UNIFIED COMPLIANCE LABORATORY

427 West 12800 South
Draper, UT 84020

Test Report

Certification

FCC ID	SWX-U7PRO
ISED ID	6545A-U7PRO
Equipment Under Test	U7-Pro
Test Report Serial Number	TR8555_04
Date of Test(s)	30 August; 1, 8, 19 September and 12, 16 October 2023
Report Issue Date	12 December 2023

Test Specification	Applicant
47 CFR FCC Part 15, Subpart E	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.

NVLAP TESTING ilac-MRA

NVLAP LAB CODE 600241-0

Certification of Engineering Report

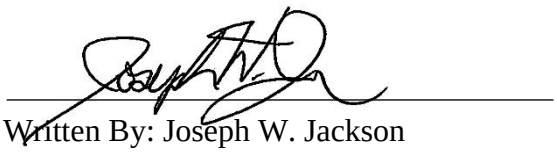
This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart E. This report may be reproduced in full. Partial reproduction of this report may only be made with the written consent of the laboratory. The results in this report apply only to the sample tested.

Applicant	Ubiquiti Inc.
Manufacturer	Ubiquiti Inc.
Brand Name	UBIQUITI
Model Number	U7-Pro
FCC ID	SWX-U7PRO
ISED ID	6545A-U7PRO

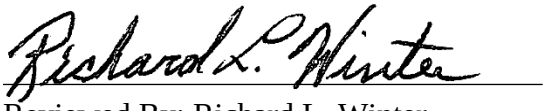
On this 12th day of December 2023, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete and correct to the best of my knowledge and are made in good faith.

Although NVLAP has accredited the Unified Compliance Laboratory testing facilities, this report must not be used to claim product certification, approval, or endorsement by NVLAP, NIST or any agency of the U.S. federal government.

Unified Compliance Laboratory



Written By: Joseph W. Jackson



Reviewed By: Richard L. Winter

Revision History		
Revision	**Description**	**Date**
01	Original Report Release	17 October 2023
02	Amend Sections 5.1 and 5.6	24 October 2023
03	Update Section 5.7	1 December 2023
04	Added CBP Test Equipment to Section 4, RE diagrams to Section 4.3, RU test Data to section 5.6, updated CBP test procedure to include 0dBi antenna gain in section 5.7	12 December 2023

Table of Contents

1 Client Information

1.1 Applicant

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Alex Macon
Title	Compliance

1.2 Manufacturer

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Alex Macon
Title	Compliance

2 Equipment Under Test (EUT)

2.1 Identification of EUT

Brand Name	UBIQUITI
Model Number	U7-PRO
Serial Number	9AZ 003
Dimensions (cm)	20.6 x 20.6 x 4.6

2.2 Description of EUT

The U7-Pro is WiFi 7 access point that represents the next generation of competitively priced, prosumer wireless technology for home and enterprise users. The U7-Pro provides high aggregate throughput speeds. The U7-Pro transmit in the 2.4 GHz, 5 GHz and 6 GHz frequency bands and uses integrated antennas. The U7-Pro is powered from an 802.3at power adapter.

The table below show the channels used within the different modulation bandwidths.

Band	Modulation Bandwidth	Frequency (MHz)	Maximum Power Setting
UNII-7	be (EHT 20)	6535, 6555, 6575, 6595, 6615, 6635, 6655, 6675	TP 10
		6695, 6715, 6735, 6755, 6775, 6795, 6815, 6835, 6855	TP 10
		6875	TP 10
	be (EHT 40)	6525, 6565, 6605, 6645,	TP 13
		6685, 6725, 6765, 6805, 6845	TP 13
		6885	TP 13
	be (EHT 80)	6545, 6625	TP 16
		6705, 6785	TP 16
		6865	TP 16
	be (EHT 160)	6505, 6665	TP 19
		6825	TP 19
	be (EHT 320)	6585	TP 21

This report covers the circuitry of the device subject to FCC Part 15, Subpart E. The circuitry of the device subject to FCC Part 15 Subpart B was found to be compliant and is covered under a separate Unified Compliance Laboratory test report.

2.3 EUT and Support Equipment

The EUT and support equipment used during the test are listed below.

Brand Name Model Number	Description	Name of Interface Ports / Interface Cables

Serial Number		
BN: UBIQUITI MN: U7-Pro SN: 9AZ 003	WiFi Access Point	See Section 2.4
BN: UBIQUITI MN: U-POE-at SN: N/A	PoE Power Adapter	Unshielded Cat 5e cable/1 meters
BN: Dell MN: XPS 13 SN: N/A	Laptop Personal Computer	Unshielded Cat 5e cable/1 meters

Notes: (1) EUT
(2) Interface port connected to EUT (See Section 2.4)

The support equipment listed above was not modified in order to achieve compliance with this standard.

2.4 Interface Ports on EUT

Name of Ports	No. of Ports Fitted to EUT	Cable Description/Length
AC Mains	1	3 conductor power cord/80 cm
POE (POE Injector)	1	Unshielded Cat 5e cable/8 meters
LAN (POE Injector)	1	Unshielded Cat 5e cable/1 meters

2.5 Operating Environment

Power Supply	120 Volts AC Mains to 48 Volts PoE
AC Mains Frequency	60 Hz
Temperature	24.7 – 26.4 °C
Humidity	30.4 – 35.9 %
Barometric Pressure	1017 mBar

2.6 Operating Modes

The U7-Pro was tested using test software in order to enable to constant transmission. The measurements within this report are corrected to reference a 100% duty cycle. All emission modes of 802.11be were investigated. All measurements are reported with the worst-case mode (802.11be) unless otherwise stated.

2.7 EUT Exercise Software

EUT firmware version 1.0 was used to operate the transmitter using a constant transmit mode.

2.8 Block Diagram of Test Configuration

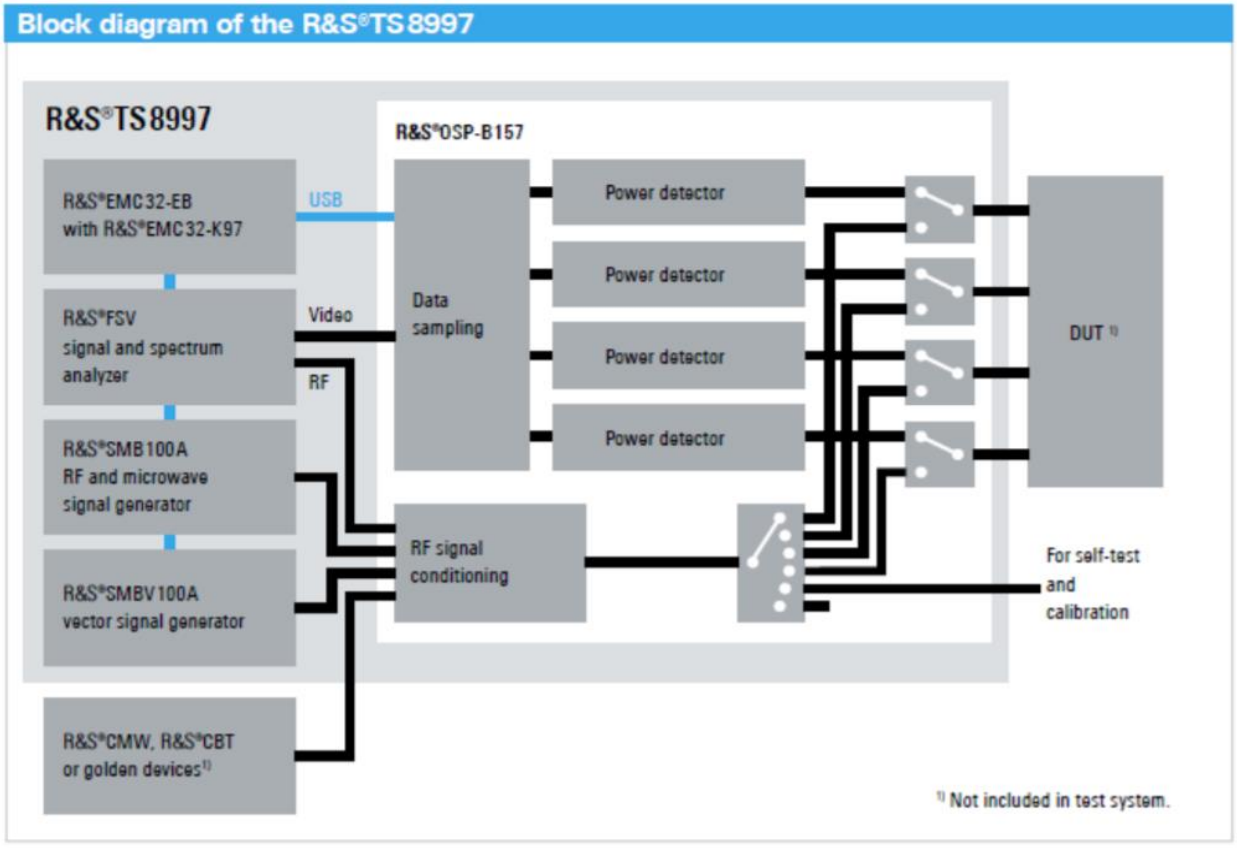


Diagram 1: Test Configuration Block Diagram

2.9 Modification Incorporated/Special Accessories on EUT

There were no modifications made to the EUT during testing to comply with the specification.

2.10 Deviation, Opinions Additional Information or Interpretations from Test Standard

There were no deviations, opinions, additional information or interpretations from the test specification.

3 Test Specification, Method and Procedures

3.1 Test Specification

Title	47 CFR FCC Part 15, Subpart E, Section 15.407 Limits and methods of measurement of radio interference characteristics of Unlicensed National Information Infrastructure Devices
Purpose of Test	The tests were performed to demonstrate initial compliance

3.2 Methods & Procedures

3.2.1 47 CFR FCC Part 15 Section 15.407

See test standard for details.

