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CommScope Technologies, LLC

TEST REPORT

SCOPE OF WORK
EMISSIONS TESTING – RPM-A5A11-B66 (Band 4)

REPORT NUMBER
105081151BOX-001

ISSUE DATE
June 10, 2022

[REVISED DATE]
July 15, 2022

DOCUMENT CONTROL NUMBER
Non-Specific Radio Report Shell Rev. December 2017

EMISSIONS TEST REPORT

(FULL COMPLIANCE)

Report Number: 105081151BOX-001
Project Number: G105081151

Report Issue Date: 06/10/2022
Report Revision Date: 07/15/2022

Model(s) Tested: RPM-A5A11-B66 (Band 4)
Model(s) Partially Tested: None
Model(s) Not Tested but declared equivalent by the client: None

Standards: CFR47 FCC Part 27 (06/2022)

Tested by:
Intertek Testing Services NA, Inc.
70 Codman Hill Road
Boxborough, MA 01719
USA

Client:
CommScope Technologies LLC
900 Chelmsford St.
Lowell, MA 01851
USA

Report prepared by

Vathana Ven / EMC Engineering Supervisor

Report reviewed by

Kouma Sinn / EMC Engineering Supervisor

Table of Contents

1 Introduction and Conclusion

The tests indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining test sections are the verbatim text from the actual data sheets used during the investigation. These test sections include the test name, the specified test Method, a list of the actual Test Equipment Used, documentation Photos, Results and raw Data. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product tested **complies** with the requirements of the standard(s) indicated. The results obtained in this test report pertain only to the item(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

2 Test Summary

Section	Test full name	Result
3	Client Information	--
4	Description of Equipment Under Test and Variant Models	--
5	System Setup and Method	--
6	Maximum Peak Output Power CFR47 FCC Parts 2.1046 and 27.50(d)(1-2)	Pass
7	Peak-to-Average Power Ratio (PAPR) CFR47 FCC Part 27.50(d)(5)	Pass
8	26 dB Bandwidth and Occupied Bandwidth CFR47 FCC Parts 2.1049 and 27.53(h)(3)	Pass
9	Upper Band Edge Compliance CFR47 FCC 2.1051, 2.1053, and 27.53(h)	Pass
10	Revision History	--

Notes: Band 4 is a subset of Band 66 the hardware is identical. It was added as a class 2 permissive change to Band 66 module.

3 Client Information

This EUT was tested at the request of:

Client: CommScope Technologies LLC
900 Chelmsford St.
Lowell, MA 01852
USA

Contact: Mr. Zac Johnson
Telephone: (978) 250-2678
Fax: None
Email: zac.johnson@commscope.com

4 Description of Equipment Under Test and Variant Models

Manufacturer: CommScope Telecommunications (China) Ltd.
68 Su Hong Xi Lu, Suzhou Industrial Park.
Suzhou, Jiangsu, 215021, China

Equipment Under Test			
Description	Manufacturer	Model Number	Serial Number
Band 4 Radio Module	CommScope Technologies LLC	RPM-A5A11-B66 (Band 4)	19473000001

Notes: Band 4 is a subset of Band 66 the hardware is identical. It was added as a class 2 permissive change to Band 66 module.

Receive Date:	06/03/2022
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)
The Radio Module is band specific using the Analog devices RF Agile Transceiver IC, AD936x. The device combines an RF front end with a flexible mixed-signal baseband section and integrated frequency synthesizers providing a configurable digital interface to the processor. The Radio Module also contains a band specific front end, band specific antenna and required power rails. All power rails required are derived from the 12 VDC bus supplied by the Baseband card. The reference frequency for the radio IC is 38.4 MHz is derived from the from an OCXO which is disciplined from a 1588 reference clock. It supports bandwidths of 5, 10, 15, and 20 MHz with four modulations; TM1.1-QPSK, TM3.2-16QAM, TM3.1-64QAM, and TM3.1a-256QAM. The radio is fixed.

Description of Radio Host (provided by client)
The OneCell® RP5100 family is factory configurable with 2 – 4 Radios Modules mounted to a Baseband card. The same PCB's will be used in both indoor and outdoor version of the radio point. The device is fixed. The baseband card is the host for the modular radios. It contains a two ethernet PHY's with one supporting 100M/1G/2.5G/5G/10G ethernet and the other supporting 100M/1G. The main processor is Zylinx Ultrascale+ MPSoC with 2 GB DDR3 and 4 GB Flash memory. The baseband PCBA converts POE power to +12 VDC bus voltage require as input to the radio modules.

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
48 VDC	0.960 mA per pair max	DC	N/A

Operating modes of the EUT:

No.	Descriptions of EUT Exercising
1	Pre-programmed to transmit at Low, Mid, and High channels at four different modulations, TM1.1-QPSK, TM3.2-16QAM, TM3.1-64QAM, and TM3.1a-256QAM.

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	RP5200_B4_B10

Radio/Receiver Characteristics	
Frequency Band(s)	2110-2155 MHz
Modulation Type(s)	TM1.1-QPSK, TM3.2-16QAM, TM3.1-64 QAM, TM3.1a-256QAM
Maximum Output Power (conducted)	22.81 dBm (Conducted)
Test Channels	Low, Middle, High Channels of 5 MHz, 10 MHz, 15 MHz, and 20 MHz Bandwidths, Single Channel operation only
Occupied Bandwidth	17.94 MHz (Worst-case)
MIMO Information (# of Transmit and Receive antenna ports)	2x2 MIMO using cross polarized antennas and uncorrelated data streams
Equipment Type	Module in a host
Antenna Type and Gain	Detachable Antenna: +4 dBi (as provided by the client. Intertek takes no responsibility for the accuracy of this information. Actual antenna gain will be determined at the time of licensing)

Variant Models:

The following variant models were not tested as part of this evaluation, but have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

None

5 System Setup and Method

Cables					
ID	Description	Length (m)	Shielding	Ferrites	Termination
--	LAN (POE Power Cable)	2.58	Shielded	None	POE P/S
--	LAN (Communication)	9.00	Shielded	None	Laptop

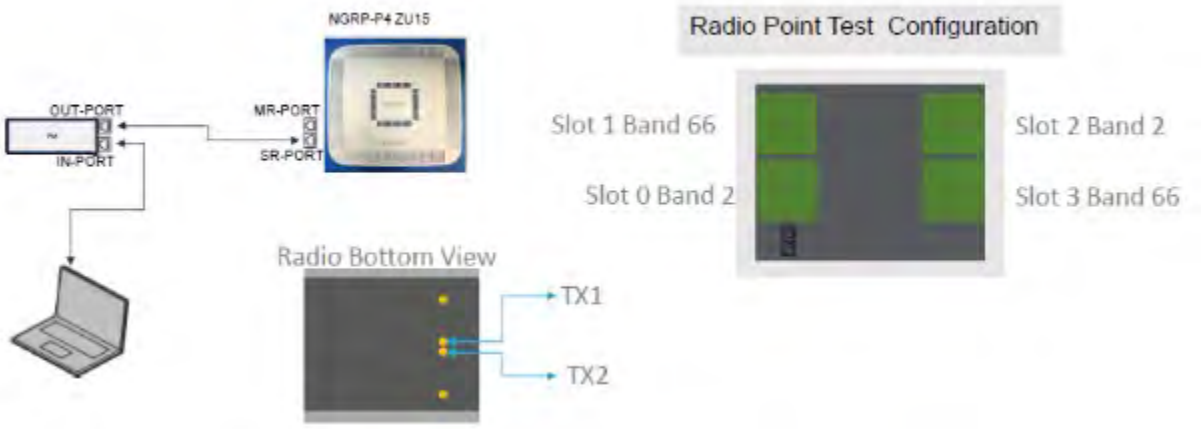
Support Equipment			
Description	Manufacturer	Model Number	Serial Number
Laptop	Dell	LATITUDE 3520	None
Power Device Analzyer	Sifos Technologies	PDA-604A	604A0107
OneCell® RP5200*	CommScope Technologies LLC	RP-A52xxi	16361780004

*Radio host used for testing

5.1 Method:

Configuration as required by ANSI C63.26-2015, KDB662911, and CFR47 FCC Part 27 (06/2022).

5.2 EUT Block Diagram:



6 Maximum Peak Output Power

6.1 Method

Tests are performed in accordance with CFR47 FCC Parts 2.1046 and 27, KDB 662911, and ANSI C63.26 Section 5.2.4.4.

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.

6.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	01/26/2022	01/26/2023
CBLHF2012-2M-2	2m 9kHz-40GHz Coaxial Cable – SET2	Huber & Suhner	SF102	252675001	02/10/2022	02/10/2023
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	11/02/2021	11/02/2022
DAV005'	Weather Station	Davis	6250	MS191218083	02/11/2022	02/11/2023

Software Utilized:

Name	Manufacturer	Version
None	--	--

6.3 Results:

The maximum conducted output power was measured to be 22.81 dBm, which is much less than the EIRP limit of 27.50(d)(1-2). The sample tested was found to Comply. Antenna gain limitations will depend on the location of deployment. Output power from the two antenna ports was not summed since the data streams are uncorrelated and the antennas are cross polarized.

FCC Part §27.50(d) The following power and antenna height requirements apply to stations transmitting in the 1695-1710 MHz, 1710-1755 MHz, 1755-1780 MHz, 1915-1920 MHz, 1995-2000 MHz, 2000-2020 MHz, 2110-2155 MHz, 2155-2180 MHz and 2180-2200 MHz bands:
(1) The power of each fixed or base station transmitting in the 1995-2000 MHz, 2110-2155 MHz, 2155-2180 MHz or 2180-2200 MHz band and located in any county with population density of 100 or fewer persons per square mile, based upon the most recently available population statistics from the Bureau of the Census, is limited to:
(i) An equivalent isotropically radiated power (EIRP) of 3280 watts when transmitting with an emission bandwidth of 1 MHz or less;
(ii) An EIRP of 3280 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.
(2) The power of each fixed or base station transmitting in the 1995-2000 MHz, the 2110-2155 MHz 2155-2180 MHz band, or 2180-2200 MHz band and situated in any geographic location other than that described in paragraph (d)(1) of this section is limited to:
(i) An equivalent isotropically radiated power (EIRP) of 1640 watts when transmitting with an emission bandwidth of 1 MHz or less;
(ii) An EIRP of 1640 watts/MHz when transmitting with an emission bandwidth greater than 1 MHz.

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.13	26.13
		ANT1	4	21.95	25.95
High	2152.50	ANT0	4	21.99	25.99
		ANT1	4	21.97	25.97

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.61	26.61
		ANT1	4	22.01	26.01
High	2150.00	ANT0	4	22.11	26.11
		ANT1	4	22.29	26.29

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.55	26.55
		ANT1	4	21.92	25.92
High	2147.50	ANT0	4	22.16	26.16
		ANT1	4	22.06	26.06

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.31	26.31
		ANT1	4	21.79	25.79
High	2145.00	ANT0	4	22.30	26.30
		ANT1	4	21.90	25.90

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.07	26.07
		ANT1	4	21.55	25.55
High	2152.50	ANT0	4	21.51	25.51
		ANT1	4	21.82	25.82

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.18	26.18
		ANT1	4	21.38	25.38
High	2150.00	ANT0	4	21.58	25.58
		ANT1	4	21.84	25.84

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.08	26.08
		ANT1	4	21.57	25.57
High	2147.50	ANT0	4	21.37	25.37
		ANT1	4	21.45	25.45

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.23	26.23
		ANT1	4	21.64	25.64
High	2145.00	ANT0	4	21.73	25.73
		ANT1	4	21.40	25.40

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.58	26.58
		ANT1	4	21.95	25.95
High	2152.50	ANT0	4	22.22	26.22
		ANT1	4	22.21	26.21

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.68	26.68
		ANT1	4	21.99	25.99
High	2150.00	ANT0	4	22.11	26.11
		ANT1	4	22.32	26.32

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.41	26.41
		ANT1	4	21.81	25.81
High	2147.50	ANT0	4	22.15	26.15
		ANT1	4	22.15	26.15

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.46	26.46
		ANT1	4	21.88	25.88
High	2145.00	ANT0	4	22.19	26.19
		ANT1	4	22.33	26.33

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.81	26.81
		ANT1	4	21.94	25.94
High	2152.50	ANT0	4	21.96	25.96
		ANT1	4	22.29	26.29

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.66	26.66
		ANT1	4	22.03	26.03
High	2150.00	ANT0	4	22.10	26.10
		ANT1	4	22.28	26.28

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

Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.56	26.56
		ANT1	4	21.94	25.94
High	2147.50	ANT0	4	22.19	26.19
		ANT1	4	22.09	26.09

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

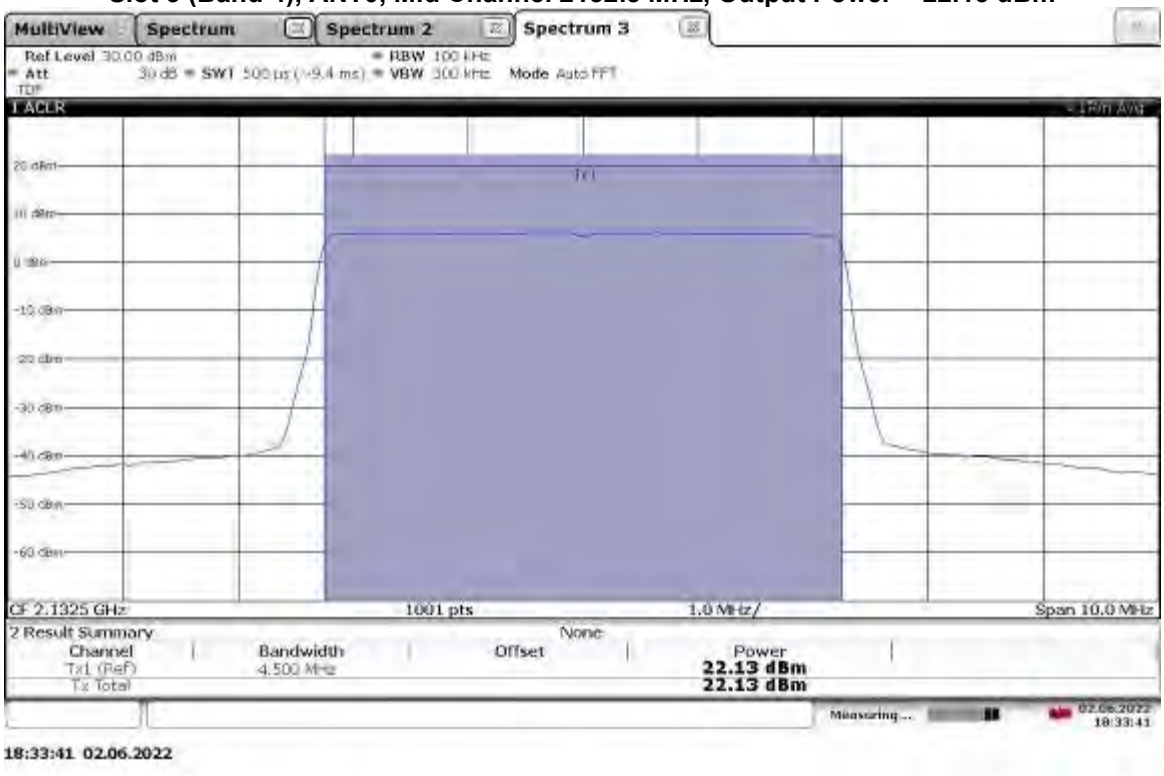
Channel	Frequency (MHz)	Antenna Port	Antenna Gain (dBi)	Conducted Output Power (dBm)	EIRP Output power (dBm)
Mid	2132.50	ANT0	4	22.47	26.47
		ANT1	4	22.01	26.01
High	2145.00	ANT0	4	22.25	26.25
		ANT1	4	22.04	26.04

6.4 Setup Photograph:

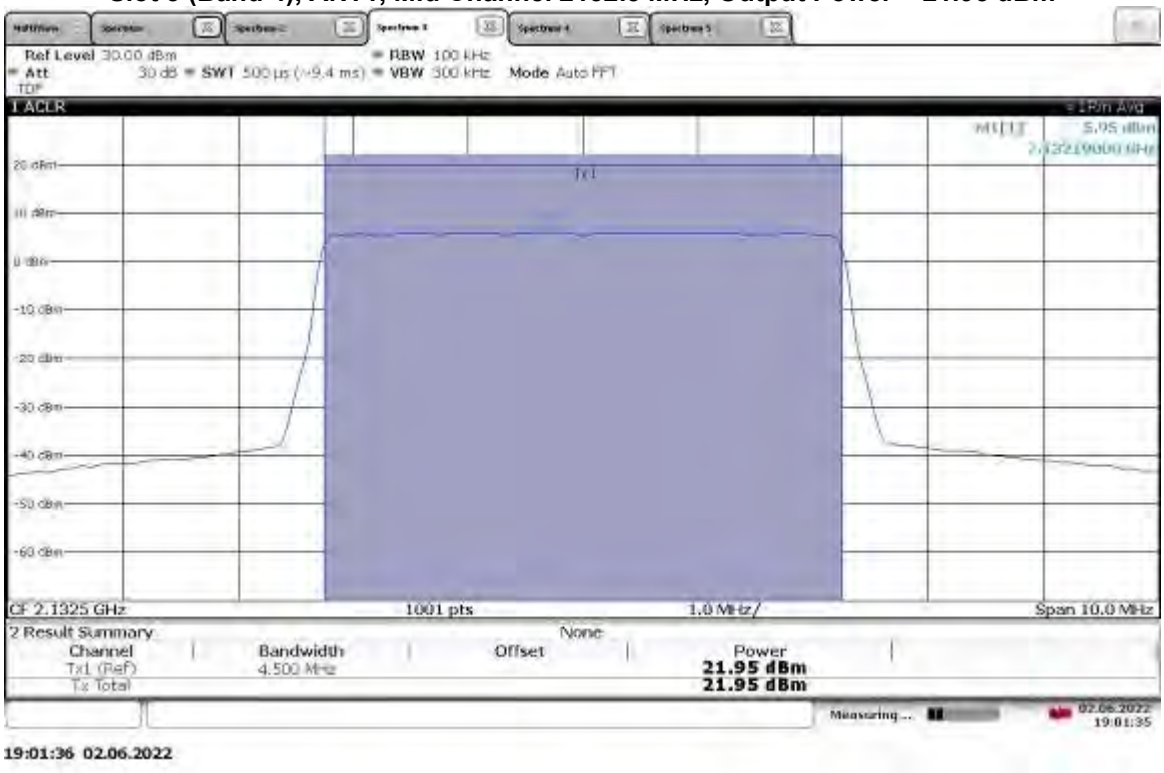
Confidential – Photos not included in this report

6.5 Plots/Data:

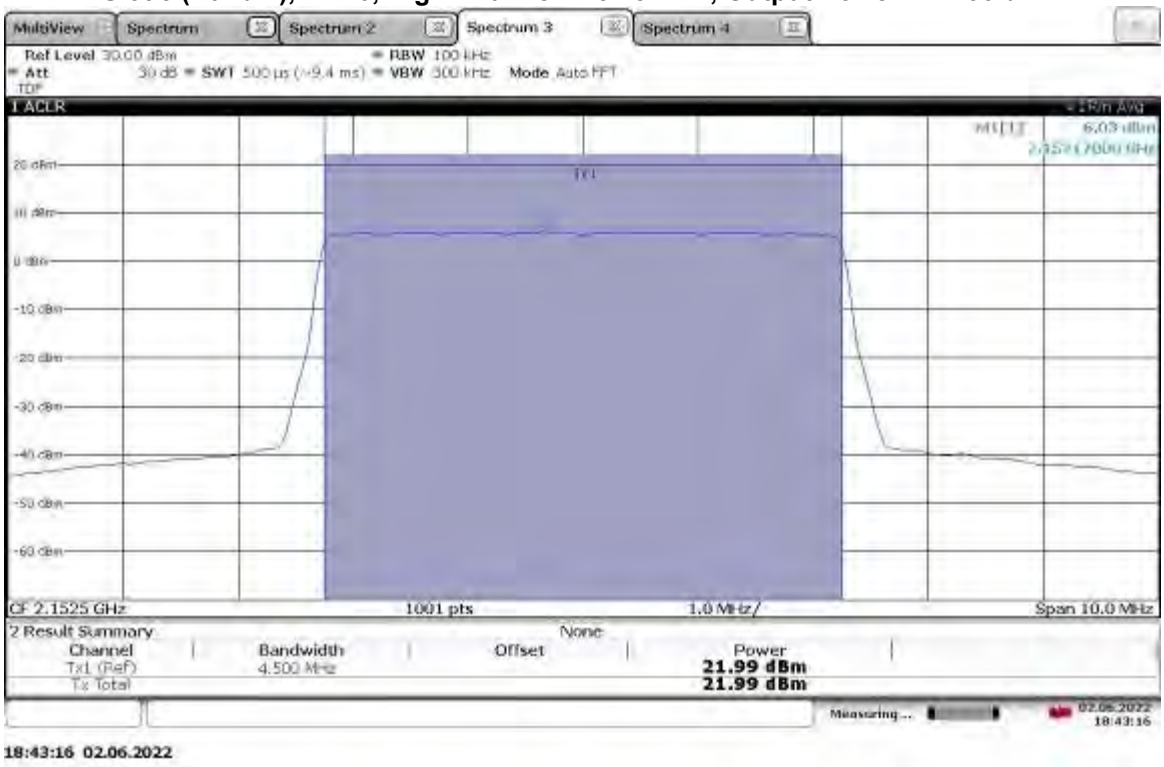
TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.13 dBm



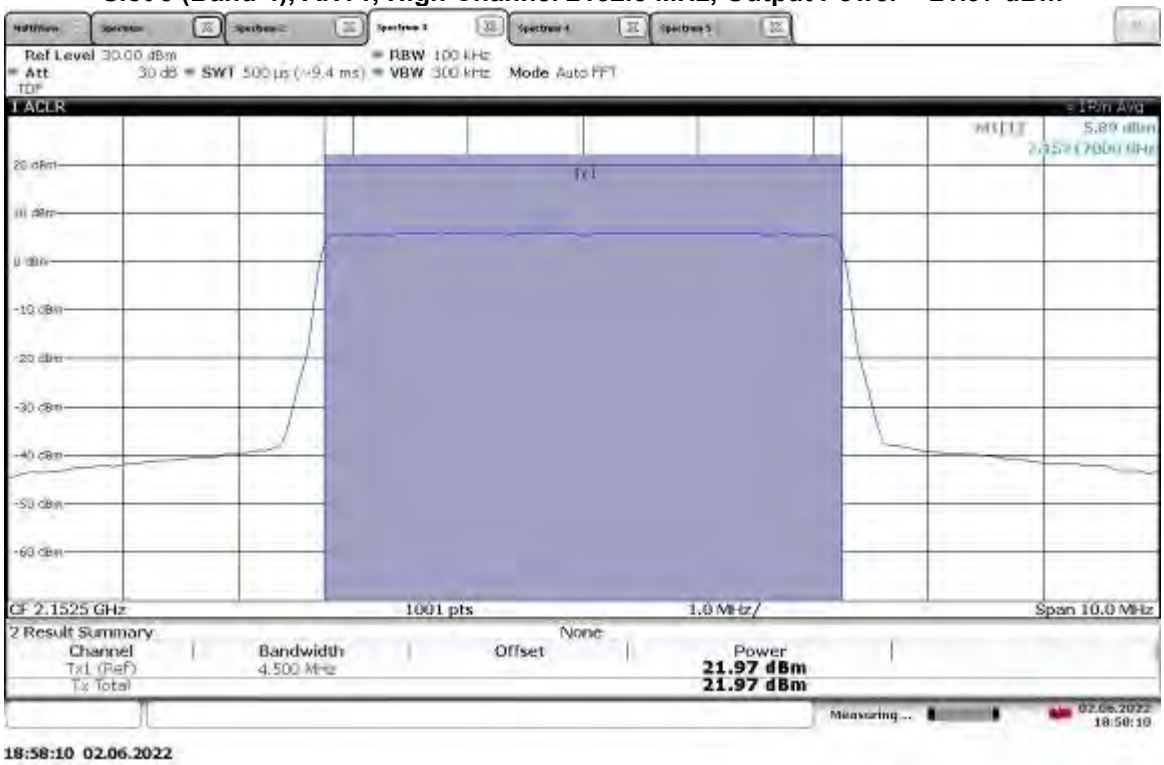
TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.95 dBm



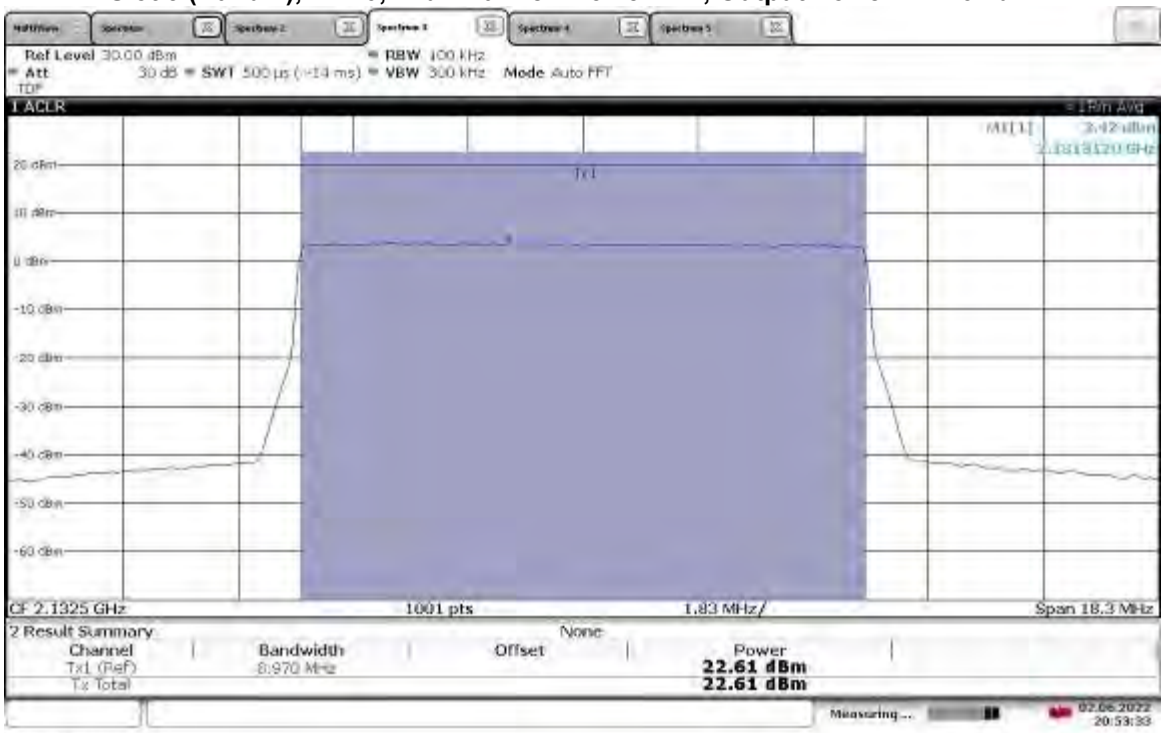
TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2152.5 MHz, Output Power = 21.99 dBm



TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2152.5 MHz, Output Power = 21.97 dBm



TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.61 dBm



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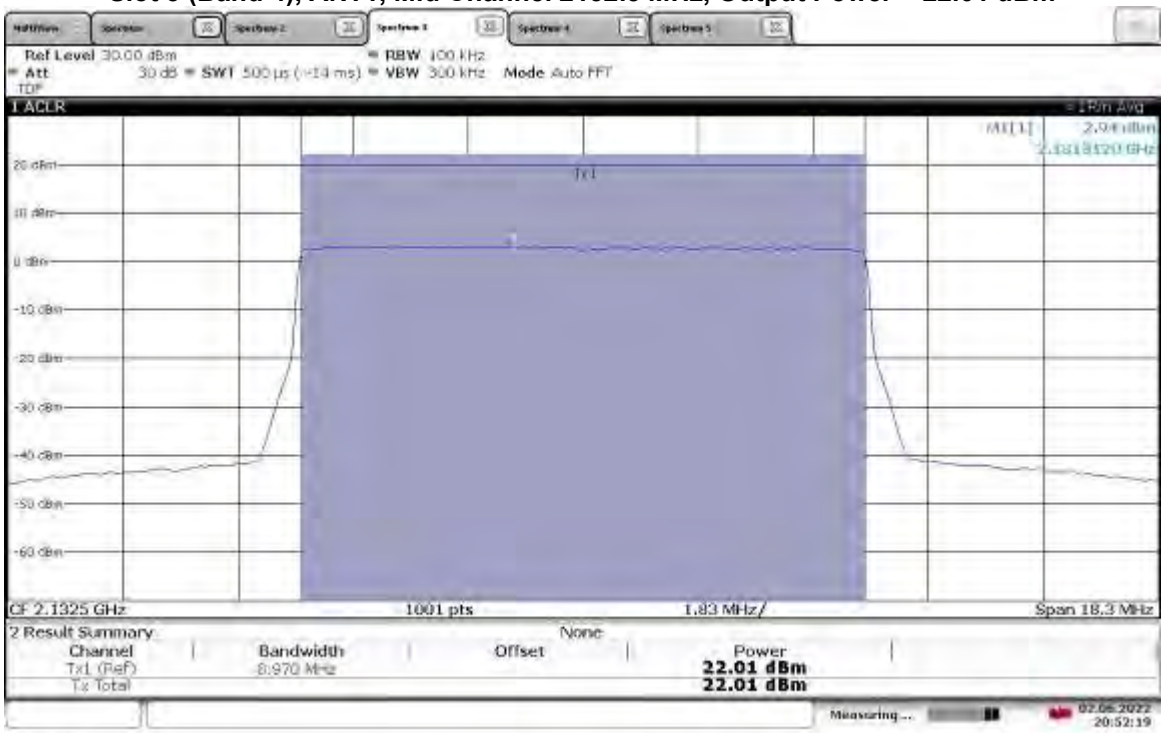
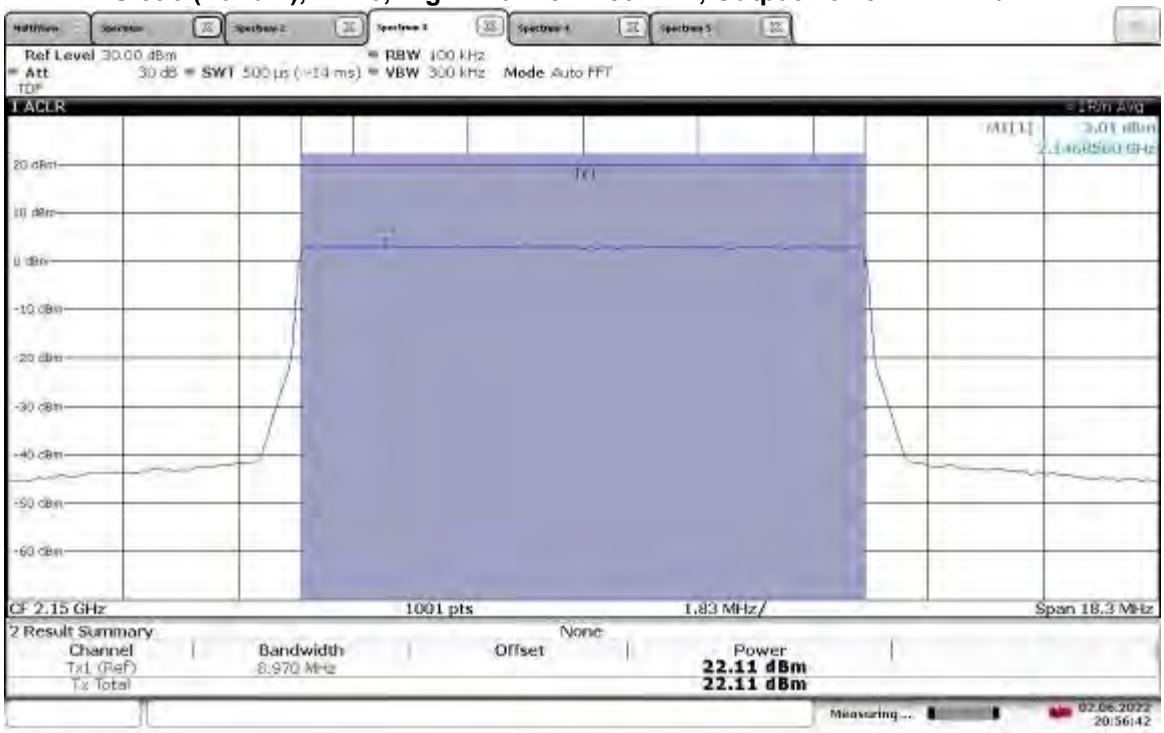
TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 22.01 dBm

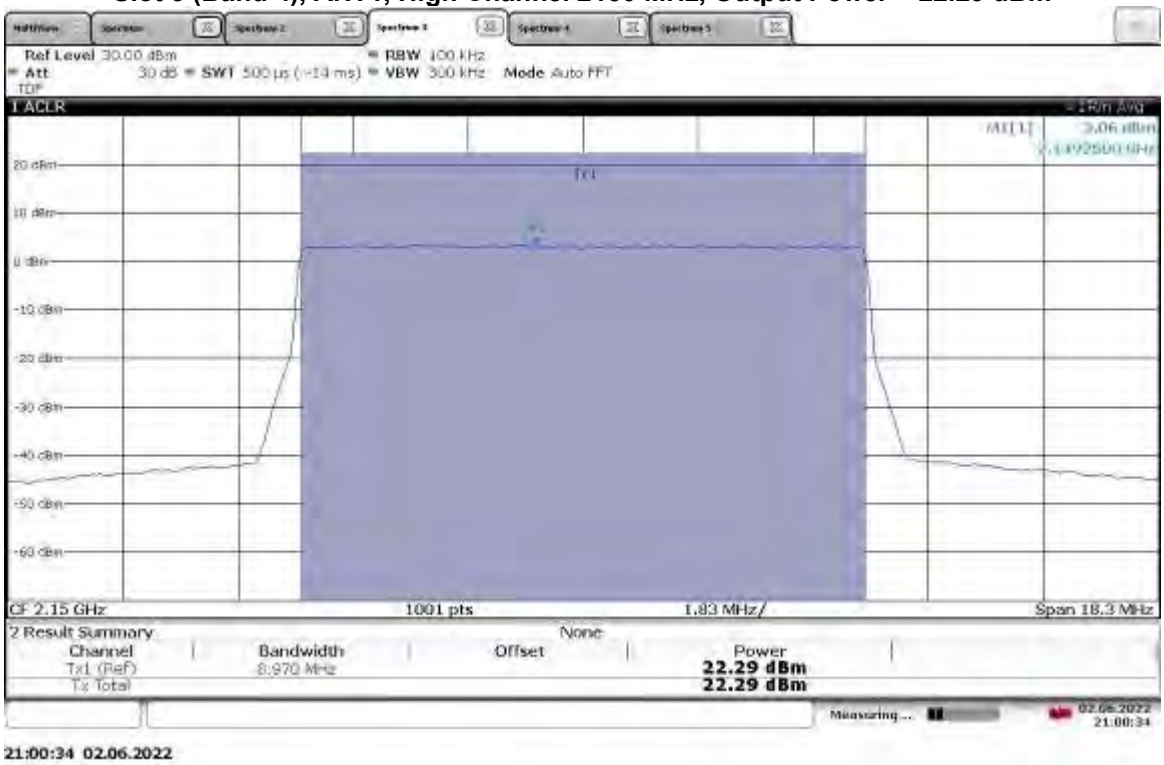


20:52:20 02.06.2022

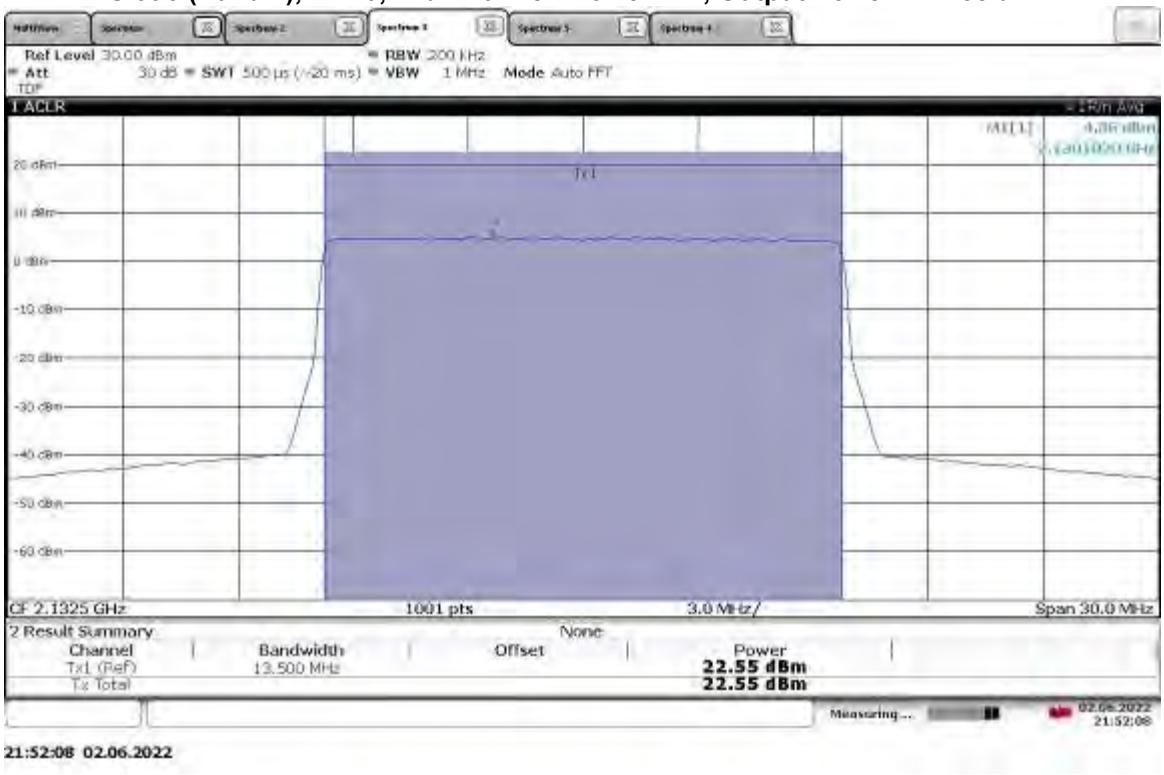
TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2150 MHz, Output Power = 22.11 dBm



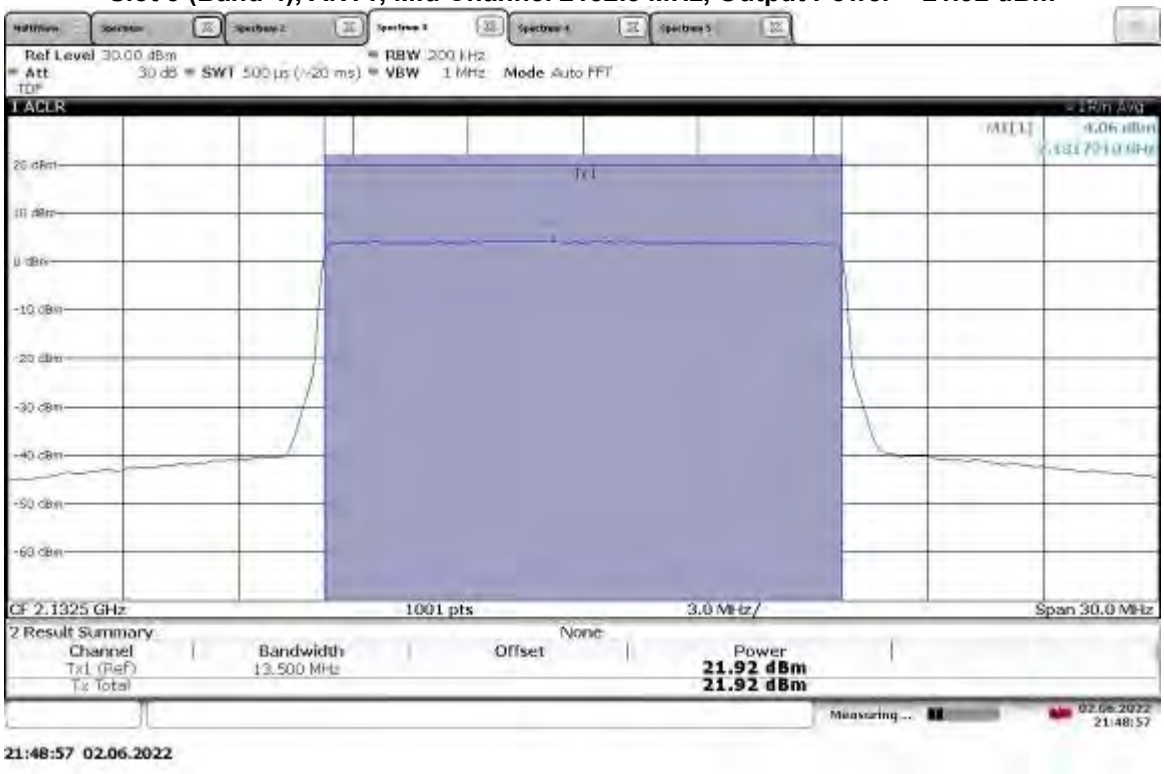
TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2150 MHz, Output Power = 22.29 dBm



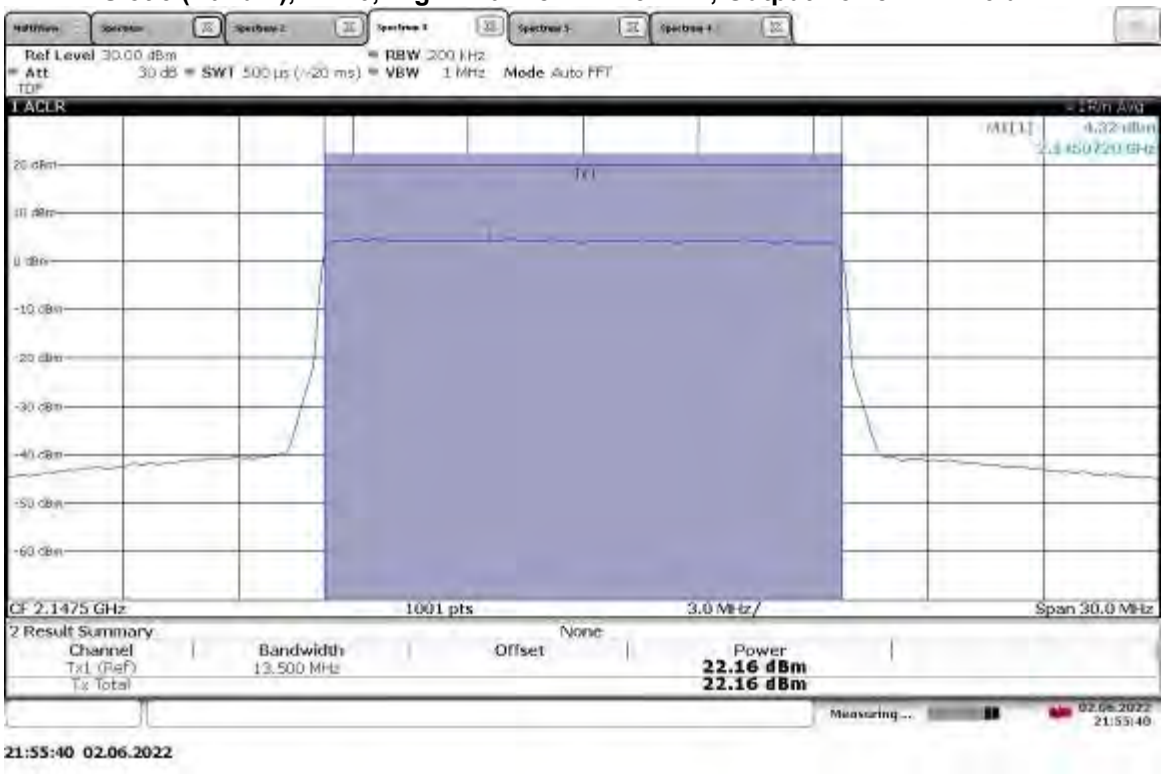
TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.55 dBm



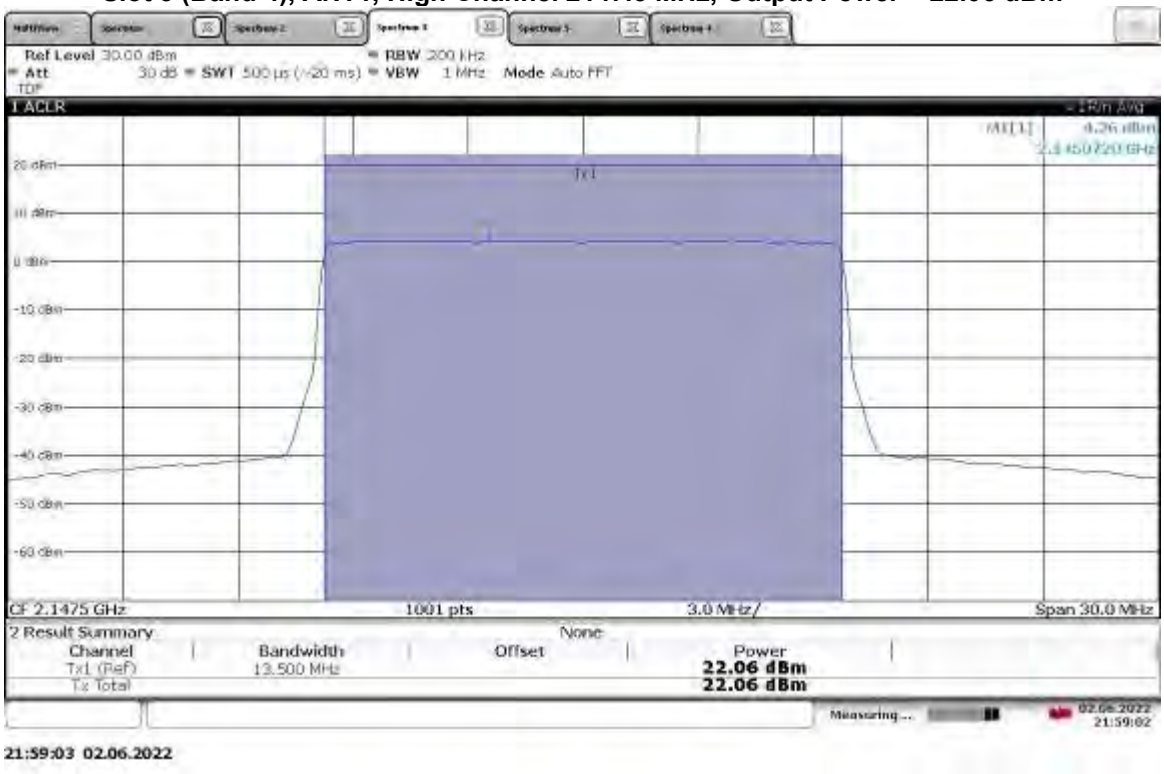
TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.92 dBm



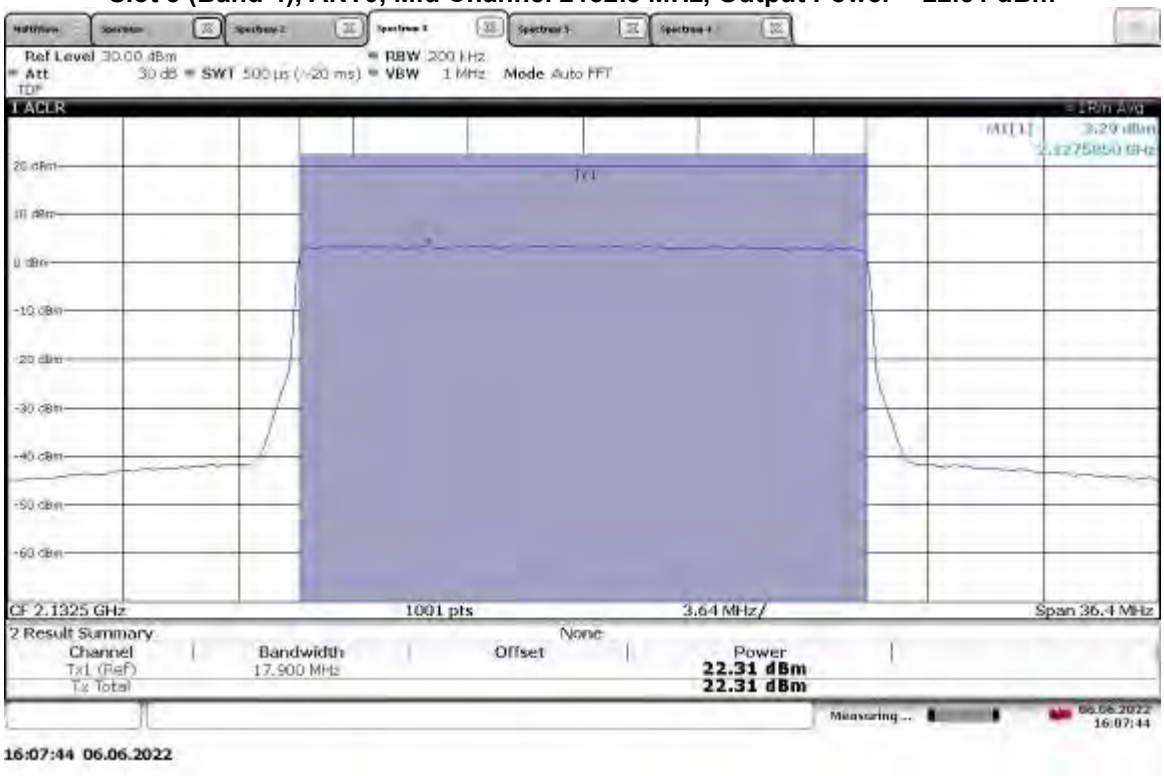
TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2147.5 MHz, Output Power = 22.16 dBm



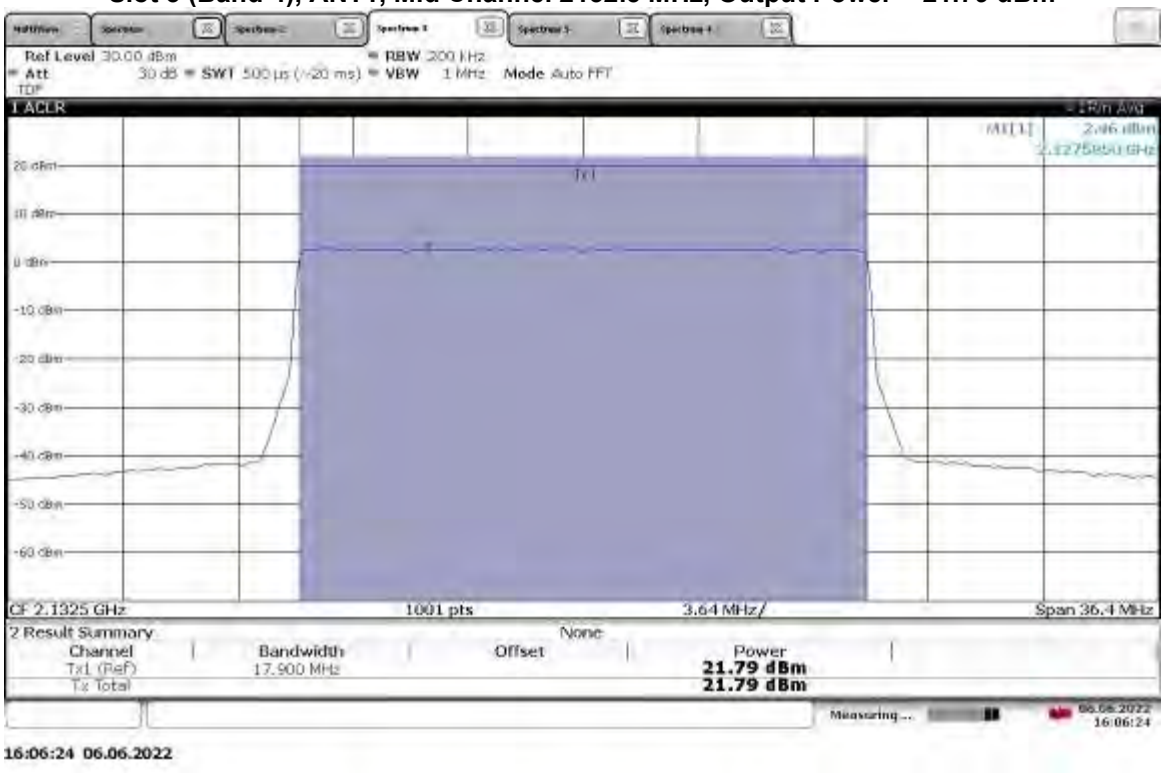
TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2147.5 MHz, Output Power = 22.06 dBm



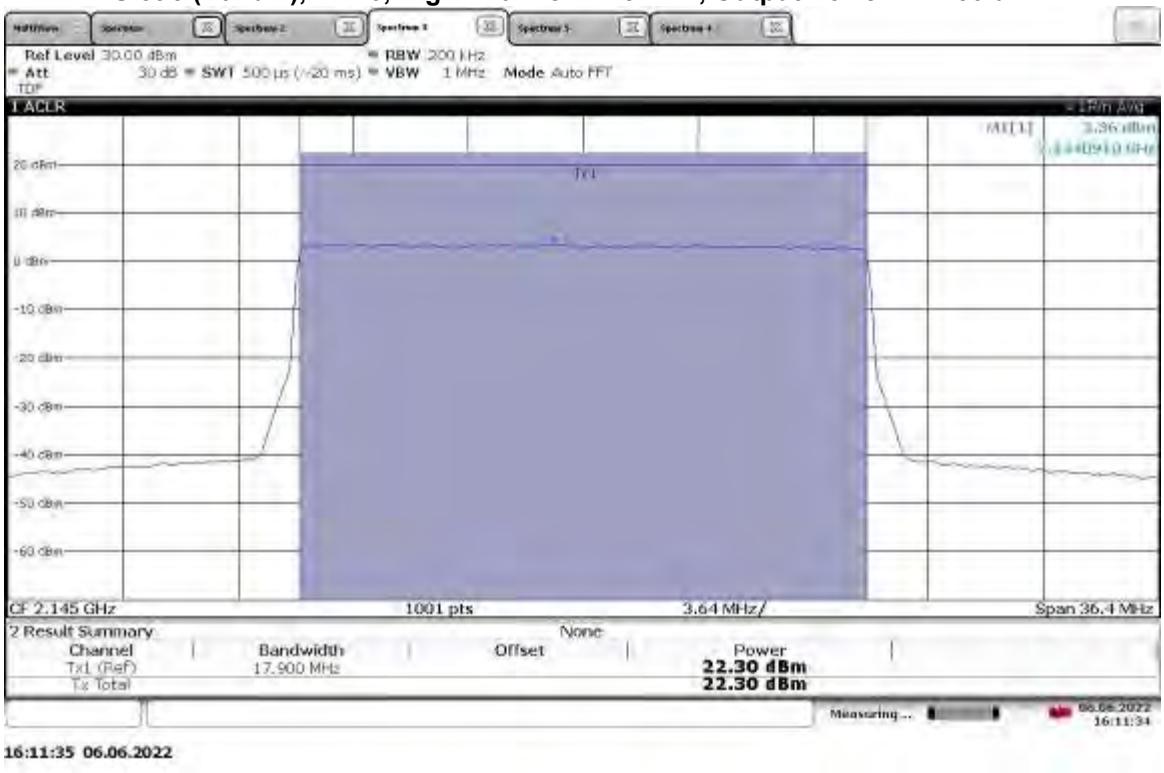
TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.31 dBm



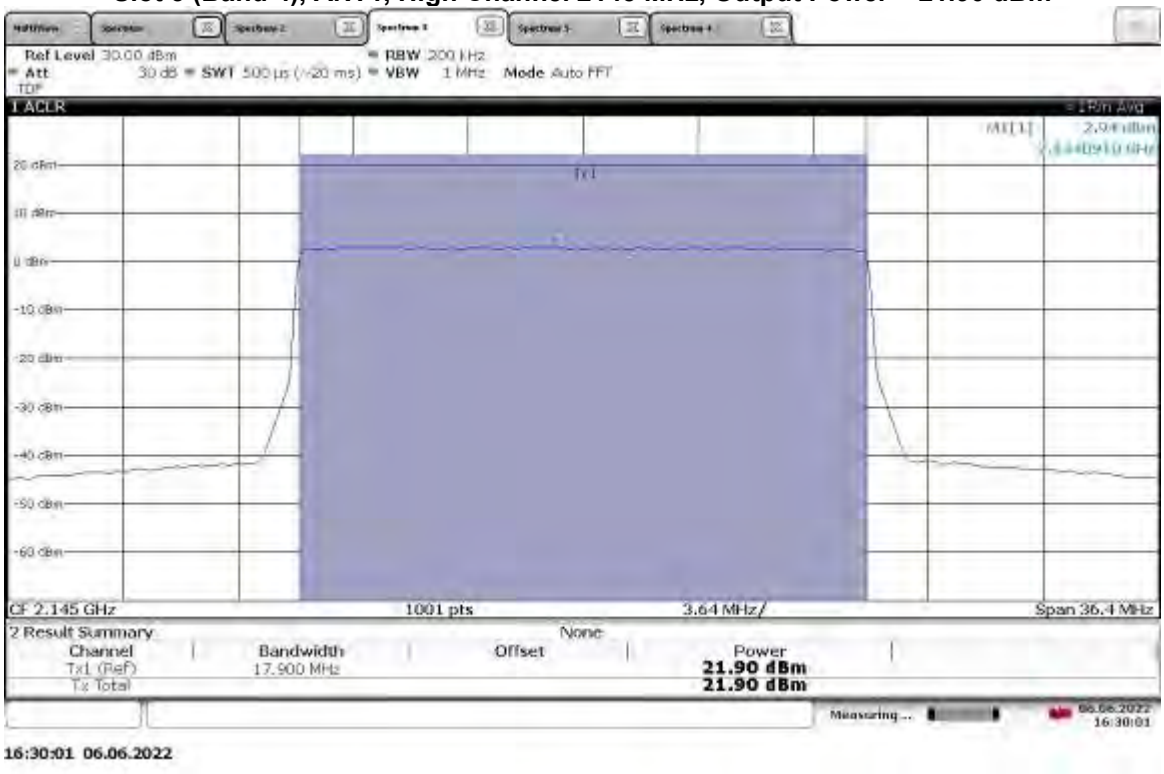
TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.79 dBm



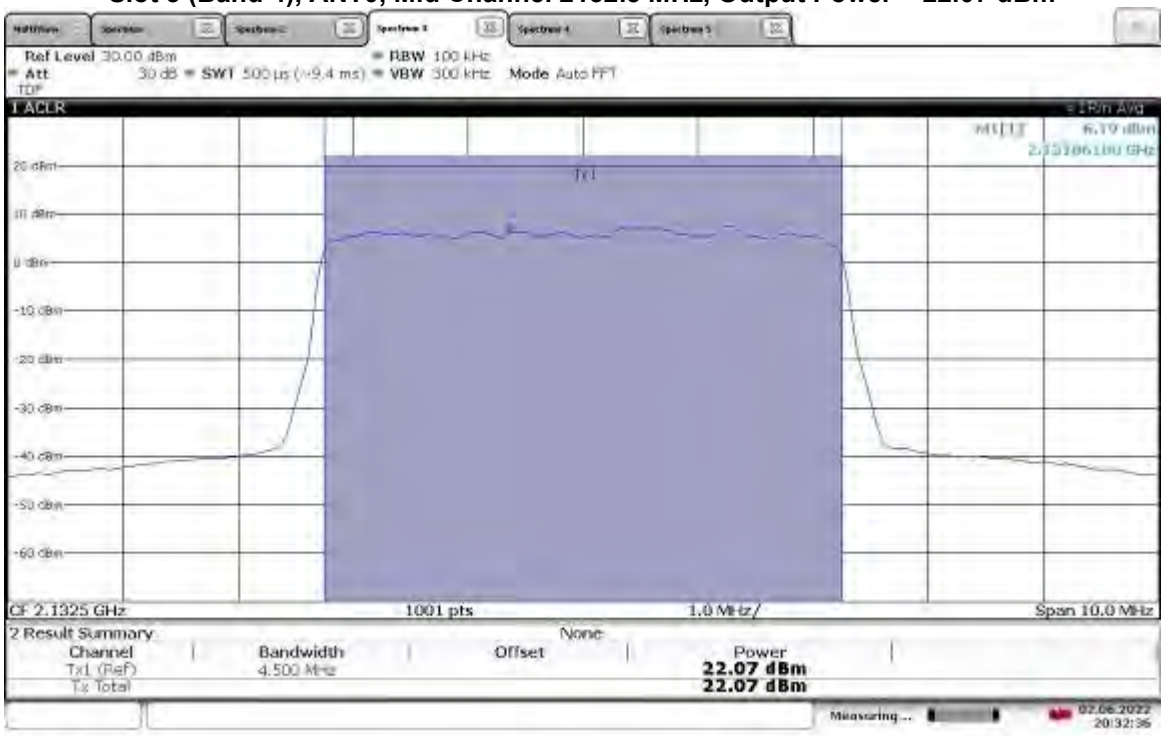
TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2145 MHz, Output Power = 22.30 dBm



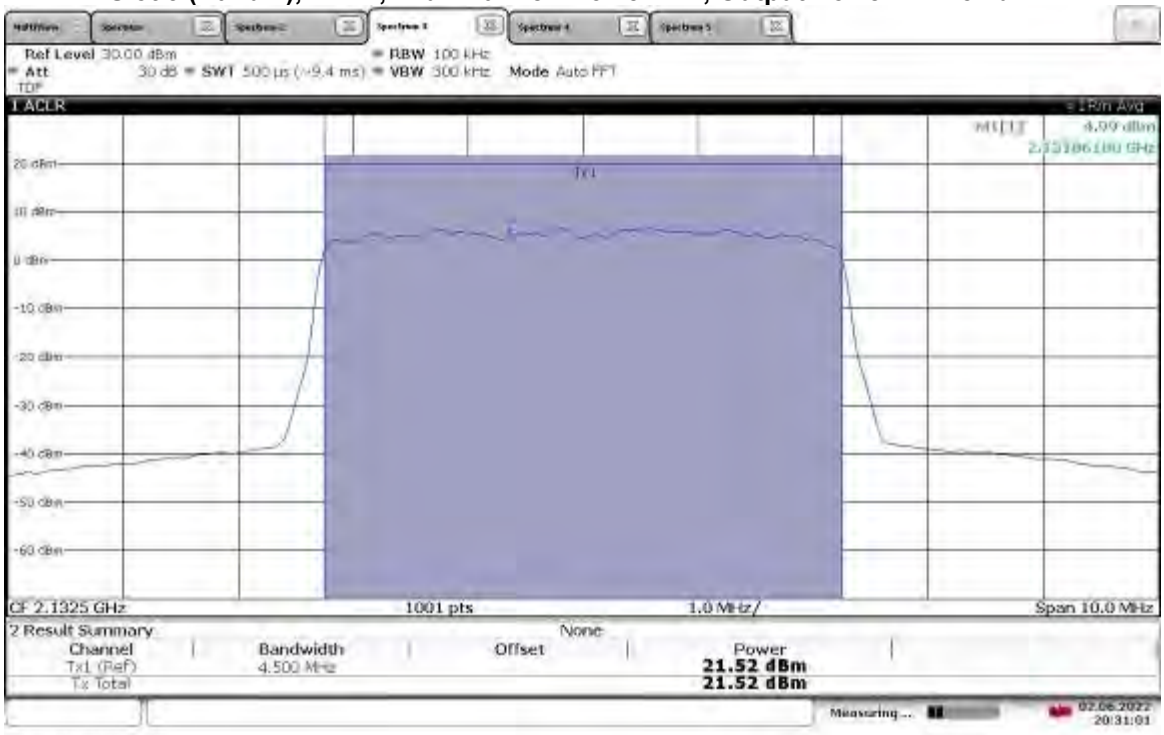
TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2145 MHz, Output Power = 21.90 dBm



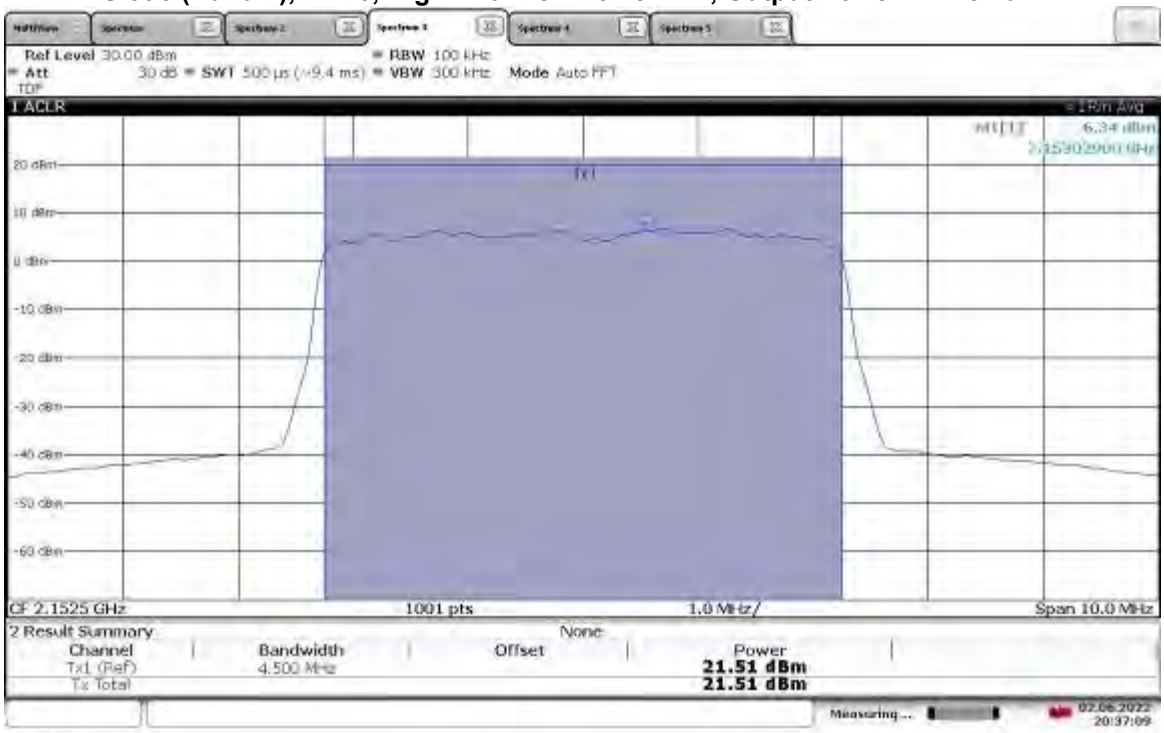
TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.07 dBm



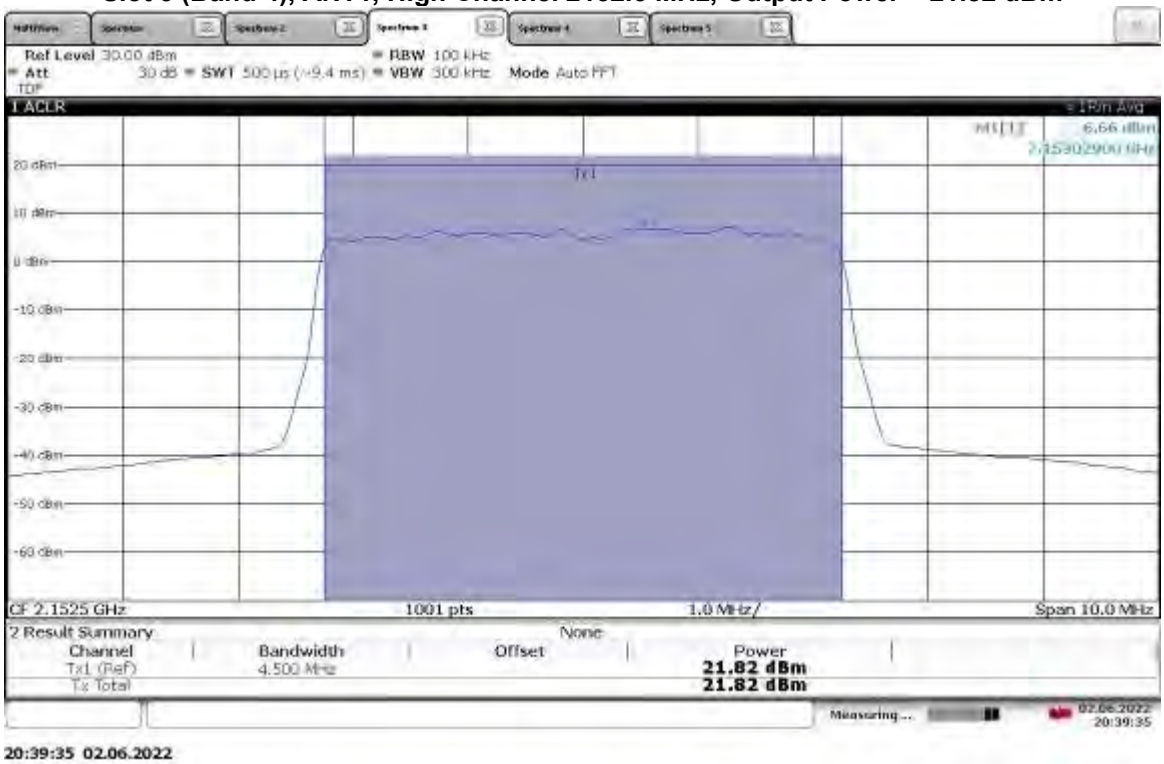
TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.52 dBm



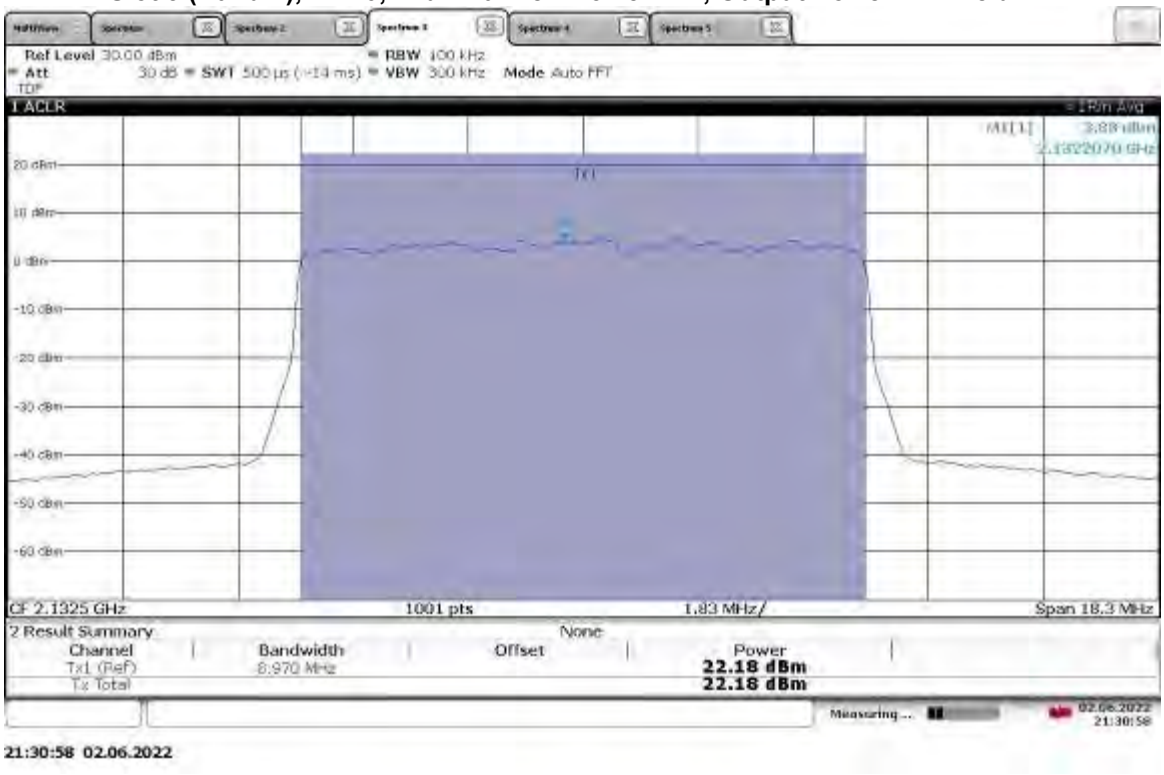
TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2152.5 MHz, Output Power = 21.51 dBm



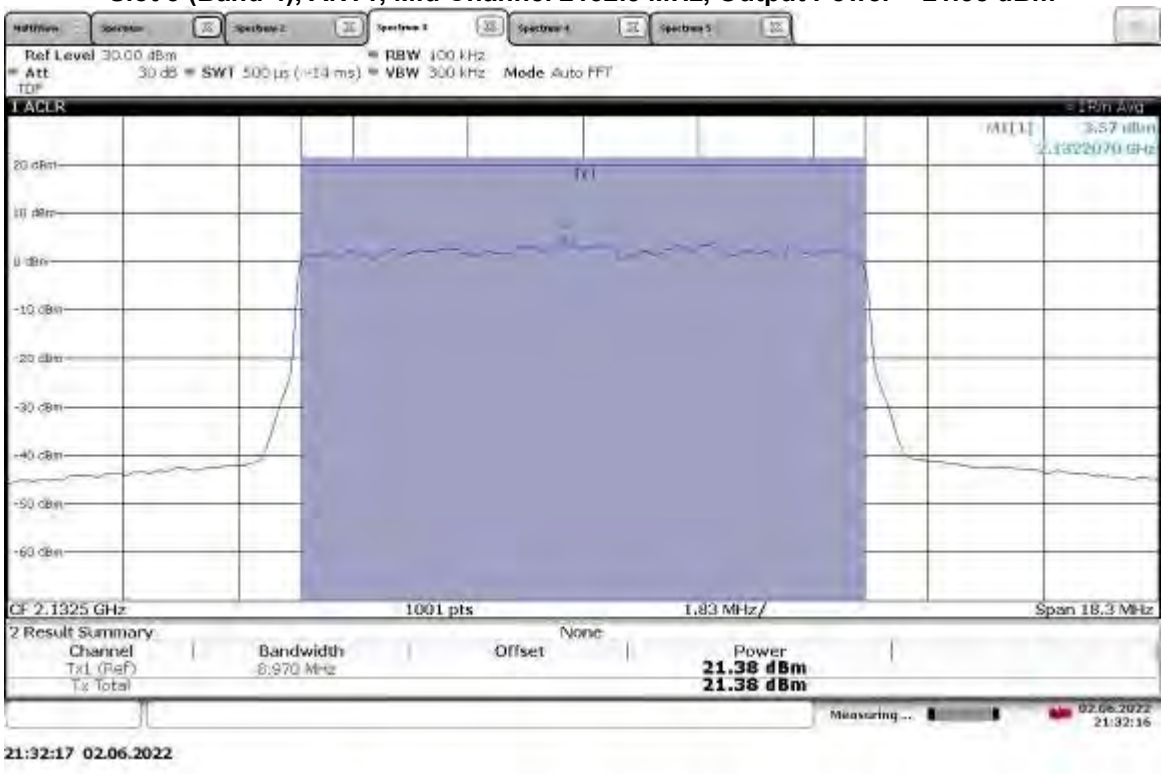
TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2152.5 MHz, Output Power = 21.82 dBm



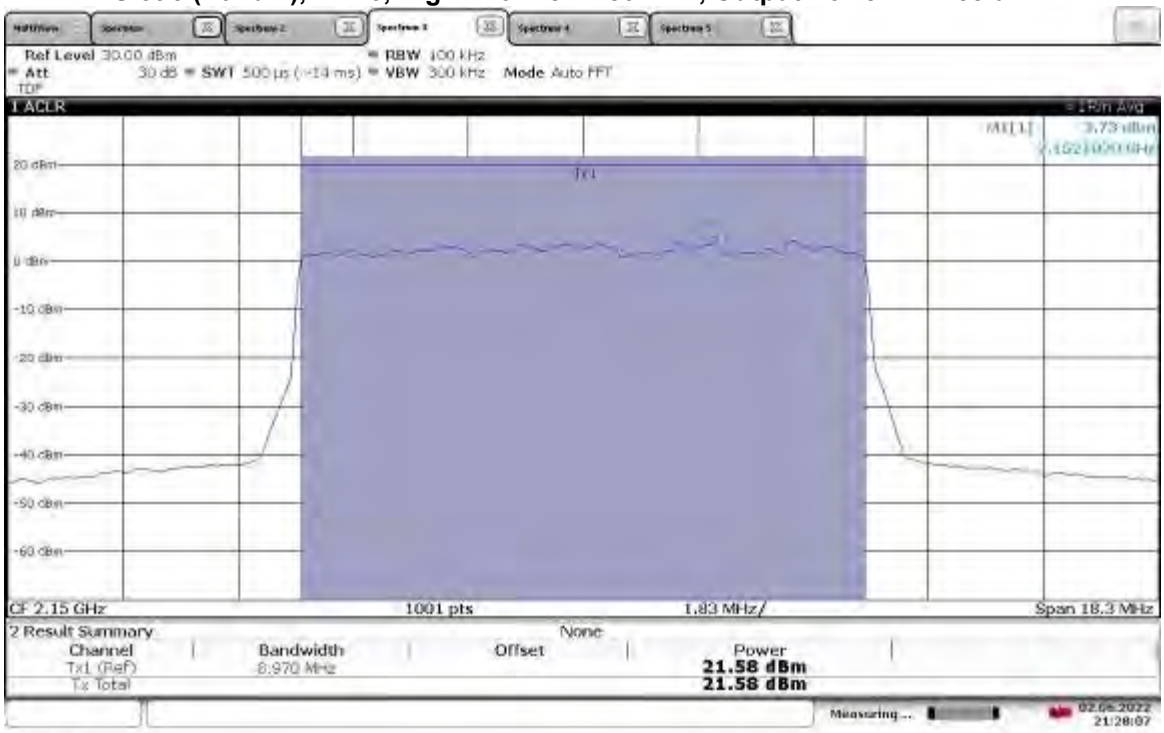
TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.18 dBm



TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.38 dBm

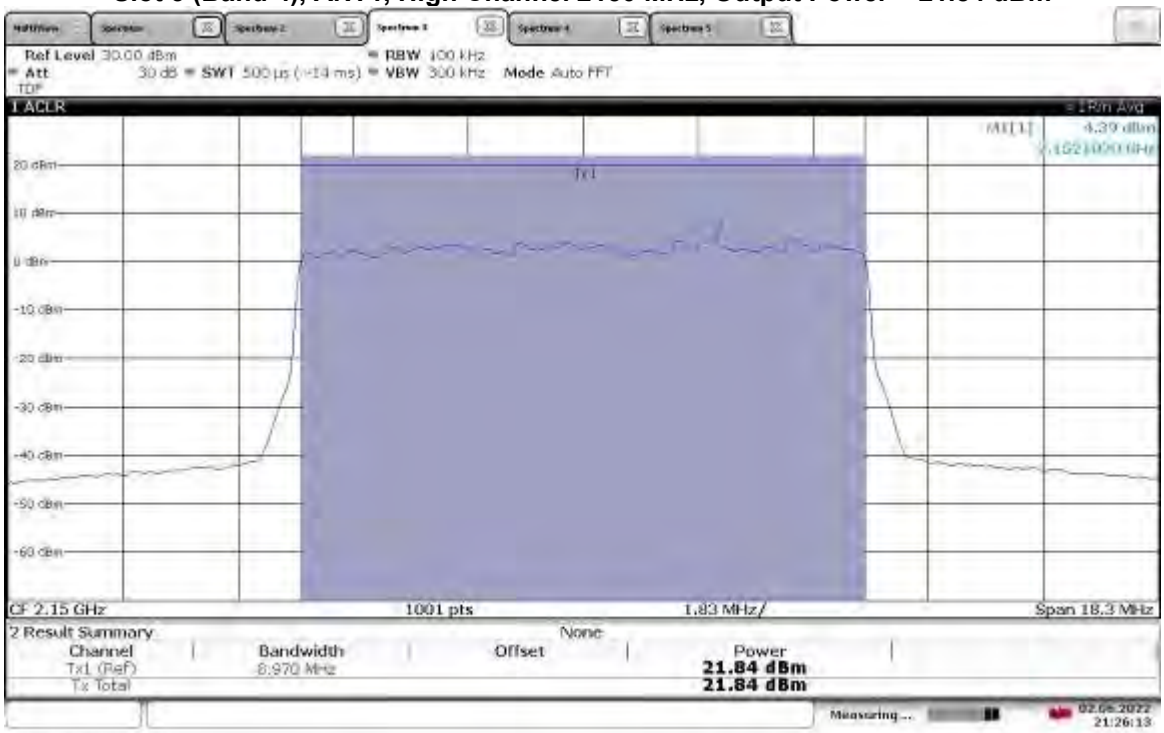


TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2150 MHz, Output Power = 21.58 dBm



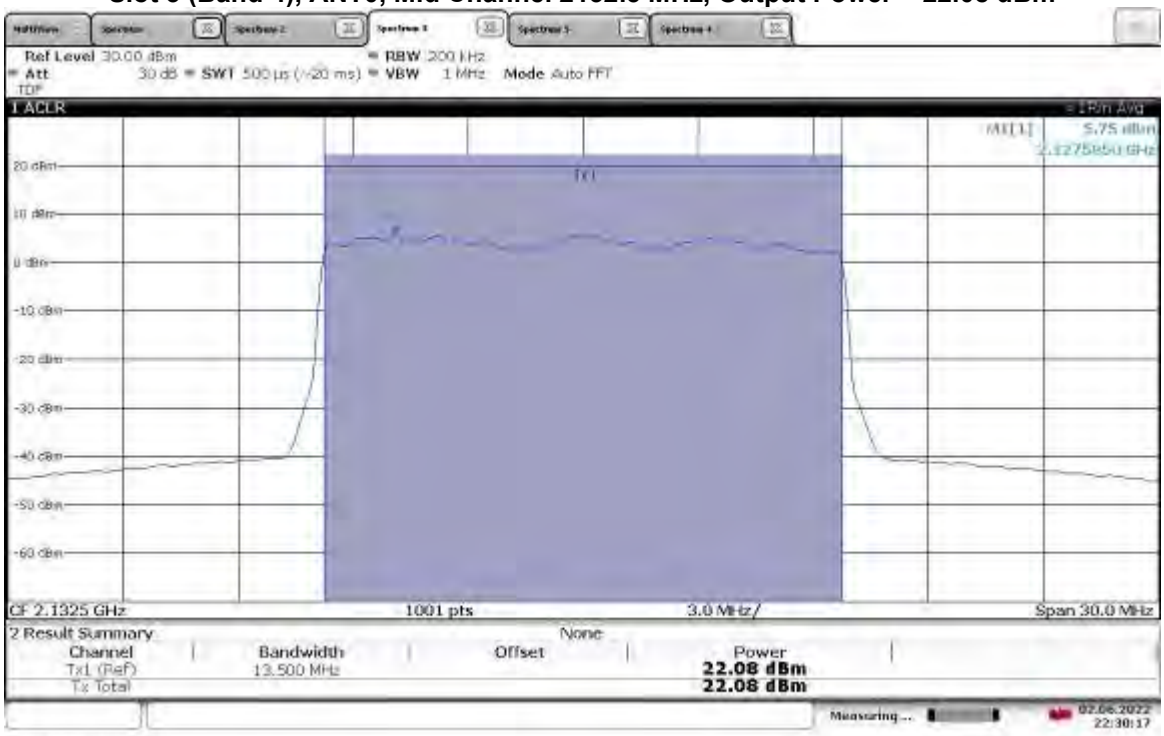
21:28:07 02.06.2022

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2150 MHz, Output Power = 21.84 dBm

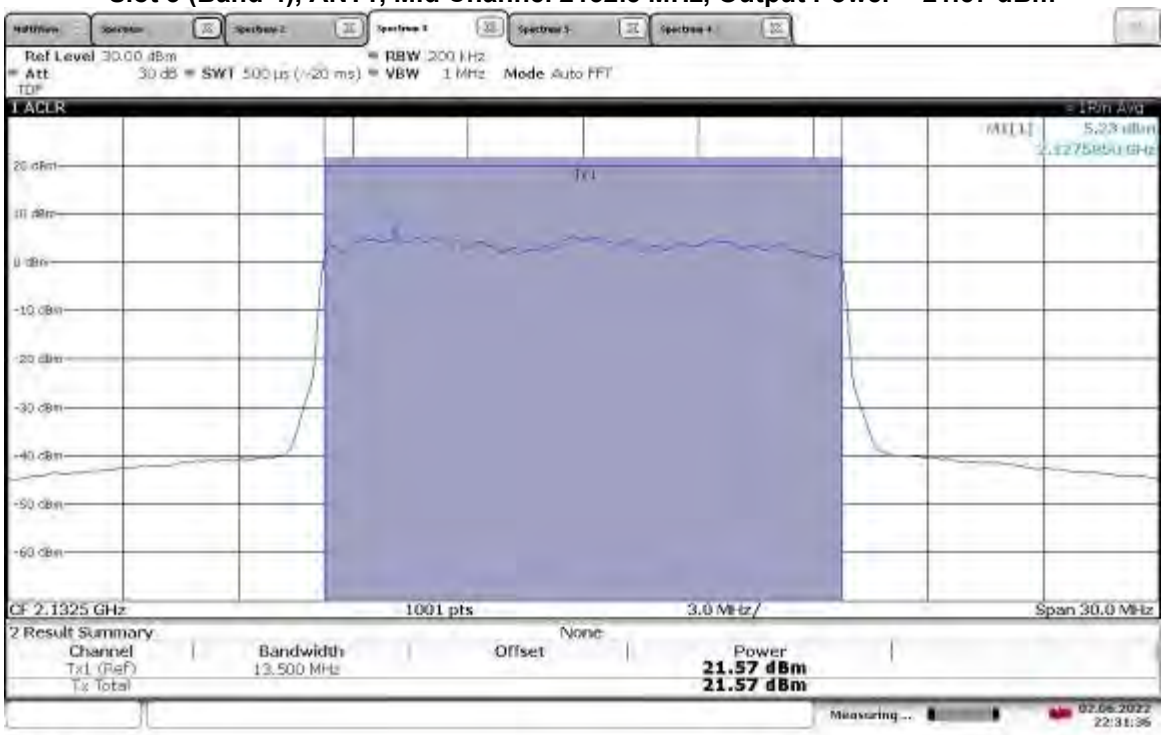


21:26:13 02.06.2022

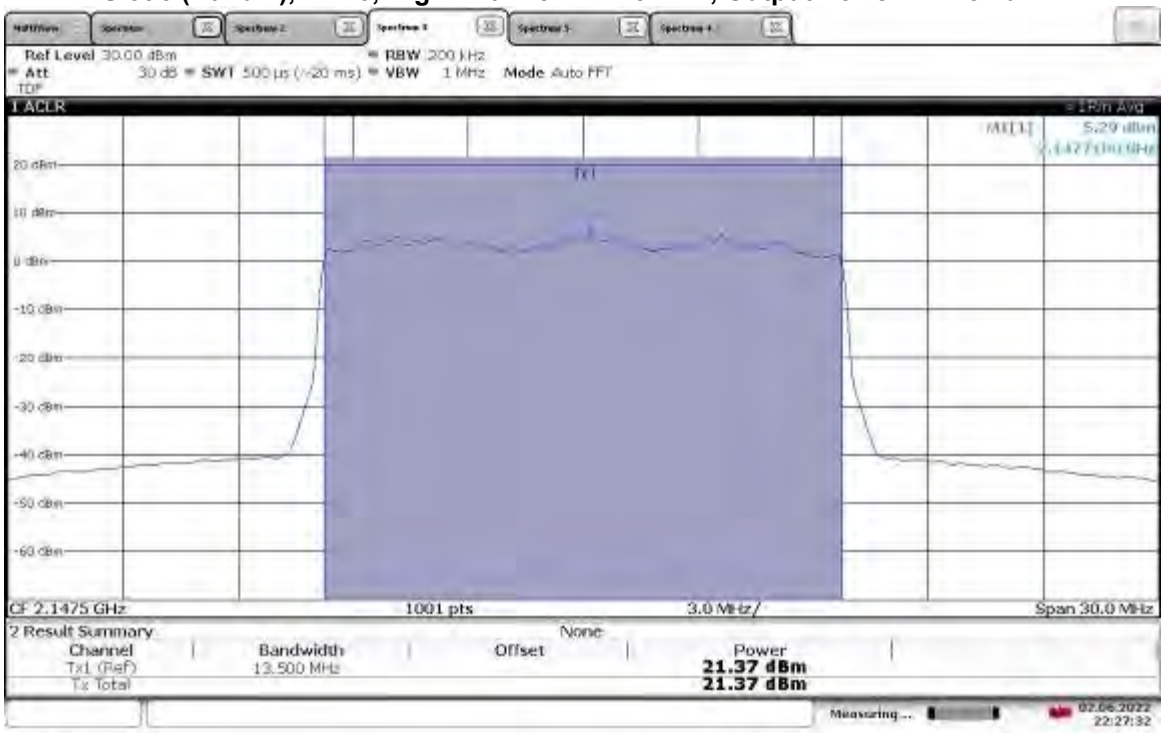
TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.08 dBm



TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.57 dBm

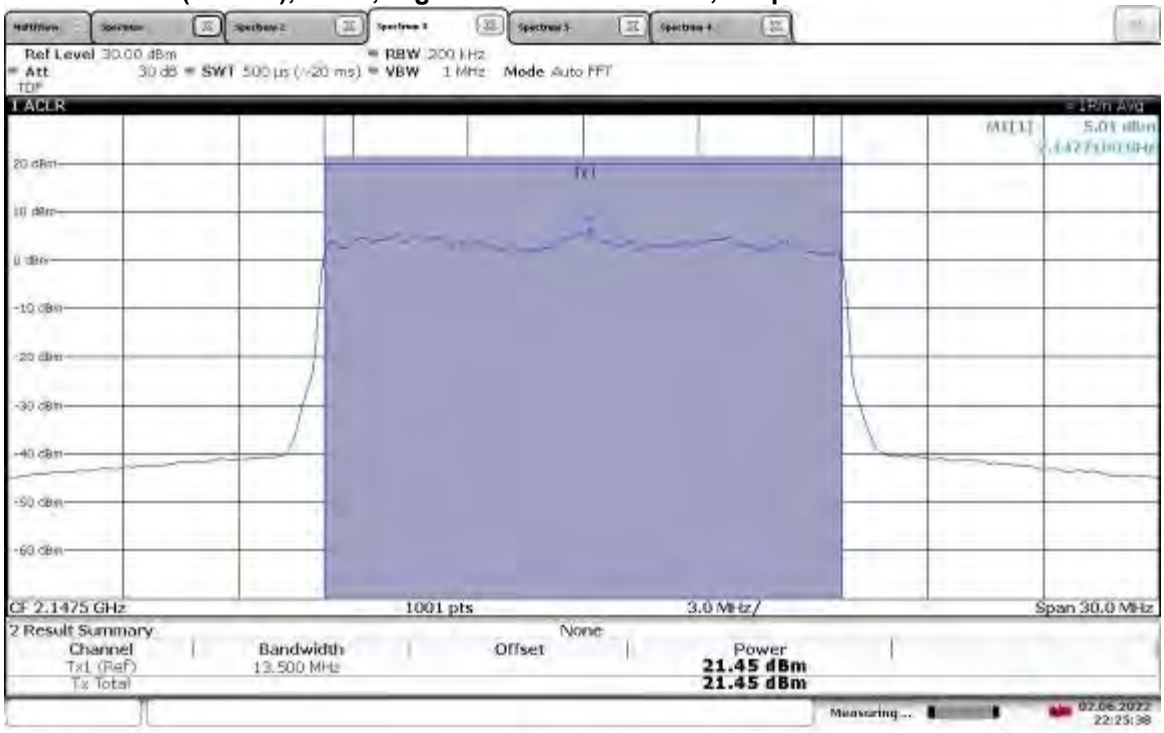


TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2147.5 MHz, Output Power = 21.37 dBm



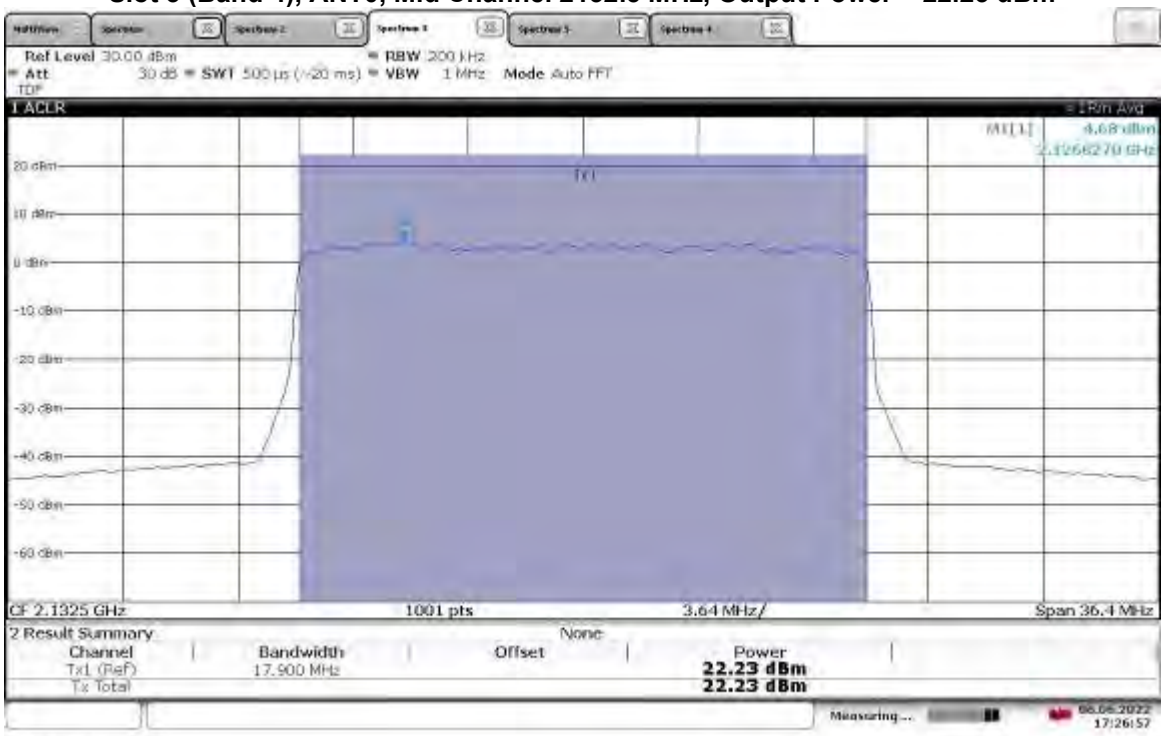
22:27:32 02.06.2022

TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2147.5 MHz, Output Power = 21.45 dBm

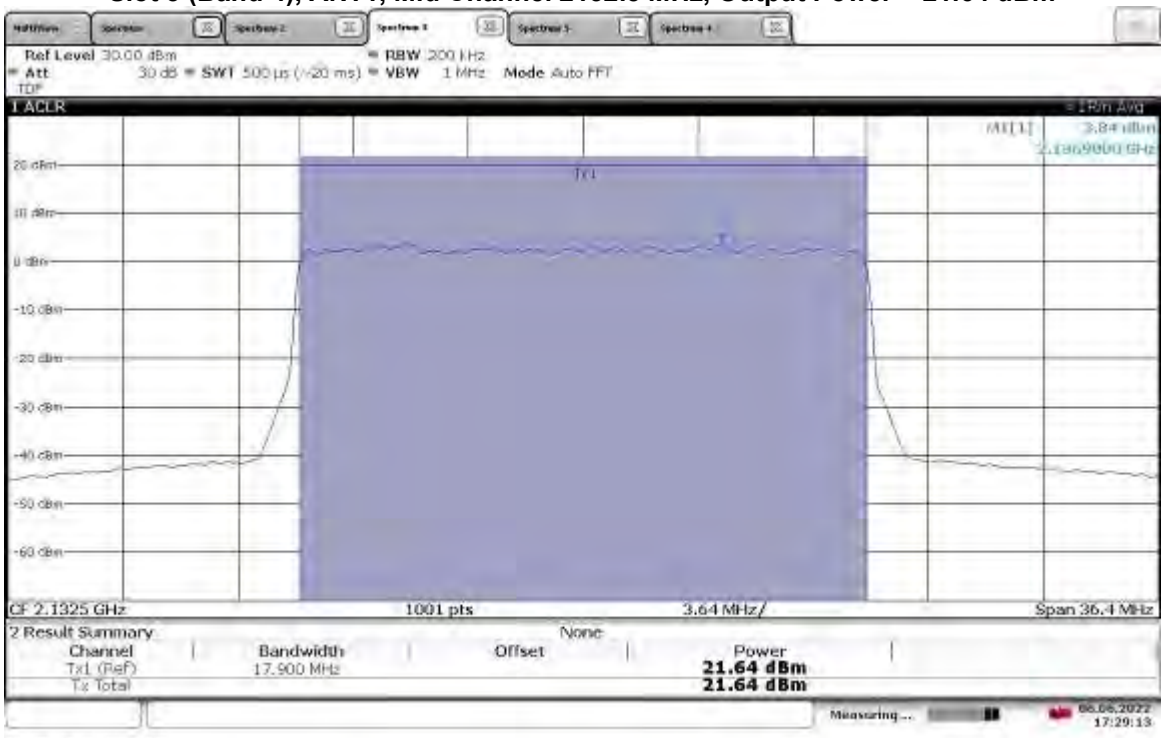


22:25:39 02.06.2022

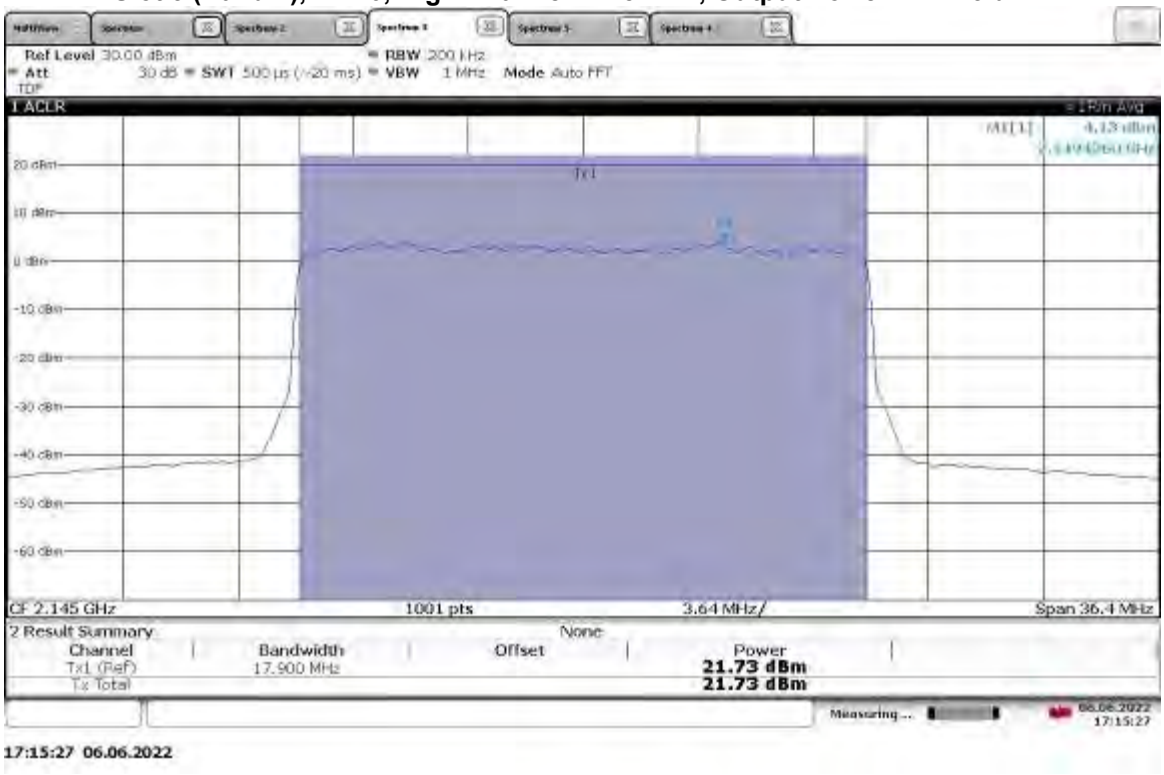
TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.23 dBm



