UNIFIED COMPLIANCE LABORATORY

427 West 12800 South
Draper, UT 84020

Test Report

Certification

FCC ID	SWX-U7PROM
ISED ID	6545A-U7PROM
Equipment Under Test	U7-Pro-Max
Test Report Serial Number	TR8822_01
Date of Tests	9-10, 17 January; 5 February; 6 – 7 March 2024
Report Issue Date	12 March 2024

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

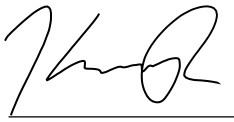
This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart E. This report may be reproduced in full. Partial reproduction of this report may only be made with 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-Max
FCC ID	SWX-U7PROM
IC ID	6545A-U7PROM

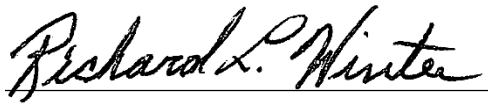
On this 13th day of February 2024, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete and correct to the best of my knowledge and are made in good faith.

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: Kimberly Rodriguez



Reviewed By: Richard L. Winter

Revision History		
Revision	**Description**	**Date**
01	Original Report Release	12 March 2024

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-Max
Serial Number	1FB64B
Dimensions (cm)	20.6 x 20.6 x 4.6

2.2 Description of EUT

The U7-Pro-Max is a PoE powered WiFi 7 access point with a 2.5 GbE PoE port. The U7-Pro-Max provides a 12.2 Gbps aggregate throughput rate. The U7-Pro-Max transmits in the 2.4 GHz, 5 GHz, and 6 GHz frequency bands and uses integral antennas and a dedicated spectral scanning radio. The U7-Pro-Max is powered by an 802.3at PoE power adapter. The U7-Pro-Max has a receiver York Scanner Module.

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-7	be (EHT20)	6535	TP10
		5595	TP10
		6875	TP10
	be (EHT40)	6525	TP13
		6685	TP13
		6885	TP13
	be (EHT80)	6545	TP16
		6705	TP16
		6865	TP16
	be (EHT160)	6505	TP18
		6665	TP19
		6825	TP19
	be (EHT320)	6585	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
BN: UBIQUITI MN: U7-Pro-Max SN: 1FB64B	Access Point	PoE Input / Shielded Cat 5E cable
BN: UBIQUITI MN: GP-h480-065G SN: N/A	PoE Injector	PoE Output / Shielded Cat 5E to U7-Pro-Max, and Ethernet / unshielded Cat 5E to PC
BN: DELL MN: XPS SN: N/A	Laptop PC	Ethernet / un-shielded Cat 5E

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
PoE Input	1	7m Shielded Cat 5E
PoE Output (PoE Injector)	1	7m Shielded Cat 5E to U7-Pro-Max PoE Input
LAN (PoE Injector)	1	unshielded Cat 5E to Laptop PC
AC (PoE Injector)	1	3 Conductor power cord to AC mains/80cm

2.5 Operating Environment

Power Supply	120 VAC
AC Mains Frequency	60 Hz
Temperature	20.6 – 23.3 °C
Humidity	14.24 – 23.86 %
Barometric Pressure	1024 mBar

2.6 Operating Modes

The U7-Pro-Max 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

802.11ax were investigated. All measurements are reported with the worst-case mode (802.11ax) 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

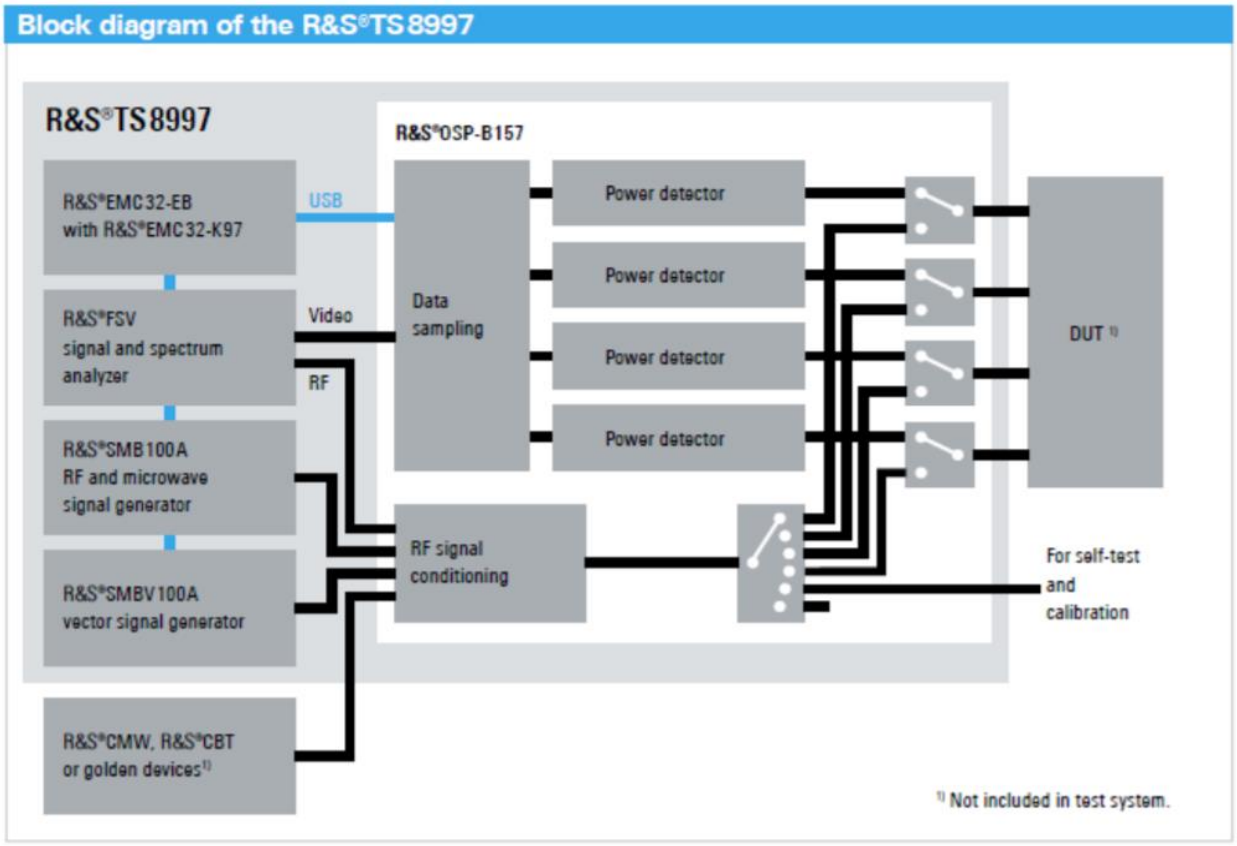


Diagram 1: Test Configuration Block Diagram

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	6535 to 6885	Compliant
15.407(e)	RSS-247 §6.2.2, §6.2.3	Peak Output Power[1]	6535 to 6885	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 6885	Compliant
15.407(d)	RSS-247 §6.2.2, §6.2.3	Contention Based Protocol	6535 to 6885	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 chamber 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	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

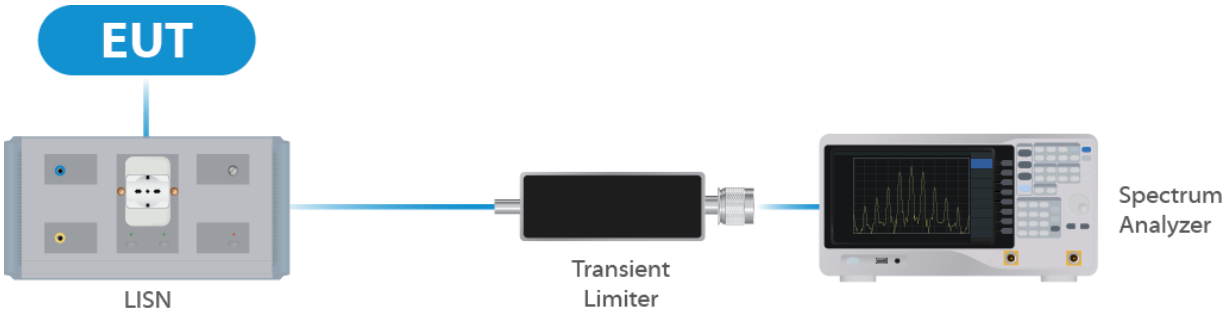


Figure 1: Conducted Emissions Test

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	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

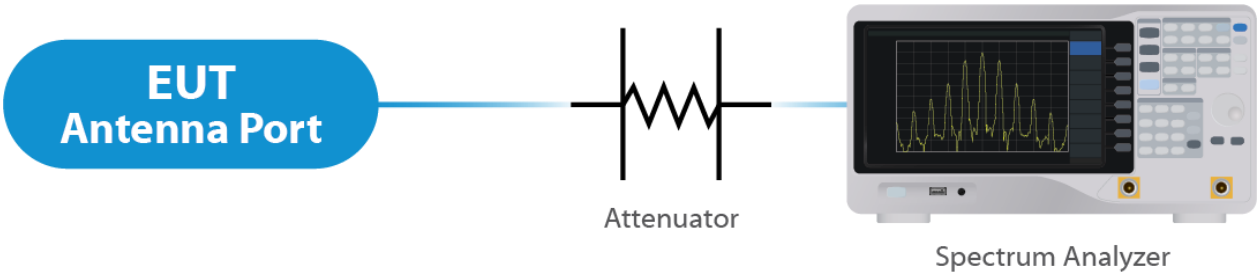


Figure 2: Direct Connect at the Antenna Port Test

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	1/25/2024	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	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	1/27/2023	1/27/2025
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	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

