CommScope Technologies, LLC
TEST REPORT

SCOPE OF WORK
Emissions testing of model RPM-A5A11-B14 (Band 14 with 5G nR and 5100 Host (Lo-PIM) and Band 14 with 5G nR and 5100 Host (Hi-PIM)) for Class II Permissive Change

REPORT NUMBER
105250625BOX-001.2

ISSUE DATE
November 30, 2022

[REVISED DATE]
January 11, 2023

DOCUMENT CONTROL NUMBER
Generic EMC Report Shell Rev. October 2022
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EMISSIONS TEST REPORT

(FULL COMPLIANCE) – CLASS II PERMISSIVE CHANGE

Report Number: 105250625BOX-001.2
Project Number: G105250625

Report Issue Date: November 30, 2022
Report Revision Date: January 11, 2023

Model(s) Tested: RPM-A5A11-B14 (Band 14 with 5G nR and 5100 Host (Lo-PIM) and Band 14 with 5G nR and 5100 Host (Hi-PIM))

Model(s) Partially Tested: None
Model(s) Not Tested but declared equivalent by the client: None

Standards: CFR47 FCC Part 90: 11/2022)

Tested by:
Intertek
70 Codman Hill Road
Boxborough, MA 01719
USA

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

Report prepared by:

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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	Output Power (ERP) CFR47 FCC Part 90.542 (a)(3): 11/2022	Pass
7	Occupied and 26 dB Bandwidths CFR47 FCC Part 90.543 (d): 11/2022, CFR47 FCC Part 2.1049: 11/2022	Pass
8	Band Edges and Emission Mask CFR47 FCC Part 90.543 (e)(1) and (e)(3): 11/2022 CFR47 FCC Part 2.1051: 11/2022, CFR47 FCC Part 2.1057: 2022	Pass
9	Antenna Port Conducted and Radiated Emissions CFR47 FCC Part 90.543 (e)(1) and (e)(3): 11/2022	Pass
10	Revision History	--

Notes: This is a class II permissive. Only selected tests as listed above were performed.

Radio modules for RP5100 host platform which cover band 14. Both old and new versions of the hardware were tested; referenced as Hi-PIM and Lo-PIM. Testing was conducted to add 5G nR waveforms to the filing, there were no changes to the hardware in this permissive change.

3 Client Information

This EUT was tested at the request of:

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

Contact: 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 14 with 5G nR and 5100 Host (Lo-PIM)	CommScope Technologies, LLC	RPM-A5A11-B14	2131810253
Band 14 with 5G nR and 5100 Host (Hi-PIM)	CommScope Technologies, LLC	RPM-A5A11-B14	21128470062

Receive Date:	11/03/2022
Received Condition:	Good
Type:	Production

Description of Equipment Under Test (provided by client)
Radio modules for RP5100 host platform which cover band 14. Both old and new versions of the hardware were tested; referenced as Hi-PIM and Lo-PIM. Testing was conducted to add 5G nR waveforms to the filing, there were no changes to the hardware in this permissive change.

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 at 5 MHz and 10 MHz Bandwidths

Software used by the EUT:

No.	Descriptions of EUT Exercising
1	RP5100_B14

Radio/Receiver Characteristics	
Frequency Band(s)	758 – 768 MHz
Modulation Type(s)	TM1.1-QPSK, TM3.2-16QAM, TM3.1-64 QAM, TM3.1a-256QAM
Maximum Output Power (ERP)	23.16 dBm (Lo-PIM), 22.62 dBm (Hi-PIM)
Test Channels	Low, Middle, High Channels of 5 MHz and 10 MHz Bandwidths, Single Channel operation only
Occupied Bandwidth	9.299 MHz (Lo-PIM), 9.297 MHz (Hi-PIM)
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 and are not eligible for certification; 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)	2.17	None	None	POE P/S
--	LAN (Communication)	9.00	None	None	Laptop

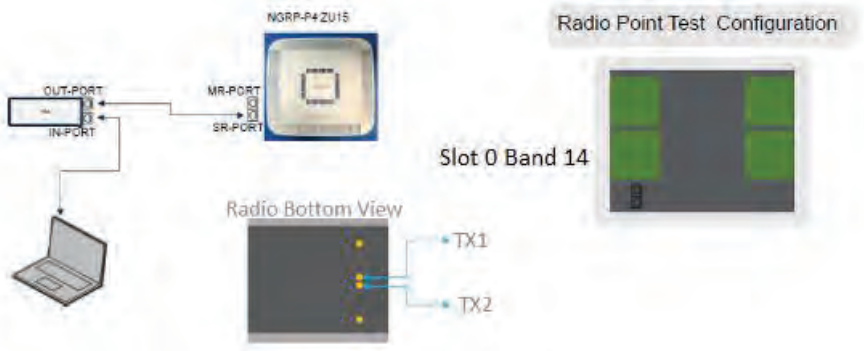
Notes: Longer cables were used to accommodate emission testing in the 10m Chamber.

Support Equipment			
Description	Manufacturer	Model Number	Serial Number
POE Power Supply	Sifos Technologies	PDA-604A	604A0107
Laptop	Dell	Latitude 3520	None

5.1 Method:

Configuration as required by ANSI C63.26-2015, KDB 662911, and CFR47 FCC Part 90: 11/2022.

5.2 EUT Block Diagram:



6 Output Power

6.1 Method

Tests are performed in accordance with CFR47 FCC Parts 2.1046 and 90, KDB662911, 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
DAV005'	Weather Station	Davis	6250	MS191218083	02/11/2022	02/11/2023
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	11/02/2021	11/02/2022
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	252675002	02/10/2022	02/10/2023
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	01/26/2022	01/26/2023
None	Mini SMA cable	Provided by CommScope	None	None	VBU	Verified

Software Utilized:

Name	Manufacturer	Version
None	N/A	N/A

6.3 Results:

The sample tested was found to Comply.

Limits:
CFR47 FCC Part 90.542 (a)(3) – Fixed and base stations transmitting a signal in the 758-768 MHz band with an emission bandwidth greater than 1 MHz must not exceed an ERP of 1000 watts/MHz and an antenna height of 305 m HAAT, except that antenna heights greater than 305 m HAAT are permitted if power levels are reduced below 1000 watts/MHz ERP accordance with Table 3 of this section.

Notes:
ERP = EIRP – 2.15 dB.
ERP = {Conducted Power (dBm) + Antenna Gain (dBi)} – 2.15 dB

Lo-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM1.1-QPSK (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
Low	760.50	ANT0	21.27	24.11	23.12	25.96	60	-36.88
		ANT1	20.93		22.78		60	-37.22
Mid	763.00	ANT0	21.01	23.90	22.86	25.75	60	-37.14
		ANT1	20.77		22.62		60	-37.38
High	765.50	ANT0	20.79	23.64	22.64	25.49	60	-37.36
		ANT1	20.46		22.31		60	-37.69

Lo-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.2-16QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
Low	760.50	ANT0	21.29	24.12	23.14	25.97	60	-36.86
		ANT1	20.92		22.77		60	-37.23
Mid	763.00	ANT0	21.05	23.94	22.90	25.79	60	-37.10
		ANT1	20.80		22.65		60	-37.35
High	765.50	ANT0	20.84	23.68	22.69	25.53	60	-37.31
		ANT1	20.50		22.35		60	-37.65

Lo-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.1-64QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
Low	760.50	ANT0	20.52	23.48	22.37	25.33	60	-37.63
		ANT1	20.42		22.27		60	-37.73
Mid	763.00	ANT0	20.79	23.8	22.64	25.65	60	-37.36
		ANT1	20.78		22.63		60	-37.37
High	765.50	ANT0	20.57	23.54	22.42	25.39	60	-37.58
		ANT1	20.49		22.34		60	-37.66

Lo-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
Low	760.50	ANT0	21.31	24.14	23.16	25.99	60	-36.84
		ANT1	20.94		22.79		60	-37.21
Mid	763.00	ANT0	21.05	23.94	22.90	25.80	60	-37.10
		ANT1	20.81		22.66		60	-37.34
High	765.50	ANT0	20.83	23.68	22.68	25.53	60	-37.32
		ANT1	20.50		22.35		60	-37.65

Lo-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM1.1-QPSK (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
High	763.00	ANT0	21.02	23.86	22.87	25.71	60	-37.13
		ANT1	20.68		22.53		60	-37.47

Lo-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM3.2-16QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
High	763.00	ANT0	21.07	23.9	22.92	25.75	60	-37.08
		ANT1	20.70		22.55		60	-37.45

Lo-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM3.1-64QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
High	763.00	ANT0	21.03	23.88	22.88	25.73	60	-37.12
		ANT1	20.71		22.56		60	-37.44

Lo-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
High	763.00	ANT0	20.71	23.88	22.56	25.73	60	-37.44
		ANT1	21.03		22.88		60	-37.12

Hi-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM1.1-QPSK (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
Low	760.50	ANT0	20.48	23.51	22.33	25.36	60	-37.67
		ANT1	20.51		22.36		60	-37.64
Mid	763.00	ANT0	20.52	23.58	22.37	25.43	60	-37.63
		ANT1	20.62		22.47		60	-37.53
High	765.50	ANT0	20.59	23.68	22.44	25.53	60	-37.56
		ANT1	20.75		22.60		60	-37.4

Hi-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.2-16QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
Low	760.50	ANT0	20.51	23.53	22.36	25.91	60	-37.64
		ANT1	20.53		22.38		60	-37.62
Mid	763.00	ANT0	20.54	23.59	22.39	25.44	60	-37.61
		ANT1	20.62		22.47		60	-37.53
High	765.50	ANT0	20.61	23.70	22.46	25.55	60	-37.54
		ANT1	20.77		22.62		60	-37.38

Hi-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.1-64QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	ERP (dBm)	ERP Limit (dBm)	ERP Margin (dB)
Low	760.50	ANT0	20.49	22.34	60	-37.66
		ANT1	20.53	22.38	60	-37.62
Mid	763.00	ANT0	20.53	22.38	60	-37.62
		ANT1	20.63	22.48	60	-37.52
High	765.5	ANT0	20.59	22.44	60	-37.56
		ANT1	20.73	22.58	60	-37.42

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
Low	760.50	ANT0	20.49	23.52	22.34	25.37	60	-37.66
		ANT1	20.53		22.38		60	-37.62
Mid	763.00	ANT0	20.53	23.59	22.38	25.44	60	-37.62
		ANT1	20.63		22.48		60	-37.52
High	765.50	ANT0	20.59	23.67	22.44	25.52	60	-37.56
		ANT1	20.73		22.58		60	-37.42

Hi-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	ERP (dBm)	ERP Limit (dBm)	ERP Margin (dB)
Low	760.50	ANT0	20.47	22.32	60	-37.68
		ANT1	20.50	22.35	60	-37.65
Mid	763.00	ANT0	20.53	22.38	60	-37.62
		ANT1	20.62	22.47	60	-37.53
High	765.5	ANT0	20.58	22.43	60	-37.57
		ANT1	20.73	22.58	60	-37.42

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
Low	760.50	ANT0	20.47	23.5	22.32	25.35	60	-37.68
		ANT1	20.50		22.35		60	-37.65
Mid	763.00	ANT0	20.53	23.56	22.38	25.44	60	-37.62
		ANT1	20.62		22.47		60	-37.53
High	765.50	ANT0	20.58	23.67	22.43	25.52	60	-37.57
		ANT1	20.73		22.58		60	-37.42

Hi-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM1.1-QPSK (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
High	763.00	ANT0	20.35	23.2	22.20	25.12	60	-37.80
		ANT1	20.16		22.01		60	-37.99

Hi-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM3.2-16QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
High	763.00	ANT0	20.54	23.59	22.39	25.44	60	-37.61
		ANT1	20.62		22.47		60	-37.53

Hi-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM3.1-64QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
High	763.00	ANT0	20.49	23.54	22.34	25.39	60	-37.66
		ANT1	20.56		22.41		60	-37.59

Hi-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM (5G nR)

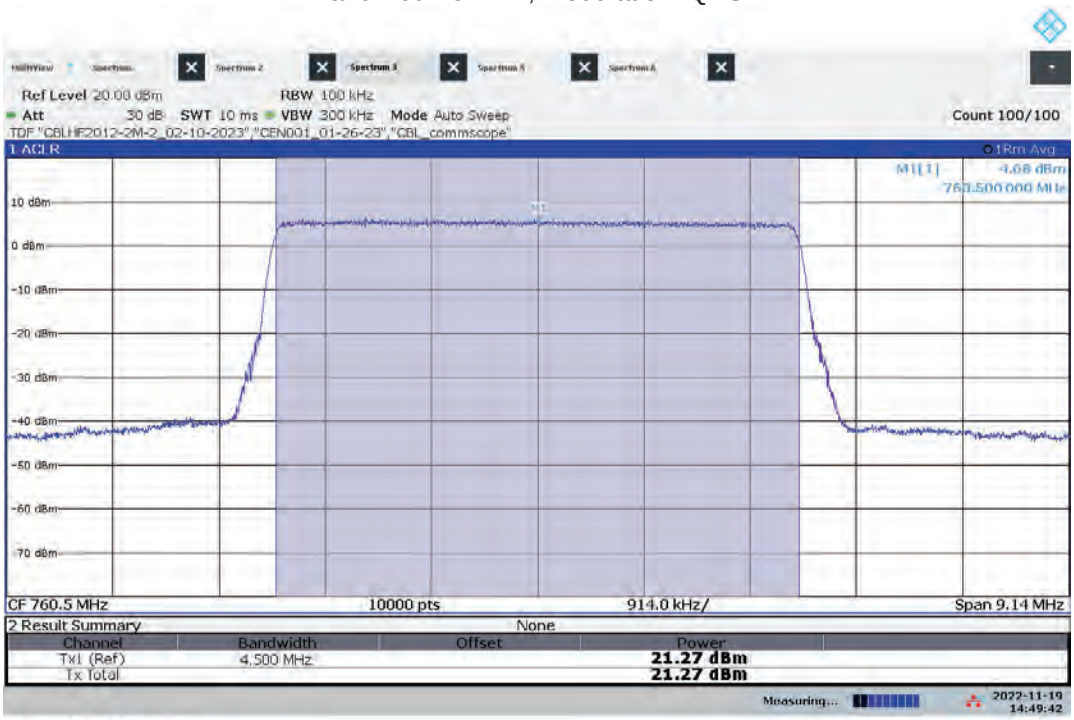
Channel	Frequency (MHz)	Antenna Port	Conducted Output Power (dBm)	Combined Conducted Output Power (dBm)	ERP (dBm)	Combined ERP (dBm	ERP Limit (dBm)	ERP Margin (dB)
High	763.00	ANT0	20.49	23.54	22.34	25.39	60	-37.66
		ANT1	20.57		22.42		60	-37.58

6.4 Setup Photographs:

Confidential – Photos not included in this report

6.5 Plots/Data:

Lo-PIM – ANT0 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: QPSK



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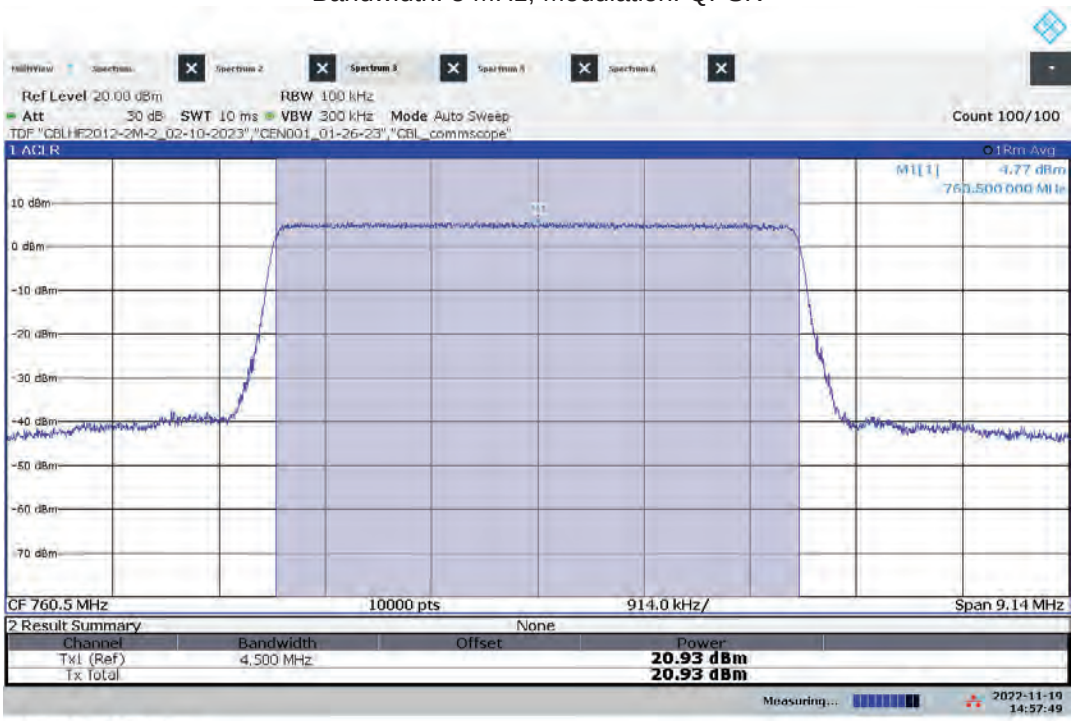
Lo-PIM – ANT1 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: QPSK



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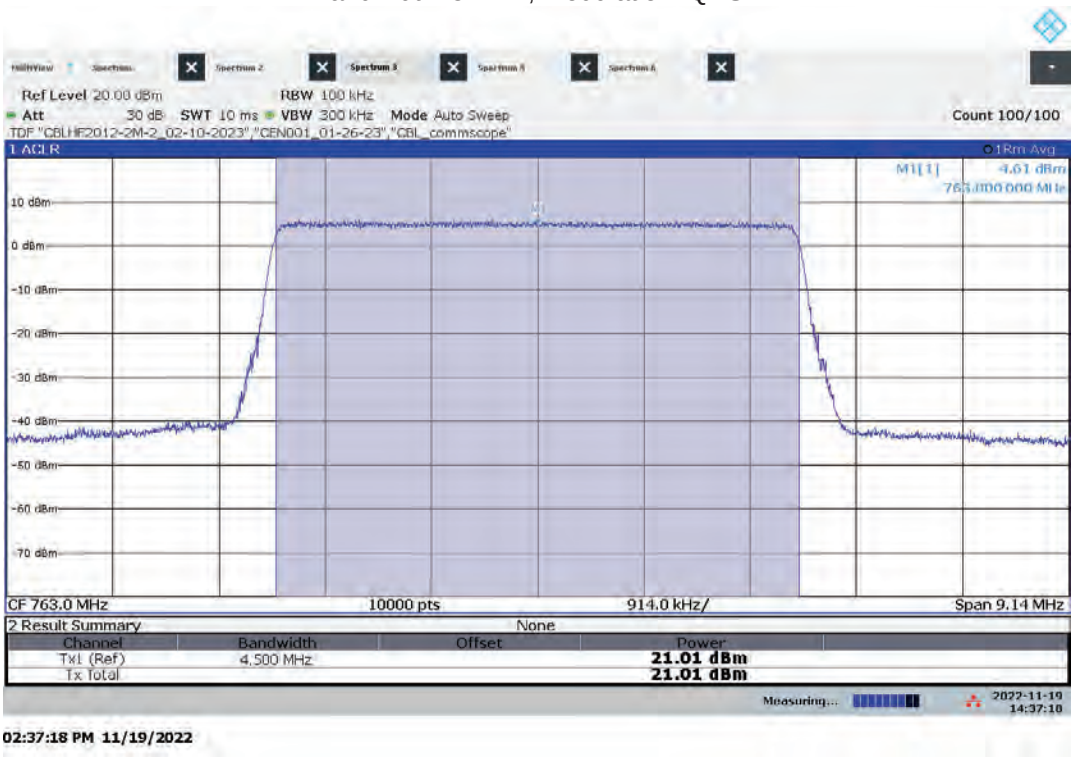
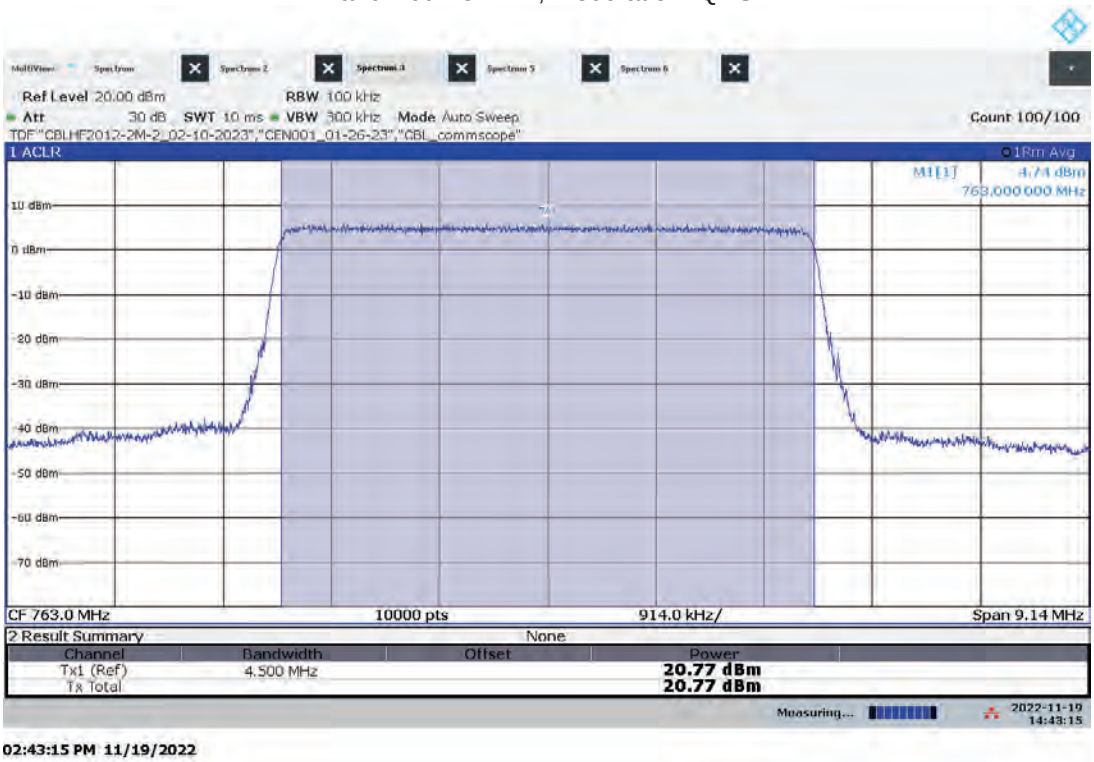
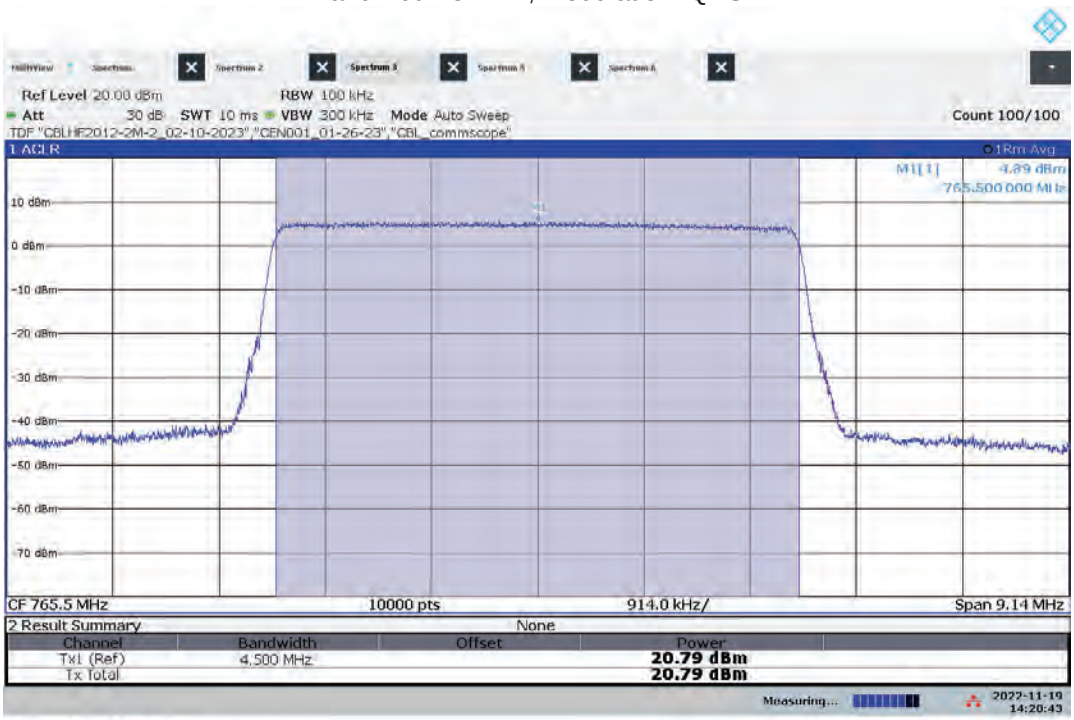
Lo-PIM – ANT0 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: QPSK



Lo-PIM – ANT1 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: QPSK



Lo-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: QPSK



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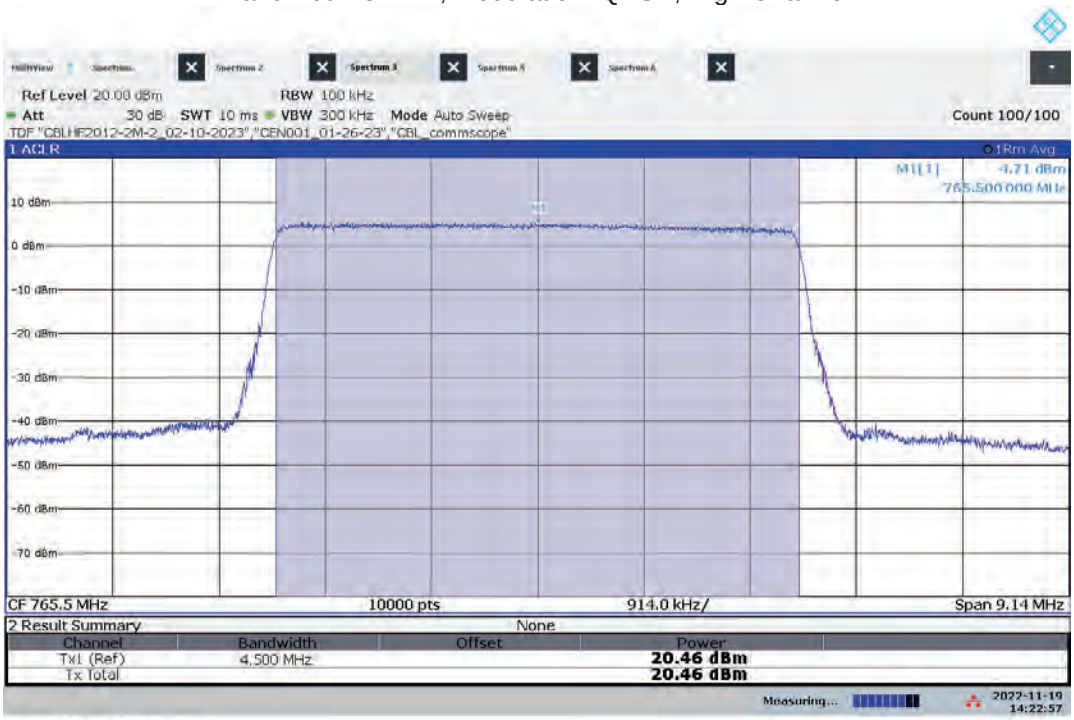
Lo-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: QPSK, High Channel



