intertek
Total Quality. Assured.

CommScope Technologies, LLC
TEST REPORT

SCOPE OF WORK
EMISSIONS TESTING – Band 30 Radio Module, Model: RPM-A5A11-B30 (with RP5200i Host Unit)

REPORT NUMBER
104601904MPK-001

ISSUE DATE	**[REVISED DATE]**
April 15, 2021	N/A

PAGES
48

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

Class II Permissive Change
TEST REPORT

Report Number: 104601904MPK-001
Project Number: G104326151

Report Issue Date: April 15, 2021

Product Designation: Radio Module B30
Model Tested: RPM-A5A11-B30 (with RP5200i Host Unit)

FCC ID: QHYRPM-A5A11-B30

to

Standards: CFR47 FCC Part 27

for

CommScope Technologies LLC

Tested by:
Intertek Testing Services NA, Inc.
1365 Adams Court
Menlo Park, CA 94025
USA

Client:
CommScope Technologies LLC
250 Apollo Drive
Chelmsford, MA 01824
USA

Report prepared by

Minh Ly / EMC Project Engineer

Report reviewed by

Krishna Vemuri/ EMC Manager

This report is for the exclusive use of Intertek's Client and is provided pursuant to the agreement between Intertek and its Client. Intertek's responsibility and liability are limited to the terms and conditions of the agreement. Intertek assumes no liability to any party, other than to the Client in accordance with the agreement, for any loss, expense or damage occasioned by the use of this report. Only the Client is authorized to permit copying or distribution of this report and then only in its entirety. Any use of the Intertek name or one of its marks for the sale or advertisement of the tested material, product or service must first be approved in writing by Intertek. The observations and test results in this report are relevant only to the sample tested. This report by itself does not imply that the material, product, or service is or has ever been under an Intertek certification program.

Table of Contents

CommScope Technologies, LLC 1
1 Introduction and Conclusion 4
2 Test Summary 4
3 Client Information 5
4 Description of Equipment Under Test and Variant Models 5
5 System Setup and Method 7
6 Equivalent Isotropically Radiated Power (EIRP) 9
7 Frequency Stability 29
8 Transmitter spurious emissions 34
9 List of Test Equipment 47
10 Revision History 48

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	Equivalent Isotropically Radiated Power CFR47 FCC Parts 2.1046 and 27.50	Pass
7	Frequency Stability CFR47 FCC Parts 2.1055 and 27.54	Pass
8	Transmitter Spurious Emissions CFR47 Parts 2.1051, 2.1053, 2.1057, and 27.53	Pass
9	List of Test Equipment	-
10	Revision History	-

3 Client Information

This EUT was tested at the request of:

Client: CommScope Technologies LLC
250 Apollo Drive
Chelmsford, MA 01824
USA

Contact: Kevin Craig
Telephone: (978) 250-2678
Email: Kevin.Craig@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**
Radio Module B30	CommScope Technologies LLC	RPM-A5A11-B30	20303000036

Received Date:	03/25/2021	**Test Started:**	03/25/2021
Received Condition:	Good	**Test Completed:**	04/08/2021
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 an OCXO which is disciplined from a 1588 reference clock.
It supports bandwidths of 5 and 10MHz with four modulations; TM1.1-QPSK, TM3.2-16QAM, TM3.1-64QAM, and TM3.1a-256QAM. The radio is fixed.
Per manufacturer, the lowest clock frequency generated in the equipment is 30.72MHz.

Description of Radio Host (provided by client)

The RP5200i baseband module host is an upgrade to the RP5000 host baseband module. It continues to support 2x2 MIMO narrow band legacy radio's as well as adding support for 4x4 MIMO wideband radio's. The processor has been upgraded to provide more processing power required for 4x4 MIMO wideband radios.The frequencies supported are shown in the table below:

LTE Band	Downlink	Uplink	Bandwidth DL/UL MHz	Duplex Spacing MHz	Band Gap MHz
30	2350-2360	2305-2315	10	45	35

The lowest clock frequency generated in the host is 33.33MHz.

Equipment Under Test Power Configuration			
Rated Voltage	**Rated Current**	**Rated Frequency**	**Number of Phases**
56 VDC	0.8 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.

Radio/Receiver Characteristics	
Frequency Band(s)	2350 - 2360 MHz
Modulation Type(s)	TM1.1-QPSK, TM3.2-16QAM, TM3.1-64 QAM, TM3.1a-256QAM
Maximum Output Power (conducted)	20.74 dBm (Conducted) 25.74 dBd (EIRP)
Test Channels	Low, Middle, High Channels of 5 MHz and 10 MHz Bandwidths, Single Channel operation only
Occupied Bandwidth	9.95 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: +5 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**
--	USB Cable	1.0	Shielded	None	PDA to Laptop
--	LAN (POE Power Cable)	3.0	Unshielded	None	PDA to EUT
--	LAN (Communication)	3.0	Unshielded	None	PDA to Laptop

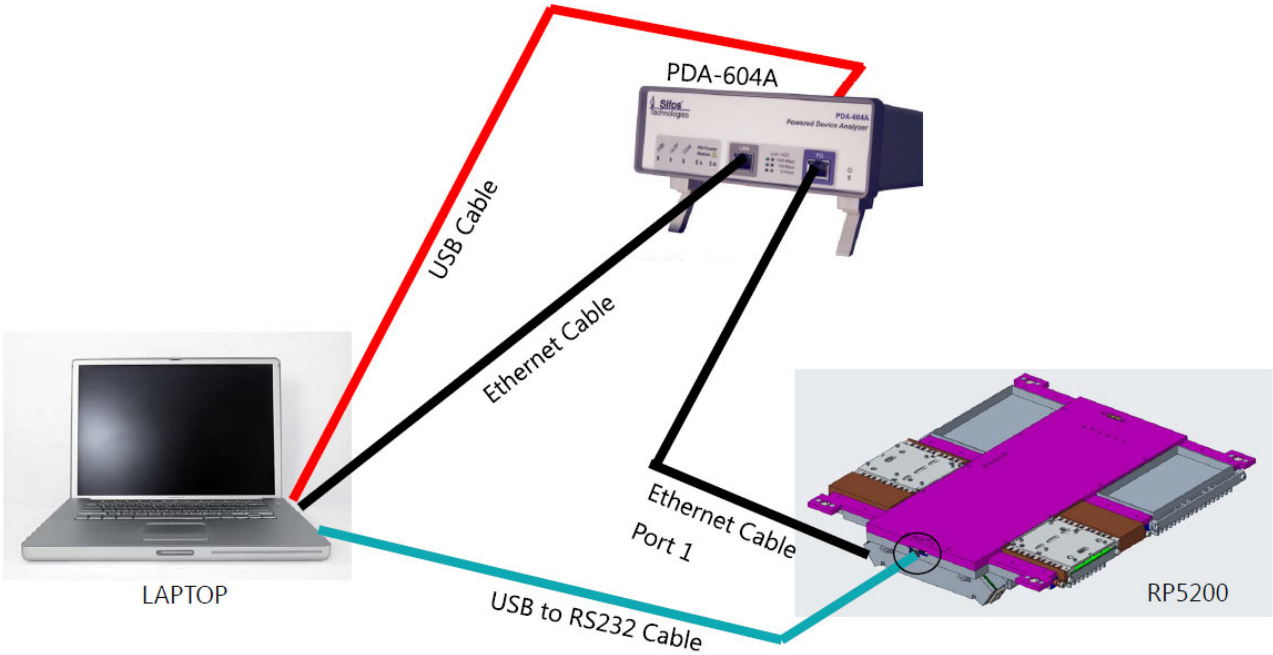
Support Equipment			
Description	**Manufacturer**	**Model Number**	**Serial Number**
Laptop	Dell	LATITUDE E6440	None
Power Device Analzyer	Sifos Technologies	PDA-604A	604A0033
OneCell® RP5200I*	CommScope Technologies LLC	RP5200I Baseband module	05321060002

*Radio host used for testing.

5.1 Method:

Configuration as required by ANSI C63.26-2015, and CFR47 FCC Part 27.

5.2 EUT Block Diagram:



5.3 Justification:

For radiated emission measurements the EUT is placed on a non-conductive table.

Class II permissive change testing was performed based on Band 30 Radio Module, Model: RPM-A5A11-B30 with RP5200i Host Unit.

6 Equivalent Isotropically Radiated Power (EIRP)

6.1 Requirement:

§27.50(a) The EIRP of base stations transmitting in the 2305-2315 MHz band or the 2350 – 2360 MHz bad must not exceed:

- 400 watts within any 1 megahertz of authorized bandwidth.
- 2000 watts within any 5 megahertz of authorized bandwidth.

6.2 Procedure:

The procedure described in FCC Publication 971168 D01 Power Meas License Digital Systems v03r01 was used. Tests are performed in accordance with ANSI C63.26 Section 5.2.4.4.1 and CFR47 FCC Parts 2.1046.

A spectrum analyzer was connected to the antenna port of the transmitter and the average power was measured using the average power function. Output power from the two antenna ports was not summed since the data streams are uncorrelated and the antennas are cross polarized.

EIRP = Conducted Output Power (dBm) + Antenna gain (dBi)

6.3 Results:

The maximum conducted output power was measured to be 20.84 dBm, which is much less than the ERP limit. The sample tested was found to Comply.

Band 30, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK

Channel	Frequency (MHz)	Antenna Port	Output Power (dBm)	EIRP (dBm)
Low	2352.5	ANT0	20.42	25.42
		ANT1	19.67	24.67
Mid	2355.0	ANT0	20.58	25.58
		ANT1	19.80	24.80
High	2357.5	ANT0	20.46	25.46
		ANT1	19.92	24.92

Band 30, Bandwidth: 5 MHz, Modulation: TM3.2-16QAM

Channel	Frequency (MHz)	Antenna Port	Output Power (dBm)	EIRP (dBm)
Low	2352.5	ANT0	20.57	25.57
		ANT1	19.89	24.89
Mid	2355.0	ANT0	20.64	25.64
		ANT1	20.09	25.09
High	2357.5	ANT0	20.62	25.62
		ANT1	19.98	24.98

Band 30, Bandwidth: 5 MHz, Modulation: TM3.1-64QAM

Channel	Frequency (MHz)	Antenna Port	Output Power (dBm)	EIRP (dBm)
Low	2352.5	ANT0	20.62	25.62
		ANT1	20.01	25.01
Mid	2355.0	ANT0	20.74	25.74
		ANT1	20.03	25.03
High	2357.5	ANT0	20.57	25.57
		ANT1	20.12	25.12

Band 30, Bandwidth: 5 MHz, Modulation: TM3.1a-256QAM

Channel	Frequency (MHz)	Antenna Port	Output Power (dBm)	EIRP (dBm)
Low	2352.5	ANT0	20.40	25.40
		ANT1	19.92	24.92
Mid	2355.0	ANT0	20.66	25.66
		ANT1	20.14	25.14
High	2357.5	ANT0	20.67	25.67
		ANT1	20.03	25.03

*Worst case E.R.P (highest level) = 20.74 + 5.0 = 25.74 dBm

Band 30, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK

Channel	Frequency (MHz)	Antenna Port	Output Power (dBm)	EIRP (dBm)
--	2355.0	ANT0	20.50	25.50
		ANT1	19.99	24.99

Band 30, Bandwidth: 10 MHz, Modulation: TM3.2-16QAM

Channel	Frequency (MHz)	Antenna Port	Output Power (dBm)	EIRP (dBm)
--	2355.0	ANT0	20.74	25.74
		ANT1	20.01	25.01

Band 30, Bandwidth: 10 MHz, Modulation: TM3.1-64QAM

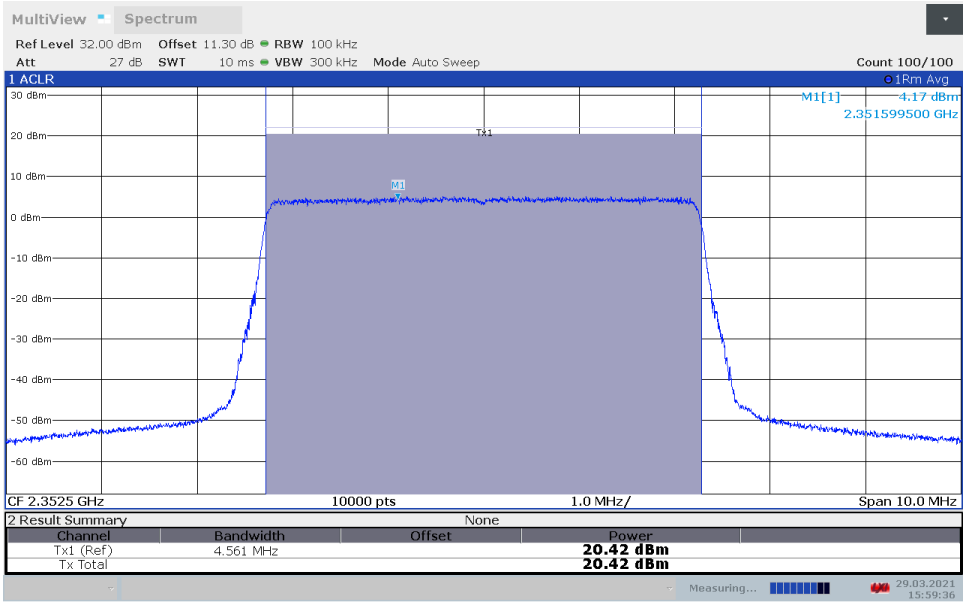
Channel	Frequency (MHz)	Antenna Port	Output Power (dBm)	EIRP (dBm)
--	2355.0	ANT0	20.62	25.62
		ANT1	20.14	25.14

Band 30, Bandwidth: 10 MHz, Modulation: TM3.1a-256QAM

Channel	Frequency (MHz)	Antenna Port	Output Power (dBm)	EIRP (dBm)
--	2355.0	ANT0	20.72	25.72
		ANT1	20.01	25.01

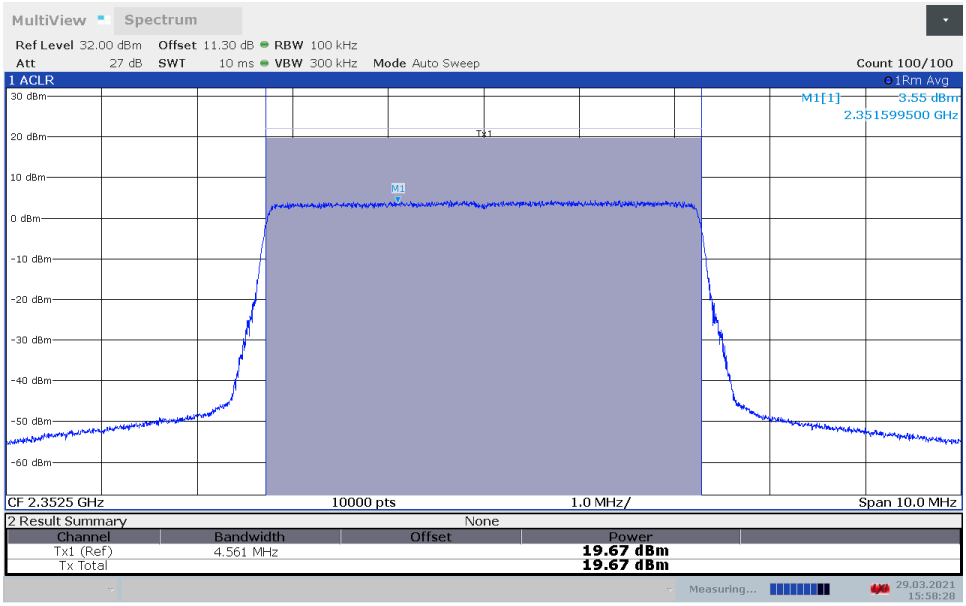
*Worst case E.R.P (highest level) = 20.74 + 5.0 = 25.74 dBm