3.3 FCC Part 15, Subpart E

3.3.1 Summary of Tests

FCC Section	ISED Section	Environmental Phenomena	Frequency Range (MHZ)	Result
15.203	N/A	Antenna requirements	Structural Requirement	Compliant
15.207	RSS-Gen	Conducted Disturbance at Mains Port	0.15 to 30	Compliant
15.407(c)	RSS-247 §6.2.2, §6.2.3	Bandwidth Requirement	6535 to 6865	Compliant
15.407(e)	RSS-247 §6.2.2, §6.2.3	Peak Output Power[1]	6535 to 6865	Compliant
15.407(f)	RSS-247 §6.2.2, §6.2.3	Antenna Conducted Spurious Emissions[1]	0.009 to 40000	N/A
15.407(g)	RSS-247 §6.2.2, §6.2.3	Radiated Spurious Emissions	0.009 to 40000	Compliant
15.407(h)	RSS-247 §6.2.2, §6.2.3	Peak Power Spectral Density[1]	6535 to 6865	Compliant
15.407(d)	RSS-247 §6.2.2, §6.2.3	Contention Based Protocol	6535 to 6865	Compliant
The testing was performed according to the procedures in ANSI C63.10-2013, KDB 789033, KDB 987594 and 47 CFR Part 15. Where applicable, KDB 662911 was followed to sum required measurements. Note [1]: Various RU modes were considered for RF Power, PSD, and Spurious Emissions, and the "single client" RU mode is the worst case - the results herein are "single client" RU mode.				

3.4 Results

In the configuration tested, the EUT complied with the requirements of the specification.

3.5 Test Location

Testing was performed at the Unified Compliance Laboratory 3-Meter and 10-Meter chambers located at 427 West 12800 South, Draper, UT 84020. Unified Compliance Laboratory is accredited by National Voluntary Laboratory Accreditation Program (NVLAP); NVLAP Code 600241-0 which is effective until 30 June 2024. This site has also been registered with Innovations, Science and Economic Development (ISED) department as was accepted under Appendix B, Phase 1 procedures of the APEC Tel MRA for Canadian recognition. ISED No.: 25346, effective until 30 June 2024.

Unified Compliance Laboratory has been assigned Designation Number US5037 by the FCC and Conformity Assessment Number US0223 by ISED.

4 Test Equipment

4.1 Conducted Emissions at Mains Ports

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
EMI Receiver	AFJ	FFT3010	UCL-6754	2/22/2023	2/22/2024
LISN	AFJ	LS16C/10	UCL-6749	12/6/2021	12/6/2023
ISN	Teseq	ISN T800	UCL-2974	6/27/2022	6/27/2024
LISN	Com-Power	LIN-120C	UCL-2612	1/24/2023	1/24/2024
AC Power Source	Laplace Instruments	AC1000A	UCL-2857	N/A	N/A
Test Software	UCL	Revision 1	UCL-3107	N/A	N/A

Table 1: List of equipment used for Conducted Emissions Testing at Mains Port

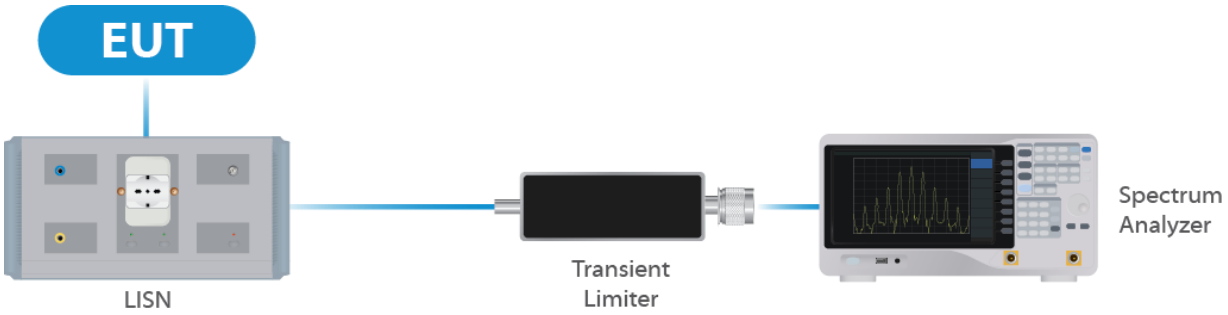


Figure 1: Conducted Emissions Test

4.2 Direct Connect at the Antenna Port Tests

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
Spectrum Analyzer	R&S	FSV40	UCL-2861	11/7/2022	11/7/2023
Signal Generator	R&S	SMB100A	UCL-2864	N/A	N/A
Vector Signal Generator	R&S	SMBV100A	UCL-2873	N/A	N/A
Switch Extension	R&S	OSP-B157WX	UCL-2867	2/22/2023	2/22/2024
Switch Extension	R&S	OSP-150W	UCL-2870	2/22/2023	2/22/2024

Table 2: List of equipment used for Direct Connect at the Antenna Port

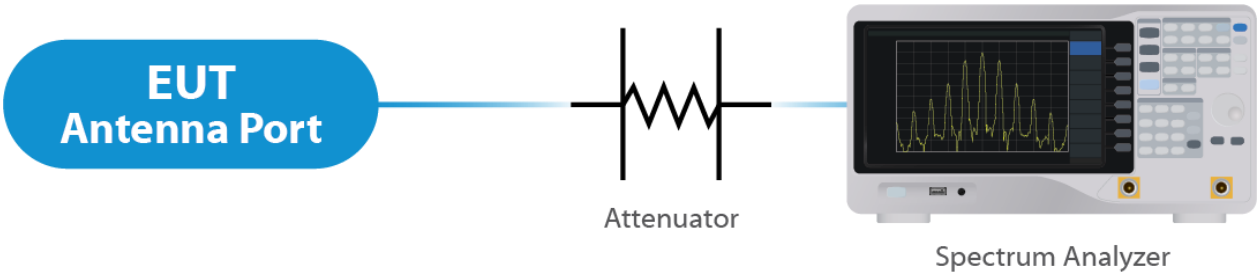


Figure 2: Direct Connect at the Antenna Port Test

4.3 Radiated Emissions

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
EMI Receiver	Keysight	N9038A	UCL-2778	1/27/2023	1/27/2024
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-2889	10/7/2021	10/7/2023
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3062	9/13/2022	9/13/2024
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3071	6/08/2022	6/22/2024
Double Ridge Horn Antenna	Scwarzbeck	BBHA 9120D	UCL-3065	9/22/2022	9/22/2024
Log Periodic	Scwarzbeck	STLP 9129	UCL-3068	1/27/2023	1/27/2025
15 - 40 GHz Horn Antenna	Scwarzbeck	BBHA 9170	UCL-2487	6/09/2022	6/09/2024
1 – 18 GHz Amplifier	Com-Power	PAM 118A	UCL-3833	12/9/2022	12/9/2023
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 3: List of equipment used for Radiated Emissions

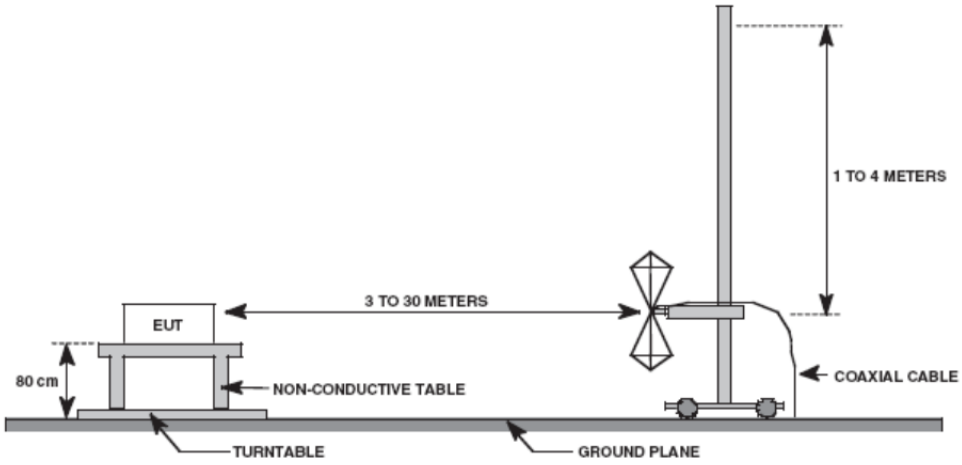


Figure 3a: Radiated Emissions Test 30-1000MHz

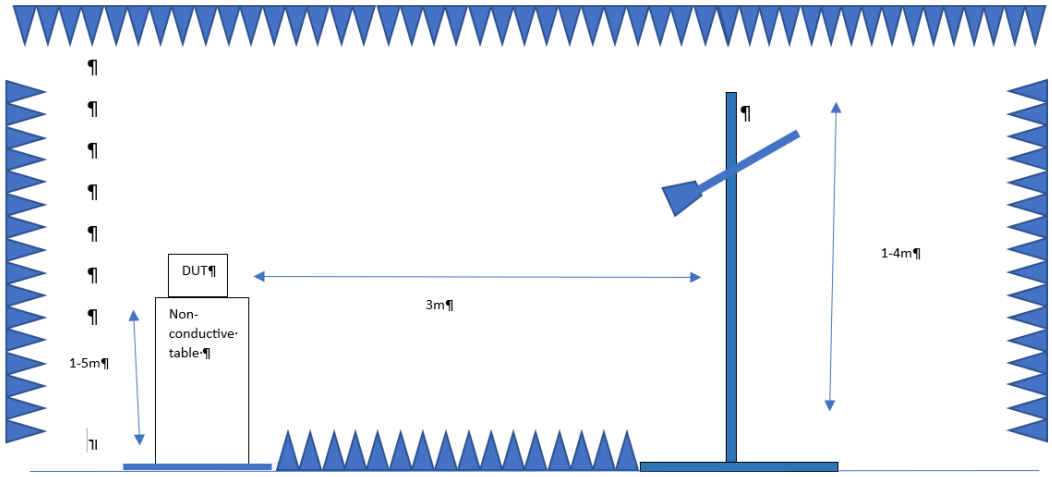


Figure 3b: Radiated Emissions Test Above 1GHz

4.4 Contention Base Protocol Tests

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
Spectrum Analyzer	Keysight	N9010B EXA	UCL-7069	4/25/2023	4/25/2024
Signal Generator	Keysight	MXG-B	UCL-6291	6/29/2023	6/29/2024
MIMO Test Set	Keysight	X8750A	UCL-7373	9/19/2023	9/19/2024

