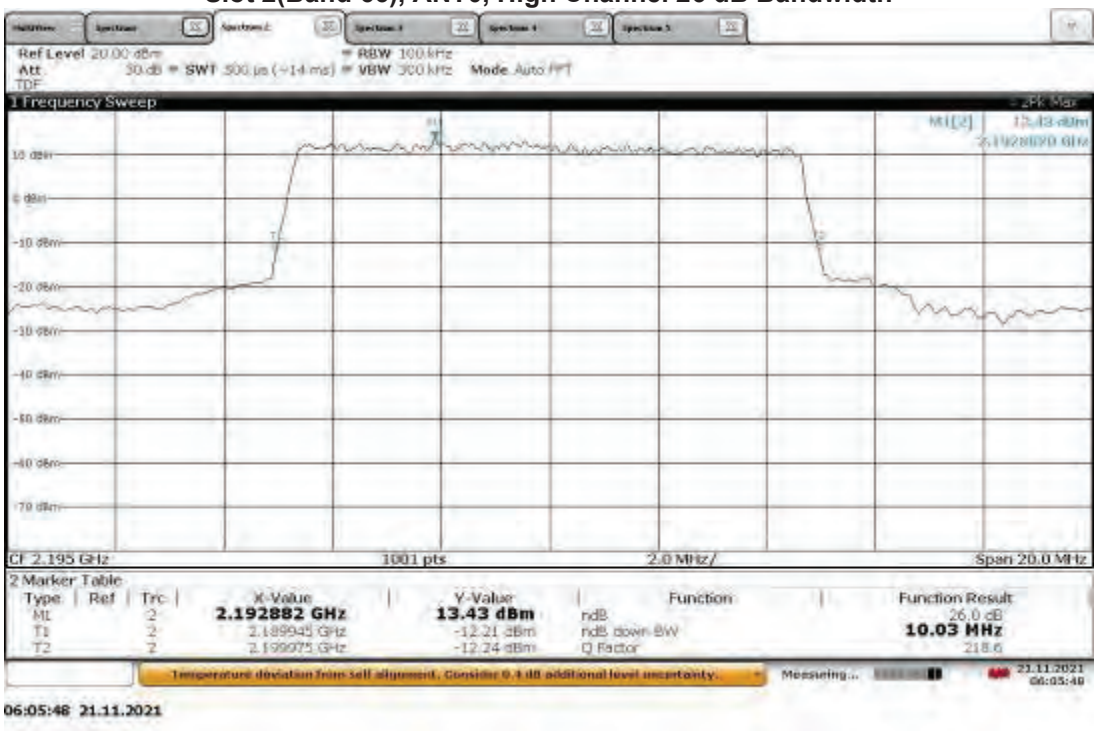
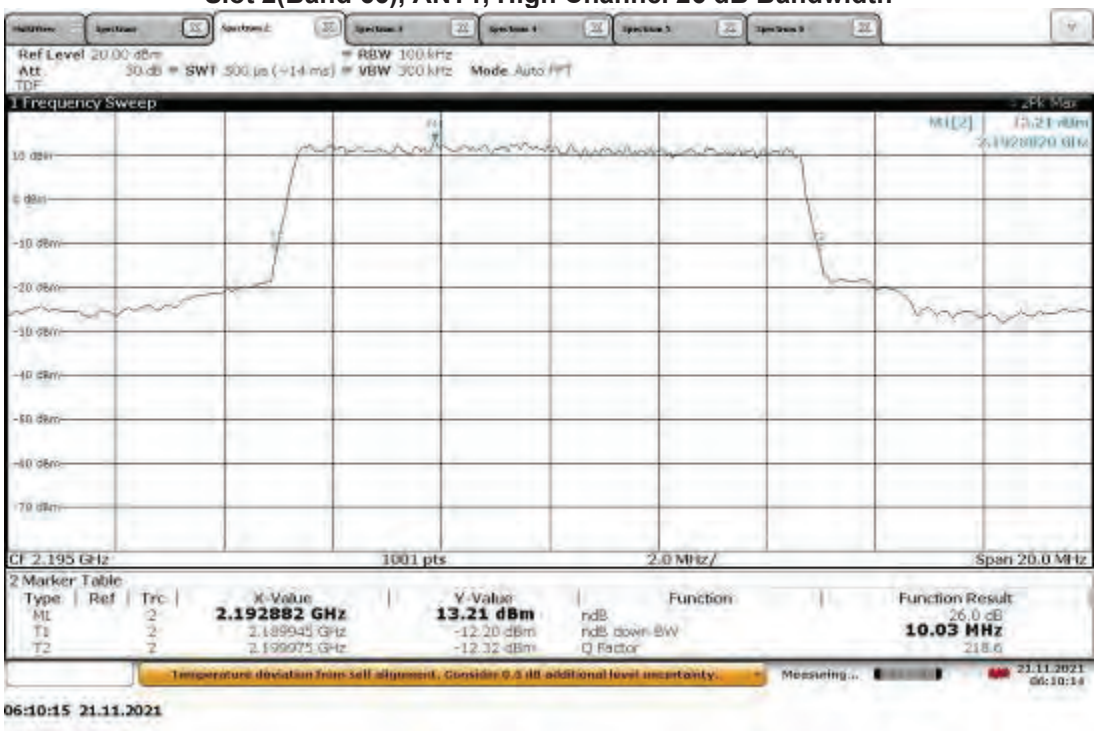
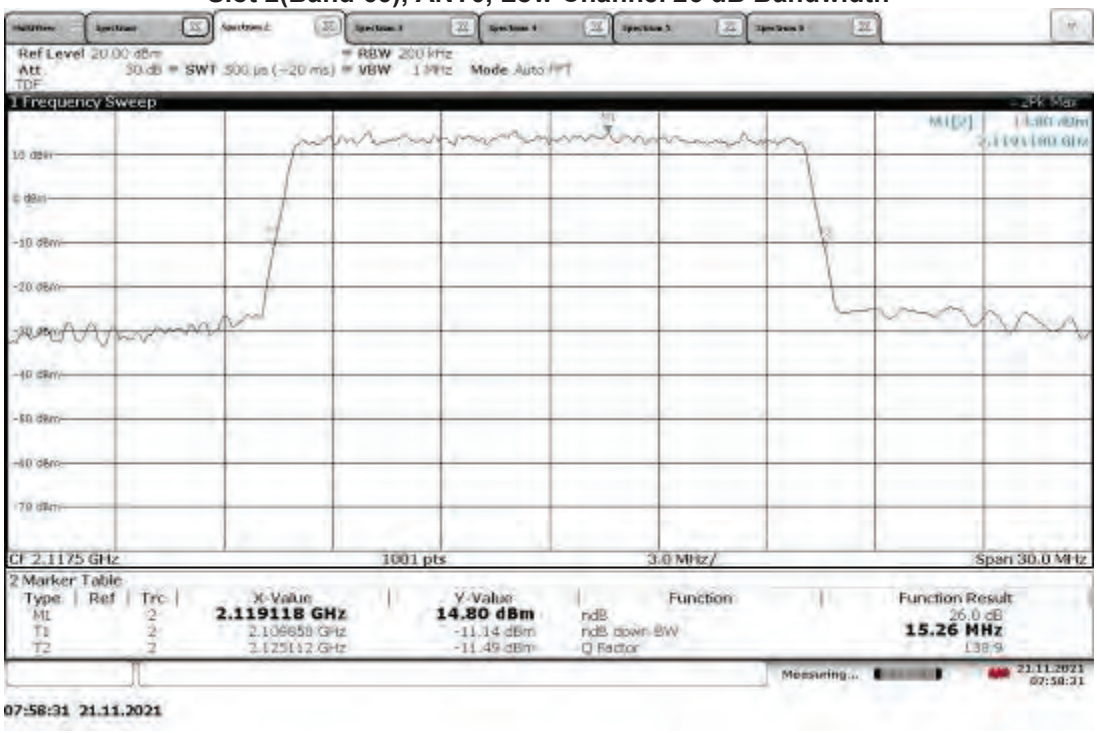
TM3.1-64QAM_10 MHz Bandwidth
Slot 2(Band 66), ANT0, High Channel 26 dB Bandwidth



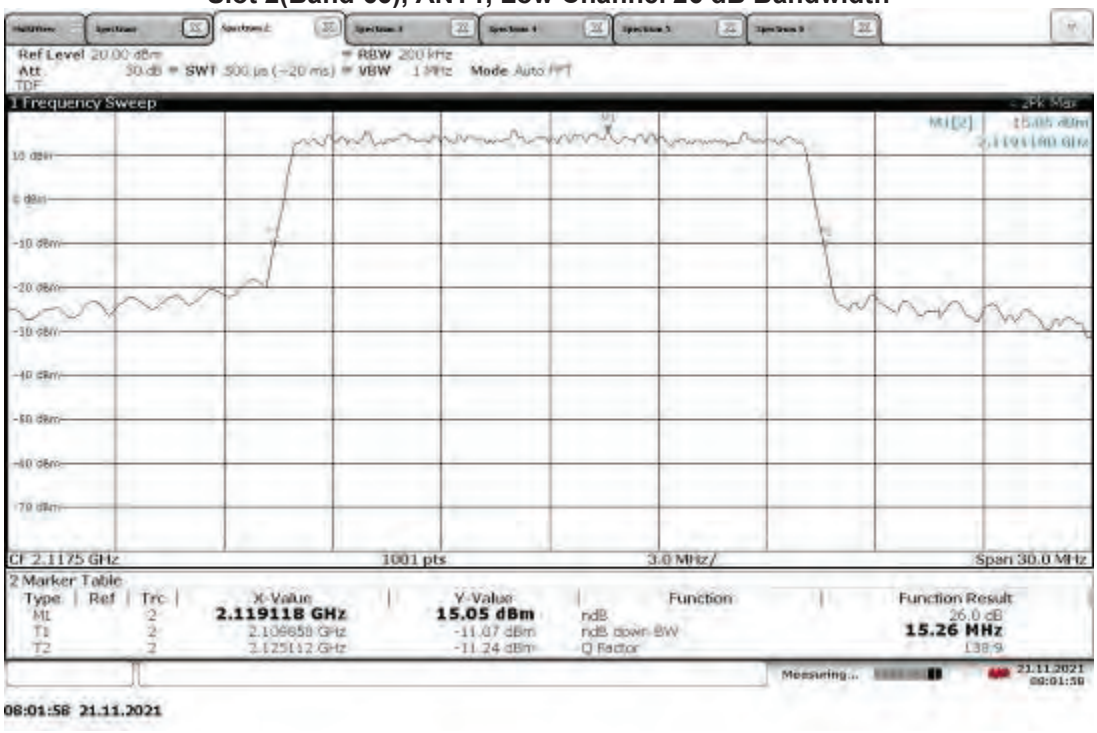
TM3.1-64QAM_10 MHz Bandwidth
Slot 2(Band 66), ANT1, High Channel 26 dB Bandwidth



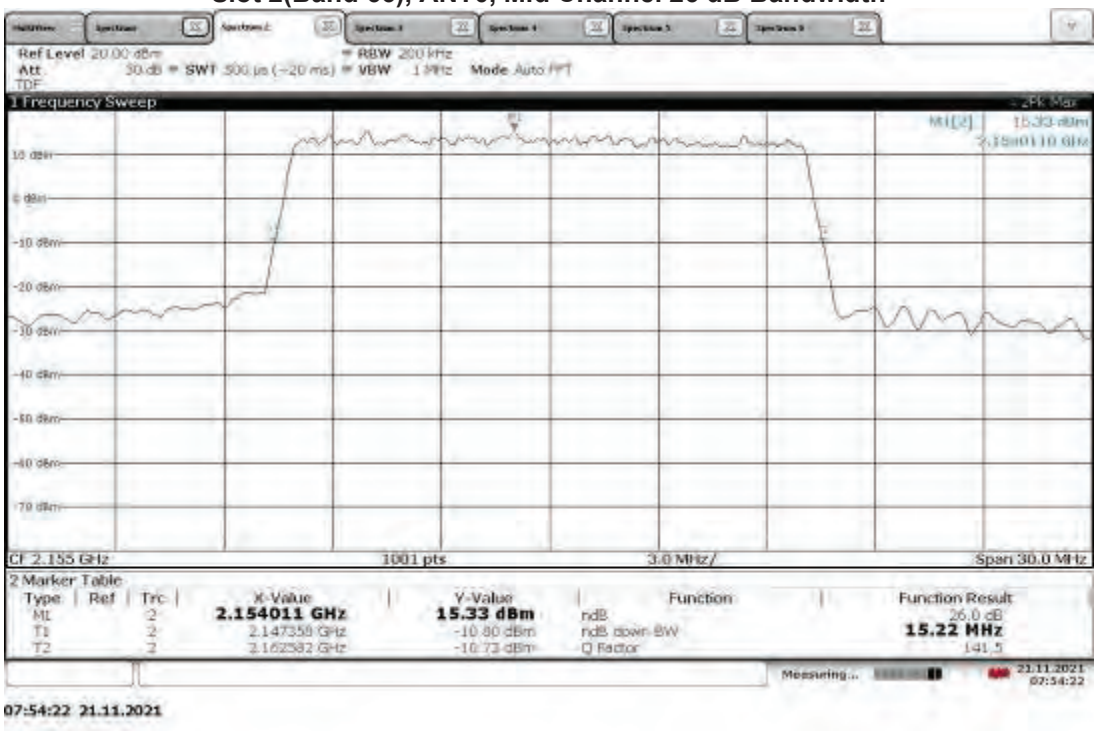
TM3.1-64QAM_15 MHz Bandwidth
Slot 2(Band 66), ANT0, Low Channel 26 dB Bandwidth



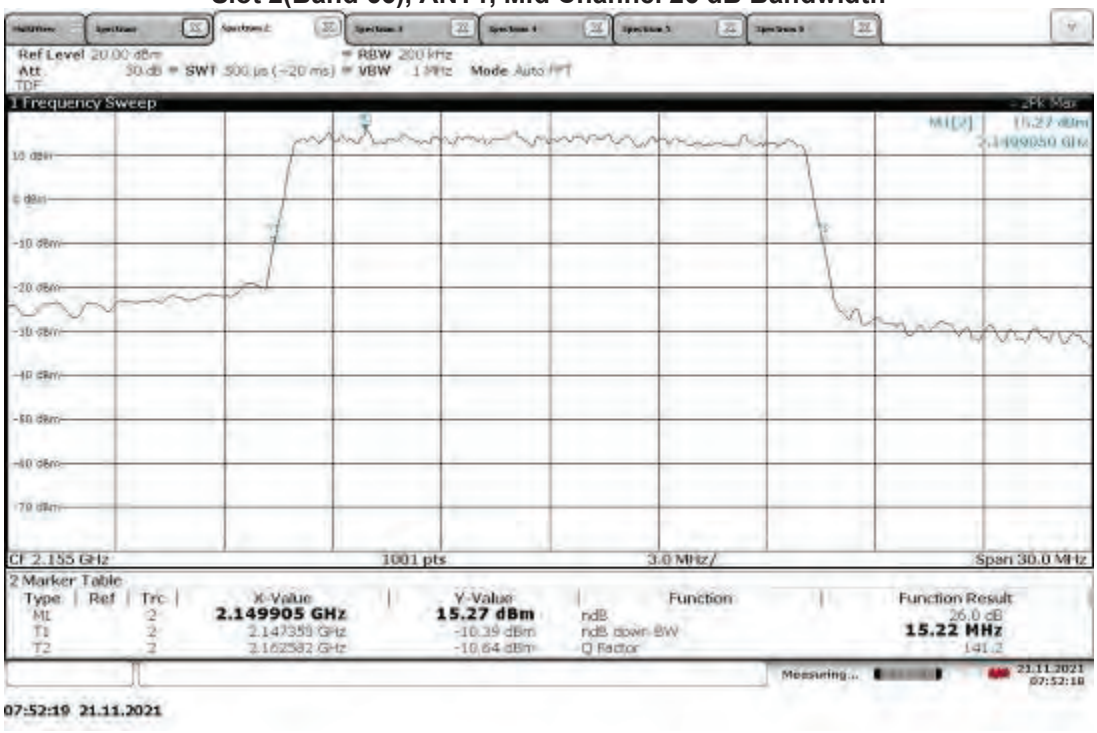
TM3.1-64QAM_15 MHz Bandwidth
Slot 2(Band 66), ANT1, Low Channel 26 dB Bandwidth



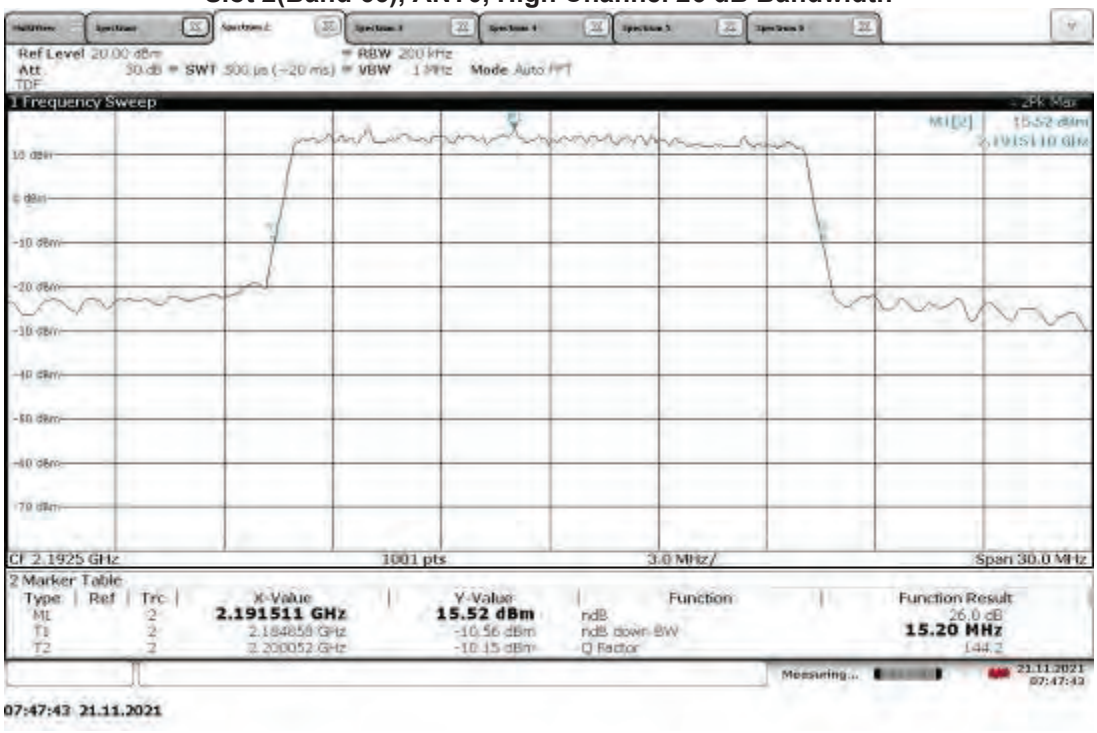
TM3.1-64QAM_15 MHz Bandwidth
Slot 2(Band 66), ANT0, Mid Channel 26 dB Bandwidth



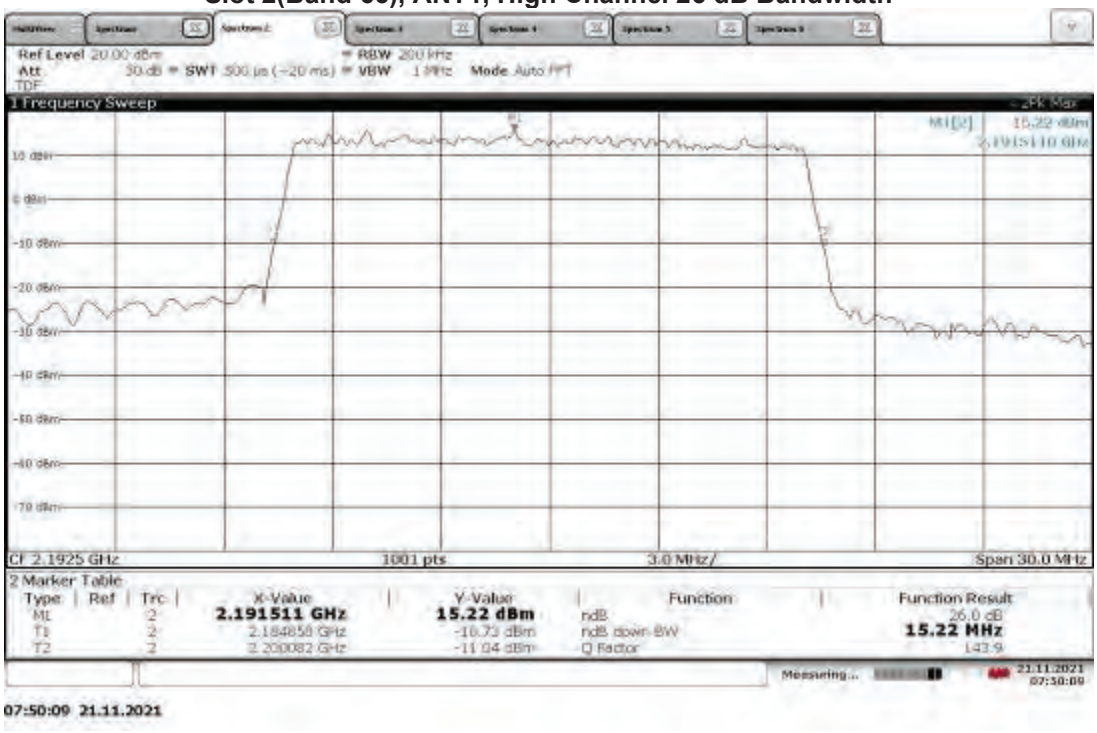
TM3.1-64QAM_15 MHz Bandwidth
Slot 2(Band 66), ANT1, Mid Channel 26 dB Bandwidth



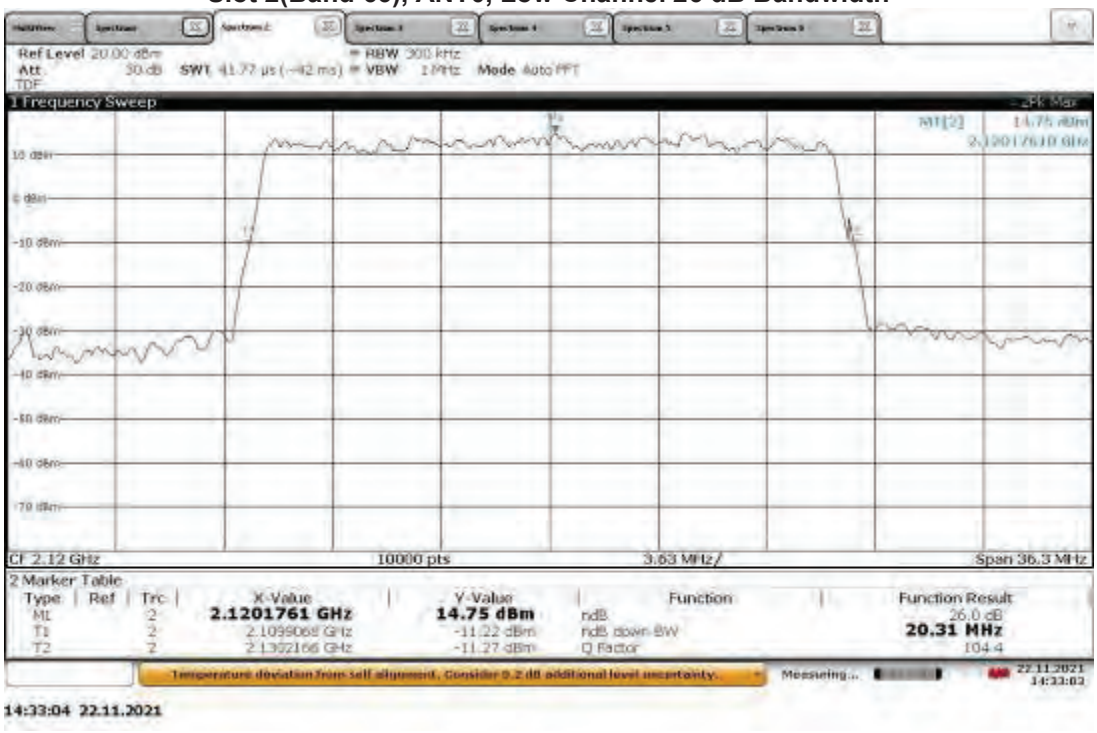
TM3.1-64QAM_15 MHz Bandwidth
Slot 2(Band 66), ANT0, High Channel 26 dB Bandwidth



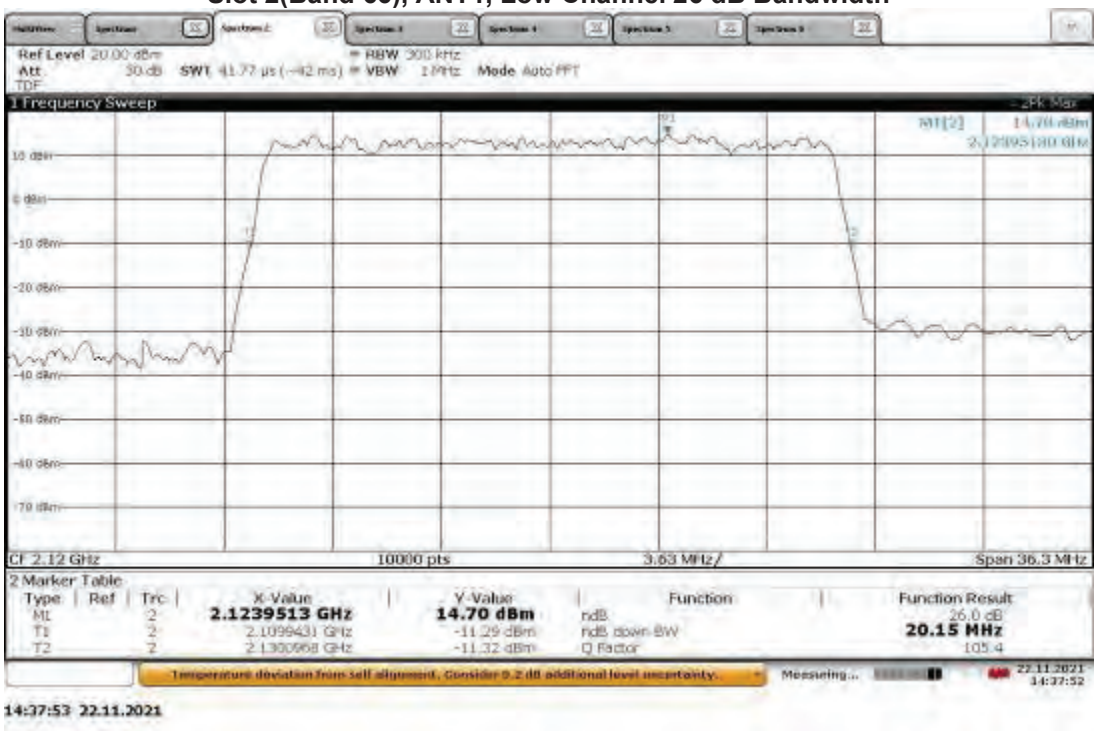
TM3.1-64QAM_15 MHz Bandwidth
Slot 2(Band 66), ANT1, High Channel 26 dB Bandwidth



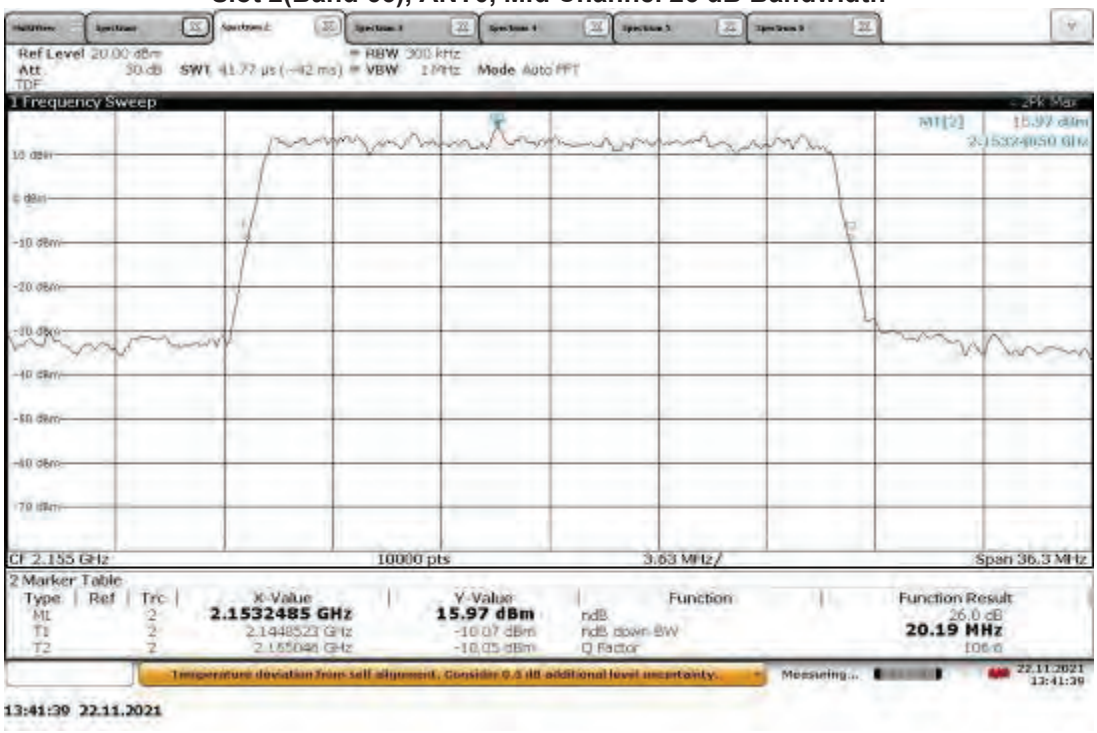
TM3.1-64QAM_20 MHz Bandwidth
Slot 2(Band 66), ANT0, Low Channel 26 dB Bandwidth



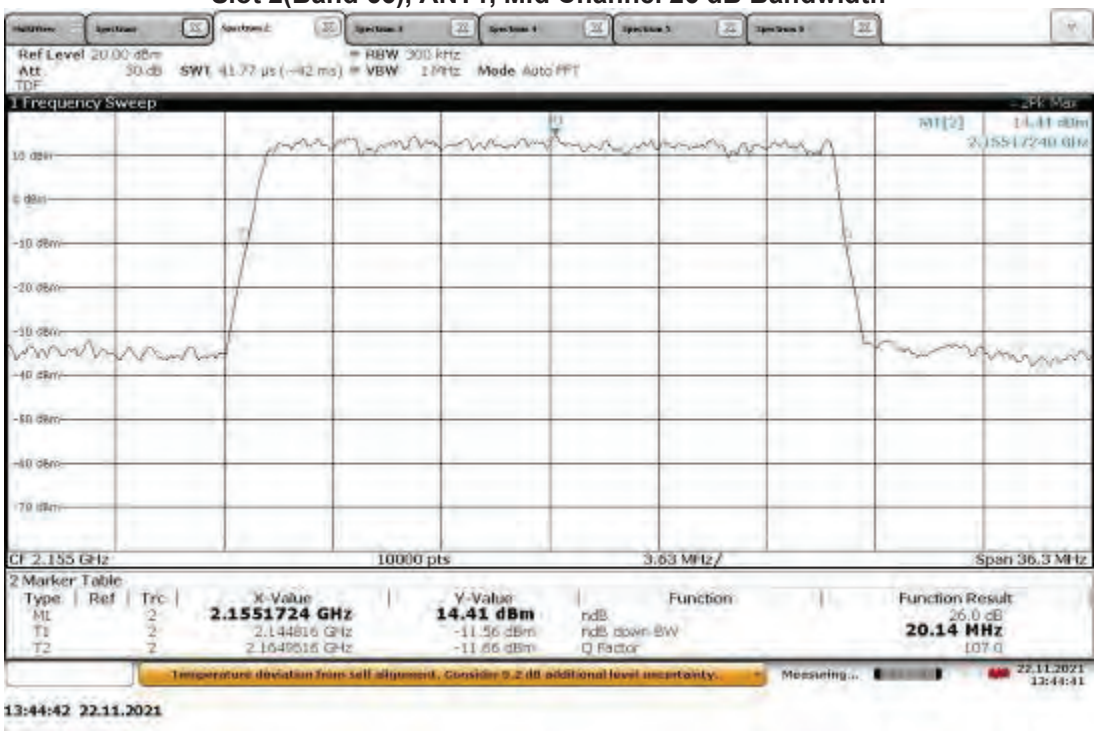
TM3.1-64QAM_20 MHz Bandwidth
Slot 2(Band 66), ANT1, Low Channel 26 dB Bandwidth



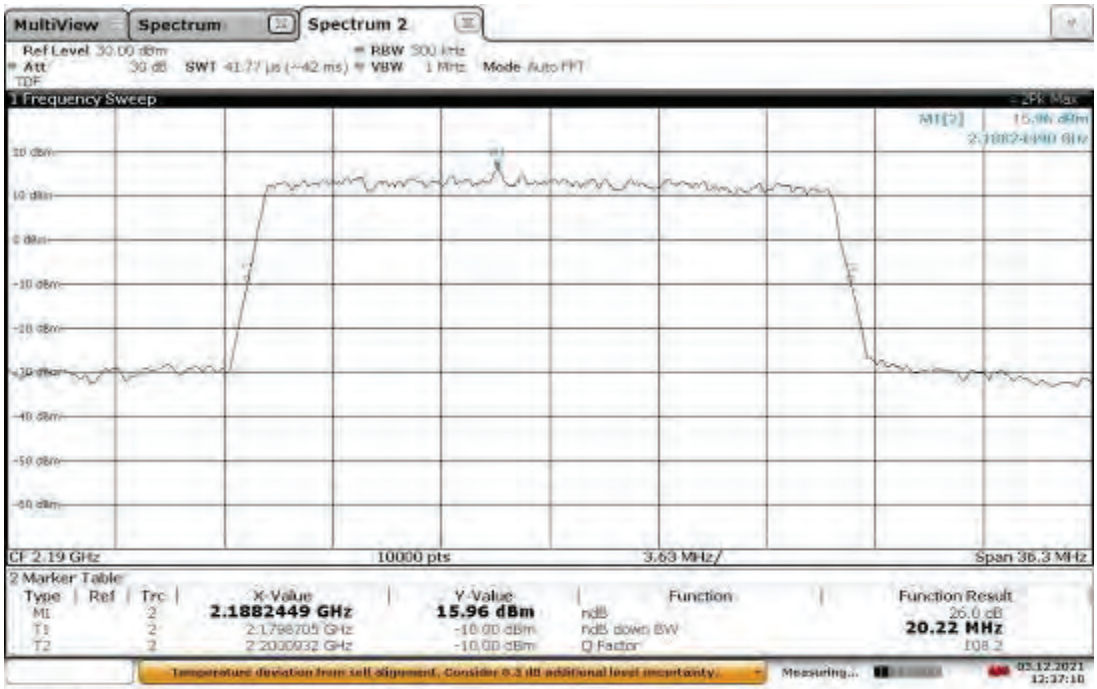
TM3.1-64QAM_20 MHz Bandwidth
Slot 2(Band 66), ANT0, Mid Channel 26 dB Bandwidth



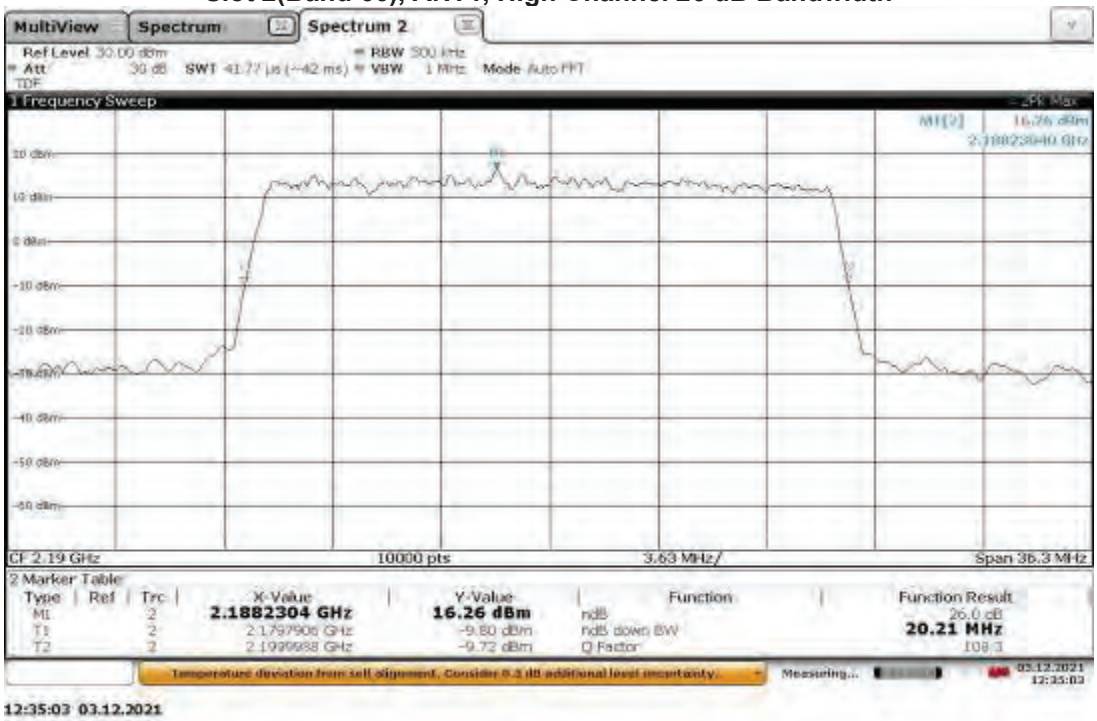
TM3.1-64QAM_20 MHz Bandwidth
Slot 2(Band 66), ANT1, Mid Channel 26 dB Bandwidth



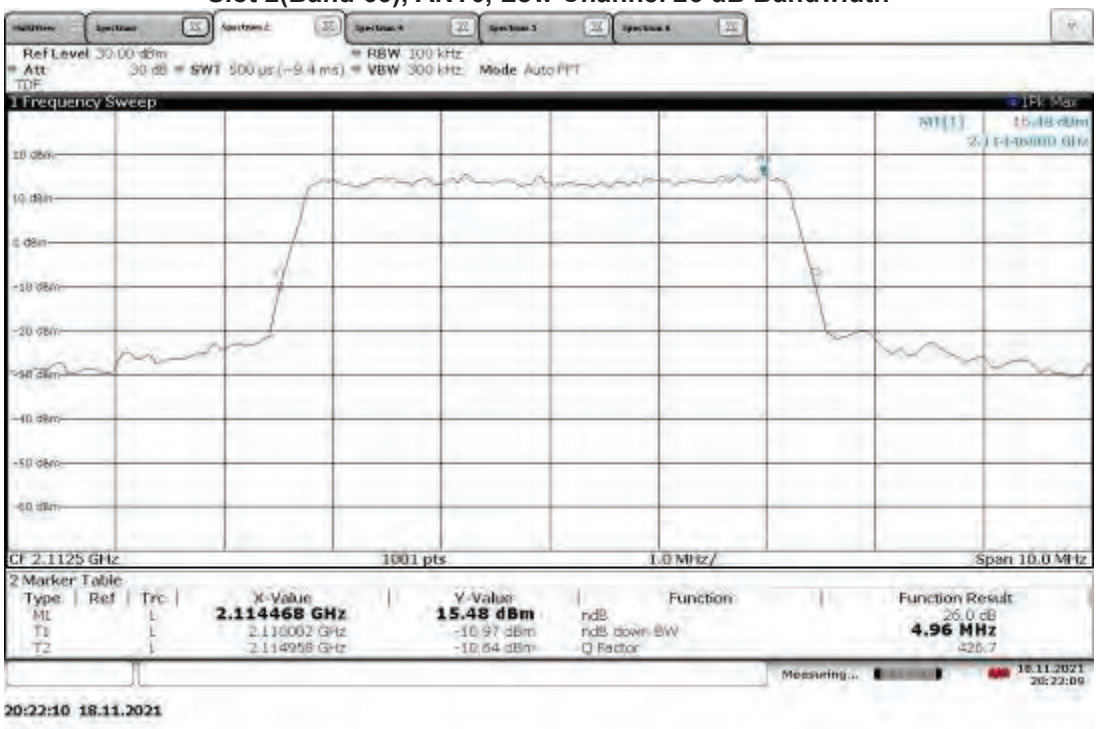
TM3.1-64QAM_20 MHz Bandwidth
Slot 2(Band 66), ANT0, High Channel 26 dB Bandwidth
DATA MISSING



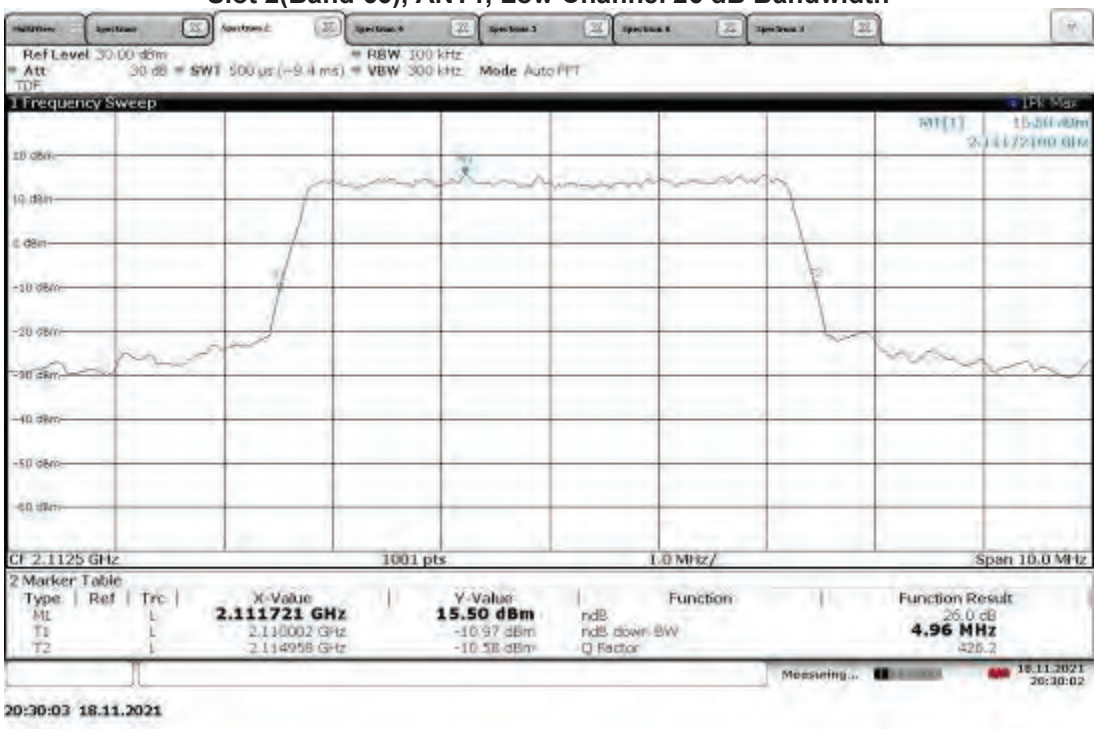
TM3.1-64QAM_20 MHz Bandwidth
Slot 2(Band 66), ANT1, High Channel 26 dB Bandwidth



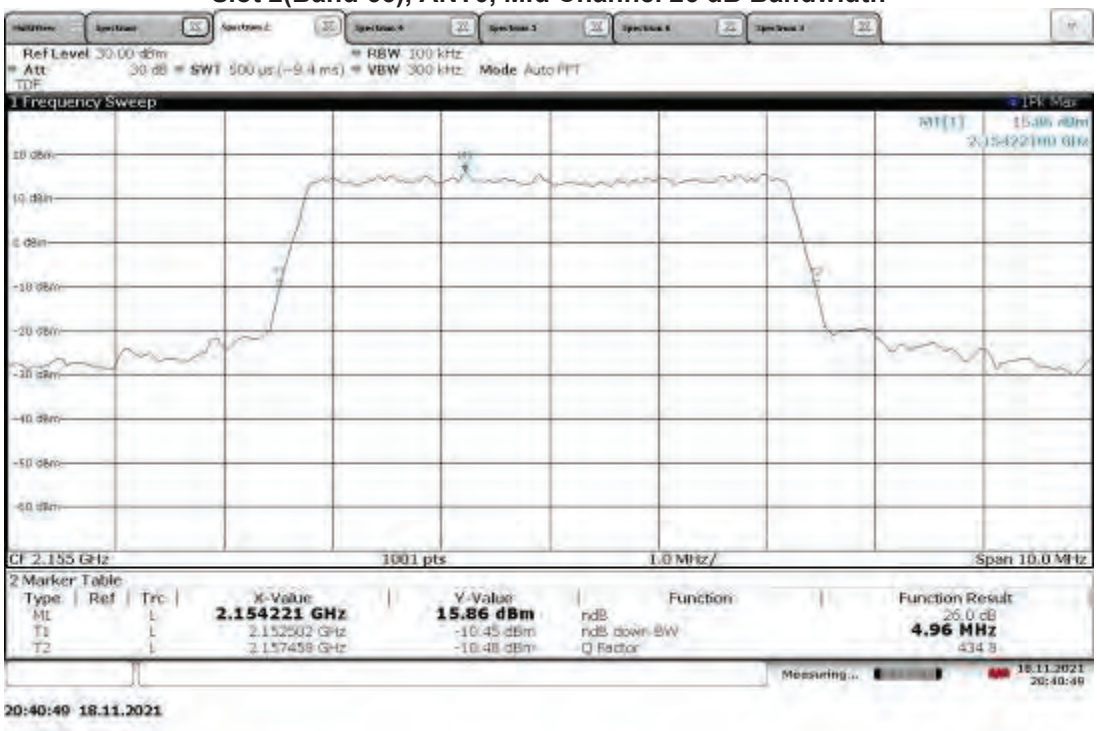
TM3.1a-256QAM_5 MHz Bandwidth
Slot 2(Band 66), ANT0, Low Channel 26 dB Bandwidth



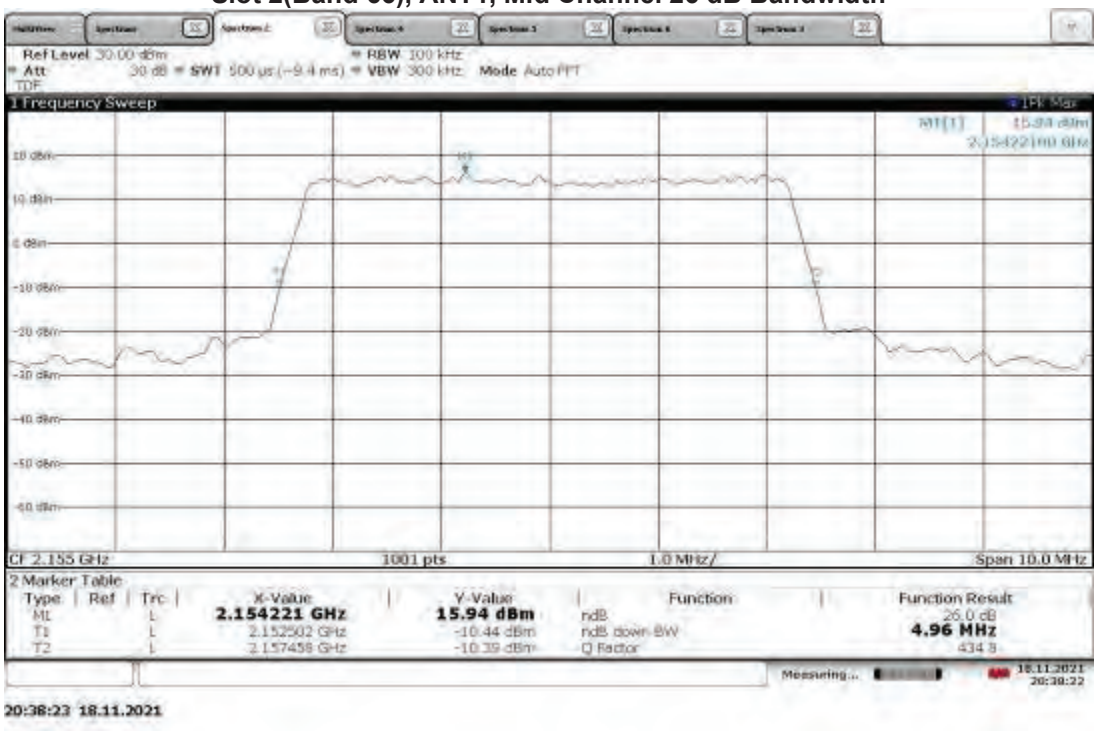
TM3.1a-256QAM_5 MHz Bandwidth
Slot 2(Band 66), ANT1, Low Channel 26 dB Bandwidth



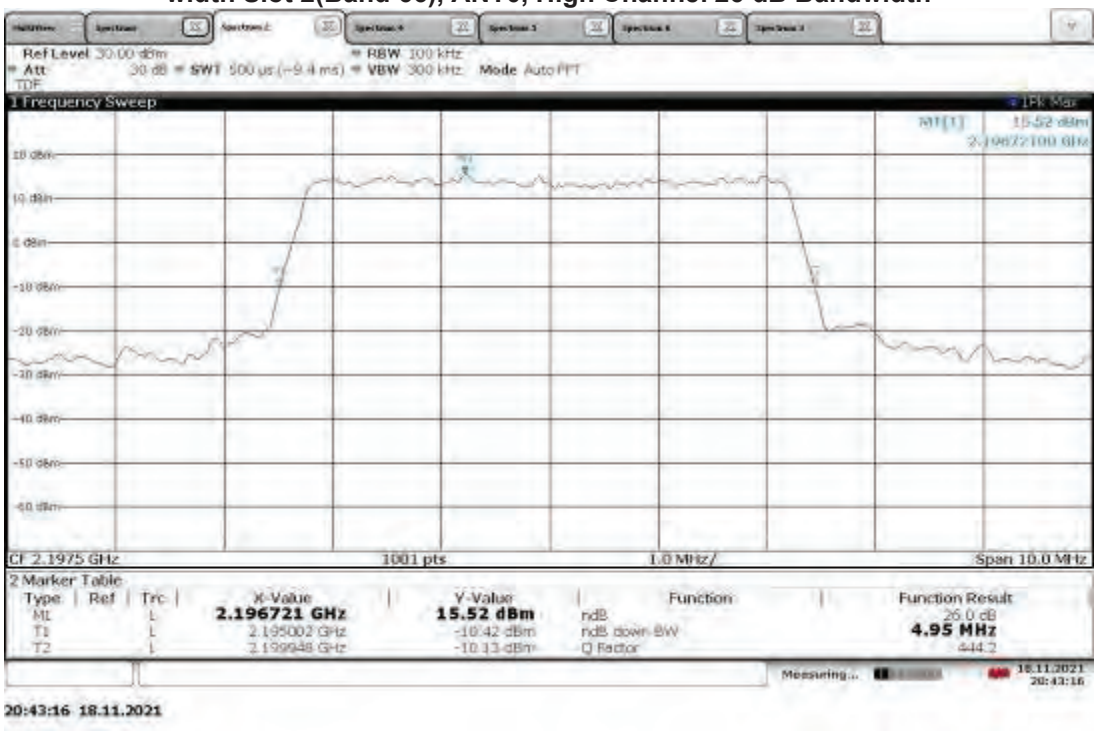
TM3.1a-256QAM_5 MHz Bandwidth
Slot 2(Band 66), ANT0, Mid Channel 26 dB Bandwidth



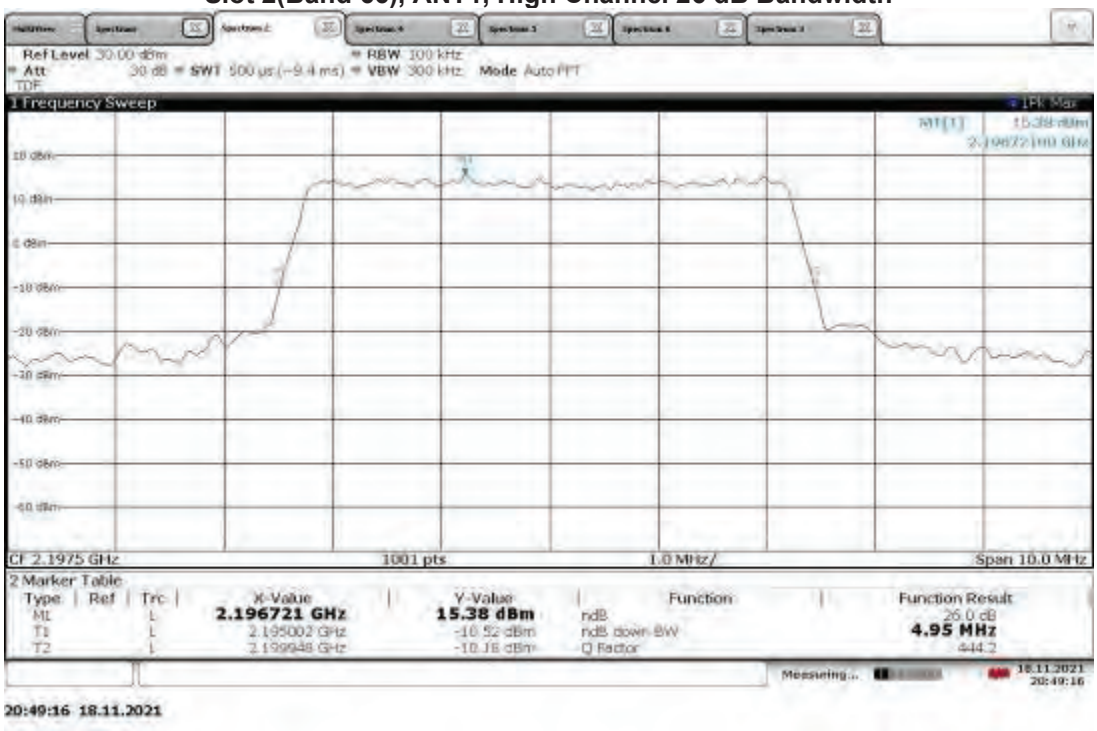
TM3.1a-256QAM_5 MHz Bandwidth
Slot 2(Band 66), ANT1, Mid Channel 26 dB Bandwidth



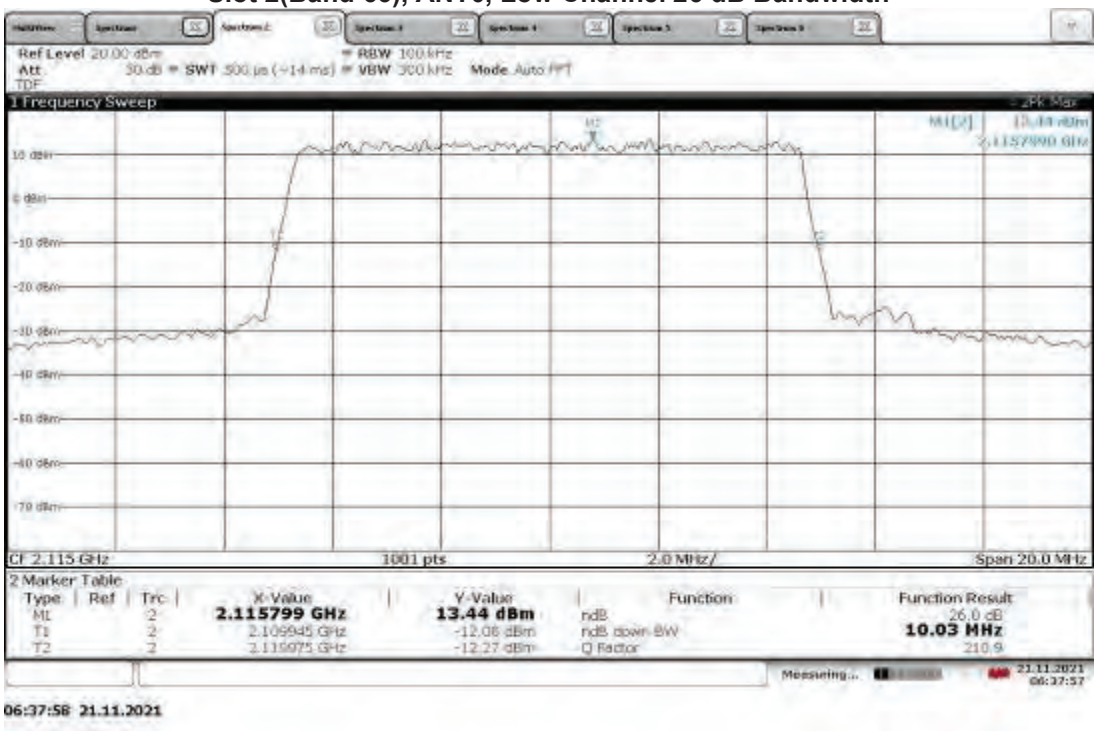
TM3.1a-256QAM_5 MHz Bandwidth
width Slot 2(Band 66), ANT0, High Channel 26 dB Bandwidth



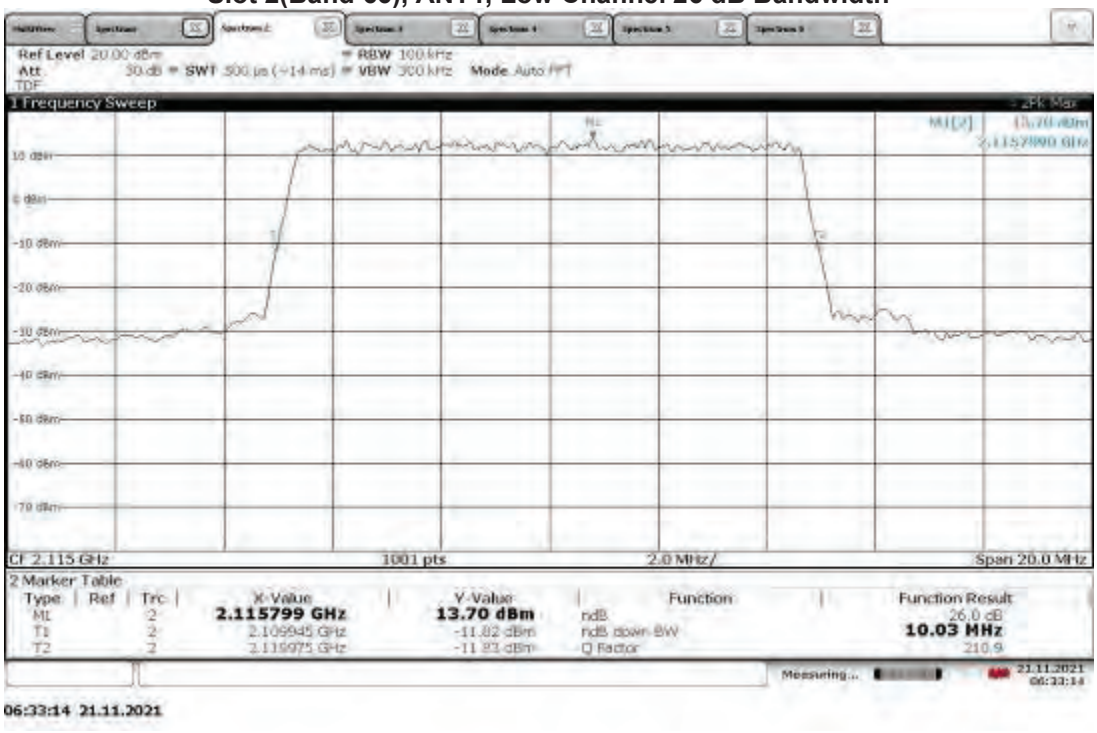
TM3.1a-256QAM_5 MHz Bandwidth
Slot 2(Band 66), ANT1, High Channel 26 dB Bandwidth



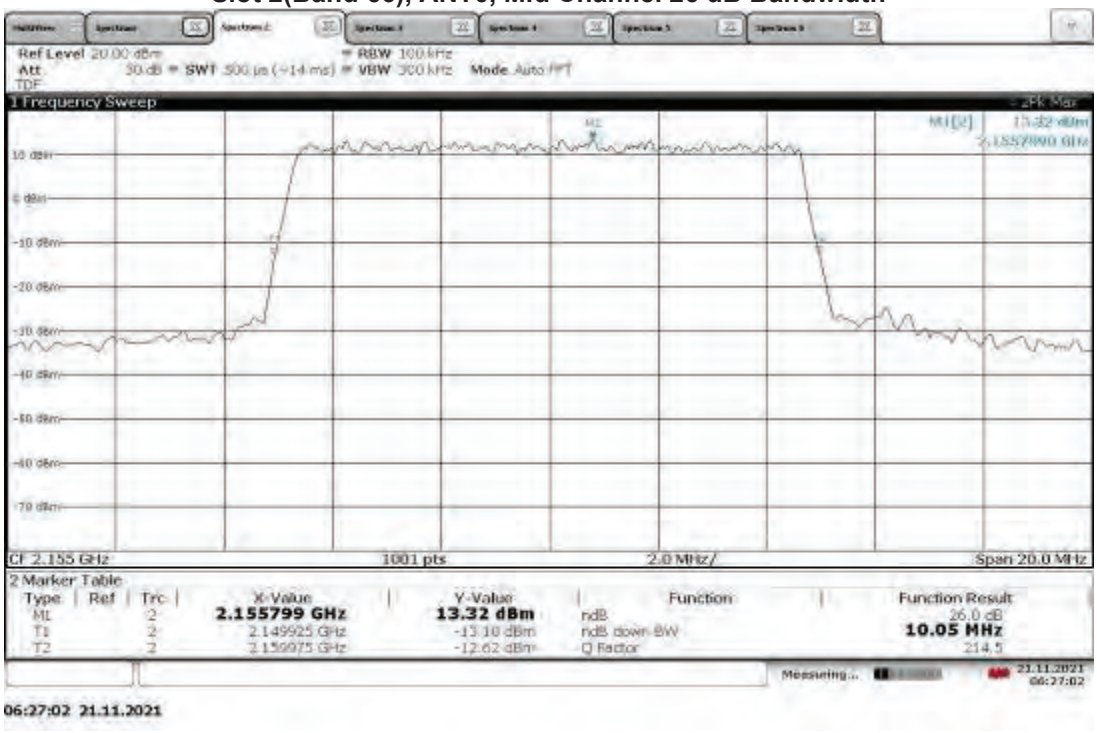
TM3.1a-256QAM_10 MHz Bandwidth
Slot 2(Band 66), ANT0, Low Channel 26 dB Bandwidth



