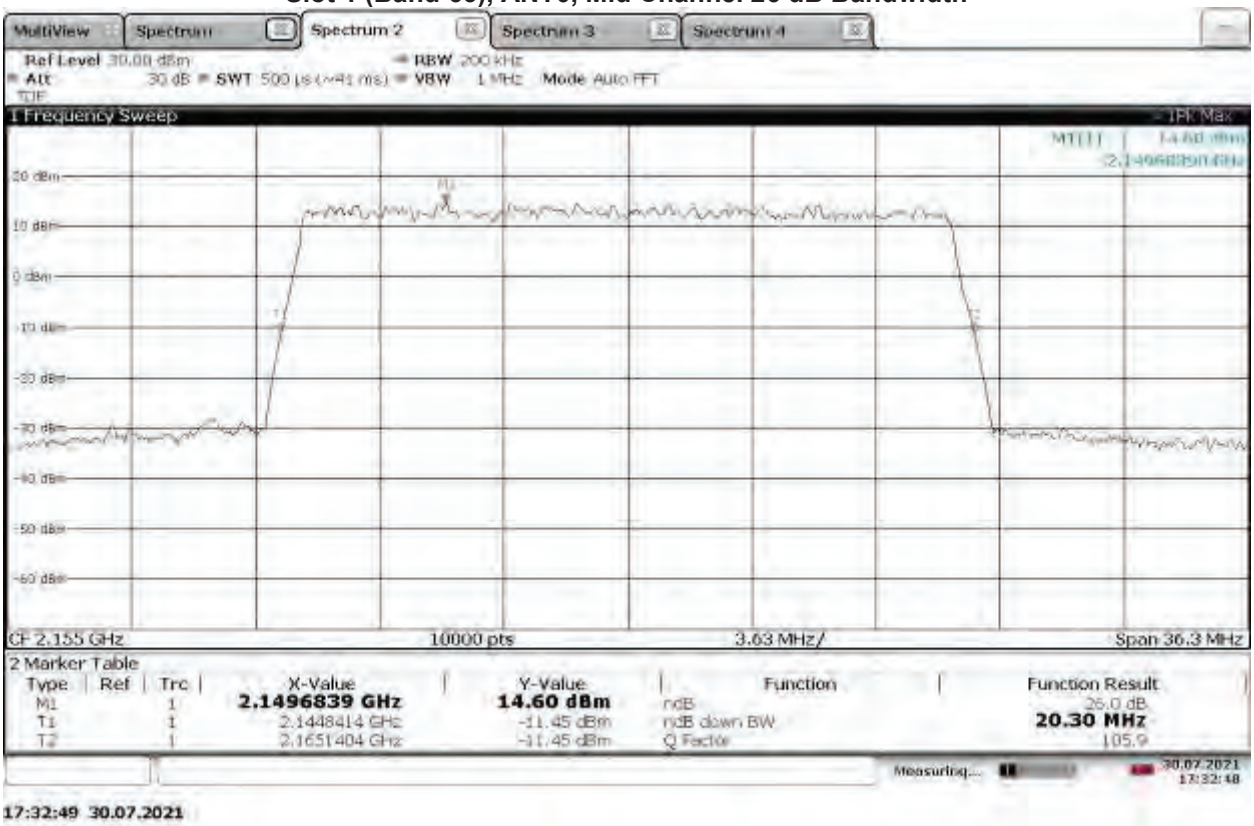
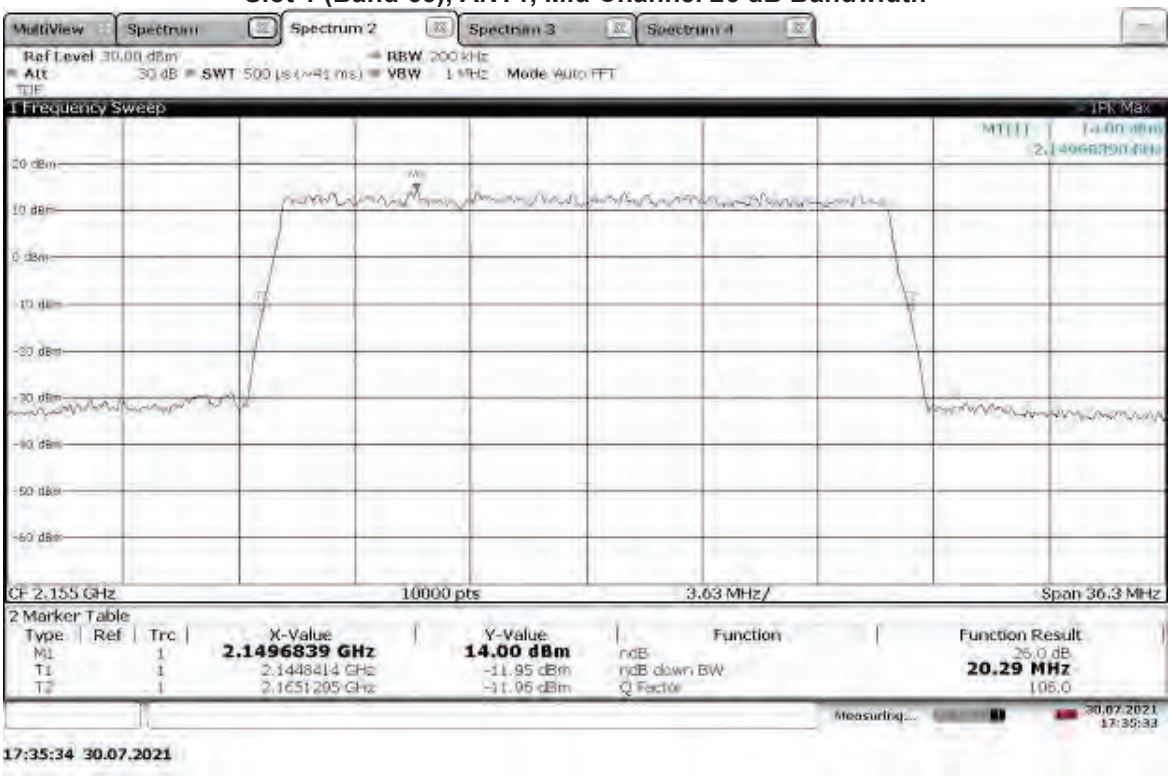
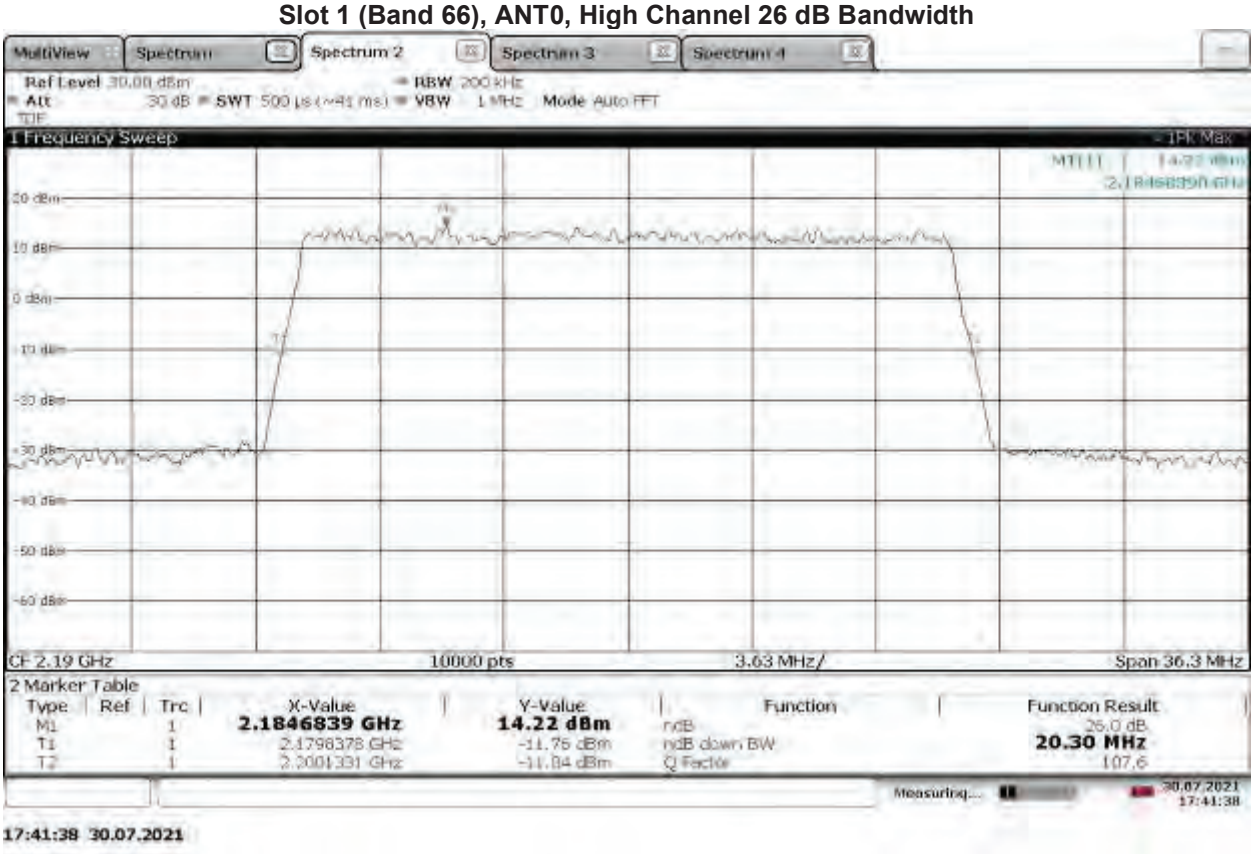
TM1.1-QPSK_20 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



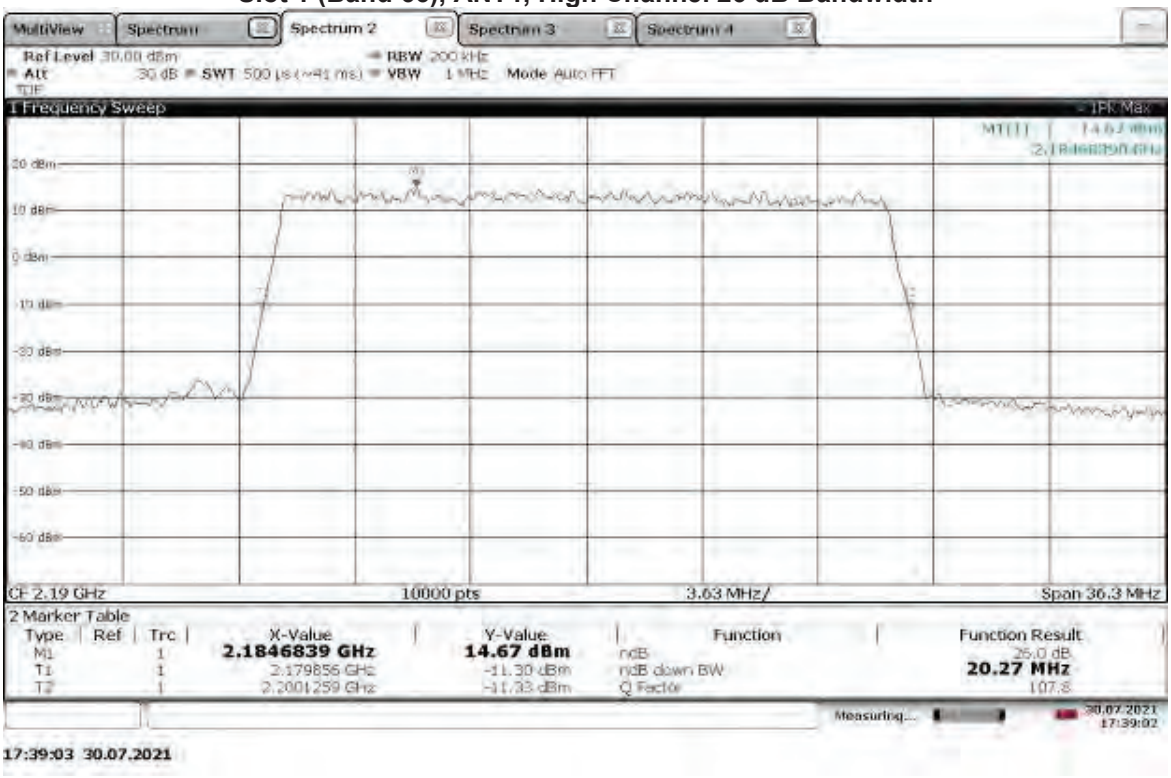
TM1.1-QPSK_20 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth



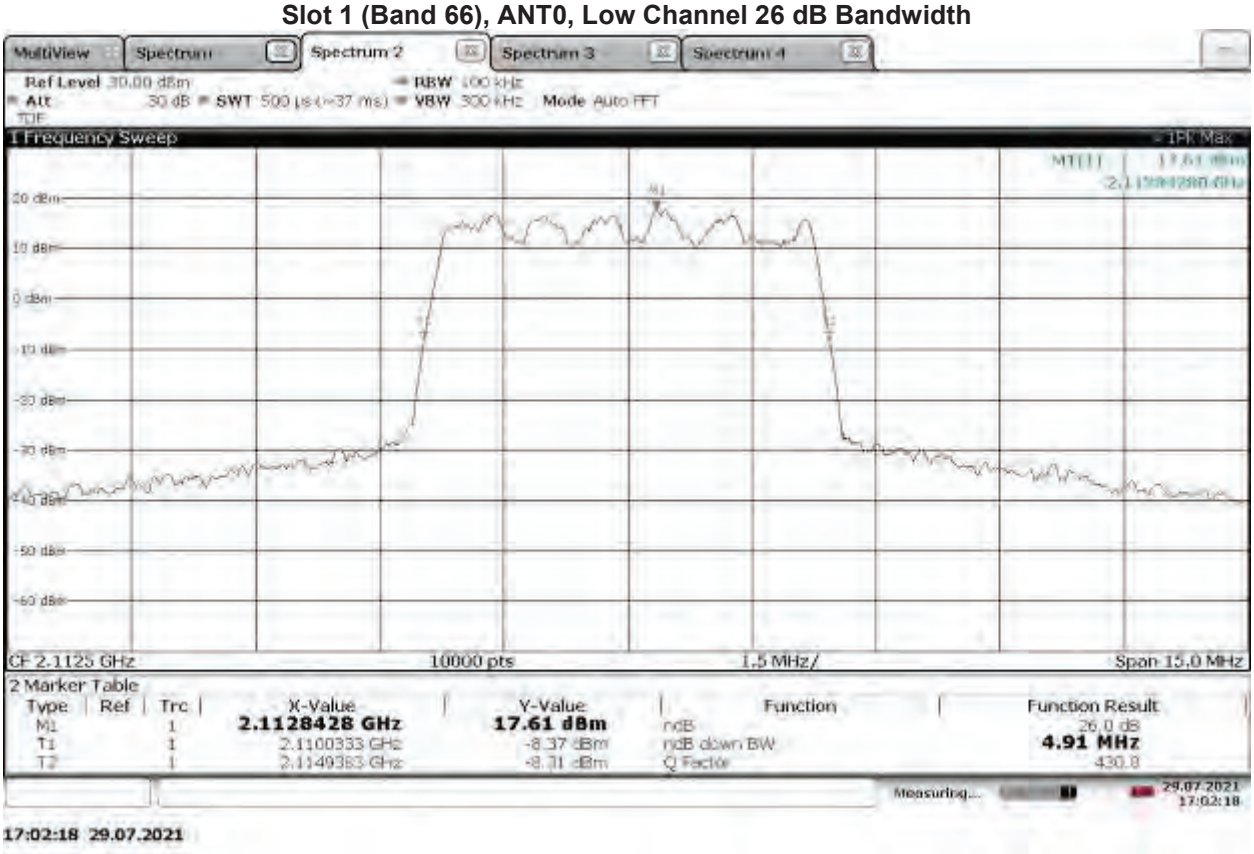
TM1.1-QPSK_20 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



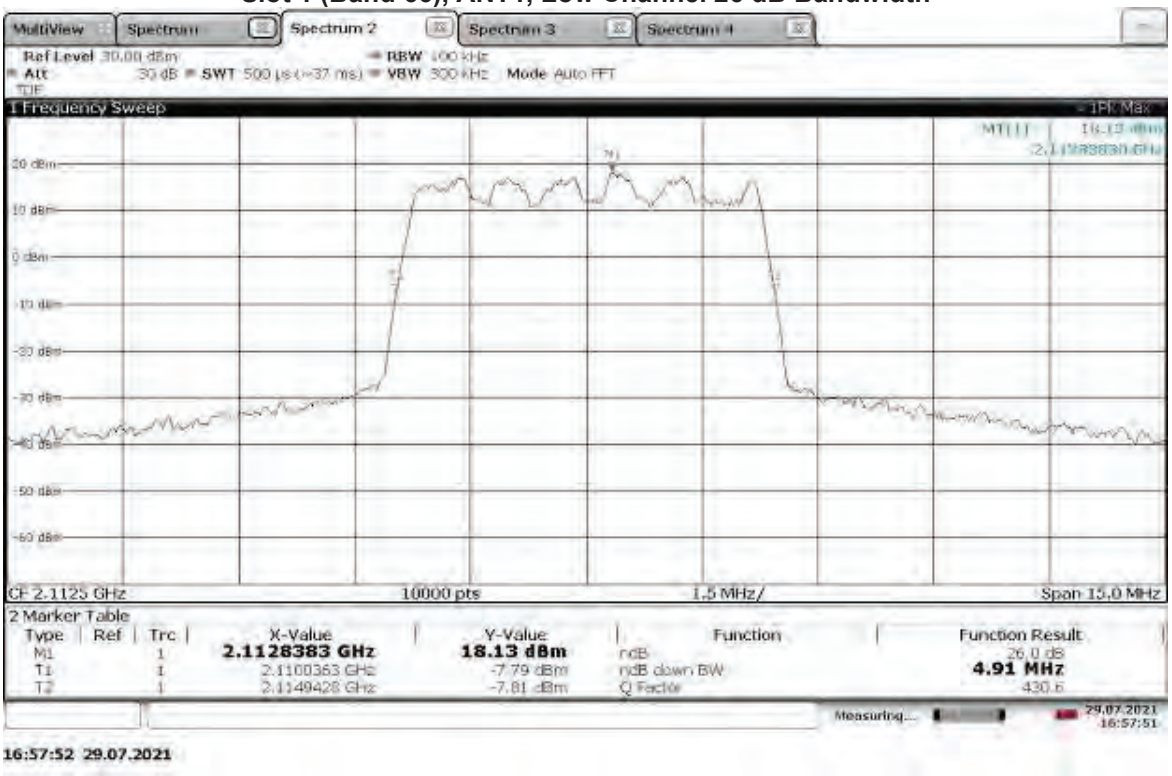
TM1.1-QPSK_20 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth



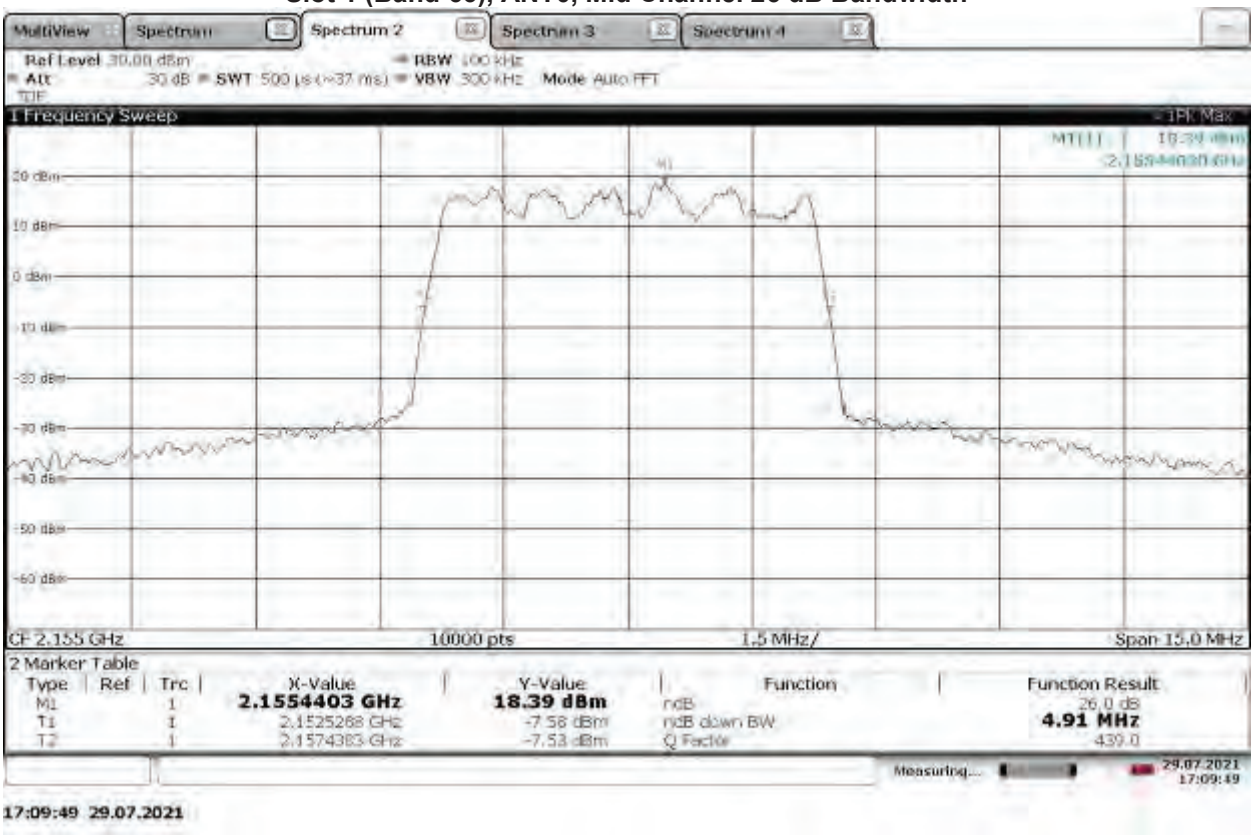
TM3.2-16QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT0, Low Channel 26 dB Bandwidth



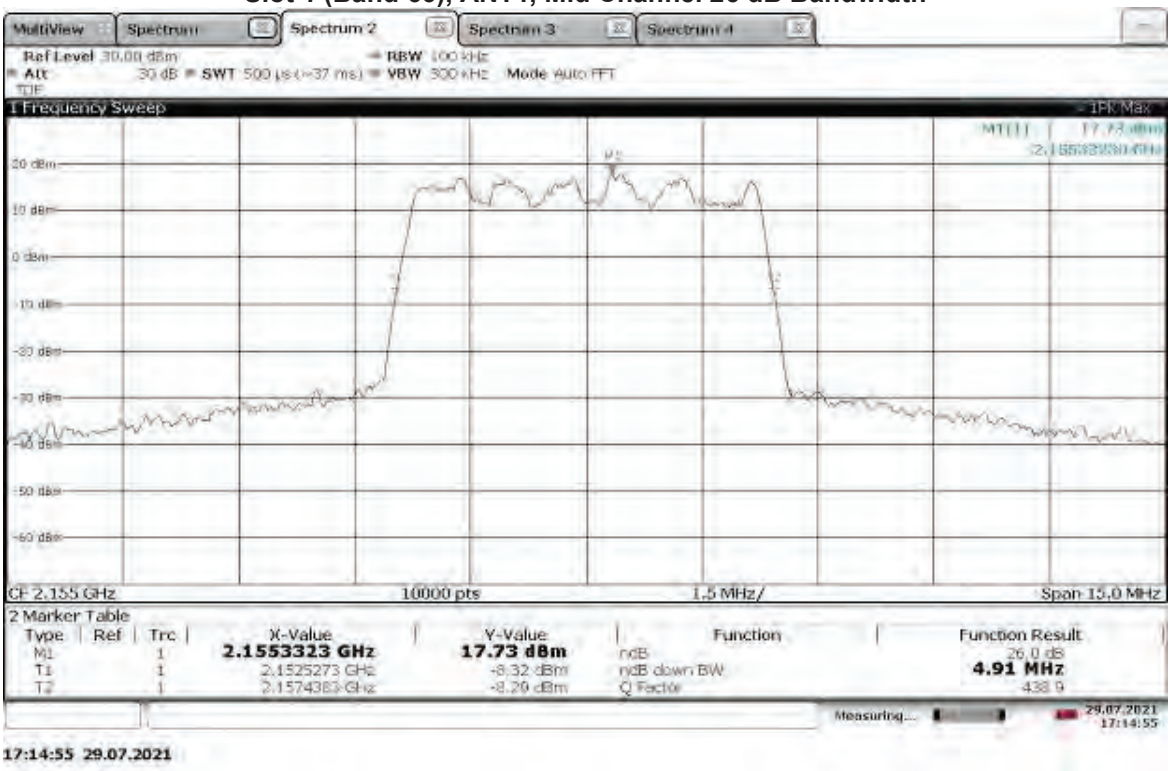
TM3.2-16QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT1, Low Channel 26 dB Bandwidth



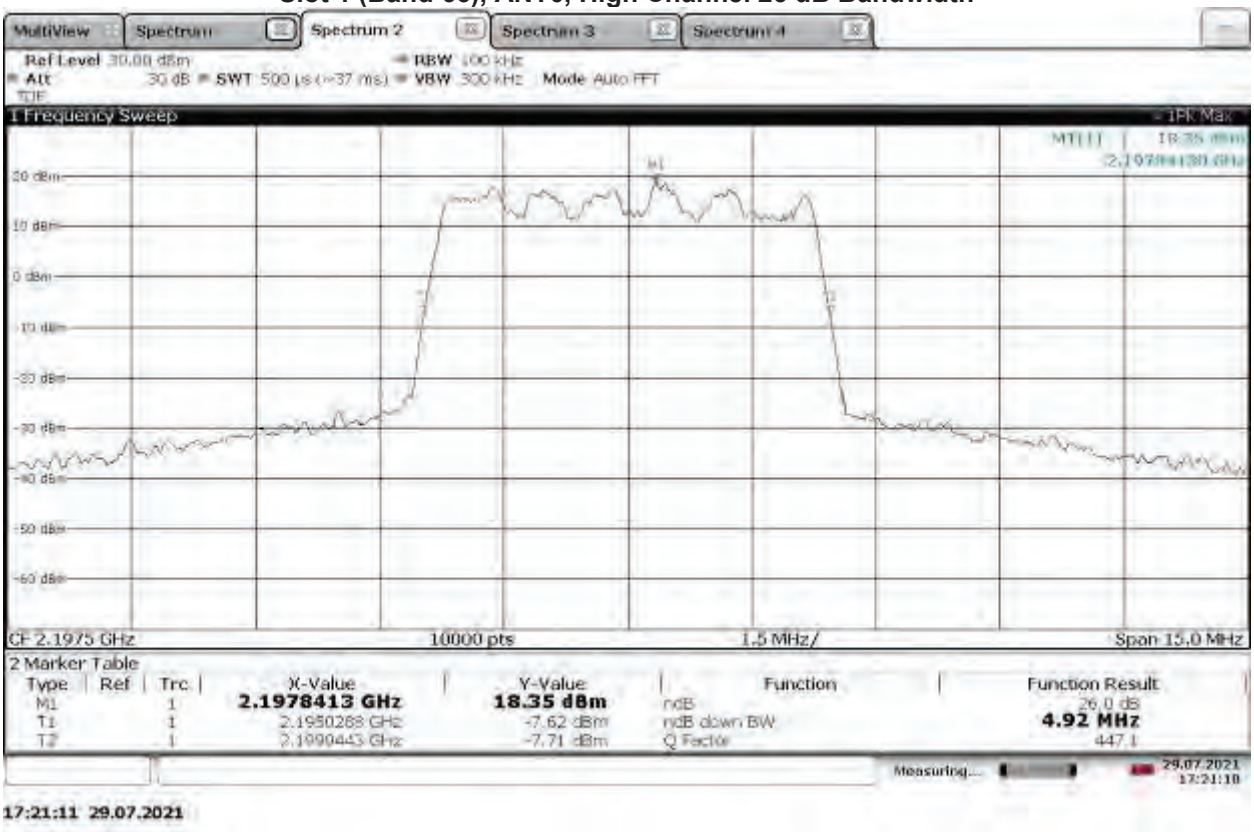
TM3.2-16QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



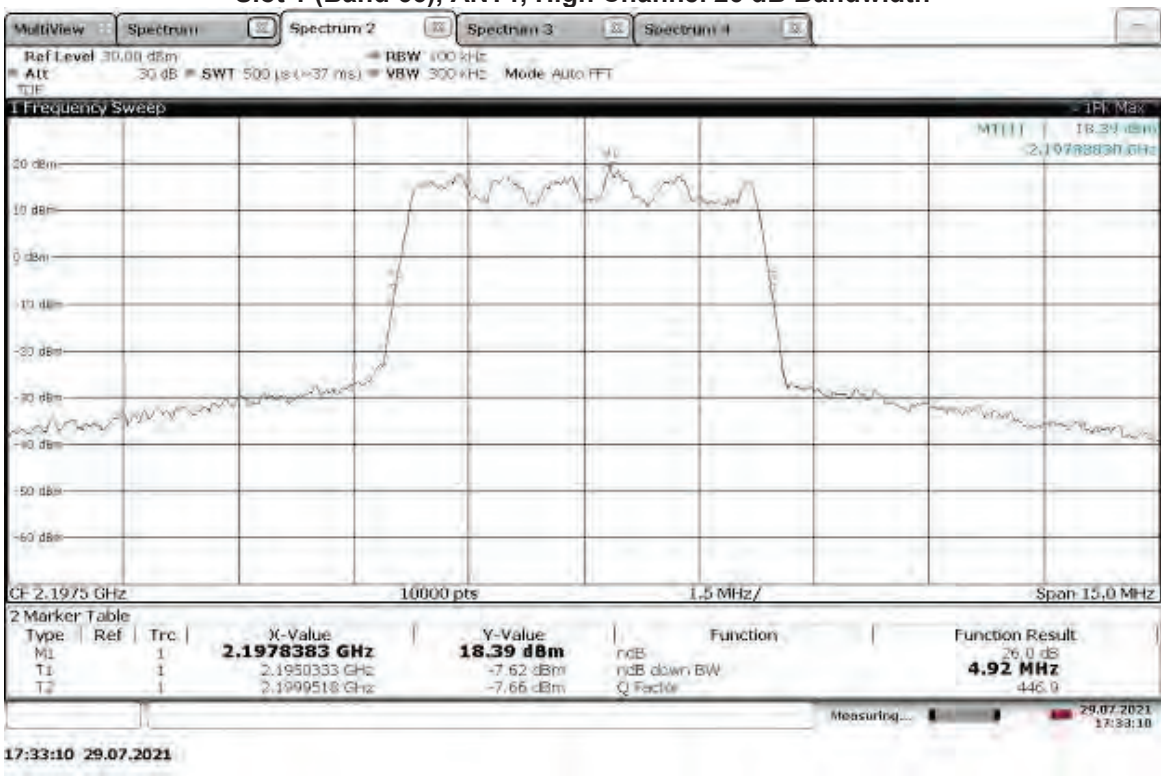
TM3.2-16QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth



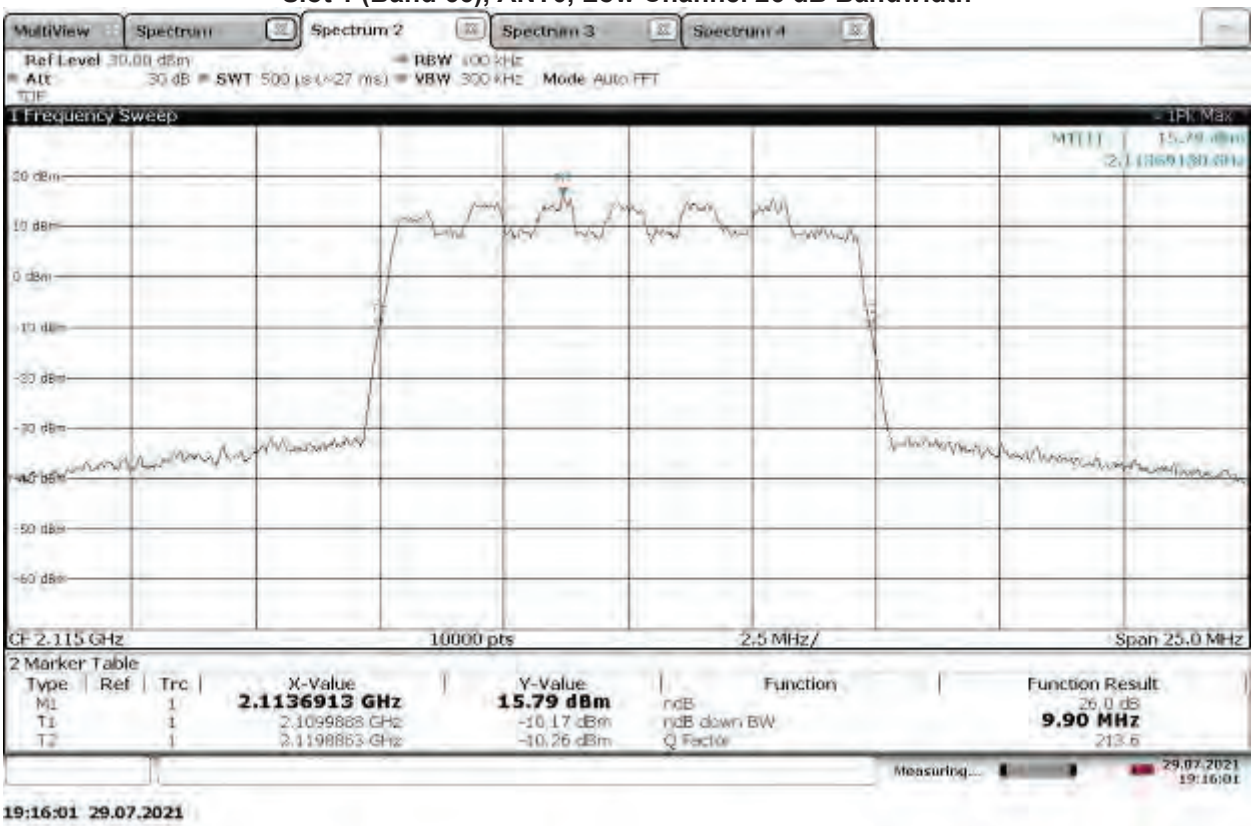
TM3.2-16QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



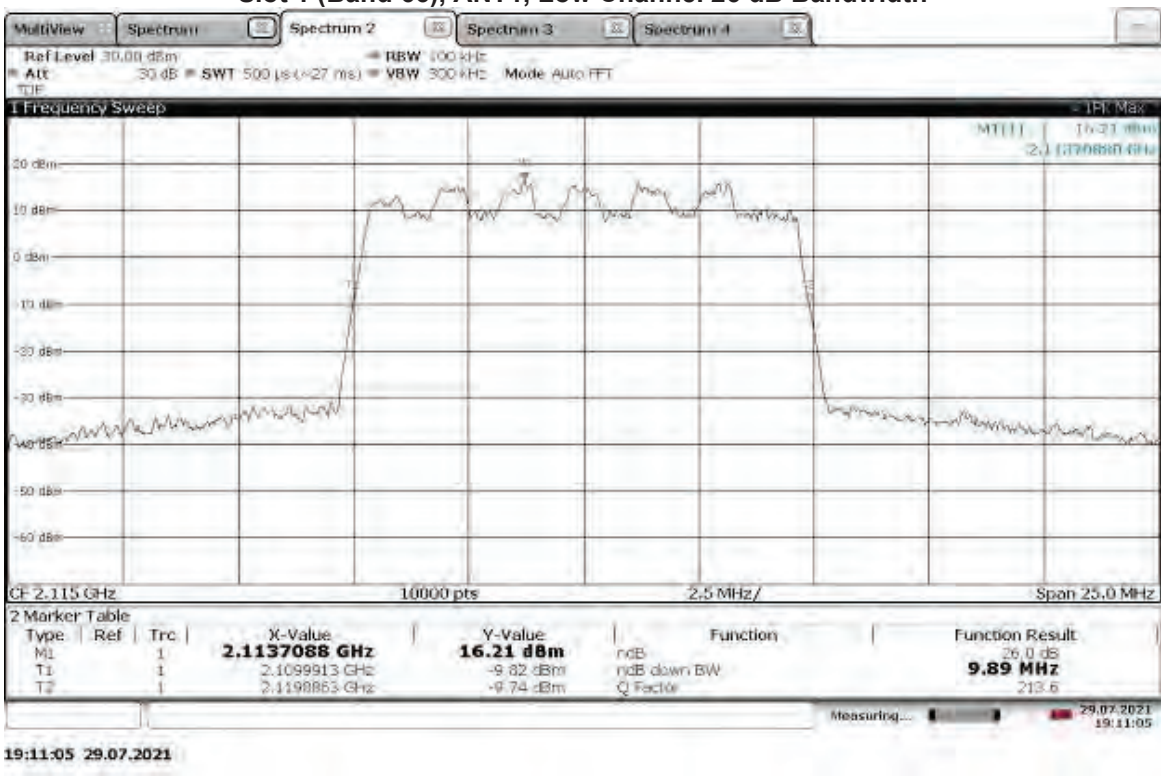
TM3.2-16QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth



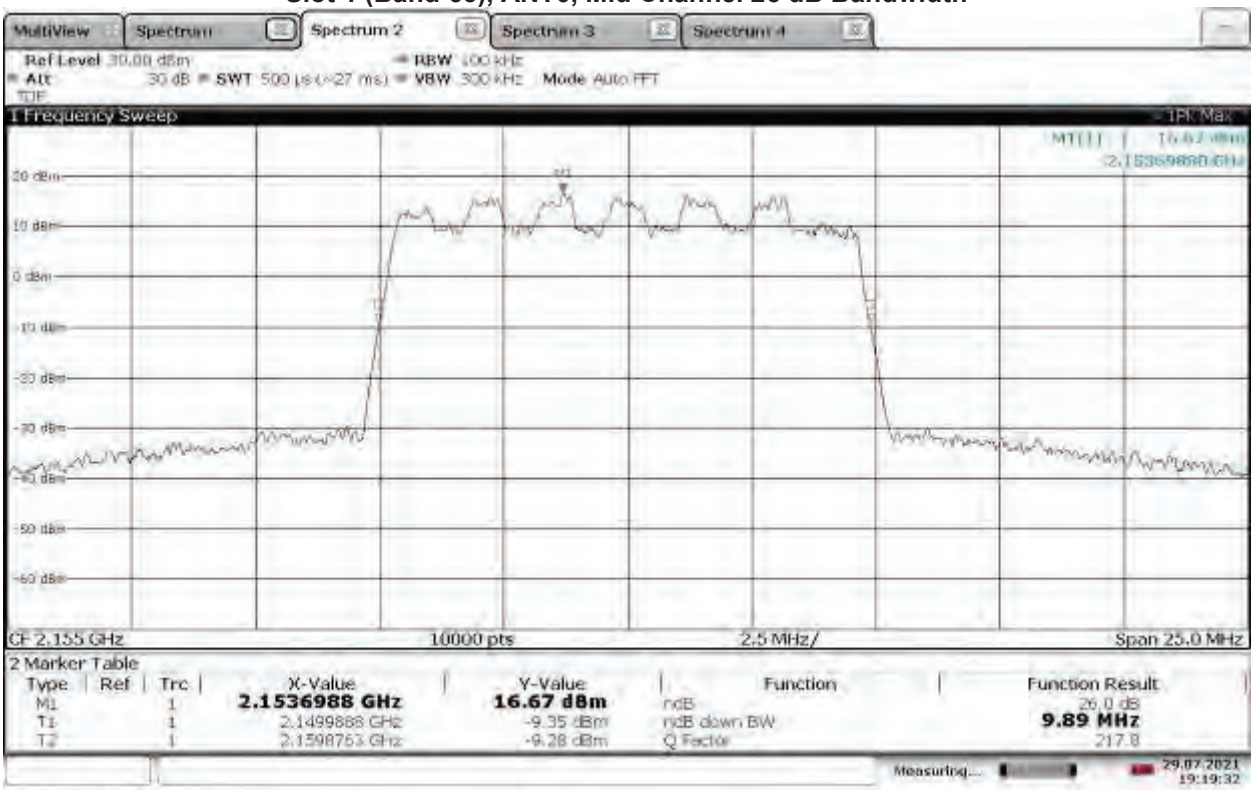
TM3.2-16QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT0, Low Channel 26 dB Bandwidth



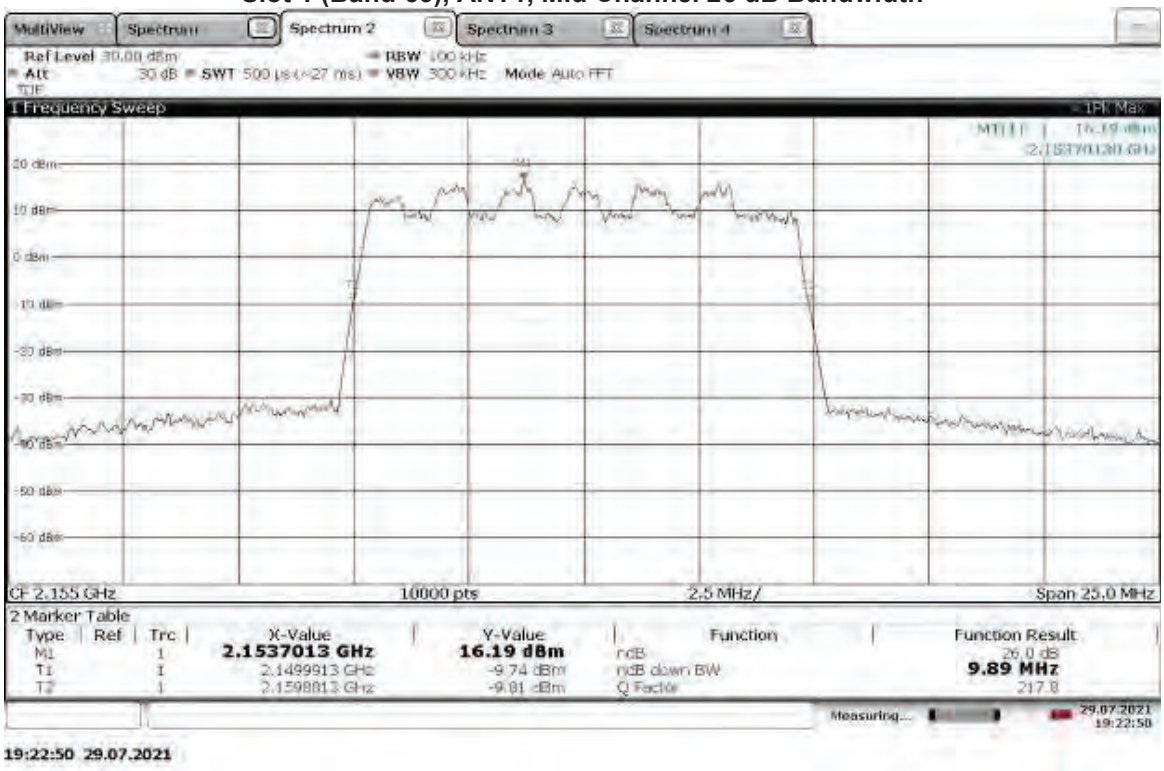
TM3.2-16QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT1, Low Channel 26 dB Bandwidth



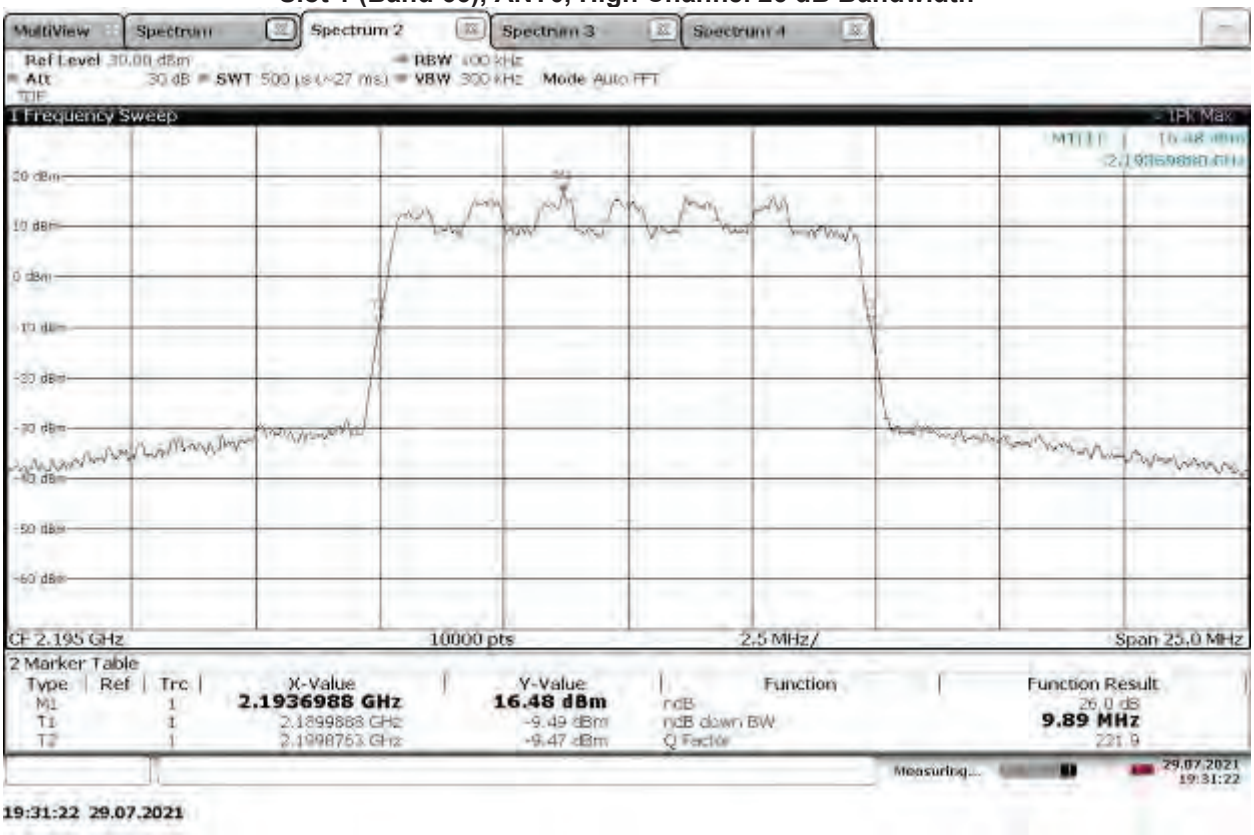
TM3.2-16QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



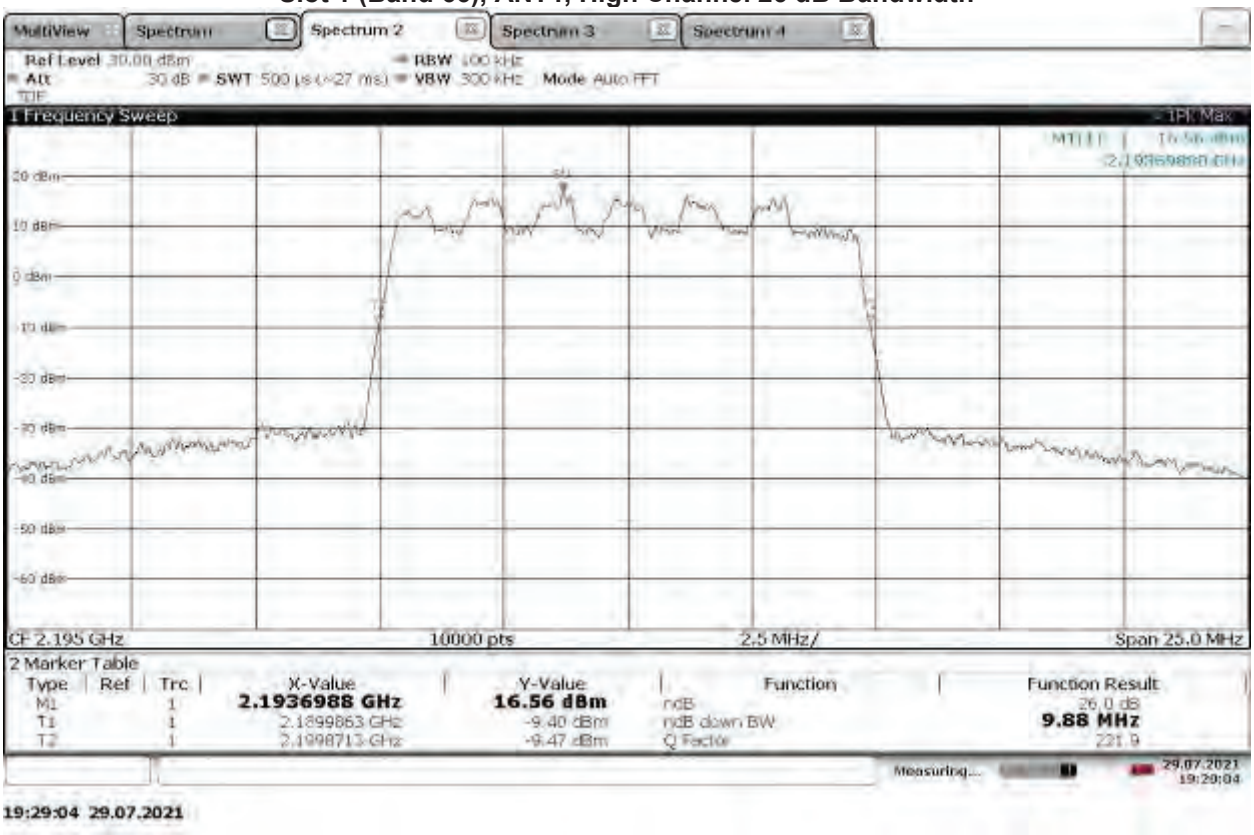
TM3.2-16QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth



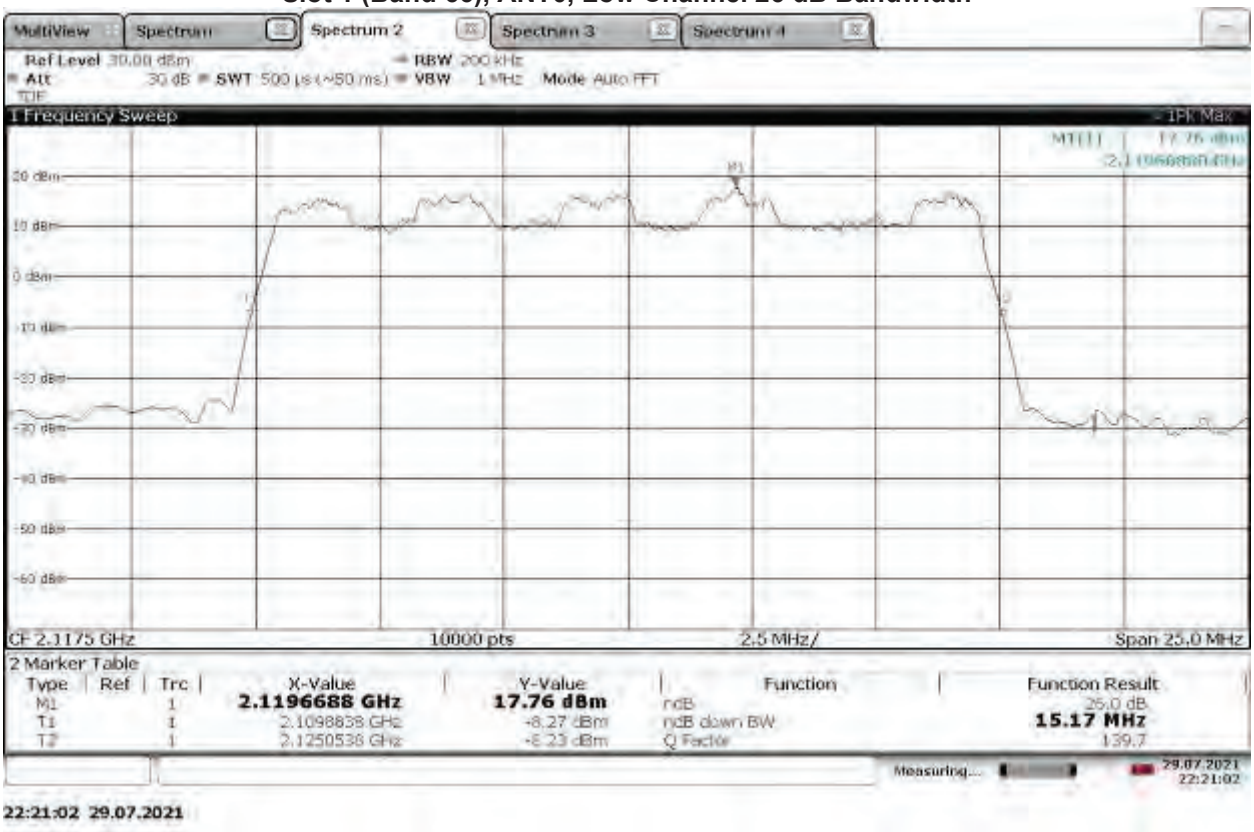
TM3.2-16QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



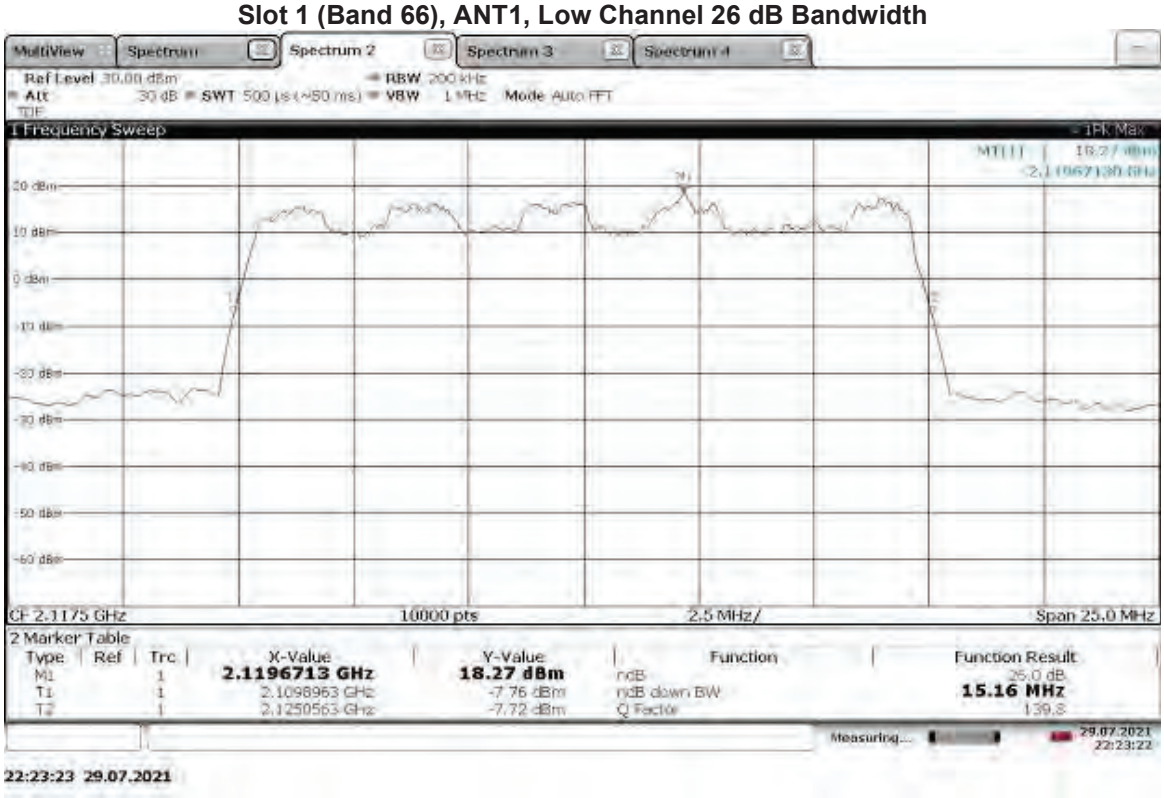
TM3.2-16QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth



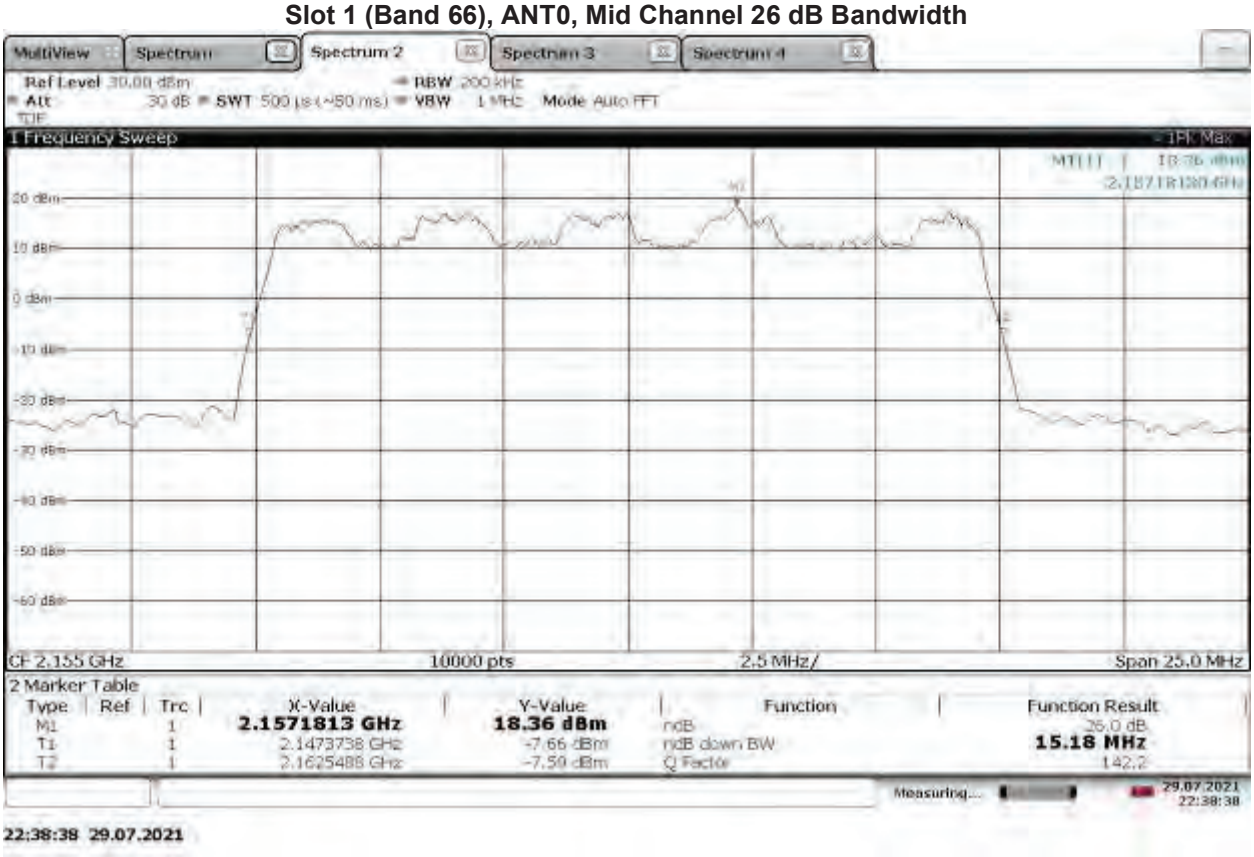
TM3.2-16QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT0, Low Channel 26 dB Bandwidth



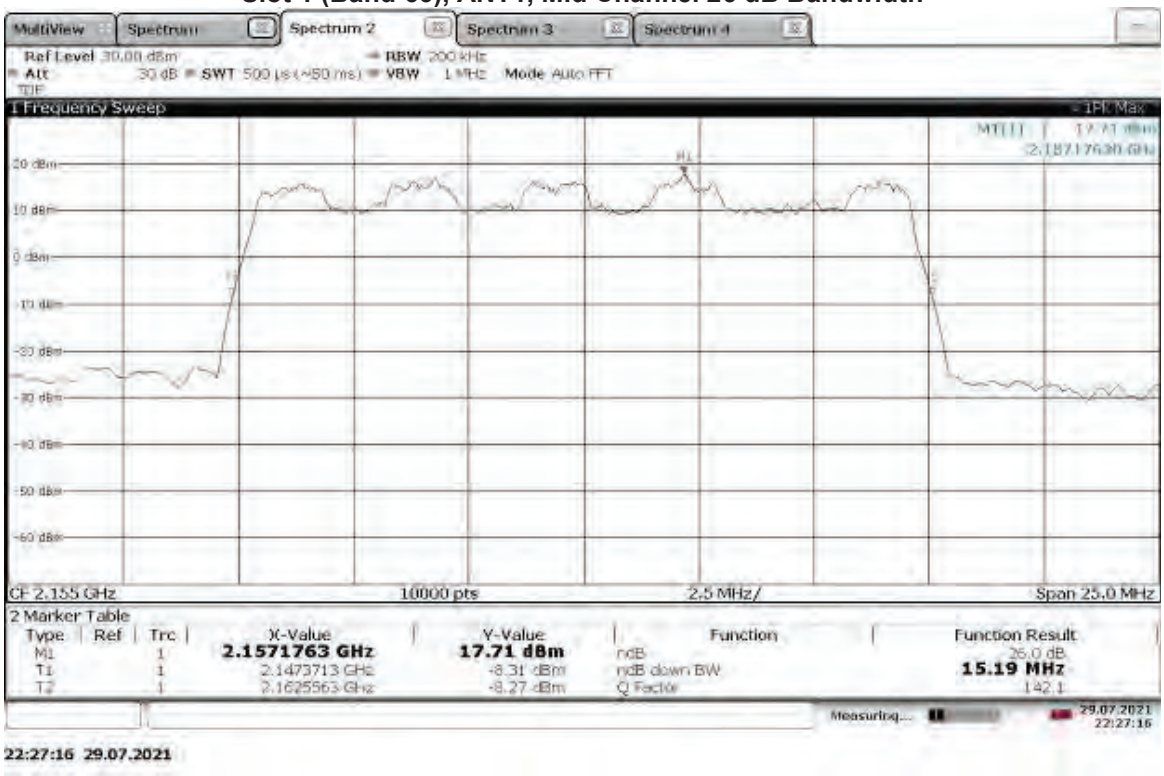
TM3.2-16QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT1, Low Channel 26 dB Bandwidth