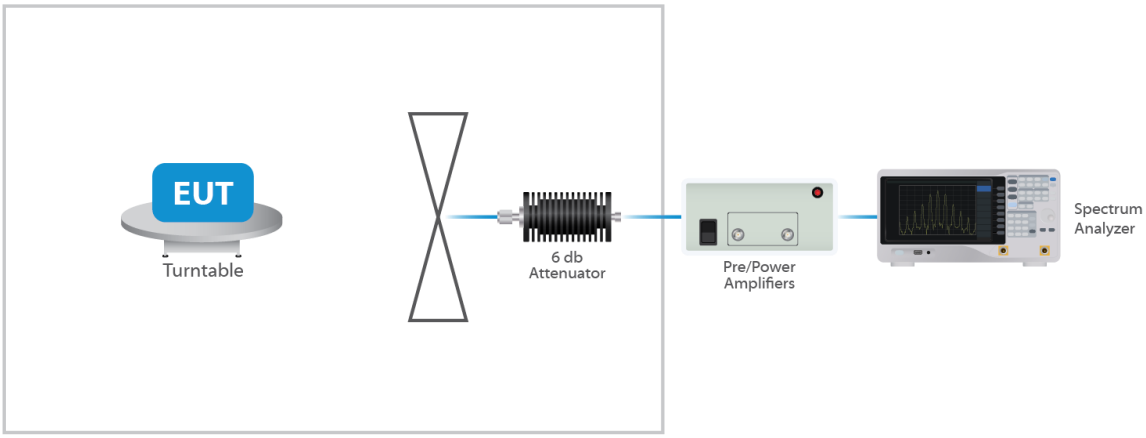


Figure 3: Radiated Emissions Test

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	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

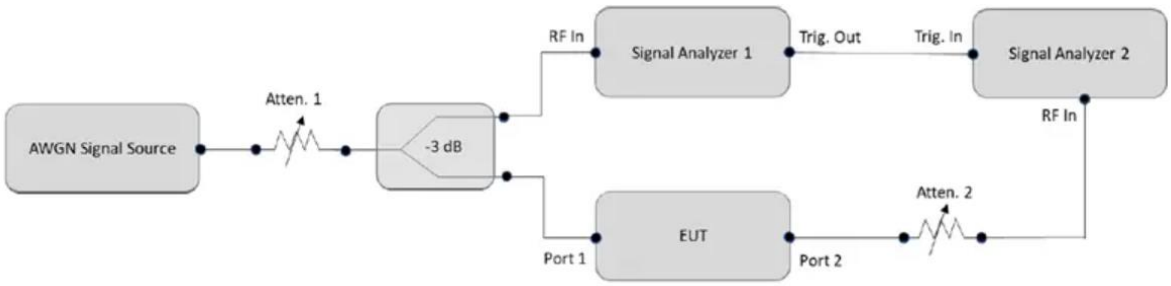


Figure 1. CBP conducted test setup diagram. Source: KDB 987594 D02 V01r01

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 structure. Per the manufacturer, the Maximum gain of the antenna per chain is 5.9 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(NANT/NSS) dB
NANT = number of transmit antennas and
NSS = number of spatial streams. NSS = 1 considered worst case.

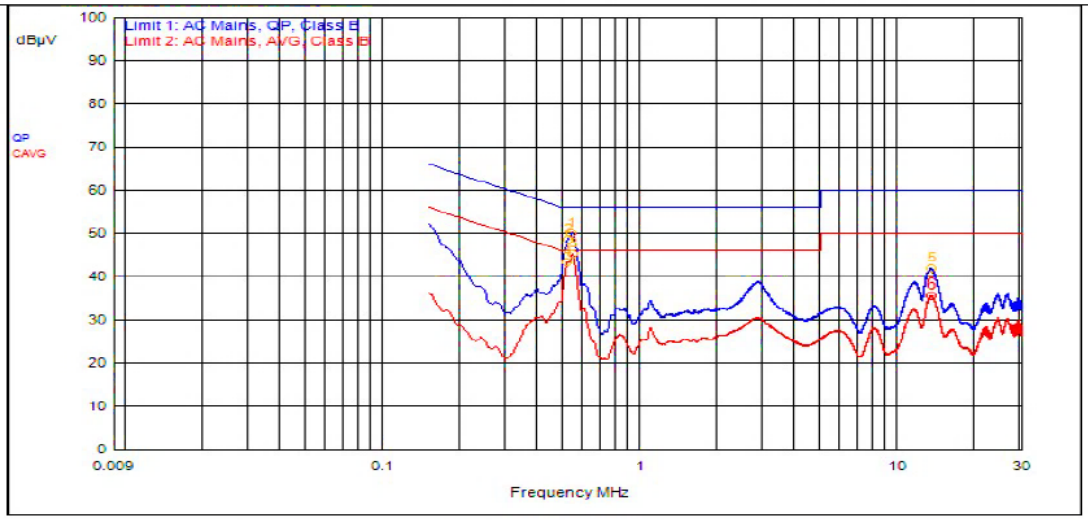
For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for NANT ≤ 4;
For PSD measurements when Nss=1: Array Gain = 10 log(NANT/NSS) dB + Antenna Gain (dBi). Or 3.01 dB + 5.9 dBi = 8.91 dBi.

Results

The EUT complied with the specification.

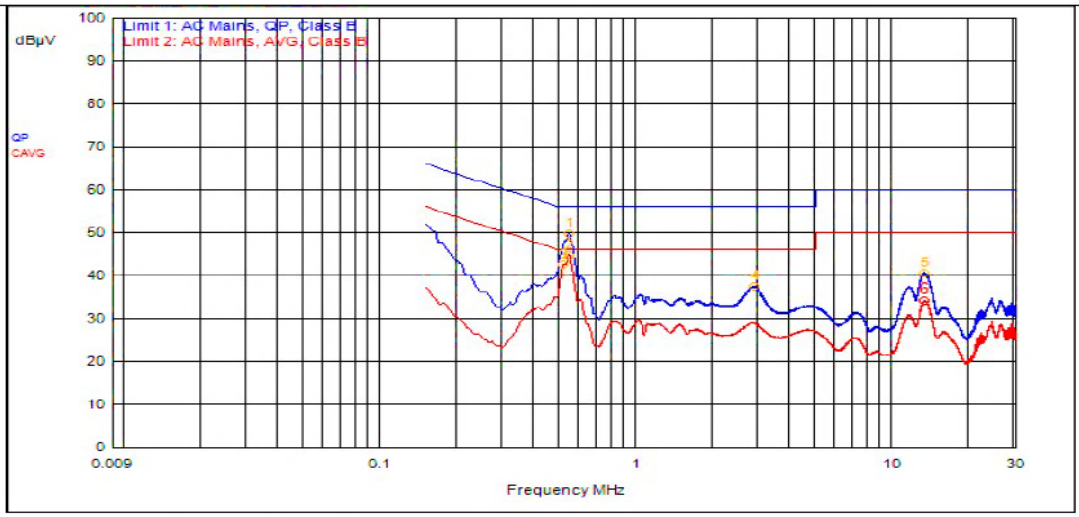
5.2 Conducted Emissions at Mains Ports Data

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	537,000kHz	12.41	0.00		QPeak	37.70	50.11	56.00	-5.89			
2	519,000kHz	12.42	0.00		QPeak	36.28	48.70	56.00	-7.30			
5	13.263	12.40	0.20		QPeak	29.24	41.84	60.00	-18.16			
3	540,000kHz	12.41	0.00		C_AVG	32.82	45.23			46.00	-0.77	
4	516,000kHz	12.42	0.00		C_AVG	30.97	43.39			46.00	-2.61	
6	13.320	12.41	0.20		C_AVG	22.93	35.54			50.00	-14.46	

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	540,000kHz	12.42	0.00		QPeak	37.28	49.70	56.00	-6.30			
4	2.862	12.29	0.10		QPeak	25.08	37.47	56.00	-18.53			
5	13.215	12.43	0.20		QPeak	28.02	40.65	60.00	-19.35			
2	543,000kHz	12.42	0.00		C_AVG	32.44	44.86			46.00	-1.14	
3	516,000kHz	12.43	0.00		C_AVG	30.17	42.60			46.00	-3.40	
6	13.200	12.42	0.20		C_AVG	21.42	34.04			50.00	-15.96	

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)
be20	6535	19.20	22.20
be20	6695	19.10	22.30
be20	6875	19.10	22.20
be40	6525	38.25	43.53
be40	6685	38.25	42.33
be40	6885	38.25	42.63
be80	6545	78.00	87.00
be80	6705	77.50	88.50
be80	6865	78.00	88.00
be160	6505	158.00	177.00
be160	6665	159.00	233.00
be 60	6825	158.00	167.00
be230	6585	320.00	637.50

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 23.72 dBm or 235.50 mW. The limit is 30 dBm EIRP, or 1 Watt EIRP. The antenna has a gain of 5.9 dBi.

