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Certificate: 1152.01

DATE: 1 February 2022

I.T.L. (PRODUCT TESTING) LTD.

FCC/IC Radio Test Report

for

Amimon Ltd.

Equipment under test:

Draco RX

AMN42012

Tested by: _____
M. Zohar

Approved by: _____
D. Shidlowsky

ISRAEL TESTING LABORATORIES
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Measurement/Technical Report for

Amimon Ltd.

Draco RX

AMN42012

FCC ID: VQSAMN42012
IC: 7680A-AMN42012

This report concerns:	Original Grant: Class I Change: Class II Change: X
Equipment type:	FCC: (NII) 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

Prepared by:

R. Ezrah

ITL (Product Testing) Ltd., 1 Bat Sheva St., Lod 7116002

Email: rame@itlglobal.org

Applicant for this device (different from "Prepared by"):

Gabi Nocham

Amimon Ltd., 26 Zarhin St., Ra'anana 4366250 Israel

Email: gabi.nocham@amimon.com

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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):	Draco RX
Equipment PMN:	AMN42012
Equipment Serial No.:	Not designated
Equipment HVIN:	AMN42012/AMN42012EX
Equipment FVIN:	7.5.15
Date of Receipt of E.U.T:	May 11, 2021
Start of Test:	May 11, 2021
End of Test:	July 20, 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, thus, creating a wireless video link.

The AMN42012 is the video display unit that receives the video information transmitted from a video transmitter such as the AMN41012 unit, for example, 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 companion device AMN41012, for example.

1.4 Test Methodology

Both conducted and radiated testing were 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 located 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 E.U.T contains a UNII 1, 2A, 2C and 3, certified as FCC /IC (FCC ID: VQSAMN42012; IC: 7680A-AMN42012).
2. The customer has asked to add performance of 20MHz to the existing 40MHz Grant.
3. This report destination is to check C2PC compliance, according to the agreed test plan between the customer and the TCB (Timco Engineering Inc.).

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 to achieve compliance.

2.5 Configuration of Tested System

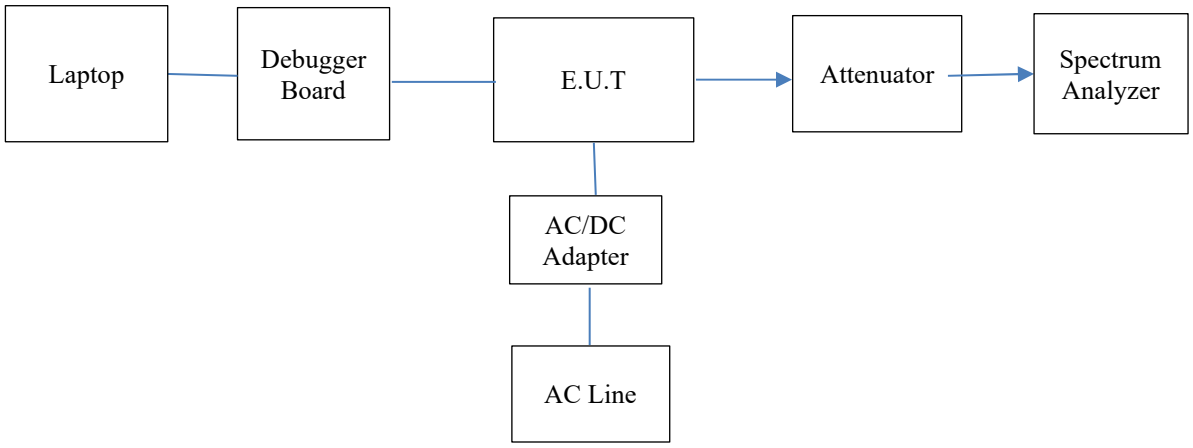


Figure 1. Configuration of Tested System - Conducted

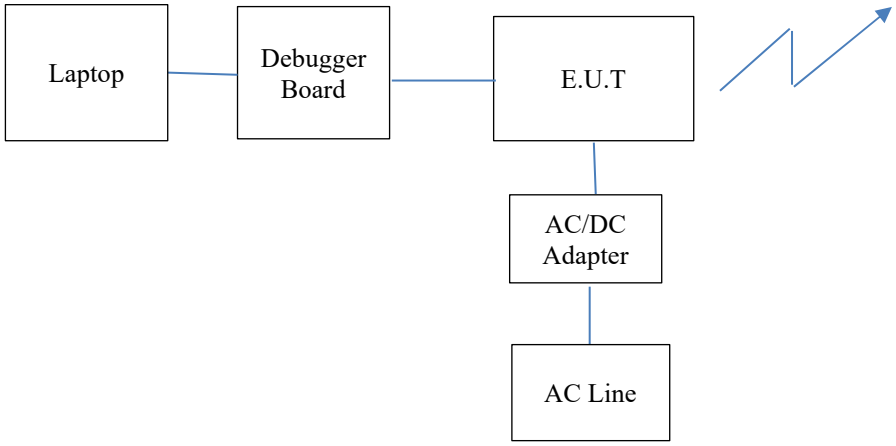


Figure 2. Configuration of Tested System - Radiated

3 Conducted and Radiated Measurement Test Setup Photos

See a separate file.

4 Maximum Conducted Output Power

4.1 Test Specification

FCC, Part 15, Subpart E, Section 407

RSS 247, Issue 2, Section 6.2

4.2 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).

4.3 FCC Test Limits

UNII1: 15.407(a)(1)(iv): For client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

UNII2: 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.

UNII3: 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.

Note: Special requirements provided for fixed point-to-point UNII devices
All UNII: 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.

4.4 ISED Test Limit

ISED: RSS-247

UNII1: 6.2.1.1: For other than OEM devices installed in vehicles, 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.

UNII2:

5250-5350MHz:

6.2.2.1(a): The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less.

6.2.2.3: Outdoor fixed devices with a maximum e.i.r.p. greater than 200 mW shall comply with the e.i.r.p. levels at different elevations angles.

Therefore, devices equal or below 200mW eirp are exempt from meeting eirp at different elevation angles.

5470-5600MHz and 5650-5725MHz:

6.2.3.1: The maximum conducted output power shall not exceed 250 mW or 11 + 10 log10B, dBm, whichever is less.

The maximum e.i.r.p. shall not exceed 1.0 W or 17 + 10 log10B, dBm, whichever is less. B is the 99% emission bandwidth in megahertz.

UNII3:

6.2.4.1: The maximum conducted output power shall not exceed 1 W. 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

4.5 Test Results for Antenna Gain 2dBi

Band U-NII 1, 5150MHz-5250MHz						
BW	**Operation Frequency**	**Port Reading**	**Antenna Gain**	**EIRP**	**Limit**	**Margin**
(MHz)	**(MHz)**	**(dBm)**	**(dBi)**	**(dBm)**	**(dBm)**	**(dB)**
20.0	5180.0	17.7	2.0	19.7	22.6	-2.9
	5220.0	18.4		20.4		-2.2
	5240.0	18.5		20.5		-2.1

**Note: EIRP includes the port reading and AG of 2dBi*

Limit is determined by lowest limit of FCC and ISED: 22.6dBm eirp by ISED (FCC limit is 23.9dBm conducted, ISED limit is min (23, 10+10logB), where B=~ 18MHz)

Figure 3 Test Results, U-NII 1

Band U-NII 2A, 5250MHz-5350MHz						
BW	**Operation Frequency**	**Port Reading**	**Antenna Gain**	**EIRP**	**Limit**	**Margin**
(MHz)	**(MHz)**	**(dBm)**	**(dBi)**	**(dBm)**	**(dBm)**	**(dB)**
20.0	5260.0	20.3	2.0	22.3	23.0	-0.7
	5280.0	20.4		22.4		-0.6
	5320.0	20.2		22.2		-0.8

**Note: EIRP includes the port reading and AG of 2dBi*

Limit is determined by ISED: 200mW eirp regardless of eirp power at elevation angles

Figure 4 Test Results, U-NII 2A

Band U-NII 2C, 5470MHz-5725MHz				
BW	Operation Frequency	Port Reading	Limit	Margin
(MHz)	(MHz)	(dBm)	(dBm)	(dB)
20.0	5500.0	20.2	23.6	-3.4
	5580.0	20.7		-2.9
	5600.0	17.8		-5.8
	5720.0	20.7		-2.9

**Note: EIRP includes the port reading and AG of 2dBi*
Limits for conducted power are the same for ISED and FCC

Figure 5 Test Results, U-NII 2C

Band U-NII 3, 5725MHz-5850MHz								
BW	Operation Frequency	Port Reading	Limit (conducted)	Margin	Antenna Gain	EIRP	Limit (Radiated)	Margin
(MHz)	(MHz)	(dBm)	(dBm)	(dB)	(dBi)	(dBm)	(dBm)	(dB)
20.0	5740.0	21.4	30.0	-8.6	2	23.4	36.0	-12.6
	5800.0	20.7		-9.3		22.7		13.3
	5840.0	20.4		-9.3		22.4		-13.6

**Note: EIRP includes the port reading and AG of 2dBi*
Limits for conducted power are the same for ISED and FCC

Figure 6 Test Results, U-NII 3

4.6 Test Results for Antenna Gain 11dBi

Band U-NII 1, 5150MHz-5250MHz						
BW	Operation Frequency	Port Reading	Antenna Gain	EIRP	Limit	Margin
(MHz)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
20.0	5180.0	11.6	11.0	22.6	22.6	0.0
	5220.0	11.2		22.2		-0.4
	5240.0	11.4		22.4		-0.2

**Note: EIRP includes the port reading and AG of 11dBi*
Limit is determined by ISED requirements of: 10+10logB, where B~=18MHz

Figure 7 Test Results, U-NII 1

Band U-NII 2A, 5250MHz-5350MHz						
BW	Operation Frequency	Port Reading	Antenna Gain	EIRP	Limit	Margin
(MHz)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
20.0	5260.0	11.3	11.0	22.3	23.0	-0.7
	5280.0	11.4		22.4		-0.6
	5320.0	11.0		22.0		-1.0

Figure 8 Test Results, U-NII 2A

**Note: EIRP includes the port reading and AG of 11dBi*
Limit is determined by ISED: 200mW eirp regardless of eirp power at elevation angles

Band U-NII 2C, 5470MHz-5725MHz						
BW	Operation Frequency	Port Reading	Antenna Gain	EIRP	Limit	Margin
(MHz)	(MHz)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
20.0	5500.0	11.9	11.0	22.9	29.6	-6.7
	5580.0	11.4		22.4		-7.2
	5720.0	11.3		22.3		7.3

**Note: EIRP includes the port reading and AG of 11dBi*

Figure 9 Test Results, U-NII 2C

Band U-NII 3, 5725MHz-5850MHz								
BW	Operation Frequency	Port Reading	Limit (Conducted)	Margin	Antenna Gain	EIRP	Limit (Radiated)	Margin
(MHz)	(MHz)	(dBm)	(dBm)	(dBm)	(dBi)	(dBm)	(dBm)	(dB)
20.0	5740.0	21.4	30.0	-8.6	11.0	32.4	36.0	-3.6
	5800.0	20.7		-9.3		31.7		-4.3
	5840.0	20.4		-9.6		31.4		-4.6

**Note: EIRP includes the port reading and AG of 11dBi*

Figure 10 Test Results, U-NII 3

JUDGMENT: FCC - Passed by 0.0 dB
JUDGMENT: ISED - Passed by 0.0 dB

For additional information see Figure 11 to Figure 35.

Configuration with 2dBi A.G:

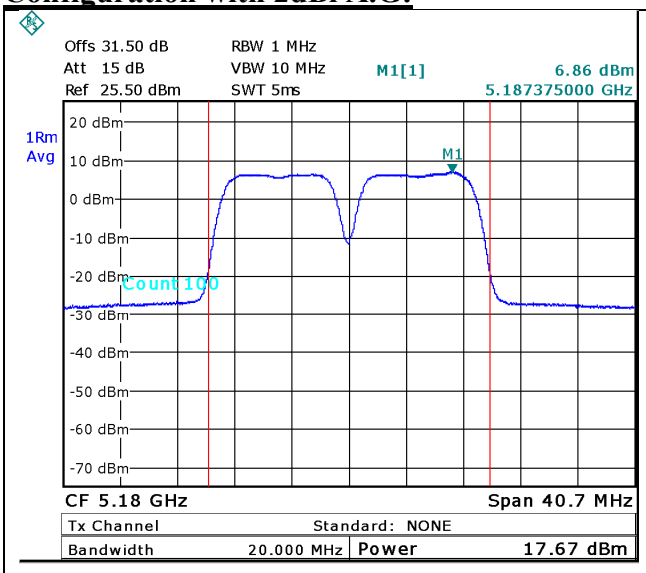


Figure 11. 5180.0MHz, 20MHz BW

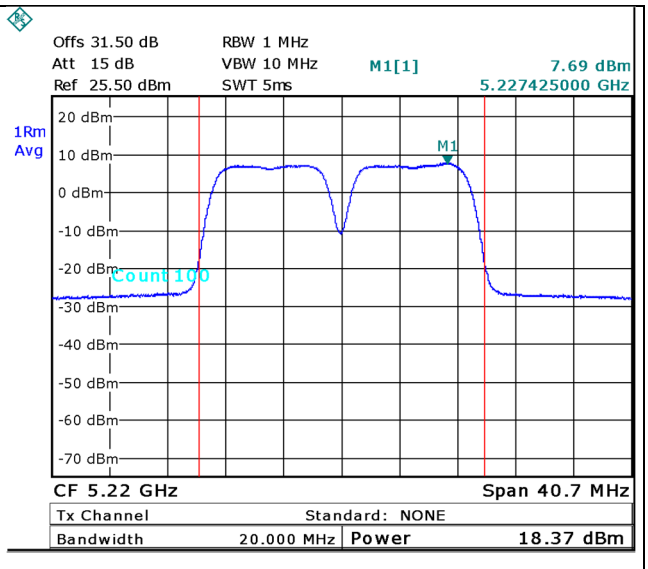


Figure 12. 5220.0MHz, 20MHz BW

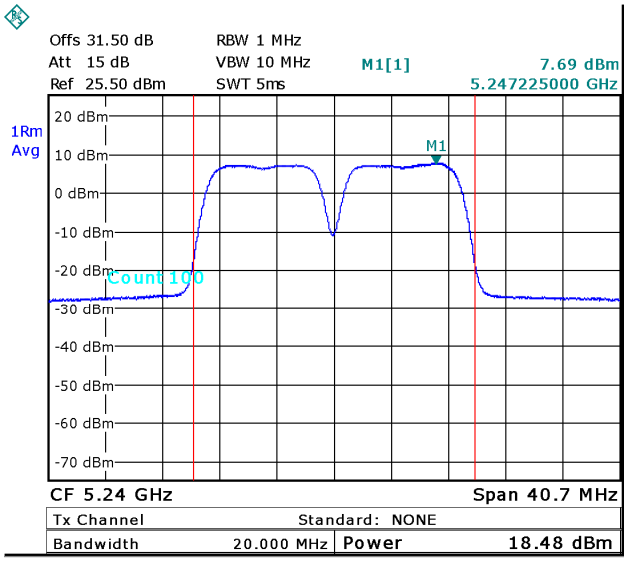


Figure 13. 5240.0MHz, 20MHz BW

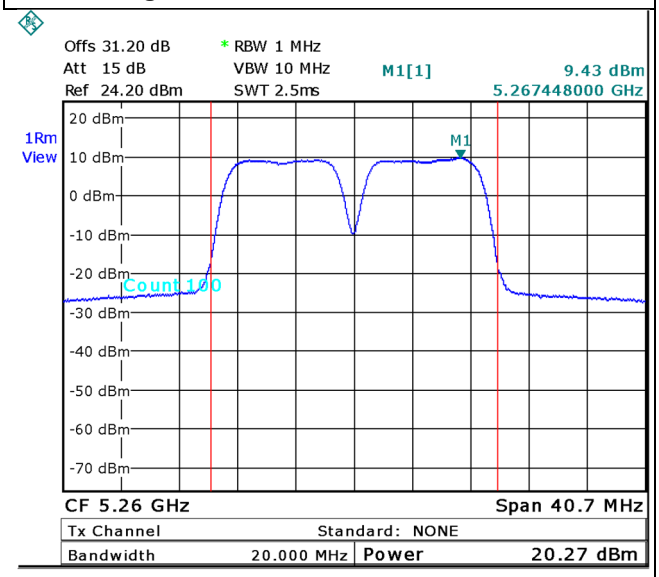


Figure 14. 5260.0MHz, 20MHz BW

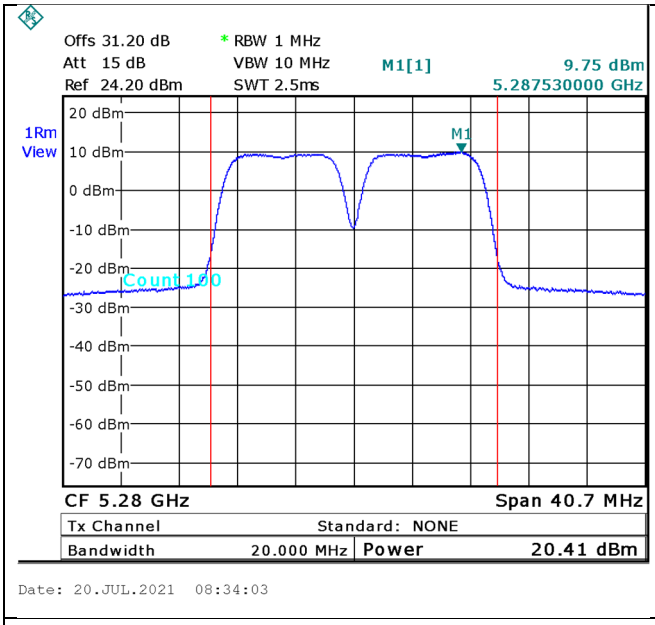


Figure 15. 5280.0MHz, 20MHz BW

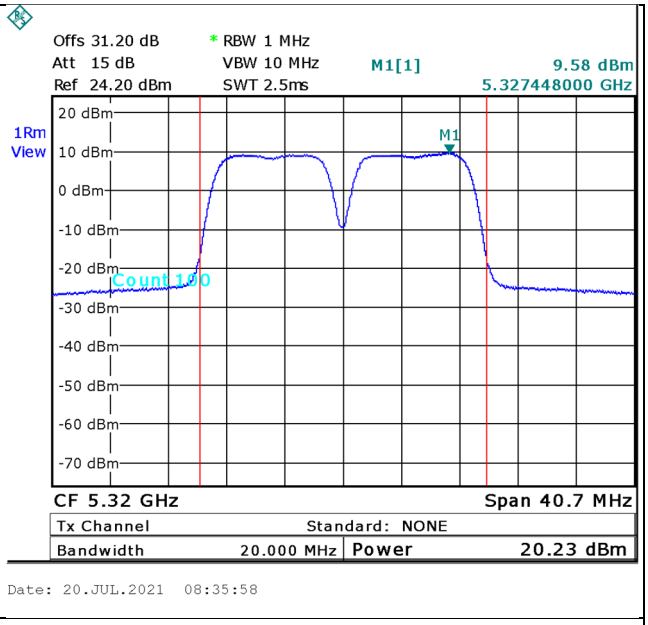


Figure 16. 5320.0MHz, 20MHz BW

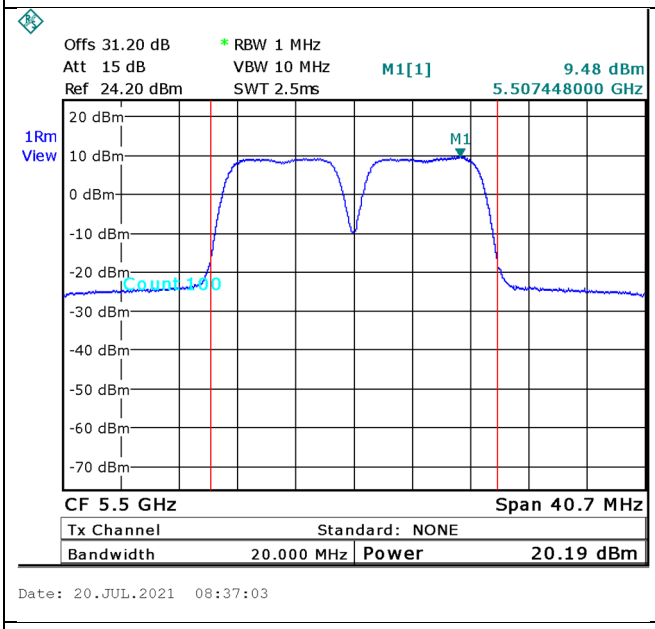


Figure 17. 5500.0MHz, 20MHz BW

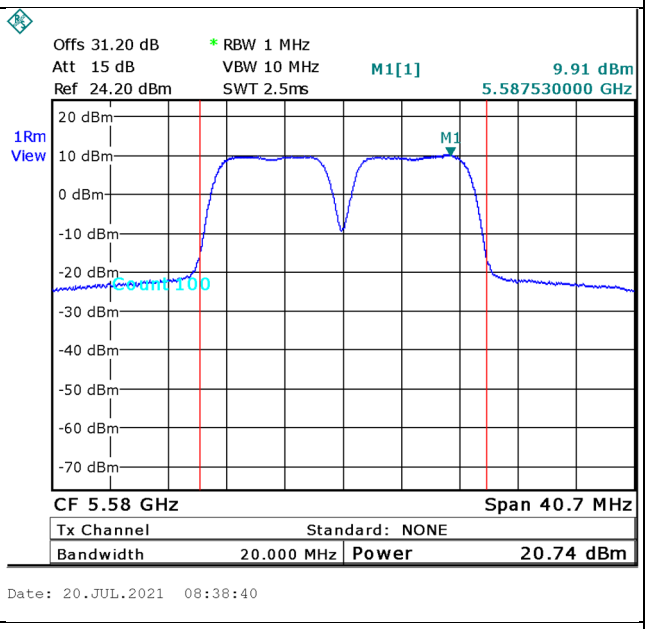


Figure 18. 5580.0MHz, 20MHz BW

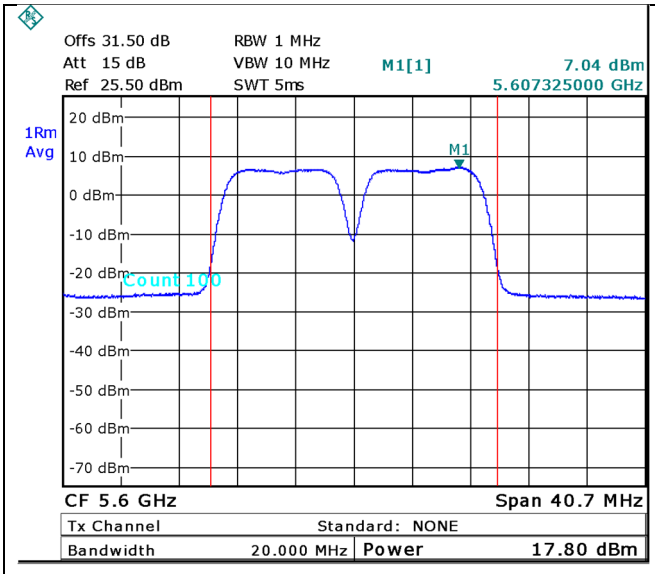


Figure 19. 5600.0MHz, 20MHz BW

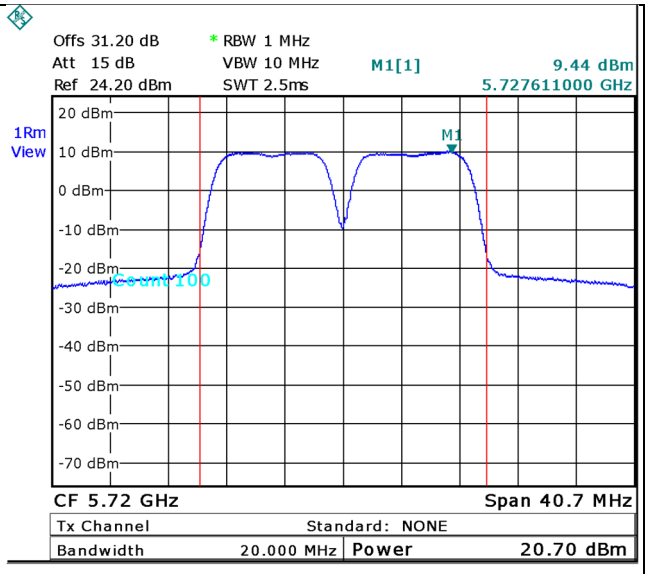


Figure 20. 5720.0MHz, 20MHz BW

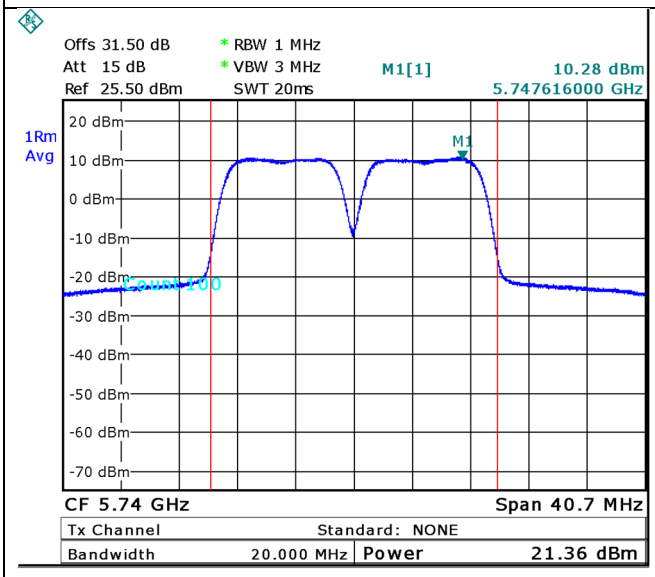


Figure 21. 5740.0MHz, 20MHz BW

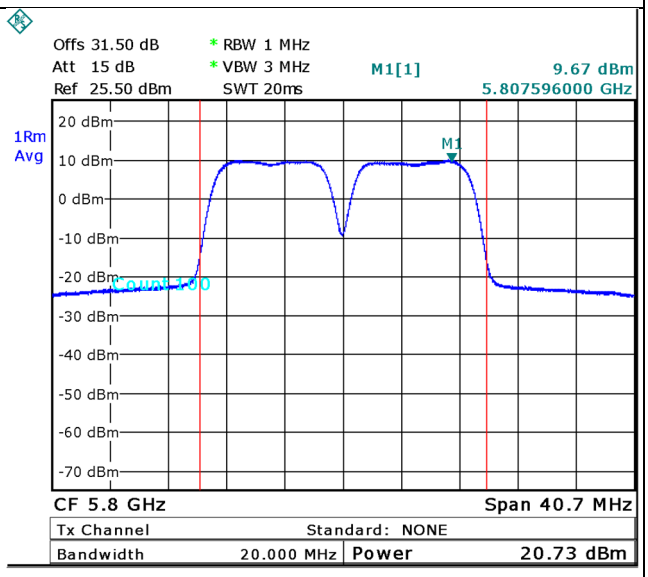


Figure 22. 5800.0MHz, 20MHz BW

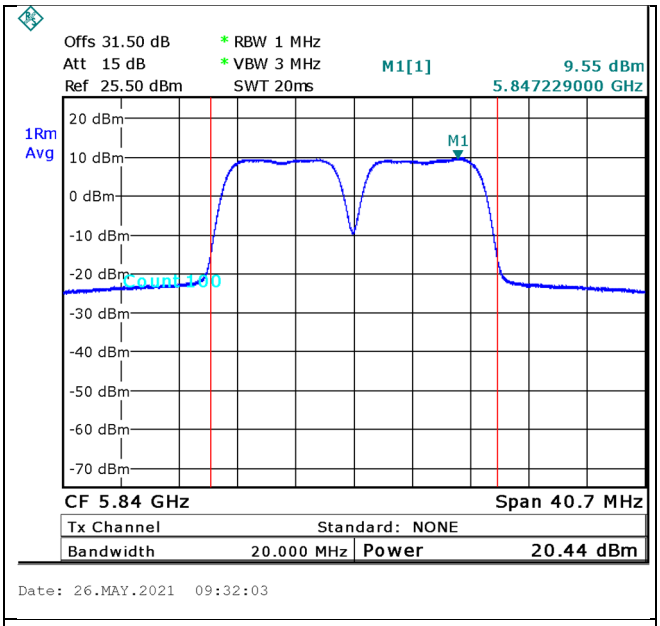


Figure 23. 5840.0MHz, 20MHz BW

Configuration with 11dBi A.G:

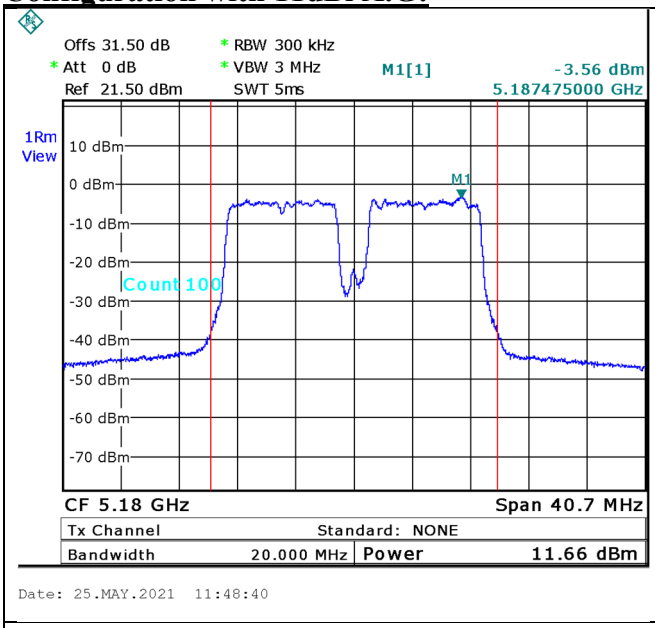


Figure 24. 5180.0MHz, 20MHz BW

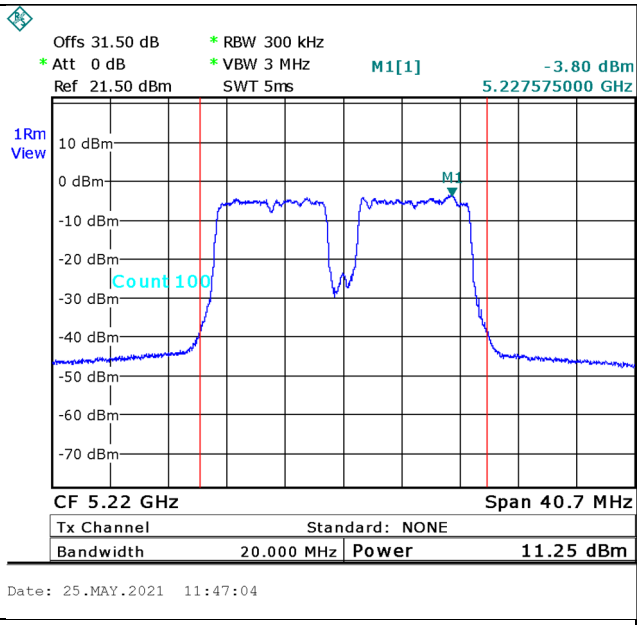


Figure 25. 5220.0MHz, 20MHz BW

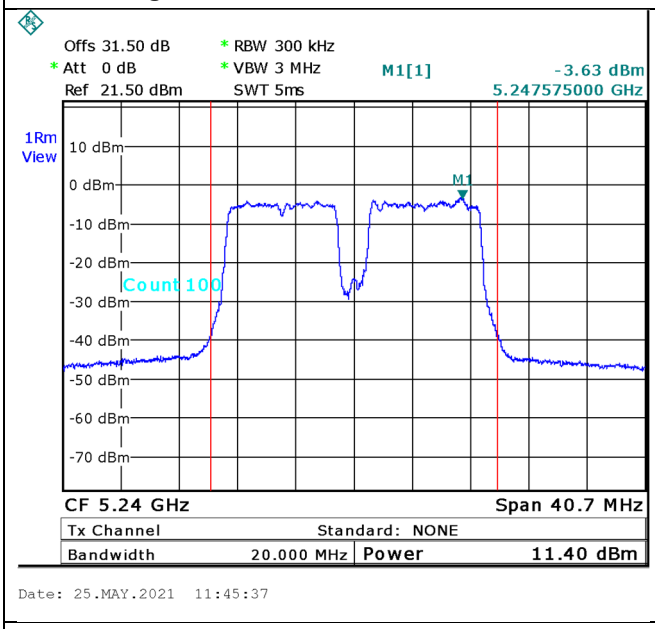


Figure 26. 5240.0MHz, 20MHz BW

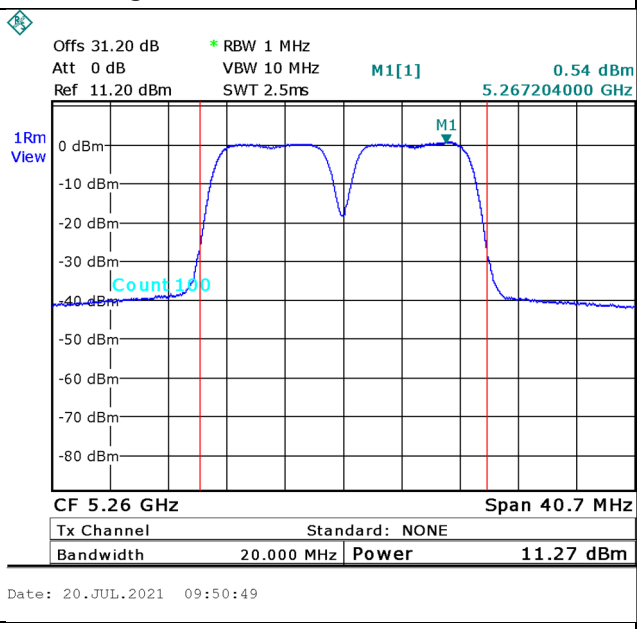


Figure 27. 5260.0MHz, 20MHz BW

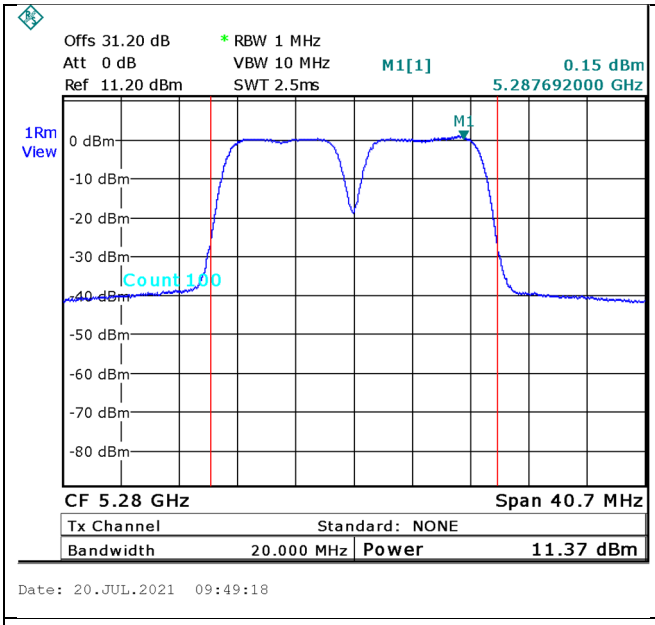


Figure 28. 5280.0MHz, 20MHz BW

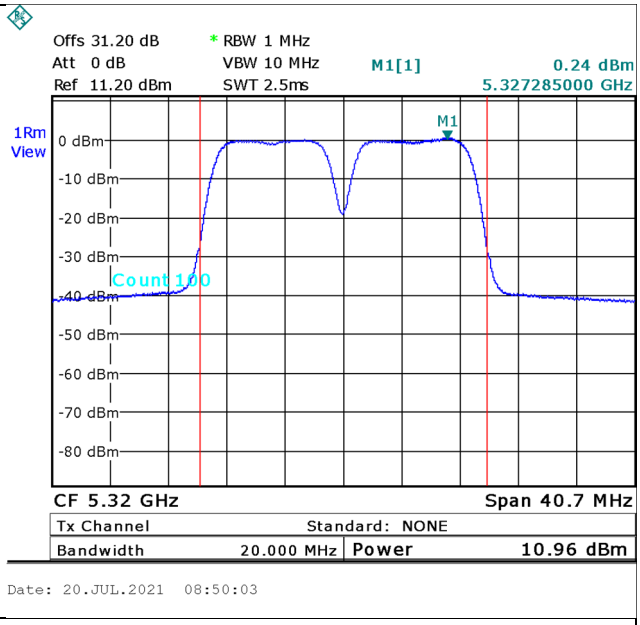


Figure 29. 5320.0MHz, 20MHz BW

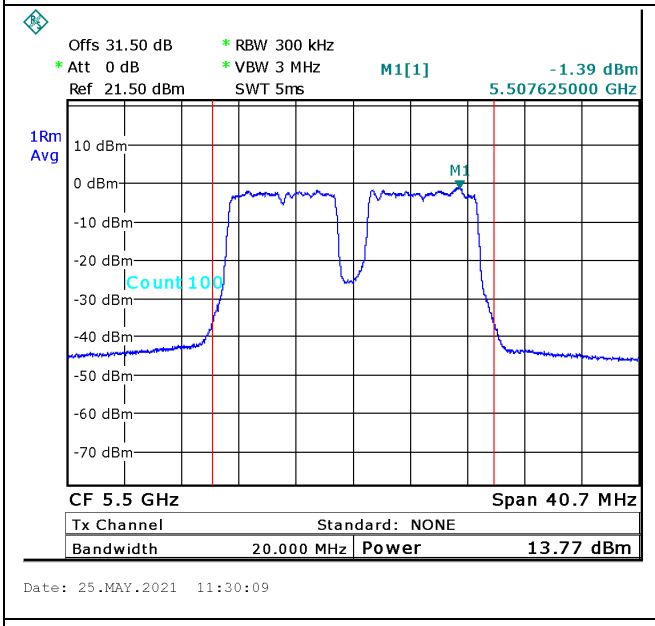


Figure 30. 5500.0MHz, 20MHz BW

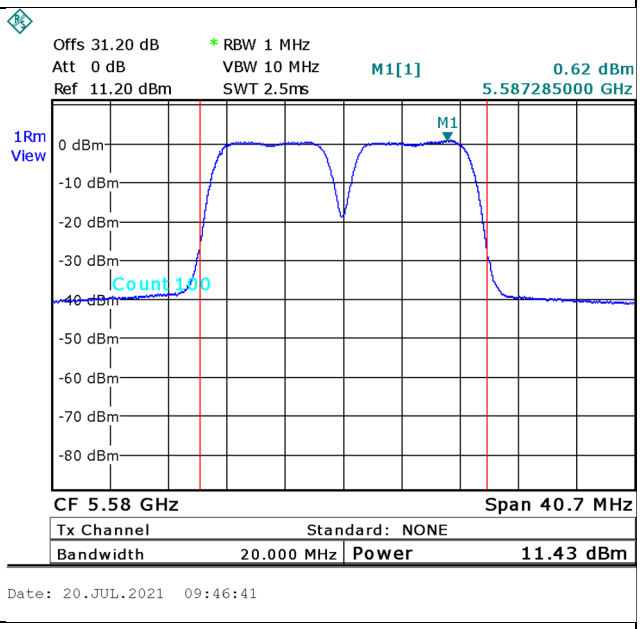


Figure 31. 5580.0MHz, 20MHz BW

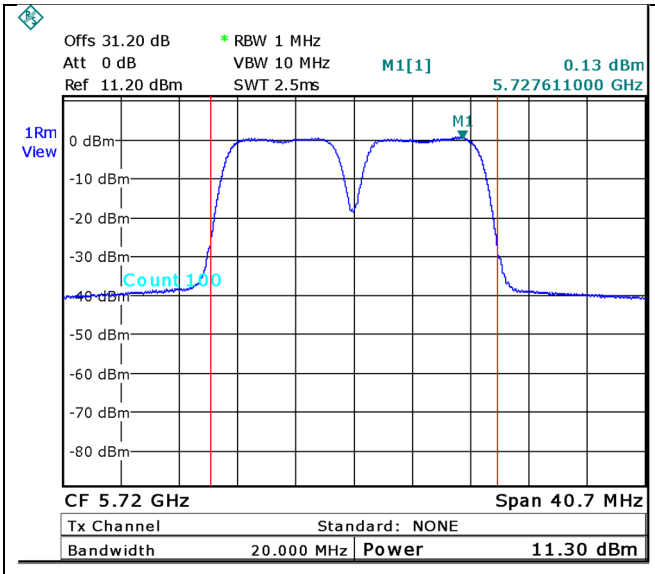


Figure 32. 5720.0MHz, 20MHz BW

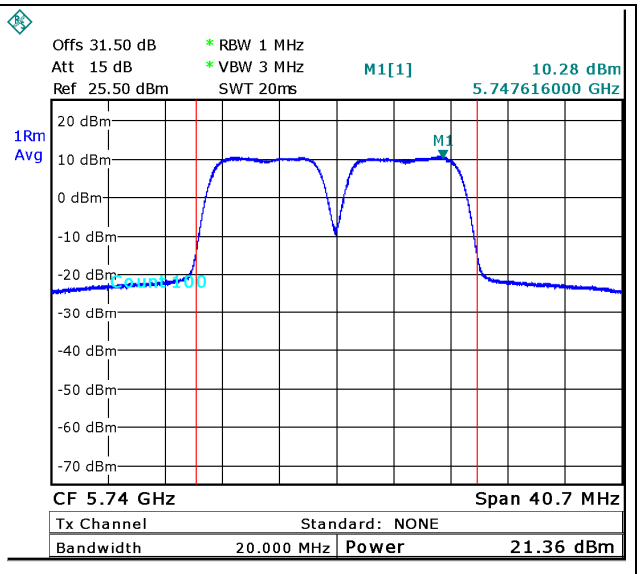


Figure 33. 5740.0MHz, 20MHz BW

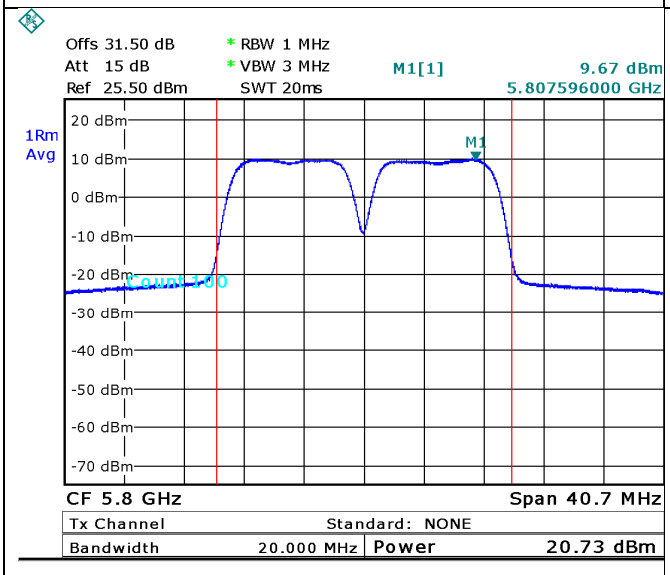


Figure 34. 5800.0MHz, 20MHz BW

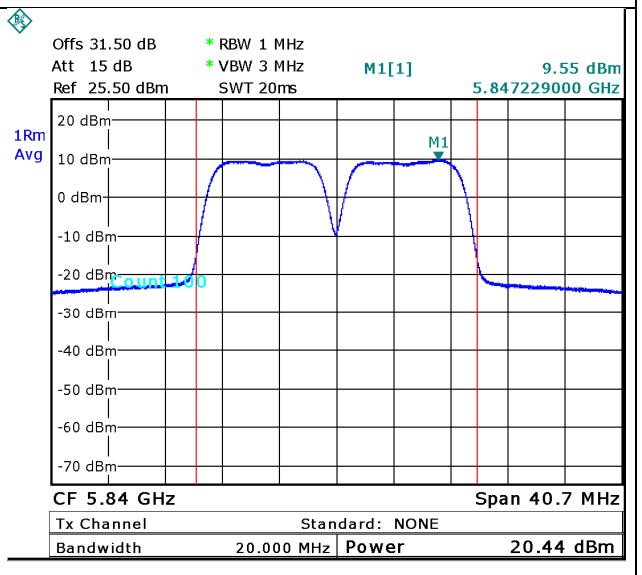


Figure 35. 5840.0MHz, 20MHz BW

4.7 Test Equipment Used; Maximum Peak Power Output

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	23/02/2021	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 36 Test Equipment Used

5 Maximum Power Spectral Density (PSD)

5.1 Test Specification

FCC, Part 15, Subpart E, Section 407

RSS 247, Issue 2, Section 6.2

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. Spectrum setting done according KDB 789033 d02 v01instructions (section F).

5.3 FCC Test Limits

UNII1: 15.407(a)(1)(iv):
For client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1 MHz band.
UNII2: 15.407(a)(2):
For the 5.25-5.35 GHz and 5.47-5.725 GHz bands:
the maximum conducted power spectral density shall not exceed 11 dBm in any 1 megahertz band.
UNII3: 15.407(a)(3)(i):
For the band 5.725-5.850 GHz, the maximum conducted power spectral density shall not exceed 30 dBm in any 500-kHz band.

Note: special requirements provided for fixed point-to-point U-NII devices
All UNII: 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.

5.4 ISED Test Limit

UNII1: RSS-247:

6.2.1.1: The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band.

UNII2:

5250-5350MHz: RSS-247: 6.2.2.1(a): The conducted power spectral density shall not exceed 11 dBm in any 1.0 MHz band;

5470-5600MHz and 5650-5725MHz:RSS-247: 6.2.3.1

The conducted power spectral density shall not exceed 11 dBm in any 1.0 MHz band.

UNII3:

RSS-247: 6.2.4.1: The output power spectral density shall not exceed 30 dBm in any 500 kHz band.

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.

5.5 Test Results for PSD with Antenna Gain 2dBi

Band U-NII 1, 5150MHz-5250MHz						
BW	Operation Frequency	Port Reading	Antenna Gain	Total PSD*	Limit	Margin
(MHz)	(MHz)	(dBm/MHz)	(dBi)	(dBm/MHz)	(dBm/MHz)	(dB)
20.0	5180.0	6.9	2.0	8.9	10	-1.1
	5220.0	7.7		9.7		-0.3
	5240.0	7.7		9.7		-0.3

**Note: EIRP includes the port reading and AG of 2dBi*
Limit is determined by ISED limitation

Figure 37 Test Results, U-NII 1

Band U-NII 2A, 5250MHz-5350MHz						
BW	Operation Frequency	Port Reading	Limit	Margin	Antenna Gain	EIRP
(MHz)	(MHz)	(dBm/MHz)	(dBm/MHz)	(dB)	(dBi)	(dB)
20.0	5260.0	9.4	11.0	-1.6	2.0	11.4
	5280.0	9.8		-1.2		11.8
	5320.0	9.6		-1.4		11.6

**Note: EIRP includes the port reading and AG of 2dBi*

Figure 38 Test Results, U-NII 2A

Band U-NII 2C, 5470MHz-5725MHz						
BW	Operation Frequency	Port Reading	Limit	Margin	Antenna Gain	EIRP
(MHz)	(MHz)	(dBm/MHz)	(dBm/MHz)	(dB)	(dBi)	(dBm/MHz)
20.0	5500.0	9.5	11.0	-1.5	2.0	11.5
	5580.0	9.9		-1.1		11.9
	5600.0	7.0		-4.0		9.0
	5720.0	9.4		-1.6		11.4

**Note: EIRP includes the port reading and AG of 2dBi*

Figure 39 Test Results, U-NII 2C

Band U-NII 2A, 5250MHz-5350MHz						
BW	Operation Frequency	Port Reading	Limit (Conducted)	Margin	Antenna Gain	EIRP
(MHz)	(MHz)	(dBm/MHz)	(dBm/500kHz)	(dB)	(dBi)	(dBm/MHz)
20.0	5740.0	10.3	30.0	-19.7	2.0	9.3
	5800.0	9.7		-20.3		8.7
	5840.0	9.6		-20.4		8.6

**Note: EIRP includes the port reading and AG of 2dBi and RBW Conversion factor that was calculated according to following equation: 10log(500kHz/1MHz) =-3dB*

Figure 40 Test Results, U-NII 3

5.6 Test Results for Antenna Gain 11dBi

Band U-NII 1, 5150MHz-5250MHz						
BW	Operation Frequency	Port Reading	Antenna Gain	Total PSD*	Limit	Margin
(MHz)	(MHz)	(dBm/MHz)	(dBi)	(dBm/MHz)	(dBm/MHz)	(dB)
20.0	5180.0	-3.6	11.0	7.4	10.0	-2.6
	5220.0	-3.8		7.2		-2.8
	5240.0	-3.6		7.4		-2.6

**Note: EIRP includes the port reading and AG of 11dBi*

Figure 41 Test Results, U-NII 1

Band U-NII 2A, 5250MHz-5350MHz						
BW	Operation Frequency	Port Reading	Limit	Margin	Antenna Gain	EIRP
(MHz)	(MHz)	(dBm/MHz)	(dBm/MHz)	(dB)	(dBi)	(dB)
20.0	5260.0	0.5	11	-10.5	11.0	11.5
	5280.0	0.2		-10.8		11.2
	5320.0	0.2		-10.8		11.2

**Note: EIRP includes the port reading and AG of 11dBi*

Figure 42 Test Results, U-NII 2A

Band U-NII 2C, 5470MHz-5725MHz						
BW	Operation Frequency	Port Reading	Limit	Margin	Antenna Gain	EIRP
(MHz)	(MHz)	(dBm/MHz)	(dBm/MHz)	(dB)	(dBi)	(dBm/MHz)
20.0	5500.0	1.2	11.0	-9.8	11.0	12.2
	5580.0	0.6		-10.4		12.6
	5600.0	-1.5		-12.5		9.5
	5720.0	0.1		-10.9		11.1

**Note: EIRP includes the port reading and AG of 2dBi*

Figure 43 Test Results, U-NII 2C

Band U-NII 3, 5725MHz-5850MHz									
BW	Operation Frequency	Port Reading	Conducted PSD	Limit	Margin	Antenna Gain	EIRP	Limit (Radiated)	Margin
(MHz)	(MHz)	(dBm/MHz)	(dBm/500kHz)	(dBm/500kHz)	(dB)	(dBi)	(dBm/MHz)	(dBm/MHz)	(dB)
20.0	5740.0	10.3	7.3	30.0	-22.7	11.0	18.3	36.0	-17.7
	5800.0	9.7	6.7		-23.3		17.7		-18.3
	5840.0	9.6	6.6		-16.7		17.6		-18.4

**Note: EIRP includes the port reading and AG of 11dBi and RBW Conversion factor that was calculated according to following equation: 10log(500kHz/1MHz) =-3dB*

Figure 44 Test Results, U-NII 3

Configuration with 2dBi A.G:

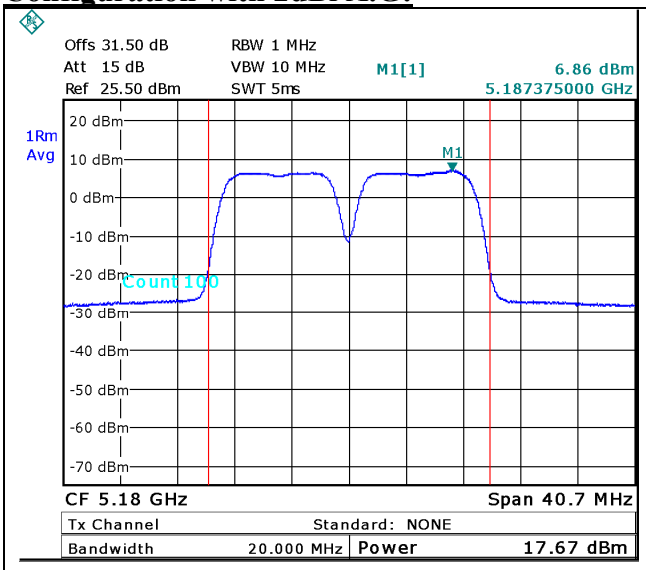


Figure 45. 5180.0MHz, 20MHz BW

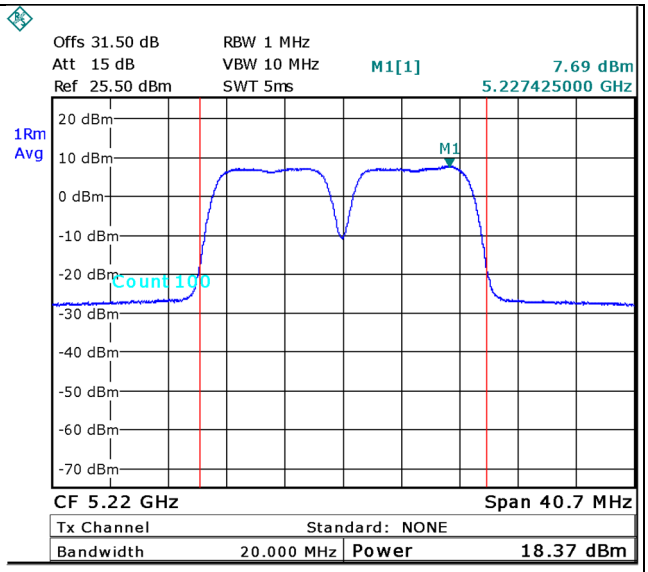


Figure 46. 5220.0MHz, 20MHz BW

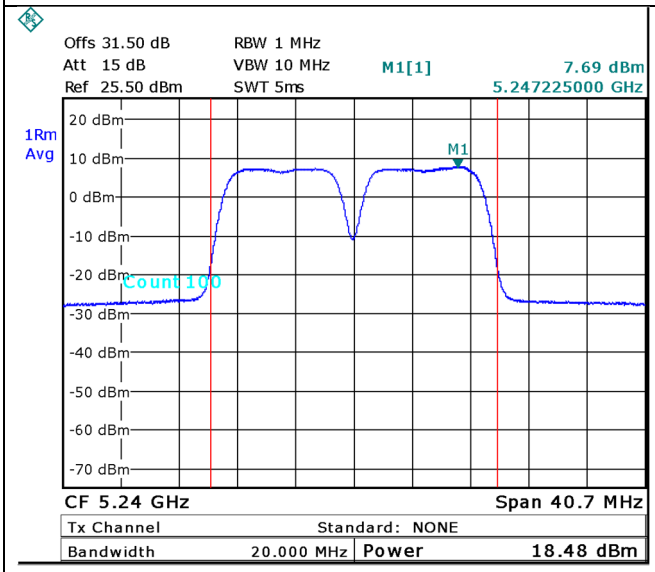


Figure 47. 5240.0MHz, 20MHz BW

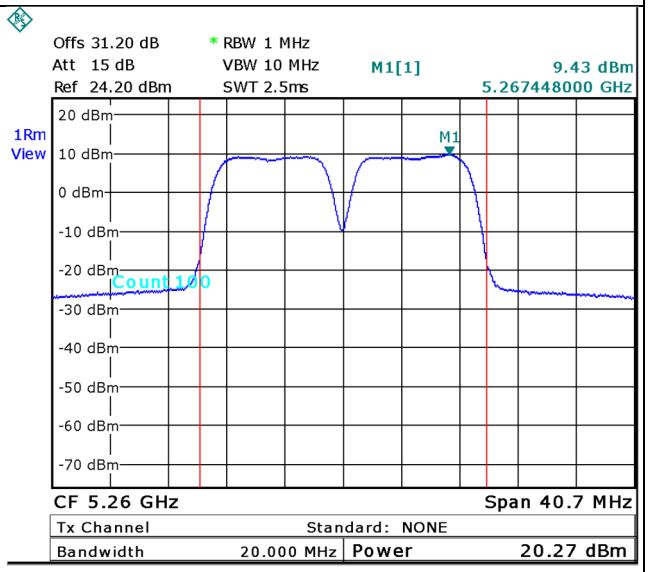


Figure 48. 5260.0MHz, 20MHz BW

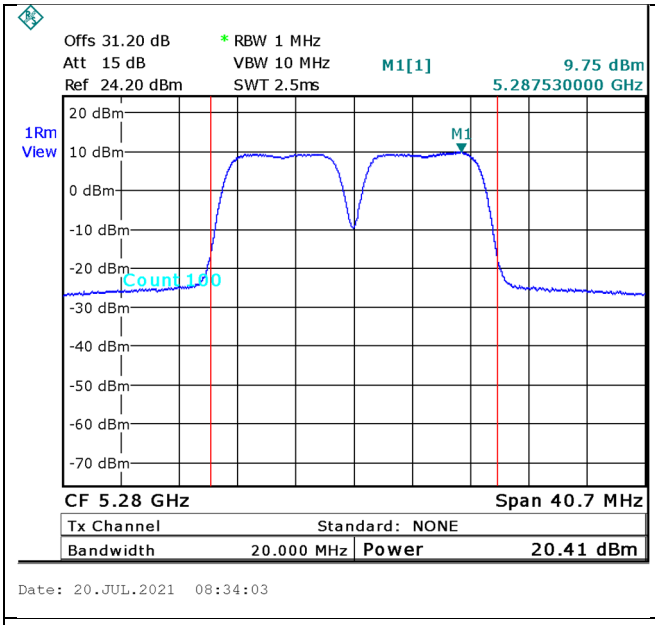


Figure 49. 5280.0MHz, 20MHz BW

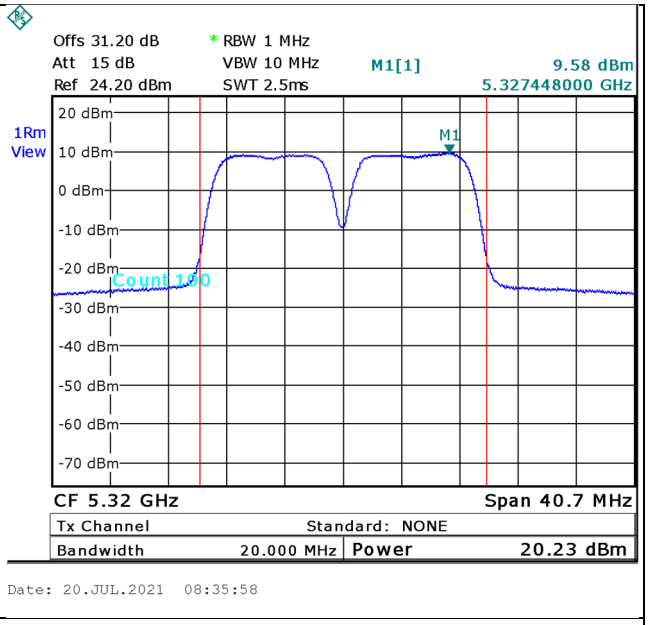


Figure 50. 5320.0MHz, 20MHz BW

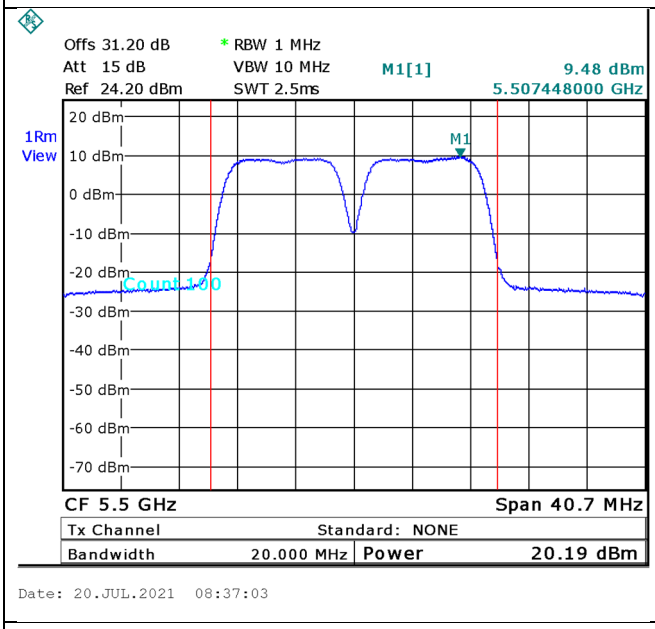


Figure 51. 5500.0MHz, 20MHz BW

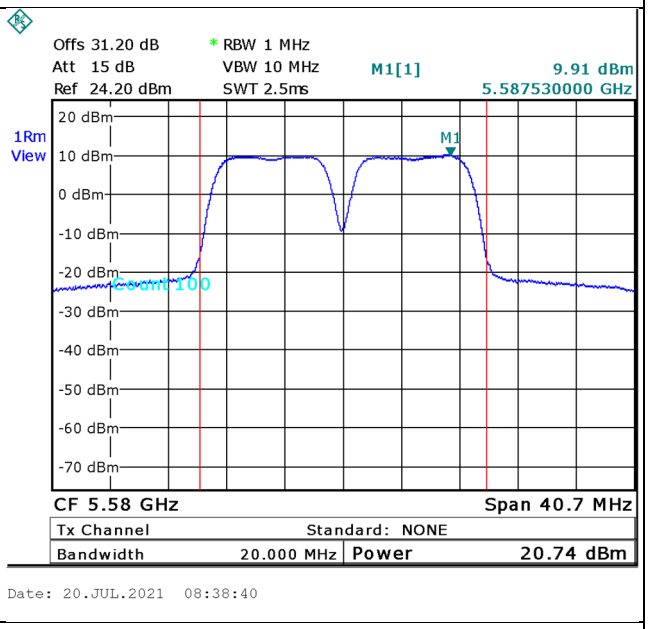


Figure 52. 5580.0MHz, 20MHz BW

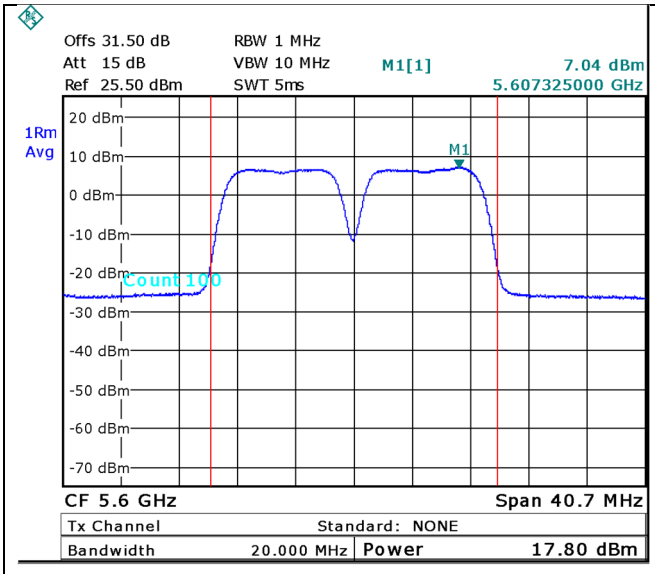


Figure 53. 5600.0MHz, 20MHz BW

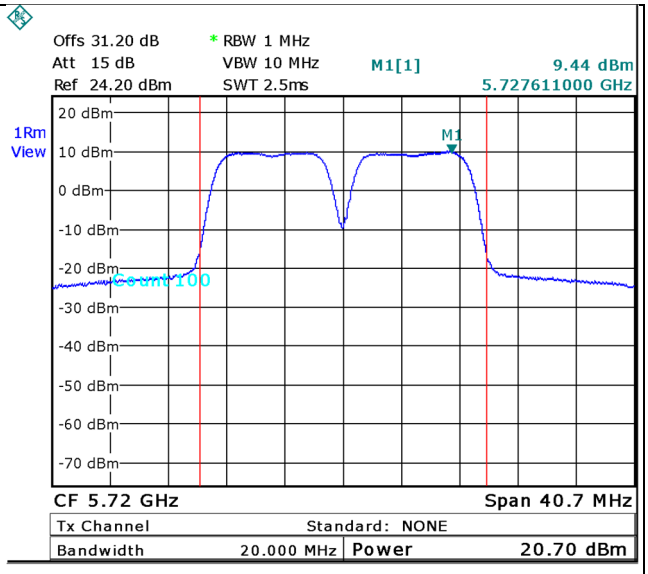


Figure 54. 5720.0MHz, 20MHz BW

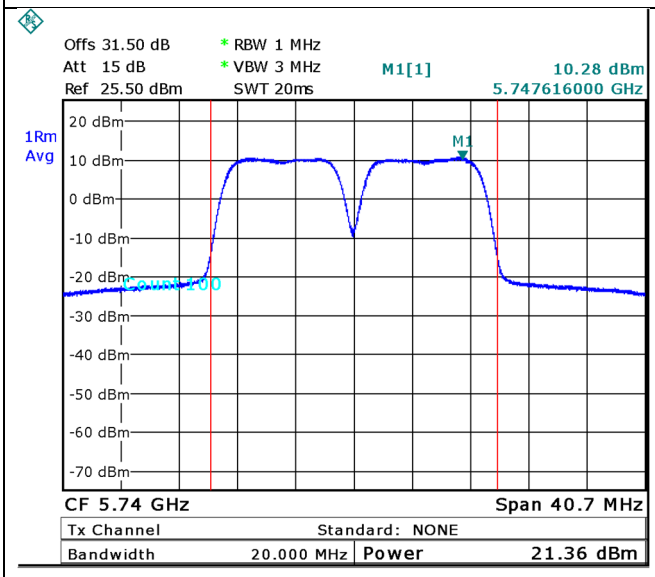


Figure 55. 5740.0MHz, 20MHz BW

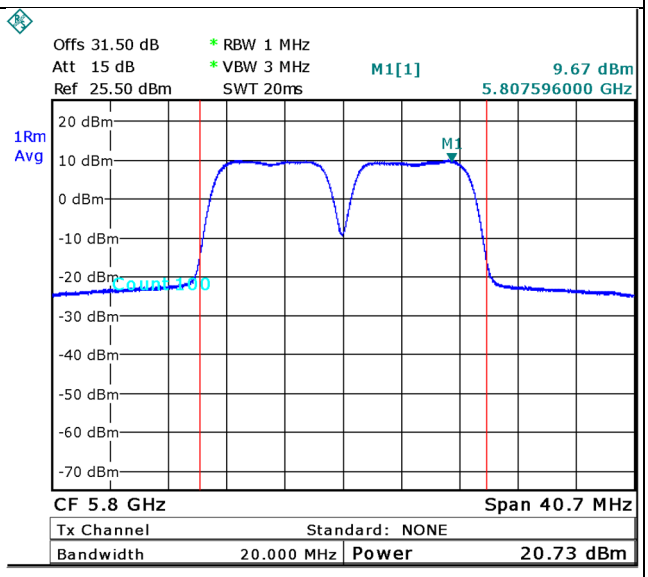


Figure 56. 5800.0MHz, 20MHz BW

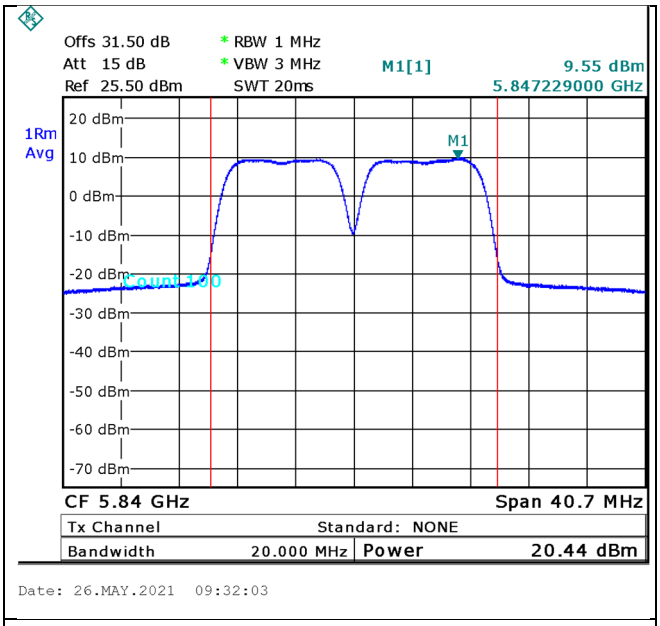


Figure 57. 5840.0MHz, 20MHz BW

Configuration with 11dBi A.G:

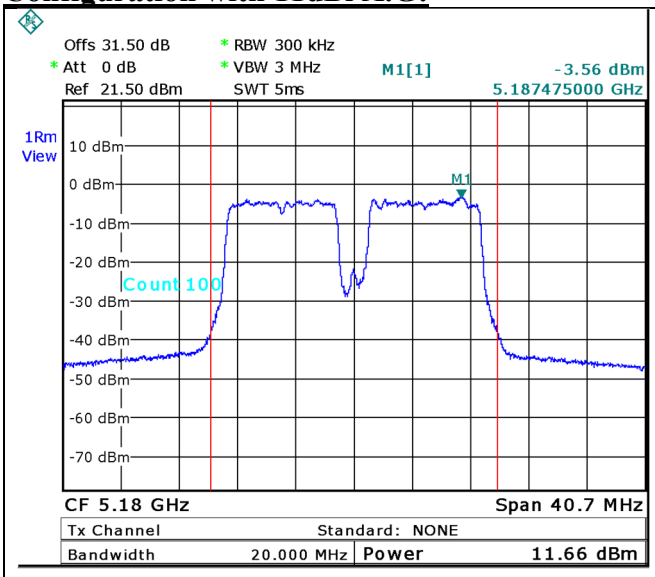


Figure 58. 5180.0MHz, 20MHz BW

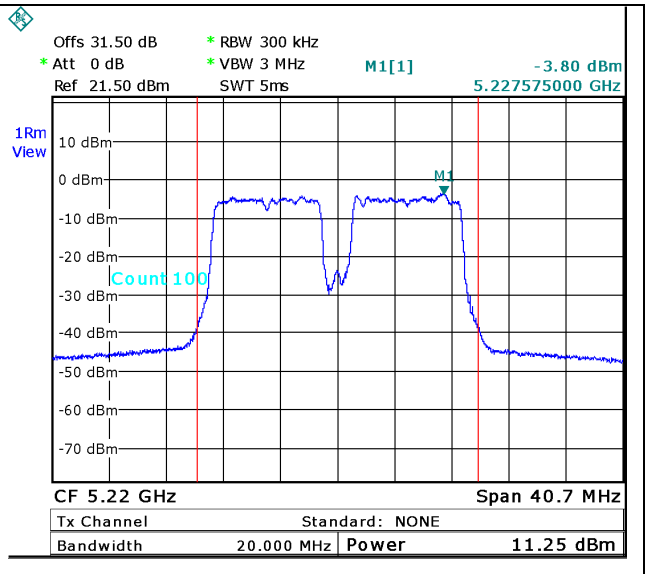


Figure 59. 5220.0MHz, 20MHz BW

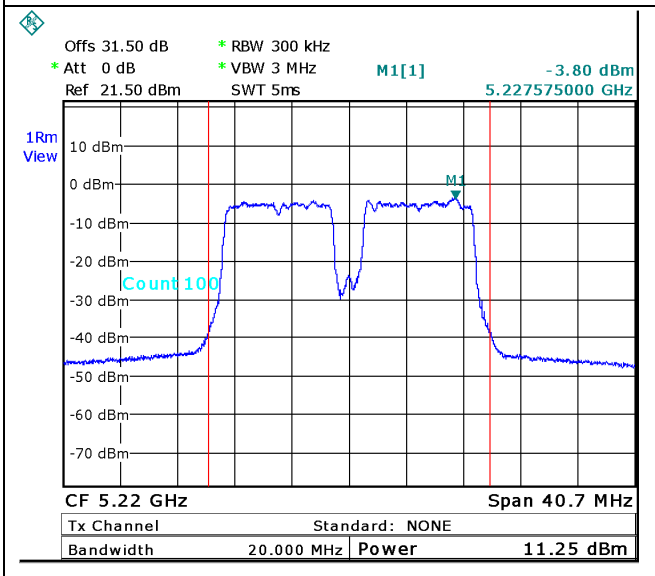


Figure 60. 5240.0MHz, 20MHz BW

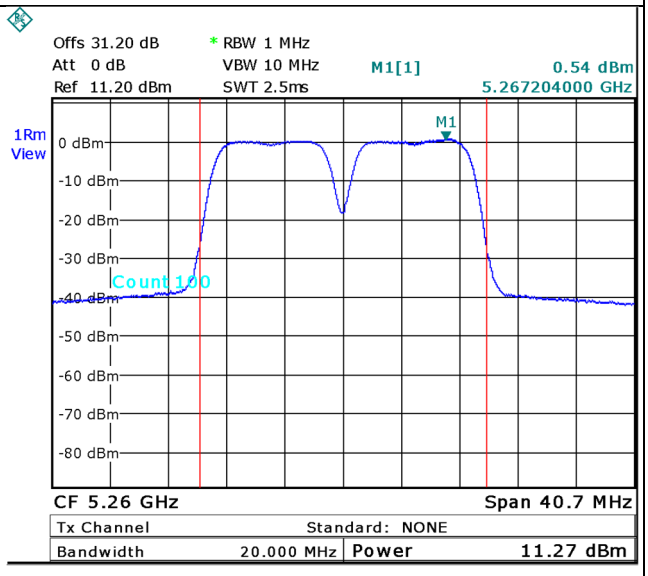


Figure 61. 5260.0MHz, 20MHz BW

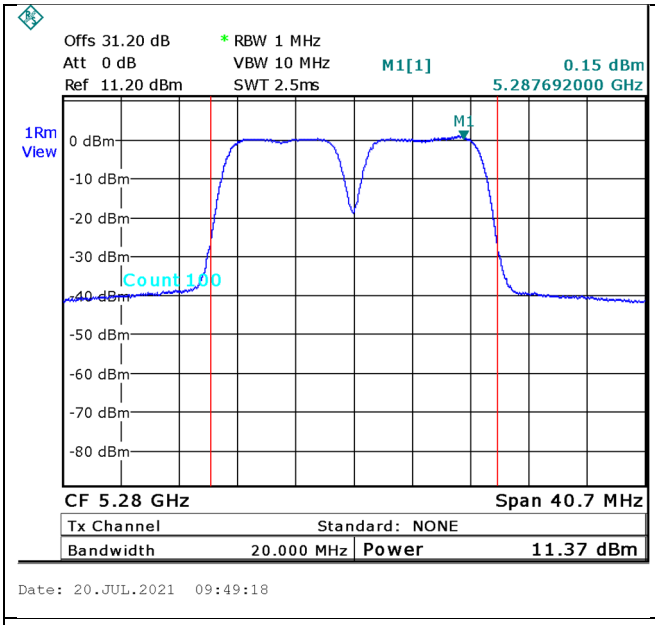


Figure 62. 5300.0MHz, 20MHz BW

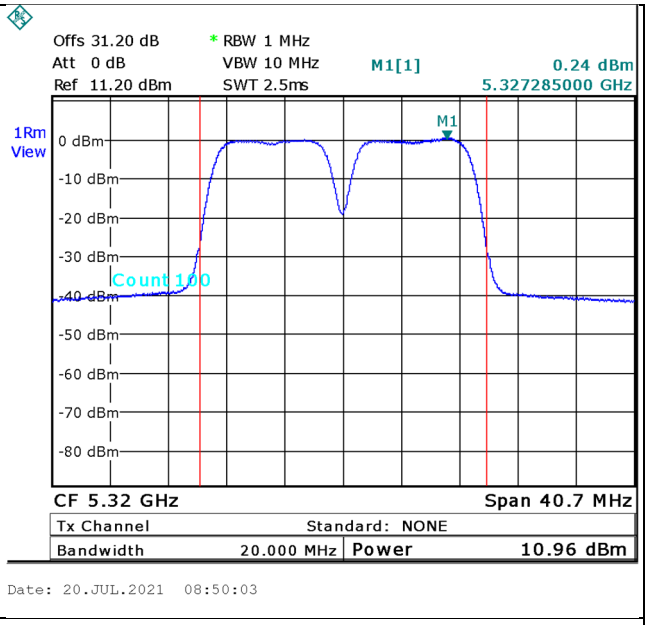


Figure 63. 5320.0MHz, 20MHz BW

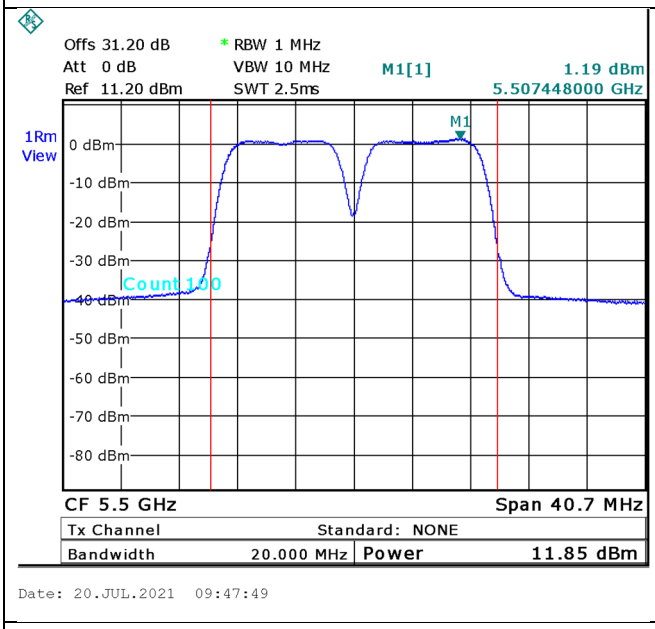


Figure 64. 5500.0MHz, 20MHz BW

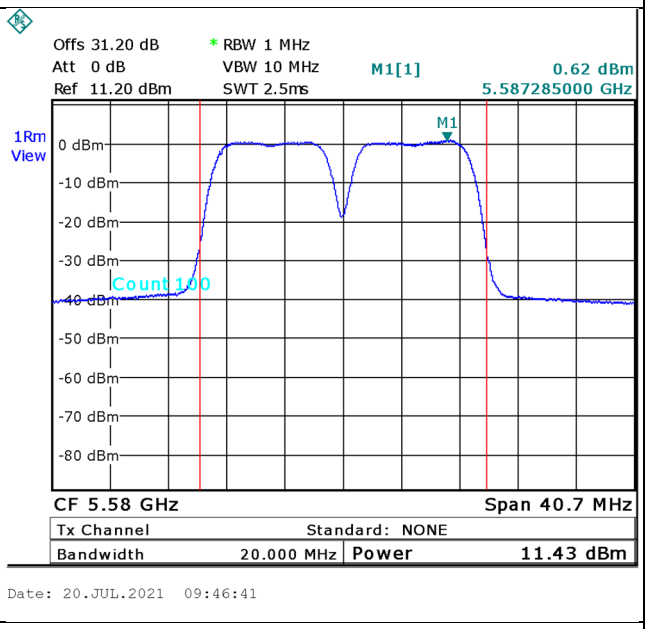


Figure 65. 5580.0MHz, 20MHz BW

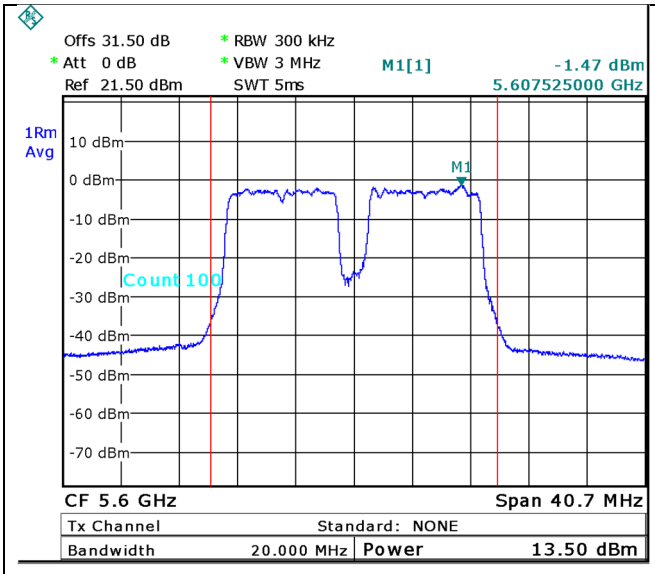


Figure 66. 5600.0MHz, 20MHz BW

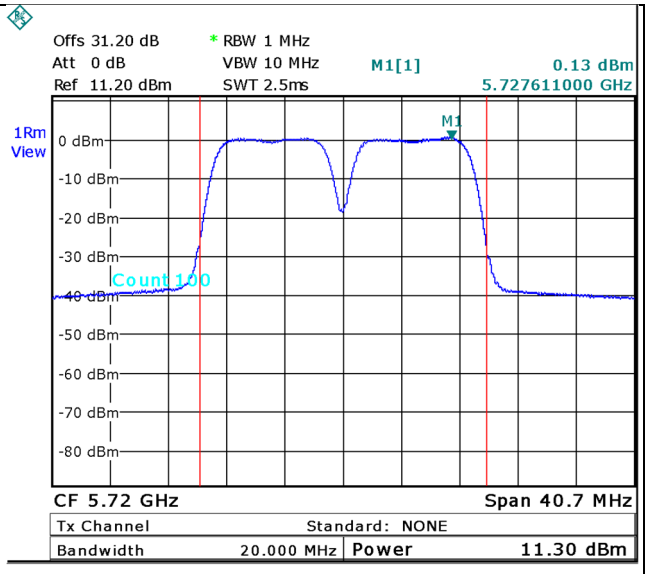


Figure 67. 5720.0MHz, 20MHz BW

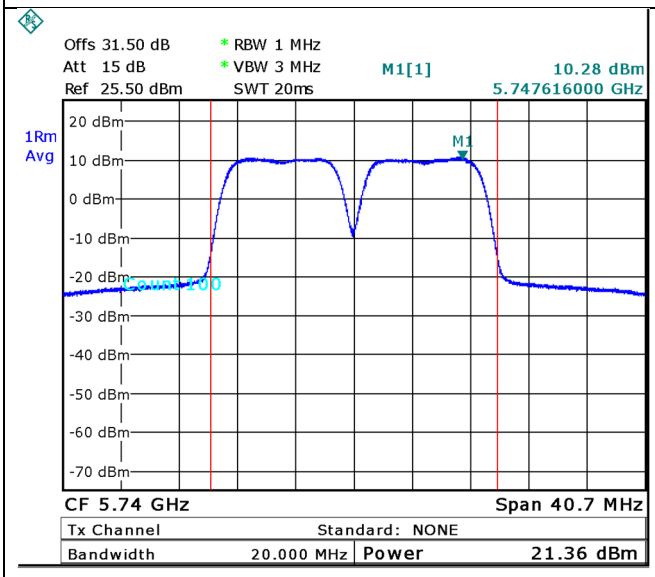


Figure 68. 5740.0MHz, 20MHz BW

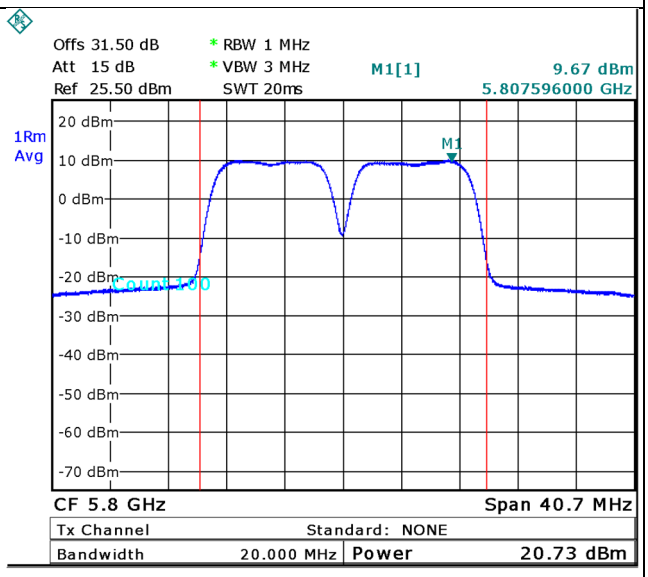


Figure 69. 5800.0MHz, 20MHz BW

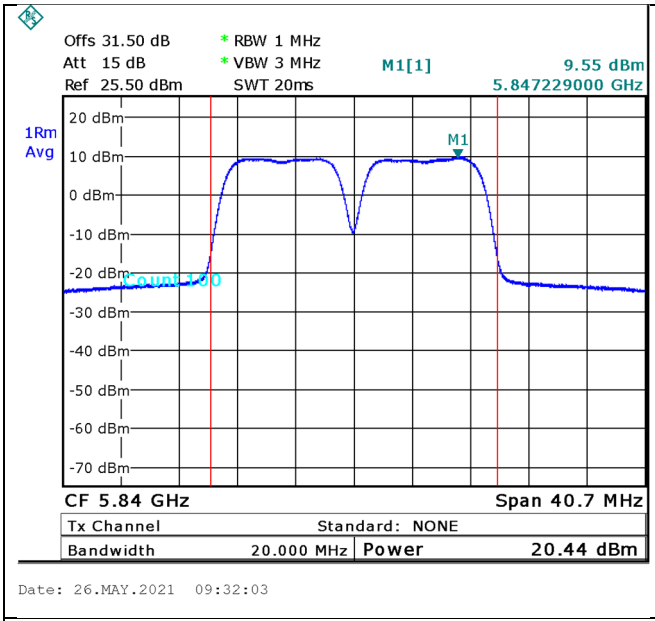


Figure 70. 5840.0MHz, 20MHz BW

5.7 Test Equipment Used; Transmitted Power Density

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	23/02/2021	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 71 Test Equipment Used

