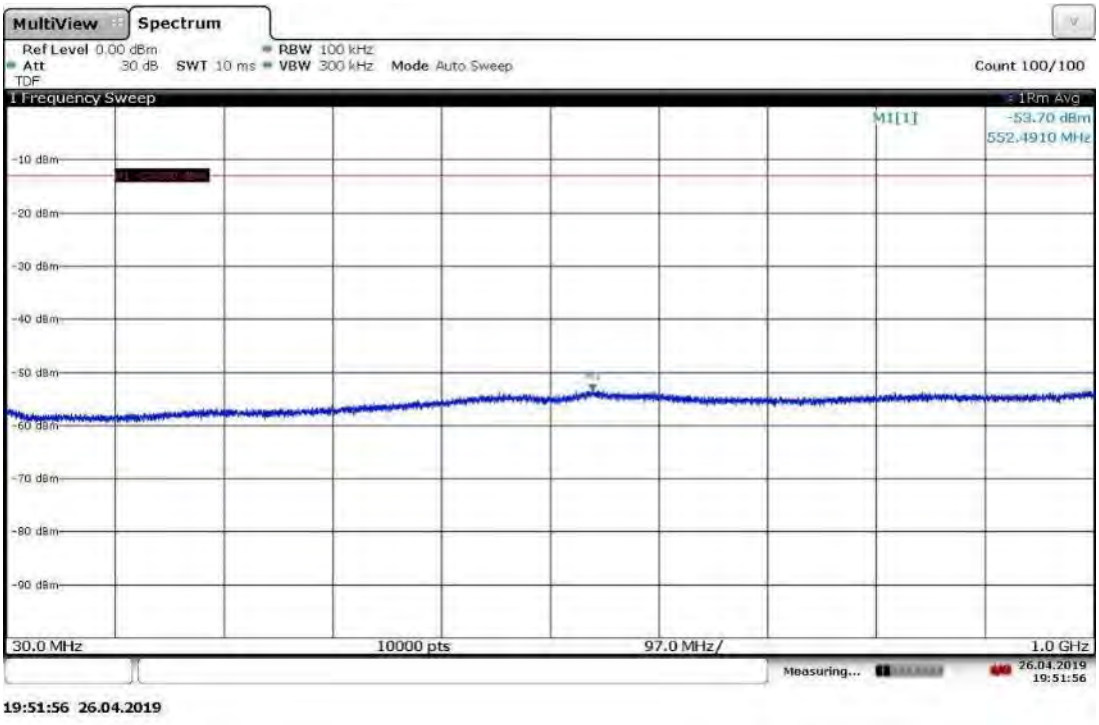
Slot 1 (Band 10), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



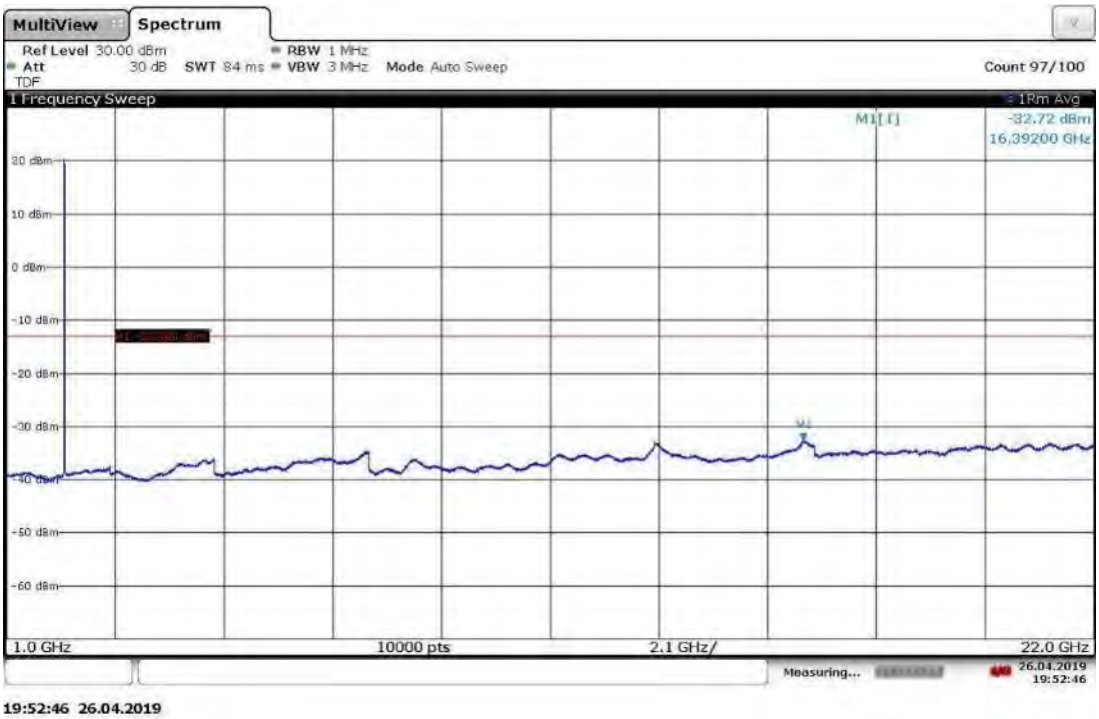
Slot 1 (Band 10), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, High Channel 1-22GHz



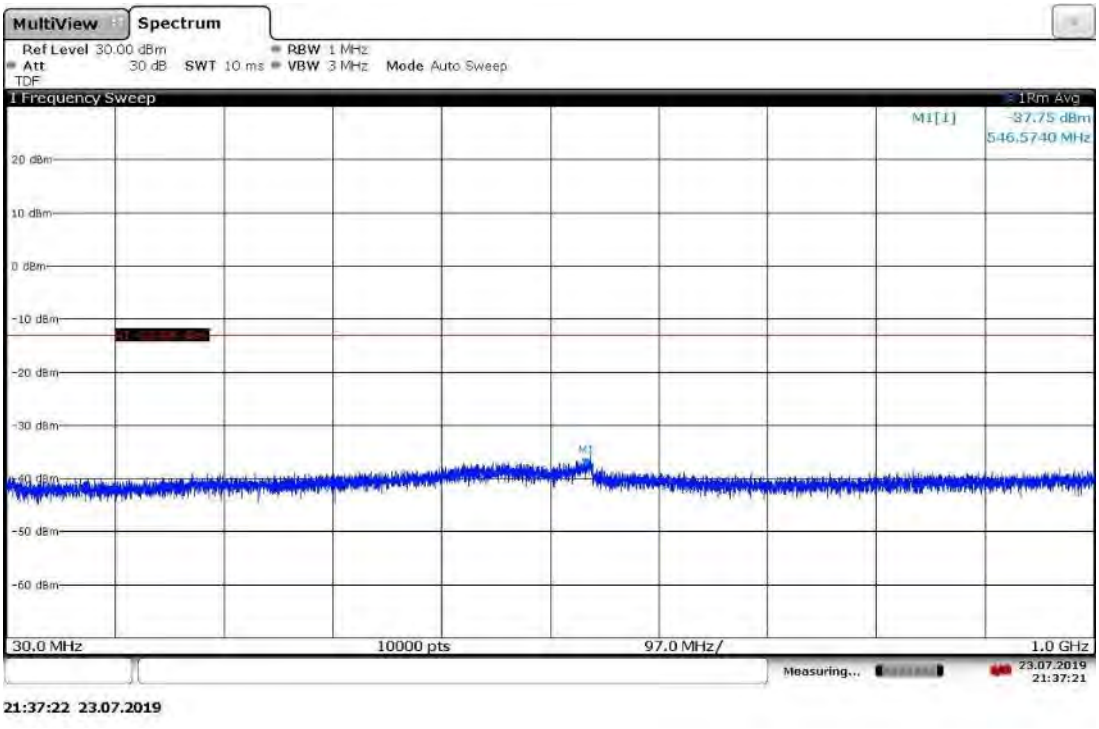
Slot 1 (Band 10), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



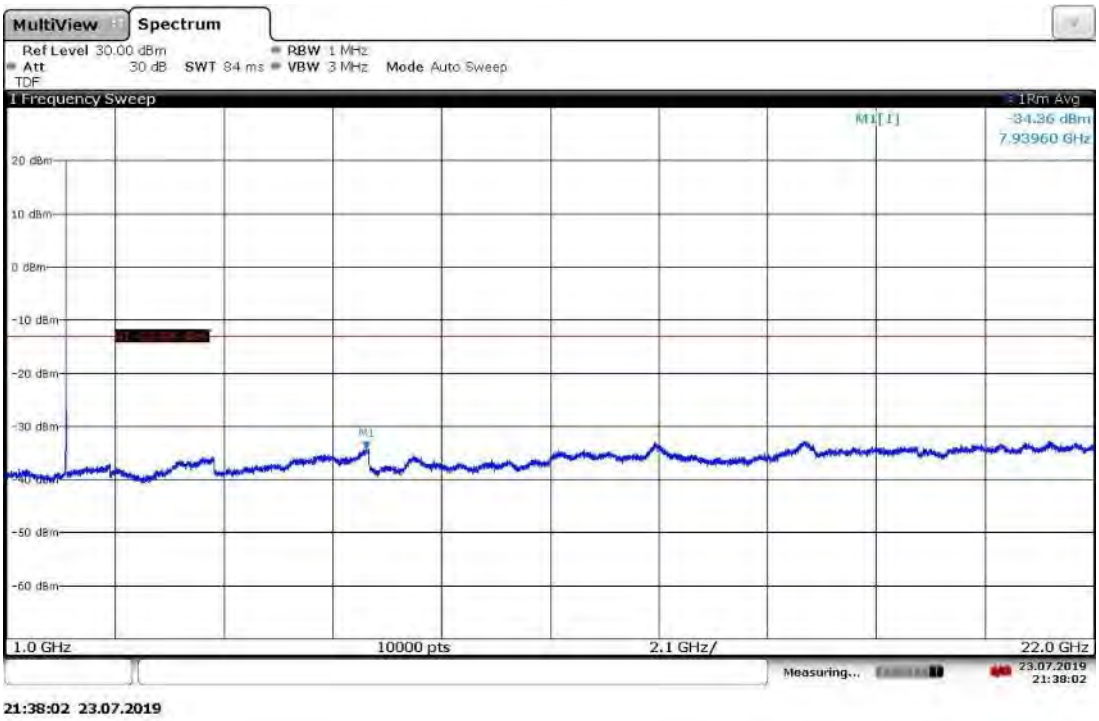
Slot 1 (Band 10), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



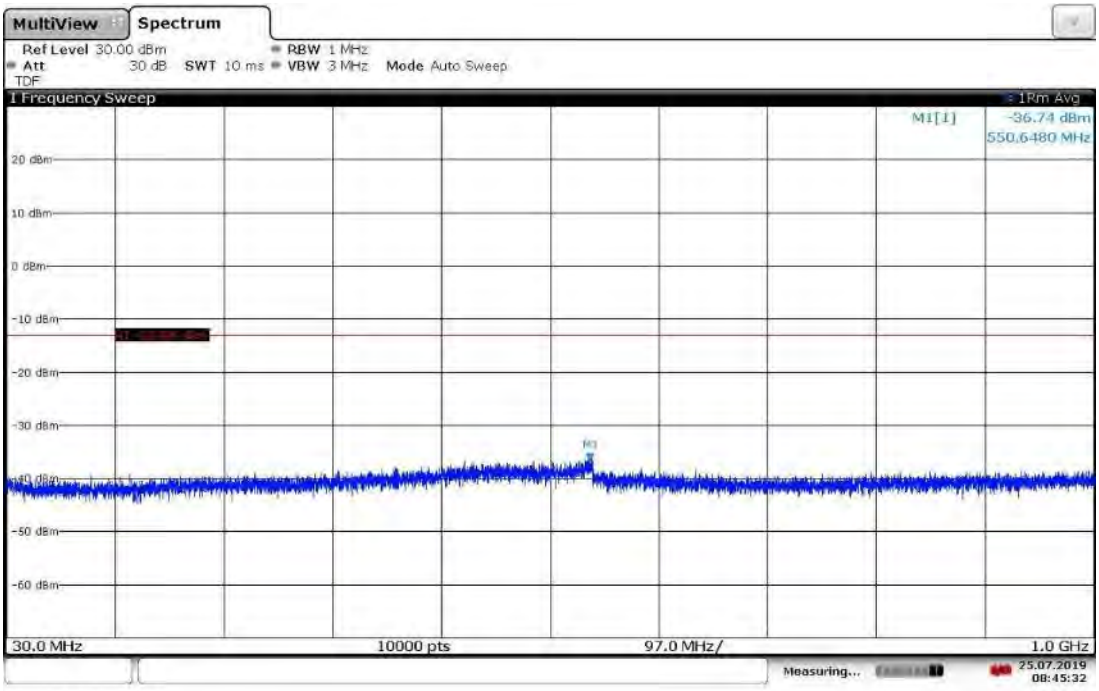
Slot 1 (Band 10), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



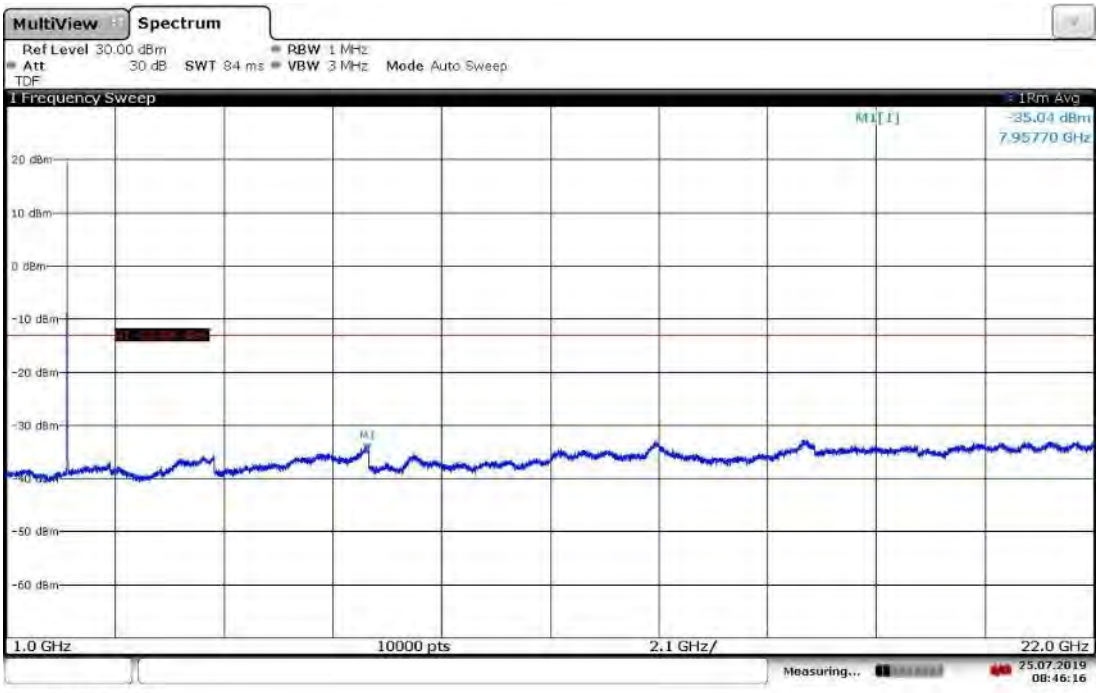
Slot 1 (Band 10), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



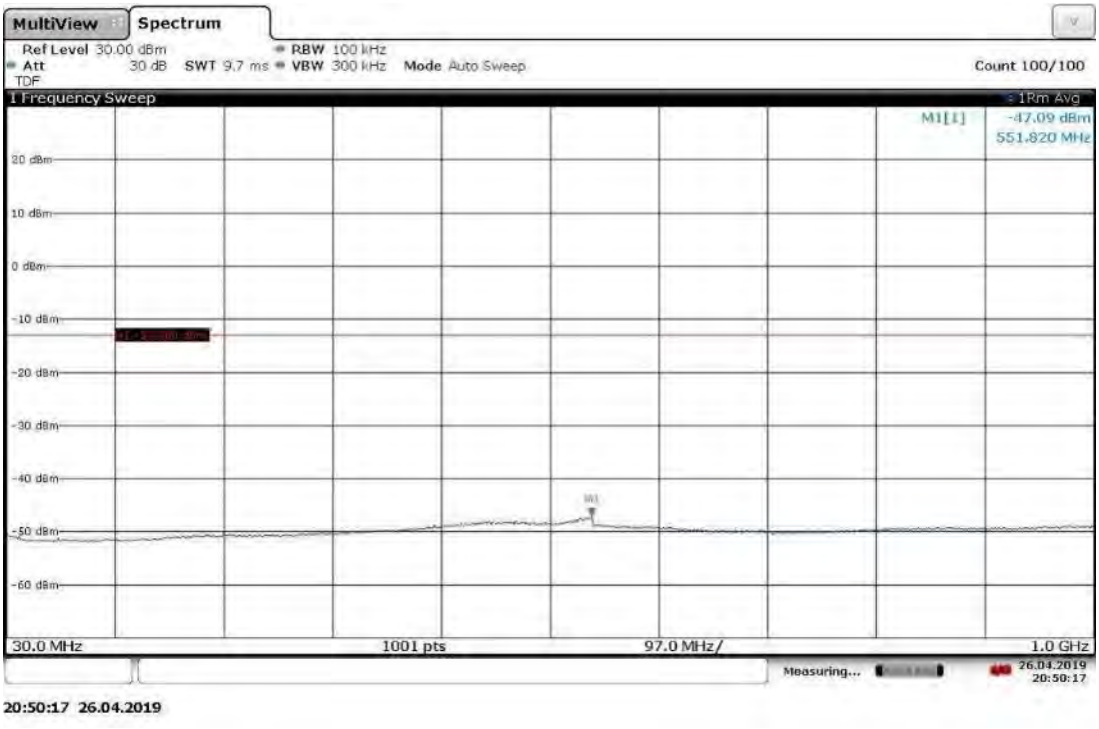
Slot 1 (Band 10), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



