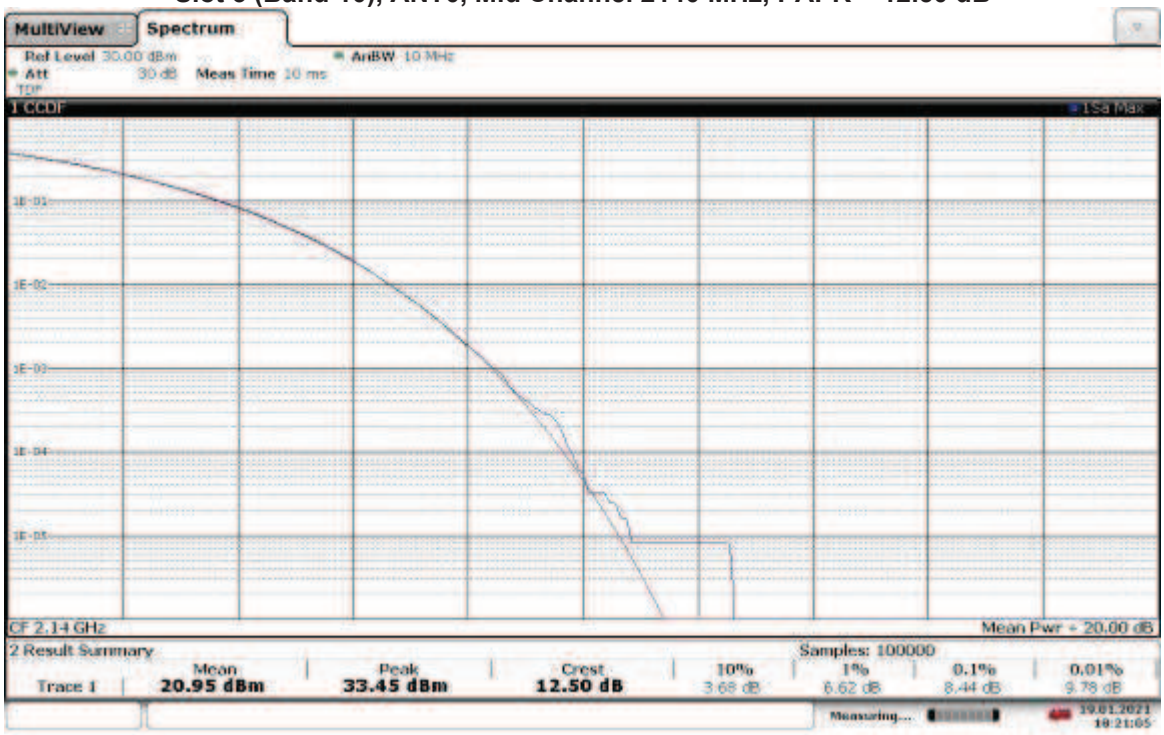
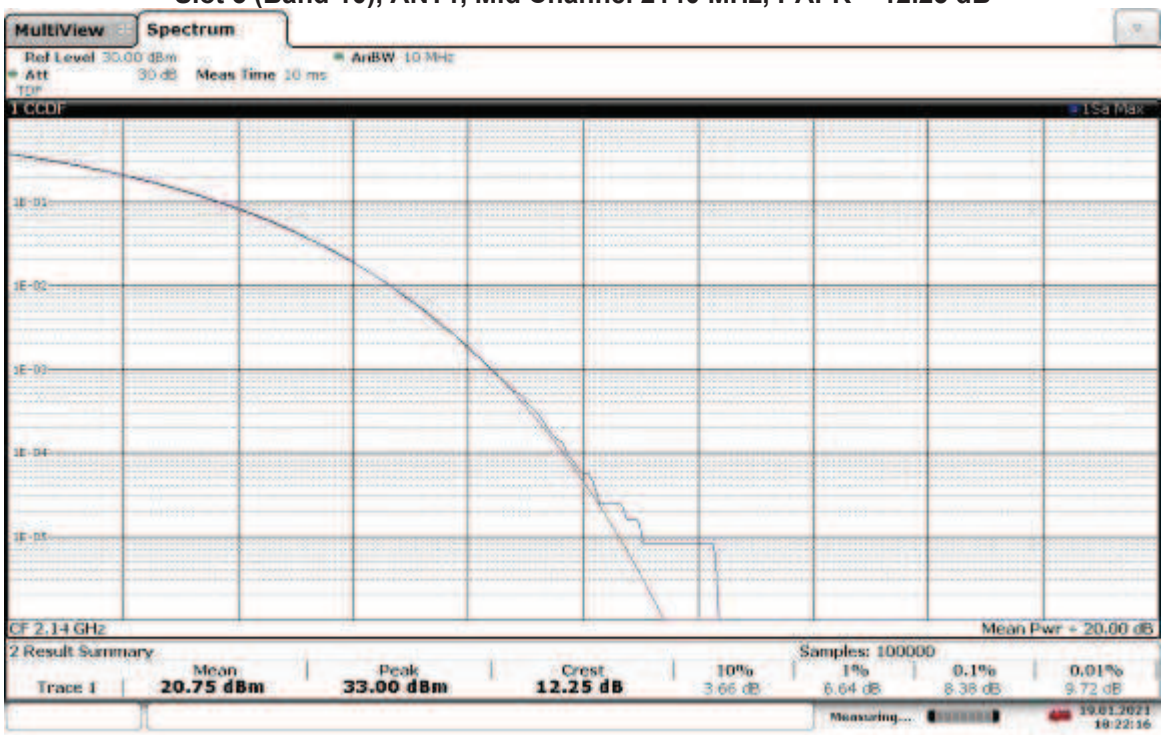
TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz, PAPR = 12.50 dB