6 Band Edge

6.1 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

6.2 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.

6.3 Test Limits

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)
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

Operating Band	Tested frequency/range	Up band edge (Non restricted band)	Low Band edge (restricted band)
(MHz)	(MHz)	(dBm)	(dBm)
	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, according to RSS-247, Section 6.2.1.2, any unwanted emission that falls into the 5250-5350 MHz band 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.

6.4 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 72 to Figure 107.

6.5 Test Results of Band Edge Emissions for Transmission with A.G 2dBi

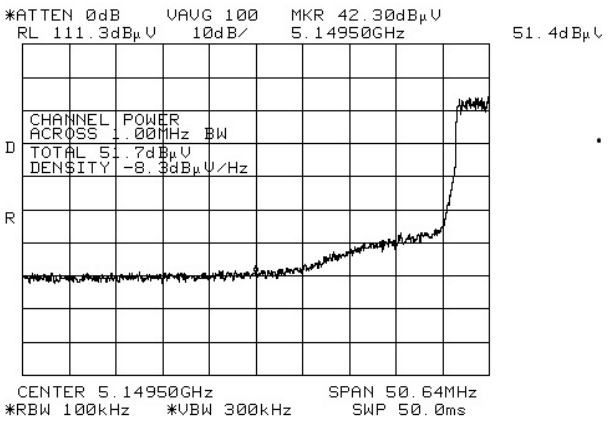


Figure 72: UNII 1, 5.1495GHz, Rest. Band AVG [Vertical]

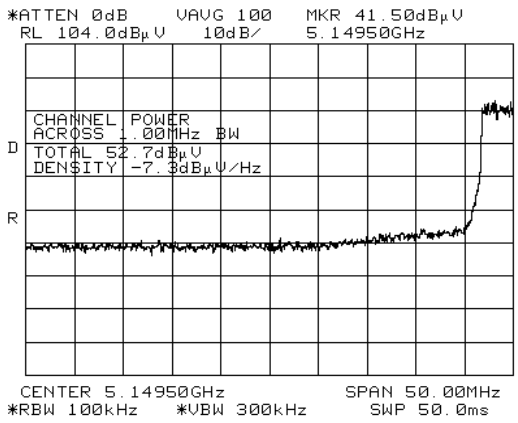


Figure 73: UNII 1, 5.1495GHz, Rest. Band AVG [Hor]

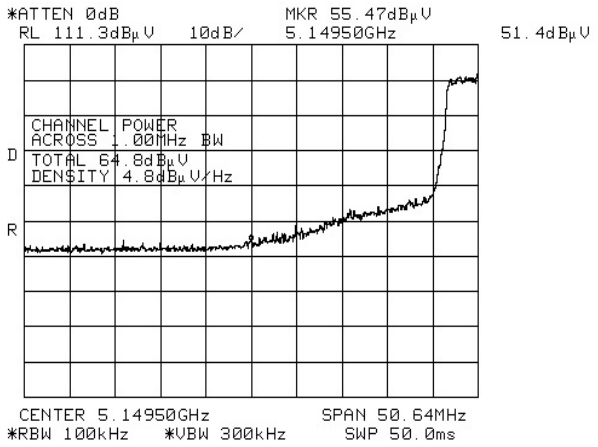


Figure 74: UNII 1, 5.1495GHz, Rest. Band Peak [Vertical]

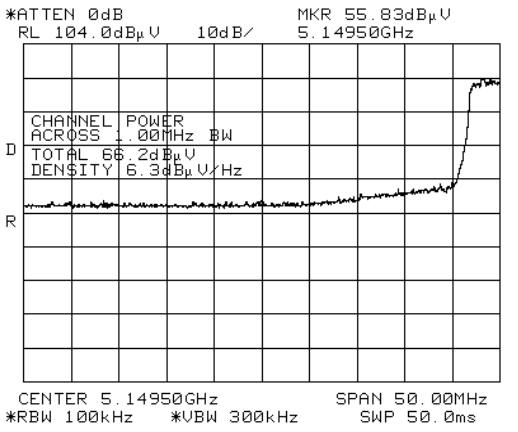


Figure 75: UNII 1, 5.1495GHz, Rest. Band Peak [Hor]

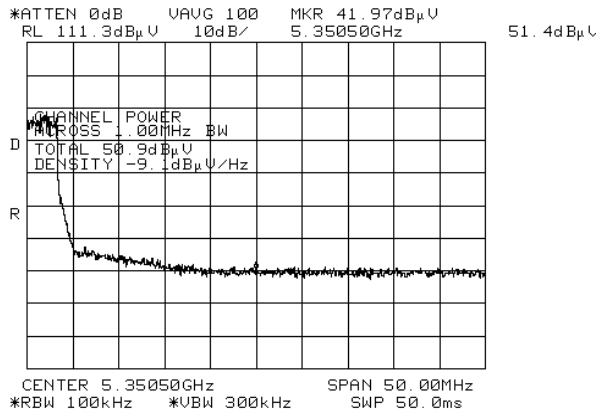


Figure 76: UNII 2A, 5.3505GHz, Rest. Band AVG [Vertical]

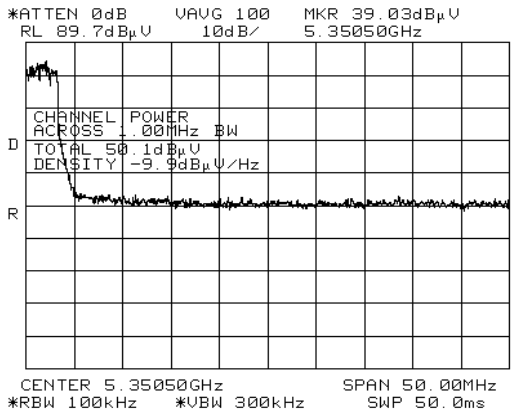


Figure 77: UNII 2A, 5.3505GHz, Rest. Band AVG [Hor]

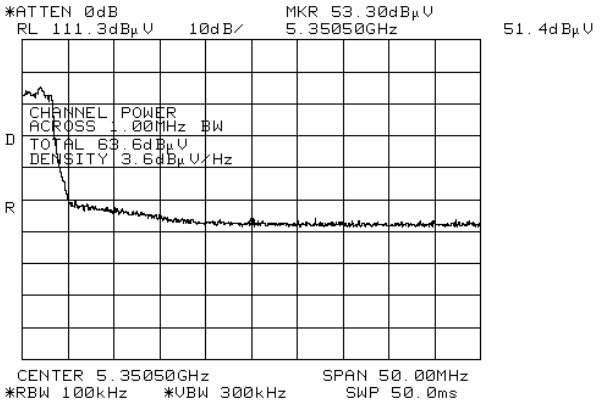


Figure 78: UNII 2A, 5.3505GHz, Rest. Band Peak [Vertical]

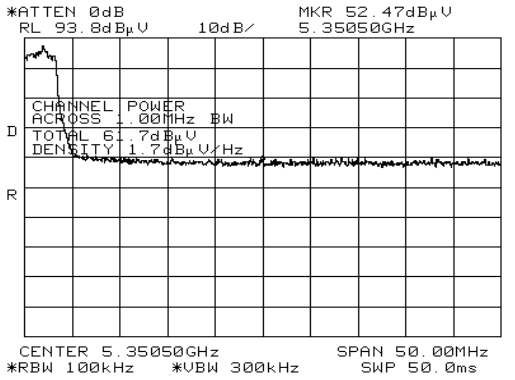
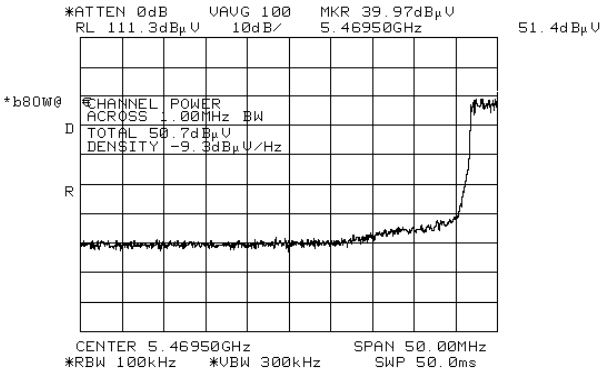


Figure 79: UNII 2A, 5.3505GHz, Rest. Band Peak [Hor]



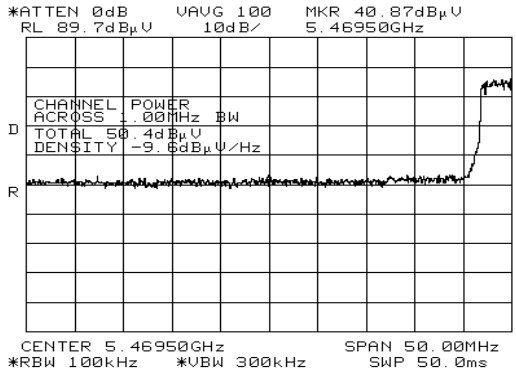


Figure 80: UNII 2C, 5.4695GHz, Rest. Band AVG [Vertical]

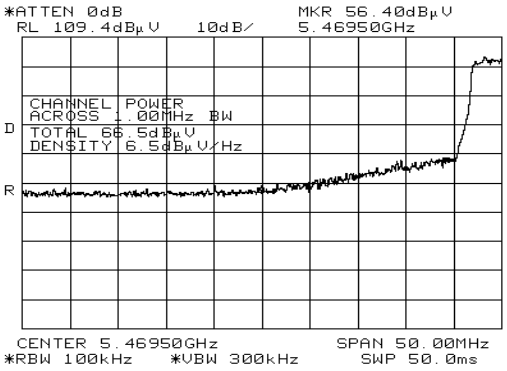


Figure 81: UNII 2C, 5.4695GHz, Rest. Band AVG [Hor]

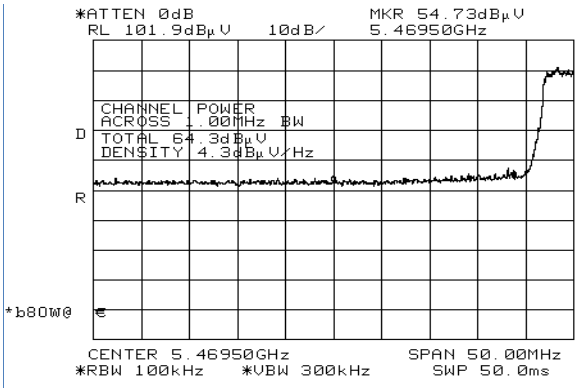


Figure 82: UNII 2C, 5.4695GHz, Rest. Band Peak [Vertical]

Figure 83: UNII 2C, 5.4695GHz, Rest. Band Peak [Hor]

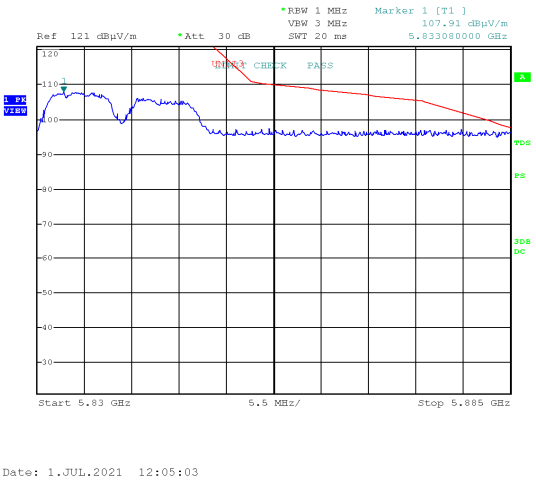


Figure 84: UNII 3, 5.830-5.885GHz, [Hor]

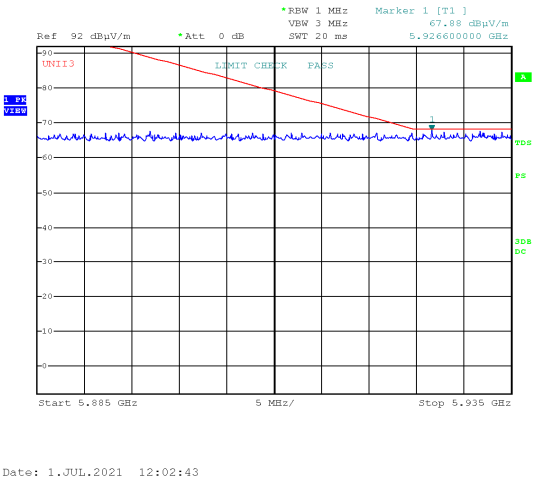


Figure 85: UNII 3, 5.885-5.935GHz, [Hor]

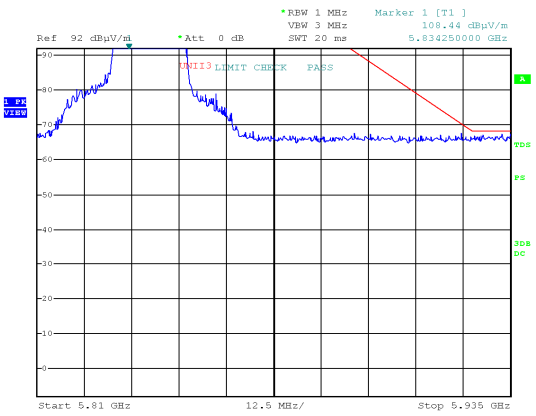


Figure 86: UNII 3, 5.830-5.935GHz, [Hor]

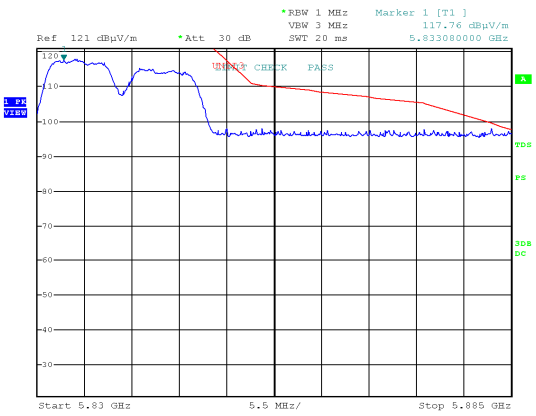


Figure 87: UNII 3, 5.835-5.885GHz, [Ver]

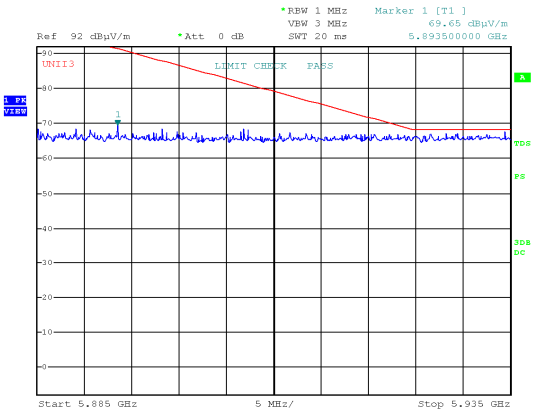


Figure 88: UNII 3, 5.885-5.935GHz, [Ver]

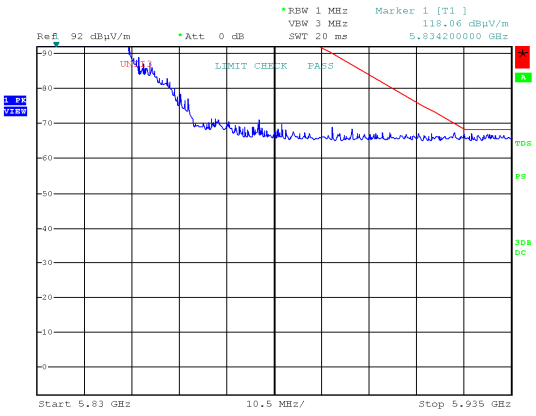


Figure 89: UNII 3, 5.835-5.935GHz, [Ver]

6.6 Test Results of Band Edge Emissions for Transmission with A.G 11dBi

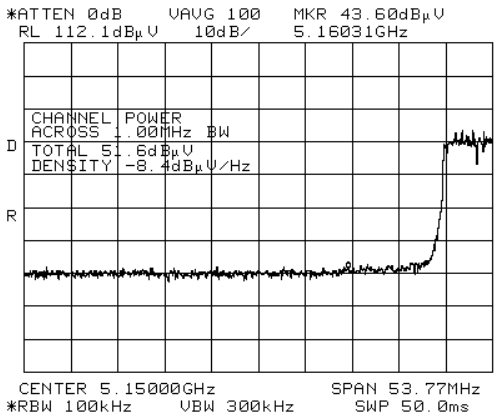


Figure 90: UNII 1, 5.1495GHz, Rest. Band AVG [Vertical]

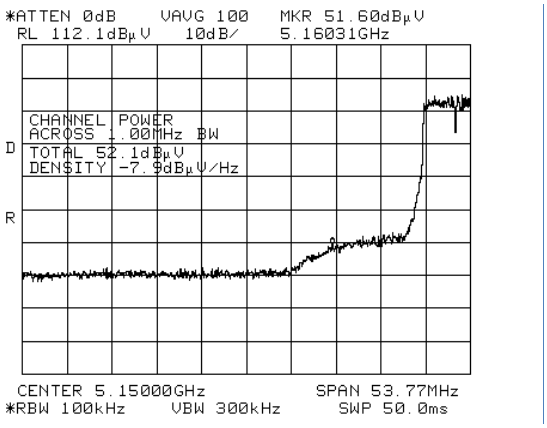


Figure 91: UNII 1, 5.1495GHz, Rest. Band AVG [Hor]

