



427 West 12800 South
Draper, UT 84020

Test Report Certification

FCC ID	SWX-UDR7
ISED ID	6545A-UDR7
Equipment Under Test	UDR7
Test Report Serial Number	TR9640_02
Date of Test(s)	11 – 13, 25 September; 9 and 22 October 2024
Report Issue Date	27 December 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 with the specifications provided by the manufacturer.

Applicant	Ubiquiti Inc.
Manufacturer	Ubiquiti Inc.
Brand Name	UBIQUITI
Model Number	UDR7
FCC ID	SWX-UDR7
ISED ID	6545A-UDR7

On this 27th day of December 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. Unified Compliance laboratory is not responsible for incorrect information provided by the manufacturer.

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: Kimberly DeBole

Revision History		
Revision	Description	Date
01	Original Report Release	12/27/2024
02	Added Bandwidth Reduction Plots to Section 5.7	01/03/2025

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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	UDR7
Serial Number	168
Dimensions (cm)	11.0 x 11.0 x 18.4

2.2 Description of EUT

The UDR7 is a UniFi Desk Gateway with integrated WiFi 7 and PoE switching. The UDR7 has one 10 GbE SFP port and 4 RJ45 PoE ports. The UDR7 transmits in the 2.4 GHz, 5 GHz and 6 GHz frequency bands using internal integral antennas. The UDR7 has a Bluetooth transmitter for system management. The UDR7 is powered from 110 – 240 Volts AC Mains.

This device does not support channel puncturing.

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	TP10
		7015, 7035, 7055, 7075, 7095	TP9
		7115	TP11
	be (EHT 40)	6925, 6945, 6965, 6985, 7005, 7025, 7045, 7065	TP13
		7085	TP14
	be (EHT 80)	6945	TP15
		7025	TP16
	be (EHT 160)	6985	TP18
	be (EHT 320)	6905	TP21

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
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BN: UBIQUITI MN: UDR7 (Note 1) SN: 168	Desktop Gateway	See Section 2.4
BN: Dell MN: XPS SN: N/A	Laptop Computer	Ethernet/un-shielded Cat 5

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	2 conductor power cable to AC mains/200 cm
10 GbE SFP WAN	1	Shielded cat 5E/7m
PoE Input	4	Unshielded Cat 5E/7m

2.5 Operating Environment

Power Supply	120 Volts AC Mains
AC Mains Frequency	60 Hz
Temperature	22.2 – 23.9 °C
Humidity	21.5 – 29.5 %
Barometric Pressure	1012 mBar

2.6 Operating Modes

The UDR7 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

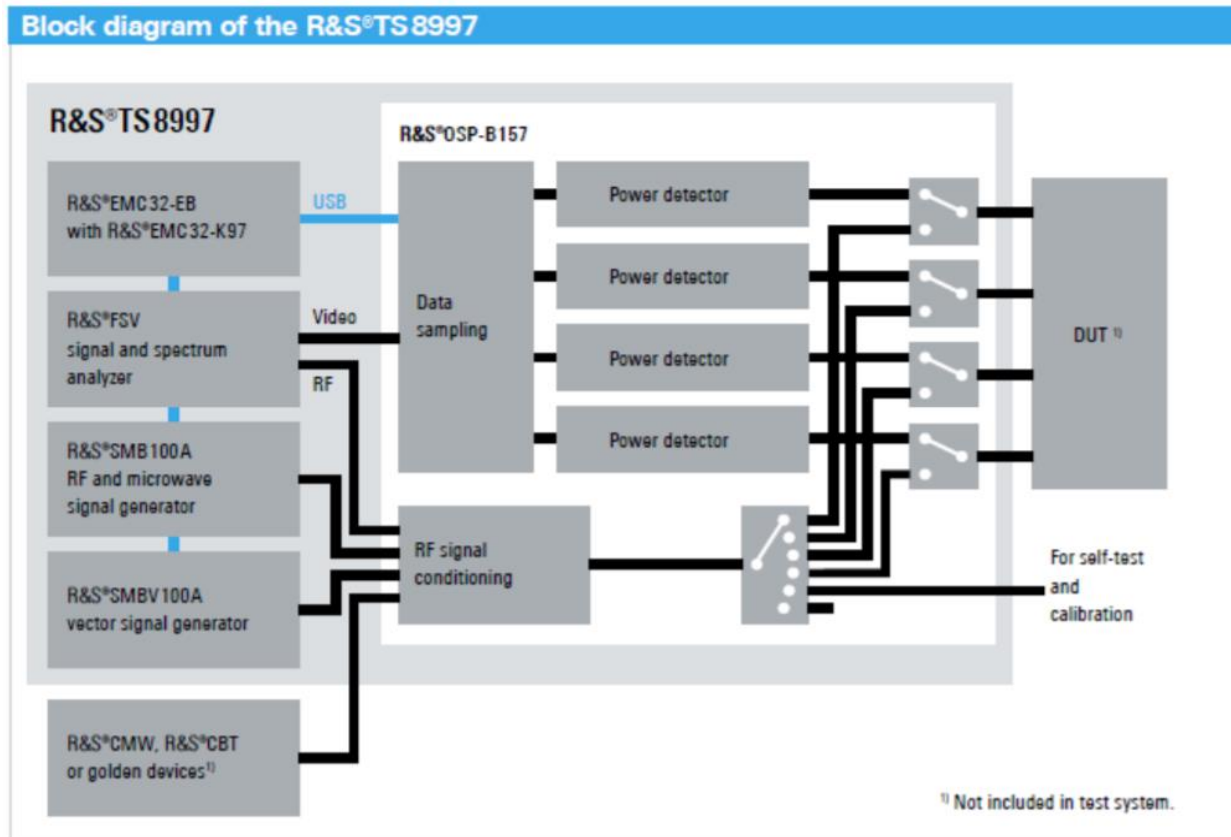


Diagram 1: Test Configuration Block Diagram

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	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 2025. 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 2025.