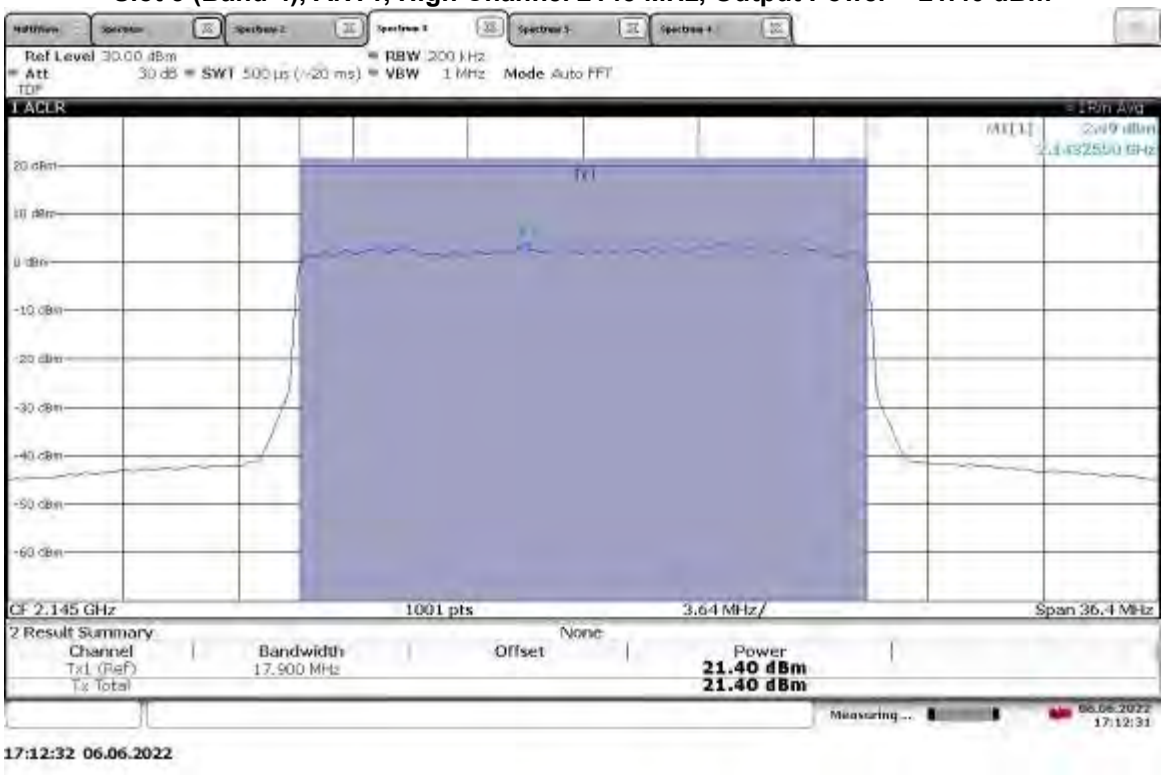
TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.64 dBm



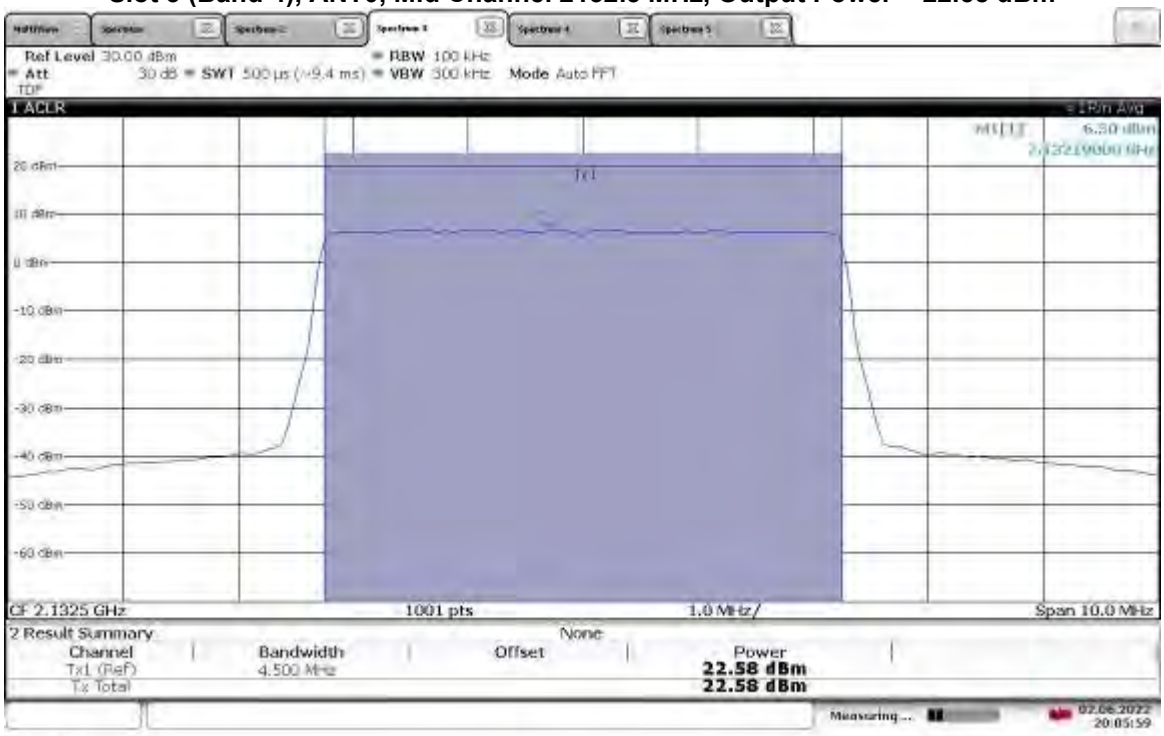
TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2145 MHz, Output Power = 21.73 dBm



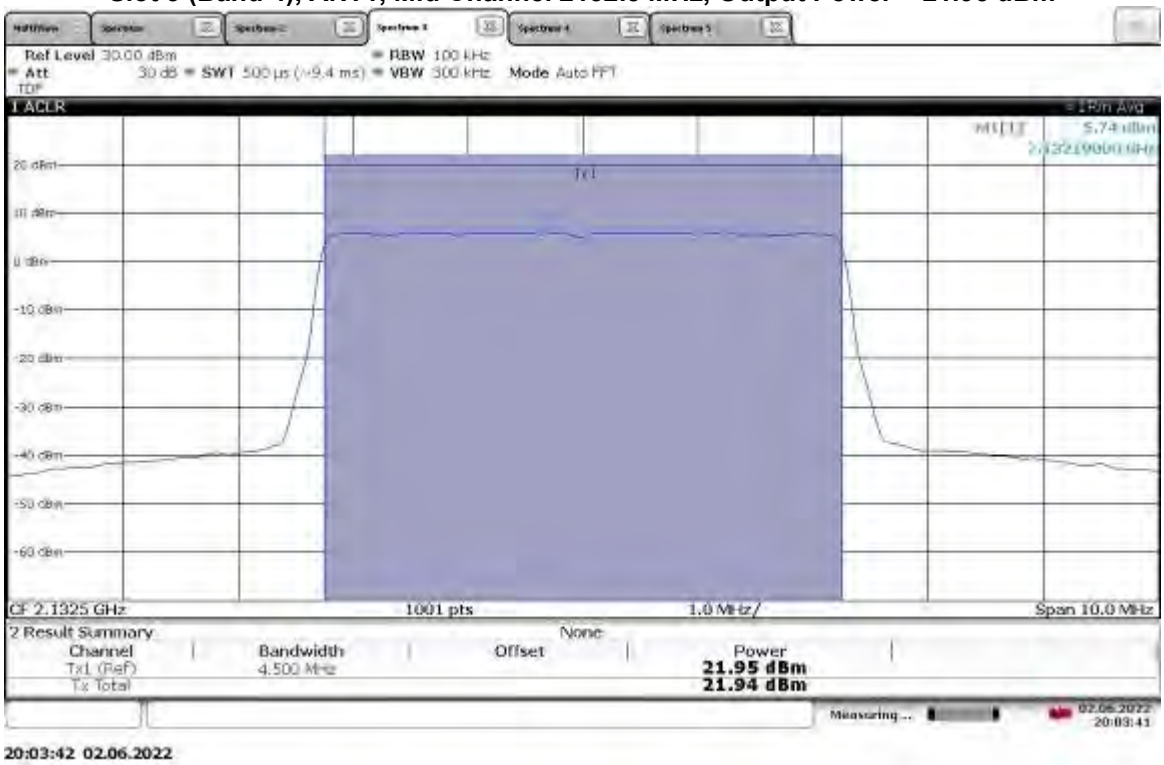
TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2145 MHz, Output Power = 21.40 dBm



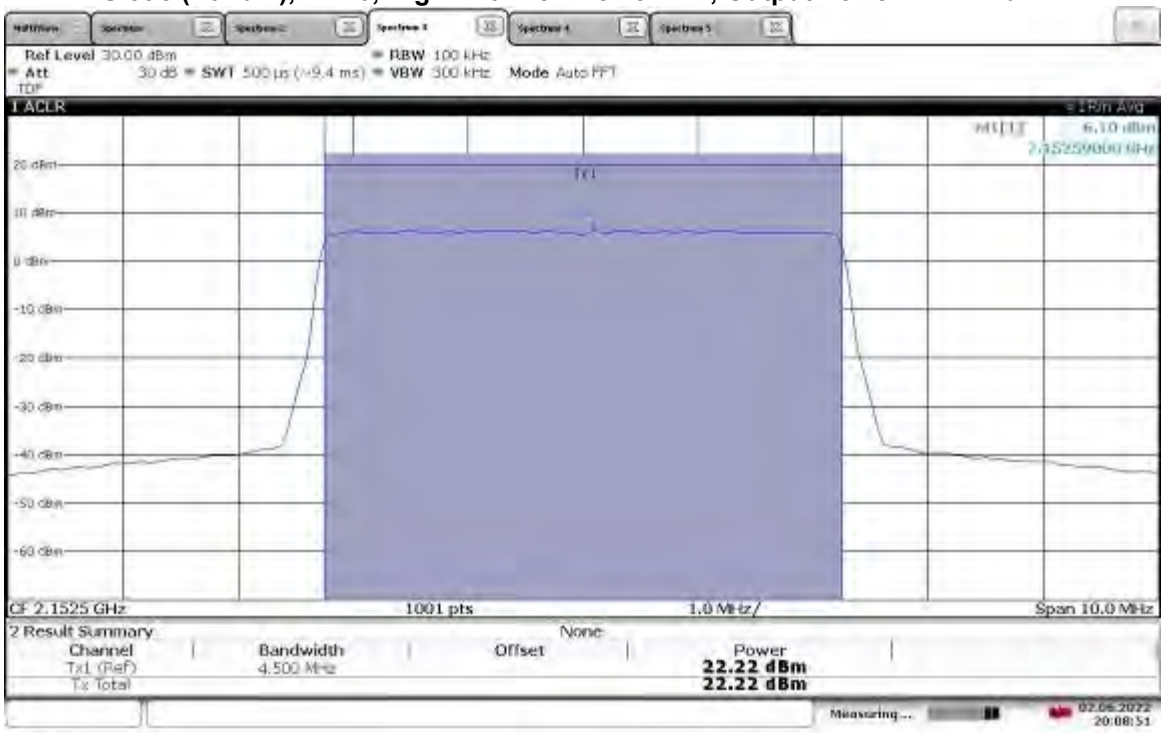
TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.58 dBm



TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.95 dBm



TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2152.5 MHz, Output Power = 22.22 dBm



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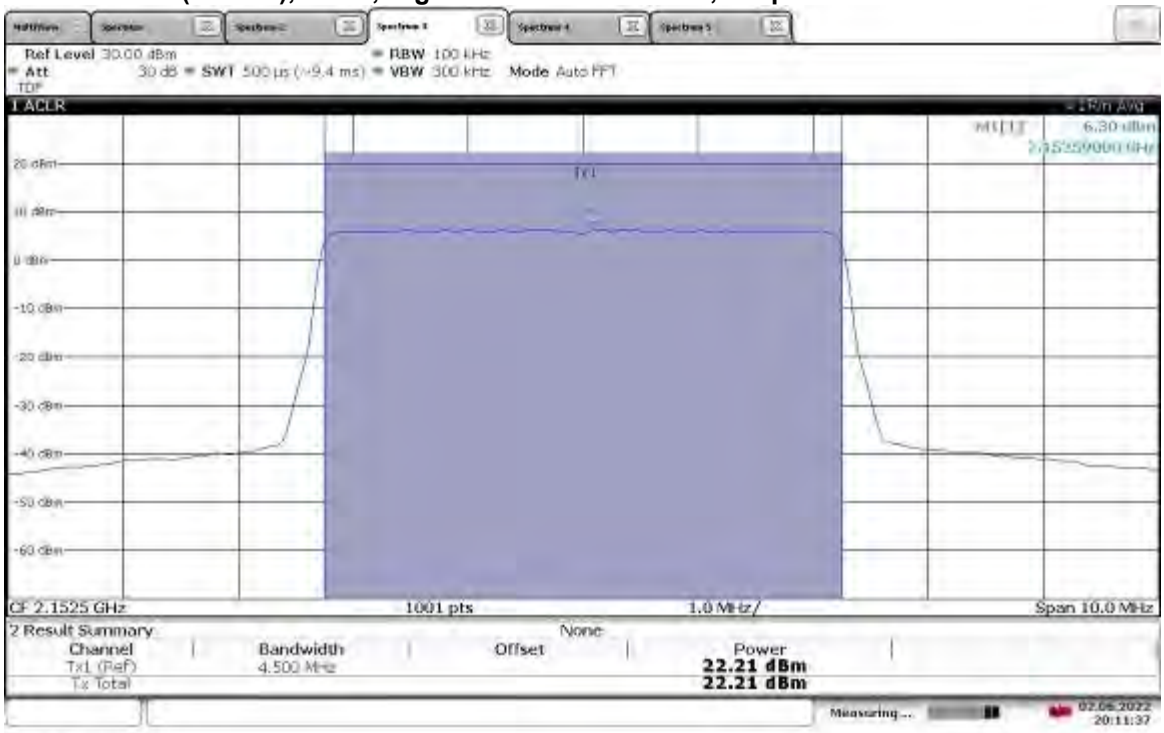
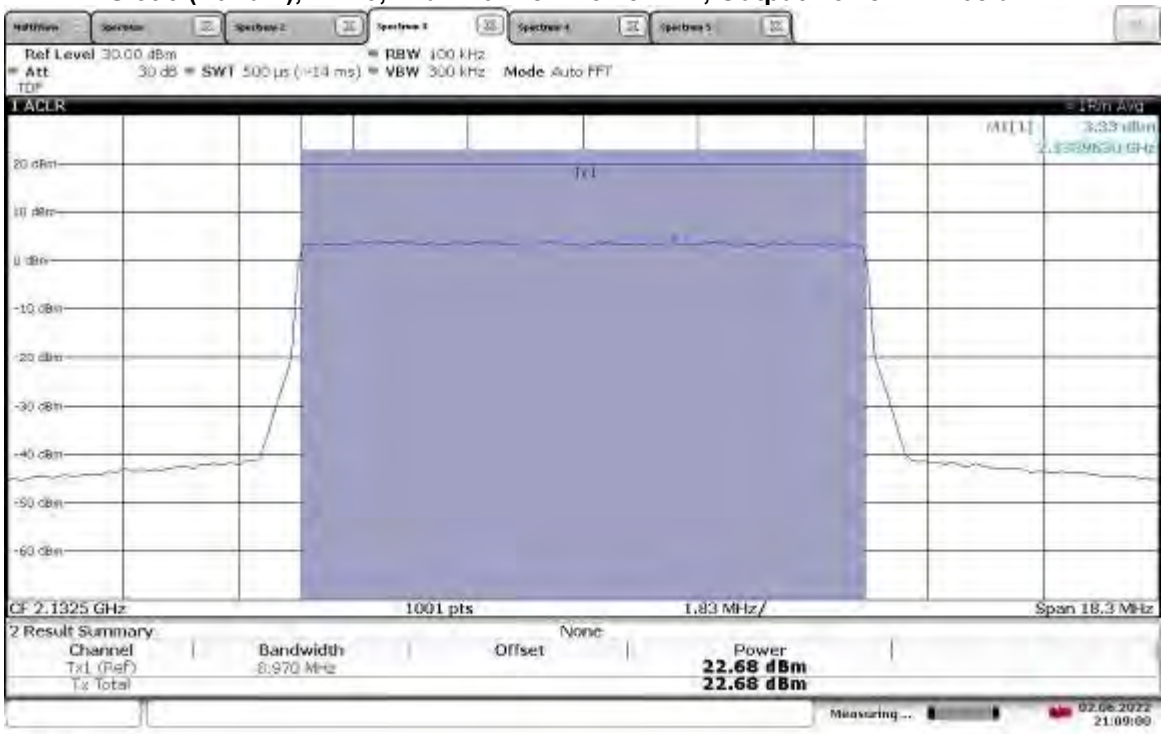
TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2152.5 MHz, Output Power = 22.21 dBm



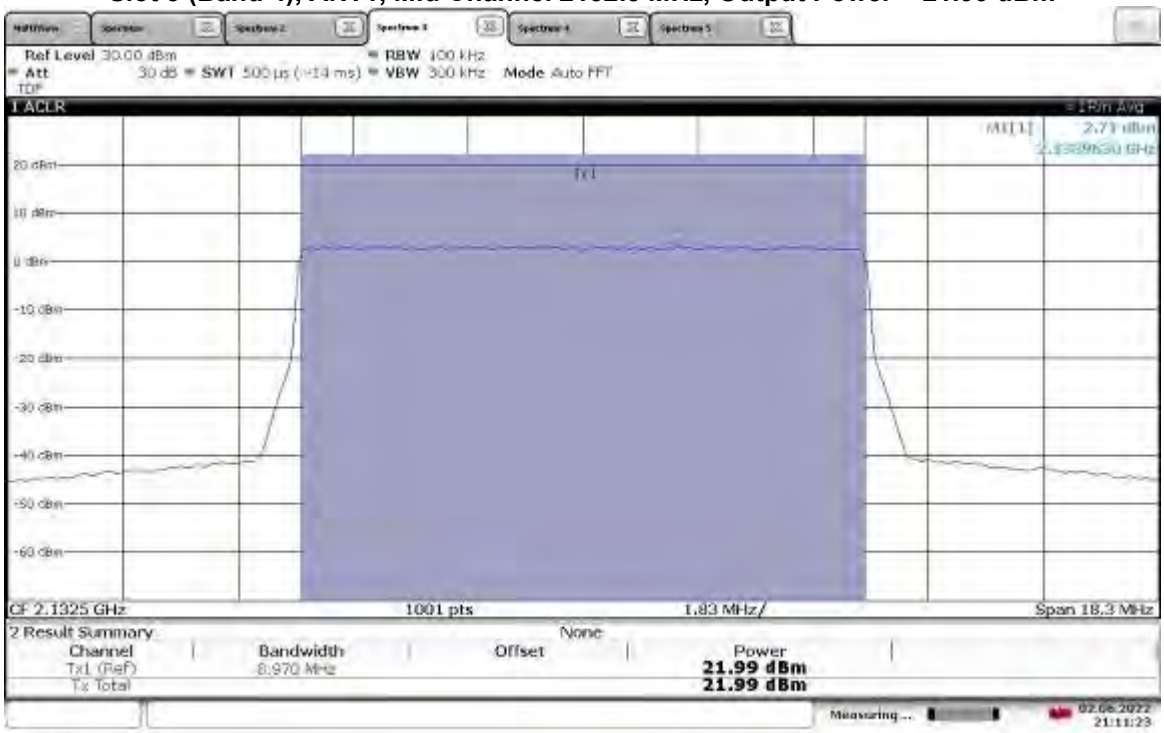
20:11:37 02.06.2022

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.68 dBm



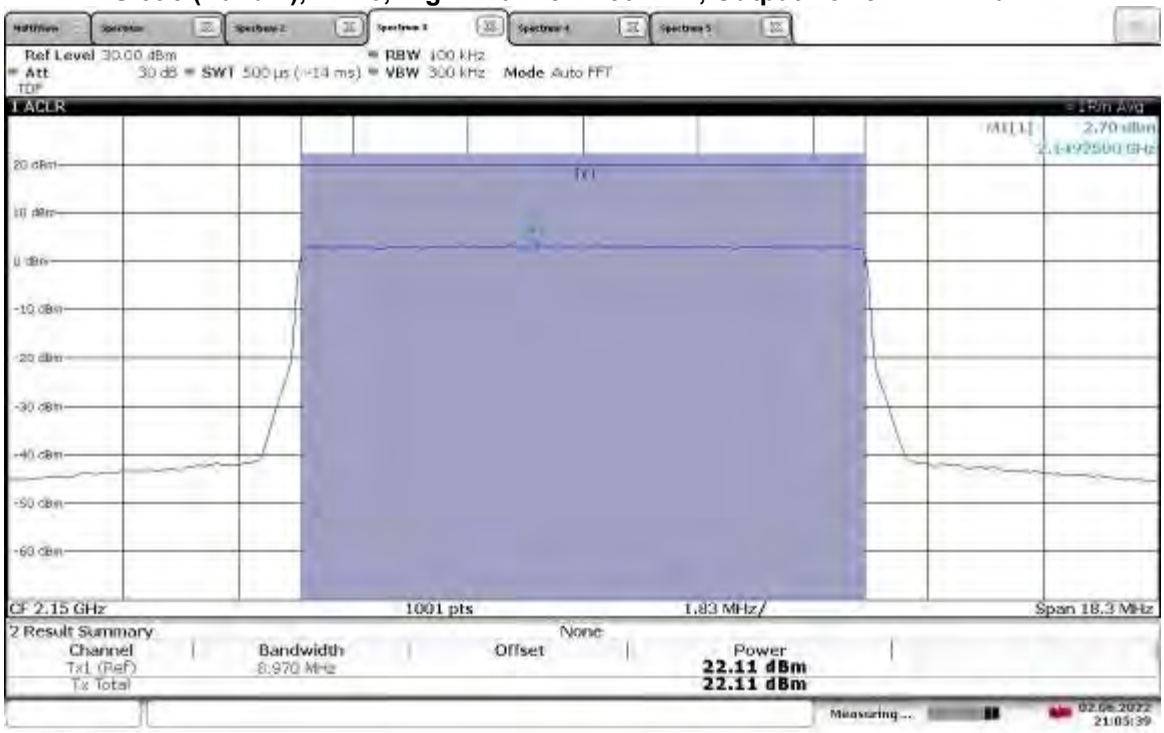
21:09:00 02.06.2022

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.99 dBm



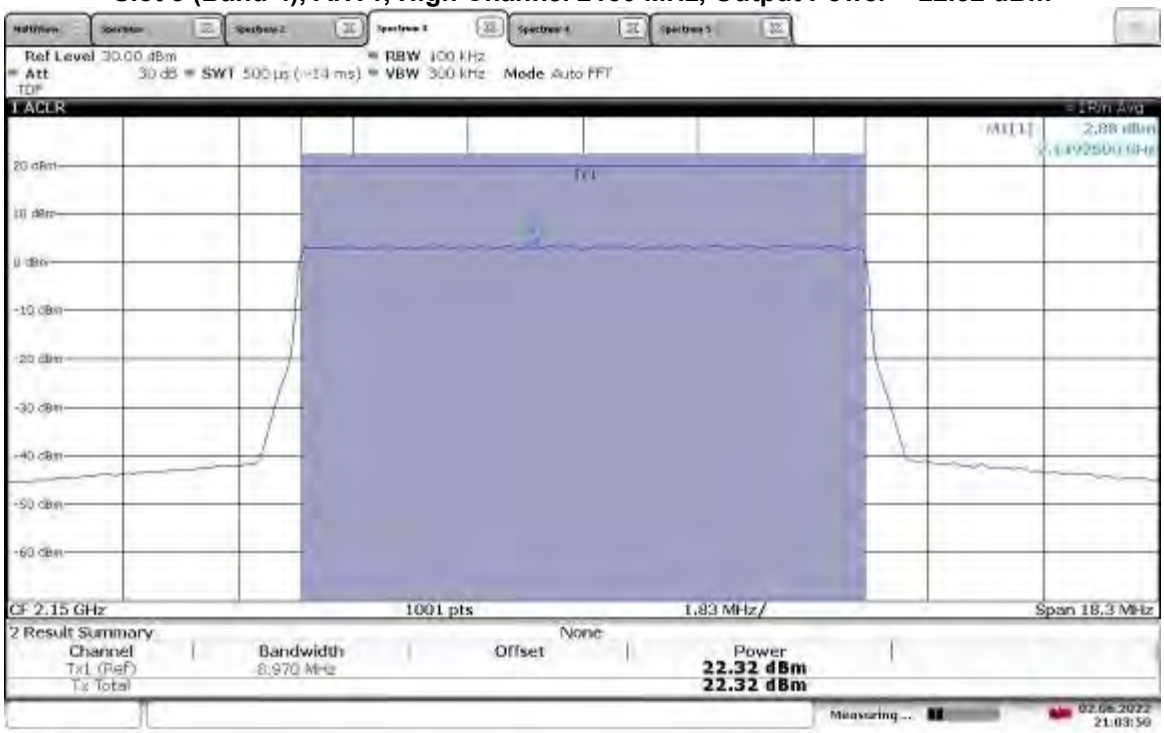
21:11:23 02.06.2022

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2150 MHz, Output Power = 22.11 dBm



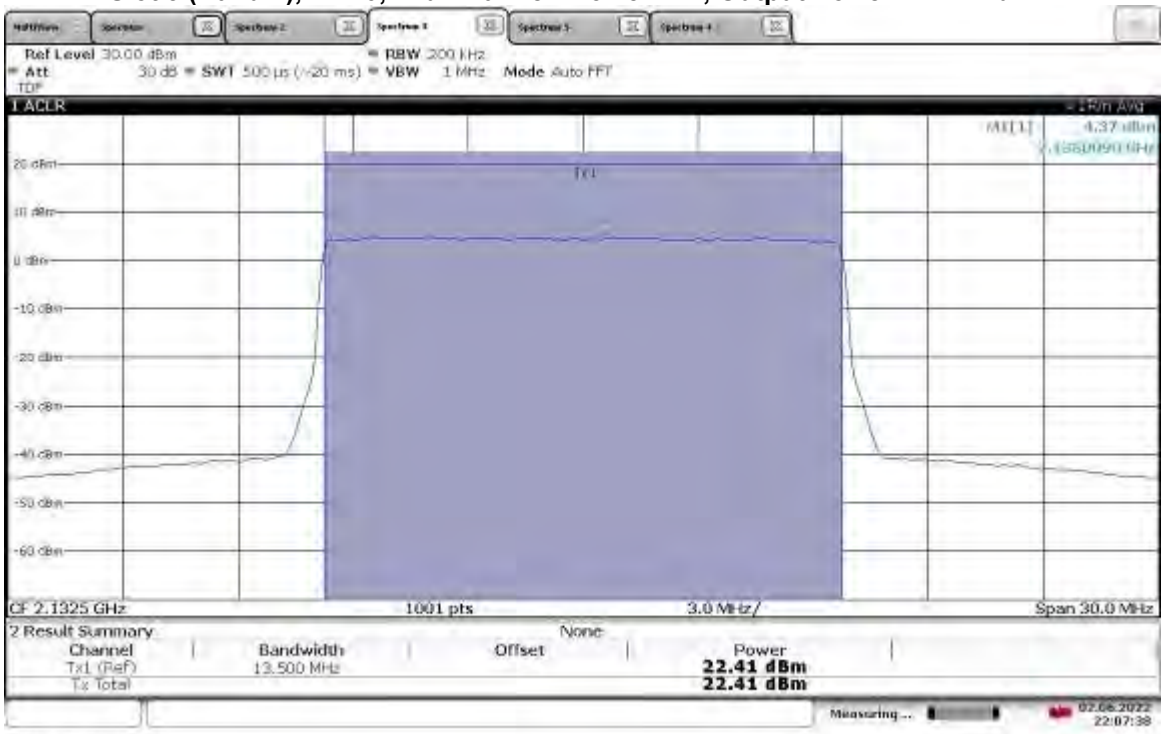
21:05:39 02.06.2022

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2150 MHz, Output Power = 22.32 dBm

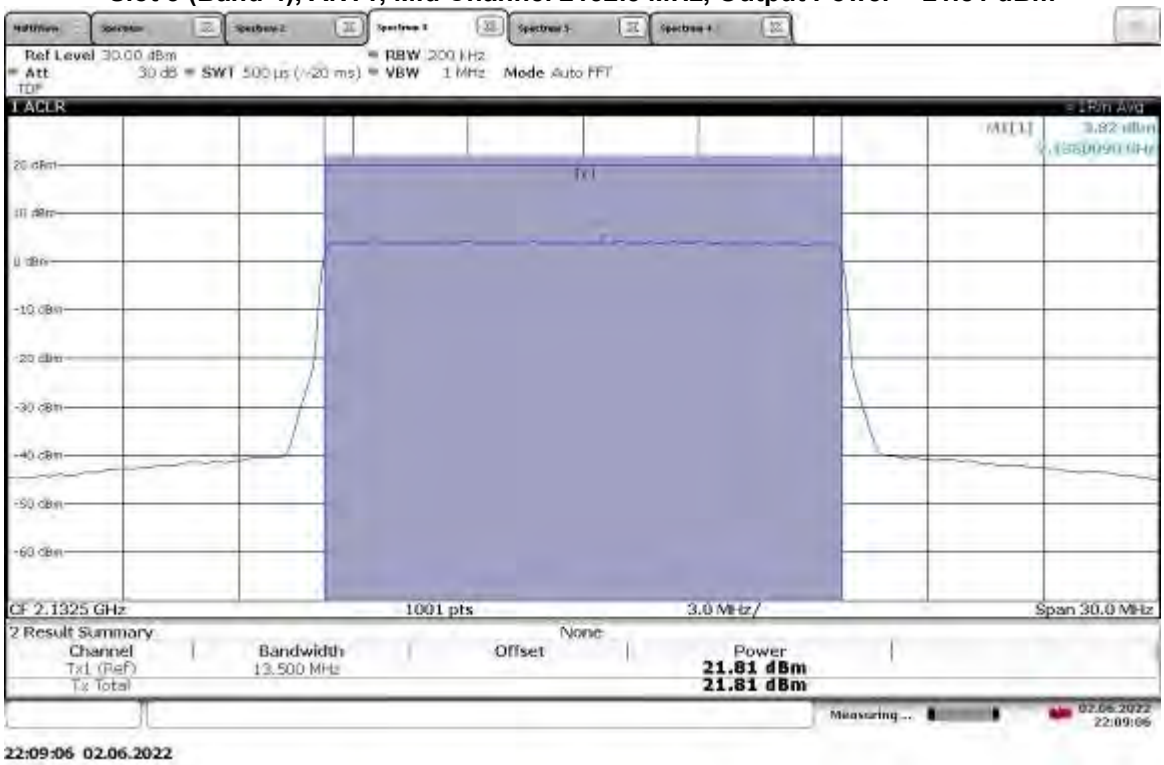


21:03:51 02.06.2022

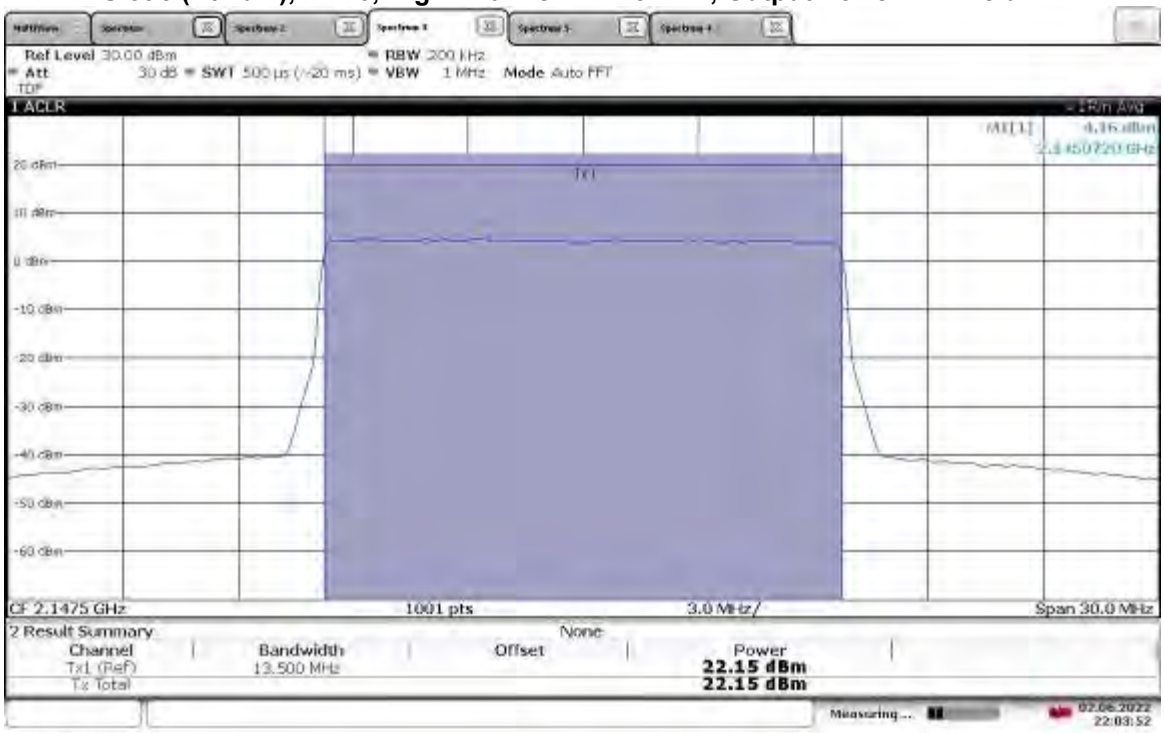
TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.41 dBm



TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.81 dBm

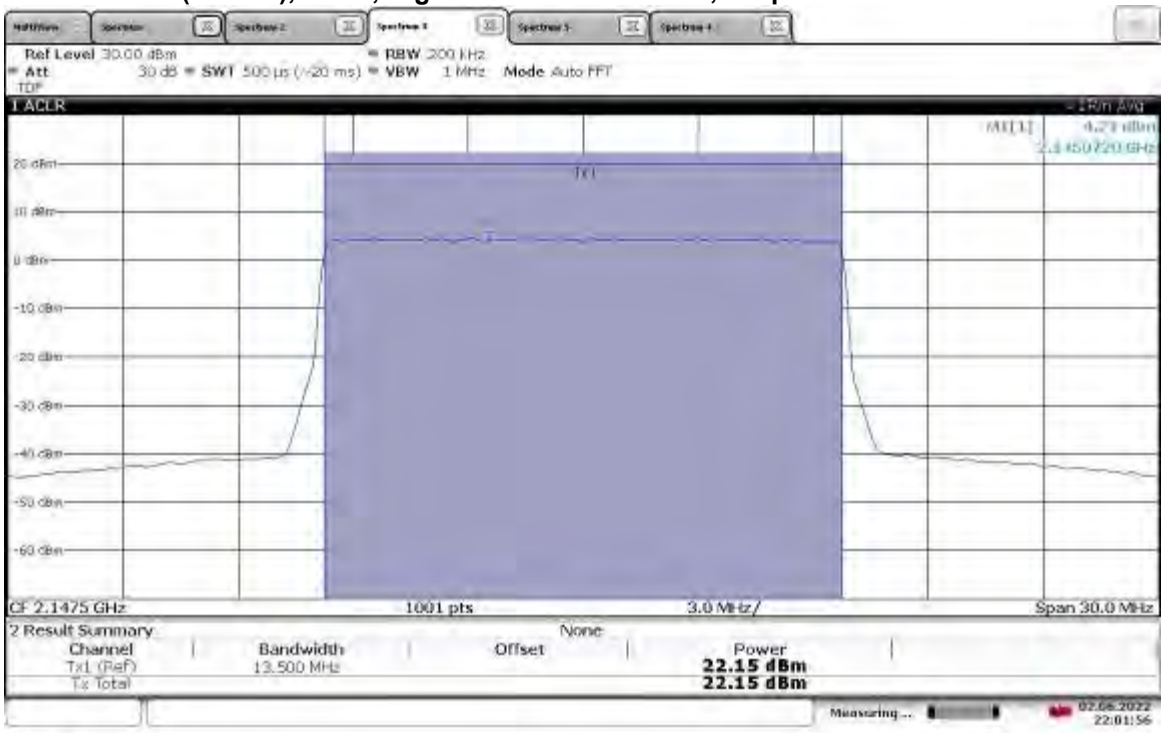


TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2147.5 MHz, Output Power = 22.15 dBm



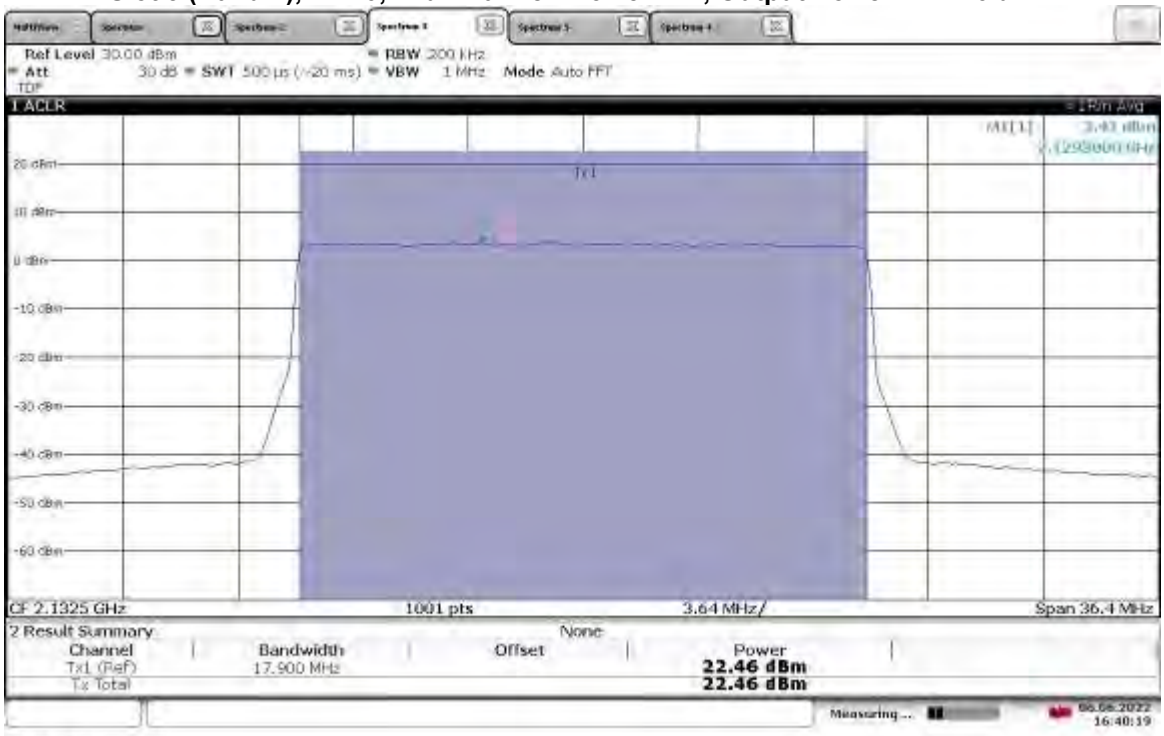
22:03:53 02.06.2022

TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2147.5 MHz, Output Power = 22.15 dBm

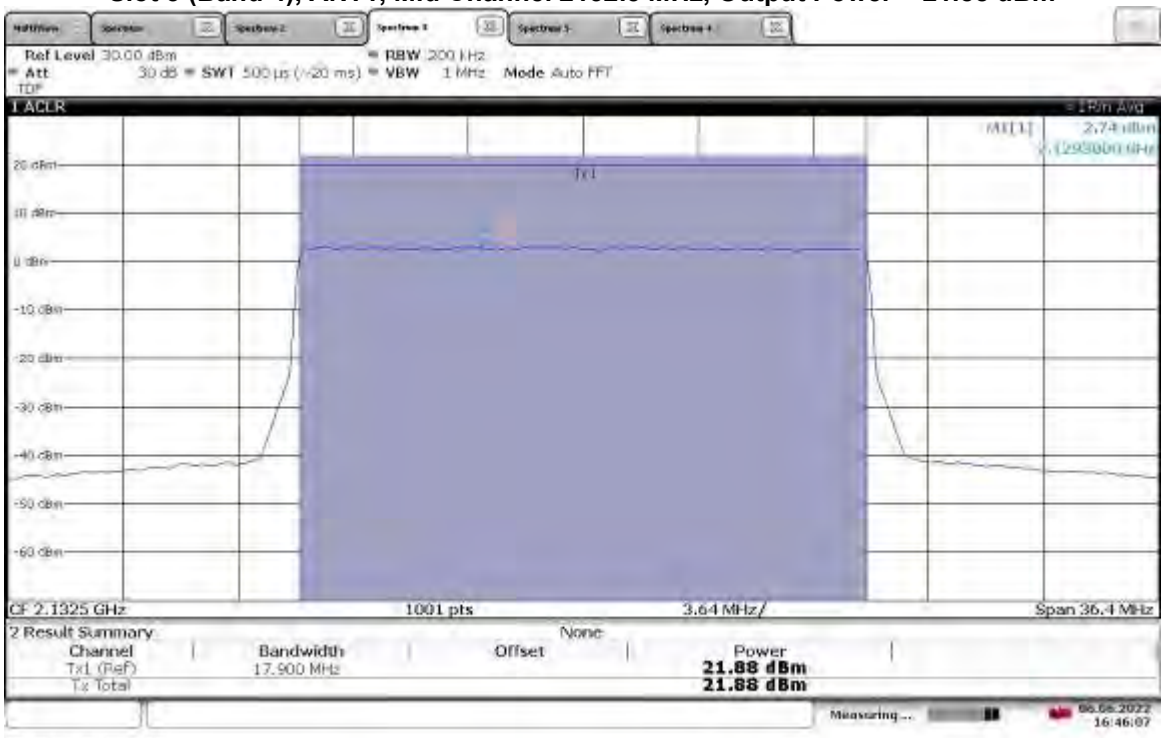


22:01:56 02.06.2022

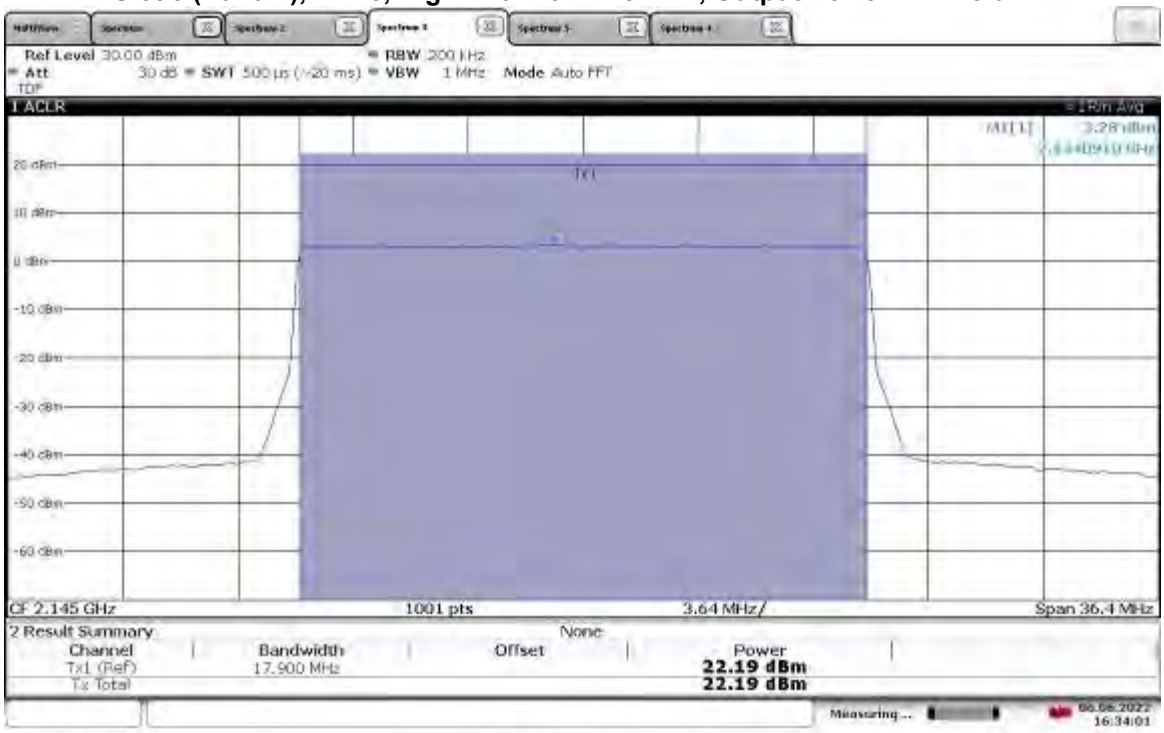
TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.46 dBm



TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.88 dBm

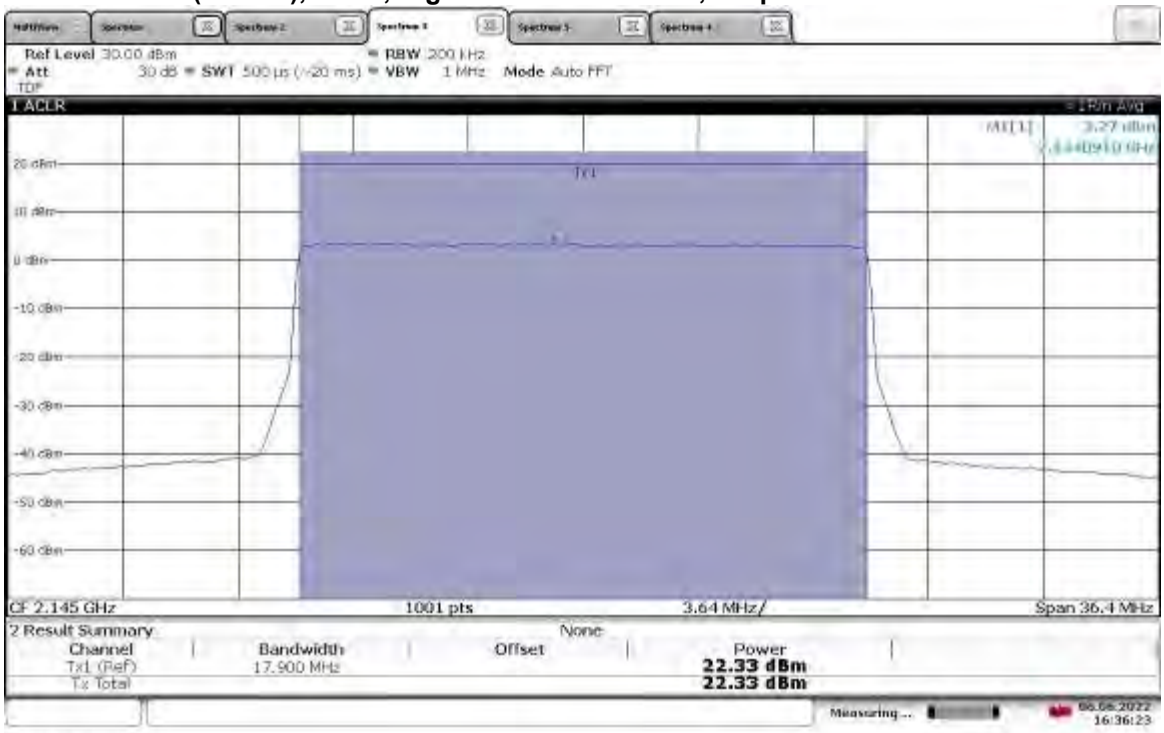


TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2145 MHz, Output Power = 22.19 dBm



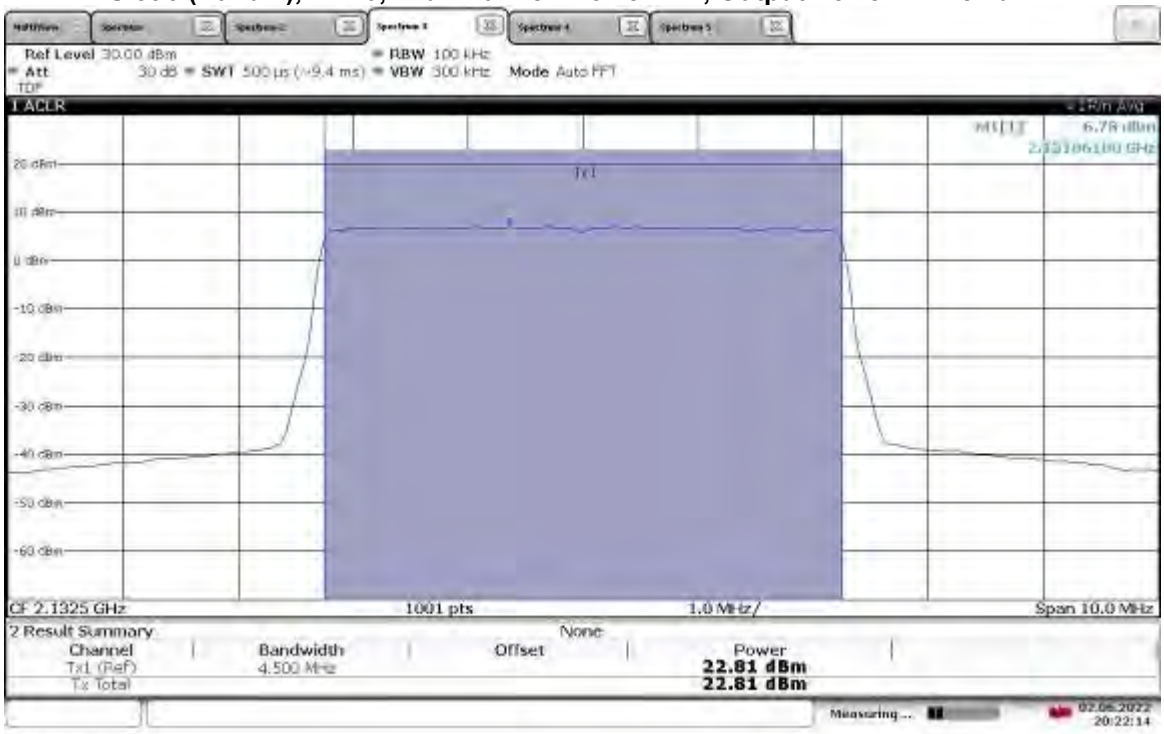
16:34:01 06.06.2022

TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2145 MHz, Output Power = 22.33 dBm



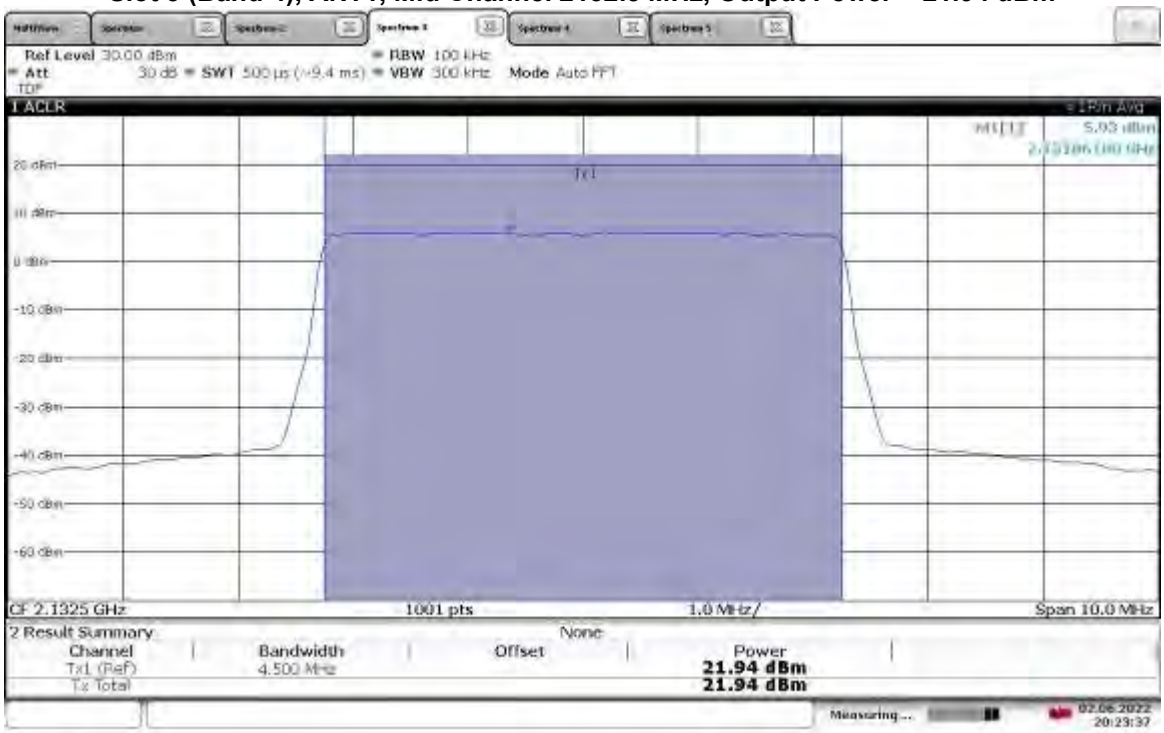
16:36:23 06.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.81 dBm



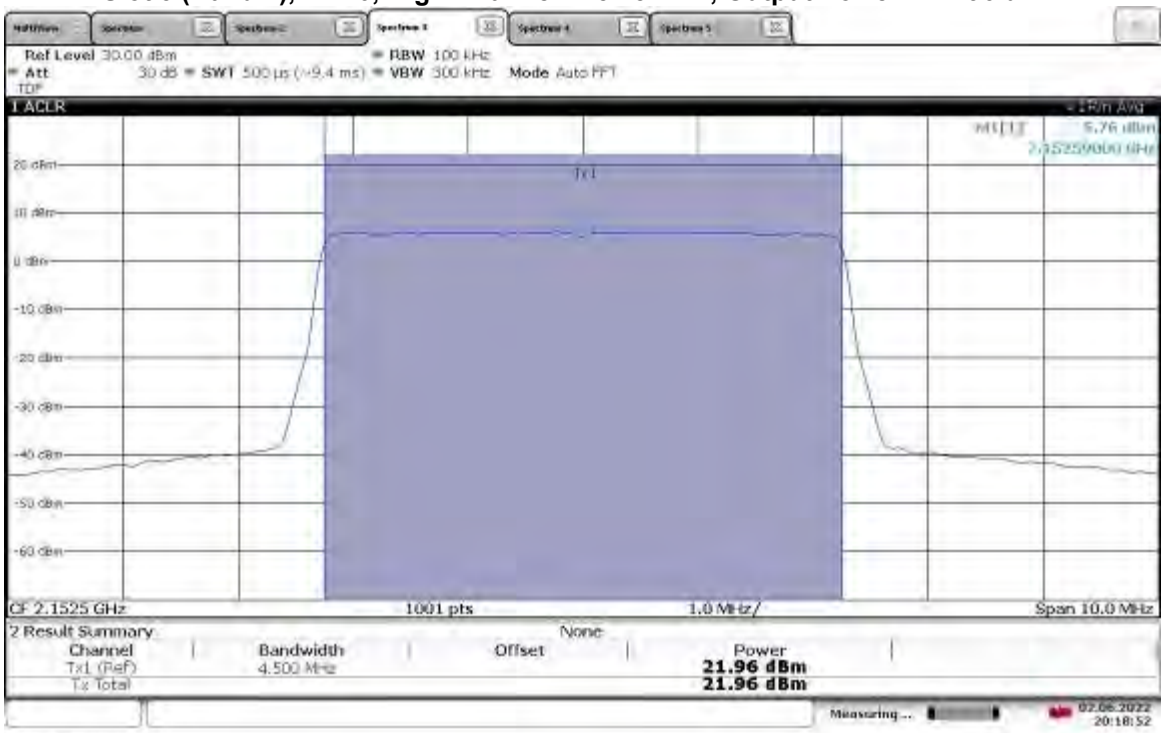
20:22:14 02.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.94 dBm



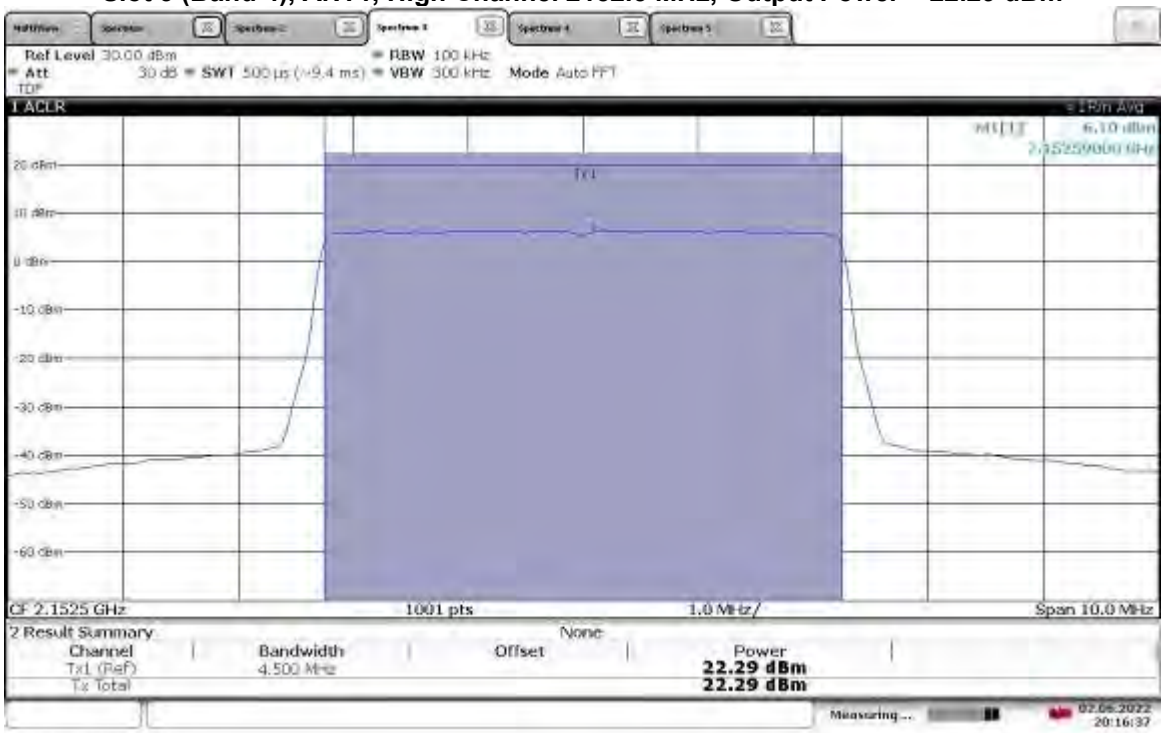
20:23:37 02.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2152.5 MHz, Output Power = 21.96 dBm



20:18:52 02.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2152.5 MHz, Output Power = 22.29 dBm



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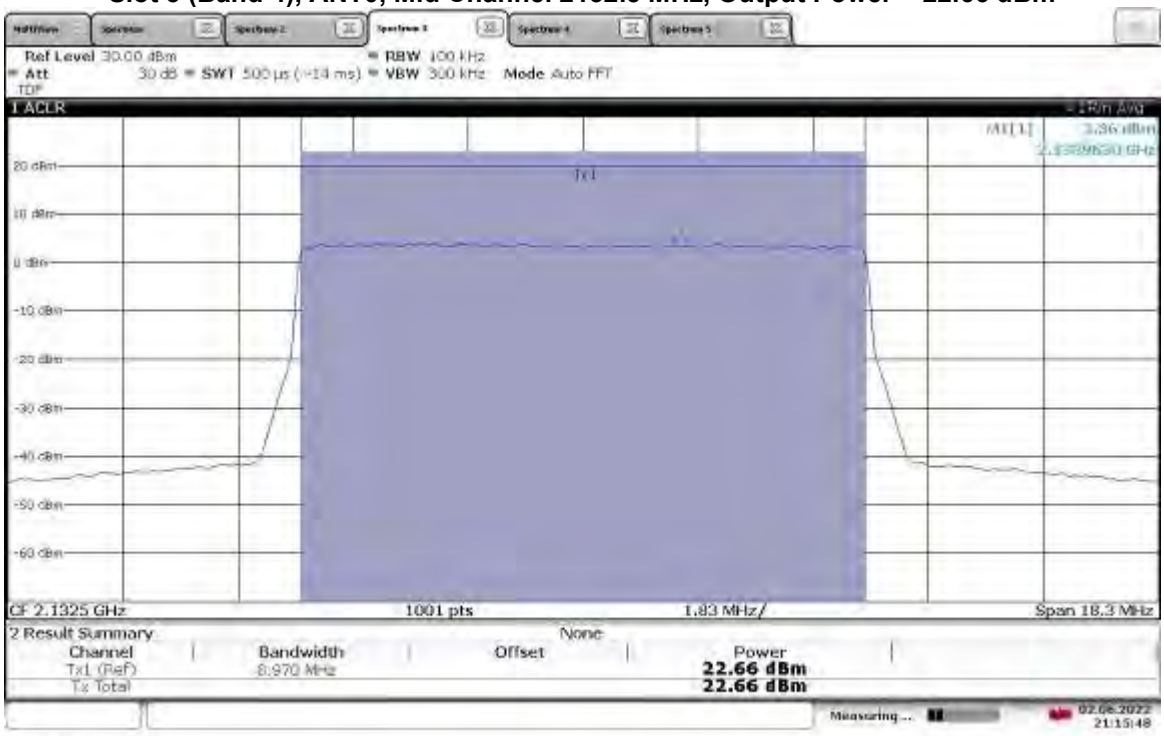
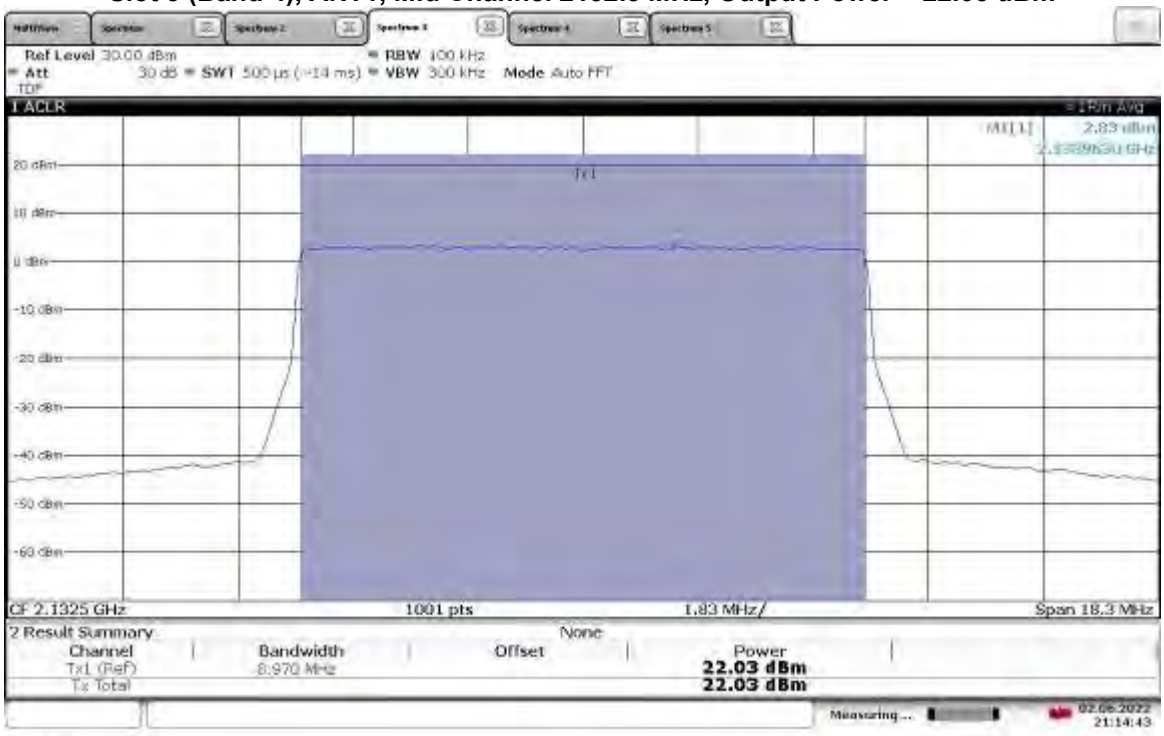
TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.66 dBm



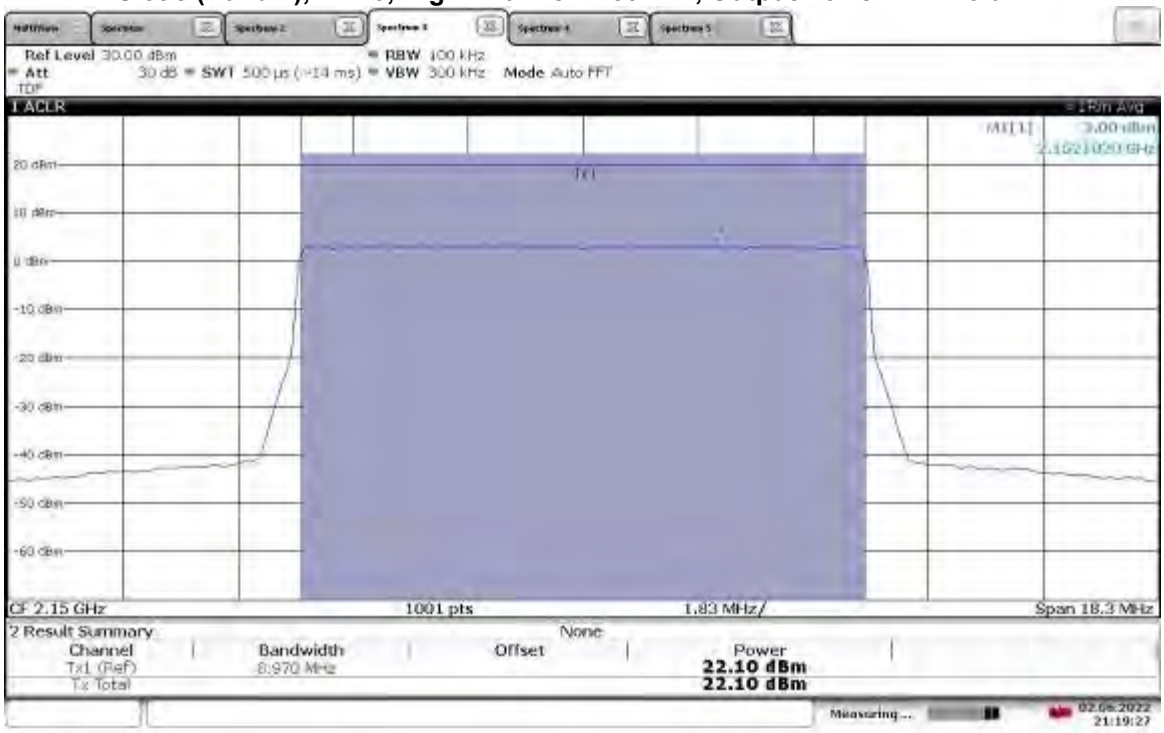
21:15:48 02.06.2022

TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 22.03 dBm

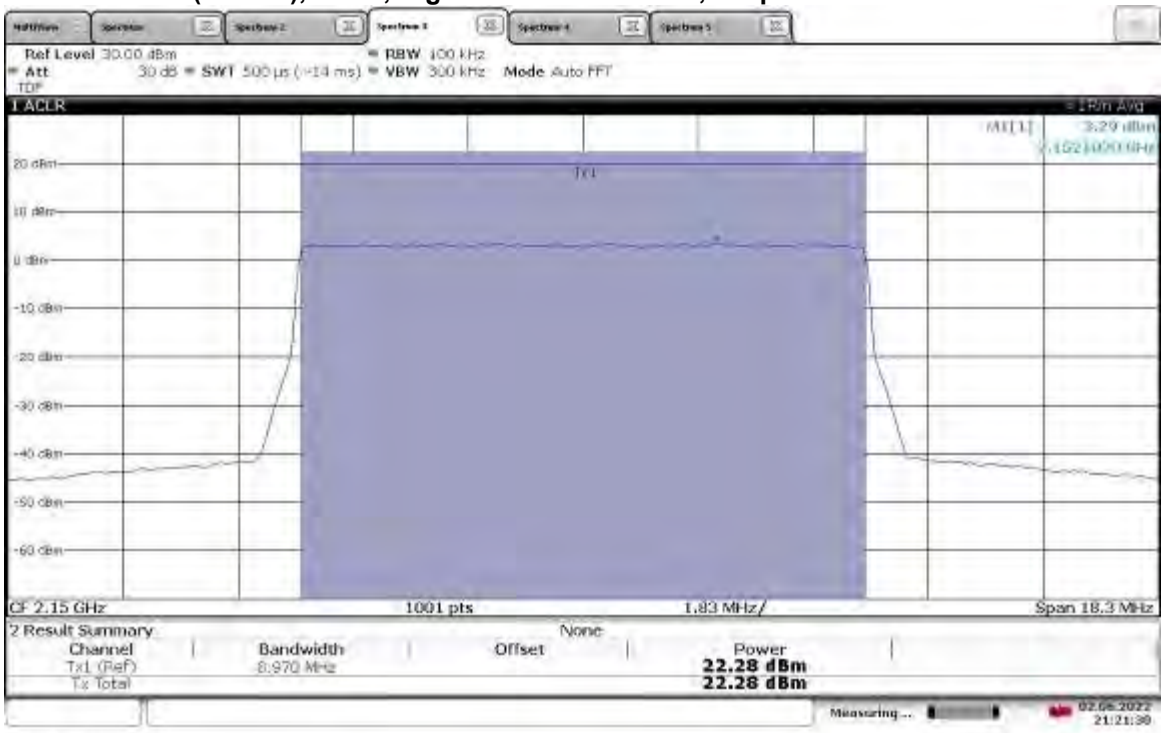


21:14:43 02.06.2022

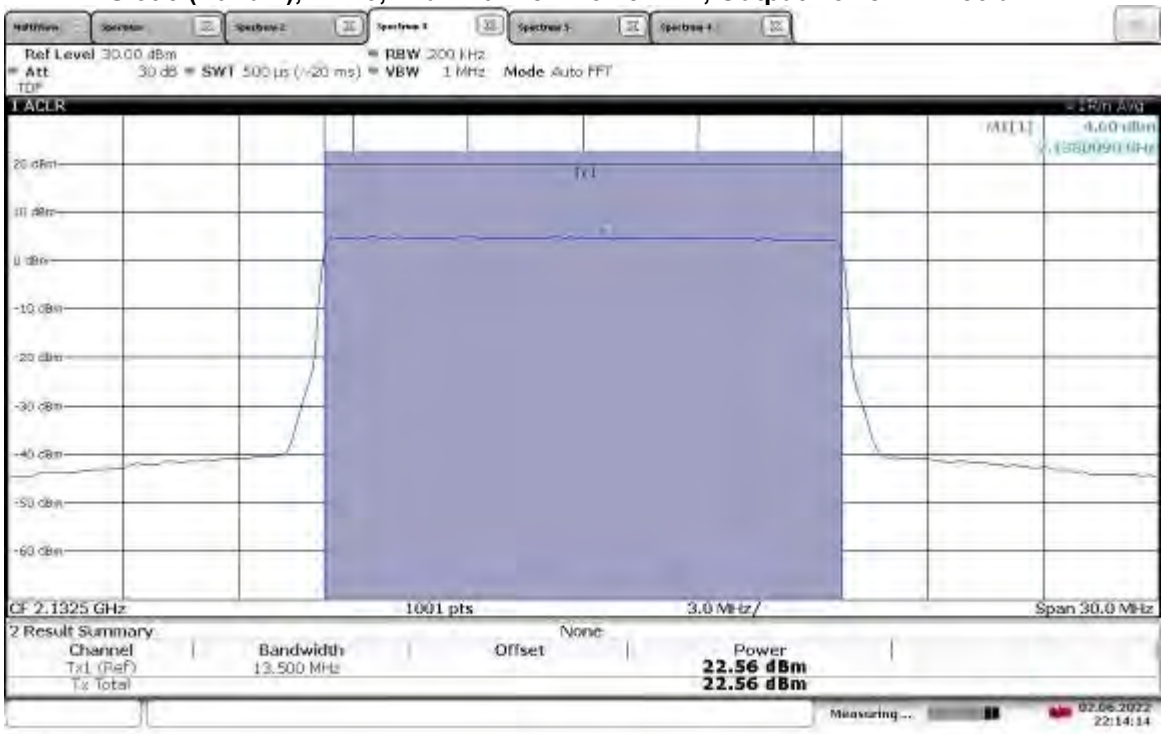
TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2150MHz, Output Power = 22.10 dBm



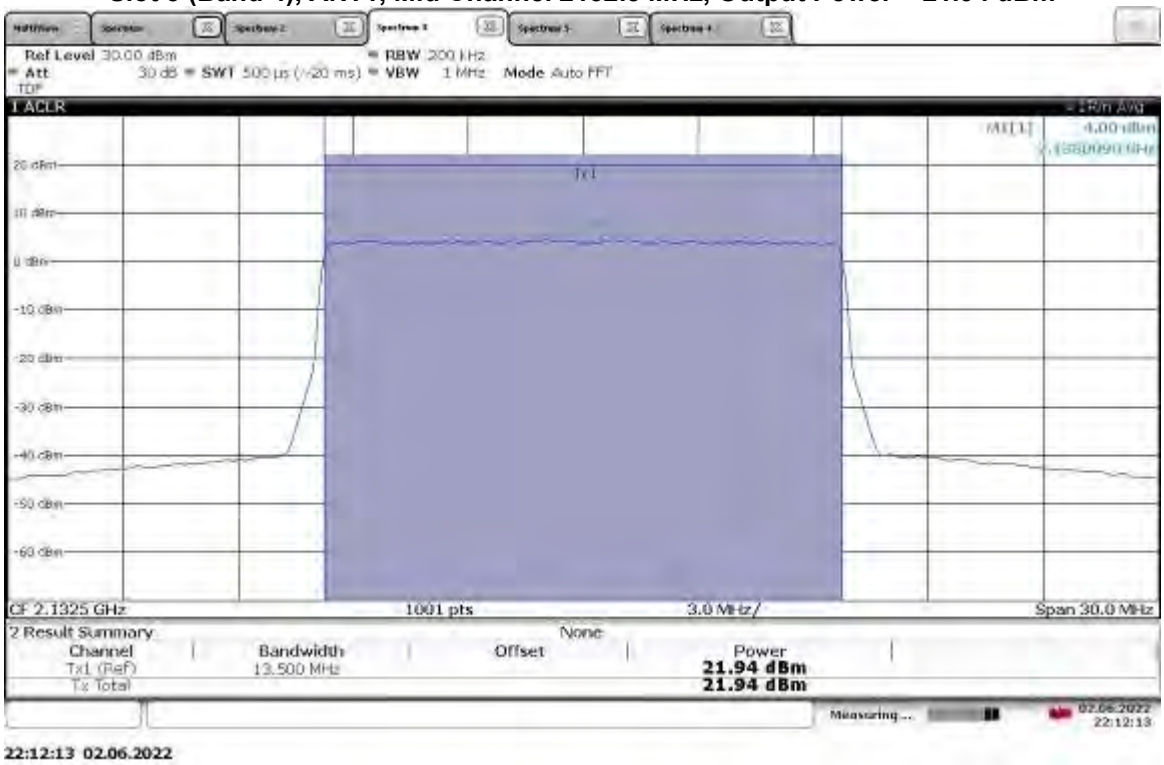
TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2150 MHz, Output Power = 22.28 dBm



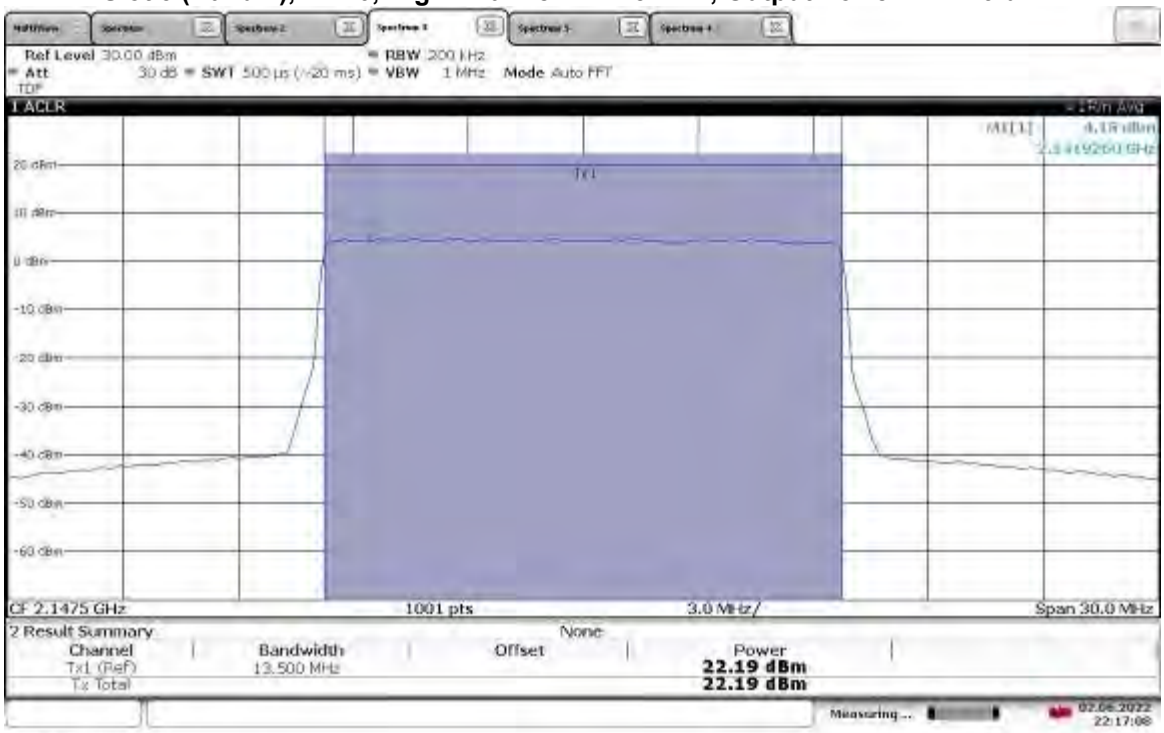
TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.56 dBm



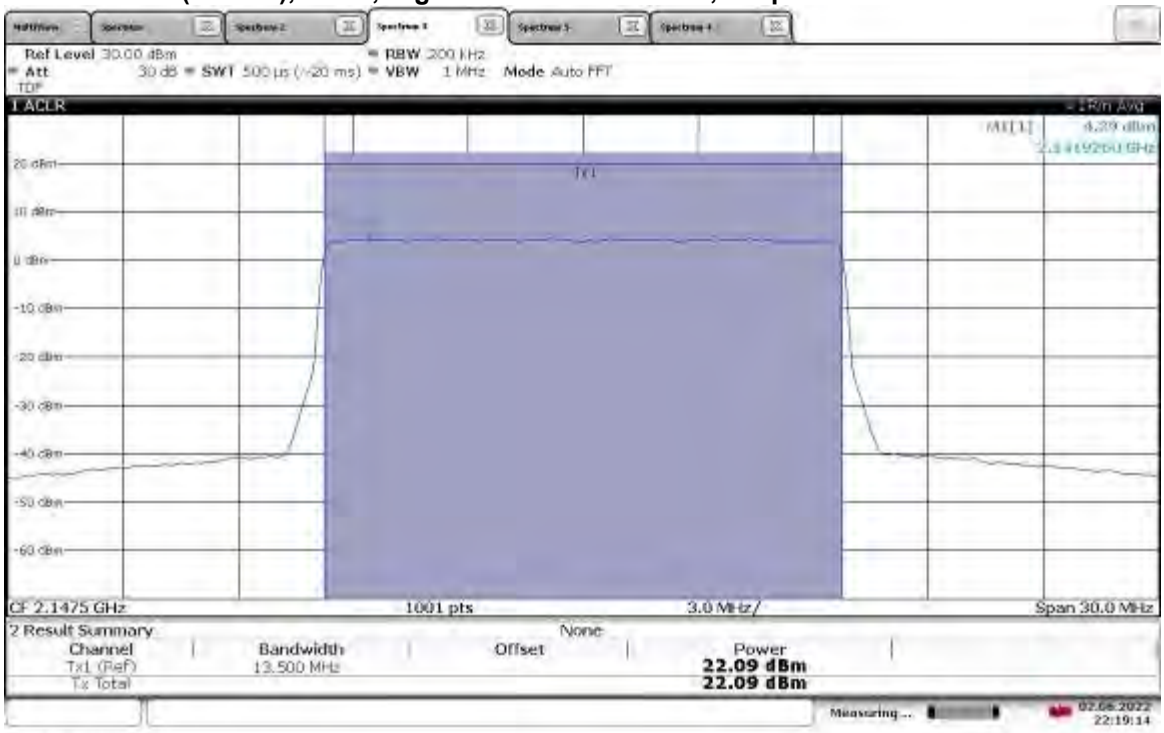
TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 21.94 dBm



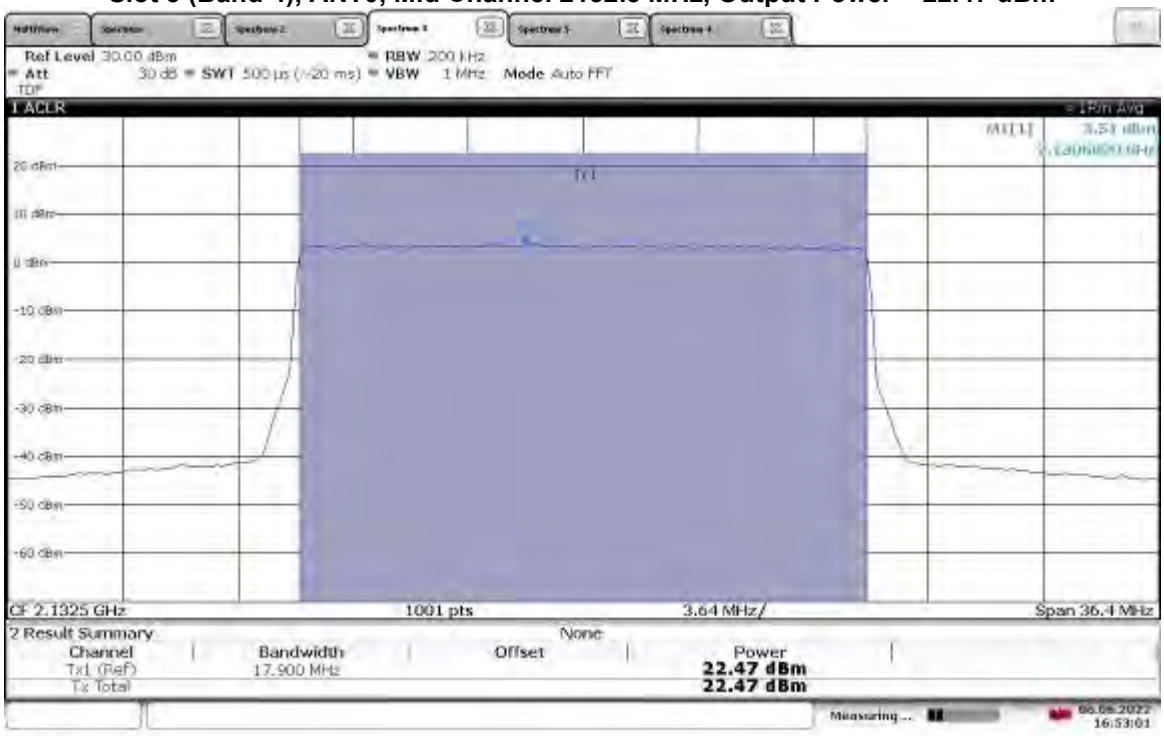
TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2147.5 MHz, Output Power = 22.19 dBm



TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2147.5 MHz, Output Power = 22.09 dBm

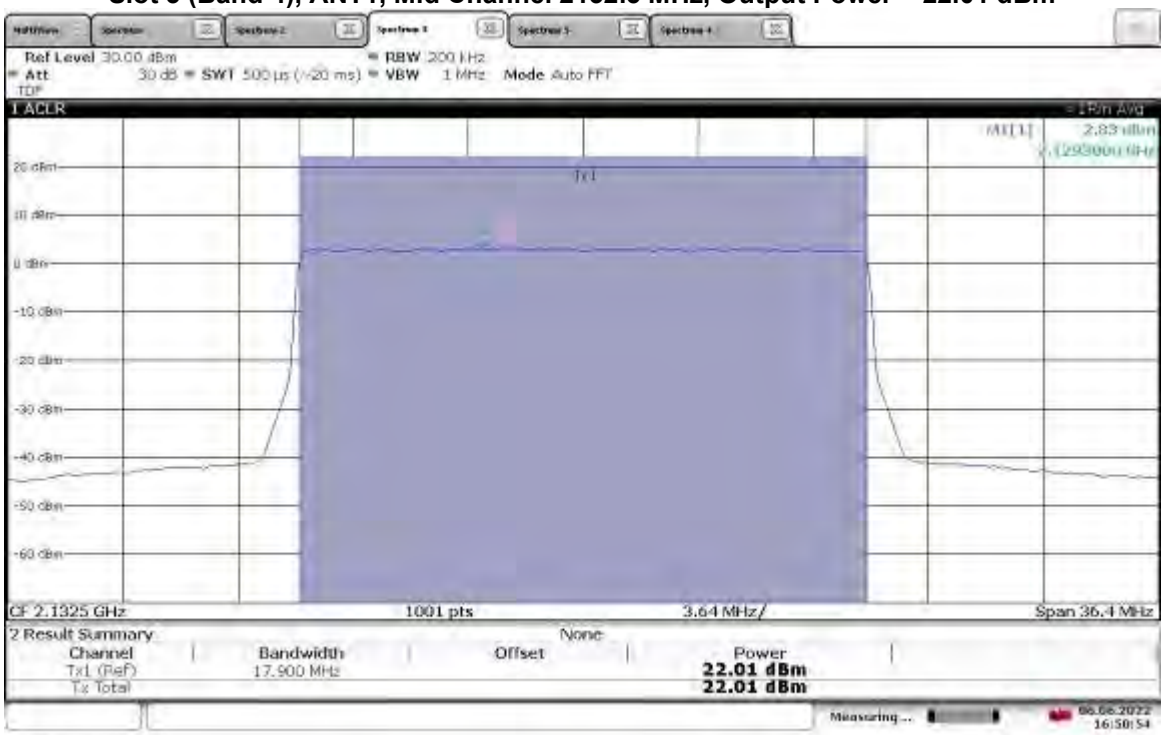


TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, Output Power = 22.47 dBm



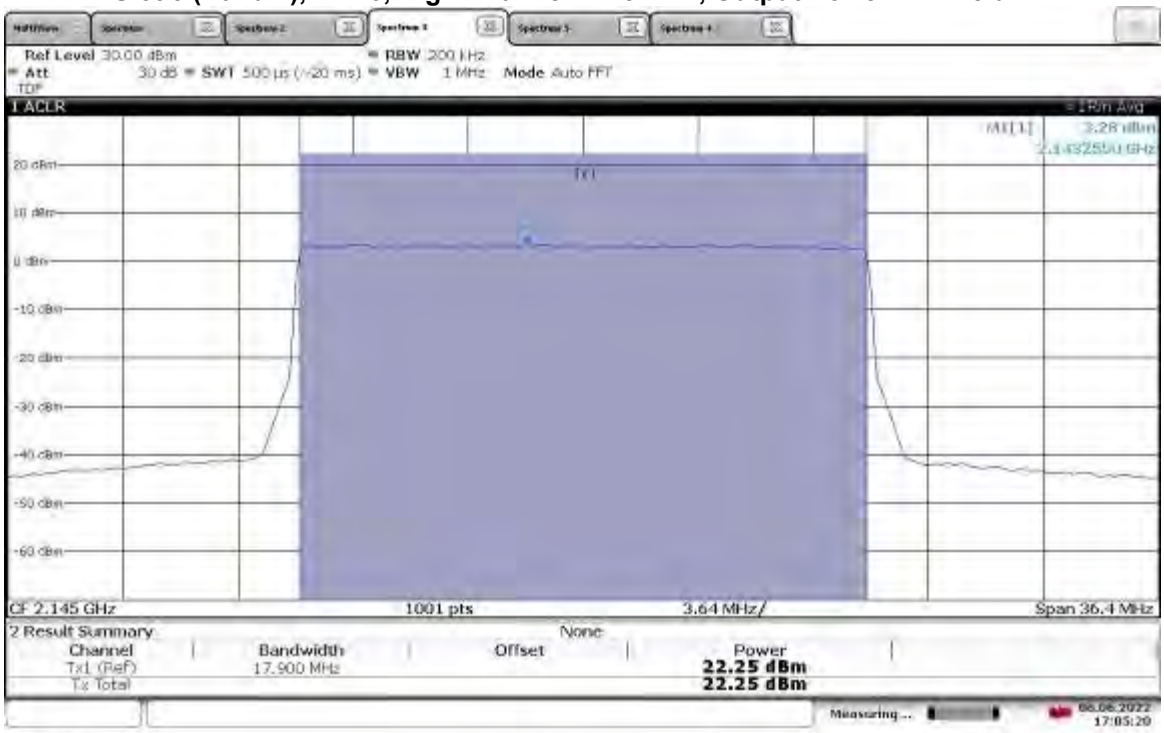
16:53:01 06.06.2022

TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, Output Power = 22.01 dBm

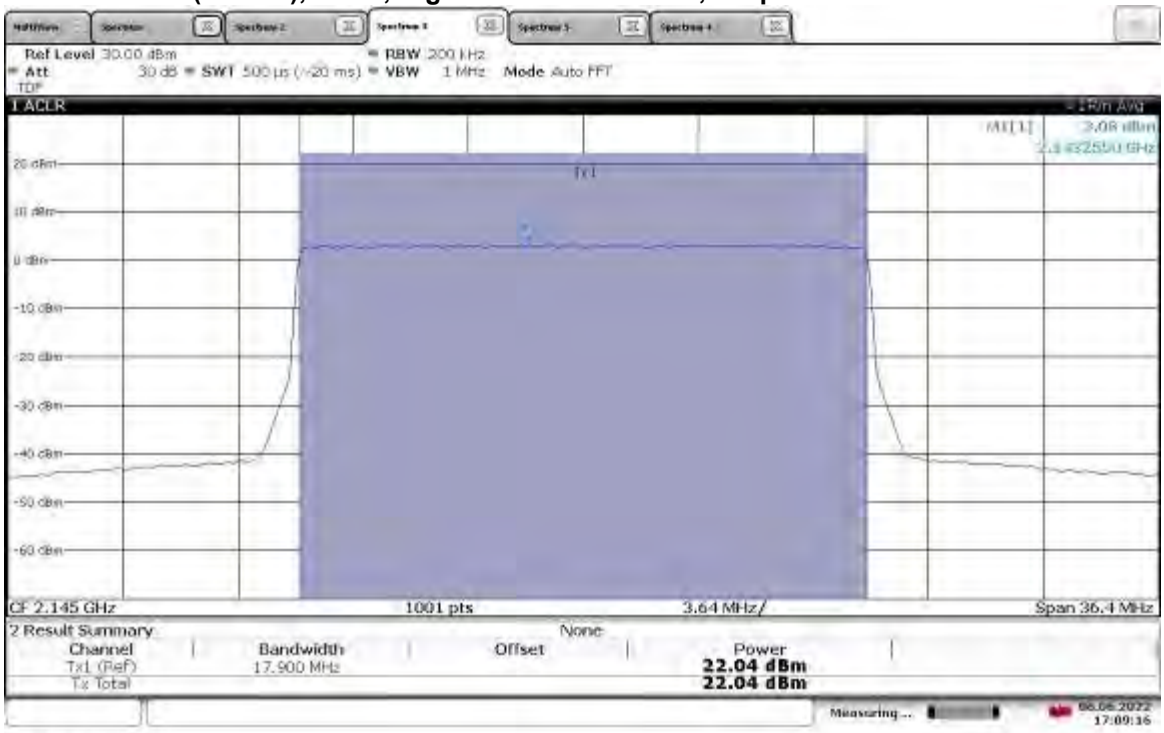


16:50:54 06.06.2022

TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2145 MHz, Output Power = 22.25 dBm



TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2145 MHz, Output Power = 22.04 dBm



Test Personnel:	Vathana Ven	Test Date:	06/02/2022 06/02/2022
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 27	Limit Applied:	See report section 6.3
Input Voltage:	48 VDC (POE)		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	22, 23 ºC
		Relative Humidity:	21, 15%
		Atmospheric Pressure:	1004, 1013mbars

Deviations, Additions, or Exclusions: None

7 Peak-to-Average Power Ratio (PAPR)

7.1 Method

Tests are performed in accordance with ANSI C63.26 and CFR47 FCC Part 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.

7.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	01/26/2022	01/26/2023
CBLHF2012-2M-2	2m 9kHz-40GHz Coaxial Cable – SET2	Huber & Suhner	SF102	252675001	02/10/2022	02/10/2023
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	11/02/2021	11/02/2022
DAV005'	Weather Station	Davis	6250	MS191218083	02/11/2022	02/11/2023

Software Utilized:

Name	Manufacturer	Version
None	--	--

7.3 Results:

The sample tested was found to Comply.

FCC Part §27.50(d)(5) The peak-to-average ratio (PAR) of the transmission may not exceed 13 dB.