Table 4: List of equipment used for Direct Connect at the Antenna Port

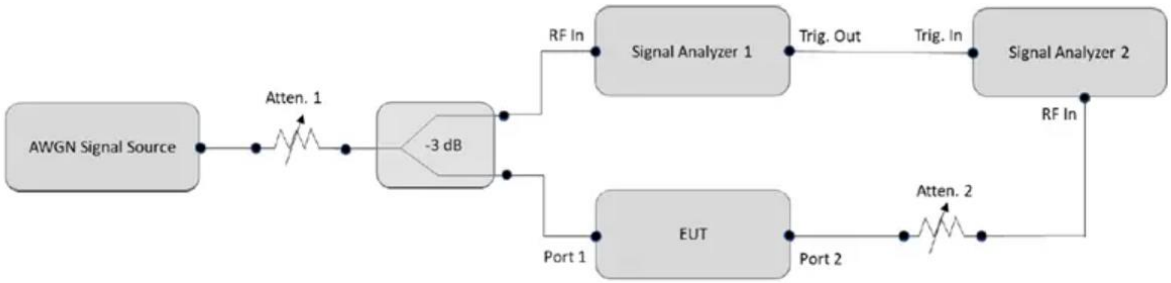


Figure 1. CBP conducted test setup diagram. Source: KDB 987594 D02 V01r01

Figure 4: Contention Base Protocol Test

4.5 Equipment Calibration

All applicable equipment is calibrated using either an independent calibration laboratory or Unified Compliance Laboratory personnel at intervals defined in ANSI C63.4:2014 following outlined calibration procedures. All measurement instrumentation is traceable to the National Institute of Standards and Technology (NIST). Supporting documentation relative to traceability is on file and is available for examination upon request.

4.6 Measurement Uncertainty

Test	Uncertainty (± dB)	Confidence (%)
Conducted Emissions	1.44	95
Radiated Emissions (9 kHz to 30 MHz)	2.50	95
Radiated Emissions (30 MHz to 1 GHz)	4.38	95
Radiated Emissions (1 GHz to 18 GHz)	4.37	95
Radiated Emissions (18 GHz to 40 GHz)	3.93	95
Direct Connect Tests	**K Factor**	**Value**
Emissions Bandwidth	2	2.0%
Output Power	2	1.0 dB
Peak Power Spectral Density	2	1.3 dB
Band Edge	2	0.8 dB
Transmitter Spurious Emissions	2	1.8 dB

5 Test Results

5.1 §15.203 Antenna Requirements

The EUT uses an integrated antenna. Per the manufacturer, the Maximum gain of the antenna per chain is 5.8 dBi. This is an 802.11 device and utilizes CDD as described in KDB 662911 D01. The antenna is not user replaceable.

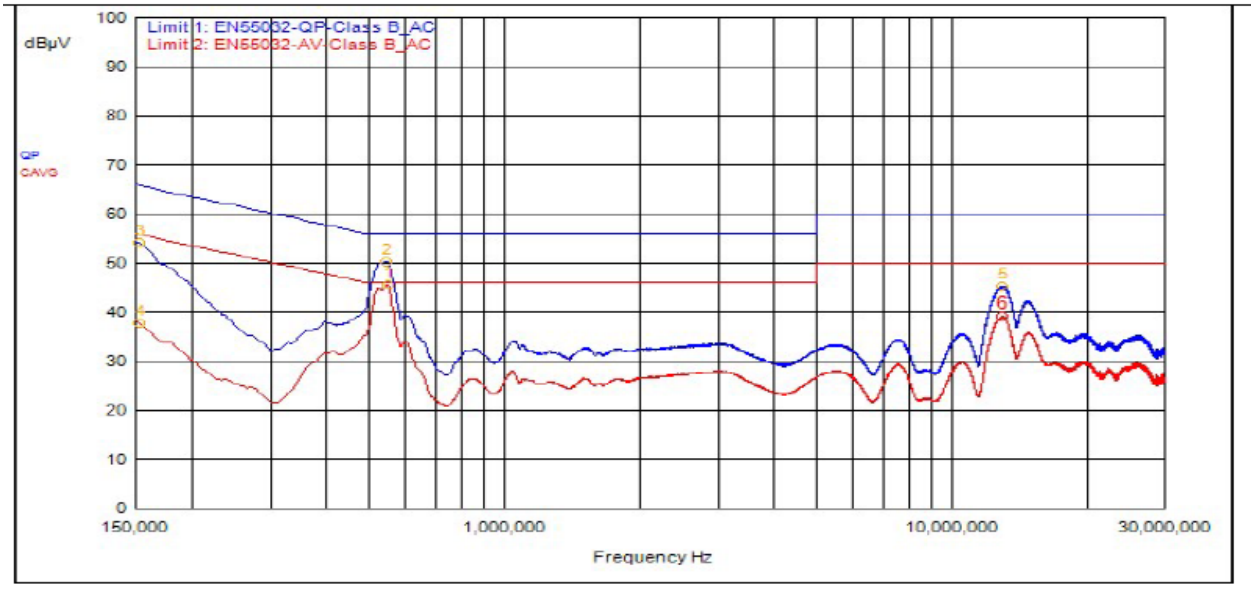
For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for NANT ≤ 4;
For PSD measurements when Nss=1: Array Gain = 10 log(NANT/NSS) dB = 3.01 dB

Results

The EUT complied with the specification

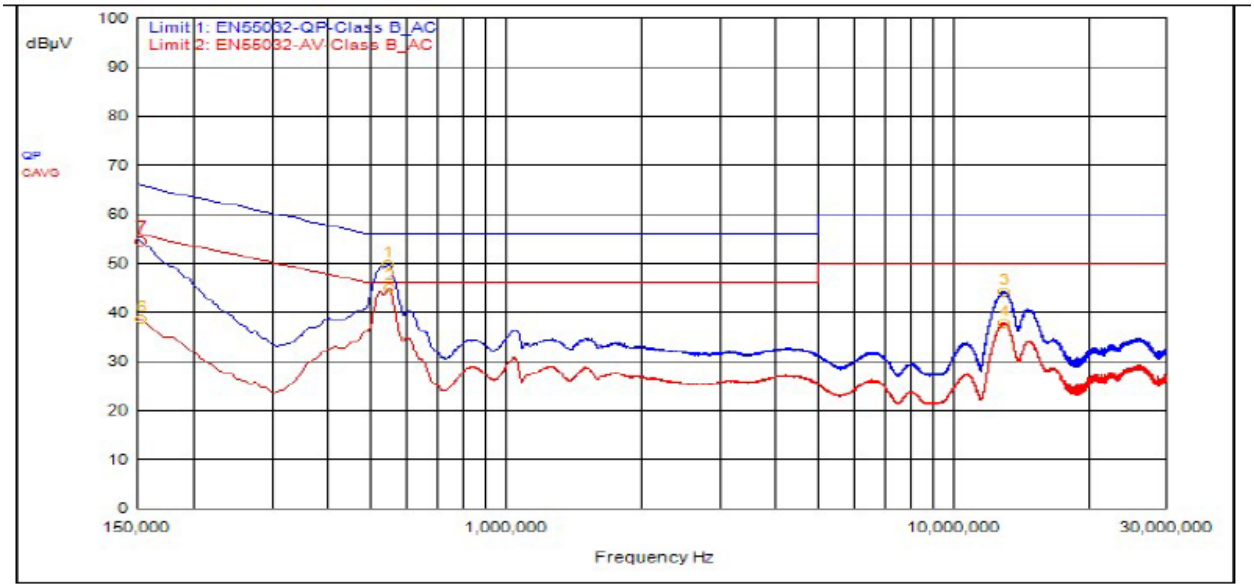
5.2 Conducted Emissions at Mains Ports Data

5.2.1 Line



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.	P/F
MU	MHz	dB	dB	dB	Type	dBµV	dBµV	dBµV	dB	dBµV	dB	P/F
2	546,000kHz	12.23	0.00		QPeak	38.16	50.39	56.00	-5.61			
3	153,000kHz	12.26	0.00		QPeak	41.82	54.08	65.84	-11.76			
5	12.996	12.27	0.00		QPeak	33.02	45.29	60.00	-14.71			
1	549,000kHz	12.23	0.00		C_AVG	33.22	45.45			46.00	-0.55	
4	153,000kHz	12.26	0.00		C_AVG	25.61	37.87			55.84	-17.96	
6	12.981	12.27	0.00		C_AVG	26.77	39.04			50.00	-10.96	

5.2.2 Neutral



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.	P/F
MU	MHz	dB	dB	dB	Type	dBµV	dBµV	dBµV	dB	dBµV	dB	P/F
1	546,000kHz	12.18	0.00		QPeak	37.58	49.76	56.00	-6.24			
5	150,000kHz	12.21	0.00		QPeak	42.89	55.10	66.00	-10.90			
7	153,000kHz	12.21	0.00		QPeak	42.12	54.33	65.84	-11.50			
3	12.993	12.29	0.00		QPeak	31.97	44.26	60.00	-15.74			
2	549,000kHz	12.18	0.00		C_AVG	32.76	44.94			46.00	-1.06	
4	12.966	12.29	0.00		C_AVG	25.48	37.77			50.00	-12.23	
6	153,000kHz	12.21	0.00		C_AVG	26.39	38.60			55.84	-17.24	

Result

The EUT complied with the specification limit.

5.3 §15.403(i) 26 dB Emissions Bandwidth

All chains were measured under the guidance of KDB 789033 Section II.C. and KDB 66291 D01. Please see associated annex for details on instrument settings.

Nominal BW (MHz)	Frequency (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
EHT 20	6535	19.1	23.5
EHT 20	6695	19.1	22.7
EHT 20	6875	19.1	22.7
EHT40	6525	38.3	42.8
EHT 40	6685	38.3	42.8
EHT 40	6885	38.3	43.1
EHT 80	6545	78.0	87.5
EHT 80	6705	77.5	87.0
EHT 80	6865	78.0	87.5
EHT 160	6505	157.0	165.0
EHT 160	6665	158.0	172.0
EHT 160	6825	157.0	177.0
EHT 320	6585	317.5	340.2

Result

All chains were tested and the highest bandwidth per chain is reported above.