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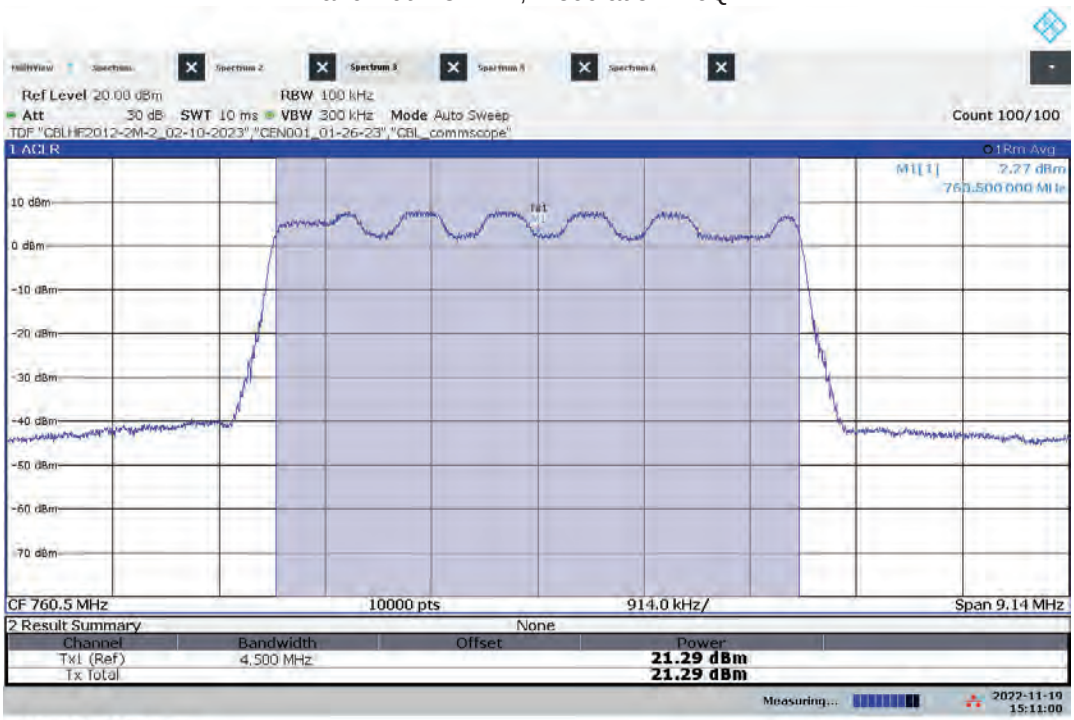
Lo-PIM – ANT0 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 16QAM



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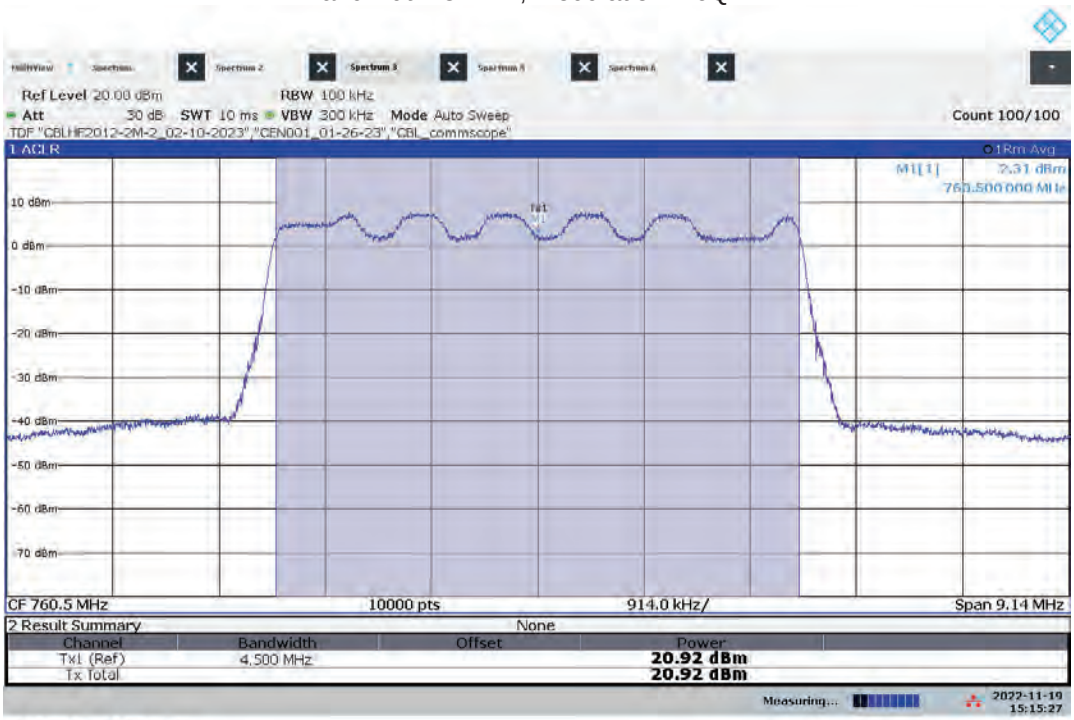
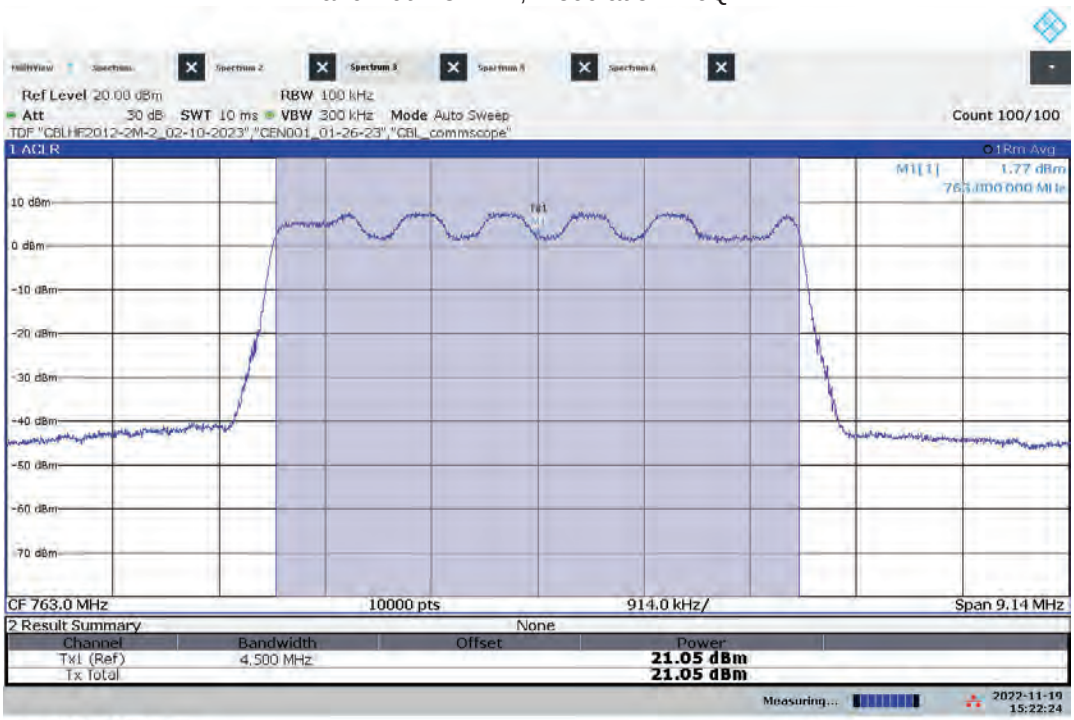
Lo-PIM – ANT1 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 16QAM



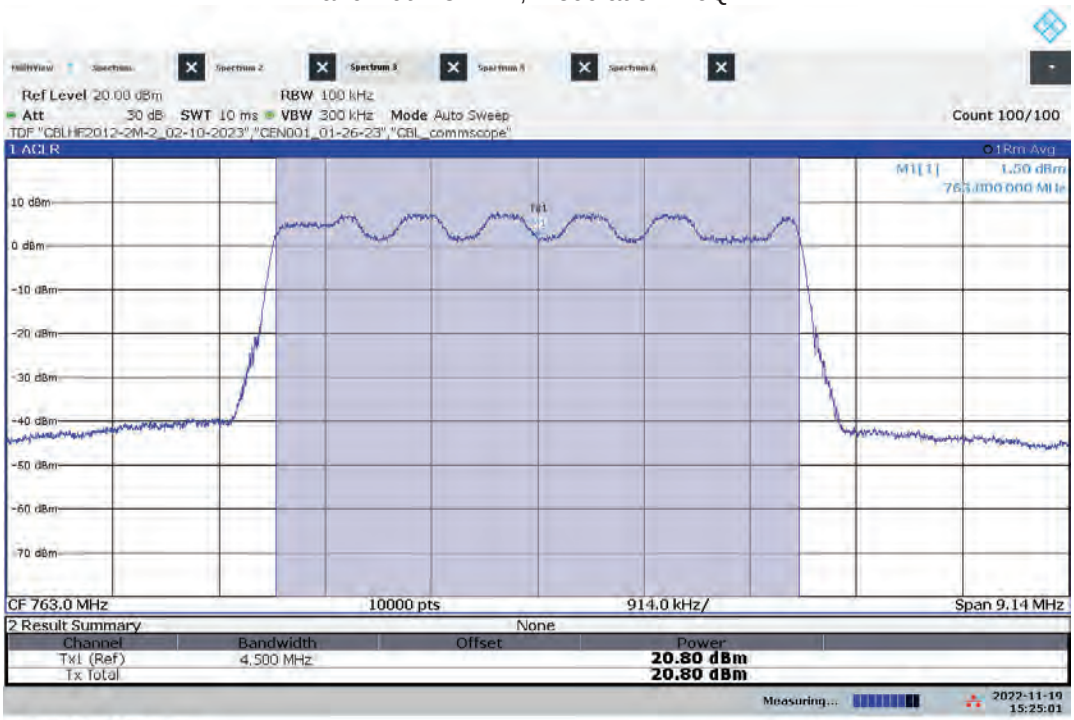
03:15:28 PM 11/19/2022

Lo-PIM – ANT0 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 16QAM



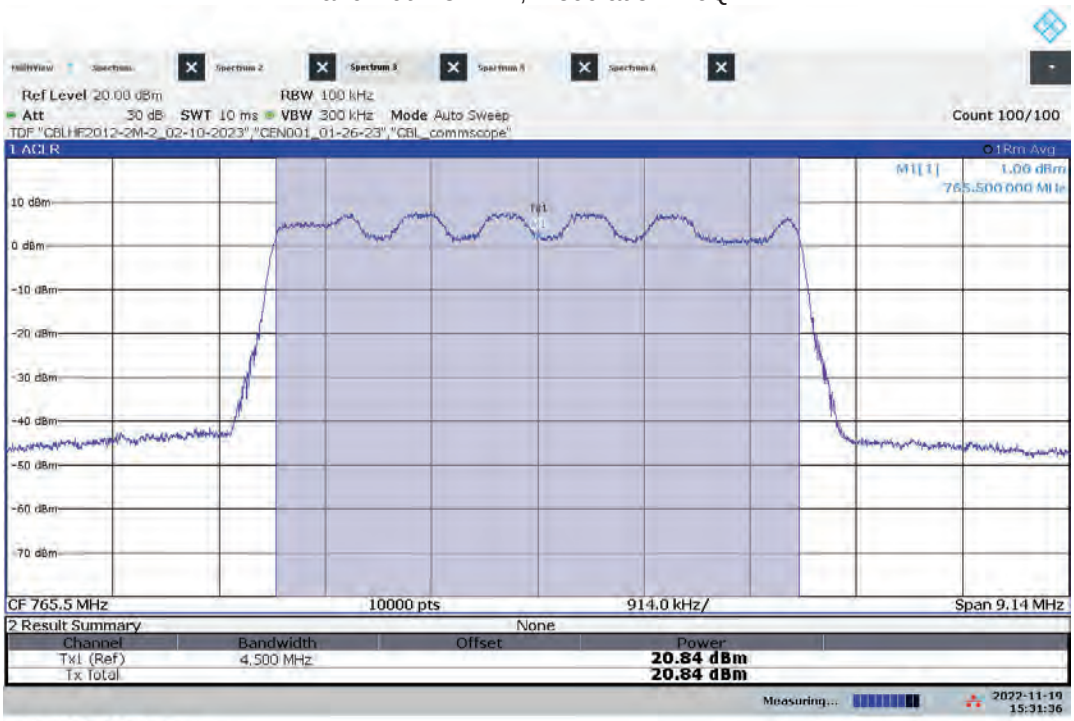
03:22:24 PM 11/19/2022

Lo-PIM – ANT1 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 16QAM



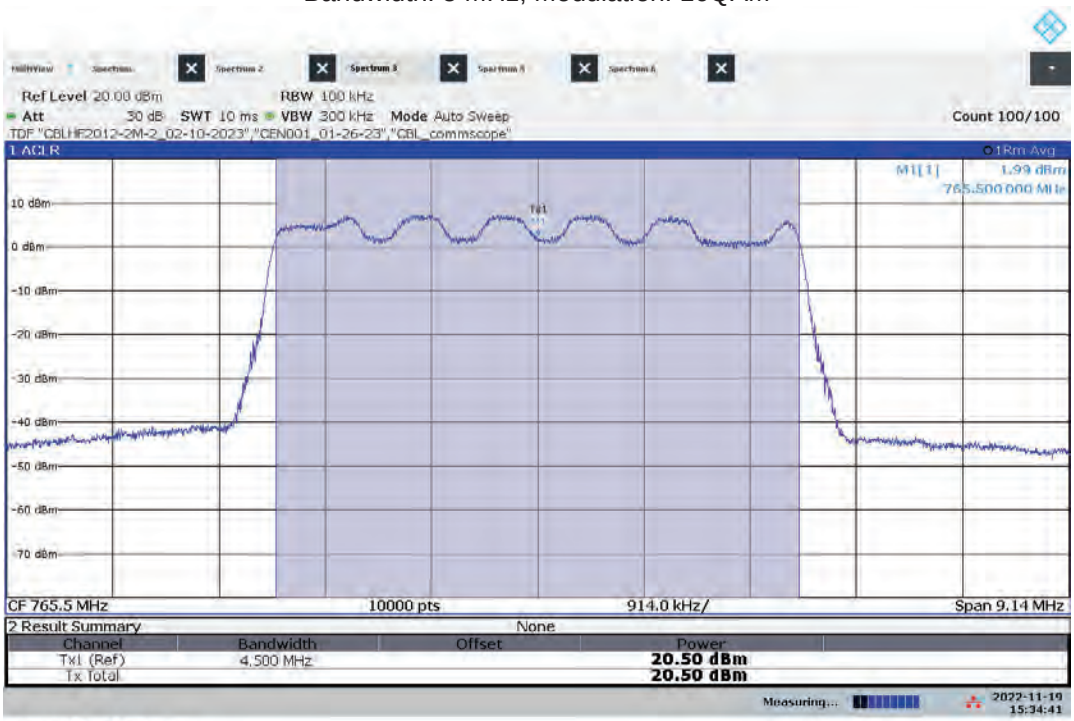
03:25:01 PM 11/19/2022

Lo-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 16QAM



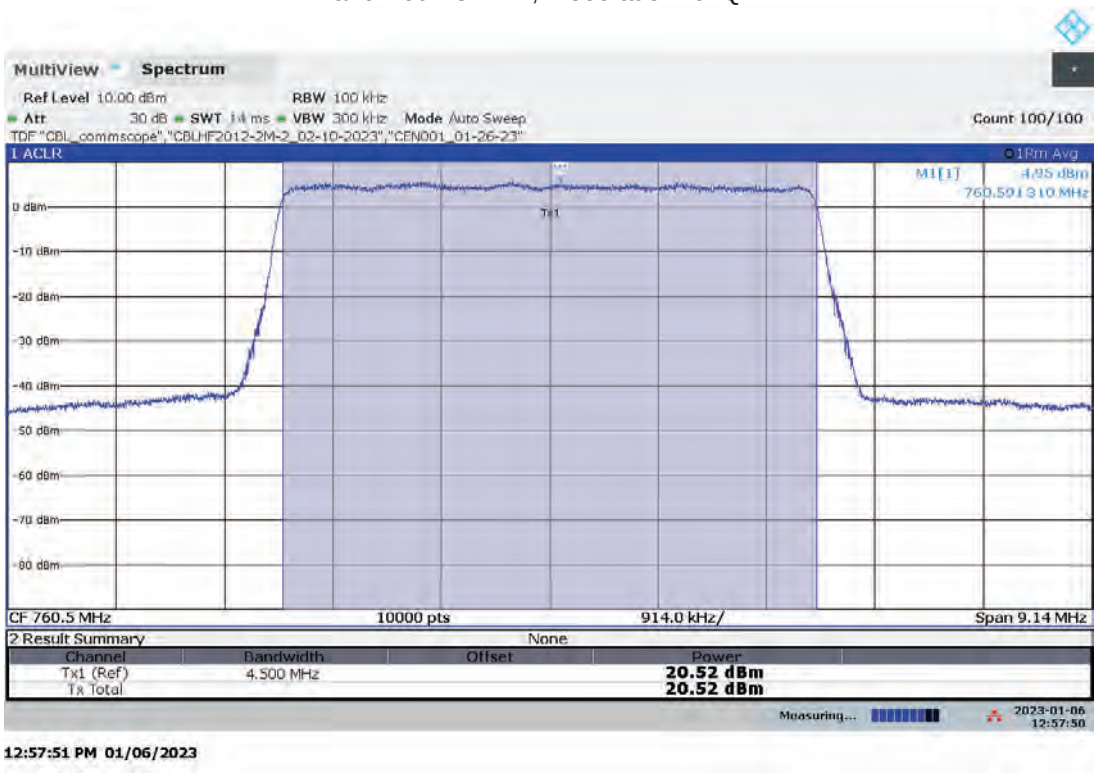
03:31:37 PM 11/19/2022

Lo-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 16QAM

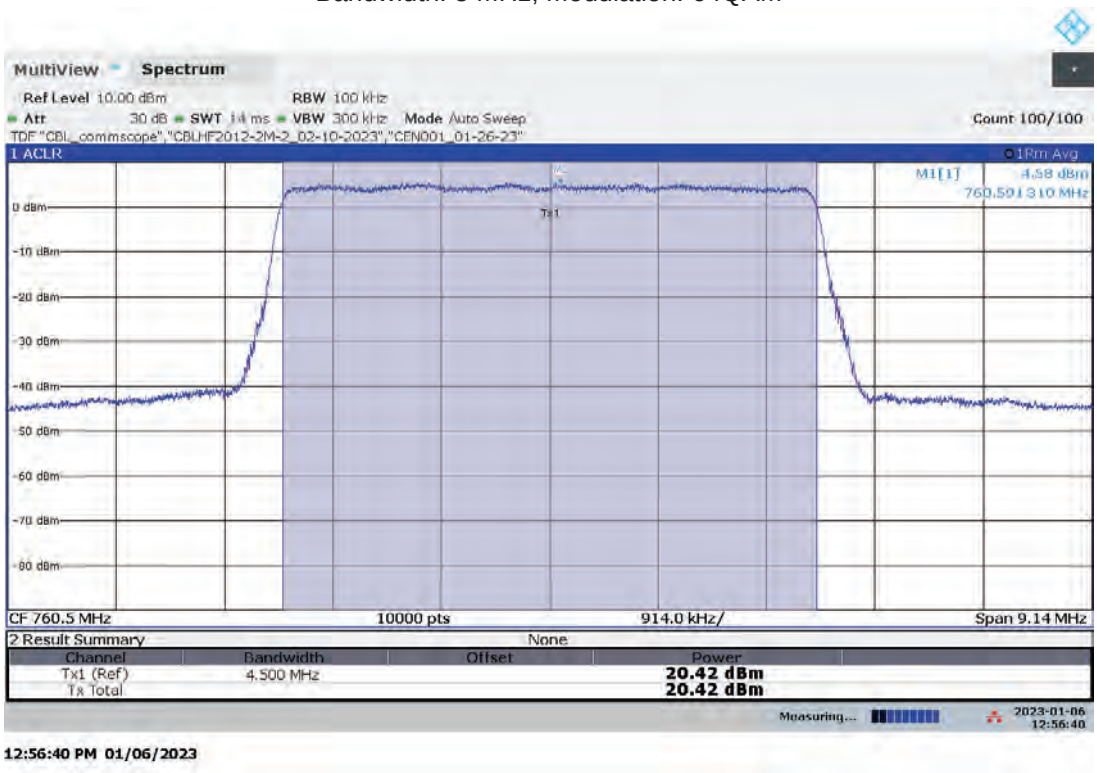


03:34:41 PM 11/19/2022

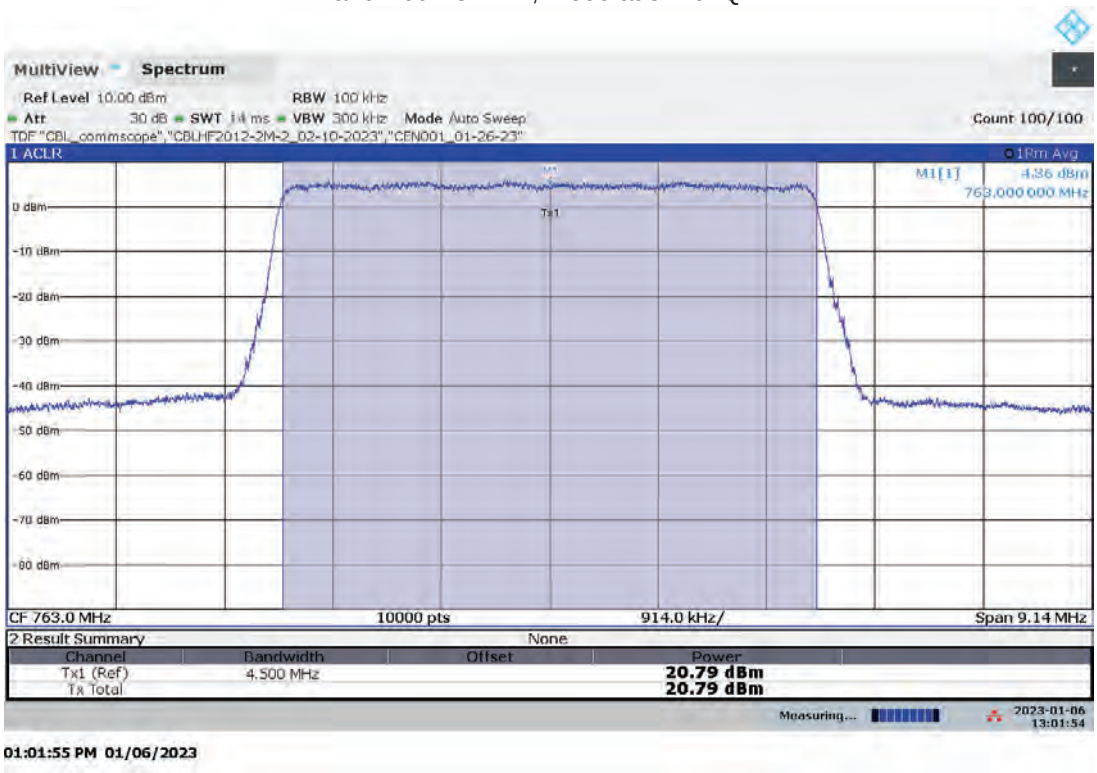
Lo-PIM – ANT0 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 64QAM