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	11.22
		ANT1	11.02
High	2152.50	ANT0	11.24
		ANT1	11.25

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	11.11
		ANT1	11.52
High	2150.00	ANT0	11.37
		ANT1	11.41

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	12.46
		ANT1	12.45
High	2147.50	ANT0	12.01
		ANT1	11.94

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	10.63
		ANT1	10.56
High	2145.00	ANT0	10.45
		ANT1	10.69

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	10.96
		ANT1	11.30
High	2152.50	ANT0	11.21
		ANT1	11.29

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	10.20
		ANT1	10.69
High	2150.00	ANT0	10.61
		ANT1	10.46

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	10.25
		ANT1	10.29
High	2147.50	ANT0	10.85
		ANT1	10.55

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	12.53
		ANT1	12.25
High	2145.00	ANT0	12.45
		ANT1	12.50

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	10.05
		ANT1	10.19
High	2152.50	ANT0	10.25
		ANT1	10.22

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	10.49
		ANT1	10.85
High	2150.00	ANT0	10.91
		ANT1	11.07

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	10.46
		ANT1	10.79
High	2147.50	ANT0	10.90
		ANT1	10.89

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	11.24
		ANT1	10.45
High	2145.00	ANT0	11.52
		ANT1	10.83

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	10.41
		ANT1	10.70
High	2152.50	ANT0	10.49
		ANT1	10.68

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	10.72
		ANT1	10.54
High	2150.00	ANT0	10.57
		ANT1	10.55

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	10.29
		ANT1	10.12
High	2147.50	ANT0	10.99
		ANT1	11.00

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

Channel	Frequency (MHz)	Antenna Port	PAPR (dB)
Mid	2132.50	ANT0	10.58
		ANT1	10.30

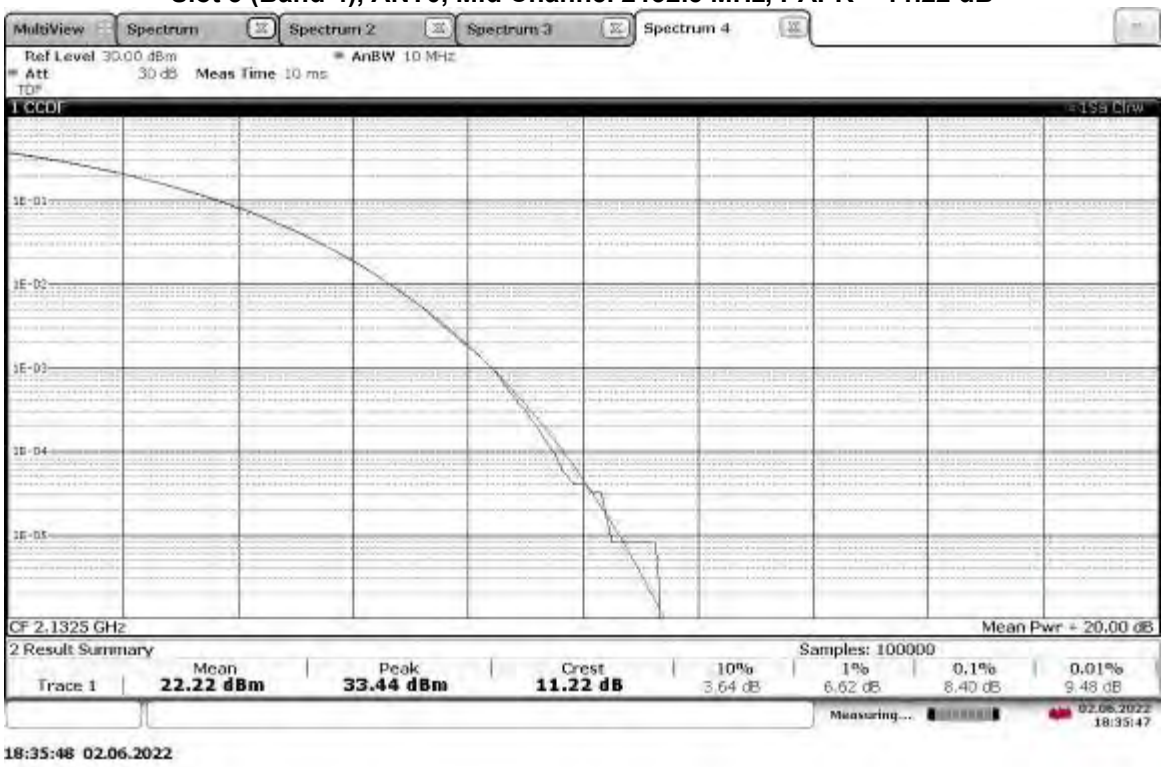
High	2145.00	ANT0	10.39
		ANT1	10.25

7.4 Setup Photograph:

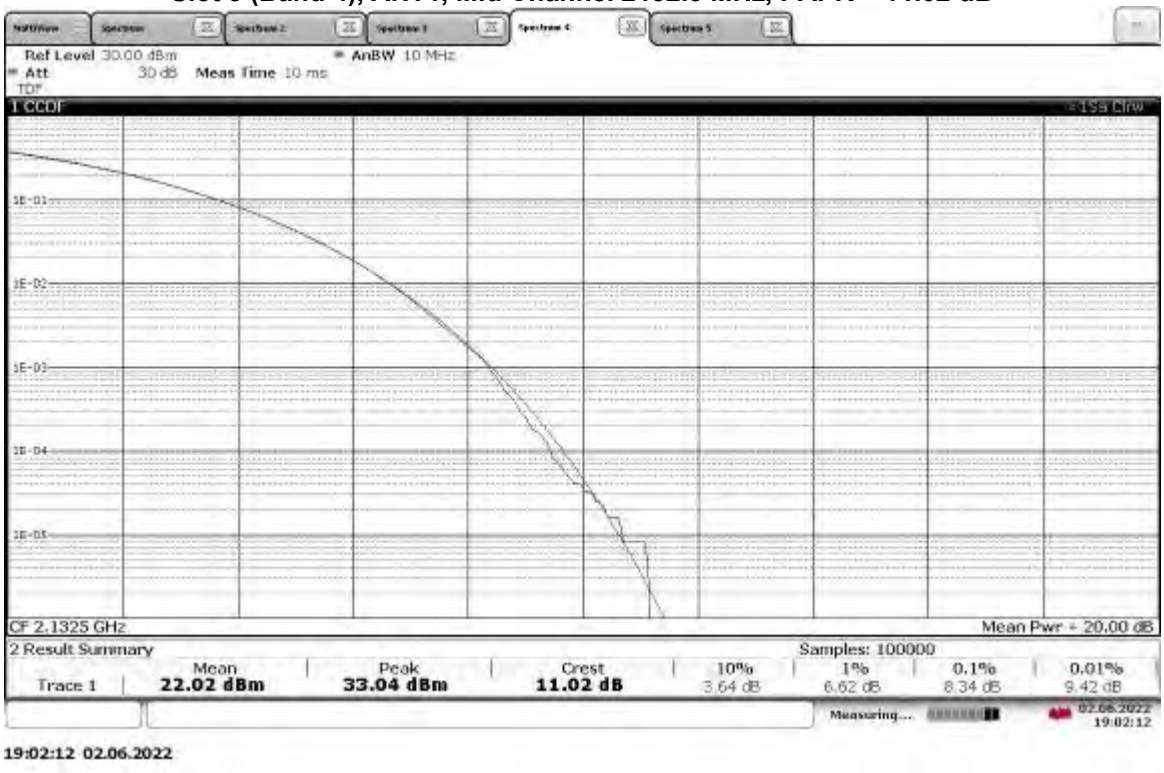
Confidential – Photos not included in this report

7.5 Plots/Data:

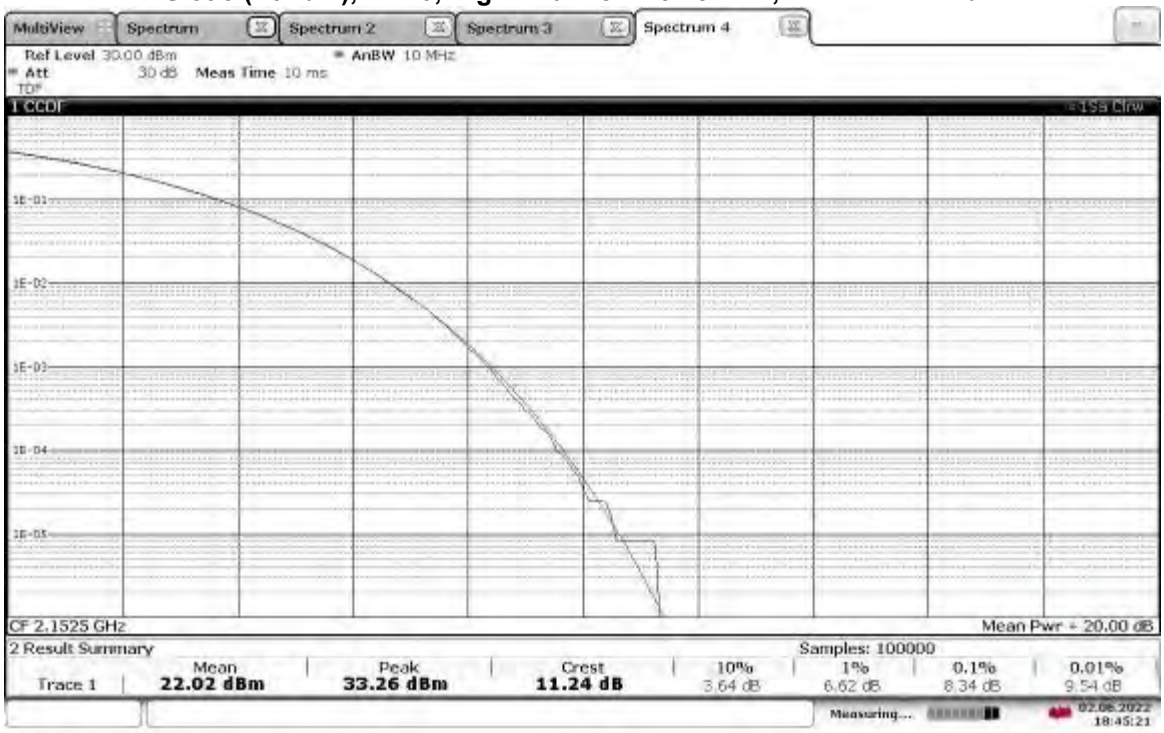
TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 11.22 dB



TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 11.02 dB

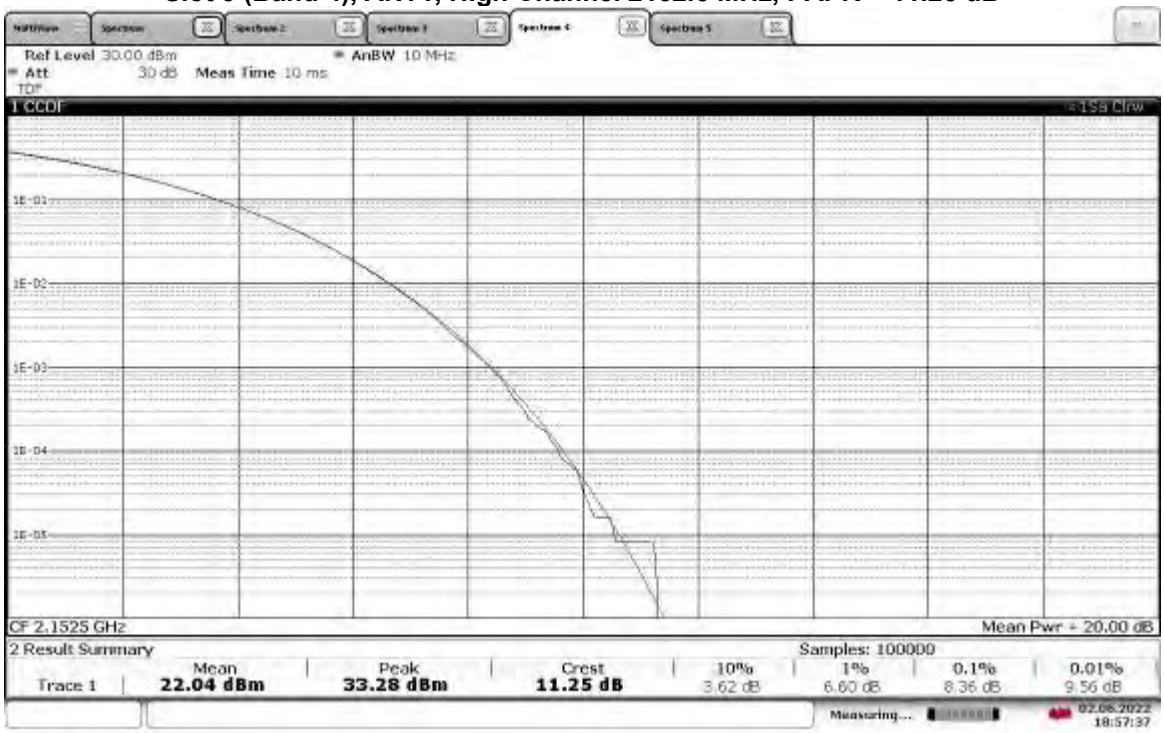


TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2152.5 MHz, PAPR = 11.24 dB



18:45:21 02.06.2022

TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2152.5 MHz, PAPR = 11.25 dB



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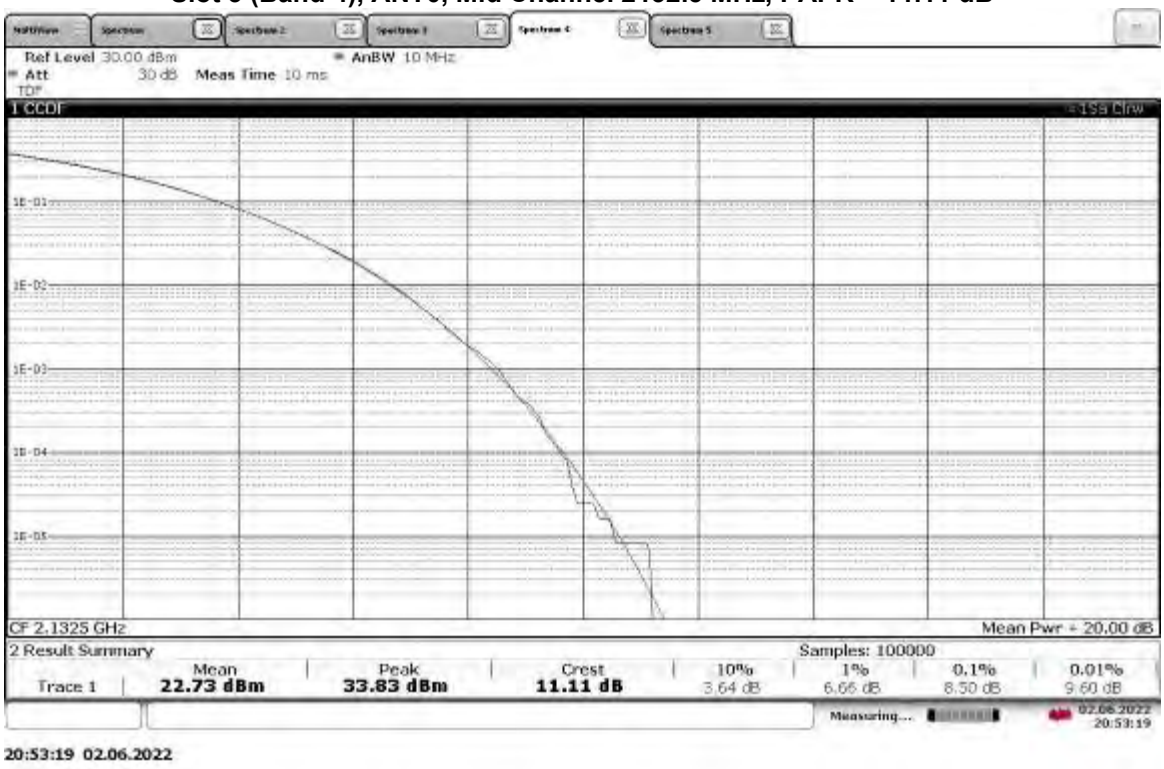
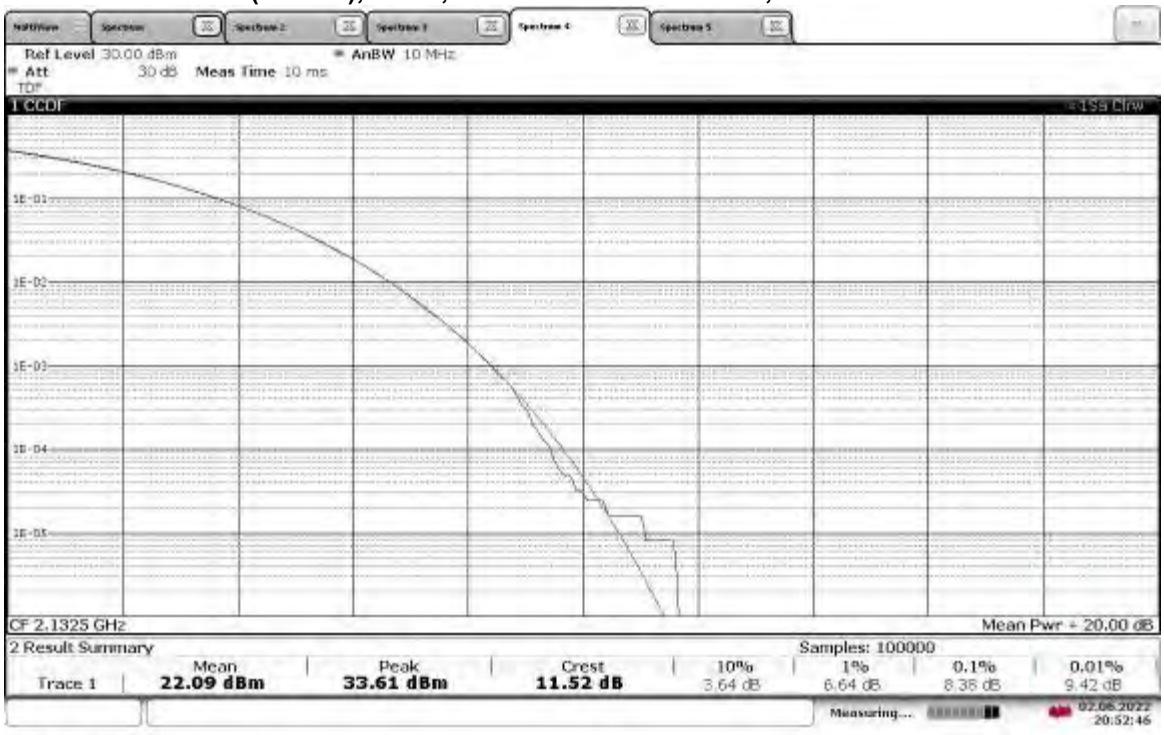
TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 11.11 dB



20:53:19 02.06.2022

TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 11.52 dB



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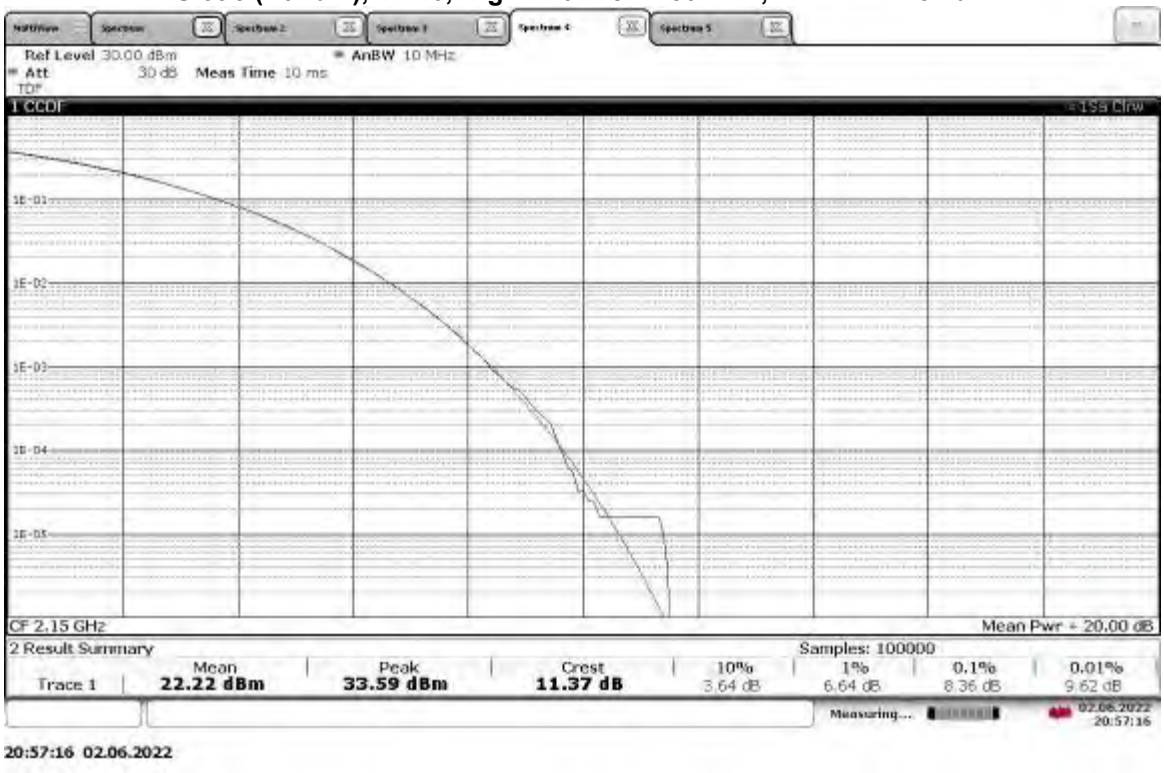
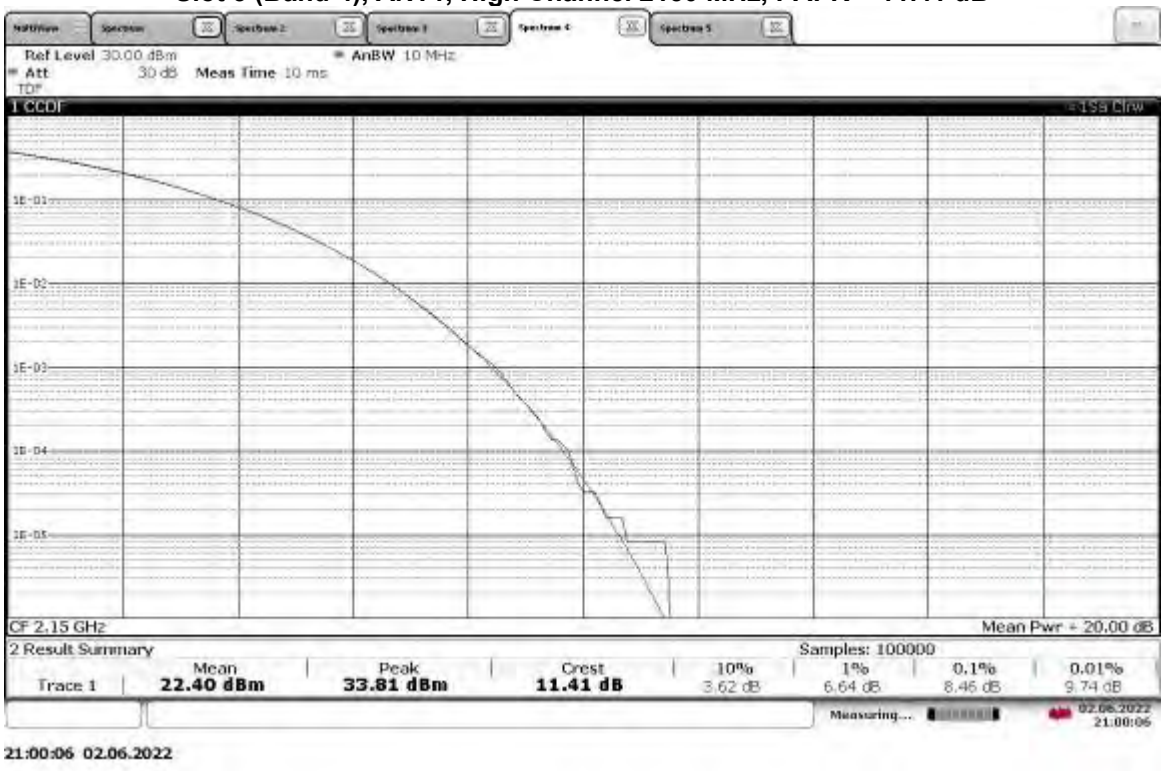
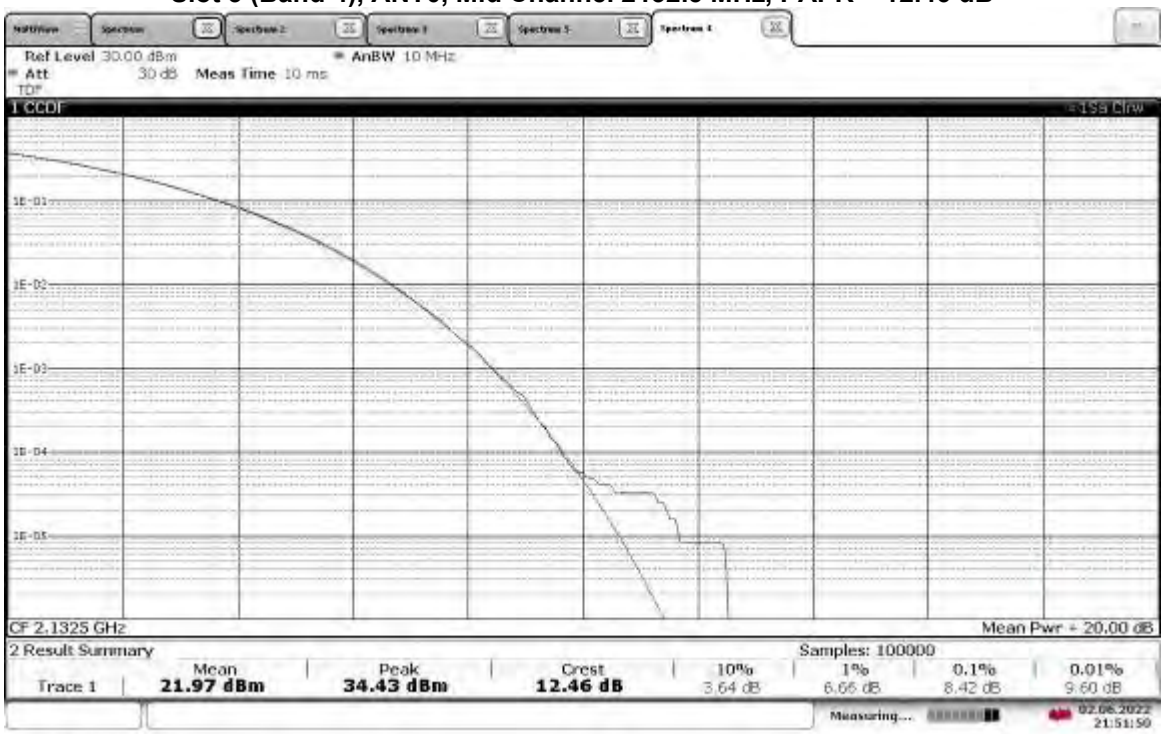
TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2150 MHz, PAPR = 11.37 dB



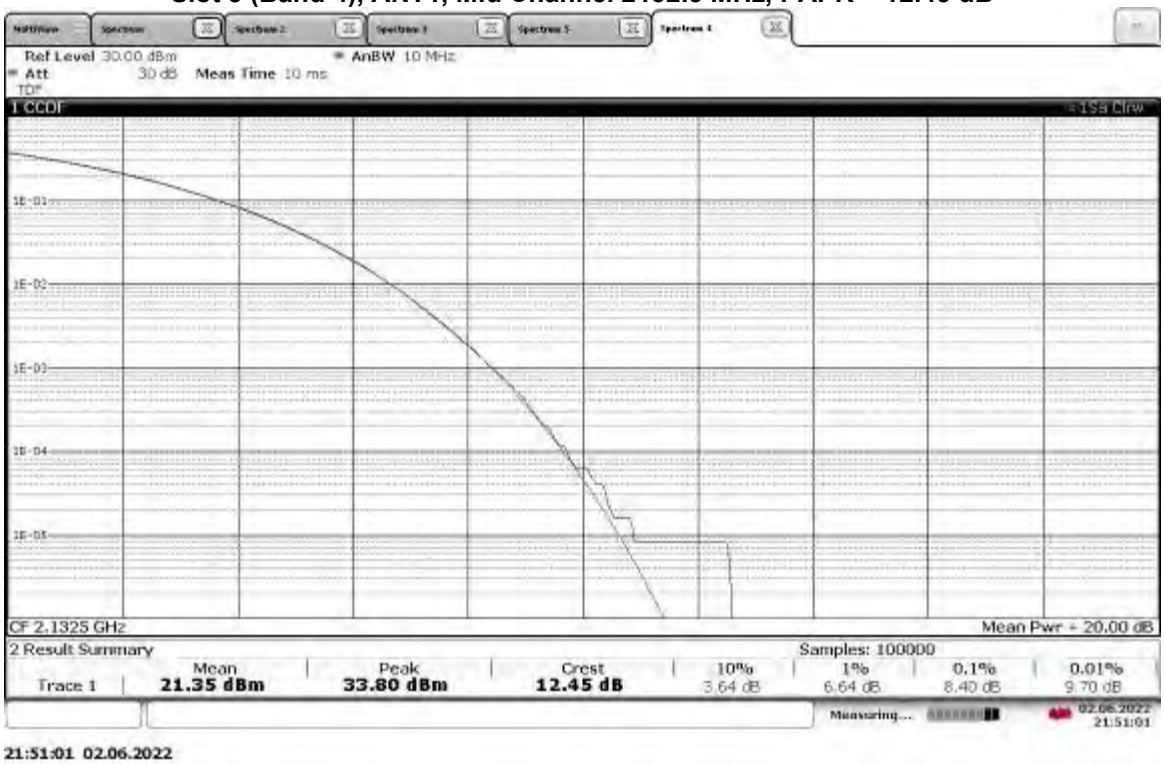
TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2150 MHz, PAPR = 11.41 dB



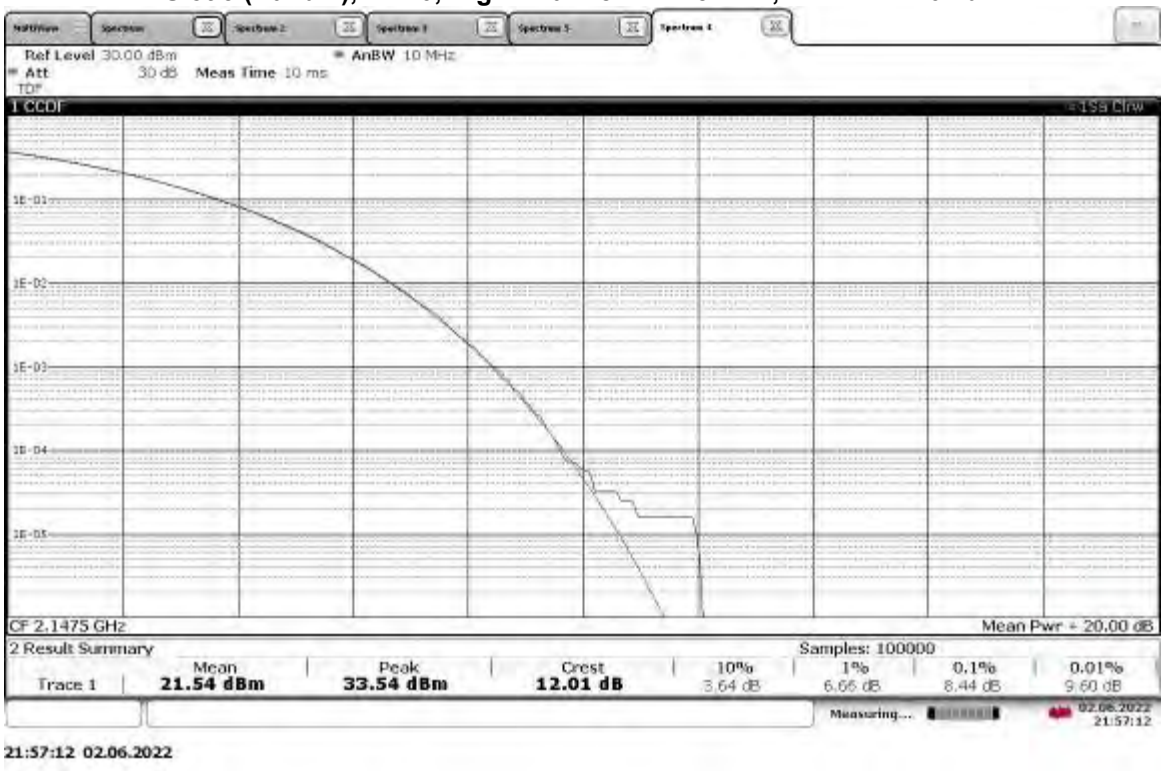
TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 12.46 dB



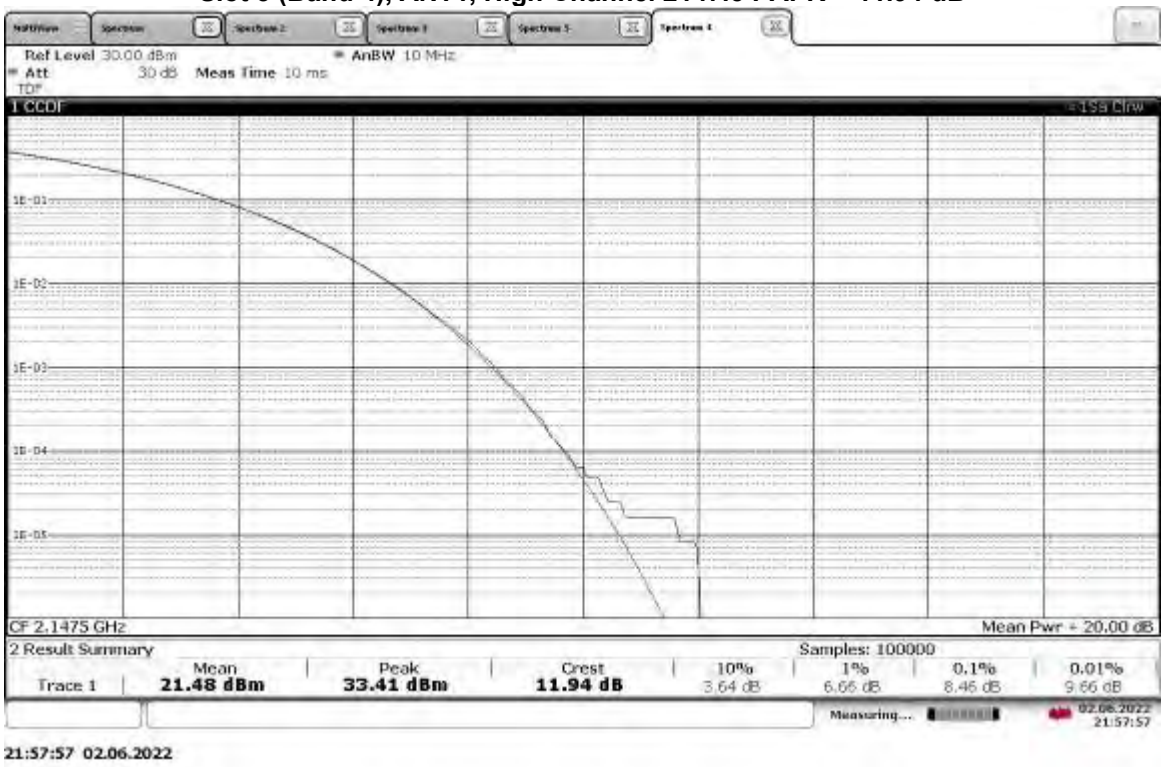
TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 12.45 dB



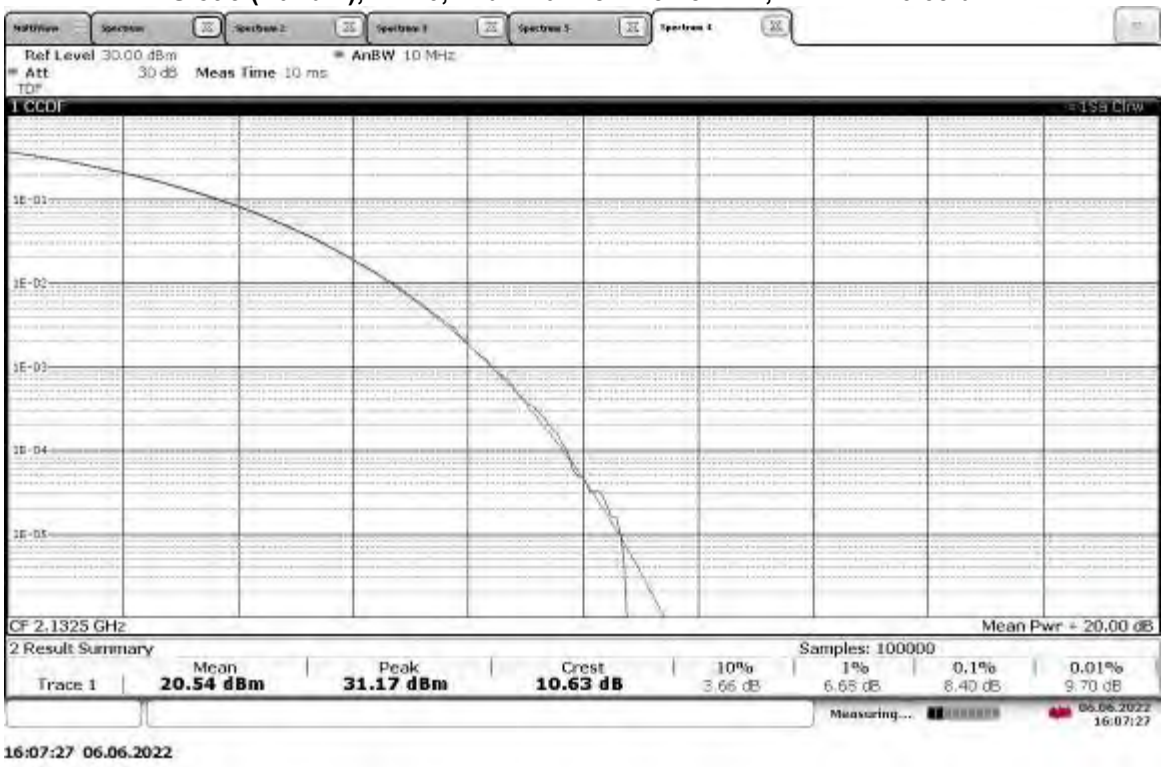
TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2147.5 MHz, PAPR = 12.01 dB



TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2147.5 PAPR = 11.94 dB

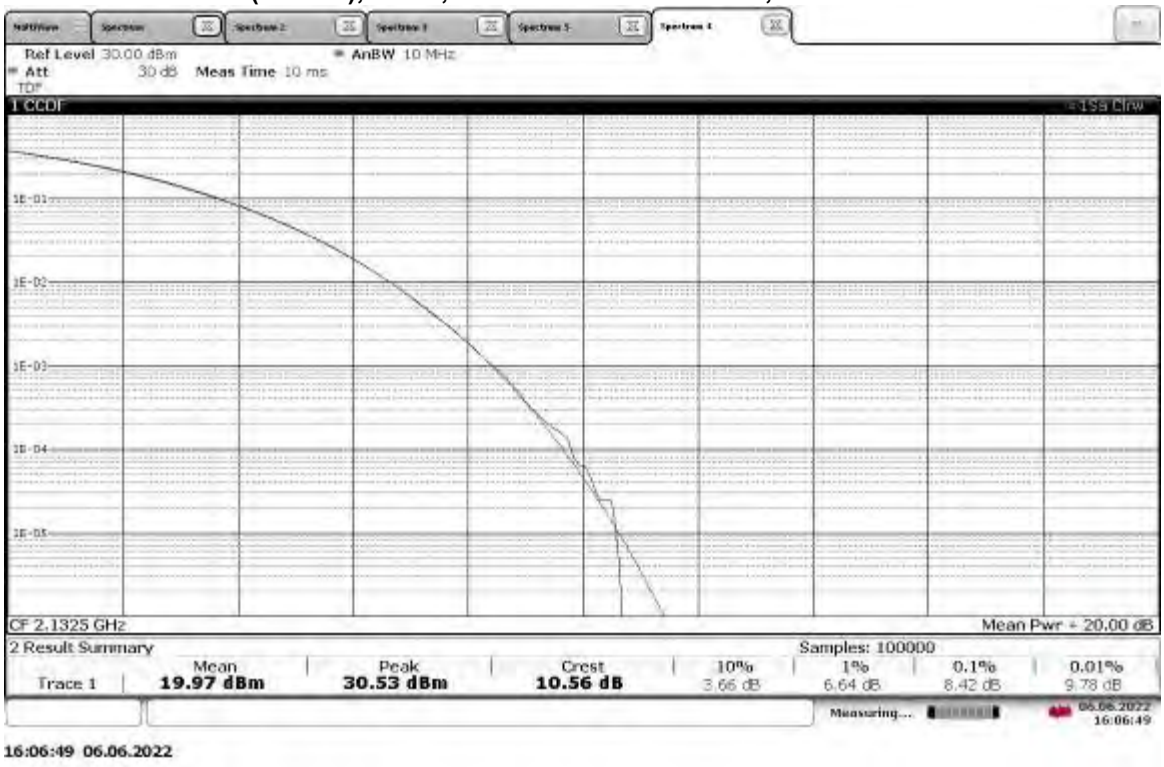


TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 10.63 dB



16:07:27 06.06.2022

TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 10.56 dB



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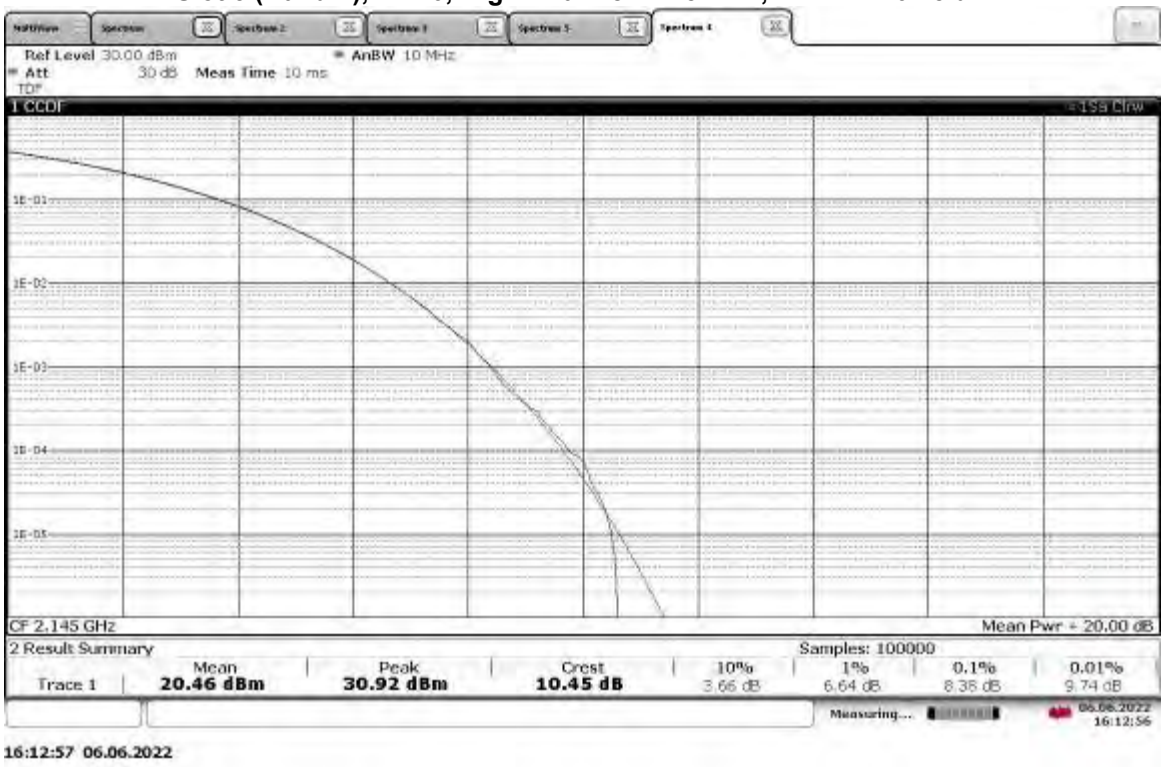
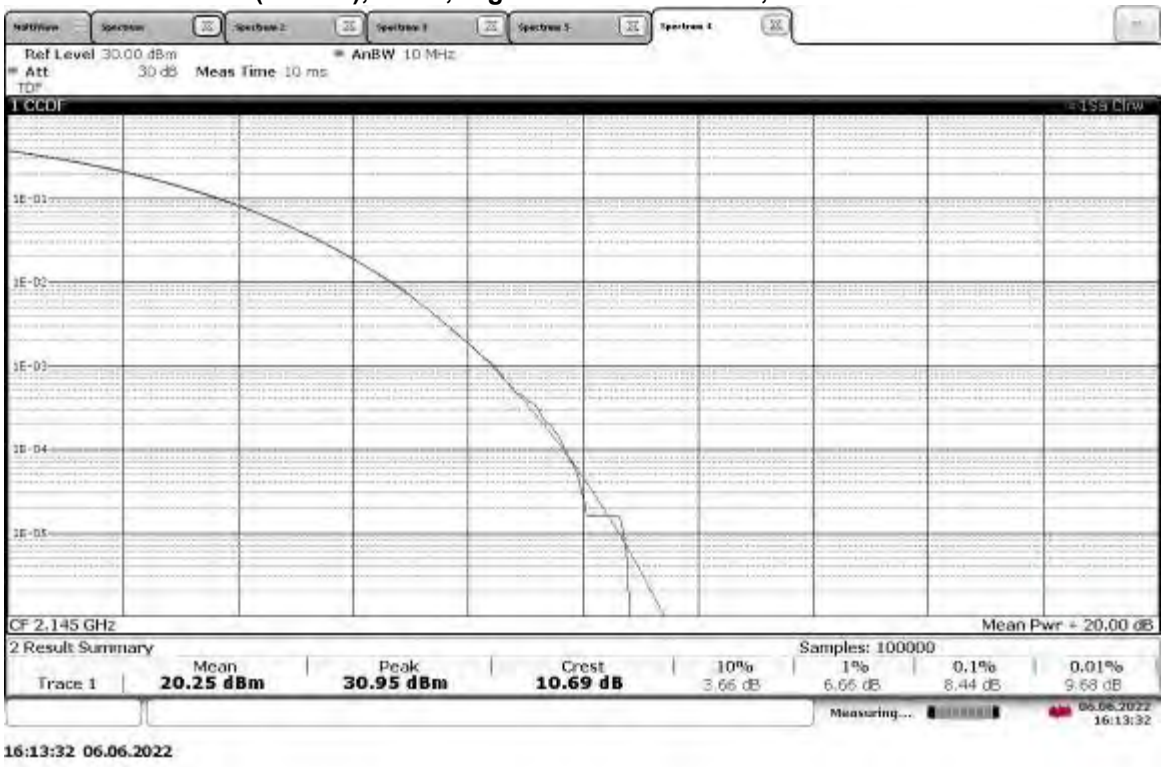
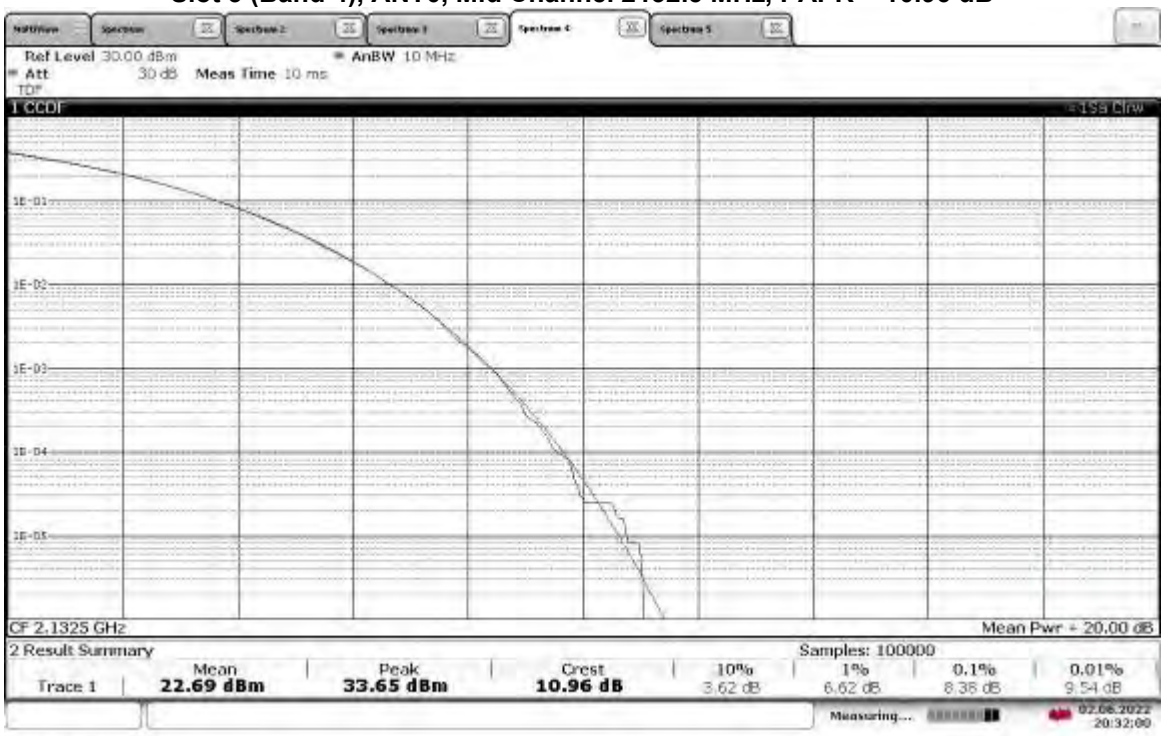
TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2145 MHz, PAPR = 10.45 dB



TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2145 MHz, PAPR = 10.69 dB

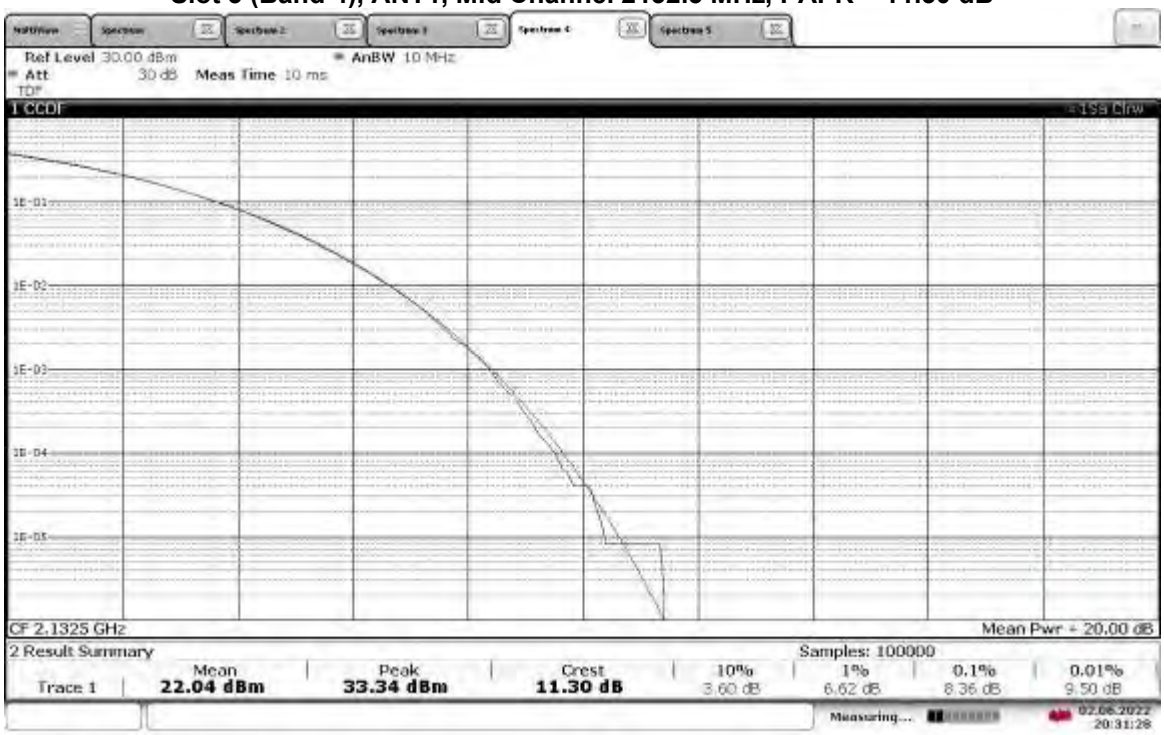


TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 10.96 dB



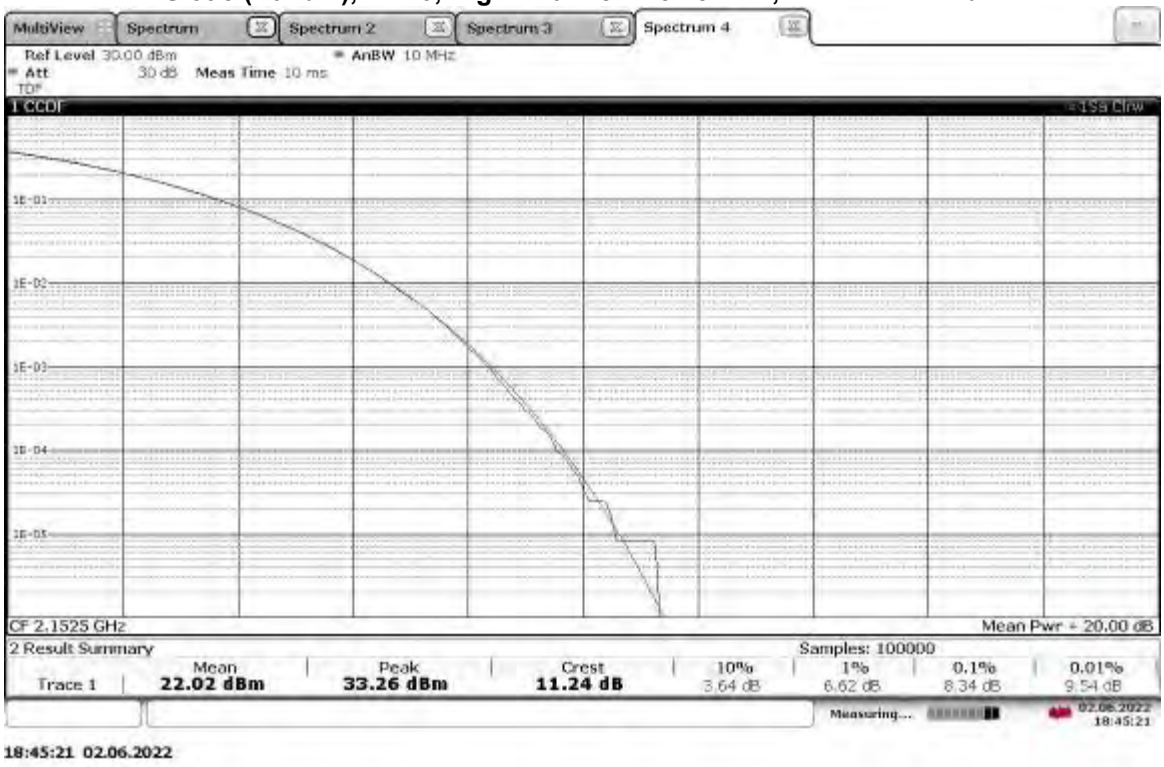
20:32:00 02.06.2022

TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 11.30 dB



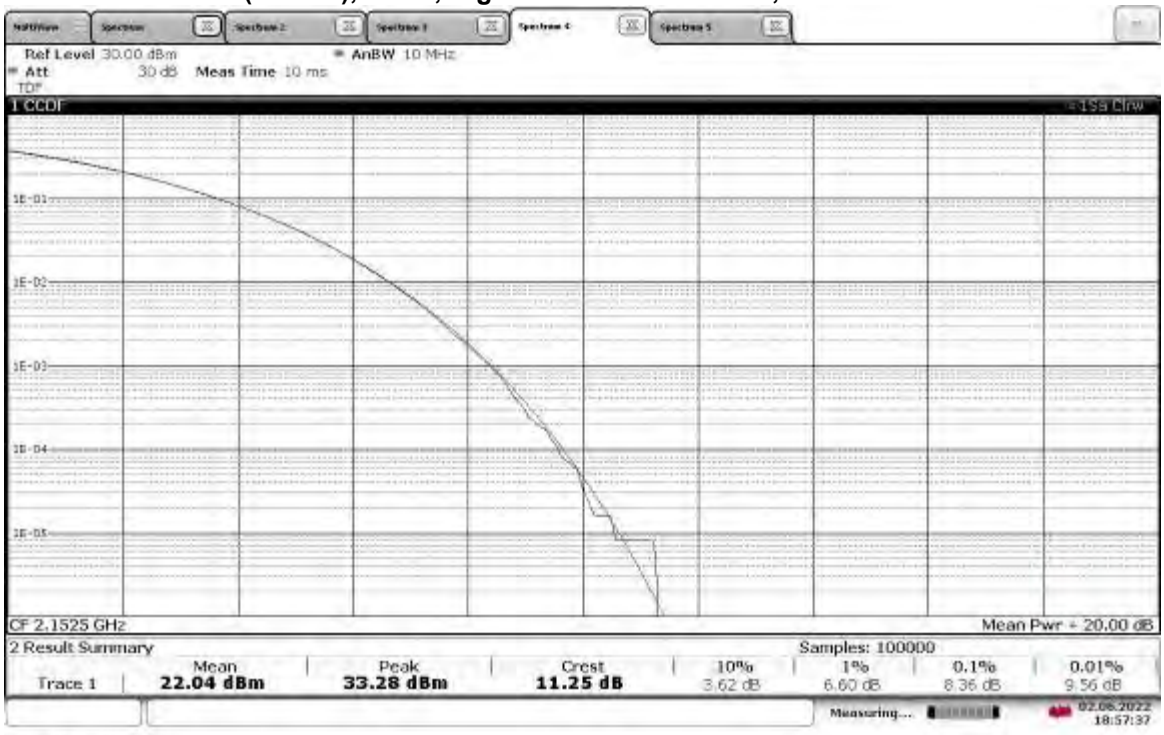
20:31:28 02.06.2022

TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2152.5 MHz, PAPR = 11.24 dB



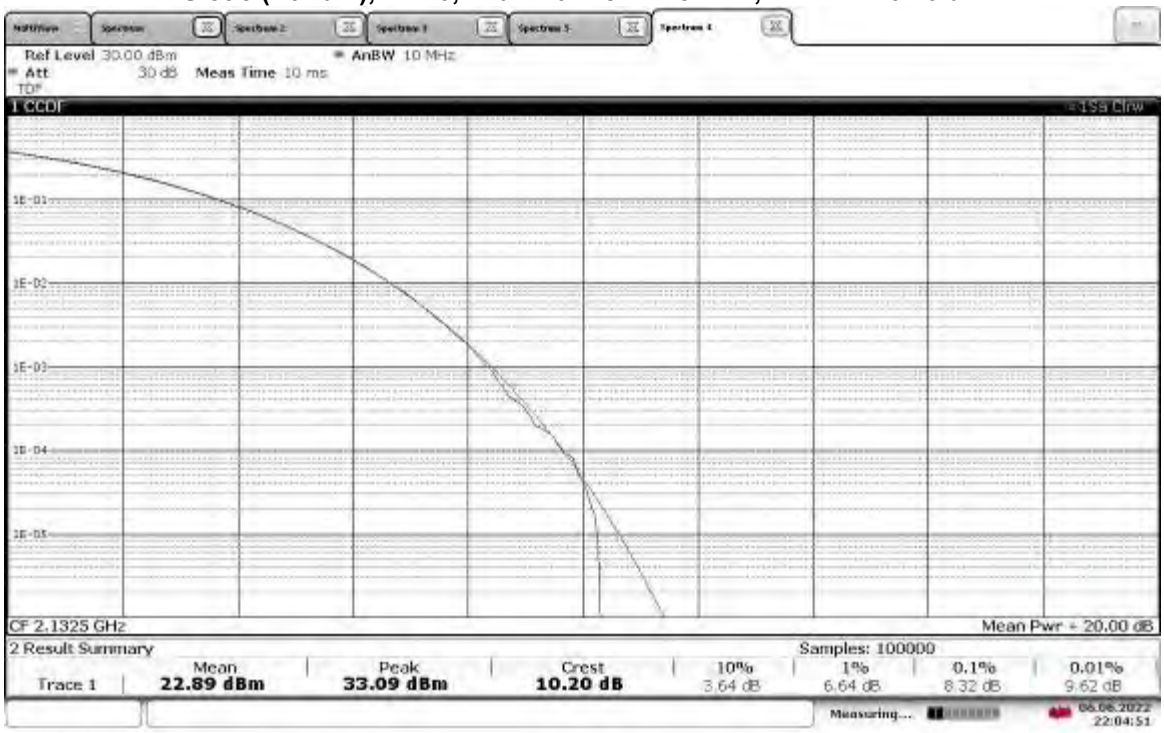
18:45:21 02.06.2022

TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2152.5 MHz, PAPR = 11.25 dB



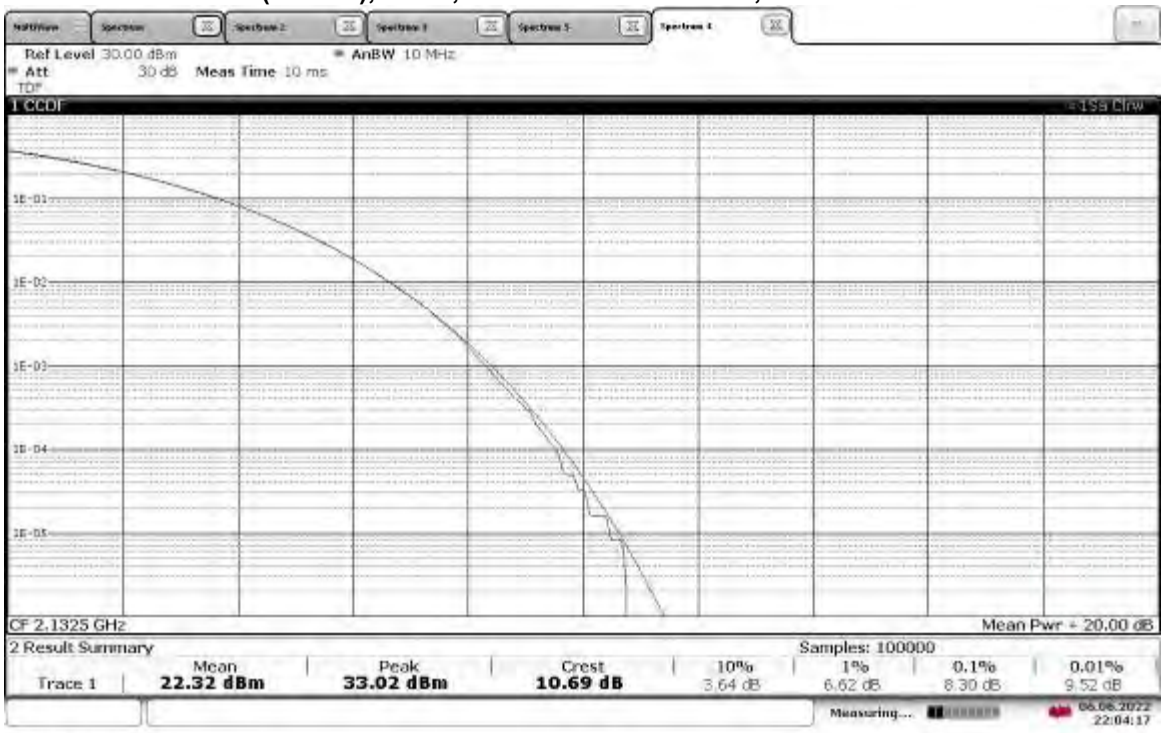
18:57:37 02.06.2022

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2115 MHz, PAPR = 10.20 dB



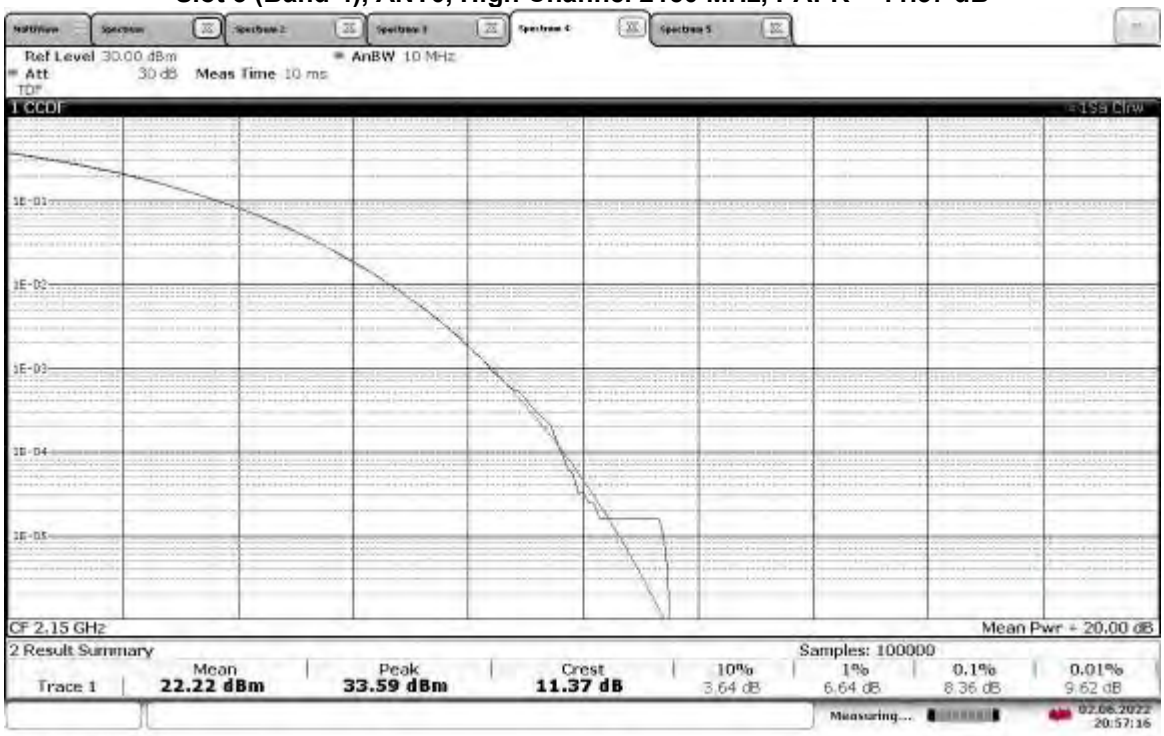
22:04:51 06.06.2022

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2115 MHz, PAPR = 10.69 dB



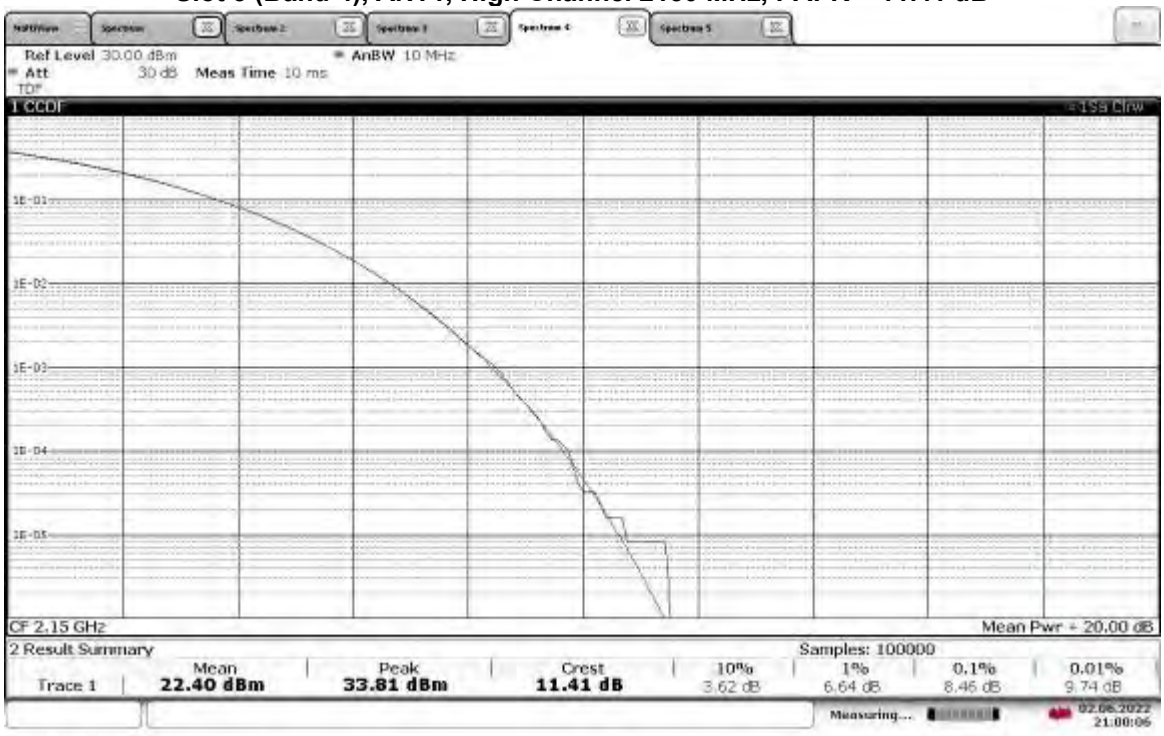
22:04:18 06.06.2022

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2150 MHz, PAPR = 11.37 dB



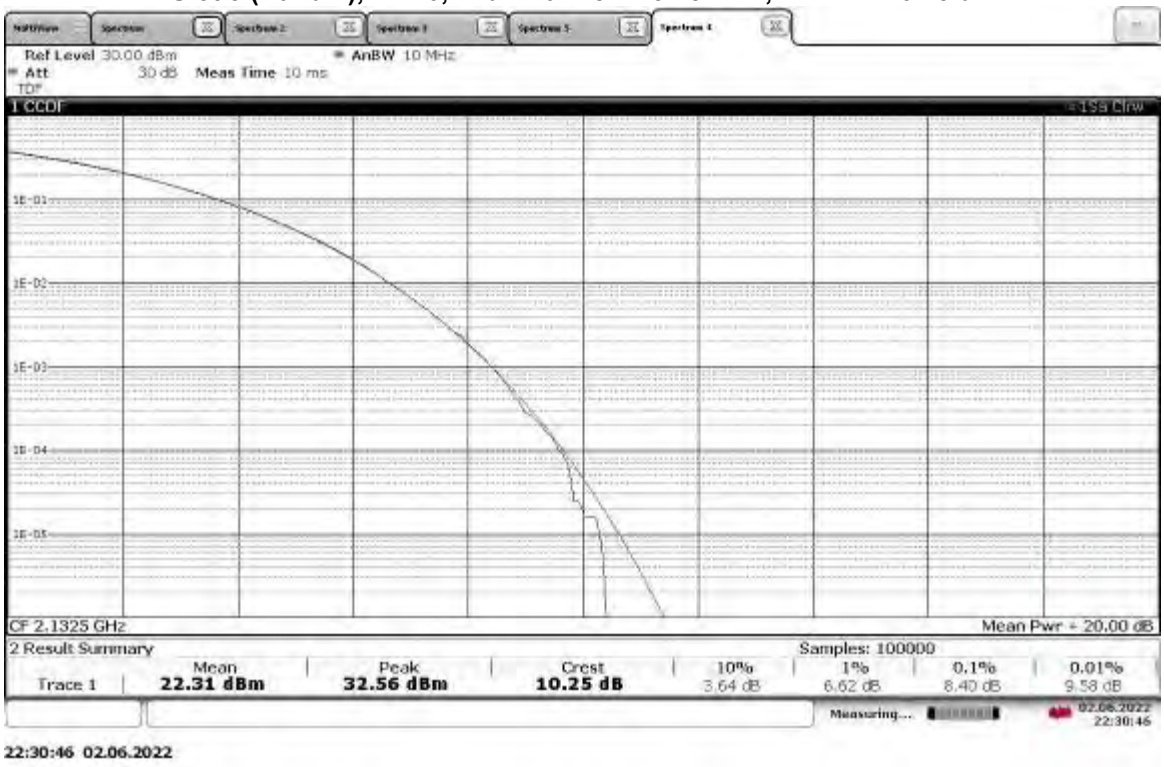
20:57:16 02.06.2022

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2150 MHz, PAPR = 11.41 dB



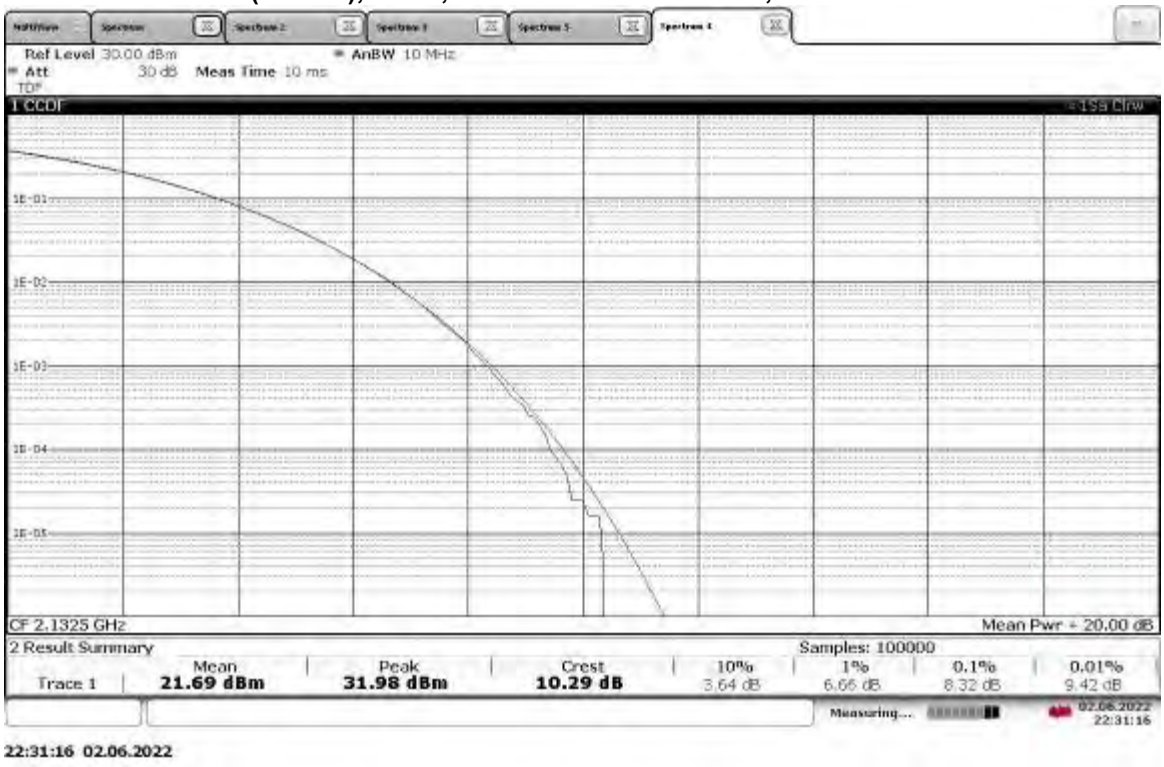
21:00:06 02.06.2022

TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 10.25 dB



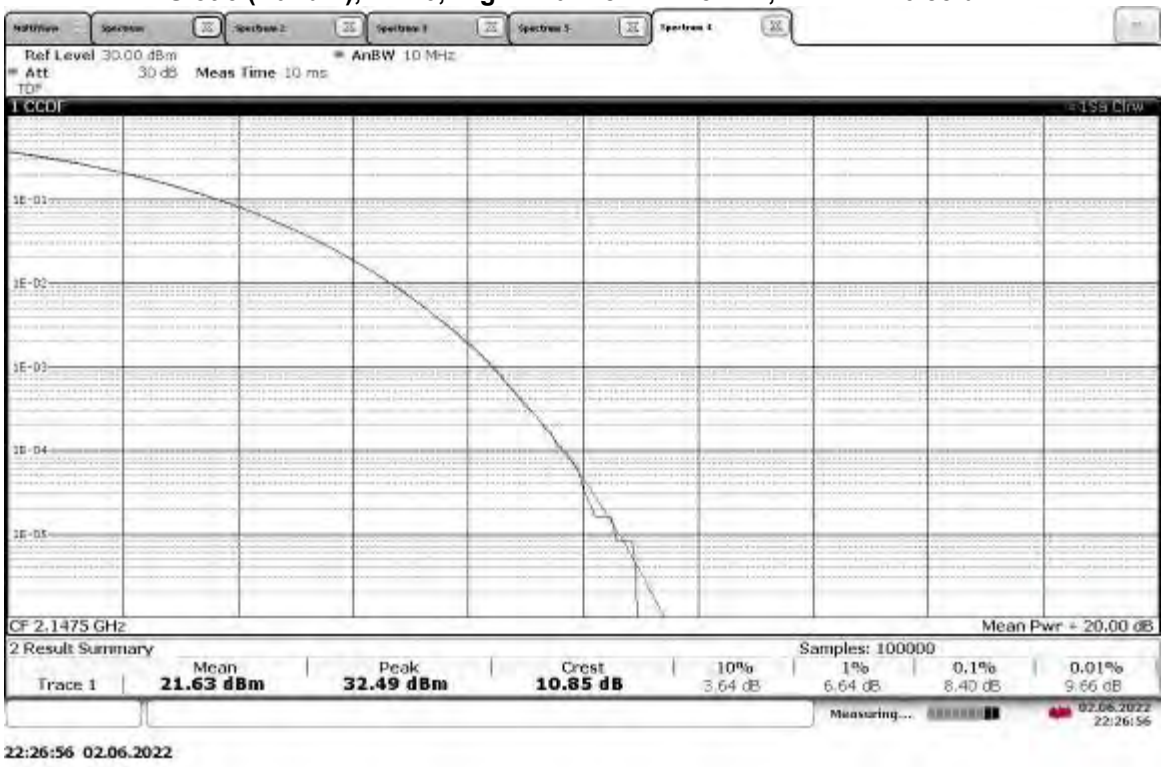
22:30:46 02.06.2022

TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 10.29 dB

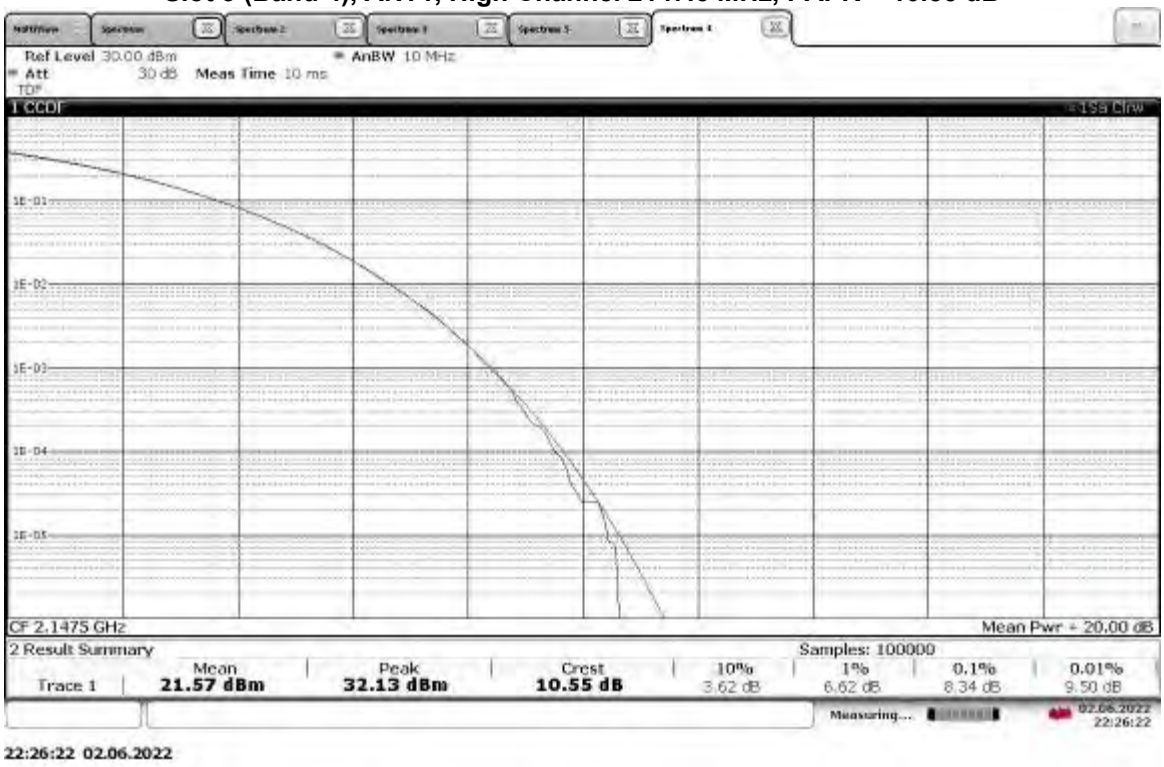


22:31:16 02.06.2022

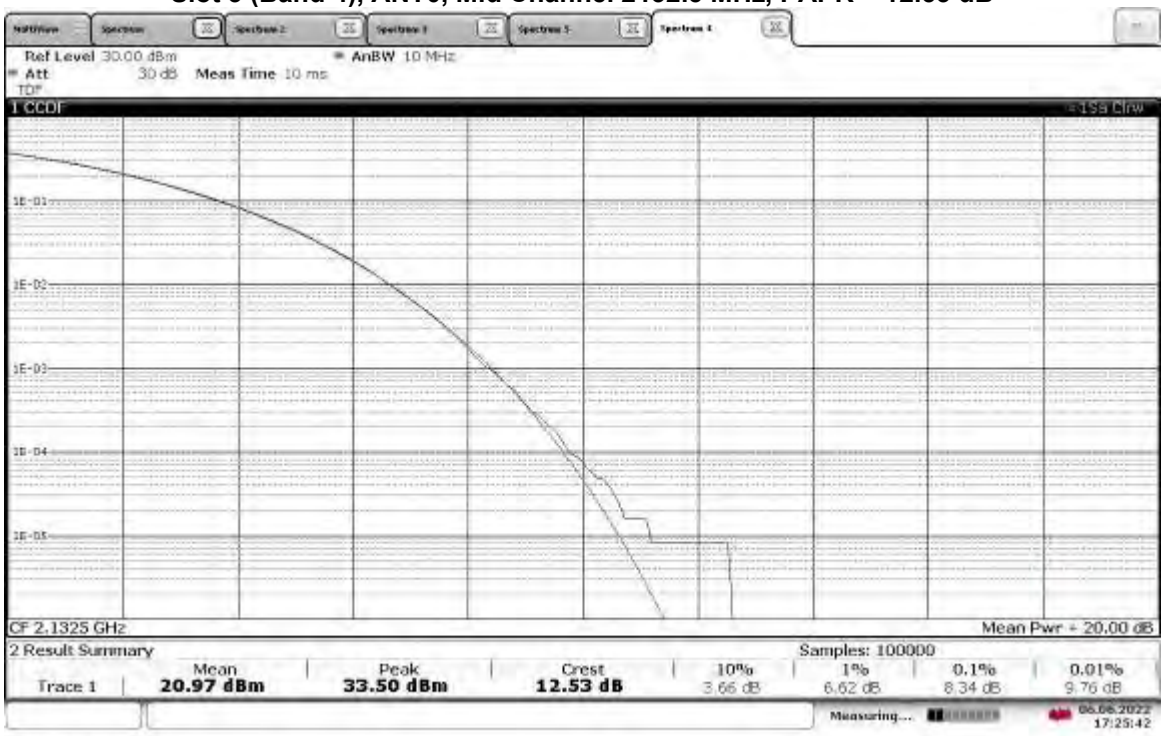
TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2147.5MHz, PAPR = 10.85 dB



TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2147.5 MHz, PAPR = 10.55 dB

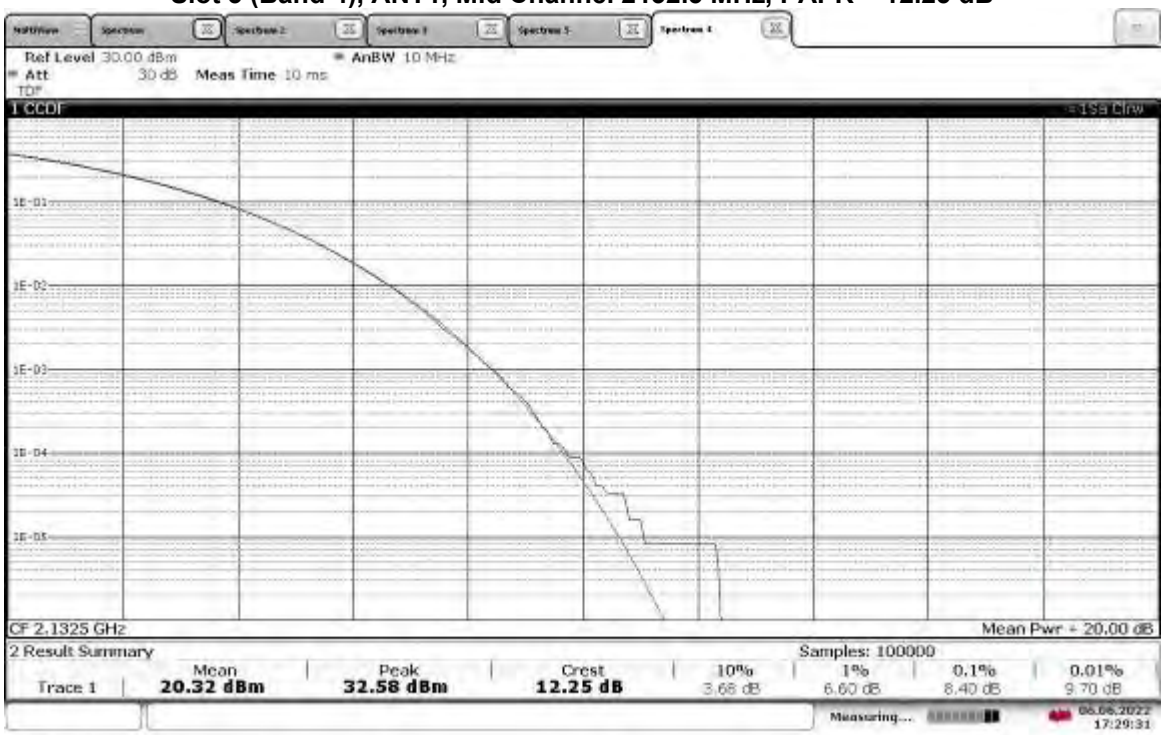


TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 12.53 dB



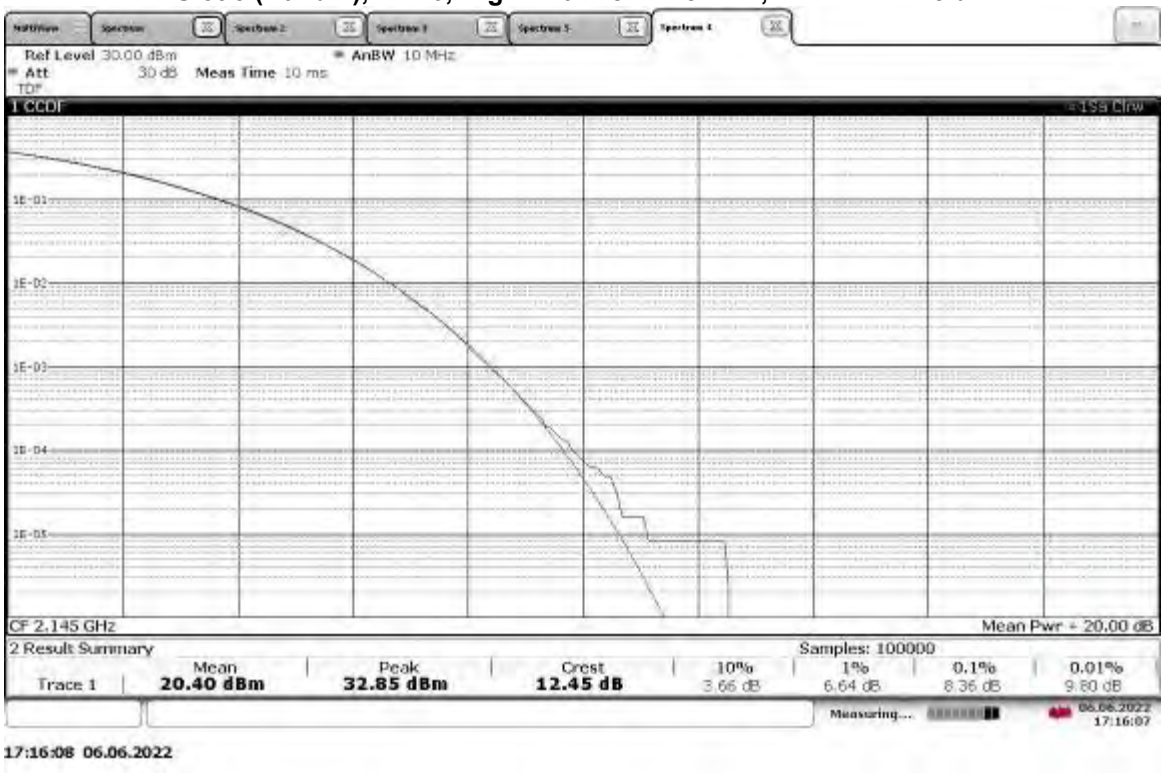
17:25:42 06.06.2022

TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 12.25 dB

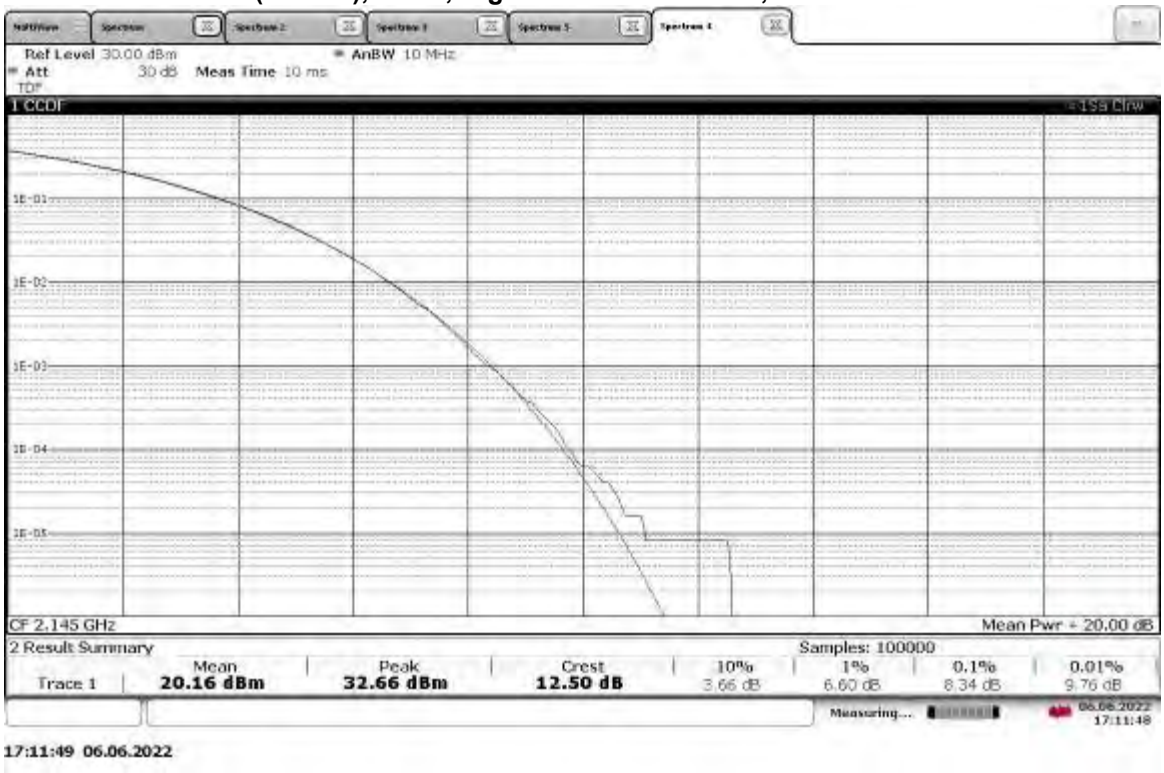


17:29:31 06.06.2022

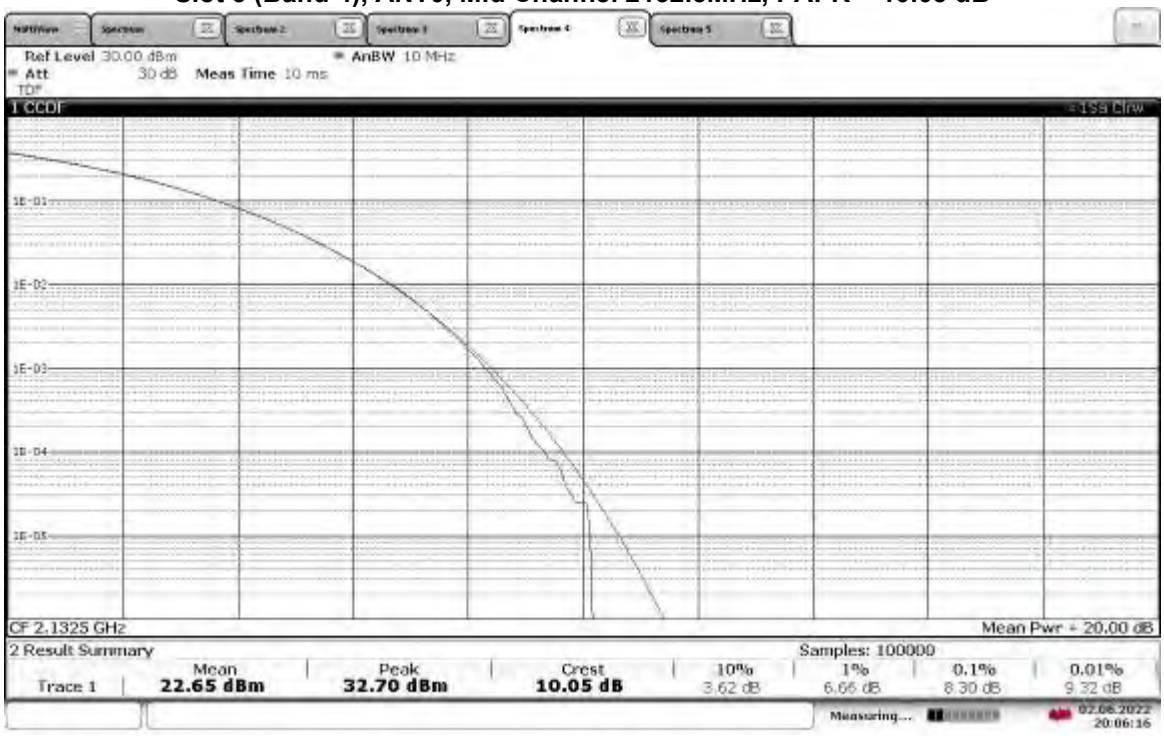
TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2145 MHz, PAPR = 12.45 dB



TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2145 MHz, PAPR = 12.50 dB

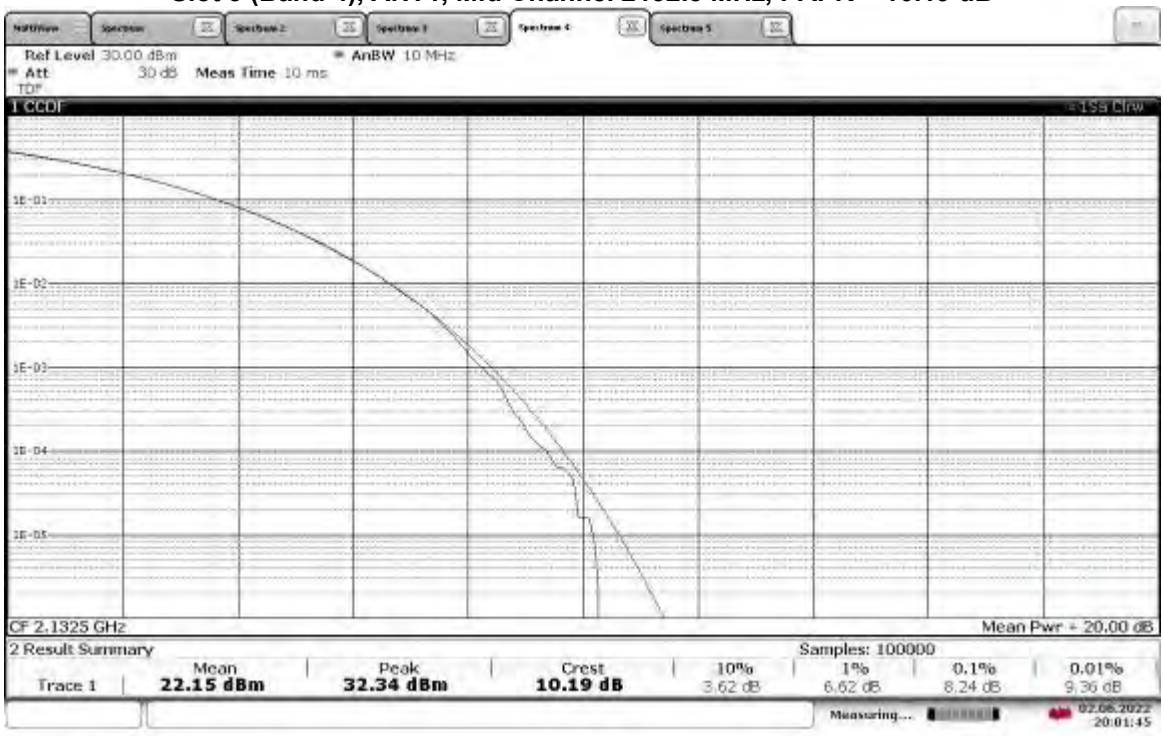


TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5MHz, PAPR = 10.05 dB



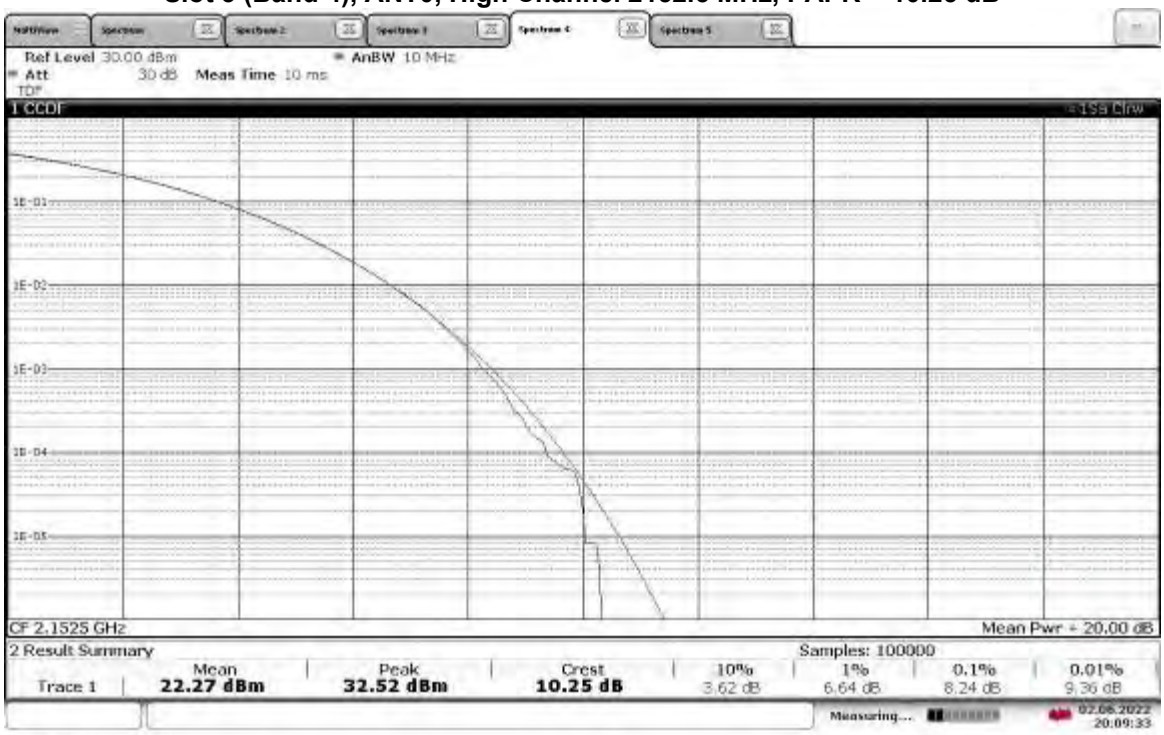
20:06:16 02.06.2022

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 10.19 dB



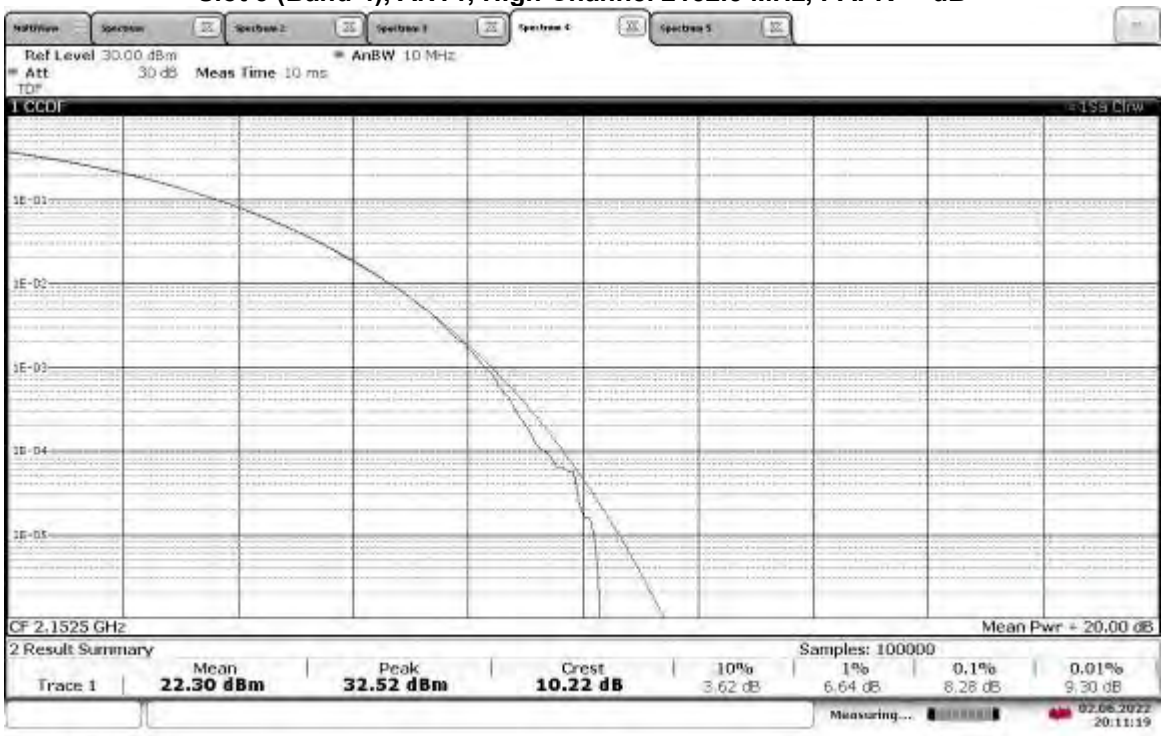
20:01:45 02.06.2022

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2152.5 MHz, PAPR = 10.25 dB



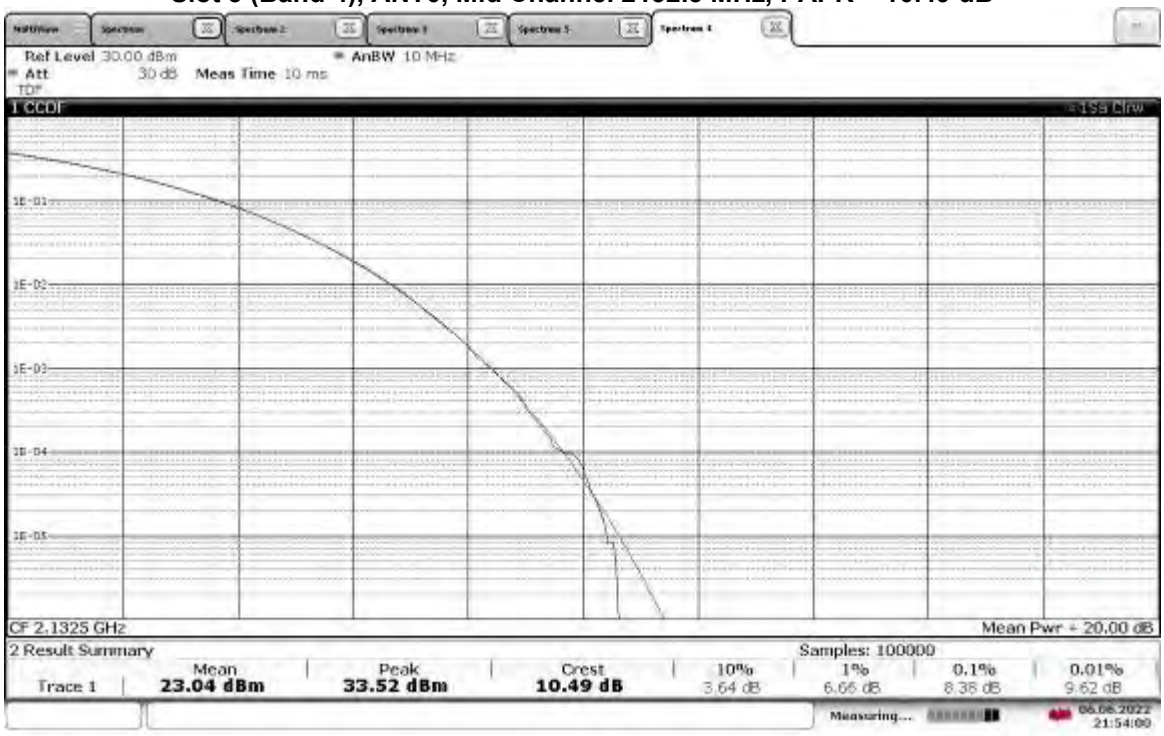
20:09:33 02.06.2022

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2152.5 MHz, PAPR = dB



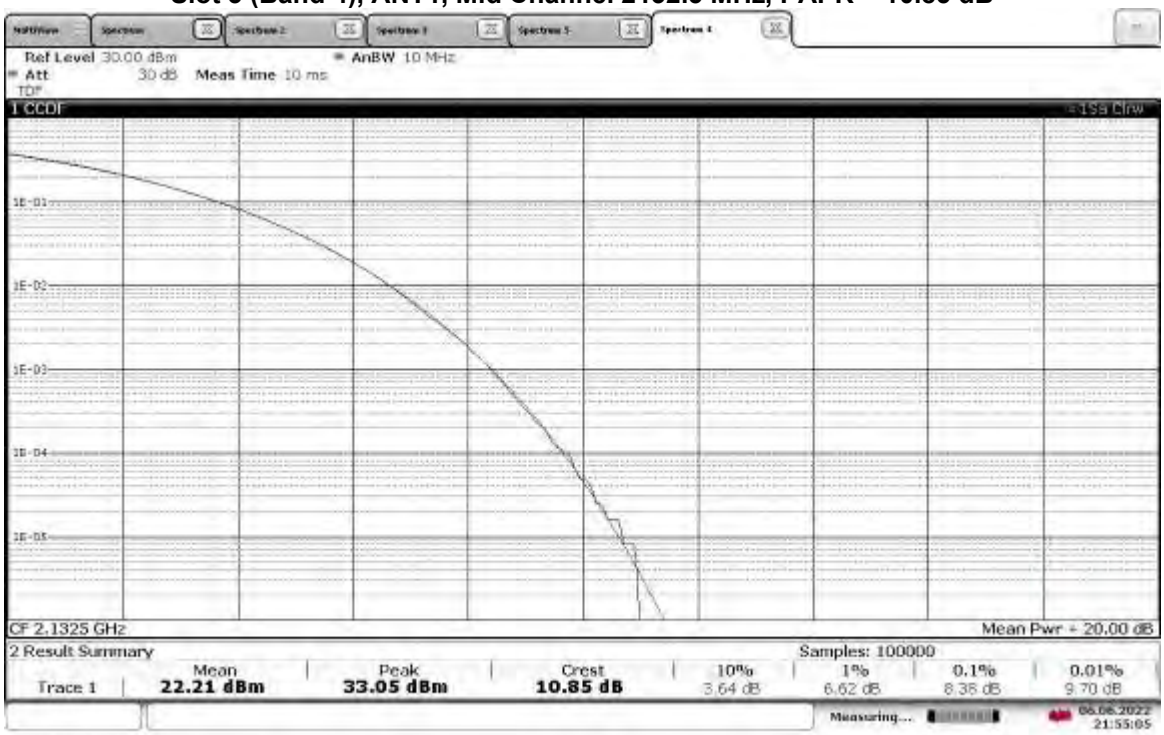
20:11:19 02.06.2022

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 10.49 dB



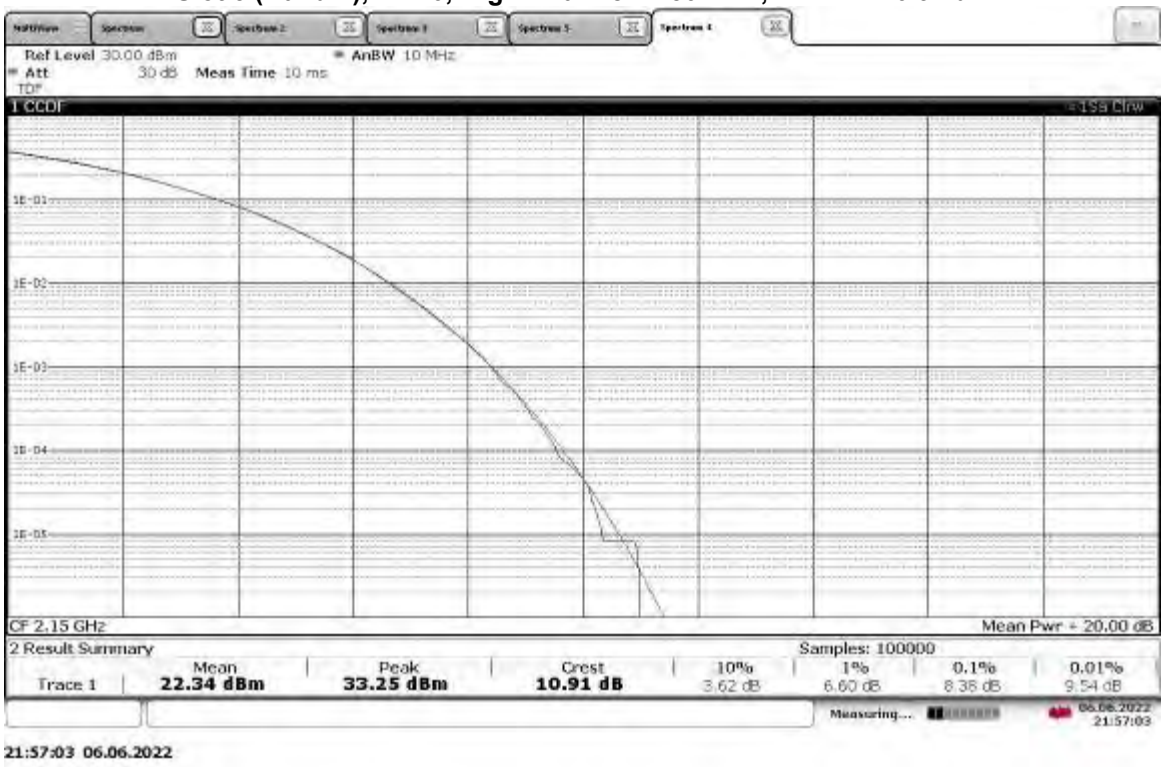
21:54:00 06.06.2022

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 10.85 dB

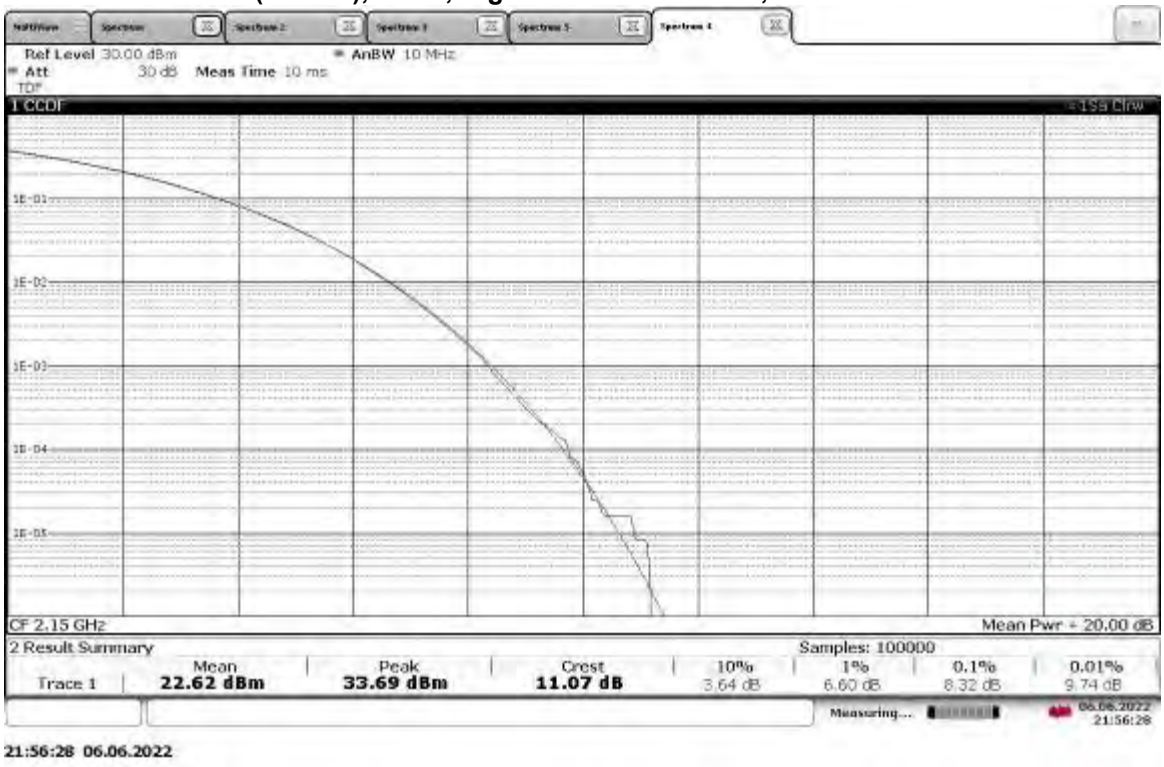


21:55:06 06.06.2022

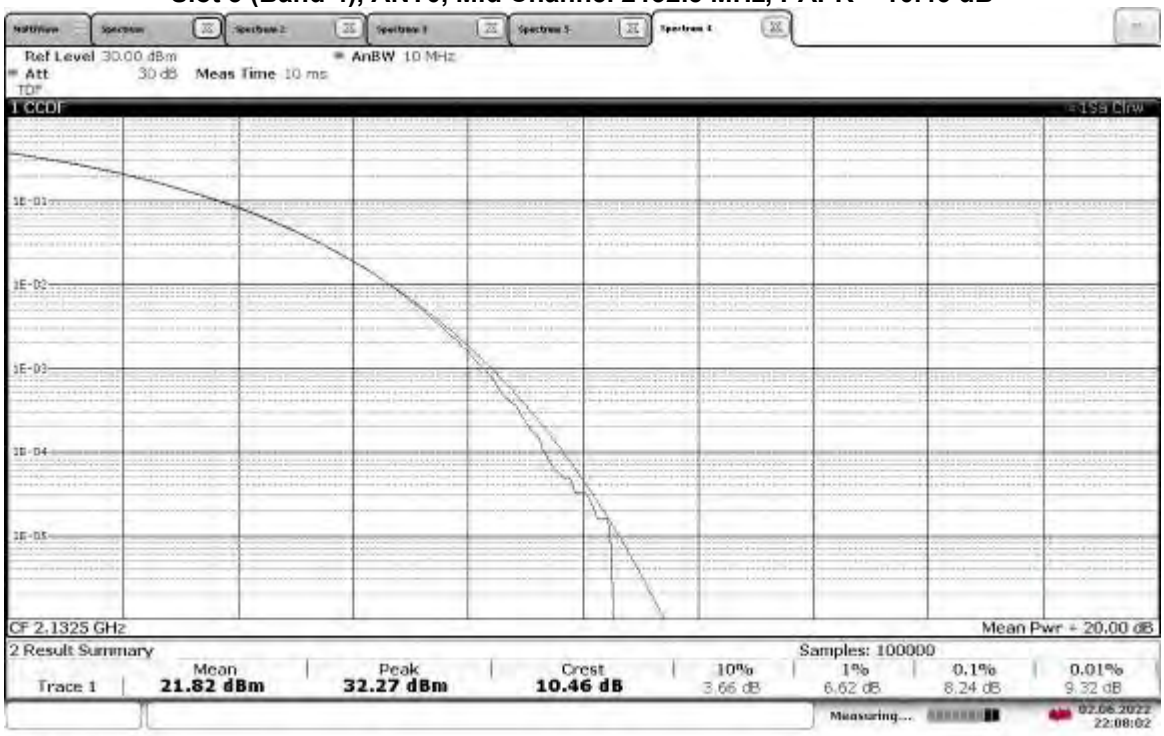
TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2150 MHz, PAPR = 10.91 dB



TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2150 MHz, PAPR = 11.07 dB

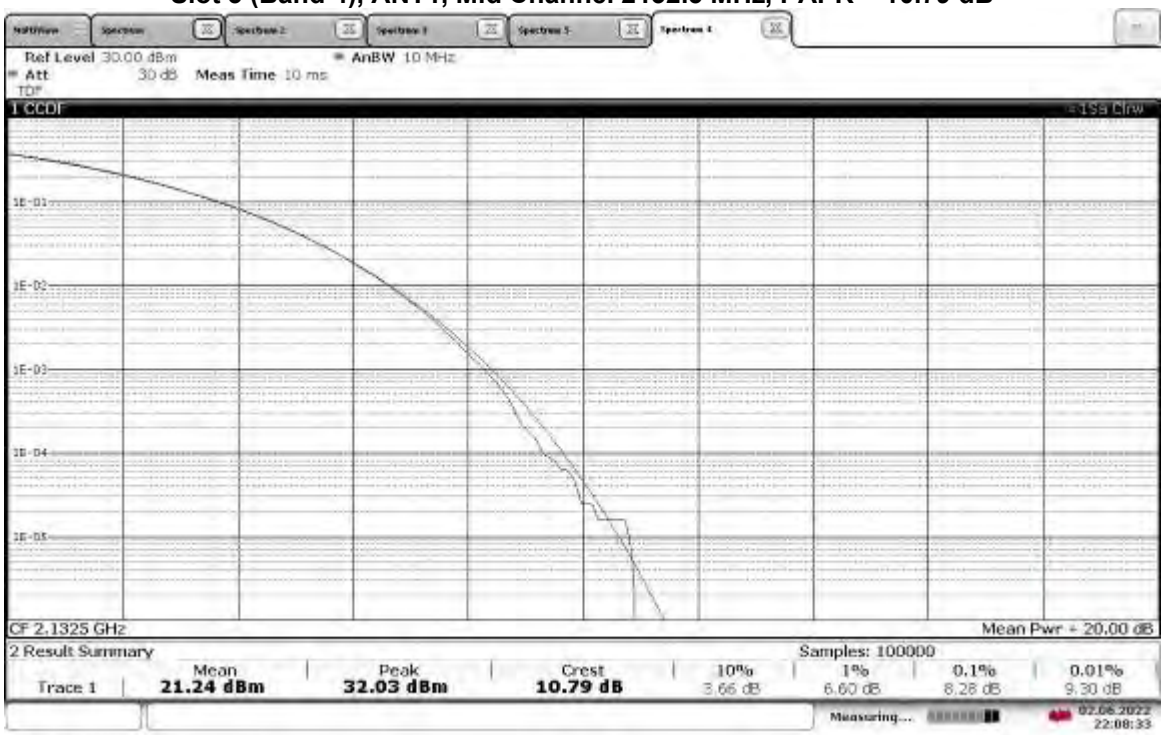


TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 10.46 dB



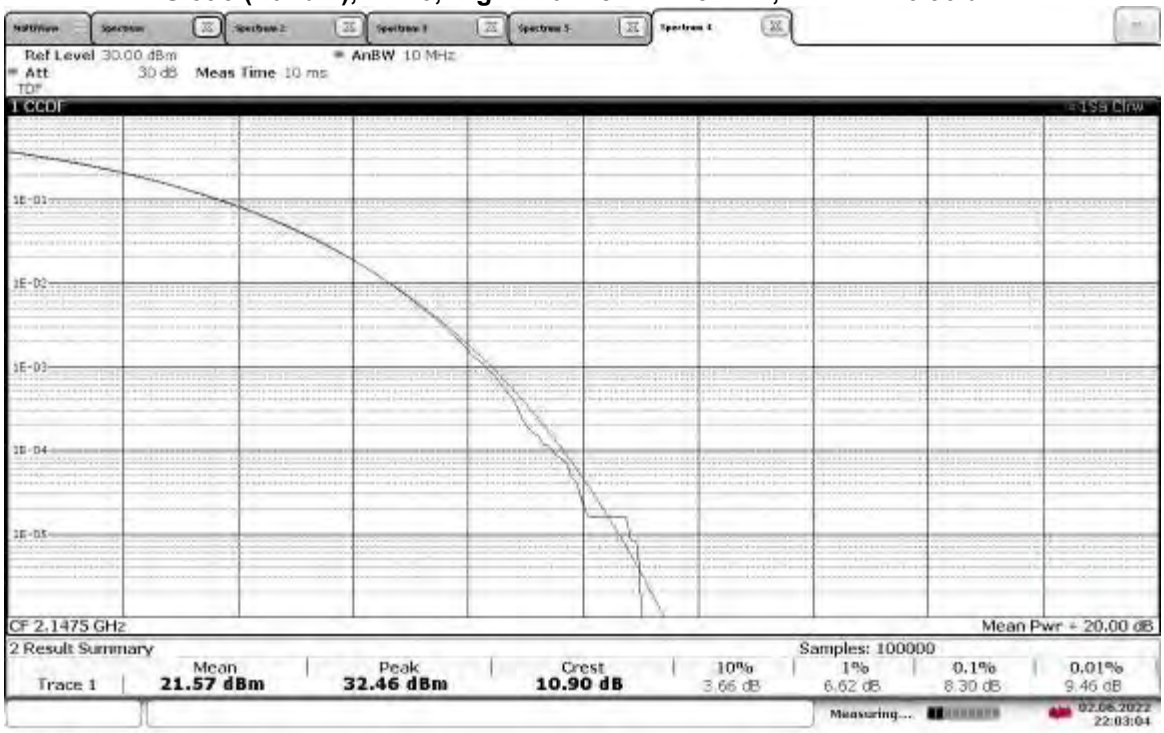
22:08:03 02.06.2022

TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 10.79 dB



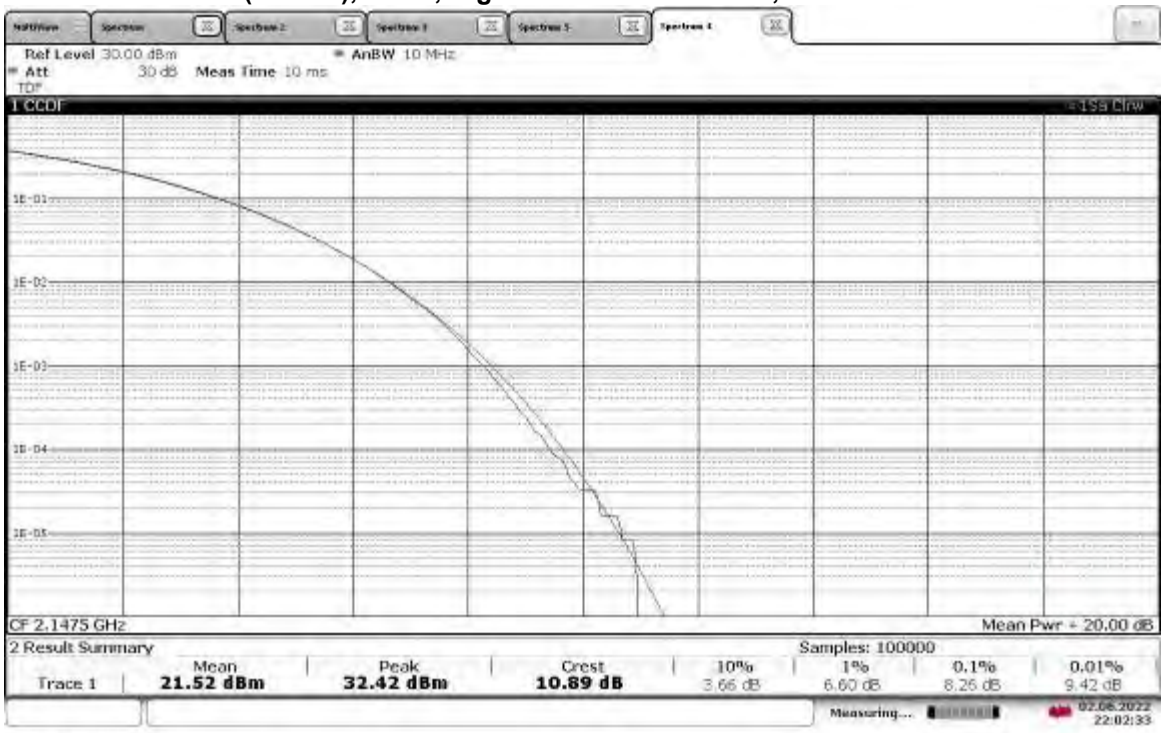
22:08:33 02.06.2022

TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2147.5 MHz, PAPR = 10.90 dB



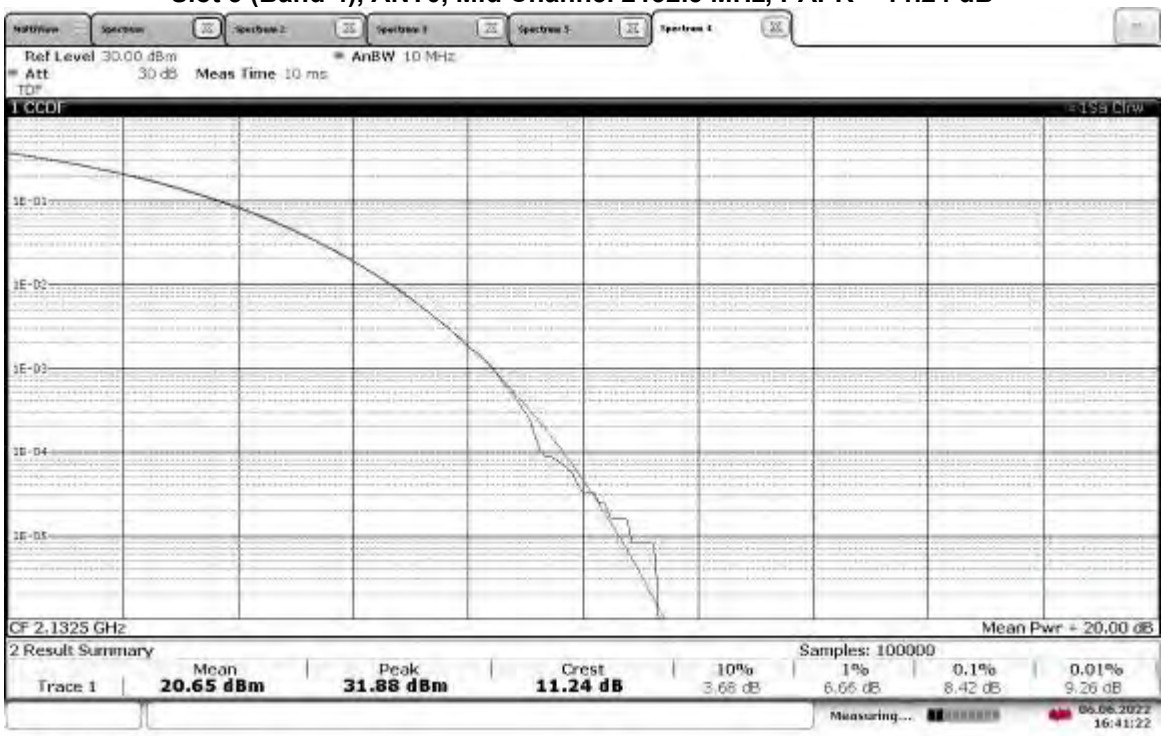
22:03:05 02.06.2022

TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2147.5 MHz, PAPR = 10.89 dB

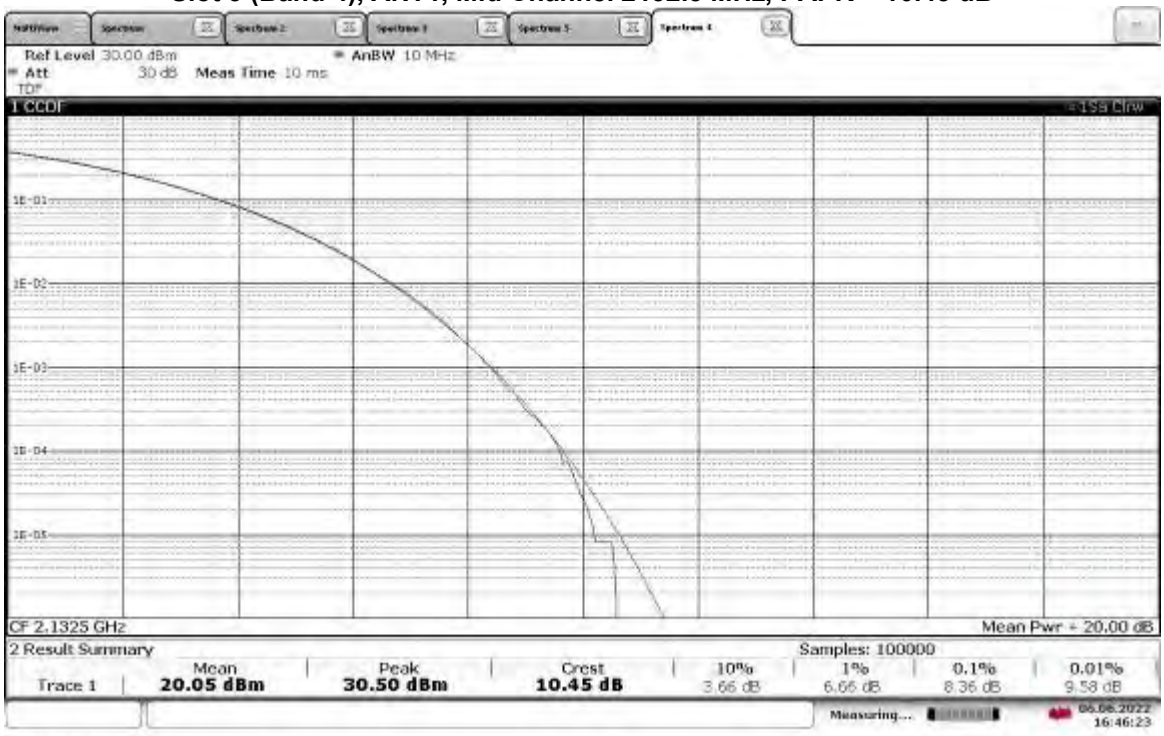


22:02:33 02.06.2022

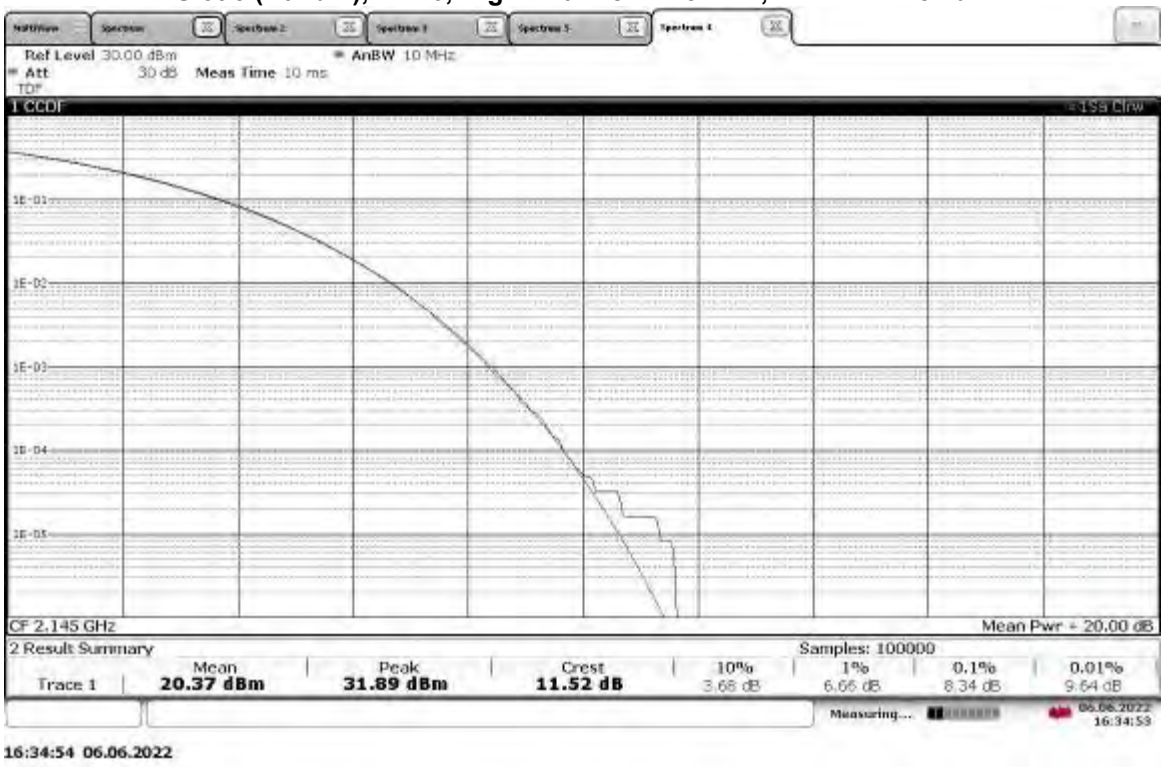
TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 11.24 dB



TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 10.45 dB

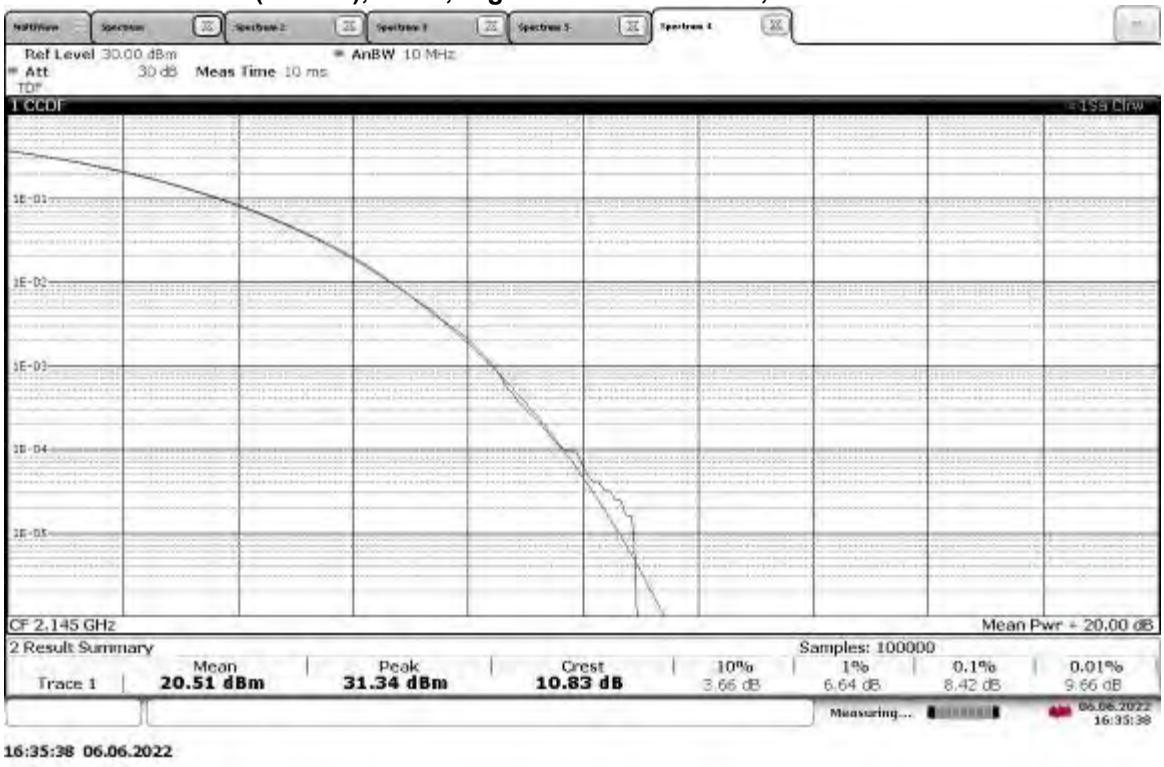


TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2145 MHz, PAPR = 11.52 dB



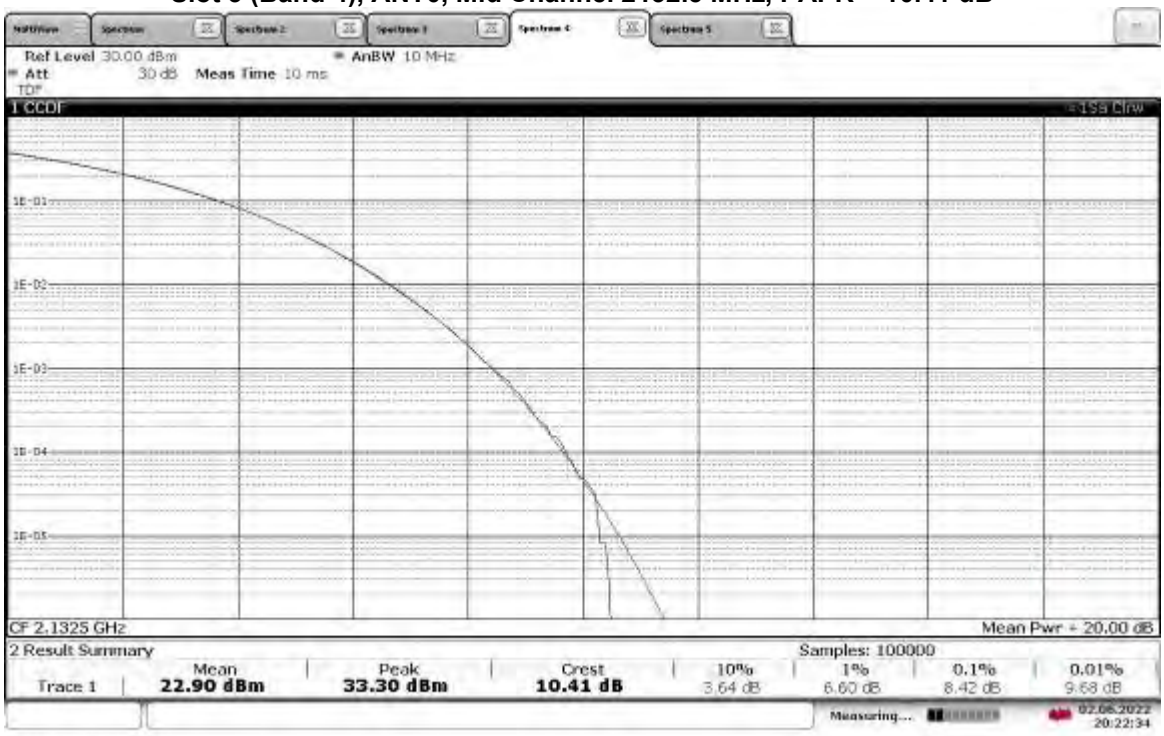
16:34:54 06.06.2022

TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2145 MHz, PAPR = 10.83 dB



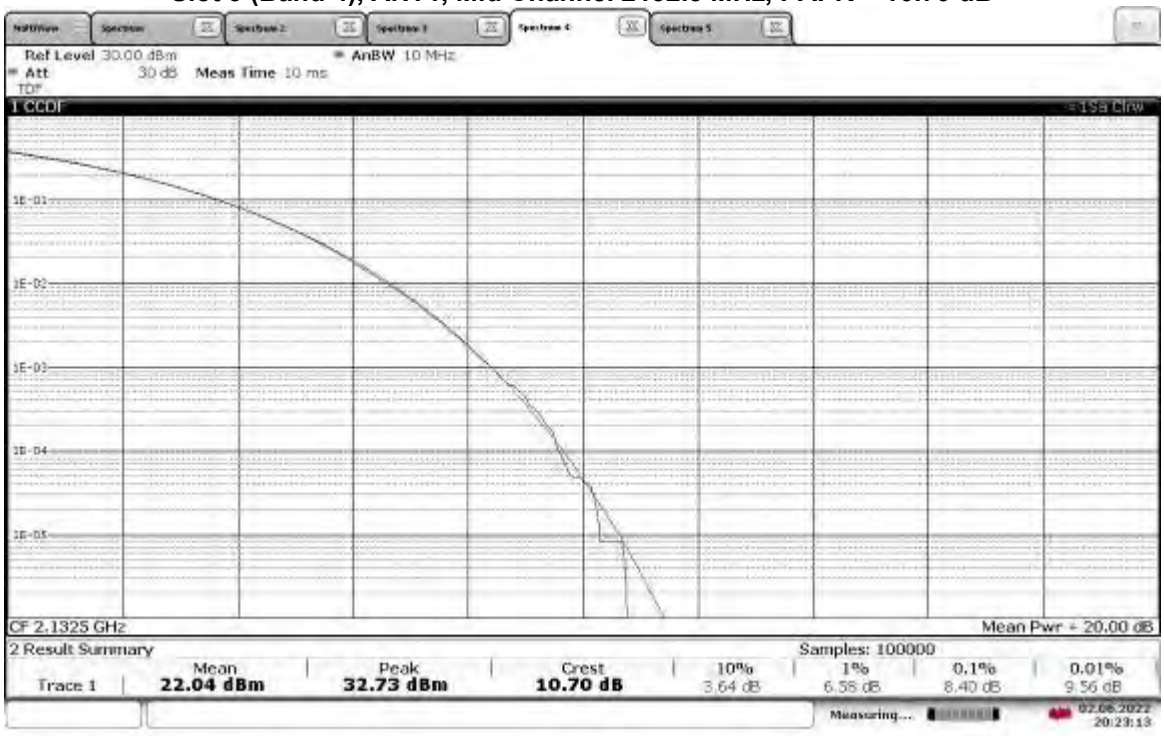
16:35:38 06.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 10.41 dB



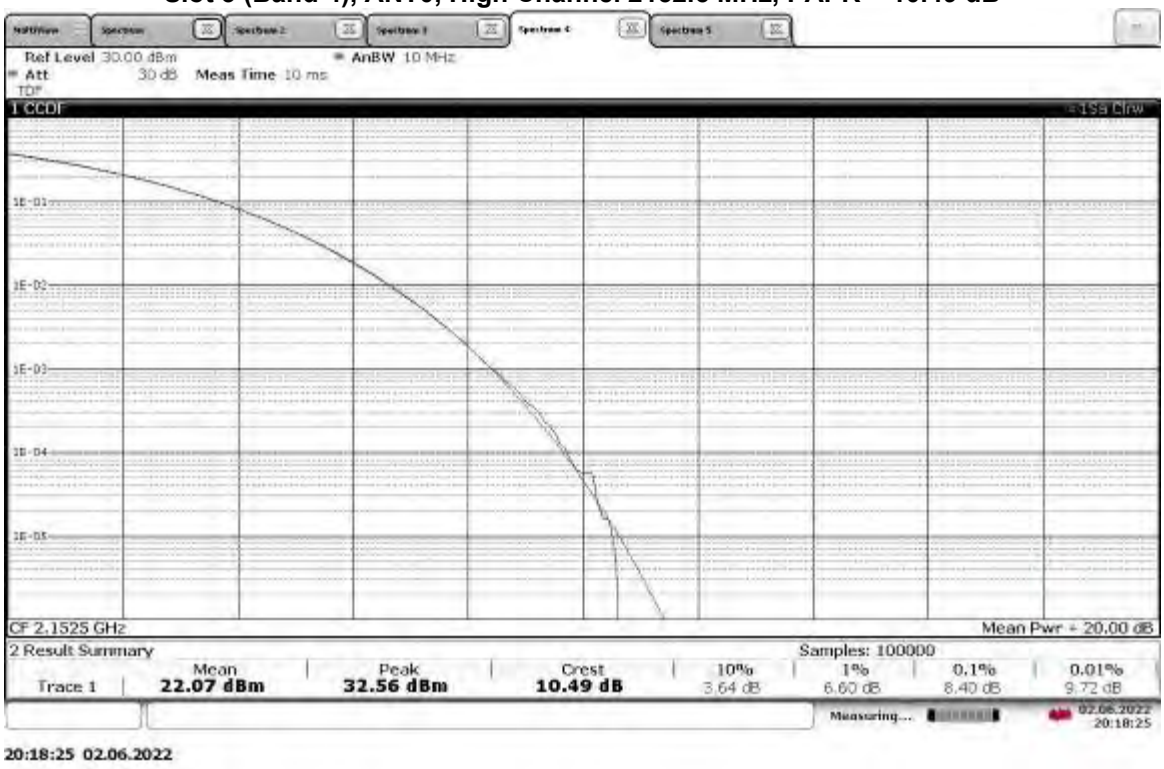
20:22:34 02.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 10.70 dB



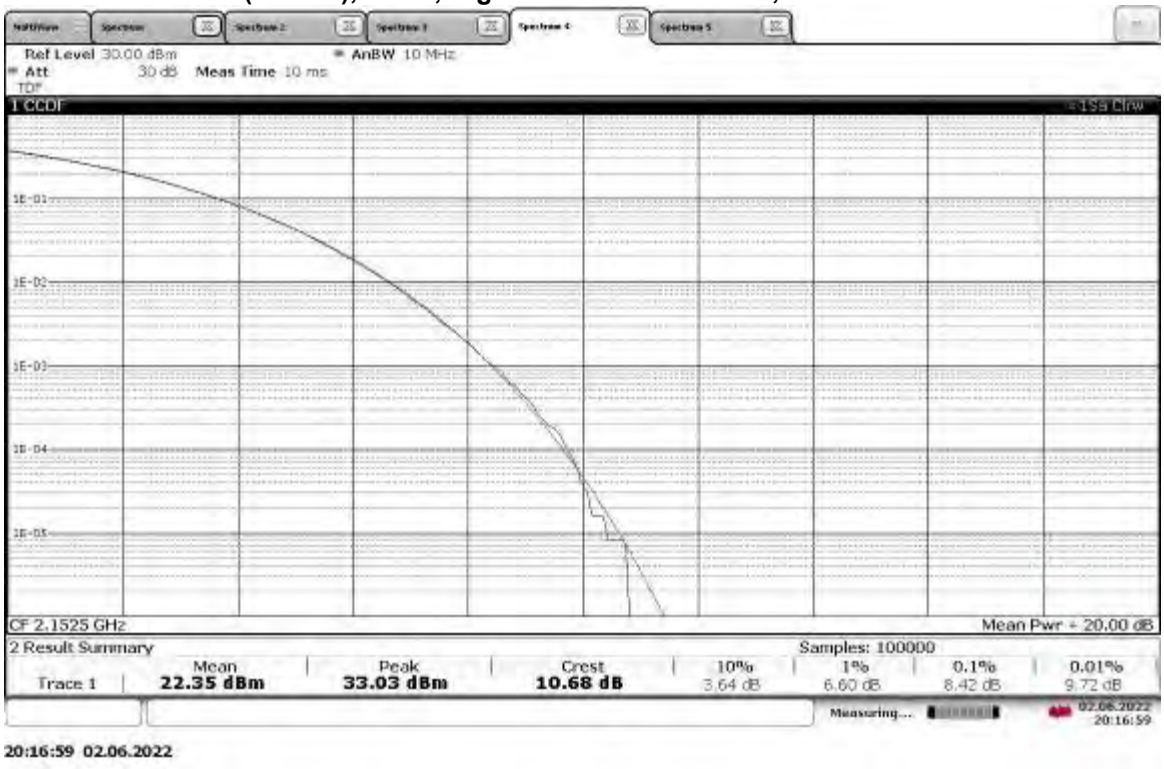
20:23:14 02.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2152.5 MHz, PAPR = 10.49 dB



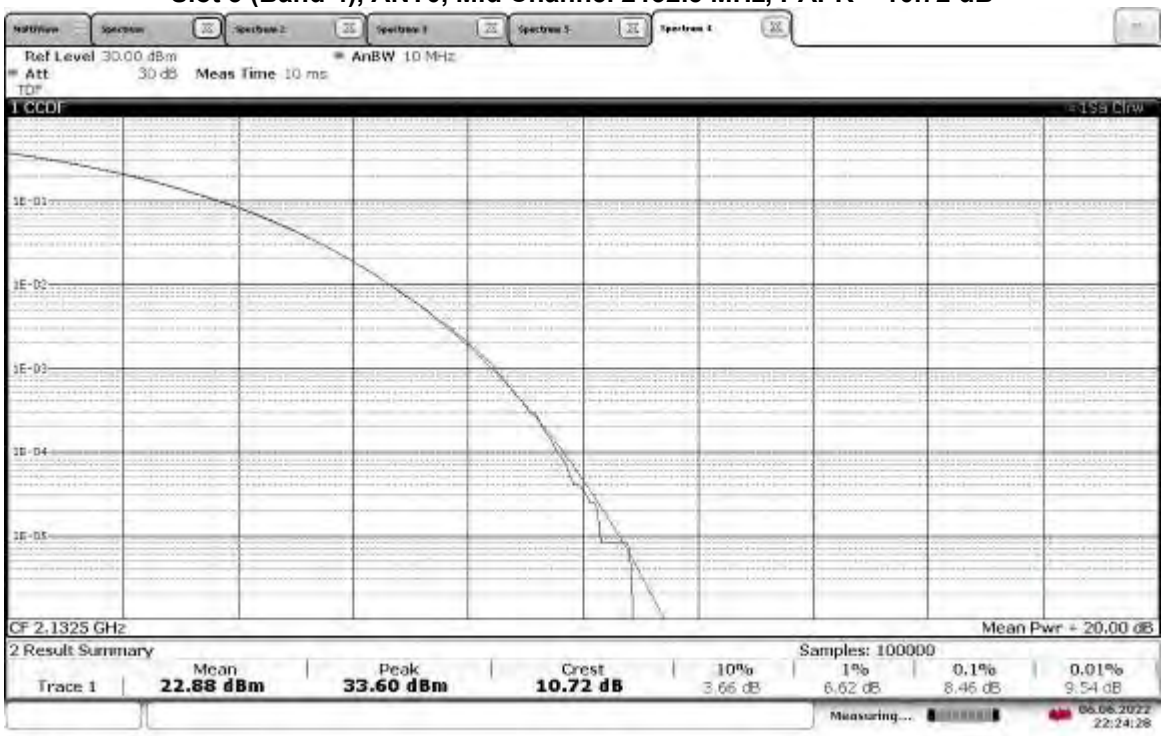
20:18:25 02.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2152.5 MHz, PAPR = 10.68 dB



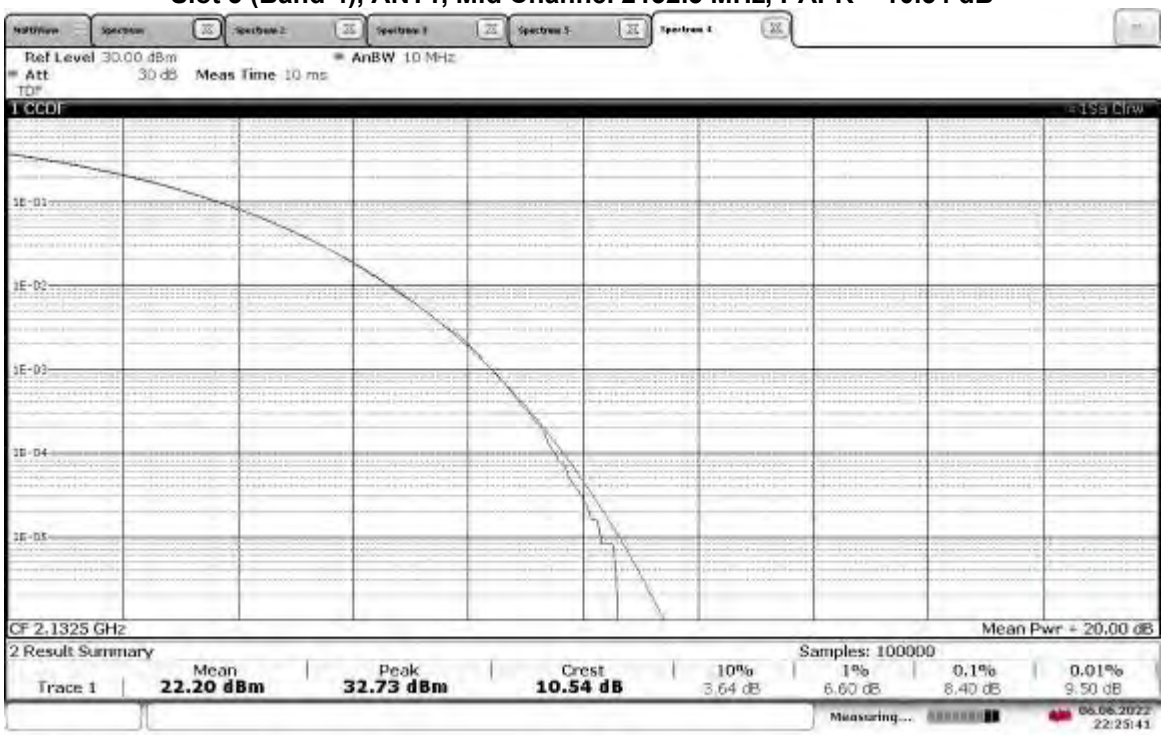
20:16:59 02.06.2022

TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 10.72 dB



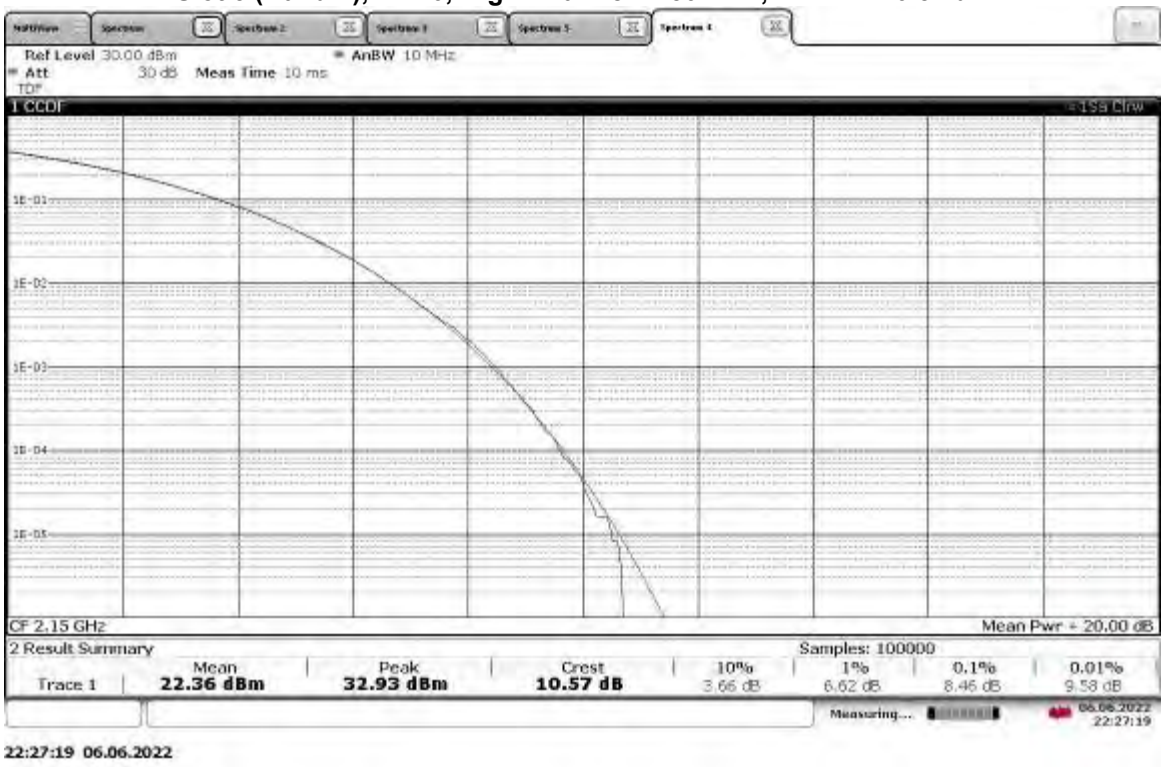
22:24:28 06.06.2022

TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 10.54 dB



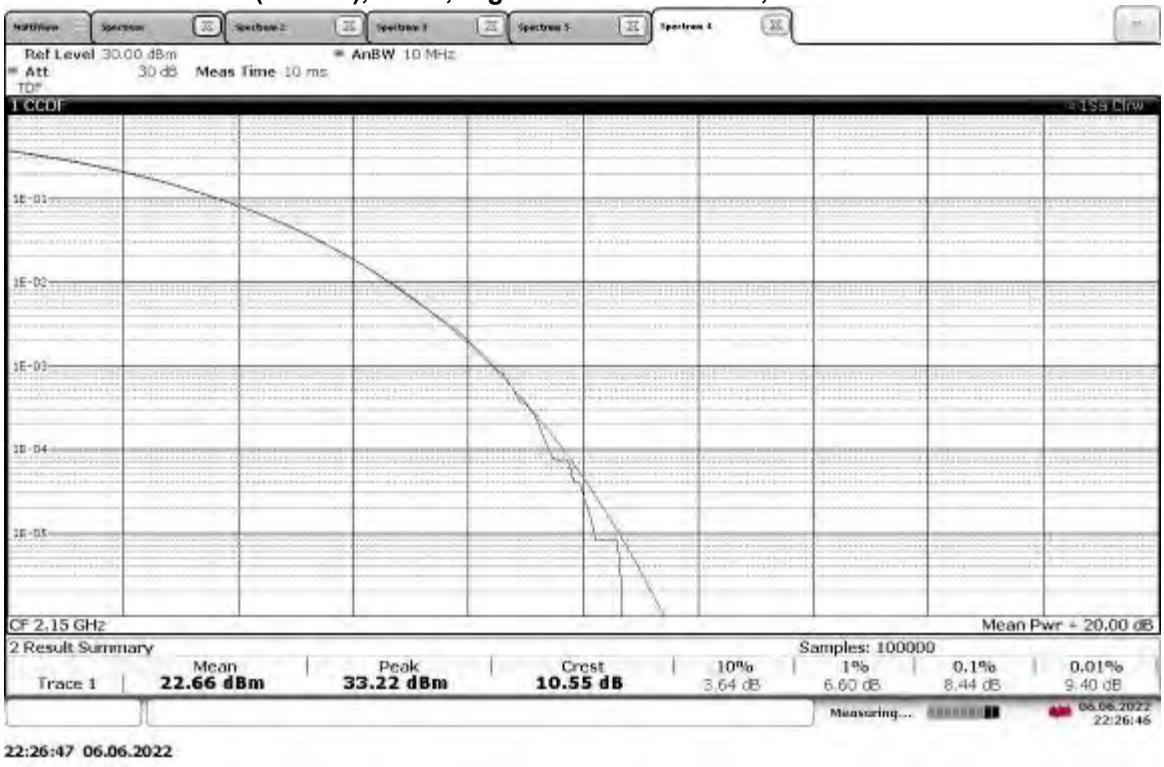
22:25:41 06.06.2022

TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2150 MHz, PAPR = 10.57 dB



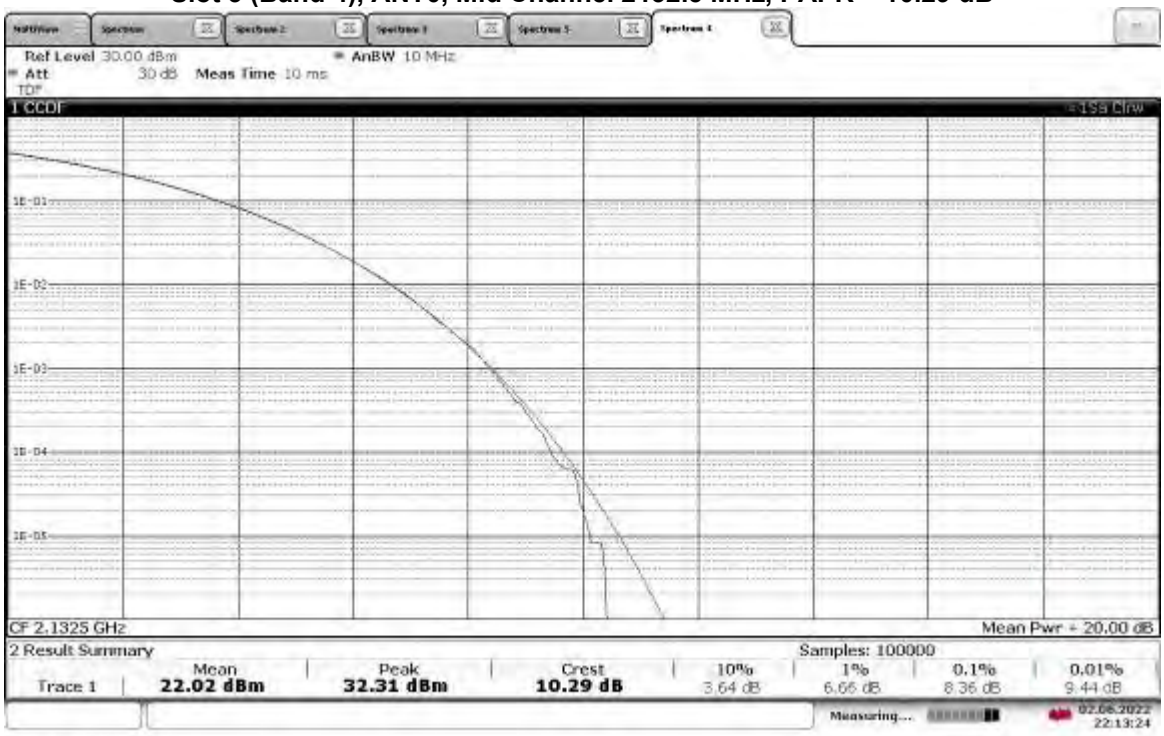
22:27:19 06.06.2022

TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2150 MHz, PAPR = 10.55 dB

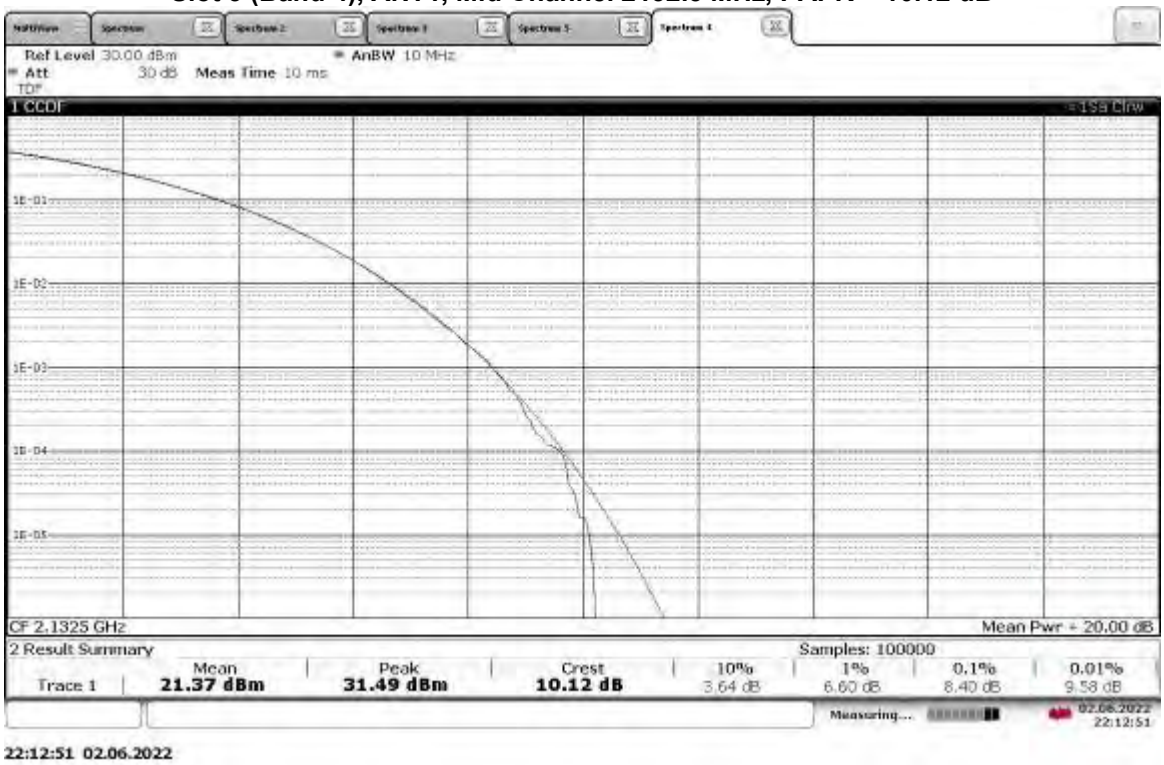


22:26:47 06.06.2022

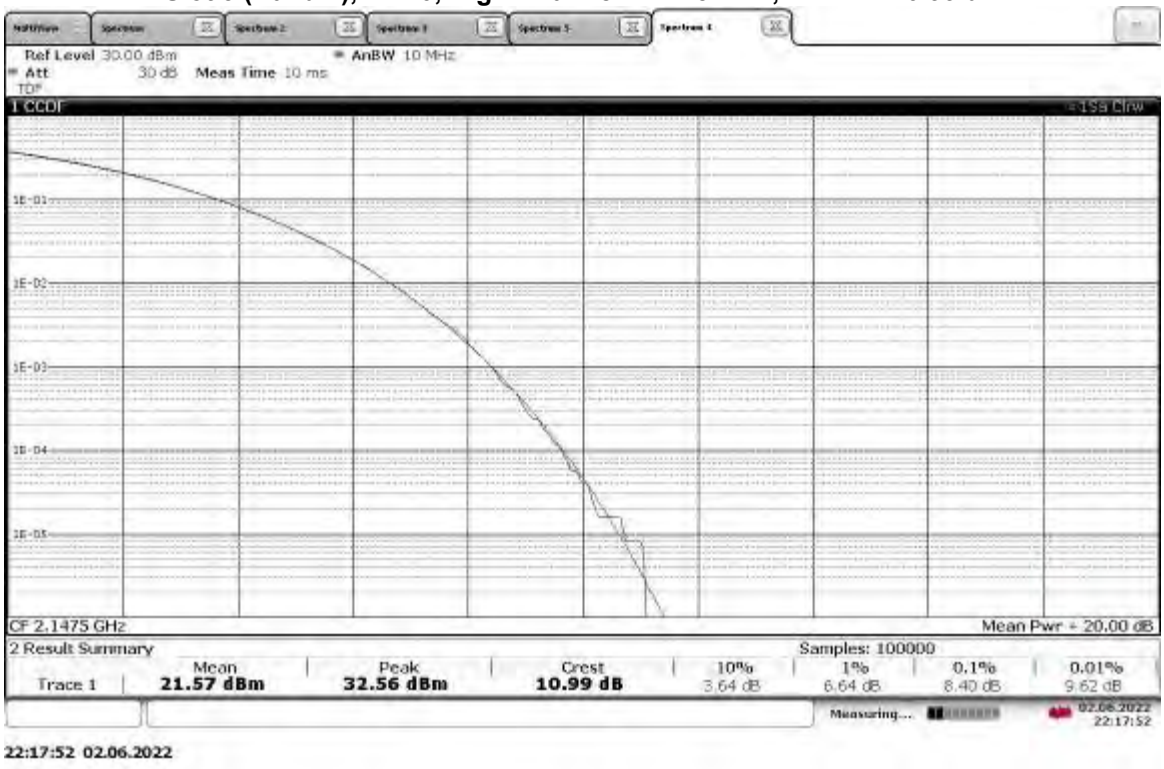
TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 10.29 dB



TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 10.12 dB

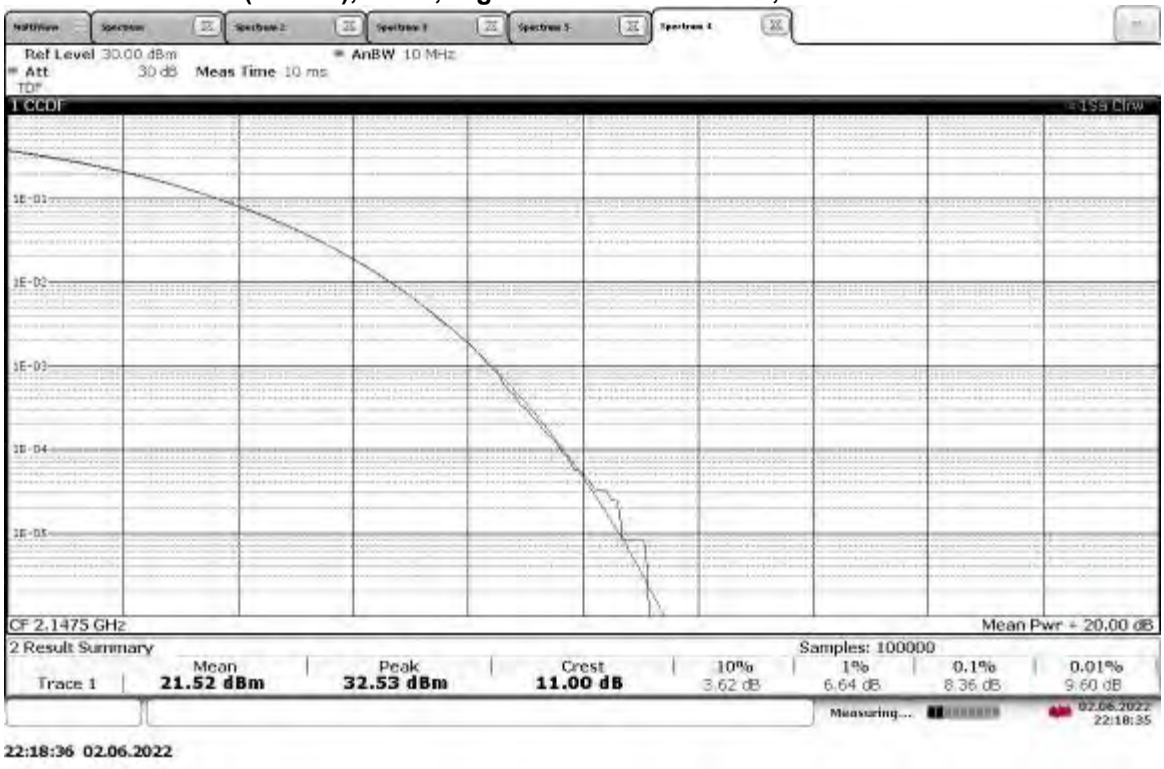


TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2147.5 MHz, PAPR = 10.99 dB



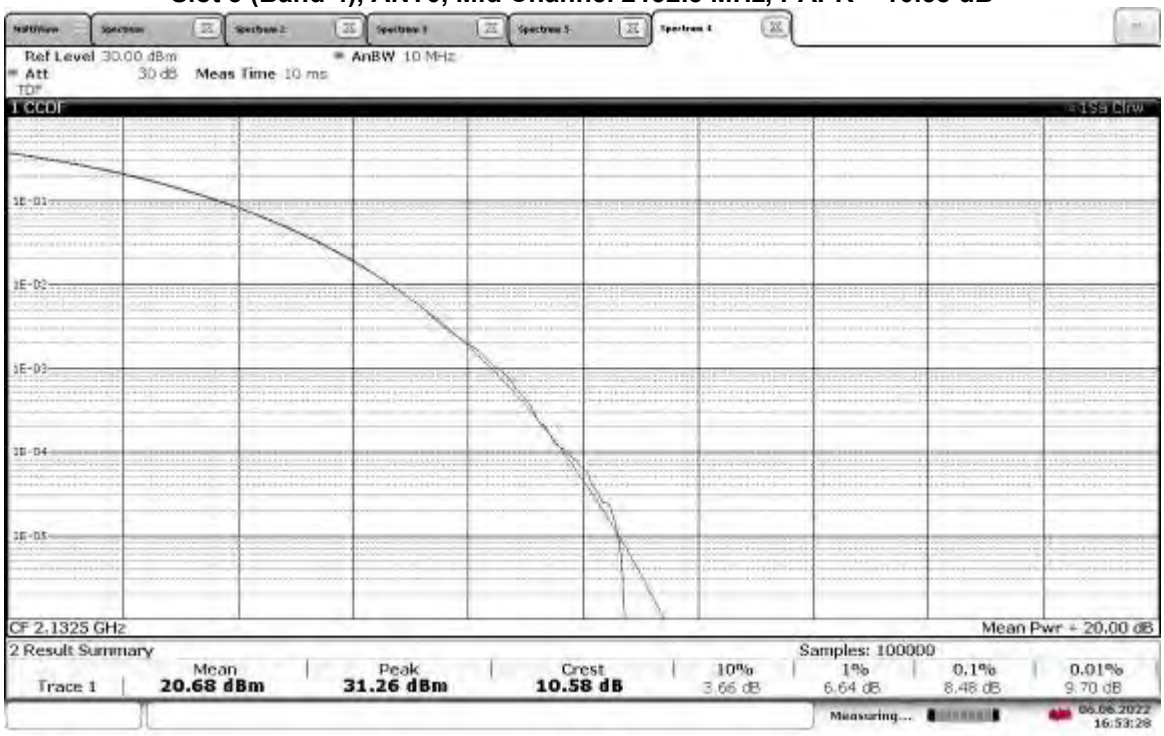
22:17:52 02.06.2022

TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2147.5 MHz, PAPR = 11.00 dB



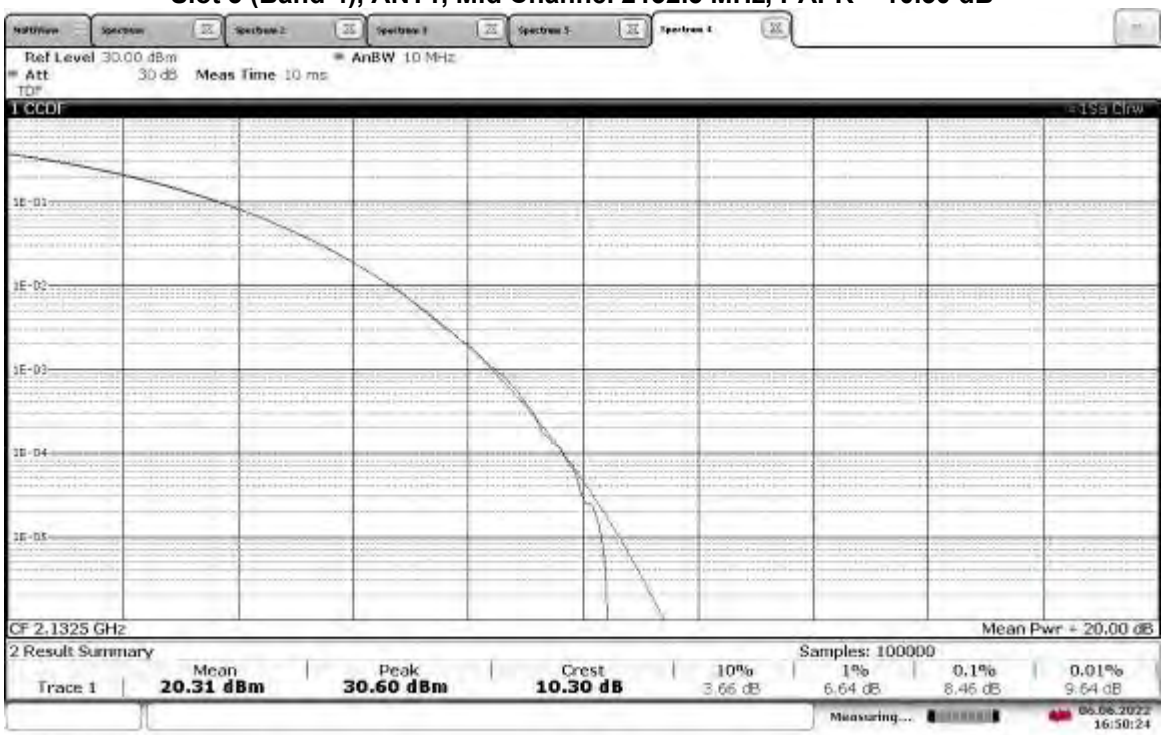
22:18:36 02.06.2022

TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 2132.5 MHz, PAPR = 10.58 dB



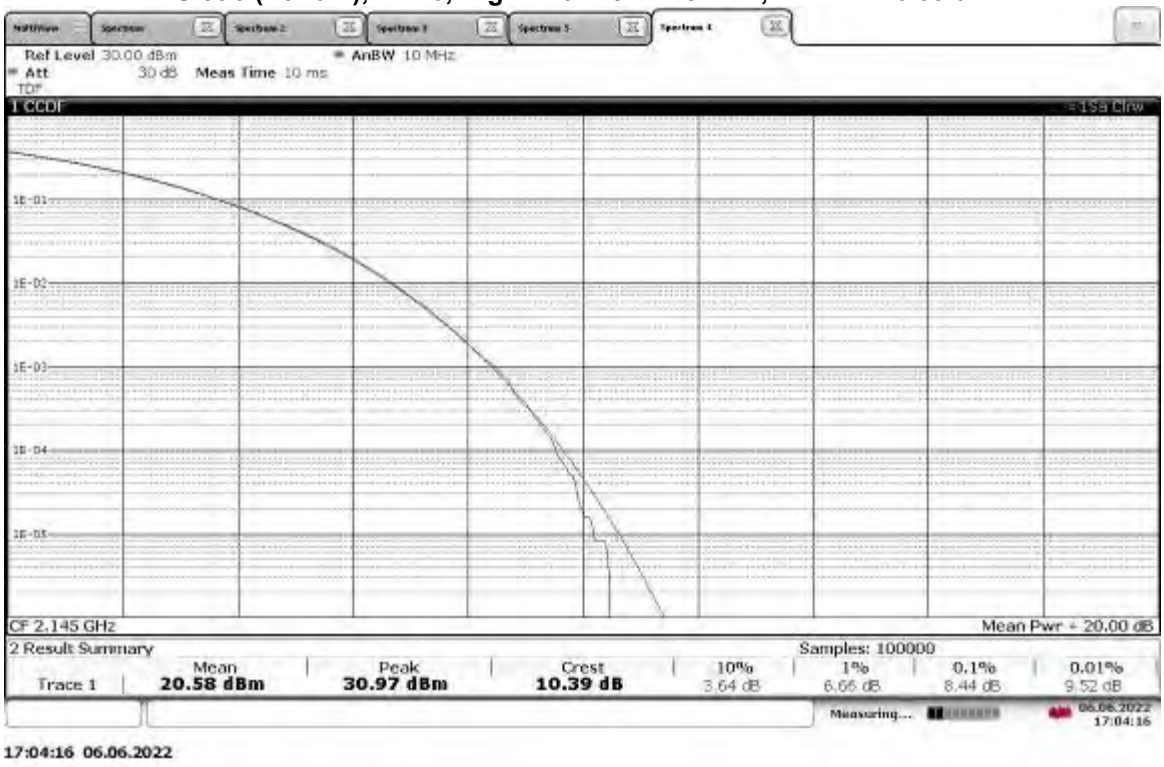
16:53:28 06.06.2022

TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 2132.5 MHz, PAPR = 10.30 dB



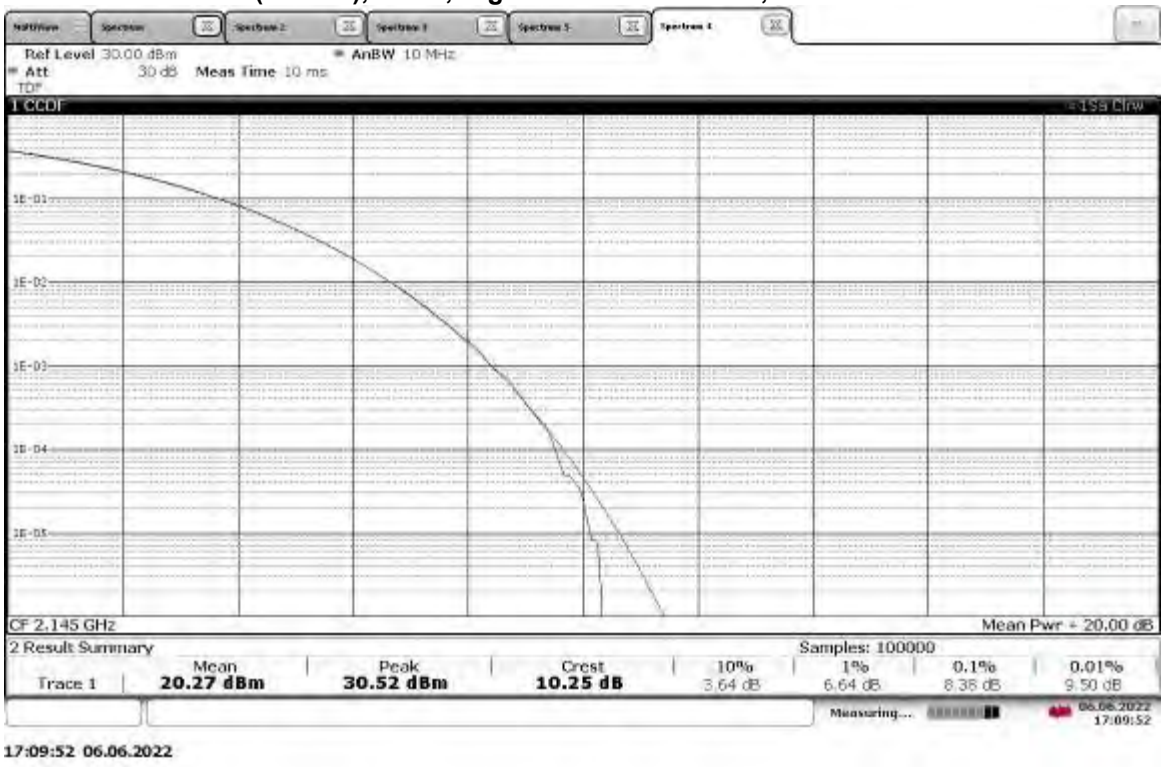
16:50:25 06.06.2022

TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 2145 MHz, PAPR = 10.39 dB



17:04:16 06.06.2022

TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 2145 MHz, PAPR = 10.25 dB



17:09:52 06.06.2022

Test Personnel:	Vathana Ven VSV	Test Date:	06/02/2022, 06/06/2022
Supervising/Reviewing Engineer: (Where Applicable)	N/A		
Product Standard:	FCC Part 27	Limit Applied:	See report section 7.3
Input Voltage:	48 VDC (POE)		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	22, 23 ºC
		Relative Humidity:	21, 15 %
		Atmospheric Pressure:	1004, 1013 mbars

Deviations, Additions, or Exclusions: None

8 26 dB Bandwidth and Occupied Bandwidth

8.1 Method

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

TEST SITE: EMC Lab

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

8.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	01/26/2022	01/26/2023
CBLHF2012-2M-2	2m 9kHz-40GHz Coaxial Cable – SET2	Huber & Suhner	SF102	252675001	02/10/2022	02/10/2023
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	11/02/2021	11/02/2022
DAV005'	Weather Station	Davis	6250	MS191218083	02/11/2022	02/11/2023

Software Utilized:

Name	Manufacturer	Version
None	--	--

8.3 Results:

The sample tested was found to Comply.

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

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

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	4.50	5.00
		ANT1	4.50	4.99
High	2152.50	ANT0	4.50	4.96
		ANT1	4.50	4.96

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	8.97	9.85
		ANT1	8.97	9.87
High	2150.00	ANT0	8.97	9.85
		ANT1	8.97	9.87

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	13.46	14.78
		ANT1	13.46	14.80
High	2147.50	ANT0	13.46	14.78
		ANT1	13.46	14.80

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	17.88	19.61
		ANT1	17.90	19.65
High	2145.00	ANT0	17.89	19.58
		ANT1	17.89	19.61

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	4.50	4.96
		ANT1	4.59	4.95
High	2152.50	ANT0	4.49	4.96
		ANT1	4.49	4.93

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	8.94	9.69
		ANT1	8.94	9.71
High	2150.00	ANT0	8.94	9.67
		ANT1	8.94	9.71

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	13.42	14.51
		ANT1	13.38	14.51
High	2147.50	ANT0	13.41	14.48
		ANT1	13.40	14.48

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	17.91	19.51
		ANT1	17.94	19.55
High	2145.00	ANT0	17.91	19.51
		ANT1	17.92	19.51

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	4.53	5.00
		ANT1	4.54	4.97
High	2152.50	ANT0	4.52	5.00
		ANT1	4.51	5.00

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	8.98	9.85
		ANT1	8.98	9.85
High	2150.00	ANT0	8.98	9.85
		ANT1	8.98	9.85

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	13.46	14.71
		ANT1	13.47	14.78
High	2147.50	ANT0	13.45	14.71
		ANT1	13.47	14.78

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	17.89	19.51
		ANT1	17.89	19.58
High	2145.00	ANT0	17.89	19.58
		ANT1	17.90	19.61

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	4.51	5.00
		ANT1	4.51	4.99
High	2152.50	ANT0	4.52	4.96
		ANT1	4.50	5.00

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	8.96	9.75
		ANT1	8.96	9.77
High	2150.00	ANT0	8.96	9.77

		ANT1	8.96	9.77

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

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	13.45	14.80
		ANT1	13.45	14.78
High	2147.50	ANT0	13.45	14.78
		ANT1	13.46	14.80

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

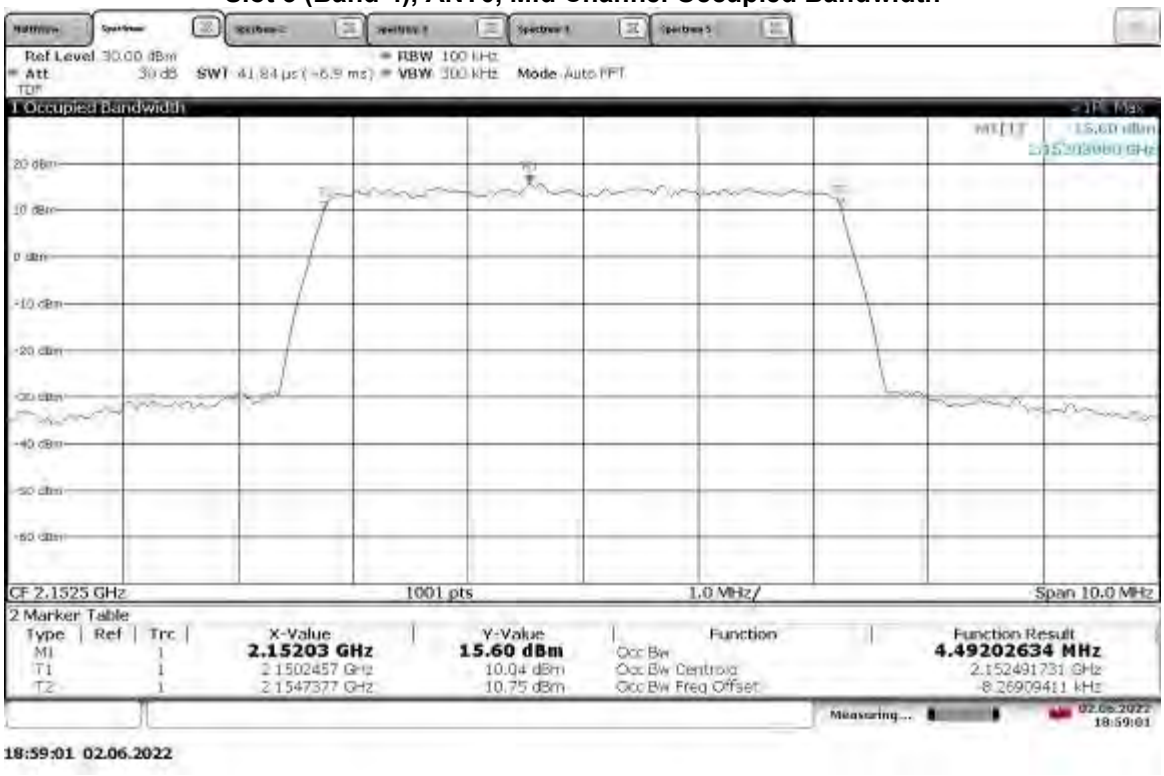
Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Mid	2132.50	ANT0	17.89	19.68
		ANT1	17.90	19.72
High	2145.00	ANT0	17.89	19.68
		ANT1	17.89	19.68

8.4 Setup Photograph:

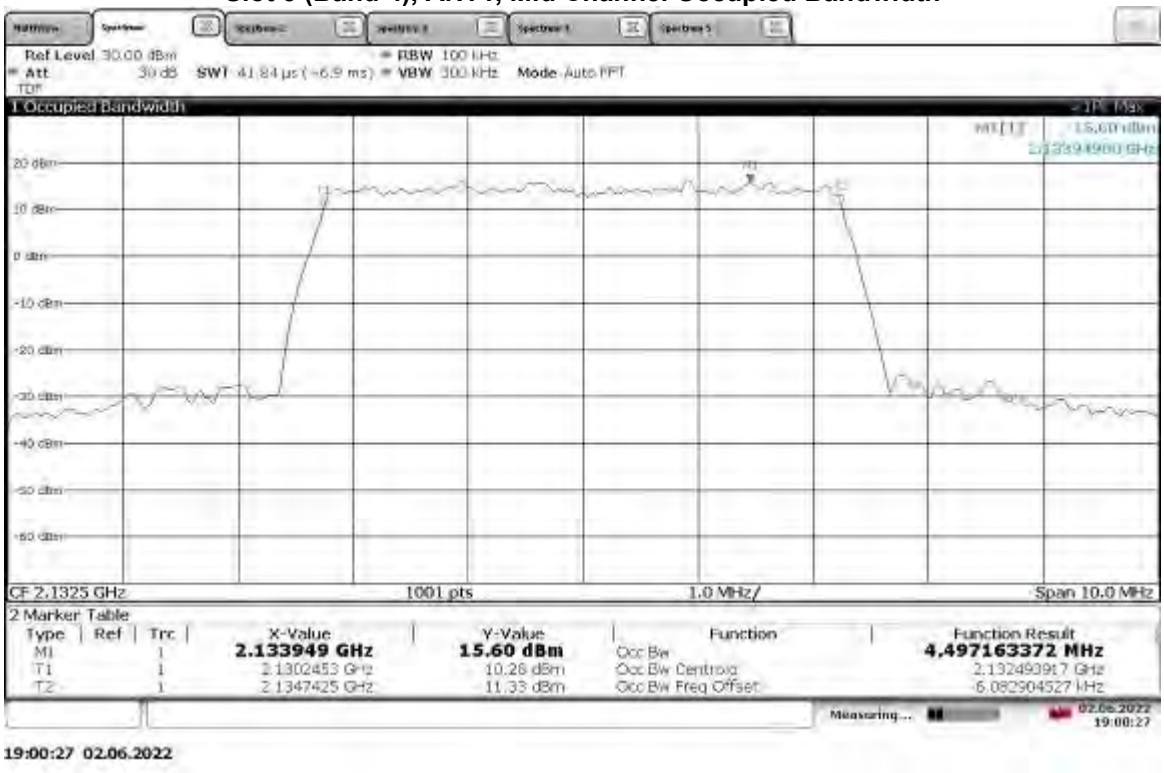
Confidential – Photos not included in this report

8.5 Plots/Data:

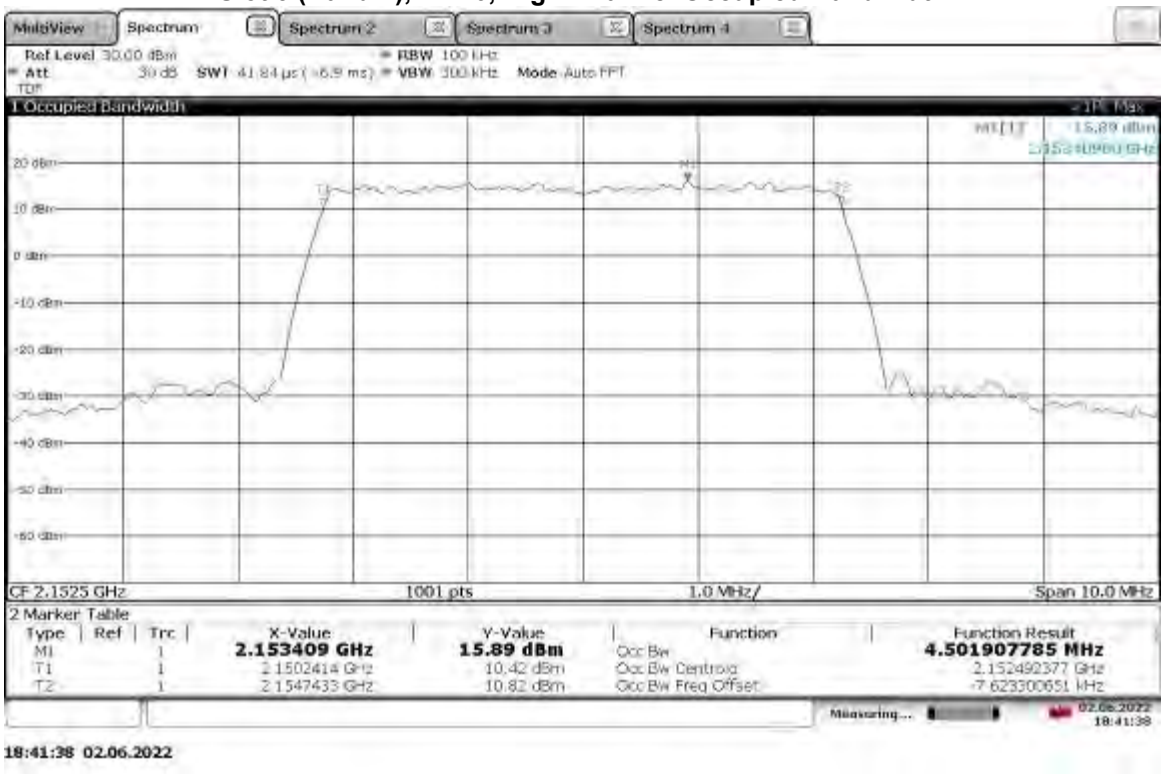
TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth



TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth

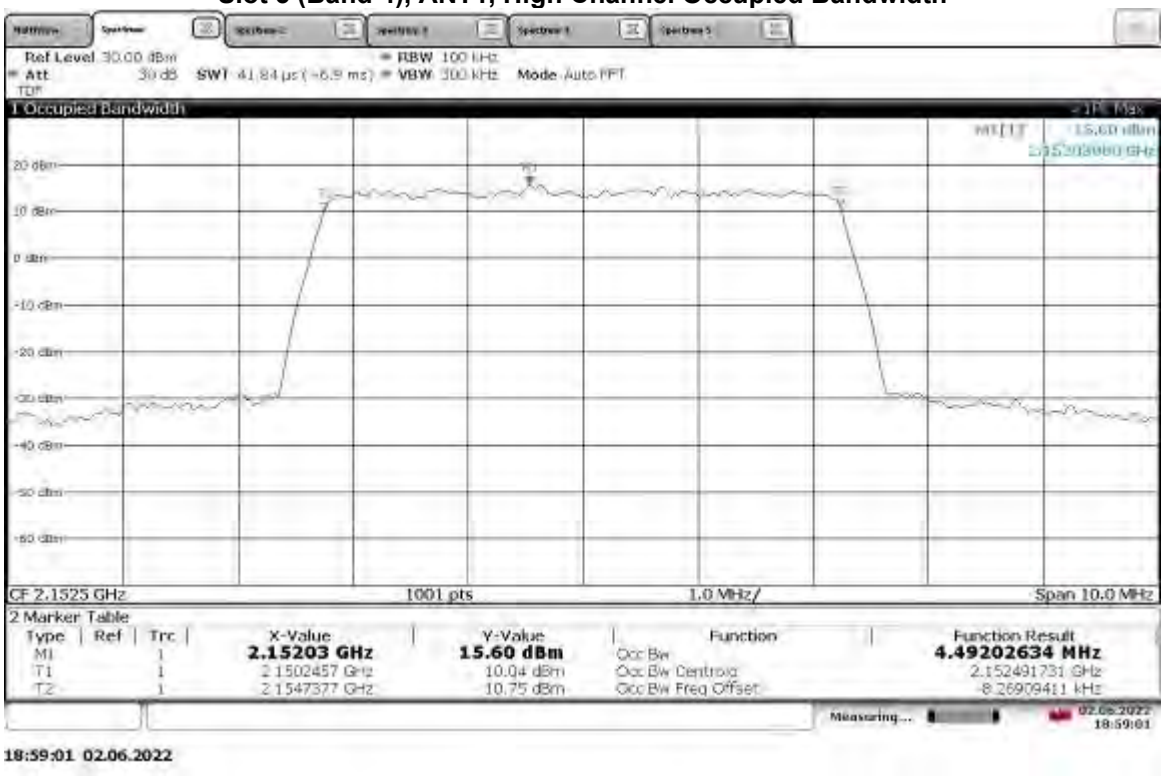


TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



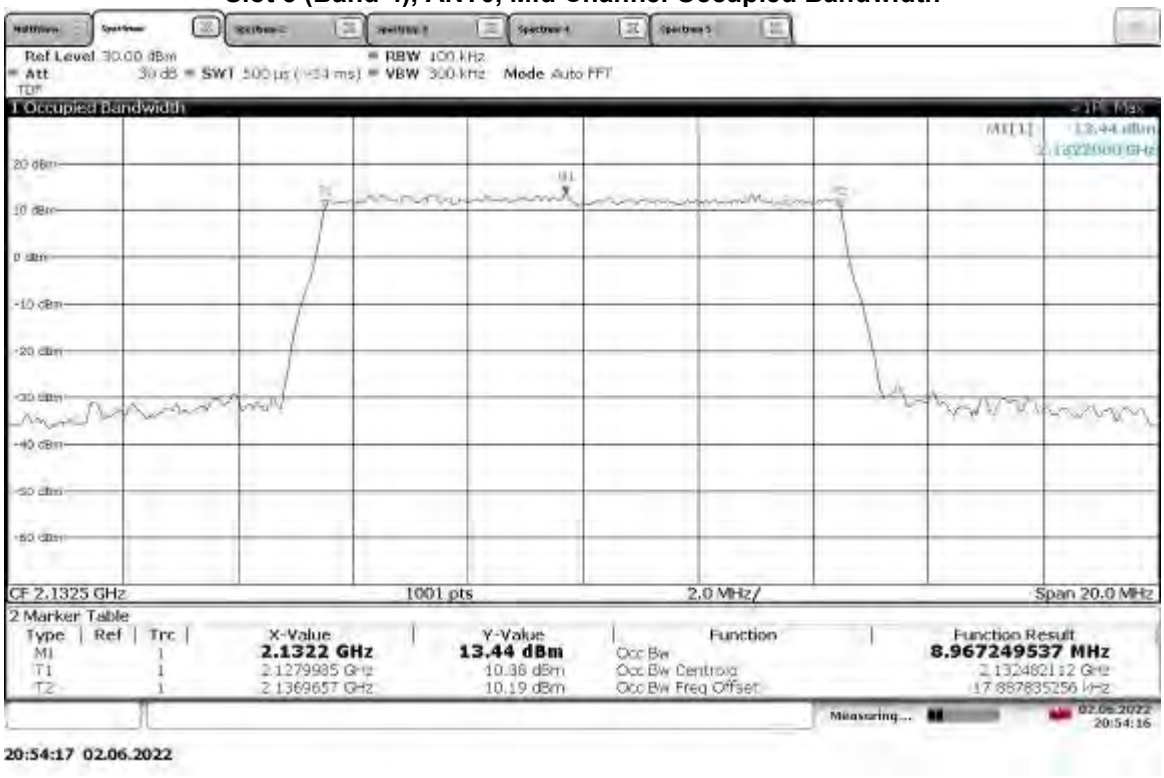
18:41:38 02.06.2022

TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth



18:59:01 02.06.2022

TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth

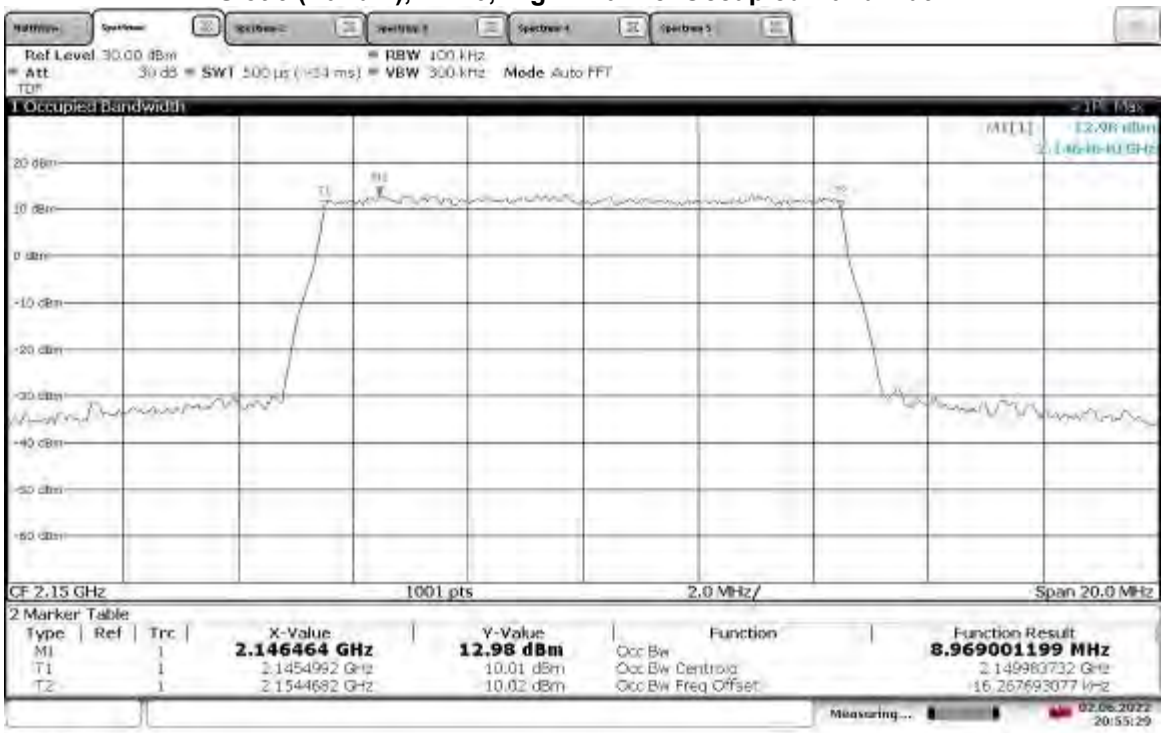


20:54:17 02.06.2022

TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth

20:50:01 02.06.2022

TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



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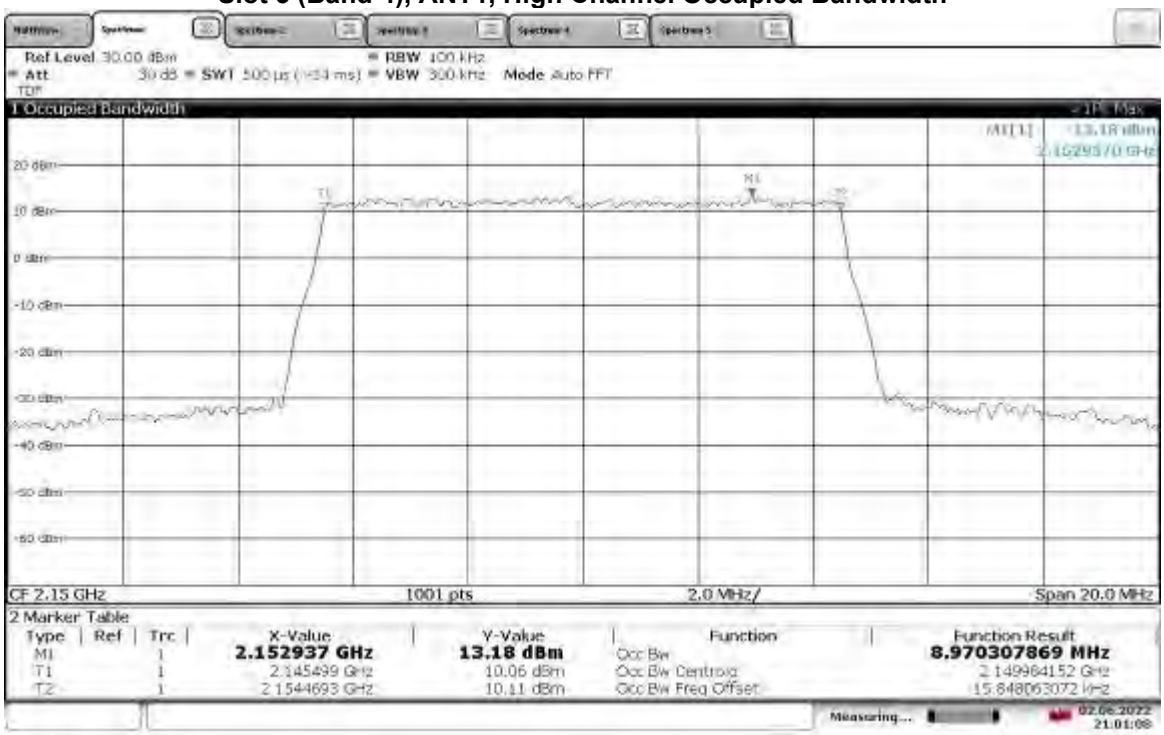
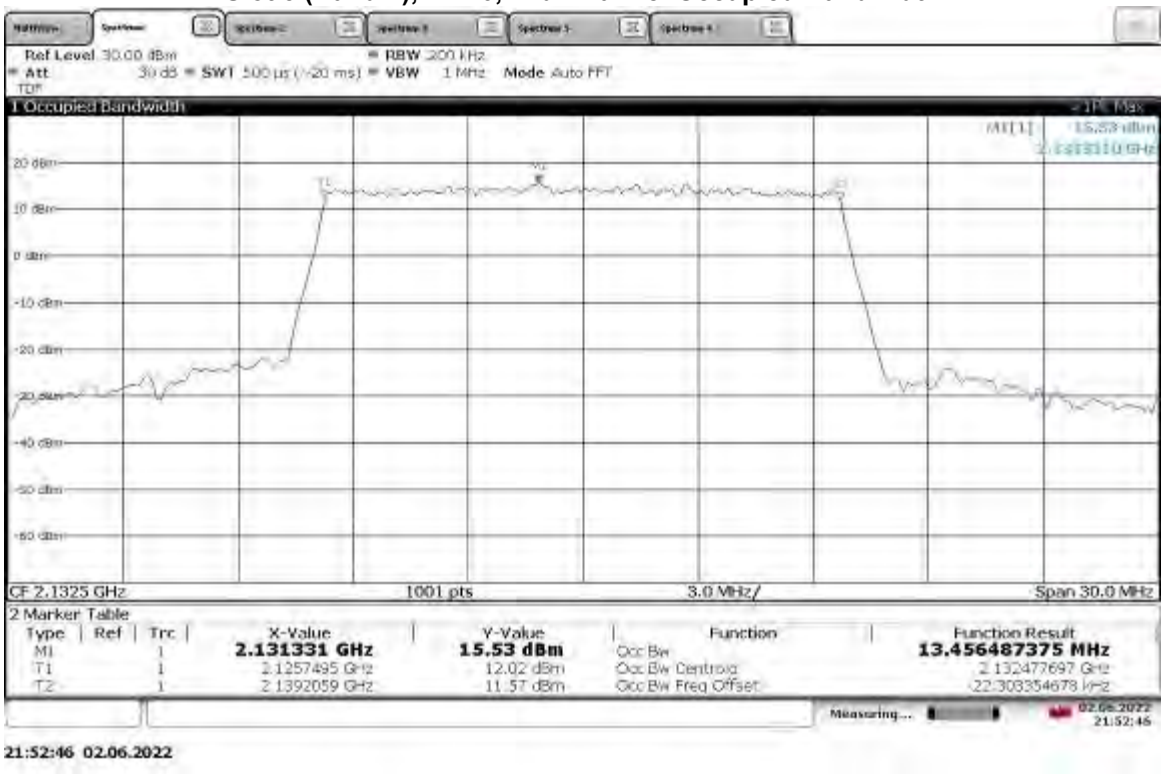
TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth



21:01:09 02.06.2022

TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth

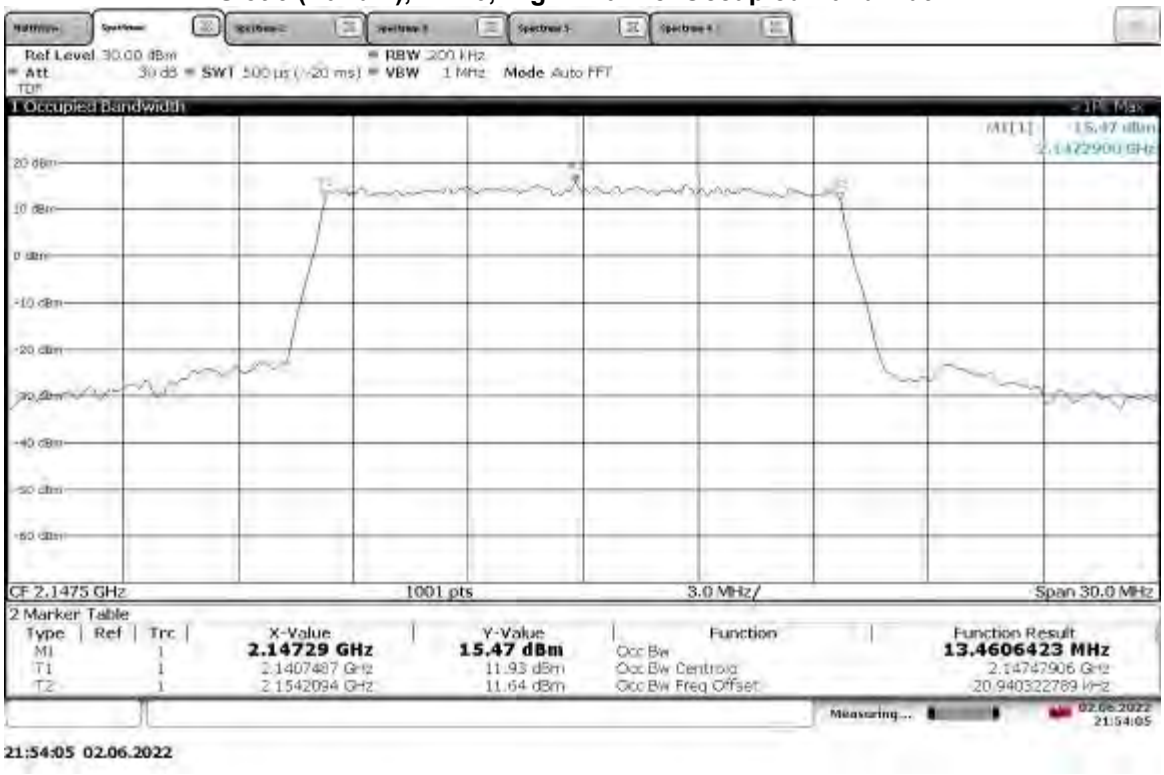


21:52:46 02.06.2022

TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth

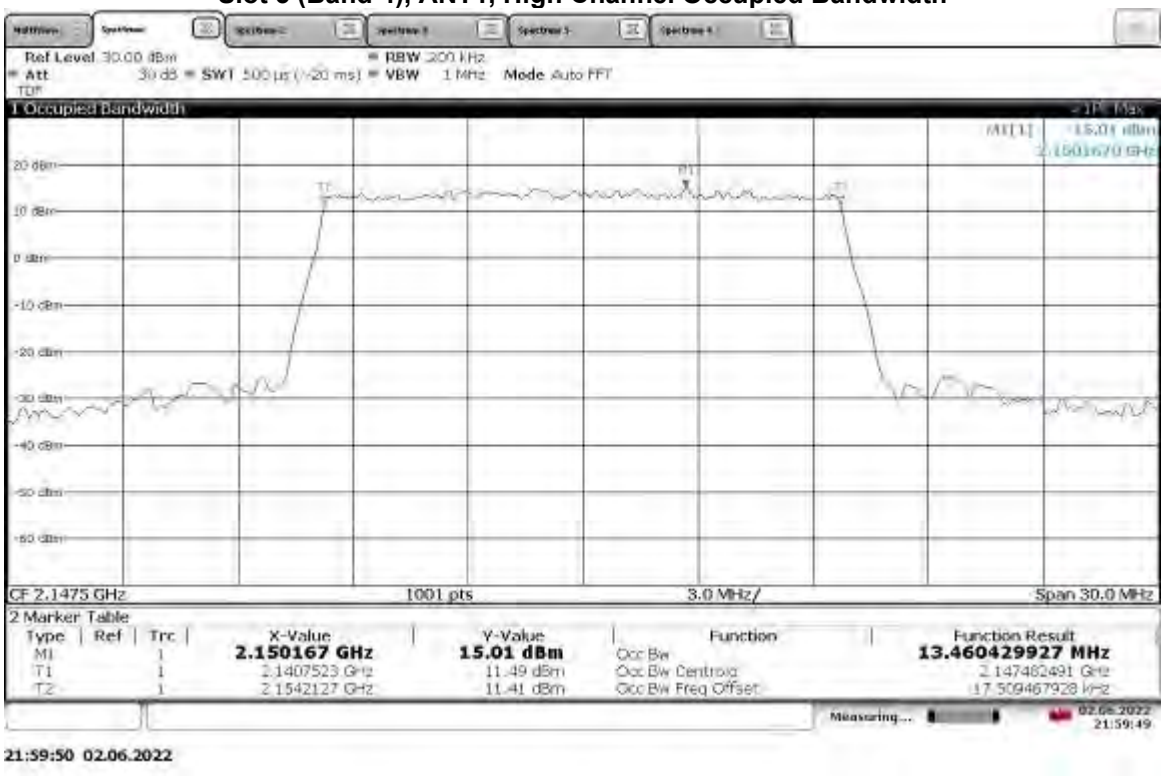
21:46:35 02.06.2022

TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



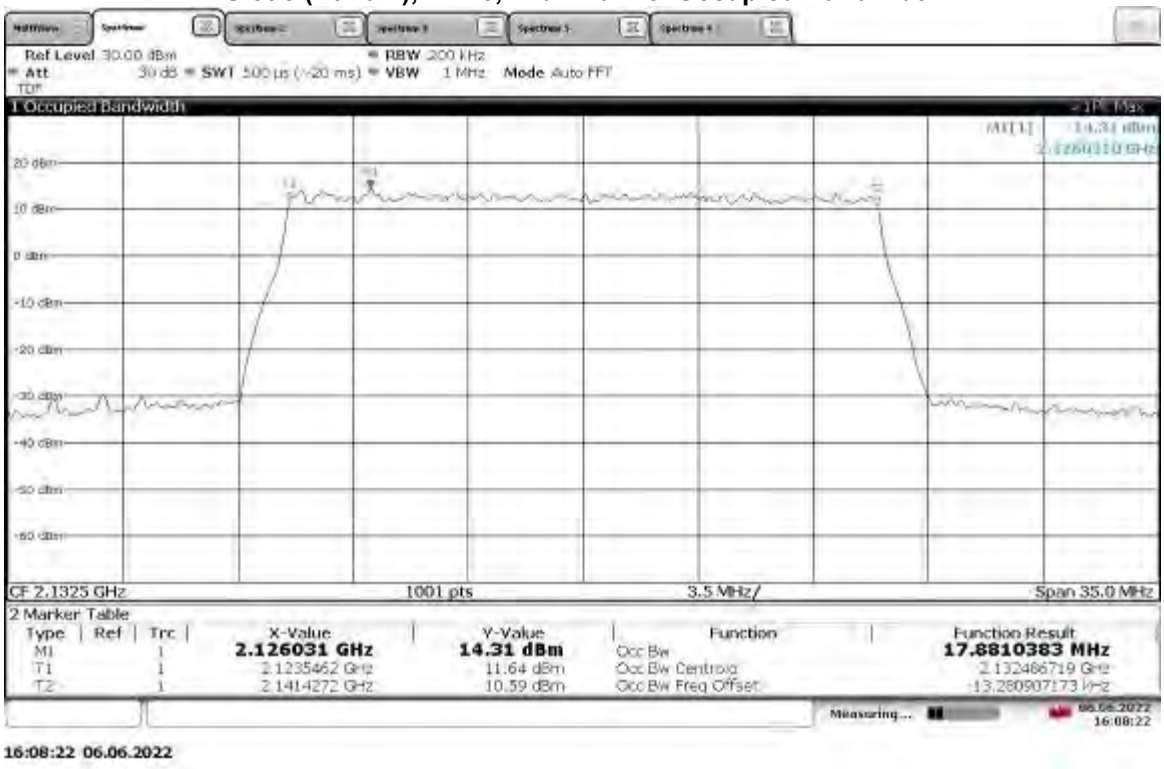
21:54:05 02.06.2022

TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth



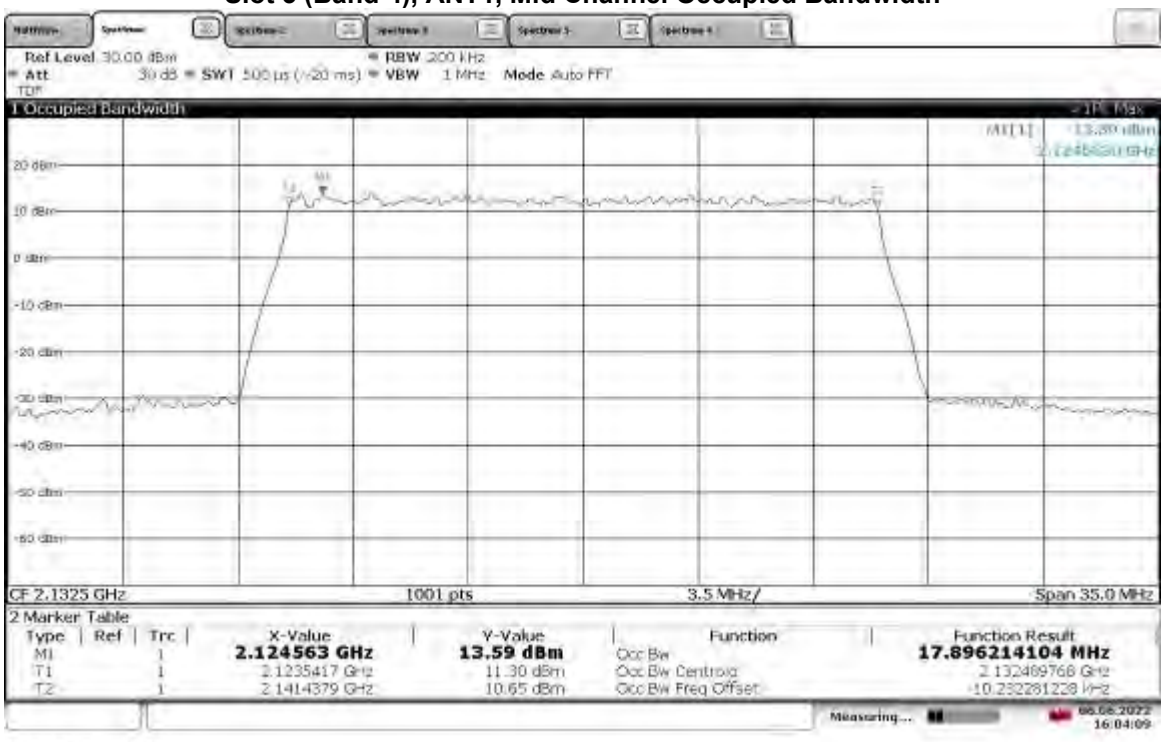
21:59:50 02.06.2022

TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth



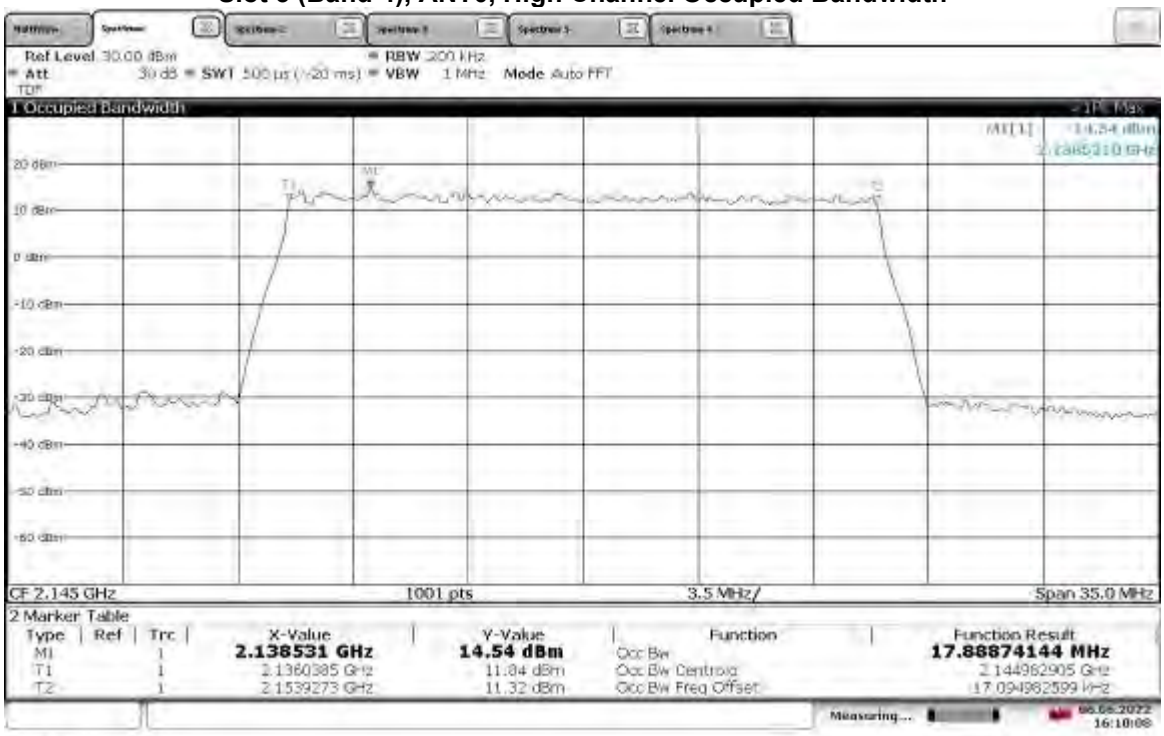
16:08:22 06.06.2022

TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth



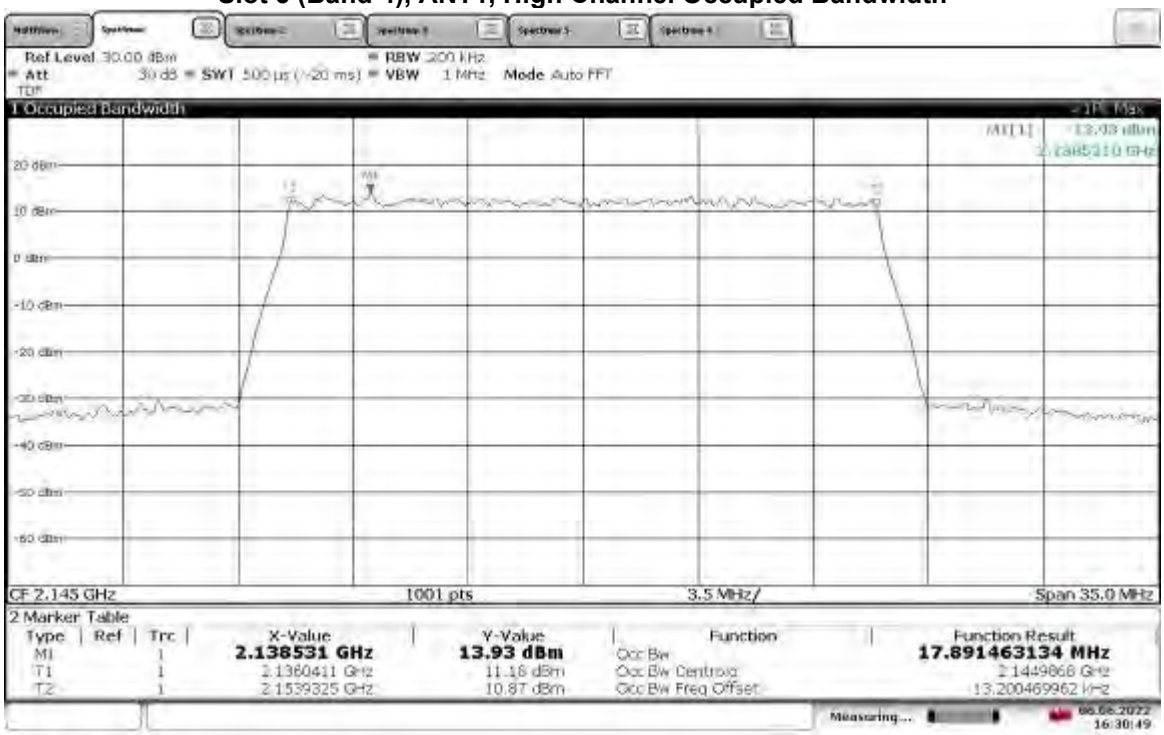
16:04:09 06.06.2022

TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



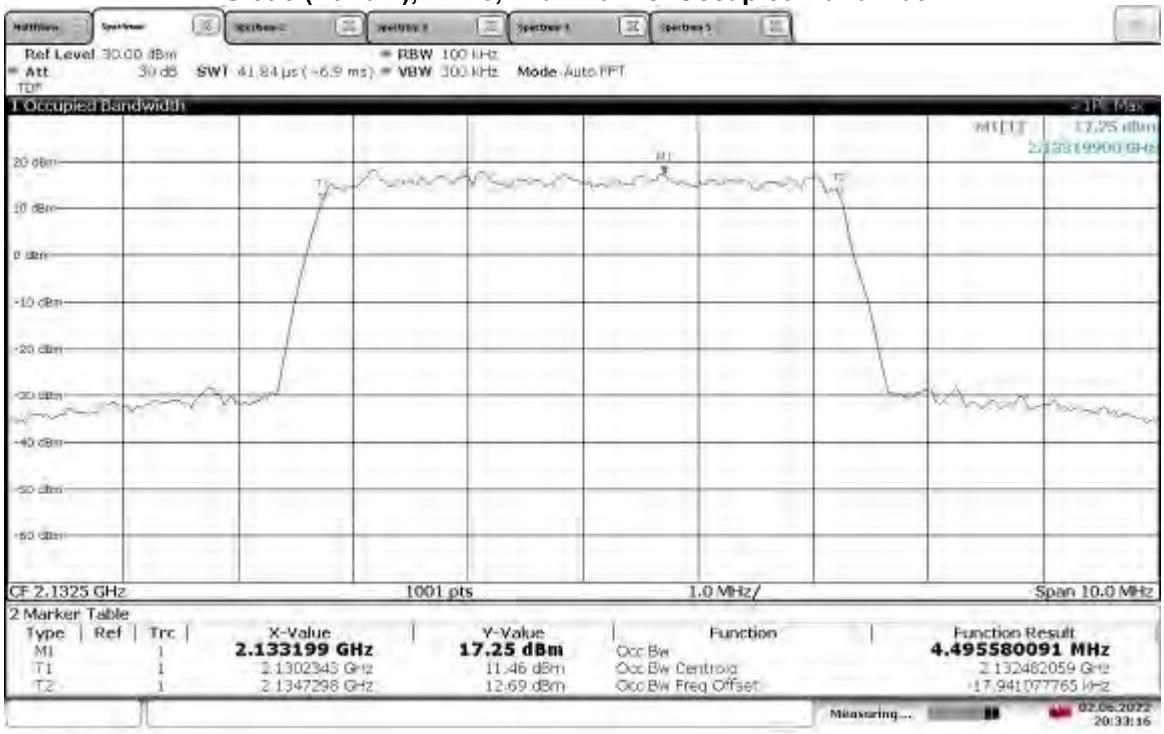
16:10:08 06.06.2022

TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth



16:30:49 06.06.2022

TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth

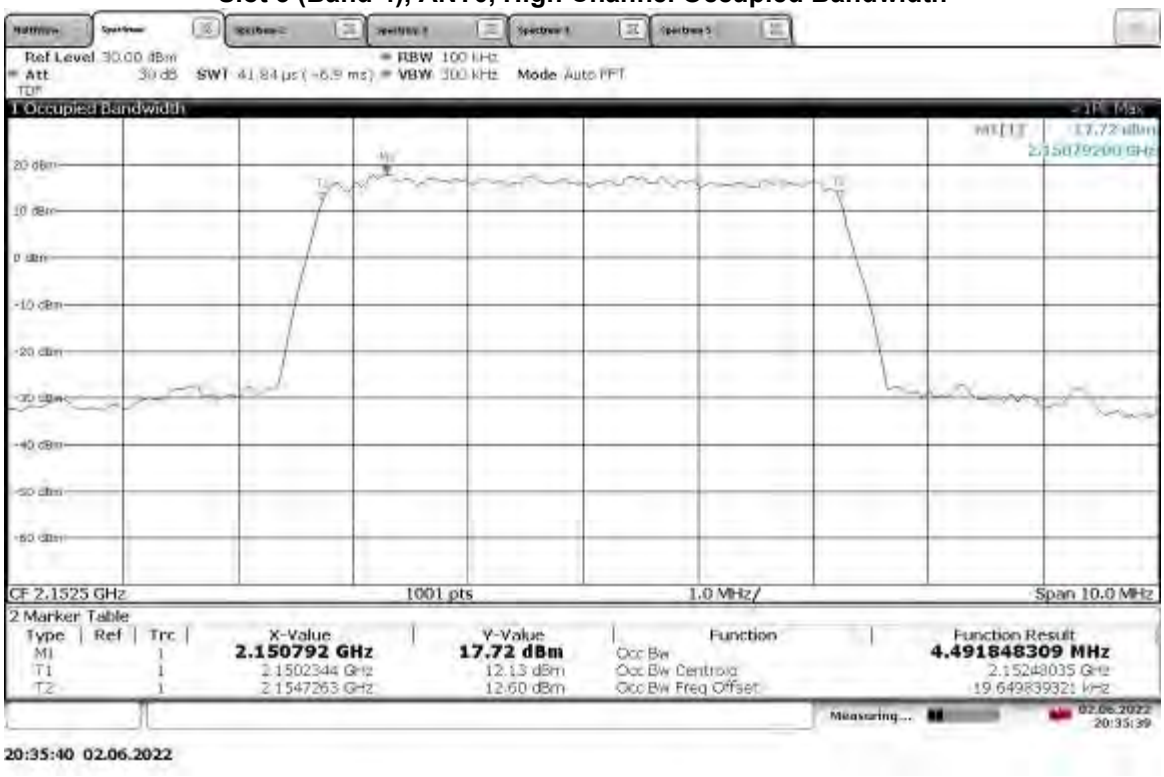


20:33:17 02.06.2022

TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth

20:30:02 02.06.2022

TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth

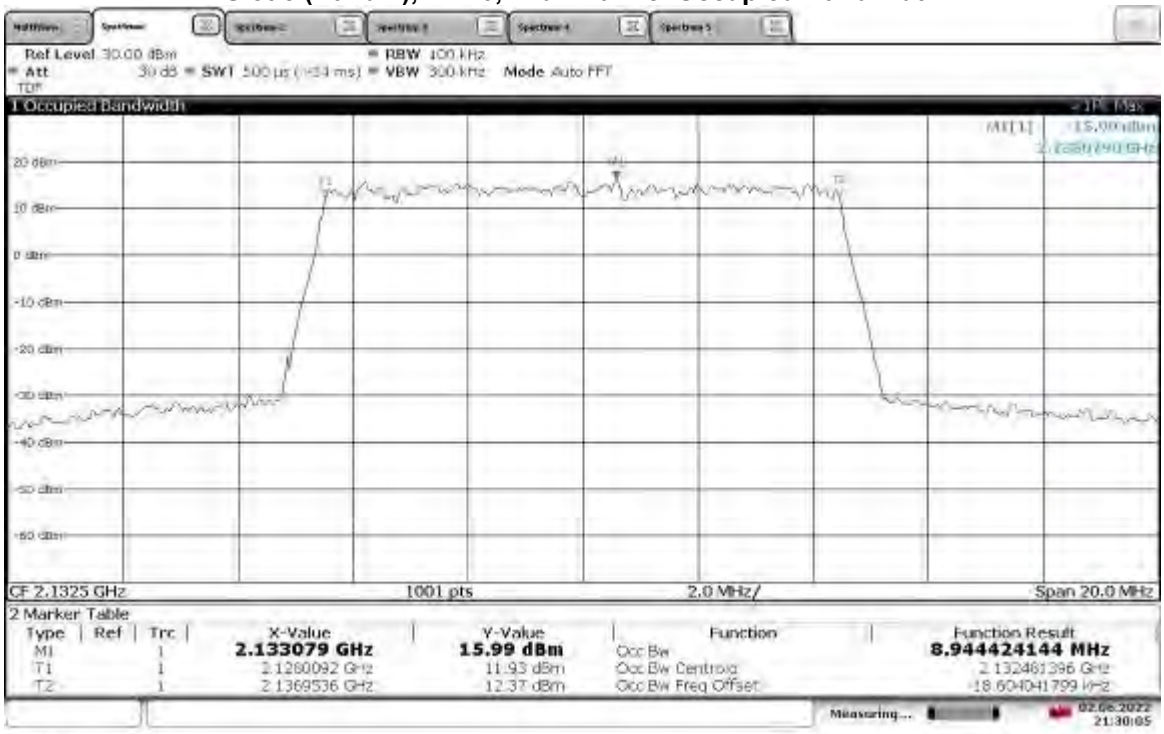


20:35:40 02.06.2022

TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth

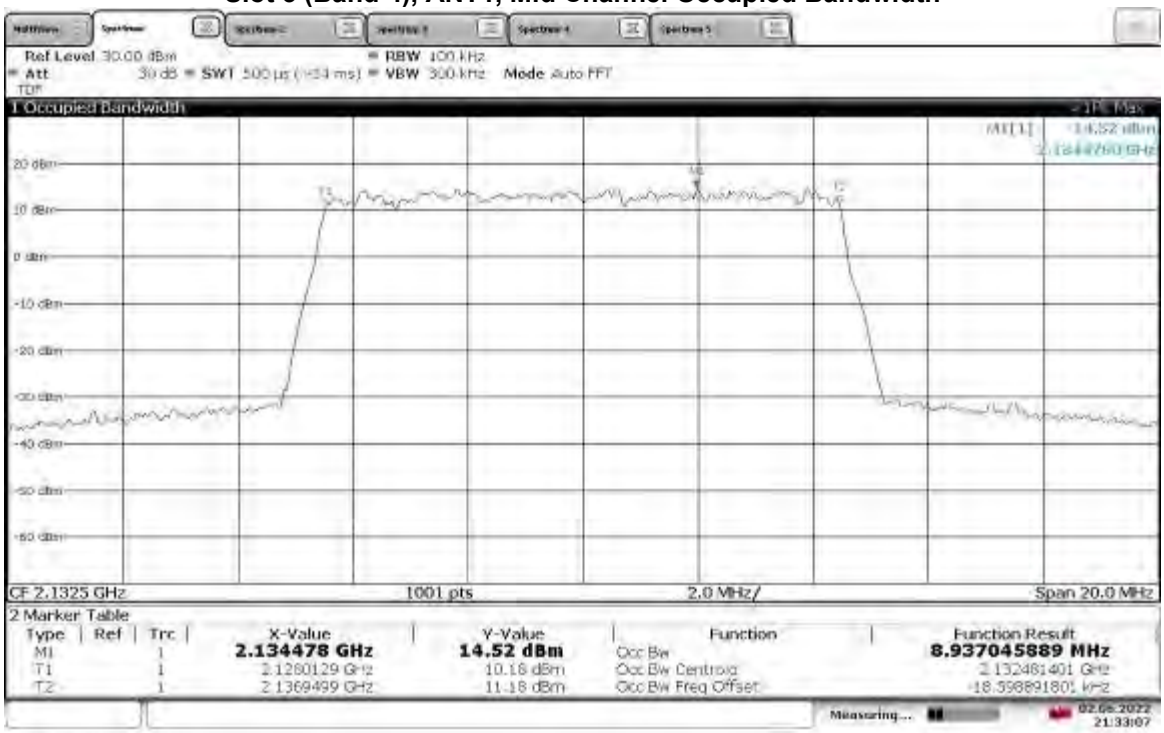
20:40:24 02.06.2022

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth



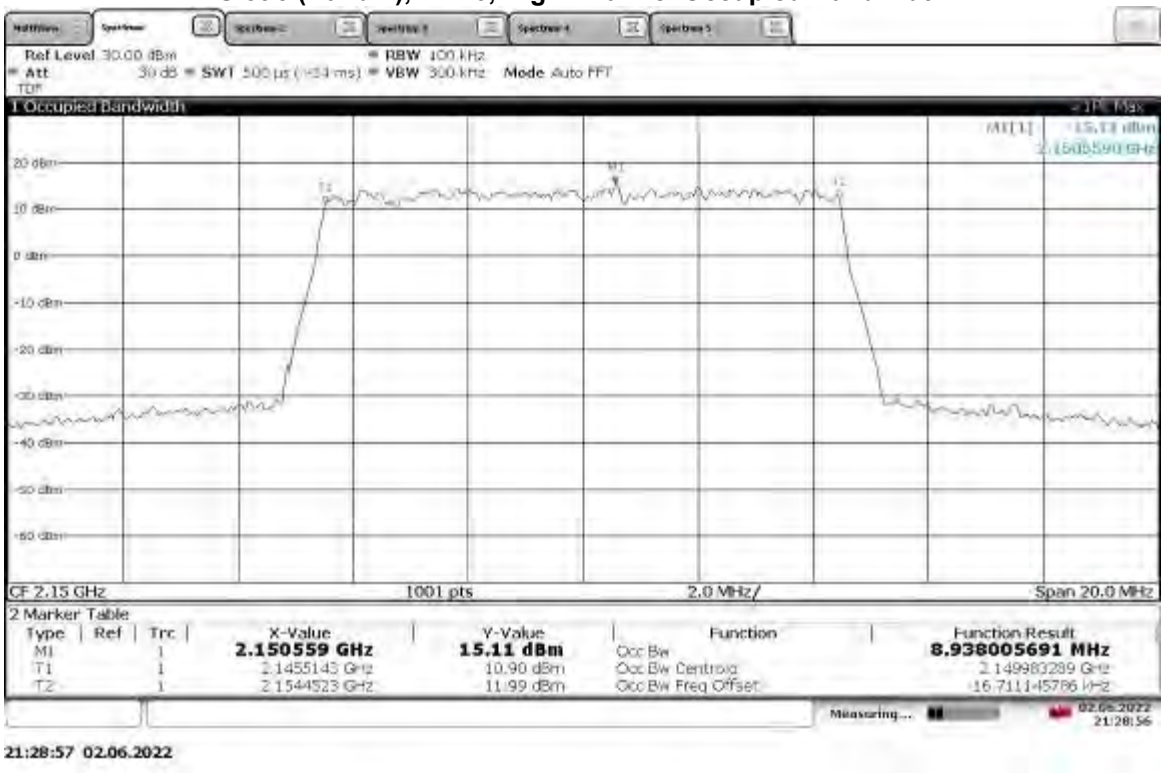
21:30:05 02.06.2022

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth



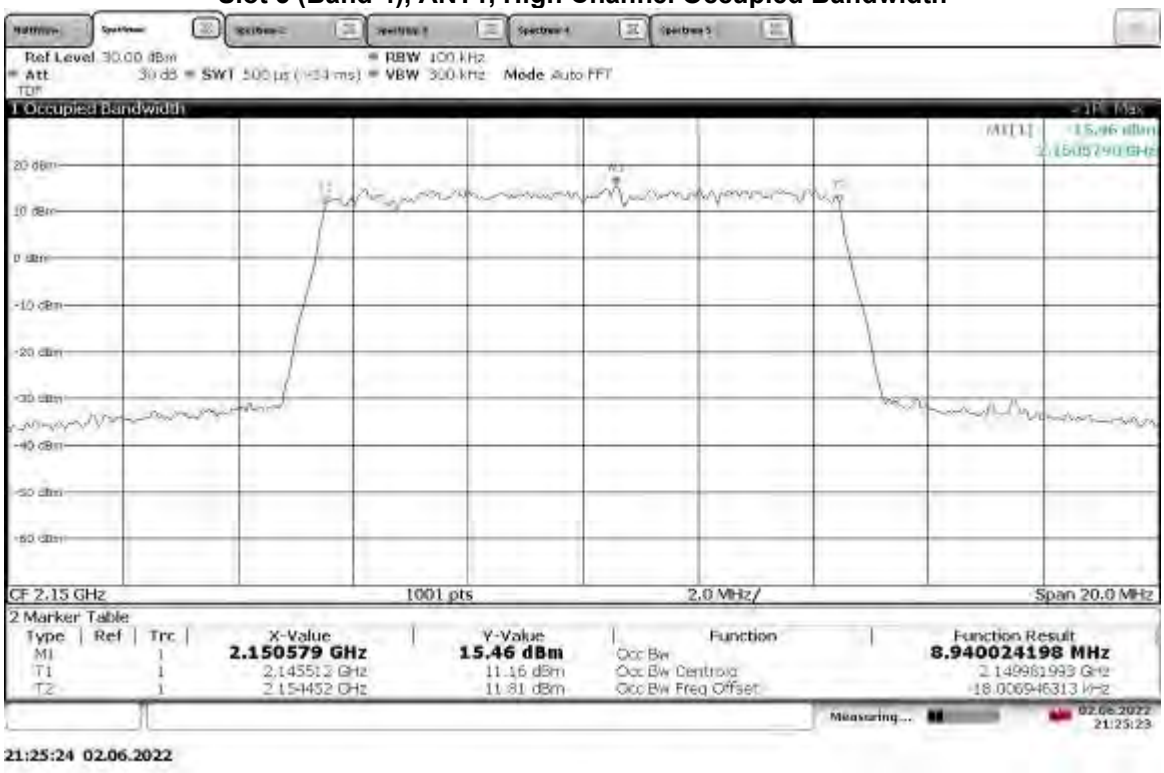
21:33:07 02.06.2022

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



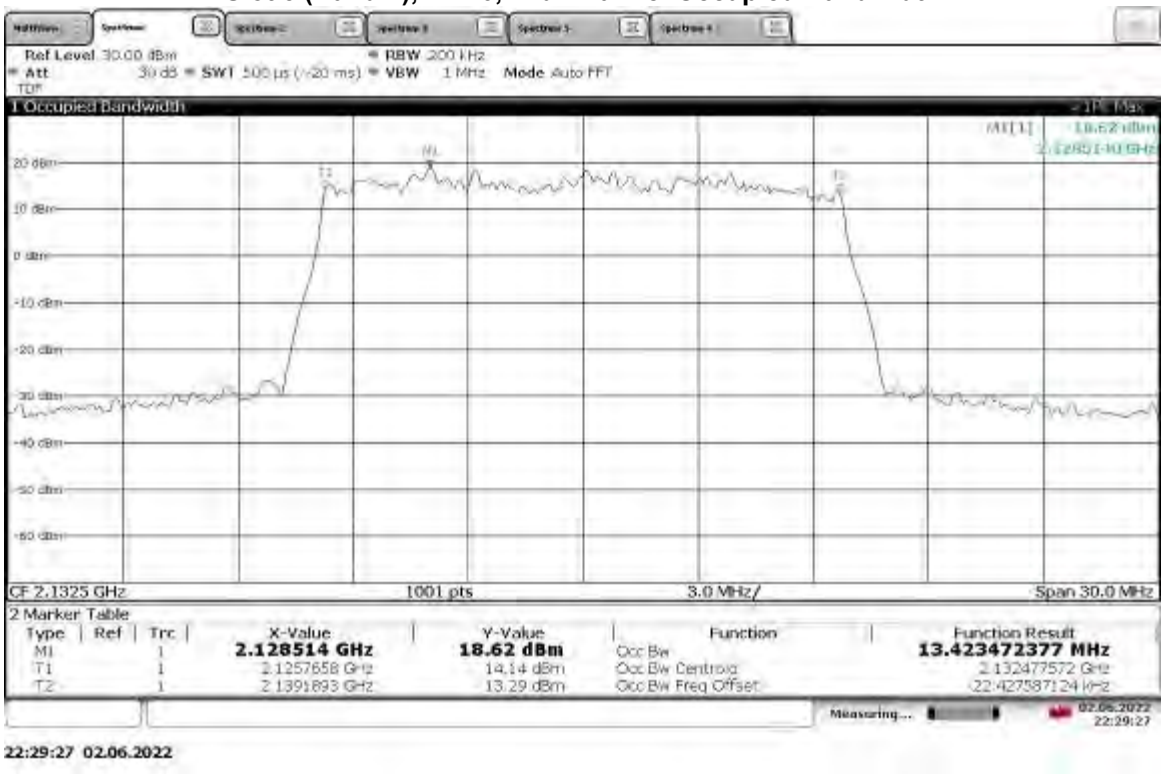
21:28:57 02.06.2022

TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth

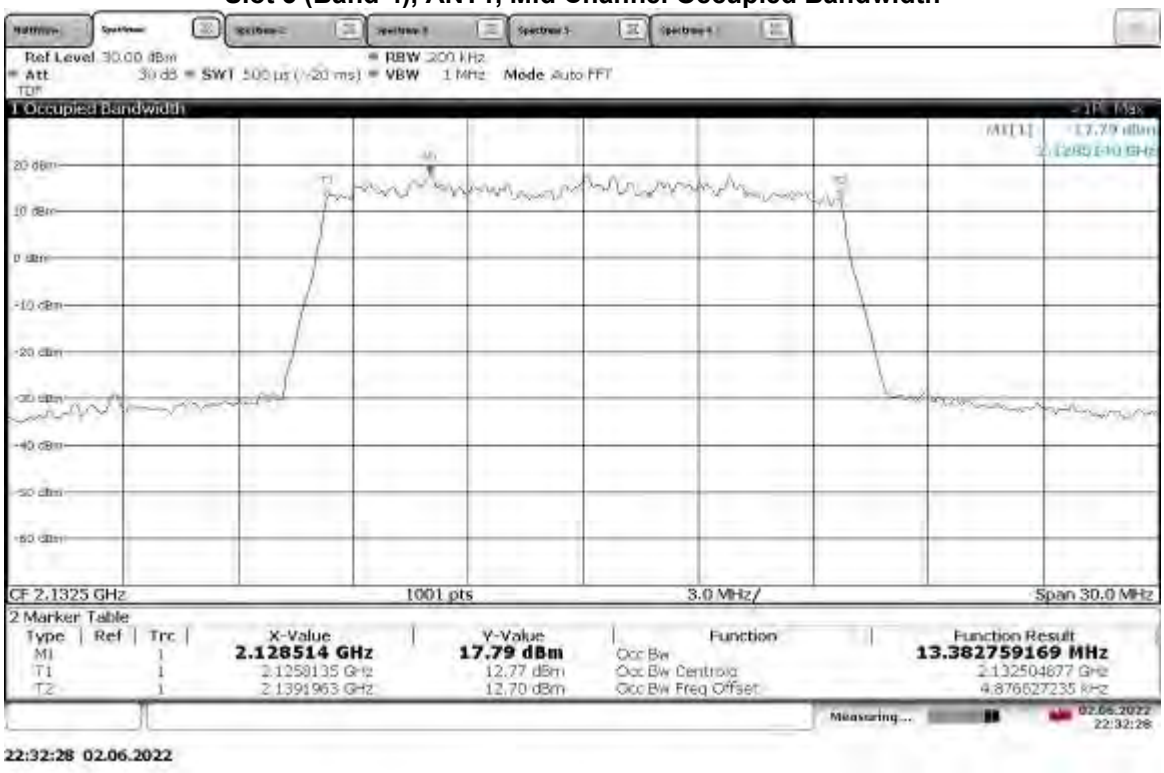


21:25:24 02.06.2022

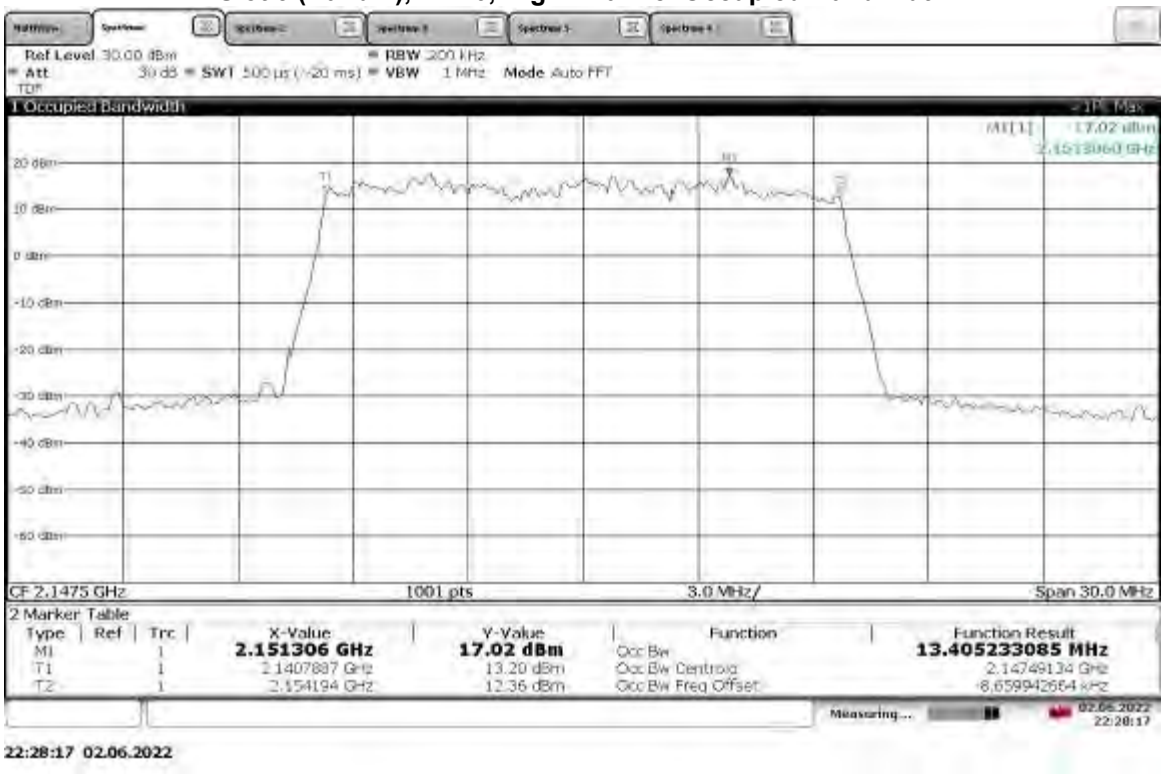
TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth



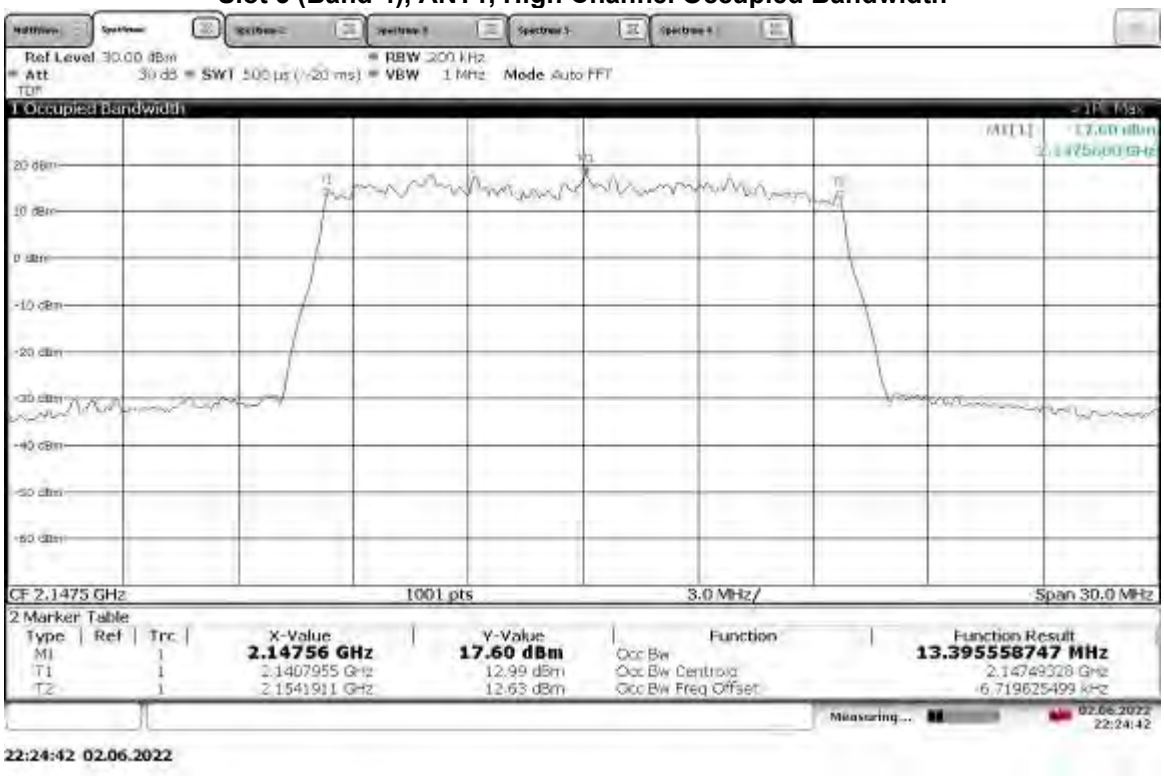
TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth



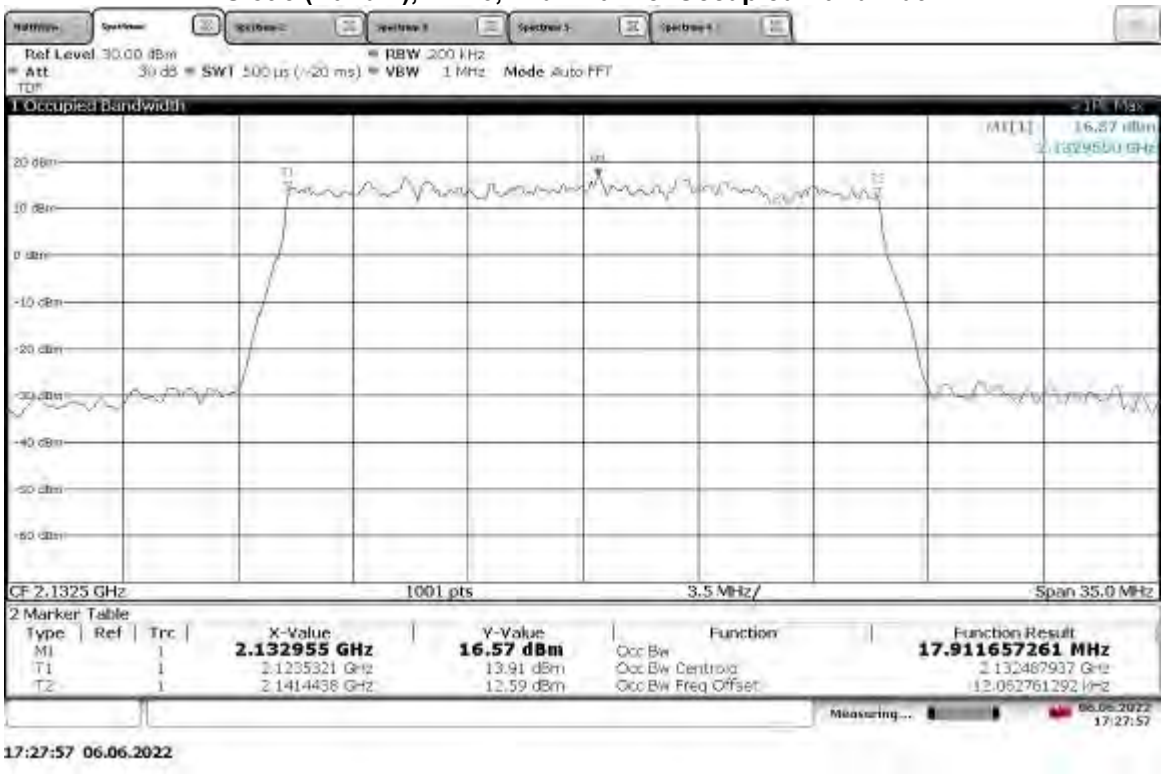
TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth

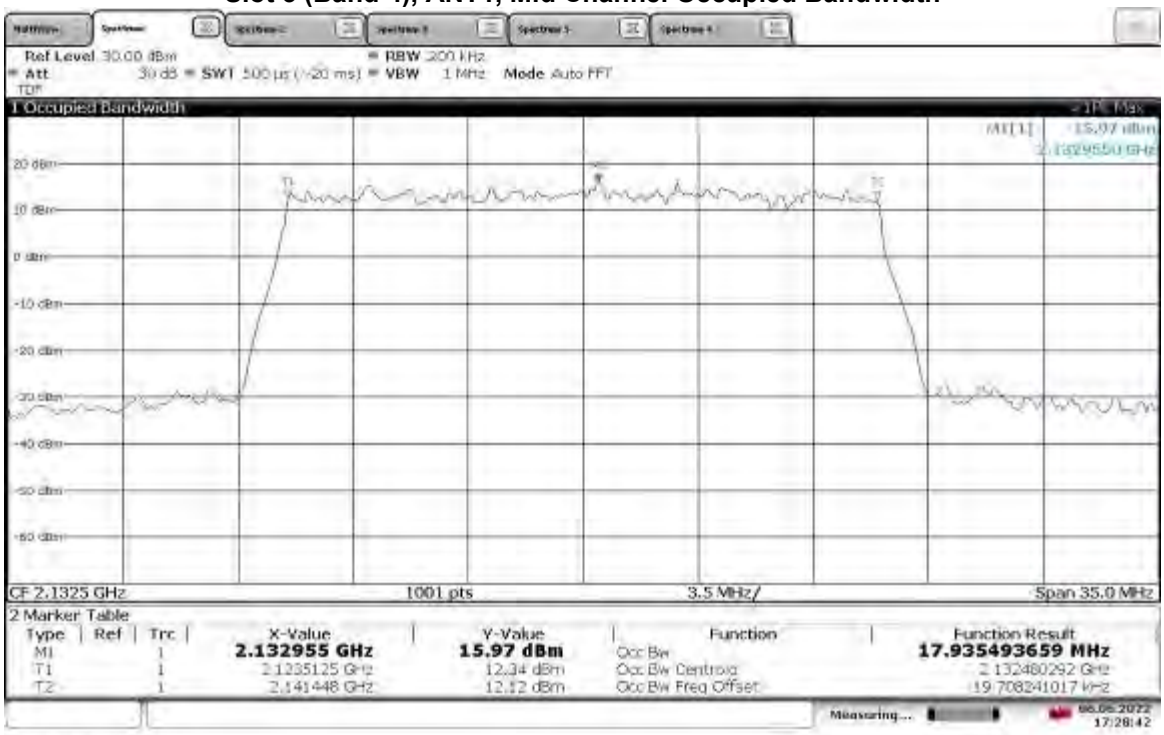


TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth



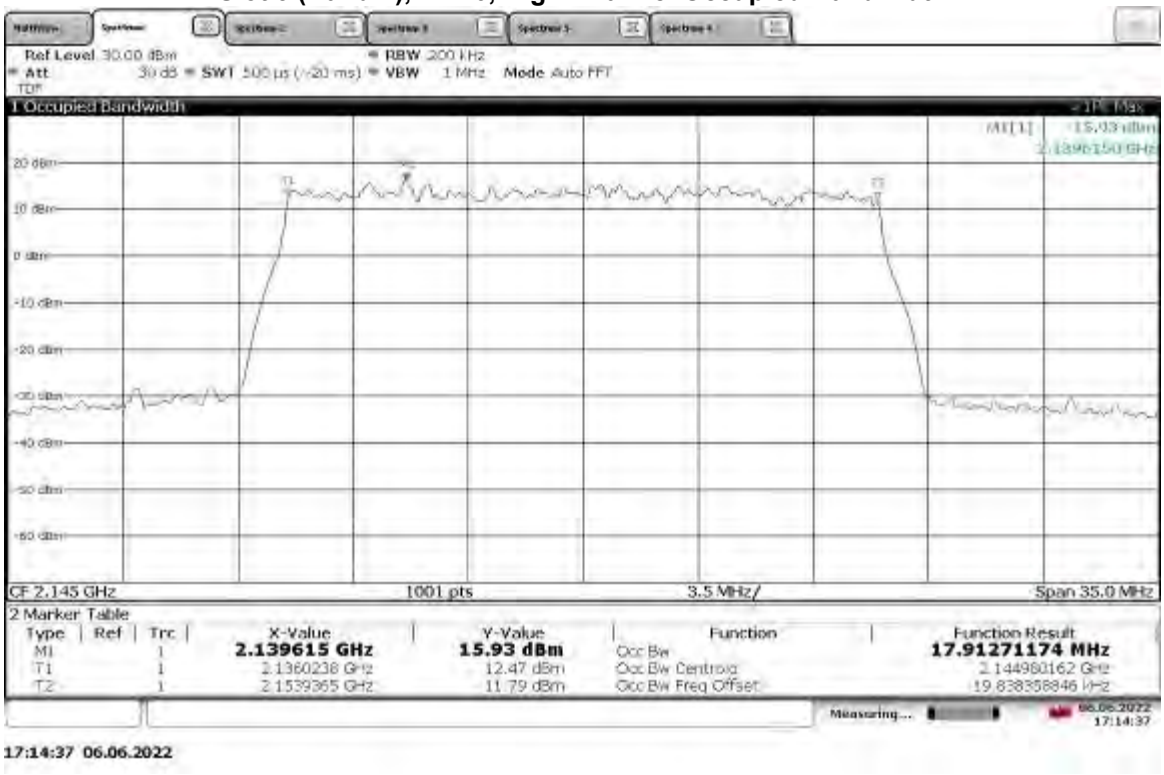
17:27:57 06.06.2022

TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth

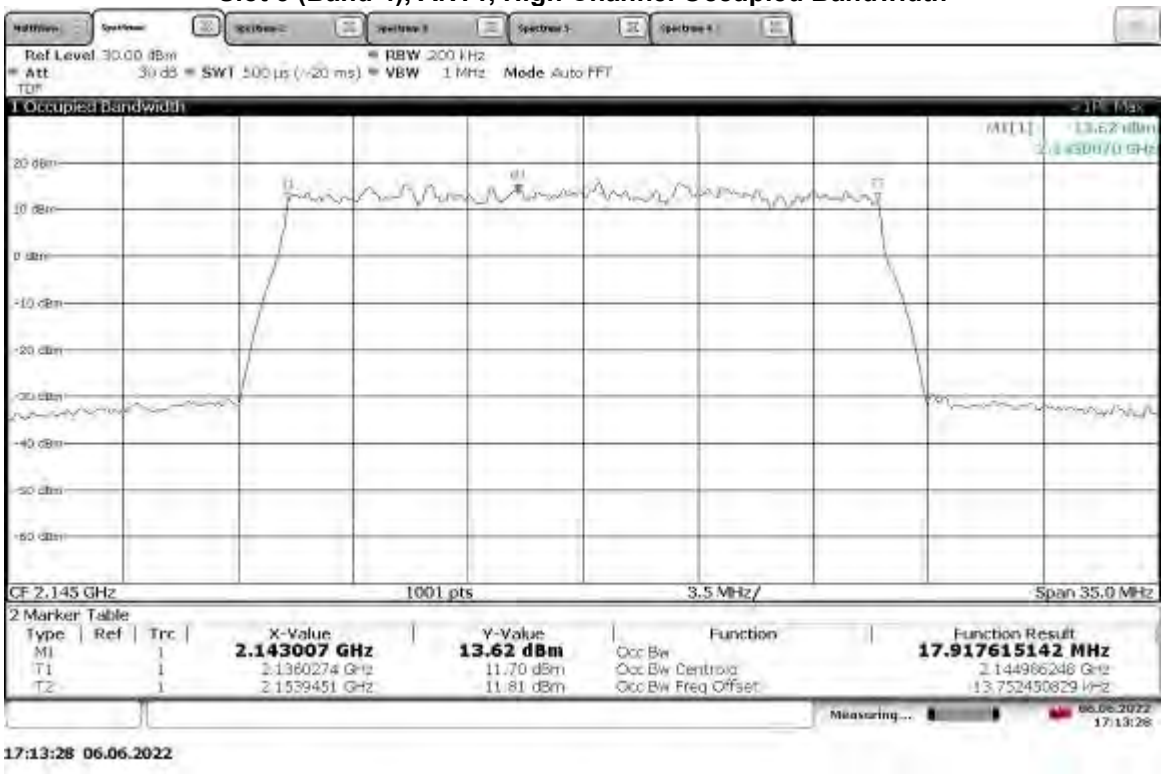


17:28:42 06.06.2022

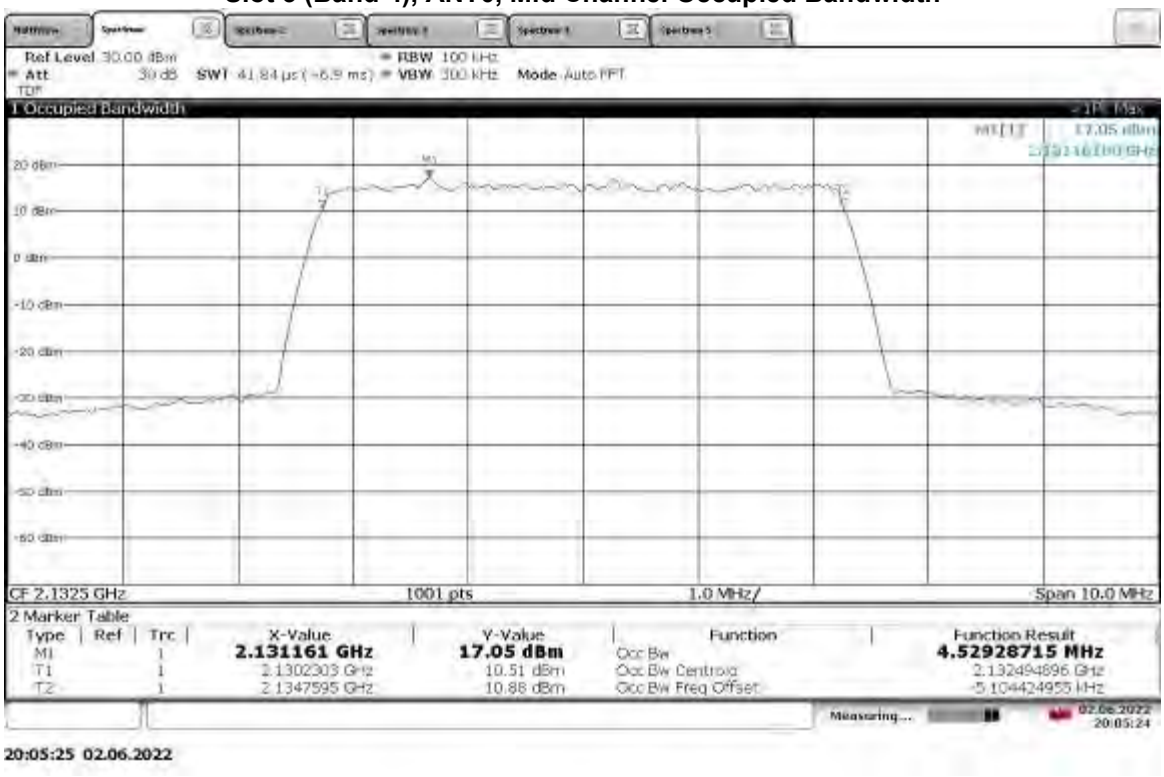
TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth



TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth

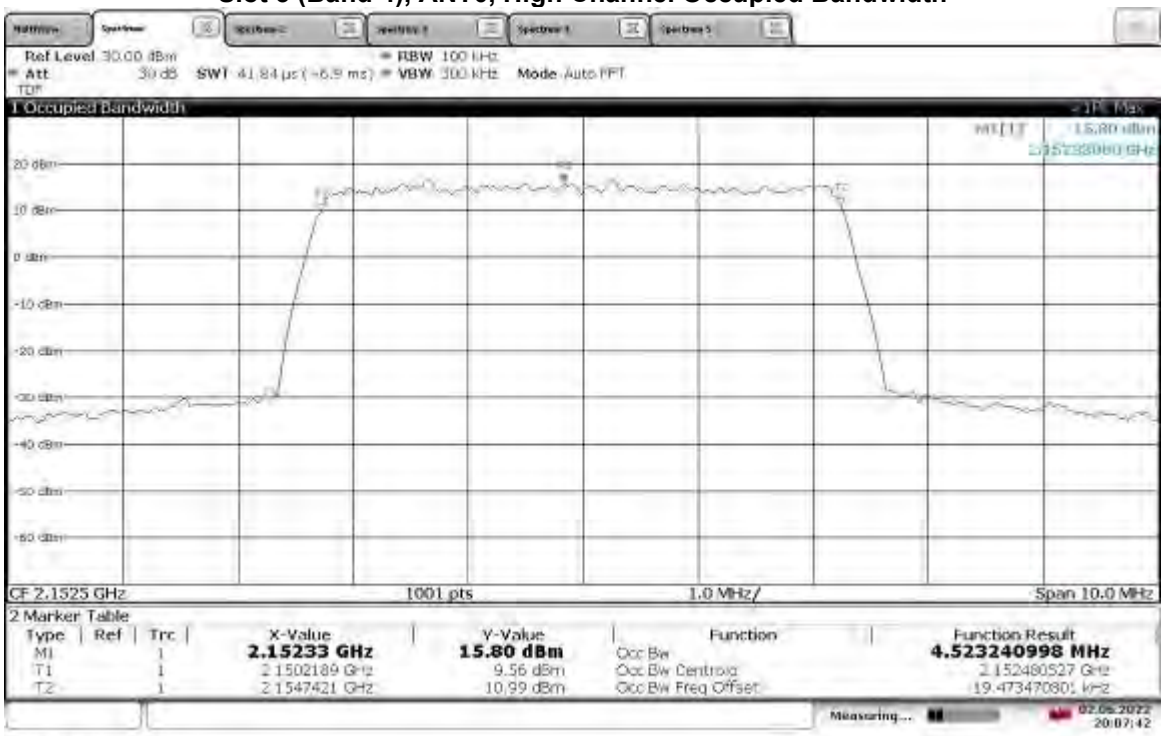


20:05:25 02.06.2022

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth

20:04:36 02.06.2022

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth

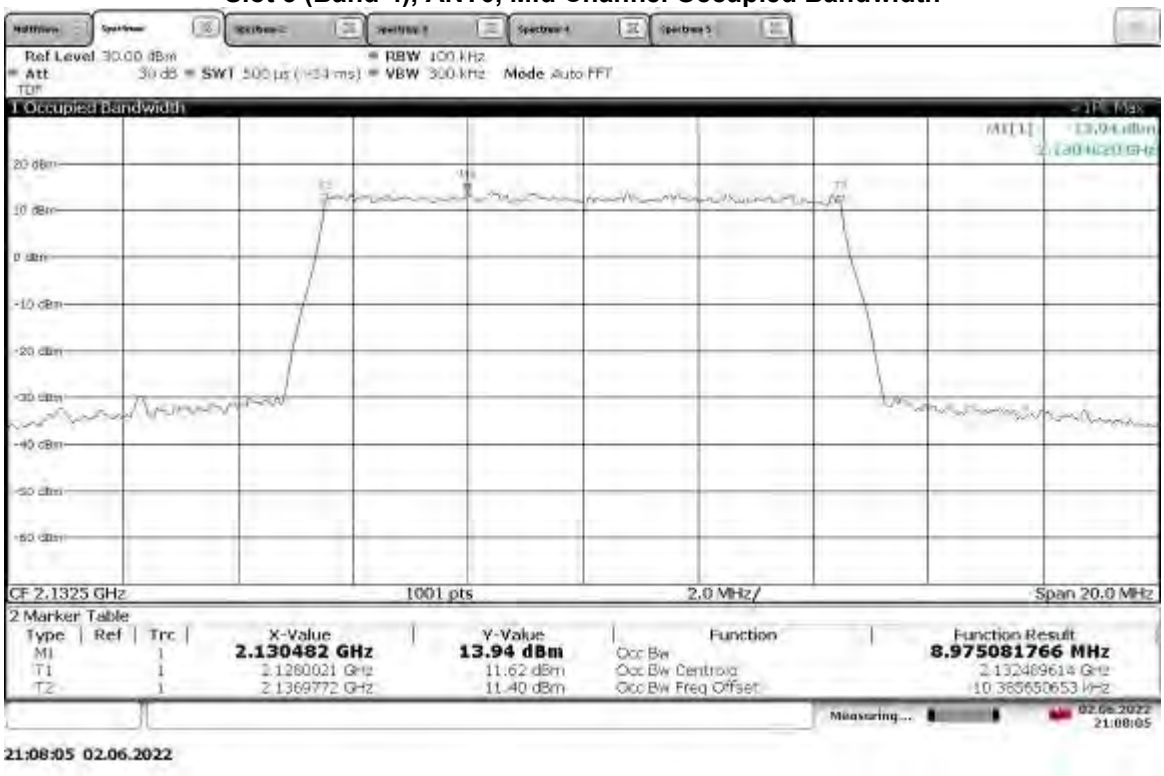


20:07:42 02.06.2022

TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth

20:12:15 02.06.2022

TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth

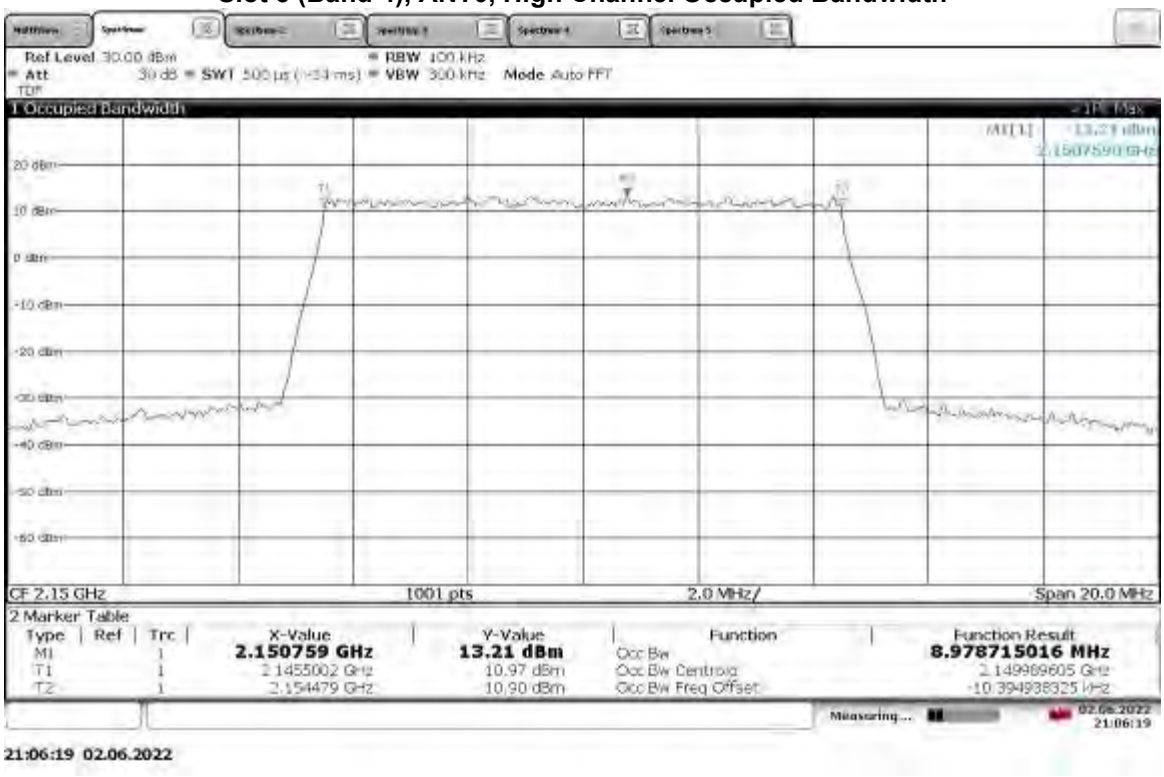


21:08:05 02.06.2022

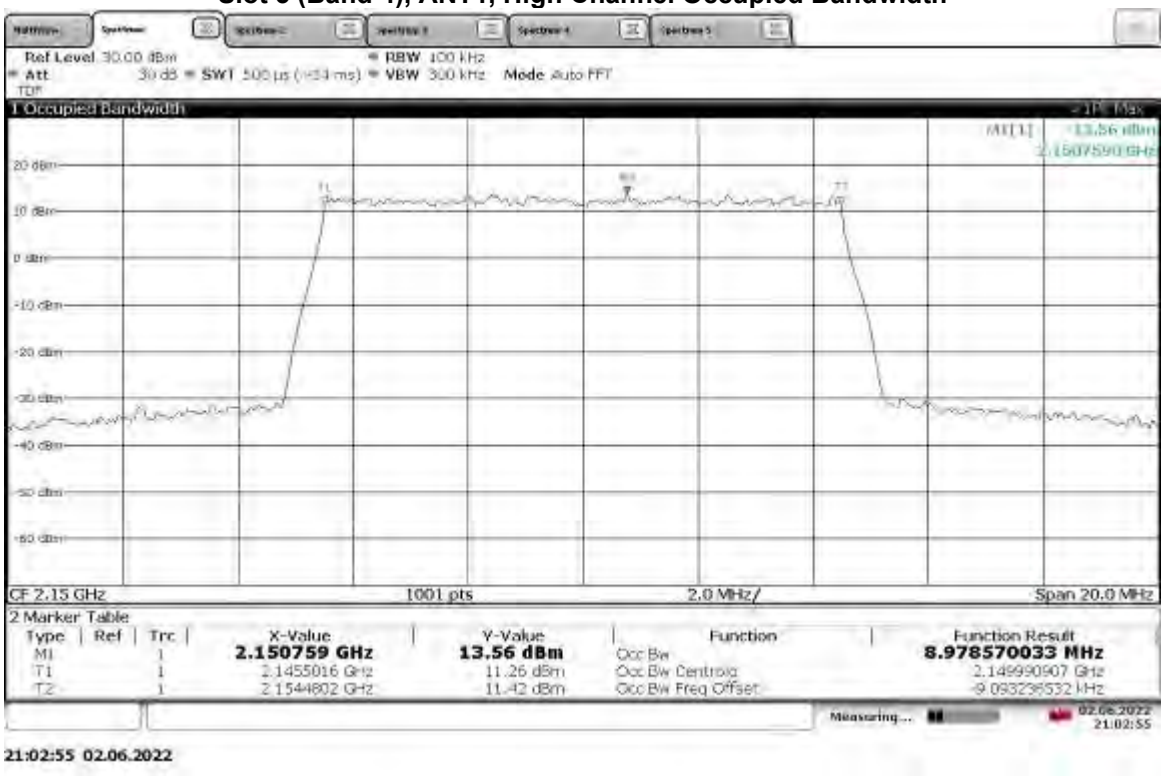
TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth

21:12:07 02.06.2022

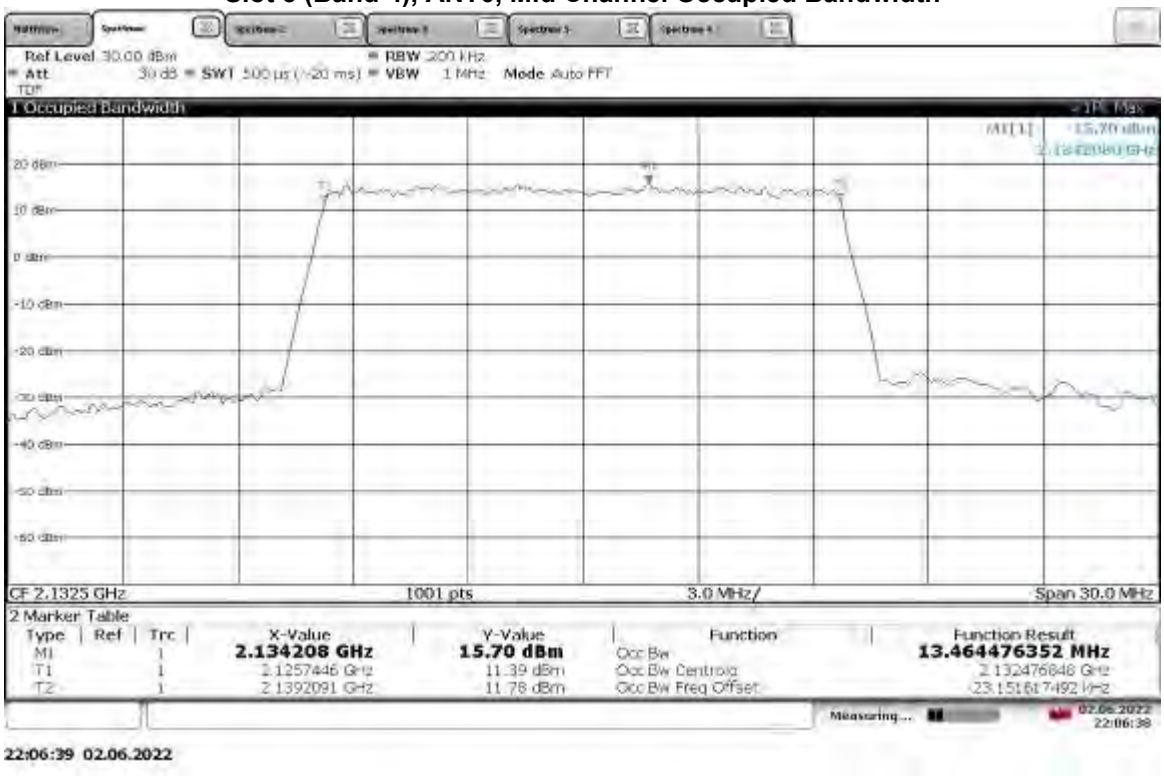
TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



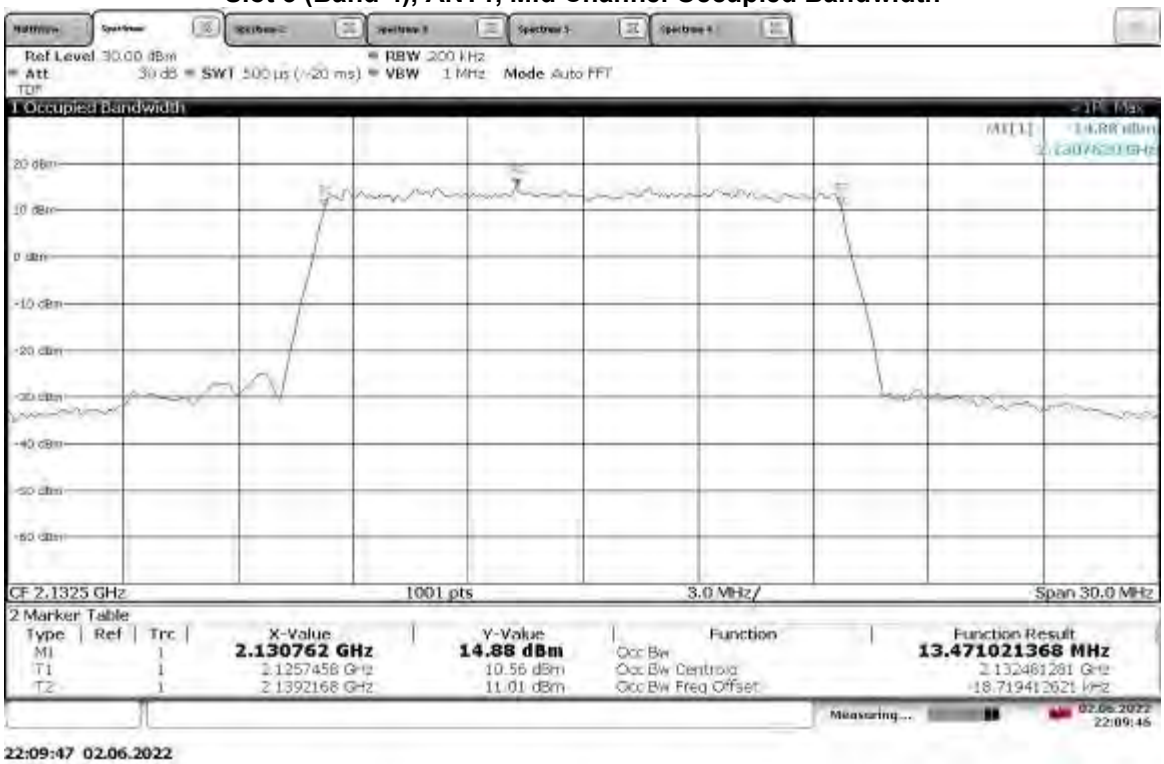
TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth



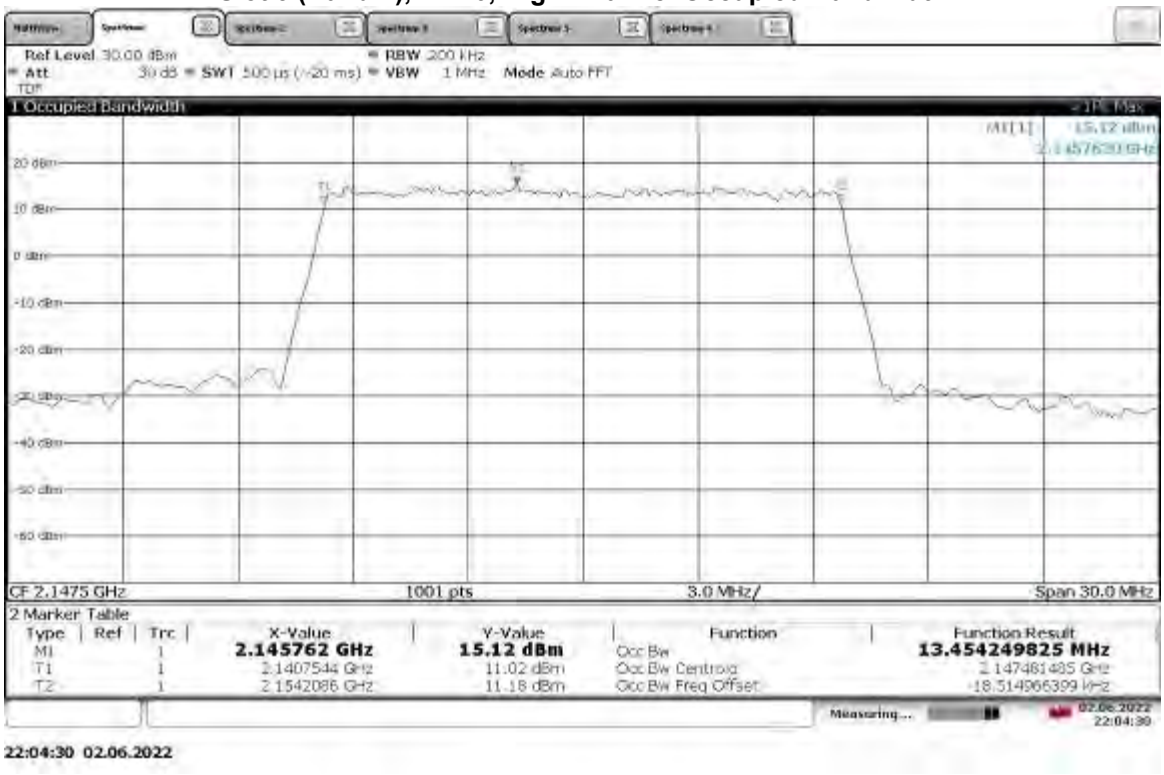
TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth



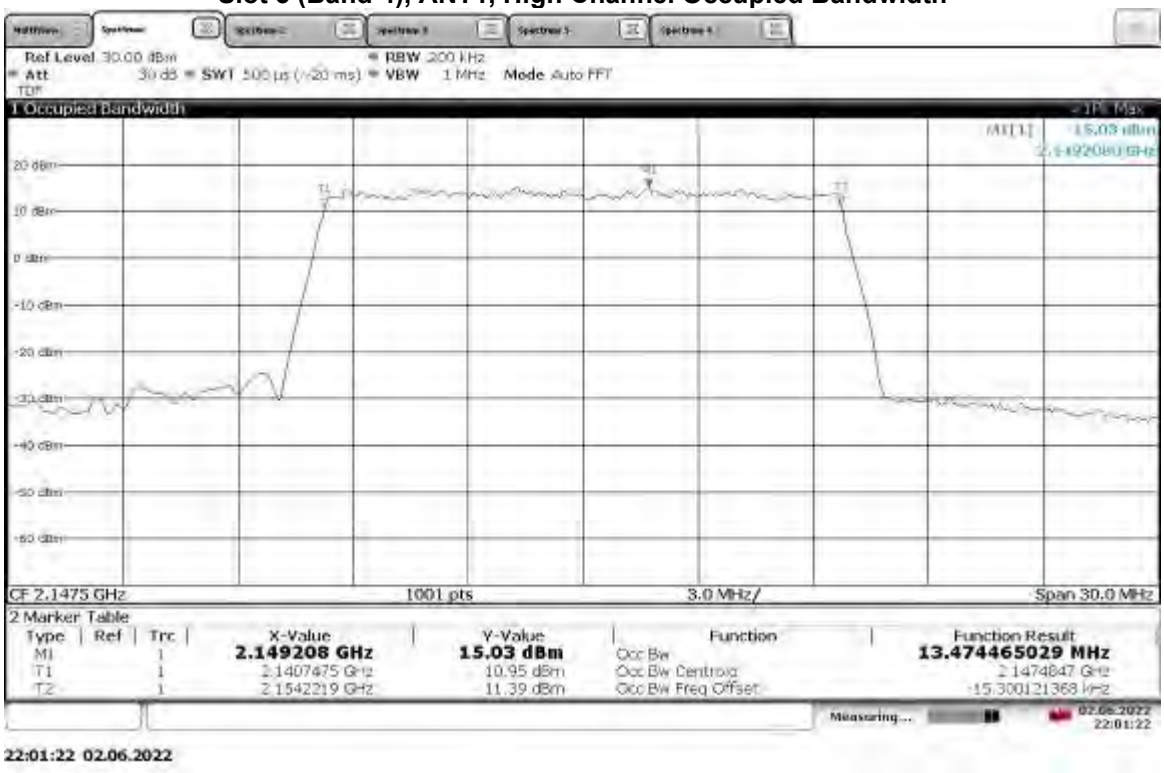
TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth



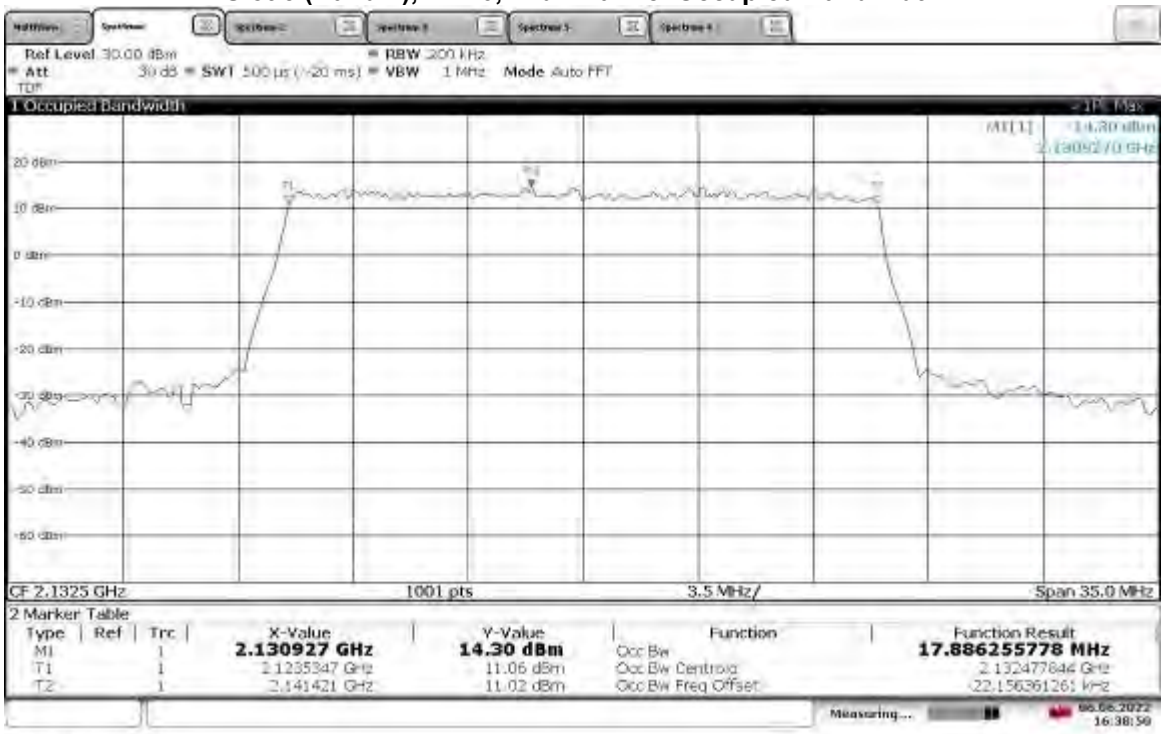
TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



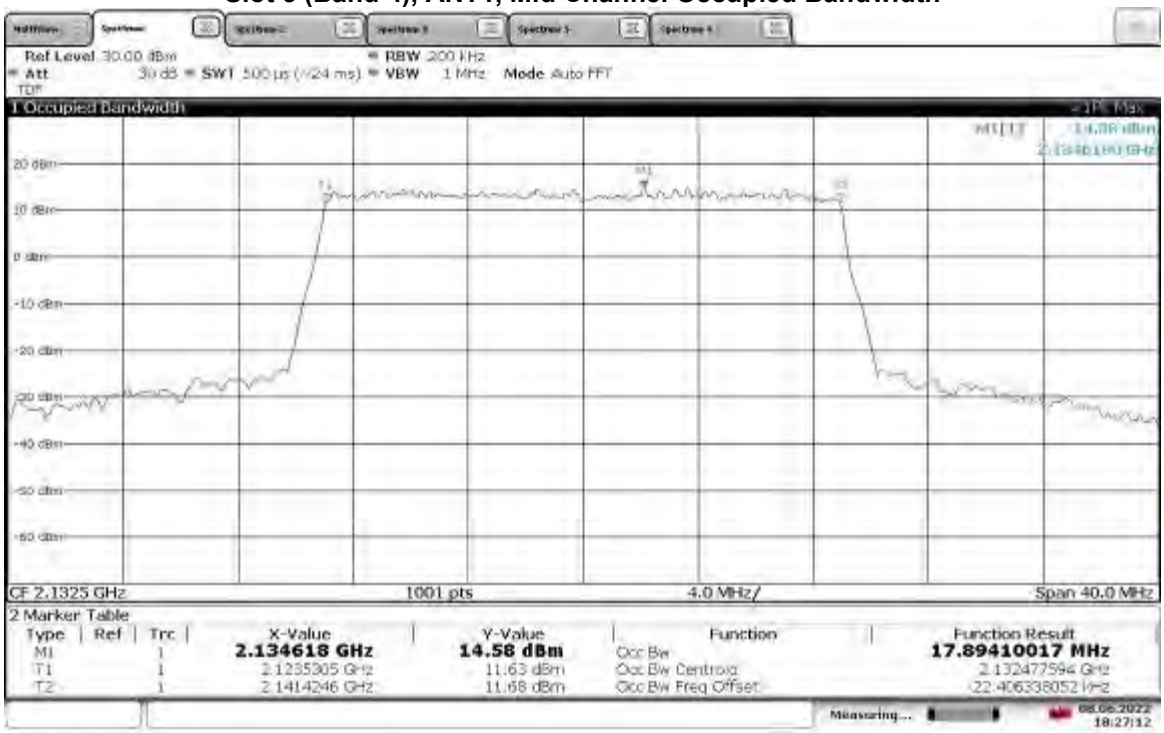
TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth



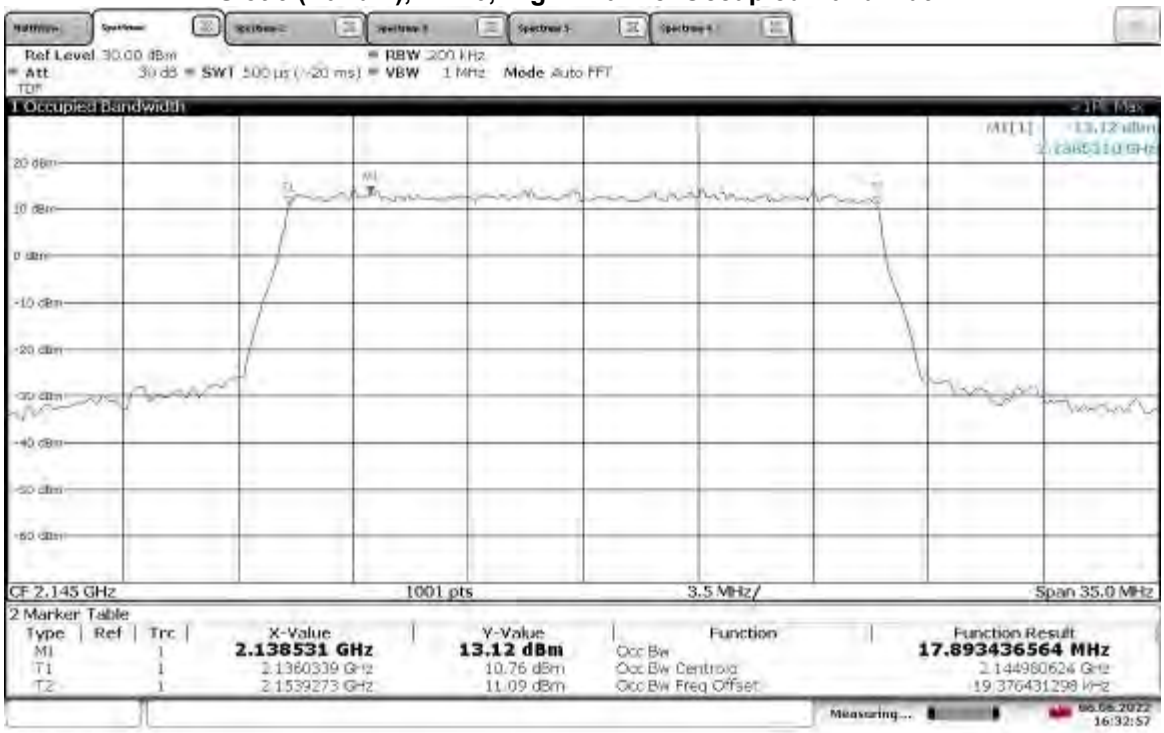
TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth



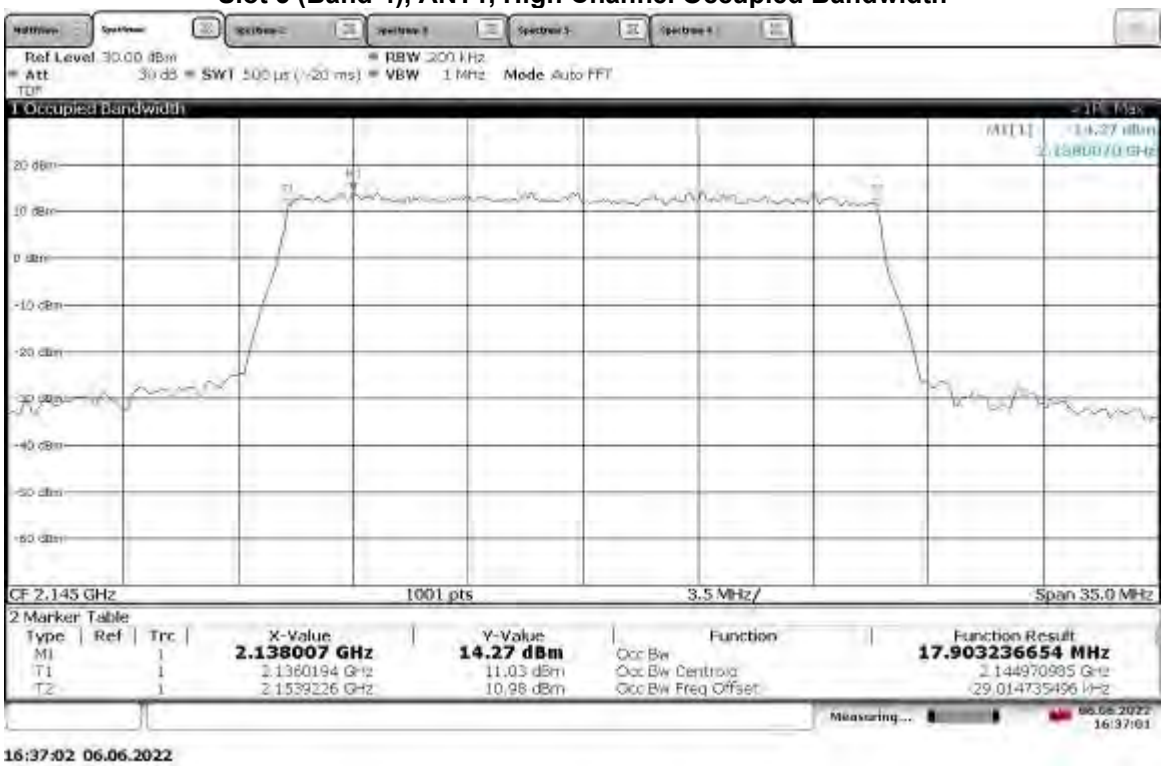
TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth



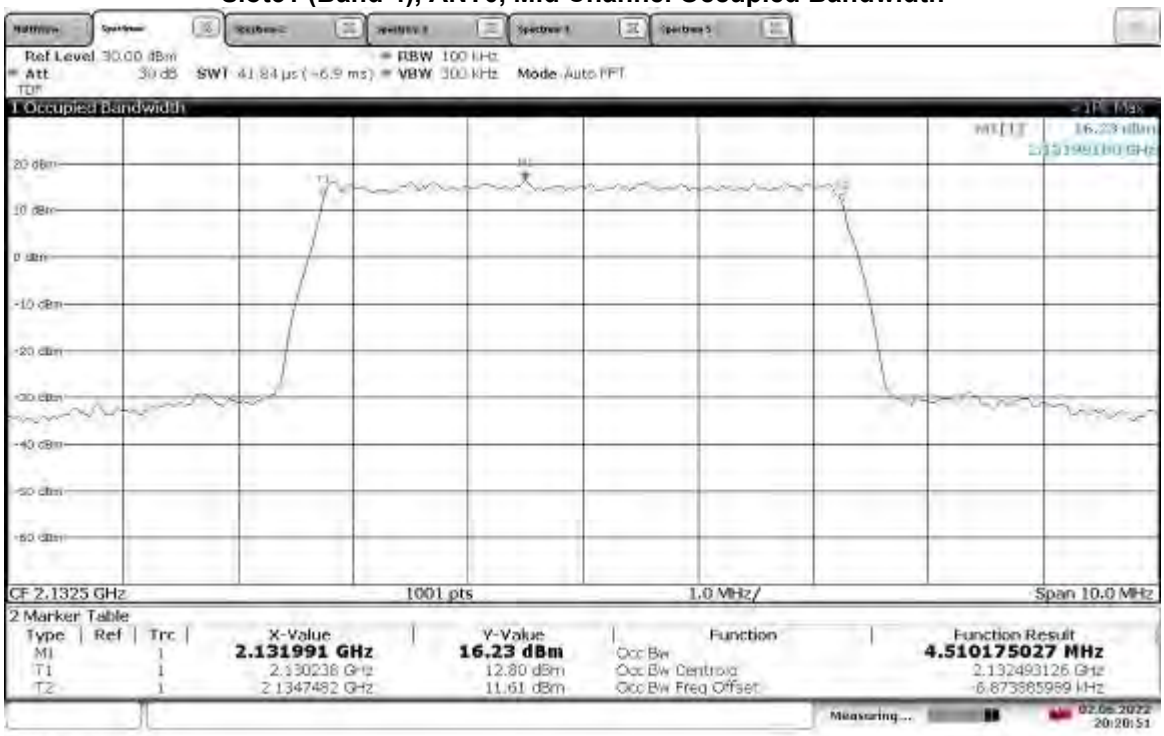
TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth

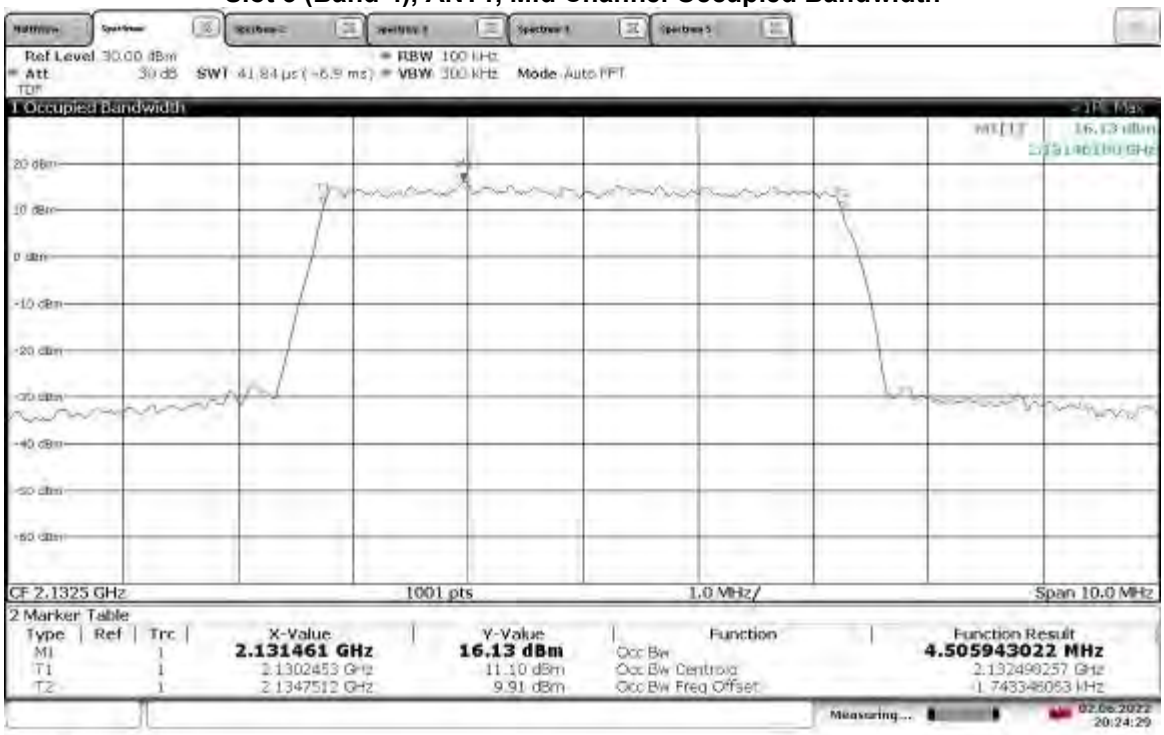


TM3.1a-256QAM_5 MHz Bandwidth
Slot31 (Band 4), ANT0, Mid Channel Occupied Bandwidth