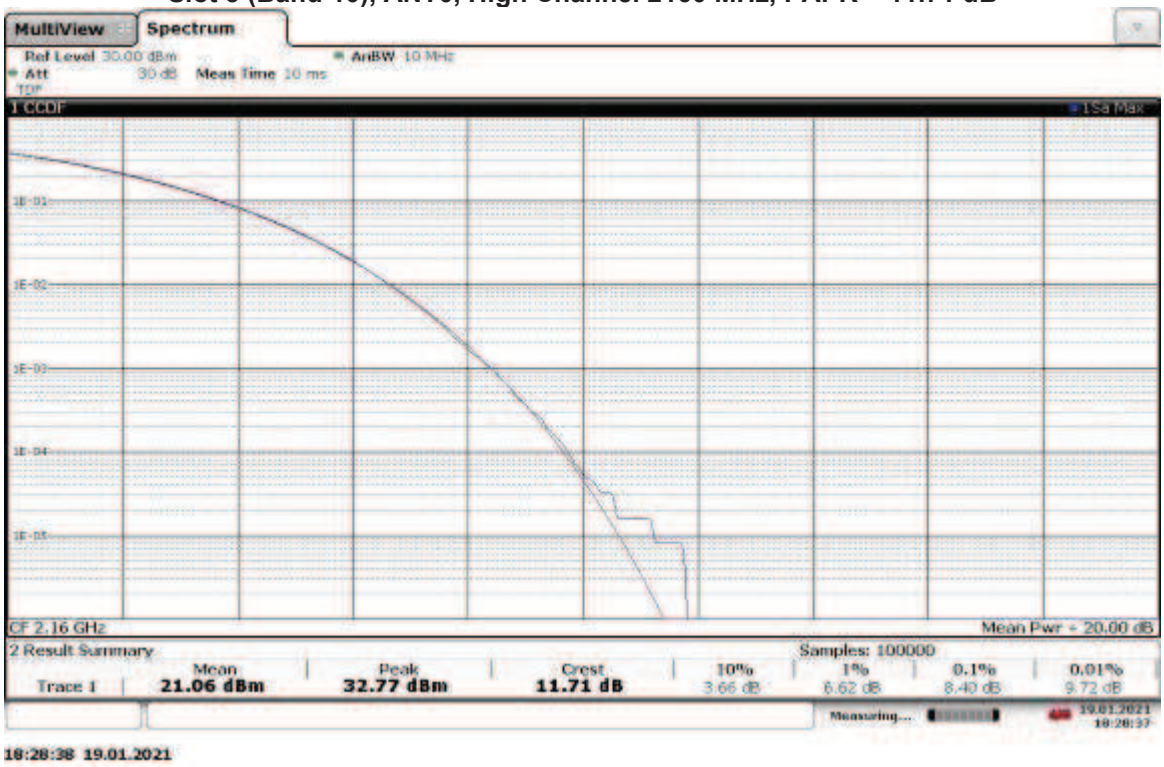
18:21:05 19.01.2021

TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz, PAPR = 12.25 dB



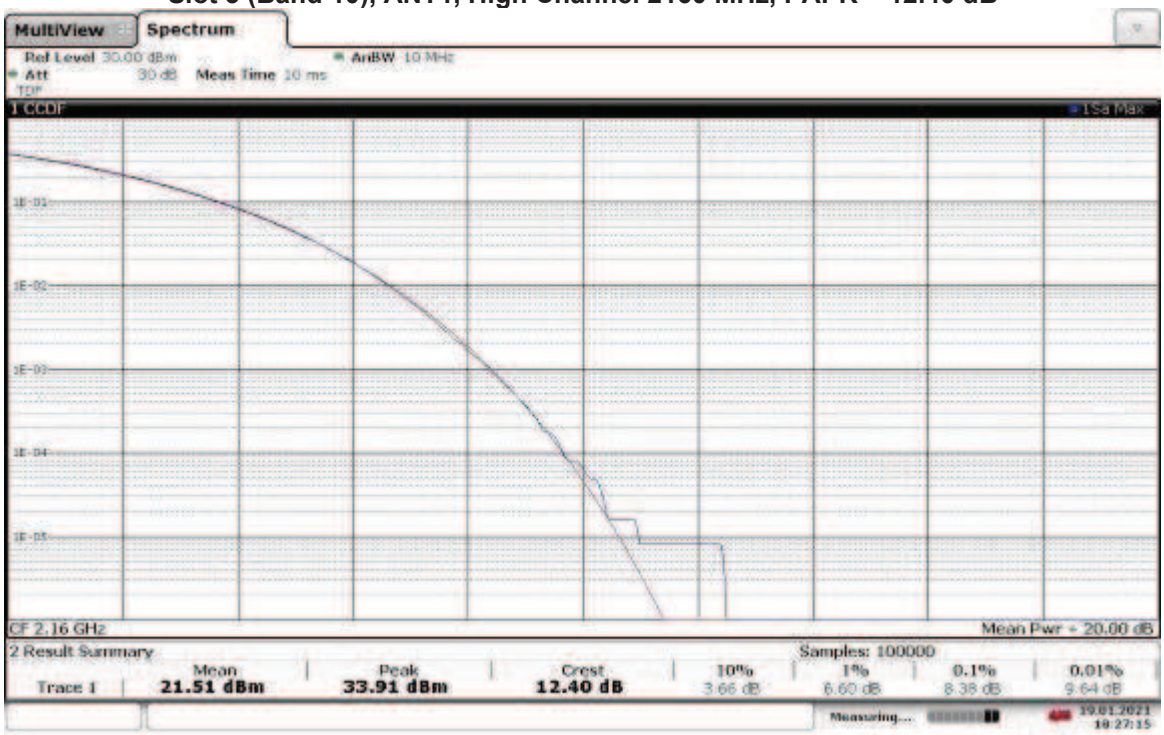
18:22:16 19.01.2021

TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2160 MHz, PAPR = 11.71 dB



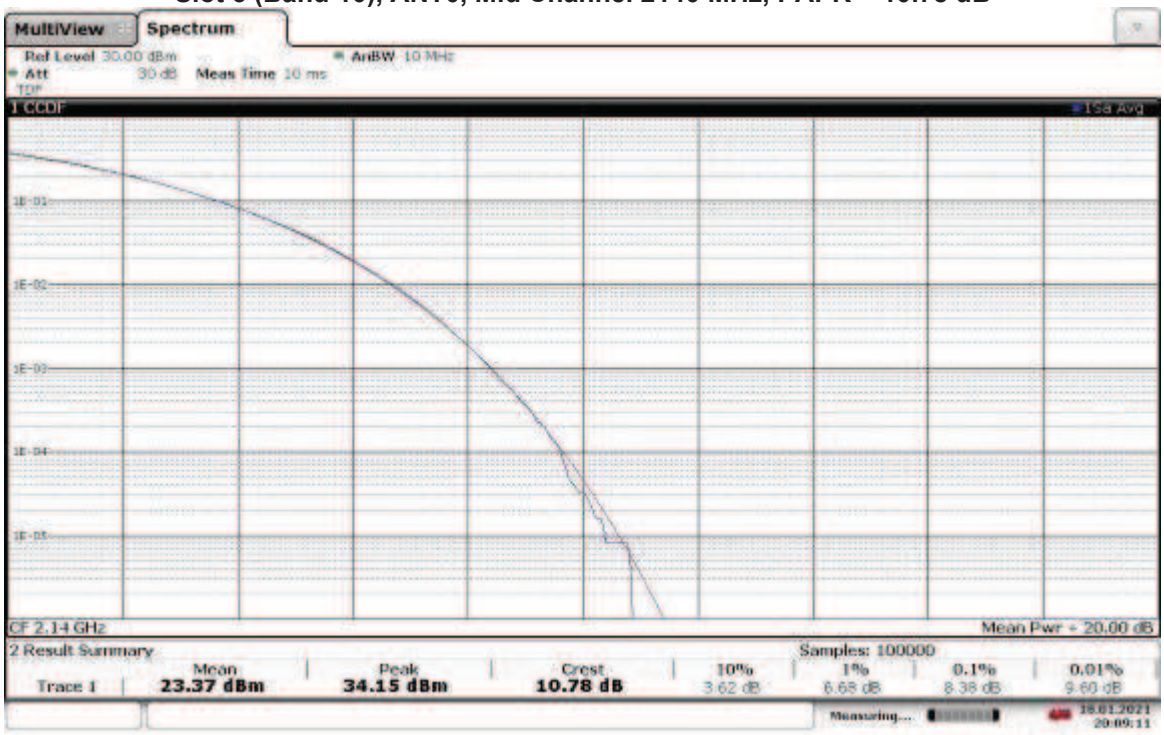
18:28:38 19.01.2021

TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2160 MHz, PAPR = 12.40 dB



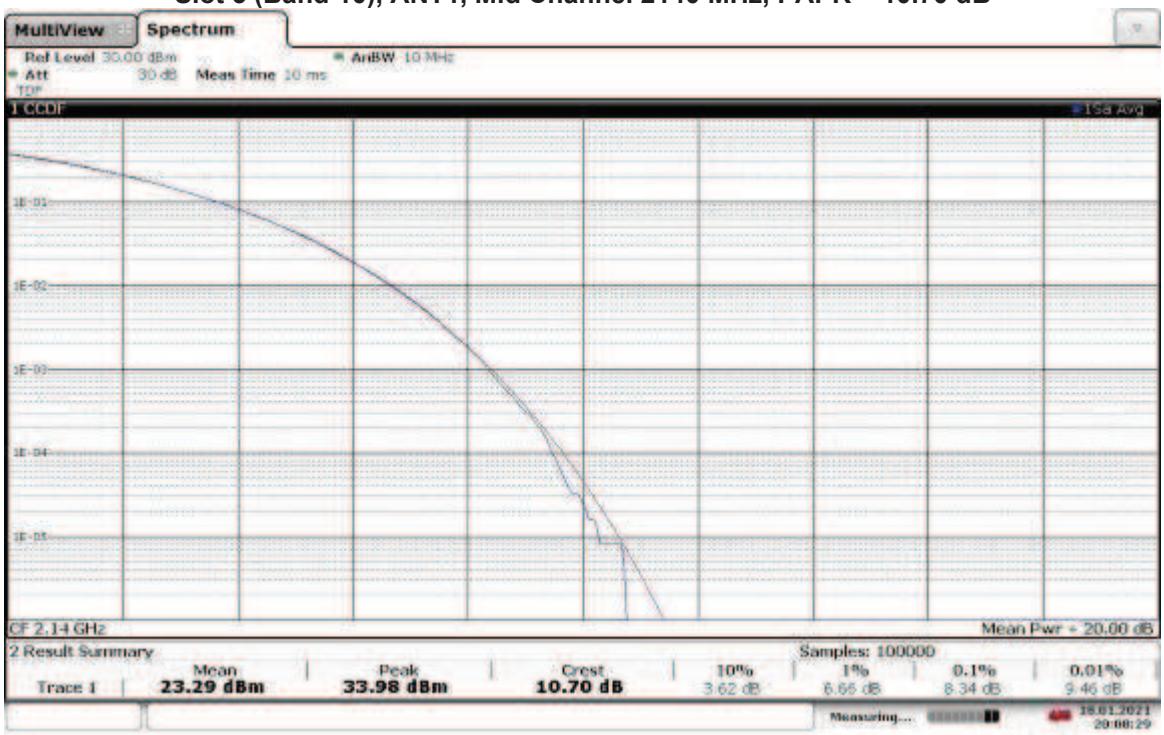
18:27:15 19.01.2021

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz, PAPR = 10.78 dB



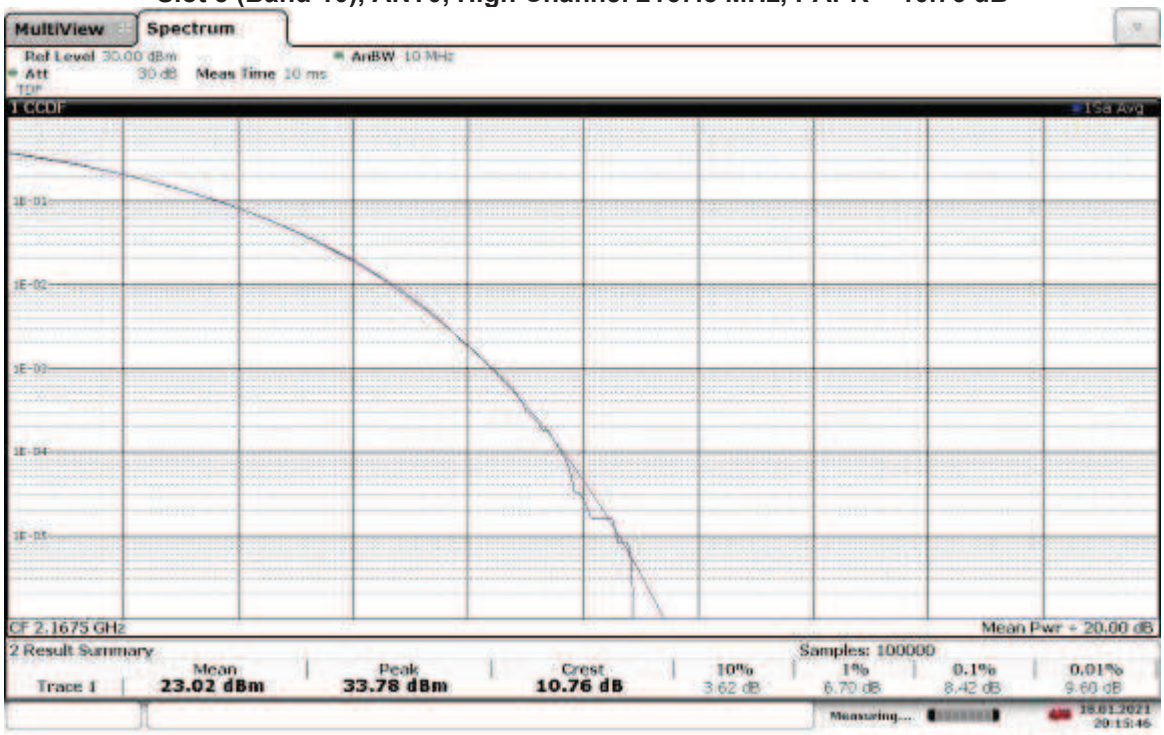
20:09:11 18.01.2021

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz, PAPR = 10.70 dB



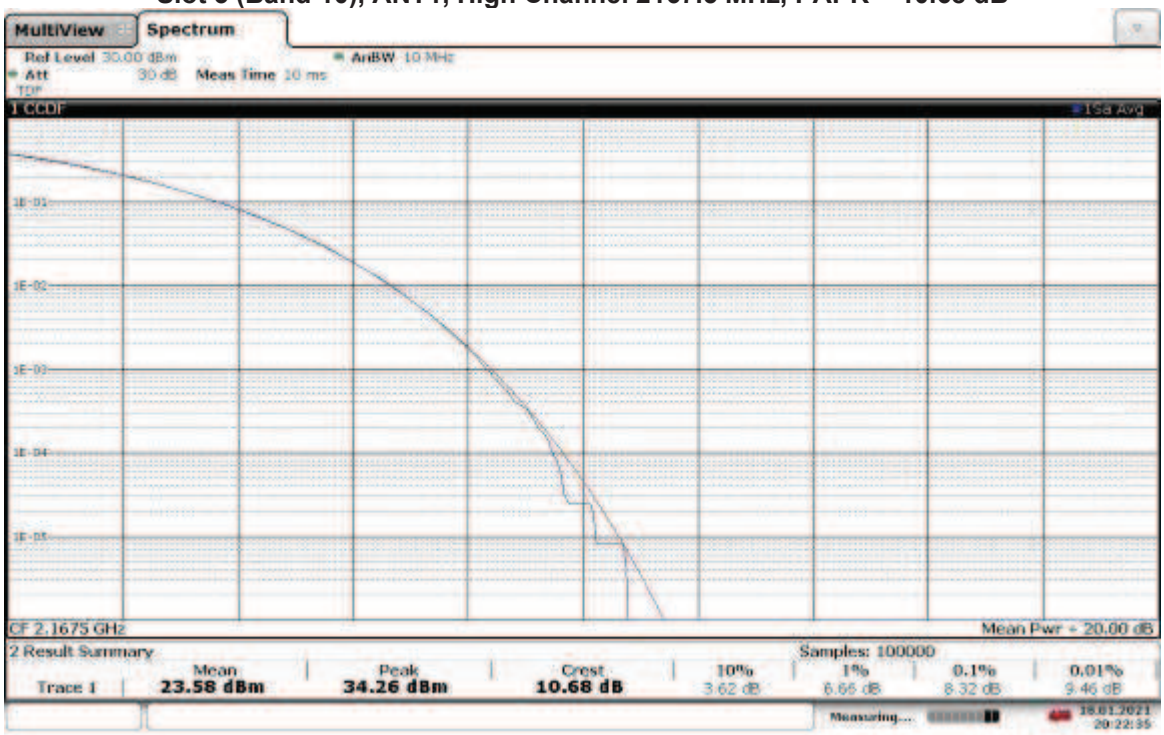
20:08:29 18.01.2021

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2167.5 MHz, PAPR = 10.76 dB



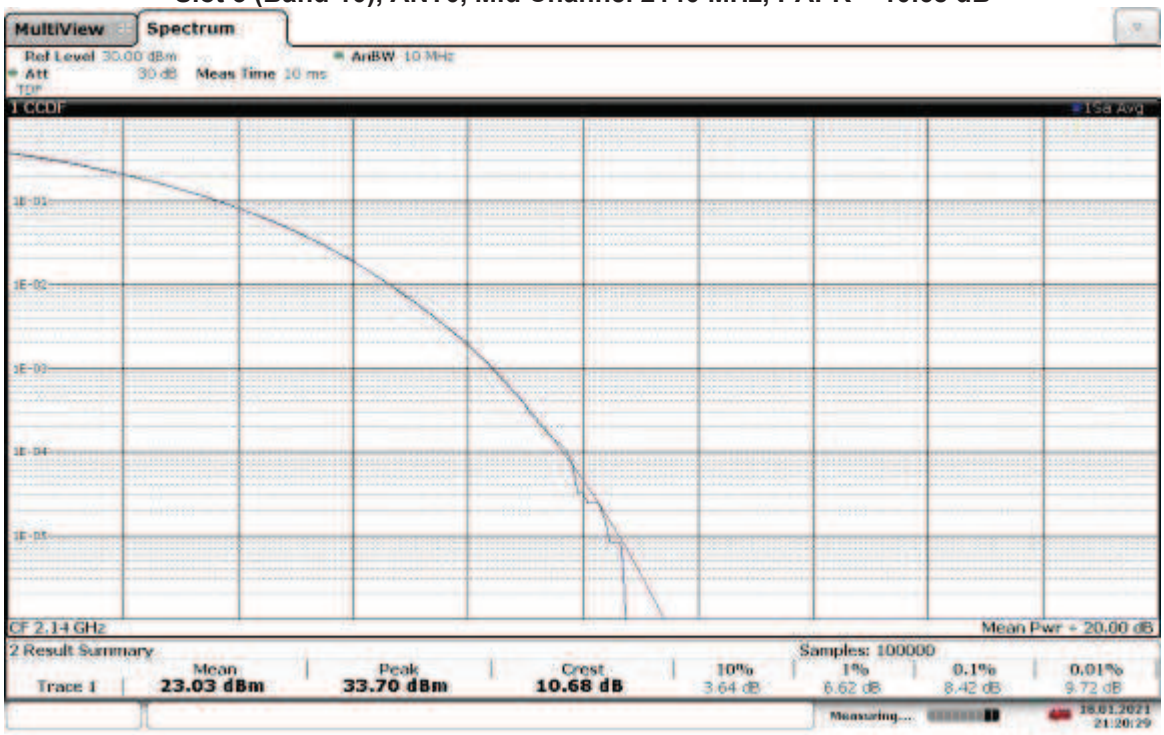
20:15:47 18.01.2021

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2167.5 MHz, PAPR = 10.68 dB



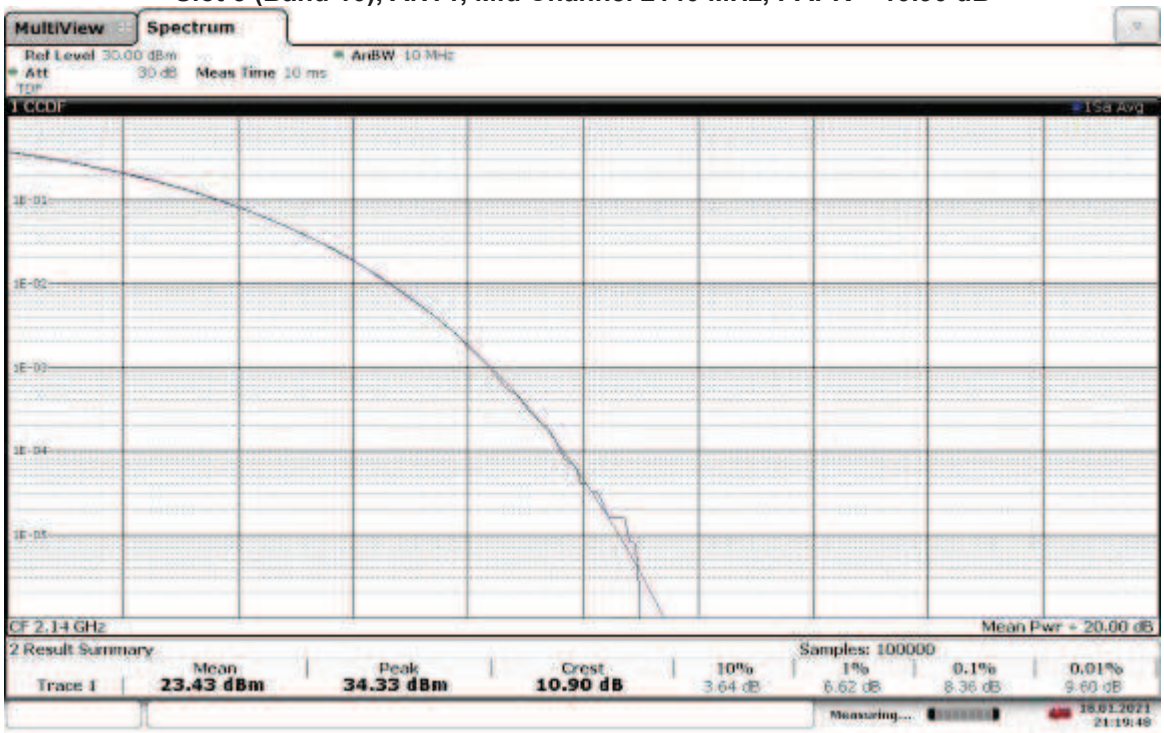
20:22:35 18.01.2021

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz, PAPR = 10.68 dB



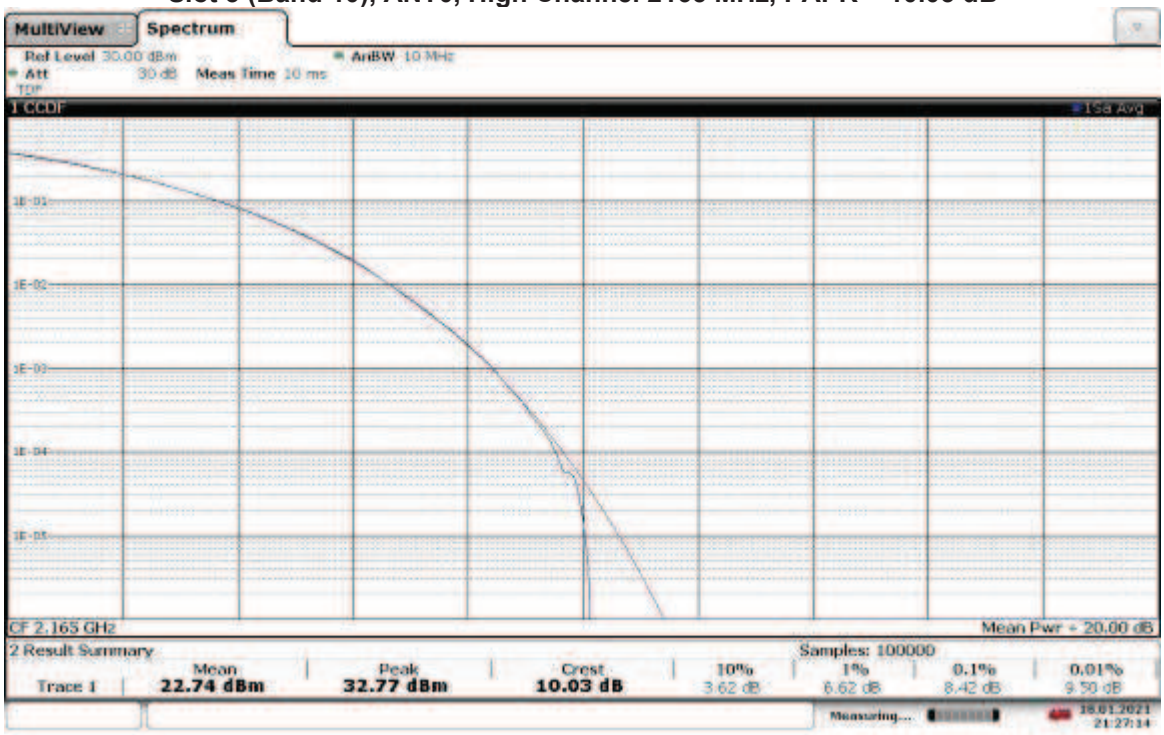
21:20:30 18.01.2021

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz, PAPR = 10.90 dB



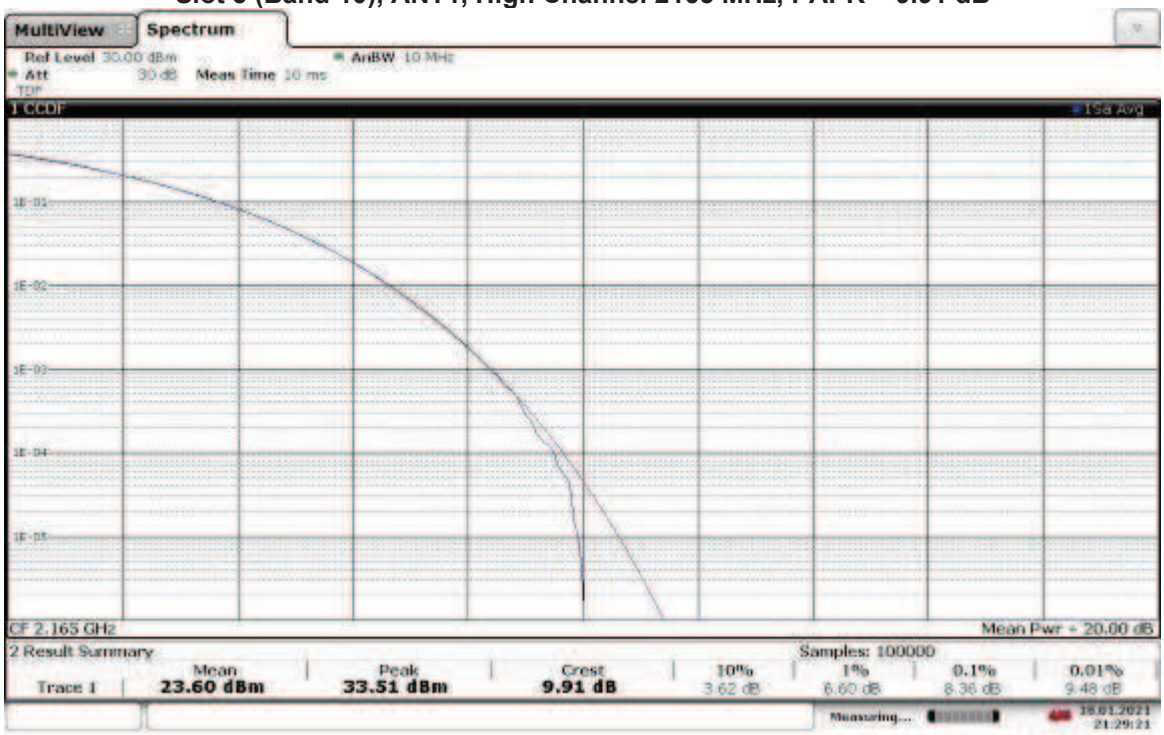
21:19:48 18.01.2021

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2165 MHz, PAPR = 10.03 dB



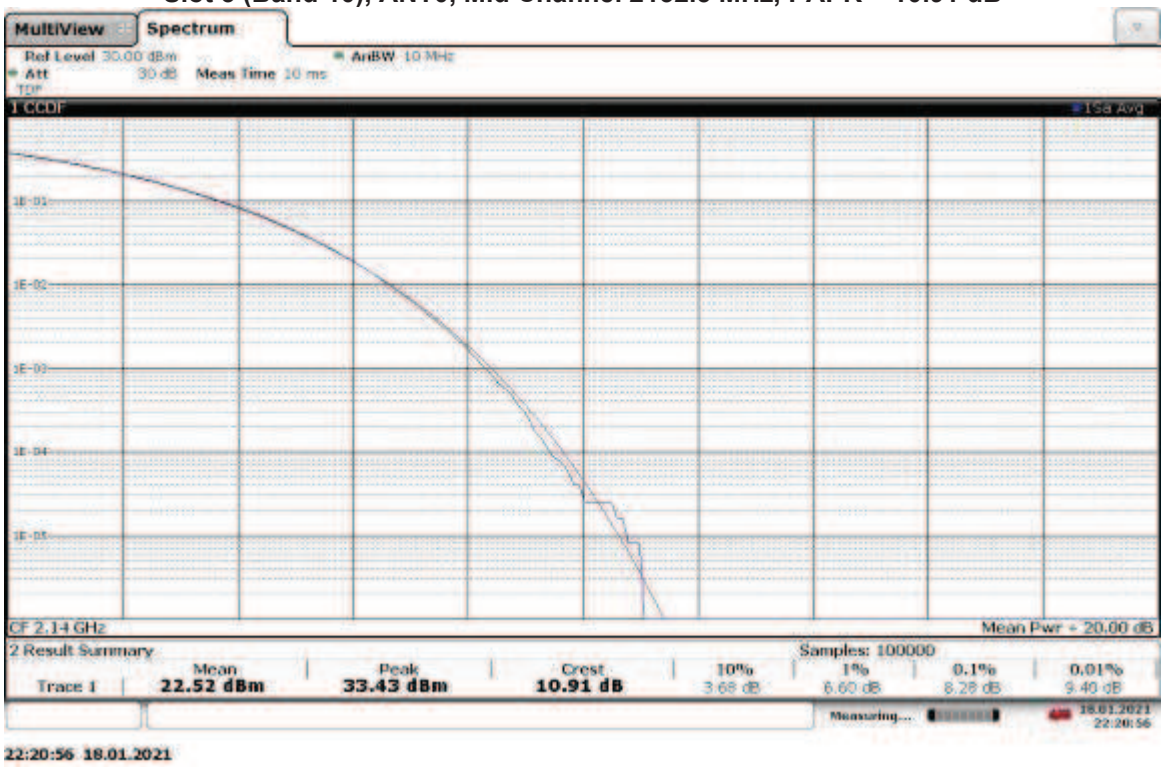
21:27:14 18.01.2021

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2165 MHz, PAPR = 9.91 dB



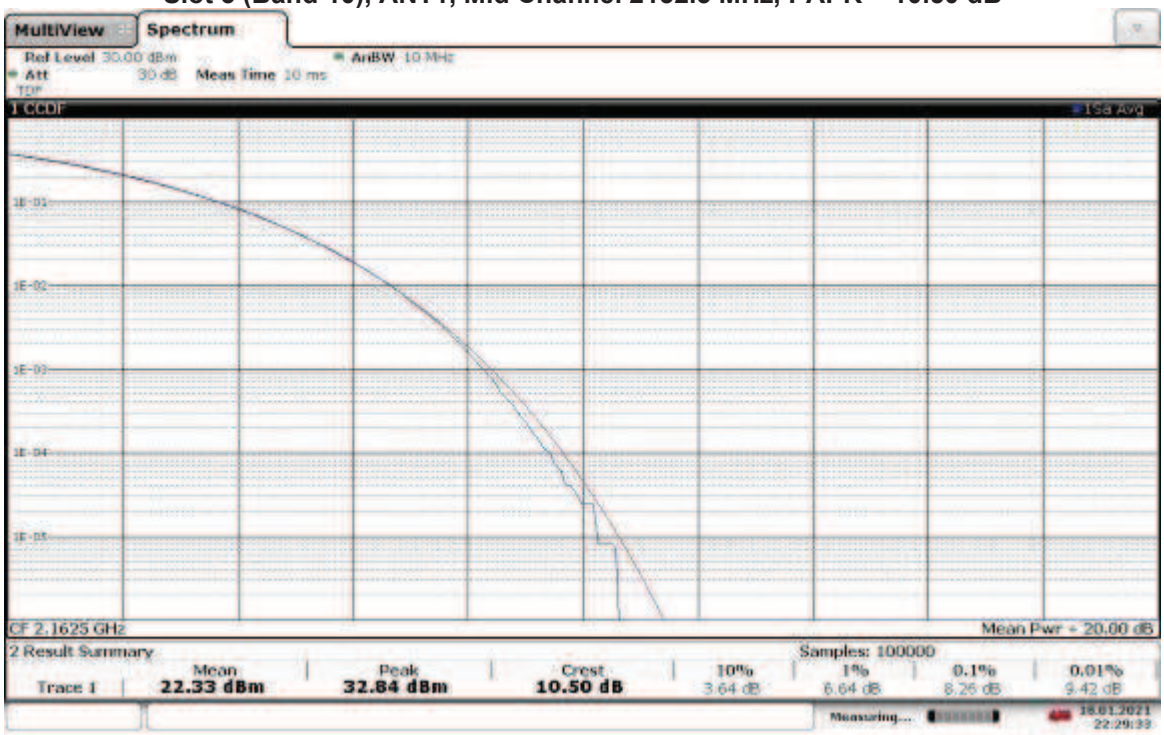
21:29:21 18.01.2021

TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2132.5 MHz, PAPR = 10.91 dB



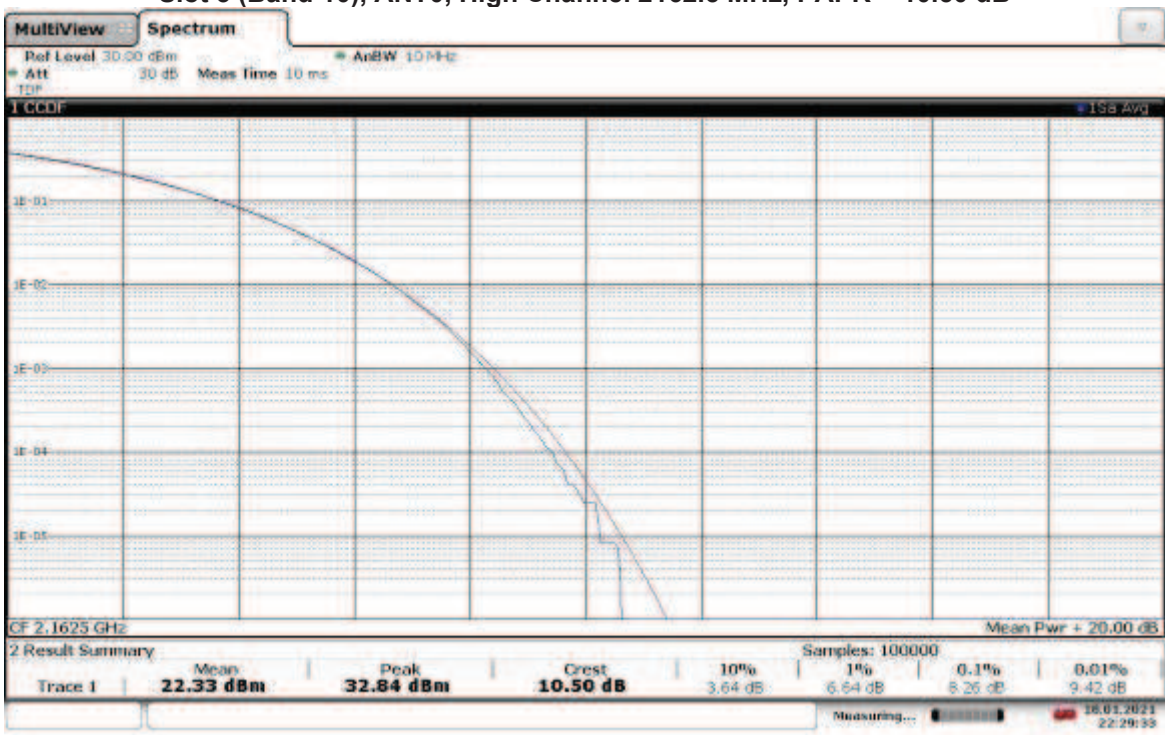
22:20:56 18.01.2021

TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2132.5 MHz, PAPR = 10.50 dB



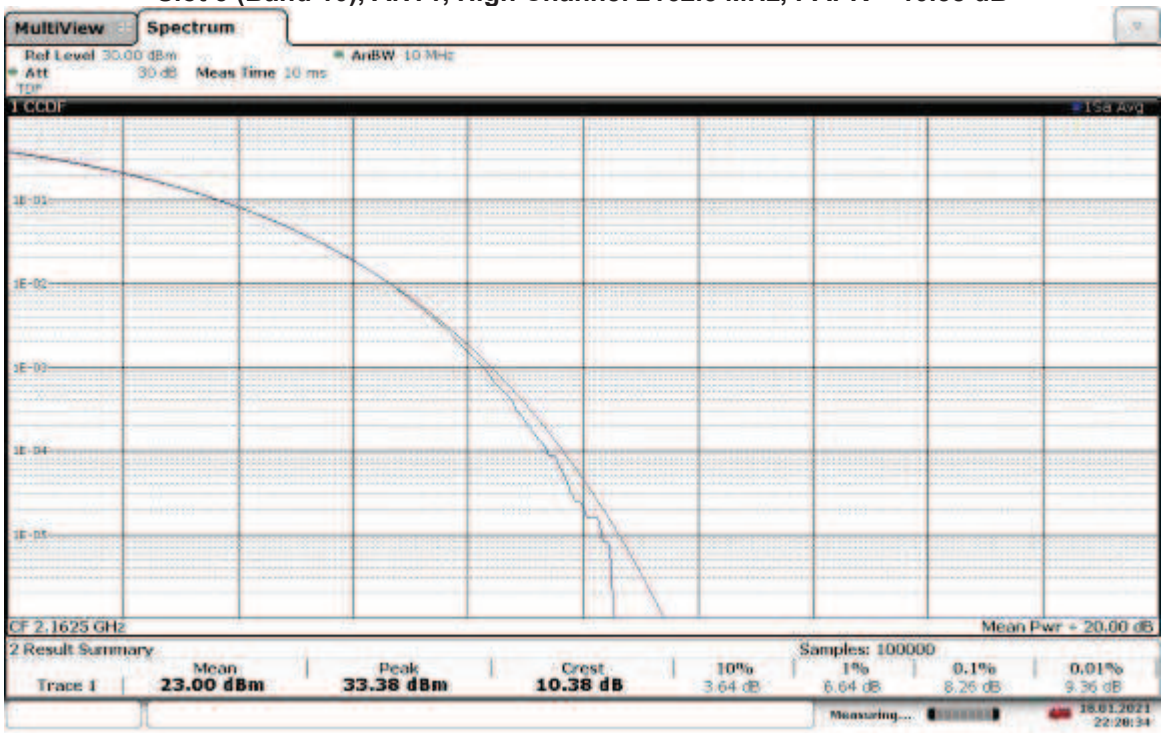
22:29:33 18.01.2021

TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2162.5 MHz, PAPR = 10.50 dB



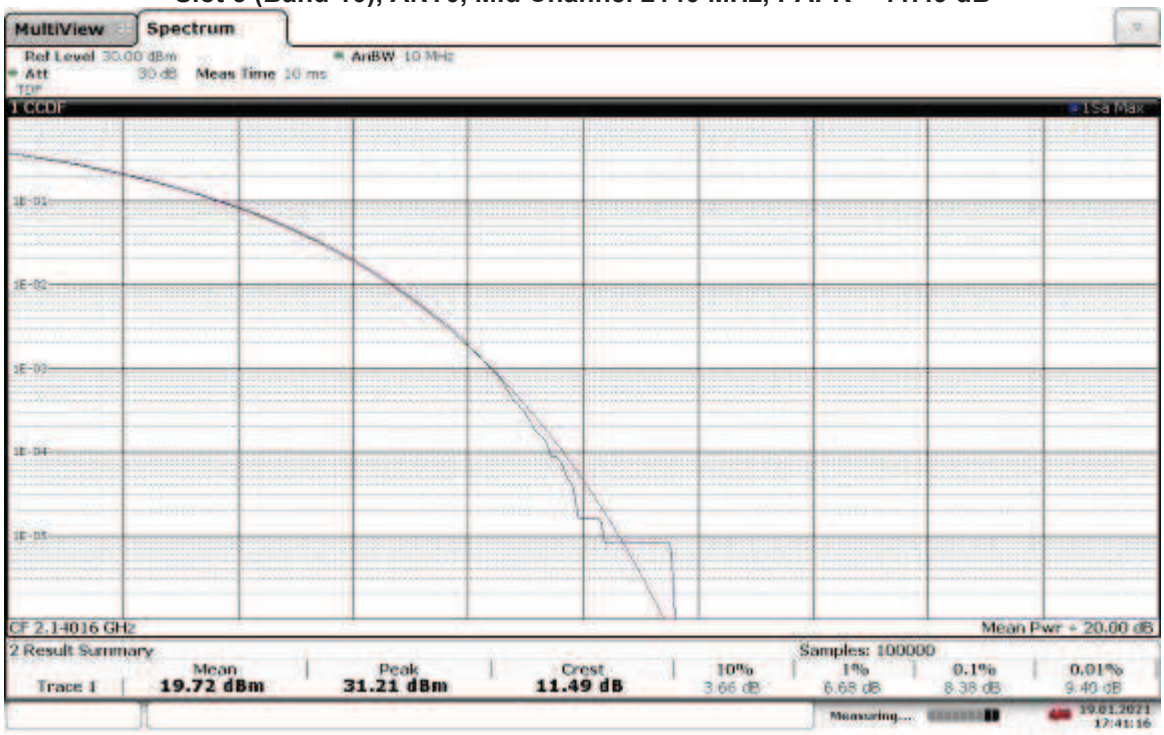
22:29:33 18.01.2021

TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2162.5 MHz, PAPR = 10.38 dB