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	1/23/2024	2/26/2025
LISN	AFJ	LS16C/10	UCL-2512	7/08/2024	7/08/2025
ISN	Teseq	ISN T800	UCL-2974	7/09/2024	7/09/2025
LISN	AFJ	LS16C\10	UCL-6749	1/29/2024	1/29/2025
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

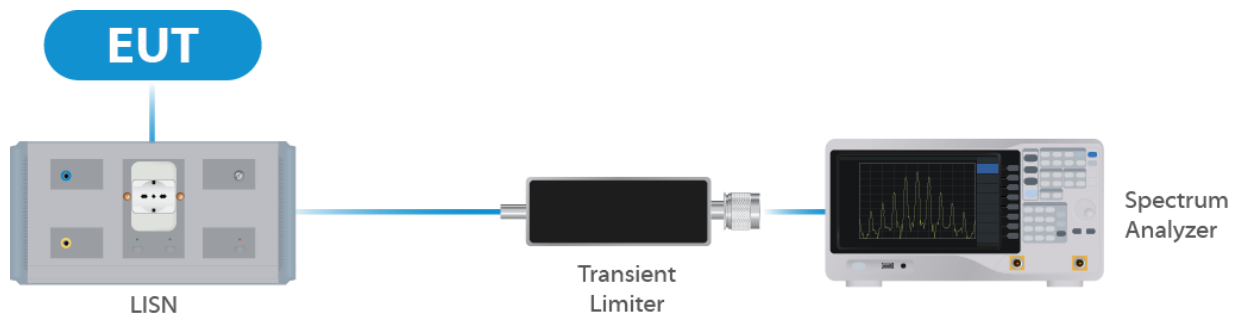


Figure 1: Conducted Emissions Test

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	12/22/2024
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	4/12/2024	4/19/2025
Switch Extension	R&S	OSP-150W	UCL-2870	4/12/2024	4/19/2025

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

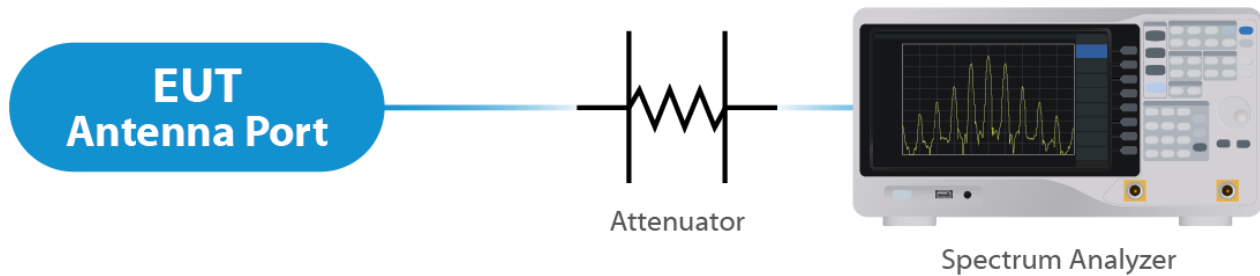


Figure 2: Direct Connect at the Antenna Port Test

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	1/25/2024	1/29/2025
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-2889	1/19/2024	1/19/2026
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3062	2/22/2023	2/22/2025
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3071	1/11/2023	1/11/2025
Double Ridge Horn Antenna	Scwarzbeck	BBHA 9120D	UCL-3065	3/10/2023	3/10/2025
Log Periodic	Scwarzbeck	STLP 9129	UCL-3068	1/27/2023	1/27/2025
15 - 40 GHz Horn Antenna	Scwarzbeck	BBHA 9170	UCL-2487	3/10/2023	3/10/2025
1 – 18 GHz Amplifier	Com-Power	PAM 118A	UCL-3833	1/19/2024	1/19/2026
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 3: List of equipment used for Radiated Emissions

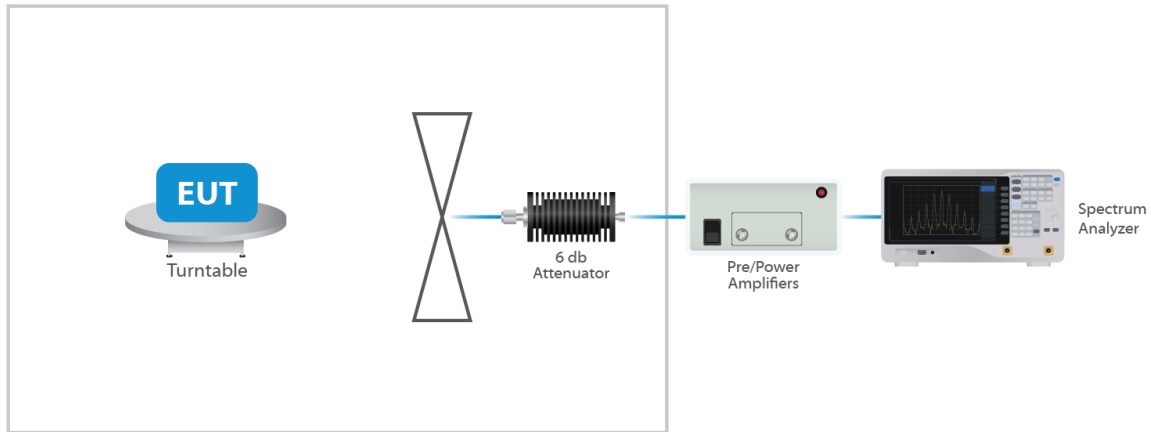


Figure 3: Radiated Emissions Test

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	5/3/2024	5/3/2025
Signal Generator	Keysight	MXG-B	UCL-6291	6/28/2024	6/22/2026
MIMO Test Set	Keysight	X8750A	UCL-7372	9/24/2024	10/07/2025