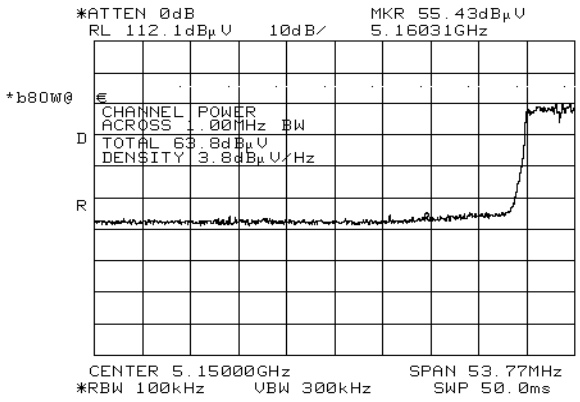


Figure 92: UNII 1, 5.1495GHz, Rest. Band Peak [Vertical]

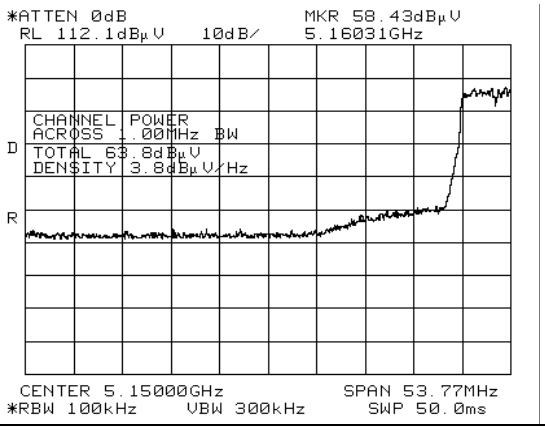


Figure 93: UNII 1, 5.1495GHz, Rest. Band Peak [Hor]

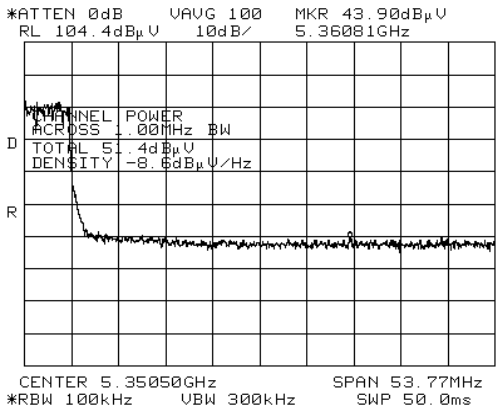


Figure 94: UNII 2A, 5.3505GHz, Rest. Band AVG [Vertical]

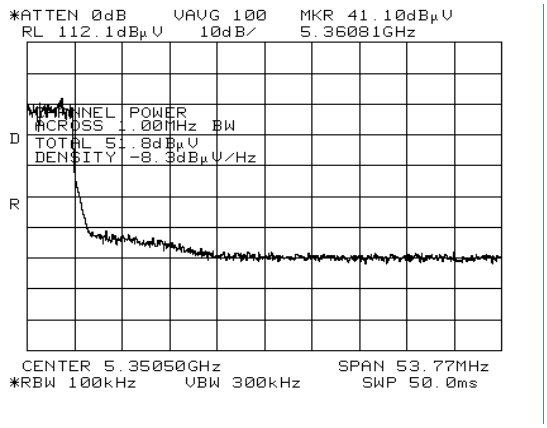


Figure 95: UNII 2A, 5.3505GHz, Rest. Band AVG [Hor]

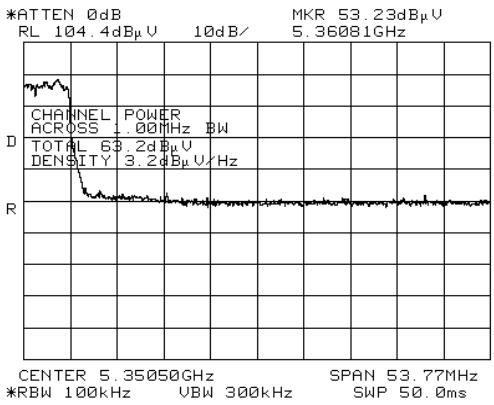


Figure 96: UNII 2A, 5.3505GHz, Rest. Band Peak [Vertical]

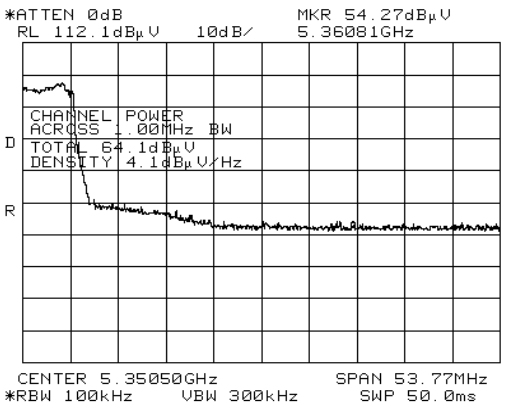


Figure 97: UNII 2A, 5.3505GHz, Rest. Band Peak [Hor]

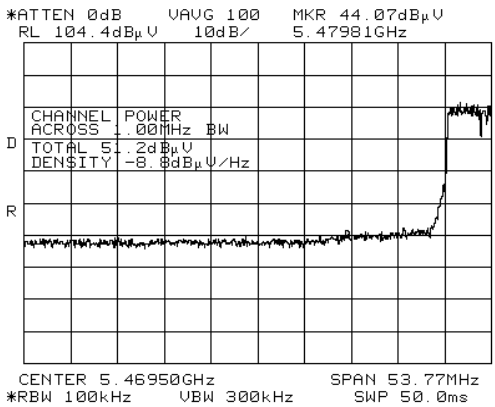


Figure 98: UNII 2C, 5.4695GHz, Rest. Band AVG [Vertical]

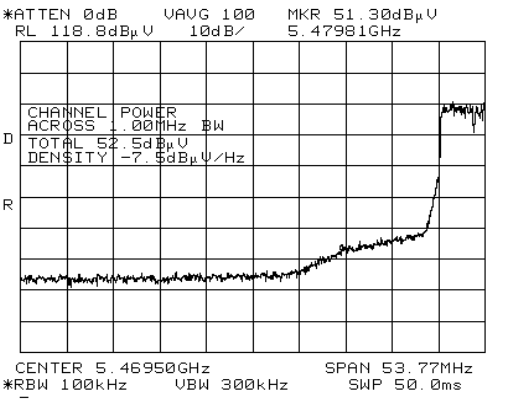


Figure 99: UNII 2C, 5.4695GHz, Rest. Band AVG [Hor]

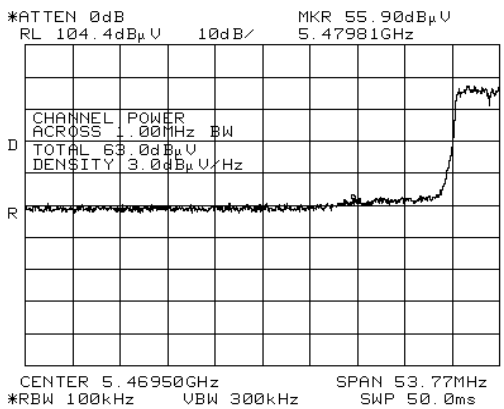


Figure 100: UNII 2C, 5.4695GHz, Rest. Band Peak [Vertical]

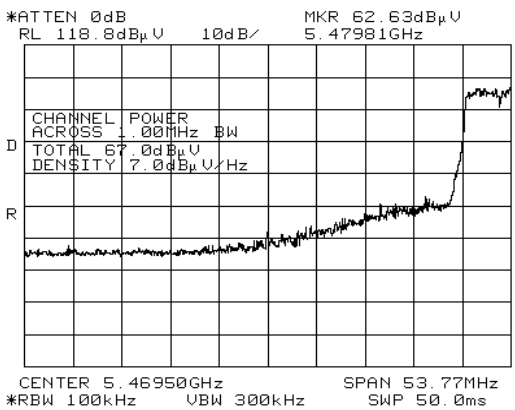


Figure 101: UNII 2C, 5.4695GHz, Rest. Band Peak [Hor]

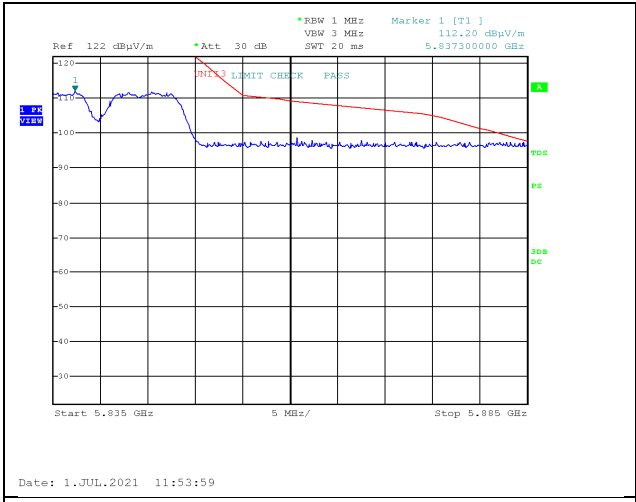


Figure 102: UNII 3, 5.835-5.885GHz, [Hor]

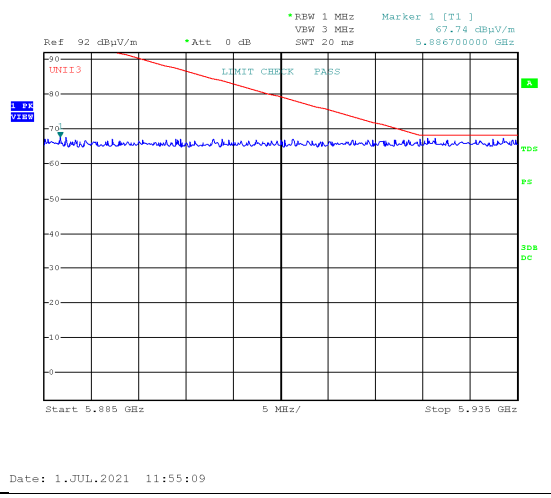


Figure 103: UNII 3, 5.885-5.935GHz, [Hor]

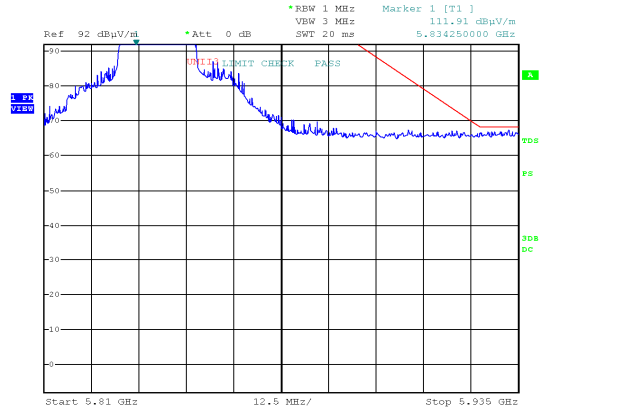


Figure 104: UNII 3, 5.835-5.935GHz, [Hor]

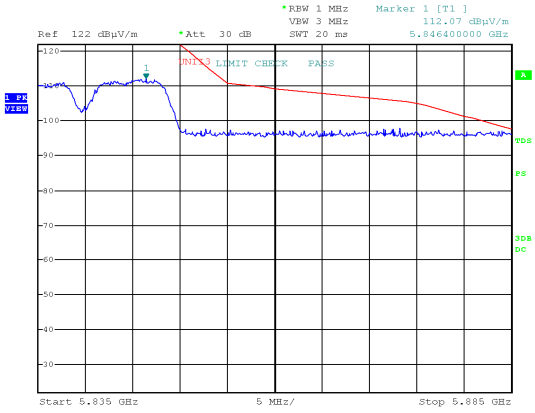


Figure 105: UNII 3, 5.885-5.935GHz, [Hor]

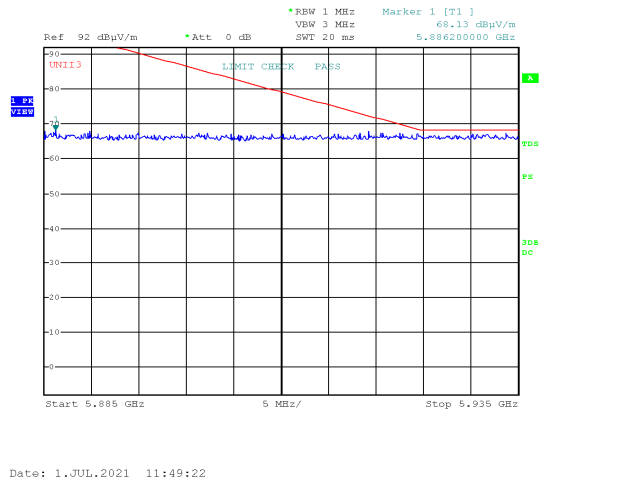


Figure 106: UNII 3, 5.835-5.885GHz, [Ver]

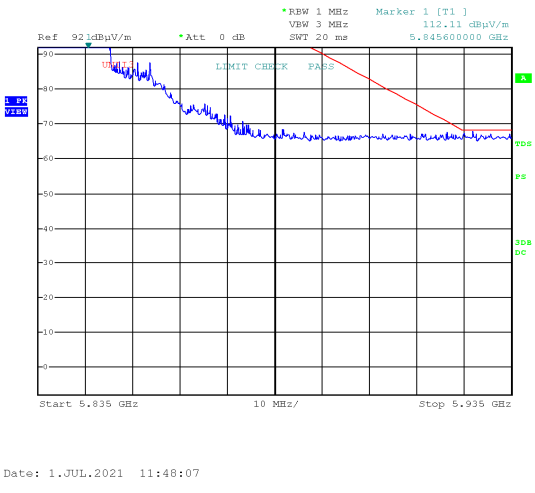


Figure 107: UNII 3, 5.885-5.935GHz, [Ver]

6.7 Test Instrumentation Used, Band Edge

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

Figure 108 Test Equipment Used

7 Undesirable/Unwanted Emissions

7.1 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

7.2 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.

The highest radiations are described in the tables below.

7.3 FCC&ISED Test Limits

Frequency ranges from band edge	EIRP limit	EIRP limit
(MHz)	(dBm/MHz)	(dBµV/m/MHz@3m)
±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 109 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 110 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 111 IC Restricted Band Limits

7.4 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

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
Antenna gain mode : 11dBi
Frequency Range: 9kHz to 40.0 GHz
Detector: Peak, Average

Operation Frequency	Freq.	Pol	Peak Reading	Peak Limit	Peak Margin	Average Reading	Average Limit	Average Margin
(MHz)	(MHz)	(H/V)	(dBµV/m)	(dBµV/m)	(dB)	(dBµV/m)	(dBµV/m)	(dB)
5180.0	No emissions detected above the spectrum anlayzer noise level which have at least 10dB margin below the limit							
5240.0								
5320.0								
5500.0								
5720.0								
5840.0								

Figure 112. Radiated Emission Results for 11dBi antenna gain

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

7.5 Test Instrumentation Used, Emissions in Non-Restricted Frequency Bands

Instrument	Manufacturer	Model	Serial No.	Last Calibration	Next Calibration
EMI Receiver	R&S	ESCI7	100724	23/02/2021	23/02/2022
EMI Receiver	HP	8542E	3906A00276	24/02/2021	24/02/2021
RF Filter Section	HP	85420E	3705A00248	24/02/2021	24/02/2021
EMC Analyzer	HP	8593 EM	3826A00265	22/02/2021	22/02/2021
Active Loop Antenna	EMCO	6502	9506-2950	05/02/2019	28/02/2023
Biconical Antenna	EMCO	3110B	9912-3337	21/05/2019	31/05/2021
Log Periodic Antenna	EMCO	3146	9505-4081	31/05/2018	31/05/2021
Horn Antenna	ETS	3115	29845	25/05/2021	25/05/2024
Horn Antenna	ARA	SWH-28	1007	31/05/2017	30/06/2021
Horn antenna 26.5-40GHz	OSR	PE9850R-20	J202021732	24/05/2021	24/05/2024
MicroWave System Amplifier	HP	83006A	3104A00589	23/08/2020	31/08/2021
RF Cable Chamber	Commscope ORS	0623 WBC-400	G020132	23/08/2020	31/08/2021
RF Cable Oats	EIM	RG214-11N(X2)		04/08/2020	31/08/2021
Filter Band Pass 4-20 GHz	Meuro	MFL040120H50	902252	02/11 2020	30/11/2021
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 113 Test Equipment Used

7.6 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.

8 Occupied Bandwidth

8.1 Test Specification

FCC, Part 2, Sub part J, Section 2.1049

RSS-Gen, Issue 5: 2014, Section 6.6

8.2 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.

8.3 Test Limit

N/A

8.4 Test Results

Declared EBW	Operation Frequency	Reading
[MHz]	(MHz)	(MHz)
Band U-NII 1, 5150-5250MHz		
20.0	5180MHz	17.72 MHz
20.0	5220MHz	17.84 MHz
20.0	5240MHz	17.72 MHz
Band U-NII 2A, 5250-5350MHz		
20.0	5260MHz	17.84 MHz
20.0	5300MHz	17.72 MHz
20.0	5320MHz	17.84 MHz
Band U-NII 2C, 5470-5725MHz		
20.0	5500MHz	17.84 MHz
20.0	5620MHz	17.84 MHz
20.0	5720MHz	17.96 MHz
Band U-NII 3, 5725-5850MHz		
20.0	5740MHz	17.96 MHz
20.0	5800MHz	17.96 MHz
20.0	5840MHz	17.96 MHz

Figure 114. Bandwidth Test Results, configuration of 2 ports transmissions

JUDGEMENT: N/A

See additional information in Figure 115 to Figure 126.