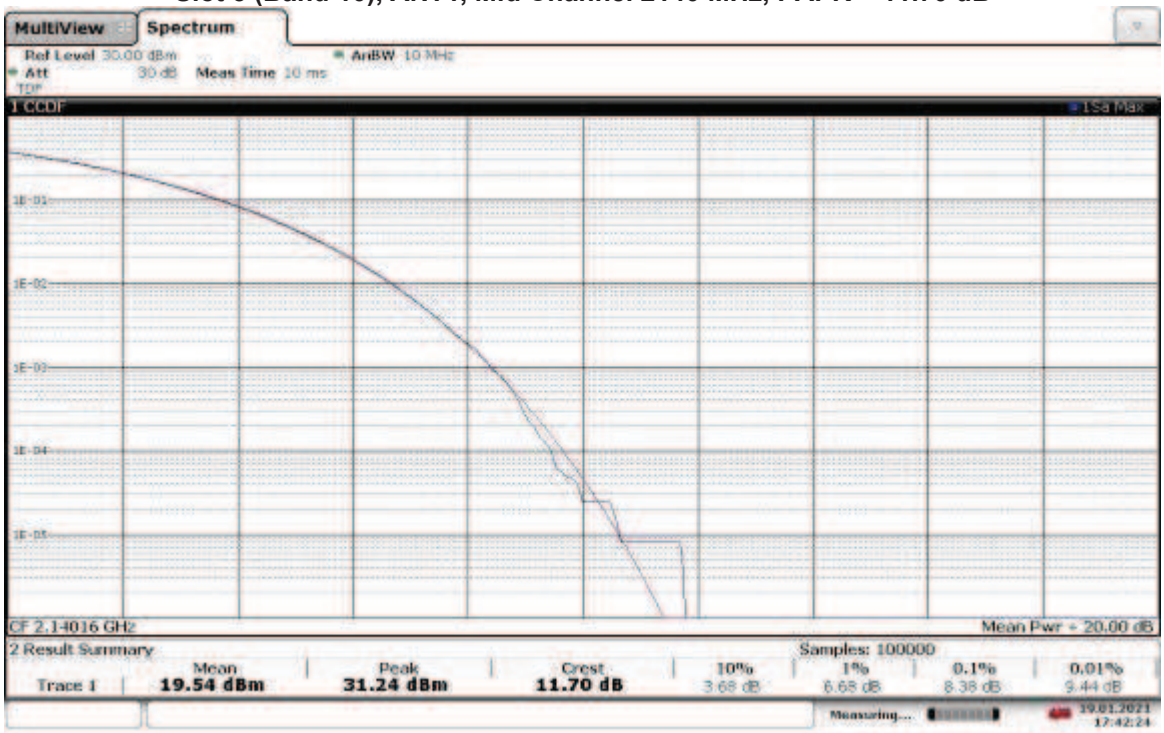
22:28:34 18.01.2021

TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz, PAPR = 11.49 dB



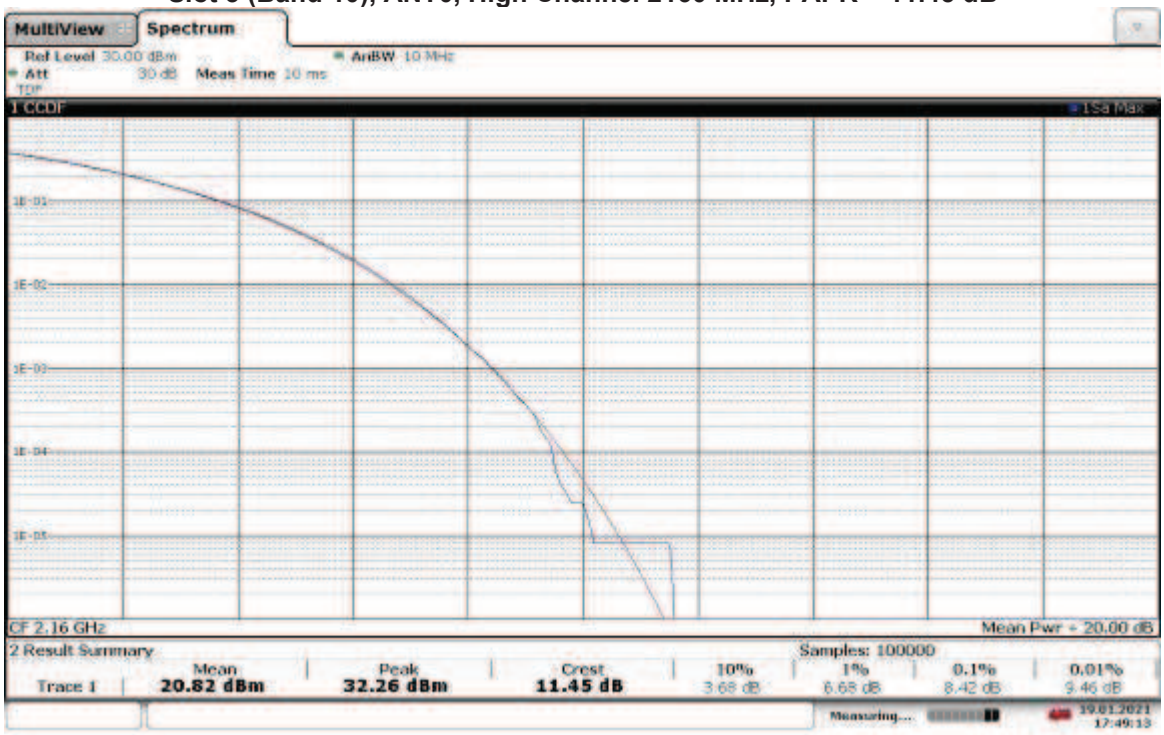
17:41:16 19.01.2021

TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz, PAPR = 11.70 dB



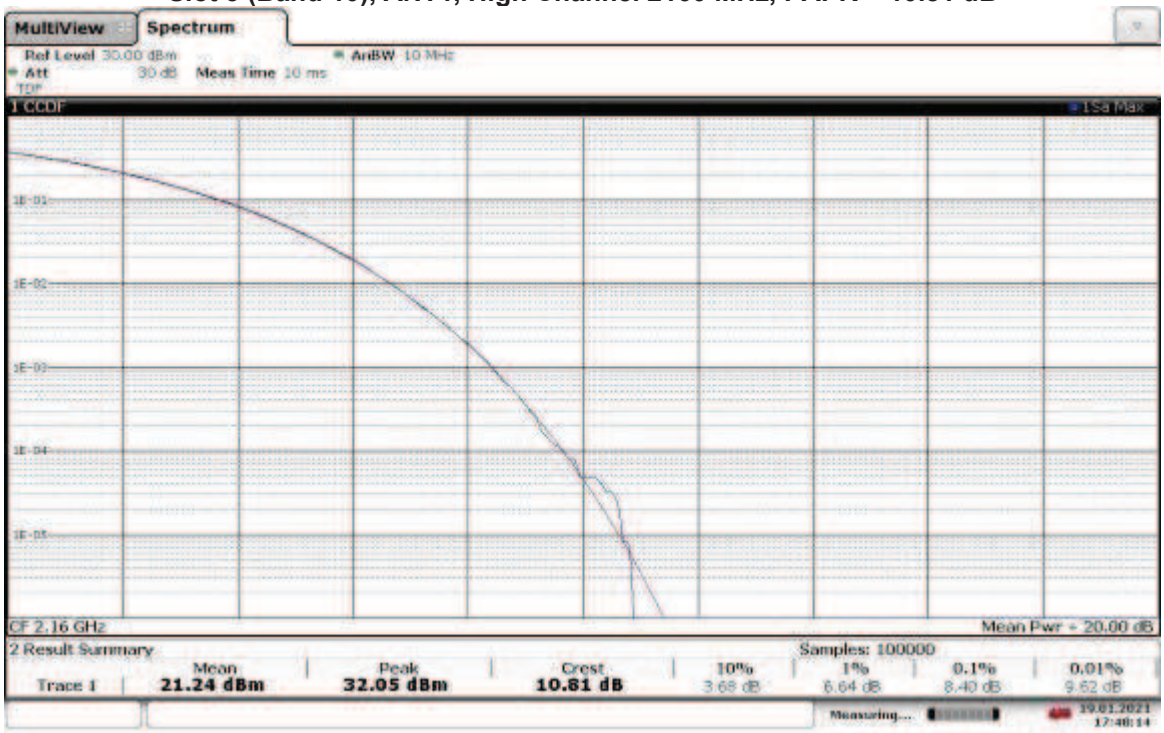
17:42:24 19.01.2021

TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2160 MHz, PAPR = 11.45 dB



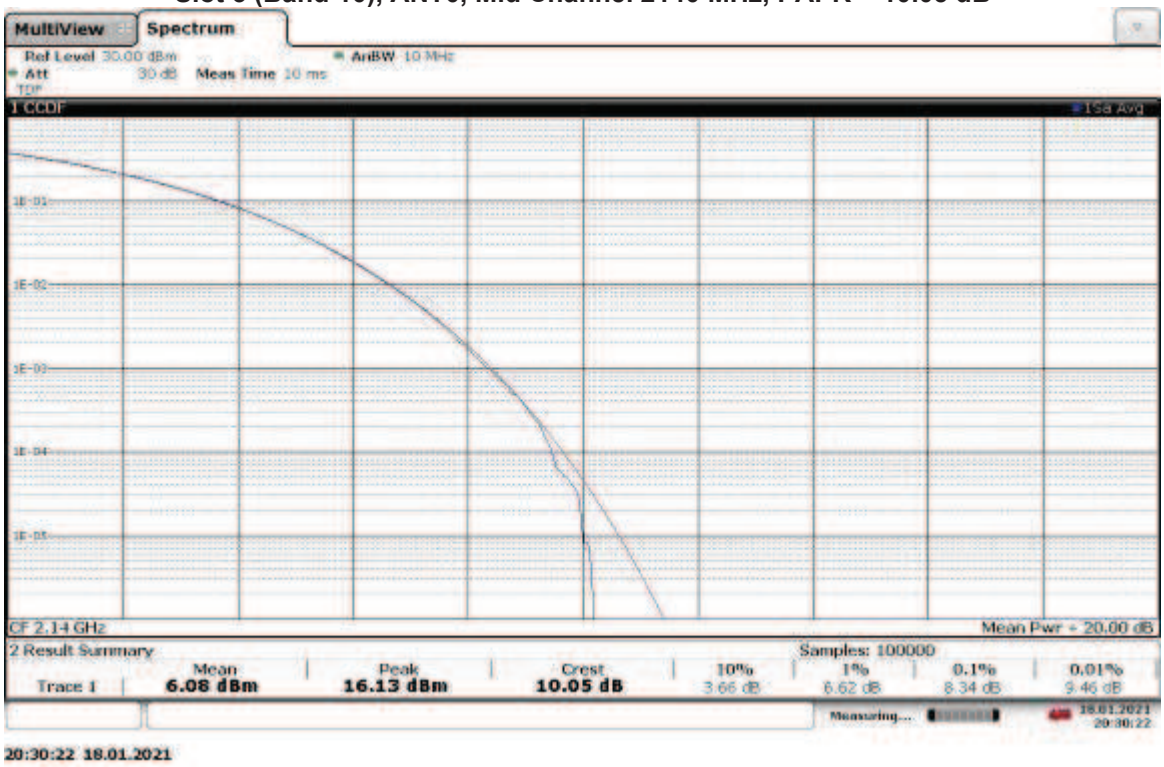
17:49:14 19.01.2021

TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2160 MHz, PAPR = 10.81 dB



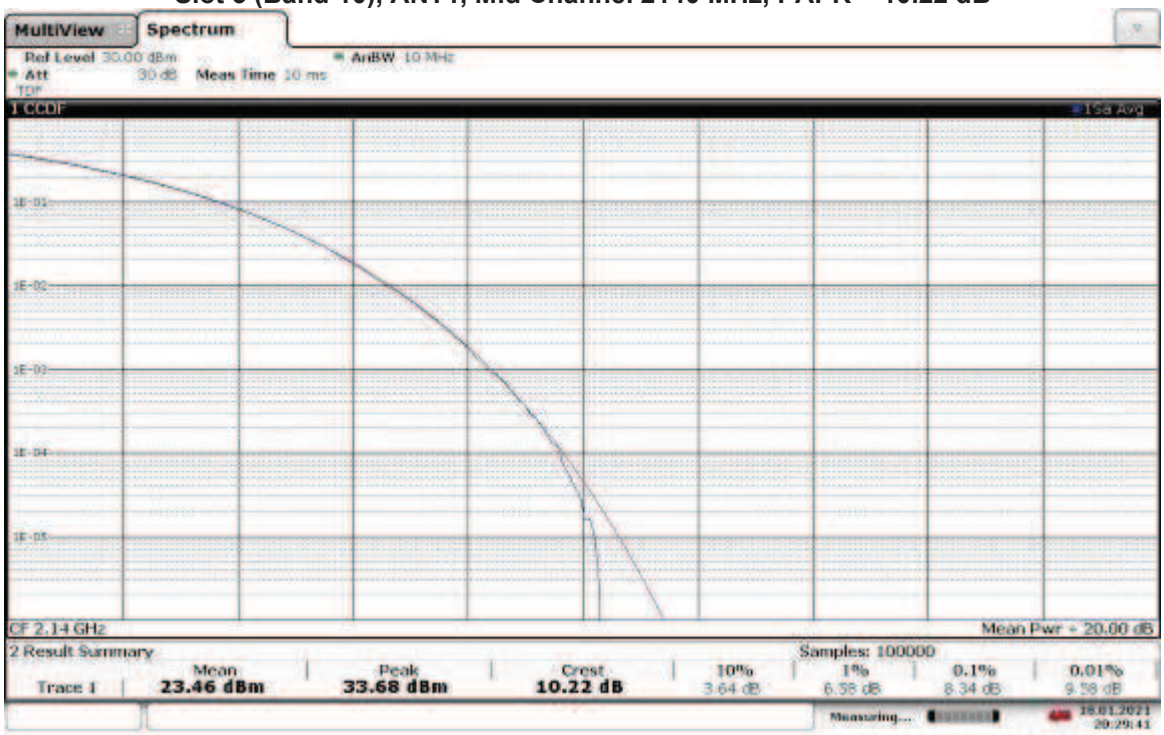
17:48:14 19.01.2021

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz, PAPR = 10.05 dB



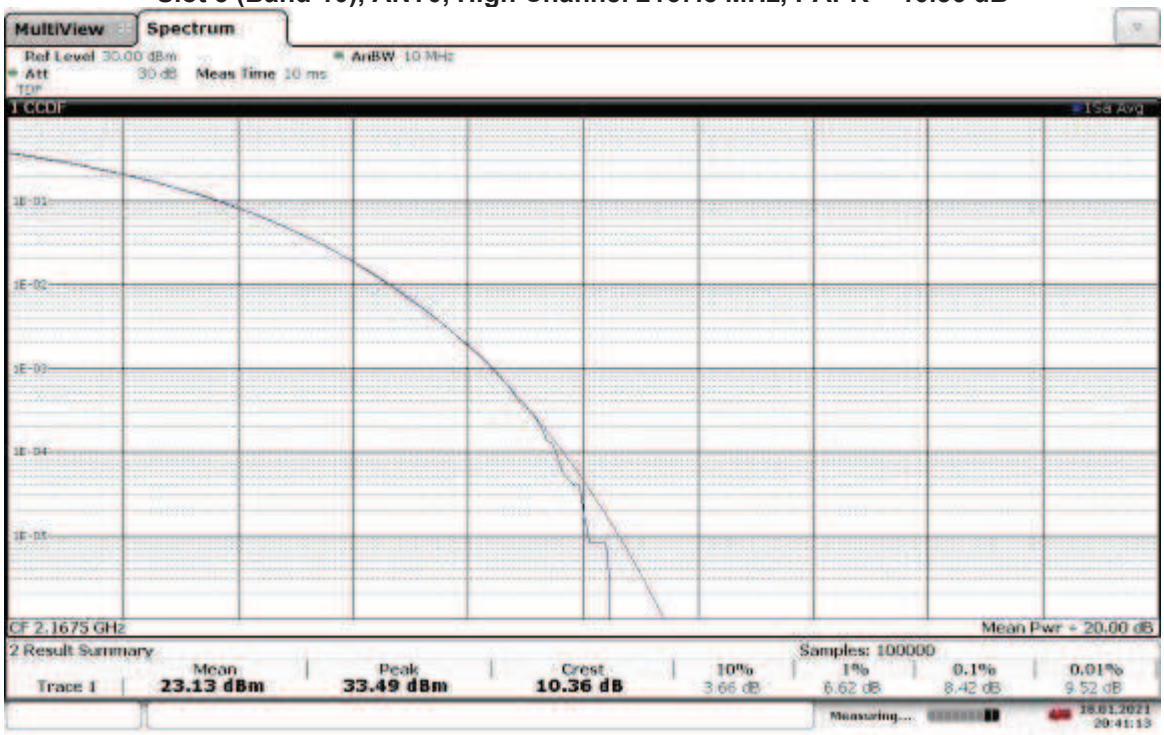
20:30:22 18.01.2021

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz, PAPR = 10.22 dB



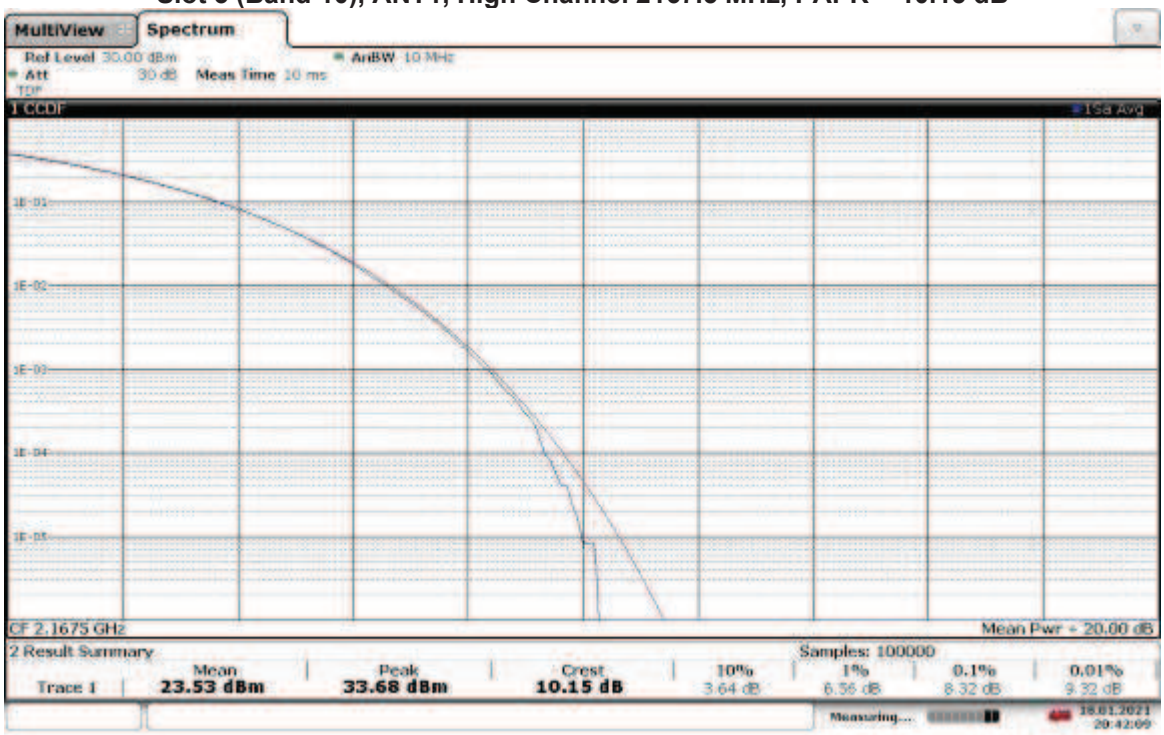
20:29:41 18.01.2021

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2167.5 MHz, PAPR = 10.36 dB



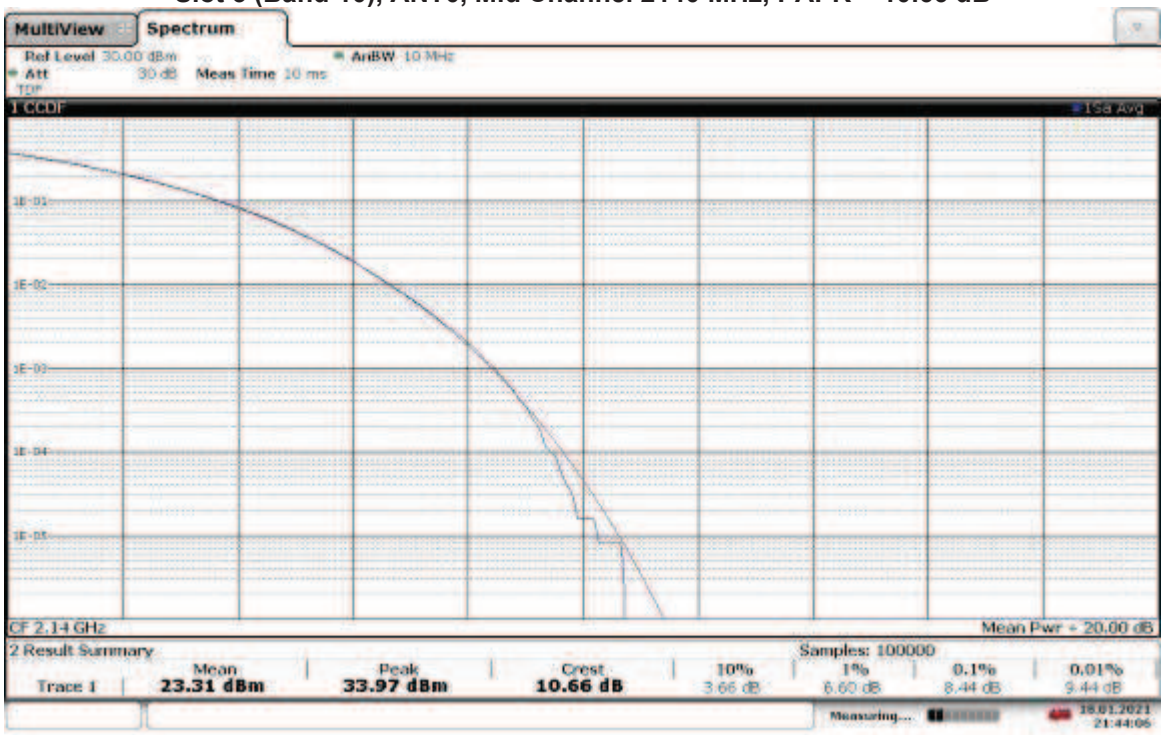
20:41:13 18.01.2021

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2167.5 MHz, PAPR = 10.15 dB



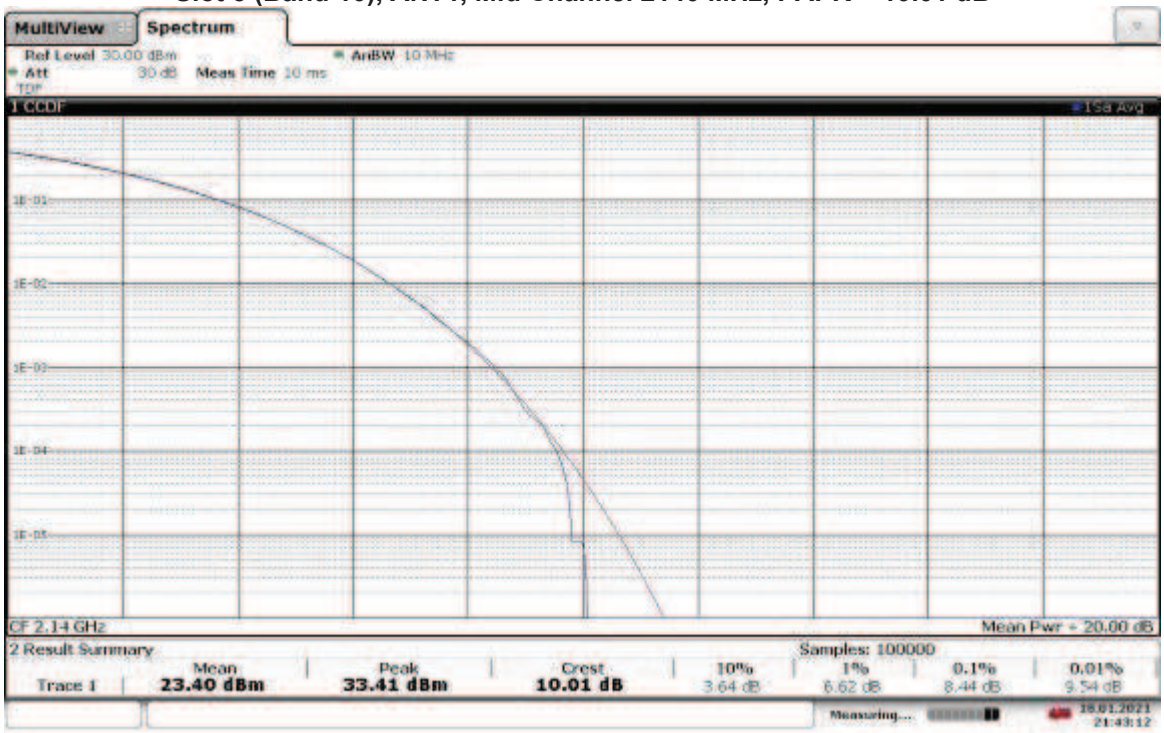
20:42:09 18.01.2021

TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz, PAPR = 10.66 dB



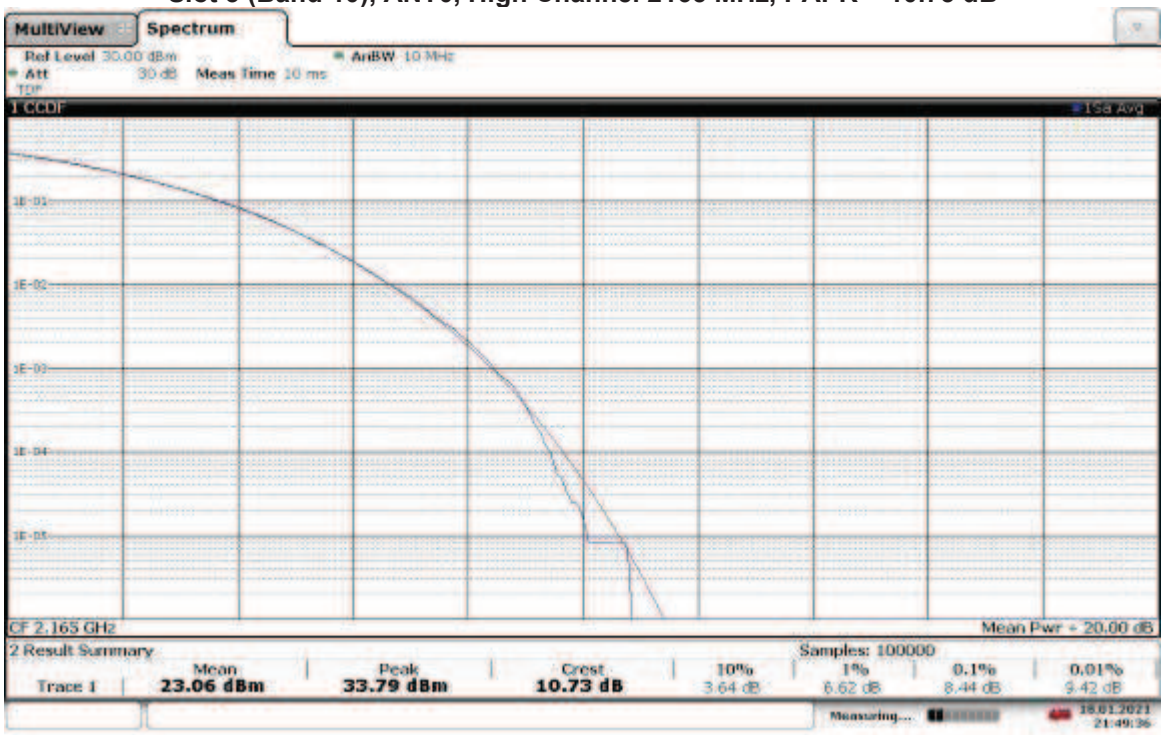
21:44:06 18.01.2021

TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz, PAPR = 10.01 dB



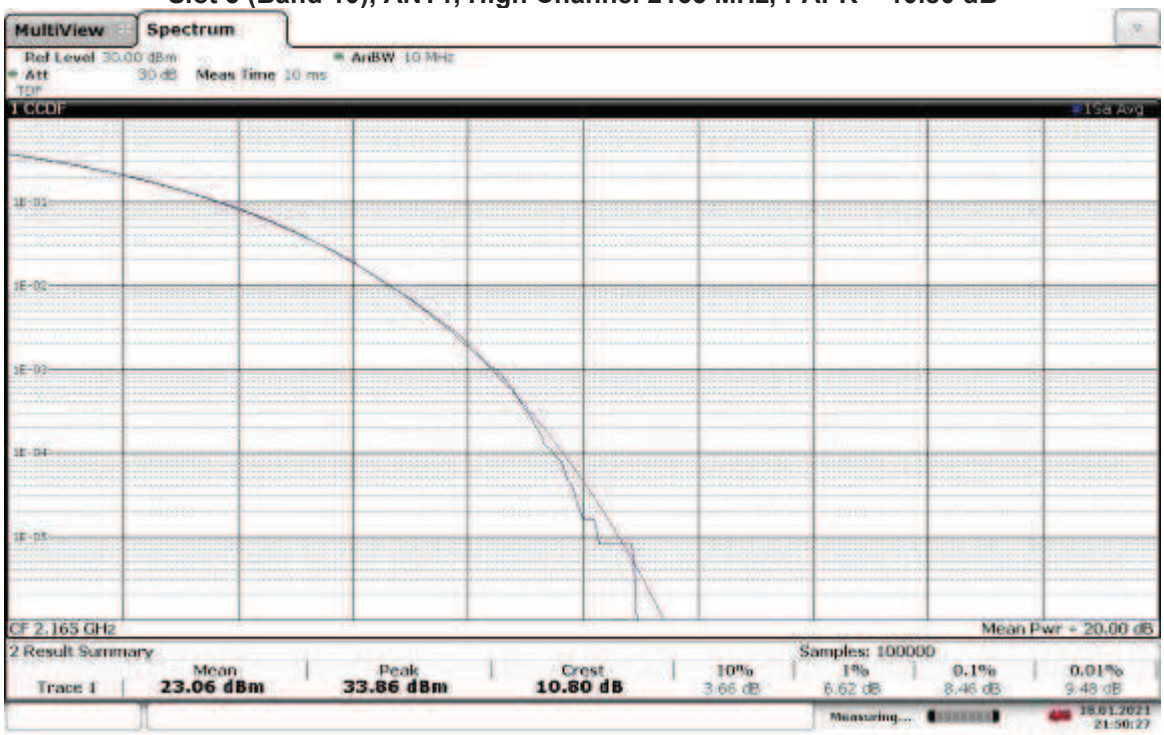
21:43:12 18.01.2021

TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2165 MHz, PAPR = 10.73 dB



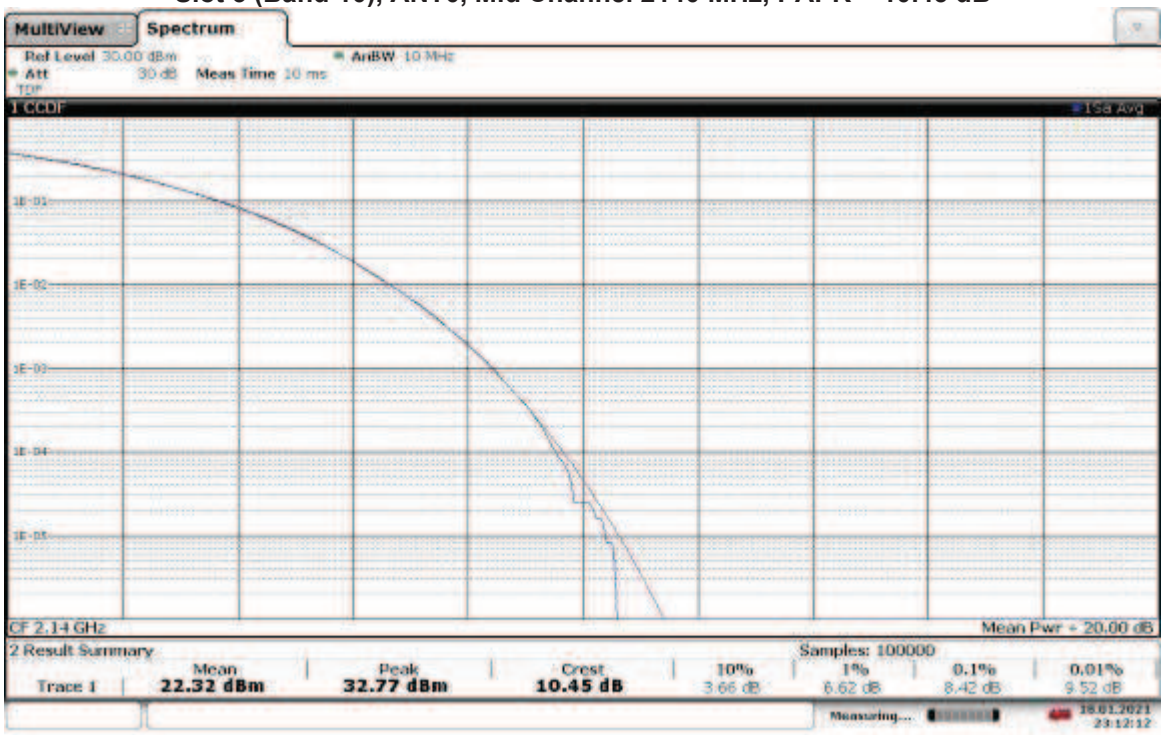
21:49:37 18.01.2021

TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2165 MHz, PAPR = 10.80 dB



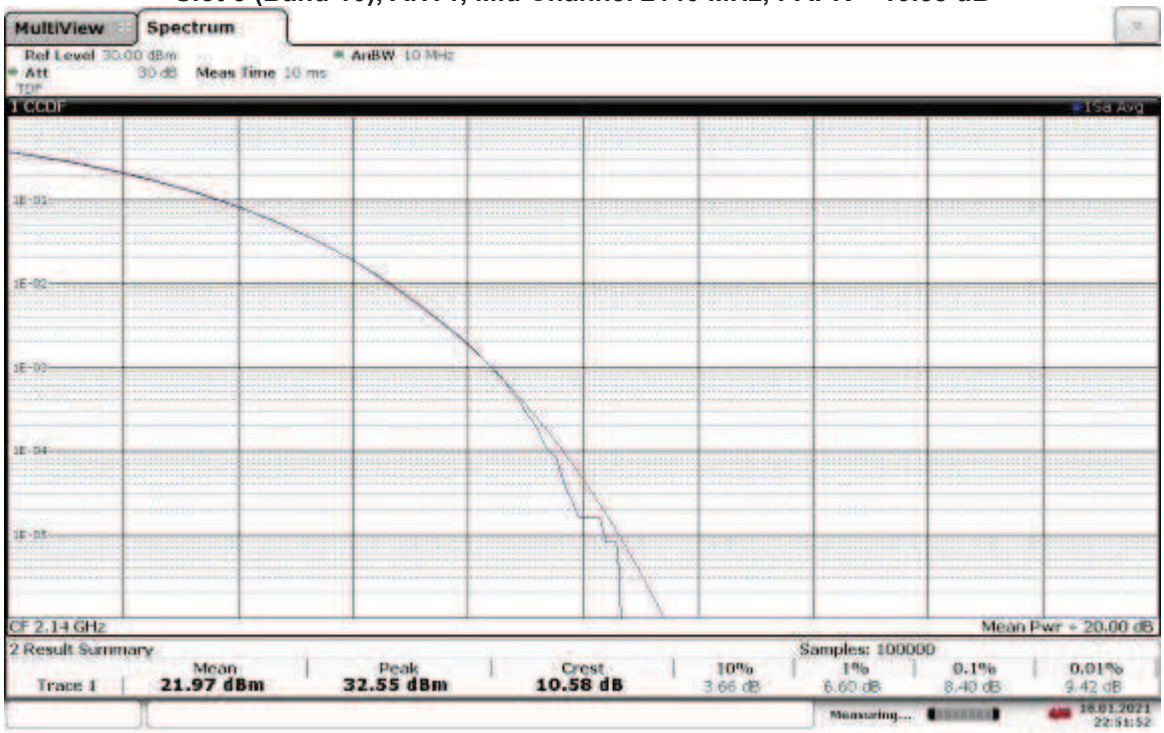
21:50:27 18.01.2021

TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz, PAPR = 10.45 dB



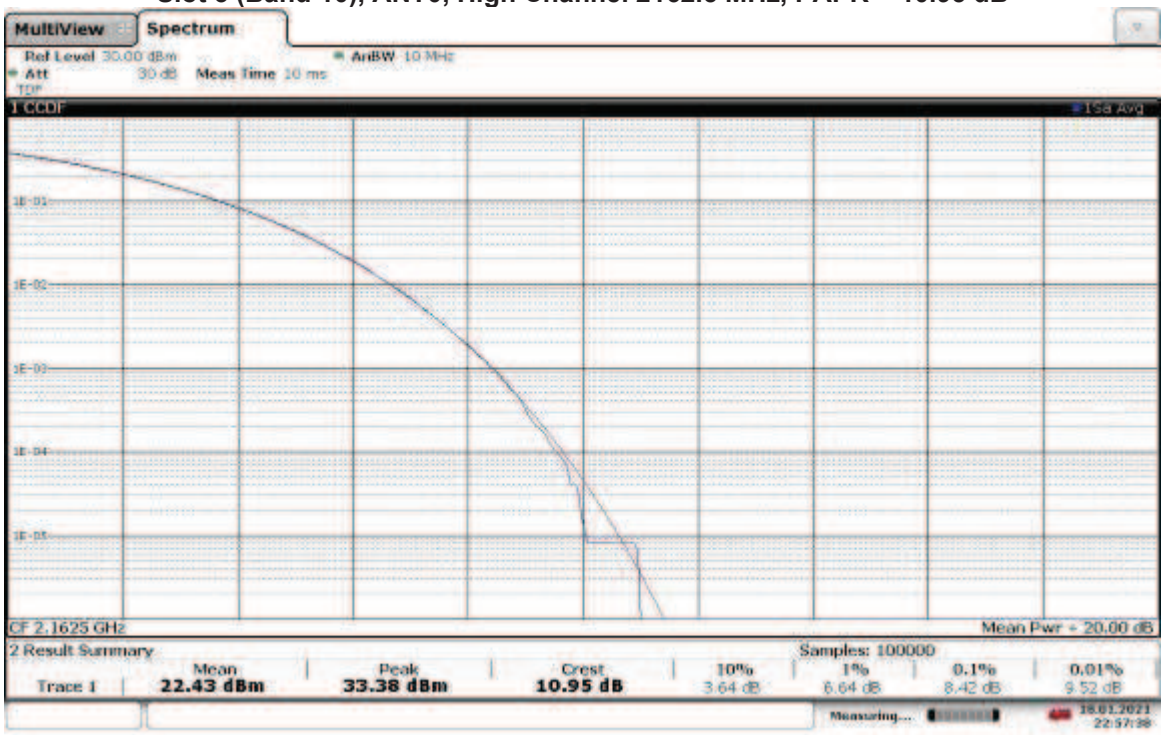
23:12:12 18.01.2021

TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz, PAPR = 10.58 dB



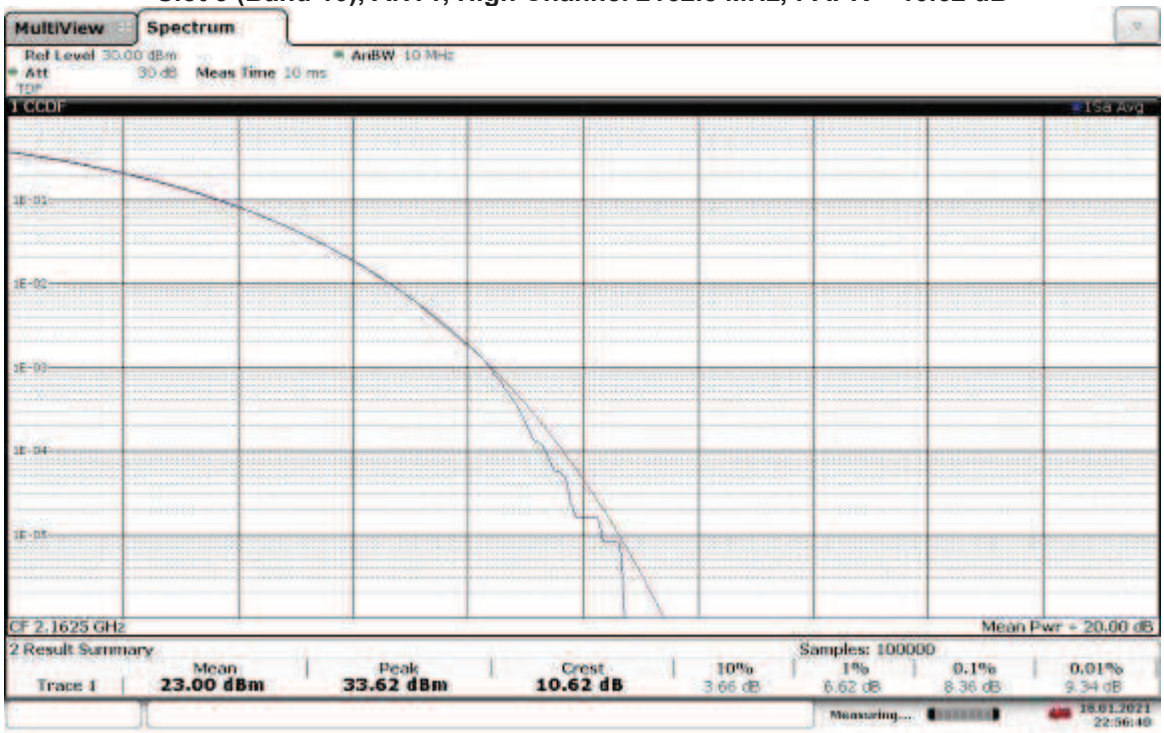
22:51:52 18.01.2021

TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2162.5 MHz, PAPR = 10.95 dB



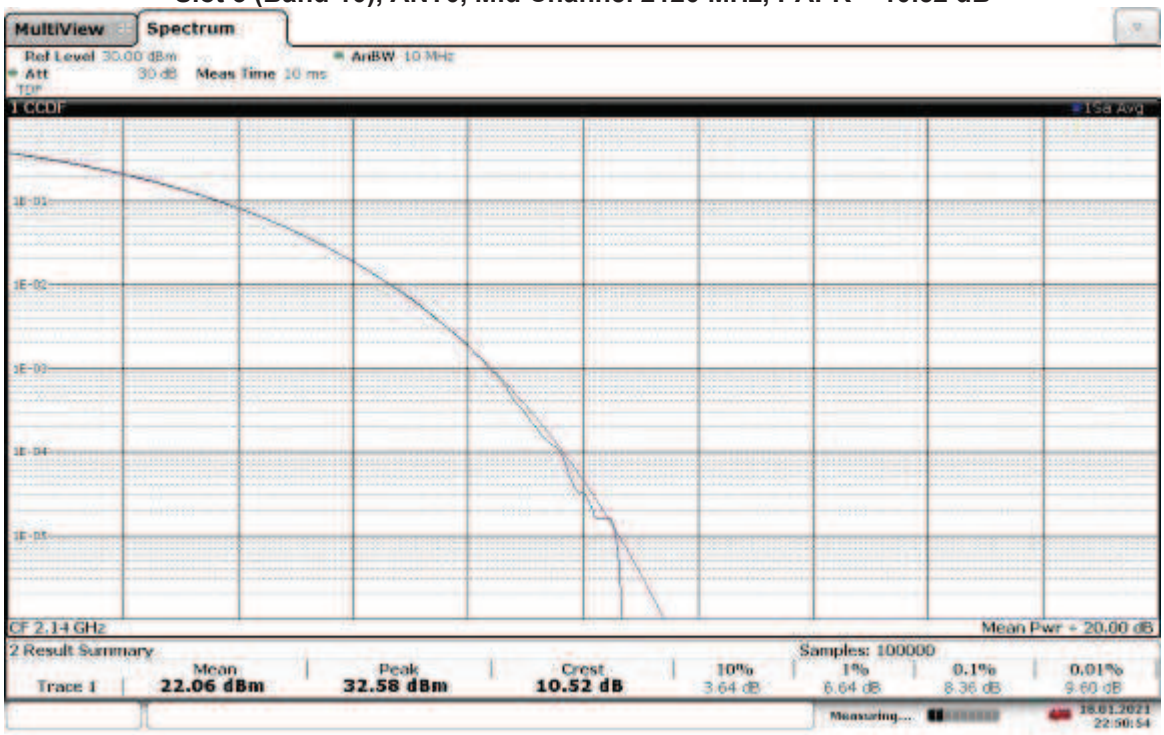
22:57:38 18.01.2021

TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2162.5 MHz, PAPR = 10.62 dB



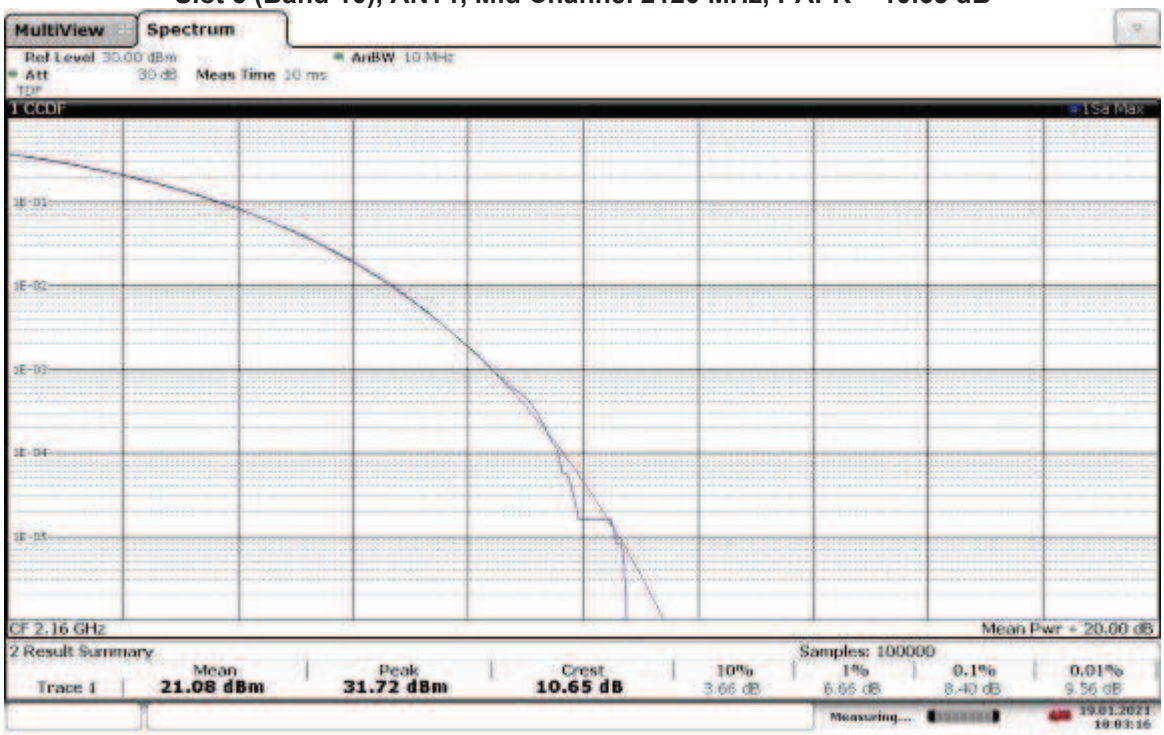
22:56:41 18.01.2021

TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2120 MHz, PAPR = 10.52 dB



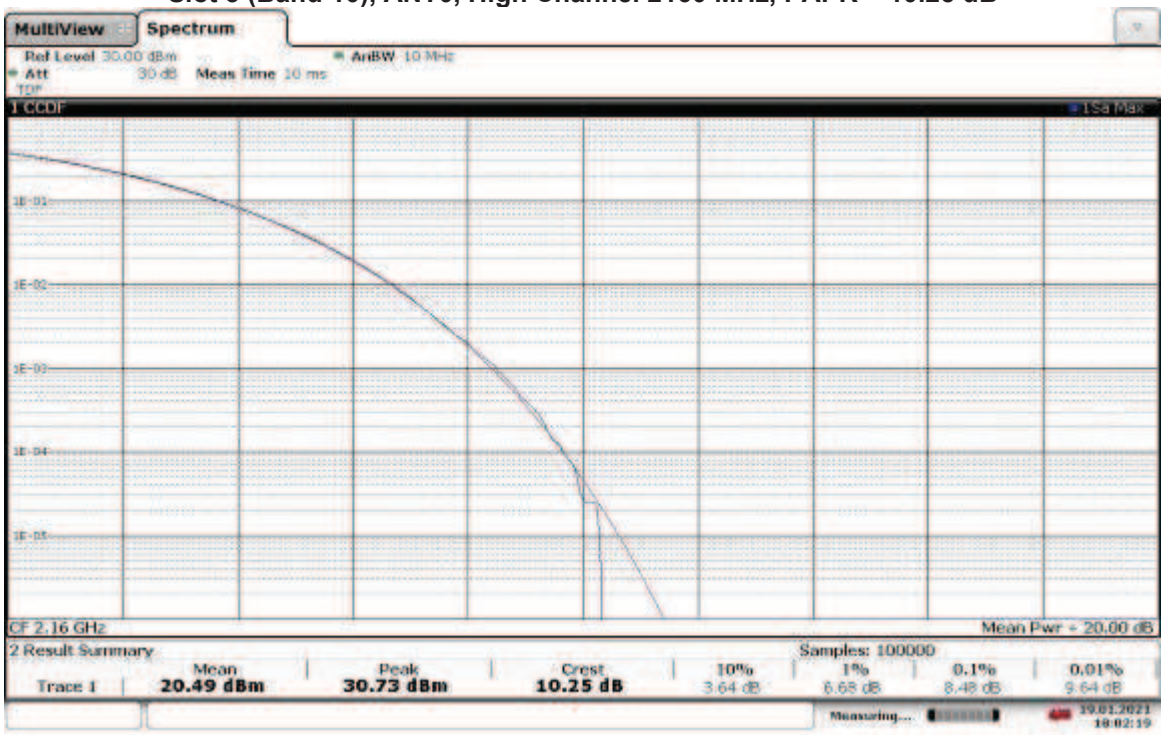
22:50:55 18.01.2021

TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2120 MHz, PAPR = 10.65 dB



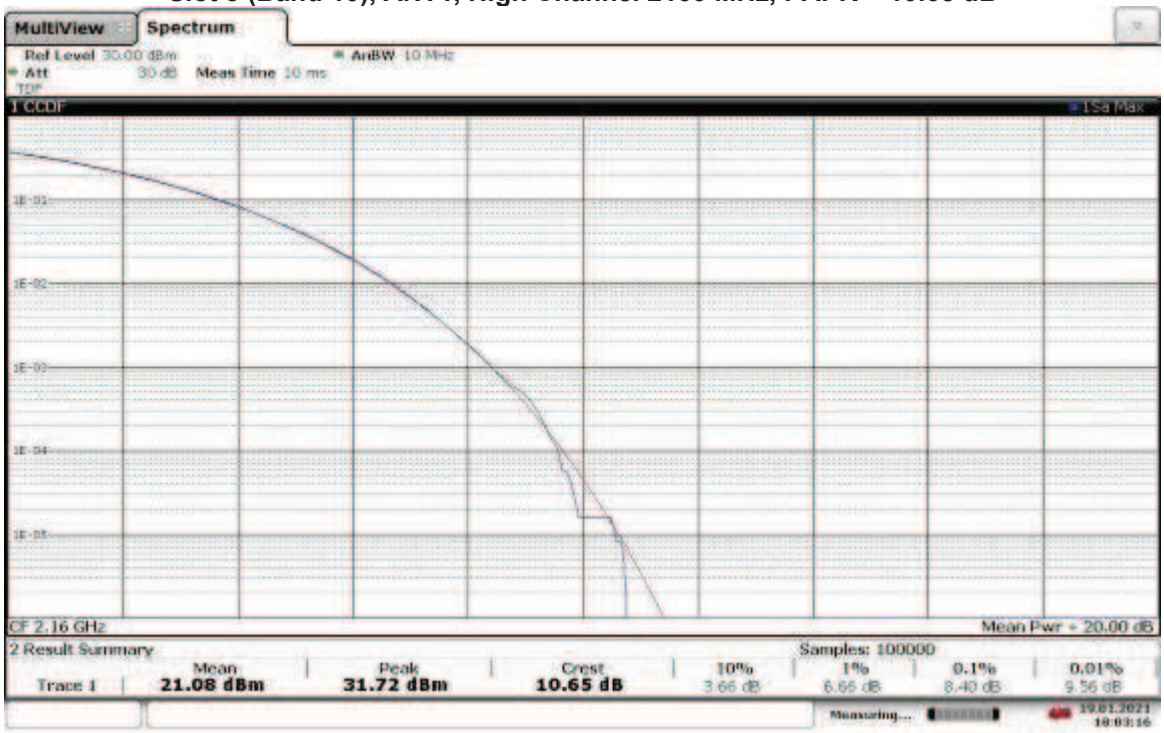
18:03:16 19.01.2021

TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2160 MHz, PAPR = 10.25 dB



18:02:19 19.01.2021

TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2160 MHz, PAPR = 10.65 dB



18:03:16 19.01.2021

Test Personnel:	Vathana Ven VJV	Test Date:	01/18/2021 01/19/2021
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 27	Limit Applied:	See report section 7.3
Input Voltage:	48 VDC (POE)		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	22, 23ºC
		Relative Humidity:	21, 15%
		Atmospheric Pressure:	1004, 1013mbars

Deviations, Additions, or Exclusions: None

8 26 dB Bandwidth and Occupied Bandwidth

8.1 Method

Tests are performed in accordance with ANSI C63.26 and CFR47 FCC Parts 2.1049 and 27.

TEST SITE: EMC Lab