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

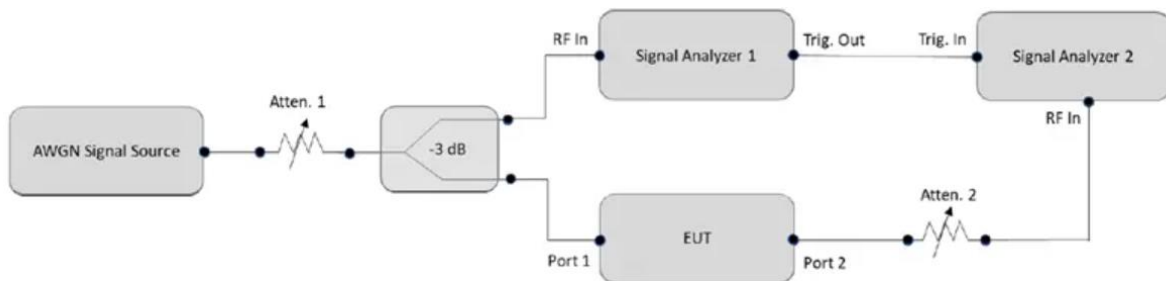


Figure 1. CBP conducted test setup diagram. Source: KDB 987594 D02 V01r01

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 integrated internal 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 $\text{NANT} \leq 4$;

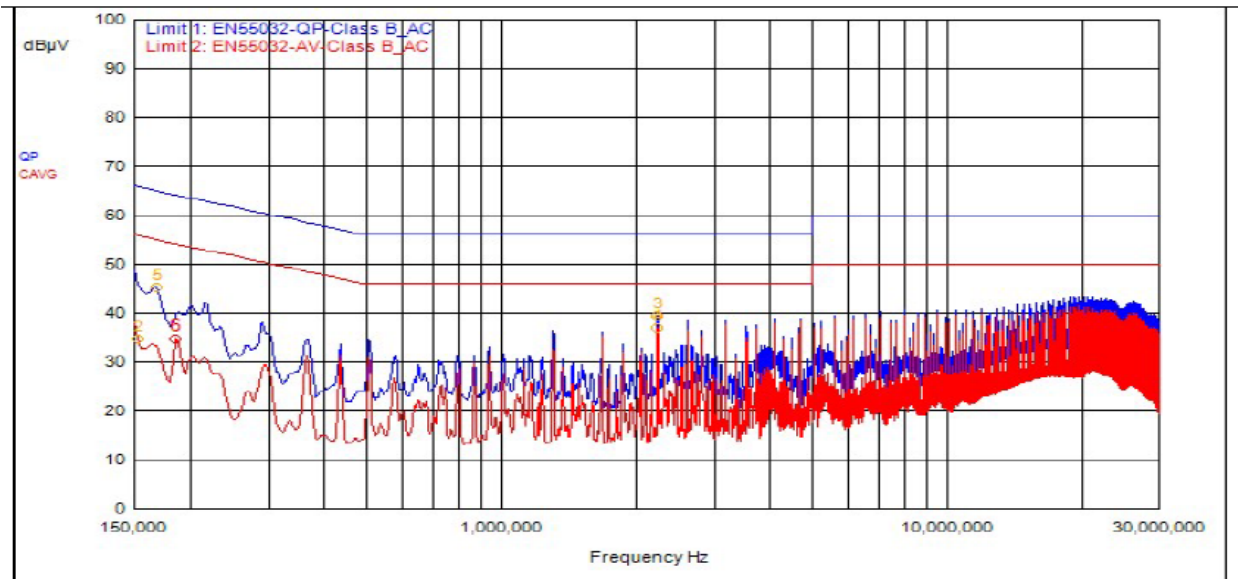
For PSD measurements when $\text{Nss}=1$: Array Gain = $10 \log(\text{NANT}/\text{NSS})$ dB + Antenna Gain (dBi). Or
 $3.01 \text{ dB} + 6 \text{ dBi} = 9.01 \text{ dBi}$.

Results

The EUT complied with the specification

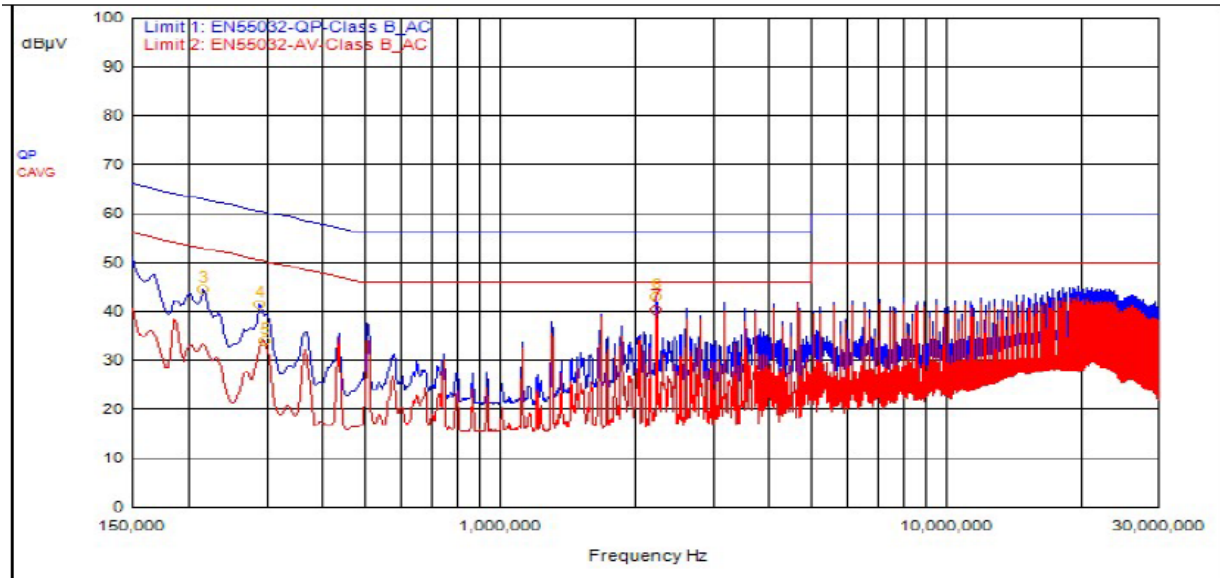
5.2 Conducted Emissions at Mains Ports Data