The 26 dB bandwidths are reported for information purposes. Please see Annex for all bandwidth measurements.

5.4 §15.407(a)(3) Maximum Average Output Power

All chains were measured and summed under the guidance of KDB 789033 Section II. E.2. and KDB 66291 D01. Please see associated annex for details on instrument settings.

The maximum average RF conducted output power measured for this device was 23.71 dBm or 234.96 mW. The limit is 30 dBm EIRP, or 1 Watt EIRP. The antenna has a gain of 5.8 dBi. When N_{ss} =1, the EUT has a beamforming composite gain of G_{ant} +10log(N_{ANT} /N_{SS}) = 8.81 dBm.

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	EIRP	Measured PSD
EHT 20	6535	Mcs0_Nss2	10	12.80	18.60	-1.31
EHT 20	6695	Mcs0_Nss2	10	12.26	18.06	-1.50
EHT 20	6875	Mcs0_Nss2	10	12.64	18.44	-1.37
EHT40	6525	Mcs0_Nss2	13	15.90	21.70	-1.40
EHT 40	6685	Mcs0_Nss2	13	15.44	21.24	-1.60
EHT 40	6885	Mcs0_Nss2	13	15.61	21.41	-1.49
EHT 80	6545	Mcs0_Nss2	16	18.87	24.67	-1.16
EHT 80	6705	Mcs0_Nss2	16	18.38	24.18	-1.65
EHT 80	6865	Mcs0_Nss2	16	18.61	24.41	-1.37
EHT 160	6505	Mcs0_Nss2	19	21.74	27.54	-1.16
EHT 160	6665	Mcs0_Nss2	19	21.31	27.11	-1.44
EHT 160	6825	Mcs0_Nss2	19	21.63	27.43	-1.30
EHT 320	6585	Mcs0_Nss2	21	23.71	29.51	-2.03

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	EIRP	Measured PSD
EHT 20	6535	Mcs0_Nss1	7	9.86	15..66	-4.34
EHT 20	6695	Mcs0_Nss1	7	9.40	15.20	-4.49
EHT 20	6875	Mcs0_Nss1	7	9.69	15.49	-4.29
EHT40	6525	Mcs0_Nss1	11	13.57	19.37	-3.64
EHT 40	6685	Mcs0_Nss1	11	13.31	19.11	-3.76
EHT 40	6885	Mcs0_Nss1	11	12.40	18.20	-4.68

EHT 80	6545	Mcs0_Nss1	13	15.89	21.69	-4.18
EHT 80	6705	Mcs0_Nss1	13	15.49	21.29	-4.51
EHT 80	6865	Mcs0_Nss1	13	15.63	21.43	-4.45
EHT 160	6505	Mcs0_Nss1	16	19.04	24.84	-3.83
EHT 160	6665	Mcs0_Nss1	16	18.51	24.31	-4.31
EHT 160	6825	Mcs0_Nss1	16	18.95	24.75	-4.06
EHT 320	6585	Mcs0_Nss1	19	21.70	27.50	-3.86

Result

In the configuration tested, the maximum average RF outpower was less than 1 watt EIRP; therefore, the EUT compiled with the requirements of the specification (see spectrum analyzer plots in attached Annex).

5.5 §15.407(b)(7) Spurious Emissions

5.5.1 Conducted Spurious Emissions

The frequency range from the lowest frequency generated or used in the device to the tenth harmonic of the highest fundamental frequency was investigated to measure any antenna-conducted emissions. The graphs show the measurement data from spurious emissions noted across the frequency range when transmitting at the lowest frequency, middle frequency and upper frequency. Shown below are plots with the EUT turned to the upper and lower channels with the antenna gain of 5.8 dBi accounted for. These demonstrate compliance with the provisions of this section at the band edges.

The emissions must be remain below -27 dBm EIRP.

Result

Conducted spurious emissions were attenuated below the limit; therefore, the EUT complies with the specification.

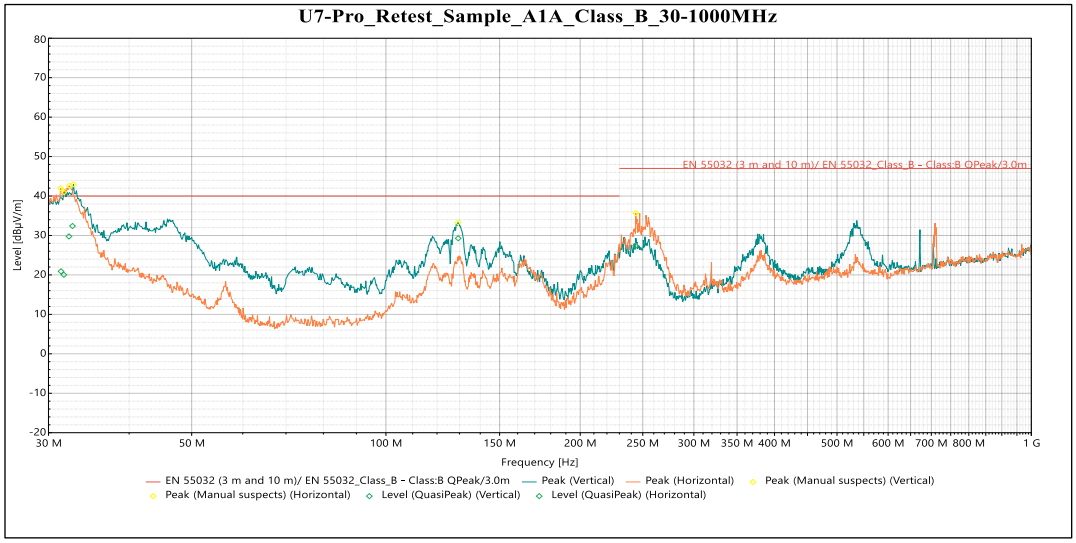
5.5.2 Radiated Spurious Emissions in the Restricted Bands of § 15.205

The EUT uses various power settings based on the channel in use. In order to reduce test time, the radiated spurious emissions at the lowest, middle, and highest channel were measured at the maximum power of TP21.

Correction Factor = Antenna Factor + Cable Loss - Pre-Amplifier Gain, and is added to the Receiver reading.

Result

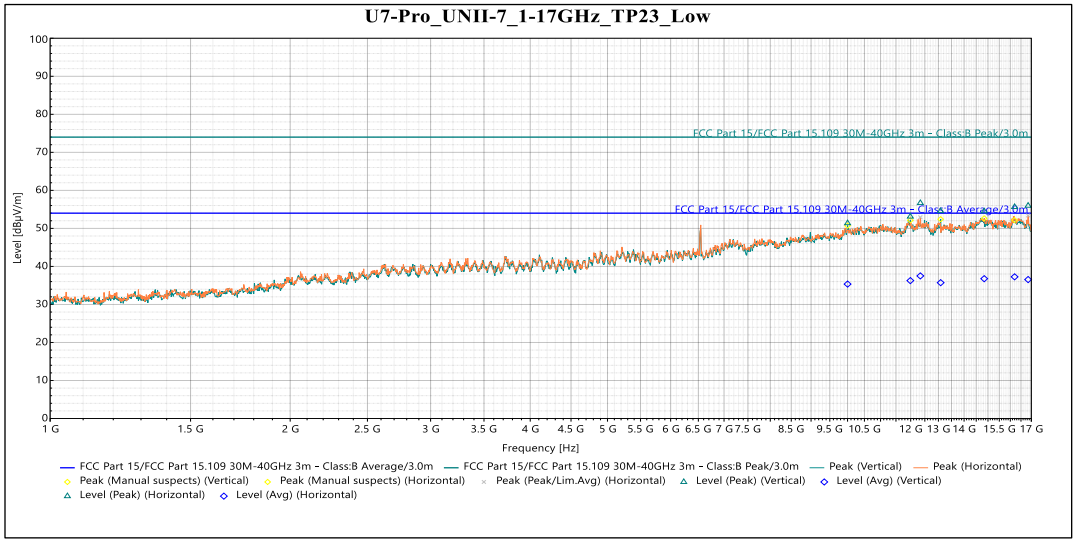
All emissions in the restricted bands of § 15.205 met the limits specified in § 15.209; therefore, the EUT complies with the specification. See Annex for Conducted Band edge plots.



QuasiPeak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
31.692 MHz	20.029	40	-19.971	69	2.759	Vertical	-8.569
32.681 MHz	32.403	40	-7.597	199	1	Vertical	-9.148
129.41 MHz	29.287	40	-10.713	341	1.138	Vertical	-14.232
31.369 MHz	20.912	40	-19.088	251	1.143	Horizontal	-8.51
32.273 MHz	29.759	40	-10.241	50	3.298	Horizontal	-8.831
243.82 MHz	27.376	47	-19.624	278	1.52	Horizontal	-15.915

Table 5: Radiated Emissions 30 – 1000 MHz



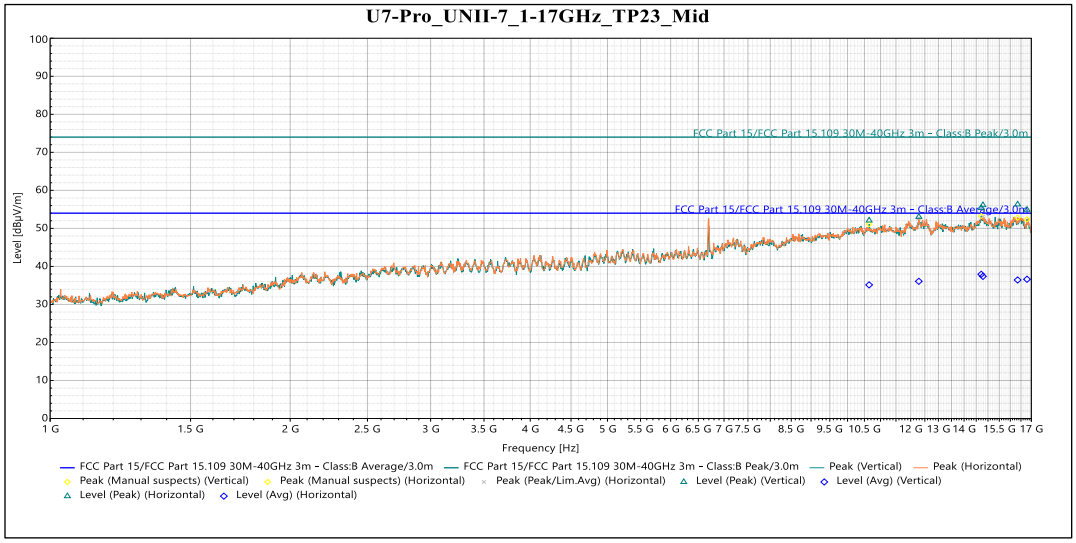
Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.001 GHz	51.358	74	-22.642	73	3.1	Vertical	14.157
11.988 GHz	53.114	74	-20.886	204	1.5	Vertical	16.309
13.085 GHz	54.56	74	-19.44	78	1.638	Vertical	15.927
16.199 GHz	55.642	74	-18.358	348	4	Vertical	18.013
12.339 GHz	56.67	74	-17.33	75	2.574	Horizontal	16.591
14.838 GHz	54.494	74	-19.506	62	2.902	Horizontal	16.529
16.844 GHz	55.958	74	-18.042	301	2.222	Horizontal	18.625