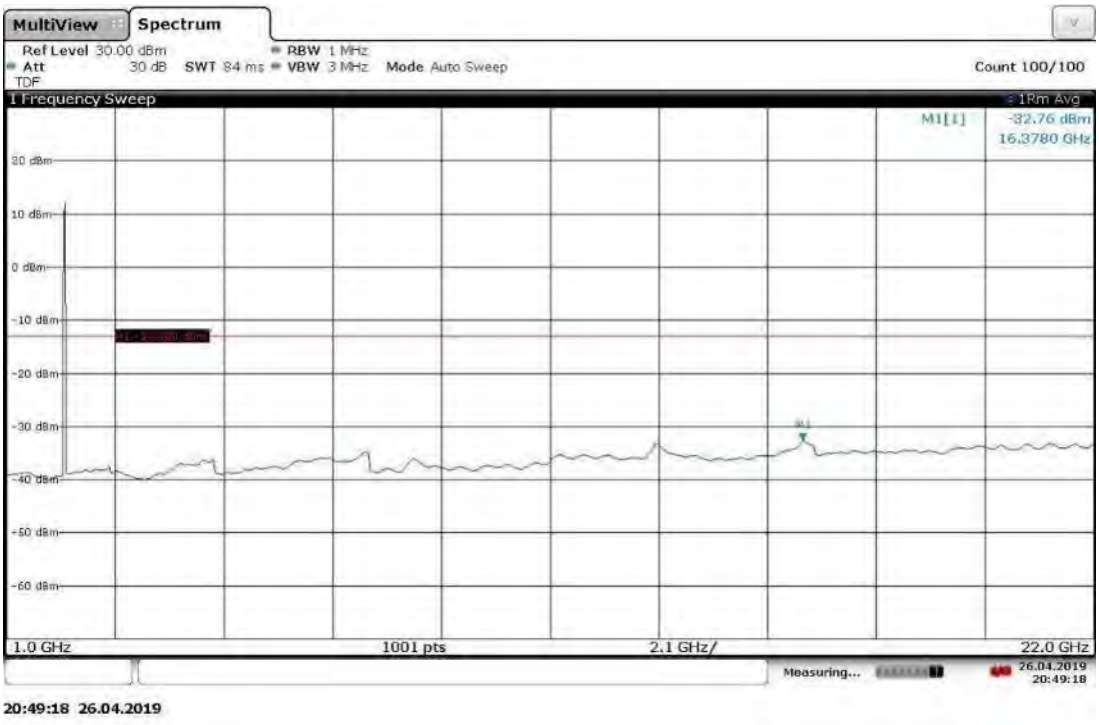
Slot 1 (Band 10), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



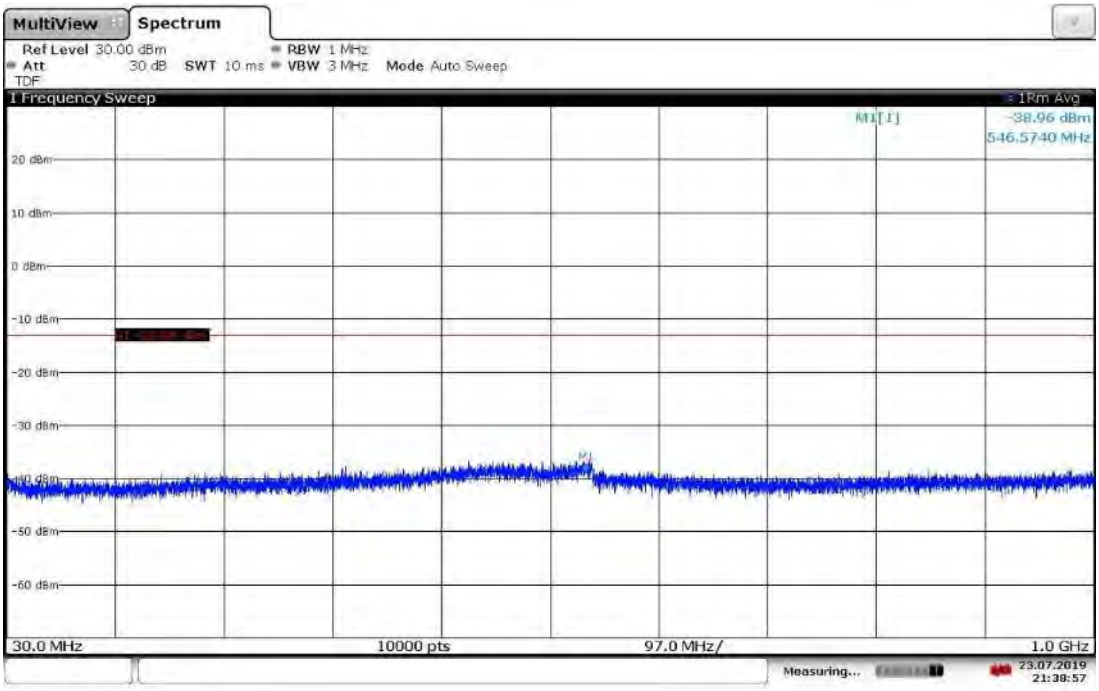
Slot 1 (Band 10), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



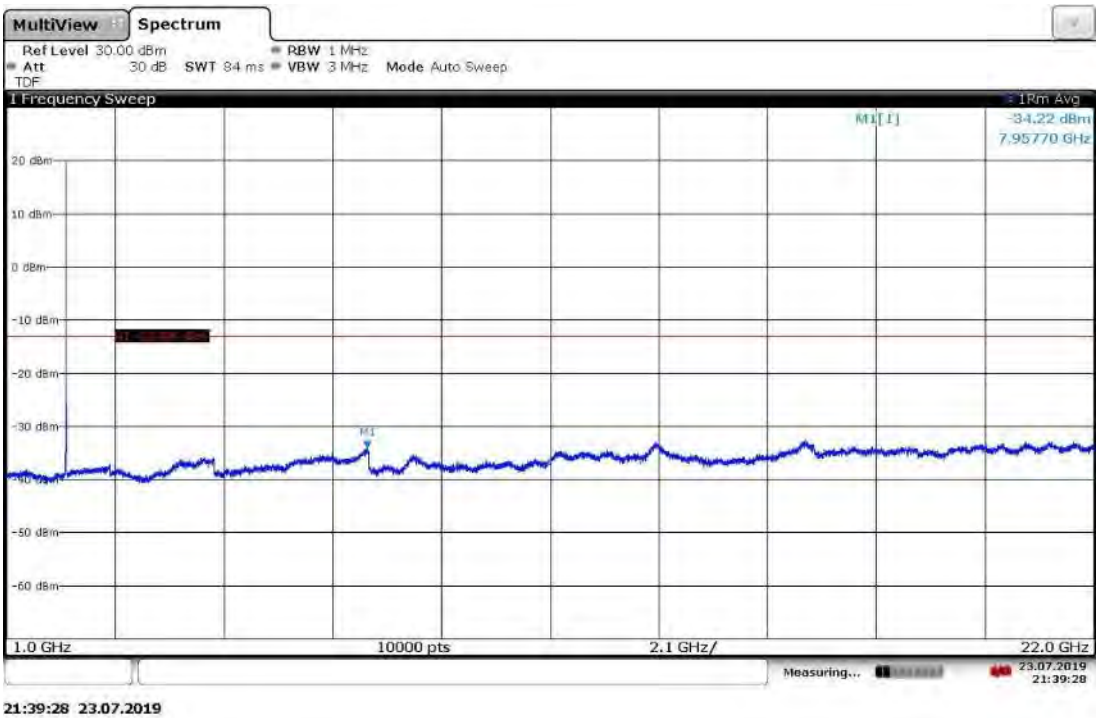
Slot 1 (Band 10), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



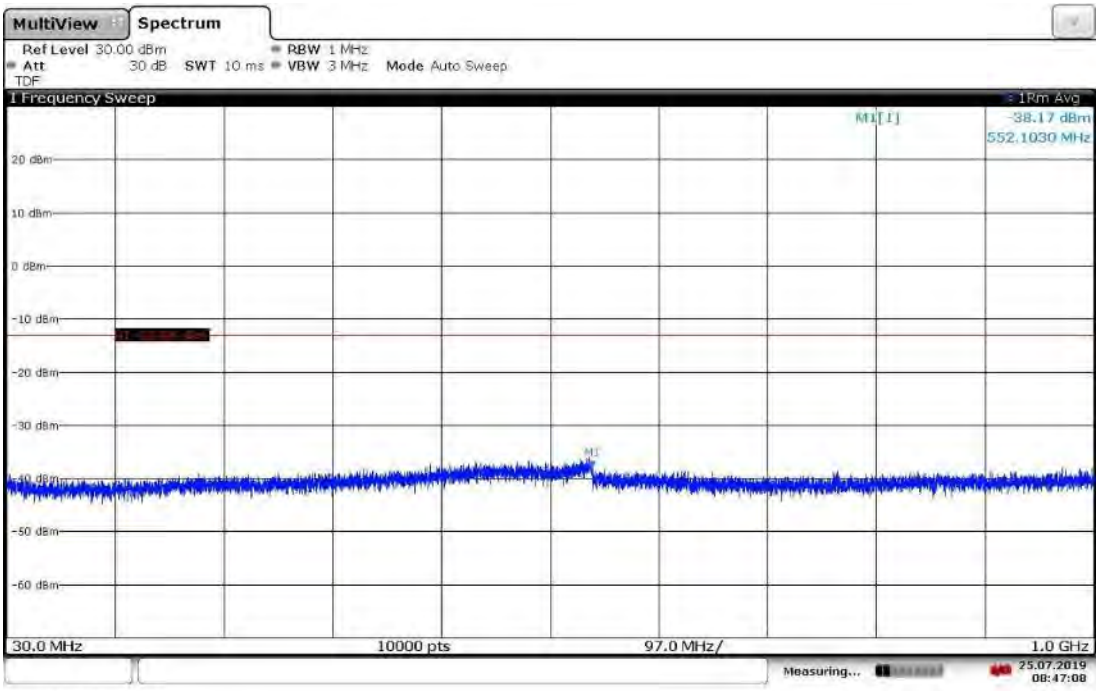
Slot 1 (Band 10), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



Slot 1 (Band 10), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz

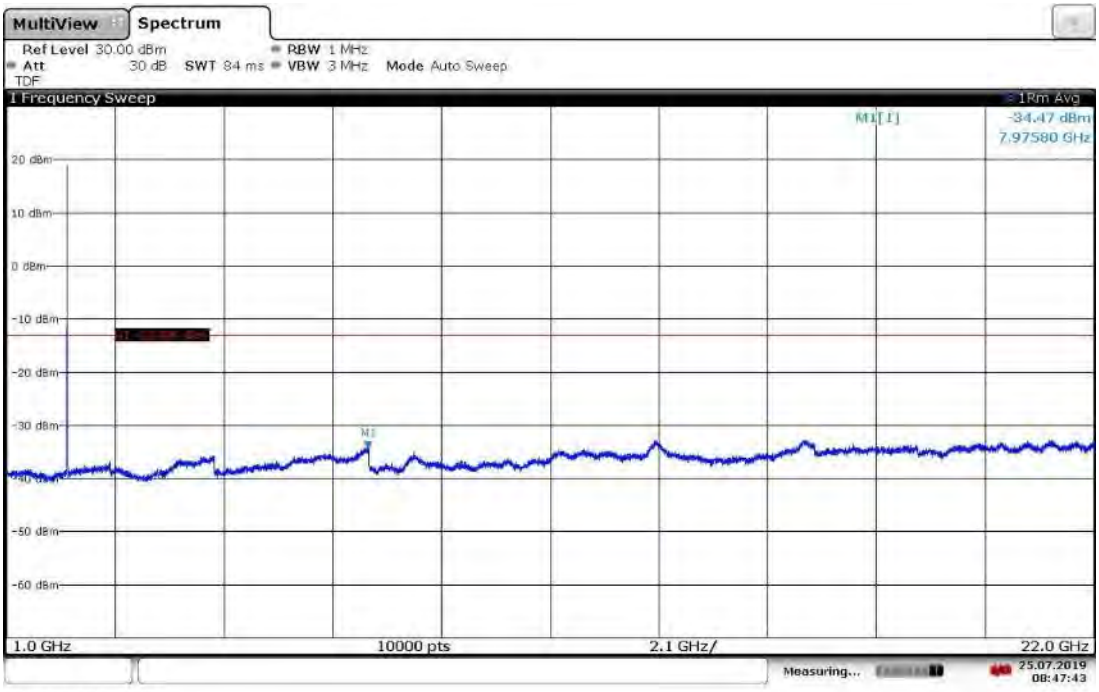


Slot 1 (Band 10), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



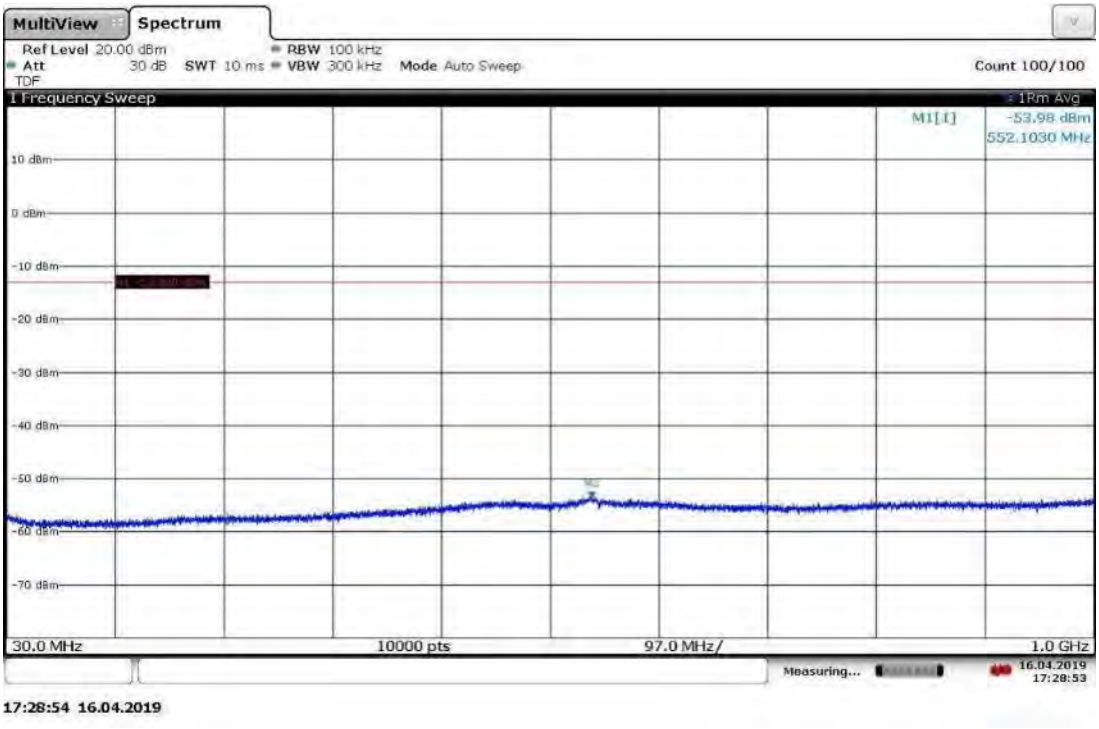
08:47:09 25.07.2019

Slot 1 (Band 10), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, High Channel 1-22GHz

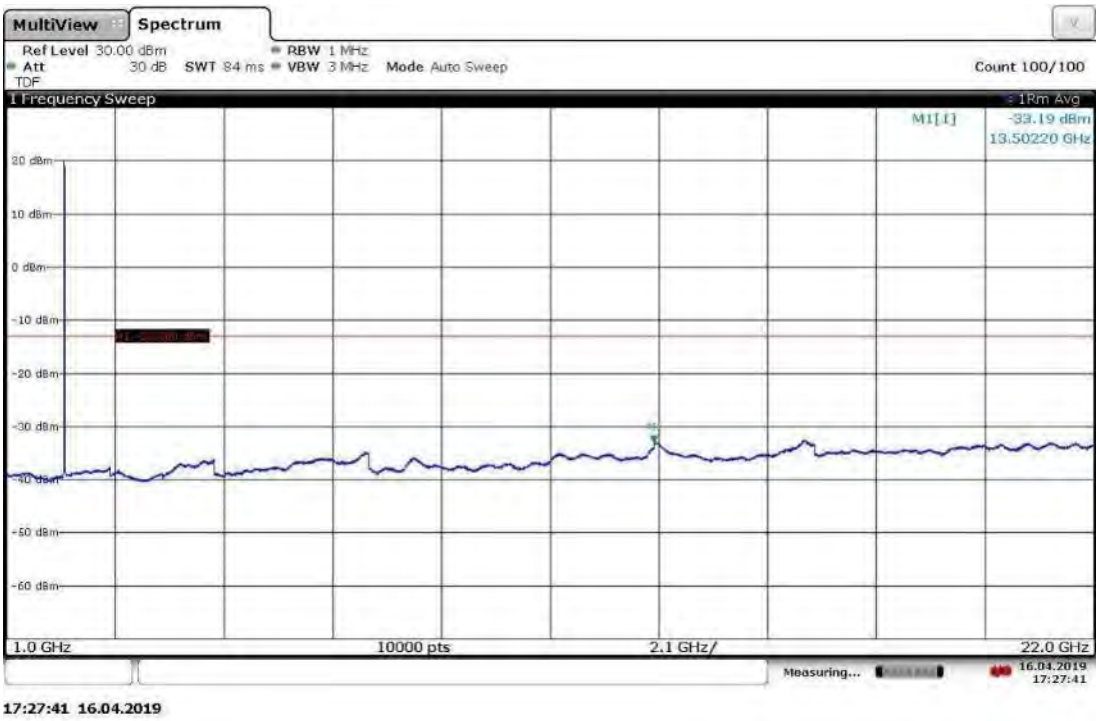


08:47:43 25.07.2019

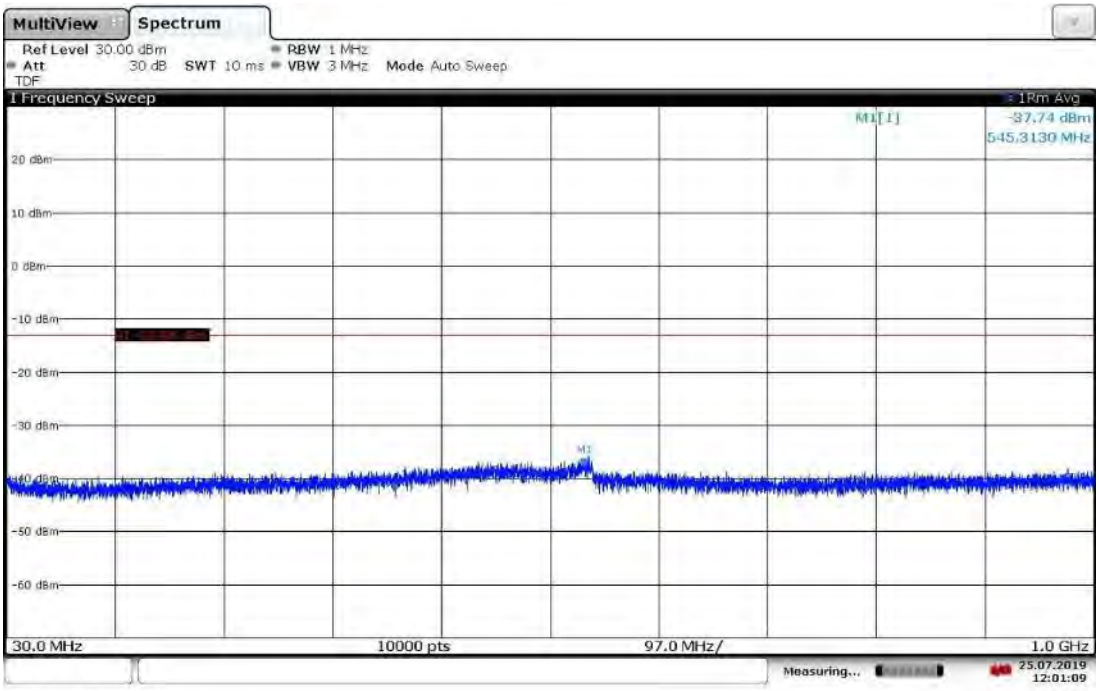
Slot 1 (Band 10), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