Lo-PIM – ANT1 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 64QAM

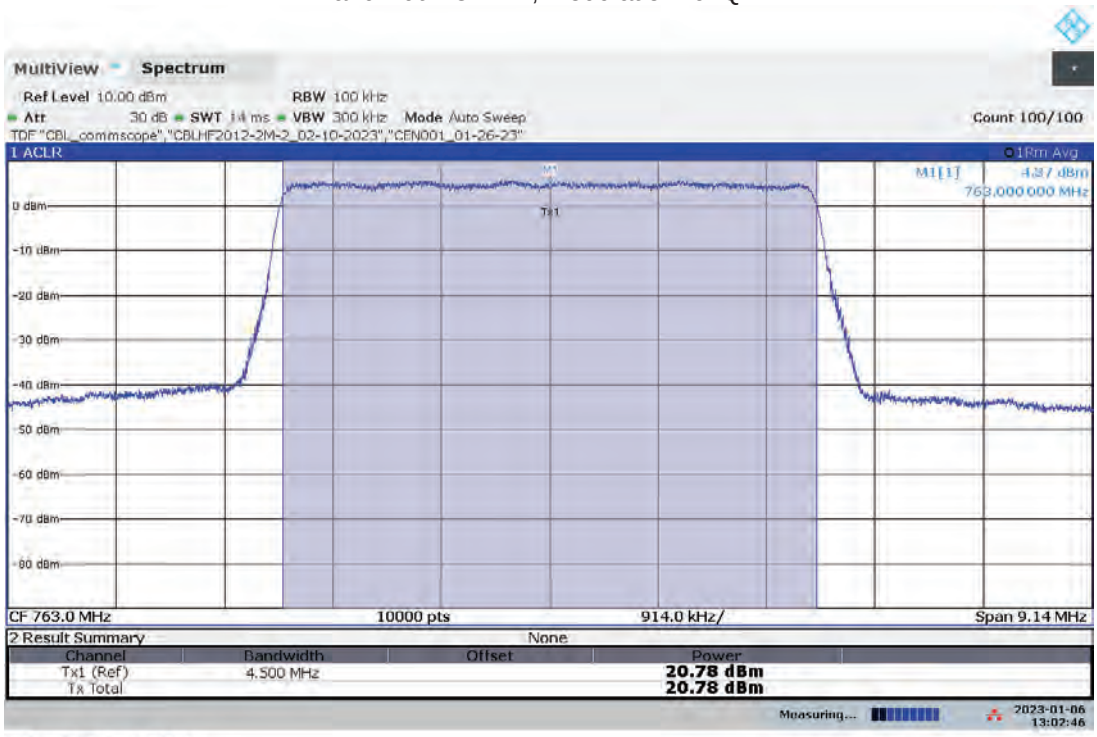


Lo-PIM – ANT0 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 64QAM



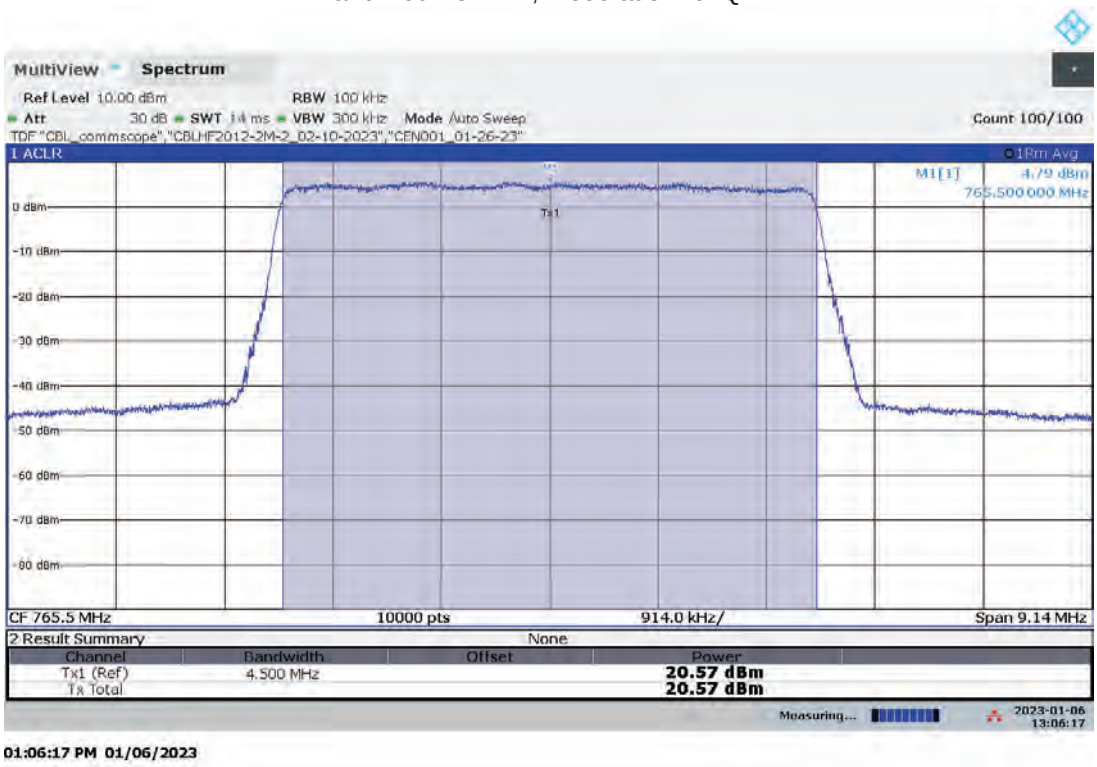
01:01:55 PM 01/06/2023

Lo-PIM – ANT1 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 64QAM

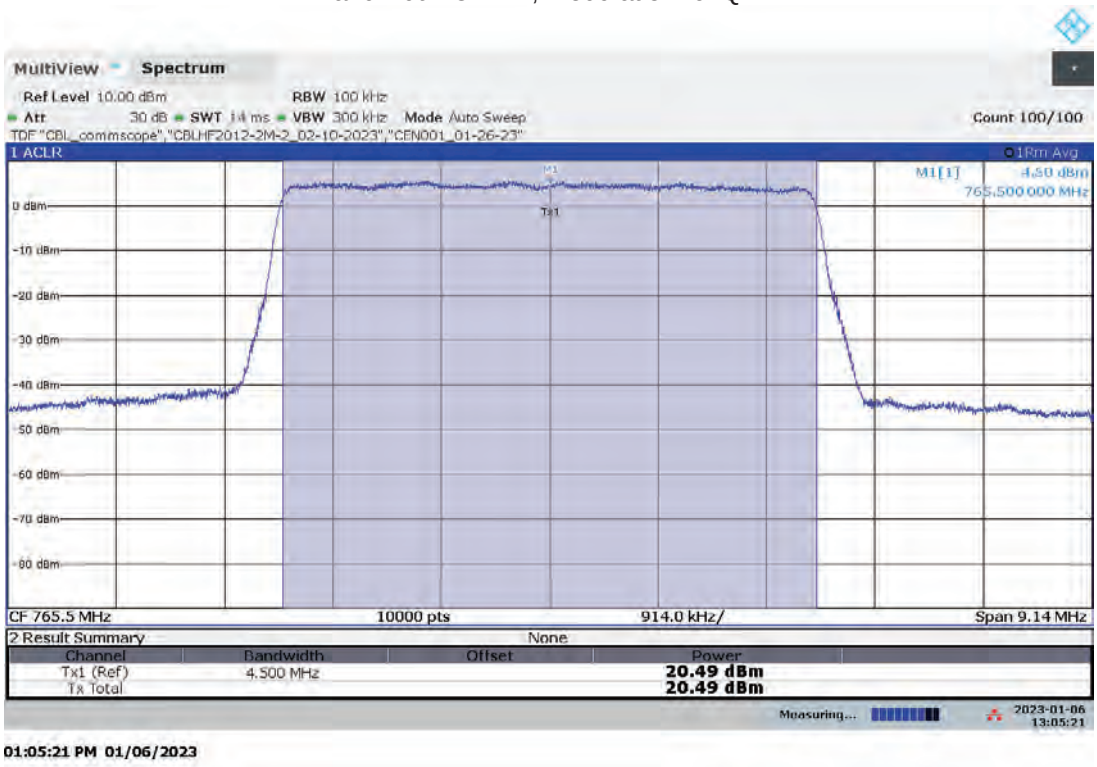


01:02:47 PM 01/06/2023

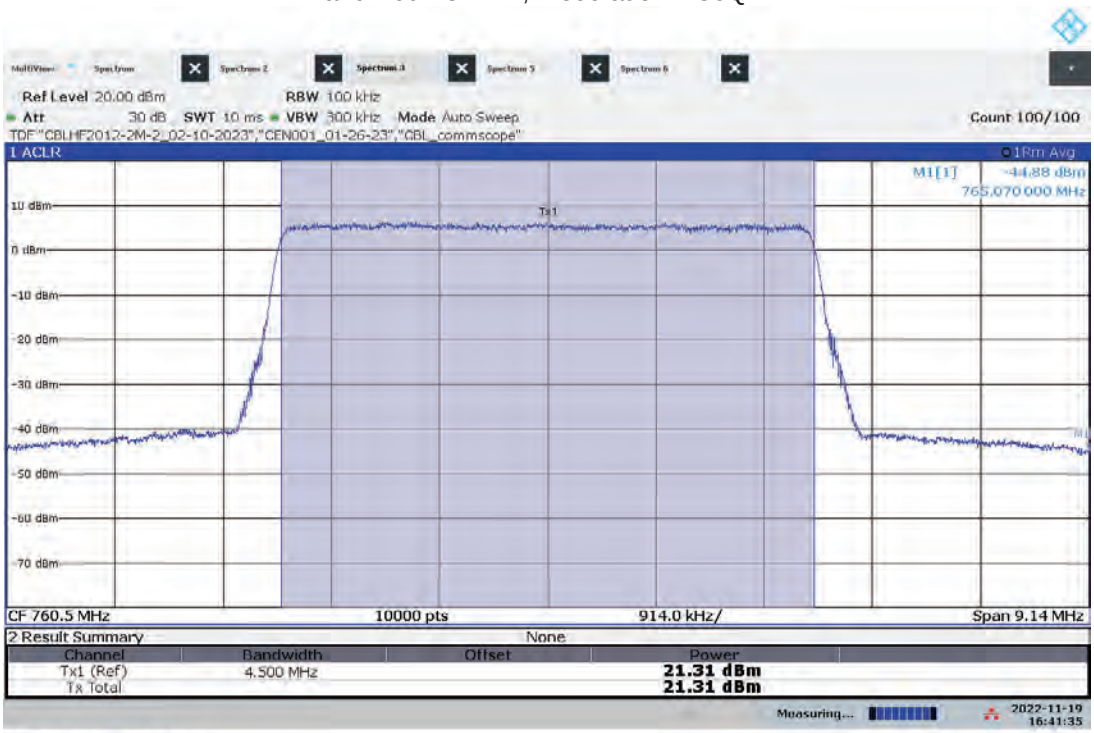
Lo-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 64QAM



Lo-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 64QAM



Lo-PIM – ANT0 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 256QAM

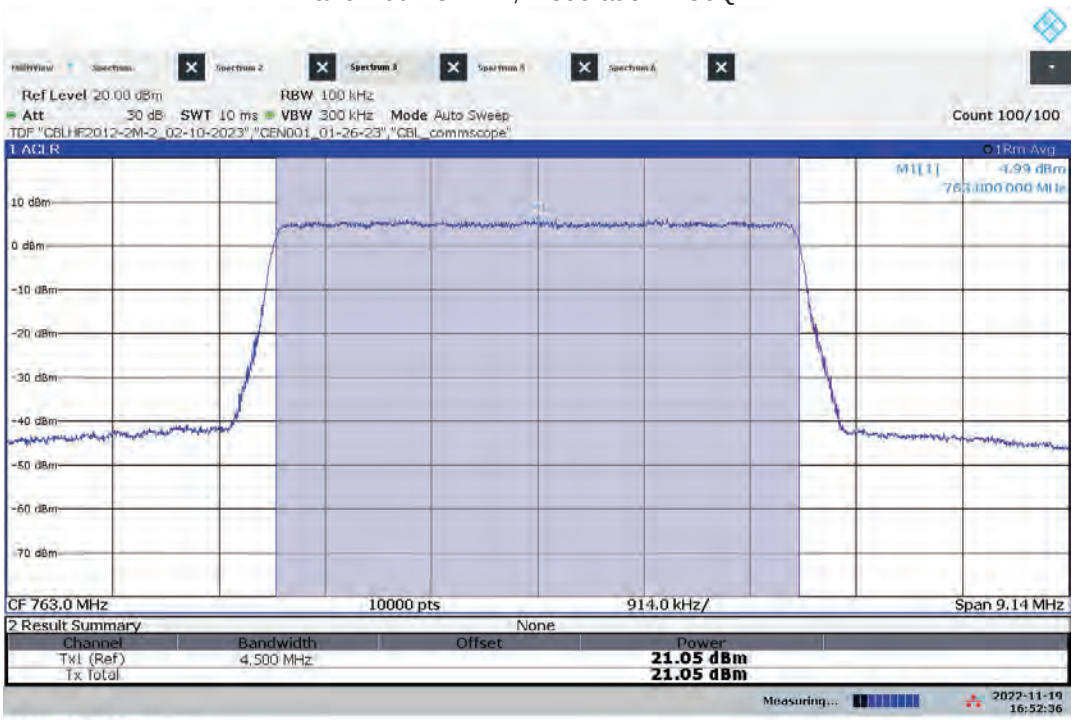


04:41:36 PM 11/19/2022

Lo-PIM – ANT1 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 256QAM

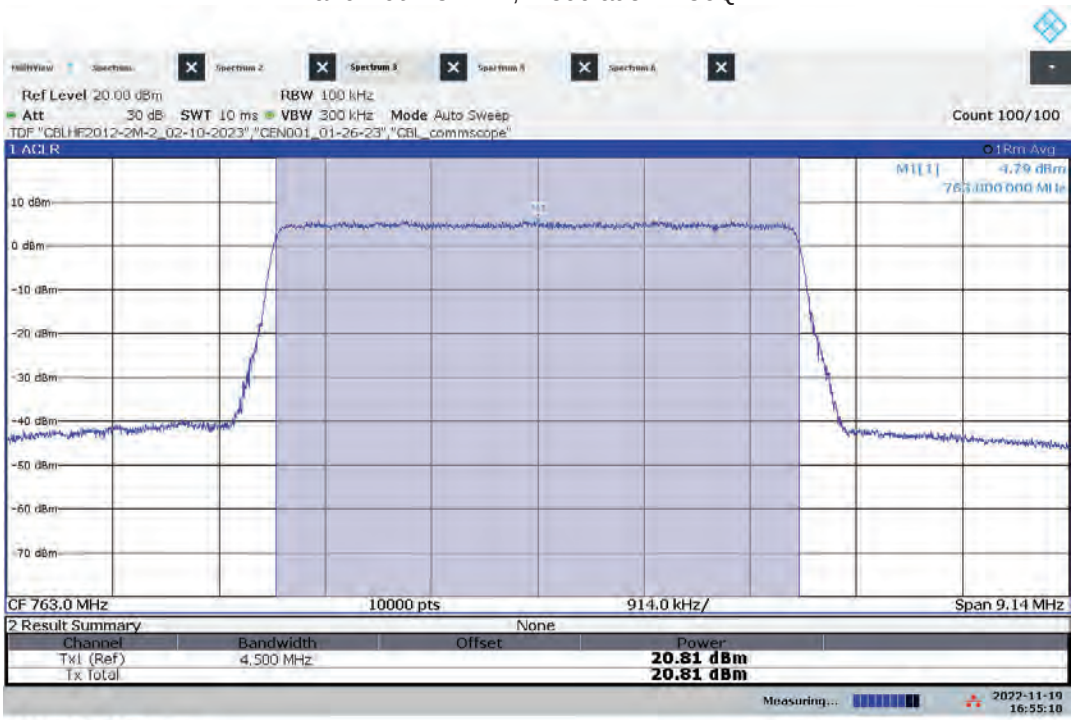
04:45:41 PM 11/19/2022

Lo-PIM – ANT0 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 256QAM



04:52:37 PM 11/19/2022

Lo-PIM – ANT1 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 256QAM



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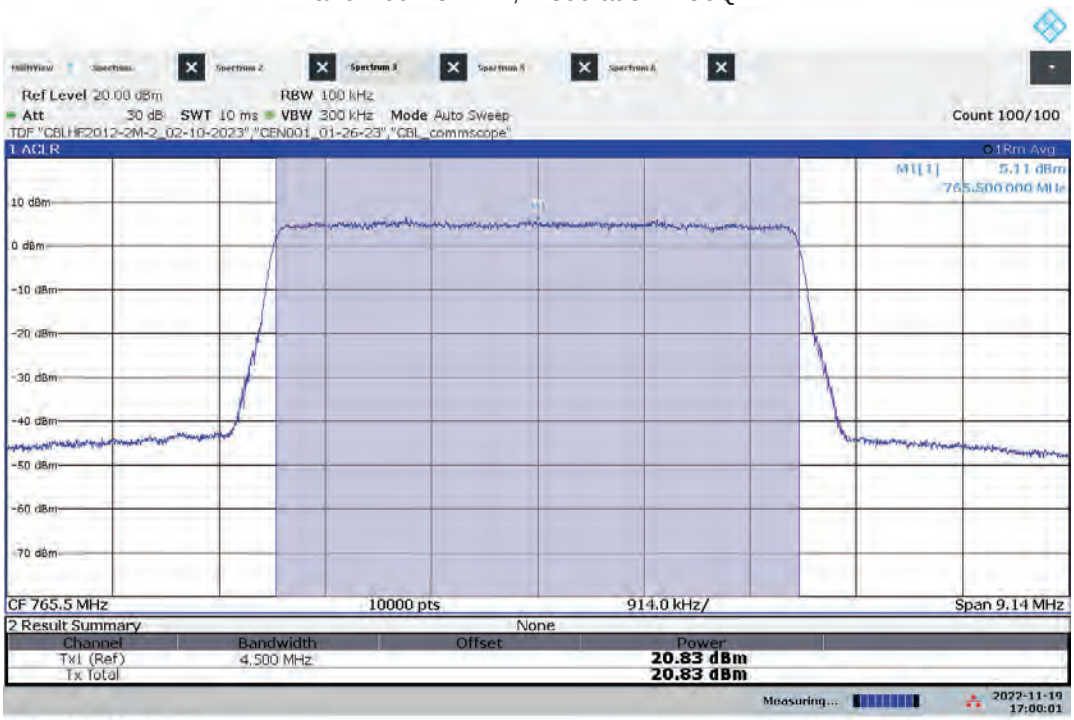
Lo-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 256QAM

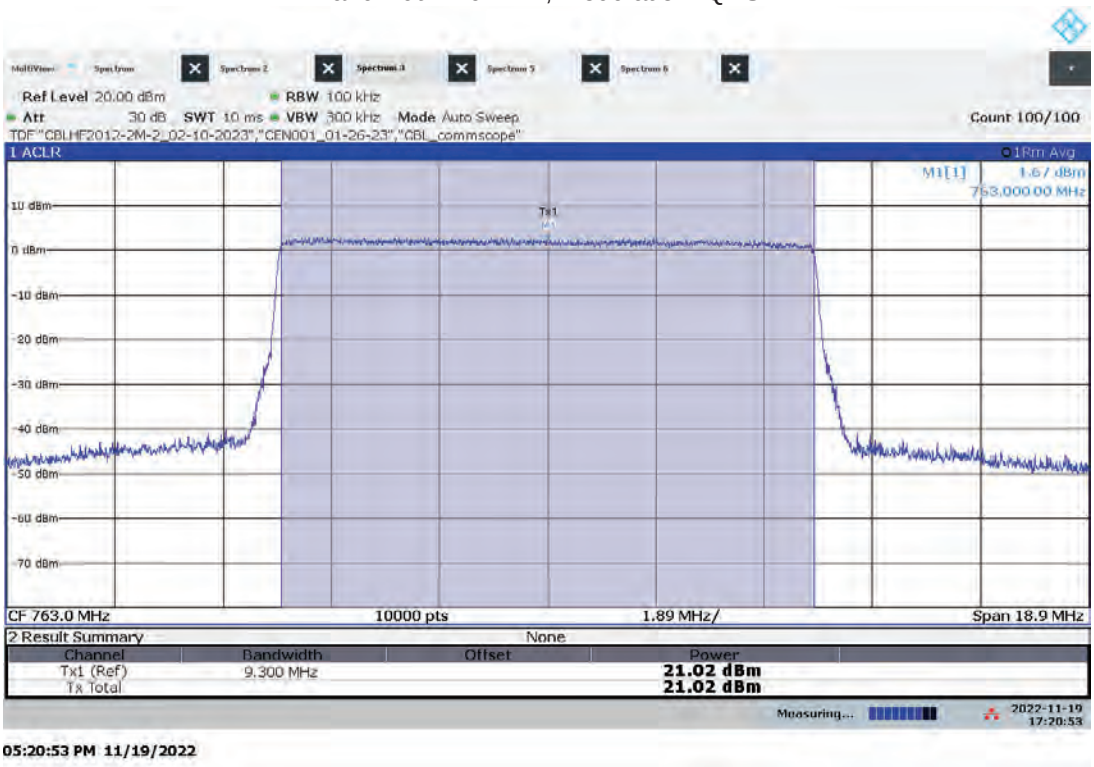


05:00:02 PM 11/19/2022

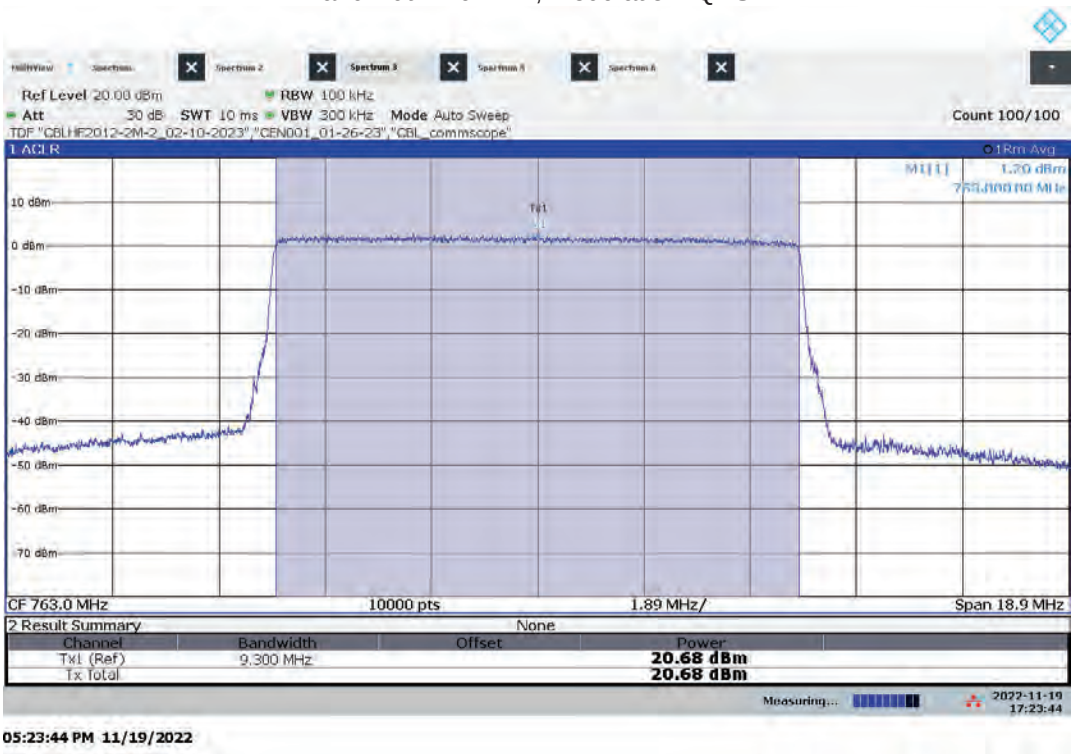
Lo-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 256QAM

05:02:55 PM 11/19/2022

Lo-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: QPSK

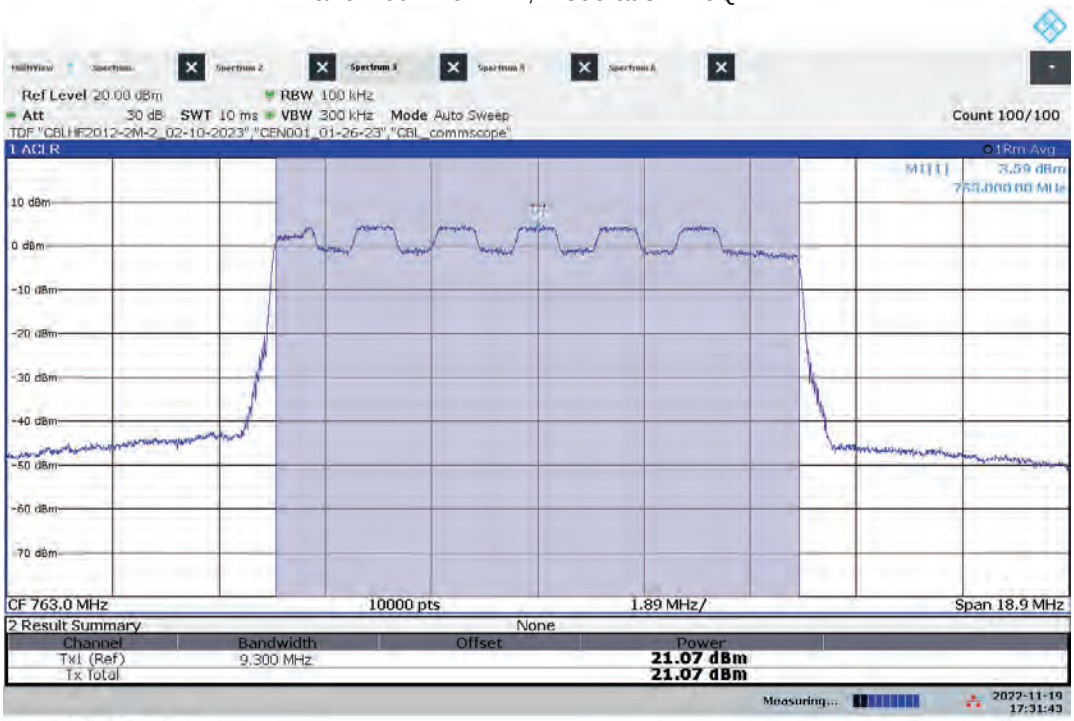


Lo-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: QPSK



Notes: Low and mid channels are the same frequency as high channel.

Lo-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: 16QAM



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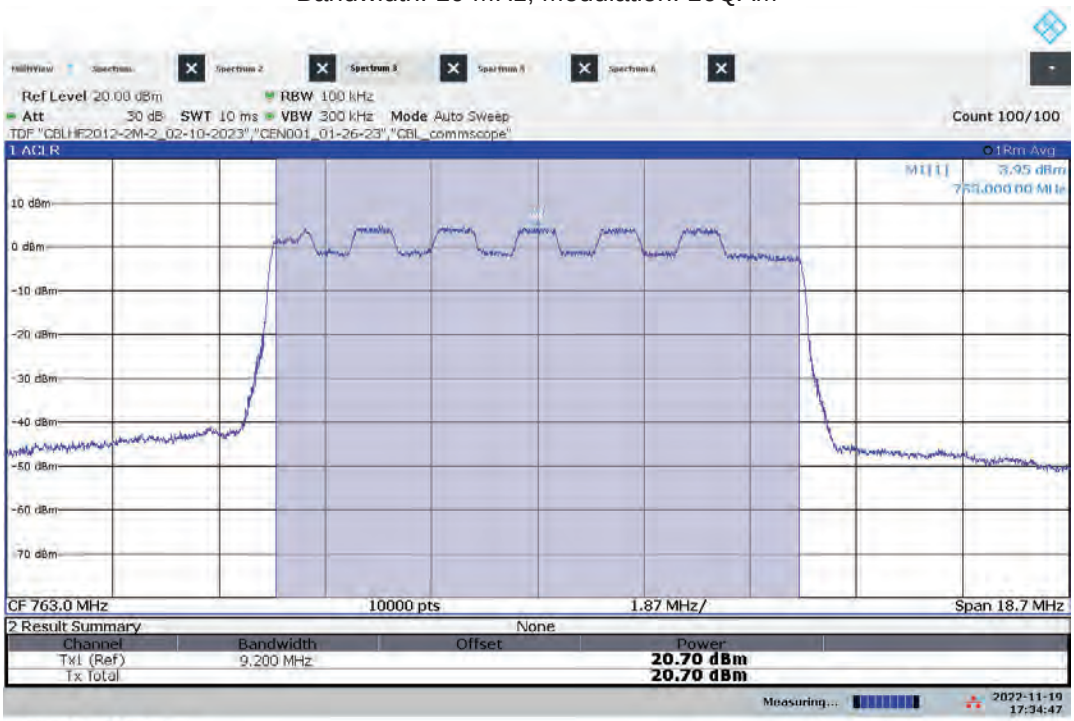
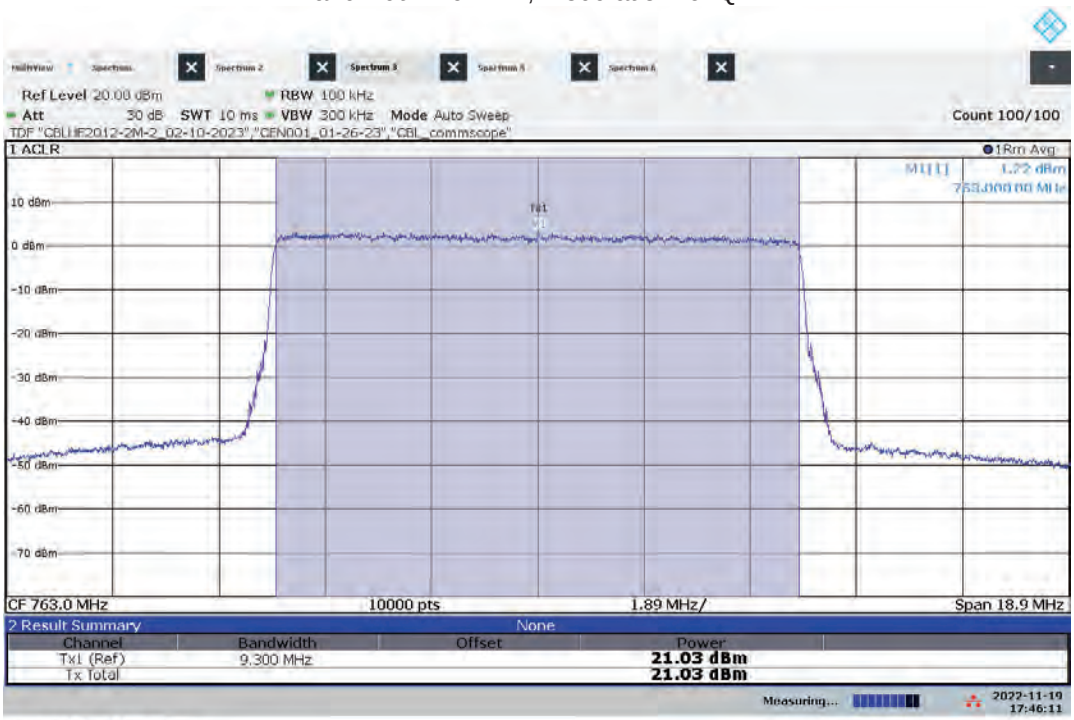
Lo-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: 16QAM



05:34:48 PM 11/19/2022

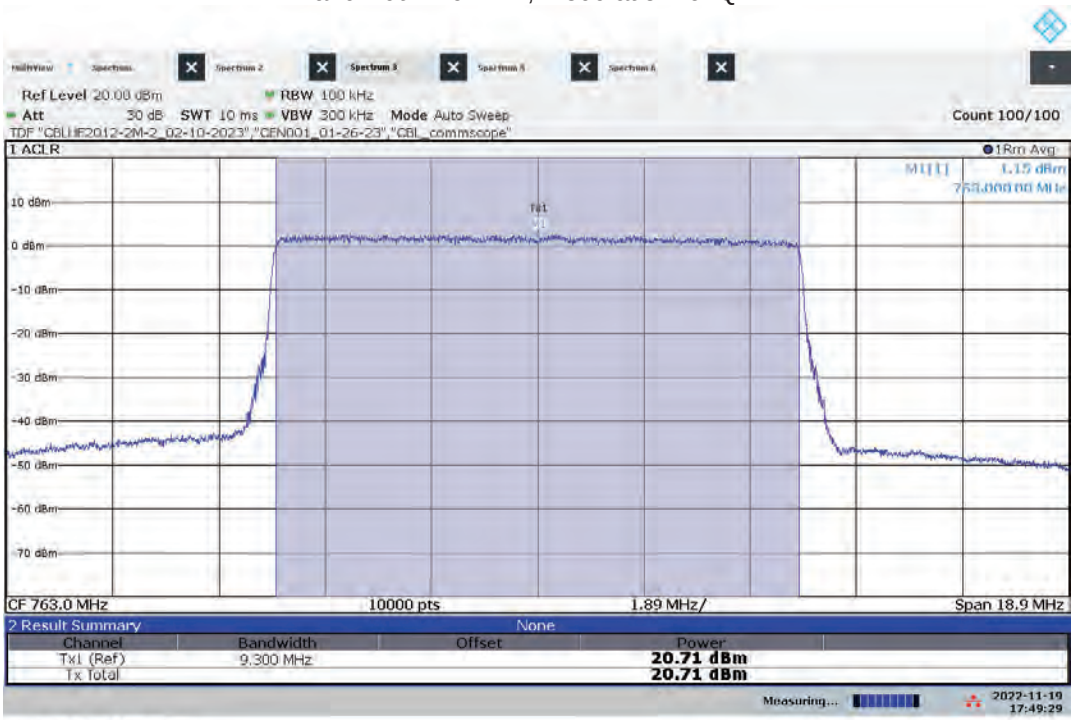
Notes: Low and mid channels are the same frequency as high channel.