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
3	2.244	9.59			QPeak	29.98	39.57	56.00	-16.43			
1	150,000kHz	9.49			QPeak	39.46	48.95	66.00	-17.05			
5	168,000kHz	9.49			QPeak	35.88	45.37	65.06	-19.69			
2	153,000kHz	9.49			C_AVG	25.35	34.84			55.84	-21.00	
4	2.244	9.59			C_AVG	27.35	36.94			46.00	-9.06	
6	186,000kHz	9.49			C_AVG	25.10	34.59			54.21	-19.63	

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
6	2.244	12.26			QPeak	30.86	43.12	56.00	-12.88			
1	150,000kHz	12.21			QPeak	38.78	50.99	66.00	-15.01			
3	216,000kHz	12.29			QPeak	32.16	44.45	62.97	-18.52			
4	288,000kHz	12.38			QPeak	28.93	41.31	60.58	-19.28			
2	150,000kHz	12.21			C_AVG	28.44	40.65			56.00	-15.35	
5	297,000kHz	12.40			C_AVG	21.47	33.87			50.33	-16.45	
7	2.244	12.26			C_AVG	28.13	40.39			46.00	-5.61	

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 662911 D01. Please see associated annex for details on instrument settings.

Nominal BW (MHz)	Frequency (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
EHT 20	6895	19.5	29.2
EHT 20	7015	19.5	23.8
EHT 20	7115	19.5	23.2
EHT 40	6925	38.0	42.8
EHT 40	7005	38.3	44.1
EHT 40	7085	38.3	44.0
EHT 80	6945	77.5	87.0
EHT 80	7025	77.5	85.5
EHT 160	6985	158.0	171.0
EHT 320	6905	317.5	335.7

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 662911 D01. Please see associated annex for details on instrument settings.

The maximum average RF conducted output power measured for this device was 22.97 dBm or 198.15 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_Nss4	10	11.74	17.74	-1.48
EHT 20	7015	Mcs0_Nss4	9	10.78	16.78	-1.95
EHT 20	7115	Mcs0_Nss4	11	10.97	16.97	-2.13
EHT 40	6925	Mcs0_Nss4	13	14.69	20.69	-1.33
EHT 40	7005	Mcs0_Nss4	13	14.93	20.93	-1.02
EHT 40	7085	Mcs0_Nss4	14	14.49	20.49	-1.67
EHT 80	6945	Mcs0_Nss4	15	16.86	22.86	-1.95
EHT 80	7025	Mcs0_Nss4	16	17.52	23.52	-1.58
EHT 160	6985	Mcs0_Nss4	18	20.68	26.68	-1.69
EHT 320	6905	Mcs0_Nss4	21	22.97	28.97	-1.87

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	EIRP	Measured PSD
EHT 20	6895	Mcs0_Nss1	7	8.51	14.51	-4.92
EHT 20	7015	Mcs0_Nss1	7	8.55	14.55	-4.23
EHT 20	7115	Mcs0_Nss1	9	8.91	14.91	-4.29
EHT 40	6925	Mcs0_Nss1	10	11.34	17.34	-4.79
EHT 40	7005	Mcs0_Nss1	10	11.57	17.57	-4.52
EHT 40	7085	Mcs0_Nss1	11	11.14	17.14	-4.91

EHT 80	6945	Mcs0_Nss1	13	14.66	20.66	-4.39
EHT 80	7025	Mcs0_Nss1	13	14.44	20.44	-4.61
EHT 160	6985	Mcs0_Nss1	15	16.86	22.86	-4.75
EHT 320	6905	Mcs0_Nss1	18	20.01	26.01	-4.80

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 TP31.

Correction Factor = Antenna Factor (dBi) + Cable Loss (dB) - Pre-Amplifier Gain (dB), 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)
31.28 MHz	36.62	40	-3.38	1	1.13	Vertical	-11.05
44.62 MHz	38.42	40	-1.58	287	1.13	Vertical	-8.07
50.72 MHz	38.38	40	-1.62	7	1.13	Vertical	-8.03
53.55 MHz	35.94	40	-4.06	62	1.13	Vertical	-8.20
96.10 MHz	32.28	40	-7.72	81	1.13	Vertical	-9.60
152.35 MHz	24.69	40	-15.31	360	1.13	Vertical	-12.72
187.05 MHz	23.28	40	-16.73	359	1.13	Vertical	-10.38
338.56 MHz	34.45	47	-12.55	132	1.13	Horizontal	-5.67

Table 5: Radiated Emissions 30 – 1000 MHz

Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.98 GHz	53.70	74.0	-20.30	186	1.5	Vertical	11.04
14.93 GHz	57.13	74.0	-16.87	139	2.867	Vertical	13.72
16.99 GHz	57.77	74.0	-16.23	330	1.5	Vertical	14.59
10.94 GHz	54.85	74.0	-19.15	204	2.04	Horizontal	11.56
14.66 GHz	57.91	74.0	-16.09	215	2.292	Horizontal	14.26
16.95 GHz	56.85	74.0	-17.15	200	2.871	Horizontal	14.28

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.98 GHz	40.88	54.0	-13.12	186	1.5	Vertical	11.04
14.93 GHz	43.65	54.0	-10.35	139	2.867	Vertical	13.72
16.99 GHz	43.94	54.0	-10.06	330	1.5	Vertical	14.59
10.94 GHz	41.72	54.0	-12.28	204	2.04	Horizontal	11.56
14.66 GHz	44.70	54.0	-9.30	215	2.292	Horizontal	14.26
16.95 GHz	43.14	54.0	-10.86	200	2.871	Horizontal	14.28

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

Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.39 GHz	53.73	74.0	-20.27	226	1.5	Vertical	10.92
14.70 GHz	57.62	74.0	-16.38	121	1.714	Vertical	14.29
16.88 GHz	56.44	74.0	-17.56	356	1.714	Vertical	13.81
11.13 GHz	52.59	74.0	-21.41	110	2.813	Horizontal	10.20
14.75 GHz	58.26	74.0	-15.74	308	1.5	Horizontal	14.07
16.98 GHz	56.69	74.0	-17.31	110	1.714	Horizontal	14.52