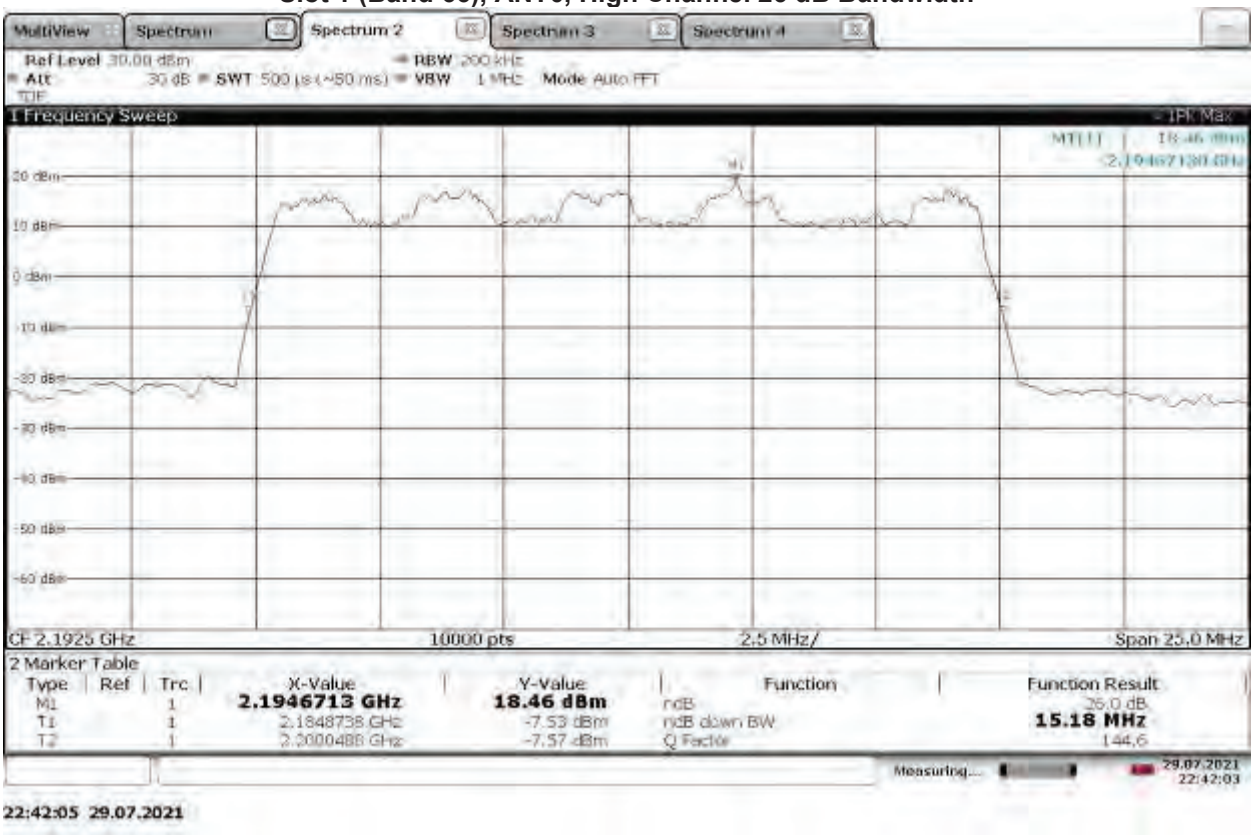
TM3.2-16QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



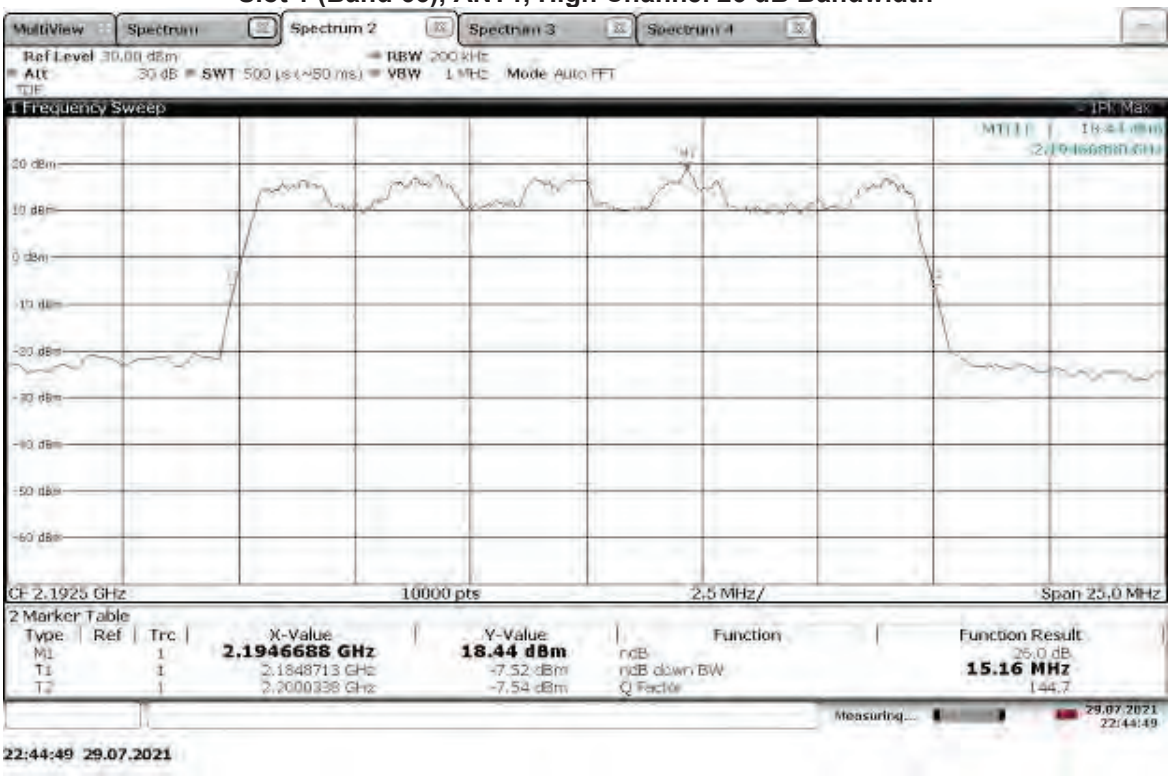
TM3.2-16QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth



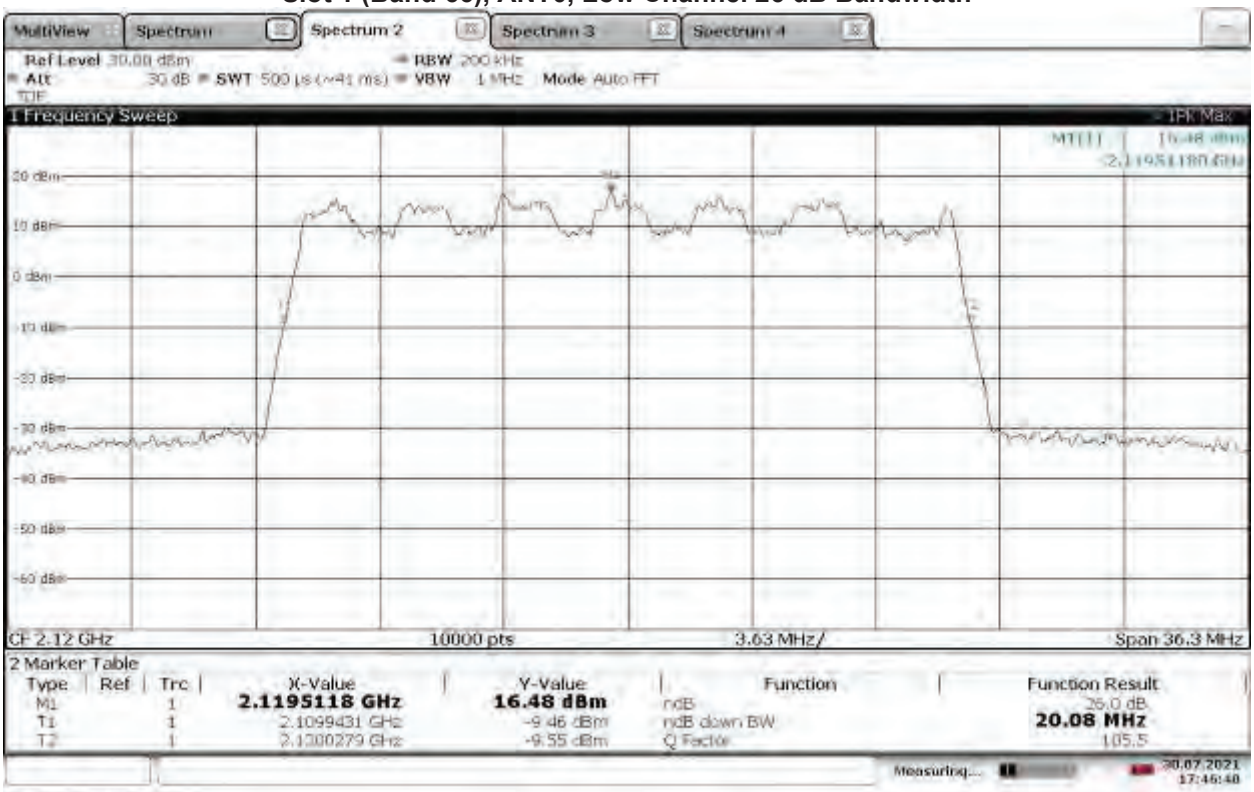
TM3.2-16QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



TM3.2-16QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth



TM3.2-16QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT0, Low Channel 26 dB Bandwidth



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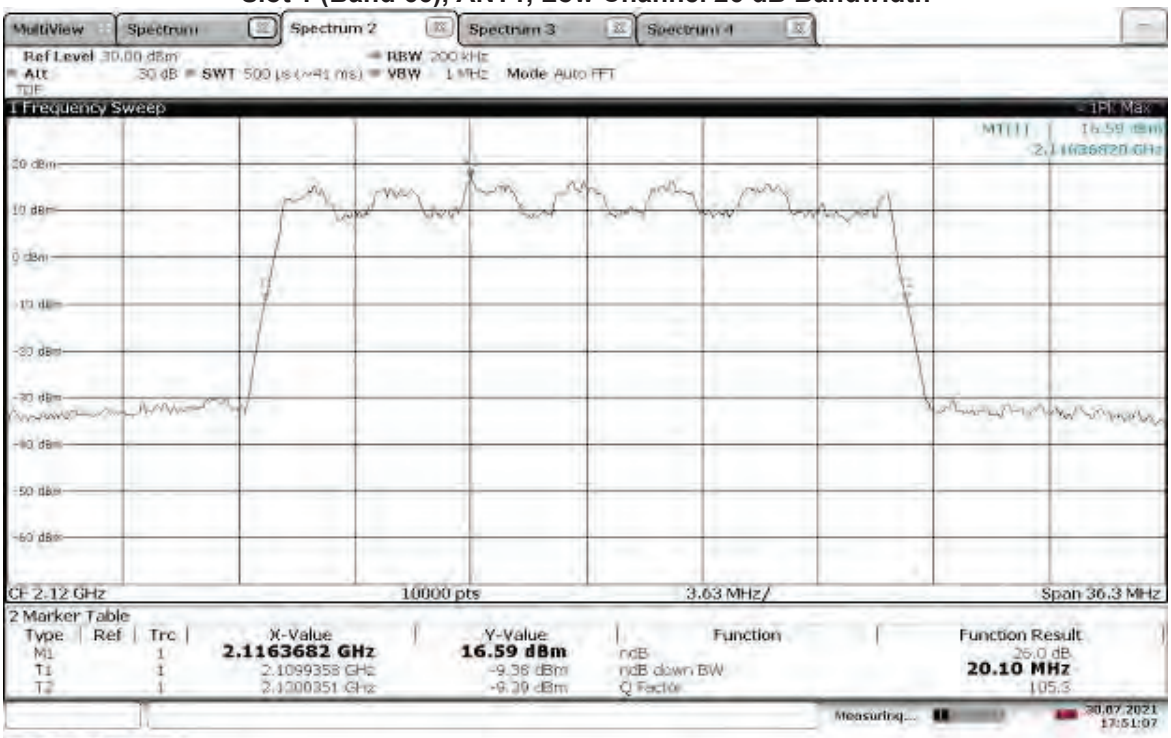
TM3.2-16QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT1, Low Channel 26 dB Bandwidth



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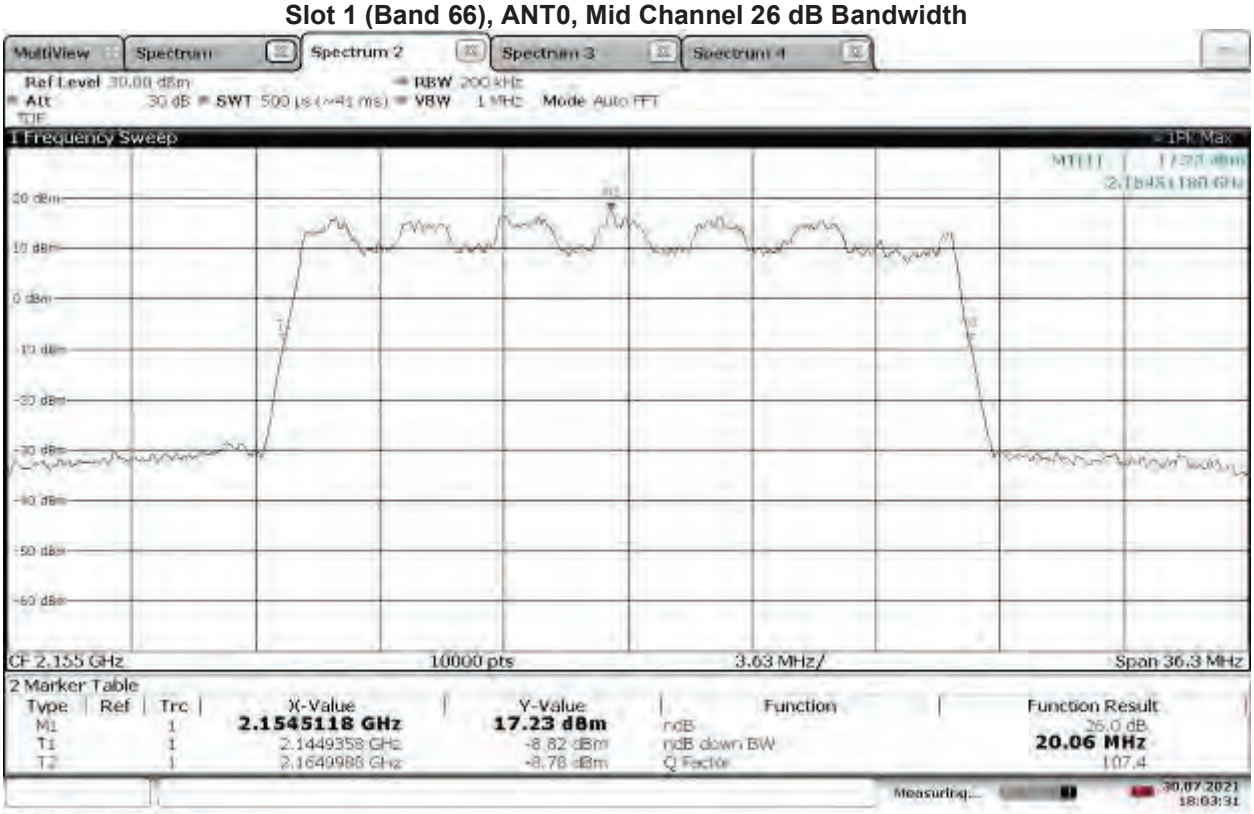
TM3.2-16QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



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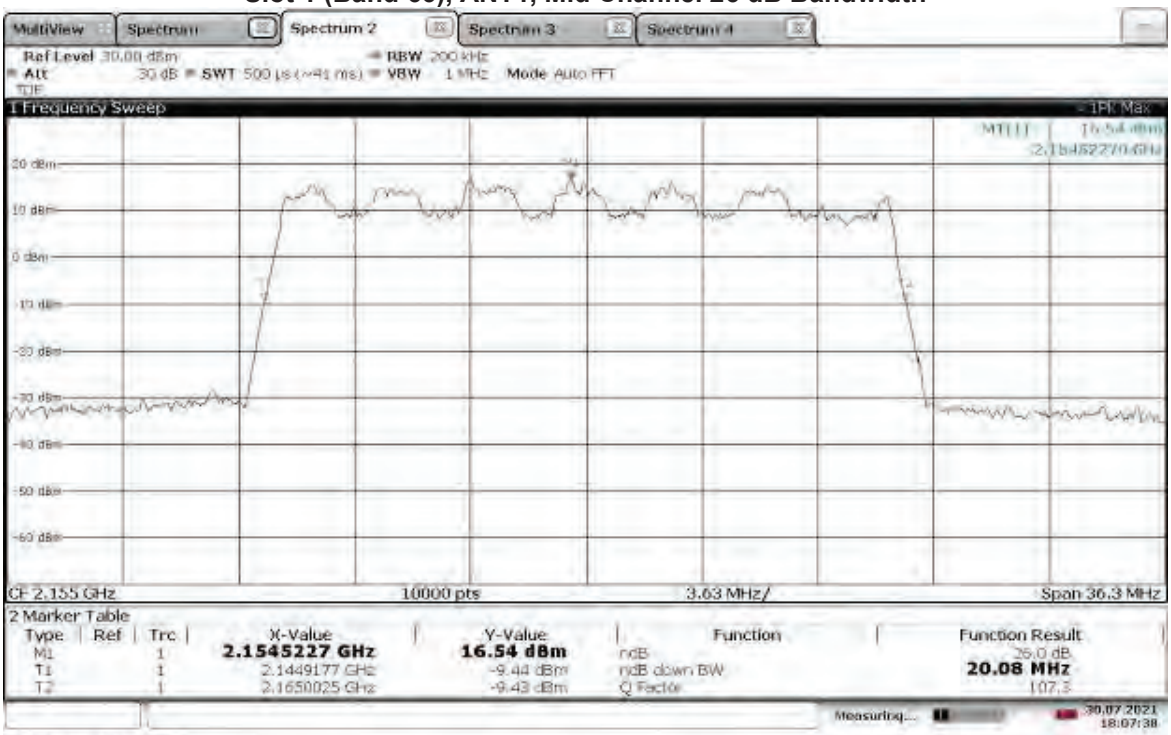
TM3.2-16QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth



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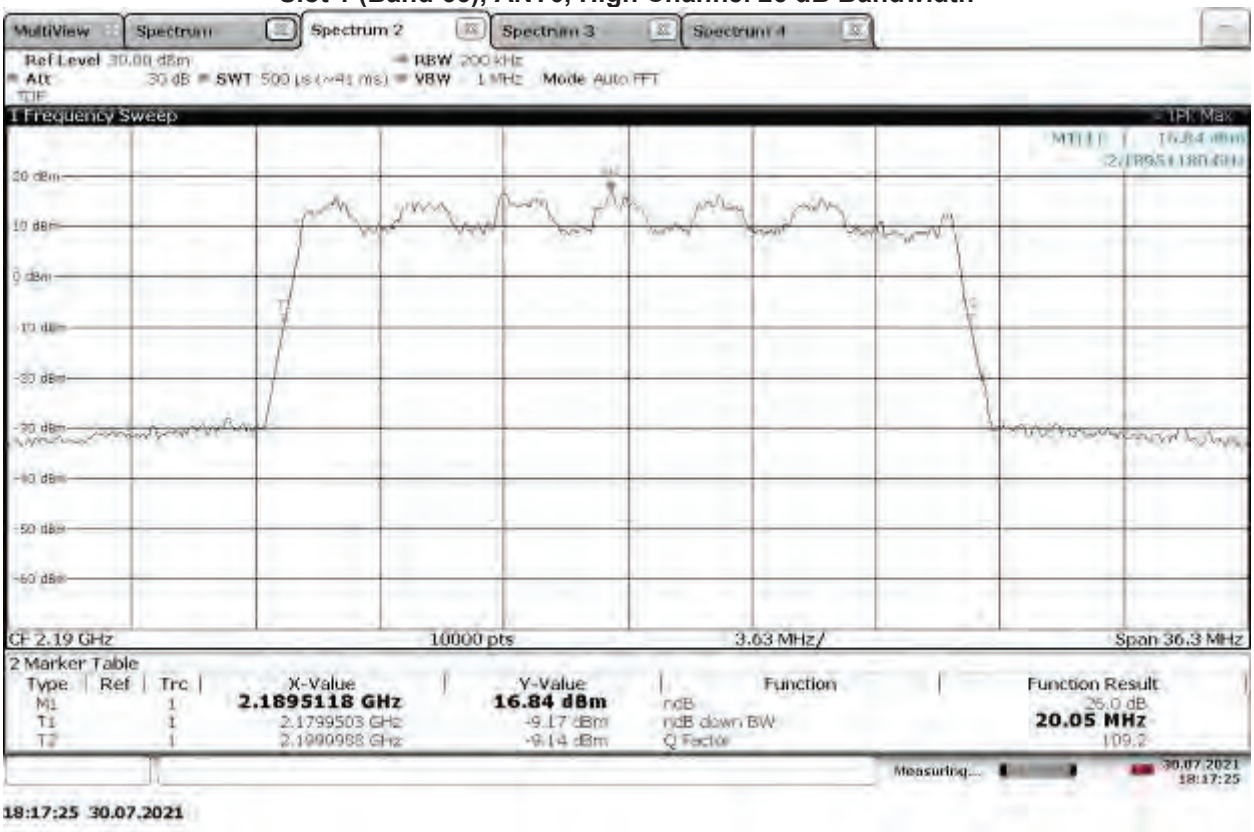
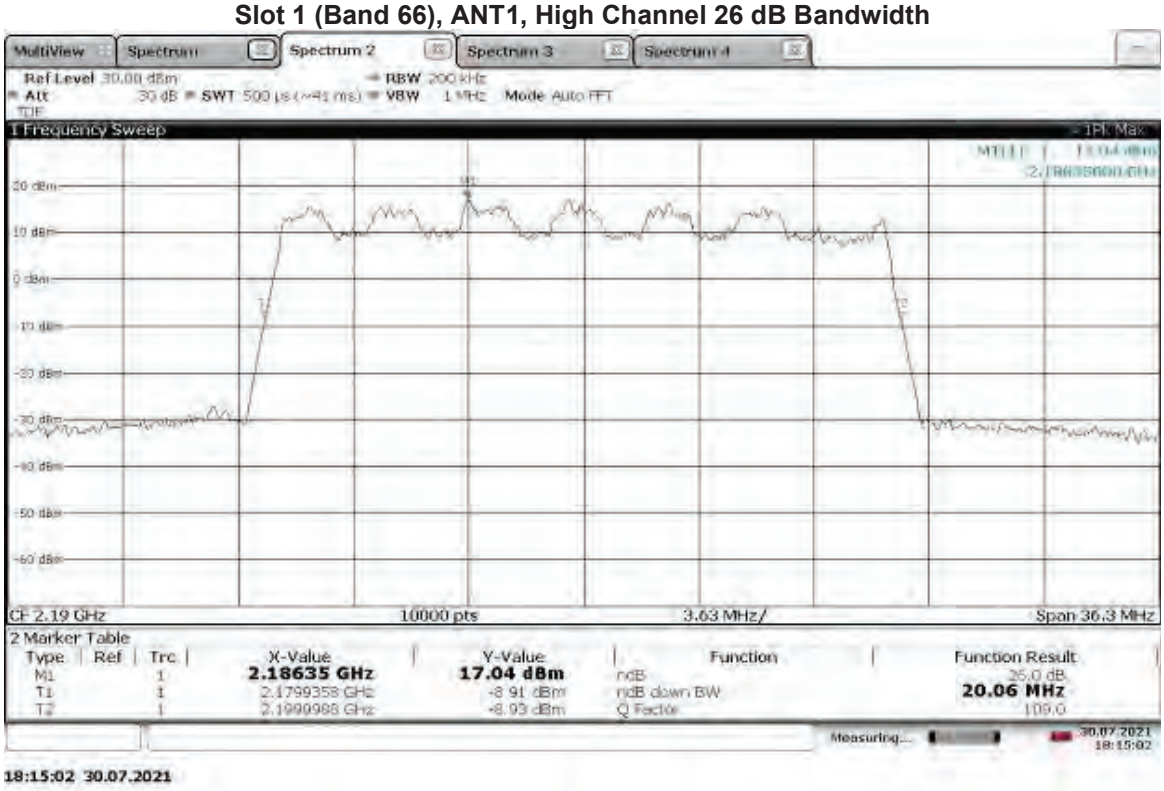
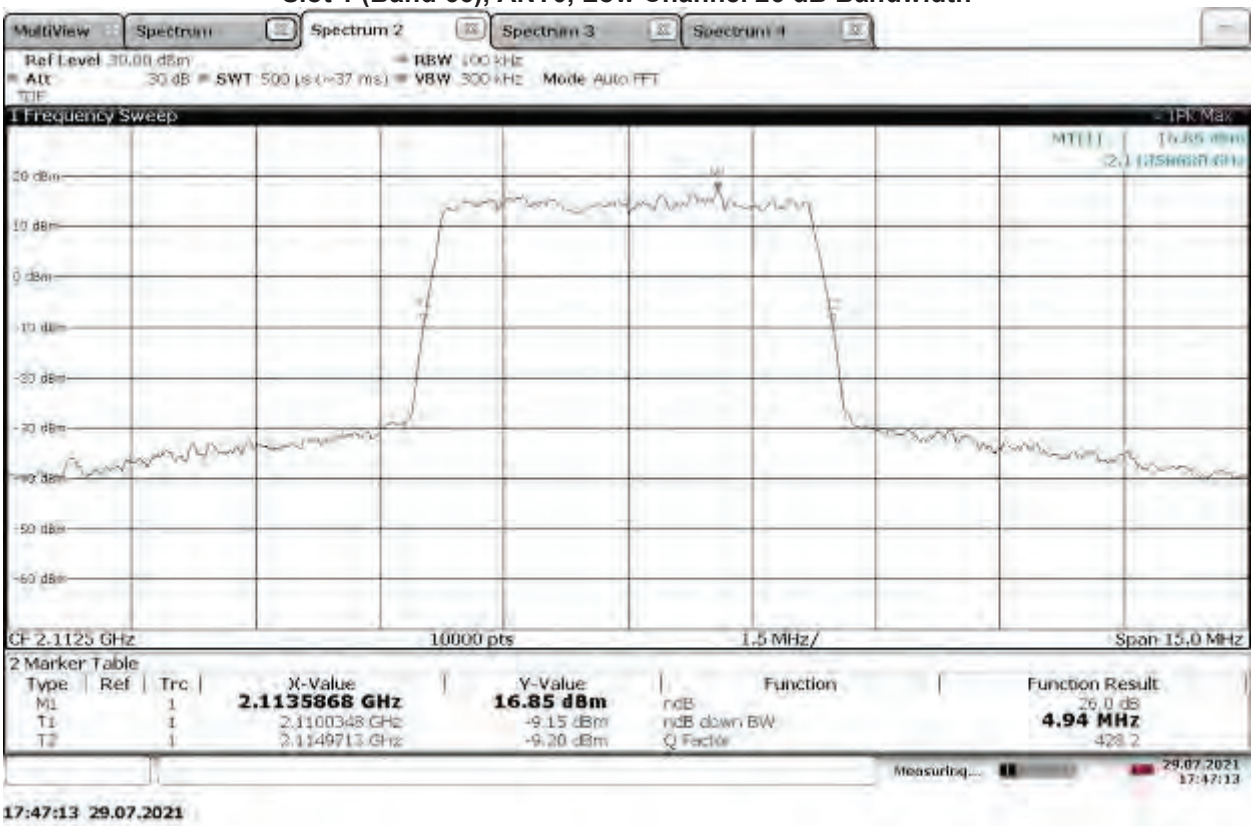
TM3.2-16QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



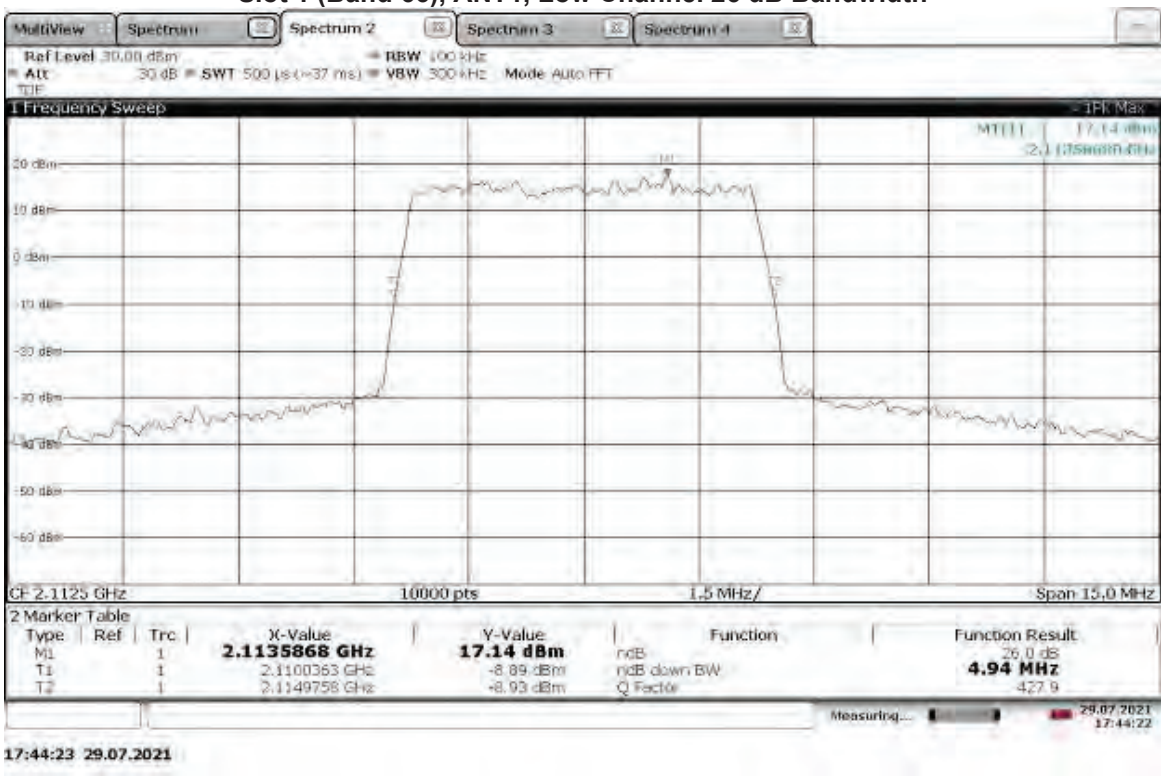
TM3.2-16QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth



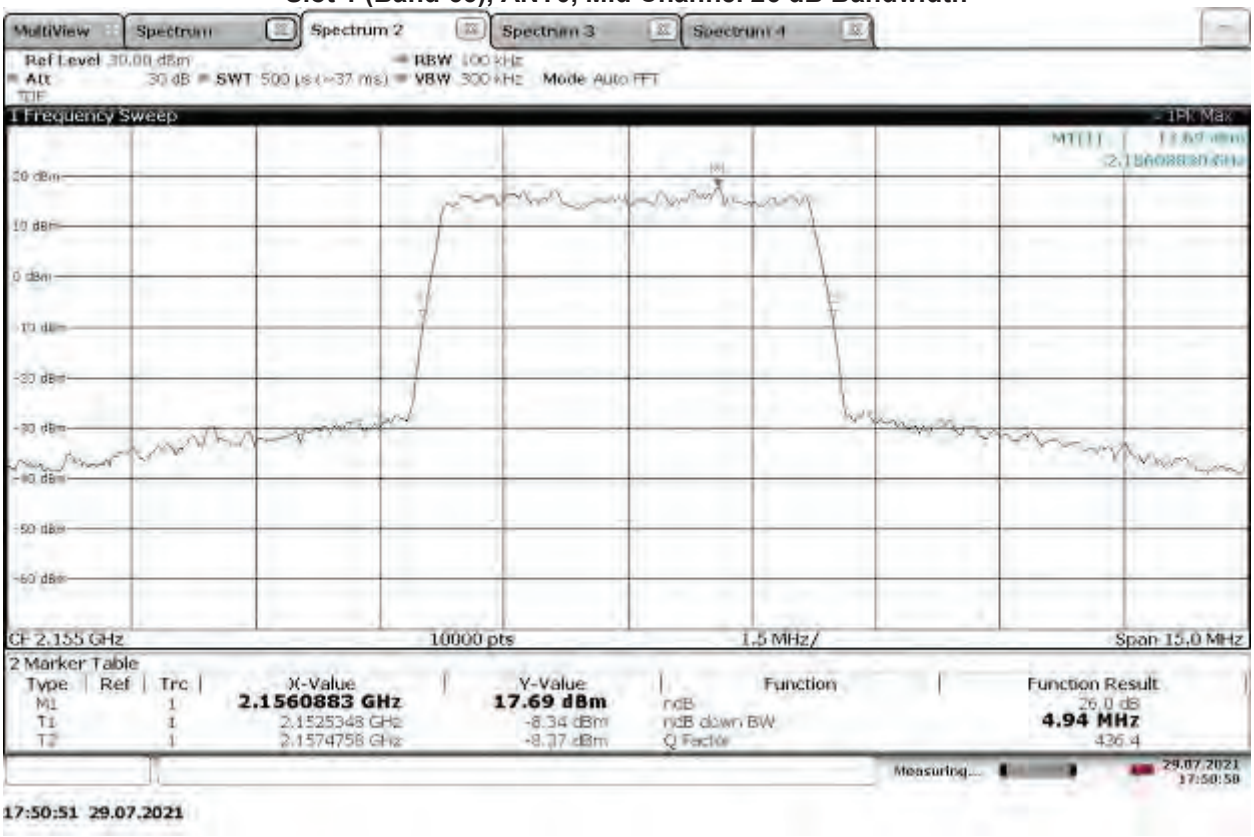
TM3.1-64QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT0, Low Channel 26 dB Bandwidth



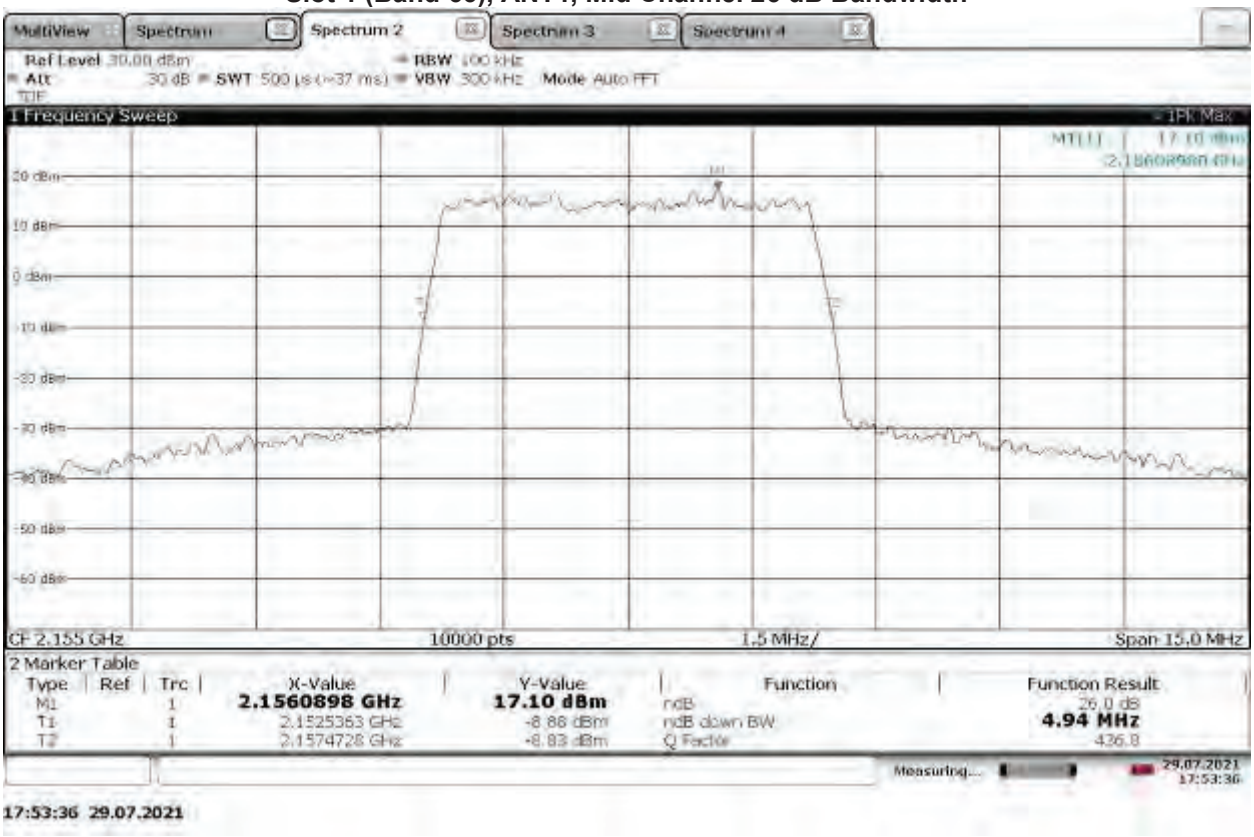
TM3.1-64QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT1, Low Channel 26 dB Bandwidth



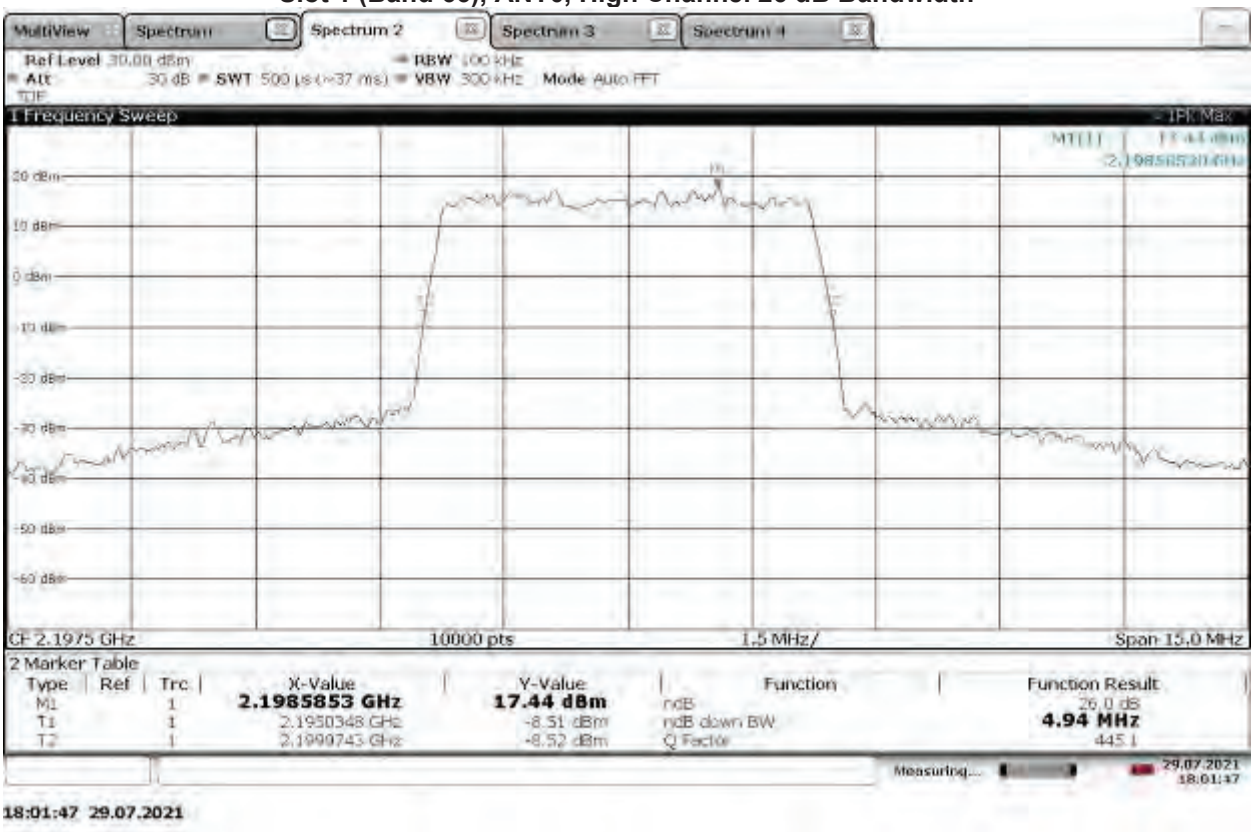
TM3.1-64QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



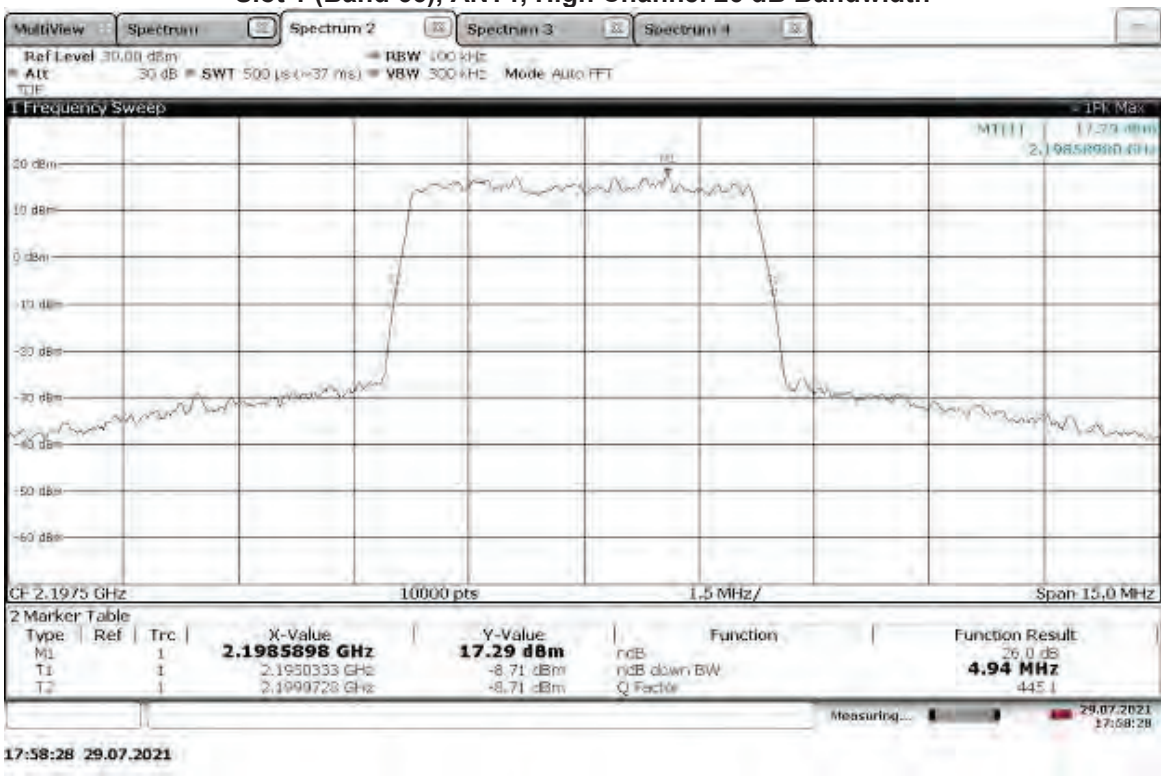
TM3.1-64QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth



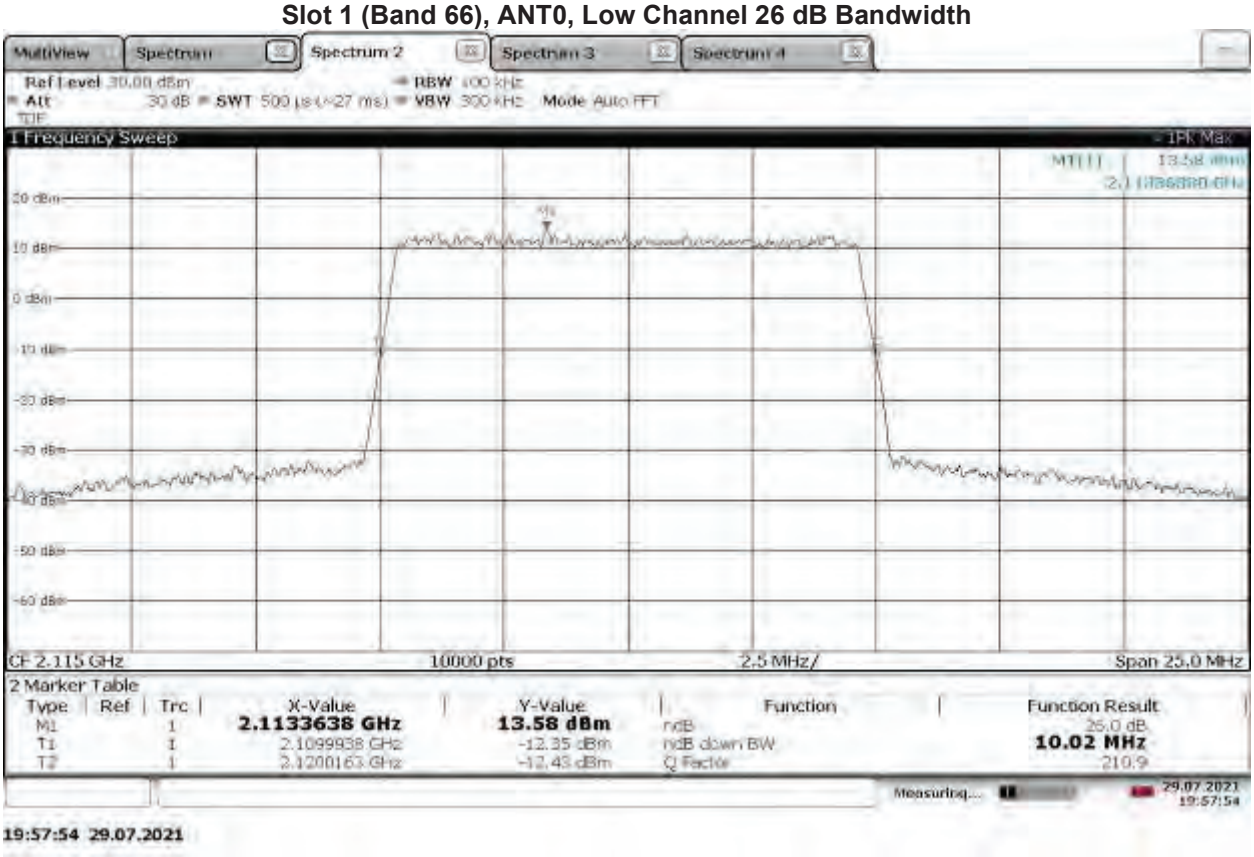
TM3.1-64QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



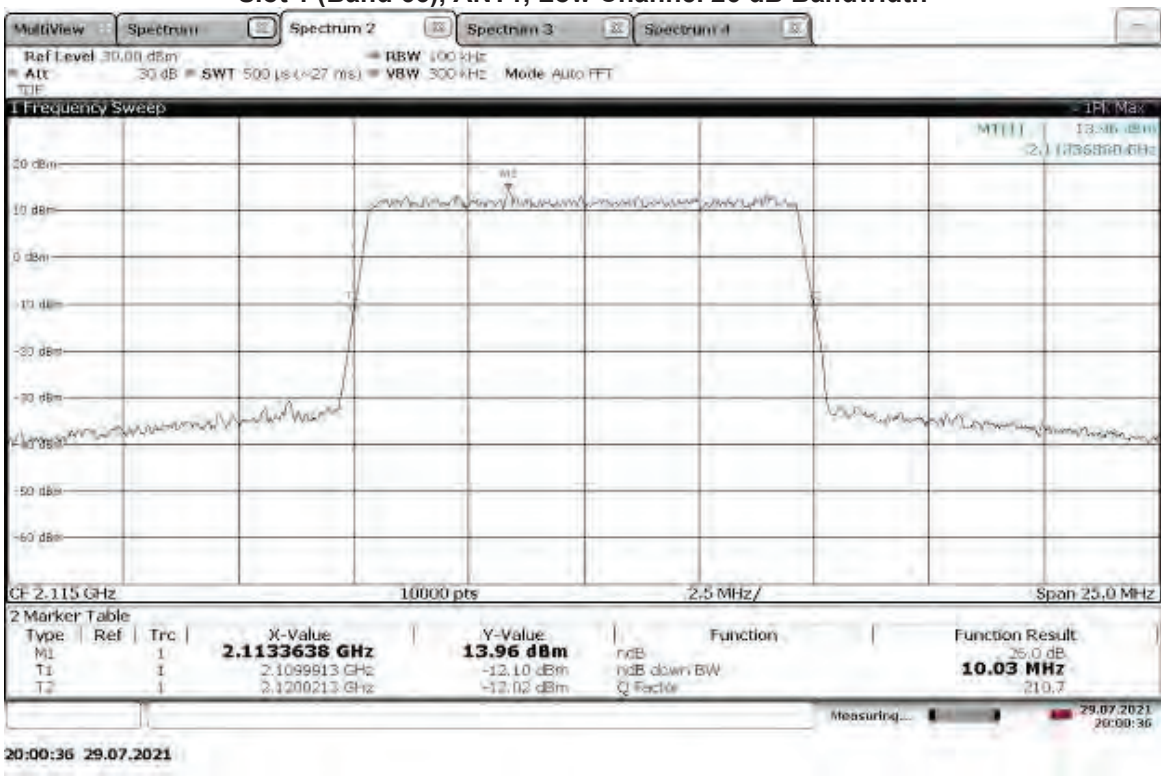
TM3.1-64QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth



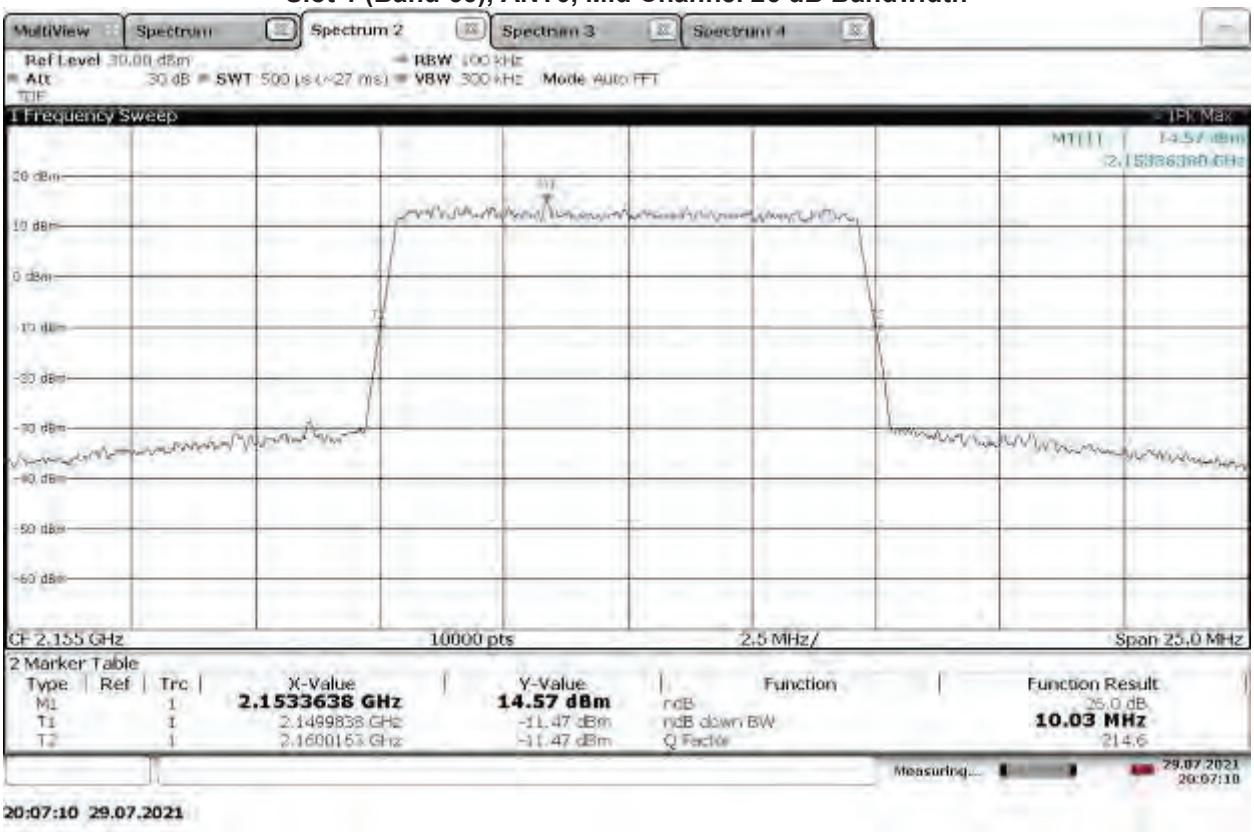
TM3.1-64QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT0, Low Channel 26 dB Bandwidth



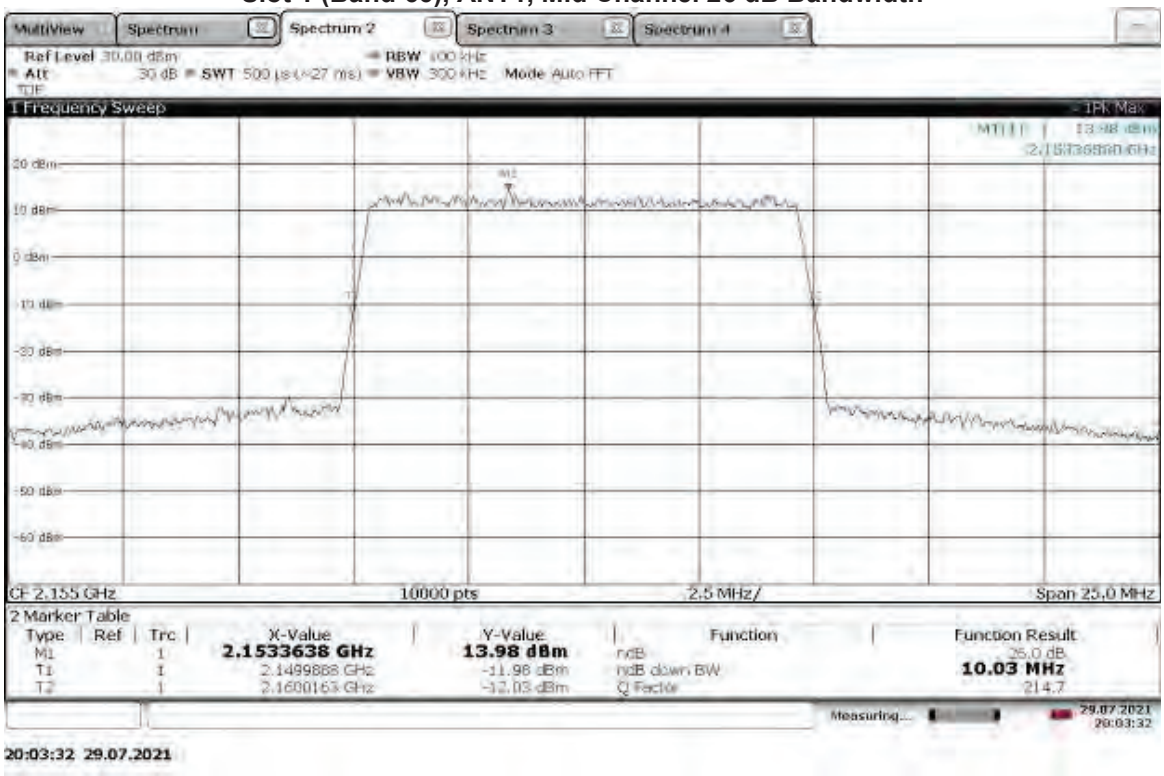
TM3.1-64QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT1, Low Channel 26 dB Bandwidth



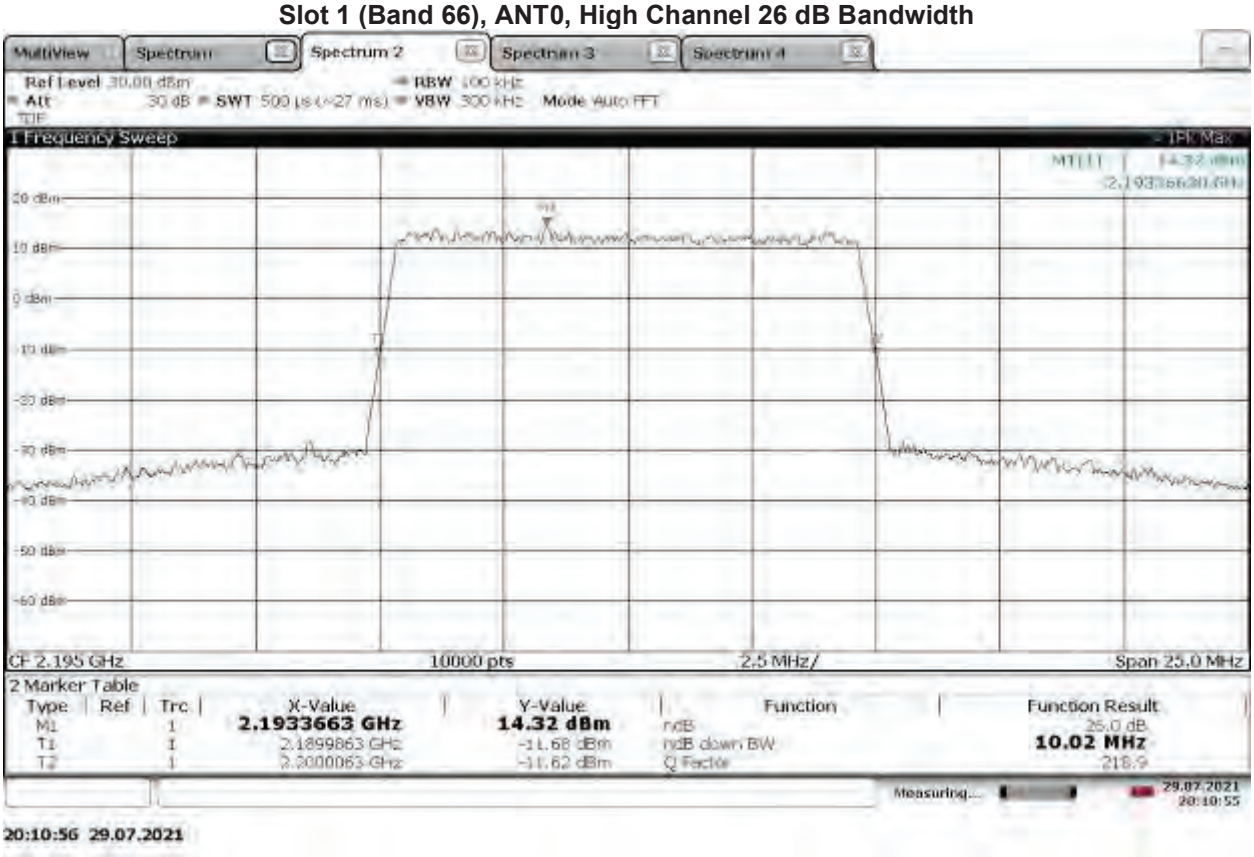
TM3.1-64QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



