



427 West 12800 South
Draper, UT 84020

Test Report Certification

FCC ID	SWX-U7PROW
ISED ID	6545A-U7PROW
Equipment Under Test	U7-Pro-Wall
Test Report Serial Number	TR8746_03
Date of Test(s)	25, 30 Oct; 7 – 9 Nov; 7 Dec 2023; 11 – 12 and 18 Jan 2024
Report Issue Date	29 February 2024

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



NVLAP LAB CODE 600241-0

Certification of Engineering Report

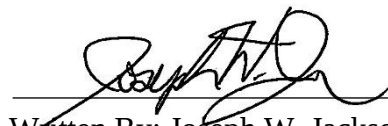
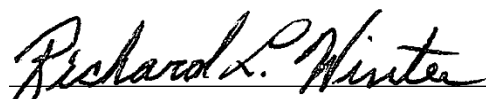
This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart E. This report may be reproduced in full. Partial reproduction of this report may only be made with 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-Wall
FCC ID	SWX-U7PROW
ISED ID	6545A-U7PROW

On this 29th day of February 2024, 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	19 January 2024
02	Added Signal Detection Plot in Section 5.7	22 February 2024
03	Added All CBP Plots and clarification on channel puncturing to Section 2.6	29 February 2024

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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-Wall
Serial Number	05BF1C
Dimensions (cm)	15.0 x 10.3 x 3.6

2.2 Description of EUT

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

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.

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

Band	Modulation Bandwidth	Frequency (MHz)	Maximum Power Setting
UNII-8	be (EHT 20)	6895, 6915, 6935, 6955, 6975, 6995	TP12
		7015, 7035, 7035, 7055, 7075, 7095	TP11
		7115	TP12
	be (EHT 40)	6925, 6965, 7005, 7045, 7085	TP15
	be (EHT 80)	6945	TP17
	be (EHT 80)	7025	TP18
	be (EHT 160)	6985	TP20
	be (EHT 320)	6905	TP22

2.3 EUT and Support Equipment

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

Brand Name Model Number Serial Number	Description	Name of Interface Ports / Interface Cables
BN: UBIQUITI MN: U7-Pro-Wall (Note 1) SN: 05BF1C	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	21.3 – 23.8 C
Humidity	16.9 – 28.9 %
Barometric Pressure	1013 mBar

2.6 Operating Modes

The U7-Pro-Wall 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.

This device does not support Channel puncturing.

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

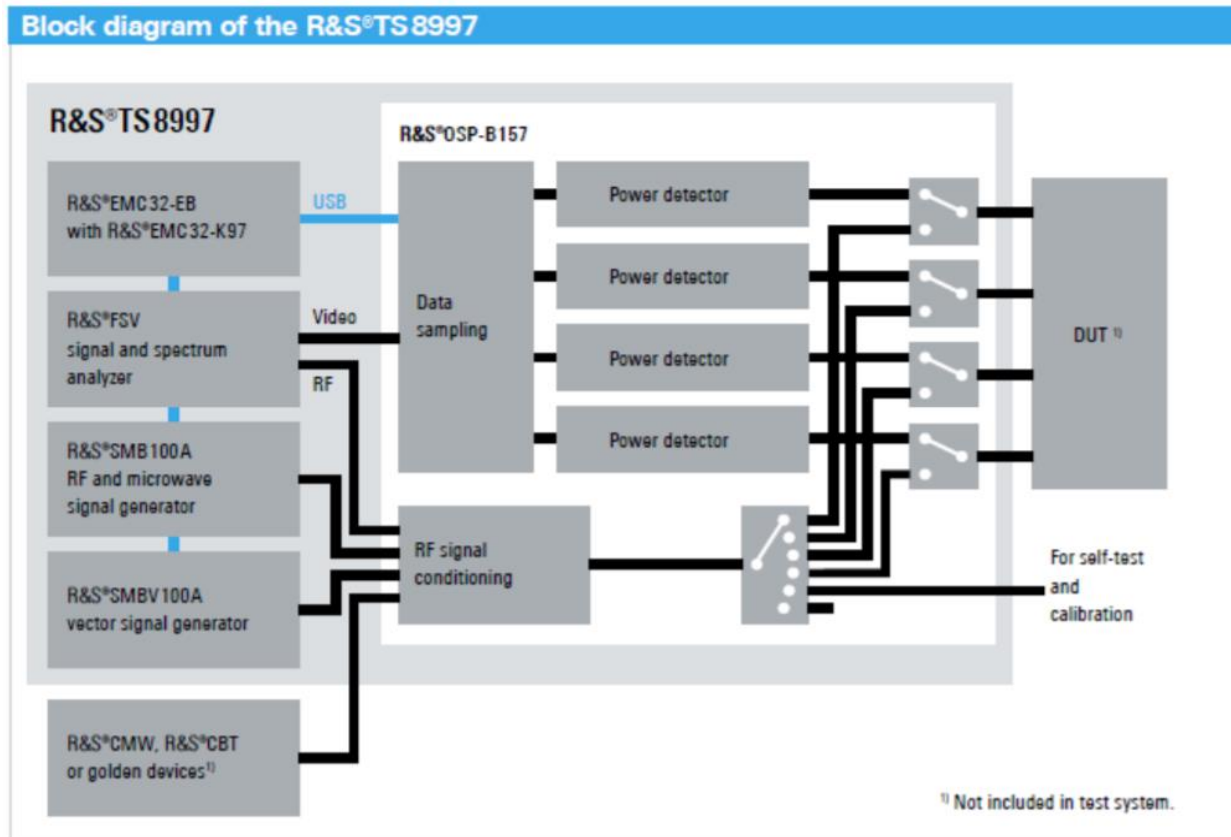


Diagram 1: Test Configuration Block Diagram

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	6875 to 7115	Compliant
15.407(e)	RSS-247 §6.2.2, §6.2.3	Peak Output Power ¹	6875 to 7115	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	6875 to 7115	Compliant
15.407(d)	RSS-247 §6.2.2, §6.2.3	Contention Based Protocol	6875 to 7115	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-2500	7/13/2023	7/13/2024
LISN	AFJ	LS16C/10	UCL-2512	5/26/2023	5/26/2024
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

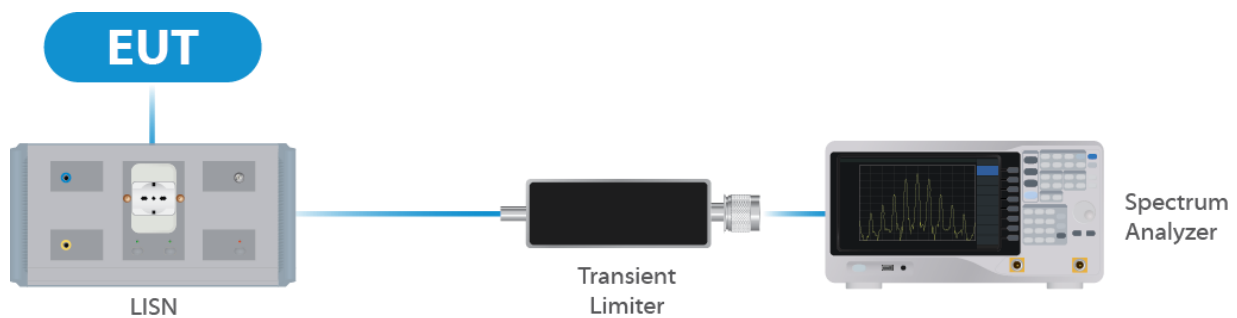


Figure 1: Conducted Emissions Test

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	11/27/2023	11/27/2024
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

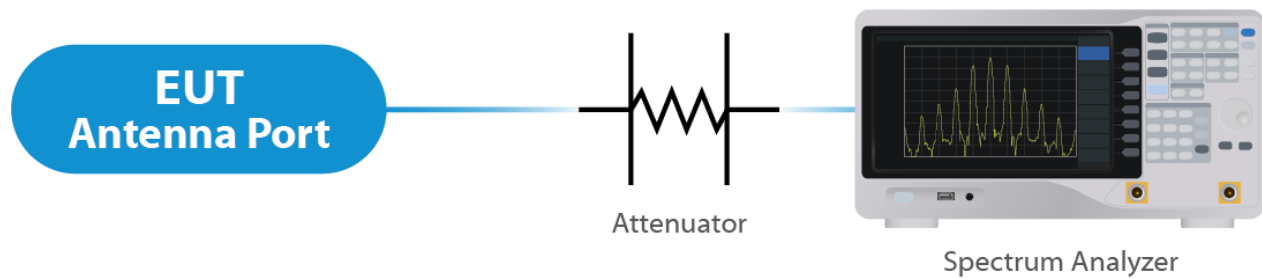


Figure 2: Direct Connect at the Antenna Port Test

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	12/7/2023
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

