



DATE: July 6 2021

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

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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

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

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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:	7.5.11
Date of Receipt of E.U.T:	December 27, 2020
Start of Test:	December 27, 2020
End of Test:	July 13, 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 the 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 remoted camera connected to the AMN41012.

1.4 **Test Methodology**

Both conducted and radiated testing was performed according to the procedures in KDB 789003 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 E.U.T contain UNII 3 band transceiver that already certified for FCC/IC (see FCCID: VQSAMN42012 IC: 7680A-AMN42012)
2. The customer asks to add the 3 channels 5,750 MHz, 5,790 MHz, 5,830 MHz to the existing 5,755 MHz, 5,795 MHz channels (operation bandwidth of 40MHz).
3. This report destination is to check C2PC compliance, according to the agreed test plan between the customer and the TCB (ACB):

Country	Test& Report Required
US	UNII3 FCC Part 15E Frequency: 5725-5850MHz Add Channels: 5750MHz, 5790MHz, 5830MHz, to the existing 5755MHz, 5795MHz Low channel: 5750MHz; test BW, Pout, and worst-case spurious emissions (1 config) mid: 5790MHz test: Pout, PSD, BW; high: 5830MHz fully test BW: 40MHz Modulation: OFDM 64QAM Ports: 1 TX chains Usage: Indoor and outdoor client at UNII3 Power: limitation by restricted band – ~23dBm conducted Antenna: 2dBi
Canada	RSS-247, 40MHz Same as US for UNII3 Usage: indoor and outdoor

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

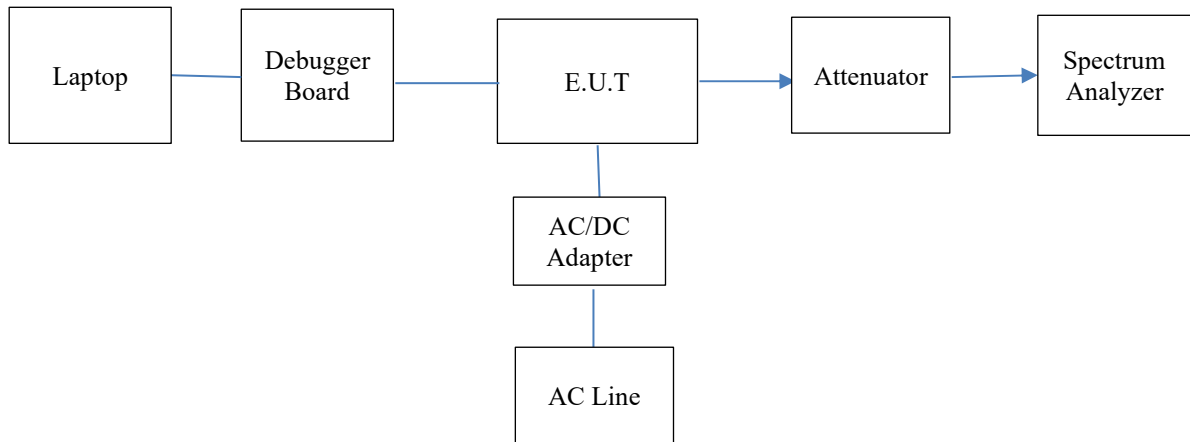


Figure 1. Configuration of Tested System Conducted

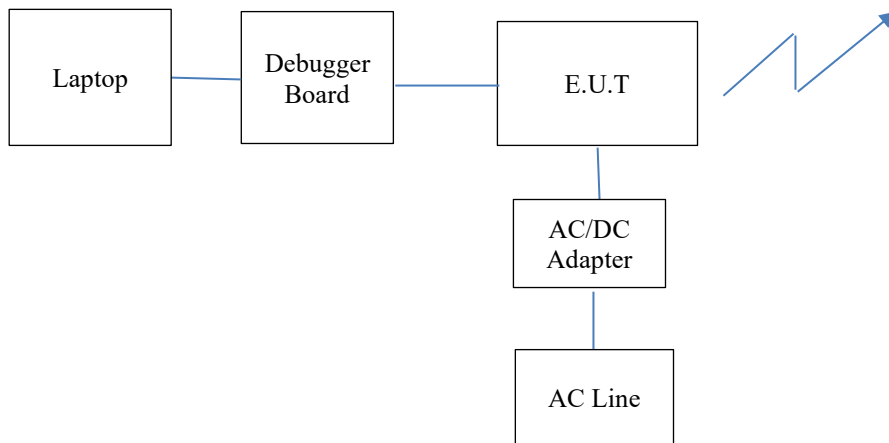


Figure 2. Configuration of Tested System Radiated



3. Conducted & 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 VAC / 60 Hz via 50 Ohm / 50 μ Hn 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 (dB μ V)	
	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 -12.06 dB

The margin between the emission levels and the specification limit is, in the worst case, -14.20 dB for the phase line at 24.018 MHz, and -12.06 dB at 24.022 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: Draco RX
Type: AMN42012
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	150 kHz	43.89	-21.25	
2 Average	170 kHz	25.09	-28.85	
1 Quasi Peak	425 kHz	29.52	-27.80	
2 Average	430 kHz	20.53	-25.71	
1 Quasi Peak	482 kHz	29.95	-25.33	
2 Average	482 kHz	22.15	-29.19	
1 Quasi Peak	738 kHz	21.10	-39.89	
2 Average	1.042 MHz	15.70	-30.25	
2 Average	1.558 MHz	15.65	-30.33	
1 Quasi Peak	1.562 MHz	21.09	-39.90	
2 Average	2.593 MHz	13.92	-26.07	
1 Quasi Peak	3.602 MHz	23.79	-28.08	
1 Quasi Peak	3.673 MHz	23.69	-28.02	
2 Average	3.77 MHz	20.01	-25.95	
2 Average	8.266 MHz	25.21	-24.75	
1 Quasi Peak	8.402 MHz	31.61	-22.39	
1 Quasi Peak	11.112 MHz	30.35	-29.54	
2 Average	11.218 MHz	24.89	-25.00	
1 Quasi Peak	22.018 MHz	36.50	-22.29	
2 Average	22.018 MHz	35.79	-14.20	