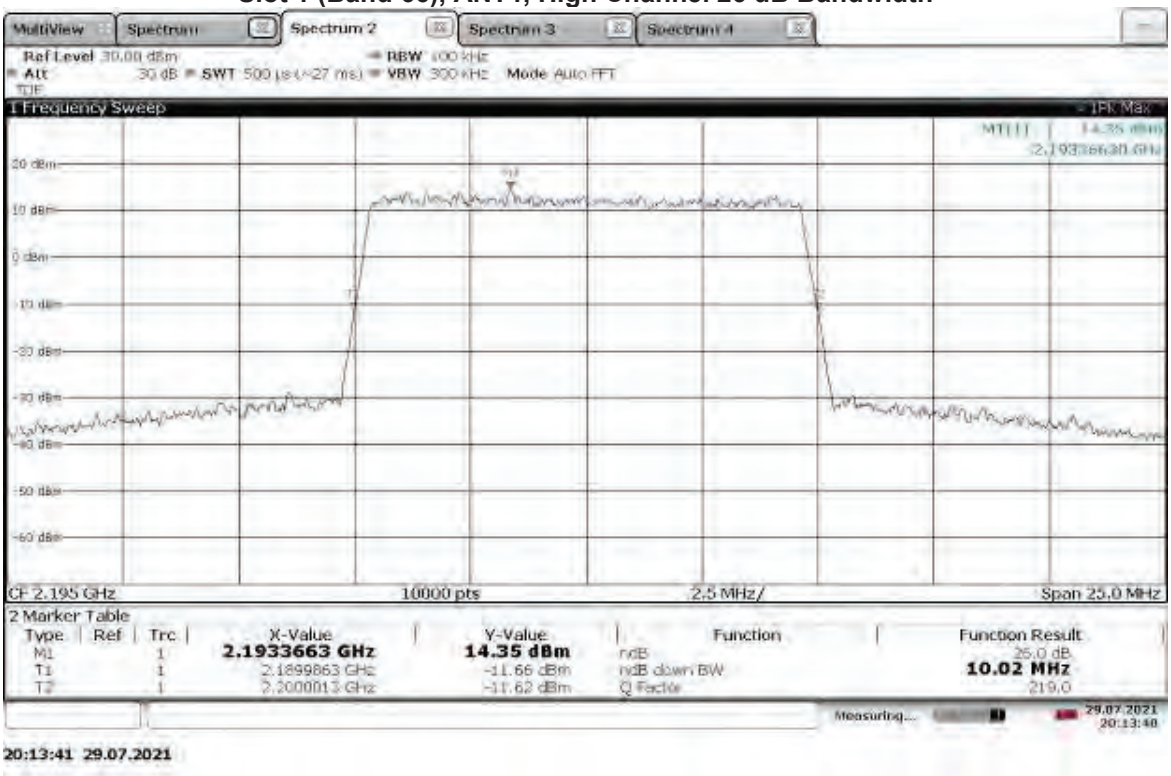
TM3.1-64QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth



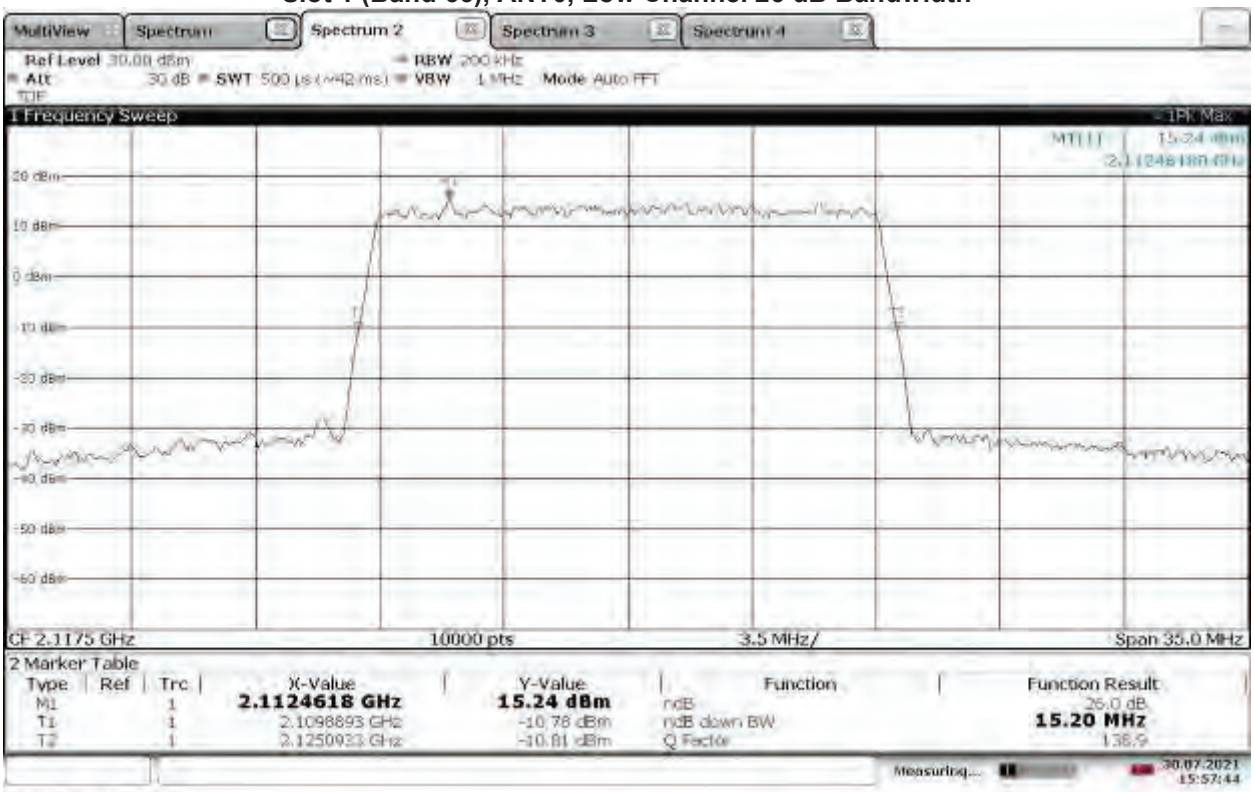
TM3.1-64QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



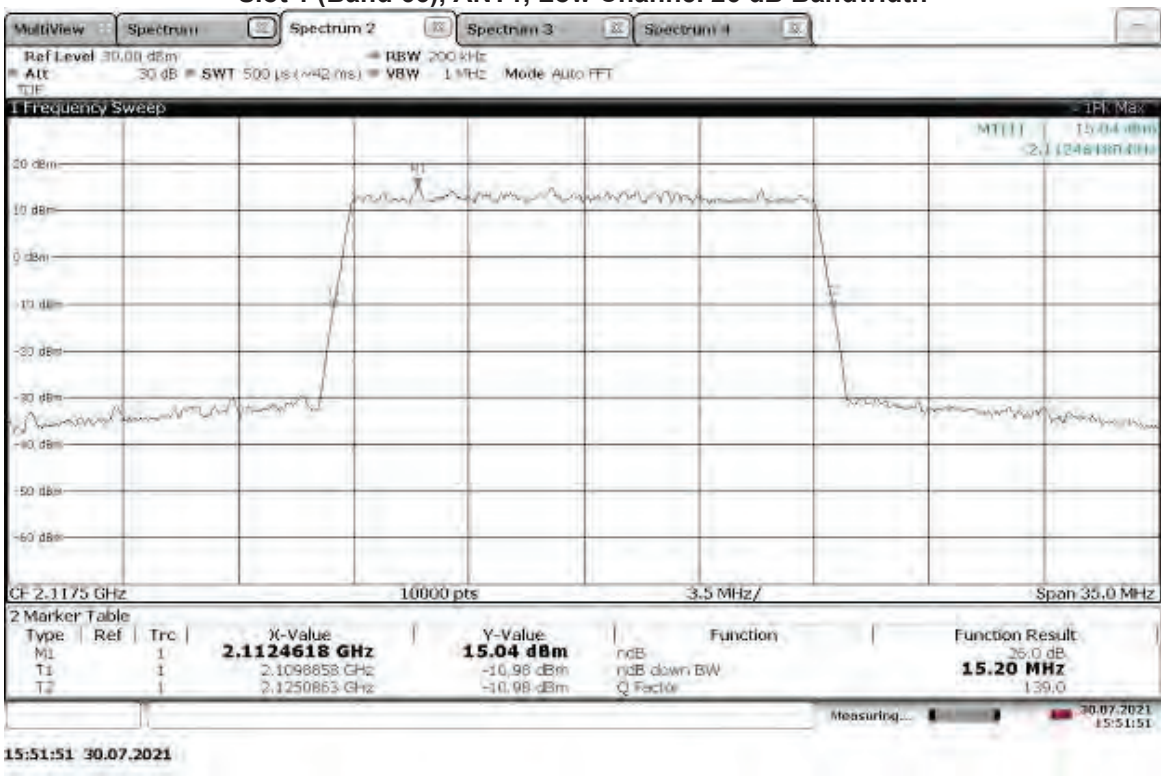
TM3.1-64QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth



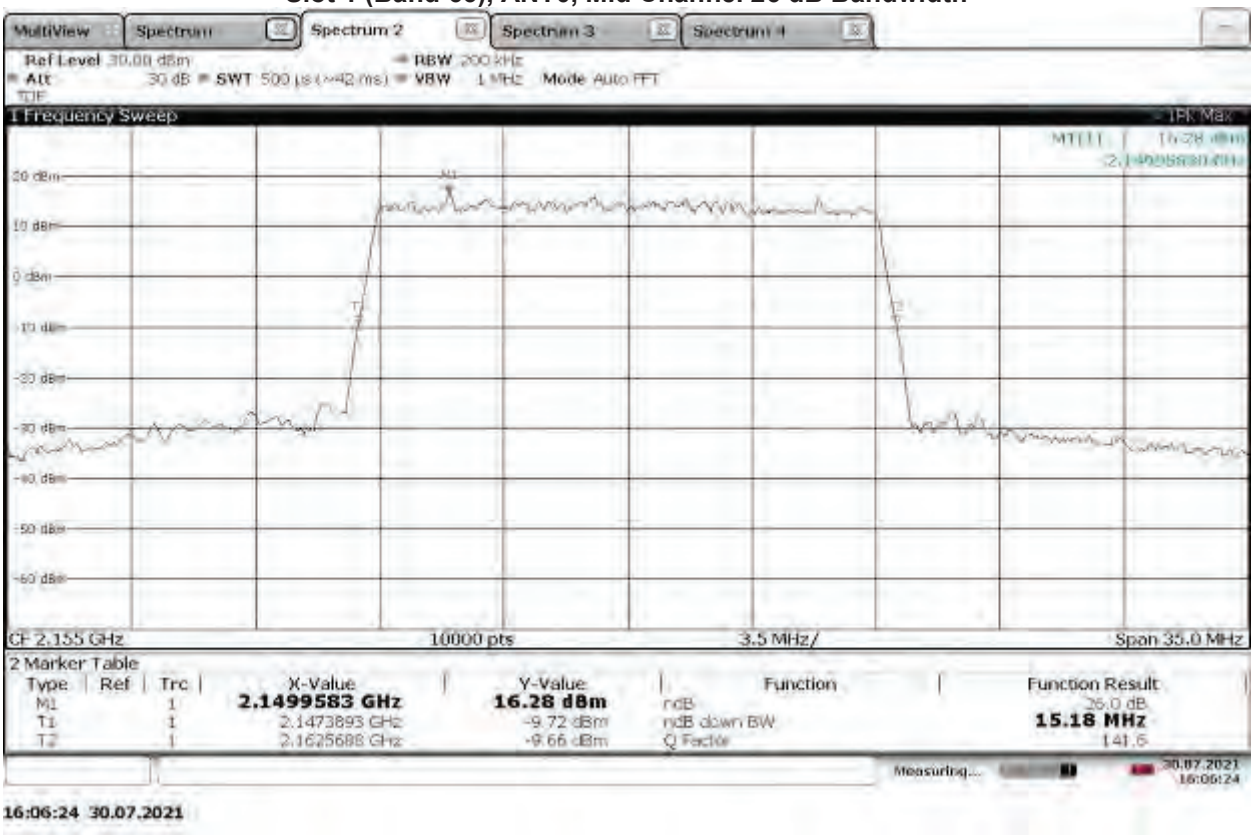
TM3.1-64QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT0, Low Channel 26 dB Bandwidth



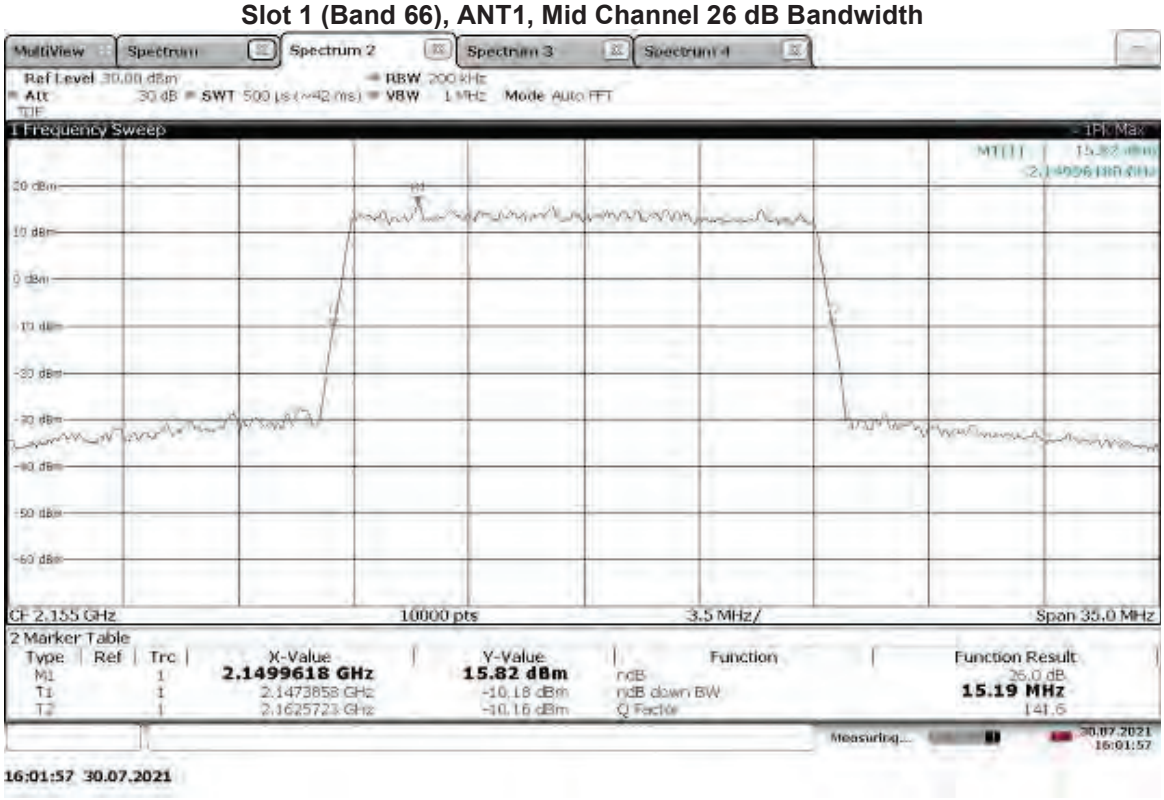
TM3.1-64QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT1, Low Channel 26 dB Bandwidth



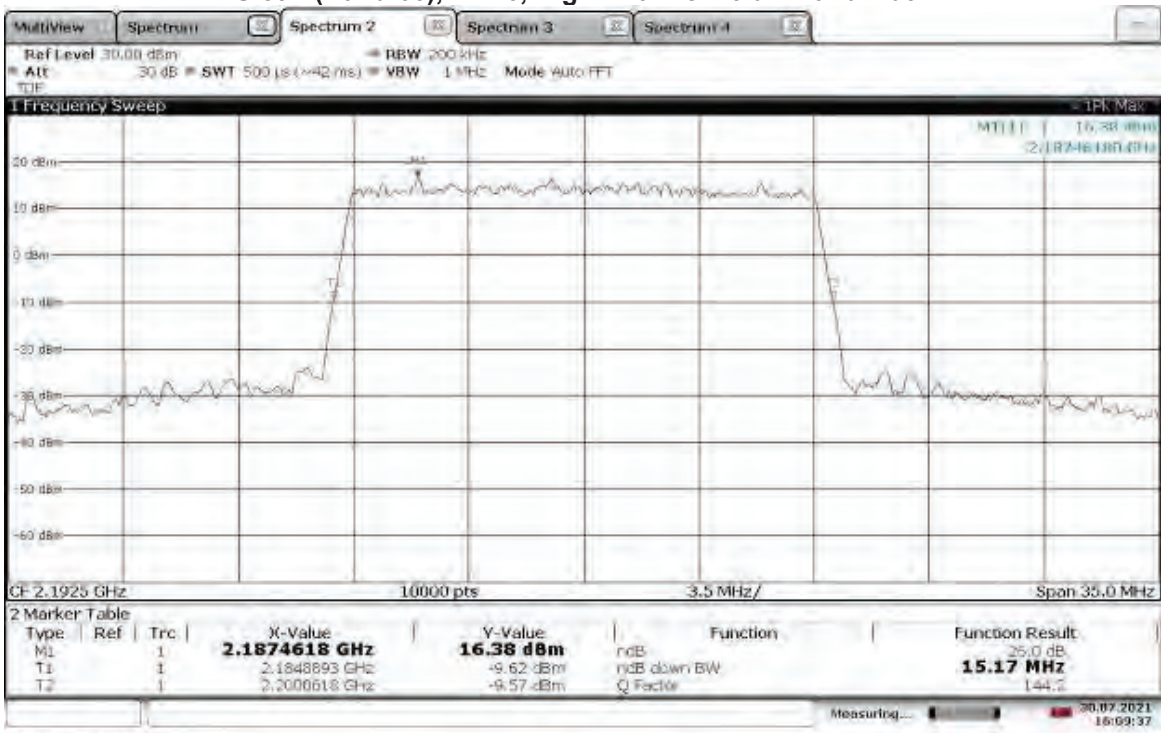
TM3.1-64QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



TM3.1-64QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth



TM3.1-64QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



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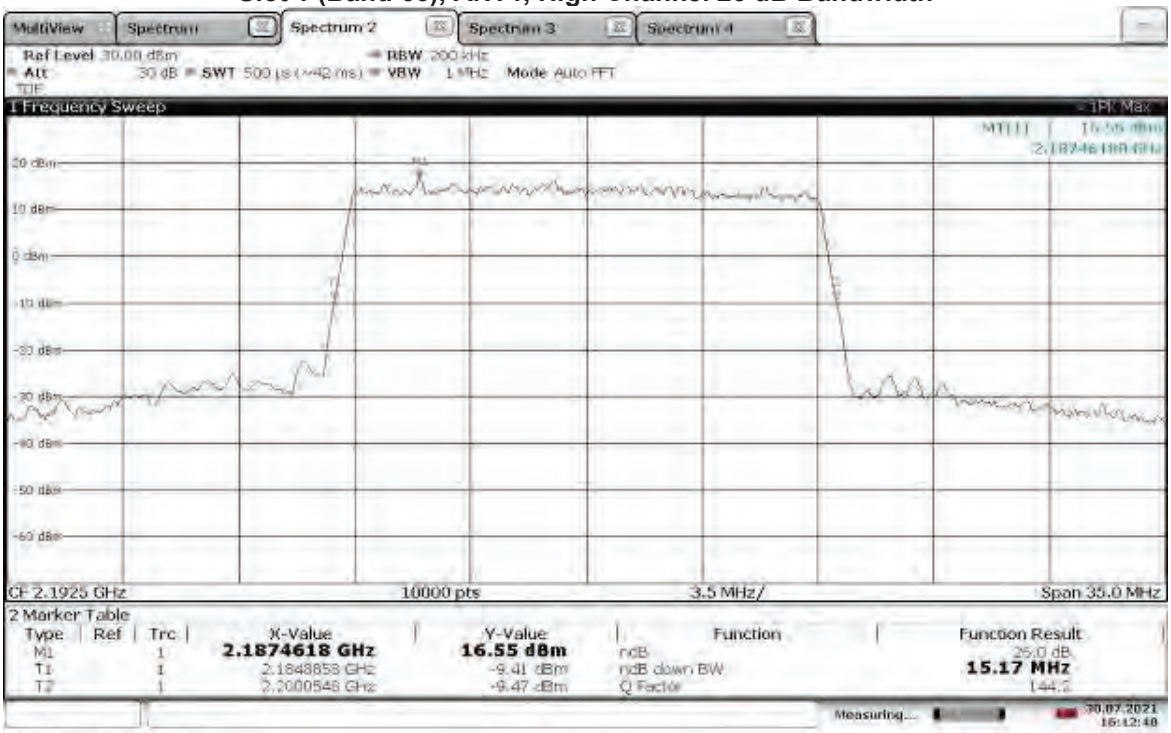
TM3.1-64QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth



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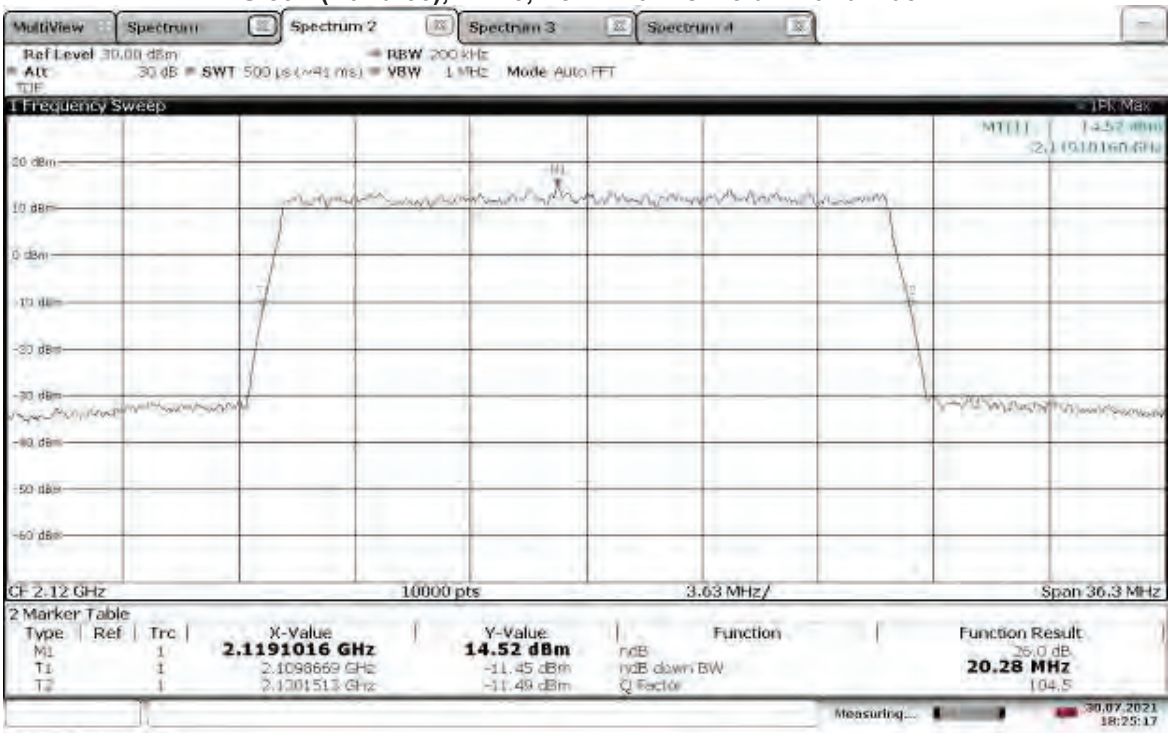
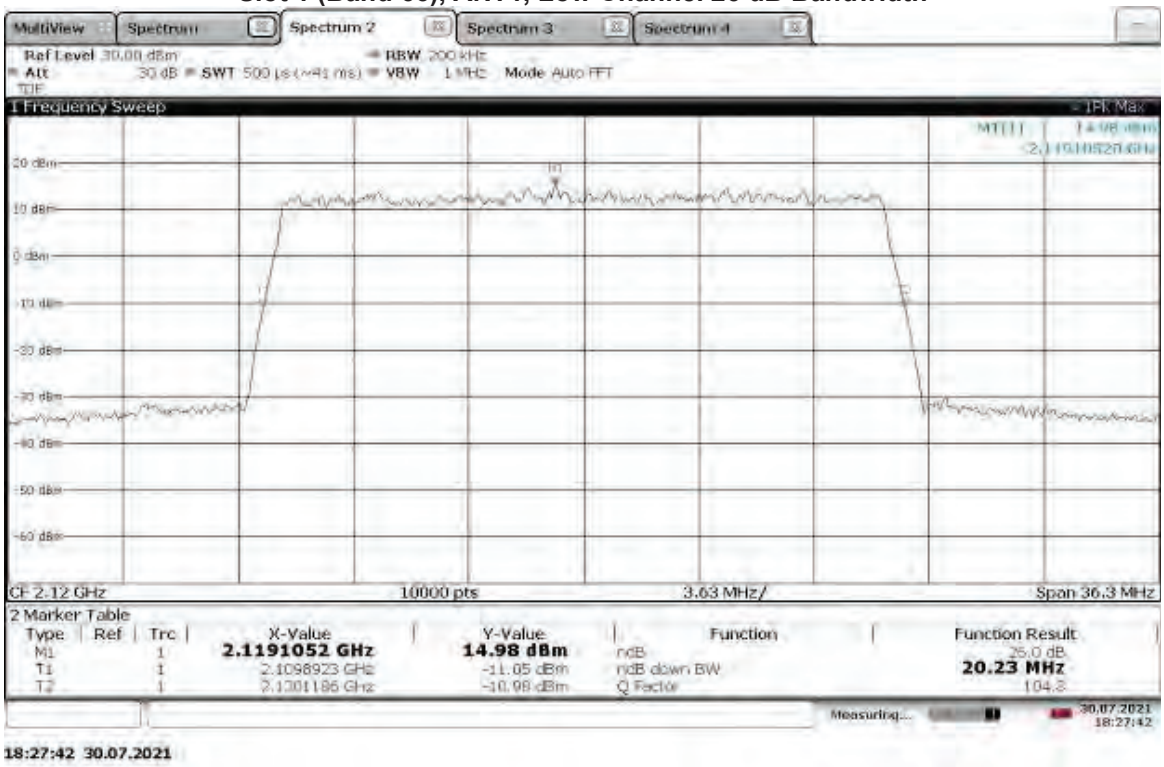
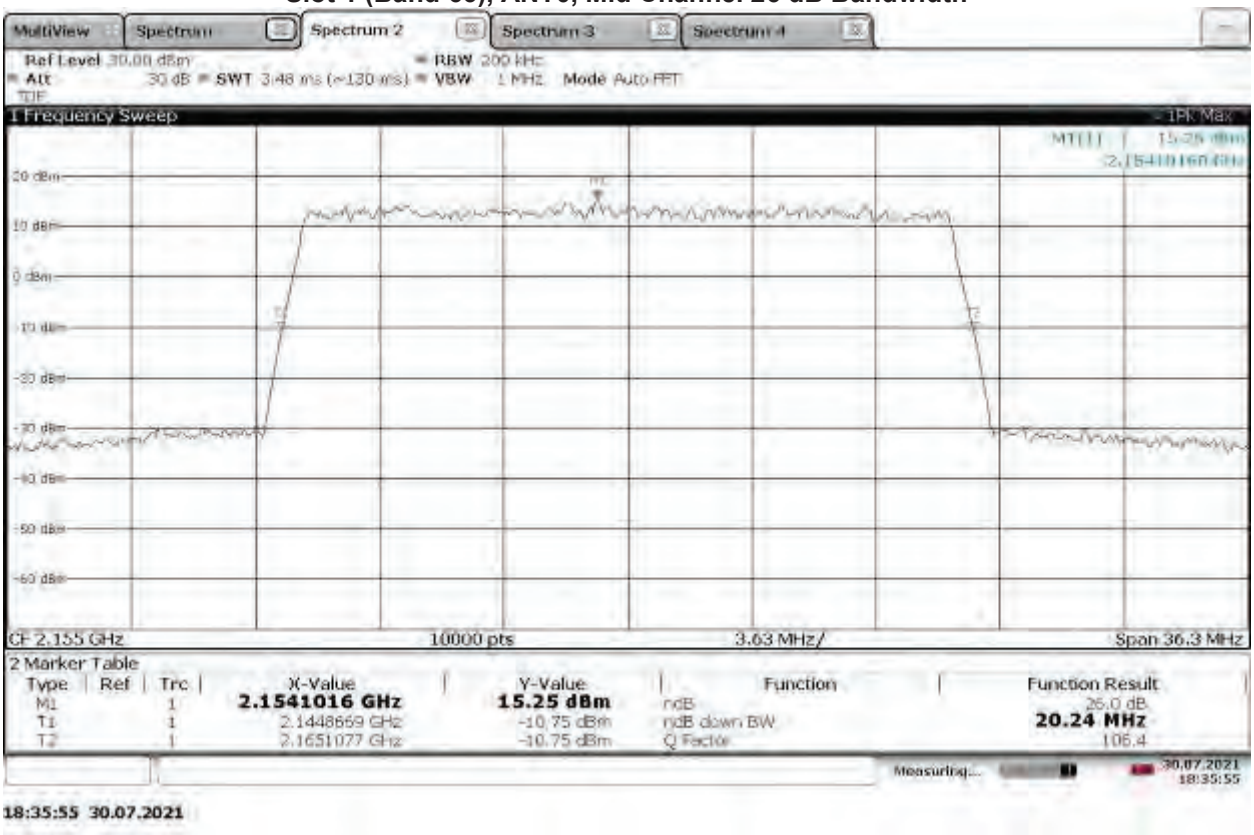
TM3.1-64QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT0, Low Channel 26 dB Bandwidth



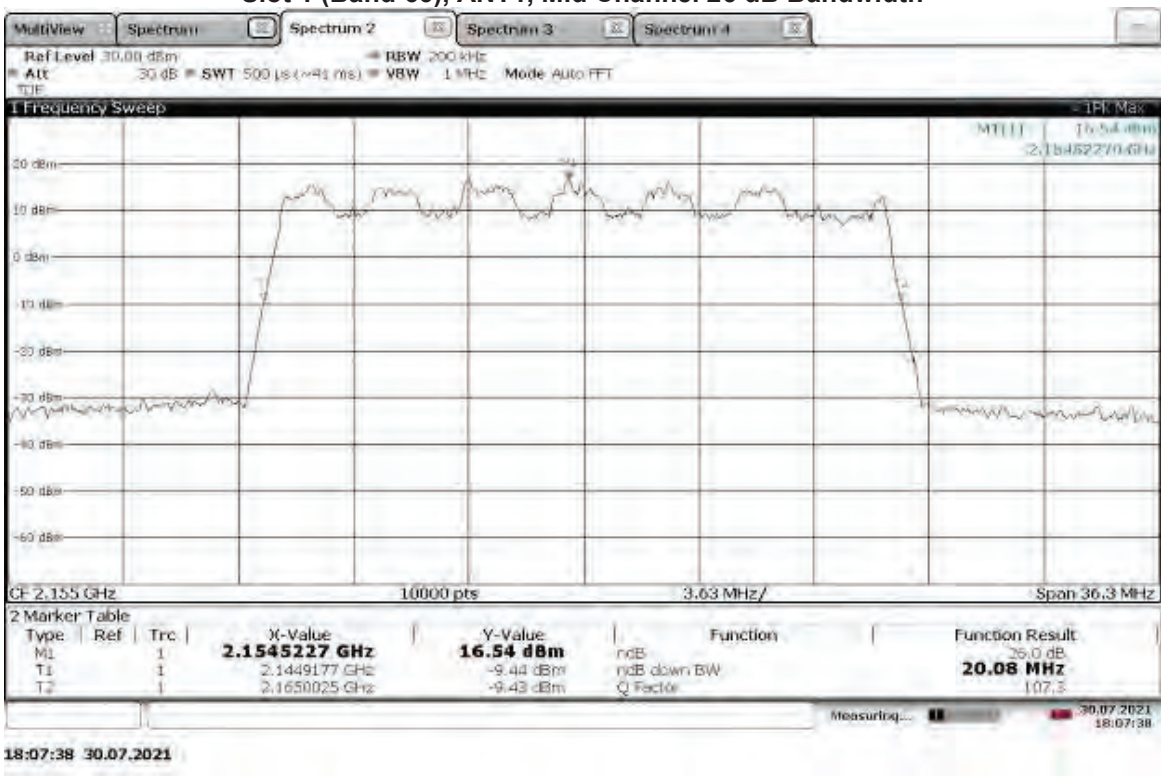
TM3.1-64QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT1, Low Channel 26 dB Bandwidth



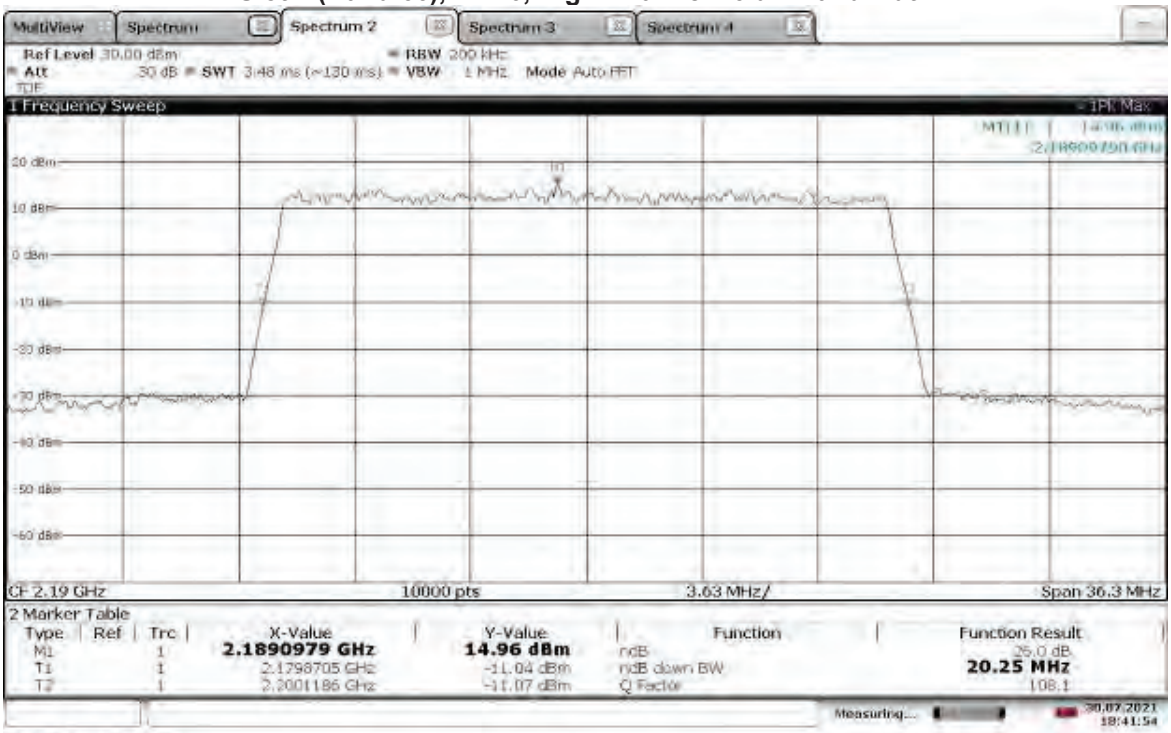
TM3.1-64QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



TM3.1-64QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth

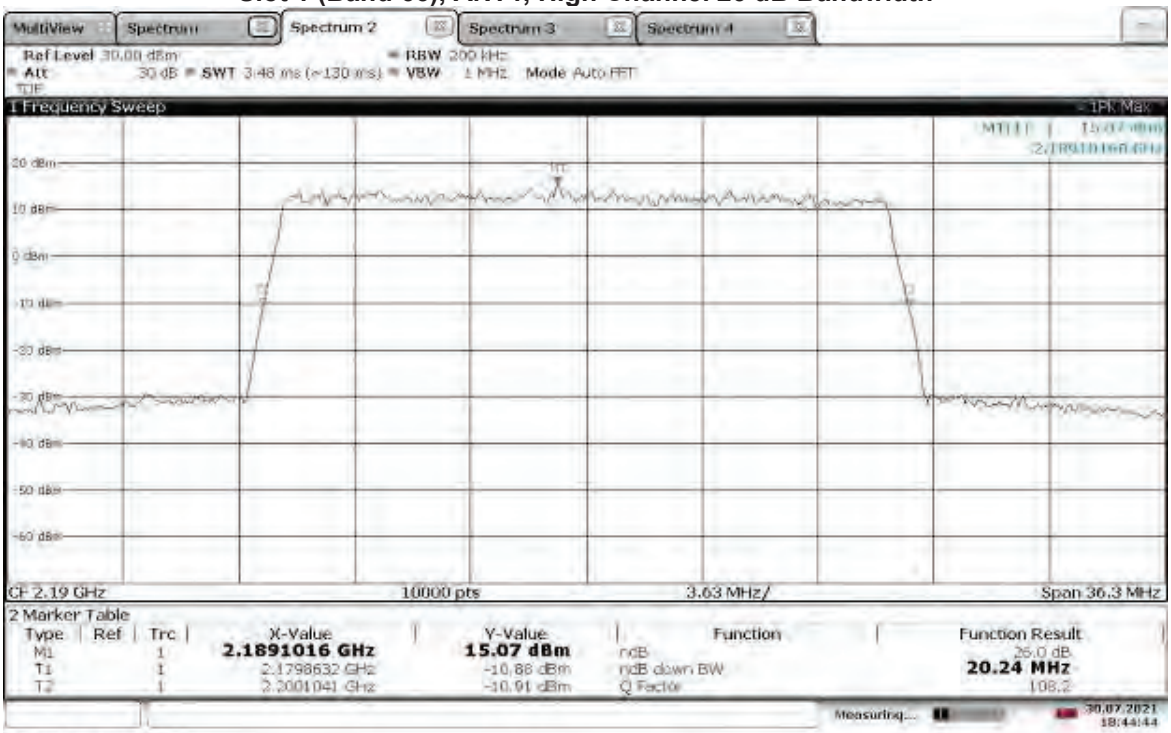


TM3.1-64QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



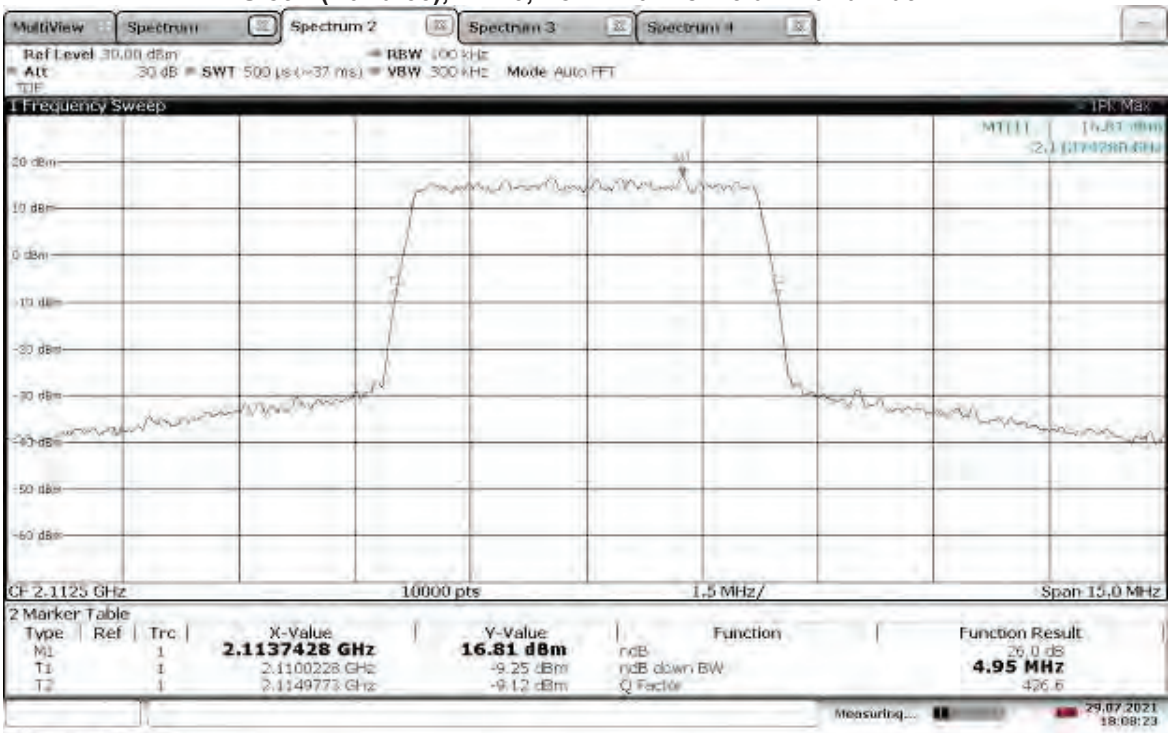
18:41:54 30.07.2021

TM3.1-64QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth



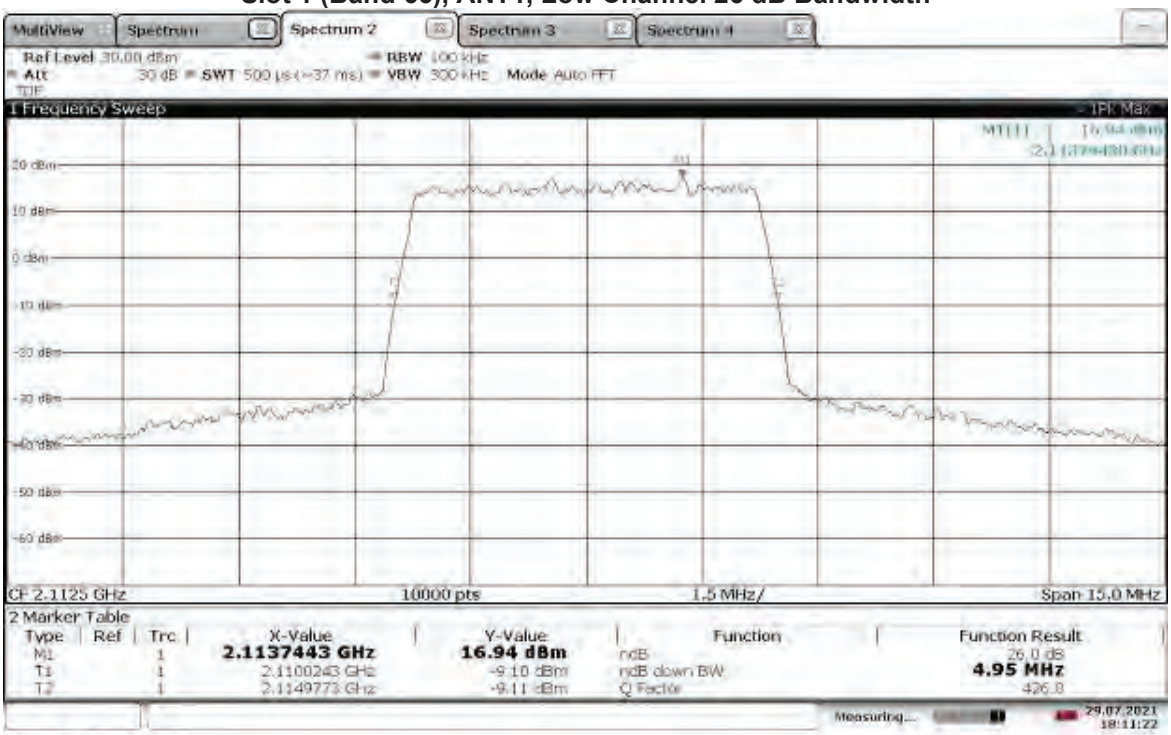
18:44:44 30.07.2021

TM3.1a-256QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT0, Low Channel 26 dB Bandwidth



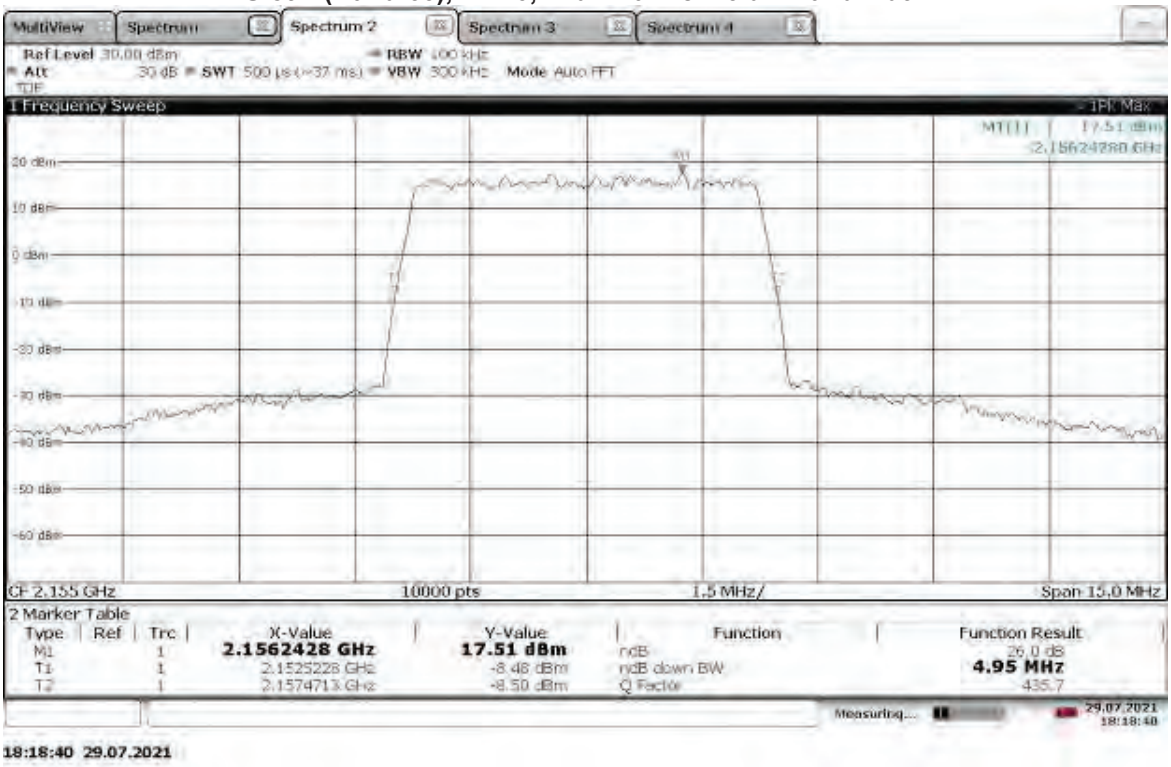
18:08:23 29.07.2021

TM3.1a-256QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT1, Low Channel 26 dB Bandwidth

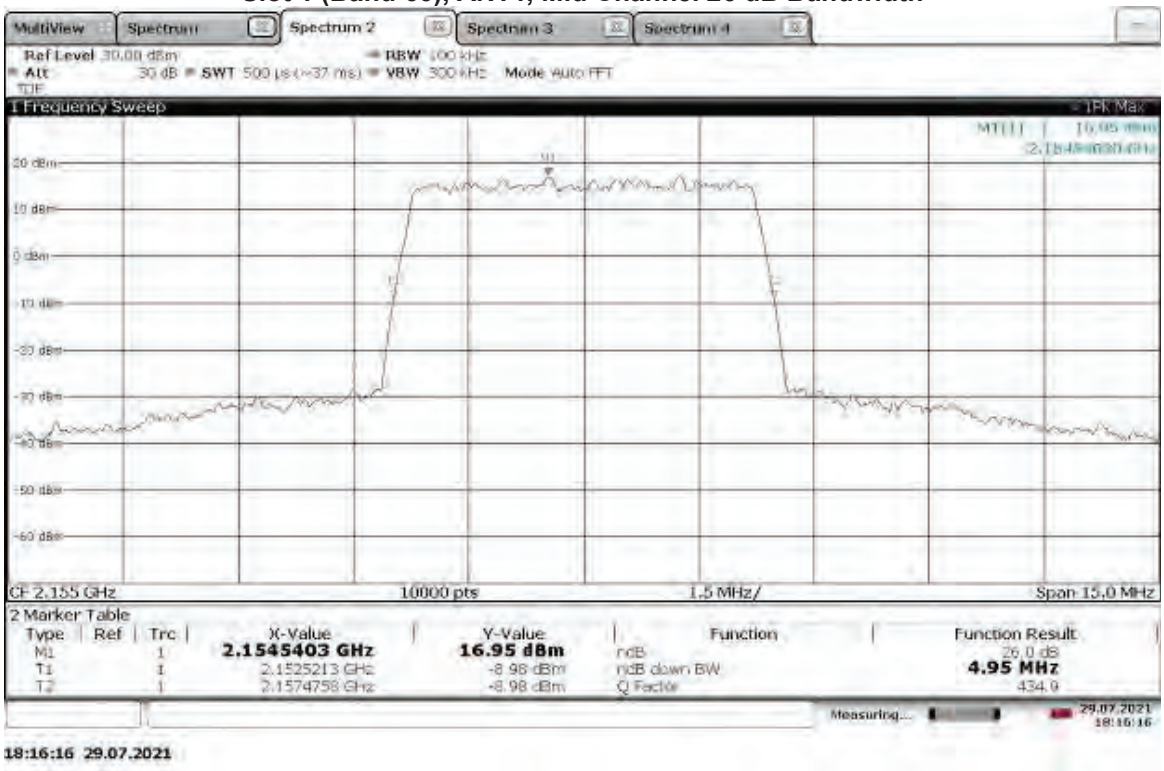


18:11:22 29.07.2021

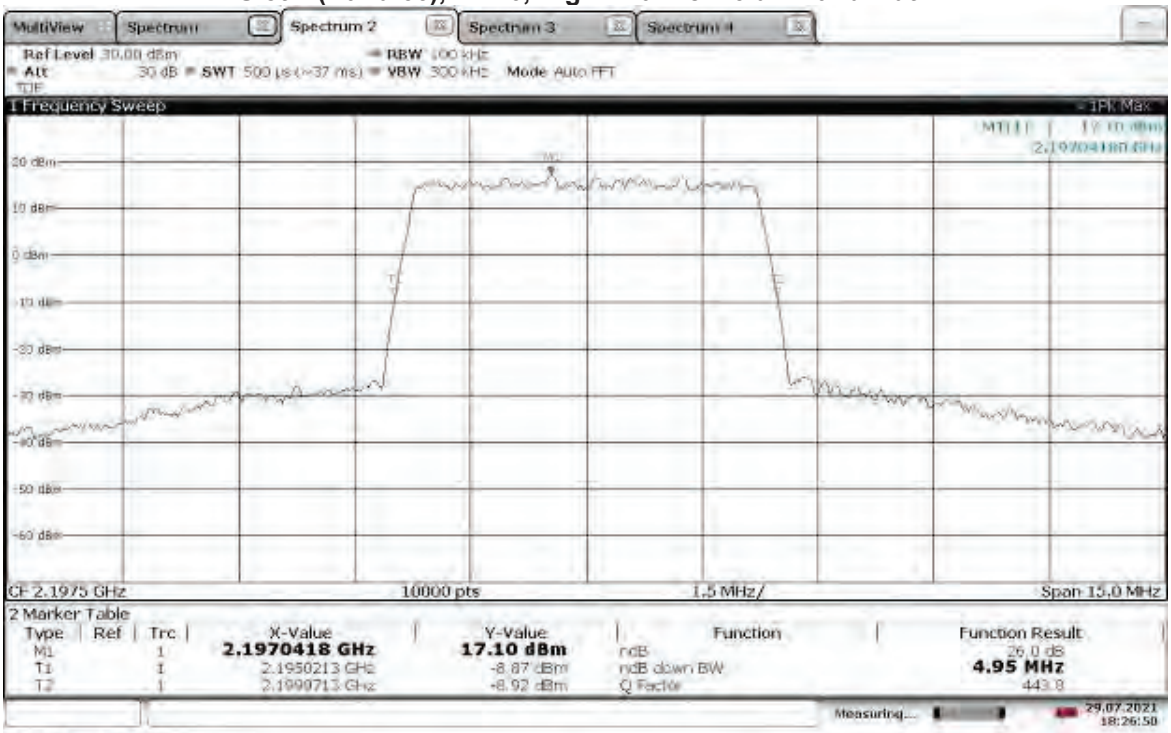
TM3.1a-256QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



TM3.1a-256QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth

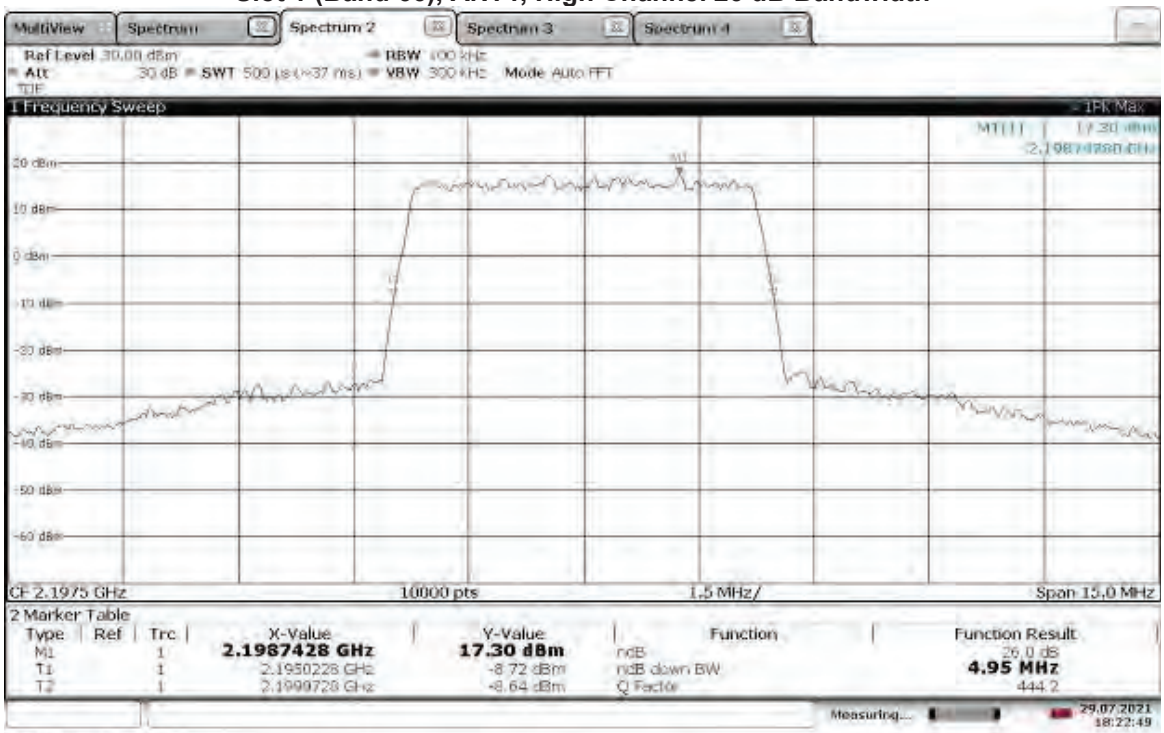


TM3.1a-256QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



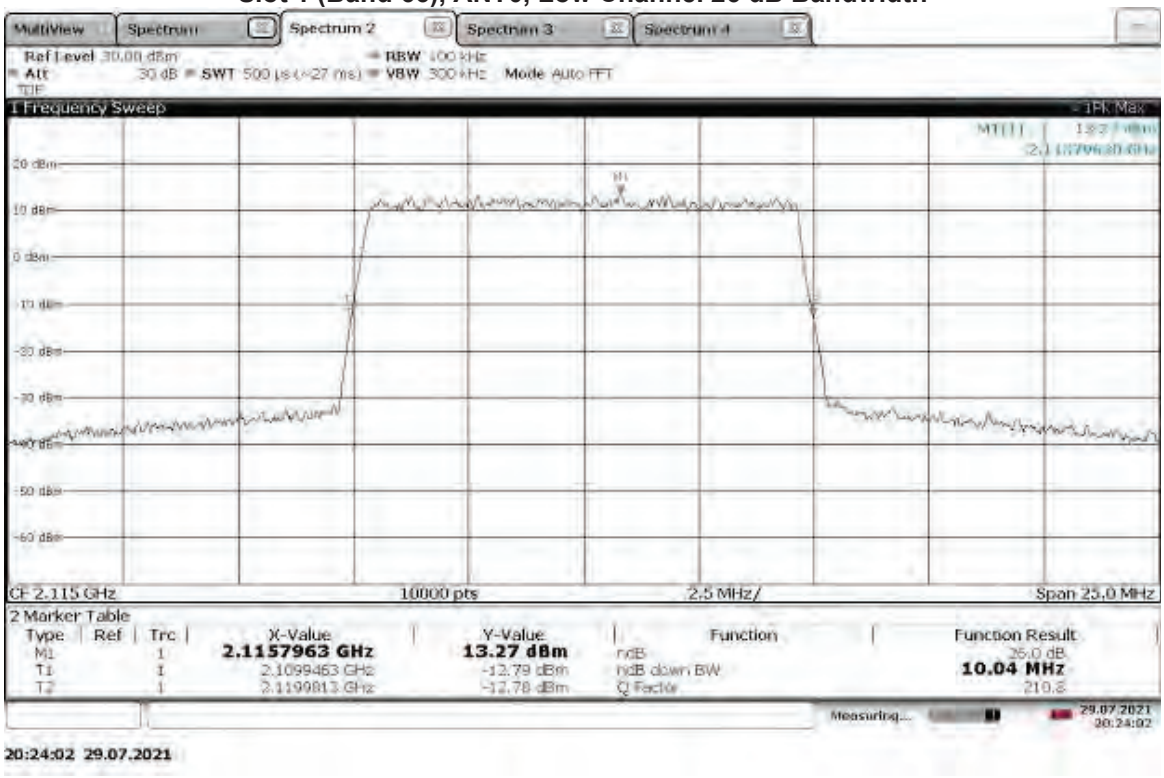
18:26:50 29.07.2021

TM3.1a-256QAM_5 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth

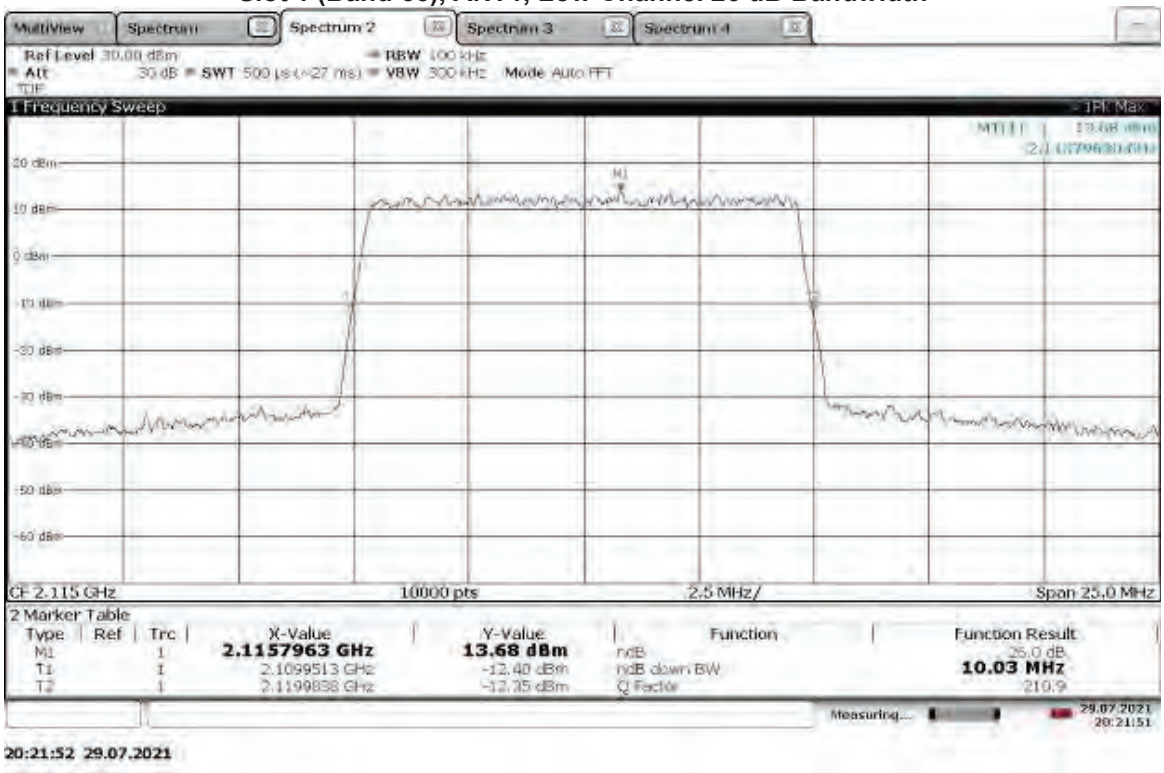


18:22:49 29.07.2021

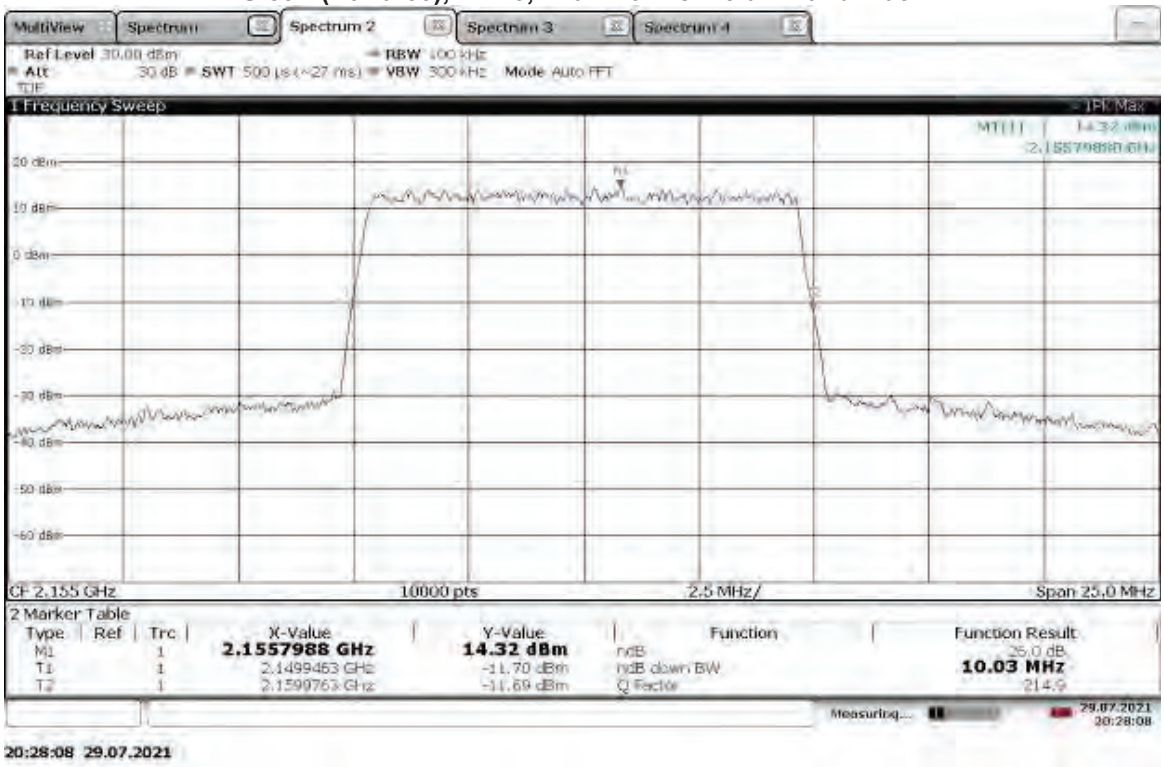
TM3.1a-256QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT0, Low Channel 26 dB Bandwidth



