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DATE: 1 February 2022

I.T.L. (PRODUCT TESTING) LTD.
FCC/IC Radio Test Report

for

Amimon Ltd.

Equipment under test:

Wireless HD Video System - Video Source Unit (VSU)

AMN41012

Tested by: _____
M. Zohar

Approved by: _____
D. Shidlowsky

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This report relates only to items tested.

Measurement/Technical Report for

Amimon Ltd.

Wireless HD Video System - Video Source Unit (VSU)

AMN41012

FCC ID: VQSAMN41012
IC: 7680A-AMN41012

This report concerns:	Original Grant: Class I Change: Class II Change: X
Equipment type:	FCC: (UNII) Unlicensed National Information Infrastructure TX ISED: WLAN
Limits used:	47CFR15, Part 15, Subpart E, Section 15.407 RSS 247, Issue 2, February 2017, Section 5 RSS-Gen, Issue 5, April 2018

Measurement procedure used is KDB 789033 D02 v02, ANSI C63.10:2013 and RSS-Gen, Issue 5, April 2018.

Application for Certification

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1 General Information

1.1 Administrative Information

Manufacturer:	Amimon Ltd.
Manufacturer's Address:	26 Zarhin St., Ra'anana 4366250, Israel
Manufacturer's Representative	Gabi Nocham
Equipment Under Test (E.U.T):	Wireless HD Video System - Video Source Unit (VSU)
Equipment PMN:	AMN41012
Equipment Serial No.:	Not designated
Equipment HVIN:	AMN7.5.11
Equipment FVIN:	N/A
Date of Receipt of E.U.T:	December 27, 2020
Start of Test:	December 27, 2020
End of Test:	August 23, 2021
Test Laboratory Location:	I.T.L. (Product Testing) Ltd. 1 Bat Sheva St., Lod 7120101, Israel
Test Specifications:	47CFR15, Part 15, Subpart E, Section 15.407 RSS 247, Issue 2, February 2017, Section 5 RSS-Gen, Issue 5, April 2018

1.2 List of Accreditations

The EMC laboratory of I.T.L. is accredited by the following bodies:

1. The American Association for Laboratory Accreditation (A2LA) (U.S.A.), Certificate No. 1152.01.
2. The Federal Communications Commission (FCC) (U.S.A.), FCC Designation No. IL1005.
3. The Israel Ministry of the Environment (Israel), Registration No. 1104/01.
4. Department of Innovation, Science and Economic Development (ISED) Canada, CAB identifier: IL1002

I.T.L. Product Testing Ltd. is accredited by the American Association for Laboratory Accreditation (A2LA) and the results shown in this test report have been determined in accordance with I.T.L.'s terms of accreditation unless stated otherwise in the report.

1.3 Product Description

The Draco system provides high-end, high performance wireless HD video connection that can operate in challenging unmanned environment.

The AMN41012 is the video source unit, which is connected to a camera to capture video signals and to transmit these signals to its companion device AMN42012, for example, thus, creating a wireless video link.

The companion AMN42012 is the video display unit that receives the video information transmitted from AMN41012 unit and transfers the images to various types of computer monitors/displays. This enables the user or camera operator to monitor the video transmitted from the remote camera connected to the AMN41012.

1.4 Test Methodology

Both conducted and radiated testing was performed according to the procedures in KDB 789033 D02 v02 and ANSI C63.10: 2013, RSS-Gen, Issue 5, April 2018. Radiated testing was performed at an antenna to EUT distance of 3 meters.

1.5 Test Facility

Emissions tests were performed at I.T.L.'s testing facility in Lod, Israel. I.T.L.'s EMC Laboratory is accredited by A2LA, certificate No. 1152.01 and its FCC Designation Number is IL1005.

1.6 Measurement Uncertainty

Conducted Emission

Conducted Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4)

0.15 – 30 MHz:
Expanded Uncertainty (95% Confidence, K=2):
± 3.44 dB

Radiated Emission

Radiated Emission (CISPR 11, EN 55011, CISPR 22, EN 55022, ANSI C63.4) for open site:

30-1000MHz:
Expanded Uncertainty (95% Confidence, K=2):
± 4.96 dB

1 GHz to 6 GHz
Expanded Uncertainty (95% Confidence, K=2):
±5.19 dB

>6 GHz
Expanded Uncertainty (95% Confidence, K=2):
±5.51 dB

2 System Test Configuration

2.1 Justification

1. The EUT contains an approved transceiver at UNII 1, 2, 3 using 40 MHz (FCC ID: VQSAMN41012; IC: 7680A-AMN41012).
2. The EUT was tested for compliance at UNII1, 2, 3 using BW of 20MHz.
3. This report destination is to check C2PC compliance

2.2 EUT Exercise Software

No special exercise software was used.

2.3 Special Accessories

No special accessories were used

2.4 Equipment Modifications

No modifications were necessary in order to achieve compliance.

2.5 Configuration of Tested System

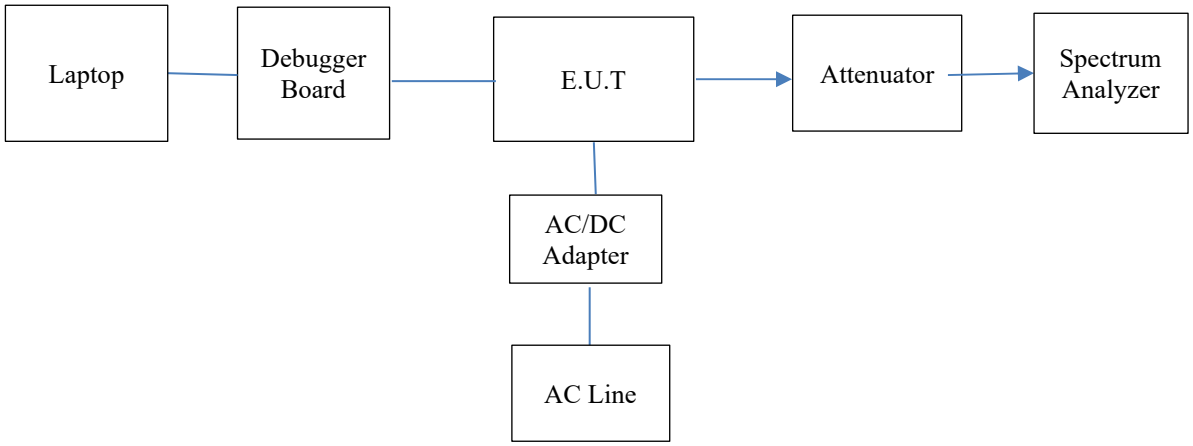


Figure 1. Configuration of Tested System - Conducted

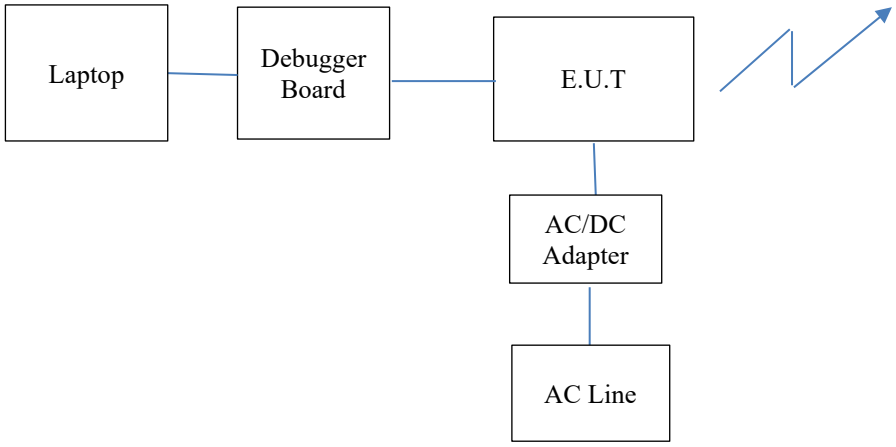


Figure 2. Configuration of Tested System - Radiated

3 Conducted and Radiated Measurement Test Setup Photos

See a separate file.

4 Conducted Emission from AC Mains

4.1 Test Specification

FCC Part 15, Subpart C, Section 15.207
RSS Gen, Issue 5, Clause 8.8

4.2 Test Procedure

(Temperature (22°C)/ Humidity (56%RH))

The E.U.T operation mode and test setup are as described in Section 2 of this report. In order to minimize background noise interference, the conducted emission testing was performed inside a shielded room, with the E.U.T placed on a 0.8 meter high wooden table, 0.4 meter from the room's vertical wall. In the case of a floor-standing E.U.T., it was placed on the horizontal ground plane.

The E.U.T was powered from 115 V AC / 60 Hz via 50 Ohm / 50 µHn Line Impedance Stabilization Network (LISN) on the phase and neutral lines. The LISN's were grounded to the shielded room ground plane (floor), and were kept at least 0.8 meters from the nearest boundary of the E.U.T.

The center of the E.U.T.'s AC cable was folded back and forth, in order to form a bundle less than 0.40 meters and a total cable length of 1 meter.

The effect of varying the position of the cables was investigated to find the configuration that produces maximum emission.

The emission voltages at the LISN's outputs were measured using a computerized receiver, complying with CISPR 16 requirements. The specification limits are loaded to the receiver and are displayed on the receiver's spectrum display.

The E.U.T was evaluated in TX operation mode.

A frequency scan between 0.15 and 30 MHz was performed at 9 kHz I.F. band width, using peak detection.

The spectral components having the highest level on each line were measured using a quasi-peak and average detector.

4.3 Test Limit

Frequency of Emission (MHz)	Conducted Limit (dBµV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46

5-30	60	50

* *Decreases with the logarithm of the frequency.*

4.4 Test Results

JUDGEMENT: Passed by -9.37 dB

The margin between the emission levels and the specification limit is, in the worst case, -9.37 dB for the phase line at 24.018 MHz, and -9.88 dB at 24.018 MHz for the neutral line.

The EUT met the FCC Part 15, Subpart C specification requirements.

The details of the highest emissions are given in *Figure 3* to *Figure 6*.

Conducted Emission

E.U.T Description	Wireless HD Video System - Video Source Unit (VSU)
Type	AMN41012
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C
	RSS Gen, Issue 5, Clause 8.8
Lead:	Phase
Detectors:	Peak, Quasi-peak, Average
Power Operation	AC/DC Adapter

EDIT PEAK LIST (Final Measurement Results)

Trace1: CE22BQP
Trace2: CE22BAP
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	170 kHz	36.91	-28.04
2	Average	230 kHz	14.12	-38.32
1	Quasi Peak	426 kHz	26.91	-30.41
2	Average	426 kHz	20.87	-26.45
2	Average	446 kHz	23.37	-23.57
1	Quasi Peak	450 kHz	29.87	-26.99
2	Average	966 kHz	18.19	-27.80
1	Quasi Peak	1.122 MHz	22.58	-33.41
1	Quasi Peak	1.35 MHz	20.88	-35.11
2	Average	1.43 MHz	16.99	-29.00
2	Average	2.202 MHz	15.18	-30.81
1	Quasi Peak	2.97 MHz	19.33	-36.66
1	Quasi Peak	3.71 MHz	19.59	-36.40
2	Average	3.73 MHz	14.95	-31.05
1	Quasi Peak	8.294 MHz	25.54	-34.45
2	Average	8.434 MHz	19.56	-30.43
1	Quasi Peak	11.022 MHz	24.30	-35.69
2	Average	11.494 MHz	19.74	-30.25
1	Quasi Peak	24.018 MHz	40.50	-19.49
2	Average	24.018 MHz	40.62	-9.37

Date: 27.DEC.2020 09:20:32

Figure 3. Detectors: Peak, Quasi-peak, Average

Note: Delta Limit refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description	Wireless HD Video System - Video Source Unit (VSU)
Type	AMN41012
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C; RSS Gen, Issue 5, Clause 8.8
Lead:	Phase
Detectors:	Peak, Quasi-peak, Average
Power Operation	AC/DC Adapter

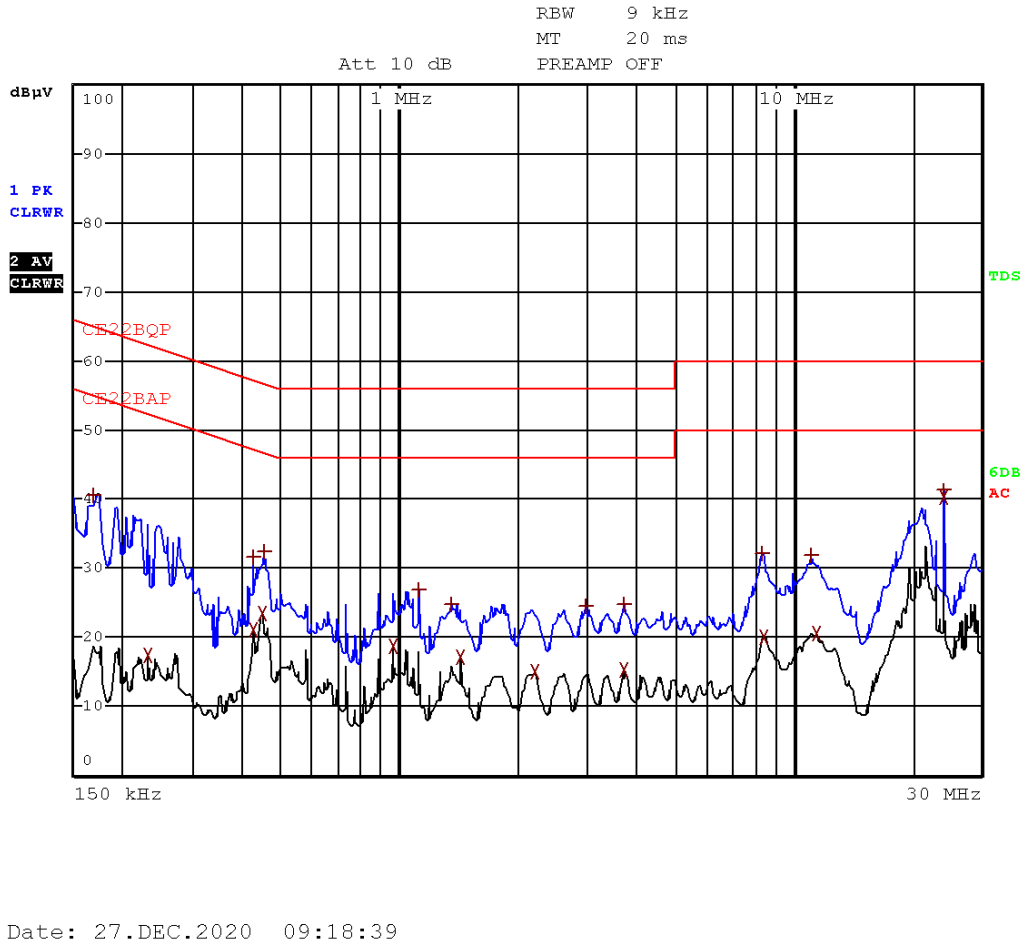


Figure 4. Detectors: Peak, Quasi-peak, Average

Conducted Emission

E.U.T Description	Wireless HD Video System - Video Source Unit (VSU)
Type	AMN41012
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C; RSS Gen, Issue 5, Clause 8.8
Lead:	Neutral
Detectors:	Peak, Quasi-peak, Average
Power Operation	AC/DC Adapter

EDIT PEAK LIST (Final Measurement Results)

Trace1: CE22BQP
Trace2: CE22BAP
Trace3: ---

	TRACE	FREQUENCY	LEVEL dBµV	DELTA LIMIT dB
1	Quasi Peak	150 kHz	37.92	-28.07
2	Average	242 kHz	16.77	-35.25
1	Quasi Peak	266 kHz	29.31	-31.92
2	Average	426 kHz	17.02	-30.31
2	Average	450 kHz	22.46	-24.41
1	Quasi Peak	462 kHz	27.84	-28.81
1	Quasi Peak	1.034 MHz	19.41	-36.58
2	Average	1.042 MHz	14.67	-31.32
1	Quasi Peak	1.41 MHz	18.82	-37.17
2	Average	1.43 MHz	13.96	-32.04
2	Average	2.626 MHz	13.90	-32.09
1	Quasi Peak	2.662 MHz	18.97	-37.02
1	Quasi Peak	4.102 MHz	19.28	-36.71
2	Average	4.174 MHz	14.56	-31.43
1	Quasi Peak	8.326 MHz	26.17	-33.82
2	Average	8.406 MHz	19.94	-30.05
2	Average	11.082 MHz	19.89	-30.10
1	Quasi Peak	11.194 MHz	25.11	-34.88
1	Quasi Peak	24.018 MHz	39.99	-20.00
2	Average	24.018 MHz	40.11	-9.88

Date: 27.DEC.2020 09:42:20

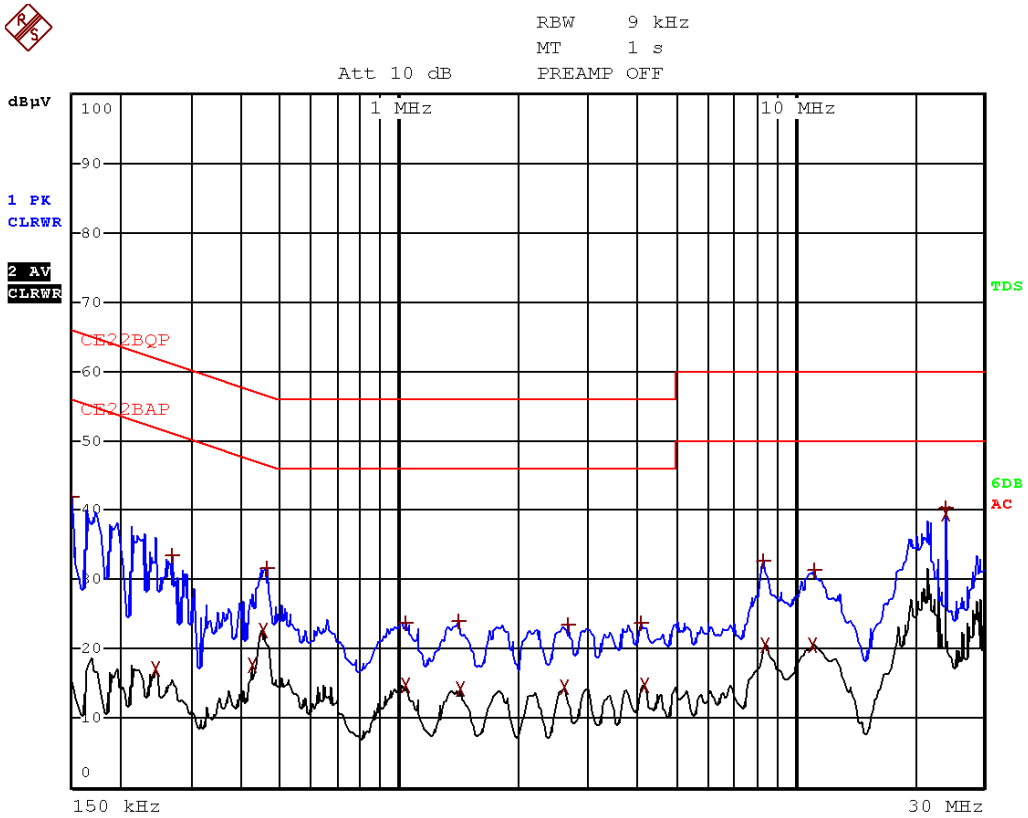
Figure 5. Detectors: Peak, Quasi-peak, Average

Note: Delta Limit refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

Conducted Emission

E.U.T Description	Wireless HD Video System - Video Source Unit (VSU)
Type	AMN41012
Serial Number:	Not designated

Specification:	FCC Part 15, Subpart C; RSS Gen, Issue 5, Clause 8.8
Lead:	Neutral
Detectors:	Peak, Quasi-peak, Average
Power Operation	AC/DC Adapter



Date: 27.DEC.2020 09:31:48

Figure 6 Detectors: Peak, Quasi-peak, Average

4.5 Test Equipment Used; Conducted Emission

Instrument	Manufacturer	Model	Serial No.	Last Calibration	Next Calibration
LISN	Fischer	FCC-LISN-25A	127	28/10/2020	28/10/2021
Transient Limiter	HP	11947A	3107A03041	28/10/2020	31/10/2021
EMI Receiver	Rohde & Schwarz	ESCI7	100724	23/02/2020	23/02/2022
Cable CE Chamber 3M + 3M	Testline 18 + RJ214	11556	-	30/03/2020	30,/03/2022

Figure 7 Test Equipment Used

5 Occupied Bandwidth

5.1 Test Specification

FCC, Part 2, Sub part J, Section 2.1049

RSS-Gen, Issue 5: 2014, Section 6.6

5.2 Test Procedure

(Temperature (22°C)/ Humidity (56%RH))
The E.U.T. operation mode and test set-up are as described in Section 2 of this report.
The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss= 31.5dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

The RBW set to the range of 1% -5% of the OBW. The span was set to 1.5-5 times of the OBW.99% occupied bandwidth function was set on.

5.3 Test Limit

N/A

5.4 Test Results

Declared EBW	Operation Frequency	Reading
[MHz]	(MHz)	(MHz)
Band U-NII 1, 5150-5250MHz		
20.0	5180MHz	18.0 MHz
20.0	5220MHz	17.9 MHz
20.0	5240MHz	17.9 MHz
Band U-NII 2A, 5250-5350MHz		
20.0	5260MHz	17.9 MHz
20.0	5300MHz	17.9 MHz
20.0	5320MHz	17.9 MHz
Band U-NII 2C, 5470-5725MHz		
20.0	5500MHz	18.0 MHz
20.0	5620MHz	17.9 MHz
20.0	5720MHz	17.9 MHz
Band U-NII 3, 5725-5850MHz		
20.0	5740MHz	18.0 MHz
20.0	5800MHz	18.0 MHz
20.0	5840MHz	18.0 MHz

Figure 8. Bandwidth Test Results

See additional information in Figure 9 to Figure 20

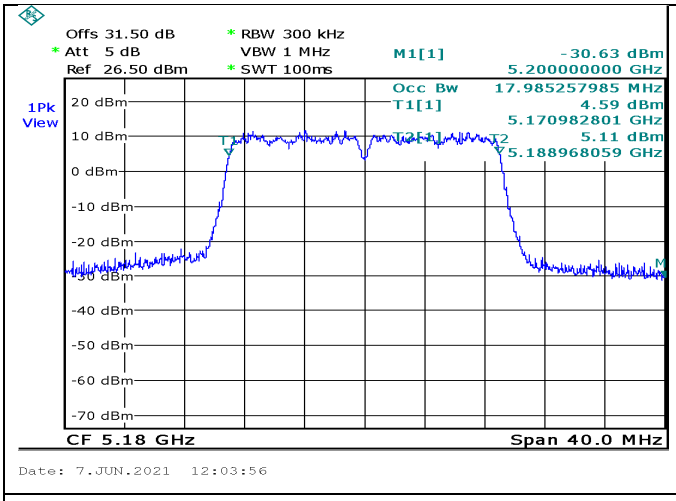


Figure 9. 5180.0MHz, 20MHz BW

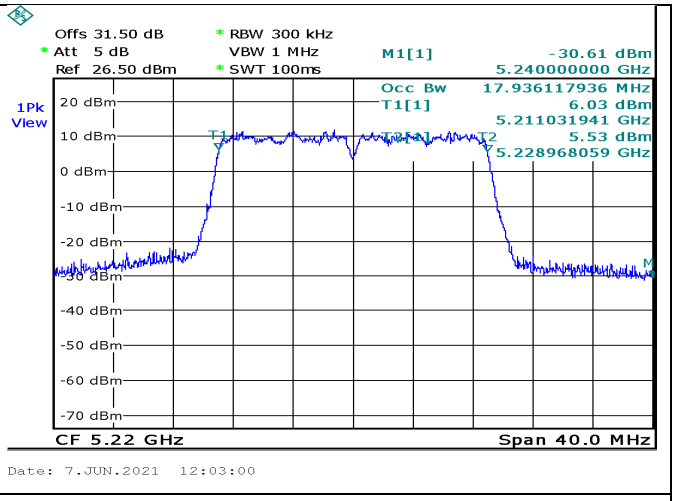


Figure 10. 5220.0MHz, 20MHz BW

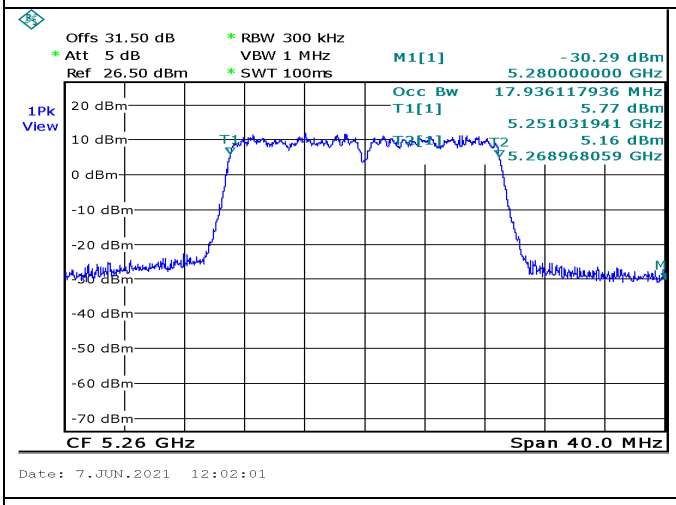


Figure 11. 5240.0MHz, 20MHz BW

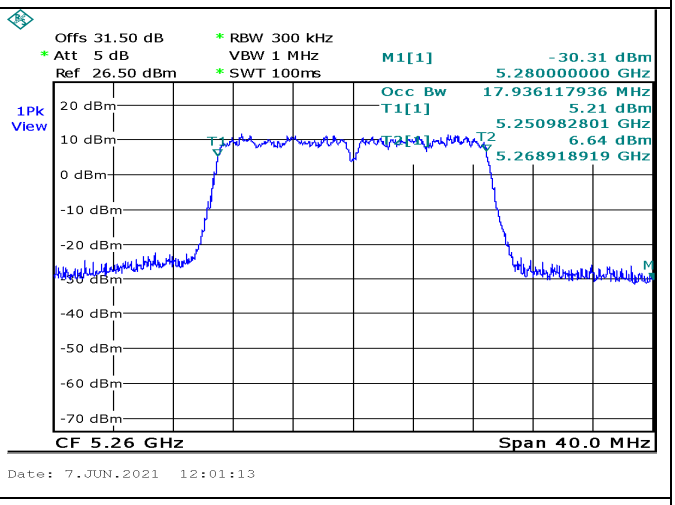


Figure 12. 5260.0MHz, 20MHz BW

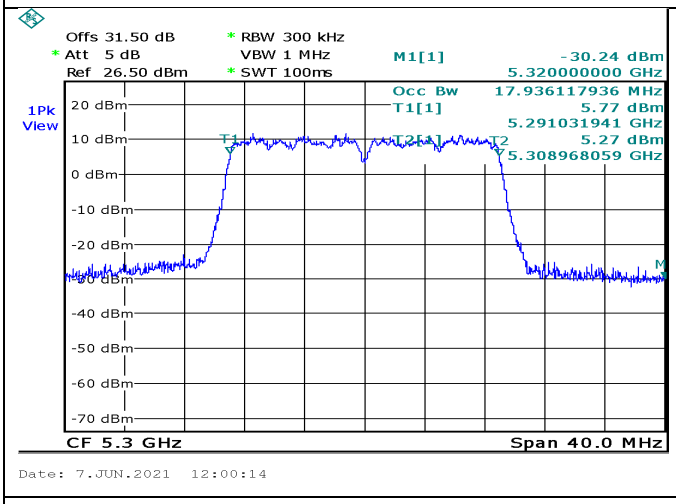


Figure 13. 5300.0MHz, 20MHz BW

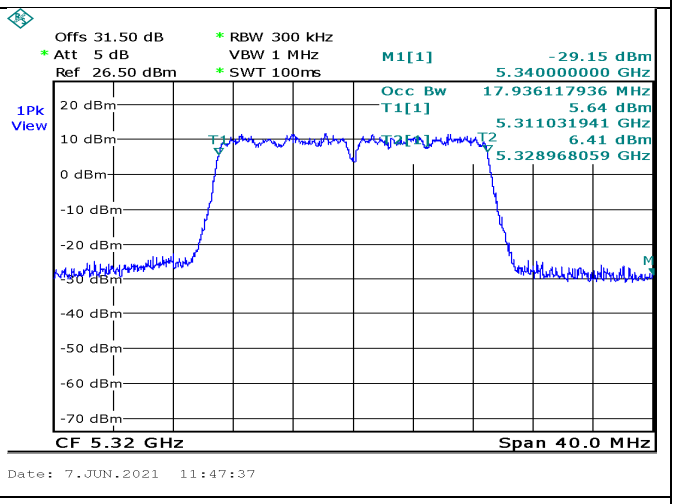


Figure 14. 5320.0MHz, 20MHz BW

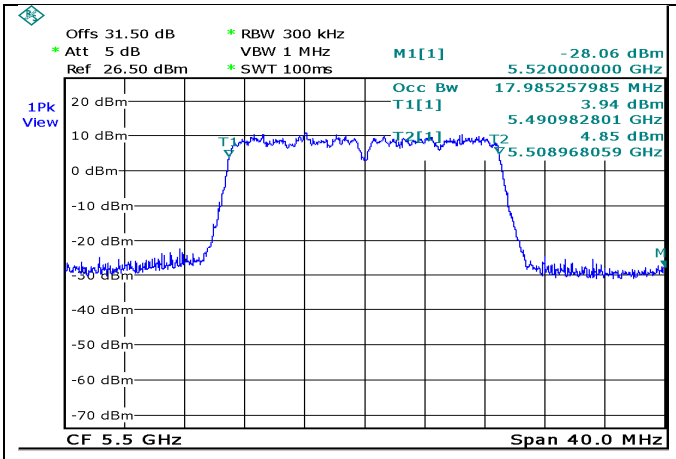


Figure 15. 5500.0MHz, 20MHz BW

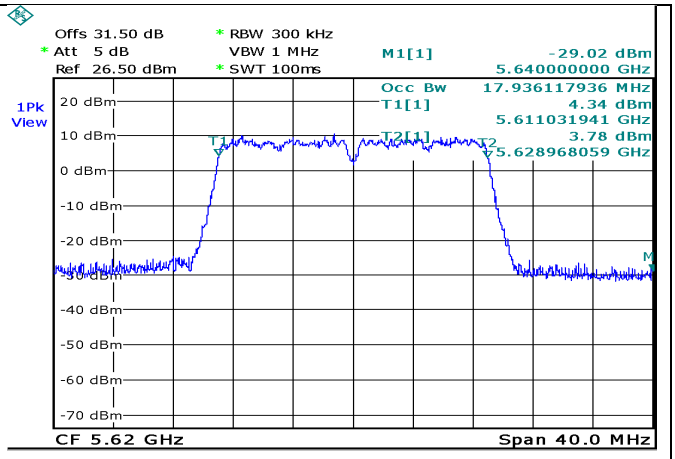


Figure 16. 5620.0MHz, 20MHz BW

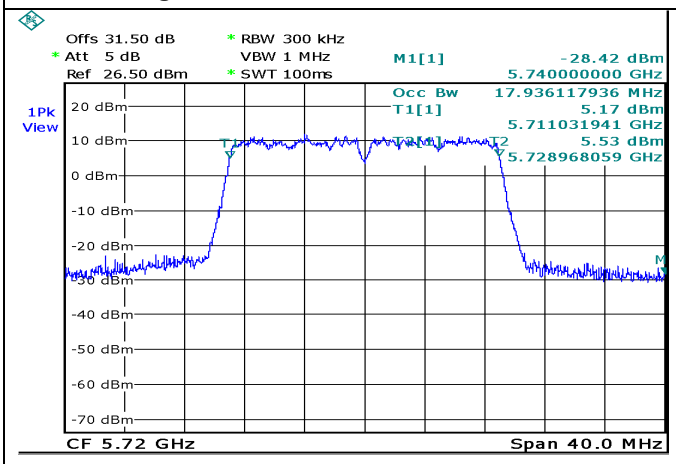


Figure 17. 5720.0MHz, 20MHz BW

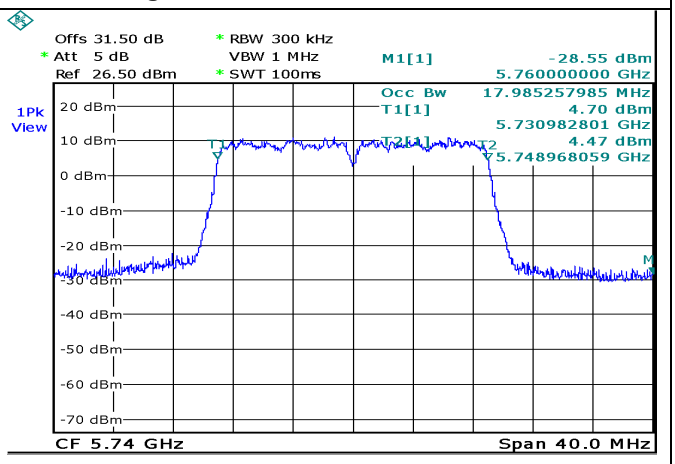


Figure 18. 5740.0MHz, 20MHz BW

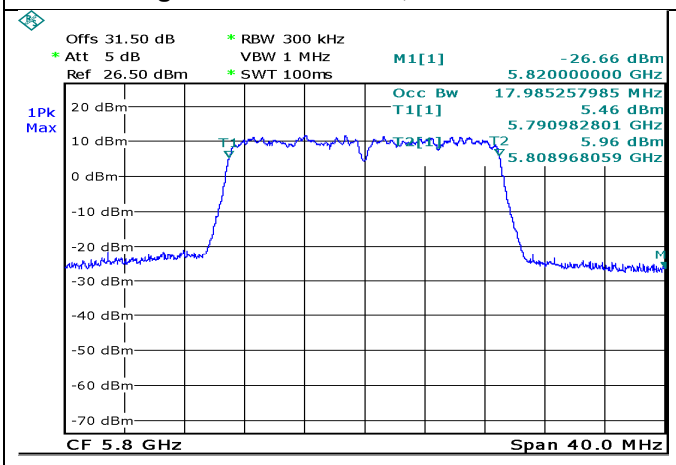


Figure 19. 5800.0MHz, 20MHz BW

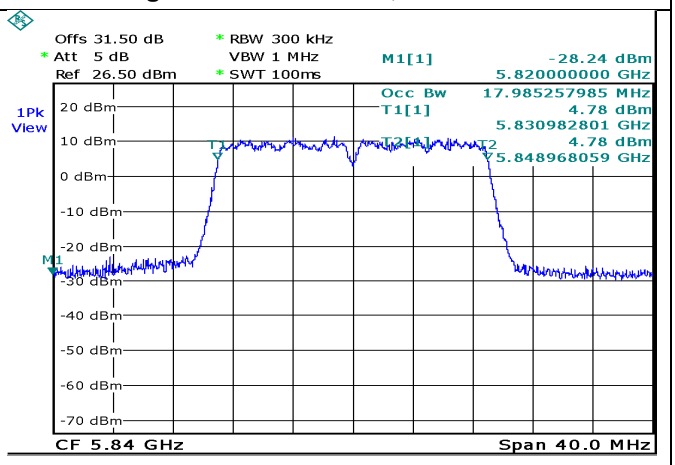


Figure 20. 5840.0MHz, 20MHz BW

5.5 Test Equipment Used; Occupied Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration	Next Calibration
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	23/02/2020	23/02/2022
Low Loss cable	Huber Shunner	Sucofelex	27504/4PEA	23/08/2020	23/08/2021
30 dB attenuator	MCL	BW-S30W5	533	23/08/2020	23/08/2021

Figure 21 Test Equipment Used

6 26dB Bandwidth

6.1 Test Specification

FCC, Part 2, Sub part J, Section 2.1049

RSS-Gen, Issue 5: 2014, Section 6.6

6.2 Test Procedure

(Temperature (22°C)/ Humidity (56%RH))
The E.U.T. operation mode and test set-up are as described in Section 2 of this report.
The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss= 31.5dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.

The RBW set to the range of 1% of the EBW.