Date: 27.DEC.2020 10:04:29

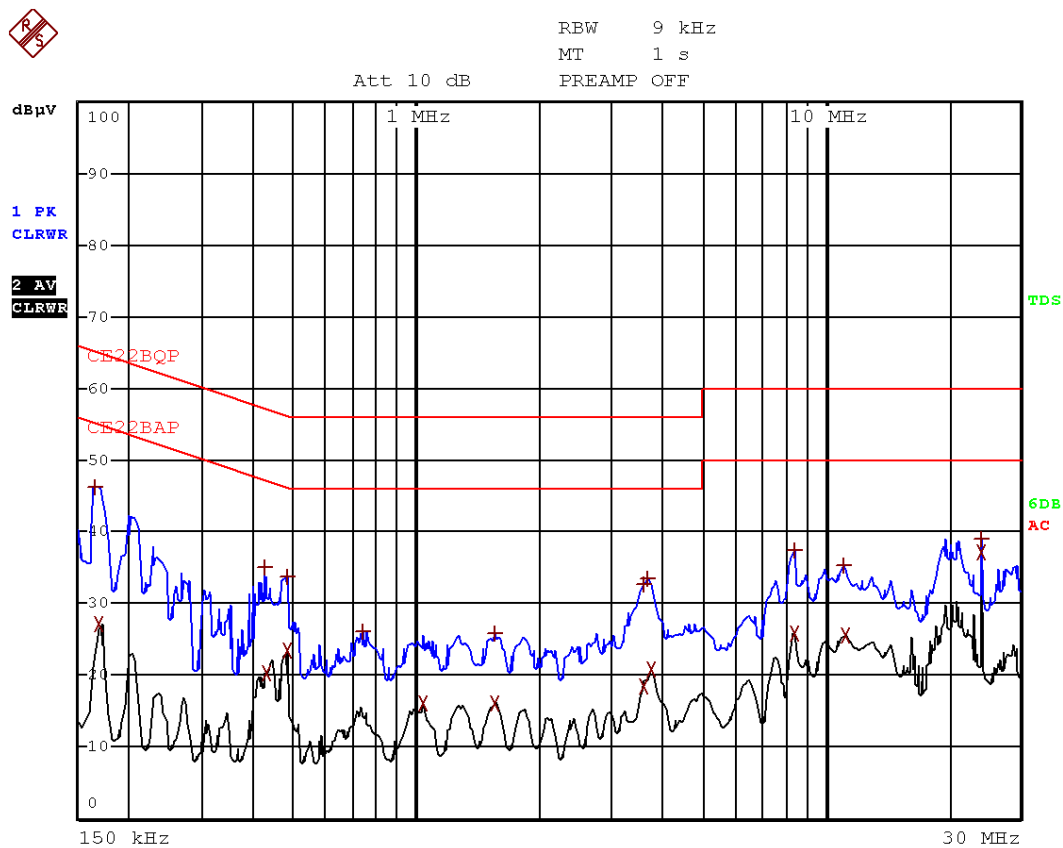
Figure 3. Detectors: Peak, Quasi-peak, Average

Note: QP Delta/Av Delta 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 Draco RX
Type AMN42012
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



Date: 27.DEC.2020 09:54:25

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

Conducted Emission

E.U.T Description Draco RX
Type AMN42012
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	170 kHz	43.24	-21.72
2	Average	170 kHz	24.85	-30.10
1	Quasi Peak	426 kHz	31.62	-25.70
2	Average	426 kHz	21.61	-25.71
1	Quasi Peak	438 kHz	30.70	-26.39
2	Average	442 kHz	23.20	-23.81
2	Average	1.042 MHz	17.96	-28.03
1	Quasi Peak	1.118 MHz	17.93	-38.06
1	Quasi Peak	1.594 MHz	21.43	-34.56
2	Average	1.838 MHz	16.05	-29.94
2	Average	2.742 MHz	15.88	-30.11
1	Quasi Peak	3.57 MHz	26.89	-29.11
1	Quasi Peak	3.71 MHz	28.16	-27.83
2	Average	3.802 MHz	19.67	-26.32
2	Average	8.378 MHz	24.60	-25.39
1	Quasi Peak	8.394 MHz	31.18	-28.81
1	Quasi Peak	11.078 MHz	30.16	-29.83
2	Average	11.222 MHz	25.19	-24.80
1	Quasi Peak	24.022 MHz	38.42	-21.57
2	Average	24.022 MHz	37.93	-12.06

Date: 27.DEC.2020 10:20:10

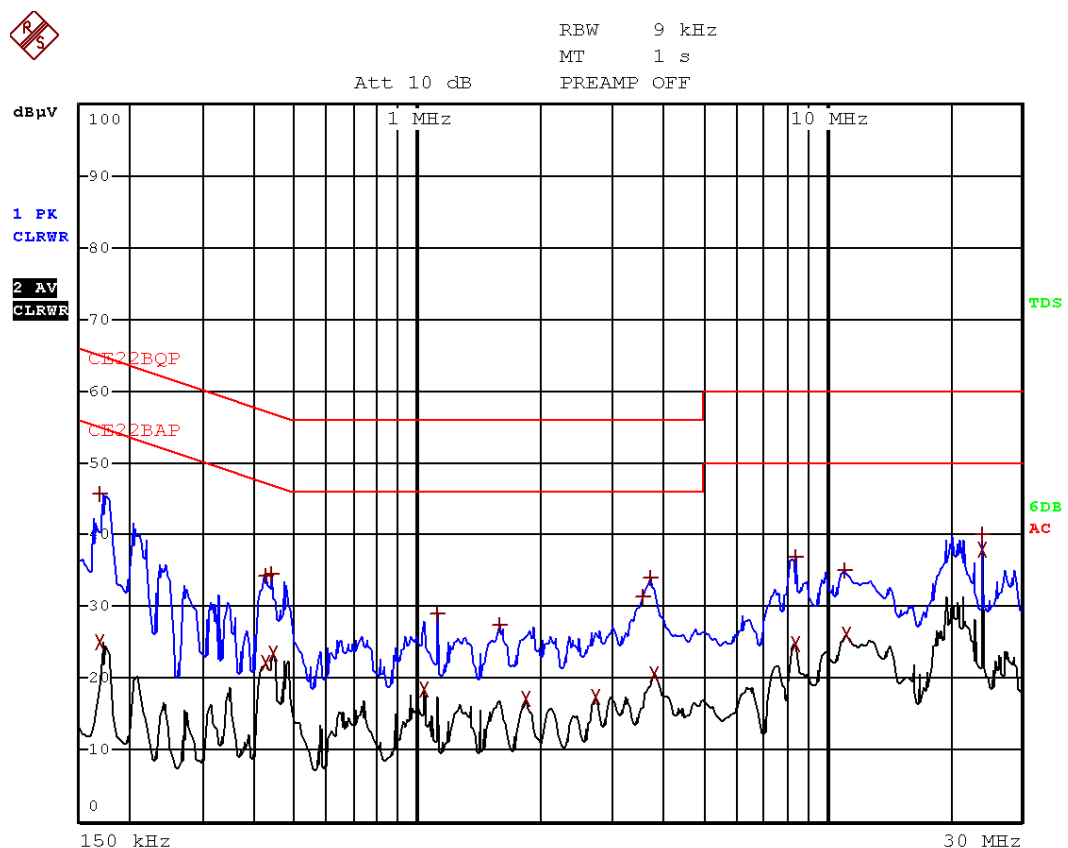
Figure 5. Detectors: Peak, Quasi-peak, Average