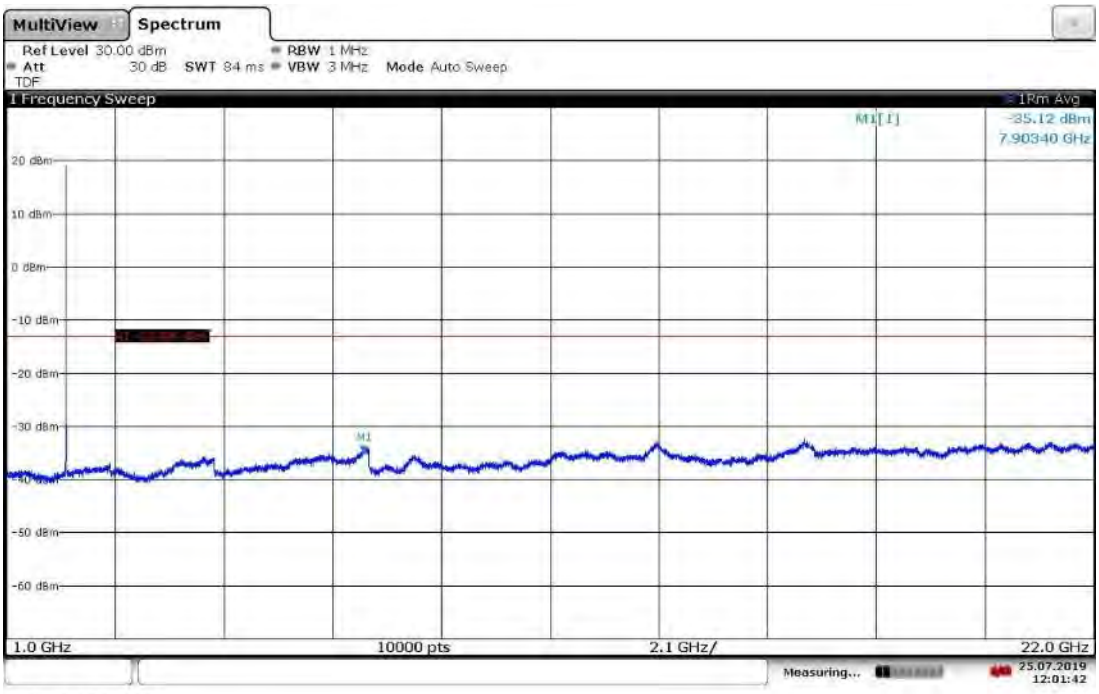
Slot 1 (Band 10), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



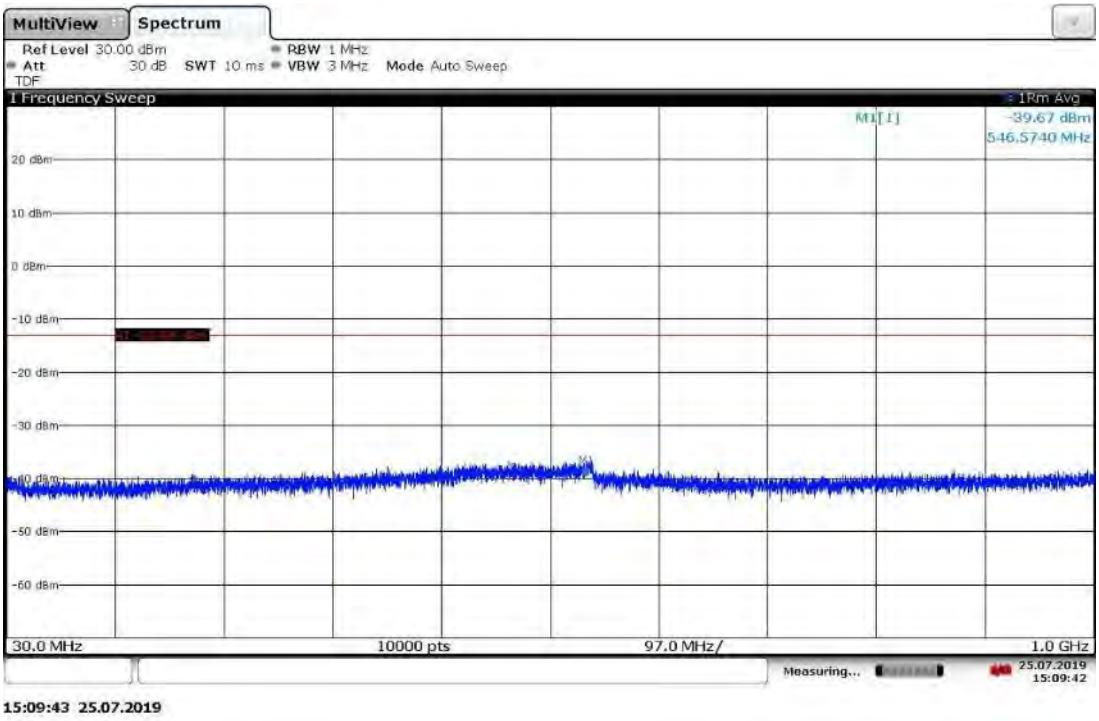
Slot 1 (Band 10), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



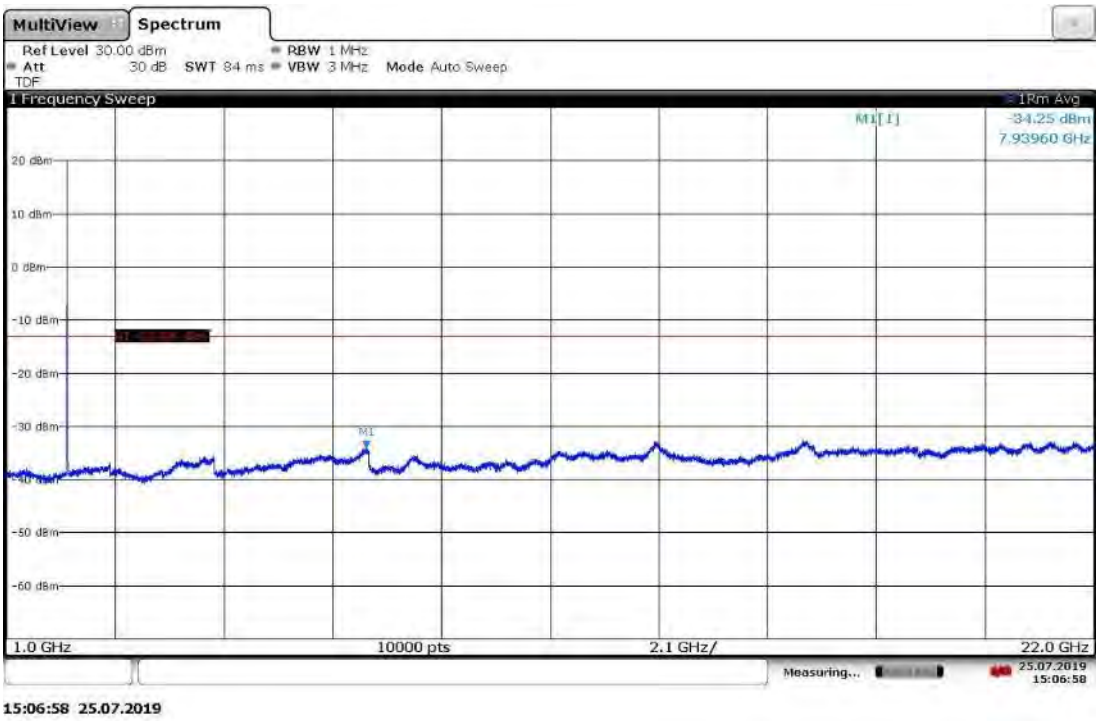
Slot 1 (Band 10), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



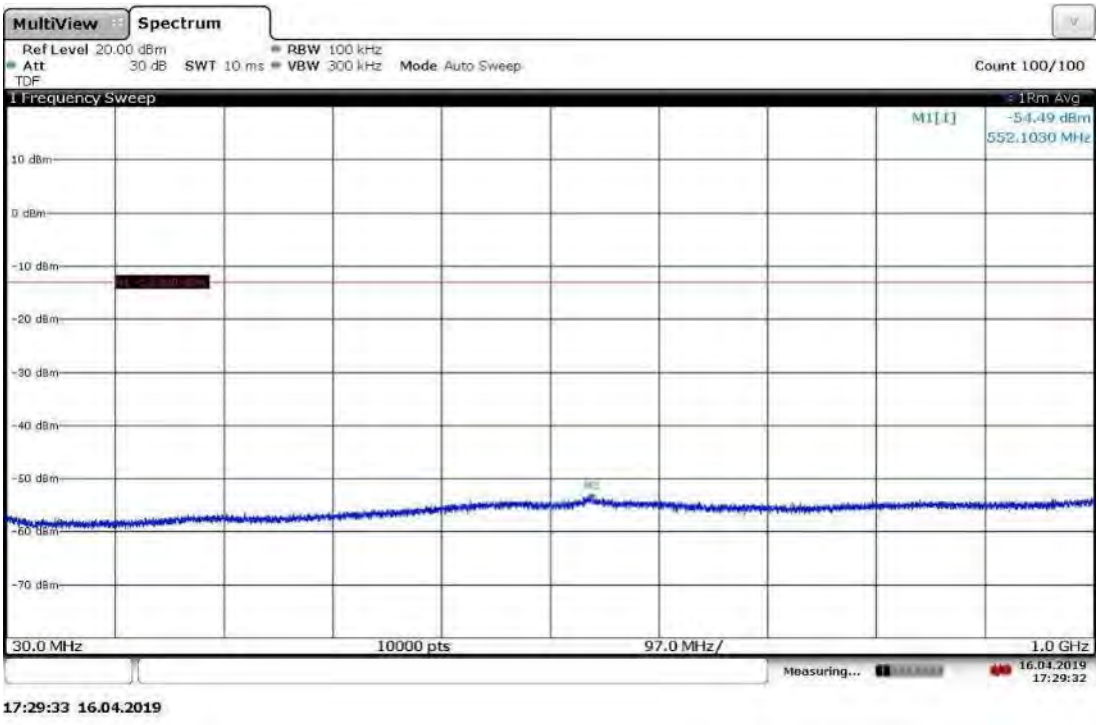
Slot 1 (Band 10), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



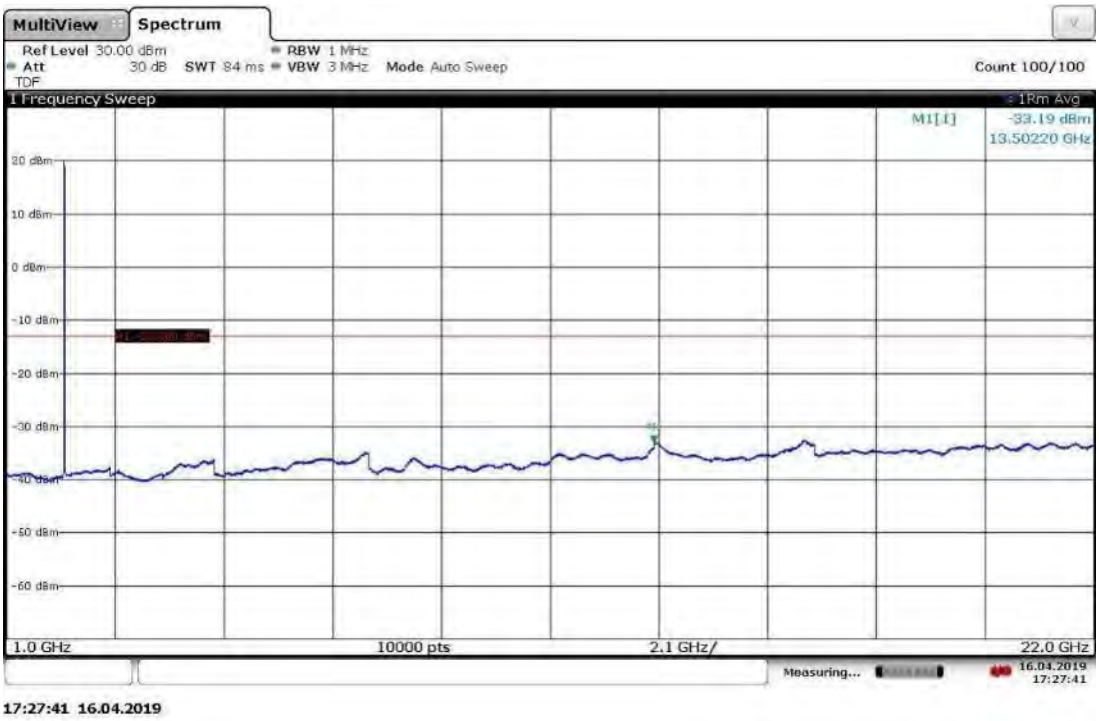
Slot 1 (Band 10), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



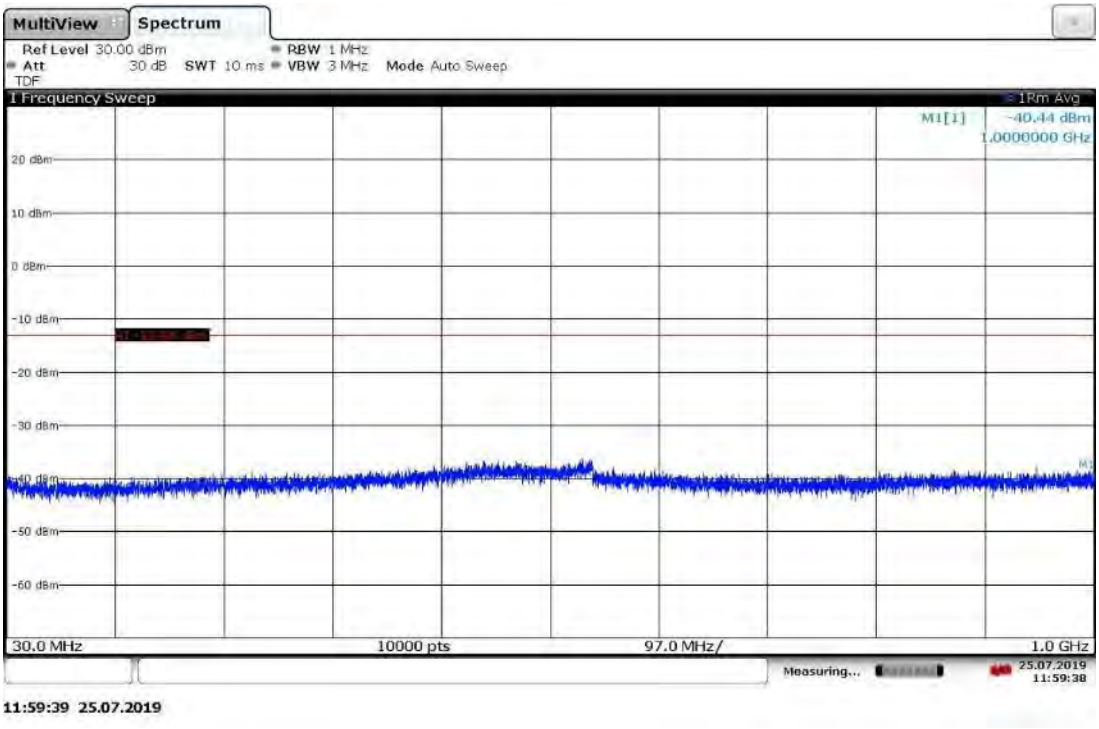
Slot 1 (Band 10), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



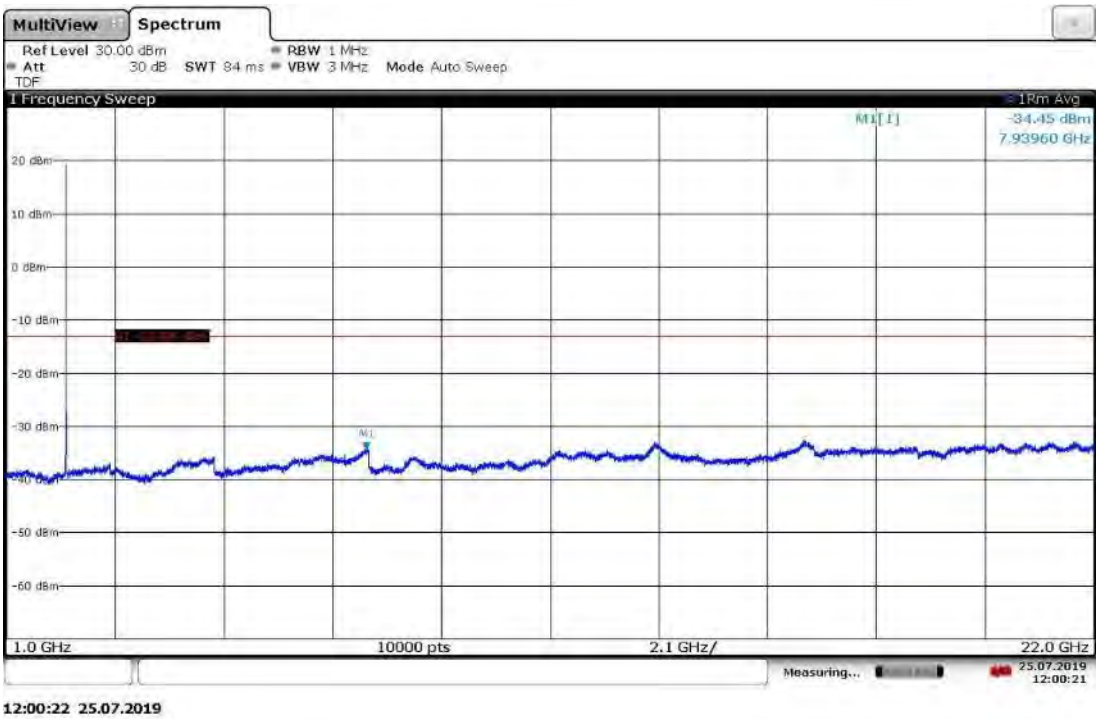
Slot 1 (Band 10), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