6.3 Test Limit

N/A

6.4 Test Results

Configuration of 2 ports transmissions		
Declared EBW	**Operation Frequency**	**Reading**
[MHz]	**(MHz)**	**(MHz)**
Band U-NII 1, 5150-5250MHz		
20.0	5180MHz	19.8 MHz
20.0	5220MHz	19.8 MHz
20.0	5240MHz	19.8 MHz
Band U-NII 2A, 5250-5350MHz		
20.0	5260MHz	19.5 MHz
20.0	5300MHz	19.2 MHz
20.0	5320MHz	19.2 MHz
Band U-NII 2C, 5470-5725MHz		
20.0	5500MHz	19.2 MHz
20.0	5620MHz	18.9 MHz
20.0	5720MHz	19.1 MHz
Band U-NII 3, 5725-5850MHz		
20.0	5740MHz	19.0 MHz
20.0	5800MHz	19.1 MHz
20.0	5840MHz	19.3 MHz

Figure 22. Bandwidth Test Results, configuration of 2 ports transmissions

Configuration of 4 ports transmissions		
Declared EBW	**Operation Frequency**	**Reading**
[MHz]	**(MHz)**	**(MHz)**
Band U-NII 1, 5150-5250MHz		
20.0	5180MHz	19.6 MHz
20.0	5220MHz	19.4 MHz
20.0	5240MHz	19.1 MHz
Band U-NII 2A, 5250-5350MHz		
20.0	5260MHz	19.4 MHz
20.0	5300MHz	19.5 MHz
20.0	5320MHz	19.4 MHz
Band U-NII 2C, 5470-5725MHz		
20.0	5500MHz	19.3 MHz
20.0	5620MHz	19.3 MHz
20.0	5720MHz	19.4 MHz
Band U-NII 3, 5725-5850MHz		
20.0	5740MHz	19.2 MHz
20.0	5800MHz	19.0 MHz
20.0	5840MHz	19.3 MHz

Figure 23. Bandwidth Test Results, configuration of 4 ports transmissions

See additional information in Figure 24 to Figure 47

26dB Bandwidth, 2 ports configuration- measurement on Port2

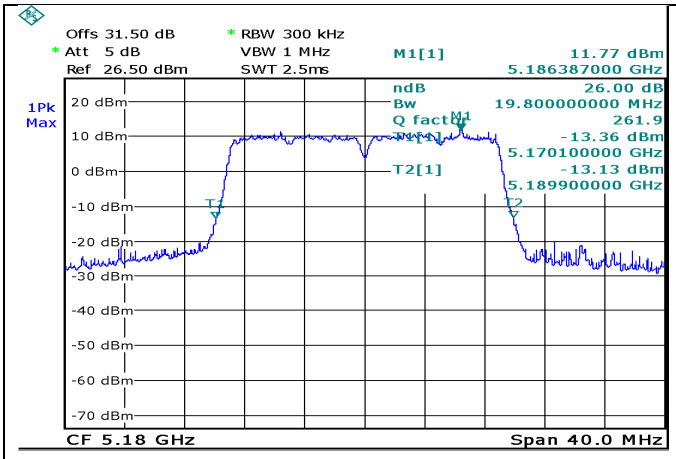


Figure 24. 5180.0MHz, 20MHz BW

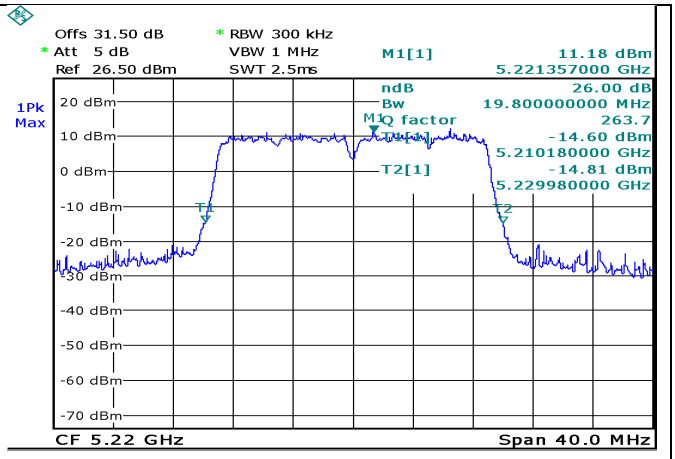


Figure 25. 5220.0MHz, 20MHz BW

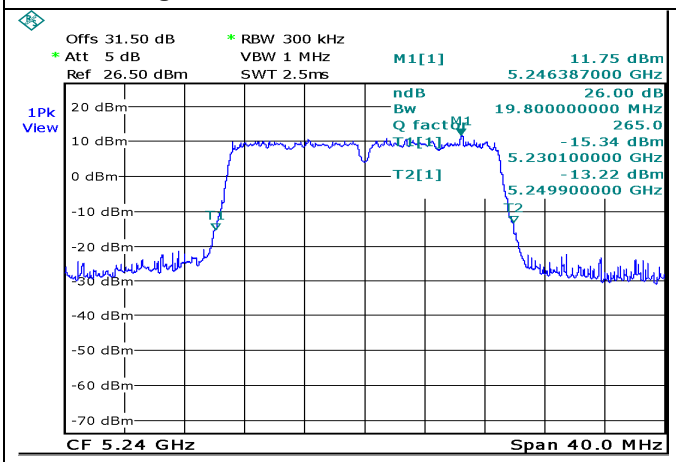


Figure 26. 5240.0MHz, 20MHz BW

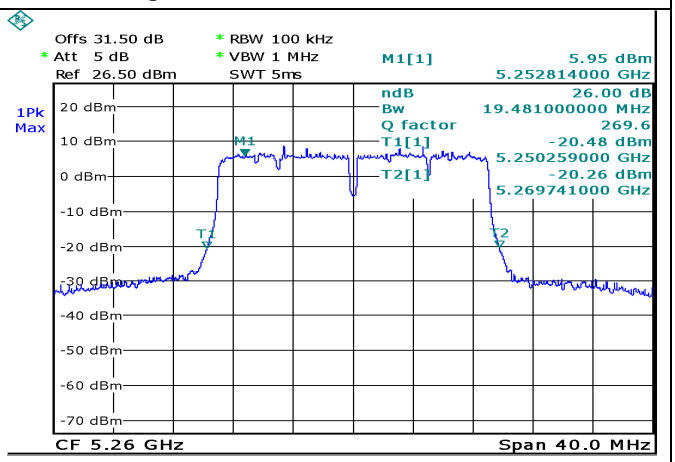


Figure 27. 5260.0MHz, 20MHz BW

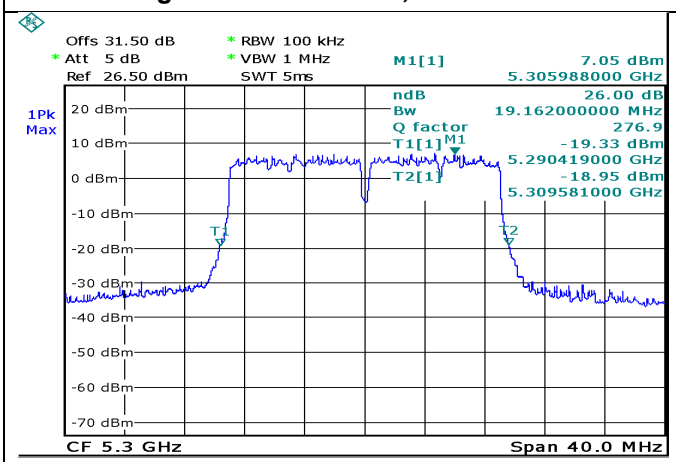


Figure 28. 5300.0MHz, 20MHz BW

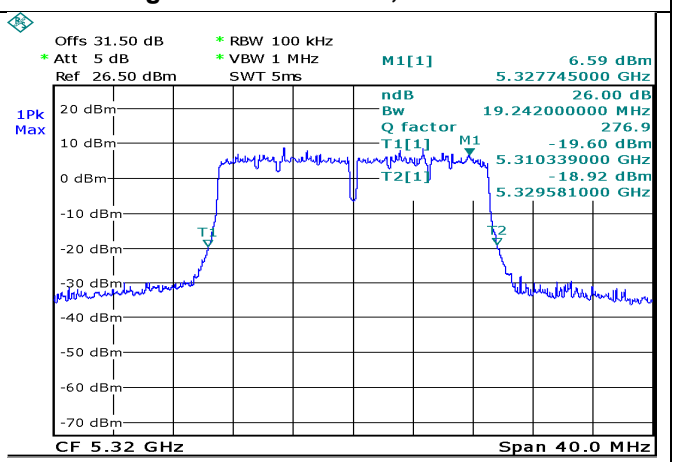


Figure 29. 5320.0MHz, 20MHz BW

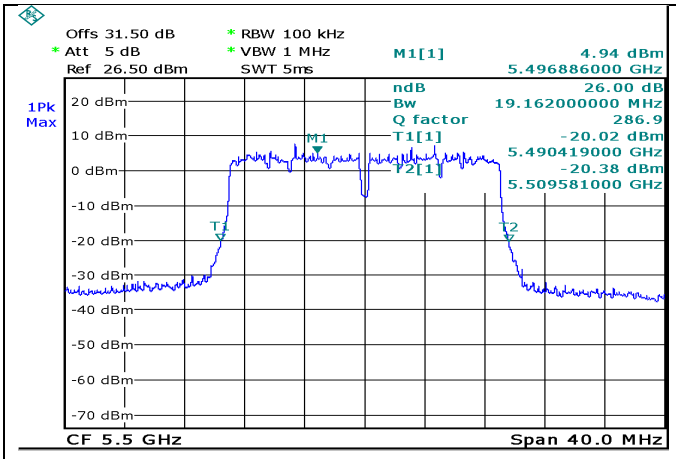


Figure 30. 5500.0MHz, 20MHz BW

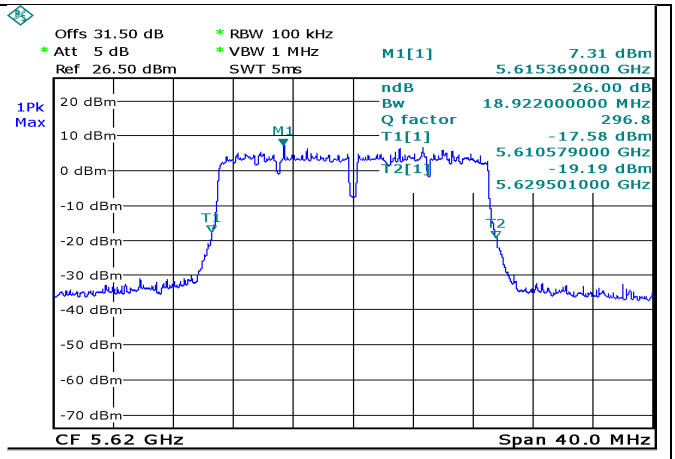


Figure 31. 5620.0MHz, 20MHz BW

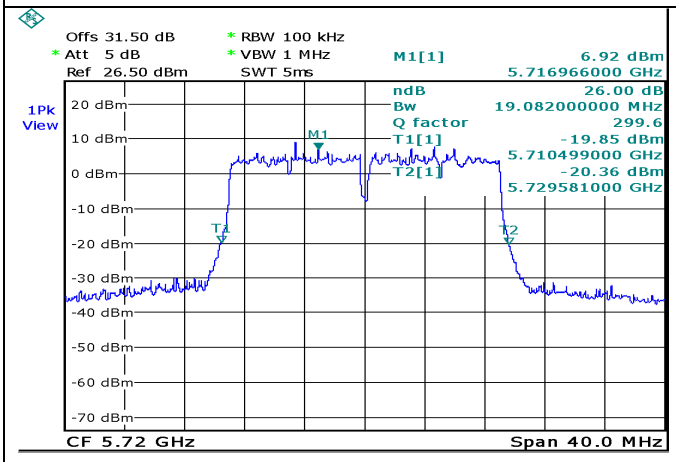


Figure 32. 5720.0MHz, 20MHz BW

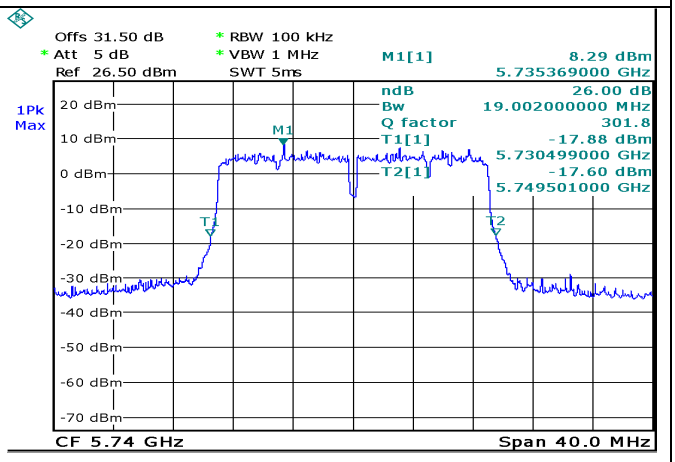


Figure 33. 5740.0MHz, 20MHz BW

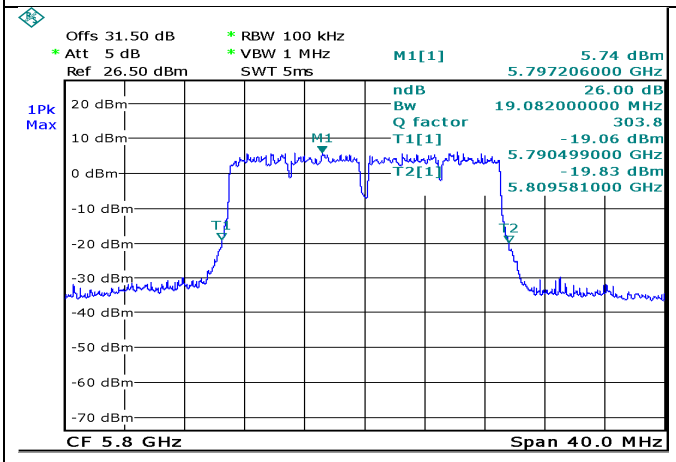


Figure 34. 5800.0MHz, 20MHz BW

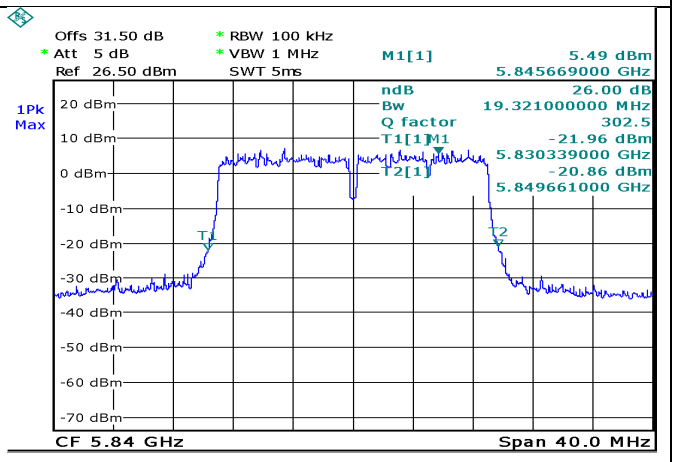


Figure 35. 5840.0MHz, 20MHz BW

26dB Bandwidth, 4 ports configuration- measurement on Port2

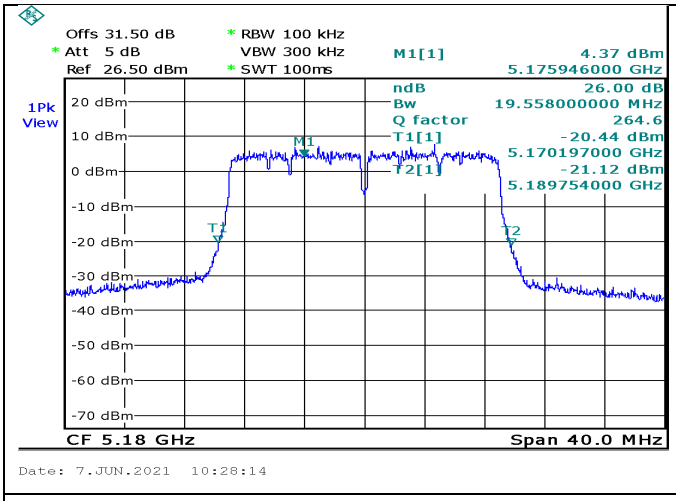


Figure 36. 5180.0MHz, 20MHz BW

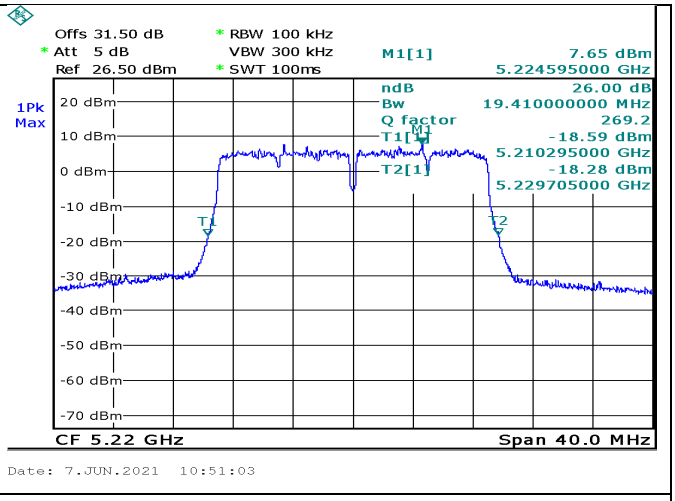


Figure 37. 5220.0MHz, 20MHz BW

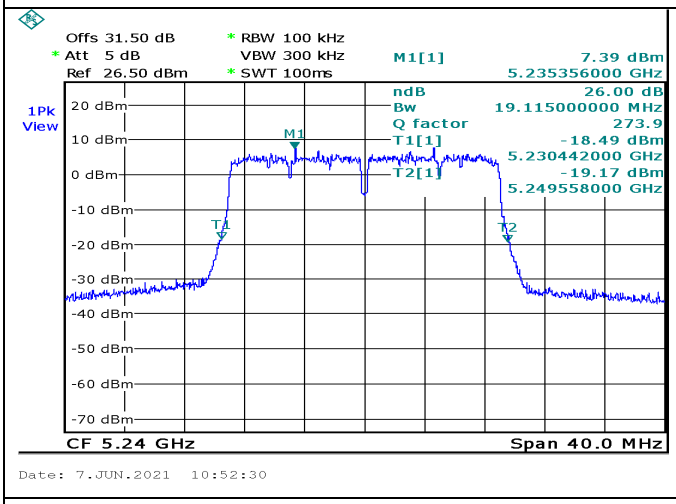


Figure 38. 5240.0MHz, 20MHz BW

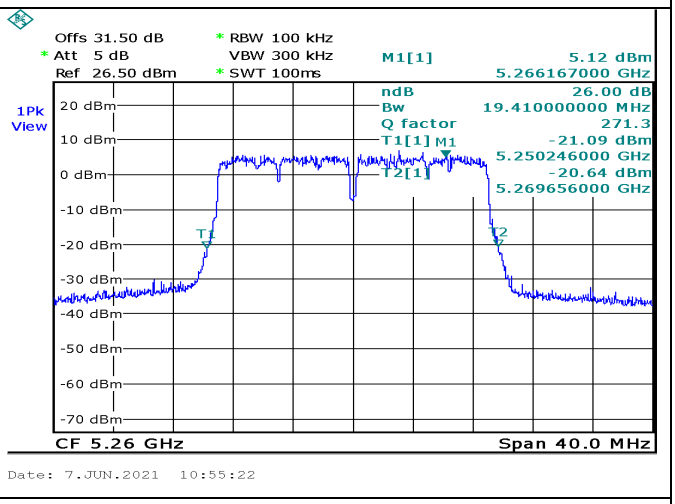


Figure 39. 5260.0MHz, 20MHz BW

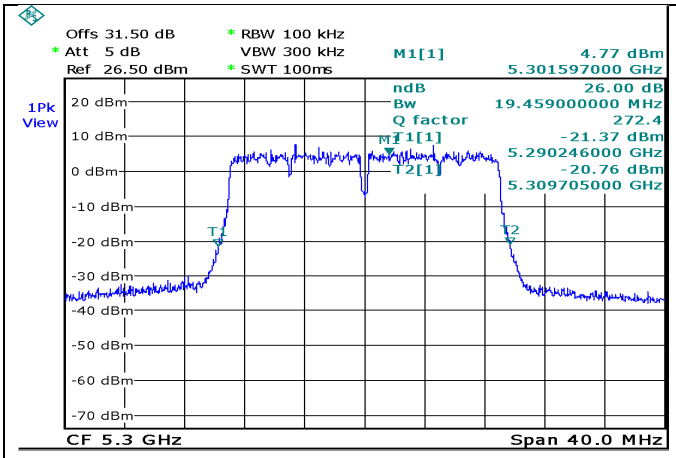


Figure 40. 5300.0MHz, 20MHz BW

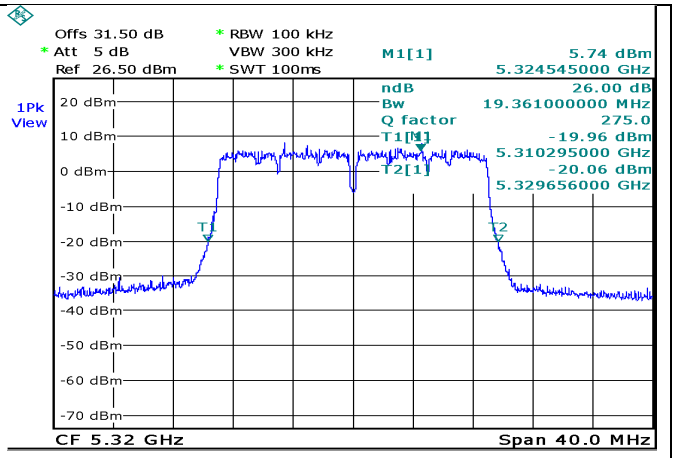


Figure 41. 5320.0MHz, 20MHz BW

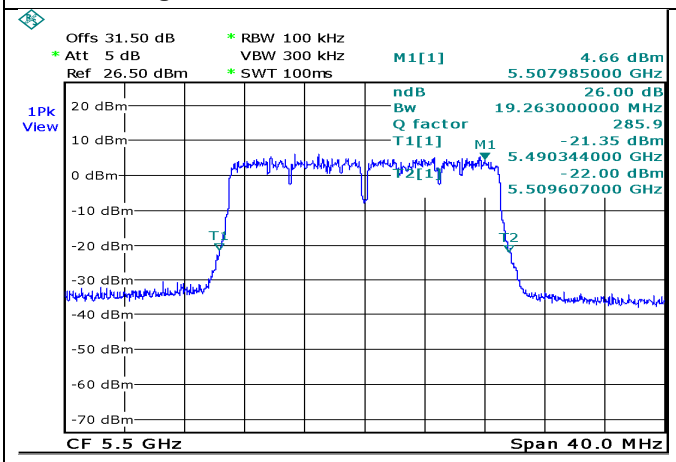


Figure 42. 5500.0MHz, 20MHz BW

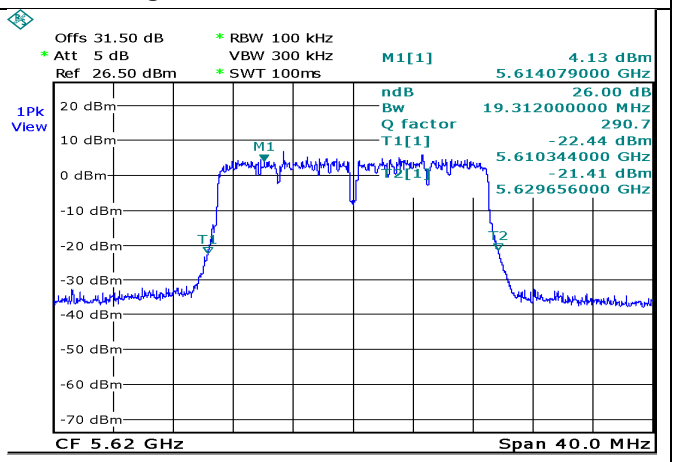


Figure 43. 5620.0MHz, 20MHz BW

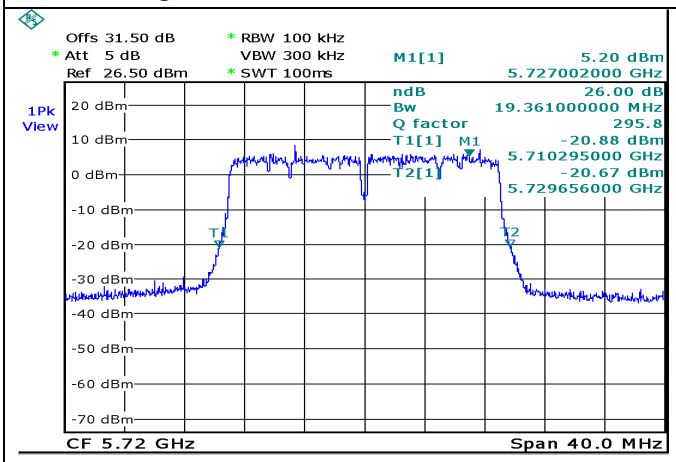


Figure 44. 5720.0MHz, 20MHz BW

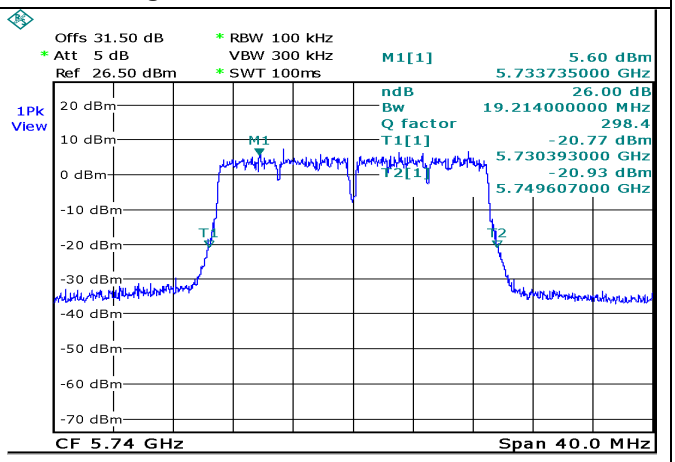


Figure 45. 5740.0MHz, 20MHz BW

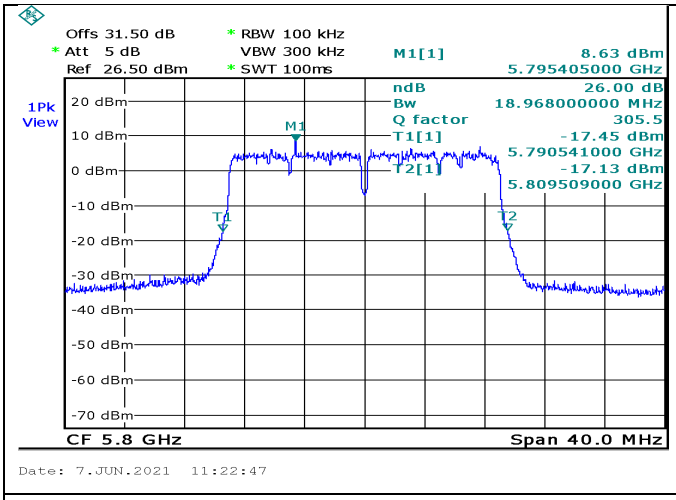


Figure 46. 5800.0MHz, 20MHz BW

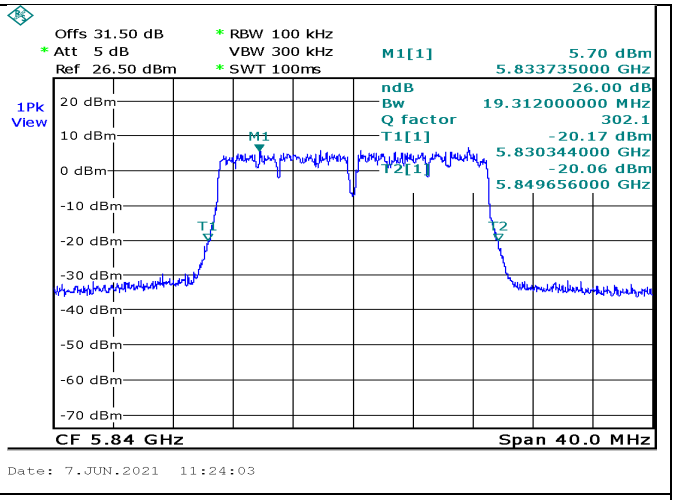


Figure 47. 5840.0MHz, 20MHz BW

6.5 Test Equipment Used; Occupied Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration	Next Calibration
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	23/02/2020	23/02/2022
Low Loss cable	Huber Shunner	Sucofelex	27504/4PEA	23/08/2020	23/08/2021
30 dB attenuator	MCL	BW-S30W5	533	23/08/2020	23/08/2021

Figure 48 Test Equipment Used

7 6 dB Minimum Bandwidth

7.1 Test Specification

FCC Part 15, Subpart E, Section 407(e)

RSS 247, Issue 2, Section 6.2.4

7.2 Test Procedure

(Temperature (22°C)/ Humidity (61%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report.
The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss=31.5 dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.
The spectrum bandwidth of the E.U.T. at the point of 6 dB below maximum peak power was measured and recorded. The RBW was set to 100 kHz.

7.3 Test Limit

For systems using digital modulation techniques that operate in the 5725-5850 MHz band. The minimum 6 dB bandwidth shall be at least 500 kHz.

7.4 Test Results

Declared EBW	Operation Frequency	Reading	Limit
[MHz]	(MHz)	(MHz)	(kHz)
Band U-NII 3, 5725-5850MHz			
Configuration of 2 ports transmissions			
20.0	5740MHz	18.0 MHz	>500.0
20.0	5800MHz	18.0 MHz	>500.0
20.0	5840MHz	17.9 MHz	>500.0
Configuration of 4 ports transmissions			
20.0	5740MHz	17.7 MHz	>500.0
20.0	5800MHz	17.5 MHz	>500.0
20.0	5840MHz	17.9 MHz	>500.0

Figure 49 6 dB Minimum Bandwidth

JUDGEMENT: Passed

For additional information see Figure 50 to Figure 55

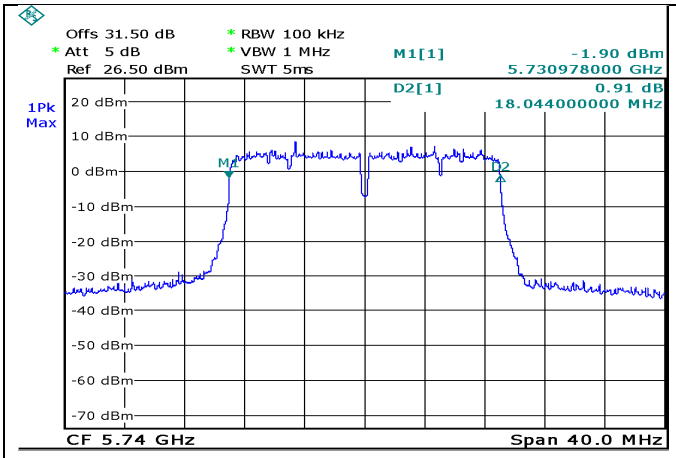


Figure 50. 5740.0MHz, 20MHz BW (2 ports Config)

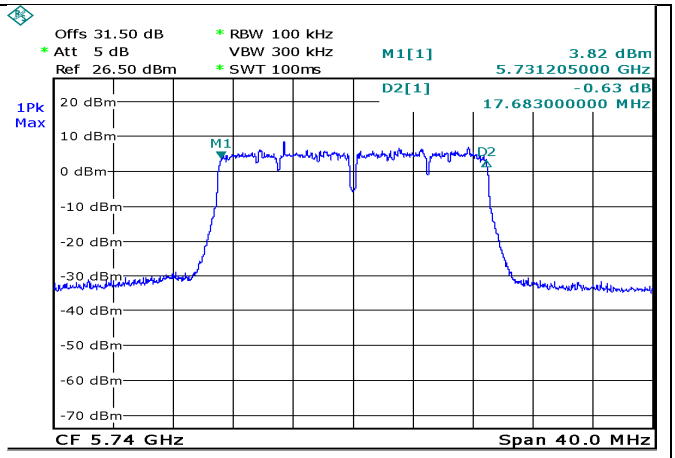


Figure 51. 5740.0MHz, 20MHz BW (4 ports Config)

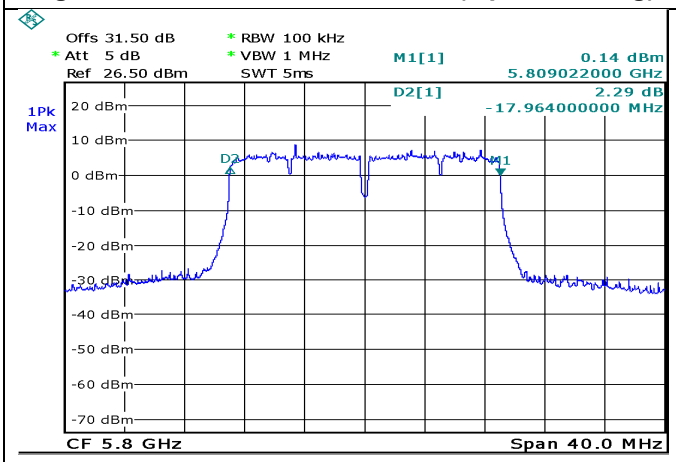


Figure 52. 5800.0MHz, 20MHz BW (2 ports Config)

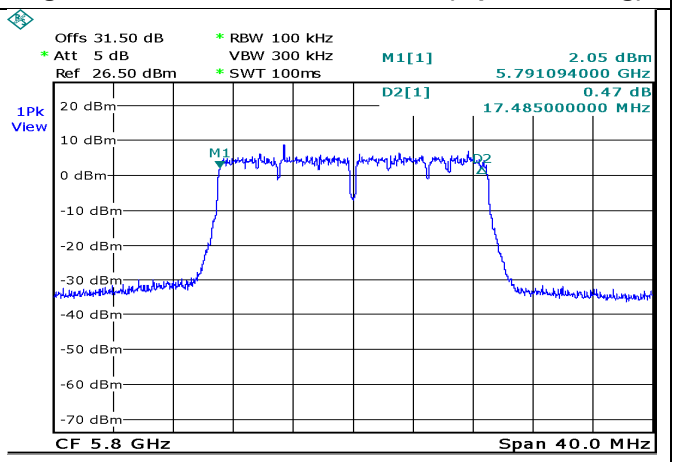


Figure 53. 5800.0MHz, 20MHz BW (4 ports Config)

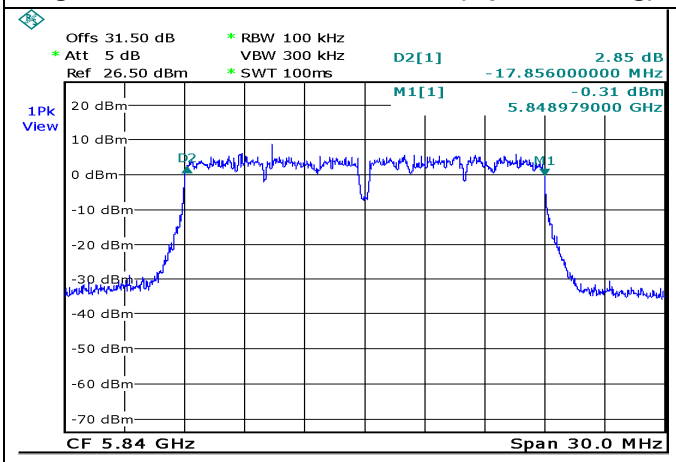


Figure 54. 5840.0MHz, 20MHz BW (2 ports Config)

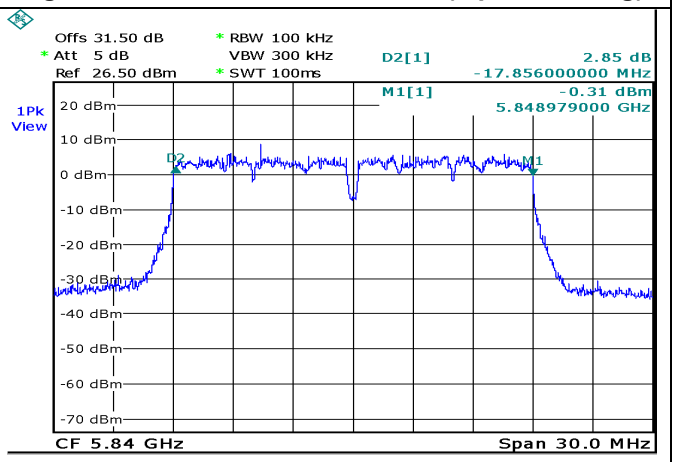


Figure 55. 5840.0MHz, 20MHz BW (4 ports Config)

7.5 Test Equipment Used; 6dB Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration	Next Calibration
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	23/02/2020	23/02/2022
Low Loss cable	Huber Shunner	Sucofelex	27504/4PEA	23/08/2020	23/08/2021
30 dB attenuator	MCL	BW-S30W5	533	23/08/2020	23/08/2021

Figure 56 Test Equipment Used

8 Maximum Conducted Output Power

8.1 Test Specification

FCC, Part 15, Subpart E, Section 407

RSS 247, Issue 2, Section 6.2

8.2 Test Procedure

(Temperature (22°C)/ Humidity (57%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report.
The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss=31.5 dB). Special attention was taken to prevent Spectrum Analyzer RF input overload.
Spectrum setting done according KDB 789033 d02 v01, method SA-1 instructions (section 2.b).

8.3 FCC Test Limits

Operational Band U-NII 1:
15.407(a)(1)(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W provided the maximum antenna gain does not exceed 6 dBi
Operational Band U-NII 2A, 2C:
15.407(a) (2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz
Operational Band U-NII 3:
15.407(a) (3) (i) For the band 5.725-5.850 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. the maximum conducted power spectral density shall not exceed 30 dBm in any 500-kHz band
For all U-NII Bands:
If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

8.4 ISED Test Limit

Operational Band U-NII 1:

For other devices, the maximum E.I.R.P. shall not exceed 200 mW or 10 + 10 log10B, dBm, whichever power is less. B is the 99% emission bandwidth in megahertz.

Operational Band U-NII 2A:

- The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less. assuming antenna gain does not exceed 6dBi.
- Devices, other than outdoor fixed devices, having an E.I.R.P. greater than 200 mW shall comply with E.I.R.P. elevation mask or implement a method to permanently reduce their E.I.R.P. via a firmware feature in case the Department requires it.

Operational Band U-NII 2C:

The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less, assuming antenna gain does not exceed 6dBi.

