

9 Band Edge Compliance

9.1 Method

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

9.2 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

Software Utilized:

Name	Manufacturer	Version
None	--	--

9.3 Results:

The sample tested was found to Comply.

§ 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.

Intertek

Report Number: 103866582BOX-24a

Issued: 08/14/2019

Band 4, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2112.50	ANT0	-14.72
		ANT1	-15.19
High	2152.5	ANT0	-13.92
		ANT1	-17.20

Band 4, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2115.00	ANT0	-16.37
		ANT1	-15.33
High	2150.00	ANT0	-14.83
		ANT1	-18.5

Band 4, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2117.50	ANT0	-16.85
		ANT1	-15.59
High	2147.50	ANT0	-17.47
		ANT1	-19.61

Band 4, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2120.00	ANT0	-19.28
		ANT1	-17.74
High	2145.00	ANT0	-19.01
		ANT1	-19.81

Band 4, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2112.50	ANT0	-15.33
		ANT1	-14.63
High	2152.5	ANT0	-14.15
		ANT1	-16.46

Band 4, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2115.00	ANT0	-14.62
		ANT1	-14.79
High	2150.00	ANT0	-15.42
		ANT1	-18.08

Band 4, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2117.50	ANT0	-16.62
		ANT1	-16.17
High	2147.50	ANT0	-17.55
		ANT1	-19.99

Band 4, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2120.00	ANT0	-15.17
		ANT1	-16.38
High	2145.00	ANT0	-20.05
		ANT1	-19.82

Intertek

Report Number: 103866582BOX-24a

Issued: 08/14/2019

Band 4, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2112.50	ANT0	-14.99
		ANT1	-14.39
High	2152.5	ANT0	-14.35
		ANT1	-15.38

Band 4, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2115.00	ANT0	-15.20
		ANT1	-14.29
High	2150.00	ANT0	-15.09
		ANT1	-18.23

Band 4, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2117.50	ANT0	-16.41
		ANT1	-16.12
High	2147.50	ANT0	-17.65
		ANT1	-19.61

Band 4, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2120.00	ANT0	-19.30
		ANT1	-16.25
High	2145.00	ANT0	-19.06
		ANT1	-19.71

Band 4, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2112.50	ANT0	-14.73
		ANT1	-14.17
High	2152.5	ANT0	-13.87
		ANT1	-15.98

Band 4, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2115.00	ANT0	-15.27
		ANT1	-14.37
High	2150.00	ANT0	-15.43
		ANT1	-19.16

Band 4, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2117.50	ANT0	-17.36
		ANT1	-17.07
High	2147.50	ANT0	-17.12
		ANT1	-19.55

Band 4, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM

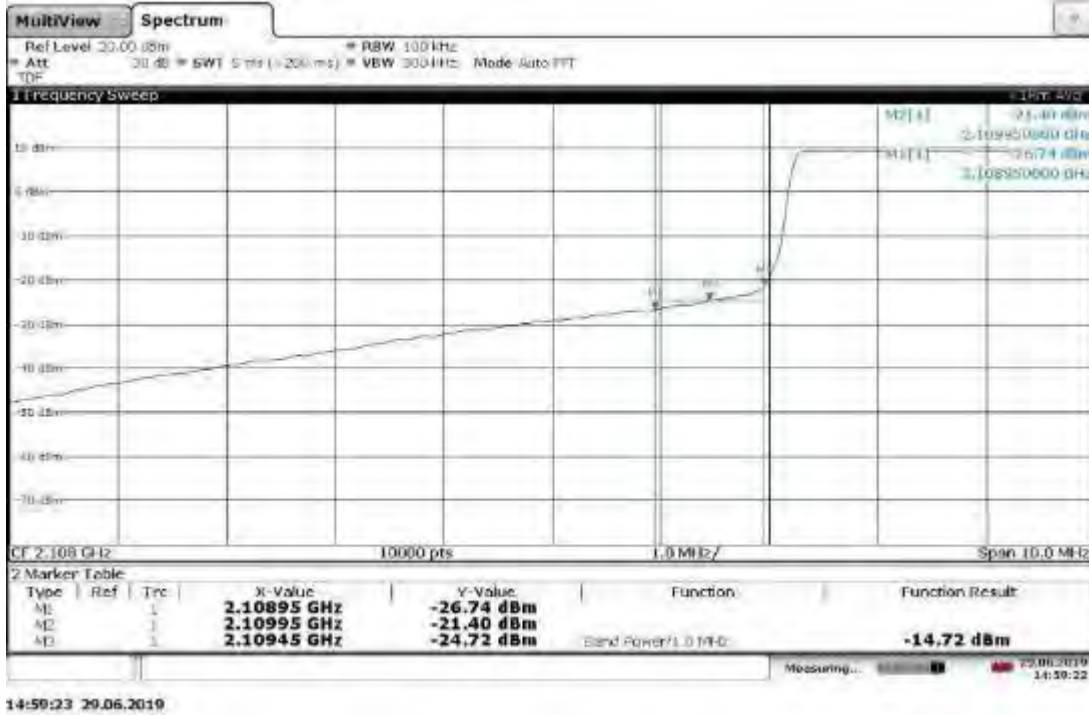
Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2120.00	ANT0	-18.04
		ANT1	-17.42
High	2145.00	ANT0	-19.61
		ANT1	-19.72

9.4 Setup Photograph:

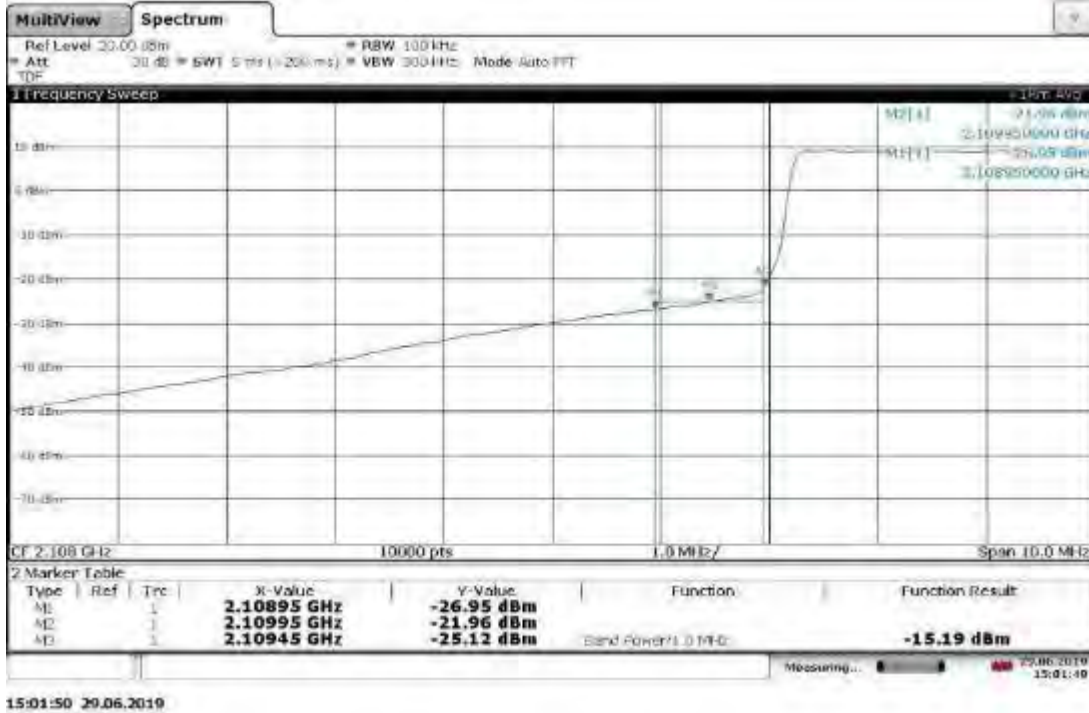


9.5 Plots/Data:

Band Edge Compliant, Lower Band Edge, 2112.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



Band Edge Compliant, Lower Band Edge, 2112.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



Band Edge Compliant, Upper Band Edge, 2152.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



13:53:54 23.07.2019

Band Edge Compliant, Upper Band Edge, 2152.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK

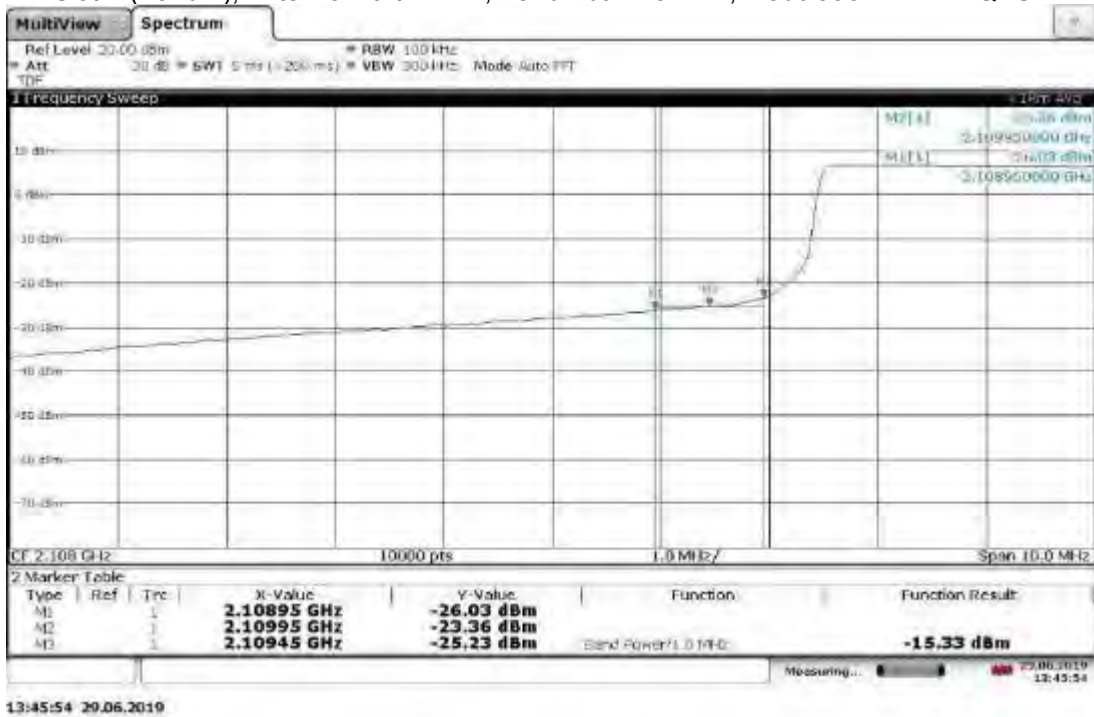


13:53:12 23.07.2019

Band Edge Compliant, Lower Band Edge, 2115 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



Band Edge Compliant, Lower Band Edge, 2115 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



Band Edge Compliant, Upper Band Edge, 2150 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



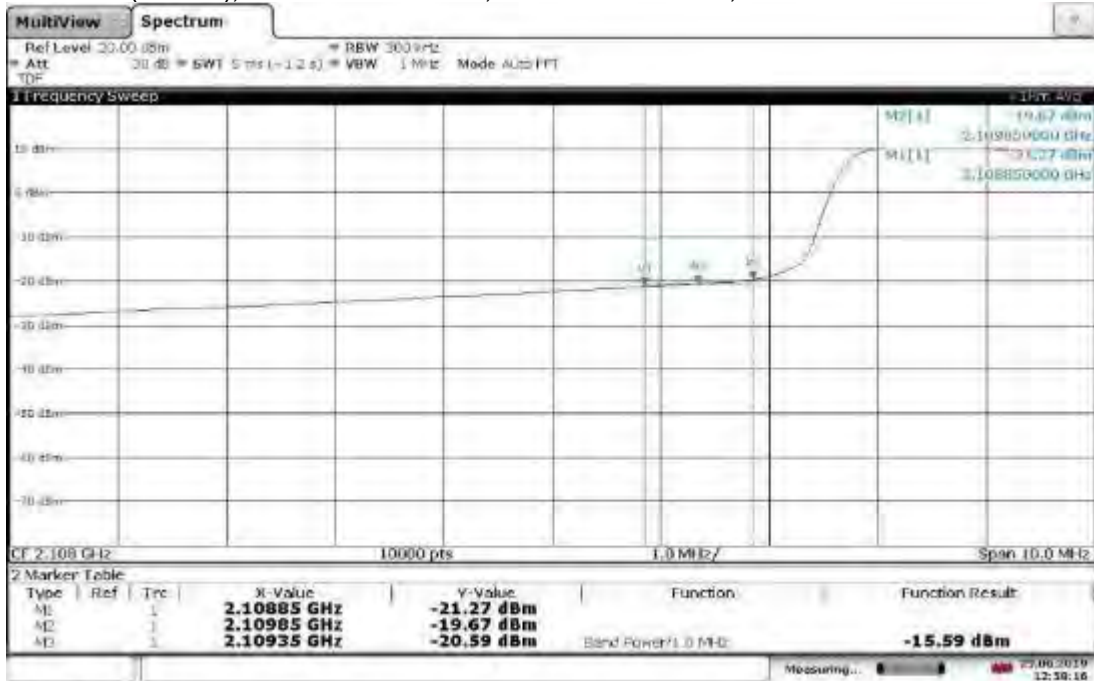
Band Edge Compliant, Upper Band Edge, 2150 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK

Band Edge Compliant, Lower Band Edge, 2117.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



12:55:59 29.06.2019

Band Edge Compliant, Lower Band Edge, 2117.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



12:58:16 29.06.2019

Band Edge Compliant, Upper Band Edge, 2147.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



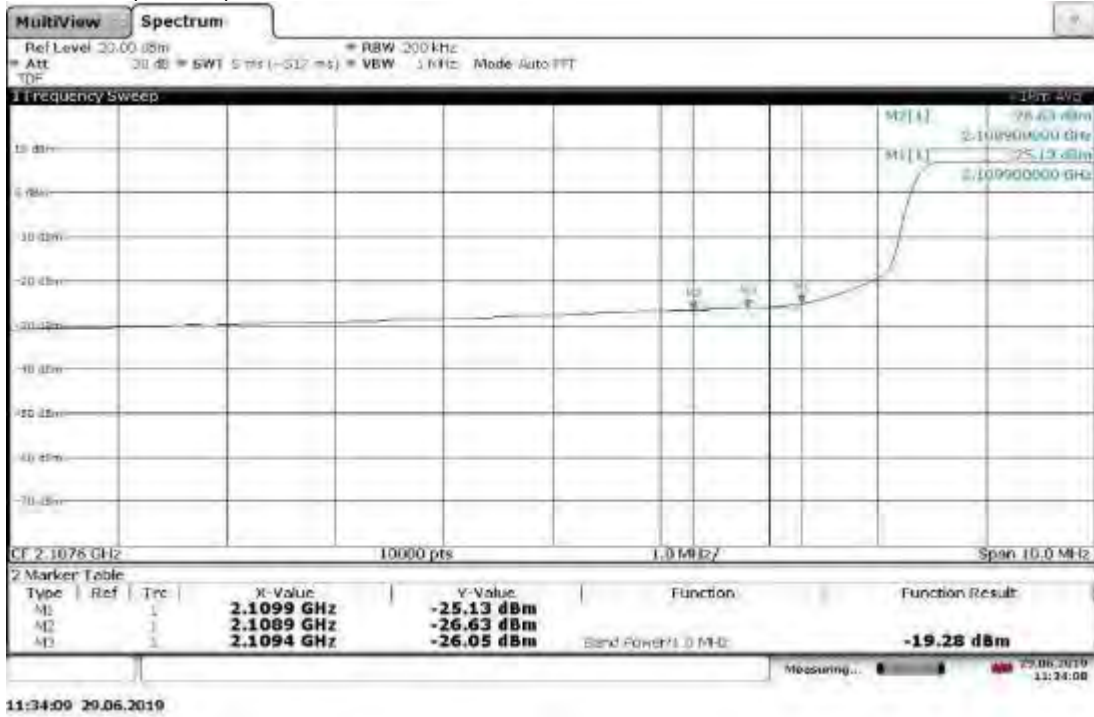
14:05:21 23.07.2019

Band Edge Compliant, Upper Band Edge, 2147.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK

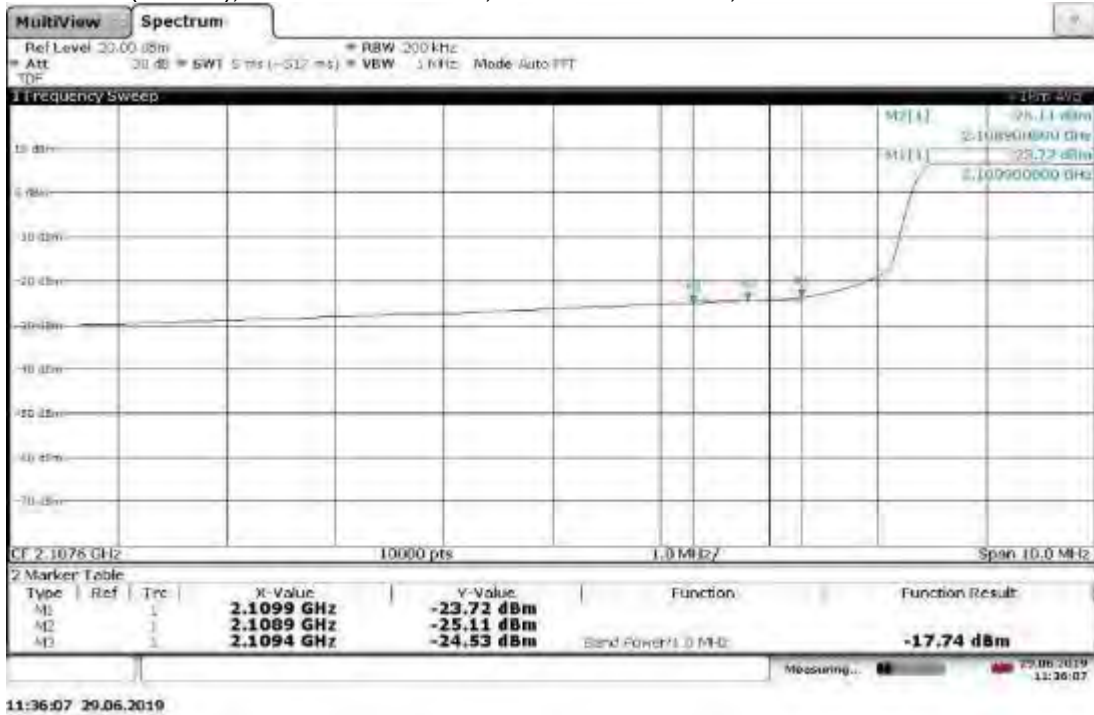


14:04:21 23.07.2019

Band Edge Compliant, Lower Band Edge, 2120 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



Band Edge Compliant, Lower Band Edge, 2120 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



Band Edge Compliant, Upper Band Edge, 2145 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



14:08:29 23.07.2019

Band Edge Compliant, Upper Band Edge, 2145 MHz
 Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



14:08:40 23.07.2019

Band Edge Compliant, Lower Band Edge, 2112.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



14:40:40 29.06.2019

Band Edge Compliant, Lower Band Edge, 2112.5MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



14:43:05 29.06.2019

Band Edge Compliant, Upper Band Edge, 2152.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



12:57:34 23.07.2019

Band Edge Compliant, Upper Band Edge, 2152.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



12:58:01 23.07.2019

Band Edge Compliant, Lower Band Edge, 2115 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



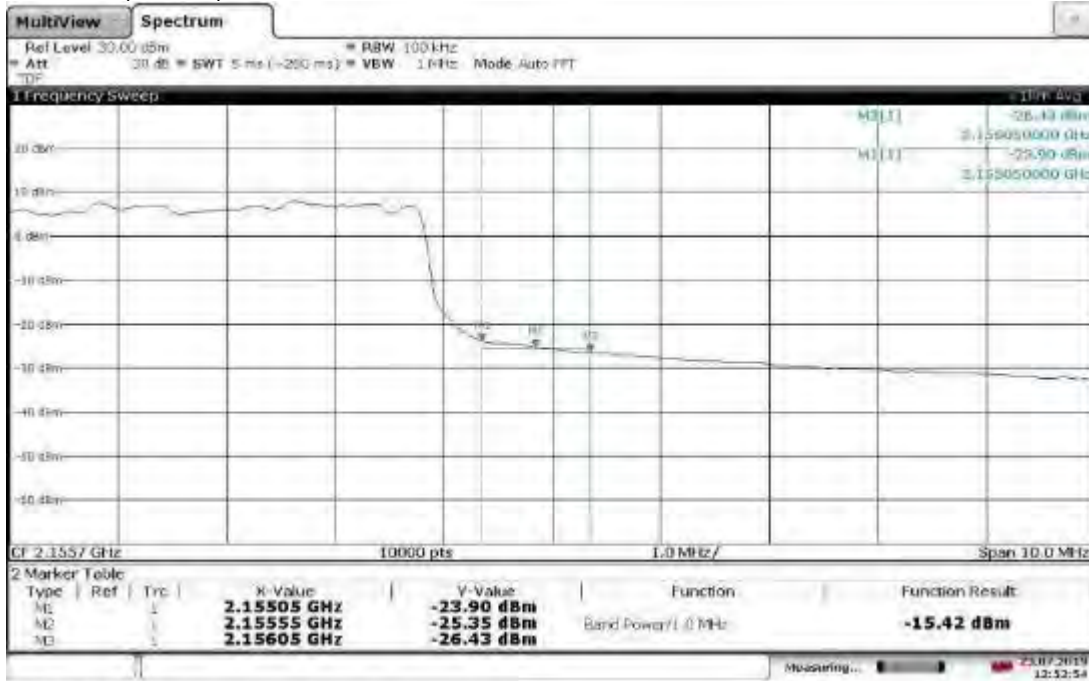
13:51:56 29.06.2019

Band Edge Compliant, Lower Band Edge, 2115 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



13:54:30 29.06.2019

Band Edge Compliant, Upper Band Edge, 2150 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



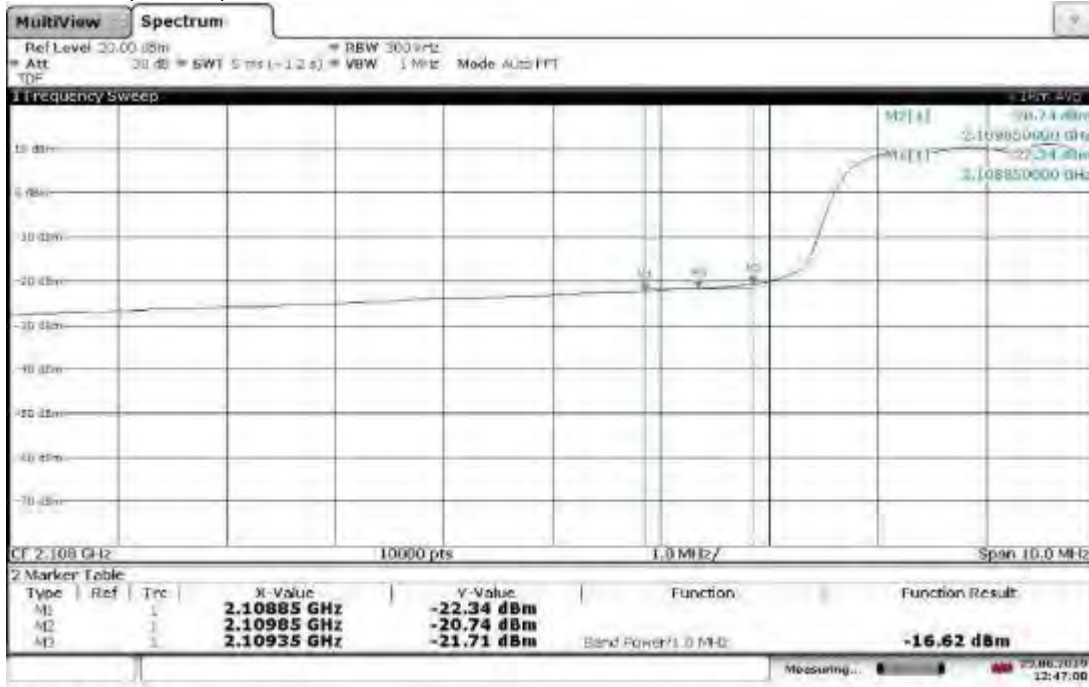
12:52:54 23.07.2019

Band Edge Compliant, Upper Band Edge, 2150 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



12:51:22 23.07.2019

Band Edge Compliant, Lower Band Edge, 2117.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth:15 MHz, Modulation: TM3.2-16QAM



12:47:00 29.06.2019

Band Edge Compliant, Lower Band Edge, 2117.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



11:52:48 08.07.2019

Band Edge Compliant, Upper Band Edge, 2147.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



12:45:58 23.07.2019

Band Edge Compliant, Upper Band Edge, 2147.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



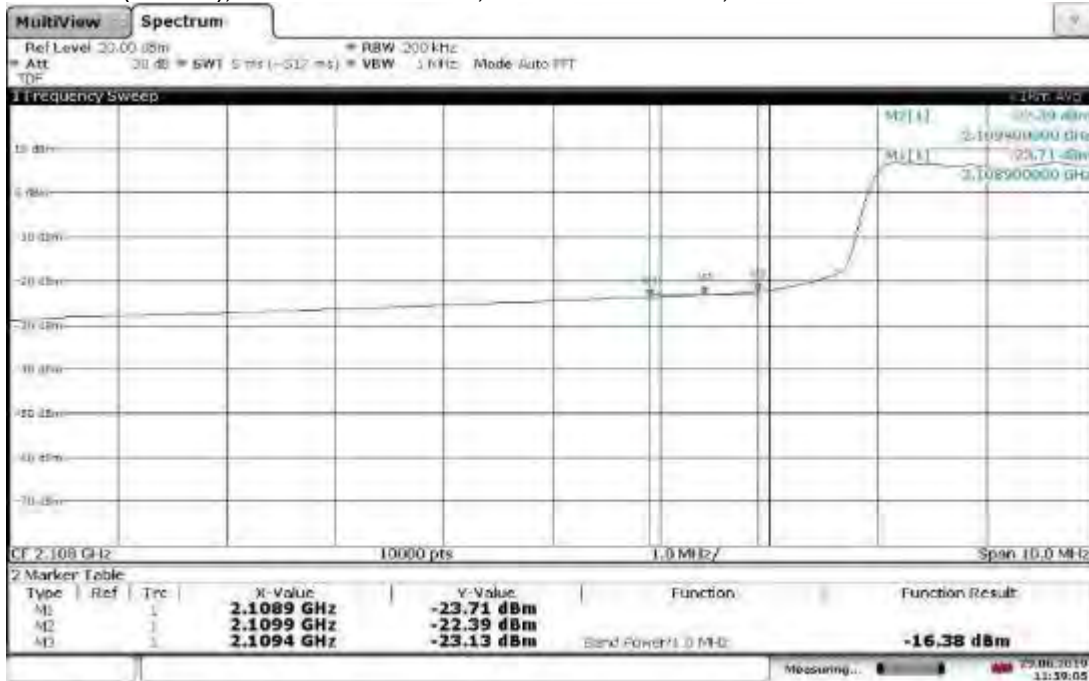
12:47:04 23.07.2019

Band Edge Compliant, Lower Band Edge, 2120 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



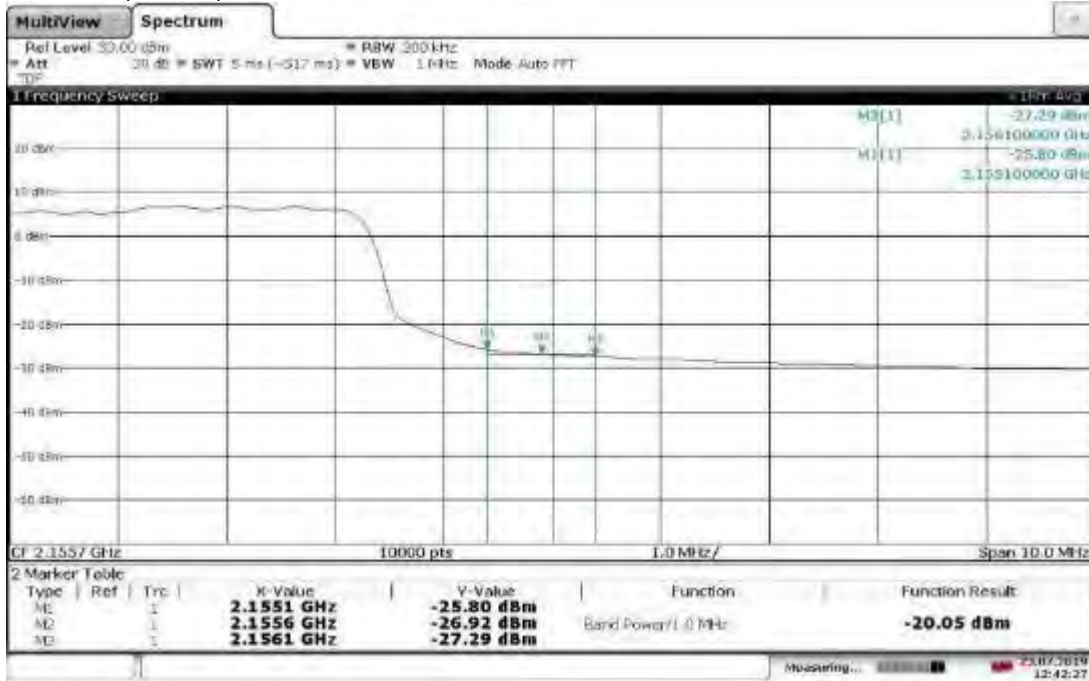
11:56:40 29.06.2019

Band Edge Compliant, Lower Band Edge, 2120 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



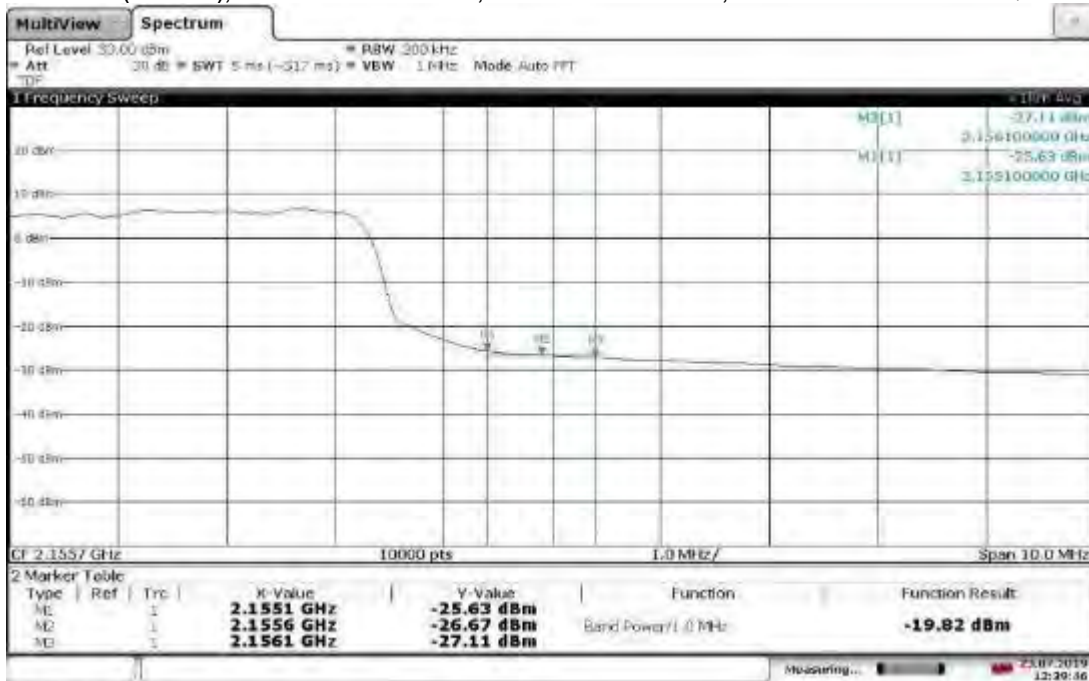
11:59:06 29.06.2019

Band Edge Compliant, Upper Band Edge, 2145 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



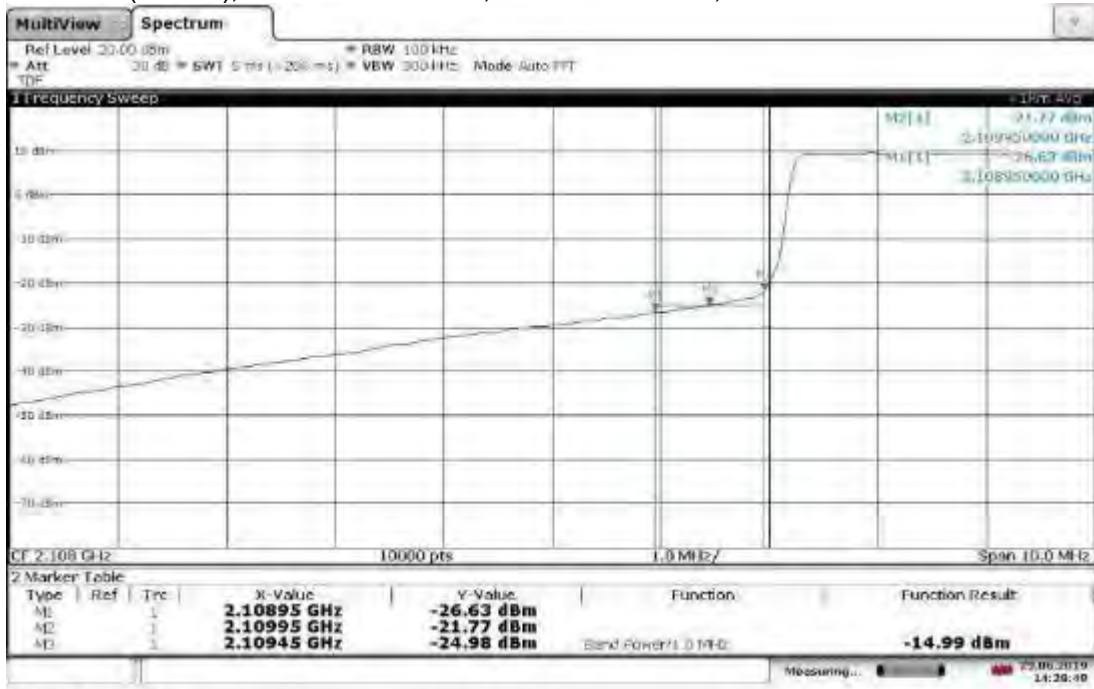
12:42:27 23.07.2019

Band Edge Compliant, Upper Band Edge, 2145 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



12:30:46 23.07.2019

Band Edge Compliant, Lower Band Edge, 2112.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



14:28:50 29.06.2019

Band Edge Compliant, Lower Band Edge, 2112.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



14:31:26 29.06.2019

Band Edge Compliant, Upper Band Edge, 2152.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



12:00:51 23.07.2019

Band Edge Compliant, Upper Band Edge, 2152.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



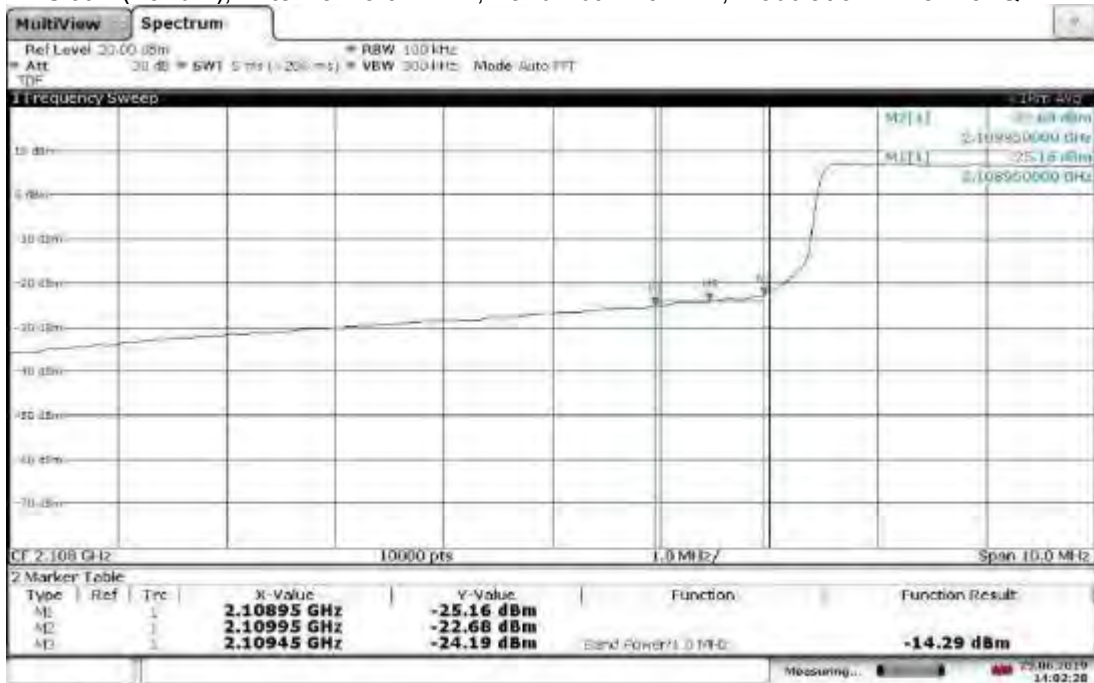
11:57:24 23.07.2019

Band Edge Compliant, Lower Band Edge, 2115 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



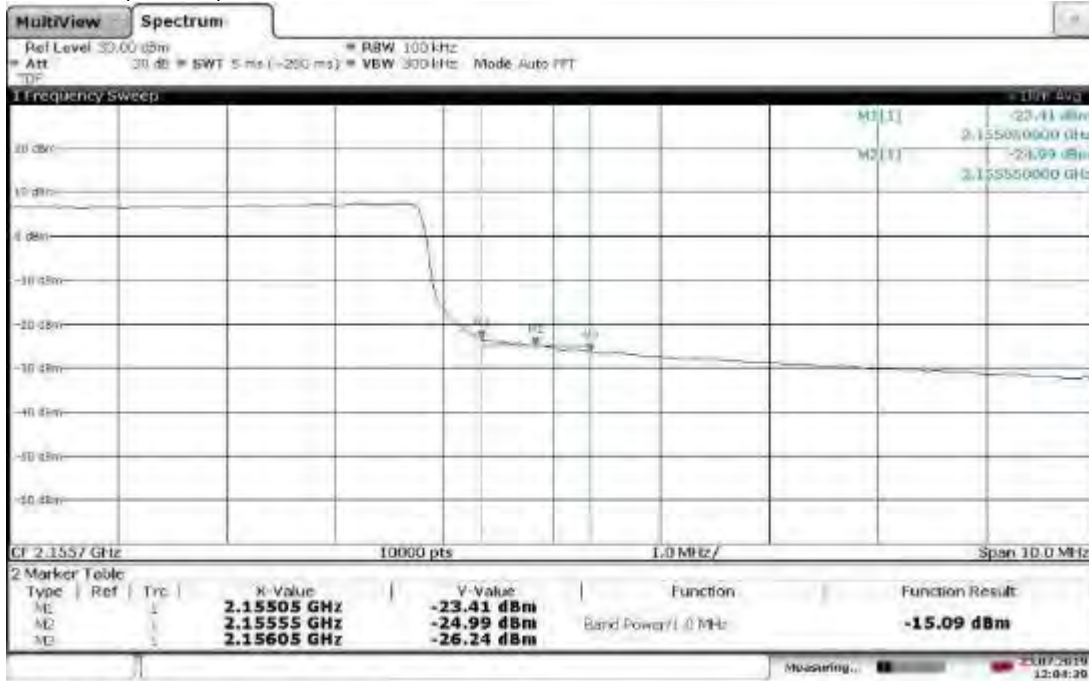
14:00:50 29.06.2019

Band Edge Compliant, Lower Band Edge, 2115 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



14:02:29 29.06.2019

Band Edge Compliant, Upper Band Edge, 2150 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



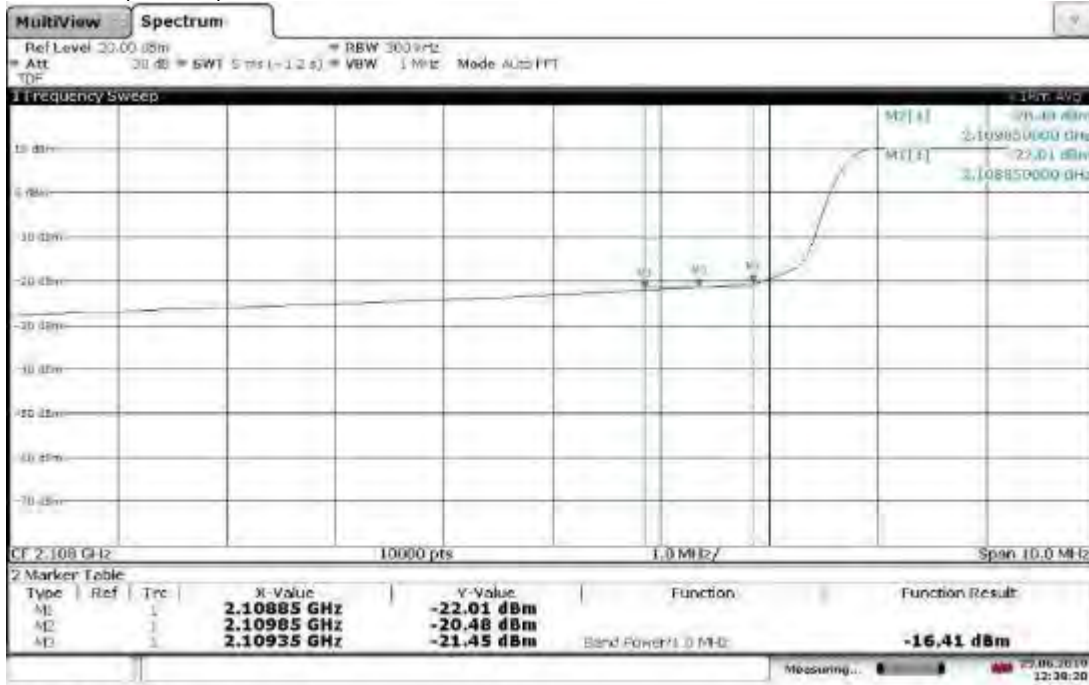
12:04:40 23.07.2019

Band Edge Compliant, Upper Band Edge, 2150 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



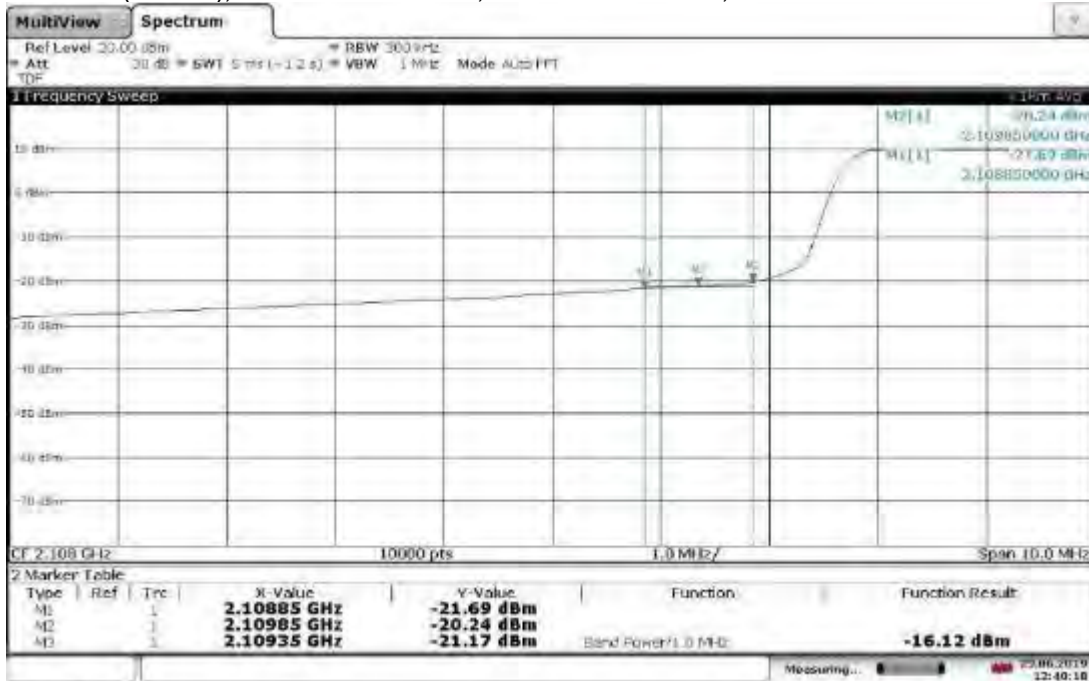
12:05:51 23.07.2019

Band Edge Compliant, Lower Band Edge, 2117.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