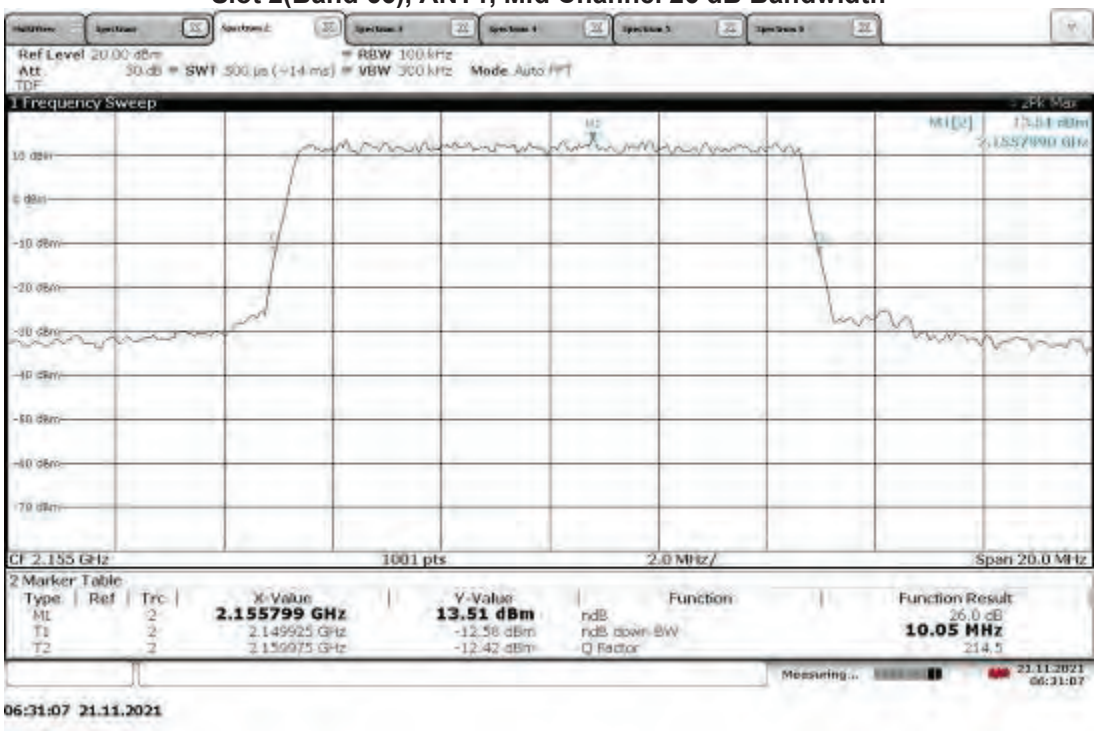
TM3.1a-256QAM_10 MHz Bandwidth
Slot 2(Band 66), ANT1, Low Channel 26 dB Bandwidth



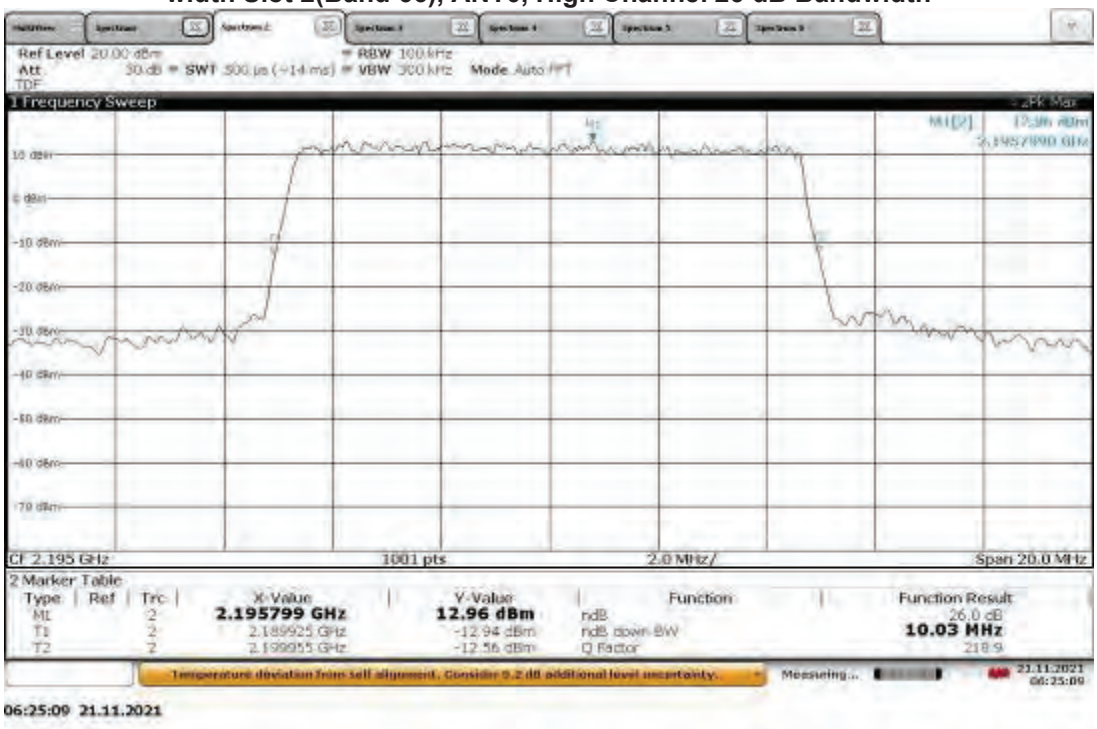
TM3.1a-256QAM_10 MHz Bandwidth
Slot 2(Band 66), ANT0, Mid Channel 26 dB Bandwidth



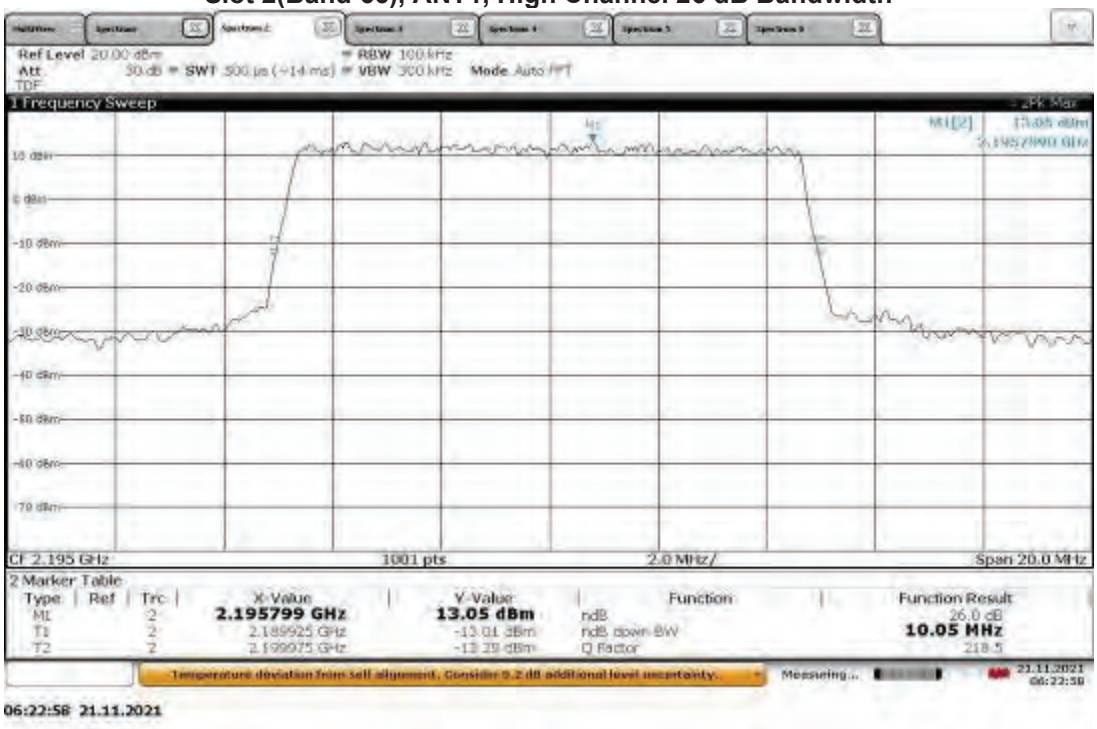
TM3.1a-256QAM_10 MHz Bandwidth
Slot 2(Band 66), ANT1, Mid Channel 26 dB Bandwidth



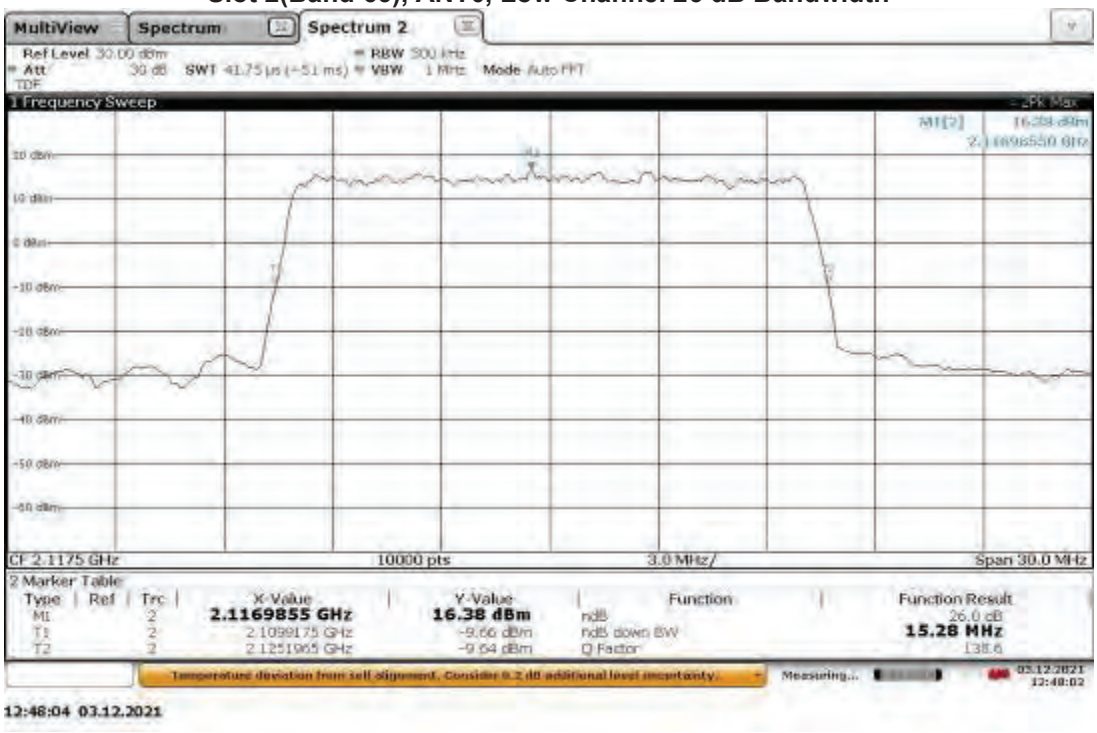
TM3.1a-256QAM_10 MHz Bandwidth
width Slot 2(Band 66), ANT0, High Channel 26 dB Bandwidth



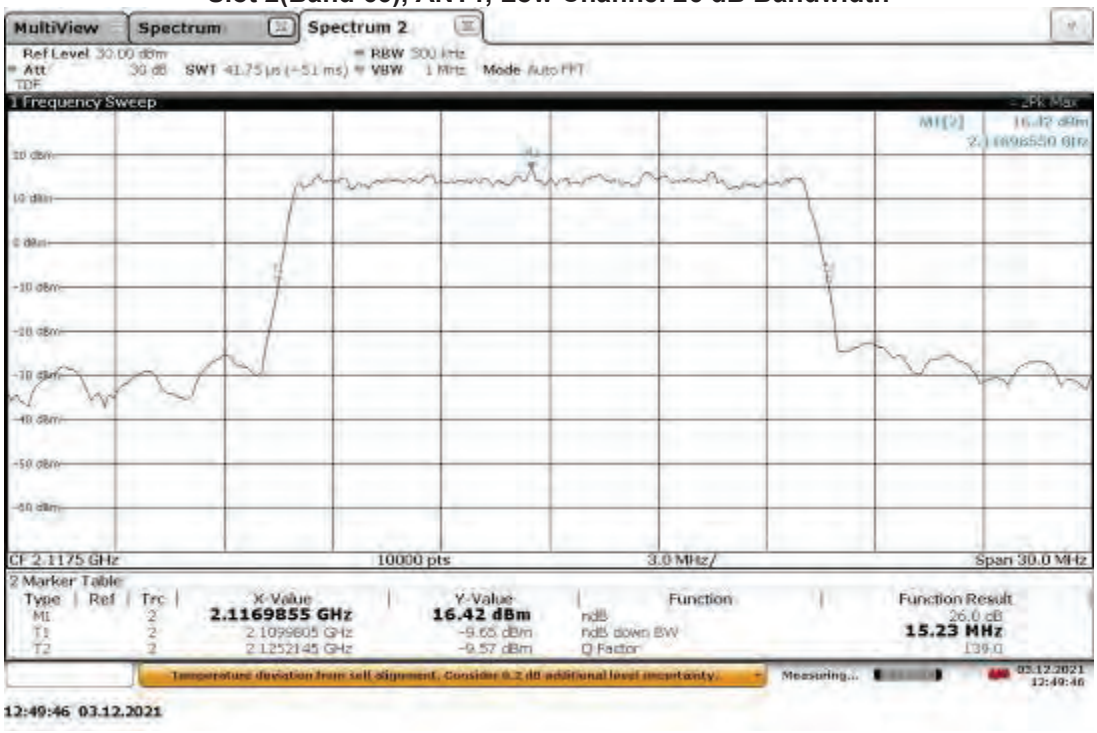
TM3.1a-256QAM_10 MHz Bandwidth
Slot 2(Band 66), ANT1, High Channel 26 dB Bandwidth



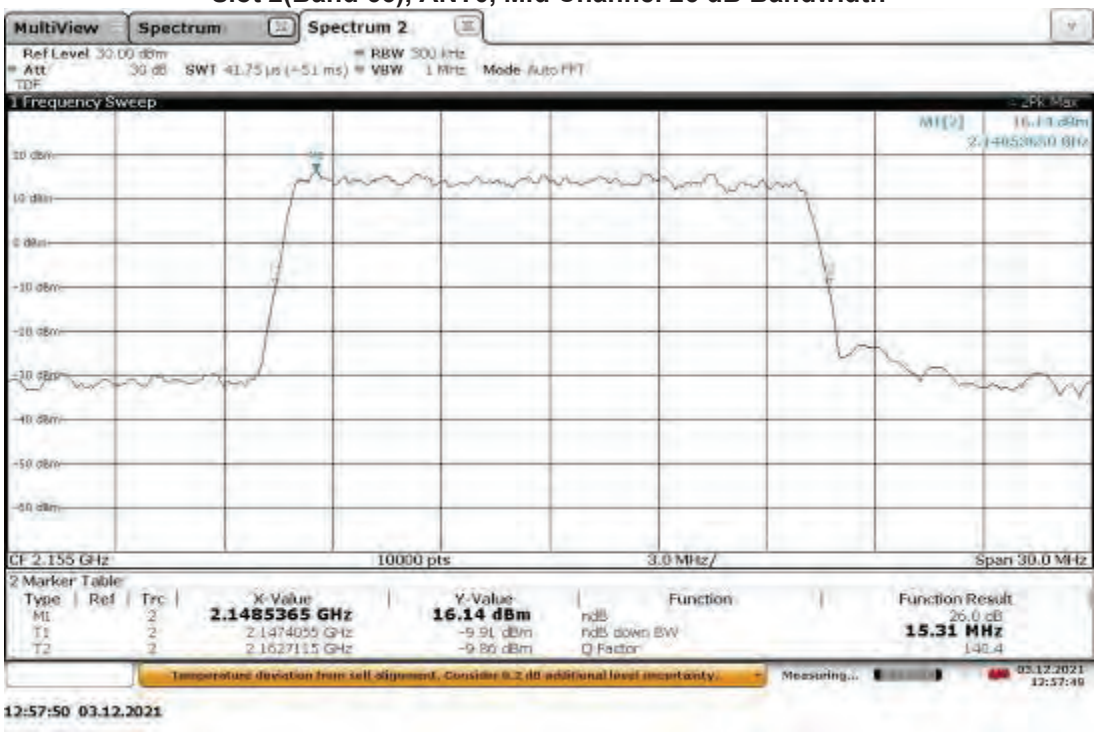
TM3.1a-256QAM_15 MHz Bandwidth
Slot 2(Band 66), ANT0, Low Channel 26 dB Bandwidth



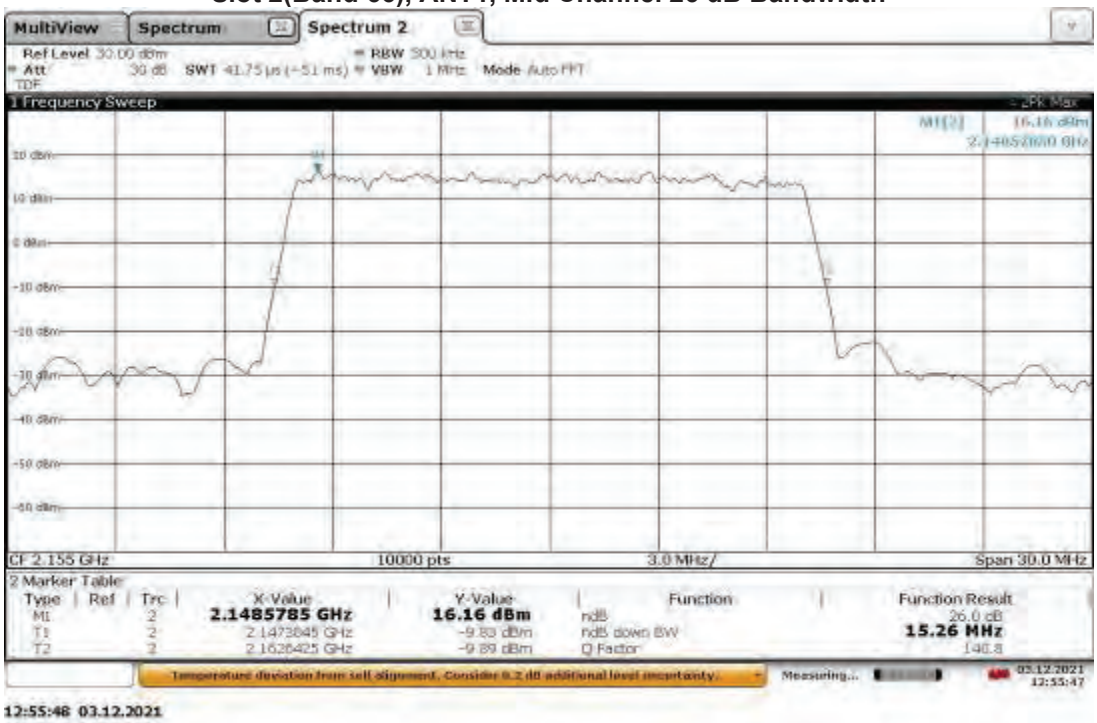
TM3.1a-256QAM_15 MHz Bandwidth
Slot 2(Band 66), ANT1, Low Channel 26 dB Bandwidth



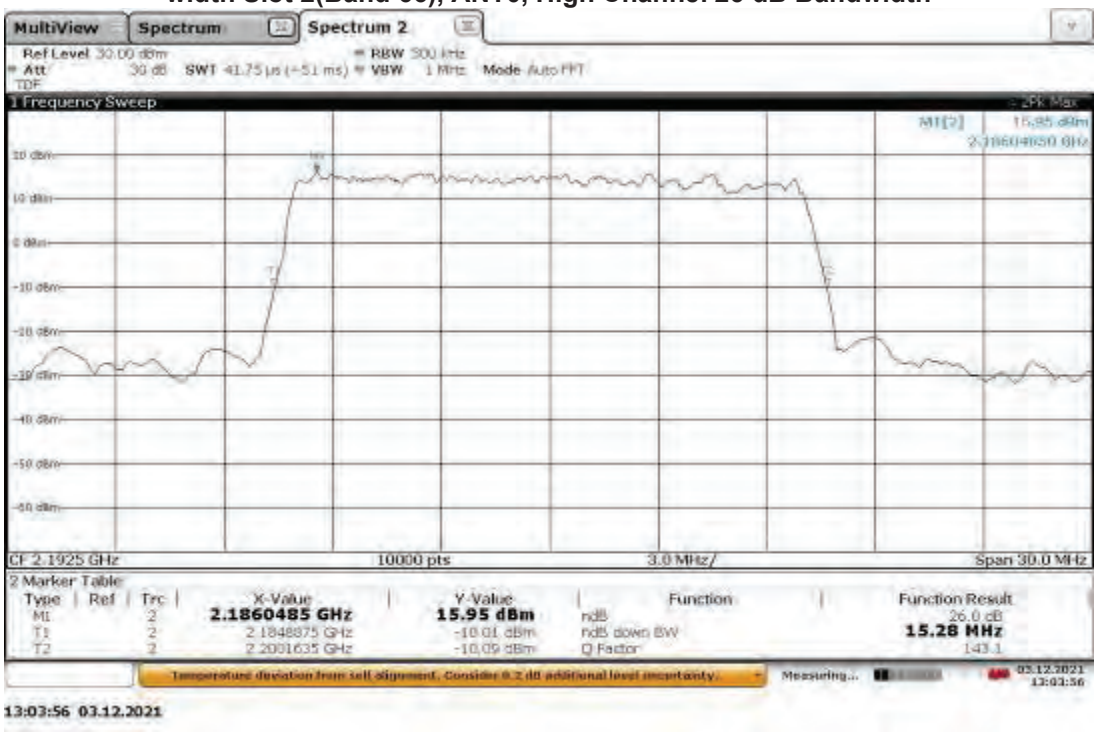
TM3.1a-256QAM_15 MHz Bandwidth
Slot 2(Band 66), ANT0, Mid Channel 26 dB Bandwidth



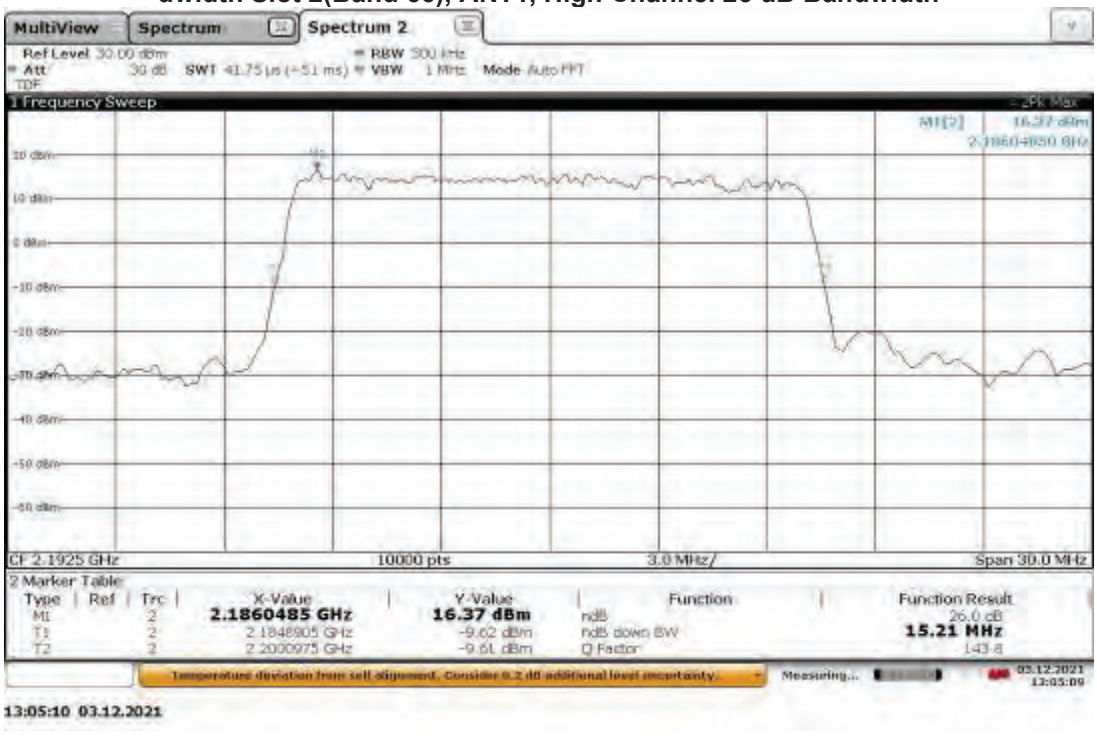
TM3.1a-256QAM_15 MHz Bandwidth
Slot 2(Band 66), ANT1, Mid Channel 26 dB Bandwidth



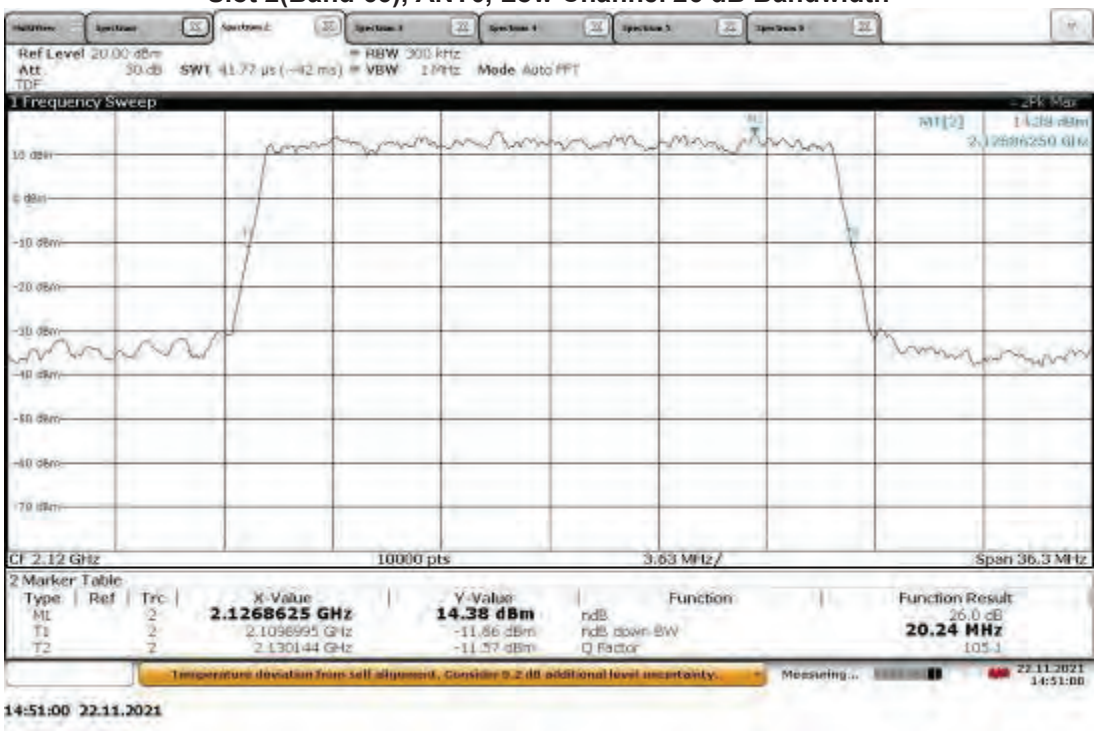
TM3.1a-256QAM_15 MHz Bandwidth
width Slot 2(Band 66), ANT0, High Channel 26 dB Bandwidth



TM3.1a-256QAM_15 MHz Bandwidth
dwidth Slot 2(Band 66), ANT1, High Channel 26 dB Bandwidth

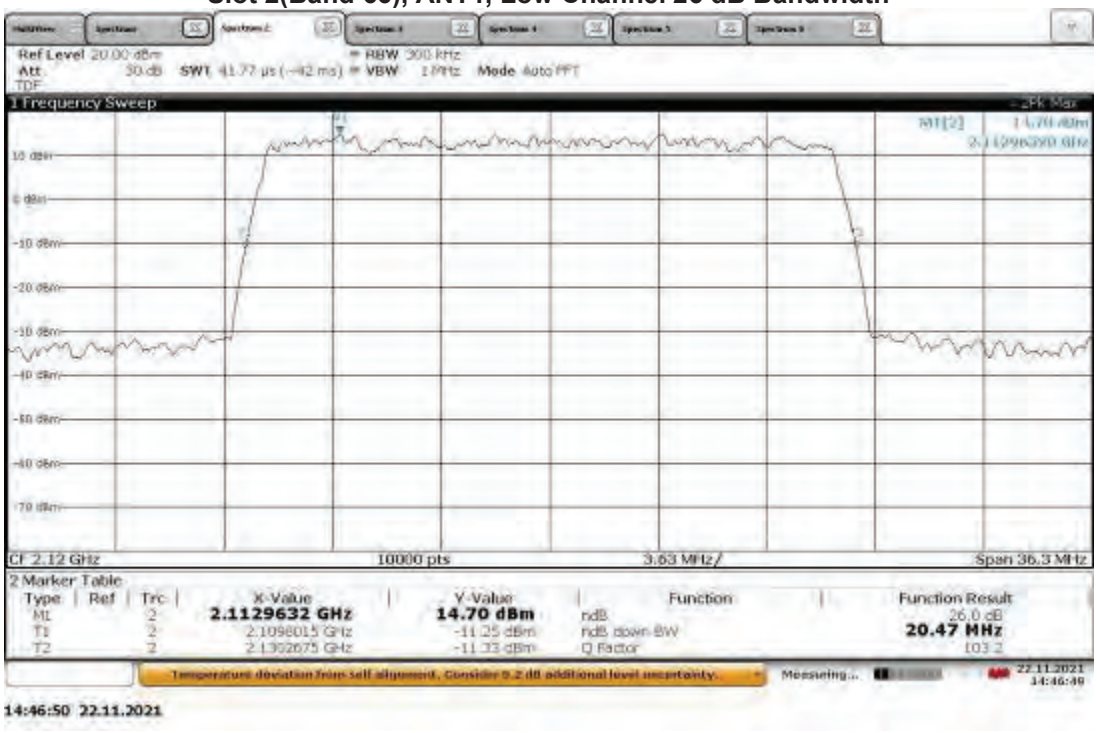


TM3.1a-256QAM_20 MHz Bandwidth
Slot 2(Band 66), ANT0, Low Channel 26 dB Bandwidth



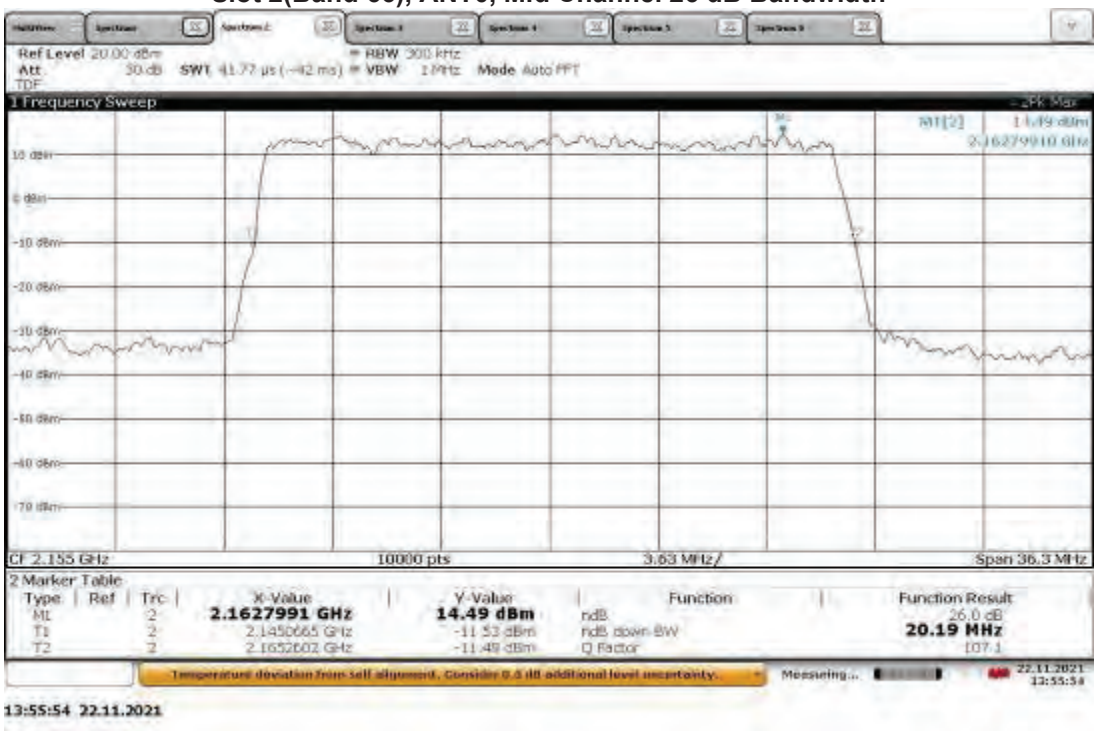
14:51:00 22.11.2021

TM3.1a-256QAM_20 MHz Bandwidth
Slot 2(Band 66), ANT1, Low Channel 26 dB Bandwidth

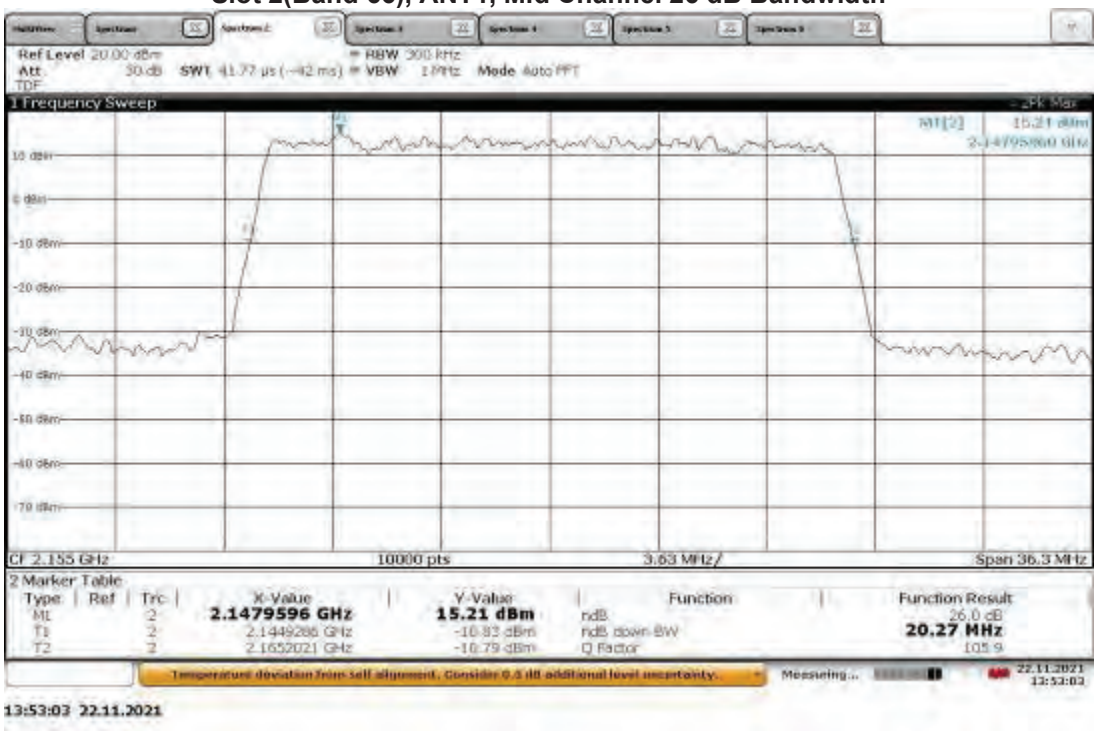


14:46:50 22.11.2021

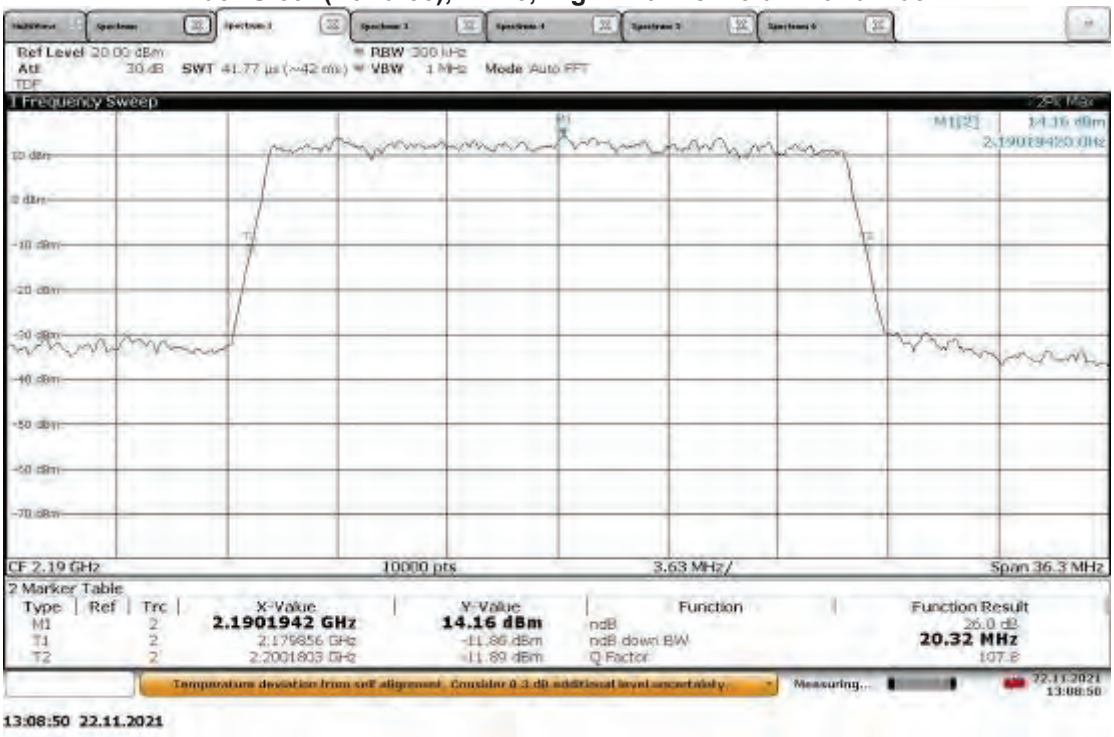
TM3.1a-256QAM_20 MHz Bandwidth
Slot 2(Band 66), ANT0, Mid Channel 26 dB Bandwidth



TM3.1a-256QAM_20 MHz Bandwidth
Slot 2(Band 66), ANT1, Mid Channel 26 dB Bandwidth

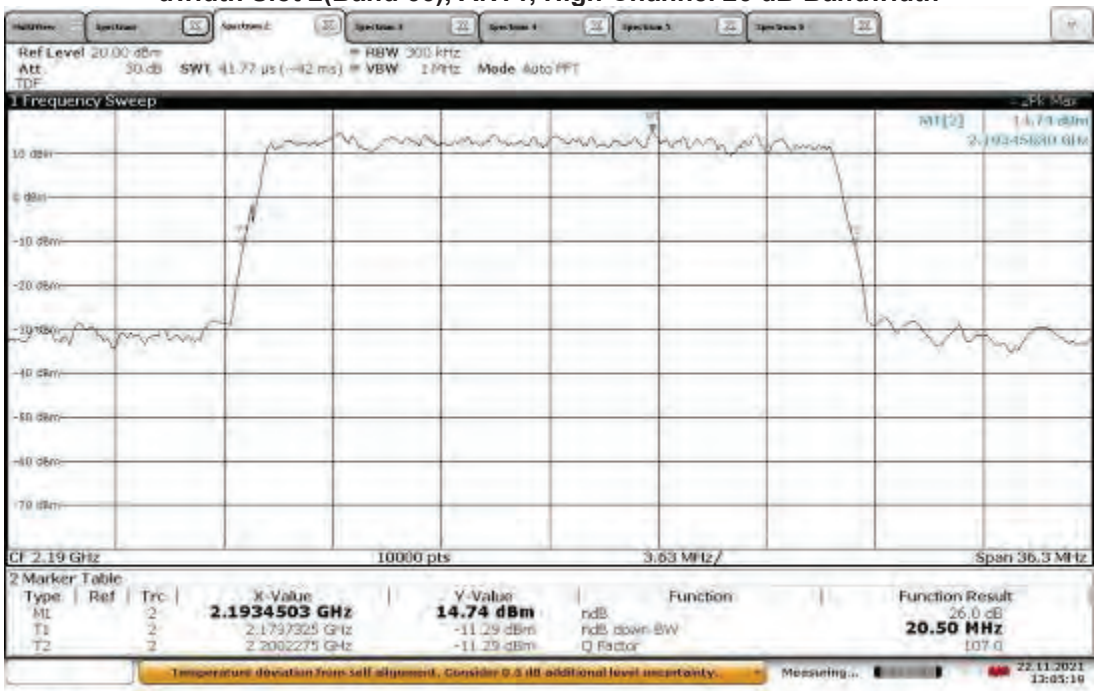


TM3.1a-256QAM_20 MHz Bandwidth
width Slot 2(Band 66), ANT0, High Channel 26 dB Bandwidth



13:08:50 22.11.2021

TM3.1a-256QAM_20 MHz Bandwidth
dwidth Slot 2(Band 66), ANT1, High Channel 26 dB Bandwidth



13:05:19 22.11.2021

Test Personnel:	Vathana F. Ven VFV	Test Date:	11/18/2021, 11/21/2021
	Kouma Sinn KPS		11/22/2021, 12/03/2021
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:	23, 23,22, 25 ºC
		Relative Humidity:	42, 42, 23, 21 %
		Atmospheric Pressure:	1001, 1018,1000, 1000 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 & 10m ALSE

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

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV005'	Weather Station	Davis	6250	MS191218083	02/07/2021	02/07/2022
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	10/02/2021	10/02/2022
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

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2112.50	ANT0	-30.76
		ANT1	-30.75
High	2197.50	ANT0	-26.05
		ANT1	-25.71

Slot 2(Band 66), Bandwidth: 10 MHz, Modulation: TM1.1-QPSK

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2115.00	ANT0	-29.85
		ANT1	-29.66
High	2195.00	ANT0	-27.57
		ANT1	-27.17

Slot 2(Band 66), Bandwidth: 15 MHz, Modulation: TM1.1-QPSK

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2117.50	ANT0	-30.76
		ANT1	-30.57
High	2192.50	ANT0	-29.57
		ANT1	-27.17

Slot 2(Band 66), Bandwidth: 20 MHz, Modulation: TM1.1-QPSK

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2120.00	ANT0	-34.30
		ANT1	-34.38
High	2190.00	ANT0	-32.90
		ANT1	-32.78

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2112.50	ANT0	-28.87
		ANT1	-29.40
High	2197.50	ANT0	-27.42
		ANT1	-26.26

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2115.00	ANT0	-30.40
		ANT1	-30.23
High	2195.00	ANT0	-29.44
		ANT1	-28.31

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2117.50	ANT0	-31.65
		ANT1	-31.11
High	2192.00	ANT0	-30.93
		ANT1	-30.19

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2120.00	ANT0	-33.67
		ANT1	-33.32
High	2190.00	ANT0	-32.91
		ANT1	-32.51

Slot 2(Band 66), Bandwidth: 5 MHz, Modulation: TM3.1-64QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2112.50	ANT0	-29.81
		ANT1	-29.78
High	2197.50	ANT0	-27.16
		ANT1	-26.80

Slot 2(Band 66), Bandwidth: 10 MHz, Modulation: TM3.1-64QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2115.00	ANT0	-31.76
		ANT1	-30.87
High	2195.00	ANT0	-26.84
		ANT1	-26.70

Slot 2(Band 66), Bandwidth: 15 MHz, Modulation: TM3.1-64QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2117.50	ANT0	-32.20
		ANT1	-31.55
High	2192.50	ANT0	-30.63
		ANT1	-30.72

Slot 2(Band 66), Bandwidth: 20 MHz, Modulation: TM3.1-64QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2120.00	ANT0	-33.01
		ANT1	-32.87
High	2190.00	ANT0	-33.19
		ANT1	-33.22

Slot 2(Band 66), Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2112.50	ANT0	-30.25
		ANT1	-30.70
High	2197.50	ANT0	-26.85
		ANT1	-25.54

Slot 2(Band 66), Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2115.00	ANT0	-31.08
		ANT1	-30.98
High	2195.00	ANT0	-28.57
		ANT1	-28.22

Slot 2(Band 66), Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2117.50	ANT0	-34.49
		ANT1	-34.21
High	2192.50	ANT0	-31.05
		ANT1	-30.24

Slot 2(Band 66), Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM

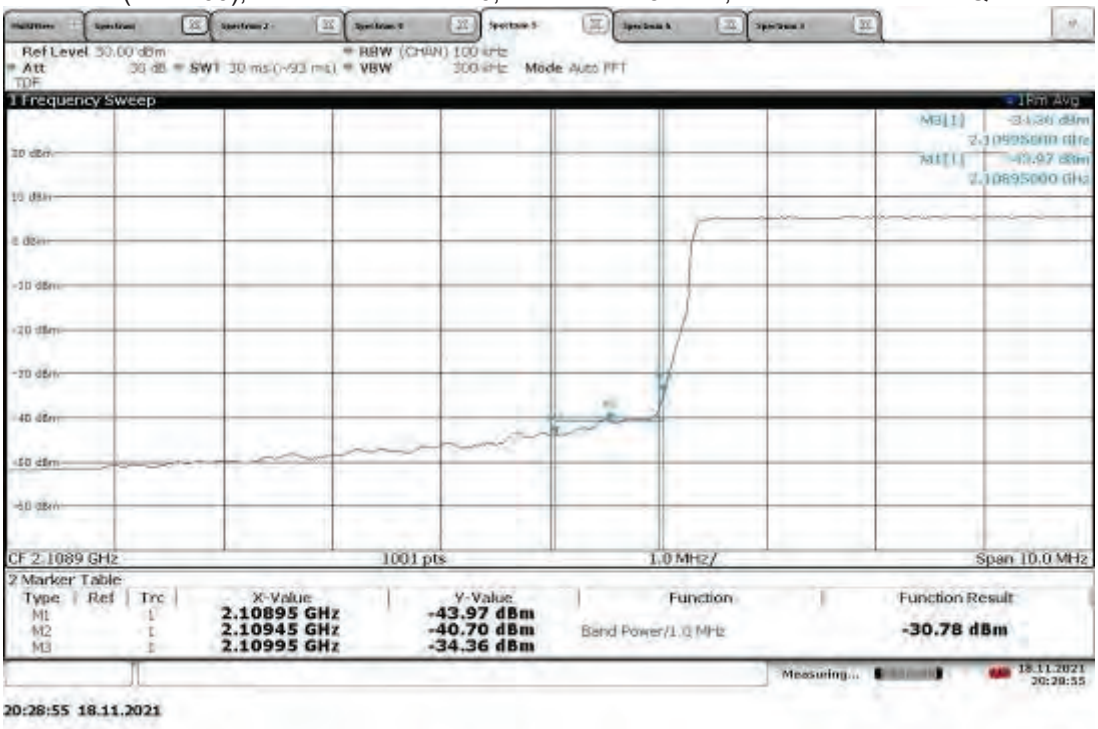
Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
Low	2120.00	ANT0	-33.40
		ANT1	-33.17
High	2190.00	ANT0	-31.49
		ANT1	-31.21

9.4 Setup Photograph:

Confidential – Test setup photo not included in this report

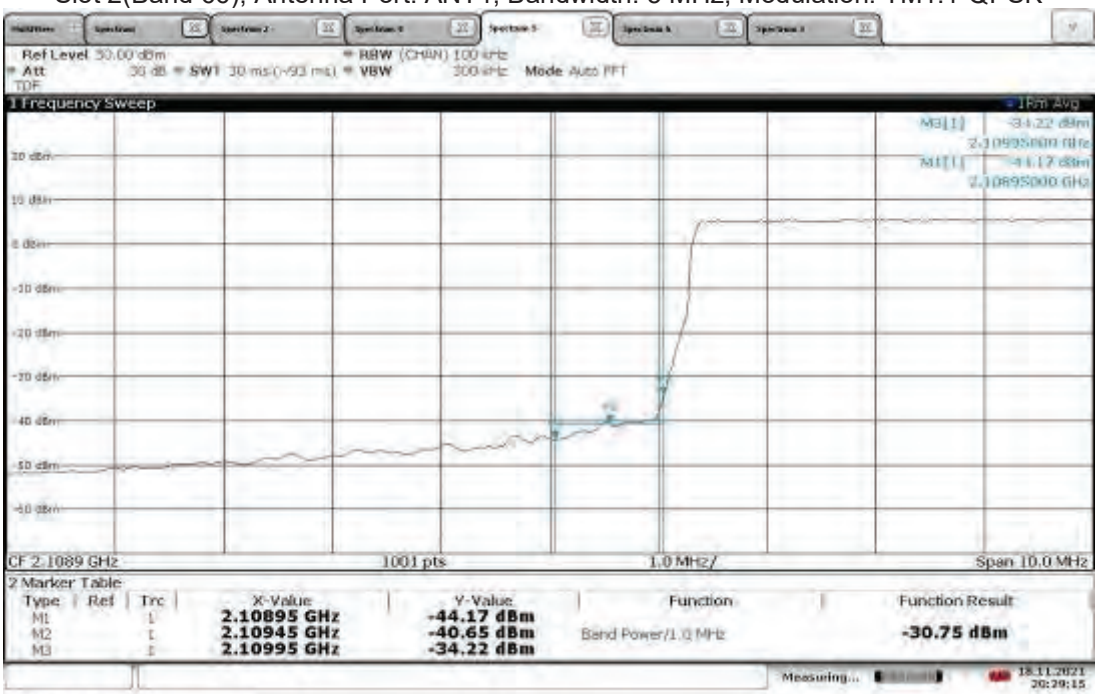
9.5 Plots/Data:

Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



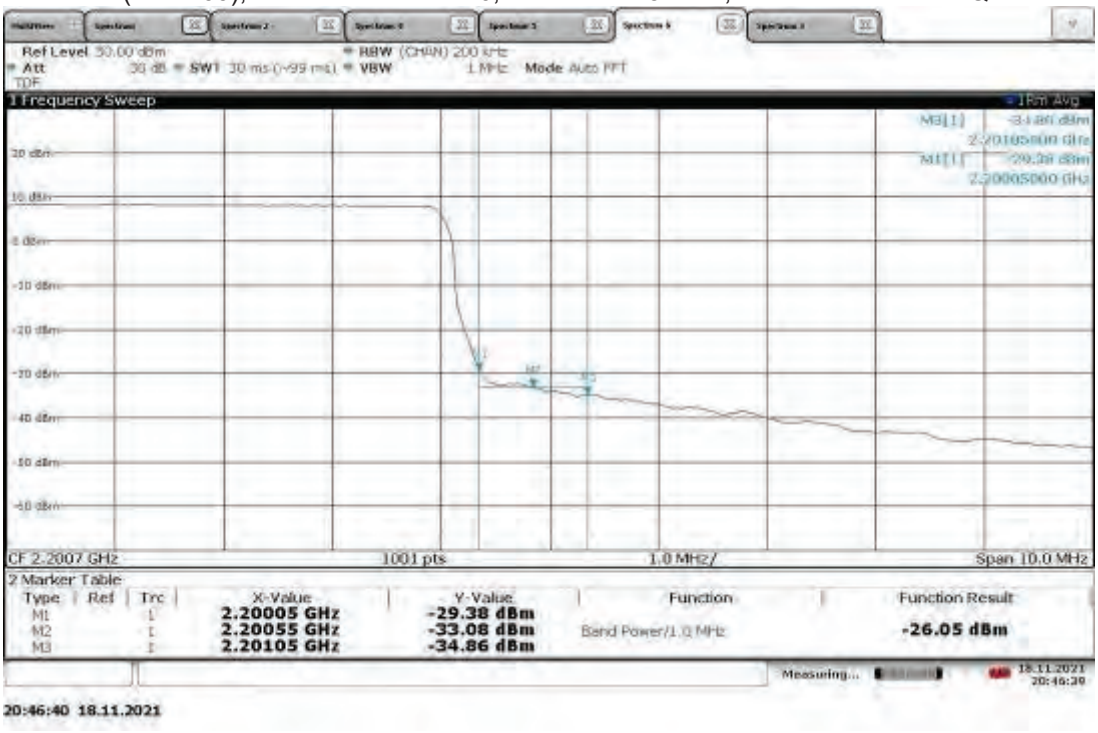
20:28:55 18.11.2021

Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK

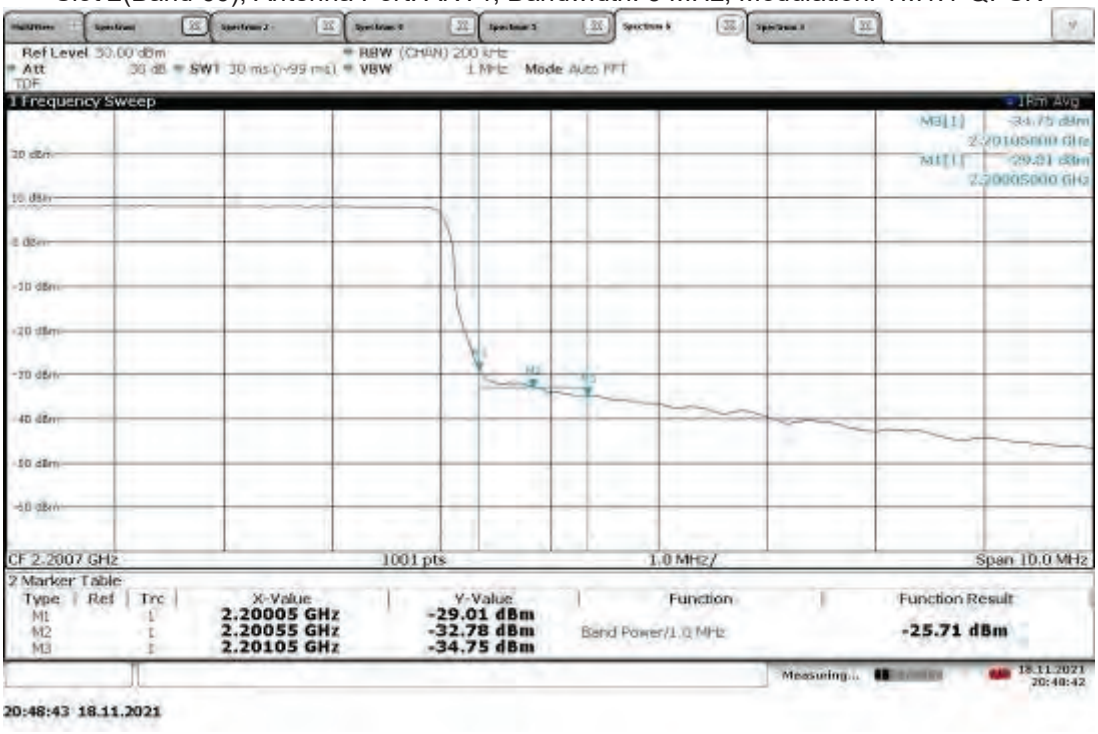


20:29:16 18.11.2021

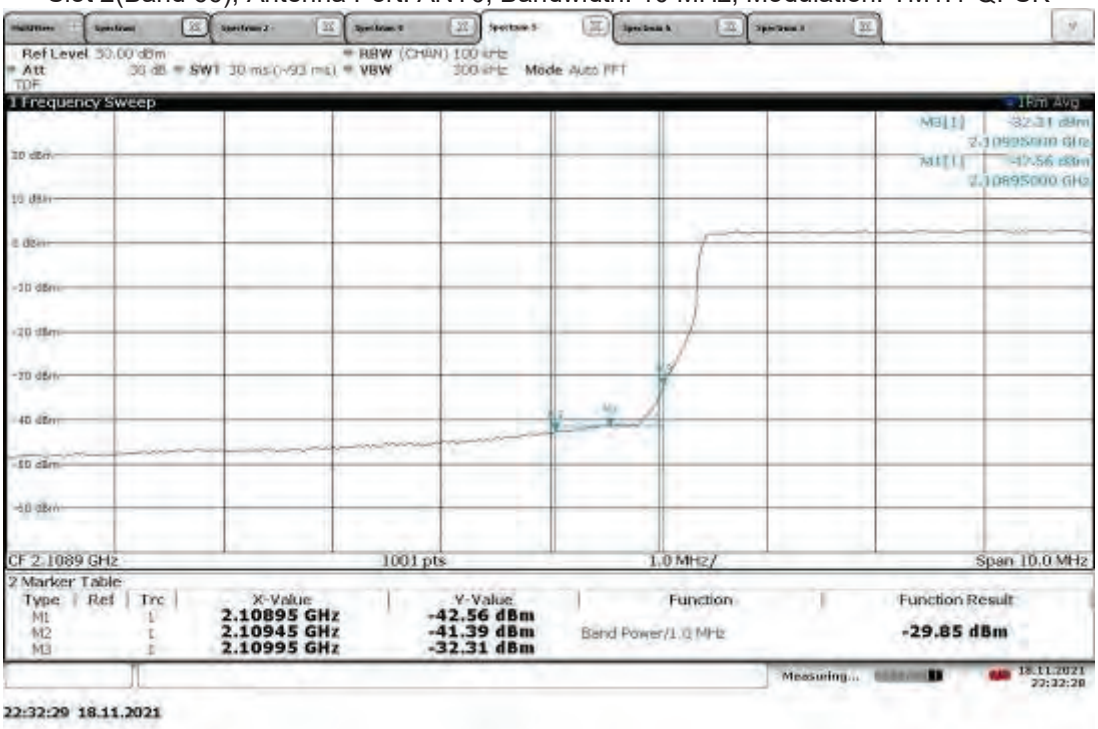
Band Edge Compliant, Upper Band Edge, 2197.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



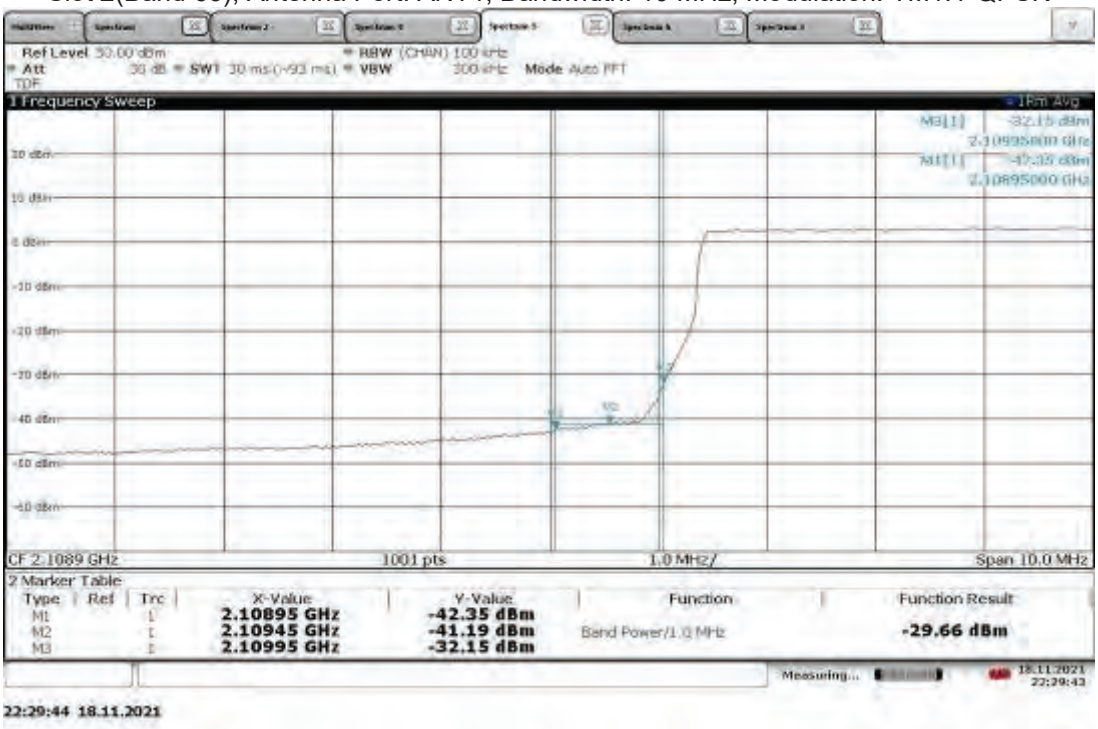
Band Edge Compliant, Upper Band Edge, 2197.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