Operational Band U-NII 3:

The maximum conducted output power shall not exceed 1W. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the output power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi

8.5 Test Results

Band U-NII 1, 5150MHz-5250MHz								
BW	Operation Frequency	Port 1 Reading	Port 2 Reading	Total Power*	Antenna Gain	EIRP	Limit	Margin
(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
20.0	5180.0	17.3	16.1	19.8	2.0	21.8	22.5	-0.7
	5220.0	16.5	16.4	19.5	2.0	21.5	22.5	-1.0
	5240.0	17.0	16.0	19.5	2.0	21.5	22.5	-1.0

**Note 1: total power (dBm)= 10 log [port1(W)+port2(W)]*
**Note 2: Limit determinates by ISED requirements and calculated by following: 10+10log (17.88MHz) =22.5dBm*

Figure 57 Test Results 2TX mode, U-NII 1

Band U-NII 2A, 5250MHz-5350MHz								
BW	Operation Frequency	Port 1 Reading	Port 2 Reading	Total Power*	Antenna Gain	EIRP	Limit	Margin
(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
20.0	5260.0	16.5	16.9	19.7	2.0	21.7	23.0	-1.3
	5300.0	17.2	18.0	20.6	2.0	22.6	23.0	-0.4
	5320.0	16.8	17.5	20.2	2.0	22.2	23.0	-0.8

**Note 1: total power (dBm)= 10 log [port1(W)+port2(W)]*
**Note 2: Limit determinates by ISED requirements to meet elevation angles examinations*

Figure 58 Test Results 2TX mode, U-NII 2A

Band U-NII 2C, 5470MHz-5725MHz							
BW	Operation Frequency	Port 1 Reading	Port 2 Reading	Total Power*	Antenna Gain	Limit	Margin
(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(dBm)	(dB)
20.0	5500.0	17.1	18.0	20.6	2.0	23.5	-2.9
	5580.0	17.2	17.6	20.4	2.0	23.5	-3.1
	5620.0	16.6	17.7	20.2	2.0	23.5	-3.3
	5720.0	17.4	17.9	20.7	2.0	23.5	-2.8

**Note 1: total power (dBm)= 10 log [port1(W)+port2(W)]*
**Note 2: Limit determinates by ISED requirements and calculated by following: 11+10log (17.88MHz) =23.5dBm. Since A.G<6dBi, the limits relates to conducted power measurements with no relation to EIRP.*

Figure 59 Test Results 2TX mode, U-NII 2C

Band U-NII 3, 5725MHz-5850MHz								
BW	Operation Frequency	Port 1 Reading	Port 2 Reading	Total Power*	Limit Conducted	Margin	Antenna Gain	EIRP
(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)
20.0	5740.0	18.3	20.5	22.5	30.0	-7.5	2.0	24.5
	5800.0	19.1	20.6	22.9	30.0	-7.1	2.0	24.9
	5840.0	19.9	20.4	23.2	30.0	-6.8	2.0	25.2

**Note 1: total power (dBm)= 10 log [port1(W)+port2(W)]*
**Note2: Since A.G<6dBi, the limits relates to conducted power measurements with no relation to EIRP.*

Figure 60 Test Results 2TX mode, U-NII 3

Band U-NII 1, 5150MHz-5250MHz										
BW	Operation Frequency	Port 1 Reading	Port 2 Reading	Port 3 Reading	Port 4 Reading	Total Power*	Antenna Gain	EIRP	Limit	Margin
(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
20.0	5180.0	14.0	12.8	12.5	12.3	19.0	2.0	21.0	22.5	-1.5
	5220.0	12.8	13.8	14.0	11.4	19.1	2.0	21.1	22.5	-1.4
	5240.0	13.8	13.7	12.1	14.1	19.5	2.0	21.5	22.5	-1.0

**Note 1: total power (dBm)= 10 log [port1(W)+port2(W)+ port3(W)+port4(W)]*
**Note 2: Limit determinates by ISED requirements and calculated by following: 10+10log (17.88MHz) =22.5dBm*

Figure 61 Test Results 4TX mode, U-NII 1

Band U-NII 2A, 5250MHz-5350MHz										
BW	Operation Frequency	Port 1 Reading	Port 2 Reading	Port 3 Reading	Port 4 Reading	Total Power*	Antenna Gain	EIRP	Limit	Margin
(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
20.0	5260.0	15.55	14.44	14.07	12.51	20.3	2.0	22.3	23.0	-0.7
	5300.0	15.36	15.32	14.14	13.32	20.6	2.0	22.6	23.0	-0.4
	5320.0	15.37	14.79	14.07	11.67	20.2	2.0	22.2	23.0	-0.8

**Note 1: total power (dBm)= 10 log [port1(W)+port2(W)+ port3(W)+port4(W)]*
**Note 2: Limit determinates by ISED requirements to meet elevation angles examinations*

Figure 62 Test Results 4TX mode, U-NII 2A

Band U-NII 2C, 5470MHz-5725MHz								
BW	Operation Frequency	Port 1 Reading	Port 2 Reading	Port 3 Reading	Port 4 Reading	Total Power*	Limit	Margin
(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
20.0	5500.0	16.01	14.82	13.84	11.94	20.4	23.6	-3.2
	5580.0	14.63	15.08	12.94	13.01	20.0	23.6	-3.6
	5620.0	13.55	14.64	12.9	11.76	19.4	23.6	-4.2
	5720.0	12.87	15.79	12.48	12.48	19.7	23.6	-3.9

**Note 1: total power (dBm)= 10 log [port1(W)+port2(W)+ port3(W)+port4(W)]*
**Note 2: Limit determinates by ISED requirements and calculated by following: 11+10log (17.88MHz) =23.6dBm. Since A.G<6dBi, the limits relates to conducted power measurements with no relation to EIRP.*

Figure 63 Test Results 4TX mode, U-NII 2C

Band U-NII 3, 5725MHz-5850MHz								
BW	Operation Frequency	Port 1 Reading	Port 2 Reading	Port 3 Reading	Port 4 Reading	Total Power*	Limit	Margin
(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dBm)	(dB)
20.0	5740.0	17.9	15.4	17.5	16.2	22.9	30.0	-7.1
	5800.0	18.1	15.4	16.8	16.4	22.8	30.0	-7.2
	5840.0	18.7	15.3	16.9	15.8	22.9	30.0	-7.1

**Note: total power (dBm)= 10 log [port1(W)+port2(W)+ port3(W)+port4(W)]*
**Note2: Since A.G<6dBi, the limits relates to conducted power measurements with no relation to EIRP.*

Figure 64 Test Results 4TX mode, U-NII 3

JUDGMENT: FCC - Passed by -0.4 dB

JUDGMENT: ISED - Passed by -0.4 dB

For additional information see Figure 65 to Figure 140

2TX mode:

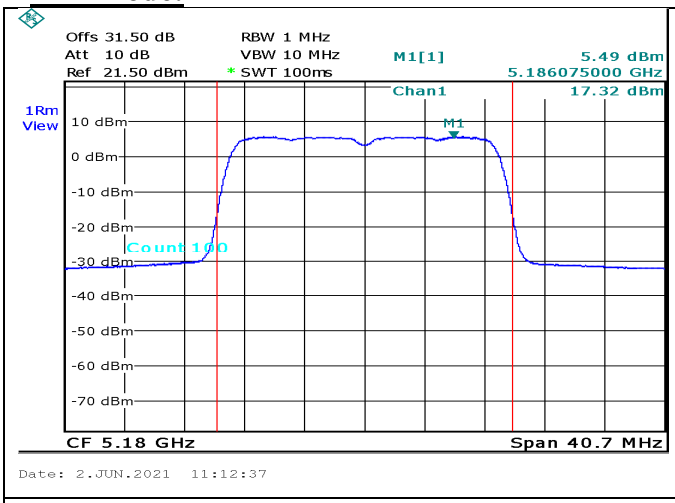


Figure 65. 5180.0MHz, 20MHz BW, port 1

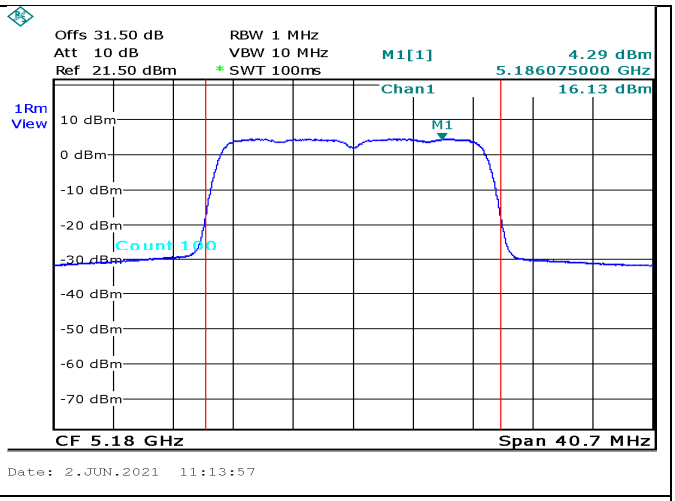


Figure 66. 5180.0MHz, 20MHz BW, port 2

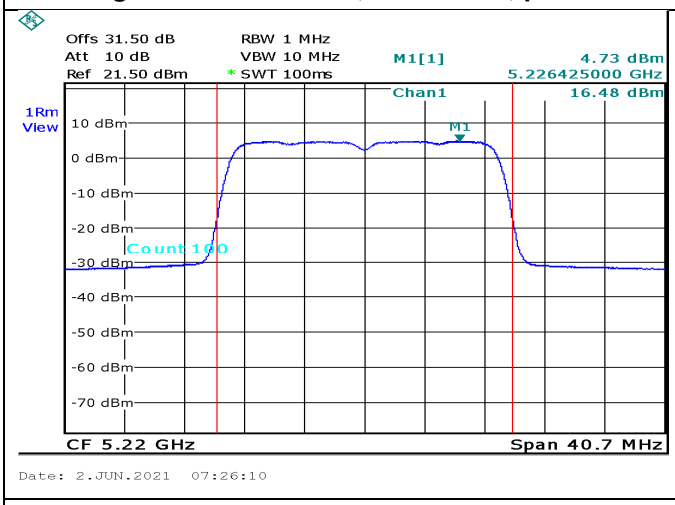


Figure 67. 5220.0MHz, 20MHz BW, port 1

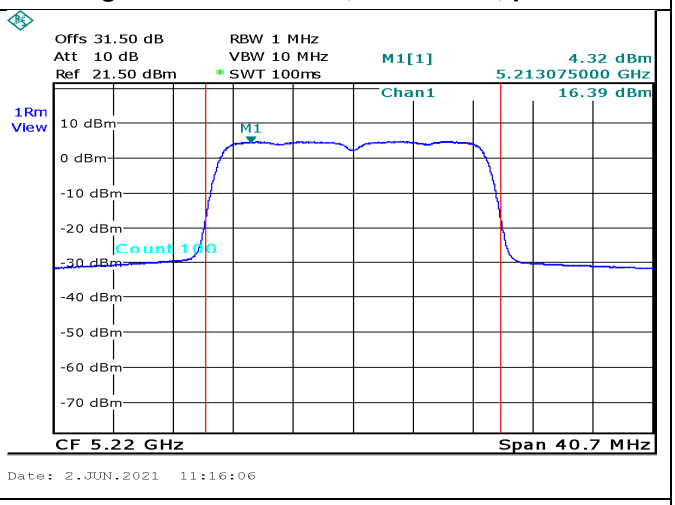


Figure 68. 5220.0MHz, 20MHz BW, port 2

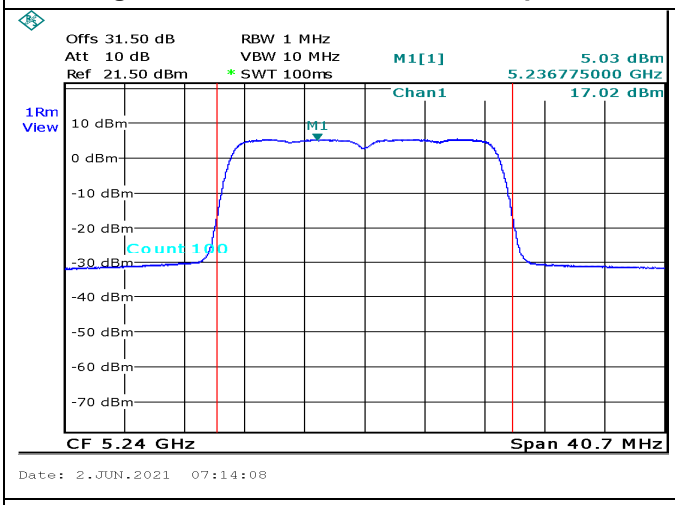


Figure 69. 5240.0MHz, 20MHz BW, port 1

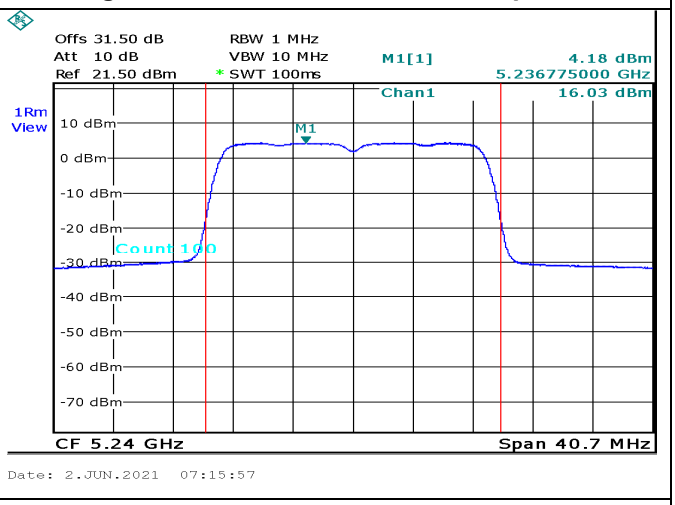


Figure 70. 5240.0MHz, 20MHz BW, port 2

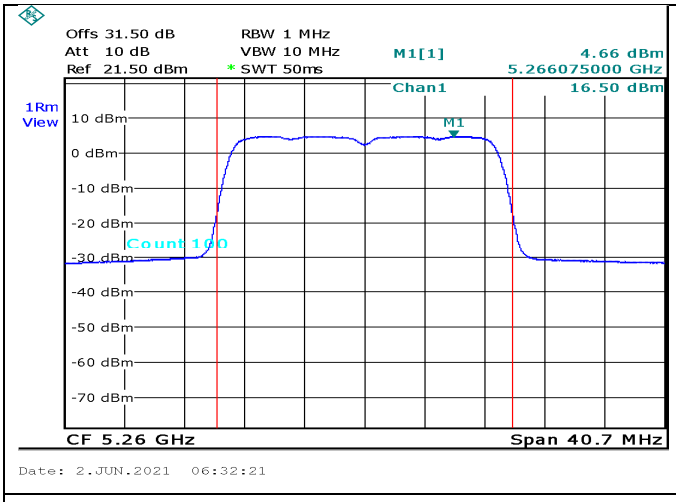


Figure 71. 5260.0MHz, 20MHz BW, port 1

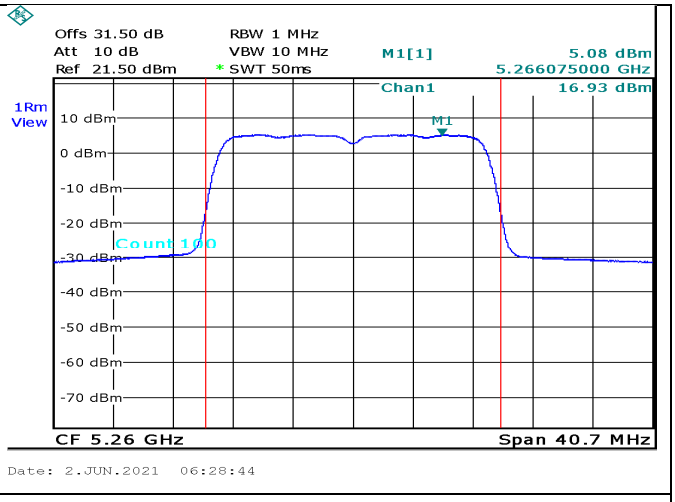


Figure 72. 5260.0MHz, 20MHz BW, port 2

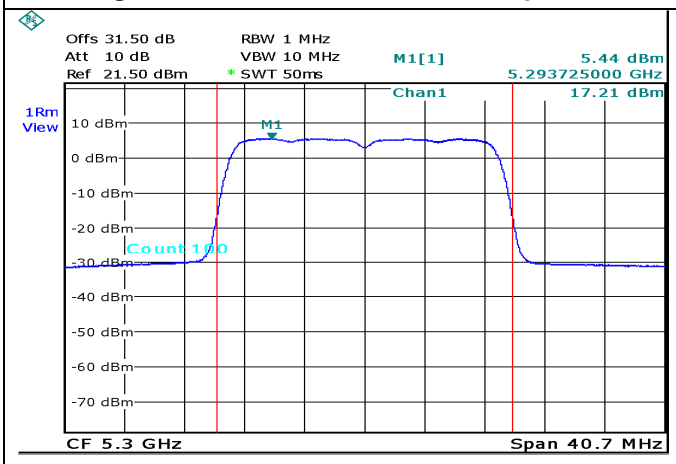


Figure 73. 5300.0MHz, 20MHz BW, port 1

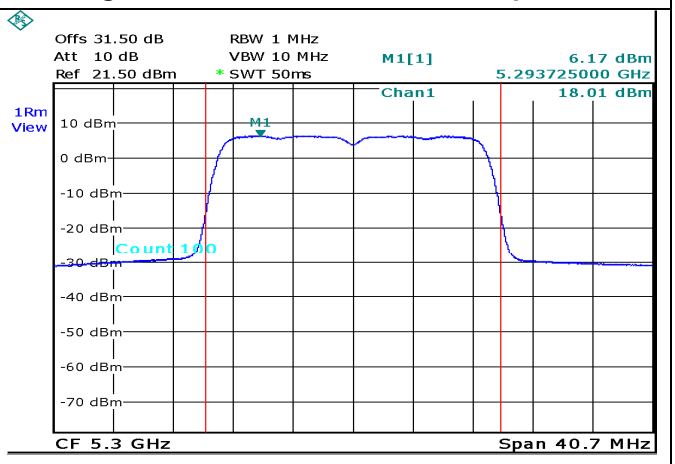


Figure 74. 5300.0MHz, 20MHz BW, port 2

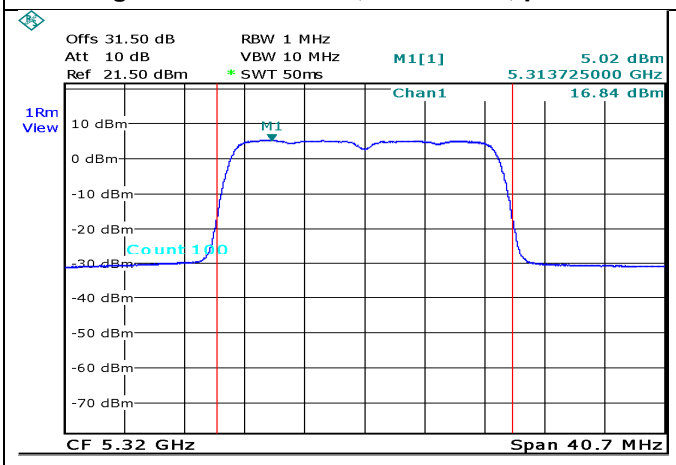


Figure 75. 5320.0MHz, 20MHz BW, port 1

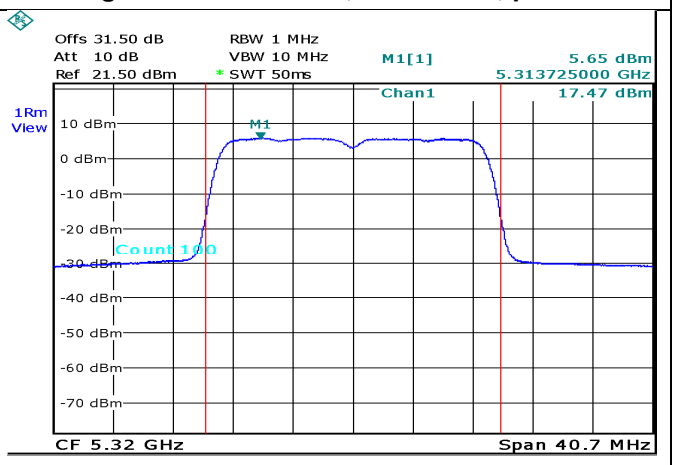


Figure 76. 5320.0MHz, 20MHz BW, port 2

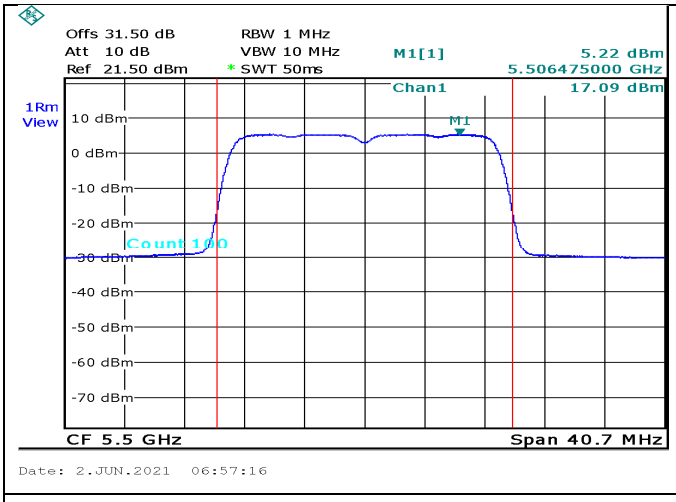


Figure 77. 5500.0MHz, 20MHz BW, port 1

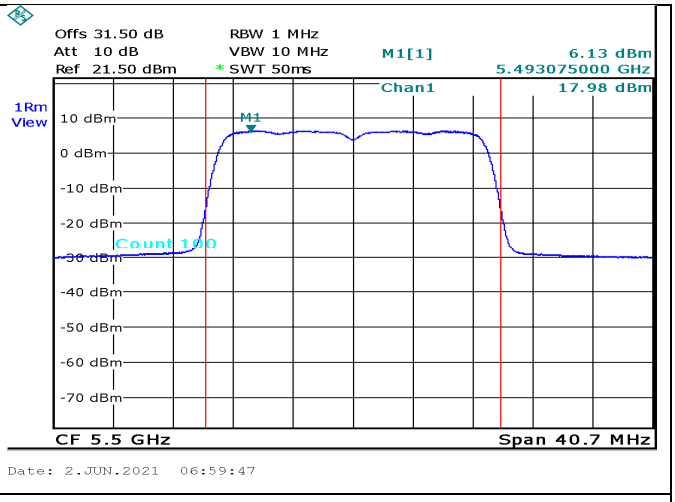


Figure 78. 5500.0MHz, 20MHz BW, port 2

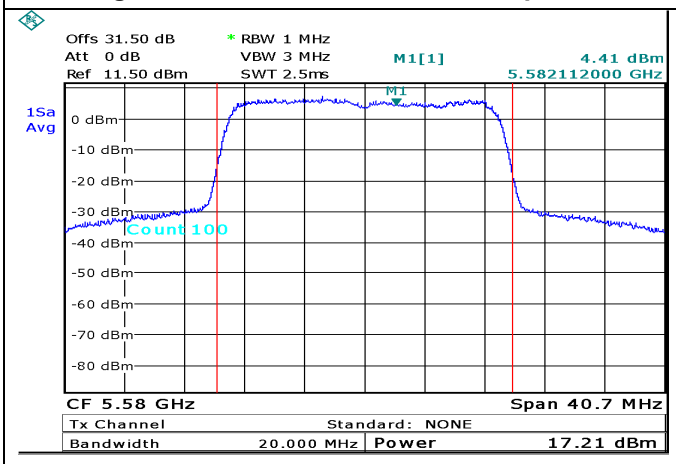


Figure 79. 5580.0MHz, 20MHz BW, port 1

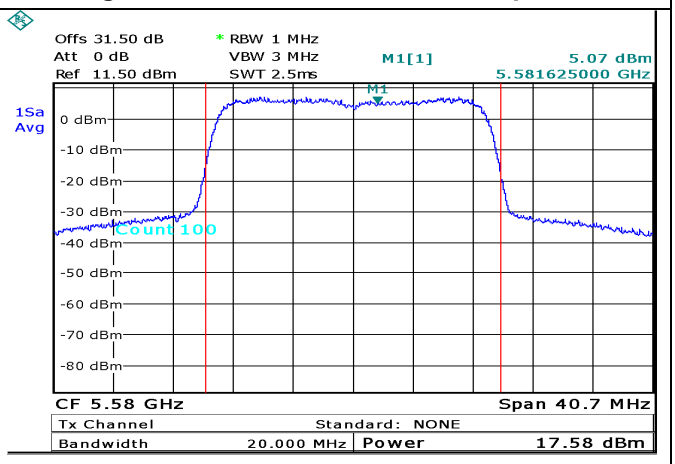


Figure 80. 5580.0MHz, 20MHz BW, port 2

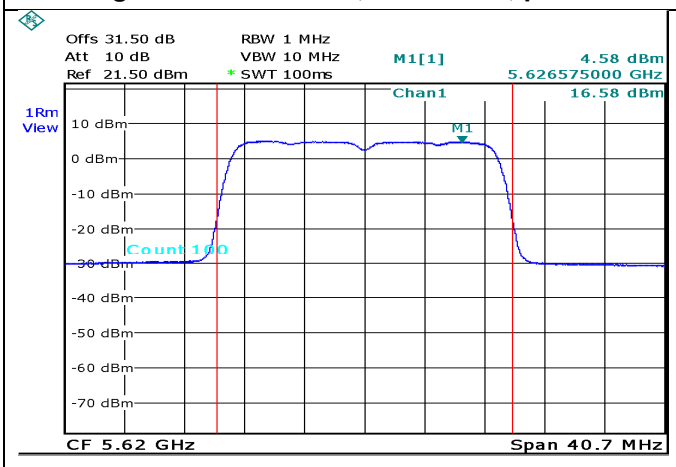


Figure 81. 5620.0MHz, 20MHz BW, port 1

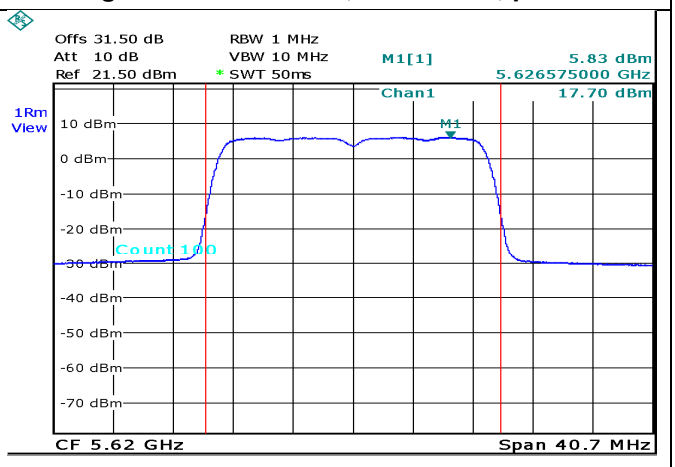


Figure 82. 5620.0MHz, 20MHz BW, port 2

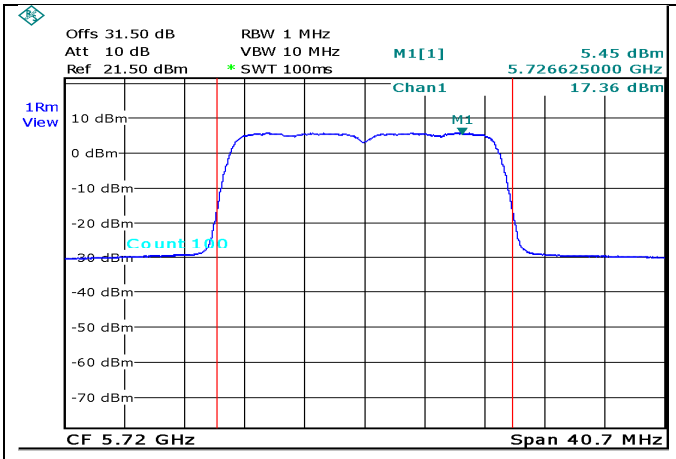


Figure 83. 5720.0MHz, 20MHz BW, port 1

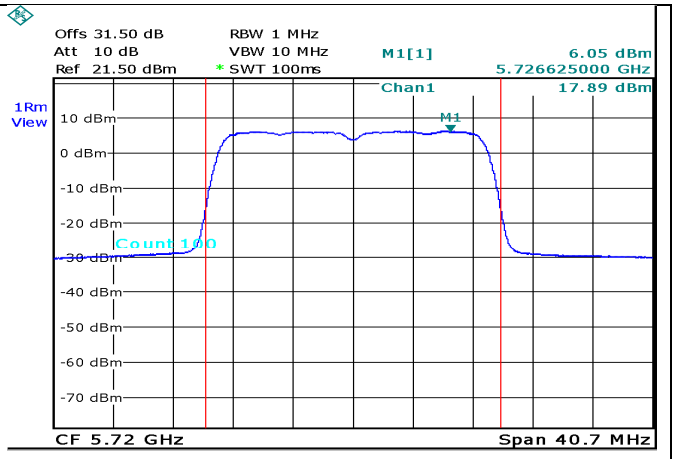


Figure 84. 5720.0MHz, 20MHz BW, port 2

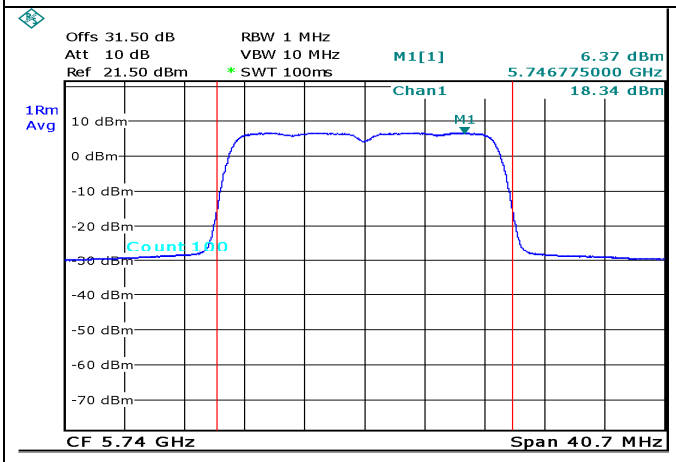


Figure 85. 5740.0MHz, 20MHz BW, port 1

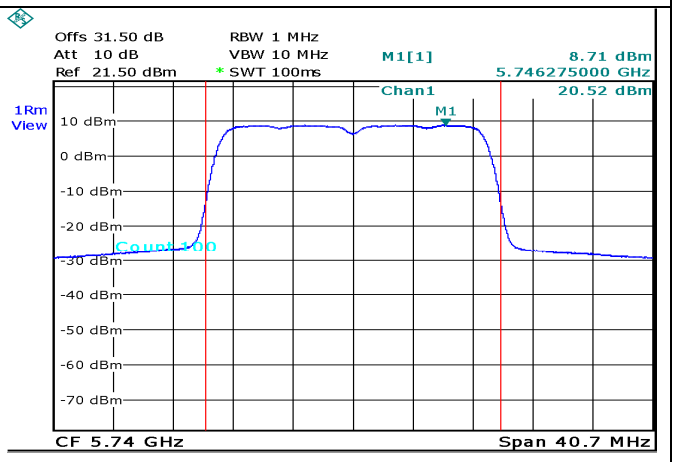


Figure 86. 5740.0MHz, 20MHz BW, port 2

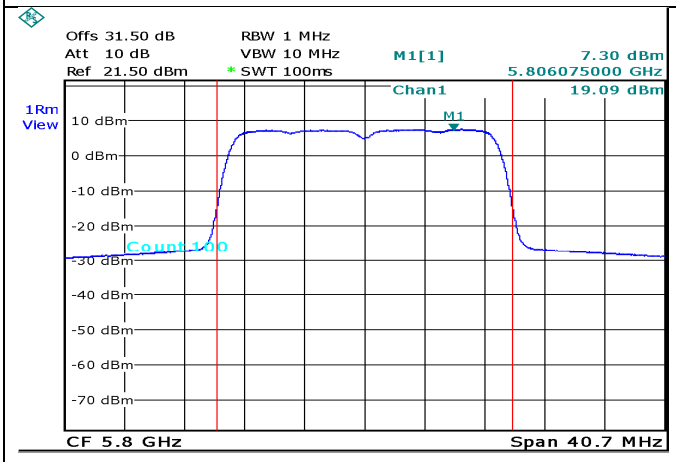


Figure 87. 5800.0MHz, 20MHz BW, port 1

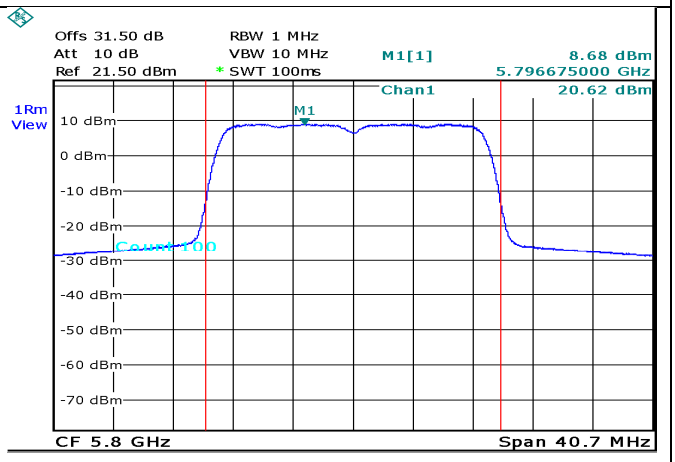


Figure 88. 5800.0MHz, 20MHz BW, port 2

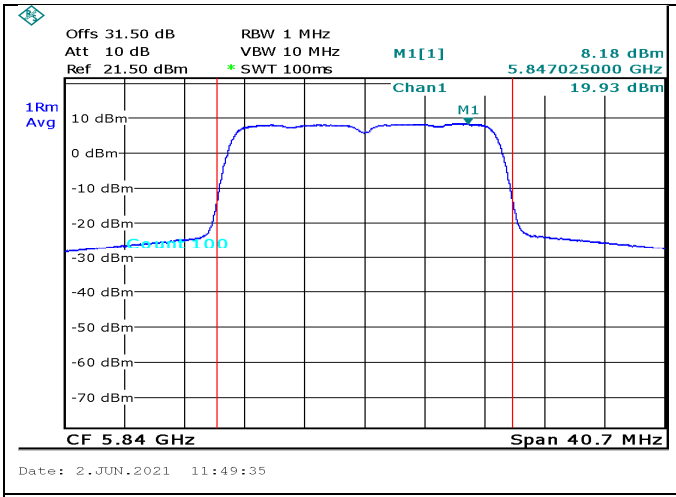


Figure 89. 5840.0MHz, 20MHz BW, port 1

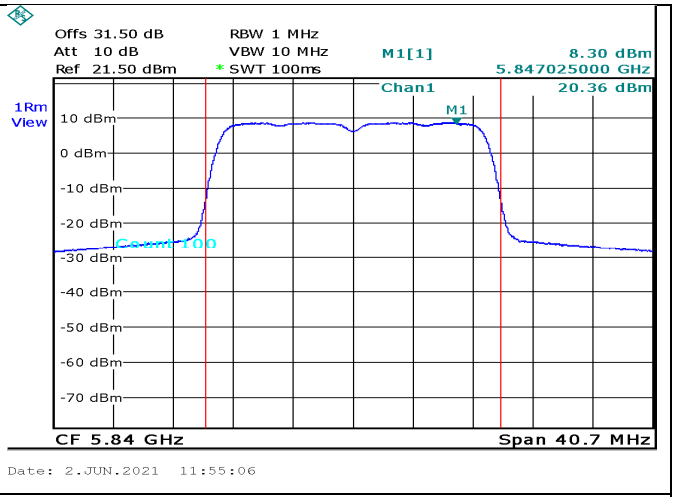


Figure 90. 5840.0MHz, 20MHz BW, port 2

4TX mode:

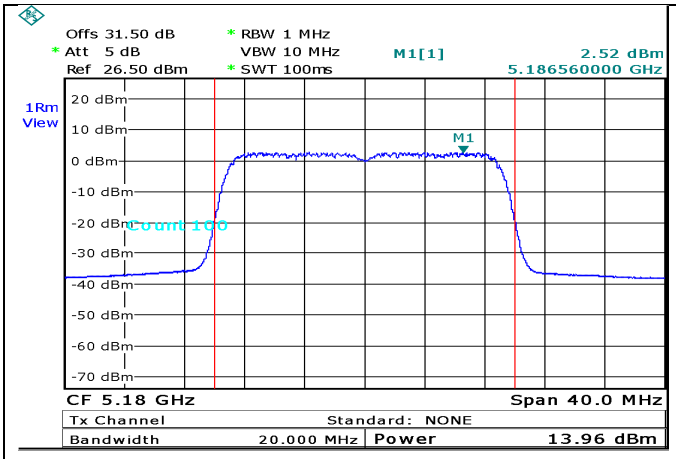


Figure 91. 5180.0MHz, 20MHz BW, port 1

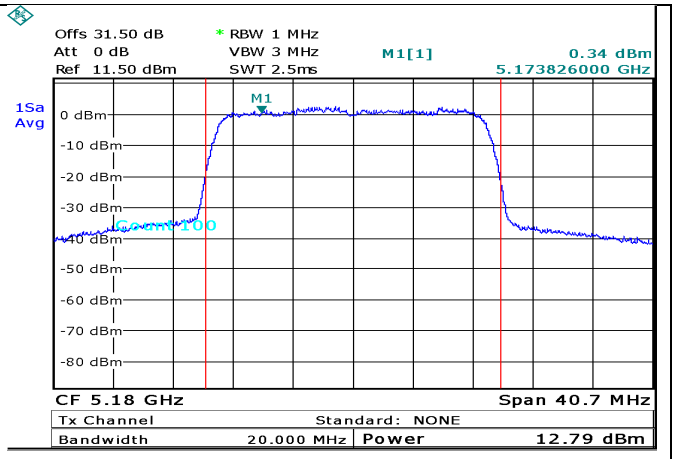


Figure 92. 5180.0MHz, 20MHz BW, port 2

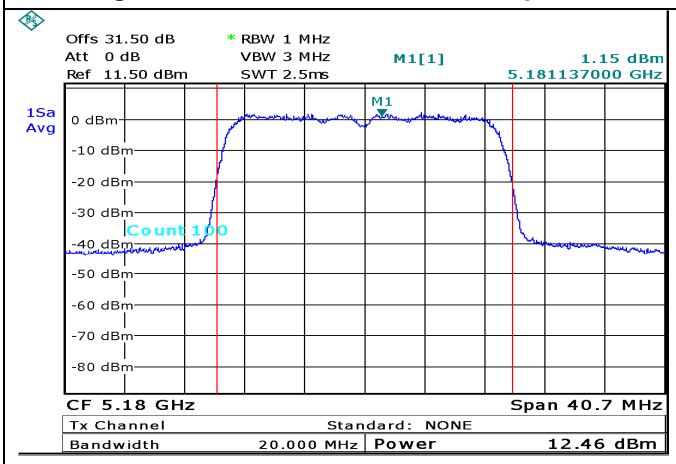


Figure 93. 5180.0MHz, 20MHz BW, port 3

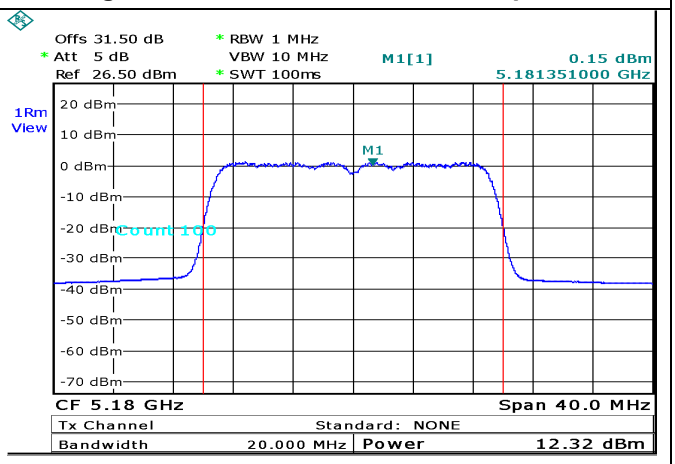


Figure 94. 5180.0MHz, 20MHz BW, port 4

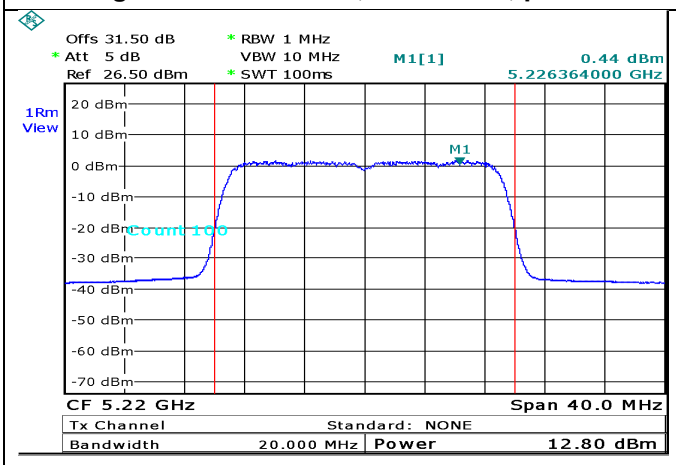


Figure 95. 5220.0MHz, 20MHz BW, port 1

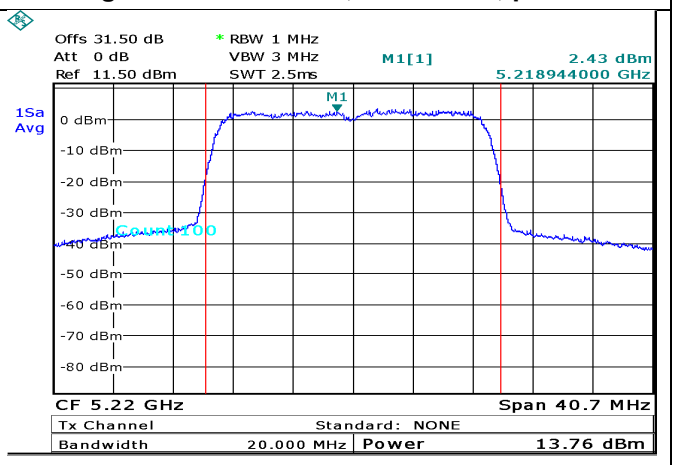


Figure 96. 5220.0MHz, 20MHz BW, port 2

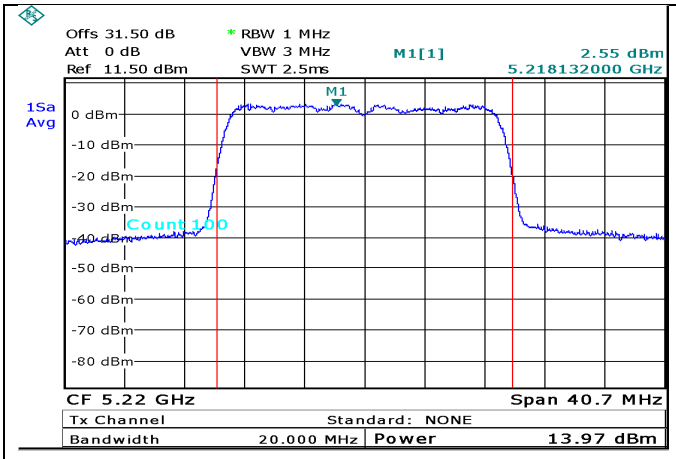


Figure 97. 5220.0MHz, 20MHz BW, port 3

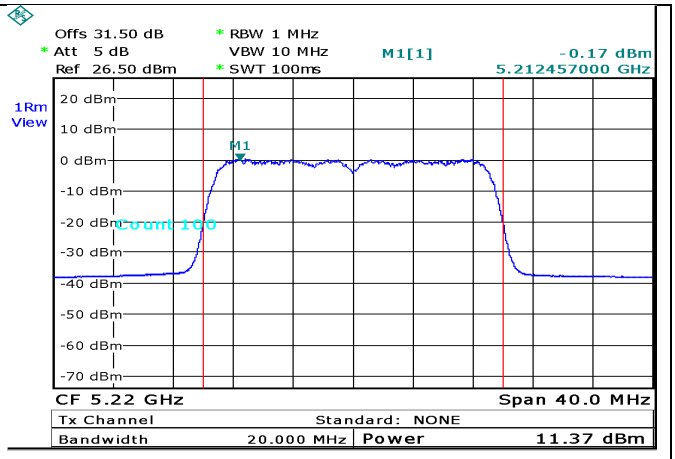


Figure 98. 5220.0MHz, 20MHz BW, port 4

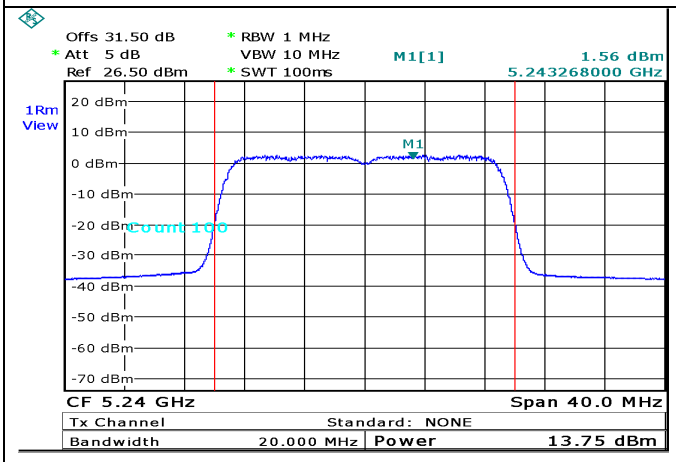


Figure 99. 5240.0MHz, 20MHz BW, port 1

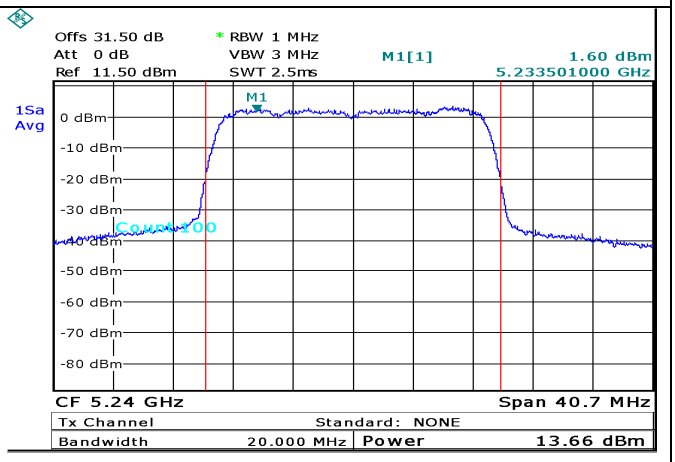


Figure 100. 5240.0MHz, 20MHz BW, port 2

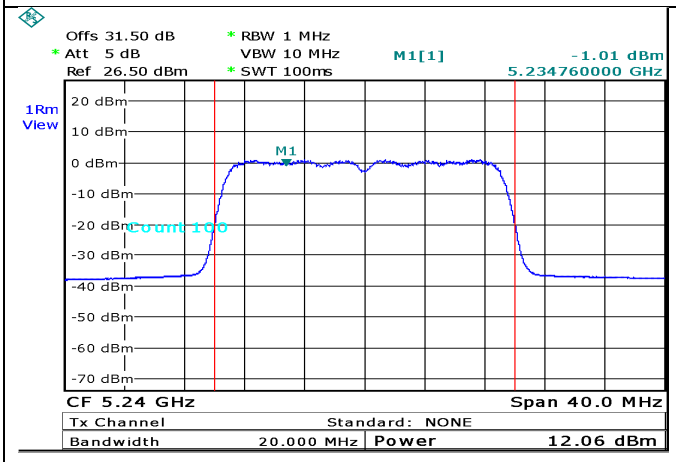


Figure 101. 5240.0MHz, 20MHz BW, port 3

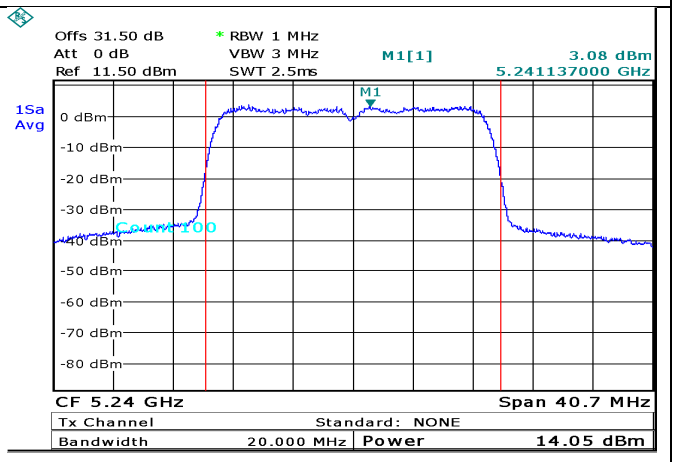


Figure 102. 5240.0MHz, 20MHz BW, port 4

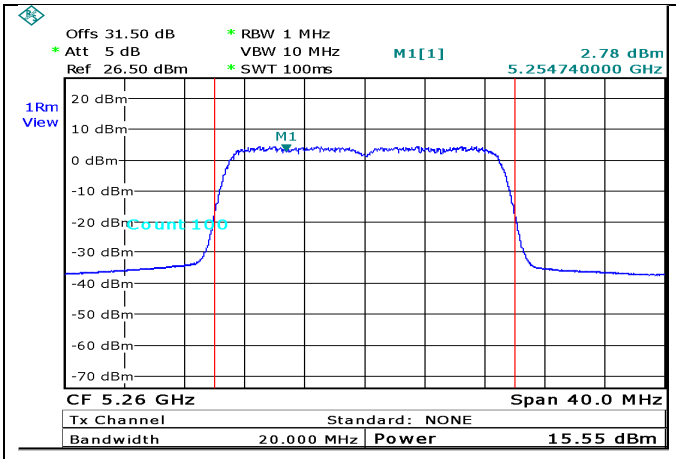


Figure 103. 5260.0MHz, 20MHz BW, port 1

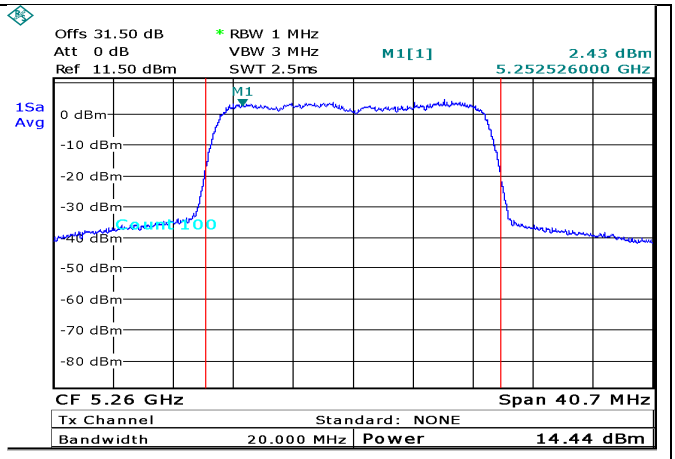


Figure 104. 5260.0MHz, 20MHz BW, port 2

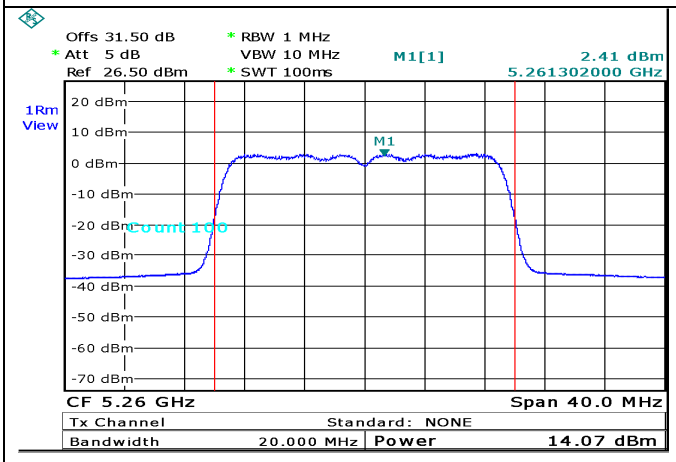


Figure 105. 5260.0MHz, 20MHz BW, port 3

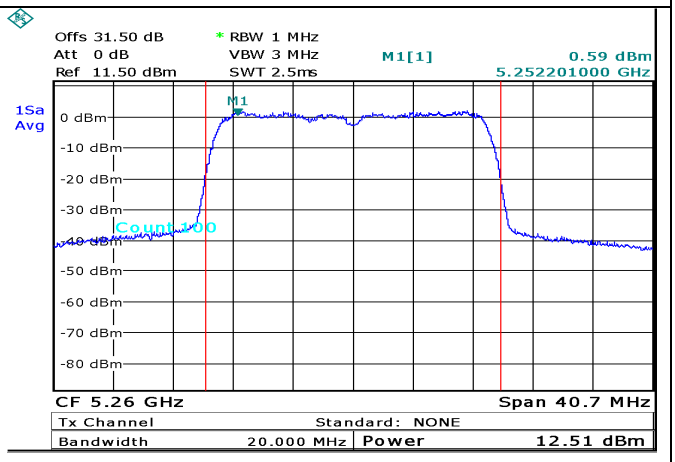


Figure 106. 5260.0MHz, 20MHz BW, port 4

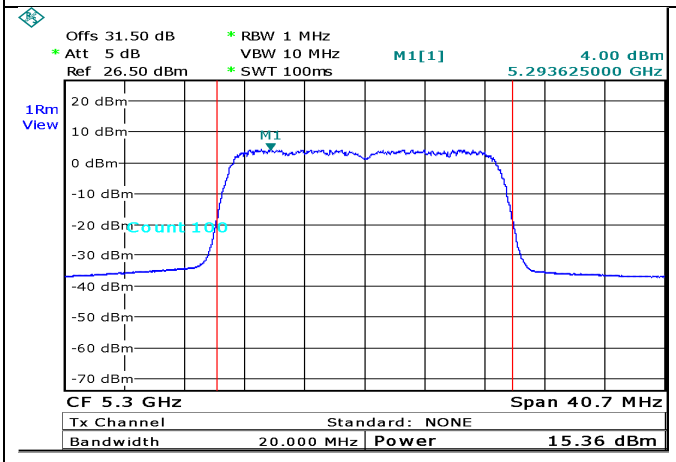


Figure 107. 5300.0MHz, 20MHz BW, port 1

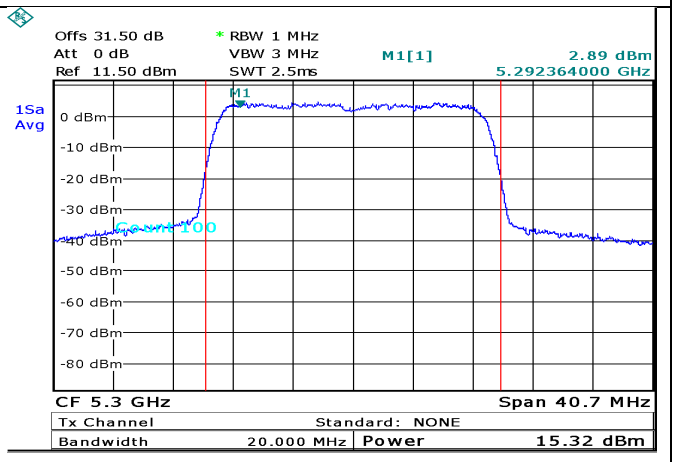


Figure 108. 5300.0MHz, 20MHz BW, port 2

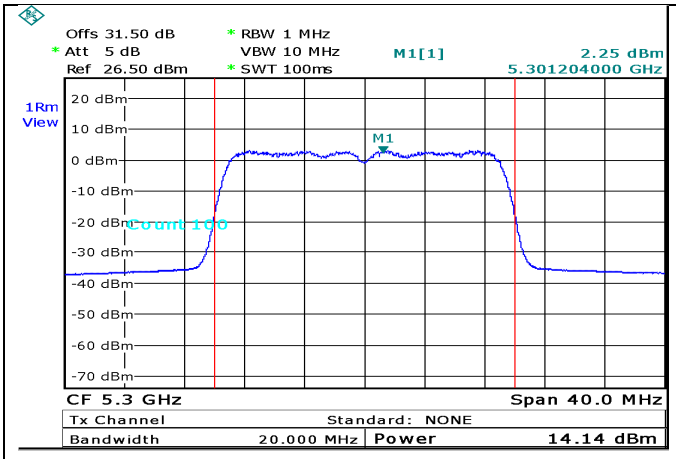


Figure 109. 5300.0MHz, 20MHz BW, port 3

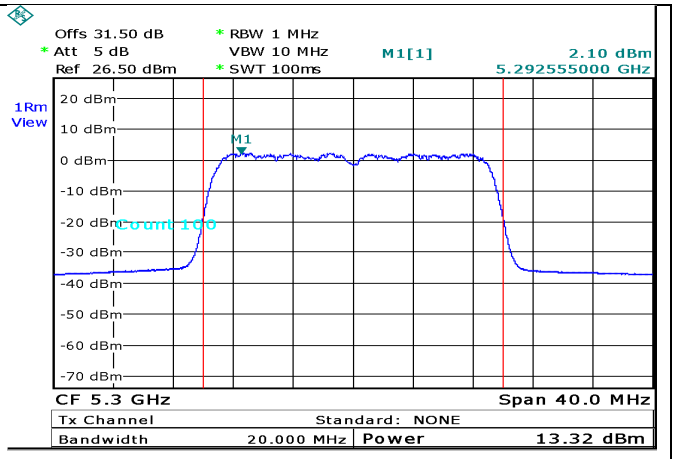


Figure 110. 5300.0MHz, 20MHz BW, port 4

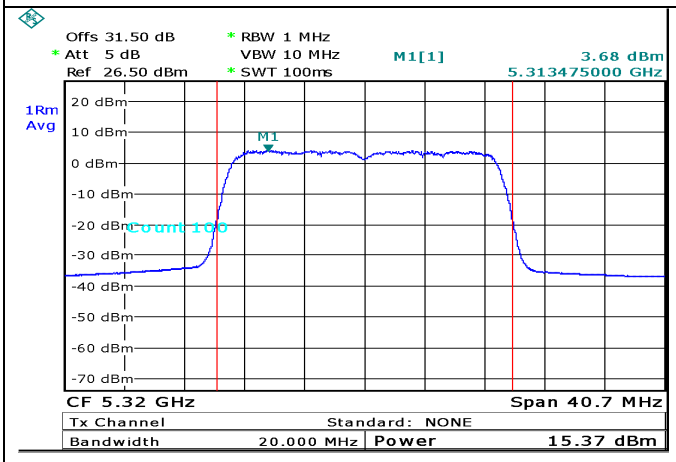


Figure 111. 5320.0MHz, 20MHz BW, port 1

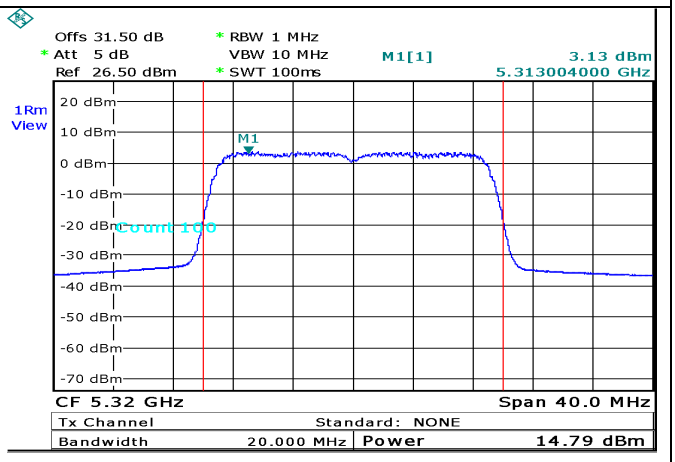


Figure 112. 5320.0MHz, 20MHz BW, port 2

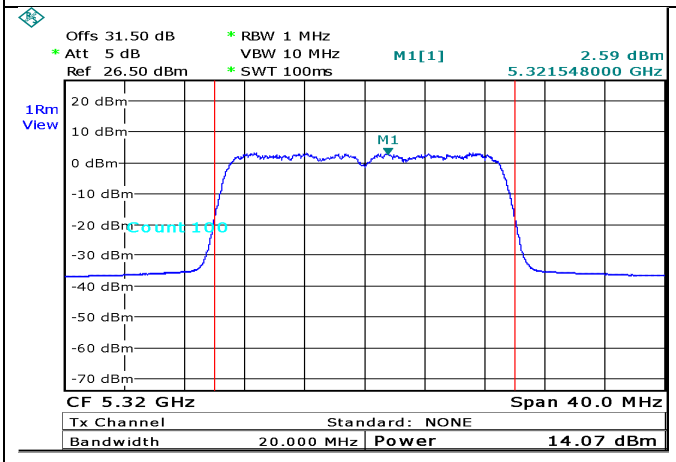


Figure 113. 5320.0MHz, 20MHz BW, port 3

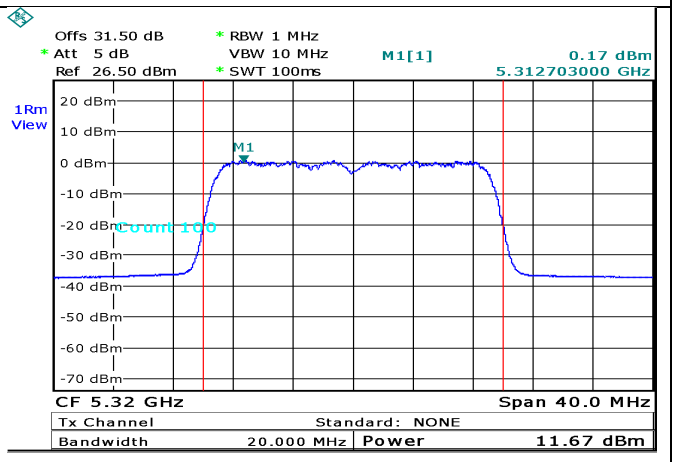


Figure 114. 5320.0MHz, 20MHz BW, port 4

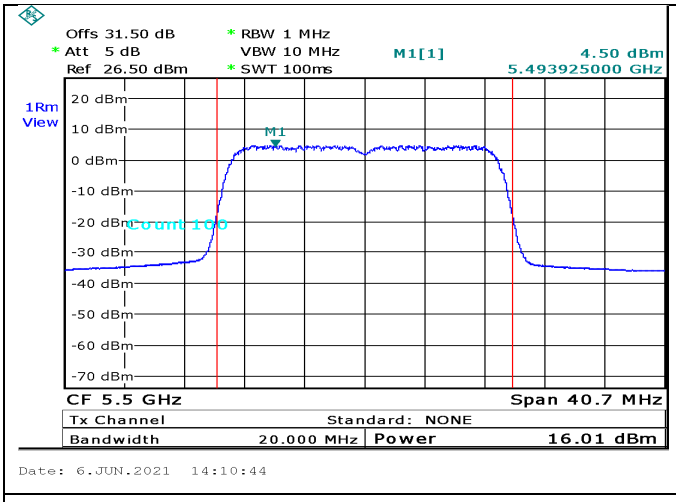


Figure 115. 5500.0MHz, 20MHz BW, port 1

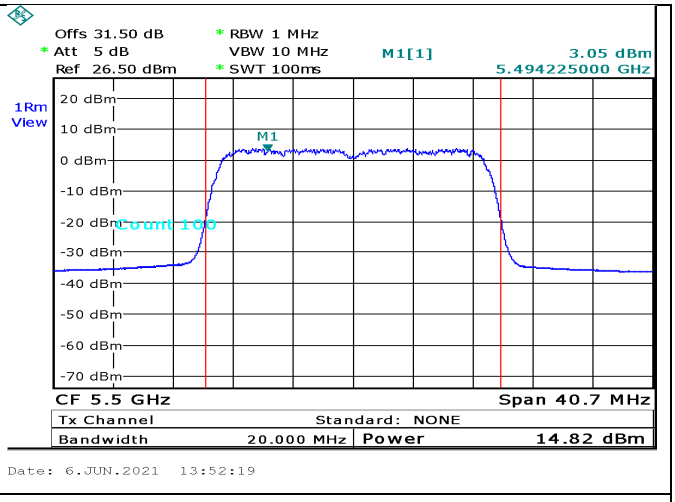


Figure 116. 5500.0MHz, 20MHz BW, port 2

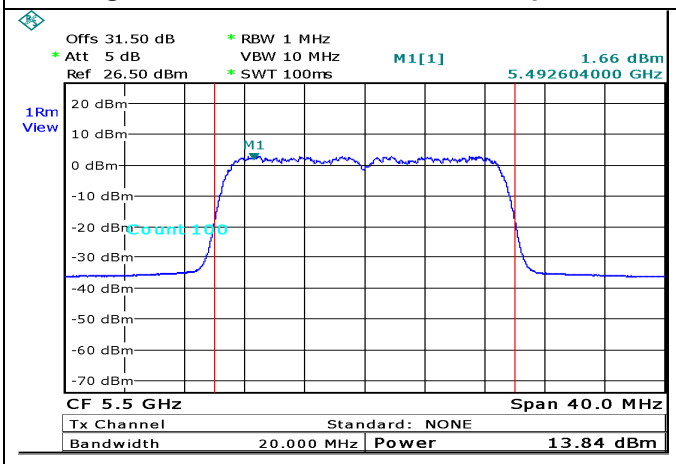


Figure 117. 5500.0MHz, 20MHz BW, port 3

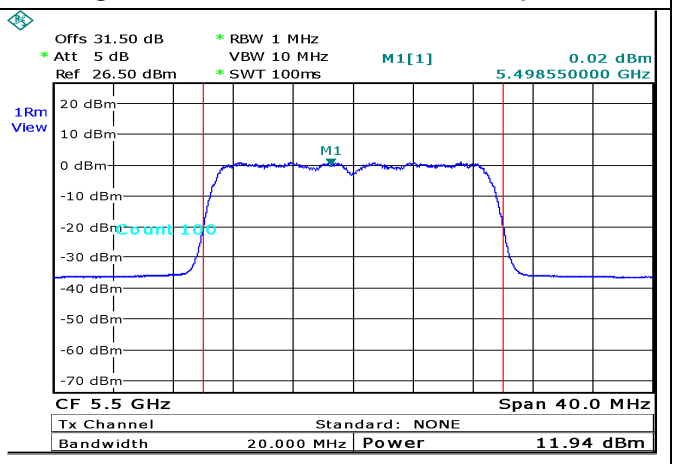


Figure 118. 5500.0MHz, 20MHz BW, port 4

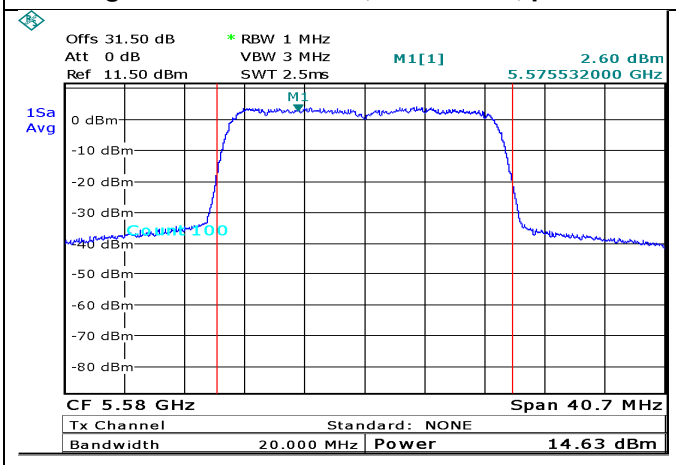


Figure 123. 5580.0MHz, 20MHz BW, port 1

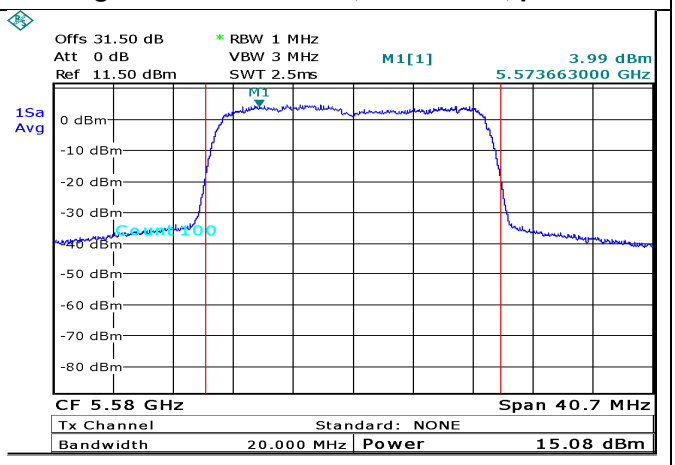


Figure 123. 5580.0MHz, 20MHz BW, port 2

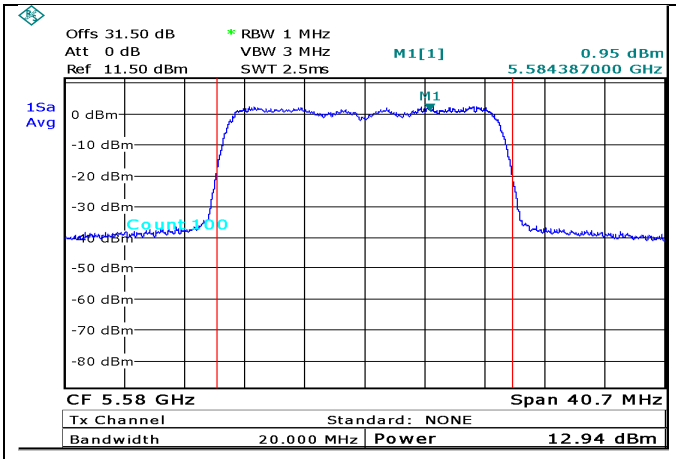


Figure 119. 5580.0MHz, 20MHz BW, port 3

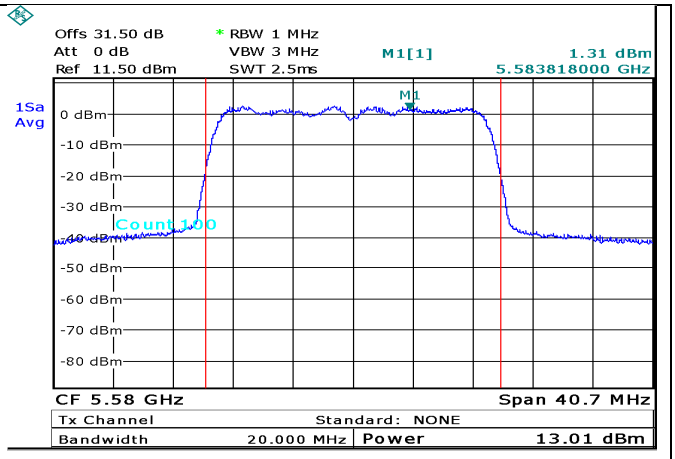


Figure 120. 5580.0MHz, 20MHz BW, port 4

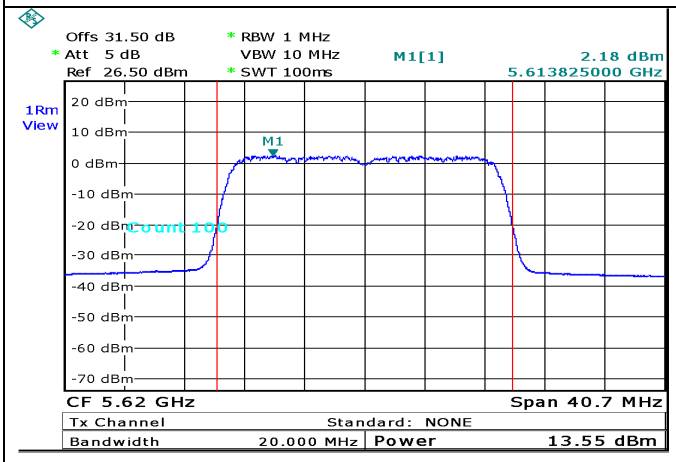


Figure 121. 5620.0MHz, 20MHz BW, port 1

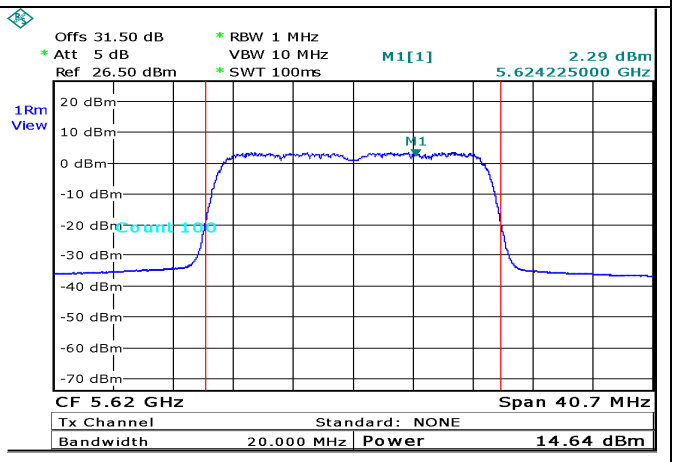


Figure 122. 5620.0MHz, 20MHz BW, port 2

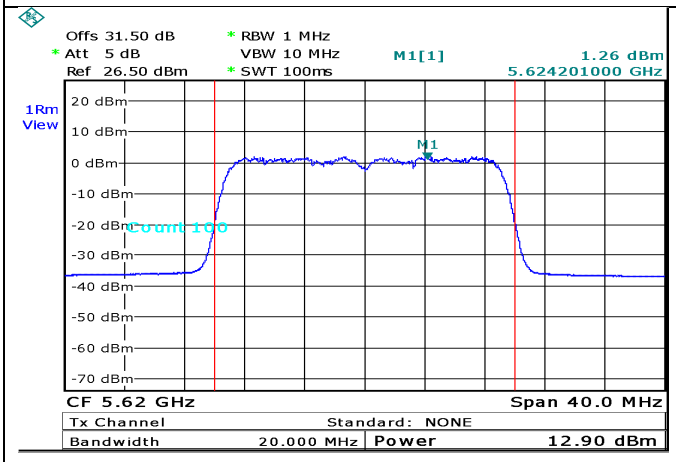


Figure 123. 5620.0MHz, 20MHz BW, port 3

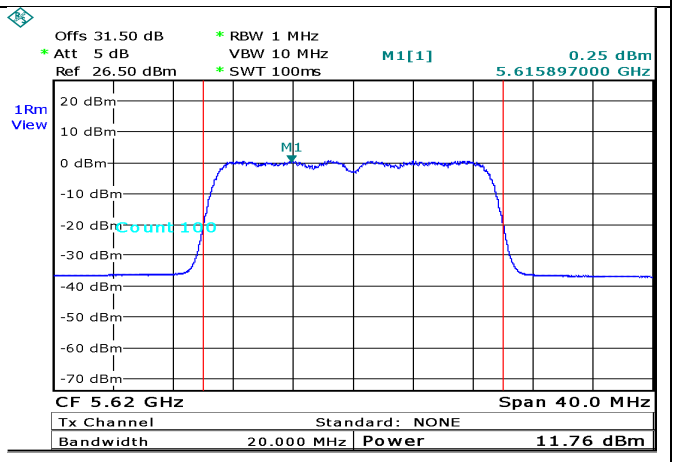


Figure 124. 5620.0MHz, 20MHz BW, port 4

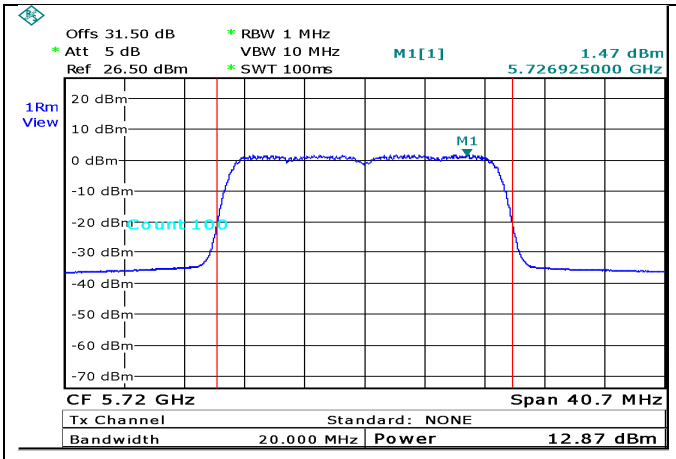


Figure 125. 5720.0MHz, 20MHz BW, port 1

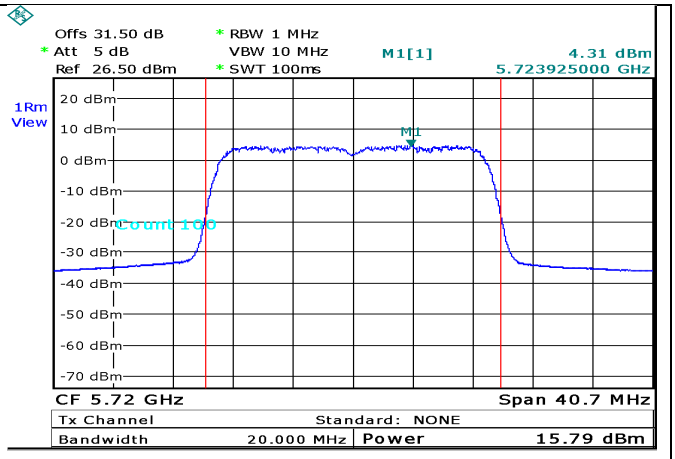


Figure 126. 5720.0MHz, 20MHz BW, port 2

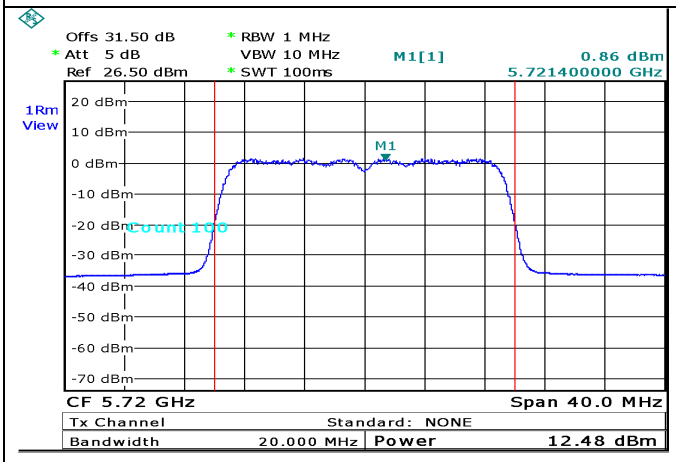


Figure 127. 5720.0MHz, 20MHz BW, port 3

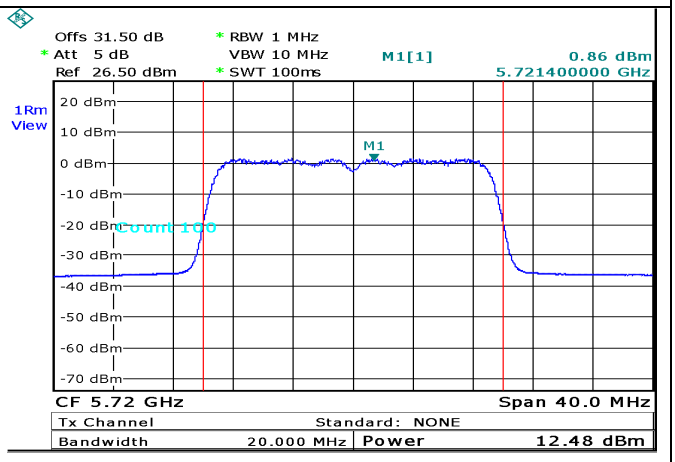


Figure 128. 5720.0MHz, 20MHz BW, port 4

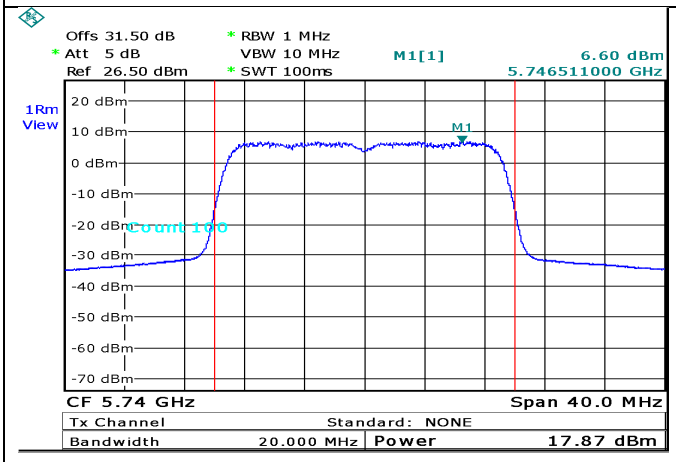


Figure 129. 5740.0MHz, 20MHz BW, port 1

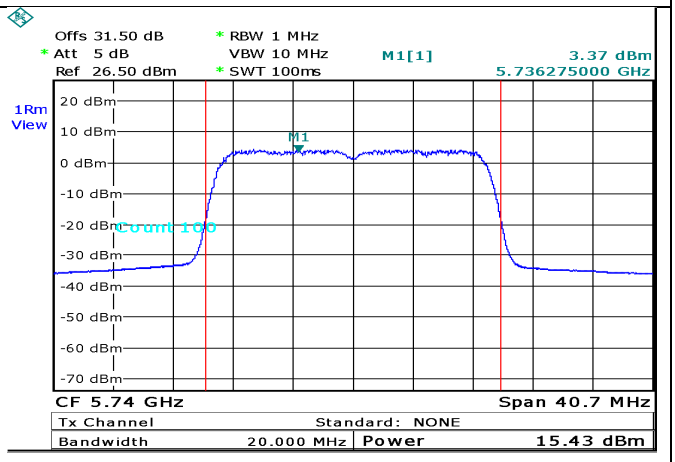


Figure 130. 5740.0MHz, 20MHz BW, port 2

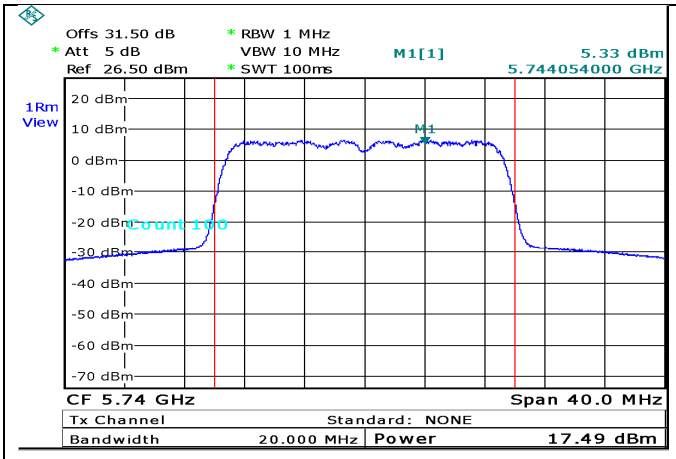


Figure 131. 5740.0MHz, 20MHz BW, port 3

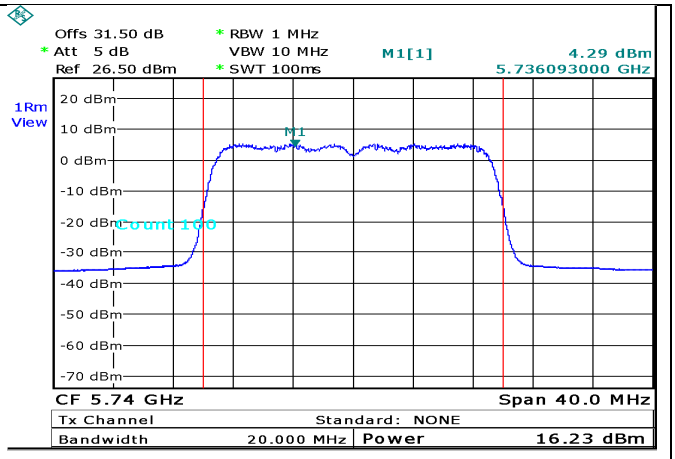


Figure 132. 5740.0MHz, 20MHz BW, port 4

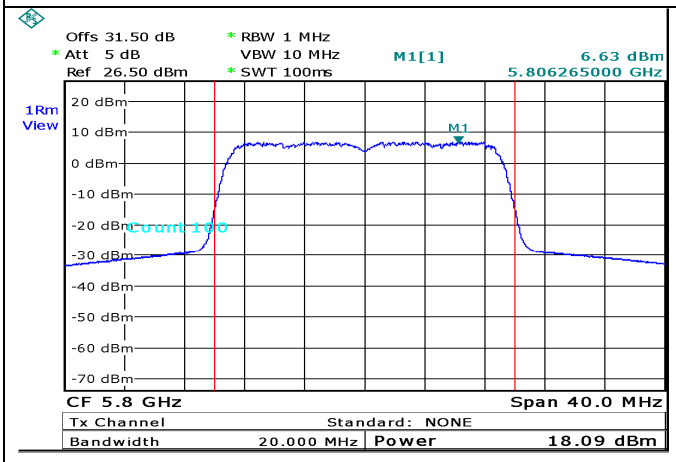


Figure 133. 5800.0MHz, 20MHz BW, port 1

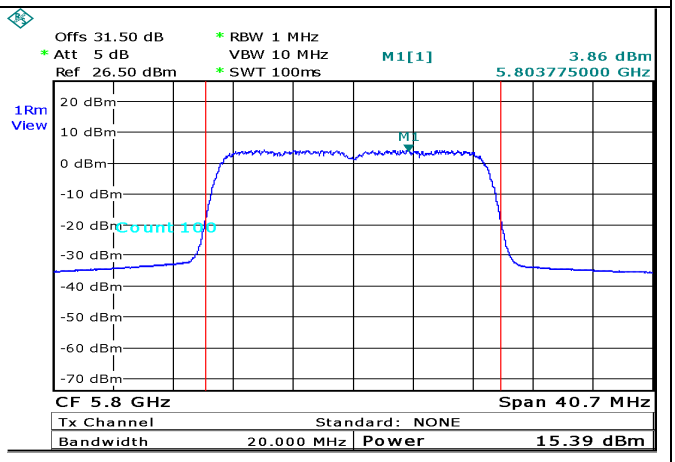


Figure 134. 5800.0MHz, 20MHz BW, port 2

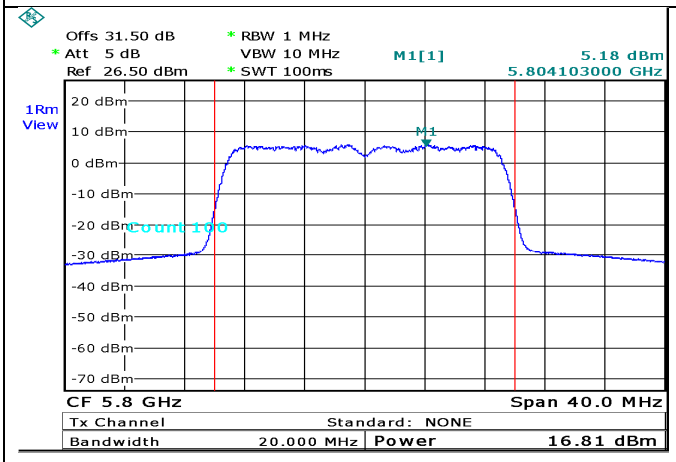


Figure 135. 5800.0MHz, 20MHz BW, port 3

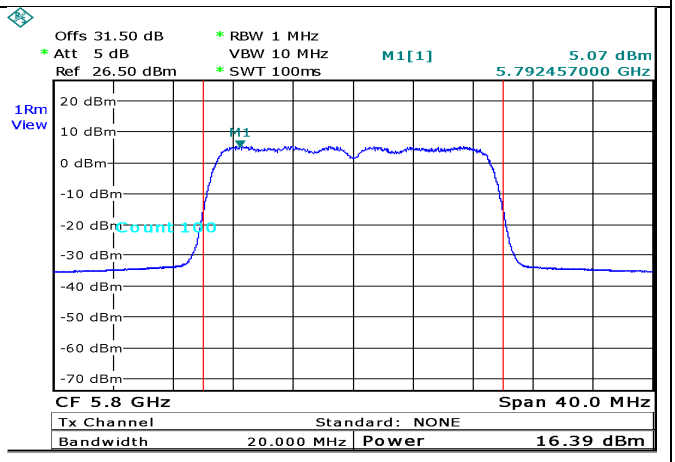


Figure 136. 5800.0MHz, 20MHz BW, port 4

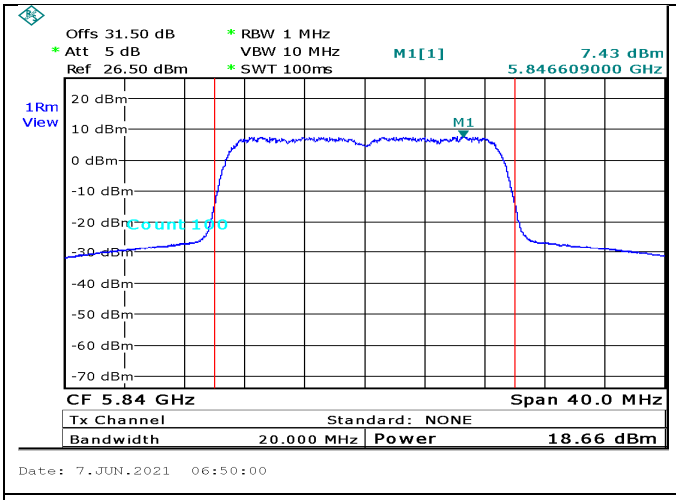


Figure 137. 5840.0MHz, 20MHz BW, port 1

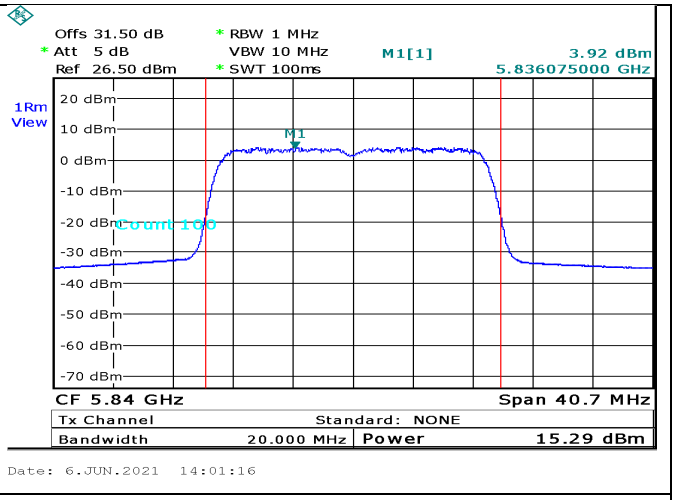


Figure 138. 5840.0MHz, 20MHz BW, port 2

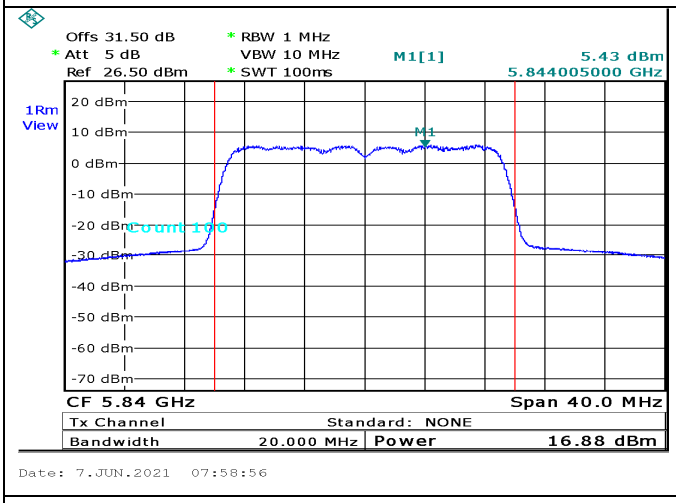


Figure 139. 5840.0MHz, 20MHz BW, port 3

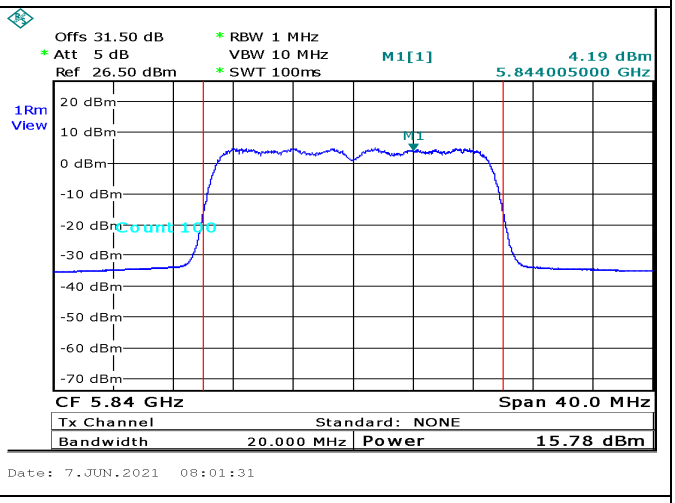


Figure 140. 5840.0MHz, 20MHz BW, port 4

8.6 *Test Equipment Used; Maximum Peak Power Output*

Instrument	Manufacturer	Model	Serial No.	Last Calibration	Next Calibration
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	23/02/2020	23/02/2022
Low Loss cable	Huber Shunner	Sucoflex	27504/4PEA	23/08/2020	23/08/2021
30 dB attenuator	MCL	BW-S30W5	533	23/08/2020	23/08/2021

Figure 141 Test Equipment Used

9 Maximum Power Spectral Density (PSD)

9.1 Test Specification

FCC, Part 15, Subpart E, Section 407

RSS 247, Issue 2, Section 6.2

9.2 Test Procedure

(Temperature (22°C)/ Humidity (56%RH))

The E.U.T operation mode and test set-up are as described in Section 2 of this report.
The E.U.T. antenna terminal was connected to the Spectrum Analyzer through an external attenuator and an appropriate coaxial cable (total loss= 31.5dB). Special attention was taken to prevent Spectrum Analyzer RF input overload. Spectrum setting done according KDB 789033 d02 v01instructions (section F).

9.3 FCC Test Limits

Operational Band U-NII 1:

For devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 17 dBm in any 1-megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Operational Band U-NII 2A, 2C:

For devices in the 5.25-5.35 GHz and 5.47-5.725GHz bands the maximum power spectral density shall not exceed 11 dBm in any 1-megahertz band, provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Operational Band U-NII 3:

For devices in the 5.725-5.85 GHz band, the maximum power spectral density shall not exceed 30dBm in any 500KHz band provided the maximum antenna gain does not exceed 6 dBi. If transmitting antennas of directional gain greater than 6 dBi are used, the maximum conducted output shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note: Special requirements provided for fixed, point-to-point U-NII devices

9.4 ISED Test Limit

Operational Band U-NII 1:

For devices in the 5.15-5.25 GHz band, the EIRP spectral density shall not exceed 10 dBm in any 1.0 MHz band.

Operational Band U-NII 2A, 2C:

For devices in the 5.25-5.725 GHz band, the maximum conducted spectral density shall not exceed 11 dBm in any 1.0 MHz band.

Operational Band U-NII 3:

For devices in the 5.725-5.85 GHz band the maximum conducted spectral density shall not exceed 30 dBm in any 500 kHz band.

All U-NII Bands:

If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi

Note: Special requirements provided for fixed, point-to-point U-NII devices

9.5 Test Results Maximum Power Spectral Density

Band U-NII 1, 5150MHz-5250MHz								
BW	Operation Frequency	PSD@RBW=1MHz		Conducted Total PSD	Antenna Gain	Total PSD*	Limit	Margin
		Port 1 Reading	Port 2 Reading					
(MHz)	(MHz)	(dBm/MHz)		(dBm/MHz)	(dBi)	(dBm/MHz)	(dBm/MHz)	(dB)
20.0	5180.0	5.5	4.3	7.95	2.0	9.95	10.0	-0.05
	5220.0	4.7	4.3	7.5		9.5		-.05
	5240.0	5.0	4.2	7.6		9.6		-0.4

**Note: total power (dBm)= 10 log [port1(W)+port2(W)], total power includes antenna gain of 2dBi.*

Figure 142 Test Results 2TX mode, U-NII 1

Band U-NII 2A, 5250MHz-5350MHz						
BW	Operation Frequency	PSD@RBW=1MHz		Total PSD*	Limit	Margin
		Port 1 Reading	Port 2 Reading			
(MHz)	(MHz)	(dBm/MHz)		(dBm/MHz)	(dBm/MHz)	(dB)
20.0	5260.0	4.66	5.1	7.9	11.0	-3.1
	5300.0	5.4	6.2	8.8		-2.2
	5320.0	5.0	5.6	8.3		-2.7

**Note: total power (dBm)= 10 log [port1(W)+port2(W)]*

Figure 143 Test Results 2TX mode, U-NII 2A

Band U-NII 2C, 5470MHz-5725MHz						
BW	Operation Frequency	PSD@RBW=1MHz		Total PSD*	Limit	Margin
		Port 1 Reading	Port 2 Reading			
(MHz)	(MHz)	(dBm/MHz)		(dBm/MHz)	(dBm/MHz)	(dB)
20.0	5500.0	5.22	6.13	8.7	11.0	-2.3
	5580.0	4.41	5.07	7.8		-3.2
	5620.0	4.58	5.83	8.3		-2.7
	5720.0	5.45	6.05	8.8		-2.2

**Note: total power (dBm)= 10 log [port1(W)+port2(W)*

Figure 144 Test Results 2TX mode, U-NII 2C

Band U-NII 3, 5725MHz-5850MHz							
BW	Operation Frequency	PSD@RBW=1MHz*		Total PSD	Total PSD*	Limit	Margin
		Port 1 Reading	Port 2 Reading				
(MHz)	(MHz)	(dBm/MHz)		(dBm/MHz)	(dBm/500kHz)	(dBm/500kHz)	(dB)
20.0	5740.0	6.4	8.7	10.7	7.7	30.0	-22.3
	5800.0	7.3	8.7	11.1	8.1		-21.9
	5840.0	8.0	8.3	11.2	8.2		-21.8

**Note: total power (dBm)= 10 log [port1(W)+port2(W)], total power includes factor of conversion RBW 1MHz to 500kHz which is 3dB*
***Note: RBW Conversion factor was calculated as the following equation: 10log(500kHz/1MHz) =-3dB*

Figure 145 Test Results 2TX mode, U-NII 3

Band U-NII 1, 5150MHz-5250MHz										
BW	Operation Frequency	PSD@RBW=1MHz				Antenna Gain	Total PSD*	EIRP PSD*	Limit	Margin
		Port 1 Reading	Port 2 Reading	Port 3 Reading	Port 4 Reading					
(MHz)	(MHz)	(dBm/MHz)				(dBi)	(dBm/MHz)	(dBm/MHz)	(dBm/MHz)	(dB)
20.0	5180.0	1.56	0.34	1.15	-0.31	2.0	6.8	8.8	10.0	-1.2
	5220.0	0.44	2.43	2.55	0.15		7.6	9.6		-0.4
	5240.0	1.56	1.6	-1.01	3.08		7.6	9.6		-0.4

**Note 1: total power (dBm)= 10 log [port1(W)+port2(W)+ port3(W)+port4(W)] total power includes antenna gain of 2dBi.*
**Note 2: EIRP is calculated as follow: Total Power+ A.G*

Figure 146 Test Results 4TX mode, U-NII 1

Band U-NII 2A, 5150MHz-5250MHz										
BW	Operation Frequency	PSD@RBW=1MHz				Antenna Gain	Total PSD*	EIRP PSD*	Limit	Margin
		Port 1 Reading	Port 2 Reading	Port 3 Reading	Port 4 Reading					
(MHz)	(MHz)	(dBm/MHz)				(dBi)	(dBm/MHz)	(dBm/MHz)	(dBm/MHz)	(dB)
20.0	5260.0	2.78	2.43	2.41	0.59	2.0	8.2	10.2	11.0	-0.8
	5300.0	4	2.89	2.25	2.1		8.9	10.9		-2.1
	5320.0	3.68	3.13	2.59	0.17		8.6	10.6		-2.4

**Note: total power (dBm)= 10 log [port1(W)+port2(W)+ port3(W)+port4(W)] total power includes antenna gain of 2dBi.*
**Note 2: EIRP is calculated as follow: Total Power+ A.G*

Figure 147 Test Results 4TX mode, U-NII 2A

Band U-NII 2C, 5470MHz-5725MHz								
BW	Operation Frequency	PSD@RBW=1MHz				Total PSD	Limit	Margin
		Port 1 Reading	Port 2 Reading	Port 3 Reading	Port 4 Reading			
(MHz)	(MHz)	(dBm/MHz)				(dBm/MHz)	(dBm/MHz)	(dB)
20.0	5500.0	4.5	3.05	1.66	0.02	8.6	11.0	-2.4
	5580.0	2.6	3.99	0.95	1.31	8.4		-2.6
	5620.0	2.18	2.29	1.26	0.25	7.6		-3.4
	5720.0	1.47	4.31	0.86	0.86	8.2		-2.8

**Note: total power (dBm)= 10 log [port1(W)+port2(W)+ port3(W)+port4(W)]*

Figure 148 Test Results 4TX mode, U-NII 2C

	Band U-NII 3, 5725MHz-5850MHz								
BW	Operation Frequency	PSD@RBW=1MHz				Total PSD	Total PSD*	Limit	Margin
		Port 1 Reading	Port 2 Reading	Port 3 Reading	Port 4 Reading				
(MHz)	(MHz)	(dBm/MHz)				(dBm/MHz	(dBm/500kHz)	(dBm/500kHz)	(dB)
20.0	5740.0	6.6	3.4	5.3	4.3	11.1	8.1	30.0	-21.9
	5800.0	6.6	3.9	5.2	5.1	11.3	8.3		-21.7
	5840.0	7.4	3.9	5.4	4.2	11.5	8.5		-21.5

**Note: total power (dBm)= 10 log [port1(W)+port2(W)+ port3(W)+port4(W)] total power includes factor of conversion RBW 1MHz to 500kHz which is 3dB*
***Note: RBW Conversion factor was calculated as the following equation: 10log(500kHz/1MHz) =-3dB*

Figure 149 Test Results 4TX mode, U-NII 3

JUDGEMENT: FCC - Passed by -0.05 dB
JUDGEMENT: ISED - Passed by -0.05 dB

For additional information see Figure 150 to Figure 225.

2TX mode:

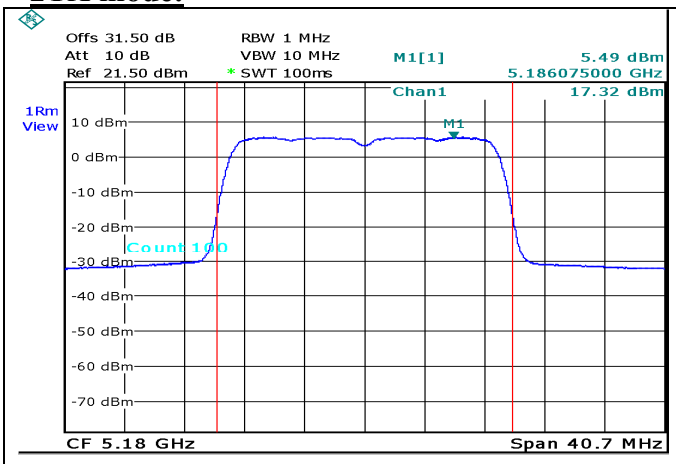


Figure 150. 5180.0MHz, 20MHz BW, port 1

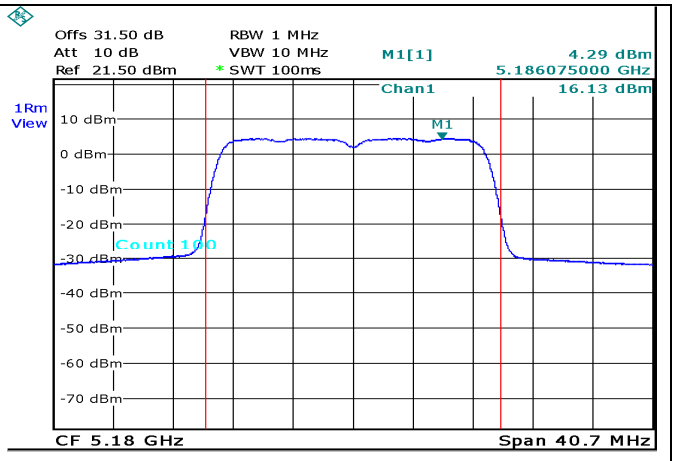


Figure 151. 5180.0MHz, 20MHz BW, port 2

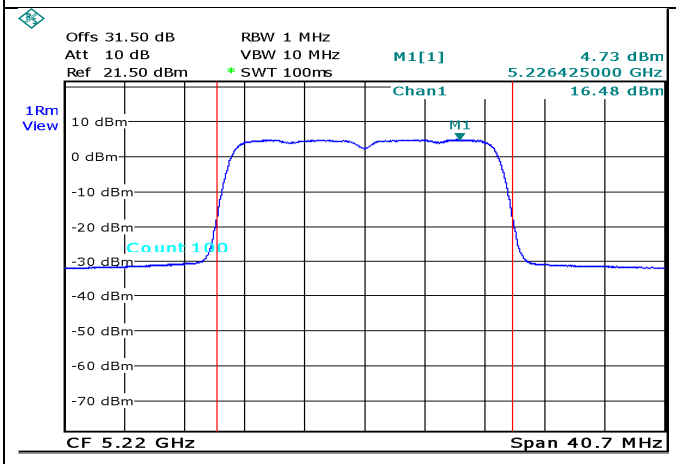


Figure 152. 5220.0MHz, 20MHz BW, port 1

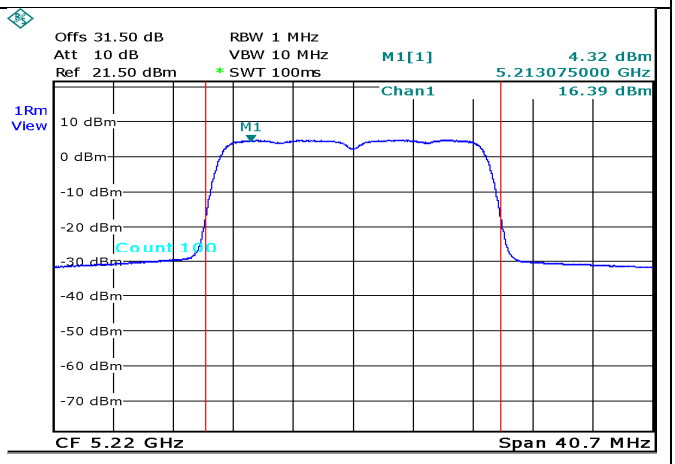


Figure 153. 5220.0MHz, 20MHz BW, port 2

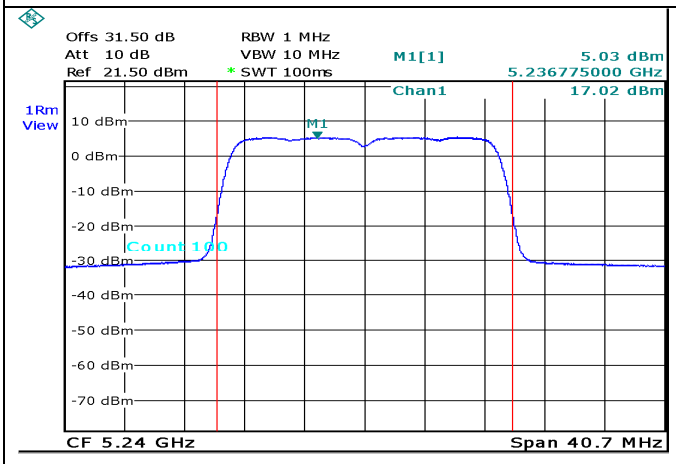


Figure 154. 5240.0MHz, 20MHz BW, port 1

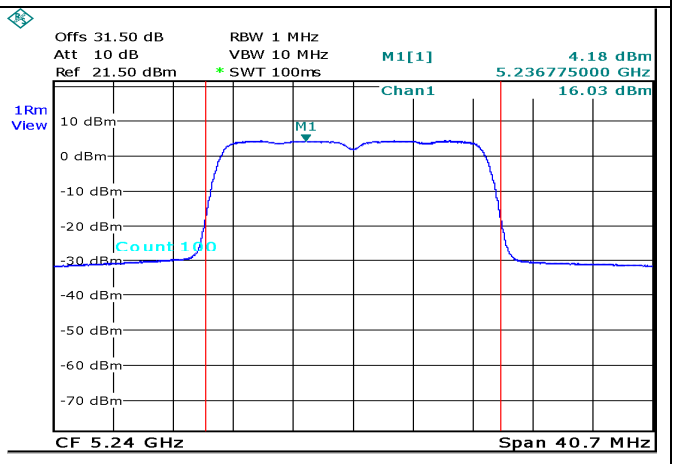


Figure 155. 5240.0MHz, 20MHz BW, port 2

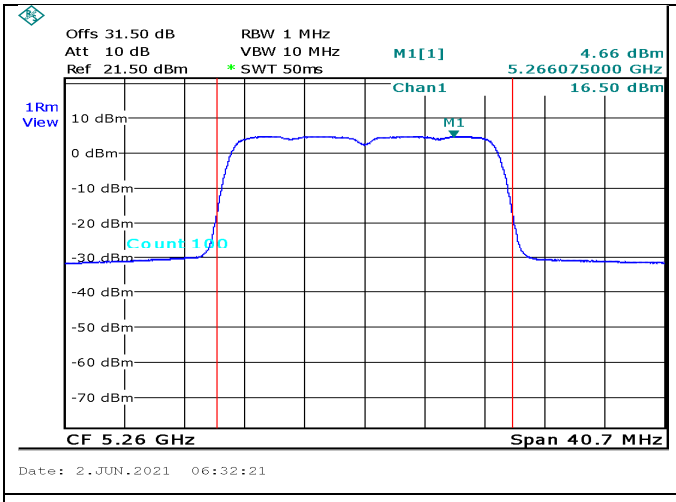


Figure 156. 5260.0MHz, 20MHz BW, port 1

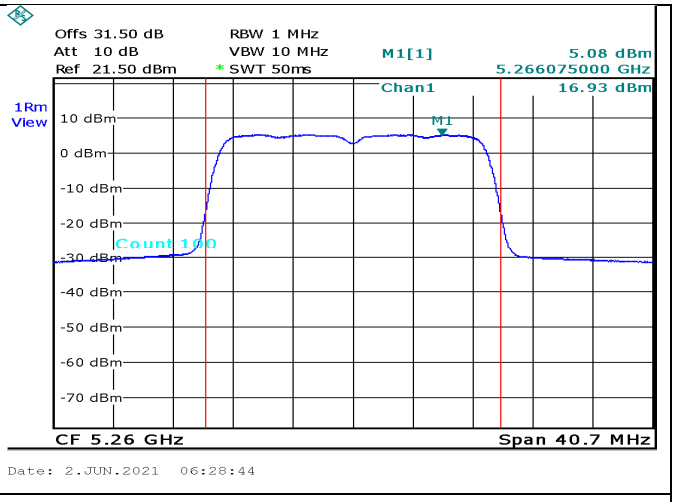


Figure 157. 5260.0MHz, 20MHz BW, port 2

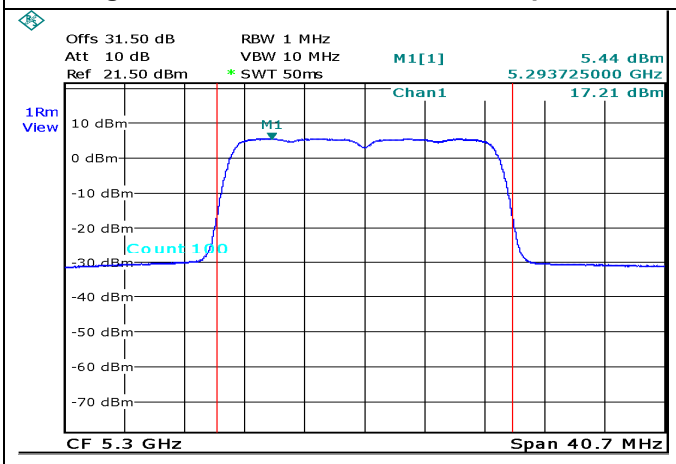


Figure 158. 5300.0MHz, 20MHz BW, port 1

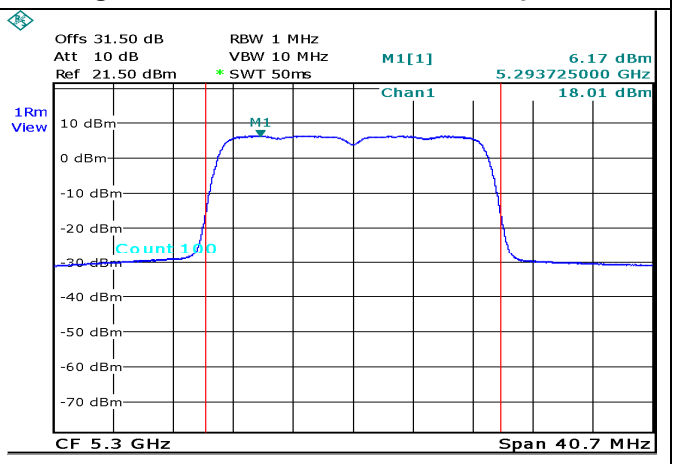


Figure 159. 5300.0MHz, 20MHz BW, port 2

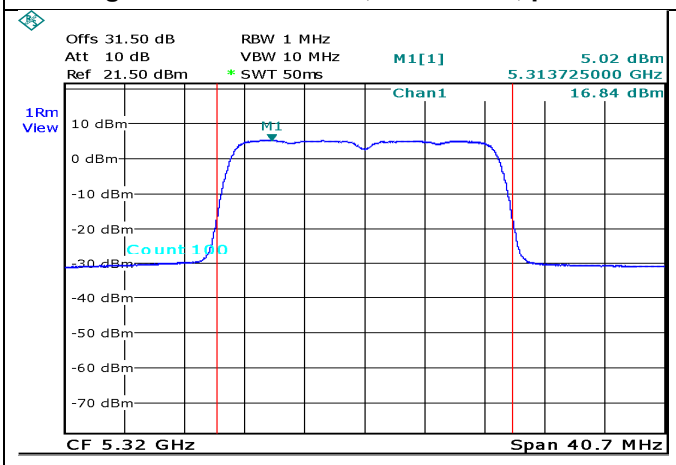


Figure 160. 5320.0MHz, 20MHz BW, port 1

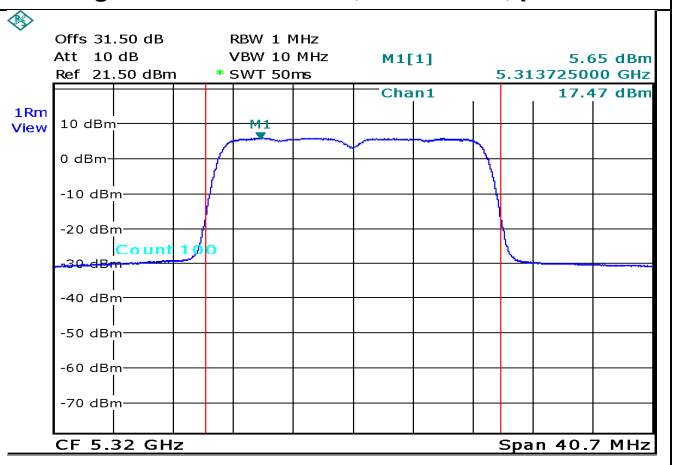


Figure 161. 5320.0MHz, 20MHz BW, port 2

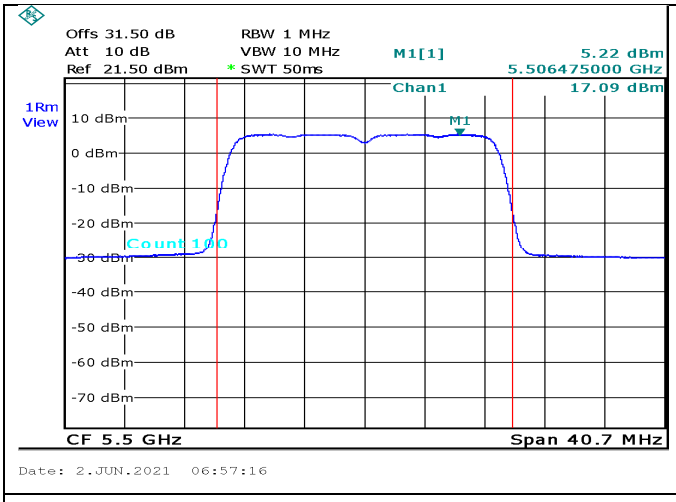


Figure 162. 5500.0MHz, 20MHz BW, port 1

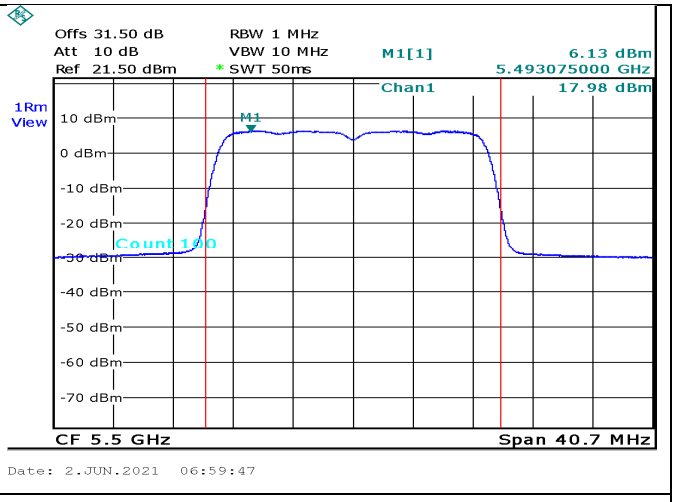


Figure 163. 5500.0MHz, 20MHz BW, port 2

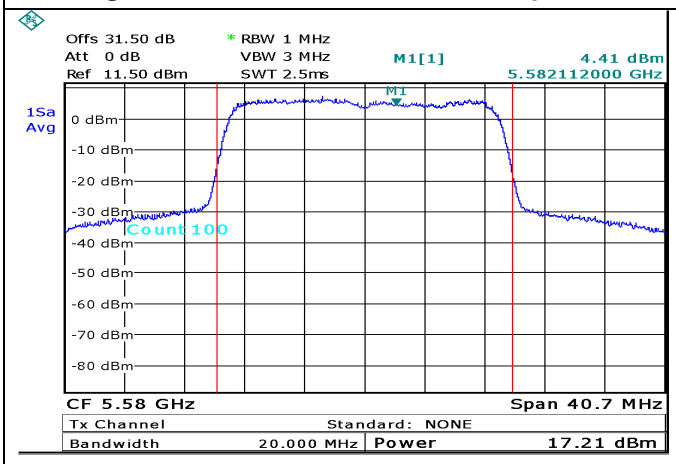


Figure 164. 5580.0MHz, 20MHz BW, port 1

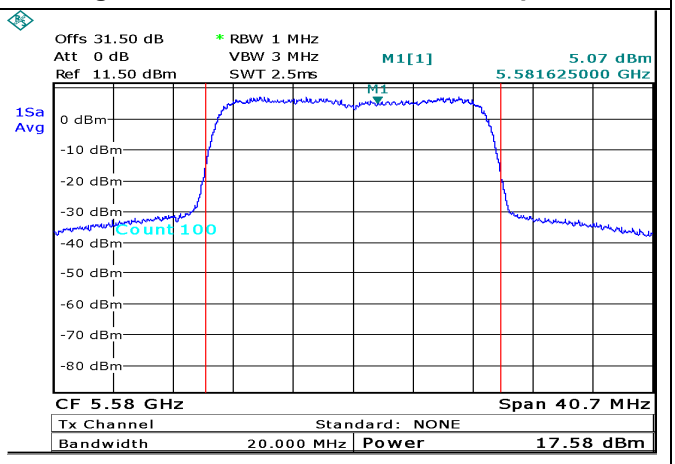


Figure 165. 5580.0MHz, 20MHz BW, port 2

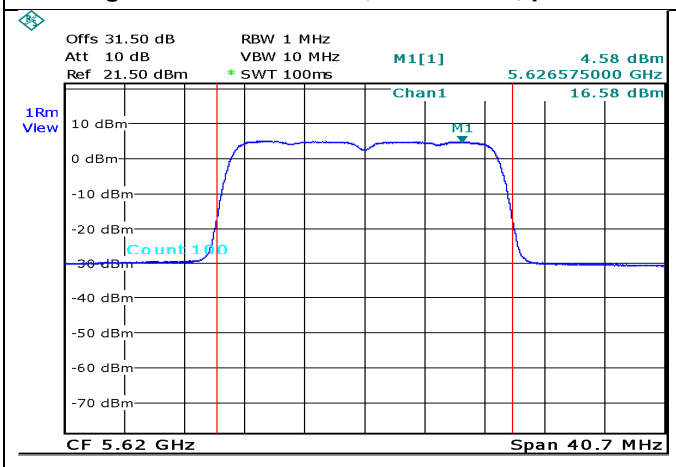


Figure 166. 5620.0MHz, 20MHz BW, port 1

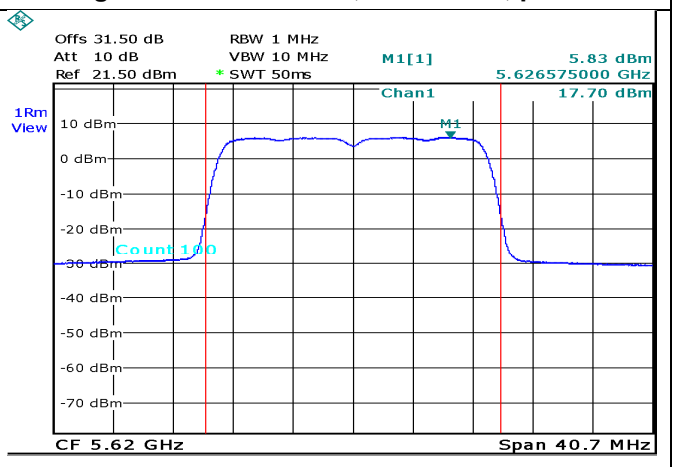


Figure 167. 5620.0MHz, 20MHz BW, port 2

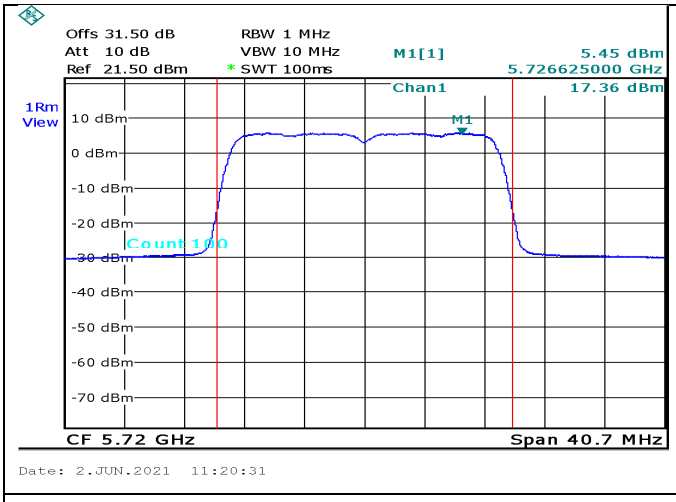


Figure 168. 5720.0MHz, 20MHz BW, port 1

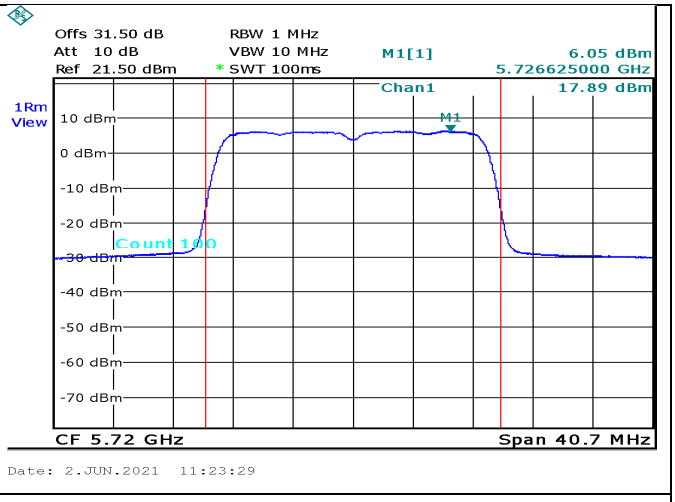


Figure 169. 5720.0MHz, 20MHz BW, port 2

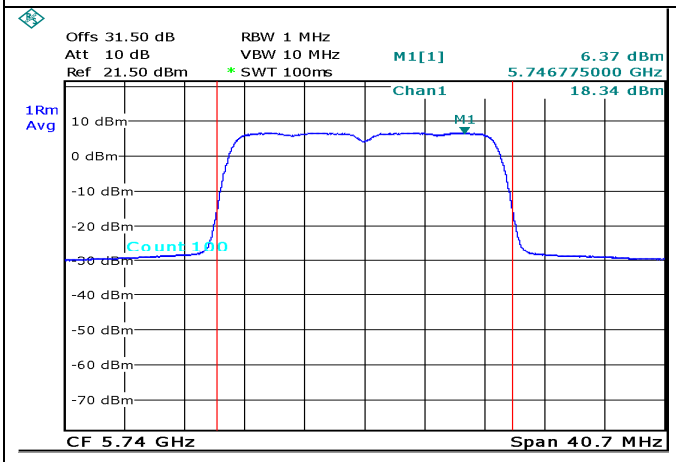


Figure 170. 5740.0MHz, 20MHz BW, port 1

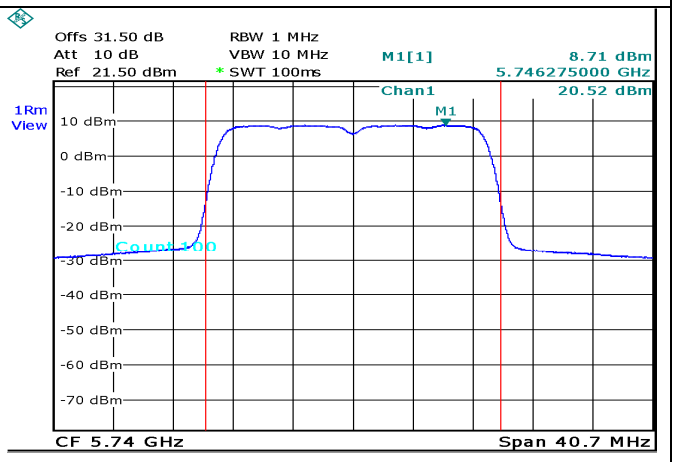


Figure 171. 5740.0MHz, 20MHz BW, port 2

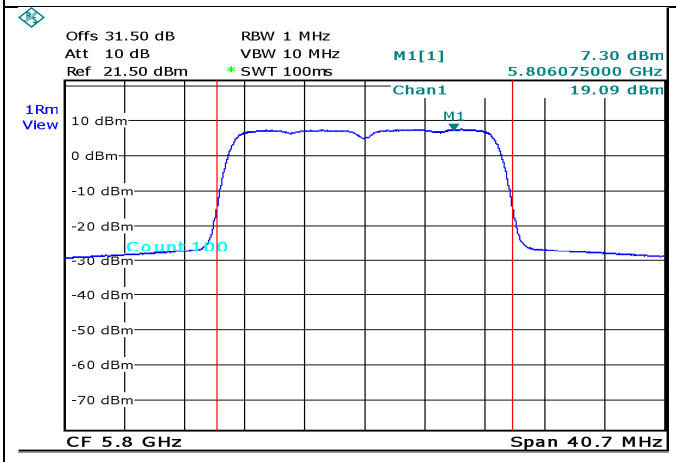


Figure 172. 5800.0MHz, 20MHz BW, port 1

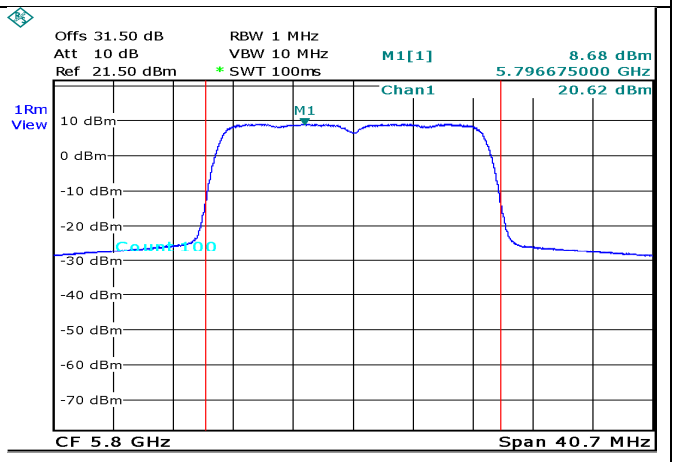


Figure 173. 5800.0MHz, 20MHz BW, port 2

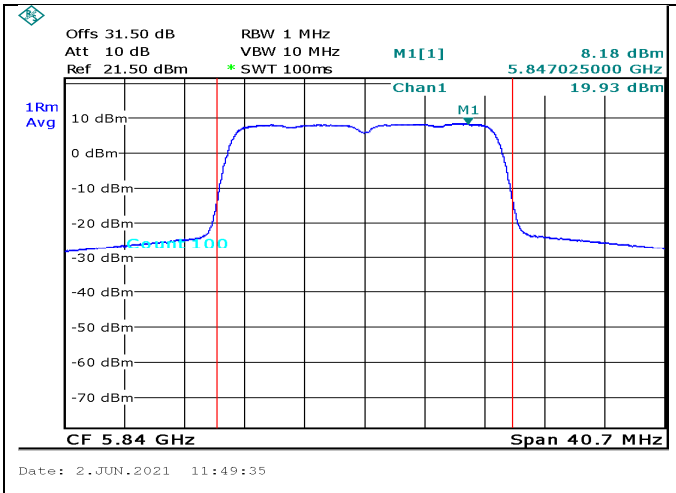


Figure 174. 5840.0MHz, 20MHz BW, port 1

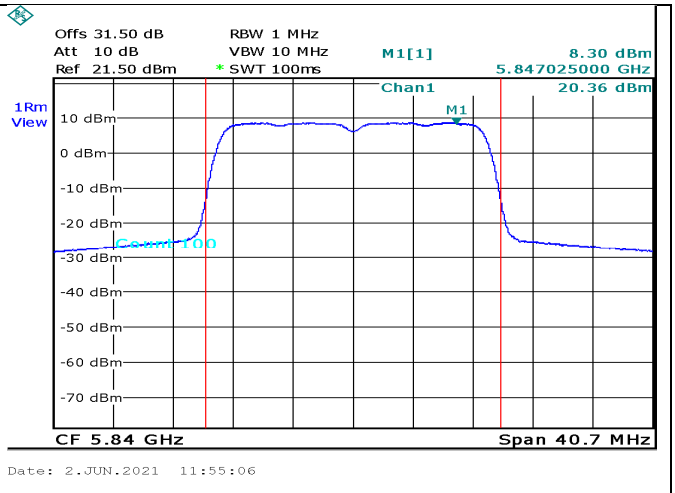


Figure 175. 5840.0MHz, 20MHz BW, port 2

4TX mode:

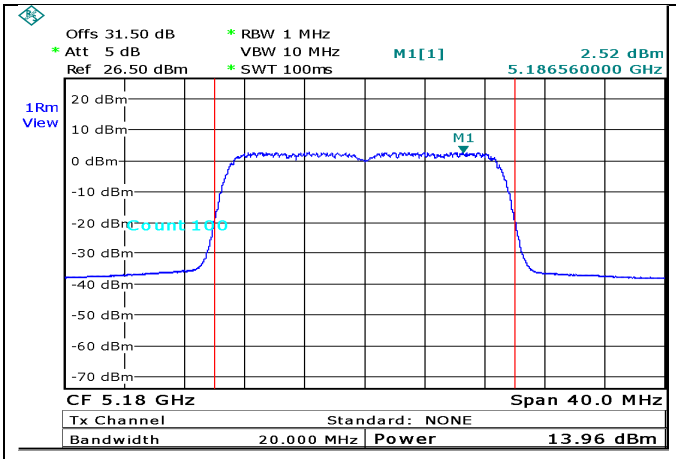


Figure 176. 5180.0MHz, 20MHz BW, port 1

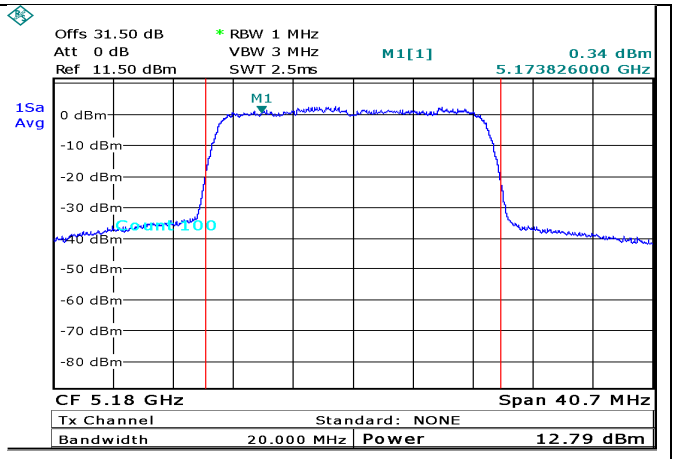


Figure 177. 5180.0MHz, 20MHz BW, port 2

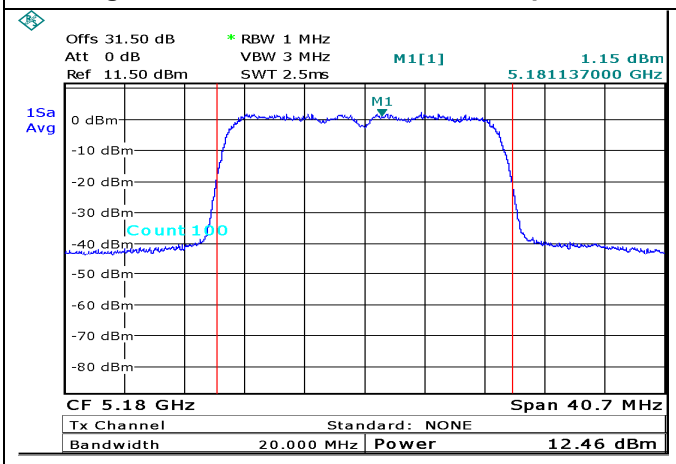


Figure 178. 5180.0MHz, 20MHz BW, port 3

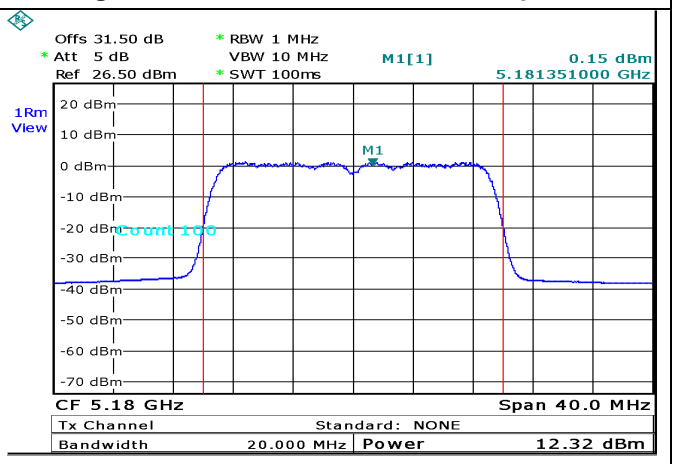


Figure 179. 5180.0MHz, 20MHz BW, port 4

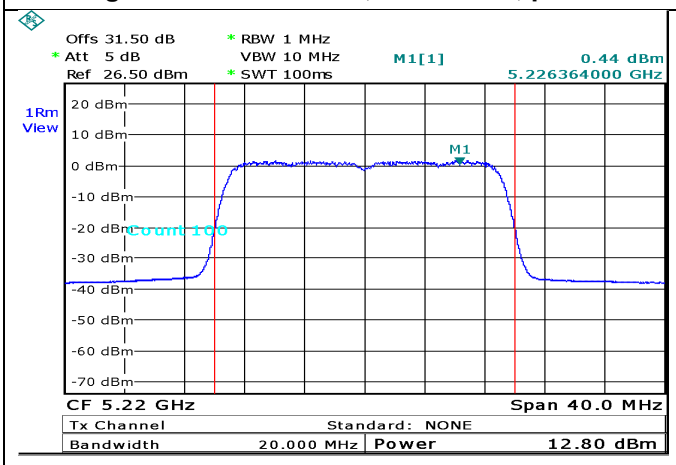


Figure 180. 5220.0MHz, 20MHz BW, port 1

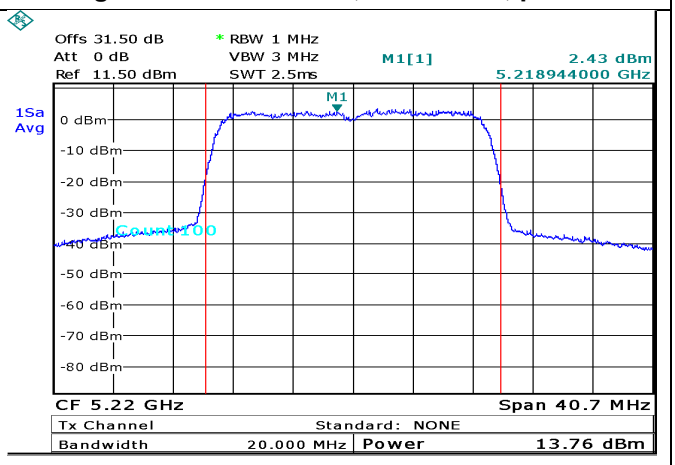


Figure 181. 5220.0MHz, 20MHz BW, port 2

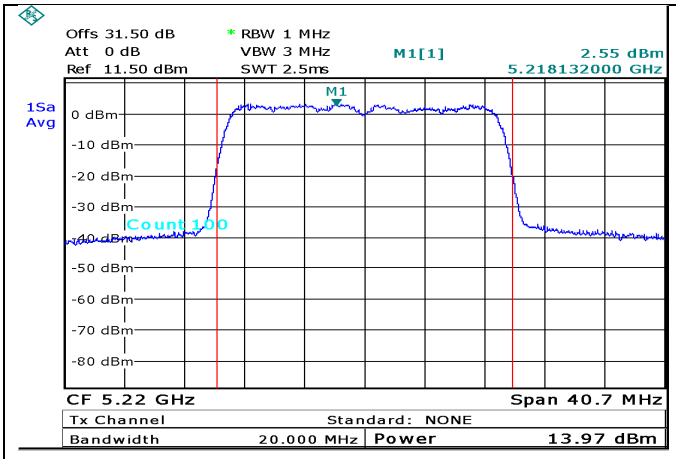


Figure 182. 5220.0MHz, 20MHz BW, port 3

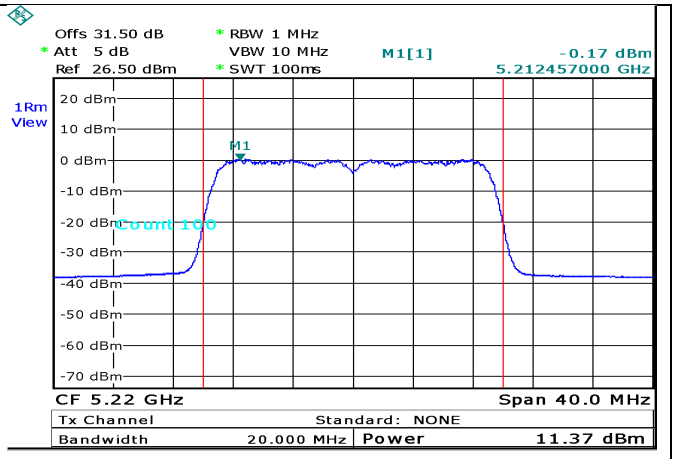


Figure 183. 5220.0MHz, 20MHz BW, port 4

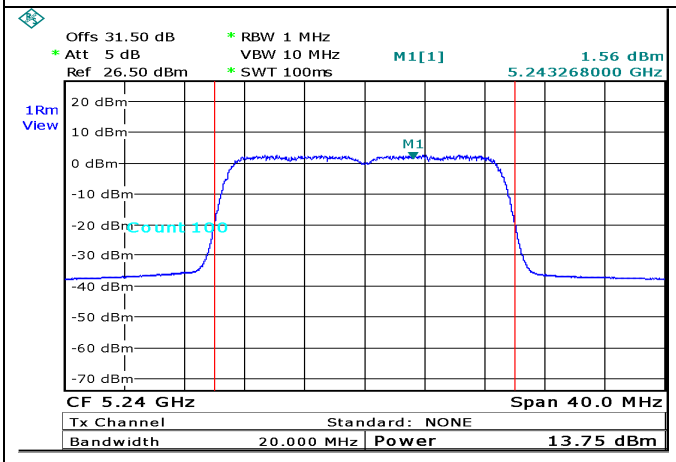


Figure 184. 5240.0MHz, 20MHz BW, port 1

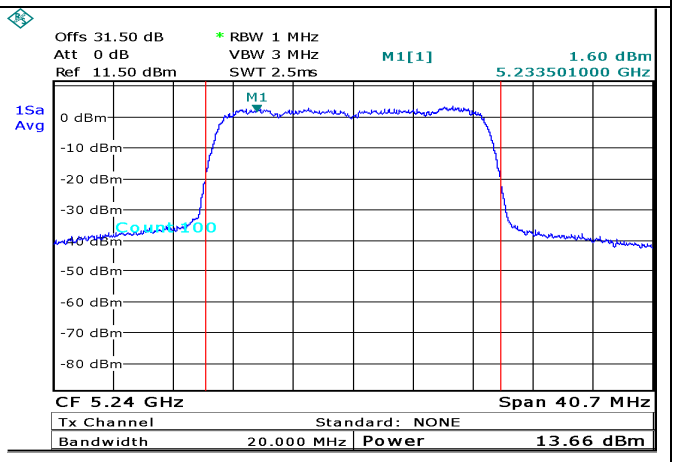


Figure 185. 5240.0MHz, 20MHz BW, port 2

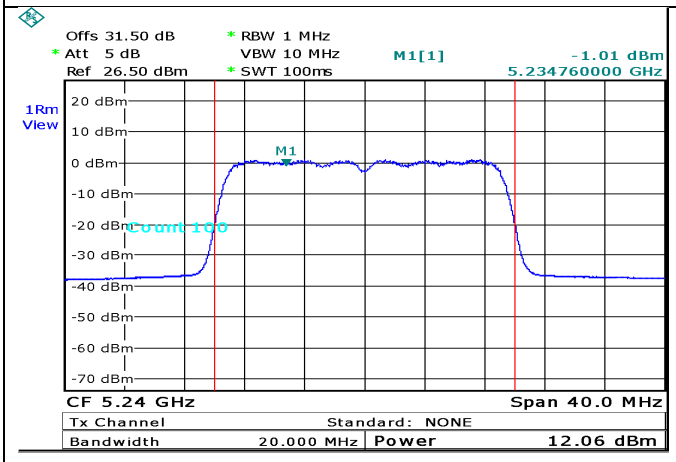


Figure 186. 5240.0MHz, 20MHz BW, port 3

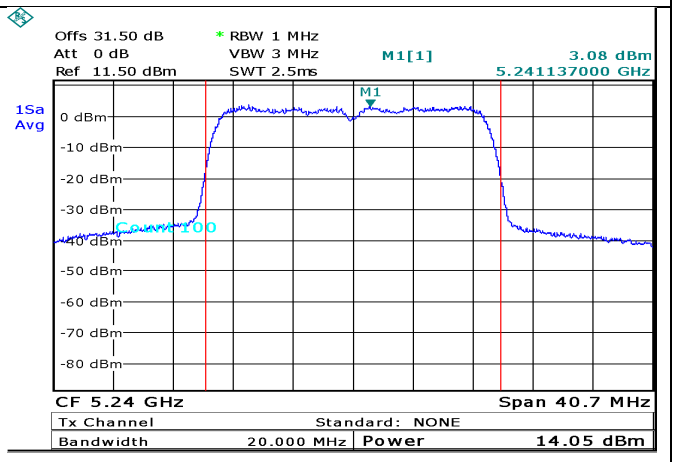


Figure 187. 5240.0MHz, 20MHz BW, port 4

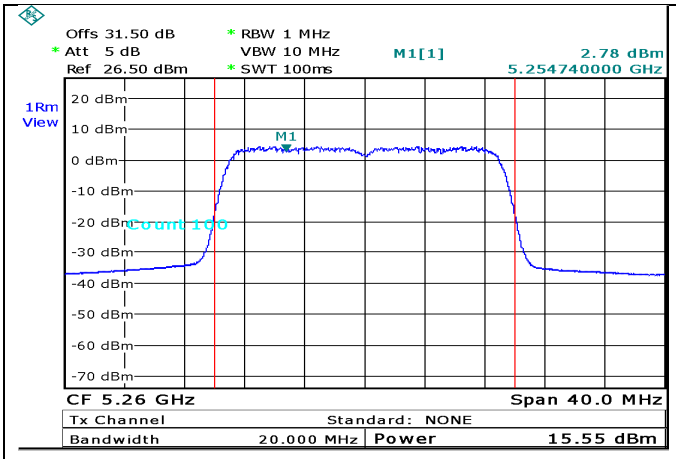


Figure 188. 5260.0MHz, 20MHz BW, port 1

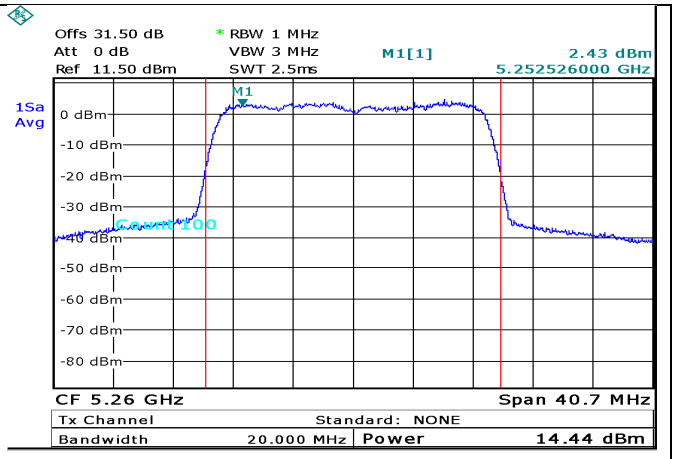


Figure 189. 5260.0MHz, 20MHz BW, port 2

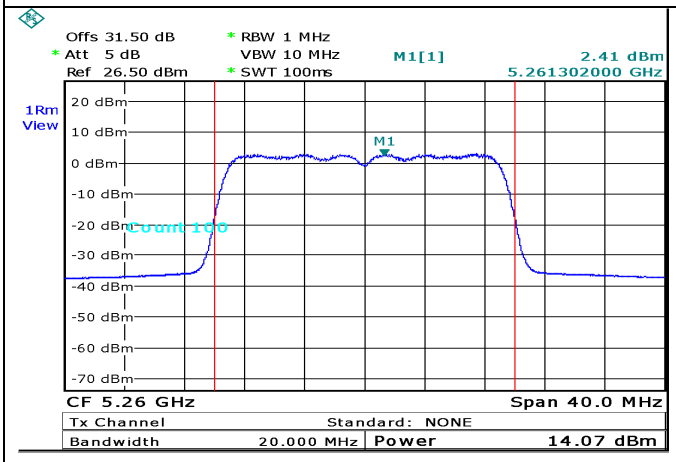


Figure 190. 5260.0MHz, 20MHz BW, port 3

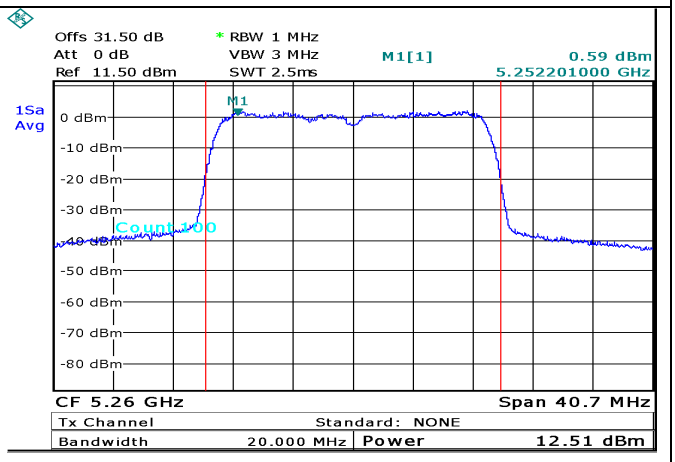


Figure 191. 5260.0MHz, 20MHz BW, port 4

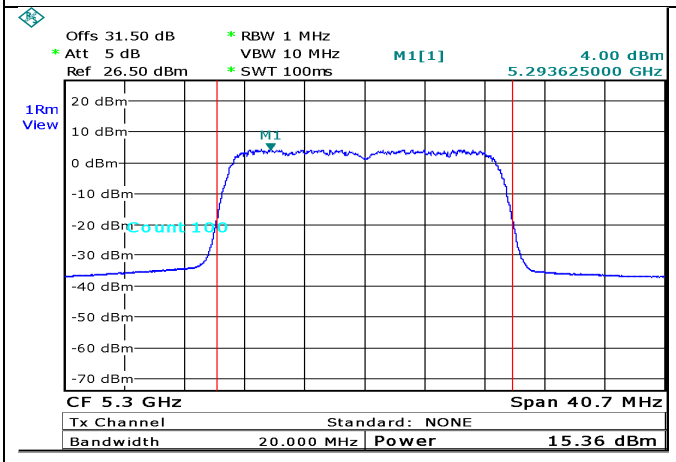


Figure 192. 5300.0MHz, 20MHz BW, port 1

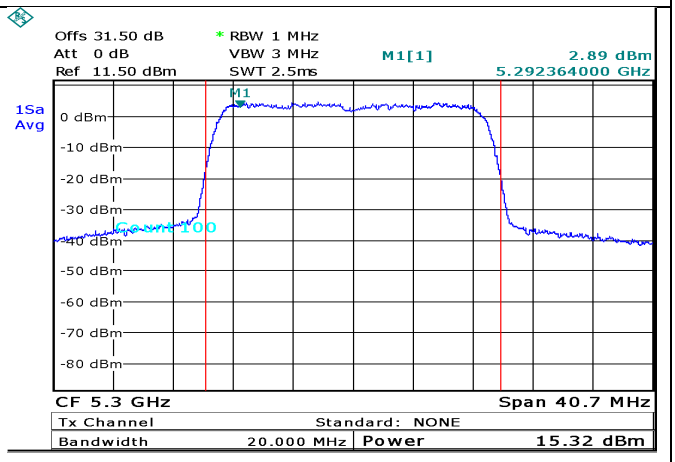


Figure 193. 5300.0MHz, 20MHz BW, port 2

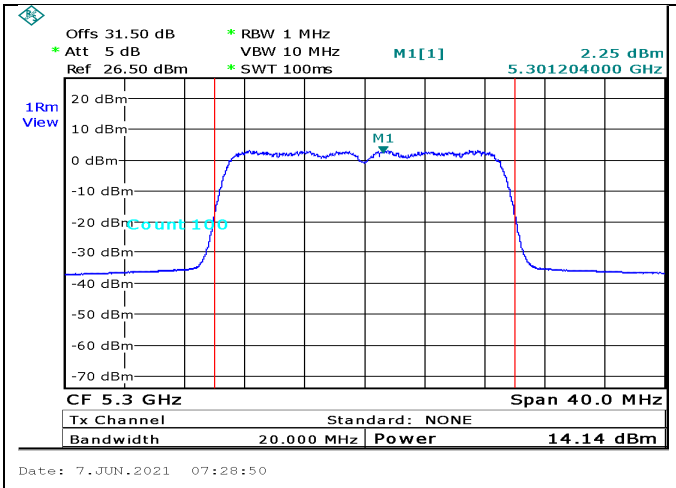


Figure 194. 5300.0MHz, 20MHz BW, port 3

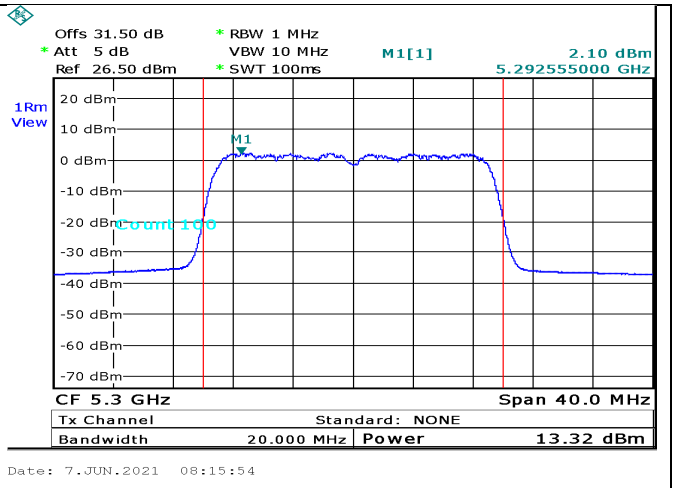


Figure 195. 5300.0MHz, 20MHz BW, port 4

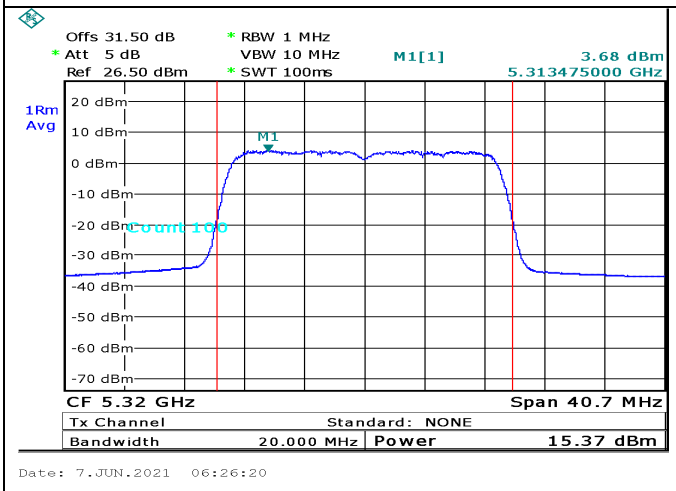


Figure 196. 5320.0MHz, 20MHz BW, port 1

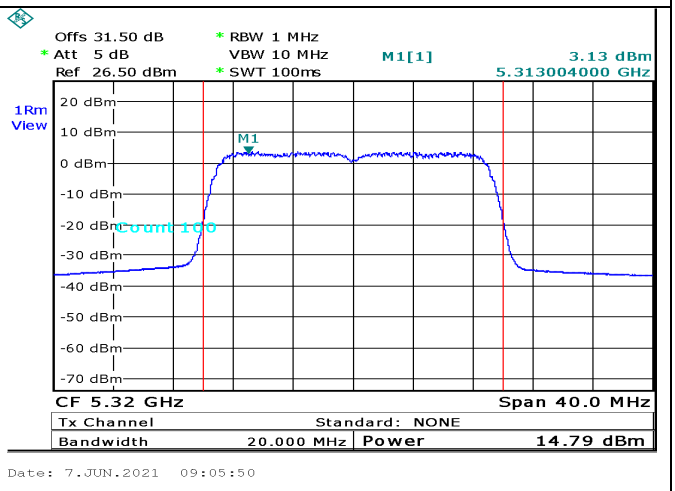


Figure 197. 5320.0MHz, 20MHz BW, port 2

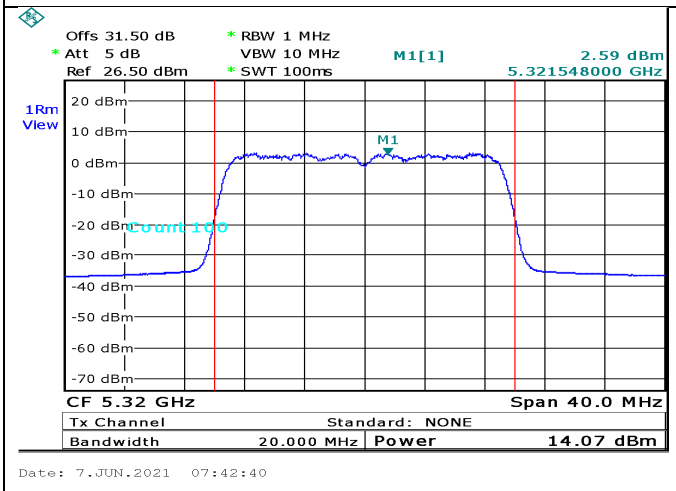


Figure 198. 5320.0MHz, 20MHz BW, port 3

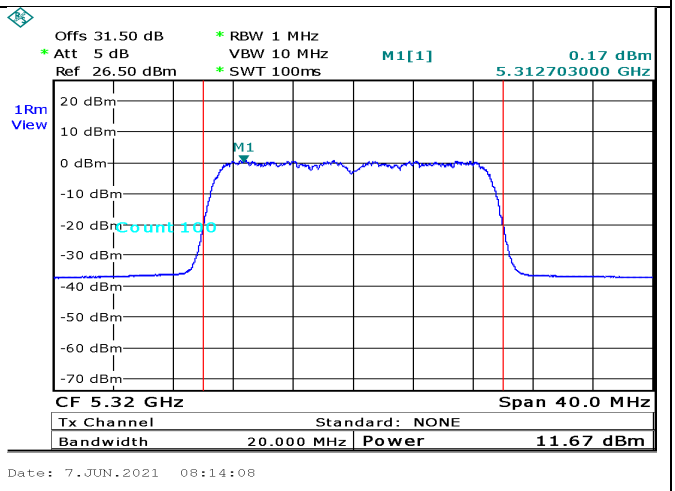


Figure 199. 5320.0MHz, 20MHz BW, port 4

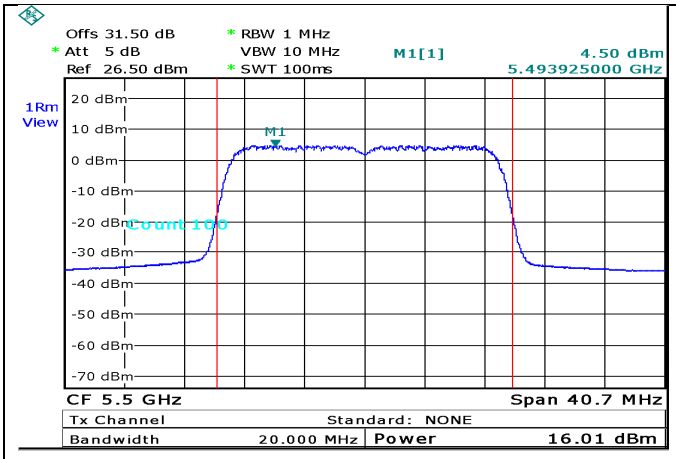


Figure 200. 5500.0MHz, 20MHz BW, port 1

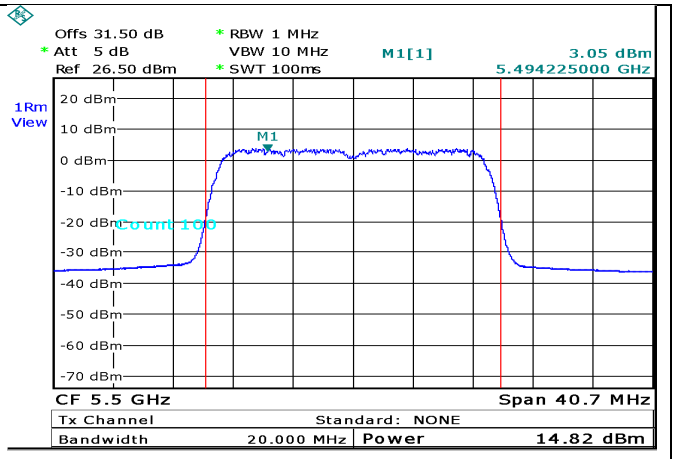


Figure 201. 5500.0MHz, 20MHz BW, port 2

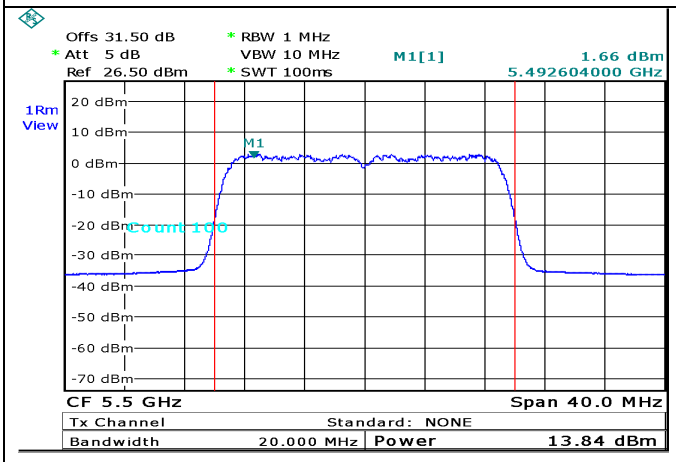


Figure 202. 5500.0MHz, 20MHz BW, port 3

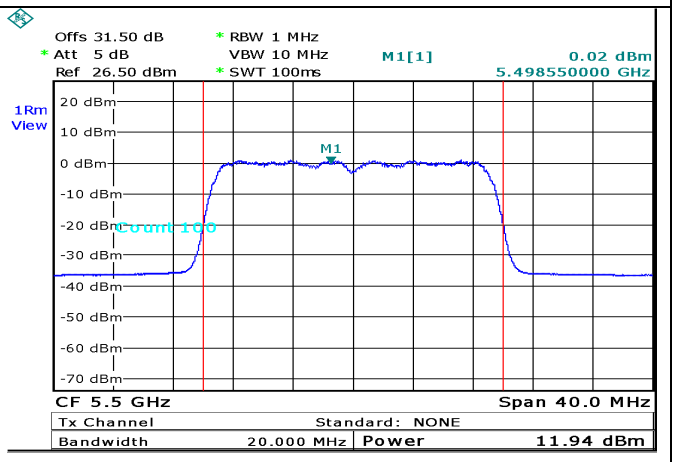


Figure 203. 5500.0MHz, 20MHz BW, port 4

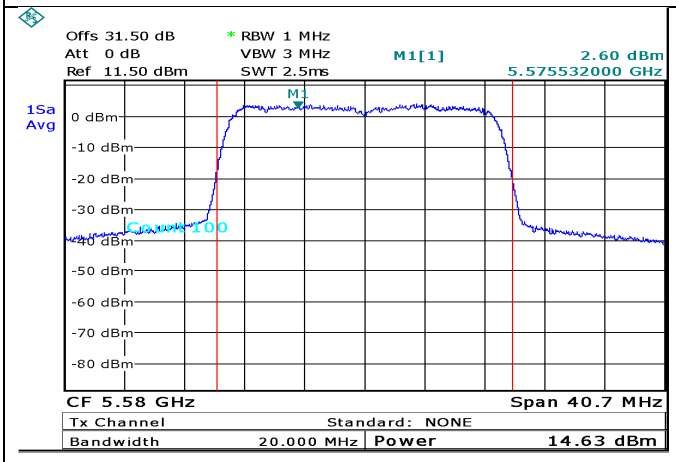


Figure 123. 5580.0MHz, 20MHz BW, port 1

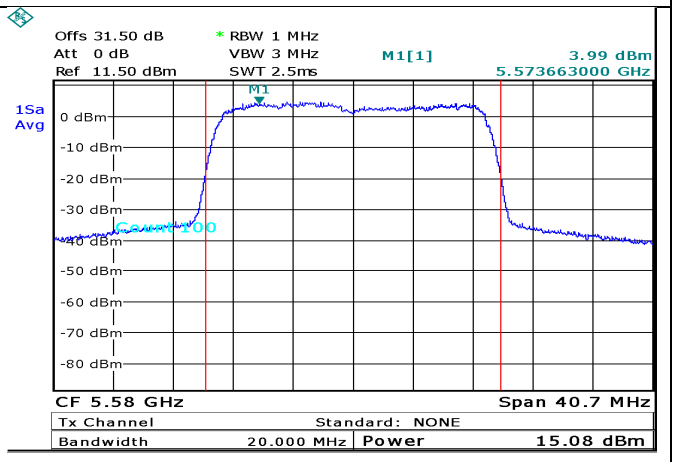


Figure 123. 5580.0MHz, 20MHz BW, port 2

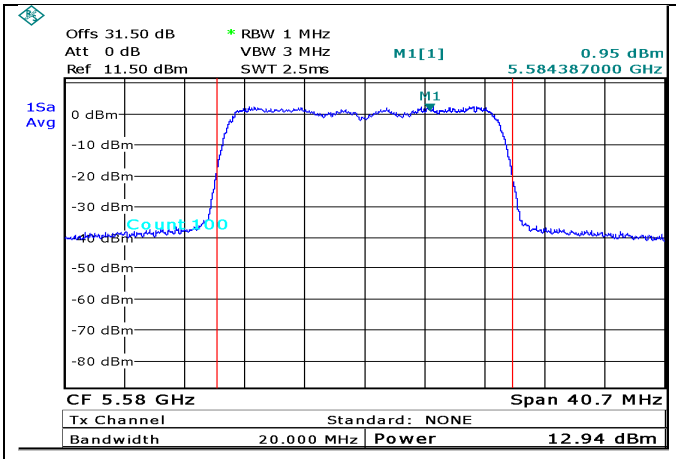


Figure 204. 5580.0MHz, 20MHz BW, port 3

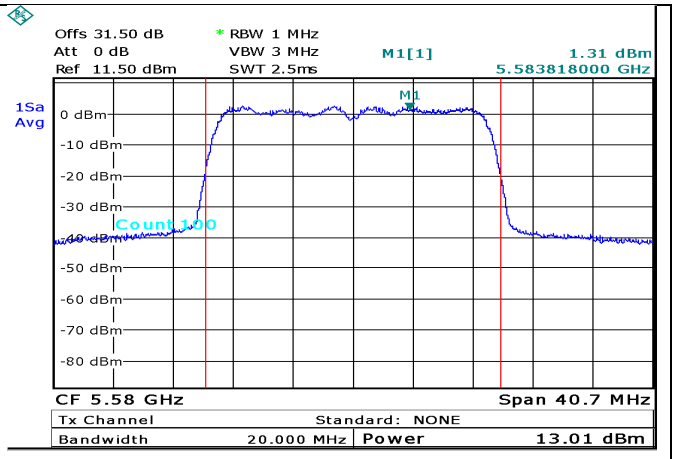


Figure 205. 5580.0MHz, 20MHz BW, port 4

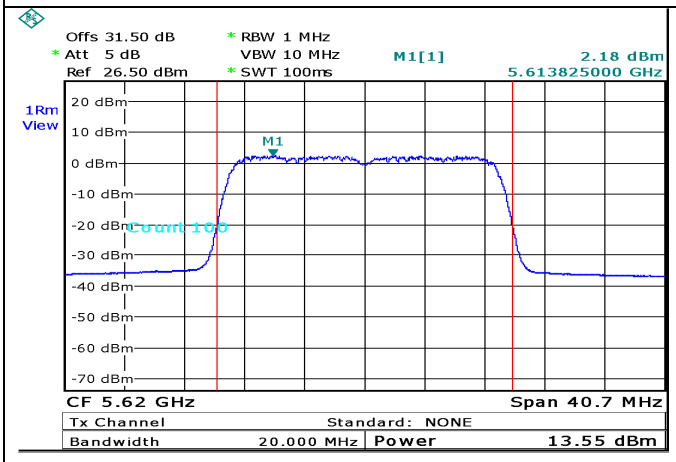


Figure 206. 5620.0MHz, 20MHz BW, port 1

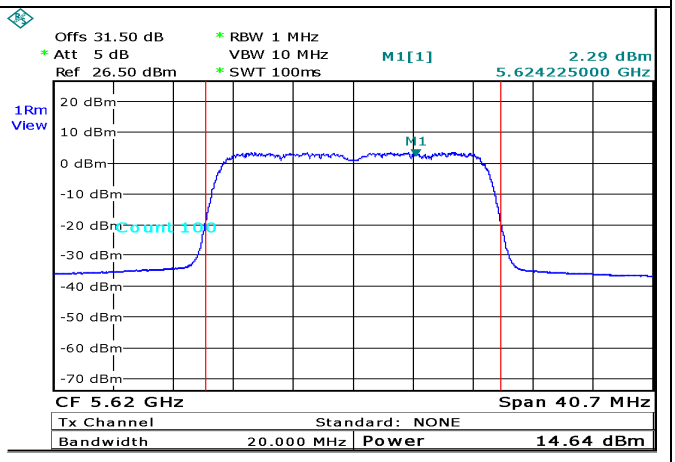


Figure 207. 5620.0MHz, 20MHz BW, port 2

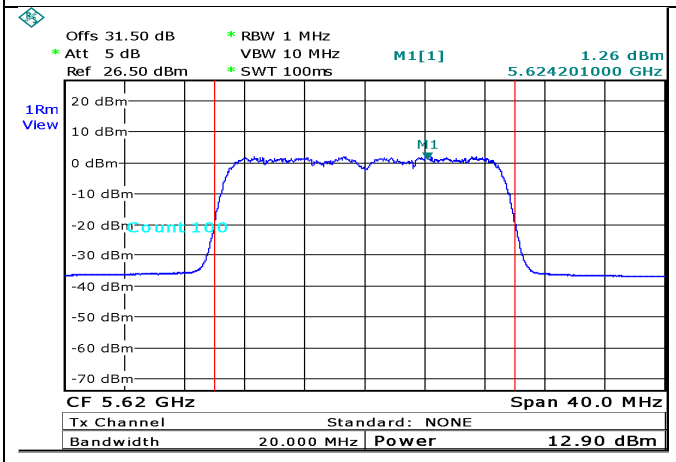


Figure 208. 5620.0MHz, 20MHz BW, port 3

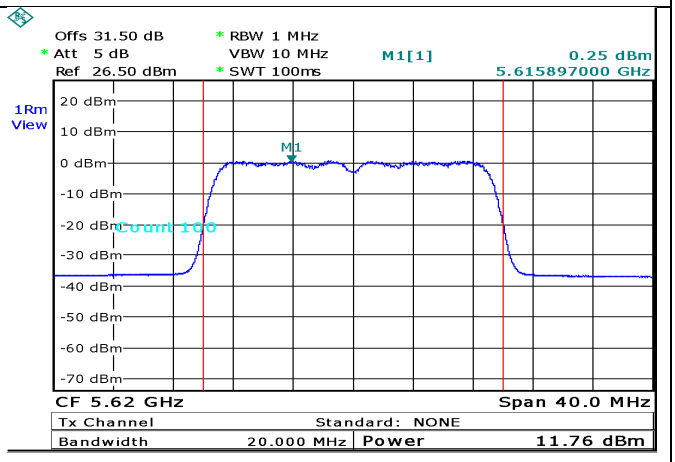


Figure 209. 5620.0MHz, 20MHz BW, port 4

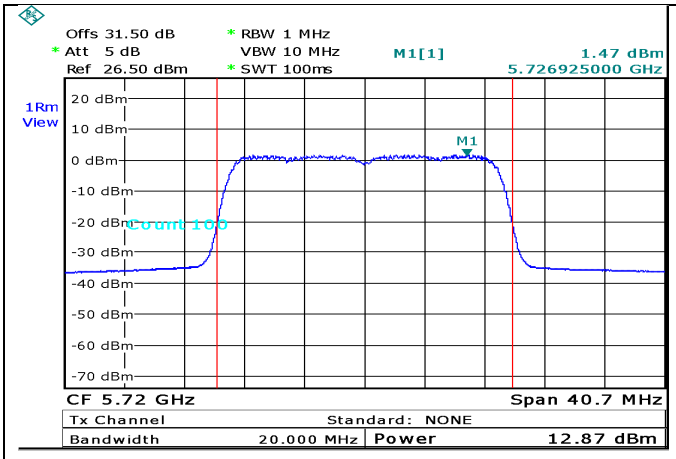


Figure 210. 5720.0MHz, 20MHz BW, port 1

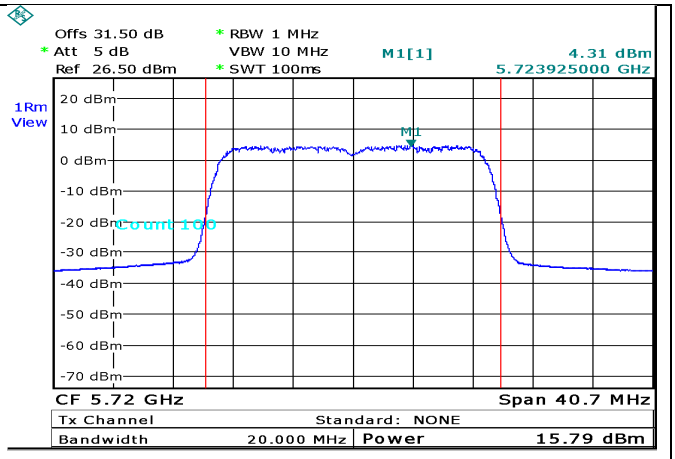


Figure 211. 5720.0MHz, 20MHz BW, port 2

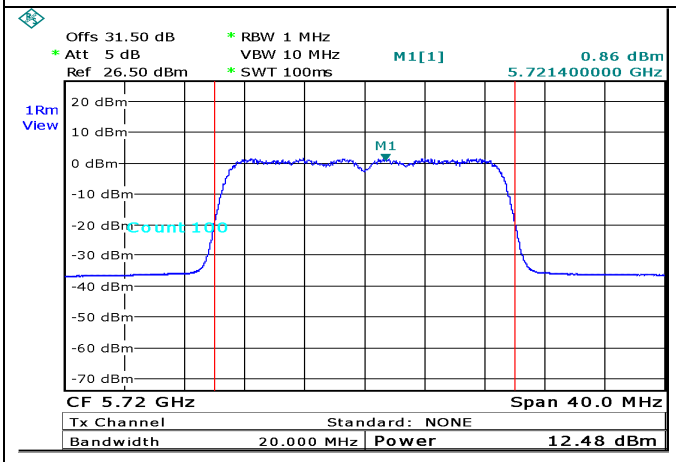


Figure 212. 5720.0MHz, 20MHz BW, port 3

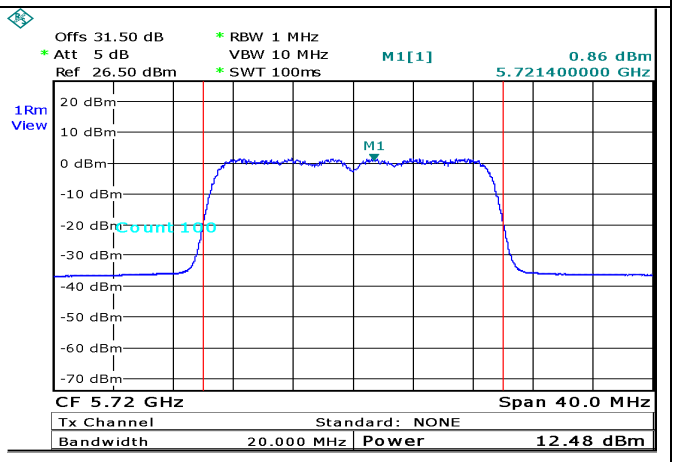


Figure 213. 5720.0MHz, 20MHz BW, port 4

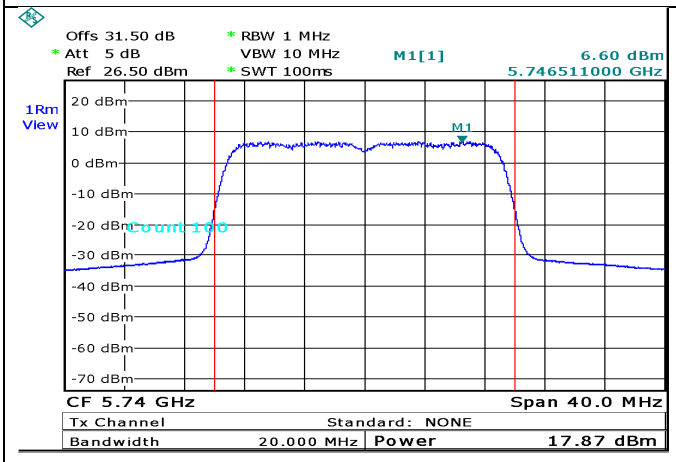


Figure 214. 5740.0MHz, 20MHz BW, port 1

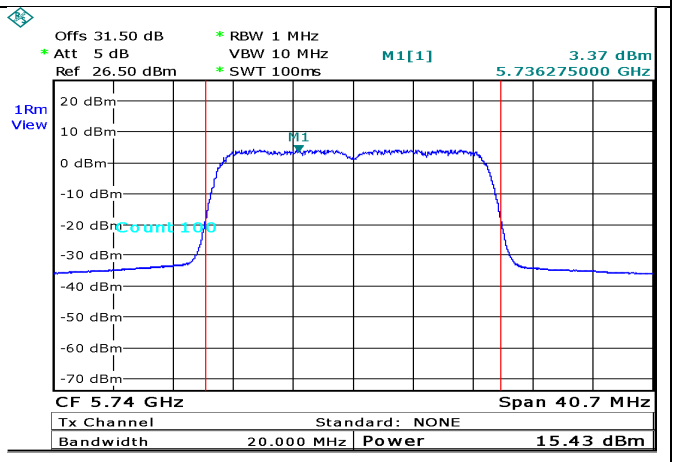


Figure 215. 5740.0MHz, 20MHz BW, port 2

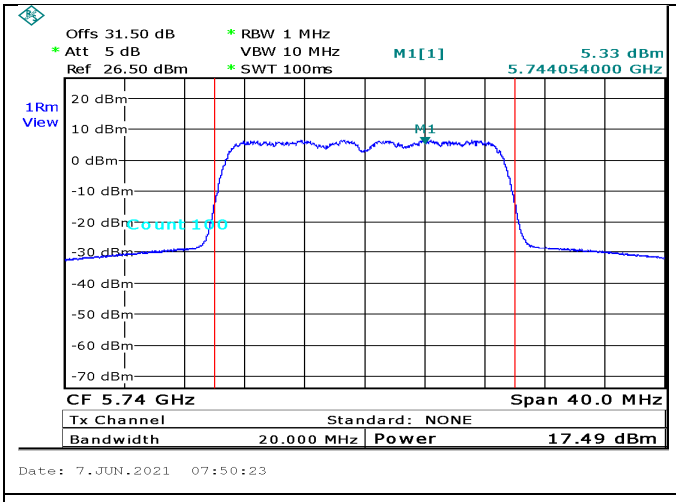


Figure 216. 5740.0MHz, 20MHz BW, port 3

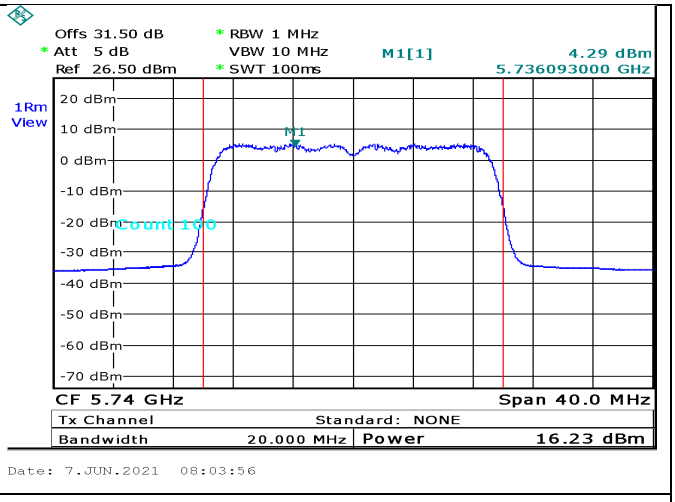


Figure 217. 5740.0MHz, 20MHz BW, port 4

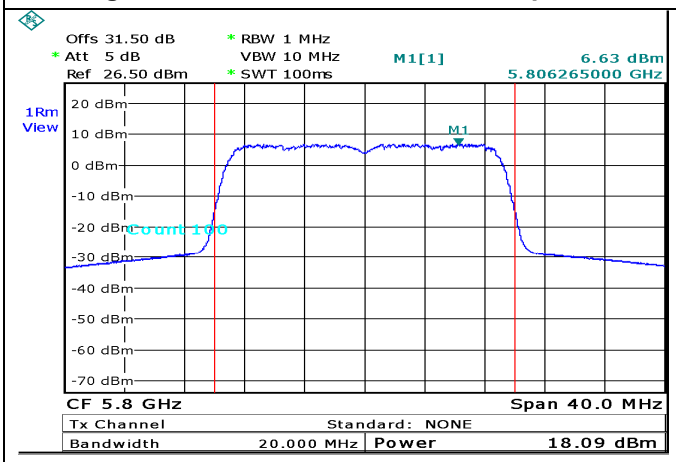


Figure 218. 5800.0MHz, 20MHz BW, port 1

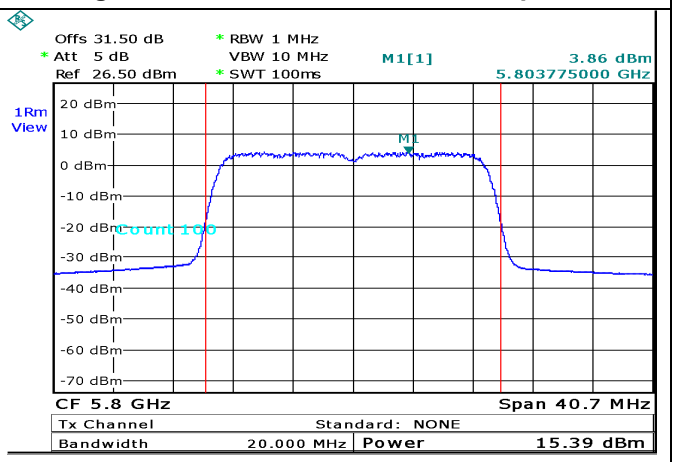


Figure 219. 5800.0MHz, 20MHz BW, port 2

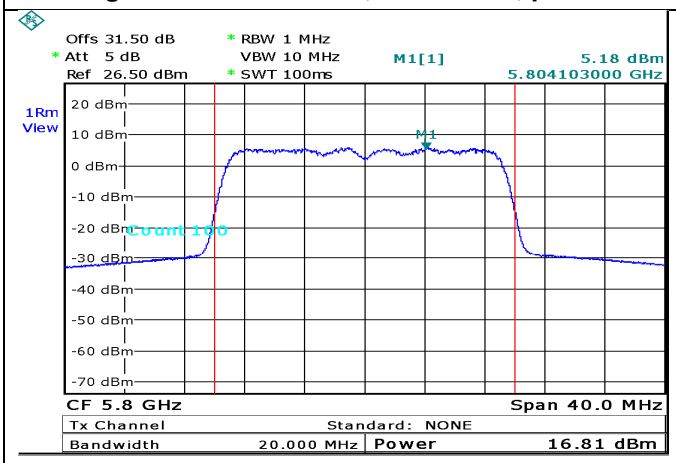


Figure 220. 5800.0MHz, 20MHz BW, port 3

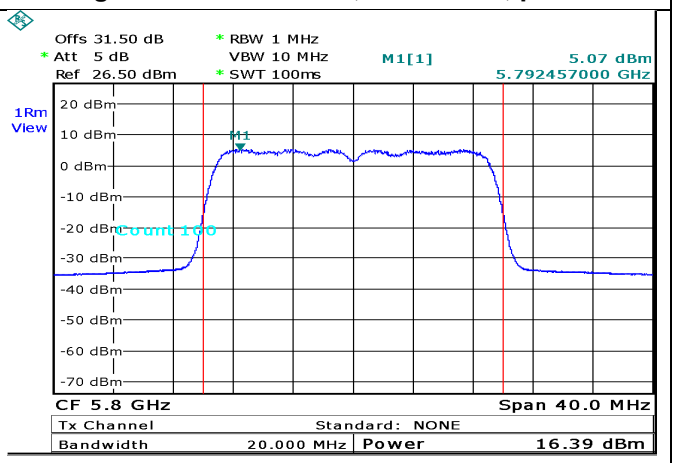


Figure 221. 5800.0MHz, 20MHz BW, port 4

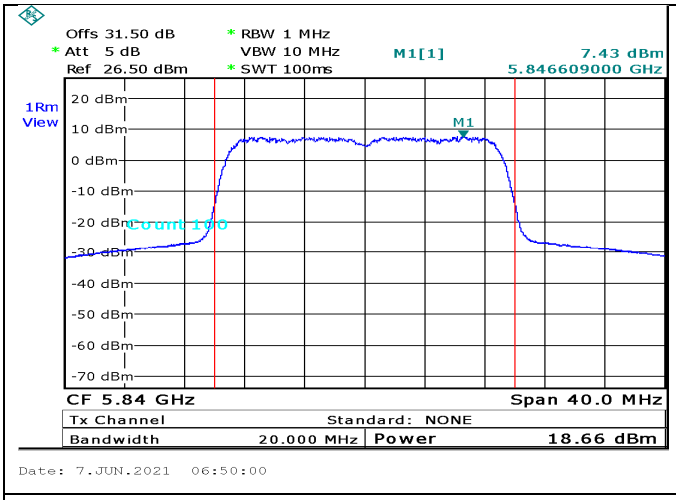


Figure 222. 5840.0MHz, 20MHz BW, port 1

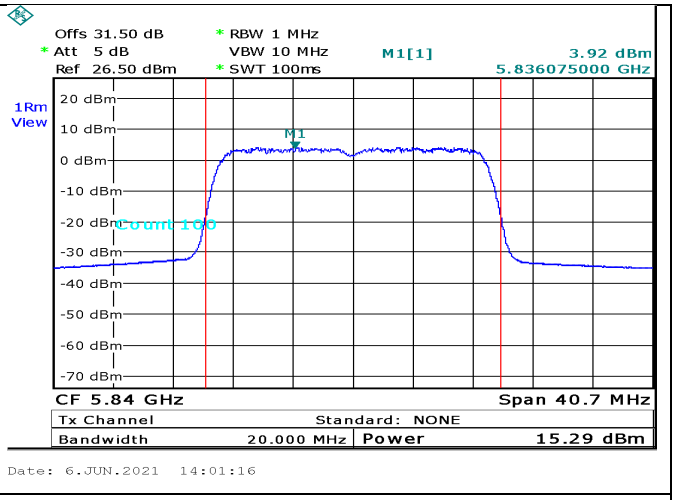


Figure 223. 5840.0MHz, 20MHz BW, port 2

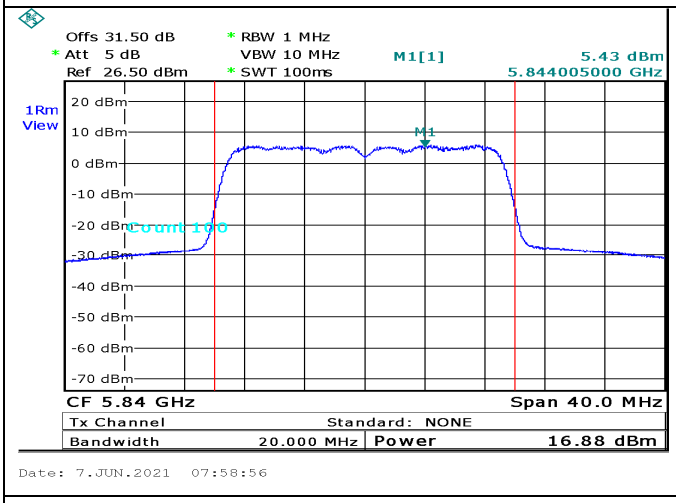