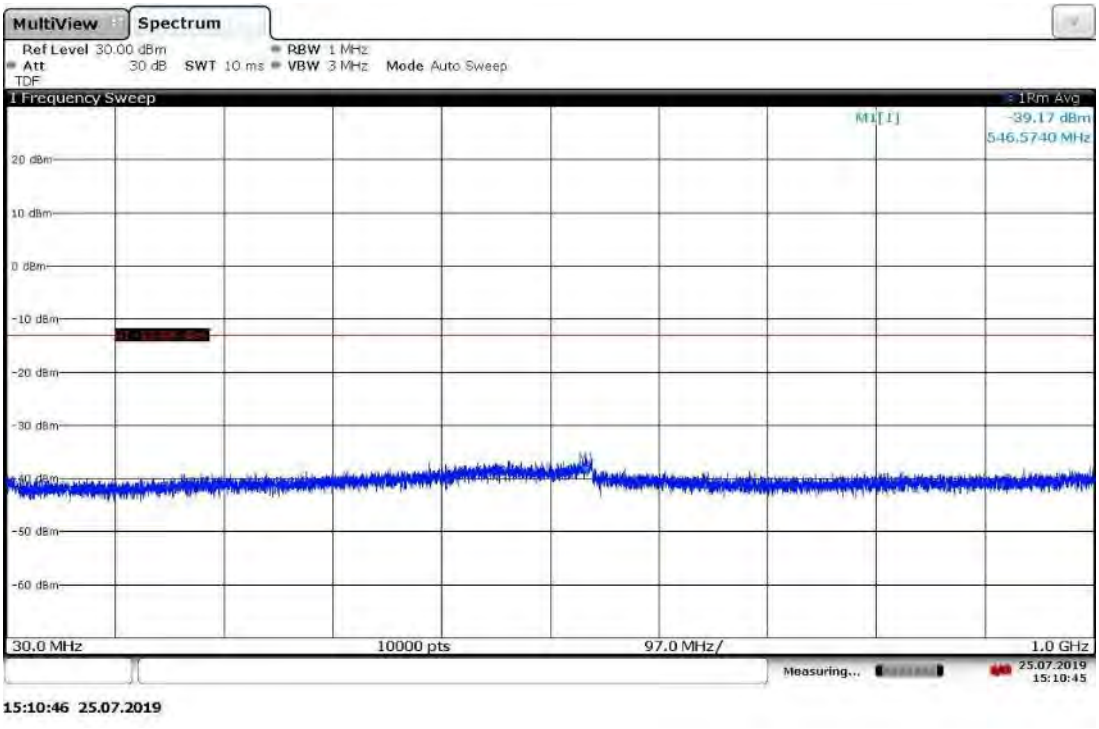
Slot 1 (Band 10), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



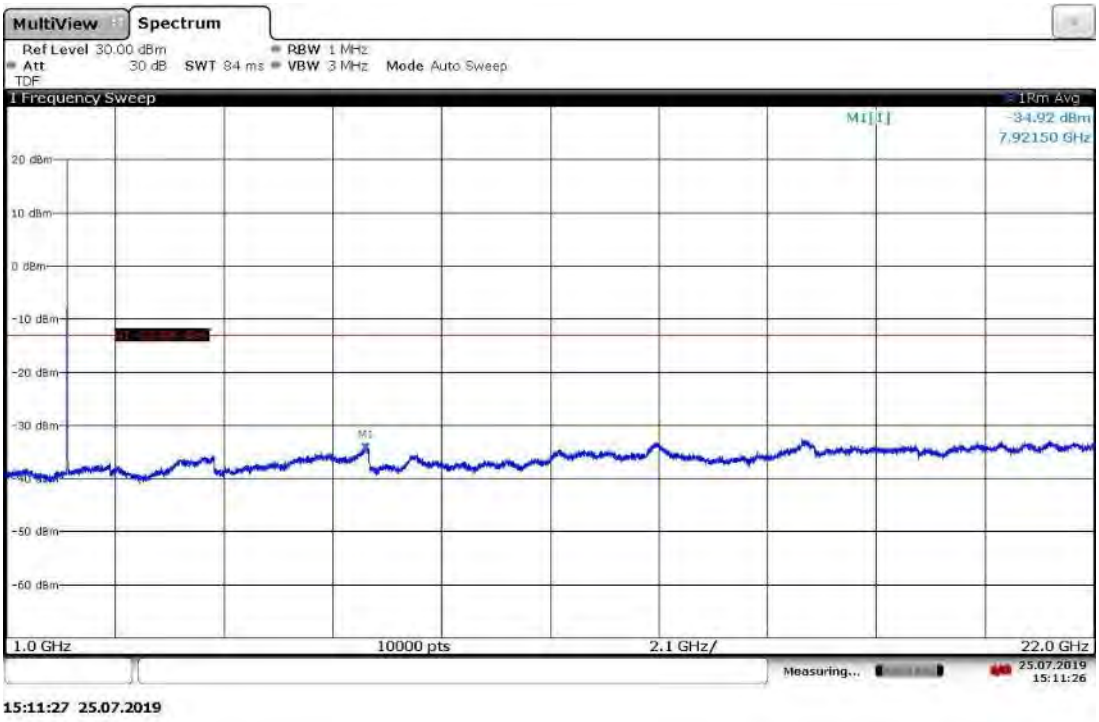
Slot 1 (Band 10), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



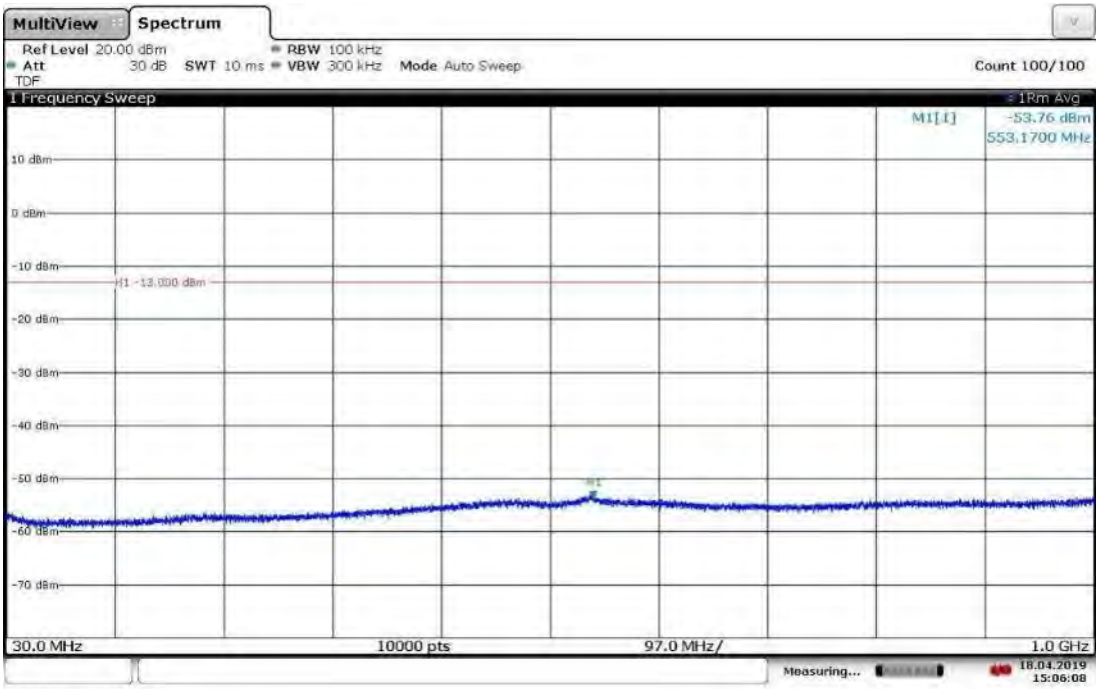
Slot 1 (Band 10), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



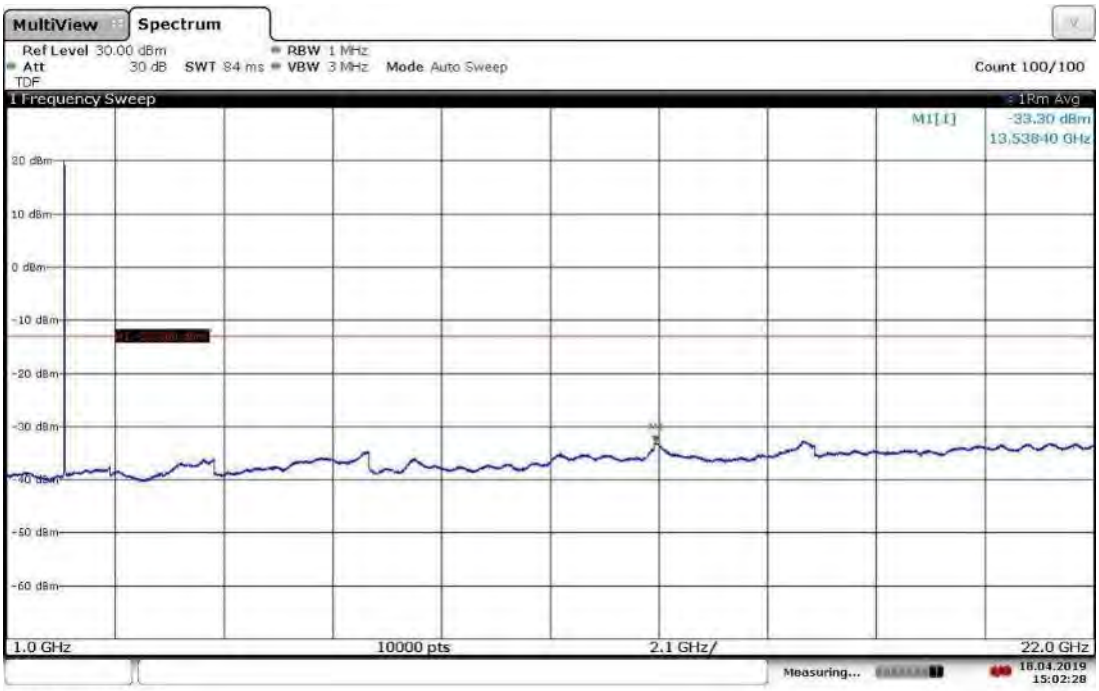
Slot 1 (Band 10), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



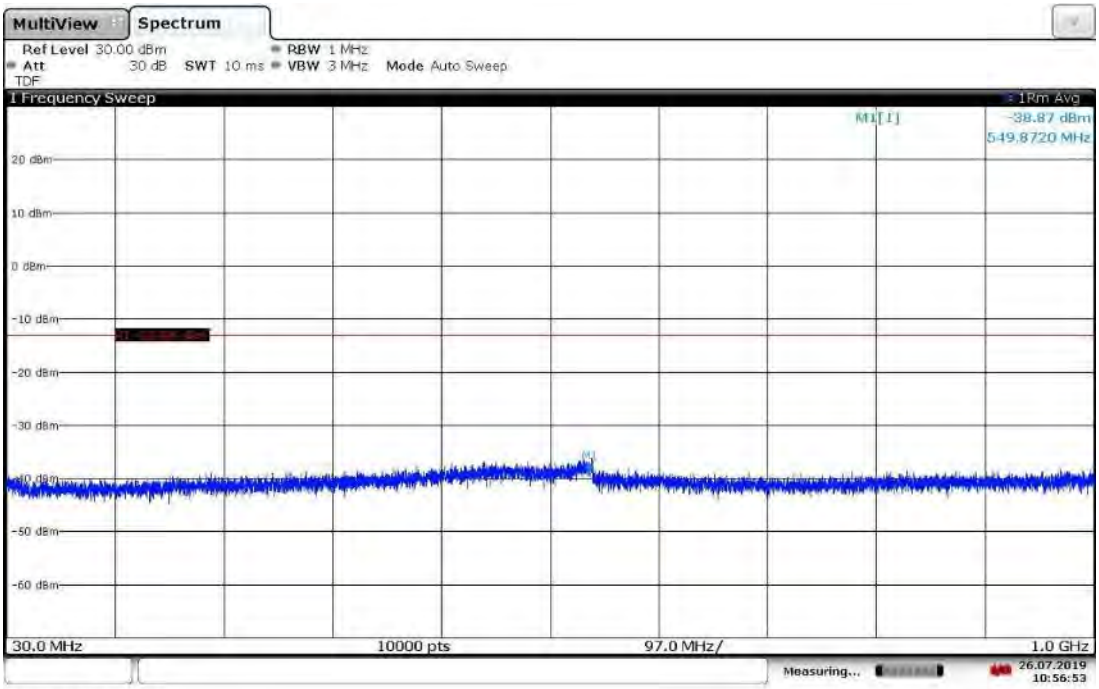
Slot 1 (Band 10), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



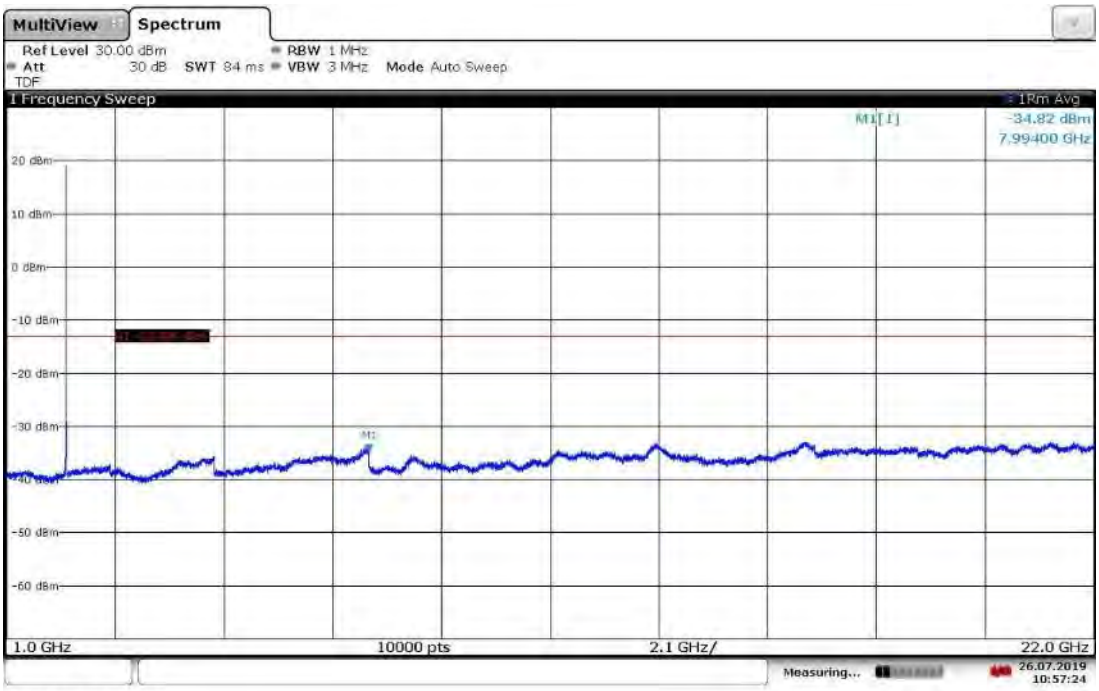
Slot 1 (Band 10), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



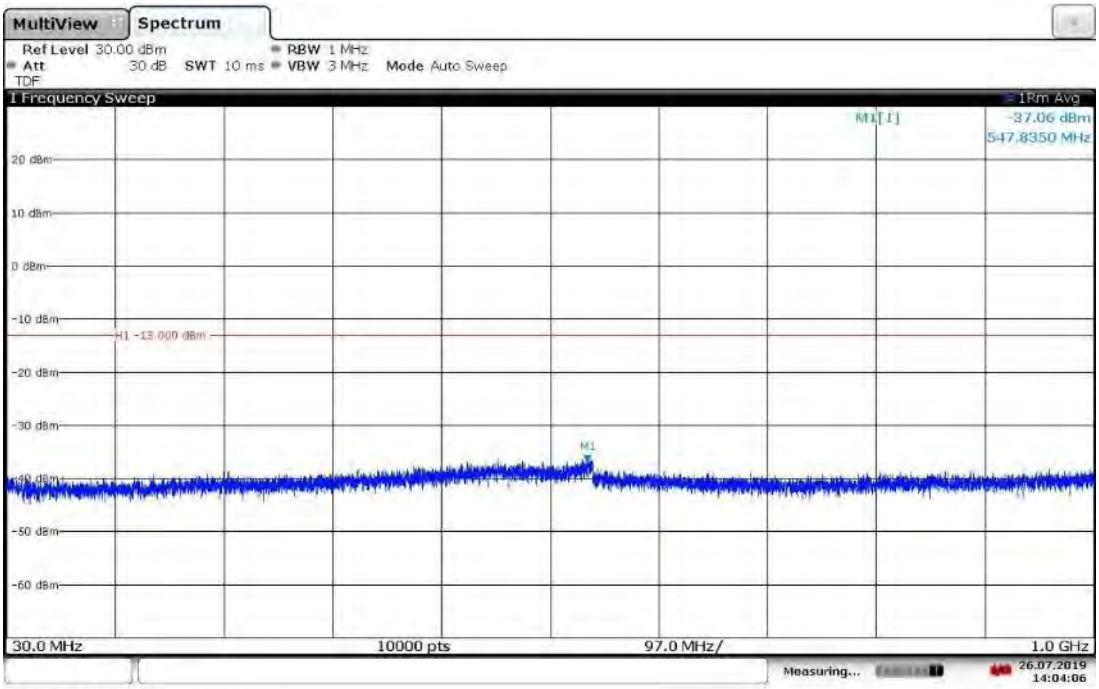
Slot 1 (Band 10), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