TM1.1-QPSK_5 MHz Bandwidth
Band 30, ANT0, Low Channel



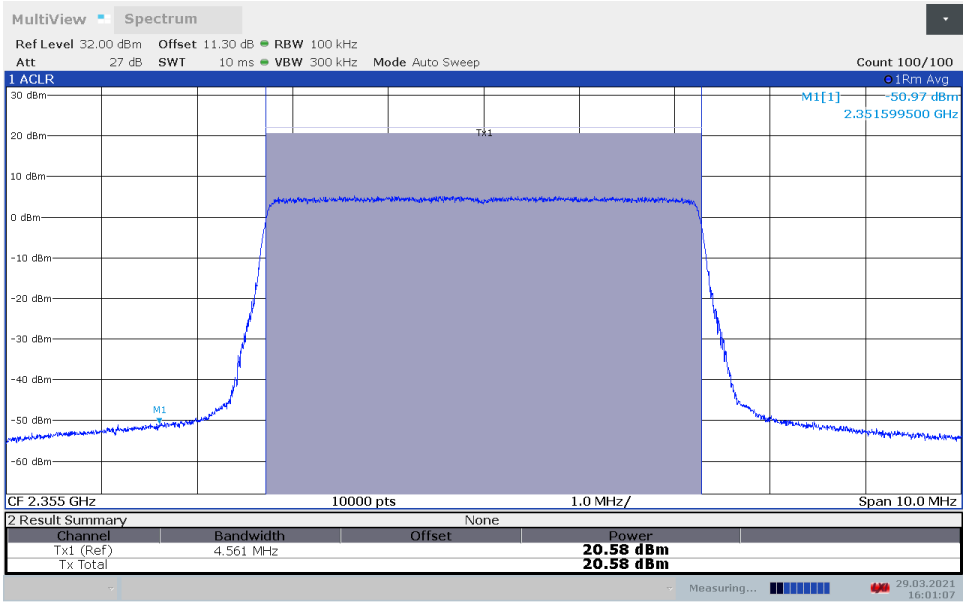
15:59:37 29.03.2021

TM1.1-QPSK_5 MHz Bandwidth
Band 30, ANT1, Low Channel



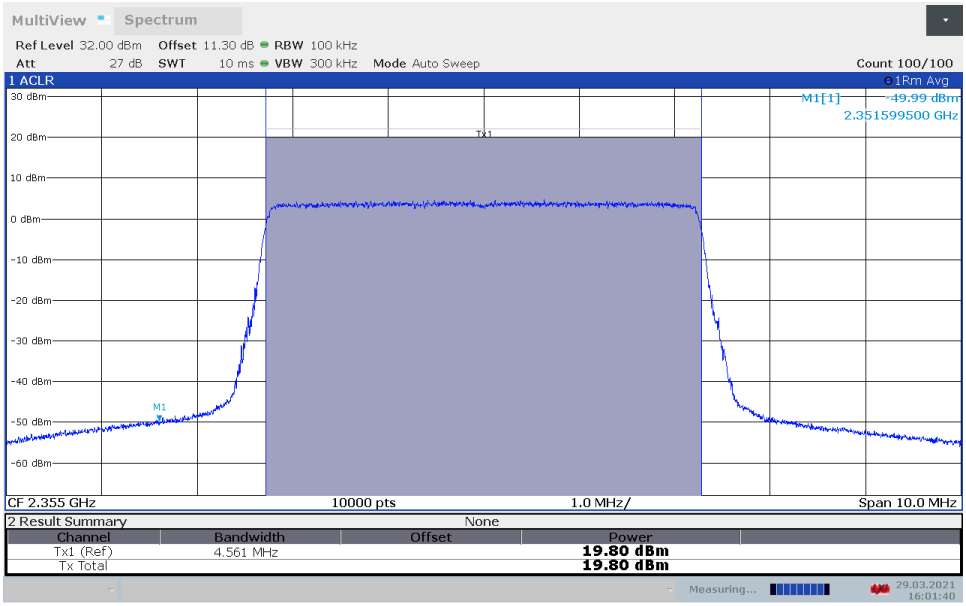
15:58:29 29.03.2021

TM1.1-QPSK_5 MHz Bandwidth
Band 30, ANT0, Mid Channel



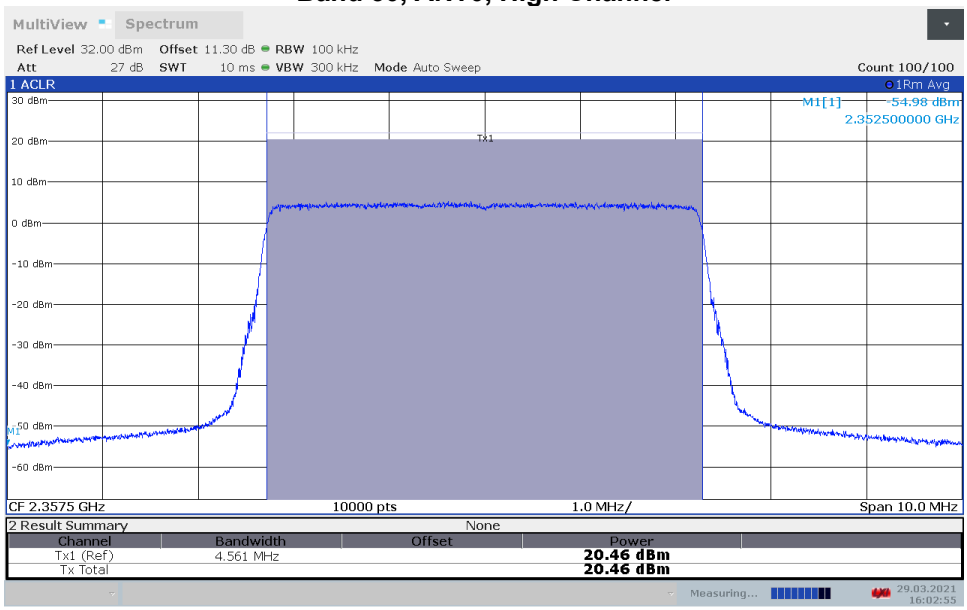
16:01:08 29.03.2021

TM1.1-QPSK_5 MHz Bandwidth
Band 30, ANT1, Mid Channel



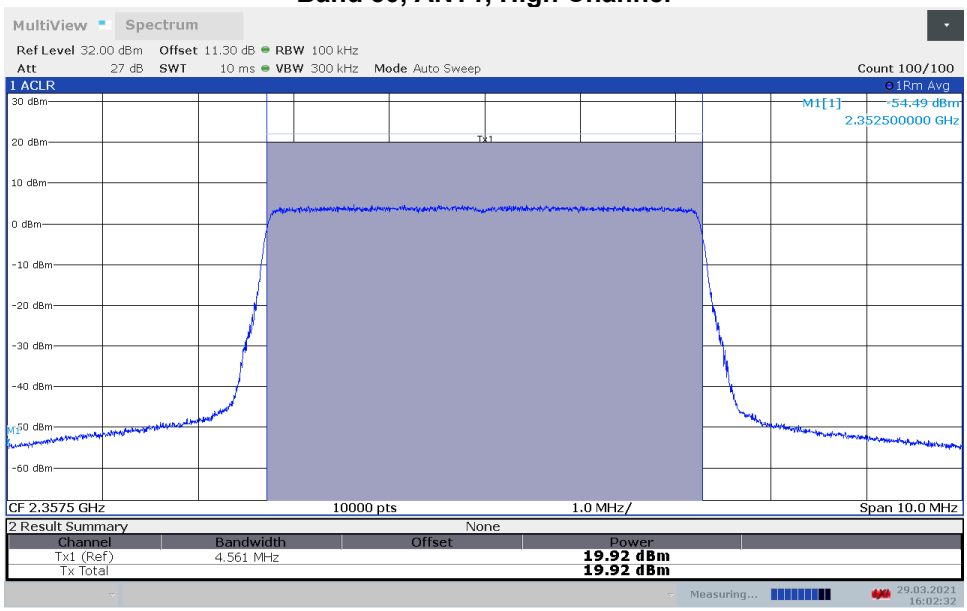
16:01:40 29.03.2021

TM1.1-QPSK_5 MHz Bandwidth
Band 30, ANT0, High Channel



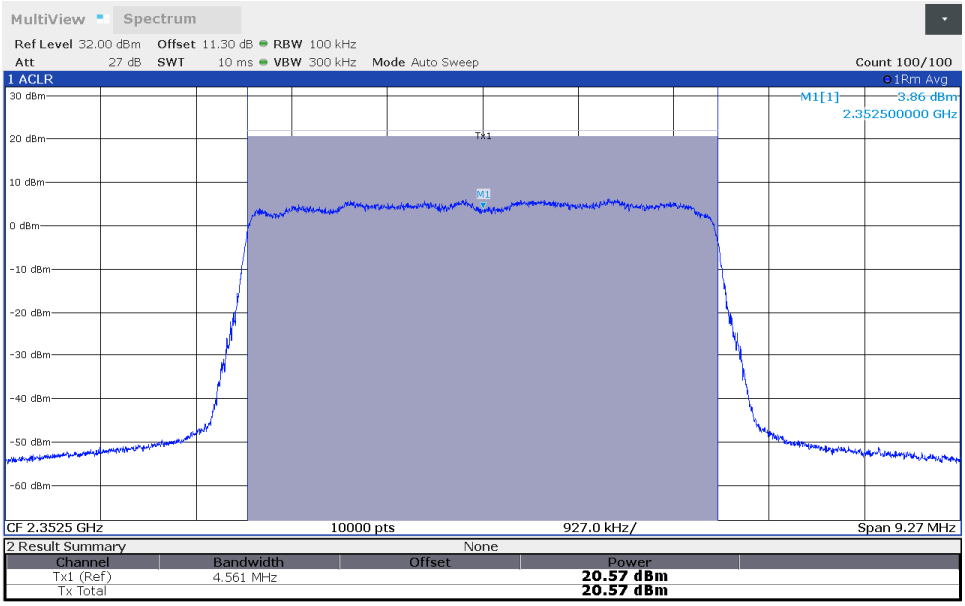
16:02:55 29.03.2021

TM1.1-QPSK_5 MHz Bandwidth
Band 30, ANT1, High Channel



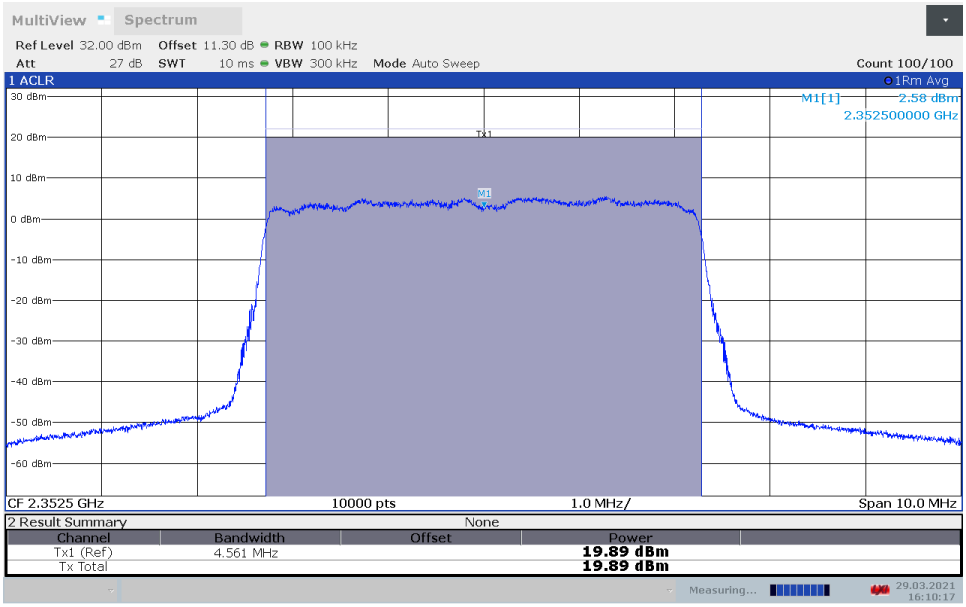
16:02:32 29.03.2021

TM3.2-16QAM_5 MHz Bandwidth
Band 30, ANT0, Low Channel



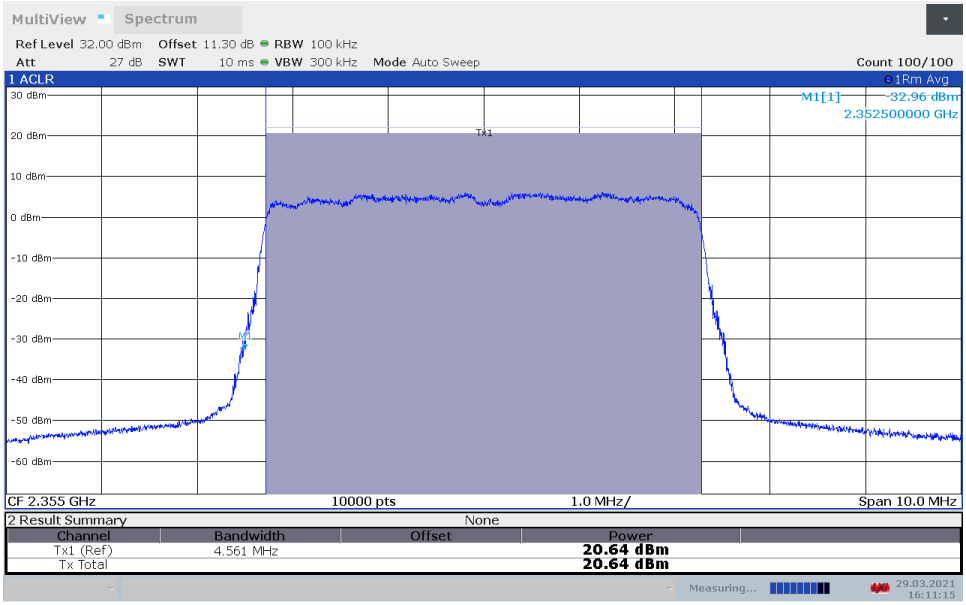
17:39:22 29.03.2021

TM3.2-16QAM_5 MHz Bandwidth
Band 30, ANT1, Low Channel



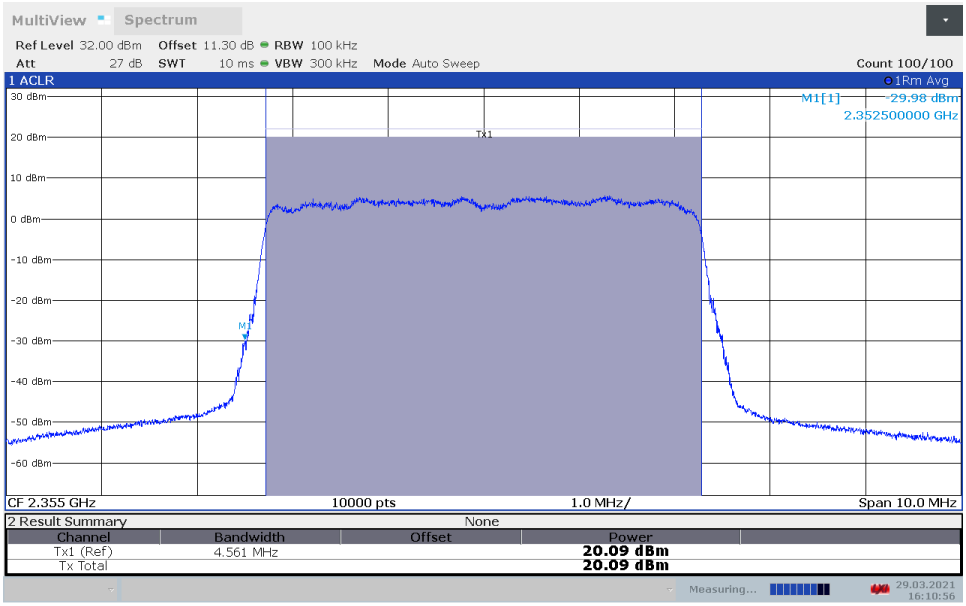
16:10:18 29.03.2021

TM3.2-16QAM_5 MHz Bandwidth
Band 30, ANT0, Mid Channel



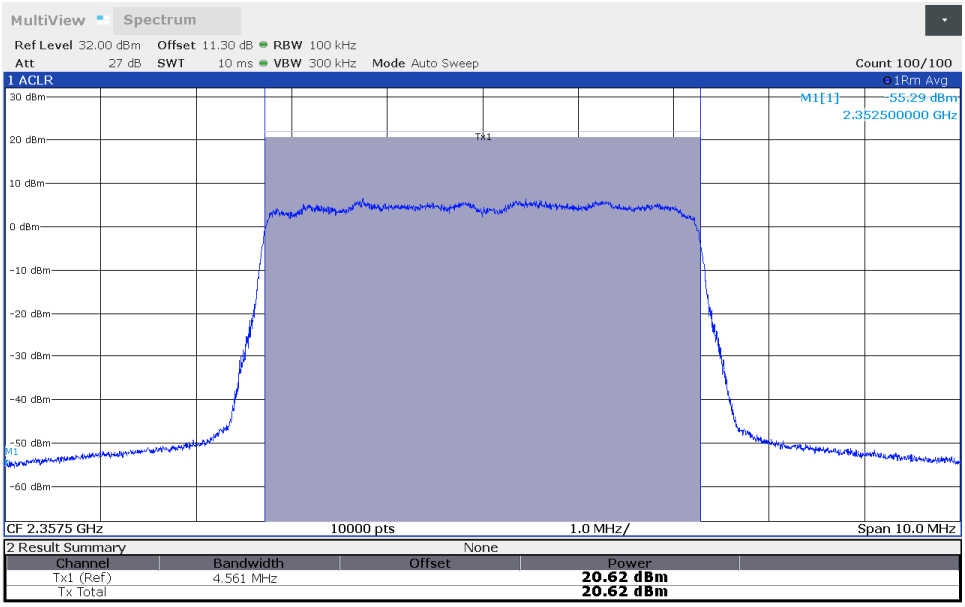