Figure 224. 5840.0MHz, 20MHz BW, port 3

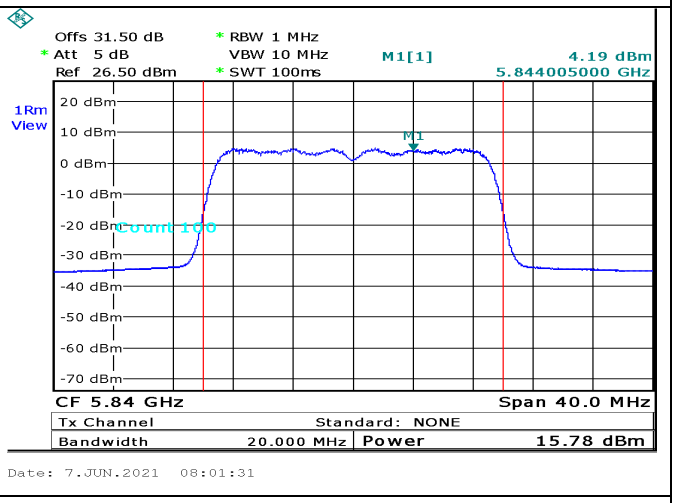


Figure 225. 5840.0MHz, 20MHz BW, port 4

9.6 Test Equipment Used; Transmitted Power Density

Instrument	Manufacturer	Model	Serial No.	Last Calibration	Next Calibration
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	23/02/2020	23/02/2022
Low Loss cable	Huber Shunner	Sucofelex	27504/4PEA	23/08/2020	23/08/2021
30 dB attenuator	MCL	BW-S30W5	533	23/08/2020	23/08/2021

Figure 226 Test Equipment Used

10 Band Edge

10.1 Test Specification

FCC Part 15, Subpart E, Section 15.407(b)(1-7)
RSS 247, Sections 6.2.1.2
RSS-Gen, Issue 4, November 2014

10.2 Test Procedure

(Temperature (22°C)/ Humidity (56%RH))
Testing was performed for both Radiated Emission for Emissions in the Non-Restricted Bands & in the Restricted Bands:

The E.U.T was tested inside the shielded room and placed on a non-metallic table, 1.5 meters above the ground. The emissions were measured at a distance of 3 meters. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.

- For band edge emissions that falls near the restricted band section II.G.1c applied with measuring methods as described in section II.G.5 (b) and II.G.6 (Method AD) of KDB 789033 D02
- For band edge emissions that falls outside the restricted band section II.G.2c and 2diii were applied with measuring methods as described in section II.G.5 (b) of KDB 789033 D02

Evaluation was performed for 20.0 MHz BW transmissions.

The highest radiations are described in the tables below.

10.3 Test Limits FCC/IE

Operating Band	Tested frequency/range	Up band edge (Non restricted band)	Low Band edge (restricted band)
(MHz)	(MHz)	(dBm)	(dBm)
5150-5250	5149.5	NA	Peak: -21.2(74dBuV/m@3m) Avg : -41.2(54dBuV/m@3m)
5250-5350	5350.5	Peak: -21.2(74dBuV/m@3m) Avg: -41.2(54dBuV/m@3m)	NA
5470-5725	5469.5	NA	Peak: -21.2(74dBuV/m@3m) Avg: -41.2(54dBuV/m@3m)

Operating Band (MHz)	Tested frequency/range (MHz)	Up/Low band edge (Non restricted band) (dBm)	Up/Low Band edge (restricted band) (dBm)
5725-5850	5850-5855	27 dBm/MHz at frequencies from the band edges decreasing linearly to 15.6 dBm/MHz at 5 MHz above or below the band edges	NA
	5855-5875	15.6 dBm/MHz at 5 MHz above or below the band edges decreasing linearly to 10 dBm/MHz at 25 MHz above or below the band edges;	NA
	5875-5925	10 dBm/MHz at 25 MHz above or below the band edges decreasing linearly to -27 dBm/MHz at 75 MHz above or below the band edges; and -27 dBm/MHz at frequencies more than 75 MHz above or below the band edges.	NA

*The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.

In addition to the IC standard, any unwanted emission that falls into the band 5250-5350 MHz shall be attenuated below the channel power by at least 26 dB, when measured using a resolution bandwidth between 1 and 5% of the occupied bandwidth (i.e. 99% bandwidth), above 5250 MHz

10.4 Test Results

JUDGEMENT: Passed
The EUT met the requirements of the F.C.C. Part 15, Subpart E, Section 15.407(b)(1-7) and RSS 247, Sections 6.2.1(2), 6.2.2(2), 6.2.3(2), 6.2.4(2) specifications.
For details see Figure 227 to Figure 262.

10.5 Test Results of Band Edge Emissions with 4 Ports Transmission Configuration

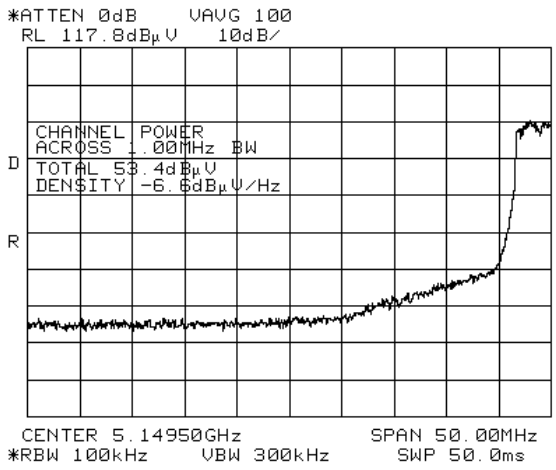


Figure 227: UNII 1, 5.1495GHz, Rest. Band AVG [Vertical]

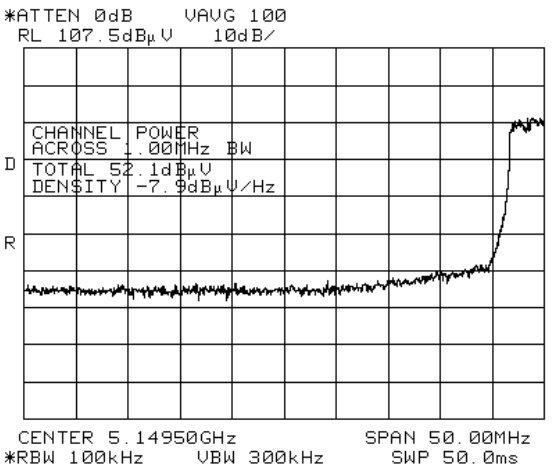


Figure 228: UNII 1, 5.1495GHz, Rest. Band AVG [Hor]

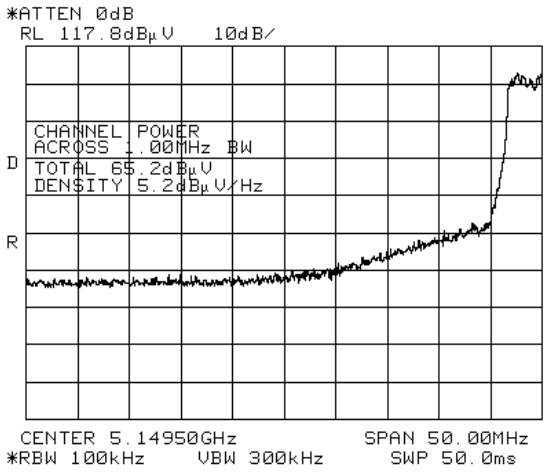


Figure 229: UNII 1, 5.1495GHz, Rest. Band Peak [Vertical]

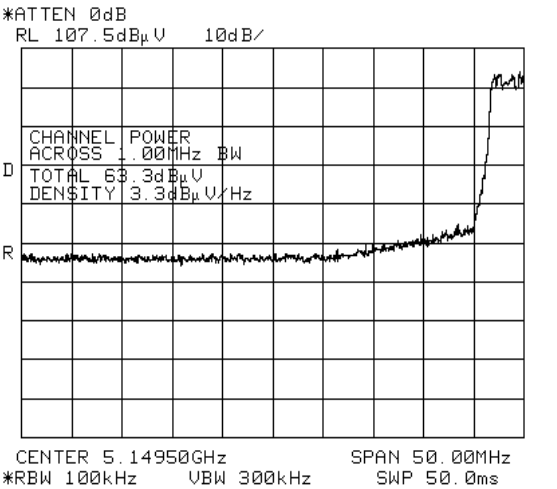


Figure 230: UNII 1, 5.1495GHz, Rest. Band Peak [Hor]

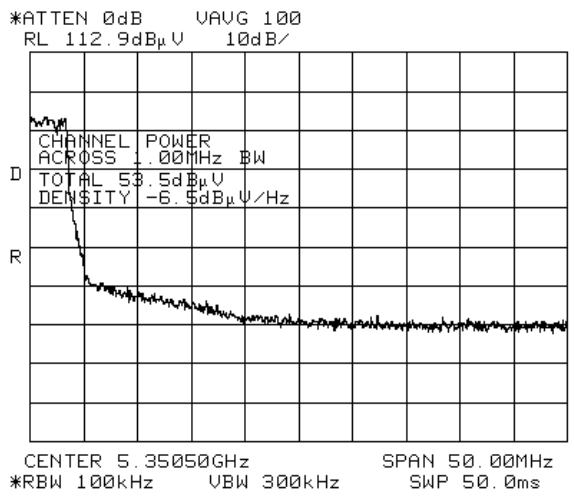


Figure 231: UNII 2A, 5.3505GHz, Rest. Band AVG [Vertical]

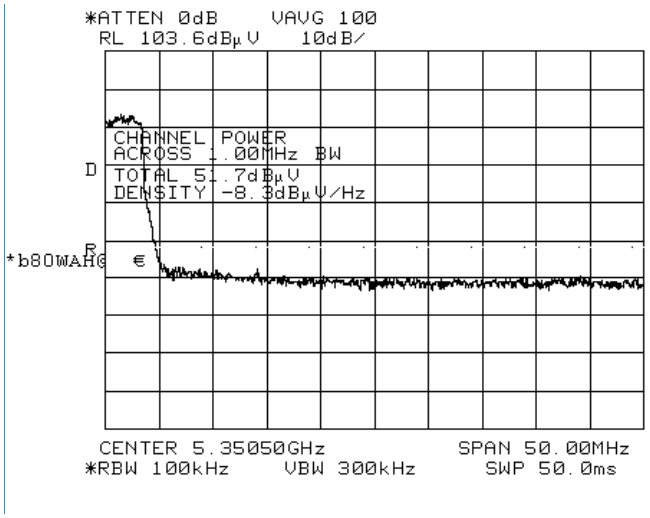


Figure 232: UNII 2A, 5.3505GHz, Rest. Band AVG [Hor]

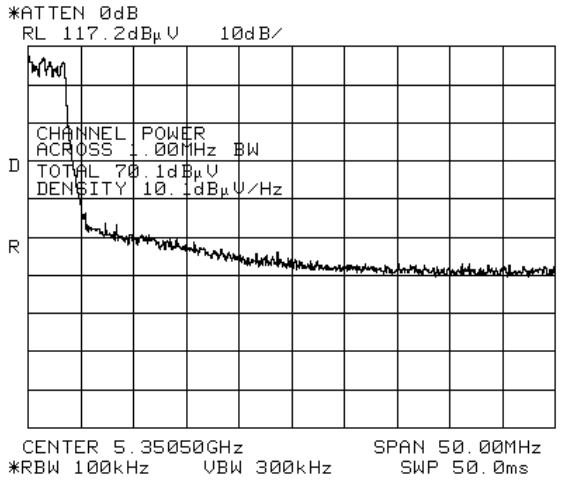


Figure 233: UNII 2A, 5.3505GHz, Rest. Band Peak [Vertical]

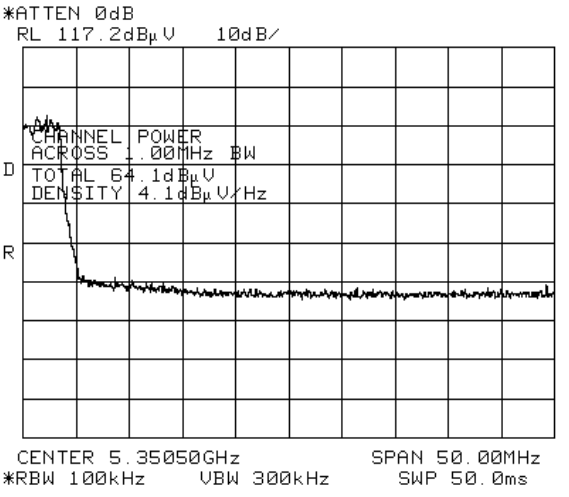


Figure 234: UNII 2A, 5.3505GHz, Rest. Band Peak [Hor]

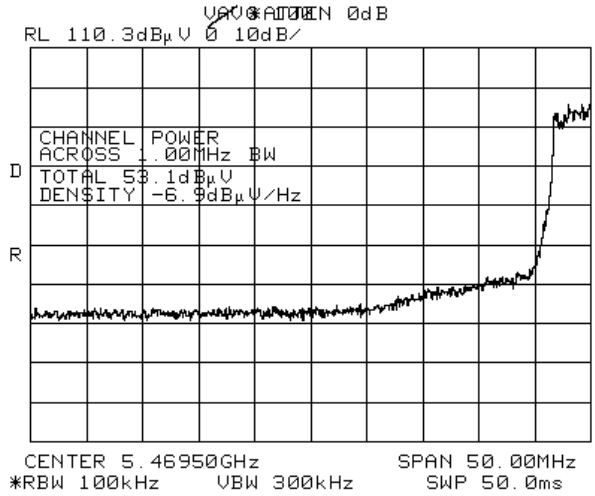


Figure 235: UNII 2C, 5.4695GHz, Rest. Band AVG [Vertical]

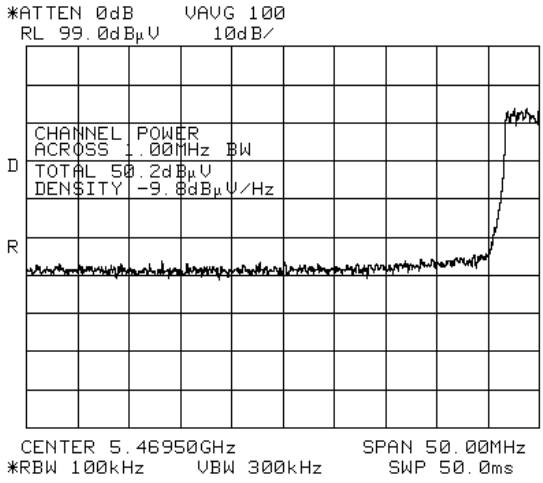


Figure 236: UNII 2C, 5.4695GHz, Rest. Band AVG [Hor]

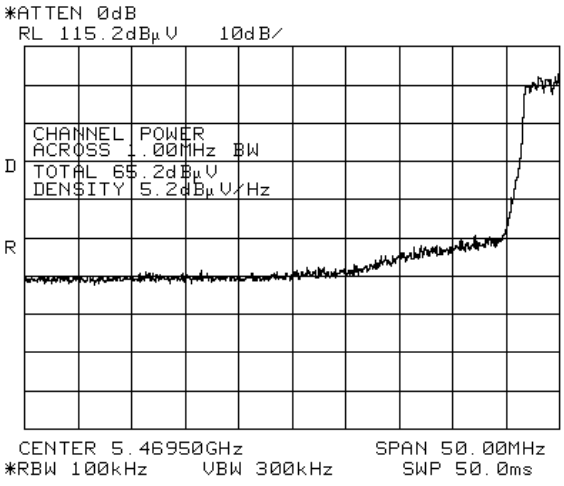


Figure 237: UNII 2C, 5.4695GHz, Rest. Band Peak [Vertical]