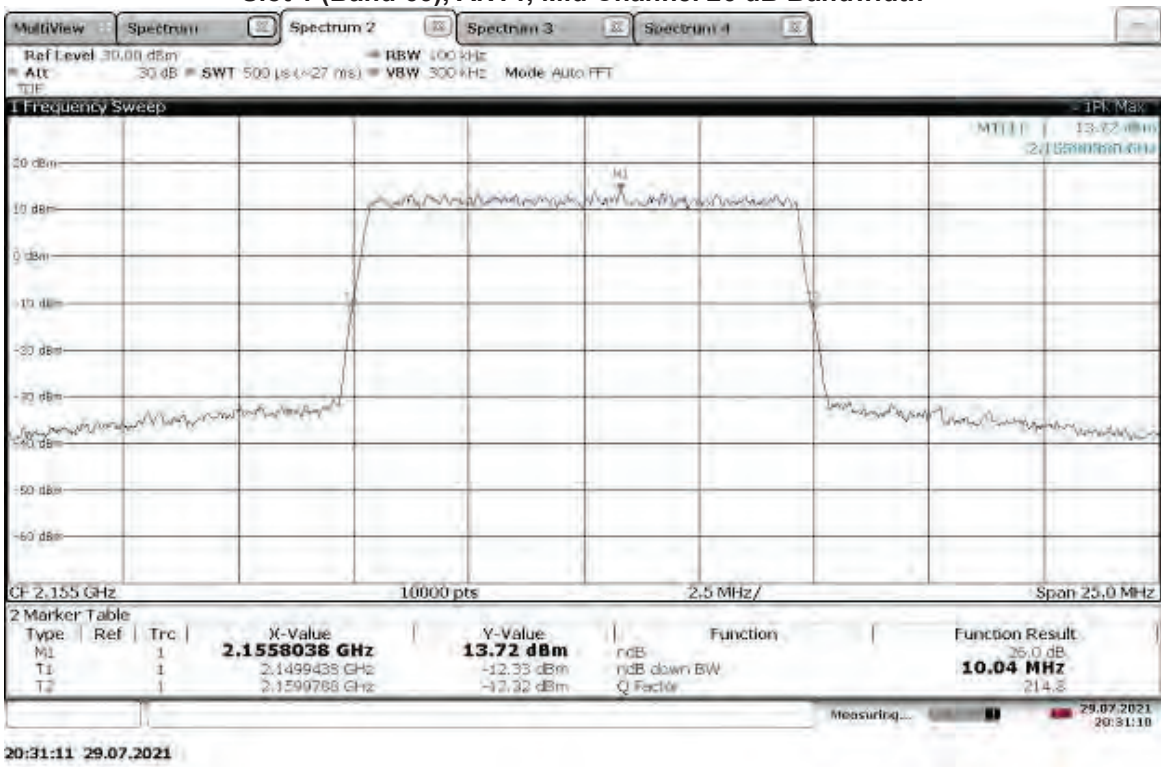
TM3.1a-256QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT1, Low Channel 26 dB Bandwidth



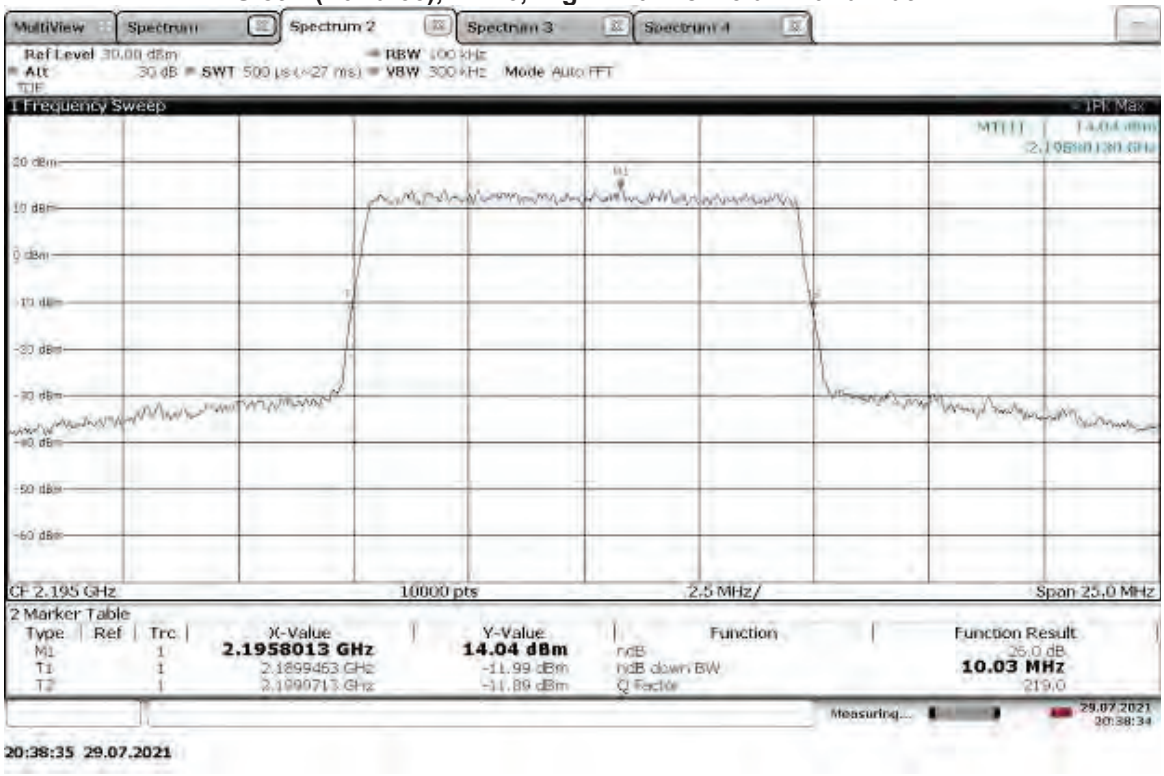
TM3.1a-256QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



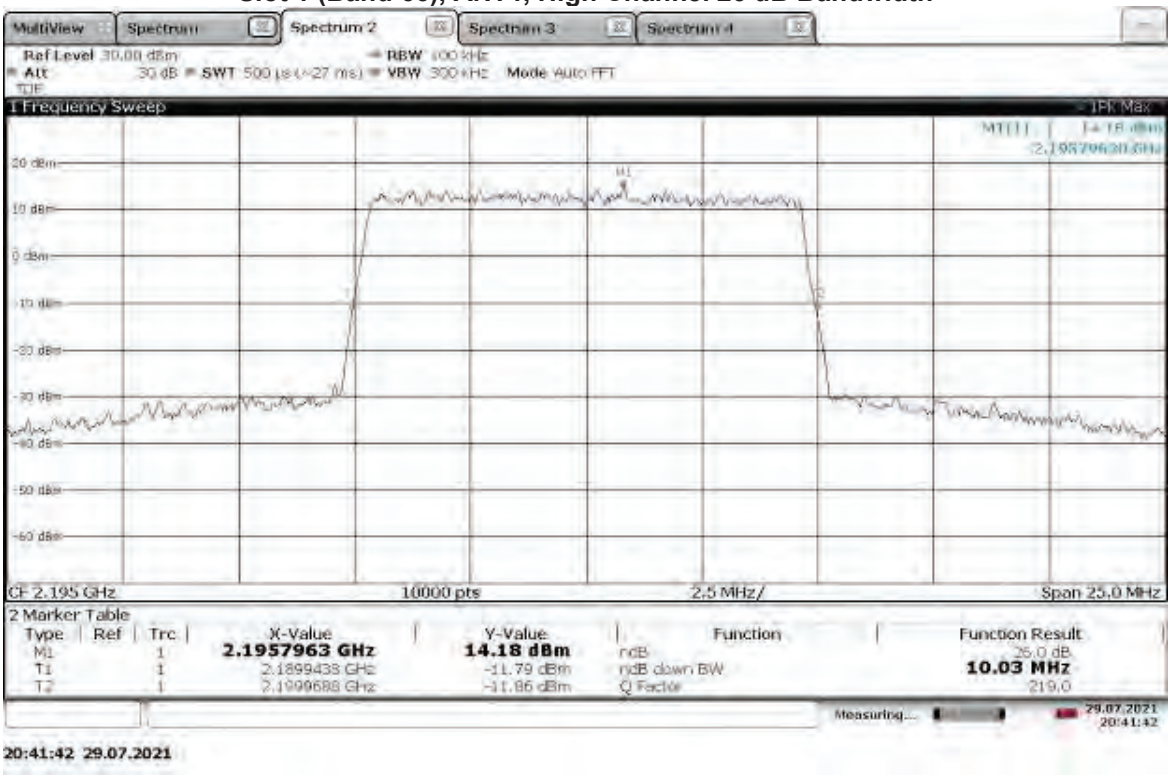
TM3.1a-256QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth



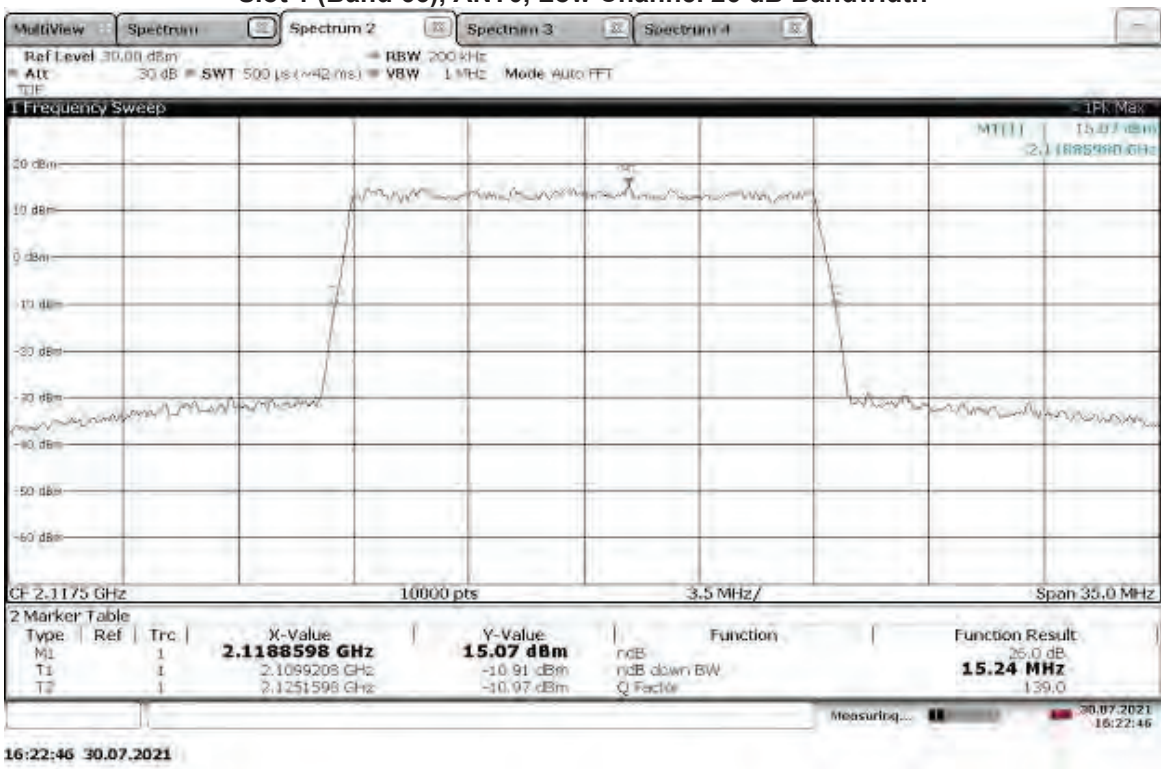
TM3.1a-256QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



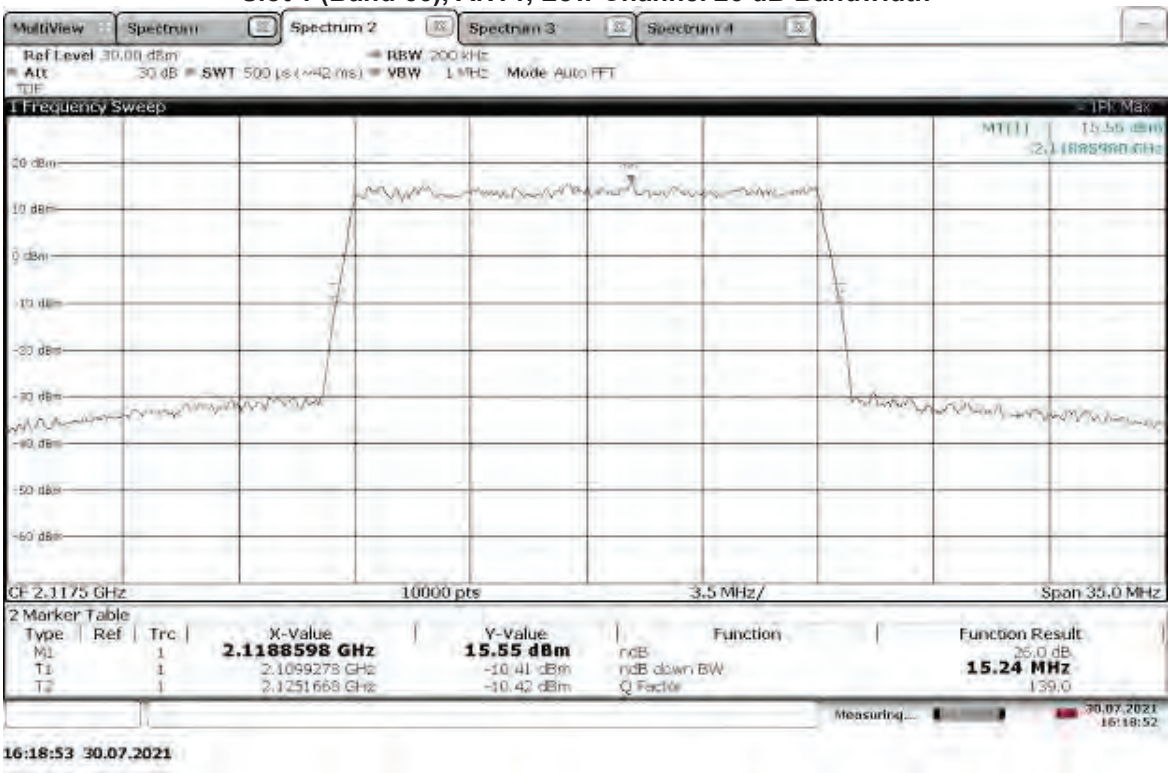
TM3.1a-256QAM_10 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth



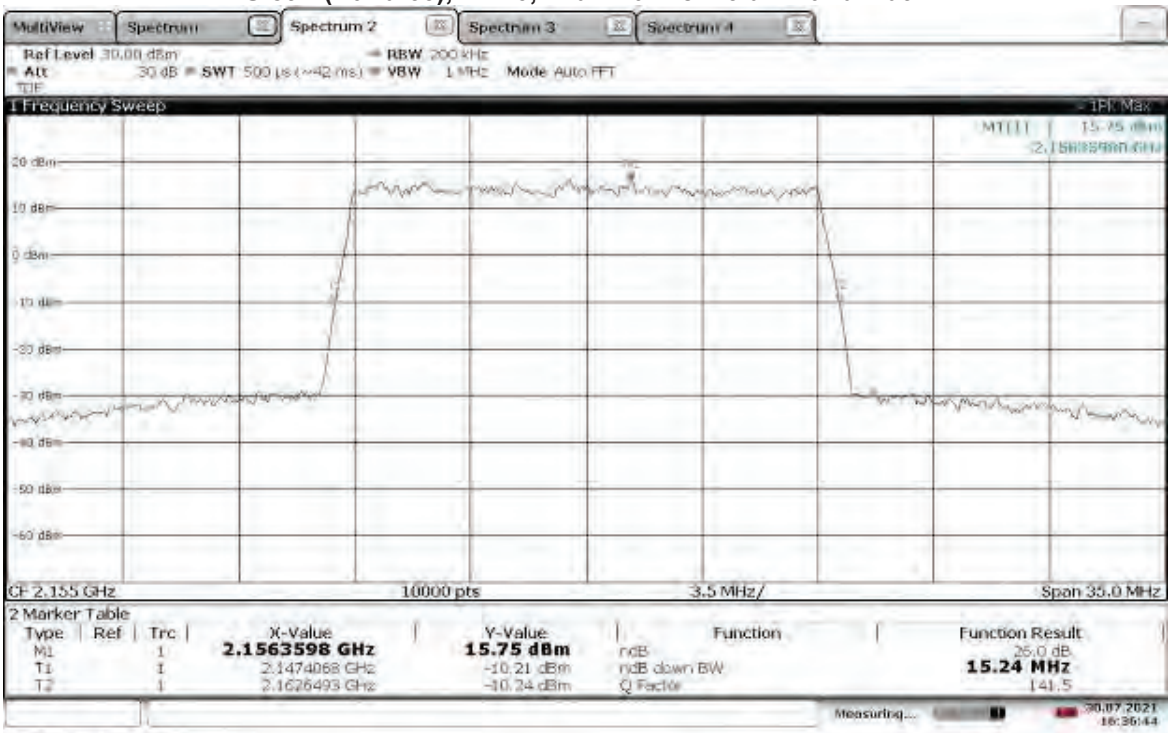
TM3.1a-256QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT0, Low Channel 26 dB Bandwidth



TM3.1a-256QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT1, Low Channel 26 dB Bandwidth

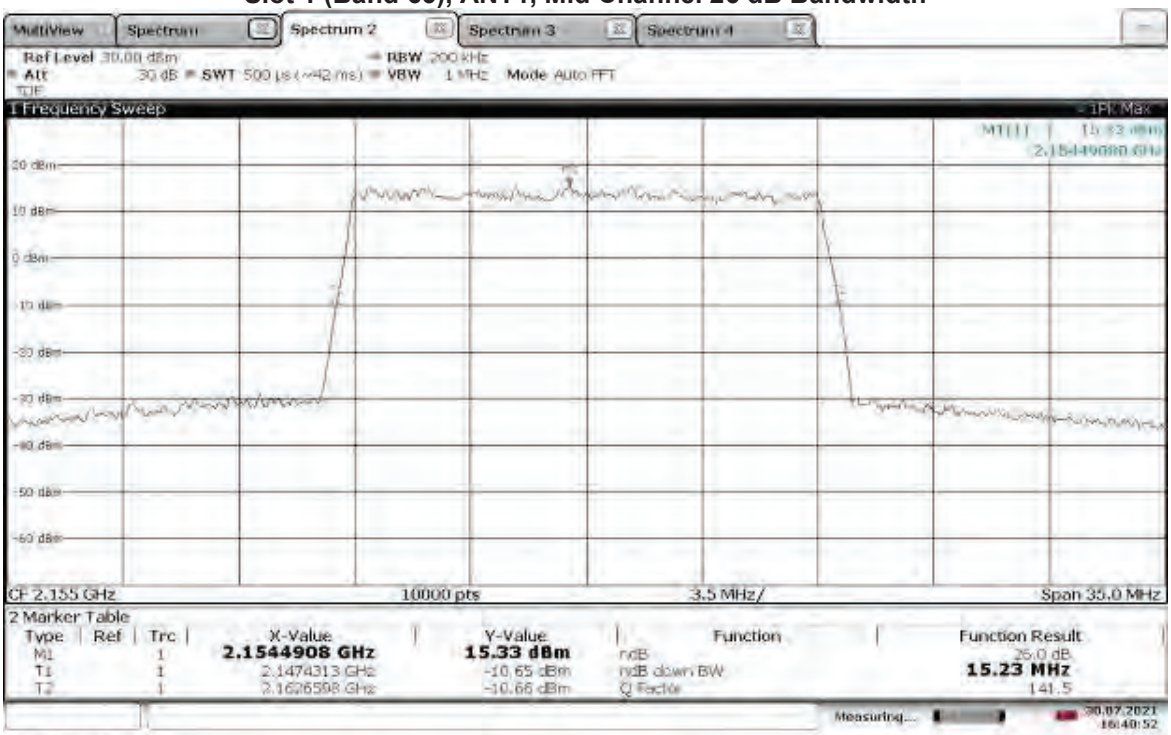


TM3.1a-256QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



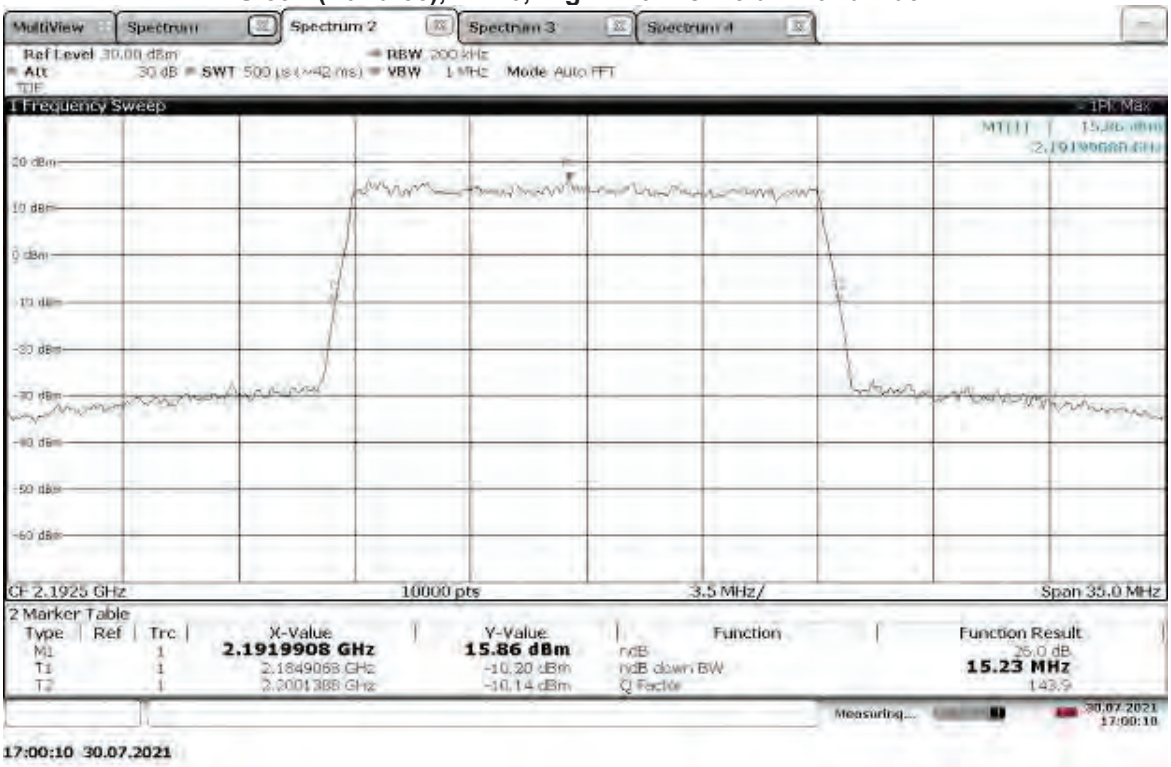
16:36:44 30.07.2021

TM3.1a-256QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth

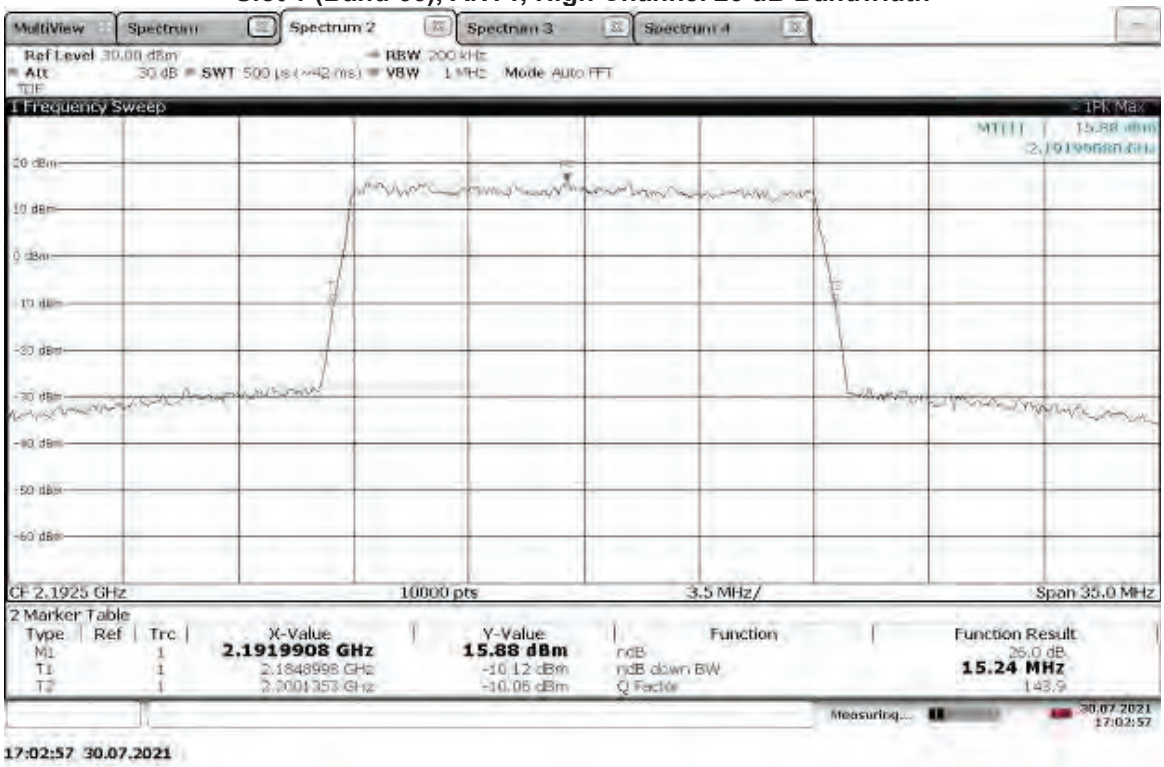


16:40:52 30.07.2021

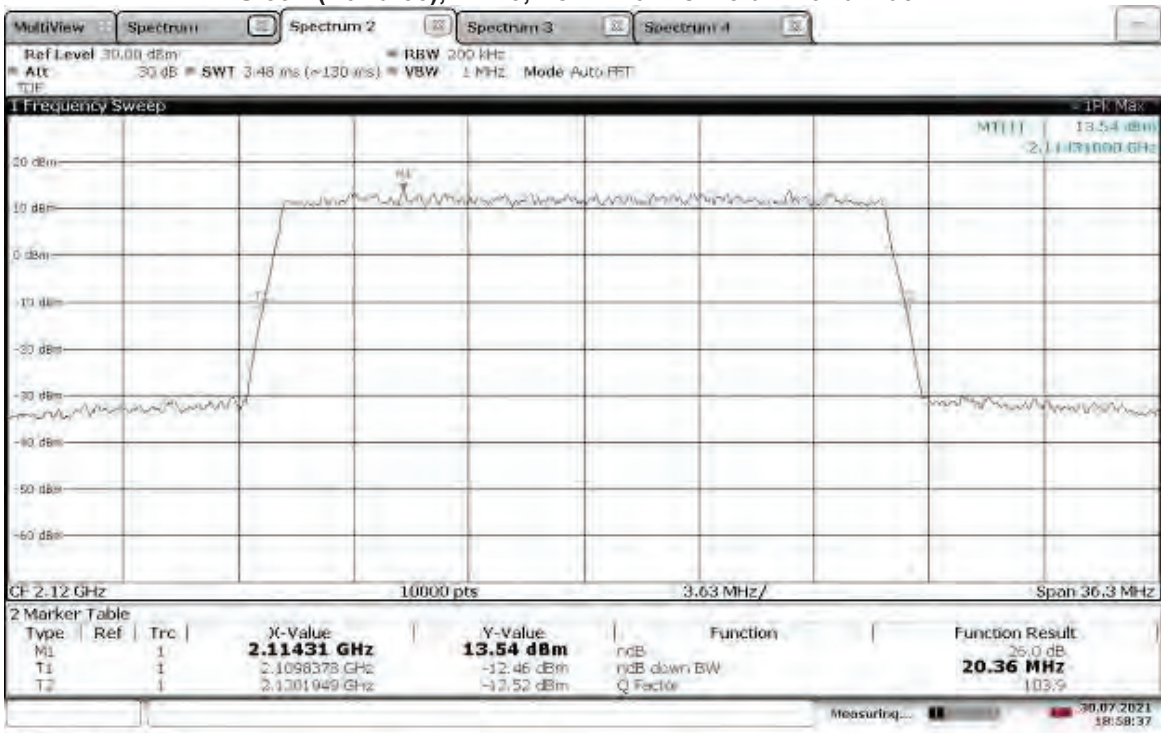
TM3.1a-256QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



TM3.1a-256QAM_15 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth

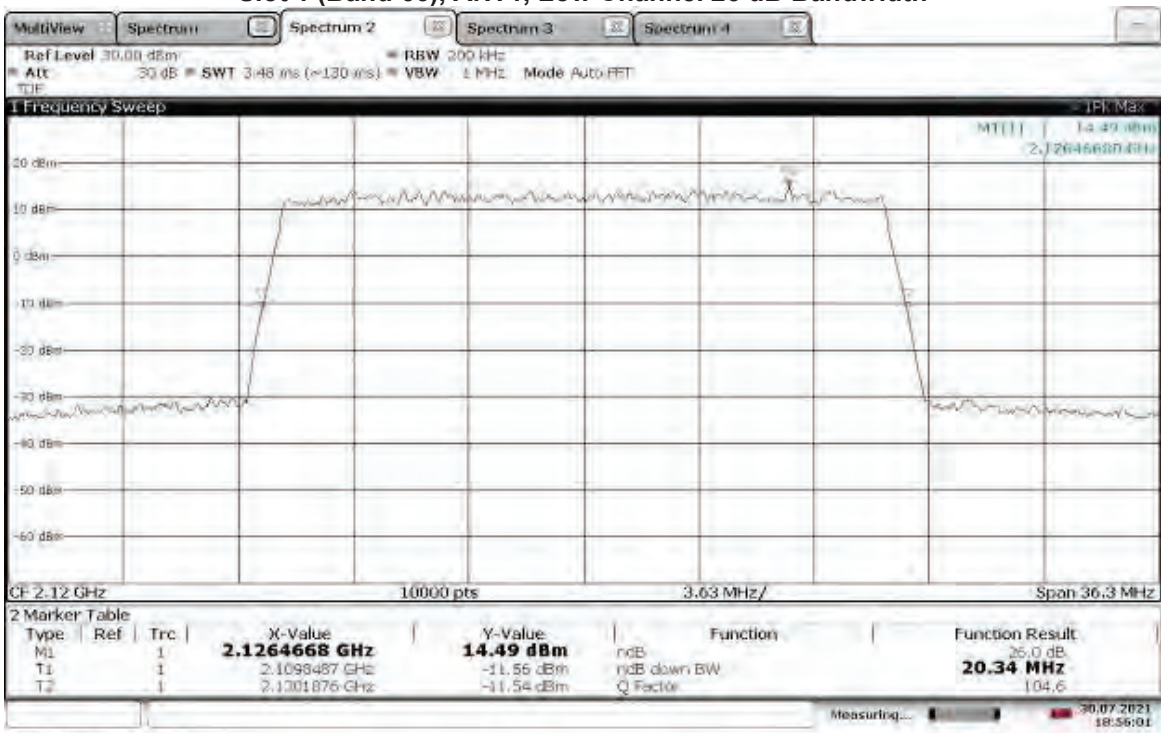


TM3.1a-256QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT0, Low Channel 26 dB Bandwidth



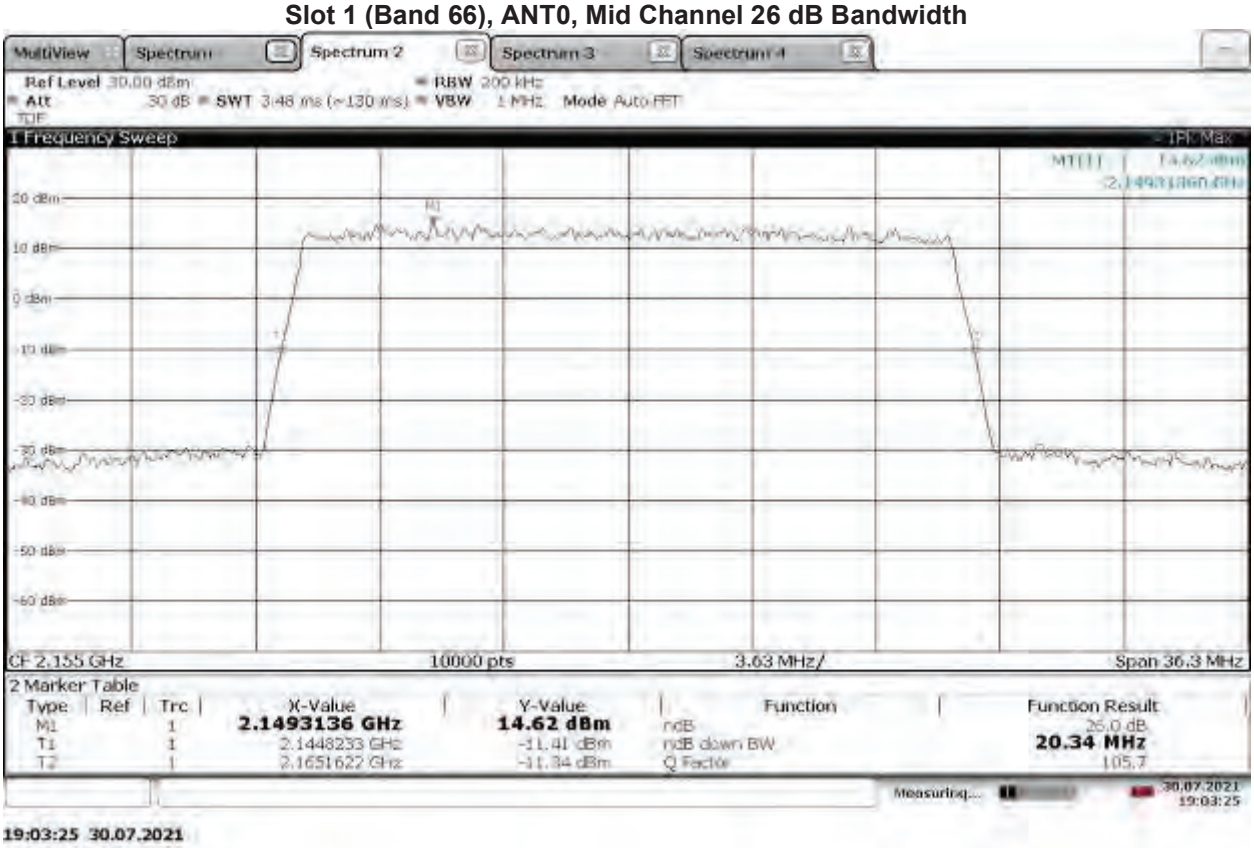
18:58:38 30.07.2021

TM3.1a-256QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT1, Low Channel 26 dB Bandwidth



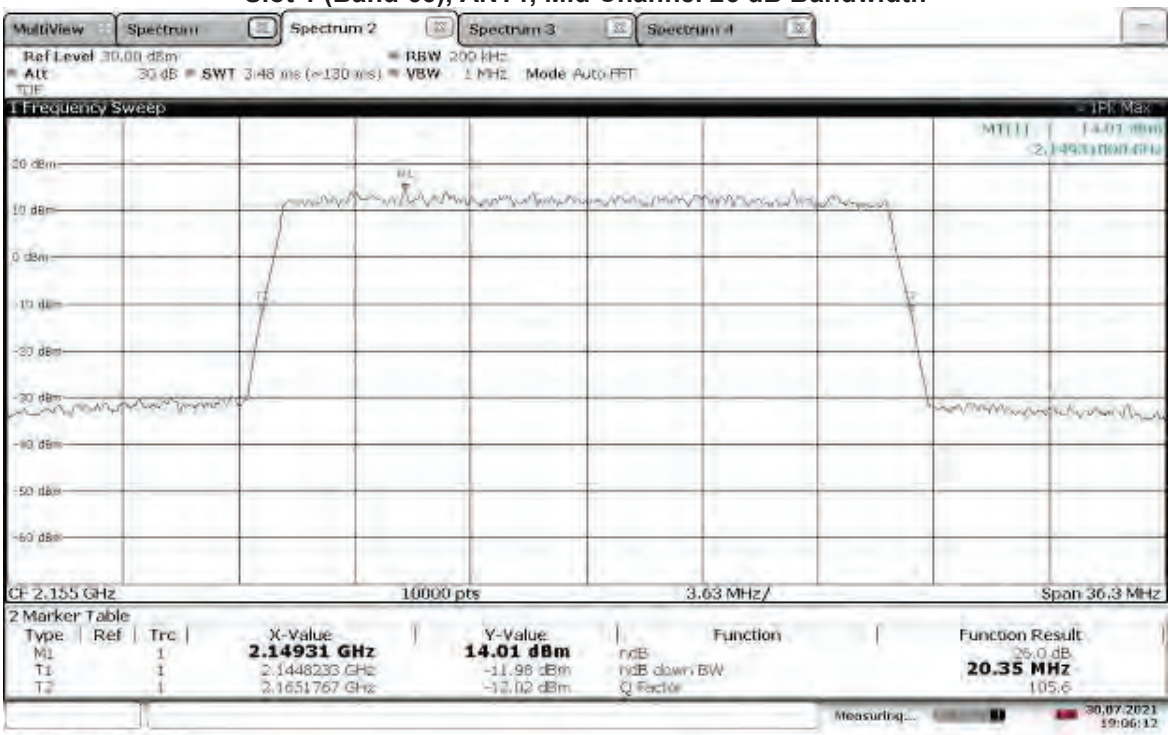
18:56:01 30.07.2021

TM3.1a-256QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT0, Mid Channel 26 dB Bandwidth



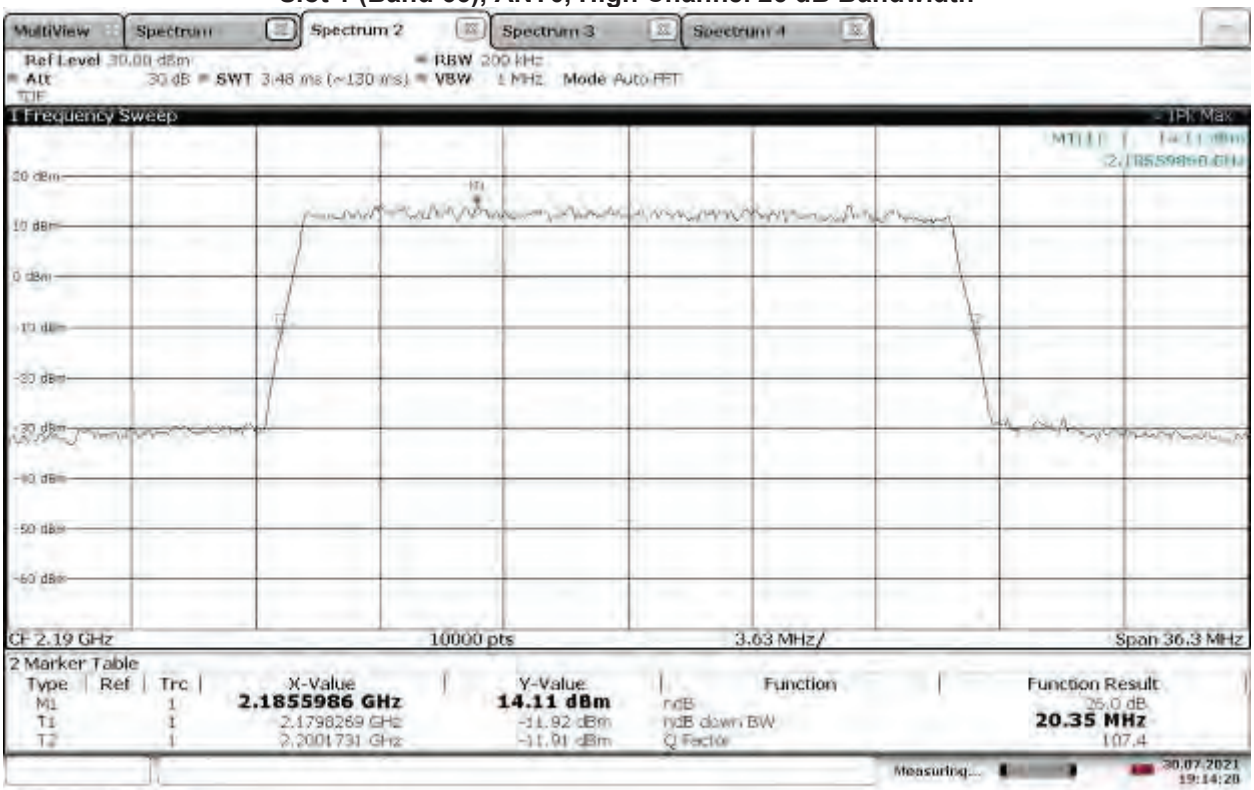
19:03:25 30.07.2021

TM3.1a-256QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT1, Mid Channel 26 dB Bandwidth

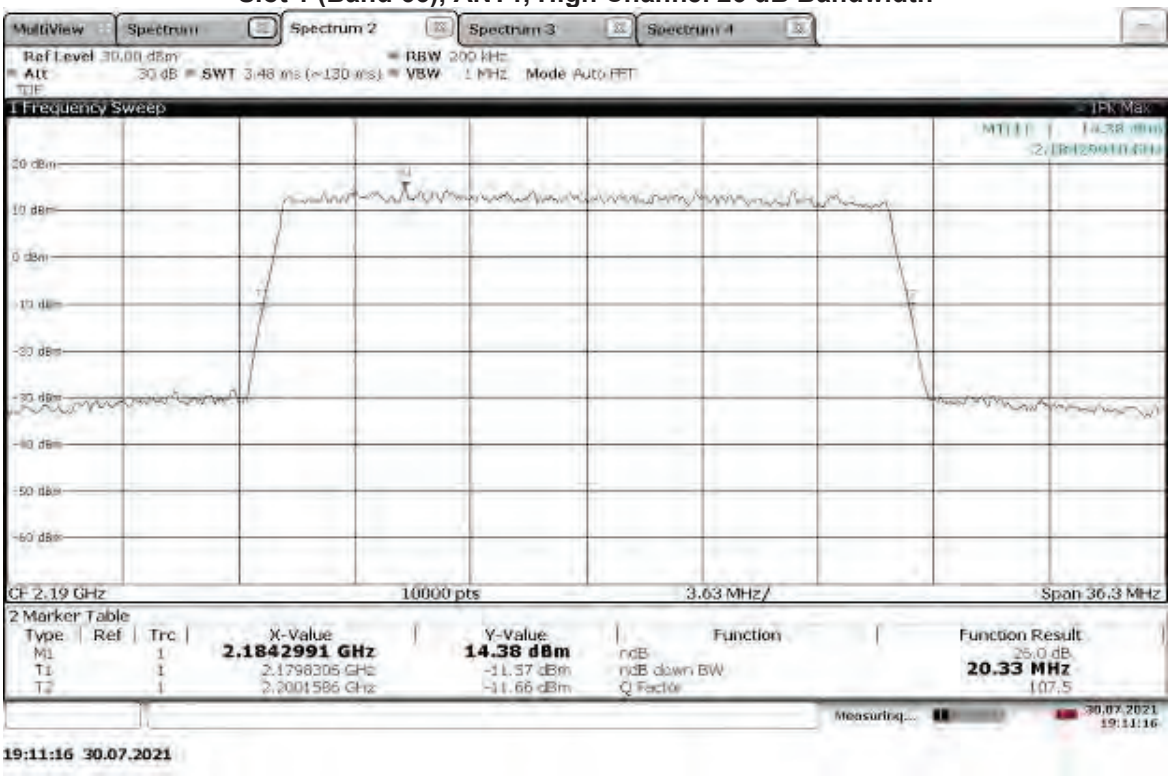


19:06:12 30.07.2021

TM3.1a-256QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT0, High Channel 26 dB Bandwidth



TM3.1a-256QAM_20 MHz Bandwidth
Slot 1 (Band 66), ANT1, High Channel 26 dB Bandwidth



Test Personnel:	Kouma Sinn KPS	Test Date:	07/29/2021, 07/30/2021
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 27	Limit Applied:	See report section 8.3
Input Voltage:	48 VDC (POE)		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	24, 22 ºC
		Relative Humidity:	62, 48 %
		Atmospheric Pressure:	996, 997 mbars

Deviations, Additions, or Exclusions: None

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

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	01/22/2021	01/22/2022
CBLSHF204'	Cable, SMA - SMA, 9kHz -40GHz, (Cable Kit 5)	Huber + Suhner	Sucoflex 102EA	234714001	02/03/2021	02/03/2022
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	10/27/2020	10/27/2021
DAV005'	Weather Station	Davis	6250	MS191218083	02/07/2021	02/07/2022

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.

Slot 1 (Band 66), Bandwidth: 5 MHz, Modulation: TM1.1-QPSK

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2112.50	ANT0	-32.01
		ANT1	-32.09
High	2197.50	ANT0	-26.37
		ANT1	-27.52

Slot 1 (Band 66), Bandwidth: 10 MHz, Modulation: TM1.1-QPSK

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2115.00	ANT0	-30.40
		ANT1	-30.64
High	2195.00	ANT0	-28.11
		ANT1	-28.85

Slot 1 (Band 66), Bandwidth: 15 MHz, Modulation: TM1.1-QPSK

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2117.50	ANT0	-30.33
		ANT1	-29.58
High	2192.50	ANT0	-29.08
		ANT1	-29.36

Slot 1 (Band 66), Bandwidth: 20 MHz, Modulation: TM1.1-QPSK

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2120.00	ANT0	-32.11
		ANT1	-32.07
High	2190.00	ANT0	-30.55
		ANT1	-31.09

Slot 1 (Band 66), Bandwidth: 5 MHz, Modulation: TM3.2-16QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2112.50	ANT0	-31.71
		ANT1	-32.13
High	2197.50	ANT0	-27.02
		ANT1	-27.98

Slot 1 (Band 66), Bandwidth: 10 MHz, Modulation: TM3.2-16QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2115.00	ANT0	-30.64
		ANT1	-29.02
High	2195.00	ANT0	-29.28
		ANT1	-29.86

Slot 1 (Band 66), Bandwidth: 15 MHz, Modulation: TM3.2-16QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2117.50	ANT0	-30.31
		ANT1	-30.39
High	2192.00	ANT0	-28.93
		ANT1	-29.49

Slot 1 (Band 66), Bandwidth: 20 MHz, Modulation: TM3.2-16QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2120.00	ANT0	-32.89
		ANT1	-30.65
High	2190.00	ANT0	-29.73
		ANT1	-30.33

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2112.50	ANT0	-32.26
		ANT1	-32.26
High	2197.50	ANT0	-26.70
		ANT1	-27.62

Slot 1 (Band 66), Bandwidth: 10 MHz, Modulation: TM3.1-64QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2115.00	ANT0	-30.77
		ANT1	-31.67
High	2195.00	ANT0	-28.15
		ANT1	-28.91

Slot 1 (Band 66), Bandwidth: 15 MHz, Modulation: TM3.1-64QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2117.50	ANT0	-32.54
		ANT1	-31.04
High	2192.50	ANT0	-29.25
		ANT1	-29.88

Slot 1 (Band 66), Bandwidth: 20 MHz, Modulation: TM3.1-64QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2120.00	ANT0	-32.76
		ANT1	-31.36
High	2190.00	ANT0	-30.79
		ANT1	-31.30

Slot 1 (Band 66), Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2112.50	ANT0	-32.13
		ANT1	-29.68
High	2197.50	ANT0	-26.73
		ANT1	-27.78

Slot 1 (Band 66), Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2115.00	ANT0	-31.65
		ANT1	-31.02
High	2195.00	ANT0	-28.42
		ANT1	-29.25

Slot 1 (Band 66), Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2117.50	ANT0	-32.98
		ANT1	-32.48
High	2192.50	ANT0	-29.00
		ANT1	-29.63

Slot 1 (Band 66), Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM

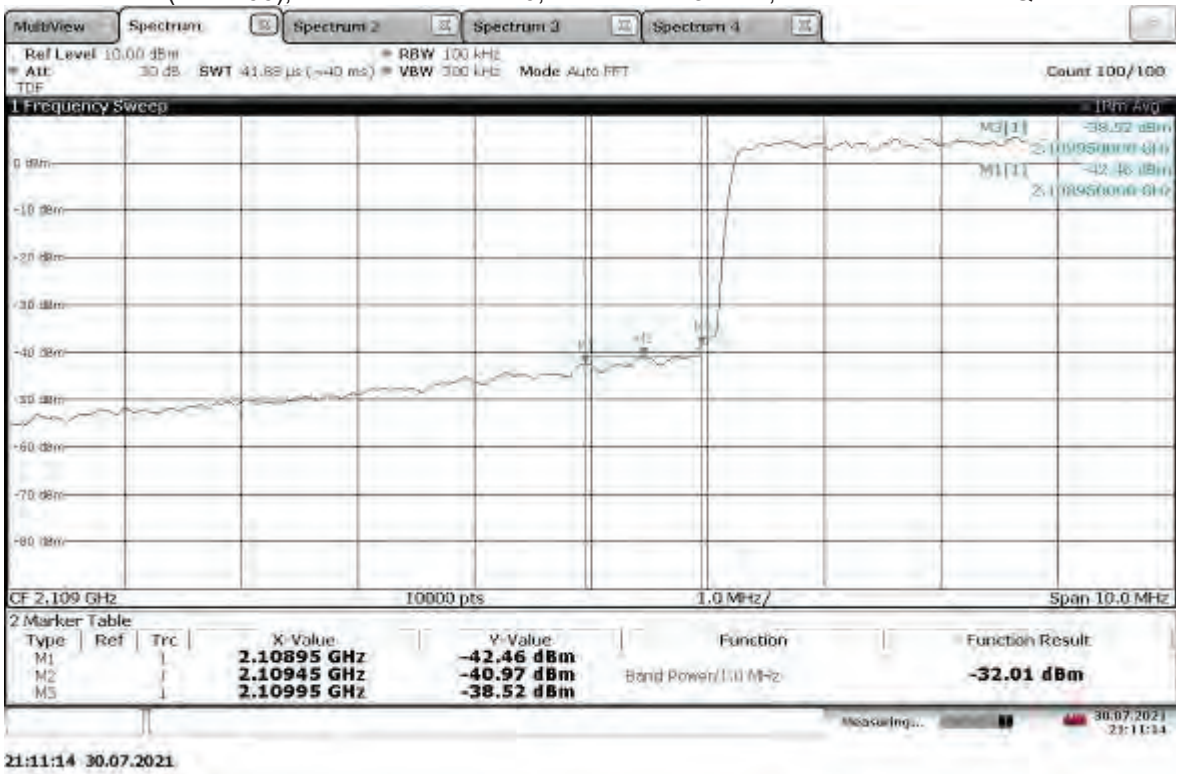
Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2120.00	ANT0	-31.95
		ANT1	-31.96
High	2190.00	ANT0	-29.95
		ANT1	-29.44

9.4 Setup Photograph:

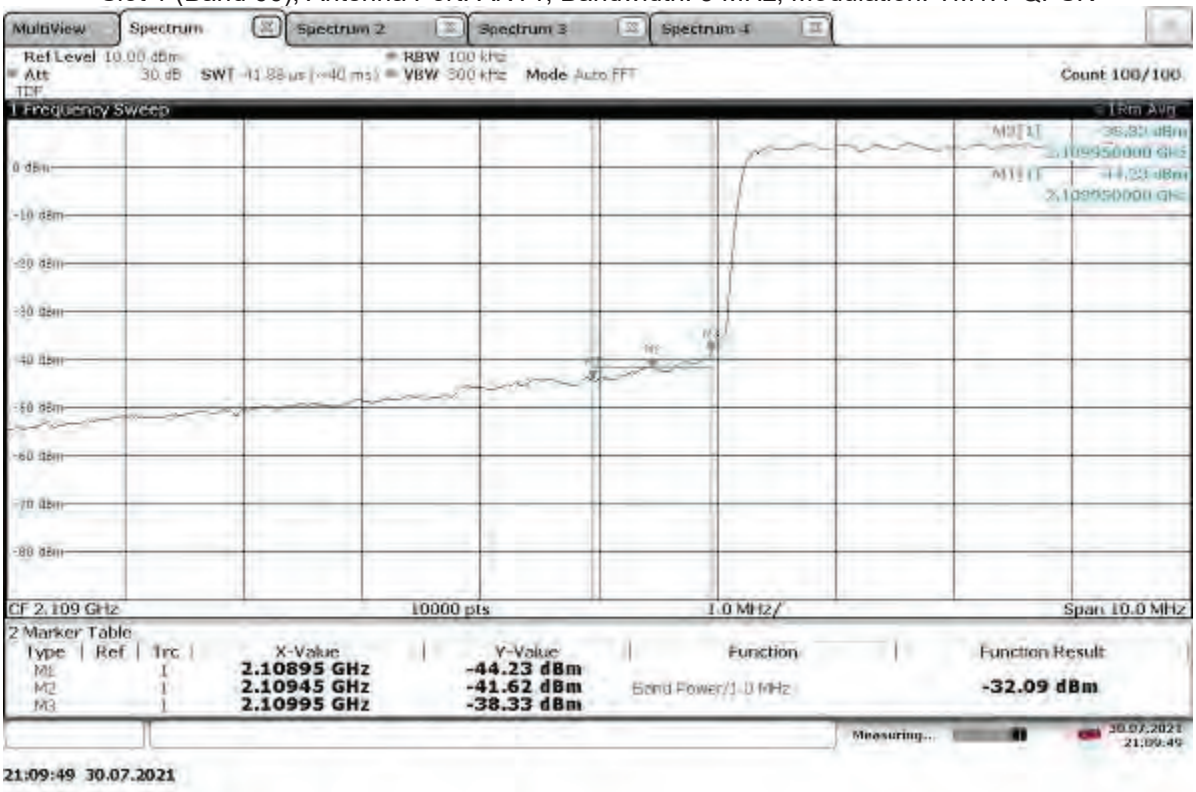
Confidential – Test setup photo not included in this report

9.5 Plots/Data:

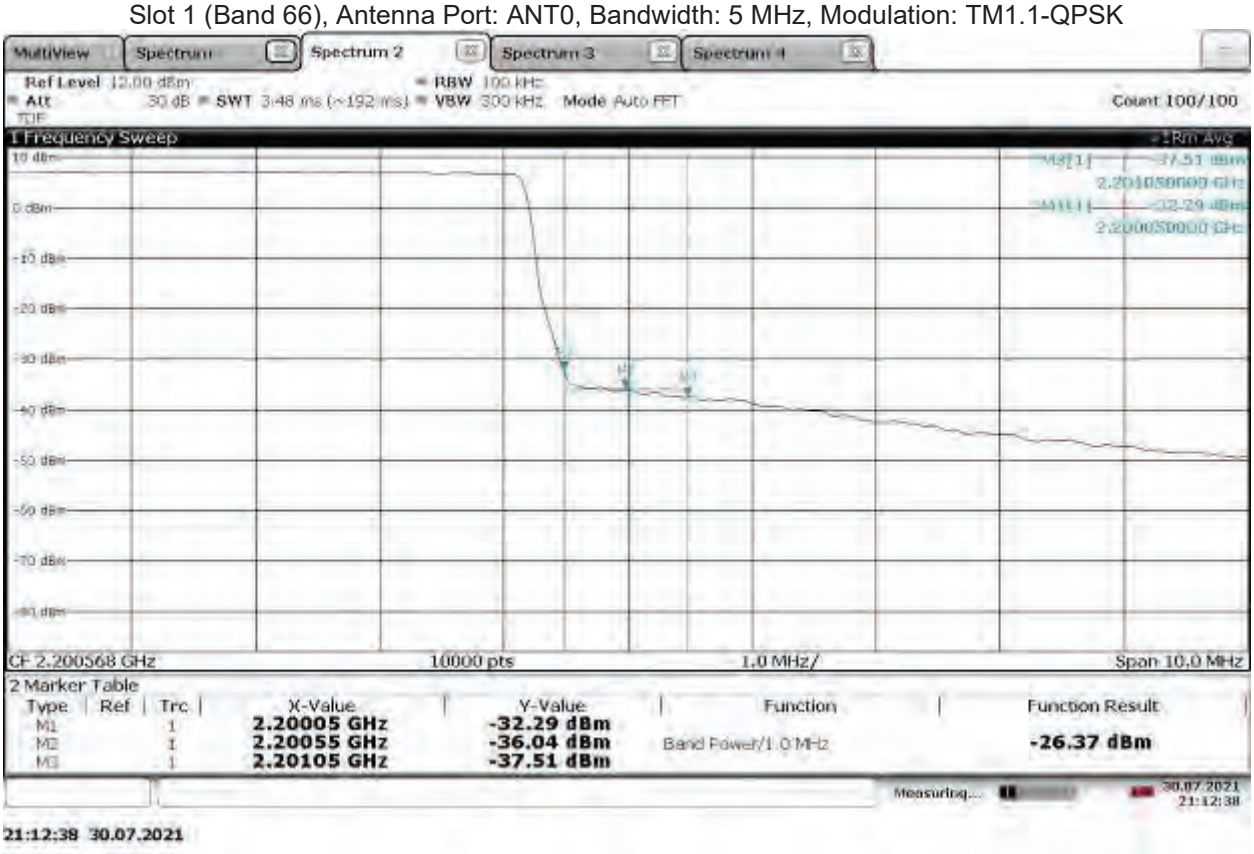
Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



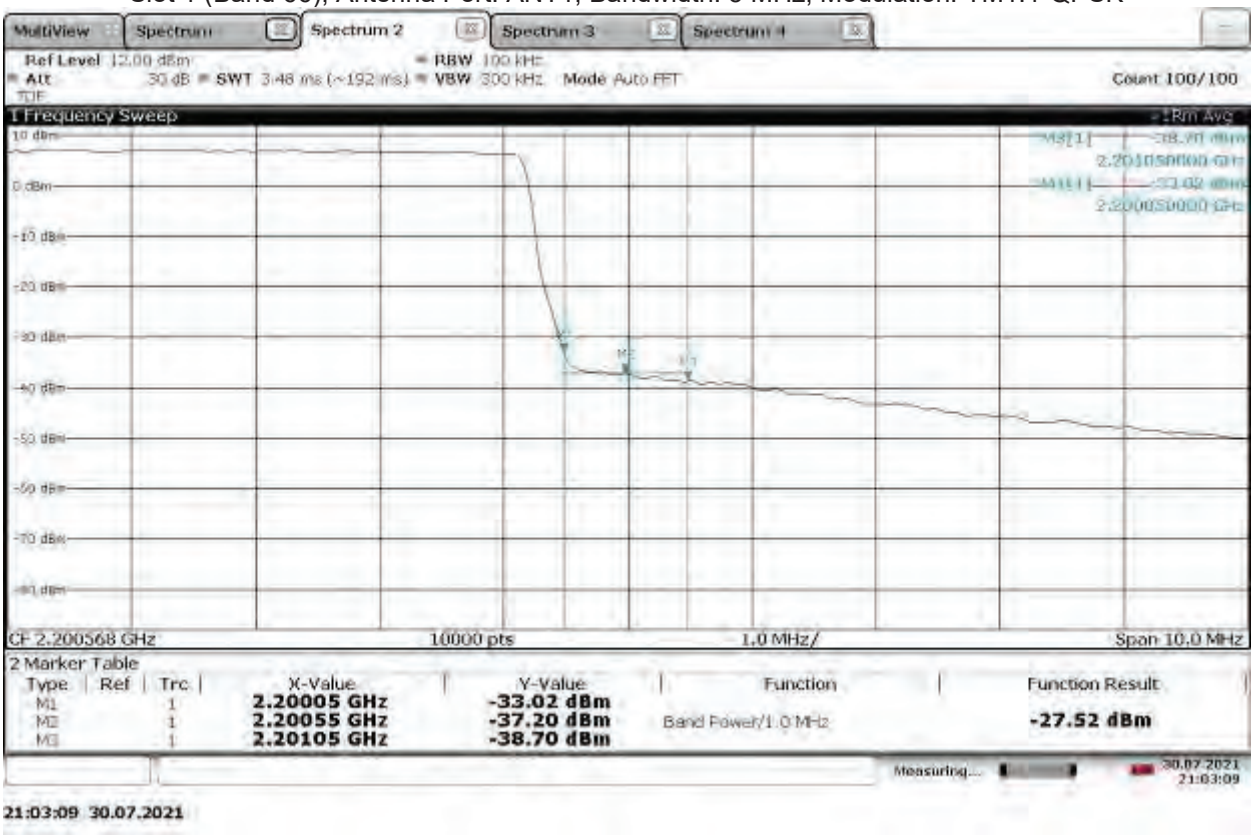
Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