16:11:16 29.03.2021

TM3.2-16QAM_5 MHz Bandwidth
Band 30, ANT1, Mid Channel



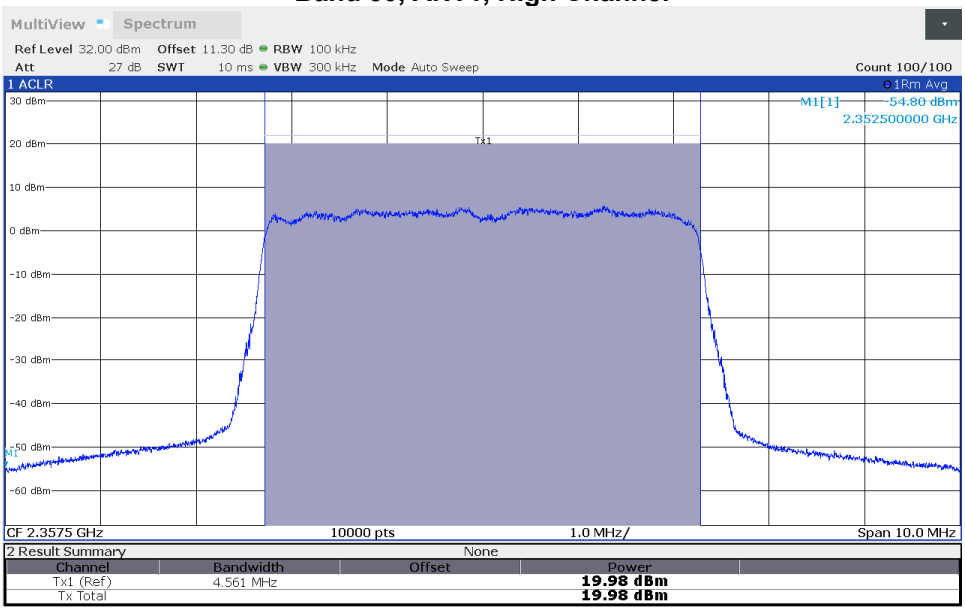
16:10:56 29.03.2021

TM3.2-16QAM_5 MHz Bandwidth
Band 30, ANT0, High Channel



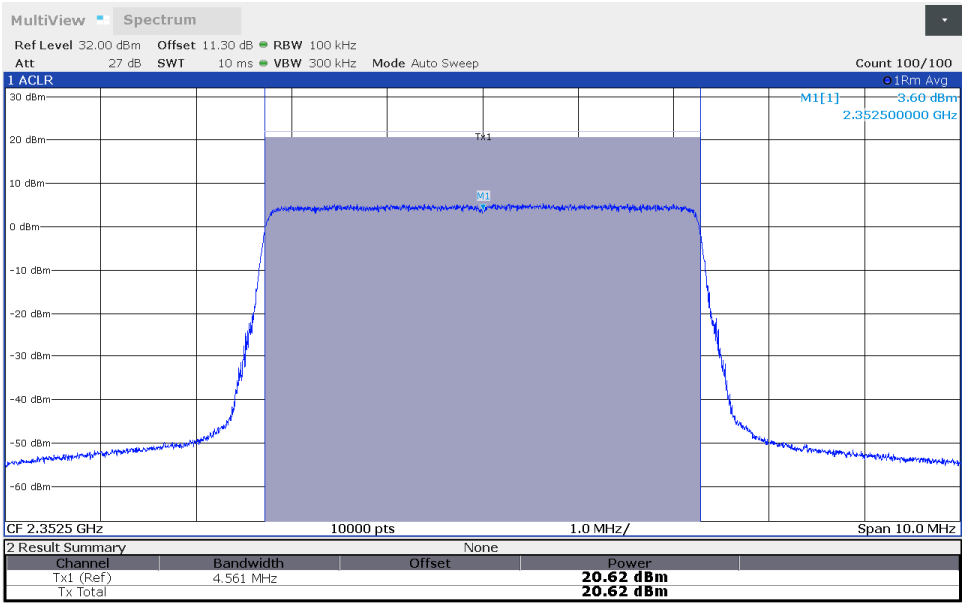
16:12:10 29.03.2021

TM3.2-16QAM_5 MHz Bandwidth
Band 30, ANT1, High Channel



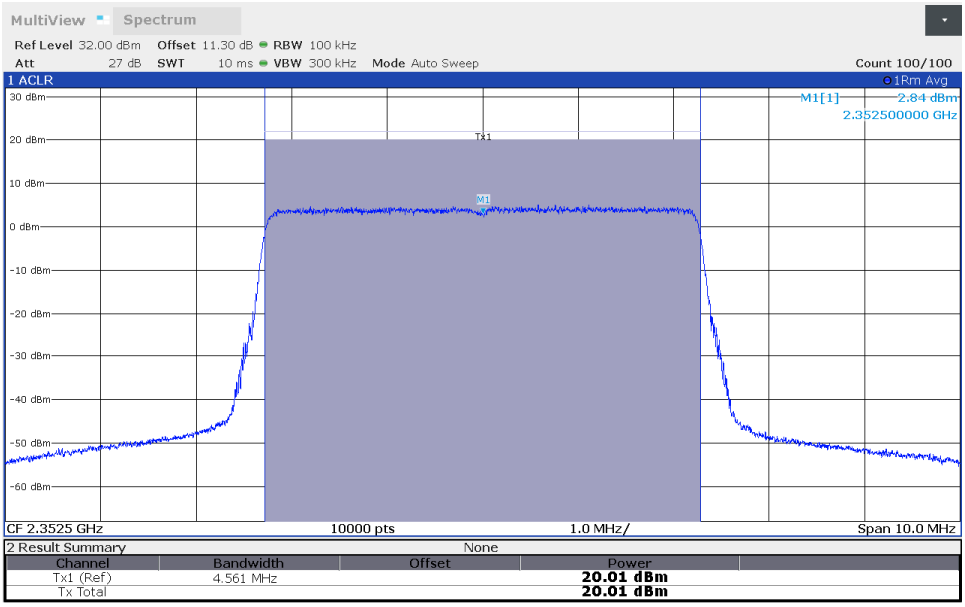
16:12:33 29.03.2021

TM3.1-64QAM_5 MHz Bandwidth
Band 30, ANT0, Low Channel



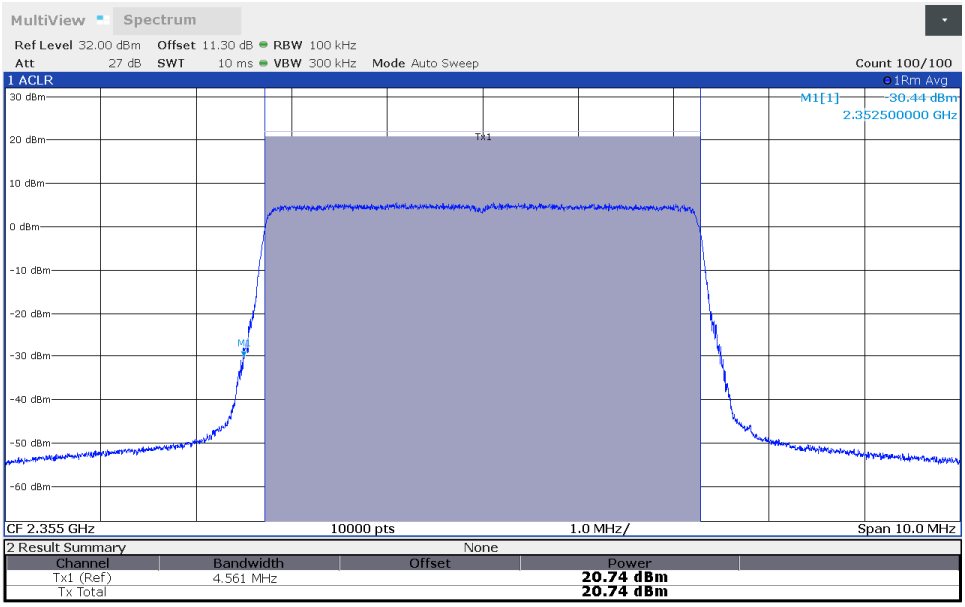
16:17:54 29.03.2021

TM3.1-64QAM_5 MHz Bandwidth
Band 30, ANT1, Low Channel



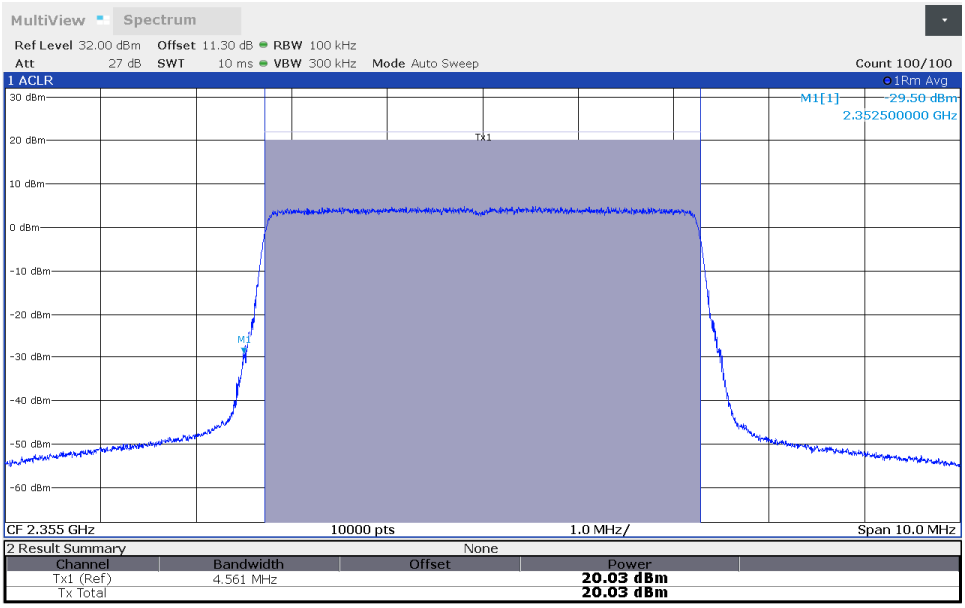
16:17:34 29.03.2021

TM3.1-64QAM_5 MHz Bandwidth
Band 30, ANT0, Mid Channel



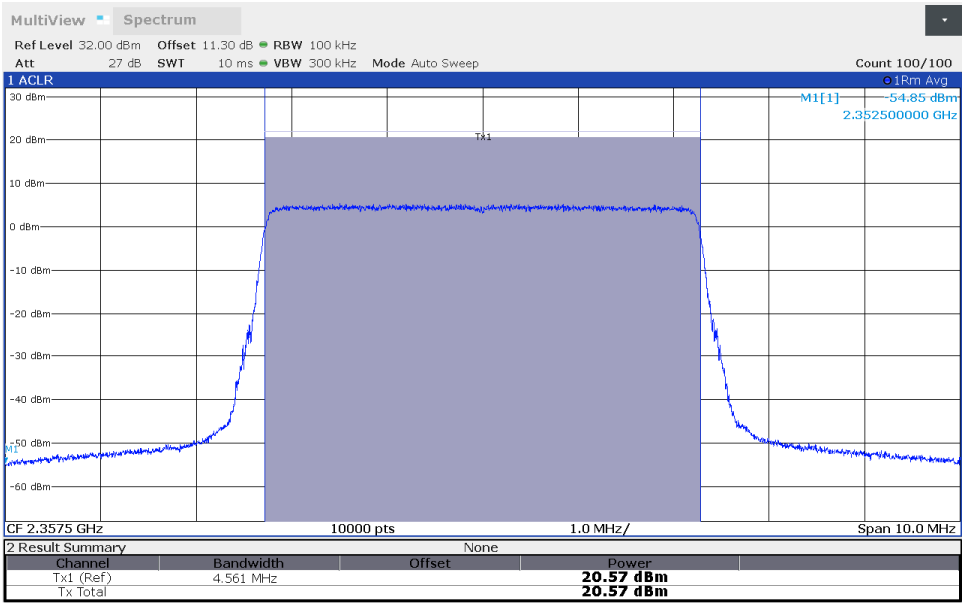
16:18:32 29.03.2021

TM3.1-64QAM_5 MHz Bandwidth
Band 30, ANT1, Mid Channel



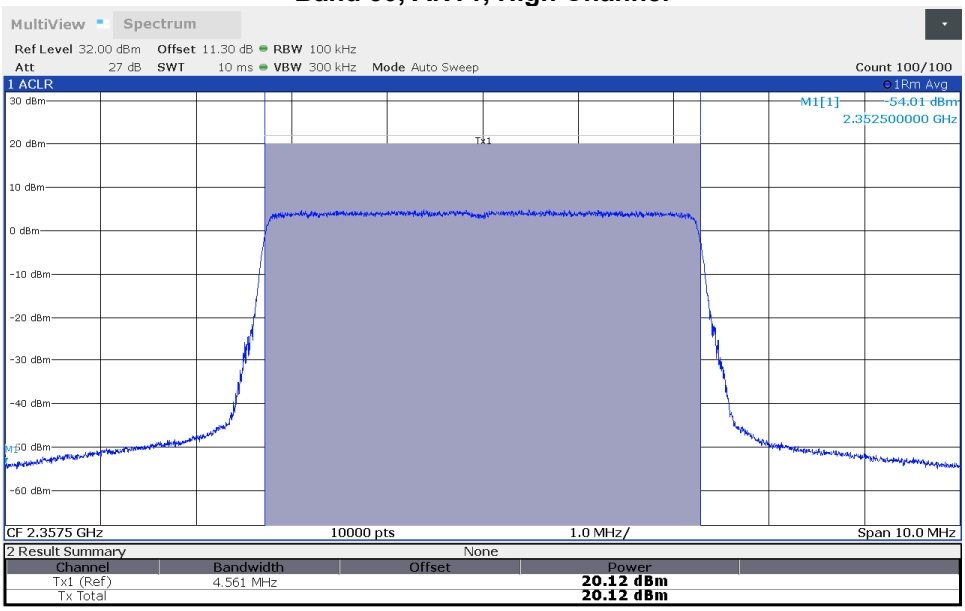
16:18:56 29.03.2021

TM3.1-64QAM_5 MHz Bandwidth
Band 30, ANT0, High Channel



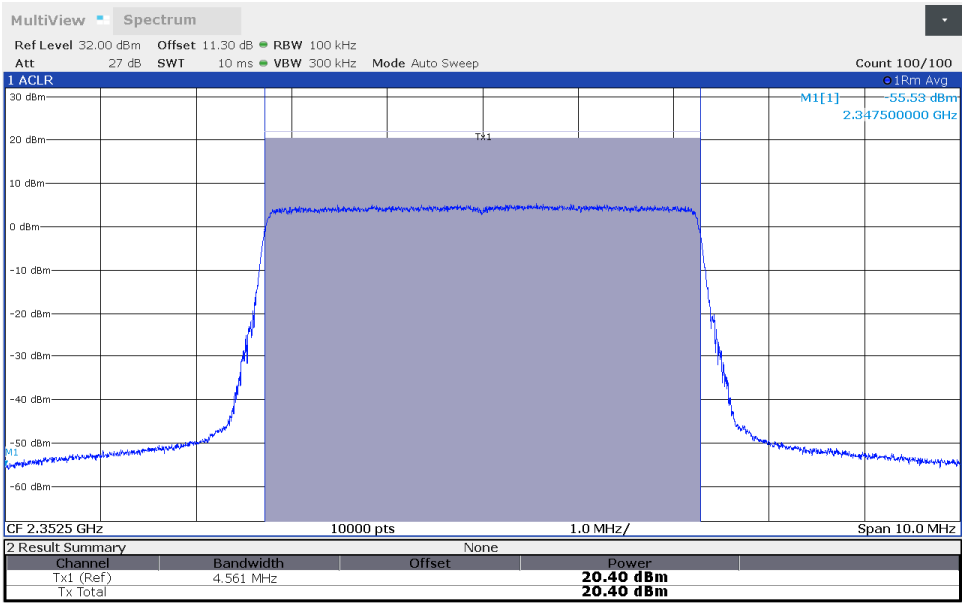
16:20:03 29.03.2021

TM3.1-64QAM_5 MHz Bandwidth
Band 30, ANT1, High Channel