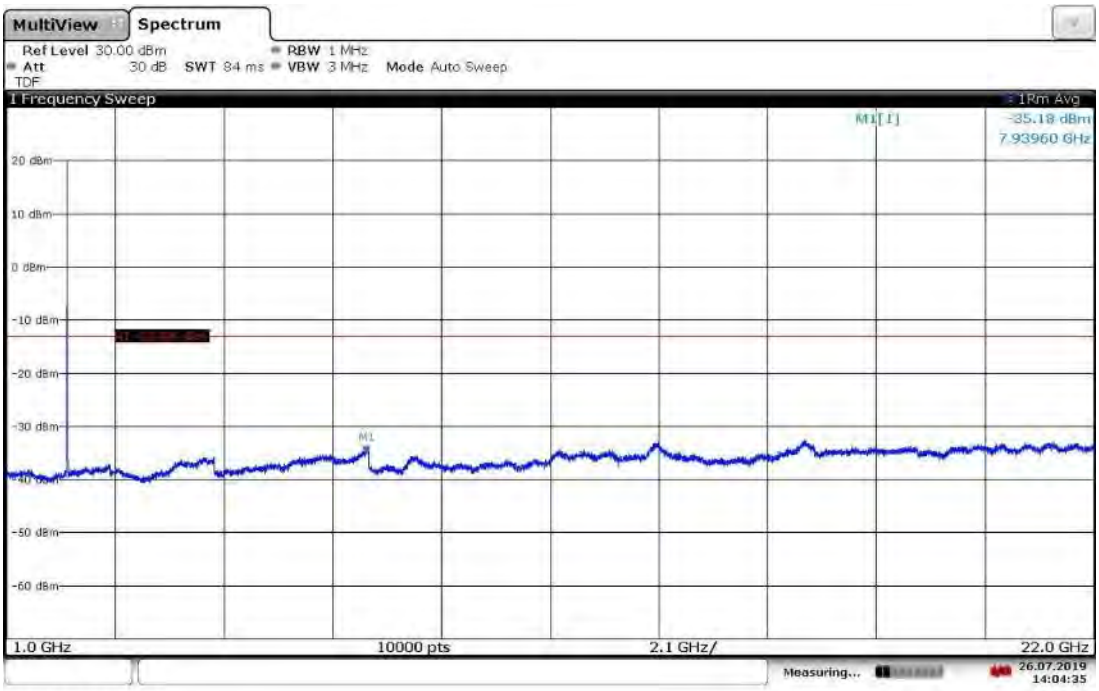
Slot 1 (Band 10), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



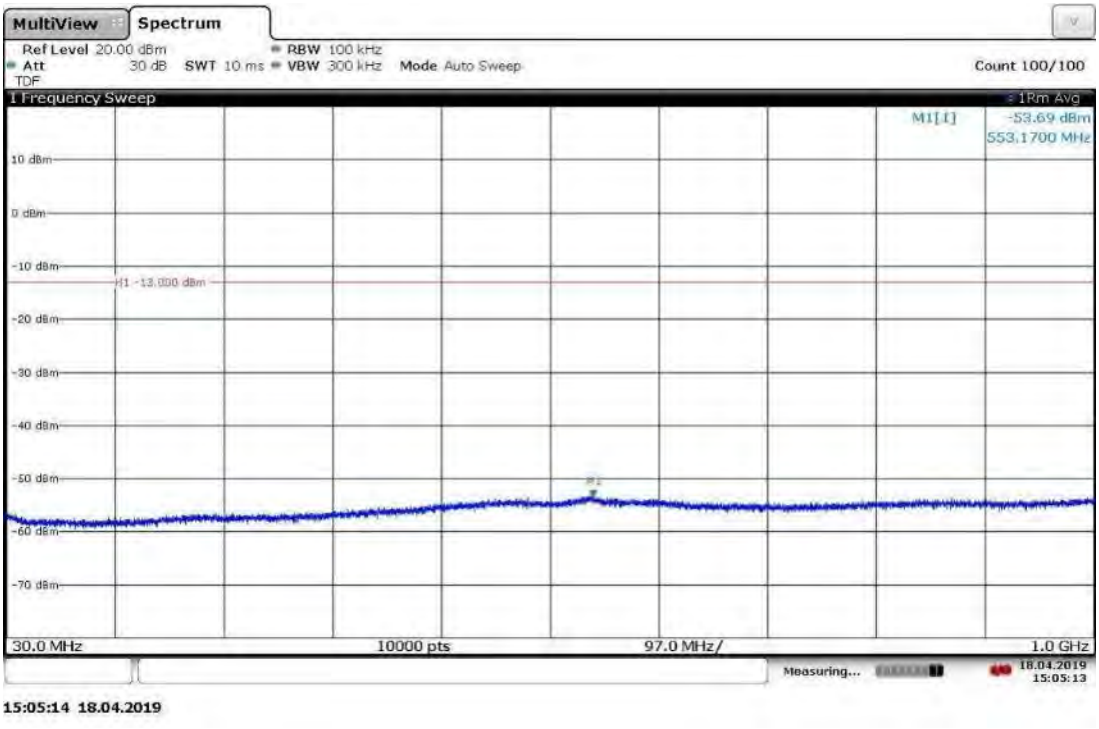
Slot 1 (Band 10), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



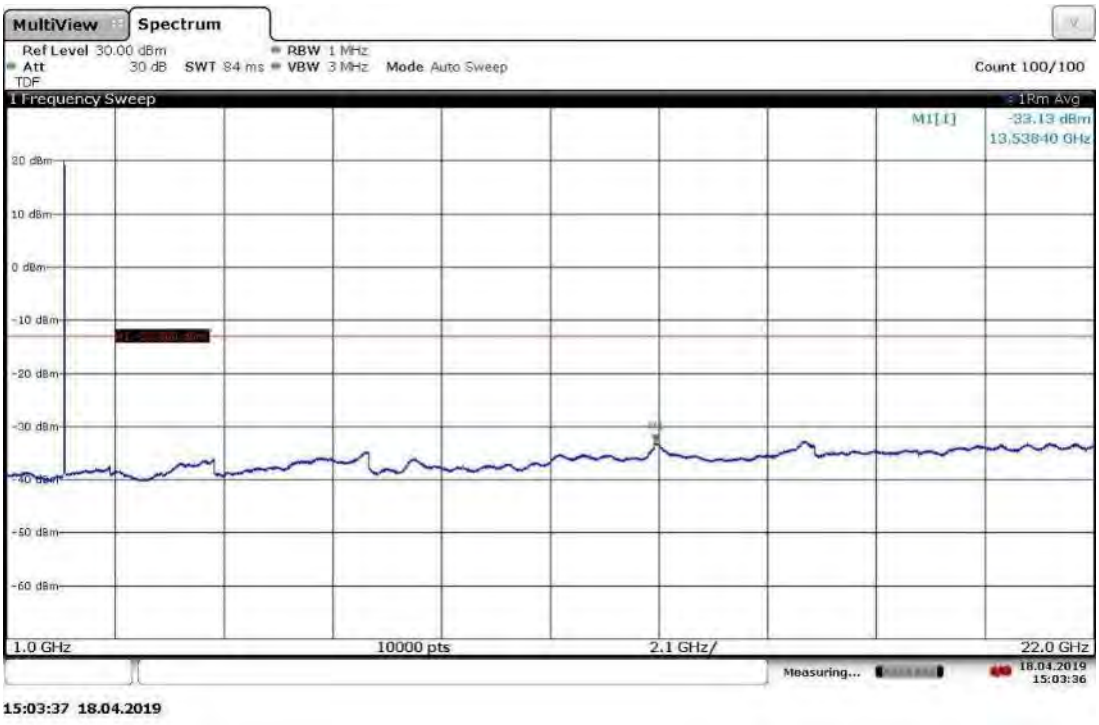
Slot 1 (Band 10), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



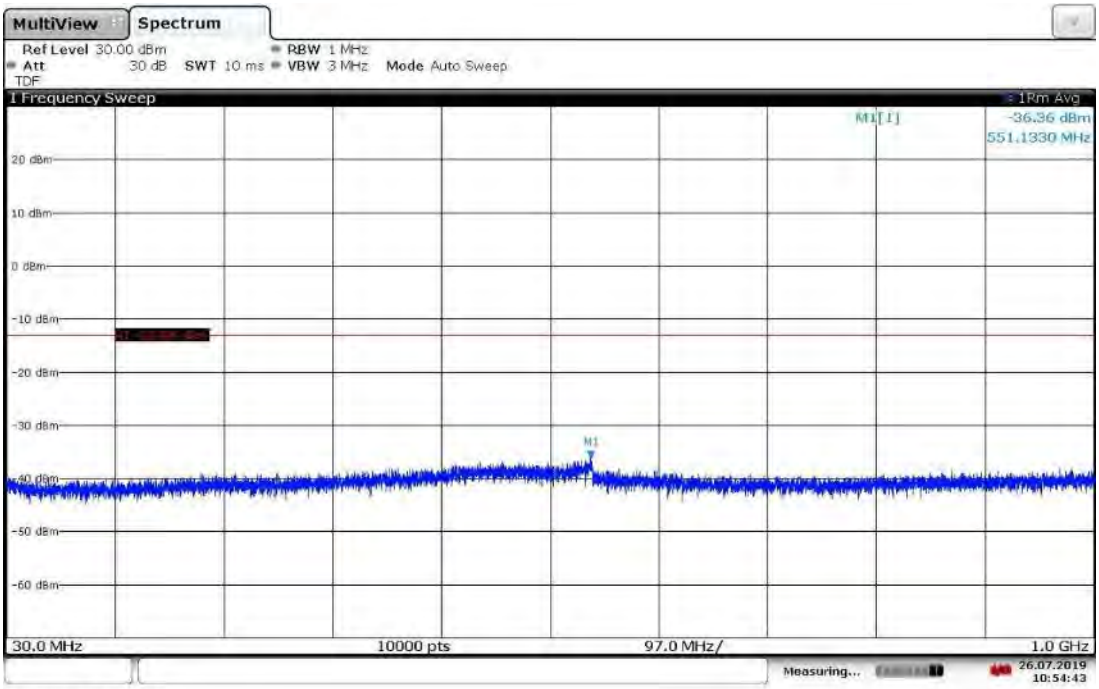
Slot 1 (Band 10), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



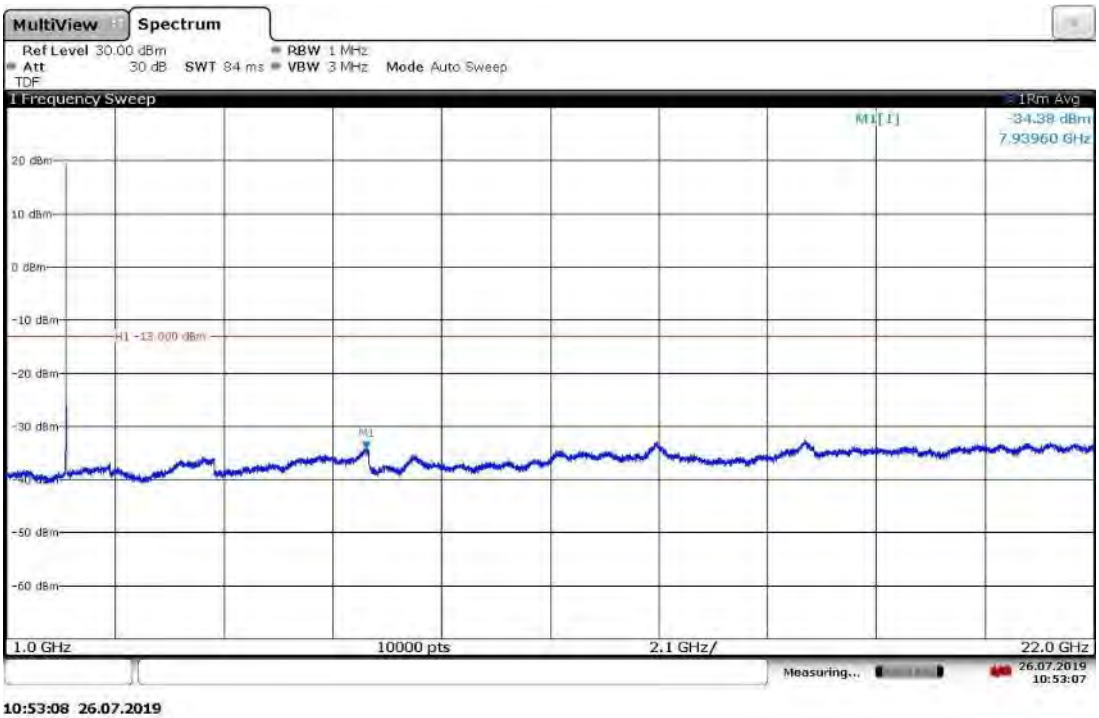
Slot 1 (Band 10), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



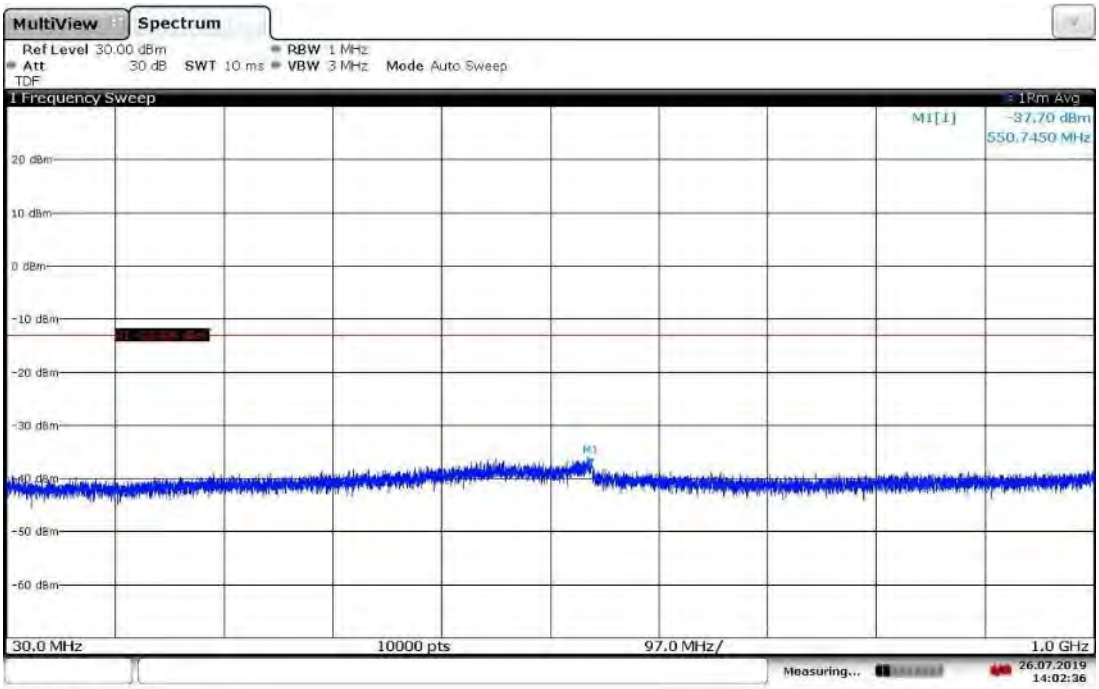
Slot 1 (Band 10), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



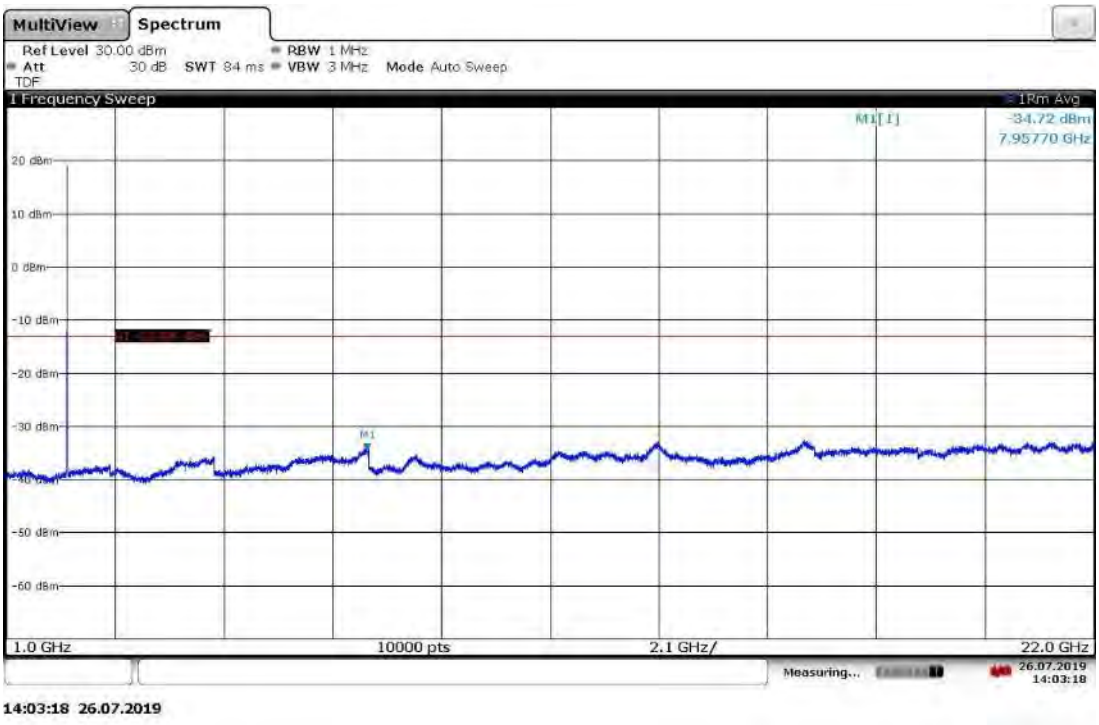
Slot 1 (Band 10), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



Slot 1 (Band 10), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



Slot 1 (Band 10), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, High Channel 1-22GHz