Lo-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: 64QAM



05:46:11 PM 11/19/2022

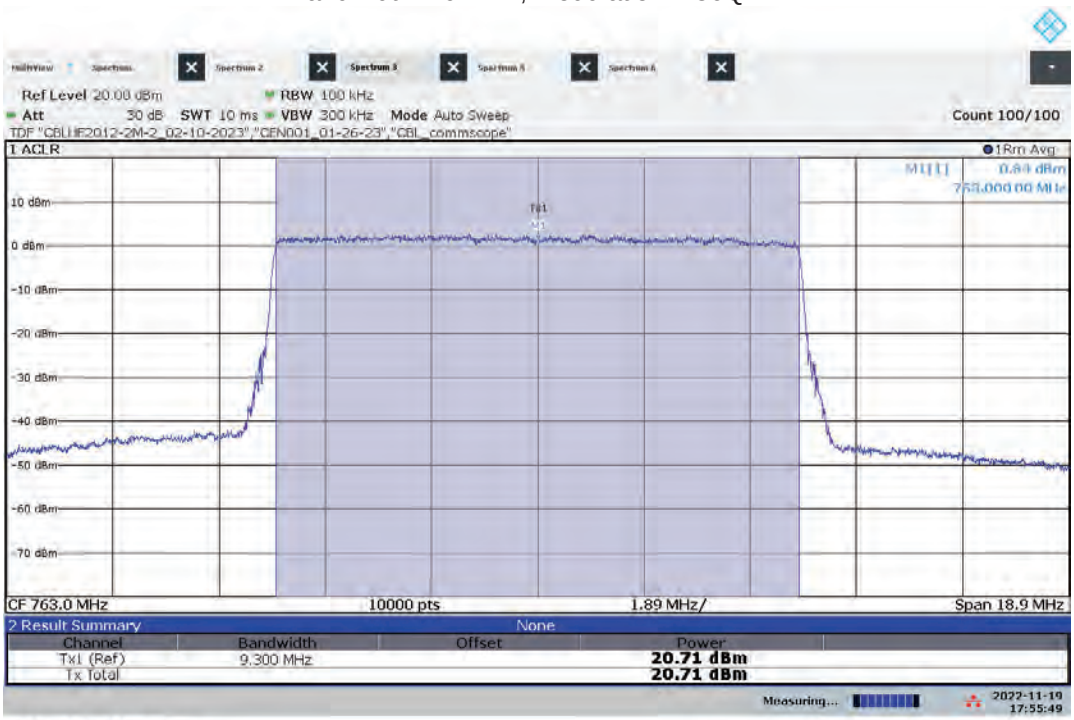
Lo-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: 64QAM



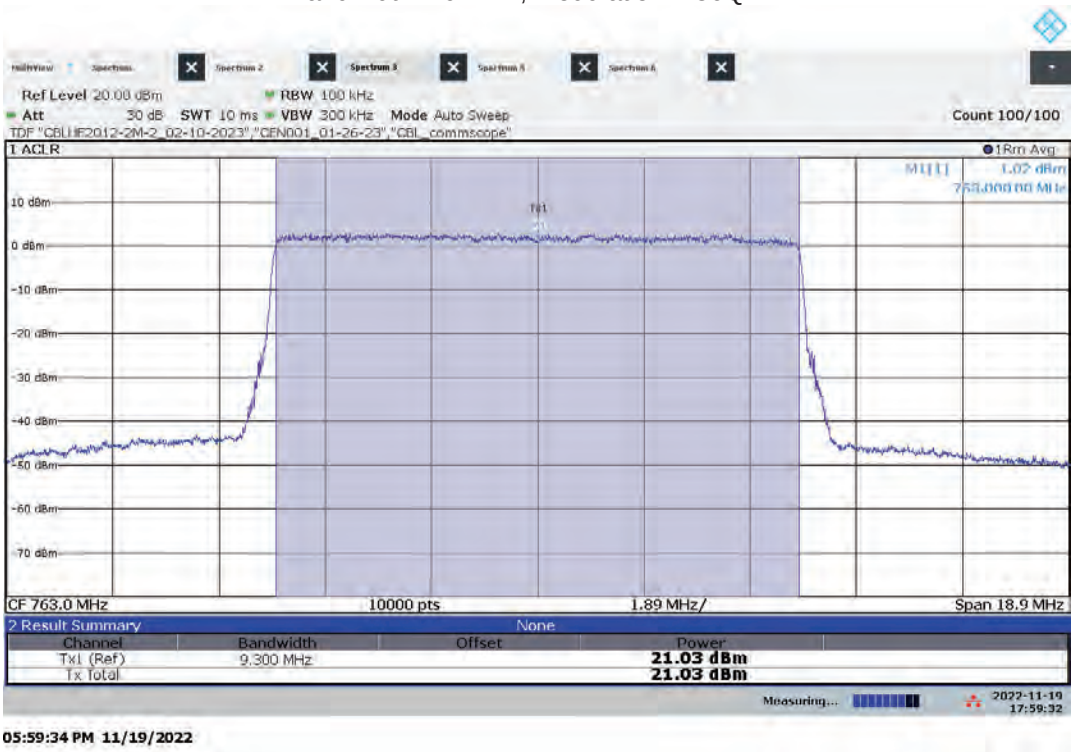
05:49:29 PM 11/19/2022

Notes: Low and mid channels are the same frequency as high channel.

Lo-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: 256QAM

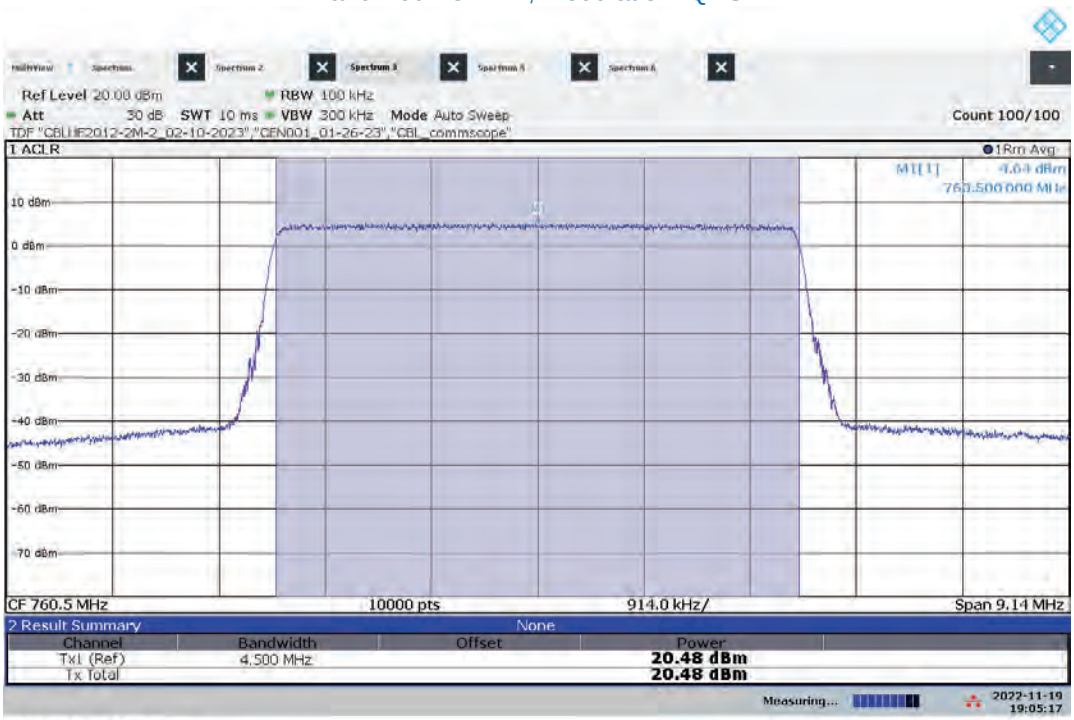


Lo-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: 256QAM



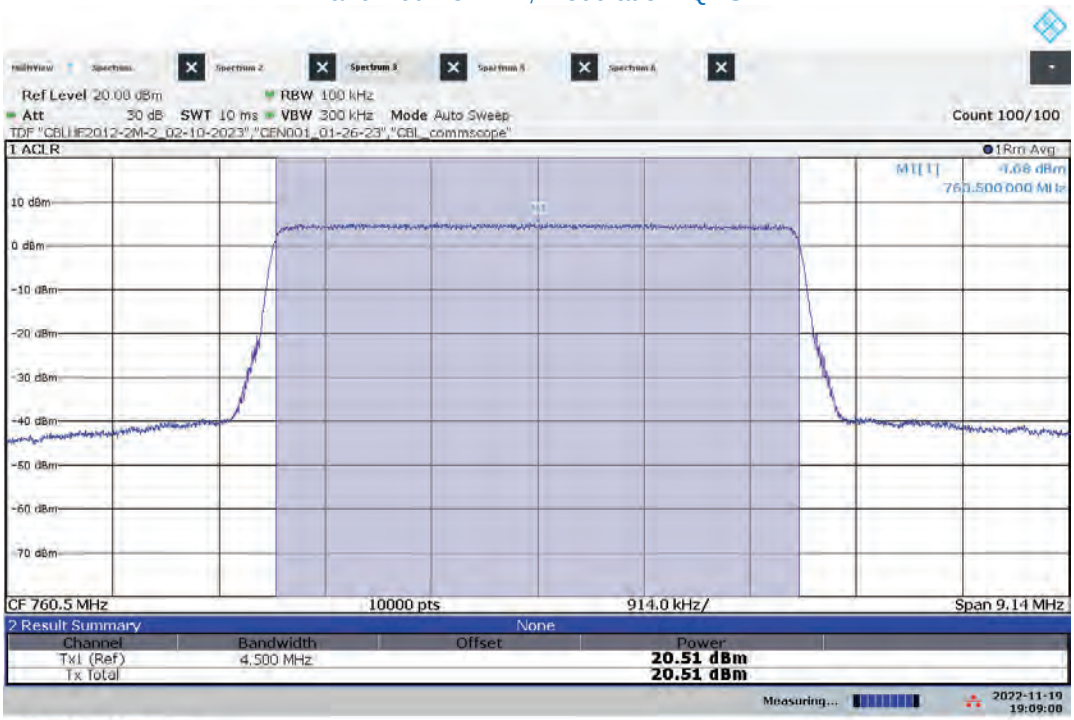
Notes: Low and mid channels are the same frequency as high channel.

Hi-PIM – ANT0 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: QPSK



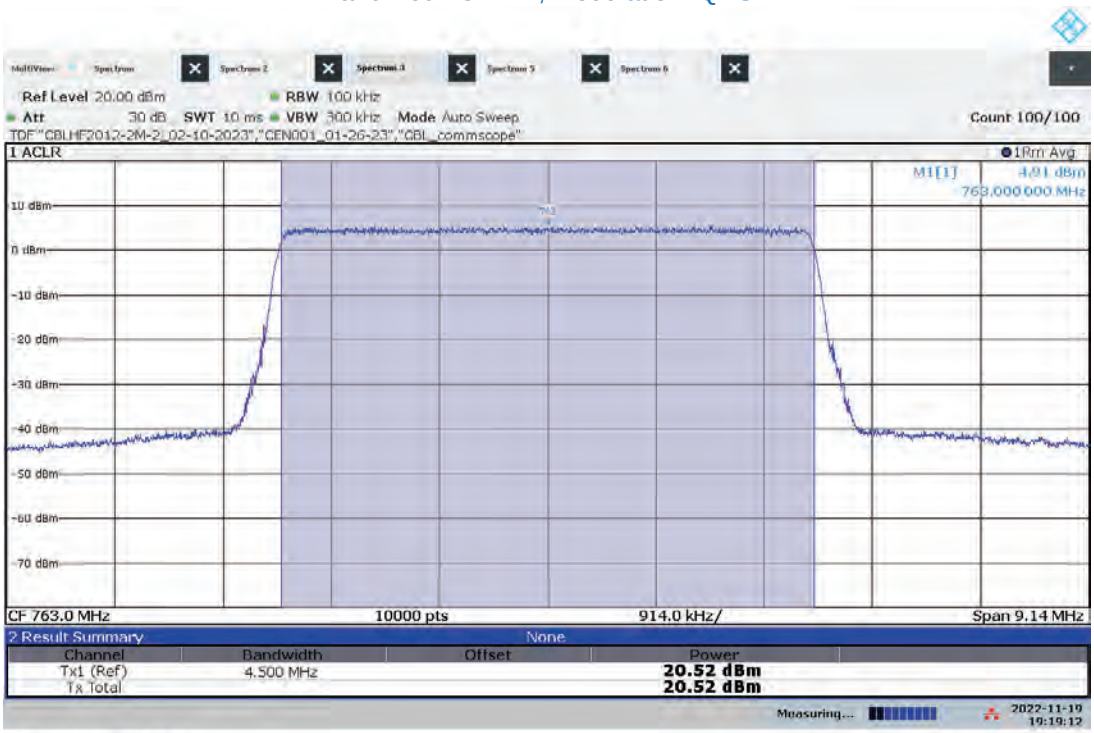
07:05:18 PM 11/19/2022

Hi-PIM – ANT1 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: QPSK

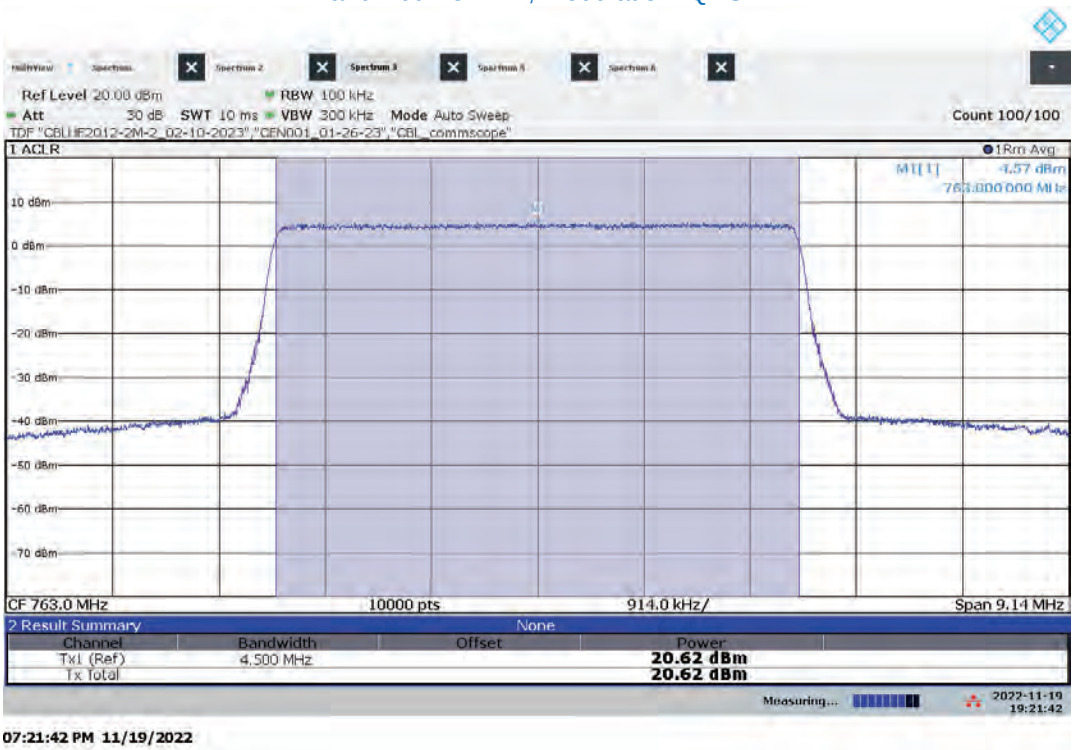


07:09:08 PM 11/19/2022

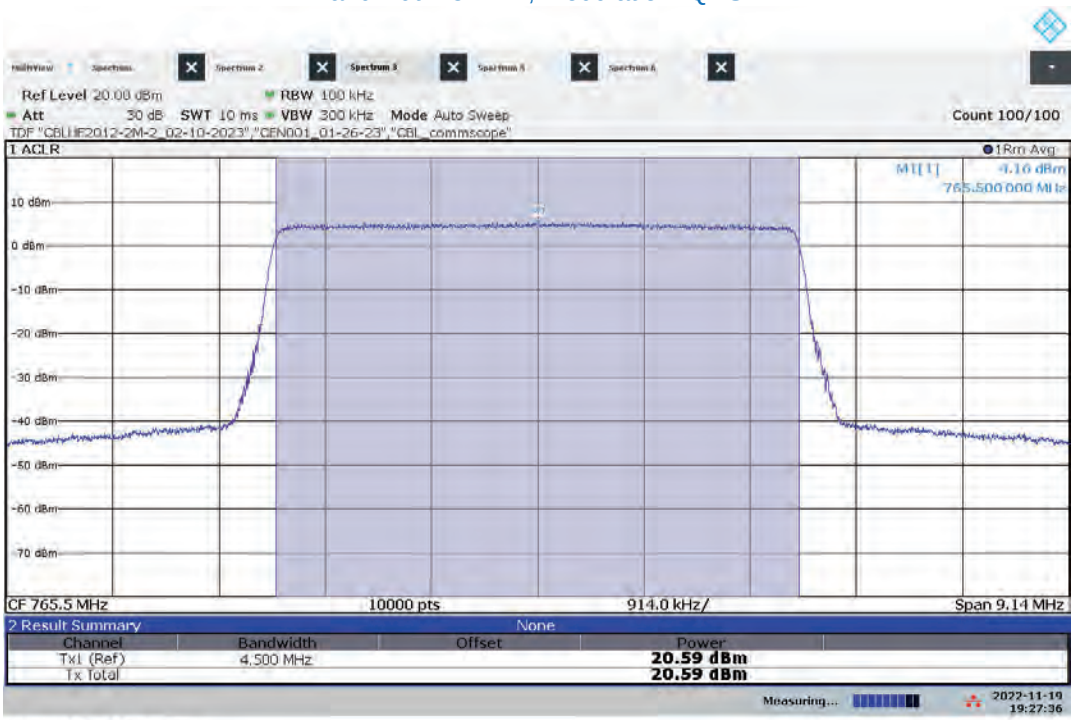
Hi-PIM – ANT0 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: QPSK