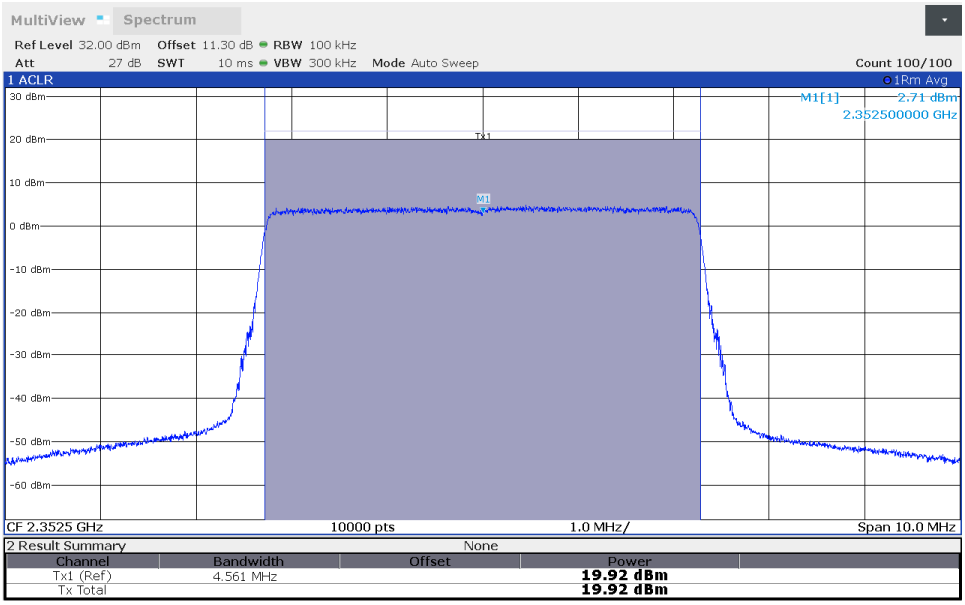
16:19:40 29.03.2021

TM3.1a-256QAM_5 MHz Bandwidth
Band 30, ANT0, Low Channel



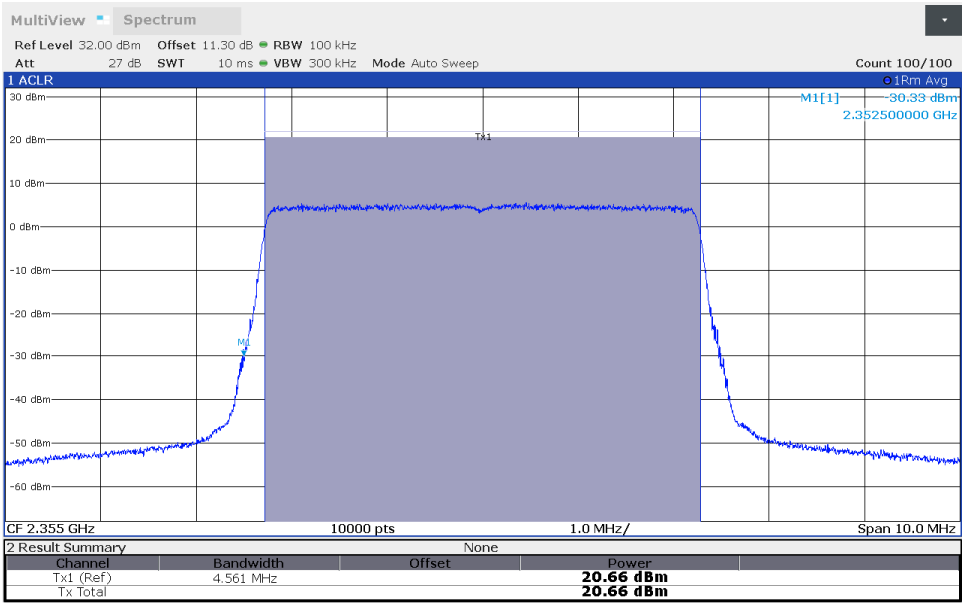
18:33:28 29.03.2021

TM3.1a-256QAM_5 MHz Bandwidth
Band 30, ANT1, Low Channel



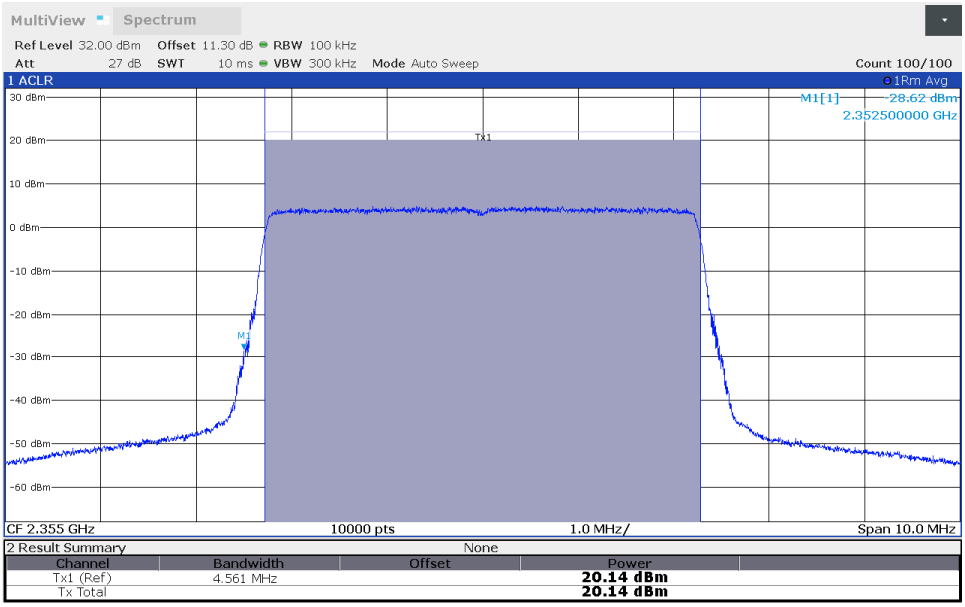
16:28:23 29.03.2021

TM3.1a-256QAM_5 MHz Bandwidth
Band 30, ANT0, Mid Channel



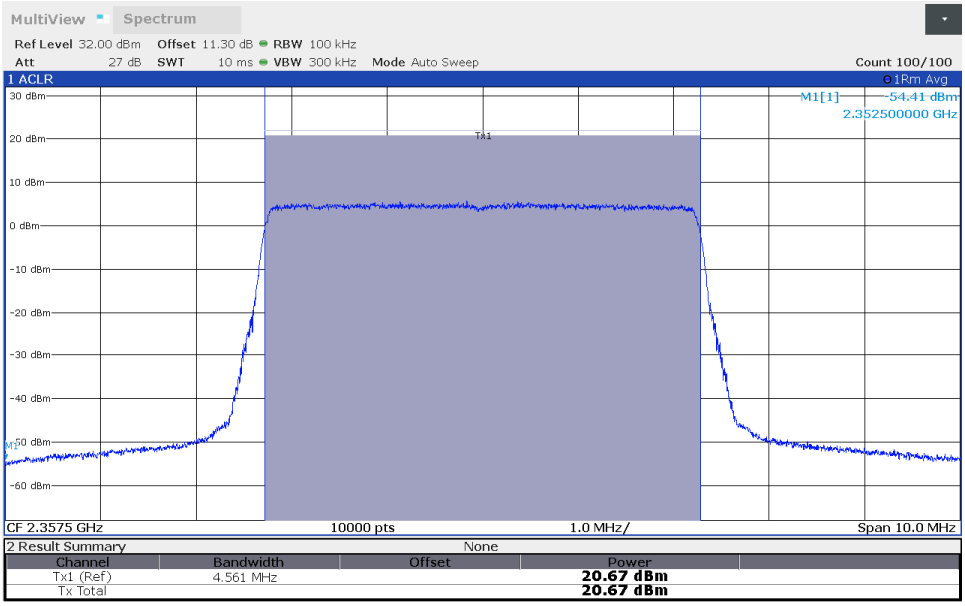
16:29:37 29.03.2021

TM3.1a-256QAM_5 MHz Bandwidth
Band 30, ANT1, Mid Channel



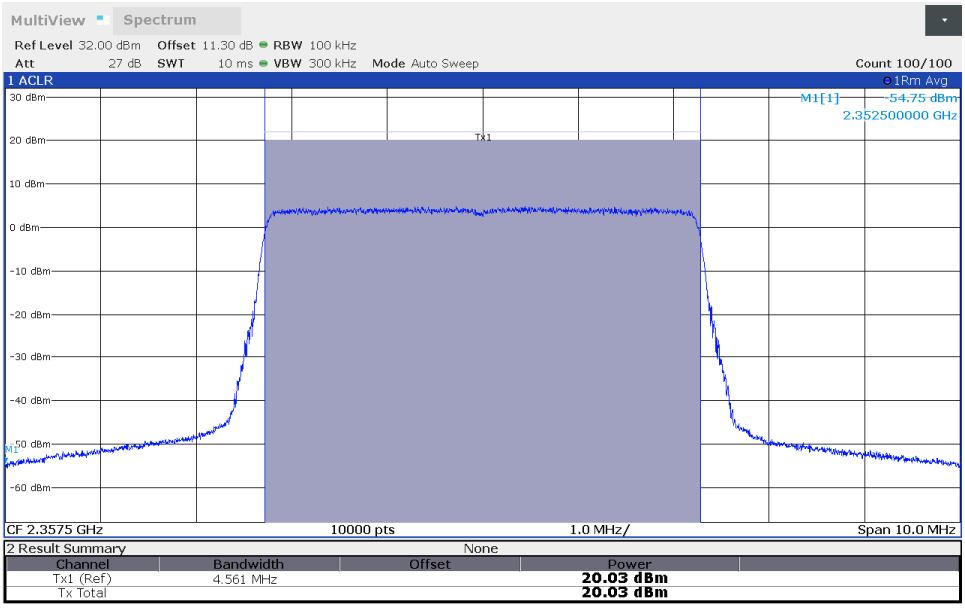
16:29:13 29.03.2021

TM3.1a-256QAM_5 MHz Bandwidth
Band 30, ANT0, High Channel



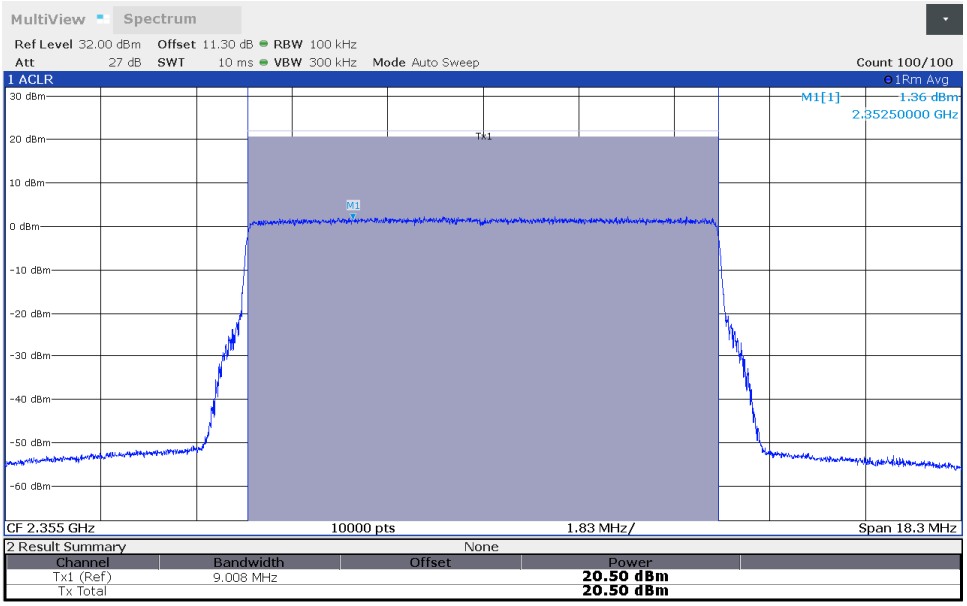
16:30:19 29.03.2021

TM3.1a-256QAM_5 MHz Bandwidth
Band 30, ANT1, High Channel



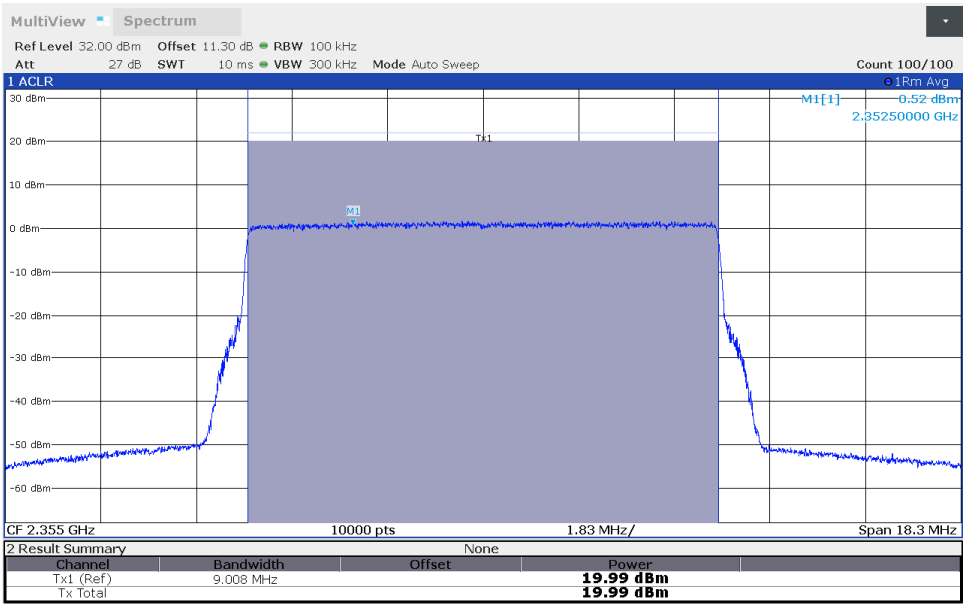
16:30:43 29.03.2021

TM1.1-QPSK_10 MHz Bandwidth
Band 30, ANT0



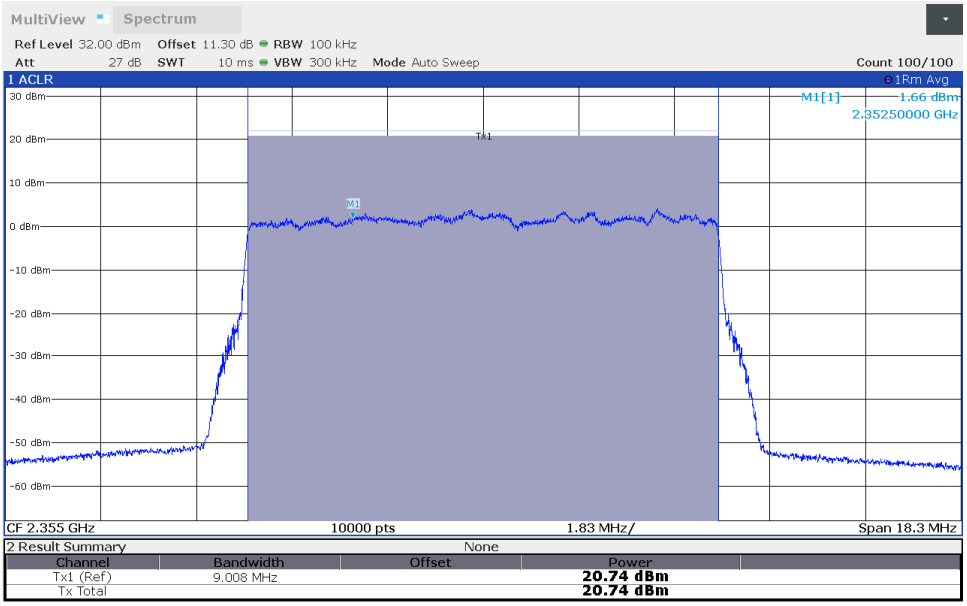
17:07:57 29.03.2021

TM1.1-QPSK_10 MHz Bandwidth
Band 30, ANT1



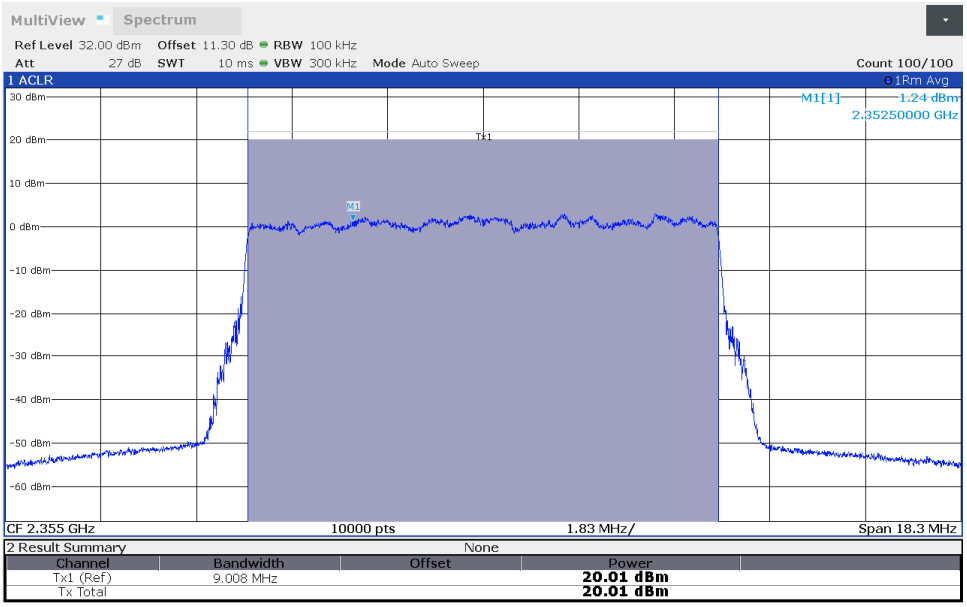
17:06:59 29.03.2021

TM3.2-16QAM_10 MHz Bandwidth
Band 30, ANT0