Note: QP Delta/Av Delta 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 Draco RX
Type AMN42012
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 10:18:26

Figure 6 Detectors: Peak, Quasi-peak, Average

4.5 Test Equipment Used; Conducted Emission

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
LISN	Fischer	FCC-LISN-25A	127	October 28, 2020	October 28, 2021
Transient Limiter	HP	11947A	3107A03042	October 28, 2020	October 31, 2021
EMI Receiver	Rohde & Schwarz	ESCI7	100724	February 23, 2020	February 23, 2021
Cable CE Chamber 5M	Telrad	RJ214	-	October 28, 2020	October 28, 2021

Figure 7 Test Equipment Used

5. Maximum Conducted Output Power

5.1 Test Specification

FCC, Part 15, Subpart E, Section 407(a)(3)

RSS 247, Issue 2, Section 6.2.4

5.2 Test Procedure

(Temperature (20°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=31.5 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).

5.3 FCC and ISSED Test Limit

For the band 5.725-5.85 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. 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.

5.4 Test Results

Frequency Band	Operation Frequency	Power	Power	Limit	Margin
	(MHz)	(dBm)	(mW)	(mW)	(mW)
5725.0-5875.0	5750.0	21.7	147.9	1000.0	852.1
	5790.0	21.2	131.8	1000.0	868.2
	5830.0	21.7	147.9	1000.0	852.1

JUDGMENT: Passed by -852.1 mW

For additional information see *Figure 8* to *Figure 10*.

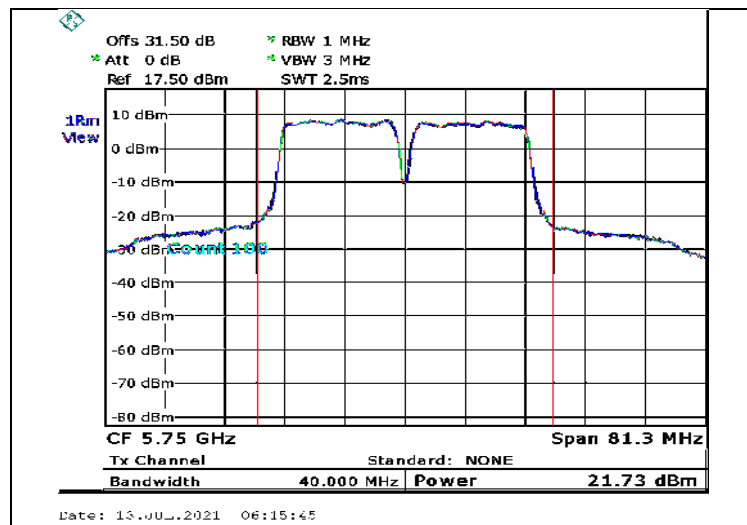


Figure 8. 5750.0MHz

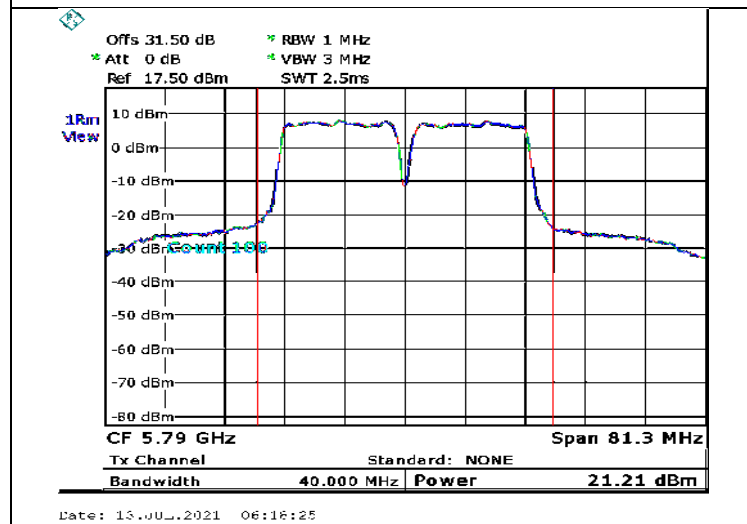


Figure 9. 5790.0MHz

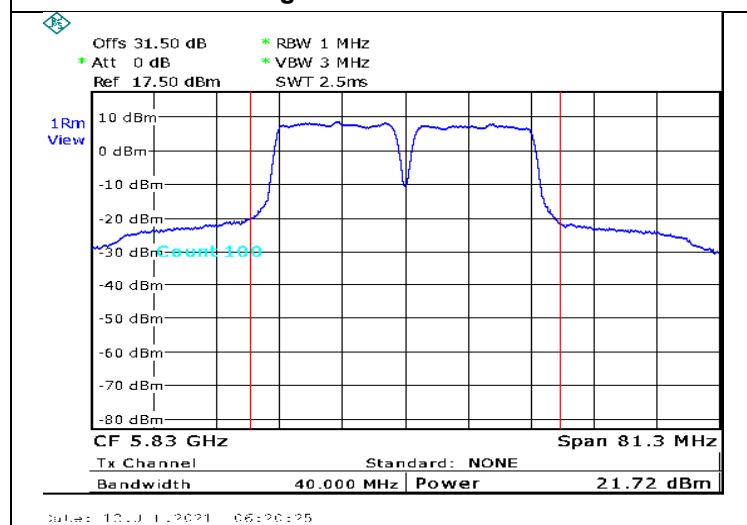


Figure 10. 5830.0MHz

5.5 Test Equipment Used; Maximum Peak Power Output

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	February 23, 2020	February 23, 2021
30dB Attenuator	MCL	BW-S30W5	533	August 23, 2020	August 23, 2021
RF Cable	Huber Suhner	Sucofelex	27504/4PEA	August 23, 2020	August 23, 2021

Figure 11 Test Equipment Used

6. Maximum Power Spectral Density (PSD)

6.1 Test Specification

FCC, Part 15, Subpart E, Section 407(a)(3)

RSS 247, Issue 2, Section 6.2.4

6.2 Test Procedure

(Temperature (20°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 v01 instructions (section F).