12:38:21 29.06.2019

Band Edge Compliant, Lower Band Edge, 2117.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



12:40:19 29.06.2019

Band Edge Compliant, Upper Band Edge, 2147.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



12:11:37 23.07.2019

Band Edge Compliant, Upper Band Edge, 2147.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



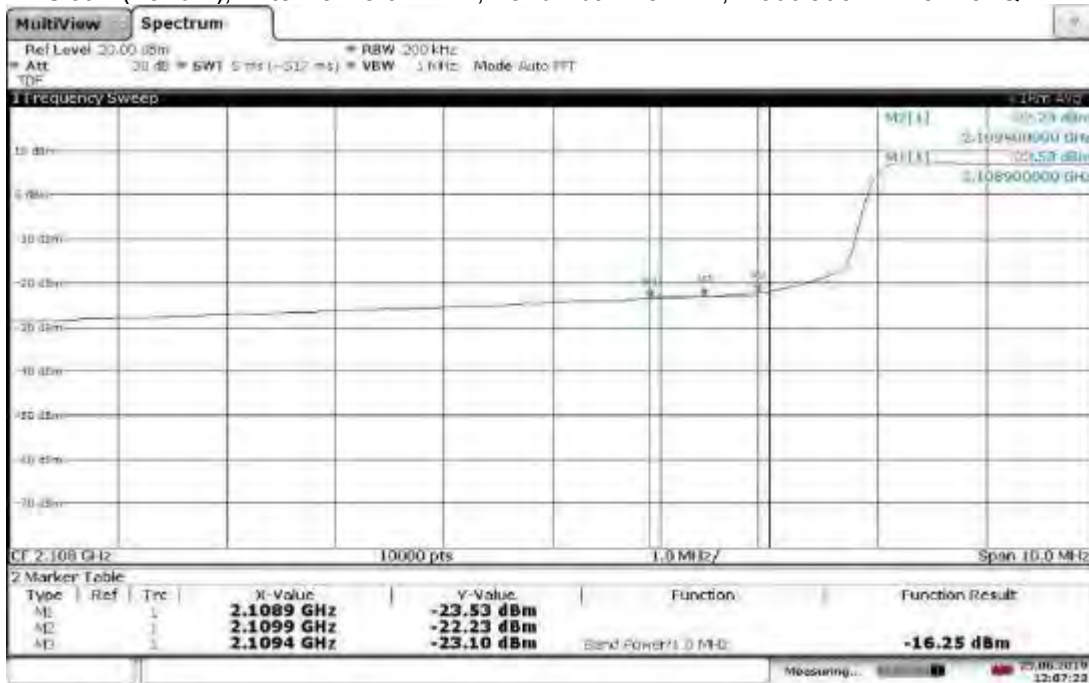
12:10:30 23.07.2019

Band Edge Compliant, Lower Band Edge, 2120 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



12:05:57 29.06.2019

Band Edge Compliant, Lower Band Edge, 2120 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



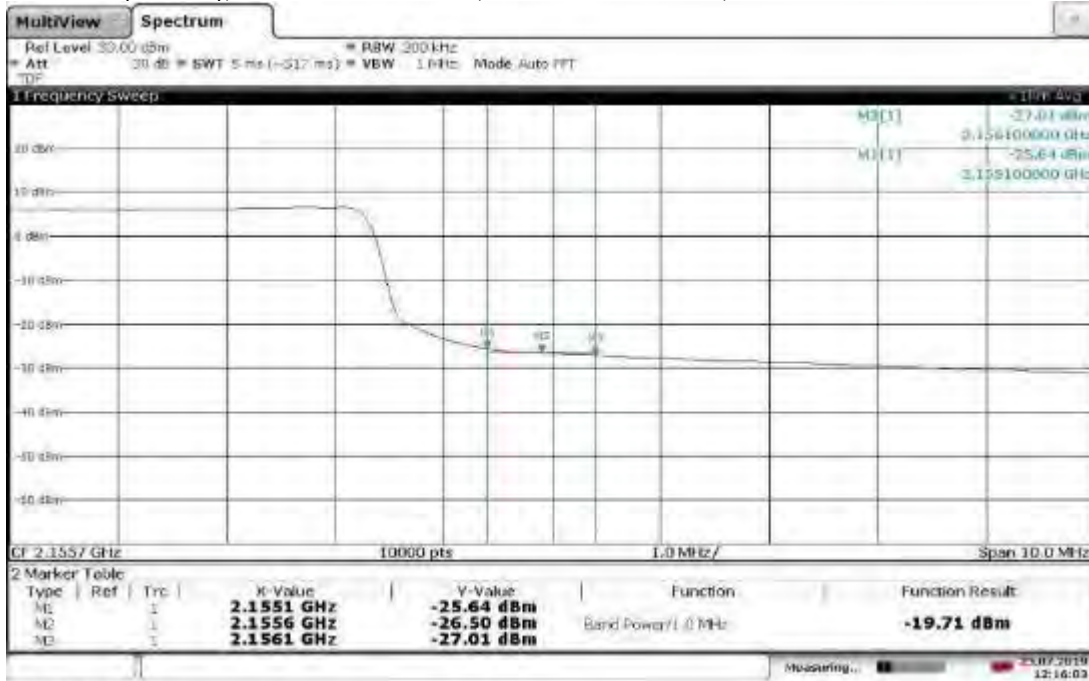
12:07:24 29.06.2019

Band Edge Compliant, Upper Band Edge, 2145 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



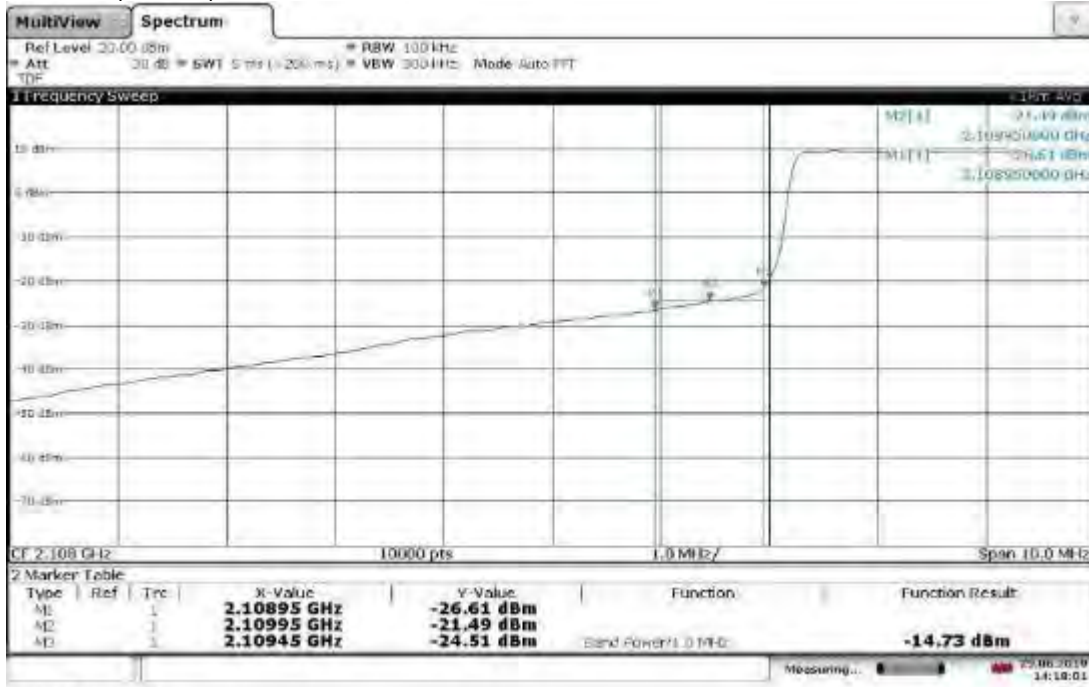
12:14:58 23.07.2019

Band Edge Compliant, Upper Band Edge, 2145 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



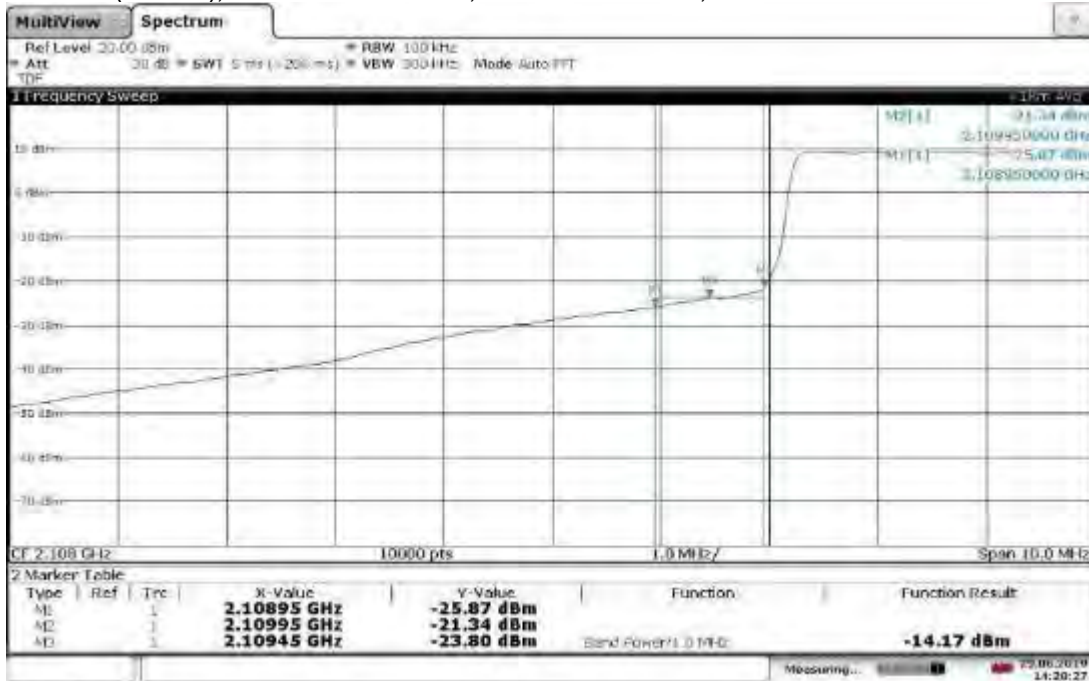
12:16:03 23.07.2019

Band Edge Compliant, Lower Band Edge, 2112.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



14:18:02 29.06.2019

Band Edge Compliant, Lower Band Edge, 2112.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



14:20:27 29.06.2019

Band Edge Compliant, Upper Band Edge, 2152.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



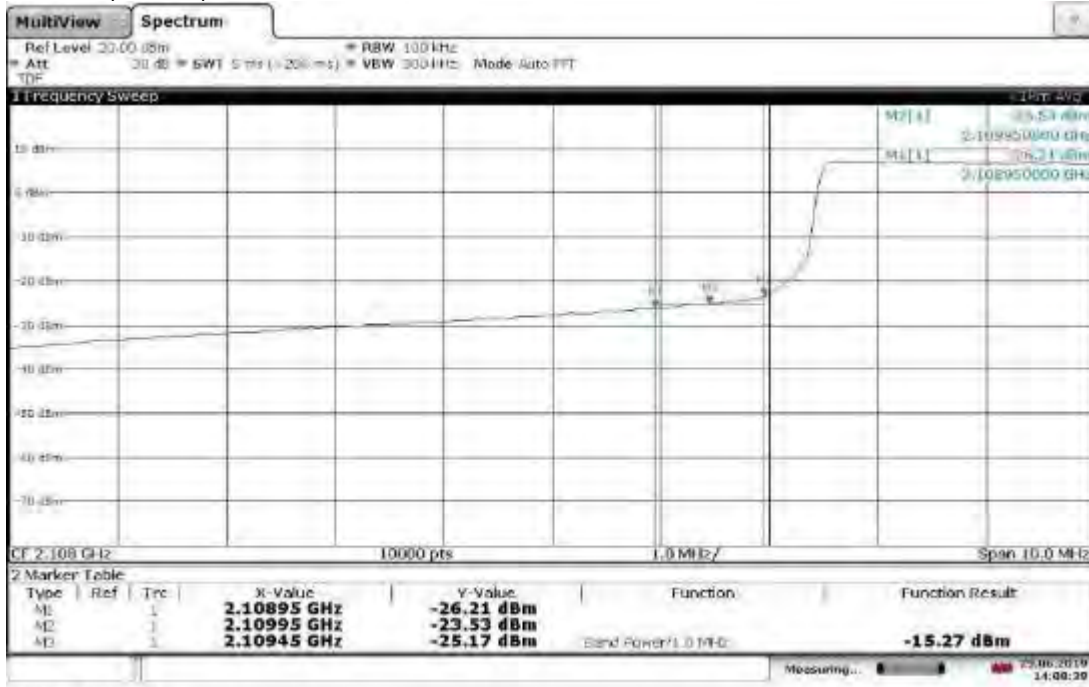
11:42:53 23.07.2019

Band Edge Compliant, Upper Band Edge, 2152.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



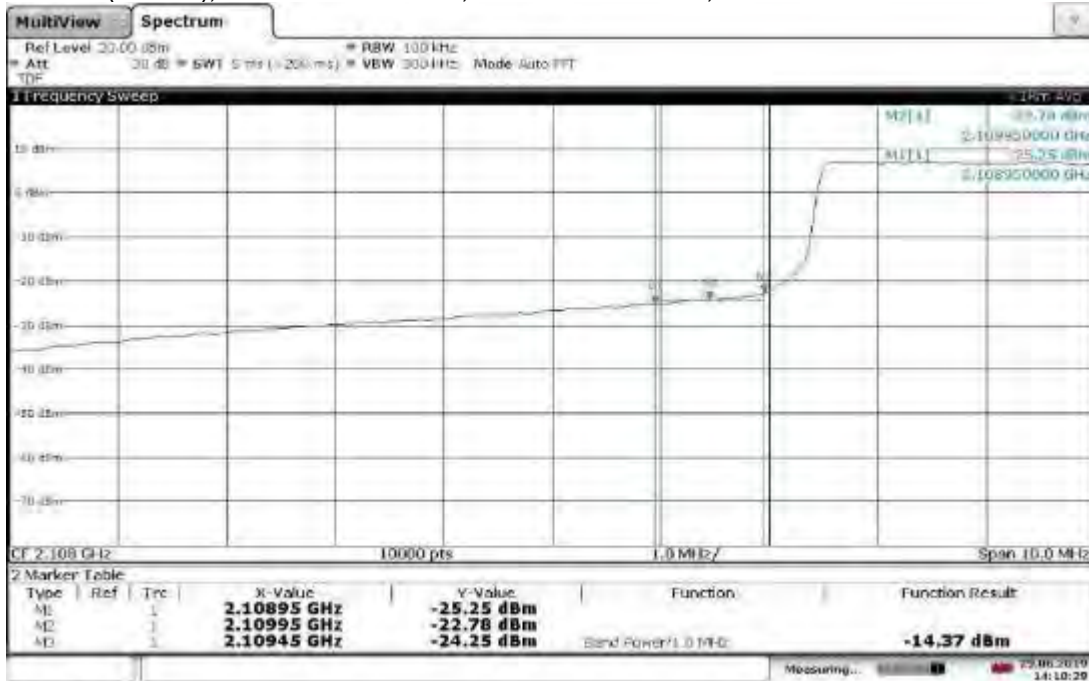
11:45:30 23.07.2019

Band Edge Compliant, Lower Band Edge, 2115 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



14:08:29 29.06.2019

Band Edge Compliant, Lower Band Edge, 2115 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



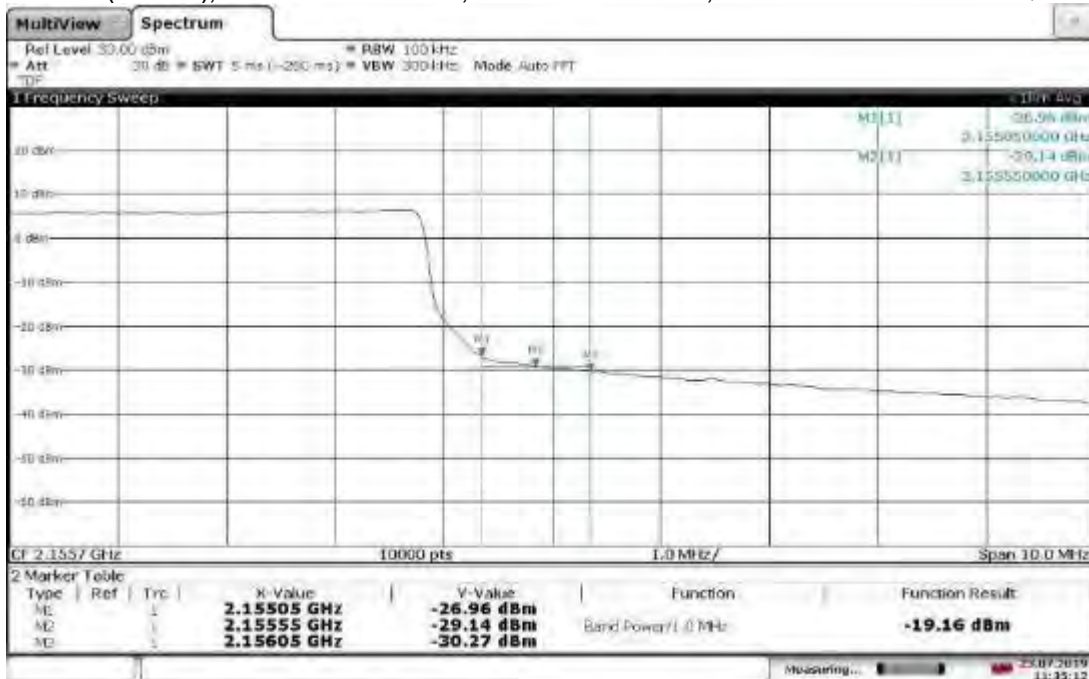
14:10:29 29.06.2019

Band Edge Compliant, Upper Band Edge, 2150 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



11:36:37 23.07.2019

Band Edge Compliant, Upper Band Edge, 2150 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



11:35:13 23.07.2019

Band Edge Compliant, Lower Band Edge, 2117.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



12:26:48 29.06.2019

Band Edge Compliant, Lower Band Edge, 2117.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



12:29:07 29.06.2019

Band Edge Compliant, Upper Band Edge, 2147.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



11:26:34 23.07.2019

Band Edge Compliant, Upper Band Edge, 2147.5 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



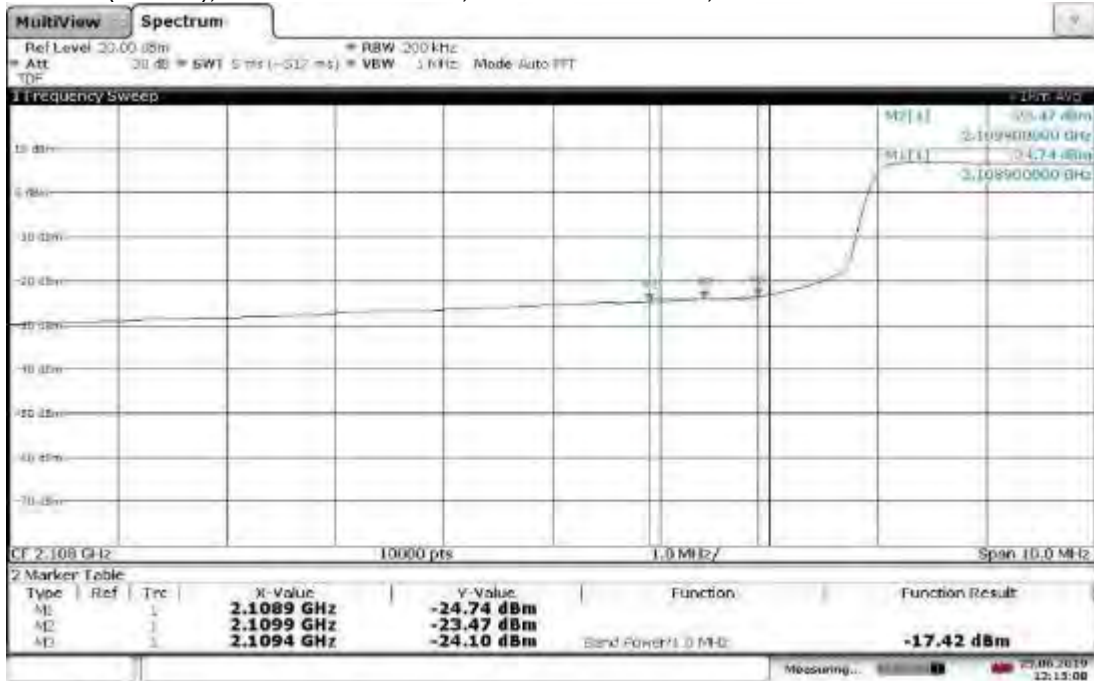
11:28:06 23.07.2019

Band Edge Compliant, Lower Band Edge, 2120 MHz
 Slot 1 (Band 4), 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 4), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



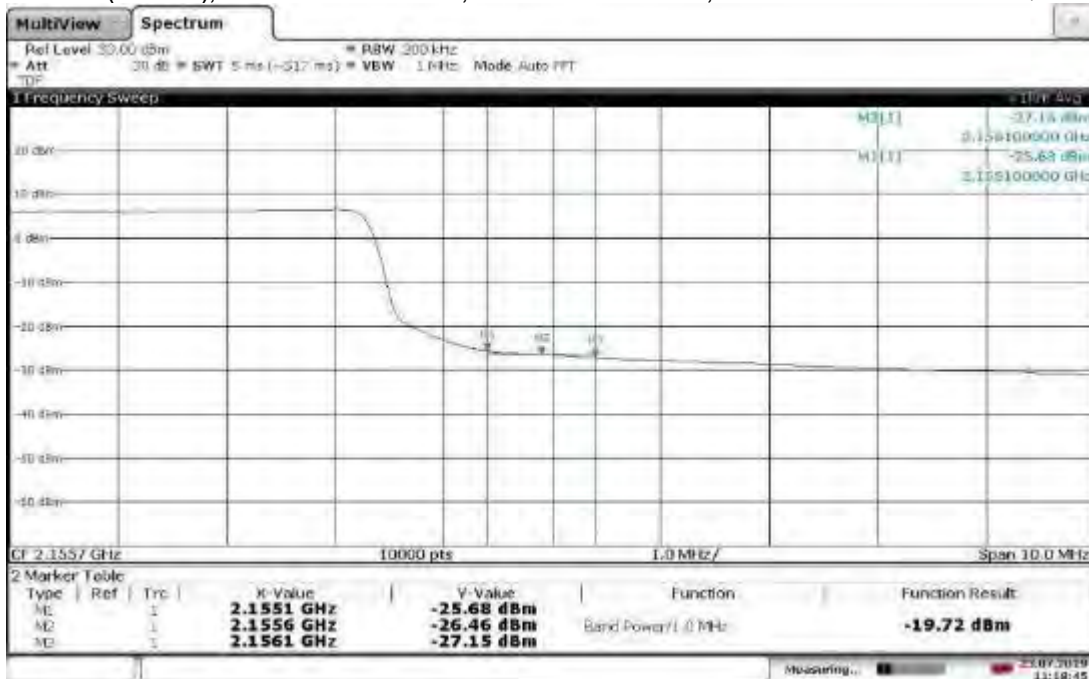
12:15:09 29.06.2019

Band Edge Compliant, Upper Band Edge, 2145 MHz
 Slot 1 (Band 4), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



11:21:27 23.07.2019

Band Edge Compliant, Upper Band Edge, 2145 MHz
 Slot 1 (Band 4), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



11:18:45 23.07.2019

Test Personnel: Kouma Sinn *KPS*
Supervising/Reviewing

Test Date: 06/29/2019, 07/23/2019

Engineer:
(Where Applicable) N/A

Product Standard: FCC Part 27
Input Voltage: 48 VDC (POE)

Limit Applied: See report section 9.3

Pretest Verification w/
Ambient Signals or
BB Source: N/A

Ambient Temperature: 23, 21 °C

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
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 2110-2155 MHz.

Intertek

Report Number: 103866582BOX-24a

Issued: 08/14/2019

Frequency stability over temperature					
Band 4, Modulation: QPSK, Bandwidth: 5MHz, Antenna Port: ANT0, Channel: Low 2112.5 MHz					
Low Edge of Occupied Bandwidth					
Temperature (Deg. C)	Low Edge (GHz)	Low Edge Deviation (GHz)	Low Edge (%) --	PPM --	Limit PPM
-30	2.11022395	-3.83E-06	-1.81498E-06	-0.02	2.5
-20	2.11020987	1.025E-05	4.85731E-06	0.05	2.5
-10	2.11021135	8.77E-06	4.15596E-06	0.04	2.5
0	2.11020495	-1.517E-05	-7.18882E-06	-0.07	2.5
10	2.11022012	0	0	0.00	2.5
20	2.11022012	0	0	0.00	--
30	2.11023141	1.129E-05	5.35015E-06	0.05	2.5
40	2.11023162	1.15E-05	5.44967E-06	0.05	2.5
50	2.11021941	-7.1E-07	-3.36458E-07	0.00	2.5
Upper Edge of Occupied Bandwidth					
Temperature (Deg. C)	Upper Edge (GHz)	Upper Edge Deviation (GHz)	Upper Edge (%) --	PPM --	Limit 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	2.11474772	-5.02E-06	-2.3738E-06	-0.02	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

Intertek

Report Number: 103866582BOX-24a

Issued: 08/14/2019

Frequency stability over temperature					
Band 4, Modulation: QPSK, Bandwidth: 5MHz, Antenna Port: ANT0 , Channel: High Channel 2152.5 MHz					
Low Edge of Occupied Bandwidth					
Temperature (Deg. C)	Low Edge (GHz)	Low Edge Deviation (GHz)	Low Edge (%) --	PPM --	Limit PPM
-30	2.15022006	-1.31E-06	-6.0924E-07	-0.01	2.5
-20	2.15021101	7.74E-06	3.59963E-06	0.04	2.5
-10	2.15021215	6.6E-06	3.06946E-06	0.03	2.5
0	2.15021752	-1.23E-06	-5.72035E-07	-0.01	2.5
10	2.15021189	-6.86E-06	-3.19037E-06	-0.03	2.5
20	2.15021875	0	0	0.00	--
30	2.15021587	-2.88E-06	-1.3394E-06	-0.01	2.5
40	2.15021881	6E-08	2.79041E-08	0.00	2.5
50	2.15022622	7.47E-06	3.47407E-06	0.03	2.5
Upper Edge of Occupied Bandwidth					
Temperature (Deg. C)	Upper Edge (GHz)	Upper Edge Deviation (GHz)	Upper Edge (%) --	PPM --	Limit PPM
-30	2.154751	-4.69E-06	-2.17659E-06	-0.02	2.5
-20	2.15473889	7.42E-06	3.44356E-06	0.03	2.5
-10	2.15474955	-3.24E-06	-1.50366E-06	-0.02	2.5
0	2.15474775	1.44E-06	6.68292E-07	0.01	2.5
10	2.15474385	-2.46E-06	-1.14167E-06	-0.01	2.5
20	2.15474631	0	0	0.00	--
30	2.15475579	9.48E-06	4.39959E-06	0.04	2.5
40	2.15474689	5.8E-07	2.69173E-07	0.00	2.5
50	2.15474896	2.65E-06	1.22984E-06	0.01	2.5

Intertek

Report Number: 103866582BOX-24a

Issued: 08/14/2019

Frequency stability over temperature					
Band 4, Modulation: QPSK, Bandwidth: 20MHz, Antenna Port: ANT0, Channel: Low Channel 2120 MHz					
Low Edge of Occupied Bandwidth					
Temperature (Deg. C)	Low Edge (GHz)	Low Edge Deviation (GHz)	Low Edge (%) --	PPM --	Limit PPM
-30	2.11103921	-1.275E-05	-6.03972E-06	-0.06	2.5
-20	2.11103434	-7.88E-06	-3.73278E-06	-0.04	2.5
-10	2.11101582	1.064E-05	5.0402E-06	0.05	2.5
0	2.11101778	-8.68E-06	-4.11174E-06	-0.04	2.5
10	2.11101906	-7.4E-06	-3.5054E-06	-0.04	2.5
20	2.11102646	0	0	0.00	--
30	2.11103017	3.71E-06	1.75744E-06	0.02	2.5
40	2.11100307	-2.339E-05	-1.10799E-05	-0.11	2.5
50	2.11104222	1.576E-05	7.46556E-06	0.07	2.5
Upper Edge of Occupied Bandwidth					
Temperature (Deg. C)	Upper Edge (GHz)	Upper Edge Deviation (GHz)	Upper Edge (%) --	PPM --	Limit 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

Intertek

Report Number: 103866582BOX-24a

Issued: 08/14/2019

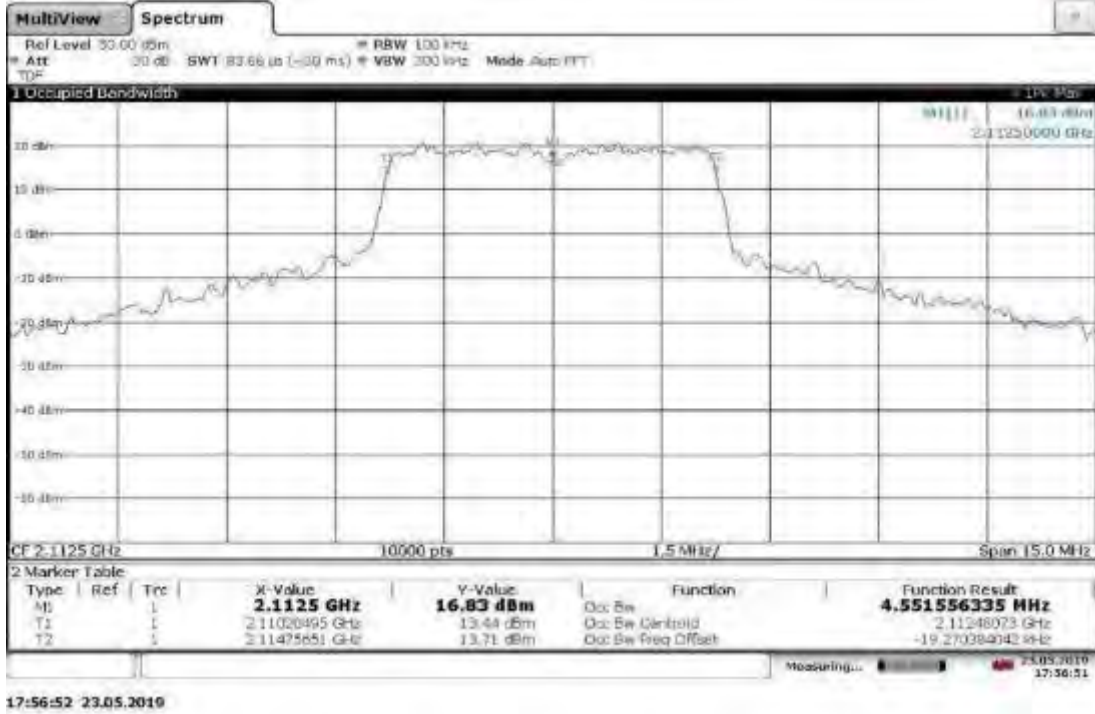
Frequency stability over temperature					
Band 4, Modulation: QPSK, Bandwidth: 20MHz, Antenna Port: ANT0, Channel: High Channel 2145 MHz					
Low Edge of Occupied Bandwidth					
Temperature (Deg. C)	Low Edge (GHz)	Low Edge Deviation (GHz)	Low Edge (%) --	PPM --	Limit PPM
-30	2.13601666	5.84E-06	2.73405E-06	0.03	2.5
-20	2.13599593	2.657E-05	1.2439E-05	0.12	2.5
-10	2.13600622	1.628E-05	7.62164E-06	0.08	2.5
0	2.13602077	-1.73E-06	-8.09917E-07	-0.01	2.5
10	2.13600232	-2.018E-05	-9.44747E-06	-0.09	2.5
20	2.1360225	0	0	0.00	--
30	2.13600602	-1.648E-05	-7.71527E-06	-0.08	2.5
40	2.13602367	1.17E-06	5.47747E-07	0.01	2.5
50	2.13599923	-2.327E-05	-1.08941E-05	-0.11	2.5
Upper Edge of Occupied Bandwidth					
Temperature (Deg. C)	Upper Edge (GHz)	Upper Edge Deviation (GHz)	Upper Edge (%) --	PPM --	Limit PPM
-30	2.15391807	-3.05E-06	-1.41603E-06	-0.01	2.5
-20	2.15393571	-2.069E-05	-9.60576E-06	-0.10	2.5
-10	2.15393415	-1.913E-05	-8.8815E-06	-0.09	2.5
0	2.15391973	4.71E-06	2.18672E-06	0.02	2.5
10	2.1539367	2.168E-05	1.00654E-05	0.10	2.5
20	2.15391502	0	0	0.00	--
30	2.1539548	3.978E-05	1.84687E-05	0.18	2.5
40	2.15391051	-4.51E-06	-2.09386E-06	-0.02	2.5
50	2.15392911	1.409E-05	6.54158E-06	0.07	2.5

10.4 Setup Photograph:

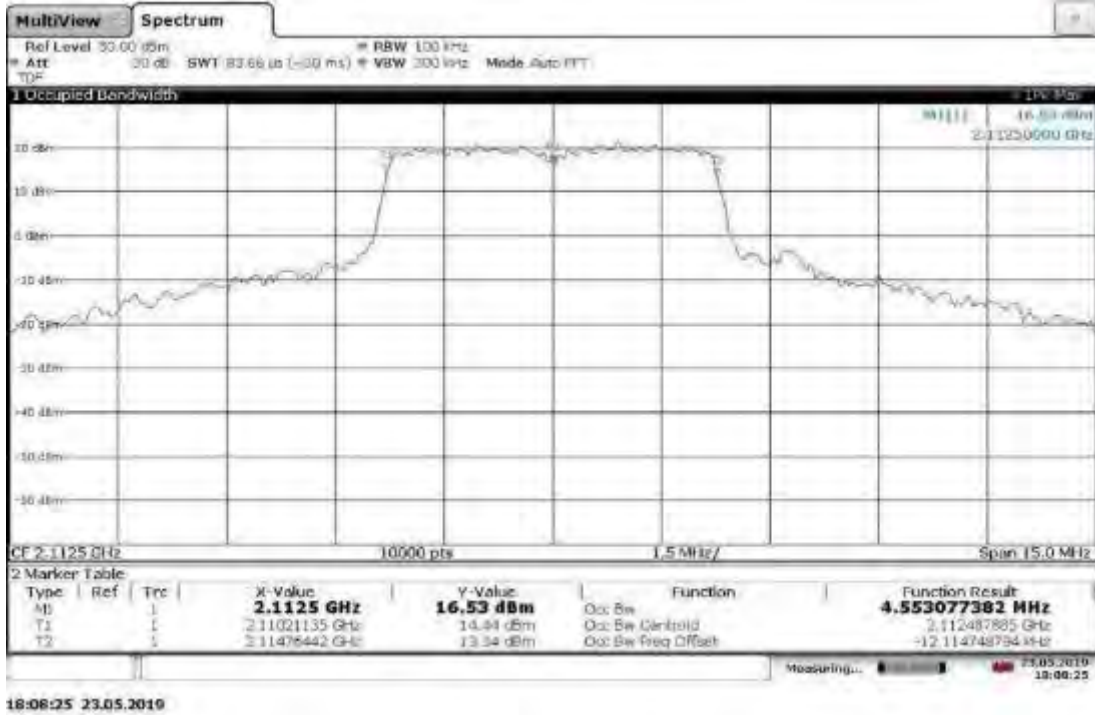


10.5 Plots/Data:

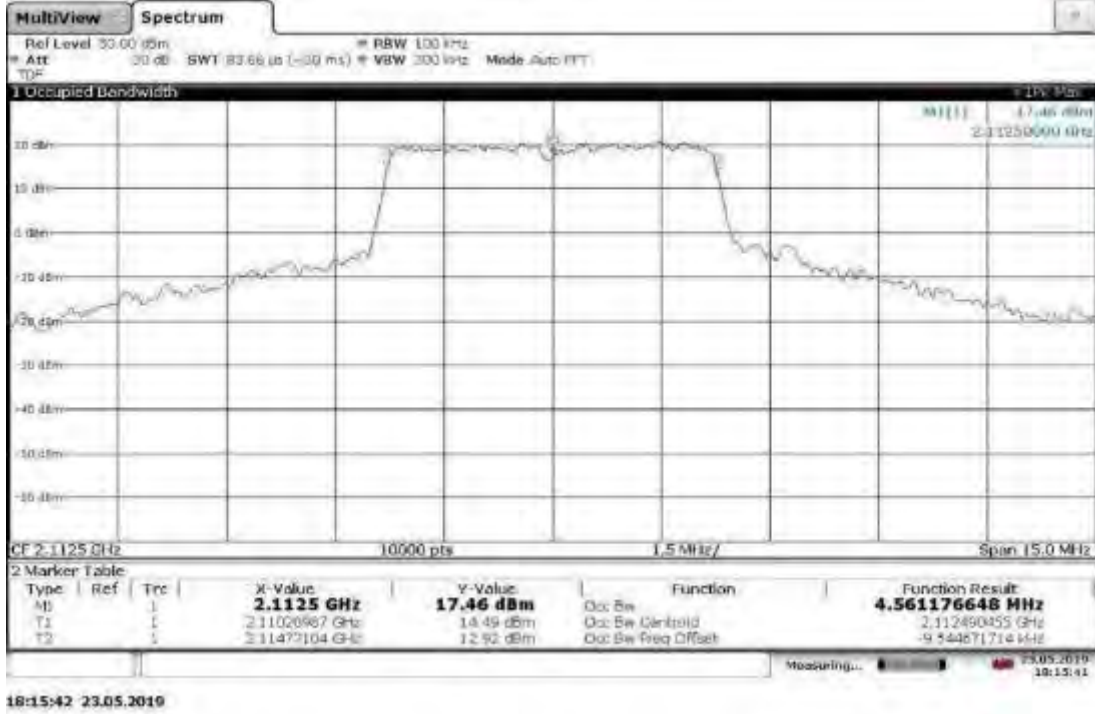
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 0 °C



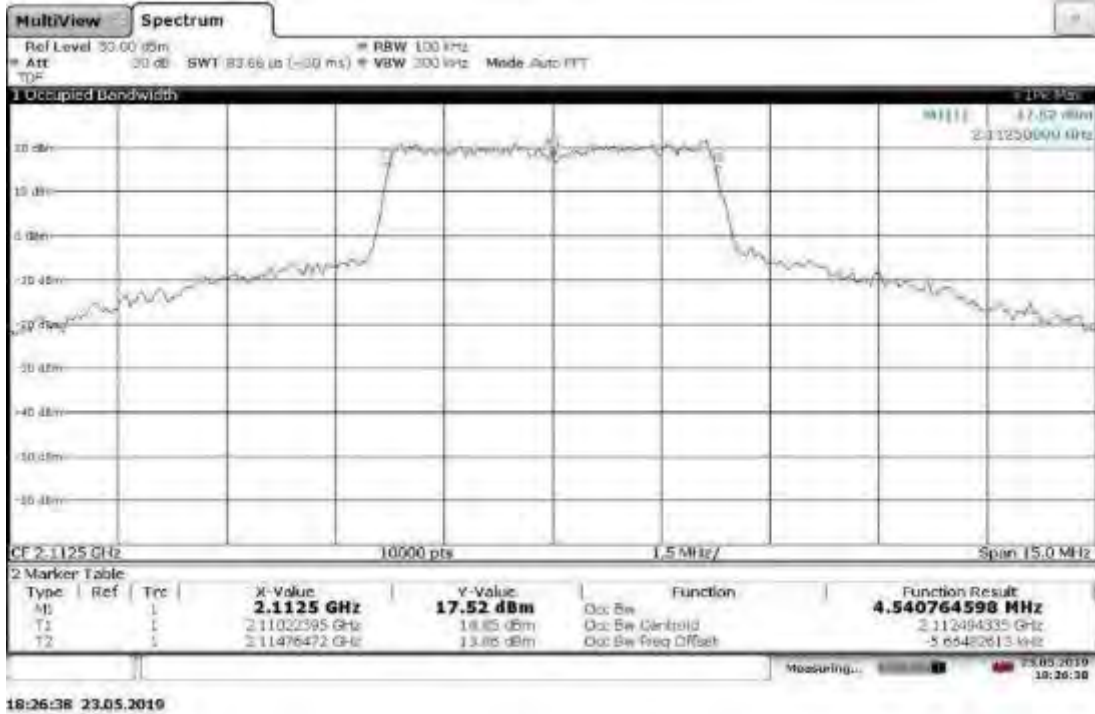
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, -10 °C



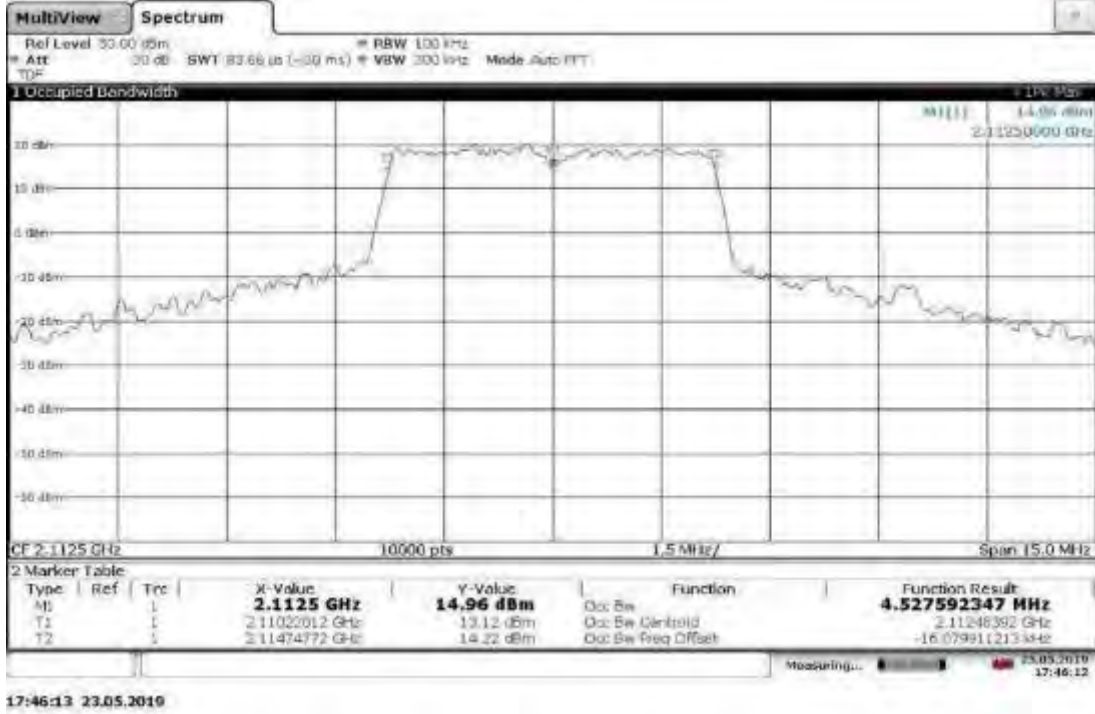
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, -20 °C



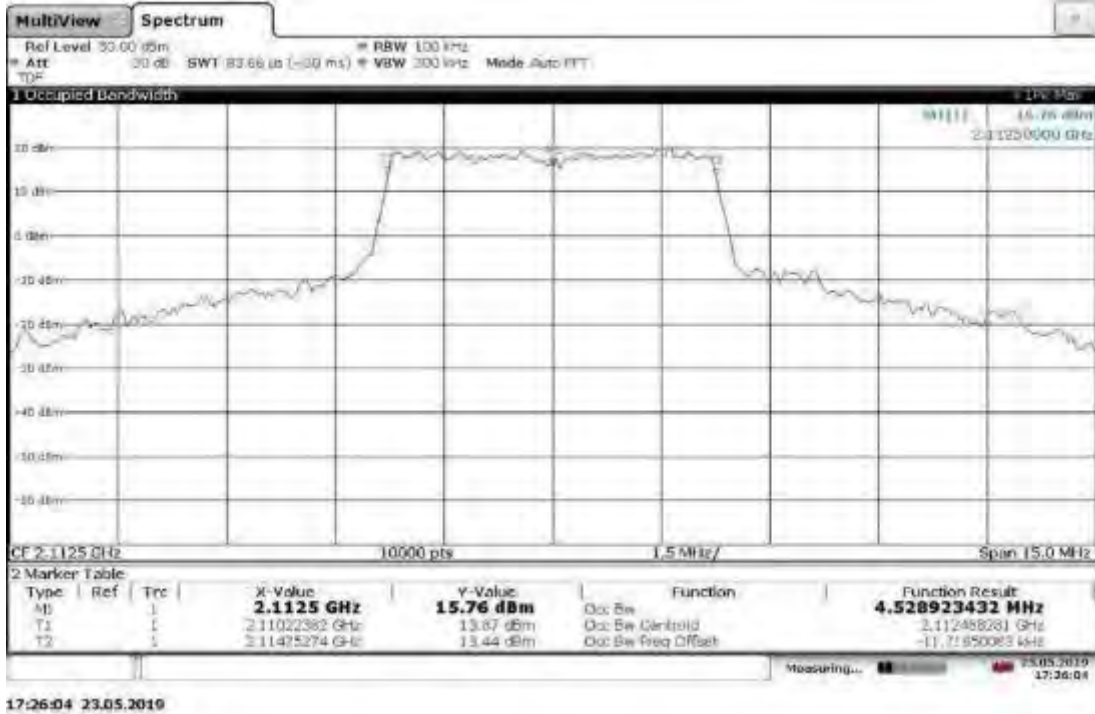
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, -30 °C