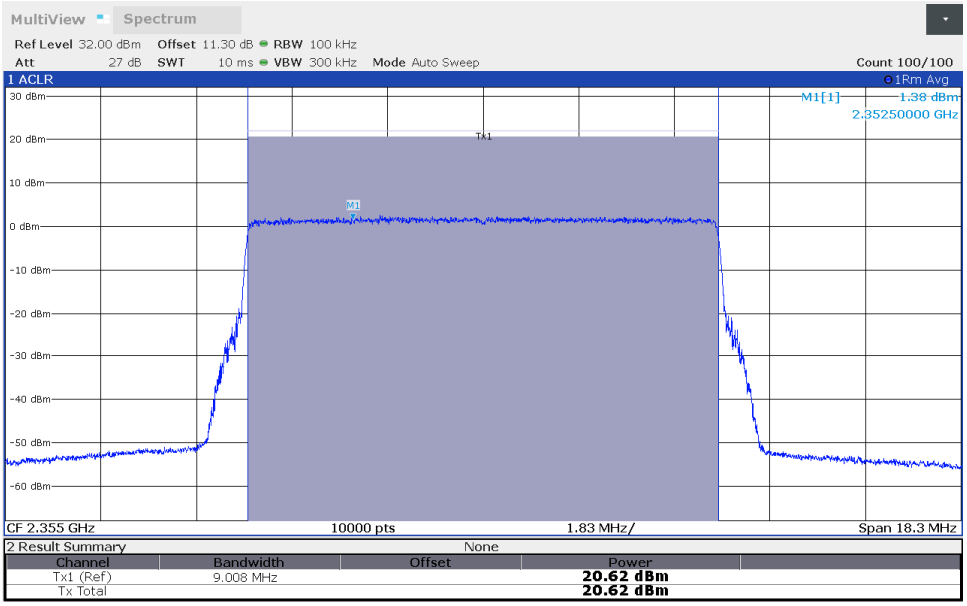
17:21:16 29.03.2021

TM3.2-16QAM_10 MHz Bandwidth
Band 30, ANT1



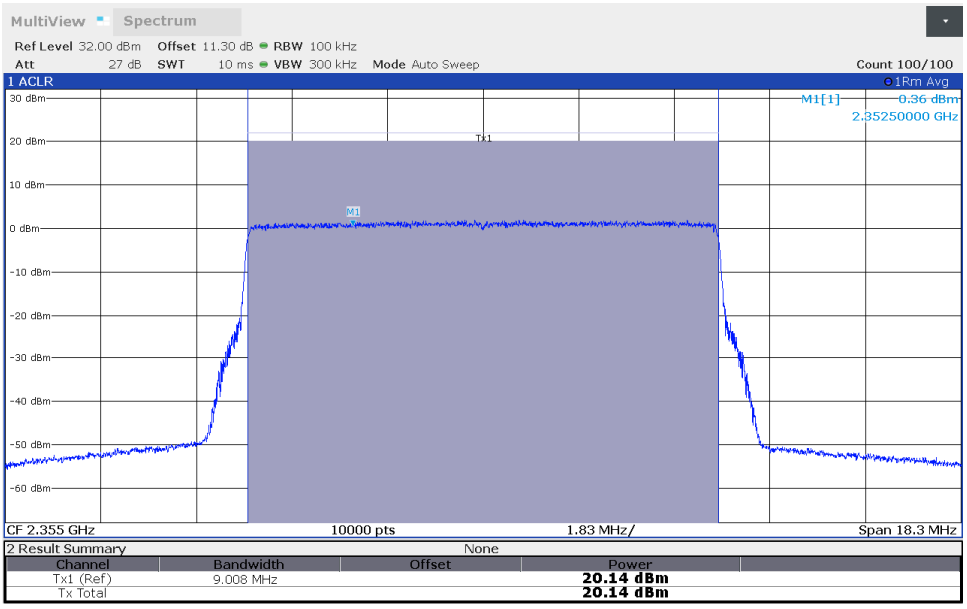
17:21:39 29.03.2021

TM3.1-64QAM_10 MHz Bandwidth
Band 30, ANT0



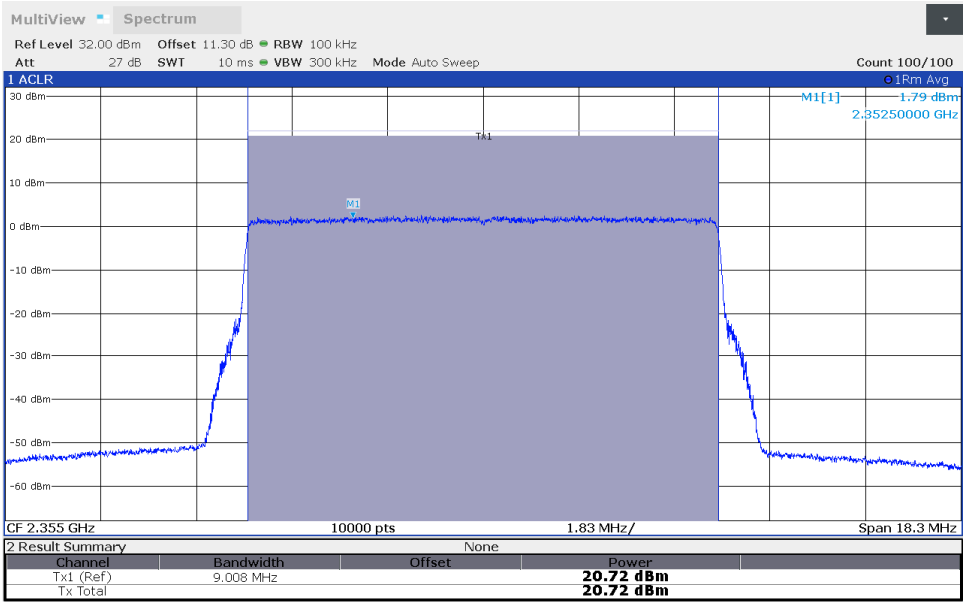
17:28:27 29.03.2021

TM3.1-64QAM_10 MHz Bandwidth
Band 30, ANT1



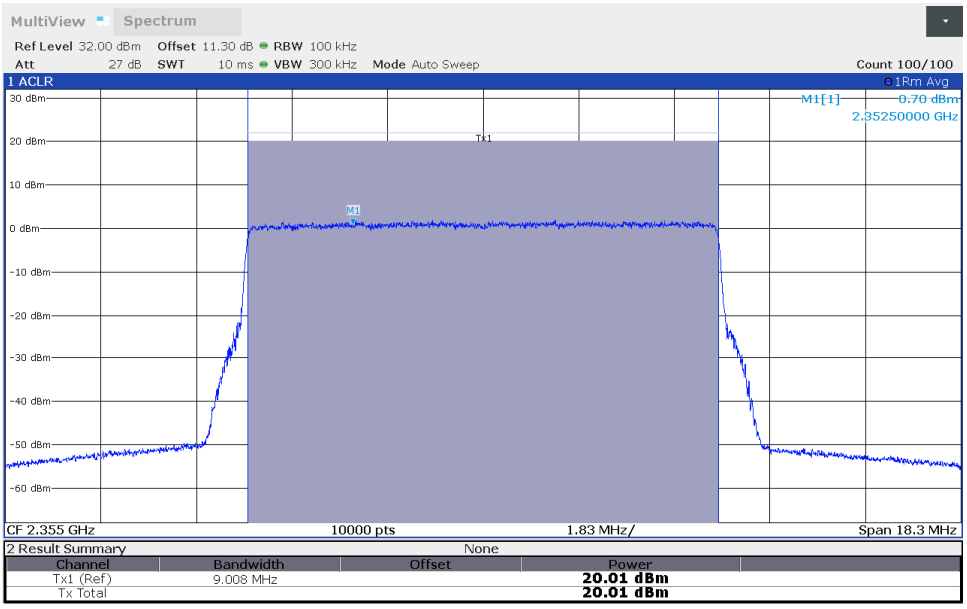
17:27:54 29.03.2021

TM3.1a-256QAM_10 MHz Bandwidth
Band 30, ANT0



17:33:23 29.03.2021

TM3.1a-256QAM_10 MHz Bandwidth
Band 30, ANT1



17:33:52 29.03.2021

Test Personnel:	Minh Ly	Test Date:	03/29/2021
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	FCC Part 27	Limit Applied:	See report section 6.1
Input Voltage:	56 VDC (POE)		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	21 ºC
		Relative Humidity:	41%
		Atmospheric Pressure:	30 in Hg

Deviations, Additions, or Exclusions: None

7 Frequency Stability

7.1 Requirement:

§27.54 The frequency stability shall be sufficient to ensure that the fundamental emissions stay within the authorized bands of operation.