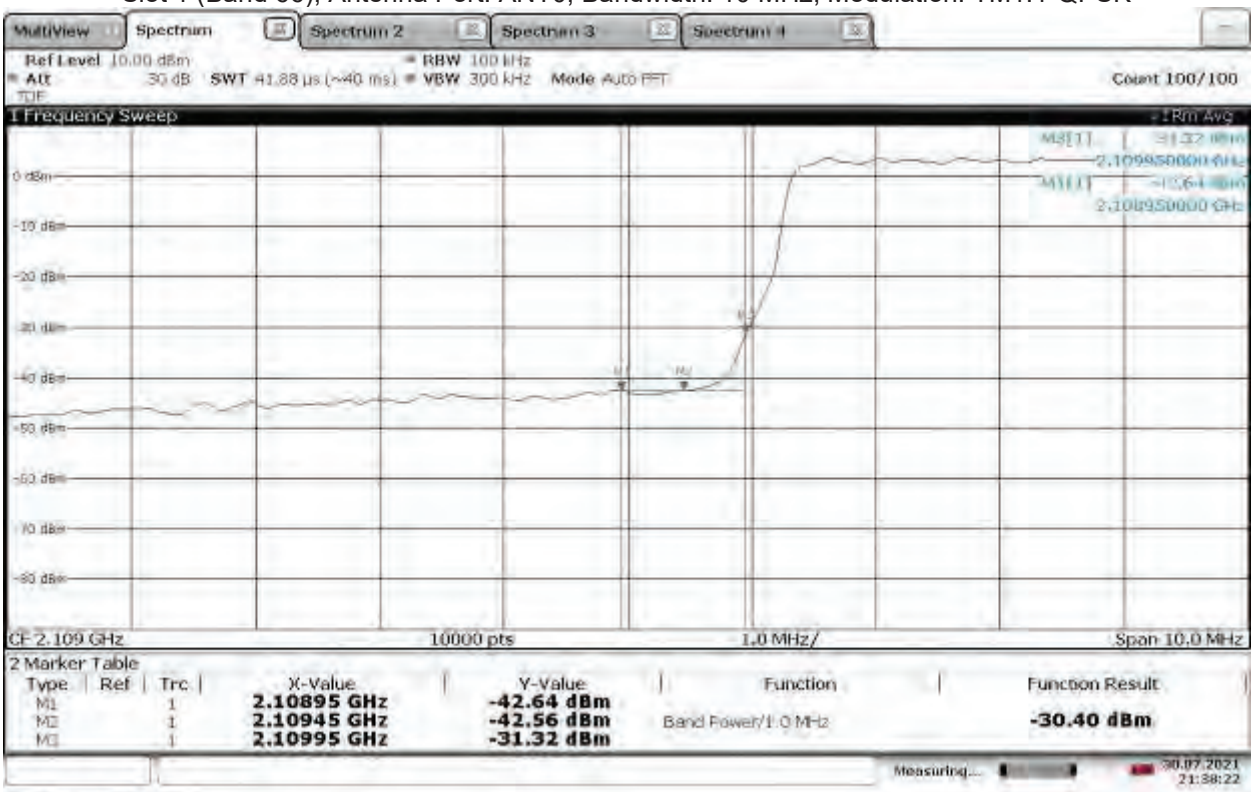
Band Edge Compliant, Upper Band Edge, 2197.5 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



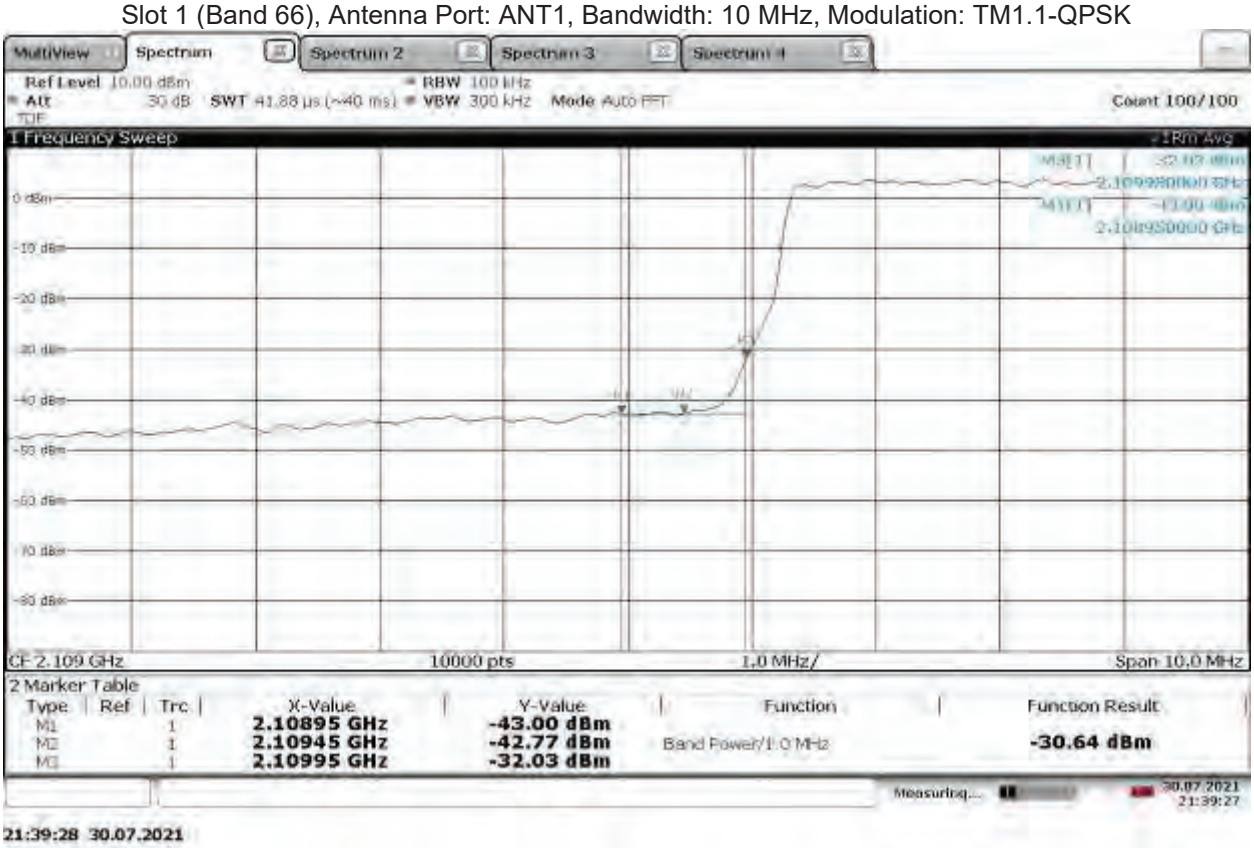
Band Edge Compliant, Upper Band Edge, 2197.5 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



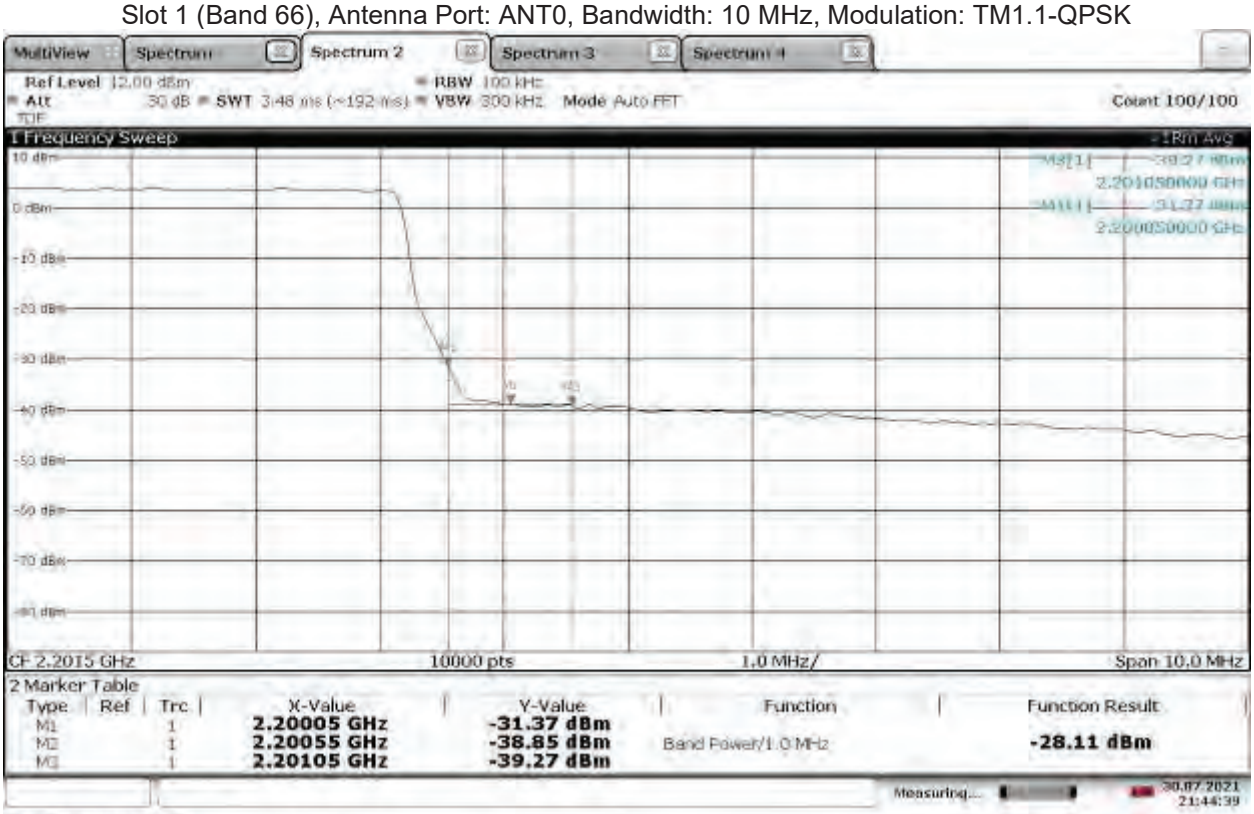
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



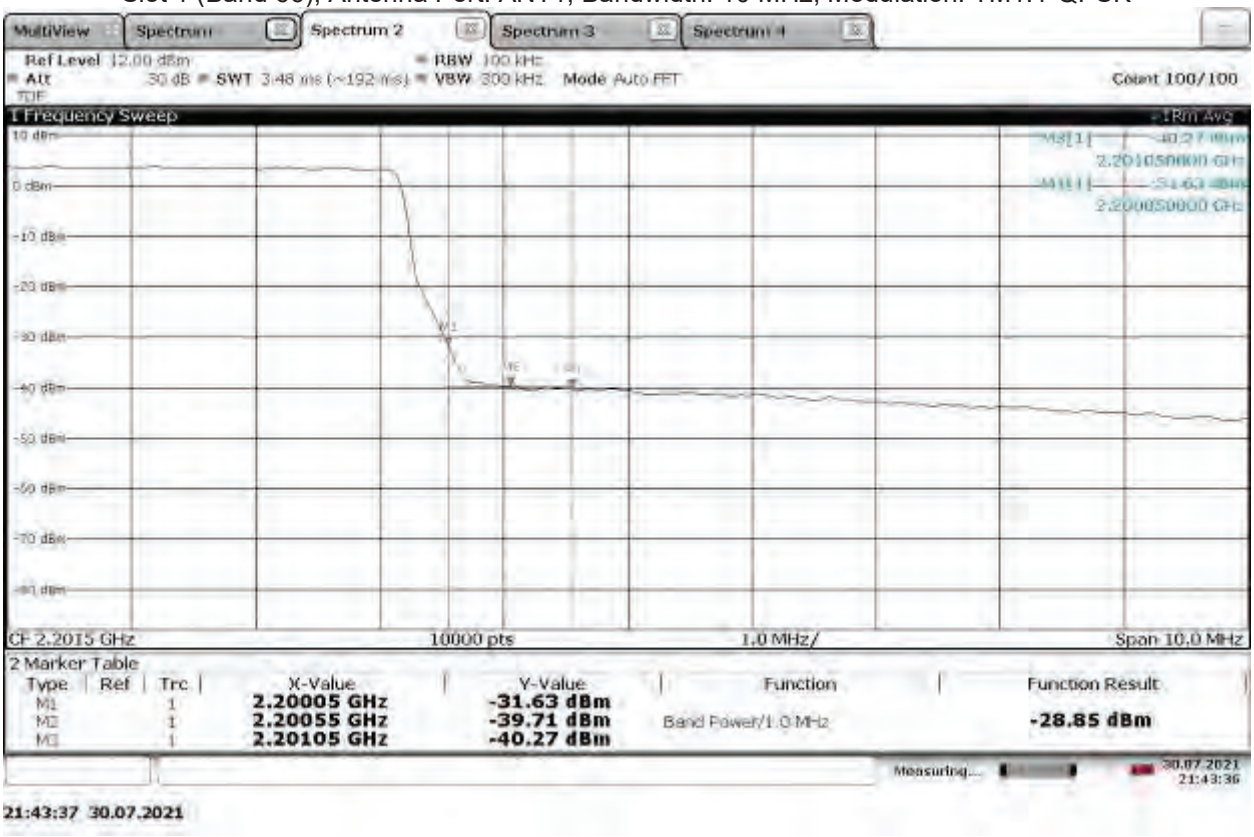
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



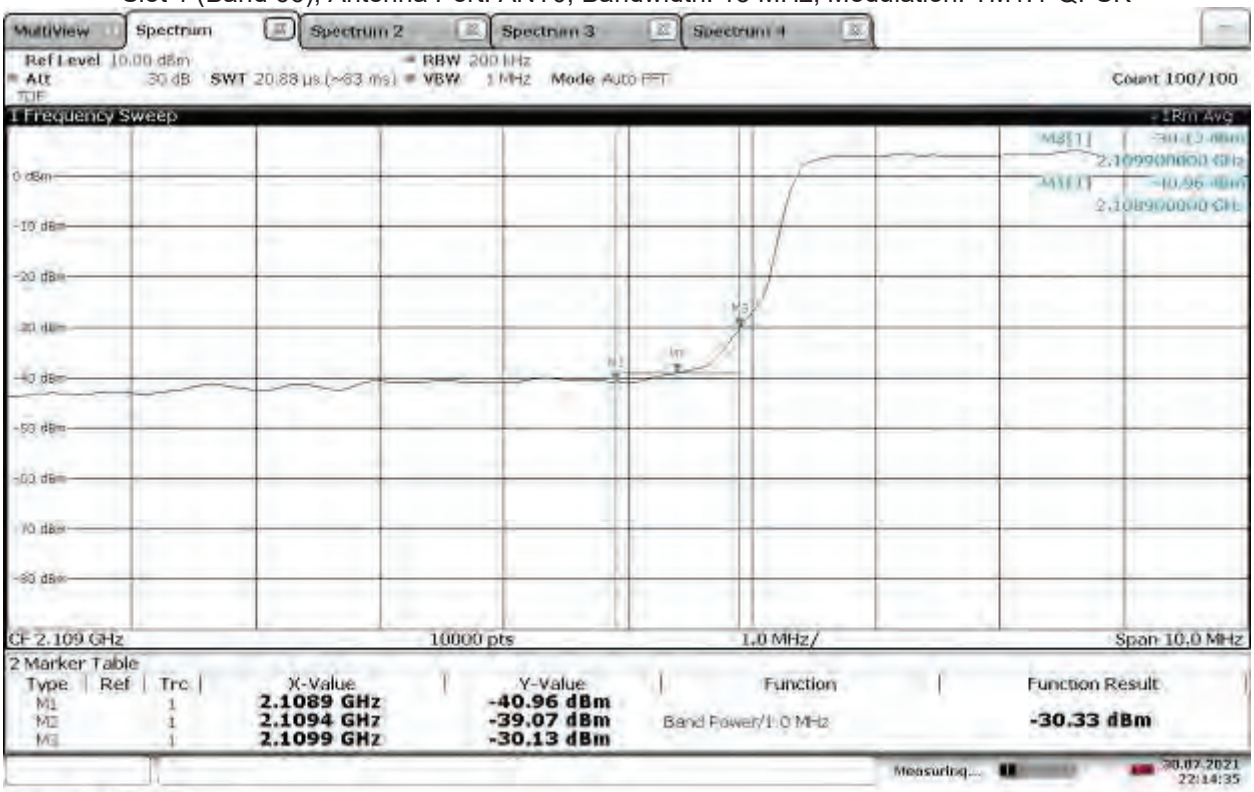
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



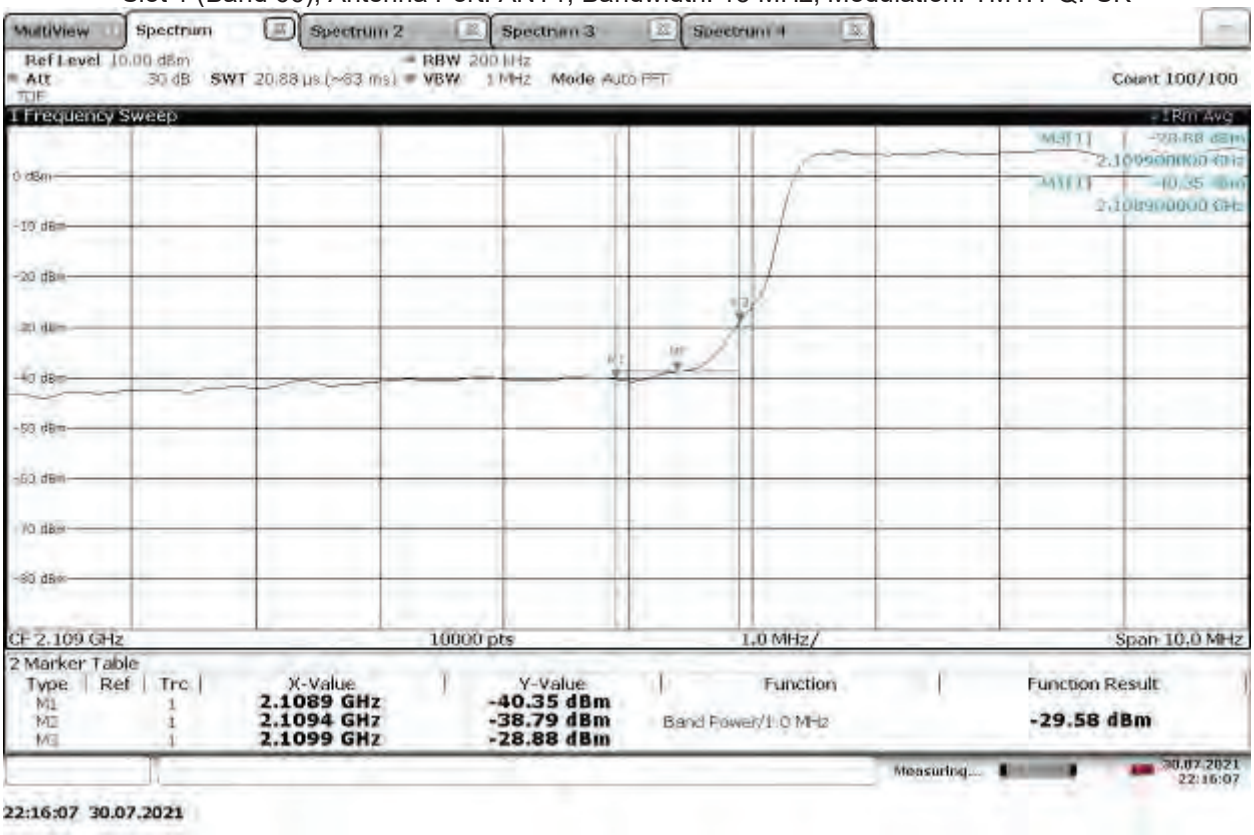
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



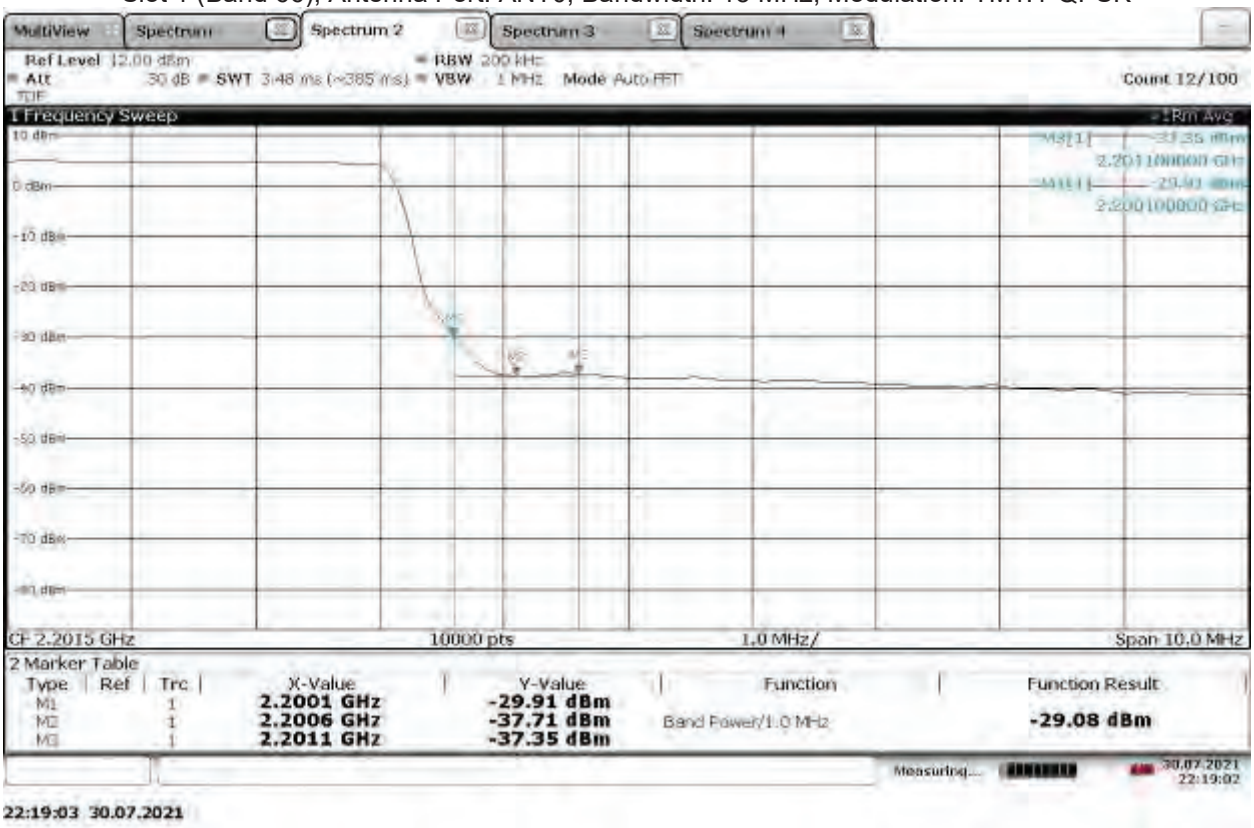
Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



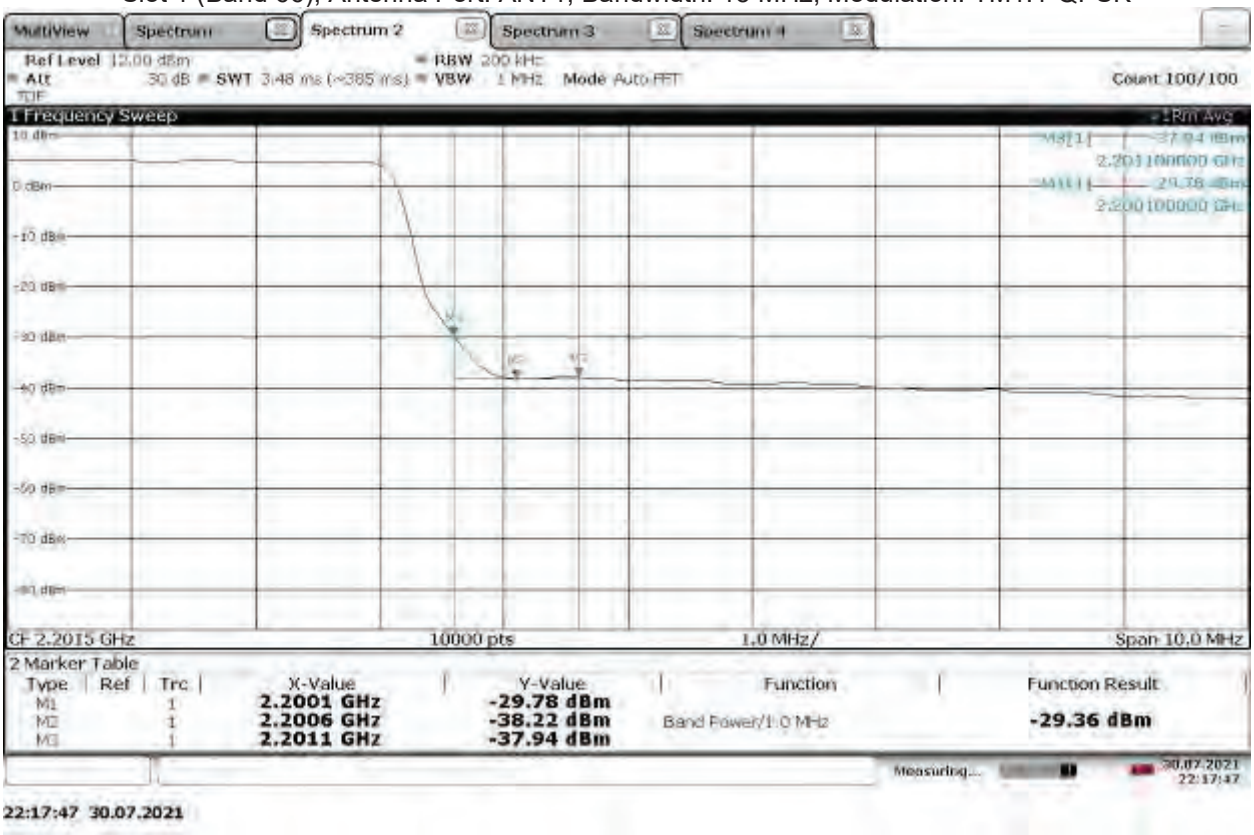
Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



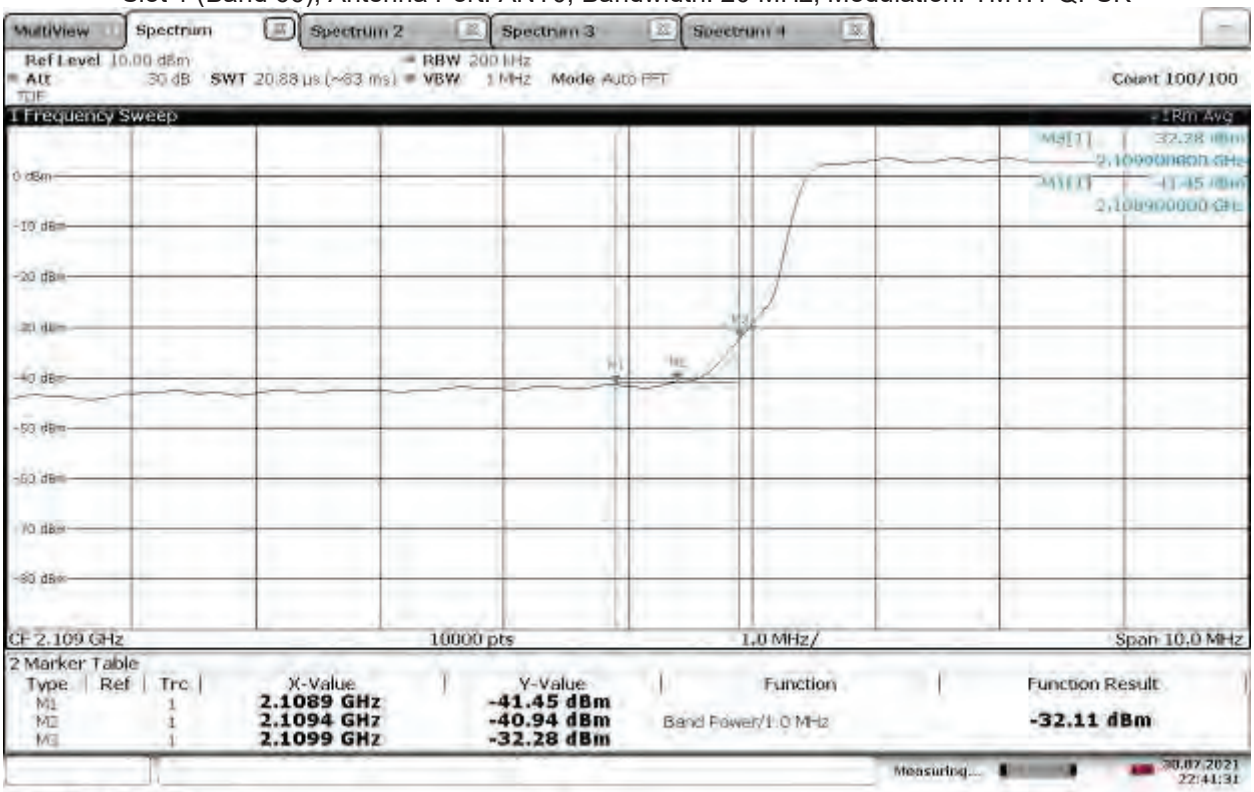
Band Edge Compliant, Upper Band Edge, 2192.5 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



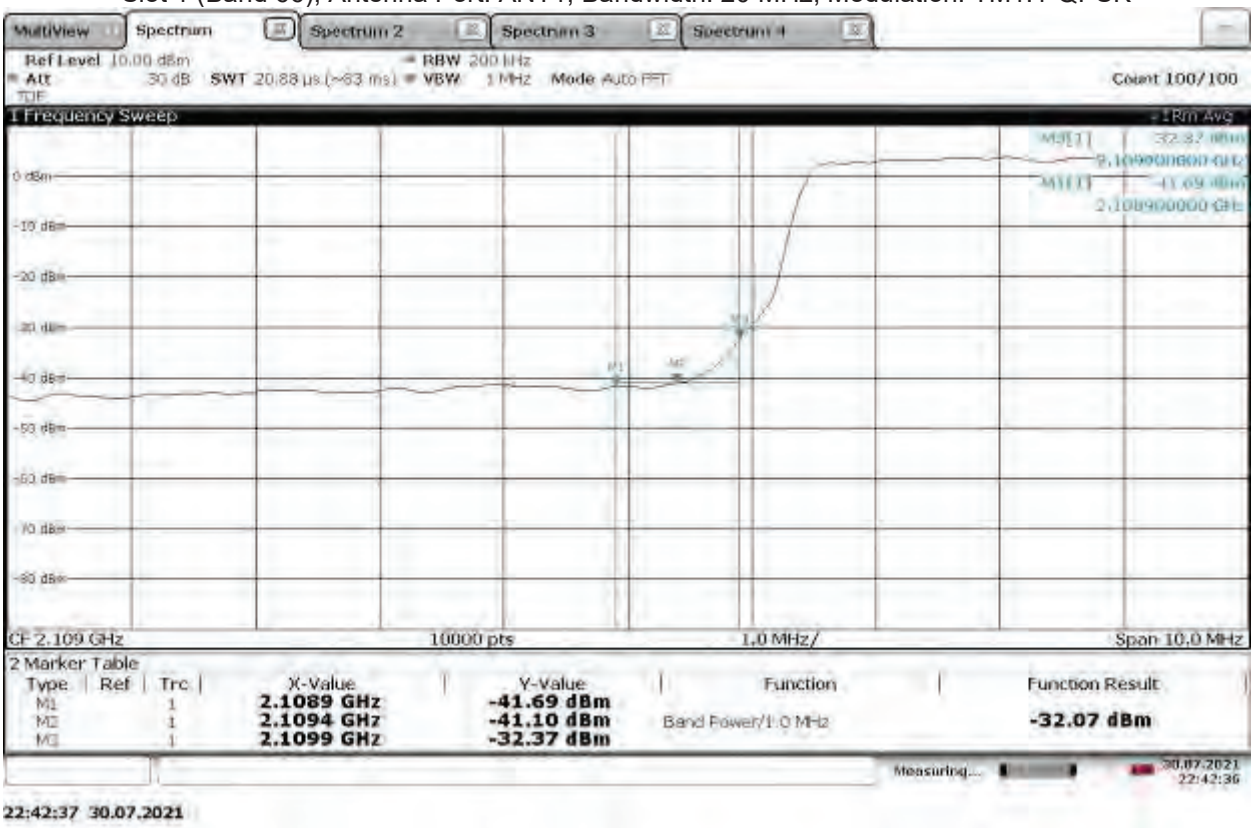
Band Edge Compliant, Upper Band Edge, 2192.5 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



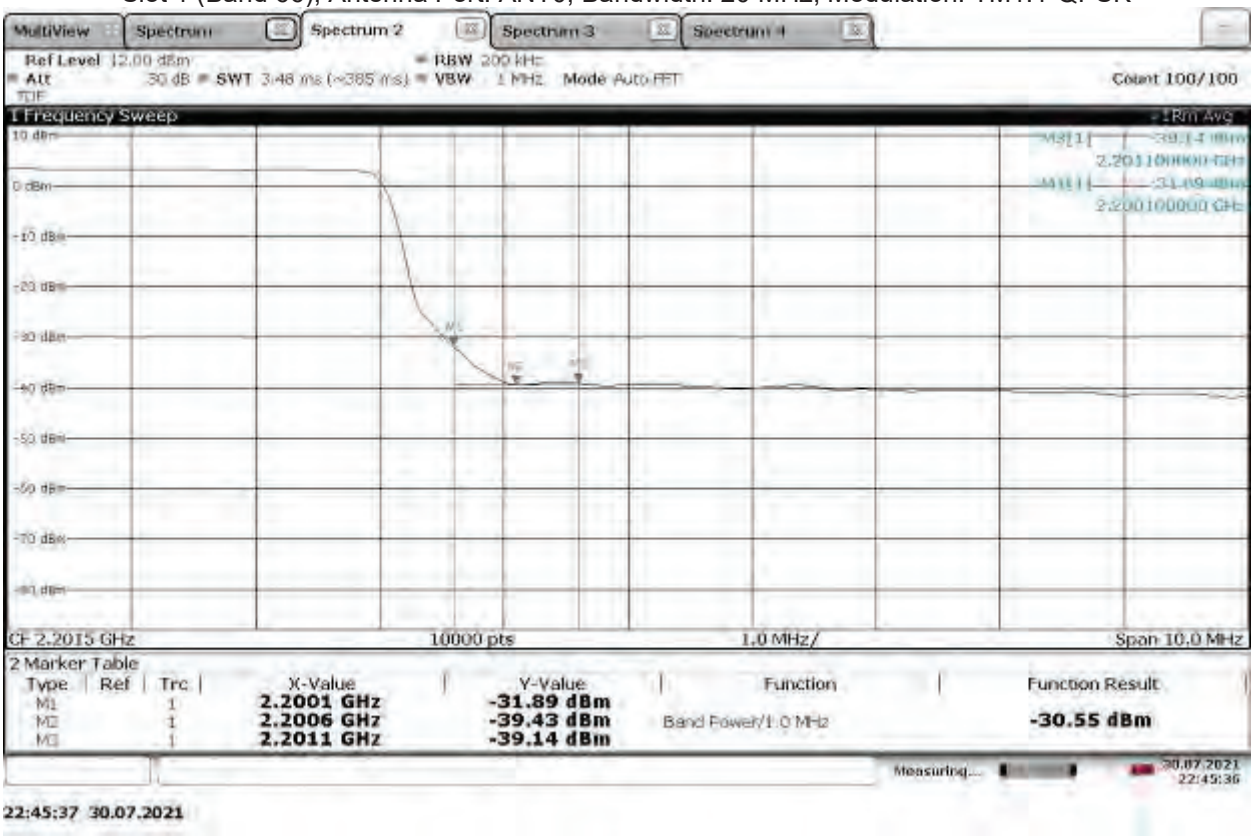
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



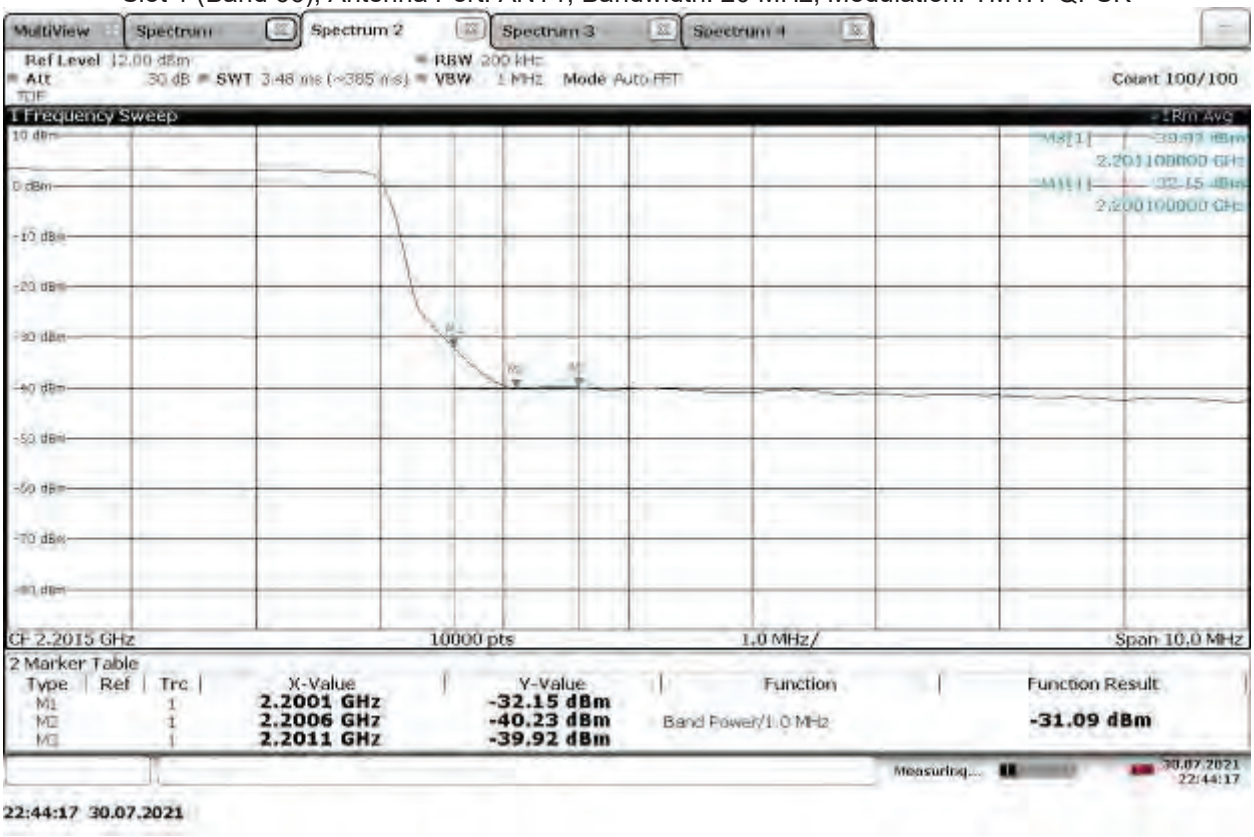
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



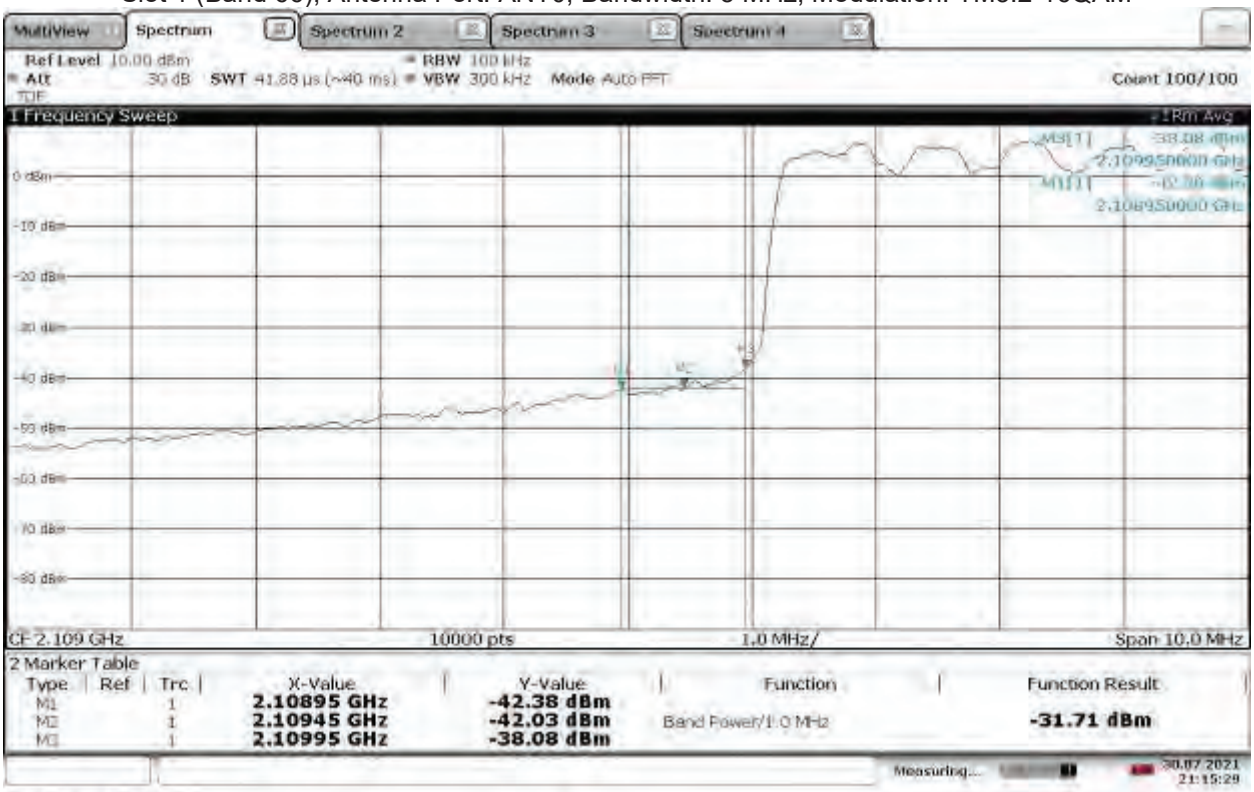
Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



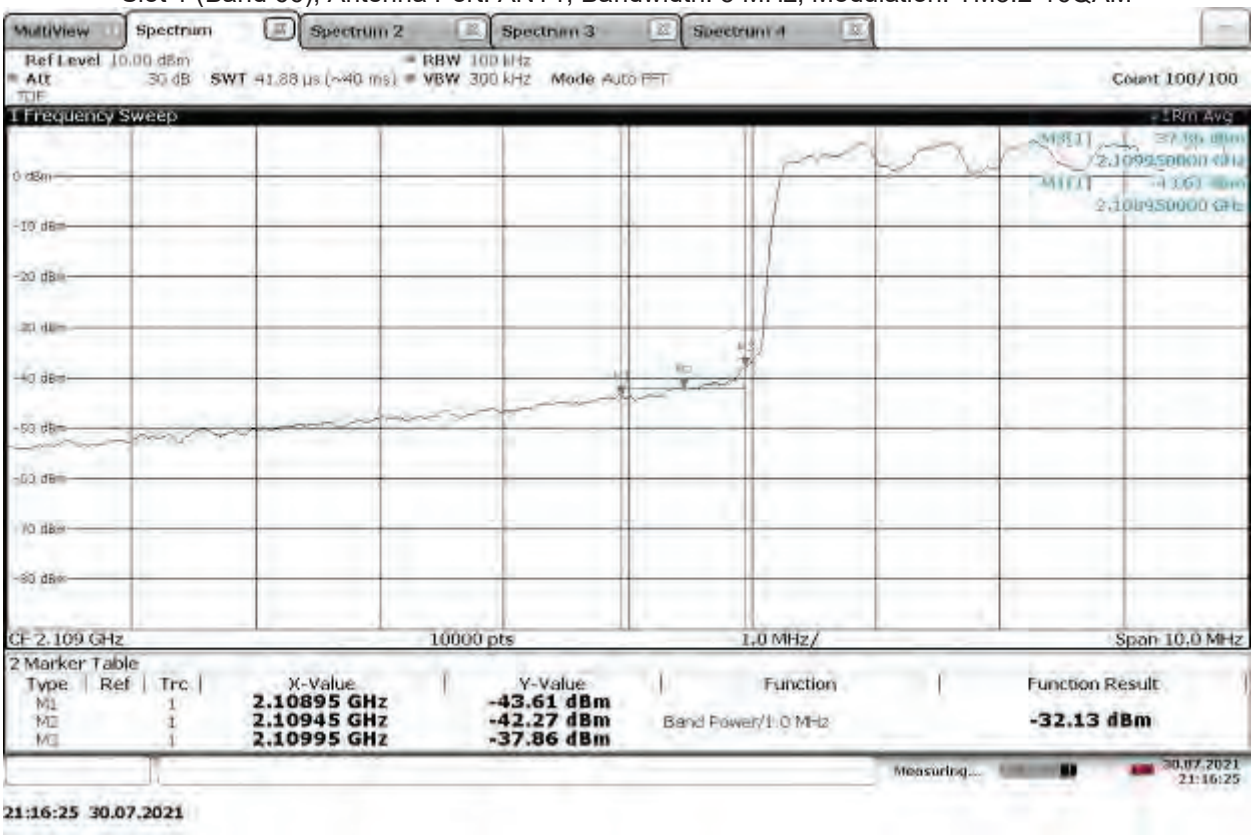
Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



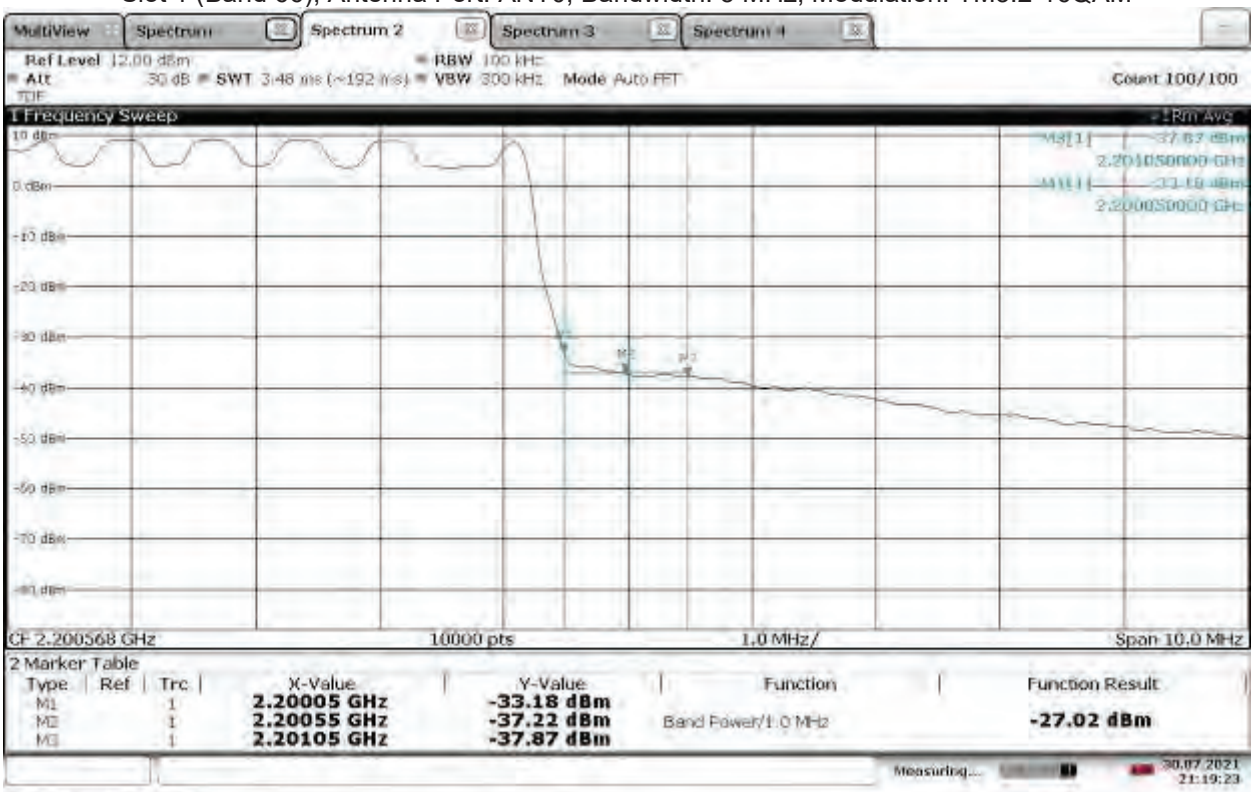
Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



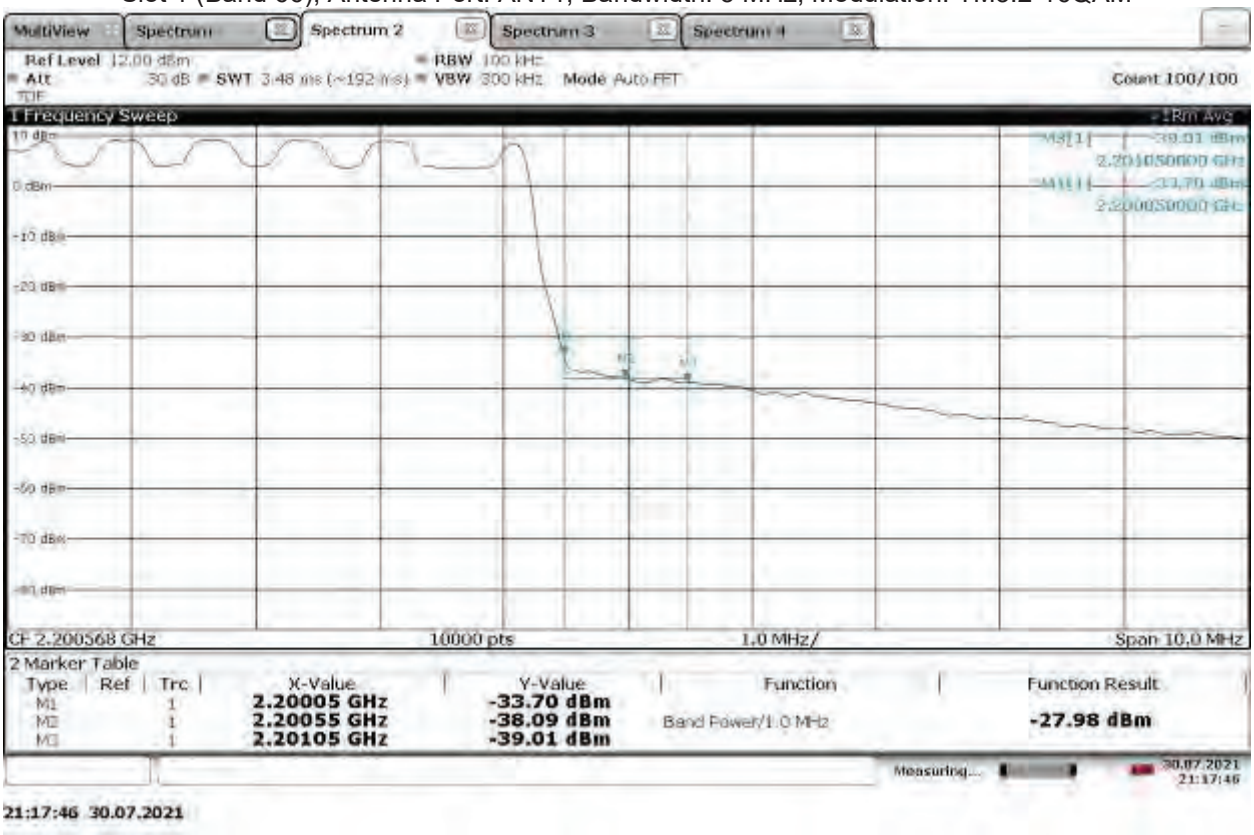
Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



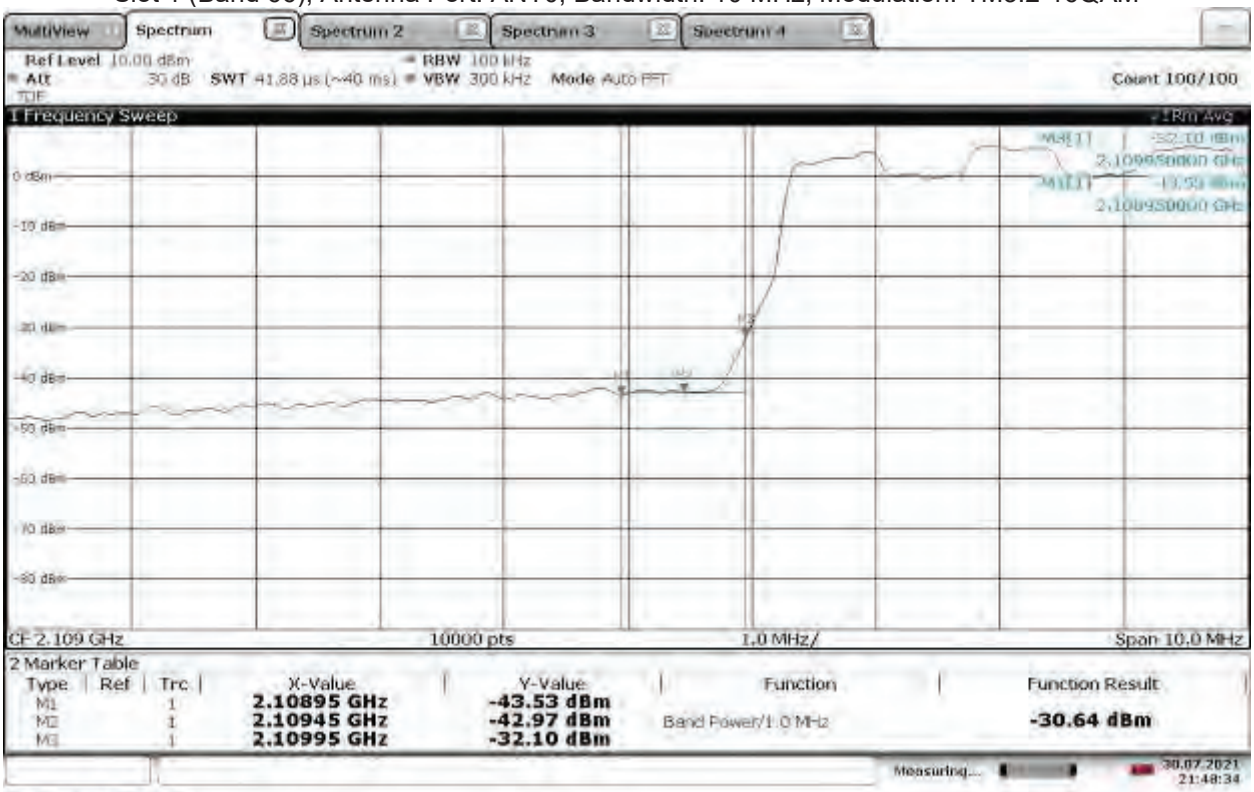
Band Edge Compliant, Upper Band Edge, 2197.5 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



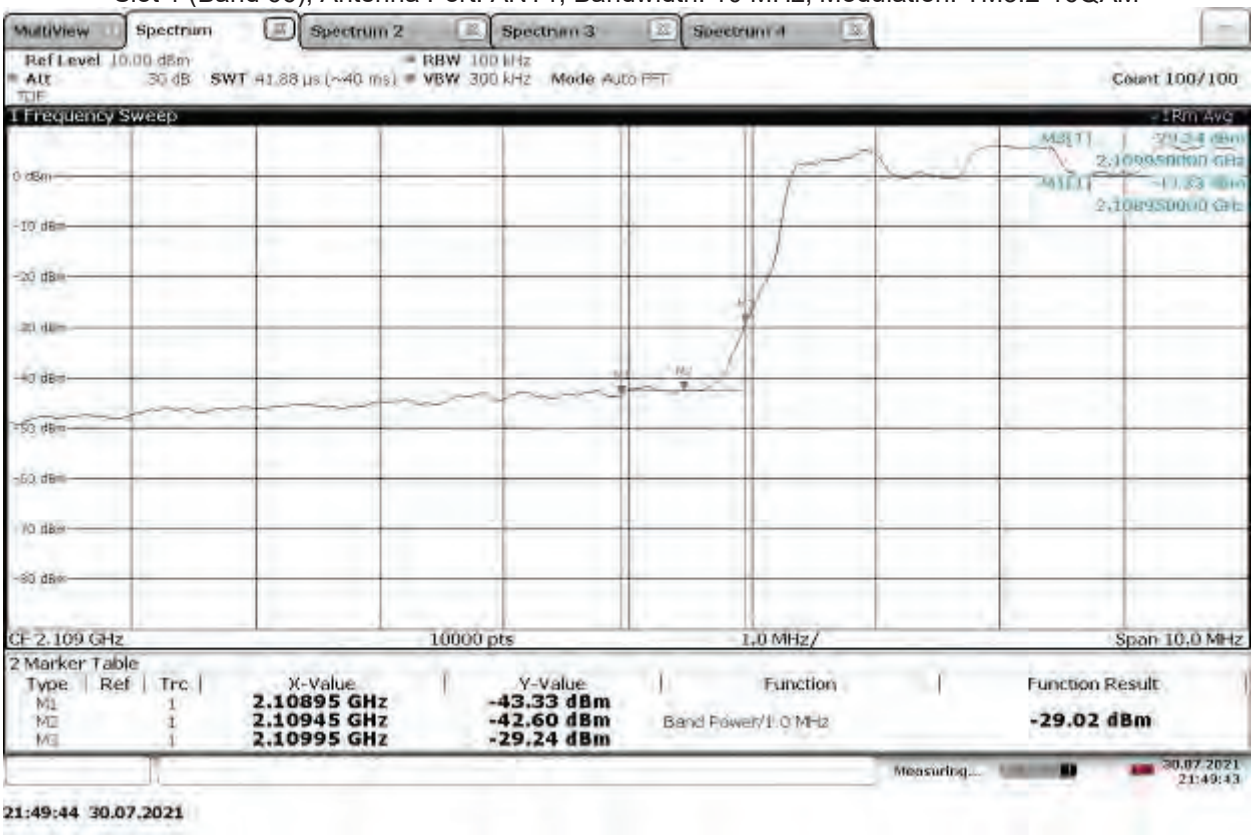
Band Edge Compliant, Upper Band Edge, 2197.5 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