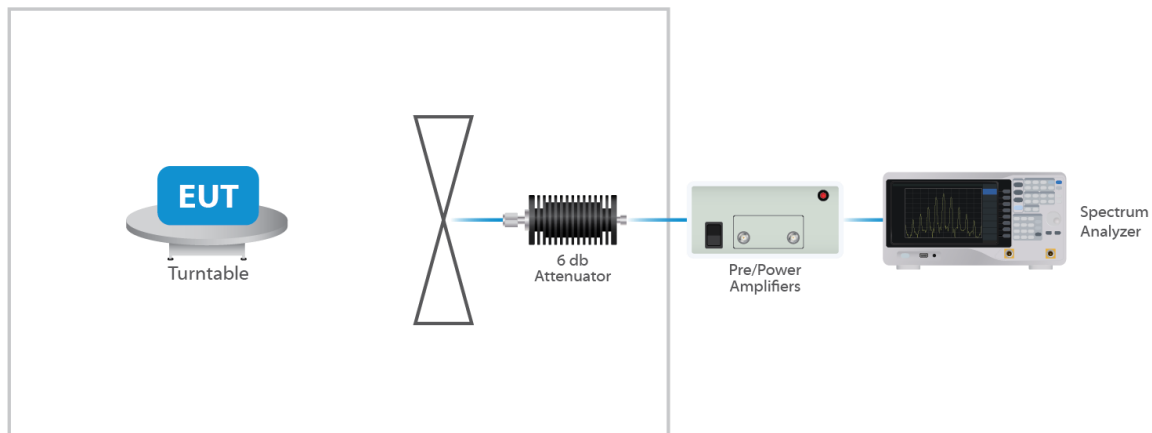


Figure 3: Radiated Emissions Test

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

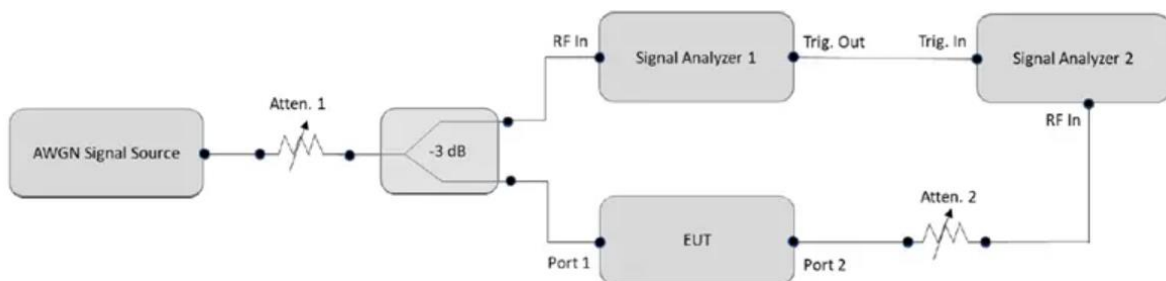


Figure 1. CBP conducted test setup diagram. Source: KDB 987594 D02 V01r01

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 ($\pm$ 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 internal integrated antenna. Per the manufacturer, the Maximum gain of the antenna per chain is 6 dBi. This is an 802.11 device and utilizes CDD as described in KDB 662911 D01. The antenna is not user replaceable. For CDD transmissions, directional gain is calculated as follows.

Array Gain = $10 \log(\text{NANT}/\text{NSS})$ dB

NANT = number of transmit antennas and

NSS = number of spatial streams. NSS = 1 considered worst case.

For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for $\text{NANT} \leq 4$;

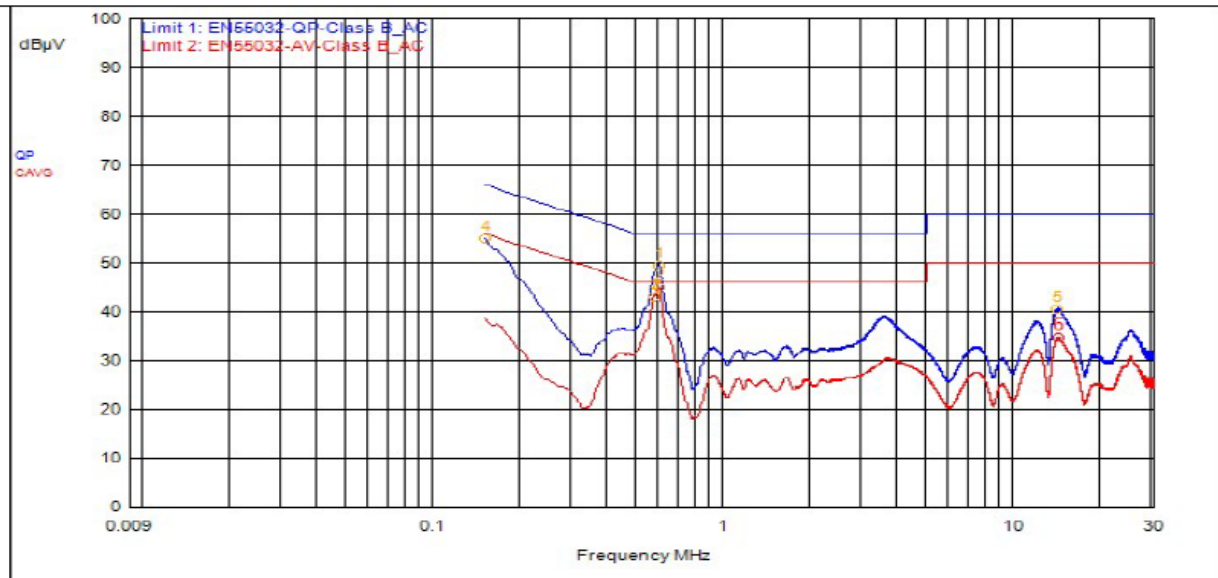
For PSD measurements when $\text{Nss}=1$: Array Gain = $10 \log(\text{NANT}/\text{NSS})$ dB + Antenna Gain (dBi). Or
 $3.01 \text{ dB} + 6.0 \text{ dBi} = 9.01 \text{ dBi}$.

Results

The EUT complied with the specification

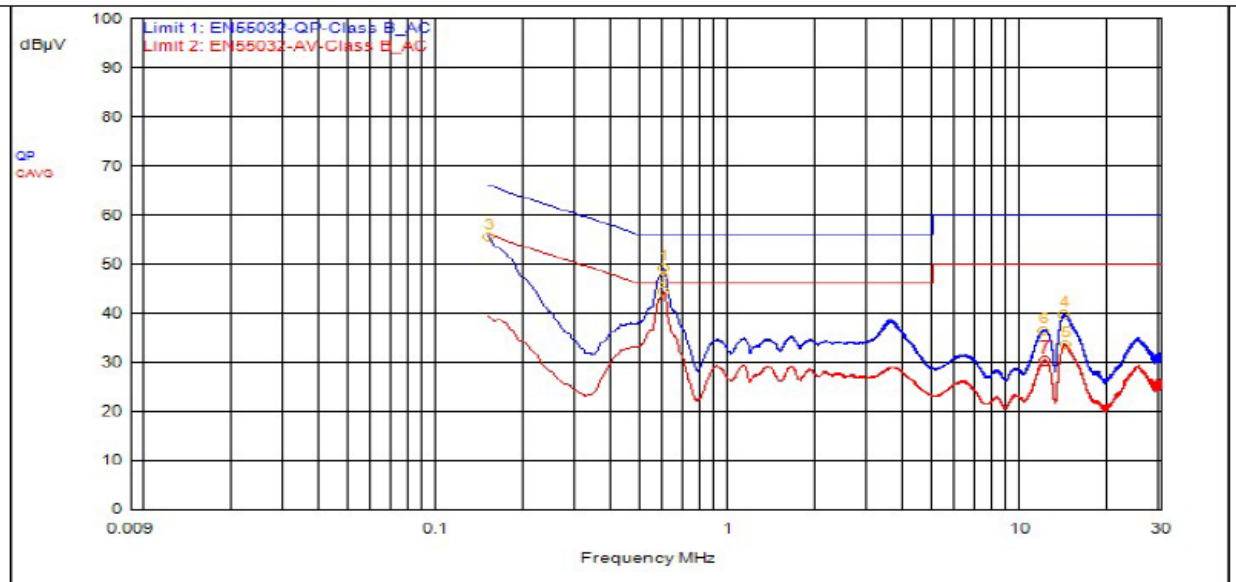
5.2 Conducted Emissions at Mains Ports Data