7.2 Procedure:

The procedure described in FCC Publication 971168 D01 Power Meas License Digital Systems v03r01 was used. Tests are performed in accordance with ANSI C63.26 Section 5.6 and CFR47 FCC Parts 2.1055.

The EUT was placed inside the temperature chamber. The EUT was setup to transmit the maximum power at low and high channel. After the temperature stabilized for approximately 20 minutes, the transmitting frequency was measured by using the occupied bandwidth function on the Spectrum analyzer to make sure the lower and upper frequencies of the occupied bandwidth remains within the assigned band of 2345-2360MHz. The measurements were made on the low and high frequency with a 10 degree increment in temperature.

At the room temperature, the frequency was measured when the EUT was powered with the nominal voltage, 48VDC (minimum), and 57VDC (maximum) voltage as declared by customer.

7.3 Result:

The sample tested was found to Comply.

Frequency Stability Over Temperatures
Band 30, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK, Low CH

Temperature (°C)	Frequency at nominal voltage (GHz)	Maximum deviation from frequency at 20°C, ppm
Low Edge		
-30	2.3502502	0.68
-20	2.3502498	0.51
-10	2.3502477	0.37
0	2.3502490	0.18
10	2.3502488	0.09
20	2.3502486	0.00
30	2.3502481	0.24
40	2.3502476	0.45
50	2.3502468	0.79
High Edge		
-30	2.3547388	0.36
-20	2.3547390	0.28
-10	2.3547397	0.03
0	2.3547399	0.11
10	2.3547394	0.08
20	2.3547396	0.00
30	2.3547395	0.07
40	2.3547388	0.37
50	2.3547390	0.28

Voltage (DC)	Frequency at 20°C (GHz)	Maximum deviation from 56VDC, ppm
Low Edge		
48V	2.3502481	0.23
57V	2.3502475	0.48
High Edge		
48V	2.3547394	0.10
57V	2.3547391	0.21

Frequency Stability Over Temperatures
Band 30, Bandwidth: 5 MHz, Modulation: TM1.1-QPSK, High CH

Temperature (°C)	Frequency at nominal voltage (GHz)	Maximum deviation from frequency at 20°C, ppm
Low Edge		
-30	2.3552440	0.64
-20	2.3552440	0.64
-10	2.3552467	0.51
0	2.3552438	0.72
10	2.3552445	0.42
20	2.3552455	0.00
30	2.3552469	0.59
40	2.3552458	0.13
50	2.3552462	0.30
High Edge		
-30	2.3597361	0.76
-20	2.3597356	0.97
-10	2.3597368	0.47
0	2.3597361	0.76
10	2.3597362	0.72
20	2.3597379	0.00
30	2.3597391	0.51
40	2.3597394	0.64
50	2.3597388	0.38

Voltage (DC)	Frequency at 20°C (GHz)	Maximum deviation from 56VDC, ppm
Low Edge		
48V	2.3552451	0.17
57V	2.3552476	0.89
High Edge		
48V	2.3597372	0.30
57V	2.3597366	0.55

Frequency Stability Over Temperatures
Band 30, Bandwidth: 10 MHz, Modulation: TM1.1-QPSK

Temperature (°C)	Frequency at nominal voltage (MHz)	Maximum deviation from frequency at 20°C, ppm
Low Edge		
-30	2.3504935	0.38
-20	2.3504942	0.68
-10	2.3504932	0.26
0	2.3504945	0.81
10	2.3504911	0.64
20	2.3504926	0.00
30	2.3504946	0.85
40	2.3504944	0.77
50	2.3504933	0.30
High Edge		
-30	2.3594678	0.72
-20	2.3594671	0.42
-10	2.3594666	0.21
0	2.3594681	0.85
10	2.3594655	0.25
20	2.3594661	0.00
30	2.3594672	0.47
40	2.3594677	0.68
50	2.3594675	0.59

Voltage (DC)	Frequency at 20°C (MHz)	Maximum deviation from 56VDC, ppm
Low Edge		
48V	2.3504931	0.21
57V	2.3504938	0.51
High Edge		
48V	2.3594667	0.25
57V	2.3594668	0.30

Test Personnel:	Minh Ly	Test Date:	04/05/21 to 04/06/21
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	FCC Part 27	Limit Applied:	See report section 7.1
Input Voltage:	See plots		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	N/A
		Relative Humidity:	N/A
		Atmospheric Pressure:	N/A

Deviations, Additions, or Exclusions: None

8 Transmitter spurious emissions

8.1 Requirement:

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 75 +10 log(P) dB.

8.2 Procedure:

The procedure described in FCC Publication 971168 D01 Power Meas License Digital Systems v03r01 was used. Tests are performed in accordance with ANSI C63.26 Section 5.7, CFR47 FCC Parts 2.1051 and 2.1053.

Conducted Spurious Emission:
A spectrum analyzer was connected to the antenna port of the transmitter.

1. Set the RBW = 100 kHz.
2. Set the VBW ≥ 3 x RBW.
3. Detector = peak.
4. Sweep time = auto couple.
5. Trace mode = max hold.
6. Allow trace to fully stabilize.
7. Use the peak marker function to determine the maximum amplitude level.

The unwanted emissions were measured from 30 MHz to 10 GHz for low, mid, and high channel for both 5MHz & 10MHz Bandwidth. Plots are corrected for cable loss and then compared to the limits.

Radiated Spurious Emission:
The measurement antenna was placed at a distance of 10 meters for 30MHz – 1GHz and 3 meters for 1-10GHz from the EUT. During the tests, the antenna height and polarization as well as EUT azimuth were varied in order to identify the maximum level of emissions from the EUT.

The frequency range up to 10th harmonic was investigated. The worst case of emissions was reported.

During the spurious emission measurement, the antenna port of the EUT was terminated by 50ohms load. The substitution method was used to investigate at the highest peak in each frequency range (30MHz – 1GHz and 1GHz – 26GHz). The EUT was substituted by a reference antenna (Biconical antenna for 30MHz – 200MHz, log-periodic for 200MHz – 1GHz, or Horn antenna - above 1GHz), connected to a signal generator. The signal generator output level ($\mathbf{V_g}$ in dBm) was adjusted to obtain the same reading as from EUT. The ERP at the spurious emissions frequency was calculated as follows.

$$EIRP_{(dBm)} = \mathbf{V_g + G_{(dBd)} + CF_{(dB)}}$$

The spurious emissions attenuation is the difference between the ERP level at the fundamental frequency and the level of the spurious emissions.

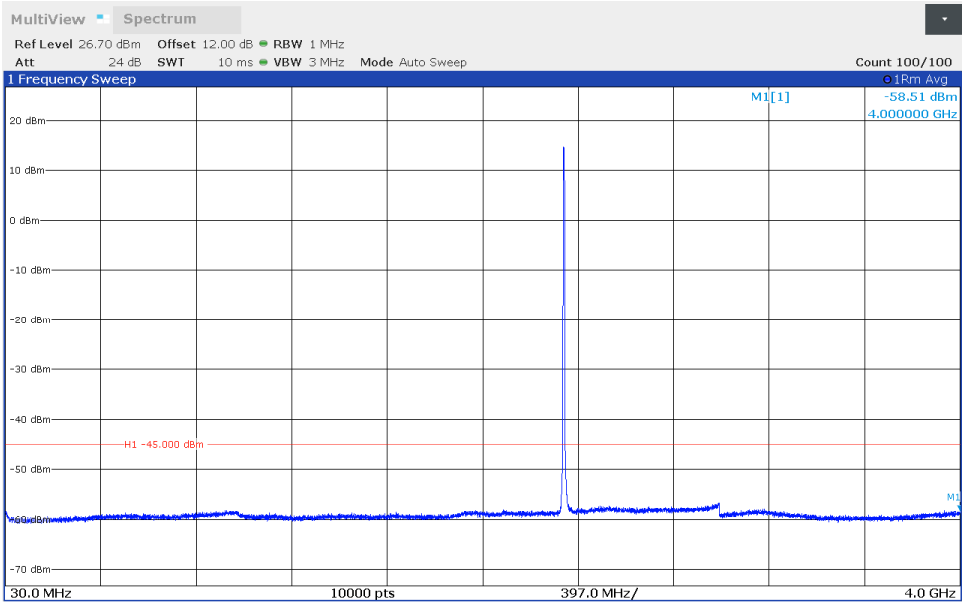
Preliminary testing was performed for all modulation/data rate modes. The worse-case data rate which resulted in the highest power and lowest spectrum were selected for final measurements:

5 MHz, Modulation: TM1.1-QPSK & 10 MHz, Modulation: TM1.1-QPSK

8.3 Results:

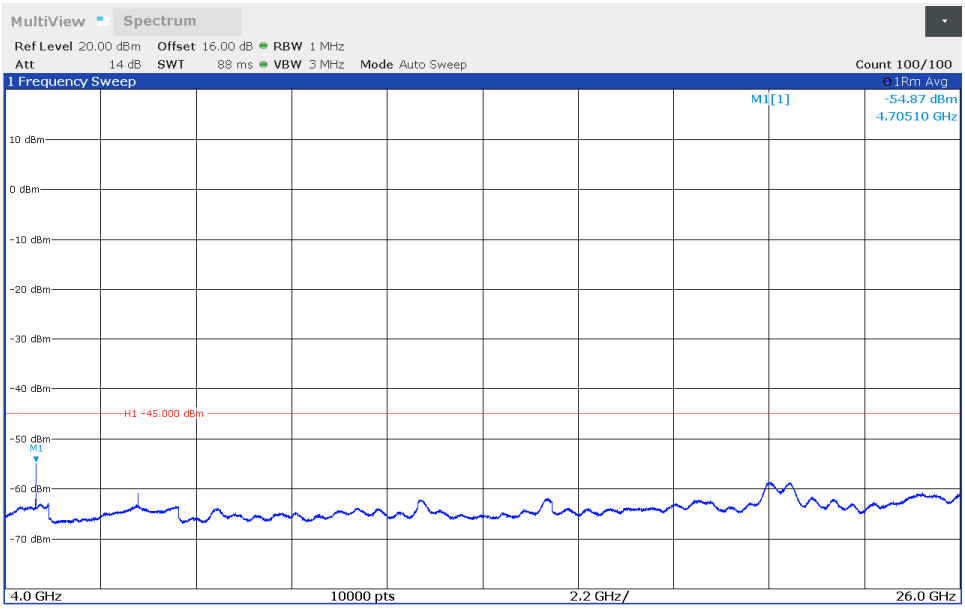
The sample tested was found to Comply.

Conducted Spurious Emission
Band 30, Bandwidth: 5 MHz, Low Channel, ANT0, 30MHz - 4GHz



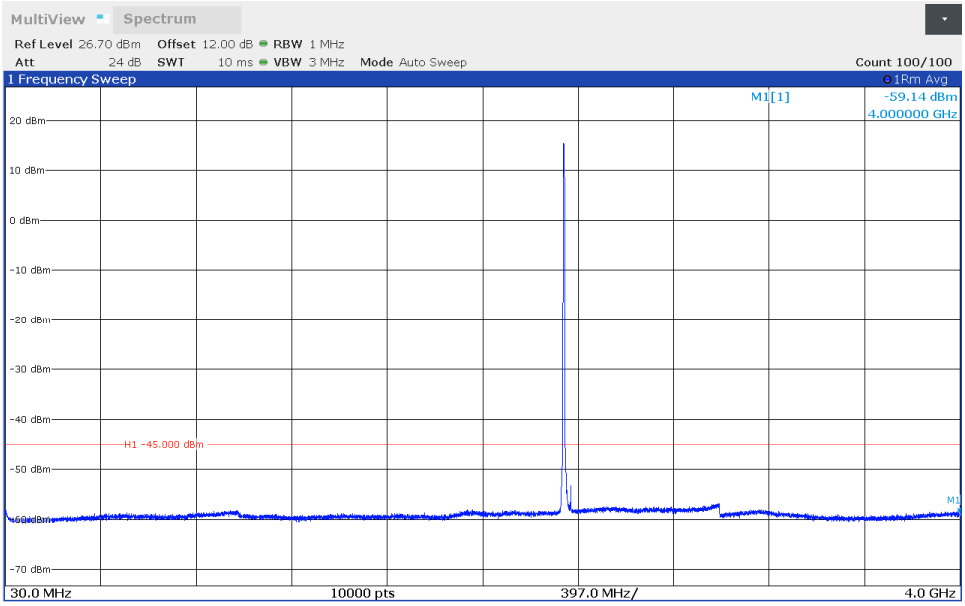
16:49:39 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 5 MHz, Low Channel, ANT0, 4GHz - 26GHz



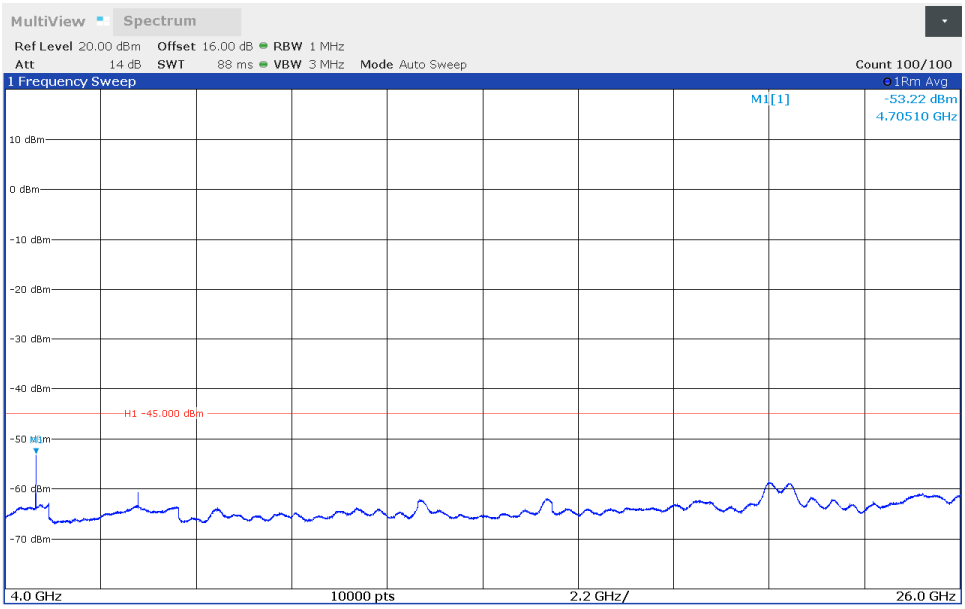
16:56:38 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 5 MHz, Low Channel, ANT1, 30MHz-4GHz