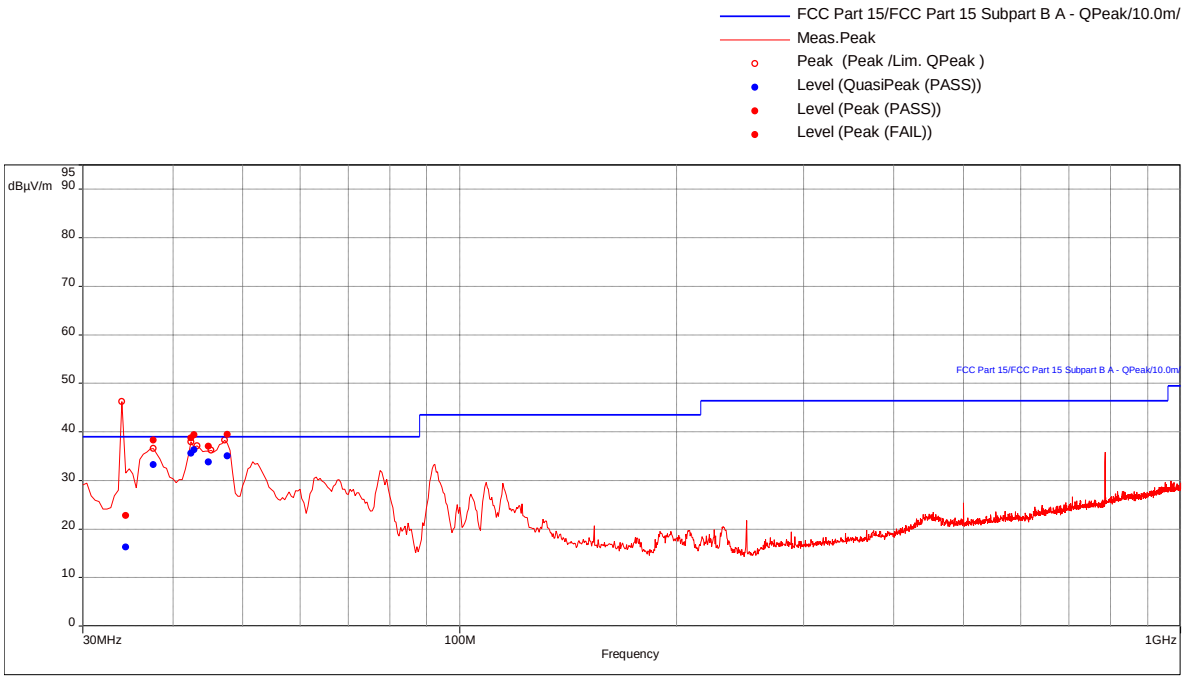


Radiated Emissions: 30-1000 MHz, Transmit @ Low Channel 2112.5 MHz Slot 1 (Band 10), Modulation: TM1.1-QPSK, Bandwidth 5 MHz

Test Information:

Date and Time	5/17/2019 7:39:39 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=-5.7_Slot 1 Ant 0_Ant1 (Used data from band 66 as low channel for this band is the same as Band 10)

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dB)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
34.37894737	22.75	-62.05	-13	-49.05	91.00	1.43	Horizontal	120000.00	-15.02
37.41052632	38.26	-46.54	-13	-33.54	350.00	1.74	Vertical	120000.00	-17.09
42.58947368	38.74	-46.06	-13	-33.06	351.00	3.06	Vertical	120000.00	-20.69
44.82105263	37.05	-47.75	-13	-35.75	351.00	1.00	Vertical	120000.00	-22.33
42.91578947	39.37	-45.43	-13	-32.43	351.00	1.00	Vertical	120000.00	-20.92
47.67368421	39.49	-45.31	-13	-32.31	335.00	1.74	Vertical	120000.00	-24.11

Level (dBm) calculated as follow:

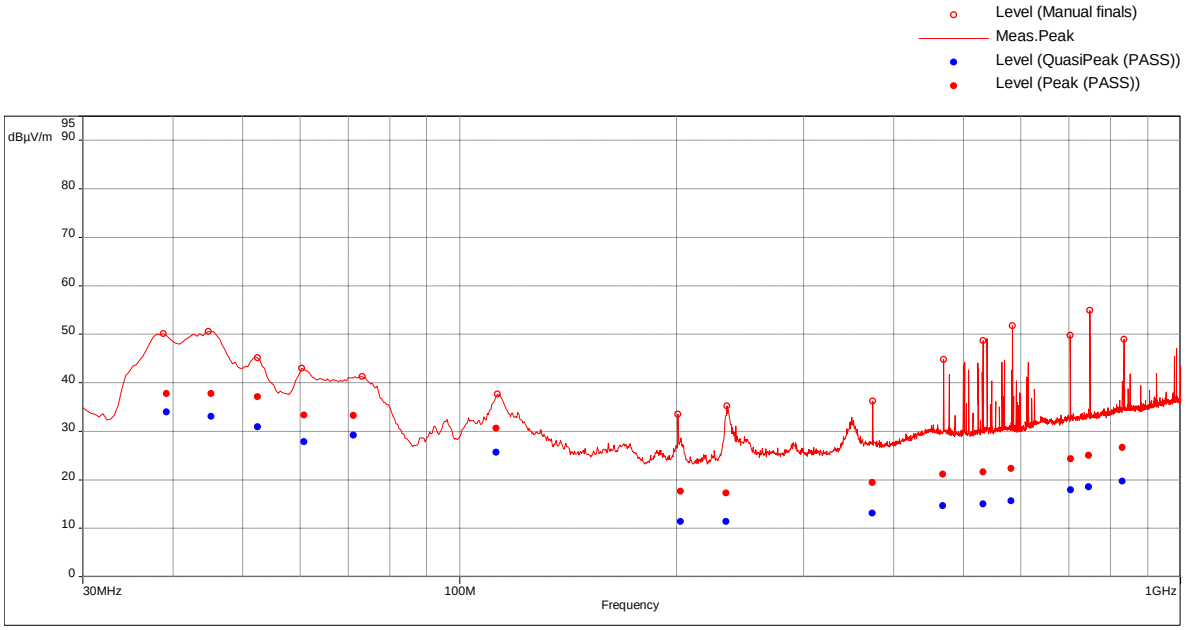
EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8 ; where D is the measurement distance (in the far field region) in m.

Radiated Emissions: 30-1000 MHz, Transmit @ Mid Channel 2140 MHz
Slot 1 (Band 10), Modulation: TM1.1-QPSK, Bandwidth 5 MHz

Test Information:

Date and Time	8/8/2019 12:18:05 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	59%
Atmospheric Pressure	996mbar
Comments	Band 10_QPSK_5MHz_Mid 2140 MHz_30-1000MHz SA mode

Graph:



Results:

Peak (PASS) (15)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
39.06315789	37.75	-47.05	-13	-34.05	111.00	1.00	Vertical	1000000.00	-18.74
45.06315789	37.79	-47.01	-13	-34.01	256.00	3.82	Vertical	1000000.00	-22.83
52.4	37.10	-47.7	-13	-34.7	218.00	2.57	Vertical	1000000.00	-25.44
60.66315789	33.31	-51.49	-13	-38.49	274.00	3.70	Vertical	1000000.00	-25.42
71.35789474	33.28	-51.52	-13	-38.52	321.00	1.65	Vertical	1000000.00	-24.72
112.5368421	30.61	-54.19	-13	-41.19	148.00	3.99	Vertical	1000000.00	-19.33
202.3789474	17.62	-67.18	-13	-54.18	97.00	1.22	Vertical	1000000.00	-19.84
234.0105263	17.24	-67.56	-13	-54.56	22.00	1.43	Horizontal	1000000.00	-20.49
373.4736842	19.47	-65.33	-13	-52.33	307.00	1.95	Horizontal	1000000.00	-16.24
467.6210526	21.13	-63.67	-13	-50.67	237.00	3.16	Horizontal	1000000.00	-13.46
532.2631579	21.59	-63.21	-13	-50.21	227.00	1.50	Horizontal	1000000.00	-12.59
582.4315789	22.27	-62.53	-13	-49.53	274.00	2.89	Horizontal	1000000.00	-11.79
703.7263158	24.28	-60.52	-13	-47.52	183.00	1.01	Horizontal	1000000.00	-9.25
745.7789474	24.99	-59.81	-13	-46.81	22.00	1.52	Horizontal	1000000.00	-8.55
830.5894737	26.64	-58.16	-13	-45.16	166.00	1.10	Horizontal	1000000.00	-6.89

Level (dBm) calculated as follow:

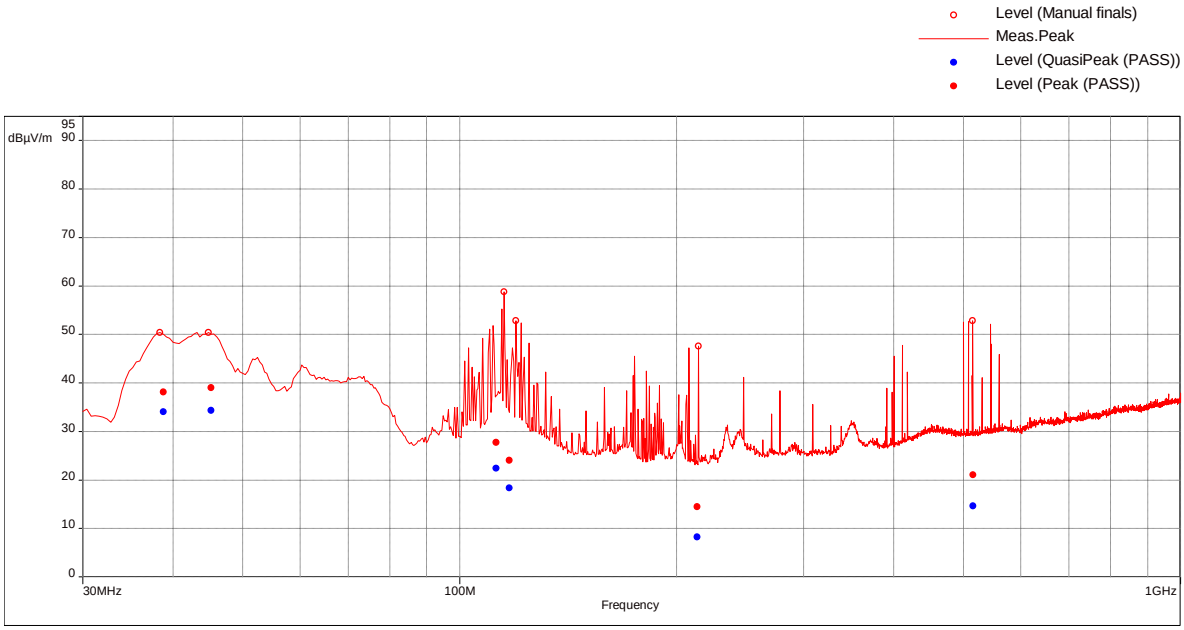
EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8, where D is the measurement distance (in the far field region) in meter.

Radiated Emissions: 30-1000 MHz, Transmit @ High Channel 2167.5 MHz
Slot 1 (Band 10), Modulation: TM1.1-QPSK, Bandwidth 5 MHz

Test Information:

Date and Time	8/8/2019 1:51:17 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	59%
Atmospheric Pressure	996mbar
Comments	Band 10_QPSK_5MHz_High 2167.5 MHz_30-1000MHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
38.66315789	38.07	-46.73	-13	-33.73	97.00	1.00	Vertical	1000000.00	-18.42
45.32631579	39.05	-45.75	-13	-32.75	0.00	1.00	Vertical	1000000.00	-22.98
112.5684211	27.74	-57.06	-13	-44.06	102.00	3.87	Horizontal	1000000.00	-19.33
117.2315789	24.02	-60.78	-13	-47.78	279.00	3.77	Horizontal	1000000.00	-18.74
213.6105263	14.43	-70.37	-13	-57.37	208.00	1.82	Horizontal	1000000.00	-21.42
515.0631579	21.04	-63.76	-13	-50.76	4.00	3.32	Horizontal	1000000.00	-13.03

Level (dBm) calculated as follow:

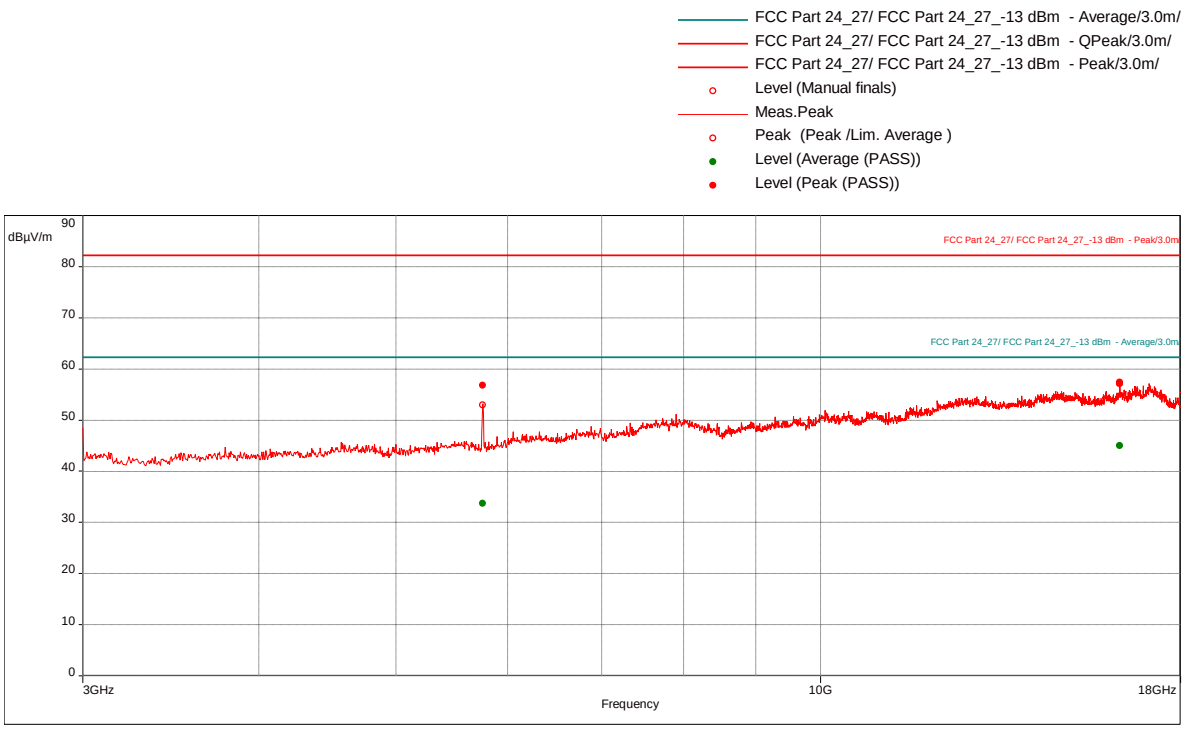
EIRP (dBm) = E (dBµV/m) + 20*LOG(D) – 104.8, where D is the measurement distance (in the far field region) in meter.

Radiated Emissions: 1-22 GHz, Transmit @ Low Channel 2112.5 MHz Slot 1 (Band 10), Modulation: TM1.1-QPSK, Bandwidth 5 MHz

Test Information:

Date and Time	5/24/2019 9:51:57 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 1_ANT0 & ANT1_P=-4.0 (Used Data From Band 66)

Graph:



Results:

Peak (PASS) (2)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
5762.105263	56.84	-38.41	-13	-25.41	91.00	1.55	Vertical	1000000.00	8.90
16298.94737	57.44	-37.82	-13	-24.82	172.00	1.90	Vertical	1000000.00	21.50

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.