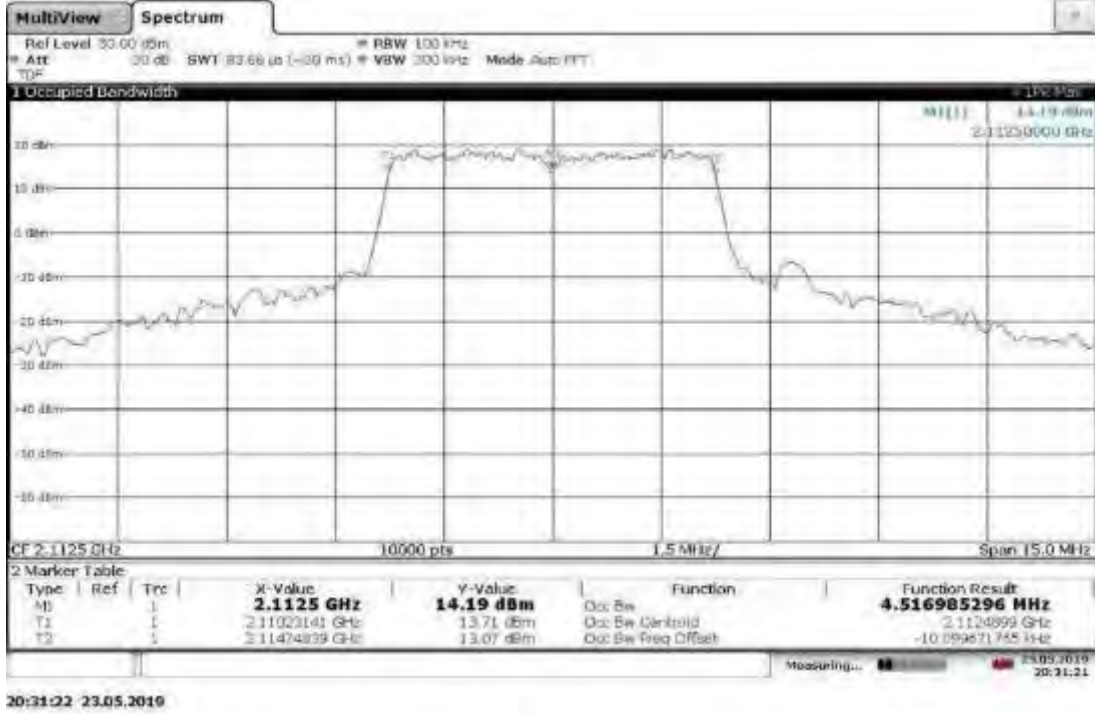
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 10 °C



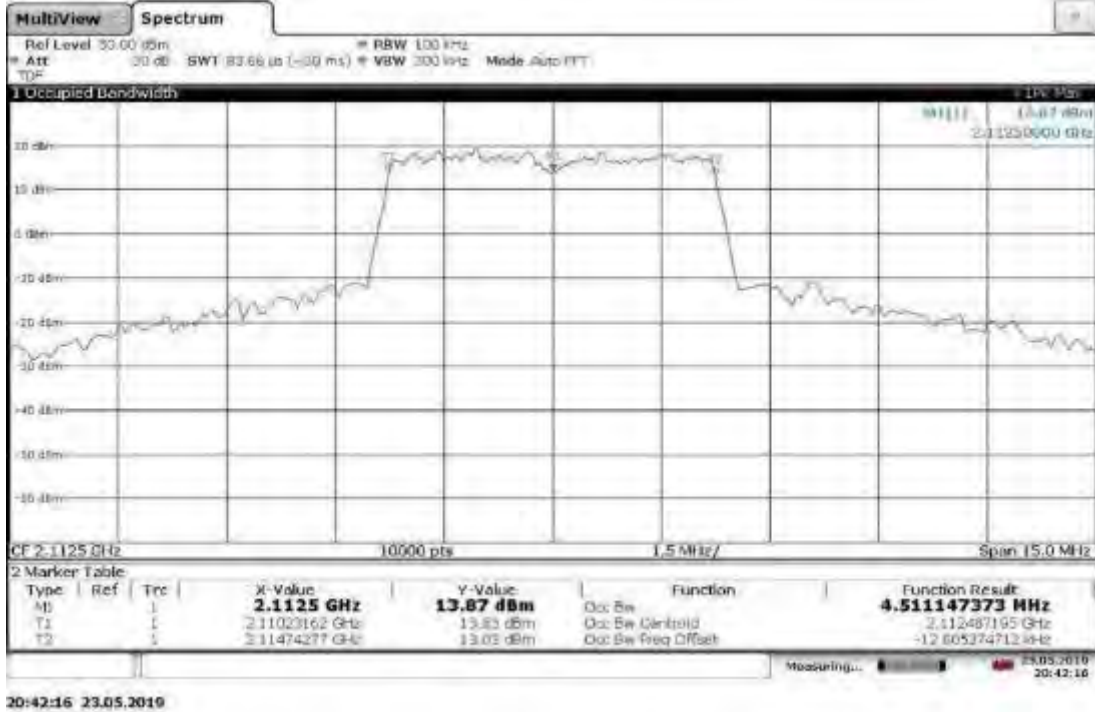
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 20 °C



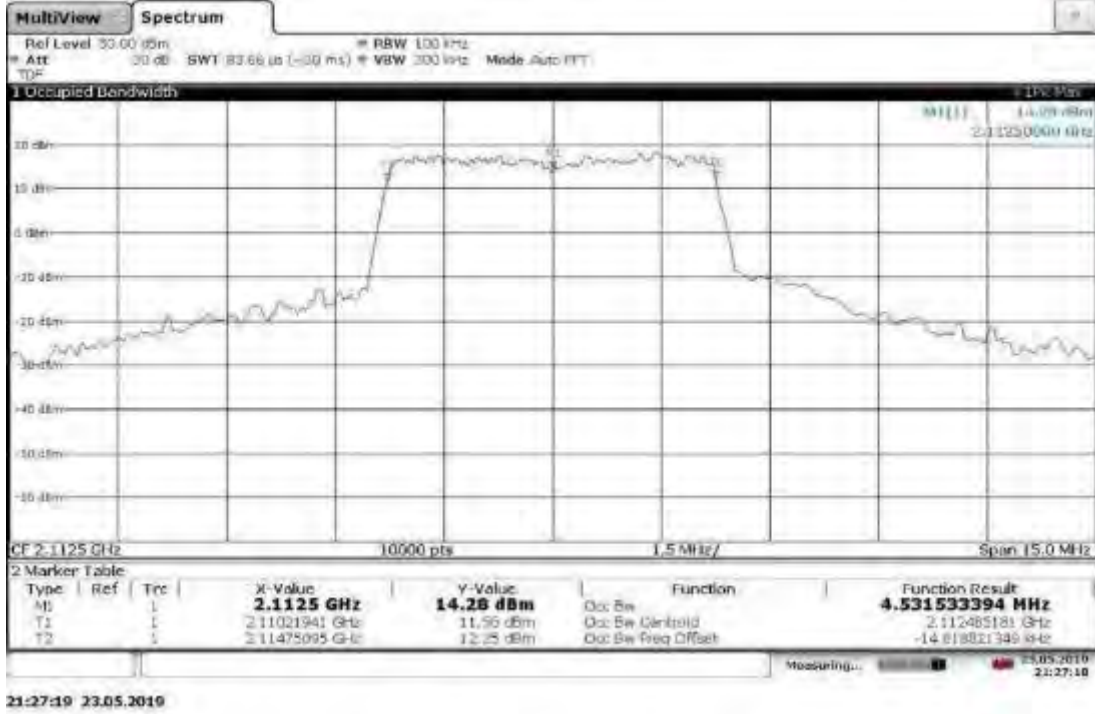
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 30 °C



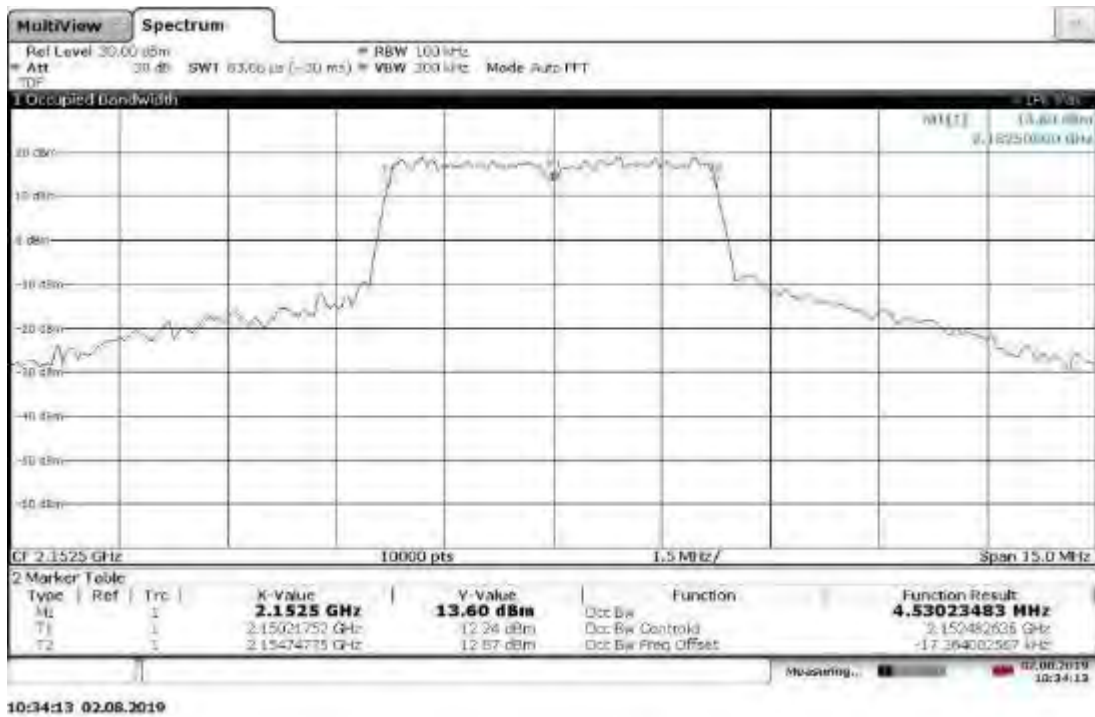
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Chanel 2112.5 MHz, 40 °C



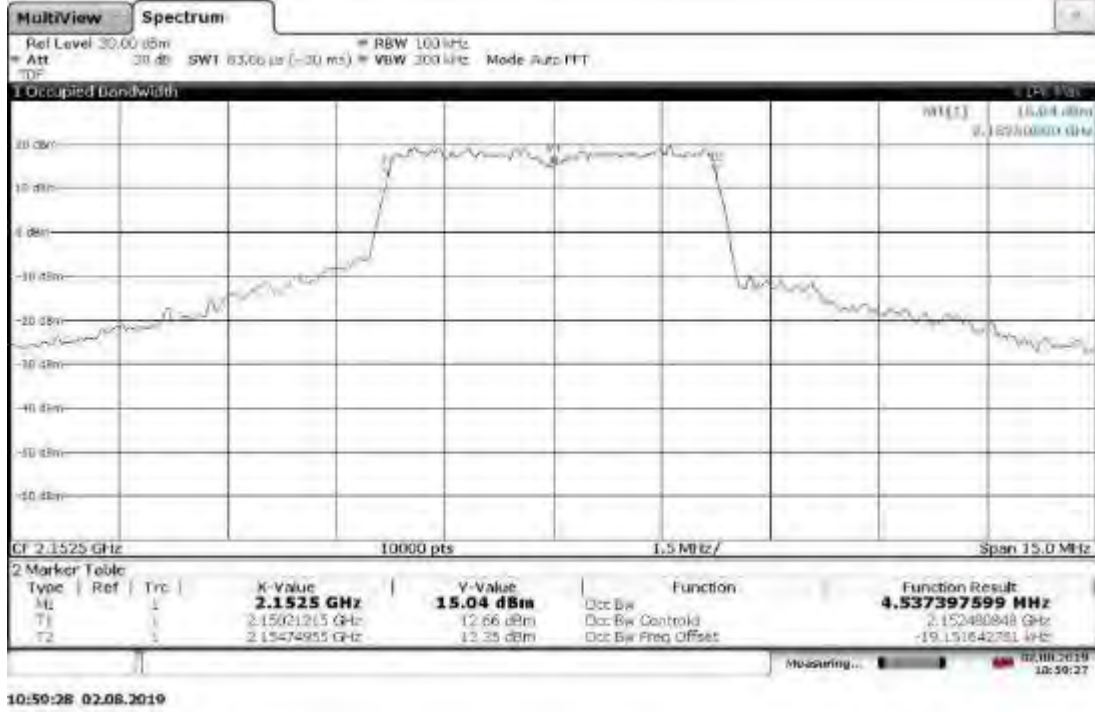
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 50 °C



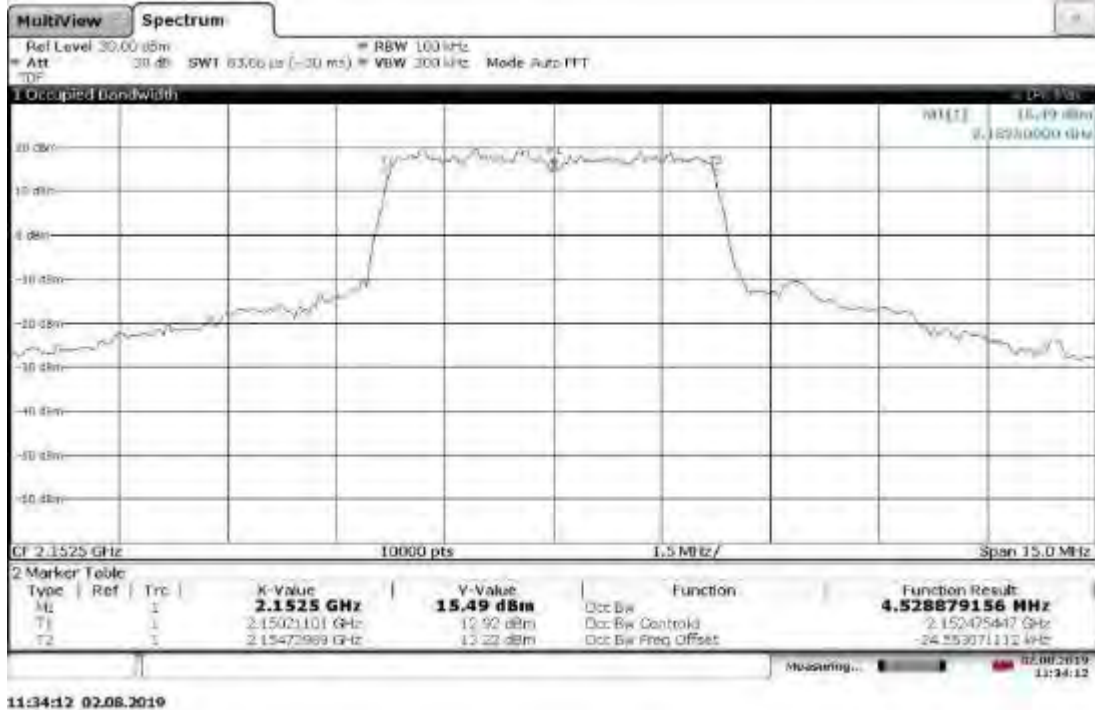
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2152.5 MHz, 0 °C



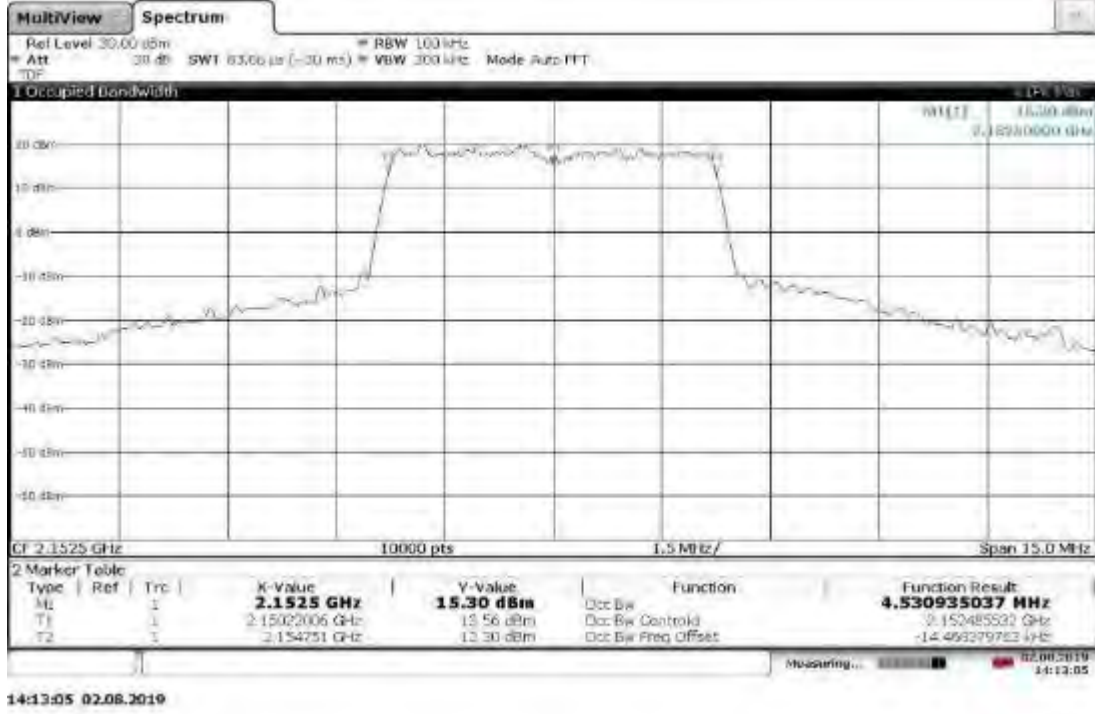
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2152.5 MHz, -10 °C



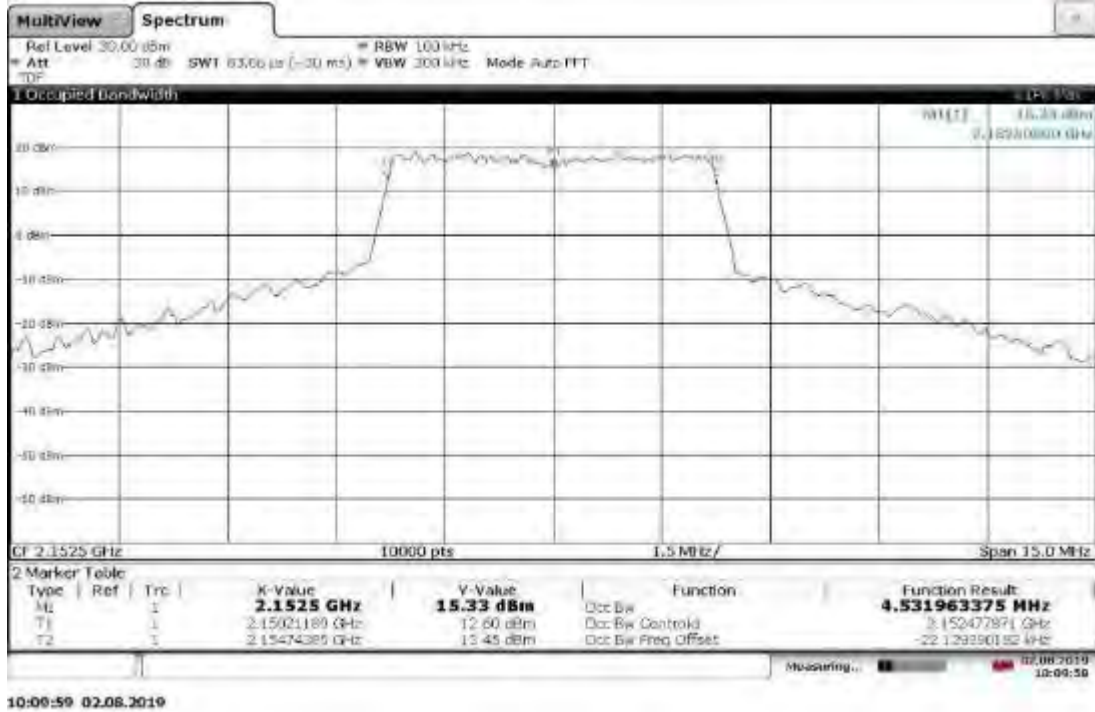
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2152.5 MHz, -20 °C



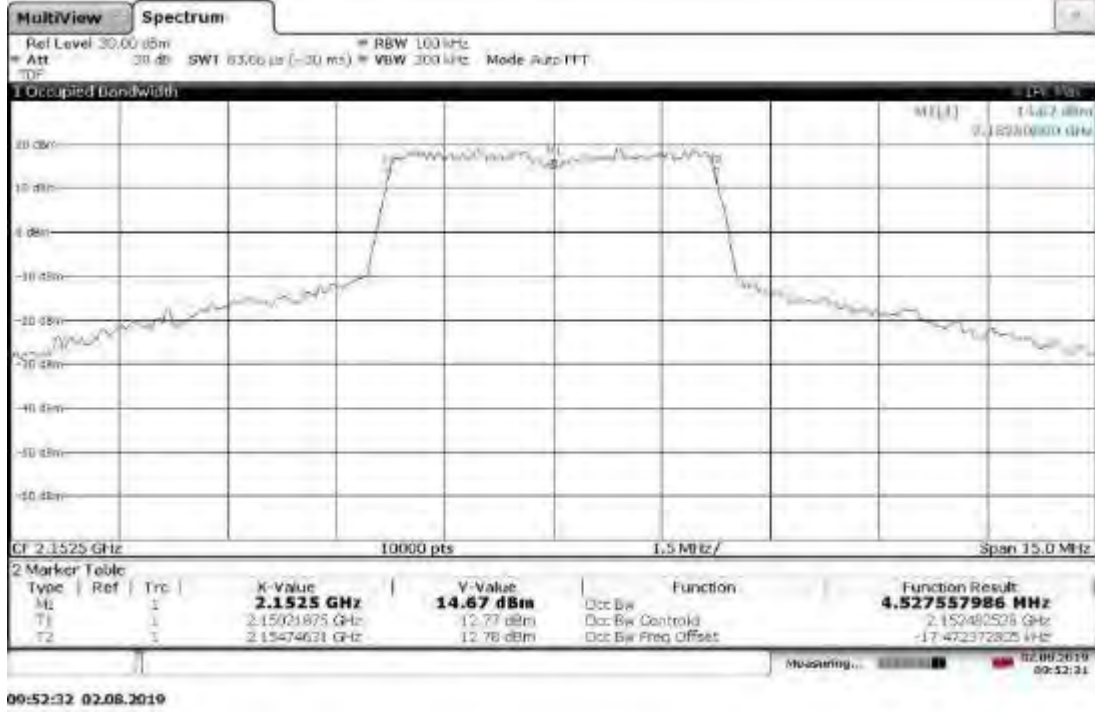
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2152.5 MHz, -30 °C



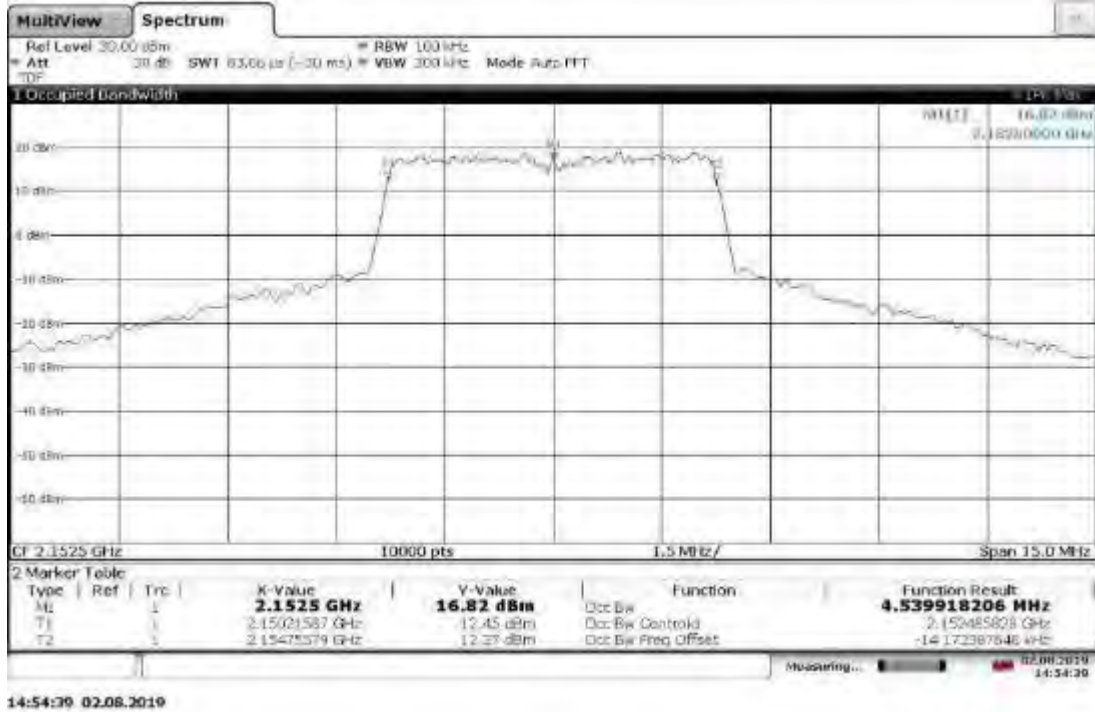
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2152.5 MHz, 10 °C



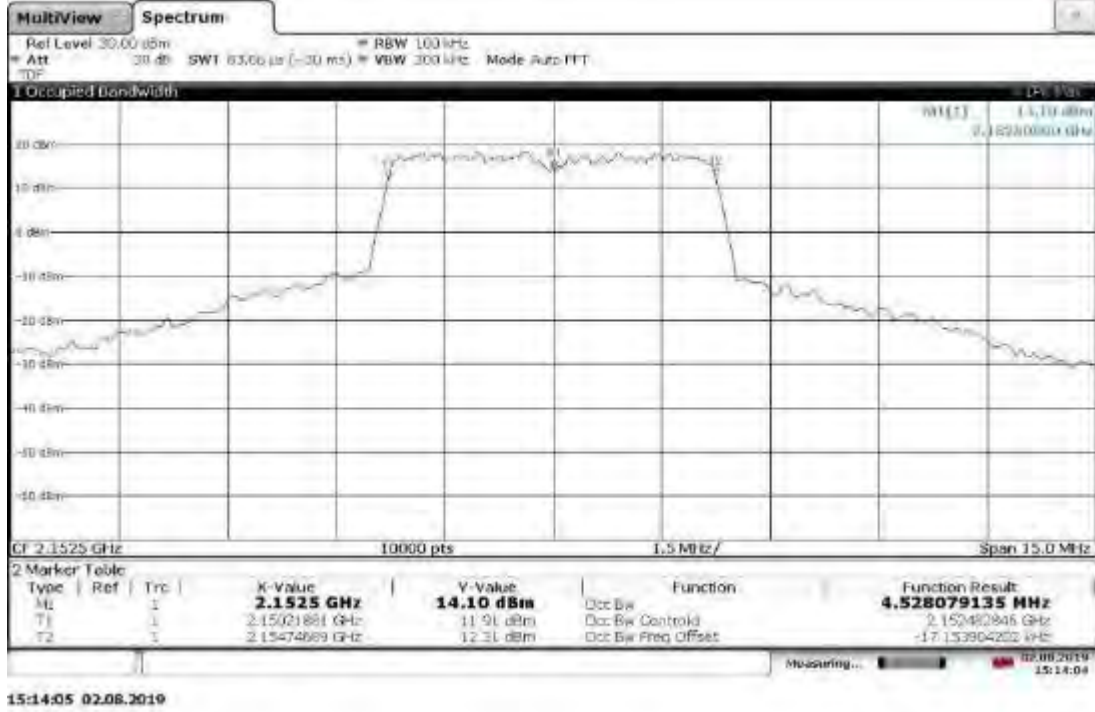
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2152.5 MHz, 20 °C



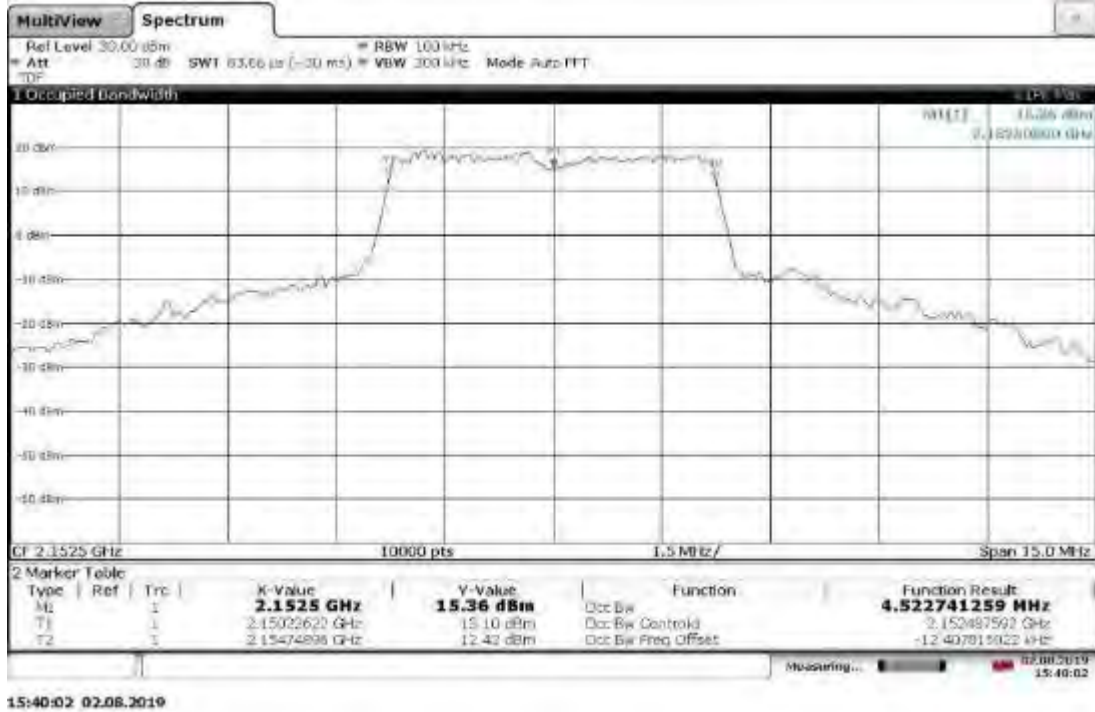
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2152.5 MHz, 30 °C



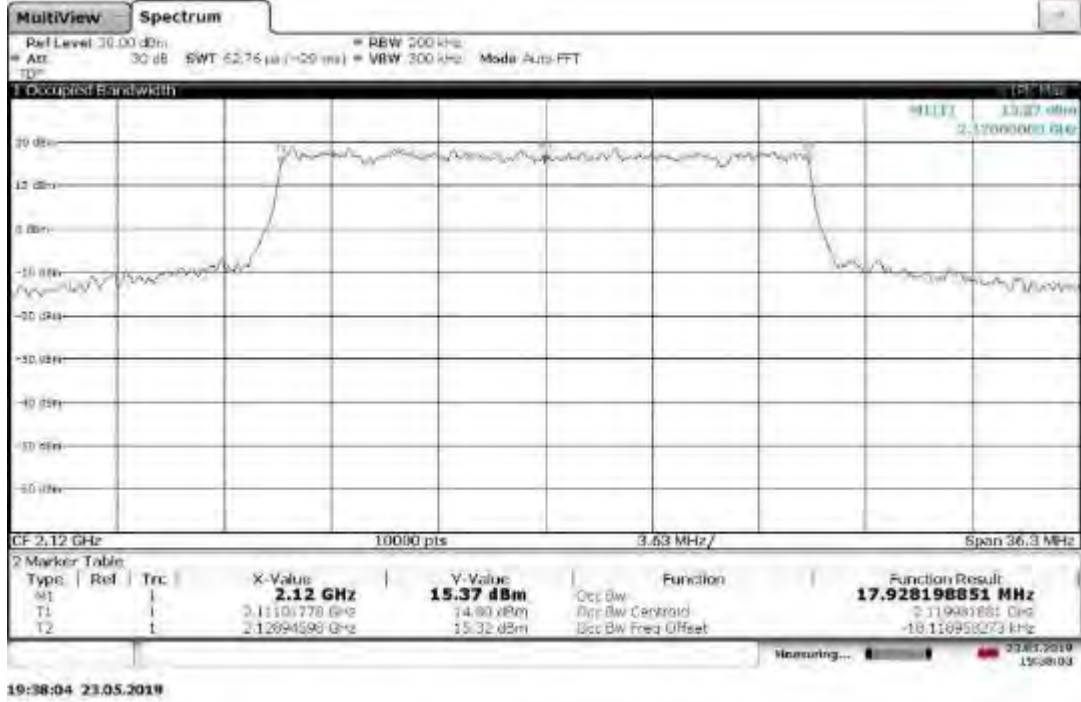
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2152.5 MHz, 40 °C



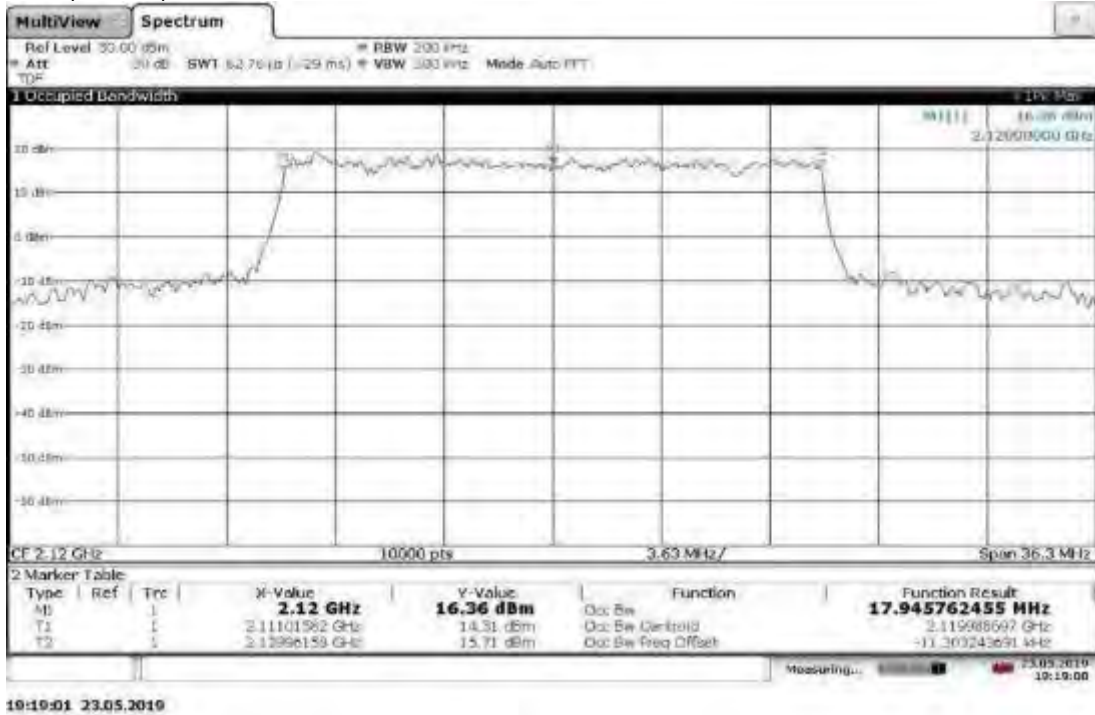
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2152.5MHz, 50 °C



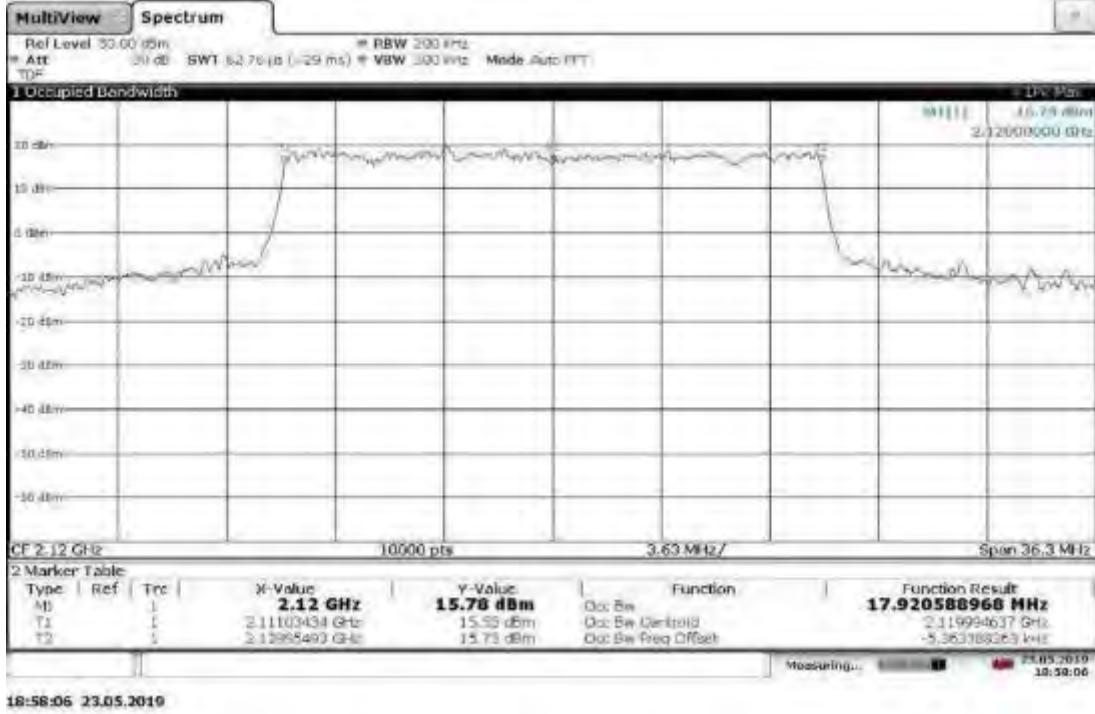
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, 0 °C



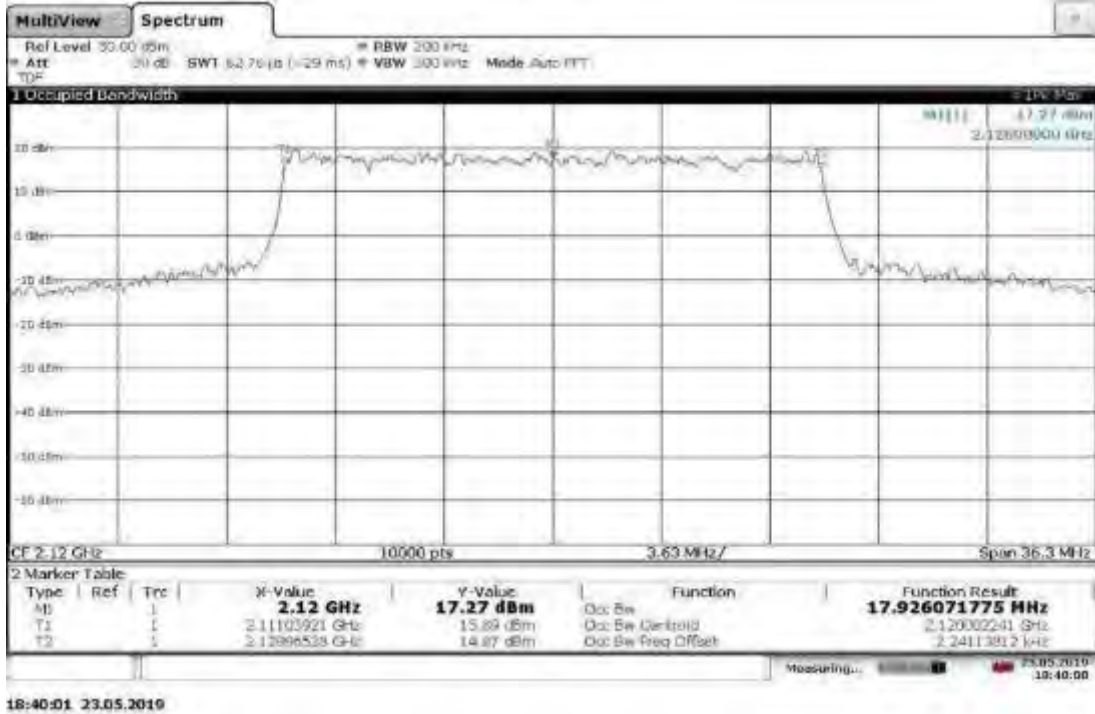
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, -10 °C



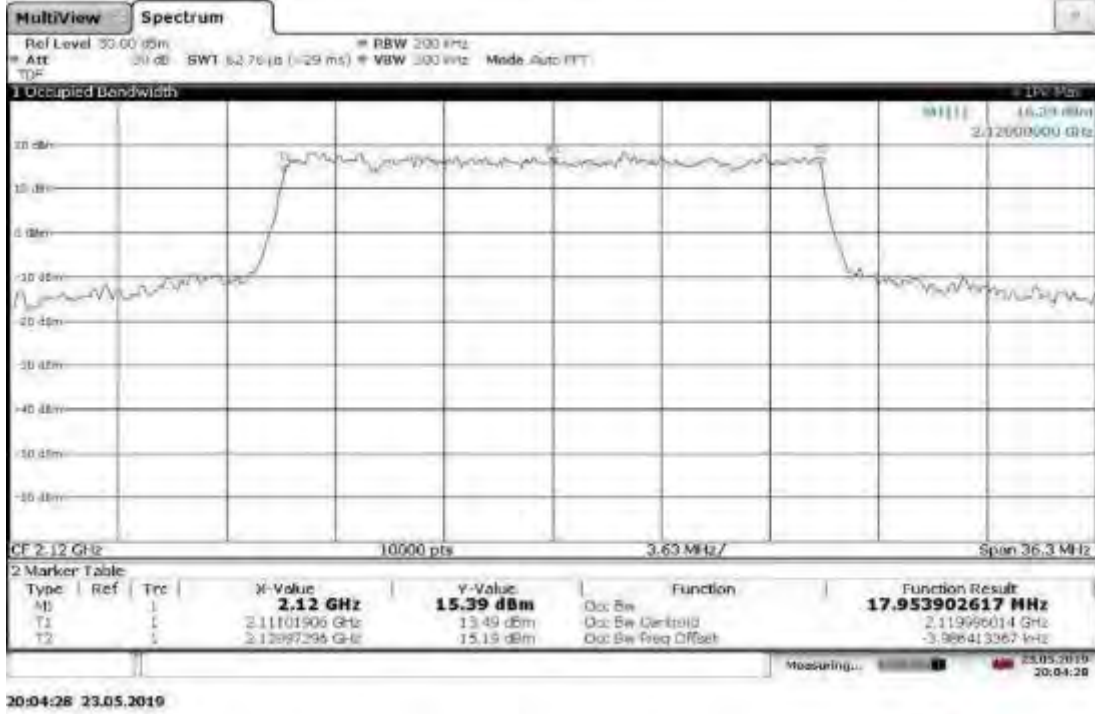
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, -20 °C