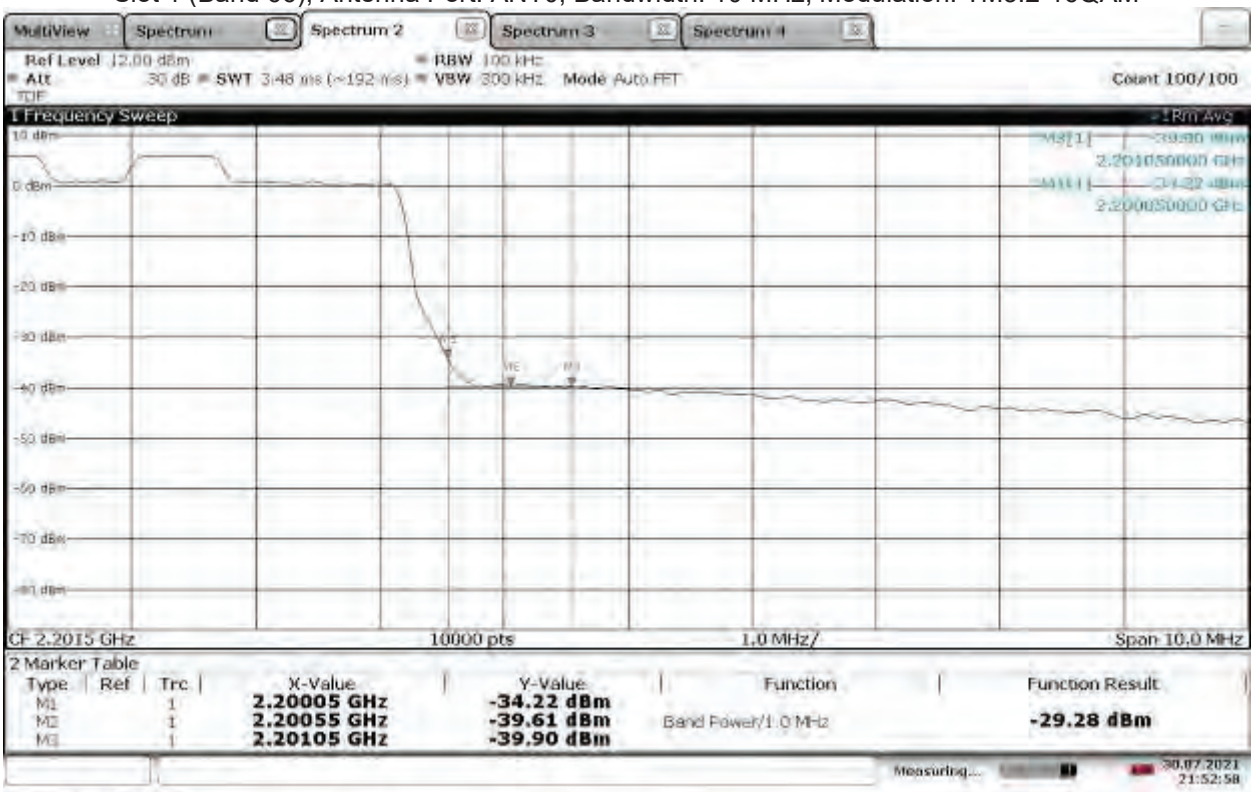
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



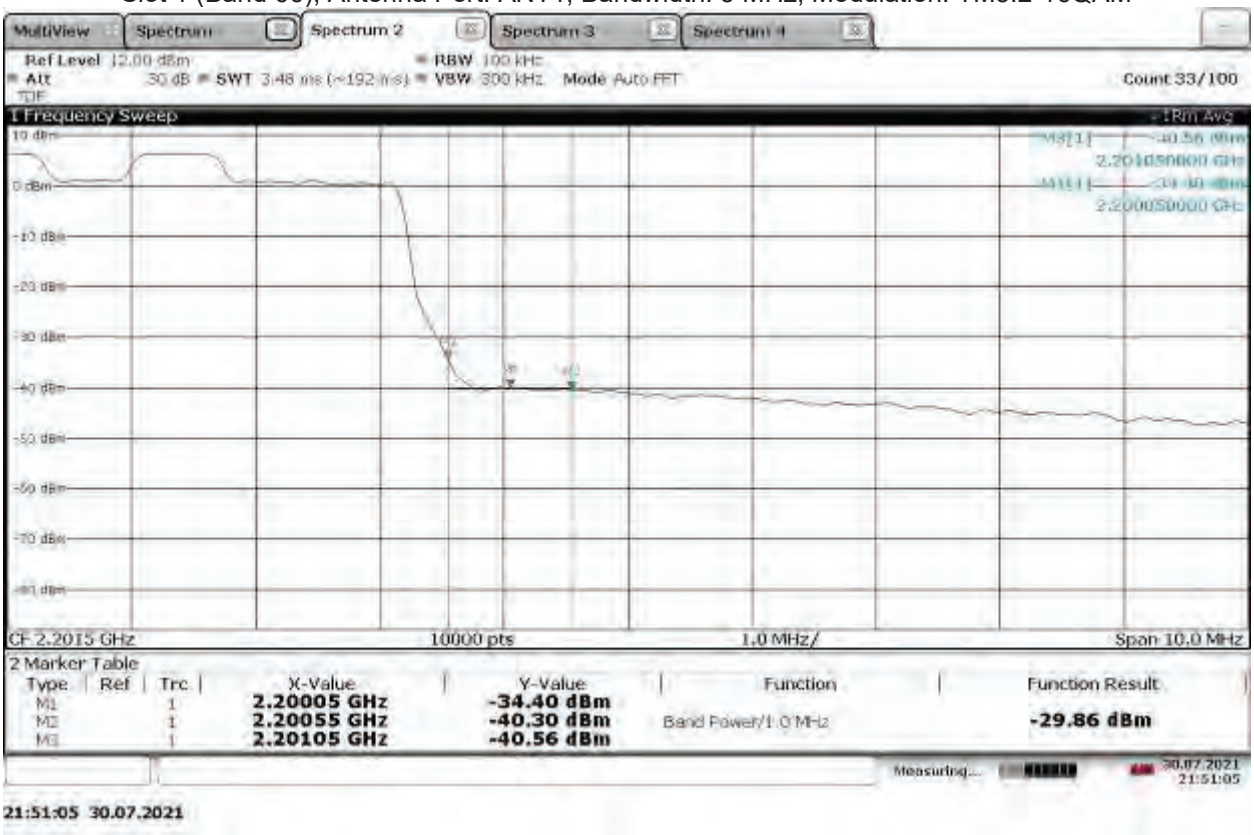
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



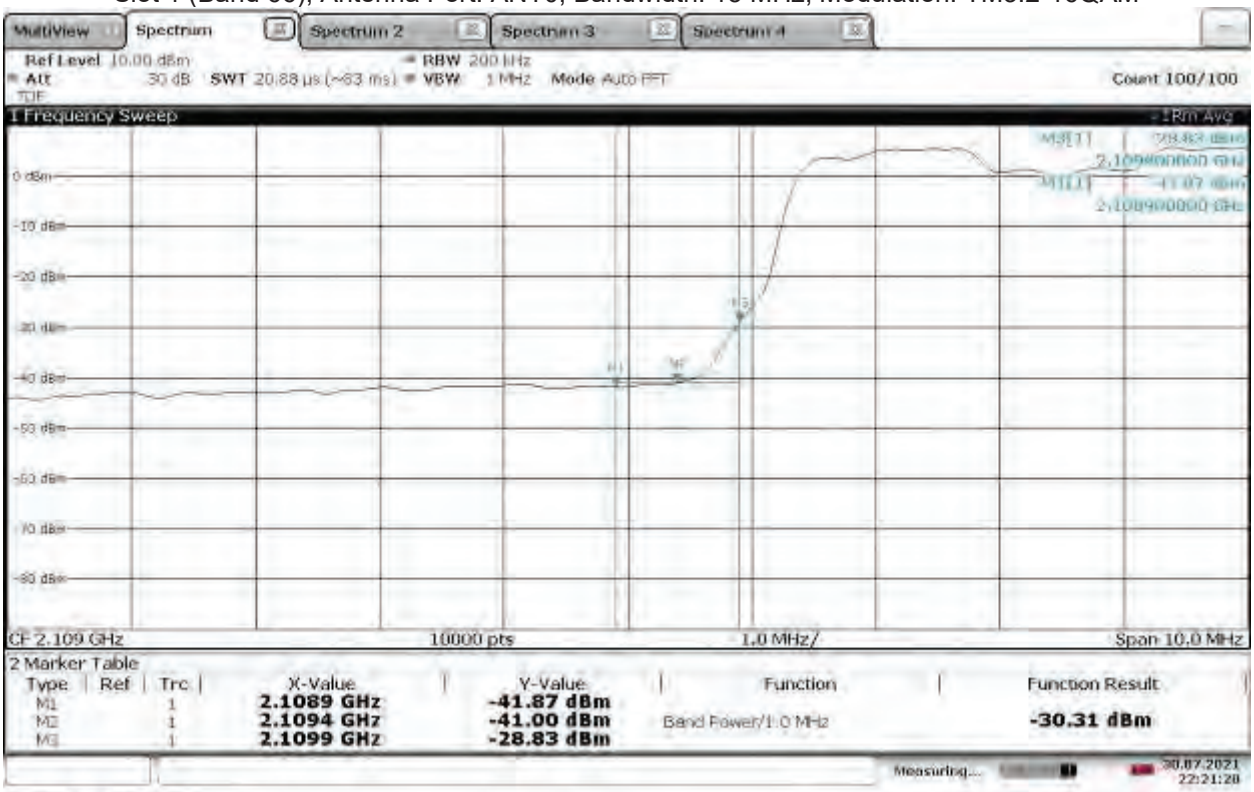
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



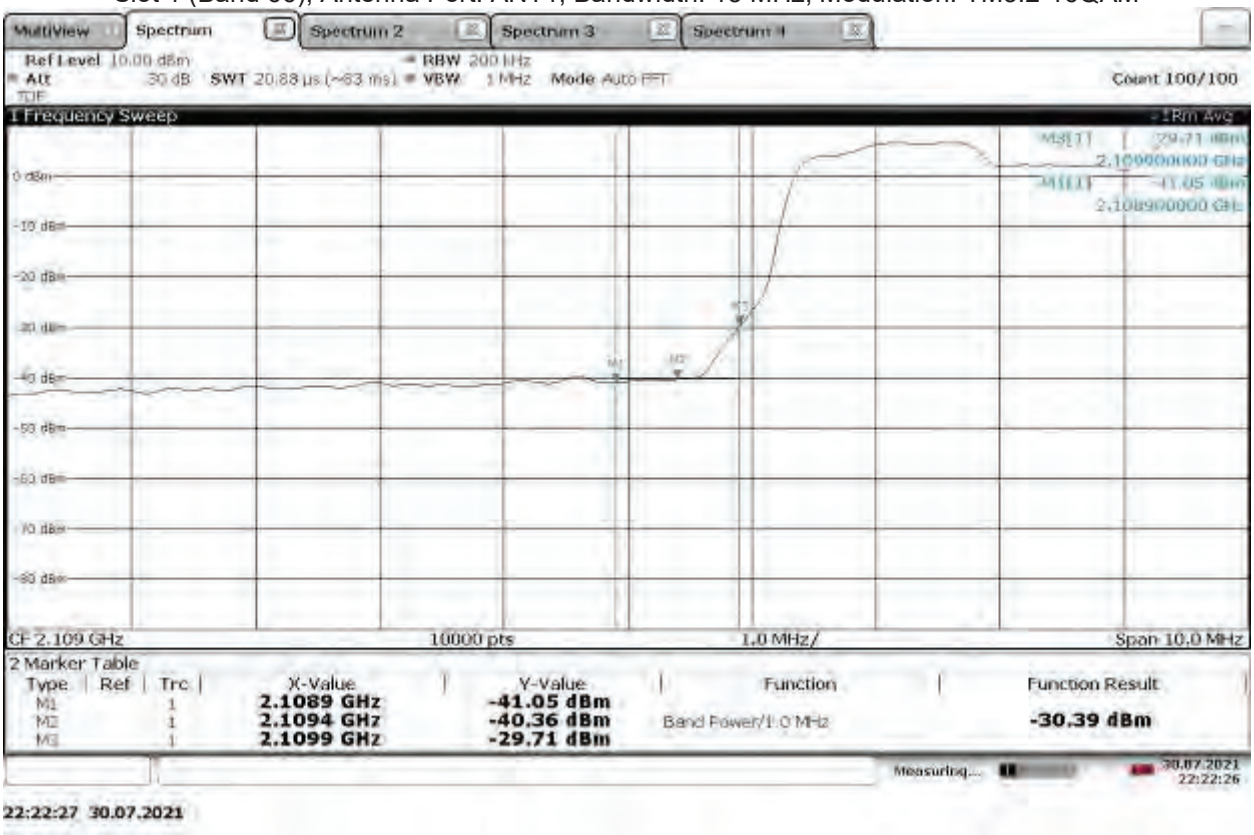
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



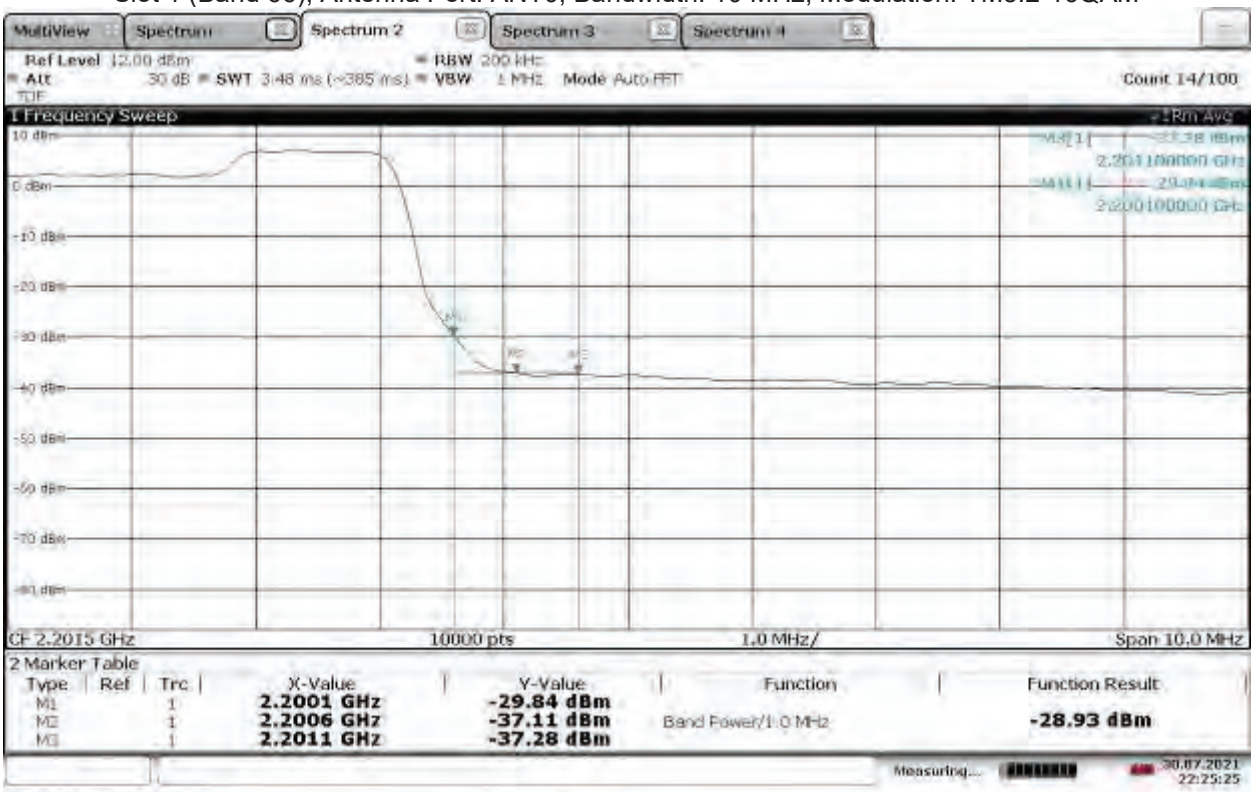
Band Edge Compliant, Lower Band Edge, 2117.50 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



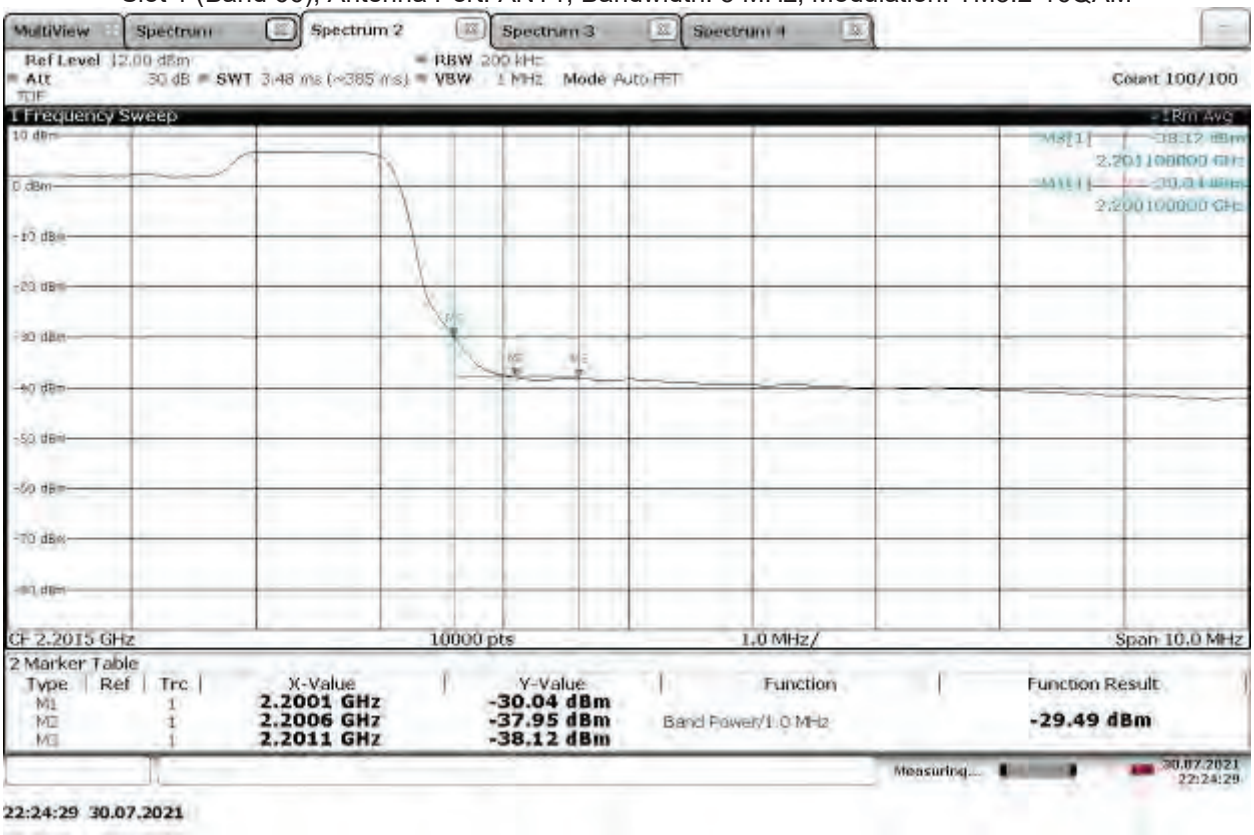
Band Edge Compliant, Lower Band Edge, 2117.50 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



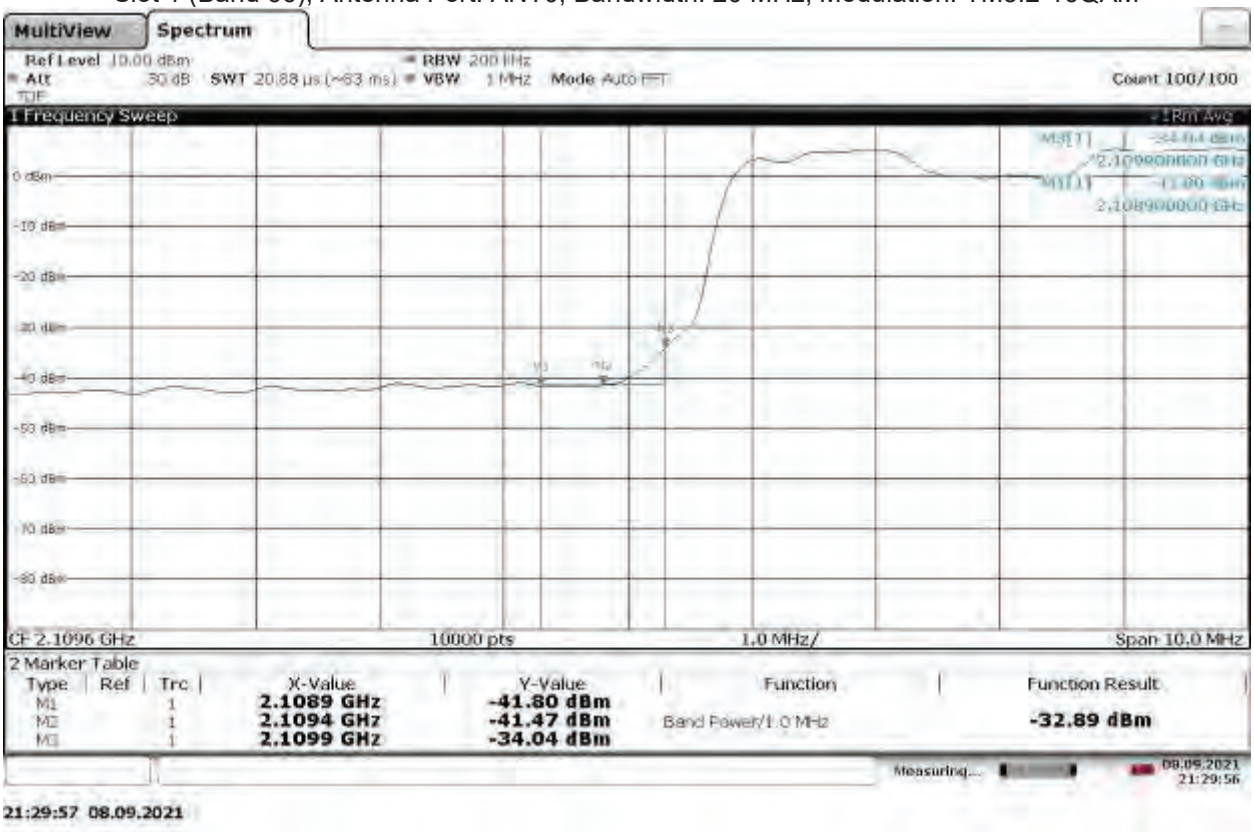
Band Edge Compliant, Upper Band Edge, 2192 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



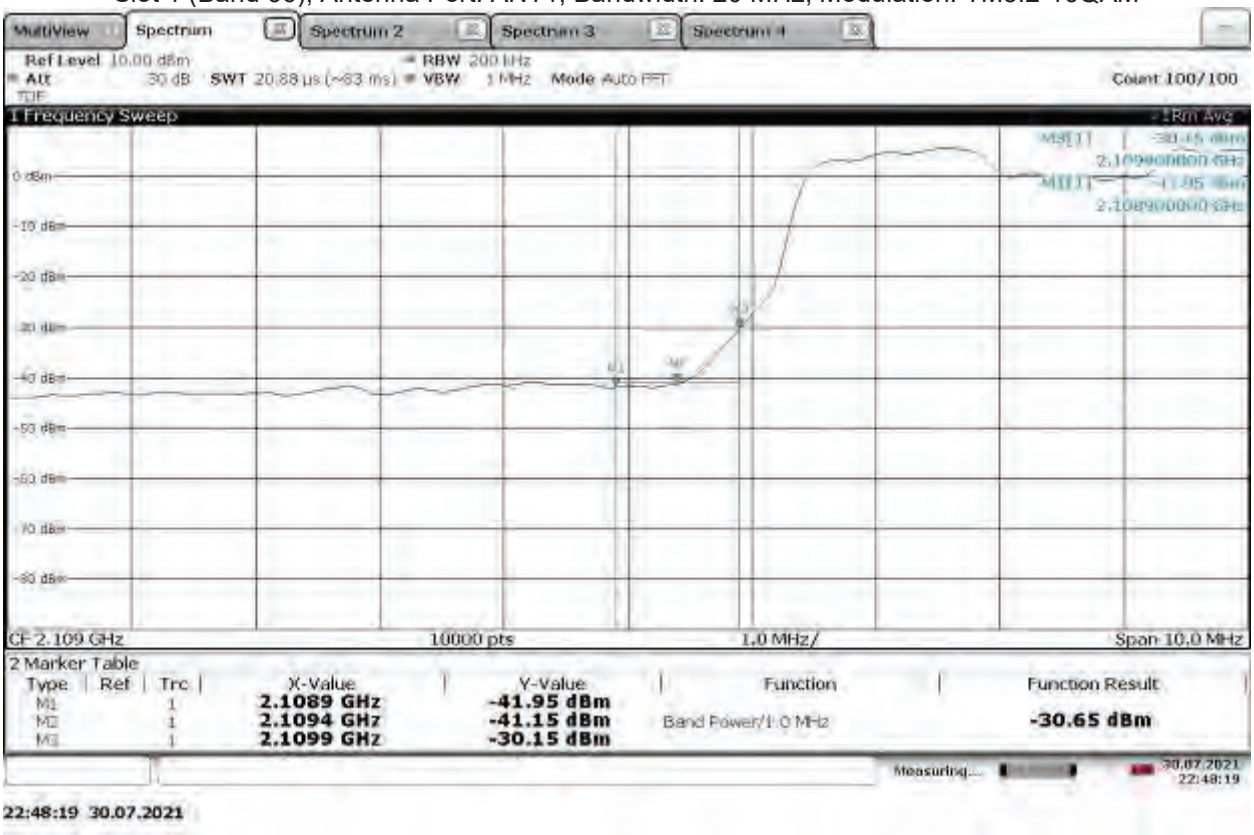
Band Edge Compliant, Upper Band Edge, 2192 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



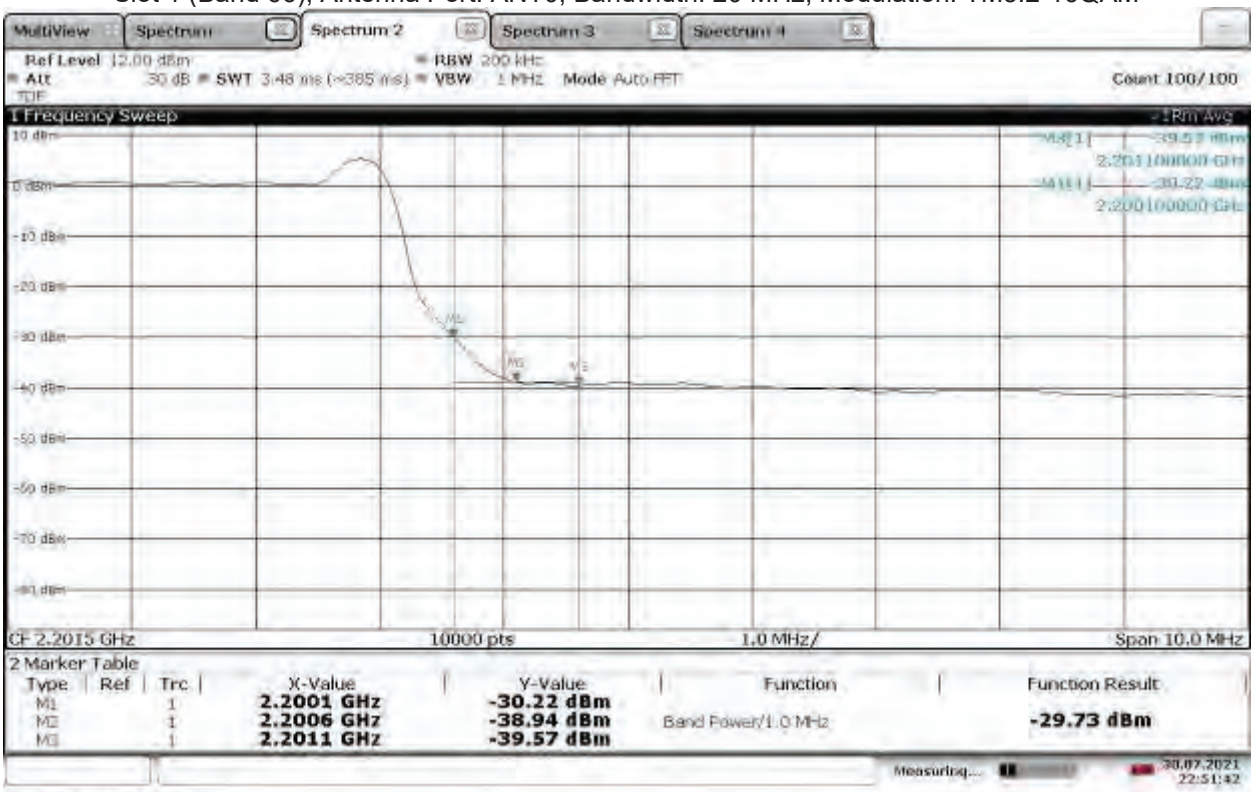
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



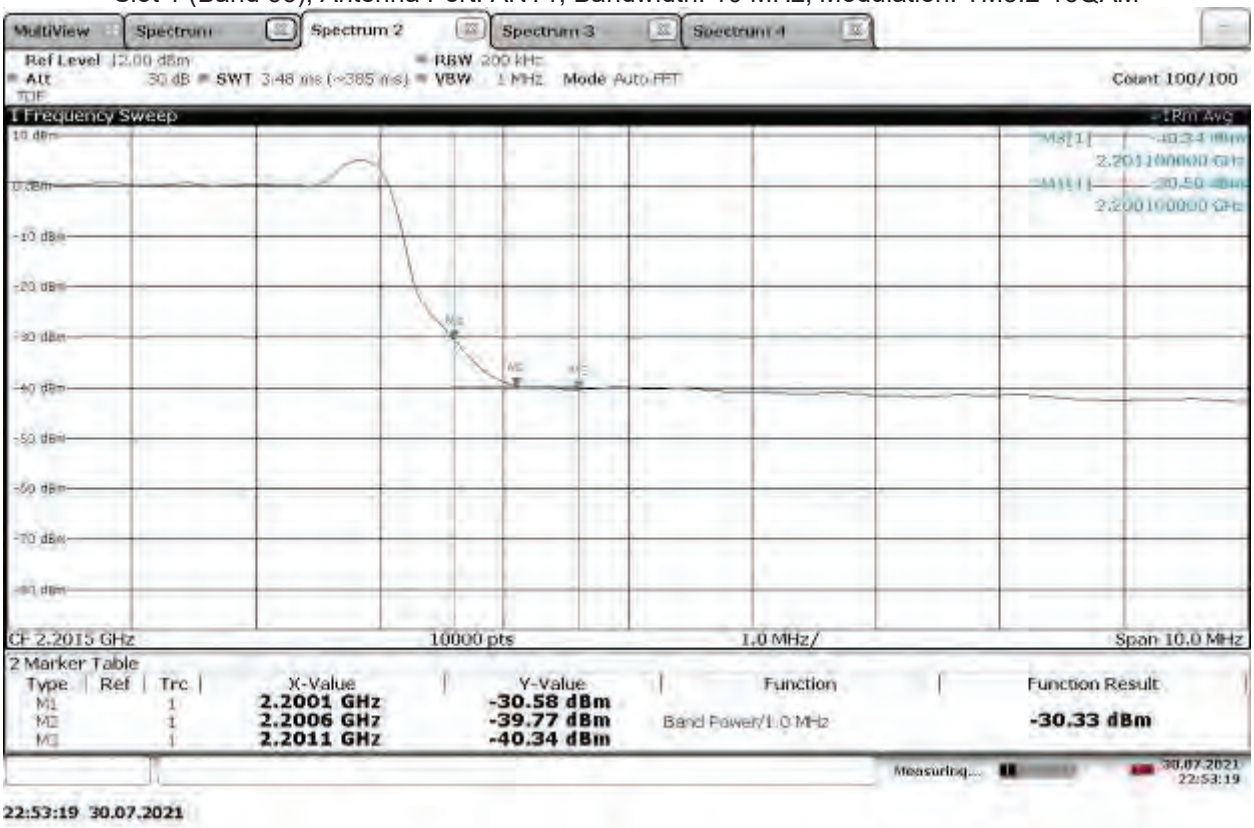
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



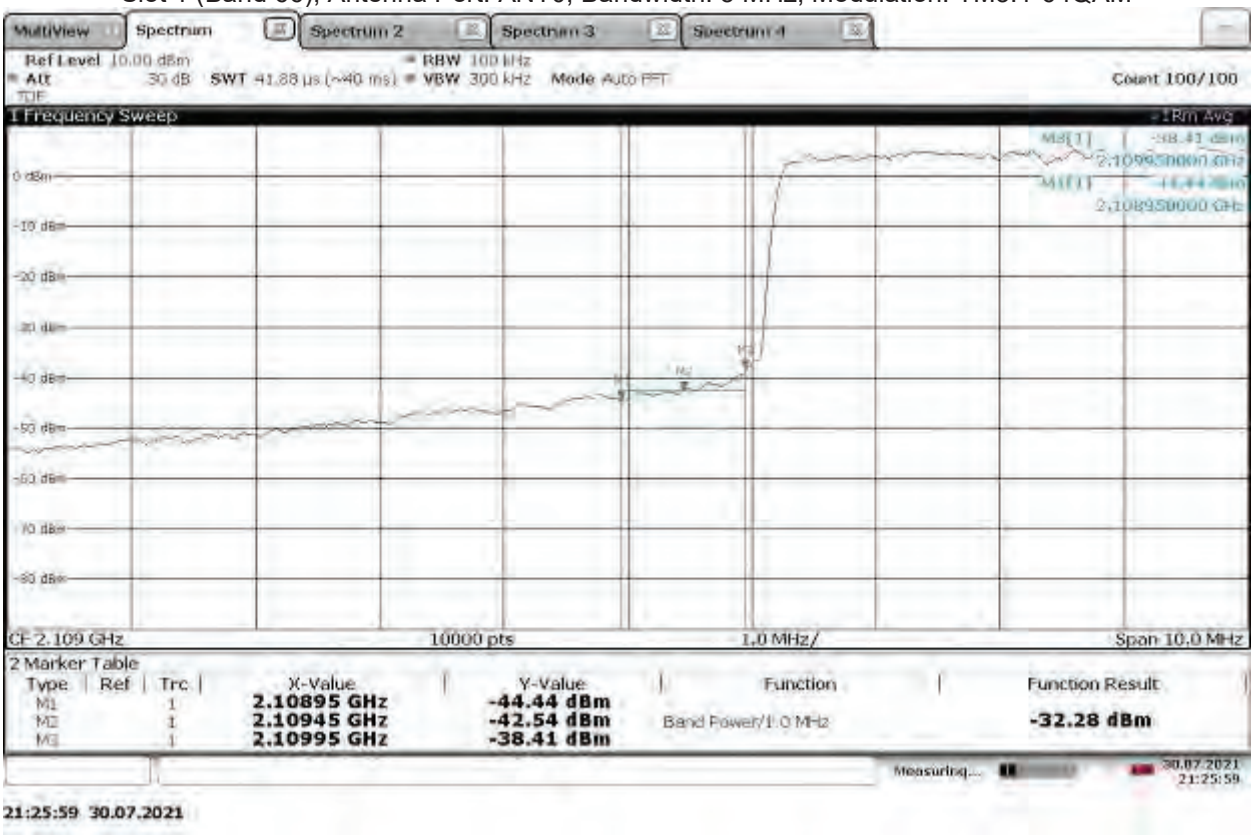
Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



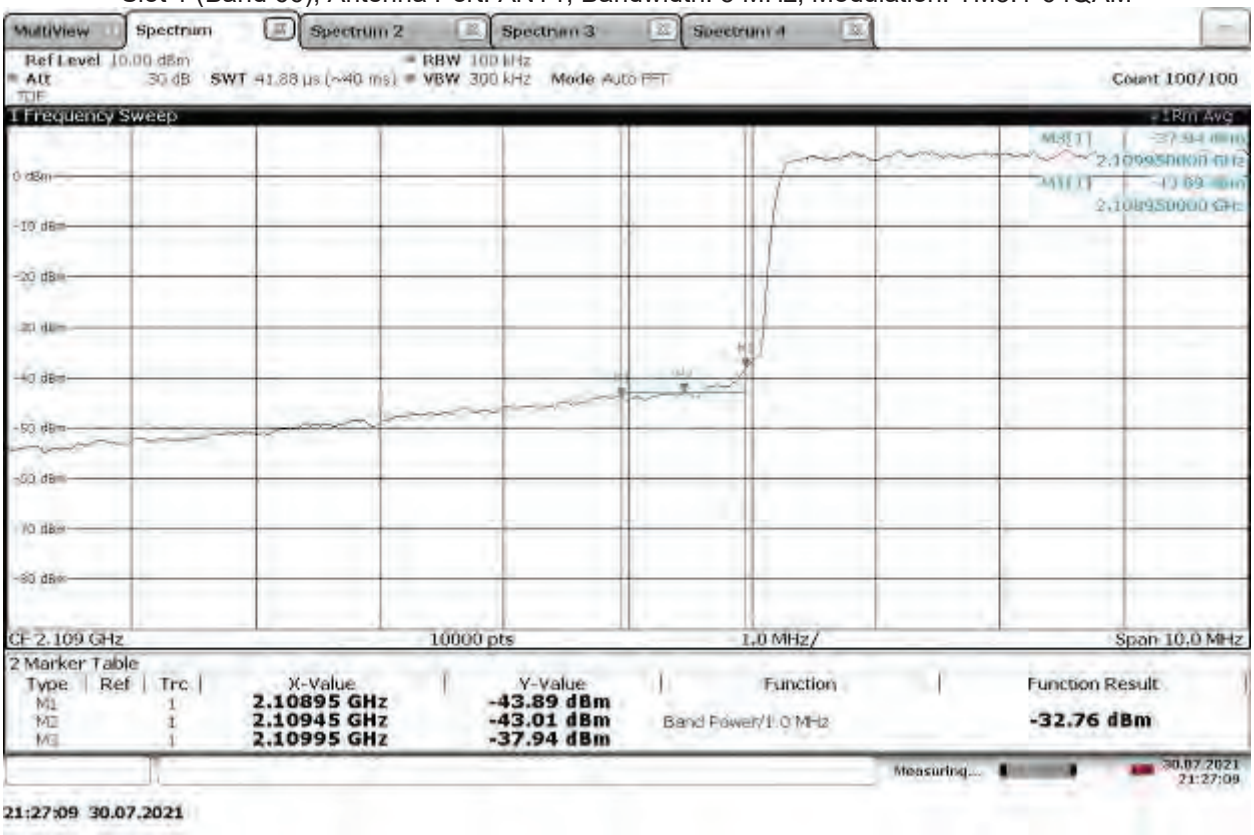
Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



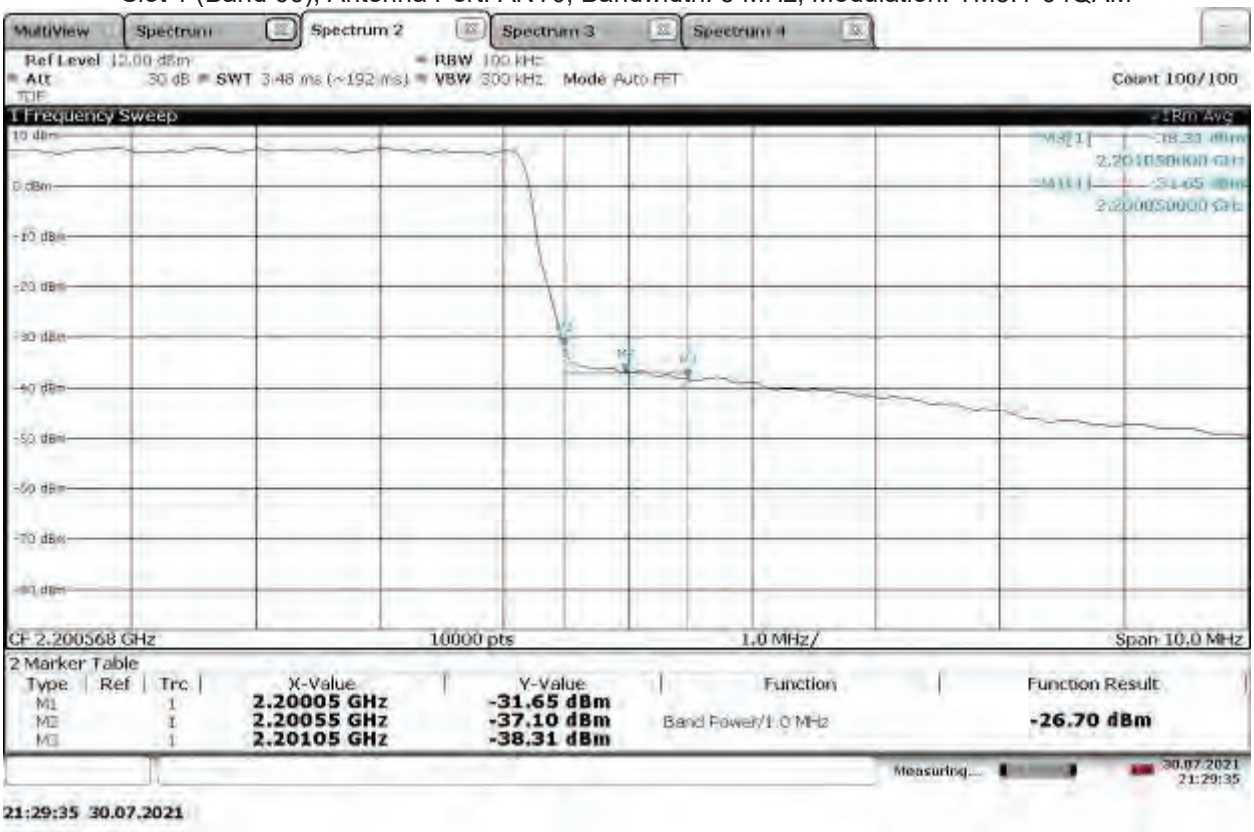
Band Edge Compliant, Lower Band Edge, 2112.50 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



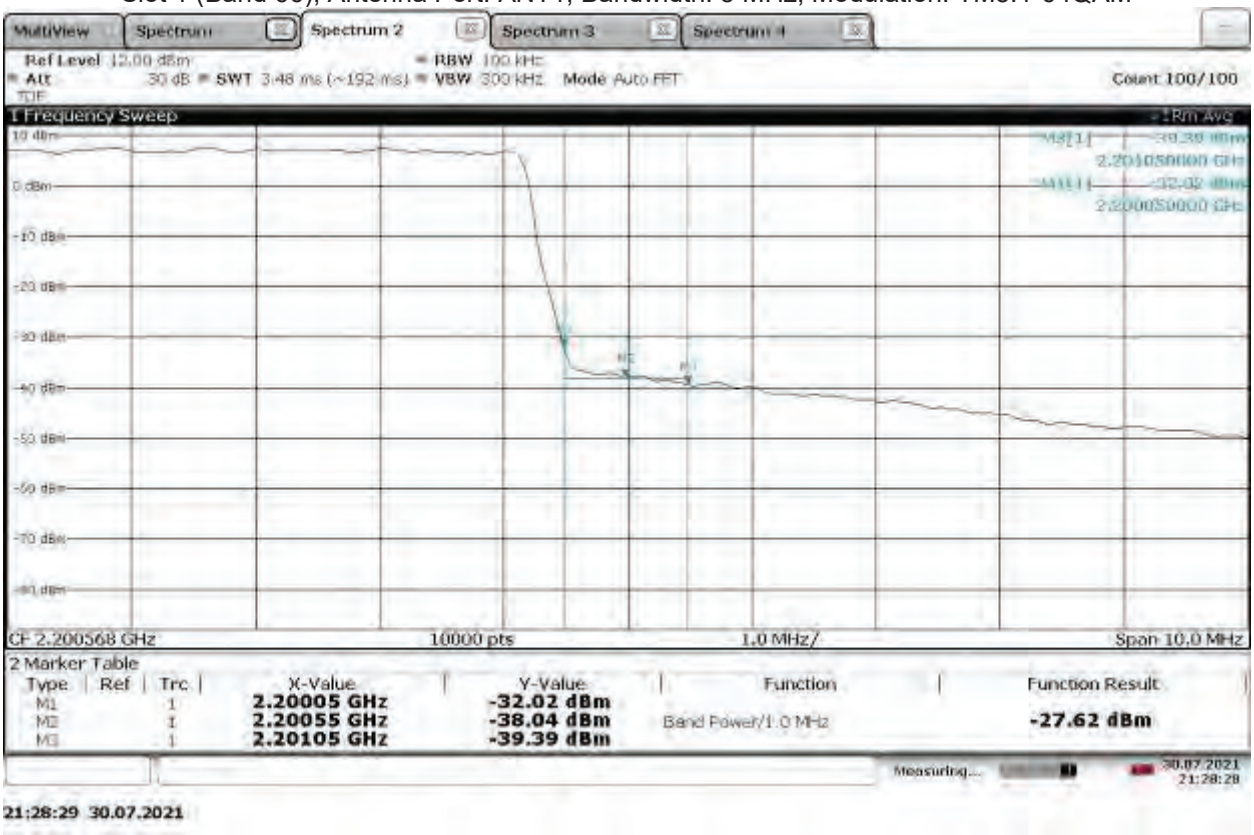
Band Edge Compliant, Lower Band Edge, 2112.50 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



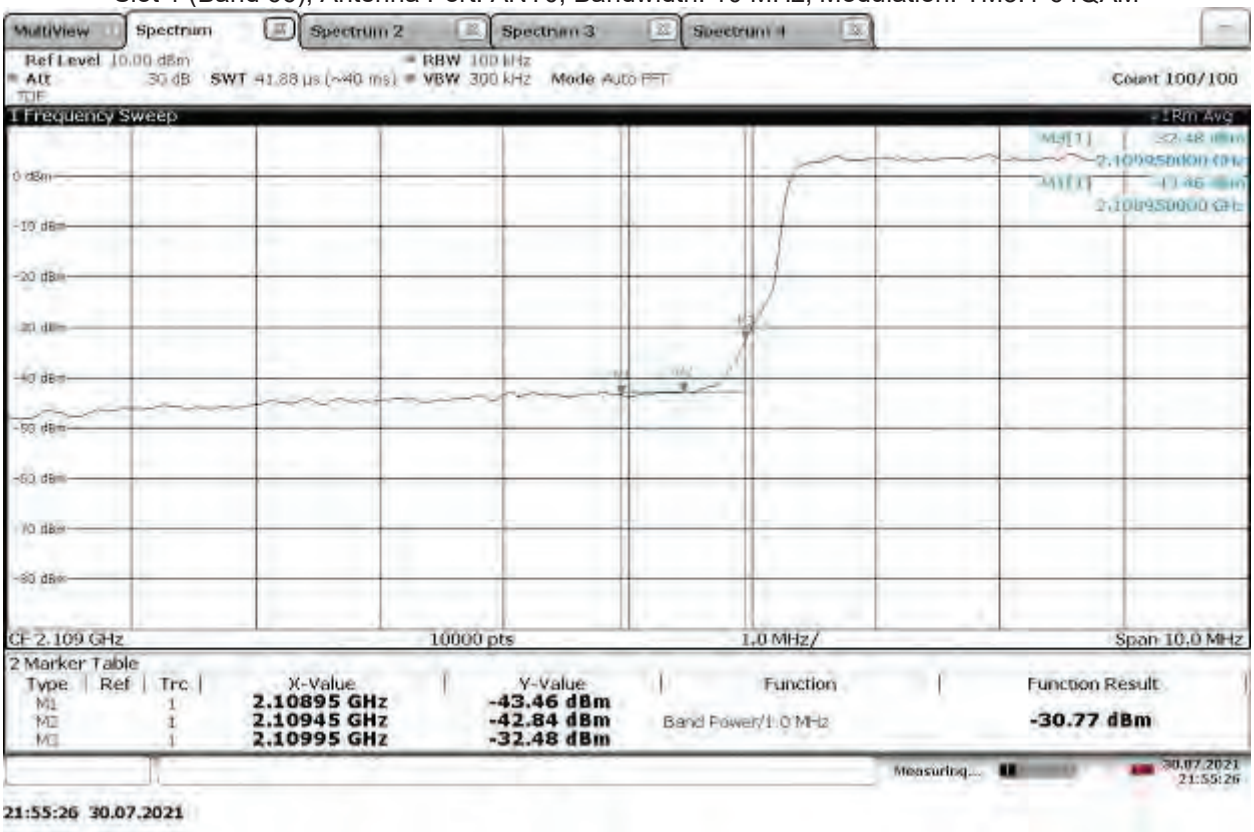
Band Edge Compliant, Upper Band Edge, 2197.50 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



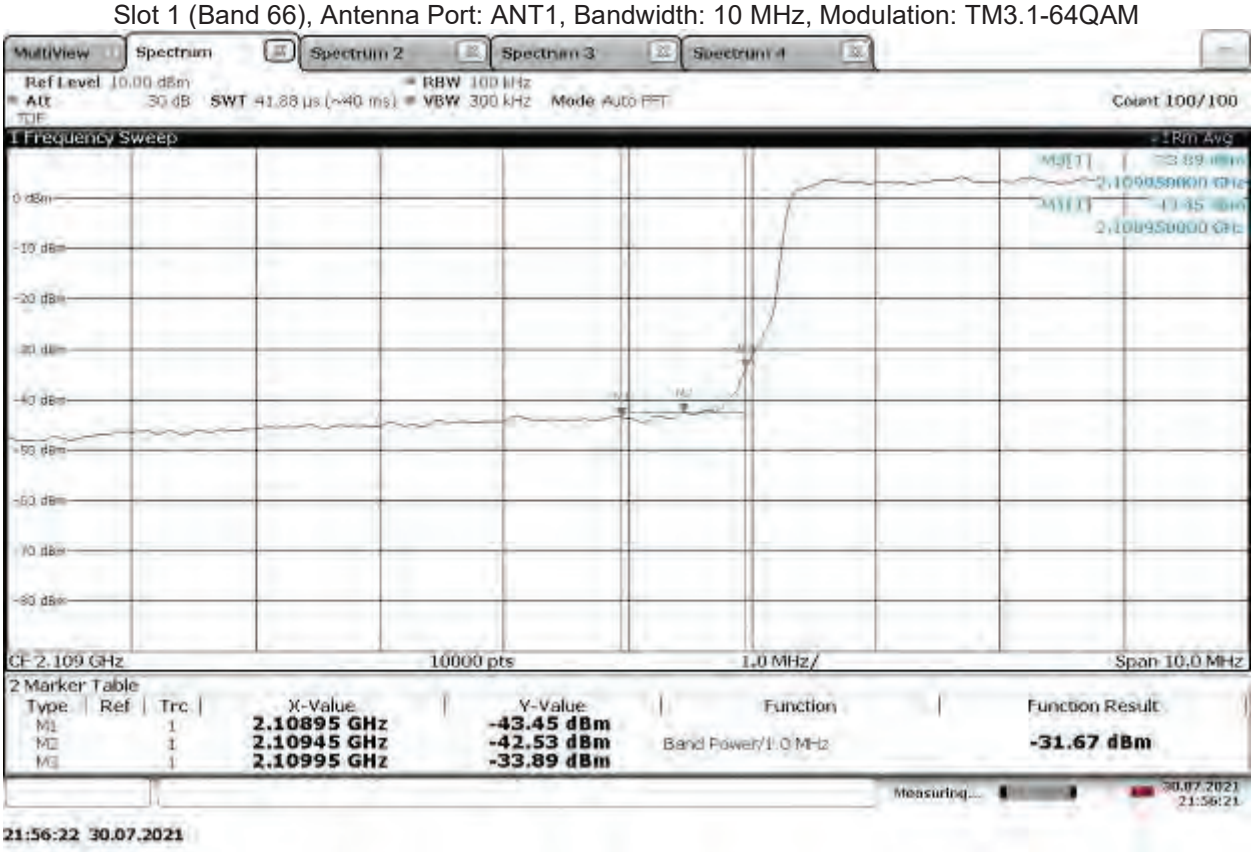
Band Edge Compliant, Upper Band Edge, 2197.50 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



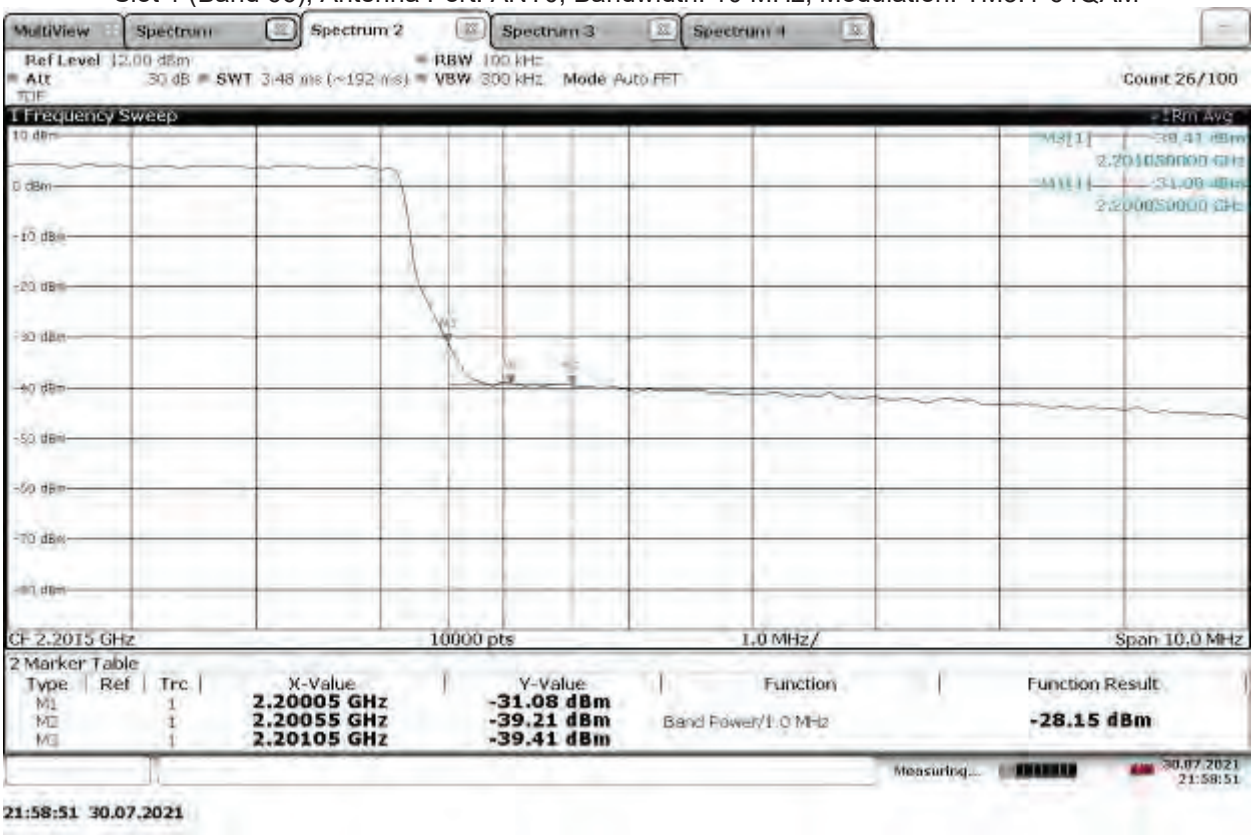
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



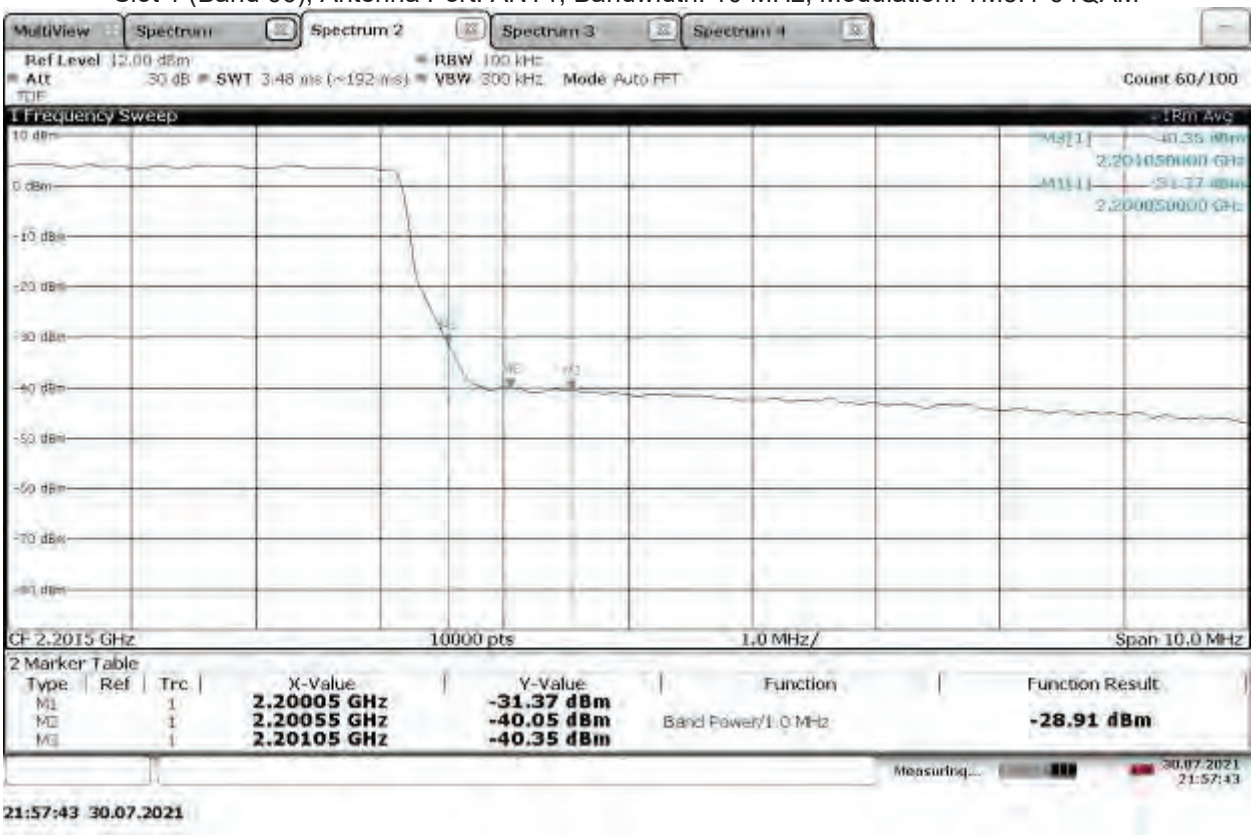
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



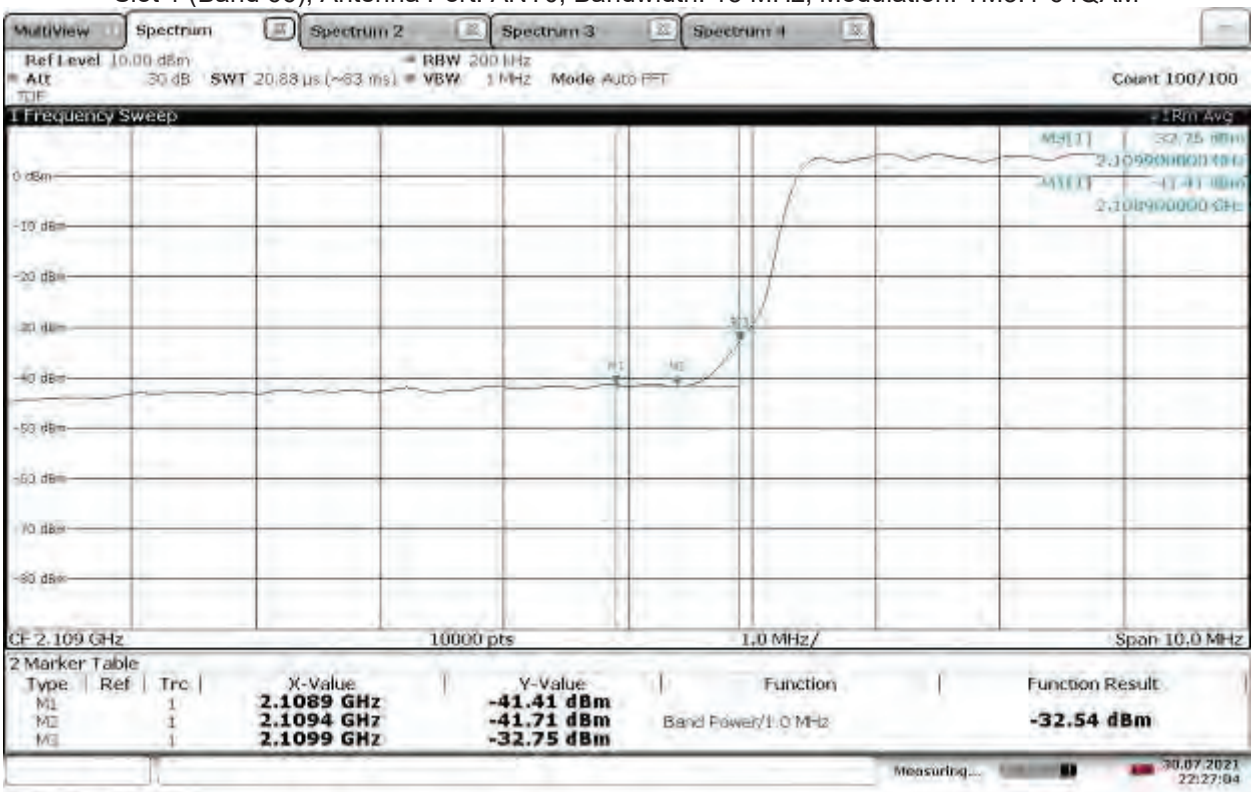
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