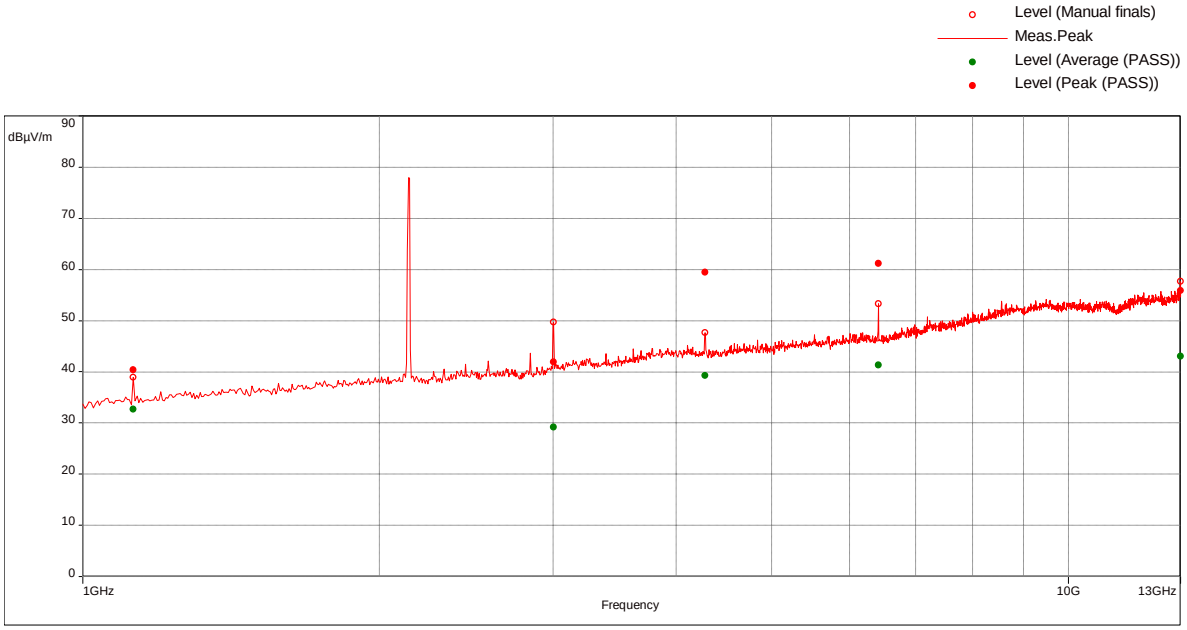
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions: 1-22 GHz, Transmit @ Mid Channel 2140 MHz
Slot 1 (Band 10), Modulation: TM1.1-QPSK, Bandwidth 5 MHz

Test Information:

Date and Time	8/9/2019 9:31:15 AM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	54%
Atmospheric Pressure	996mbar
Comments	Band 10_TM1.1-QPSK_5MHz_Mid 2140MHz_1 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (5)

Frequency (MHz)	Level (dBµVm)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
1125	40.35	-54.91	-13	-41.91	223.00	2.80	Vertical	1000000.00	-26.33
3004.473684	41.90	-53.36	-13	-40.36	97.00	2.95	Vertical	1000000.00	-17.70
4280	59.49	-35.77	-13	-22.77	101.00	1.85	Vertical	1000000.00	-13.27
6419.210526	61.19	-34.07	-13	-21.07	101.00	1.25	Vertical	1000000.00	-8.05
12999.21053	55.87	-39.39	-13	-26.39	298.00	2.55	Vertical	1000000.00	4.35

Level (dBm) is calculated as follow :

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

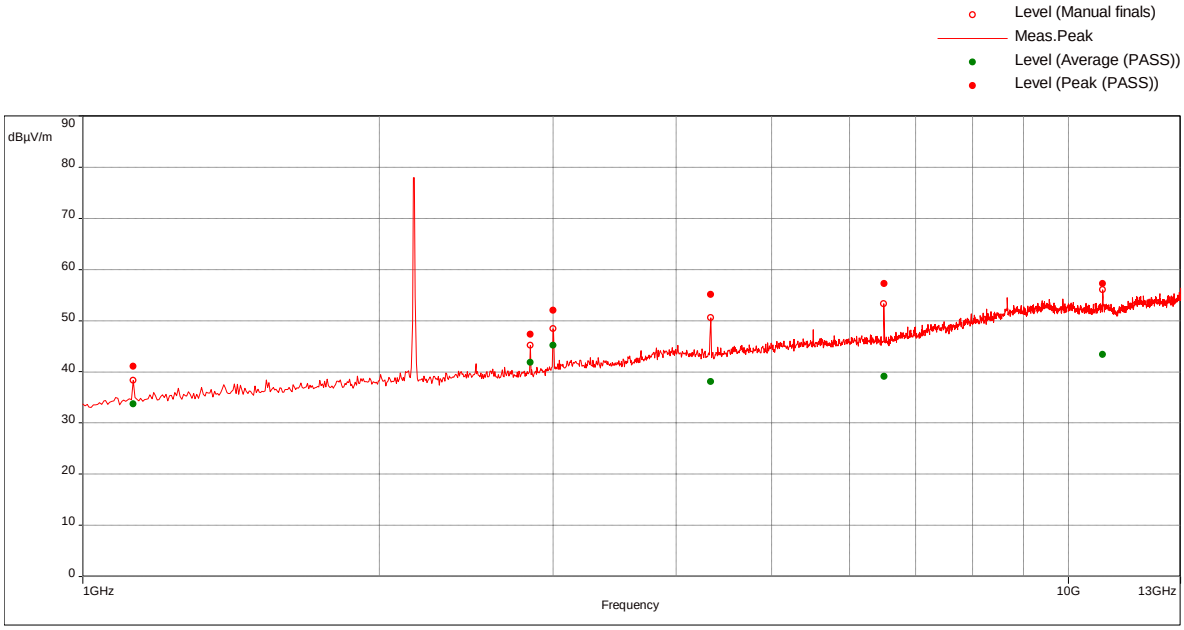
The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions: 1-22 GHz, Transmit @ High Channel 2167.5 MHz
Slot 1 (Band 10), Modulation: TM1.1-QPSK, Bandwidth 5 MHz

Test Information:

Date and Time	8/9/2019 9:36:08 AM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	54%
Atmospheric Pressure	996mbar
Comments	Band 10_TM1.1-QPSK_5MHz_High 2167.5MHz_1 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµVm)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
1125	41.08	-54.18	-13	-41.18	222.00	1.06	Horizontal	1000000.00	-26.33
2844.473684	47.31	-47.95	-13	-34.95	171.00	1.45	Vertical	1000000.00	-18.89
3000	52.01	-43.25	-13	-30.25	162.00	1.45	Vertical	1000000.00	-17.74
4335	55.09	-40.17	-13	-27.17	106.00	1.85	Vertical	1000000.00	-13.16
6502.631579	57.23	-38.03	-13	-25.03	106.00	1.85	Vertical	1000000.00	-7.97
10840	57.21	-38.05	-13	-25.05	143.00	3.25	Vertical	1000000.00	0.20

Level (dBm) is calculated as follow :

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

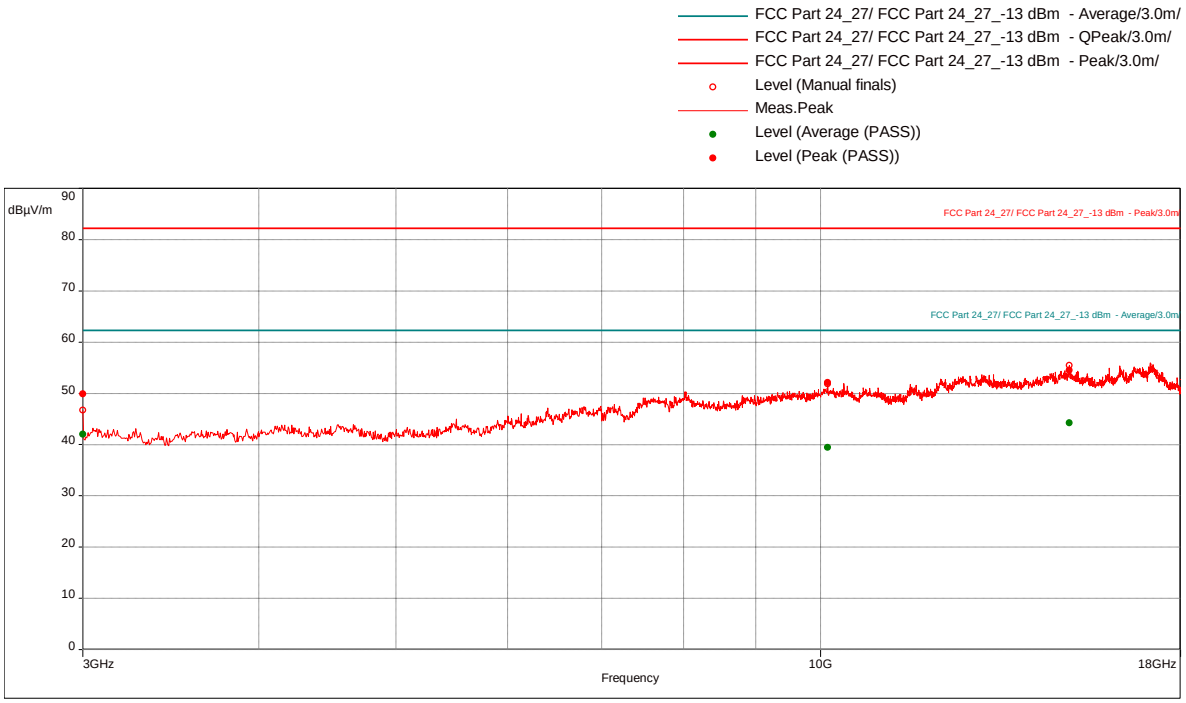
The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions: 1-22 GHz, Transmit @ Low Channel 2112.5 MHz Slot 1 (Band 10), Modulation: TM3.2-16QAM, Bandwidth 5 MHz

Test Information:

Date and Time	6/1/2019 11:03:47 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 1_ANT0 (-4.5) & ANT1 (-4.75), Used Data From Band 66 Testing

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	49.91	-45.35	-13	-32.35	269.00	1.15	Vertical	1000000.00	2.42
10119.737	52.09	-43.17	-13	-30.17	173.00	1.70	Horizontal	1000000.00	15.13
15010.526	54.51	-40.75	-13	-27.75	0.00	3.94	Horizontal	1000000.00	21.45

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.

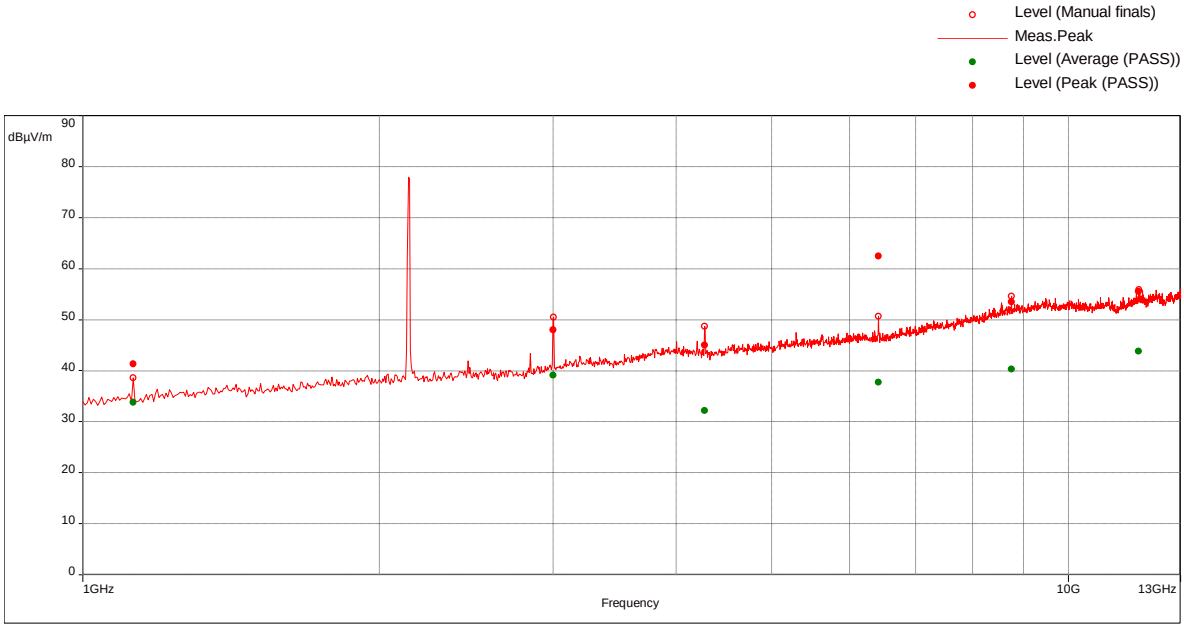
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions: 1-22 GHz, Transmit @ Mid Channel 2140 MHz
Slot 1 (Band 10), Modulation: TM3.2-16QAM, Bandwidth 5 MHz

Test Information:

Date and Time	8/9/2019 10:18:22 AM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	54%
Atmospheric Pressure	996mbar
Comments	Band 10_TM3.2-16QAM_5MHz_Mid 2140MHz_1 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµVm)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
1125	41.34	-53.92	-13	-40.92	219.00	1.05	Horizontal	1000000.00	-26.33
3000.263158	48.01	-47.25	-13	-34.25	78.00	1.20	Vertical	1000000.00	-17.74
4273.947368	44.98	-50.28	-13	-37.28	348.00	1.00	Vertical	1000000.00	-13.27
6416.052632	62.50	-32.76	-13	-19.76	102.00	1.85	Vertical	1000000.00	-8.05
8753.421053	53.44	-41.82	-13	-28.82	232.00	1.55	Vertical	1000000.00	-2.03
11792.10526	55.57	-39.69	-13	-26.69	13.00	1.00	Vertical	1000000.00	2.56

Level (dBm) is calculated as follow :

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

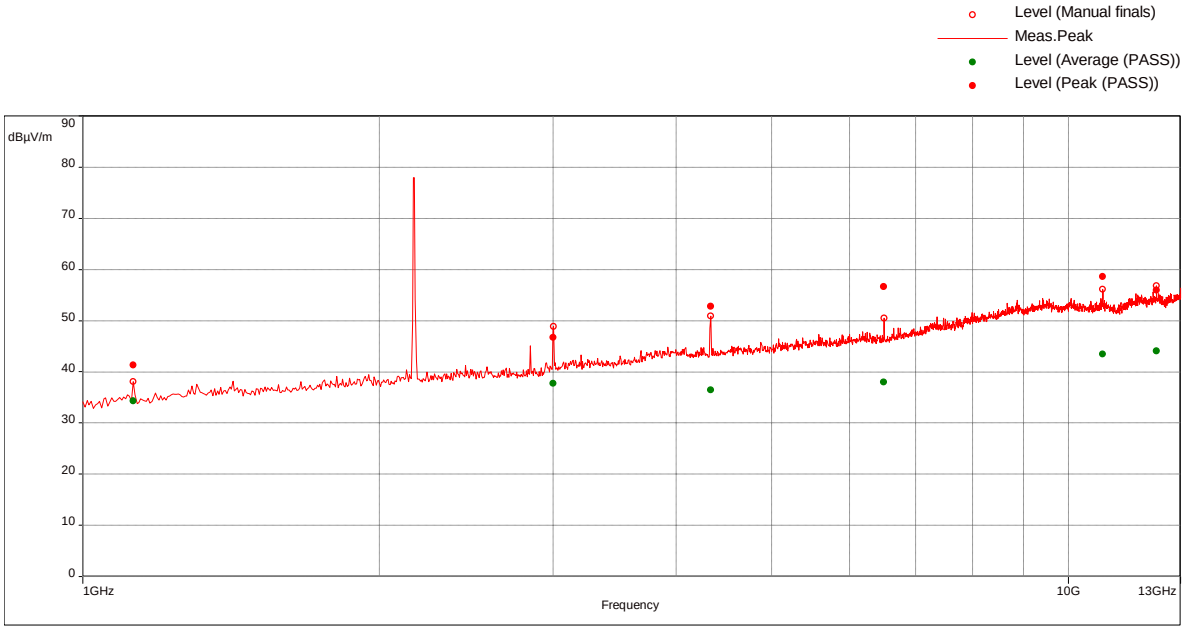
The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions: 1-22 GHz, Transmit @ High Channel 2167.5 MHz
Slot 1 (Band 10), Modulation: TM3.2-16QAM, Bandwidth 5 MHz

Test Information:

Date and Time	8/9/2019 10:55:04 AM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	54%
Atmospheric Pressure	996mbar
Comments	Band 10_TM3.2-16QAM_5MHz_High 2167.5MHz_1 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµVm)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
1125	41.34	-53.92	-13	-40.92	213.00	1.20	Horizontal	1000000.00	-26.33
3000.263158	46.72	-48.54	-13	-35.54	311.00	1.40	Vertical	1000000.00	-17.74
4335.263158	52.80	-42.46	-13	-29.46	101.00	1.55	Vertical	1000000.00	-13.16
6501.578947	56.61	-38.65	-13	-25.65	102.00	1.25	Vertical	1000000.00	-7.97
10841.84211	58.58	-36.68	-13	-23.68	144.00	2.35	Vertical	1000000.00	0.21
12293.68421	55.99	-39.27	-13	-26.27	13.00	1.60	Horizontal	1000000.00	3.12

Level (dBm) is calculated as follow :

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

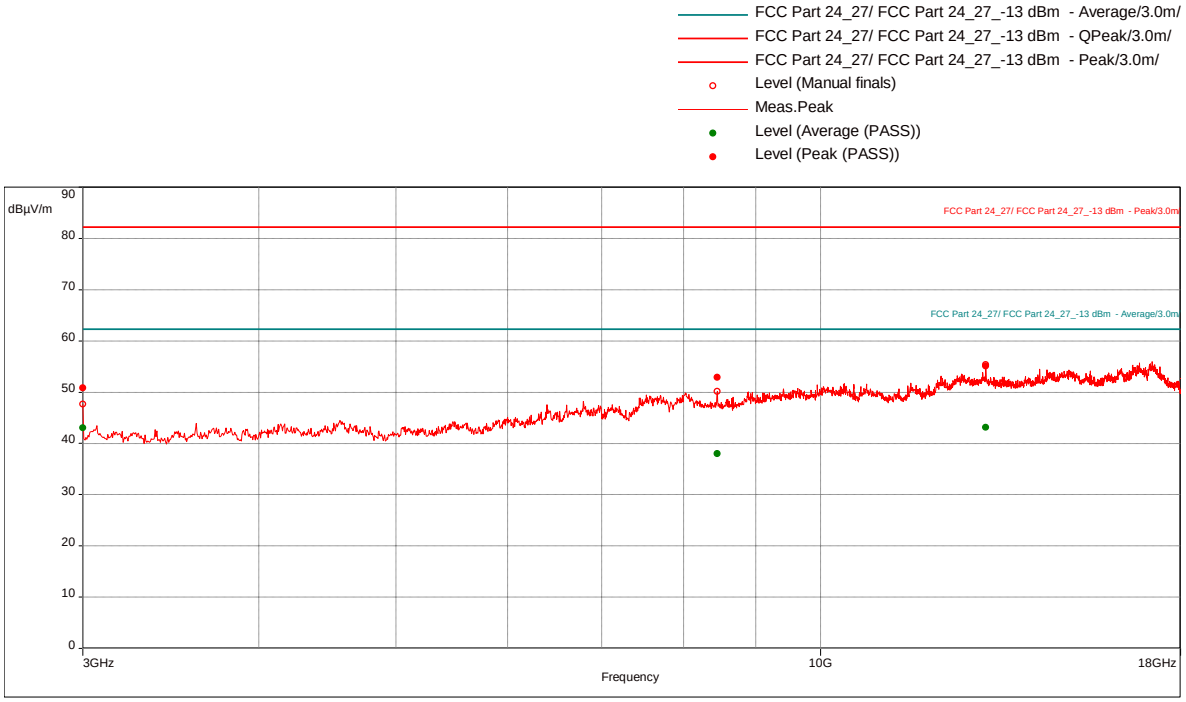
The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions: 1-22 GHz, Transmit @ Low Channel 2112.5 MHz Slot 1 (Band 10), Modulation: TM3.1-64QAM, Bandwidth 5 MHz

Test Information:

Date and Time	6/1/2019 12:23:48 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 1_ANT0 (-5.25) & ANT1 (-5.75)

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	50.81	-44.45	-13	-31.45	275.00	1.40	Vertical	1000000.00	2.42
8448.9474	52.85	-42.41	-13	-29.41	150.00	2.60	Vertical	1000000.00	11.62
13098.421	55.14	-40.12	-13	-27.12	159.00	1.55	Horizontal	1000000.00	20.23

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.

