



427 West 12800 South
Draper, UT 84020

Test Report Certification

FCC ID	SWX-UDB
ISED ID	6545A-UDB
Equipment Under Test	UDB
Test Report Serial Number	TR9356_02
Date of Test(s)	12, 15 – 18 July; 9, 12, 29 - 30 August; 10 September 2024
Report Issue Date	11 September 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

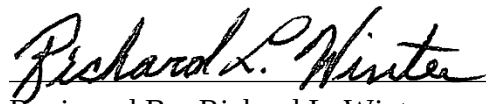
This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart E. This report may be reproduced in full. Partial reproduction of this report may only be made with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

On this 11th day of September 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	11 September 2024
02	Amended Section 5.4	23 September 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	UDB
Serial Number	942A6F40644E
Dimensions (cm)	13.0 x 5.5 x 3.4

2.2 Description of EUT

The UDB is a wireless bridging PoE adapter. The UDB has a 2.4 GHz and 5 GHz transmitter for wireless communications. The 5 GHz is operating in the UNII-1, UNII-2a, UNII-2c, and UNII-3 bands. The UDB can operate with an internal and external antenna. The UDB has one PoE port to power a PoE supported device. The UDB is powered from 120 – 240 Volts AC Mains.

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

Band	WiFi Mode	Modulation Bandwidth	Modulation Type	Frequency (MHz)
UNII-3	a	20 MHz	OFDM	5745, 5775, 5825
	ac	20 MHz	VHT	5745, 5775, 5825
	ac	40 MHz	VHT	5755, 5775, 5795
	ac	80 MHz	VHT	5775

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

2.3 EUT and Support Equipment

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

Brand Name Model Number Serial Number	Description	Name of Interface Ports / Interface Cables
BN: UBIQUITI MN: UDB SN: 942A6F40644E	PoE Bridging Adapter	See Section 2.4
BN: Dell MN: XPS 13 SN: N/A	Laptop Computer	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
AC Mains	1	Power Cable/1m
PoE Output	1	Unshielded Cat 5E/7m

2.5 Operating Environment

Power Supply	120 Volts AC Mains
AC Mains Frequency	60 Hz
Temperature	25.7 – 26.3 °C
Humidity	26.6 – 35.8 %
Barometric Pressure	1015mBar