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.001 GHz	35.351	54	-18.649	73	3.1	Vertical	14.157
11.988 GHz	36.264	54	-17.736	204	1.5	Vertical	16.309
13.085 GHz	35.717	54	-18.283	78	1.638	Vertical	15.927
16.199 GHz	37.265	54	-16.735	348	4	Vertical	18.013
12.339 GHz	37.497	54	-16.503	75	2.574	Horizontal	16.591
14.838 GHz	36.767	54	-17.233	62	2.902	Horizontal	16.529
16.844 GHz	36.542	54	-17.458	301	2.222	Horizontal	18.625

Table 6: Radiated Emissions 1 – 17 GHz Lowest Frequency



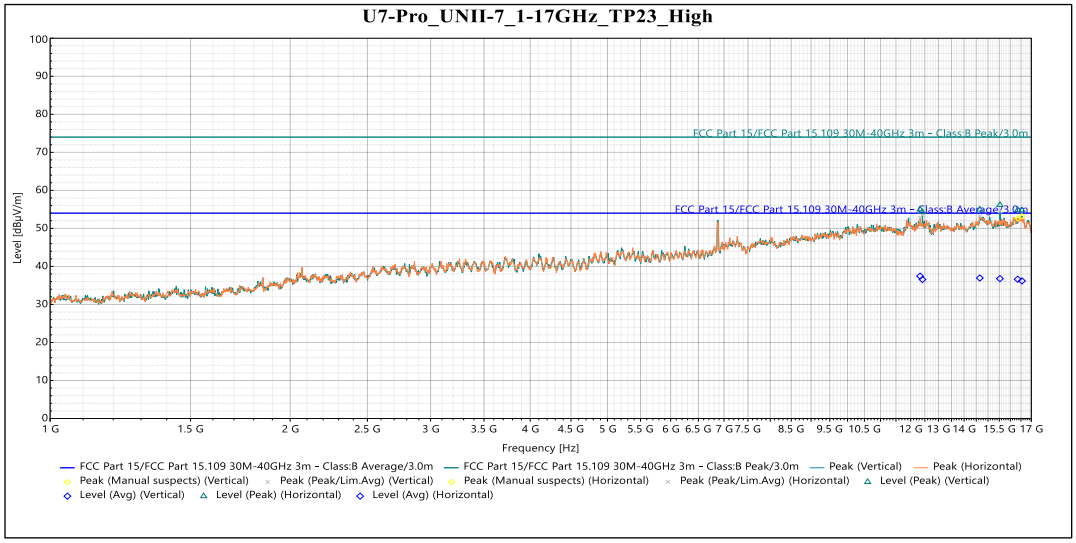
Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.643 GHz	52.083	74	-21.917	170	3.272	Vertical	14.719
14.713 GHz	55.357	74	-18.643	312	1.696	Vertical	17.312
16.79 GHz	54.906	74	-19.094	56	1.643	Vertical	18.612
12.285 GHz	53.049	74	-20.951	75	2.539	Horizontal	16.657
14.783 GHz	56.122	74	-17.878	173	3.259	Horizontal	16.836
16.342 GHz	56.308	74	-17.692	201	2.747	Horizontal	17.295

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.643 GHz	35.144	54	-18.856	170	3.272	Vertical	14.719
14.713 GHz	37.93	54	-16.07	312	1.696	Vertical	17.312
16.79 GHz	36.622	54	-17.378	56	1.643	Vertical	18.612
12.285 GHz	36.079	54	-17.921	75	2.539	Horizontal	16.657
14.783 GHz	37.381	54	-16.619	173	3.259	Horizontal	16.836
16.342 GHz	36.431	54	-17.569	201	2.747	Horizontal	17.295

Table 7: Radiated Emissions 1 – 17 GHz Middle Frequency



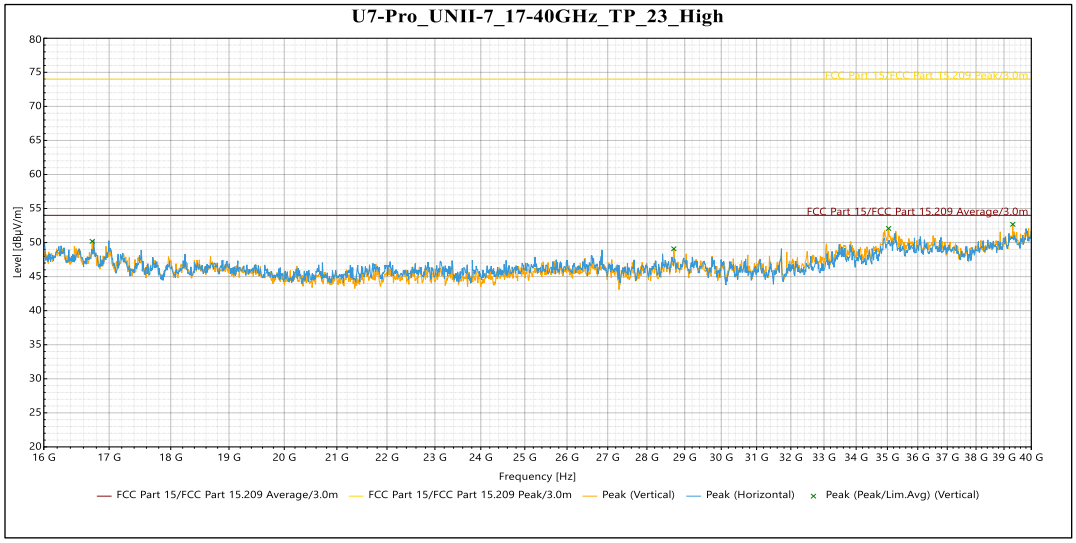
Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.414 GHz	54.293	74	-19.707	279	3.272	Vertical	16.317
15.528 GHz	56.165	74	-17.835	114	2.393	Vertical	15.926
16.548 GHz	54.746	74	-19.254	105	3.079	Vertical	18.37
12.331 GHz	54.973	74	-19.027	111	3.272	Horizontal	16.629
14.652 GHz	54.947	74	-19.053	263	2.398	Horizontal	16.831
16.345 GHz	54.839	74	-19.161	75	3.798	Horizontal	17.321

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.414 GHz	36.563	54	-17.437	279	3.272	Vertical	16.317
15.528 GHz	36.782	54	-17.218	114	2.393	Vertical	15.926
16.548 GHz	36.193	54	-17.807	105	3.079	Vertical	18.37
12.331 GHz	37.44	54	-16.56	111	3.272	Horizontal	16.629
14.652 GHz	36.948	54	-17.052	263	2.398	Horizontal	16.831
16.345 GHz	36.616	54	-17.384	75	3.798	Horizontal	17.321

Table 8: Radiated Emissions 1 – 17 GHz Highest Frequency



Source	Frequency	Peak (dBµV/m)	Lim.Avg (dBµV/m)	Peak-Lim.Avg (dB)	Height (m)	Angle1 (°)	Polarization	Correction (dB)
No Significant Emissions was Observed from 17 – 40 GHz in Either Orientation of the Antenna								

Table 9: Radiated Emissions 17 – 40 GHz Highest Frequency (worse case)

5.6 §15.407(a) Maximum Power Spectral Density

All chains were measured and summed under the guidance of KDB 789033 Section II. F. and KDB 66291 D01. Please see associated annex for details on instrument settings.

The maximum average power spectral density conducted from the intentional radiator of the antenna shall not be greater than 5 dBm EIRP in any 1 MHz band during any time interval of continuous transmission. As per KDB 662911, When the EUT is using spatial-multiplexing in HE modes, there is not additional array gain to accommodate. When the EUT uses Nss=1 data rates, the antenna gain is 5.8 dBi + Array gain of 3.01 dB which is a total of 8.81 dBi.
Results of this testing are summarized.

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured PSD
EHT 20	6535	Mcs0_Nss2	10	12.80	-1.31
EHT 20	6695	Mcs0_Nss2	10	12.26	-1.50
EHT 20	6875	Mcs0_Nss2	10	12.64	-1.37
EHT40	6525	Mcs0_Nss2	13	15.90	-1.40
EHT 40	6685	Mcs0_Nss2	13	15.44	-1.60
EHT 40	6885	Mcs0_Nss2	13	15.61	-1.49
EHT 80	6545	Mcs0_Nss2	16	18.87	-1.16
EHT 80	6705	Mcs0_Nss2	16	18.38	-1.65
EHT 80	6865	Mcs0_Nss2	16	18.61	-1.37
EHT 160	6505	Mcs0_Nss2	19	21.74	-1.16
EHT 160	6665	Mcs0_Nss2	19	21.31	-1.44
EHT 160	6825	Mcs0_Nss2	19	21.63	-1.30
EHT 320	6585	Mcs0_Nss2	21	23.71	-2.03

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured PSD
EHT 20	6535	Mcs0_Nss1	7	9.86	-4.34
EHT 20	6695	Mcs0_Nss1	7	9.40	-4.49
EHT 20	6875	Mcs0_Nss1	7	9.69	-4.29
EHT40	6525	Mcs0_Nss1	11	13.57	-3.64

EHT 40	6685	Mcs0_Nss1	11	13.31	-3.76
EHT 40	6885	Mcs0_Nss1	11	12.40	-4.68
EHT 80	6545	Mcs0_Nss1	13	15.89	-4.18
EHT 80	6705	Mcs0_Nss1	13	15.49	-4.51
EHT 80	6865	Mcs0_Nss1	13	15.63	-4.45
EHT 160	6505	Mcs0_Nss1	16	19.04	-3.83
EHT 160	6665	Mcs0_Nss1	16	18.51	-4.31
EHT 160	6825	Mcs0_Nss1	16	18.95	-4.06
EHT 320	6585	Mcs0_Nss1	19	21.70	-3.86

Result

The maximum average power spectral density was less than the limit of 5 dBm EIRP; therefore, the EUT complies with the specification.