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.39 GHz	40.86	54.0	-13.14	226	1.5	Vertical	10.92
14.70 GHz	44.73	54.0	-9.27	121	1.714	Vertical	14.29
16.88 GHz	43.12	54.0	-10.88	356	1.714	Vertical	13.81
11.13 GHz	39.61	54.0	-14.39	110	2.813	Horizontal	10.20

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
14.75 GHz	44.51	54.0	-9.49	308	1.5	Horizontal	14.07
16.98 GHz	43.70	54.0	-10.30	110	1.714	Horizontal	14.52

Table 7: Radiated Emissions 1 – 17 GHz at the Middle Frequency

Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.93 GHz	54.95	74.0	-19.05	88	1.5	Vertical	11.67
14.67 GHz	57.68	74.0	-16.32	279	1.714	Vertical	14.28
16.97 GHz	56.93	74.0	-17.07	287	2.287	Vertical	14.43
11.47 GHz	53.86	74.0	-20.14	120	1.5	Horizontal	10.50
15.06 GHz	57.01	74.0	-16.99	312	1.714	Horizontal	13.32
16.95 GHz	56.66	74.0	-17.34	37	2.867	Horizontal	14.27

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.93 GHz	41.69	54.0	-12.31	88	1.5	Vertical	11.67
14.67 GHz	44.62	54.0	-9.38	279	1.714	Vertical	14.28
16.97 GHz	43.66	54.0	-10.34	287	2.287	Vertical	14.43
11.47 GHz	40.69	54.0	-13.31	120	1.5	Horizontal	10.50
15.06 GHz	43.64	54.0	-10.36	312	1.714	Horizontal	13.32
16.95 GHz	43.01	54.0	-10.99	37	2.867	Horizontal	14.27

Table 8: Radiated Emissions 1 – 17 GHz at the Highest Frequency

Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
28.06 GHz	58.02	74.0	-15.98	51	Vertical	2.37
35.06 GHz	59.66	74.0	-14.34	320	Vertical	6.07
28.06 GHz	56.98	74.0	-17.02	17	Horizontal	2.38
35.07 GHz	62.35	74.0	-11.65	1	Horizontal	5.98

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
28.06 GHz	51.43	54.0	-2.57	51	Vertical	2.37

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
35.06 GHz	45.61	54.0	-8.39	320	Vertical	6.07
28.06 GHz	44.25	54.0	-9.75	17	Horizontal	2.38
35.07 GHz	47.75	54.0	-6.25	1	Horizontal	5.98

Table 9: Radiated Emissions 17 – 40 GHz at the Middle 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 662911 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 9.01dBi.

Results of this testing are summarized.

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	Measured PSD
EHT 20	6895	Mcs0_Nss4	10	11.74	-1.48
EHT 20	7015	Mcs0_Nss4	9	10.78	-1.95
EHT 20	7115	Mcs0_Nss4	11	10.97	-2.13
EHT 40	6925	Mcs0_Nss4	13	14.69	-1.33
EHT 40	7005	Mcs0_Nss4	13	14.93	-1.02
EHT 40	7085	Mcs0_Nss4	14	14.49	-1.67
EHT 80	6945	Mcs0_Nss4	15	16.86	-1.95
EHT 80	7025	Mcs0_Nss4	16	17.52	-1.58
EHT 160	6985	Mcs0_Nss4	18	20.68	-1.69
EHT 320	6905	Mcs0_Nss4	21	22.97	-1.87

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	Measured PSD
EHT 20	6895	Mcs0_Nss1	7	8.51	-4.92
EHT 20	7015	Mcs0_Nss1	7	8.55	-4.23

EHT 20	7115	Mcs0_Nss1	9	8.91	-4.29
EHT 40	6925	Mcs0_Nss1	10	11.34	-4.79
EHT 40	7005	Mcs0_Nss1	10	11.57	-4.52
EHT 40	7085	Mcs0_Nss1	11	11.14	-4.91
EHT 80	6945	Mcs0_Nss1	13	14.66	-4.39
EHT 80	7025	Mcs0_Nss1	13	14.44	-4.61
EHT 160	6985	Mcs0_Nss1	15	16.86	-4.75
EHT 320	6905	Mcs0_Nss1	18	20.01	-4.80

Result

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

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.

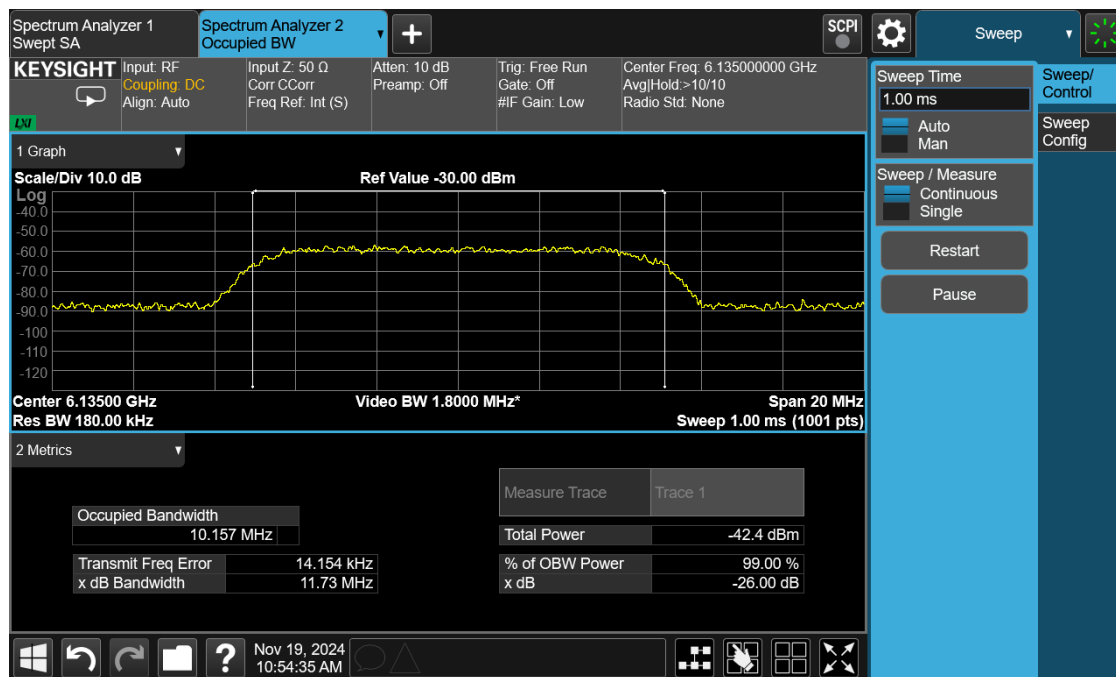
Initially the test setup was connected directly to the signal source with all splitters (splitters terminated with a 50-ohm loads on unused ports) and cables in place to verify the AWGN signal is 10MHz wide at a signal level of less than or equal to -62dBm and for conducted measurements the threshold was adjusted for an antenna gain of 6 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. This device supports bandwidth reduction.