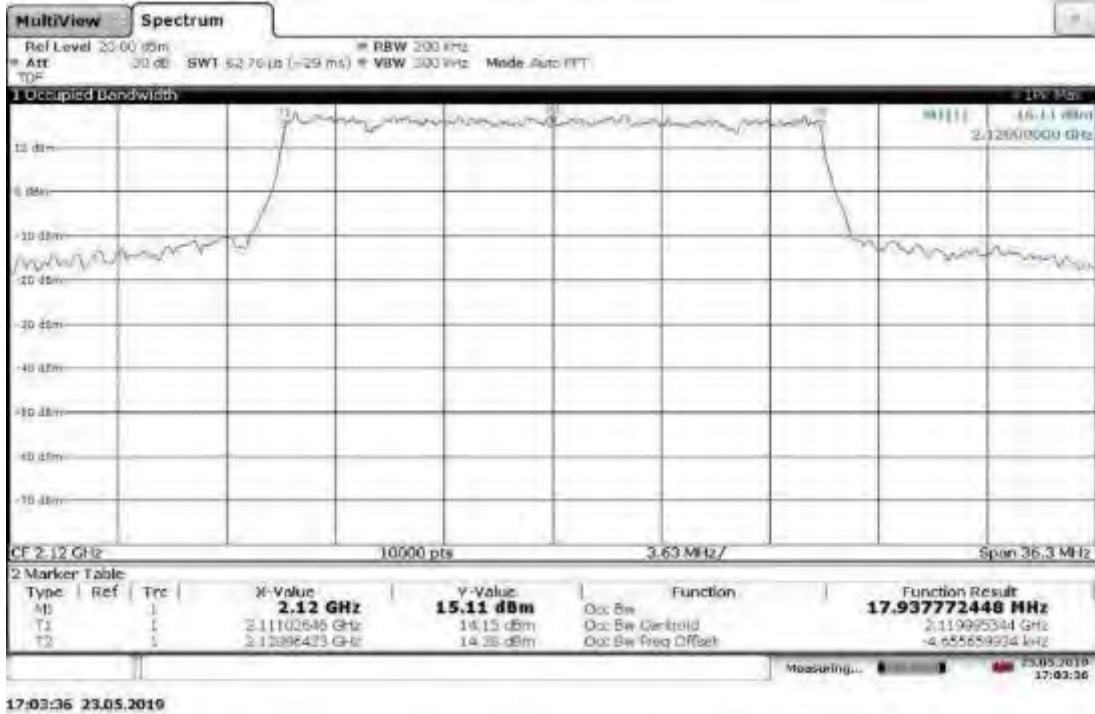
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, -30 °C



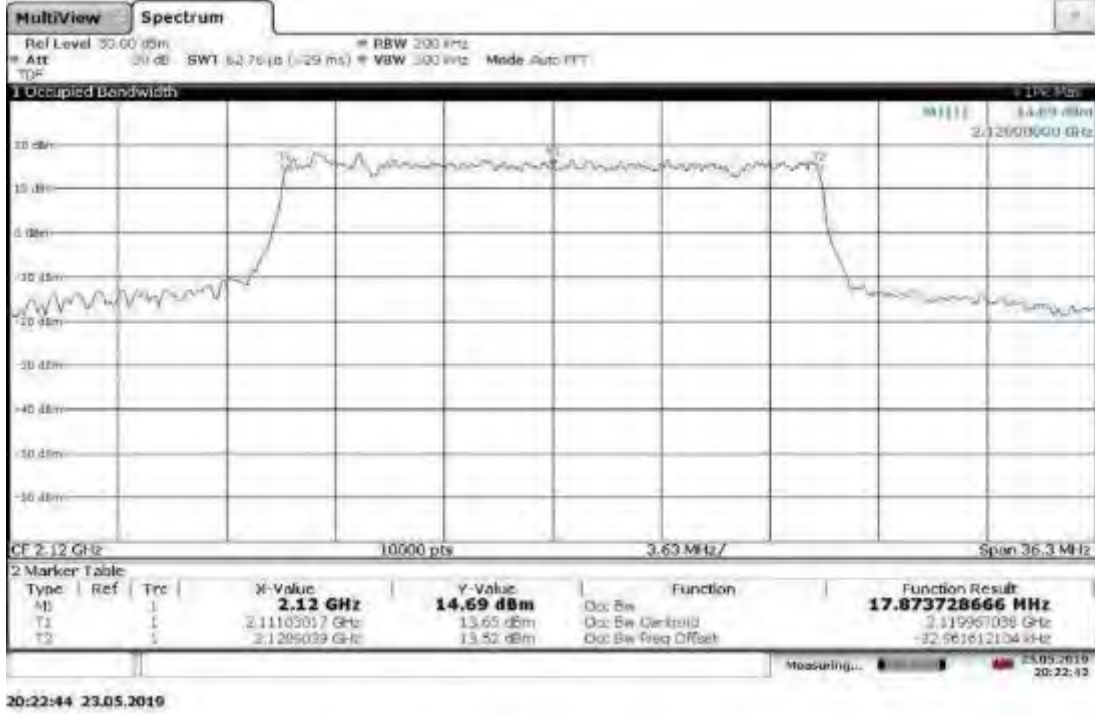
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, 10 °C



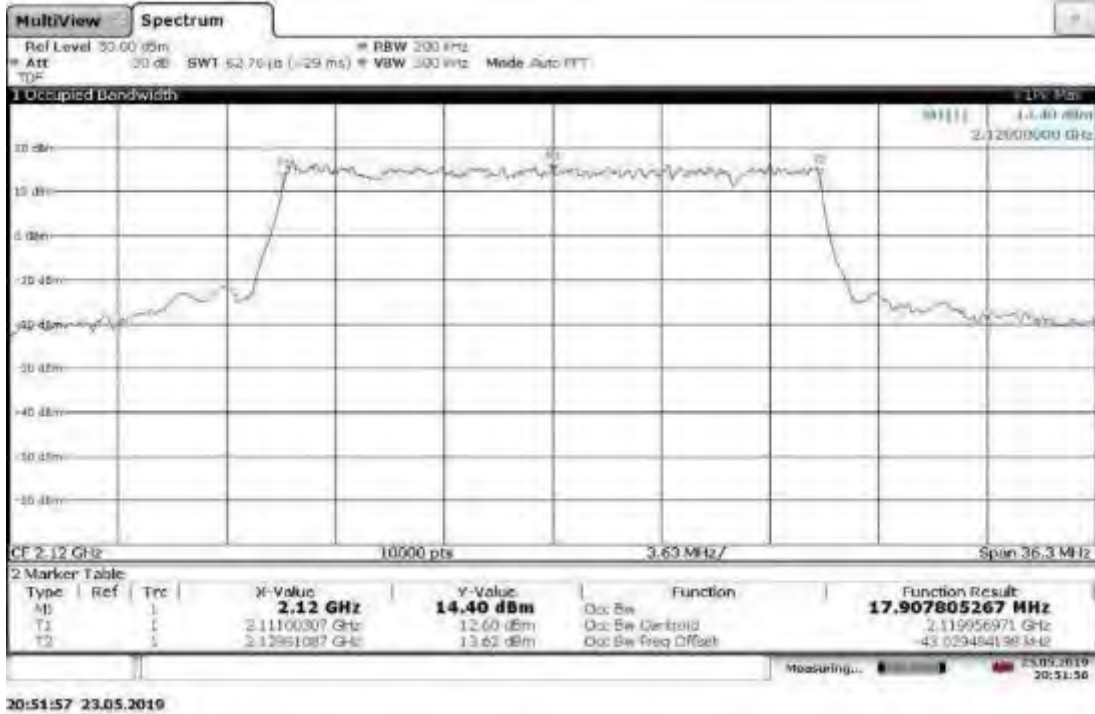
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, 20 °C



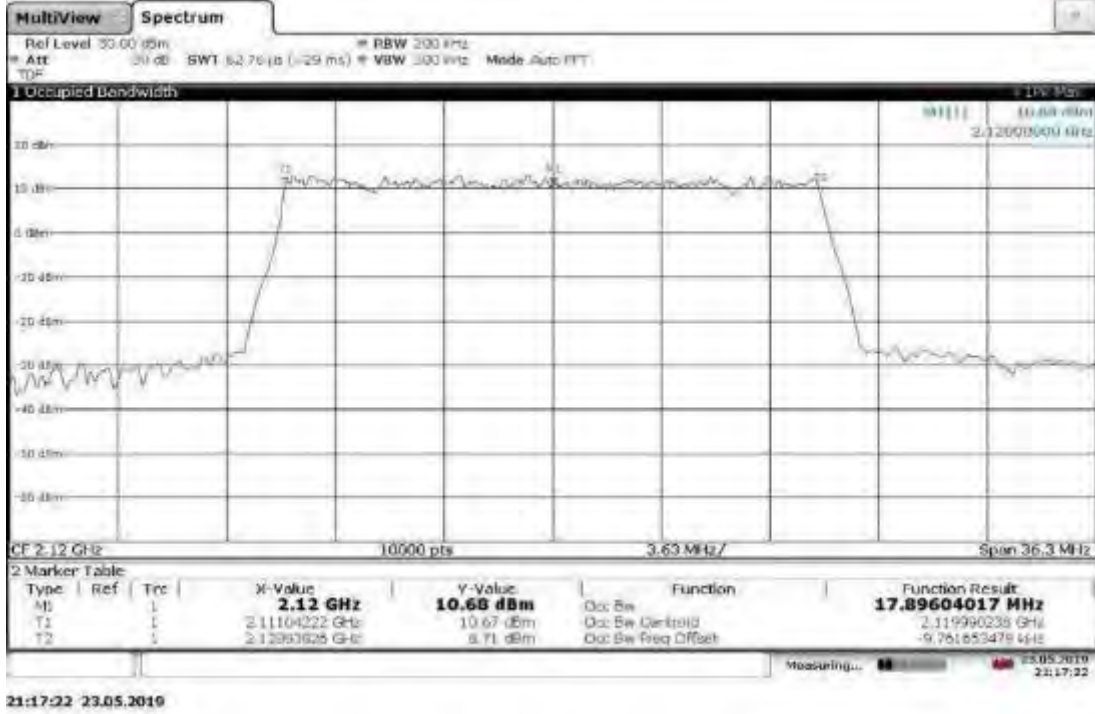
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, 30 °C



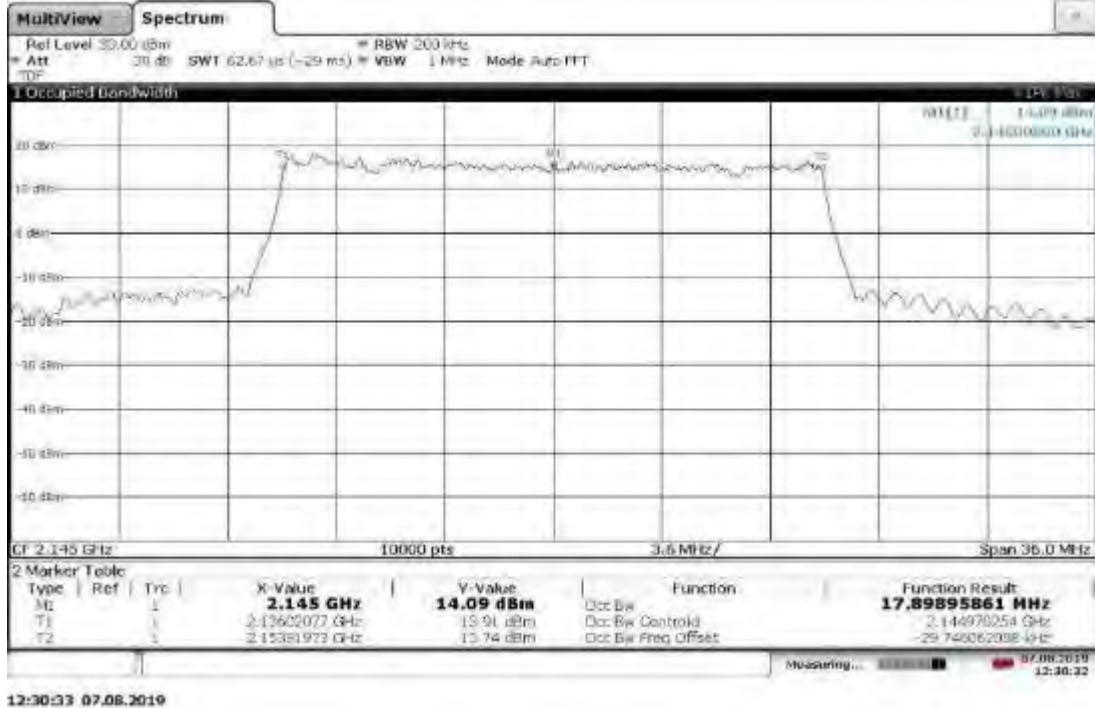
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, 40 °C



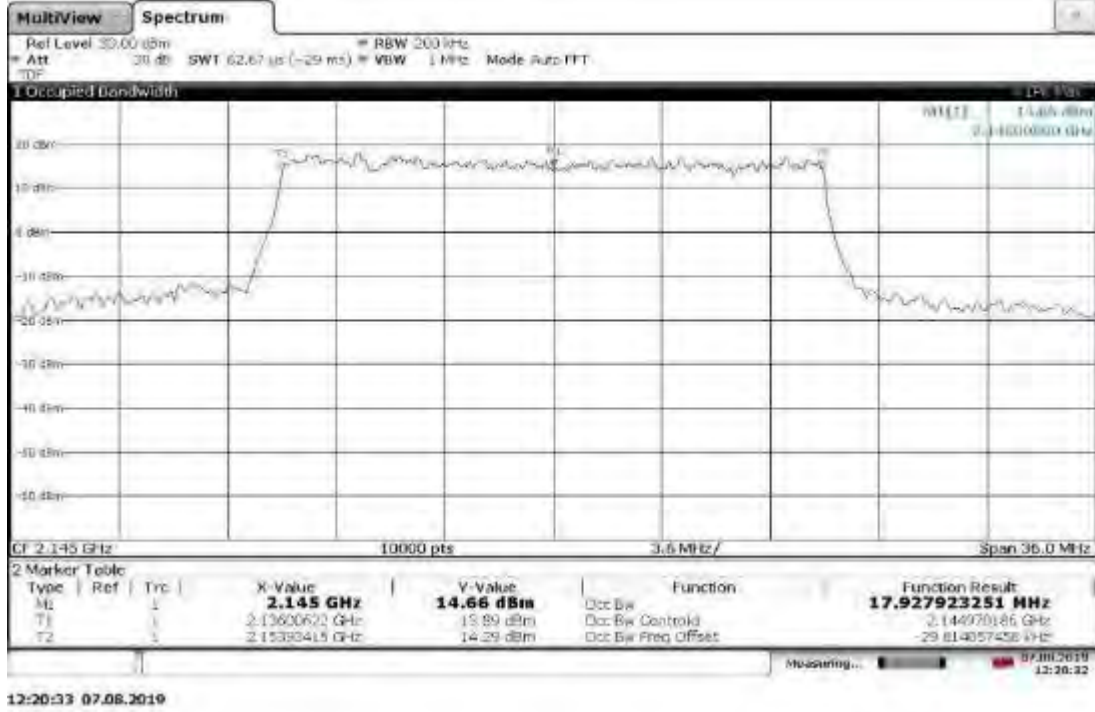
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz Low Channel 2120 MHz, 50 °C



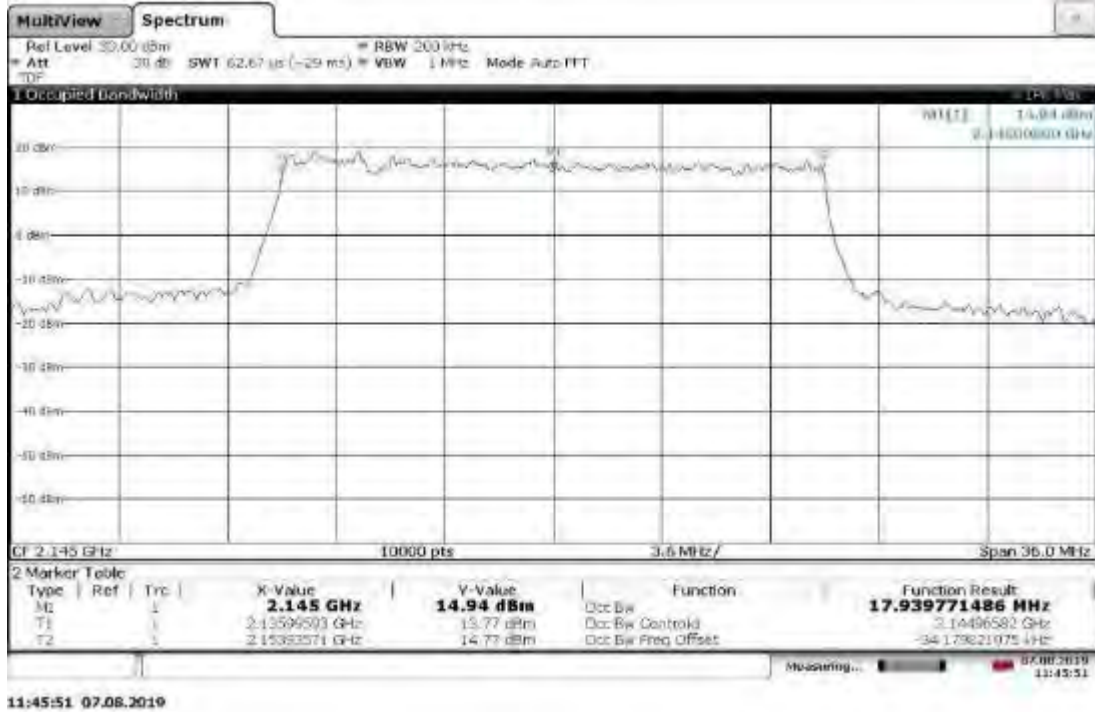
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2145 MHz, 0 °C



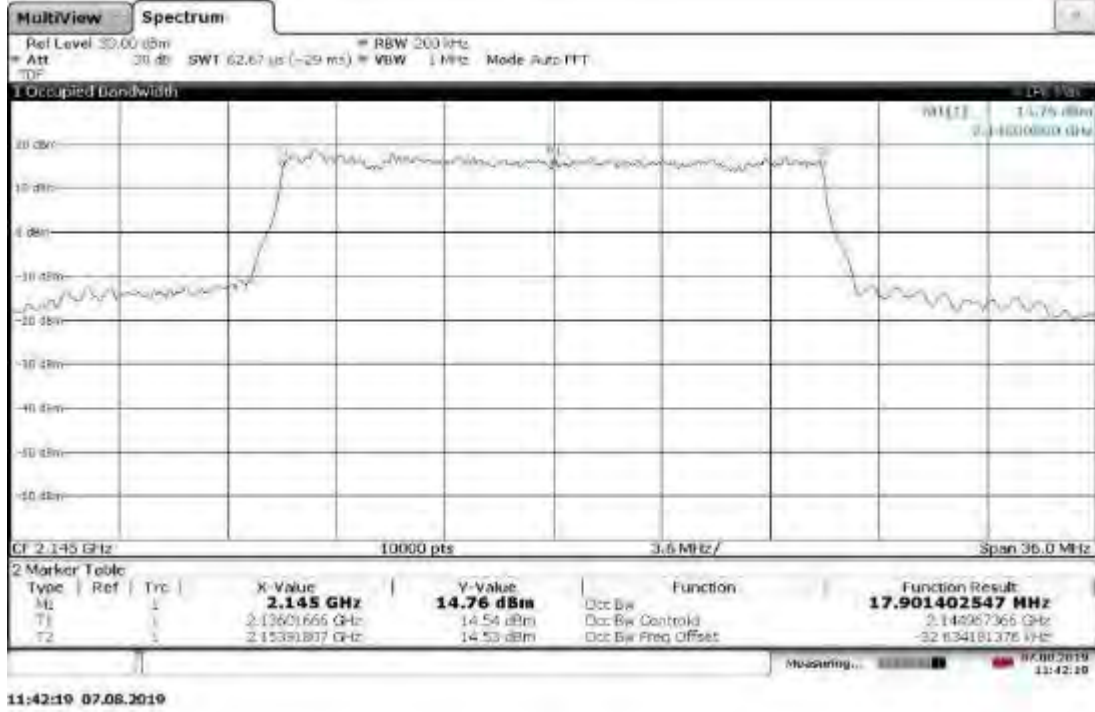
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2145 MHz, -10 °C



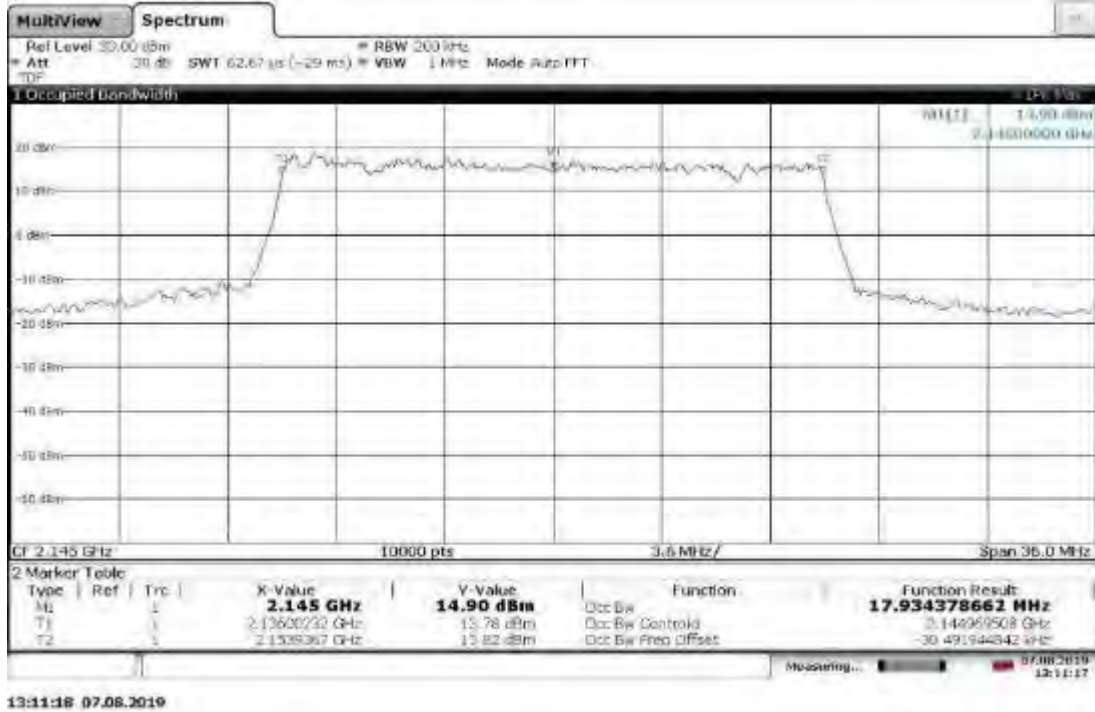
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2145 MHz, -20 °C



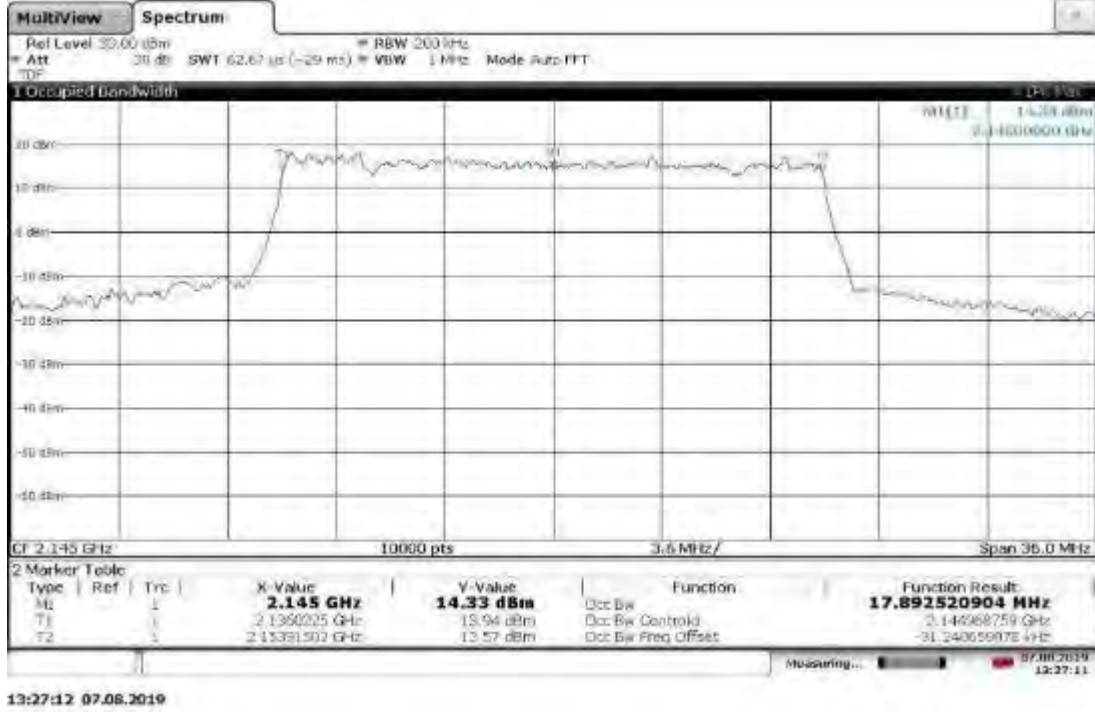
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2145 MHz, -30 °C



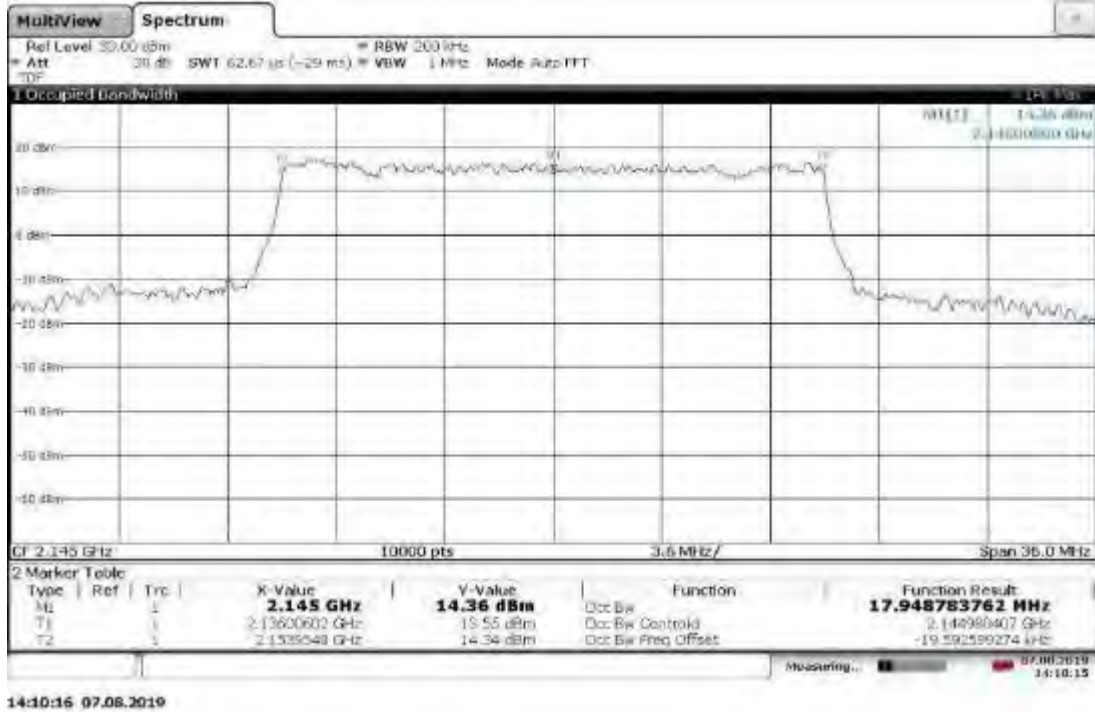
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2145 MHz, 10 °C



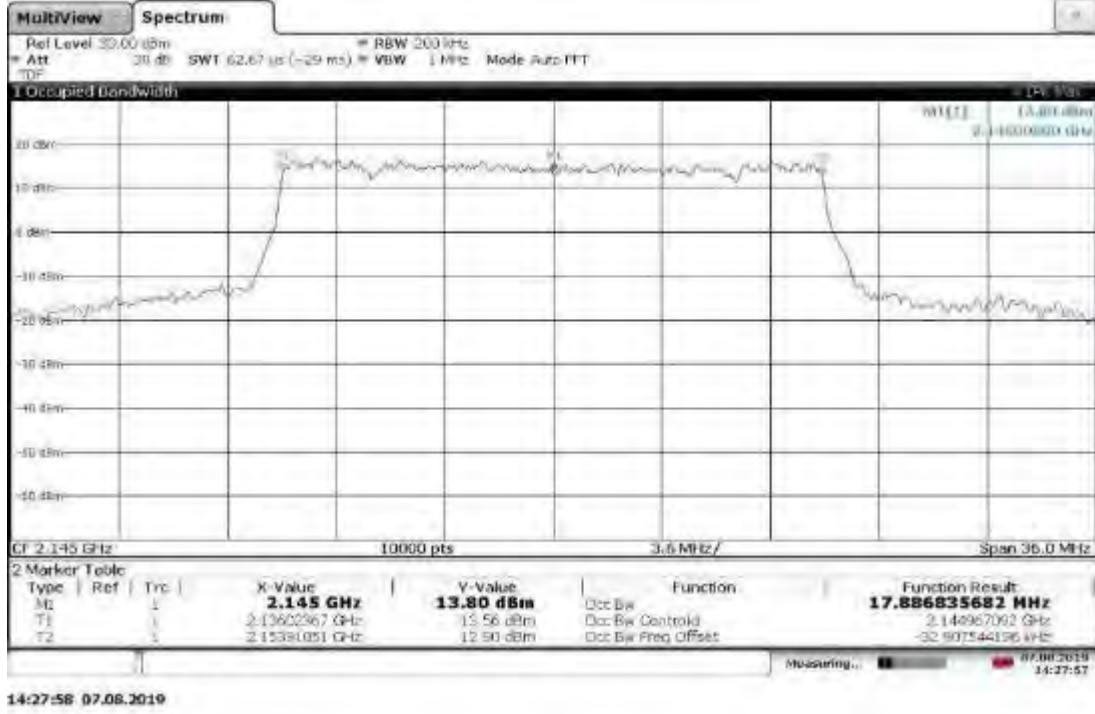
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2145 MHz, 20 °C



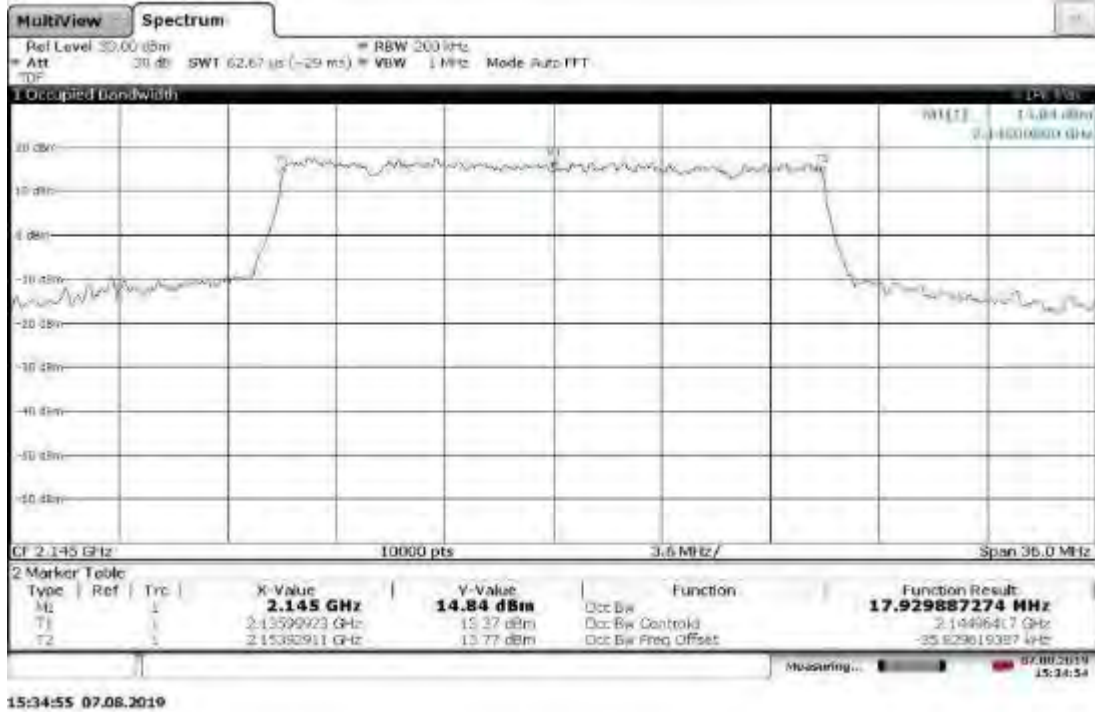
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2145 MHz, 30 °C



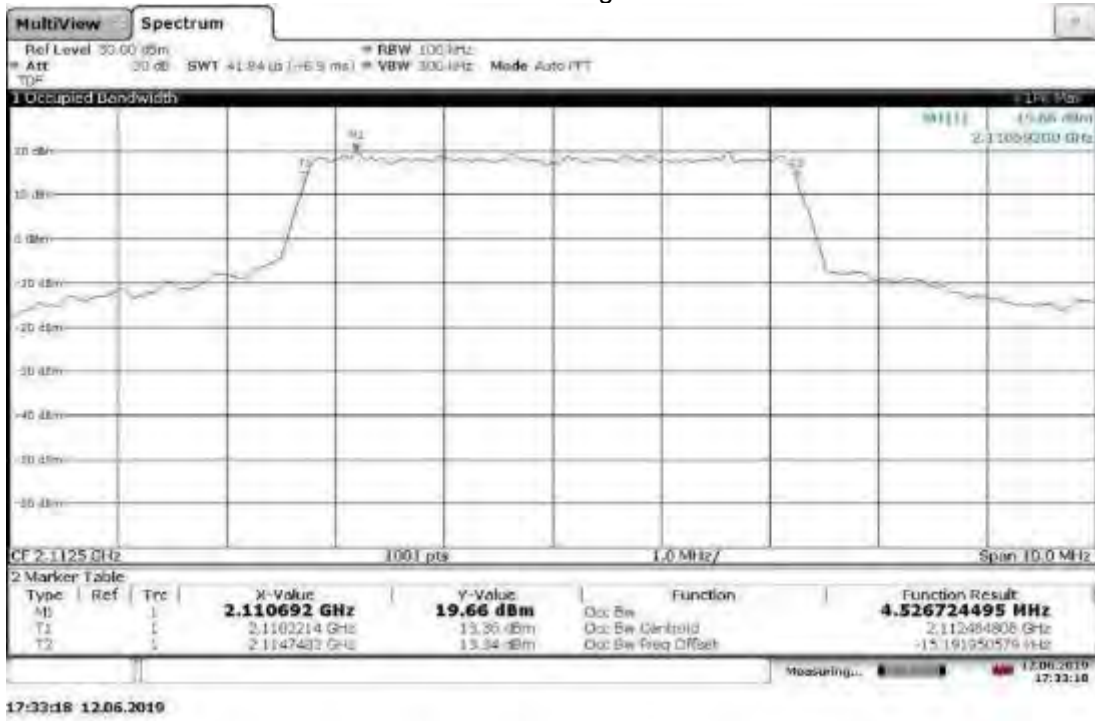
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2145 MHz, 40 °C



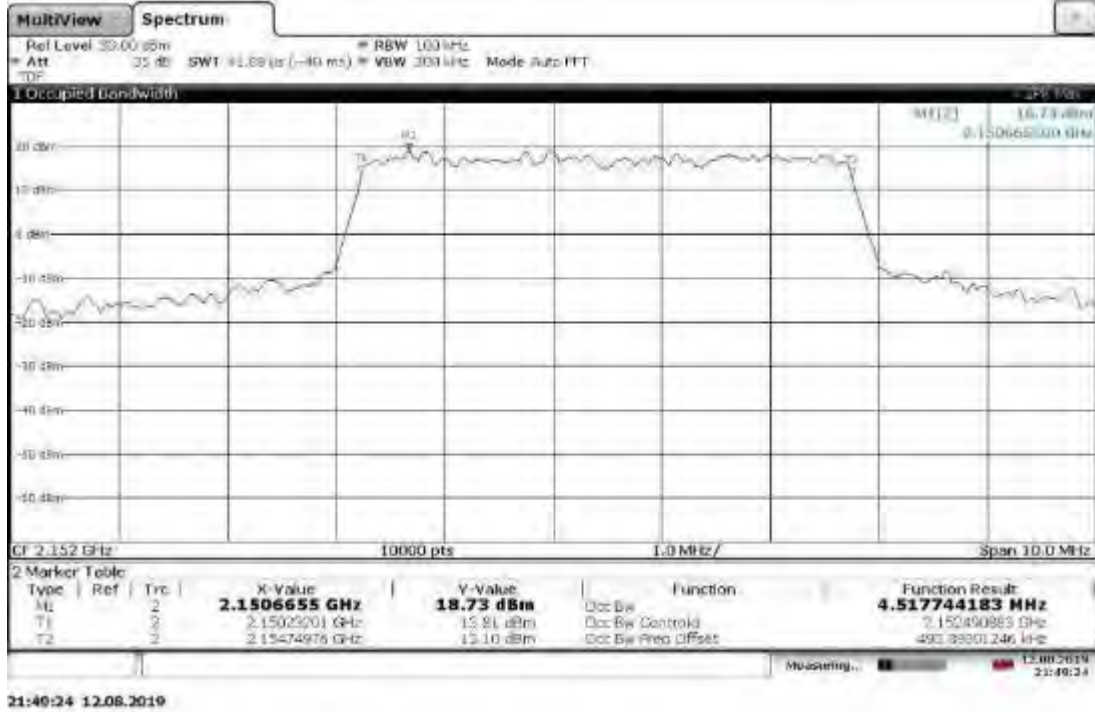
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz High Channel 2145 MHz, 50 °C



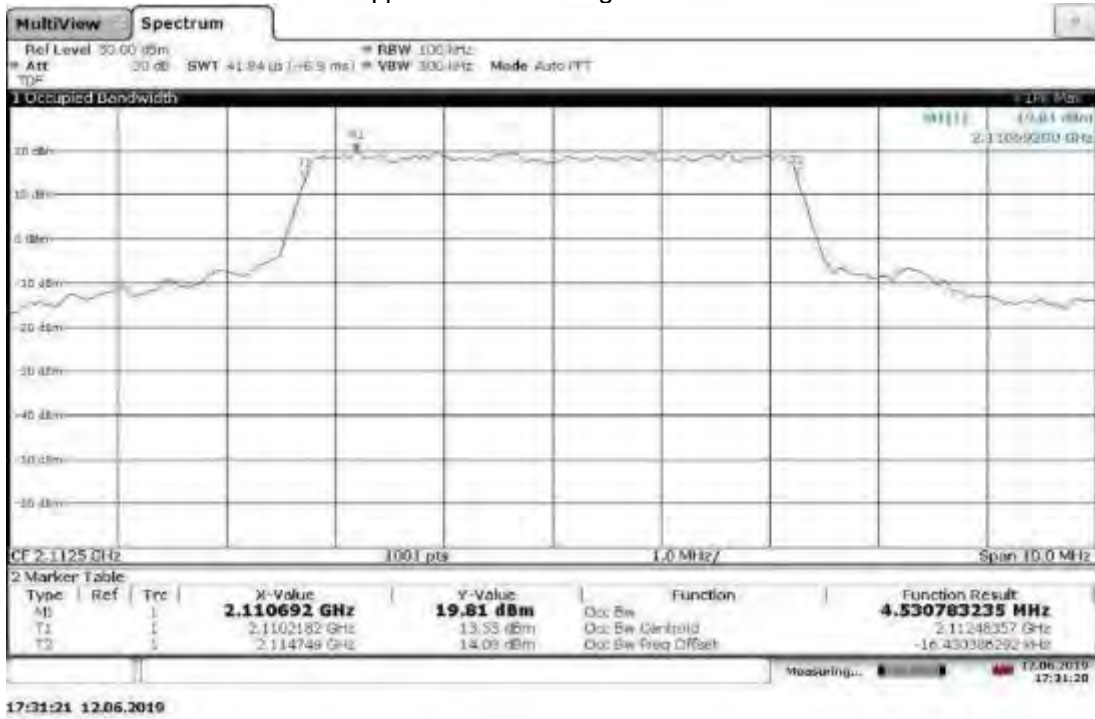
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz, Low Channel,
Lower Extreme Voltage: 41.1VDC



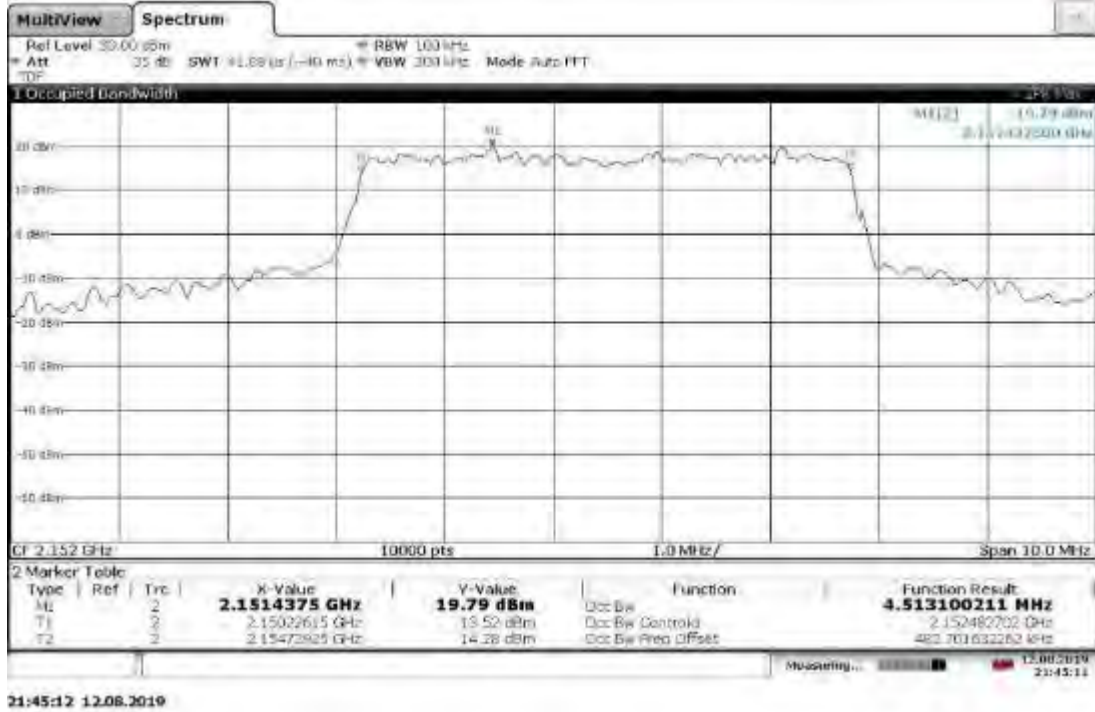
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz, High Channel,
Lower Extreme Voltage: 41.1VDC



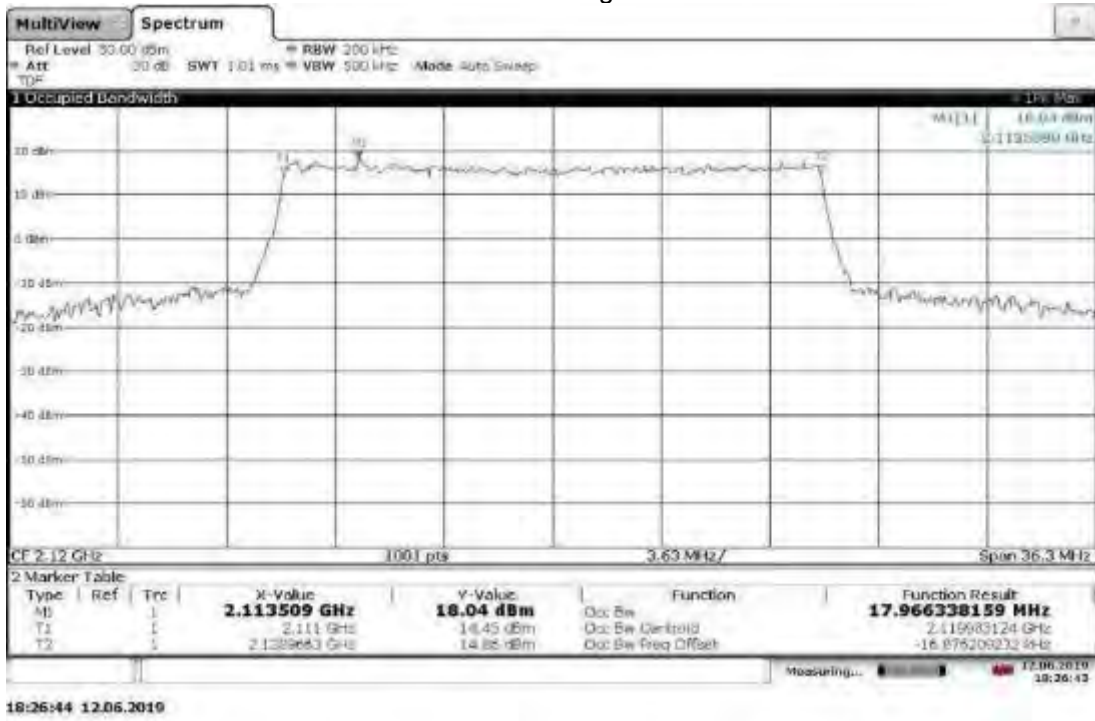
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz, Low Channel,
Upper Extreme Voltage: 57.0VDC