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
1	591,000kHz	9.50	0.00		QPeak	39.98	49.48	56.00	-6.52			
4	150,000kHz	9.49	0.00		QPeak	45.58	55.07	66.00	-10.93			
5	13.893	9.67	0.00		QPeak	30.98	40.65	60.00	-19.35			
2	594,000kHz	9.50	0.00		C_AVG	35.43	44.93			46.00	-1.07	
3	570,000kHz	9.49	0.00		C_AVG	33.65	43.14			46.00	-2.86	
6	14.019	9.67	0.00		C_AVG	25.08	34.75			50.00	-15.25	

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	594,000kHz	9.59	0.00		QPeak	39.62	49.21	56.00	-6.79			
3	150,000kHz	9.62	0.00		QPeak	45.80	55.42	66.00	-10.58			
4	13.935	9.72	0.00		QPeak	29.91	39.63	60.00	-20.37			
6	11.739	9.67	0.00		QPeak	26.82	36.49	60.00	-23.51			
2	597,000kHz	9.59	0.00		C_AVG	34.97	44.56			46.00	-1.44	
5	13.998	9.73	0.00		C_AVG	23.77	33.50			50.00	-16.50	
7	11.952	9.68	0.00		C_AVG	20.65	30.33			50.00	-19.67	

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)
20	6895	19.1	23.2
20	7015	19.2	23.2
20	7115	19.2	23.1
40	6925	38.3	42.0
40	7005	38.3	44.6
40	7085	38.3	44.0
80	6945	78.0	88.5
80	7025	77.5	86.0
160	6985	158.0	166.0
320	6905	317.5	341.7

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 22.96 dBm or 197.70 mW. The limit is 30 dBm EIRP, or 1 Watt EIRP. The antenna has a gain of 6 dBi.

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	EIRP	Measured PSD
EHT 20	6895	Mcs0_Nss2	12	12.84	18.84	-1.07
EHT 20	7015	Mcs0_Nss2	11	11.54	17.54	-2.14
EHT 20	7115	Mcs0_Nss2	12	12.04	18.04	-1.29
EHT 40	6925	Mcs0_Nss2	15	15.92	21.92	-1.06
EHT 40	7005	Mcs0_Nss2	15	15.85	21.85	-1.22
EHT 40	7085	Mcs0_Nss2	15	15.08	21.08	-1.83
EHT 80	6945	Mcs0_Nss2	17	17.90	23.90	-1.90
EHT 80	7025	Mcs0_Nss2	18	18.59	24.59	-1.46
EHT 160	6985	Mcs0_Nss2	20	20.97	26.97	-1.52
EHT 320	6905	Mcs0_Nss2	22	22.96	28.96	-2.63

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	EIRP	Measured PSD
EHT 20	6895	Mcs0_Nss1	9	9.84	15.84	-4.12
EHT 20	7015	Mcs0_Nss1	9	9.55	15.55	-4.40
EHT 20	7115	Mcs0_Nss1	9	9.18	15.18	-4.32
EHT 40	6925	Mcs0_Nss1	12	12.74	18.74	-4.24
EHT 40	7005	Mcs0_Nss1	12	12.60	18.60	-4.25
EHT 40	7085	Mcs0_Nss1	12	12.15	18.15	-4.61

EHT 80	6945	Mcs0_Nss1	14	14.96	20.96	-4.86
EHT 80	7025	Mcs0_Nss1	15	15.53	21.53	-4.52
EHT 160	6985	Mcs0_Nss1	17	18.13	24.13	-4.35
EHT 320	6905	Mcs0_Nss1	20	21.08	27.08	-4.49

Result

In the configuration tested, the maximum average RF outpower was less than 1 watt EIRP; therefore, the EUT complied 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 6 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.

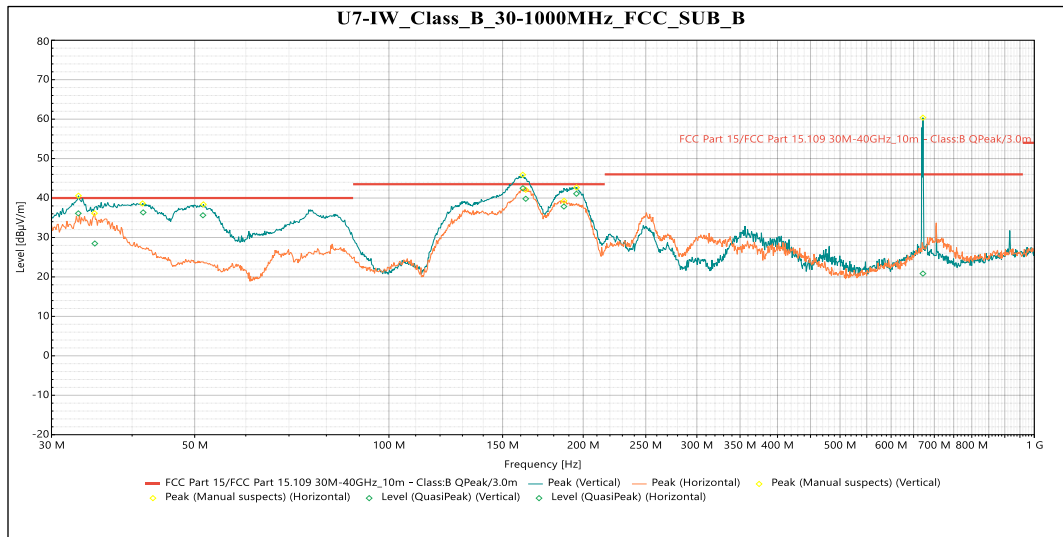
5.5.2 Radiated Spurious Emissions in the Restricted Bands of § 15.205

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 TP22.

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

Result

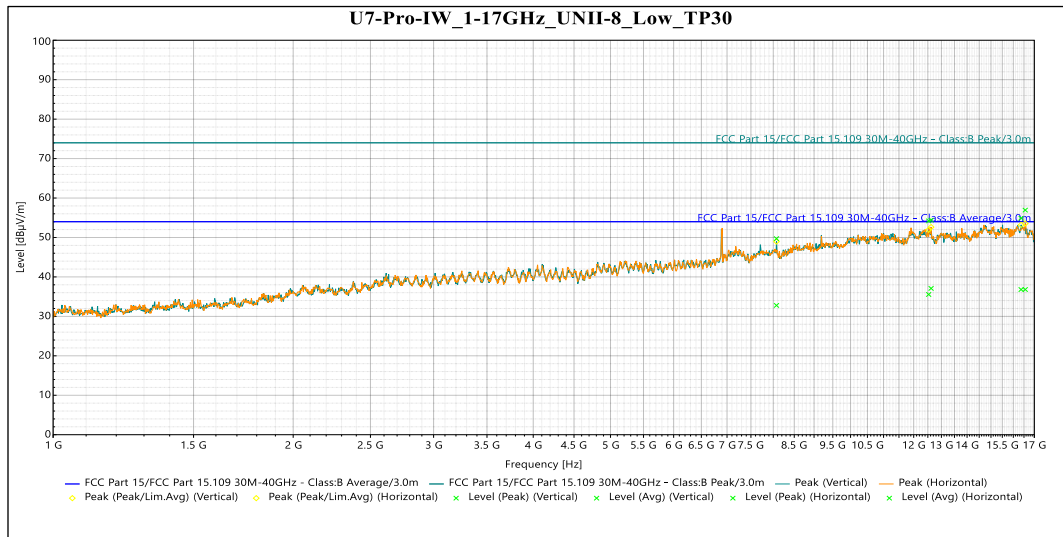
All emissions in the restricted bands of § 15.205 met the limits specified in § 15.209; therefore, the EUT complies with the specification. See Annex for Conducted Band edge plots.



QuasiPeak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
33.017 MHz	36.111	40	-3.889	204	1.129	Vertical	-9.415
41.61 MHz	36.345	40	-3.655	359	1.129	Vertical	-15.523
51.502 MHz	35.629	40	-4.371	359	1.129	Vertical	-21.223
161.28 MHz	42.492	43.5	-1.008	358	1.132	Vertical	-16.039
195.23 MHz	41.094	43.5	-2.406	353	1.129	Vertical	-15.934
672.08 MHz	20.853	46	-25.147	83	1.667	Vertical	-6.922
35.016 MHz	28.469	40	-11.531	171	3.65	Horizontal	-10.579
162.92 MHz	39.812	43.5	-3.688	103	1.489	Horizontal	-16.105
186.7 MHz	37.853	43.5	-5.647	274	1.712	Horizontal	-16.813