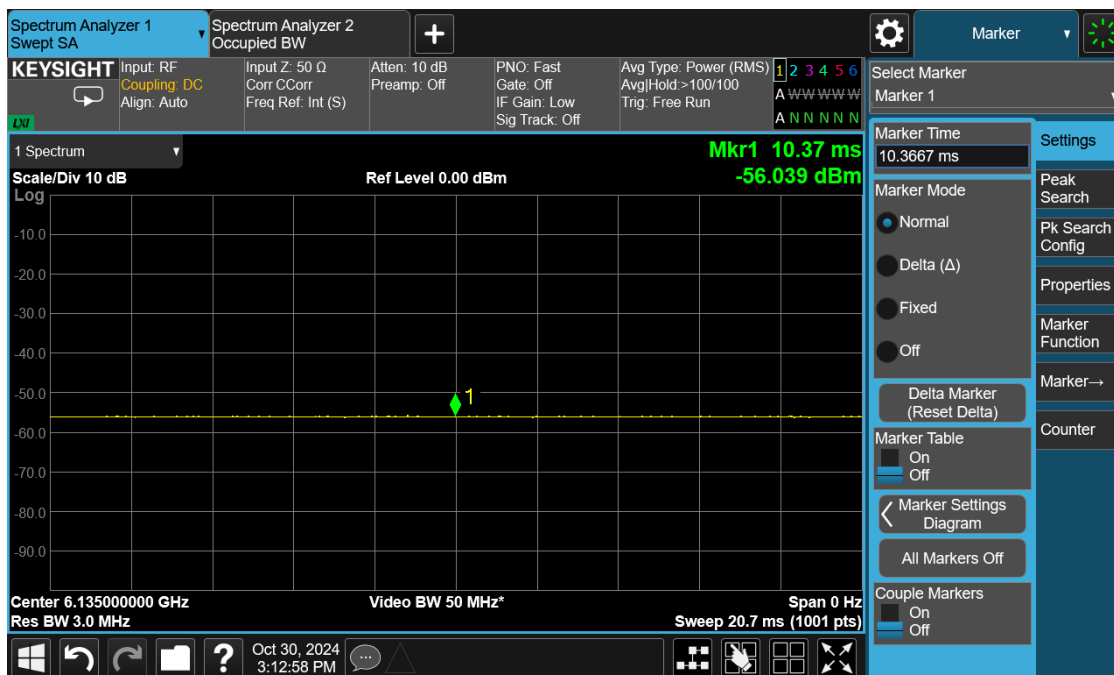
Starting at the levels established above, the AWGN signal was introduced to the DUT and increased to determine a threshold level at where the DUT will terminate with at least a 90% detection rate. The level at the DUT, which the 90% detection rate was achieved was recorded as the “Sensitivity Level”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

Any measurement below the sensitivity level will result in the Tx minimal and any further measurement below the sensitivity level will result in Tx on.

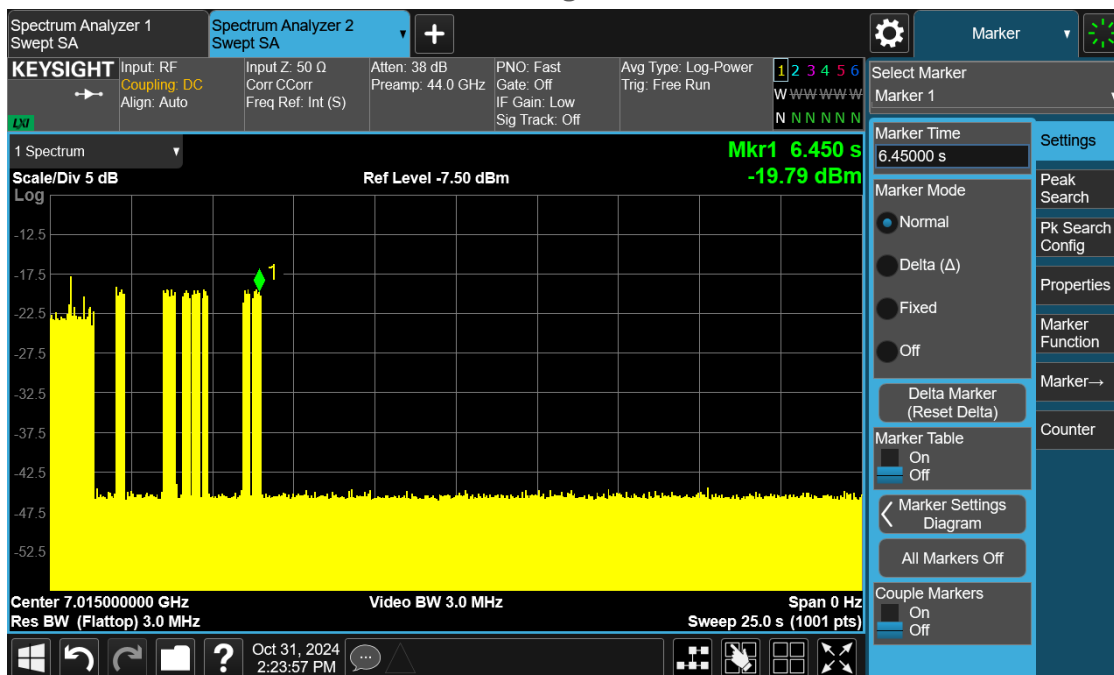
Testing shall be repeated at each applicable channel and bandwidth as noted in Table 1 of KDB 987594 D02.