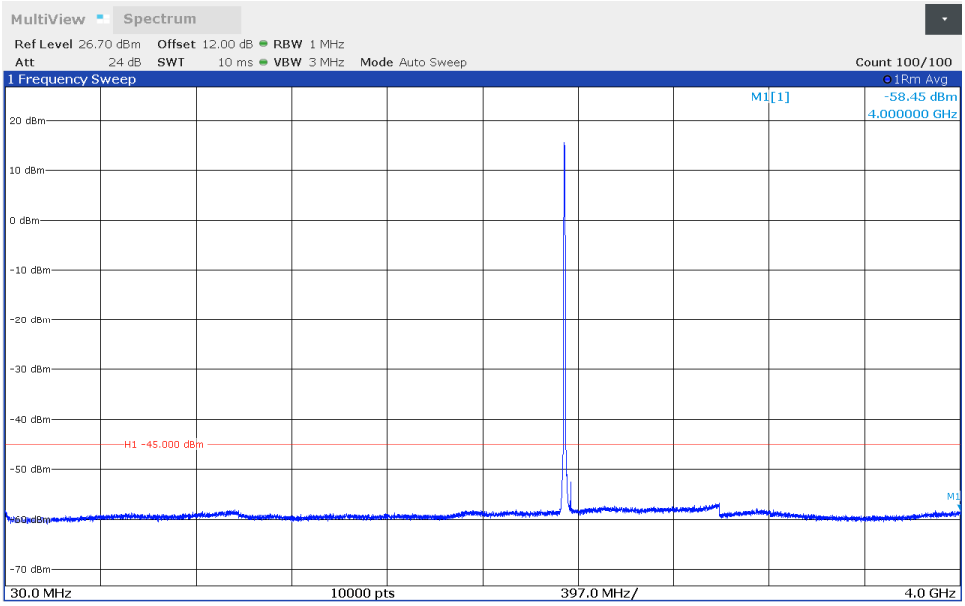
16:50:30 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 5 MHz, Low Channel, ANT1, 4GHz - 26GHz



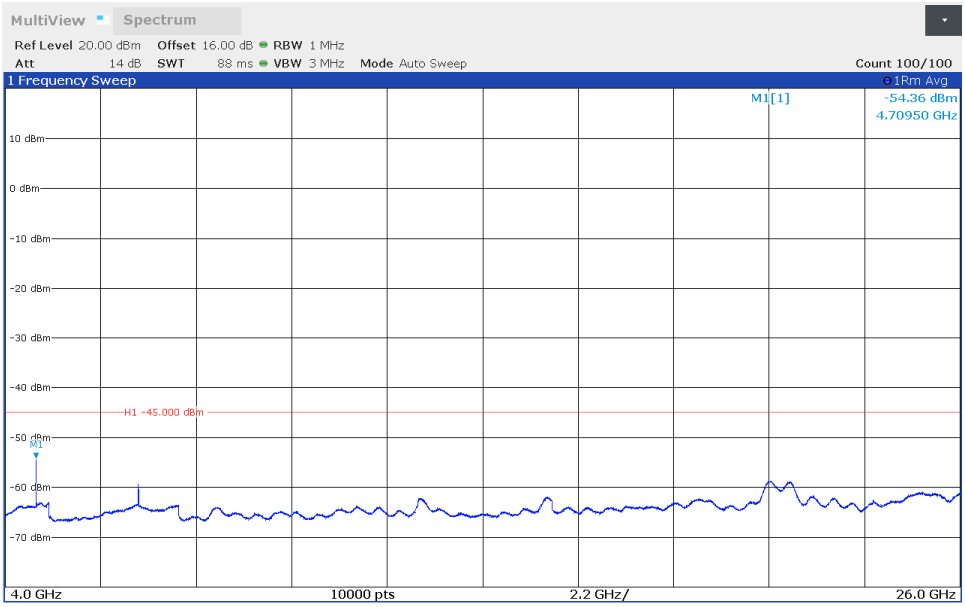
16:57:03 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 5 MHz, Mid Channel, ANT0, 30MHz - 4GHz



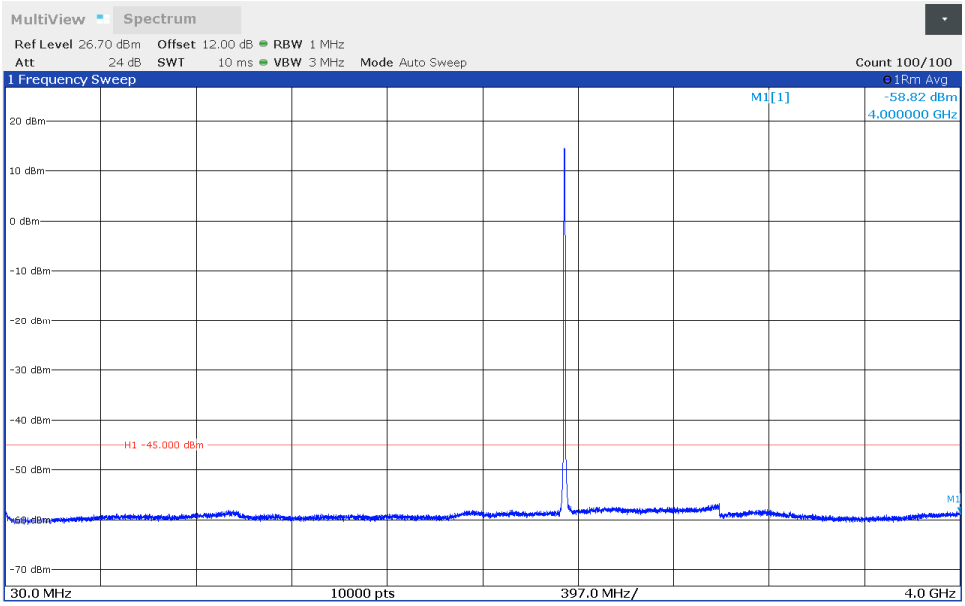
16:51:22 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 5 MHz, Mid Channel, ANT0, 4GHz - 26GHz



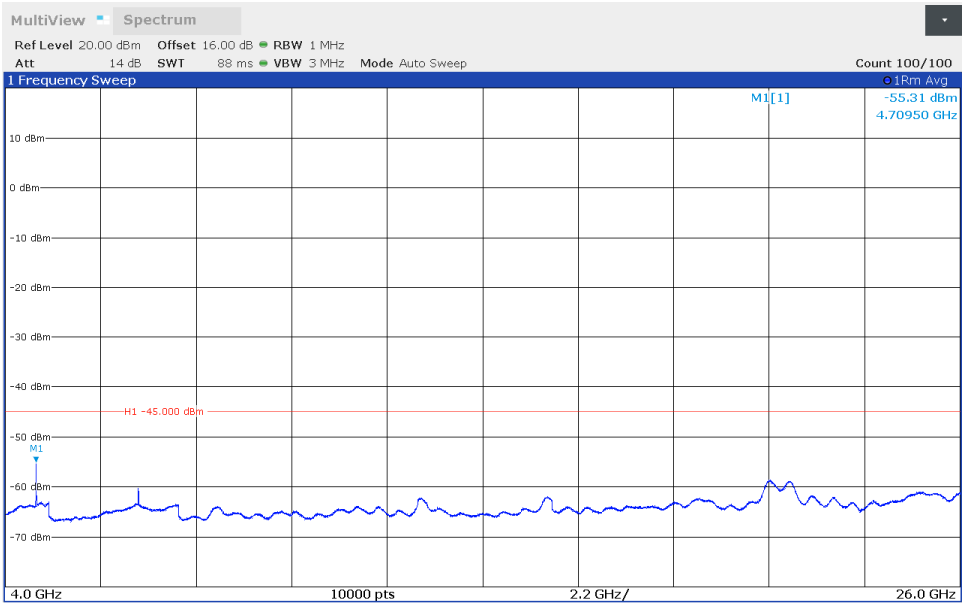
16:55:33 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 5 MHz, Mid Channel, ANT1, 30MHz-4GHz



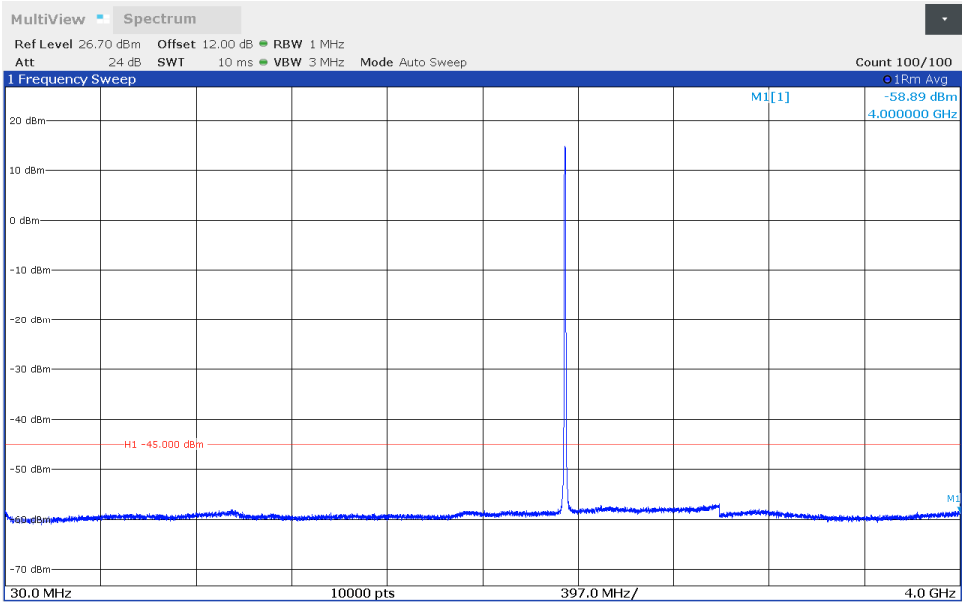
16:51:44 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 5 MHz, Mid Channel, ANT1, 4GHz - 26GHz



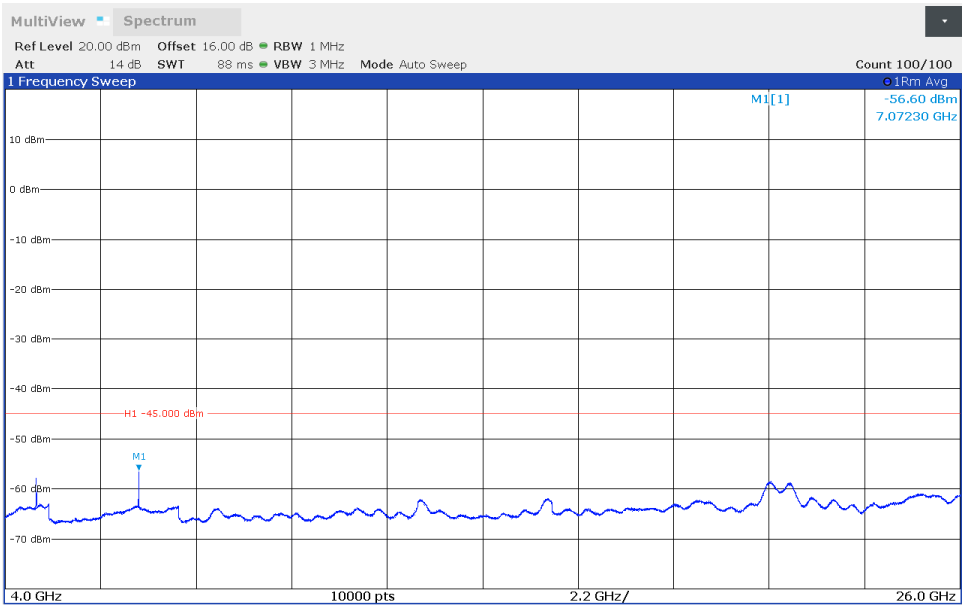
16:55:12 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 5 MHz, High Channel, ANT0, 30MHz - 4GHz



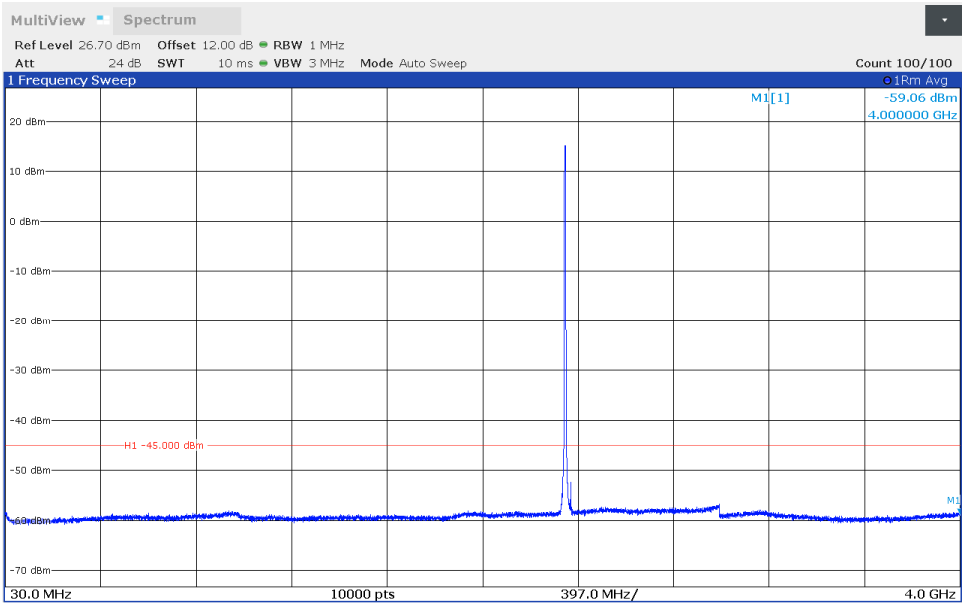
16:52:20 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 5 MHz, High Channel, ANT0, 4GHz - 26GHz



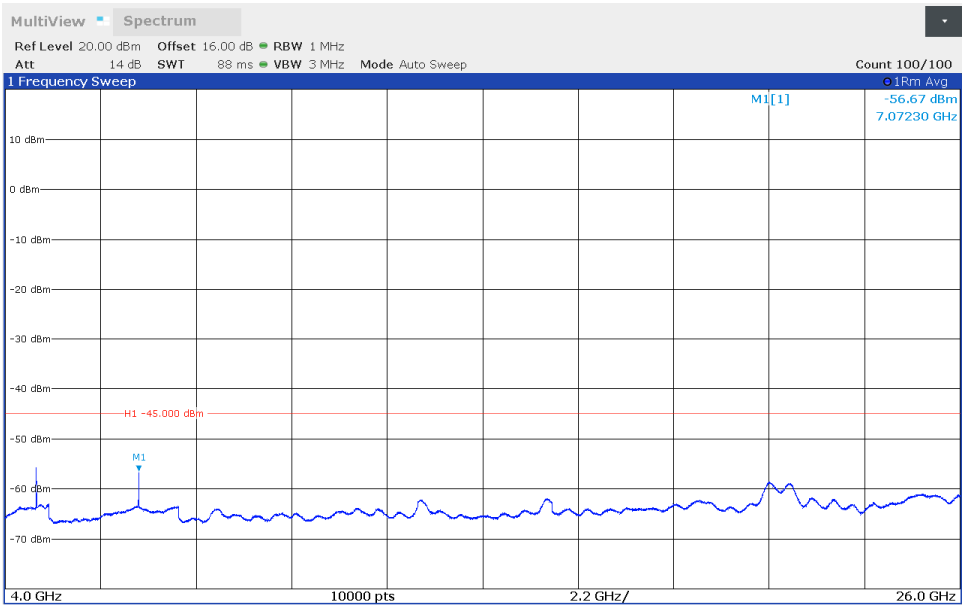
16:53:58 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 5 MHz, High Channel, ANT1, 30MHz-4GHz