Hi-PIM – ANT1 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: QPSK

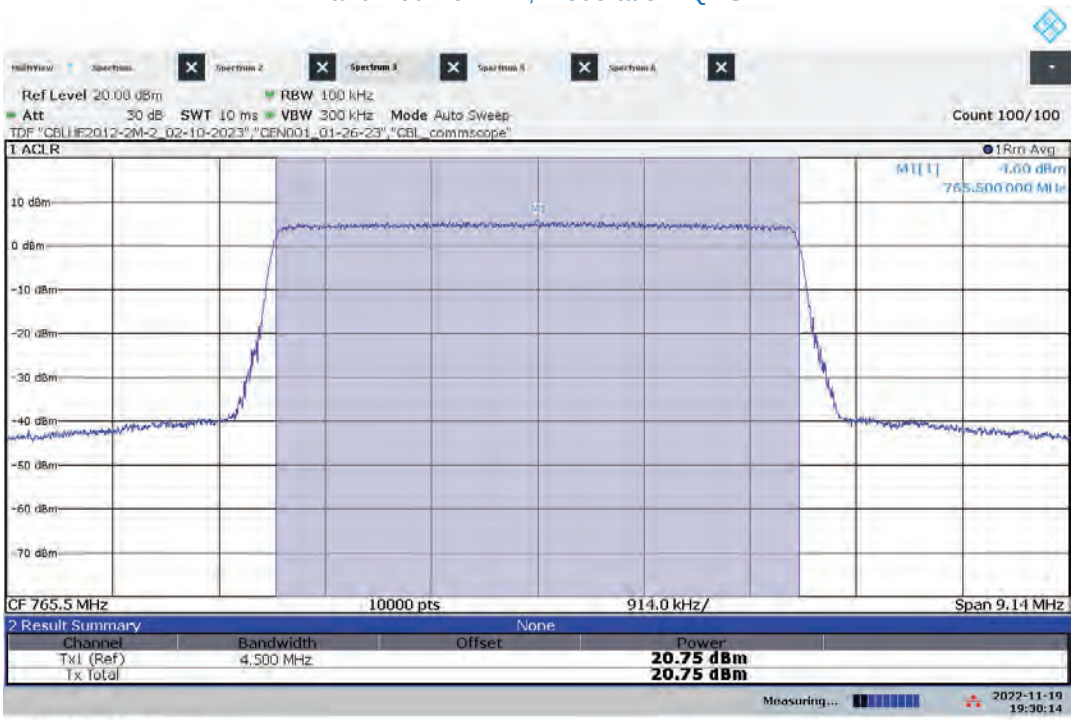


Hi-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: QPSK



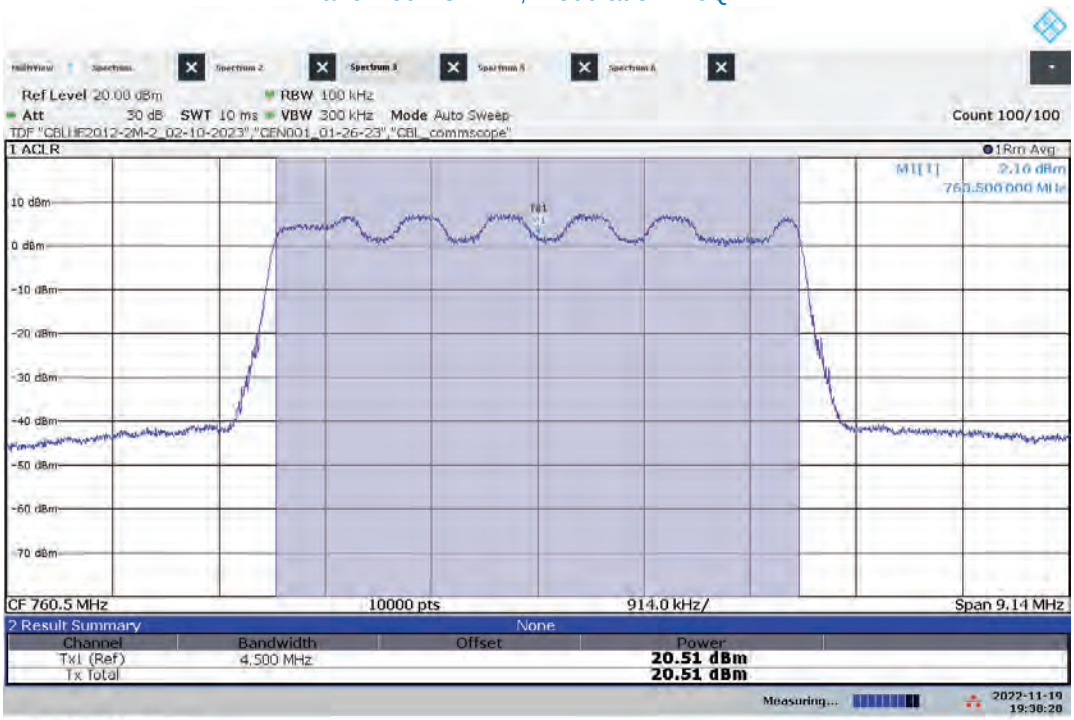
07:27:36 PM 11/19/2022

Hi-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: QPSK



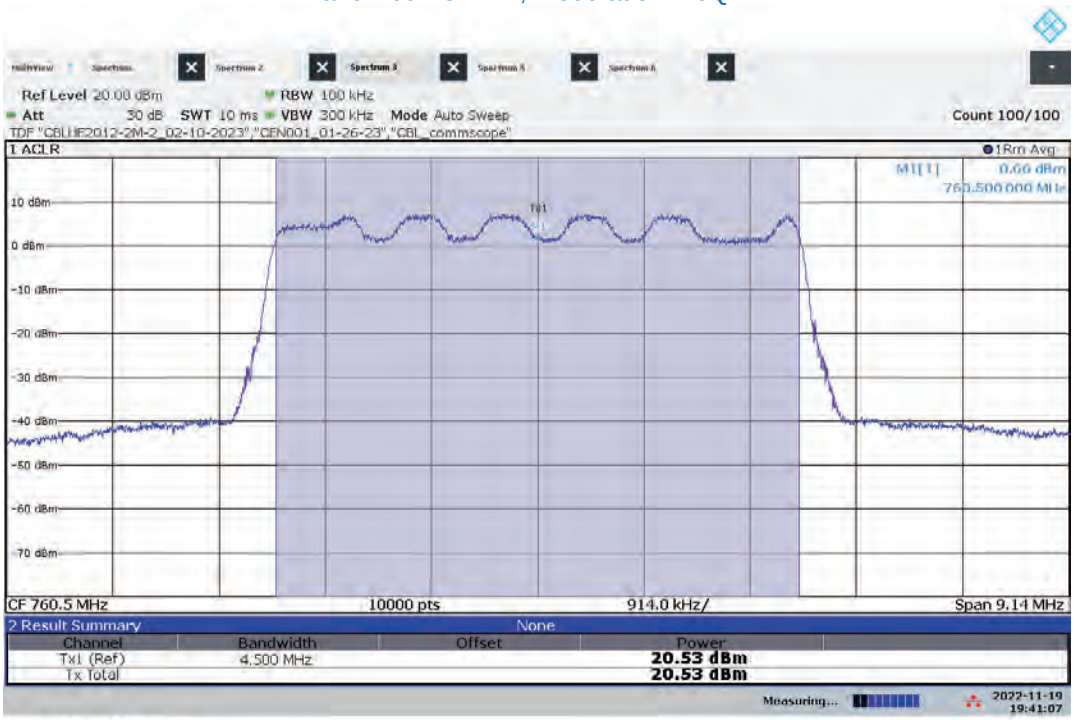
07:30:15 PM 11/19/2022

Hi-PIM – ANT0 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 16QAM



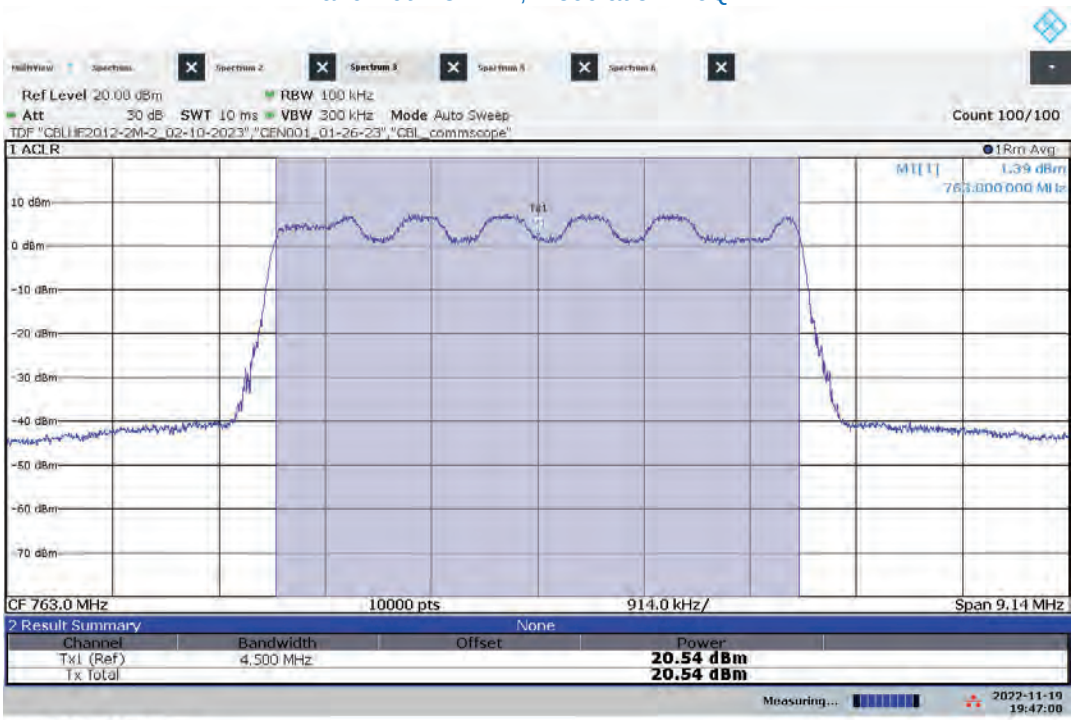
07:38:28 PM 11/19/2022

Hi-PIM – ANT1 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 16QAM



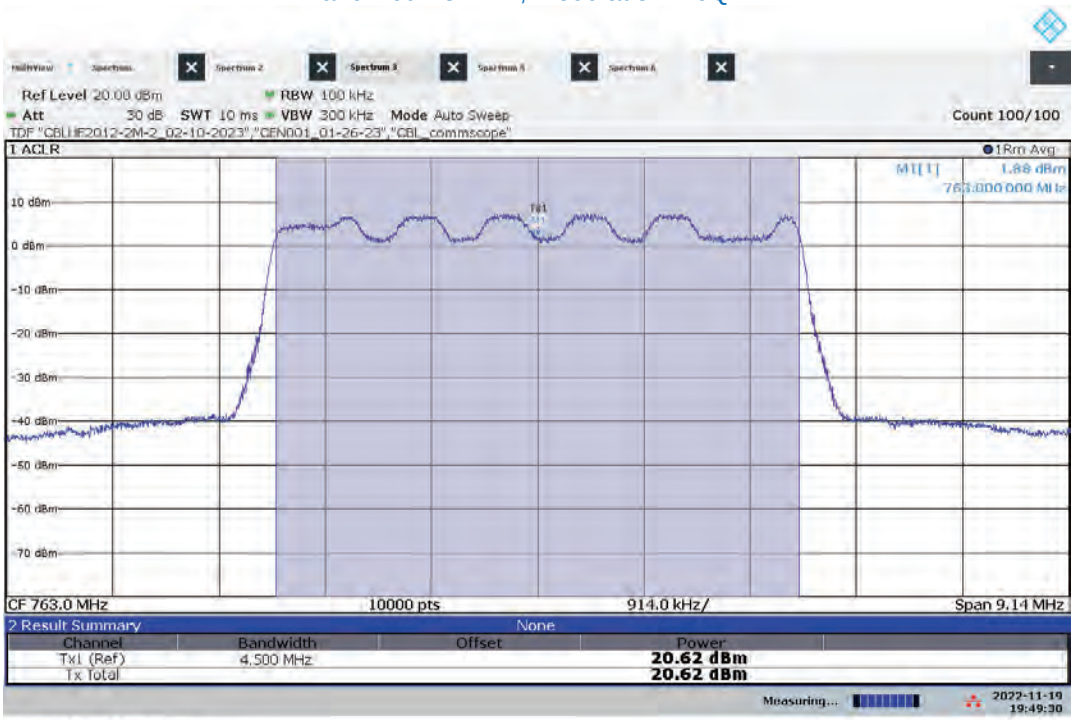
07:41:07 PM 11/19/2022

Hi-PIM – ANT0 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 16QAM



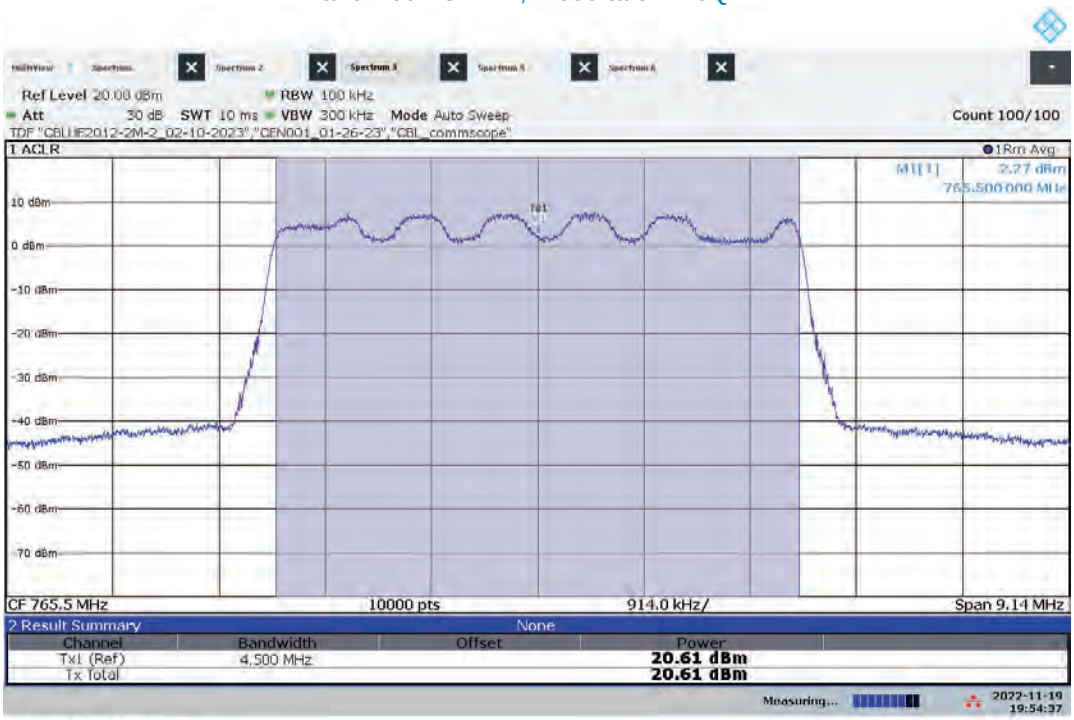
07:47:09 PM 11/19/2022

Hi-PIM – ANT1 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 16QAM



07:49:31 PM 11/19/2022

Hi-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 16QAM



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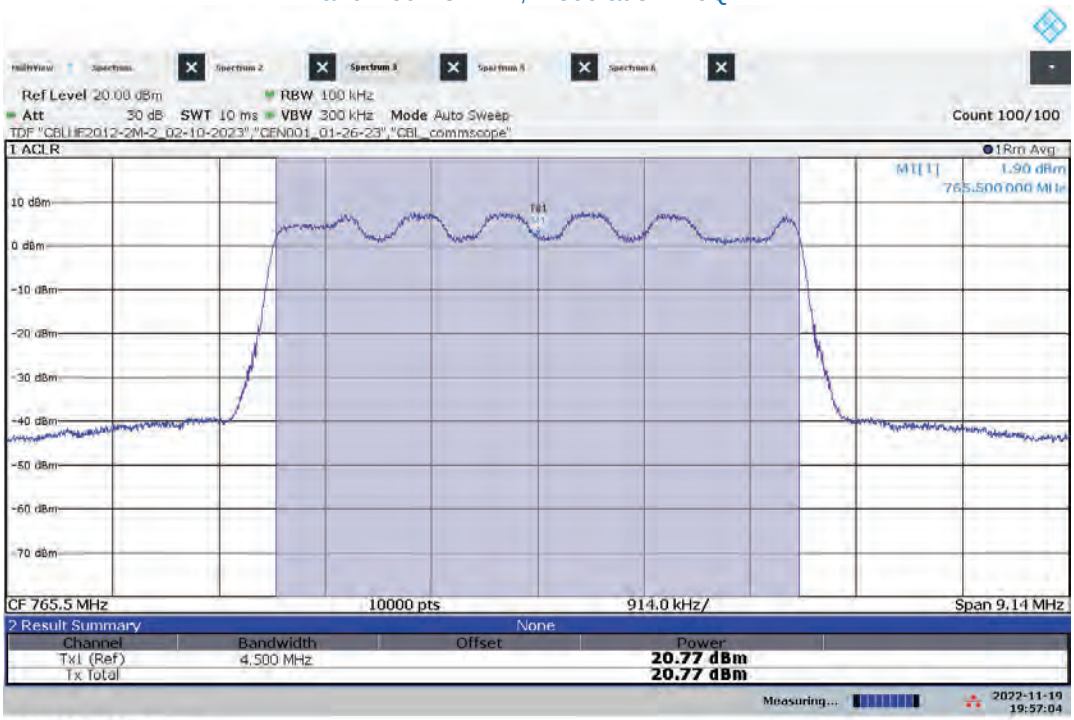
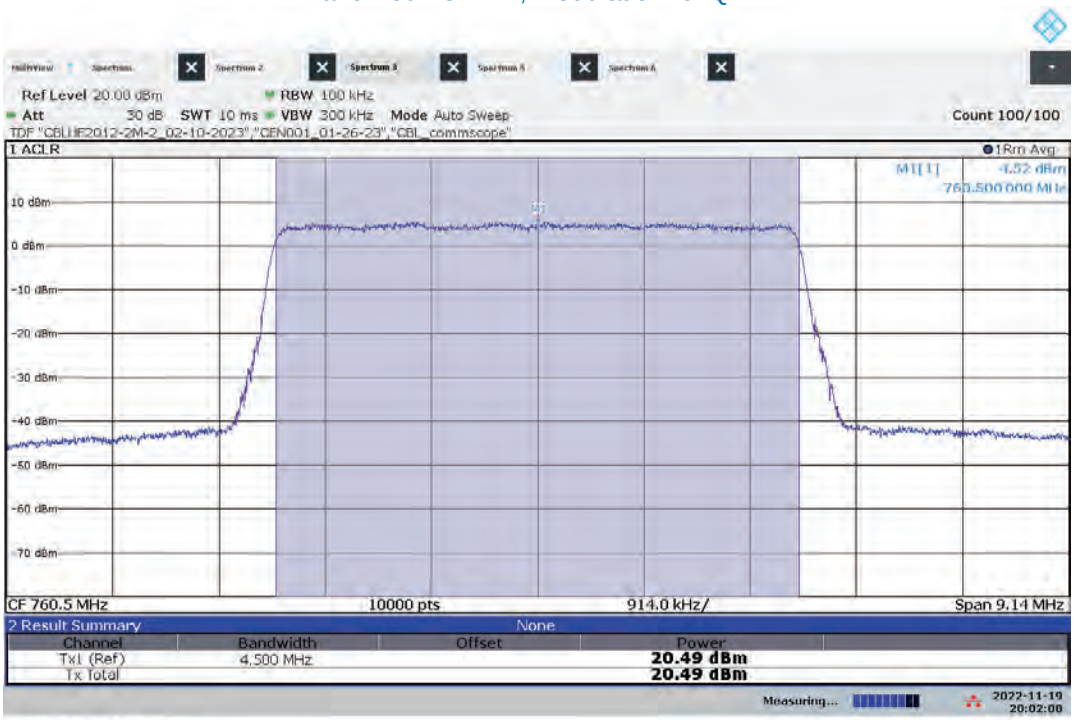
Hi-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 16QAM