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	EIRP	Measured PSD
EHT 20	6535	Mcs0_Nss2	14	14.73	20.63	-1.86
EHT 20	6695	Mcs0_Nss2	14	14.92	20.82	-1.18
EHT 20	6875	Mcs0_Nss2	13	15.16	21.06	-1.14
EHT 40	6525	Mcs0_Nss2	18	18.13	24.03	-1.09
EHT 40	6685	Mcs0_Nss2	17	17.85	23.75	-1.23
EHT 40	6885	Mcs0_Nss2	16	18.03	23.93	-1.34
EHT 80	6545	Mcs0_Nss2	20	20.14	26.04	-1.64
EHT 80	6705	Mcs0_Nss2	20	20.53	26.43	-1.48
EHT 80	6865	Mcs0_Nss2	19	20.64	26.54	-1.82
EHT 160	6505	Mcs0_Nss2	22	22.86	28.76	-1.64
EHT 160	6665	Mcs0_Nss2	23	23.72	29.62	-1.24
EHT 160	6825	Mcs0_Nss2	22	23.45	29.35	-1.65
EHT 320	6585	Mcs0_Nss2	23	23.49	29.39	-2.91

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	EIRP	Measured PSD
EHT 20	6535	Mcs0_Nss1	10	12.48	18.38	-4.14
EHT 20	6695	Mcs0_Nss1	10	11.91	17.81	-4.39
EHT 20	6875	Mcs0_Nss1	10	12.13	18.03	-4.41
EHT 40	6525	Mcs0_Nss1	13	15.24	21.14	-4.35
EHT 40	6685	Mcs0_Nss1	13	14.58	20.48	-4.79
EHT 40	6885	Mcs0_Nss1	13	15.02	20.92	-4.56
EHT 80	6545	Mcs0_Nss1	16	18.17	24.07	-4.19
EHT 80	6705	Mcs0_Nss1	16	17.57	23.47	-4.75
EHT 80	6865	Mcs0_Nss1	16	17.97	23.87	-4.65

EHT 160	6505	Mcs0_Nss1	18	20.35	26.25	-4.64
EHT 160	6665	Mcs0_Nss1	19	20.59	26.49	-4.71
EHT 160	6825	Mcs0_Nss1	19	20.68	26.58	-4.74
EHT 320	6585	Mcs0_Nss1	21	23.54	29.44	-4.37

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 5.9 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.

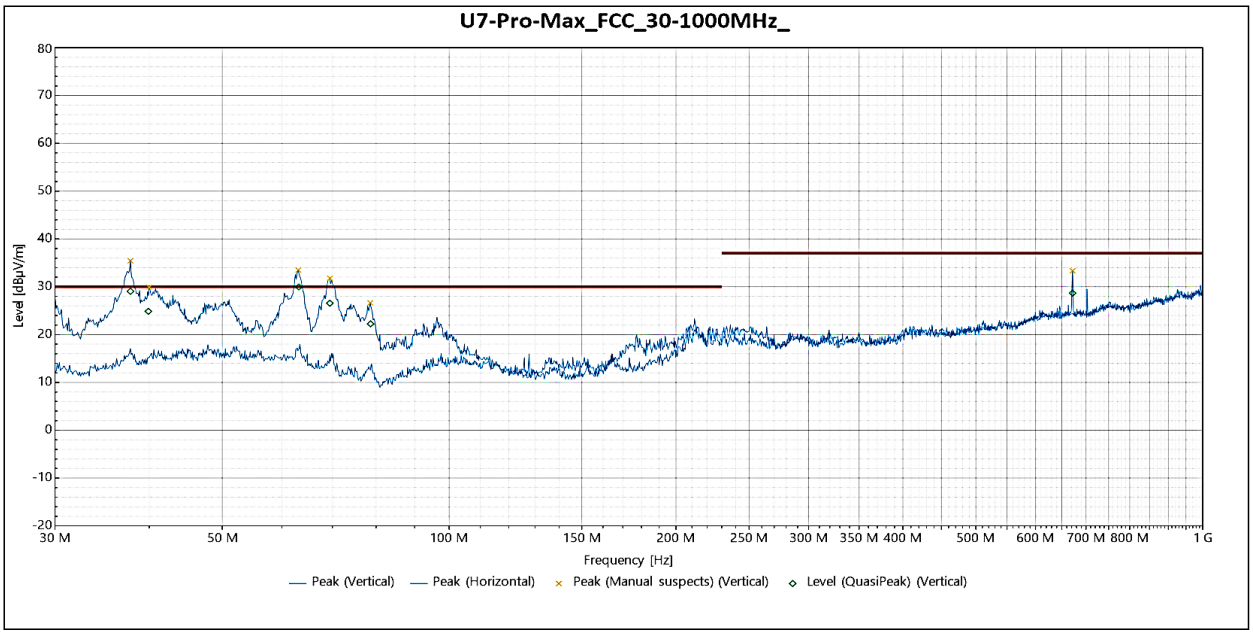
5.5.2 Radiated Spurious Emissions in the Restricted Bands of § 15.205

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 TP23.
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.

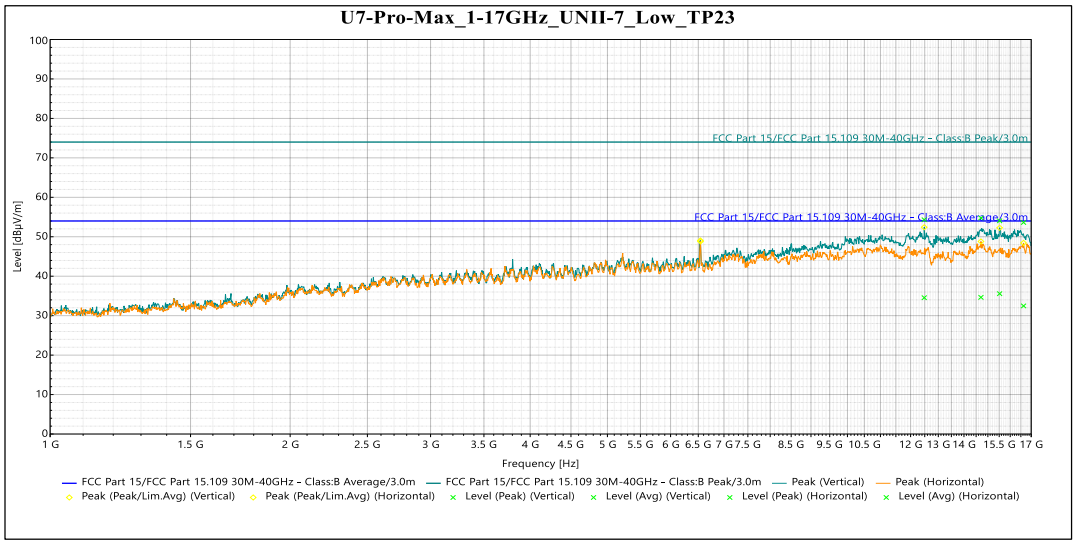
EUT



QuasiPeak

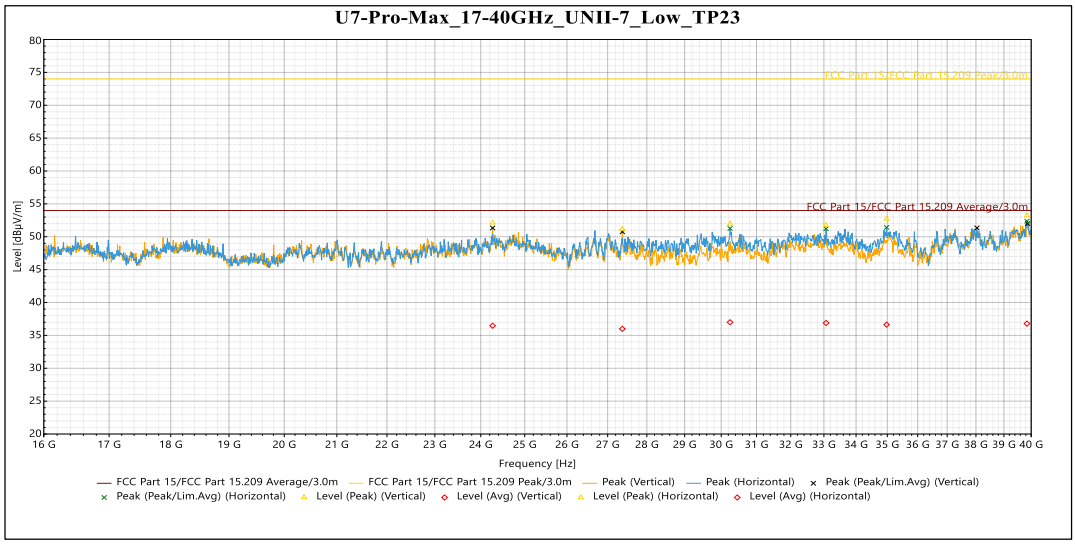
Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
37.769 MHz	29.054	30	-0.946	215	1.821	Vertical	-14.696
39.89 MHz	24.87	30	-5.13	75	1.108	Vertical	-13.531
63.164 MHz	29.972	30	-0.028	123	3.455	Vertical	-14.834
69.458 MHz	26.573	30	-3.427	99	3.459	Vertical	-16.754
78.66 MHz	22.249	30	-7.751	272	3.715	Vertical	-19.447
671.8 MHz	28.679	37	-8.321	77	2.965	Vertical	-6.121
No significant emissions	-	-	-	-	-	Horizontal	-

Table 5: Radiated Emissions within 30MHz - 1GHz



Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.483 GHz	Peak	54.309	74	-19.691	113	2.397	Vertical	16.434
15.519 GHz	Peak	54.044	74	-19.956	218	4	Vertical	15.958
12.483 GHz	AVG	34.555	54	-19.445	113	2.397	Vertical	16.434
15.519 GHz	AVG	35.572	54	-18.428	218	4	Vertical	15.958
14.704 GHz	Peak	54.758	74	-19.242	167	1.872	Horizontal	17.417
16.629 GHz	Peak	53.617	74	-20.383	318	1.643	Horizontal	17.999
14.704 GHz	AVG	34.644	54	-19.356	167	1.872	Horizontal	17.417
16.629 GHz	AVG	32.468	54	-21.532	318	1.643	Horizontal	17.999