5.6.1 OFDMA RU Check

If EUT supports OFDMA multiple partial Resource Unit (RU) configurations were verified and the worst case mode was tested.

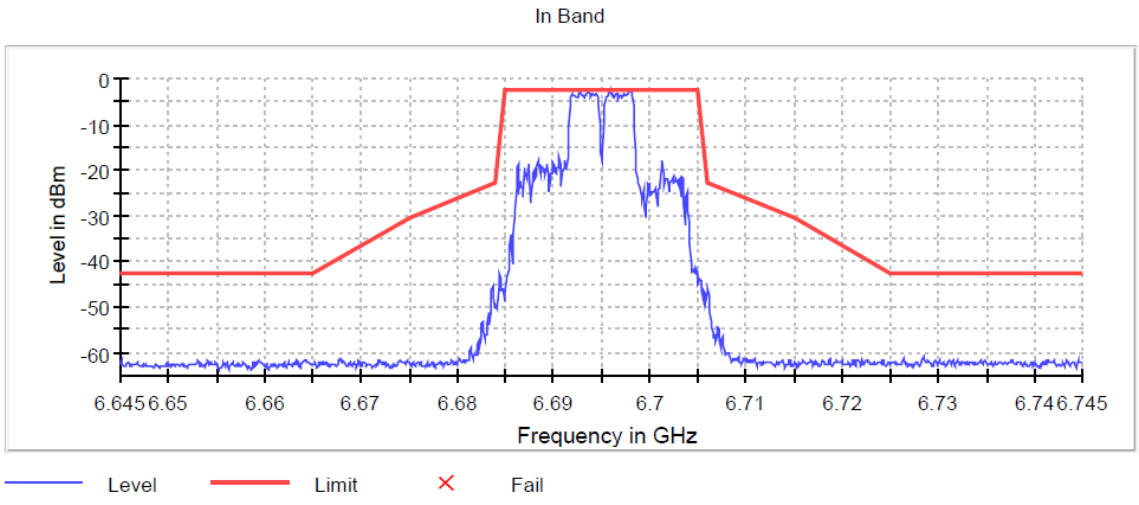


Figure 5: 6695 20MHz RU Vérification - Center

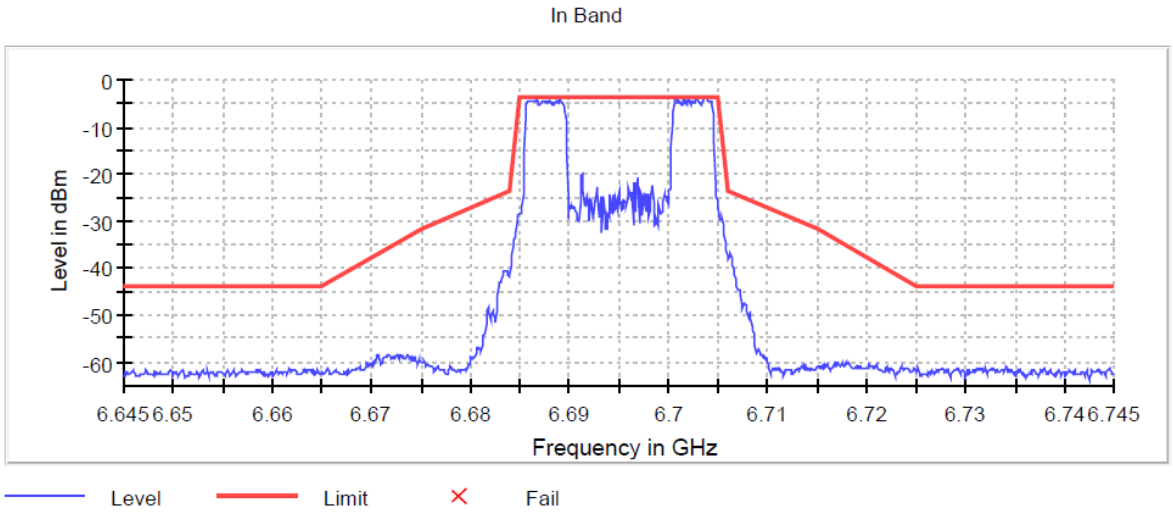


Figure 6: 6695 20MHz RU Vérification - Edge

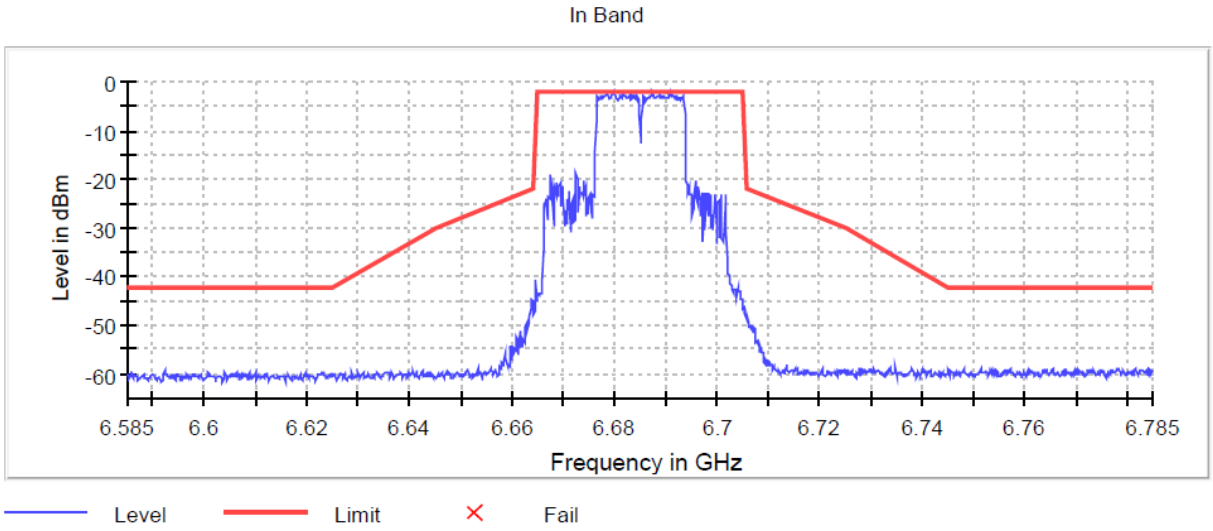


Figure 7: 6685 40MHz RU Vérification - Center

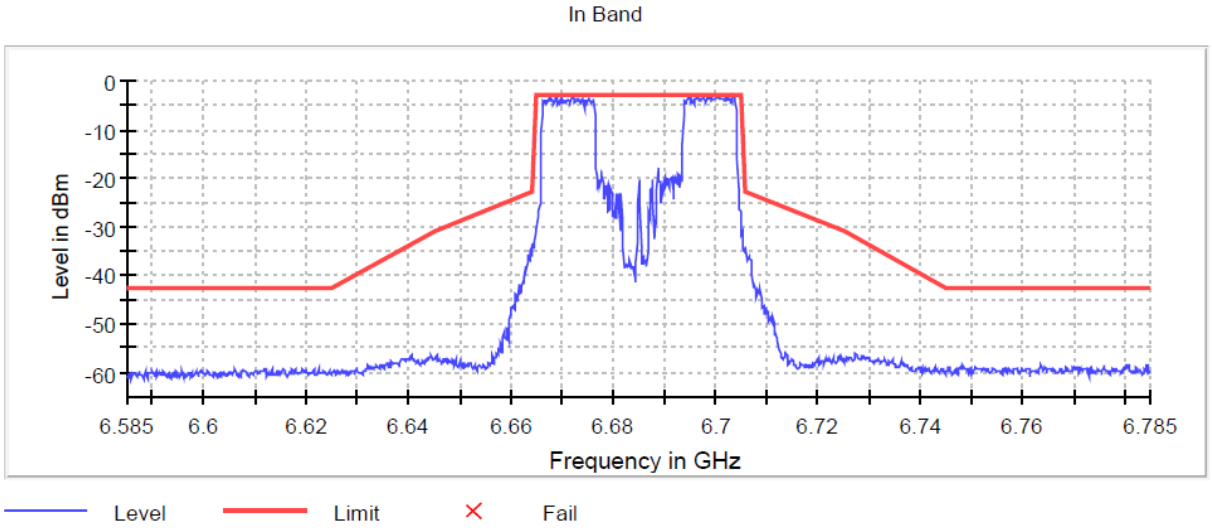


Figure 8: 6685 40MHz RU Vérification - Edge

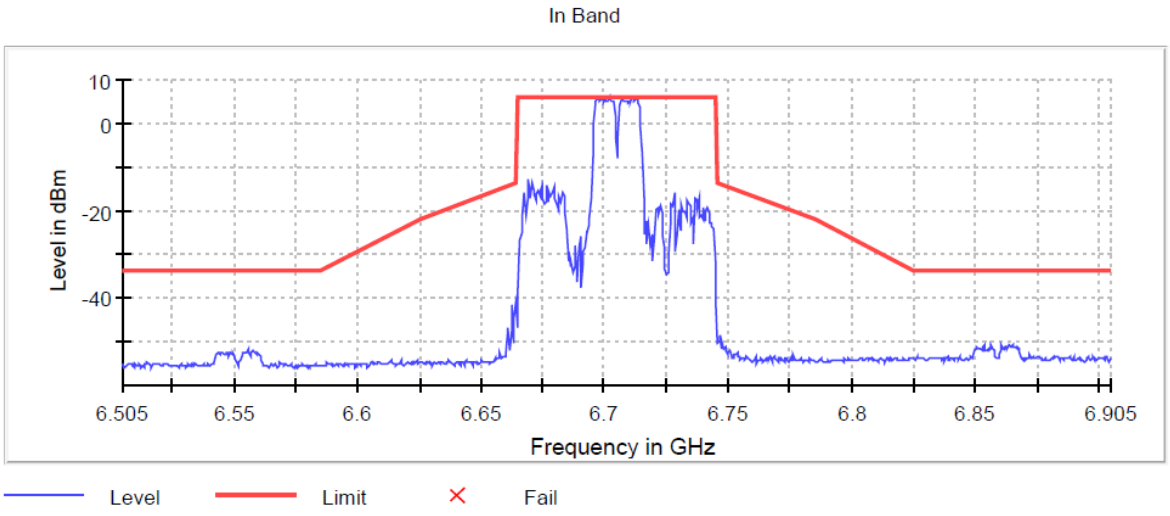