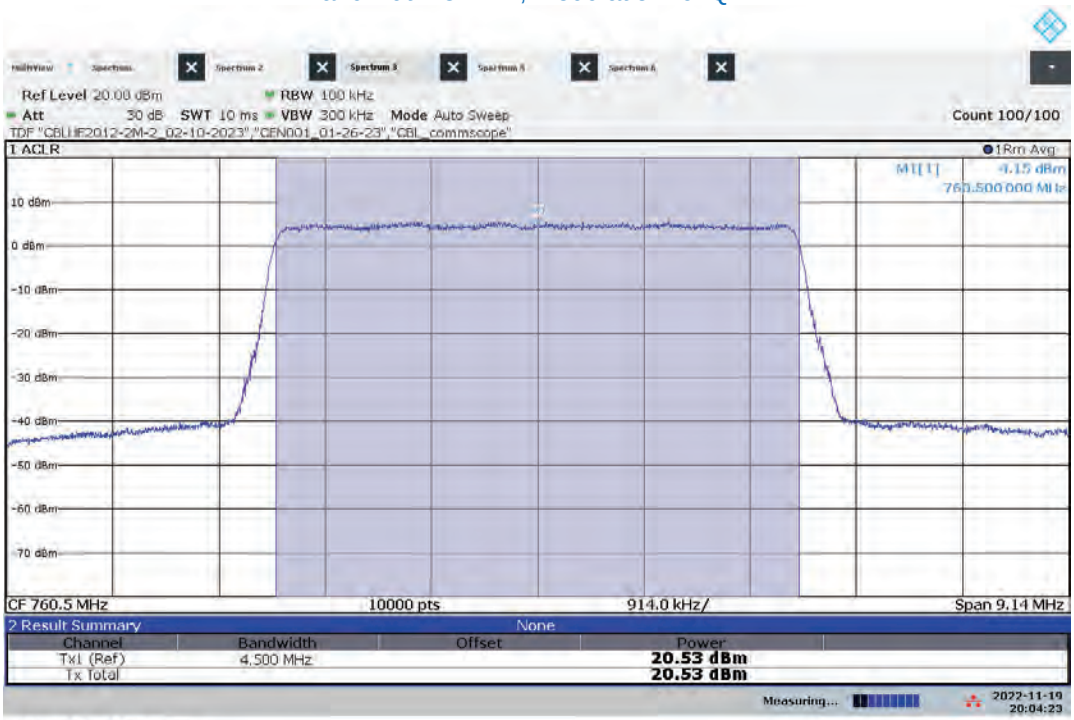
07:57:04 PM 11/19/2022

Hi-PIM – ANT0 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 64QAM



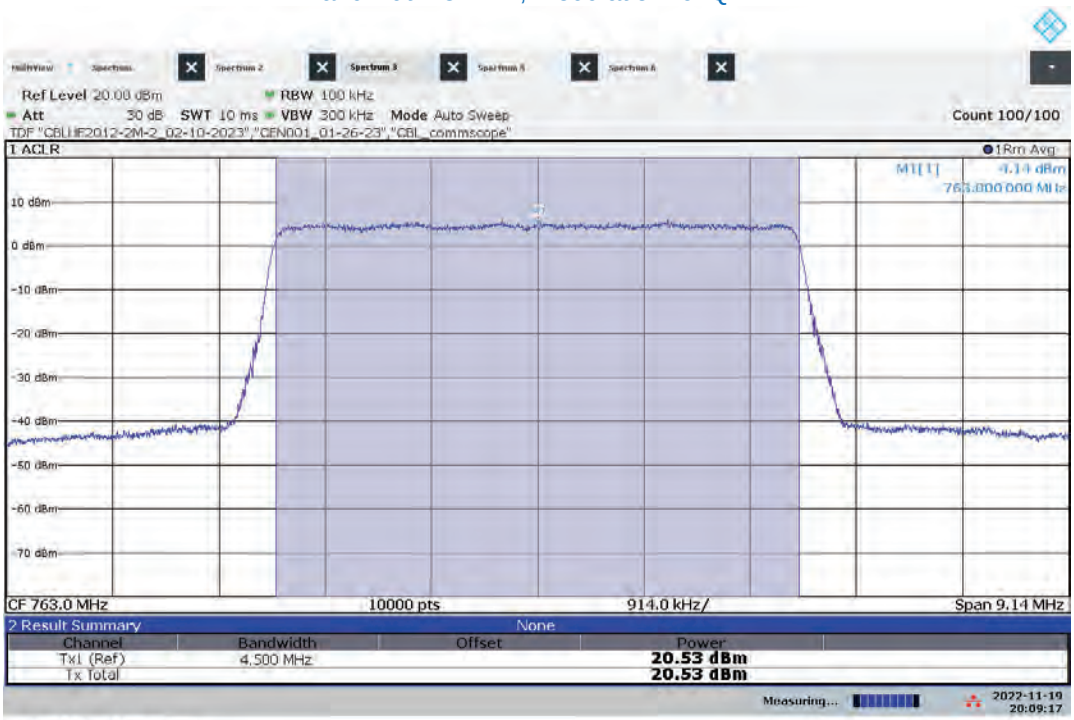
08:02:09 PM 11/19/2022

Hi-PIM – ANT1 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 64QAM



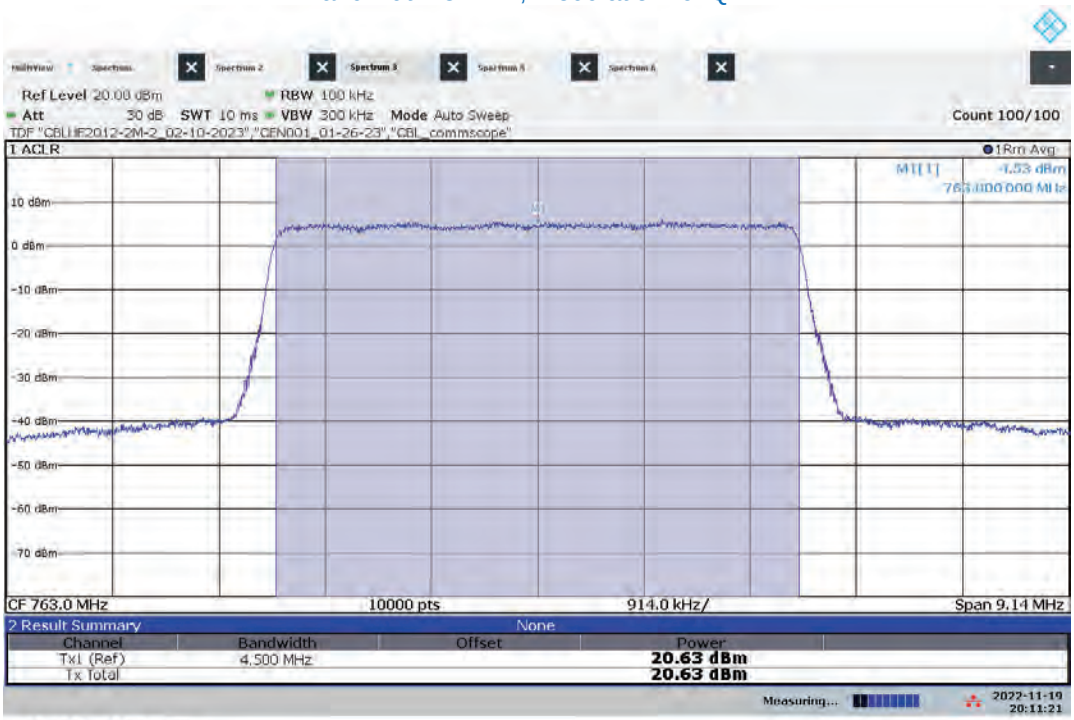
08:04:23 PM 11/19/2022

Hi-PIM – ANT0 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 64QAM



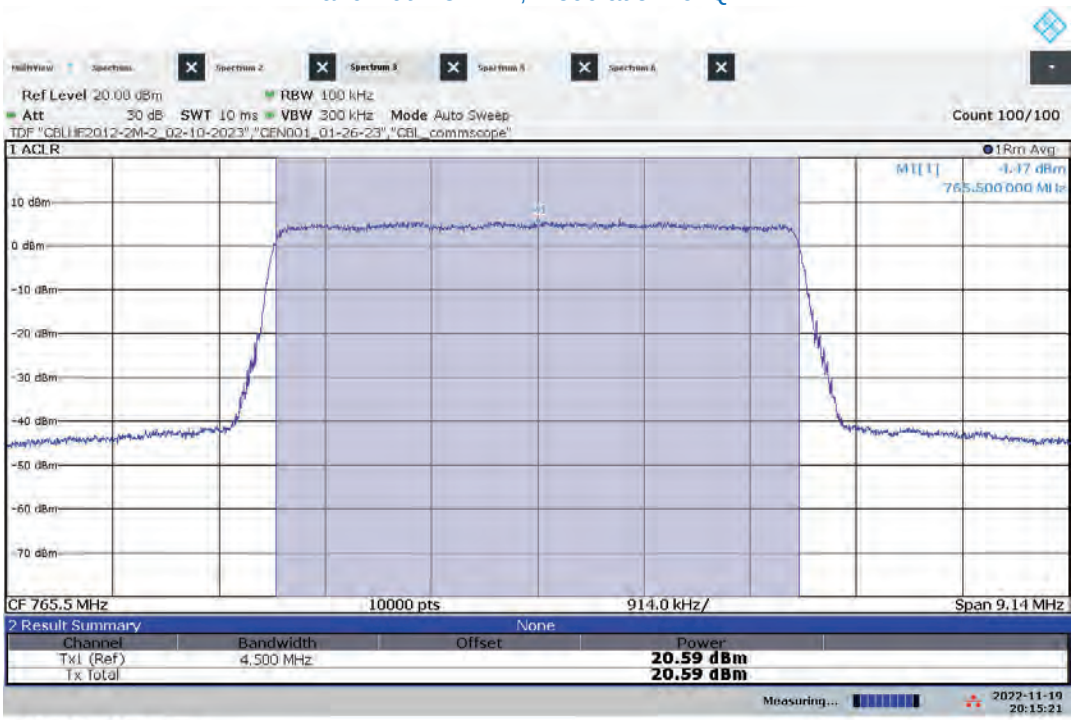
08:09:17 PM 11/19/2022

Hi-PIM – ANT1 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 64QAM



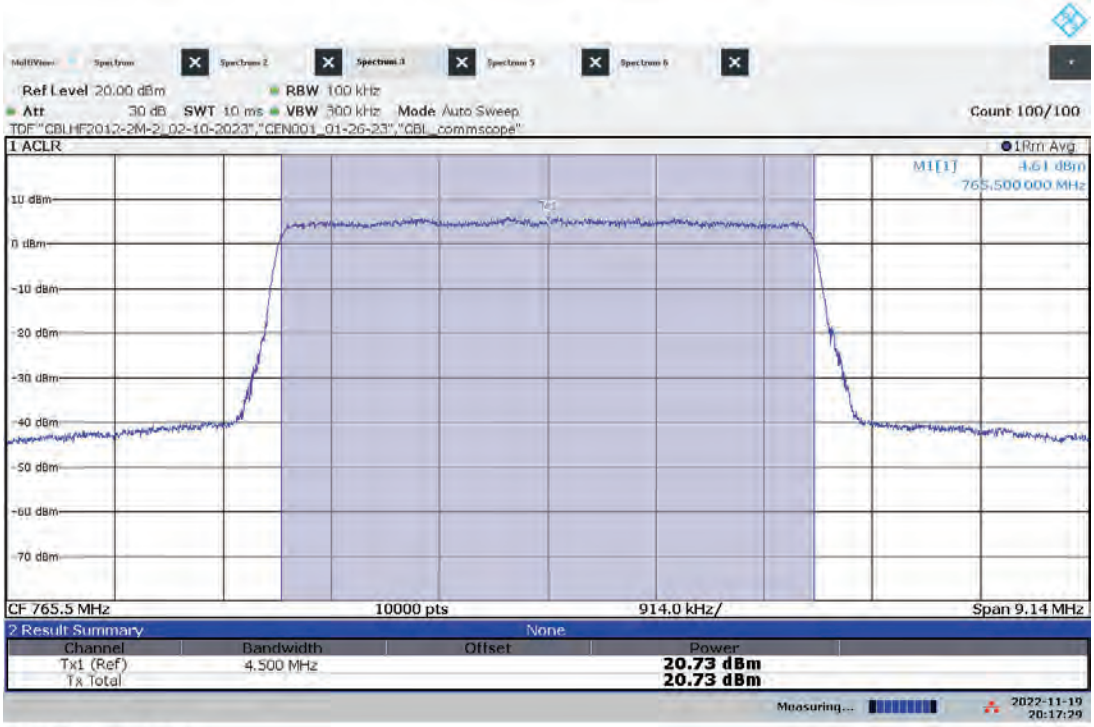
08:11:22 PM 11/19/2022

Hi-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 64QAM



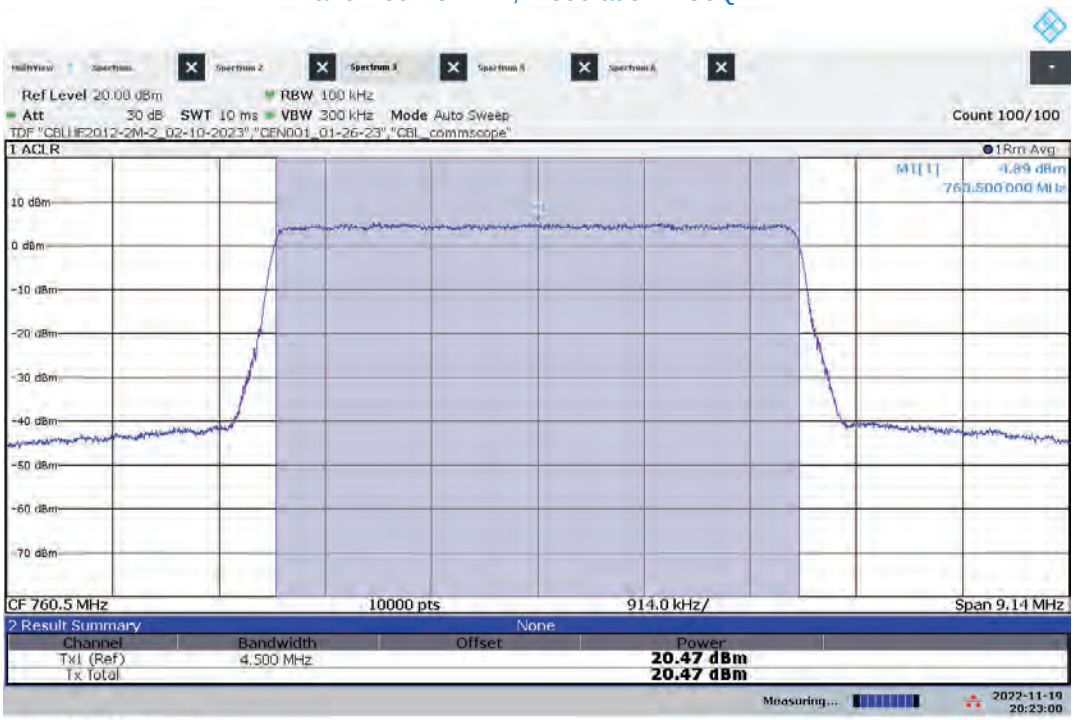
08:15:21 PM 11/19/2022

Hi-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 64QAM



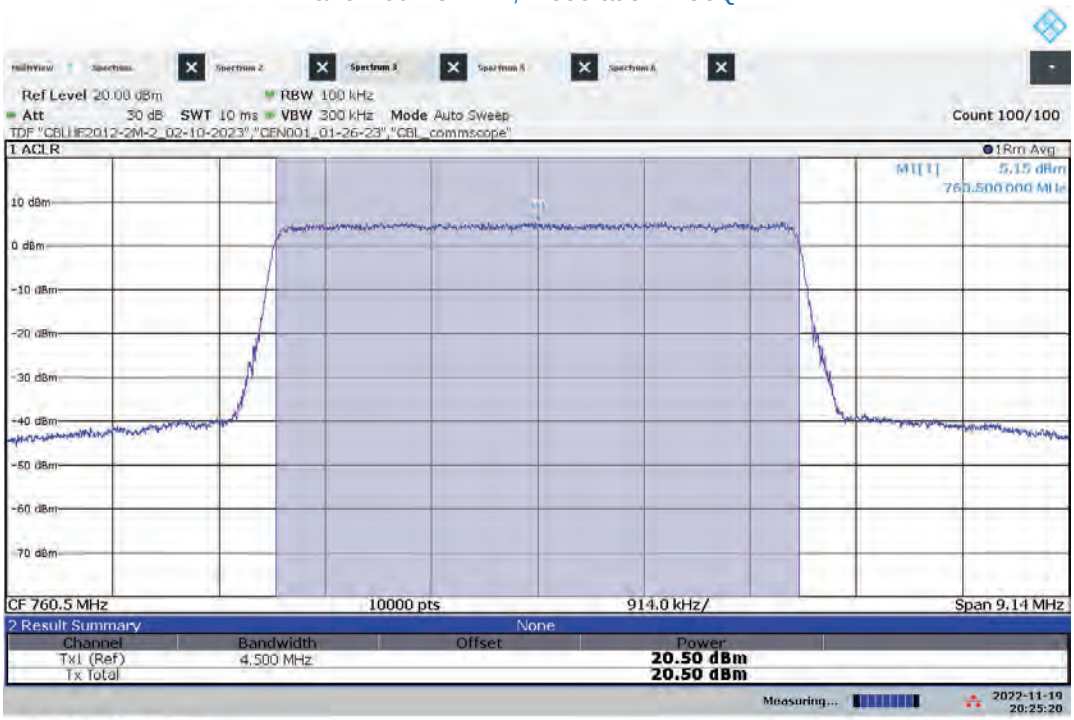
08:17:29 PM 11/19/2022

Hi-PIM – ANT0 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 256QAM



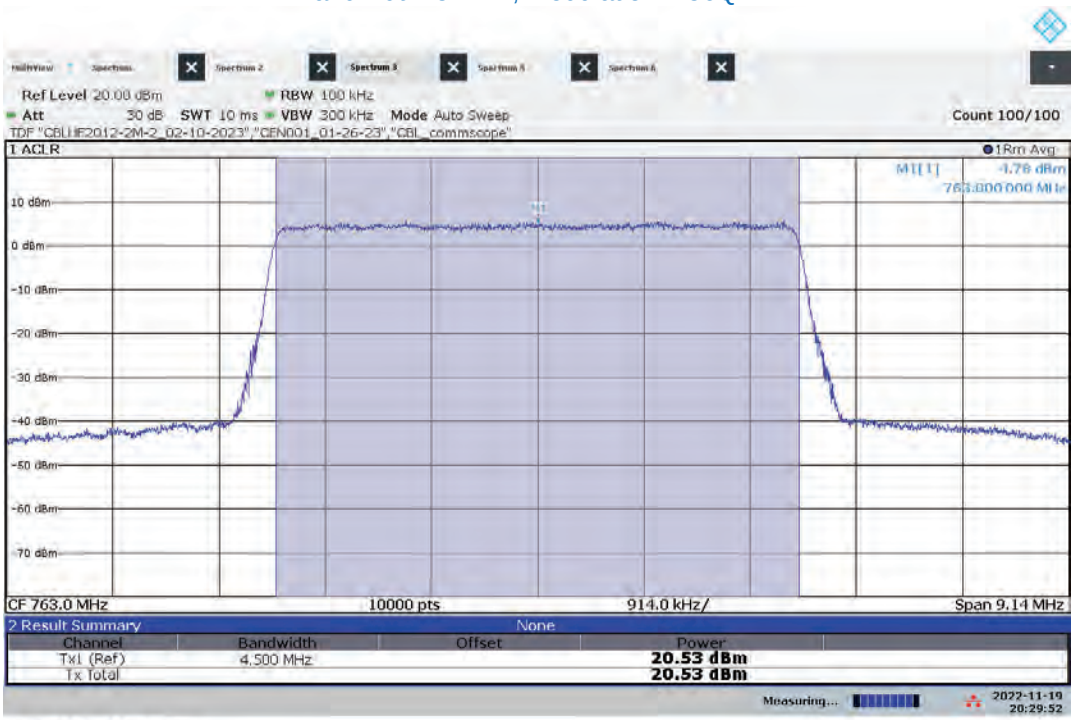
08:23:00 PM 11/19/2022

Hi-PIM – ANT1 Low Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 256QAM



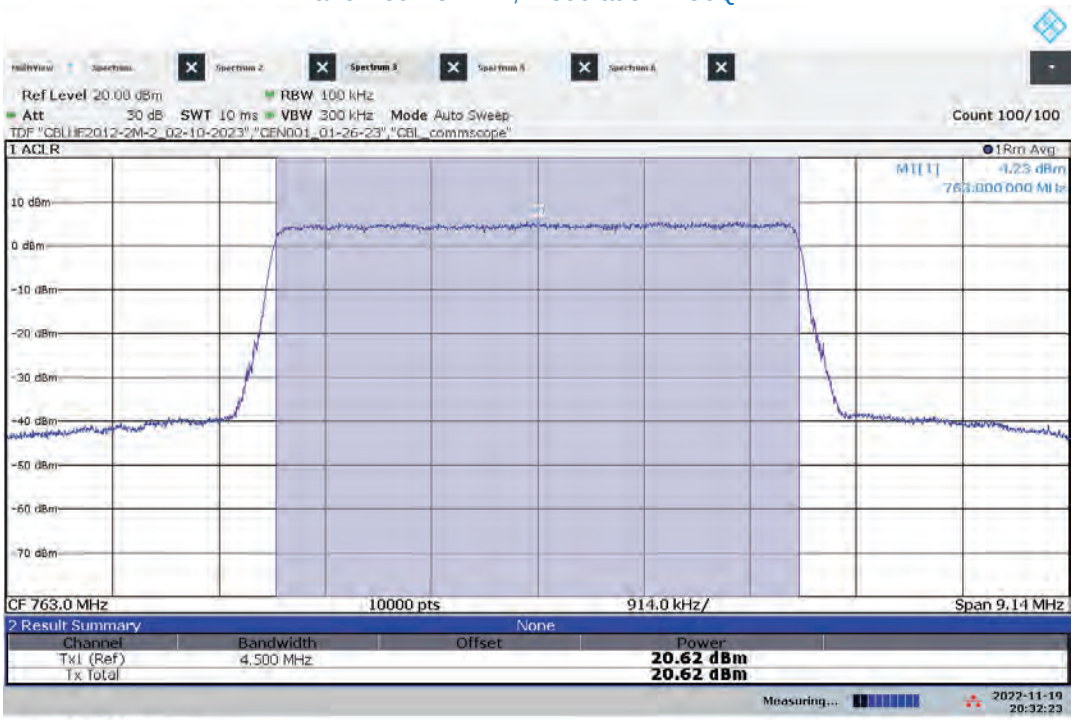
08:25:20 PM 11/19/2022

Hi-PIM – ANT0 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 256QAM



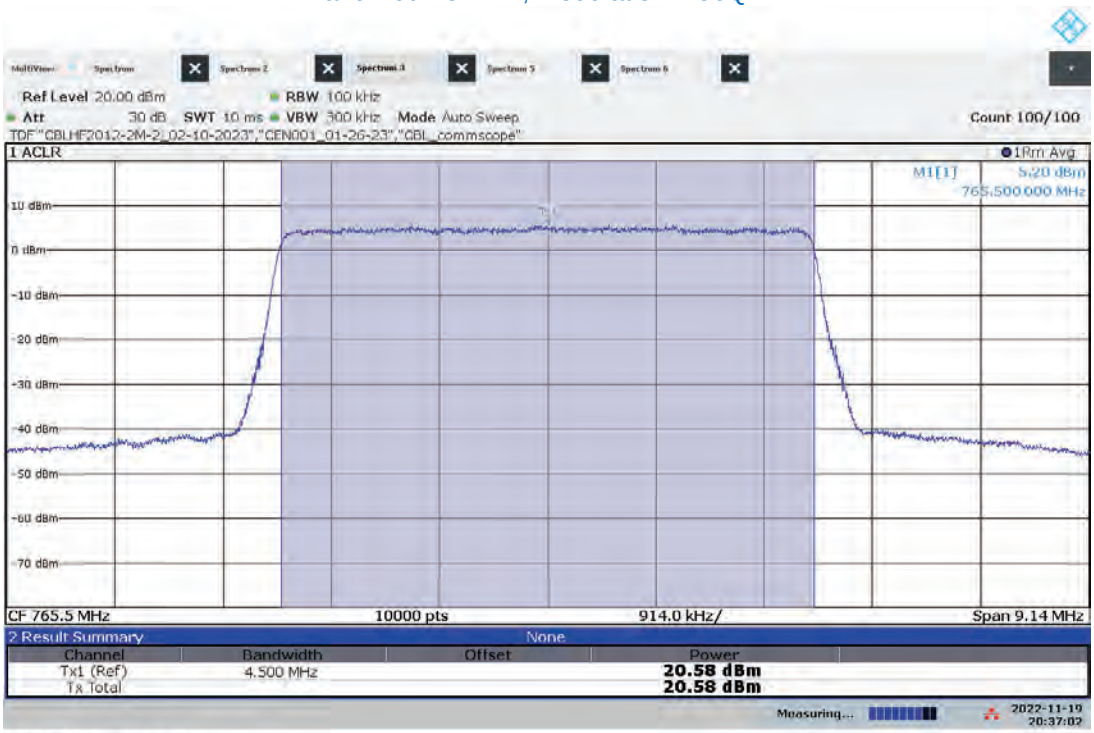
08:29:52 PM 11/19/2022

Hi-PIM – ANT1 Mid Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 256QAM



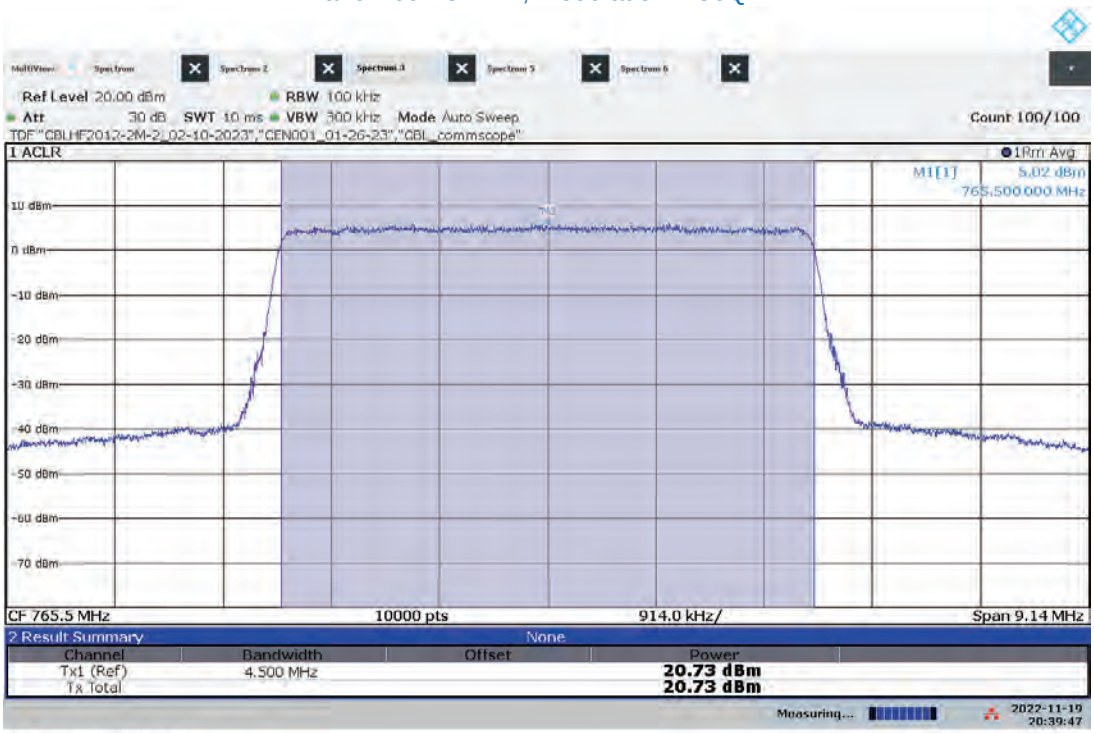
08:32:23 PM 11/19/2022

Hi-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 256QAM



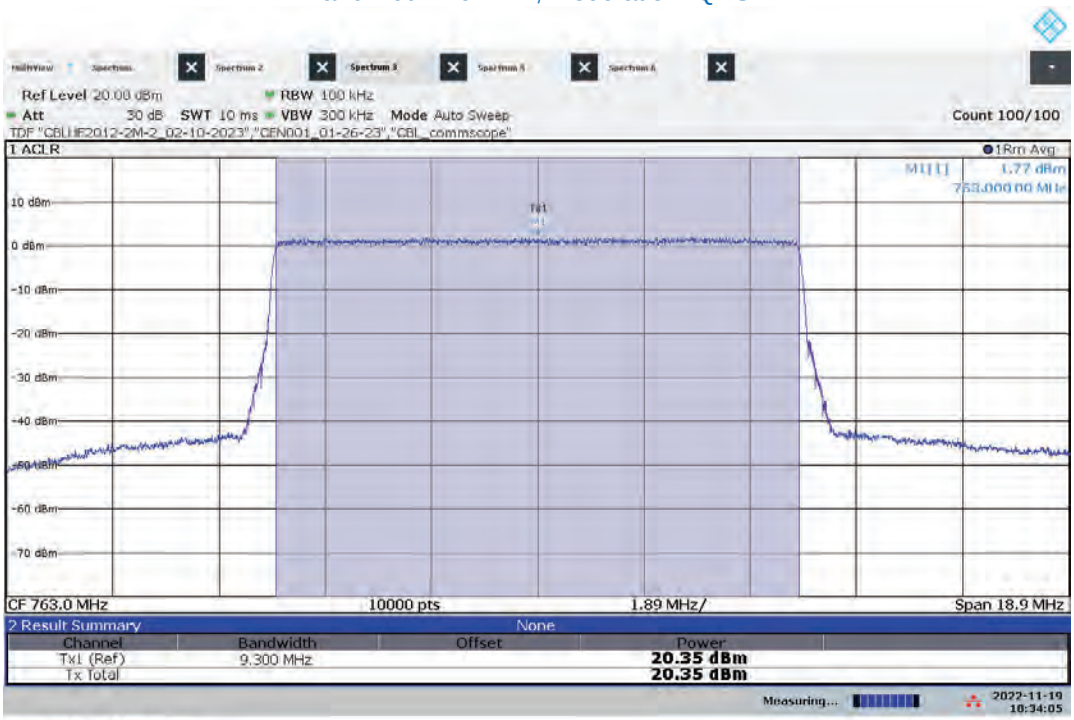
08:37:02 PM 11/19/2022

Hi-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 5 MHz, Modulation: 256QAM

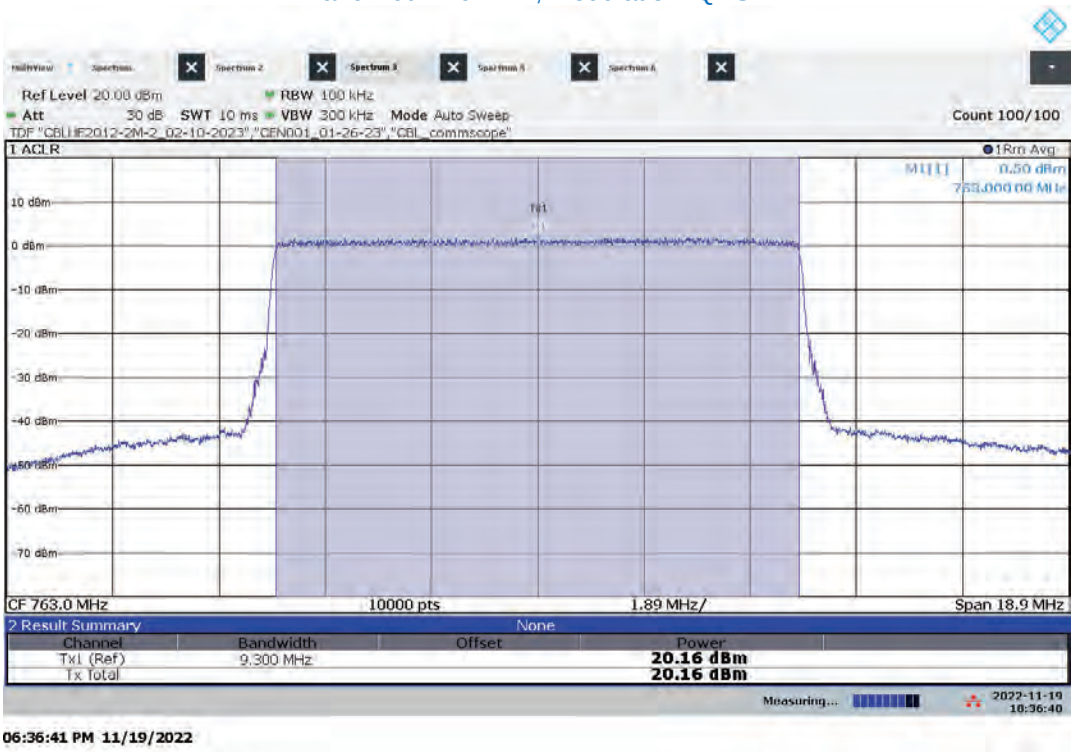


08:39:47 PM 11/19/2022

Hi-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: QPSK

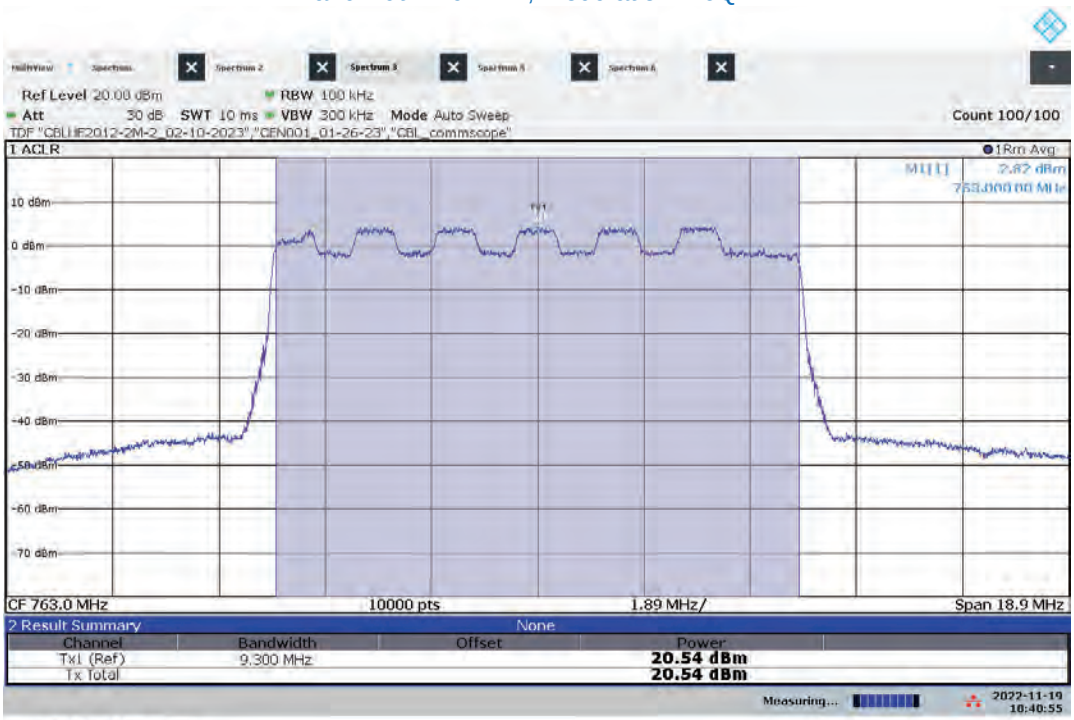


Hi-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: QPSK

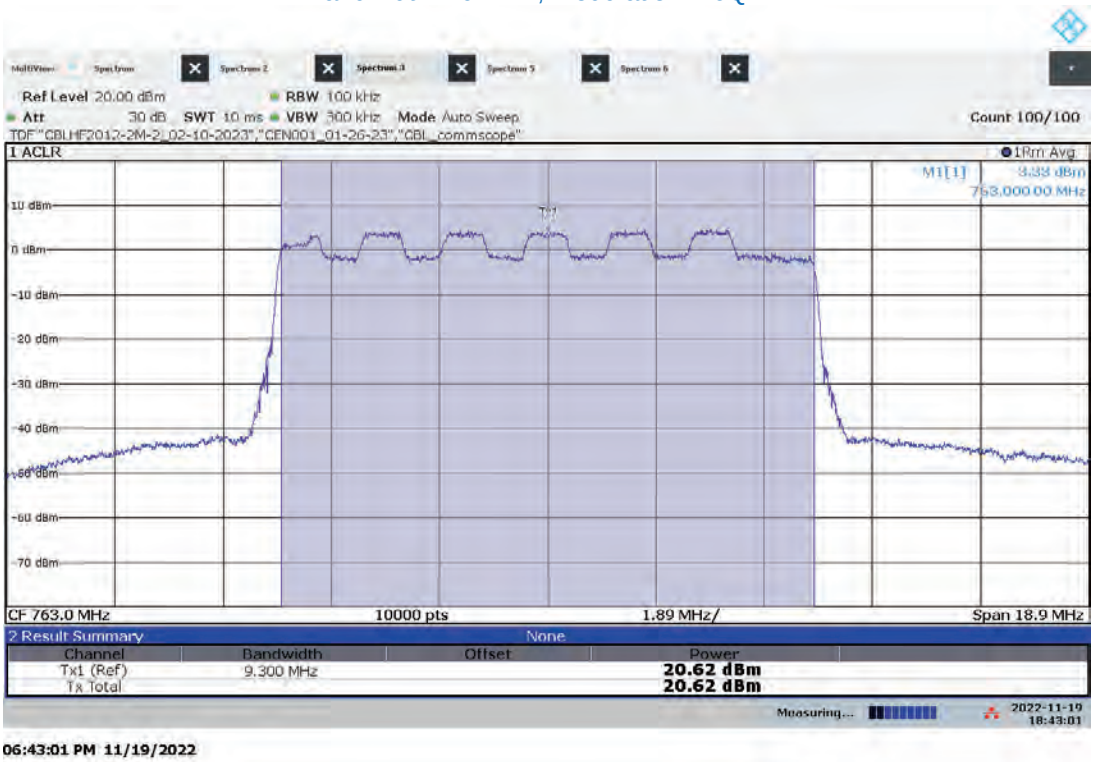


Notes: Low and mid channels are the same frequency as high channel.

Hi-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: 16QAM

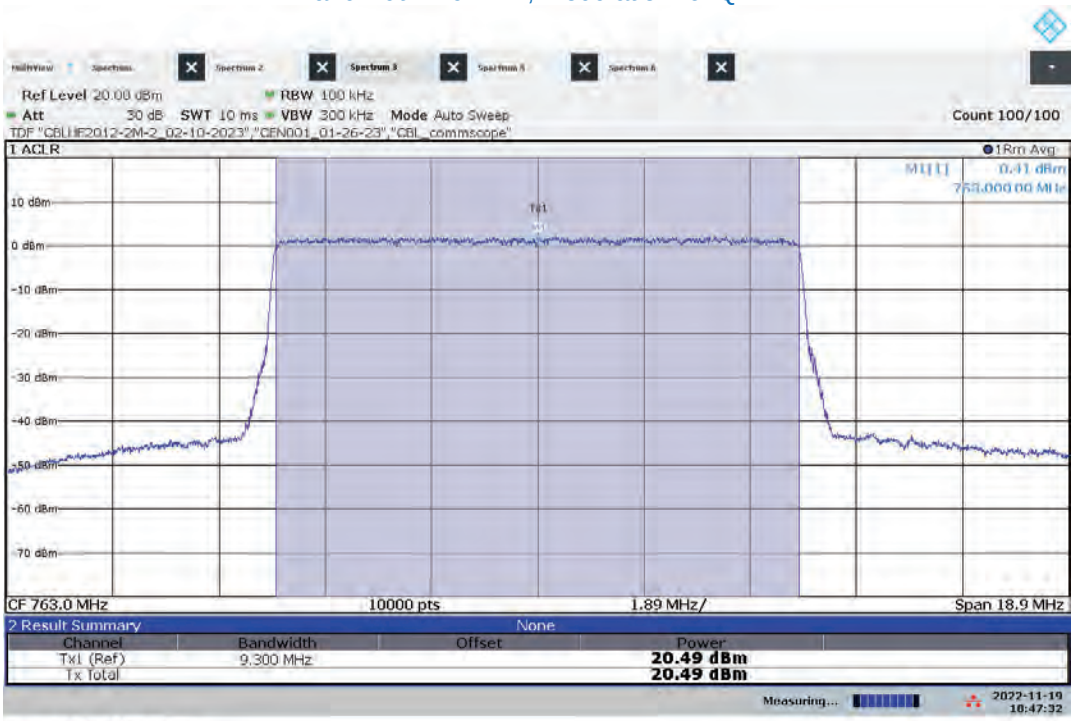


Hi-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: 16QAM



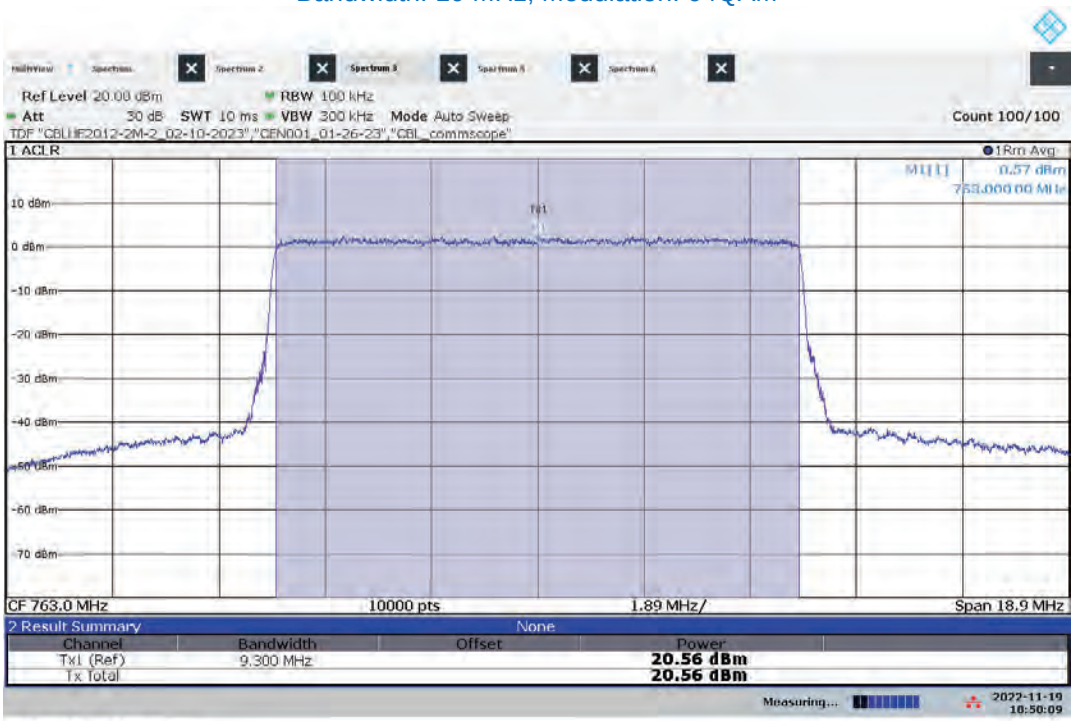
Notes: Low and mid channels are the same frequency as high channel.