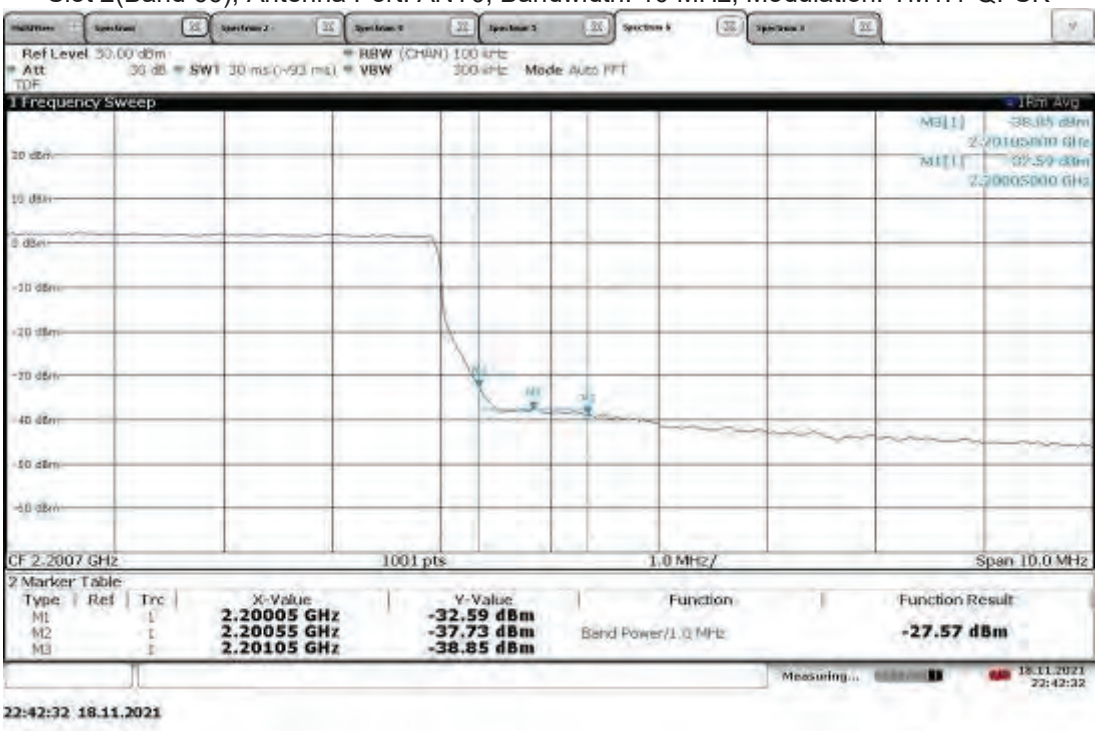
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



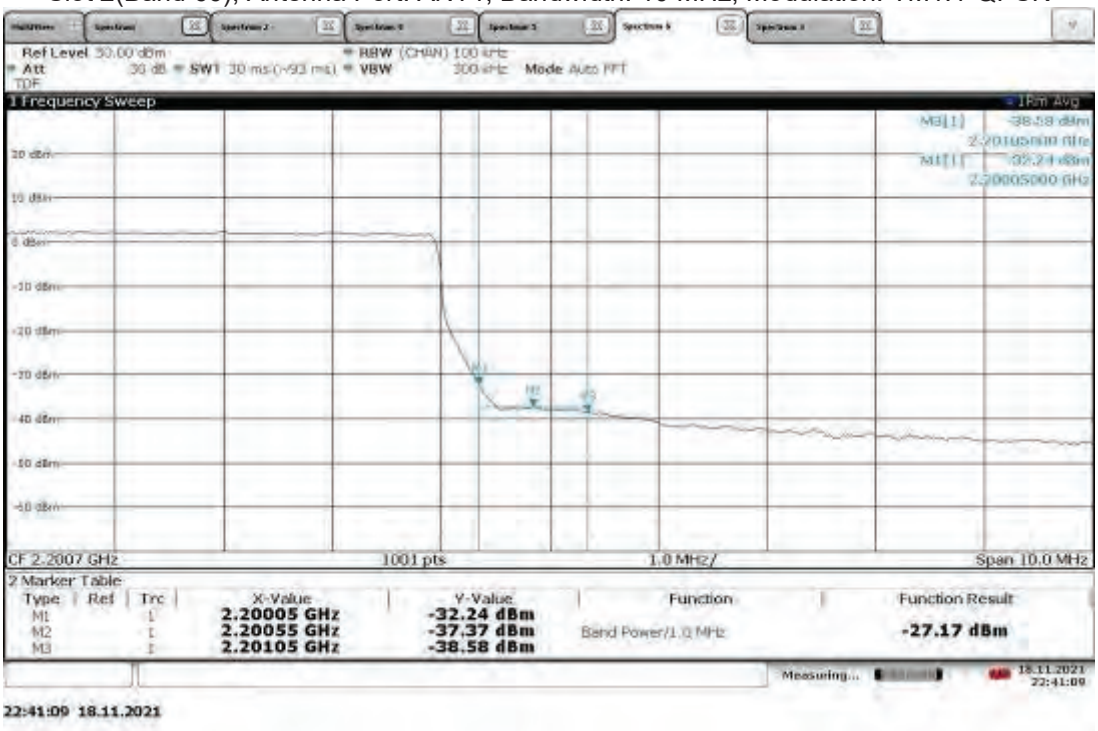
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



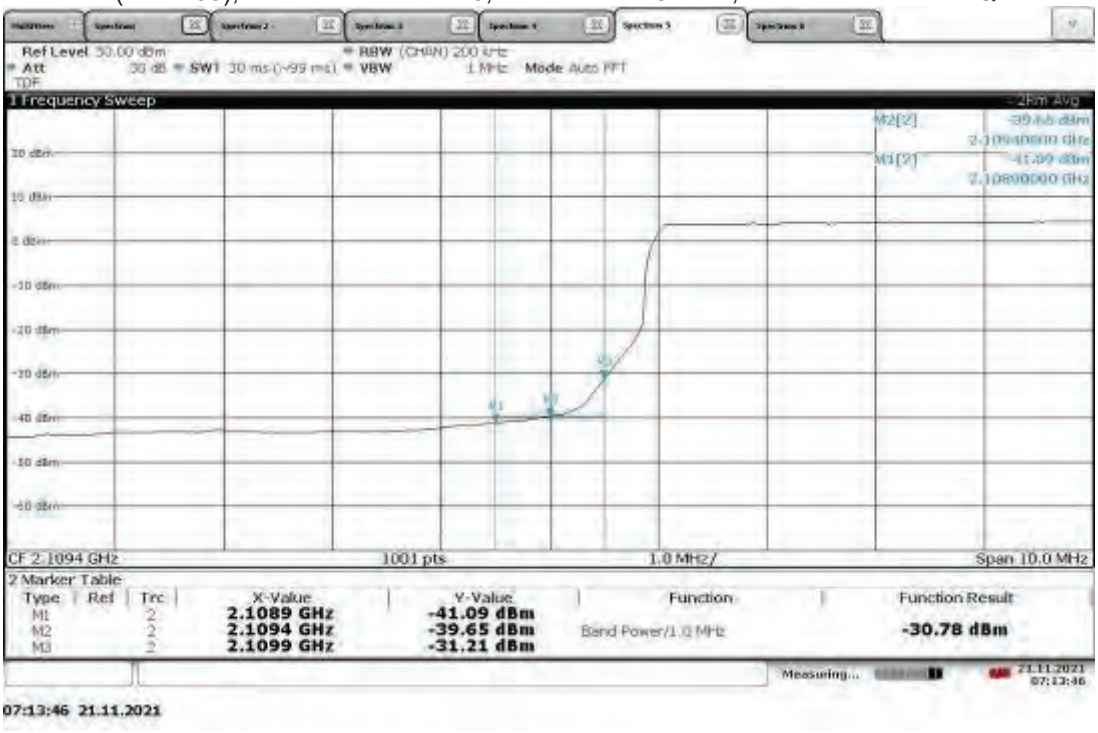
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



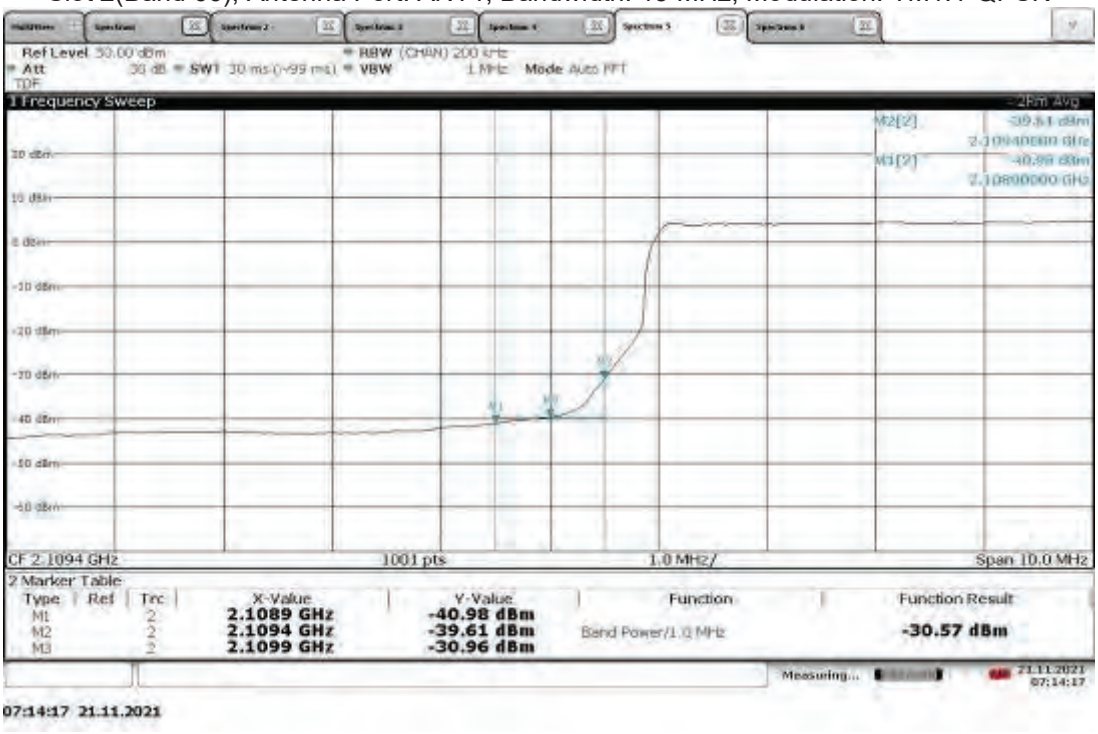
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



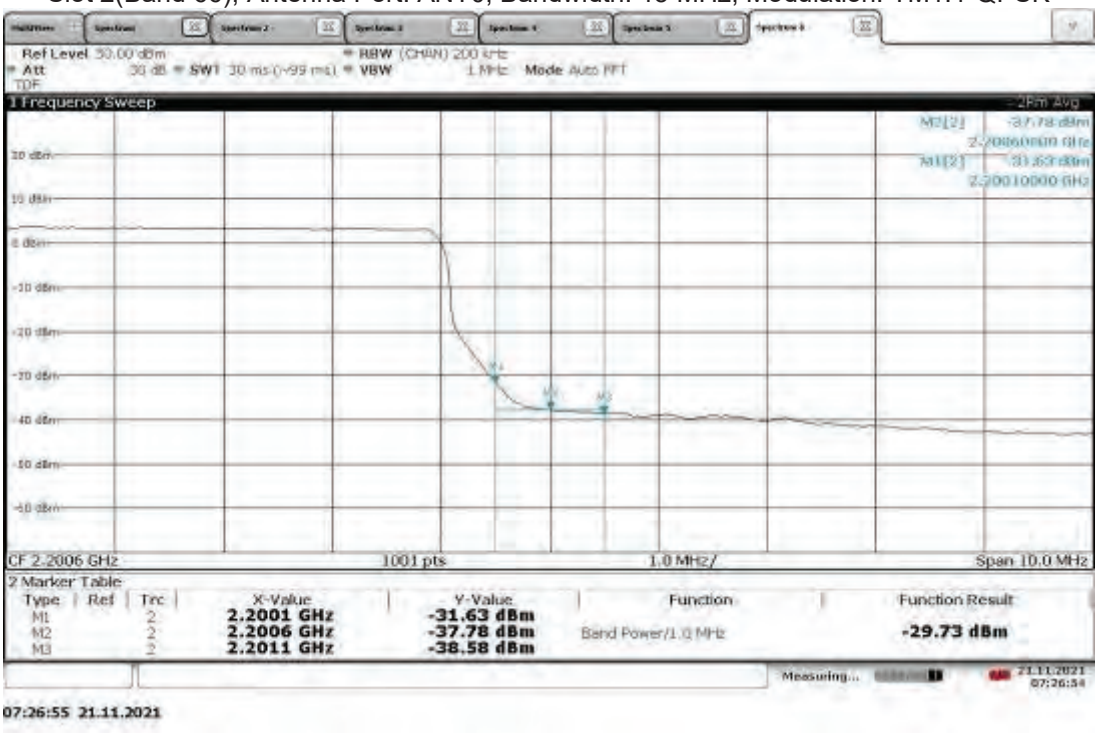
Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



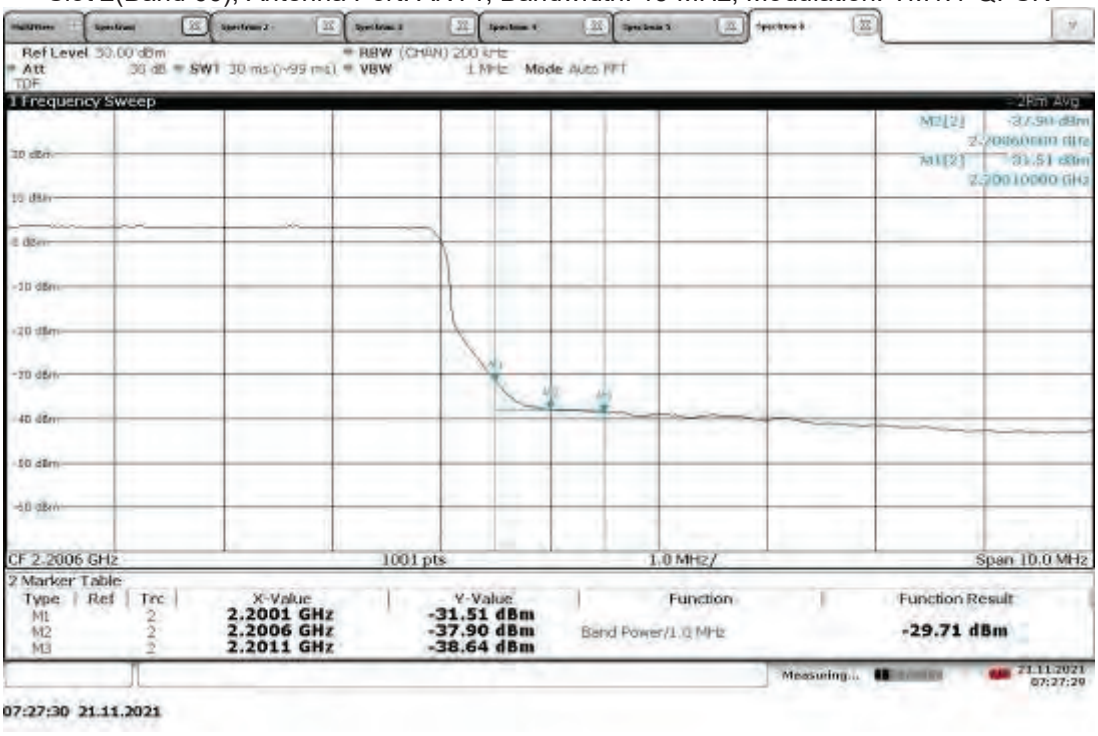
Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



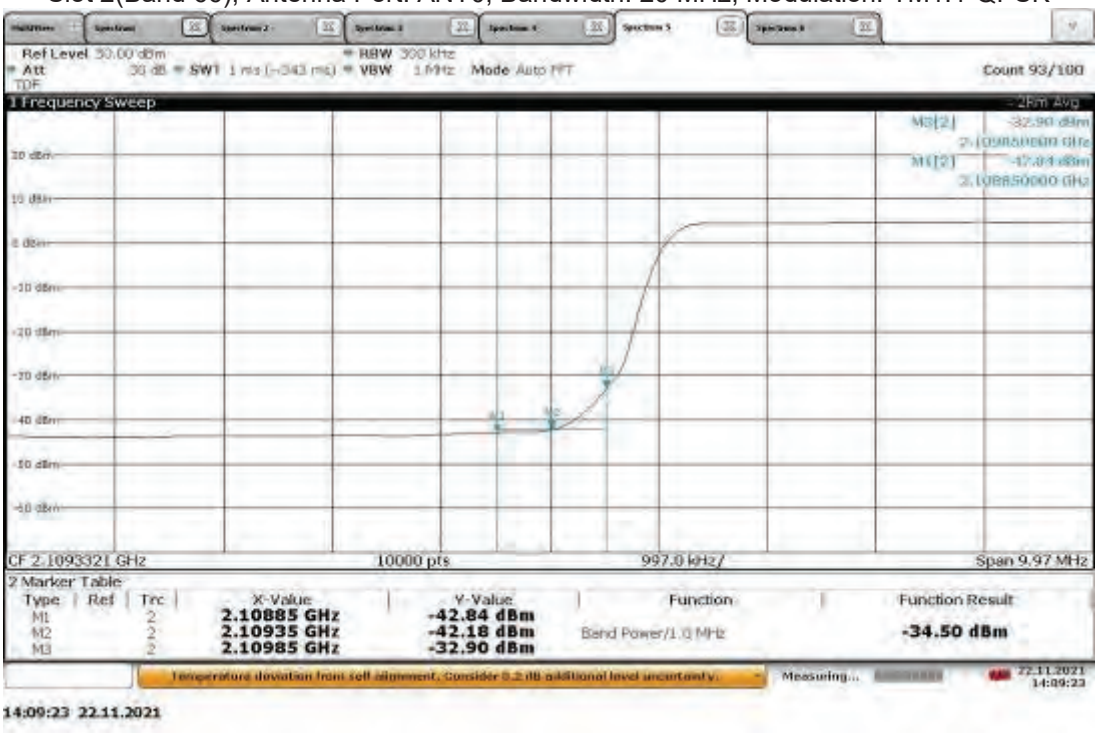
Band Edge Compliant, Upper Band Edge, 2192.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



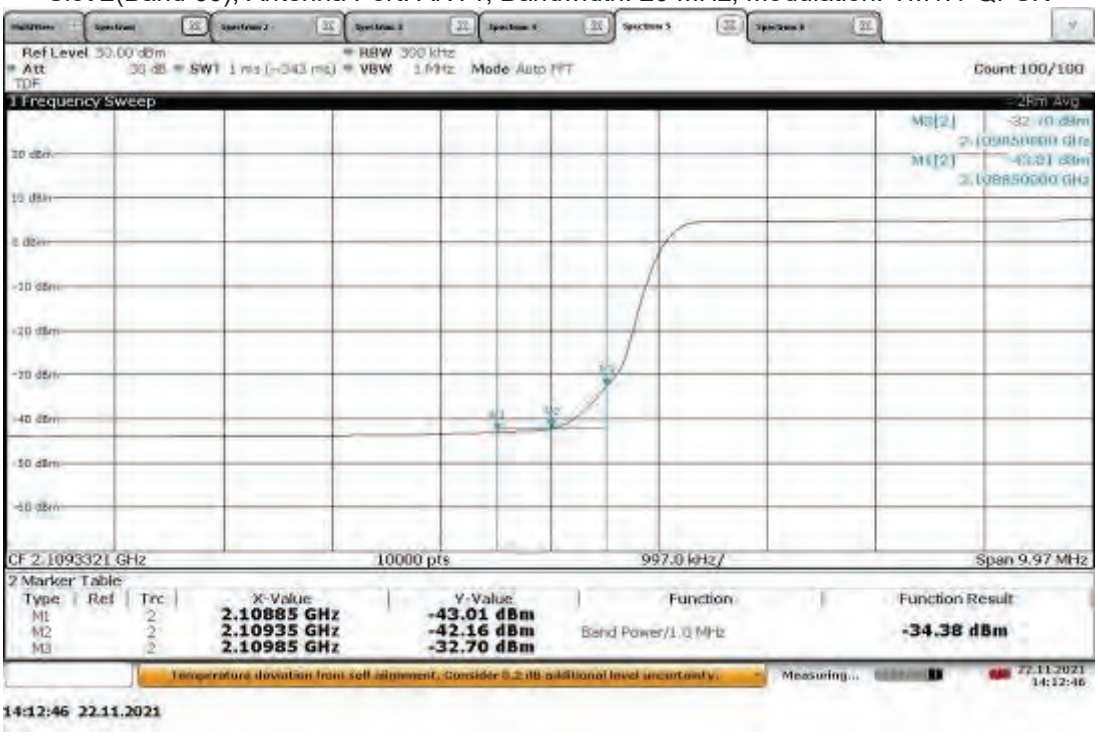
Band Edge Compliant, Upper Band Edge, 2192.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



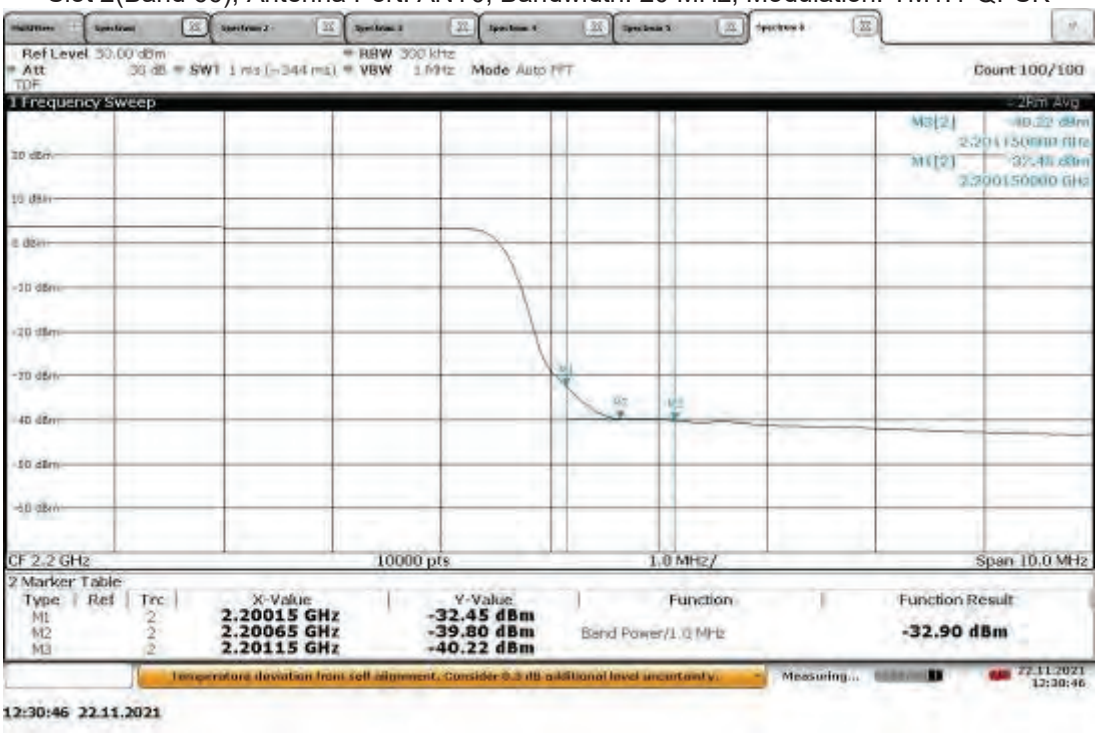
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



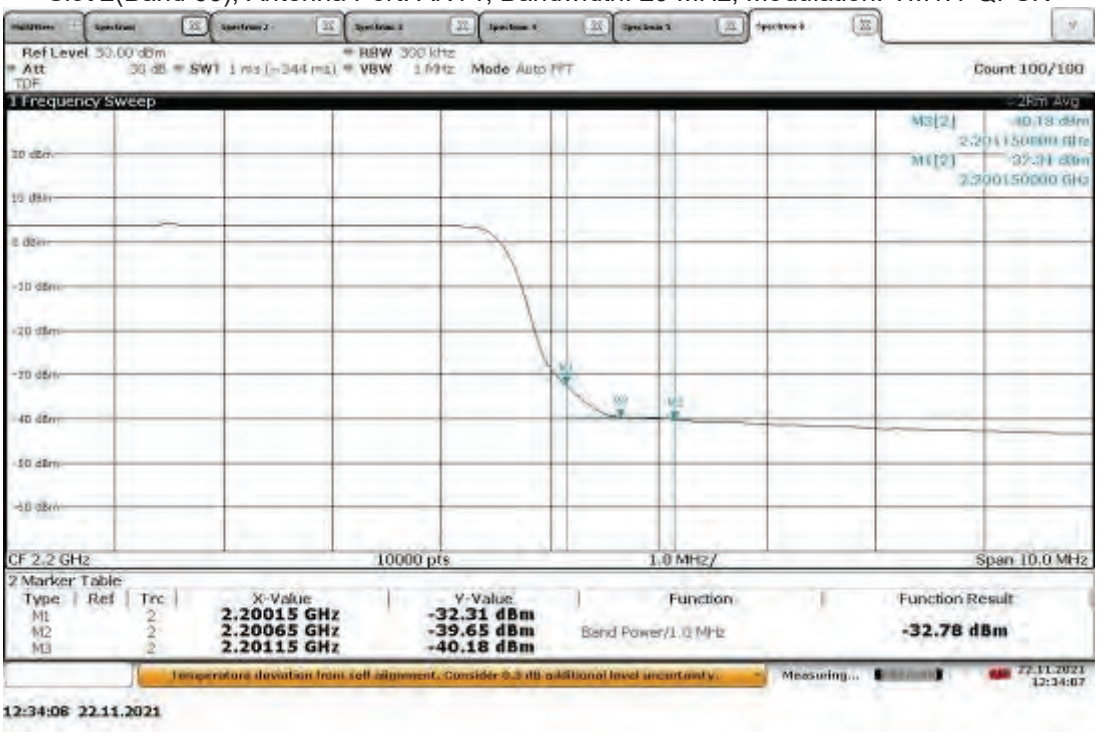
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



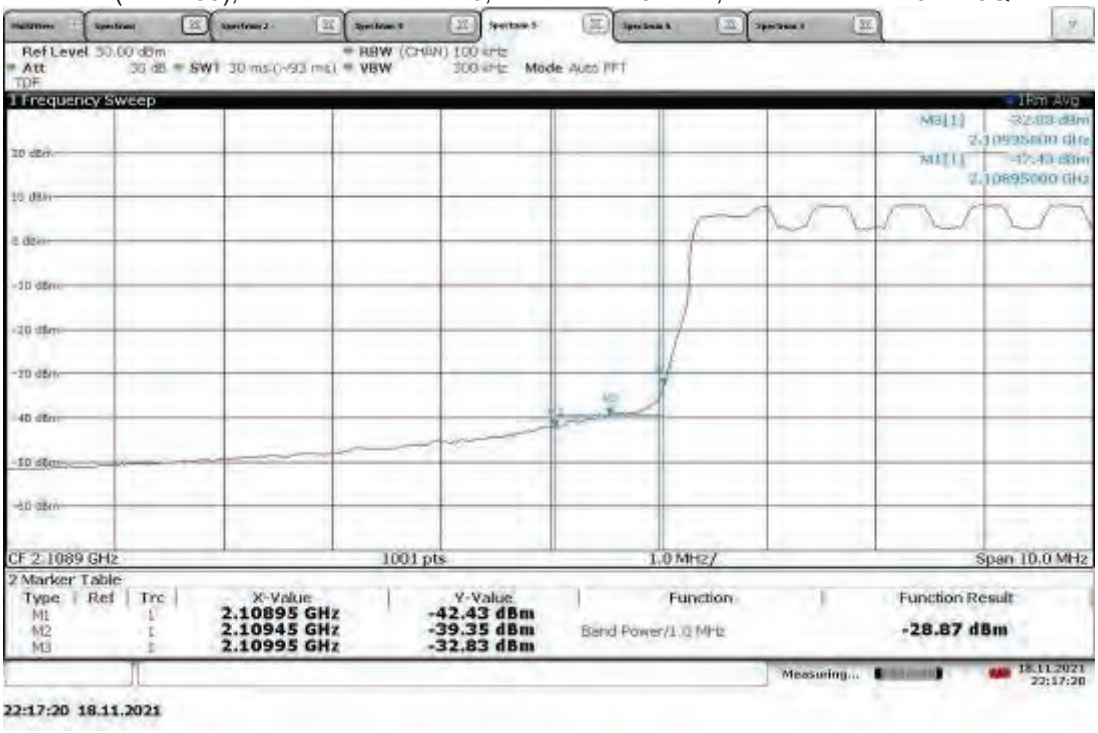
Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



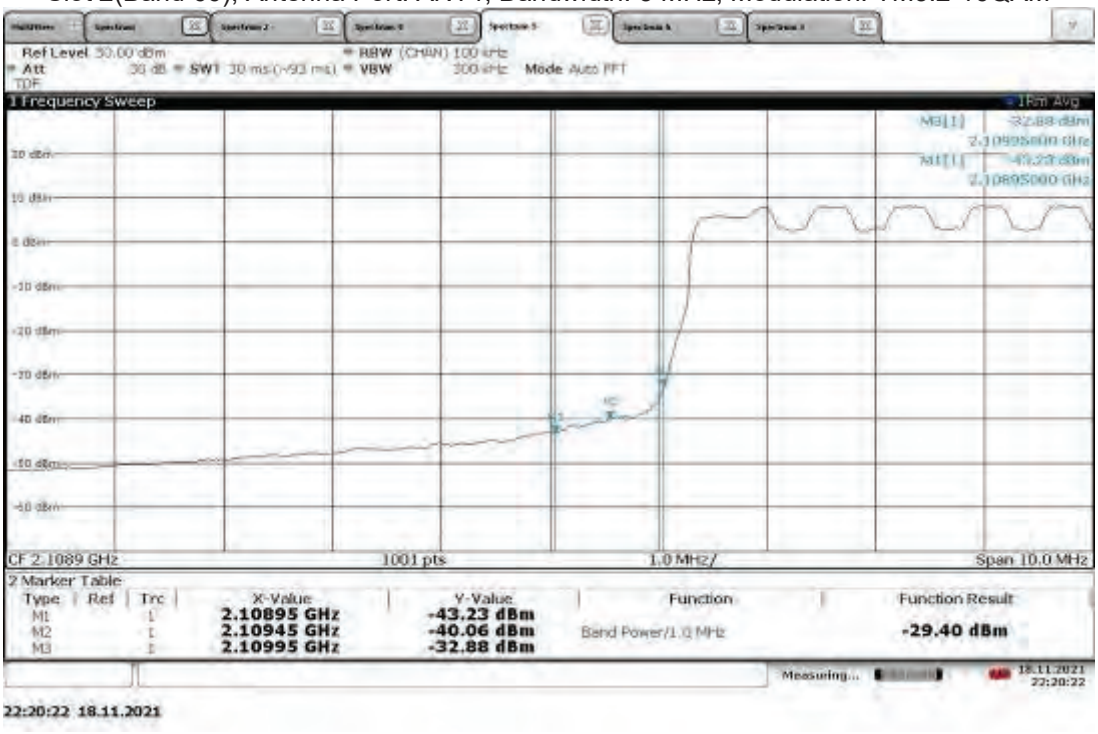
Band Edge Compliant, Upper Band Edge, 2190MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK



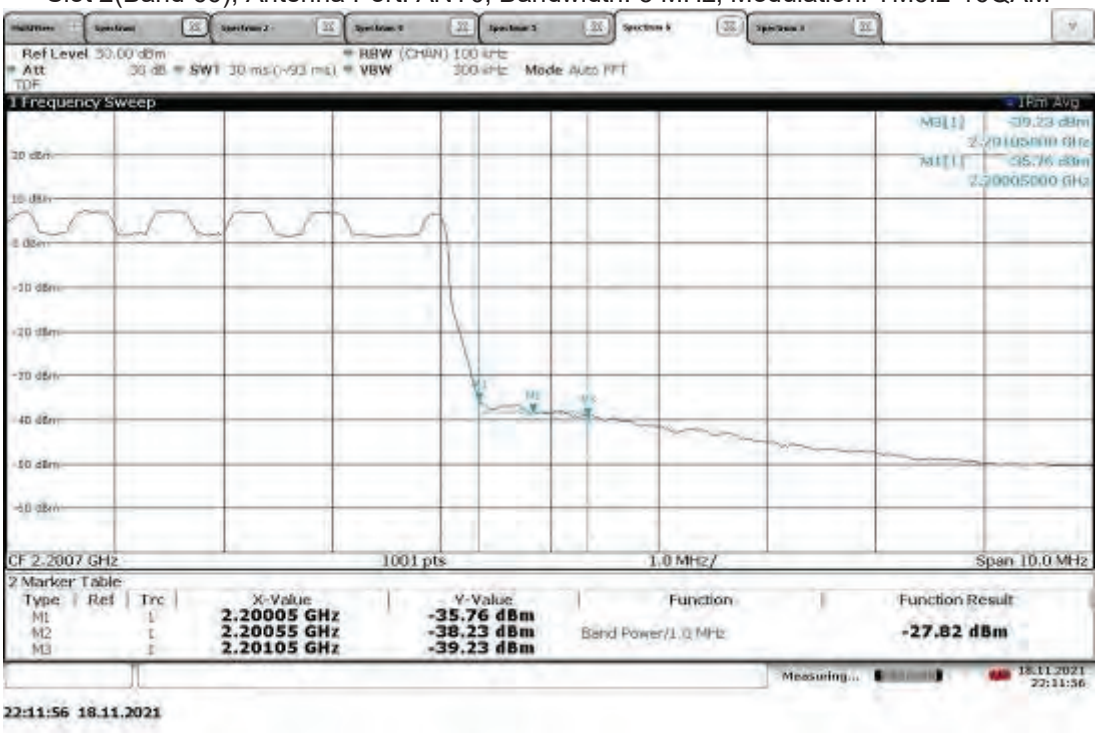
Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



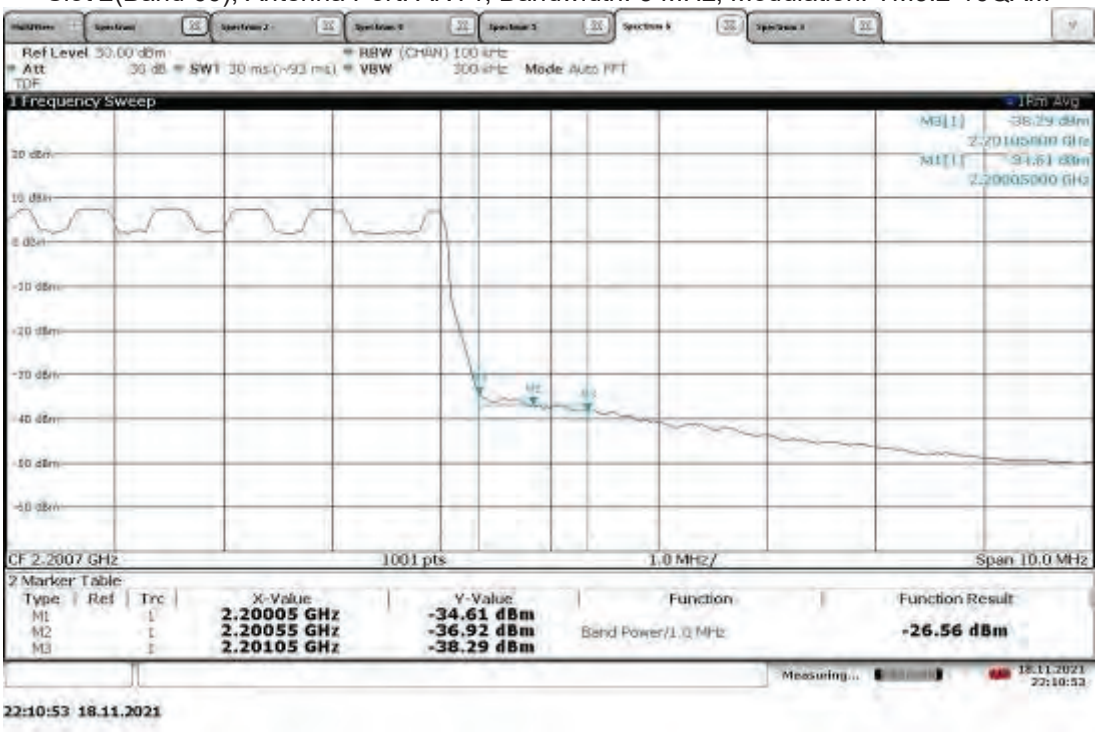
Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



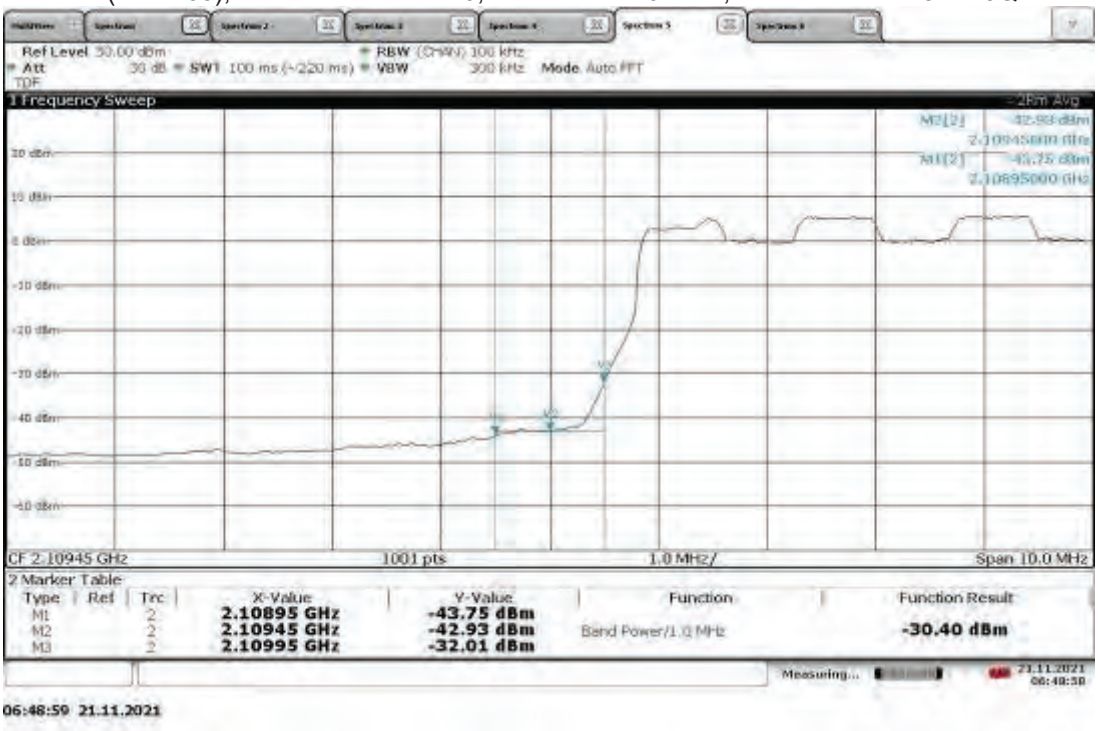
Band Edge Compliant, Upper Band Edge, 2197.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



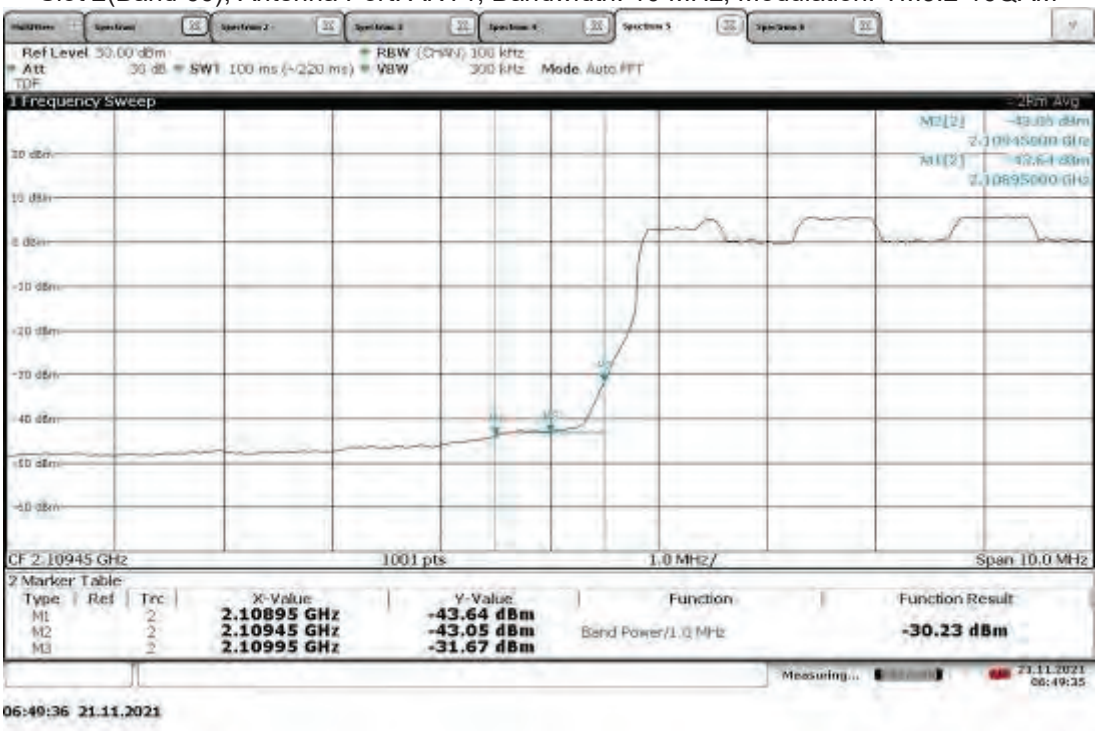
Band Edge Compliant, Upper Band Edge, 2197.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



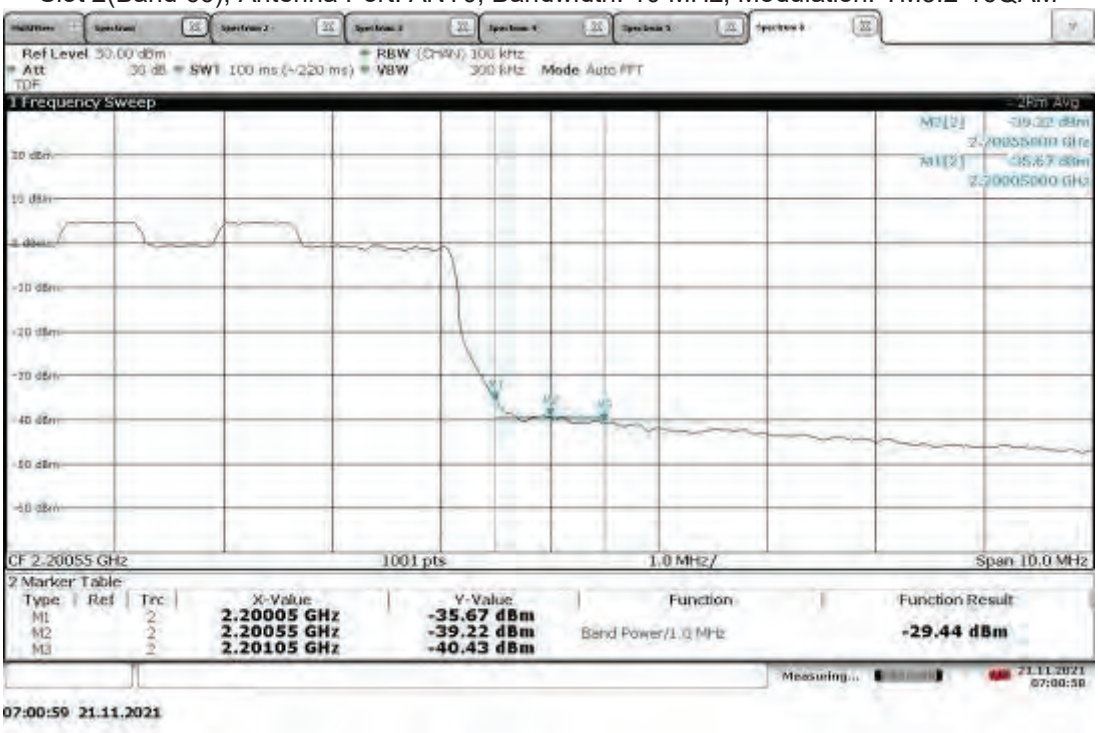
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



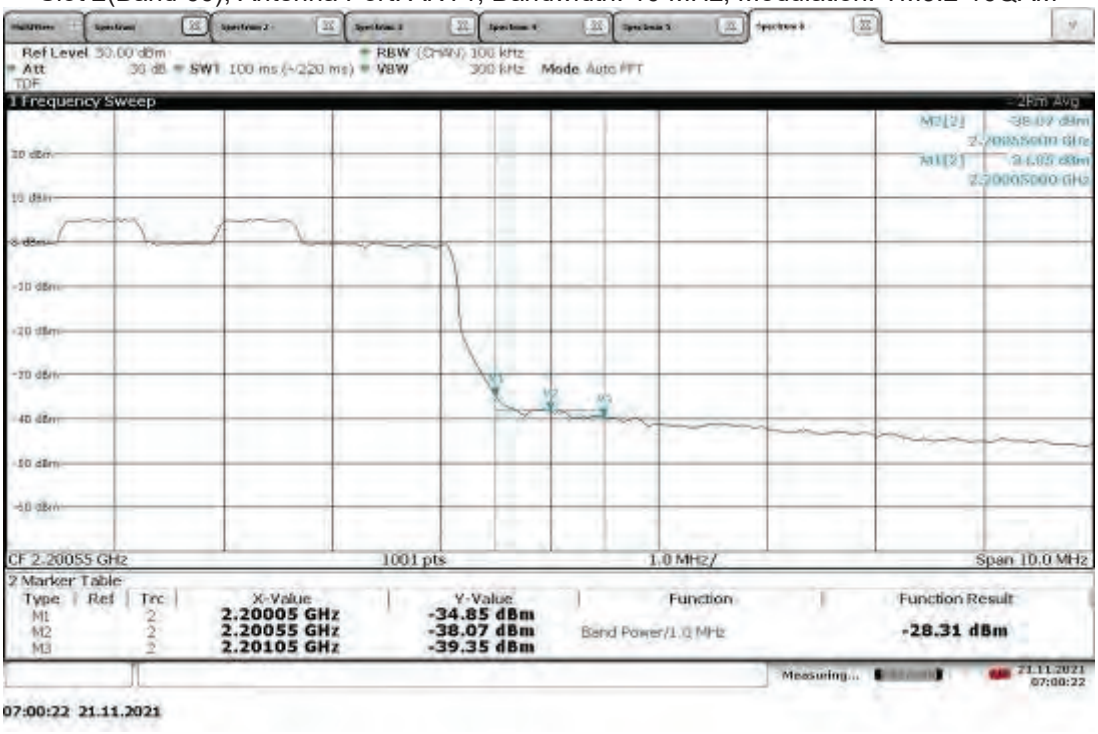
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



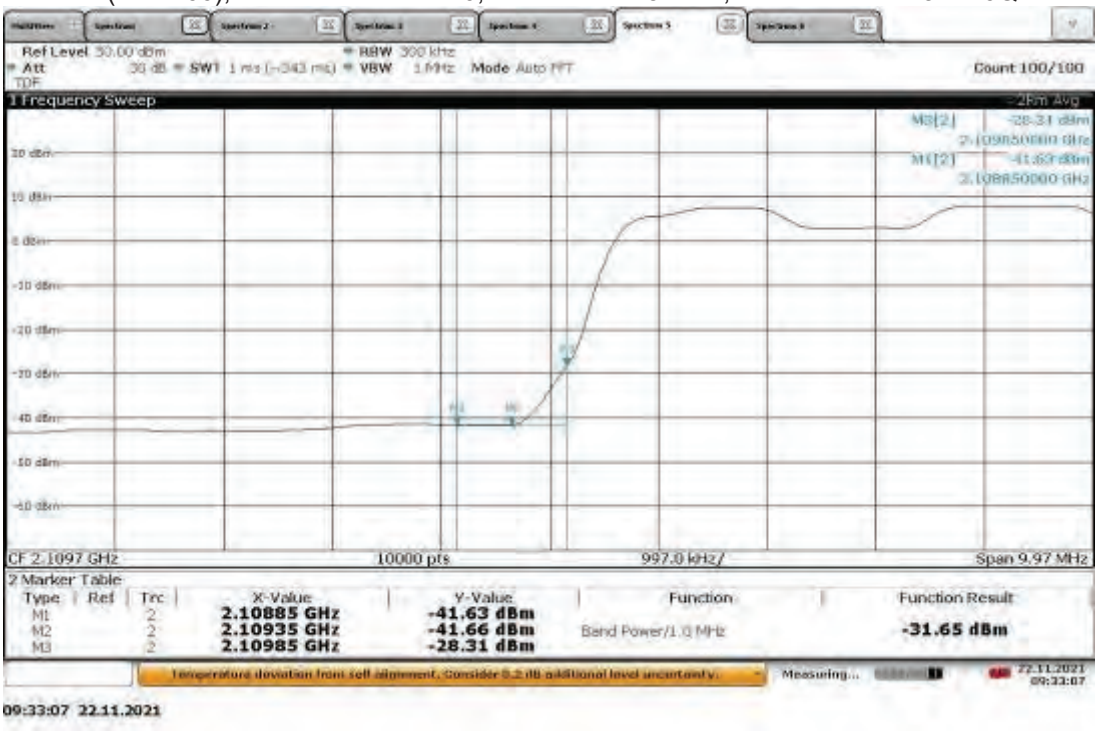
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



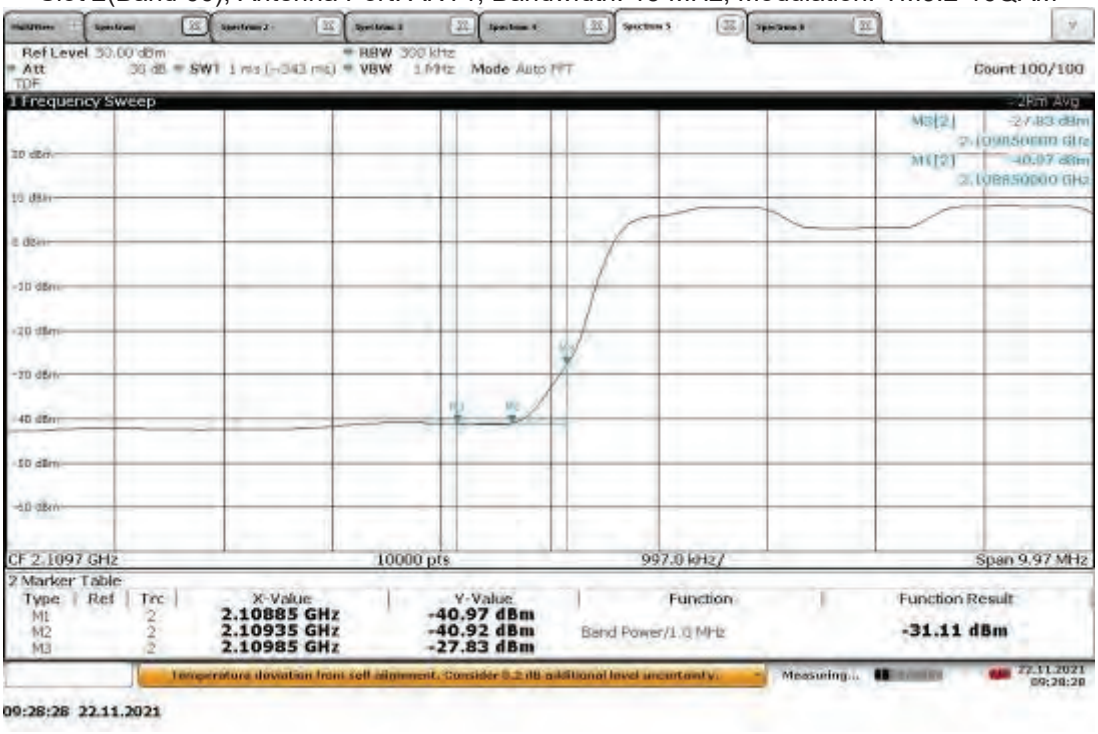
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



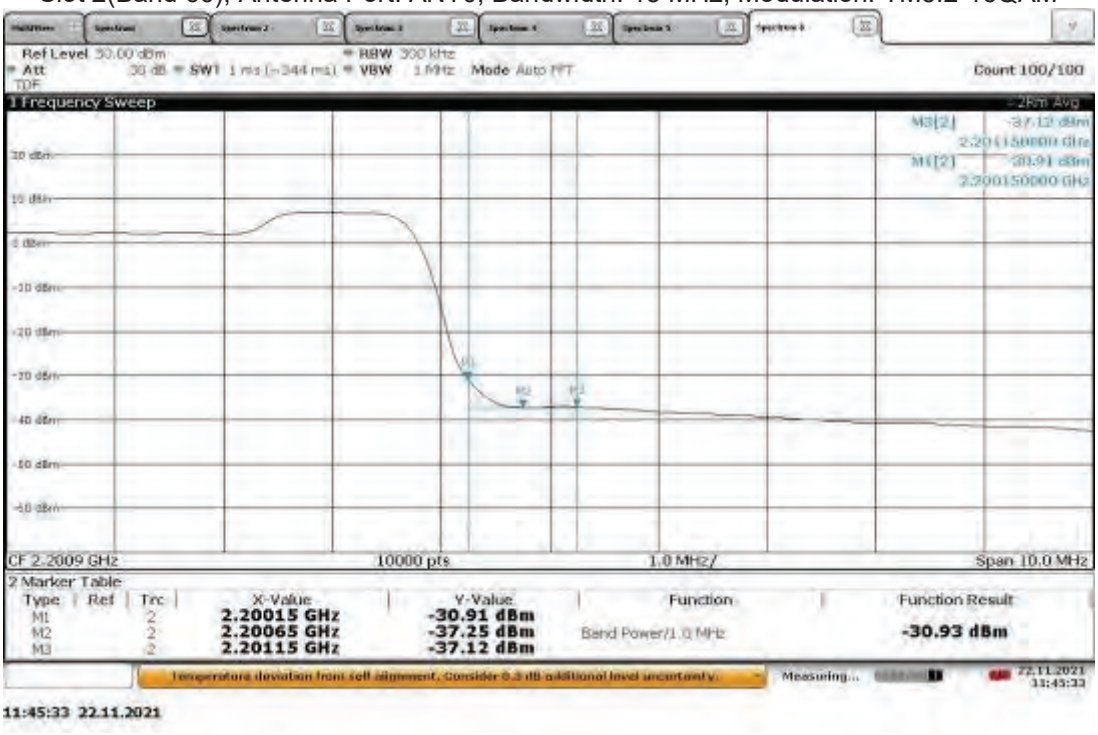
Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



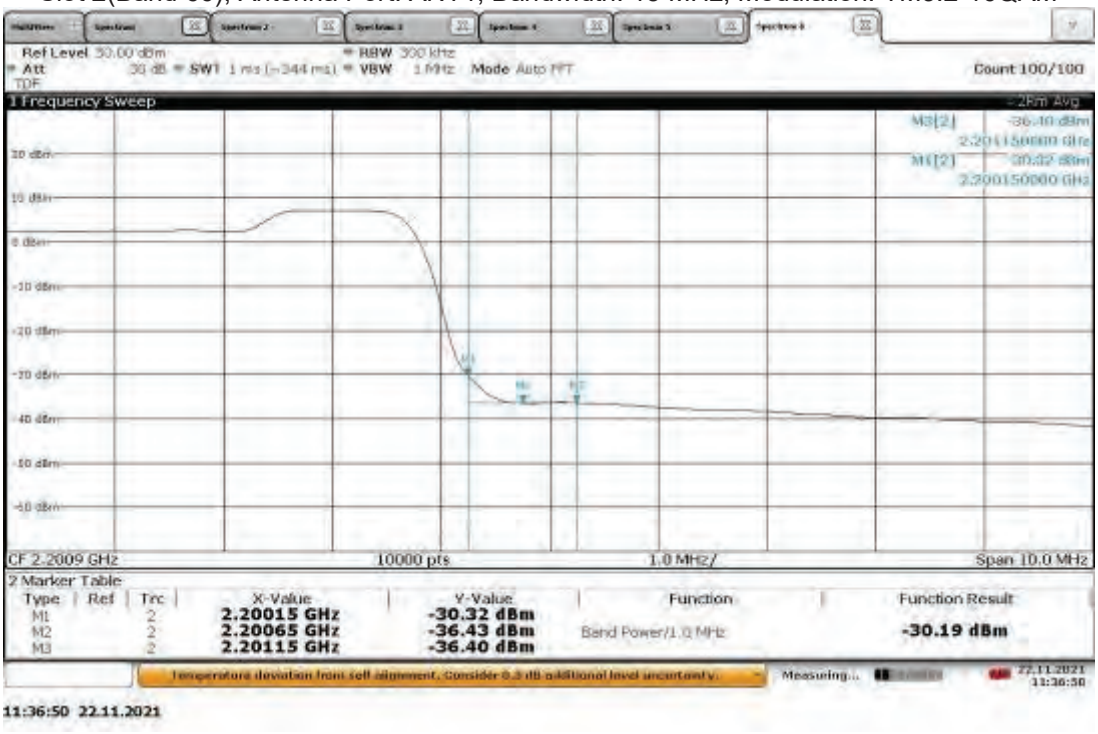
Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



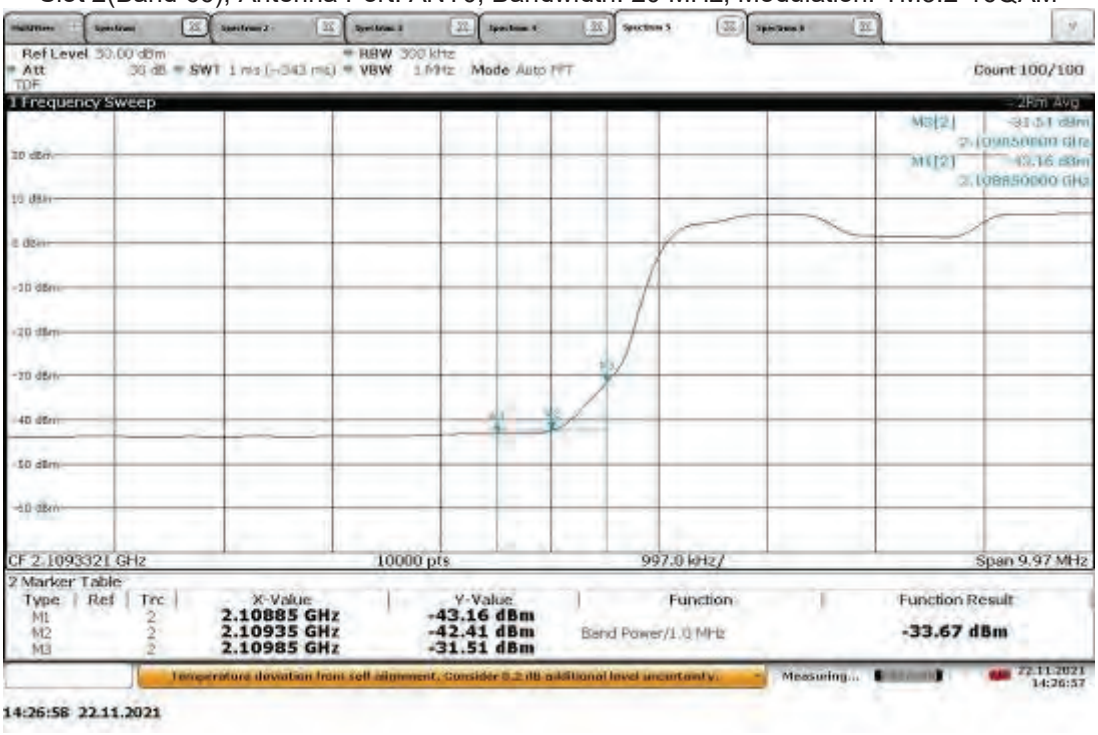
Band Edge Compliant, Upper Band Edge, 2192.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



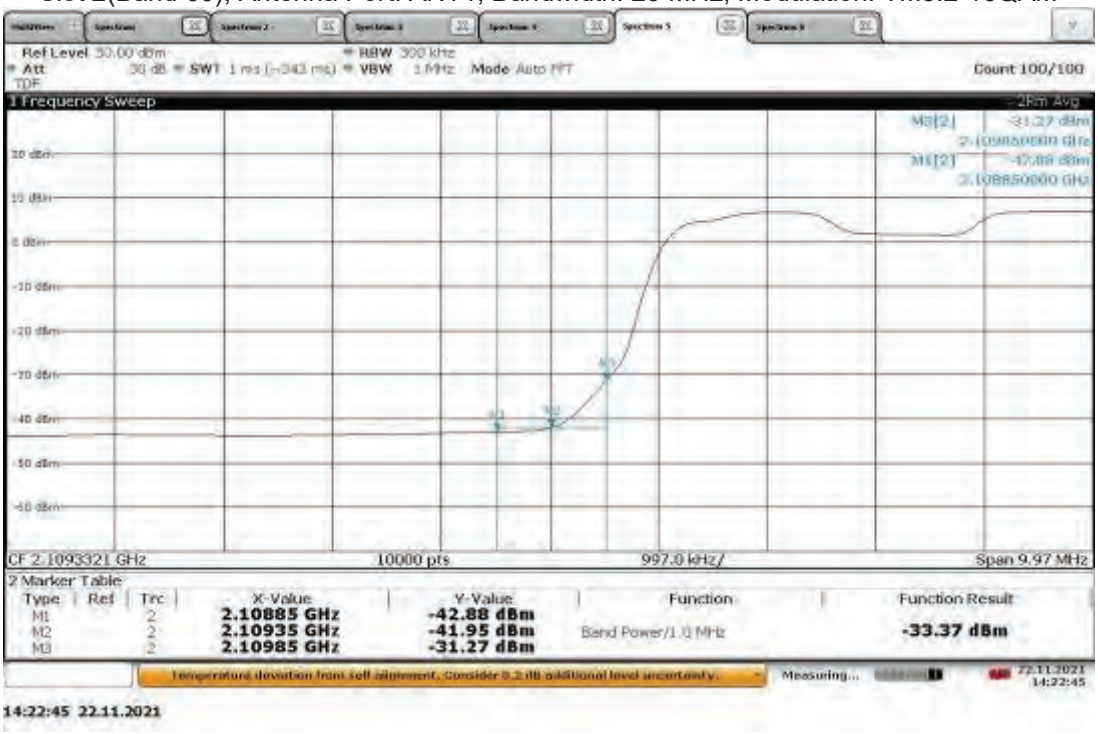
Band Edge Compliant, Upper Band Edge, 2192.5MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