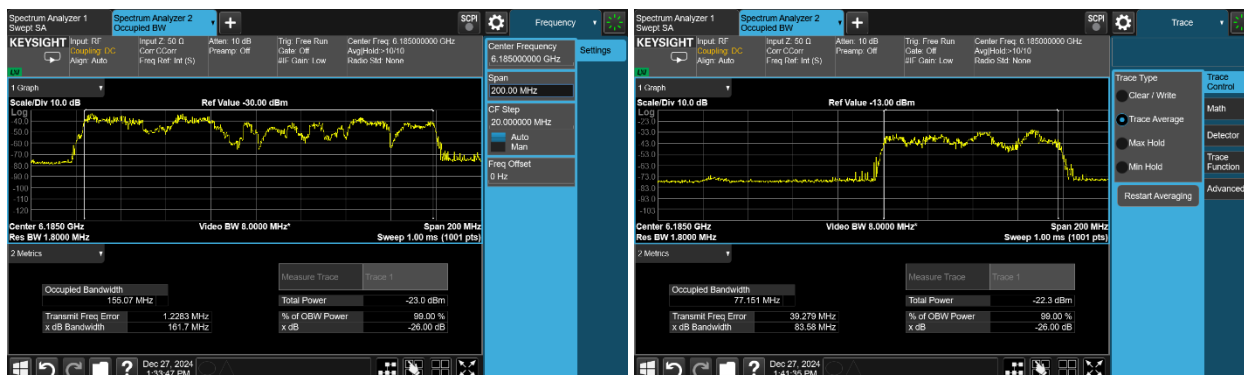
Plot 1: AWGN Signal BW Details



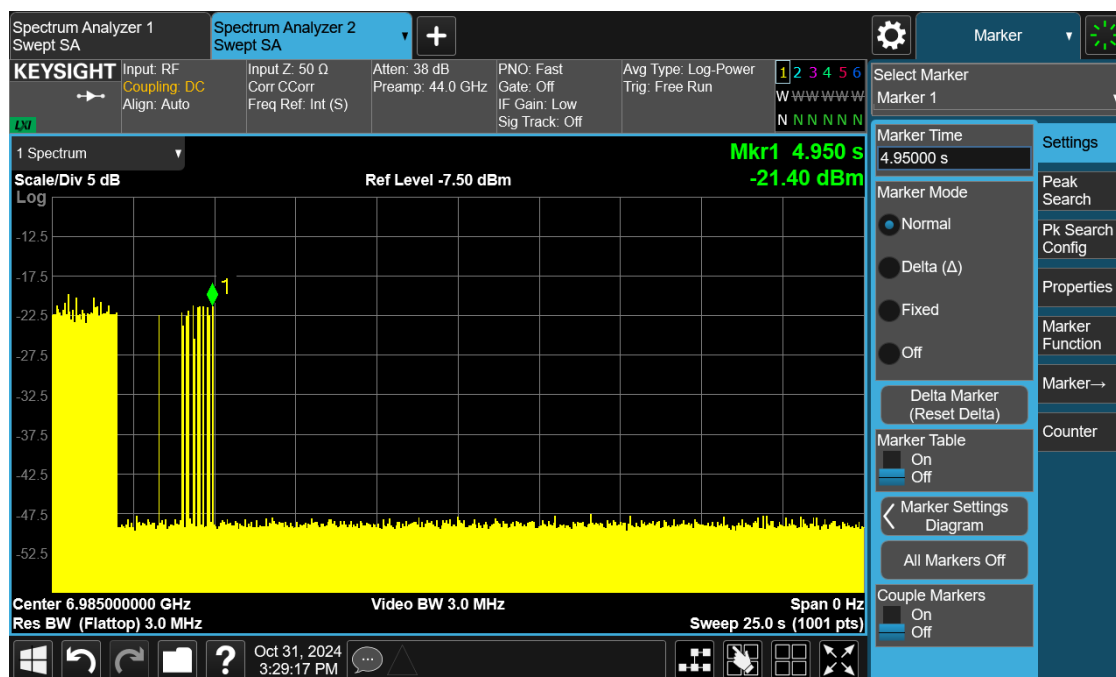
Plot 2: AWGN Signal Level Details



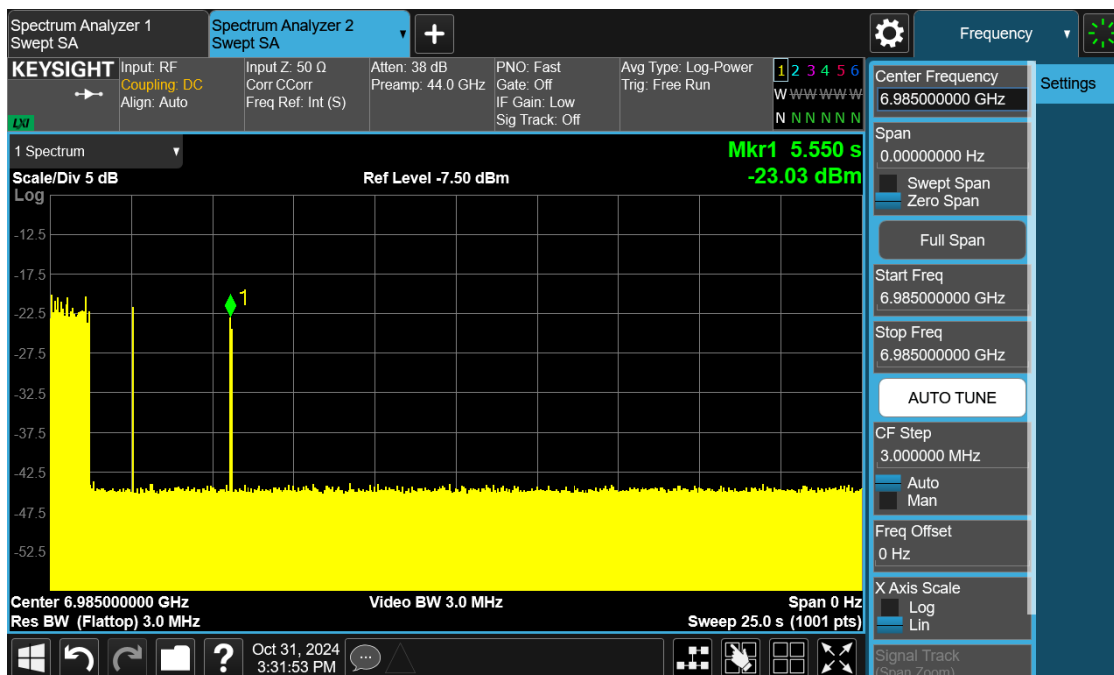
Plot 3: AWGN Signal Detection 20MHz



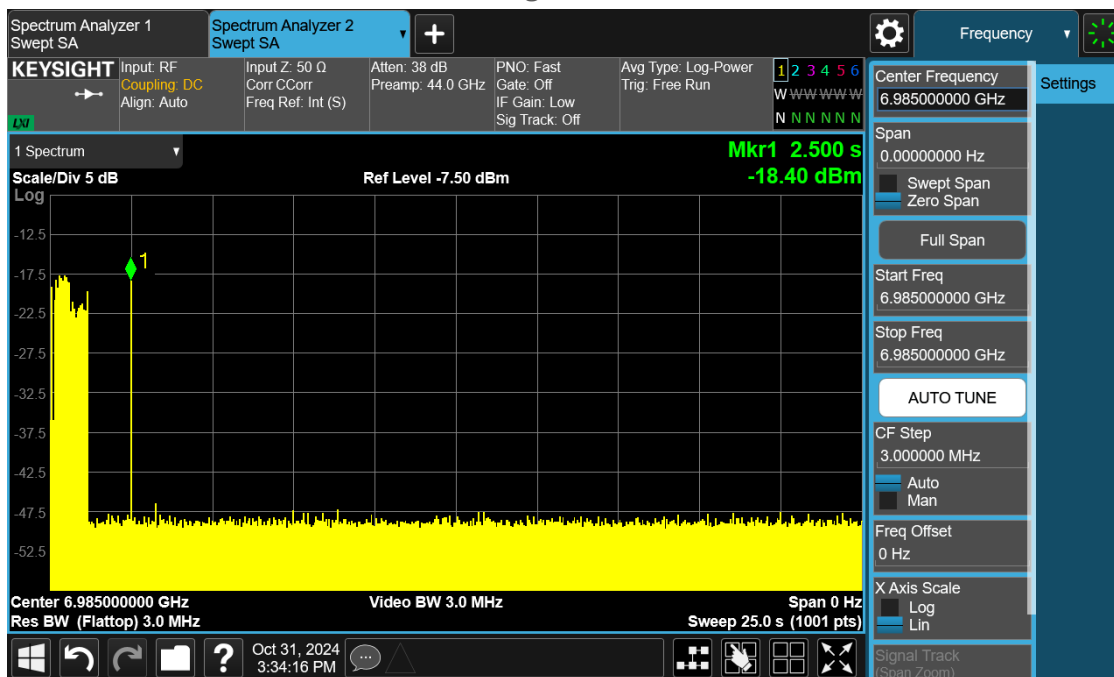
Plot 4: EUT 160MHz Transmission and Bandwidth Reduction (Example)



Plot 5: AWGN Signal Detection 160MHz



Plot 6: AWGN Signal Detection 160MHz



Plot 7: AWGN Signal Detection 160MHz

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

Band	BW _{EUT}	F _{c1}	F _{c2}	EU Tx Minimal (dBm)	AWGN Power (dBm)	Adjusted Power (dBm)	Limit (dBm)	Margin (dB)
UNII-5 5.925 - 6.425GHz	20	6135	6135	-60	-55	-74	-56	18
	160	6185	6110	-43	-41	-60	-56	4
			6185	-41	-38	-57	-56	1
			6260	-45	-40	-59	-56	3