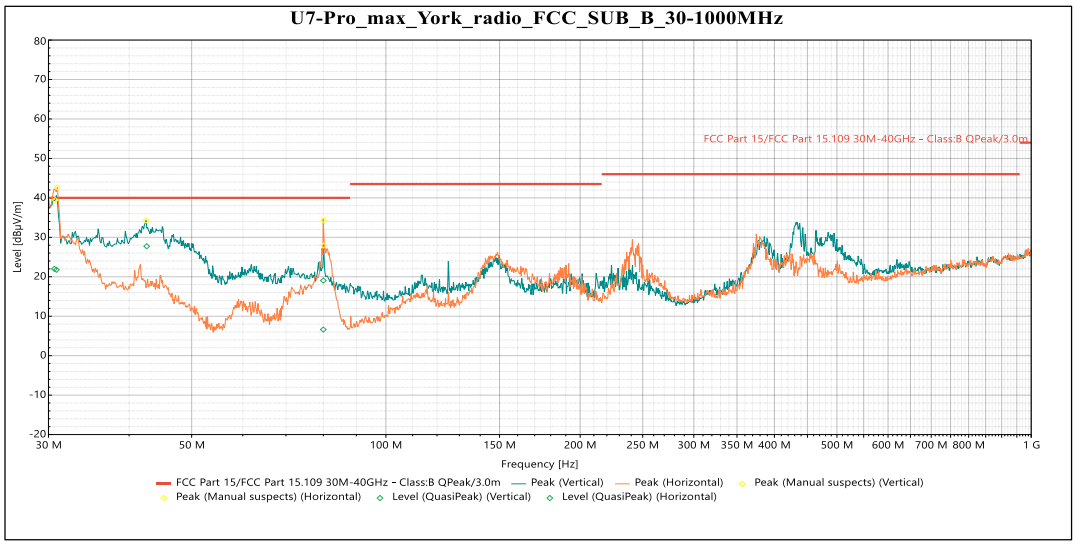
Table 6: Transmitting on the Middle Frequency 6535 MHz



Frequency	SR #	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
24.266 GHz	Peak	52.133	74	-21.867	105	Vertical	1.833
27.371 GHz	Peak	51.155	74	-22.845	123	Vertical	1.571
24.266 GHz	AVG	36.47	54	-17.53	105	Vertical	1.833
27.371 GHz	AVG	35.99	54	-18.01	123	Vertical	1.571
30.248 GHz	Peak	51.951	74	-22.049	83	Horizontal	1.222
33.067 GHz	Peak	51.762	74	-22.238	141	Horizontal	1.629
34.978 GHz	Peak	52.708	74	-21.292	226	Horizontal	3.527
39.843 GHz	Peak	53.205	74	-20.795	71	Horizontal	3.068
30.248 GHz	AVG	37.004	54	-16.996	83	Horizontal	1.222
33.067 GHz	AVG	36.883	54	-17.117	141	Horizontal	1.629
34.978 GHz	AVG	36.633	54	-17.367	226	Horizontal	3.527
39.843 GHz	AVG	36.789	54	-17.211	71	Horizontal	3.068

Table 7: Transmitting on the Lowest Frequency 6535 MHz

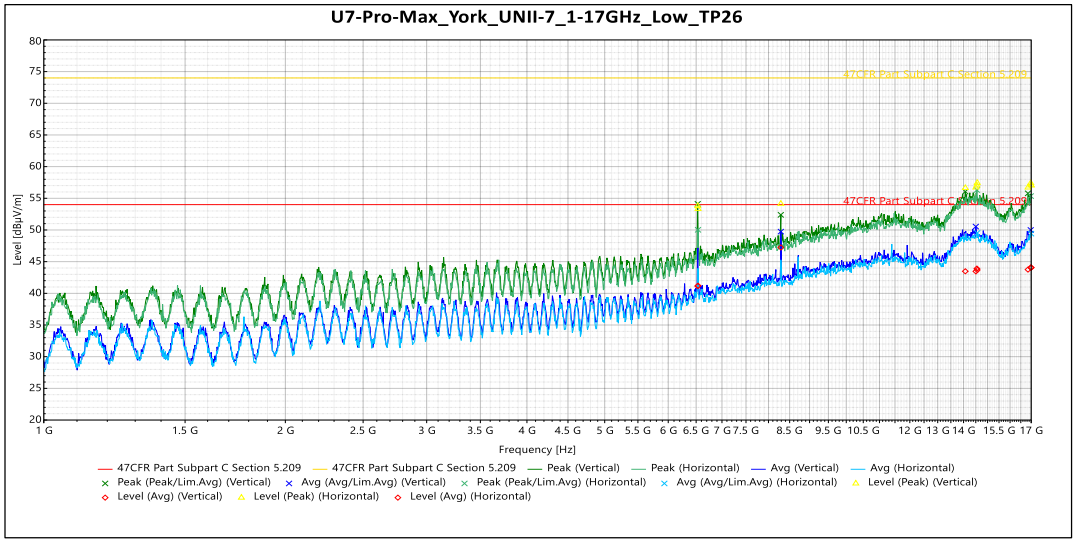
York Module



QuasiPeak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
30.64 MHz	22.014	40	-17.986	307	1.128	Vertical	-8.155
42.595 MHz	27.726	40	-12.274	36	1.132	Vertical	-16.243
79.988 MHz	19.05	40	-20.95	289	2.207	Vertical	-20.517
30.865 MHz	21.773	40	-18.227	265	3.65	Horizontal	-8.335
79.98 MHz	6.624	40	-33.376	296	3.868	Horizontal	-20.517

Table 8: Radiated Emissions 30 – 1000 MHz



Peak

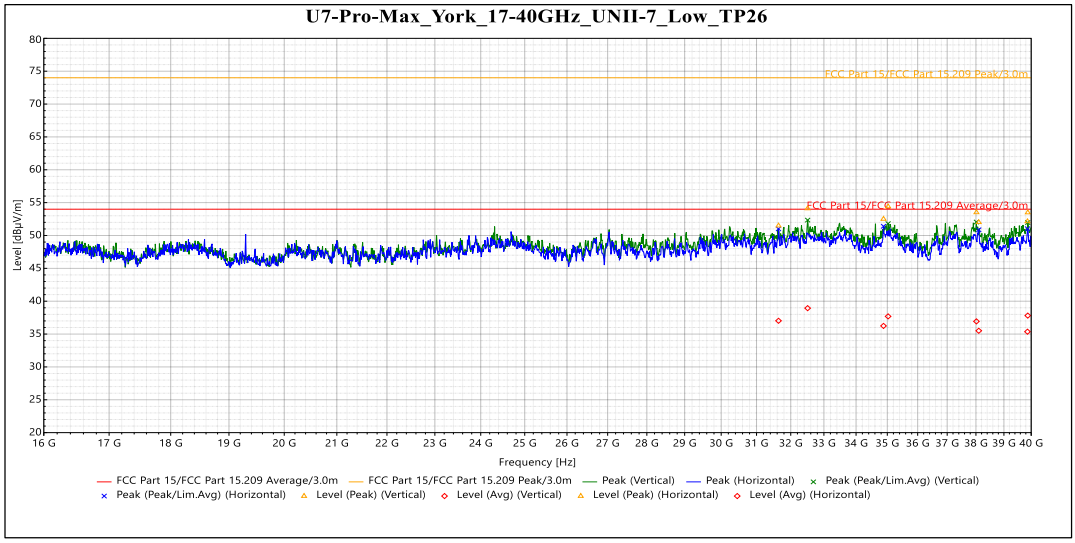
Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
6.53 GHz	53.779	74	-20.221	184	3.808	Vertical	-2.123
8.2881 GHz	54.137	74	-19.863	216	1.629	Vertical	2.122
14.072 GHz	56.631	74	-17.369	347	2.137	Vertical	11.119
14.503 GHz	56.711	74	-17.289	359	4	Vertical	11.663
16.844 GHz	56.713	74	-17.287	31	3.318	Vertical	13.218
16.999 GHz	57.045	74	-16.955	101	2.827	Vertical	13.495
6.5359 GHz	53.321	74	-20.679	107	1.5	Horizontal	-2.067
14.547 GHz	57.028	74	-16.972	45	1.629	Horizontal	11.832
14.562 GHz	57.444	74	-16.556	97	4	Horizontal	11.77
16.979 GHz	57.406	74	-16.594	261	2.336	Horizontal	13.544
16.996 GHz	57.075	74	-16.925	210	2.133	Horizontal	13.502

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
6.53 GHz	41.138	54	-12.862	184	3.808	Vertical	-2.123
8.2881 GHz	47.241	54	-6.759	216	1.629	Vertical	2.122
14.072 GHz	43.479	54	-10.521	347	2.137	Vertical	11.119
14.503 GHz	43.473	54	-10.527	359	4	Vertical	11.663
16.844 GHz	43.751	54	-10.249	31	3.318	Vertical	13.218
16.999 GHz	44.065	54	-9.935	101	2.827	Vertical	13.495
6.5359 GHz	41.21	54	-12.79	107	1.5	Horizontal	-2.067
14.547 GHz	43.905	54	-10.095	45	1.629	Horizontal	11.832

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
14.562 GHz	43.693	54	-10.307	97	4	Horizontal	11.77
16.979 GHz	44.081	54	-9.919	261	2.336	Horizontal	13.544
16.996 GHz	44.039	54	-9.961	210	2.133	Horizontal	13.502

Table 9: Radiated Emissions 1 – 17 GHz on the Lowest Frequency (worse case)



Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
32.506 GHz	54.112	74	-19.888	253	Vertical	2.465
35.026 GHz	54.412	74	-19.588	130	Vertical	3.566
38.018 GHz	53.507	74	-20.493	147	Vertical	3.197
39.873 GHz	53.488	74	-20.512	181	Vertical	3.364
31.639 GHz	51.486	74	-22.514	80	Horizontal	1.787
34.877 GHz	52.513	74	-21.487	115	Horizontal	2.804
38.1 GHz	52.01	74	-21.99	129	Horizontal	3.302
39.862 GHz	52.144	74	-21.856	88	Horizontal	3.295