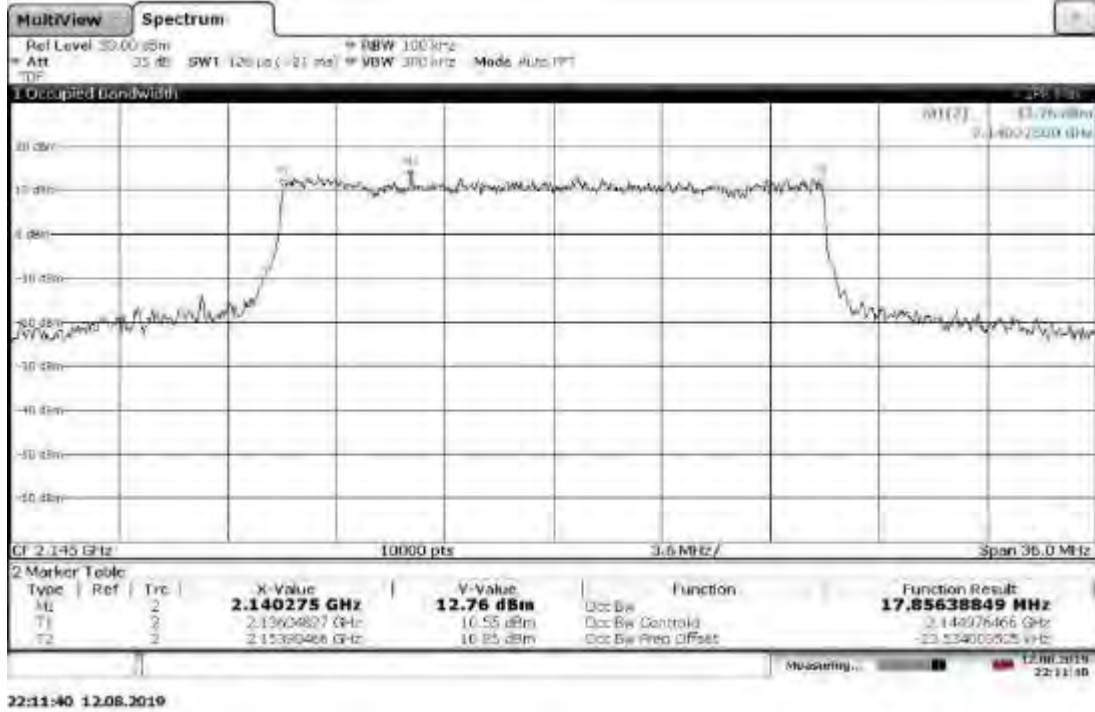
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 5 MHz, High Channel,
Upper Extreme Voltage: 57.0VDC



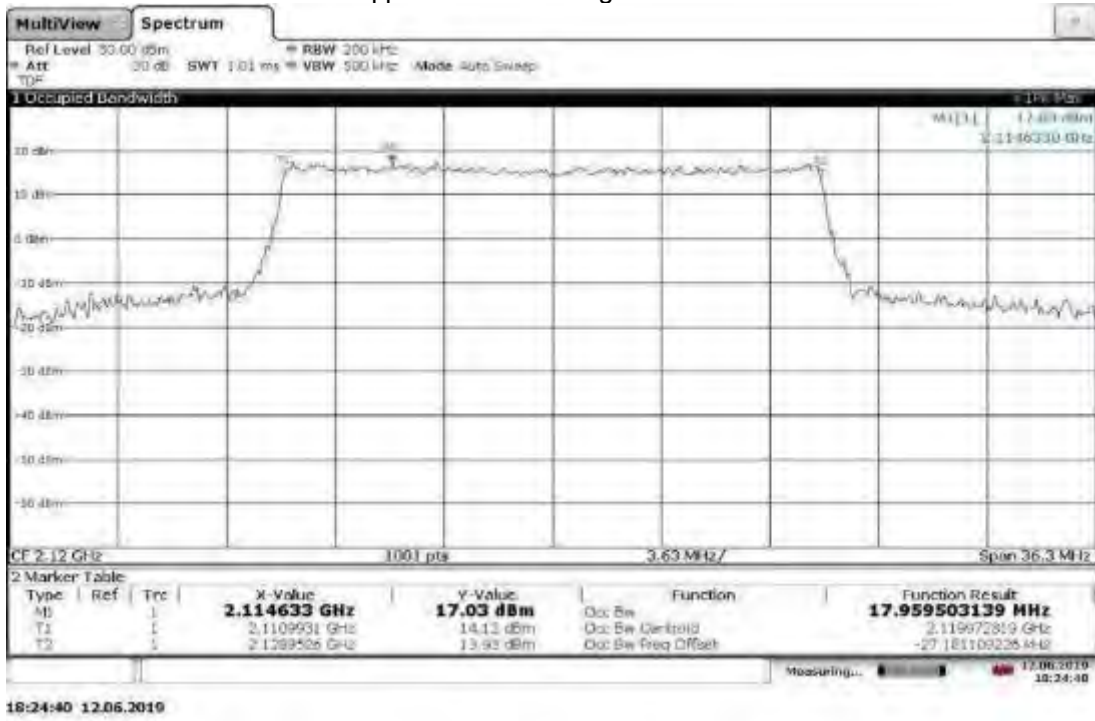
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz, Low Channel,
Lower Extreme Voltage: 41.4VDC



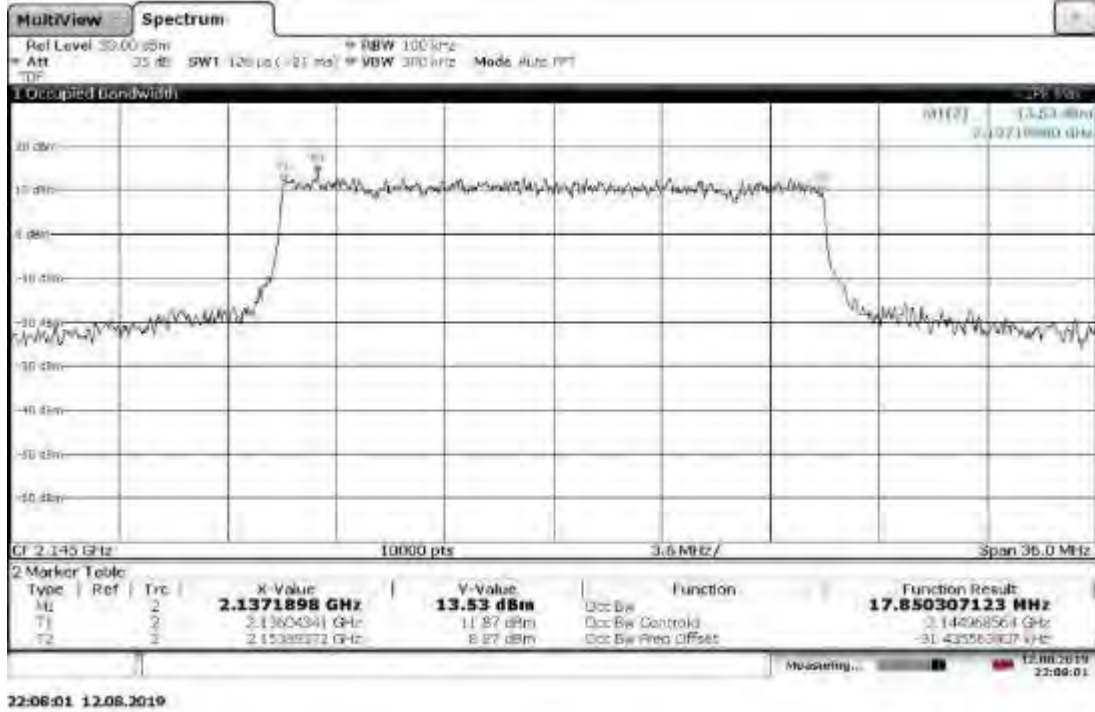
Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz, High Channel,
Lower Extreme Voltage: 41.4VDC



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



Slot 1 (Band 4), ANT0, Modulation: QPSK, Bandwidth: 20 MHz, High Channel,
Upper Extreme Voltage: 57.0VDC



Intertek

Report Number: 103866582BOX-24a

Issued: 08/14/2019

Test Personnel: Kouma Sinn *KPS*
Supervising/Reviewing
Engineer:
(Where Applicable) N/A

Test Date: 05/23/2019, 08/02/2019,
08/12/2019

Product Standard: FCC Part 27
Input Voltage: See plots

Limit Applied: See report section 10.3

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)	U _{cispr}
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 dB μ V/m
- RA = Receiver Amplitude (including preamplifier) in dB μ V
- 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 dB μ V 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 dB μ V/m. This value in dB μ V/m was converted to its corresponding level in μ V/m.

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

To convert from dB μ V to μ V or mV the following was used:

$$UF = 10^{(NF / 20)} \text{ where } UF = \text{Net Reading in } \mu\text{V}$$

$$NF = \text{Net Reading in dB } \mu\text{V}$$

Example:

$$FS = RA + AF + CF - AG = 52.0 + 7.4 + 1.6 - 29.0 = 32.0$$

$$UF = 10^{(32 \text{ dB } \mu\text{V} / 20)} = 39.8 \mu\text{V/m}$$

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	PRE 11	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	ESB 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
CBLSHF 102'	Cable, SMA - SMA, 9kHz-40GHz (Cable Kit 5)	Sucoflex (Huber Suhner)	104PE	CBLSHF102	09/13/2018	09/13/2019
145108'	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESB40	100209	06/06/2019	06/06/2020
PRE8'	PREAMPLIFIER 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

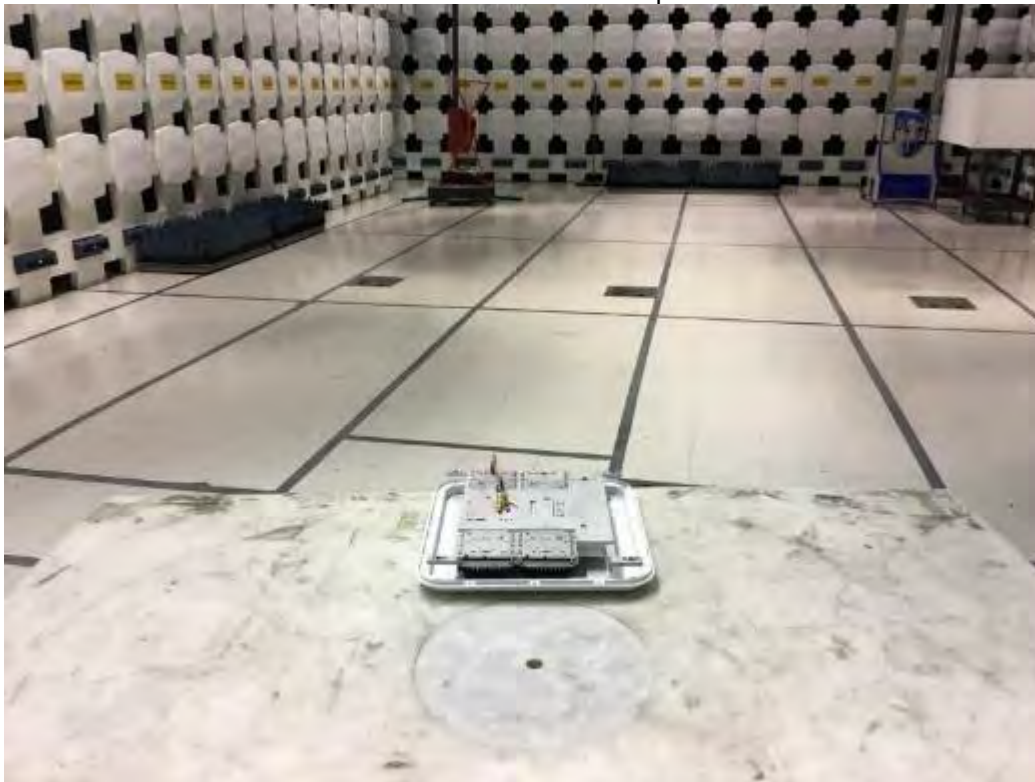
11.3 Results:

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.

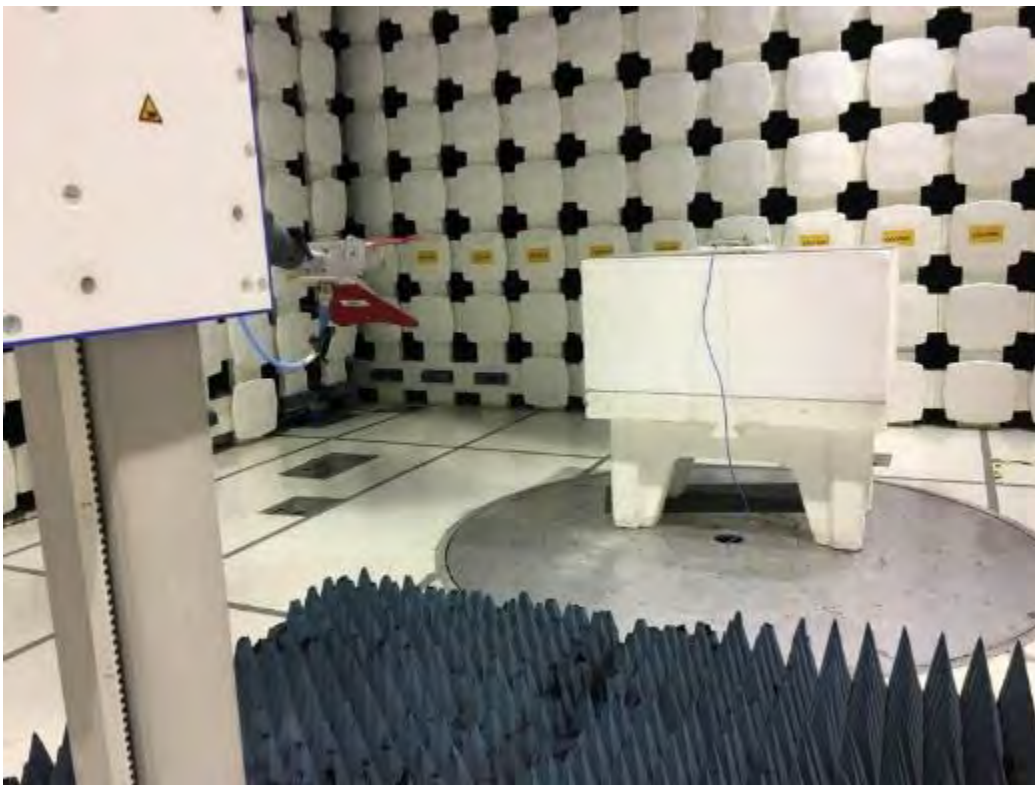
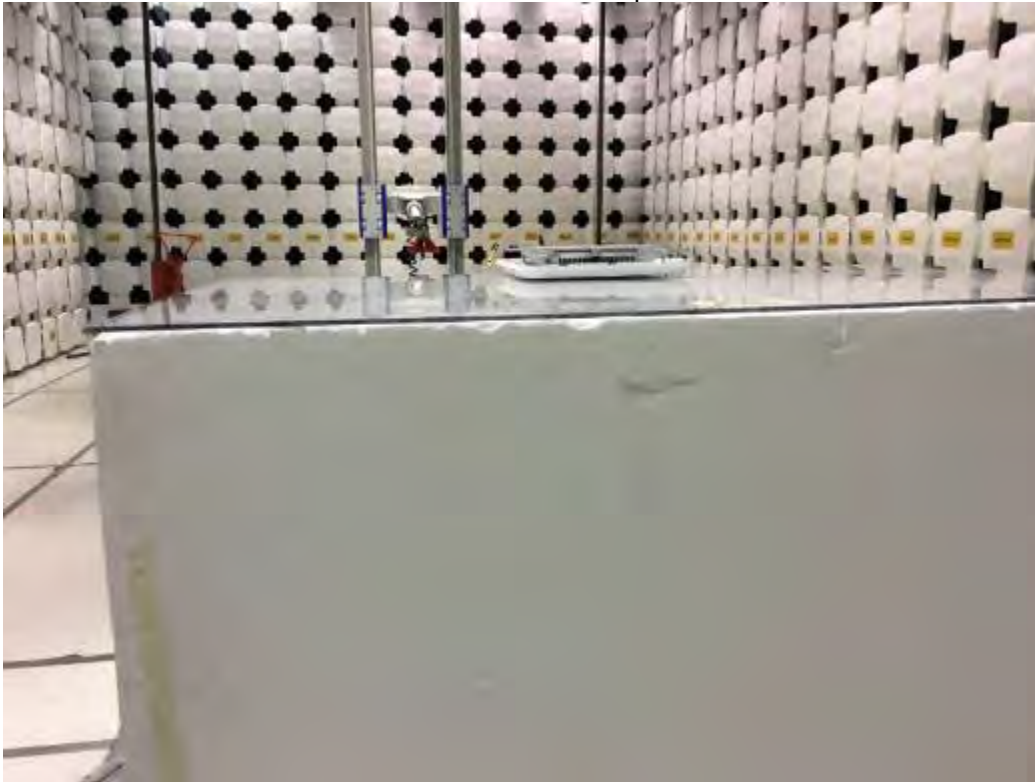
§27.53(h): The power of any emission outside of the authorized operating frequency ranges must be attenuated below the transmitting power (P) by a factor of at least 43 + 10 log(P) dB.

11.4 Setup Photographs:

30-1000 MHz Test Setup



1-18 GHz Test Setup



18-22 GHz

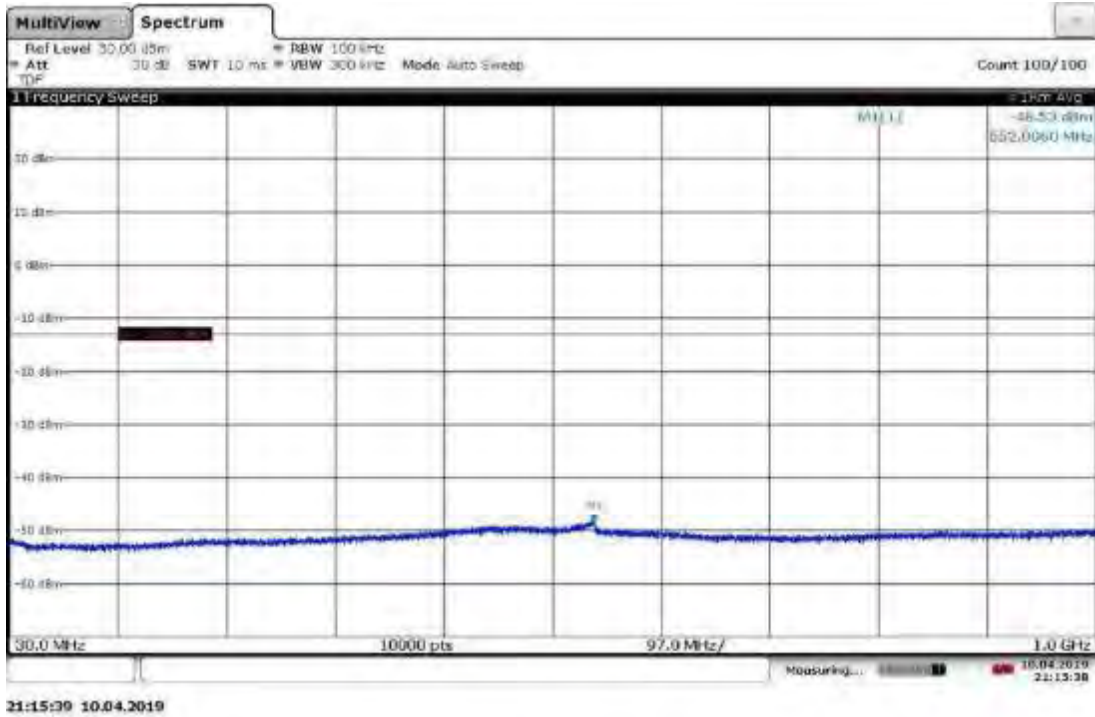


Antenna Port Conducted Test Setup

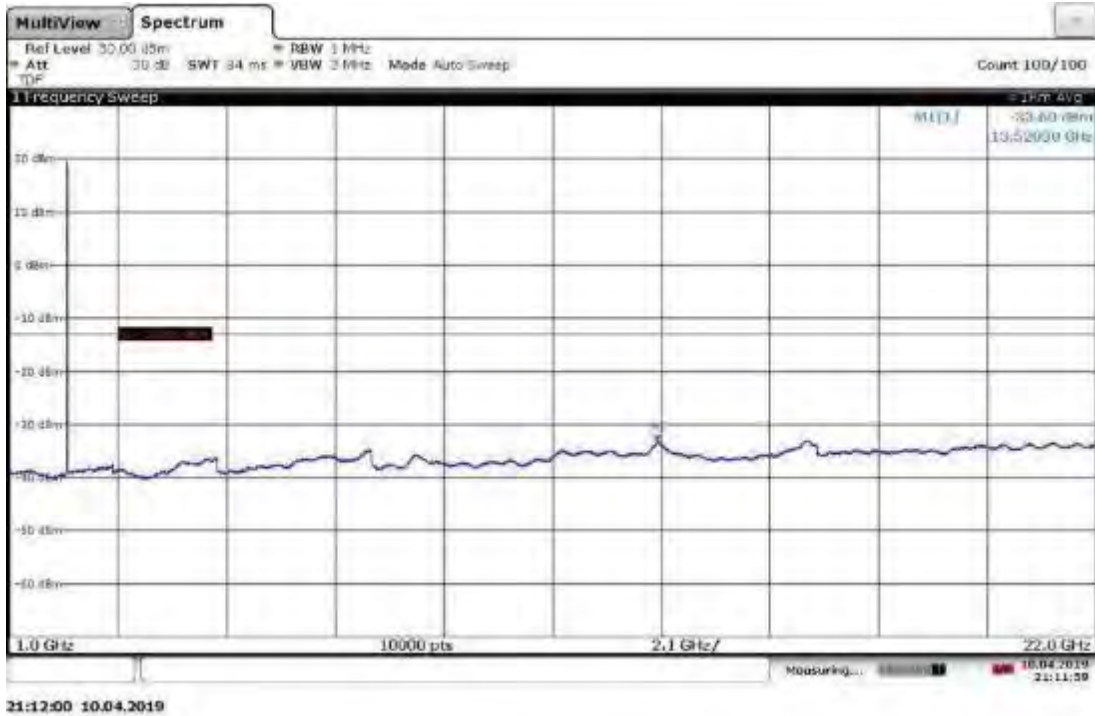


11.5 Plots/Data:

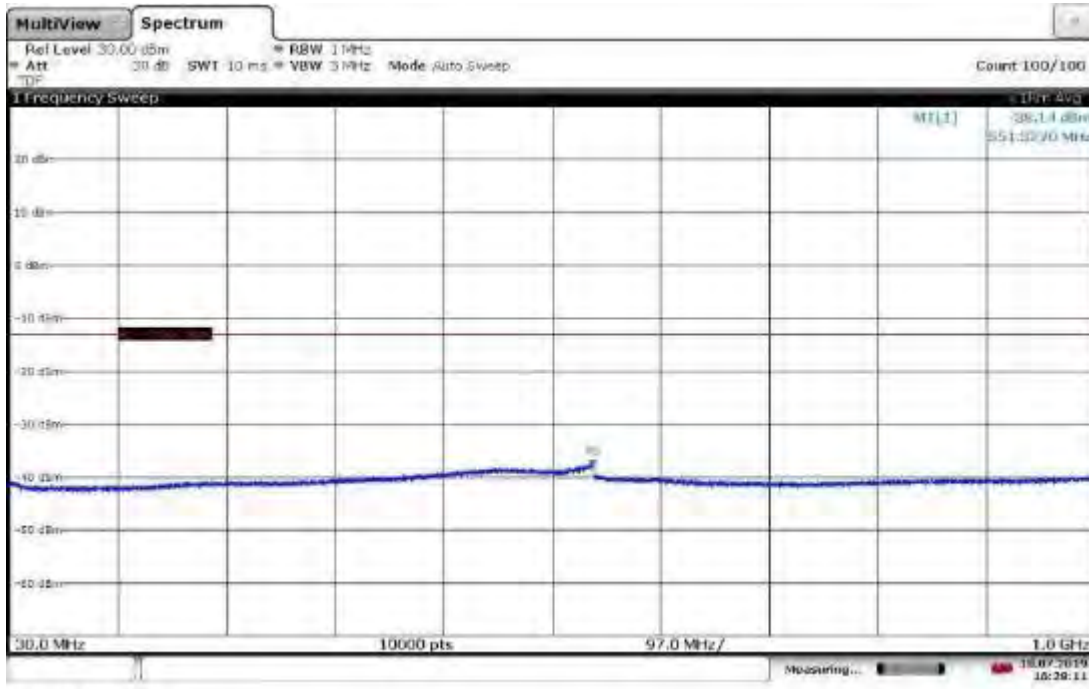
Slot 1 (Band 4), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



Slot 1 (Band 4), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Low Channel 1-22GHz



Slot 1 (Band 4), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



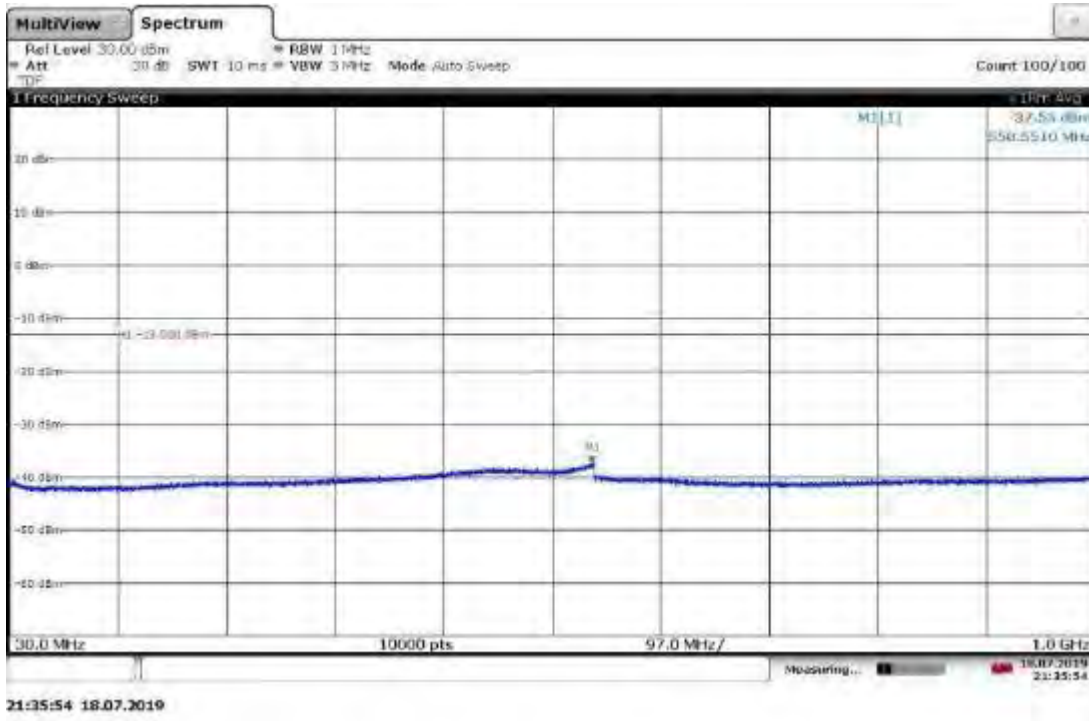
16:28:11 18.07.2019

Slot 1 (Band 4), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Mid Channel 1-22GHz

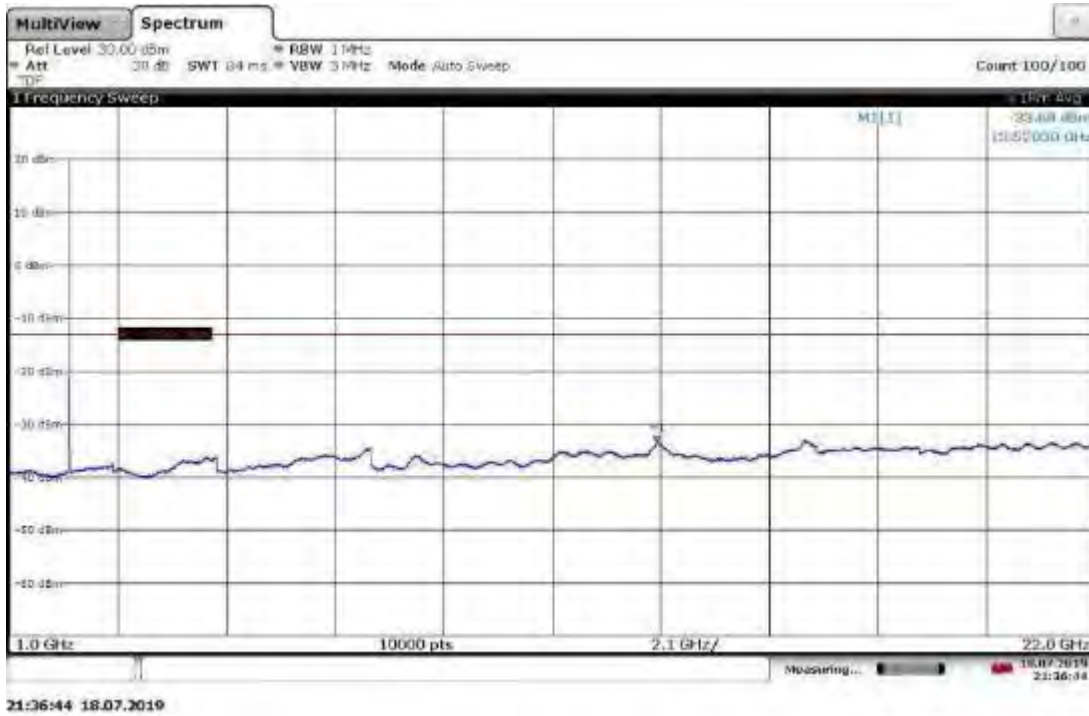


16:29:21 18.07.2019

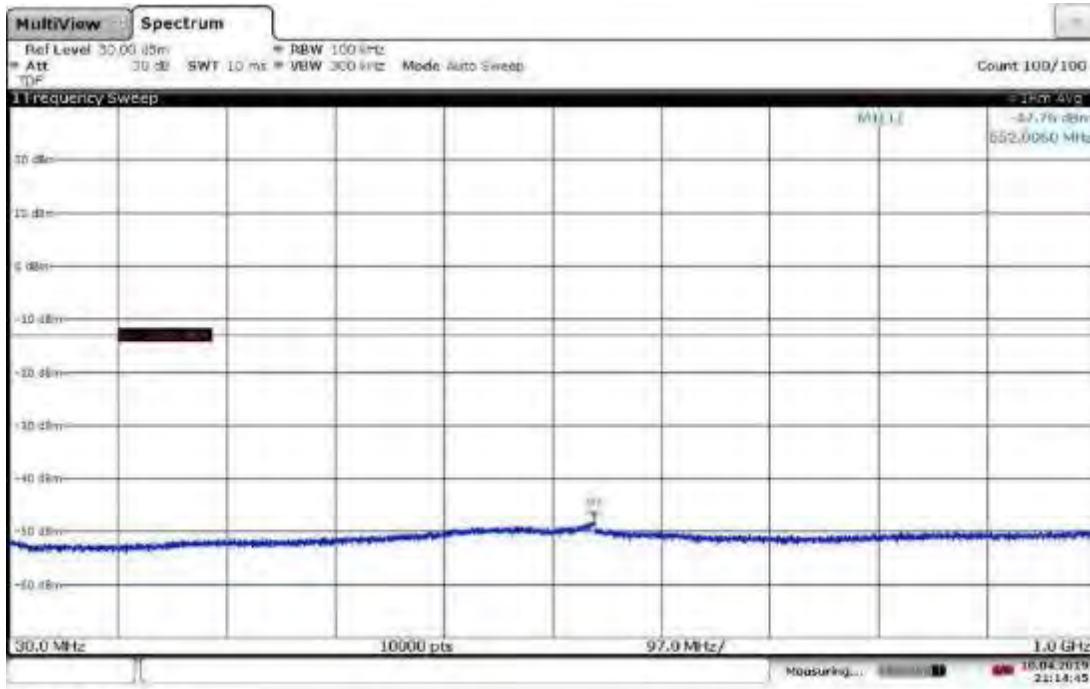
Slot 1 (Band 4), ANT0, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



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

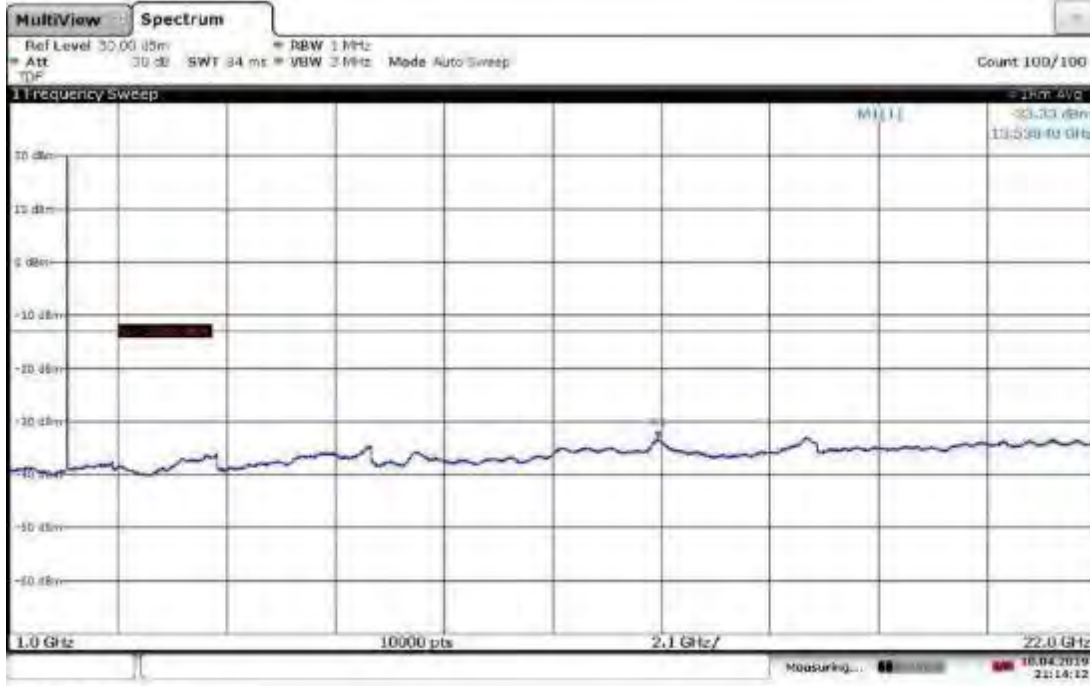


Slot 1 (Band 4), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



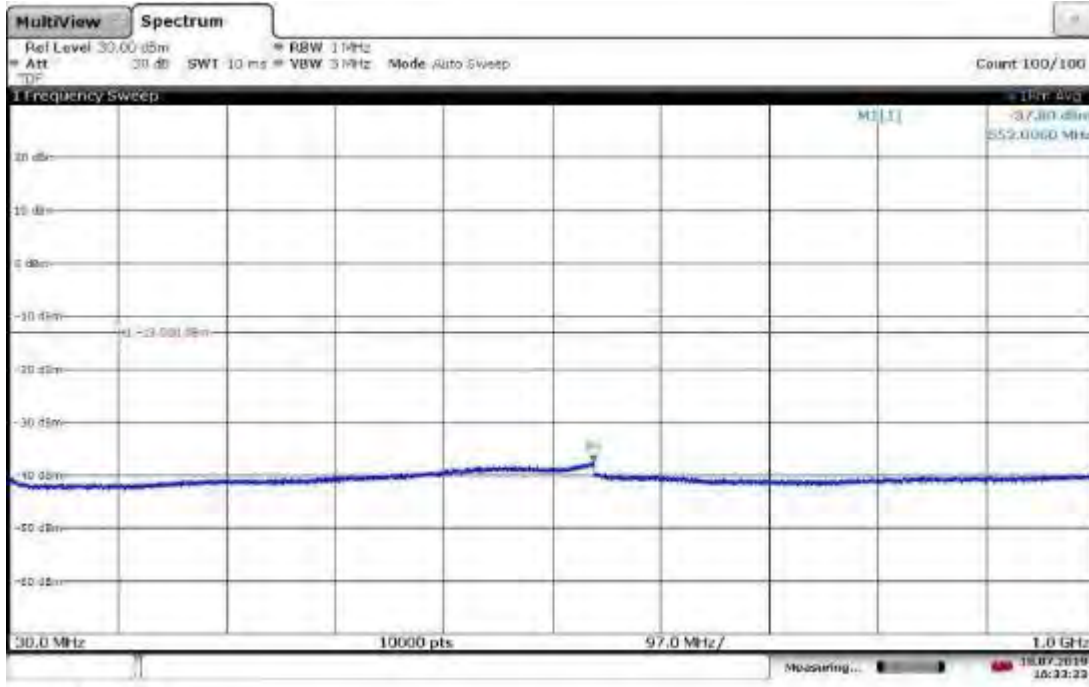
21:14:45 10.04.2019

Slot 1 (Band 4), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Low Channel 1-22GHz



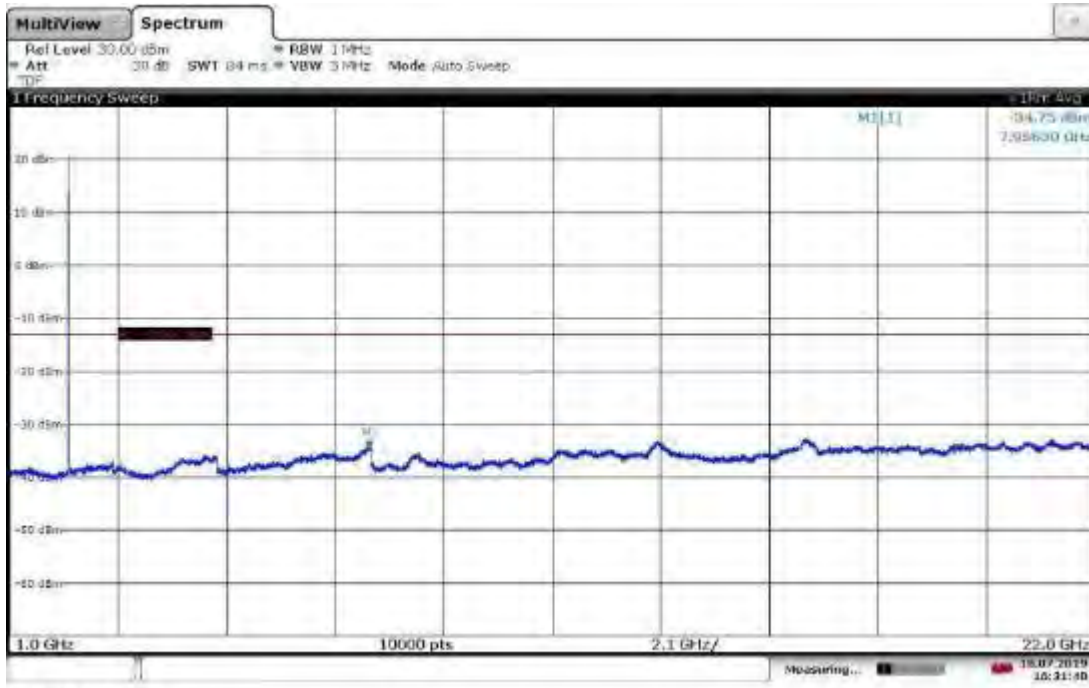
21:14:12 10.04.2019

Slot 1 (Band 4), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



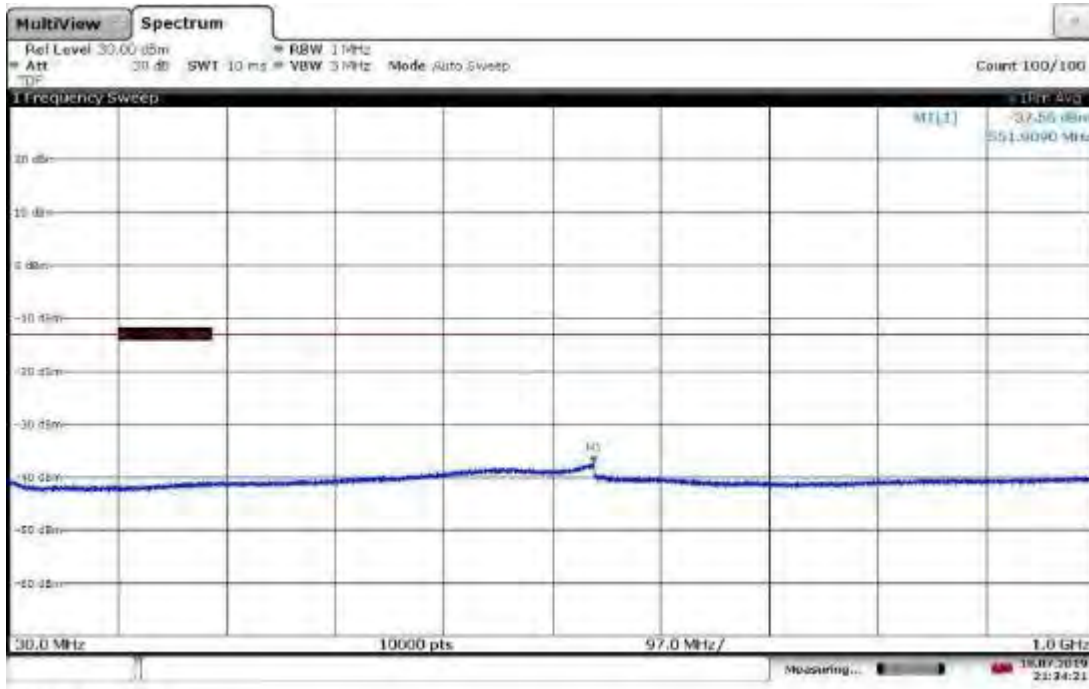
16:33:23 18.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, Mid Channel 1-22GHz



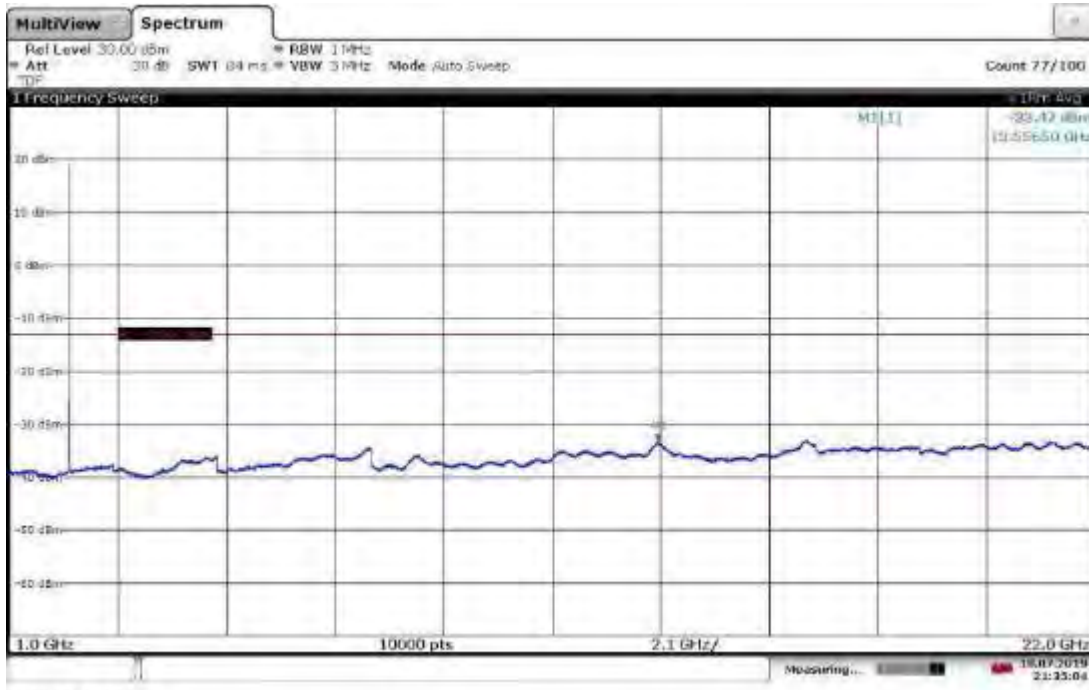
16:31:41 18.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