Figure 9: 6705 80MHz RU Vérification - Center

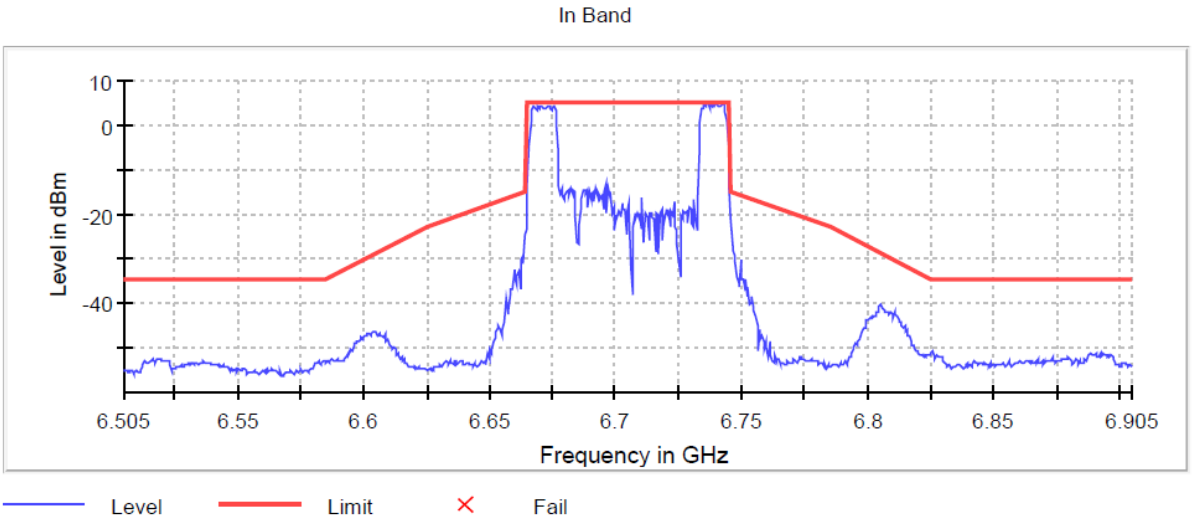


Figure 10: 6705 80MHz RU Vérification - Edge

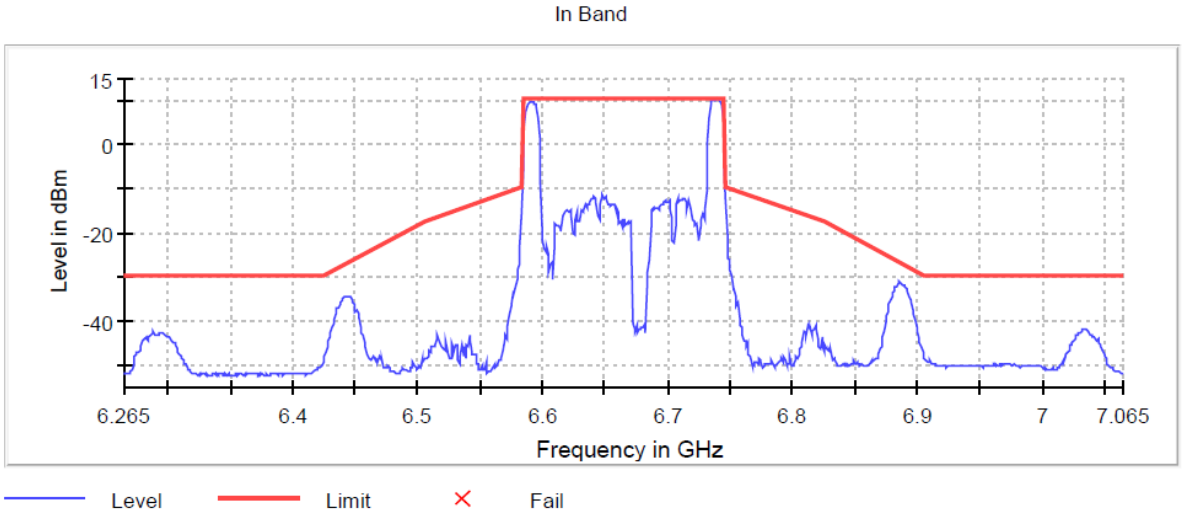


Figure 11: 6665 160MHz RU Vérification - Center

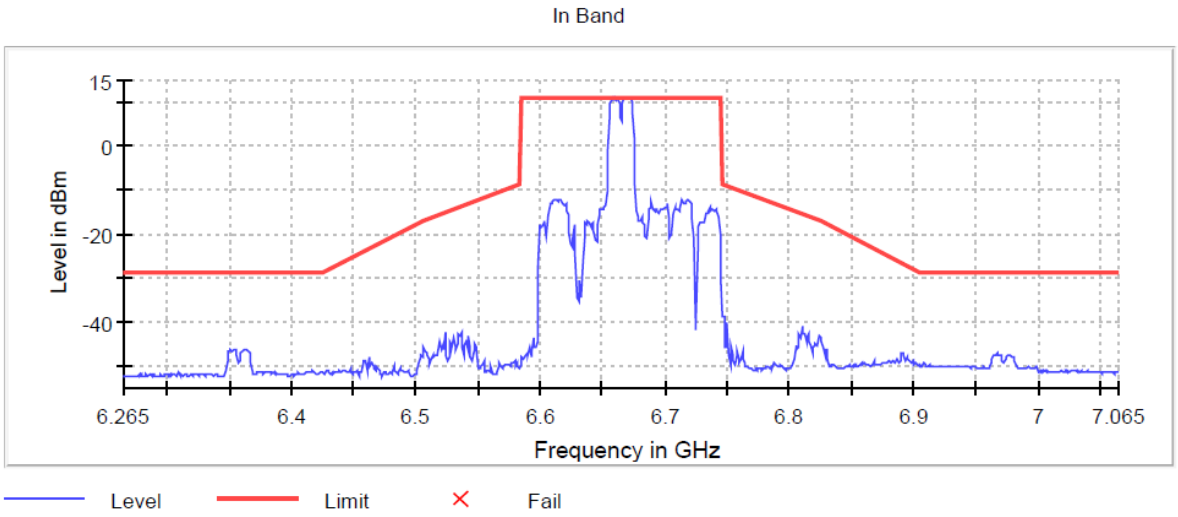


Figure 12: 6665 160MHz RU Vérification - Edge

5.7 §15.407(d) Contention Based Protocol

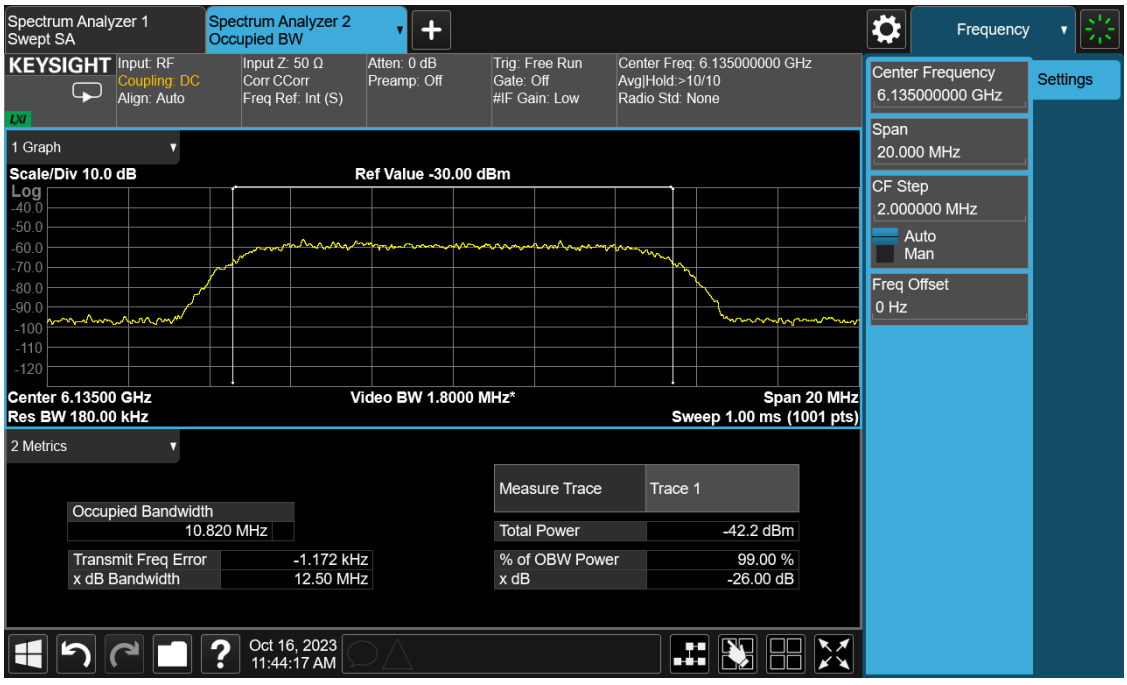
This product was tested and found to be compliant with the requirements of Contention-based Protocol as specified in FCC Part 15.407 and KDB 987594 D02.