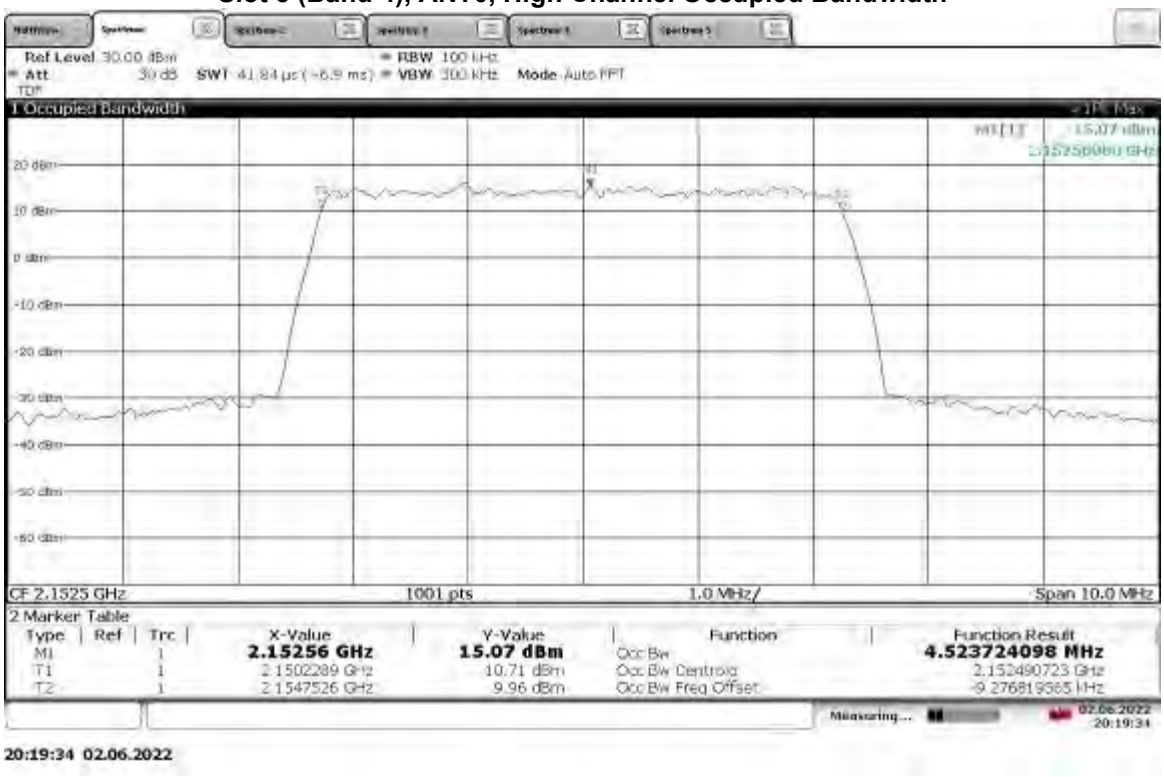
20:20:52 02.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth



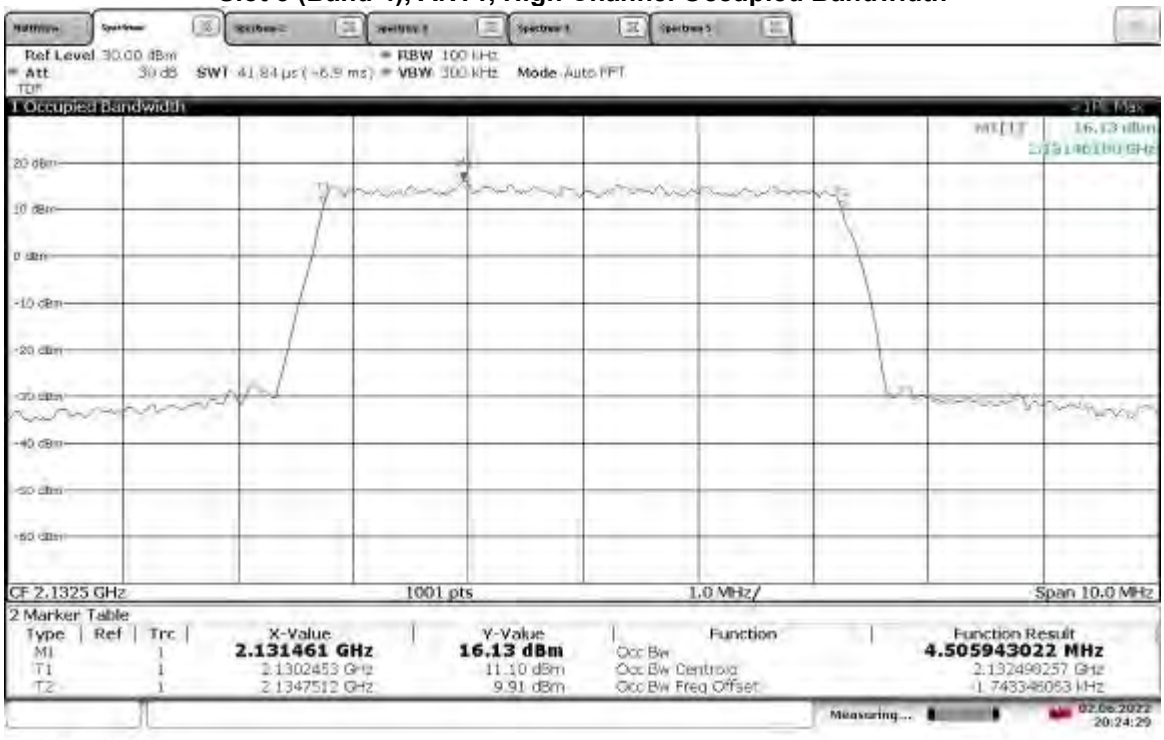
20:24:30 02.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



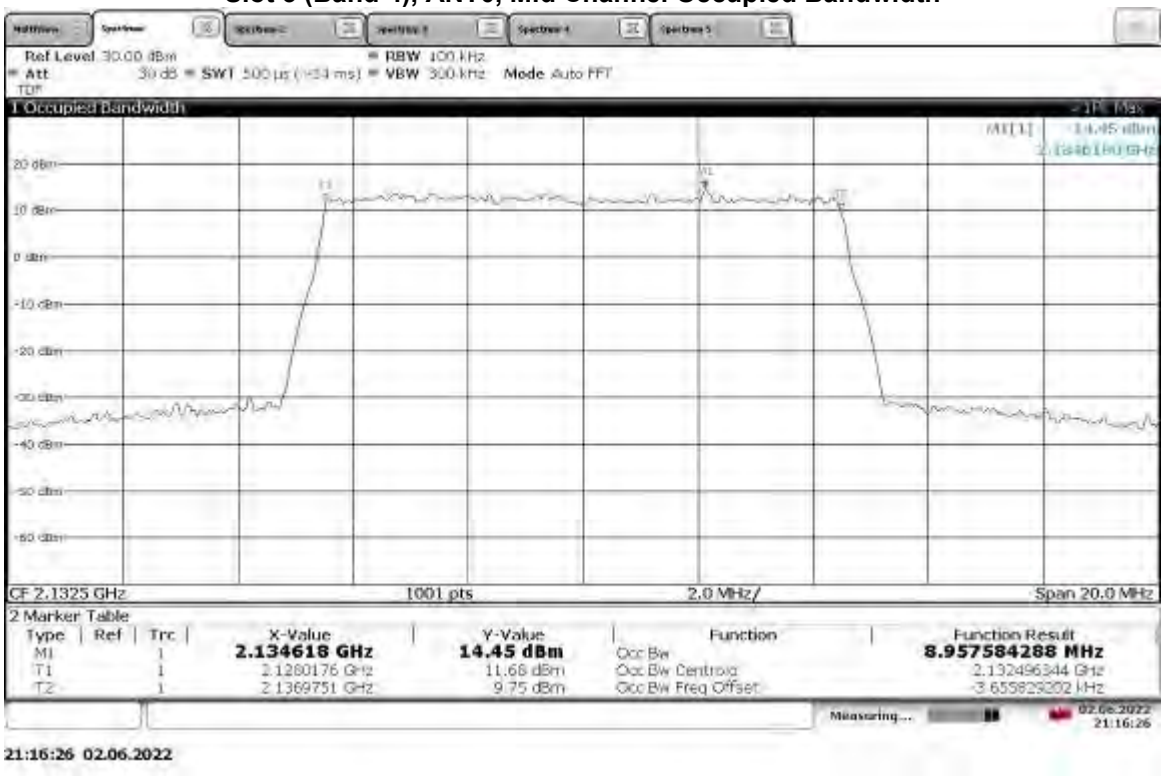
20:19:34 02.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth

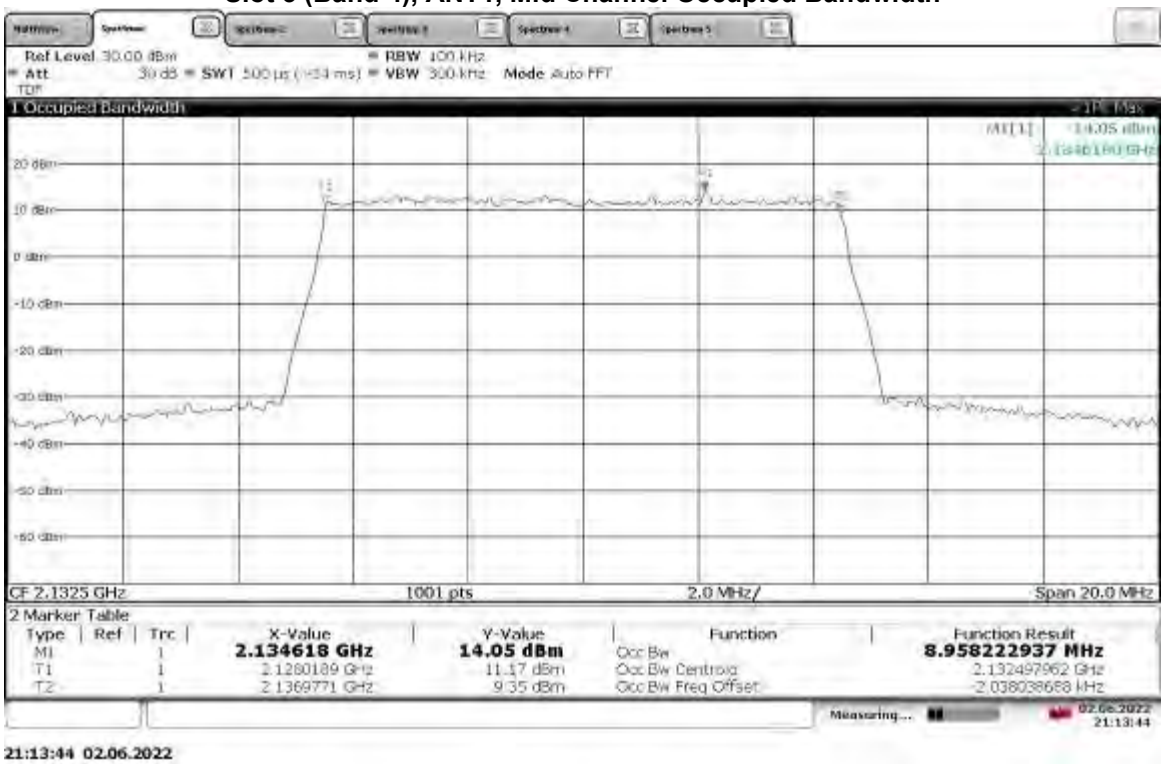


20:24:30 02.06.2022

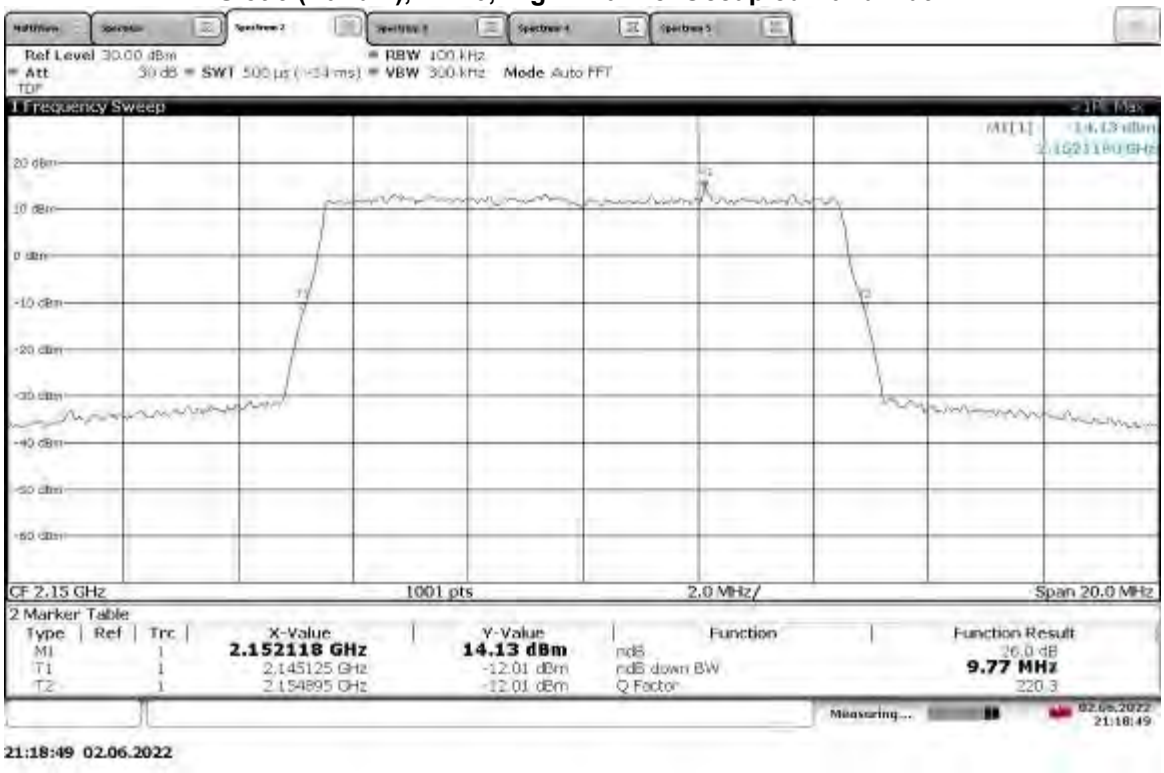
TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth



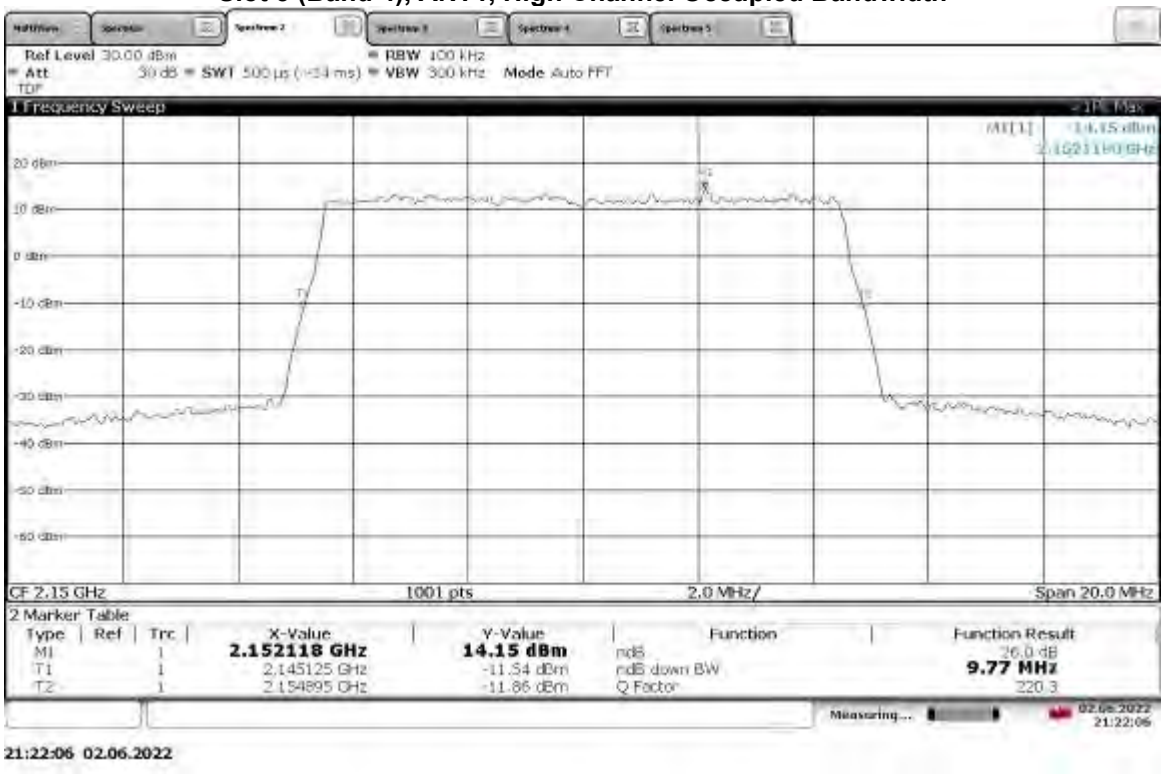
TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth



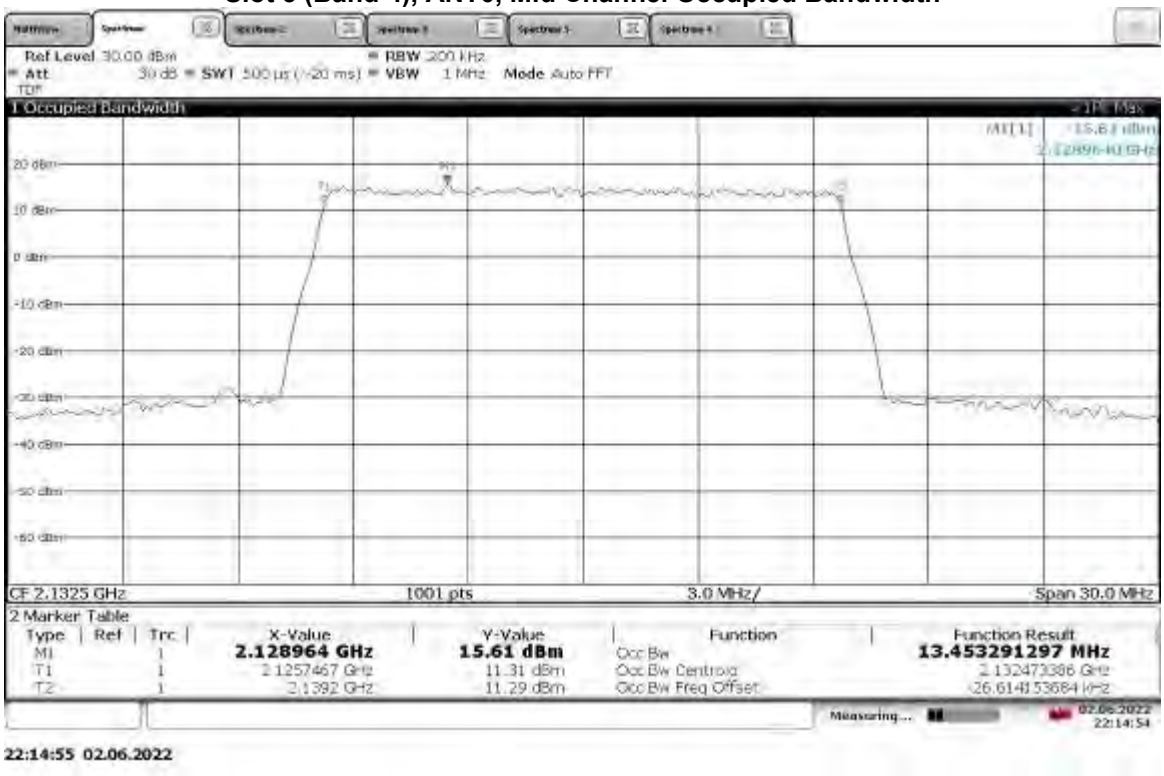
TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



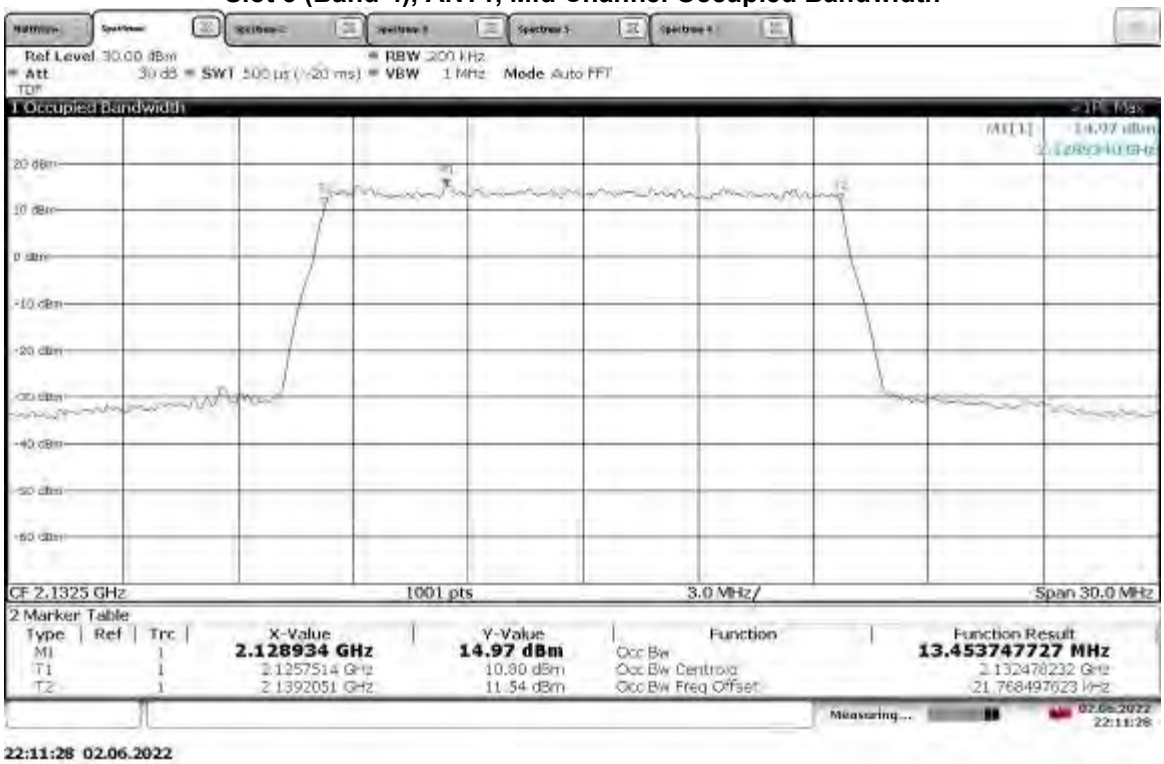
TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth



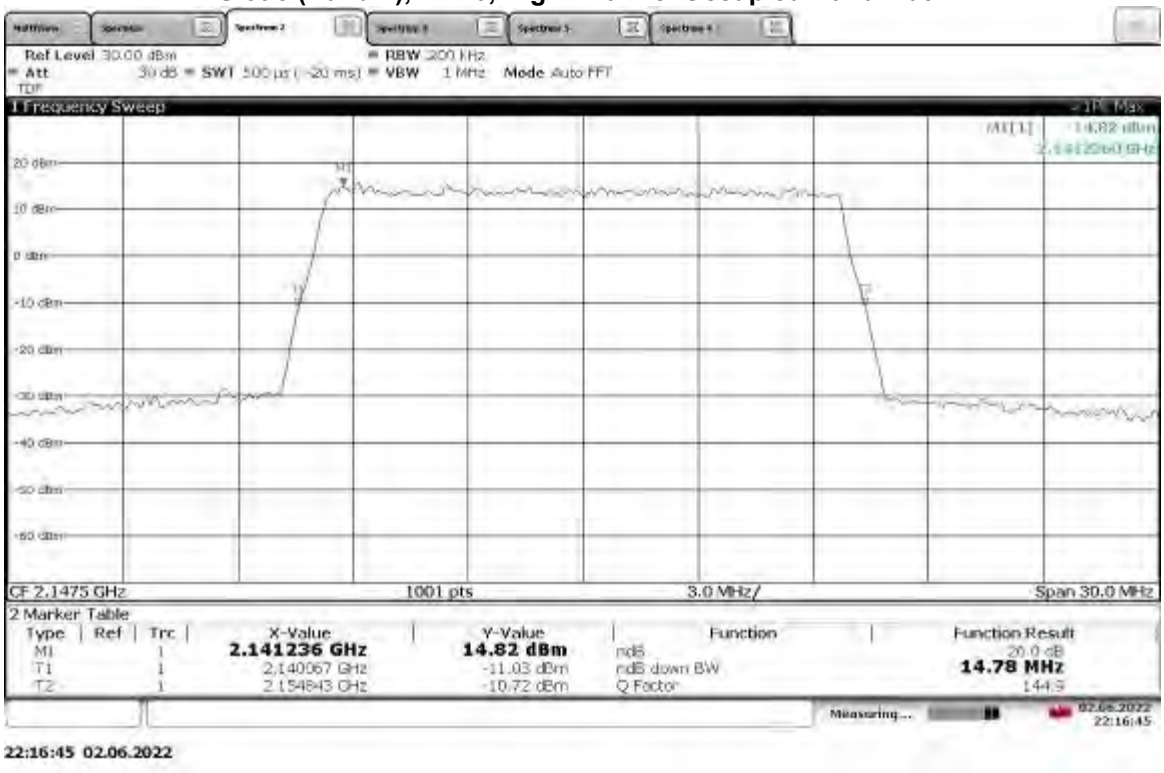
TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth



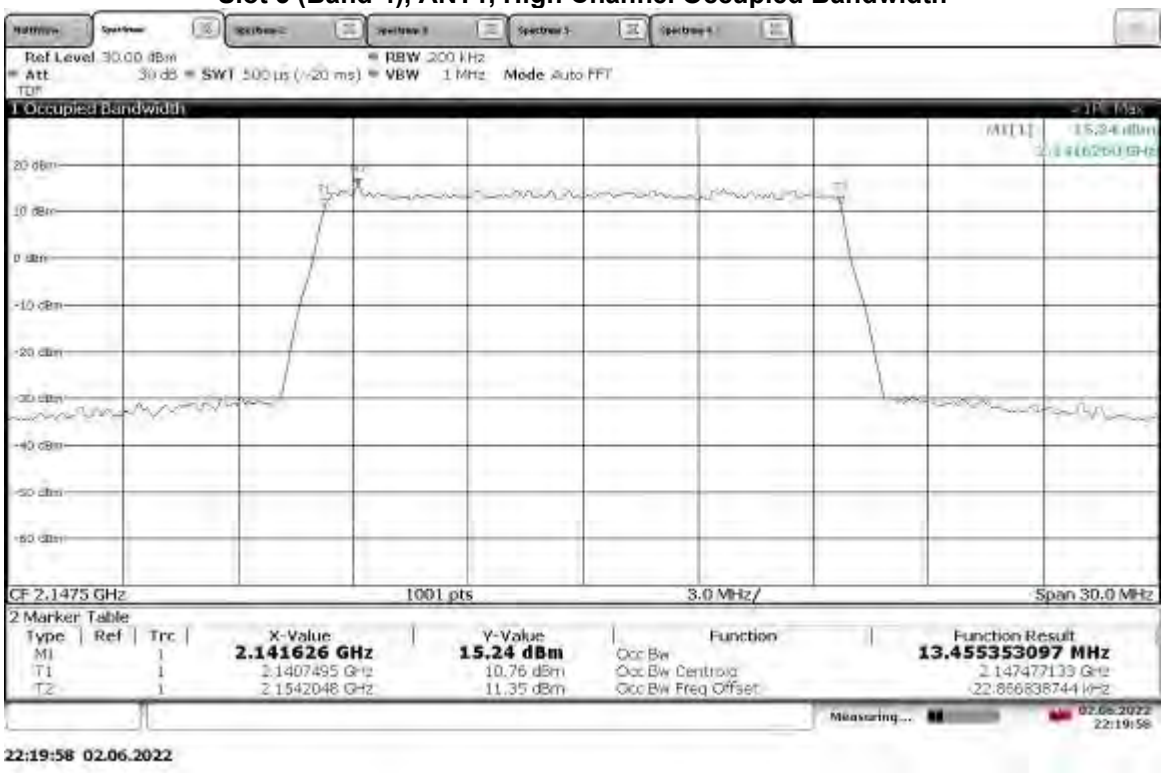
TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth



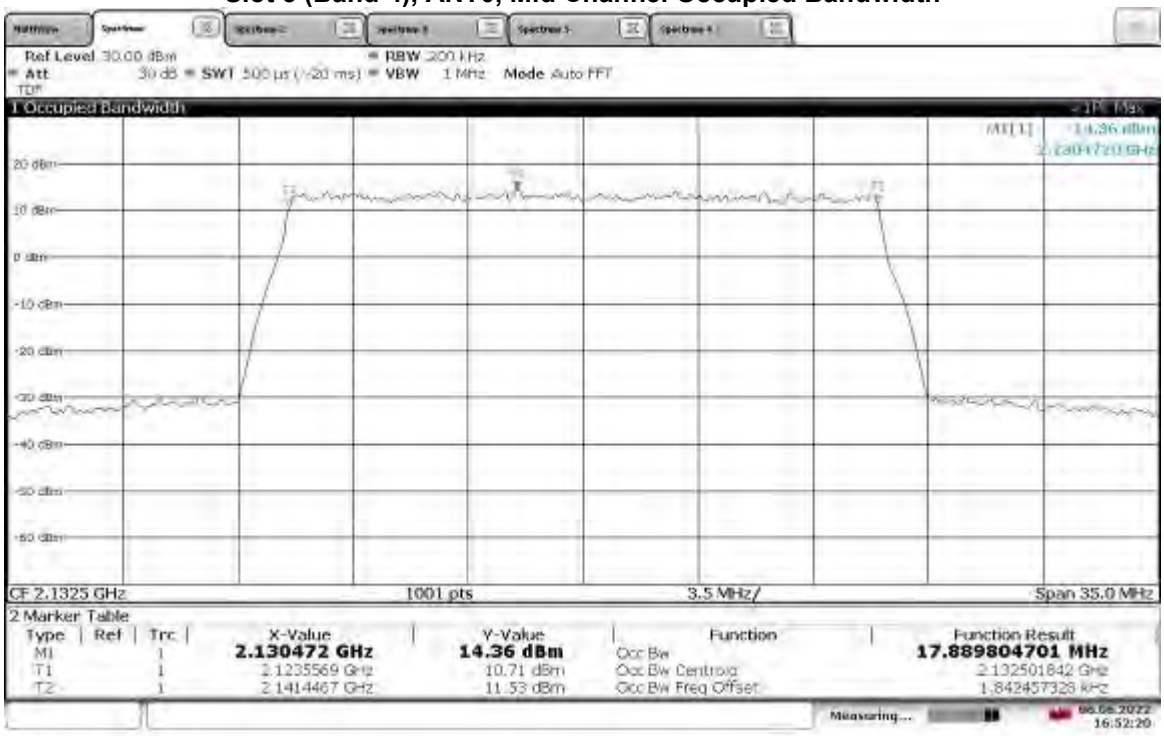
TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth

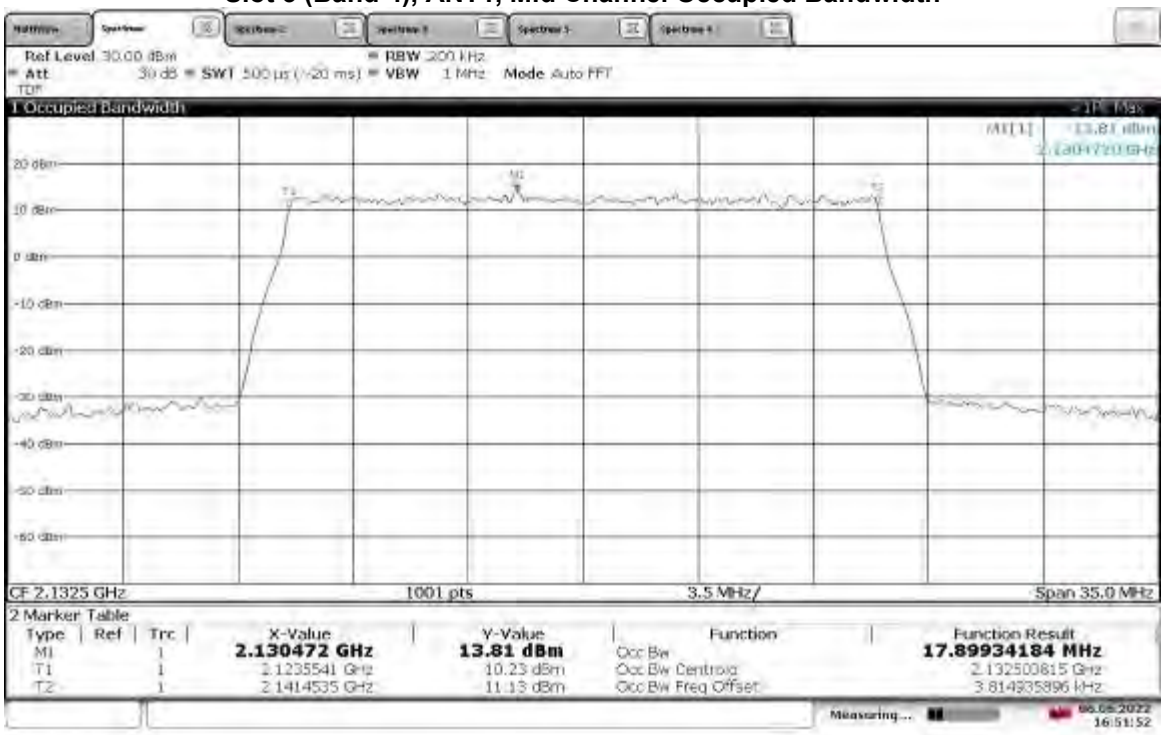


TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel Occupied Bandwidth



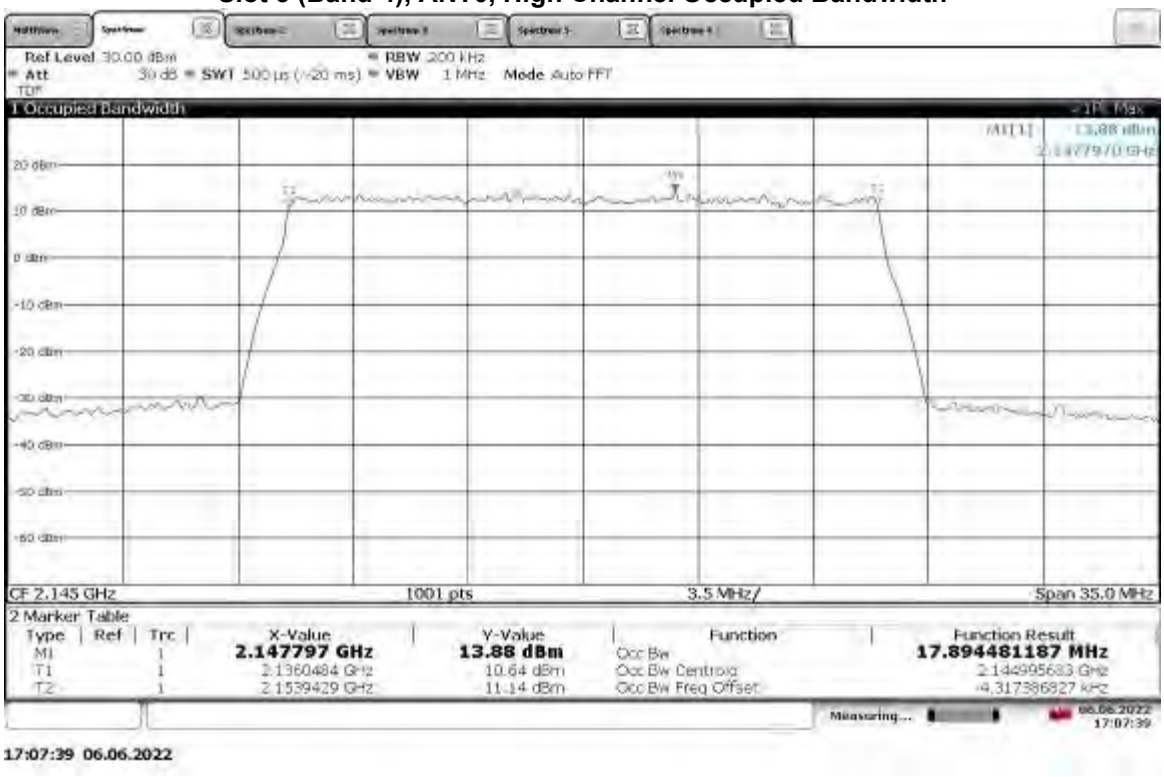
16:52:21 06.06.2022

TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel Occupied Bandwidth

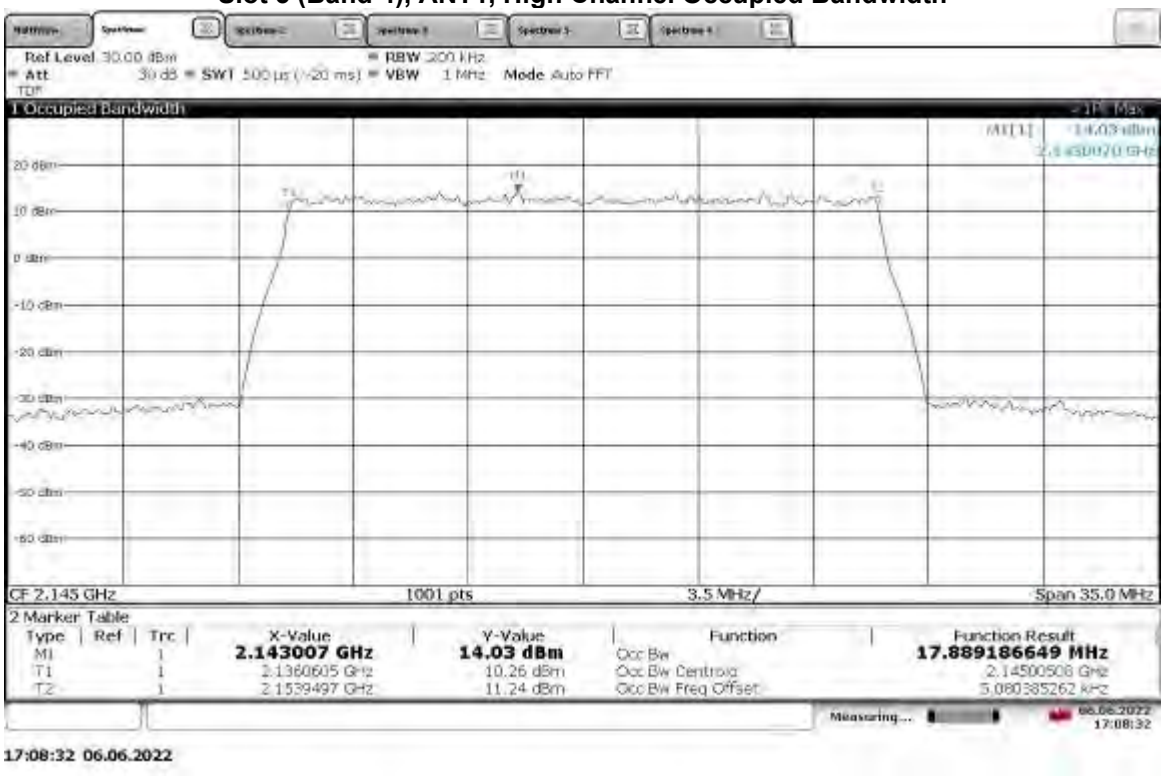


16:51:52 06.06.2022

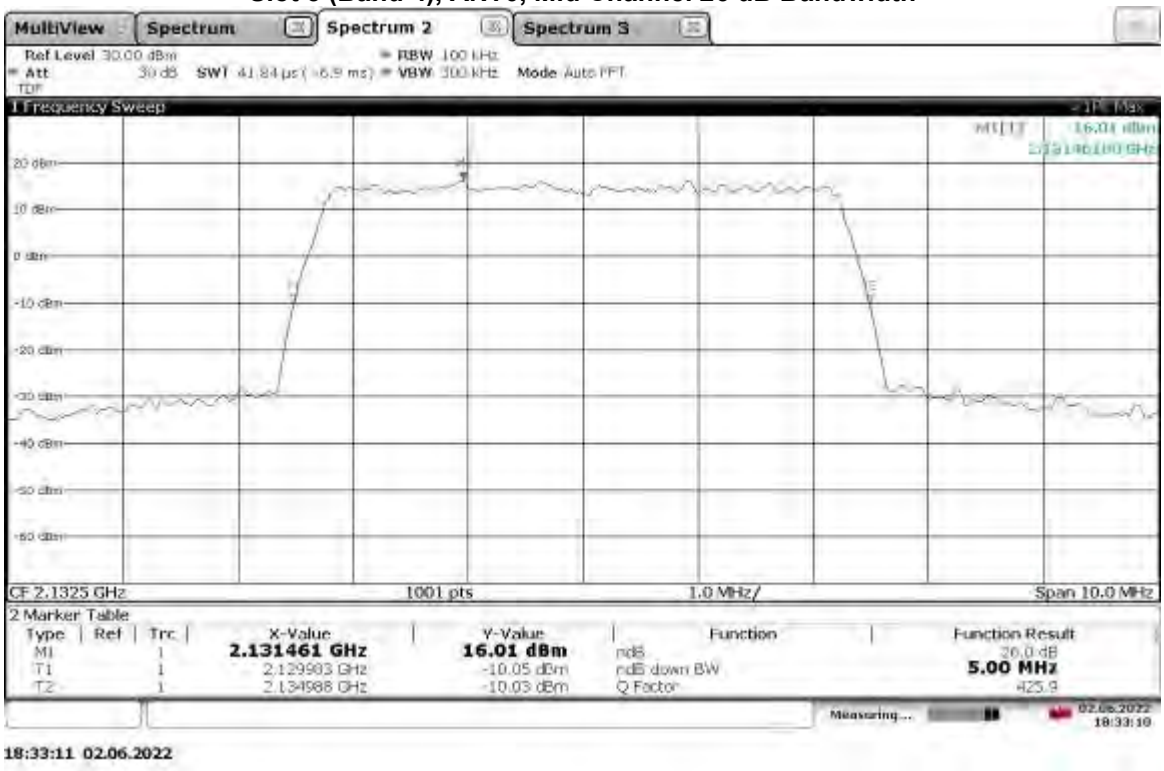
TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel Occupied Bandwidth



TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel Occupied Bandwidth

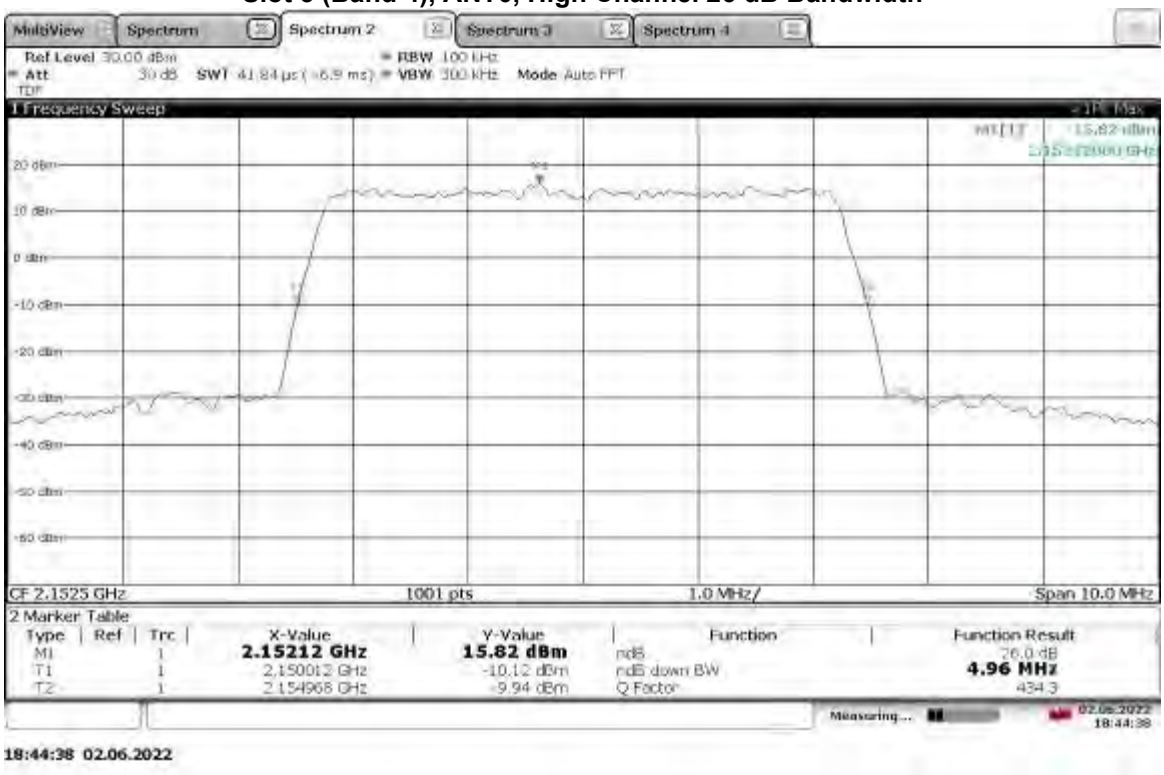


TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth

TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



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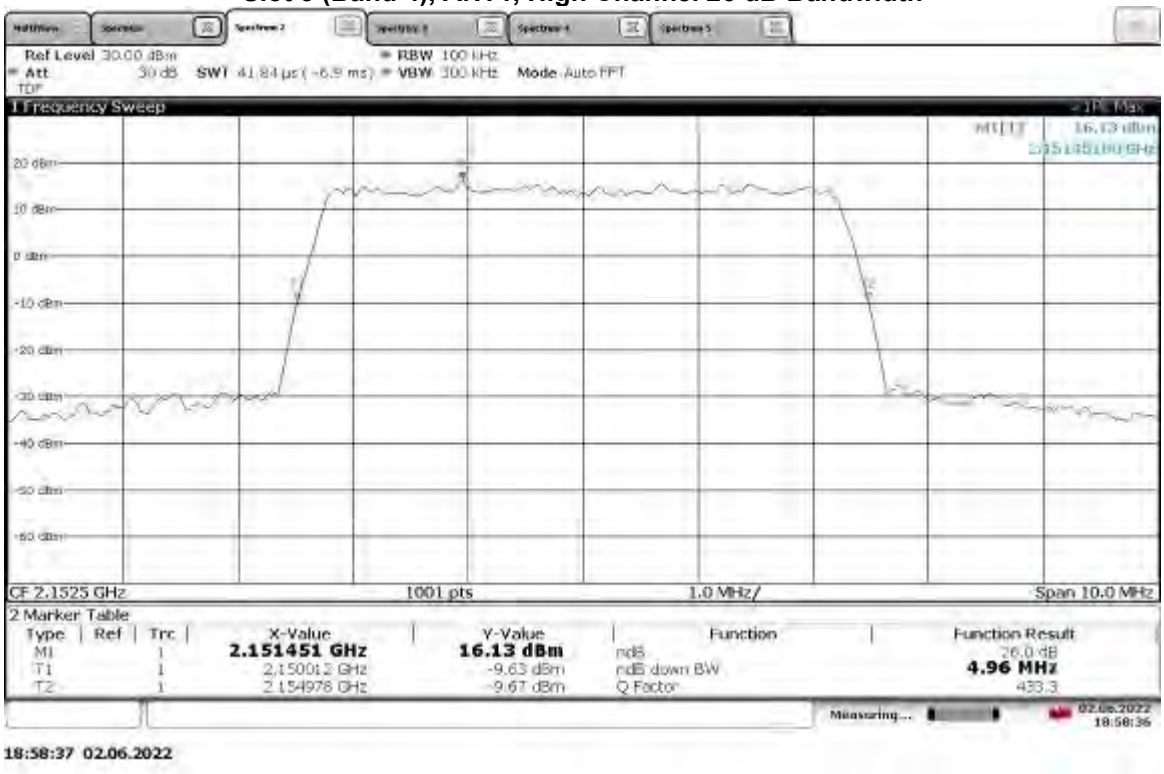
TM1.1-QPSK_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth



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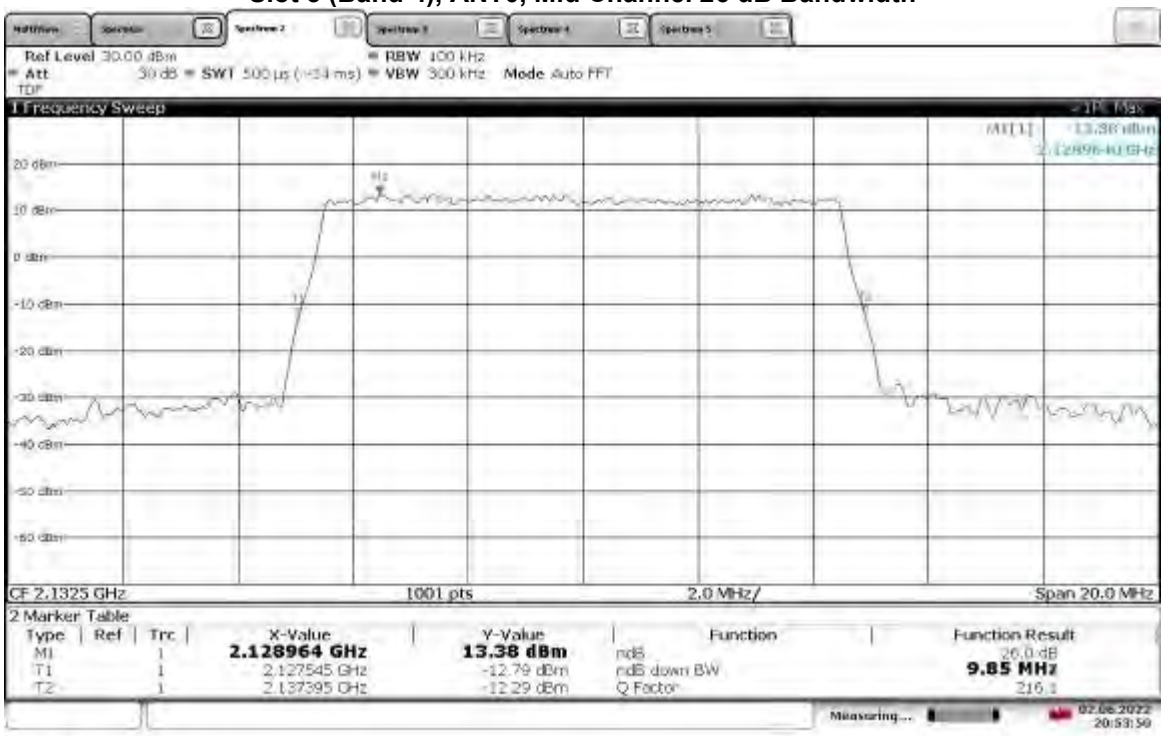
TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



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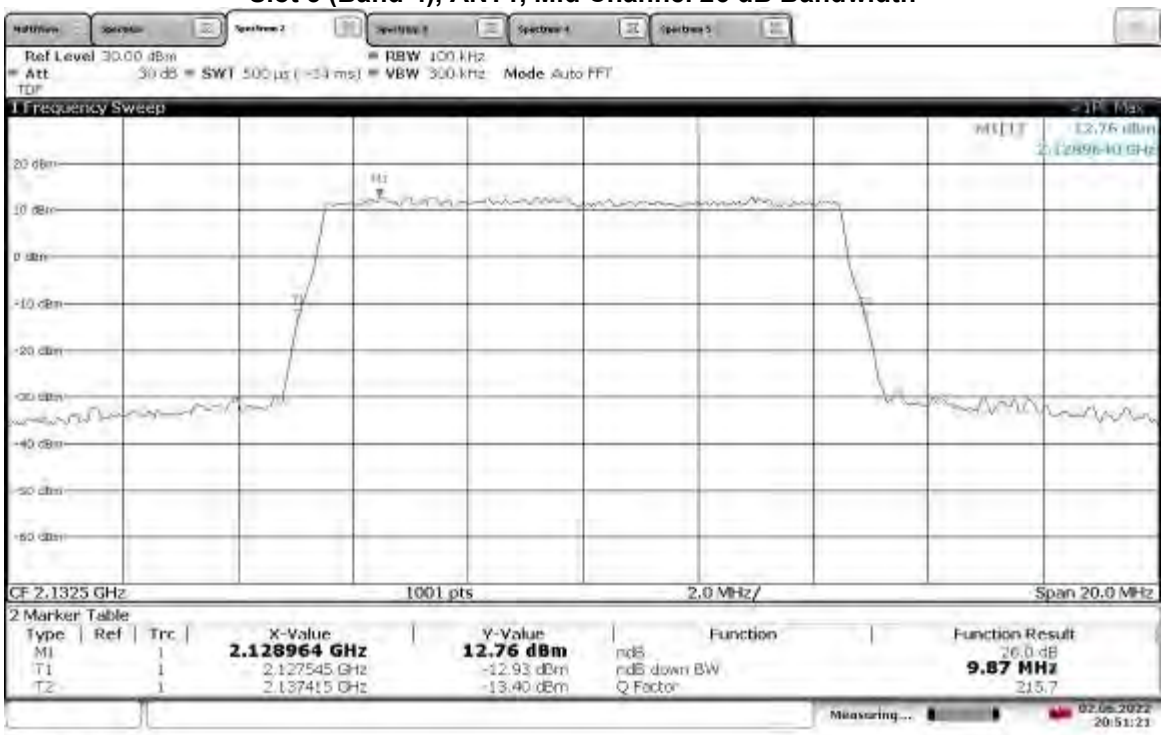
TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



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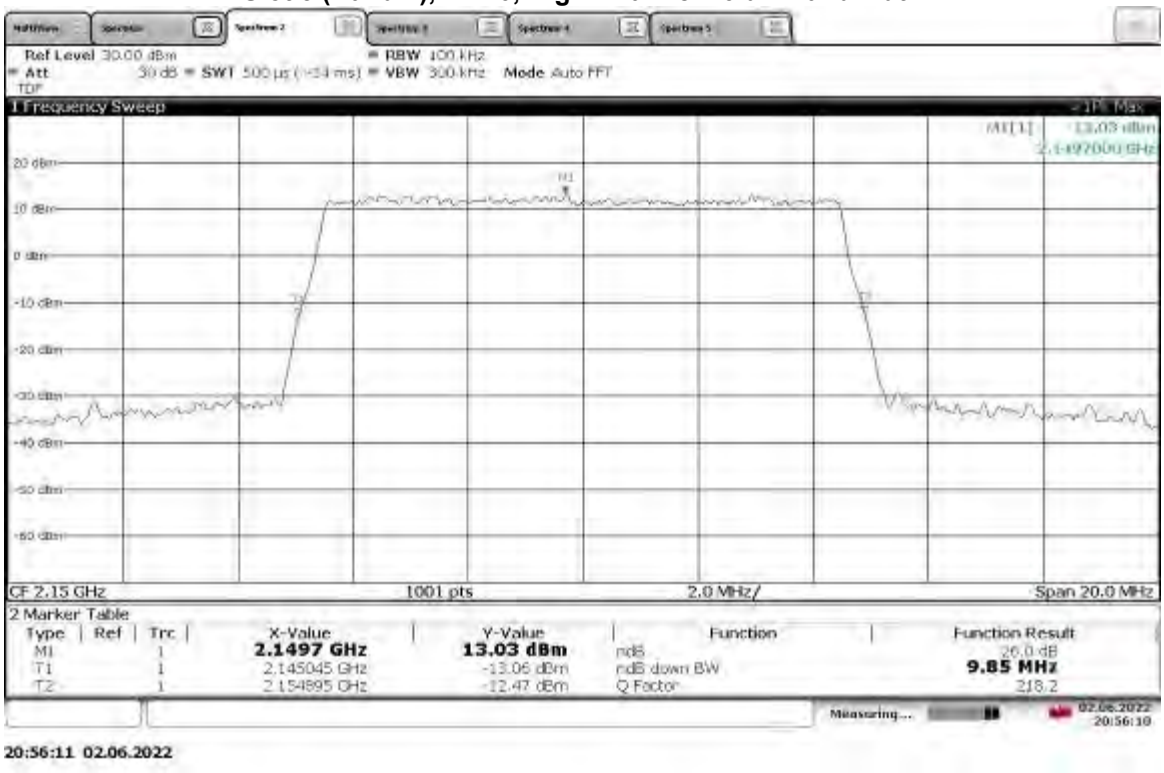
TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



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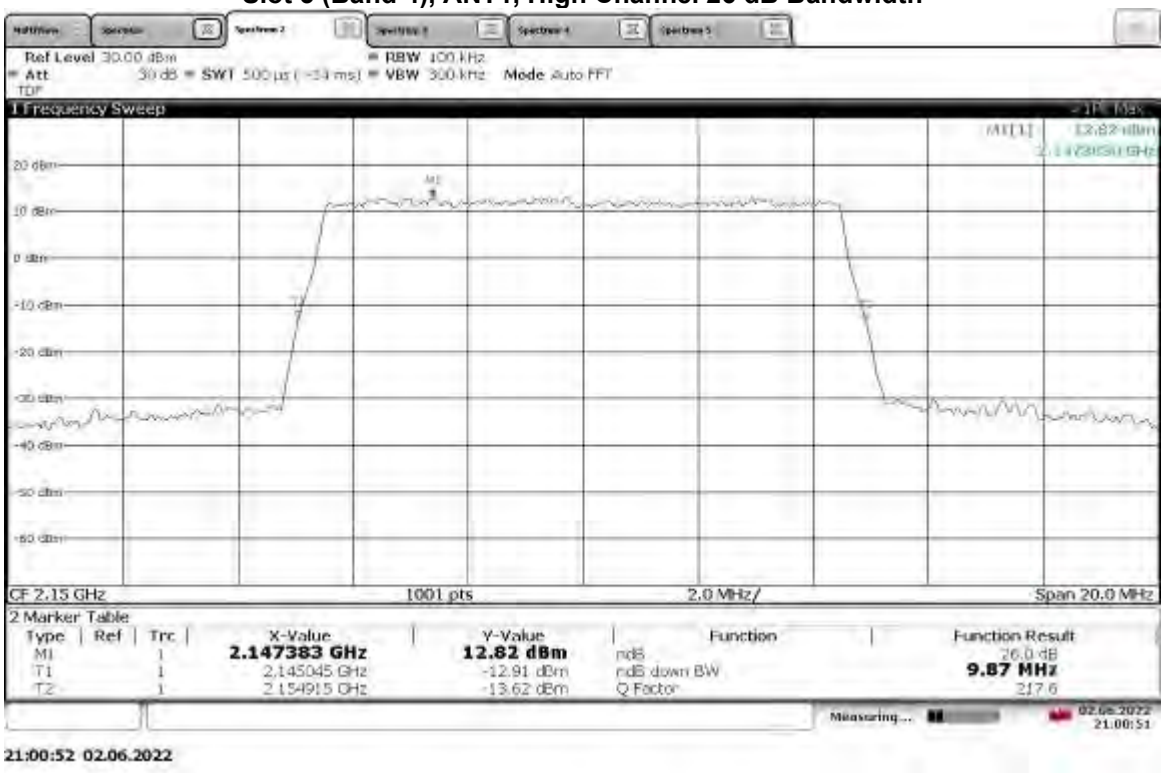
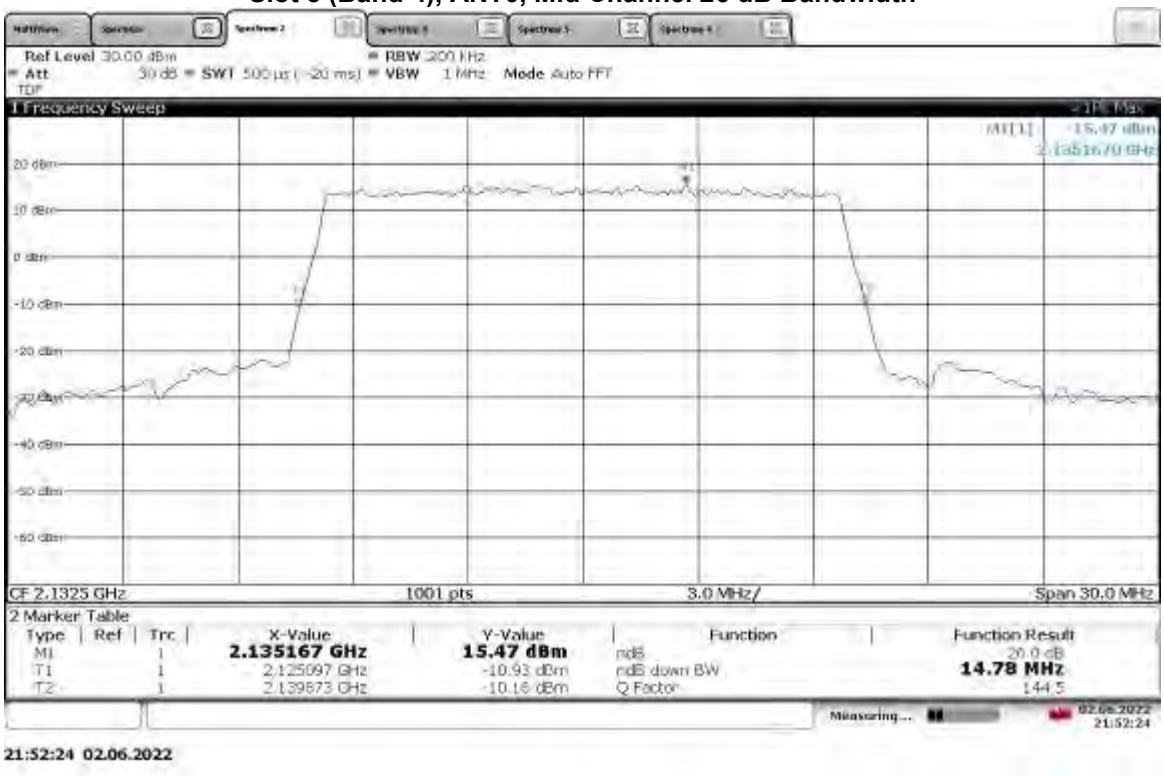
TM1.1-QPSK_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth

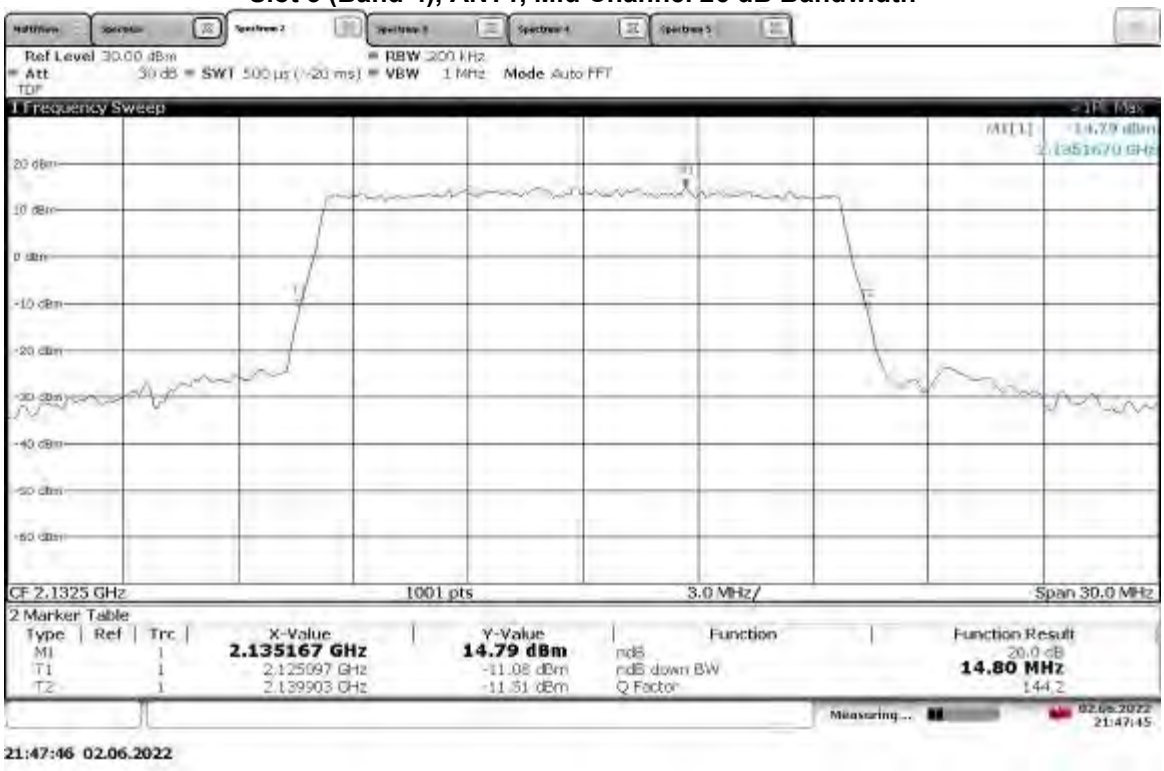


21:00:52 02.06.2022

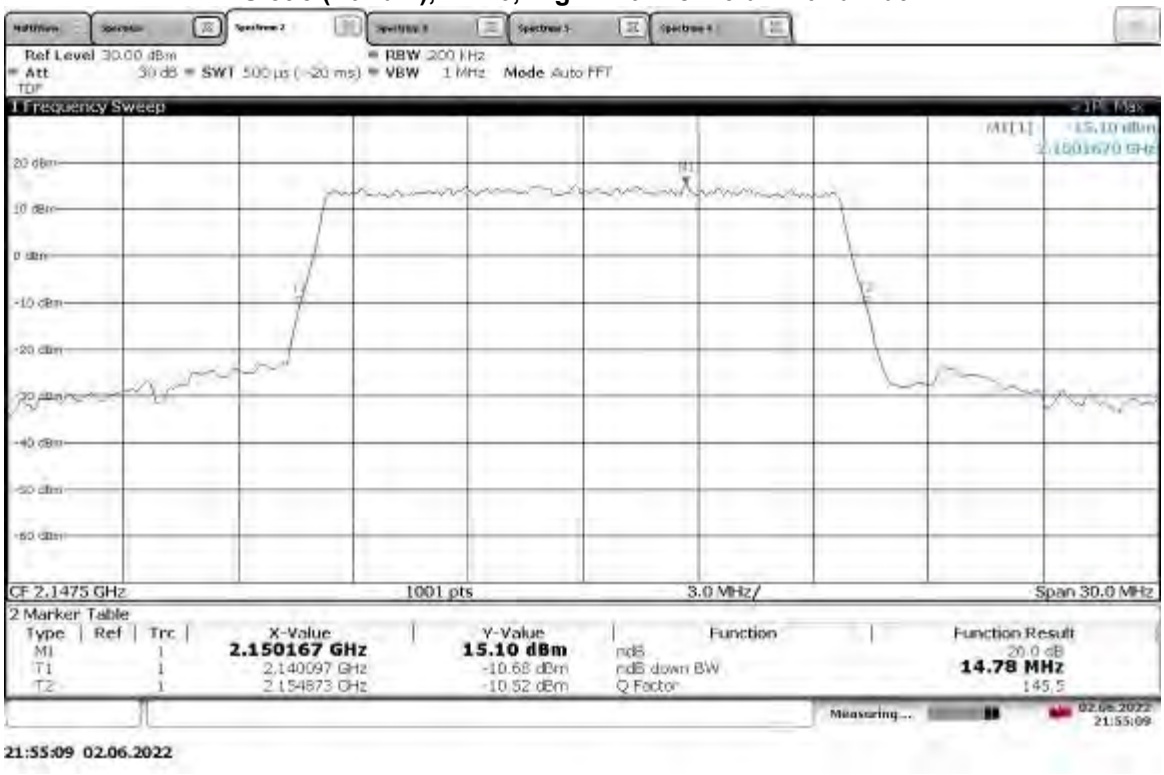
TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



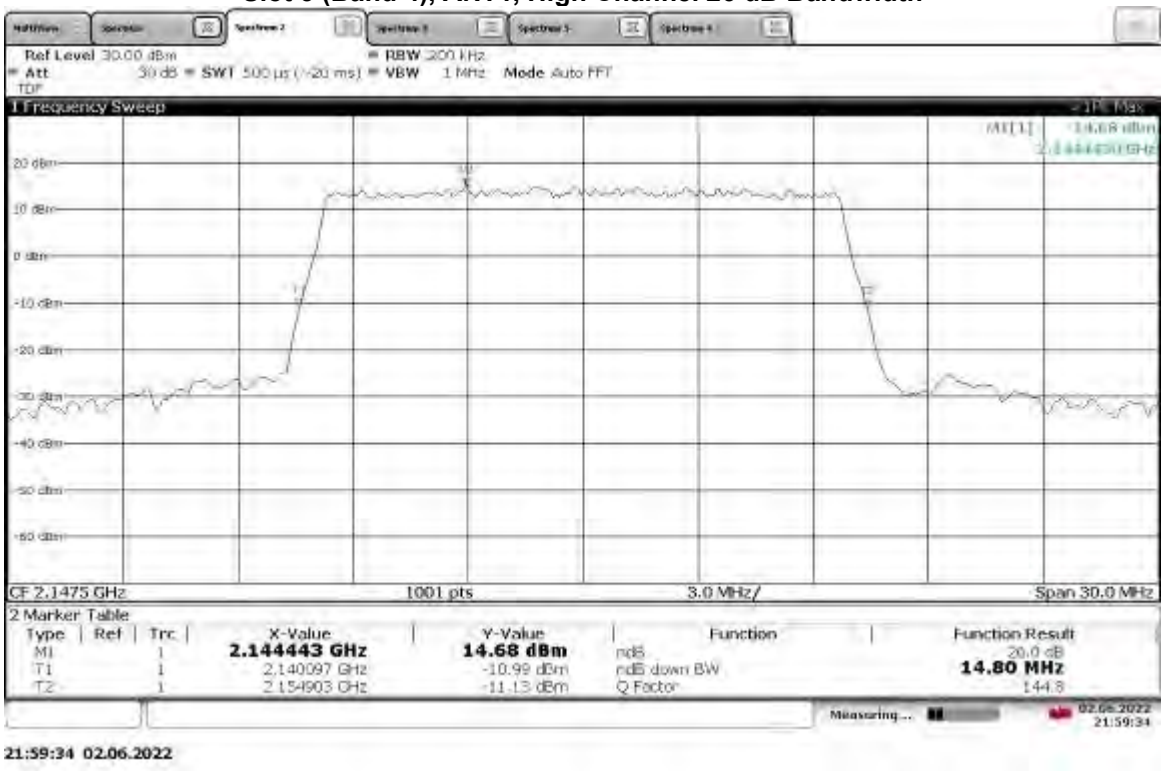
TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



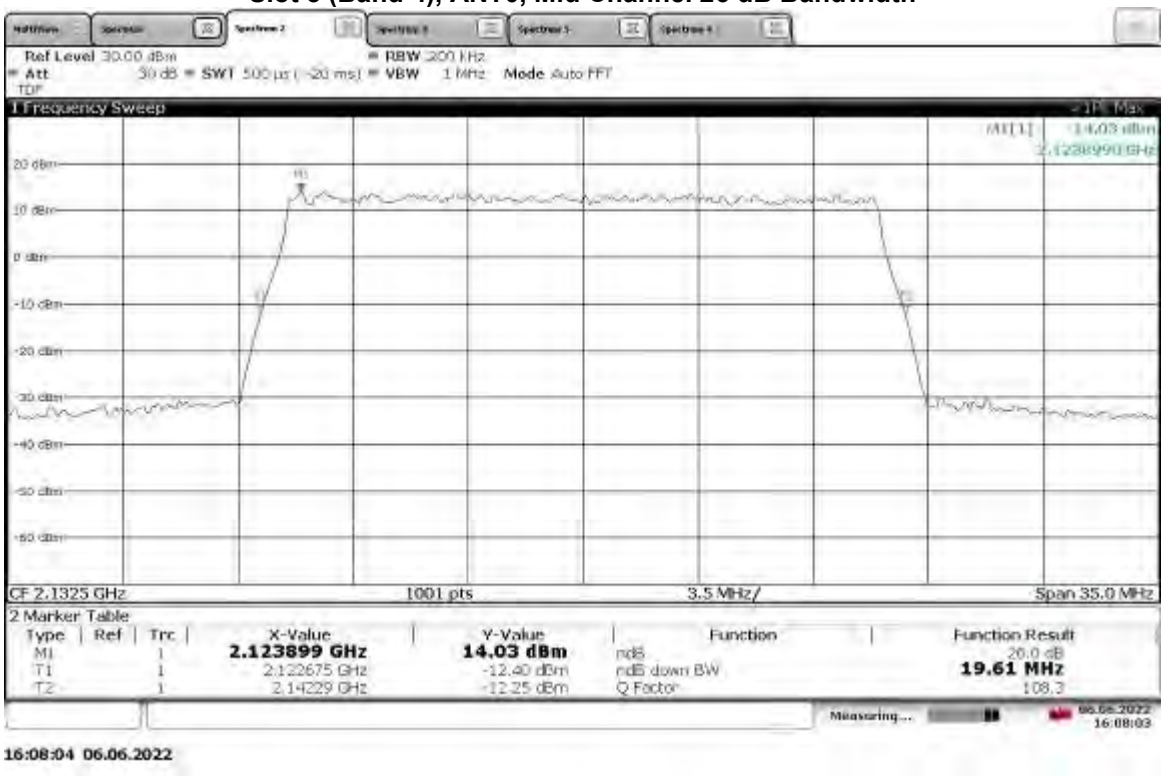
TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



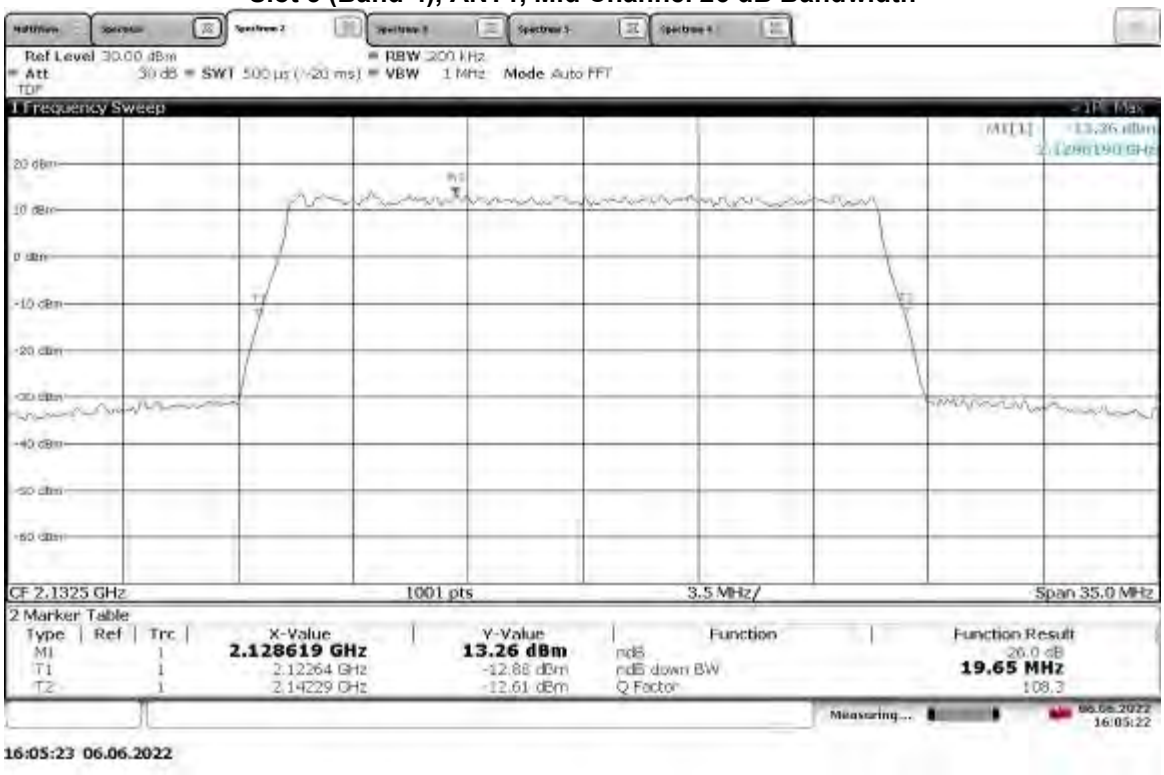
TM1.1-QPSK_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth



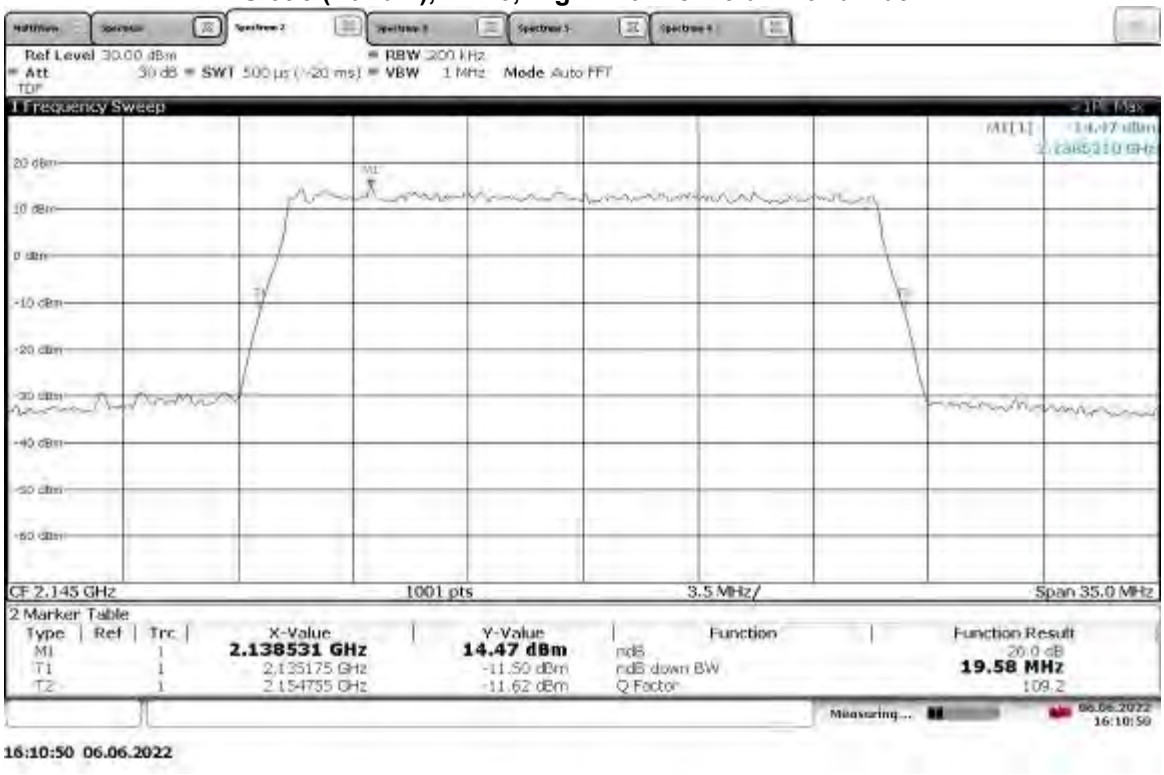
TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



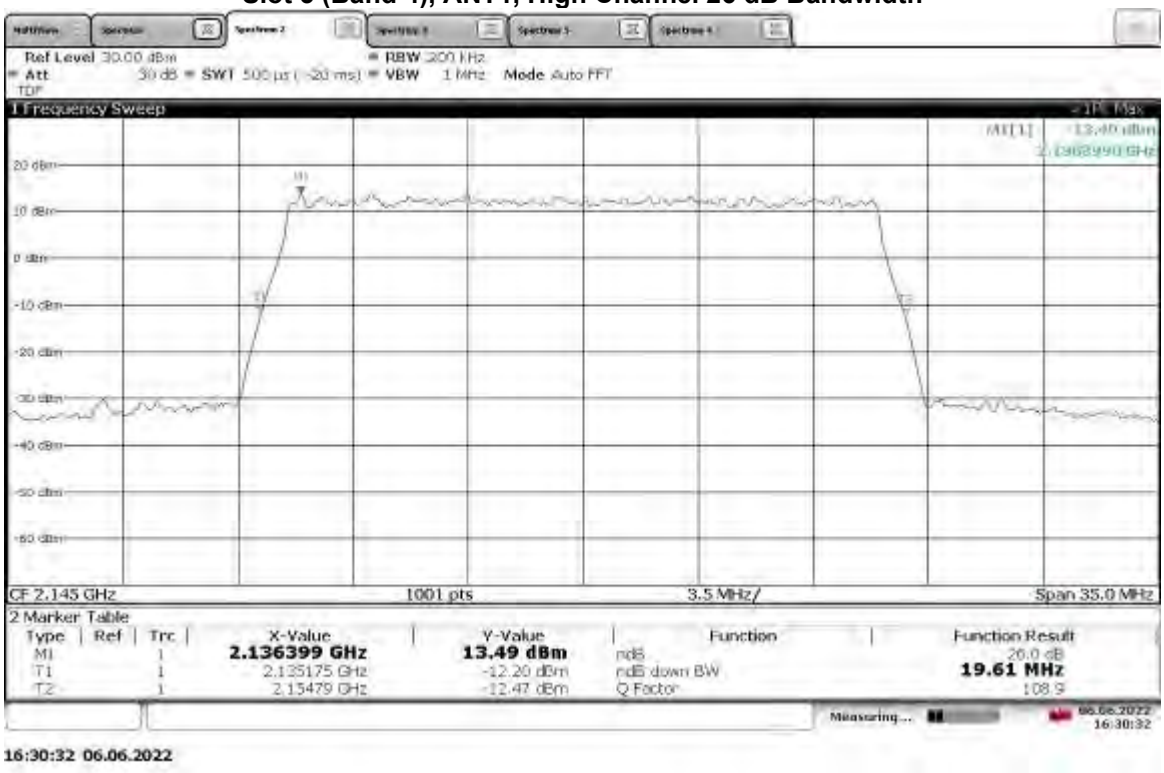
TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



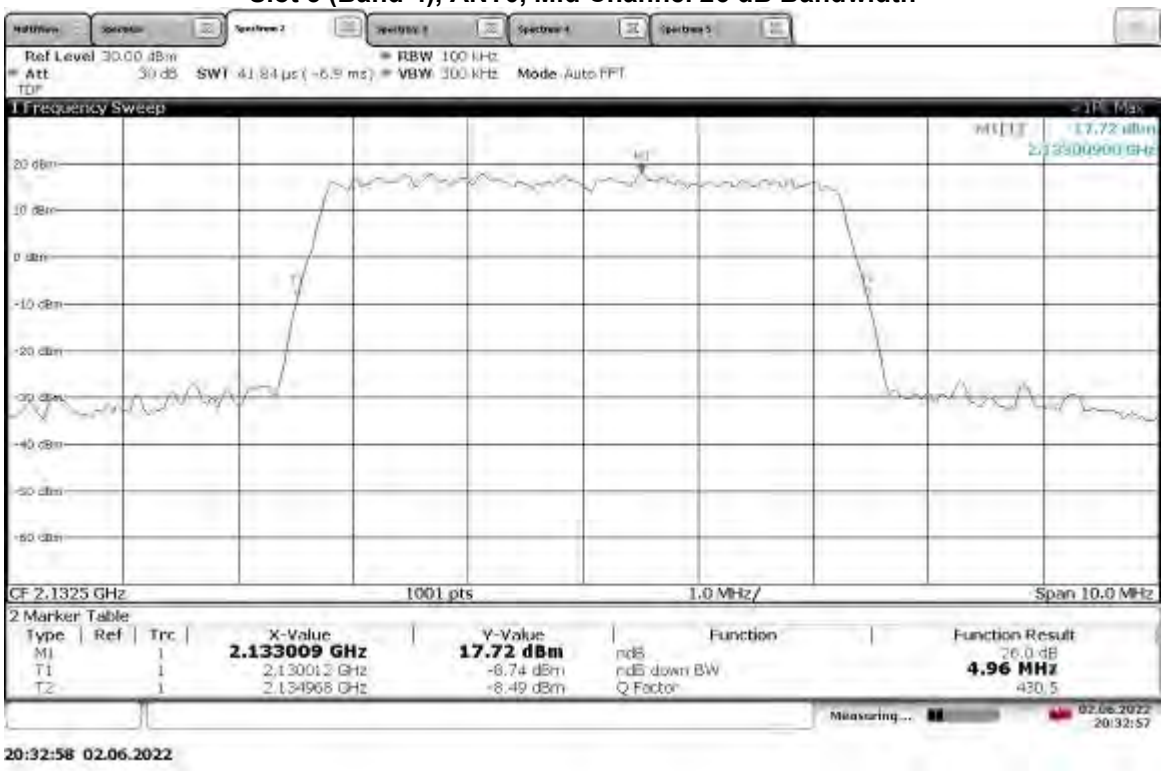
TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



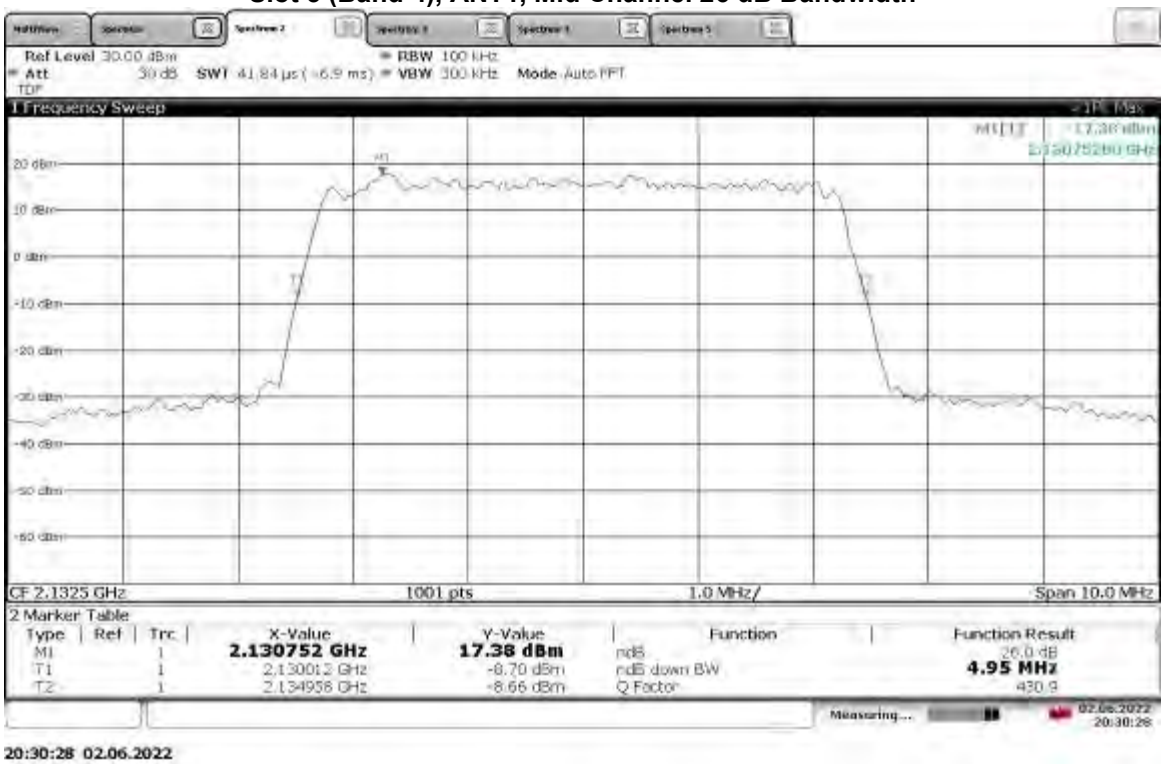
TM1.1-QPSK_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth



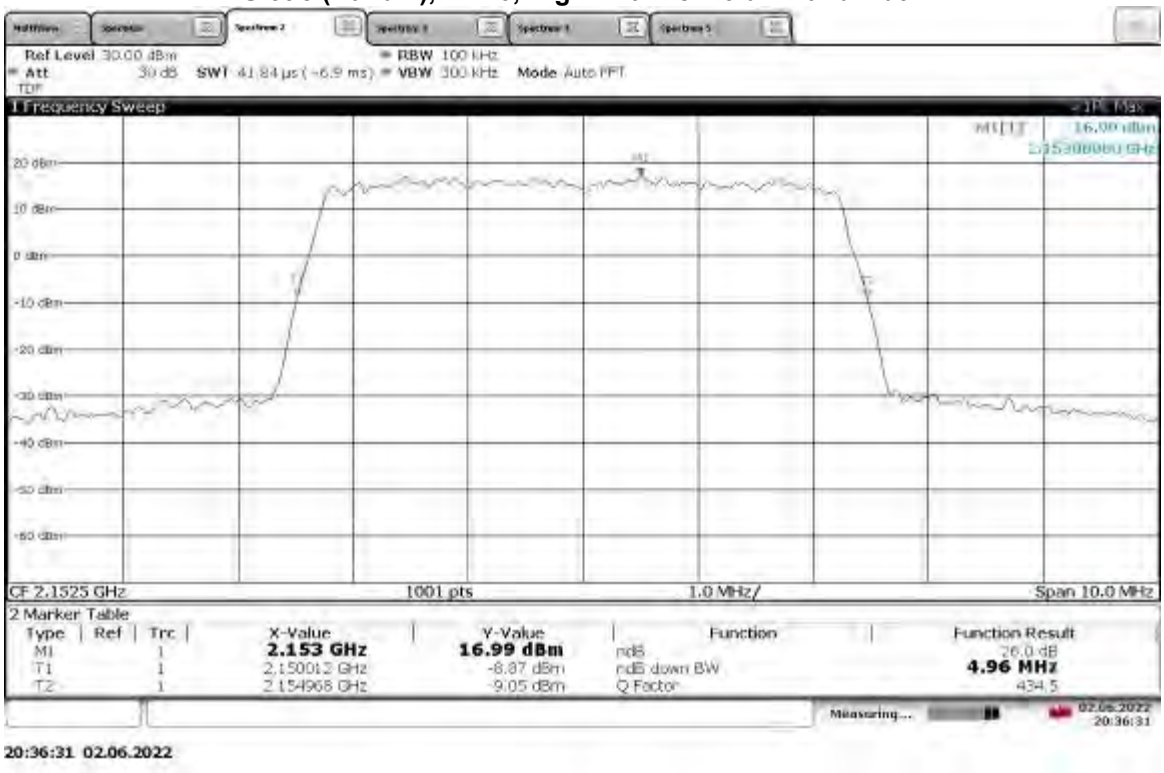
TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



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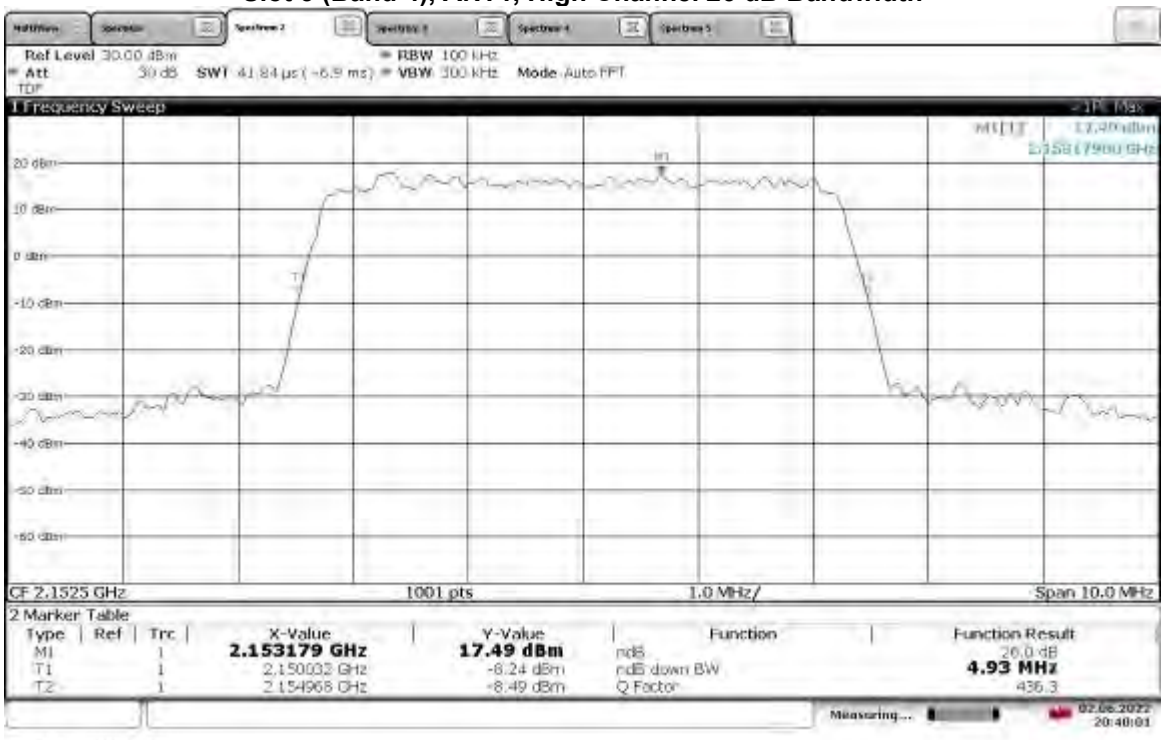
TM3.2-16QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth



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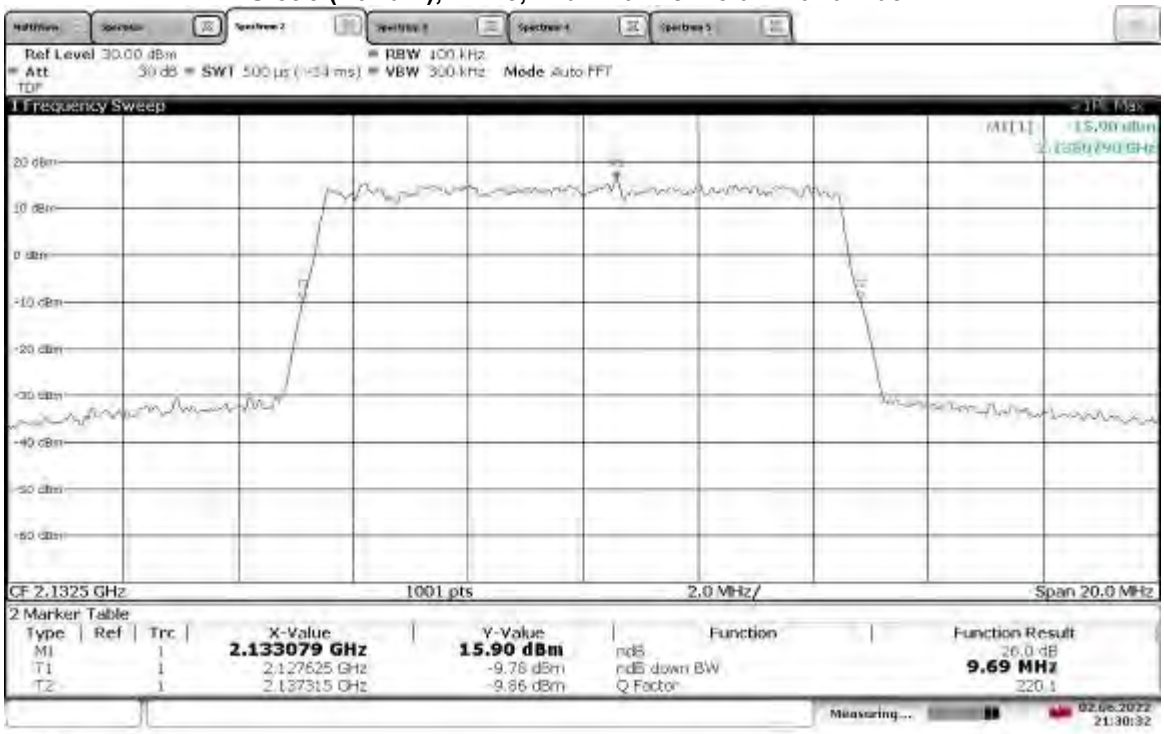
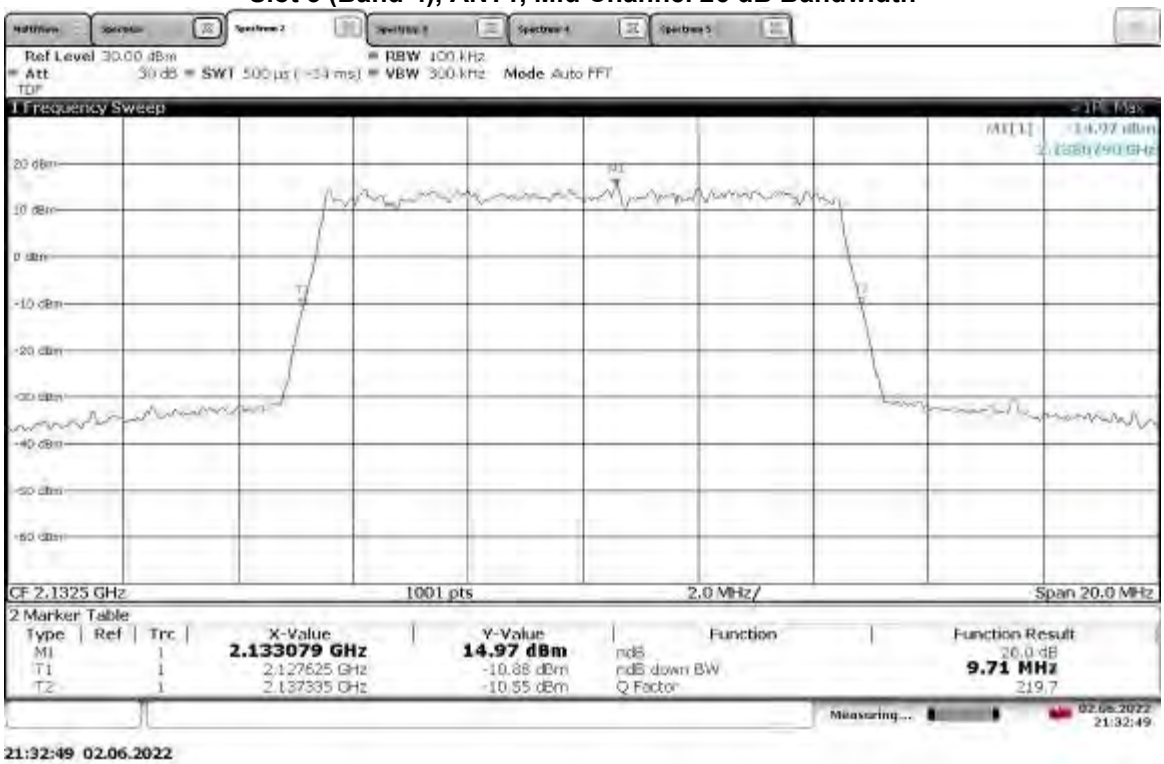
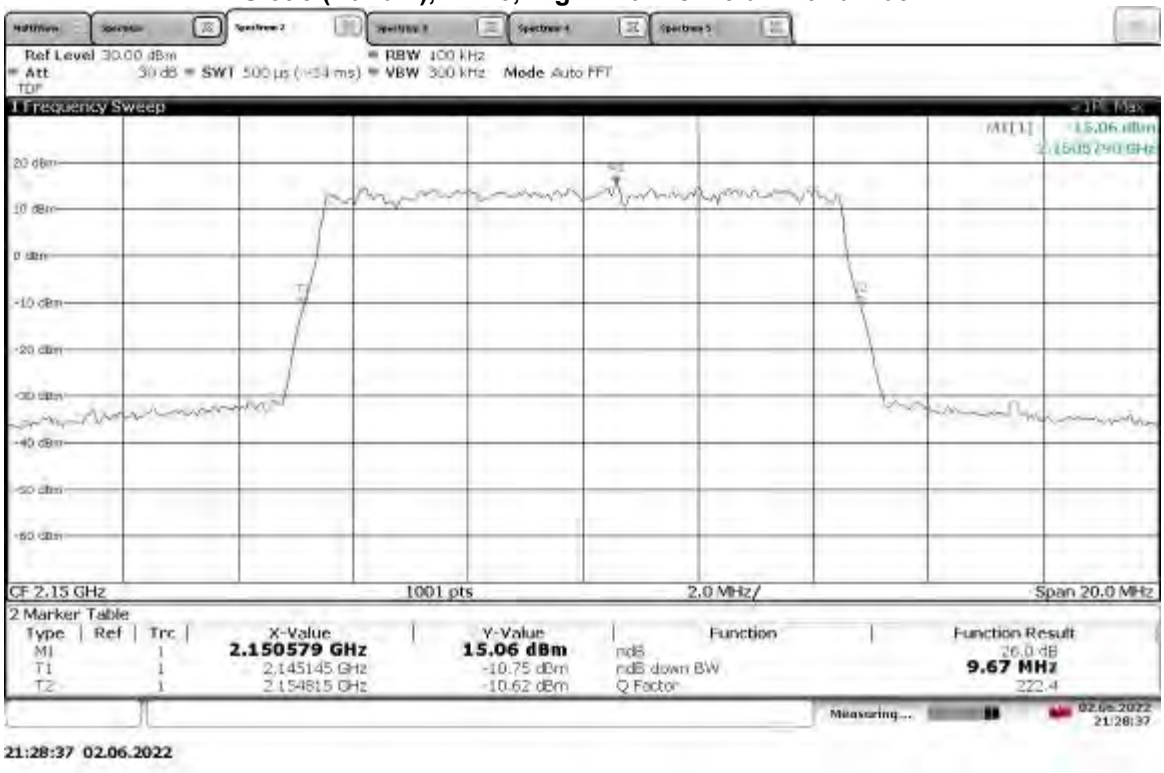
TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