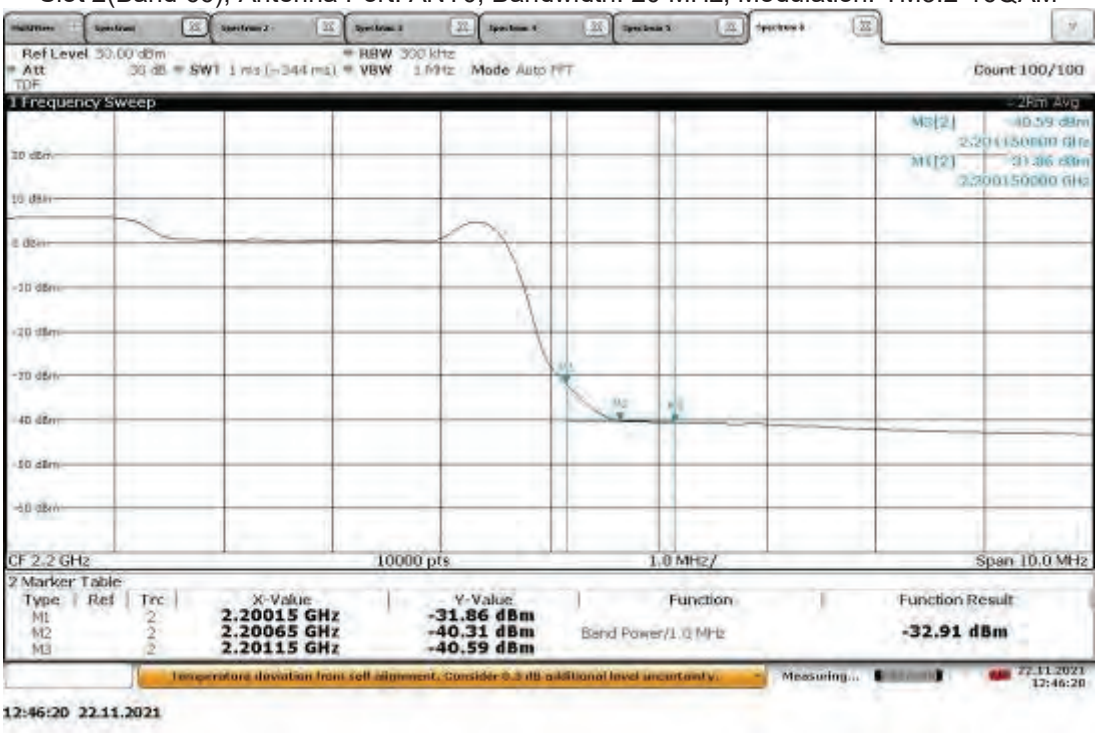
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



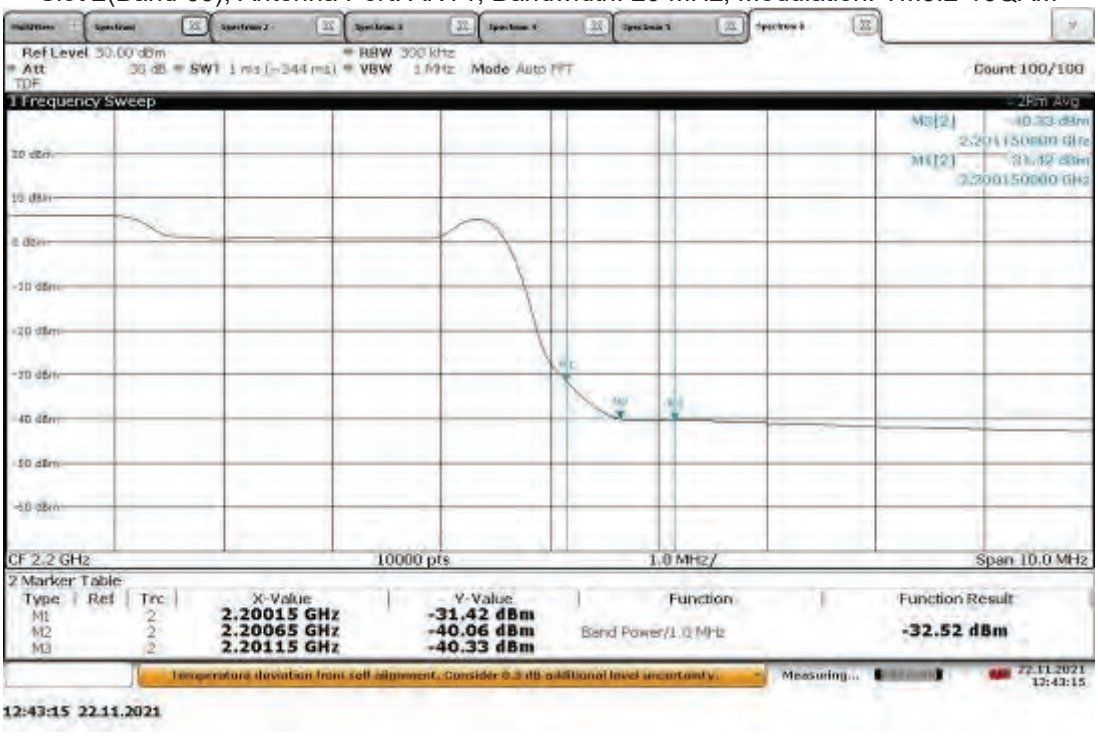
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



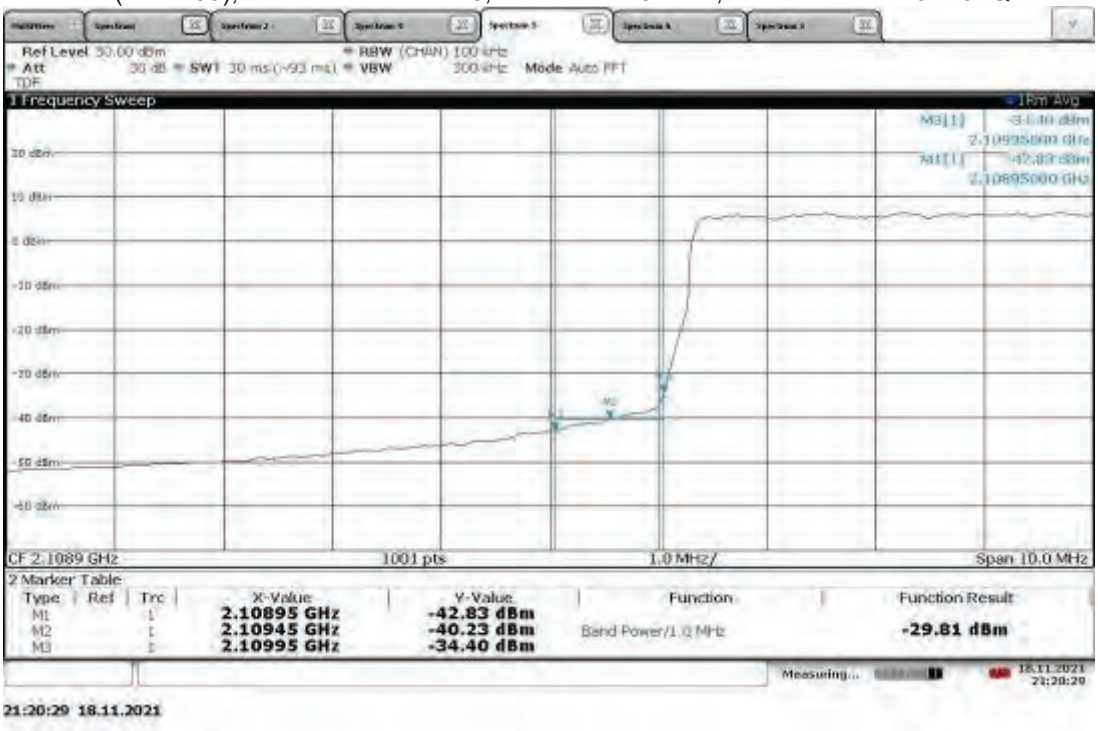
Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



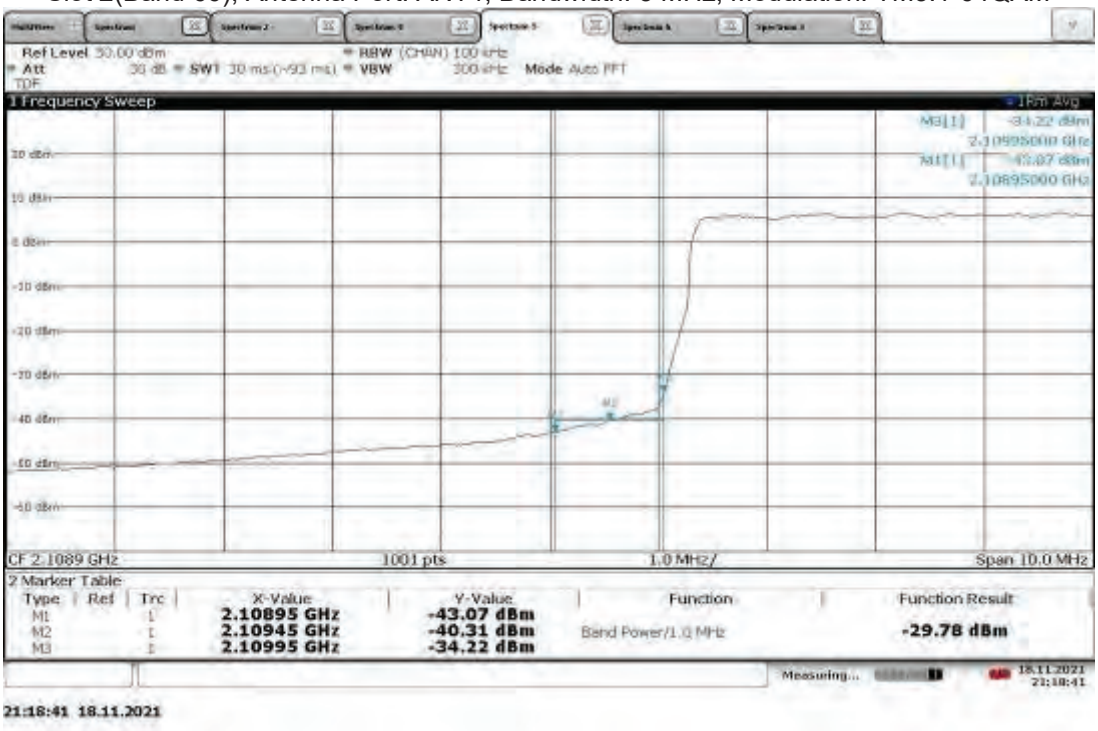
Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



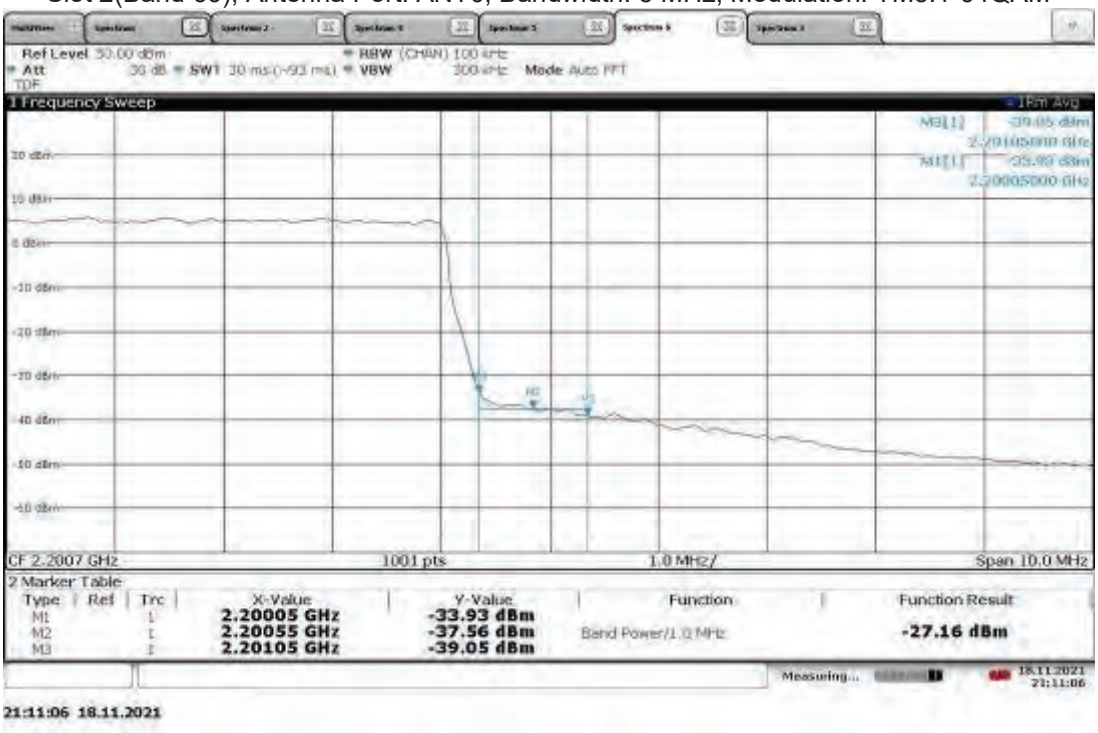
Band Edge Compliant, Lower Band Edge, 2112.50 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



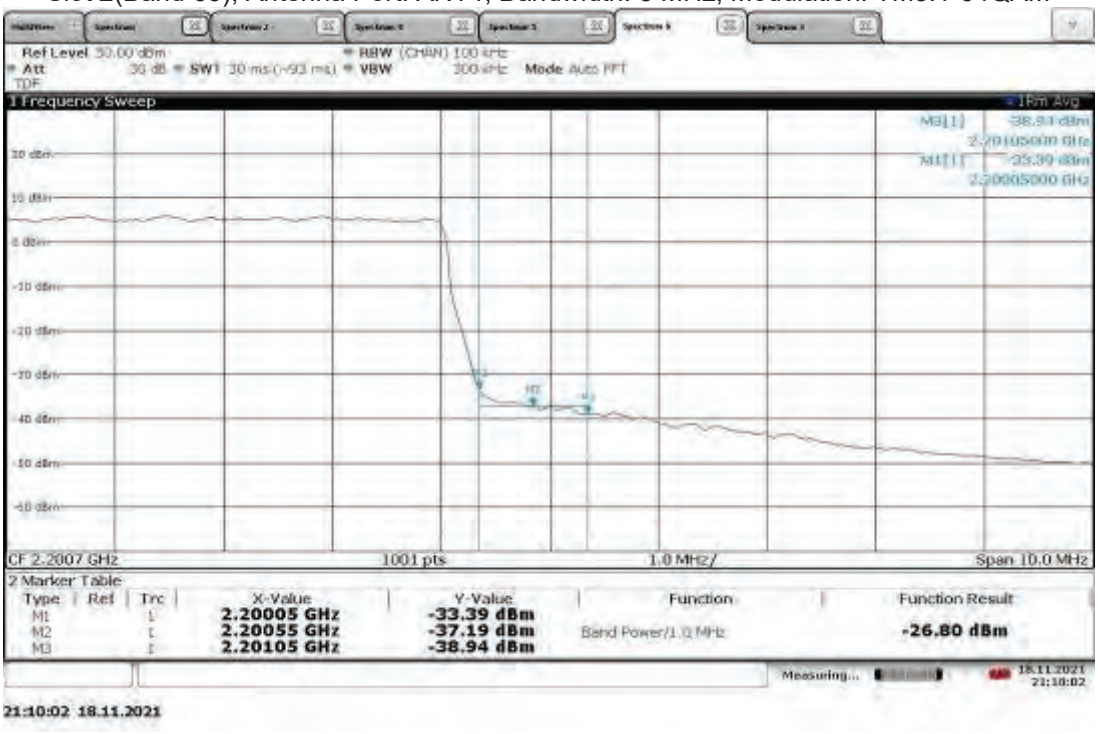
Band Edge Compliant, Lower Band Edge, 2112.50 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



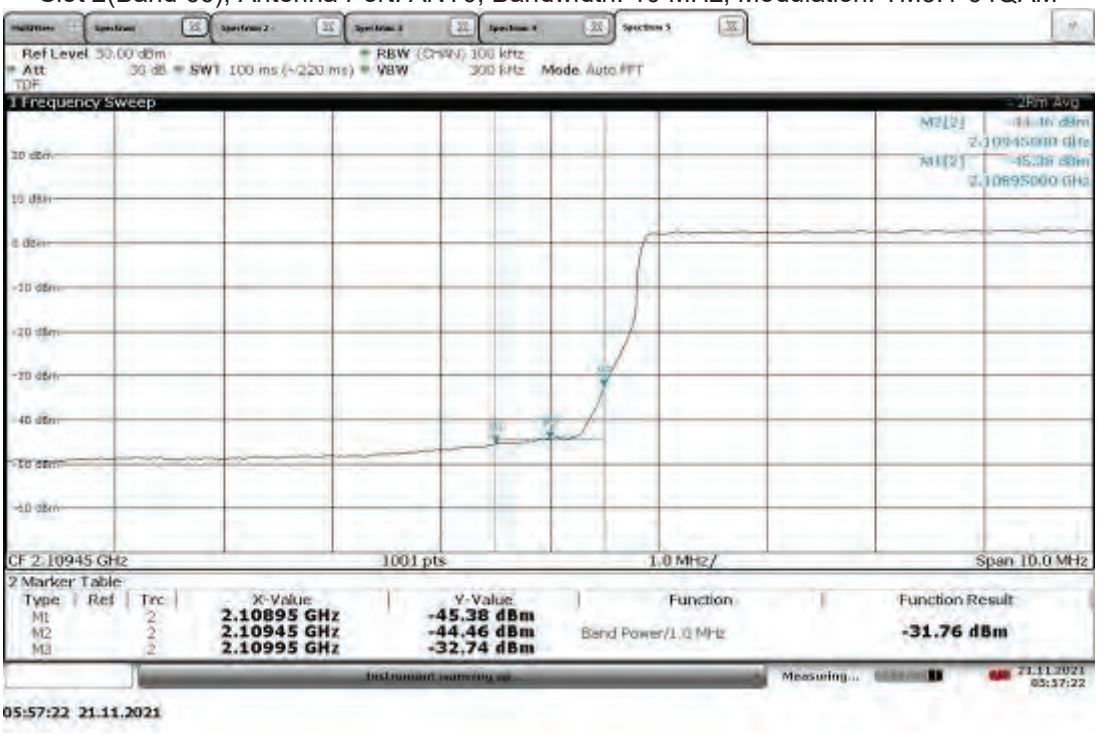
Band Edge Compliant, Upper Band Edge, 2197.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



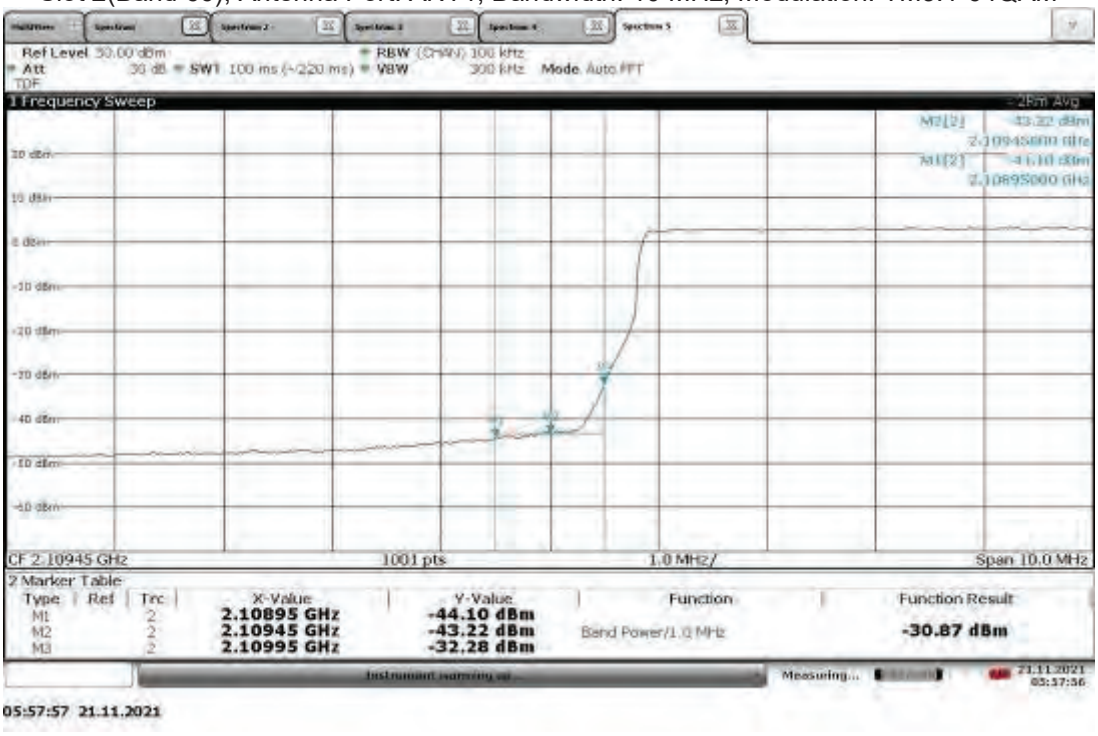
Band Edge Compliant, Upper Band Edge, 2197.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



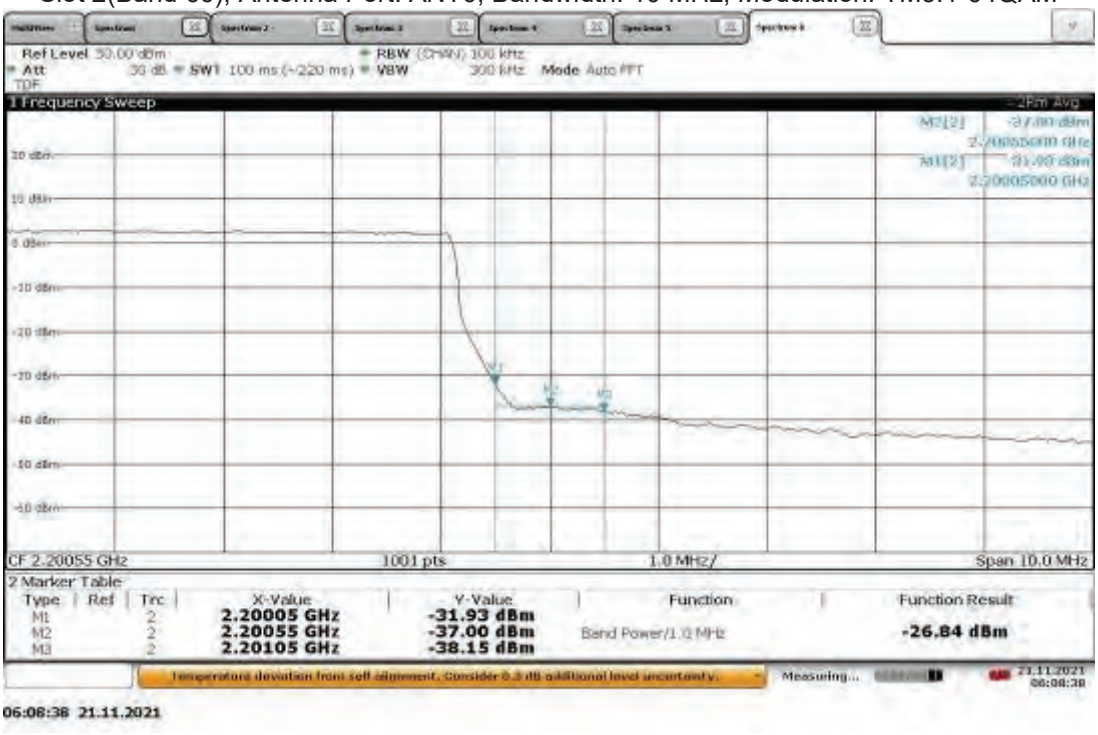
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



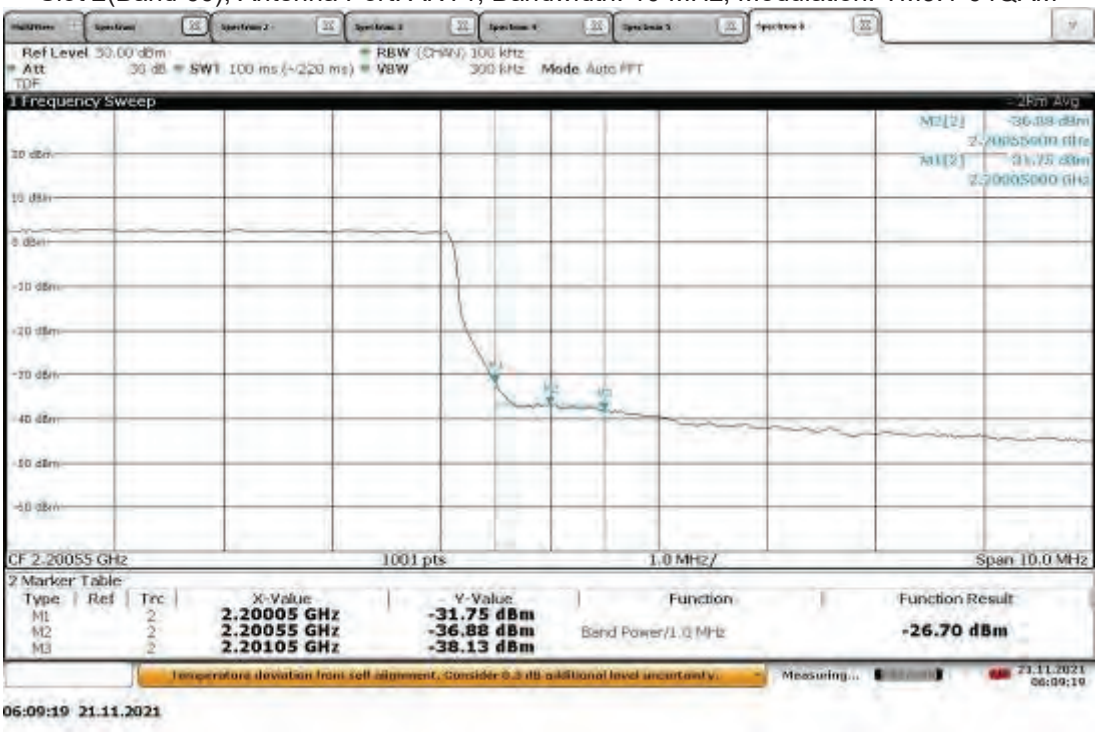
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



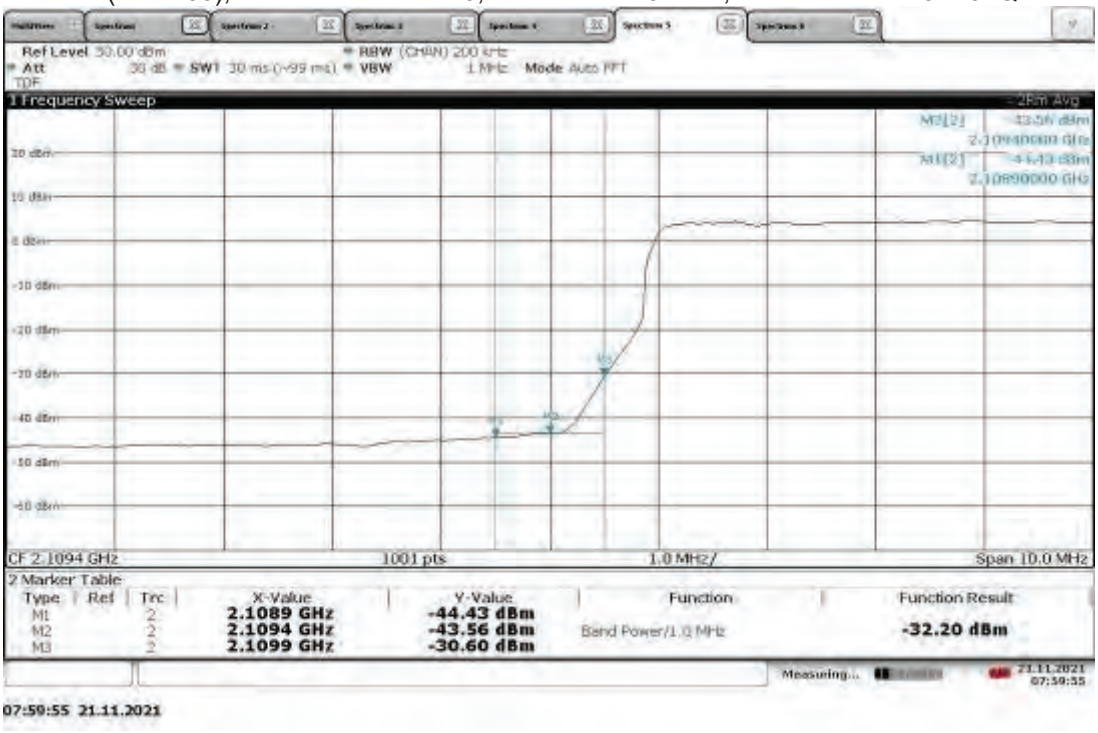
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



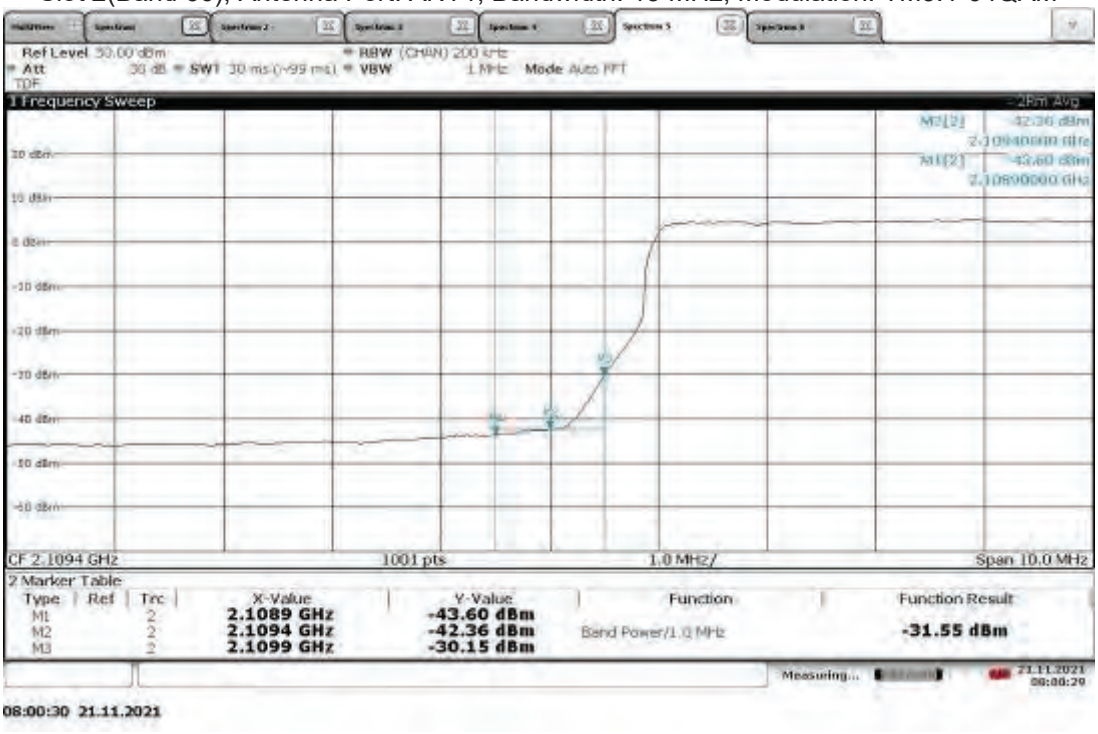
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



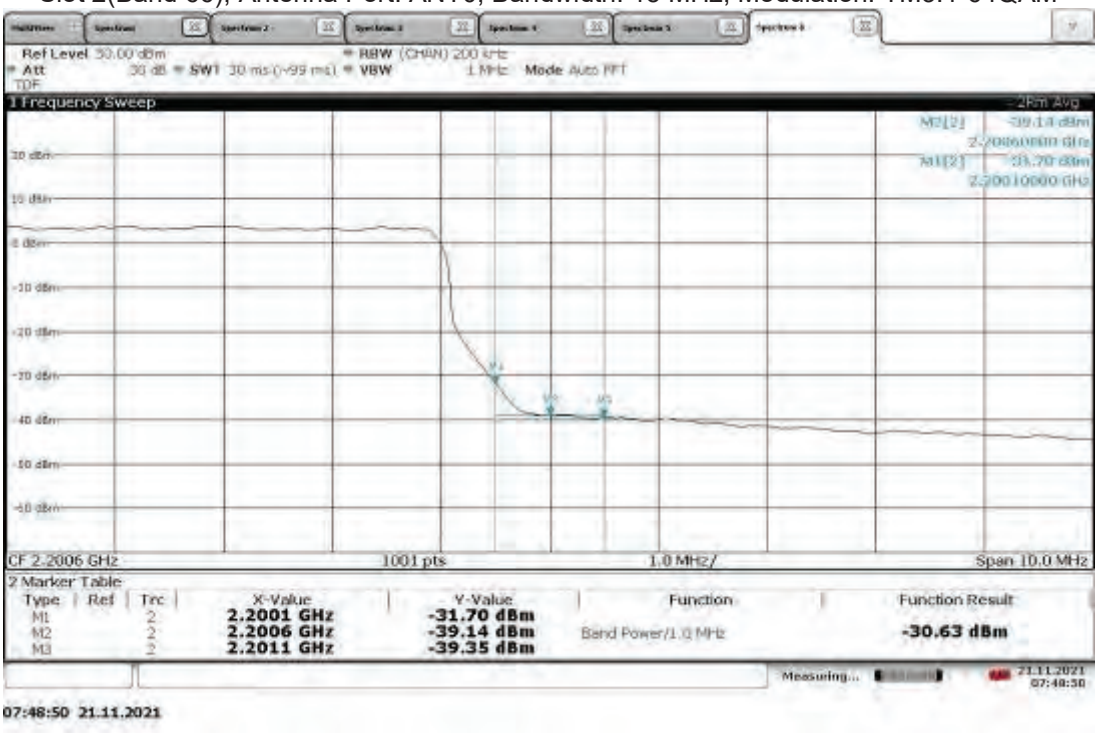
Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



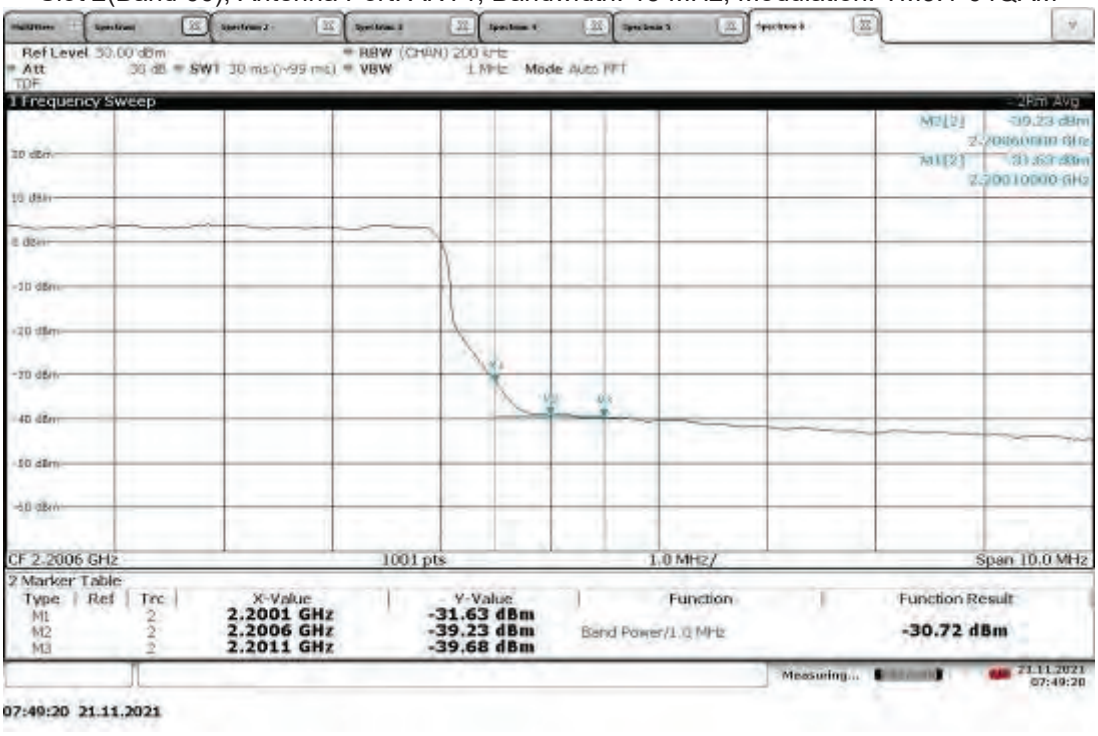
Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



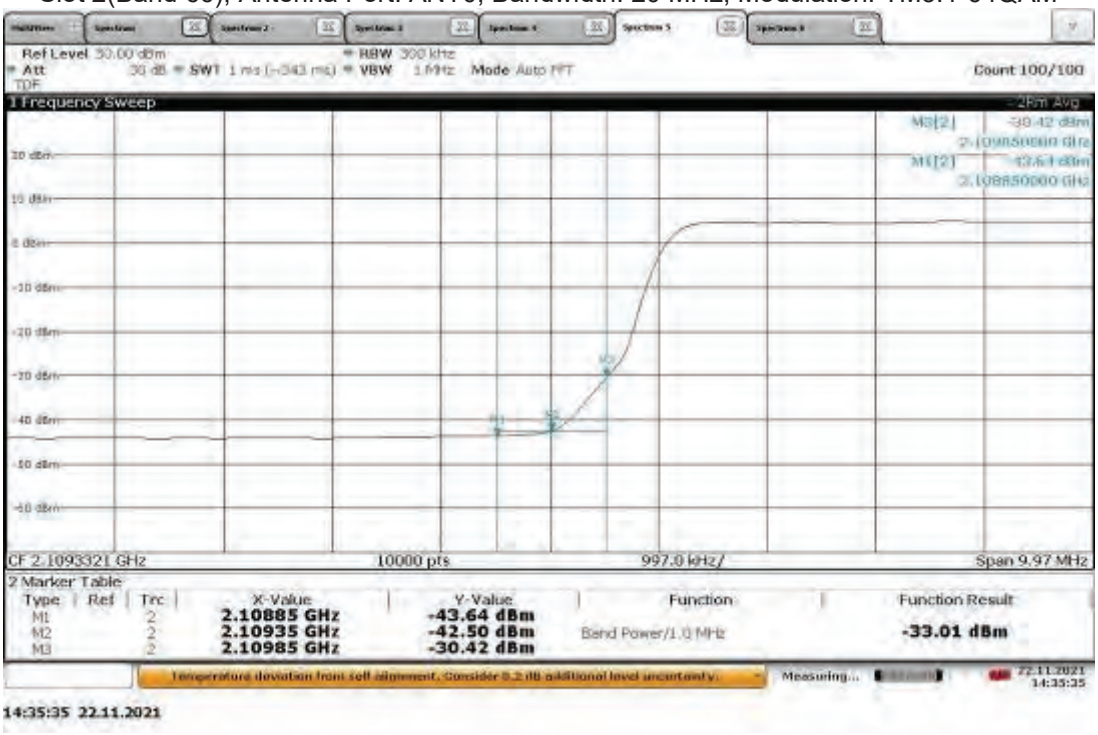
Band Edge Compliant, Upper Band Edge, 2192.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



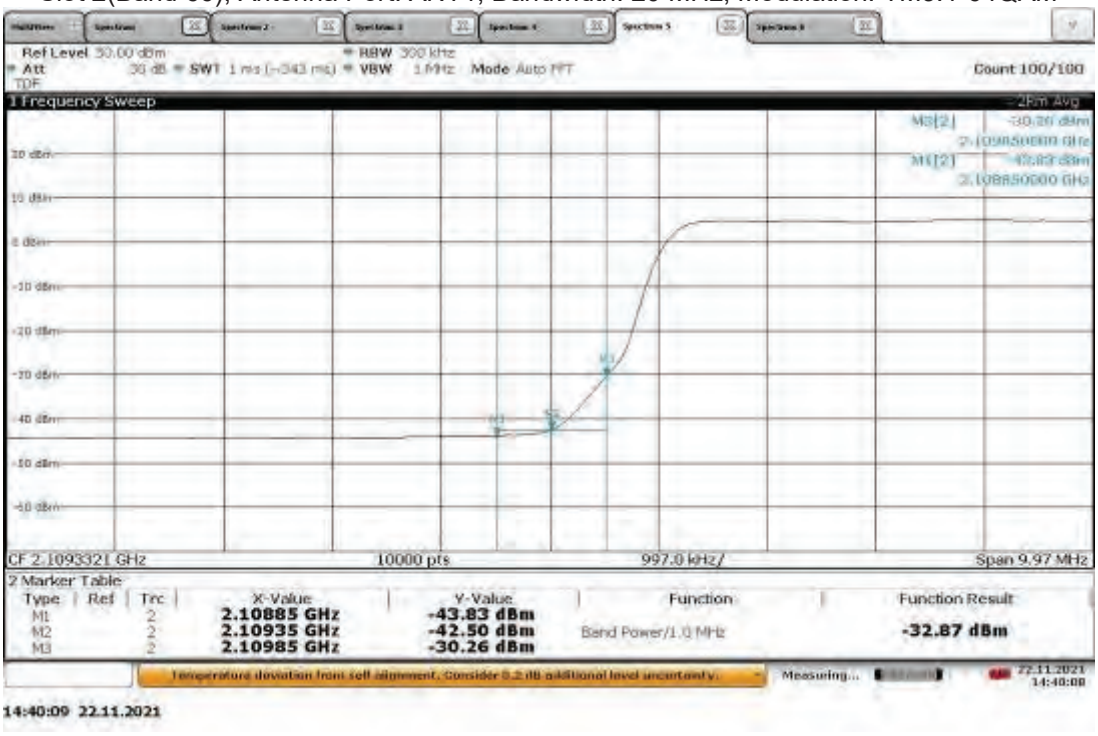
Band Edge Compliant, Upper Band Edge, 2192.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM



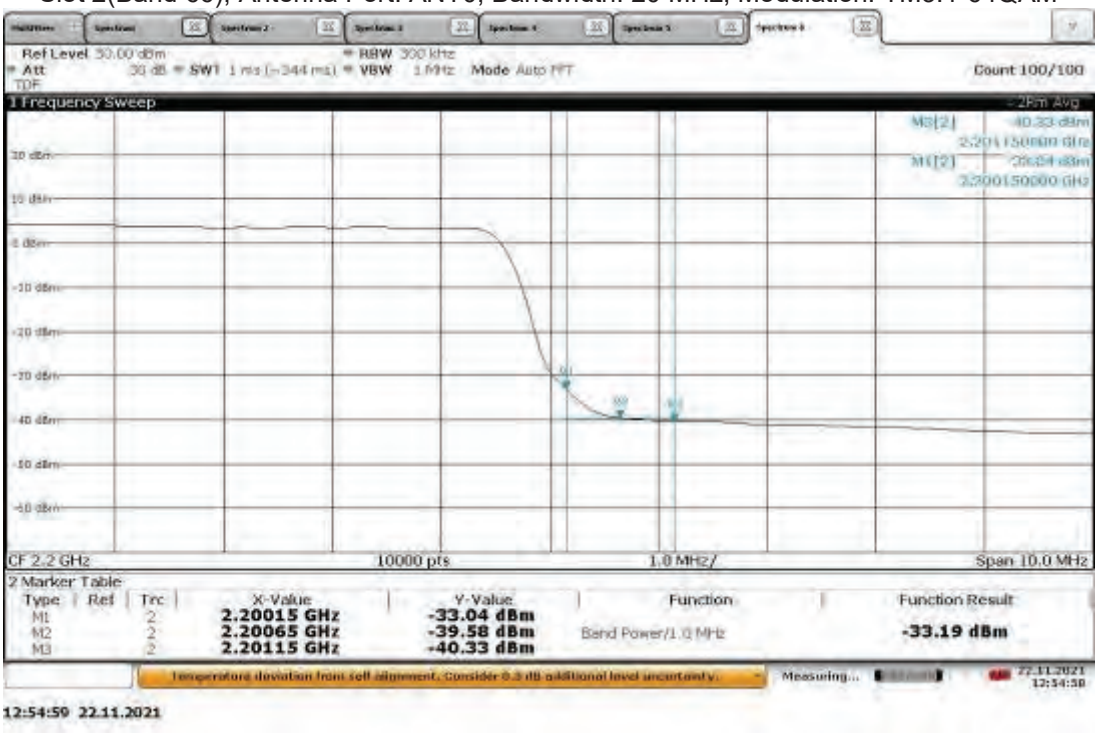
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



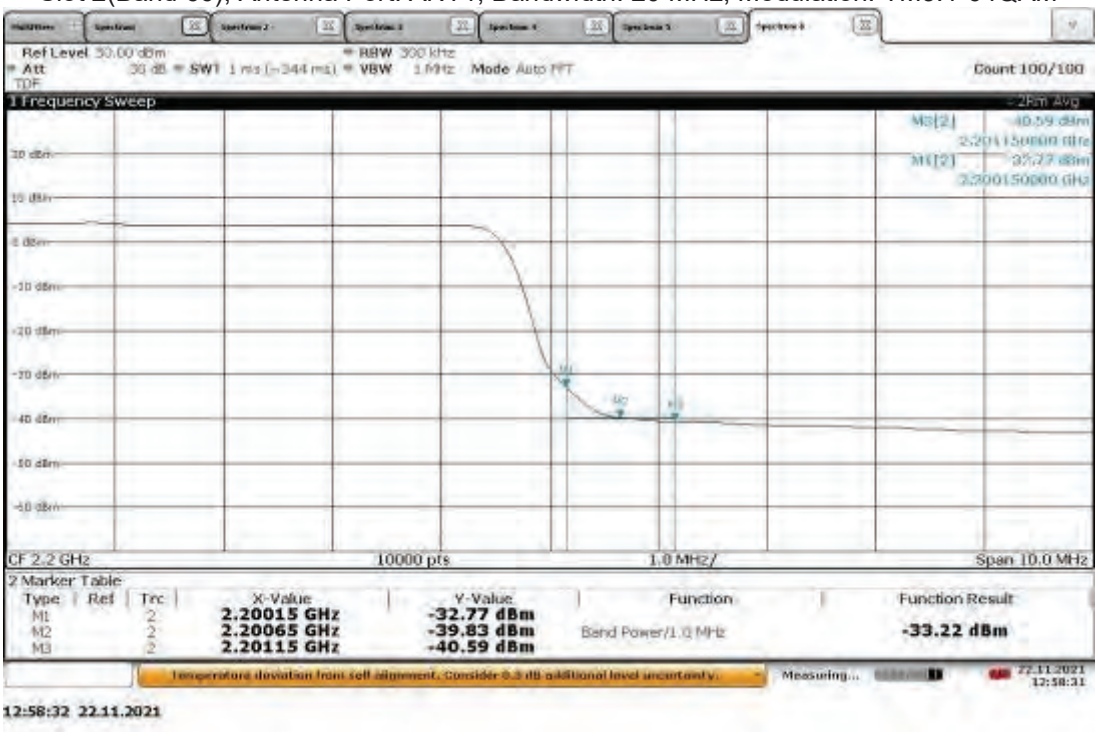
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



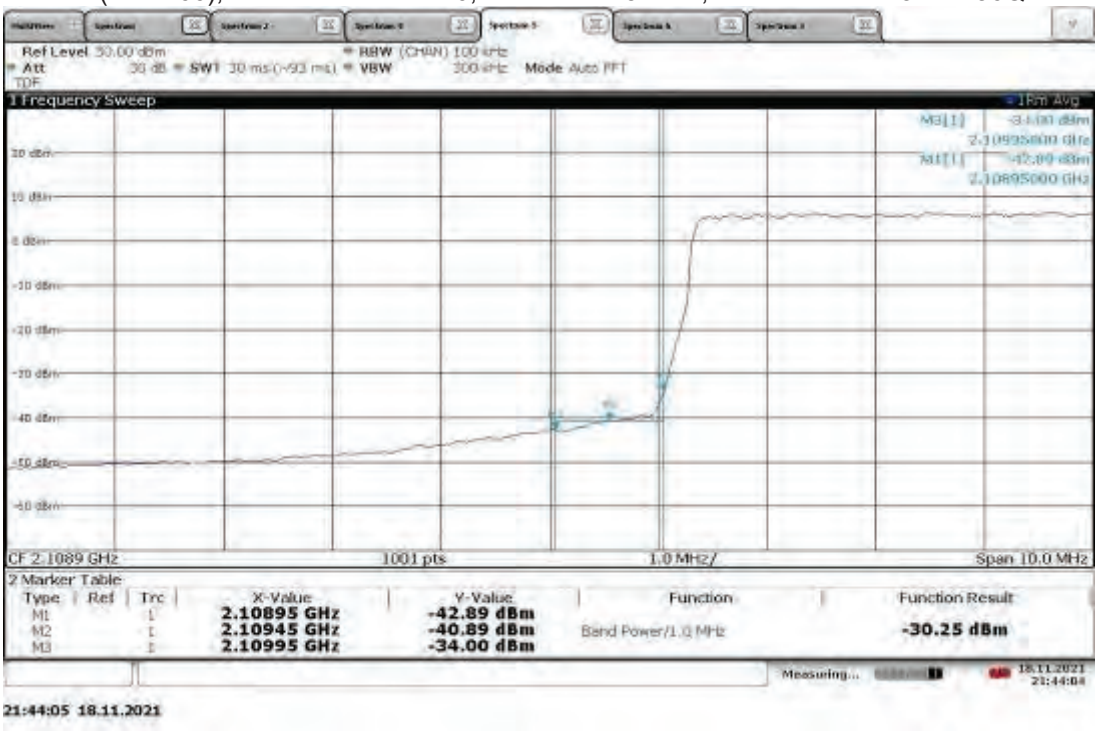
Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



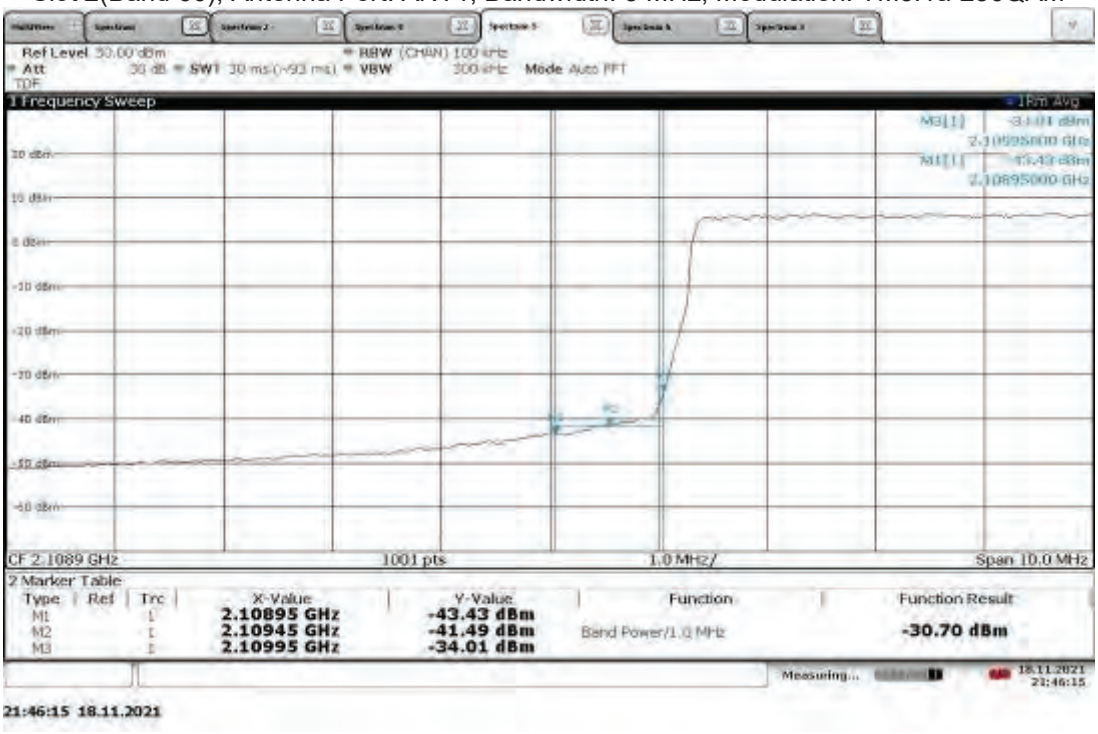
Band Edge Compliant, Upper Band Edge, 2190 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



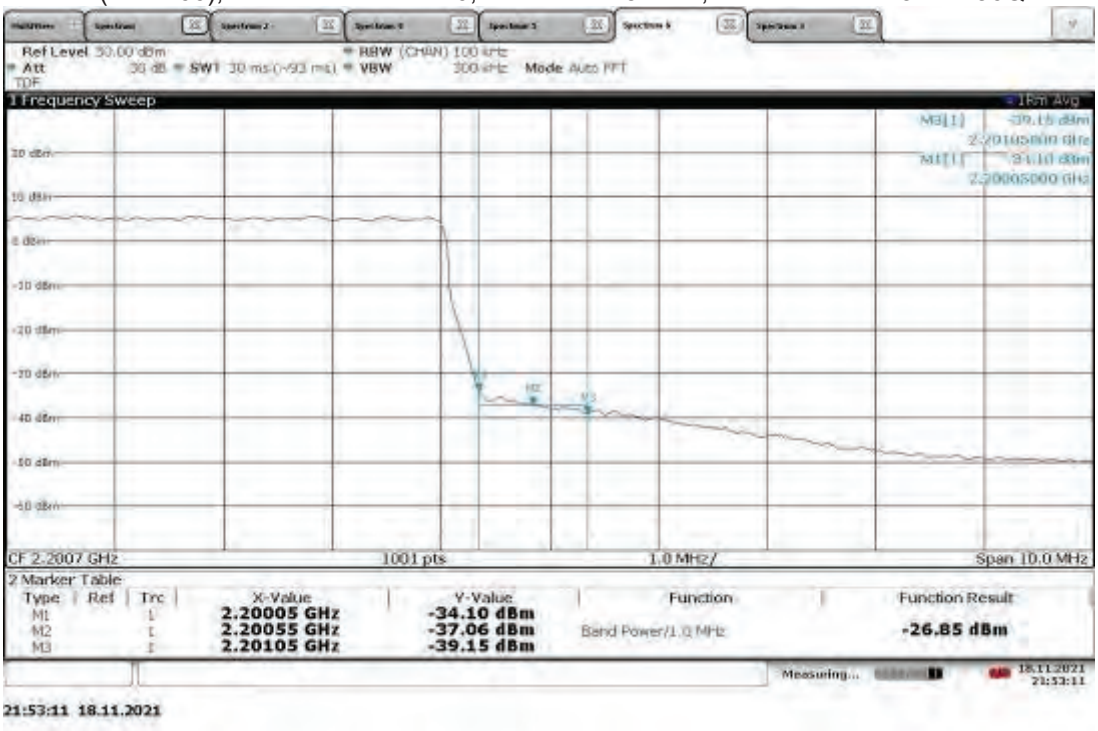
Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



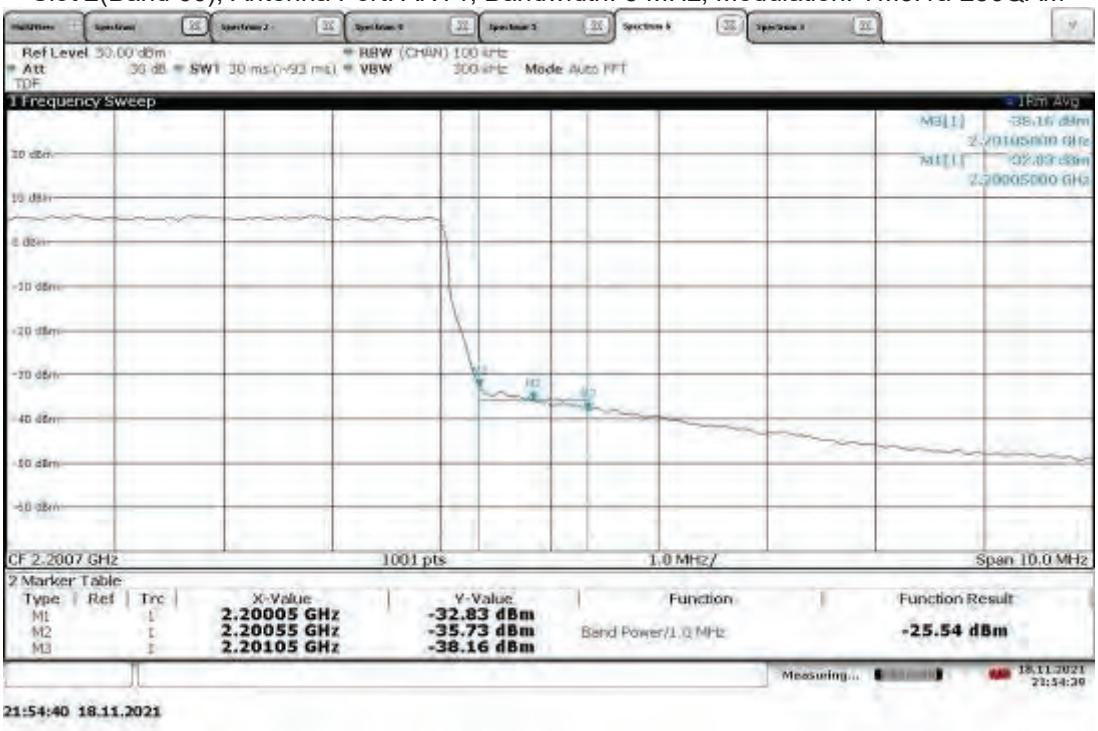
Band Edge Compliant, Lower Band Edge, 2112.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



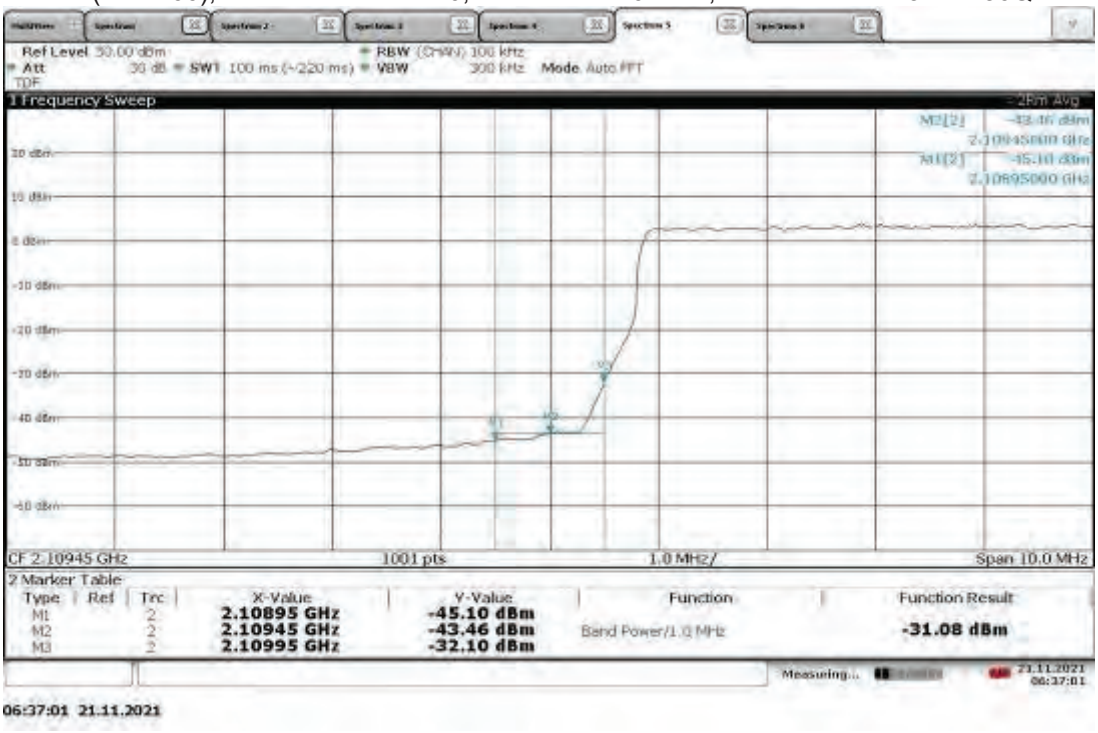
Band Edge Compliant, Upper Band Edge, 2197.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