Table 5: Radiated Emissions 30 – 1000 MHz



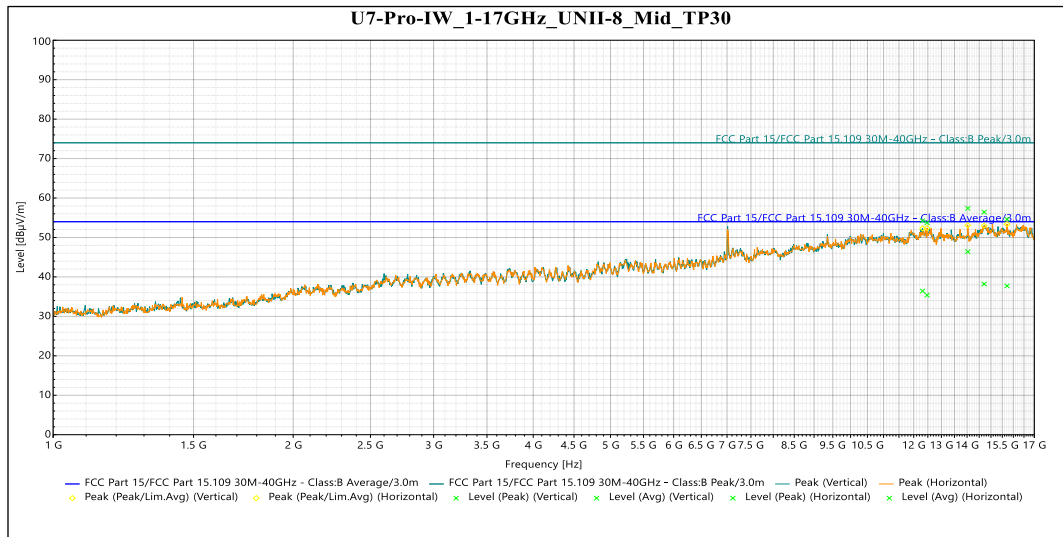
Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
8.0744 GHz	49.712	74	-24.288	359	2.231	Vertical	11.322
12.531 GHz	54.198	74	-19.802	55	1.632	Vertical	16.574
16.364 GHz	54.896	74	-19.104	5	1.809	Vertical	17.49
12.618 GHz	54.391	74	-19.609	216	3.808	Horizontal	16.476
16.561 GHz	56.935	74	-17.065	24	3.81	Horizontal	18.393

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
8.0744 GHz	32.776	54	-21.224	359	2.231	Vertical	11.322
12.531 GHz	35.549	54	-18.451	55	1.632	Vertical	16.574
16.364 GHz	36.8	54	-17.2	5	1.809	Vertical	17.49
12.618 GHz	37.093	54	-16.907	216	3.808	Horizontal	16.476
16.561 GHz	36.805	54	-17.195	24	3.81	Horizontal	18.393

Table 6: Radiated Emissions 1 – 17 GHz on the Lowest Frequency



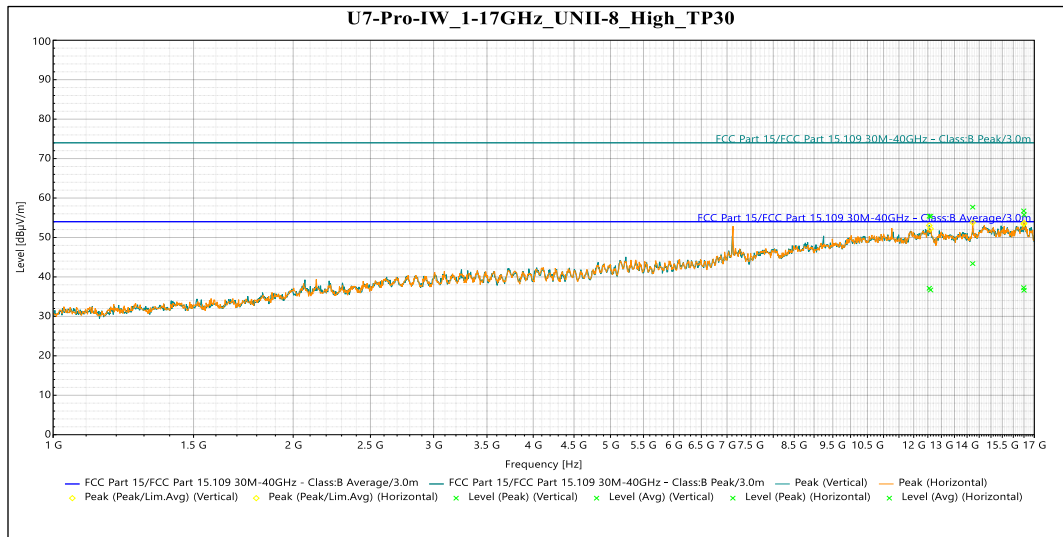
Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.311 GHz	54.244	74	-19.756	226	1.63	Vertical	16.723
14.708 GHz	56.411	74	-17.589	38	1.813	Vertical	17.37
12.474 GHz	53.741	74	-20.259	204	3.283	Horizontal	16.408
14.03 GHz	57.391	74	-16.609	71	1.702	Horizontal	15.147
15.712 GHz	54.624	74	-19.376	15	2.348	Horizontal	16.115

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.311 GHz	36.422	54	-17.578	226	1.63	Vertical	16.723
14.708 GHz	38.176	54	-15.824	38	1.813	Vertical	17.37
12.474 GHz	35.373	54	-18.627	204	3.283	Horizontal	16.408
14.03 GHz	46.411	54	-7.589	71	1.702	Horizontal	15.147
15.712 GHz	37.718	54	-16.282	15	2.348	Horizontal	16.115

Table 7: Radiated Emissions 1 – 17 on the Middle Frequency



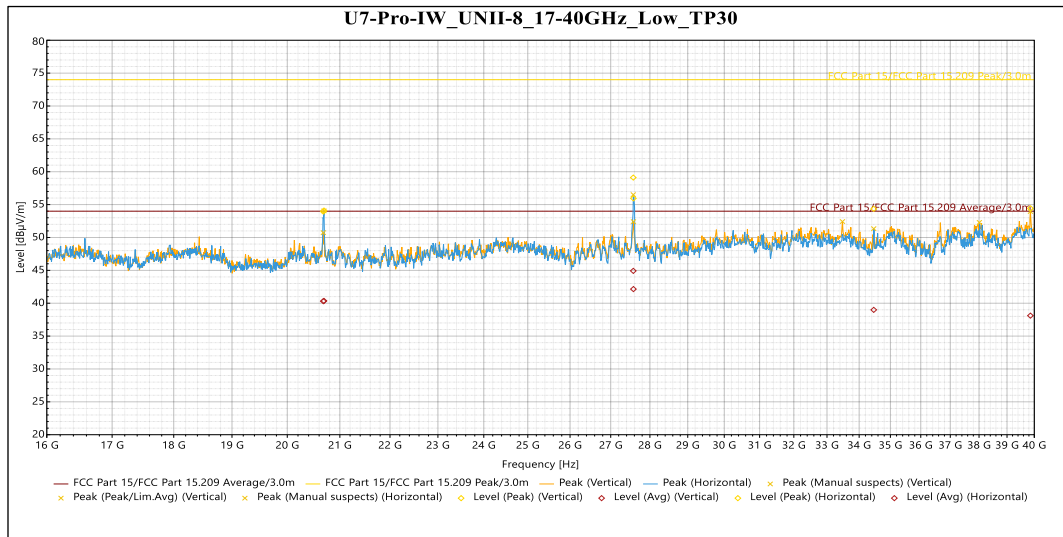
Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.553 GHz	55.406	74	-18.594	125	2.168	Vertical	16.638
16.489 GHz	56.736	74	-17.264	275	1.632	Vertical	18.269
12.6 GHz	55.339	74	-18.661	132	1.882	Horizontal	16.774
14.23 GHz	57.694	74	-16.306	70	1.81	Horizontal	15.51
16.505 GHz	55.77	74	-18.23	181	1.63	Horizontal	18.289

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.553 GHz	37.132	54	-16.868	125	2.168	Vertical	16.638
16.489 GHz	37.277	54	-16.723	275	1.632	Vertical	18.269
12.6 GHz	36.692	54	-17.308	132	1.882	Horizontal	16.774
14.23 GHz	43.384	54	-10.616	70	1.81	Horizontal	15.51
16.505 GHz	36.622	54	-17.378	181	1.63	Horizontal	18.289

Table 8: Radiated Emissions 1 – 17 on the Highest Frequency



Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
20.68 GHz	53.942	74	-20.058	49	Vertical	-0.288
27.575 GHz	55.948	74	-18.052	21	Vertical	0.281
39.856 GHz	54.442	74	-19.558	119	Vertical	3.258
20.693 GHz	54.102	74	-19.898	72	Horizontal	-0.589
27.572 GHz	59.106	74	-14.894	350	Horizontal	0.342
34.463 GHz	54.361	74	-19.639	122	Horizontal	1.536

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
20.68 GHz	40.311	54	-13.689	49	Vertical	-0.288
27.575 GHz	42.155	54	-11.845	21	Vertical	0.281
39.856 GHz	38.109	54	-15.891	119	Vertical	3.258
20.693 GHz	40.349	54	-13.651	72	Horizontal	-0.589
27.572 GHz	44.919	54	-9.081	350	Horizontal	0.342
34.463 GHz	38.987	54	-15.013	122	Horizontal	1.536

Table 9: Radiated Emissions on the Lowest 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 6 dBi + Array gain of 3.01 dB which is a total of 9.01 dBi.