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.

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	01/22/2021	01/22/2022
CBLHF2012-2M-1'	2m 9kHz-40GHz Coaxial Cable - SET1	Huber & Suhner	SF102	252675001	02/17/2020	02/17/2021
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	10/27/2020	10/27/2021
DAV005'	Weather Station	Davis	6250	MS191218083	02/05/2020	02/05/2021

Software Utilized:

Name	Manufacturer	Version
None	--	--

8.3 Results:

The sample tested was found to Comply.

§27.53(h)(3): The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

§2.1049: The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission.

Band 10, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	4.490	4.930
		ANT1	4.496	4.940
High	2167.50	ANT0	4.497	4.970
		ANT1	4.500	4.940

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	8.945	9.740
		ANT1	8.950	9.760
High	2165.00	ANT0	8.957	9.780
		ANT1	8.947	9.750

Band 10, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	13.429	14.670
		ANT1	13.434	14.700
High	2162.50	ANT0	13.428	14.620
		ANT1	13.391	14.440

Band 10, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	17.882	19.270
		ANT1	17.867	19.500
High	2160.00	ANT0	13.428	19.260
		ANT1	13.391	19.310

Band 10, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	4.469	4.910
		ANT1	4.486	4.920
High	2152.50	ANT0	4.493	4.910
		ANT1	4.486	4.930

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	8.954	9.730
		ANT1	8.962	9.600
High	2165.00	ANT0	8.956	9.710
		ANT1	8.954	9.760

Band 10, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	13.409	14.250
		ANT1	13.433	14.390
High	2162.50	ANT0	13.453	14.470
		ANT1	13.434	14.580

Band 10, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	17.887	19.440
		ANT1	17.889	19.470
High	2160.00	ANT0	17.891	19.440
		ANT1	17.883	19.440

Band 10, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	4.501	4.930
		ANT1	4.511	4.910
High	2167.50	ANT0	4.509	4.910
		ANT1	4.490	4.920

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	8.949	9.680
		ANT1	8.948	9.720
High	2165.00	ANT0	8.953	9.700
		ANT1	8.950	9.630

Band 10, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	13.459	14.550
		ANT1	13.459	14.640
High	2162.50	ANT0	13.414	14.620
		ANT1	13.435	14.620

Band 10, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	17.954	19.900
		ANT1	17.891	19.450
High	2160.00	ANT0	17.893	19.390
		ANT1	17.885	19.380

Band 10, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	4.495	4.960
		ANT1	4.487	4.950
High	2167.50	ANT0	4.509	4.940
		ANT1	4.493	4.960

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	8.940	9.660
		ANT1	8.954	9.700
High	2165.00	ANT0	8.944	9.690
		ANT1	8.942	9.630

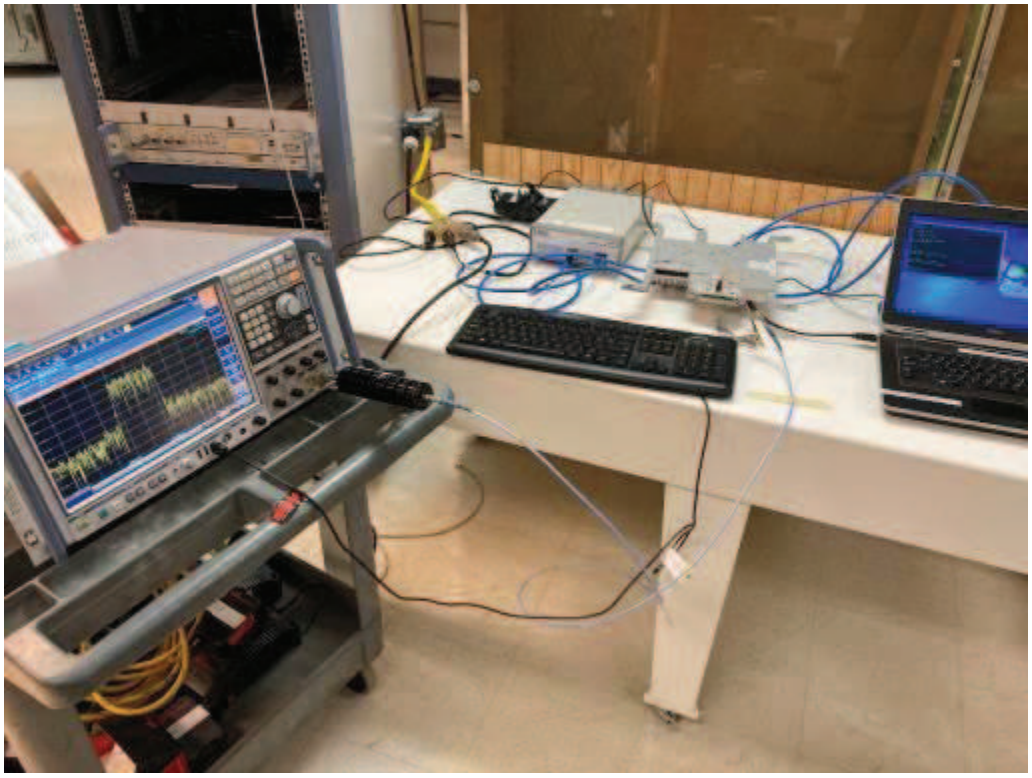
Band 10, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	13.398	14.600
		ANT1	13.436	14.500
High	2162.50	ANT0	13.473	14.560
		ANT1	13.414	14.460

Band 10, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM

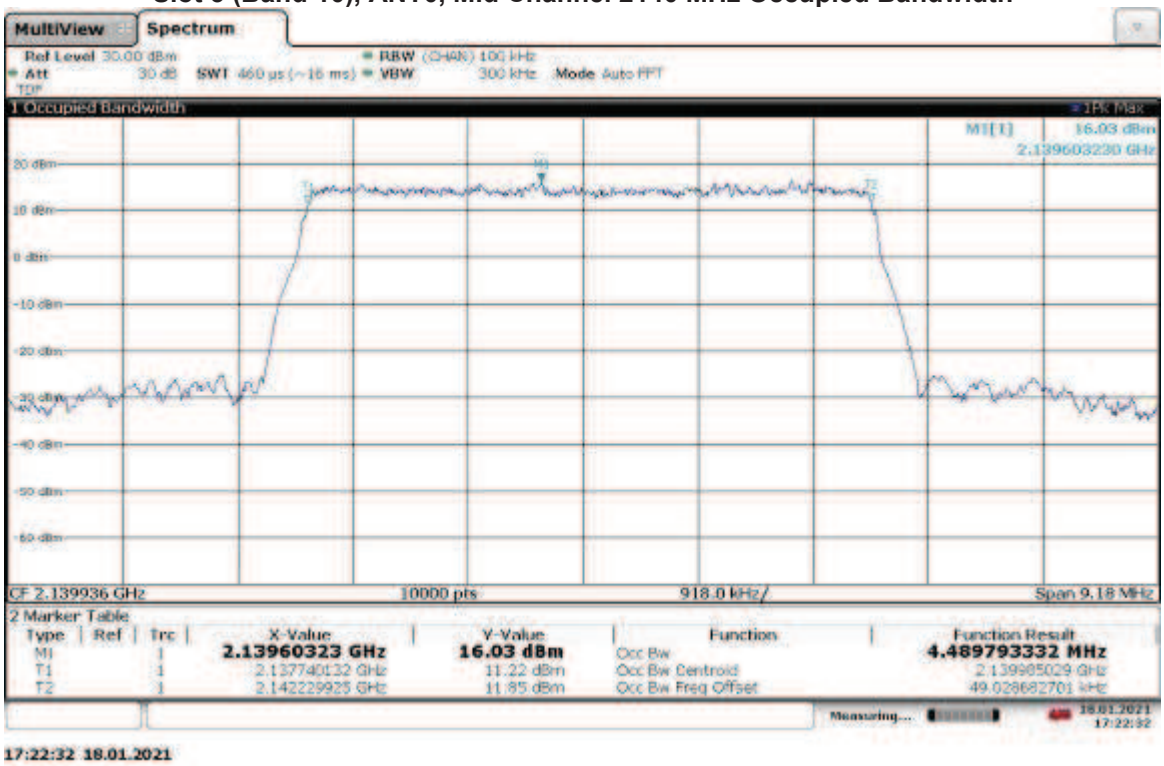
Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2140.00	ANT0	17.884	19.620
		ANT1	17.888	19.580
High	2160.00	ANT0	17.882	19.600
		ANT1	17.885	19.550

8.4 Setup Photograph:



8.5 Plots/Data:

TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz Occupied Bandwidth



17:22:32 18.01.2021

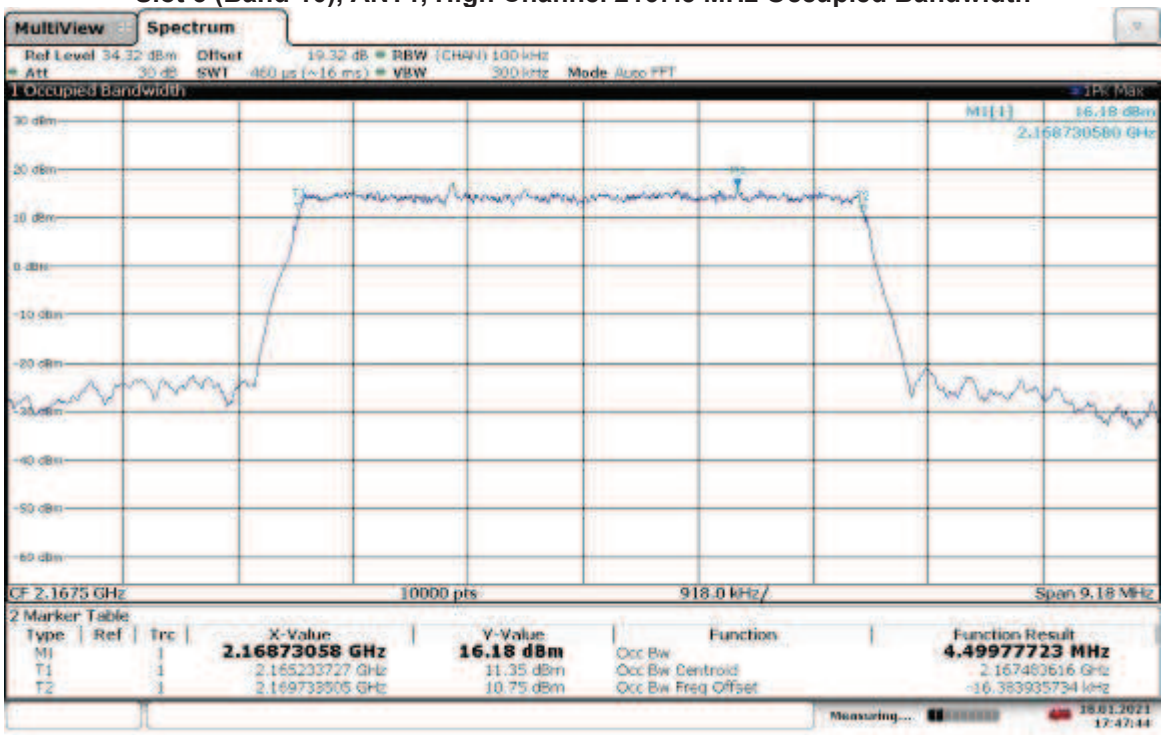
TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz Occupied Bandwidth