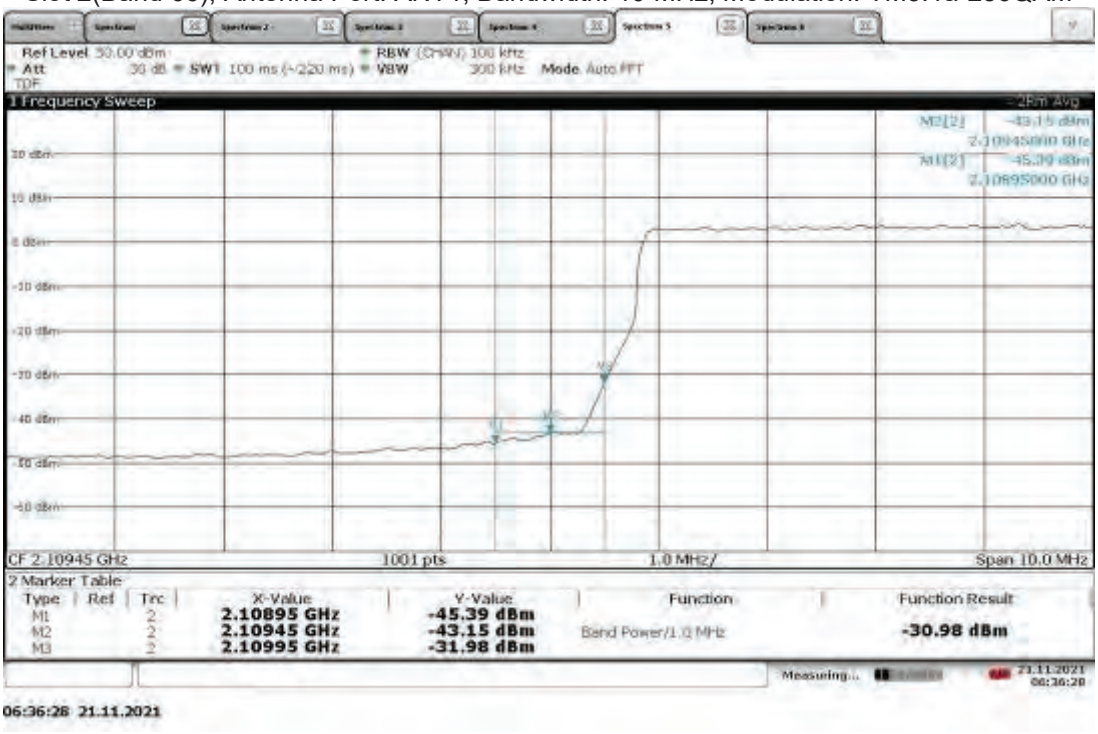
Band Edge Compliant, Upper Band Edge, 2197.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



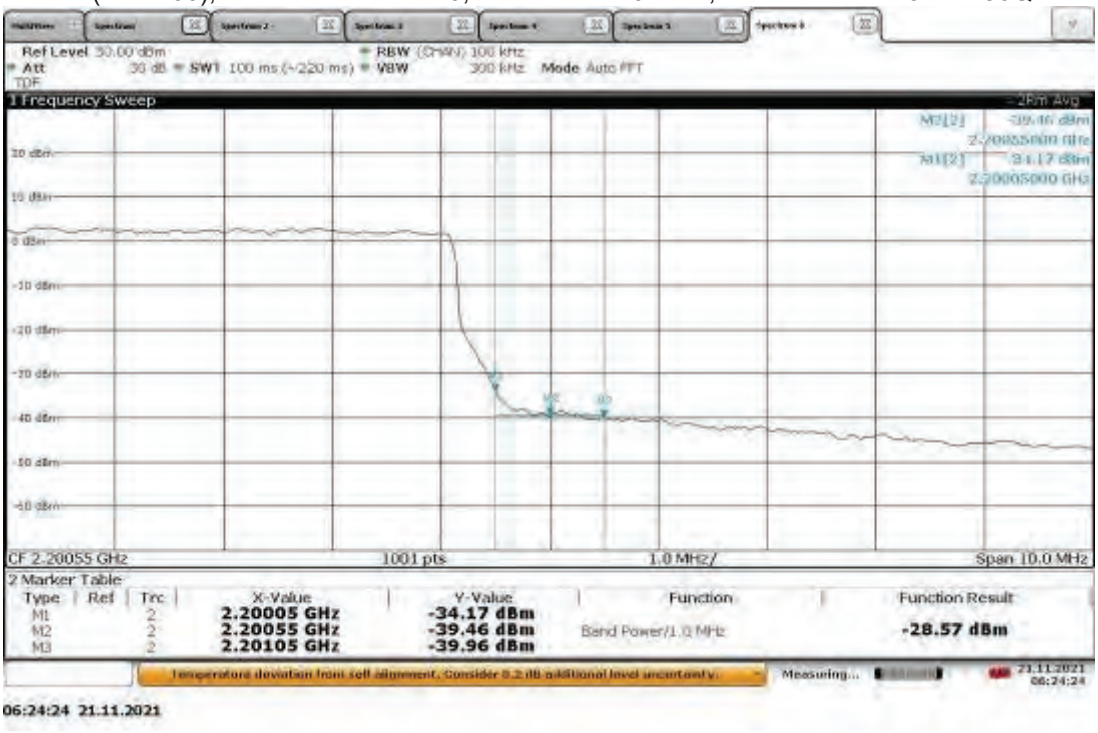
Band Edge Compliant, Lower Band Edge, 2115 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



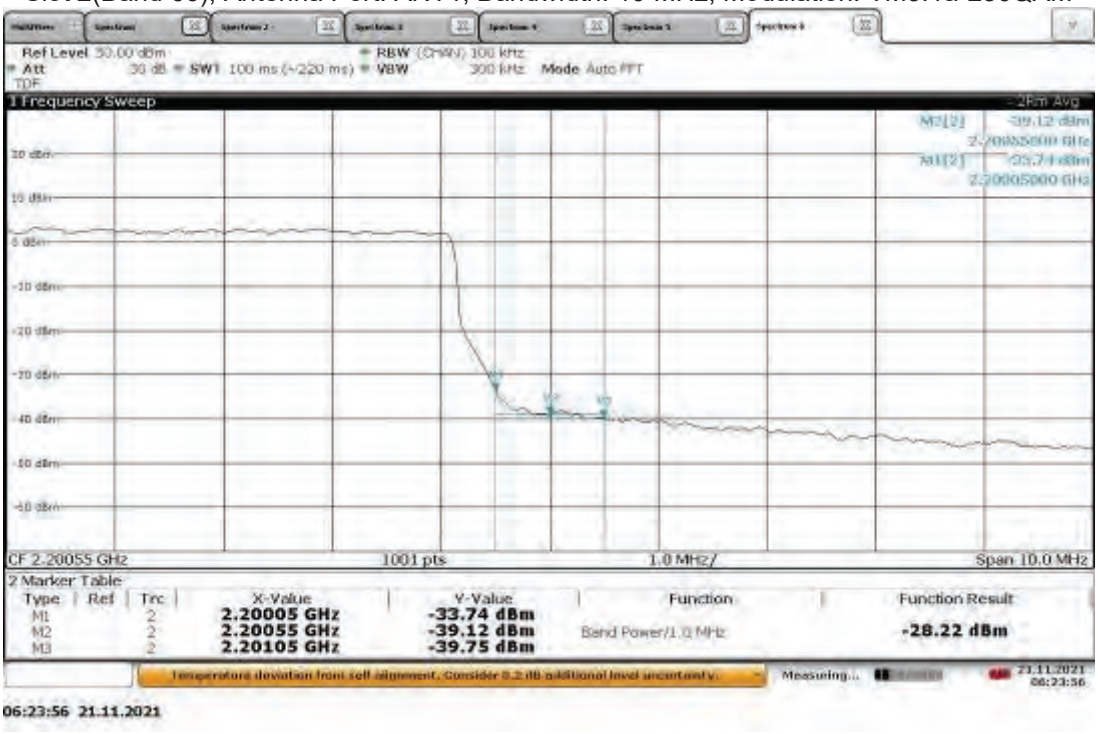
Band Edge Compliant, Lower Band Edge, 2115MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



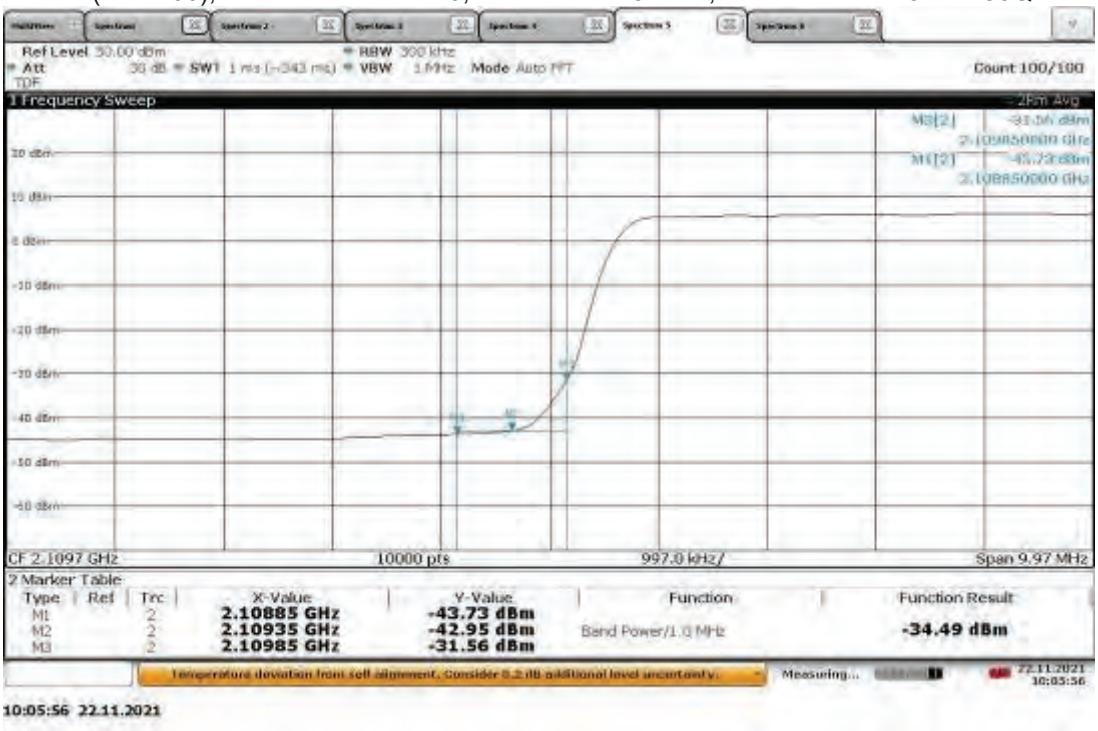
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



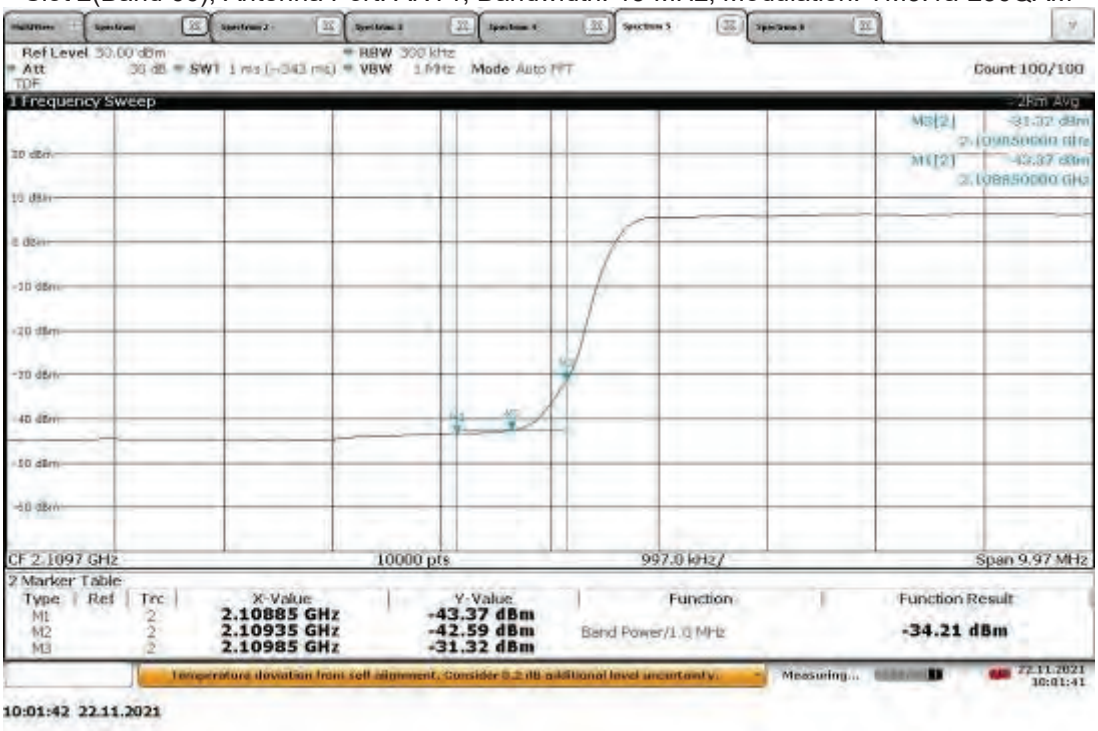
Band Edge Compliant, Upper Band Edge, 2195 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



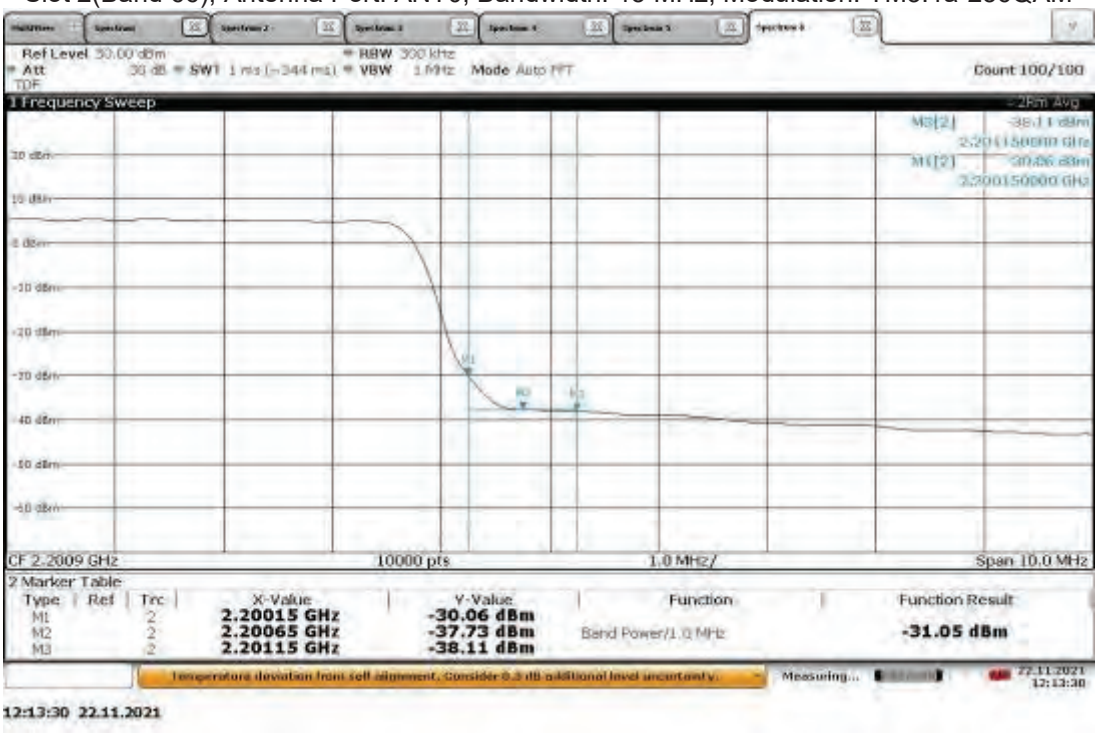
Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



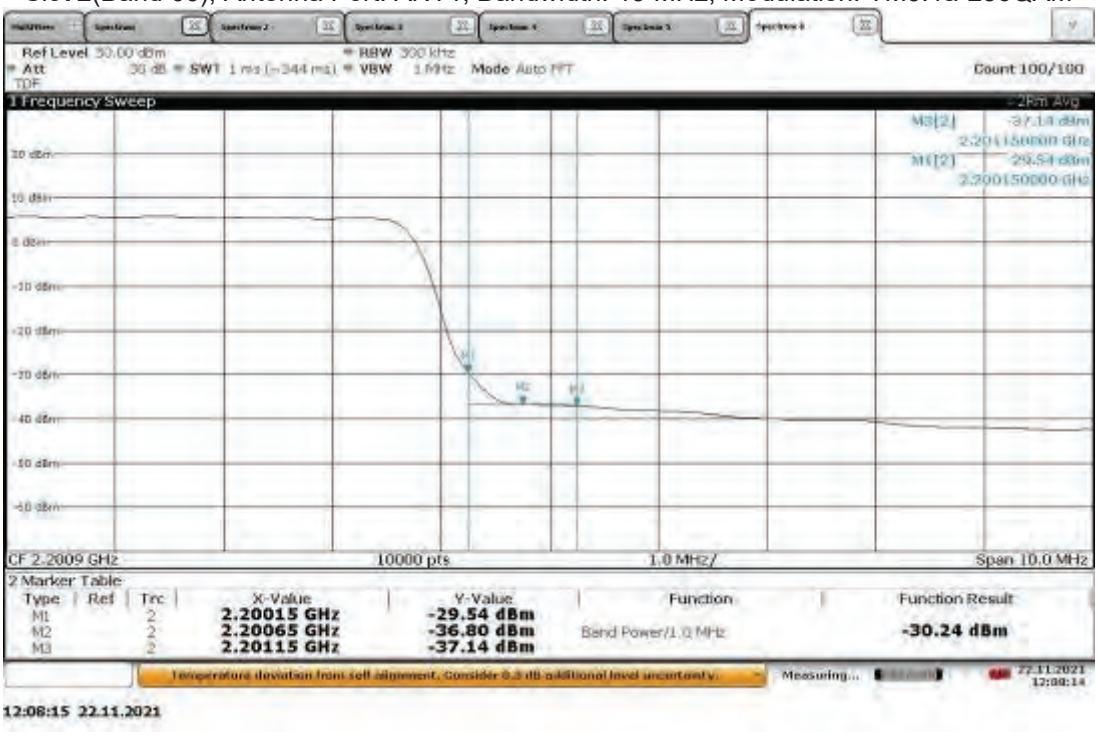
Band Edge Compliant, Lower Band Edge, 2117.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



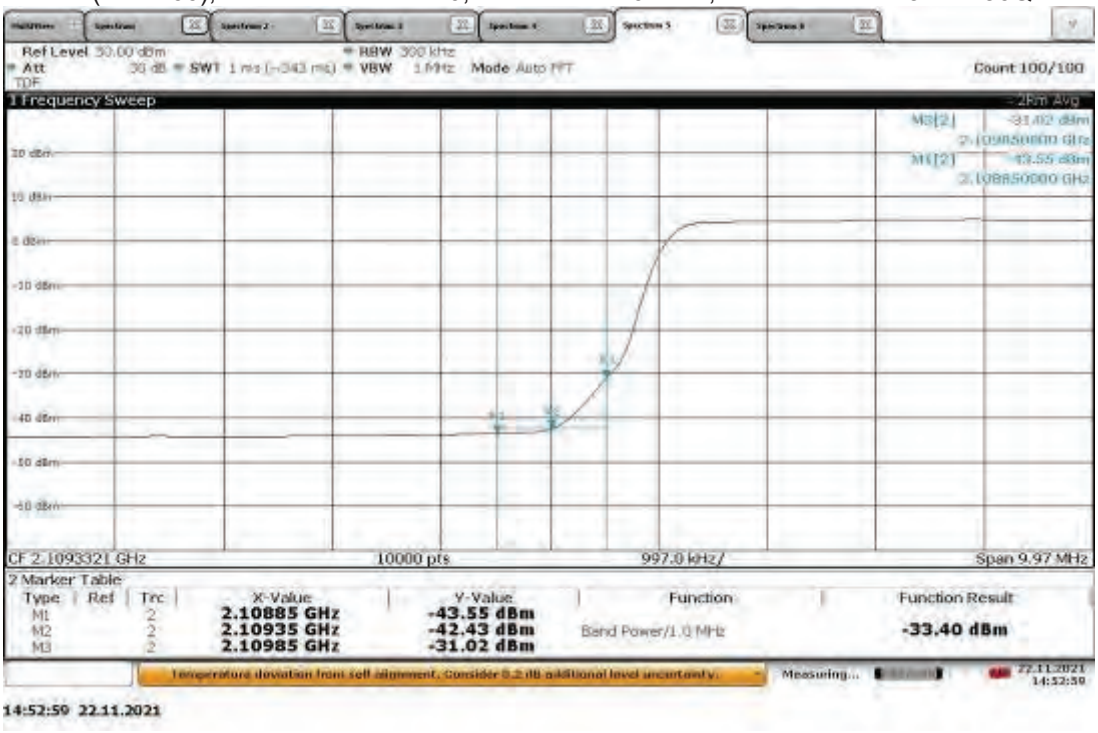
Band Edge Compliant, Upper Band Edge, 2192.5 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



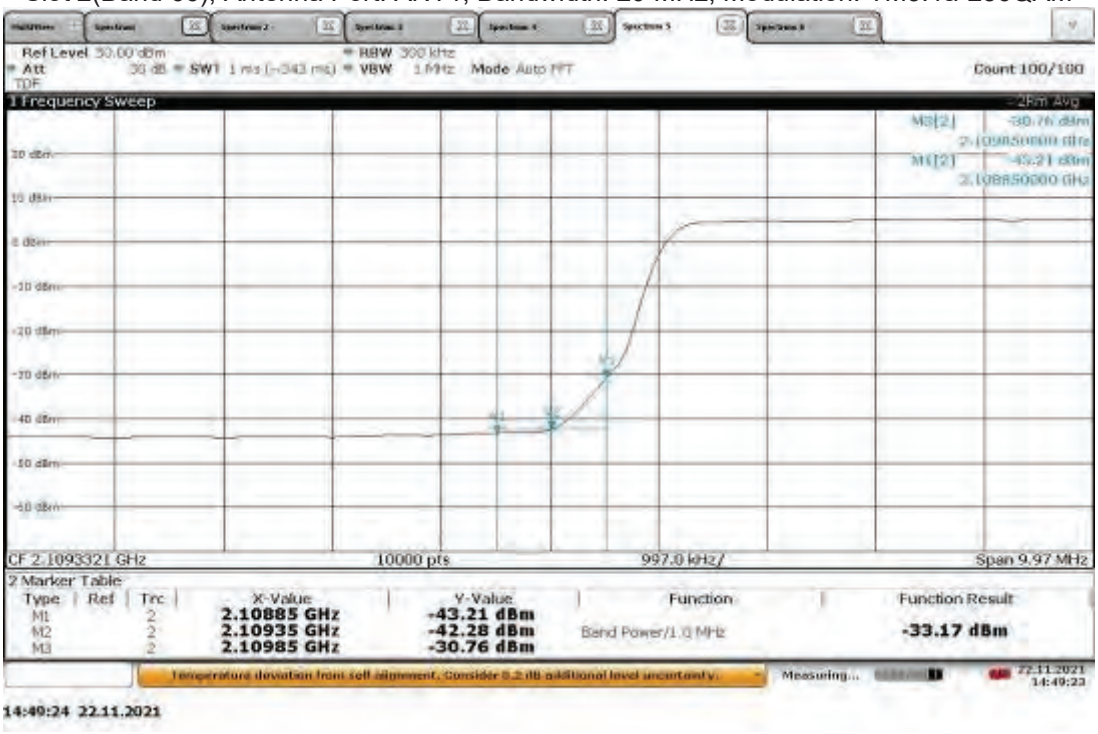
Band Edge Compliant, Upper Band Edge, 2192.5 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



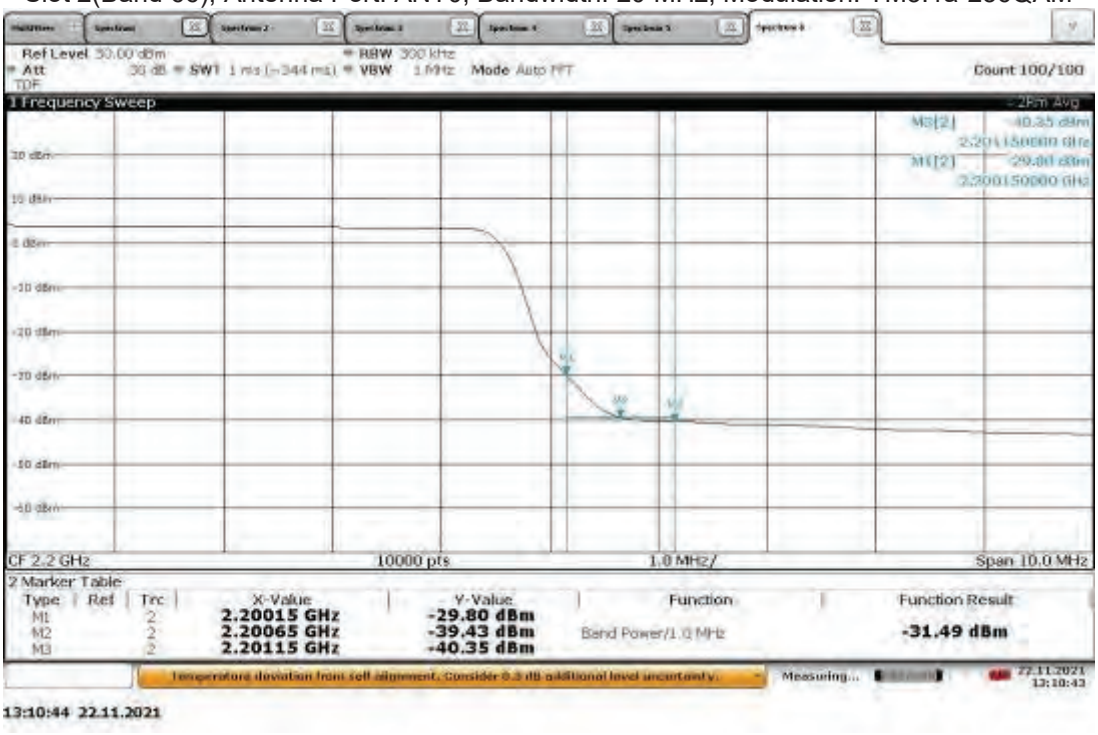
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



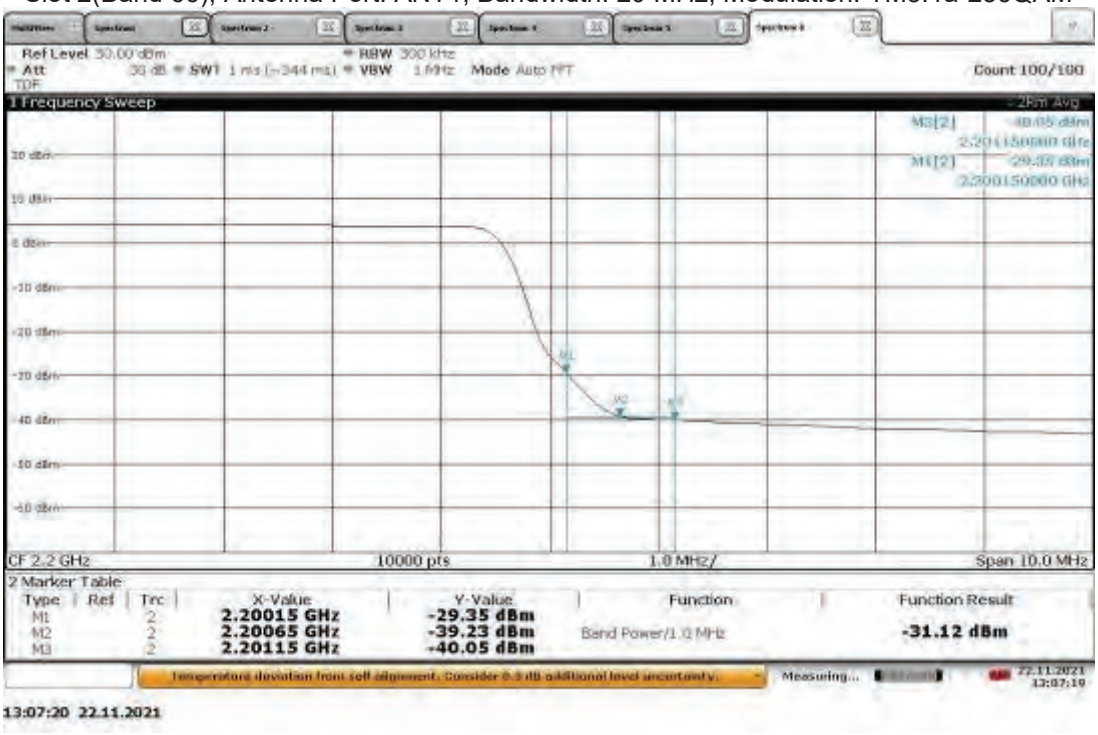
Band Edge Compliant, Lower Band Edge, 2120 MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Upper Band Edge, 2120 MHz
Slot 2(Band 66), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Upper Band Edge, 2120MHz
Slot 2(Band 66), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



Test Personnel:	Vathana F. Ven VFV	Test Date:	11/18/2021, 11/21/2021
	Kouma Sinn KPS		11/22/2021
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:	23, 23,22 ºC
		Relative Humidity:	42, 42, 23 %
		Atmospheric Pressure:	1001, 1018,1000 mbars

10 Frequency Stability Due to Temperature and Voltage Variations

10.1 Method

Tests are performed in accordance with ANSI C63.26 and CFR47 FCC Parts 2.1055 and 27.

TEST SITE: EMC Lab & 10m ALSE

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

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
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	--	--

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, 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	2.11024848	-1.23E-06	-5.8287E-07	-0.01	2.5
-20	2.11024958	-2.33E-06	-1.10414E-06	-0.01	2.5
-10	2.11025015	-2.9E-06	-1.37425E-06	-0.01	2.5
0	2.11024782	5.7E-07	2.70111E-07	0.00	2.5
10	2.11024791	6.6E-07	3.1276E-07	0.00	2.5
20	2.11024725	0	0	0.00	--
30	2.11024815	9E-07	4.2649E-07	0.00	2.5
40	2.1102466	-6.5E-07	-3.08021E-07	0.00	2.5
50	2.11024729	4E-08	1.89551E-08	0.00	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.114472397	0.000249603	0.000118031	1.18	2.5
-20	2.11472503	-3.03E-06	-1.43281E-06	-0.01	2.5
-10	2.11472271	-7.1E-07	-3.35742E-07	0.00	2.5
0	2.11472325	1.25E-06	5.91094E-07	0.01	2.5
10	2.11472316	1.16E-06	5.48535E-07	0.01	2.5
20	2.114722	0	0	0.00	--
30	2.11472361	1.61E-06	7.61329E-07	0.01	2.5
40	2.11472396	1.96E-06	9.26836E-07	0.01	2.5
50	2.11472395	1.95E-06	9.22107E-07	0.01	2.5

Band 66, Modulation: QPSK, Bandwidth: 5MHz, Antenna Port: ANT0, 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	2.19524153	4.6E-07	2.09544E-07	0.00	2.5
-20	2.19524296	-9.7E-07	-4.41865E-07	0.00	2.5
-10	2.19524141	5.8E-07	2.64208E-07	0.00	2.5
0	2.19524139	-6E-07	-2.73318E-07	0.00	2.5
10	2.19524193	-6E-08	-2.73318E-08	0.00	2.5
20	2.19524199	0	0	0.00	--
30	2.19524242	4.3E-07	1.95878E-07	0.00	2.5
40	2.19524138	-6.1E-07	-2.77874E-07	0.00	2.5
50	2.19524182	-1.7E-07	-7.74402E-08	0.00	2.5

Upper Edge of Occupied Bandwidth

Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.19971823	-6.1E-07	-2.77308E-07	0.00	2.5
-20	2.19971795	-3.3E-07	-1.50019E-07	0.00	2.5
-10	2.19971839	-7.7E-07	-3.50045E-07	0.00	2.5
0	2.19971859	9.7E-07	4.40966E-07	0.00	2.5
10	2.19971952	1.9E-06	8.63747E-07	0.01	2.5
20	2.19971762	0	0	0.00	--
30	2.19971706	-5.6E-07	-2.54578E-07	0.00	2.5
40	2.19971869	1.07E-06	4.86426E-07	0.00	2.5
50	2.19971981	2.19E-06	9.95582E-07	0.01	2.5

Frequency stability over temperature

Band 66, Modulation: TM1.1 QPSK, Bandwidth: 20MHz, Antenna Port: ANT1 , 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	2.11053677	-1.383E-05	-6.55288E-06	-0.07	2.5
-20	2.11053716	-1.422E-05	-6.73767E-06	-0.07	2.5
-10	2.11053171	-8.77E-06	-4.15537E-06	-0.04	2.5
0	2.11053038	7.44E-06	3.52519E-06	0.04	2.5
10	2.11052507	2.13E-06	1.00923E-06	0.01	2.5
20	2.11052294	0	0	0.00	--
30	2.11052435	1.41E-06	6.68081E-07	0.01	2.5
40	2.11054412	2.118E-05	1.00354E-05	0.10	2.5
50	2.11052338	4.4E-07	2.08479E-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	2.12941669	2.02E-06	9.48616E-07	0.01	2.5
-20	2.12941798	7.3E-07	3.42817E-07	0.00	2.5
-10	2.12941904	-3.3E-07	-1.54972E-07	0.00	2.5
0	2.12941955	8.4E-07	3.94474E-07	0.00	2.5
10	2.12941875	4E-08	1.87845E-08	0.00	2.5
20	2.12941871	0	0	0.00	--
30	2.12941864	-7E-08	-3.28728E-08	0.00	2.5
40	2.12941575	-2.96E-06	-1.39005E-06	-0.01	2.5
50	2.12941624	-2.47E-06	-1.15994E-06	-0.01	2.5

Frequency stability over temperature

Band 66, Modulation: TM1.1 QPSK, Bandwidth: 20MHz, Antenna Port: ANT0 , Channel: High 2190 MHz

Low Edge of Occupied Bandwidth

Temperature	Low Edge	Low Edge Deviation	Low Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.18050542	1.067E-05	4.89334E-06	0.05	2.5
-20	2.18050569	1.04E-05	4.76951E-06	0.05	2.5
-10	2.18050531	1.078E-05	4.94378E-06	0.05	2.5
0	2.180507	-9.09E-06	-4.16874E-06	-0.04	2.5
10	2.18050957	-6.52E-06	-2.99012E-06	-0.03	2.5
20	2.18051609	0	0	0.00	--
30	2.180516989	8.99E-07	4.12288E-07	0.00	2.5
40	2.18051479	-1.3E-06	-5.96189E-07	-0.01	2.5
50	2.18051322	-2.87E-06	-1.3162E-06	-0.01	2.5

Upper Edge of Occupied Bandwidth

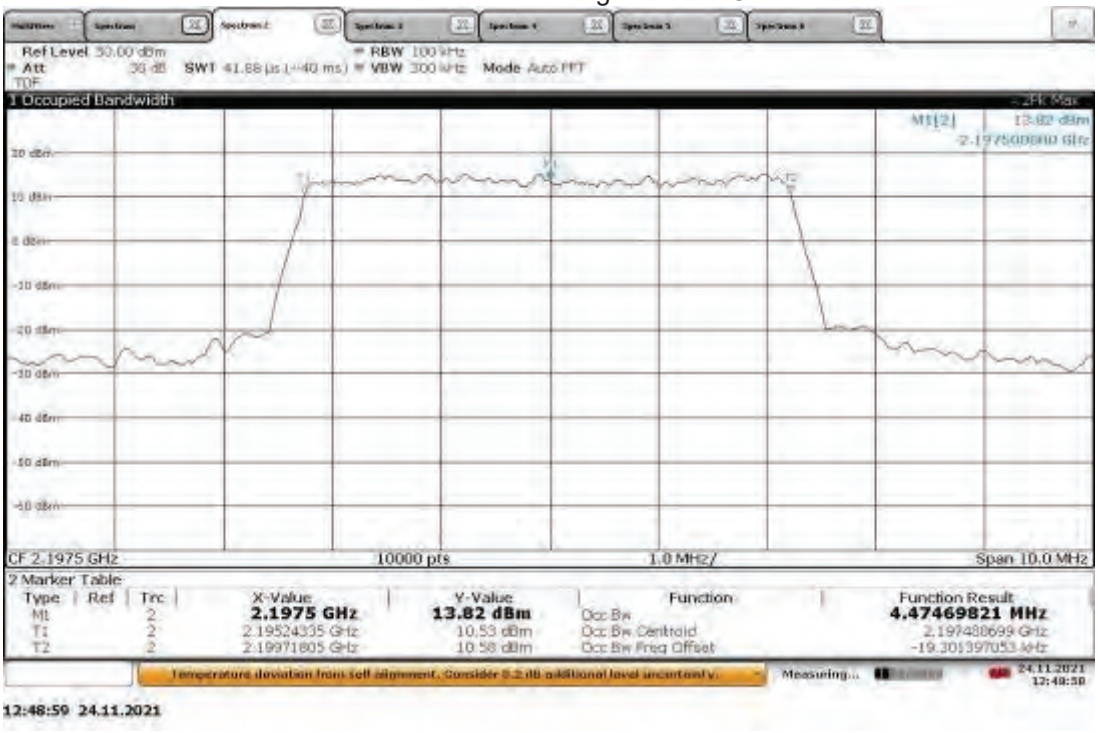
Temperature	Upper Edge	Upper Edge Deviation	Upper Edge (%)	PPM	Limit
(Deg. C)	(GHz)	(GHz)	--	--	PPM
-30	2.19939068	-6.25E-06	-2.8417E-06	-0.03	2.5
-20	2.19938945	-5.02E-06	-2.28246E-06	-0.02	2.5
-10	2.1993038	8.063E-05	3.66603E-05	0.37	2.5
0	2.1993911	6.67E-06	3.03267E-06	0.03	2.5
10	2.19938985	5.42E-06	2.46433E-06	0.02	2.5
20	2.19938443	0	0	0.00	--
30	2.19938819	3.76E-06	1.70957E-06	0.02	2.5
40	2.19938783	3.4E-06	1.54589E-06	0.02	2.5
50	2.19938392	-5.1E-07	-2.31883E-07	0.00	2.5

10.4 Setup Photographs:

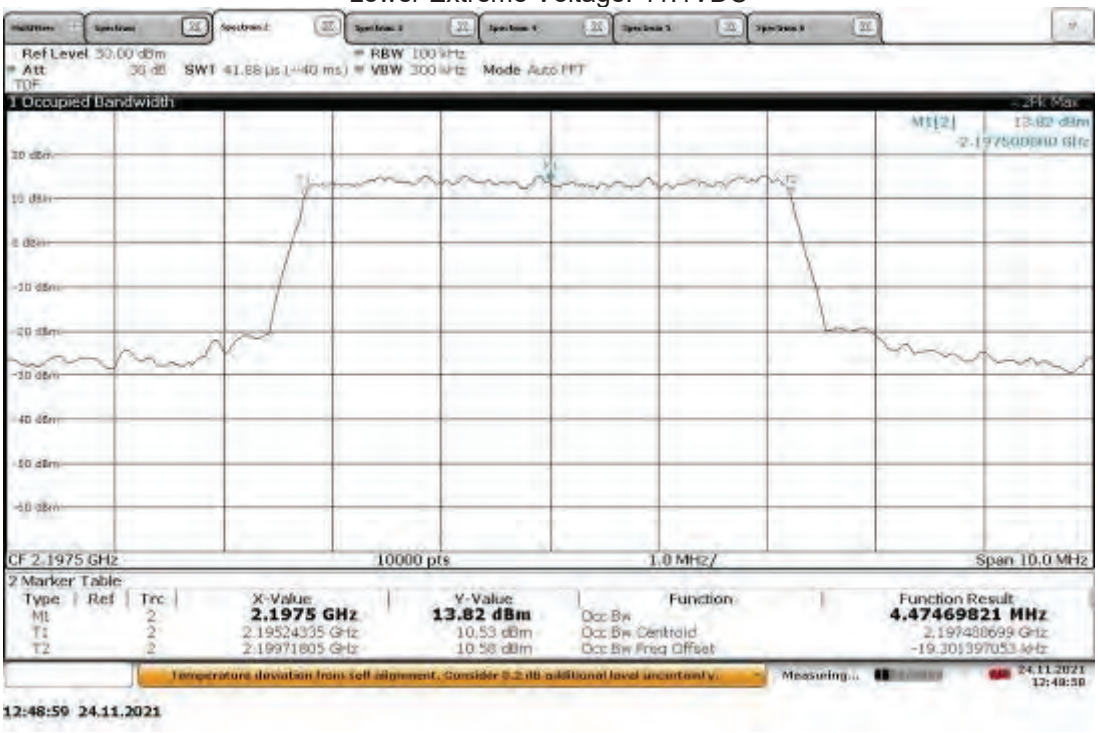
Confidential – Test setup photo not included in this report

10.5 Plots/Data:

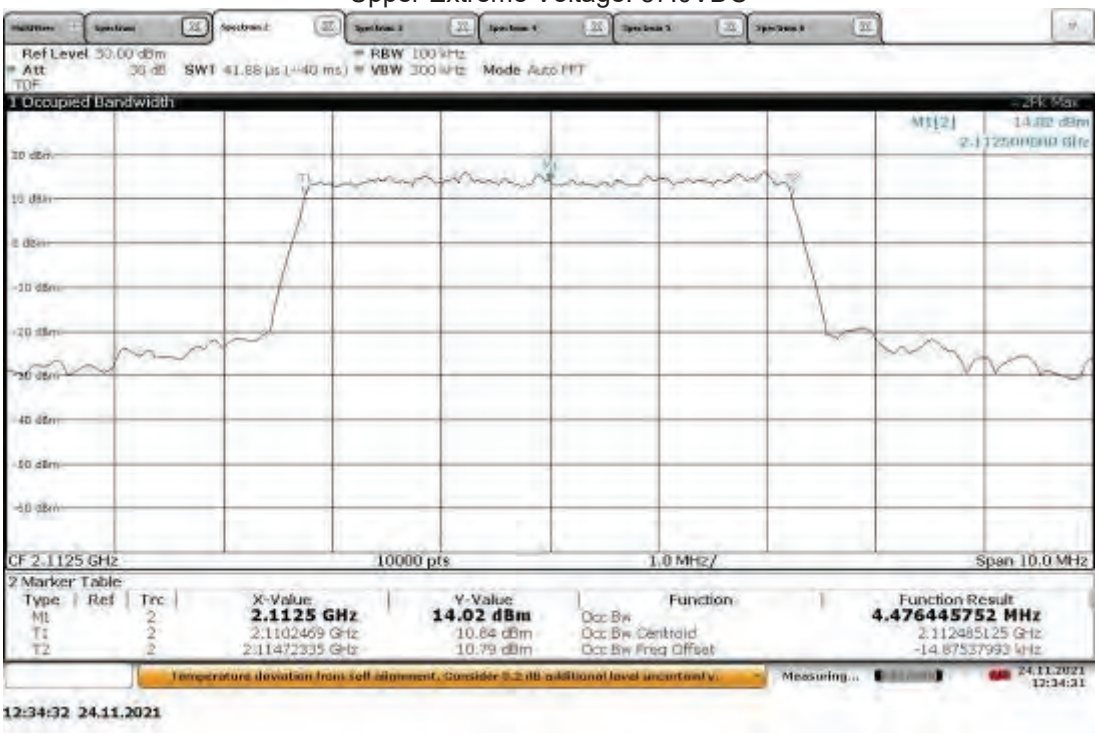
Slot 2(Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz, Low Channel, Lower Extreme Voltage: 41.1VDC



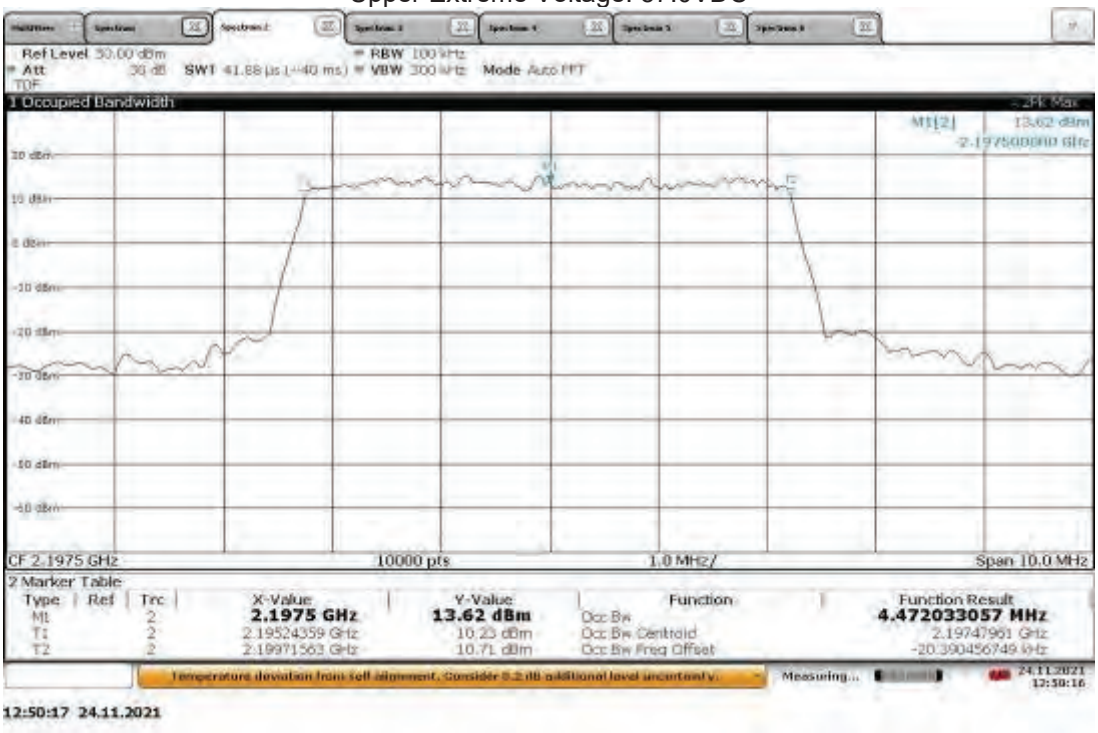
Slot 2(Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz, High Channel, Lower Extreme Voltage: 41.1VDC



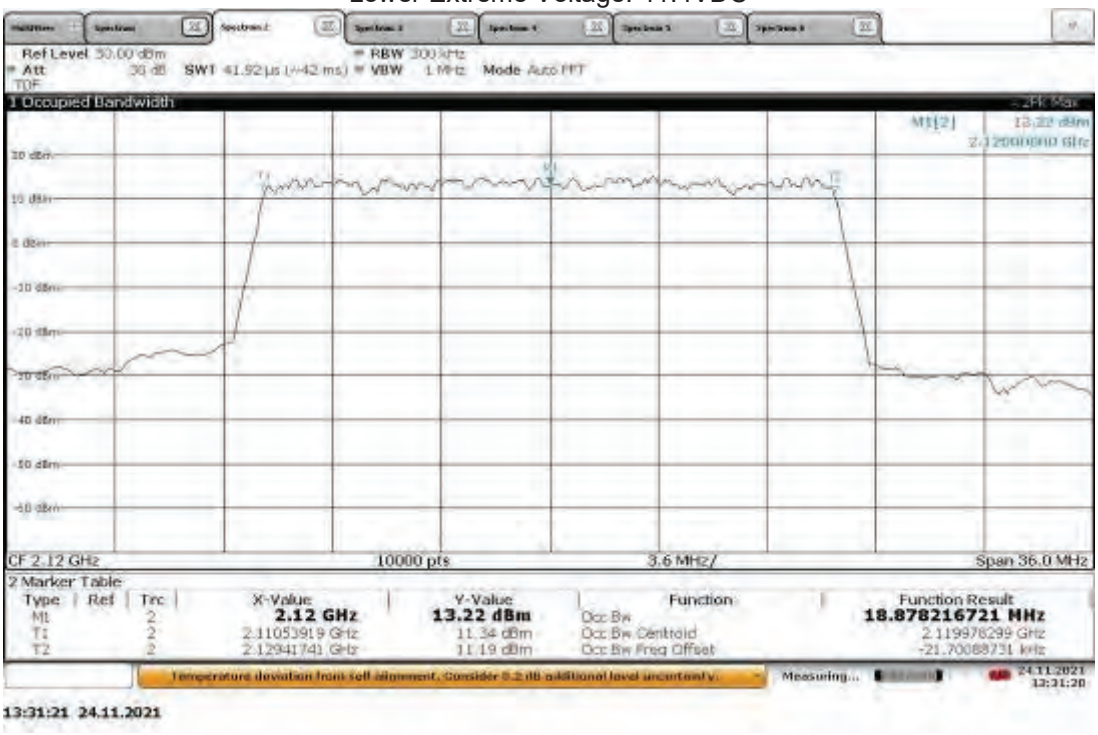
Slot 2(Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz, Low Channel,
Upper Extreme Voltage: 57.0VDC



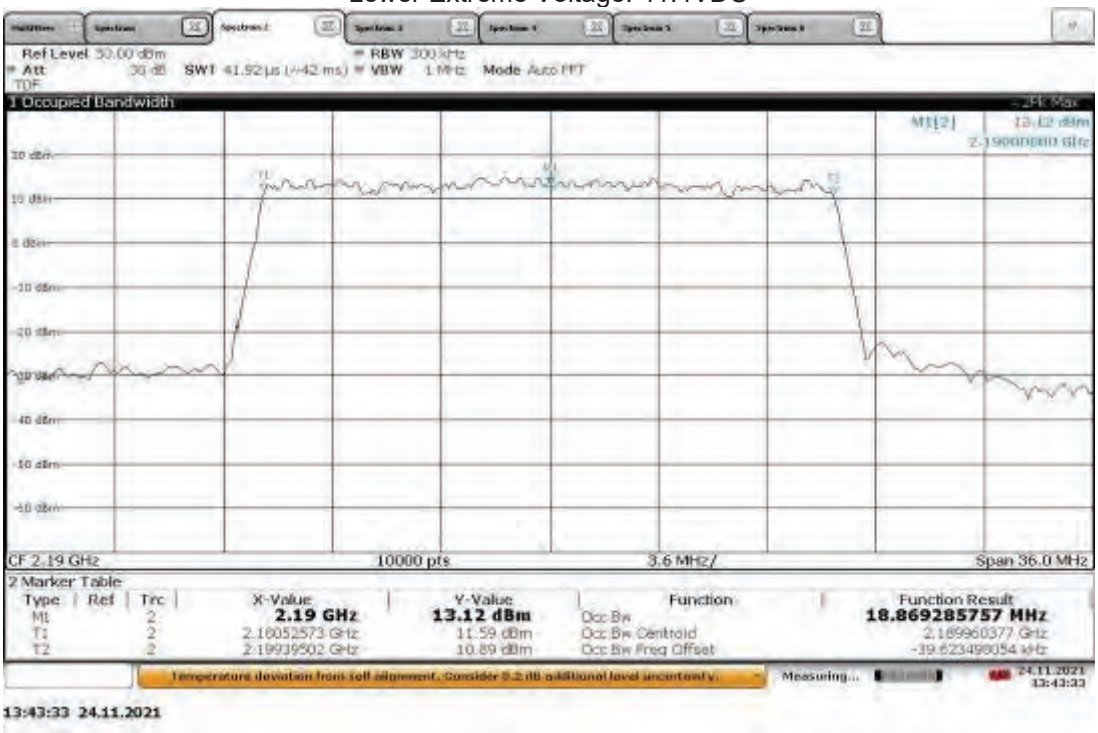
Slot 2(Band 66), ANT0, Modulation: QPSK, Bandwidth: 5 MHz, High Channel,
Upper Extreme Voltage: 57.0VDC



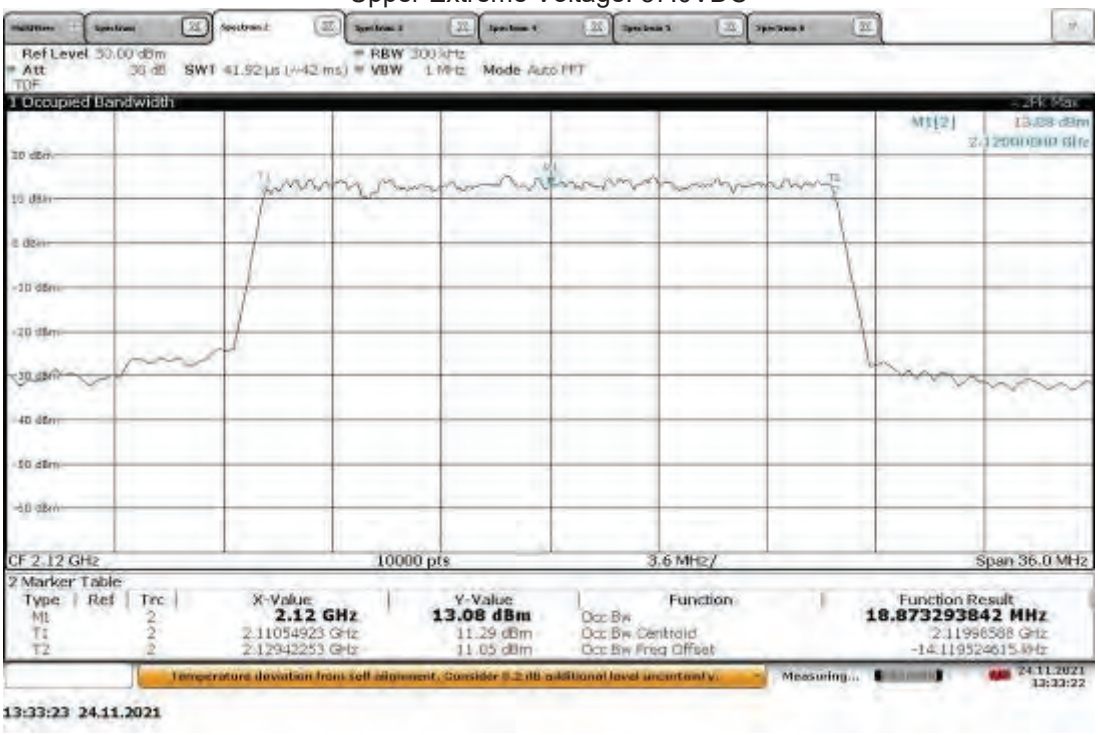
Slot 2(Band 66), ANT0, Modulation: QPSK, Bandwidth: 20 MHz, Low Channel, Lower Extreme Voltage: 41.4VDC



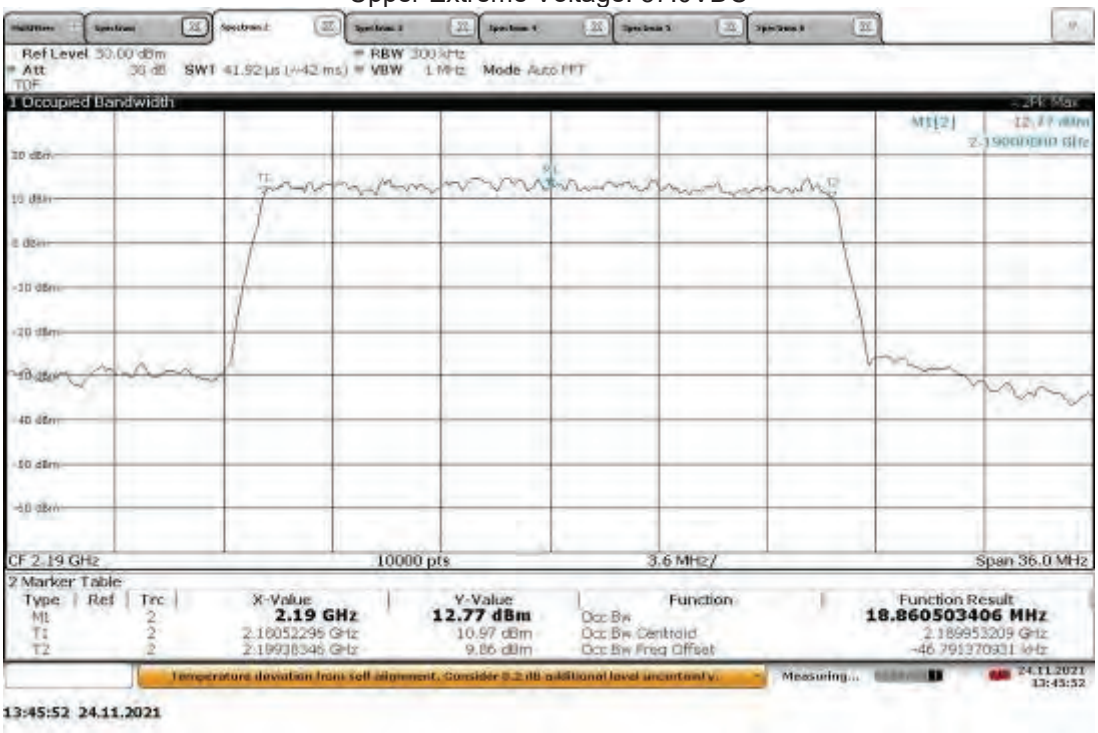
Slot 2(Band 66), ANT0, Modulation: QPSK, Bandwidth: 20 MHz, High Channel, Lower Extreme Voltage: 41.4VDC



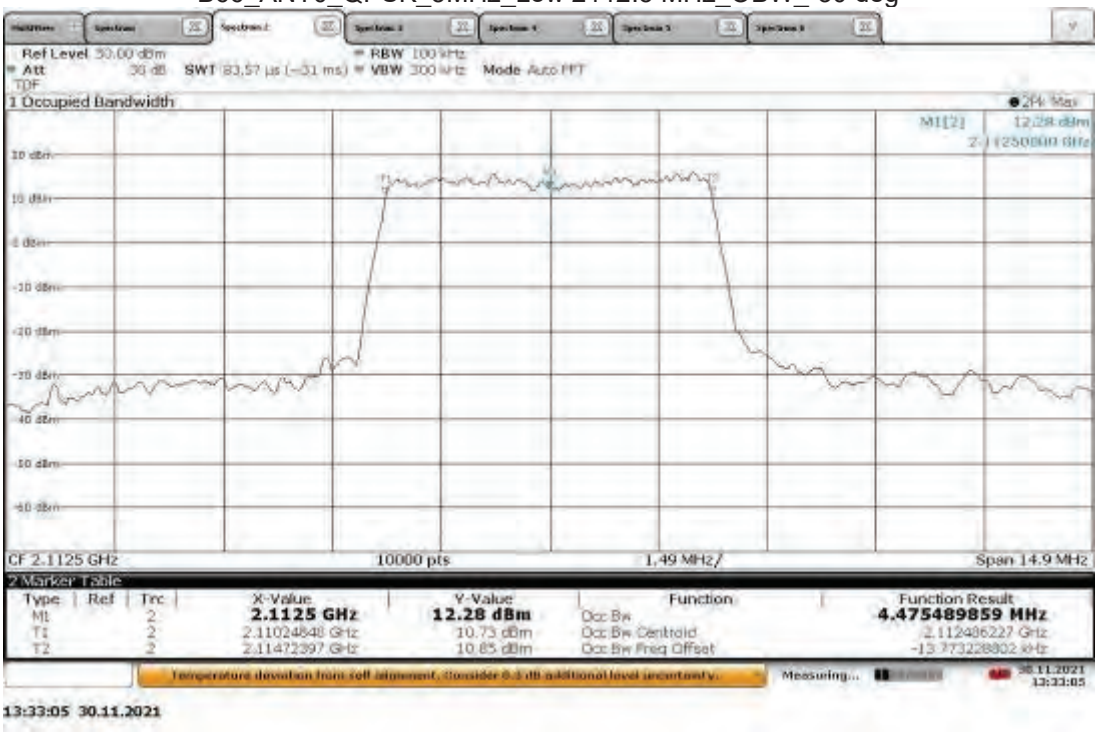
Slot 2(Band 66), ANT0, Modulation: QPSK, Bandwidth: 20 MHz, Low Channel, Upper Extreme Voltage: 57.0VDC



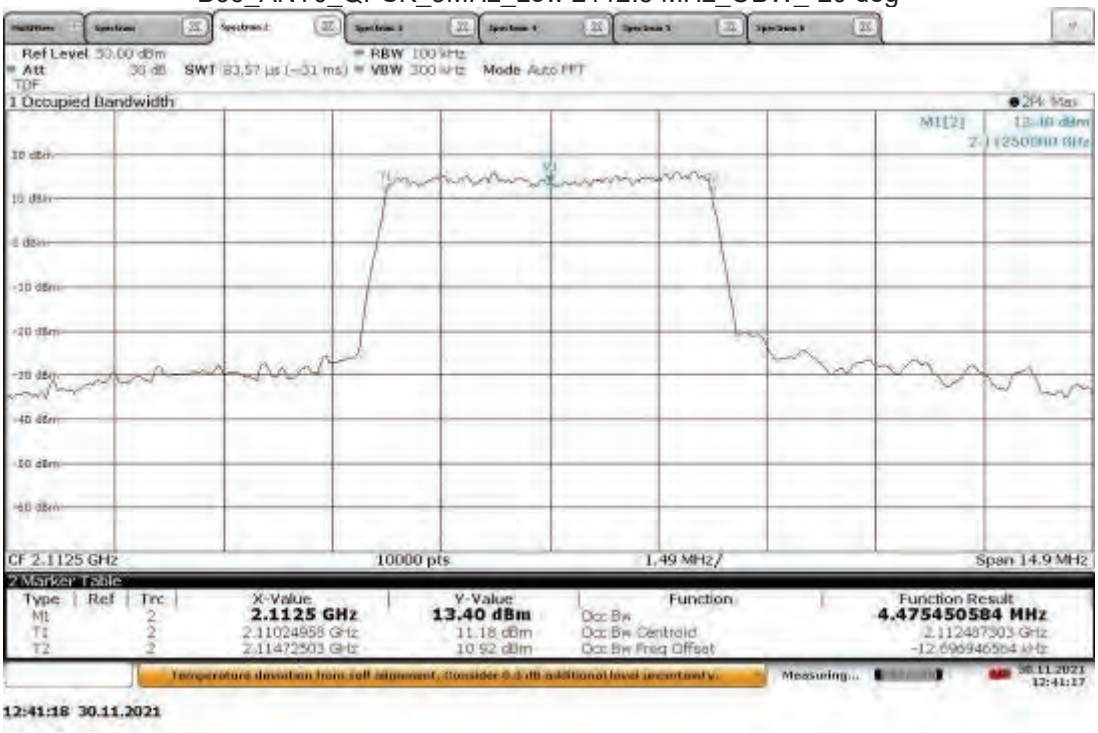
Slot 2(Band 66), ANT0, Modulation: QPSK, Bandwidth: 20 MHz, High Channel, Upper Extreme Voltage: 57.0VDC