Results of this testing are summarized.

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	EIRP	Measured PSD
EHT 20	6895	Mcs0_Nss2	12	12.84	18.84	-1.07
EHT 20	7015	Mcs0_Nss2	11	11.54	17.54	-2.14
EHT 20	7115	Mcs0_Nss2	12	12.04	18.04	-1.29
EHT 40	6925	Mcs0_Nss2	15	15.92	21.92	-1.06
EHT 40	7005	Mcs0_Nss2	15	15.85	21.85	-1.22
EHT 40	7085	Mcs0_Nss2	15	15.08	21.08	-1.83
EHT 80	6945	Mcs0_Nss2	17	17.90	23.90	-1.90
EHT 80	7025	Mcs0_Nss2	18	18.59	24.59	-1.46
EHT 160	6985	Mcs0_Nss2	20	20.97	26.97	-1.52
EHT 320	6905	Mcs0_Nss2	22	22.96	28.96	-2.63

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	EIRP	Measured PSD
EHT 20	6895	Mcs0_Nss1	9	9.84	15.84	-4.12
EHT 20	7015	Mcs0_Nss1	9	9.55	15.55	-4.40
EHT 20	7115	Mcs0_Nss1	9	9.18	15.18	-4.32

EHT 40	6925	Mcs0_Nss1	12	12.74	18.74	-4.24
EHT 40	7005	Mcs0_Nss1	12	12.60	18.60	-4.25
EHT 40	7085	Mcs0_Nss1	12	12.15	18.15	-4.61
EHT 80	6945	Mcs0_Nss1	14	14.96	20.96	-4.86
EHT 80	7025	Mcs0_Nss1	15	15.53	21.53	-4.52
EHT 160	6985	Mcs0_Nss1	17	18.13	24.13	-4.35
EHT 320	6905	Mcs0_Nss1	20	21.08	27.08	-4.49

Result

The maximum average power spectral density was less than the limit of 5 dBm EIRP and -4.01 dBm for Nss1; 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.