8.5 Occupied Bandwidth

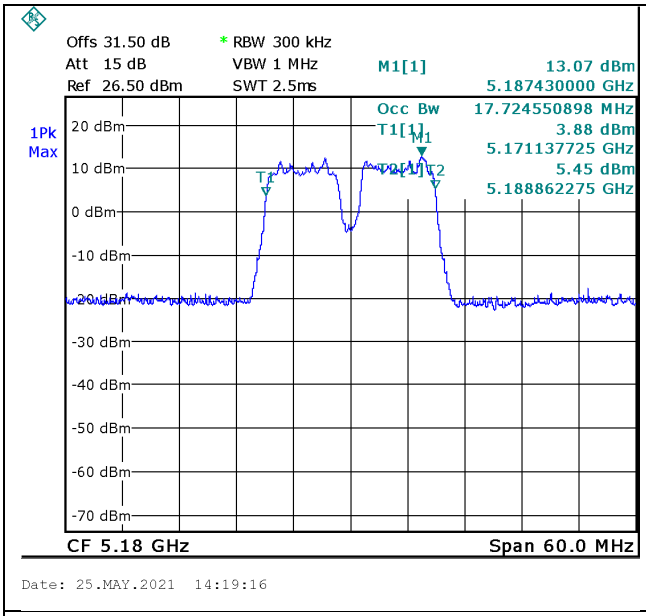


Figure 115. 5180.0MHz, 20MHz BW

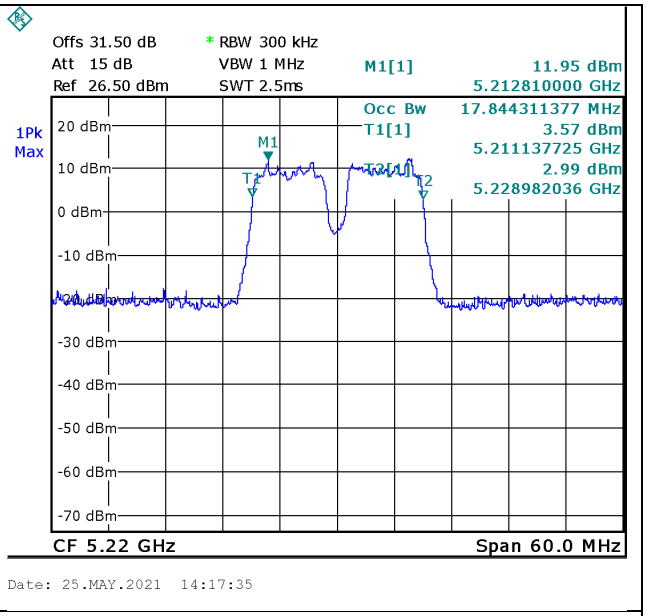


Figure 116. 5220.0MHz, 20MHz BW

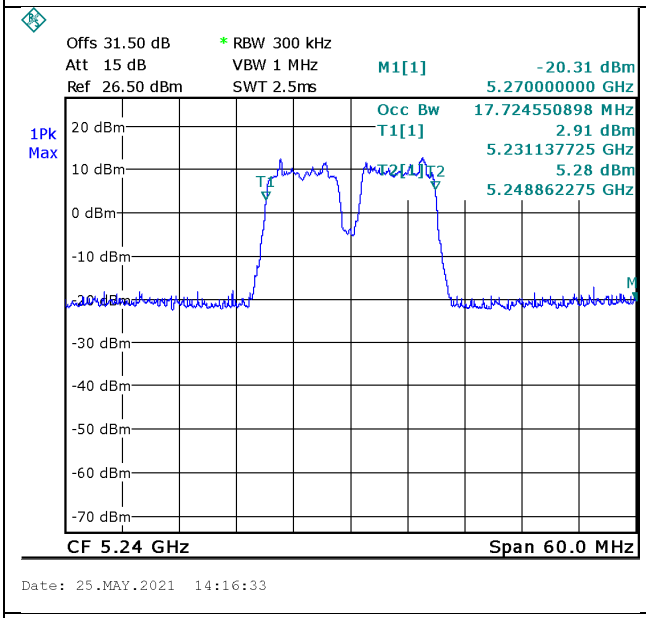


Figure 117. 5240.0MHz, 20MHz BW

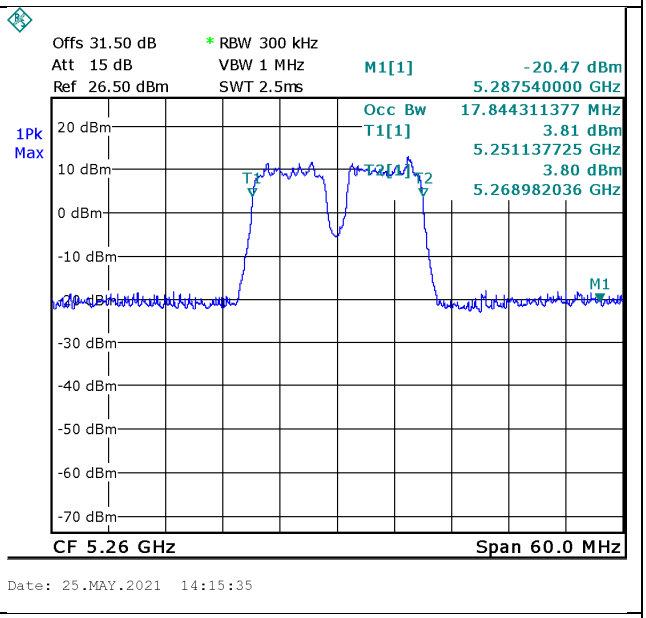


Figure 118. 5260.0MHz, 20MHz BW

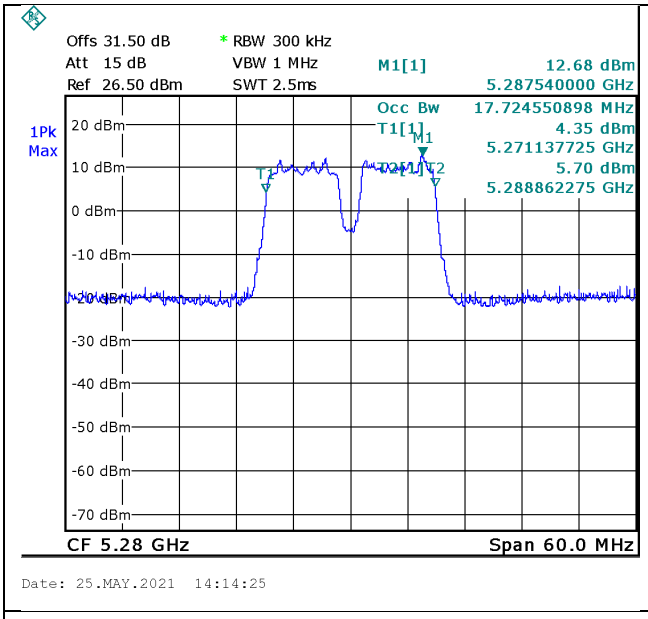


Figure 119. 5280.0MHz, 20MHz B

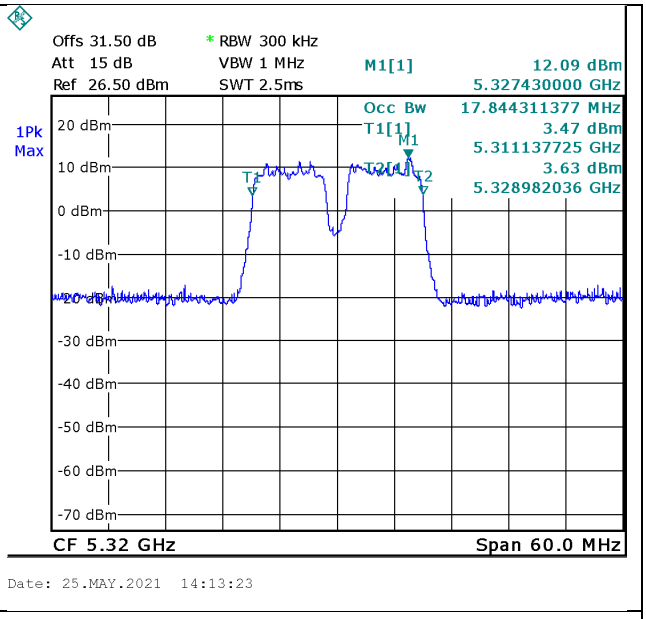


Figure 120. 5320.0MHz, 20MHz BW

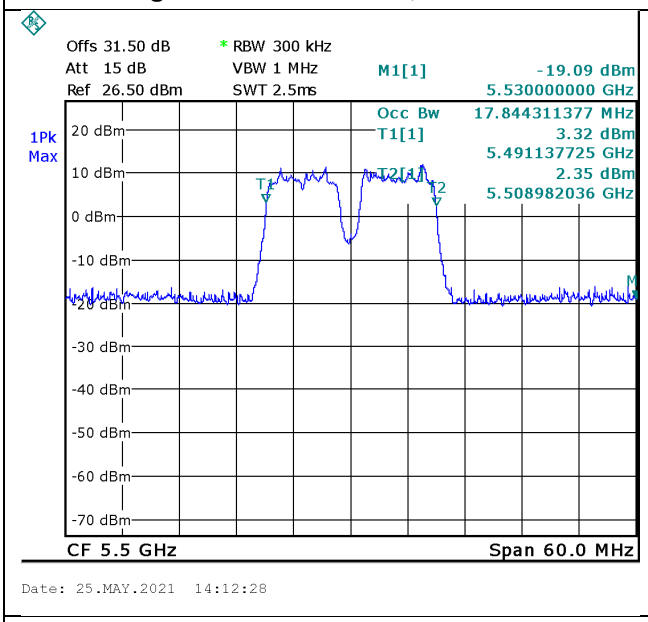


Figure 121. 5500.0MHz, 20MHz BW

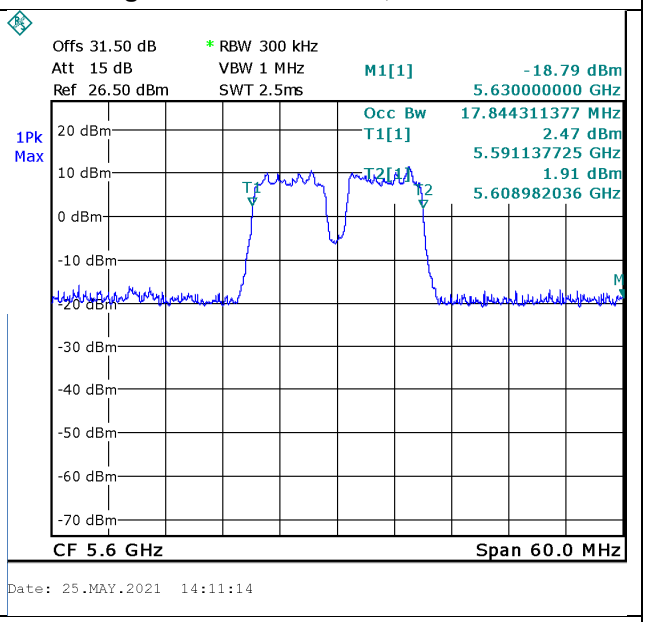


Figure 122. 5600.0MHz, 20MHz BW

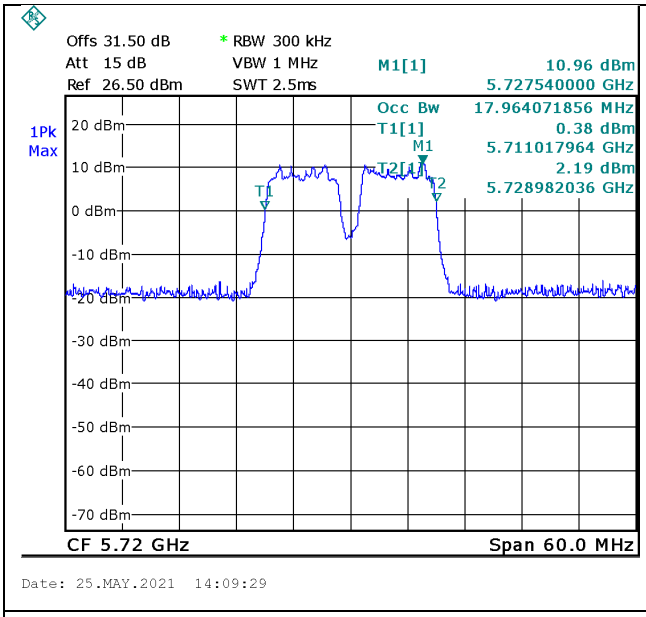


Figure 123. 5720.0MHz, 20MHz BW

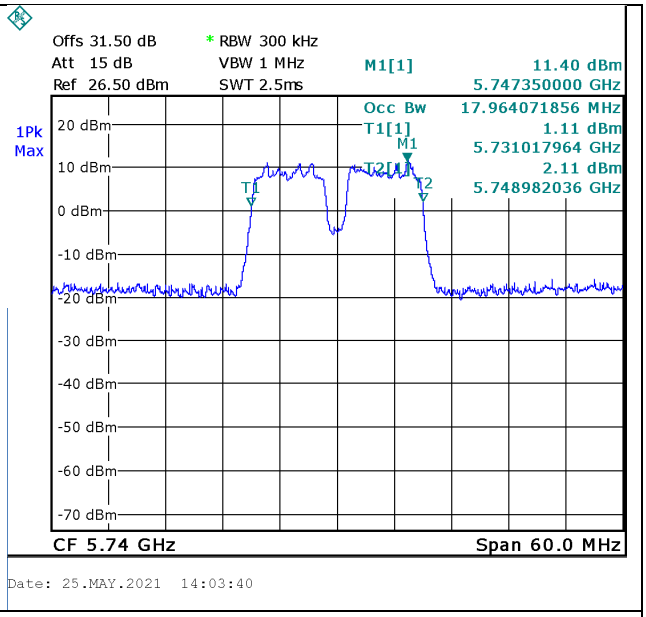


Figure 124. 5740.0MHz, 20MHz BW

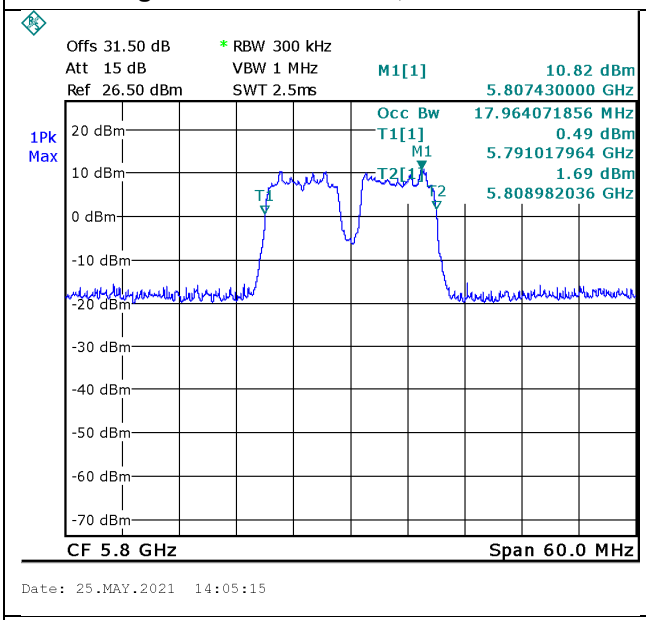


Figure 125. 5800.0MHz, 20MHz BW

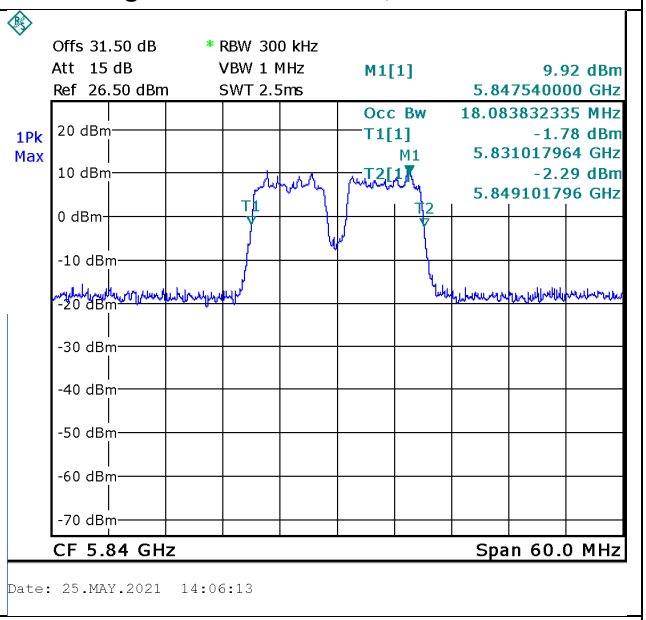


Figure 126. 5840.0MHz, 20MHz BW

8.6 Test Equipment Used; Occupied Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration	Next Calibration
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	23/02/2021	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 127 Test Equipment Used

9 26dB Bandwidth

9.1 Test Specification

FCC, Part 2, Sub part J, Section 2.1049

RSS-Gen, Issue 5: 2014, Section 6.6

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.

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

9.3 Test Limit

N/A

9.4 Test Results

Configuration of 2 ports transmissions		
Declared EBW	**Operation Frequency**	**Reading**
[MHz]	**(MHz)**	**(MHz)**
Band U-NII 1, 5150-5250MHz		
20.0	5180MHz	20.04 MHz
20.0	5220MHz	19.8 MHz
20.0	5240MHz	19.64 MHz
Band U-NII 2A, 5250-5350MHz		
20.0	5260MHz	19.56 MHz
20.0	5280MHz	19.64 MHz
20.0	5320MHz	19.72 MHz
Band U-NII 2C, 5470-5725MHz		
20.0	5500MHz	19.64 MHz
20.0	5600MHz	19.8 MHz
20.0	5720MHz	19.8 MHz
Band U-NII 3, 5725-5850MHz		
20.0	5740MHz	19.88 MHz
20.0	5800MHz	20.12 MHz
20.0	5840MHz	20.04

Figure 128. Bandwidth Test Results

JUDGEMENT: N/A

See additional information in Figure 129 to Figure 140.