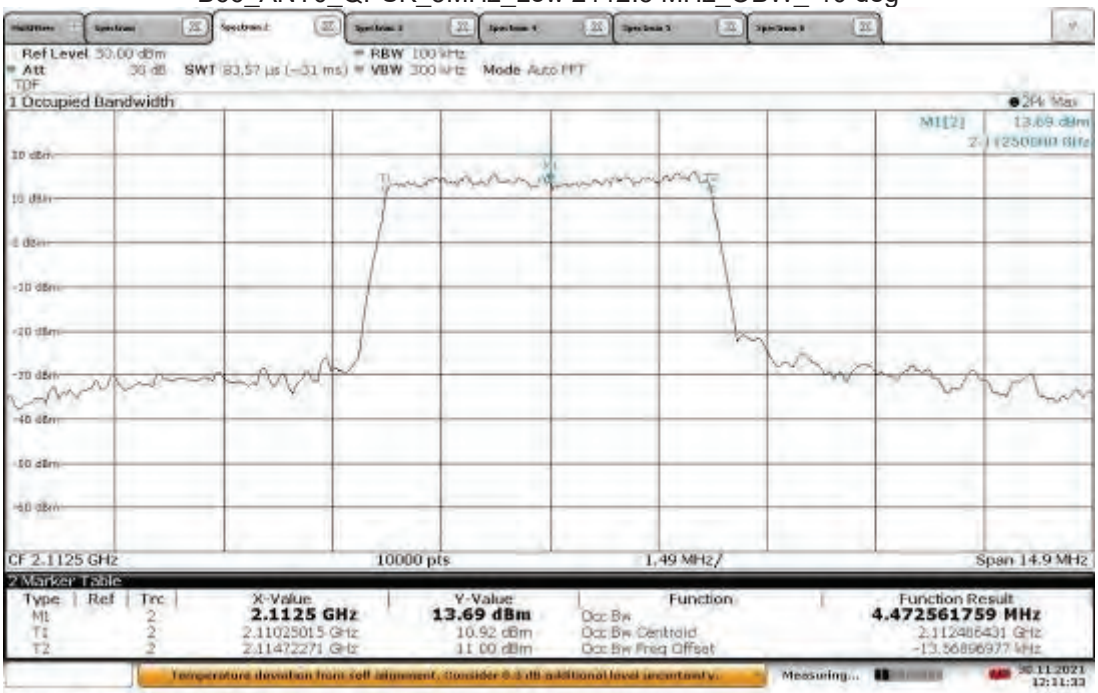
B66_ANT0_QPSK_5MHz_Low 2112.5 MHz_OBW_-30 deg



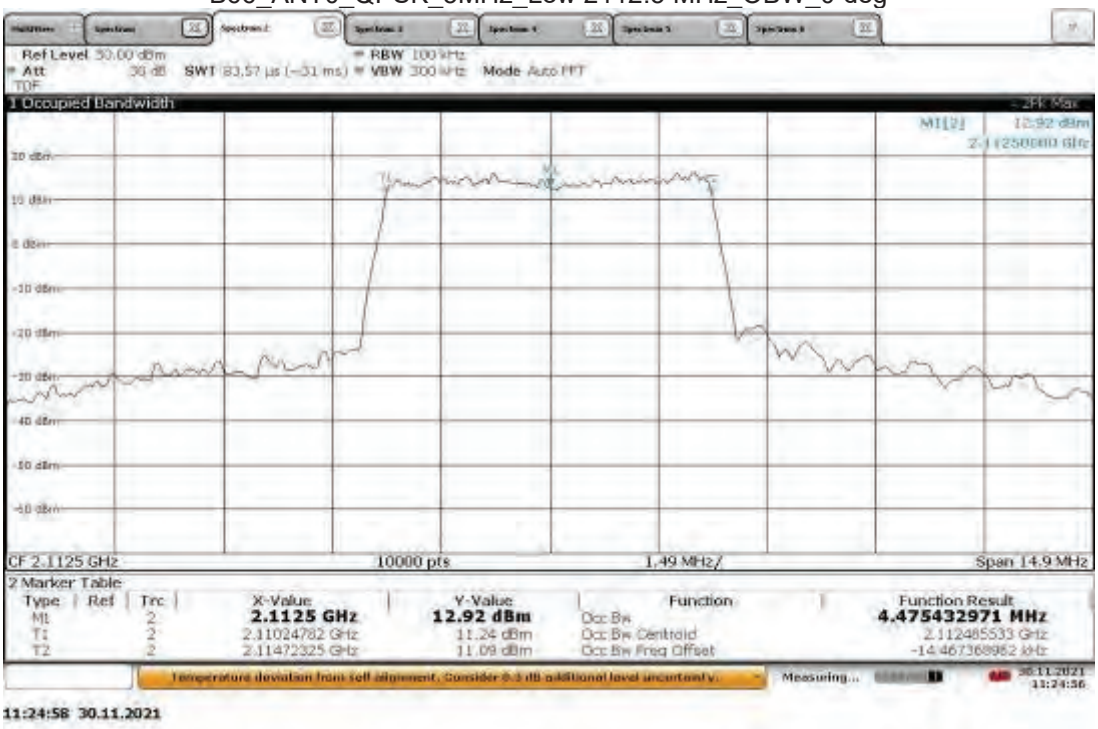
B66_ANT0_QPSK_5MHz_Low 2112.5 MHz_OBW_-20 deg



B66_ANT0_QPSK_5MHz_Low 2112.5 MHz_OBW_-10 deg



B66_ANT0_QPSK_5MHz_Low 2112.5 MHz_OBW_0 deg



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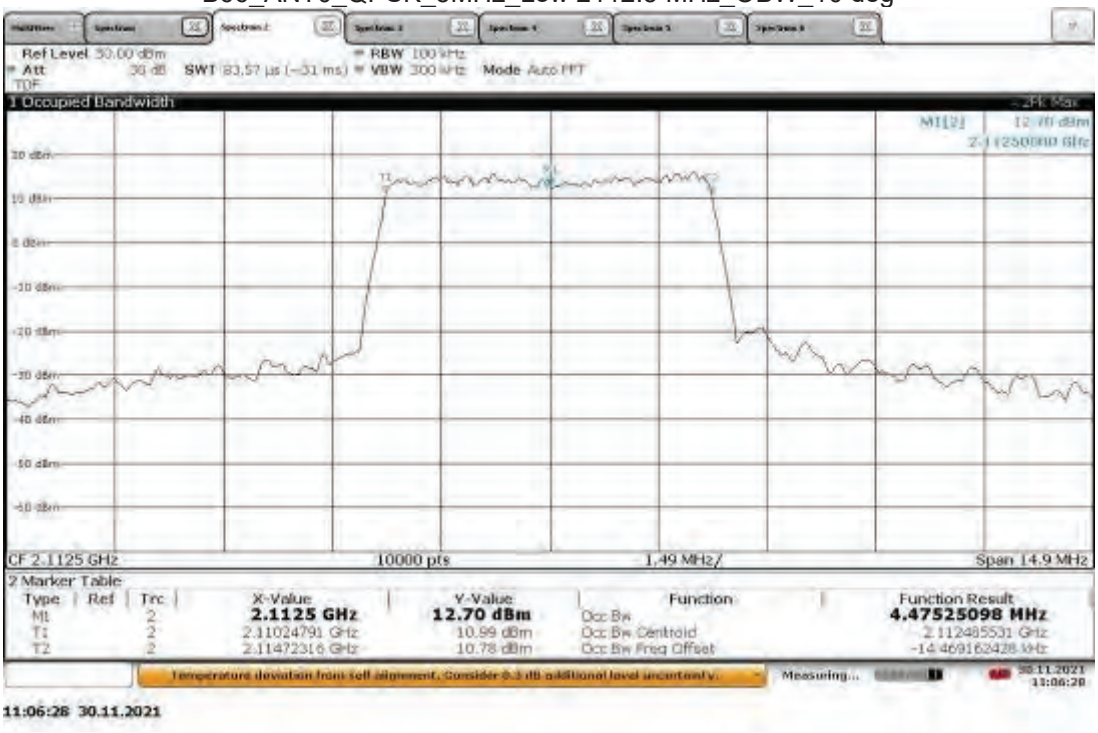
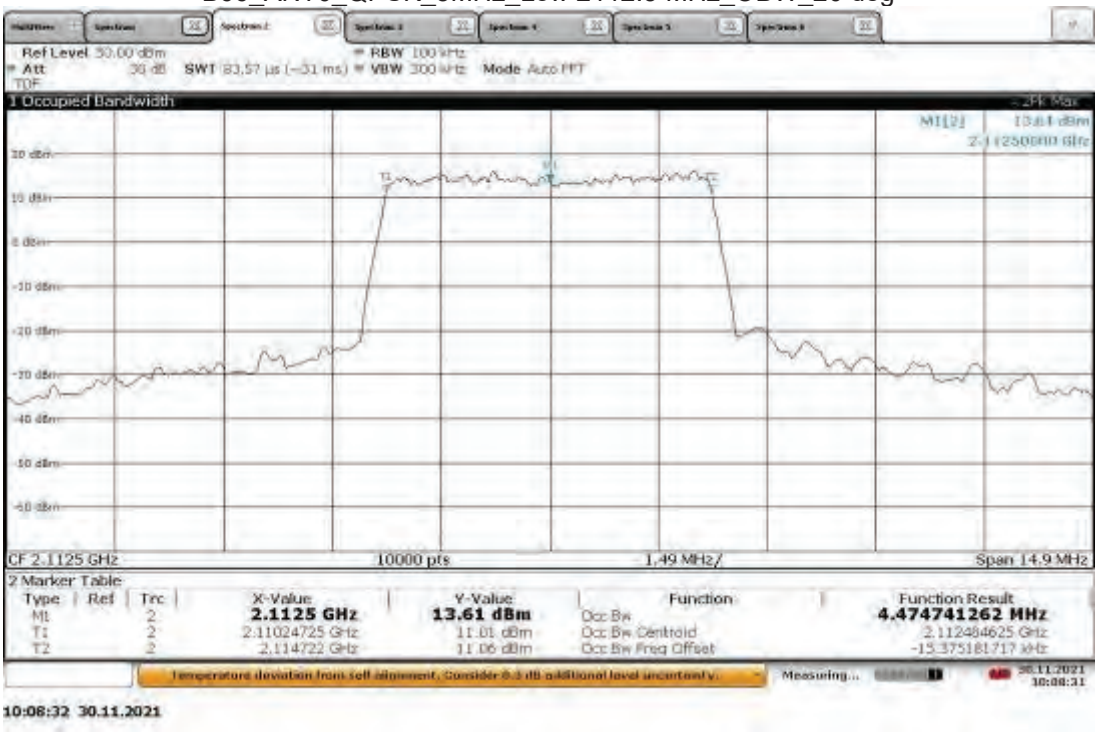
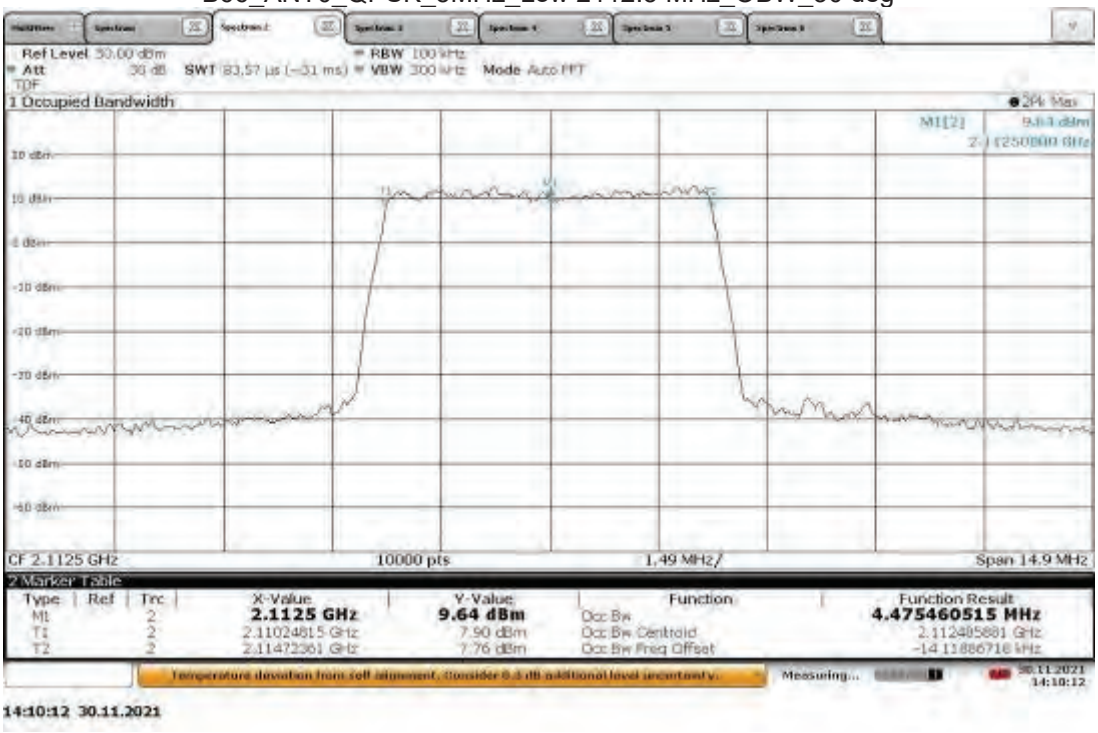


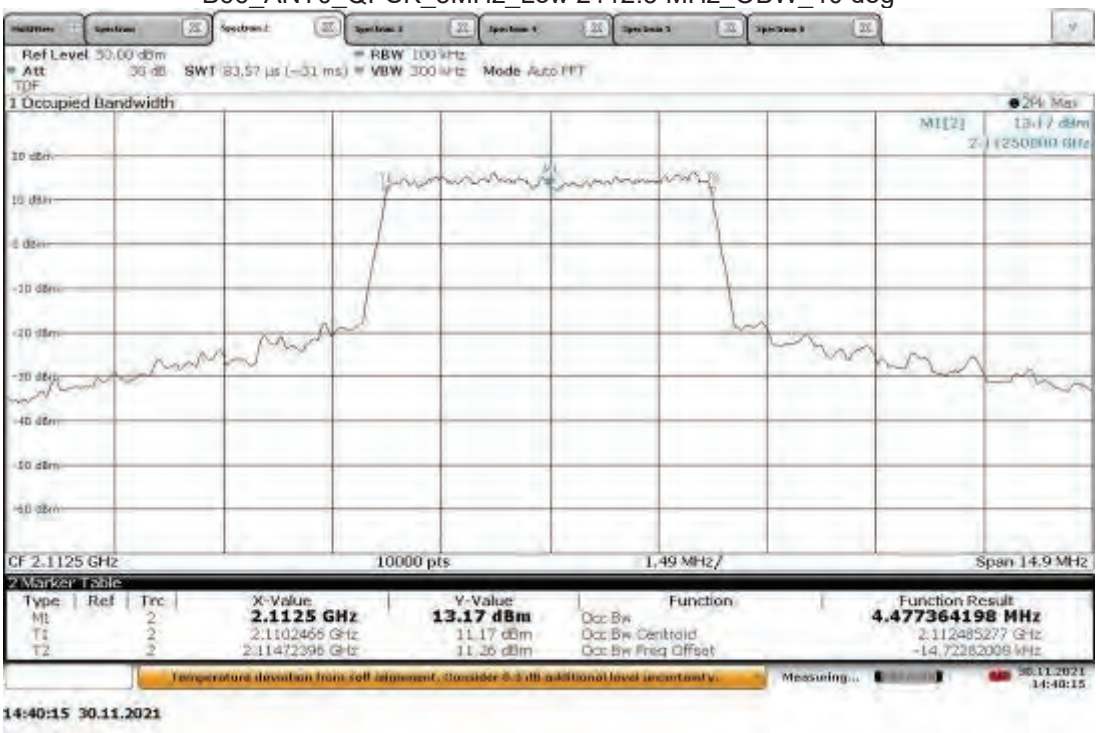
B66_ANT0_QPSK_5MHz_Low 2112.5 MHz_OBW_20 deg



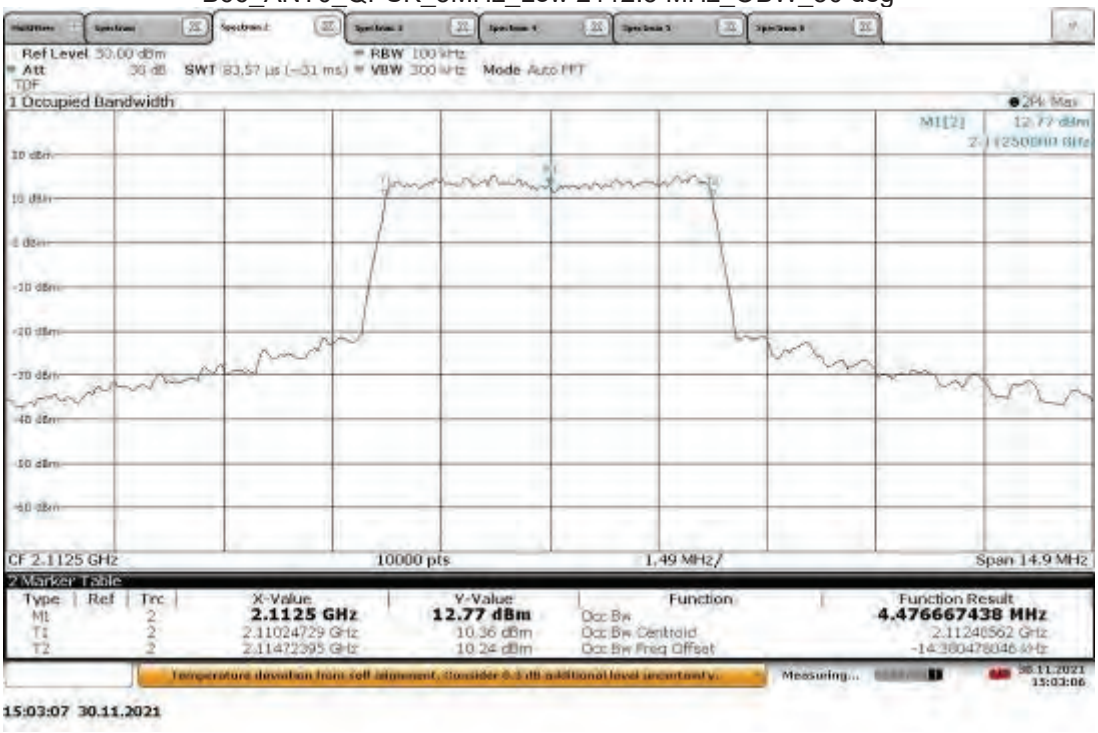
B66_ANT0_QPSK_5MHz_Low 2112.5 MHz_OBW_30 deg



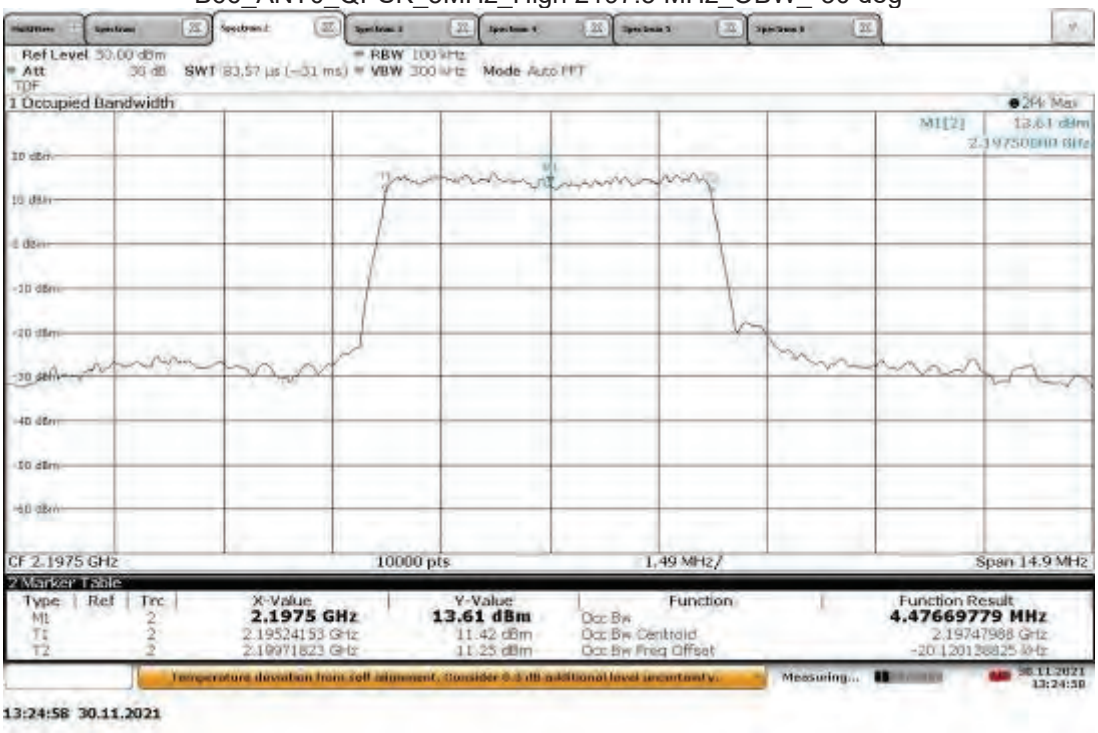
B66_ANT0_QPSK_5MHz_Low 2112.5 MHz_OBW_40 deg



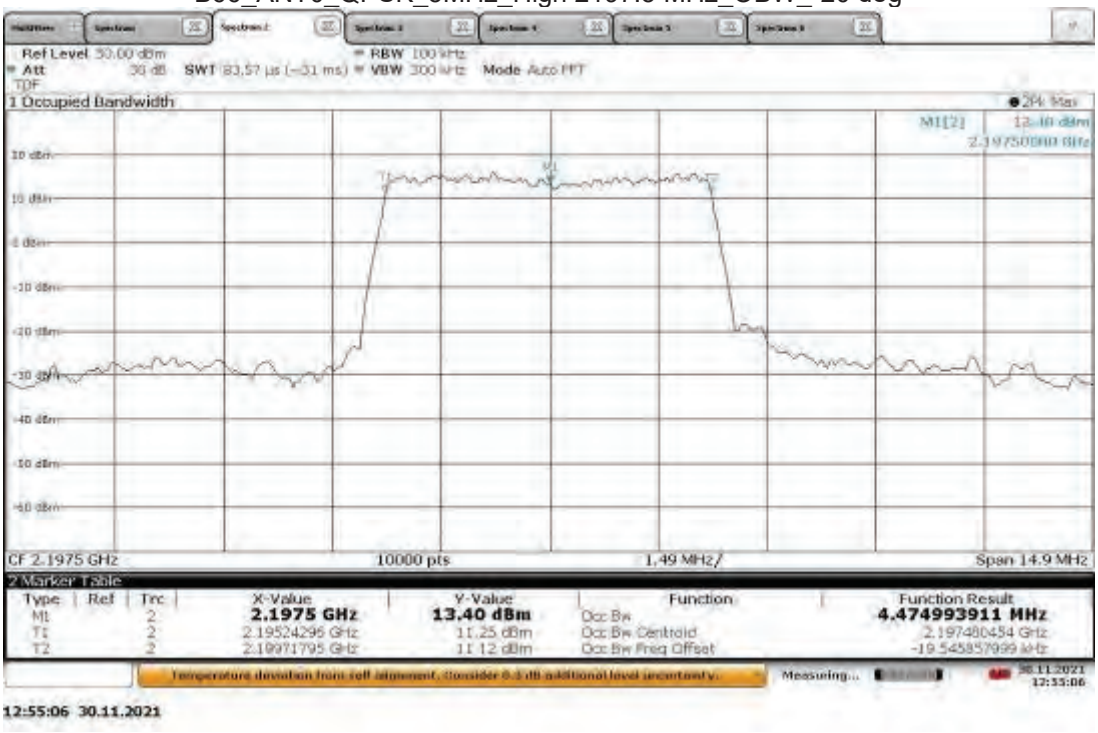
B66_ANT0_QPSK_5MHz_Low 2112.5 MHz_OBW_50 deg



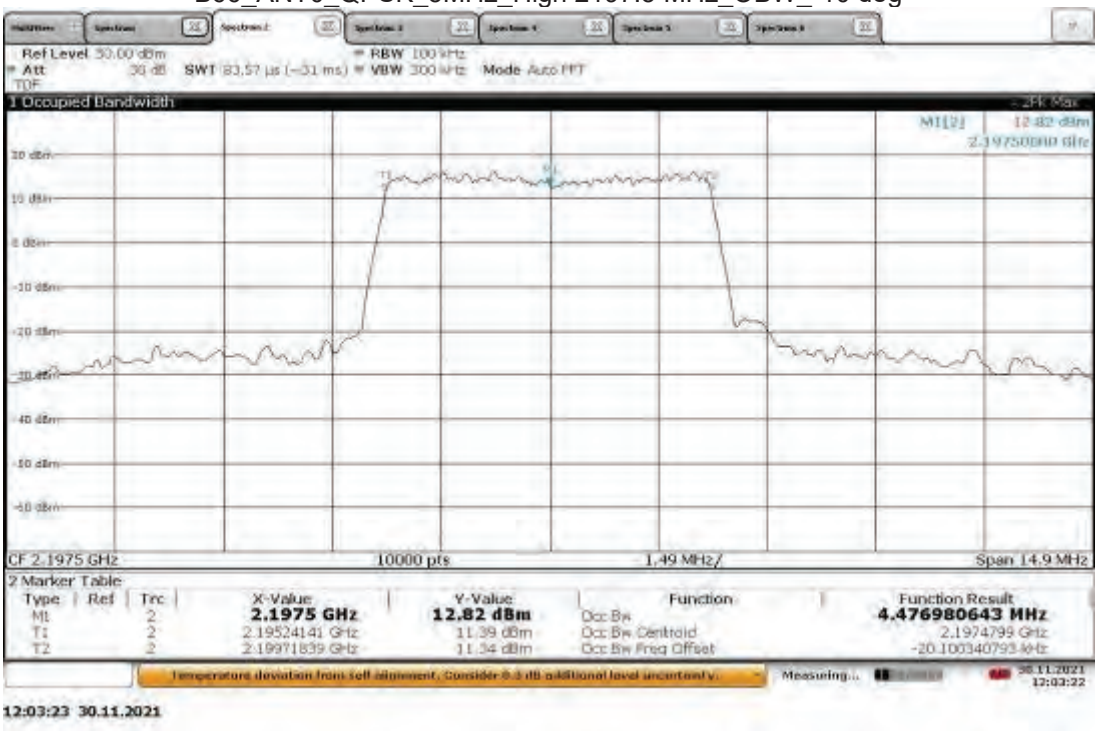
B66_ANT0_QPSK_5MHz_High 2197.5 MHz_OBW_-30 deg



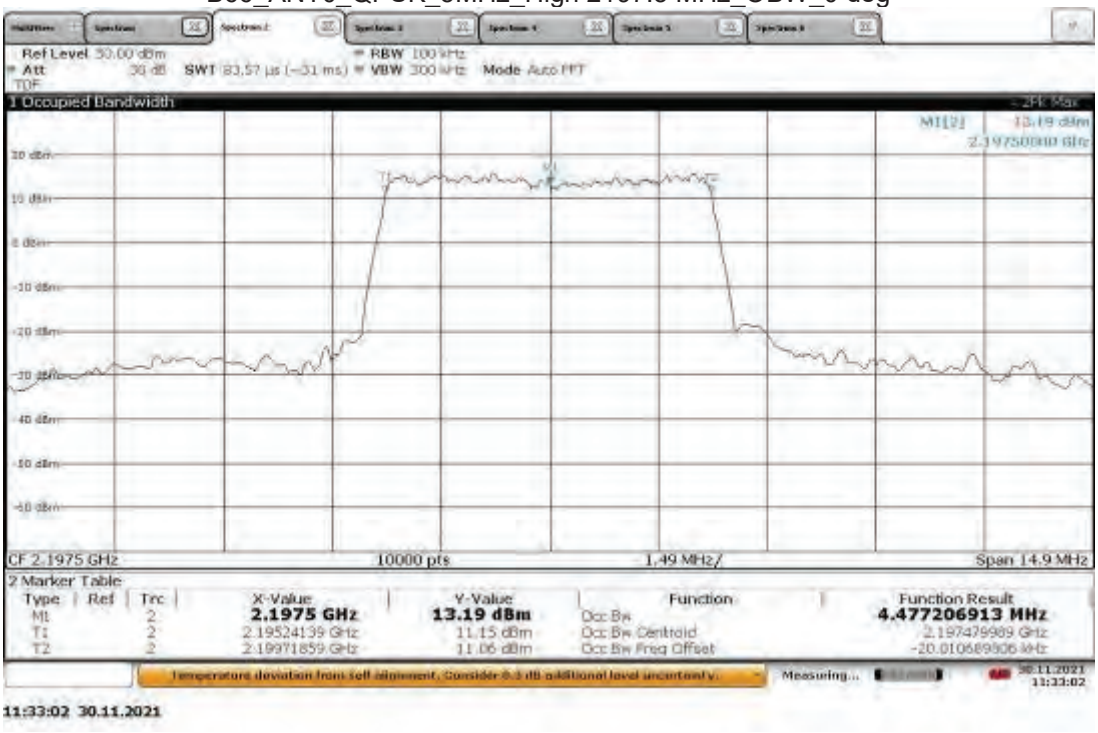
B66_ANT0_QPSK_5MHz_High 2197.5 MHz_OBW_-20 deg



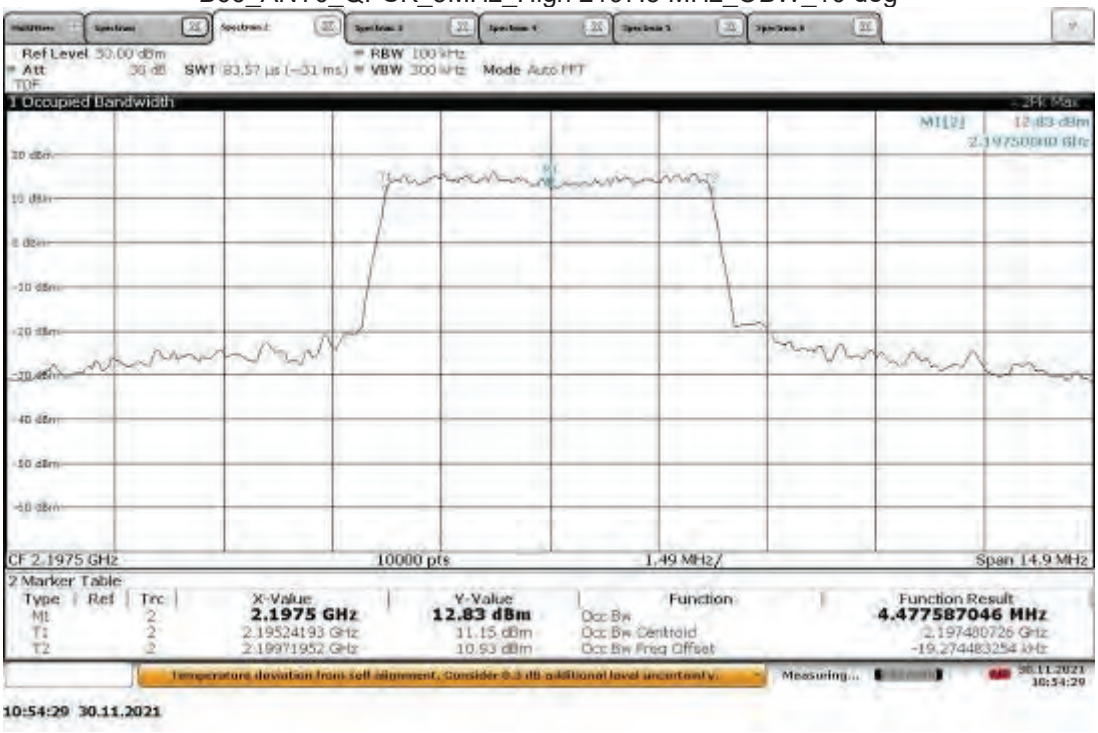
B66_ANT0_QPSK_5MHz_High 2197.5 MHz_OBW_-10 deg



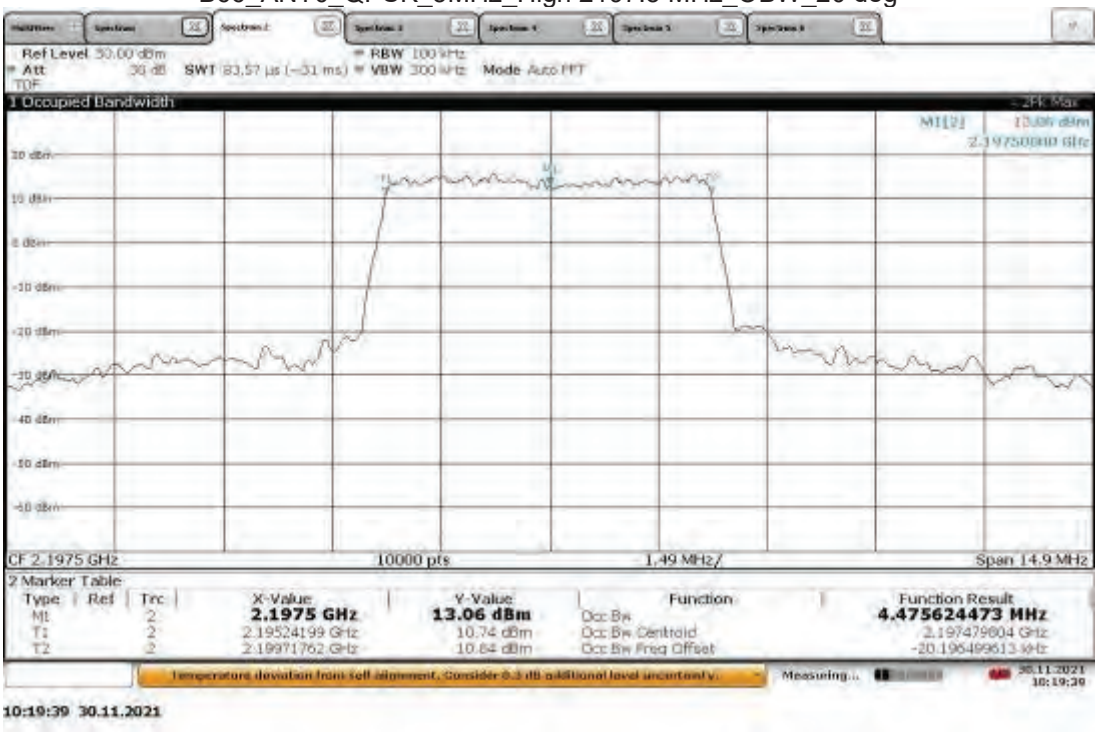
B66_ANT0_QPSK_5MHz_High 2197.5 MHz_OBW_0 deg



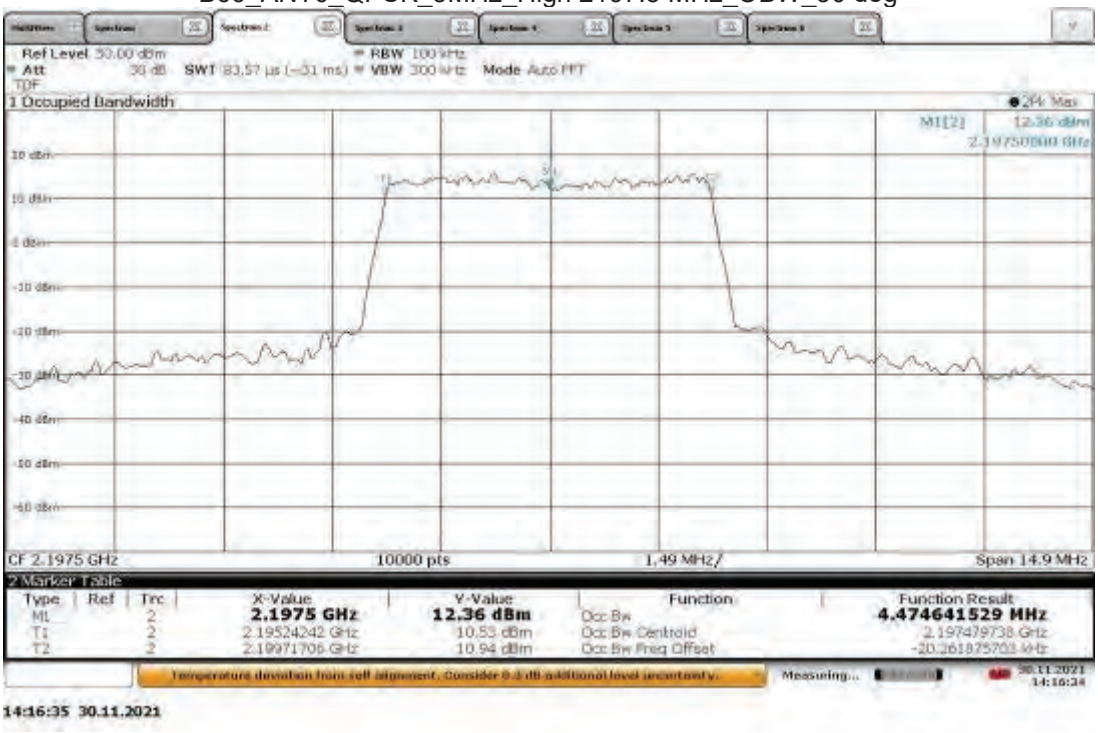
B66_ANT0_QPSK_5MHz_High 2197.5 MHz_OBW_10 deg



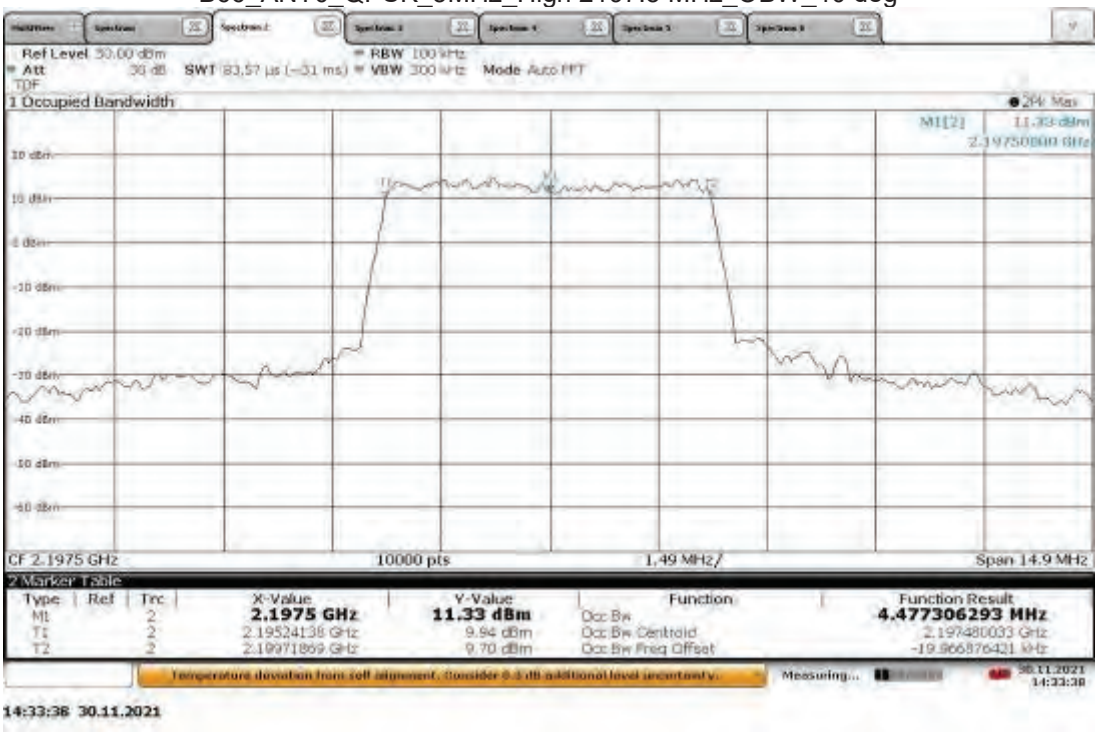
B66_ANT0_QPSK_5MHz_High 2197.5 MHz_OBW_20 deg



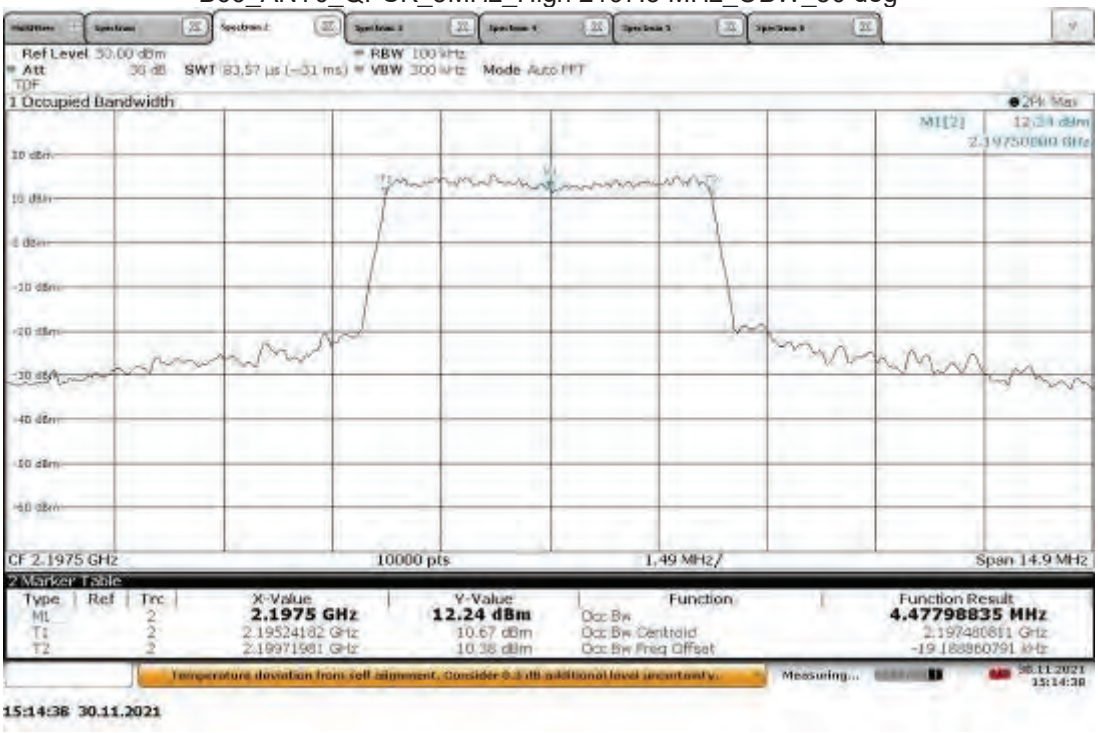
B66_ANT0_QPSK_5MHz_High 2197.5 MHz_OBW_30 deg



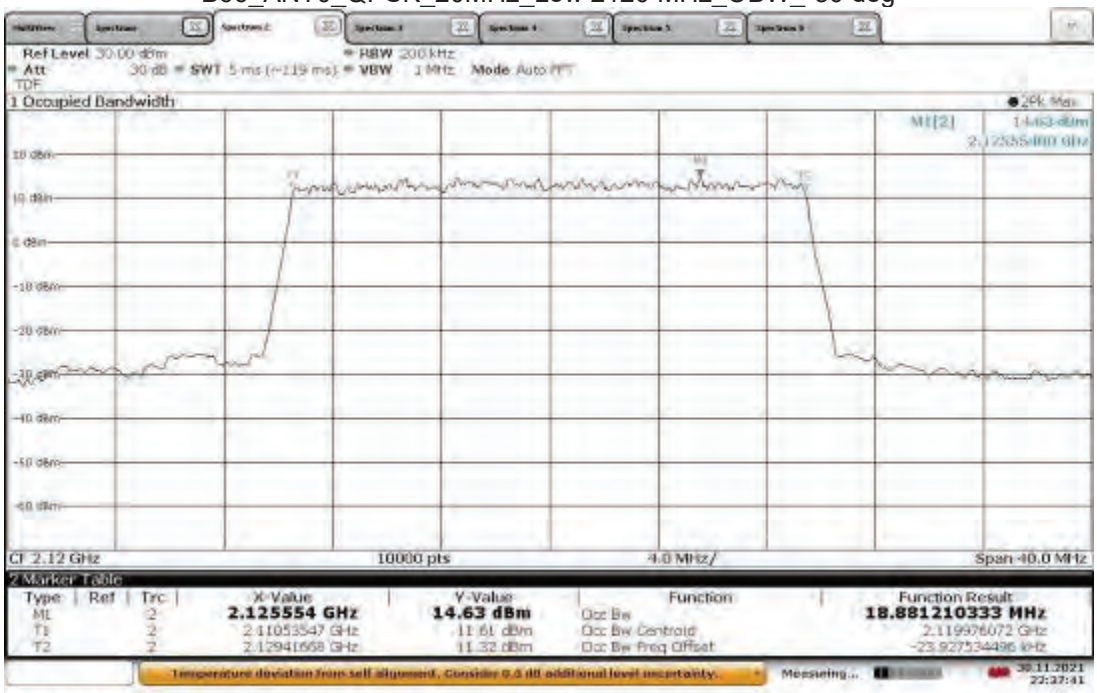
B66_ANT0_QPSK_5MHz_High 2197.5 MHz_OBW_40 deg



B66_ANT0_QPSK_5MHz_High 2197.5 MHz_OBW_50 deg

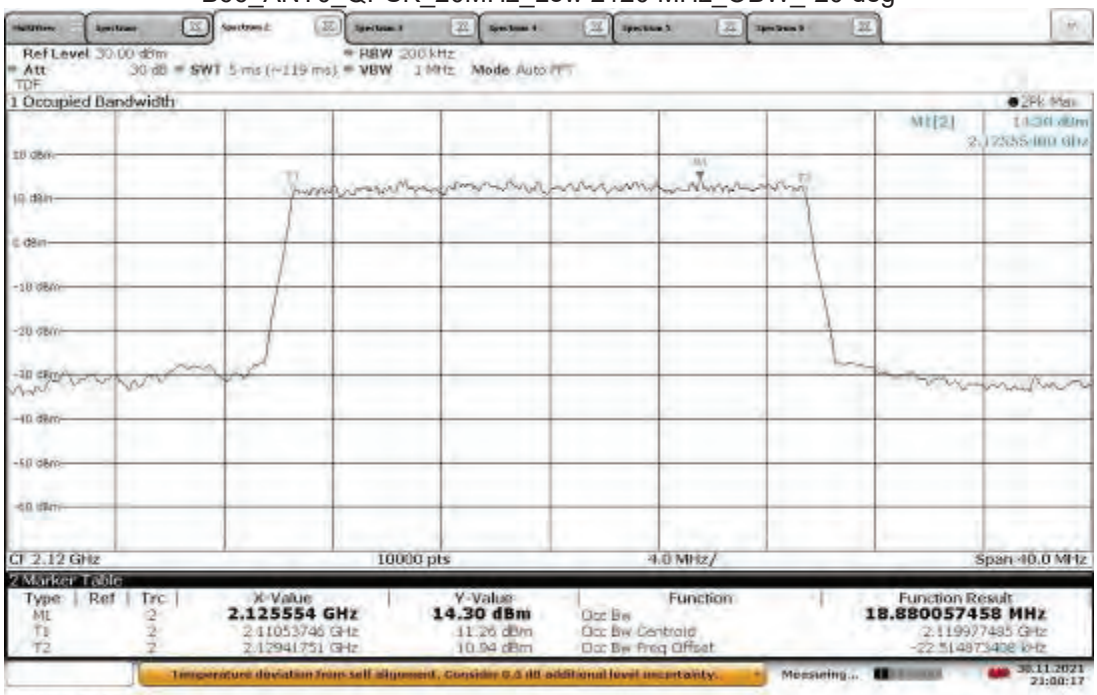


B66_ANT0_QPSK_20MHz_Low 2120 MHz_OBW_-30 deg



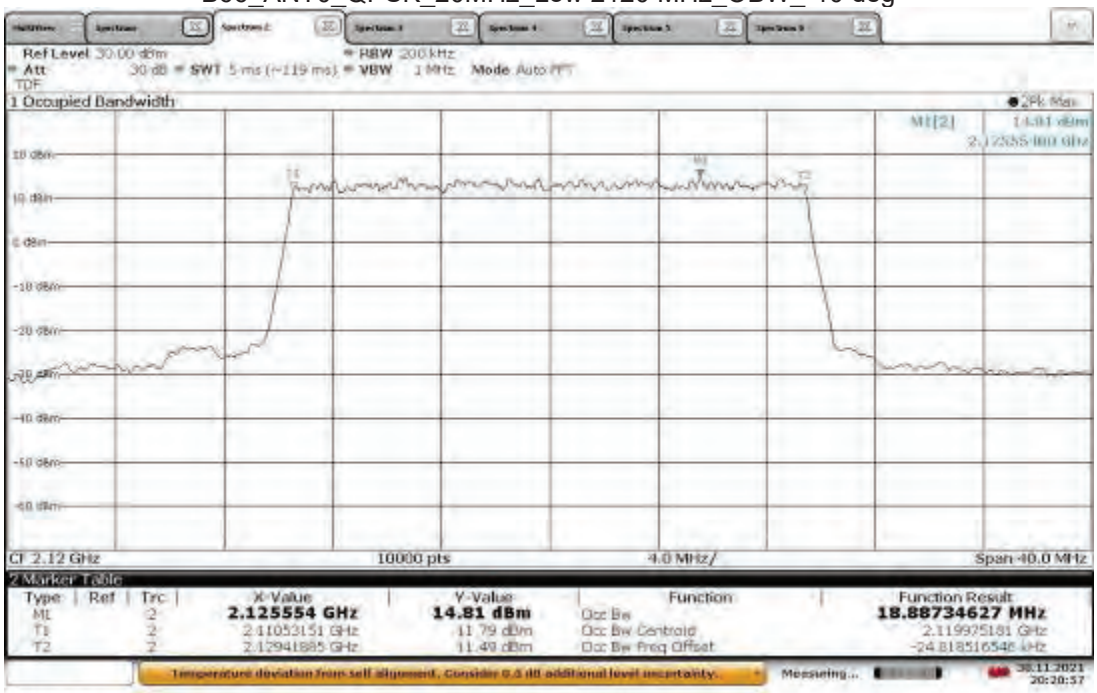
22:37:42 30.11.2021

B66_ANT0_QPSK_20MHz_Low 2120 MHz_OBW_-20 deg



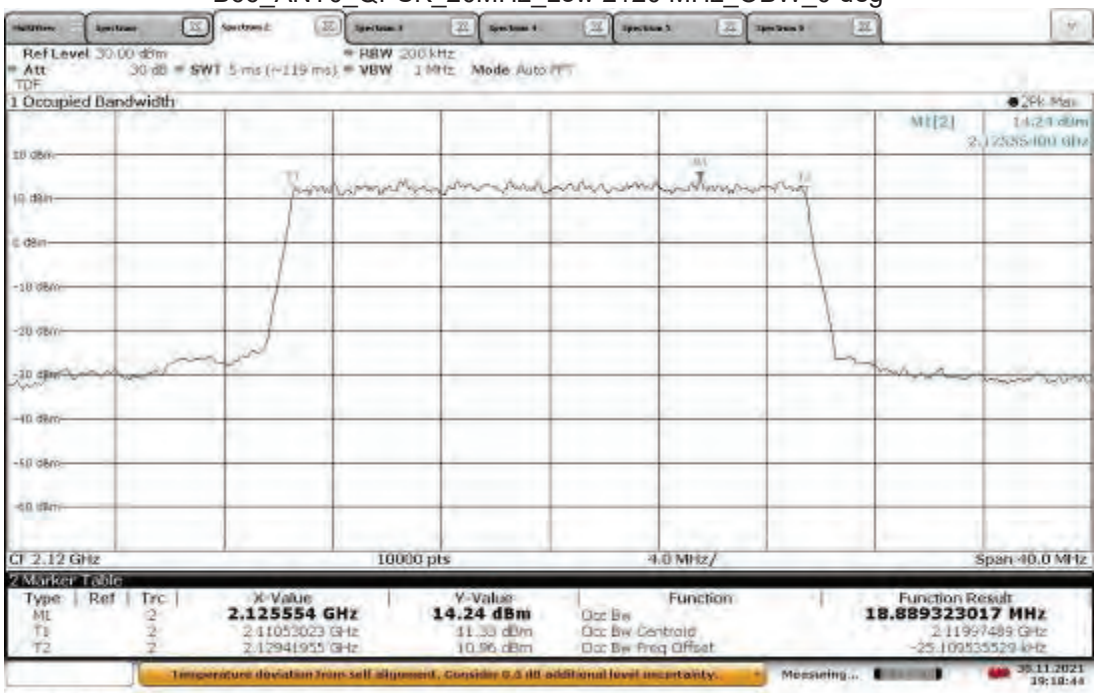
21:00:17 30.11.2021

B66_ANT0_QPSK_20MHz_Low 2120 MHz_OBW_-10 deg



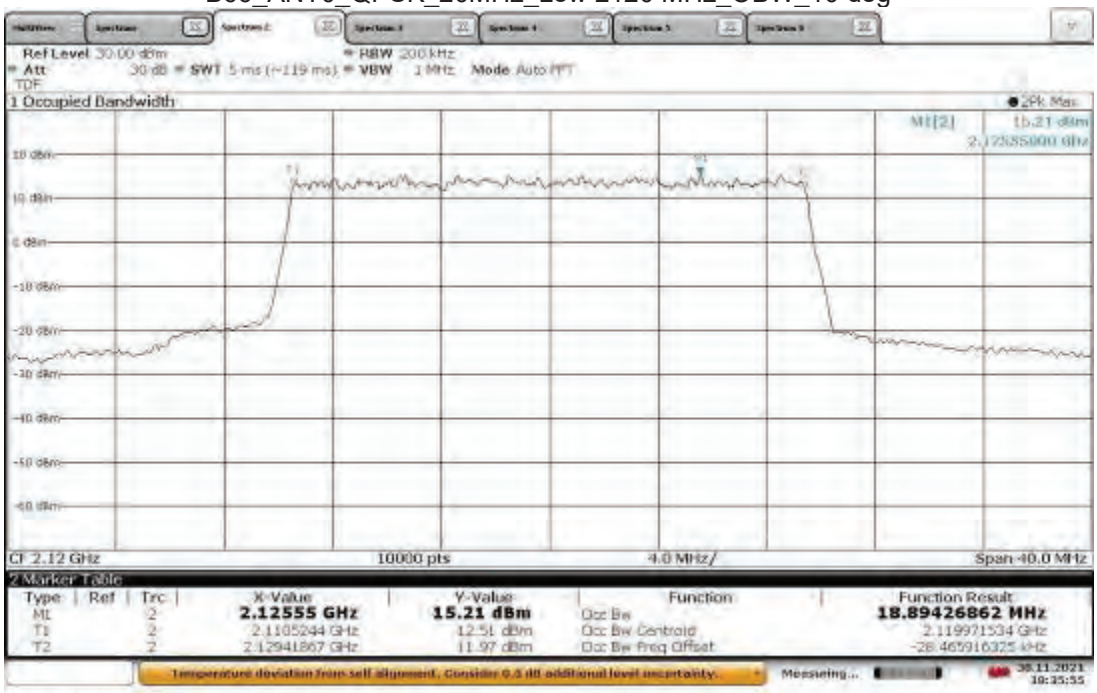
20:20:58 30.11.2021

B66_ANT0_QPSK_20MHz_Low 2120 MHz_OBW_0 deg



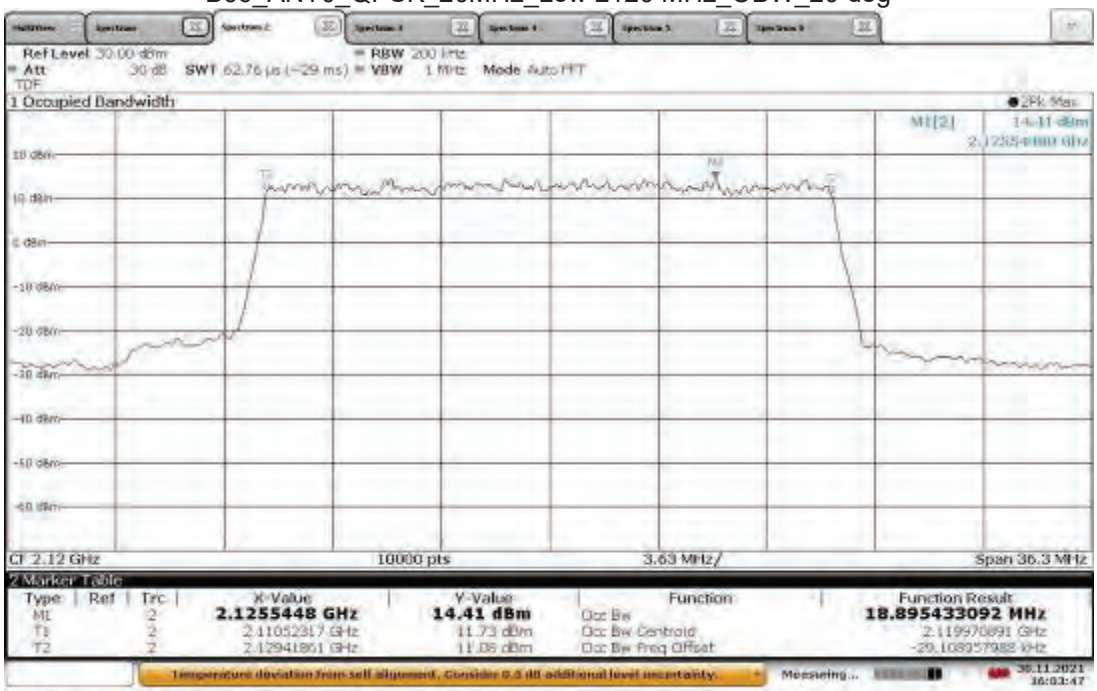
19:18:44 30.11.2021

B66_ANT0_QPSK_20MHz_Low 2120 MHz_OBW_10 deg



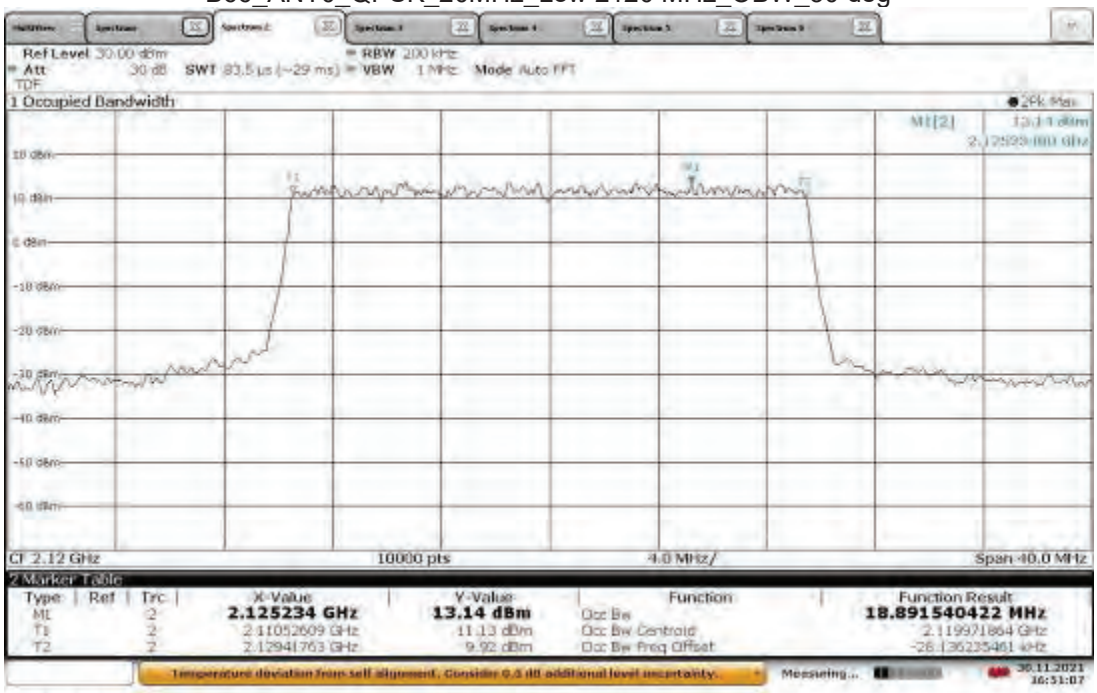
18:35:56 30.11.2021

B66_ANT0_QPSK_20MHz_Low 2120 MHz_OBW_20 deg

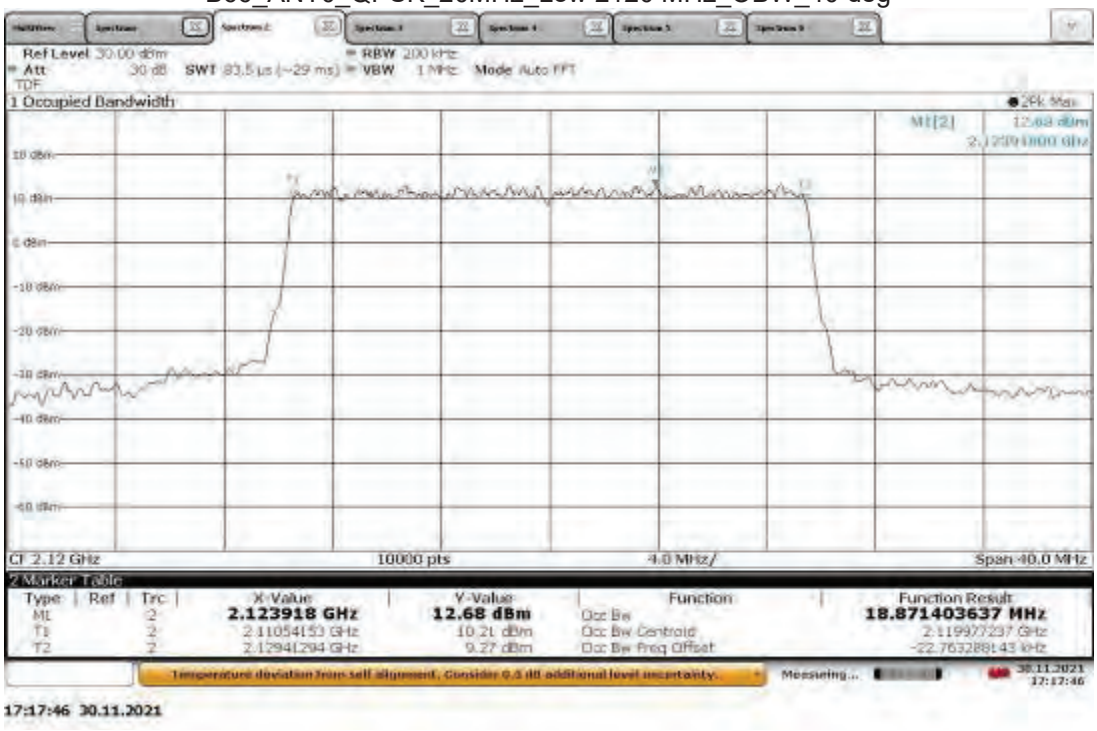


16:03:48 30.11.2021

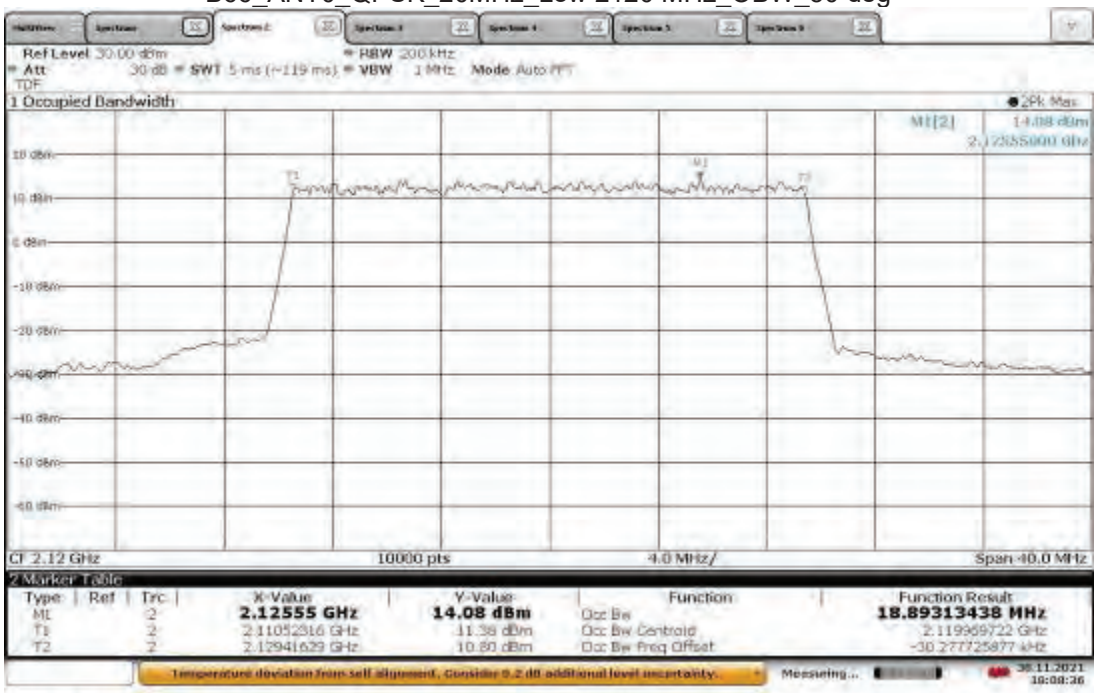
B66_ANT0_QPSK_20MHz_Low 2120 MHz_OBW_30 deg