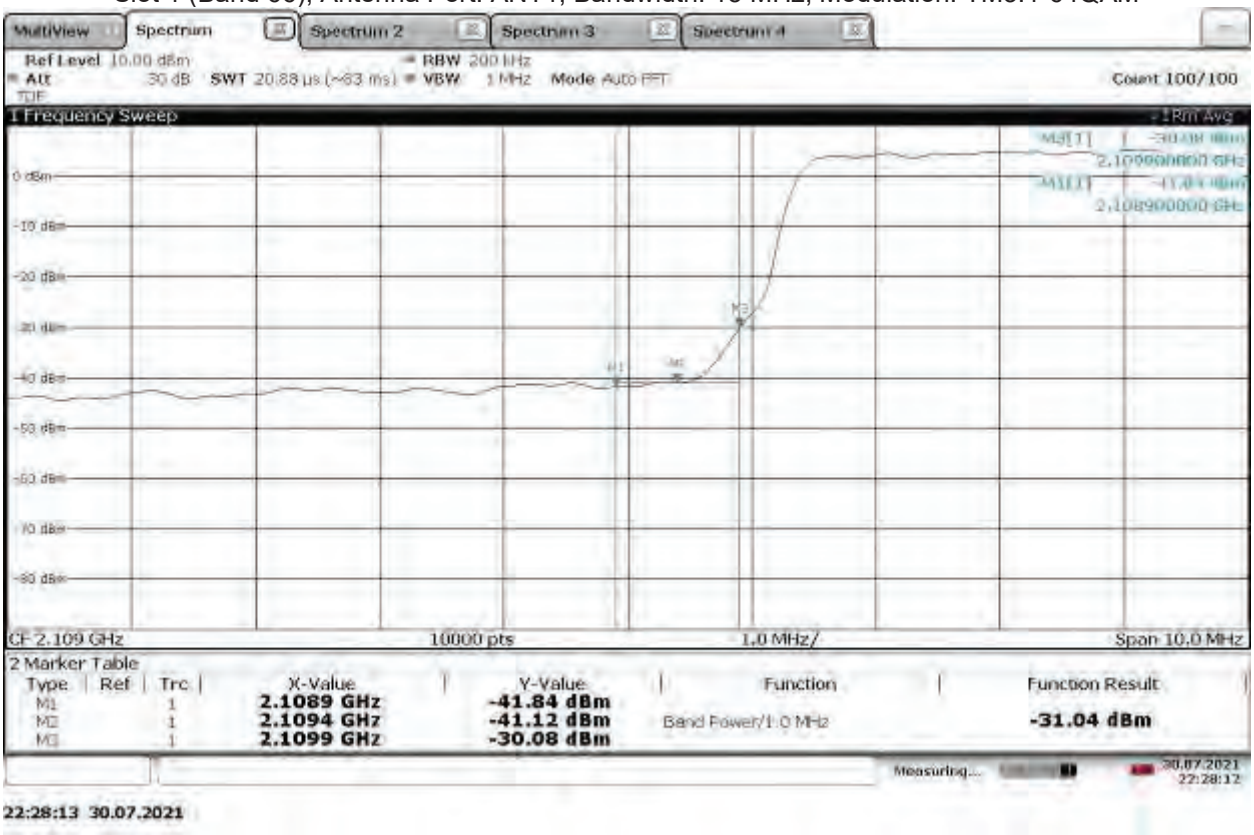
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



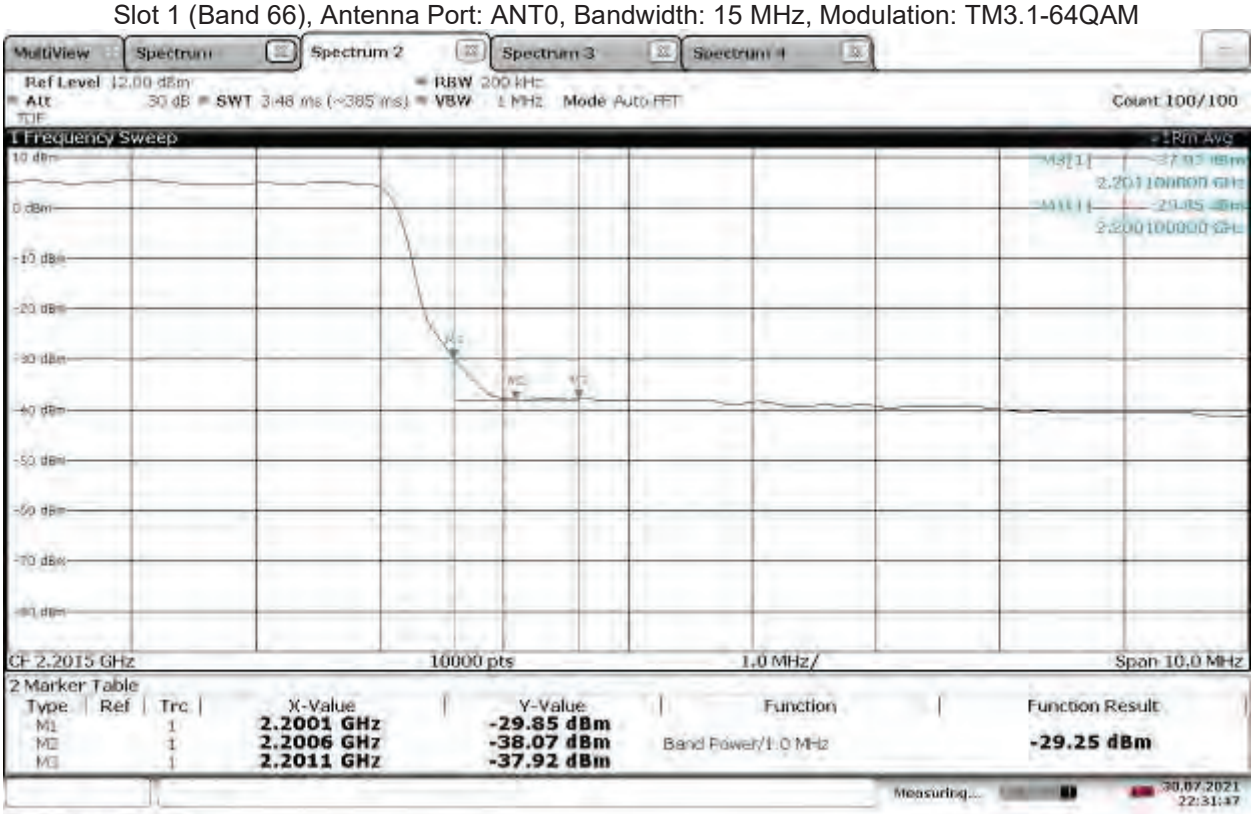
Band Edge Compliant, Lower Band Edge, 2117.50 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



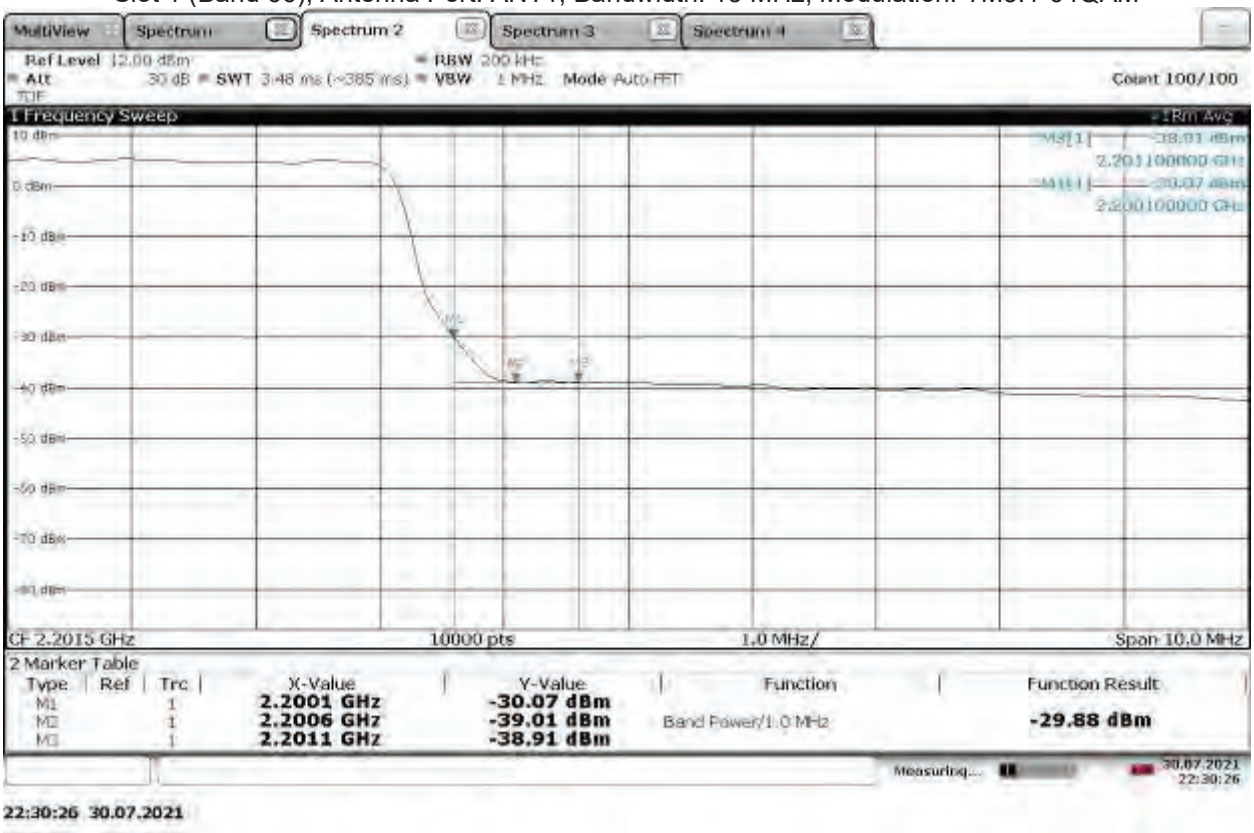
Band Edge Compliant, Lower Band Edge, 2117.50 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



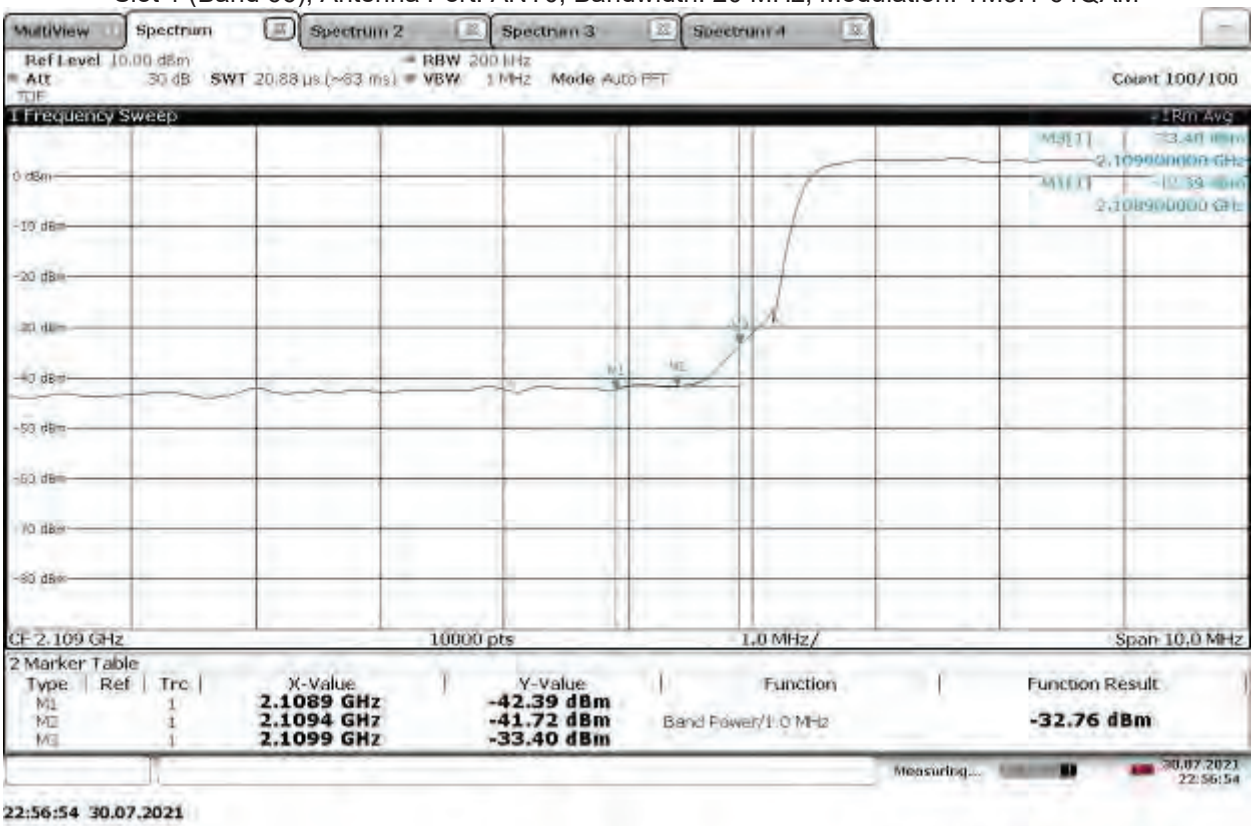
Band Edge Compliant, Upper Band Edge, 2192.50 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



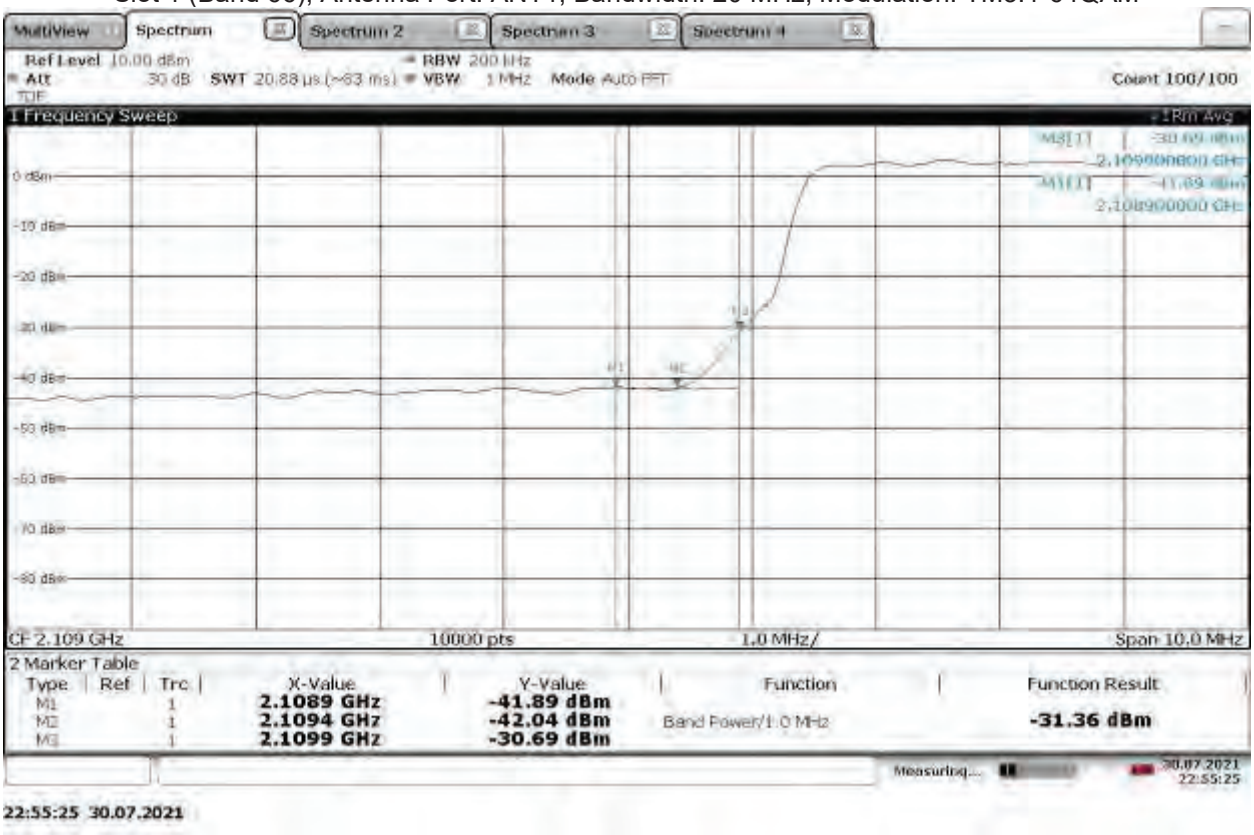
Band Edge Compliant, Upper Band Edge, 2192.50 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



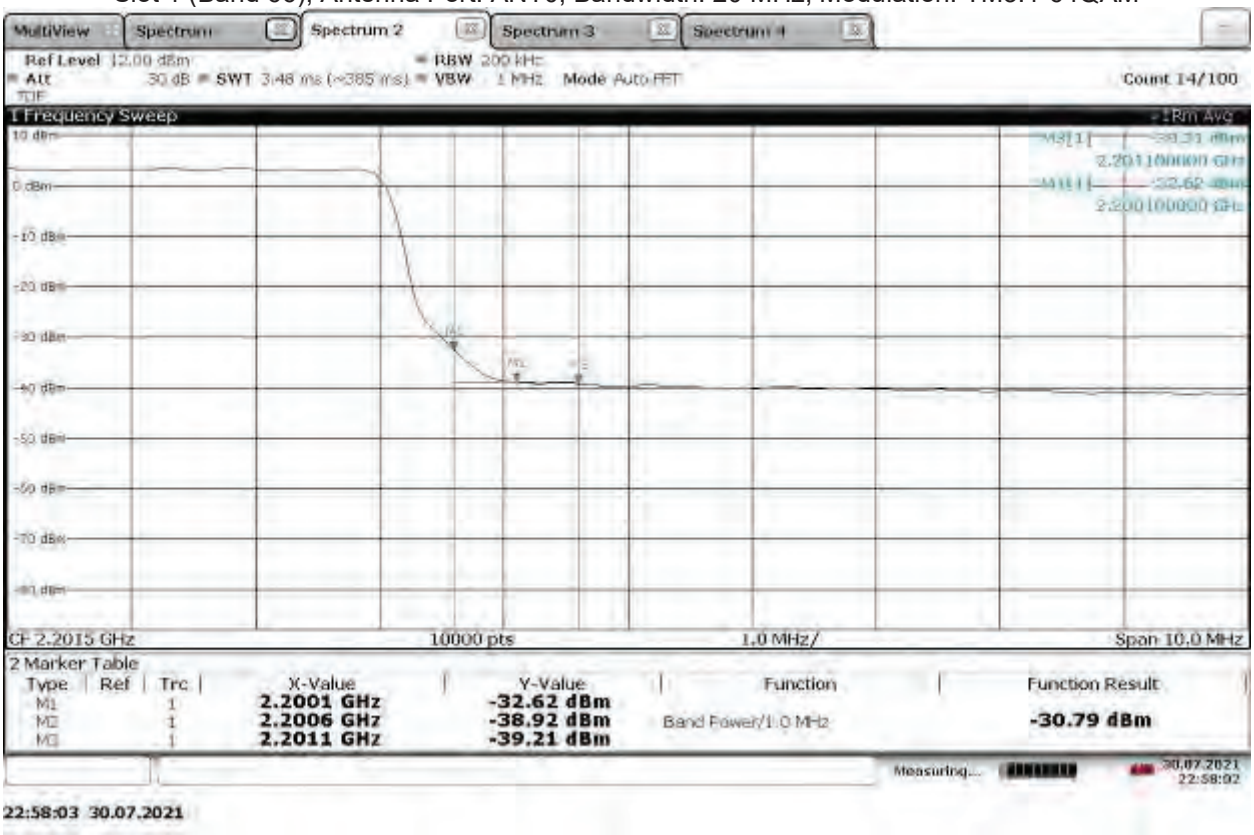
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



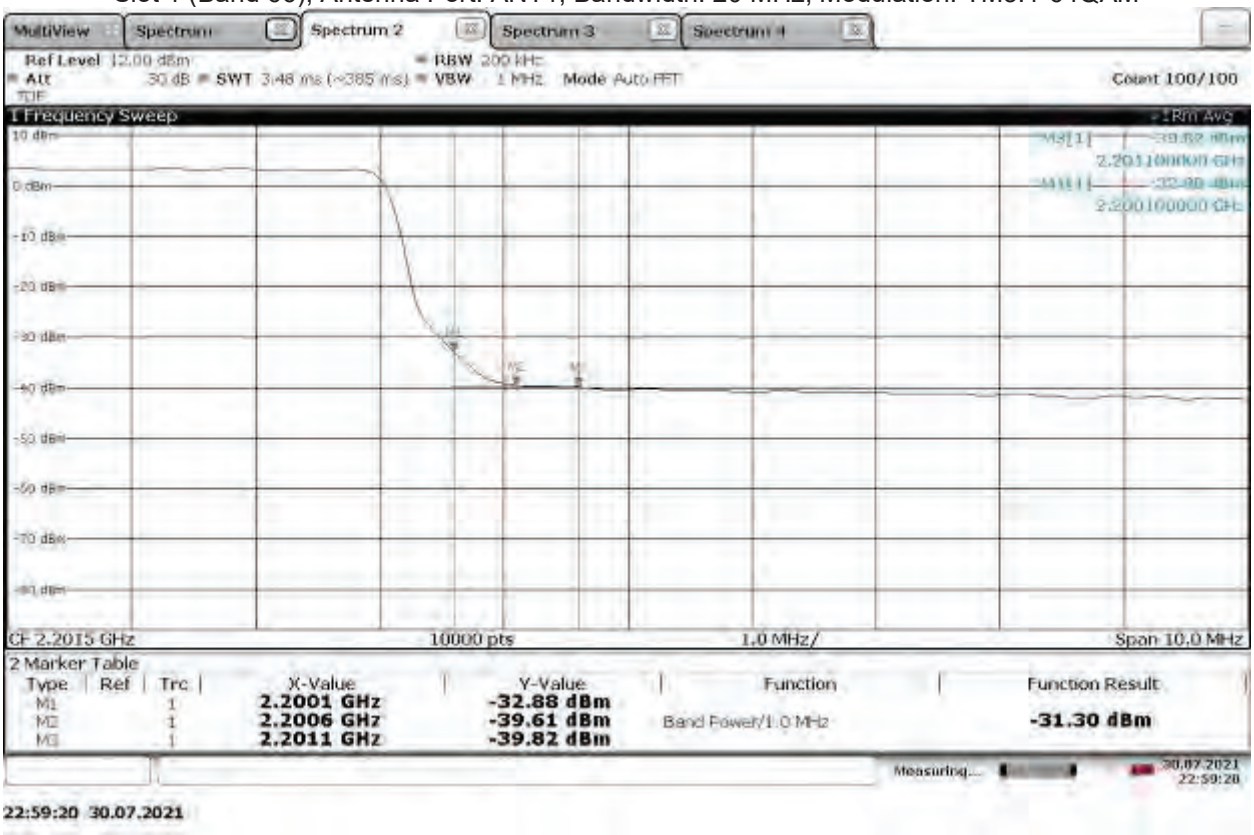
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



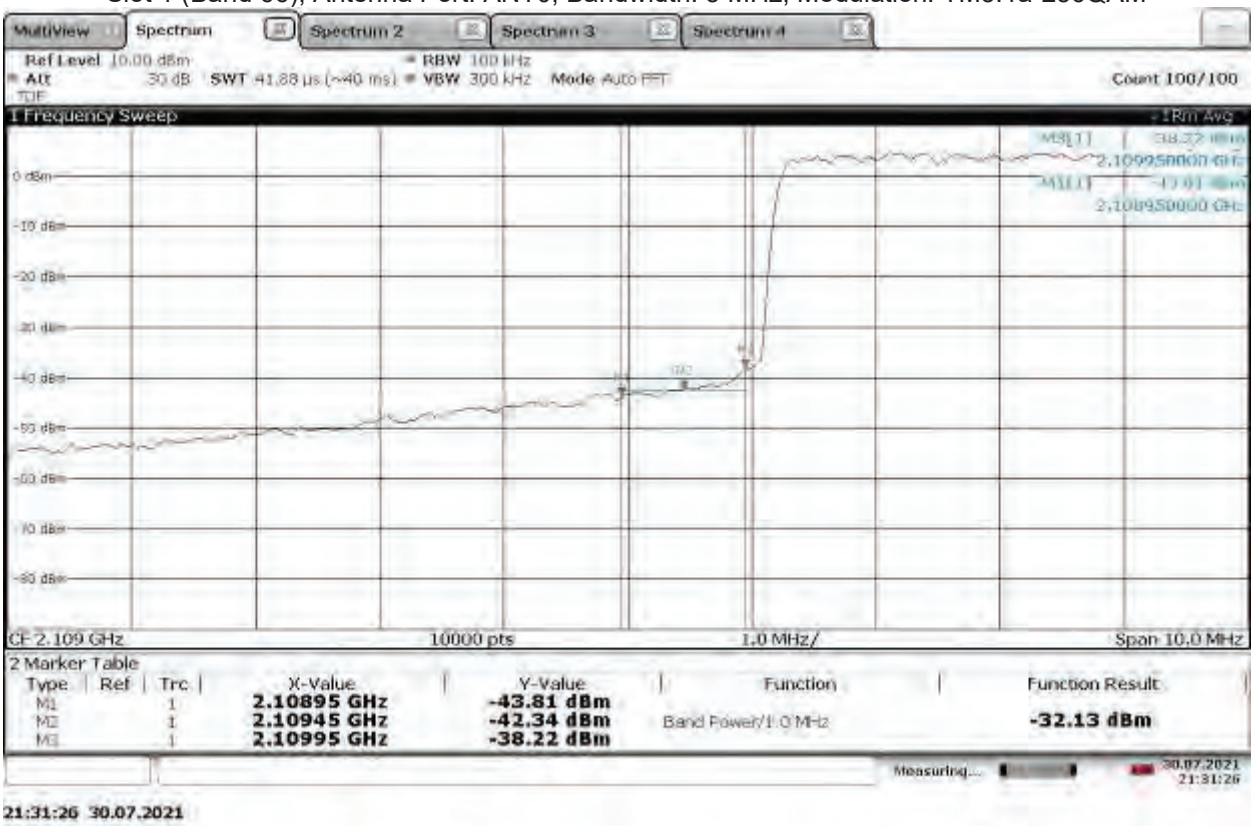
Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



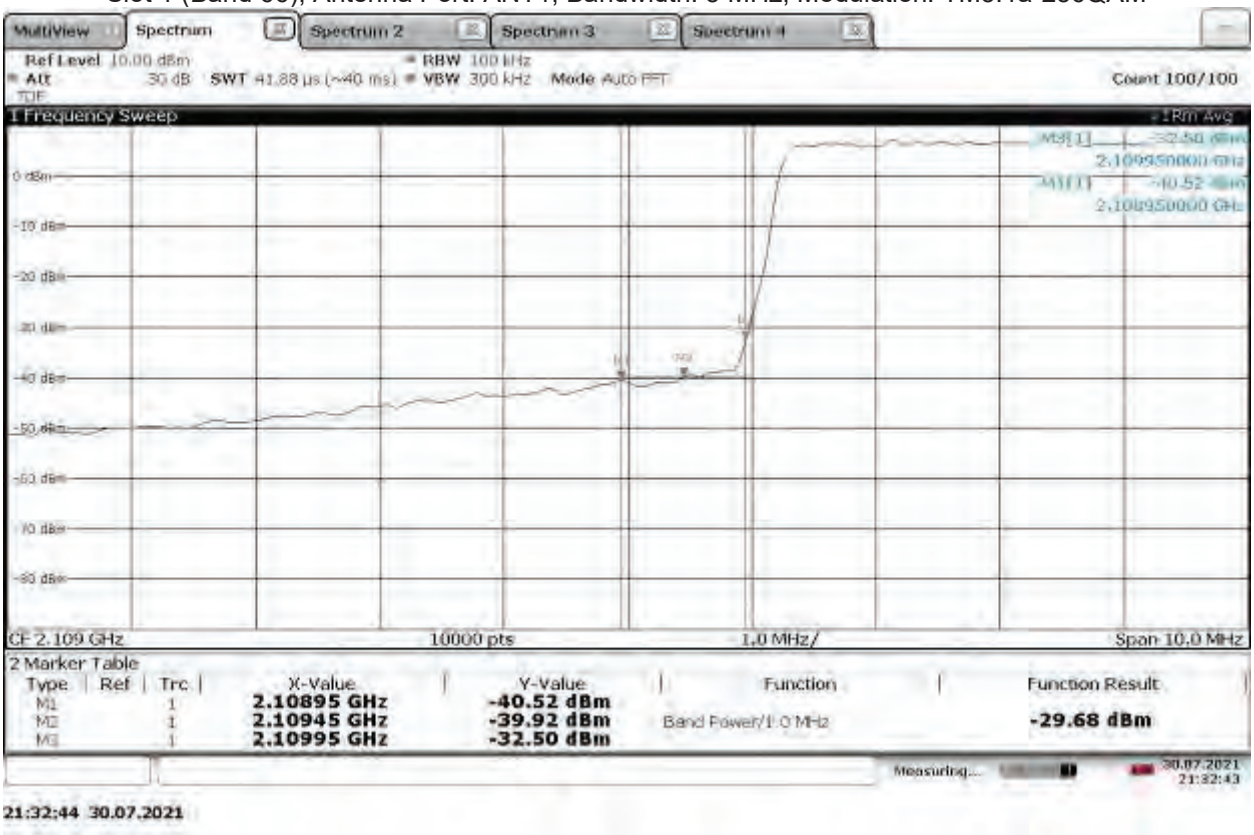
Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



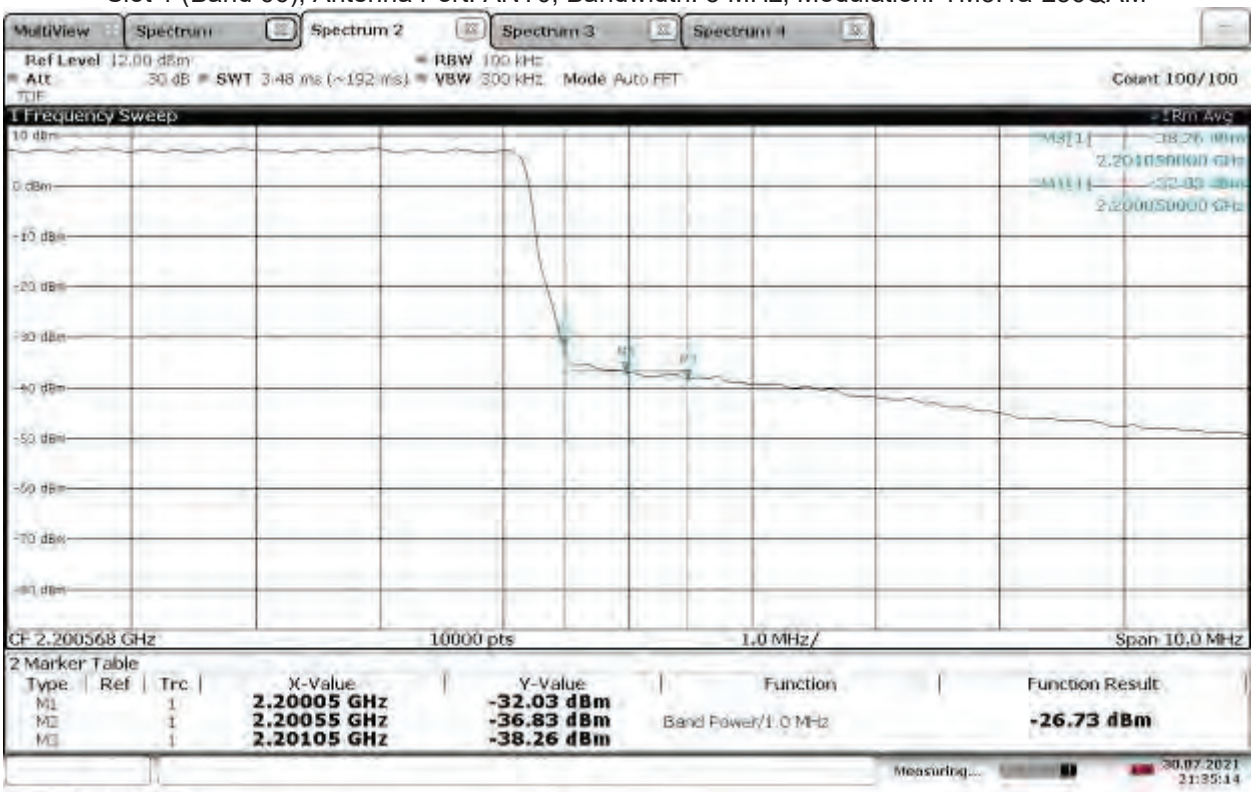
Band Edge Compliant, Lower Band Edge, 2112.50 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



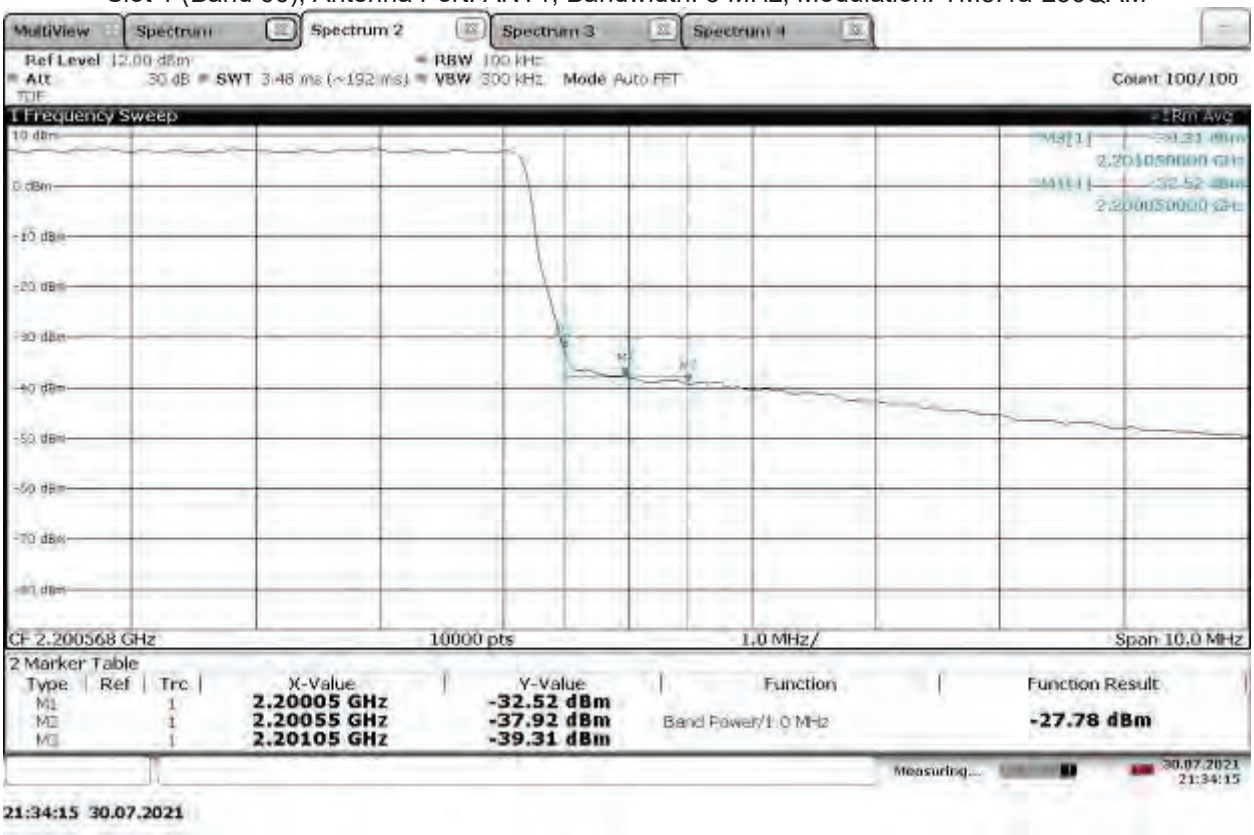
Band Edge Compliant, Lower Band Edge, 2112.50 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



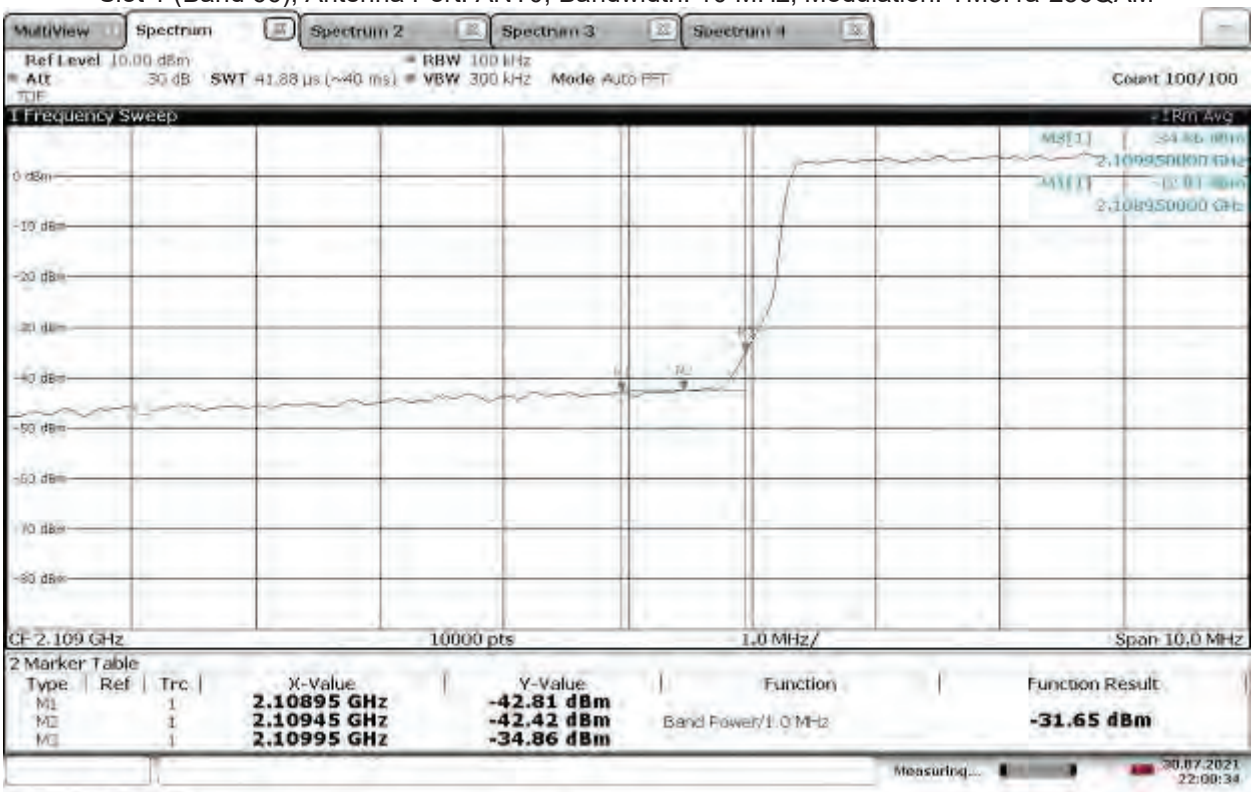
Band Edge Compliant, Upper Band Edge, 2197.50 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



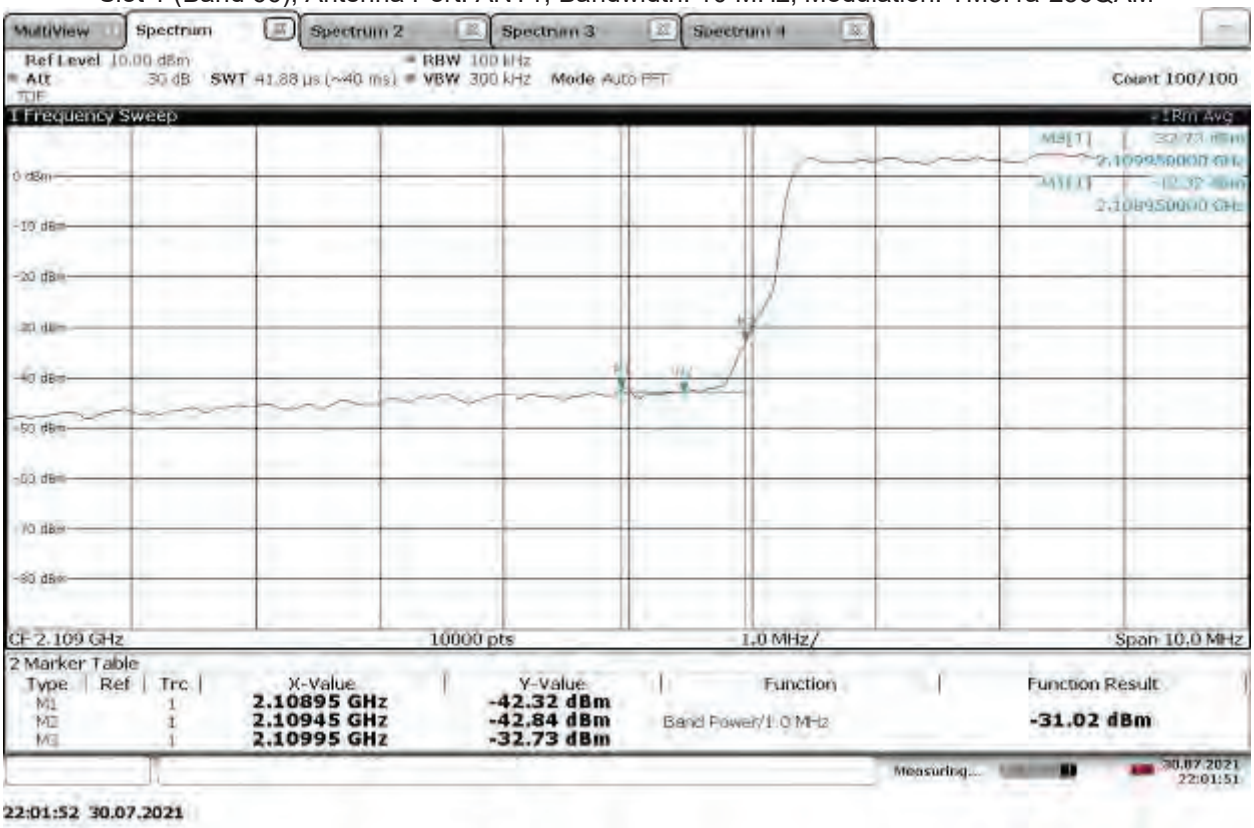
Band Edge Compliant, Upper Band Edge, 2197.50 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



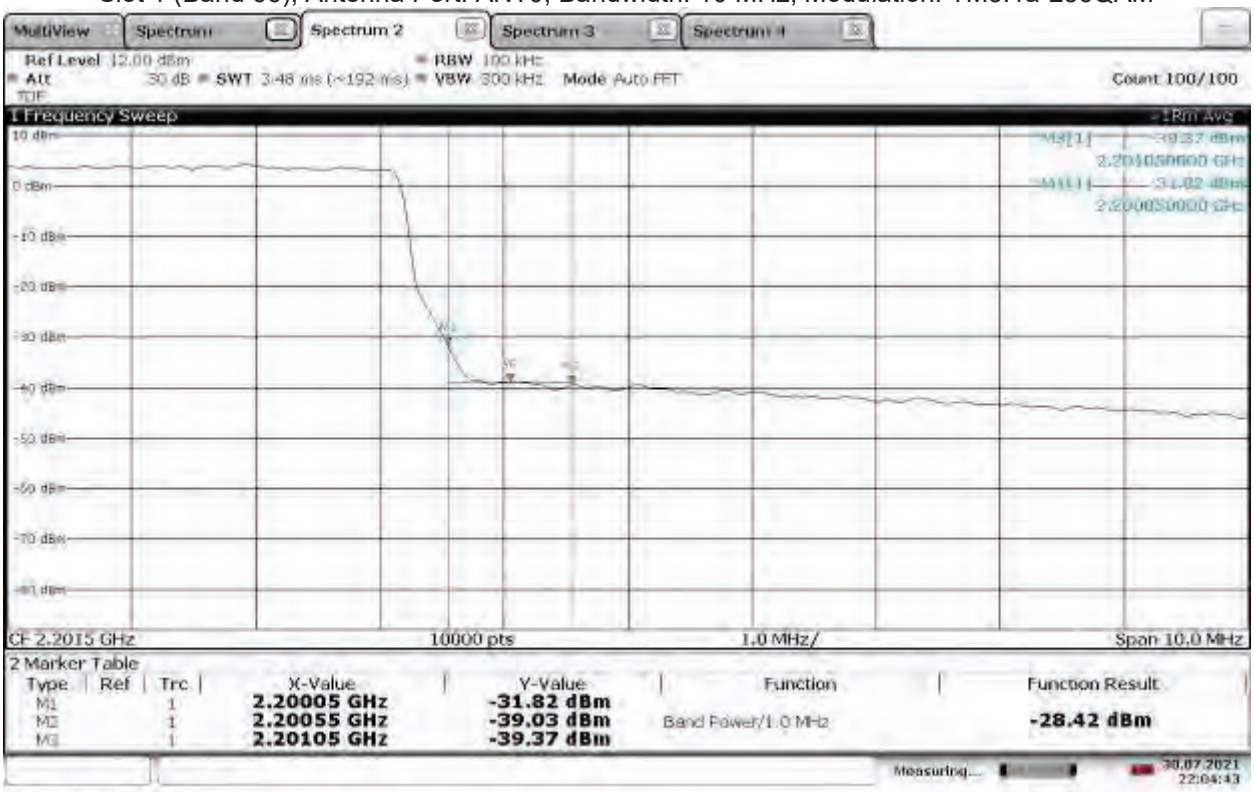
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



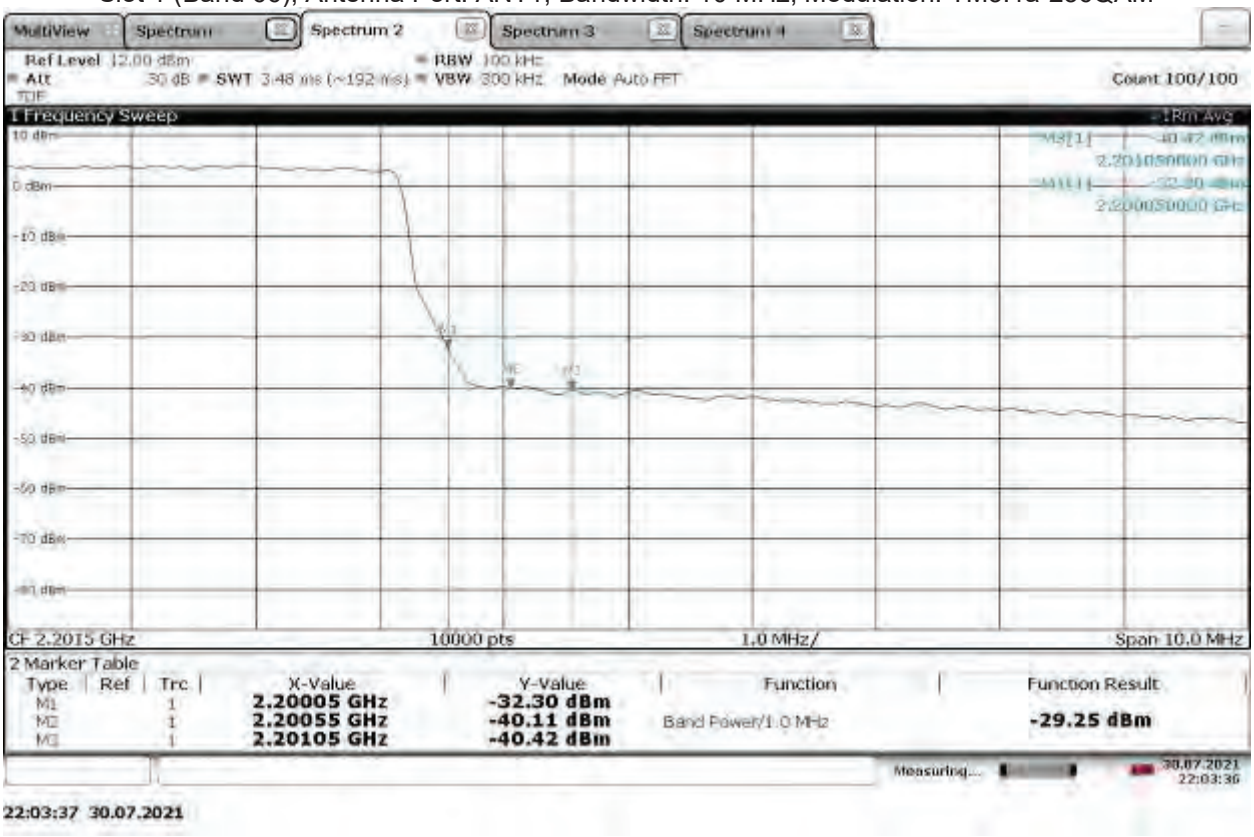
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



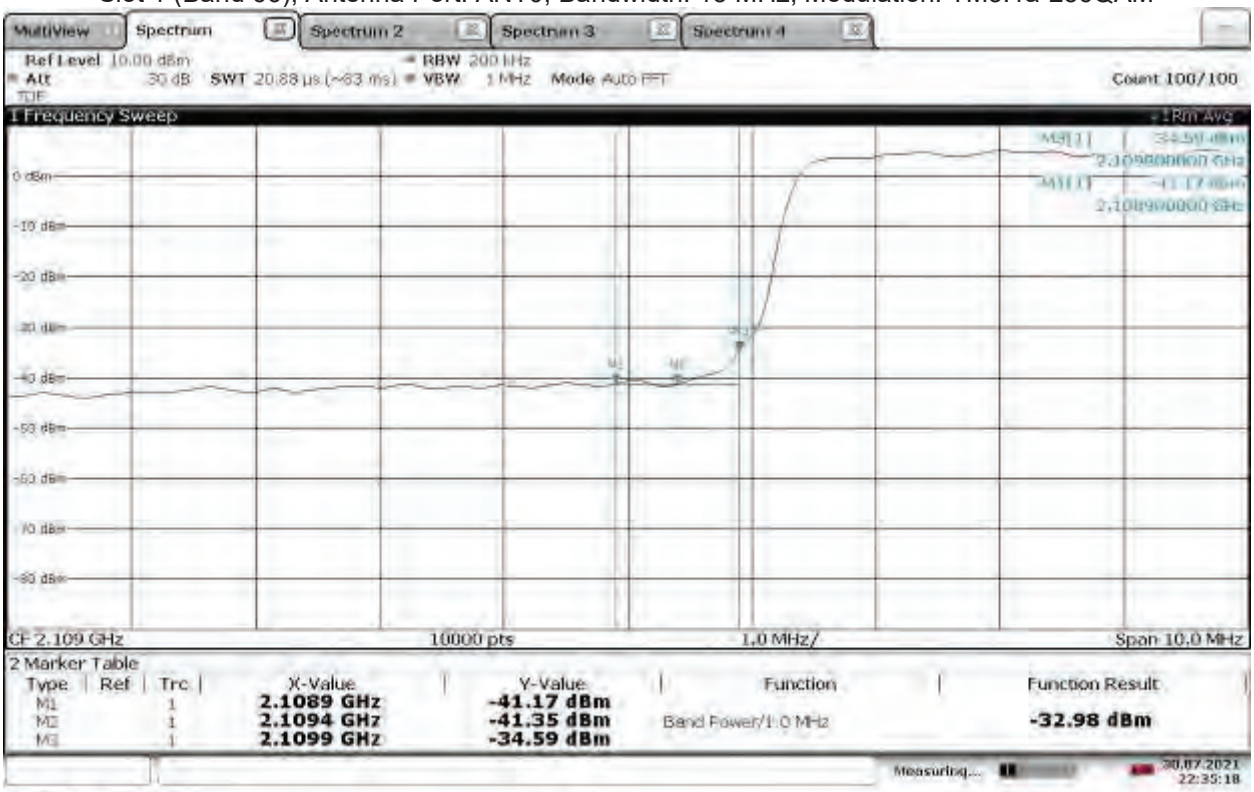
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



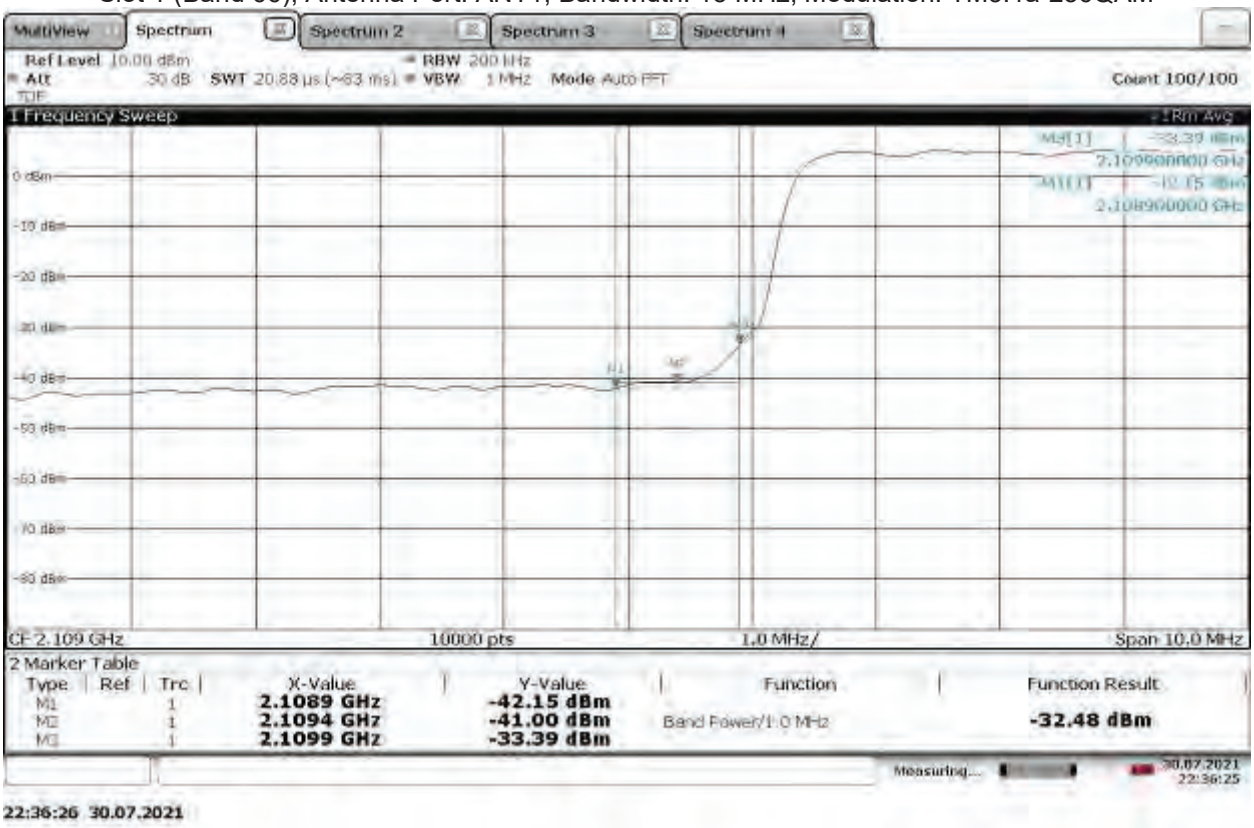
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



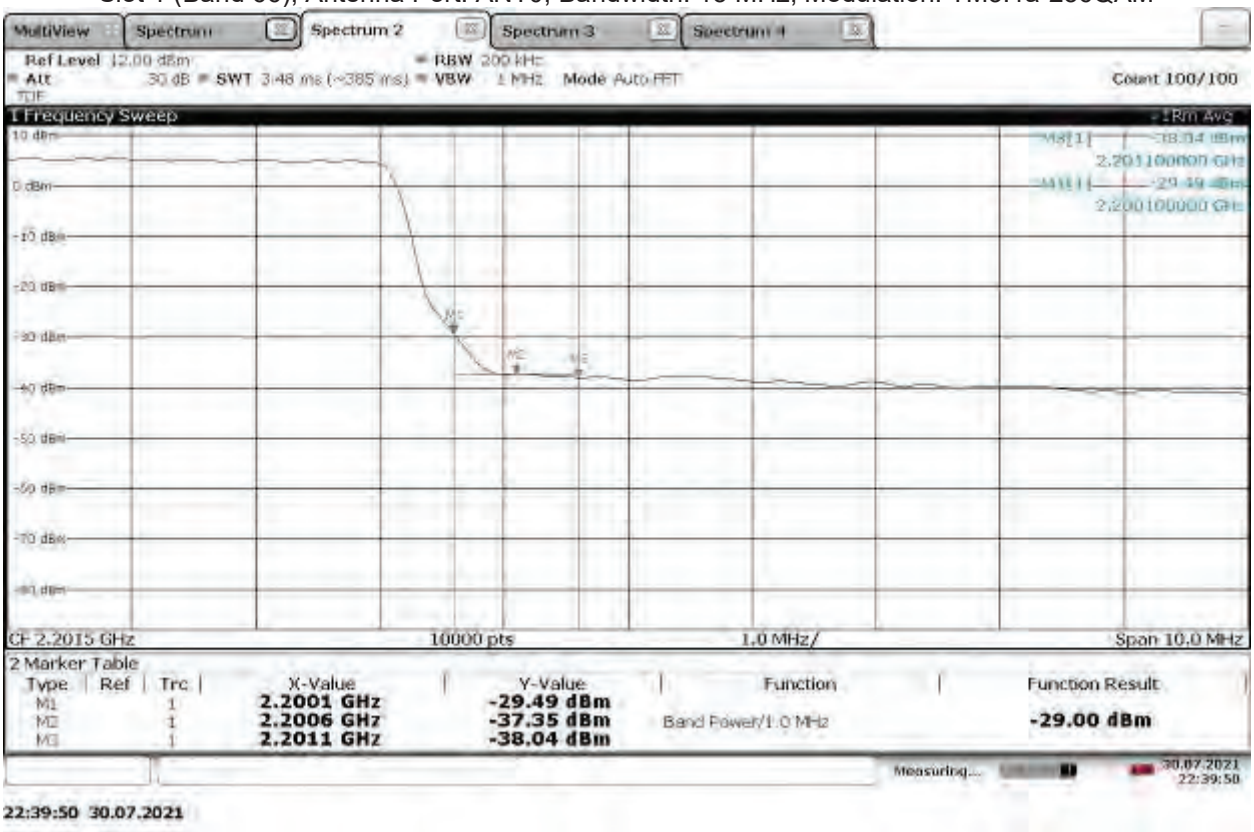
Band Edge Compliant, Lower Band Edge, 2117.50 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



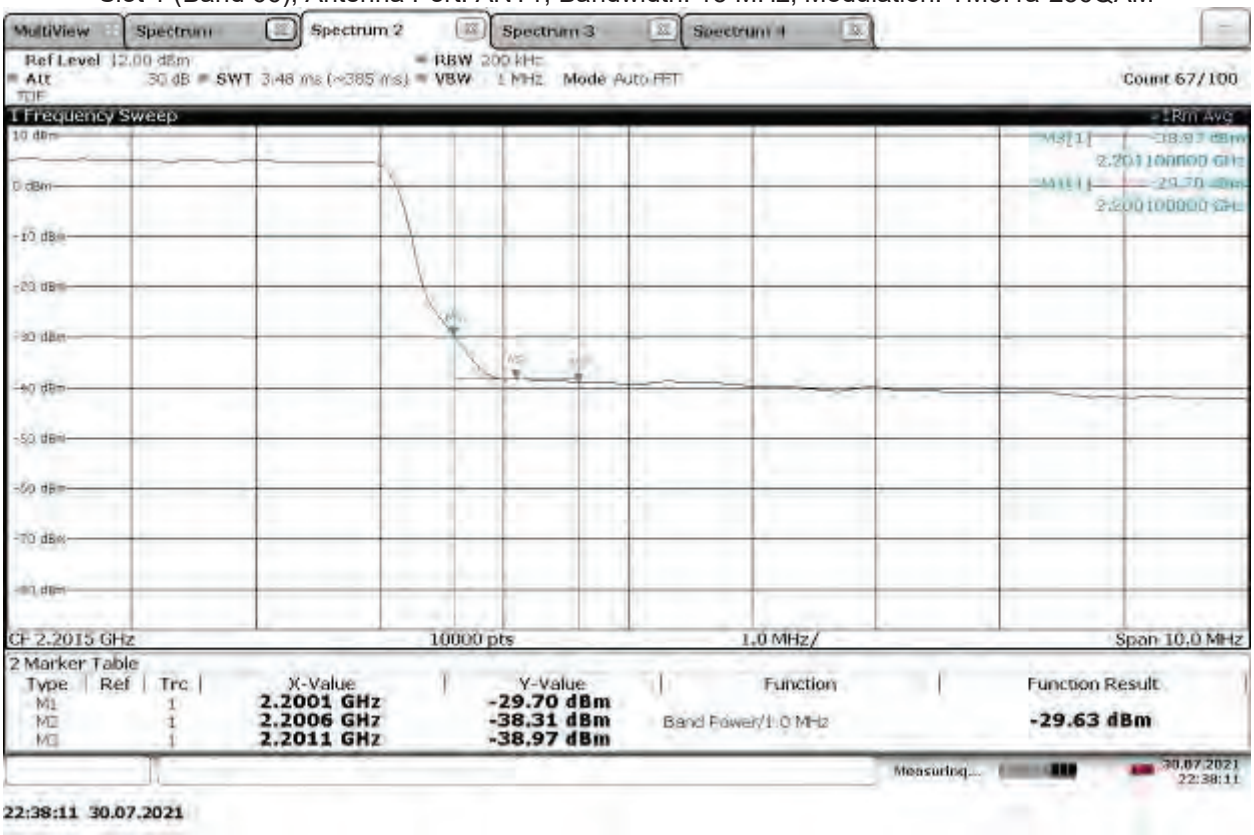
Band Edge Compliant, Lower Band Edge, 2117.50 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