17:10:34 18.01.2021

TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2167.5 MHz Occupied Bandwidth

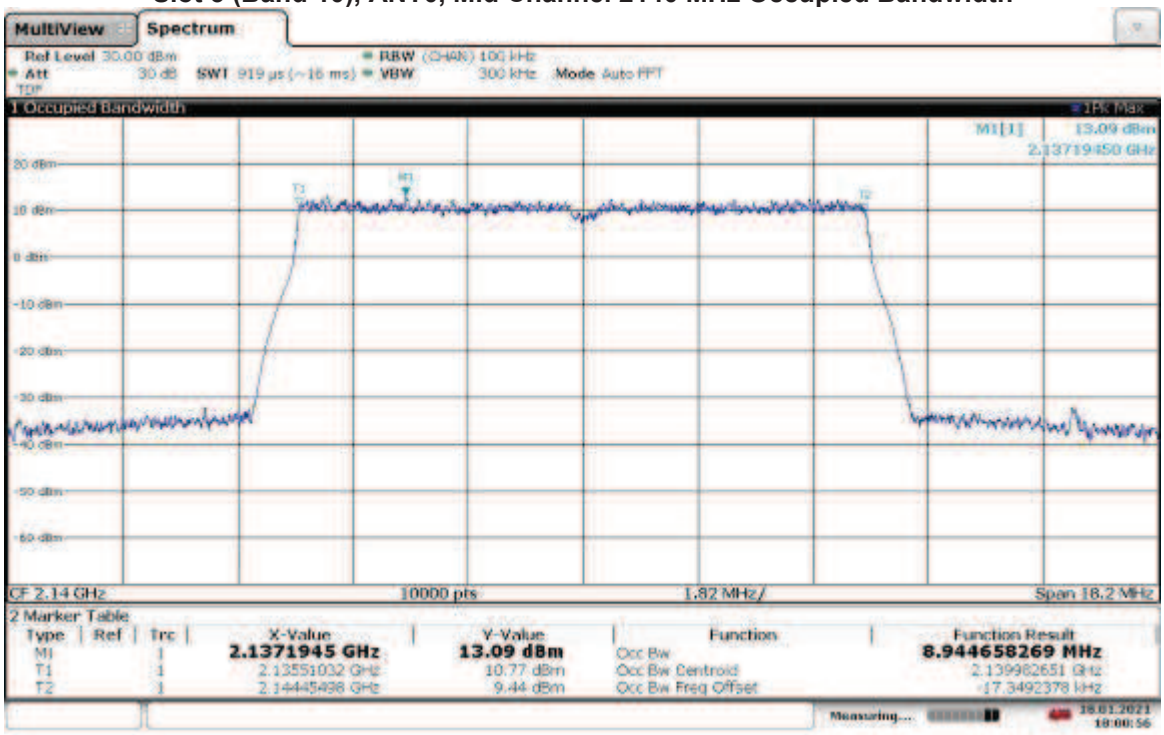
17:31:09 18.01.2021

TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2167.5 MHz Occupied Bandwidth



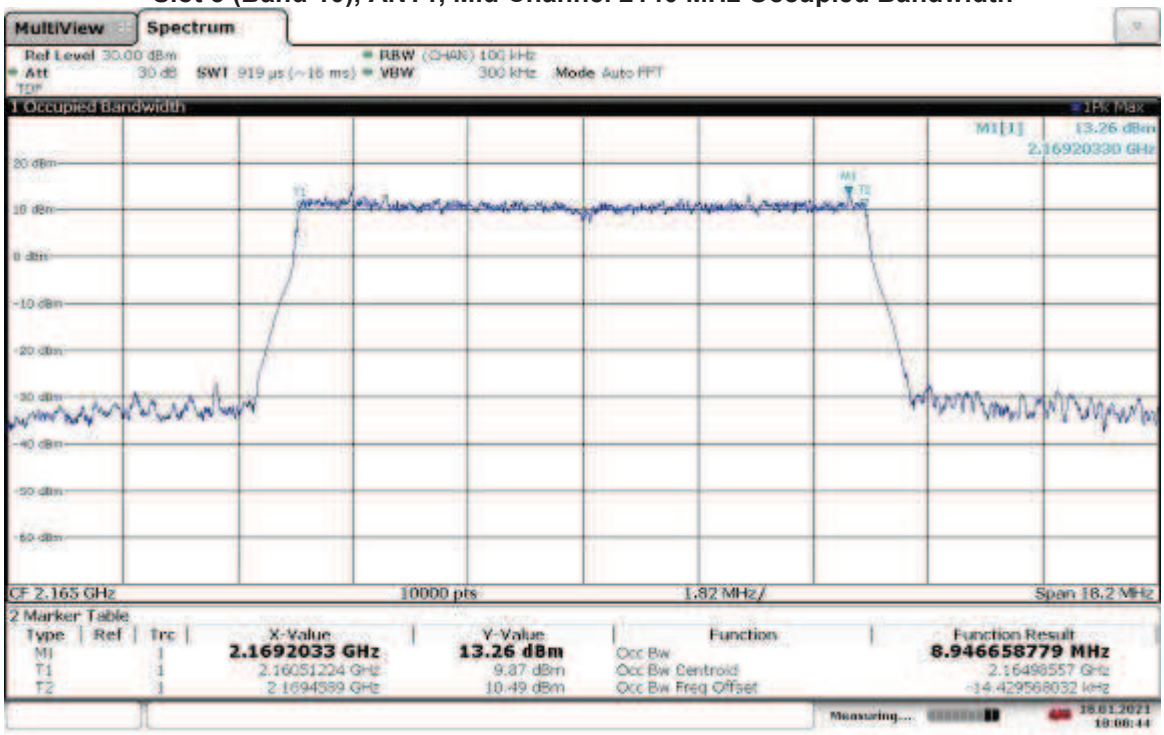
17:47:44 18.01.2021

TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz Occupied Bandwidth



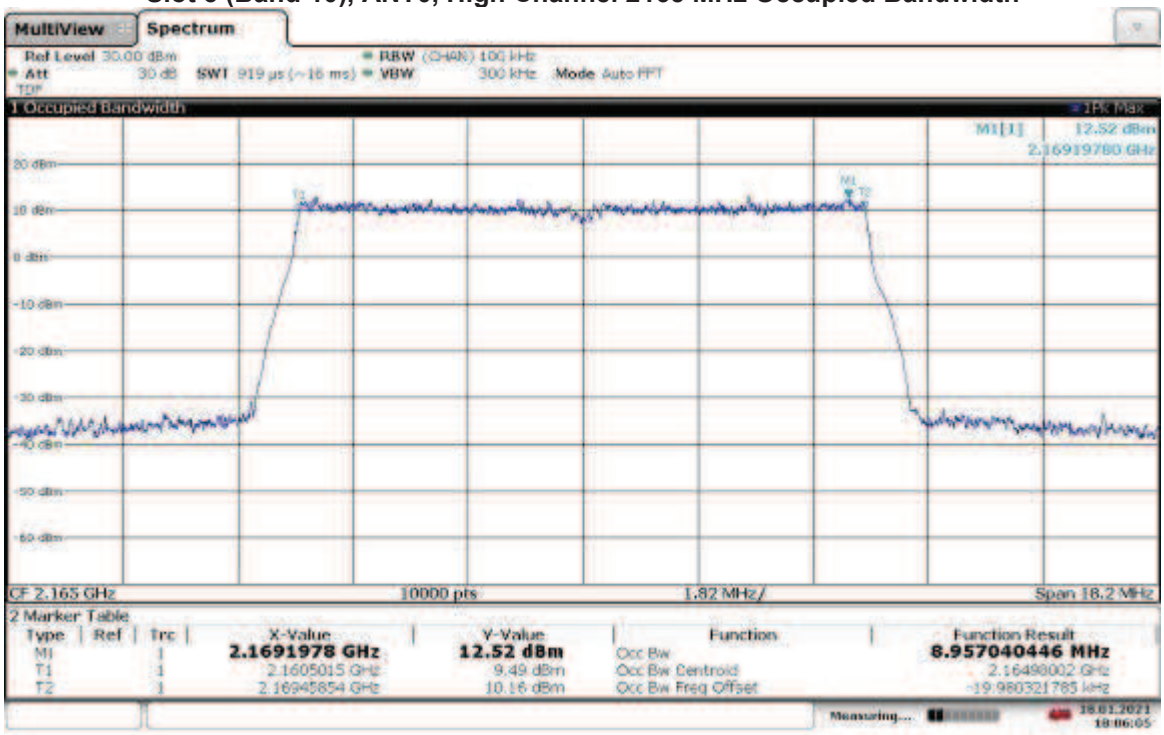
18:00:56 18.01.2021

TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz Occupied Bandwidth



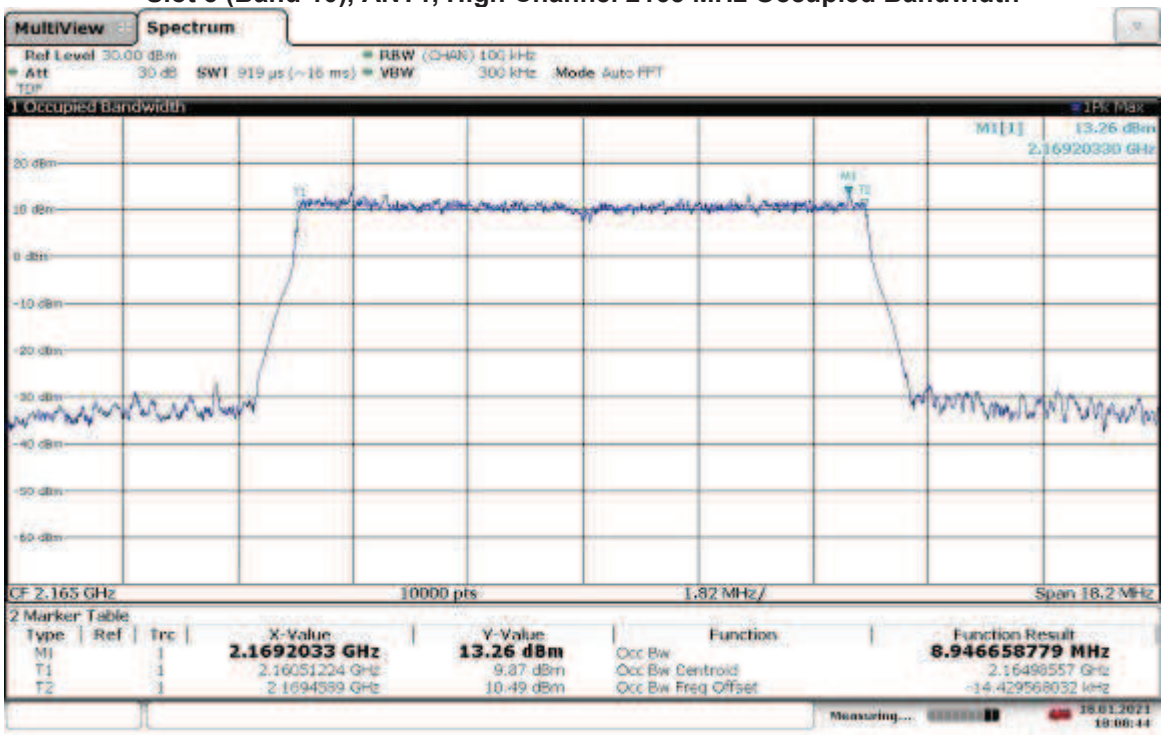
18:08:44 18.01.2021

TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2165 MHz Occupied Bandwidth



18:06:06 18.01.2021

TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2165 MHz Occupied Bandwidth



18:08:44 18.01.2021

TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz Occupied Bandwidth

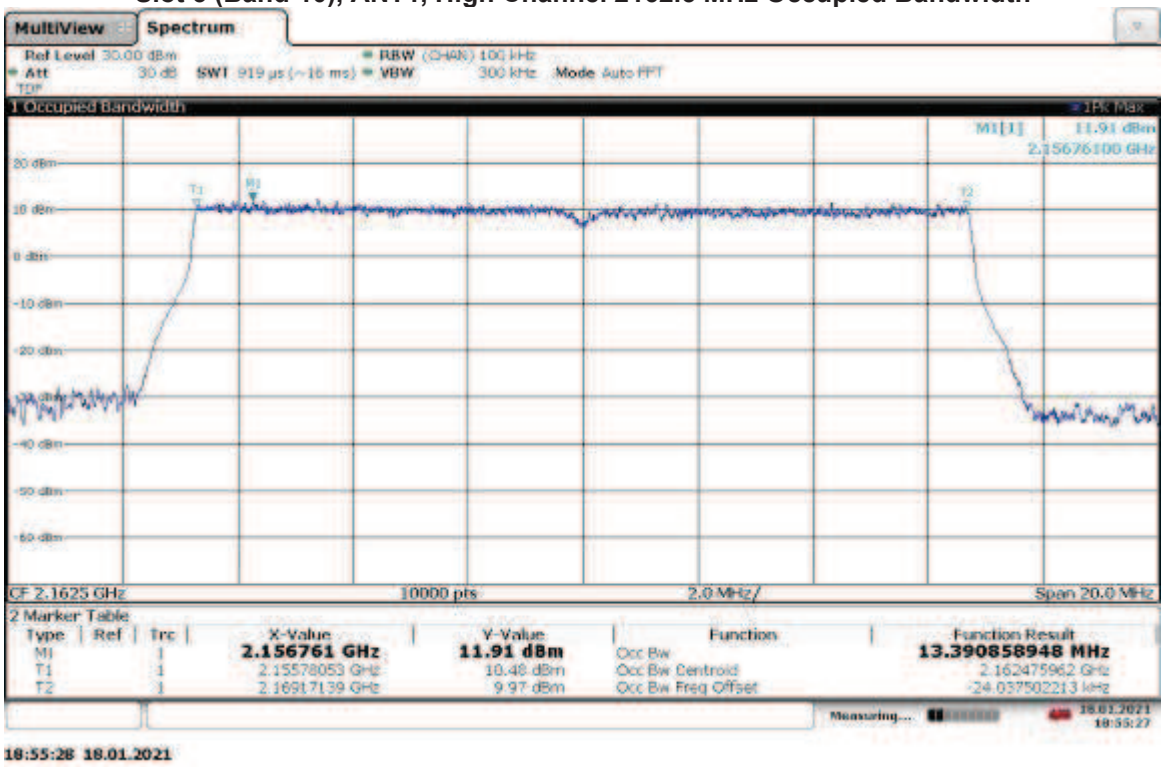
19:01:37 18.01.2021

TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz Occupied Bandwidth

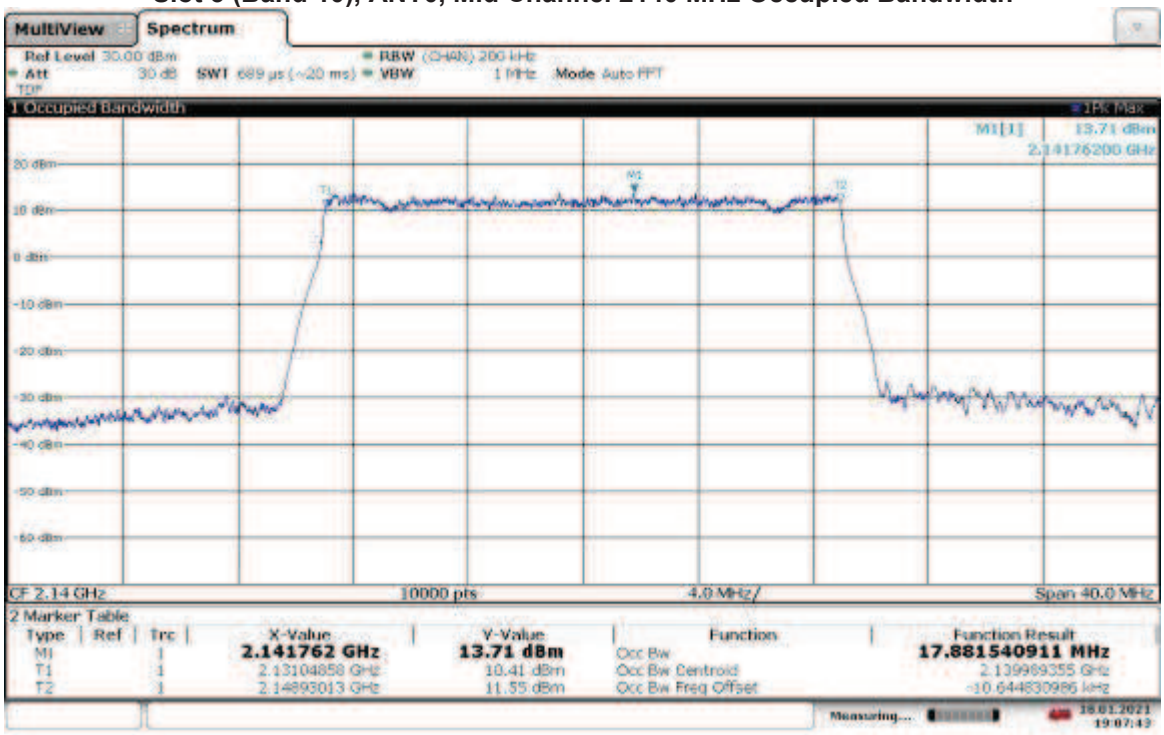
19:03:31 18.01.2021

TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2162.5 MHz Occupied Bandwidth

TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2162.5 MHz Occupied Bandwidth

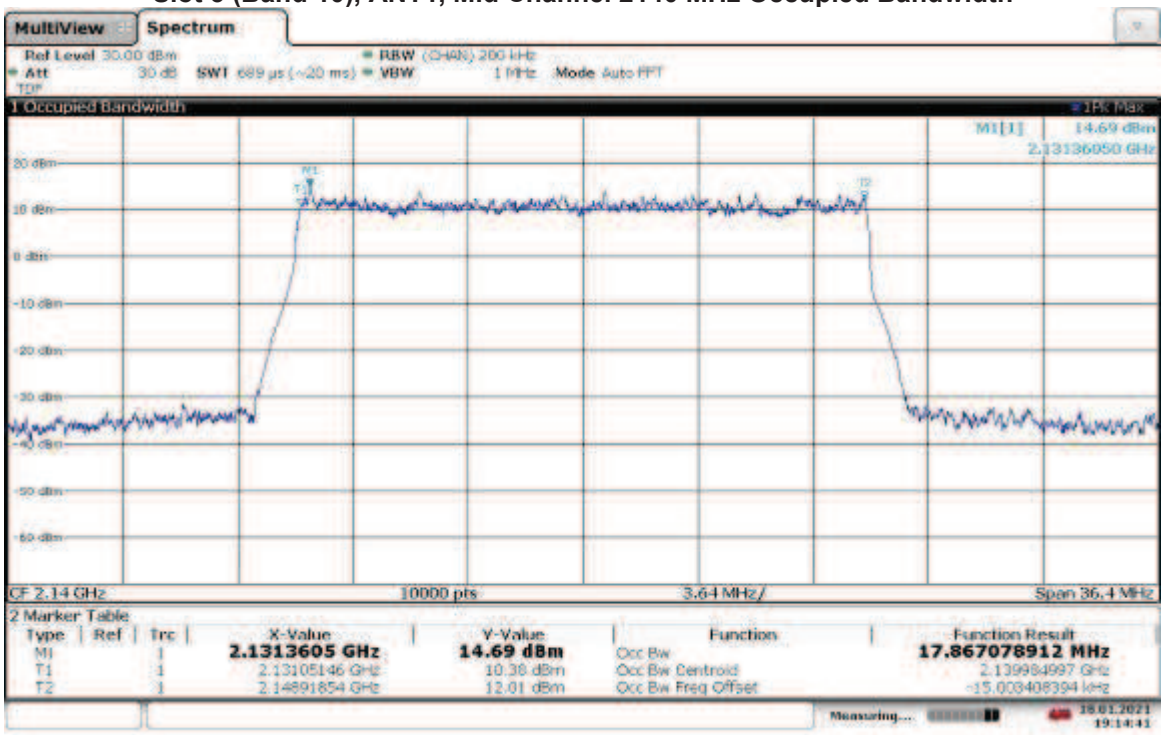


TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz Occupied Bandwidth



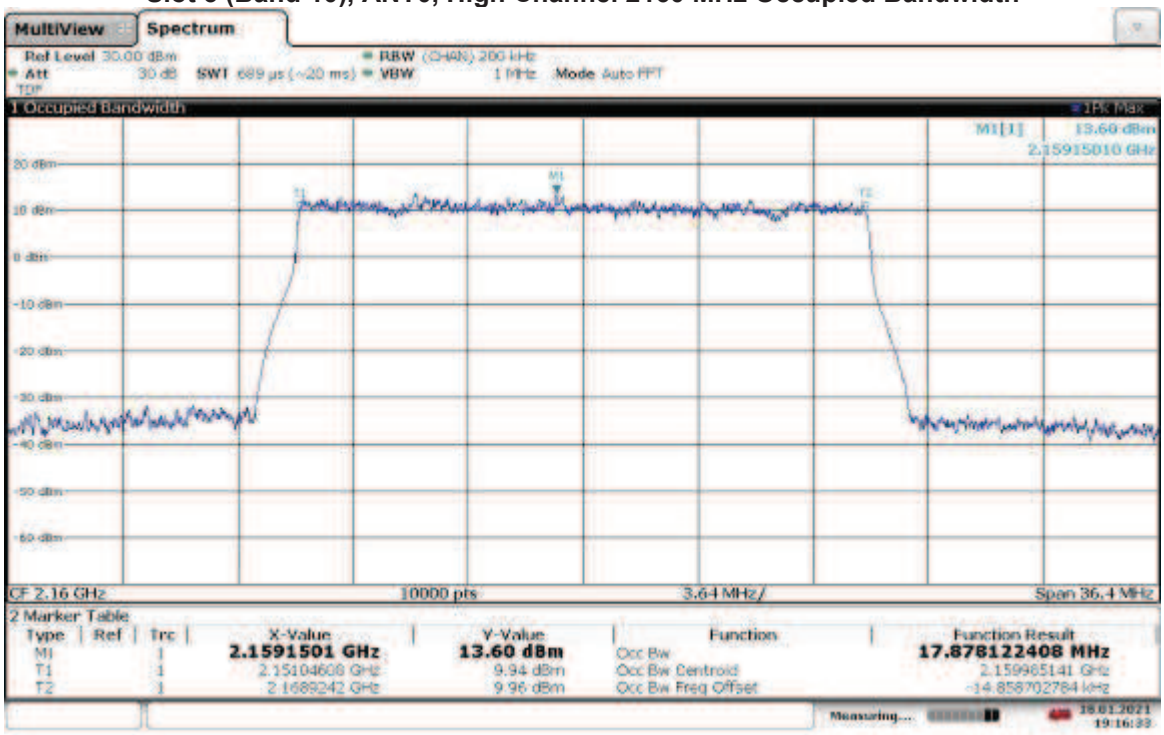
19:07:43 18.01.2021

TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz Occupied Bandwidth



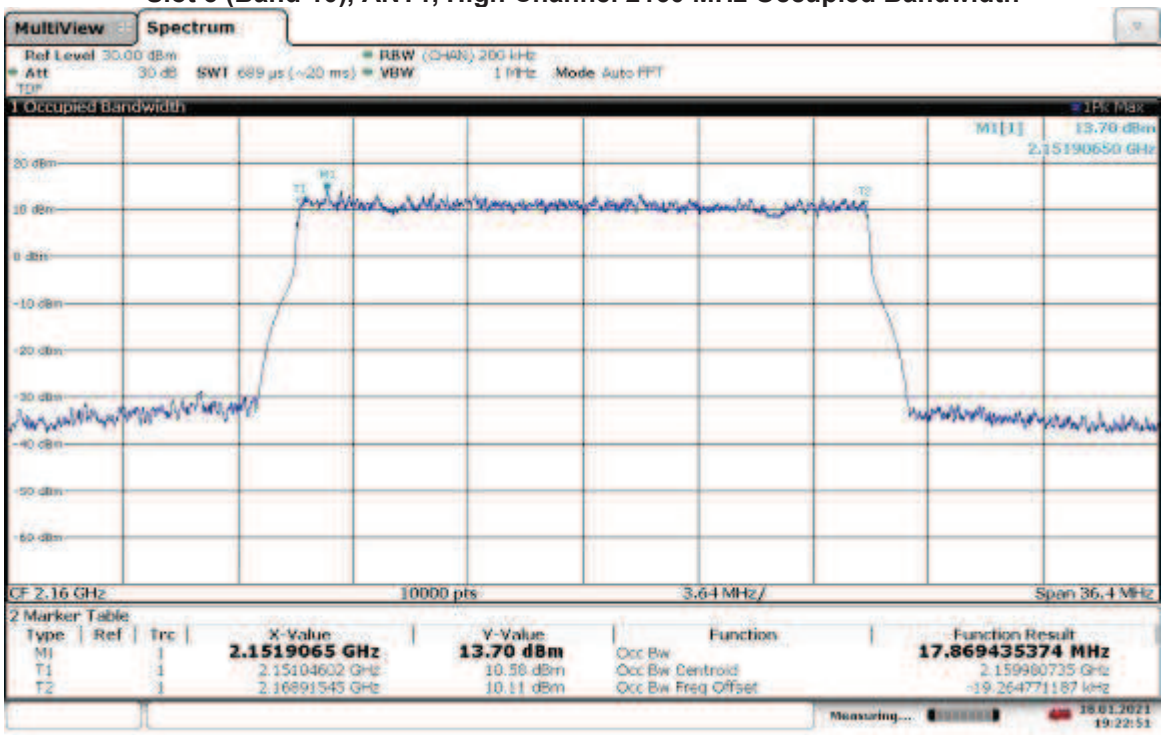
19:14:42 18.01.2021

TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2160 MHz Occupied Bandwidth



19:16:34 18.01.2021

TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2160 MHz Occupied Bandwidth