	320	6105	5965	-40	-38	-57	-56	1
			6105	-66	-65	-84	-56	28
			6255	-65	-60	-79	-56	23
UNII-6 6.425 - 6.525GHz	20	6455	6455	-55	-38	-57	-56	1
	160	6505	6430	-41	-39	-58	-56	2
			6505	-42	-40	-59	-56	3
			6580	-45	-42	-61	-56	5
UN11-7 6.525 - 6.875GHz	20	6695	6695	-45	-42	-61	-56	5
	160	6665	6595	-41	-39	-58	-56	2
			6665	-39	-38	-57	-56	1
			6740	-41	-39	-58	-56	2
	320	6745	6590	-46	-45	-64	-56	8
			6745	-56	-55	-74	-56	18
UNII-8 6.875 - 7.125GHz	20	7015	6745	-56	-55	-74	-56	18
			6860	-56	-55	-74	-56	18
	160	6985	6910	-40	-38	-57	-56	1
			6985	-41	-39	-58	-56	2
			7060	-40	-39	-58	-56	2

Table 10: Trial Table

CBP Path Loss is – 22 dB

Detection Level = Injected AWGN Power (dBm) – Antenna Gain (dbi) + Path Loss (dB)

Result

The EUT complies with the specification.

-- End of Test Report --