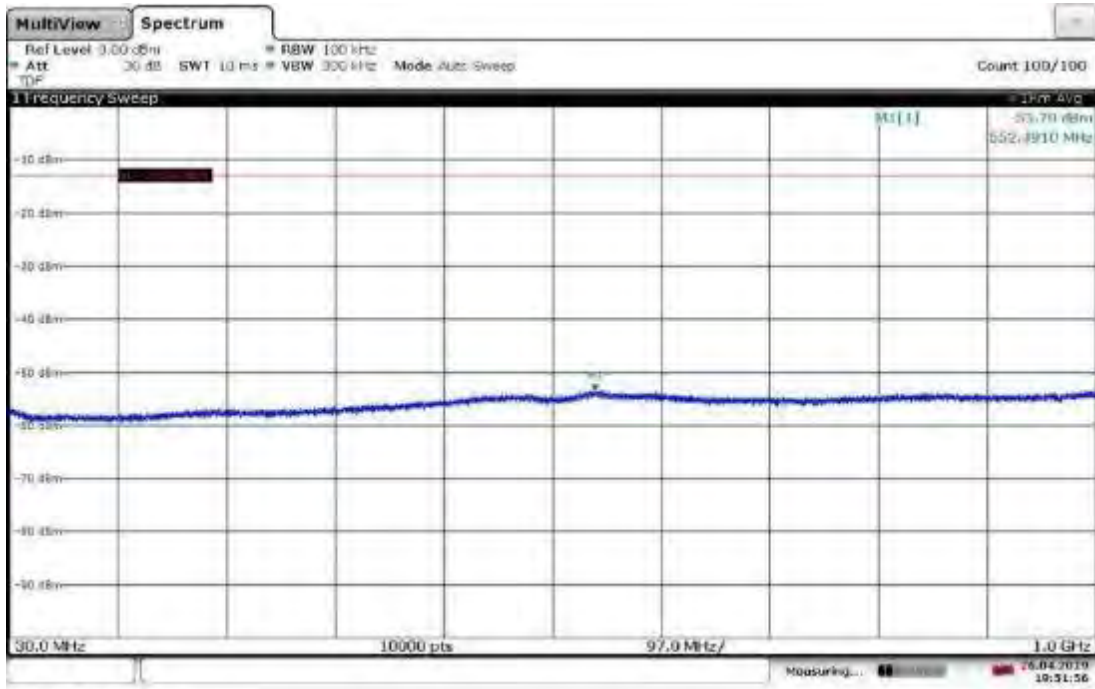
21:34:21 18.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM1.1-QPSK, Bandwidth: 5 MHz, High Channel 1-22GHz



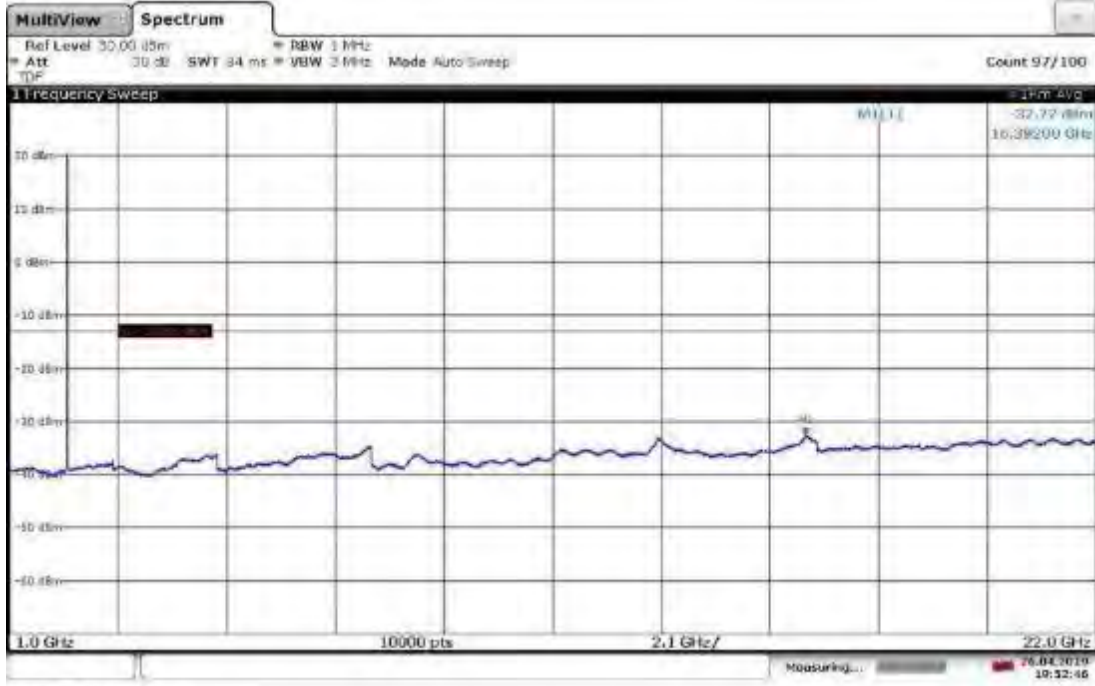
21:35:05 18.07.2019

Slot 1 (Band 4), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



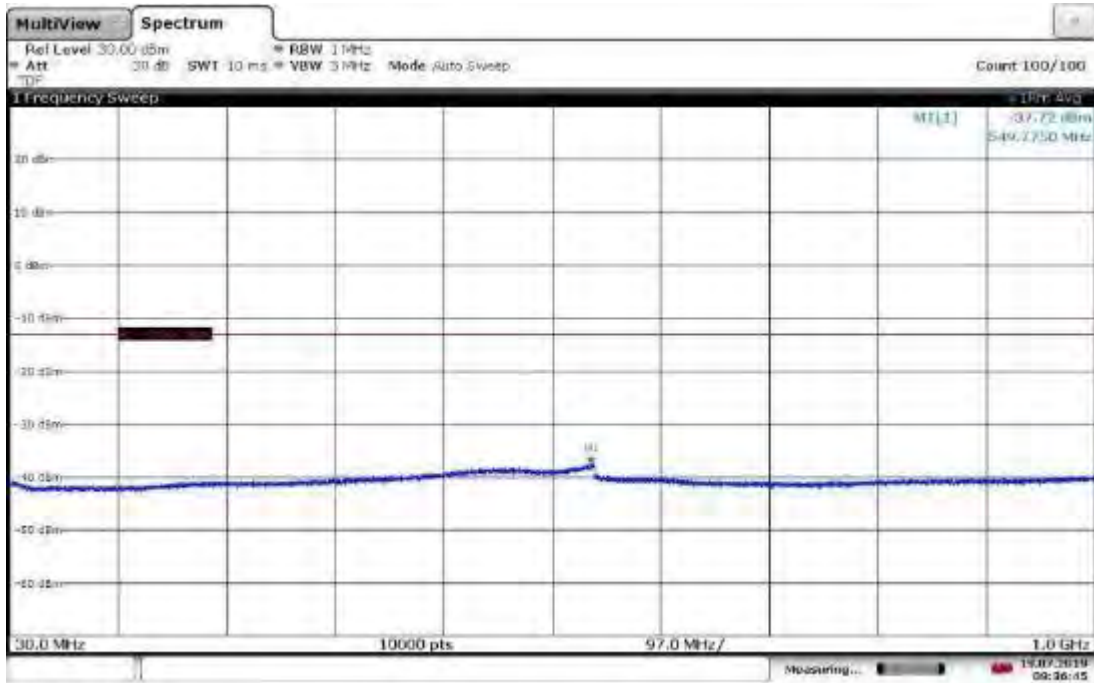
19:51:56 26.04.2019

Slot 1 (Band 4), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



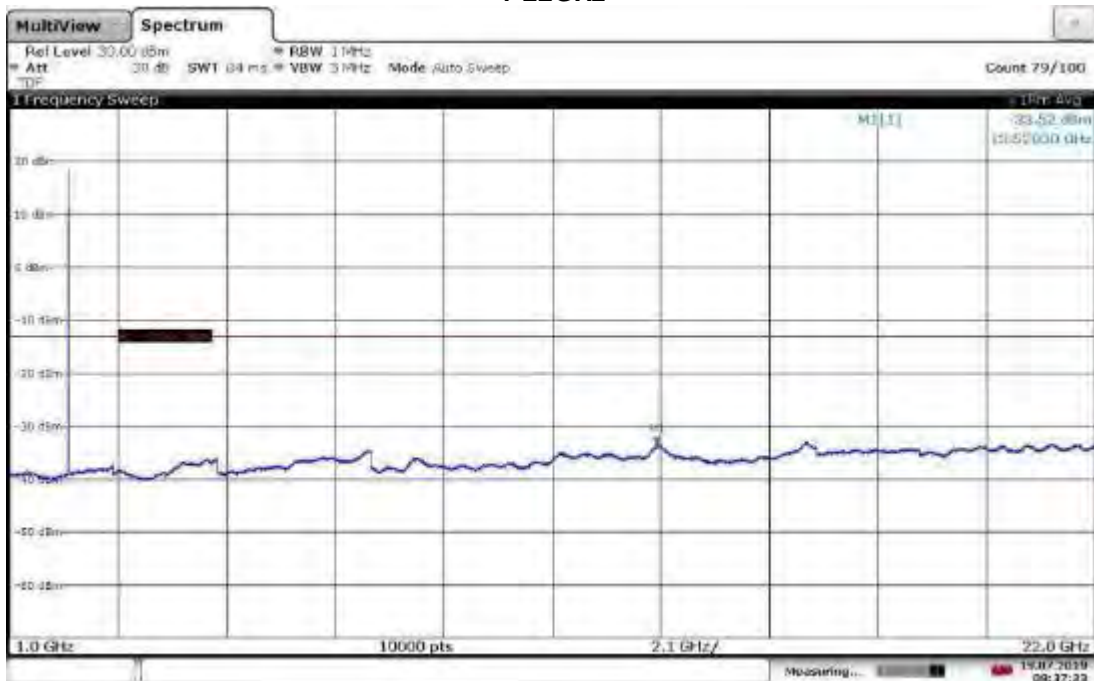
19:52:46 26.04.2019

Slot 1 (Band 4), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



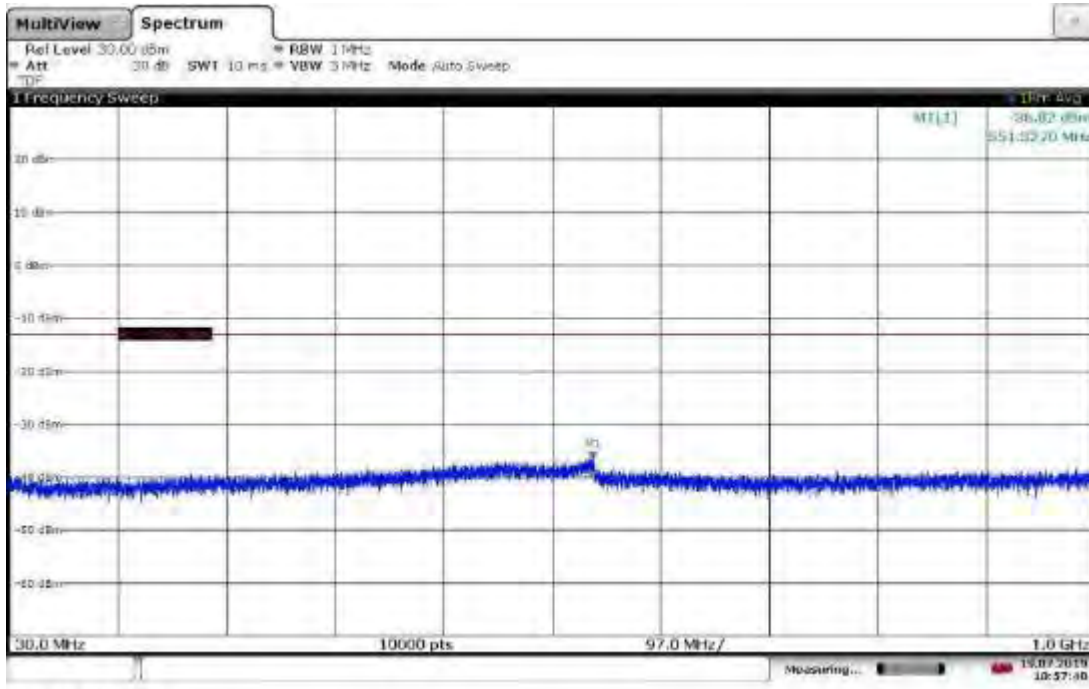
08:36:45 19.07.2019

Slot 1 (Band 4), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



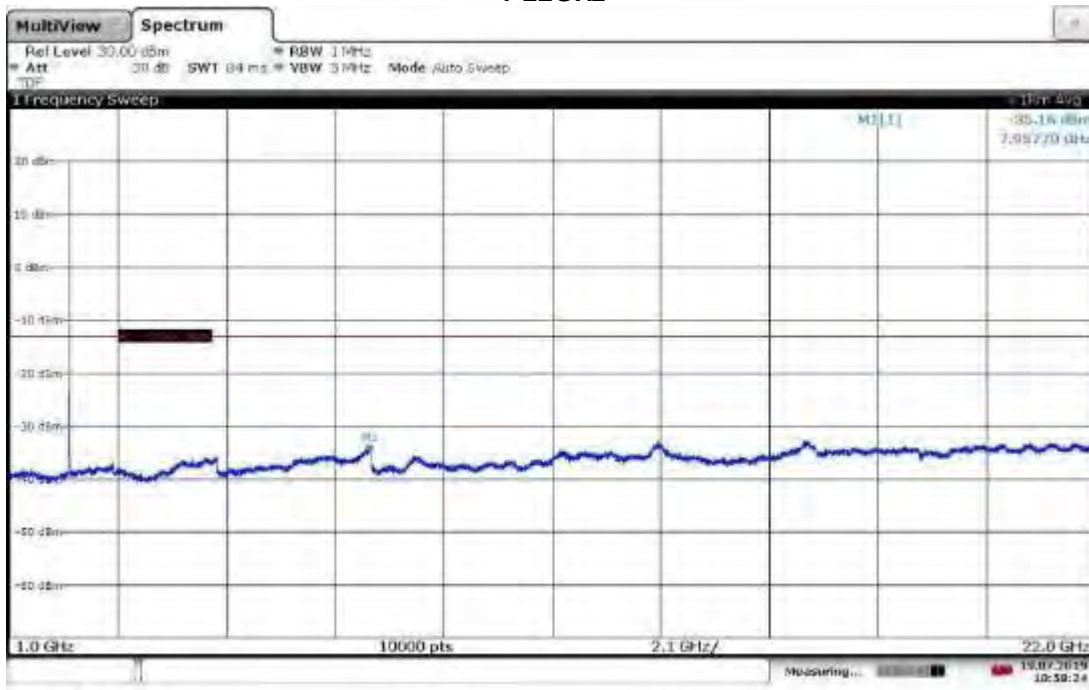
08:37:34 19.07.2019

Slot 1 (Band 4), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



10:57:40 19.07.2019

Slot 1 (Band 4), ANT0, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



10:58:25 19.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



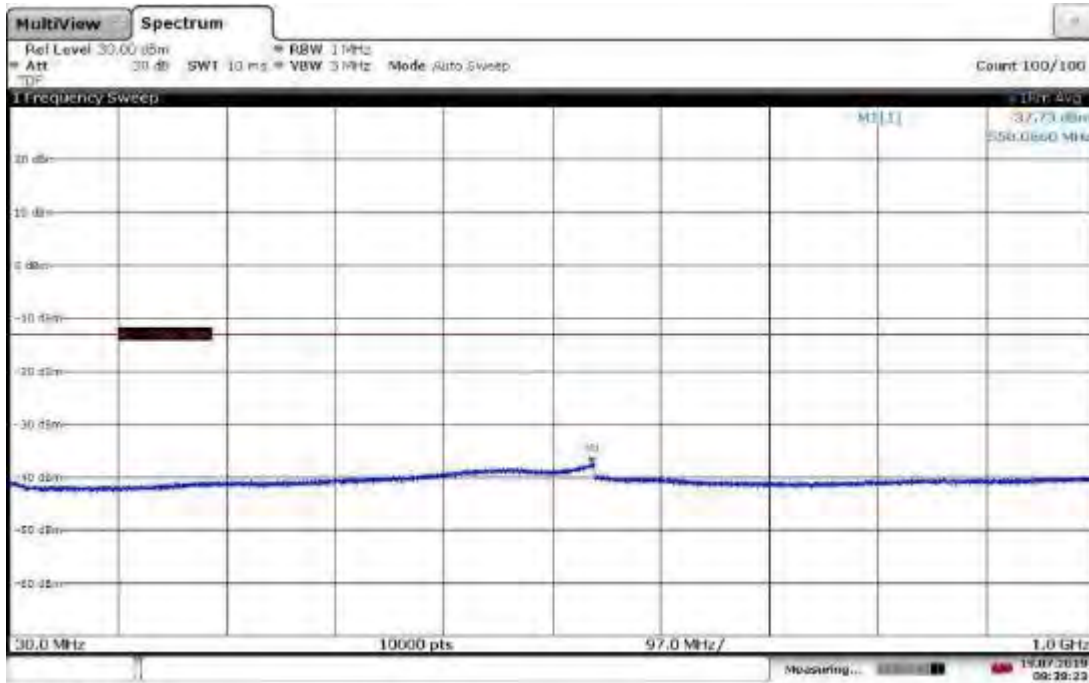
20:50:17 26.04.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



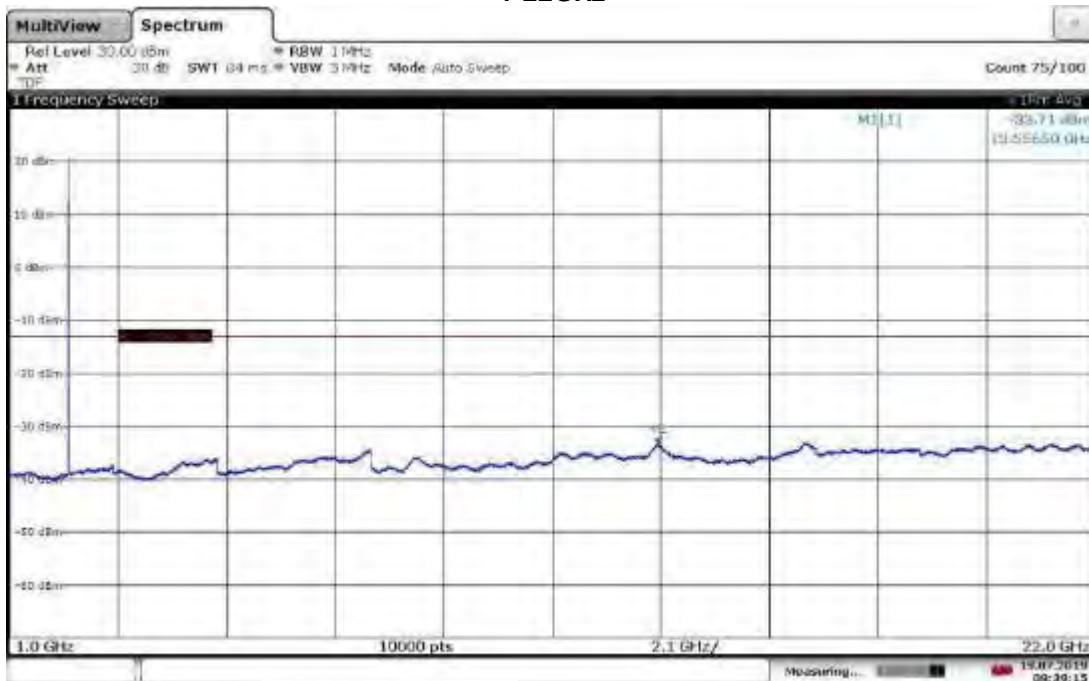
20:49:18 26.04.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



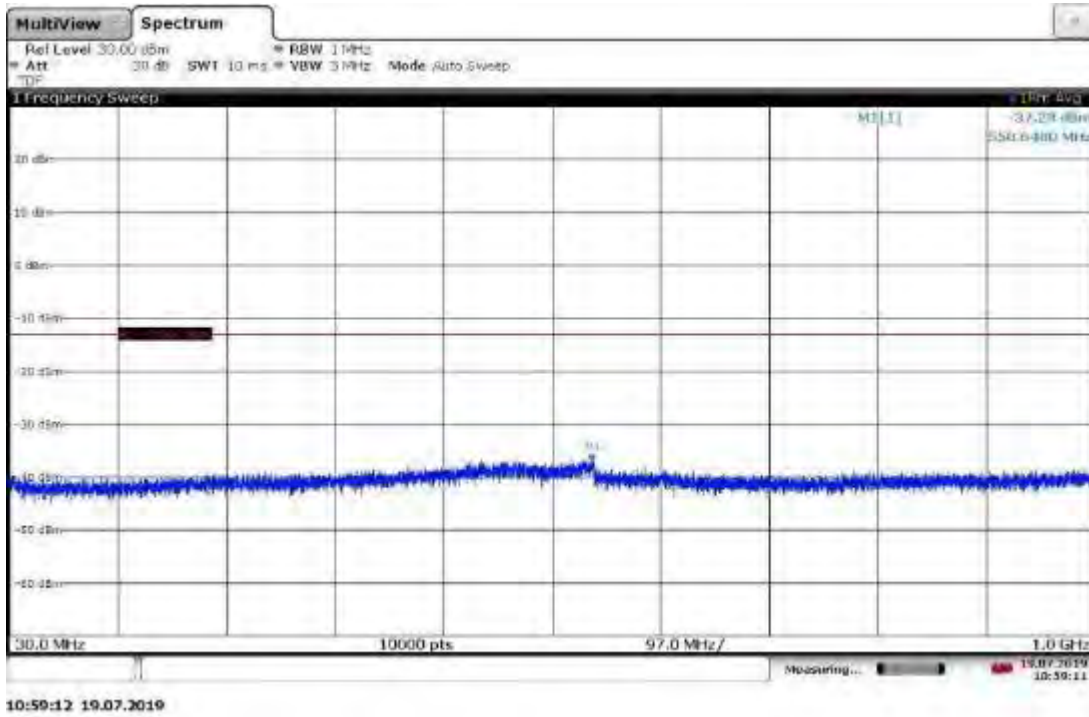
08:38:23 19.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz

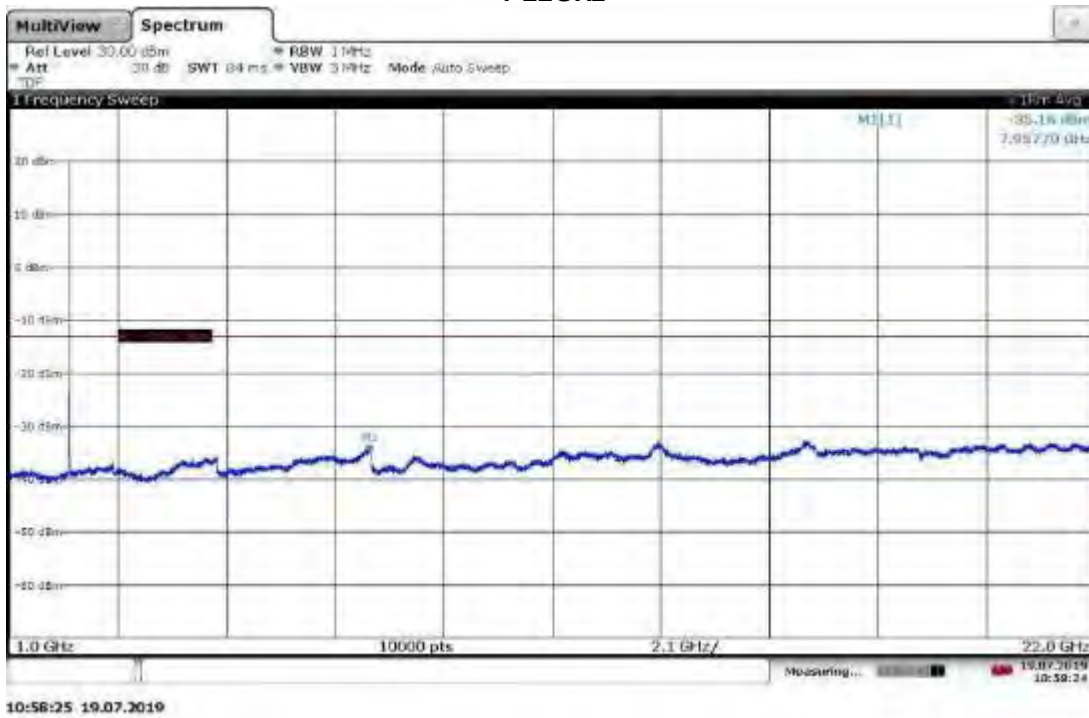


08:38:16 19.07.2019

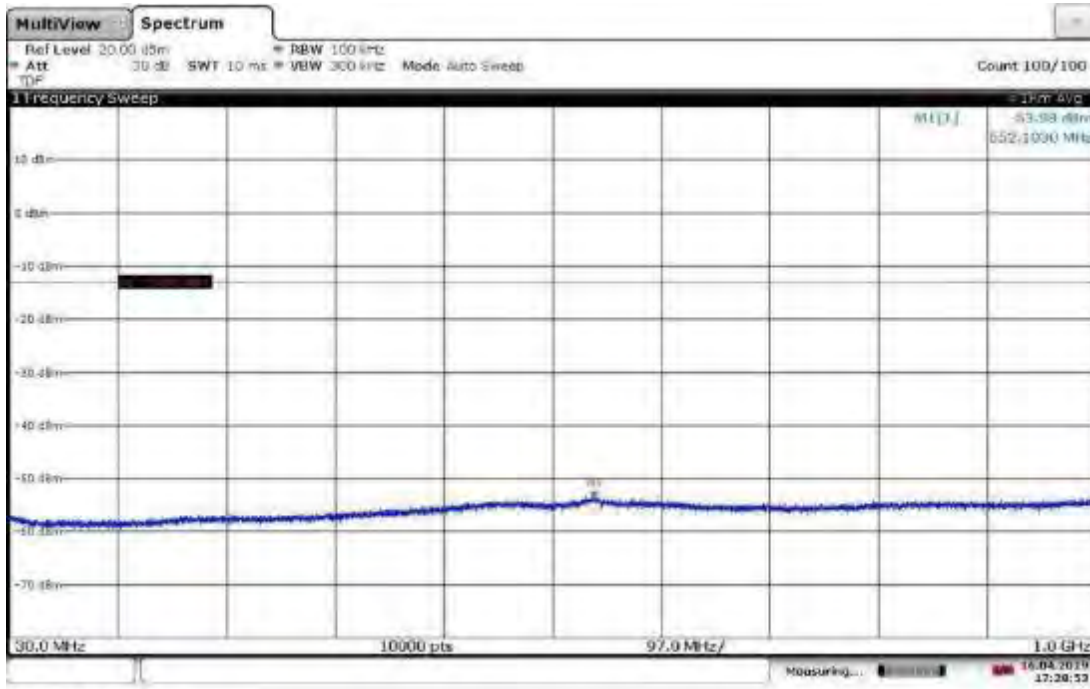
Slot 1 (Band 4), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



Slot 1 (Band 4), ANT1, Modulation: TM3.2-16QAM, Bandwidth: 5 MHz, High Channel 1-22GHz

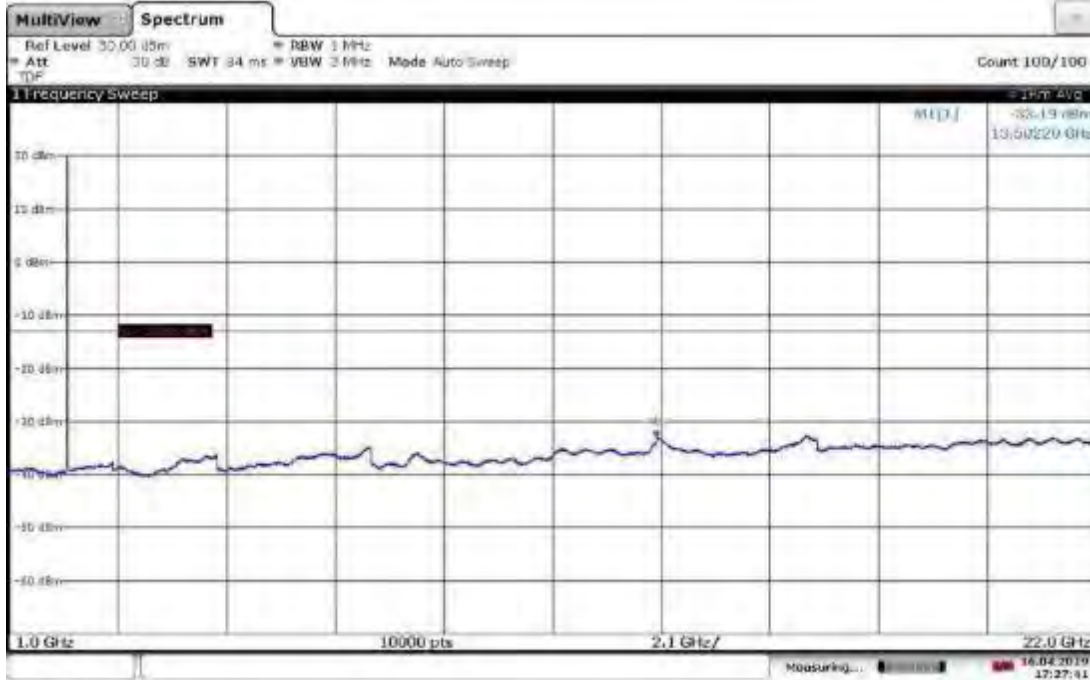


Slot 1 (Band 4), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



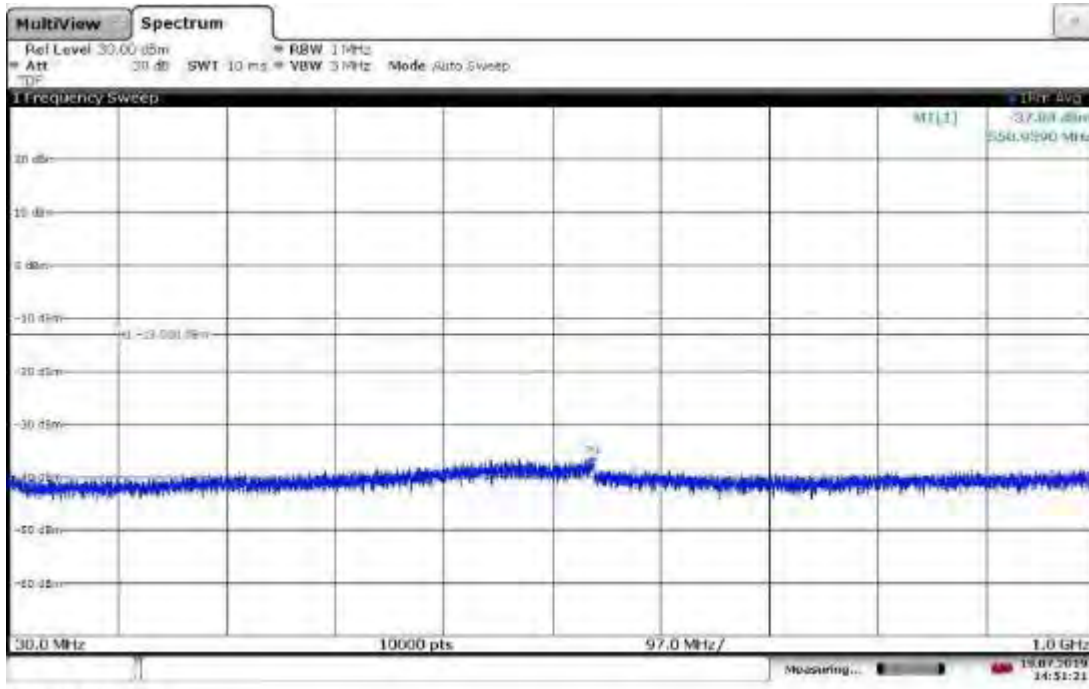
17:28:54 16.04.2019

Slot 1 (Band 4), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz

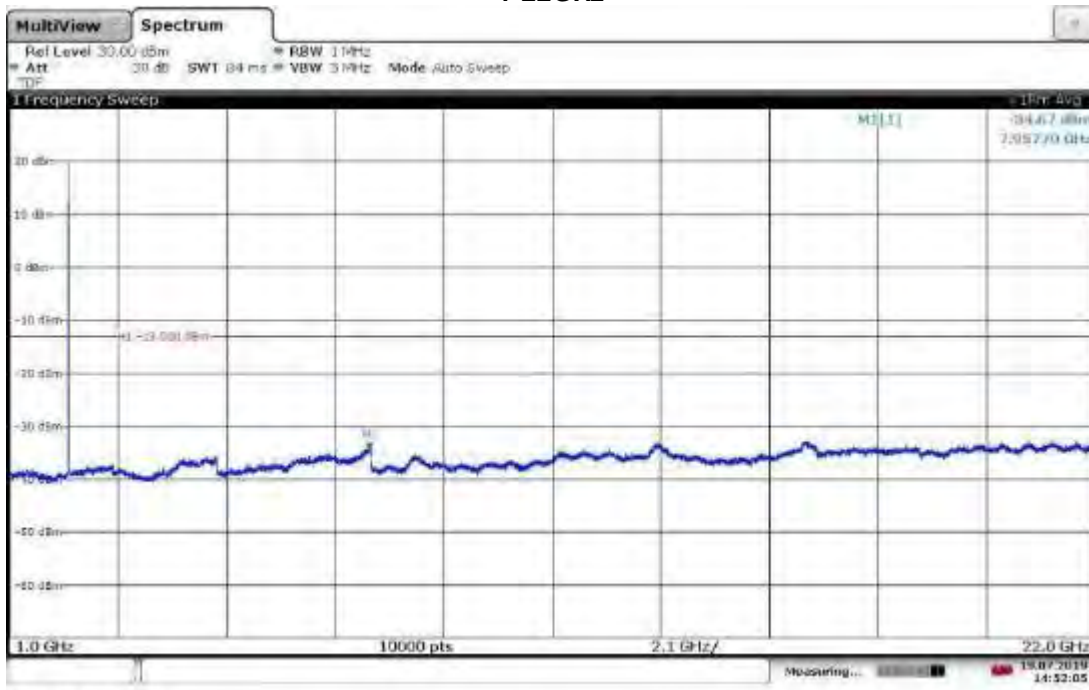


17:27:41 16.04.2019

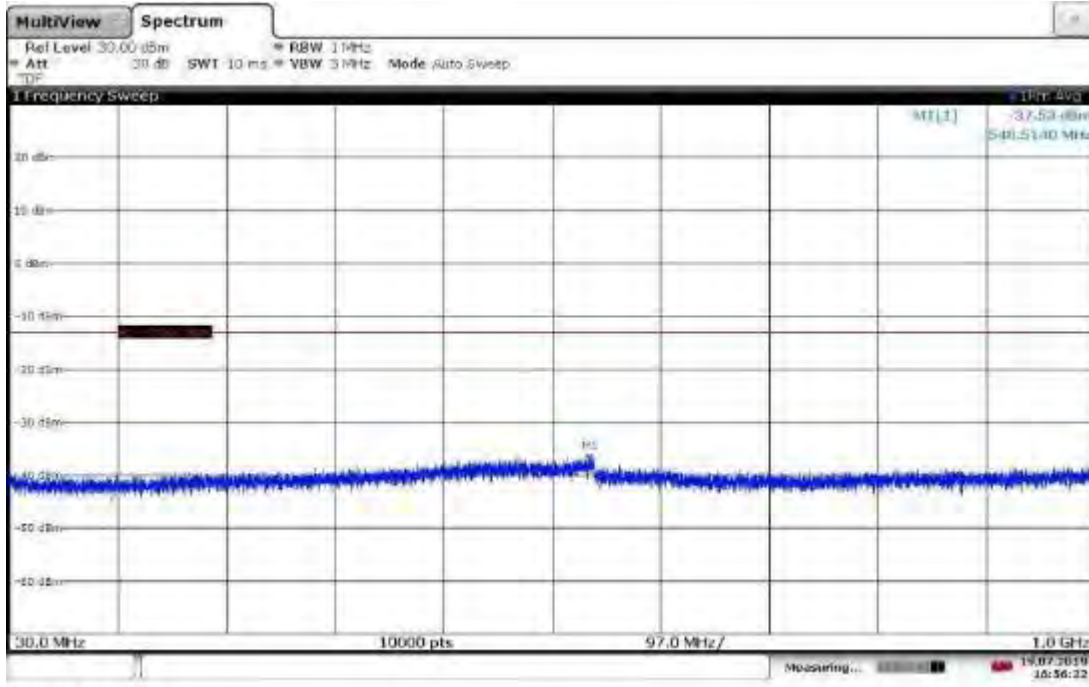
Slot 1 (Band 4), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



Slot 1 (Band 4), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz

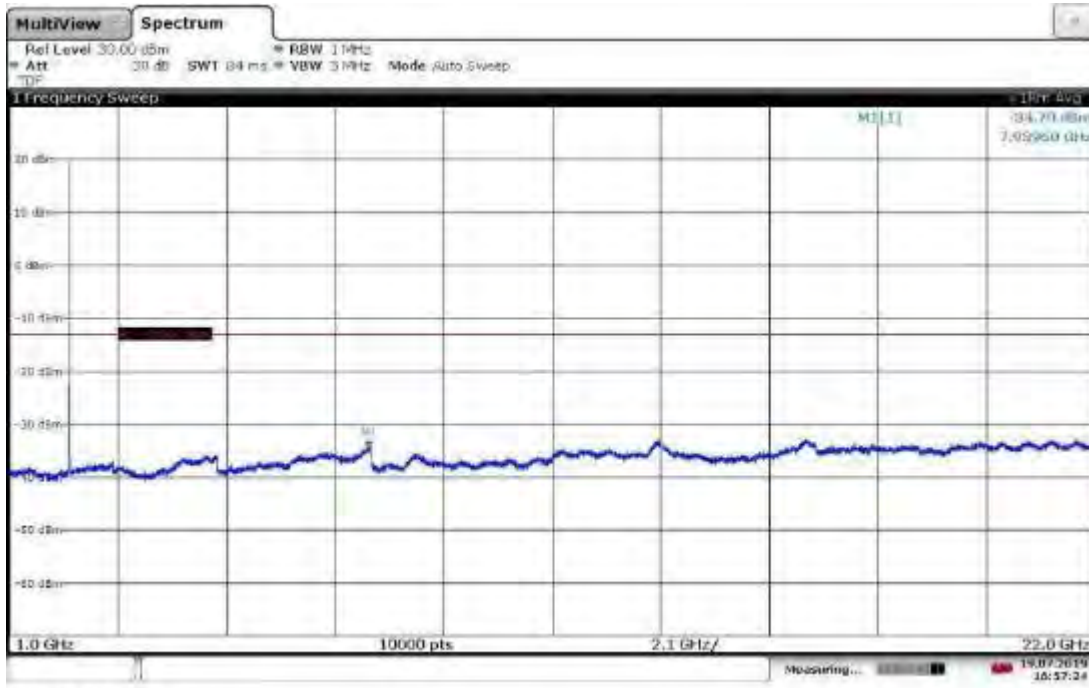


Slot 1 (Band 4), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



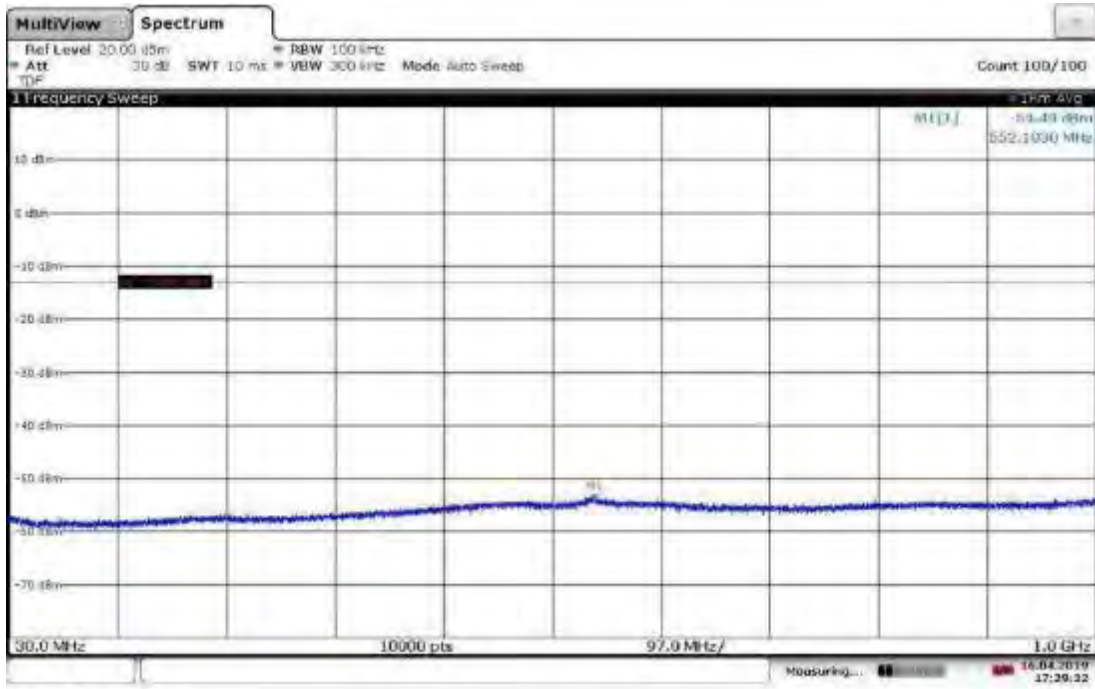
16:56:22 19.07.2019

Slot 1 (Band 4), ANT0, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



16:57:24 19.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



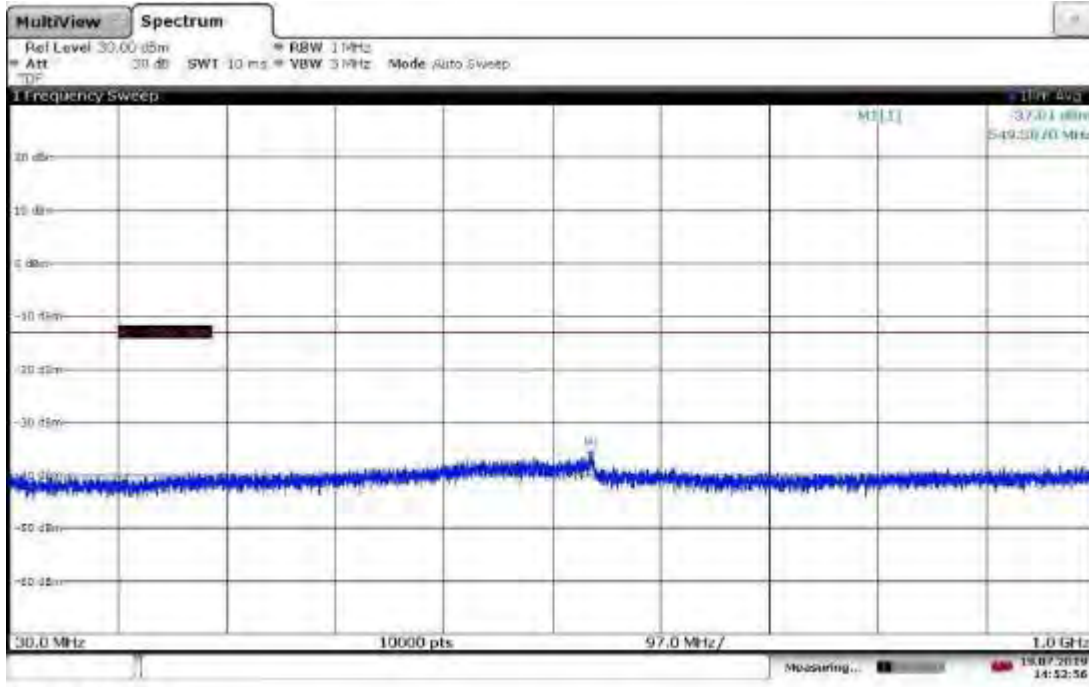
17:29:33 16.04.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