9.5 26dB Bandwidth

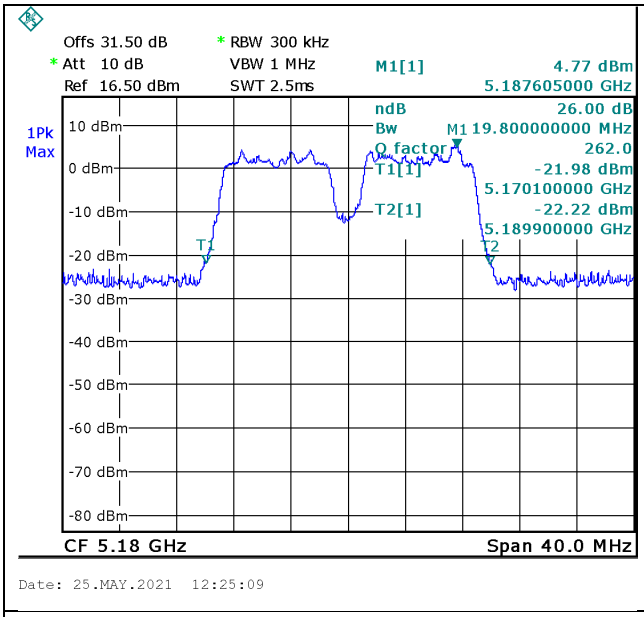


Figure 129. 5180.0MHz, 20MHz BW

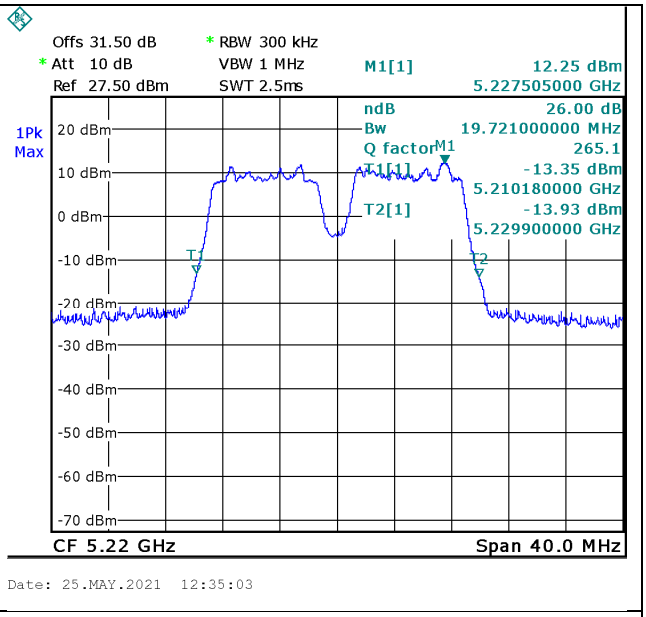


Figure 130. 5220.0MHz, 20MHz BW

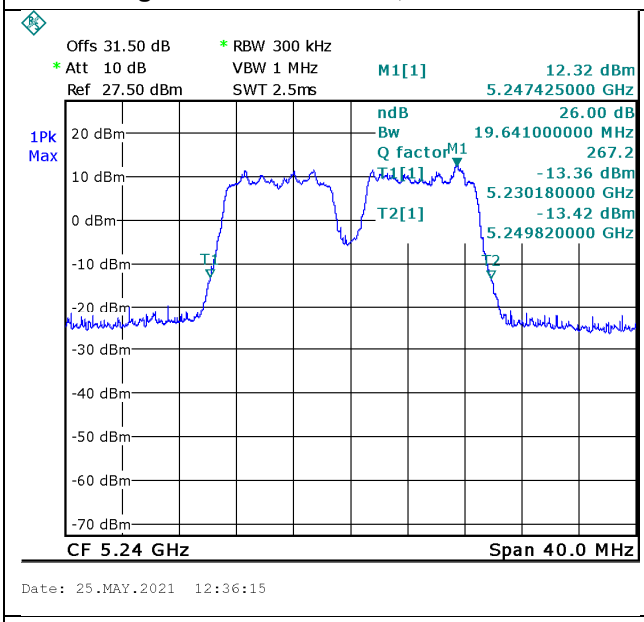


Figure 131. 5240.0MHz, 20MHz BW

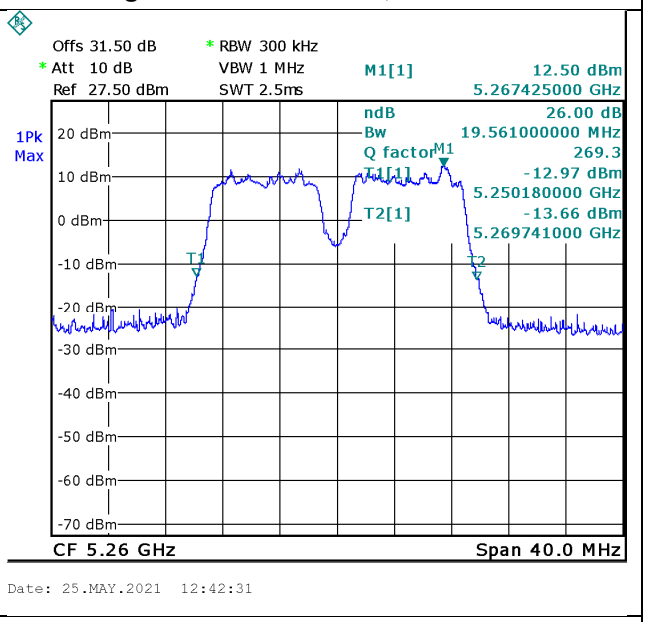


Figure 132. 5260.0MHz, 20MHz BW

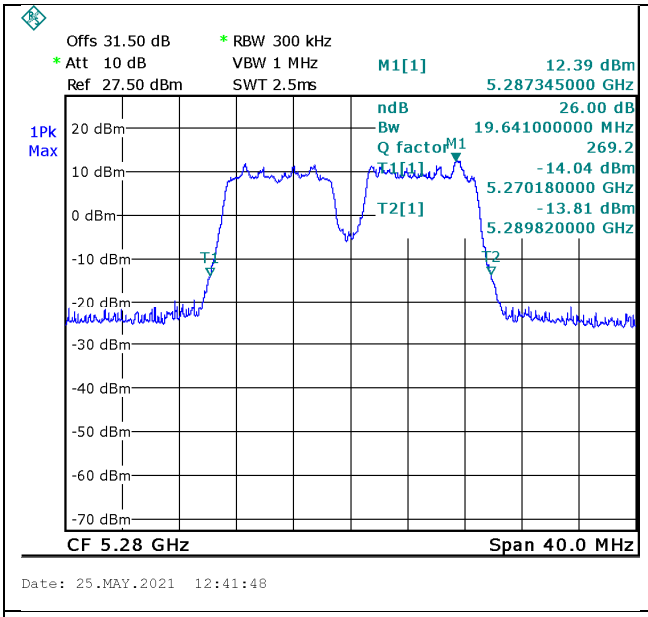


Figure 133. 5280.0MHz, 20MHz BW

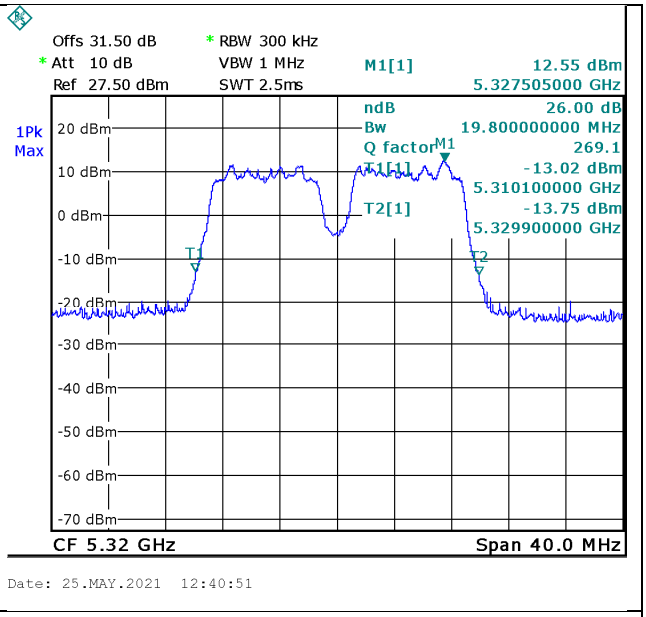


Figure 134. 5320.0MHz, 20MHz BW

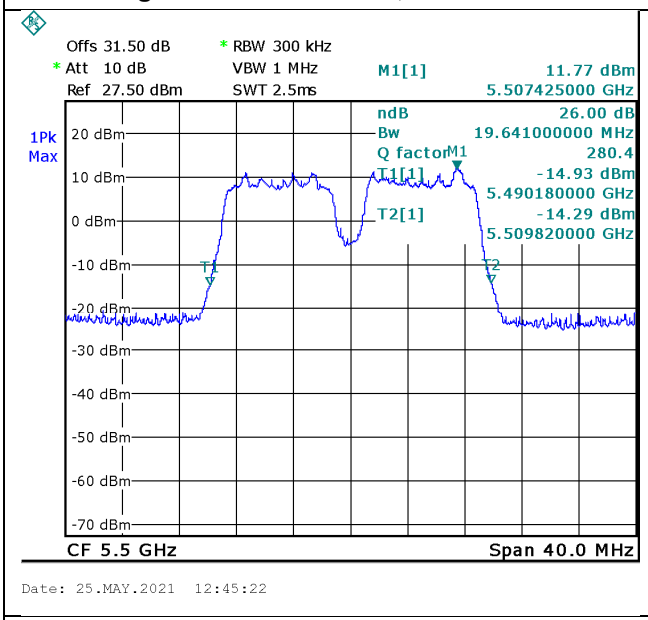


Figure 135. 5500.0MHz, 20MHz BW

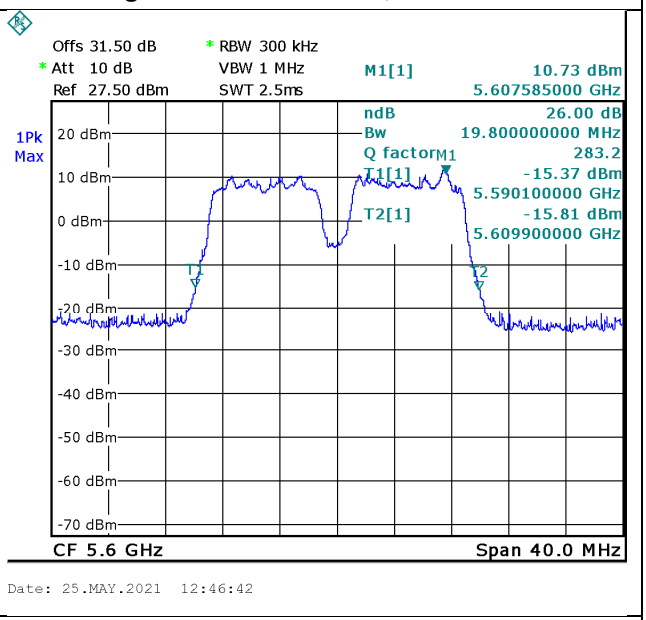


Figure 136. 5620.0MHz, 20MHz BW

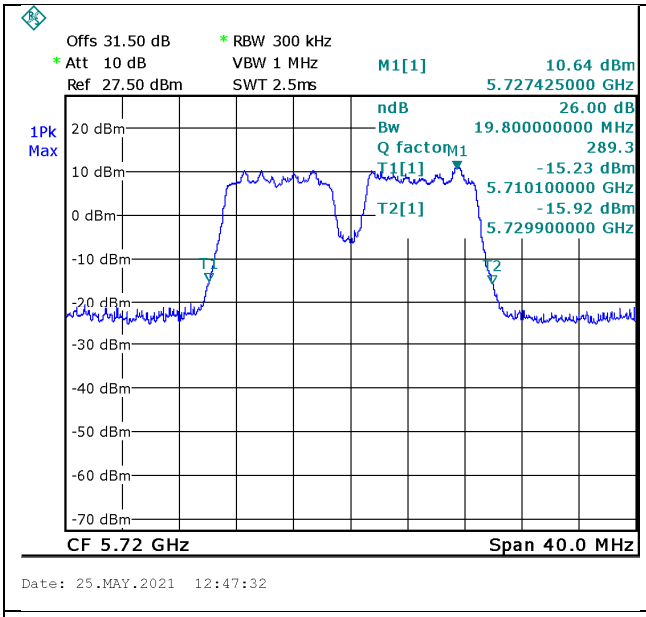


Figure 137. 5720.0MHz, 20MHz BW

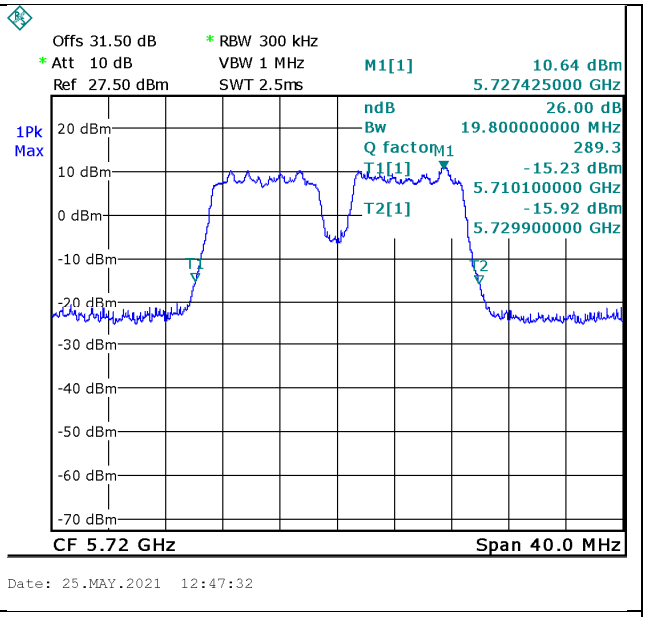


Figure 138. 5740.0MHz, 20MHz BW

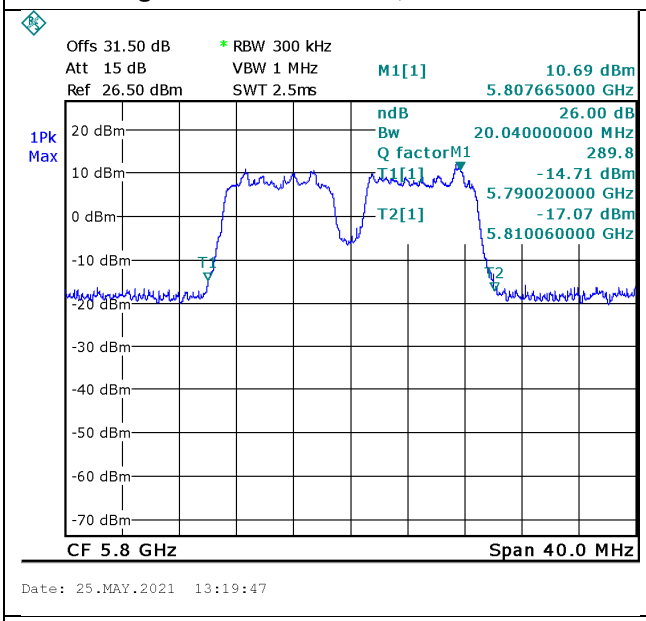


Figure 139. 5800.0MHz, 20MHz BW

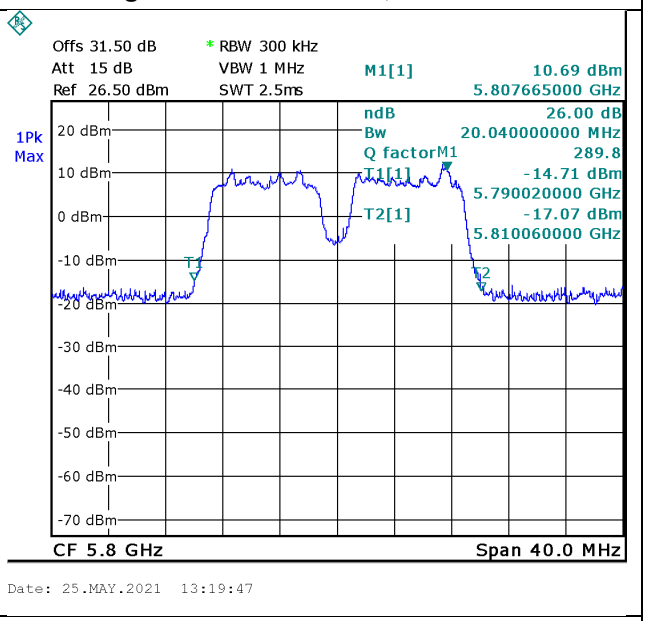


Figure 140. 5840.0MHz, 20MHz BW

9.6 Test Equipment Used; Occupied Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	23/02/2021	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 141 Test Equipment Used

10 6 dB Minimum Bandwidth

10.1 Test Specification

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

RSS 247, Issue 2, Section 6.2.4

1.1 Test Procedure

10.2 (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.

10.3 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.

10.4 Test Results

Declared EBW	Operation Frequency	Reading	Limit
[MHz]	(MHz)	(MHz)	(kHz)
Band U-NII 3, 5725-5850MHz			
20.0	5740MHz	17.7 MHz	>500.0
20.0	5800MHz	17.82 MHz	>500.0
20.0	5840MHz	17.86 MHz	>500.0

Figure 142 6 dB Minimum Bandwidth

JUDGEMENT: Passed

For additional information see Figure 143 to Figure 145.

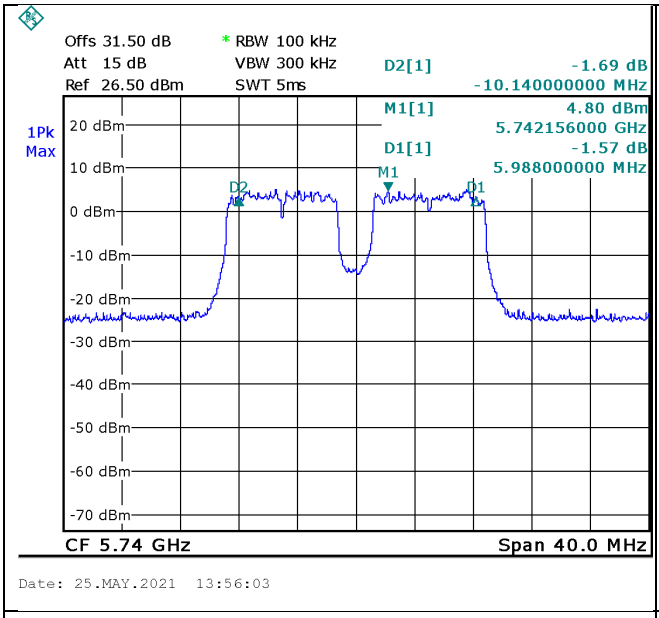


Figure 143. 5740.0MHz, 20MHz BW

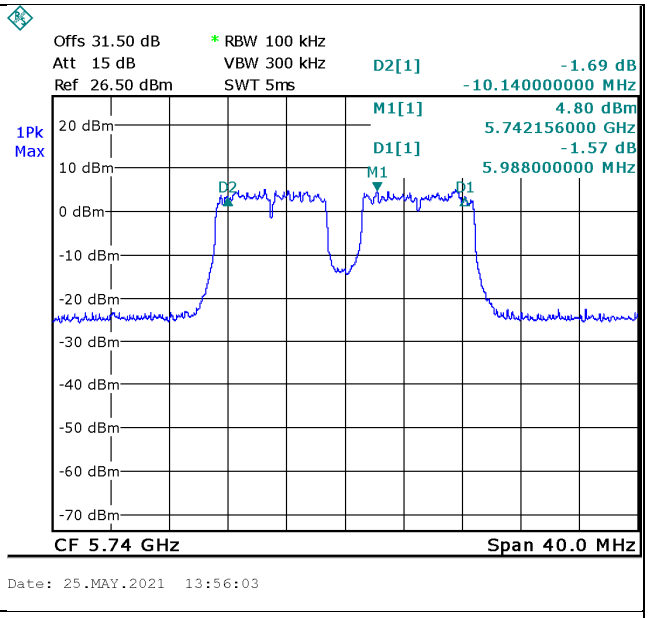


Figure 144. 58000.0MHz, 20MHz BW

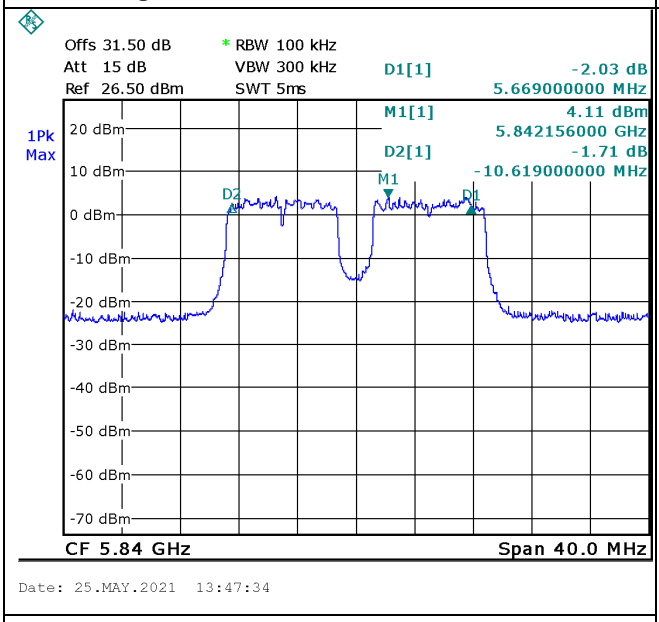


Figure 145. 5840.0MHz, 20MHz BW

10.5 Test Equipment Used; 6dB Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration	Next Calibration
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	23/02/2021	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 146 Test Equipment Used

11 Antenna Gain/Information

11.1 Test Specification

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

11.2 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).

11.3 Test Results

Model	Type	Antenna Gain	Impedance
VT5-7.5G-R-1	Dipole	2 dBi	50Ω
WSS002	Dipole	2 dBi	50Ω
AMN5330	Directional Antenna	11 dBi	50Ω

Figure 147 Antenna Gain Results

Judgment: Passed

2dBi antenna with RP-SMA connector type

12 R.F Exposure/Safety

The device's intended use is to operate in a user home environment, linked to the home router, allowing a two way video call and upload of files to the network.

The typical distance between the E.U.T. and the user is at least 20cm. Transmission occurs when the device is placed on a surface.

Calculation of Maximum Permissible Exposure (MPE)

Based on 47CFR1 Section 1.1307(b)(1) and RSS 102 Issue 5, Table 4 Requirements

(a) FCC: The limit for the 5.0 GHz band is: $1\frac{mW}{cm^2}$

Using Table 1 of 47CFR1 Section 1.1310 limit for general population/uncontrolled exposures, the above levels are an average over 30 minutes.

The power density produced by the E.U.T. is:

$$S = \frac{P_t G_t}{4\pi R^2}$$

P_t = Conducted Transmitted Power 21.4 dBm = 138.04 mW

G_t = Antenna Gain 11dBi = 12.59 numeric

R = Distance From Transmitter 20 cm

The peak power density produced by the E.U.T. is:

$S = 138.04*12.59/4\pi(20)^2 = 0.034$ mW/cm^2

This is below the FCC limit.

(b) ISED: The limit: 300-6000MHz = $0.02619 \times f^{0.6834}$ W/m^2= $0.02619 \times 5840^{0.6834}$ W = 0.02619 x 374.9 = 9.8 W/m^2

The peak power density produced by the E.U.T. is

$S = 0.138*12.59/4\pi(0.2)^2 = 3.46$ W/m^2

This result is below the ISED limit.

13 APPENDIX A - CORRECTION FACTORS

13.1 For ITL #1911 OATS RF Cable

Frequency (MHz)	Cable Loss (dB)		Frequency (MHz)	Cable Loss (dB)
1.0	0.5		450.00	5.83
10.00	1.0		500.00	6.33
20.00	1.34		550.00	6.67
30.00	1.5		600.00	6.83
50.00	1.83		650.00	7.17
100.00	2.67		700.00	7.66
150.00	3.17		750.00	7.83
200.00	3.83		800.00	8.16
250.00	4.17		850.00	8.5
300.00	4.5		900.00	8.83
350.00	5.17		950.00	8.84
400.00	5.5		1000.00	9.0

13.2 For ITL #1840 Anechoic Chamber RF Cable

Frequency (MHz)	Cable Loss (dB)		Frequency (MHz)	Cable Loss (dB)
1000.0	-1.4		10000.0	-6.0
1500.0	-1.7		10500.0	-6.2
2000.0	-2.0		11000.0	-6.2
2500.0	-2.3		11500.0	-6.0
3000.0	-2.6		12000.0	-6.0
3500.0	-2.8		12500.0	-6.1
4000.0	-3.1		13000.0	-6.3
4500.0	-3.3		13500.0	-6.5
5000.0	-3.6		14000.0	-6.7
5500.0	-3.7		14500.0	-7.0
6000.0	-4.0		15000.0	-7.3
6500.0	-4.4		15500.0	-7.5
7000.0	-4.7		16000.0	-7.6
7500.0	-4.8		16500.0	-8.0
8000.0	-5.0		17000.0	-8.0
8500.0	-5.1		17500.0	-8.1
9000.0	-5.6		18000.0	-8.2
9500.0	-5.8			

13.3 For ITL # 1075 Active Loop Antenna

Frequency (MHz)	MAF (dBs/m)	AF (dB/m)
0.01	-33.1	18.4
0.02	-37.2	14.3
0.03	-38.2	13.3
0.05	-39.8	11.7
0.1	-40.1	11.4
0.2	-40.3	11.2
0.3	-40.3	11.2
0.5	-40.3	11.2
0.7	-40.3	11.2
1	-40.1	11.4
2	-40.0	11.5
3	-40.0	11.5
4	-40.1	11.4
5	-40.2	11.3
6	-40.4	11.1
7	-40.4	11.1
8	-40.4	11.1
9	-40.5	11.0
10	-40.5	11.0
20	-41.5	10.0
30	-43.5	8.0

13.4 For ITL #1356 Biconical Antenna

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

13.5 For ITL # 1349 Log Periodic Antenna

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

13.6 For ITL # 1352 1-18 GHz Horn Antenna

Frequency (MHz)	AF (dB/m)		Frequency (MHz)	AF (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

13.7 For ITL # 1353 18-26.5 GHz Horn Antenna

CALIBRATION DATA

3 m distance

Frequency MHZ	Measured antenna factor dB/m
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.

13.8 For ITL # 1777 26.5-40 GHz Horn Antenna