6.3 FCC and ISSED Test Limit

In addition, the maximum 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, maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

6.4 Test Results

Operation Frequency (MHz)	PSD@RBW=1MHz (dBm)	Factor* (dB)	PSD@RBW=500kHz (dBm)	Limit (dBm)	Margin (dB)
5750.0	6.9	-3.0	3.9	30.0	-26.1
5790.0	6.9	-3.0	3.9	30.0	-26.1
5830.0	6.2	-3.0	3.2	30.0	-26.8

NOTE: factor value was calculated as the following equation: $10 \cdot \log(500k/1M) = -3dB$

JUDGMENT: Passed by -26.1 dB

For additional information see *Figure 12* to *Figure 14*.

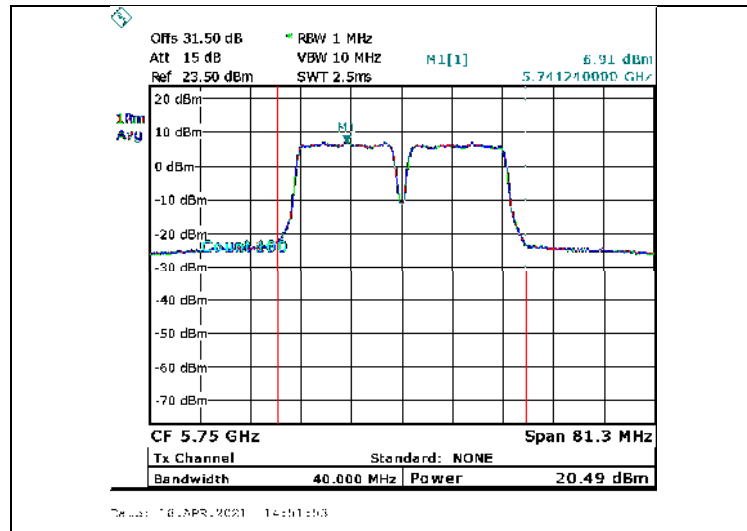


Figure 12. 5750.0MHz

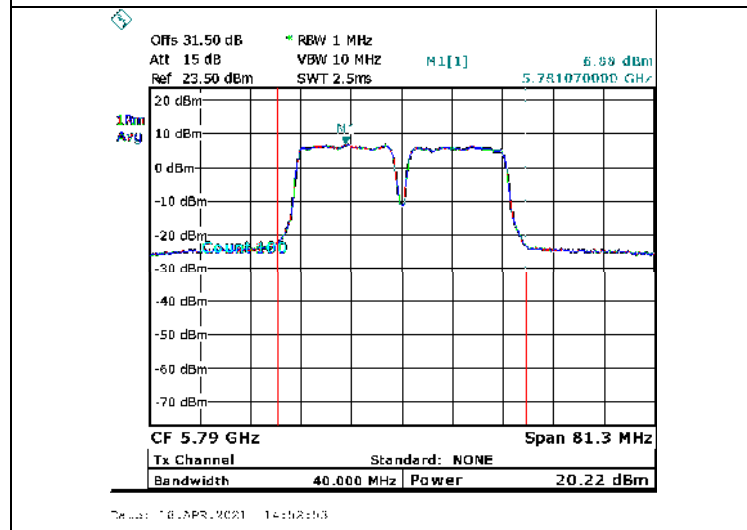


Figure 13. 5790.0MHz

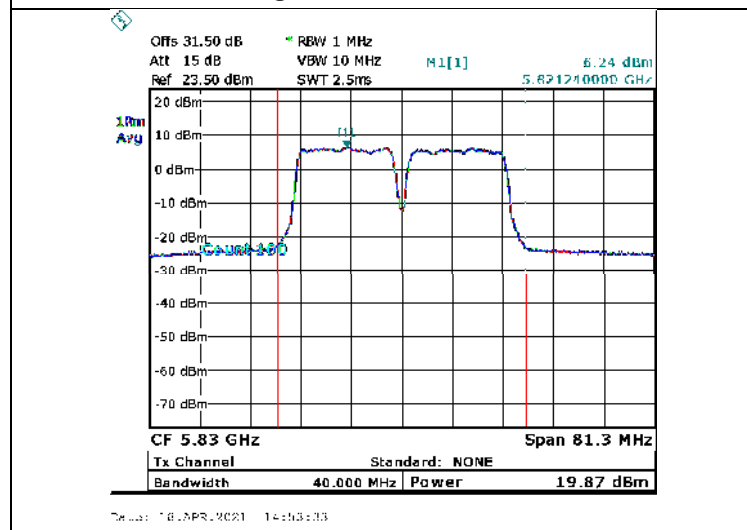


Figure 14. 5830.0MHz

For additional information see *Figure 15*.

6.5 Test Equipment Used; Transmitted Power Density

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	February 23, 2020	February 23, 2021
30dB Attenuator	MCL	BW-S30W5	533	August 23, 2020	August 23, 2021
RF Cable	Huber Suhner	Sucofelex	27504/4PEA	August 23, 2020	August 23, 2021

Figure 15 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 0.009MHz-30MHz was scanned.

For measurements between 30.0-1000.0 MHz:

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 30MHz -1000MHz was scanned and the list of the highest emissions was verified and updated accordingly.

For measurements between 1.0-40.0 GHz:

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 40.0 MHz BW transmissions.

The highest radiations are described in the next tables.

7.3 FCC and ISSED 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 16 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 17 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.