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
32.506 GHz	38.938	54	-15.062	253	Vertical	2.465
35.026 GHz	37.689	54	-16.311	130	Vertical	3.566
38.018 GHz	36.928	54	-17.072	147	Vertical	3.197
39.873 GHz	37.807	54	-16.193	181	Vertical	3.364
31.639 GHz	37.016	54	-16.984	80	Horizontal	1.787
34.877 GHz	36.238	54	-17.762	115	Horizontal	2.804
38.1 GHz	35.502	54	-18.498	129	Horizontal	3.302
39.862 GHz	35.361	54	-18.639	88	Horizontal	3.295

Table 10: Radiated Emissions 17 – 40 GHz 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 EHT modes, there is not additional array gain to accommodate. When the EUT uses Nss=1 data rates, the antenna gain is 5.9 dBi + Array gain of 3.01 dB which is a total of 9 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	14	14.73	-1.86
EHT 20	6695	Mcs0_Nss2	14	14.92	-1.18
EHT 20	6875	Mcs0_Nss2	13	15.16	-1.14
EHT 40	6525	Mcs0_Nss2	18	18.13	-1.09
EHT 40	6685	Mcs0_Nss2	17	17.85	-1.23
EHT 40	6885	Mcs0_Nss2	16	18.03	-1.34
EHT 80	6545	Mcs0_Nss2	20	20.14	-1.64
EHT 80	6705	Mcs0_Nss2	20	20.53	-1.48
EHT 80	6865	Mcs0_Nss2	19	20.64	-1.82
EHT 160	6505	Mcs0_Nss2	22	22.86	-1.64
EHT 160	6665	Mcs0_Nss2	23	23.72	-1.24
EHT 160	6825	Mcs0_Nss2	22	23.45	-1.65
EHT 320	6585	Mcs0_Nss2	23	23.49	-2.91

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured PSD
EHT 20	6535	Mcs0_Nss1	10	12.48	-4.14
EHT 20	6695	Mcs0_Nss1	10	11.91	-4.39
EHT 20	6875	Mcs0_Nss1	10	12.13	-4.41
EHT 40	6525	Mcs0_Nss1	13	15.24	-4.35
EHT 40	6685	Mcs0_Nss1	13	14.58	-4.79
EHT 40	6885	Mcs0_Nss1	13	15.02	-4.56
EHT 80	6545	Mcs0_Nss1	16	18.17	-4.19
EHT 80	6705	Mcs0_Nss1	16	17.57	-4.75
EHT 80	6865	Mcs0_Nss1	16	17.97	-4.65
EHT 160	6505	Mcs0_Nss1	18	20.35	-4.64
EHT 160	6665	Mcs0_Nss1	19	20.59	-4.71
EHT 160	6825	Mcs0_Nss1	19	20.68	-4.74
EHT 320	6585	Mcs0_Nss1	21	23.54	-4.37

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.