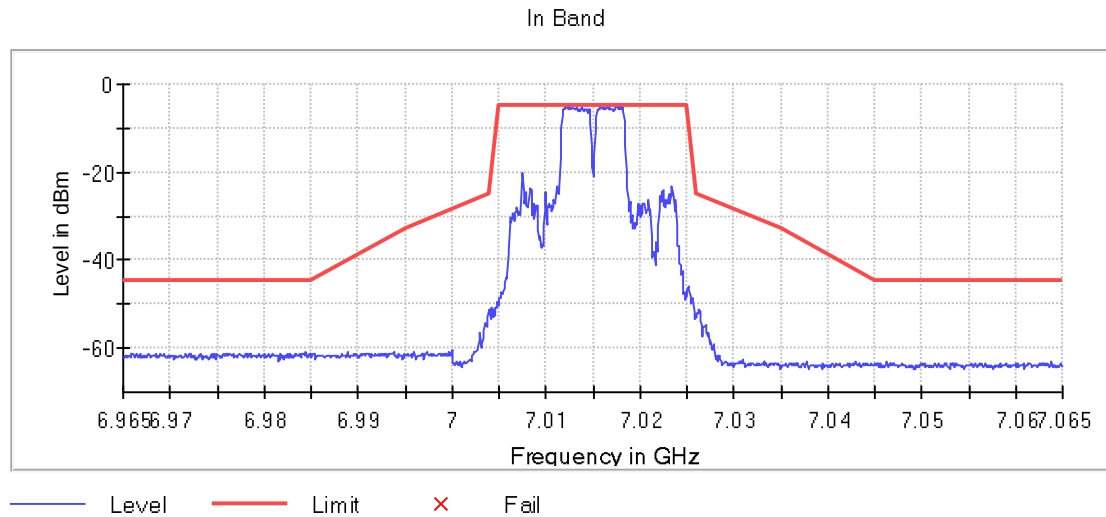


Figure 5: 7015 20MHz RU Vérification - Center

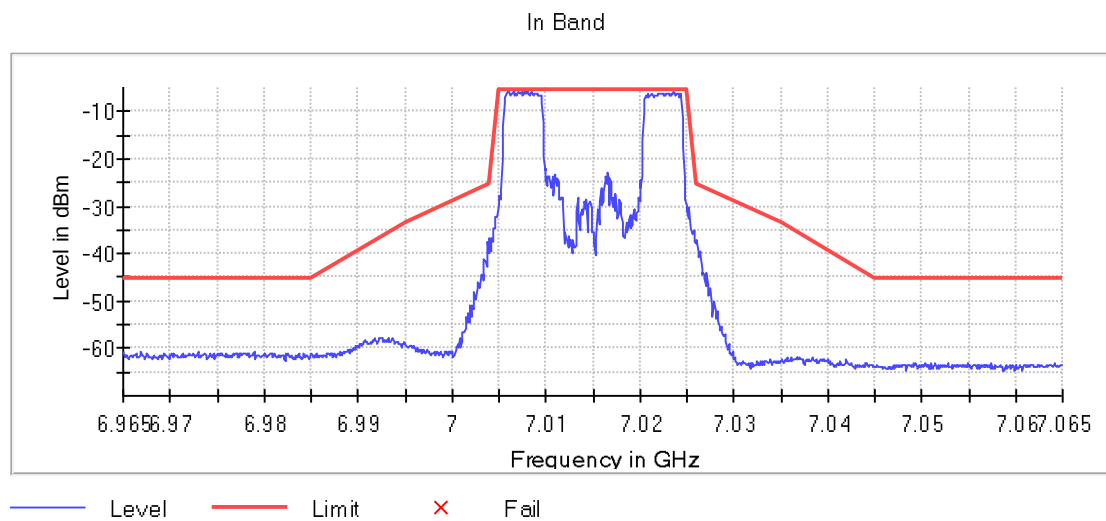


Figure 6: 7015 20MHz RU Vérification - Edge

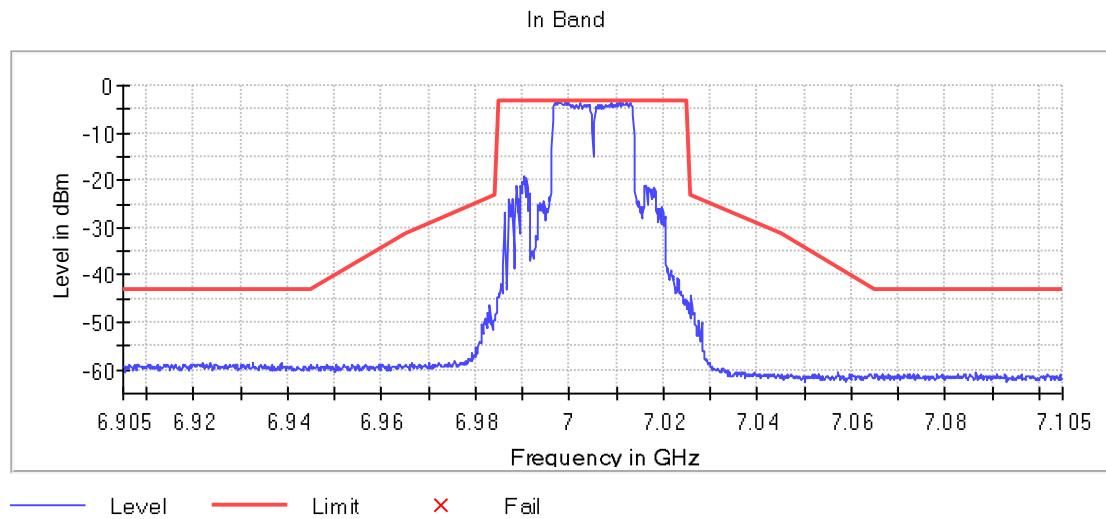


Figure 7: 7005 40MHz RU Vérification - Center

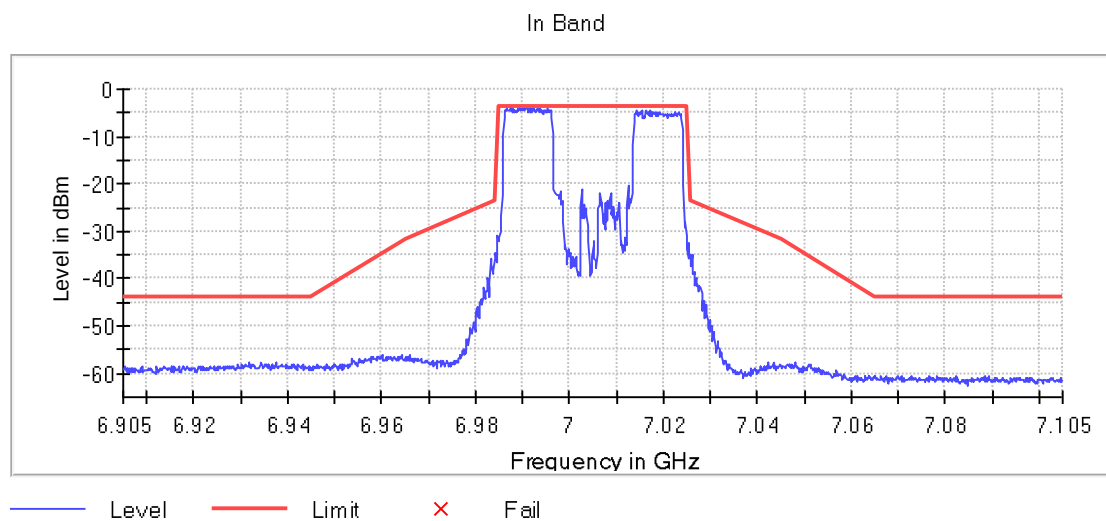


Figure 8: 7005 40MHz RU Vérification - Edge

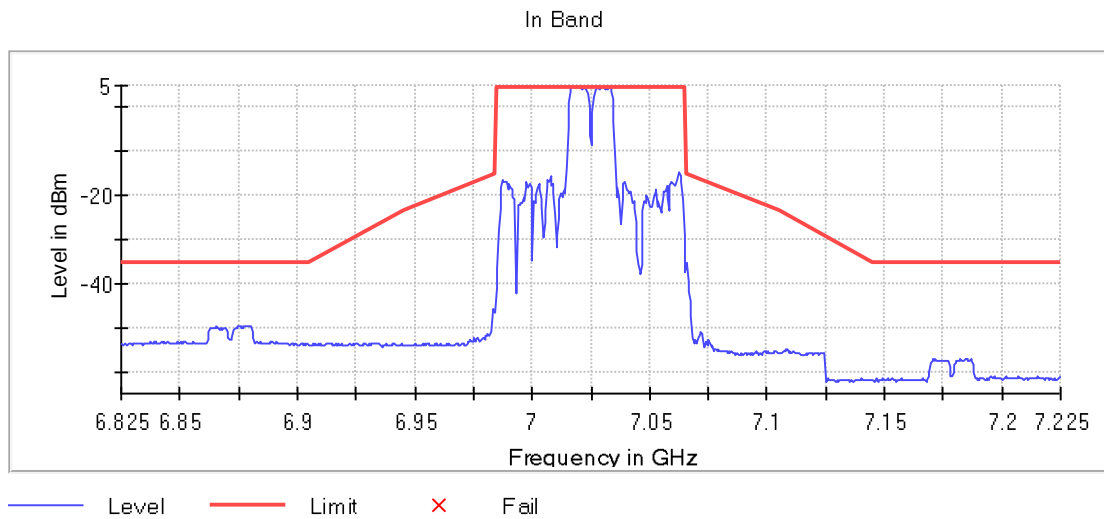


Figure 9: 7025 80MHz RU Vérification - Center

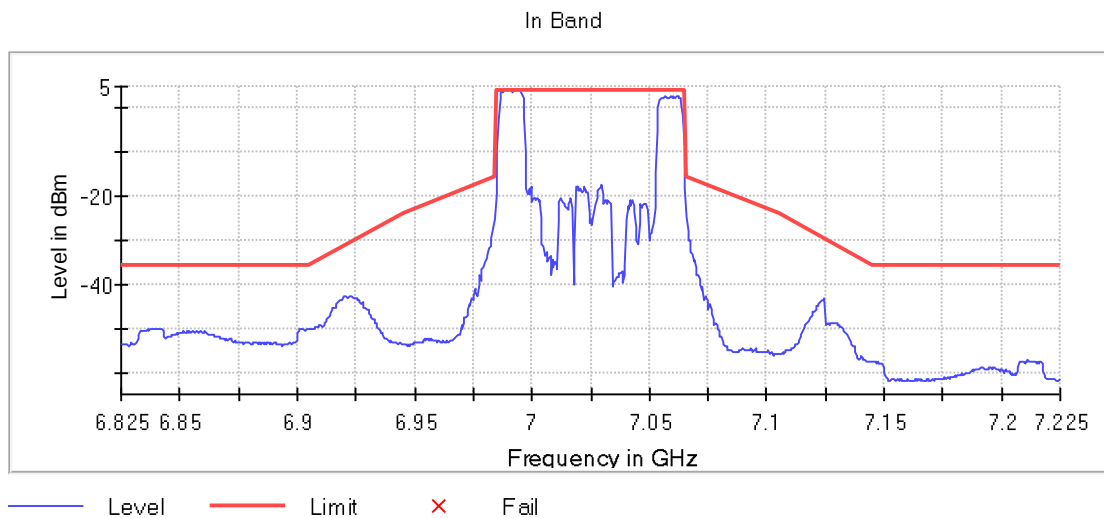


Figure 10: 7025 80MHz RU Vérification - Edge

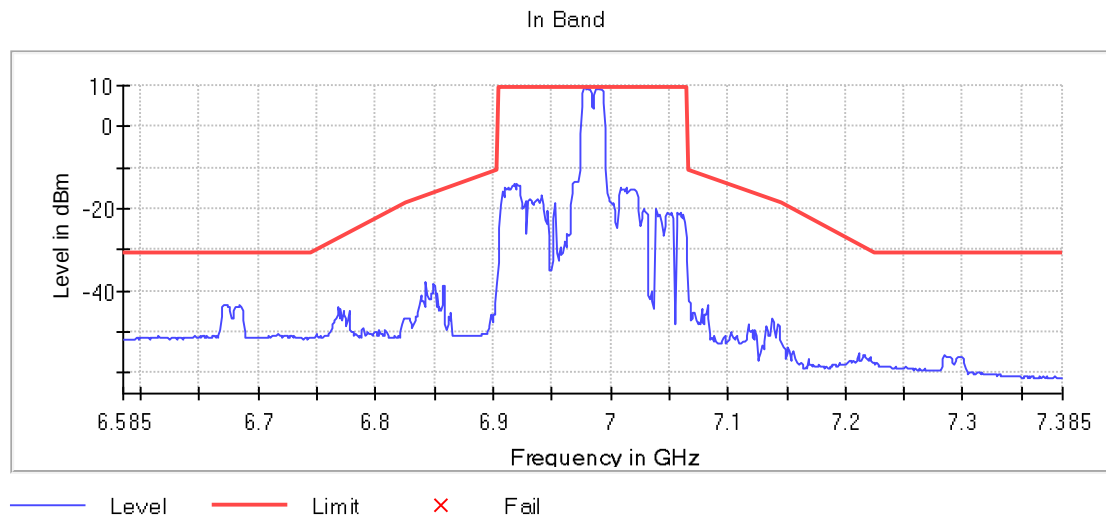


Figure 11: 6985 160MHz RU Vérification - Center

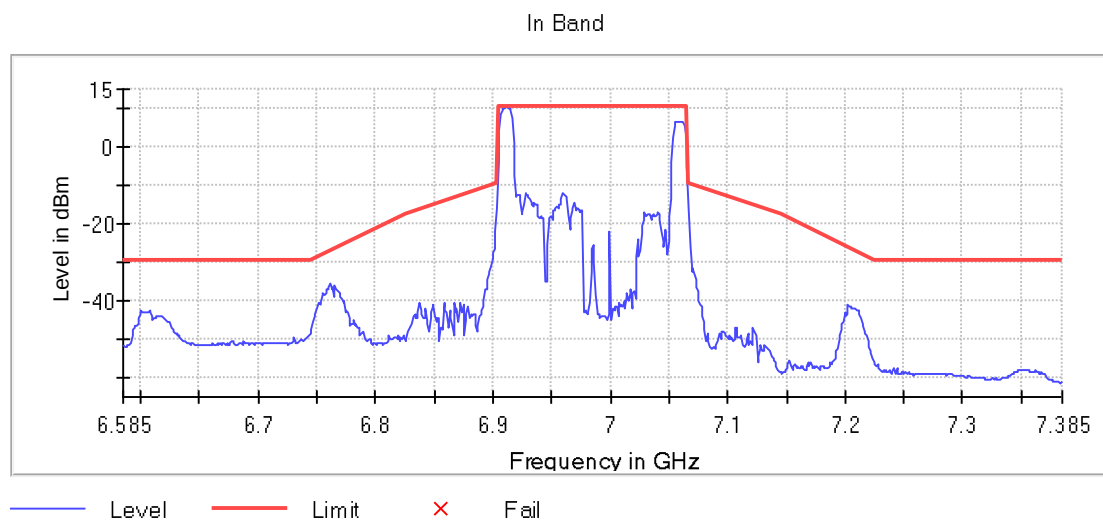


Figure 12: 6985 160MHz RU Vérification - Edge

5.7 §15.407(d) Contention Based Protocol

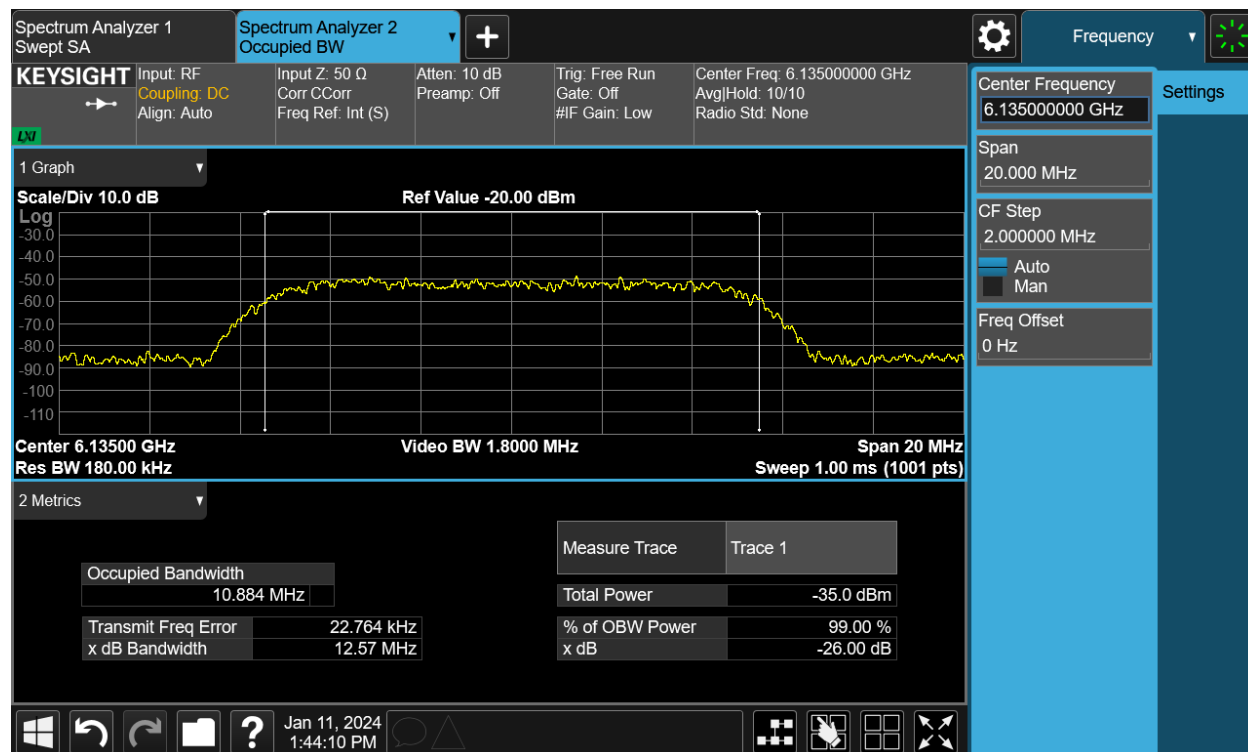