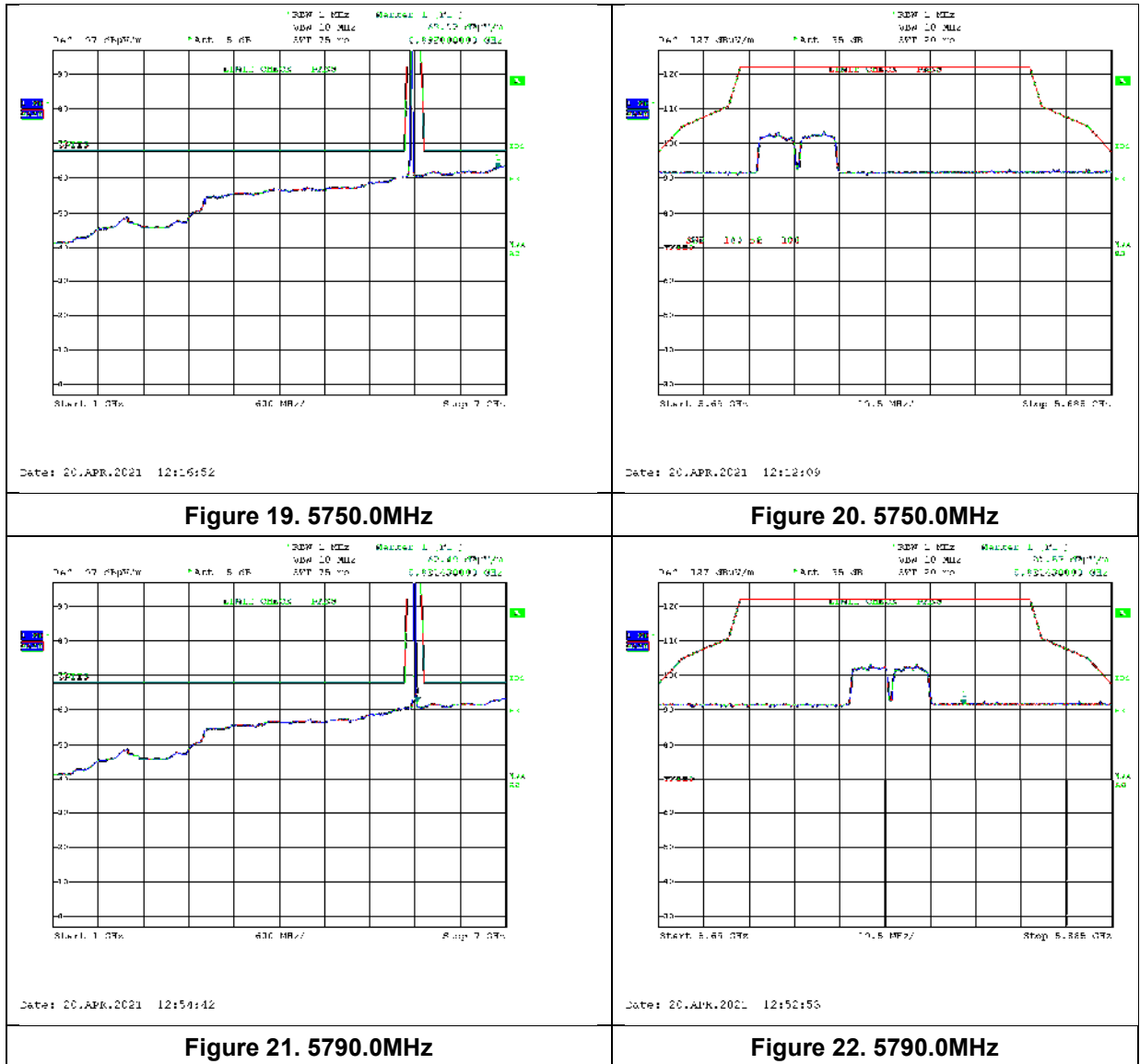
Figure 18 IC Restricted Band Limits

7.4 Test Results

JUDGEMENT: Passed

The EUT met the requirements of the Part 15, Subpart E, 15.407(b)
RSS 247, Issue 2, Section 6.2.4.2, RSS-Gen, Issue 5: 2018, Section 8.9 specification.

Non-Restricted Band plots (vertical):



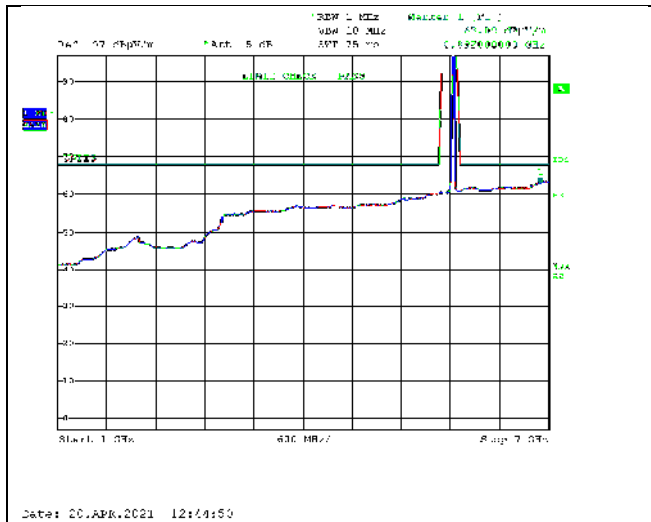


Figure 23. 5830.0MHz

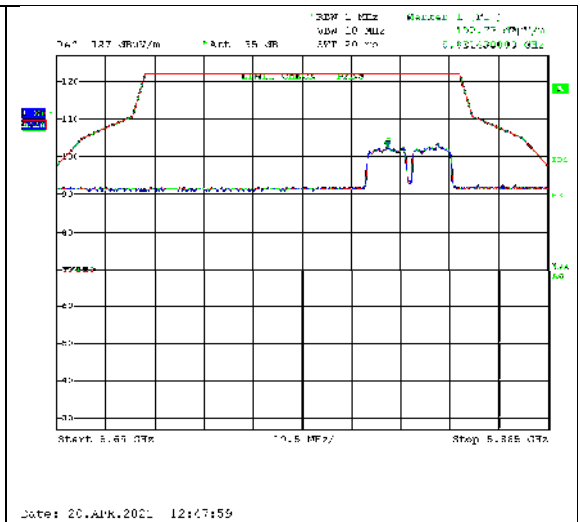


Figure 24. 5830.0MHz

Non-Restricted Band plots (horizontal):