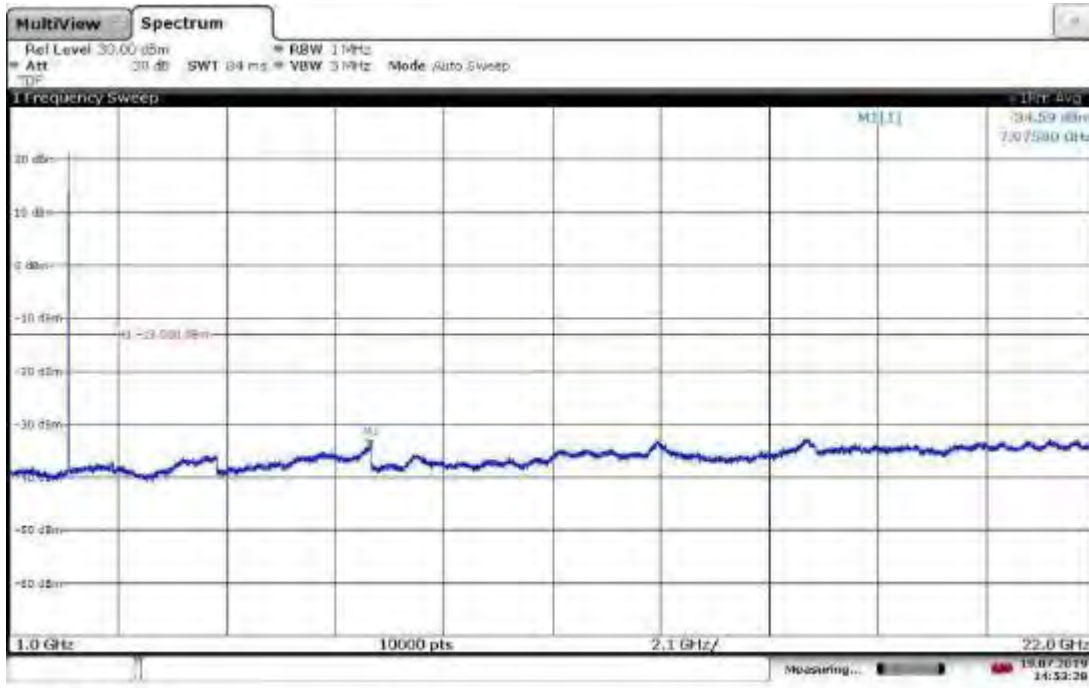
17:27:41 16.04.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



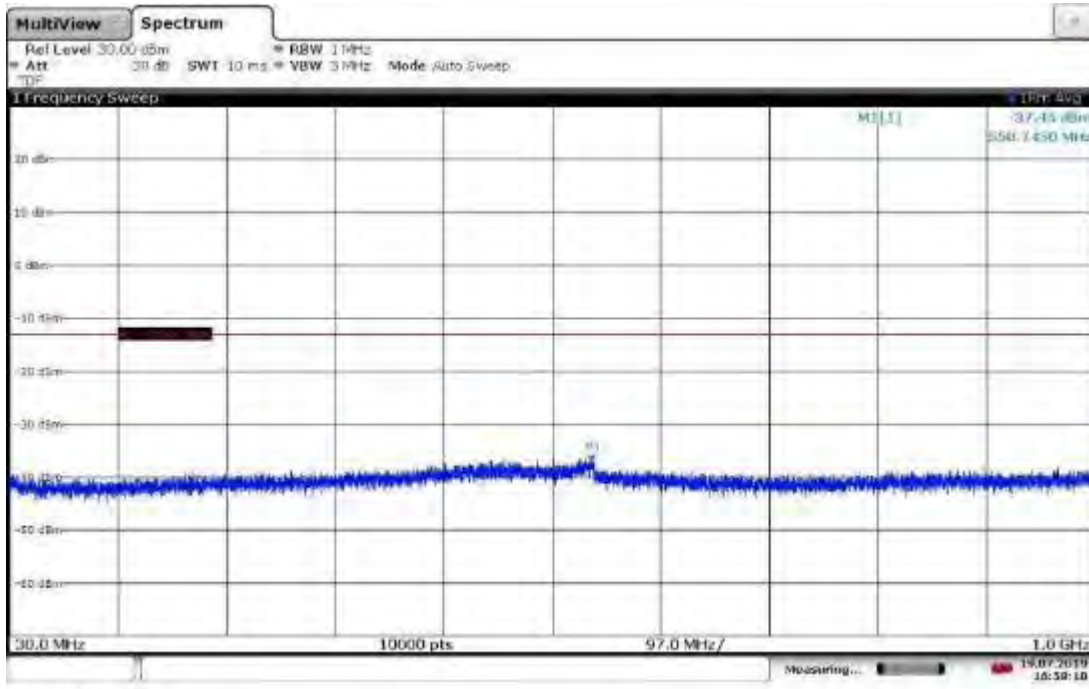
14:52:56 19.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



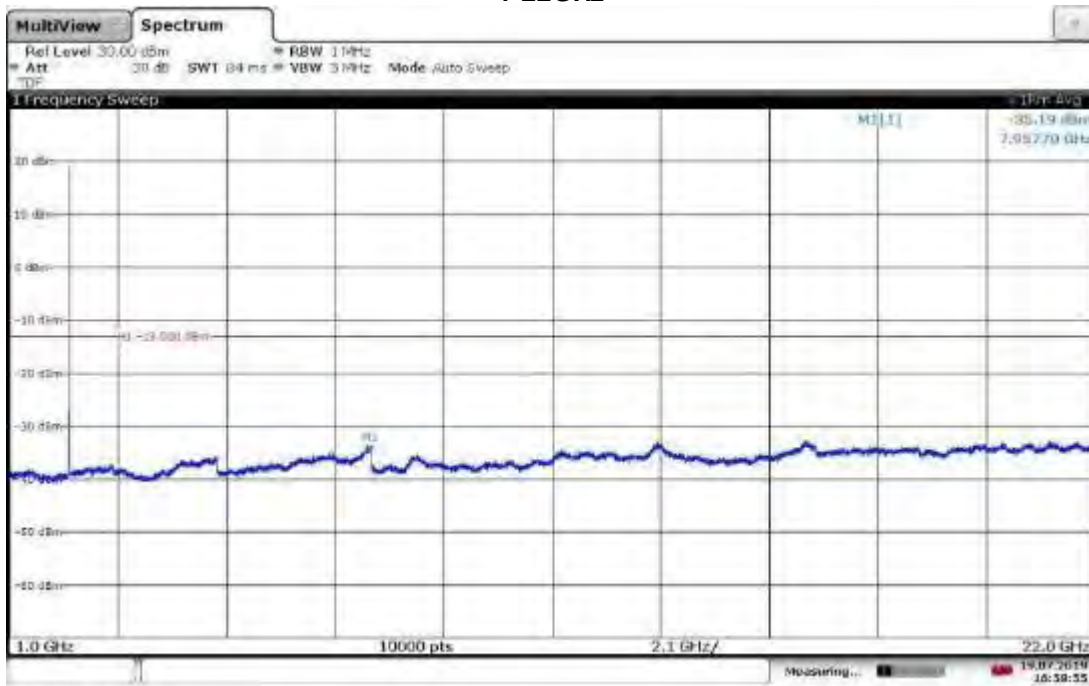
14:53:29 19.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



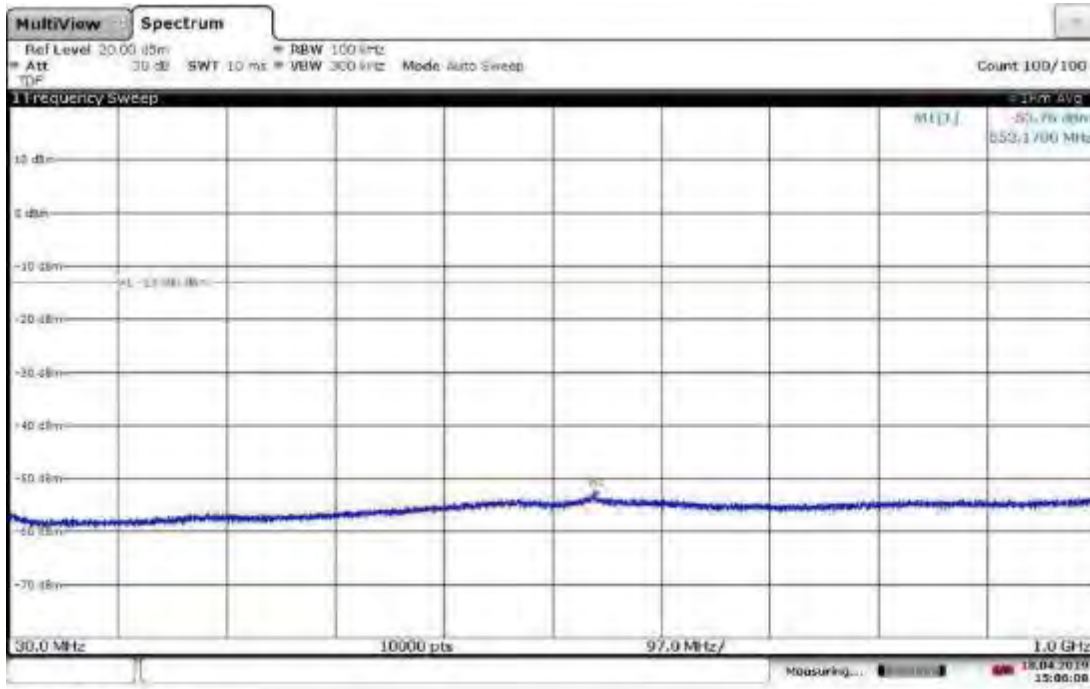
16:58:11 19.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.1-64QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



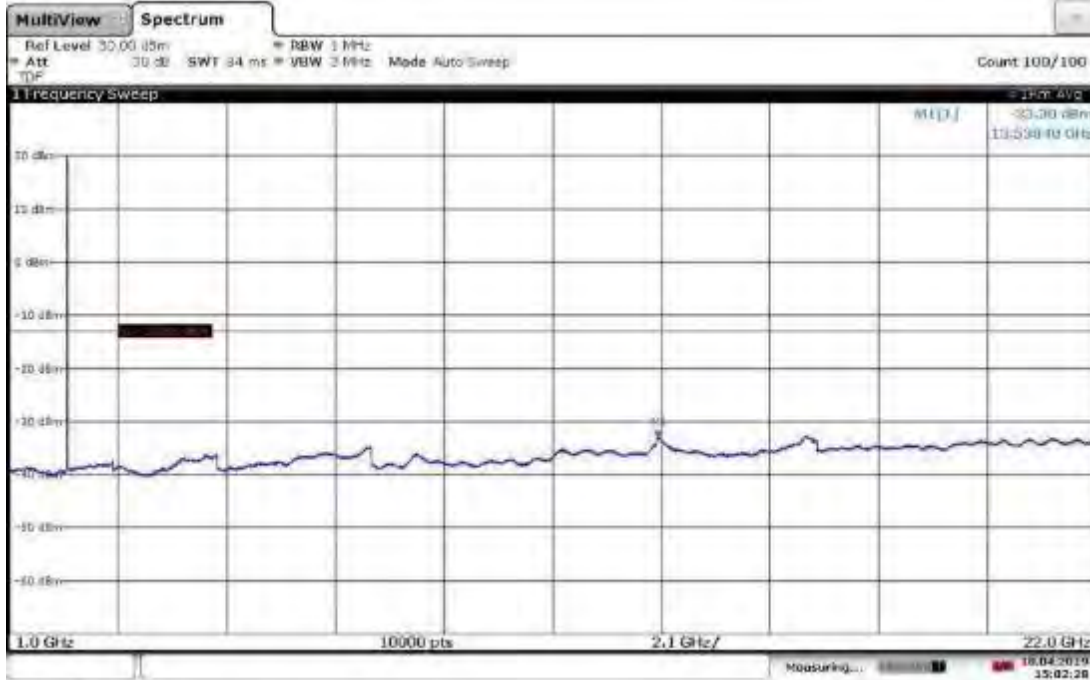
16:58:55 19.07.2019

Slot 1 (Band 4), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



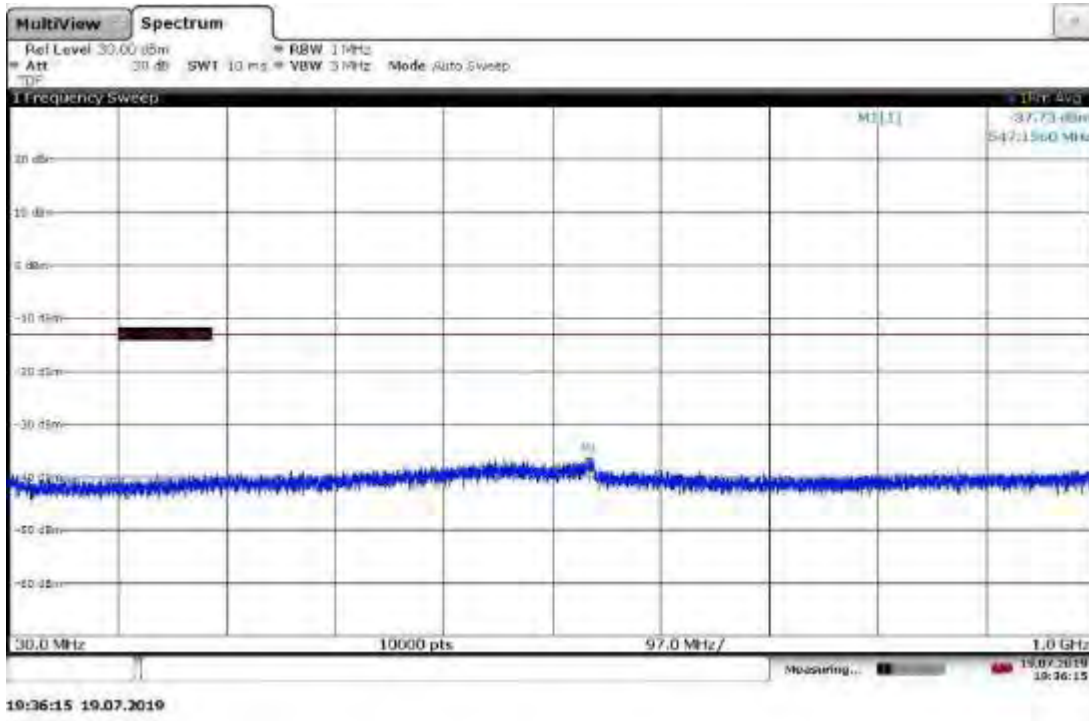
15:06:08 18.04.2019

Slot 1 (Band 4), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz

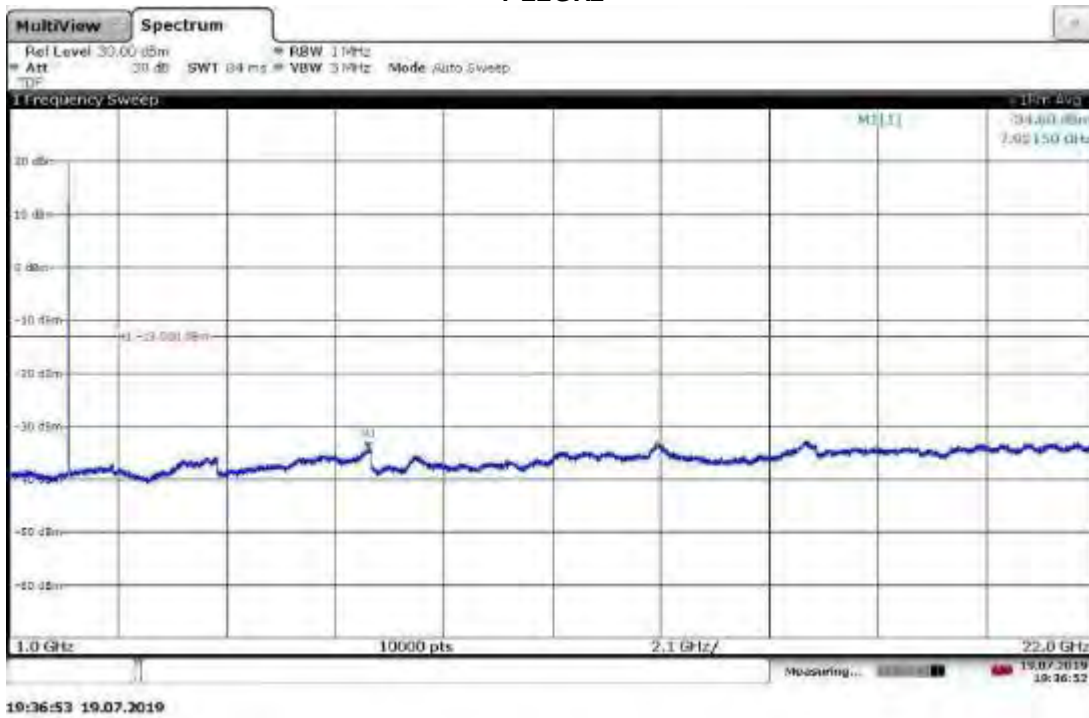


15:02:28 18.04.2019

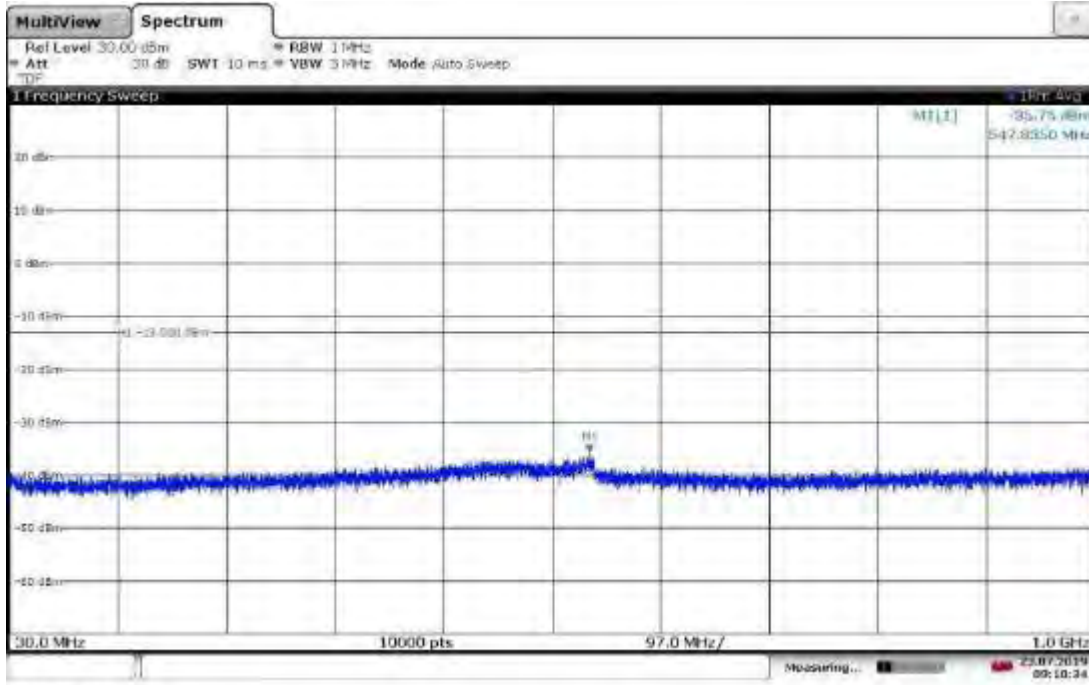
Slot 1 (Band 4), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



Slot 1 (Band 4), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz

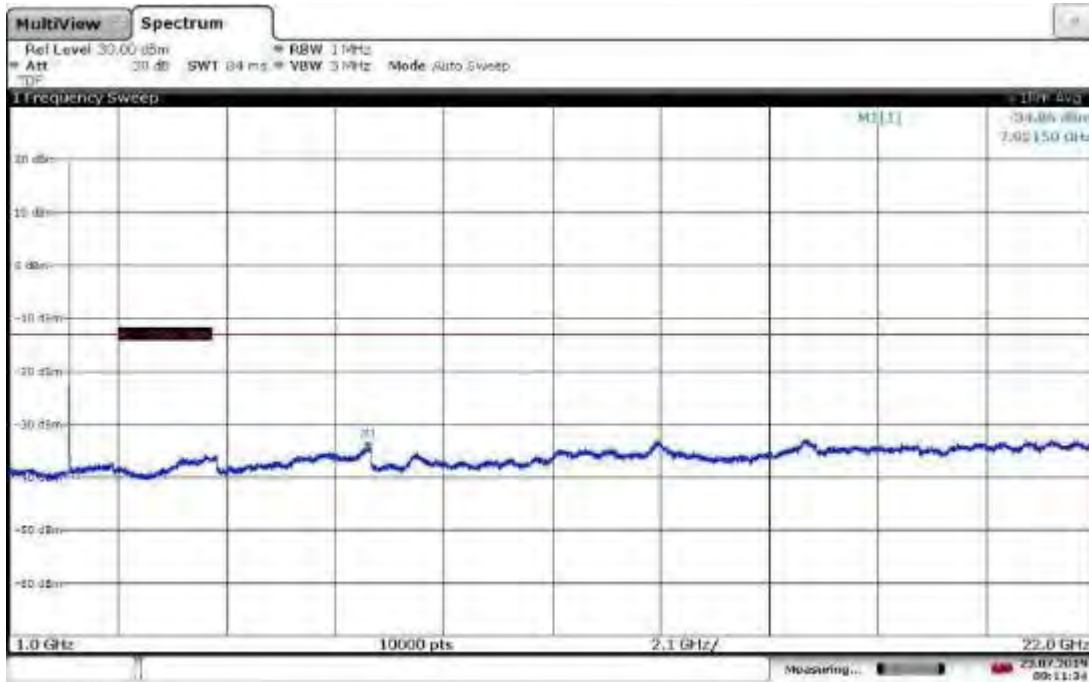


Slot 1 (Band 4), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



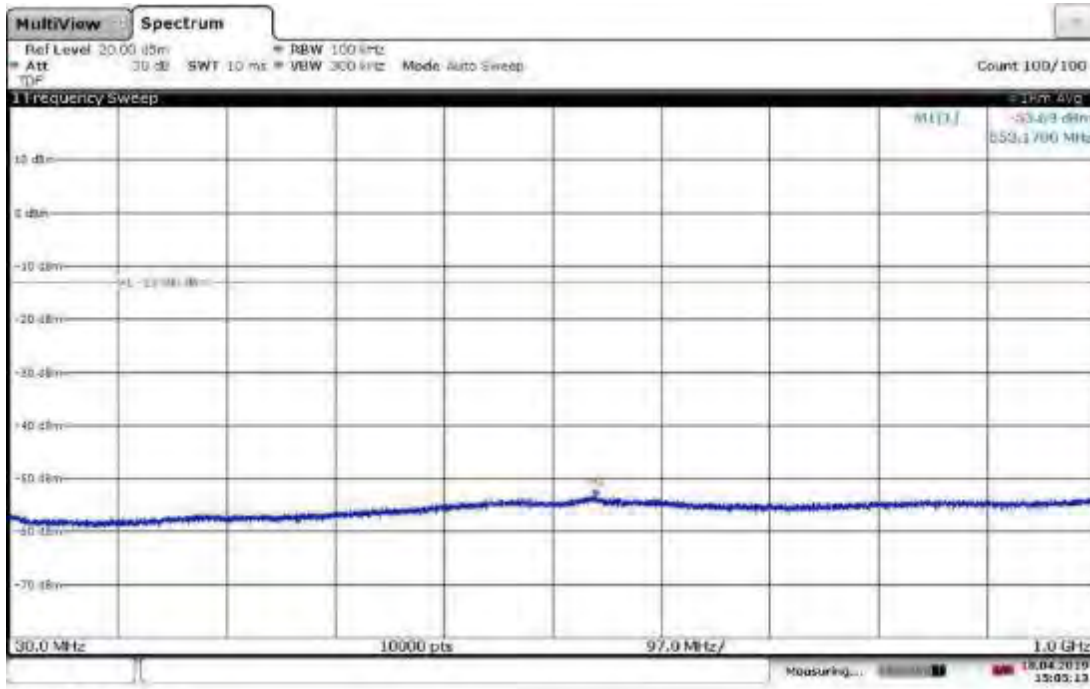
09:10:34 23.07.2019

Slot 1 (Band 4), ANT0, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



09:11:35 23.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Low Channel 30MHz-1GHz



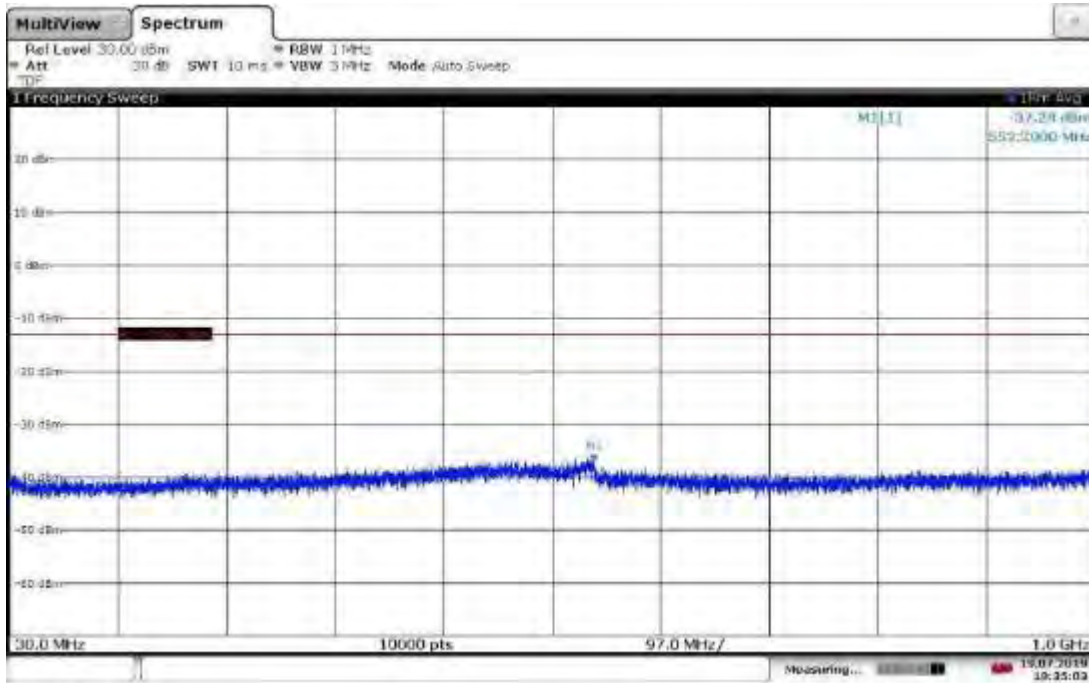
15:05:14 18.04.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Low Channel 1-22GHz



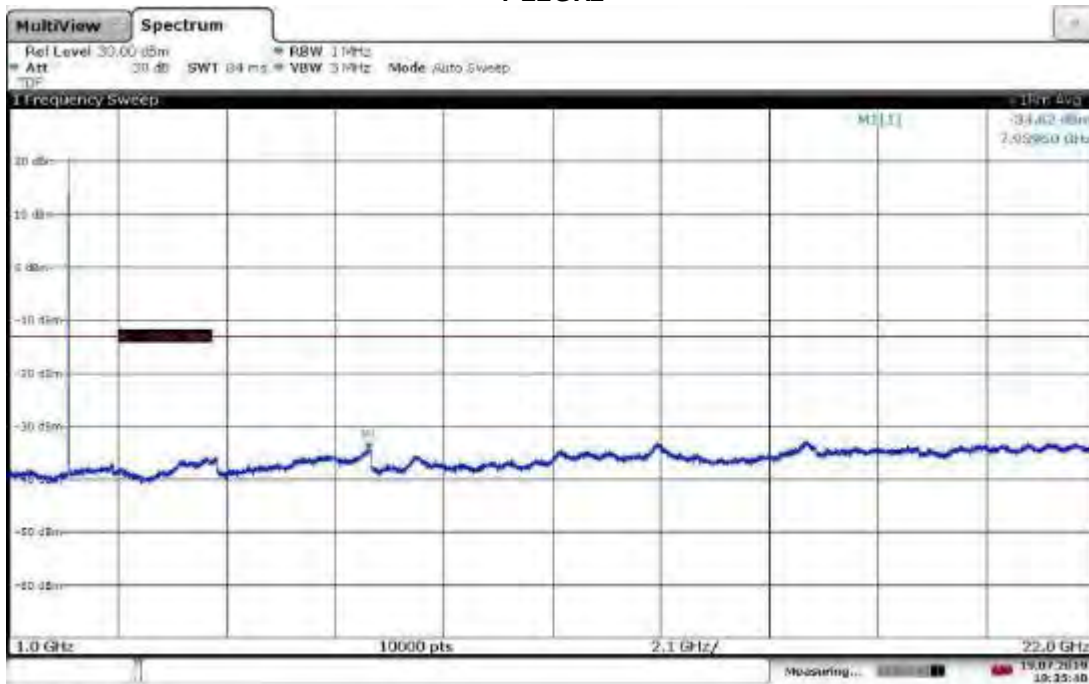
15:03:37 18.04.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Mid Channel 30MHz-1GHz



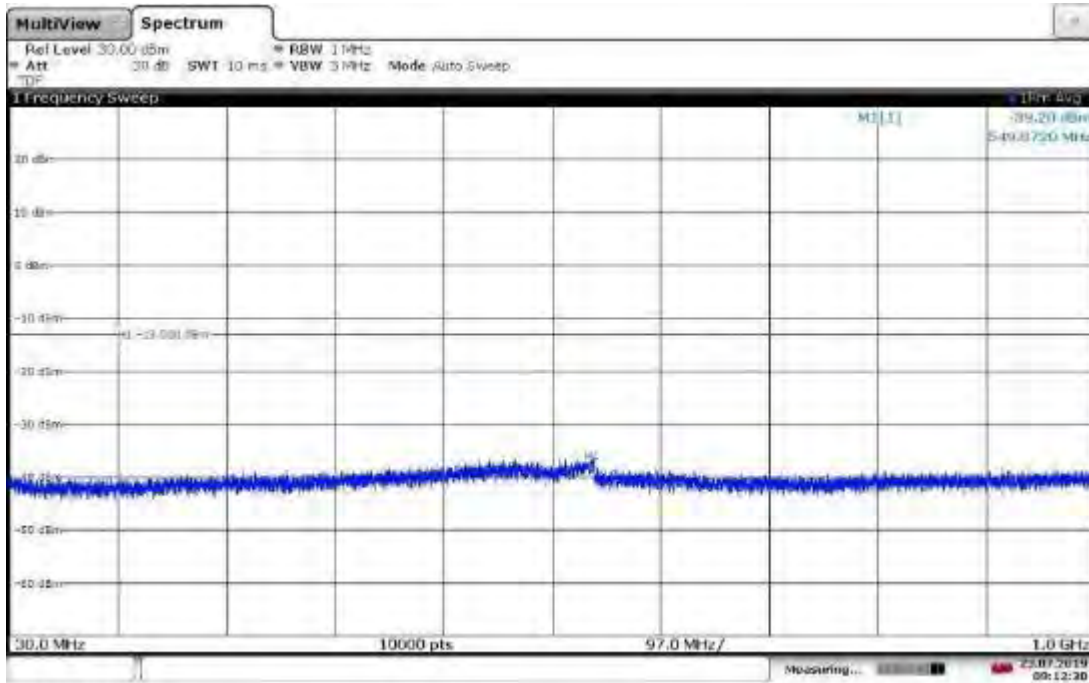
19:35:04 19.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, Mid Channel 1-22GHz



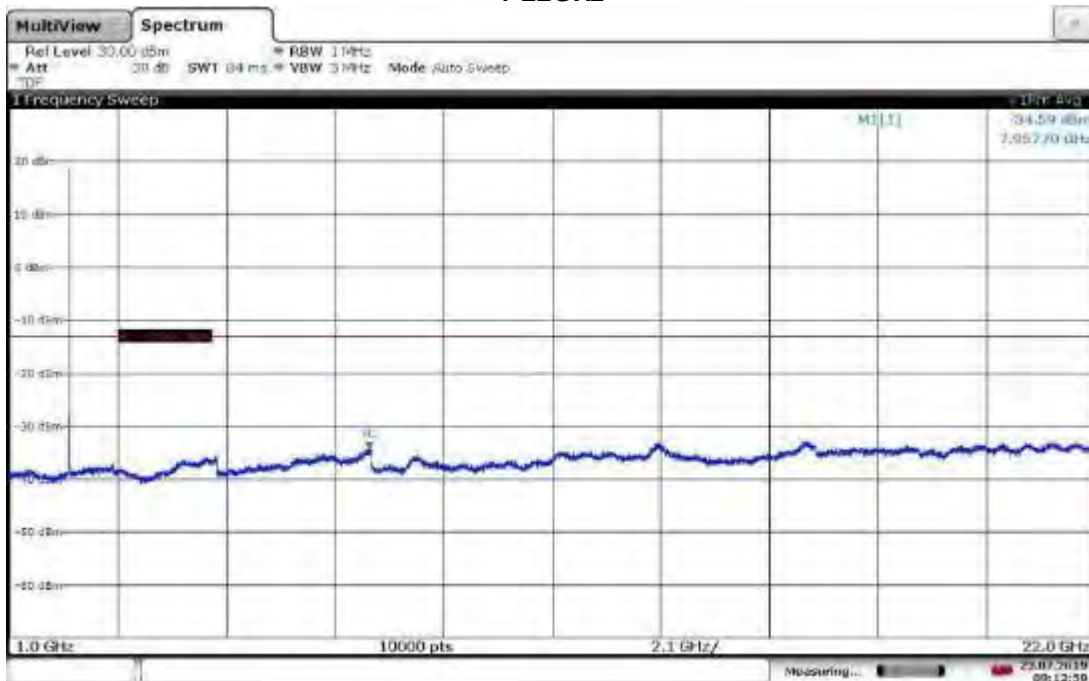
19:35:10 19.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, High Channel 30MHz-1GHz



09:12:30 23.07.2019

Slot 1 (Band 4), ANT1, Modulation: TM3.1a-256QAM, Bandwidth: 5 MHz, High Channel 1-22GHz



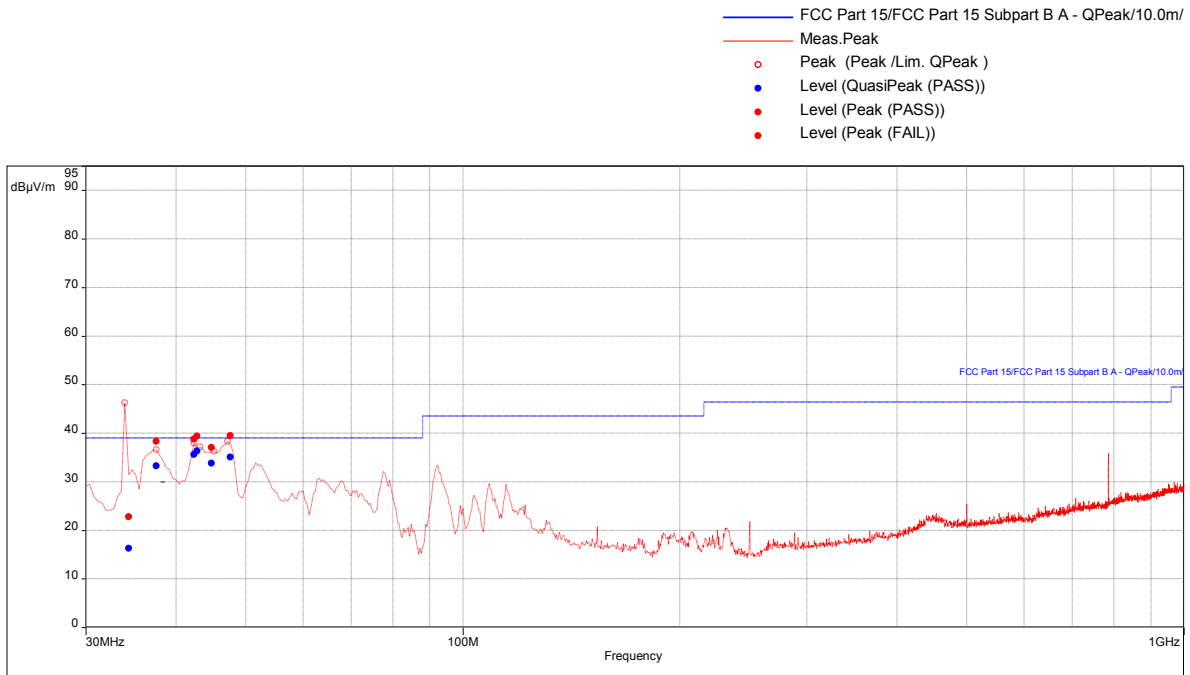
09:13:00 23.07.2019

**Radiated Emissions: 30-1000 MHz, Transmit @ Low Channel 2112.5 MHz
Slot 1 (Band 4), 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)

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:

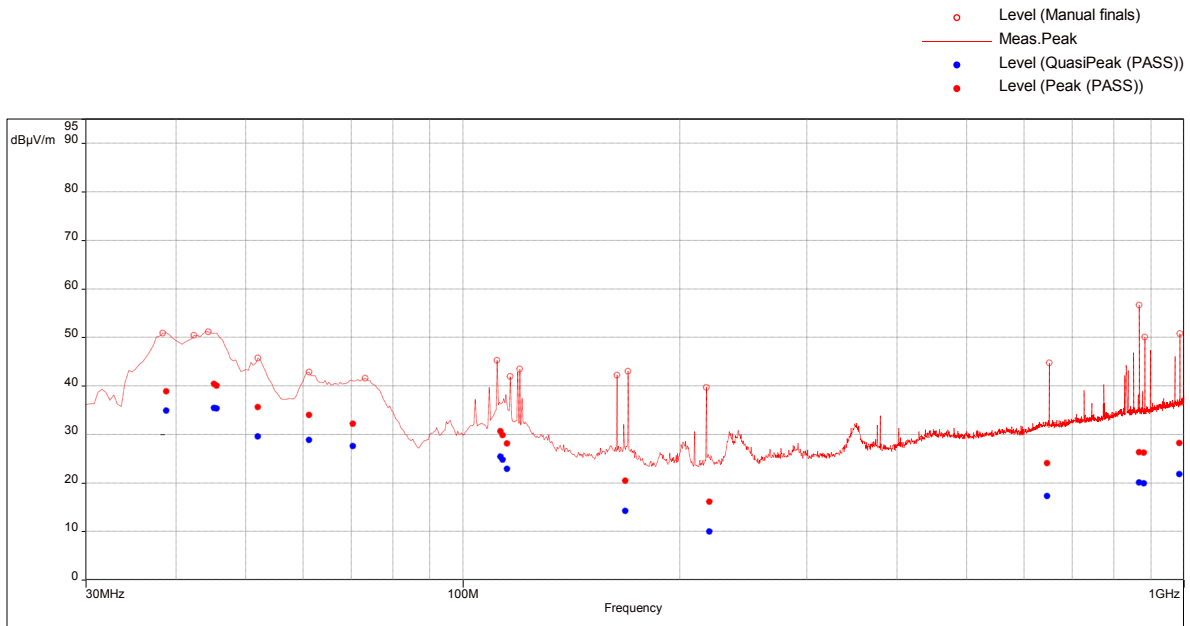
$$EIRP \text{ (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20 \cdot \text{LOG}(D) - 104.8 ; \text{ where } D \text{ is the measurement distance (in the far field region) in m.}$$

**Radiated Emissions: 30-1000 MHz, Transmit @ Mid Channel 2132.5 MHz
Slot 1 (Band 4), Modulation: TM1.1-QPSK, Bandwidth 5 MHz**

Test Information:

Date and Time	8/8/2019 9:06:48 AM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	59%
Atmospheric Pressure	996mbar
Comments	Band 4 QPSK 5MHz Mid 2132.5 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)
38.66315789	38.83	-45.97	-13	-32.97	162.00	1.00	Vertical	1000000.0	-18.42
45.29473684	40.34	-44.46	-13	-31.46	1.00	1.00	Vertical	1000000.0	-22.96
45.45263158	39.99	-44.81	-13	-31.81	131.00	1.00	Vertical	1000000.0	-23.05
52	35.61	-49.19	-13	-36.19	348.00	3.95	Vertical	1000000.0	-25.40
61.2	33.96	-50.84	-13	-37.84	284.00	2.19	Vertical	1000000.0	-25.40
70.56842105	32.15	-52.65	-13	-39.65	349.00	1.76	Vertical	1000000.0	-24.73
112.9157895	30.65	-54.15	-13	-41.15	163.00	3.40	Vertical	1000000.0	-19.29
113.5052632	29.83	-54.97	-13	-41.97	302.00	2.27	Vertical	1000000.0	-19.18
115.2631579	28.12	-56.68	-13	-43.68	172.00	2.05	Vertical	1000000.0	-18.94
168.0210526	20.44	-64.36	-13	-51.36	125.00	1.59	Vertical	1000000.0	-20.14
219.9684211	16.10	-68.70	-13	-55.70	176.00	1.03	Vertical	1000000.0	-21.22
646.3263158	24.04	-60.76	-13	-47.76	106.00	1.89	Horizontal	1000000.0	-10.02
867.6	26.25	-58.55	-13	-45.55	176.00	2.61	Horizontal	1000000.0	-6.52
880.4315789	26.22	-58.58	-13	-45.58	1.00	3.98	Horizontal	1000000.0	-6.54
986.2842105	28.18	-56.62	-13	-43.62	153.00	2.98	Horizontal	1000000.0	-4.72

Level (dBm) calculated as follow:

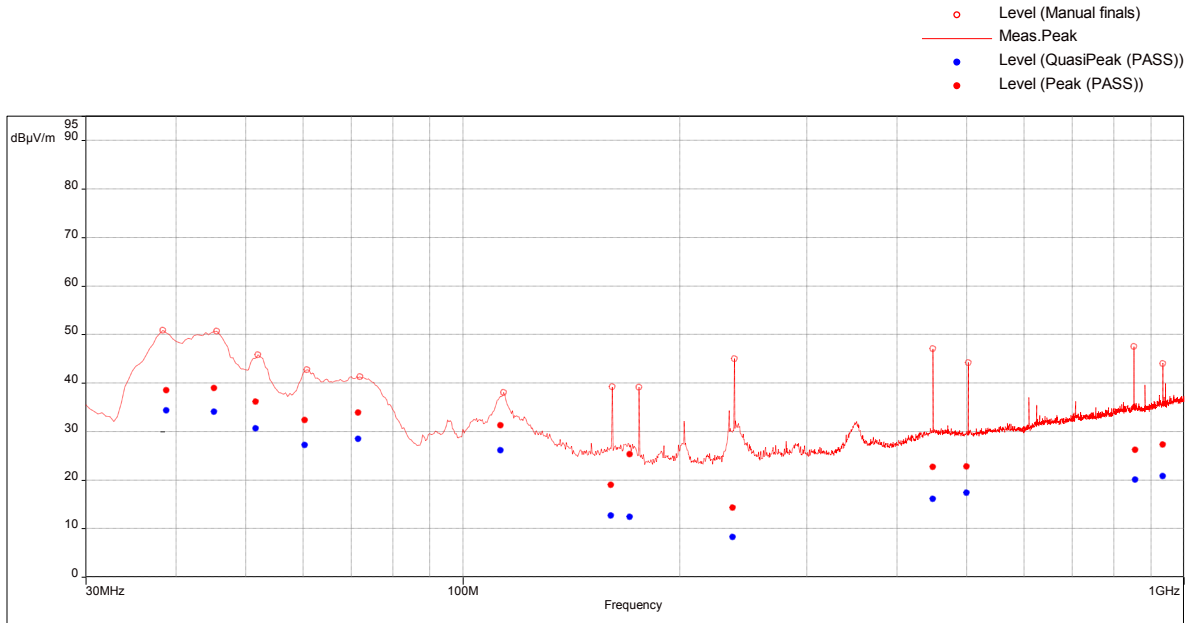
$EIRP (dBm) = E (dB\mu V/m) + 20 \cdot \log(D) - 104.8$, where D is the measurement distance (in the far field region) in meter.

**Radiated Emissions: 30-1000 MHz, Transmit @ High Channel 2152.5 MHz
Slot 1 (Band 4), Modulation: TM1.1-QPSK, Bandwidth 5 MHz**

Test Information:

Date and Time	8/8/2019 10:51:23 AM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	59%
Atmospheric Pressure	996mbar
Comments	Band 4 QPSK 5MHz High 2152.5 MHz 30-1000MHz SA mode

Graph:



Results:

Peak (PASS) (13)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
38.66315789	38.46	-46.34	-13	-33.34	74.00	1.00	Vertical	1000000.0	-18.42
45.33684211	38.92	-45.88	-13	-32.88	237.00	3.95	Vertical	1000000.0	-22.99
51.73684211	36.17	-48.63	-13	-35.63	218.00	2.18	Vertical	1000000.0	-25.35
60.53684211	32.32	-52.48	-13	-39.48	148.00	1.95	Vertical	1000000.0	-25.43
71.73684211	33.89	-50.91	-13	-37.91	313.00	1.67	Vertical	1000000.0	-24.72
112.6842105	31.28	-53.52	-13	-40.52	162.00	3.19	Vertical	1000000.0	-19.32
160.4105263	18.96	-65.84	-13	-52.84	145.00	2.04	Vertical	1000000.0	-19.71
170.6	25.28	-59.52	-13	-46.52	74.00	3.00	Vertical	1000000.0	-20.38
236.9473684	14.31	-70.49	-13	-57.49	106.00	2.31	Vertical	1000000.0	-20.28
448.5368421	22.64	-62.16	-13	-49.16	116.00	3.00	Horizontal	1000000.0	-14.16
500.0315789	22.80	-62	-13	-49	0.00	3.27	Horizontal	1000000.0	-13.18
856.7473684	26.15	-58.65	-13	-45.65	59.00	1.31	Vertical	1000000.0	-6.48
934.9368421	27.28	-57.52	-13	-44.52	0.00	3.17	Vertical	1000000.0	-5.49

Level (dBm) calculated as follow:

$EIRP (dBm) = E (dB\mu V/m) + 20 * LOG(D) - 104.8$, where D is the measurement distance (in the far field region) in meter.