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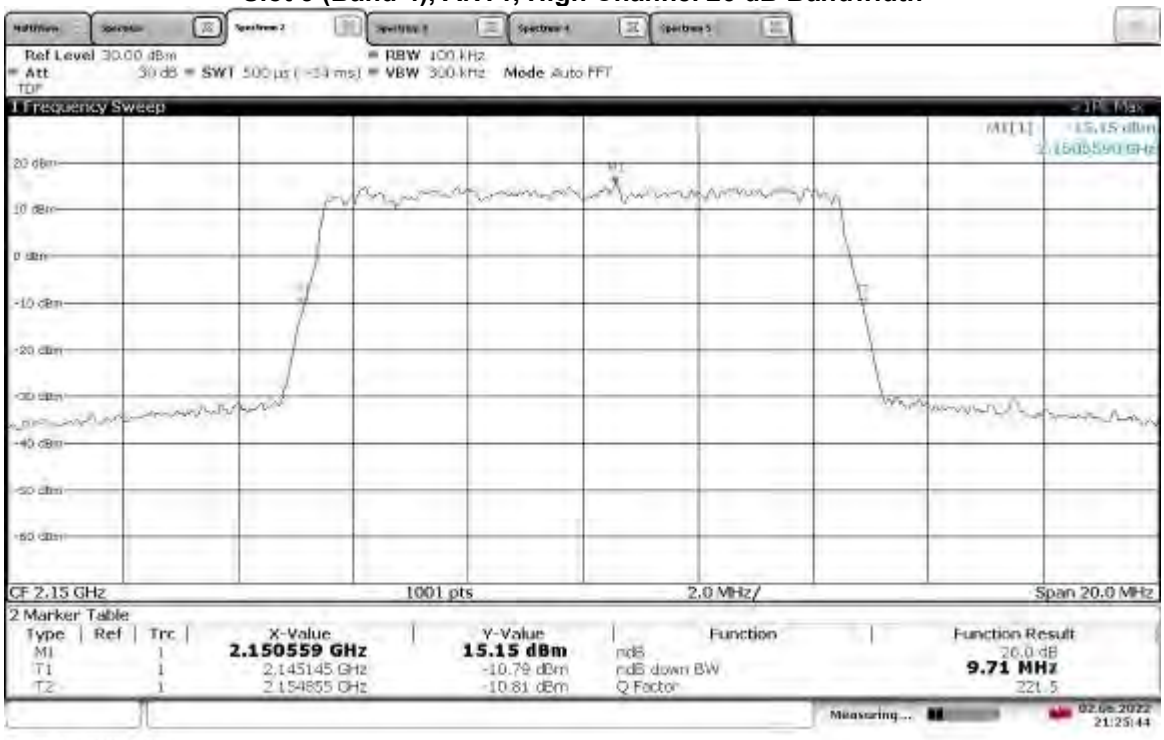
TM3.2-16QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth



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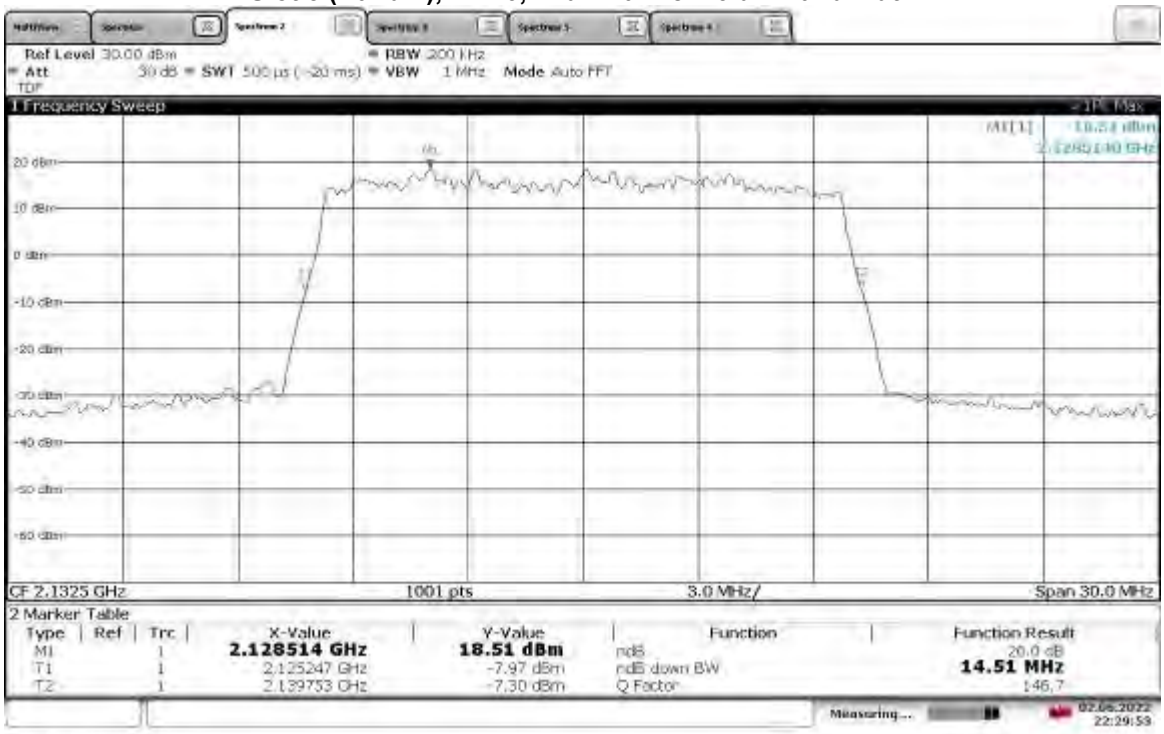
TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



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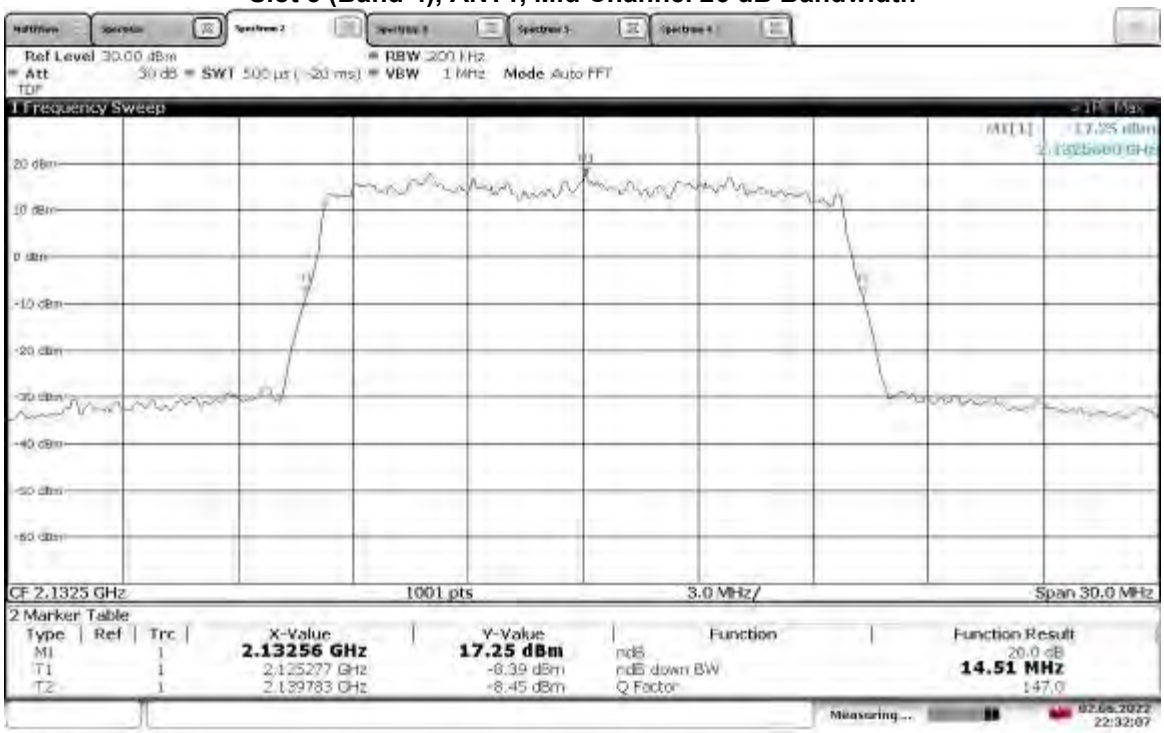
TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



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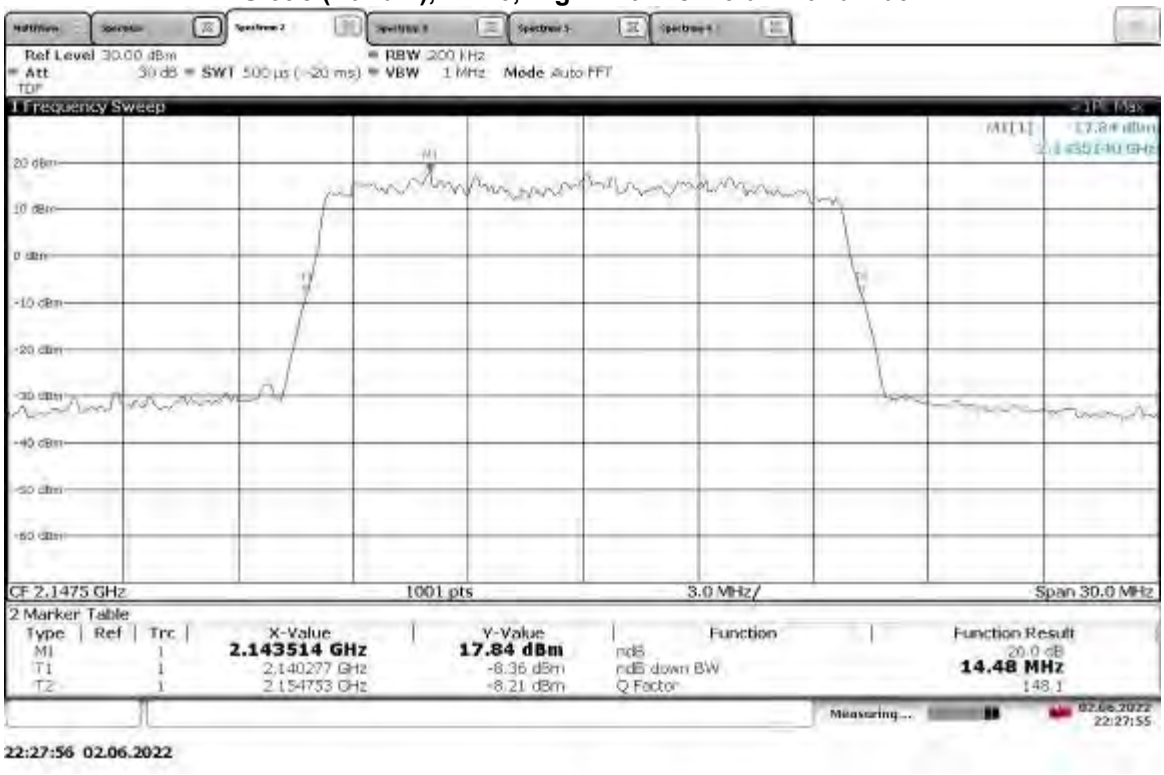
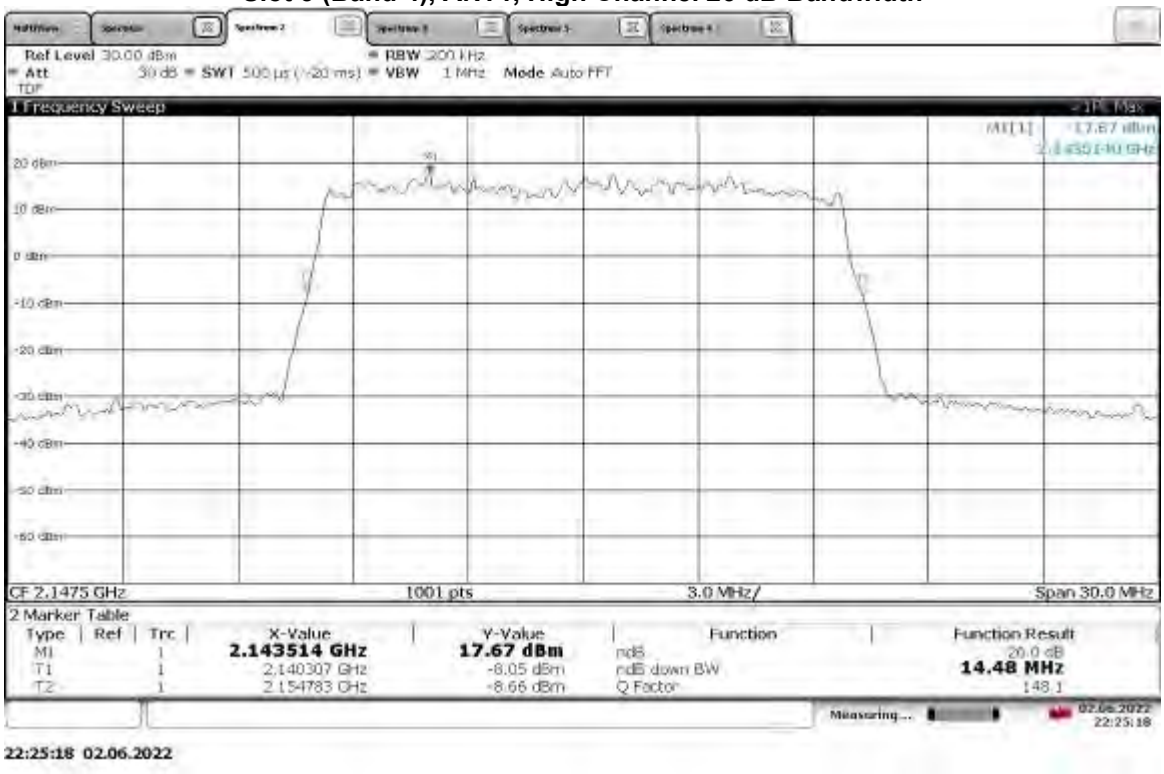
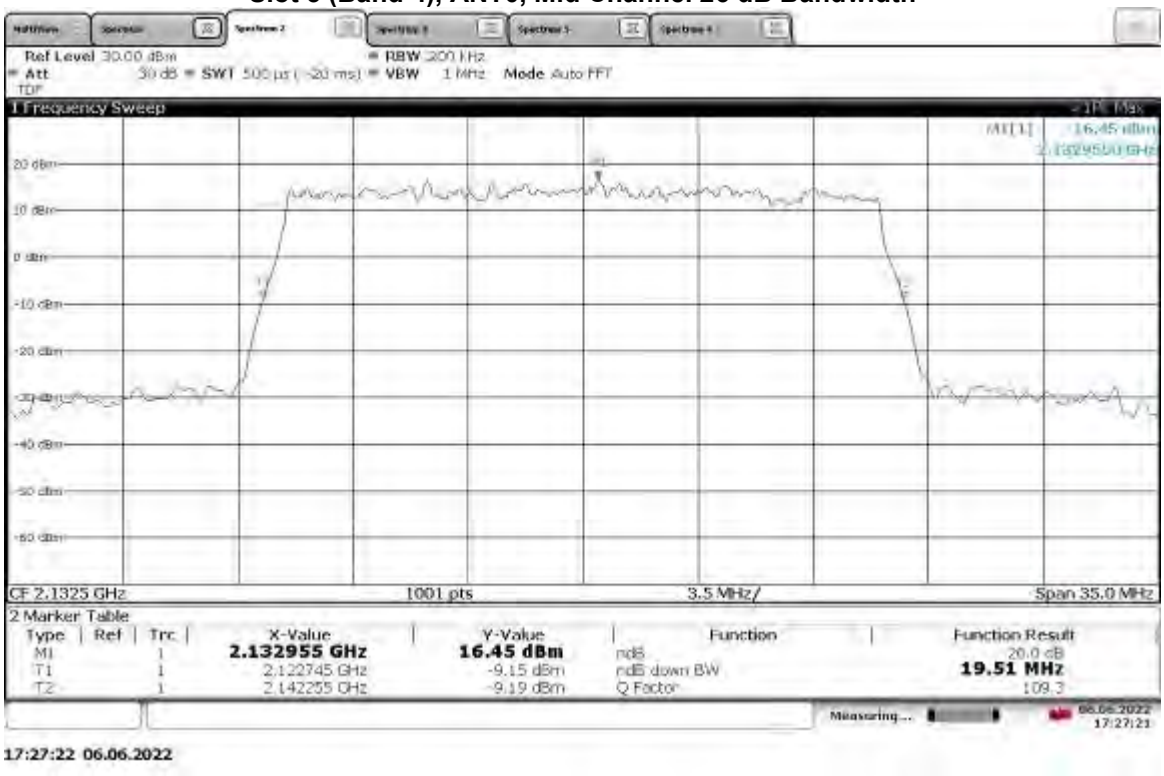
TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



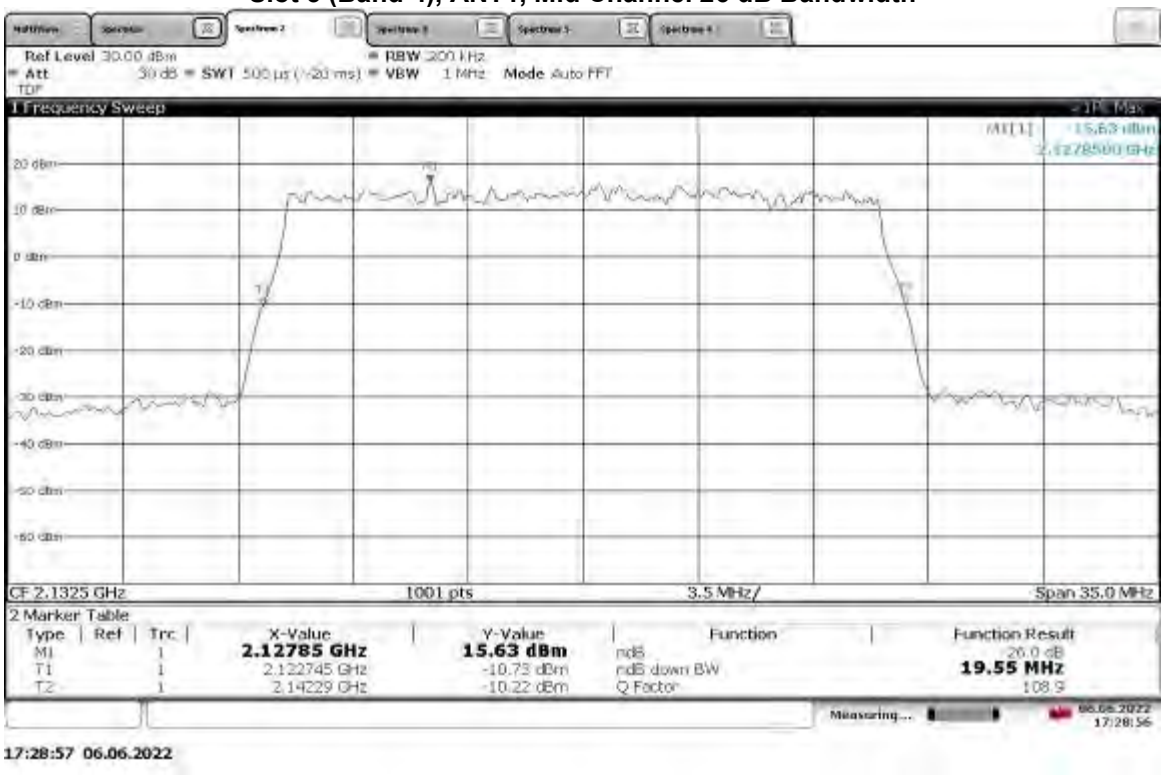
TM3.2-16QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth



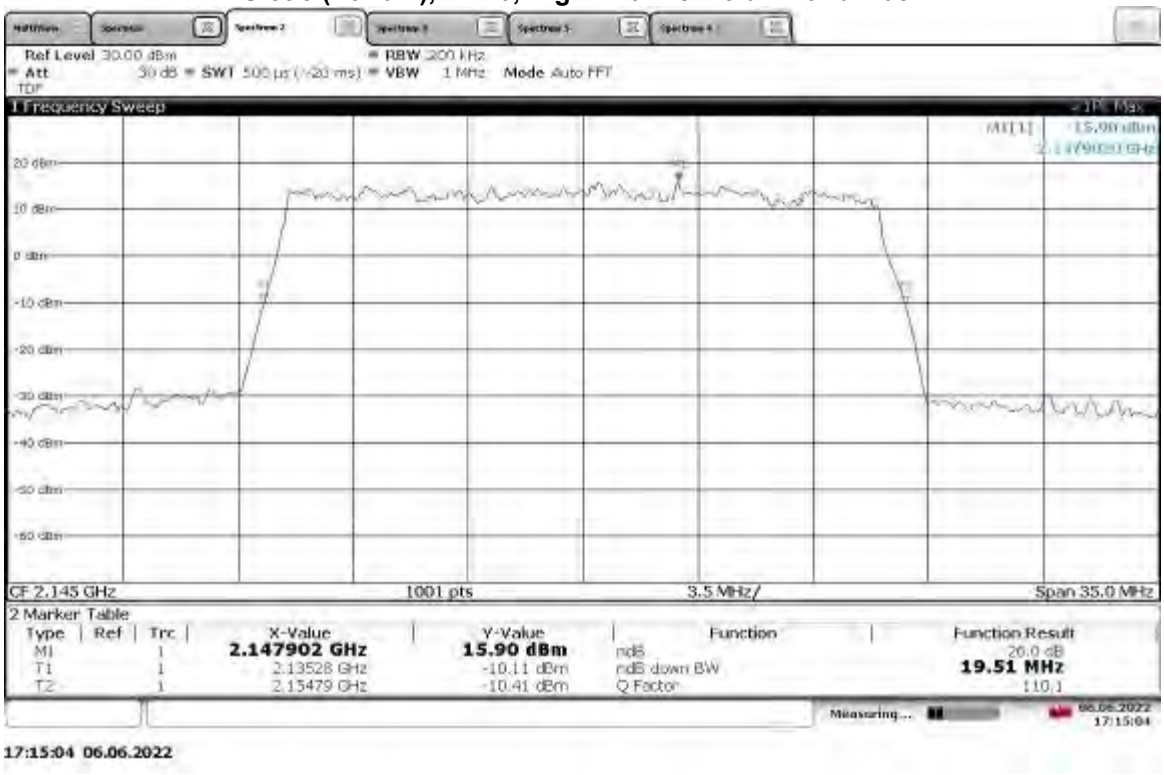
TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



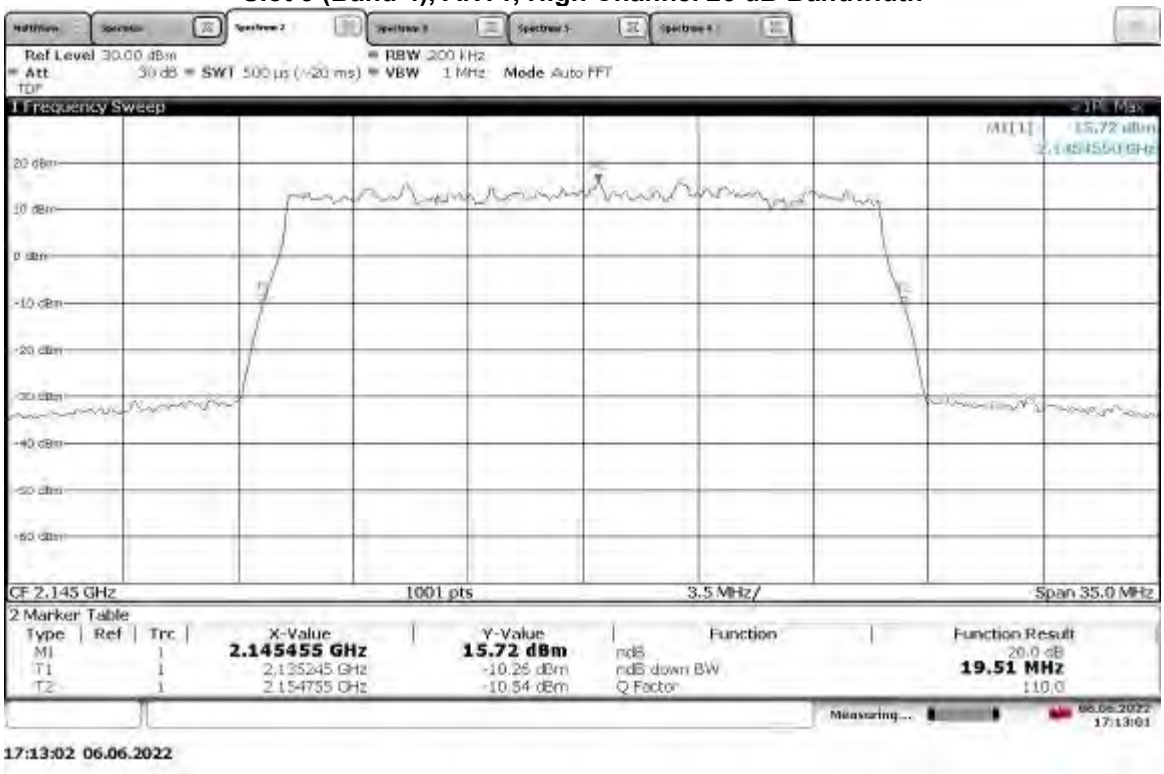
TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



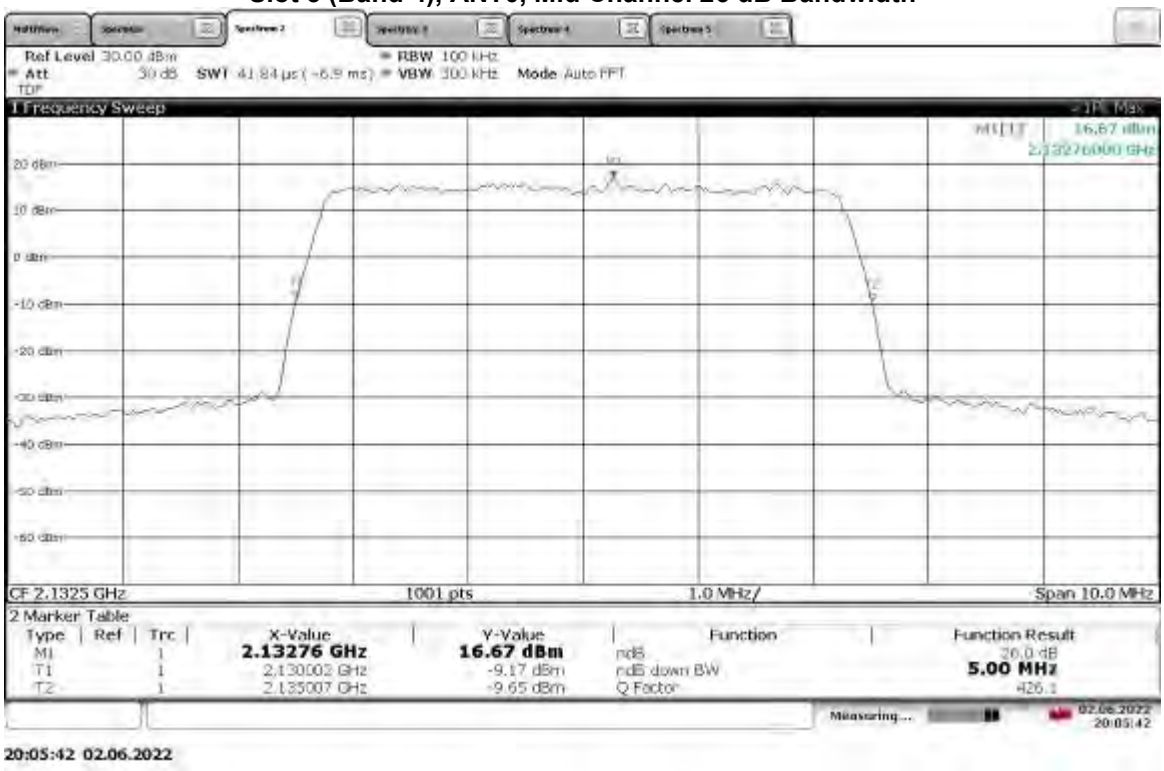
TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



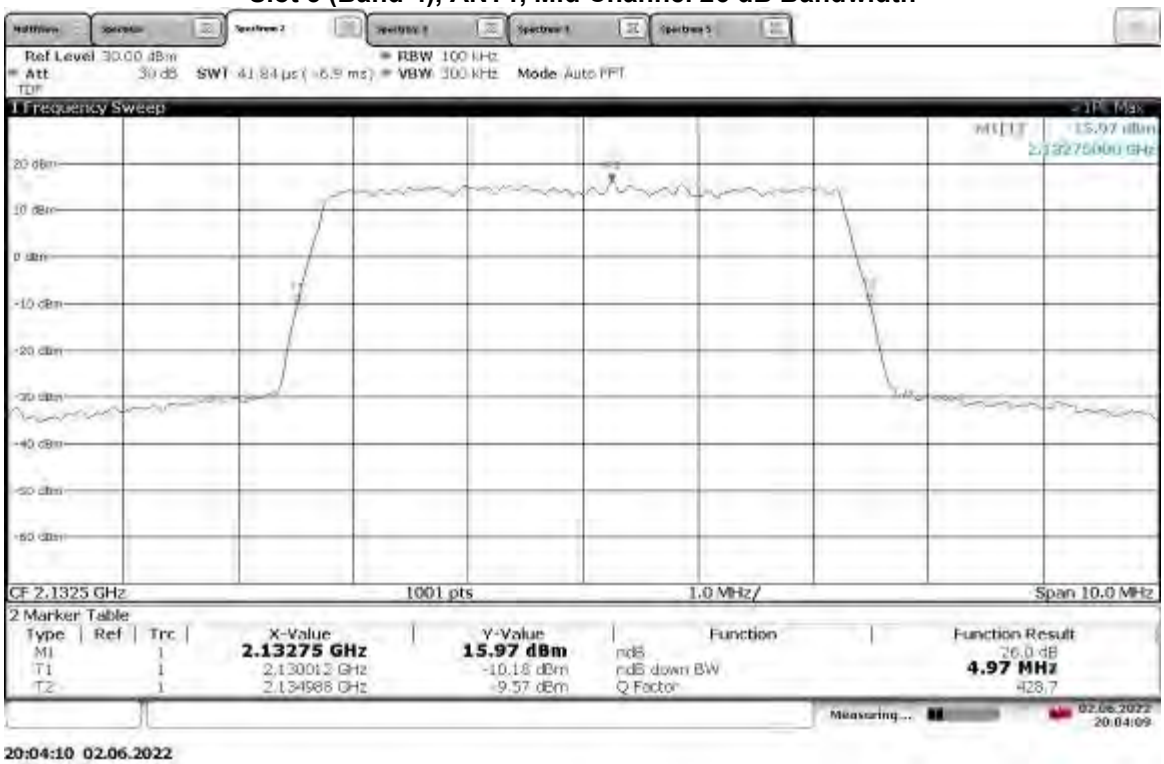
TM3.2-16QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth



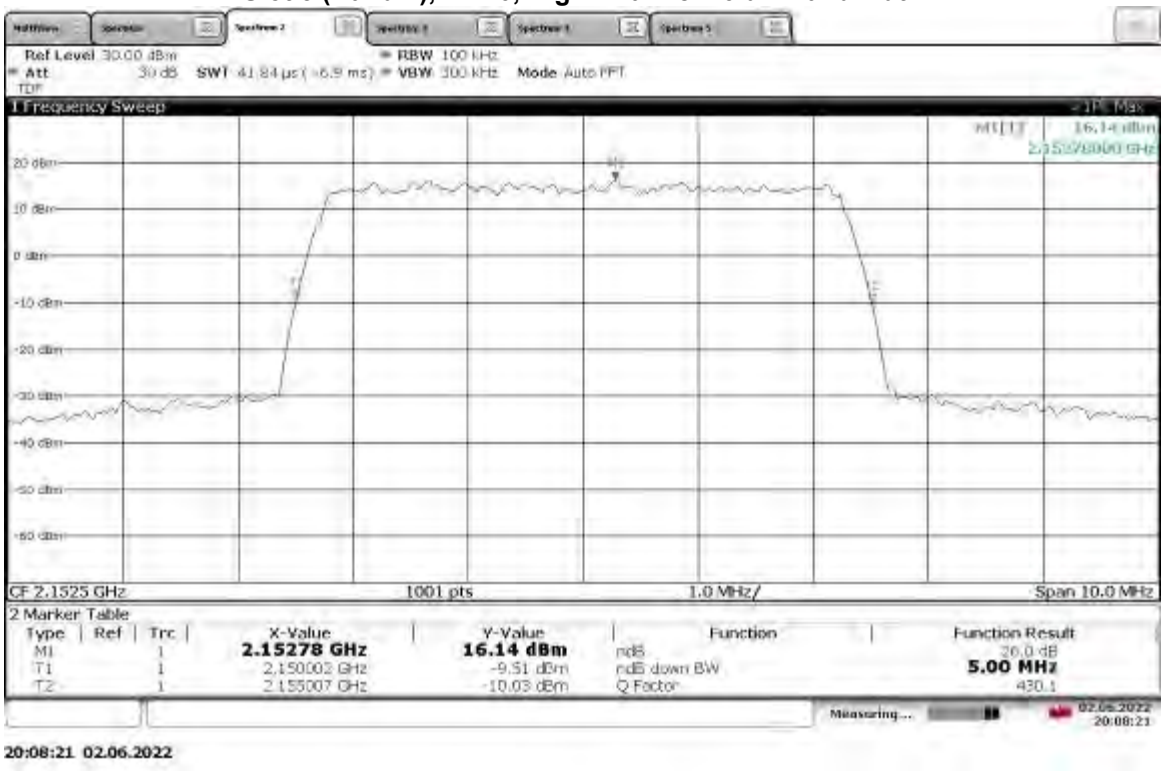
TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



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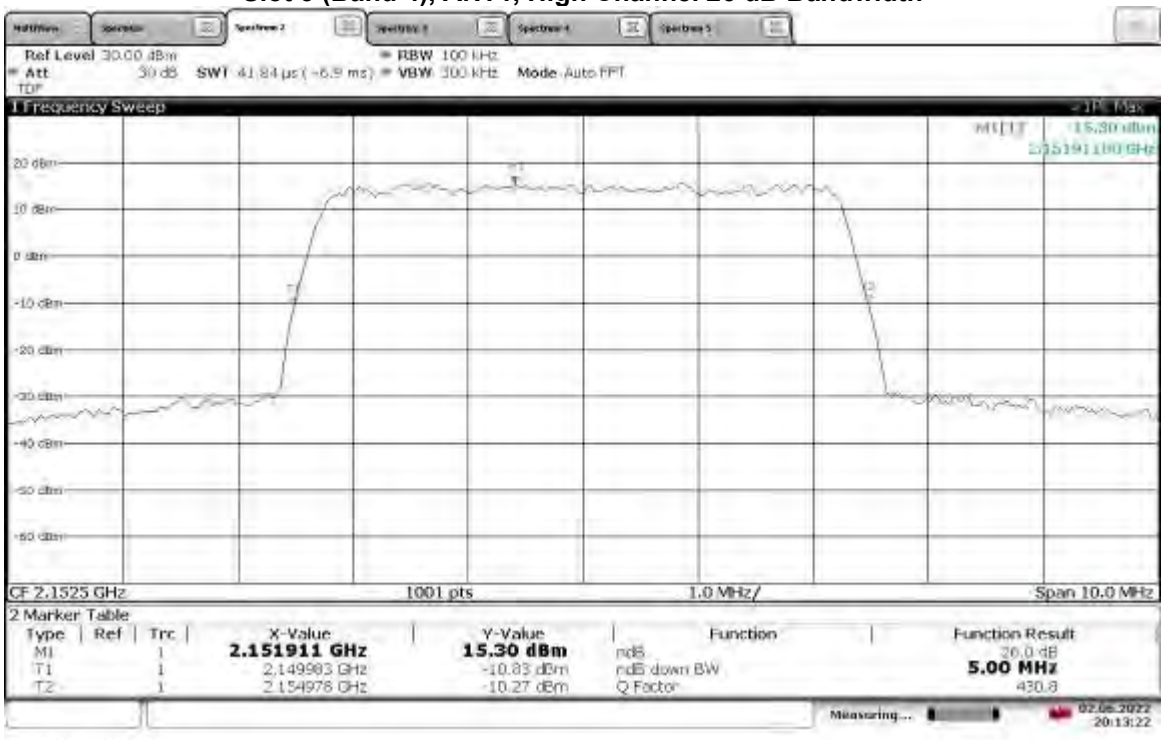
TM3.1-64QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth



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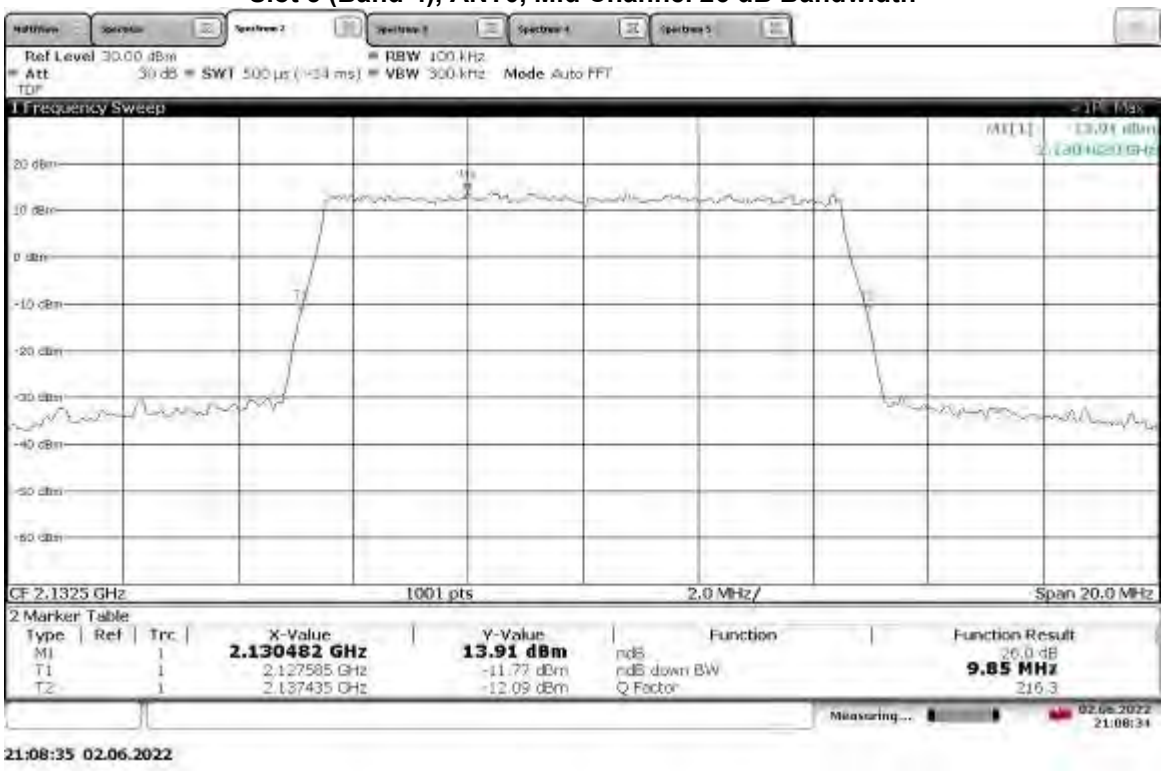
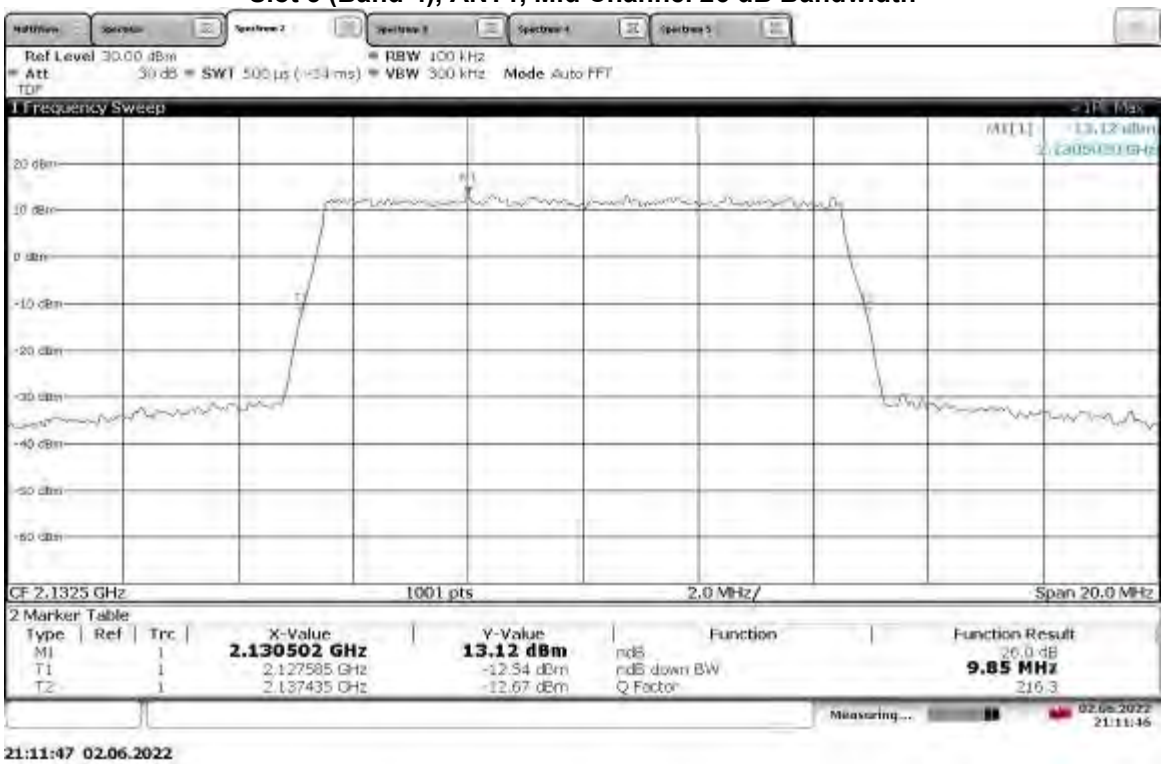
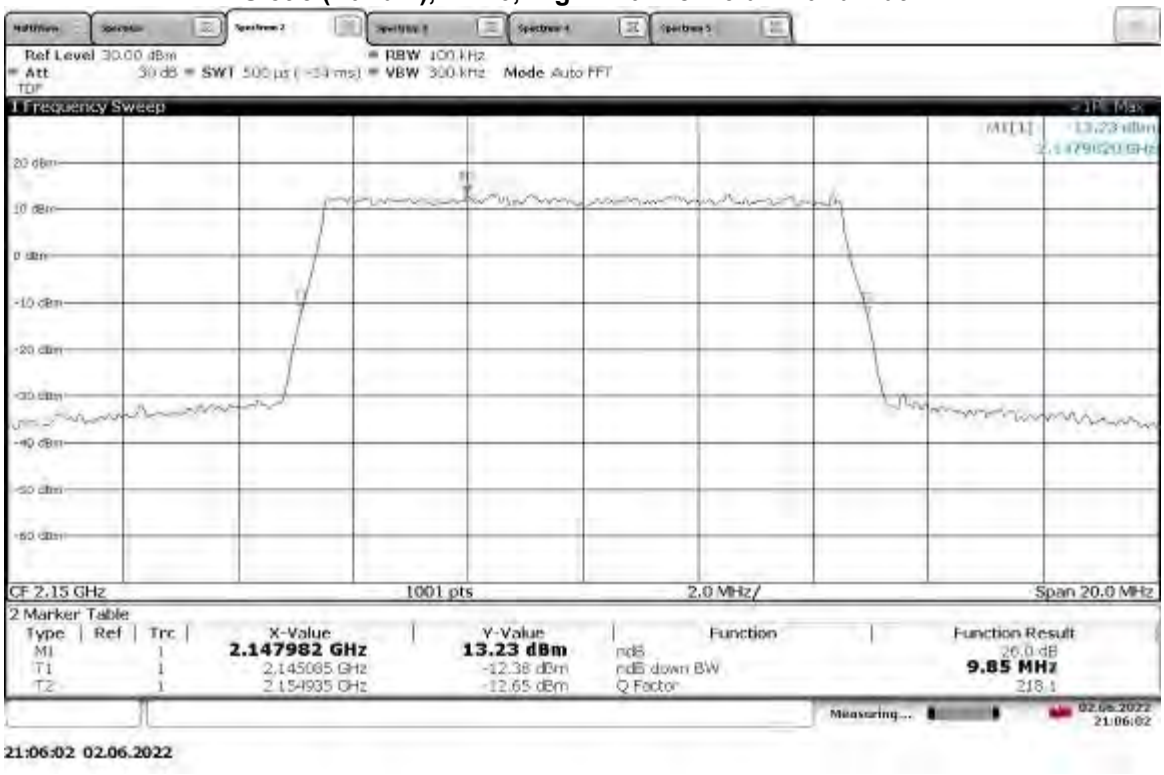
TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



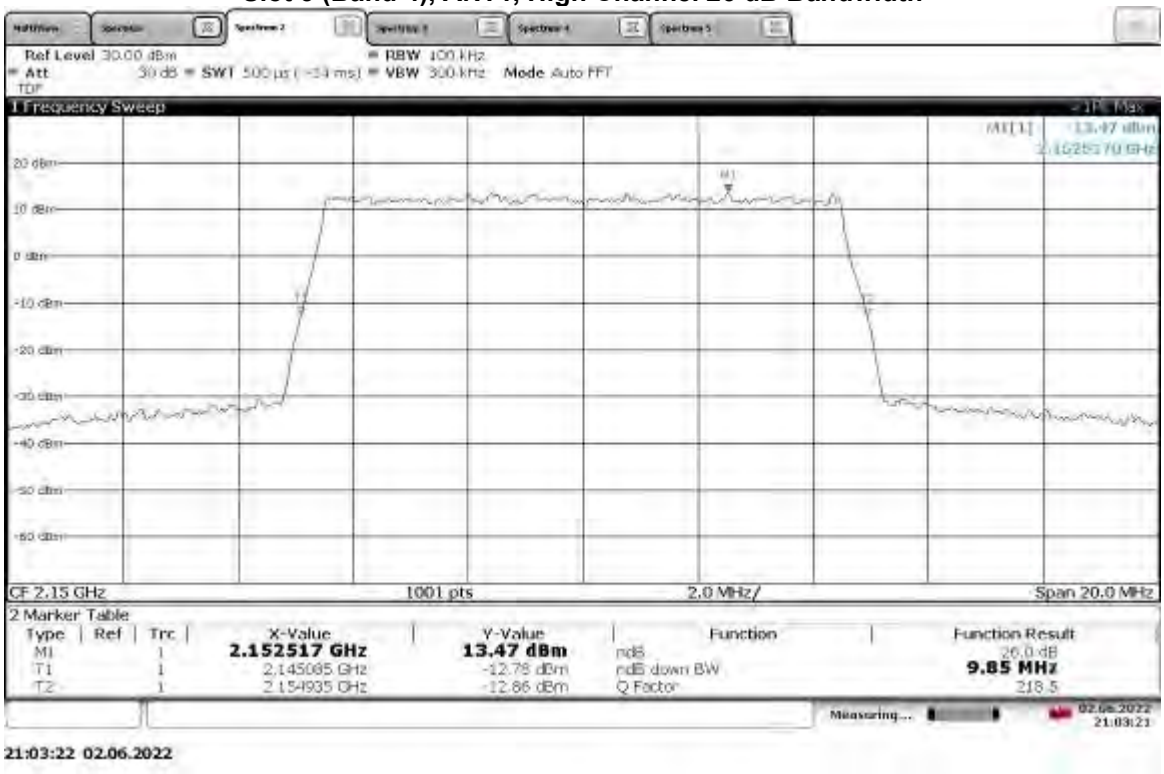
TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



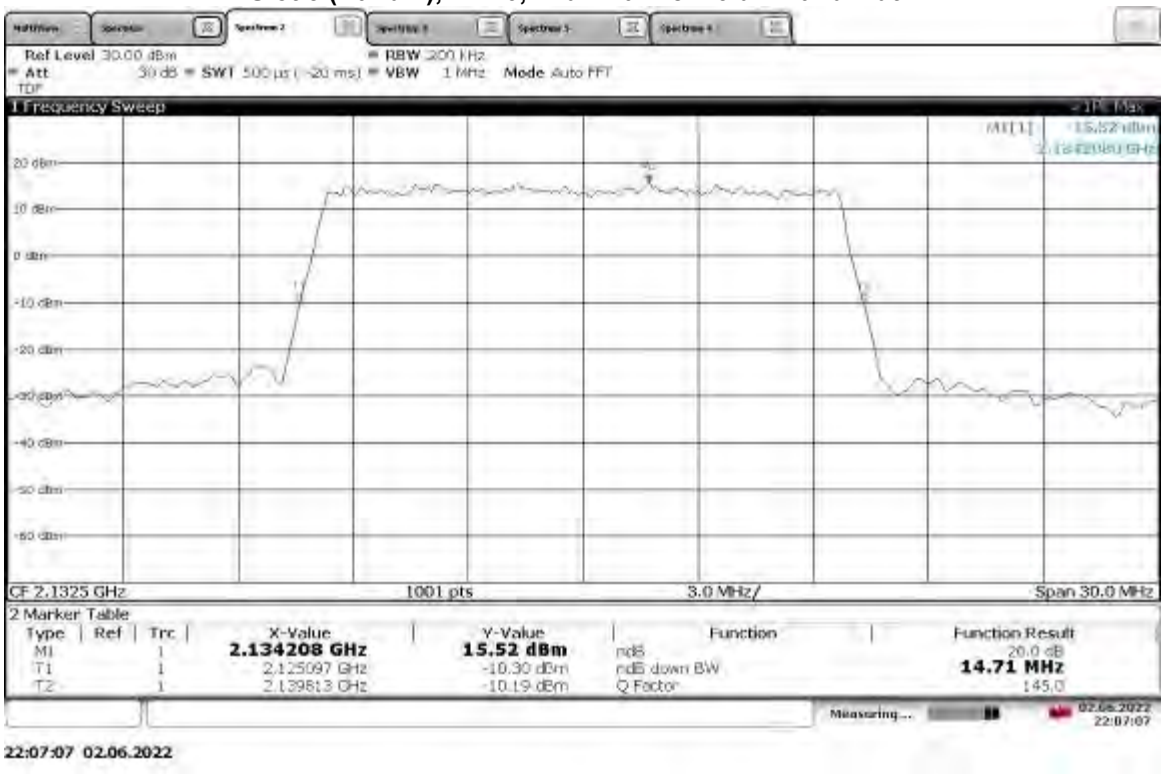
TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



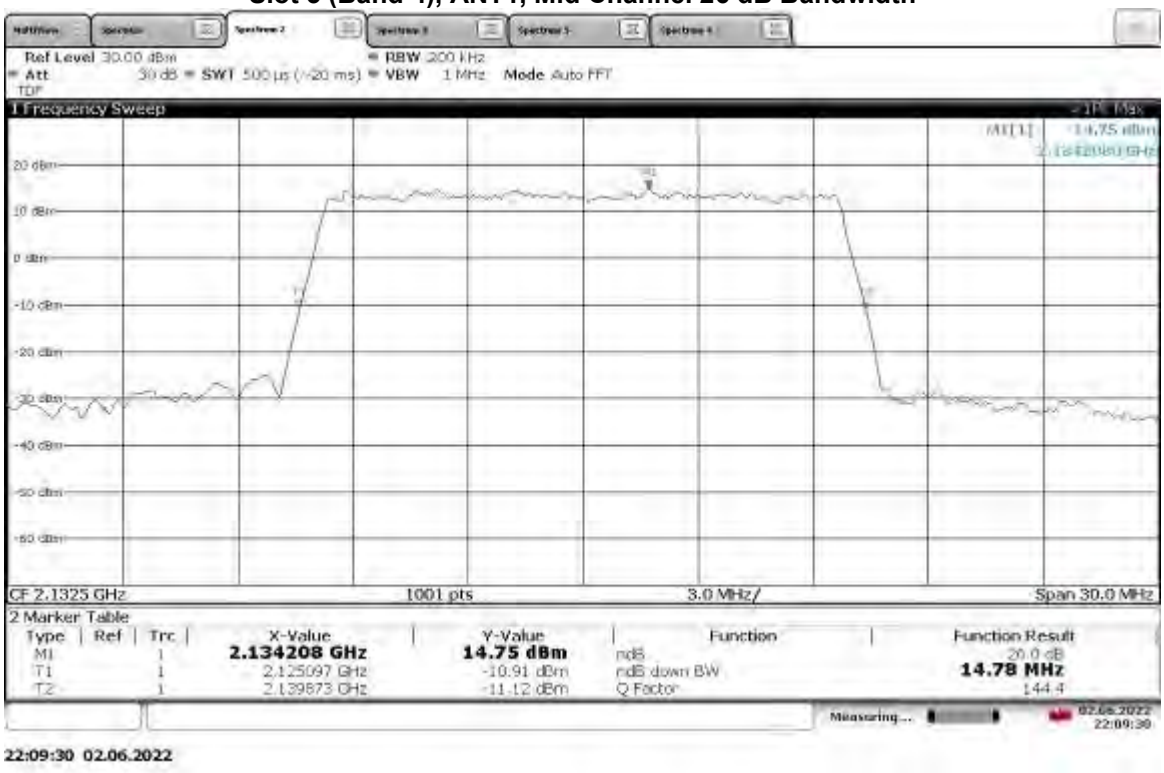
TM3.1-64QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth



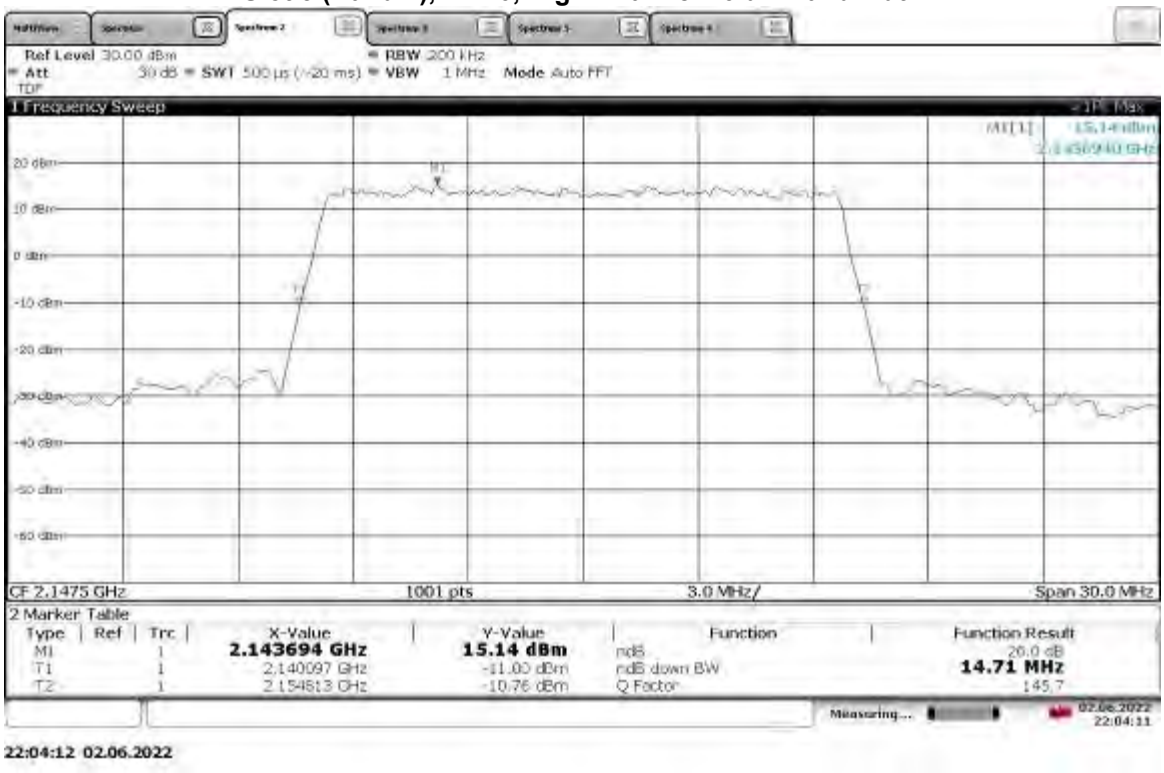
TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



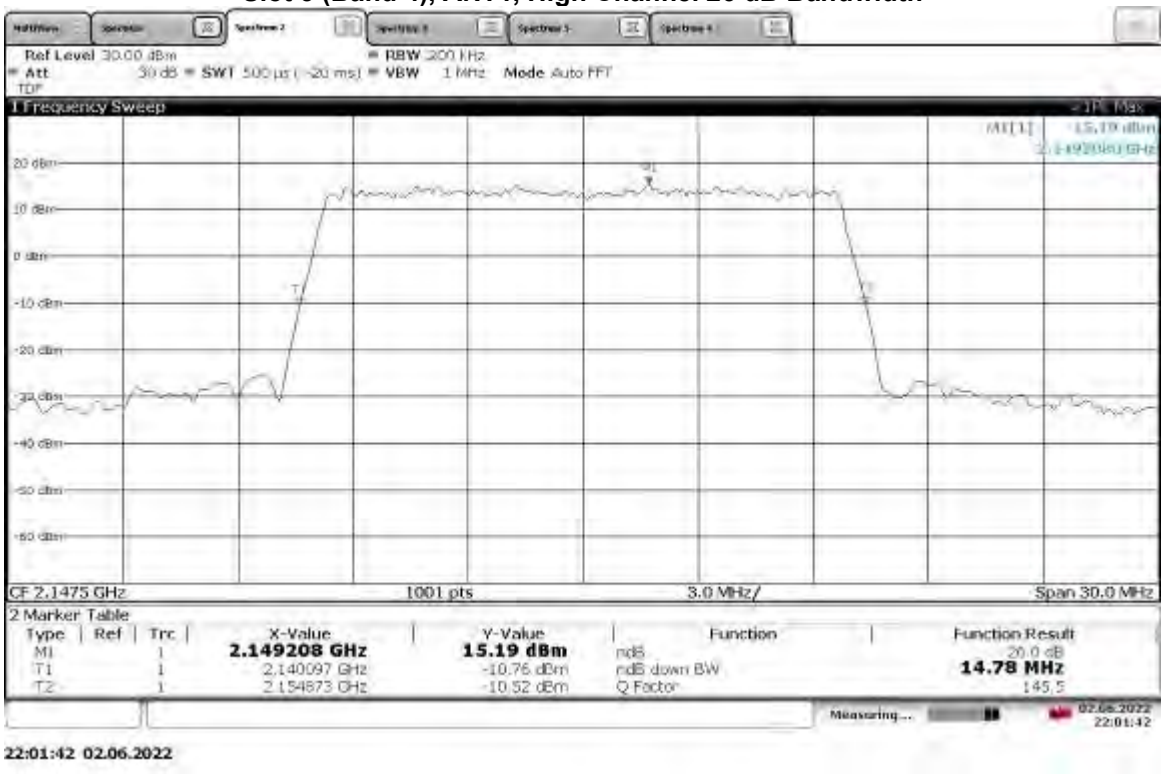
TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



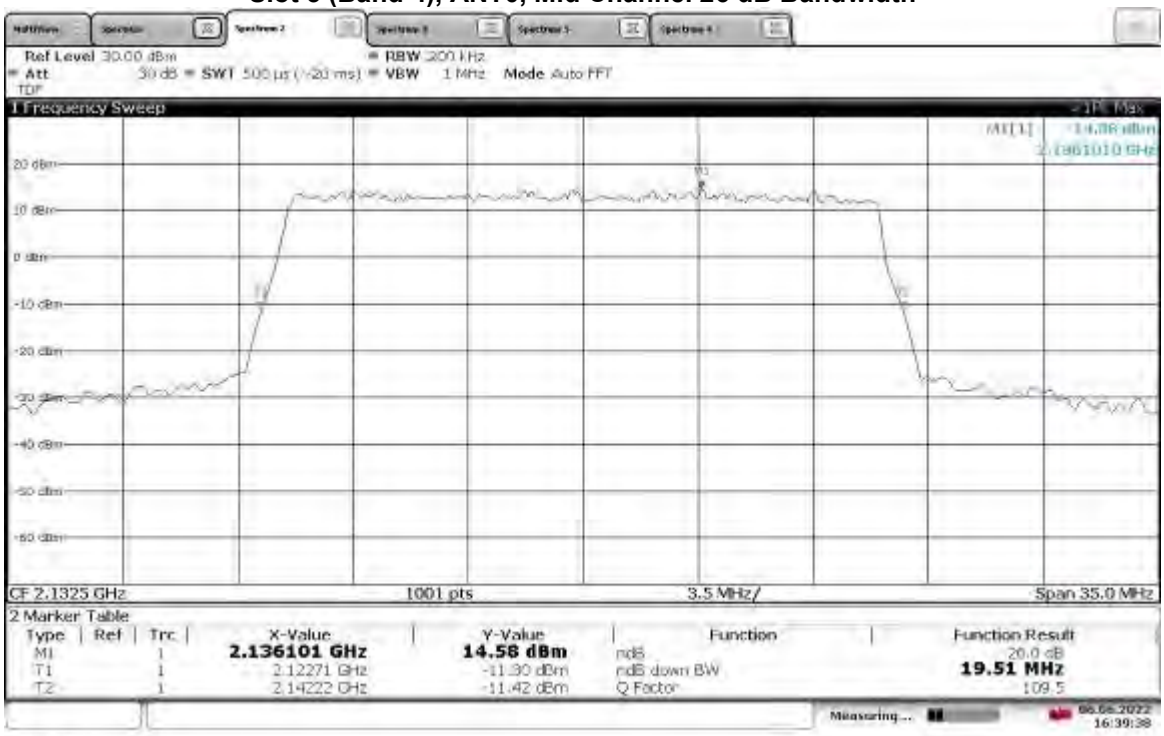
TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



TM3.1-64QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth

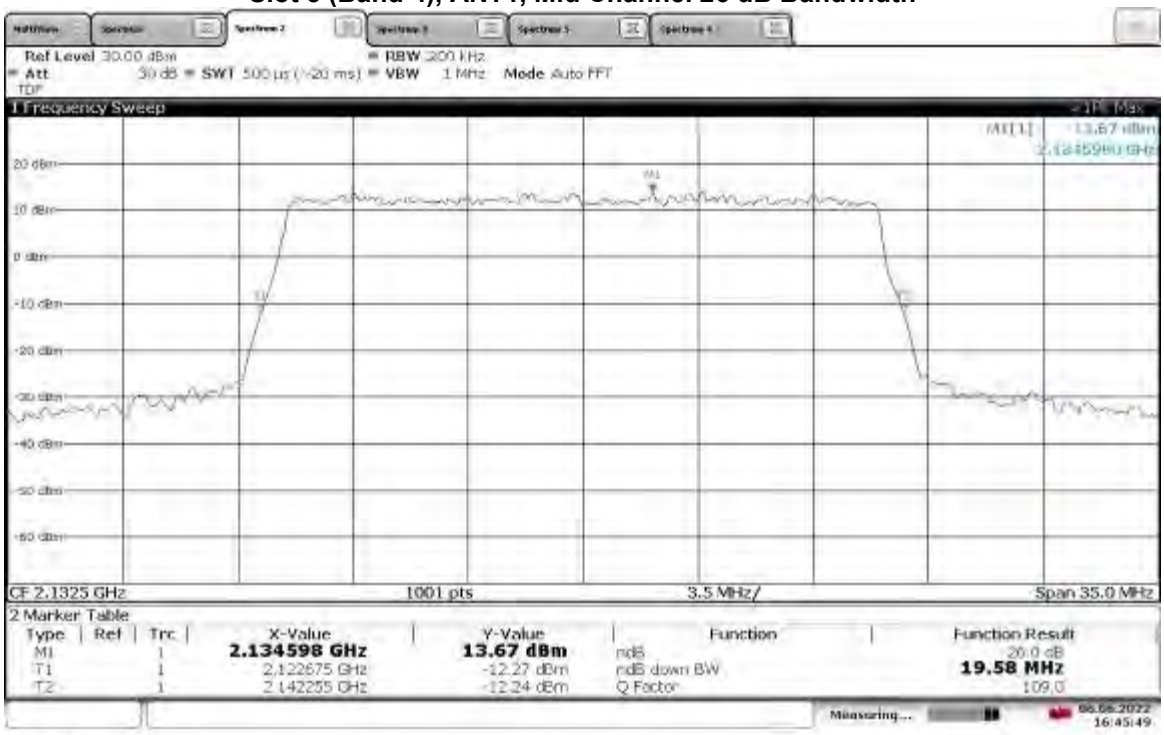


TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



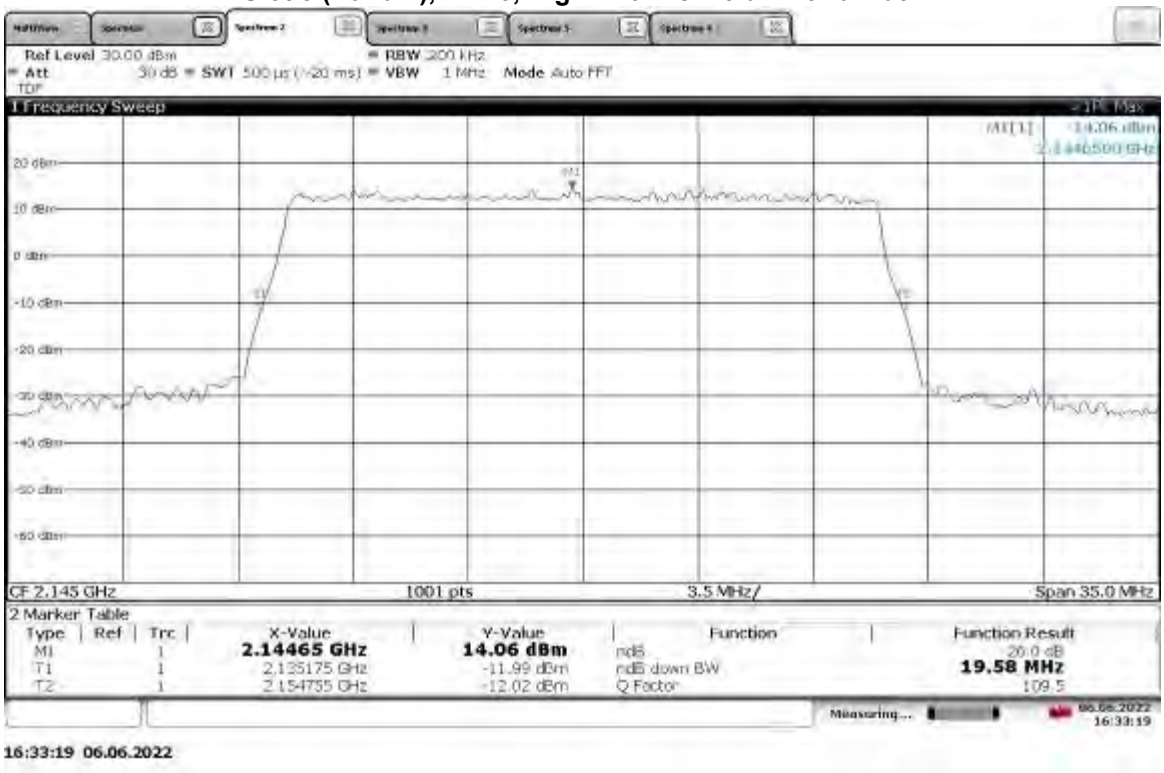
16:39:39 06.06.2022

TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth

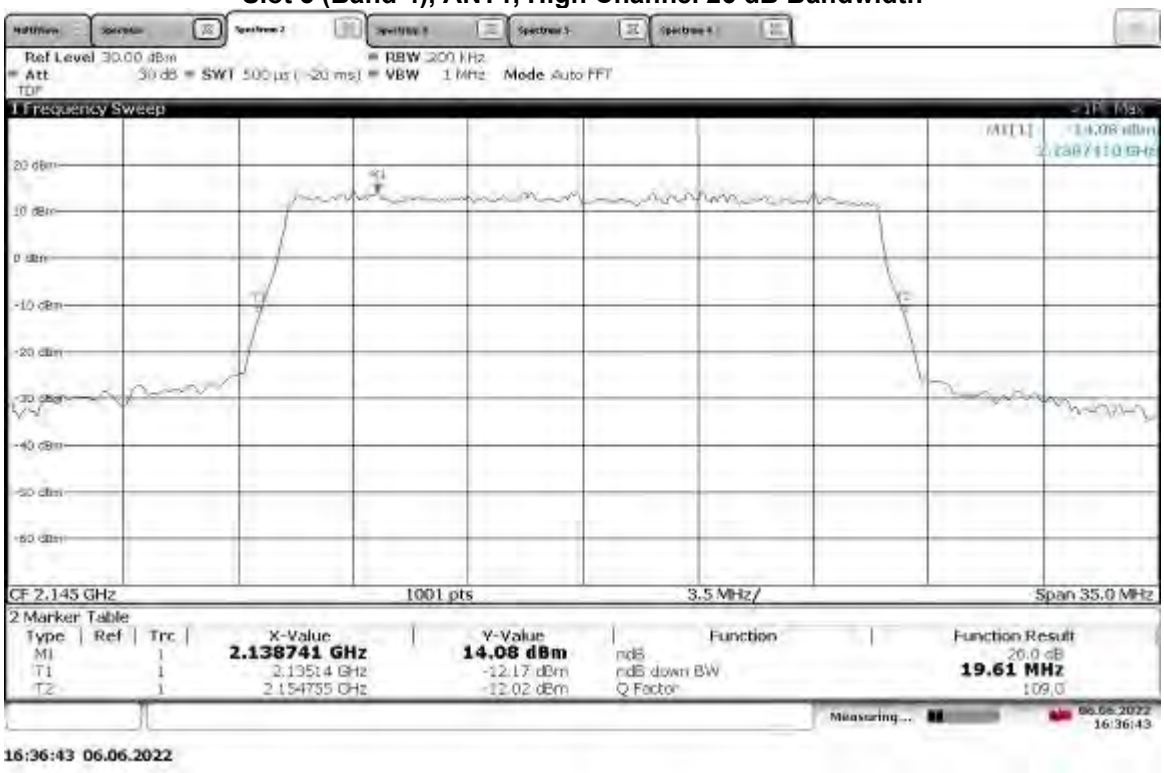


16:45:50 06.06.2022

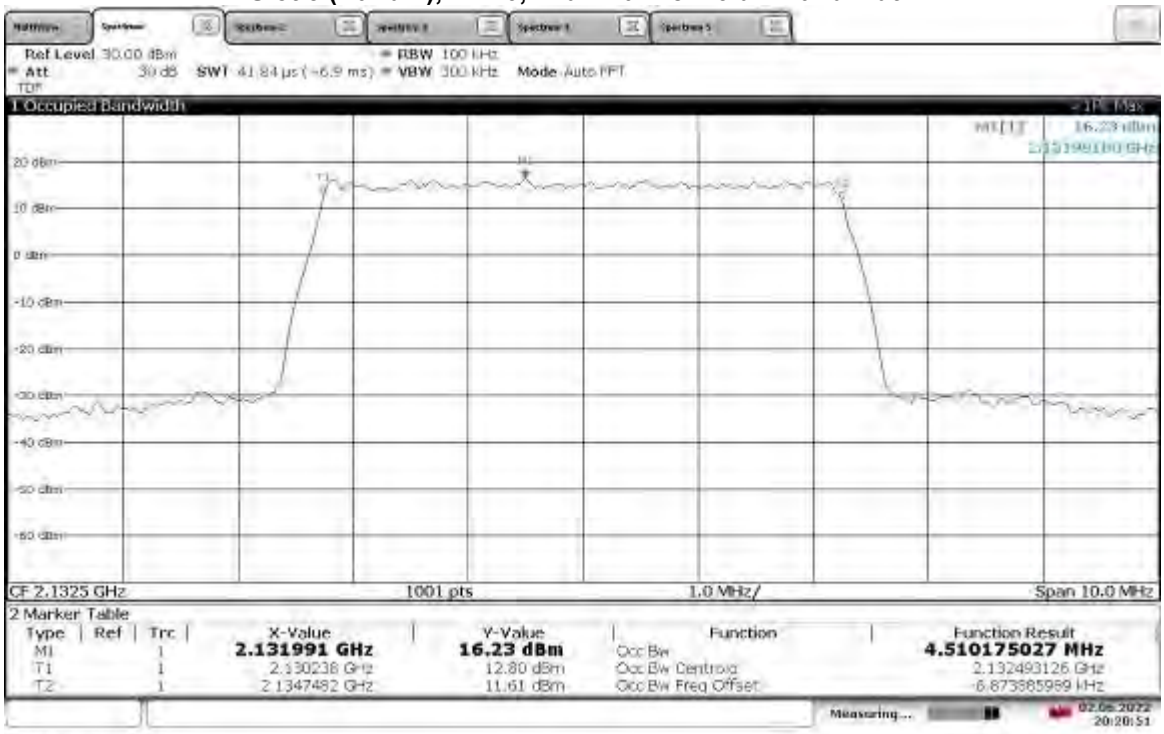
TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



TM3.1-64QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth



TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth

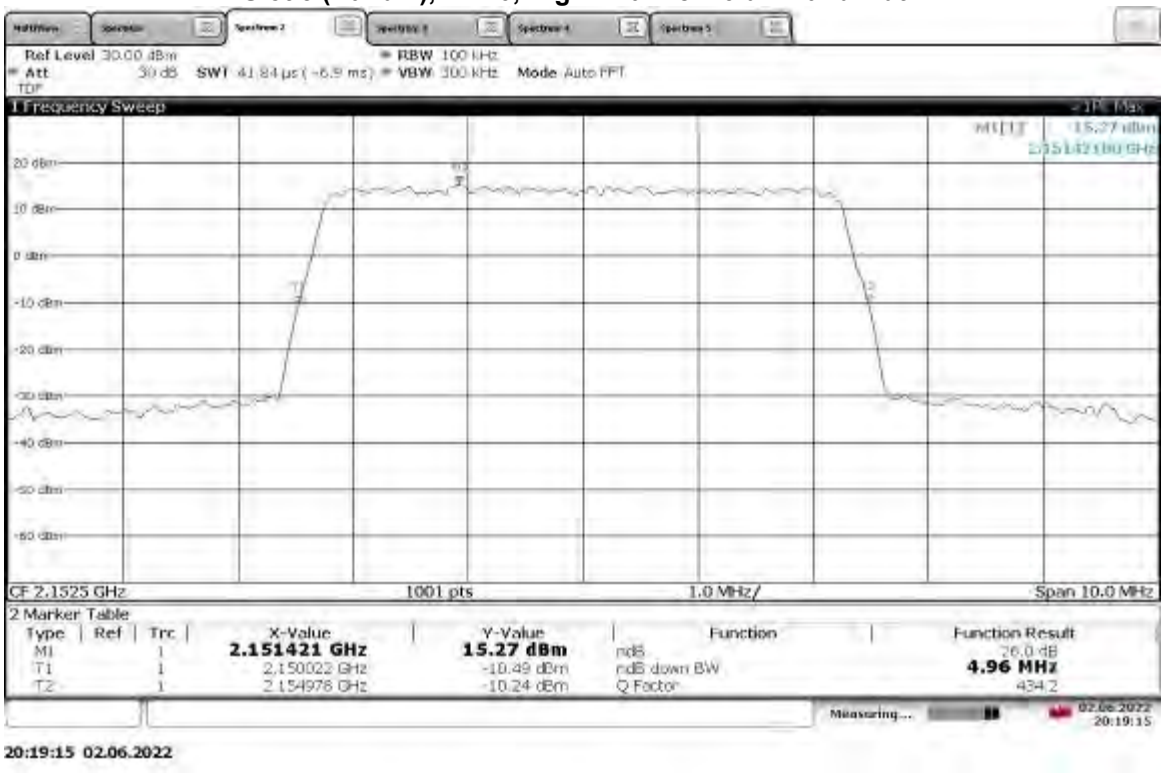


20:20:52 02.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth

20:24:10 02.06.2022

TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth

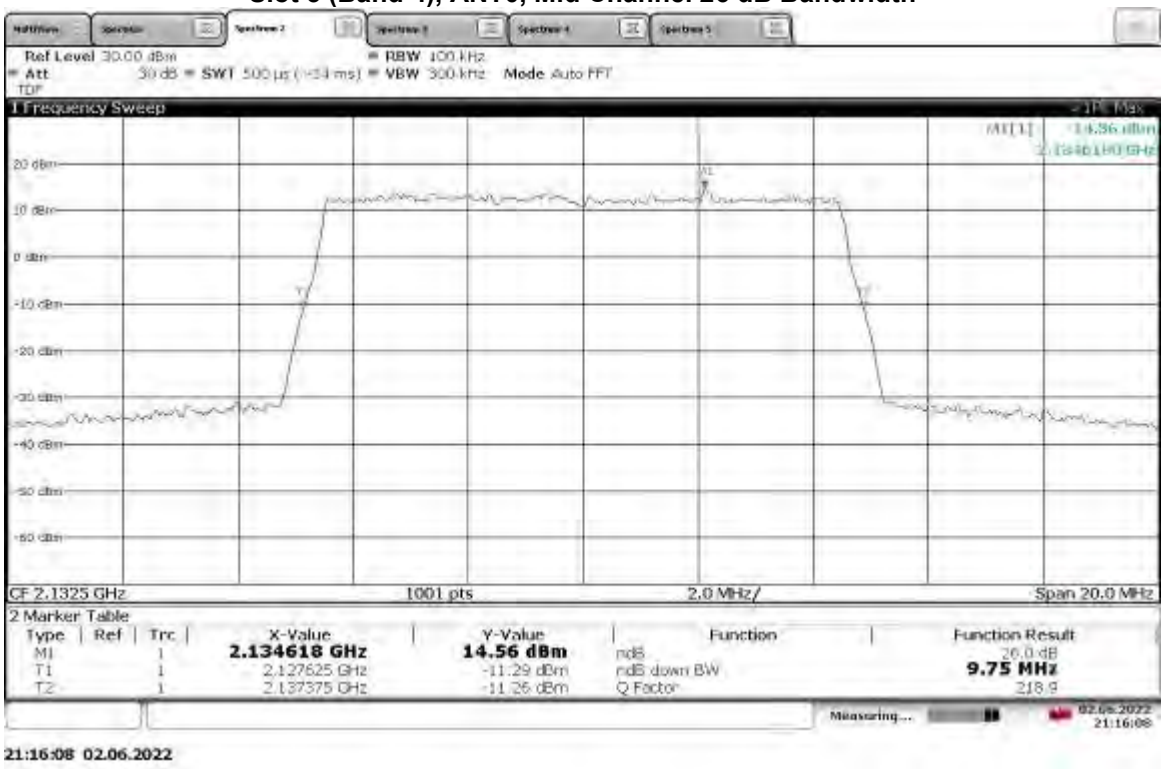


20:19:15 02.06.2022

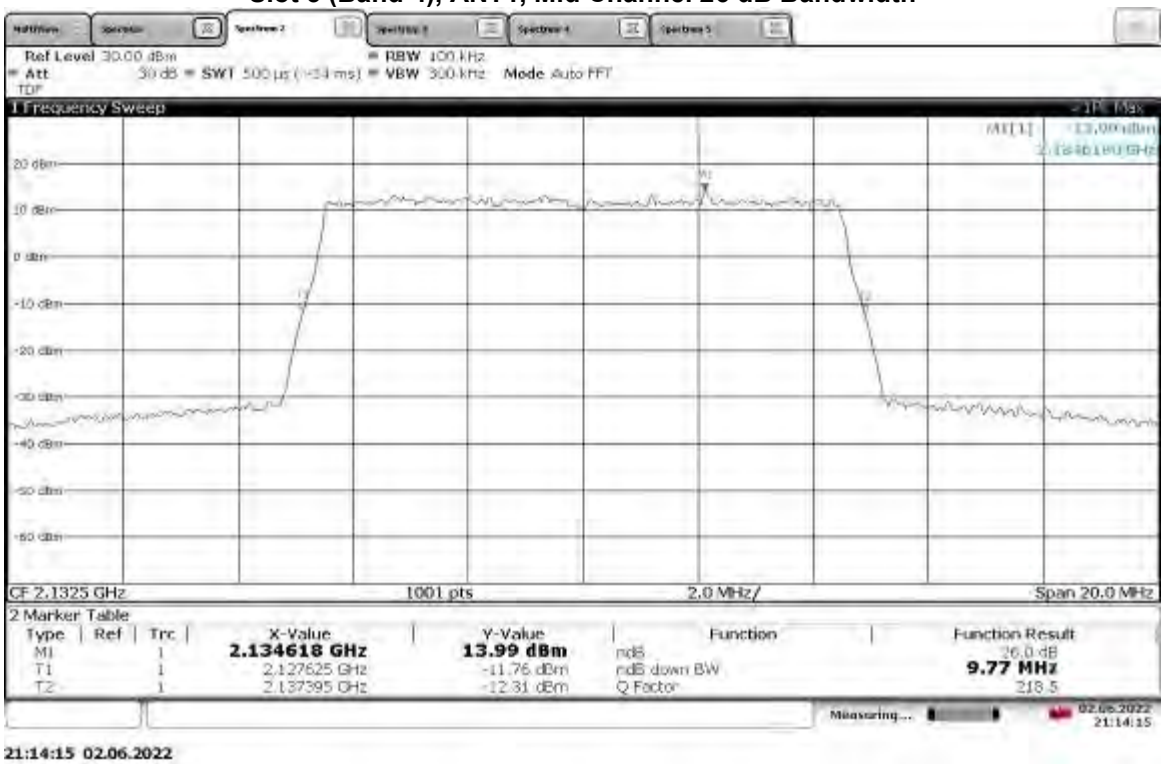
TM3.1a-256QAM_5 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth

20:15:33 02.06.2022

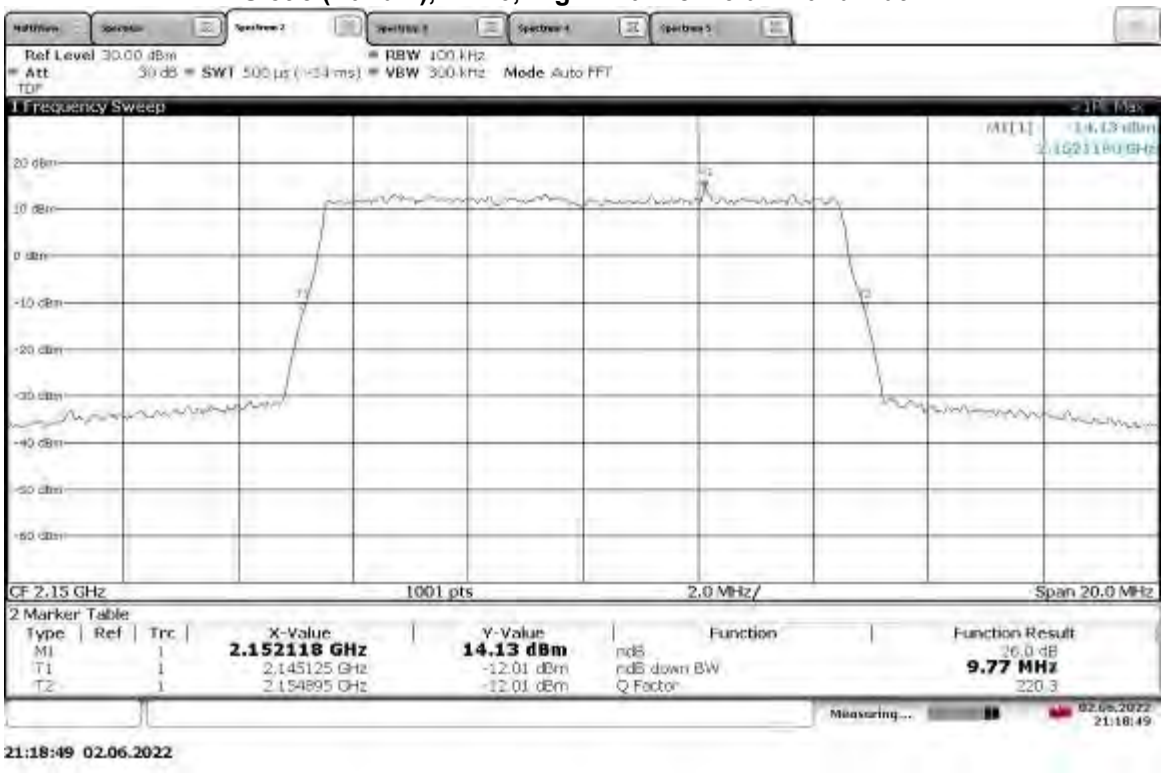
TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



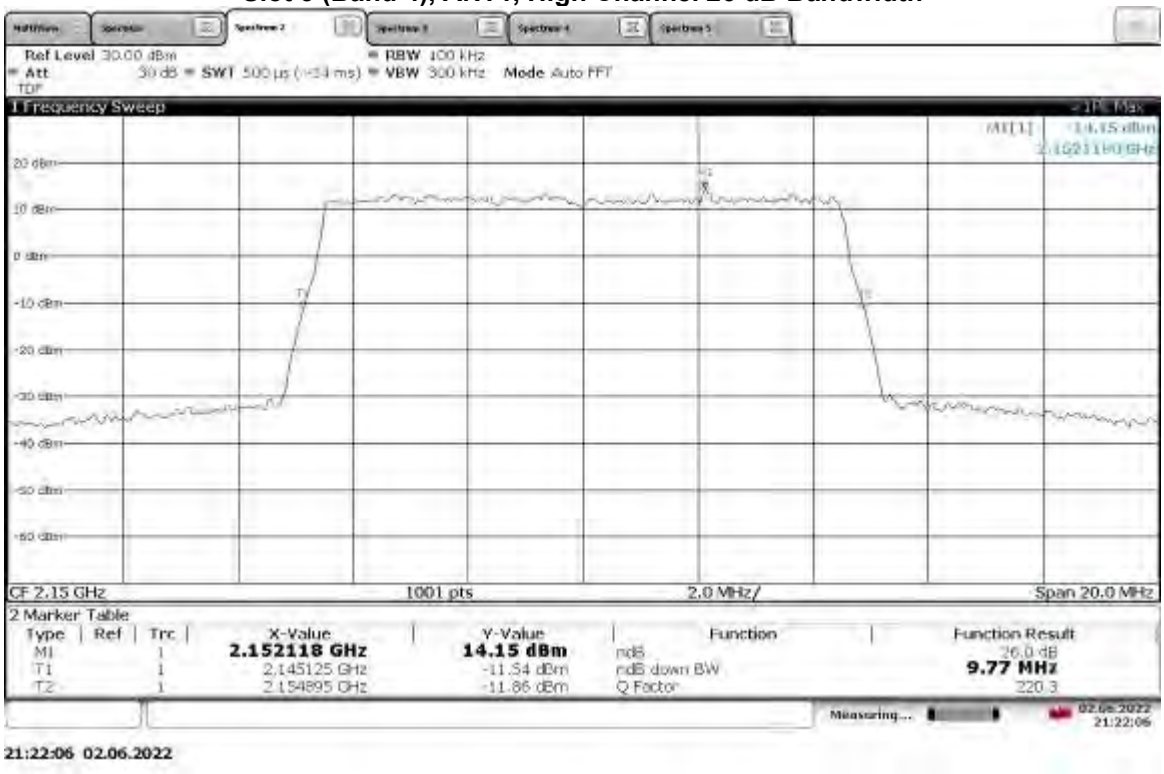
TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



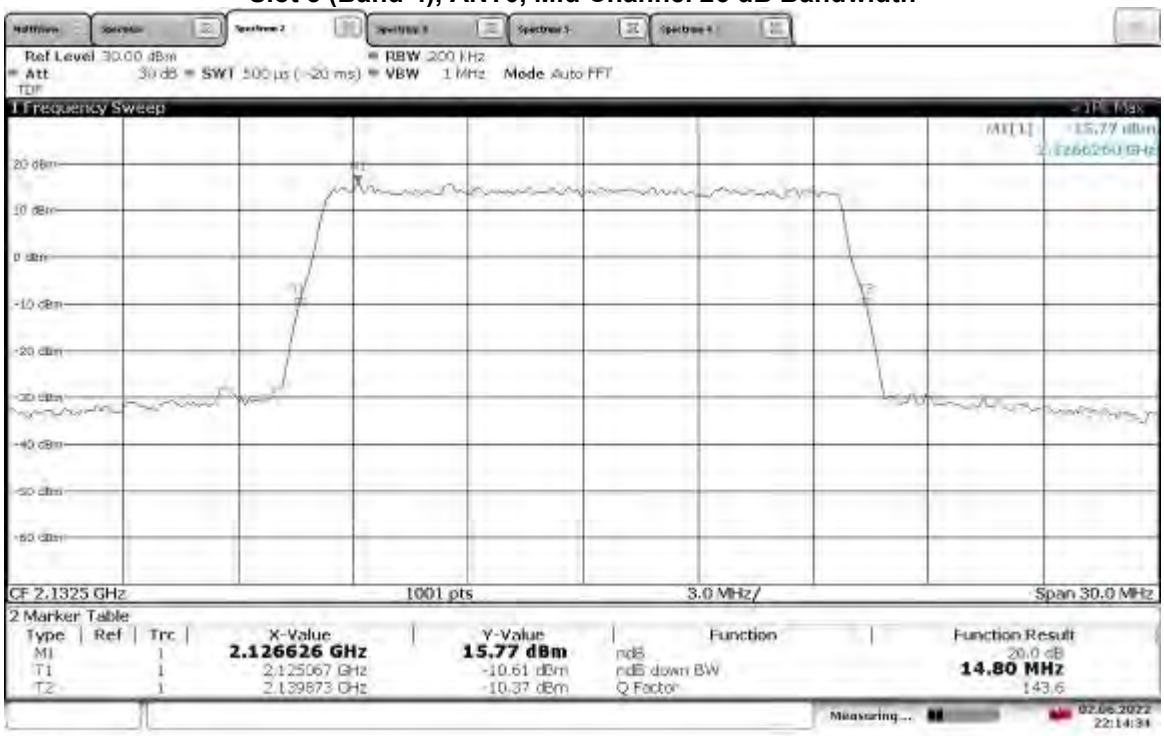
TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



TM3.1a-256QAM_10 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth

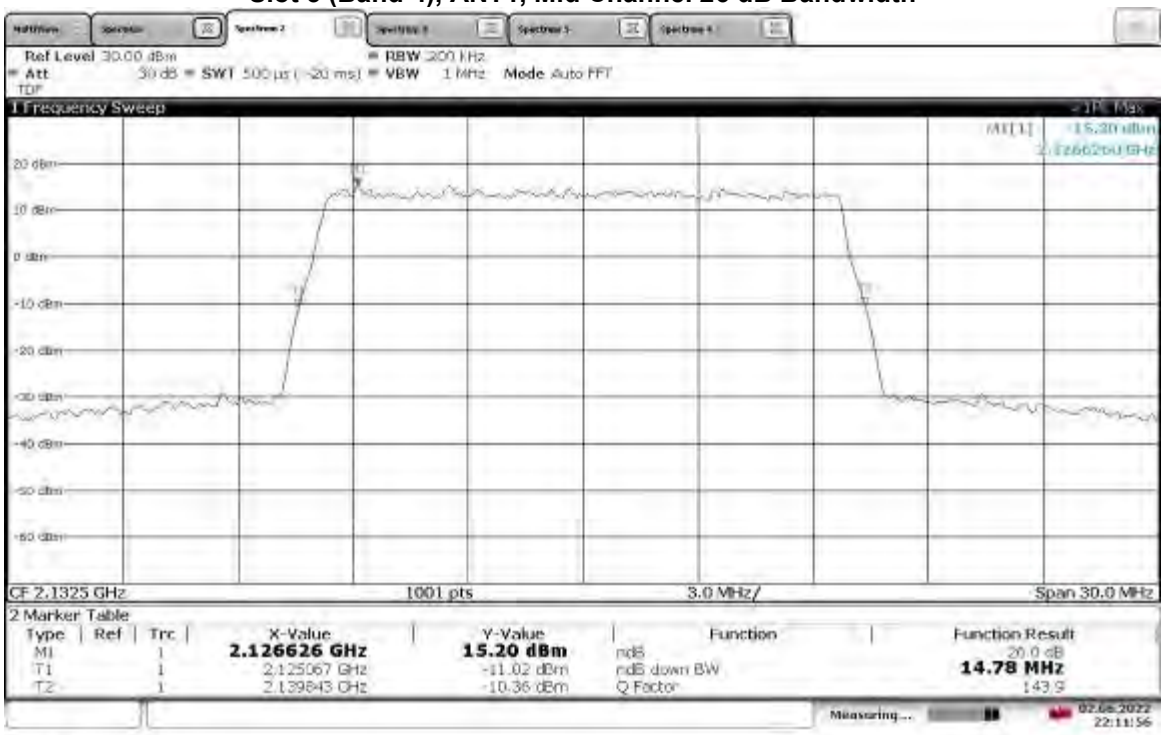


TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



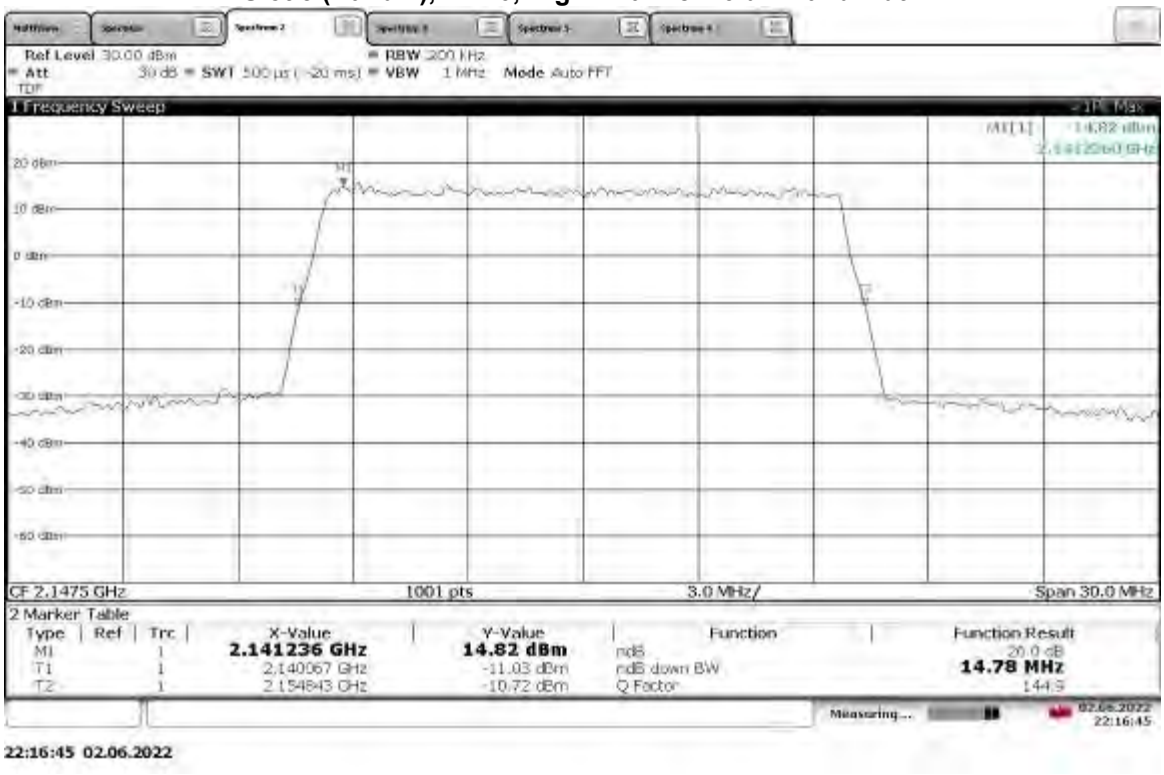
22:14:34 02.06.2022

TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



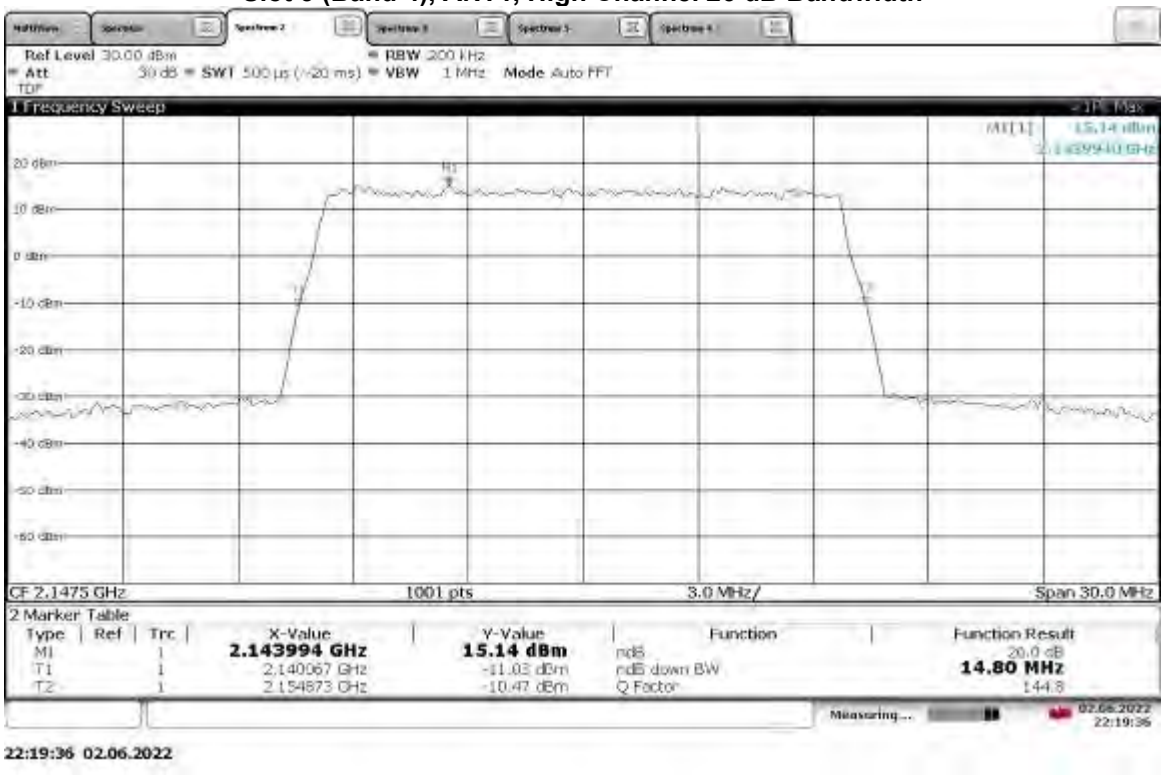
22:11:56 02.06.2022

TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



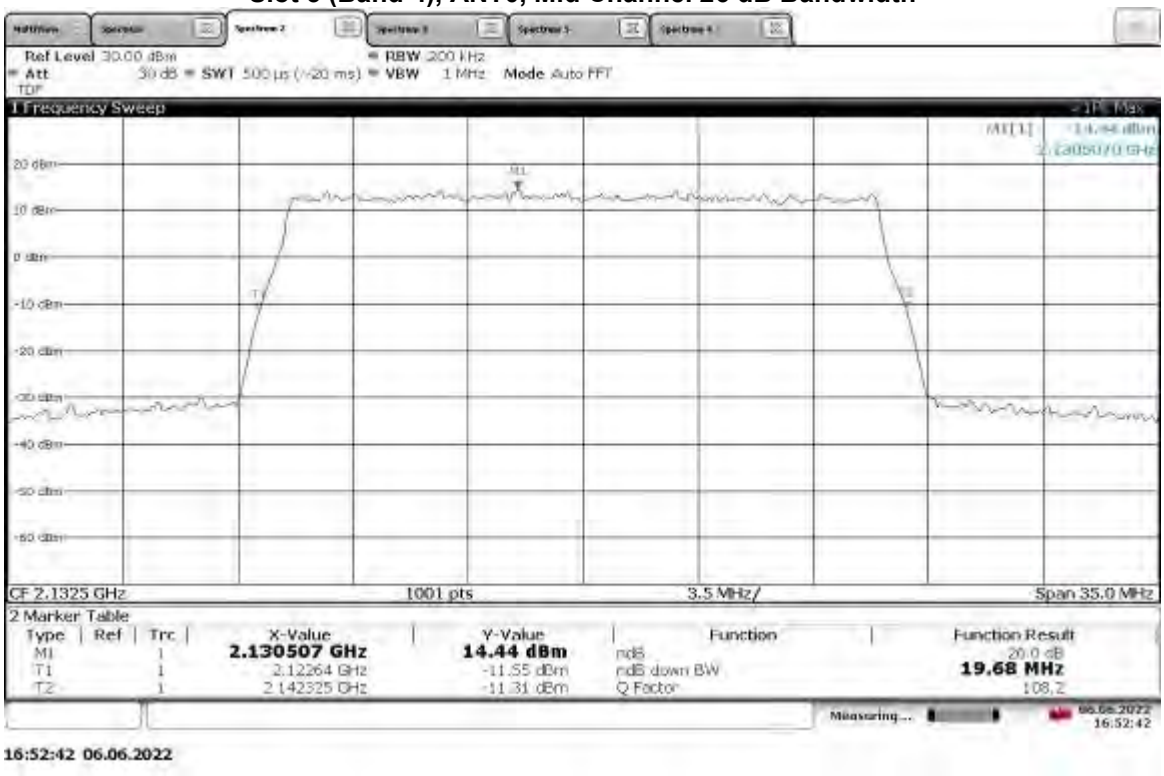
22:16:45 02.06.2022

TM3.1a-256QAM_15 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth

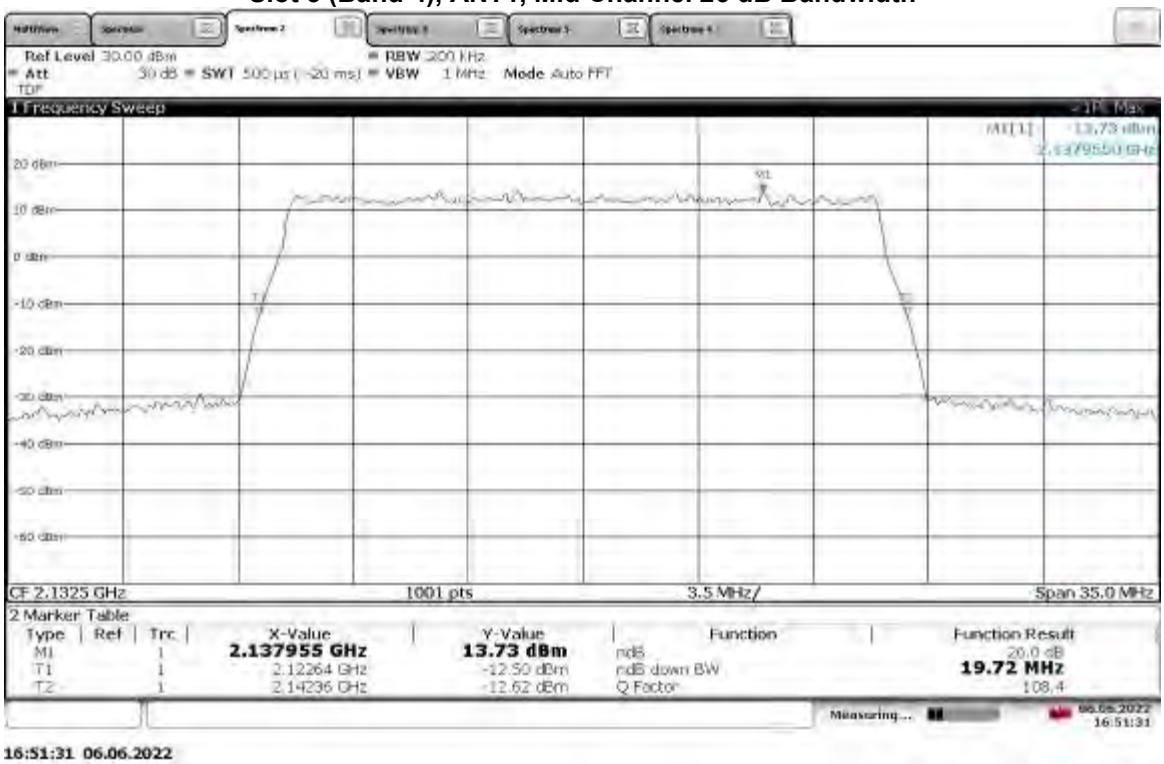


22:19:36 02.06.2022

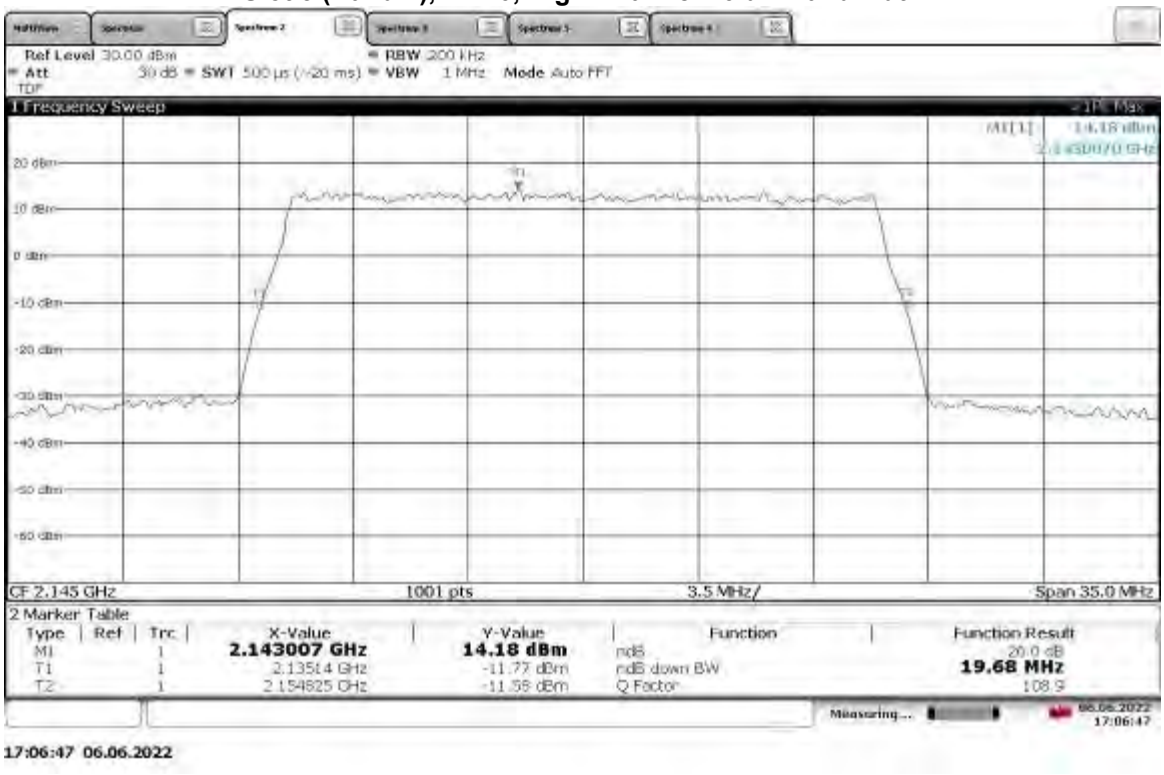
TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, Mid Channel 26 dB Bandwidth



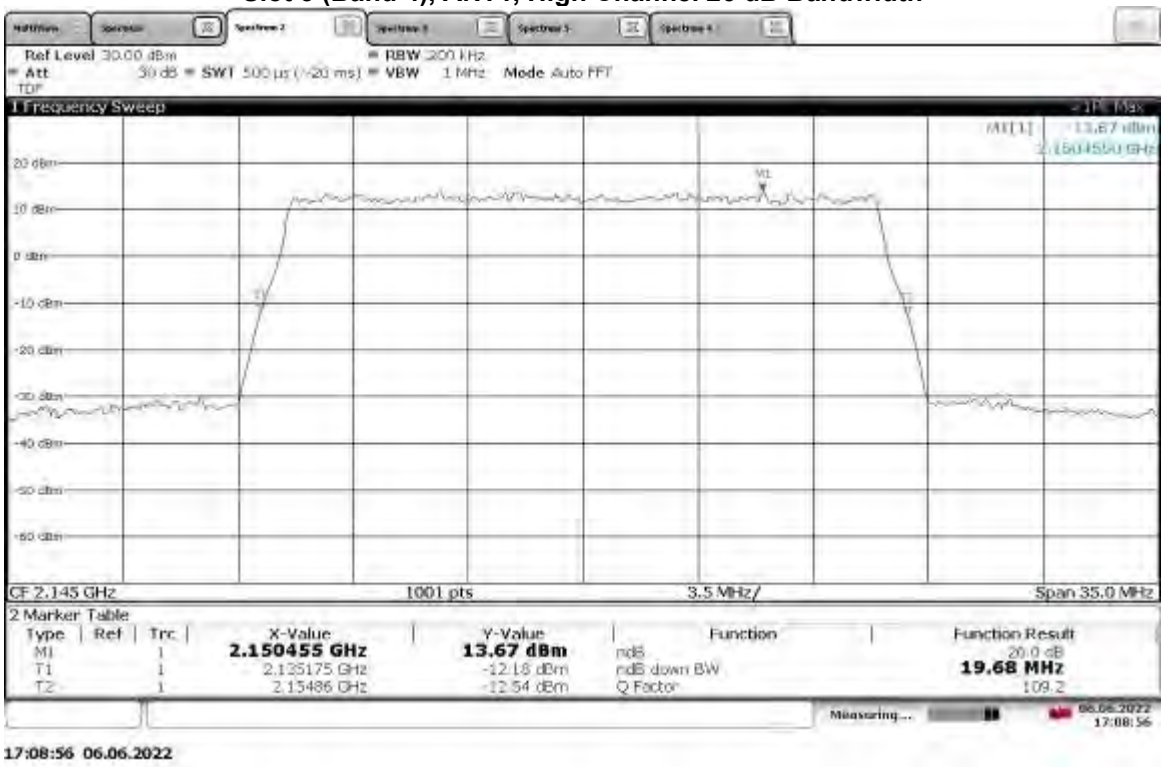
TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, Mid Channel 26 dB Bandwidth



TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT0, High Channel 26 dB Bandwidth



TM3.1a-256QAM_20 MHz Bandwidth
Slot 3 (Band 4), ANT1, High Channel 26 dB Bandwidth



Test Personnel:	Vathana Ven	Test Date:	06/02/2022, 06/06/2022
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:	22, 23 ºC
		Relative Humidity:	21, 15 %
		Atmospheric Pressure:	1004, 1013 mbars

Deviations, Additions, or Exclusions: None

9 Upper Band Edge Compliance

9.1 Method

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

TEST SITE: EMC Lab & 10m ALSE

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

9.2 Test Equipment Used:

Asset	Description	Manufacturer	Model	Serial	Cal Date	Cal Due
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	01/26/2022	01/26/2023
CBLHF2012-2M-2	2m 9kHz-40GHz Coaxial Cable – SET2	Huber & Suhner	SF102	252675001	02/10/2022	02/10/2023
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	11/02/2021	11/02/2022
DAV005'	Weather Station	Davis	6250	MS191218083	02/11/2022	02/11/2023

Software Utilized:

Name	Manufacturer	Version
None	--	--

9.3 Results:

The sample tested was found to Comply.