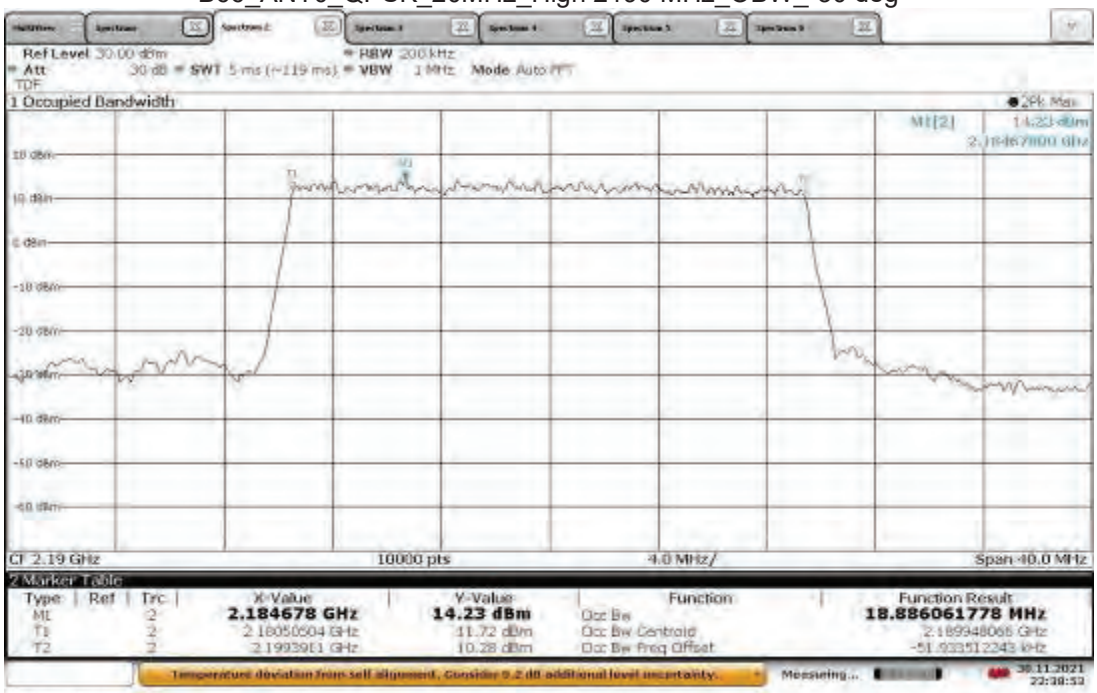
B66_ANT0_QPSK_20MHz_Low 2120 MHz_OBW_40 deg



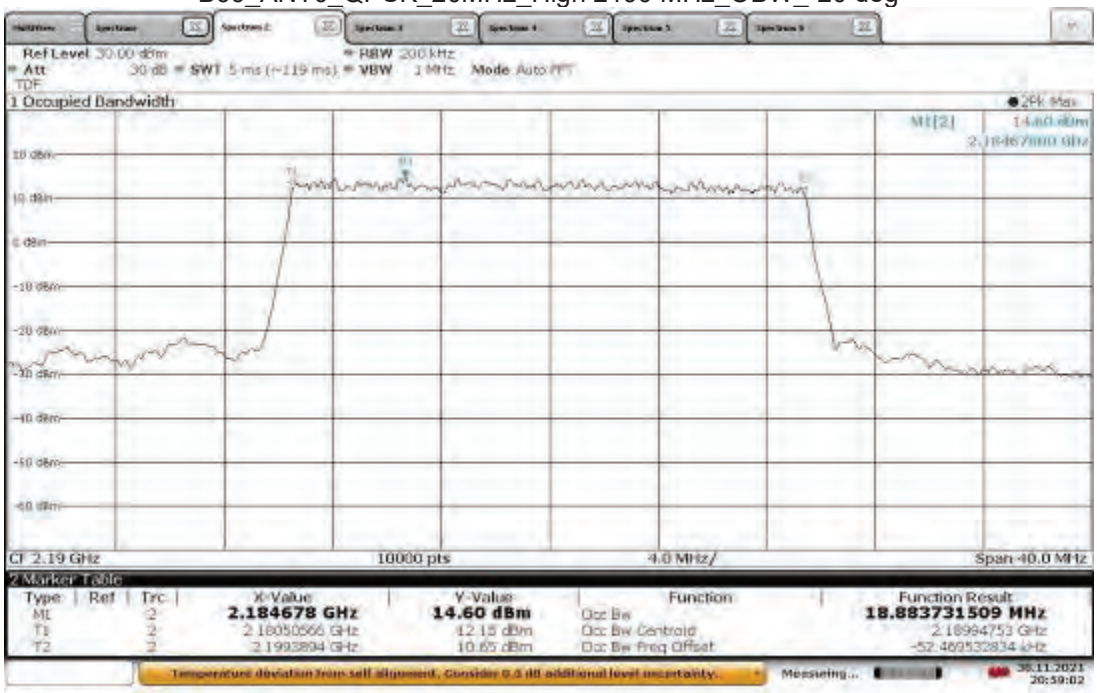
B66_ANT0_QPSK_20MHz_Low 2120 MHz_OBW_50 deg



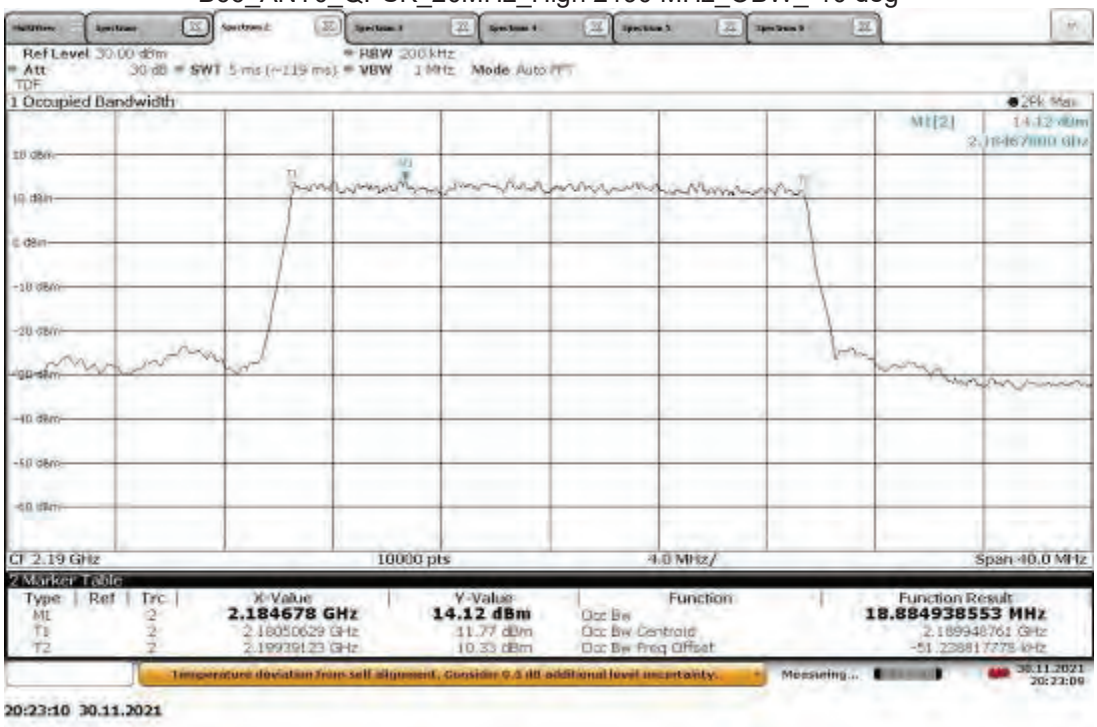
B66_ANT0_QPSK_20MHz_High 2190 MHz_OBW_-30 deg



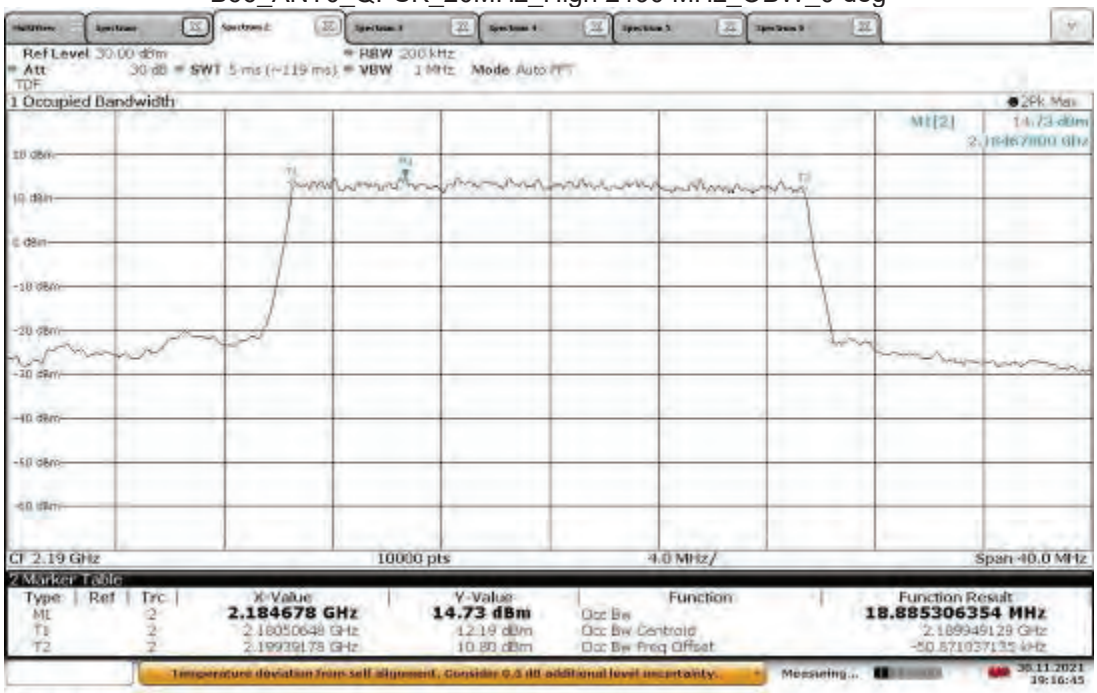
B66_ANT0_QPSK_20MHz_High 2190 MHz_OBW_-20 deg



B66_ANT0_QPSK_20MHz_High 2190 MHz_OBW_-10 deg



B66_ANT0_QPSK_20MHz_High 2190 MHz_OBW_0 deg



19:16:45 30.11.2021

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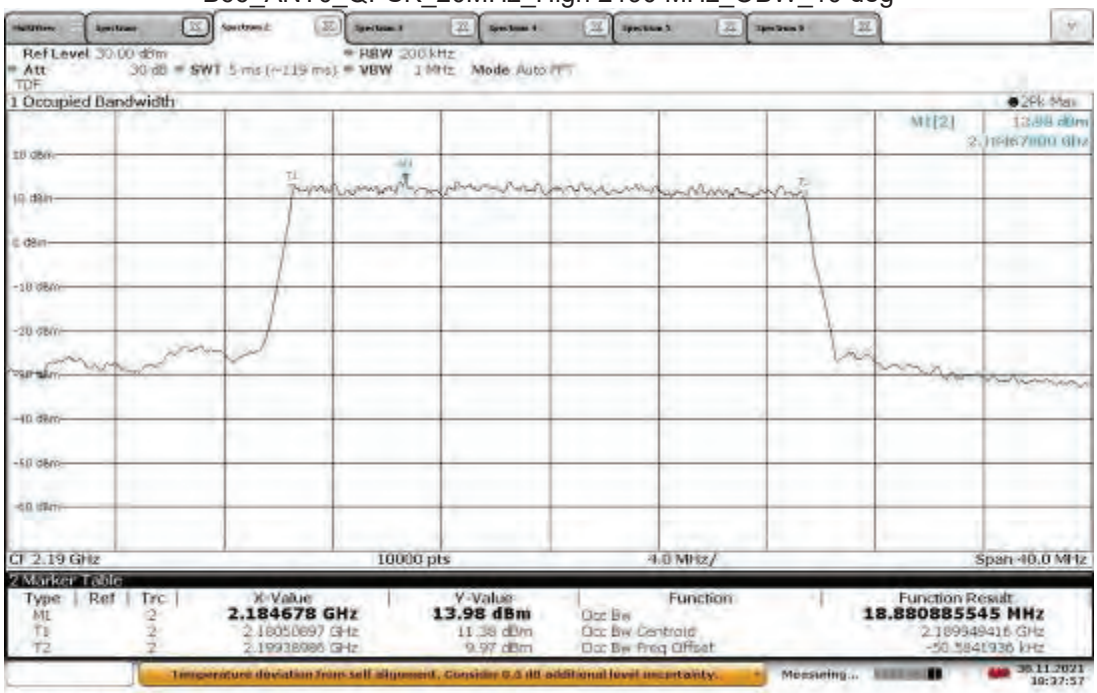

18:37:57 30.11.2021

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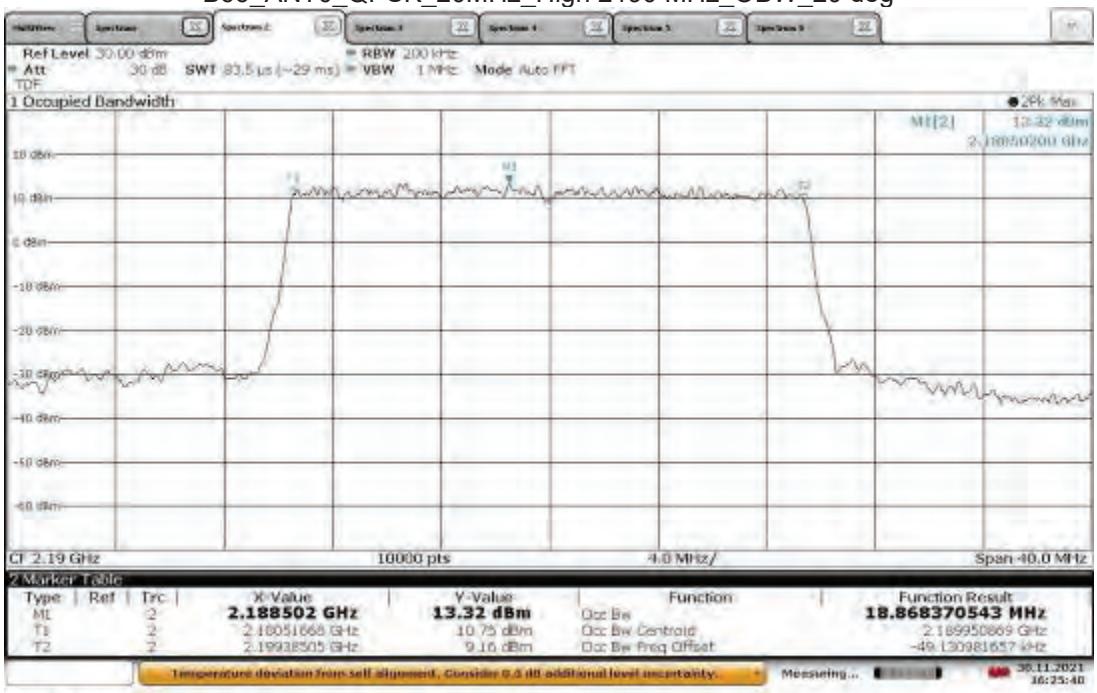
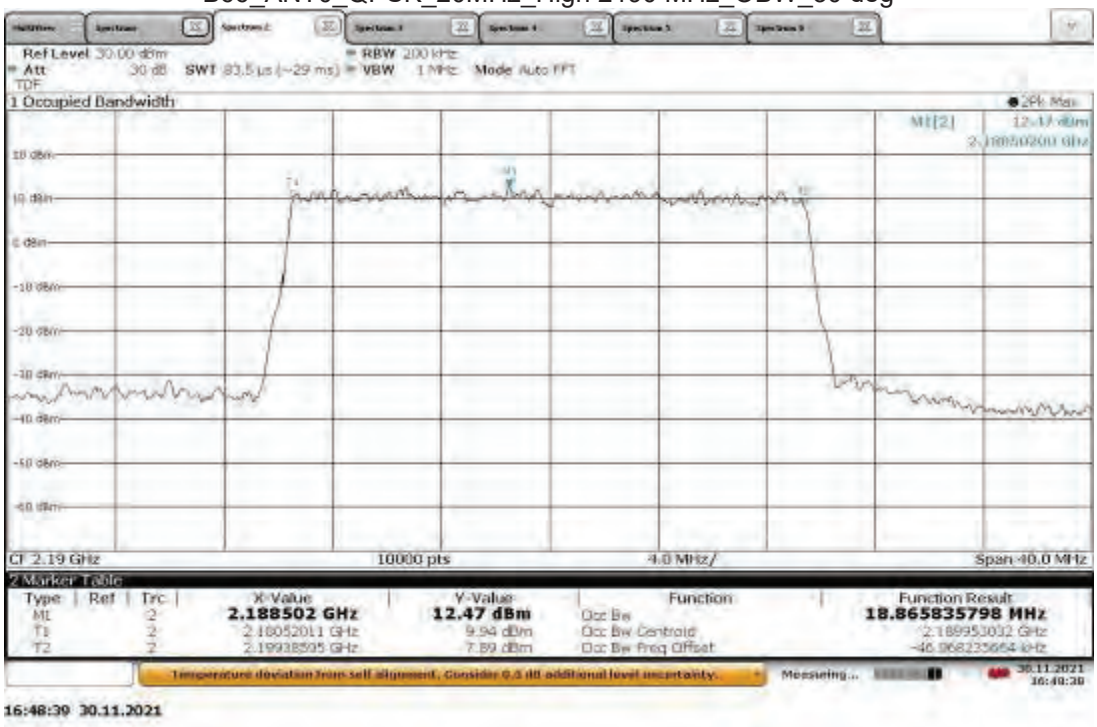
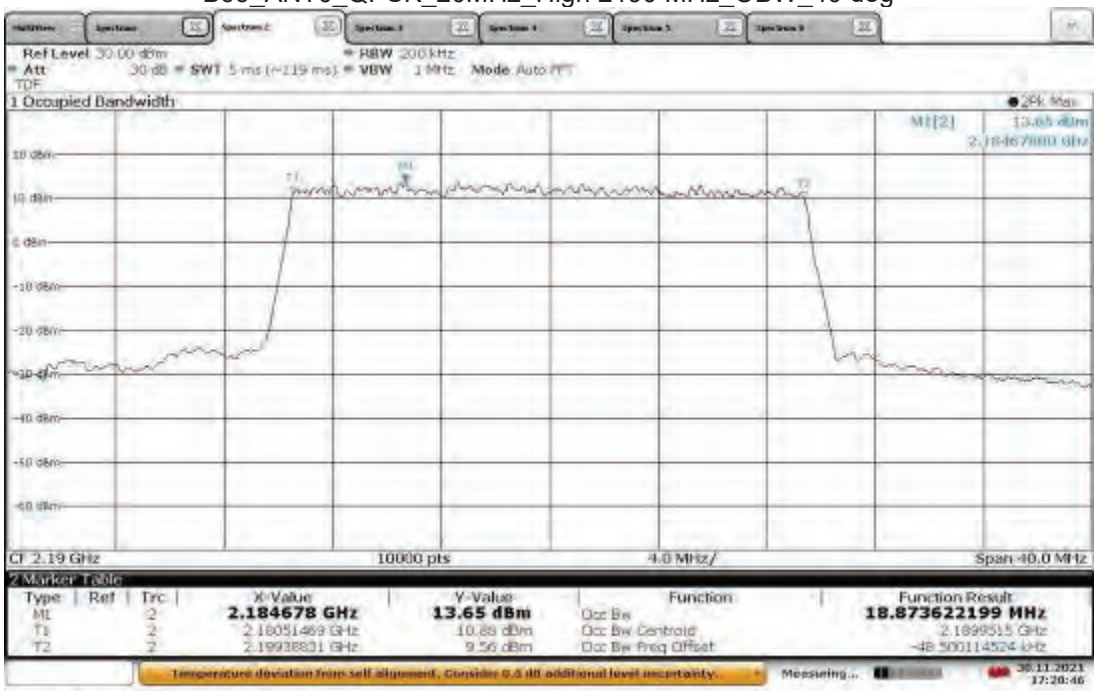


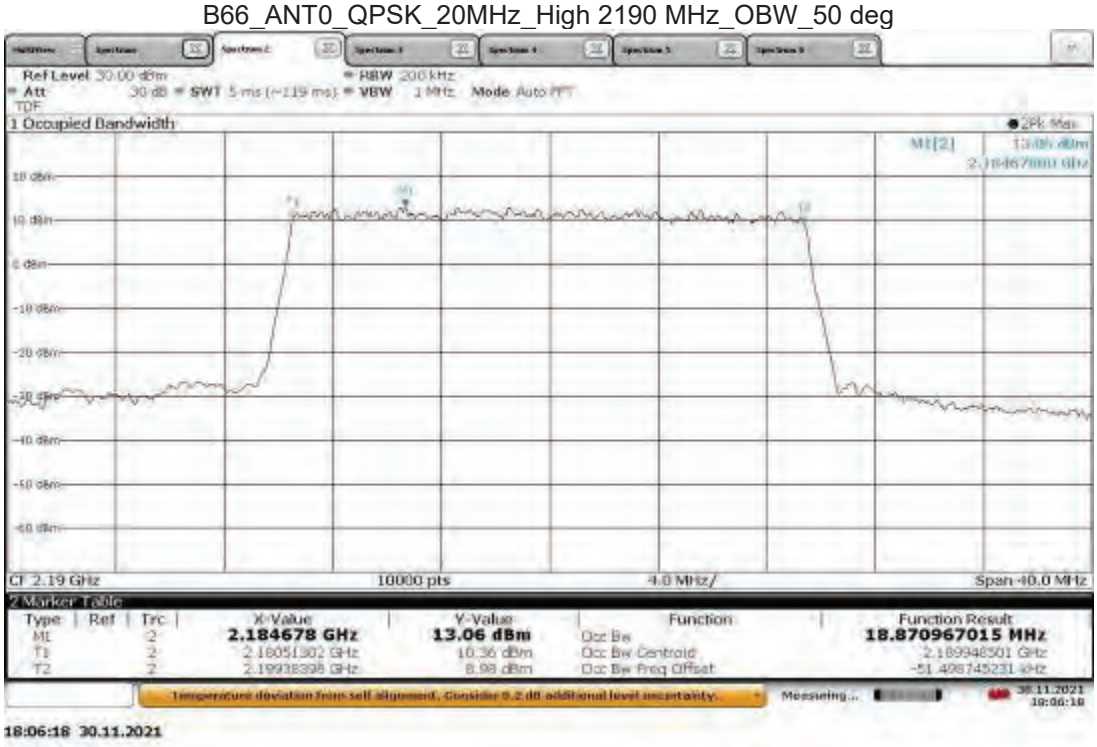
B66_ANT0_QPSK_20MHz_High 2190 MHz_OBW_30 deg



B66_ANT0_QPSK_20MHz_High 2190 MHz_OBW_40 deg



B66_ANT0_QPSK_20MHz_High 2190 MHz_OBW_50 deg



Test Personnel:	Kouma Sinn KPS	Test Date:	11/24/2021 (1st shift)
	Vathana F. Ven VFV		11/24/2021 (2nd Shift)
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 27	Limit Applied:	See report section 10.3
Input Voltage:	48 VDC (POE)		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	N/A
		Relative Humidity:	N/A
		Atmospheric Pressure:	N/A

11 Transmitter spurious emissions

11.1 Method

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

TEST SITE: 10m ALSE

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

Measurement Uncertainty

Measurement	Frequency Range	Expanded Uncertainty (k=2)	Ucispr
Radiated Emissions, 10m	30-1000 MHz	5.0 dB	6.3 dB
Radiated Emissions, 3m	30-1000 MHz	4.6 dB	6.3 dB
Radiated Emissions, 3m	1-6 GHz	4.9 dB	5.2 dB
Radiated Emissions, 3m	6-15 GHz	5.1 dB	5.5 dB
Radiated Emissions, 3m	15-18 GHz	4.7 dB	5.5 dB
Radiated Emissions, 3m	18-40 GHz	4.7 dB	5.5 dB

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

Sample Calculation

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

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

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

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

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

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

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

Example:

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

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

11.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
DAV007'	Weather Station Vantage Vue	Davis	6250	MS191212003	03/20/2021	03/20/2022
DAV005'	Weather Station	Davis	6250	MS191218083	02/07/2021	02/07/2022
EMC04'	ANTENNA, RIDGED GUIDE, 18-40 GHZ	EMCO	3116	2090	01/28/2021	01/28/2022
CBLHF2012-2M-1'	2m 9kHz-40GHz Coaxial Cable - SET1	Huber & Suhner	SF102	252675001	02/19/2021	02/19/2022
CBLHF2012-5M-2'	5m 9kHz-40GHz Coaxial Cable - SET2	Huber & Suhner	SF102	252676002	02/19/2021	02/19/2022
PRE9	100MHz-40GHz Preamp	MITEQ	NSP4000-NFG	1260417	09/23/2021	09/23/2022
REA006	18GHz High Pass Filter	Reactel, Inc	7HS-18G/40G K11	(06)1	04/23/2021	04/23/2022
REA004	3GHz High Pass Filter	Reactel, Inc	7HSX-3G/18G-S11	06-1	02/19/2021	02/19/2022
145-414'	Cables 145-400 145-403 145-405 145-409	Huber + Suhner	3m Track A cables	multiple	07/09/2021	07/09/2022
145-420'	Receiver to floor cable	Utiflex	UFB311A-2-0591-70070	145-420	02/17/2021	02/17/2022
145-422'	10Amp Pre-amp to under floor	Utiflex	UFB311A-0-2756-70070	145-422	02/17/2021	02/17/2022
IW003'	8.4 meter cable	Insulated Wire	2800-NPS	003	10/15/2021	10/15/2022
ETS002'	1-18GHz DRG Horn Antenna	ETS Lindgren	3117	00143260	08/24/2021	08/24/2022
145108'	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESIB40	100209	06/22/2021	06/22/2022
PRE10'	30-1000MHz pre-amp	ITS	PRE10	PRE10	02/17/2021	02/17/2022
IW006'	DC-18GHz cable 8.4m long	Insulated Wire	2800-NPS	IW006	11/25/2020	11/25/2021
145-424'	9kHz to 40GHz Cable	Huber and Suhner	Sucoflex	145-424	02/17/2021	02/17/2022
IW001'	2 meter cable	Insulated Wire	2801-NPS	001	09/23/2021	09/23/2022
145108'	EMI Test Receiver (20Hz - 40GHz)	Rohde & Schwarz	ESIB40	100209	06/22/2021	06/22/2022
145145'	Broadband Hybrid Antenna 30 MHz - 3 GHz	Sunol Sciences Corp.	JB3	A122313	06/09/2021	06/09/2022

Software Utilized:

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

11.3 Results:

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

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

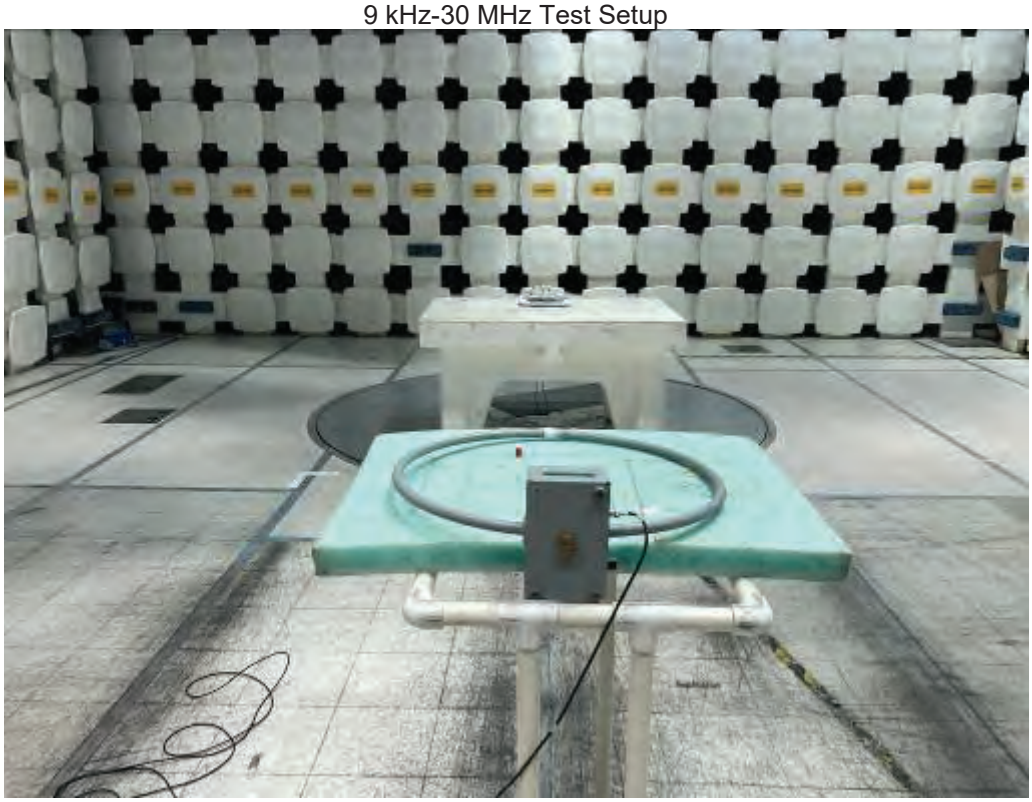
Note: All spurious emissions were tested with narrowest bandwidth and QPSK modulation settings. Since there were no emissions within 30dB of limit, and settings had ~1dB effect on peak readings, other settings were not tested and EUT was considered compliant.

11.4 Setup Photographs:

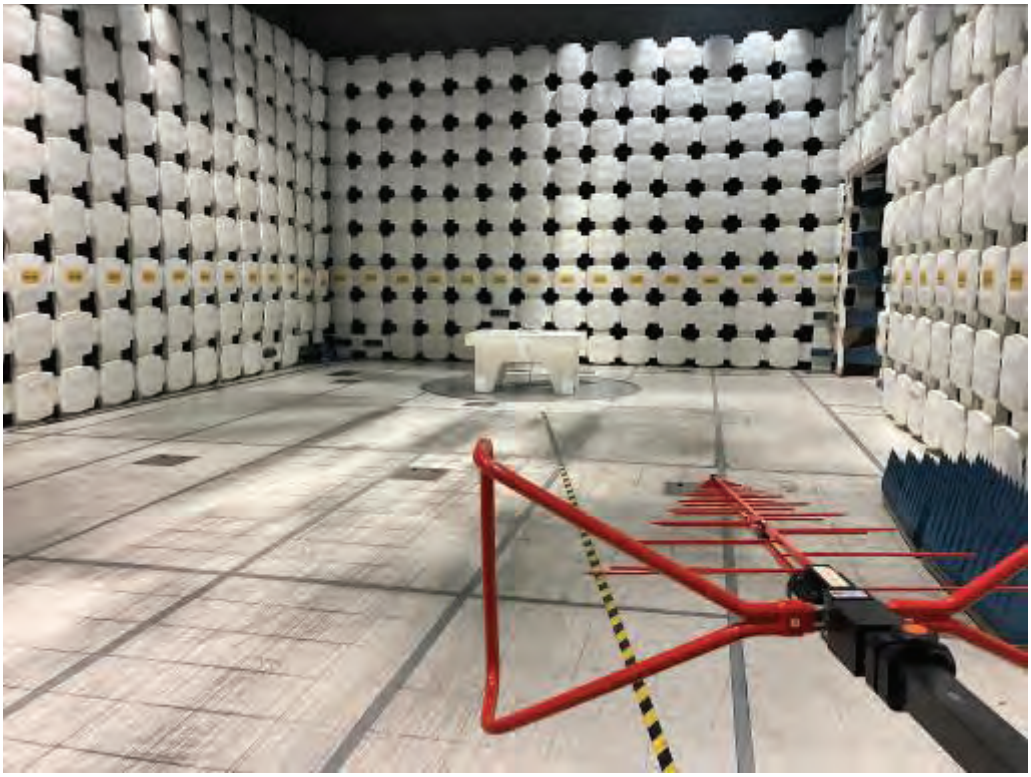
9 kHz-30 MHz Test Setup

9 kHz-30 MHz Test Setup

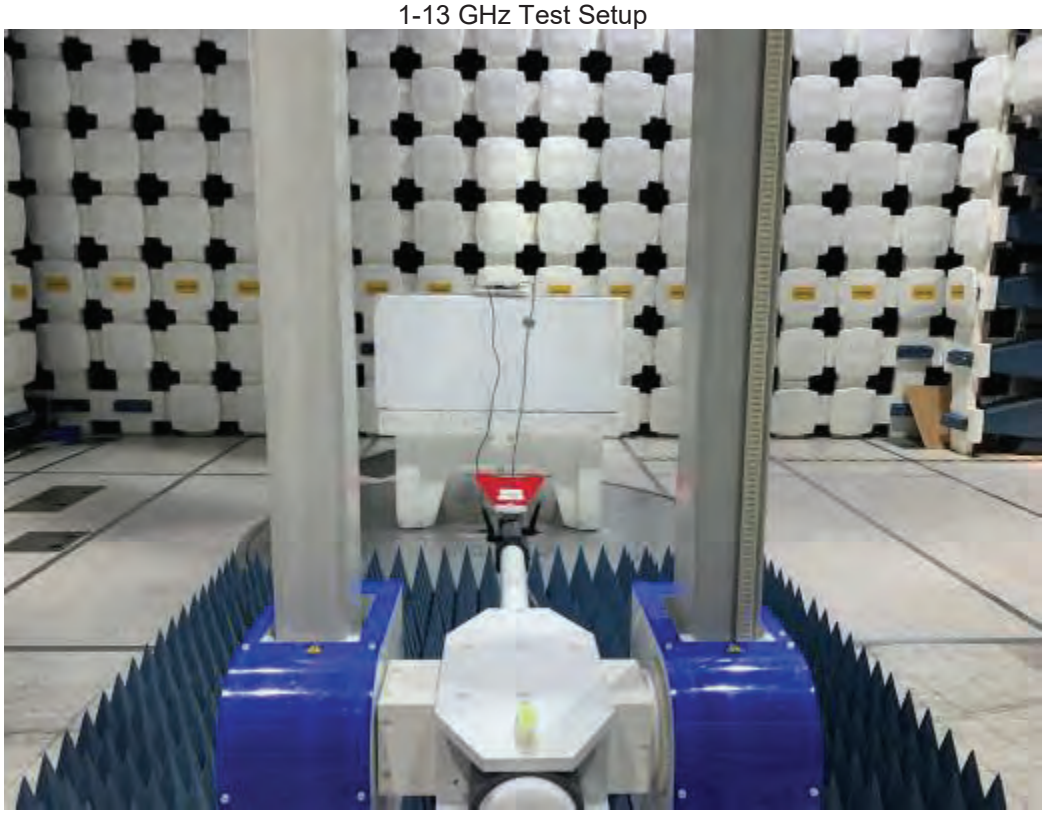
9 kHz-30 MHz Test Setup



30-1000 MHz Test Setup

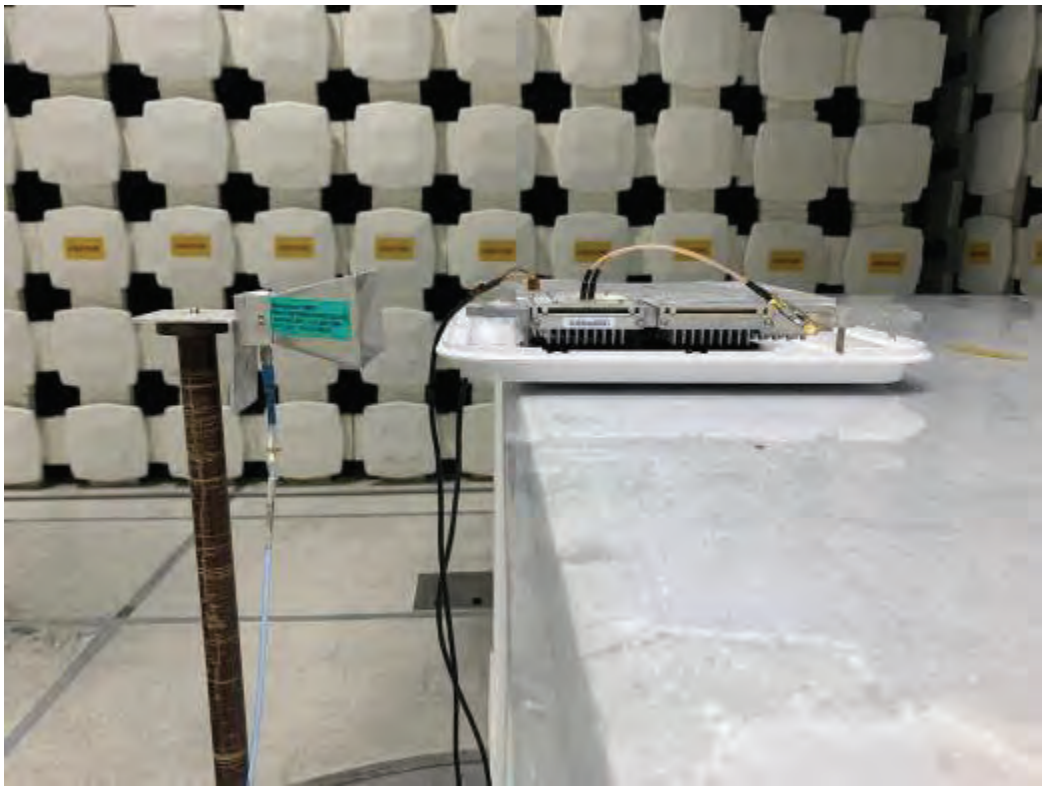


1-13 GHz Test Setup



13-18 GHz Test Setup

18-22 GHz Test Setup



Antenna Port Conducted Emissions Test Setup

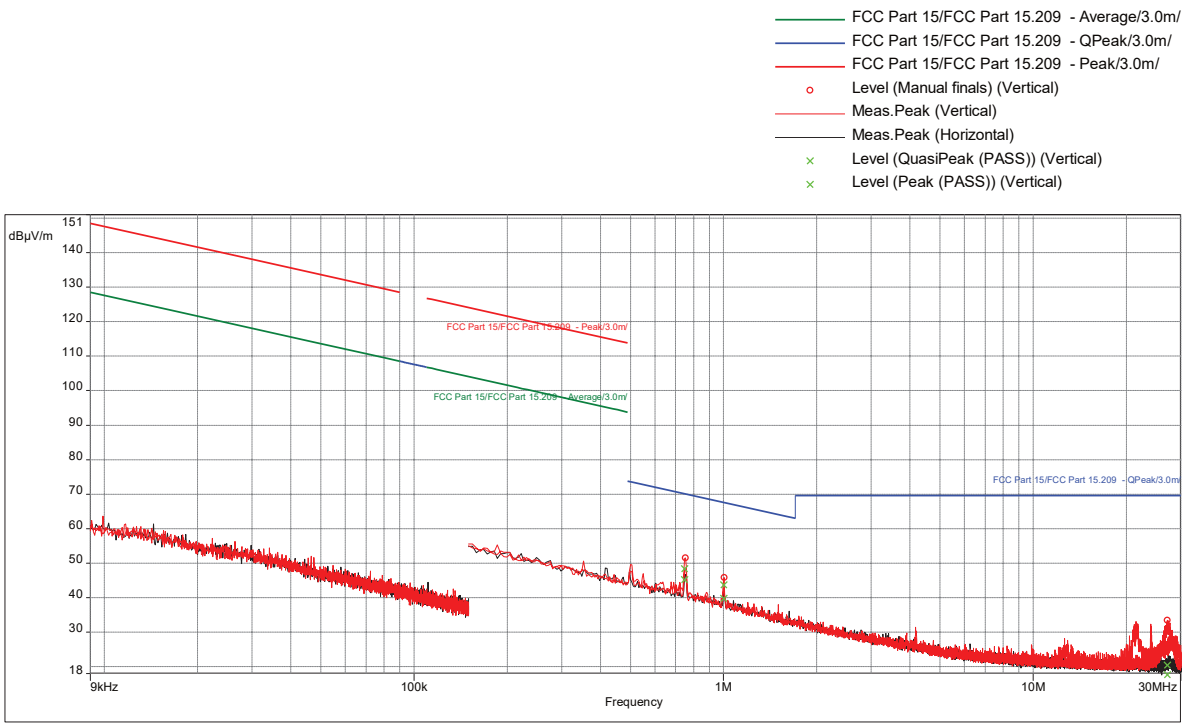
11.5 Plots/Data:

Radiated Emissions, 9kHz-30 MHz
Band 66, 5 MHz BW - TM3.2 (worst-case output power), RP5100 host

Test Information:

Date and Time	11/28/2021 11:08:07 AM
Client and Project Number	Commscope_G104844468
Engineer	Vathana Ven
Temperature	23 C
Humidity	15 %
Atmospheric Pressure	1002 mbar
Comments	RE 9kHz-30MHz Loop antenna, Electric Field, 3M Location_Band 66 5MHz BW_TM3.2 (worst-case output power)_RP5100 host

Graph:



Results:

Peak and E.I.R.P

Frequency (MHz)	Peak Level (dBµV/m)	E.I.R.P Level (dBm)	E.I.R.P Limit (dBm)	E.I.R.P Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
0.7506315789	48.32	-36.48	-13	-23.48	16.00	1.00	Vertical	9000.00	11.16
1.000263158	43.64	-41.16	-13	-28.16	213.00	1.00	Vertical	9000.00	11.50
27.1725	20.38	-64.42	-13	-51.42	83.00	1.00	Vertical	9000.00	10.24

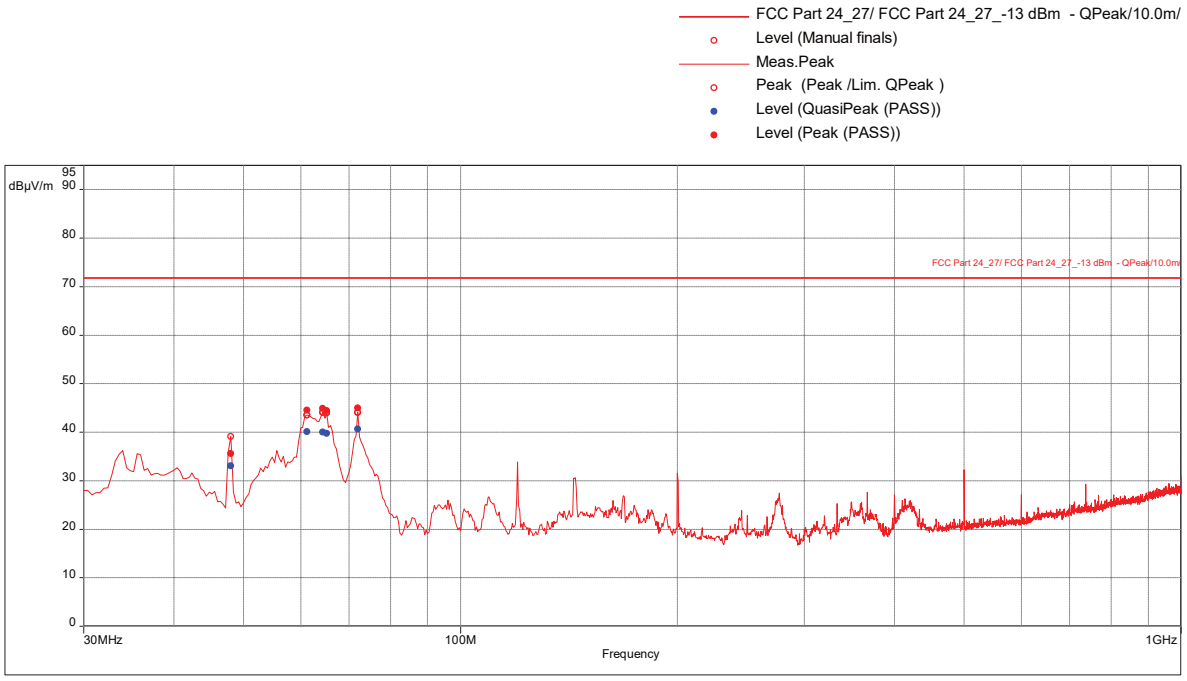
Notes:
The level in E.I.R.P (dBm) is calculated from the peak readings as follow : E.I.R.P (dBm) = E Peak (dBµV/m) + 20*Log(d) -104.8, where d is the distance (in far field region) in meter. E.I.R.P (dBm) = E Peak (dBµV/m) -84.8 dB at 10 meters.

Radiated Emissions, 30-1000 MHz
Band 66, 5 MHz BW - TM3.2 (worst-case output power), RP5100 host, Low Channel

Test Information:

Date and Time	11/28/2021 9:23:29 AM
Client and Project Number	Commscope_G104844468
Engineer	Vathana Ven
Temperature	23 C
Humidity	15 %
Atmospheric Pressure	1002 mbar
Comments	RE 30-1000MHz_Low Ch, Band 66 with 5G NR, 5MHz BW, TM3.2 (worst-case output power), RP5100 host

Graph:



Results:

Peak and E.I.R.P

Frequency (MHz)	Peak Level (dBµV/m)	E.I.R.P Level (dBm)	E.I.R.P Limit (dBm)	E.I.R.P Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
48	35.63	-49.17	-13.00	-36.17	248.00	1.35	Vertical	120000.00	-24.43
61.29473684	44.52	-40.28	-13.00	-27.28	112.00	1.63	Vertical	120000.00	-25.42
64.49473684	44.89	-39.91	-13.00	-26.91	24.00	2.23	Vertical	120000.00	-25.06
65.35789474	44.41	-40.39	-13.00	-27.39	31.00	2.23	Vertical	120000.00	-24.99
71.96842105	45.02	-39.78	-13.00	-26.78	110.00	1.90	Vertical	120000.00	-24.89

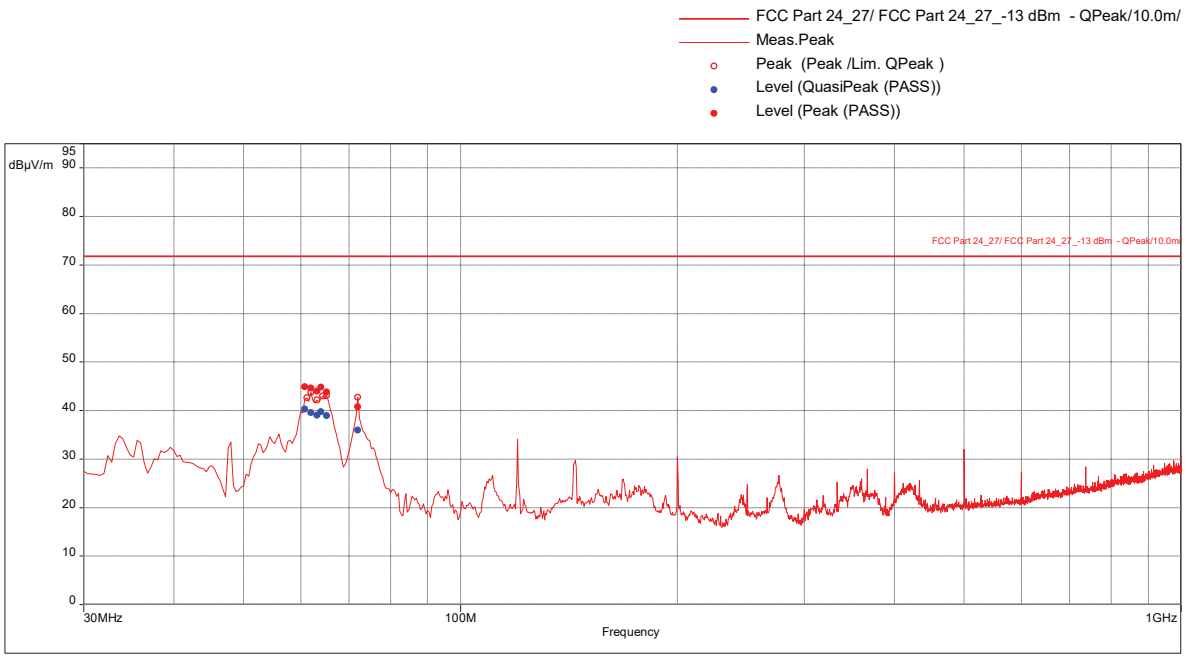
Notes:
The level in E.I.R.P (dBm) is calculated from the peak readings as follow : E.I.R.P (dBm) = E Peak (dBµV/m) + 20*Log(d) -104.8, where d is the distance (in far field region) in meter. E.I.R.P (dBm) = E Peak (dBµV/m) -84.8 dB at 10 meters.

Radiated Emissions, 30-1000 MHz
Band 66, 5 MHz BW - TM3.2 (worst-case output power), RP5100 host, Mid Channel

Test Information:

Date and Time	11/28/2021 9:26:44 AM
Client and Project Number	Commscope_G104844468
Engineer	Vathana Ven
Temperature	23 C
Humidity	15 %
Atmospheric Pressure	1002 mbar
Comments	RE 30-1000MHz_Mid Ch, Band 66 with 5G NR, 5MHz BW, TM3.2 (worst-case output power), RP5100 host

Graph:



Results:

Peak and E.I.R.P

Frequency (MHz)	Peak Level (dBµV/m)	E.I.R.P Level (dBm)	E.I.R.P Limit (dBm)	E.I.R.P Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
60.94736842	44.89	-39.91	-13.00	-26.91	148.00	1.75	Vertical	120000.00	-25.46
61.90526316	44.59	-40.21	-13.00	-27.21	18.00	2.19	Vertical	120000.00	-25.36
63.16842105	43.97	-40.83	-13.00	-27.83	0.00	2.53	Vertical	120000.00	-25.21
64.05263158	44.83	-39.97	-13.00	-26.97	190.00	2.13	Vertical	120000.00	-25.12
65.16842105	43.76	-41.04	-13.00	-28.04	278.00	2.62	Vertical	120000.00	-24.99
71.96842105	40.76	-44.04	-13.00	-31.04	53.00	1.95	Vertical	120000.00	-24.89

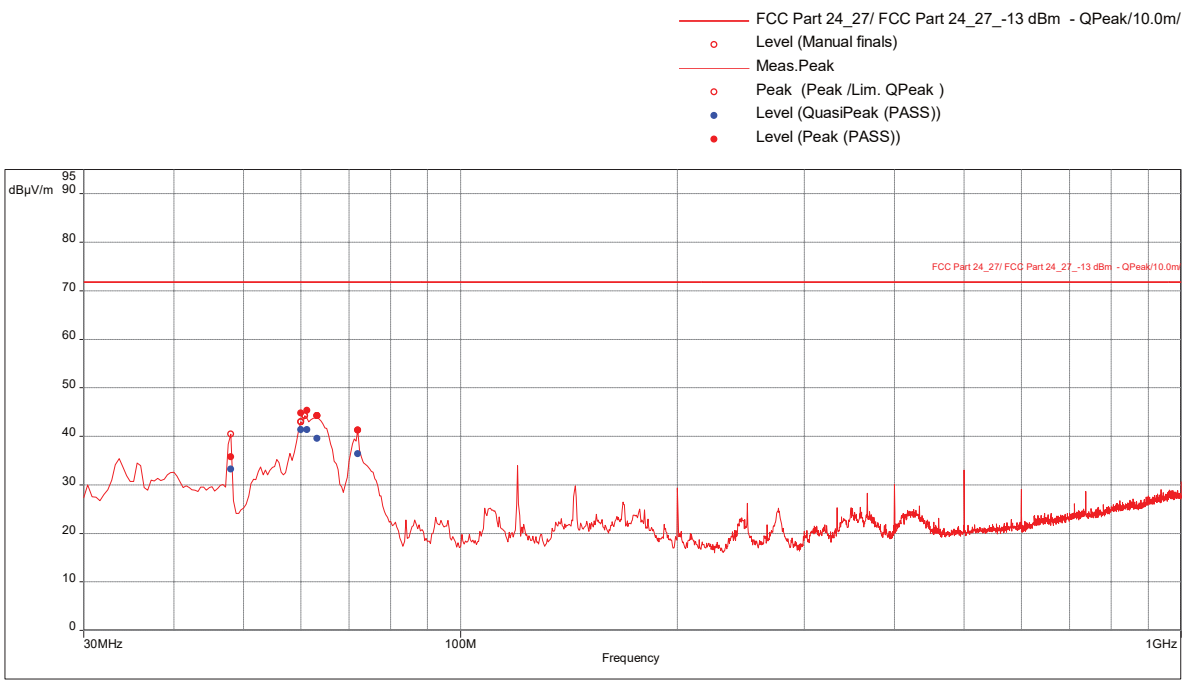
Notes:
The level in E.I.R.P (dBm) is calculated from the peak readings as follow : E.I.R.P (dBm) = E Peak (dBµV/m) + 20*Log(d) -104.8, where d is the distance (in far field region) in meter. E.I.R.P (dBm) = E Peak (dBµV/m) -84.8 dB at 10 meters.

Radiated Emissions, 30-1000 MHz
Band 66, 5 MHz BW - TM3.2 (worst-case output power), RP5100 host, High Channel

Test Information:

Date and Time	11/28/2021 10:13:53 AM
Client and Project Number	Commscope_G104844468
Engineer	Vathana Ven
Temperature	23 C
Humidity	15 %
Atmospheric Pressure	1002 mbar
Comments	RE 30-1000MHz_High Ch, Band 66 with 5G NR, 5MHz BW, TM3.2 (worst-case output power), RP5100 host

Graph:



Results:

Peak and E.I.R.P

Frequency (MHz)	Peak Level (dBµV/m)	E.I.R.P Level (dBm)	E.I.R.P Limit (dBm)	E.I.R.P Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
48	35.75	-49.05	-13.00	-36.05	32.00	2.18	Vertical	120000.00	-24.43
60	44.83	-39.97	-13.00	-26.97	46.00	1.47	Vertical	120000.00	-25.58
61.08421053	45.35	-39.45	-13.00	-26.45	39.00	1.89	Vertical	120000.00	-25.44
63.10526316	44.29	-40.51	-13.00	-27.51	24.00	1.68	Vertical	120000.00	-25.22
72.03157895	41.26	-43.54	-13.00	-30.54	32.00	2.24	Vertical	120000.00	-24.89

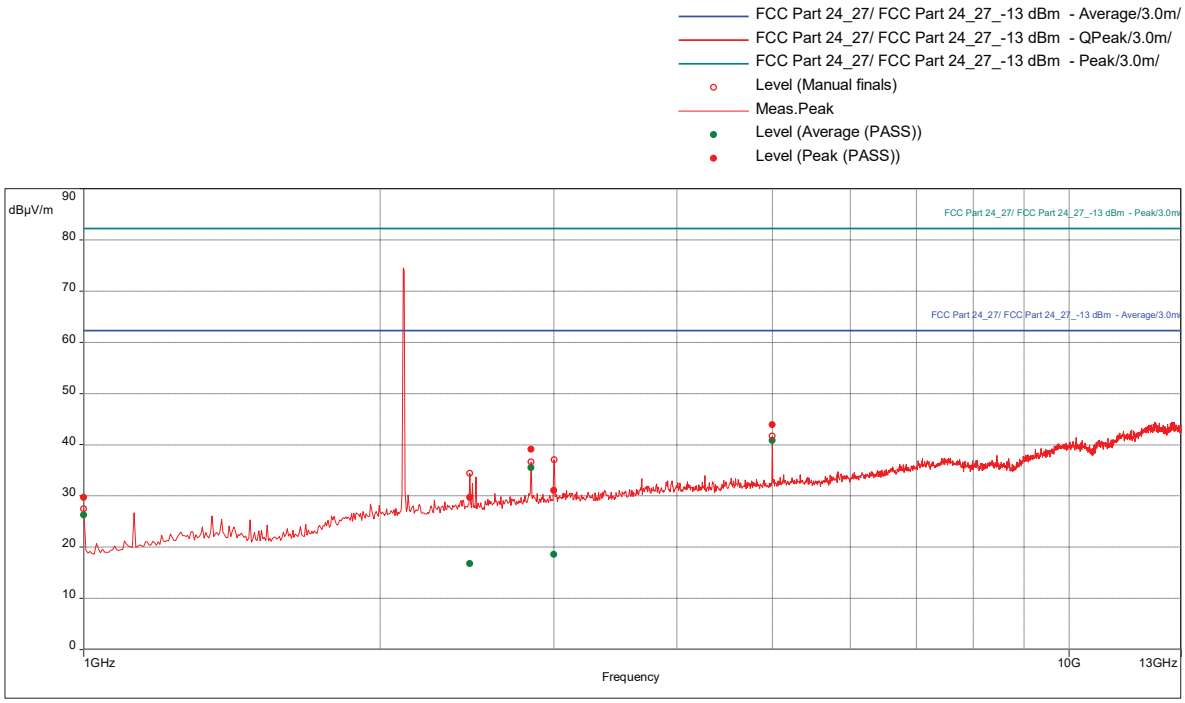
Notes:
The level in E.I.R.P (dBm) is calculated from the peak readings as follow : E.I.R.P (dBm) = E Peak (dBµV/m) + 20*Log(d) -104.8, where d is the distance (in far field region) in meter. E.I.R.P (dBm) = E Peak (dBµV/m) -84.8 dB at 10 meters.