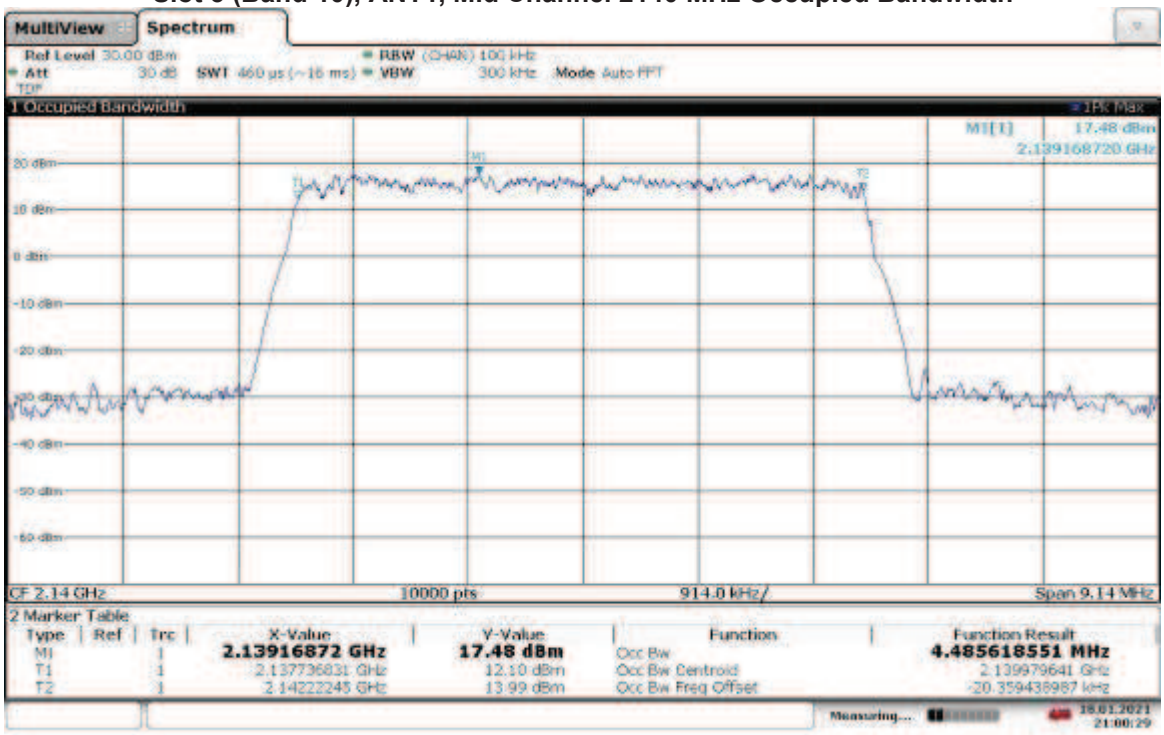


19:22:51 18.01.2021

TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz Occupied Bandwidth

20:57:58 18.01.2021

TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz Occupied Bandwidth

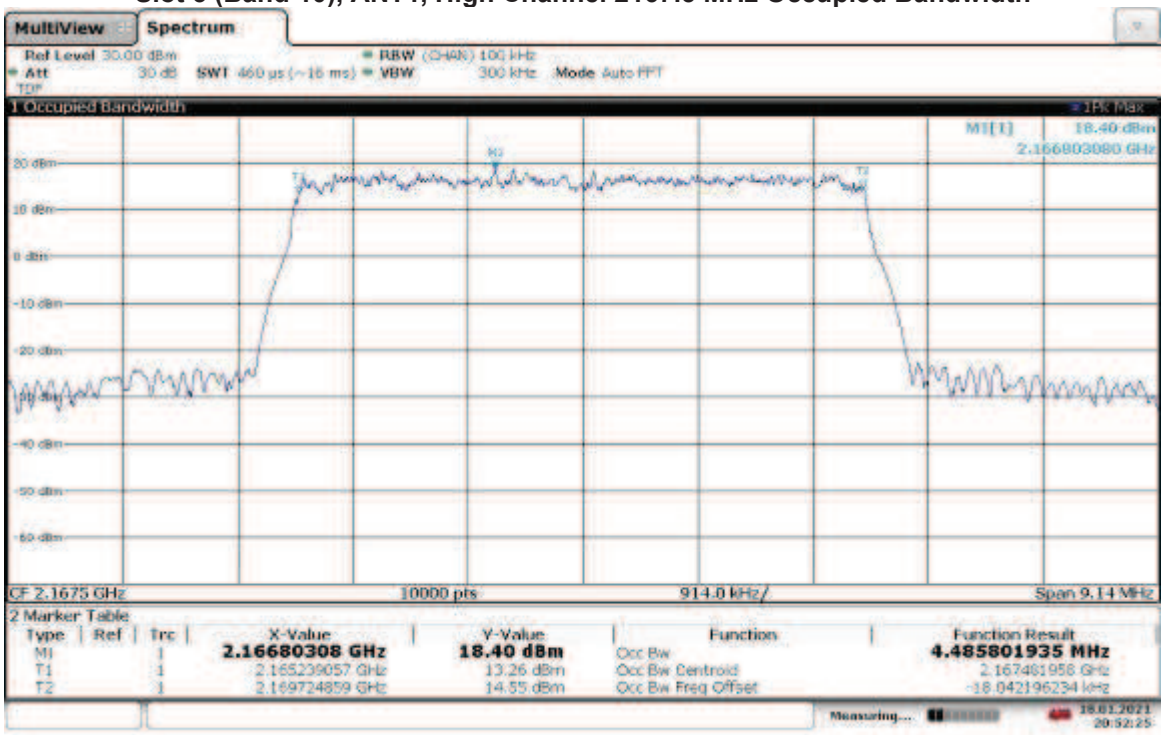


21:00:29 18.01.2021

TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2167.5 MHz Occupied Bandwidth

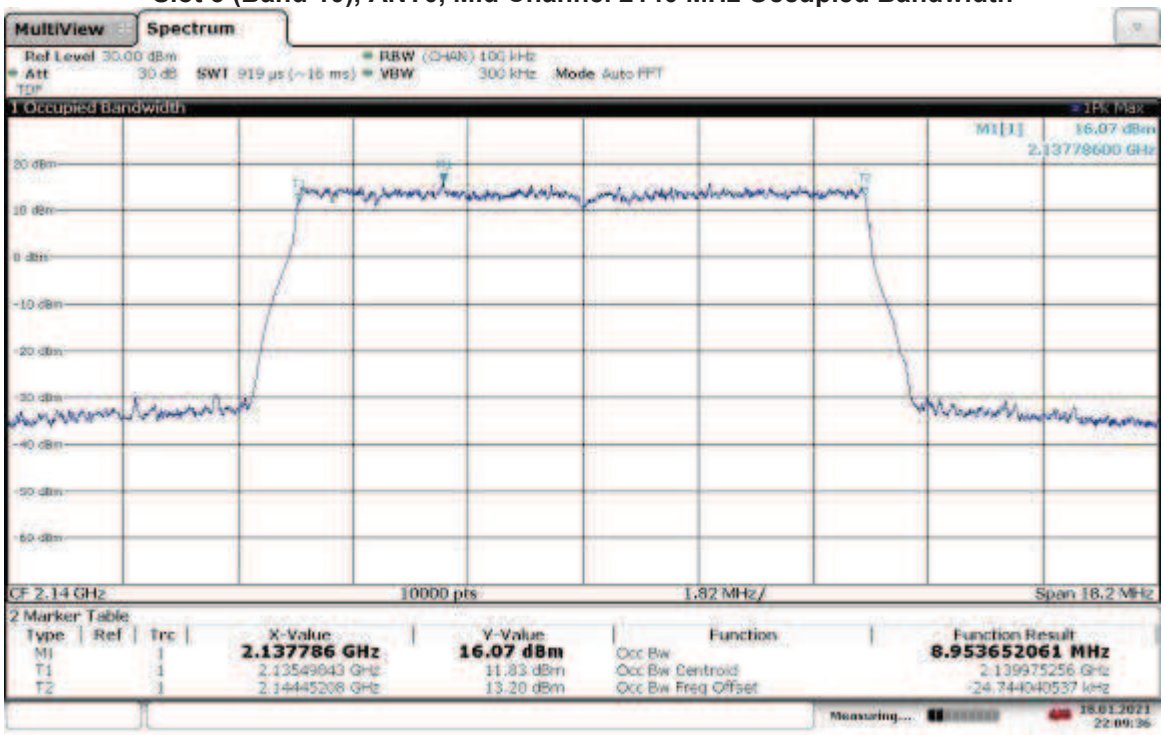
20:54:28 18.01.2021

TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2167.5 MHz Occupied Bandwidth



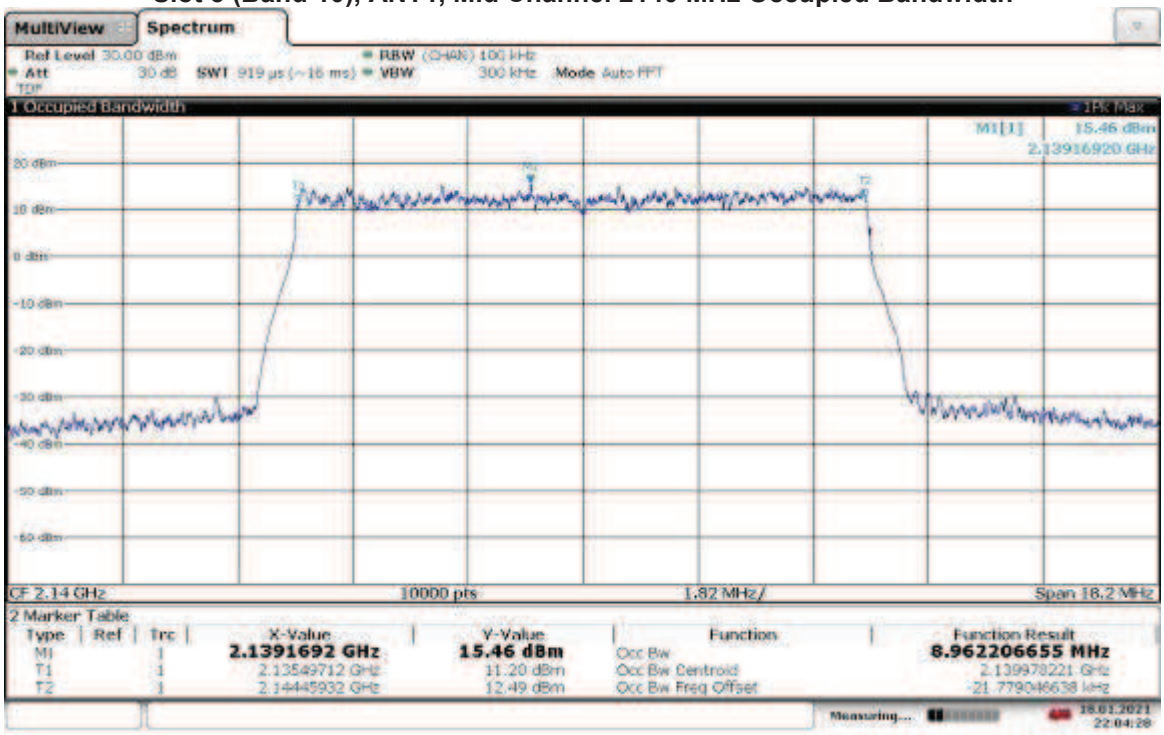
20:52:25 18.01.2021

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz Occupied Bandwidth



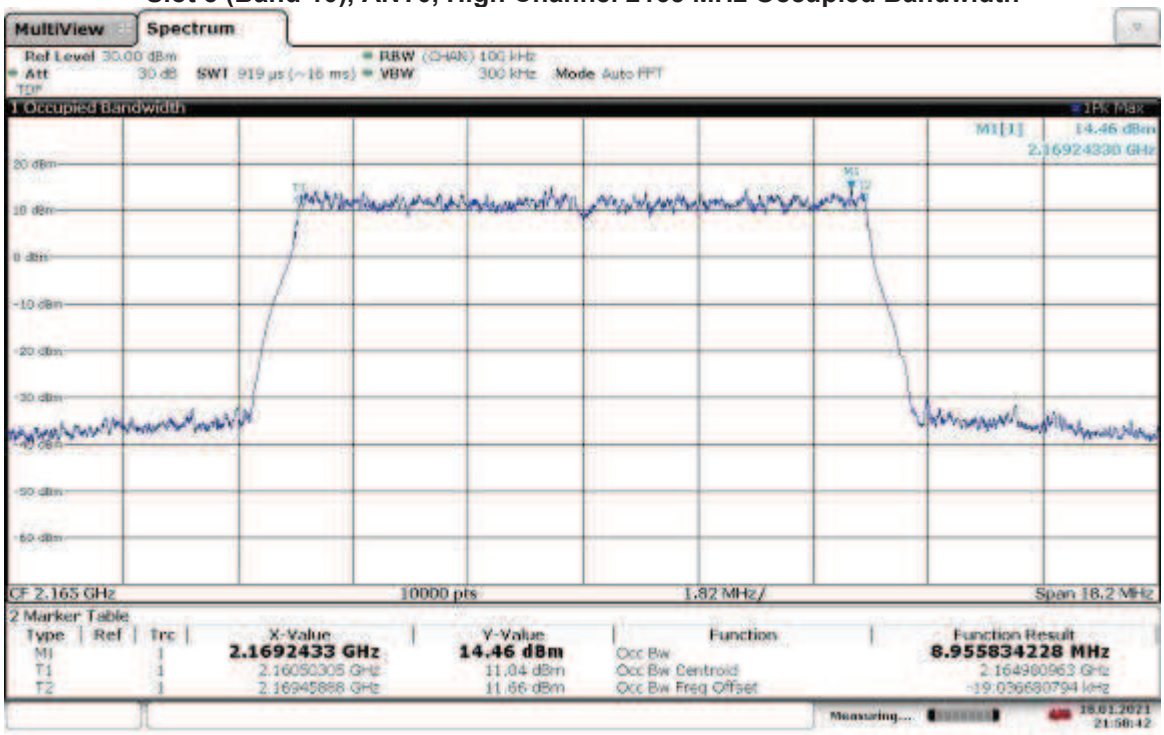
22:09:37 18.01.2021

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz Occupied Bandwidth



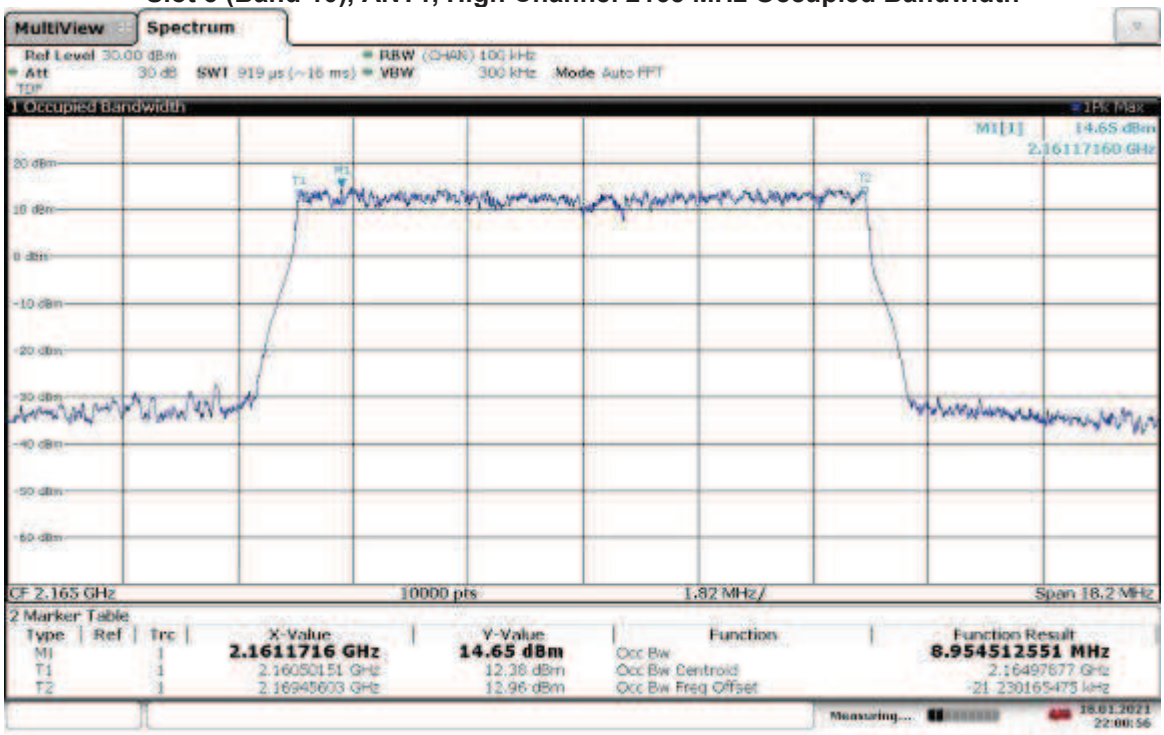
22:04:29 18.01.2021

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2165 MHz Occupied Bandwidth



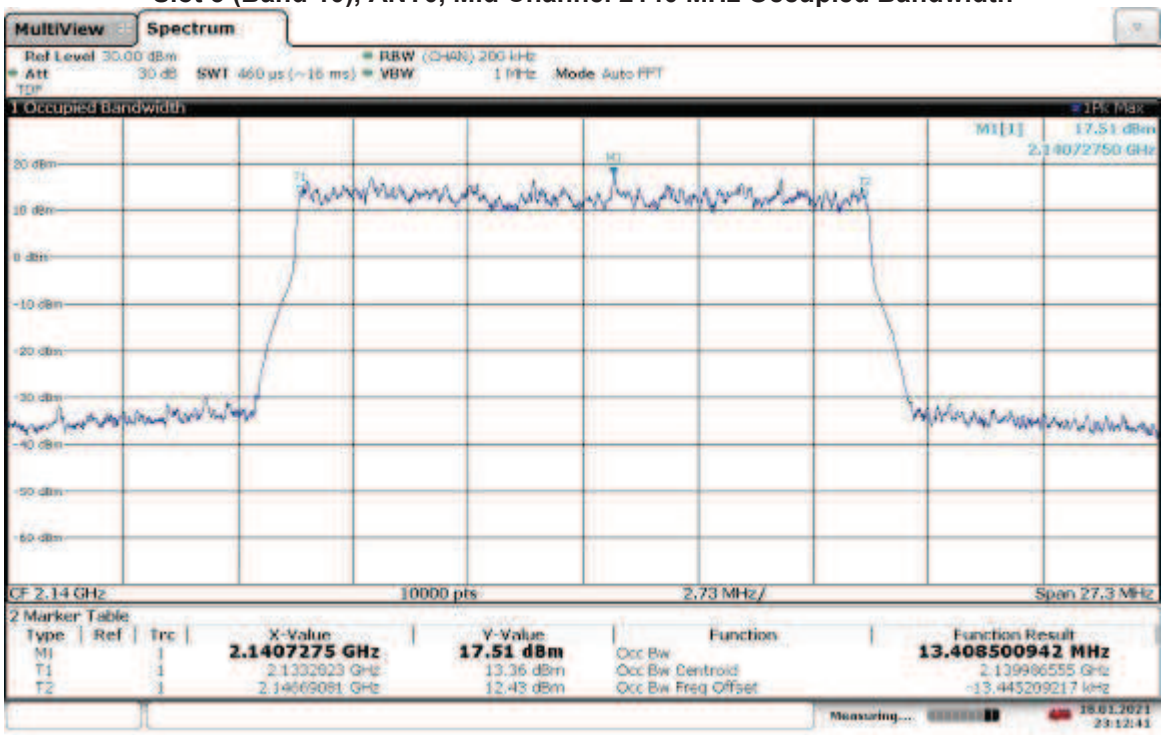
21:58:43 18.01.2021

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2165 MHz Occupied Bandwidth



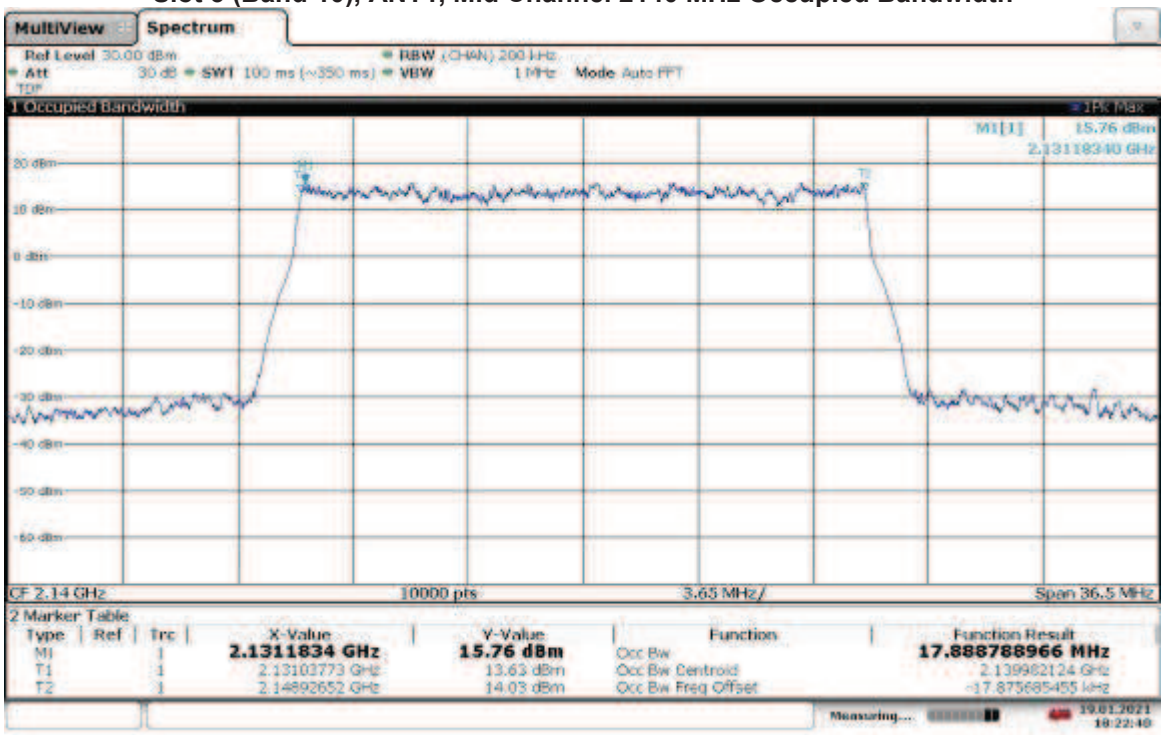
22:00:57 18.01.2021

TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz Occupied Bandwidth



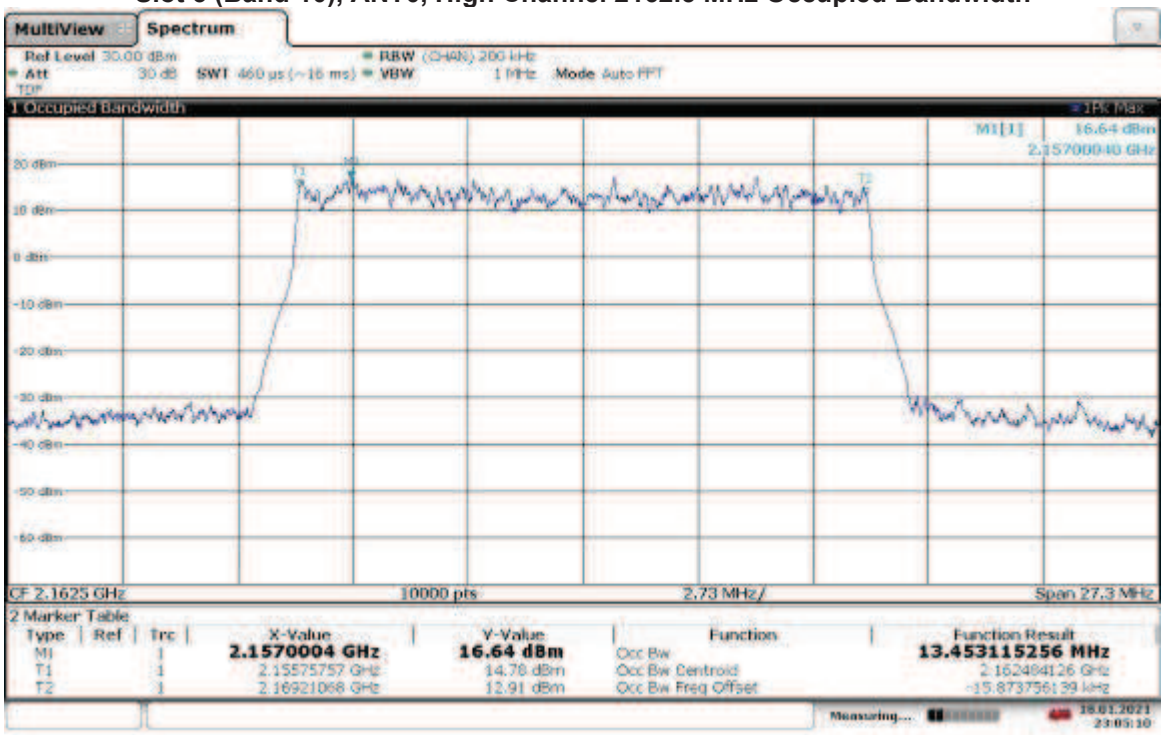
23:12:42 18.01.2021

TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz Occupied Bandwidth



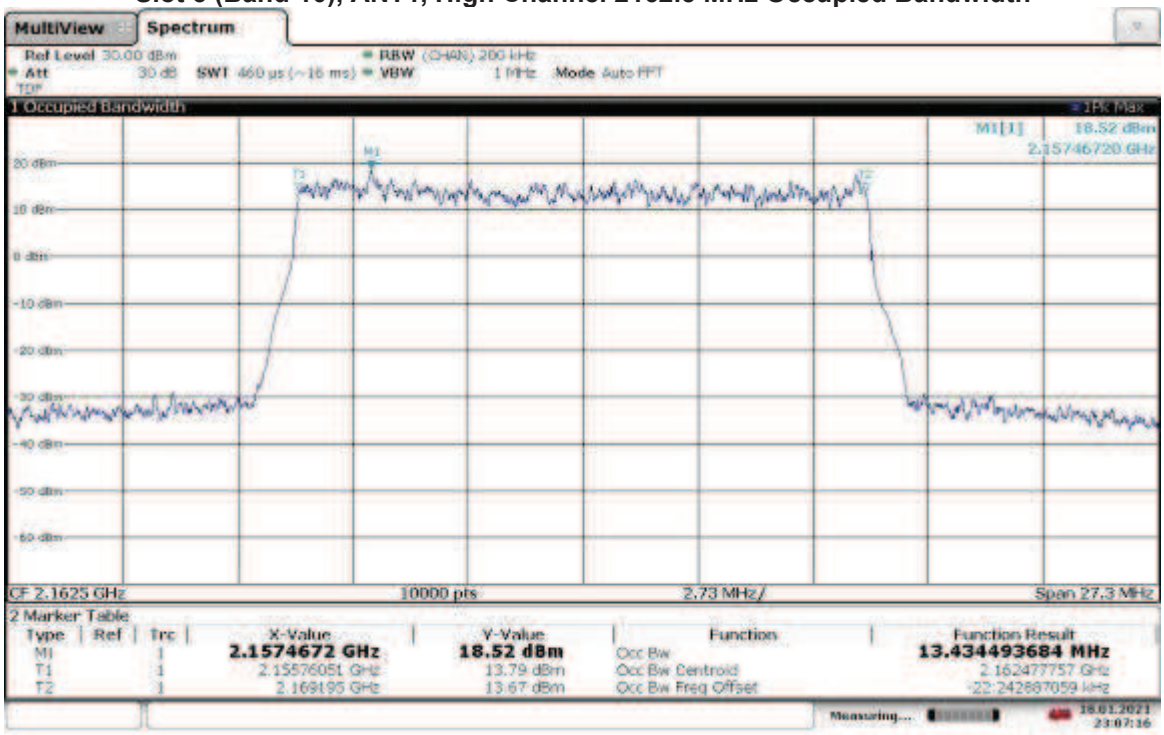
18:22:41 19.01.2021

TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2162.5 MHz Occupied Bandwidth