This product was tested and found to be compliant with the requirements of Contention-based Protocol as specified in FCC Part 15.407 and KDB 987594 D02.

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 of 0 dBi. The level at the signal generator required to achieve the required signal level at the DUT was recorded for use during testing.

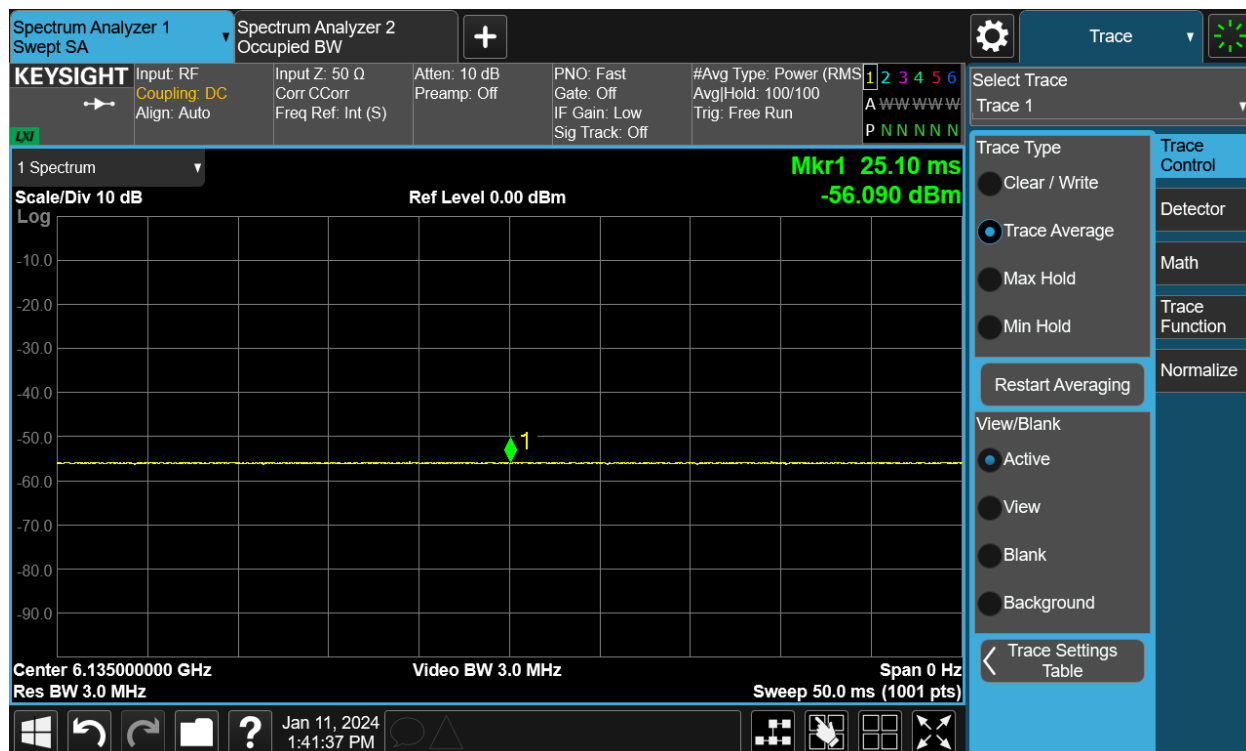
The DUT was connected as shown in figure 4 above and set to transmit at a constant duty cycle at each frequency and bandwidth noted in the table below and verified to be communicating with the companion device as intended.

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.

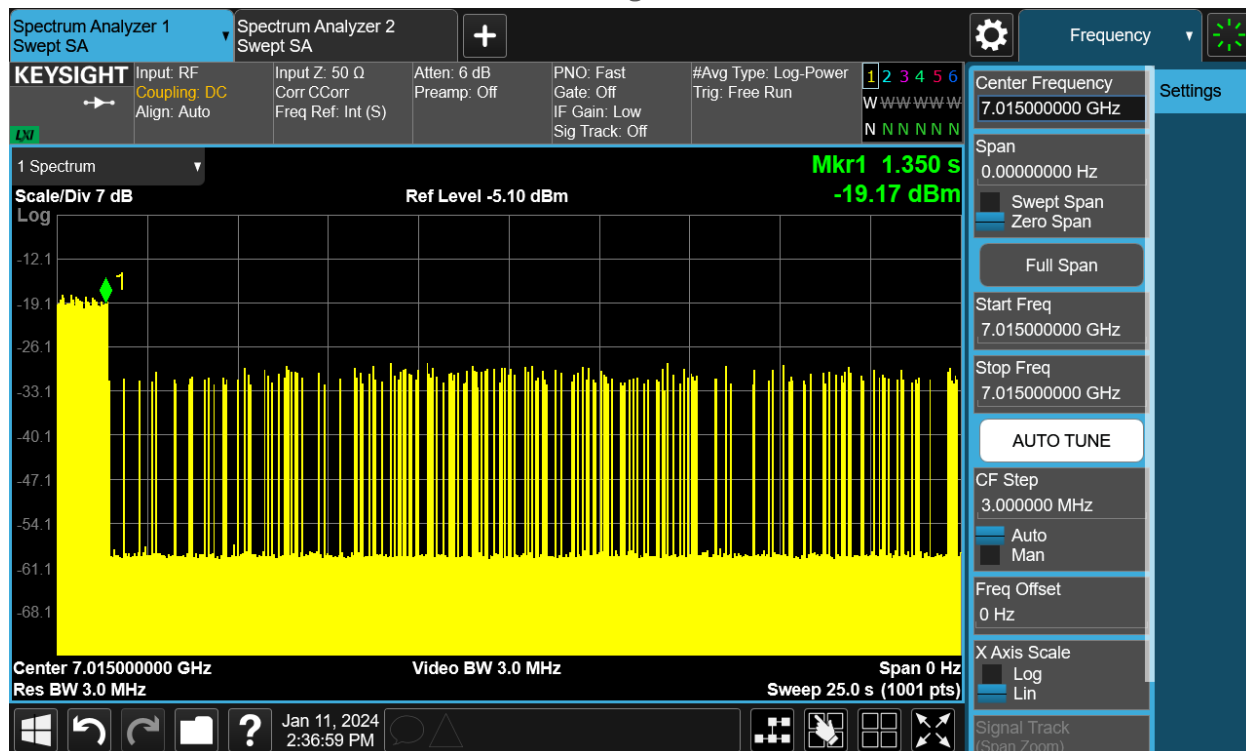
Testing shall be repeated at each applicable channel and bandwidth as noted in Table 1 of KDB 987594 D02.