FCC Part § 27.53(h) (1): 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.

FCC Part § 27.53(h) (3): The Compliance with this provision is based on the use of measurement instrumentation employing a resolution bandwidth of 1 megahertz or greater. However, in the 1 megahertz bands immediately outside and adjacent to the licensee's frequency block, a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emissions are attenuated at least 26 dB below the transmitter power.

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2152.5	ANT0	-28.29
		ANT1	-27.85

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2150.00	ANT0	-31.41
		ANT1	-30.84

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2147.50	ANT0	-30.05
		ANT1	-32.60

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2145.00	ANT0	-34.07
		ANT1	-34.05

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2152.5	ANT0	-28.46
		ANT1	-27.83

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2150.00	ANT0	-31.46
		ANT1	-30.80

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2147.50	ANT0	-33.26
		ANT1	-32.90

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2145.00	ANT0	-34.15
		ANT1	-33.86

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2152.5	ANT0	-28.37
		ANT1	-27.67

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2150.00	ANT0	-31.28
		ANT1	-30.83

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2147.50	ANT0	-33.13
		ANT1	-32.63

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2145.00	ANT0	-33.58
		ANT1	-33.94

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2152.5	ANT0	-28.36
		ANT1	-27.83

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2150.00	ANT0	-31.24
		ANT1	-30.81

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

Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2147.50	ANT0	-33.02
		ANT1	-32.56

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

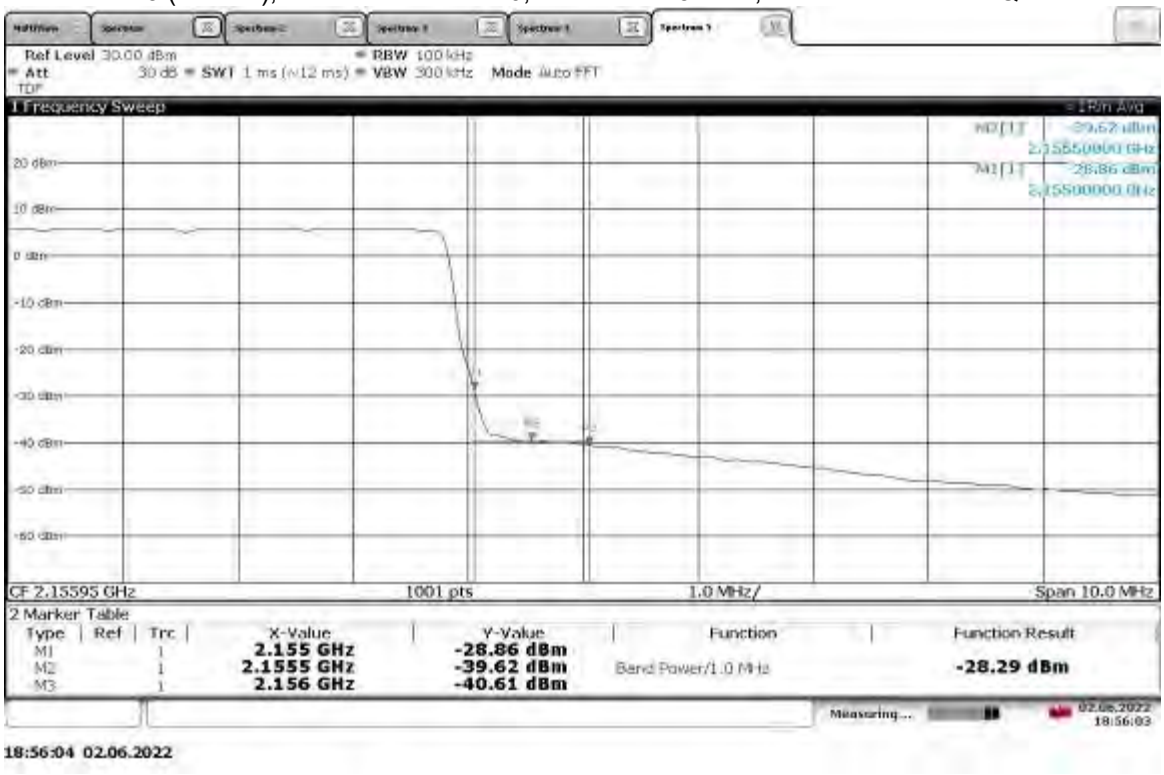
Band Edge	Frequency (MHz)	Antenna Port	Reading (dBm)
High	2145.00	ANT0	-34.04
		ANT1	-33.68

9.4 Setup Photograph:

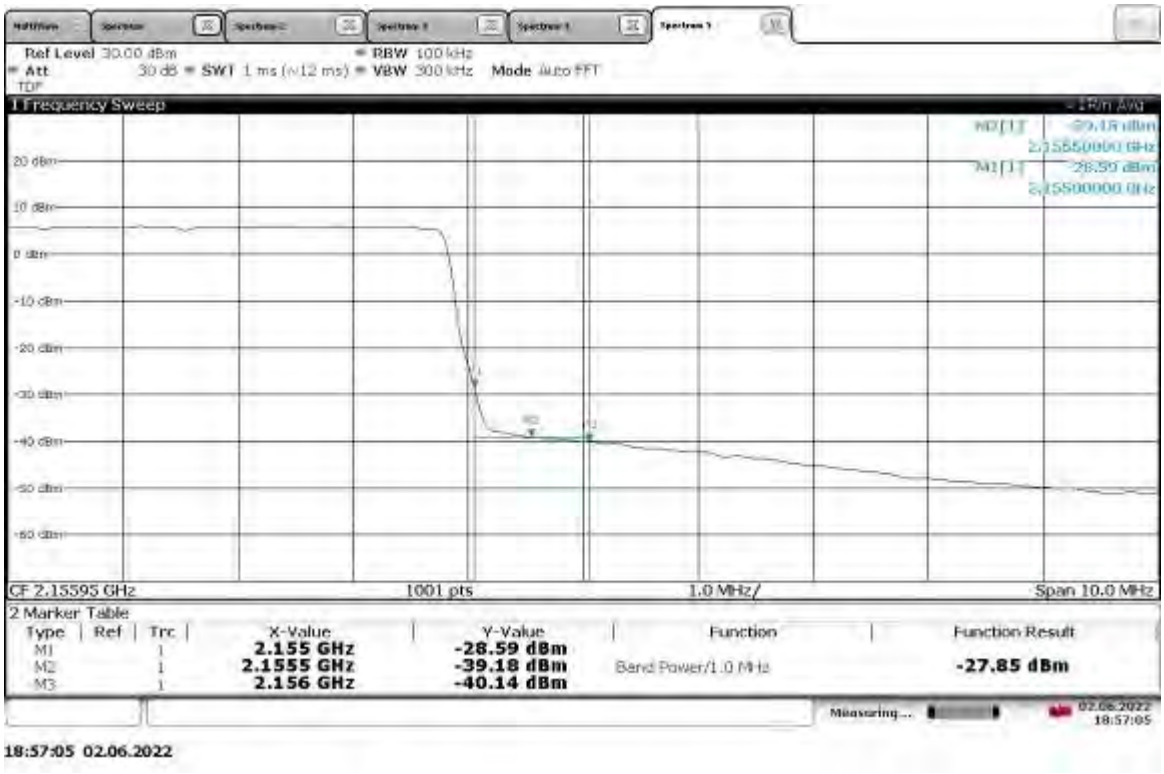
Confidential – Photos not included in this report

9.5 Plots/Data:

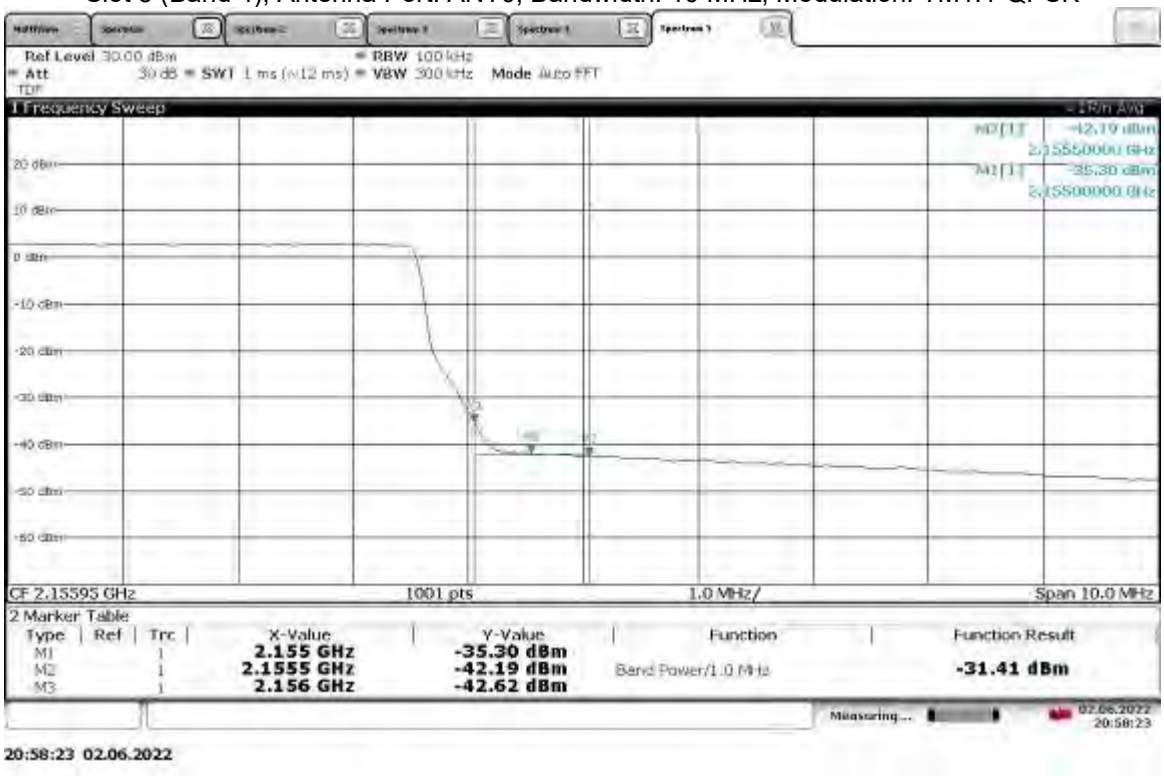
Band Edge Compliant, Upper Band Edge, 2152.5 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK



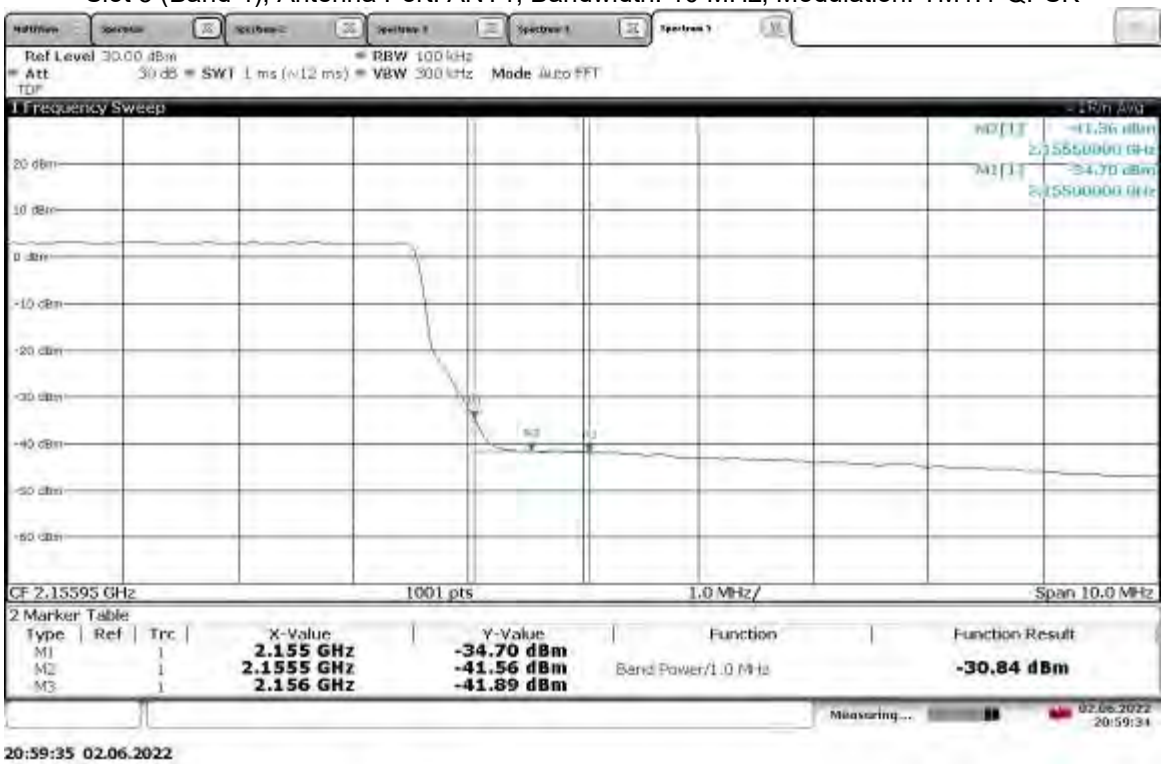
Band Edge Compliant, Upper Band Edge, 2152.5 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK


Ref Level 30.00 dBm
RBW 100 kHz
Att 30 dB SWT 1 ms (~12 ms) VBW 300 kHz Mode Auto FFT
TDF
1 Frequency Sweep
1Rm Avg
M2[1] -39.18 dBm
2.15550000 GHz
M1[1] -28.59 dBm
2.15500000 GHz
20 dBm
10 dBm
0 dBm
-10 dBm
-20 dBm
-30 dBm
-40 dBm
-50 dBm
-60 dBm
CF 2.15595 GHz
1001 pts
1.0 MHz/
Span 10.0 MHz
2 Marker Table
Type Ref Trc X-Value Y-Value Function Function Result
M1 1 2.155 GHz -28.59 dBm
M2 1 2.1555 GHz -39.18 dBm Band Power/1.0 MHz -27.85 dBm
M3 1 2.156 GHz -40.14 dBm
Measuring...
02.06.2022
18:57:05
18:57:05 02.06.2022

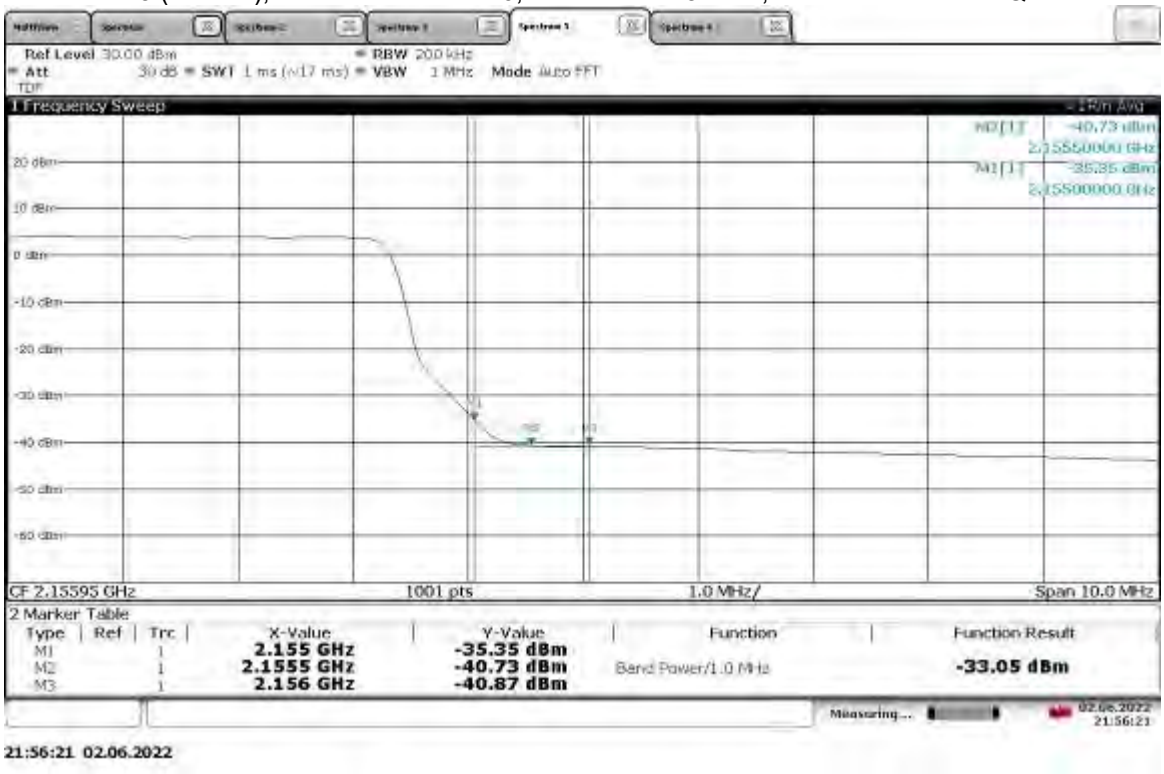
Band Edge Compliant, Upper Band Edge, 2150 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



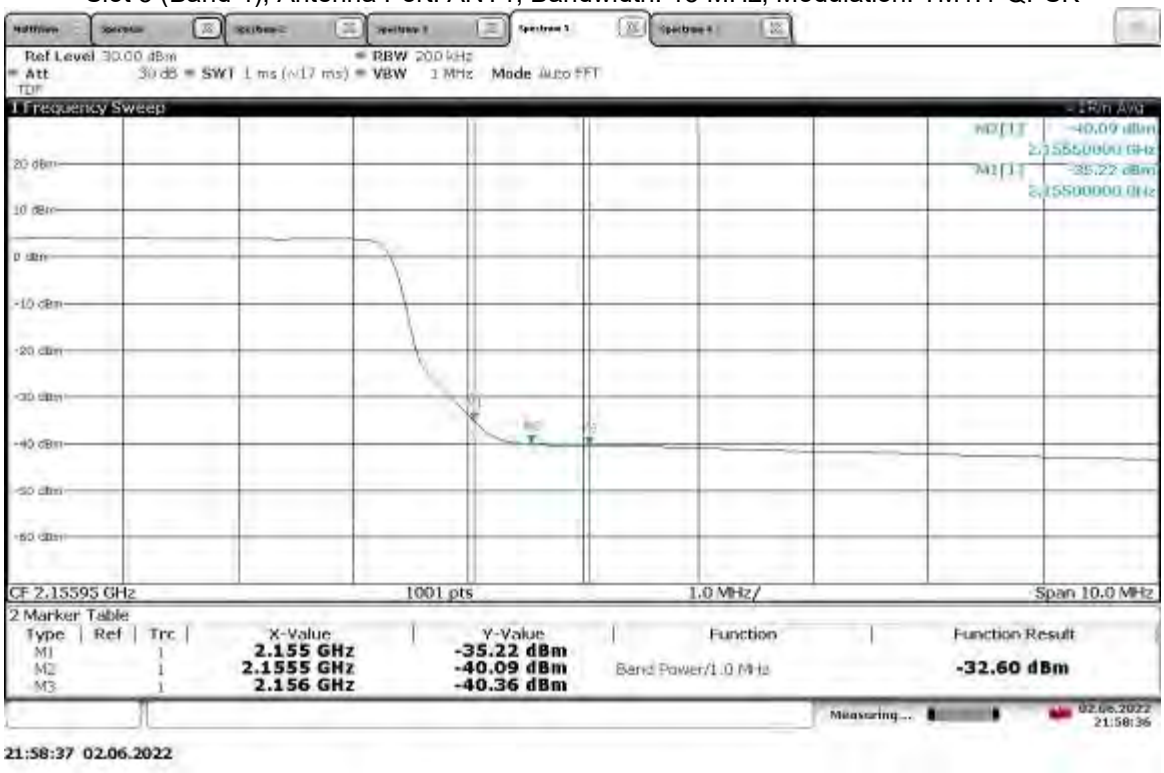
Band Edge Compliant, Upper Band Edge, 2150 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK



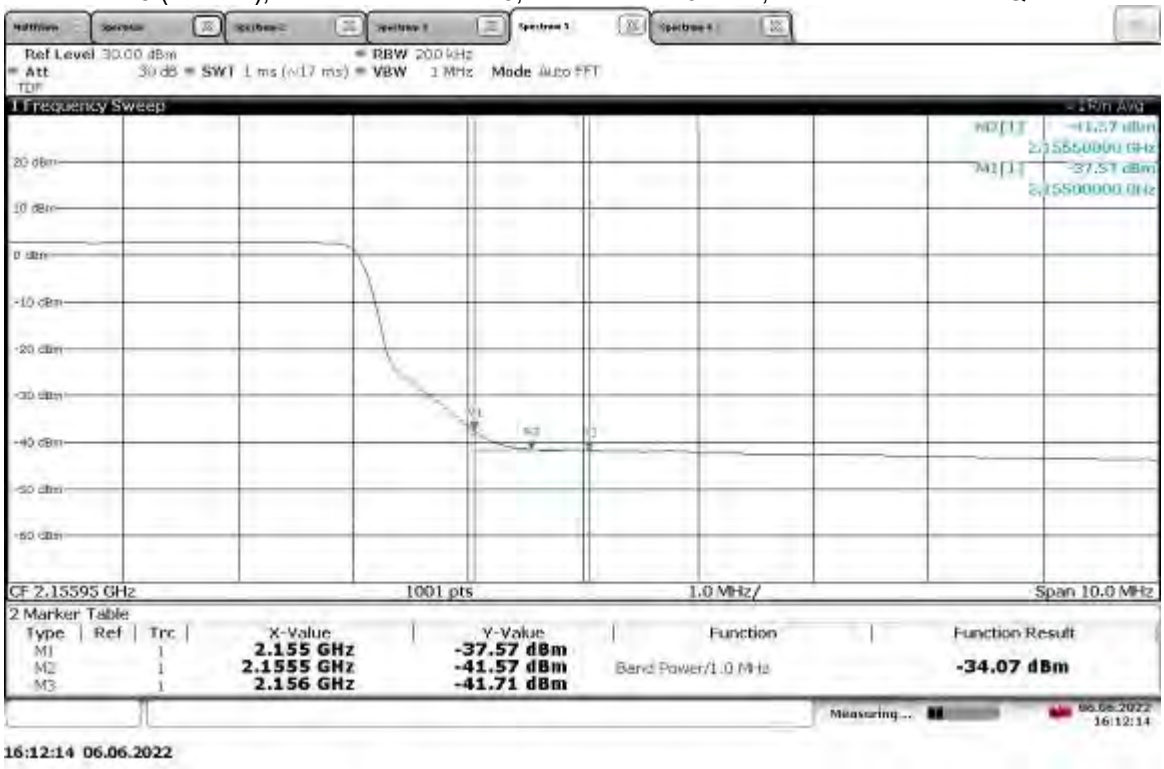
Band Edge Compliant, Upper Band Edge, 2147.5 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



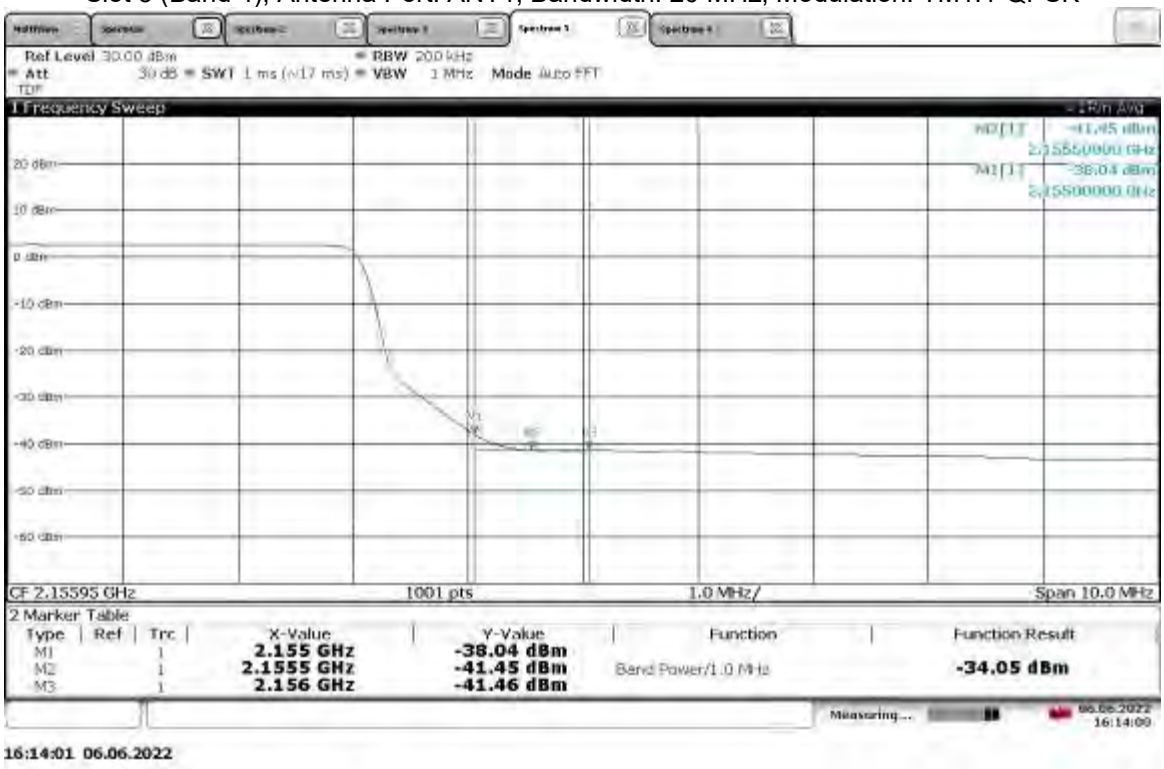
Band Edge Compliant, Upper Band Edge, 2147.5 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM1.1-QPSK



Band Edge Compliant, Upper Band Edge, 2145 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK

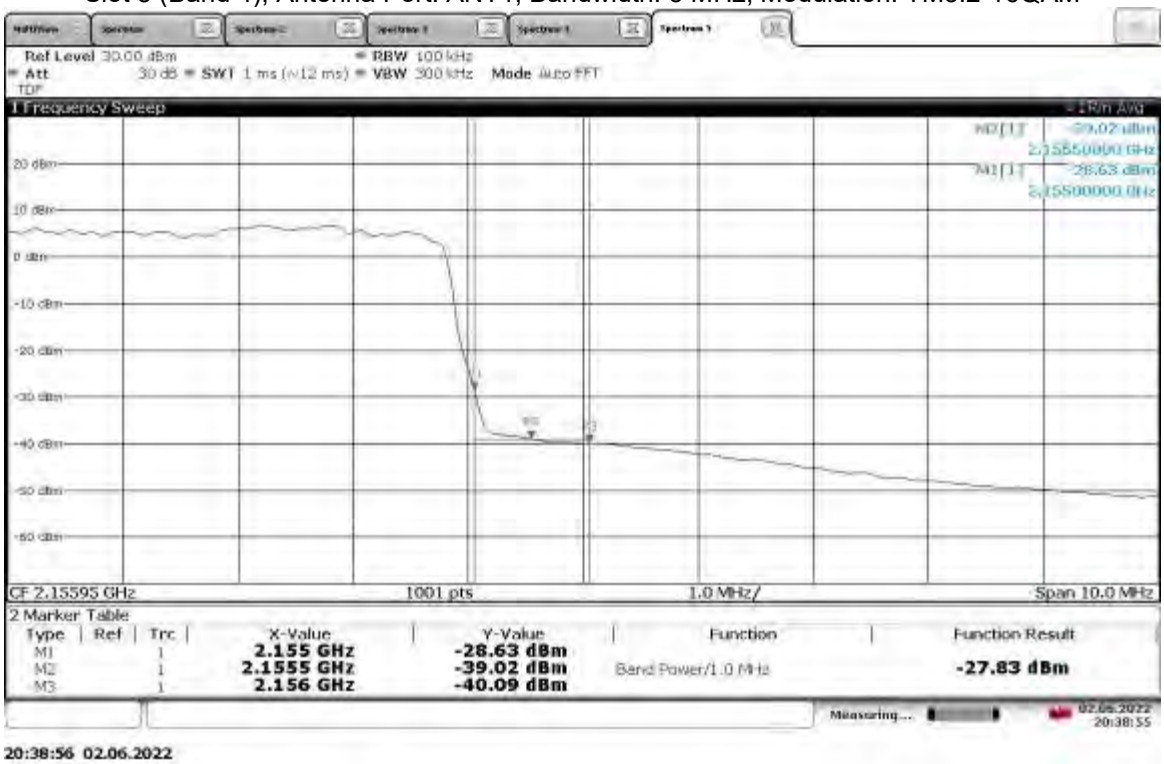


Band Edge Compliant, Upper Band Edge, 2145 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM1.1-QPSK

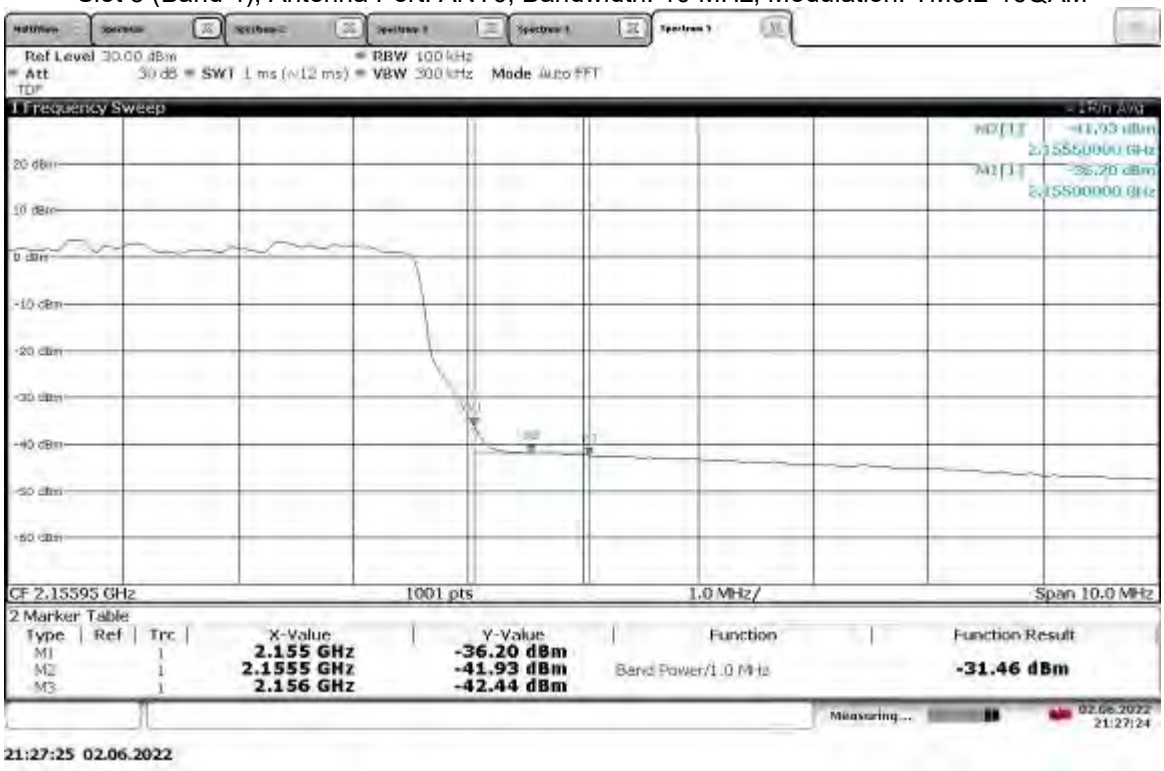


Band Edge Compliant, Upper Band Edge, 2152.5 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM

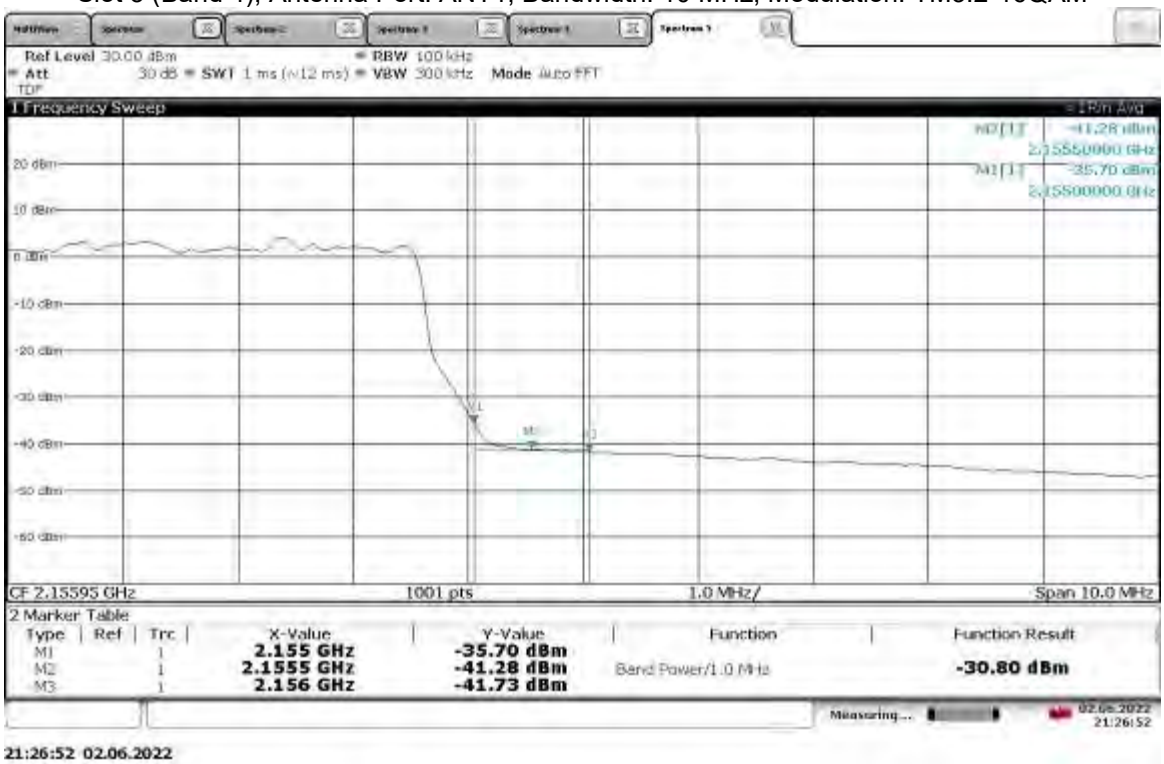
Band Edge Compliant, Upper Band Edge, 2152.5 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM



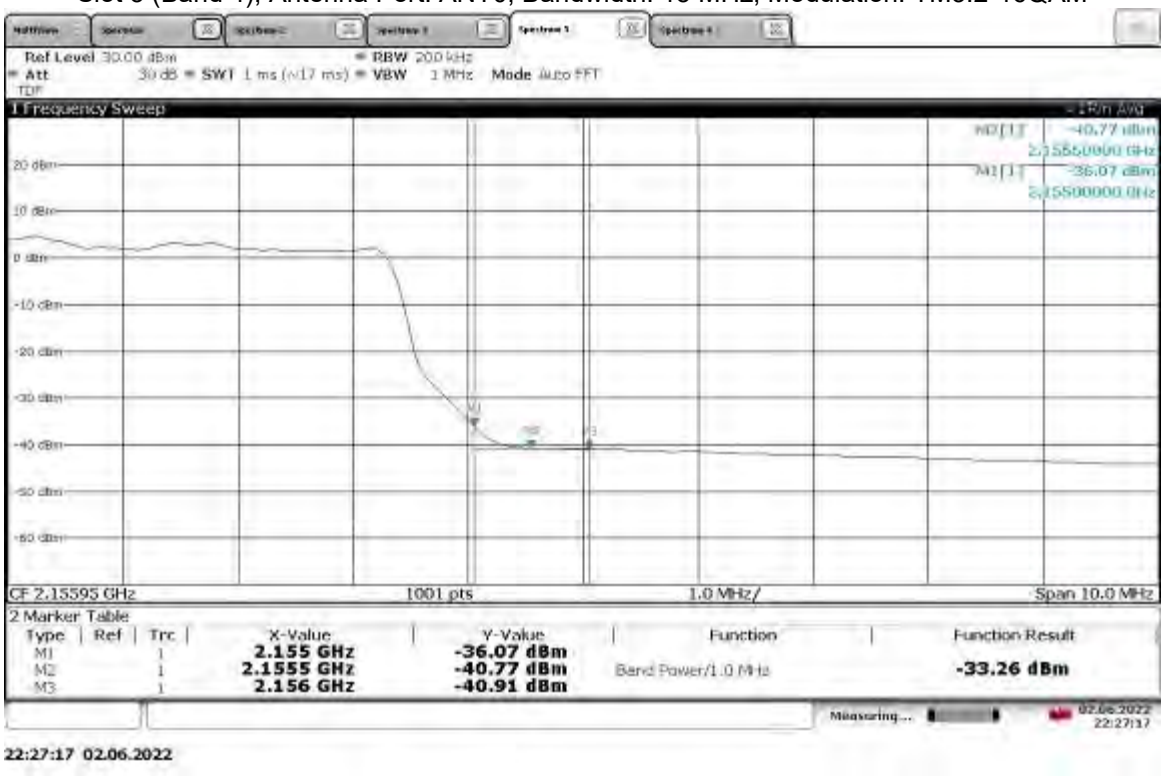
Band Edge Compliant, Upper Band Edge, 2150 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



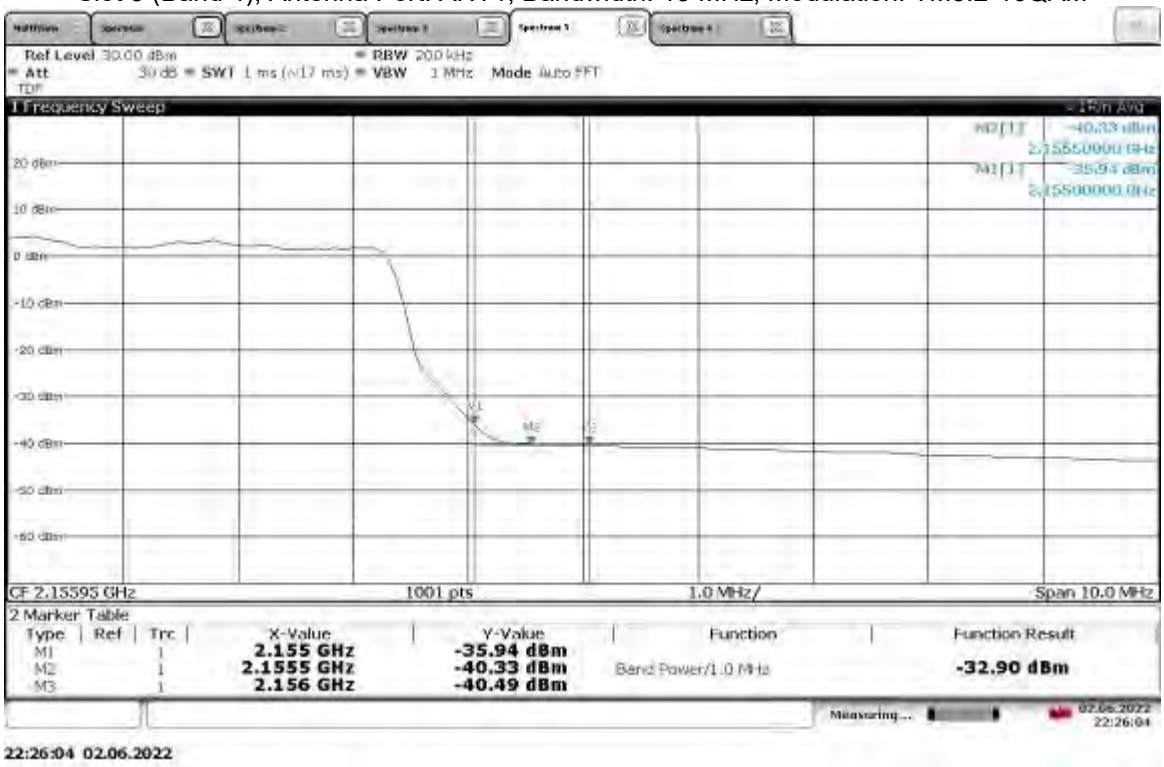
Band Edge Compliant, Upper Band Edge, 2150 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM



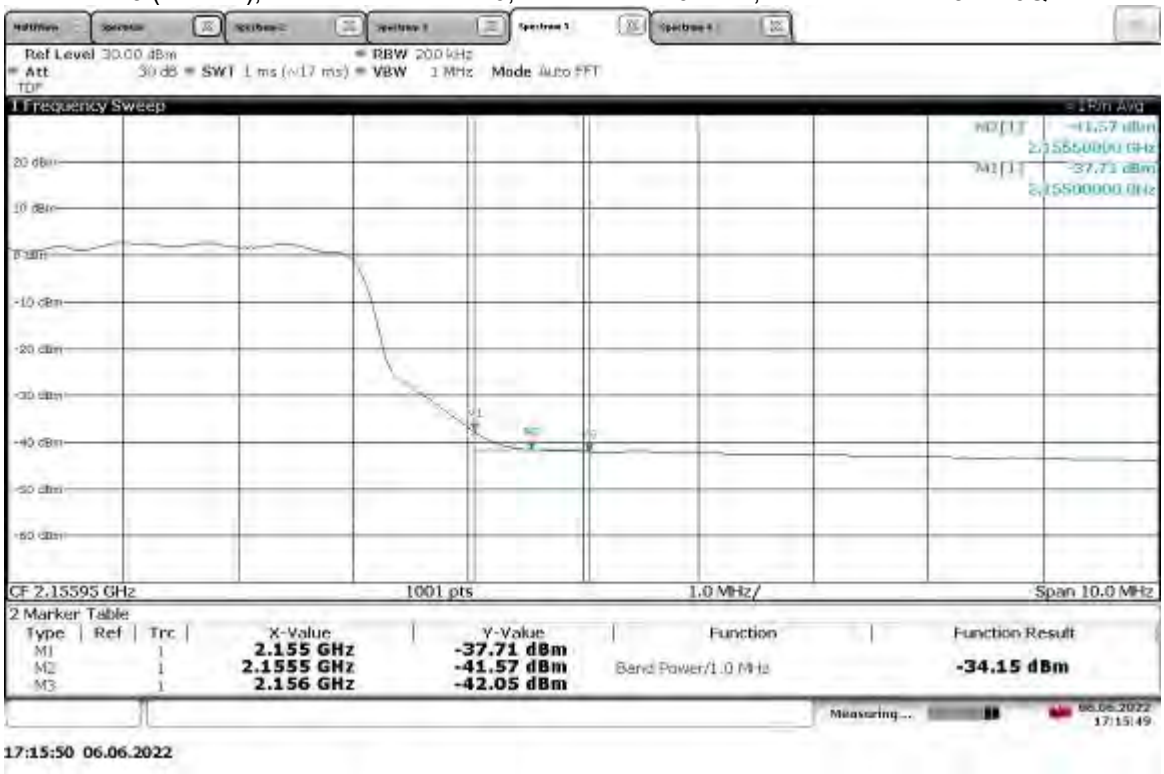
Band Edge Compliant, Upper Band Edge, 2147.5 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



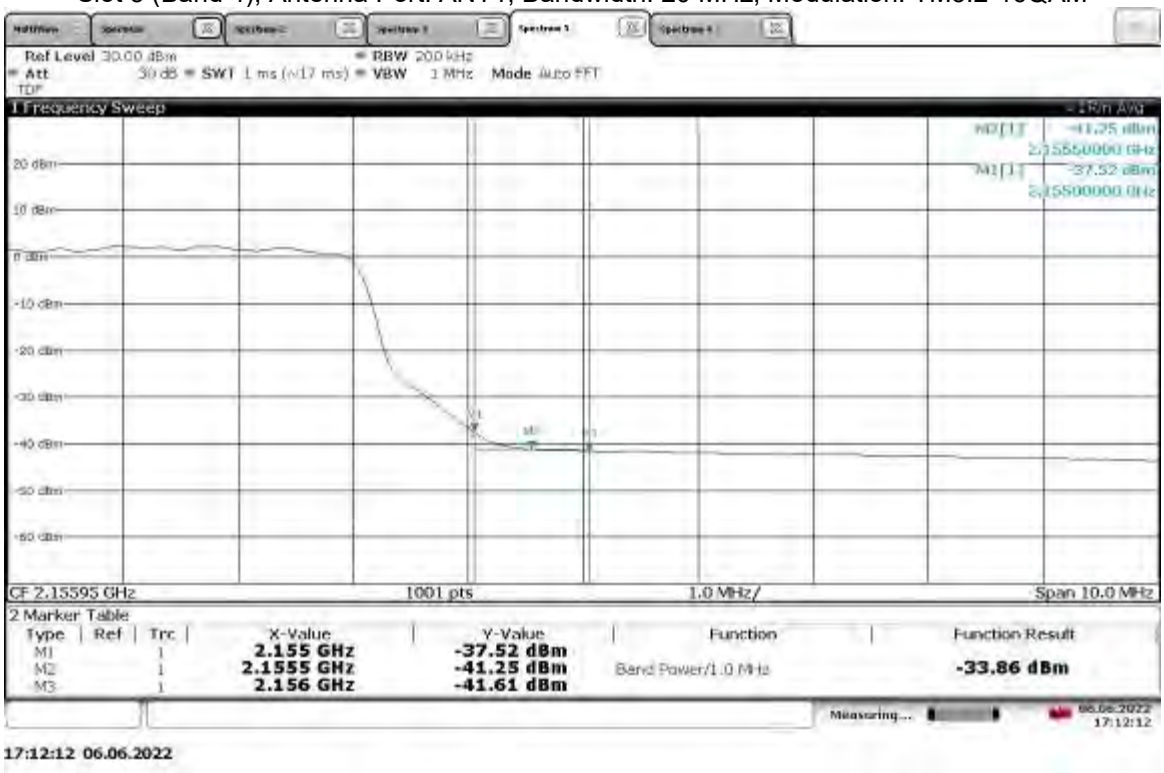
Band Edge Compliant, Upper Band Edge, 2147.5 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.2-16QAM



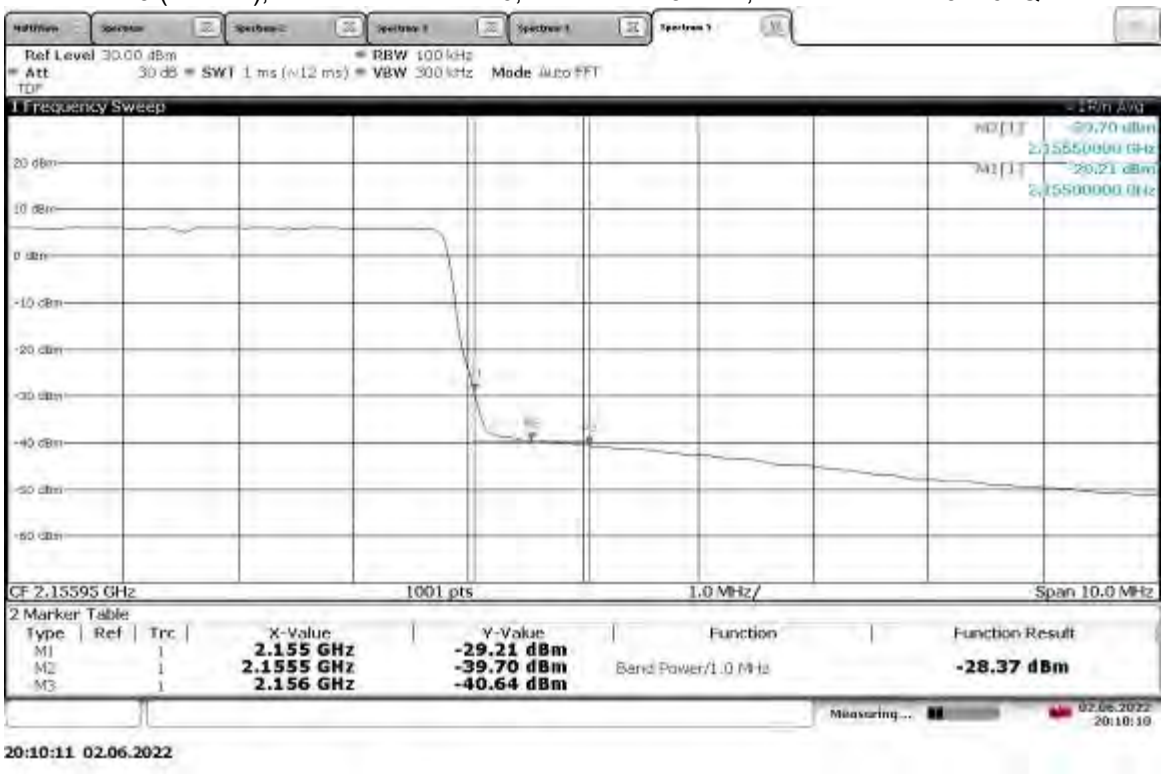
Band Edge Compliant, Upper Band Edge, 2145 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



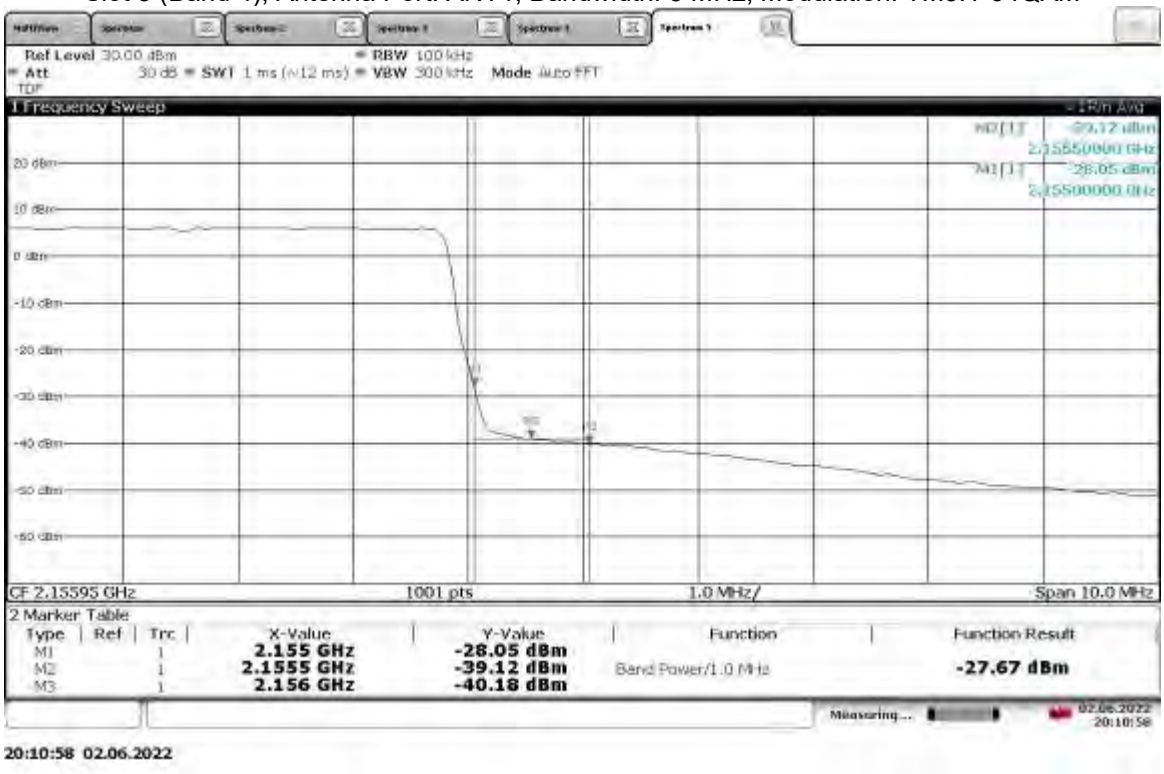
Band Edge Compliant, Upper Band Edge, 2145 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.2-16QAM



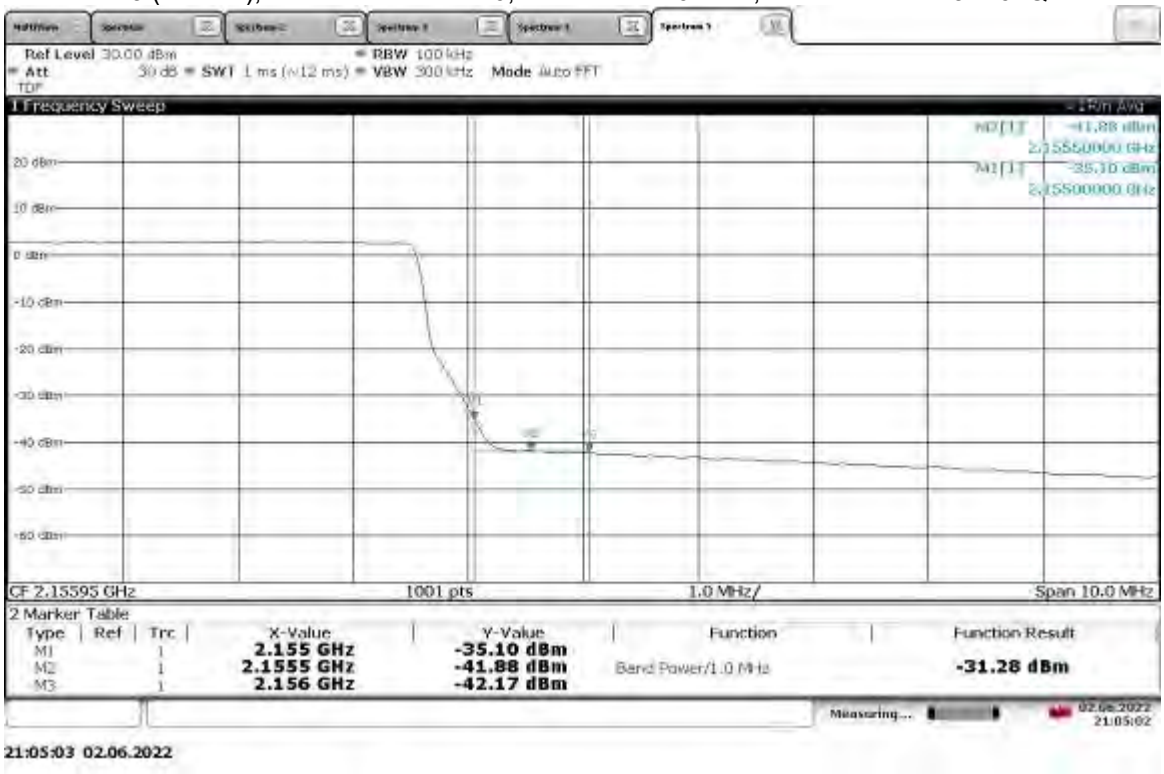
Band Edge Compliant, Upper Band Edge, 2152.5 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



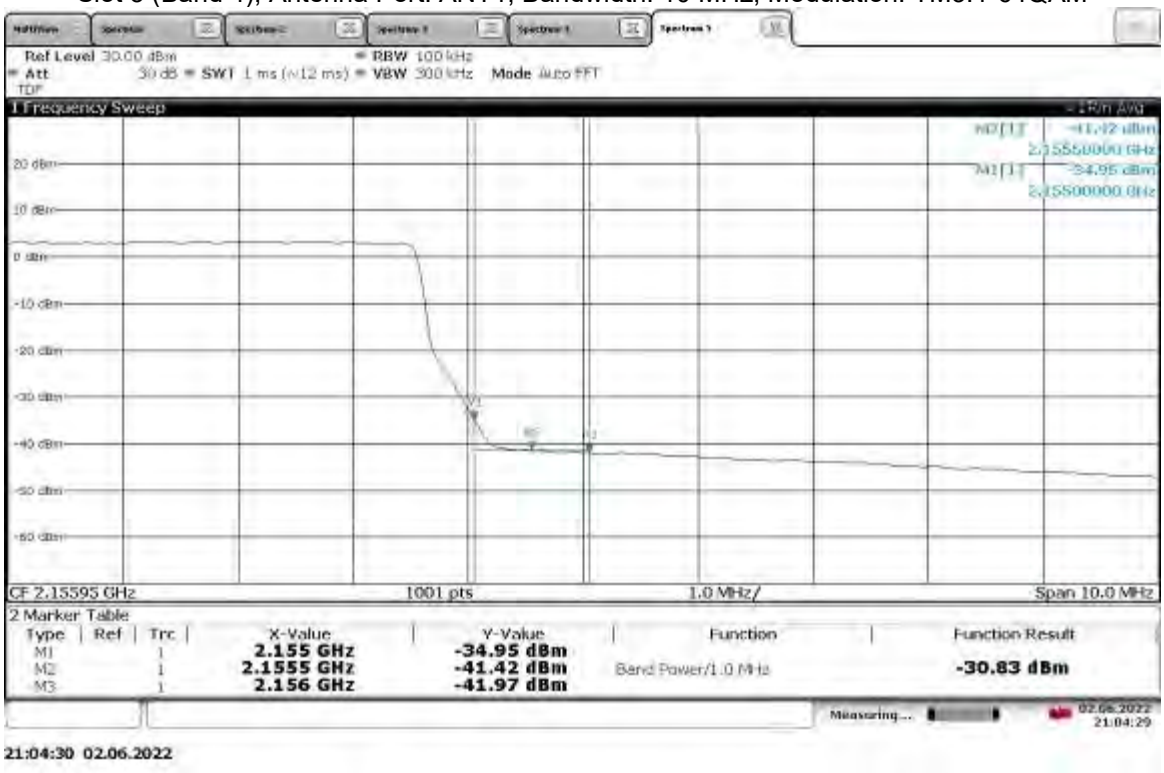
Band Edge Compliant, Upper Band Edge, 2152.5 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM



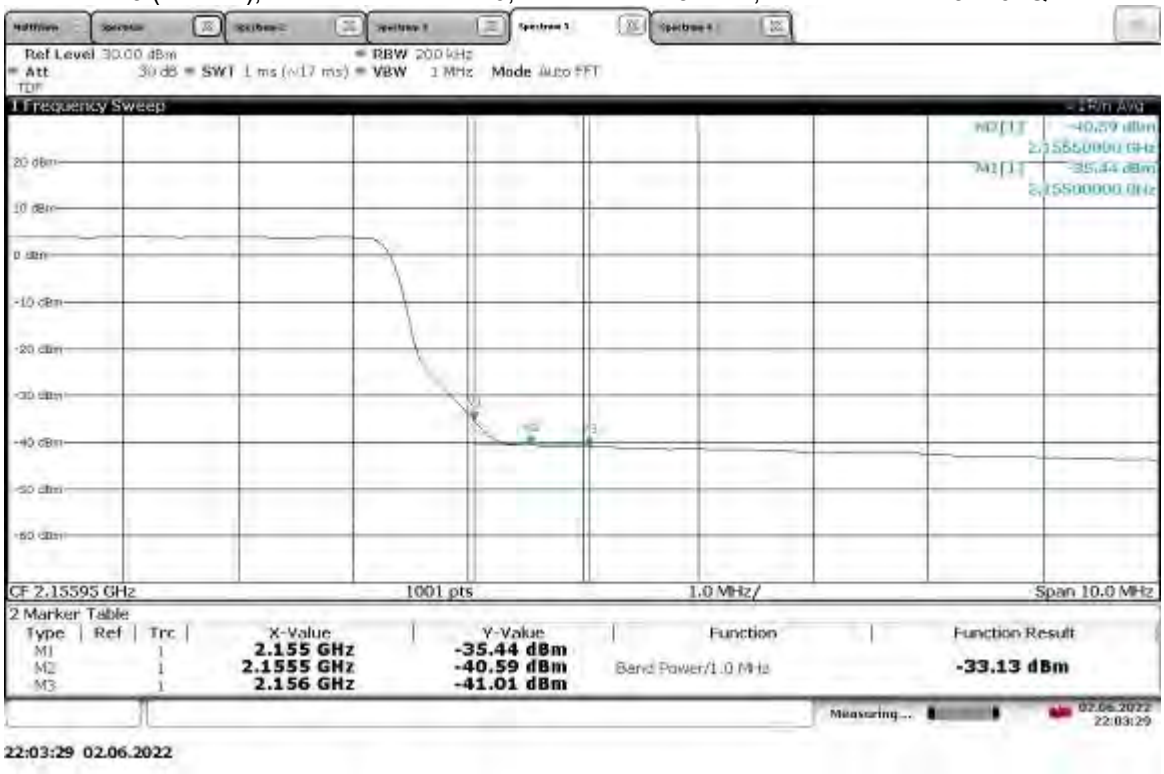
Band Edge Compliant, Upper Band Edge, 2150 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



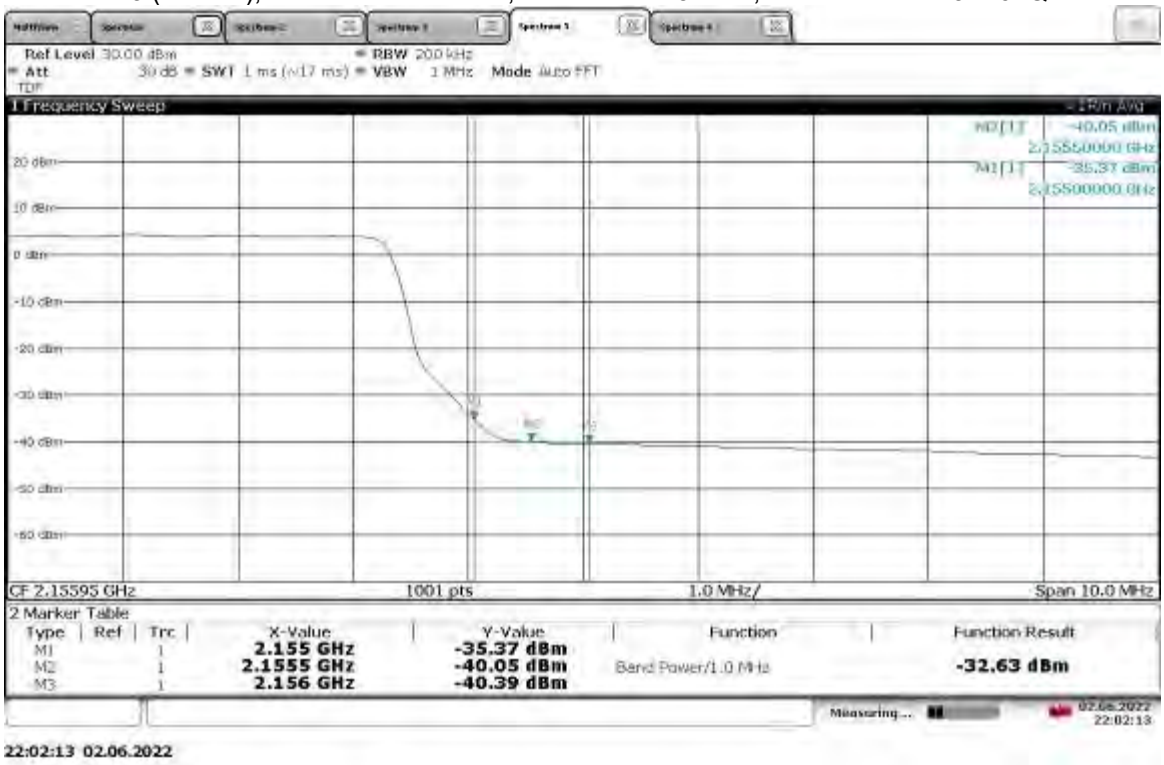
Band Edge Compliant, Upper Band Edge, 2150 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM



Band Edge Compliant, Upper Band Edge, 2147.5 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM

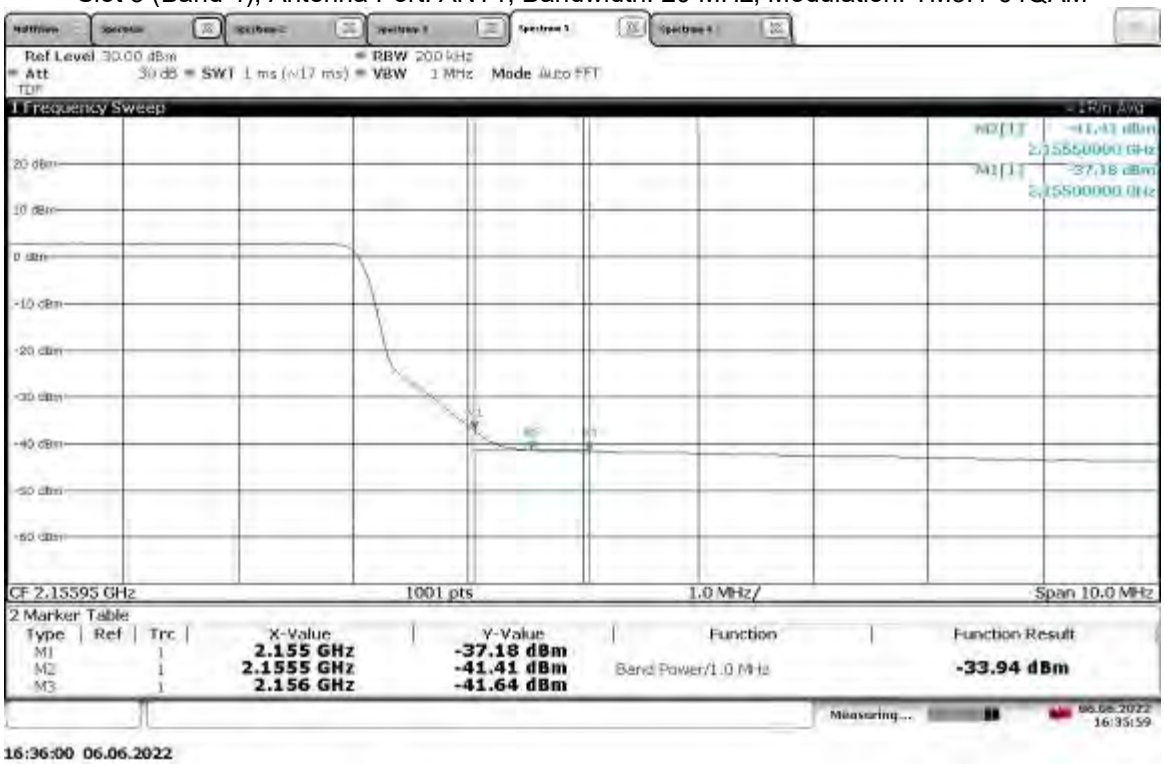


Band Edge Compliant, Upper Band Edge, 2147.5 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1-64QAM

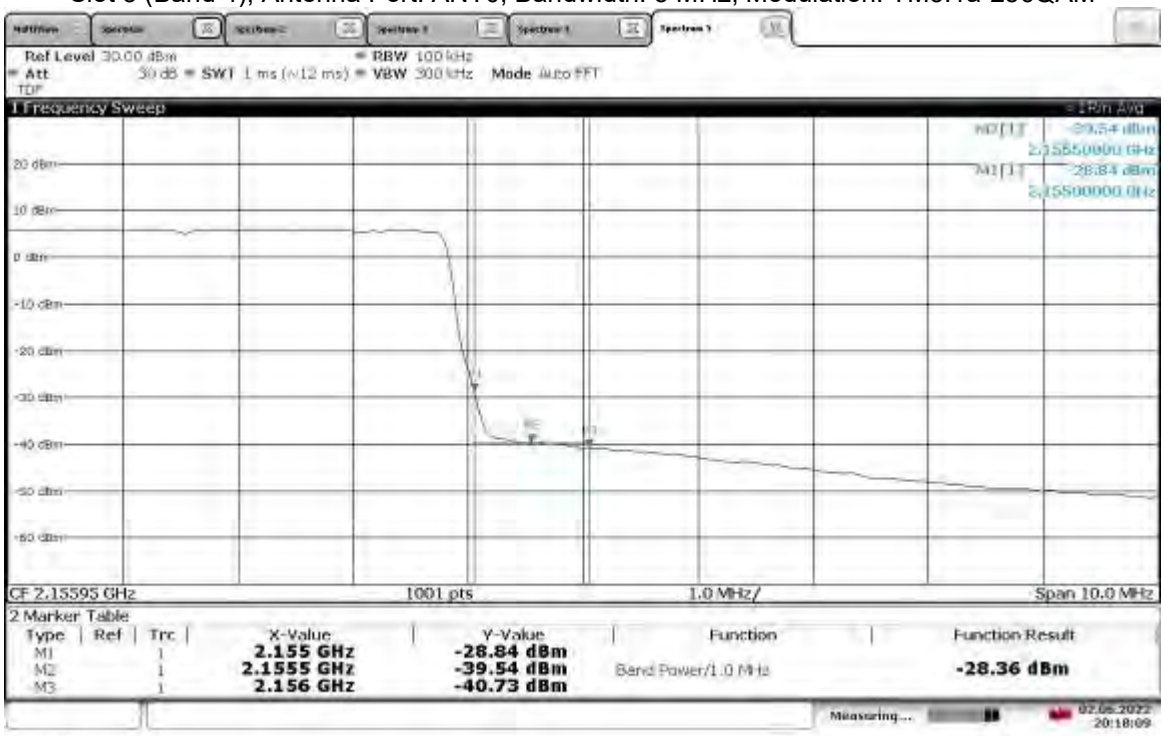


Band Edge Compliant, Upper Band Edge, 2145 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM

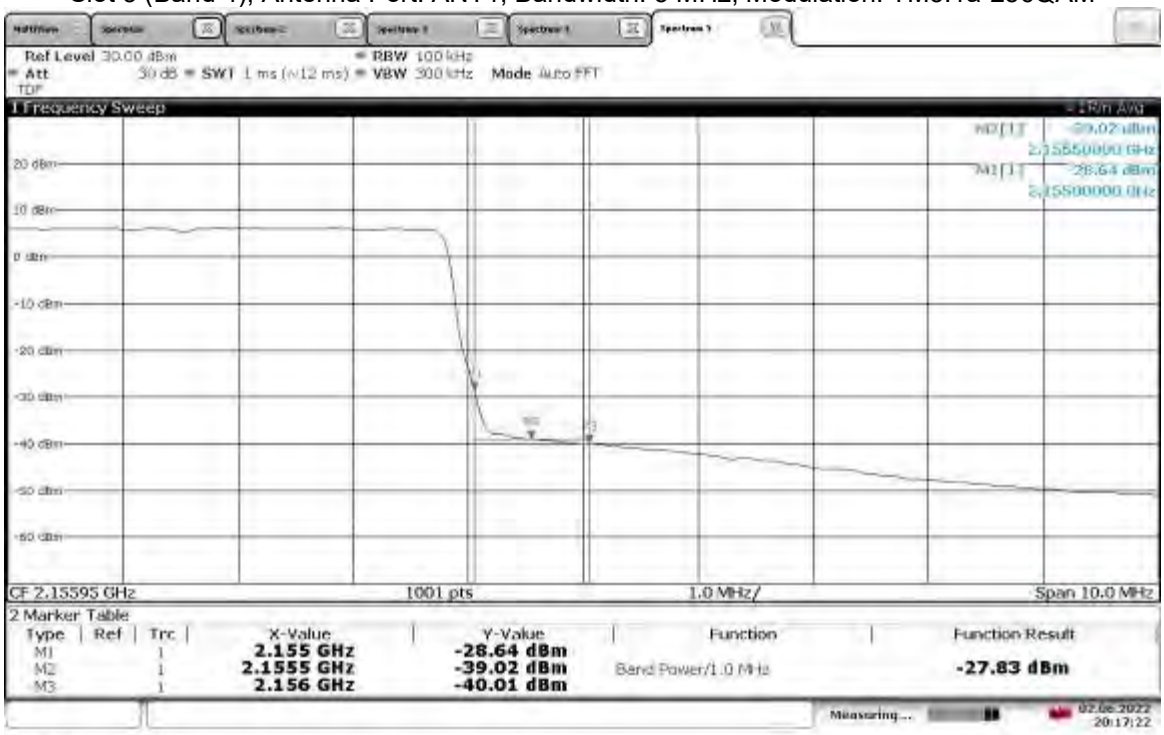
Band Edge Compliant, Upper Band Edge, 2145 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1-64QAM



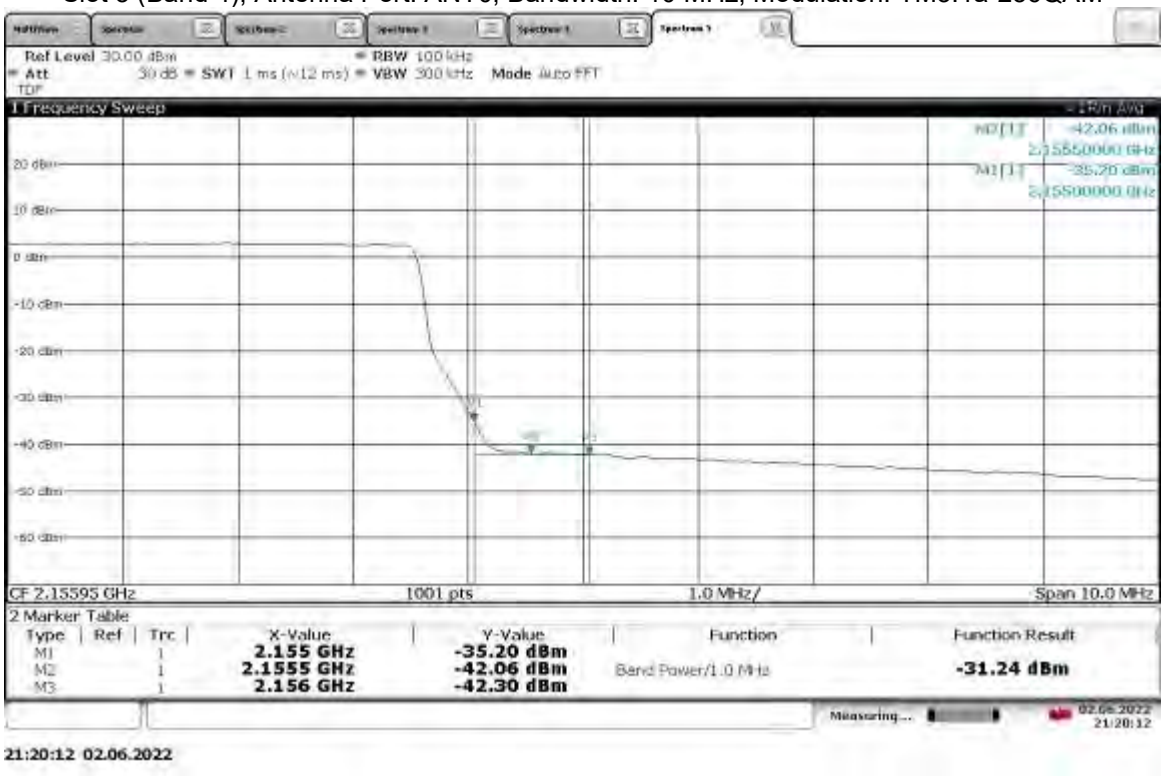
Band Edge Compliant, Upper Band Edge, 2152.5 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



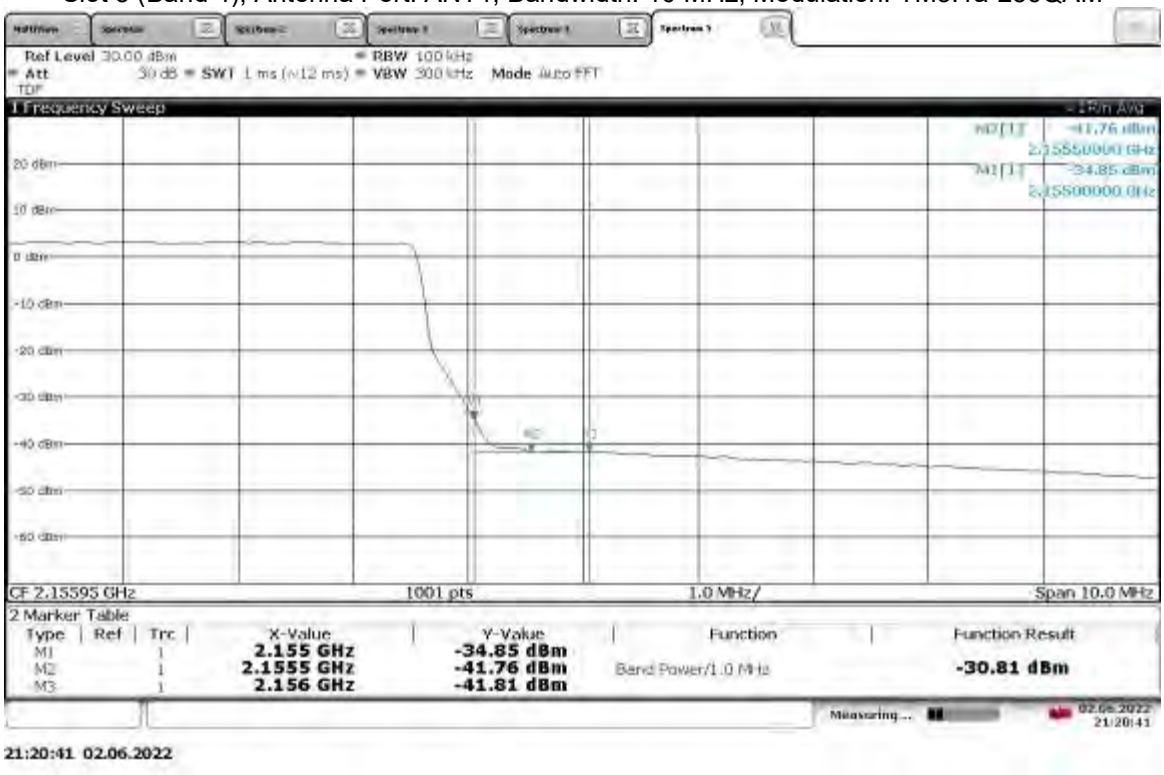
Band Edge Compliant, Upper Band Edge, 2152.5 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM



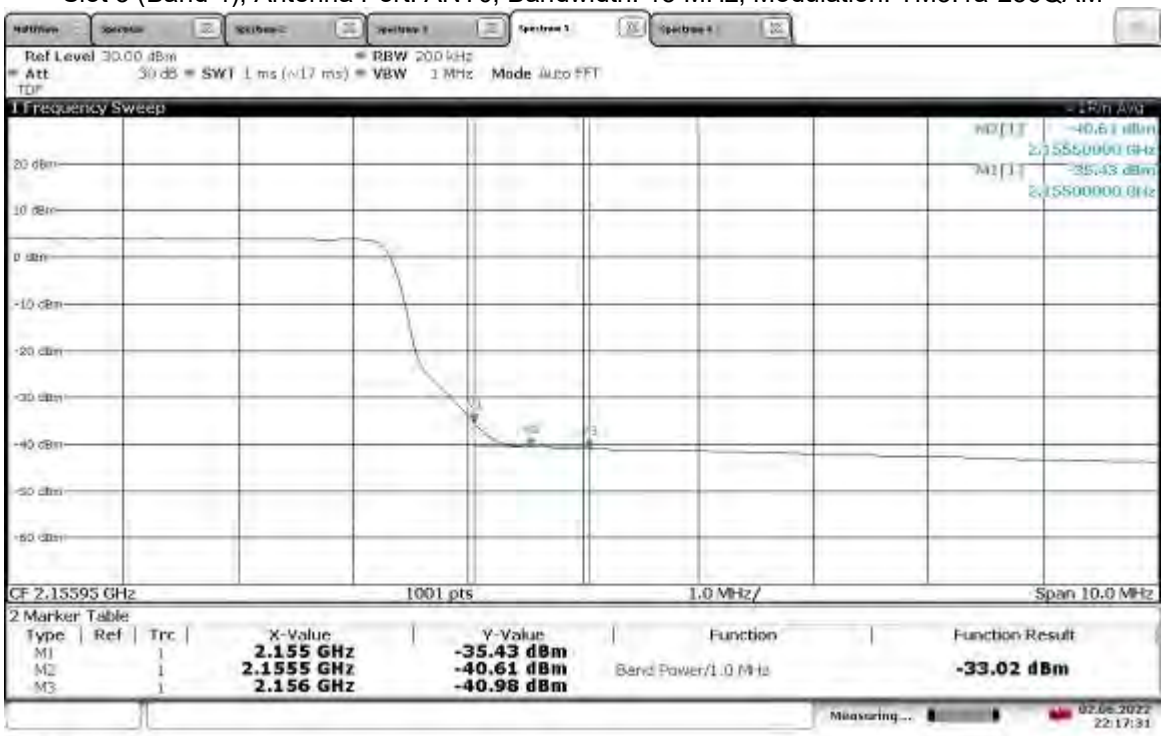
Band Edge Compliant, Upper Band Edge, 2150 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



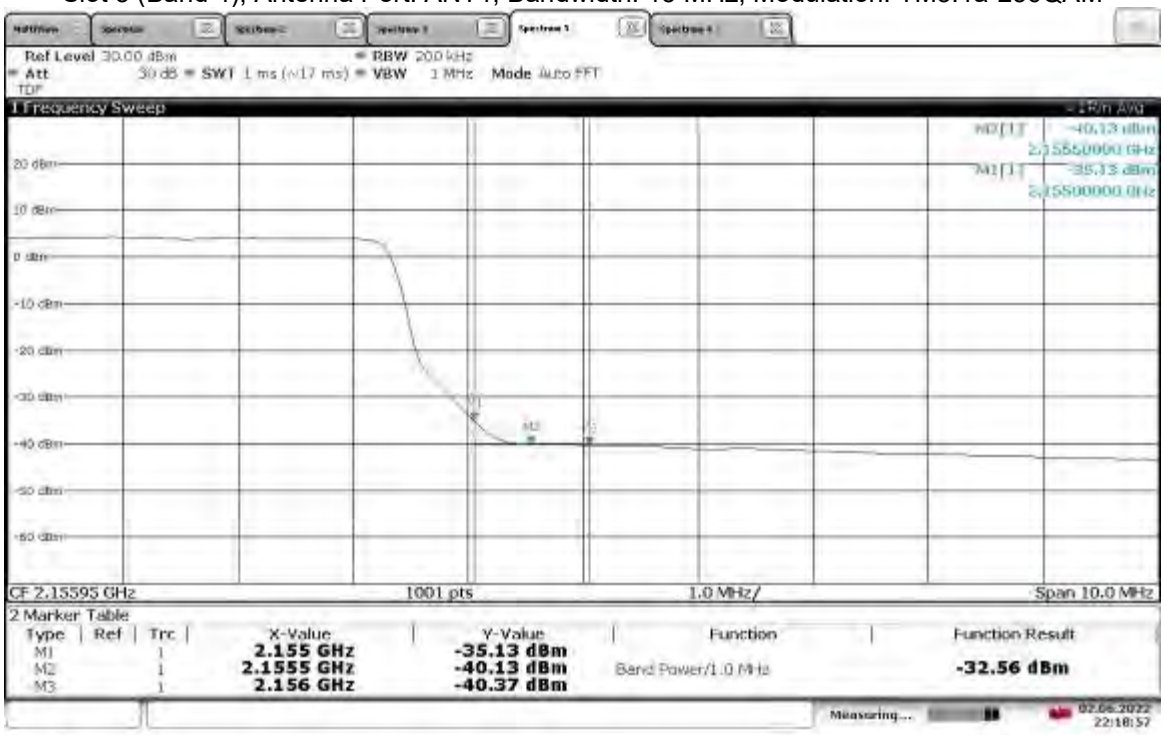
Band Edge Compliant, Upper Band Edge, 2150 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM



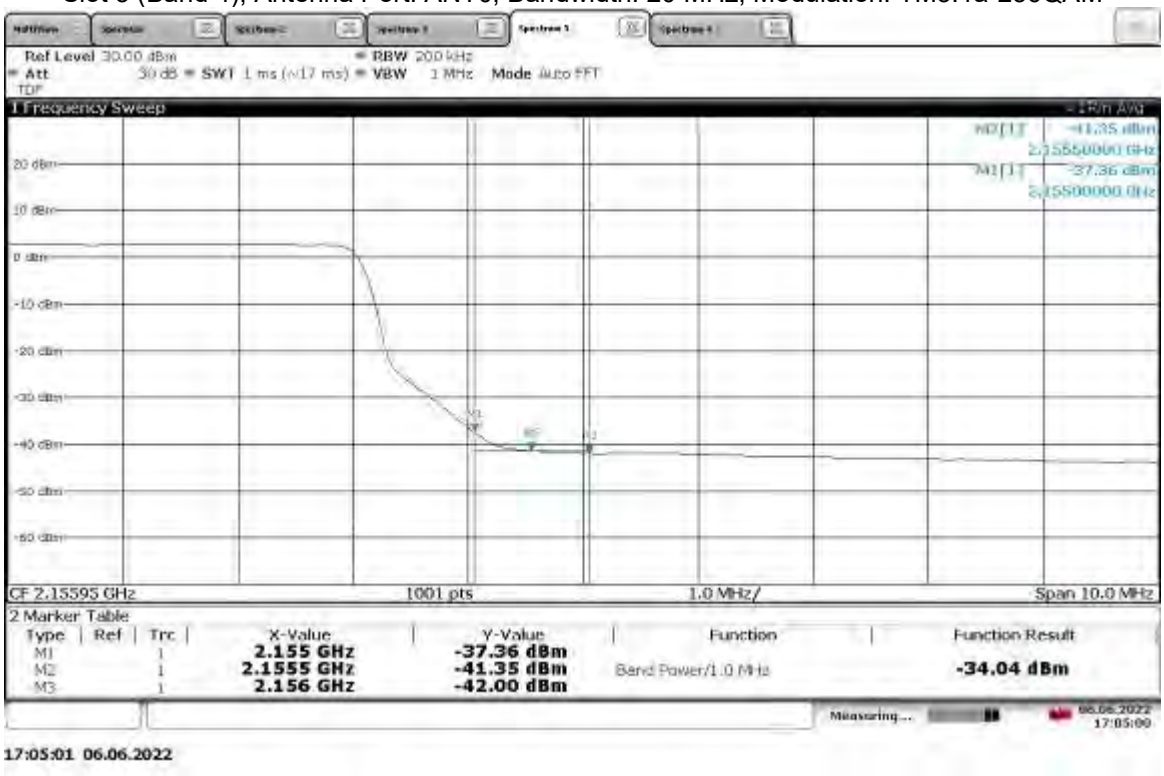
Band Edge Compliant, Upper Band Edge, 2147.5 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



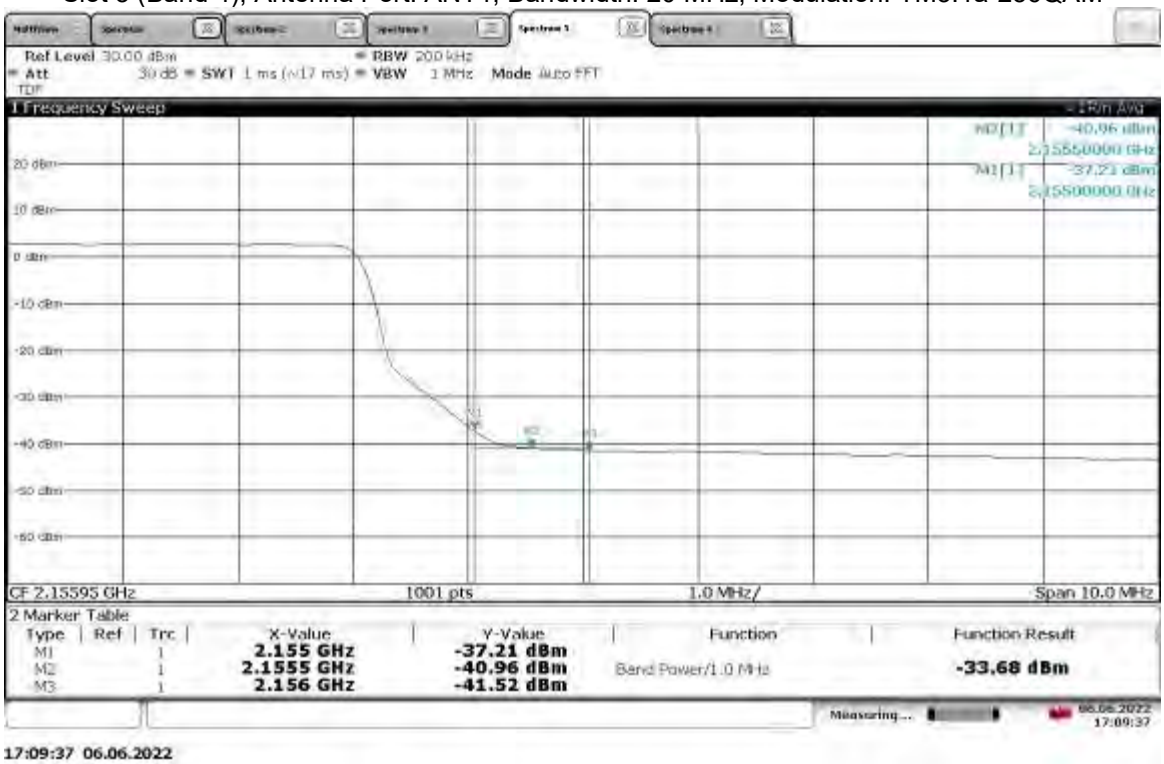
Band Edge Compliant, Upper Band Edge, 2147.5 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 15 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Upper Band Edge, 2145 MHz
Slot 3 (Band 4), Antenna Port: ANT0, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



Band Edge Compliant, Upper Band Edge, 2145 MHz
Slot 3 (Band 4), Antenna Port: ANT1, Bandwidth: 20 MHz, Modulation: TM3.1a-256QAM



Test Personnel:	Vathana Ven	Test Date:	06/02/2022, 06/06/2022
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:	22, 23 ºC
		Relative Humidity:	21, 15 %
		Atmospheric Pressure:	1004, 1013 mbars

Deviations, Additions, or Exclusions: None

10 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	06/10/2022	105081151BOX-001	VFV	KPS	Original Issue
1	07/15/2022	105081151BOX-001	VFV	KPS	Modified result tables on pages 9-10