Initially the test setup was connected directly to the signal source with all splitters (splitters terminated with a 50-ohm loads on unused ports) and cables in place to verify the AWGN signal is 10MHz wide at a signal level of less than or equal to -82dBm and for conducted measurements the threshold was adjusted for an antenna gain for 0dBi. The level at the signal generator required to achieve the required signal level at the DUT was recorded for use during testing.

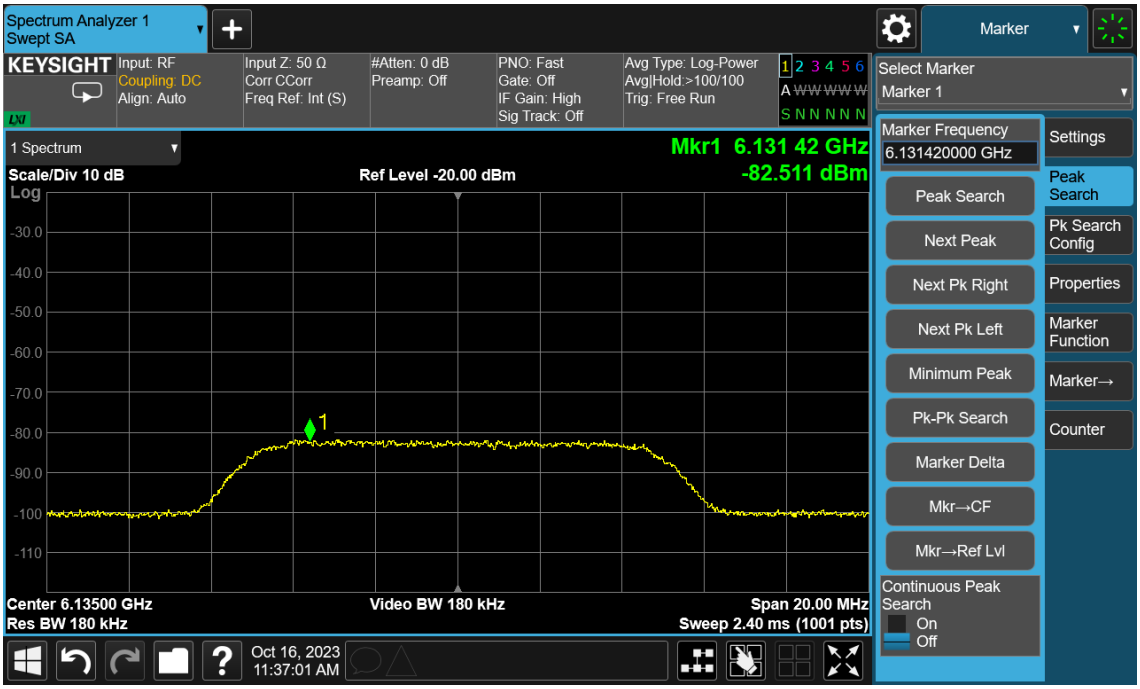
The DUT was connected as shown in figure 4 above and set to transmit at a constant duty cycle at each frequency and bandwidth noted in the table below and verified to be communicating with the companion device as intended.

Starting at the levels established above, the AWGN signal was introduced to the DUT and increased to determine a threshold level at where the DUT will terminate with at least a 90% detection rate. The level at the DUT, which the 90% detection rate was achieved was recorded as the “Sensitivity Level” below.

Testing shall be repeated at each applicable channel and bandwidth as noted in Table 1 of KDB 987594 D02.



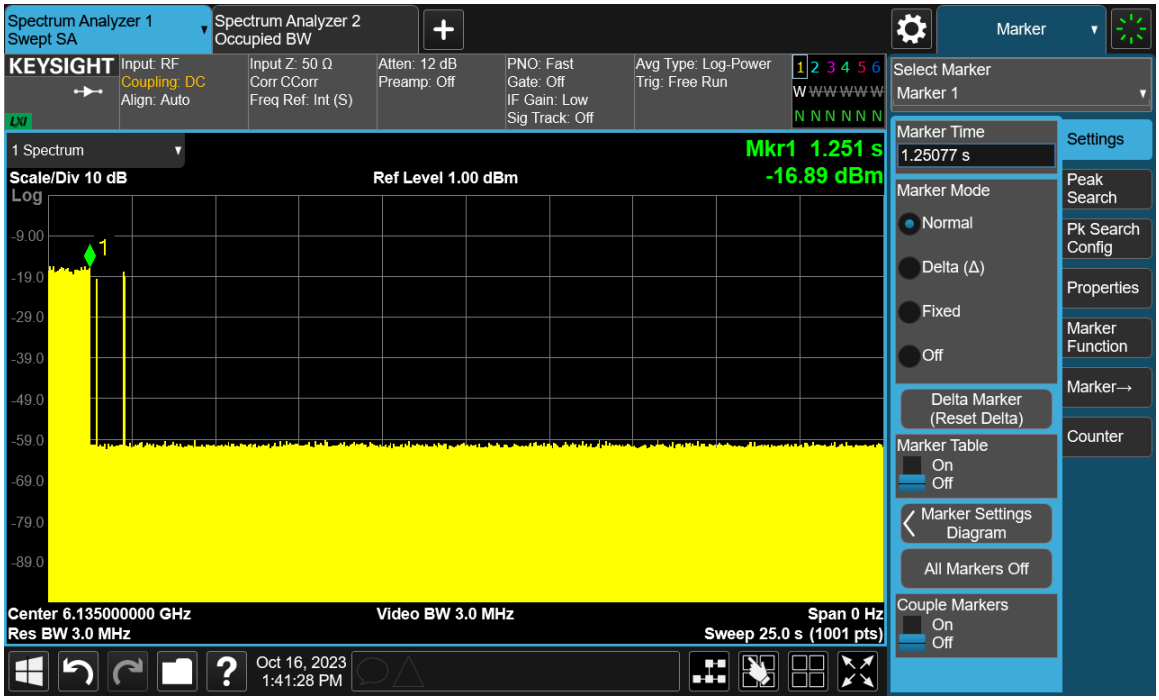
Plot 1: Signal BW Details



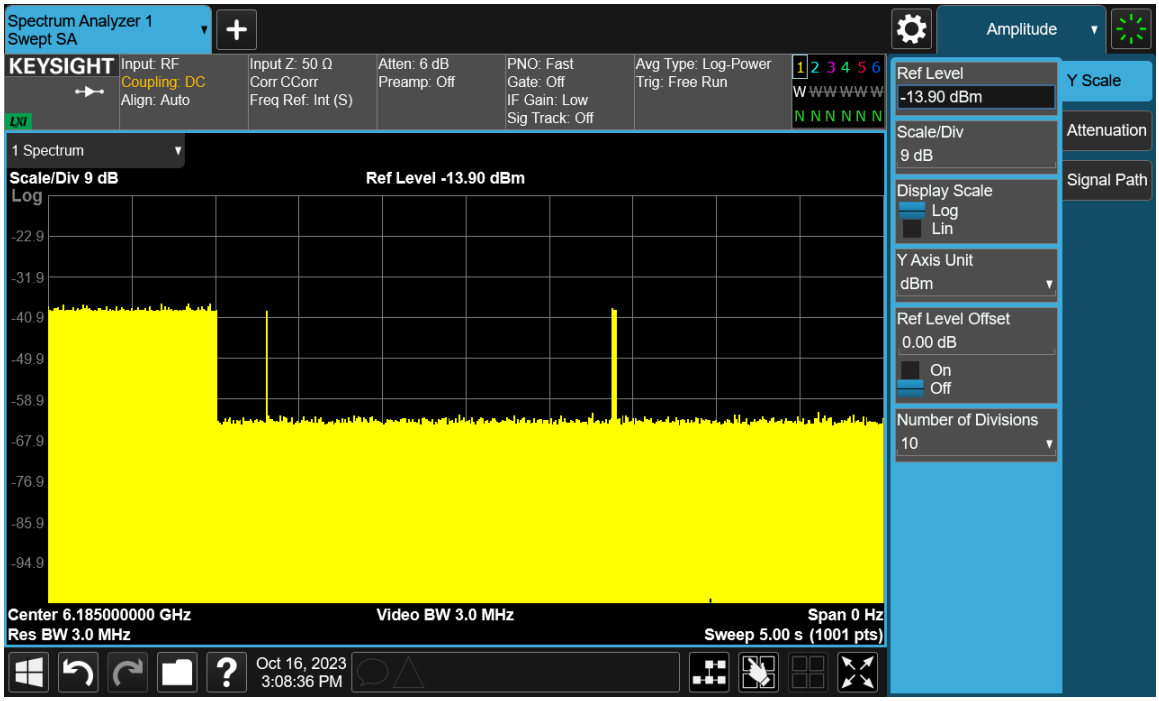
Plot 2: AWGN Signal Level Details

Band	BW_{EUT}	F_{c1}	F_{c2}	Signal Power Level (dBm)	Detection Rate (%)	Margin (dB)
UNII-5 5.925 - 6.425GHz	20	6135	6135	-73	100	16.8
	160	6185	6110	-76	100	19.8
			6185	-75	100	18.8
			6260	-76	100	19.8
	320	6265	6110	-58	100	1.8
			6265	-60	100	3.8
			6410	-57	100	0.8
UNII-6 6.425 - 6.525GHz	20	6455	6455	-73	100	16.8
	160	6505	6430	-76	100	19.8
			6505	-72	100	15.8
			6580	-72	100	15.8
UN1I-7 6.525 - 6.875GHz	20	6695	6695	-72	100	15.8
	160	6665	6590	-68	100	11.8
			6665	-62	100	5.8
			6740	-72	100	15.8
	320	6745	6590	-59	100	2.8
			6745	-64	100	7.8
			6860	-60	100	3.8
UNII-8 6.875 - 7.125GHz	20	7015	7015	-76	100	19.8
	160	6985	6910	-70	100	13.8
			6985	-70	100	13.8
			7060	-73	100	16.8

Table 10: Trial Table



Plot 3: 20MHz Example Detection Trace



Plot 4: 160MHz Example Detection Trace

-- End of Test Report –