Hi-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: 64QAM



06:47:32 PM 11/19/2022

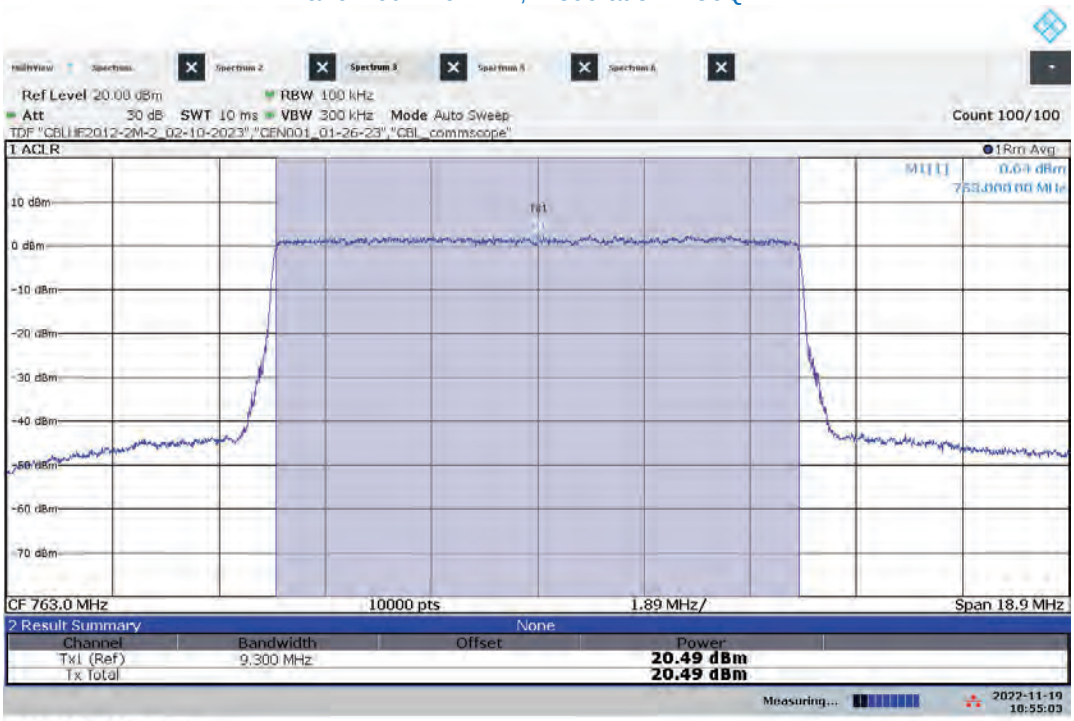
Hi-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: 64QAM



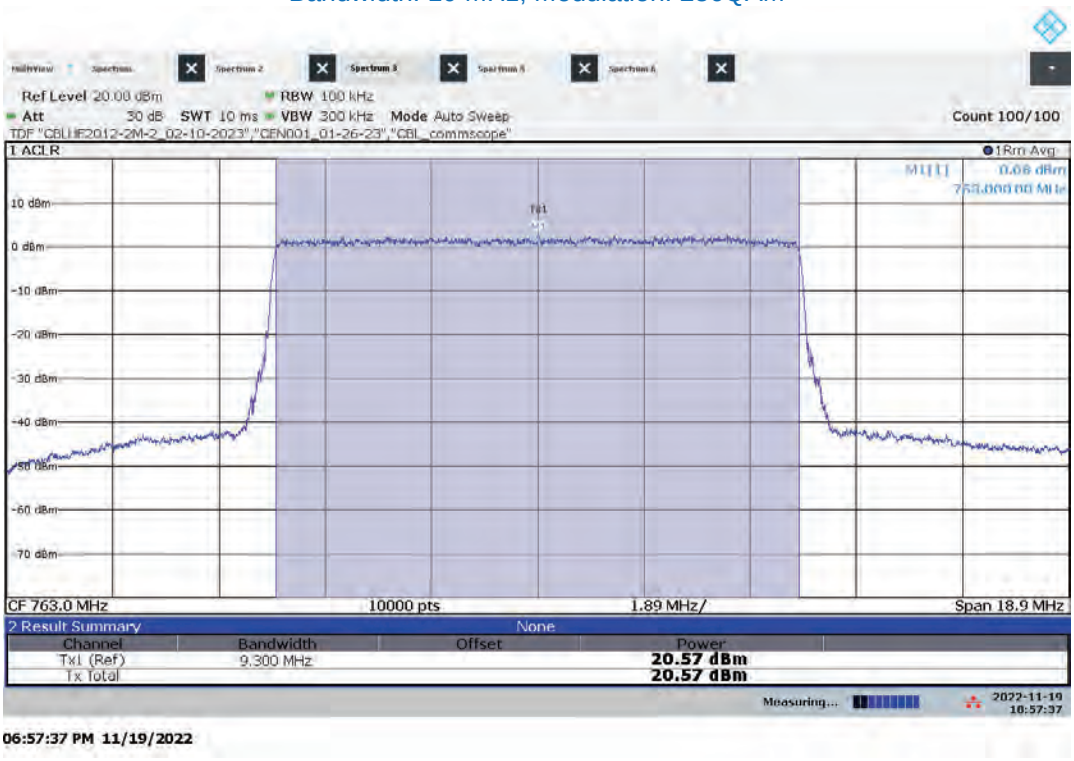
06:50:10 PM 11/19/2022

Notes: Low and mid channels are the same frequency as high channel.

Hi-PIM – ANT0 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: 256QAM



Hi-PIM – ANT1 High Channel Conducted Output Power
Bandwidth: 10 MHz, Modulation: 256QAM



Notes: Low and mid channels are the same frequency as high channel.

	Product Standard: CFR47 FCC Part 90			Limit applied: See Report Section 6.3 Pretest Verification w/BB source: N/A			
Test Date	Test Personnel/ Initials	Supervising Engineer/ Initials	Input Voltage	Mode	Atmospheric Data		
					Temp C°	Relative Humidity %	Atmospheric Pressure mbar
11/19/2022	Kouma Sinn KPS	Vathana F. Ven VFV	POE	Transmit	24	14	1009

Deviations, Additions, or Exclusions: None

7 Occupied and 26 dB Bandwidths

7.1 Method

Tests are performed in accordance with ANSI C63.26 and CFR47 FCC Parts 2.1049 and 90.

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
DAV005'	Weather Station	Davis	6250	MS191218083	02/11/2022	02/11/2023
ROS005-1'	Signal and Spectrum Analyzer	Rohde and Shwartz	FSW43	100646	11/02/2021	11/02/2022
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	252675002	02/10/2022	02/10/2023
CEN001'	DC-40GHz attenuator 20dB	Centric RF	C411-20	CEN001	01/26/2022	01/26/2023
None	Mini SMA cable	Provided by CommScope	None	None	VBU	Verified

Software Utilized:

Name	Manufacturer	Version
None	N/A	N/A

7.3 Results:

The sample tested was found to Comply.

§90.543 (d): *Authorized bandwidth.* Provided that the ACP requirements of this section are met, applicants may request any authorized bandwidth that does not exceed the channel size.

§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.

Lo-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM1.1-QPSK (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Low	760.50	ANT0	4.472	4.98
		ANT1	4.468	4.98
Mid	763.00	ANT0	4.474	4.98
		ANT1	4.475	4.99
High	765.50	ANT0	4.465	4.98
		ANT1	4.469	4.98

Lo-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.2-16QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Low	760.50	ANT0	4.516	5.02
		ANT1	4.519	5.02
Mid	763.00	ANT0	4.515	5.04
		ANT1	4.513	5.03
High	765.50	ANT0	4.512	5.01
		ANT1	5.514	5.02

Lo-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.1-64QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Low	760.50	ANT0	4.481	4.99
		ANT1	4.480	4.99
Mid	763.00	ANT0	4.477	4.85
		ANT1	4.473	4.87
High	765.50	ANT0	4.472	4.97
		ANT1	4.474	4.99

Lo-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Low	760.50	ANT0	4.480	4.99
		ANT1	4.473	5.01
Mid	763.00	ANT0	4.480	4.98
		ANT1	4.479	4.97
High	765.50	ANT0	4.470	4.99
		ANT1	4.472	4.99

Lo-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM1.1-QPSK (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
High	763.00	ANT0	9.299	10.09
		ANT1	9.293	10.11

Lo-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM3.2-16QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
High	763.00	ANT0	9.222	9.97
		ANT1	9.215	9.97

Lo-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM3.1-64QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
High	763.00	ANT0	9.297	10.09
		ANT1	9.295	10.07

Lo-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
High	763.00	ANT0	9.291	10.07
		ANT1	9.278	10.11

Hi-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM1.1-QPSK (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Low	760.50	ANT0	4.467	4.99
		ANT1	4.470	4.97
Mid	763.00	ANT0	4.475	4.99
		ANT1	4.478	4.99
High	765.50	ANT0	4.467	4.99
		ANT1	4.472	4.96

Hi-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.2-16QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Low	760.50	ANT0	4.514	5.03
		ANT1	4.519	5.03
Mid	763.00	ANT0	4.522	5.04
		ANT1	4.515	5.03
High	765.50	ANT0	4.485	5.03
		ANT1	4.511	5.01

Hi-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.1-64QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Low	760.50	ANT0	4.487	4.93
		ANT1	4.480	4.92
Mid	763.00	ANT0	4.487	4.93
		ANT1	4.487	4.92
High	765.50	ANT0	4.479	4.93
		ANT1	4.479	4.93

Hi-PIM, Slot 0 (Band 14), Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
Low	760.50	ANT0	4.480	4.96
		ANT1	4.477	4.95
Mid	763.00	ANT0	4.486	4.96
		ANT1	4.473	4.96
High	765.50	ANT0	4.478	4.95
		ANT1	4.477	4.95

Hi-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM1.1-QPSK (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
High	763.00	ANT0	9.295	10.11
		ANT1	9.291	10.11

Hi-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM3.2-16QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
High	763.00	ANT0	9.235	9.97
		ANT1	9.231	9.95

Hi-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM3.1-64QAM (5G nR)

Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
High	763.00	ANT0	9.297	10.07
		ANT1	9.300	10.09

Hi-PIM, Slot 0 (Band 14), Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM (5G nR)

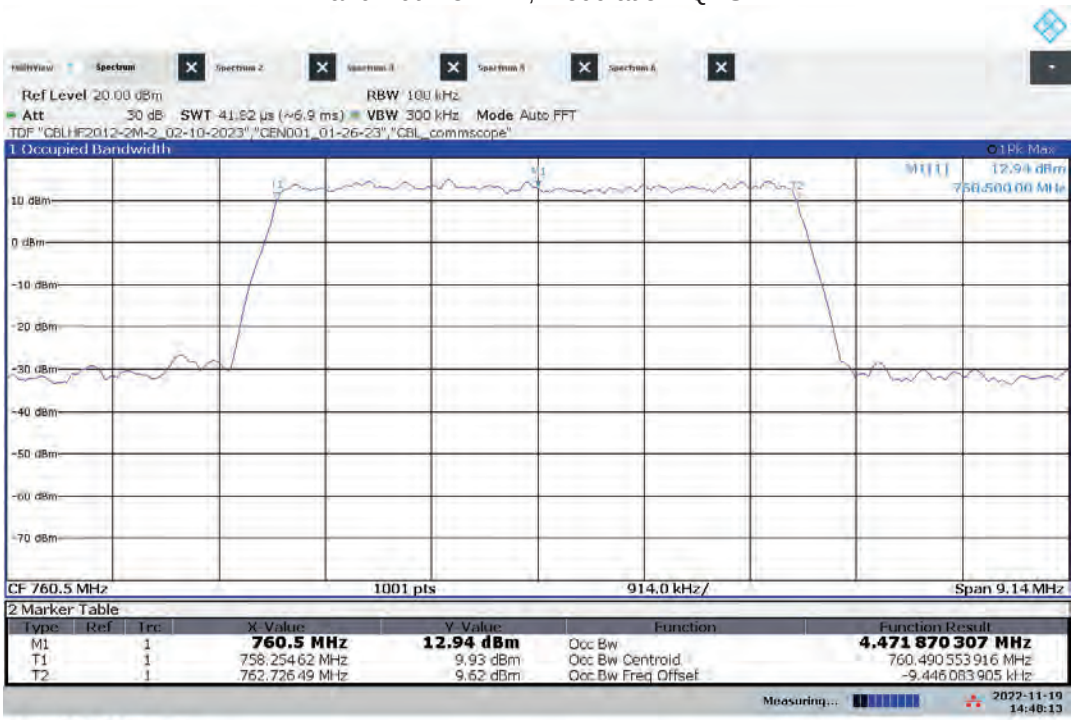
Channel	Frequency (MHz)	Antenna Port	Occupied BW (MHz)	26 dB BW (MHz)
High	763.00	ANT0	9.290	10.11
		ANT1	9.294	10.09

7.4 Setup Photographs:

Confidential – Photos not included in this report

7.5 Plots/Data:

Lo-PIM – ANT0 Low Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: QPSK



02:48:13 PM 11/19/2022

Lo-PIM – ANT1 Low Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: QPSK

02:51:35 PM 11/19/2022

Lo-PIM – ANT0 Mid Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: QPSK

02:34:35 PM 11/19/2022

Lo-PIM – ANT1 Mid Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: QPSK

02:42:15 PM 11/19/2022

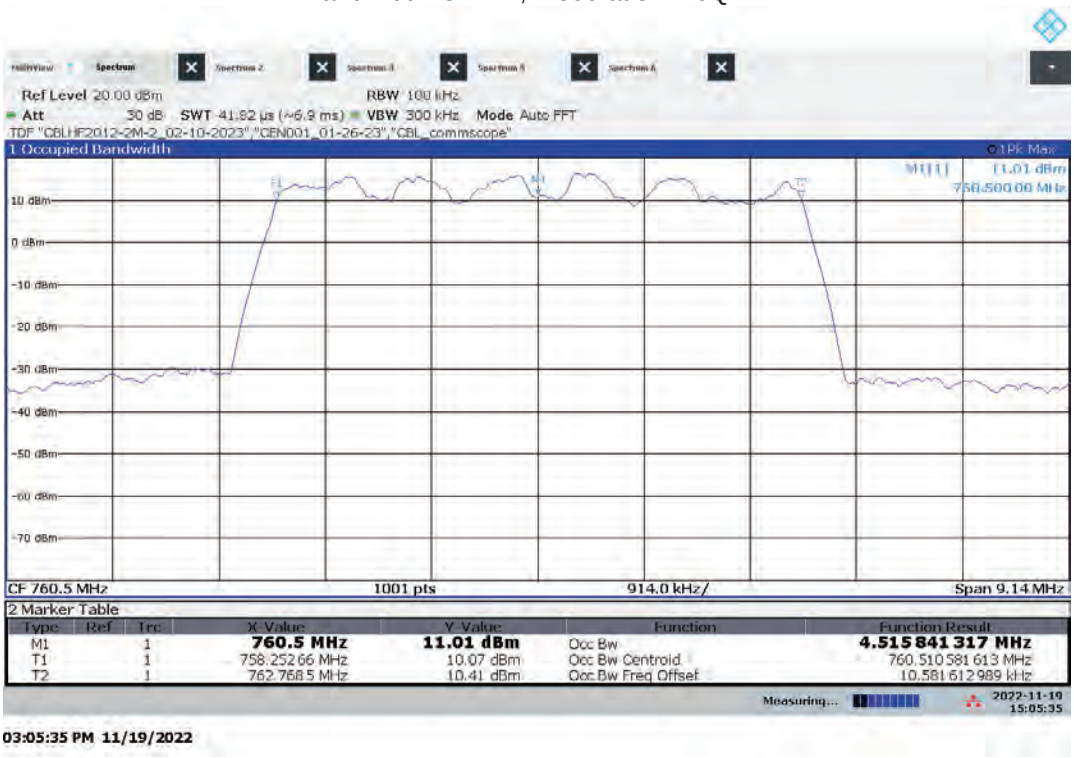
Lo-PIM – ANT0 High Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: QPSK

02:19:51 PM 11/19/2022

Lo-PIM – ANT1 High Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: QPSK

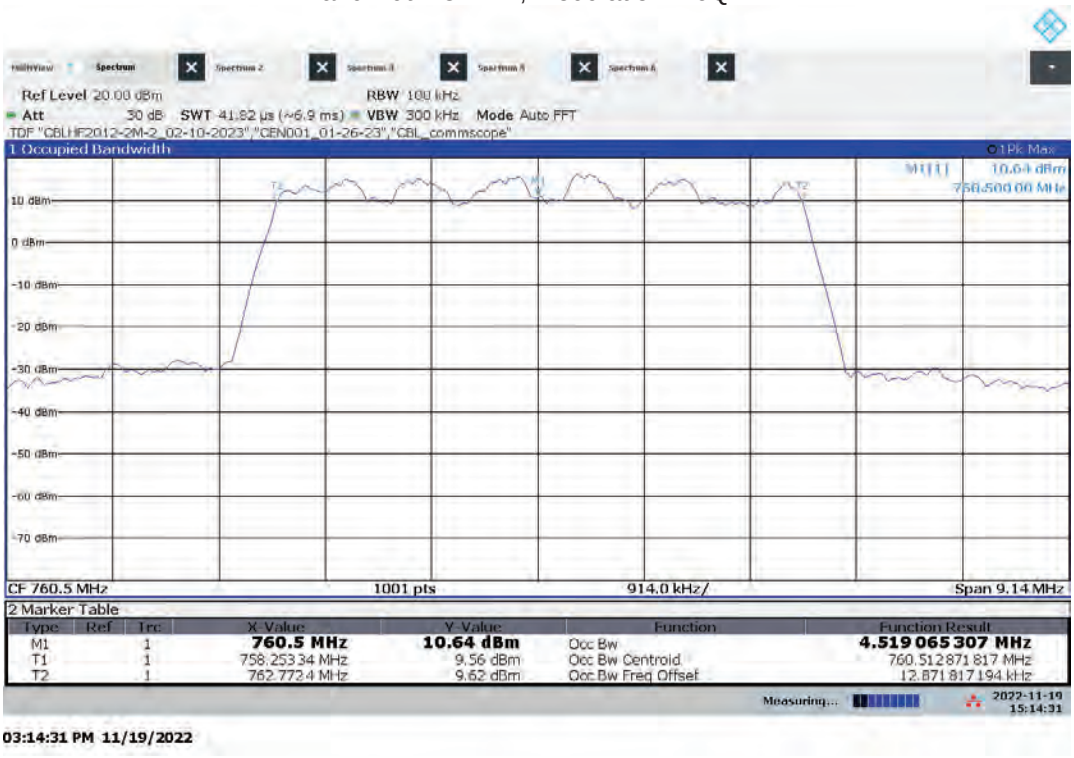
02:22:18 PM 11/19/2022

Lo-PIM – ANT0 Low Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 16QAM



03:05:35 PM 11/19/2022

Lo-PIM – ANT1 Low Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 16QAM

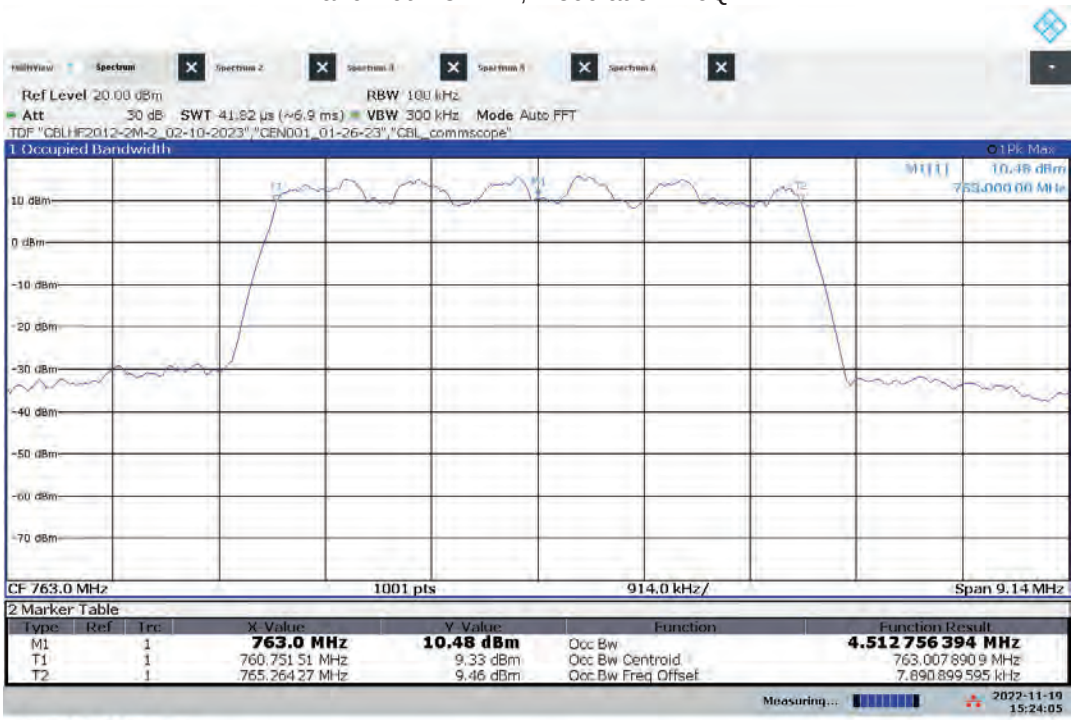


03:14:31 PM 11/19/2022

Lo-PIM – ANT0 Mid Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 16QAM

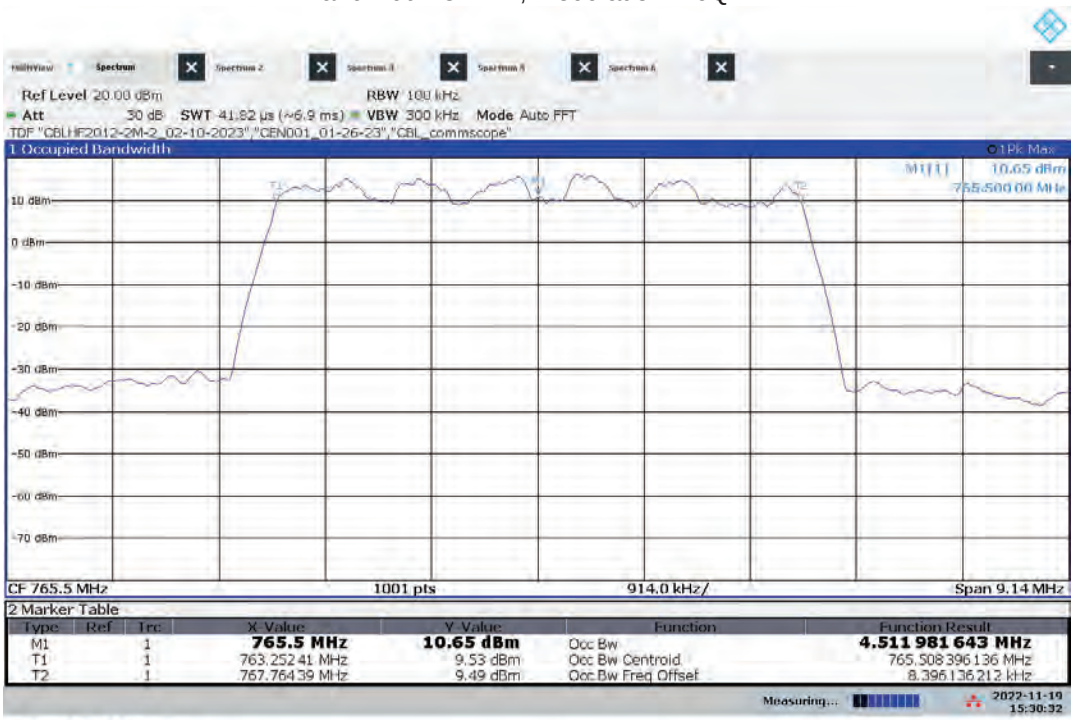
03:21:02 PM 11/19/2022

Lo-PIM – ANT1 Mid Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 16QAM



03:24:05 PM 11/19/2022

Lo-PIM – ANT0 High Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 16QAM

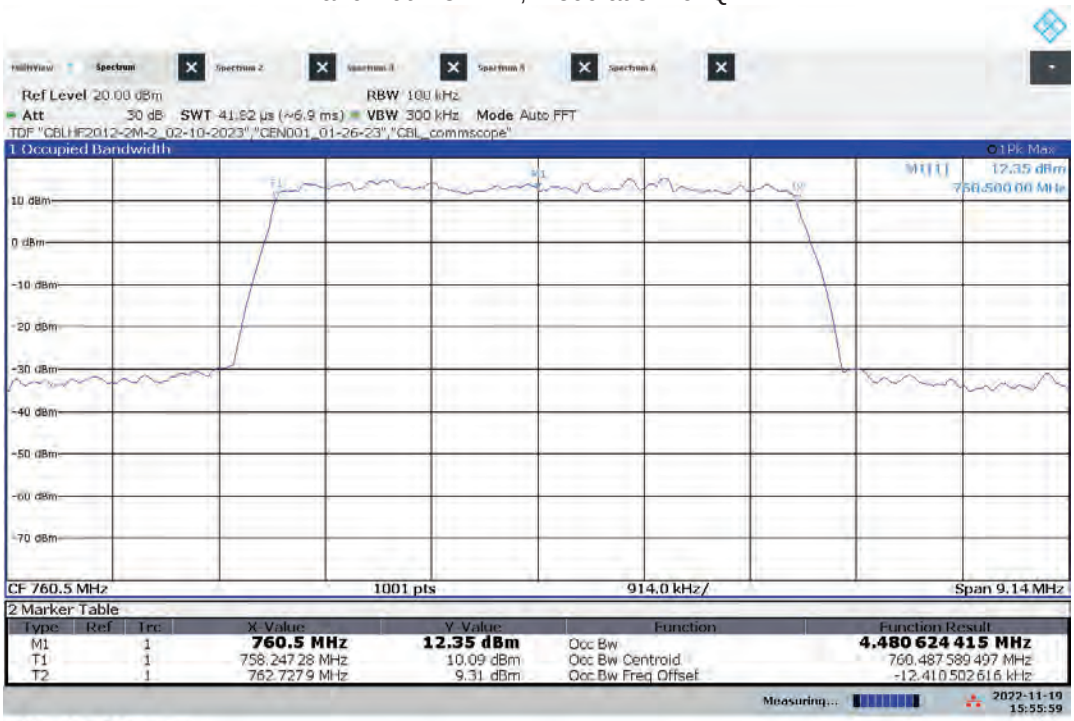


03:30:32 PM 11/19/2022

Lo-PIM – ANT1 High Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 16QAM

03:33:53 PM 11/19/2022

Lo-PIM – ANT0 Low Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 64QAM



03:56:00 PM 11/19/2022

Lo-PIM – ANT1 Low Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 64QAM

03:59:54 PM 11/19/2022

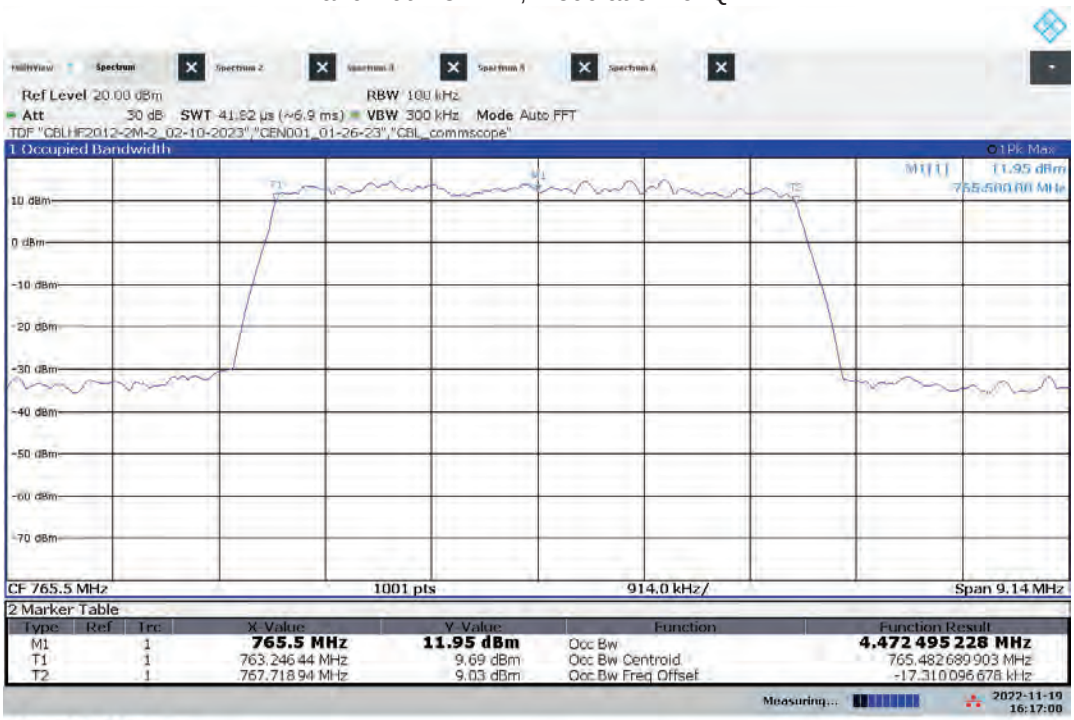
Lo-PIM – ANT0 Mid Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 64QAM