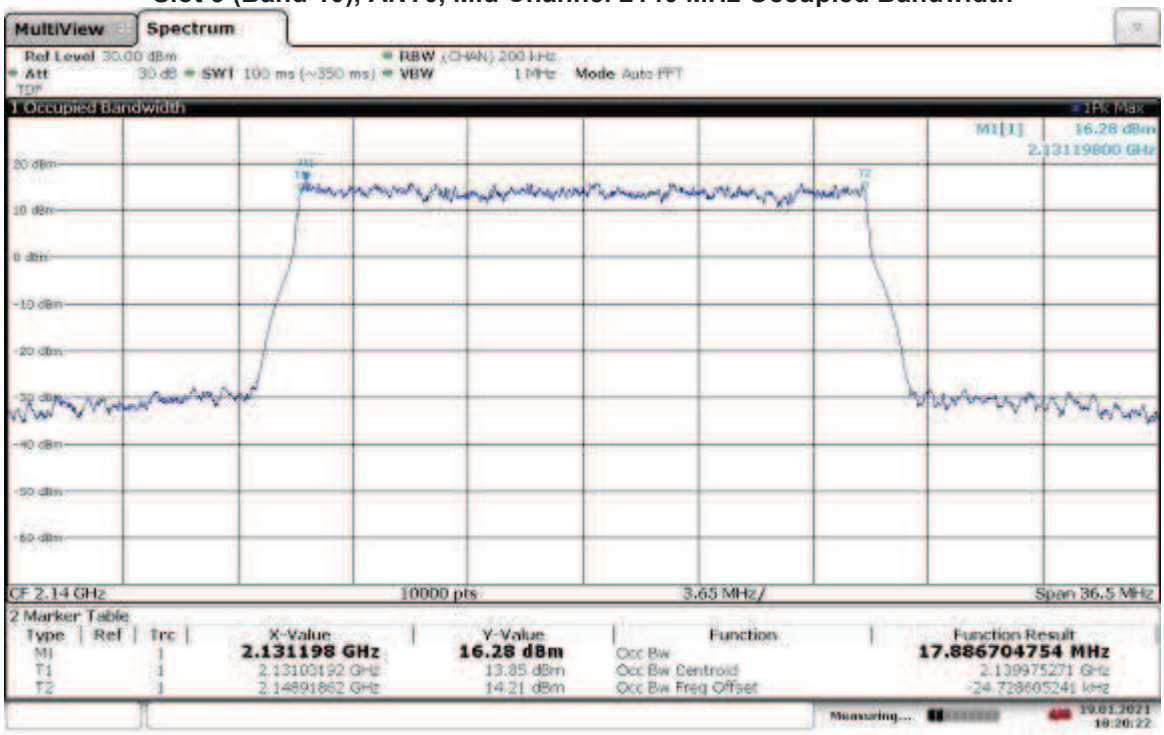
23:05:11 18.01.2021

TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2162.5 MHz Occupied Bandwidth



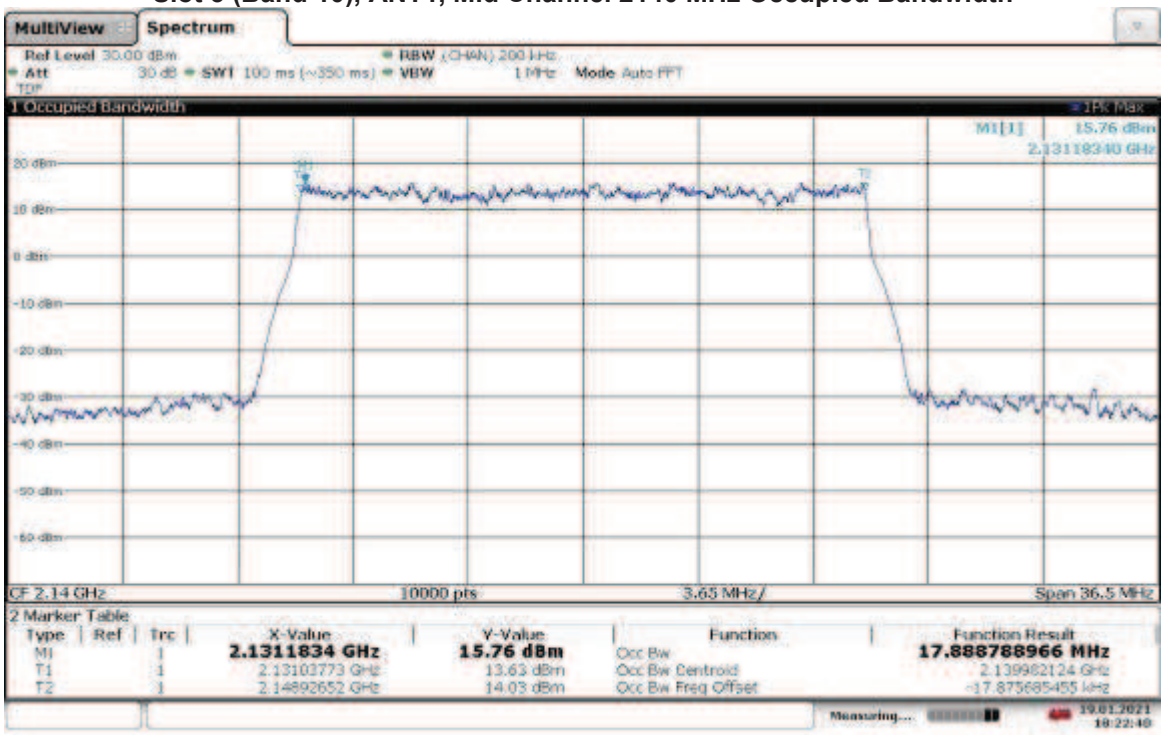
23:07:17 18.01.2021

TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz Occupied Bandwidth



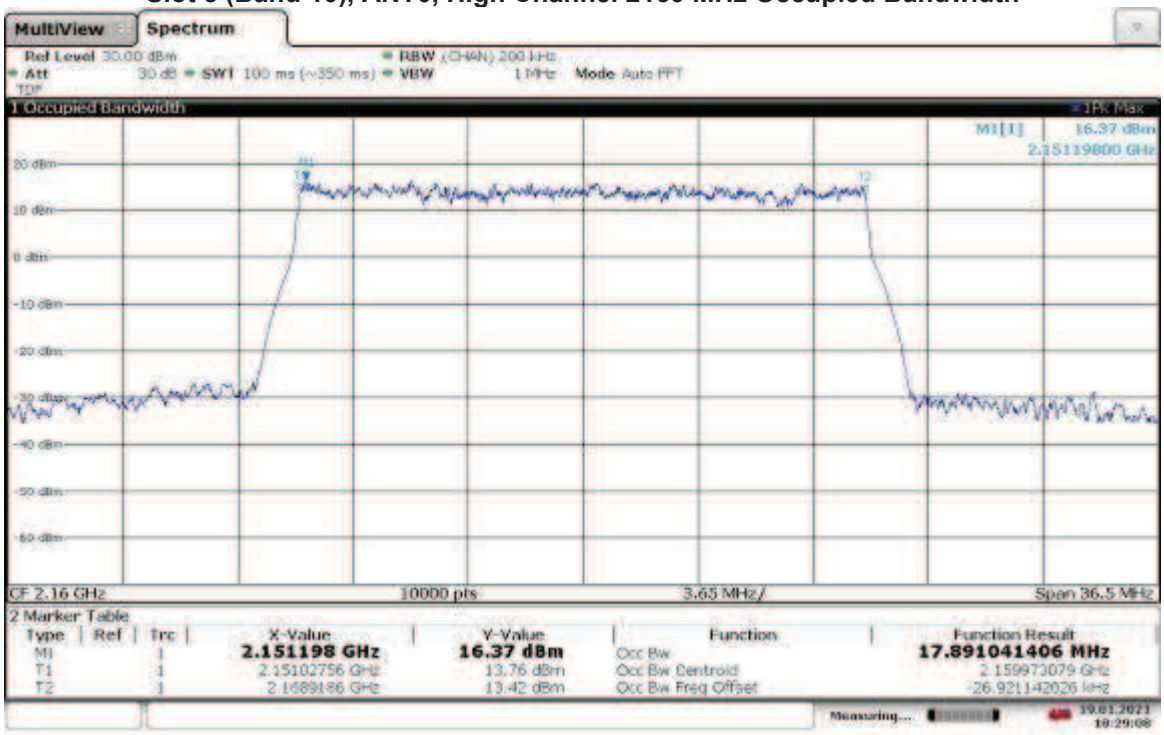
18:20:23 19.01.2021

TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz Occupied Bandwidth



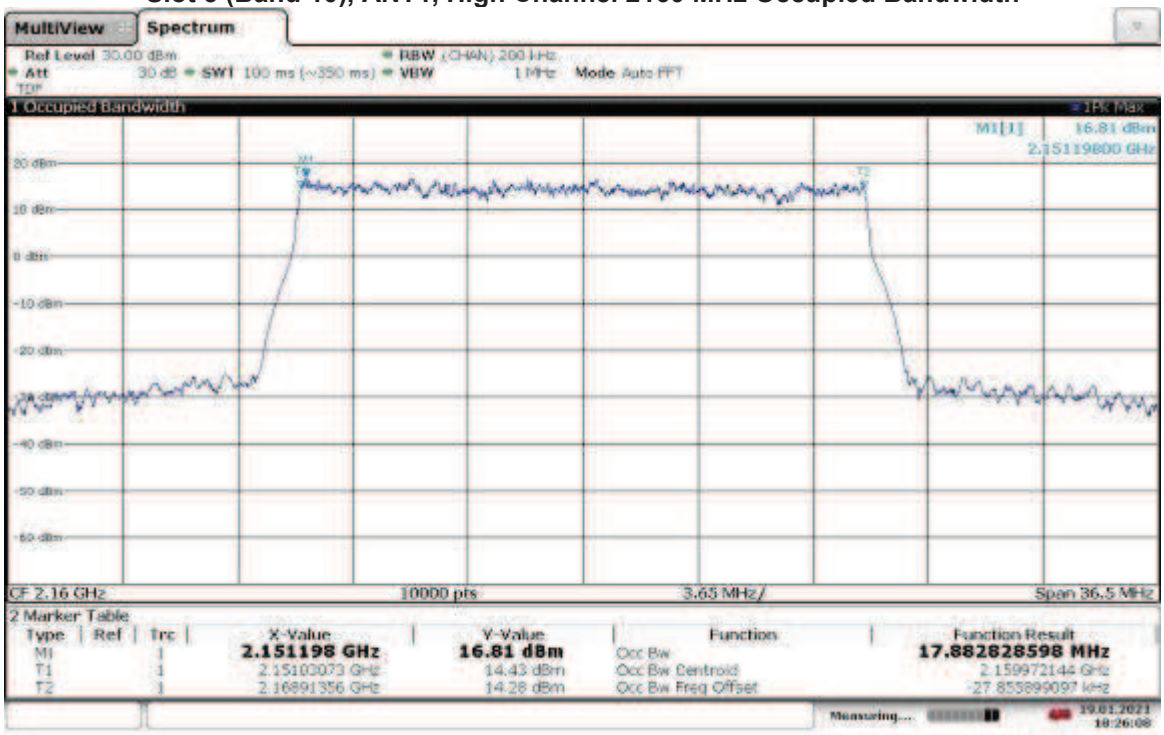
18:22:41 19.01.2021

TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2160 MHz Occupied Bandwidth



18:29:08 19.01.2021

TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2160 MHz Occupied Bandwidth

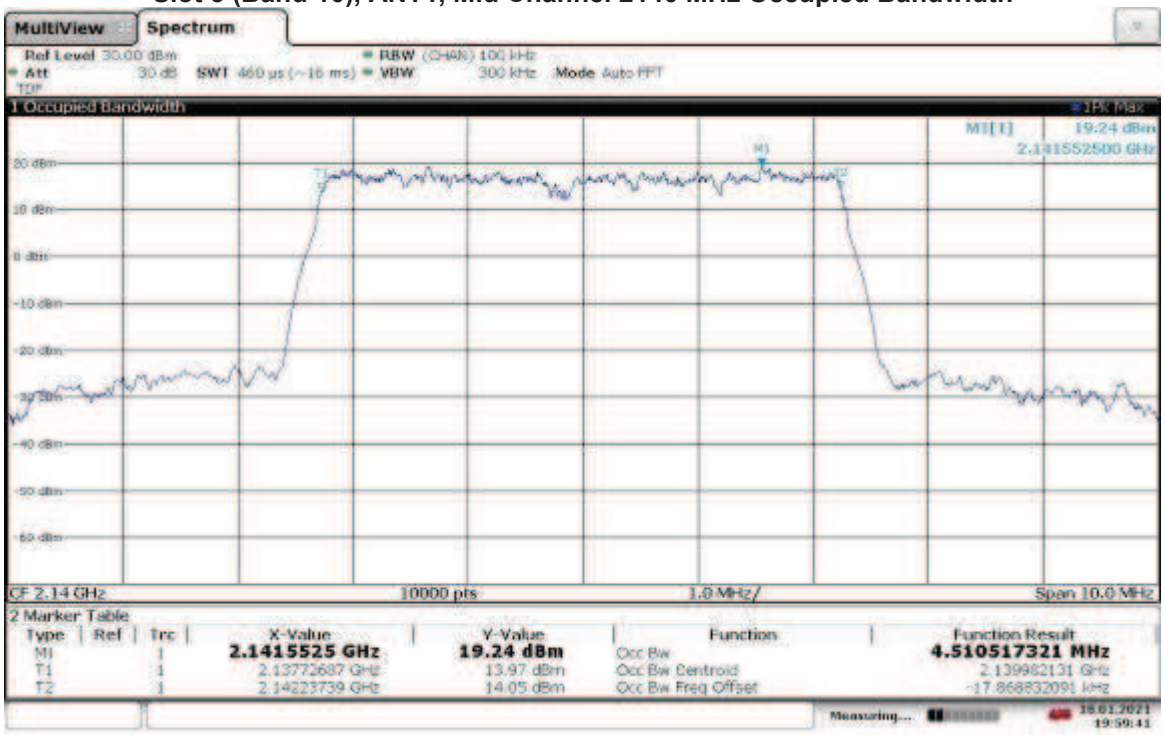


18:26:08 19.01.2021

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz Occupied Bandwidth

20:09:47 18.01.2021

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz Occupied Bandwidth

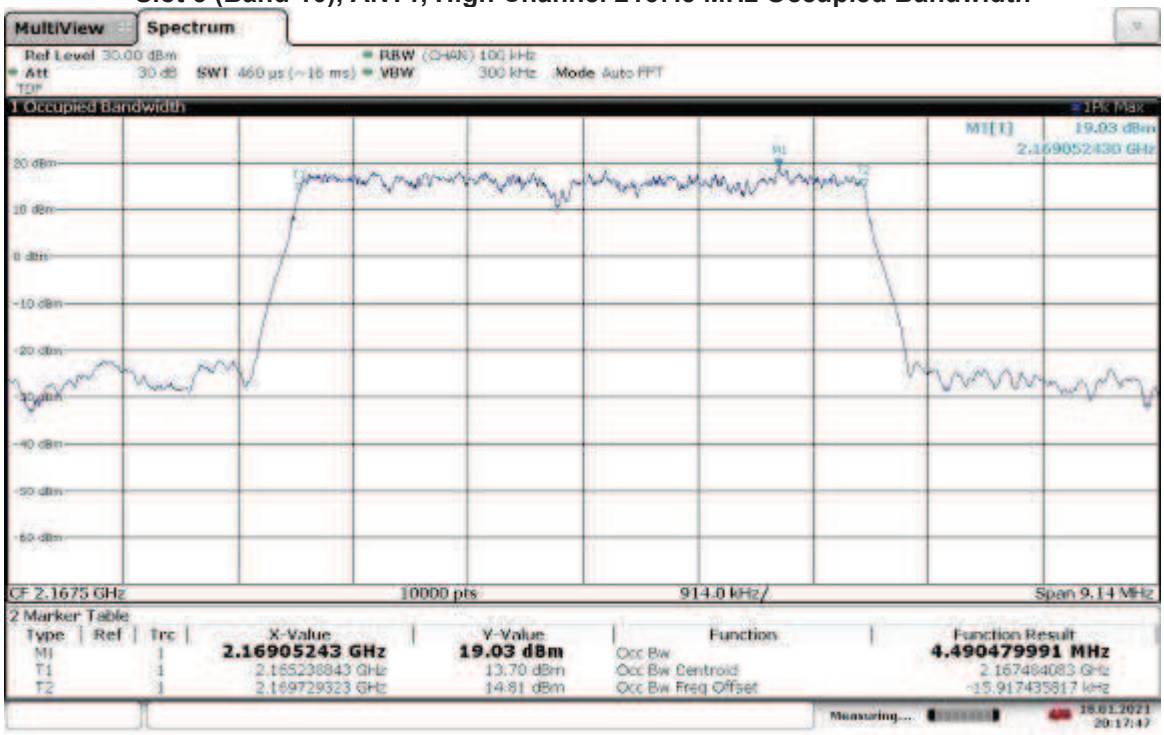


19:59:41 18.01.2021

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2167.5 MHz Occupied Bandwidth

20:14:48 18.01.2021

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2167.5 MHz Occupied Bandwidth