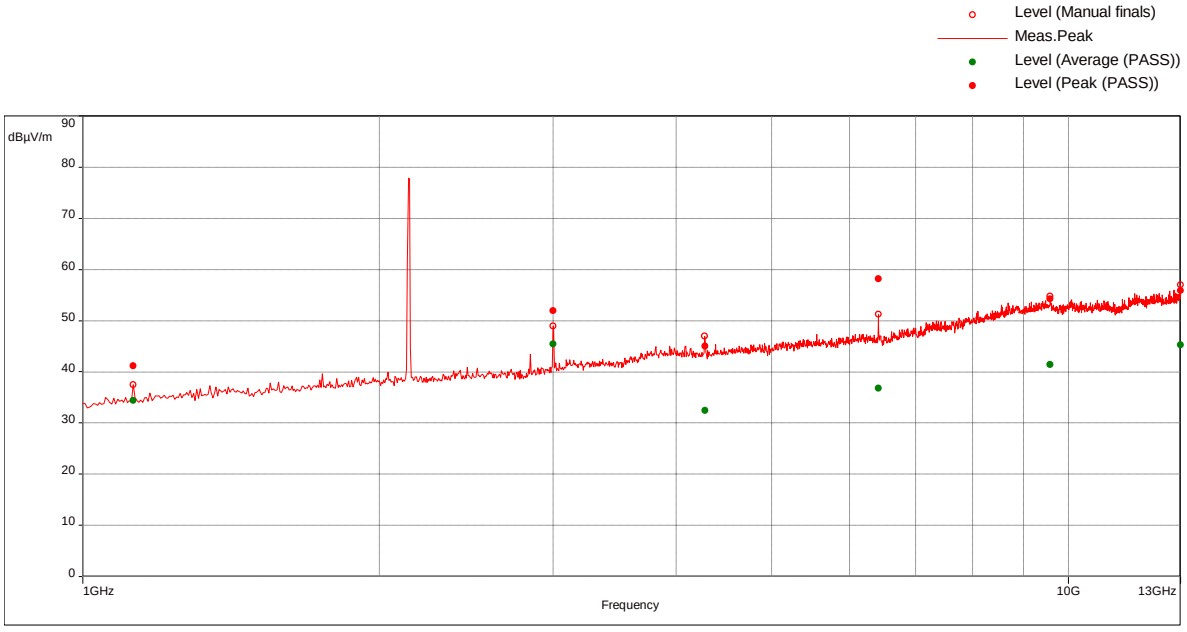
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm

Radiated Emissions: 1-22 GHz, Transmit @ Mid Channel 2140 MHz
Slot 1 (Band 10), Modulation: TM3.1-64QAM, Bandwidth 5 MHz

Test Information:

Date and Time	8/9/2019 11:37:07 AM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	54%
Atmospheric Pressure	996mbar
Comments	Band 10_TM3.1-64QAM_5MHz_Mid 2140MHz_1 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµVm)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
1125	41.20	-54.06	-13	-41.06	227.00	1.15	Horizontal	1000000.00	-26.33
3000	51.91	-43.35	-13	-30.35	162.00	1.20	Vertical	1000000.00	-17.74
4278.157895	44.98	-50.28	-13	-37.28	340.00	2.00	Vertical	1000000.00	-13.27
6415	58.16	-37.1	-13	-24.1	101.00	1.85	Vertical	1000000.00	-8.05
9584.210526	54.27	-40.99	-13	-27.99	245.00	1.01	Horizontal	1000000.00	-0.81
12996.84211	55.87	-39.39	-13	-26.39	45.00	1.36	Vertical	1000000.00	4.35

Level (dBm) is calculated as follow :

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

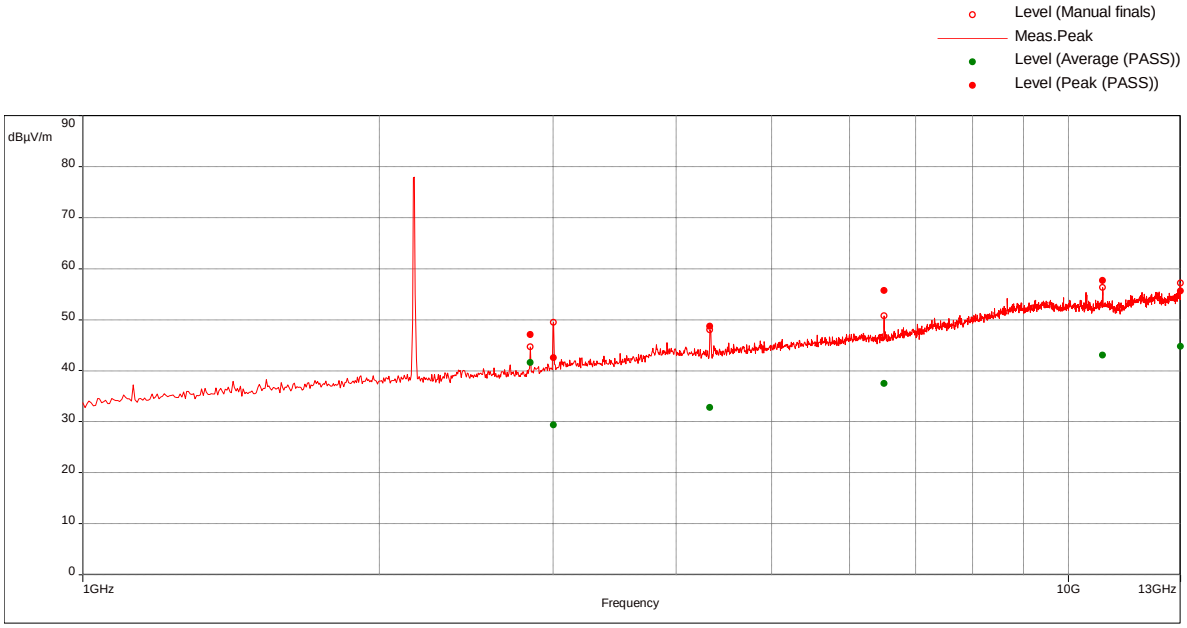
The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions: 1-22 GHz, Transmit @ High Channel 2167.5 MHz
Slot 1 (Band 10), Modulation: TM3.1-64QAM, Bandwidth 5 MHz

Test Information:

Date and Time	8/9/2019 12:36:02 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	54%
Atmospheric Pressure	996mbar
Comments	Band 10_TM3.1-64QAM_5MHz_High 2167.5MHz_1 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµVm)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
2844.473684	47.07	-48.19	-13	-35.19	162.00	1.10	Vertical	1000000.00	-18.89
3006.578947	42.55	-52.71	-13	-39.71	8.00	3.84	Vertical	1000000.00	-17.68
4331.578947	48.73	-46.53	-13	-33.53	88.00	1.10	Vertical	1000000.00	-13.17
6505.263158	55.72	-39.54	-13	-26.54	102.00	1.25	Vertical	1000000.00	-7.96
10840	57.71	-37.55	-13	-24.55	143.00	3.25	Vertical	1000000.00	0.20
12996.97368	55.60	-39.66	-13	-26.66	9.00	2.65	Vertical	1000000.00	4.35

Level (dBm) is calculated as follow :

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

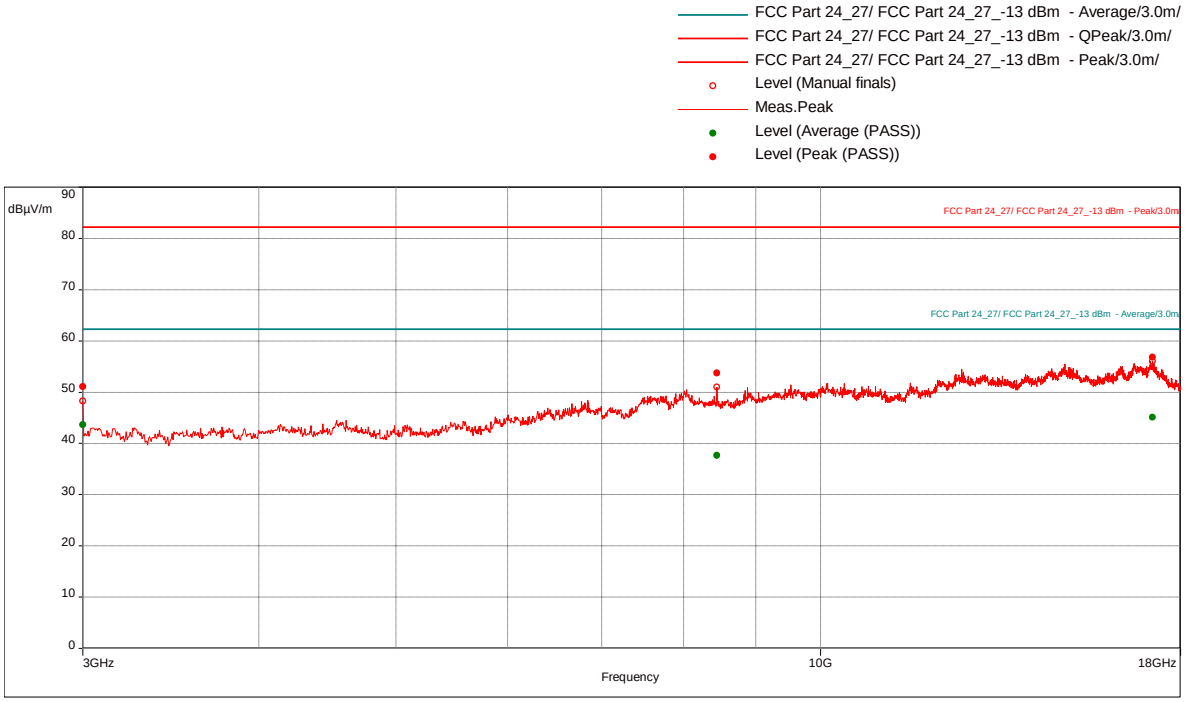
The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions: 1-22 GHz, Transmit @ Low Channel 2112.5 MHz Slot 1 (Band 10), Modulation: TM3.1a-256QAM, Bandwidth 5 MHz

Test Information:

Date and Time	6/2/2019 9:16:34 AM
Client and Project Number	CommScope_G103866582
Engineer	Kouma Sinn
Temperature	22 deg C
Humidity	51 %
Atmospheric Pressure	997 mB
Comments	RE_6-2-19 _3 to 18 GHz_TM3.1a_Low Ch_5M BW_Slot 1_ANT0 (-5.5) & ANT1 (-6)

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	275.00	1.40	Vertical	1000000.00	2.42
8446.5789	53.74	-41.52	-13	-28.52	150.00	1.35	Vertical	1000000.00	11.63
17195.789	56.79	-38.47	-13	-25.47	0.00	1.35	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.

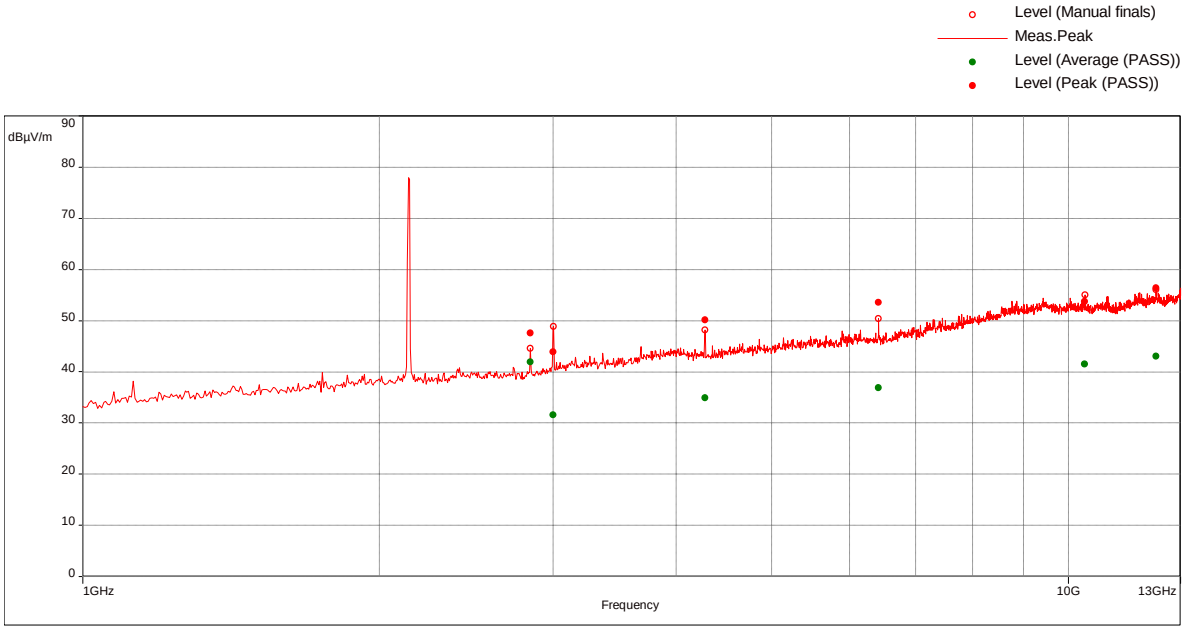
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm

Radiated Emissions: 1-22 GHz, Transmit @ Mid Channel 2140 MHz
Slot 1 (Band 10), Modulation: TM3.1a-256QAM, Bandwidth 5 MHz

Test Information:

Date and Time	8/9/2019 1:26:50 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	54%
Atmospheric Pressure	996mbar
Comments	Band 10_TM3.1a-256QAM_5MHz_Mid 2140 MHz_1 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµVm)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
2844.473684	47.56	-47.7	-13	-34.7	168.00	1.30	Vertical	1000000.00	-18.89
3000.263158	43.91	-51.35	-13	-38.35	246.00	2.40	Vertical	1000000.00	-17.74
4278.421053	50.16	-45.1	-13	-32.1	83.00	1.10	Vertical	1000000.00	-13.27
6417.368421	53.60	-41.66	-13	-28.66	32.00	1.10	Vertical	1000000.00	-8.05
10397.36842	53.74	-41.52	-13	-28.52	284.00	2.95	Horizontal	1000000.00	-0.17
12274.47368	56.40	-38.86	-13	-25.86	222.00	3.84	Horizontal	1000000.00	3.13

Level (dBm) is calculated as follow :

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

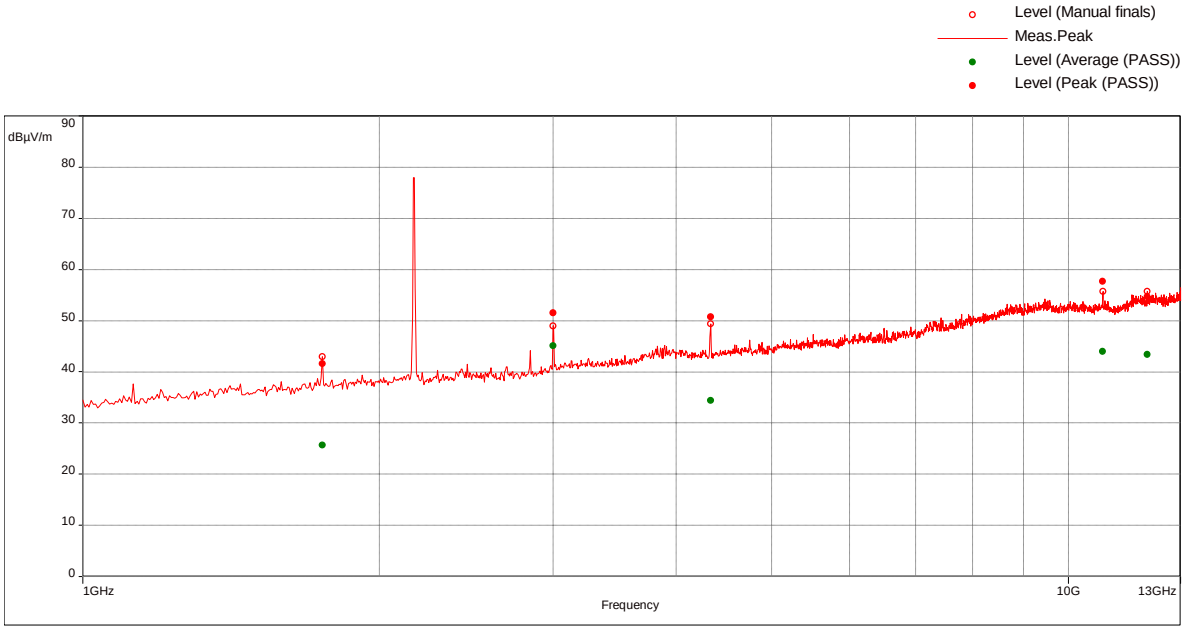
The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

Radiated Emissions: 1-22 GHz, Transmit @ High Channel 2167.5 MHz
Slot 1 (Band 10), Modulation: TM3.1a-256QAM, Bandwidth 5 MHz

.**Test Information:**

Date and Time	8/9/2019 2:17:32 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	54%
Atmospheric Pressure	996mbar
Comments	Band 10_TM3.1a-256QAM_5MHz_High 2167.5MHz_1 to 13 GHz SA mode

Graph:



Results:

Peak (PASS) (5)

Frequency (MHz)	Level (dBµVm)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
1748.421053	41.56	-53.7	-13	-40.7	40.00	2.75	Horizontal	1000000.00	-22.37
3000	51.50	-43.76	-13	-30.76	163.00	1.25	Vertical	1000000.00	-17.74
4332.631579	50.76	-44.5	-13	-31.5	106.00	1.80	Vertical	1000000.00	-13.17
10842.36842	57.71	-37.55	-13	-24.55	144.00	3.25	Vertical	1000000.00	0.21
12023.94737	54.70	-40.56	-13	-27.56	172.00	2.85	Horizontal	1000000.00	2.92

Level (dBm) is calculated as follow :

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

The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

		Test Date:	04/10/2019, 04/16/2019, 04/26/2019, 05/17/2019, 05/24/2019, 06/01/2019, 07/18/2019, 07/19/2019, 07/23/2019, 08/08/2019
Test Personnel:	Kouma Sinn KPS		
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 27	Limit Applied:	See report section 11.3
Input Voltage:	48 VDC (POE)		
		Ambient Temperature:	22, 23, 20, 23, 23, 22, 21, 22, 21, 23 ºC
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Relative Humidity:	21, 20, 42, 5, 410, 40, 64, 62, 71, 59 %
		Atmospheric Pressure:	1004, 1001, 996, 995, 1007, 1001, 1005, 1005, 1001, 996 mbars

Deviations, Additions, or Exclusions: None

12 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	08/14/2019	103866582BOX-24b	KPS	NNA	Original Issue