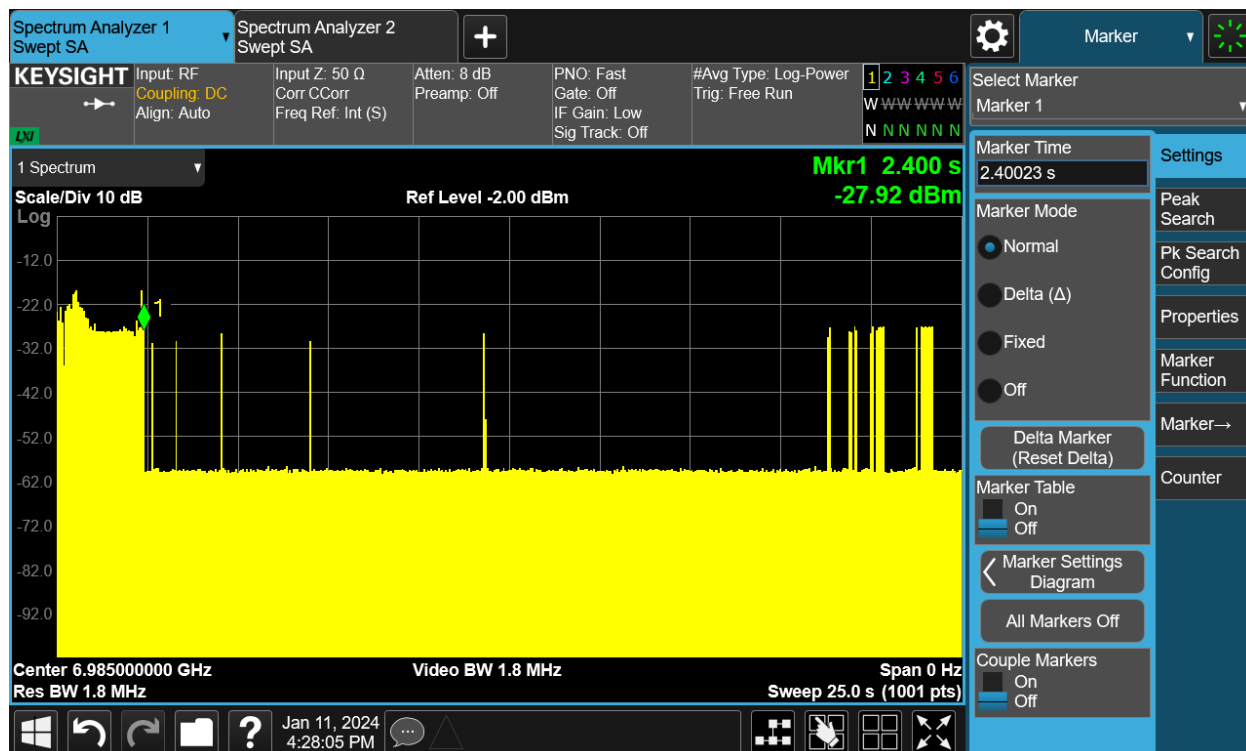
Plot 1: Signal BW Details



Plot 2: AWGN Signal Level Details



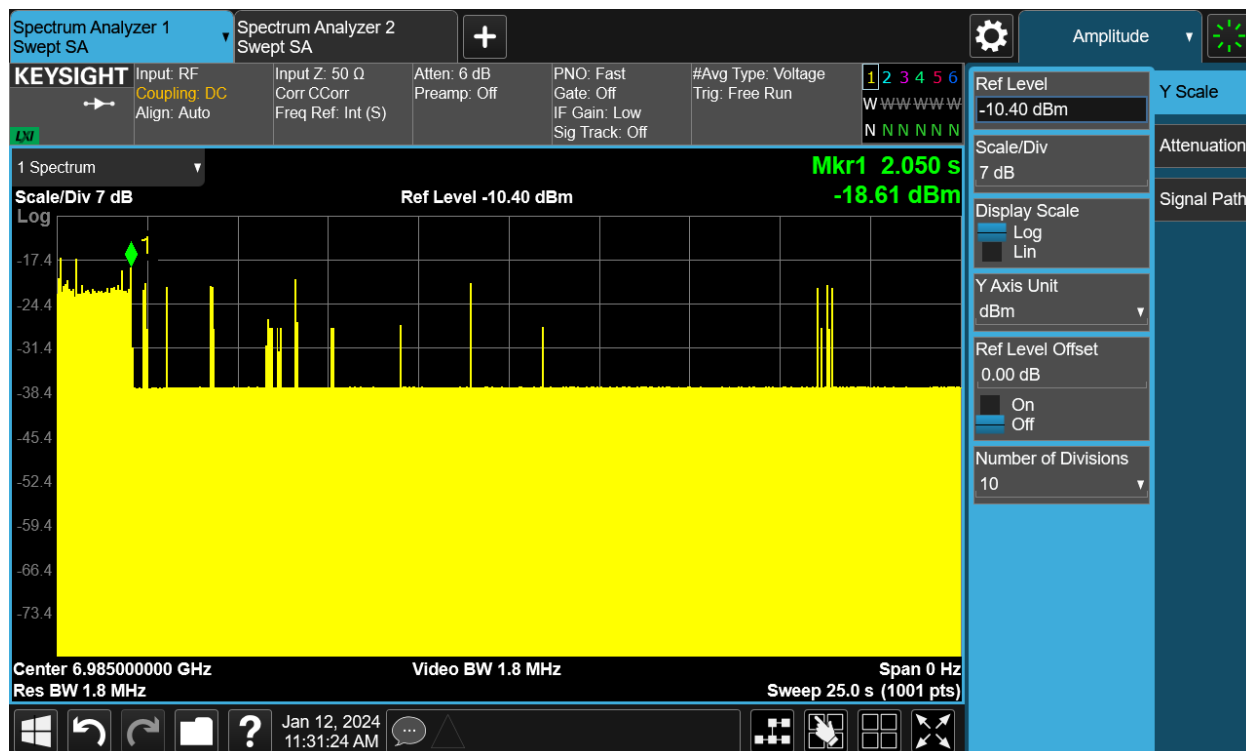
Plot 3: AWGN Signal Detection Details 20MHzBW, 7015MHz



Plot 4: AWGN Signal Detection Details 160MHzBW, 6985-6910MHz



Plot 5: AWGN Signal Detection Details 160MHzBW, 6985-6985MHz



Plot 6: AWGN Signal Detection Details 160MHzBW, 6985-7060MHz

Contention Based Protocol 987594 D02 U-NNI 6 GHz EMC Measurement

Band	BW _{EUT}	F _{c1}	F _{c2}	Signal Power Level (dBm)	Detection Rate (%)	Margin (dB)
UNII-5 5.925 - 6.425GHz	20	6135	6135	-74	100	18
			6110	-62	100	6
	160	6185	6185	-74	100	18
			6260	-61	100	5
	320	6265	6110	-63	100	7
			6265	-57	100	1
UNII-6 6.425 - 6.525GHz	20	6455	6455	-74	100	18
	160	6505	6430	-58	100	2
			6505	-74	100	18
			6580	-62	100	6
UN1I-7 6.525 - 6.875GHz	20	6695	6695	-74	100	18
	160	6665	6595	-58	100	2
			6665	-59	100	3
			6740	-68	100	12
	320	6745	6590	-67	100	11
			6745	-58	100	2
UNII-8 6.875 - 7.125GHz	20	7015	7015	-74	100	18
			6910	-59	100	3
	160	6985	6985	-60	100	4
			7060	-71	100	15

Table 10: Trial Table

Result

The EUT complies with the specification.

-- End of Test Report --