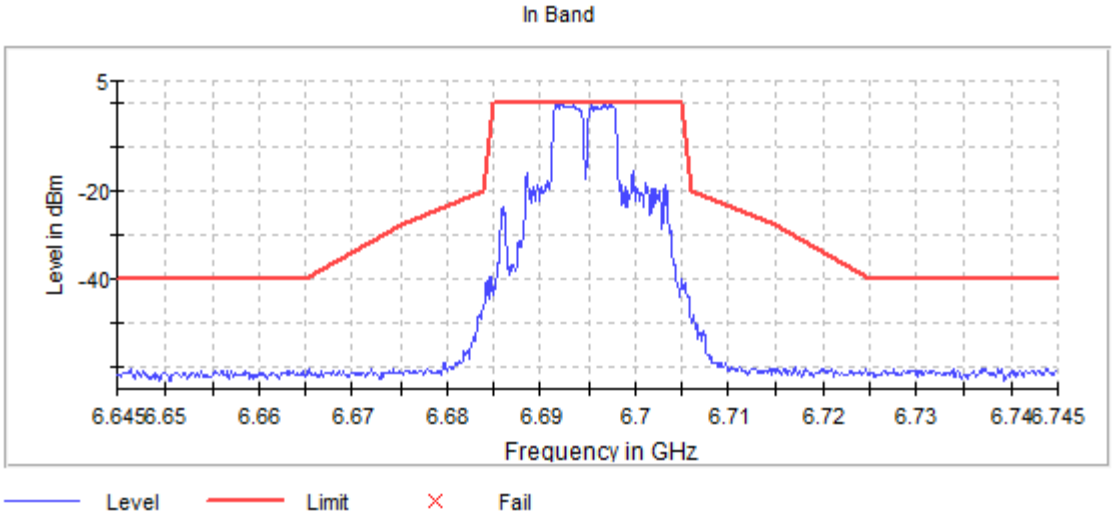


Figure 5: 6695 20MHz RU Vérification - Center

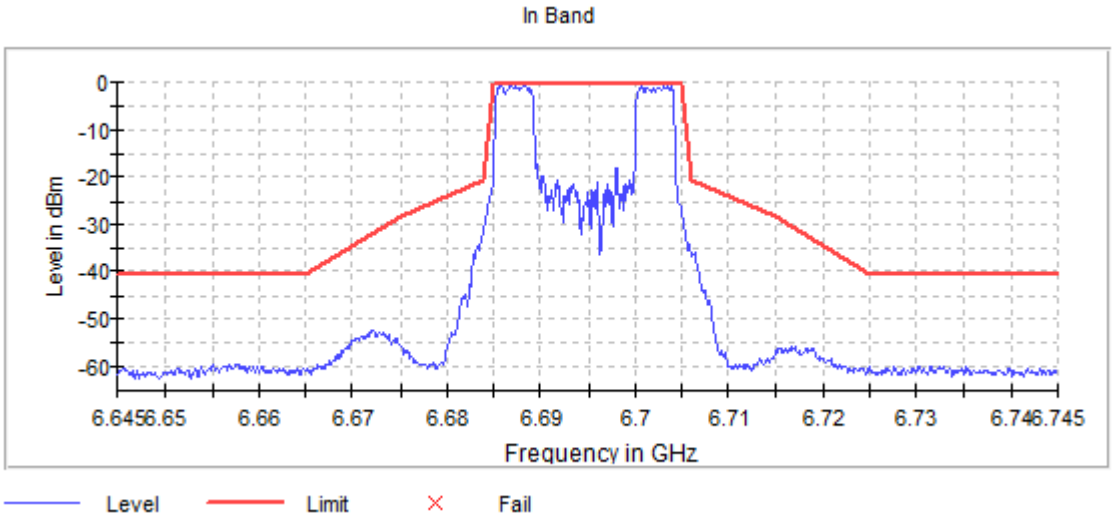


Figure 6: 6695 20MHz RU Vérification - Edge

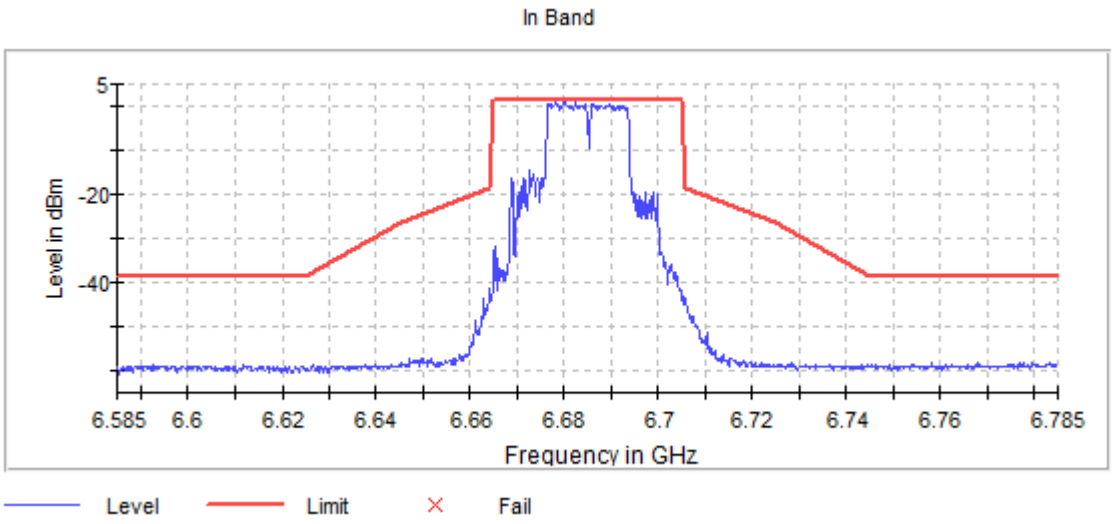


Figure 7: 6685 40MHz RU Vérification - Center

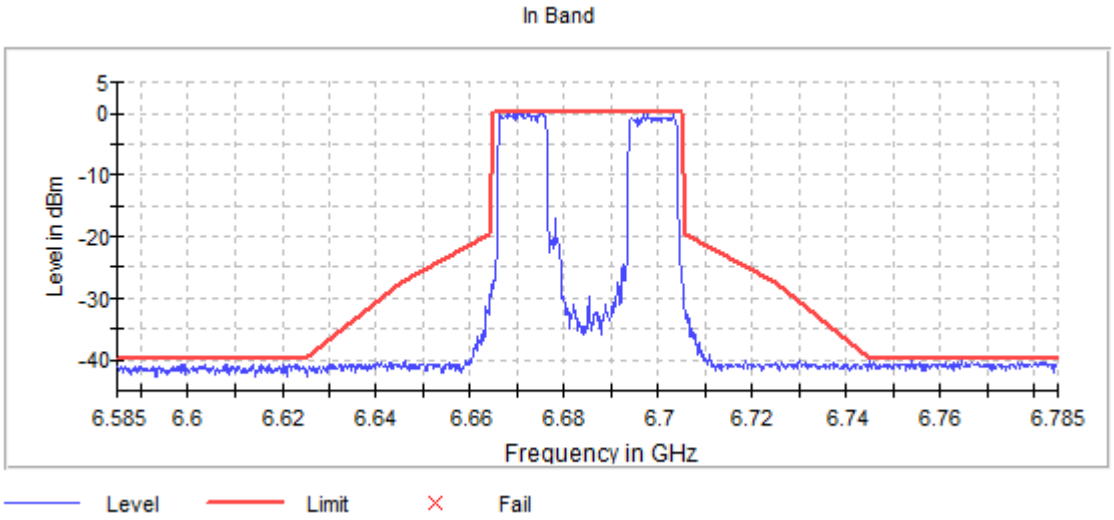


Figure 8: 6685 40MHz RU Vérification - Edge

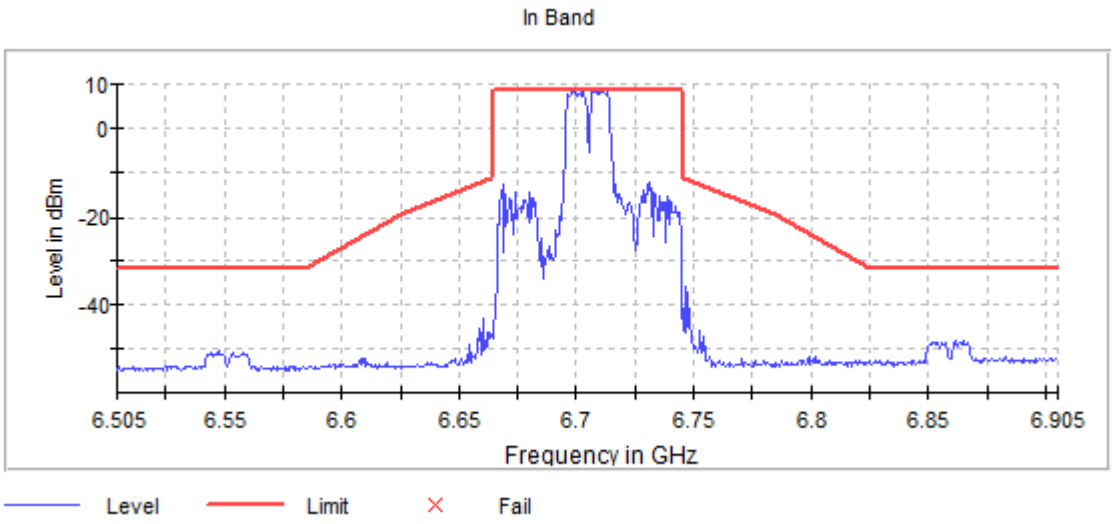


Figure 9: 6705 80MHz RU Vérification - Center

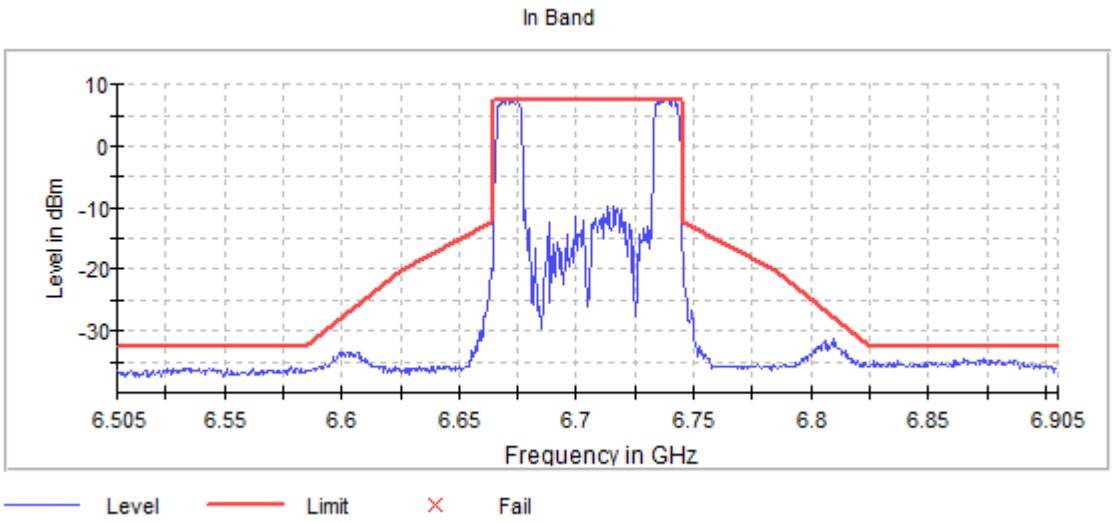


Figure 10: 6705 80MHz RU Vérification - Edge

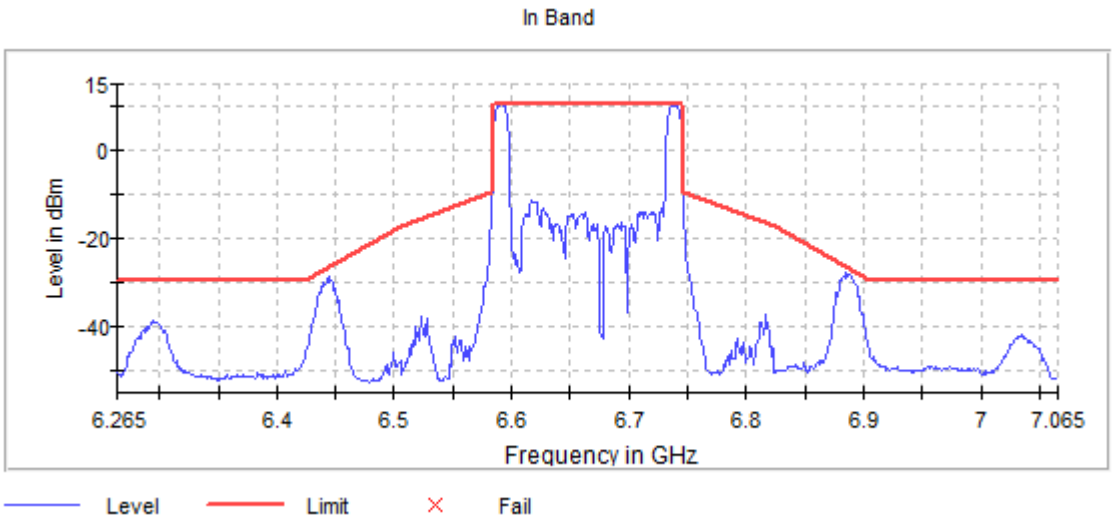


Figure 11: 6665 160MHz RU Vérification - Center

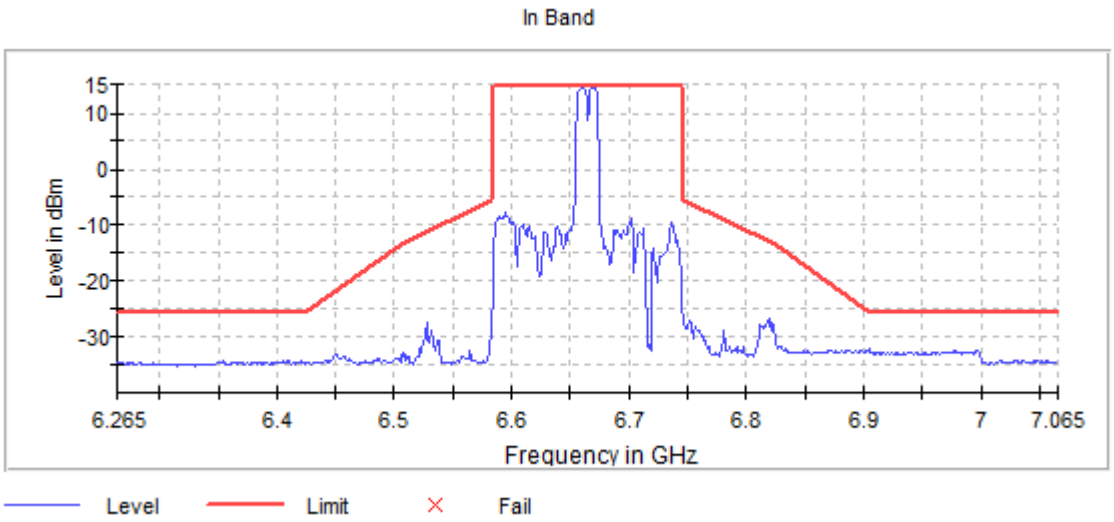


Figure 12: 6665 160MHz RU Vérification - Edge