04:05:33 PM 11/19/2022

Lo-PIM – ANT1 Mid Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 64QAM

04:10:59 PM 11/19/2022

Lo-PIM – ANT0 High Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 64QAM

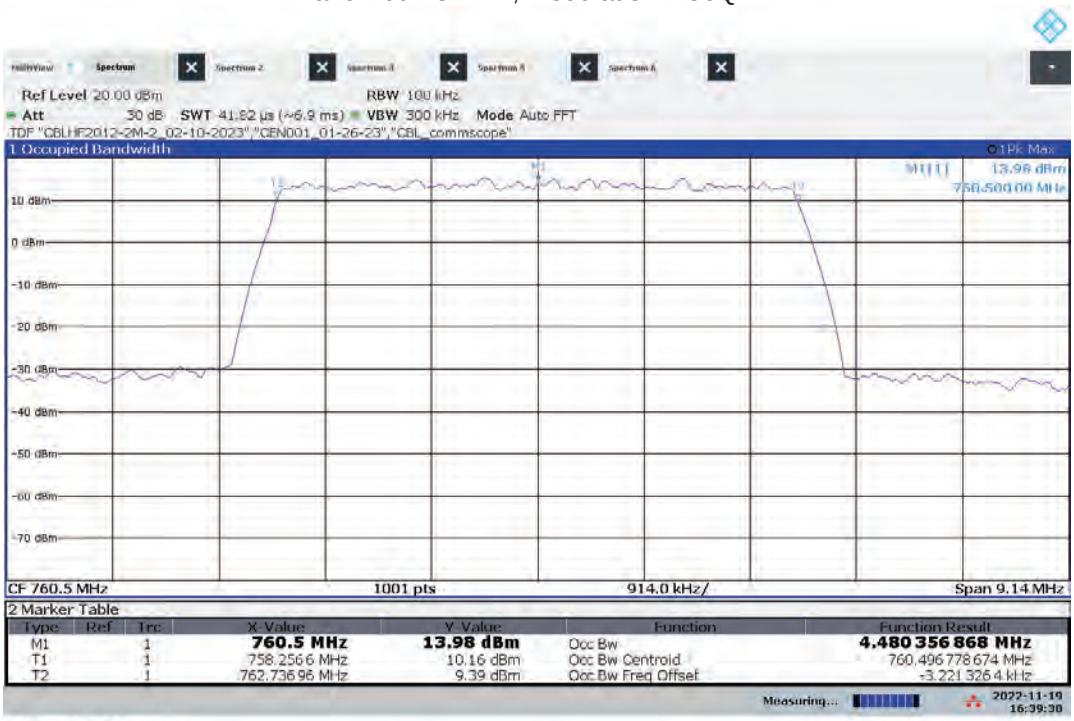


04:17:09 PM 11/19/2022

Lo-PIM – ANT1 High Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 64QAM

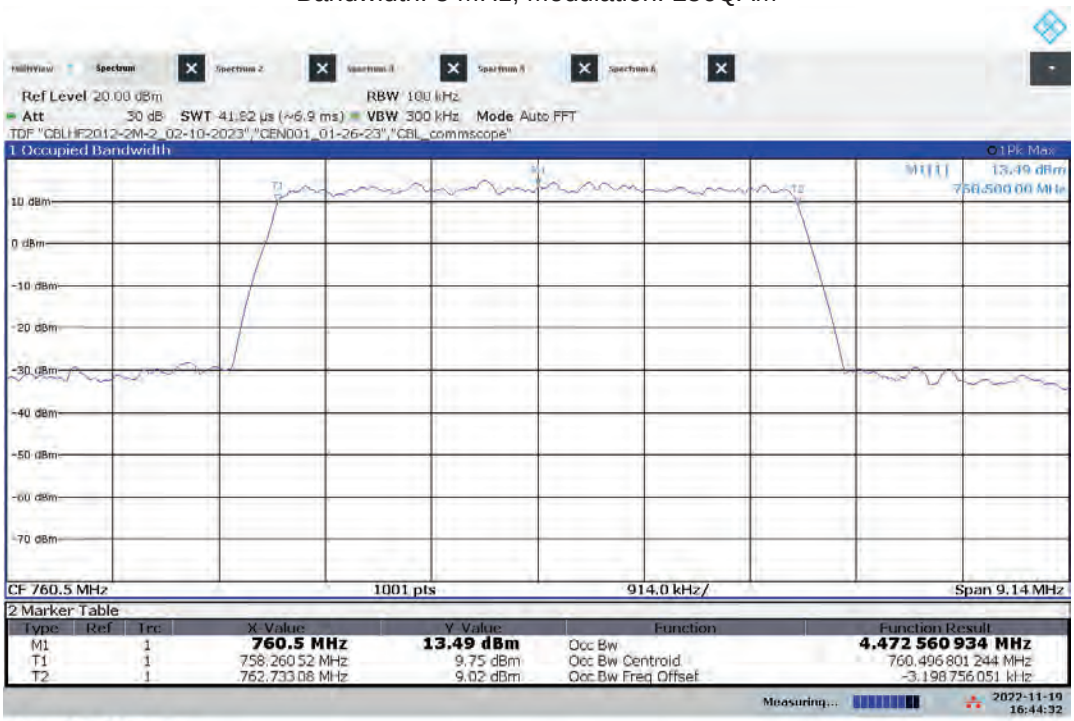
04:20:33 PM 11/19/2022

Lo-PIM – ANT0 Low Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 256QAM



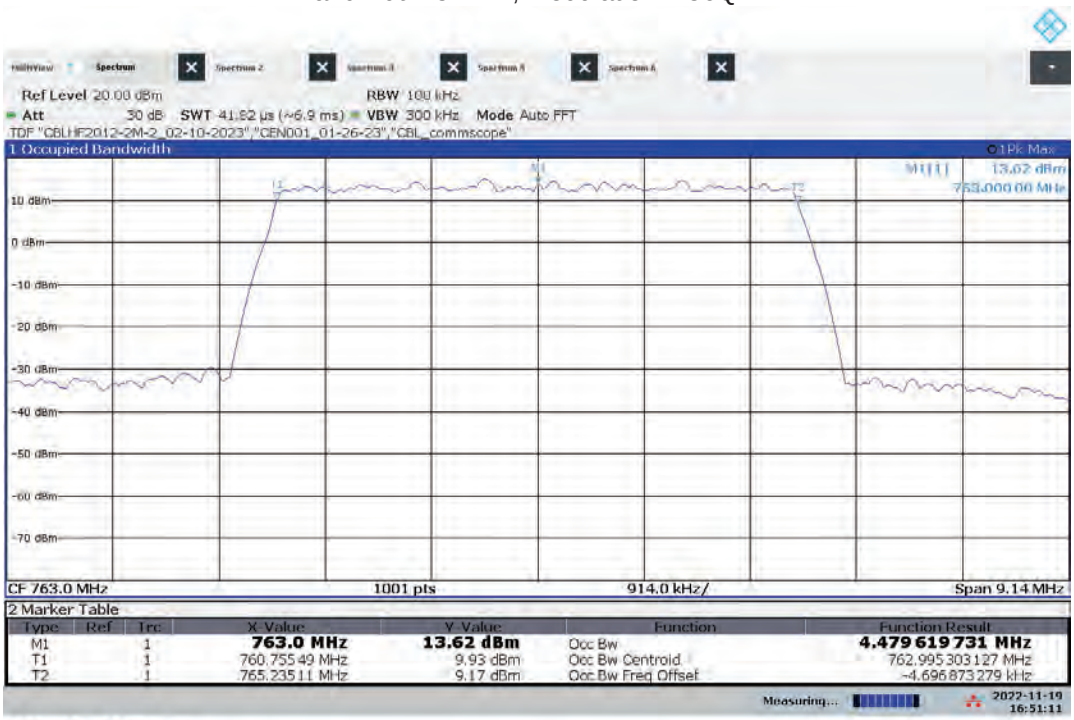
04:39:38 PM 11/19/2022

Lo-PIM – ANT1 Low Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 256QAM



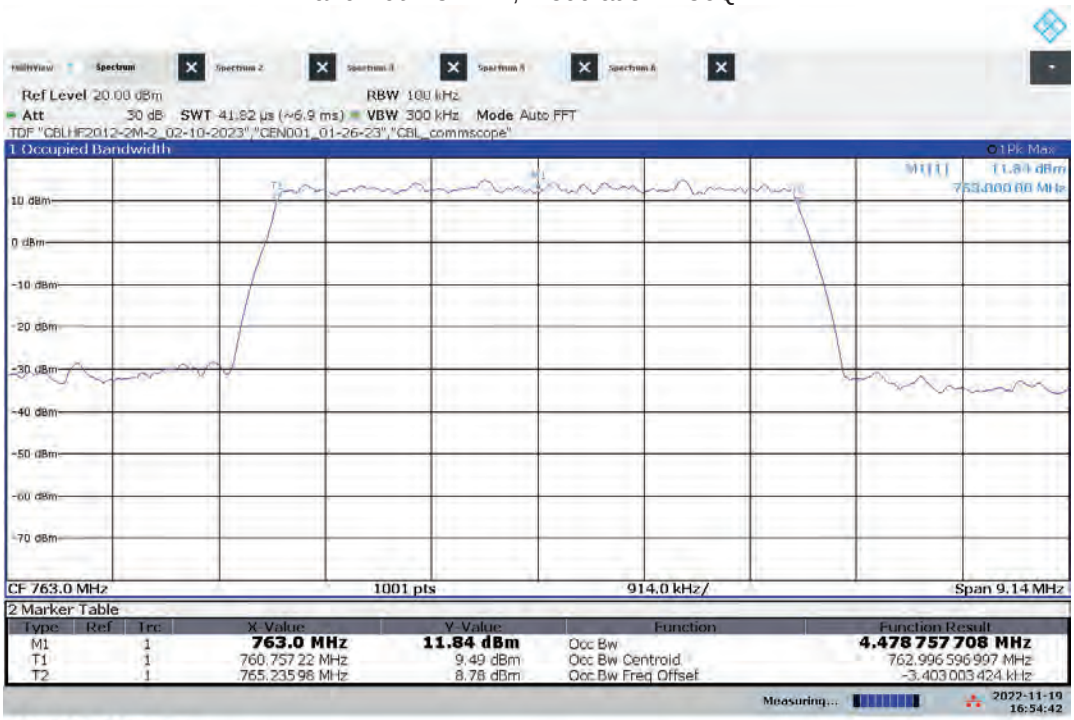
04:44:32 PM 11/19/2022

Lo-PIM – ANT0 Mid Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 256QAM



04:51:11 PM 11/19/2022

Lo-PIM – ANT1 Mid Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 256QAM

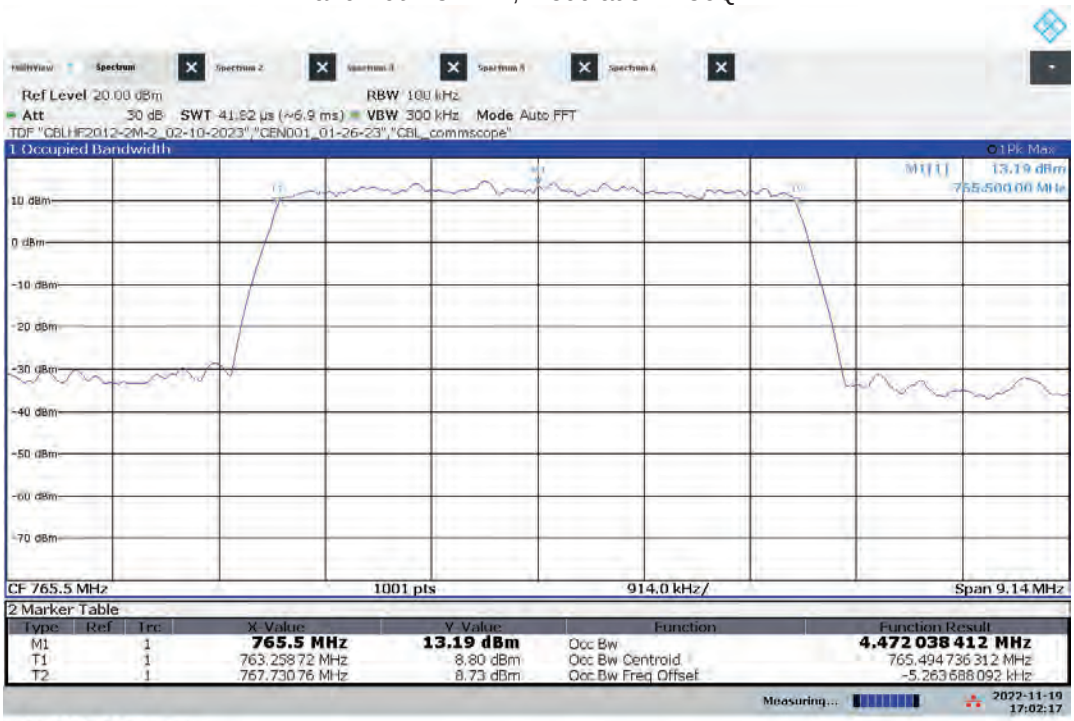


04:54:42 PM 11/19/2022

Lo-PIM – ANT0 High Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 256QAM

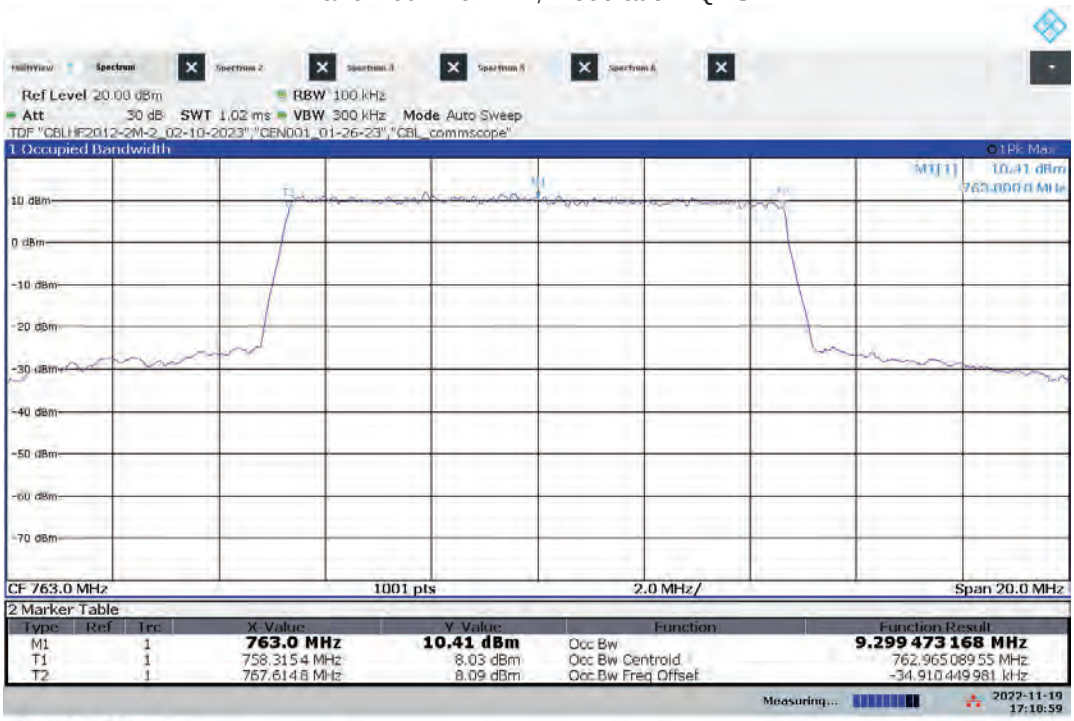
04:58:55 PM 11/19/2022

Lo-PIM – ANT1 High Channel Occupied Bandwidth
Bandwidth: 5 MHz, Modulation: 256QAM



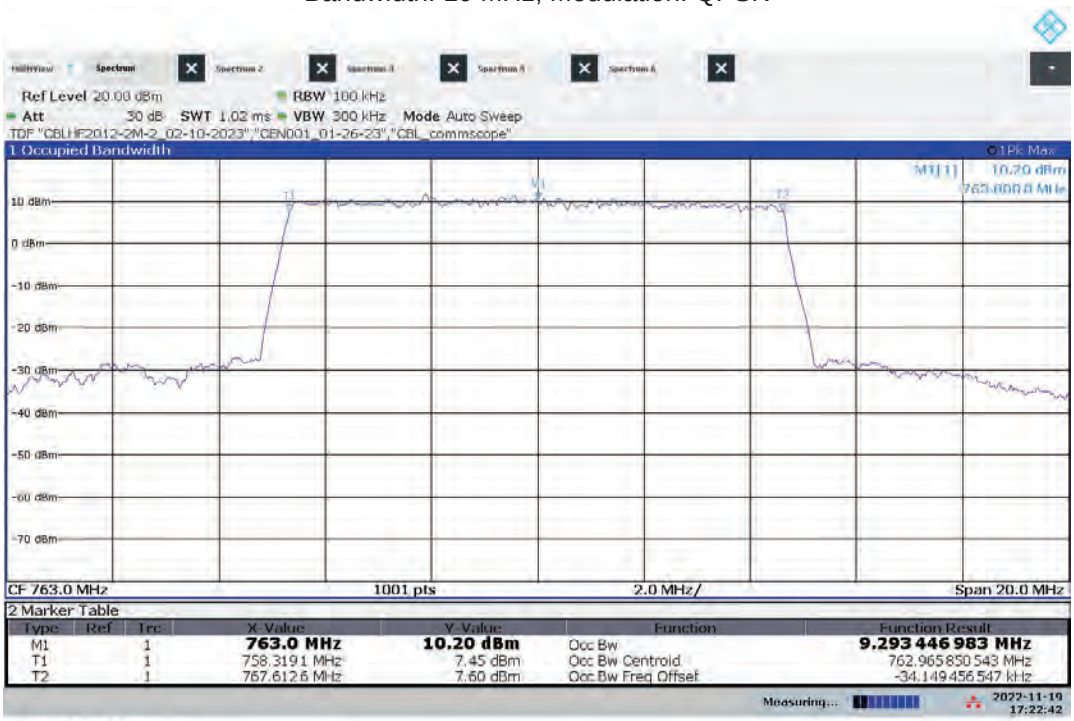
05:02:17 PM 11/19/2022

Lo-PIM – ANT0 High Channel Occupied Bandwidth
Bandwidth: 10 MHz, Modulation: QPSK



05:19:00 PM 11/19/2022

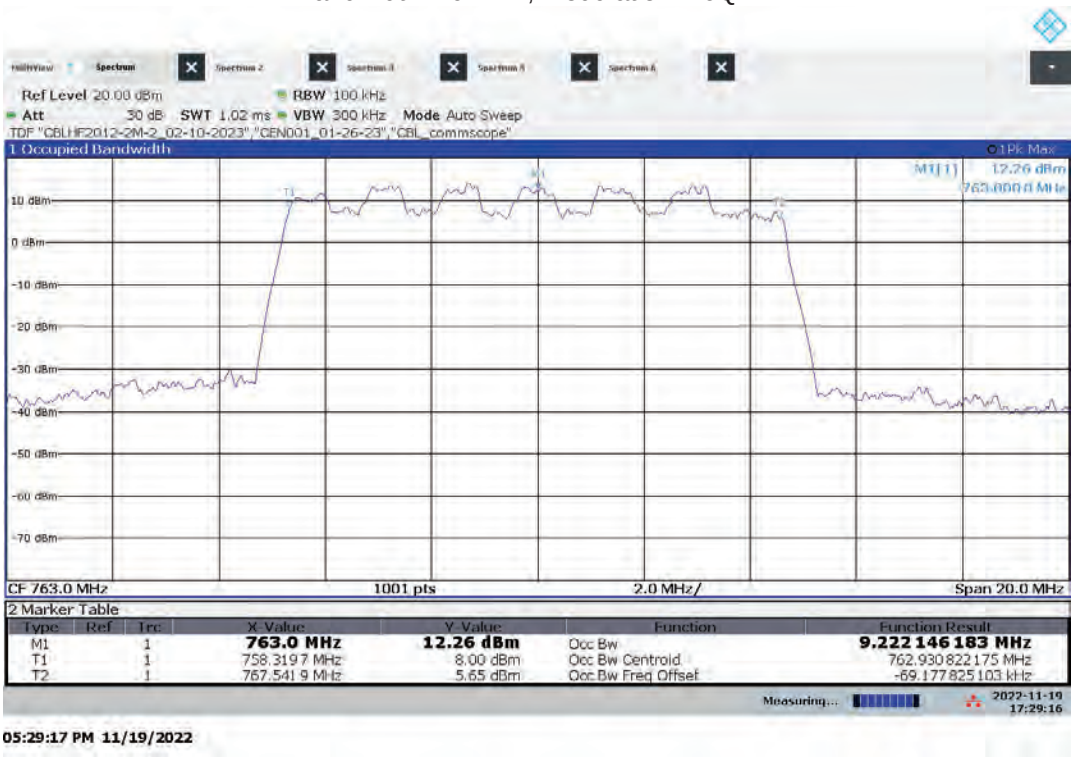
Lo-PIM – ANT1 High Channel Occupied Bandwidth
Bandwidth: 10 MHz, Modulation: QPSK



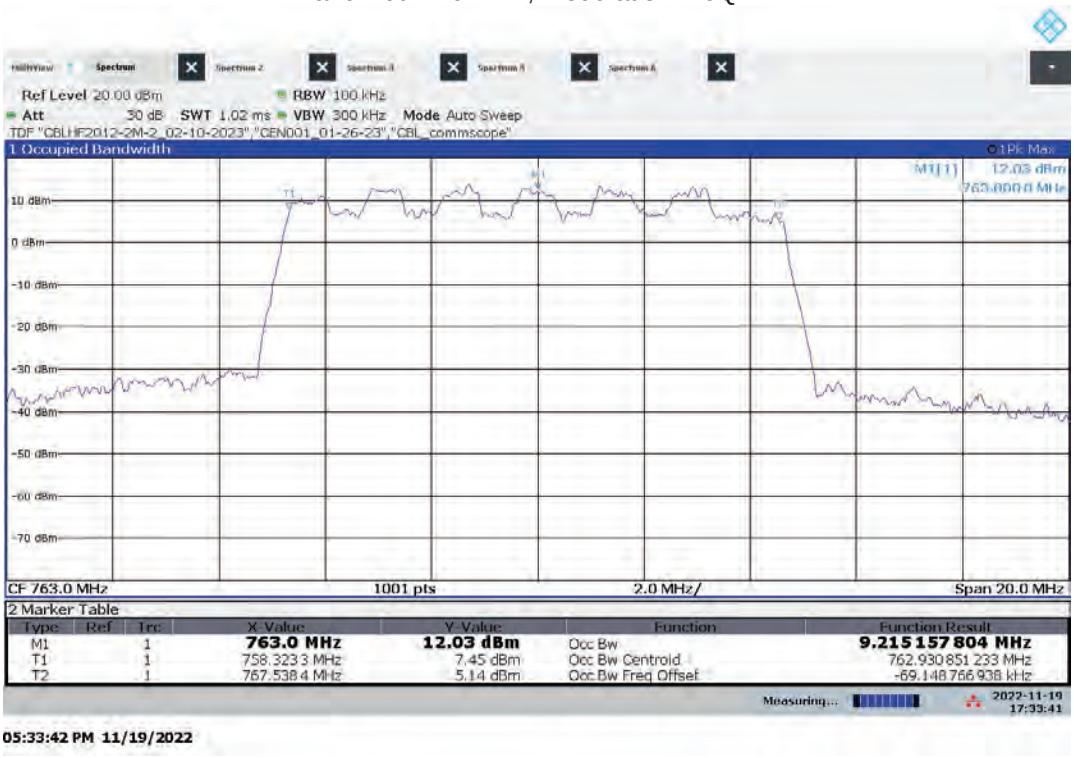
05:22:42 PM 11/19/2022

Notes: Low and mid channels are the same frequency as high channel.

Lo-PIM – ANT0 High Channel Occupied Bandwidth
Bandwidth: 10 MHz, Modulation: 16QAM

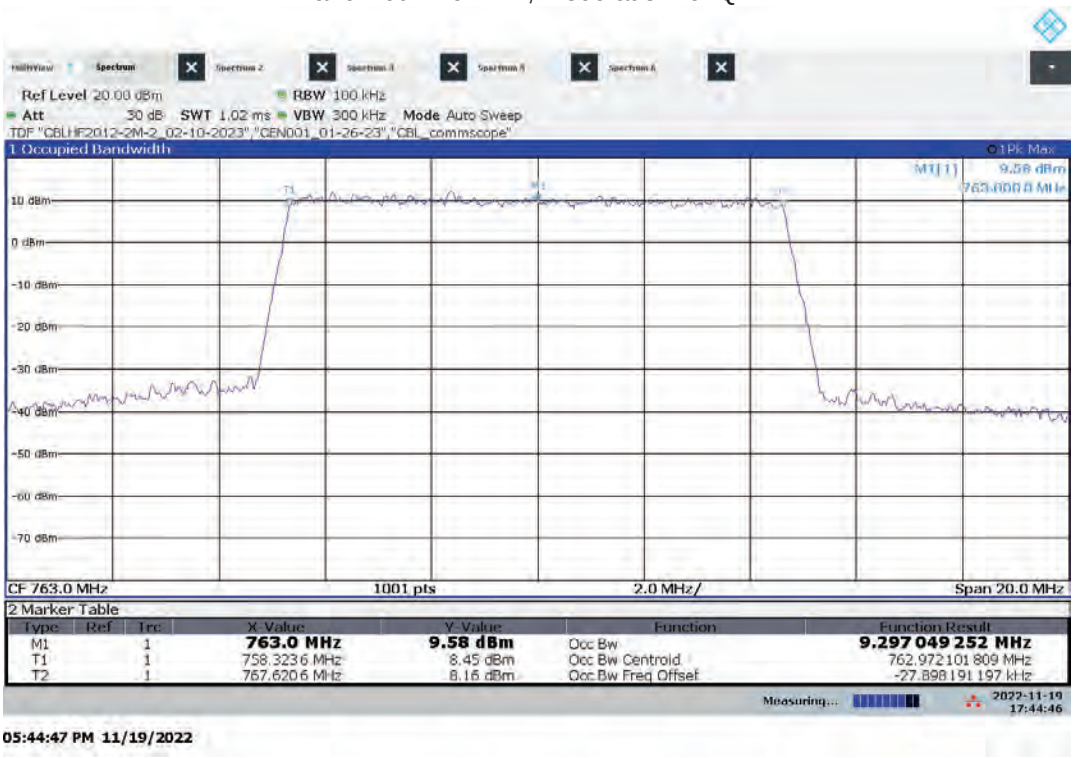


Lo-PIM – ANT1 High Channel Occupied Bandwidth
Bandwidth: 10 MHz, Modulation: 16QAM



Notes: Low and mid channels are the same frequency as high channel.

Lo-PIM – ANT0 High Channel Occupied Bandwidth
Bandwidth: 10 MHz, Modulation: 64QAM



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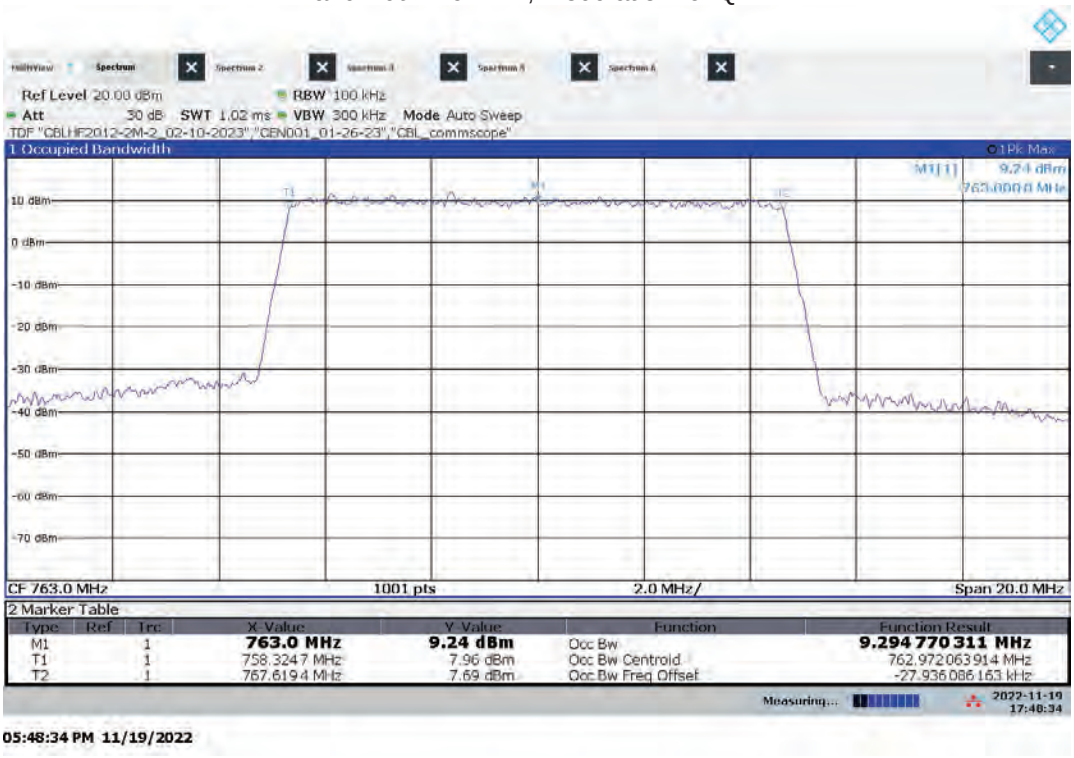
Lo-PIM – ANT1 High Channel Occupied Bandwidth
Bandwidth: 10 MHz, Modulation: 64QAM



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Notes: Low and mid channels are the same frequency as high channel.