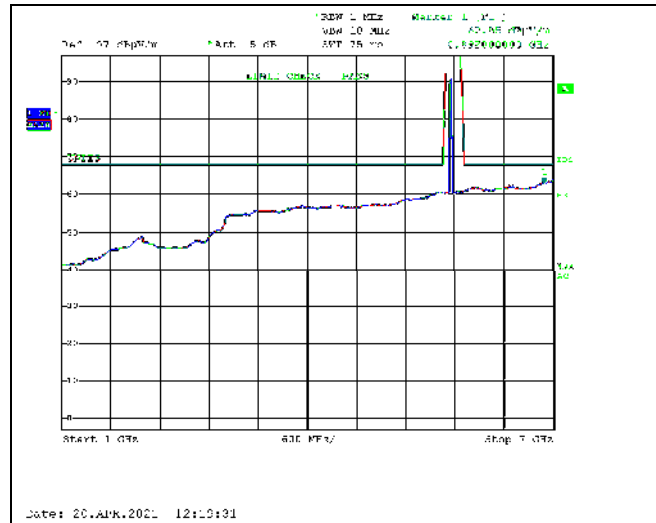


Figure 25. 5750.0MHz

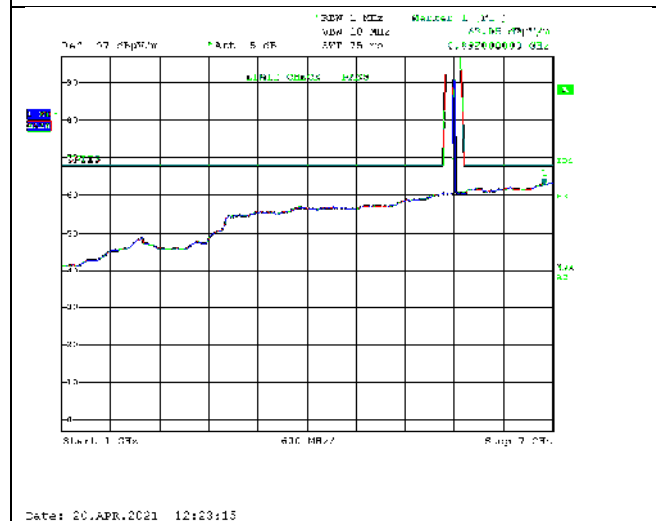


Figure 26. 5790.0MHz

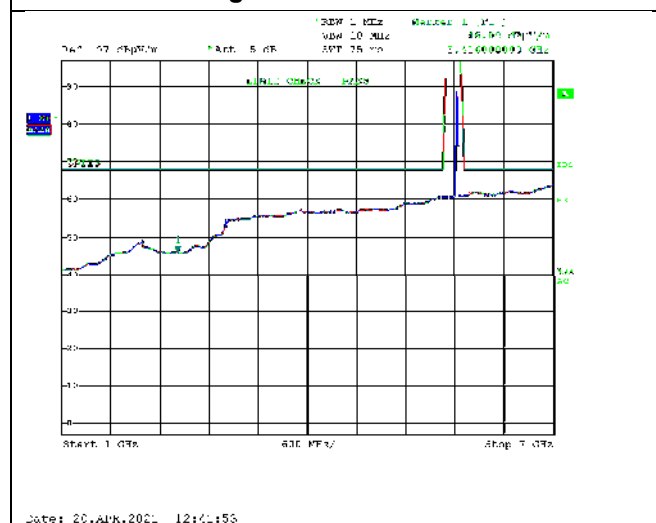


Figure 27. 5830.0MHz

Radiated Emission

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

Antenna Polarization: Horizontal/Vertical
Distance: 3m

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)
5750.0	No emissions detected above the spectrum analyzer noise level which have at least 10dB margin below the limit							
5790.0								
5830.0								

Figure 28. Radiated Emission Results for 40MHz BW

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, Undesirable Emissions

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
EMI Receiver	R&S	ESCI7	100724	March 9, 2020	March 31, 2021
EMI Receiver	HP	8542E	3906A00276	March 11, 2020	March 31, 2021
RF Filter Section	HP	85420E	3705A00248	March 11, 2020	March 31, 2021
EMC Analyzer	HP	8593 EM	3826A00265	March 9, 2020	March 31, 2021
Active Loop Antenna	EMCO	6502	9506-2950	February 5, 2019	February 28, 2023
Biconical Antenna	EMCO	3110B	9912-3337	May 21, 2019	May 31, 2021
Log Periodic Antenna	EMCO	3146	9505-4081	May 31, 2018	May 31, 2021
Horn Antenna	ETS	3115	29845	May 31, 2018	May 31, 2021
Horn Antenna	ARA	SWH-28	1007	December 31, 2017	June 30, 2021
MicroWave System Amplifier	HP	83006A	3104A00589	August 23, 2020	August 31, 2021
RF Cable Chamber	Commscope ORS	0623 WBC-400	G020132	August 23, 2020	August 31, 2021
RF Cable Oats	EIM	RG214-11N(X2)		August 4, 2020	August 31, 2021
Filter Band Pass 4-20 GHz	Meuro	MFL040120H50	902252	November 2, 2020	November 30, 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 29 Test Equipment 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 (20°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

Operation Frequency (MHz)	Reading (MHz)
5750.0	34.5
5790.0	34.5
5830.0	34.6

Figure 30. Bandwidth Test Results

JUDGEMENT: N/A

See additional information in *Figure 31* to *Figure 33*.