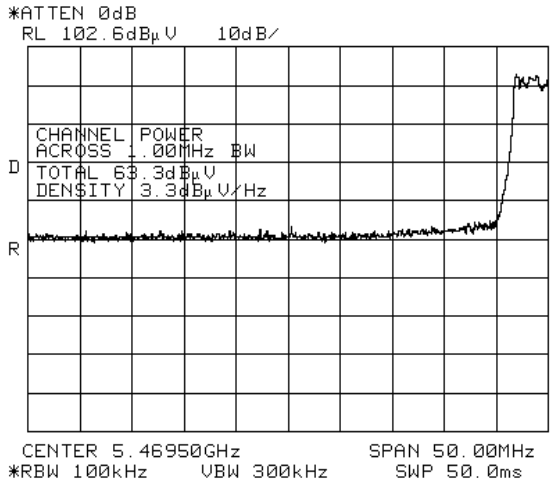


Figure 238: UNII 2C, 5.4695GHz, Rest. Band Peak [Hor]

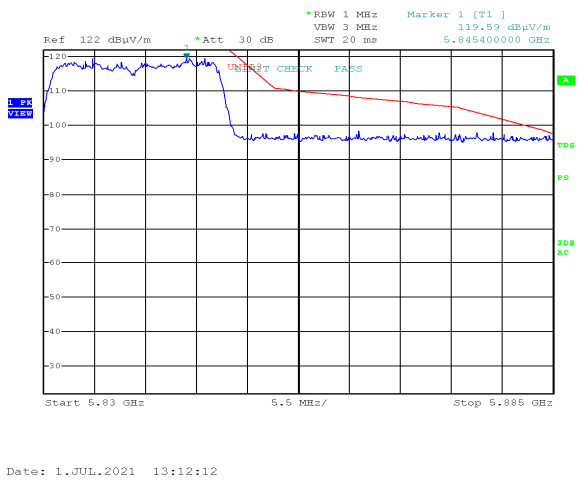


Figure 239: UNII 3, 5.830-5.885GHz, [Hor]

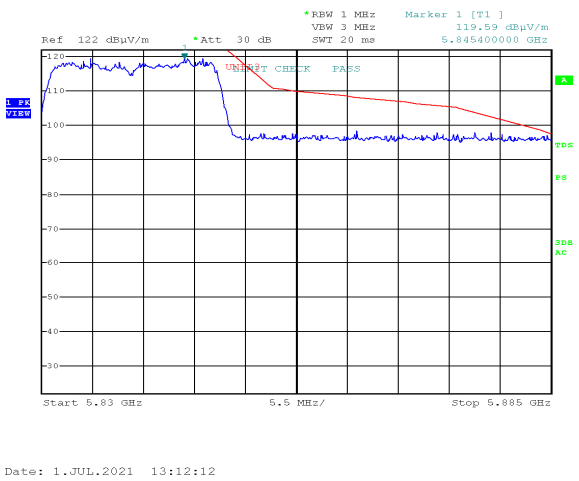


Figure 240: UNII 3, 5.885-5.935GHz, [Hor]

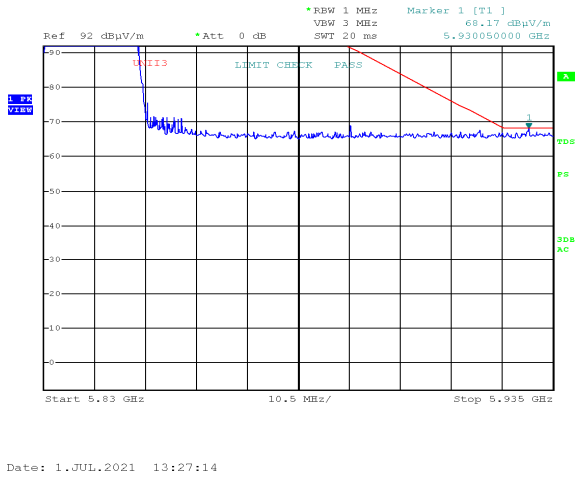


Figure 241: UNII 3, 5.830-5.935GHz, [Hor]

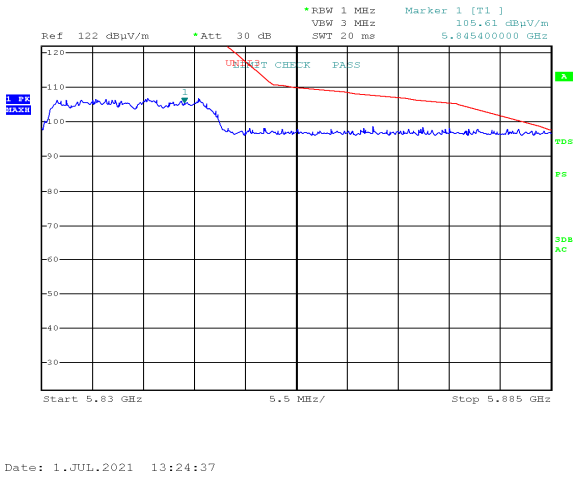


Figure 242: UNII 3, 5.83-5.885GHz, [Hor]

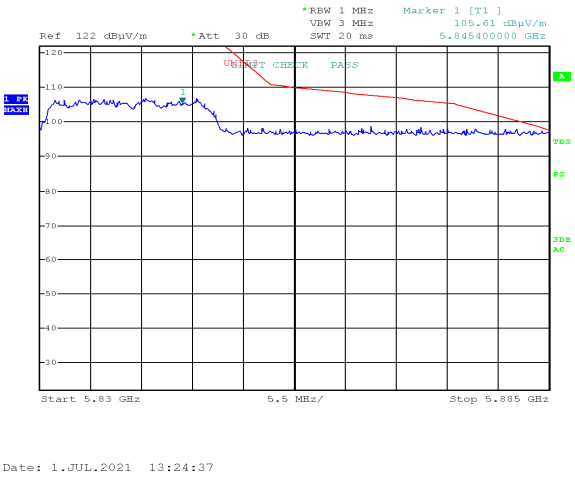


Figure 243: UNII 3, 5.830-5.935GHz, [Ver]

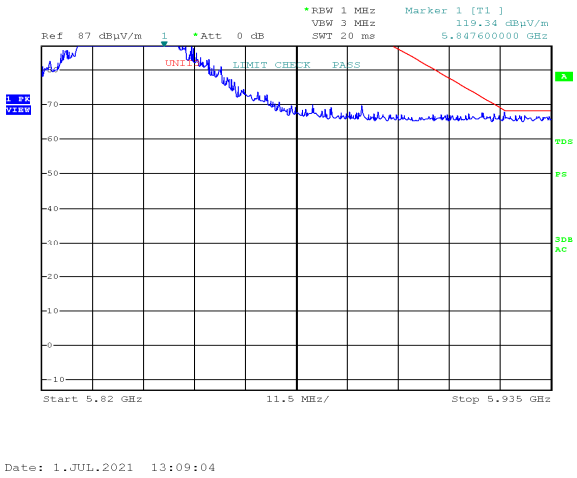


Figure 244: UNII 3, 5.820-5.935GHz, [Ver]

10.6 Test Results of Band Edge Emissions with 2 Ports Transmission Configuration

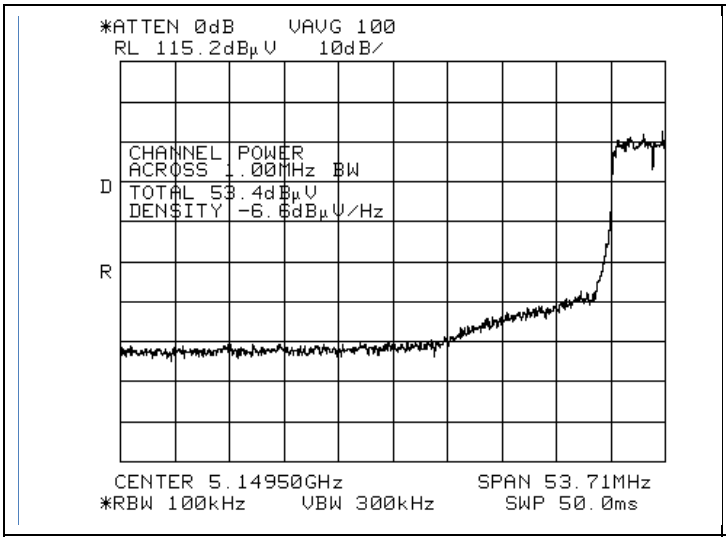


Figure 245: UNII 1, 5.1495GHz, Rest. Band AVG [Vertical]

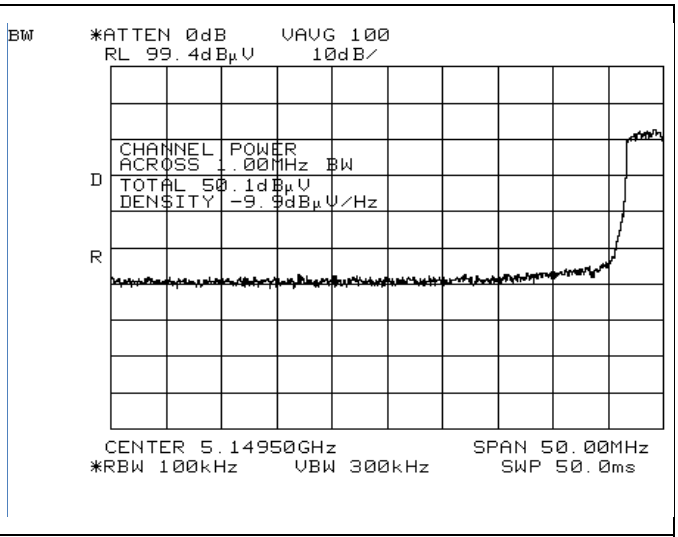


Figure 246: UNII 1, 5.1495GHz, Rest. Band AVG [Hor]

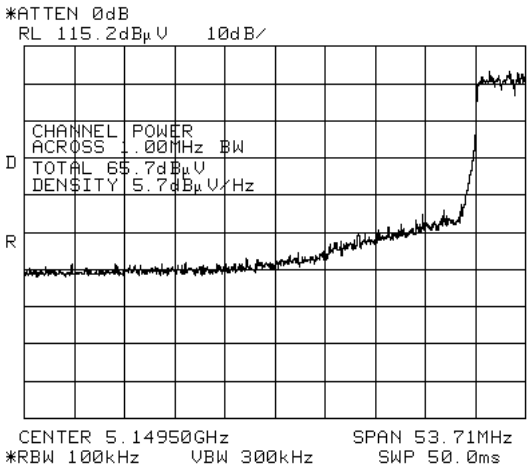


Figure 247: UNII 1, 5.1495GHz, Rest. Band Peak [Vertical]

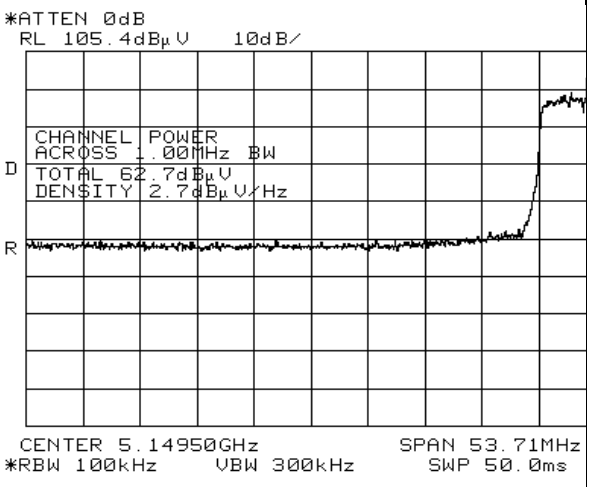


Figure 248: UNII 1, 5.1495GHz, Rest. Band Peak [Hor]

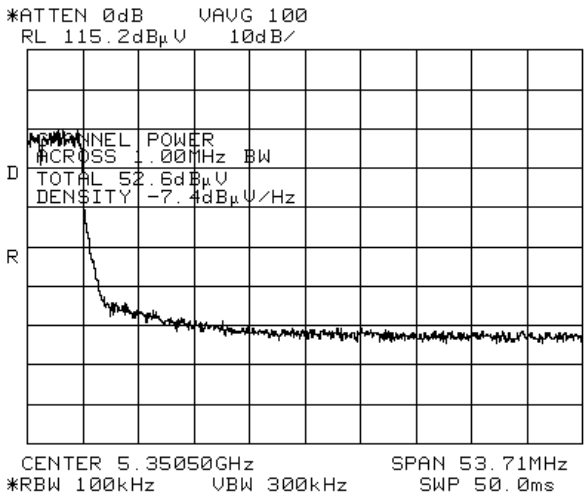


Figure 249: UNII 2A, 5.3505GHz, Rest. Band AVG [Vertical]

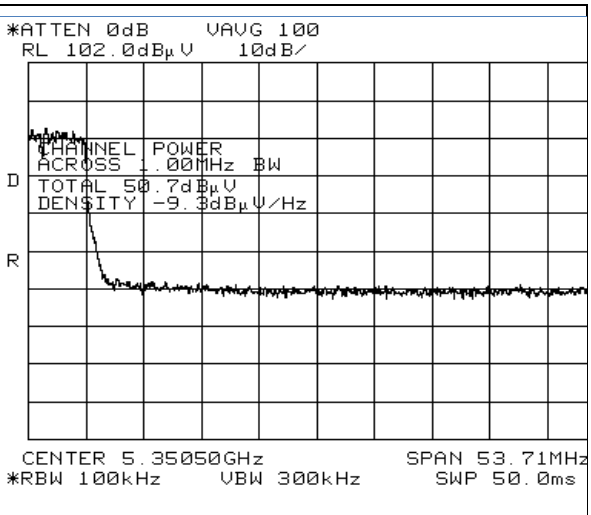


Figure 250: UNII 2A, 5.3505GHz, Rest. Band AVG [Hor]

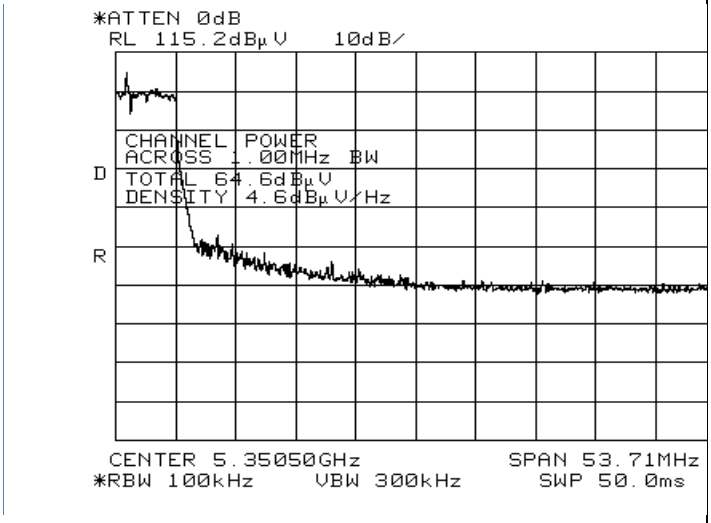


Figure 251: UNII 2A, 5.3505GHz, Rest. Band Peak [Vertical]

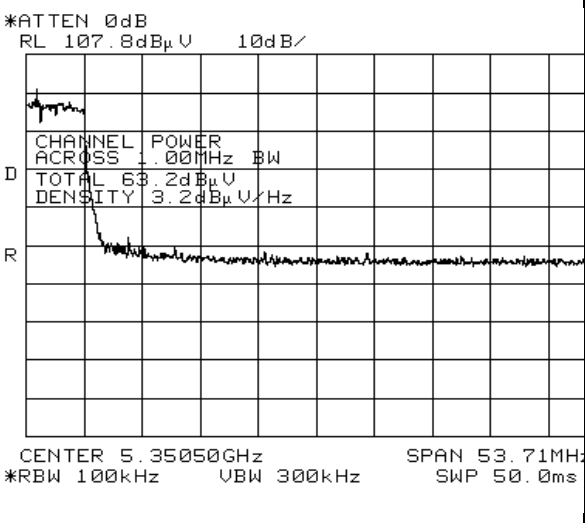


Figure 252: UNII 2A, 5.3505GHz, Rest. Band Peak [Hor]

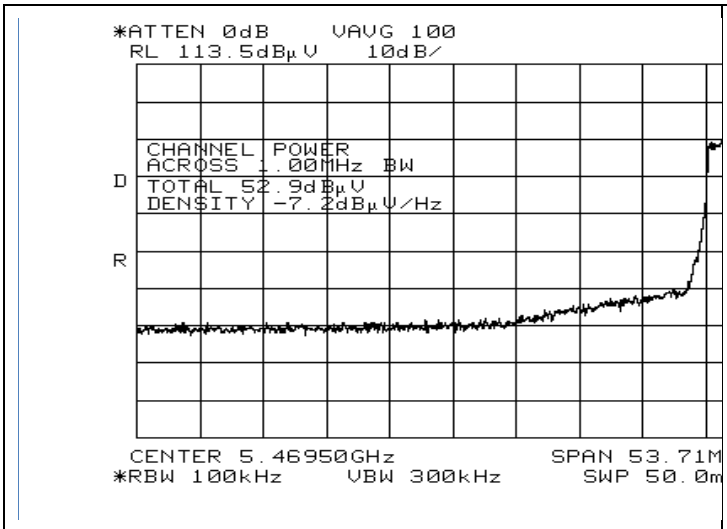


Figure 253: UNII 2C, 5.4695GHz, Rest. Band AVG [Vertical]

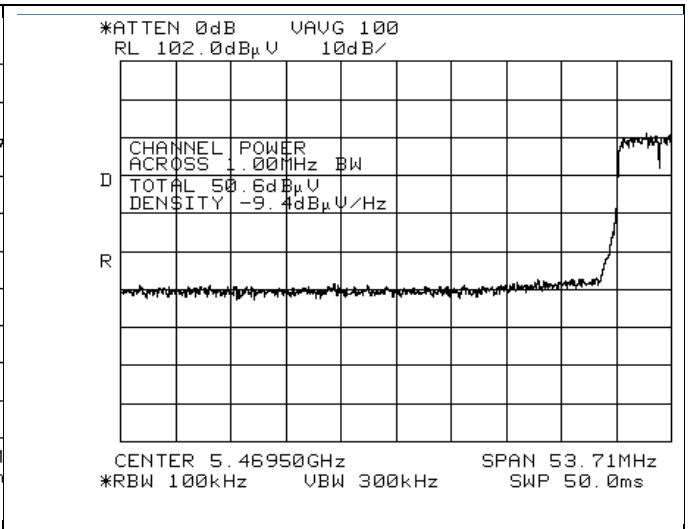


Figure 254: UNII 2C, 5.4695GHz, Rest. Band AVG [Hor]

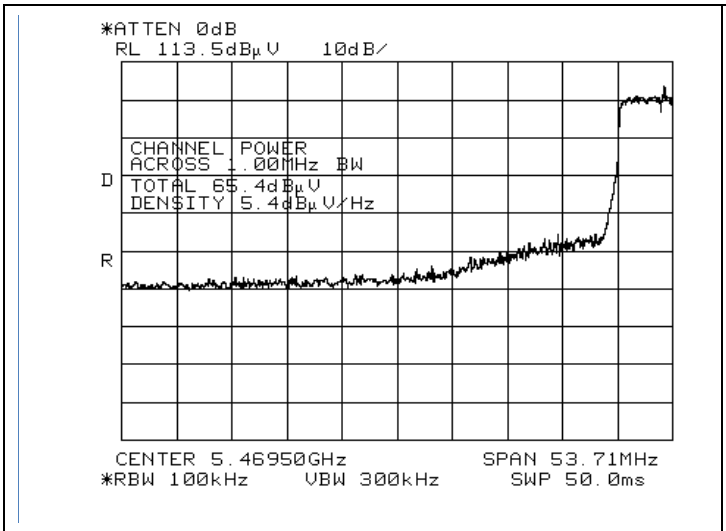


Figure 255: UNII 2C, 5.4695GHz, Rest. Band Peak [Vertical]

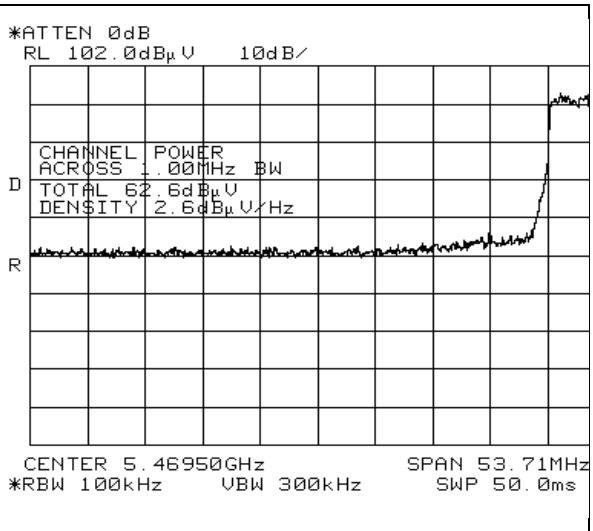


Figure 256: UNII 2C, 5.4695GHz, Rest. Band Peak [Hor]

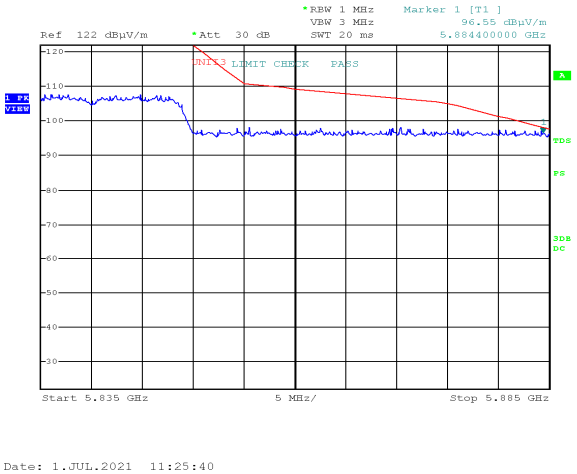


Figure 257: UNII 3, 5.835-5.885GHz, [Hor]

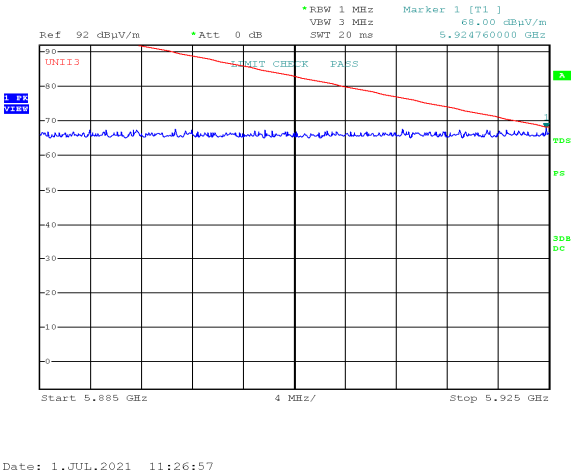


Figure 258: UNII 3, 5.885-5.935GHz, [Hor]

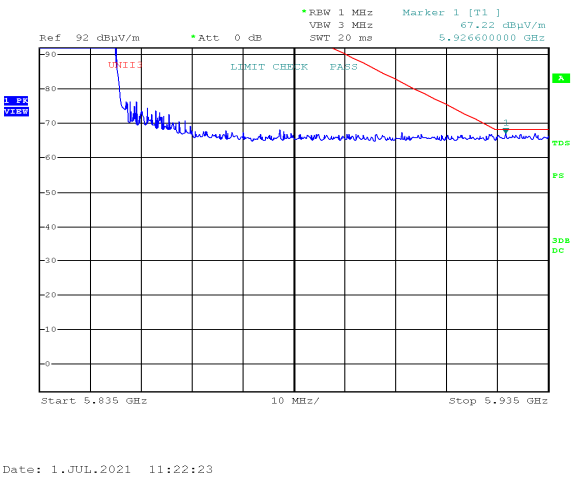


Figure 259: UNII 3, 5.835-5.935GHz, [Hor]

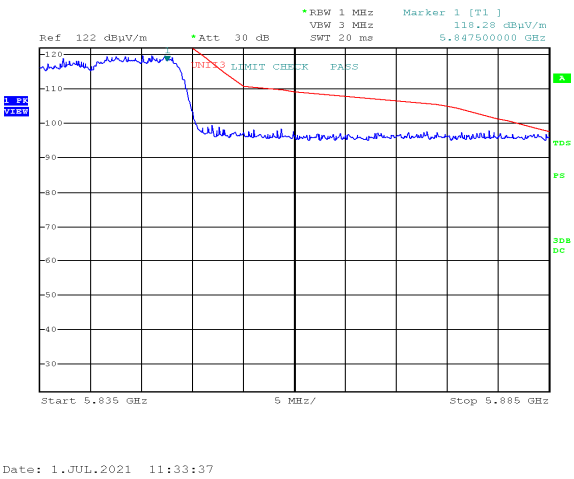


Figure 260: UNII 3, 5.835-5.885GHz, [Ver]

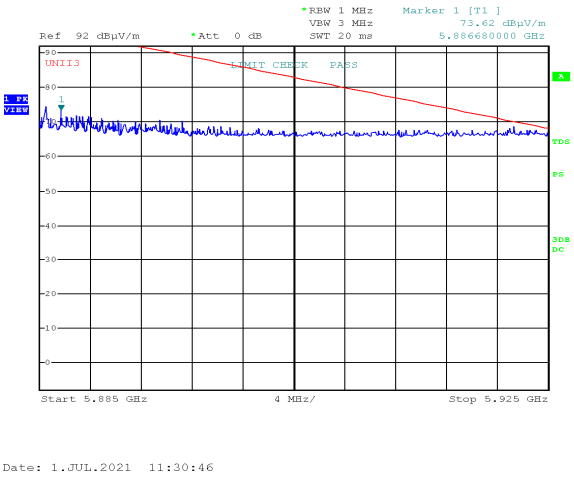


Figure 261: UNII 3, 5.885-5.935GHz, [Ver]

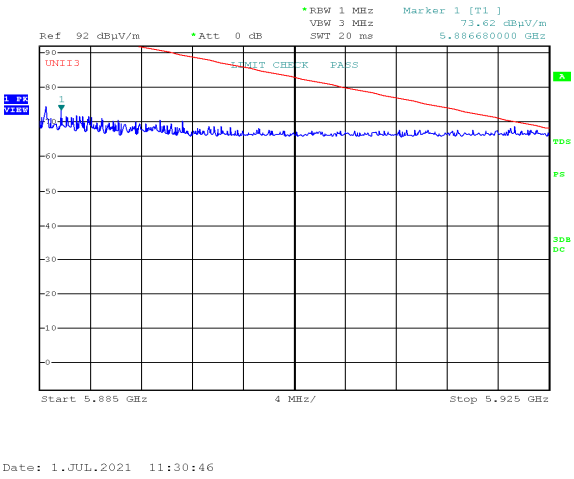


Figure 262: UNII 3, 5.835-5.935GHz, [Ver]

10.7 Test Instrumentation Used, Band Edge

Instrument	Manufacturer	Model	Serial No.	Last Calibration	Next Calibration
Spectrum Analyzer	HP	8564E	3442A00275	28/02/2020	28/02/2022
Horn Antenna	ETS	3115	29845	25/05/2020	25/05/2024
EMI Test Receiver	Rohde & Schwarz	ESCI7	100724	23/02/2020	23/02/2022
Cable for KA Band Antenna	OSR Electronics	37297C KPS\KPS (KPS-1503-590-KPS	1503-590 (05032006)	23/08/2020	23/08/2021
10 m RF cable	Commscope ORS	0623 WBC-400	G020132	23/08/2020	23/08/2021

Figure 263 Test Equipment Used

11 Undesirable/Unwanted Emissions

11.1 Test Specification

Part 15, Subpart E, 15.407(b)
RSS 247, Issue 2, Section 6.2.4.2, RSS-Gen, Issue 5: 2018, Section 8.9

11.2 Test Procedure

(Temperature (22°C)/ Humidity (56%RH))
Testing was performed for both Radiated Emission for Emissions in the Non-Restricted Bands & in the Restricted Bands:

For measurements between 0.009-30MHz:

The E.U.T was tested inside the shielded room and placed on a non-metallic table, 0.8 meters above the ground. The emissions were measured at a distance of 3 meters. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.
The frequency range 0.009-30MHz was scanned.

For measurements between 30-1000MHz:
A preliminary measurement to characterize the E.U.T was performed inside the shielded room at a distance of 3 meters, using peak detection mode and broadband antennas. The preliminary measurements produced a list of the highest emissions. The E.U.T was then transferred to the open site and placed on a remote-controlled turntable. The E.U.T was placed on a non-metallic table, 0.8 meters above the ground. The emissions were measured at a distance of 3 meters. The readings were maximized by adjusting the antenna height between 1-4 meters, the turntable azimuth between 0-360°, and the antenna polarization.
The frequency range 30-1000MHz was scanned and the list of the highest emissions was verified and updated accordingly.

For measurements between 1-40GHz:

The E.U.T was tested inside the shielded room and placed on a non-metallic table, 1.5 meters above the ground. The emissions were measured at a distance of 3 meters. The readings were maximized by the turntable azimuth between 0-360°, and the antenna polarization.
The frequency range 1.0-40.0 GHz was scanned.

Evaluation was performed for 20.0 MHz BW transmissions and at all operations frequencies
The highest radiations are described in the tables below.

11.3 FCC&ISED Test Limits

Operation frequency band	Frequency ranges from band edge	EIRP limit	EIRP limit
	(MHz)	(dBm/MHz)	(dBµV/m/MHz@3m)
UNII1	N/A	-27.0.0	68.2
UNII2A	N/A	-27.0.0	68.2
UNII2C	N/A	-27.0.0	68.2
UNII3	±5.0	27.0 decreasing linearly to 15.6	122.2 decreasing linearly to 110.8
	±5.0±25.0	15.6 decreasing linearly to 10.0	110.0 decreasing linearly to 105.2
	±25.0±75.0	10.0 decreasing linearly to -27.0	105.2 decreasing linearly to 68.2
	±75.0	-27.0.0	68.2

Figure 264 FCC and IC Non-Restricted Band Limits

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)	Field strength (dBµV/m)	Field strength* (dBµV/m) @ 3m
0.009-0.490	2400/F(kHz)	300	48.5-13.8	128.5-73.8
0.490-1.705	24000/F(kHz)	30	33.8-23.0	73.8-63.0
1.705-30.0	30	30	29.5	69.5
30-88	100	3	40.0	40.0
88-216	150	3	43.5	43.5
216-960	200	3	46.0	46.0
Above 960	500	3	54.0	54.0

*The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector. For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

Figure 265 FCC Restricted Band Limits

Frequency (MHz)	Magnetic Field strength (microampere/meter)	Measurement distance (meters)	Magnetic Field strength (dBµA/m)	Magnetic Field strength* (dBµA/m) @ 3m
0.009-0.490	6.37/F(kHz)	300	-3.0-(-37.7)	77.0-42.2
0.490-1.705	63.7/F(kHz)	30	-17.7-(-28.5)	22.3-11.4
1.705-30.0	0.08	30	-21.9	18.0
Frequency (MHz)	**Field strength (microvolts/meter)**	**Measurement distance (meters)**	**Field strength (dBµV/m)**	**Field strength* (dBµV/m) @ 3m**
30-88	100	3	40.0	40.0
88-216	150	3	43.5	43.5
216-960	200	3	46.0	46.0
Above 960	500	3	54.0	54.0

*The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9-90 kHz, 110-490 kHz and above 1000 MHz Radiated emission limits in these three bands are based on measurements employing an average detector. For average radiated emission measurements above 1000 MHz, there is also a limit corresponding to 20 dB above the indicated values in the table is specified when measuring with peak detector function.

Figure 266 IC Restricted Band Limits

11.4 Test Results

JUDGEMENT: Passed

The EUT met the requirements of the F.C.C. Part 15, Subpart E, Section 15.407(b)(1-7) and RSS 247, Sections 6.2.1(2), 6.2.2(2), 6.2.3(2), 6.2.4(2) specification.

Radiated Emission

E.U.T Description	Draco Tx
Type	AMN41012
Serial Number:	Not designated

Specifications: FCC, Part 15, Subpart E, Section 15.407(b)(1-7) and RSS 247, Sections 6.2.1(2), 6.2.2(2), 6.2.3(2), 6.2.4(2)

Antenna Polarization: Horizontal/Vertical

Frequency Range: 9kHz to 40.0 GHz

Detector: Peak, Average

Freq.	Pol	Peak Reading	Peak Limit	Peak Margin	Average Reading	Average Limit	Average Margin
(MHz)	(H/V)	(dBµV/m)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
No emissions detected above the spectrum anlyzer noise level which have at least 10dB margin below the limit							

Figure 267. Radiated Emission Results

Margin refers to the test results obtained minus specified requirement; thus a positive number indicates failure, and a negative result indicates that the product passes the test.

"Peak Amp" includes correction factor.

* "Correction Factor" = Antenna Factor + Cable Loss- Low Noise Amplifier Gain

11.5 Test Instrumentation Used, Emissions in Non Restricted Frequency Bands

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	February 23, 2020	February 23, 2022
EMI Receiver	HP	8542E	3906A00276	February 24, 2020	February 24, 2022
RF Filter Section	HP	85420E	3705A00248	February 24, 2020	February 24, 2022
EMC Analyzer	HP	8593 EM	3826A00265	February 22, 2020	February 22, 2022
Active Loop Antenna	EMCO	6502	9506-2950	February 5, 2019	February 29, 2021
Biconical Antenna	EMCO	3110B	9912-3337	May 03, 2020	May 03, 2022
Log Periodic Antenna	EMCO	3146	9505-4081	April 27, 2020	April 27, 2024
Horn Antenna	ETS	3115	29845	May 25, 2020	May 25, 2024
Horn Antenna	ARA	SWH-28	1007	November 02, 2021	November 02, 2024
MicroWave System Amplifier	HP	83006A	3104A00589	August 23, 2020	August 23, 2021
Low Noise Amplifier 1-18GHz	Miteq	AFSX4-02001800-50-8P	-	May 24, 2020	May 24, 2022
RF Cable Chamber	Commscope ORS	0623 WBC-400	G020132	May 25, 2020	May 25, 2022
RF Cable Oats	EIM	RG214-11N(X2)		August 04, 2020	August 04, 2021
Filter Band Pass 4-20 GHz	Meuro	MFL040120H50	902252	May 24, 2020	May 24, 2022
Full Anechoic Civil Chamber	ETS	S81	SL 11643	NCR	NCR
Antenna Mast	ETS	2070-2	9608-1497	NCR	NCR
Turntable	ETS	2087	-	NCR	NCR
Mast & Table Controller	ETS/EMCO	2090	9608-1456	NCR	NCR

Figure 268 Test Equipment Used

11.6 Field Strength Calculation

The field strength is calculated directly by the EMI Receiver software, and a "Correction Factors", using the following equation:

FS = RA + AF + CF

FS: Field Strength [dBµv/m]

RA: Receiver Amplitude [dBµv]

AF: Receiving Antenna Correction Factor [dB/m]

CF: Cable Attenuation Factor [dB]

Example: FS = 30.7 dBµV (RA) + 14.0 dB (AF) + 0.9 dB (CF) = 45.6 dBµV

No external pre-amplifiers are used.

12 Antenna Gain/Information

12.1 Test Specification

FCC, Part 15, Subpart B. section 212 (a)(iv)

12.2 Test Limit

The modular transmitter must comply with the antenna and transmission system requirements of §§15.203, 15.204(b) and 15.204(c). The antenna must either be permanently attached or employ a “unique” antenna coupler (at all connections between the module and the antenna, including the cable).

12.3 Test Results

Model	Type	Antenna Gain	Impedance
VT5-7.5G-R-1	Dipole	2 dBi	50Ω
WSS002	Dipole	2 dBi	50Ω

Figure 269 Antenna Gain Results

Judgment: Passed

2dBi antenna with RP-SMA connector type

13 R.F. Exposure/Safety

See a separate file.

14 APPENDIX A - CORRECTION FACTORS

14.1 Correction factors for RF OATS Cable 35m

ITL #1911

Frequency (MHz)	Loss (dB)
30.0	1.3
50.0	1.7
100.0	2.6
200.0	3.7
300.0	4.7
400.0	5.5
500.0	6.3
600.0	7.0
700.0	7.6
800.0	8.4
900.0	9.0
1000.0	9.6

14.2 Correction factor for RF cable for Anechoic Chamber

ITL #1840

FREQ (MHz)	LOSS (dB)
1000.0	1.5
2000.0	2.1
3000.0	2.7
4000.0	3.1
5000.0	3.5
6000.0	4.1
7000.0	4.6
8000.0	4.9
9000.0	5.7
10000.0	5.7
11000.0	6.1
12000.0	6.1
13000.0	6.2
14000.0	6.7
15000.0	7.4
16000.0	7.5
17000.0	7.9
18000.0	8.1
19000.0	8.8
20000.0	9.1

NOTES:

1. The cable is manufactured by Commscope

2. The cable type is 0623 WBC-400, serial # G020132 and 10m long

14.3 Correction factors forActive Loop Antenna

Model 6502 S/N 9506-2950

ITL # 1075:

F(MHz)	AF(dB/m)
0.01	18.4
0.02	14.3
0.03	13.3
0.05	11.7
0.1	11.4
0.2	11.2
0.3	11.2
0.5	11.2
0.7	11.2
1	11.4
2	11.5
3	11.5
4	11.4
5	11.3
6	11.1
7	11.1
8	11.1
9	11
10	11
20	10
30	8

14.4 Correction factors forbiconical antenna

ITL #1356
Model: EMCO 3110B
Serial No.: 9912-3337

Frequency [MHz]	AF [dB/m]
30	13.00
35	10.89
40	10.59
45	10.63
50	10.12
60	9.26
70	7.74
80	6.63
90	8.23
100	11.12
120	13.16
140	13.07
160	14.80
180	16.95
200	17.17

14.5 Correction factors forlog periodic antenna

ITL # 1349
Model: EMCO 3146
Serial No.: 9505-4081

Frequency [MHz]	AF [dB/m]
200	11.58
250	12.04
300	14.76
400	15.55
500	17.85
600	18.66
700	20.87
800	21.15
900	22.32
1000	24.22

14.6 Correction factors for ANTENNA Double –Ridged Waveguide Horn

Model: 3115
Serial number:29845
3 meter range; ITL # 1352

FREQUENCY (GHz)	AFE (dB/m)	FREQUENCY (GHz)	AFE (dB/m)
0.75	25	9.5	38
1.0	23.5	10.0	38.5
1.5	26.0	10.5	38.5
2.0	29.0	11.0	38.5
2.5	27.5	11.5	38.5
3.0	30.0	12.0	38.0
3.5	31.5	12.5	38.5
4.0	32.5	13.0	40.0
4.5	32.5	13.5	41.0
5.0	33.0	14.0	40.0
5.5	35.0	14.5	39.0
6.0	36.5	15.0	38.0
6.5	36.5	15.5	37.5
7.0	37.5	16.0	37.5
7.5	37.5	16.5	39.0
8.0	37.5	17.0	40.0
8.5	38.0	17.5	42.0
9.0	37.5	18.0	42.5

14.7 Correction factors forHorn Antenna Model: SWH-28

CALIBRATION DATA

3 m distance

Frequency, MHz	Measured antenna factor, dB/m [1]
18000	32.4
18500	32.0
19000	32.3
19500	32.4
20000	32.3
20500	32.8
21000	32.8
21500	32.7
22000	33.1
22500	33.0
23000	33.1
23500	33.8
24000	33.5
24500	33.5
25000	33.8
25500	33.9
26000	34.2
26500	34.7

[1] The antenna factor shall be added to receiver reading in dBµV to obtain field strength in dBµV/m.