5.7 §15.407(d) Contention Based Protocol

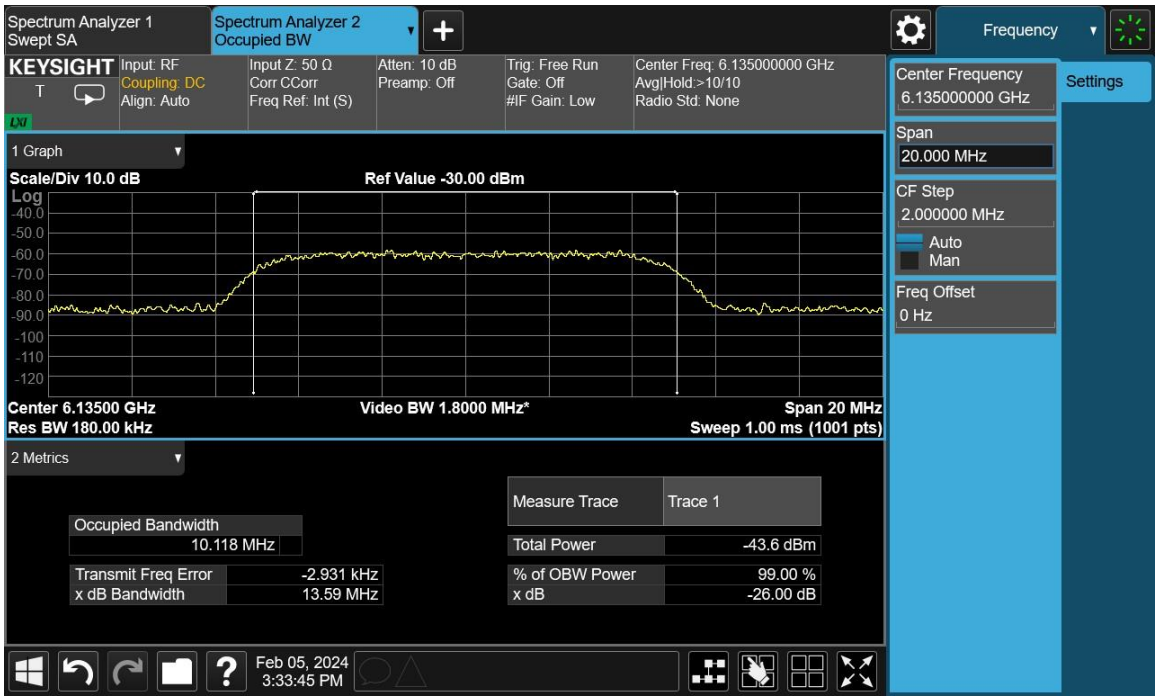
This product was tested and found to be compliant with the requirements of Contention-based Protocol as specified in FCC Part 15.407 and KDB 987594 D02.

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 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.

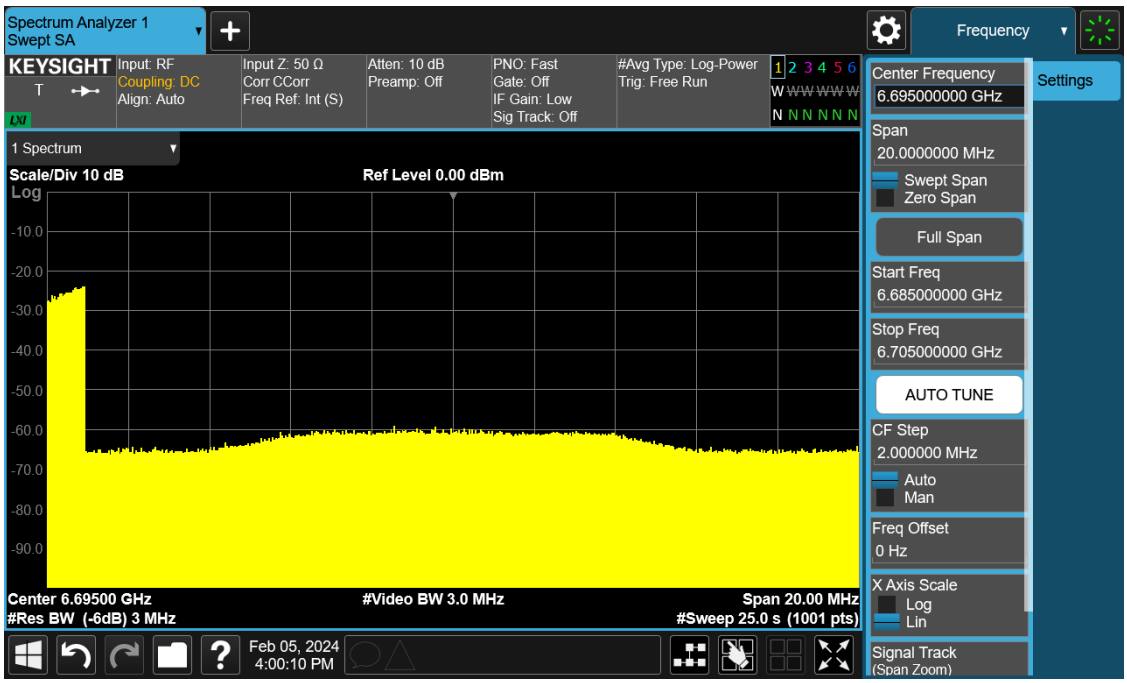
Starting at the levels established above, the AWGN signal was introduced to the DUT and increased to determine a threshold level at where the DUT will terminate with at least a 90% detection rate. The level at the DUT, which the 90% detection rate was achieved was recorded as the “Sensitivity Level”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