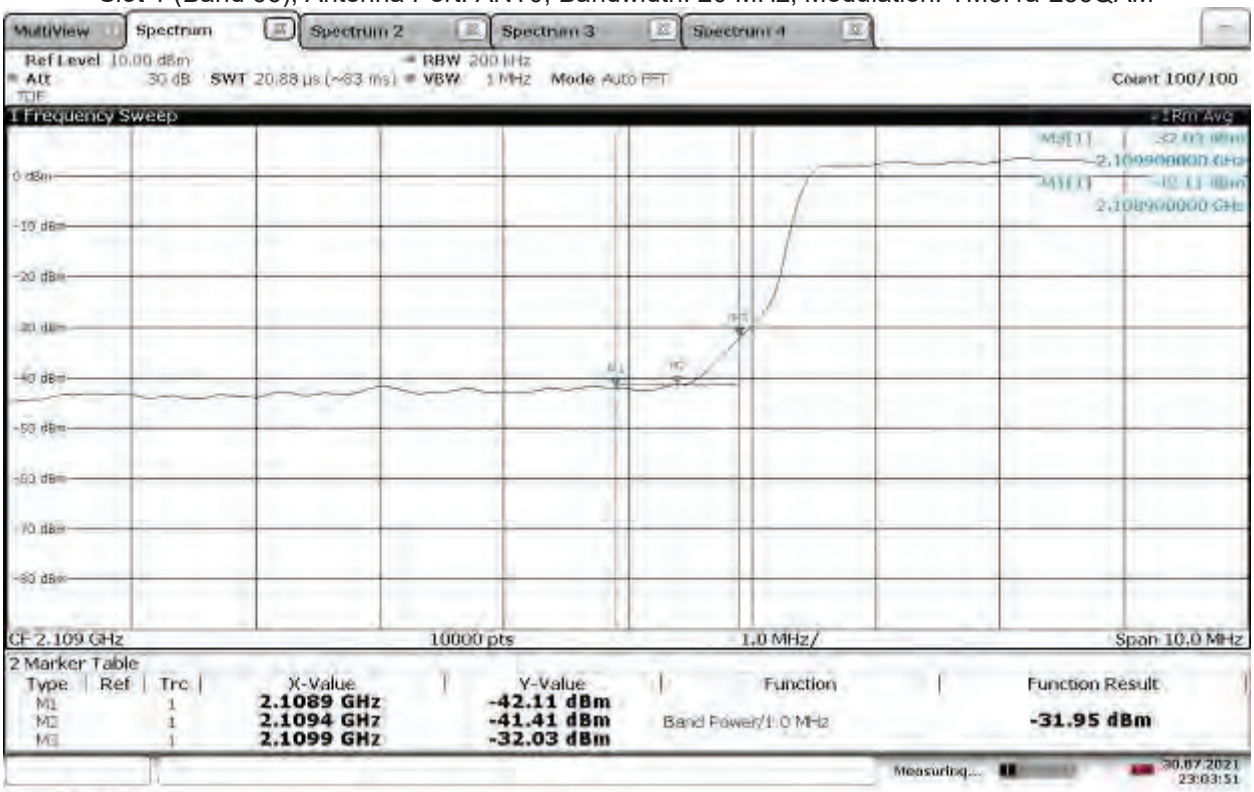
Band Edge Compliant, Upper Band Edge, 2192.50 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



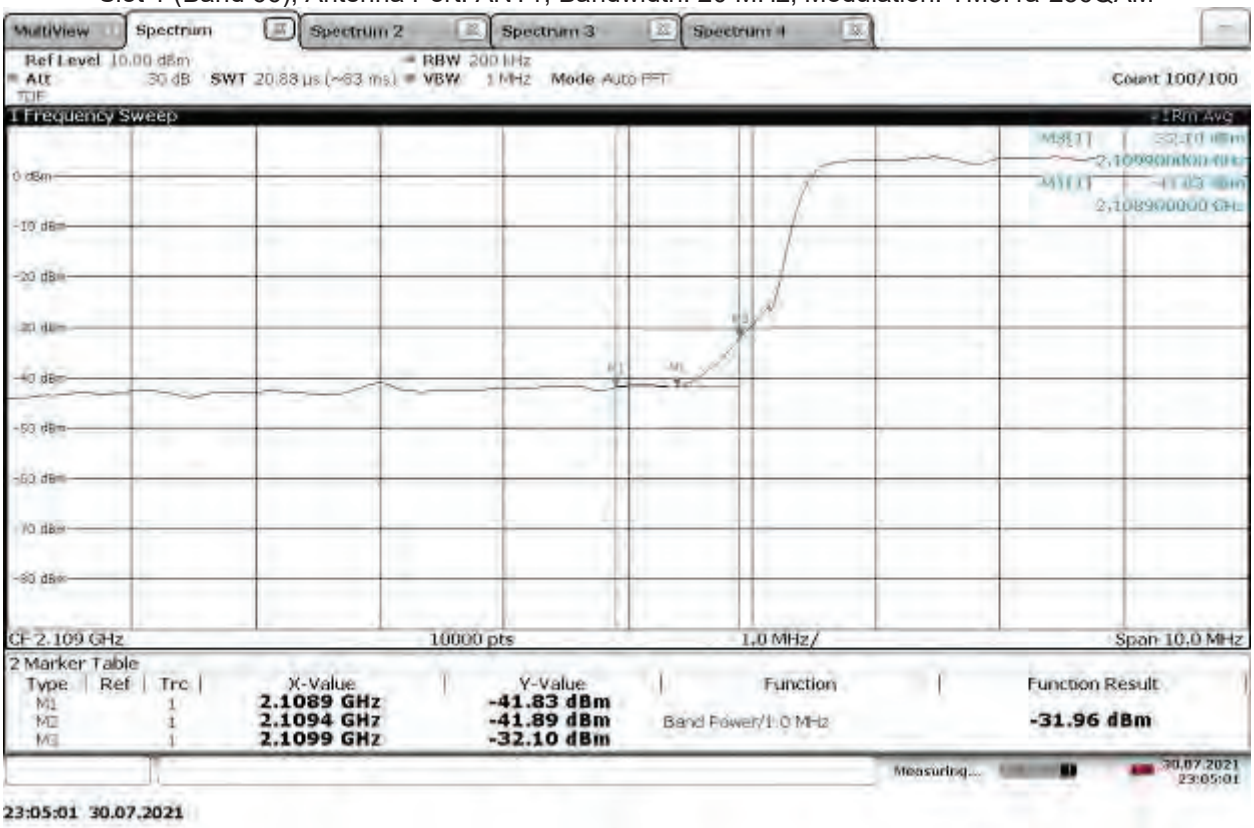
Band Edge Compliant, Upper Band Edge, 2192.50 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



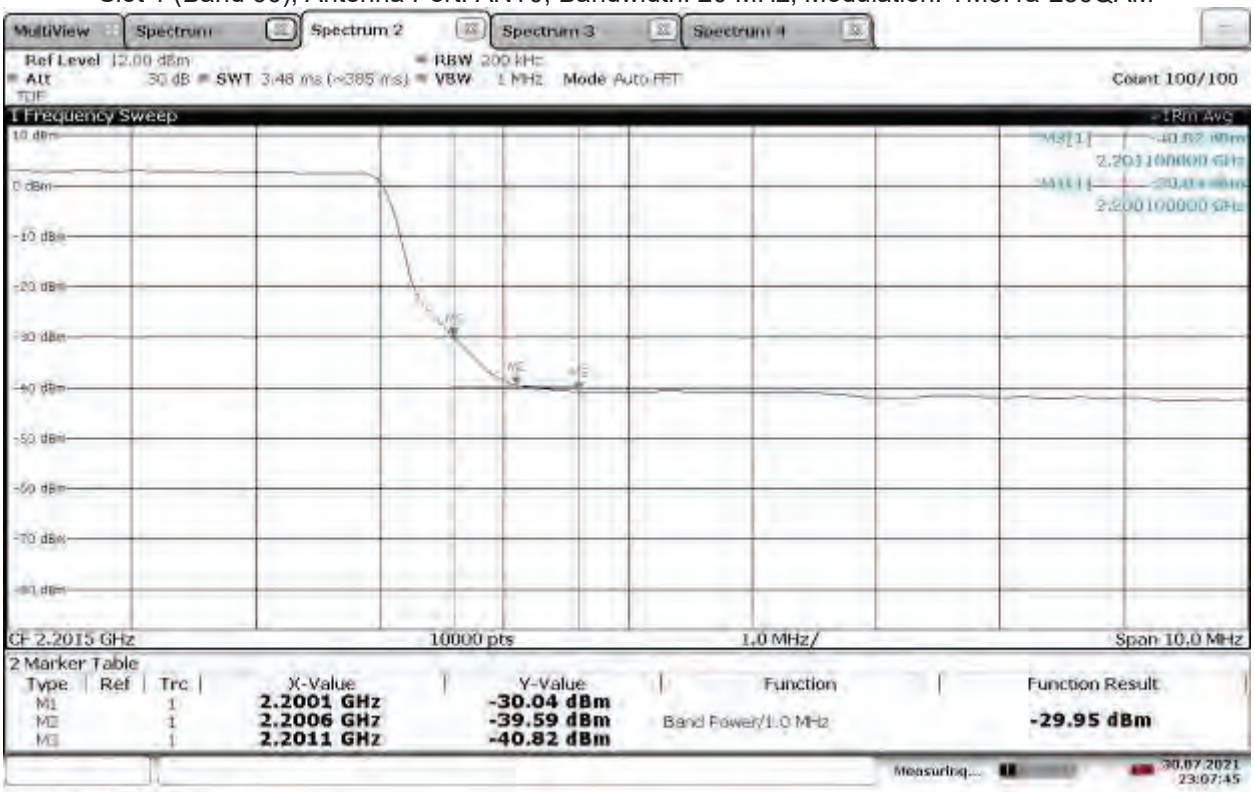
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



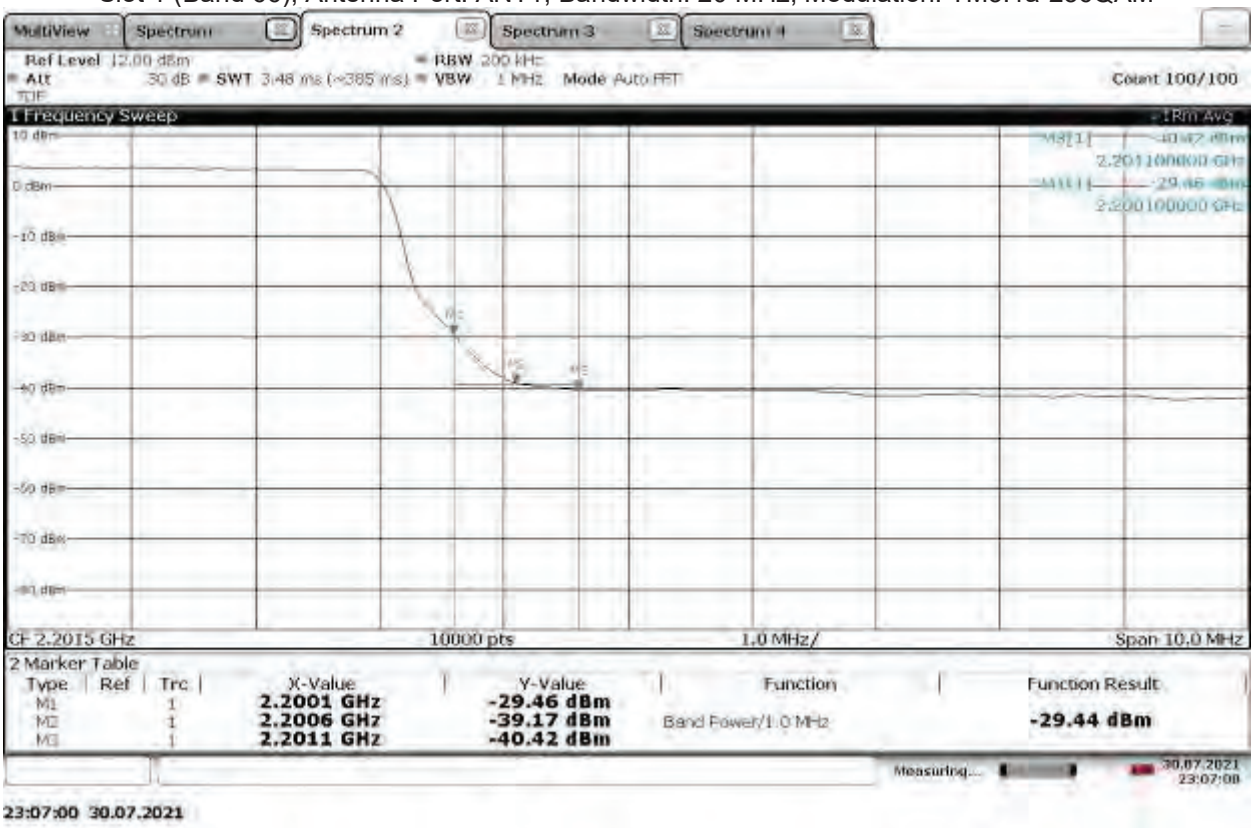
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 1 (Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 1 (Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



Test Personnel:	Kouma Sinn KPS	Test Date:	07/29/2021, 07/30/2021, 09/08/2021
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 27	Limit Applied:	See report section 9.3
Input Voltage:	48 VDC (POE)		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	24, 22, 24 ºC
		Relative Humidity:	62, 48, 60 %
		Atmospheric Pressure:	996, 997, 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	01/22/2021	01/22/2022
CBLHF2012-5M-2'	5m 9kHz-40GHz Coaxial Cable - SET2	Huber & Suhner	SF102	252676002	02/19/2021	02/19/2022
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	10/27/2020	10/27/2021
DAV005'	Weather Station	Davis	6250	MS191218083	02/07/2021	02/07/2022
SAF1153'	Freezing Rain\Icing\Temp\Humidity\ - 73deg C to +190deg C, 95% humidity, Ice Freezing Rain	Cincinnati Sub-Zero	CTH-(FR)64-6-6-SC/AC	12-CT15628	11/18/2020	11/18/2021

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 2110-2200 MHz.

Frequency stability over temperature

Band 66, Modulation: QPSK, Bandwidth: 5MHz, Antenna Port: ANT0 , Channel: Low 2112.5 MHz

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.11025445	3.6E-07	1.70596E-07	0.002	2.5
-20	2.11025494	-1.3E-07	-6.16039E-08	-0.001	2.5
-10	2.11025489	-8E-08	-3.79101E-08	0.000	2.5
0	2.11025513	3.2E-07	1.5164E-07	0.002	2.5
10	2.11025457	-2.4E-07	-1.1373E-07	-0.001	2.5
20	2.11025481	0	0	0.000	--
30	2.11025523	4.2E-07	1.99028E-07	0.002	2.5
40	2.11025514	3.3E-07	1.56379E-07	0.002	2.5
50	2.11025529	4.8E-07	2.27461E-07	0.002	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.11473052	-5E-08	-2.36437E-08	0.000	2.5
-20	2.11473082	-3.5E-07	-1.65506E-07	-0.002	2.5
-10	2.11473031	1.6E-07	7.56598E-08	0.001	2.5
0	2.11473022	-2.5E-07	-1.18218E-07	-0.001	2.5
10	2.11473036	-1.1E-07	-5.20161E-08	-0.001	2.5
20	2.11473047	0	0	0.000	--
30	2.11473047	0	0	0.000	2.5
40	2.11473052	5E-08	2.36437E-08	0.000	2.5
50	2.1147303	-1.7E-07	-8.03885E-08	-0.001	2.5

Frequency stability over temperature

Band 66, Modulation: QPSK, Bandwidth: 5MHz, Antenna Port: ANT0 , Channel: High 2197.5 MHz

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.19525154	1.8E-07	8.19952E-08	0.00	2.5
-20	2.19525127	4.5E-07	2.04988E-07	0.00	2.5
-10	2.19525186	-1.4E-07	-6.3774E-08	0.00	2.5
0	2.19525199	2.7E-07	1.22993E-07	0.00	2.5
10	2.19525225	5.3E-07	2.4143E-07	0.00	2.5
20	2.19525172	0	0	0.00	--
30	2.19525127	-4.5E-07	-2.04988E-07	0.00	2.5
40	2.19525131	-4.1E-07	-1.86767E-07	0.00	2.5
50	2.195251	-7.2E-07	-3.27981E-07	0.00	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.19972777	-4.3E-07	-1.95479E-07	0.00	2.5
-20	2.19972811	-7.7E-07	-3.50043E-07	0.00	2.5
-10	2.19972764	-3E-07	-1.36381E-07	0.00	2.5
0	2.19972744	1E-07	4.54602E-08	0.00	2.5
10	2.19972701	-3.3E-07	-1.50019E-07	0.00	2.5
20	2.19972734	0	0	0.00	--
30	2.1997279	5.6E-07	2.54577E-07	0.00	2.5
40	2.19972648	-8.6E-07	-3.90958E-07	0.00	2.5
50	2.1997265	-8.4E-07	-3.81866E-07	0.00	2.5

Frequency stability over temperature

Band 66, Modulation: QPSK, Bandwidth: 20MHz, Antenna Port: ANT0 , Channel: Low 2120 MHz

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.1105298	-1.15E-06	-5.44887E-07	-0.01	2.5
-20	2.11053098	-2.33E-06	-1.10399E-06	-0.01	2.5
-10	2.11052722	1.43E-06	6.77555E-07	0.01	2.5
0	2.11052738	-1.27E-06	-6.01745E-07	-0.01	2.5
10	2.11052933	6.8E-07	3.22194E-07	0.00	2.5
20	2.11052865	0	0	0.00	--
30	2.11053265	4E-06	1.89526E-06	0.02	2.5
40	2.11053051	1.86E-06	8.81296E-07	0.01	2.5
50	2.11052974	1.09E-06	5.16458E-07	0.01	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.1294191	4.72E-06	2.21656E-06	0.02	2.5
-20	2.12941931	4.51E-06	2.11794E-06	0.02	2.5
-10	2.12942218	1.64E-06	7.70161E-07	0.01	2.5
0	2.12942246	-1.36E-06	-6.3867E-07	-0.01	2.5
10	2.12941996	-3.86E-06	-1.8127E-06	-0.02	2.5
20	2.12942382	0	0	0.00	--
30	2.12942367	-1.5E-07	-7.04416E-08	0.00	2.5
40	2.12942731	3.49E-06	1.63894E-06	0.02	2.5
50	2.12942621	2.39E-06	1.12237E-06	0.01	2.5

Frequency stability over temperature

Band 66, Modulation: QPSK, Bandwidth: 20MHz, Antenna Port: ANT0 , Channel: Low 2190 MHz

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.1805229	-3.91E-06	-1.79315E-06	-0.02	2.5
-20	2.18052359	-4.6E-06	-2.10959E-06	-0.02	2.5
-10	2.18052485	-5.86E-06	-2.68743E-06	-0.03	2.5
0	2.18052554	6.55E-06	3.00387E-06	0.03	2.5
10	2.18052477	5.78E-06	2.65075E-06	0.03	2.5
20	2.18051899	0	0	0.00	--
30	2.18052474	5.75E-06	2.63699E-06	0.03	2.5
40	2.18052541	6.42E-06	2.94425E-06	0.03	2.5
50	2.18052642	7.43E-06	3.40745E-06	0.03	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.19941291	6.17E-06	2.80529E-06	0.03	2.5
-20	2.19941349	5.59E-06	2.54158E-06	0.03	2.5
-10	2.19941363	5.45E-06	2.47793E-06	0.02	2.5
0	2.19941405	-5.03E-06	-2.28697E-06	-0.02	2.5
10	2.19941636	-2.72E-06	-1.23669E-06	-0.01	2.5
20	2.19941908	0	0	0.00	--
30	2.19941663	-2.45E-06	-1.11393E-06	-0.01	2.5
40	2.19941523	-3.85E-06	-1.75046E-06	-0.02	2.5
50	2.19941133	-7.75E-06	-3.52366E-06	-0.04	2.5

Frequency stability over voltages

Band 66, 5G, RP5200, Modulation: QPSK, Bandwidth: 5MHz, Antenna Port: ANT0 , Low Channel

Low Edge of Occupied Bandwidth

Voltage	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	2.11025506	1.27E-06	6.01823E-07	0.01	2.5
48	2.11025379	0	0	0.00	--
57	2.11025498	1.19E-06	5.63913E-07	0.01	2.5

Upper Edge of Occupied Bandwidth

Volt	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	2.11473045	1.69E-06	7.99157E-07	0.01	2.5
48	2.11472876	0	0	0.00	--
57	2.11473039	1.63E-06	7.70784E-07	0.01	2.5

Band 66, 5G, RP5200, Modulation: QPSK, Bandwidth: 5MHz, Antenna Port: ANT0 , High Channel

Low Edge of Occupied Bandwidth

Voltage	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	2.19525194	-6E-08	-2.73317E-08	0.00	2.5
48	2.195252	0	0	0.00	--
57	2.19525207	7E-08	3.1887E-08	0.00	2.5

Upper Edge of Occupied Bandwidth

Volt	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	2.19972694	-3.7E-07	-1.68203E-07	0.00	2.5
48	2.19972731	0	0	0.00	--
57	2.19972697	-3.4E-07	-1.54565E-07	0.00	2.5

Frequency stability over voltages

Band 5, 5G, RP5100, Modulation: QPSK, Bandwidth: 20MHz, Antenna Port: ANT0 , Low Channel

Low Edge of Occupied Bandwidth

Voltage	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	869.5152	-0.0065	-7.47537E-06	-0.07	2.5
48	869.5217	0	0	0.00	--
57	869.513	-0.0087	-1.00055E-05	-0.10	2.5

Upper Edge of Occupied Bandwidth

Volt	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	888.4191	-0.0069	-7.76654E-06	-0.08	2.5
48	888.426	0	0	0.00	--
57	888.4291	0.0031	3.48932E-06	0.03	2.5

Band 5, 5G, RP5100, Modulation: QPSK, Bandwidth: 20MHz, Antenna Port: ANT0 , High Channel

Low Edge of Occupied Bandwidth

Voltage	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	874.4853	-0.0079	-9.0338E-06	-0.09	2.5
48	874.4932	0	0	0.00	--
57	874.4854	-0.0078	-8.91945E-06	-0.09	2.5

Upper Edge of Occupied Bandwidth

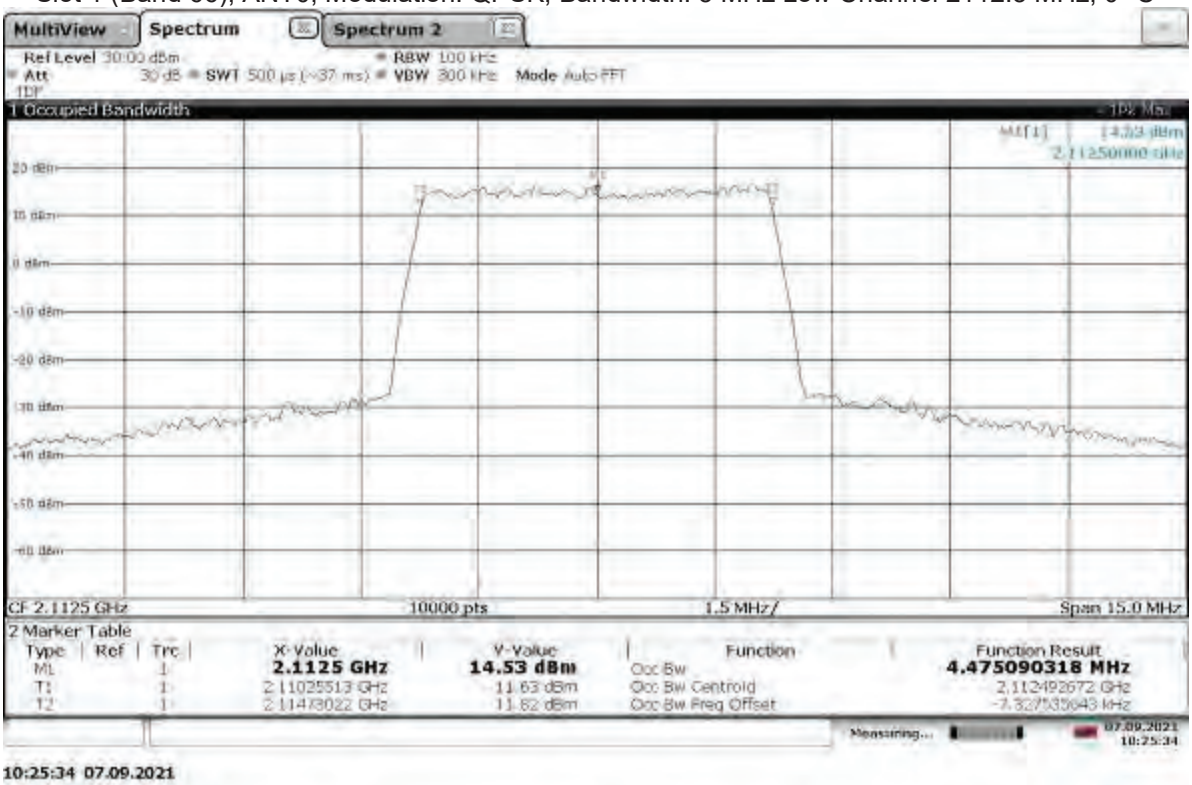
Volt	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(VDC)	(GHz)	(GHz)	--	--	PPM
41.1	893.4445	0.0026	2.91009E-06	0.03	2.5
48	893.4419	0	0	0.00	--
57	893.4434	0.0015	1.6789E-06	0.02	2.5

10.4 Setup Photograph:

Confidential – Test setup photo not included in this report

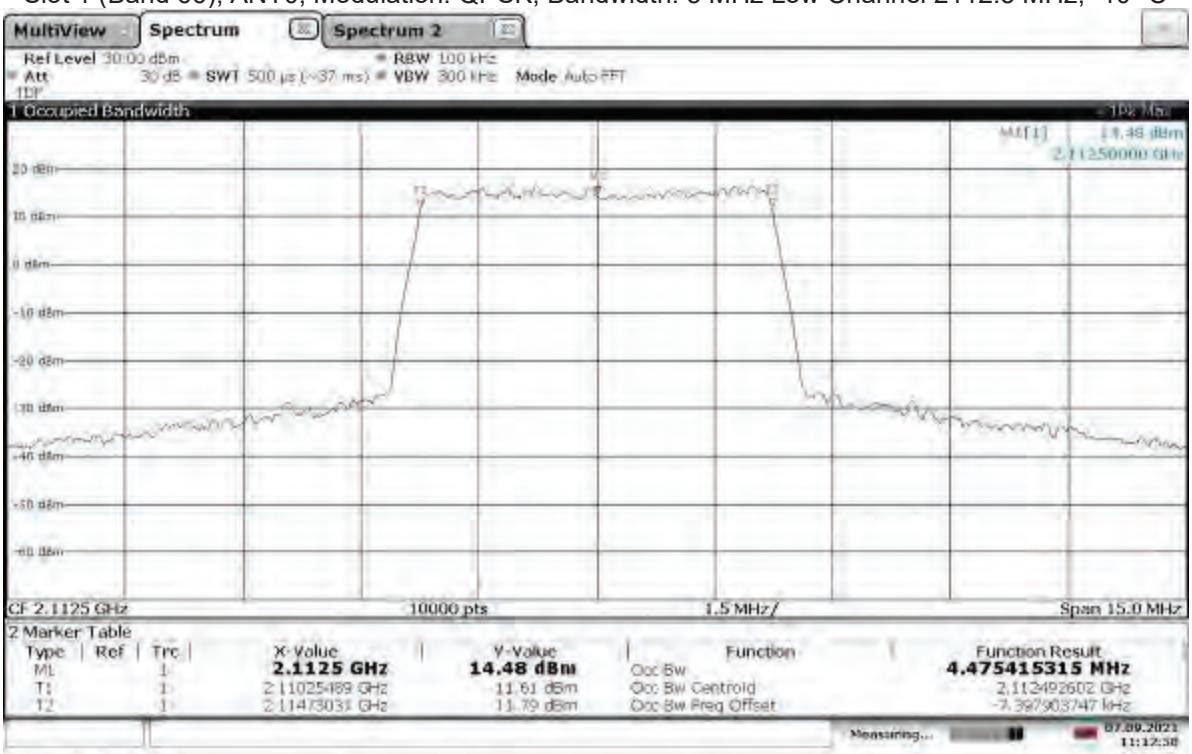
10.5 Plots/Data:

Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 0 ºC



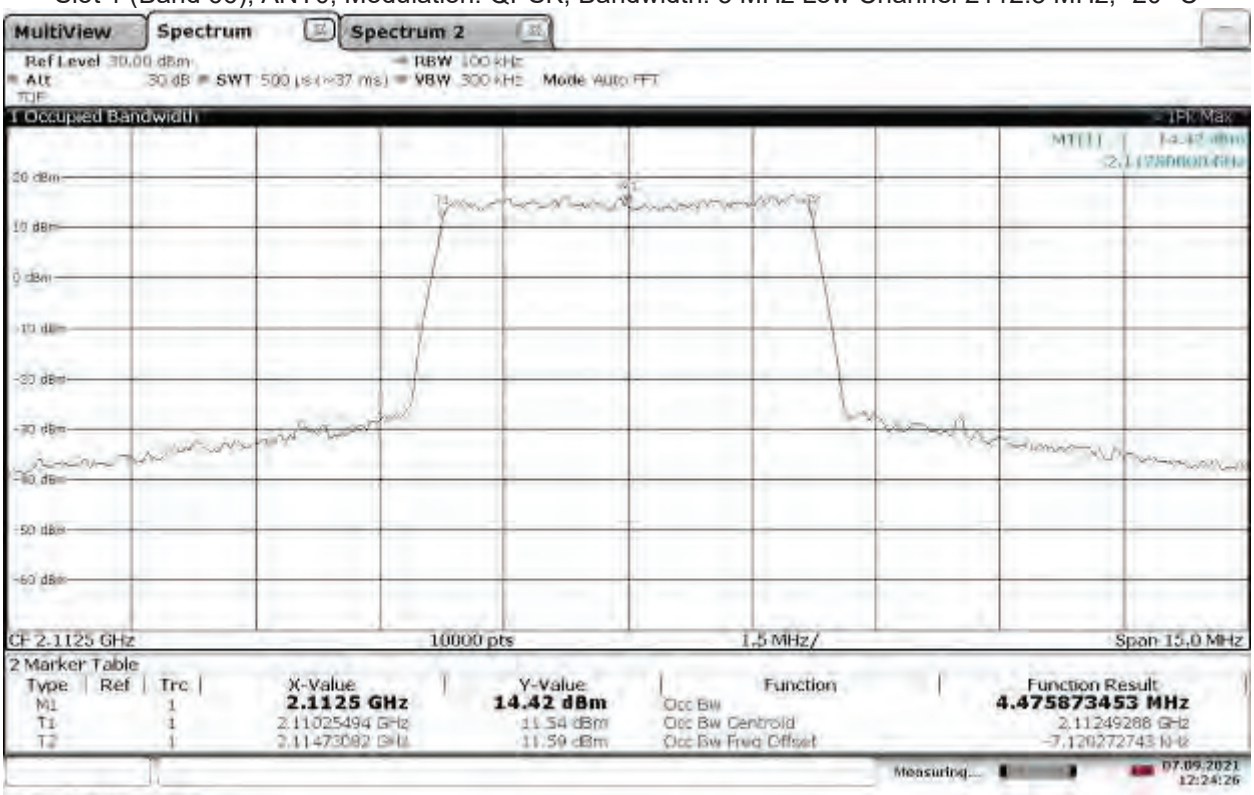
10:25:34 07.09.2021

Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, -10 ºC



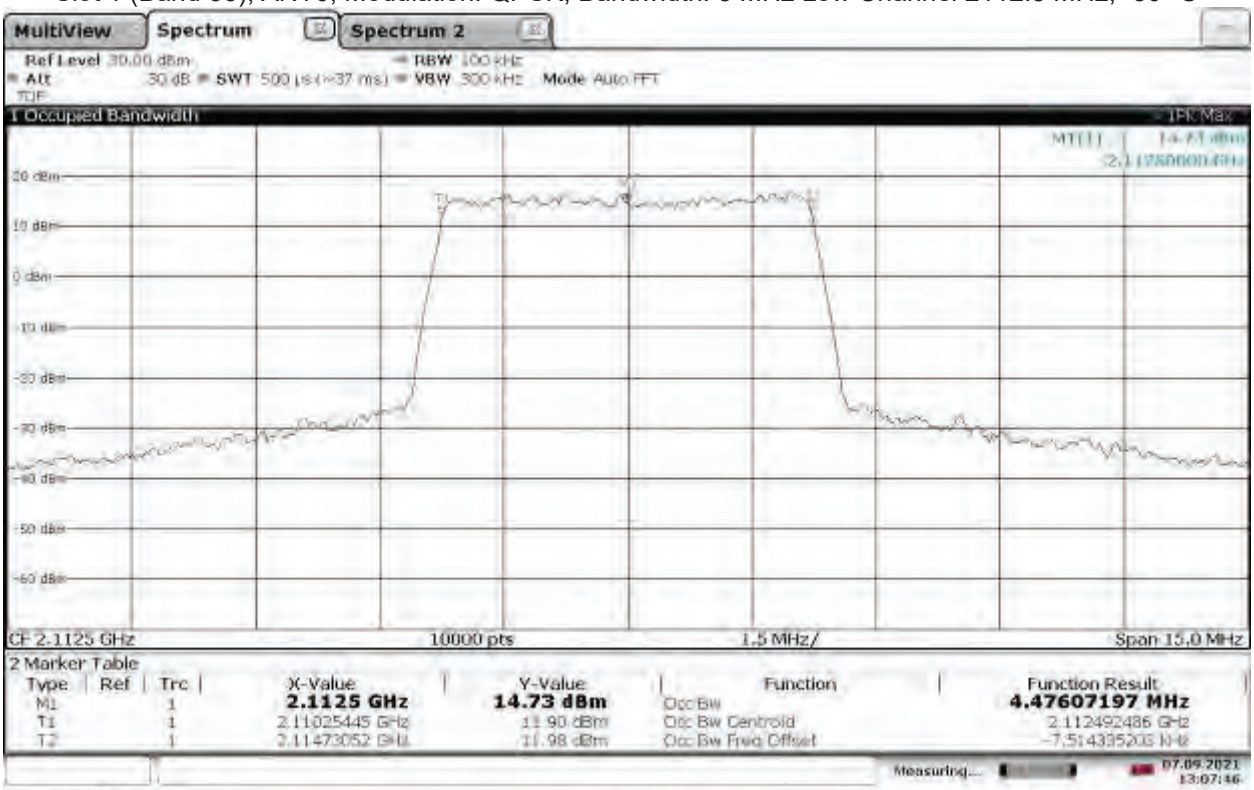
11:12:58 07.09.2021

Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, -20 ºC



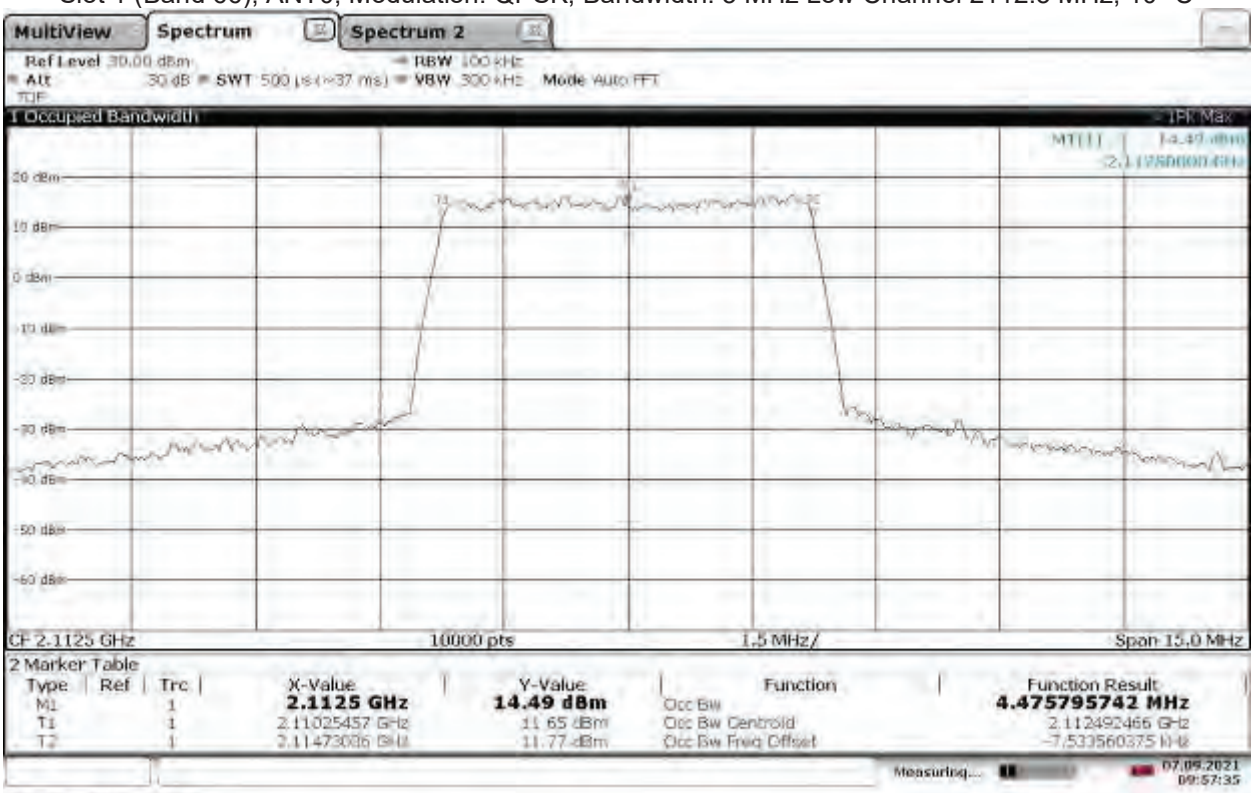
12:24:26 07.09.2021

Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, -30 ºC



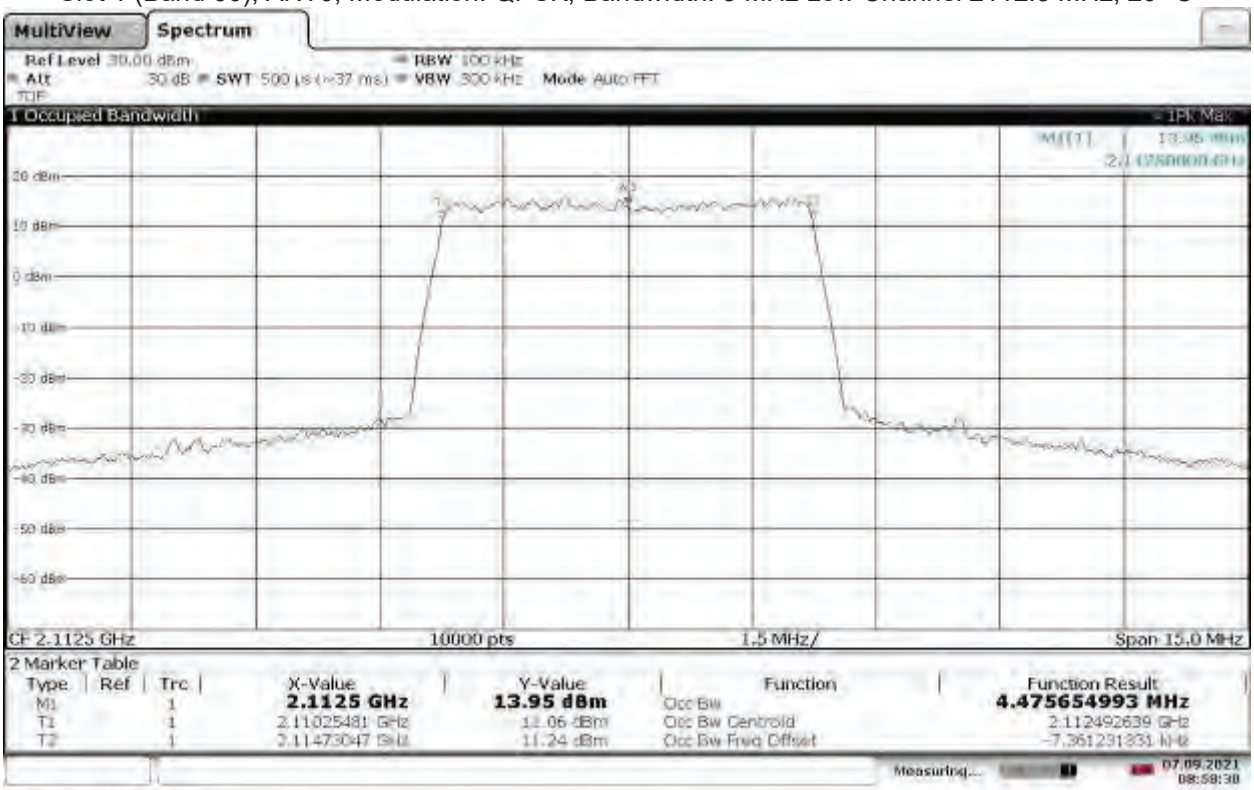
13:07:47 07.09.2021

Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 10 ºC



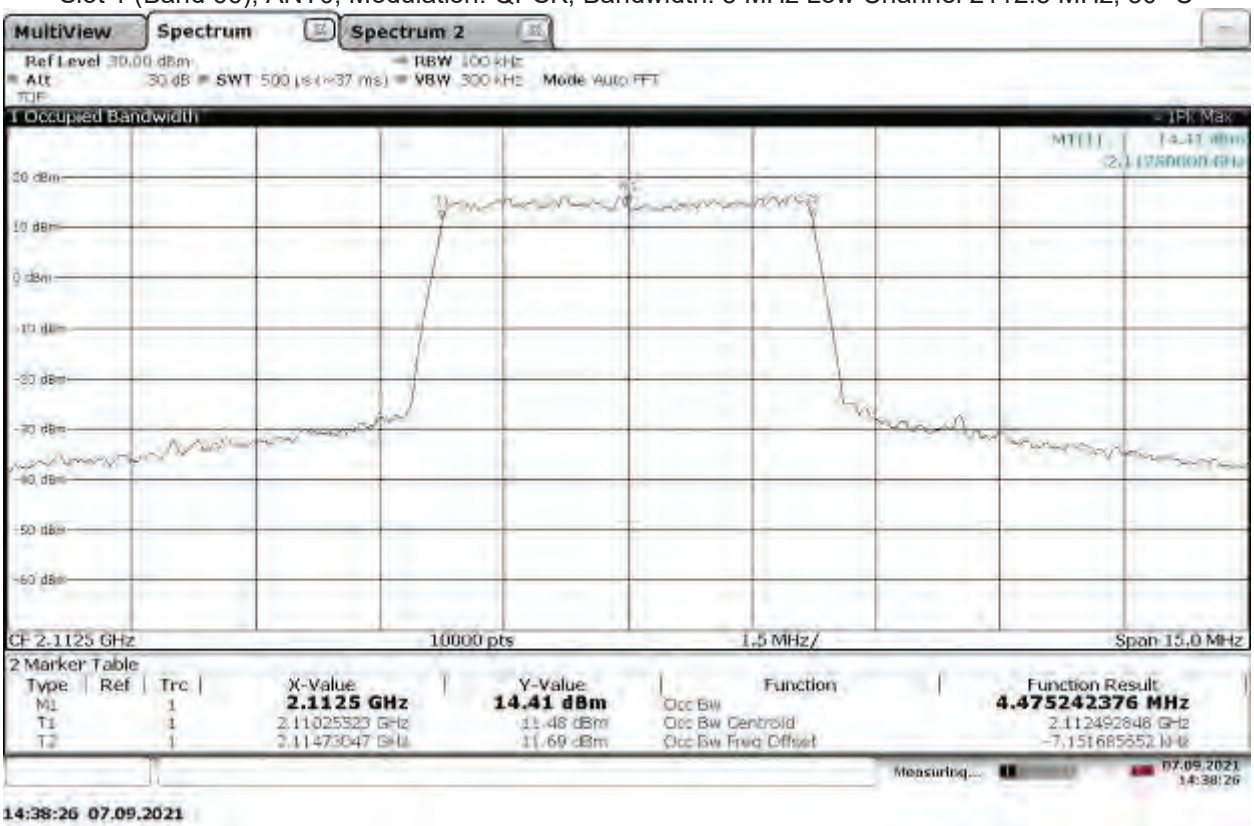
09:57:36 07.09.2021

Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 20 ºC

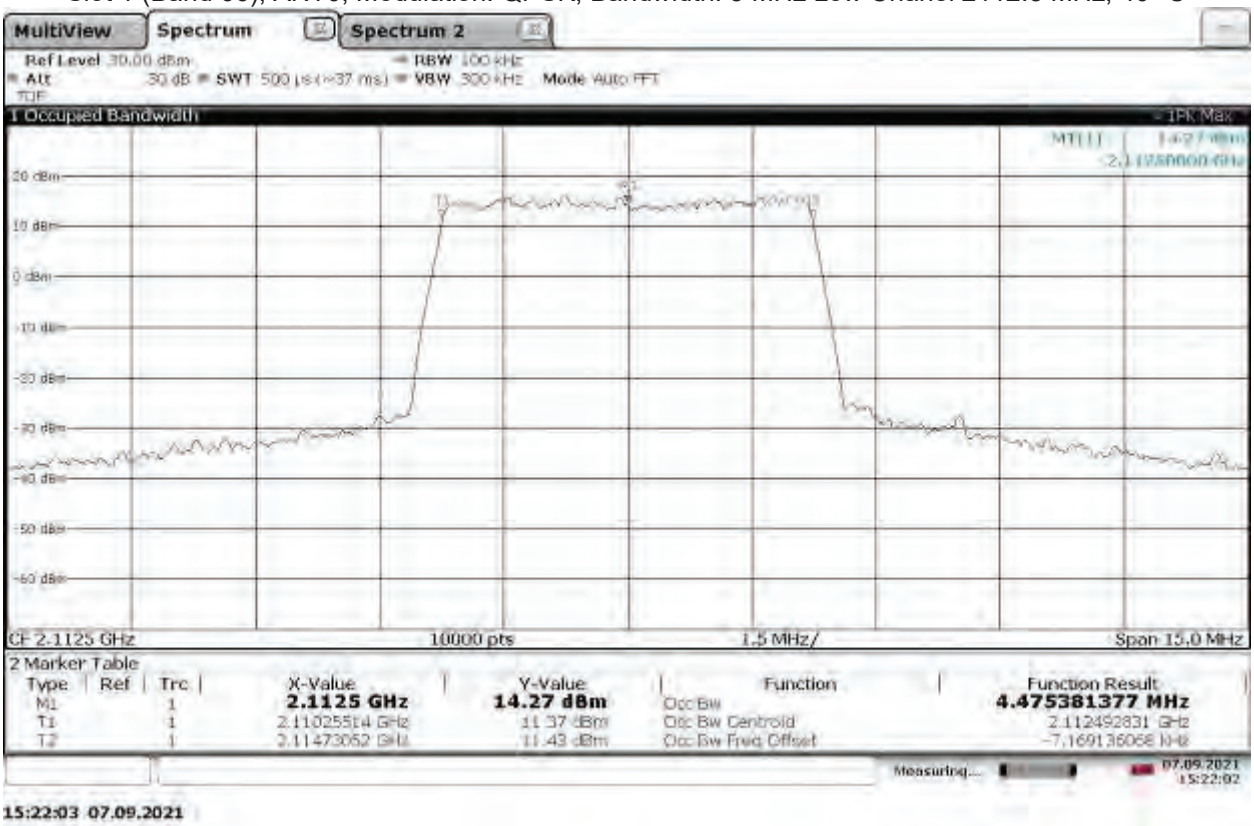


08:58:30 07.09.2021

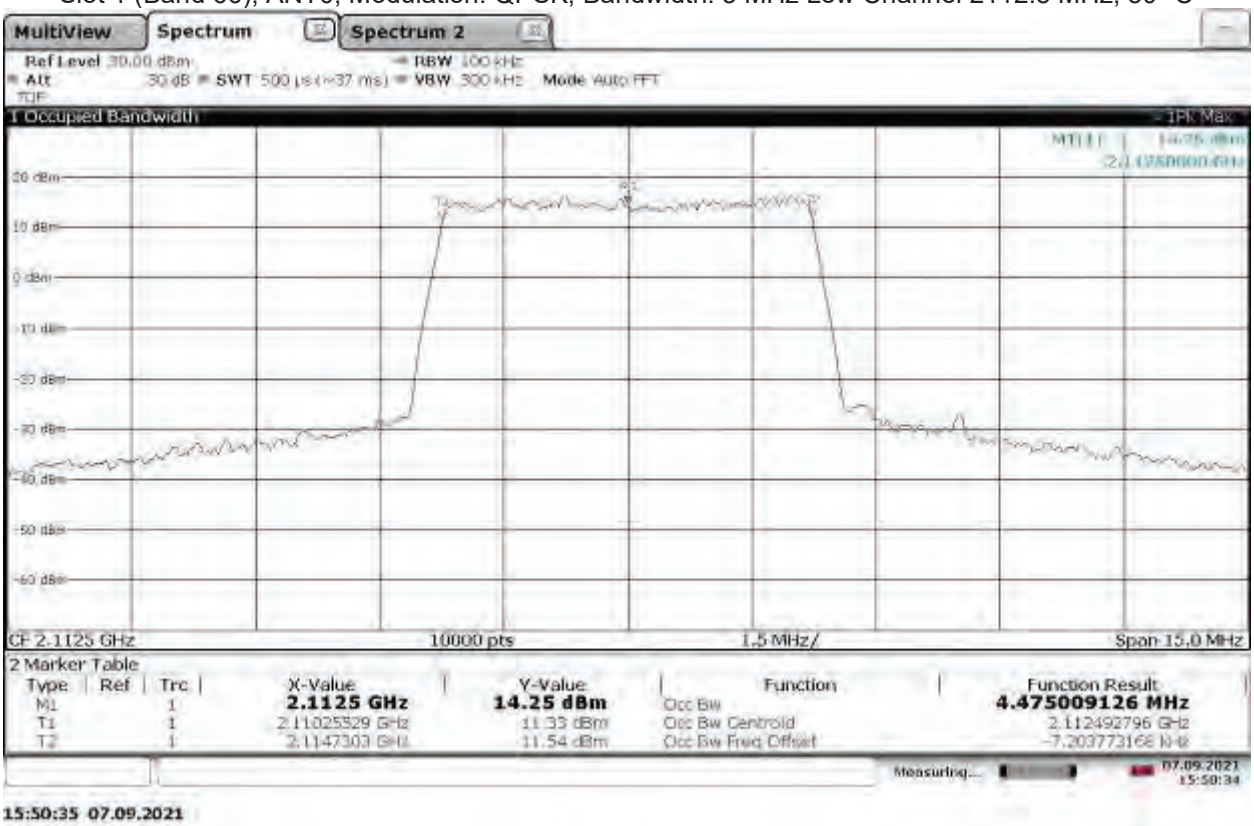
Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 30 ºC



Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Chanel 2112.5 MHz, 40 ºC

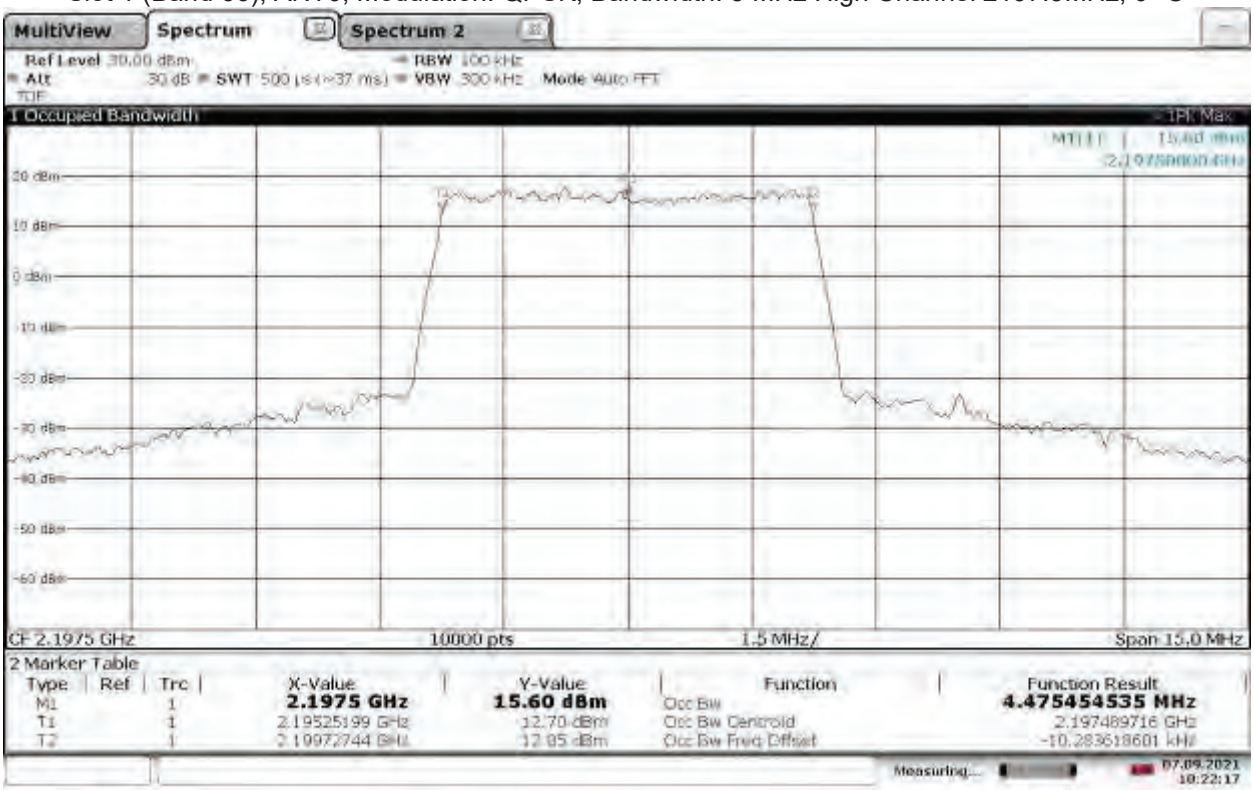


Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz Low Channel 2112.5 MHz, 50 ºC



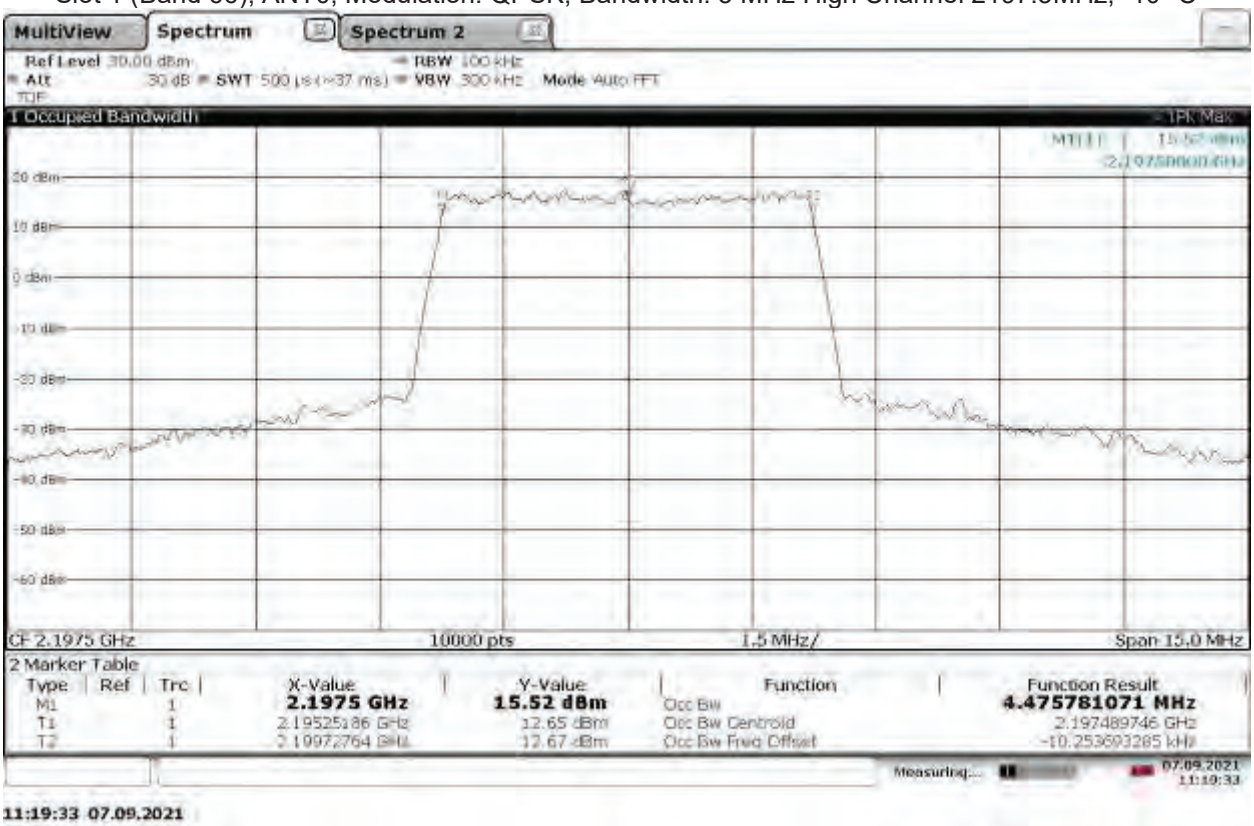
15:50:35 07.09.2021

Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2197.5MHz, 0 ºC



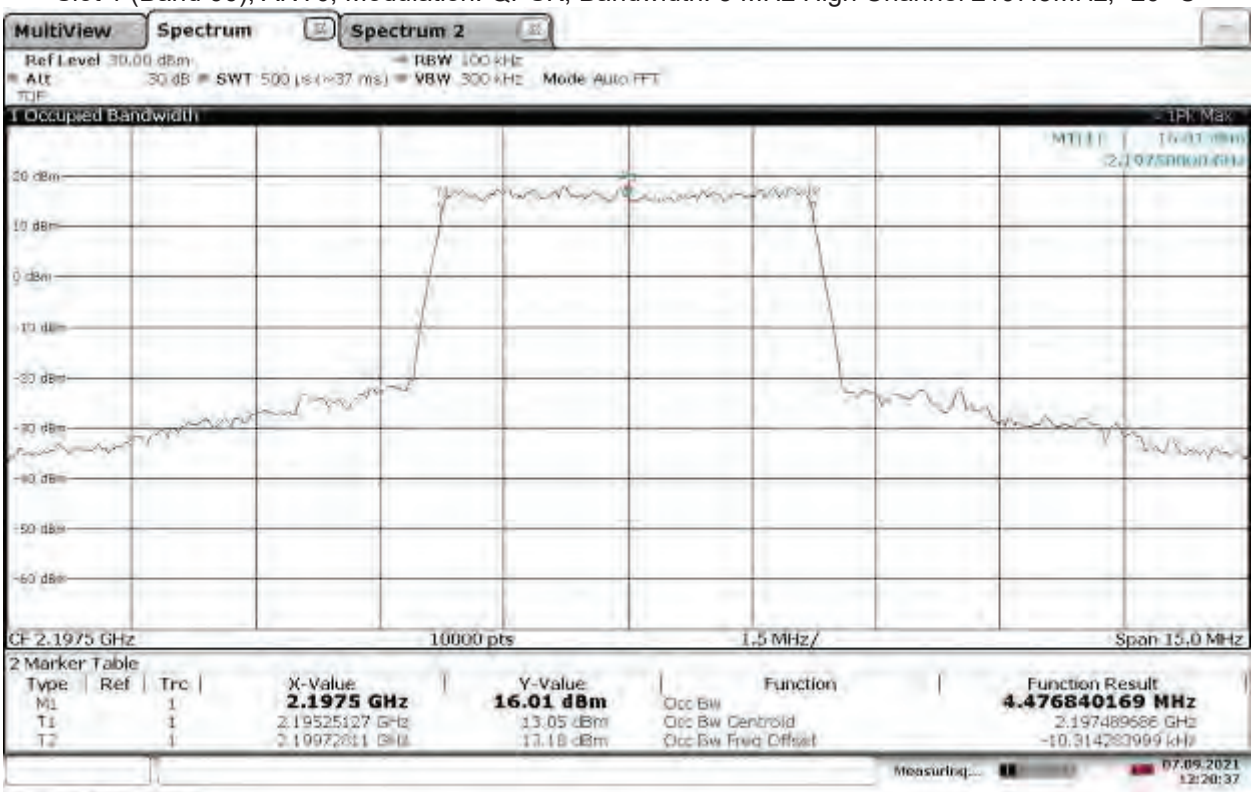
10:22:18 07.09.2021

Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2197.5MHz, -10 ºC



11:19:33 07.09.2021

Slot 1 (Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz High Channel 2197.5MHz, -20 ºC



12:20:37 07.09.2021