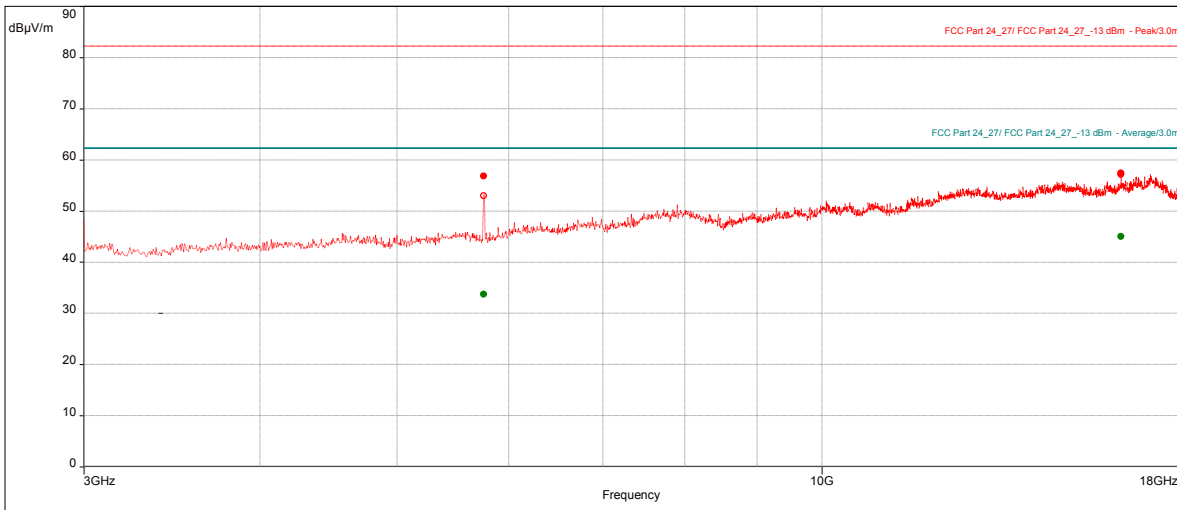
**Radiated Emissions: 1-22 GHz, Transmit @ Low Channel 2112.5 MHz
Slot 1 (Band 4), Modulation: TM1.1-QPSK, Bandwidth 5 MHz**

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:

- FCC Part 24_27/ FCC Part 24_27_-13 dBm - Average/3.0m/
- FCC Part 24_27/ FCC Part 24_27_-13 dBm - QPeak/3.0m/
- FCC Part 24_27/ FCC Part 24_27_-13 dBm - Peak/3.0m/
- Level (Manual finals)
- Meas.Peak
- Peak (Peak /Lim. Average)
- Level (Average (PASS))
- Level (Peak (PASS))



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:

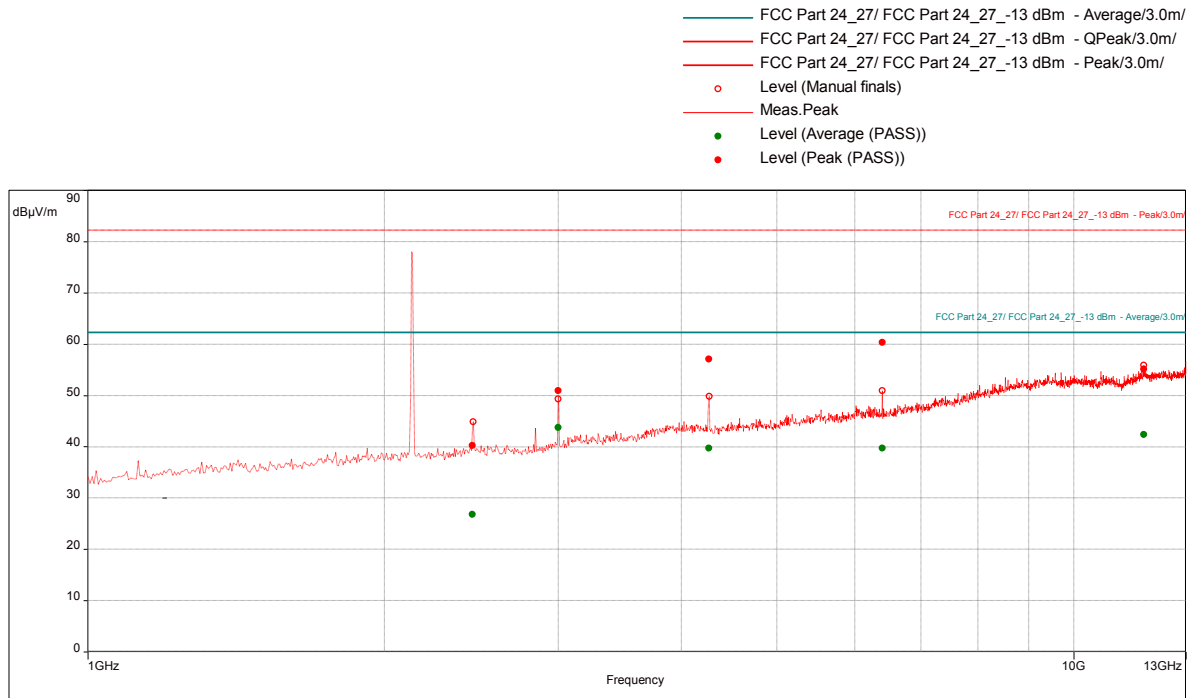
$$EIRP \text{ (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20 \cdot \text{LOG}(D) - 104.8 ; \text{ where } D \text{ is the measurement distance (in the far field region) in m.}$$

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 2132.5 MHz Slot 1 (Band 4), Modulation: TM1.1-QPSK, Bandwidth 5 MHz

Test Information:

Date and Time	8/8/2019 4:54:41 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	59%
Atmospheric Pressure	996mbar
Comments	RE 1 to 13 GHz_Band 4_5MHz_Tx mode_TM1.1_Mid Ch

Graph:

Results:

Peak (PASS) (5)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2457.368421	40.20	-55.06	-13.00	-42.06	180.00	3.10	Vertical	1000000.00	-19.65
3000	50.90	-44.36	-13.00	-31.36	84.00	1.40	Vertical	1000000.00	-17.74
4265	57.03	-38.23	-13.00	-25.23	102.00	1.50	Vertical	1000000.00	-13.27
6400	60.33	-34.93	-13.00	-21.93	101.00	1.50	Vertical	1000000.00	-8.05
11780.26316	55.11	-40.15	-13.00	-27.15	107.00	3.94	Vertical	1000000.00	2.52

Level (dBm) is calculated as follow :

$$\text{EIRP (dBm)} = \text{E(dB}\mu\text{/m)} + 20 \cdot \text{LOG(D)} - 104.8 ; \text{ where D is the measurement distance (in the far field region) in m.}$$

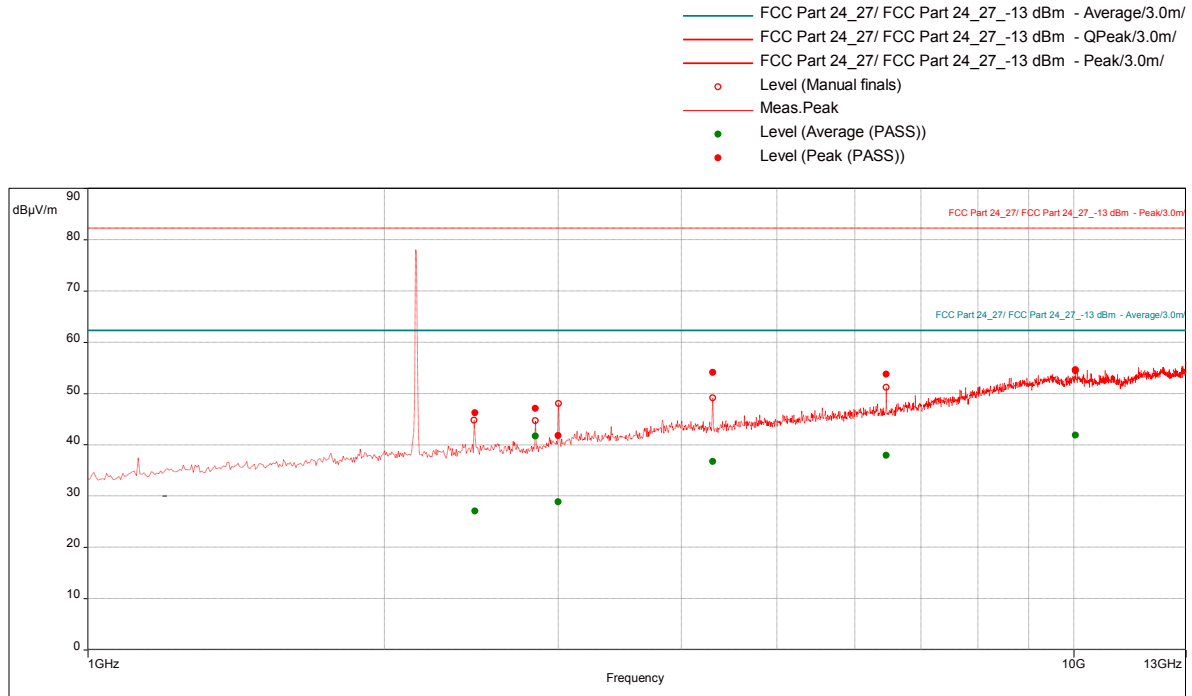
The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

**Radiated Emissions: 1-22 GHz, Transmit @ High Channel 2152.5 MHz
Slot 1 (Band 4), Modulation: TM1.1-QPSK, Bandwidth 5 MHz**

Test Information:

Date and Time	8/8/2019 5:13:57 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	59%
Atmospheric Pressure	996mbar
Comments	RE 1 to 13 GHz_Band 4_5MHz_Tx mode_TM1.1_High Ch

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2467.631579	46.22	-49.04	-13.00	-36.04	163.00	1.55	Horizontal	1000000.00	-19.63
2844.473684	47.07	-48.19	-13.00	-35.19	167.00	1.30	Vertical	1000000.00	-18.89
3001.842105	41.75	-53.51	-13.00	-40.51	298.00	3.20	Vertical	1000000.00	-17.72
4305	54.04	-41.22	-13.00	-28.22	102.00	2.45	Vertical	1000000.00	-13.25
6457.631579	53.75	-41.51	-13.00	-28.51	32.00	1.10	Vertical	1000000.00	-8.02
10046.31579	54.55	-40.71	-13.00	-27.71	218.00	2.25	Horizontal	1000000.00	-0.52

Level (dBm) is calculated as follow :

$$EIRP \text{ (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20 \cdot \text{LOG}(D) - 104.8 ; \text{ where } D \text{ is the measurement distance (in the far field region) in m.}$$

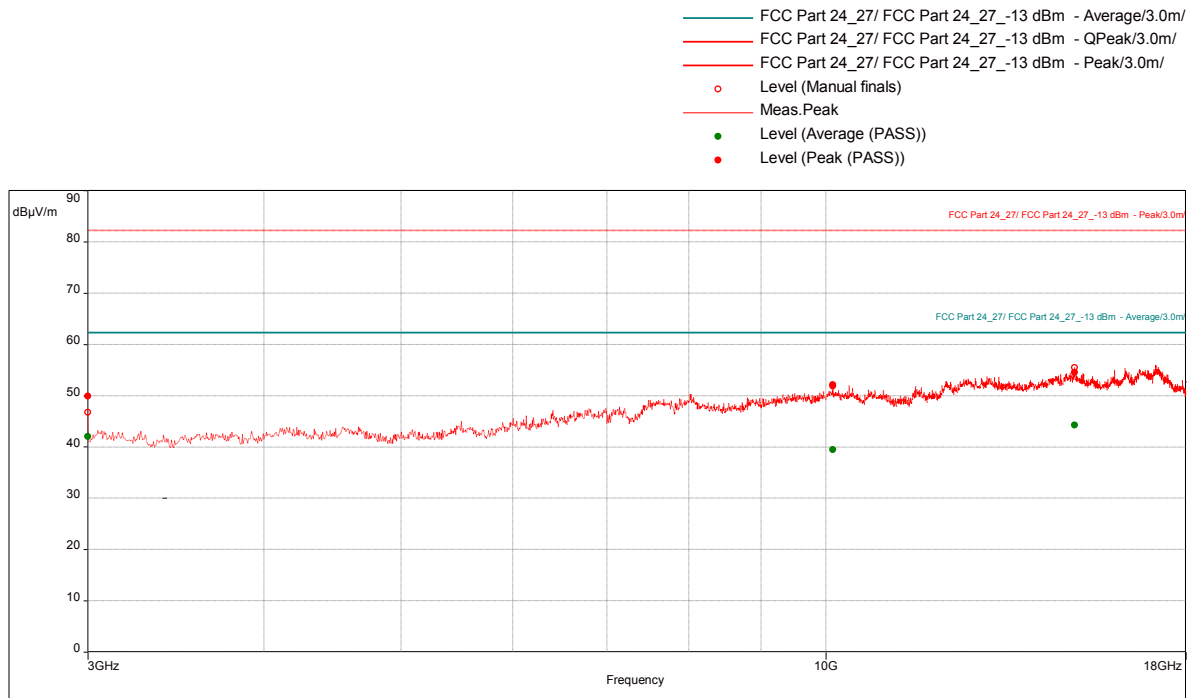
The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

**Radiated Emissions, 1-22 GHz, Transmit @ Low Channel 2112.5 MHz
Slot 1 (Band 4), 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:

$$EIRP \text{ (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20 \cdot \text{LOG}(D) - 104.8; \text{ where } D \text{ is the measurement distance (in the far field region) in m.}$$

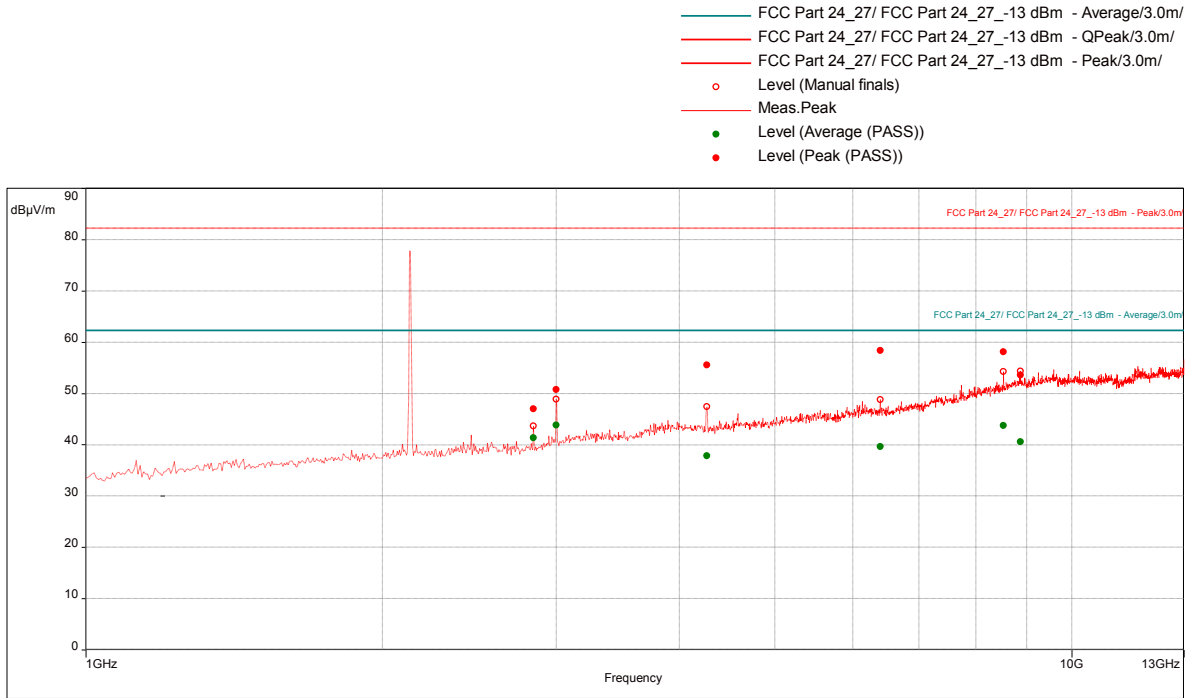
Notes: Testing was performed manually from 1-3 GHz and 18-22 GHz with no emissions were detected at a distance of 10 cm.

**Radiated Emissions, 1-22 GHz, Transmit @ Mid Channel 2132.5 MHz
Slot 1 (Band 4), Modulation: TM3.2-16QAM, Bandwidth 5 MHz**

Test Information:

Date and Time	8/8/2019 9:07:11 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	59%
Atmospheric Pressure	996mbar
Comments	RE 1 to 13 GHz_Band 4_5MHz_Tx mode_TM3.2_Mid Ch

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2844.473684	46.97	-48.29	-13.00	-35.29	162.00	1.15	Vertical	1000000.00	-18.89
3000	50.76	-44.50	-13.00	-31.50	162.00	1.25	Vertical	1000000.00	-17.74
4265.263158	55.50	-39.76	-13.00	-26.76	106.00	2.15	Vertical	1000000.00	-13.27
6397.894737	58.39	-36.87	-13.00	-23.87	106.00	1.50	Vertical	1000000.00	-8.05
8530.263158	58.12	-37.14	-13.00	-24.14	32.00	3.10	Vertical	1000000.00	-2.89
8876.578947	53.60	-41.66	-13.00	-28.66	294.00	1.35	Horizontal	1000000.00	-1.86

Level (dBm) is calculated as follow :

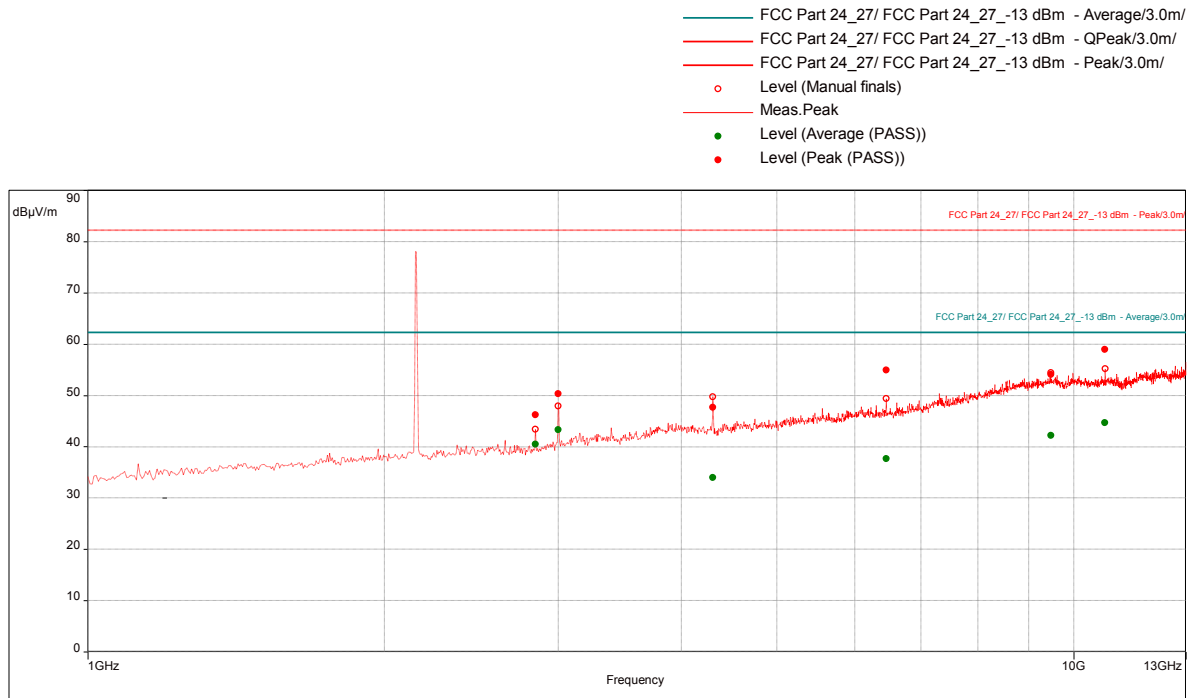
$$EIRP (dBm) = E(dB\mu/m) + 20 \cdot \text{LOG}(D) - 104.8 ; \text{ where } D \text{ is the measurement distance (in the far field region) in m.}$$

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 2152.5 MHz Slot 1 (Band 4), Modulation: TM3.2-16QAM, Bandwidth 5 MHz

Test Information:

Date and Time	8/8/2019 9:57:03 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	59%
Atmospheric Pressure	996mbar
Comments	RE 1 to 13 GHz_Band 4_5MHz_Tx mode_TM3.2_High Ch

Graph:

Results:
Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2844.473684	46.20	-49.06	-13.00	-36.06	158.00	1.00	Vertical	1000000.00	-18.89
3000	50.29	-45.00	-13.00	-31.97	82.00	1.45	Vertical	1000000.00	-17.74
4305	47.62	-47.64	-13.00	-34.64	139.00	1.05	Vertical	1000000.00	-13.25
6457.894737	54.89	-40.37	-13.00	-27.37	32.00	3.30	Vertical	1000000.00	-8.02
9483.421053	54.04	-41.22	-13.00	-28.22	250.00	2.00	Vertical	1000000.00	-0.78
10761.31579	58.99	-36.27	-13.00	-23.27	134.00	2.20	Vertical	1000000.00	0.01

Level (dBm) is calculated as follow :

$$\text{EIRP (dBm)} = \text{E(dB}\mu\text{/m)} + 20 \cdot \text{LOG(D)} - 104.8 ; \text{ where D is the measurement distance (in the far field region) in m.}$$

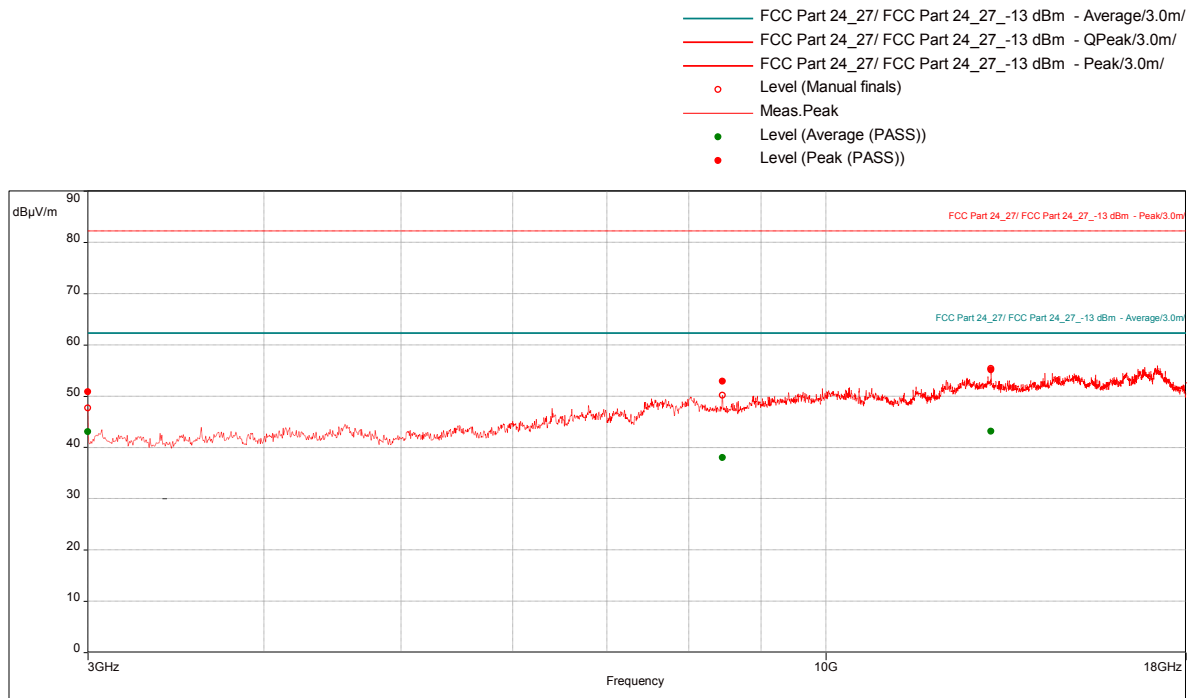
The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

**Radiated Emissions, 1-22 GHz, Transmit @ Low Channel 2112.5 MHz
Slot 1 (Band 4), 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:

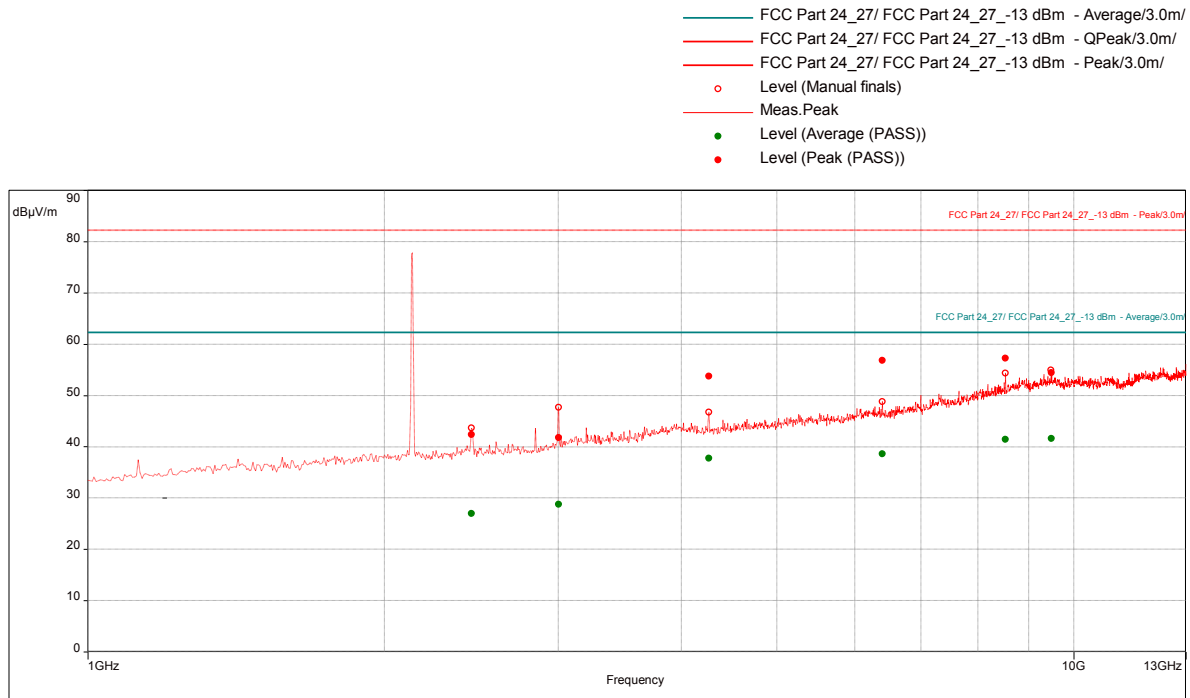
$$EIRP (dBm) = E (dBµV/m) + 20 \cdot \text{LOG}(D) - 104.8; \text{ where } D \text{ is the measurement distance (in the far field region) in m.}$$

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 2132.5 MHz Slot 1 (Band 66), Modulation: TM3.1-64QAM, Bandwidth 5 MHz

Test Information:

Date and Time	8/8/2019 6:07:54 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	59%
Atmospheric Pressure	996mbar
Comments	RE 1 to 13 GHz_Band 4_5MHz_Tx mode_TM3.1_Mid Ch

Graph:

Results:
Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2448.947368	42.36	-52.90	-13.00	-39.90	27.00	2.20	Vertical	1000000.00	-19.67
3006.578947	41.79	-53.47	-13.00	-40.47	153.00	1.80	Vertical	1000000.00	-17.68
4265.526316	53.77	-41.49	-13.00	-28.49	101.00	2.10	Vertical	1000000.00	-13.27
6399.473684	56.79	-38.47	-13.00	-25.47	106.00	1.85	Vertical	1000000.00	-8.05
8528.684211	57.21	-38.05	-13.00	-25.05	37.00	1.00	Vertical	1000000.00	-2.89
9493.947368	54.44	-40.82	-13.00	-27.82	231.00	3.10	Vertical	1000000.00	-0.76

Level (dBm) is calculated as follow :

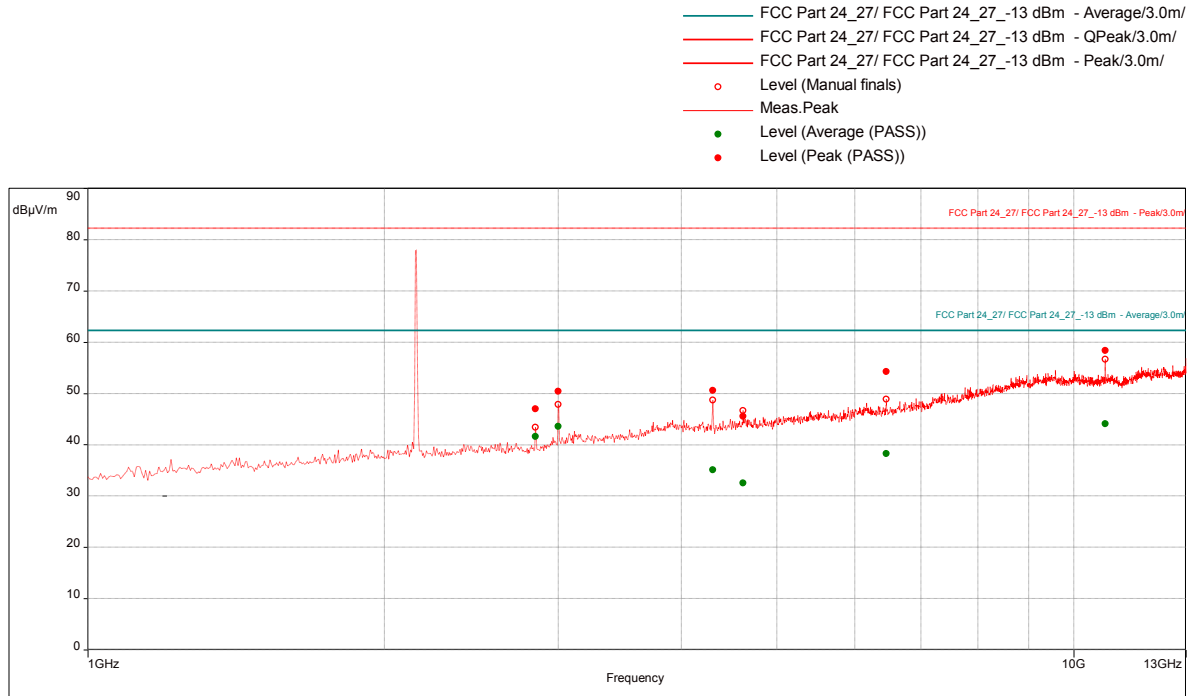
$$\text{EIRP (dBm)} = \text{E(dB}\mu\text{/m)} + 20 \cdot \text{LOG(D)} - 104.8 ; \text{ where D is the measurement distance (in the far field region) in m.}$$

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 2152.5 MHz Slot 1 (Band 66), Modulation: TM3.1-64QAM, Bandwidth 5 MHz

Test Information:

Date and Time	8/8/2019 6:48:47 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	59%
Atmospheric Pressure	996mbar
Comments	RE 1 to 13 GHz_Band 4_5MHz_Tx mode_TM3.1_High Ch

Graph:

Results:
Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2844.473684	46.97	-48.29	-13.00	-35.29	163.00	1.10	Vertical	1000000.00	-18.89
3000	50.39	-44.87	-13.00	-31.87	82.00	1.40	Vertical	1000000.00	-17.74
4306.578947	50.56	-44.70	-13.00	-31.70	106.00	2.10	Vertical	1000000.00	-13.25
4619.210526	45.49	-49.77	-13.00	-36.77	148.00	1.50	Horizontal	1000000.00	-12.01
6456.842105	54.26	-41.00	-13.00	-28.00	32.00	2.90	Vertical	1000000.00	-8.03
10763.15789	58.38	-36.88	-13.00	-23.88	130.00	2.45	Vertical	1000000.00	0.02

Level (dBm) is calculated as follow :

$$\text{EIRP (dBm)} = \text{E(dB}\mu\text{/m)} + 20 \cdot \text{LOG(D)} - 104.8 ; \text{ where D is the measurement distance (in the far field region) in m.}$$

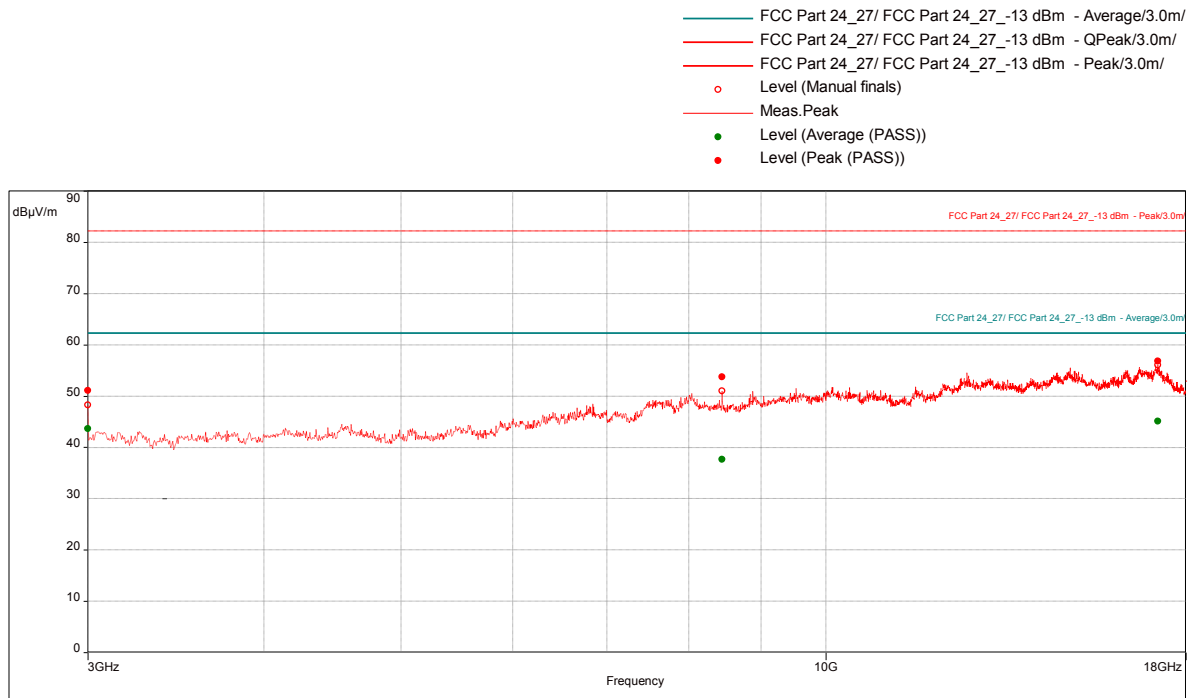
The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

**Radiated Emissions, 1-22 GHz, Transmit @ Low Channel 2112.5 MHz
Slot 1 (Band 4), 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:

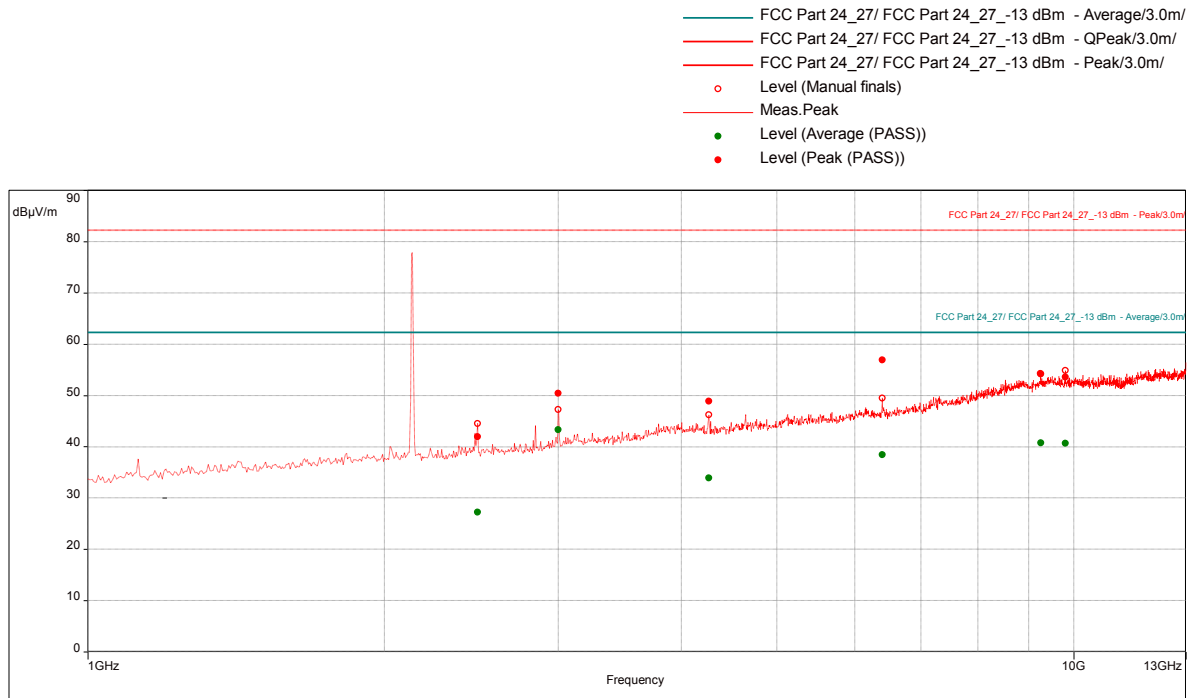
$$EIRP \text{ (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20 \cdot \text{LOG}(D) - 104.8; \text{ where } D \text{ is the measurement distance (in the far field region) in m.}$$

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 2132.5 MHz Slot 1 (Band 4), Modulation: TM3.1a-256QAM, Bandwidth 5 MHz

Test Information:

Date and Time	8/8/2019 7:33:51 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	59%
Atmospheric Pressure	996mbar
Comments	RE 1 to 13 GHz_Band 4_5MHz_Tx mode_TM3.1a_Mid Ch

Graph:

Results:
Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2484.736842	41.92	-53.34	-13.00	-40.34	31.00	1.35	Vertical	1000000.00	-19.60
3000	50.39	-44.87	-13.00	-31.87	83.00	1.45	Vertical	1000000.00	-17.74
4262.894737	48.89	-46.37	-13.00	-33.37	358.00	1.30	Vertical	1000000.00	-13.27
6396.578947	56.93	-38.33	-13.00	-25.33	106.00	1.85	Vertical	1000000.00	-8.05
9264.473684	54.12	-41.14	-13.00	-28.14	359.00	1.00	Horizontal	1000000.00	-1.47
9808.421053	53.57	-41.69	-13.00	-28.69	269.00	1.20	Vertical	1000000.00	-0.85

Level (dBm) is calculated as follow :

$$\text{EIRP (dBm)} = \text{E(dB}\mu\text{V/m)} + 20 \cdot \text{LOG(D)} - 104.8 ; \text{ where D is the measurement distance (in the far field region) in m.}$$

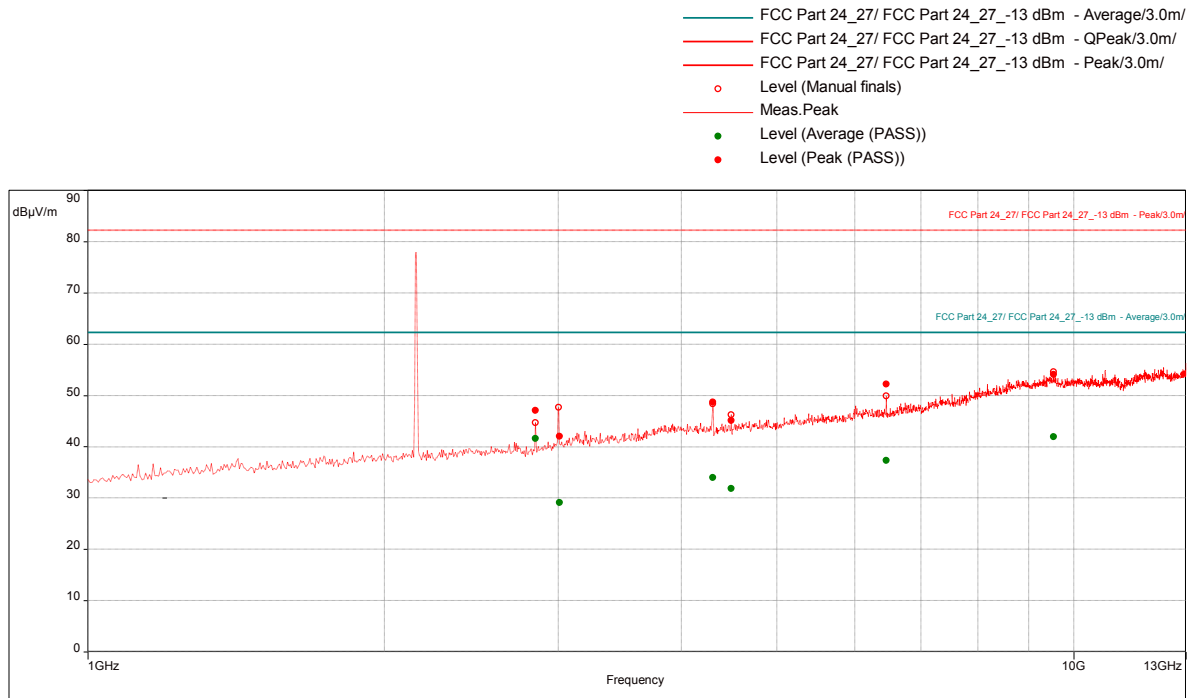
The high peak is the fundamental frequency. Testing was performed manually from 13-22 GHz with no emissions were detected at a distance of 10 cm.

**Radiated Emissions, 1-22 GHz, Transmit @ High Channel
Slot 1 (Band 4), Modulation: TM3.1a-256QAM, Bandwidth 5 MHz,**

Test Information:

Date and Time	8/8/2019 8:17:45 PM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	23C
Humidity	59%
Atmospheric Pressure	996mbar
Comments	RE 1 to 13 GHz_Band 4_5MHz_Tx mode_TM3.1a_High Ch

Graph:



Results:

Peak (PASS) (6)

Frequency (MHz)	Level (dBµV/m)	Level (dBm)	Limit (dBm)	Margin (dB)	Azimuth (°) (dB)	Height (m) (dB)	Pol. (dB)	RBW (dB)	Correction (dB)
2844.473684	47.07	-48.19	-13.00	-35.19	162.00	1.30	Vertical	1000000.00	-18.89
3007.631579	42.05	-53.21	-13.00	-40.21	227.00	1.55	Vertical	1000000.00	-17.68
4304.736842	48.65	-46.61	-13.00	-33.61	176.00	1.01	Vertical	1000000.00	-13.26
4494.736842	45.12	-50.14	-13.00	-37.14	213.00	2.56	Horizontal	1000000.00	-12.63
6458.421053	52.21	-43.05	-13.00	-30.05	32.00	1.00	Vertical	1000000.00	-8.02
9540.789474	54.07	-41.19	-13.00	-28.19	190.00	1.80	Vertical	1000000.00	-0.75

Level (dBm) is calculated as follow :

$$EIRP \text{ (dBm)} = E \text{ (dB}\mu\text{V/m)} + 20 \cdot \text{LOG}(D) - 104.8 ; \text{ where } D \text{ is the measurement distance (in the far field region) in m.}$$

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.

Intertek

Report Number: 103866582BOX-24a

Issued: 08/14/2019

Test Personnel:	<u>Kouma Sinn <i>KPS</i></u>	Test Date:	<u>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</u>
Supervising/Reviewing Engineer: (Where Applicable)	<u>N/A</u>		
Product Standard:	<u>FCC Part 27</u>	Limit Applied:	<u>See report section 11.3</u>
Input Voltage:	<u>48 VDC (POE)</u>		
		Ambient Temperature:	<u>22, 23, 20, 23, 23, 22, 21, 22, 21, 23 °C</u>
Pretest Verification w/ Ambient Signals or BB Source:	<u>N/A</u>	Relative Humidity:	<u>21, 20, 42, 5, 410, 40, 64, 62, 71, 59 %</u>
		Atmospheric Pressure:	<u>1004, 1001, 996, 995, 1007, 1001, 1005, 1005, 1001, 996 mbars</u>

Deviations, Additions, or Exclusions: None

12 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	08/14/2019	103866582BOX-24a	KPS <i>KPS</i>	NNA <i>NNA</i>	Original Issue
1	09/16/2019	103866582BOX-24a	KPS <i>KPS</i>		Corrected the model from RPM-A5A11-B04 to RPM-A5A11-B66