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



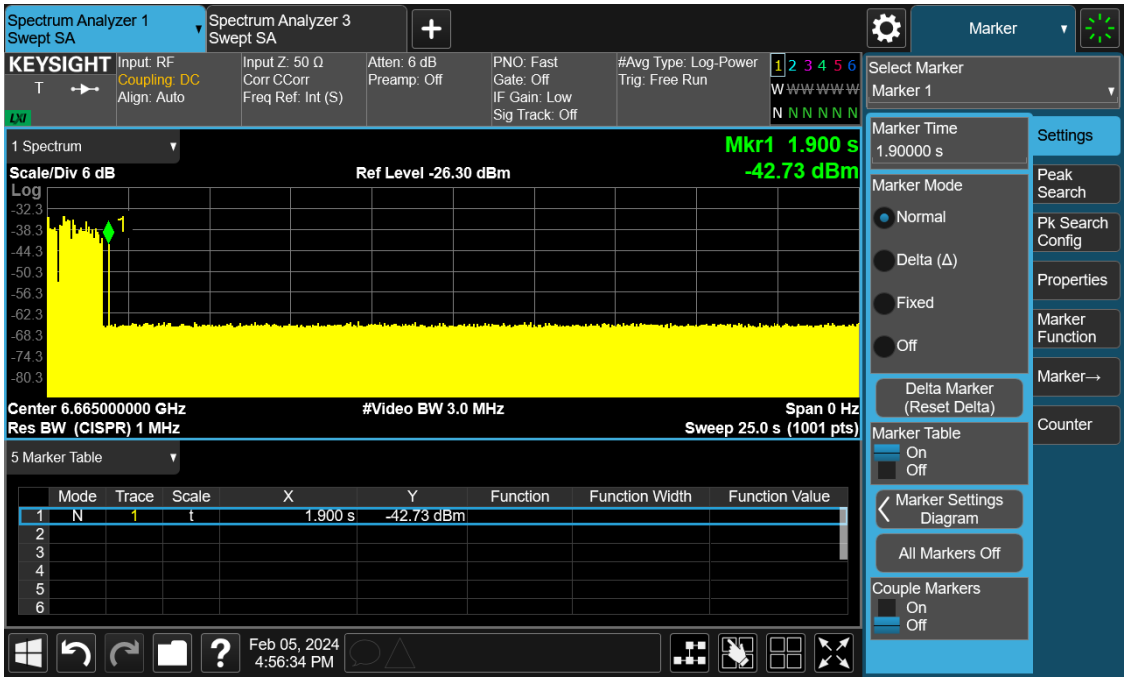
Plot 1: Signal BW Details

Plot 2: AWGN Signal Level Details

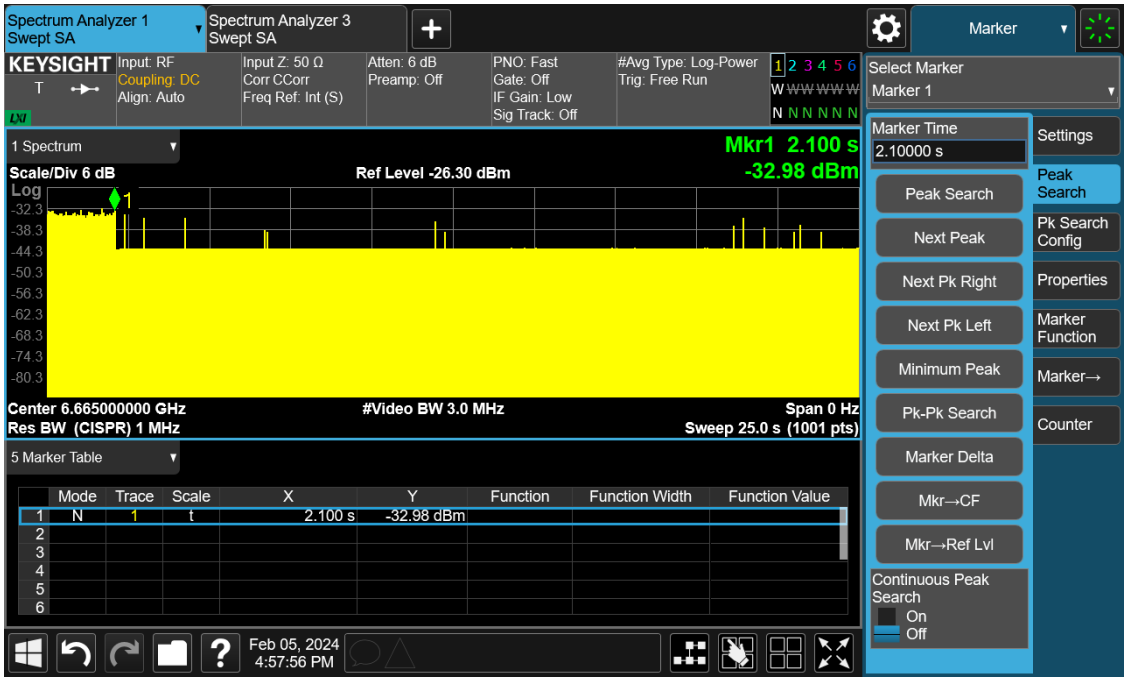


Plot 3: AWGN Signal Detection Details 20MHz BW, 6695

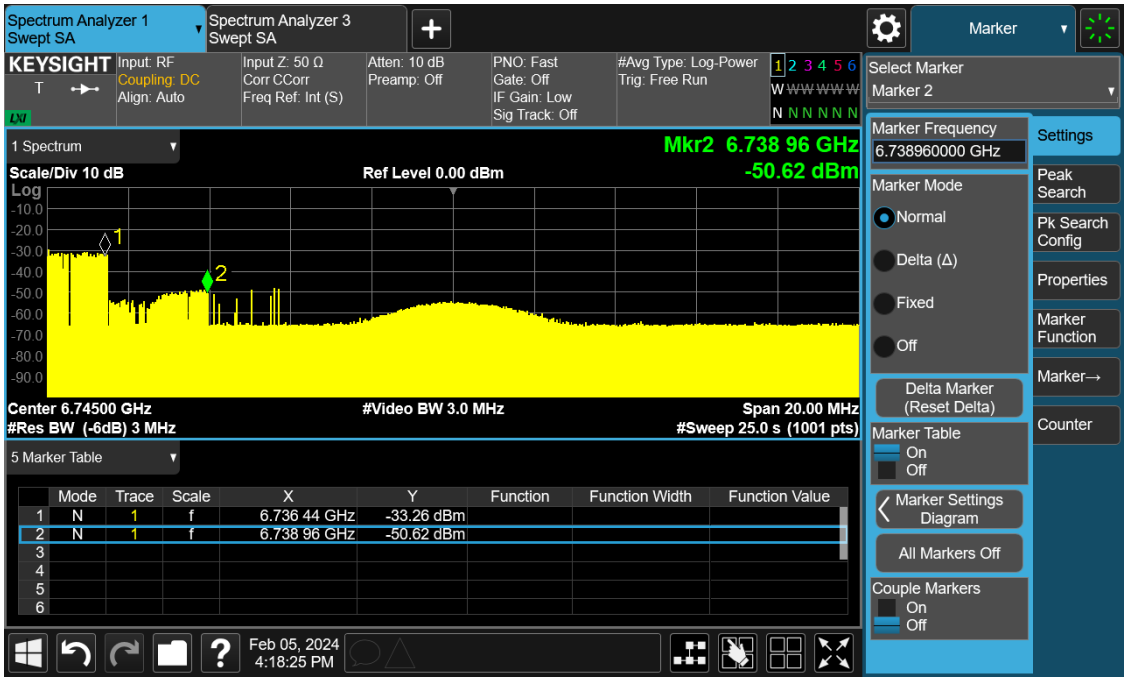
Plot 4: AWGN Signal Detection Details 160MHz BW, 6665 - 6595



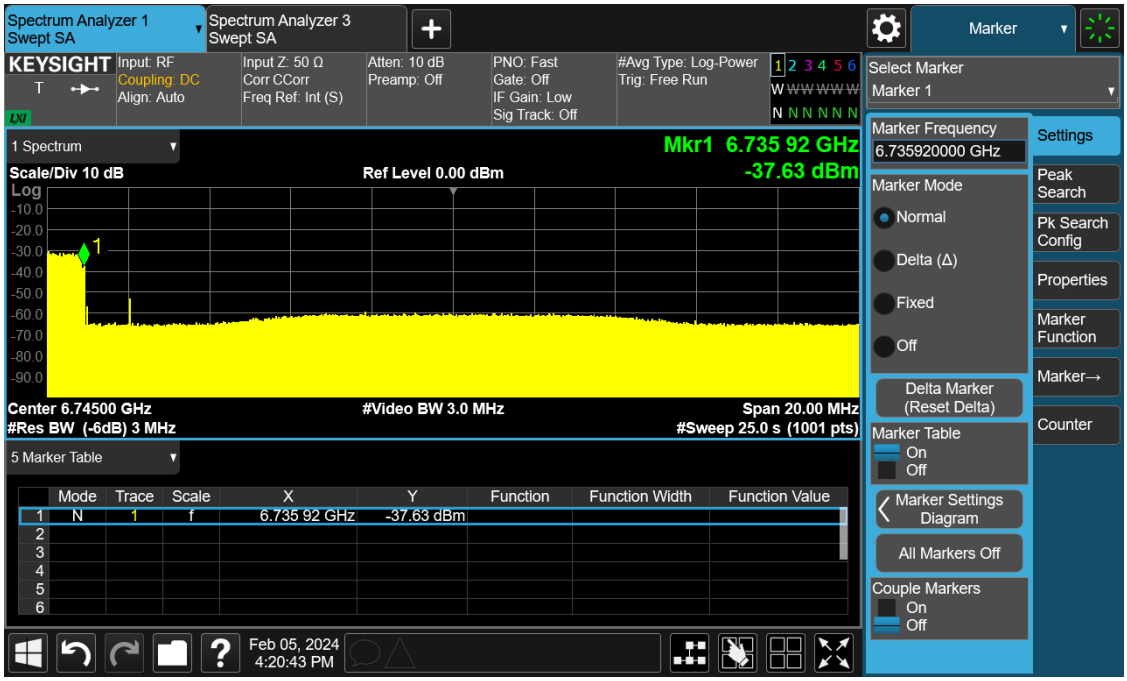
Plot 5: AWGN Signal Detection Details 160MHz BW, 6665 - 6665



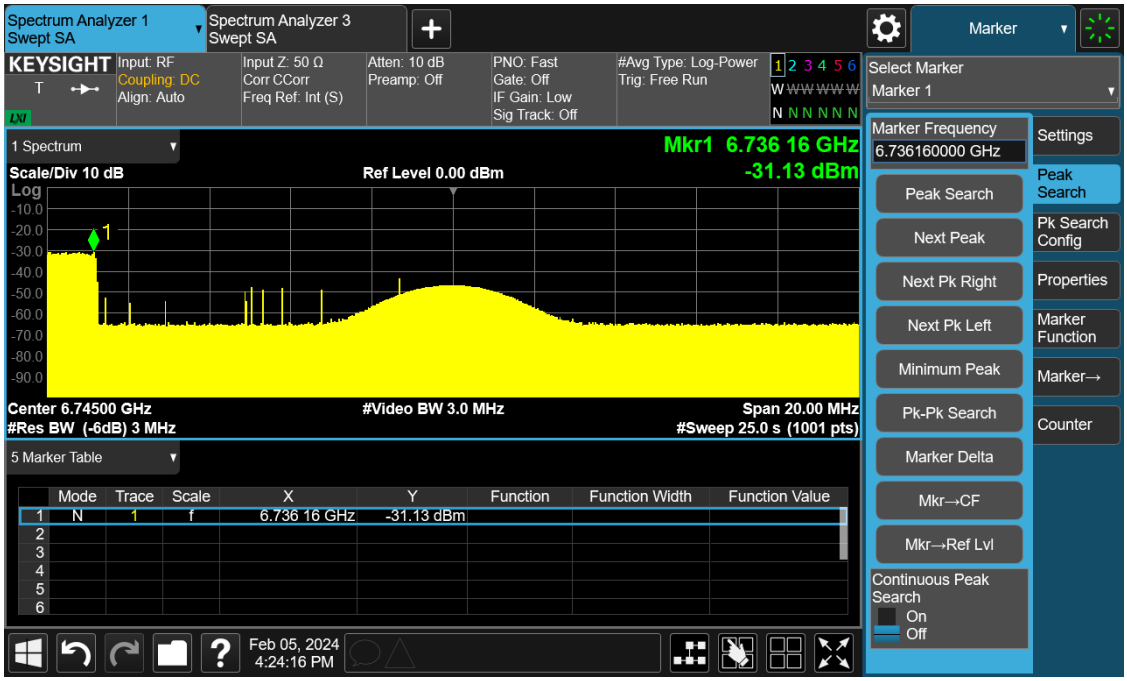
Plot 6: AWGN Signal Detection Details 160MHz BW, 6665-6740



Plot 7: AWGN Signal Detection Details 320MHz BW, 6745-6590



Plot 8: AWGN Signal Detection Details 320MHz BW, 6745-6745



Plot 9: AWGN Signal Detection Details 320MHz BW, 6745-6860

Contention Based Protocol 987594 D02 U-NNI 6 GHz EMC Measurement							
Band	BW_{EUT}	F_{c1}	F_{c2}	Signal Power Level (dBm)	Limit (dBm)	Detection Rate (%)	Margin (dB)
UNII-5 5.925 - 6.425GHz	20	6135	6135	-76	-56.1	100	19.9
	160	6185	6110	-67	-56.1	100	10.9
			6185	-76	-56.1	100	19.9
			6260	-73	-56.1	100	16.9
	320	6105	5950	-62	-56.1	100	5.9
			6105	-67	-56.1	100	10.9
			6250	-67	-56.1	100	10.9
UNII-6 6.425 - 6.525GHz	20	6455	6455	-65	-56.1	100	8.9
	160	6505	6430	-67	-56.1	100	10.9
			6505	-74	-56.1	100	17.9
			6580	-65	-56.1	100	8.9
UN1I-7 6.525 - 6.875GHz	20	6695	6695	-76	-56.1	100	19.9
	160	6665	6595	-67	-56.1	100	10.9
			6665	-76	-56.1	100	19.9
			6740	-65	-56.1	100	8.9
	320	6745	6590	-60	-56.1	100	3.9
			6745	-76	-56.1	100	19.9
			6890	-62	-56.1	100	5.9
UNII-8 6.875 - 7.125GHz	20	7015	7015	-76	-56.1	100	19.9
	160	6985	6910	-72	-56.1	100	15.9
			6985	-76	-56.1	100	19.9
			7060	-67	-56.1	100	10.9
Min. Antenna Gain (dBi)		5.9		Ports: 6G0 & 6G1			
Max Threshold Level (TL)		-56.1		FJ5,FJ6			

Table 11: Trial Table

Result

The EUT complies with the specification.

-- End of Test Report –