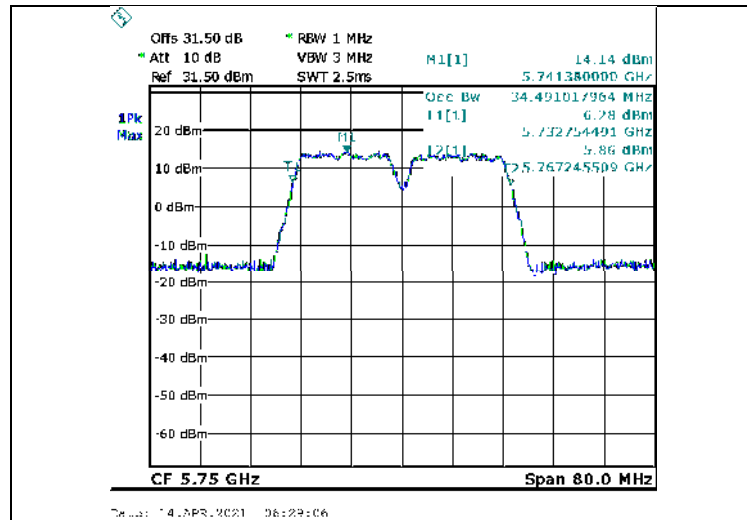


Figure 31. 5750.0MHz

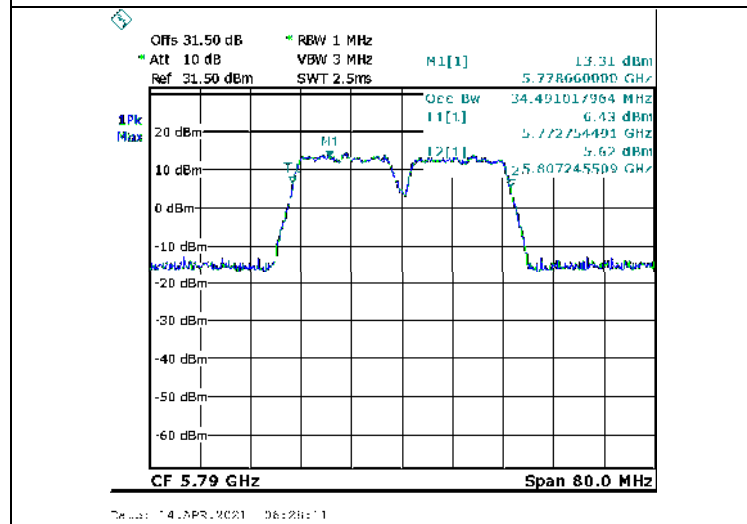


Figure 32. 5790.0MHz

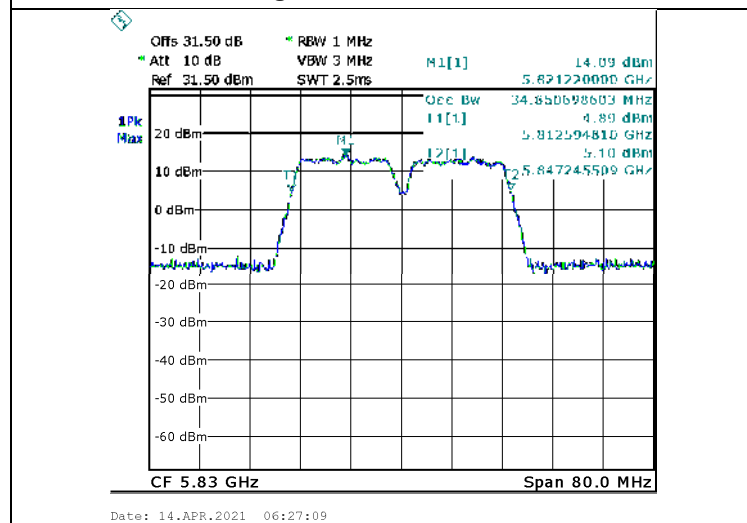


Figure 33. 5830.0MHz

8.5 *Test Equipment Used; Occupied Bandwidth*

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	February 23, 2020	February 23, 2021
30dB Attenuator	MCL	BW-S30W5	533	August 23, 2020	August 23, 2021
RF Cable	Huber Suhner	Sucofelex	27504/4PEA	August 23, 2020	August 23, 2021

Figure 34 Test Equipment Used

9. 26 dB 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 (20°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

Operation Frequency	Reading
(MHz)	(MHz)
5750.0	39.7
5790.0	39.9
5830.0	39.7

Figure 35. Bandwidth Test Results

JUDGEMENT: N/A

See additional information in *Figure 36* to *Figure 38*.

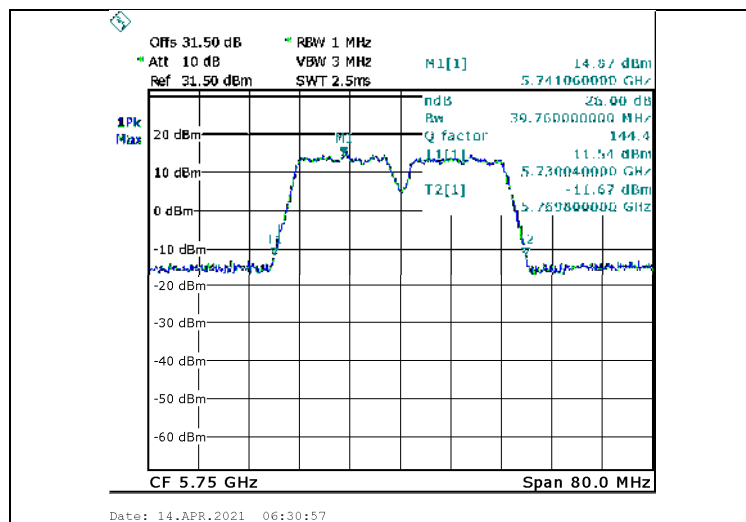


Figure 36. 5750.0MHz

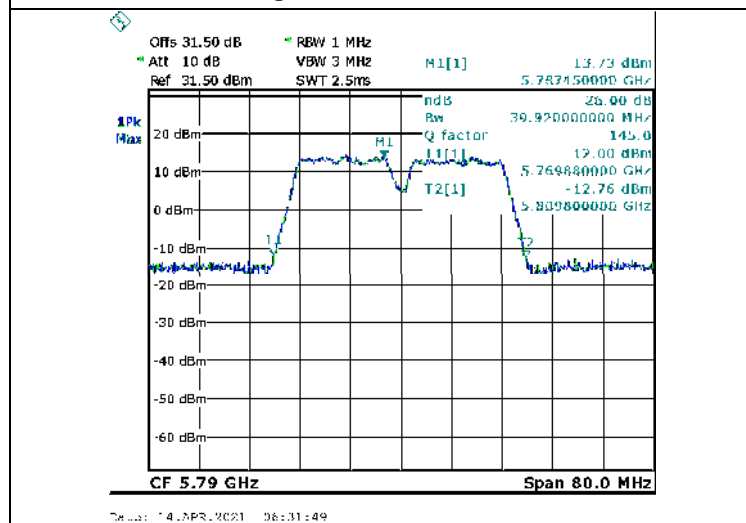


Figure 37. 5790.0MHz

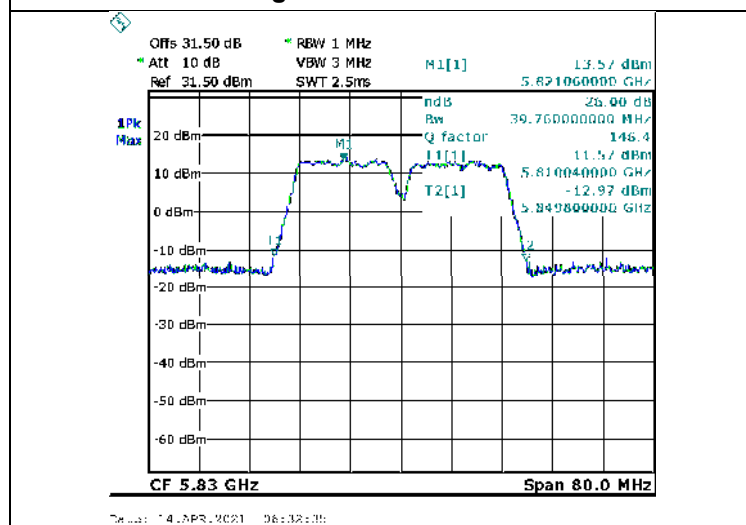


Figure 38. 5830.0MHz

9.5 Test Equipment Used; 26 dB Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	February 23, 2020	February 23, 2021
30dB Attenuator	MCL	BW-S30W5	533	August 23, 2020	August 23, 2021
RF Cable	Huber Suhner	Sucofelex	27504/4PEA	August 23, 2020	August 23, 2021

Figure 39 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

10.2 Test Procedure

(Temperature (20°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=31.5 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

Operation Frequency	Reading	Limit
(MHz)	(kHz)	(kHz)
5750.0	33.2	>500.0
5790.0	33.1	>500.0
5830.0	33.2	>500.0

Figure 40 6 dB Minimum Bandwidth

JUDGEMENT: Passed

For additional information see *Figure 41* to *Figure 43*.