Radiated Emissions, 1-13 GHz
Band 66, 5 MHz BW - TM3.2 (worst-case output power), RP5100 host, Low Channel

Test Information:

Date and Time	12/1/2021 9:25:47 AM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	24 C
Humidity	21 %
Atmospheric Pressure	1007 mbar
Comments	Scan 1: Legacy Band 66-5100, 16QAM-5MHz BW, Low Ch 2112.5 MHz, RE 1 to 13 GHz SA mode

Graph:



Results:

Peak and E.I.R.P

Frequency (MHz)	Peak Level (dBµV/m)	E.I.R.P Level (dBm)	E.I.R.P Limit (dBm)	E.I.R.P Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
1000	29.71	-65.55	-13	-52.55	349.00	1.40	Horizontal	1000000.00	-22.09
2465.526316	29.73	-65.53	-13	-52.53	252.00	1.05	Horizontal	1000000.00	-13.74
2844.473684	39.09	-56.17	-13	-43.17	23.00	1.00	Vertical	1000000.00	-12.72
3001.578947	31.10	-64.16	-13	-51.16	141.00	3.49	Vertical	1000000.00	-12.24
5000	43.91	-51.35	-13	-38.35	10.00	1.05	Vertical	1000000.00	-7.90

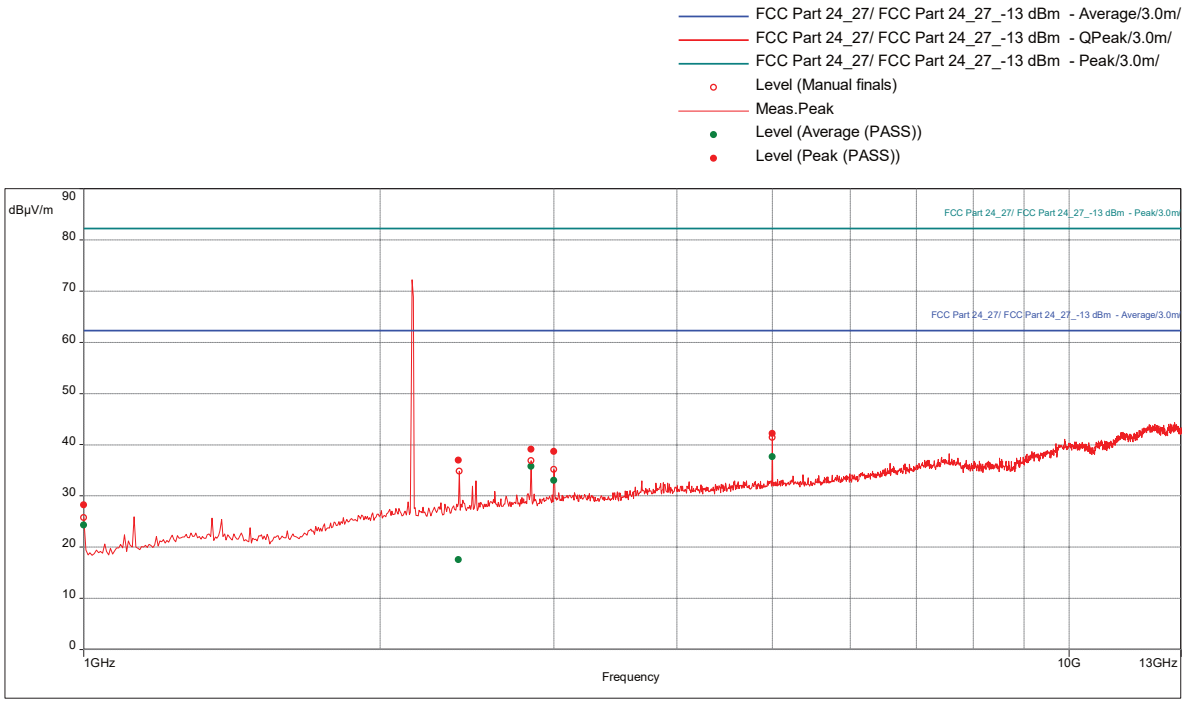
Notes:
The level in E.I.R.P (dBm) is calculated from the peak readings as follow : E.I.R.P (dBm) = E Peak (dBµV/m) + 20*Log(d) -104.8, where d is the distance (in far field region) in meter. E.I.R.P (dBm) = E Peak (dBµV/m) -95.26 dB at 3 meters.

Radiated Emissions, 1-13 GHz
Band 66, 5 MHz BW - TM3.2 (worst-case output power), RP5100 host, Mid Channel

Test Information:

Date and Time	12/1/2021 10:04:23 AM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	24 C
Humidity	21 %
Atmospheric Pressure	1007 mbar
Comments	Scan 2: Legacy Band 66-5100, 16QAM-5MHz BW, Mid Ch 2155 MHz, RE 1 to 13 GHz SA mode

Graph:



Results:

Peak and E.I.R.P

Frequency (MHz)	Peak Level (dBµV/m)	E.I.R.P Level (dBm)	E.I.R.P Limit (dBm)	E.I.R.P Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
1000	28.26	-67	-13	-54	356.00	1.35	Horizontal	1000000.00	-22.09
2402.105263	36.93	-58.33	-13	-45.33	154.00	1.00	Vertical	1000000.00	-13.56
2844.473684	39.09	-56.17	-13	-43.17	89.00	1.00	Vertical	1000000.00	-12.72
3000	38.67	-56.59	-13	-43.59	9.00	1.00	Vertical	1000000.00	-12.25
5000.263158	42.18	-53.08	-13	-40.08	44.00	1.01	Vertical	1000000.00	-7.90

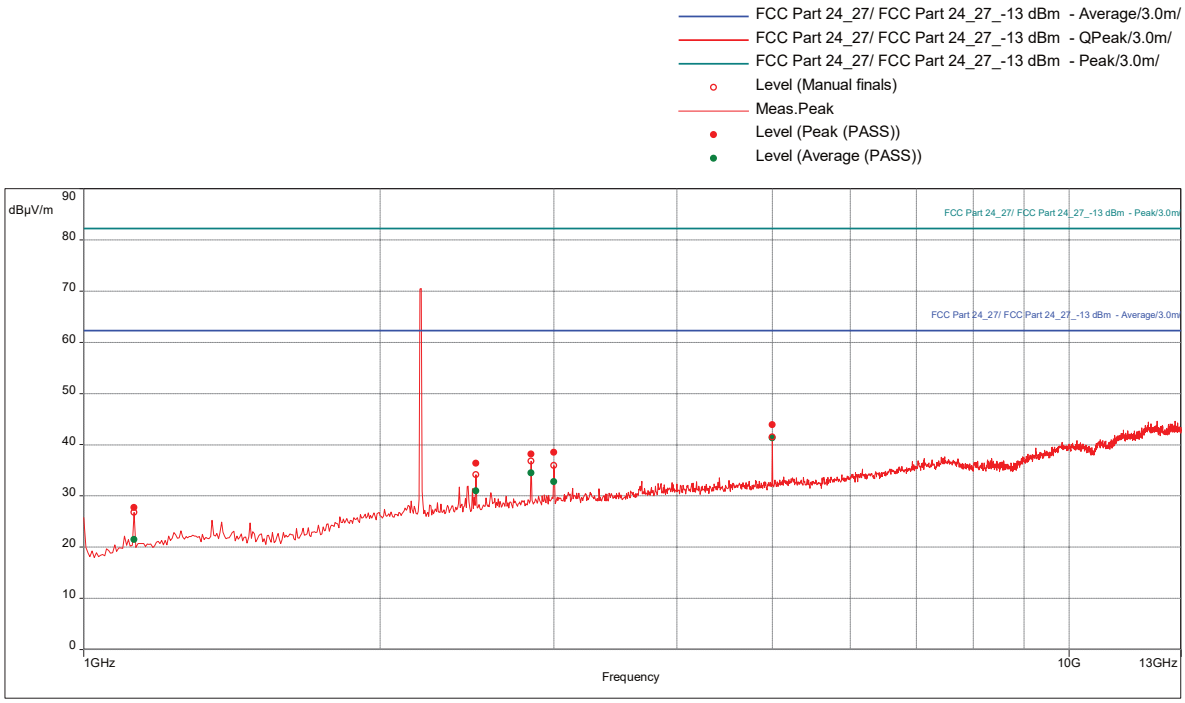
Notes:
The level in E.I.R.P (dBm) is calculated from the peak readings as follow : E.I.R.P (dBm) = E Peak (dBµV/m) + 20*Log(d) -104.8, where d is the distance (in far field region) in meter. E.I.R.P (dBm) = E Peak (dBµV/m) -95.26 dB at 3 meters.

Radiated Emissions, 1-13 GHz
Band 66, 5 MHz BW - TM3.2 (worst-case output power), RP5100 host, High Channel

Test Information:

Date and Time	12/1/2021 10:38:50 AM
Client and Project Number	Commscope
Engineer	Kouma Sinn
Temperature	24 C
Humidity	21 %
Atmospheric Pressure	1007 mbar
Comments	Scan 3: Legacy Band 66-5100, 16QAM-5MHz BW, High Ch 2197.5 MHz, RE 1 to 13 GHz SA mode

Graph:



Results:

Peak and E.I.R.P

Frequency (MHz)	Peak Level (dBµV/m)	E.I.R.P Level (dBm)	E.I.R.P Limit (dBm)	E.I.R.P Margin (dB)	Azimuth (°)	Height (m)	Pol.	RBW (Hz)	Correction (dB)
1125	27.69	-67.57	-13	-54.57	60.00	2.10	Vertical	1000000.00	-21.29
2500	36.39	-58.87	-13	-45.87	24.00	1.00	Vertical	1000000.00	-13.58
2844.473684	38.20	-57.06	-13	-44.06	95.00	1.00	Vertical	1000000.00	-12.72
3000	38.52	-56.74	-13	-43.74	9.00	1.10	Vertical	1000000.00	-12.25
5000	43.91	-51.35	-13	-38.35	9.00	3.89	Vertical	1000000.00	-7.90

Notes:
The level in E.I.R.P (dBm) is calculated from the peak readings as follow : E.I.R.P (dBm) = E Peak (dBµV/m) + 20*Log(d) -104.8, where d is the distance (in far field region) in meter. E.I.R.P (dBm) = E Peak (dBµV/m) -95.26 dB at 3 meters.

13-18 GHz Radiated Emissions

Company: Commscope | Antenna & Cables: LF | Bands: N, LF, HF, SHF
Model #: Legacy Band 66 With RP5100 host | Antenna: ETS002 3m 08_24_2022.txt ETS002 3m 08_24_2022.txt
Serial #: TBD | Cable(s): CBLHF2012-5M-2_02-19-2022.txt CBLHF2012-2M-1_02-19-2022.txt
Engineers: Kouma Sinn | Location: 10m Chamber | Barometer: DAV007 | Filter: REA004
Project #: G104844468 | Date(s): 12/01/21
Standard: CFR47 FCC Part 27 | Temp/Humidity/Pressure: 24 C 22% 1008 mbar
Receiver: ROS005-1 | Limit Distance (m): 3
PreAmp: PRE9_09-23-2022.txt | Test Distance (m): 0.1
PreAmp Used? (Y or N): Y | Voltage/Frequency: POE | Frequency Range: 13-18 GHz

Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
Low, Mid, and High channels manually scan at 10 cm. No emission was detected above the instrument noise floor											

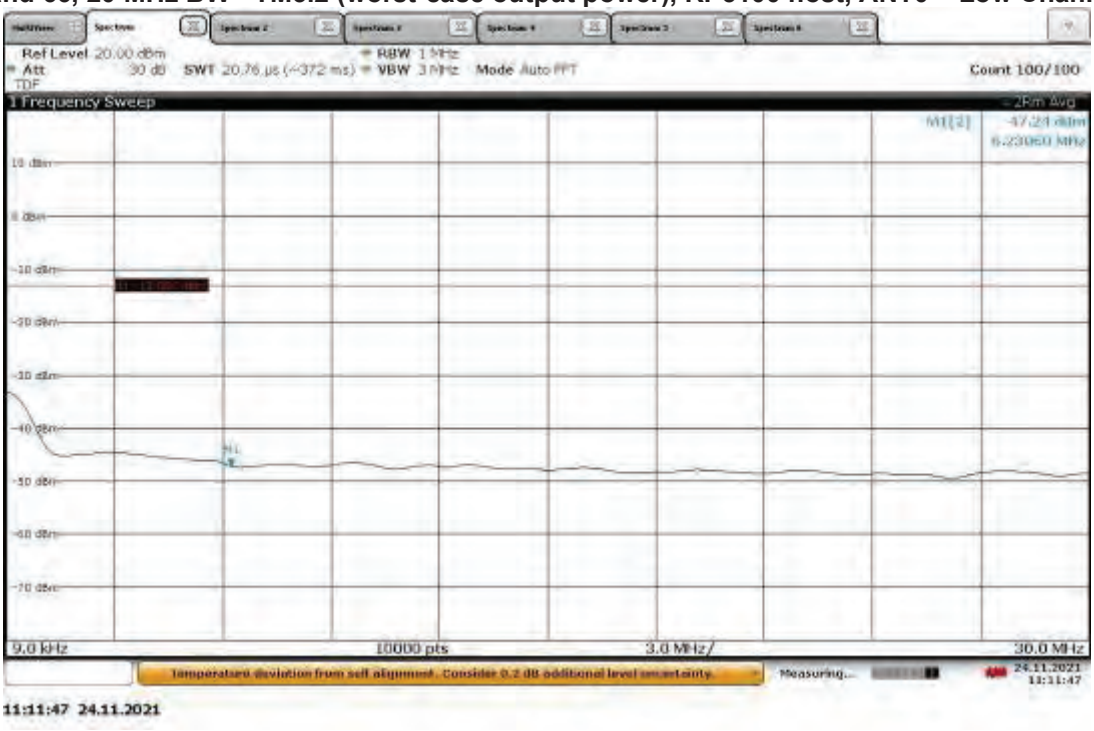
18-22 GHz Radiated Emissions

Company: Commscope | Antenna & Cables: HF | Bands: N, LF, HF, SHF
Model #: Legacy Band 66 With RP5100 host | Antenna: EMC04_1M_vert_01-28-2022.txt EMC04_1M_hor_01-28-2022.txt
Serial #: TBD | Cable(s): CBLHF2012-5M-2_02-19-2022.txt CBLHF2012-2M-1_02-19-2022.txt
Engineers: Kouma Sinn | Location: 10m Chamber | Barometer: DAV007 | Filter: REA006
Project #: G104844468 | Date(s): 12/01/21
Standard: CFR47 FCC Part 27 | Temp/Humidity/Pressure: 24 C 22% 1008 mbar
Receiver: ROS005-1 | Limit Distance (m): 3
PreAmp: PRE9_09-23-2022.txt | Test Distance (m): 0.1
PreAmp Used? (Y or N): Y | Voltage/Frequency: POE | Frequency Range: 18-22 GHz

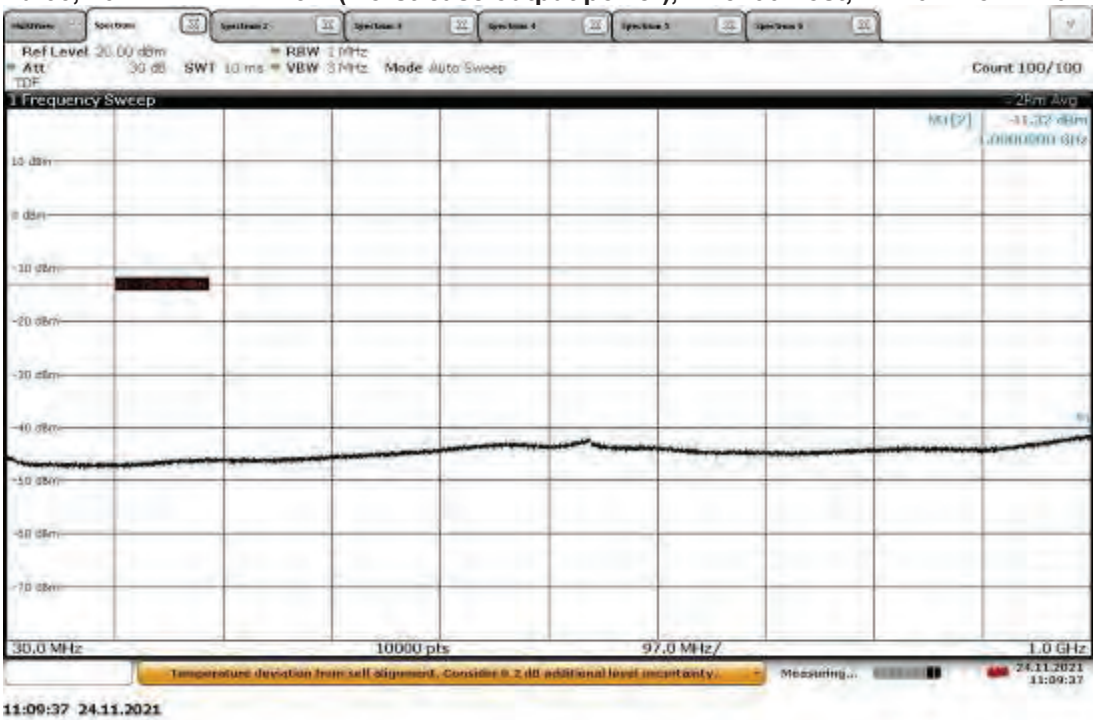
Net = Reading (dBuV/m) + Antenna Factor (dB1/m) + Cable Loss (dB) - Preamp Factor (dB) - Distance Factor (dB)
Peak: PK Quasi-Peak: QP Average: AVG RMS: RMS; NF = Noise Floor, RB = Restricted Band; Bandwidth denoted as RBW/VBW

Detector Type	Ant. Pol. (V/H)	Frequency MHz	Reading dB(uV)	Antenna Factor dB(1/m)	Cable Loss dB	Pre-amp Factor dB	Distance Factor dB	Net dB(uV/m)	Limit dB(uV/m)	Margin dB	Bandwidth
Low, Mid, and High channels manually scan at 10 cm. No emission was detected above the instrument noise floor											

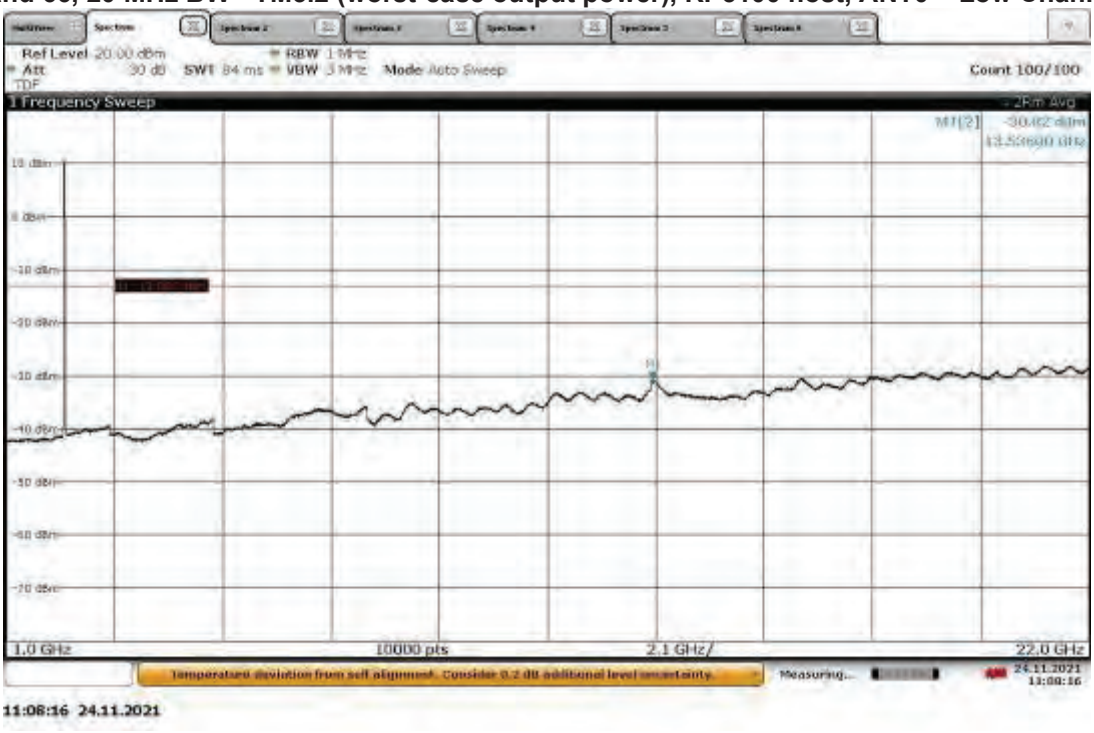
Antenna Port Conducted Emissions, 9kHz-30 MHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT0 – Low Channel



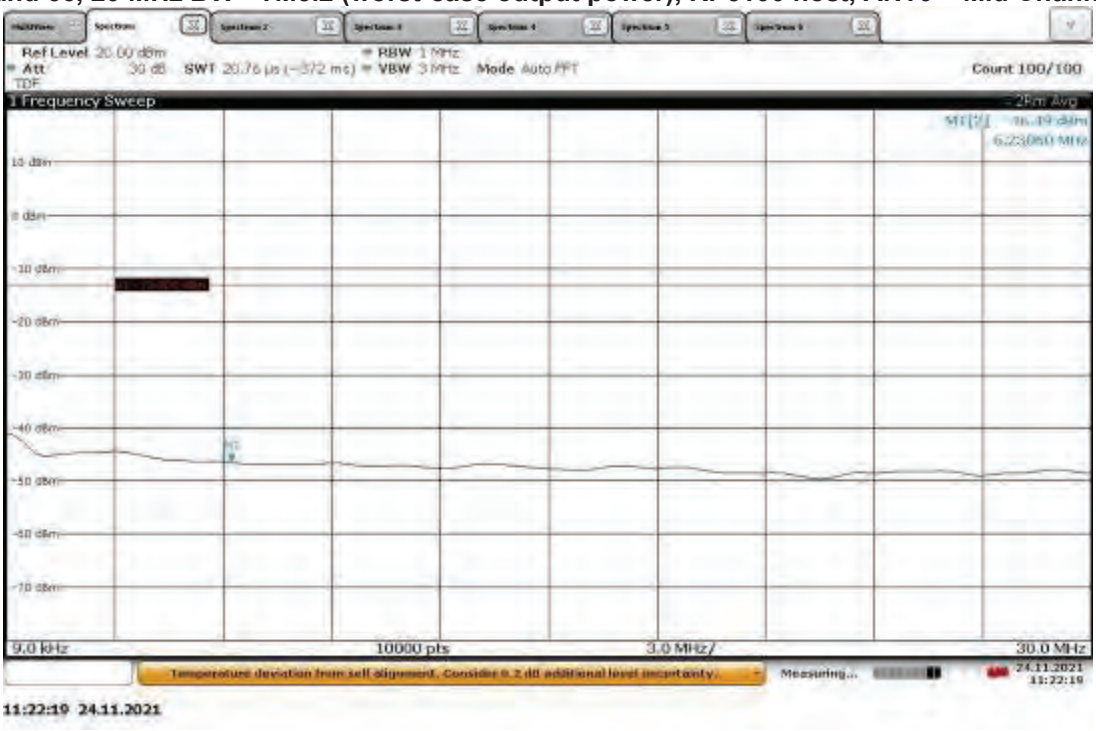
Antenna Port Conducted Emissions, 30 MHz-1 GHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT0 – Low Channel



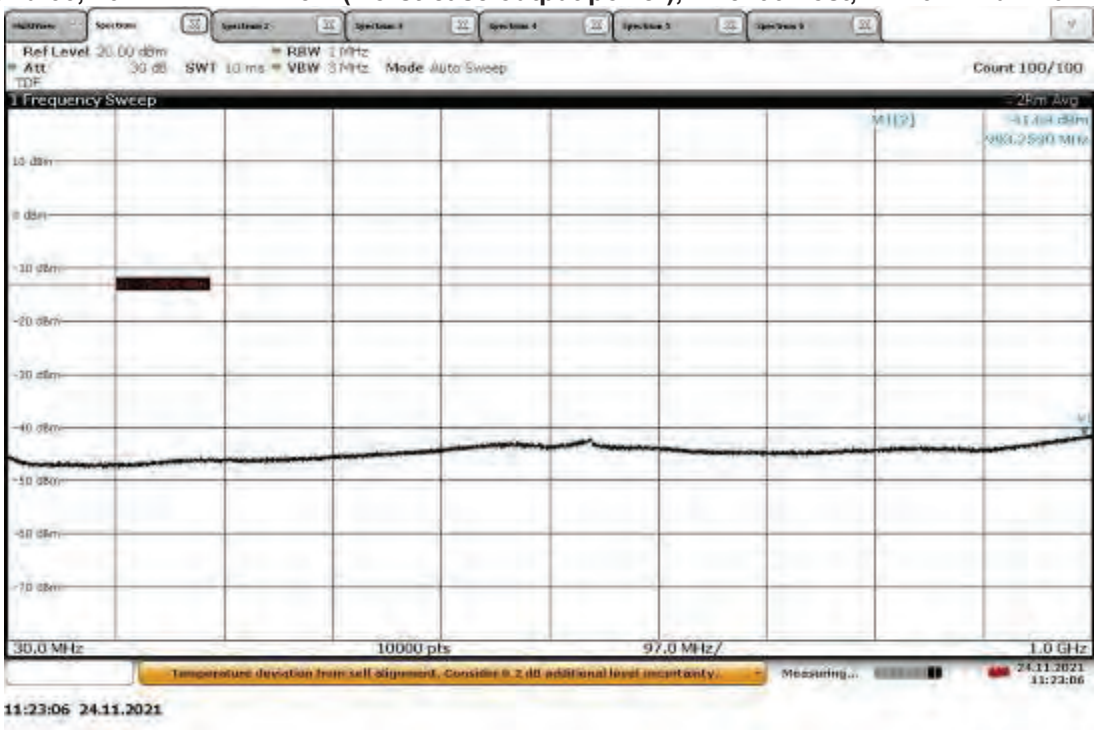
Antenna Port Conducted Emissions, 1-22 GHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT0 – Low Channel



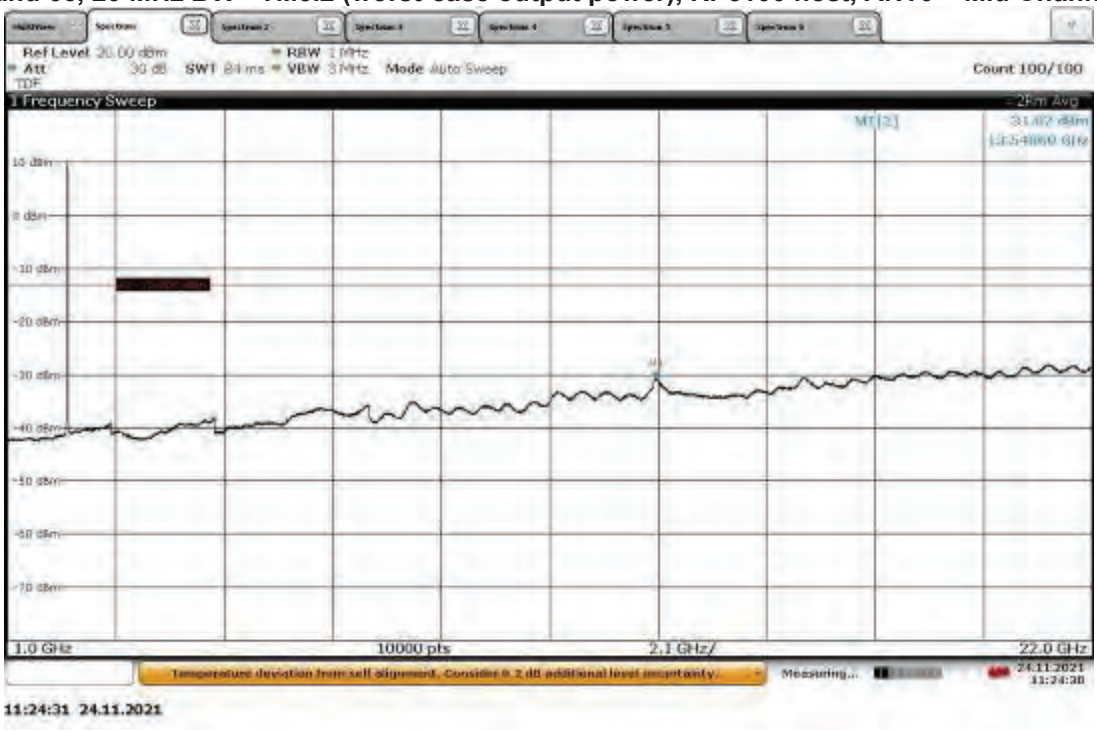
Antenna Port Conducted Emissions, 9 kHz-30 MHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT0 – Mid Channel



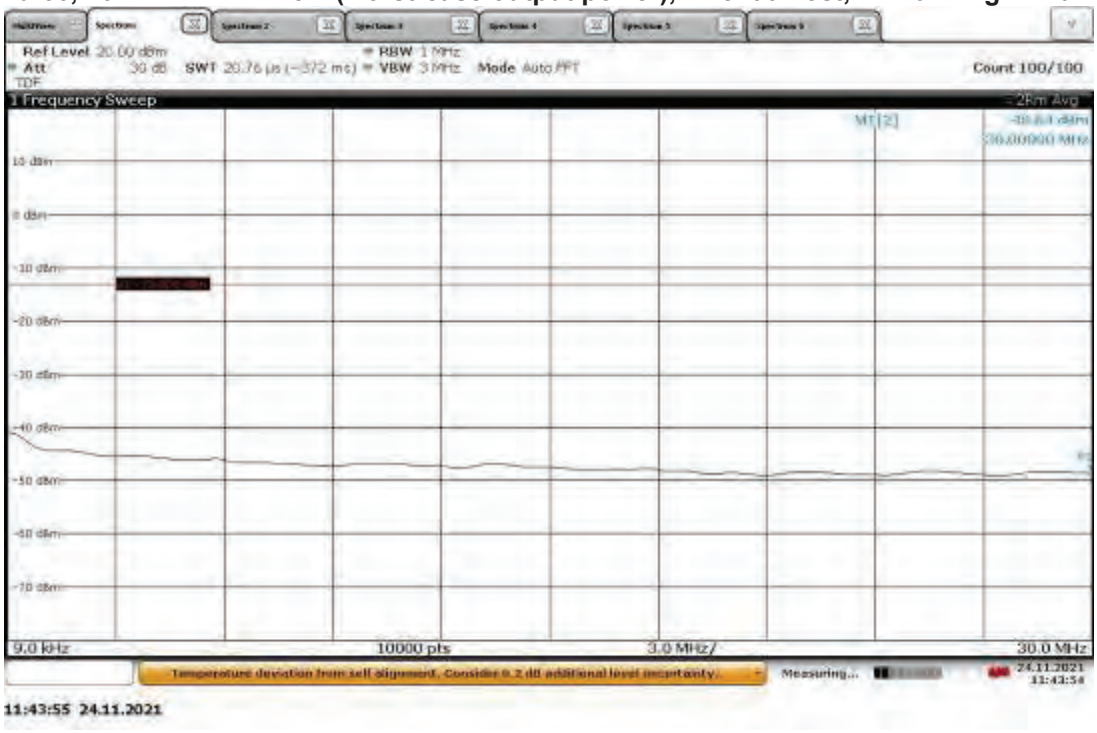
Antenna Port Conducted Emissions, 30 MHz- 1GHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT0 – Mid Channel



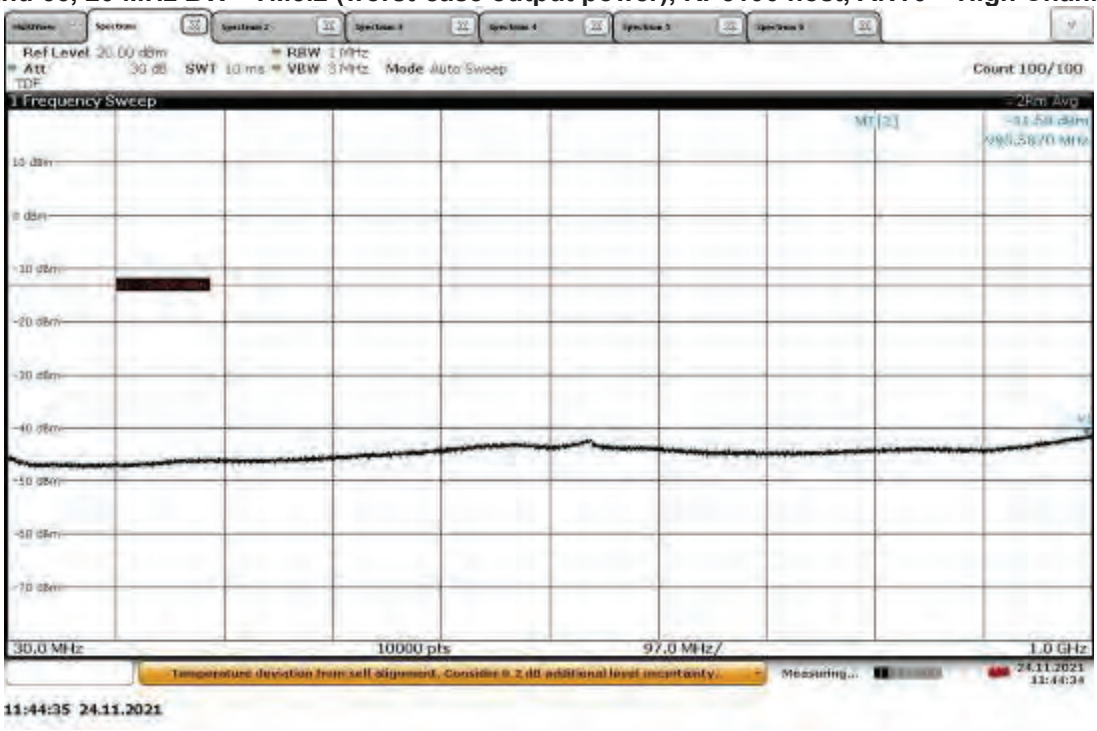
Antenna Port Conducted Emissions, 1-22 GHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT0 – Mid Channel



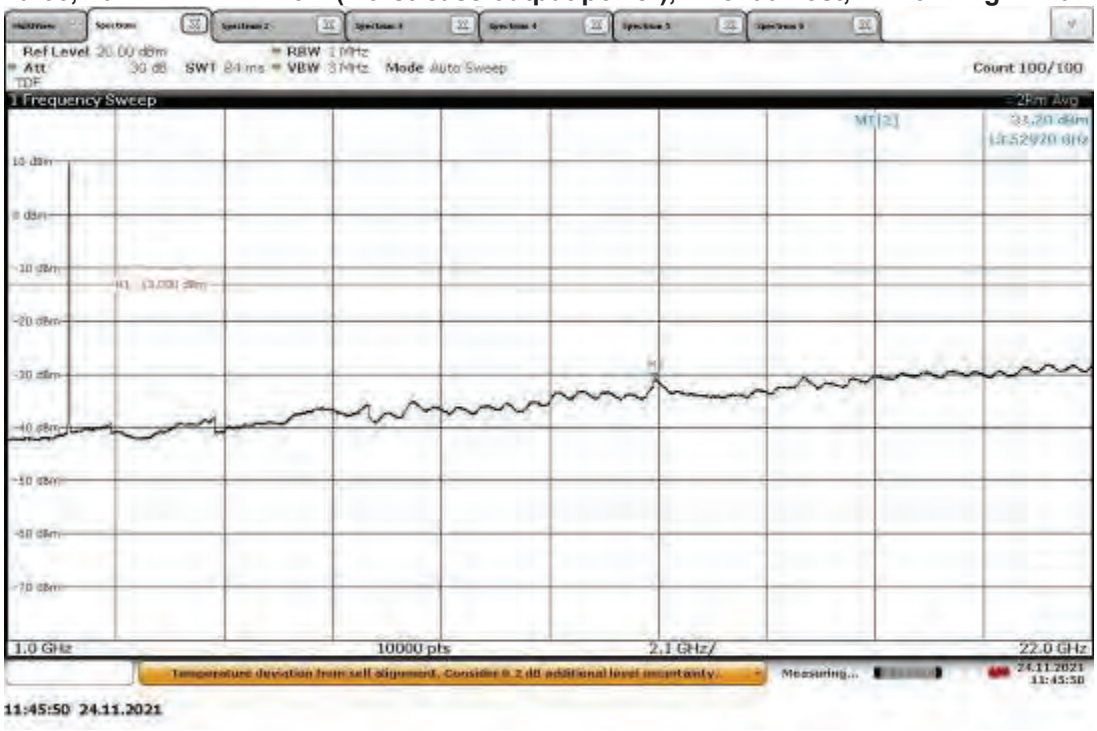
Antenna Port Conducted Emissions, 9 kHz-30 MHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT0 – High Channel



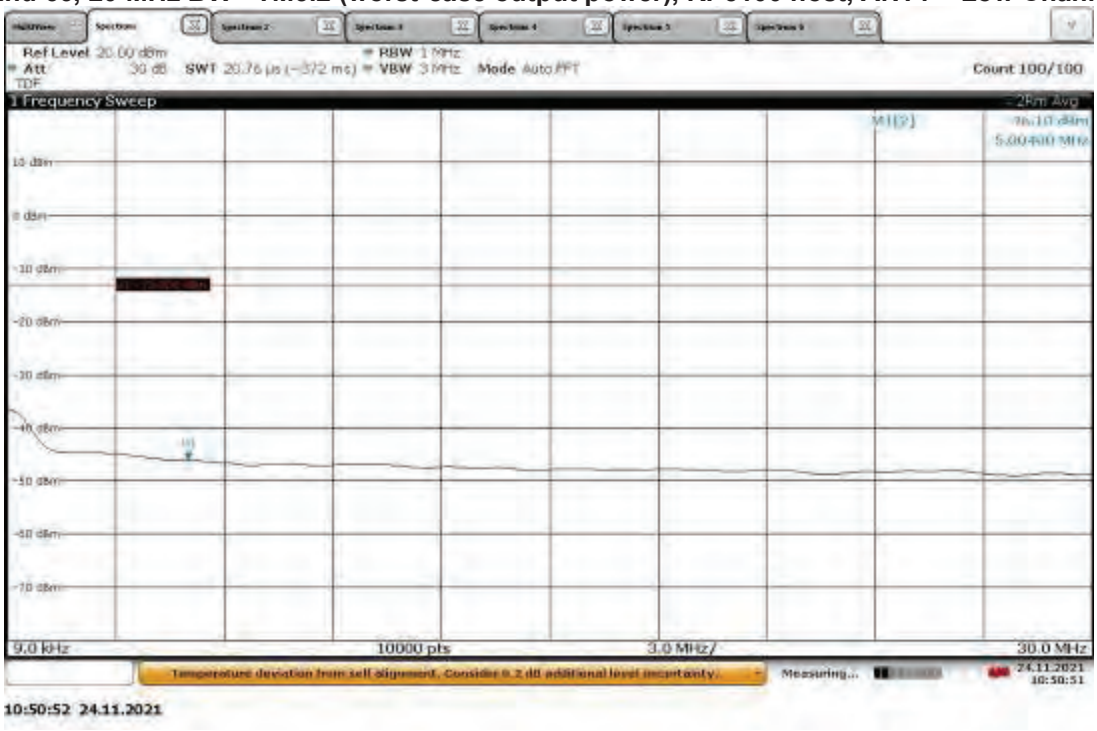
Antenna Port Conducted Emissions, 30 MHz- 1GHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT0 – High Channel



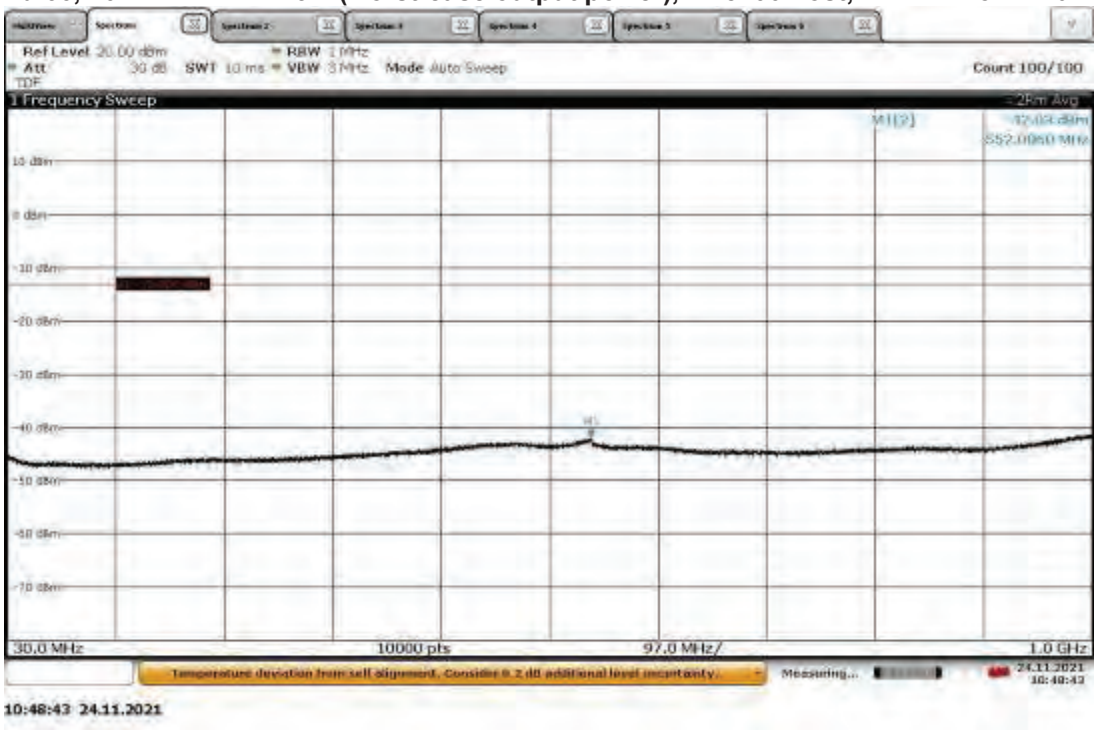
Antenna Port Conducted Emissions, 1-22 GHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT0 – High Channel



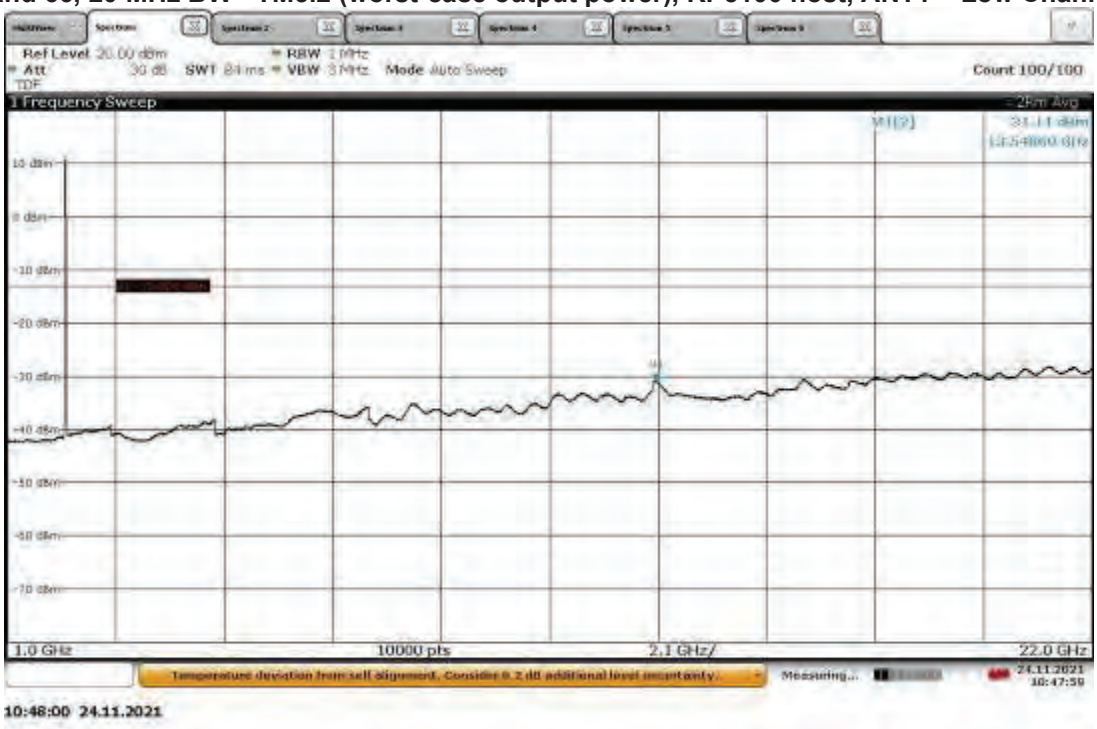
Antenna Port Conducted Emissions, 9 kHz-30 MHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT1 – Low Channel



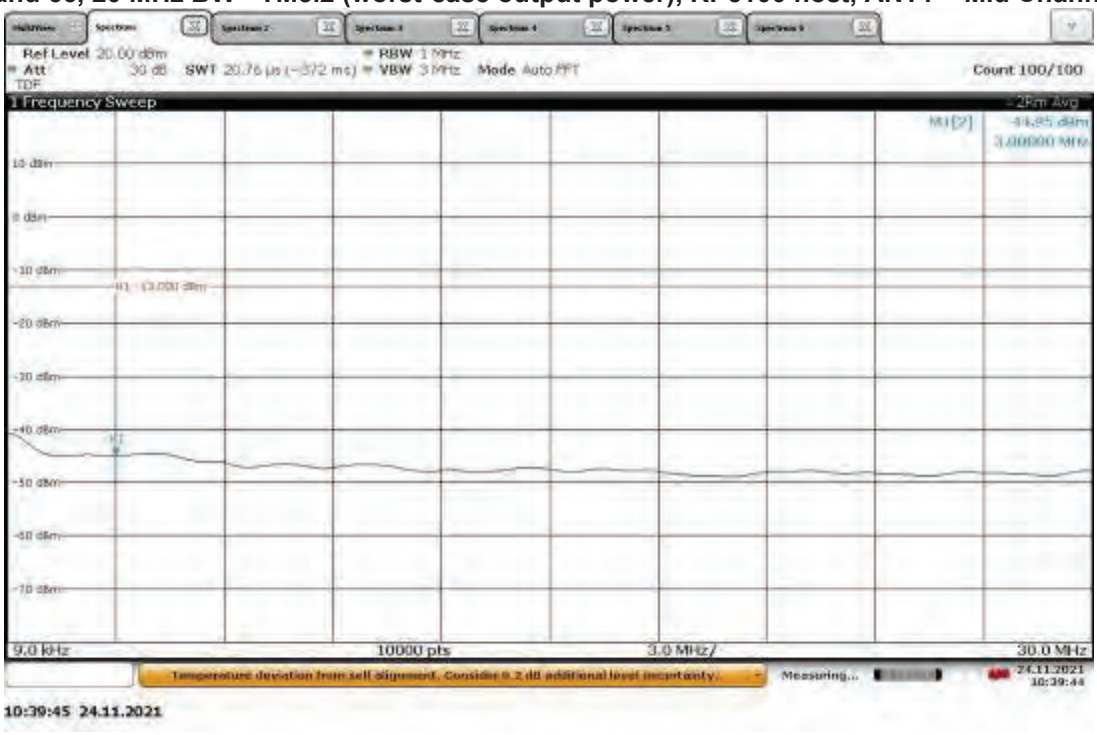
Antenna Port Conducted Emissions, 30 MHz- 1GHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT1 – Low Channel



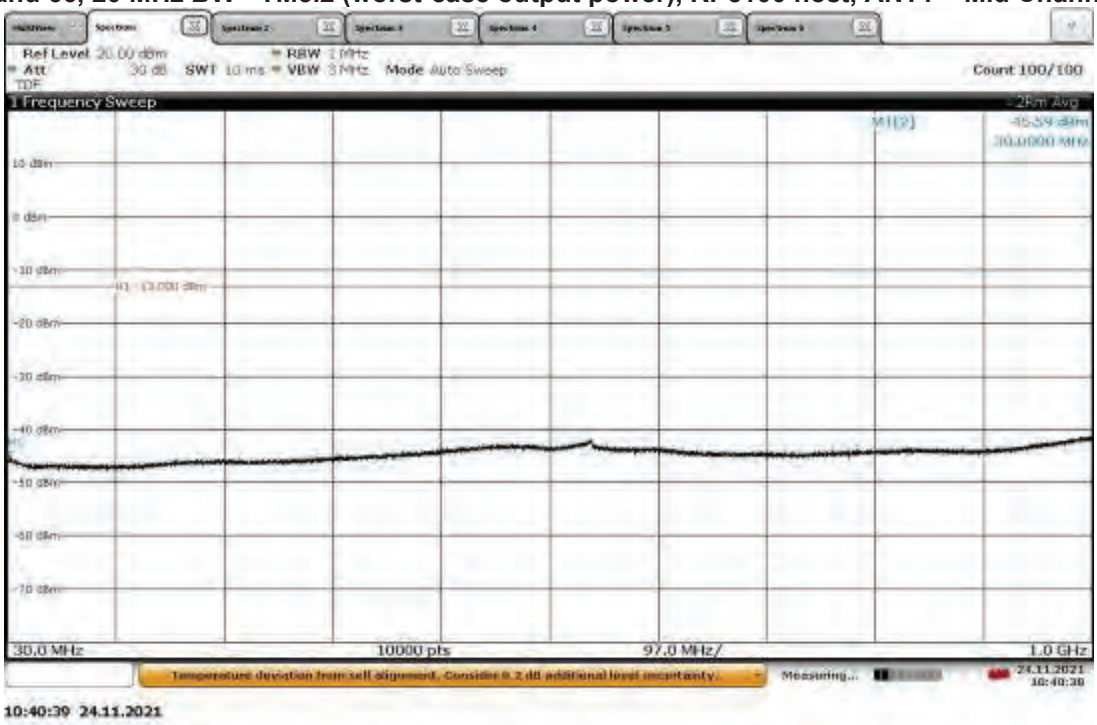
Antenna Port Conducted Emissions, 1-22 GHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT1 – Low Channel



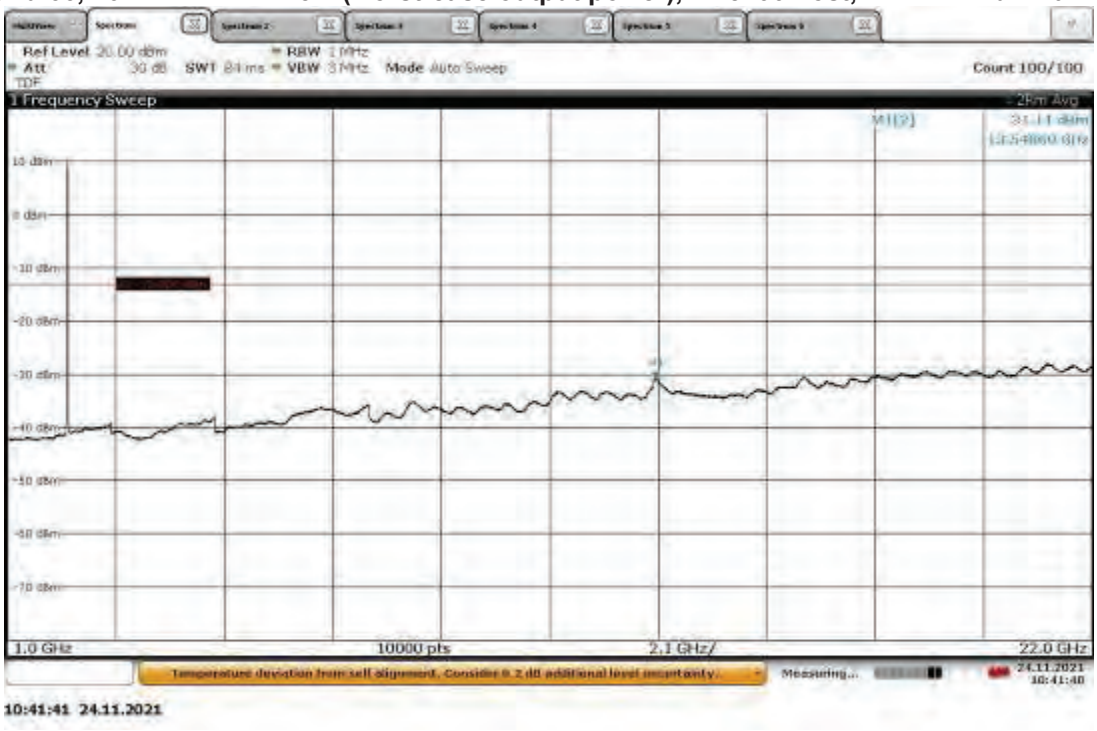
Antenna Port Conducted Emissions, 9 kHz-30 MHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT1 – Mid Channel



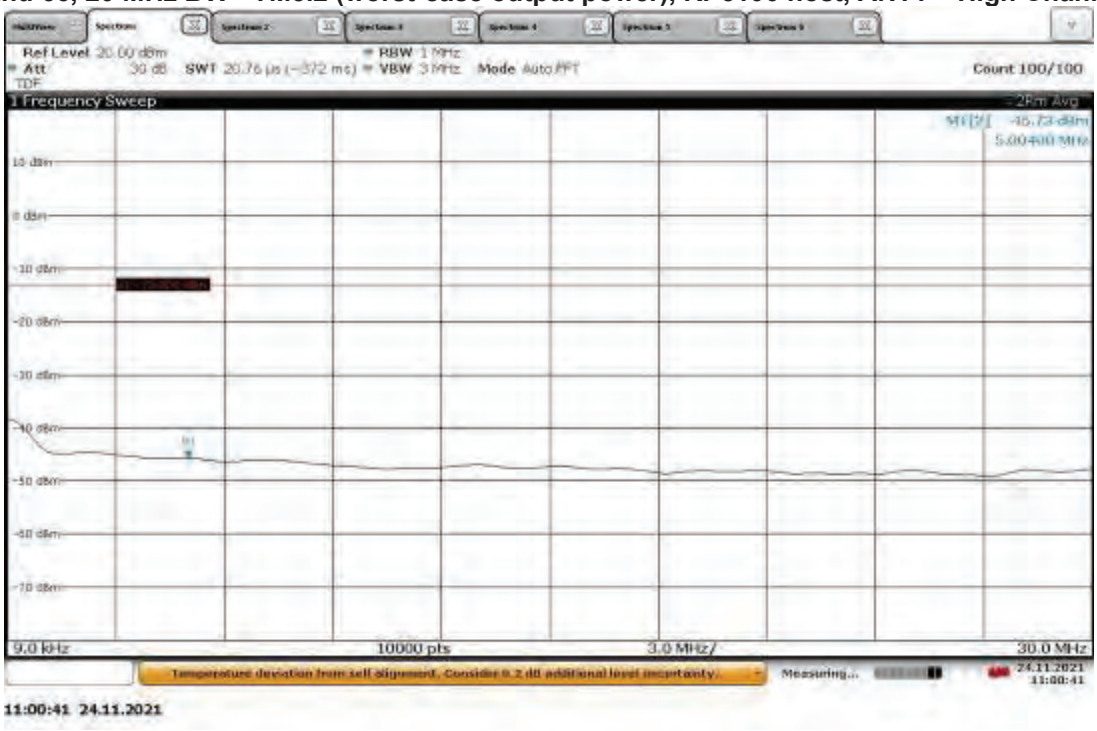
Antenna Port Conducted Emissions, 30 MHz- 1GHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT1 – Mid Channel



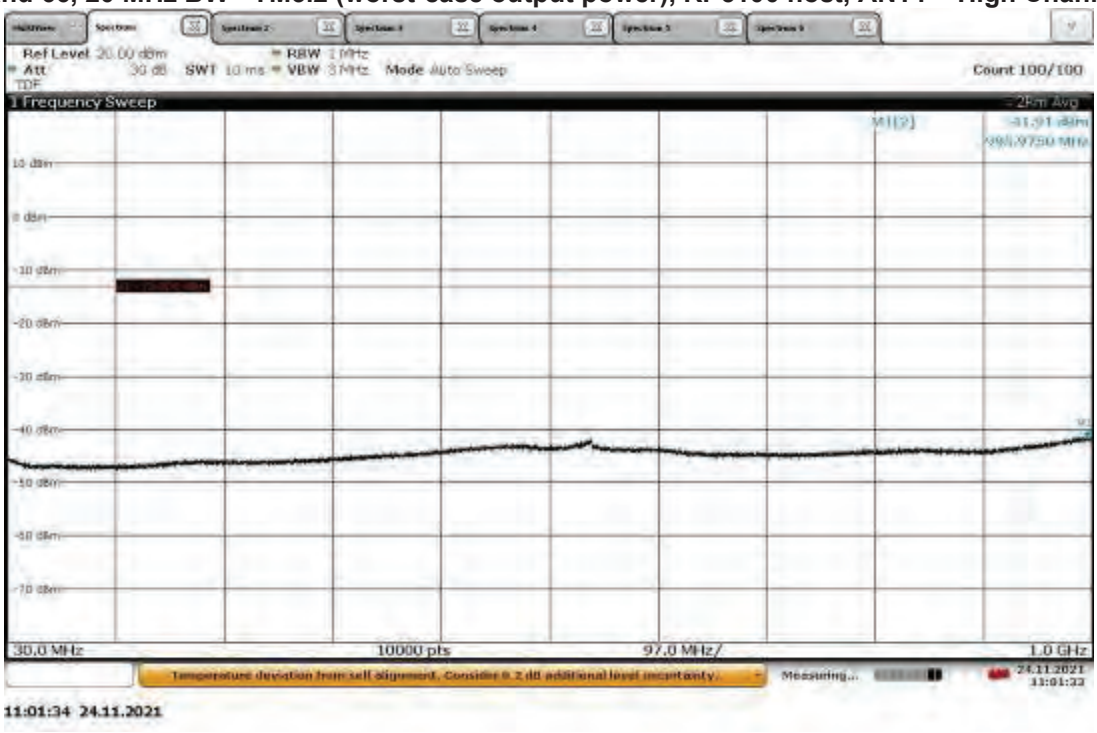
Antenna Port Conducted Emissions, 1-22 GHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT1 – Mid Channel



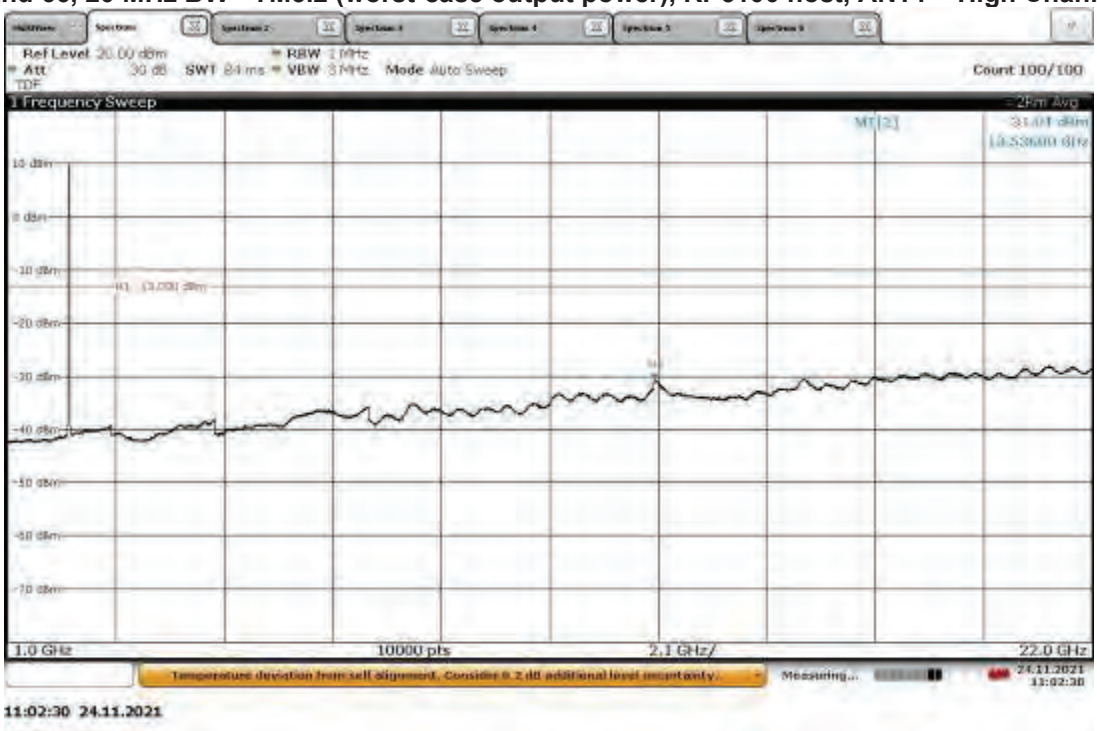
Antenna Port Conducted Emissions, 9 kHz-30 MHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT1 – High Channel



Antenna Port Conducted Emissions, 30 MHz- 1GHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT1 – High Channel



Antenna Port Conducted Emissions, 1-22 GHz
Band 66, 20 MHz BW - TM3.2 (worst-case output power), RP5100 host, ANT1 – High Channel



Test Personnel:	Kouma Sinn KPS	Test Date:	11/24/2021, 12/01/2021
	Vathana F. Ven VFV		11/28/2021
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 27	Limit Applied:	See report section 11.3
Input Voltage:	48 VDC (POE)		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	23, 23, 24 ºC
		Relative Humidity:	14, 15, 21 %
		Atmospheric Pressure:	1014, 1002, 1007 mbars

Deviations, Additions, or Exclusions: None

12 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	12/07/2021	104844468BOX-005	KPS	VFV	Original Issue
1	02/07/2022	104844468BOX-005	KPS	VFV	Removed photos, Added justification for worst case for spurious emissions on page 292