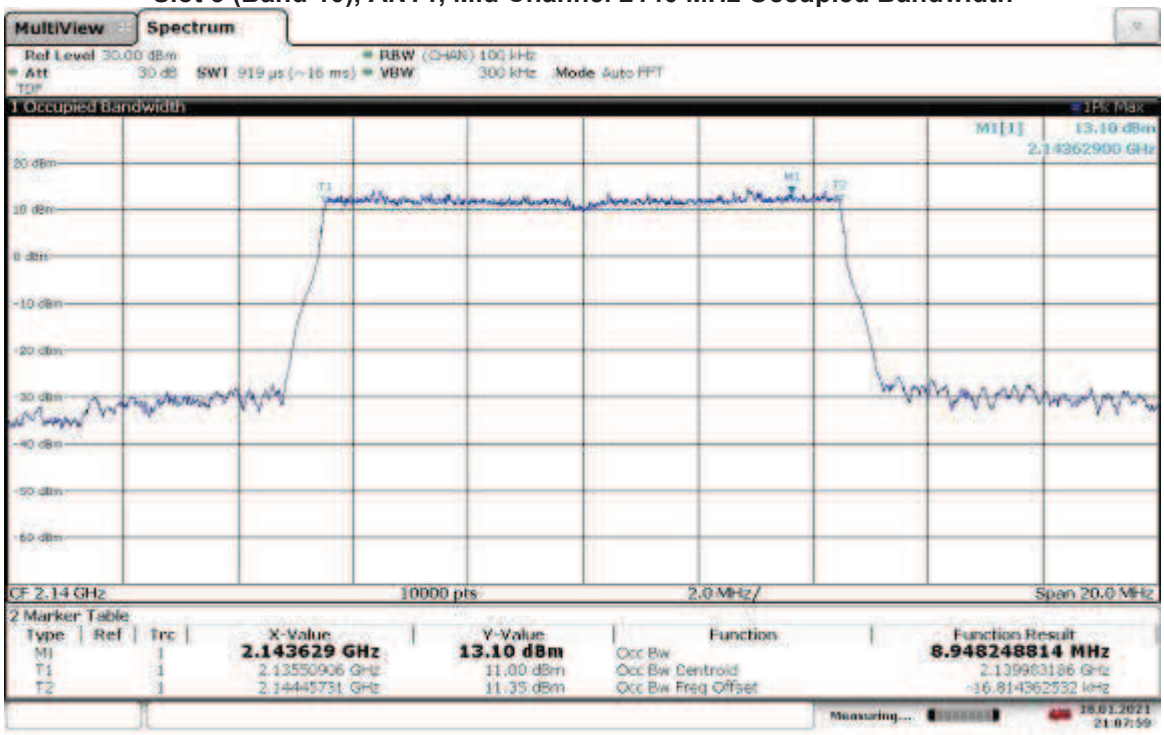


20:17:47 18.01.2021

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz Occupied Bandwidth

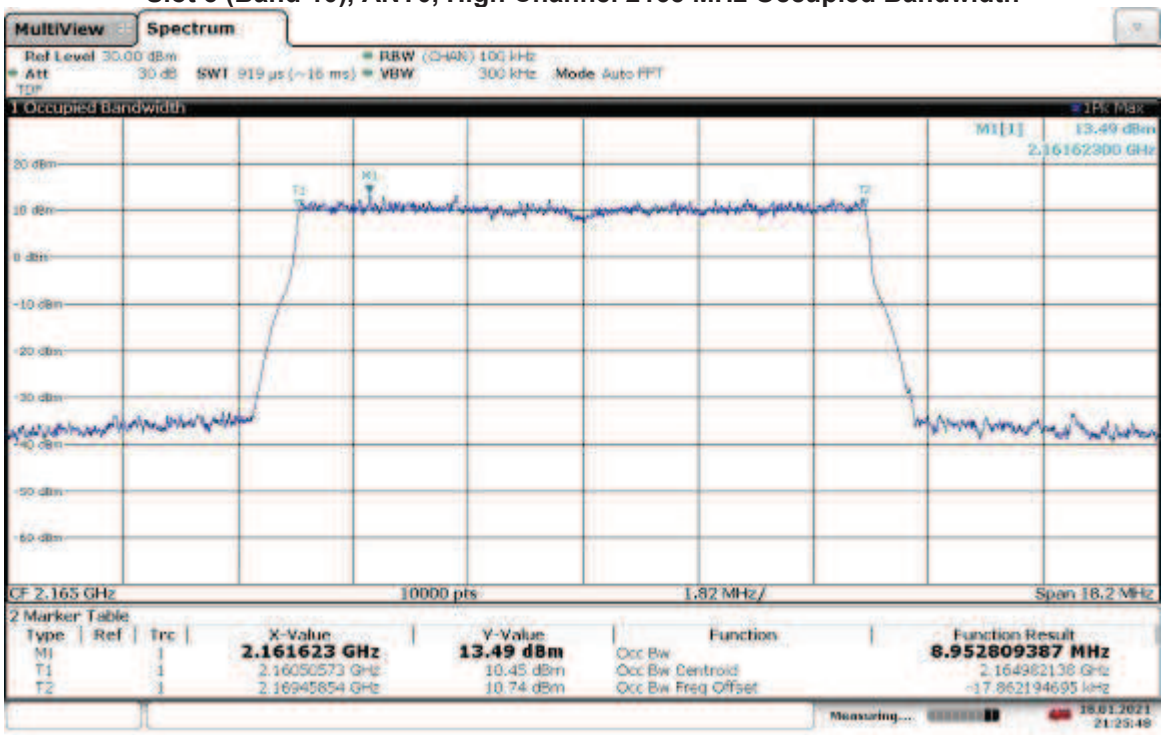
21:21:25 18.01.2021

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz Occupied Bandwidth



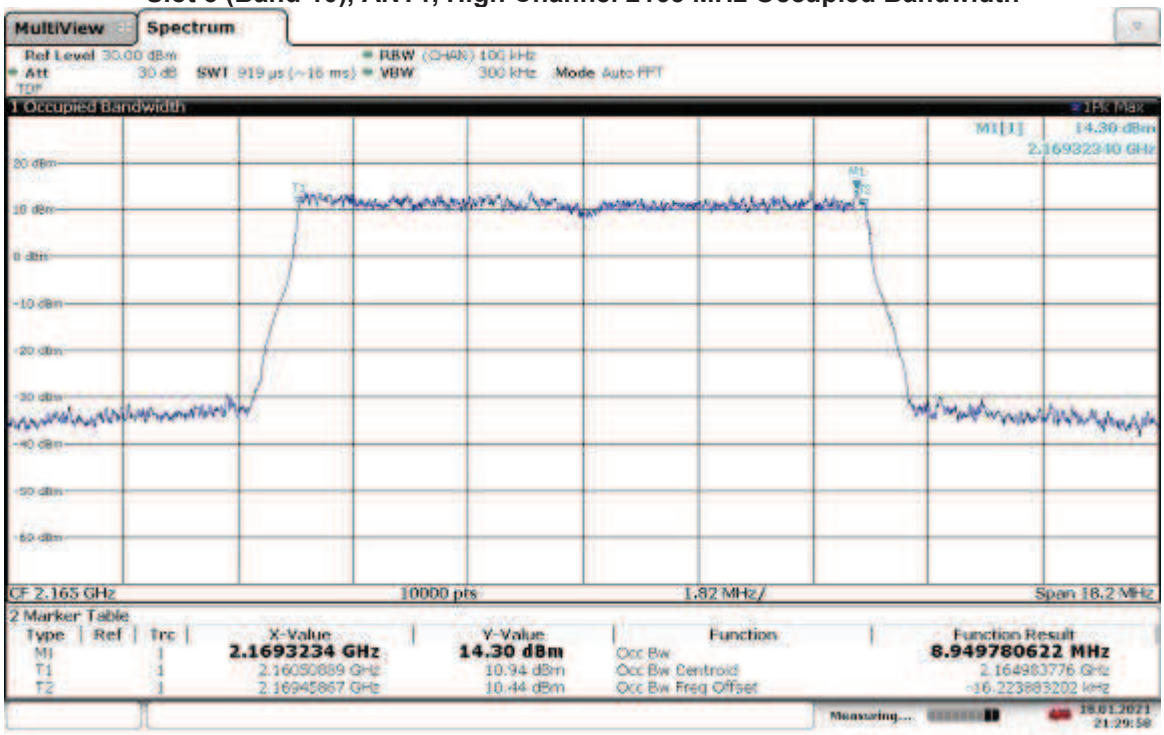
21:07:59 18.01.2021

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2165 MHz Occupied Bandwidth



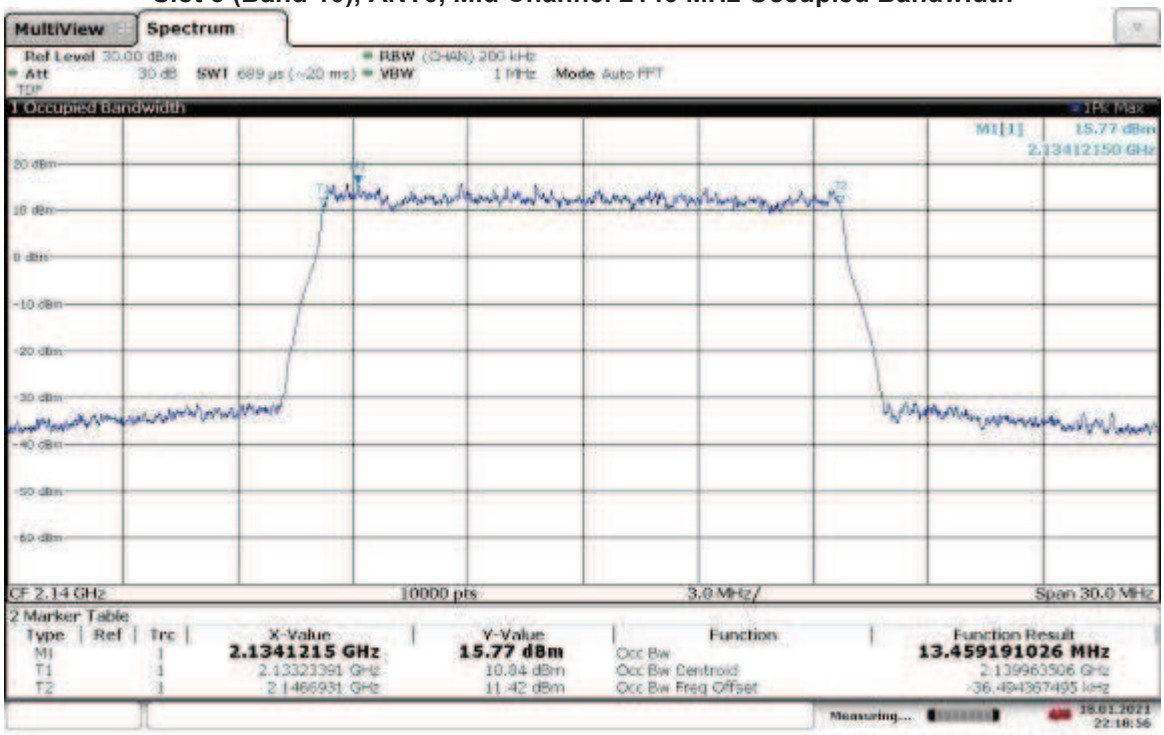
21:25:49 18.01.2021

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2165 MHz Occupied Bandwidth



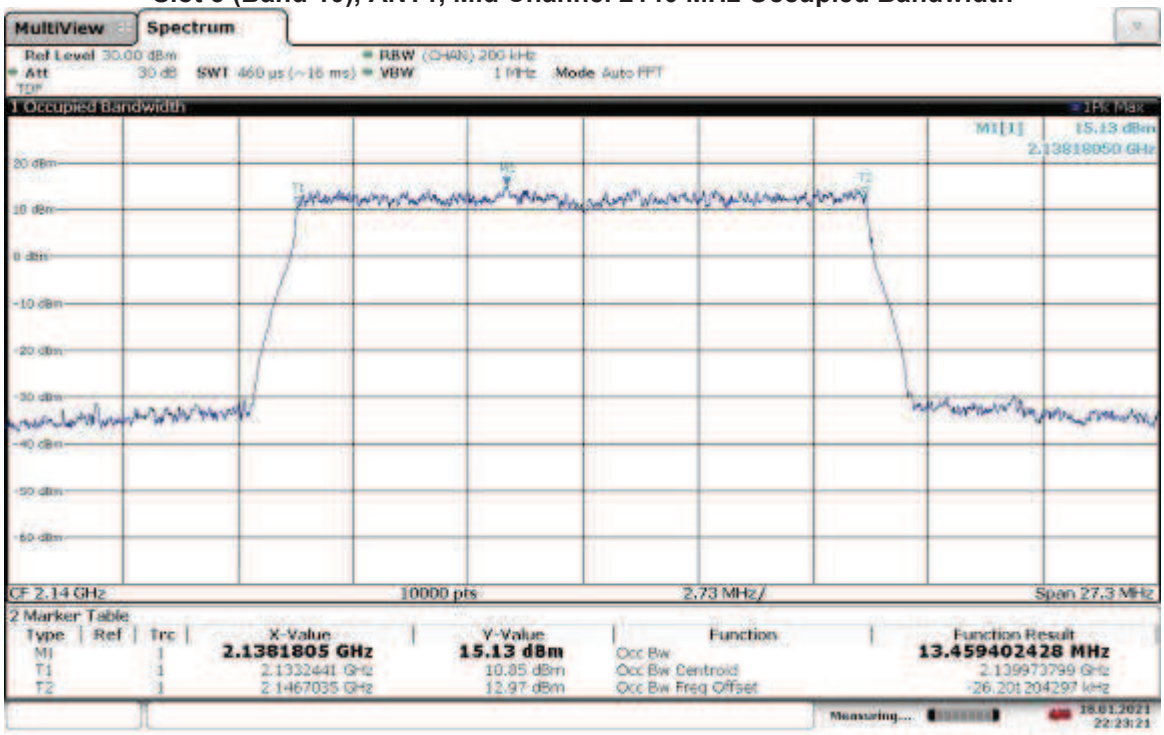
21:29:59 18.01.2021

TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz Occupied Bandwidth



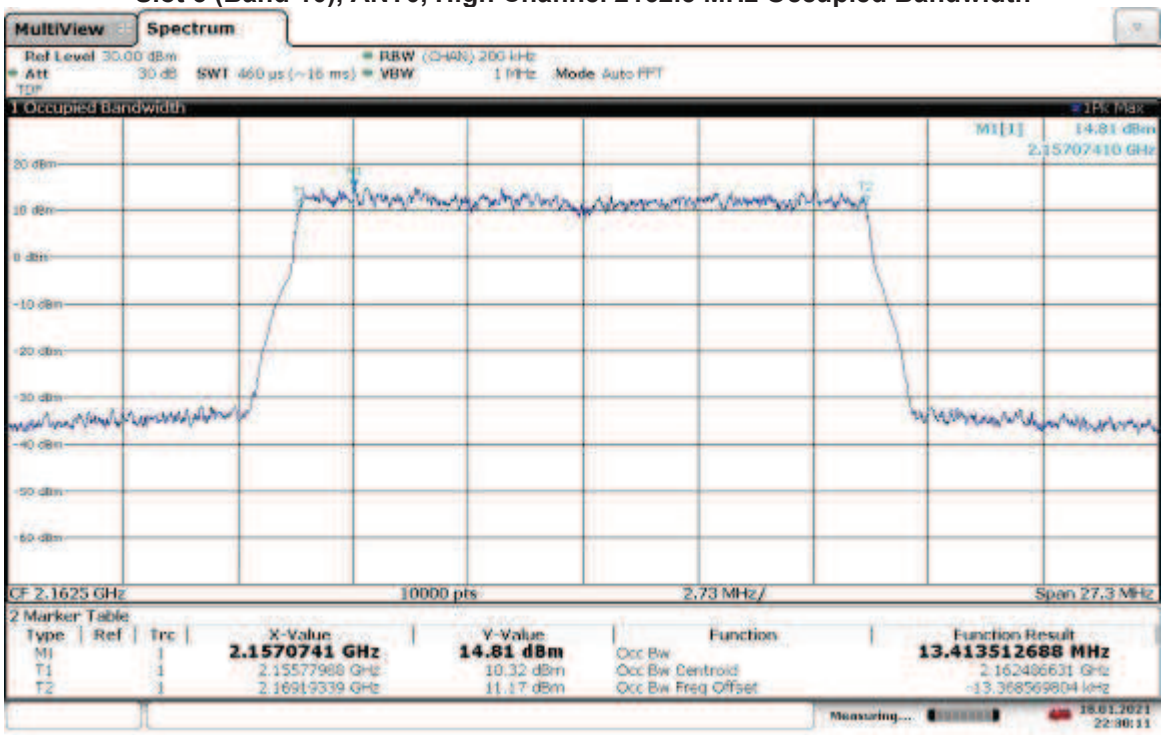
22:18:56 18.01.2021

TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz Occupied Bandwidth



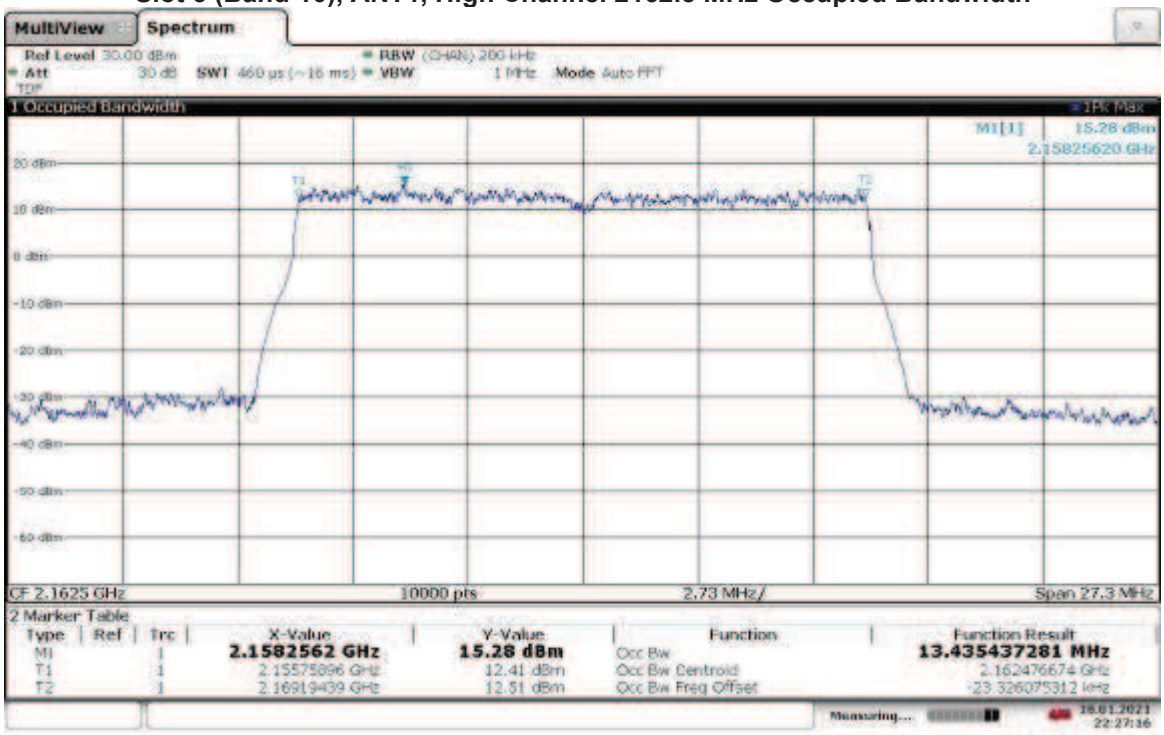
22:23:22 18.01.2021

TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2162.5 MHz Occupied Bandwidth



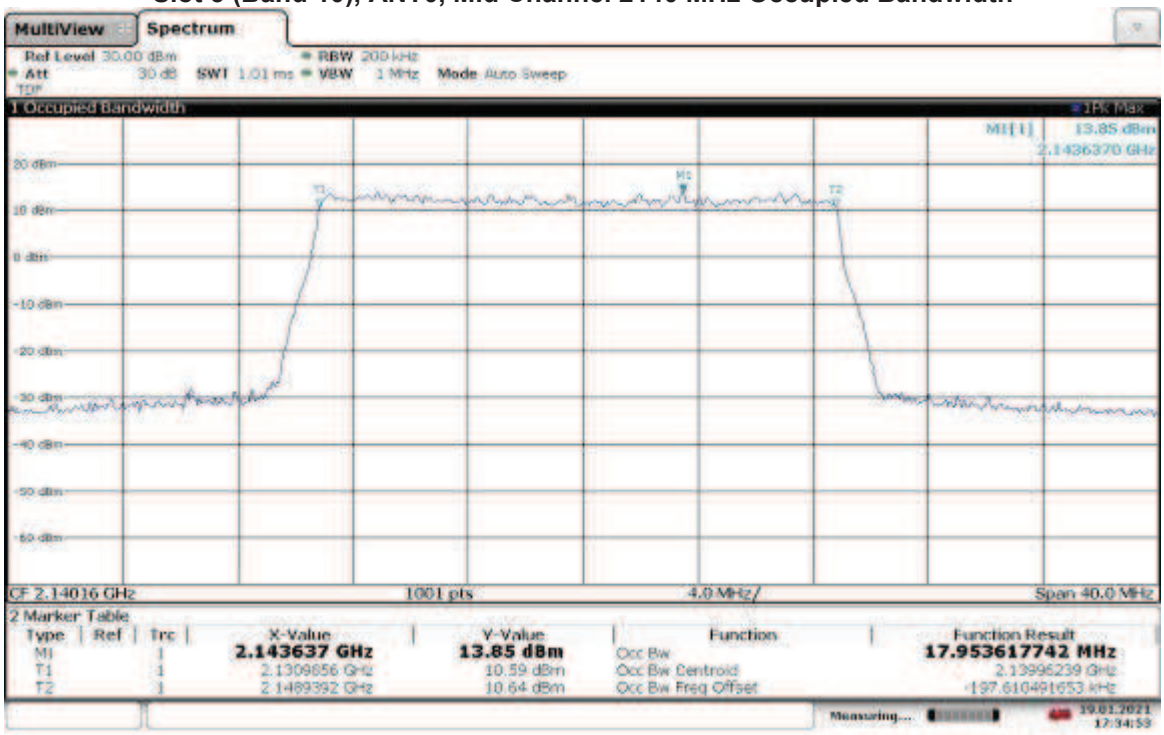
22:30:11 18.01.2021

TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2162.5 MHz Occupied Bandwidth



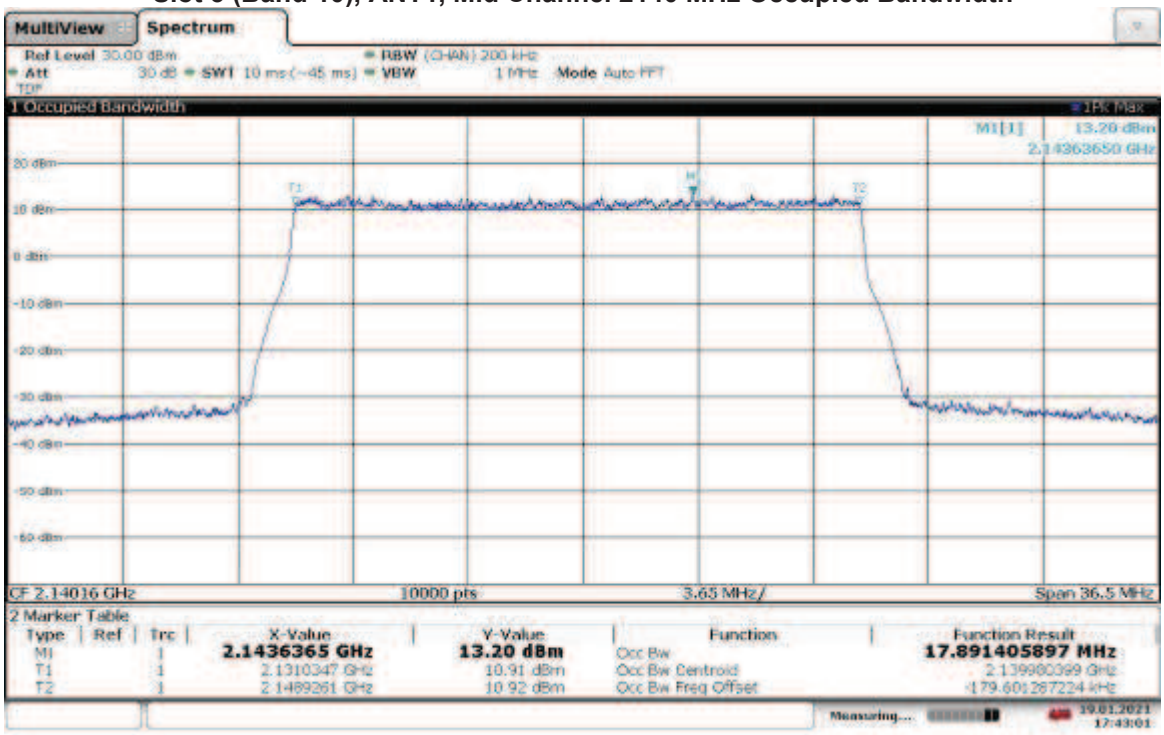
22:27:16 18.01.2021

TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2140 MHz Occupied Bandwidth



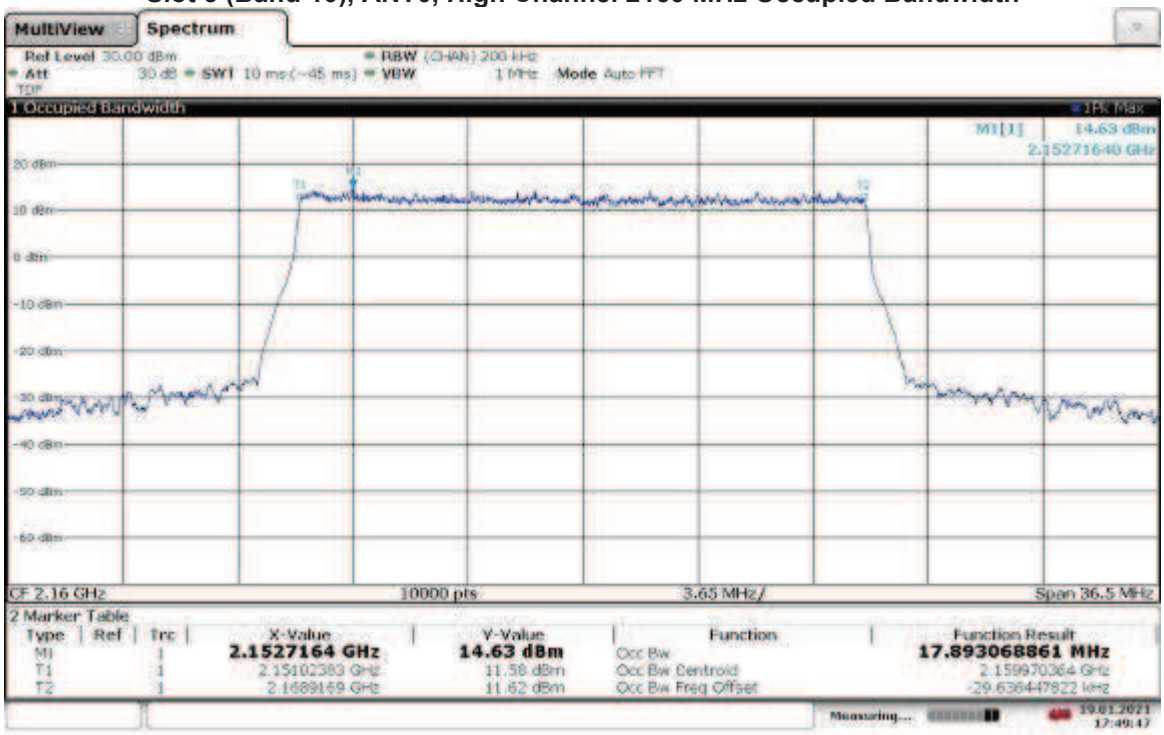
17:34:54 19.01.2021

TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2140 MHz Occupied Bandwidth



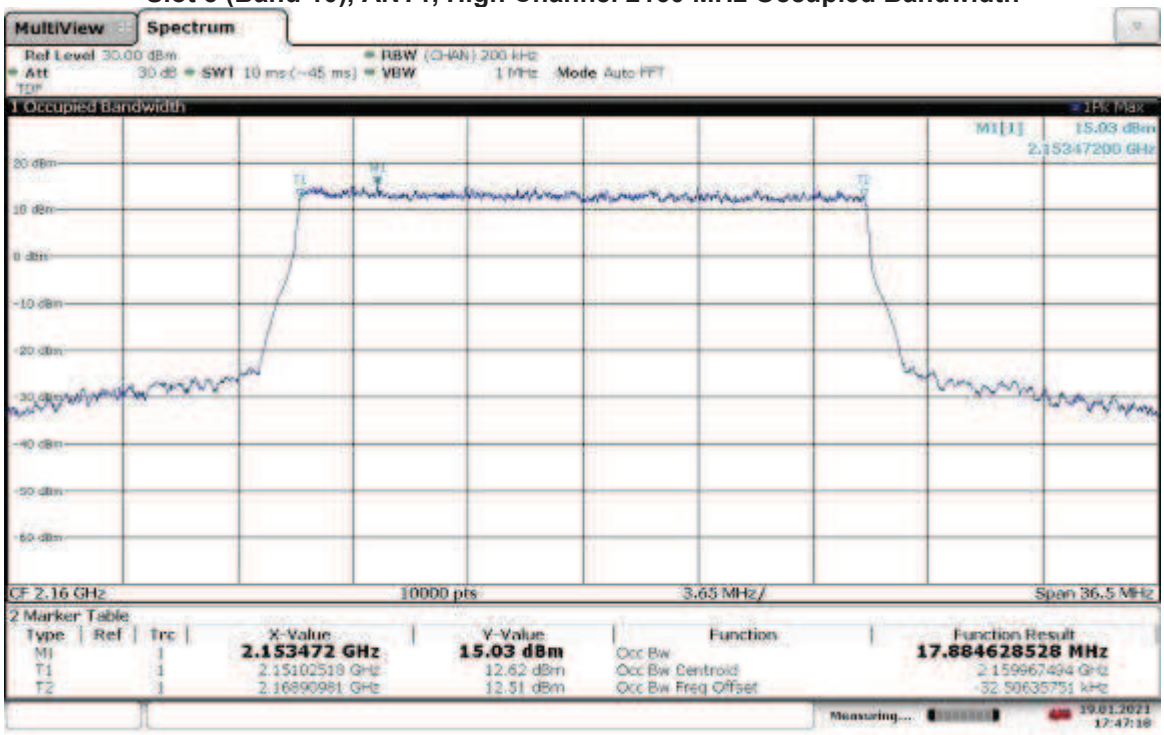
17:43:02 19.01.2021

TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2160 MHz Occupied Bandwidth



17:49:47 19.01.2021

TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2160 MHz Occupied Bandwidth

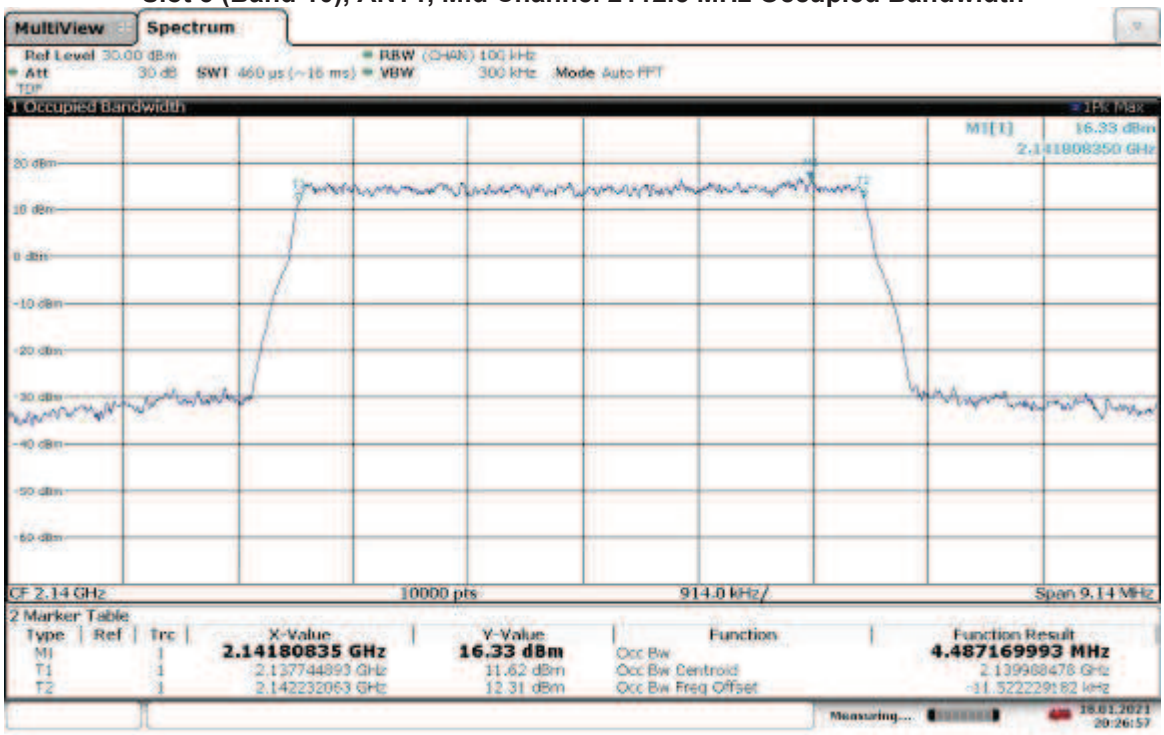


17:47:19 19.01.2021

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT0, Mid Channel 2112.5 MHz Occupied Bandwidth

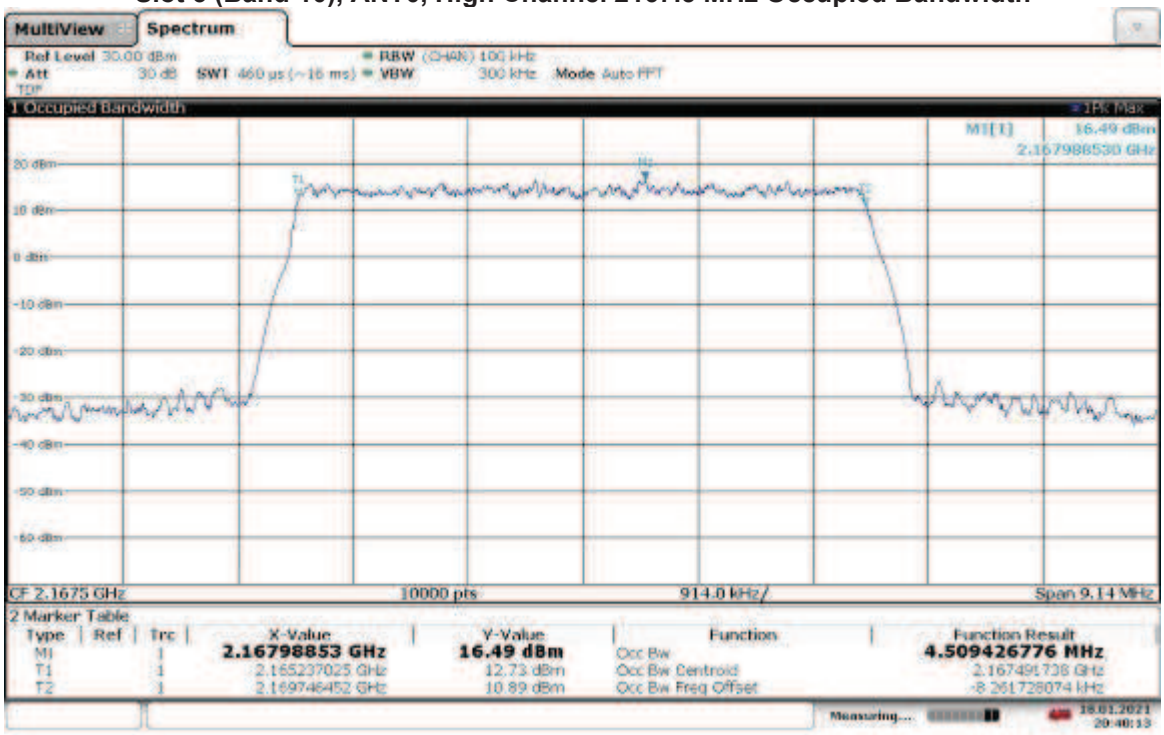
20:31:38 18.01.2021

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT1, Mid Channel 2112.5 MHz Occupied Bandwidth



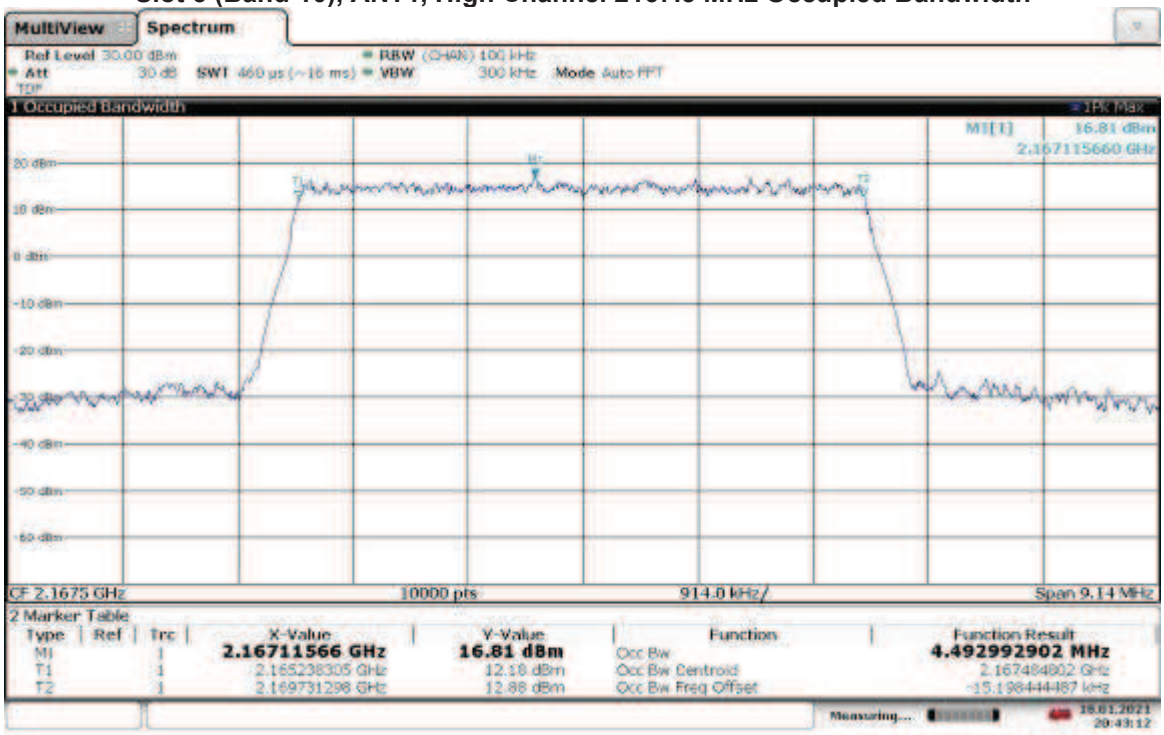
20:26:58 18.01.2021

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT0, High Channel 2167.5 MHz Occupied Bandwidth



20:40:13 18.01.2021

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 10), ANT1, High Channel 2167.5 MHz Occupied Bandwidth



20:43:13 18.01.2021