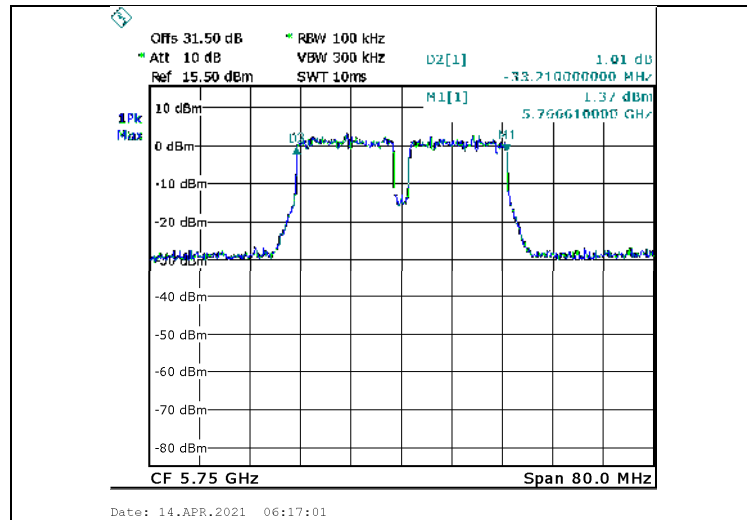


Figure 41. 5750.0MHz

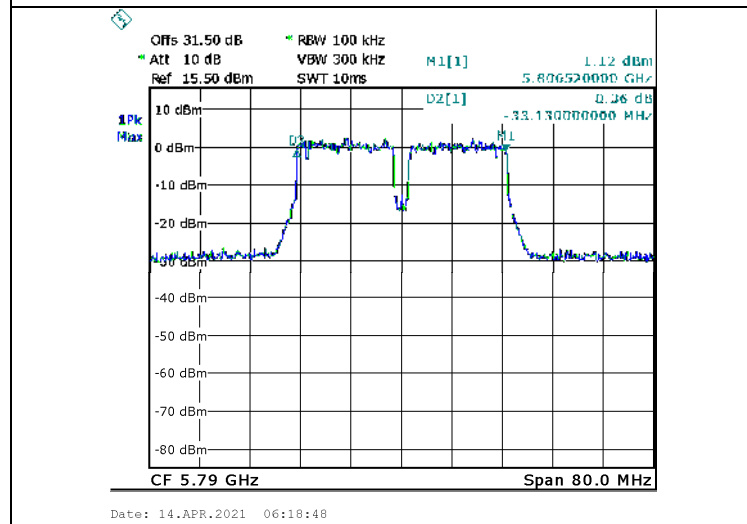


Figure 42. 5790.0MHz

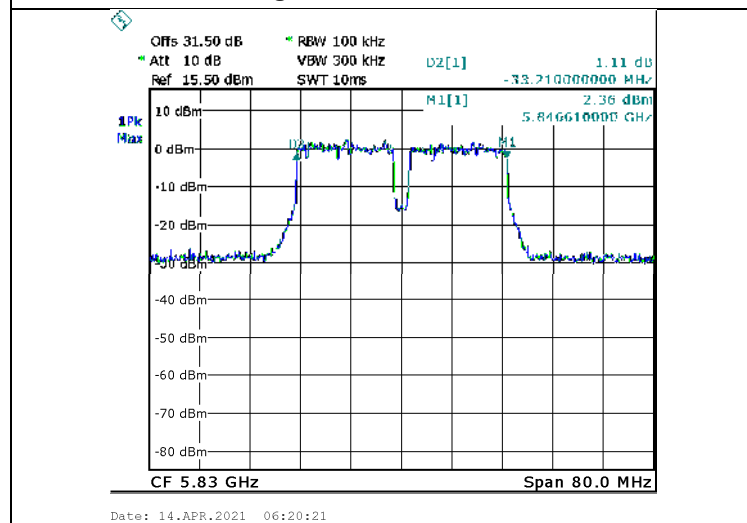


Figure 43. 5830.0MHz



10.5 Test Equipment Used; 6dB Bandwidth

Instrument	Manufacturer	Model	Serial No.	Last Calibration Date	Next Calibration Due
Spectrum Analyzer	Rohde & Schwarz	FSL6	100194	February 23, 2020	February 23, 2021
30dB Attenuator	MCL	BW-S30W5	533	August 23, 2020	August 23, 2021
RF Cable	Huber Suhner	Sucofelex	27504/4PEA	August 23, 2020	August 23, 2021

Figure 44 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

Judgment: Passed

2dBi antenna with RP-SMA connector type

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

12. RF 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 at 5800MHz 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 21.7dBm = 148 mW

G_t = Antenna Gain 2dBi = 1.58 numeric

R = Distance from Transmitter = 20 cm

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

$$S = 148 * 1.58 / 4\pi(20)^2 = 0.05 \text{ mW/cm}^2$$

This is below the FCC limit.

- (b) ISED: The limit: 300-6000MHz = $1.31 \times 10^{-2} f^{0.6834} \text{ W}$ =
 $1.31 \times 10^{-2} f^{0.6834} \text{ W} = 1.31 \times 0.01 \times 348.17 = 4.88 \text{ W}$

$$(\text{EIRP} = 21.7\text{dBm} + 2\text{dBi} = 23.7\text{dBm}) = 0.251 \text{ W}$$

This is below the ISED limit.

13. APPENDIX A - CORRECTION FACTORS

13.1 Correction factors 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 Correction factors 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 Correction factors 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 Correction factors 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 Correction factors for ITL # 1349(log periodic antenna)

Frequency	AF
[MHz]	[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 Correction factors for ITL # 1352(1-18GHz Horn antenna)

FREQUENCY (GHz)	AF (dB/m)	FREQUENCY (GHz)	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 Correction factors for ITL # 1353(18-26.5GHz Horn antenna)

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 dB μ V to obtain field strength in dB μ V/m.

13.8 Correction factors for ITL # 1777(26.5-40GHz Horn antenna)