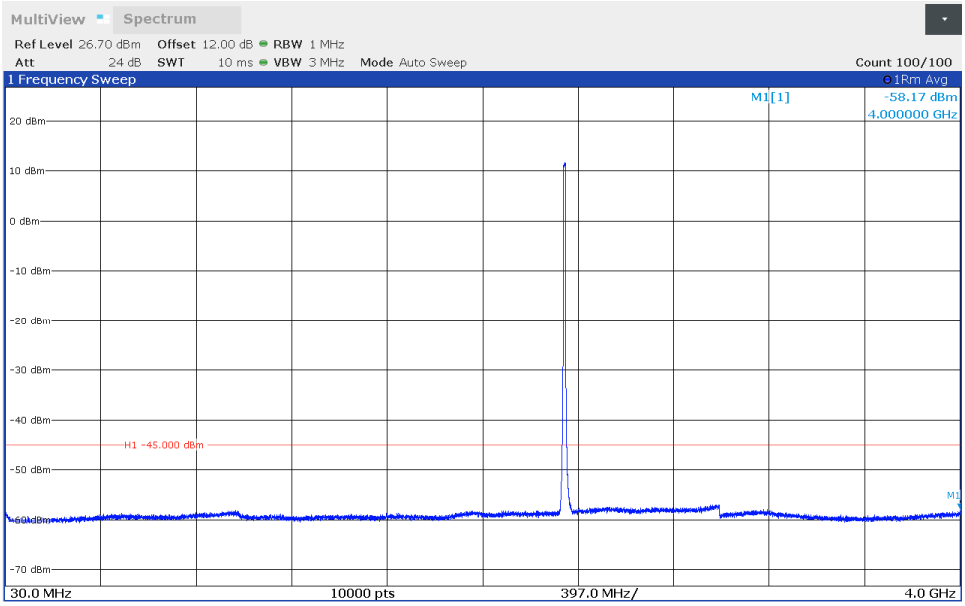
16:52:42 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 5 MHz, High Channel, ANT1, 4GHz - 26GHz



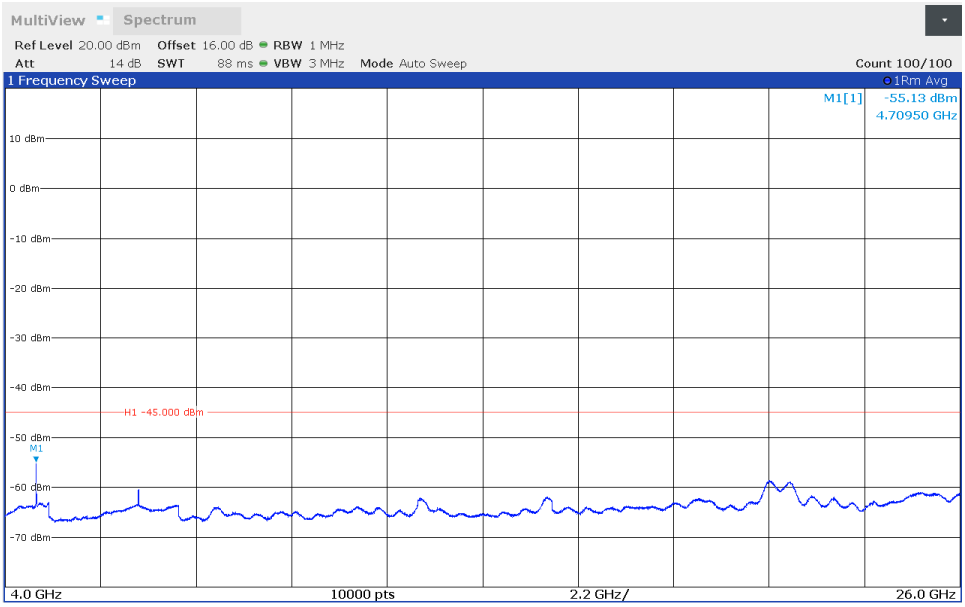
16:54:29 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 10 MHz, ANT0, 30MHz - 4GHz



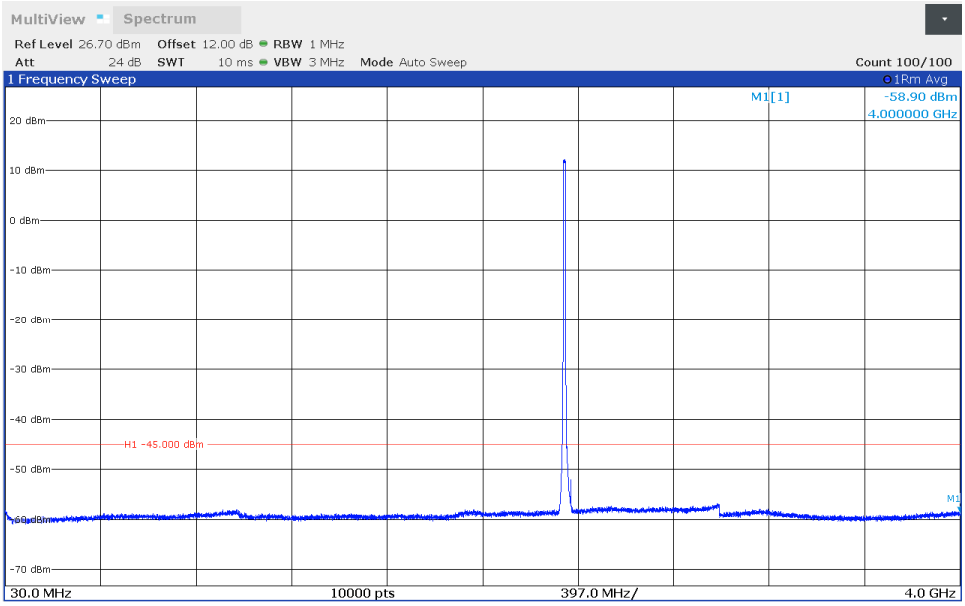
16:44:59 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 10 MHz, ANT0, 4GHz - 26GHz



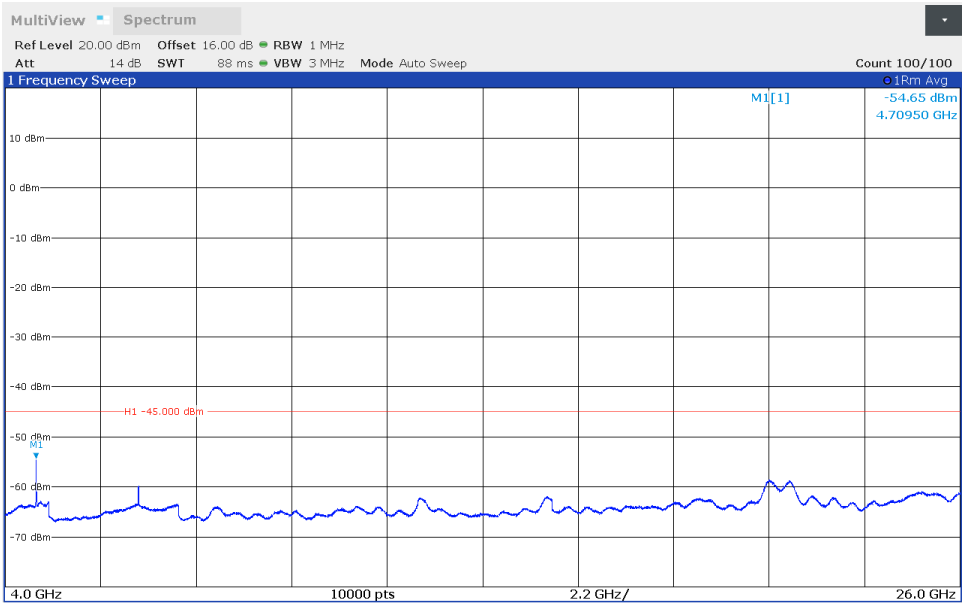
16:42:08 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 10 MHz, ANT1, 30MHz-4GHz



16:44:33 30.03.2021

Conducted Spurious Emission
Band 30, Bandwidth: 10 MHz, ANT1, 4GHz - 26GHz



17:03:58 30.03.2021

Transmitter Radiated Spurious Emissions
(Measured by Substitution Method)
5MHz, Low Channel

Freq.	Raw Amplitude	Sig Gen	Cable Loss	Antenna Sub Gain	EIRP	Limit	Margin
MHz	dBuV/m	dBm	dB	dBi	dBi	dBm	dB
41.737	49.3	-35.7	0.3	-14.2	-50.2	-45	-5.2
59.132	52.6	-49.6	0.4	-4.1	-54.1	-45	-9.1
625.030	40.8	-50.8	1.1	2.6	-49.4	-45	-4.4
1200.033	67.0	-50.7	2.4	7.3	-45.8	-45	-0.8
1906.100	62.5	-53.4	2.8	8.7	-47.5	-45	-2.5
5529.367	52.4	-54.3	5.6	11.1	-48.8	-45	-3.8
10312.600	47.8	-52.1	7.8	12.1	-47.9	-45	-2.9

Transmitter Radiated Spurious Emissions
(Measured by Substitution Method)
5MHz, Mid Channel

Freq.	Raw Amplitude	Sig Gen	Cable Loss	Antenna Sub Gain	EIRP	Limit	Margin
MHz	dBuV/m	dBm	dB	dBi	dBi	dBm	dB
34.656	40.7	-35.3	0.3	-19.6	-55.2	-45	-10.2
326.432	44.5	-55.2	0.6	2.9	-53.0	-45	-8.0
624.998	38.4	-53.3	1.1	2.6	-51.8	-45	-6.8
1199.467	65.6	-52.1	2.4	7.3	-47.2	-45	-2.2
5529.367	52.6	-54.2	5.6	11.1	-48.6	-45	-3.6
10312.600	47.3	-52.6	7.8	12.1	-48.4	-45	-3.4

Transmitter Radiated Spurious Emissions
(Measured by Substitution Method)
5MHz, High Channel

Freq.	Raw Amplitude	Sig Gen	Cable Loss	Antenna Sub Gain	EIRP	Limit	Margin
MHz	dBuV/m	dBm	dB	dBi	dBi	dBm	dB
35.335	41.8	-35.1	0.3	-19.0	-54.4	-45	-9.4
326.400	46.5	-53.2	0.6	2.9	-51.0	-45	-6.0
624.998	39.4	-52.3	1.1	2.6	-50.8	-45	-5.8
1199.467	65.9	-51.9	2.4	7.3	-47.0	-45	-2.0
3071.733	58.6	-55.9	3.5	10.4	-49.0	-45	-4.0
5529.367	51.8	-54.9	5.6	11.1	-49.4	-45	-4.4
10312.600	47.2	-52.7	7.8	12.1	-48.5	-45	-3.5

Transmitter Radiated Spurious Emissions
(Measured by Substitution Method)
10MHz

Freq.	Raw Amplitude	Sig Gen	Cable Loss	Antenna Sub Gain	EIRP	Limit	Margin
MHz	dBuV/m	dBm	dB	dBi	dBi	dBm	dB
34.753	42.1	-34.0	0.3	-19.5	-53.8	-45	-8.8
39.280	41.6	-40.3	0.3	-16.1	-56.7	-45	-11.7
326.432	45.3	-54.5	0.6	2.9	-52.2	-45	-7.2
594.087	40.8	-50.8	1.1	1.9	-50.0	-45	-5.0
1200.033	65.0	-52.7	2.4	7.3	-47.9	-45	-2.9
3071.733	58.6	-55.9	3.5	10.4	-49.0	-45	-4.0
5529.367	52.6	-54.1	5.6	11.1	-48.5	-45	-3.5
10312.600	46.7	-53.2	7.8	12.1	-49.0	-45	-4.0

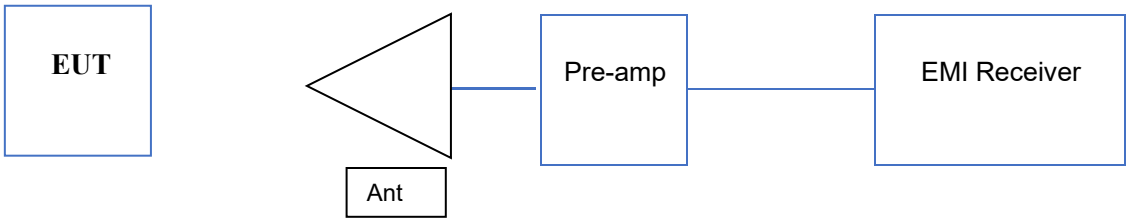
ERP is calculated as: **ERP$_{(dBm)}$= Sig Gen$_{(dBm)}$ + Antenna Gain $_{(dBi)}$ – Cable Loss $_{(dB)}$**

Note: Investigation performed up to 26.0 GHz. All other emissions not reported are at least 10dB below the limits.

Result:	**Complies by 0.8 dB**

8.4 Test Setup Configuration:

The following photographs show the testing configurations used.



Test Personnel:	Minh Ly	Test Date:	03/31/2021
Supervising/Reviewing Engineer: (Where Applicable)			
Product Standard:	FCC Part 27	Limit Applied:	See report section 8.1
Input Voltage:	56 VDC (POE)		
Pretest Verification w/ Ambient Signals or BB Source:	N/A	Ambient Temperature:	21 ºC
		Relative Humidity:	41 %
		Atmospheric Pressure:	30 inHg

Deviations, Additions, or Exclusions: None

9 List of Test Equipment

Measurement equipment used for emission compliance testing utilized the equipment on the following list:

Equipment	Manufacturer	Model Tested/Type	Asset #	Cal Int	Cal Due
EMI Receiver	Rohde and Schwarz	ESU	ITS 00961	12	03/09/22
BI-Log Antenna	Teseq	CBL6111D	ITS 01650	12	08/17/21
Pre-Amplifier	Sonoma Instrument	310N	ITS 01714	12	11/13/21
RE Cable	TRU Corporation	TRU CORE 300	ITS 01462	12	09/01/21
RE Cable	TRU Corporation	TRU CORE 300	ITS 01465	12	09/01/21
RE Cable	TRU Corporation	TRU CORE 300	ITS 01470	12	09/01/21
RF Cable	TRU Corporation	TRU CORE 300	ITS 01342	12	09/01/21
Active Horn Antenna	ETS Lindgren	3117PA	ITS 01636	12	12/17/21
Log Periodic	Com-power	ALP-100	ITS 01785	12	06/26/21
Bicon	Com-power	AB-900A	ITS 01391	12	07/22/21
Horn Antenna	ETS	3115	ITS 00982	12	04/21/21
Spectrum Analyzer	Rohde and Schwarz	FSW	ITS 01818	12	07/09/21
10 Meter Chamber	Panashield	10 Meter Semi-Anechoic Chamber	ITS 00984	36	07/29/23
Environmental Chamber	Espec	BTX-475	ITS 01436	12	10/20/21

10 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	April 15, 2021	104601904MPK-001	ML	KV	Original Issue