2.6 Operating Modes

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

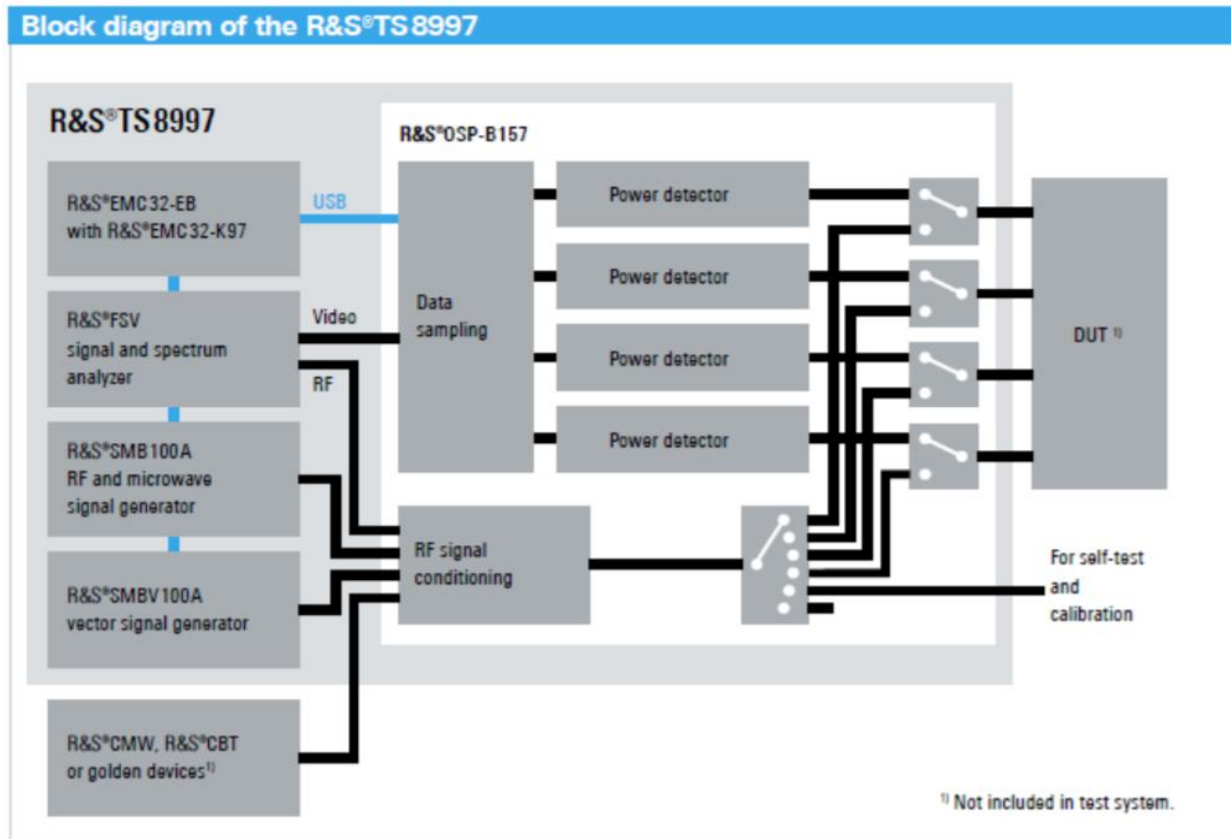


Diagram 1: Test Configuration Block Diagram

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
15.407(a)	N/A	Antenna requirements	Structural Requirement	Compliant
15.407(b)	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	5725 to 5850	Compliant
15.407(e)	RSS-247 §6.2.2, §6.2.3	Peak Output Power	5725 to 5850	Compliant
15.407(f)	RSS-247 §6.2.2, §6.2.3	Antenna Conducted Spurious Emissions	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	5725 to 5850	Compliant
The testing was performed according to the procedures in ANSI C63.10-2013, KDB 789033 and 47 CFR Part 15. Where applicable, KDB 662911 was followed to sum required measurements.				

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

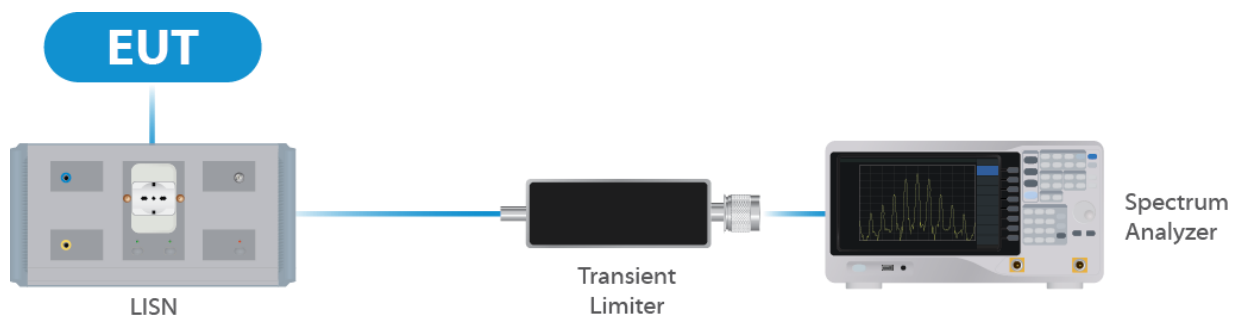


Figure 1: Conducted Emissions Test

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	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	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

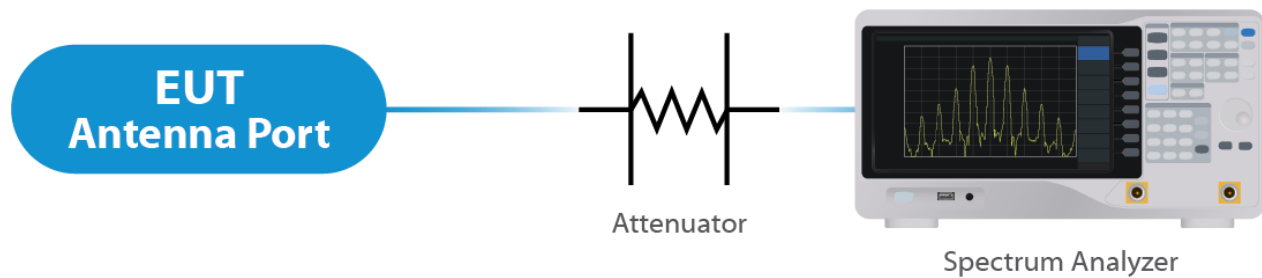


Figure 2: Direct Connect at the Antenna Port Test



Figure 3: Output Power Measurement

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

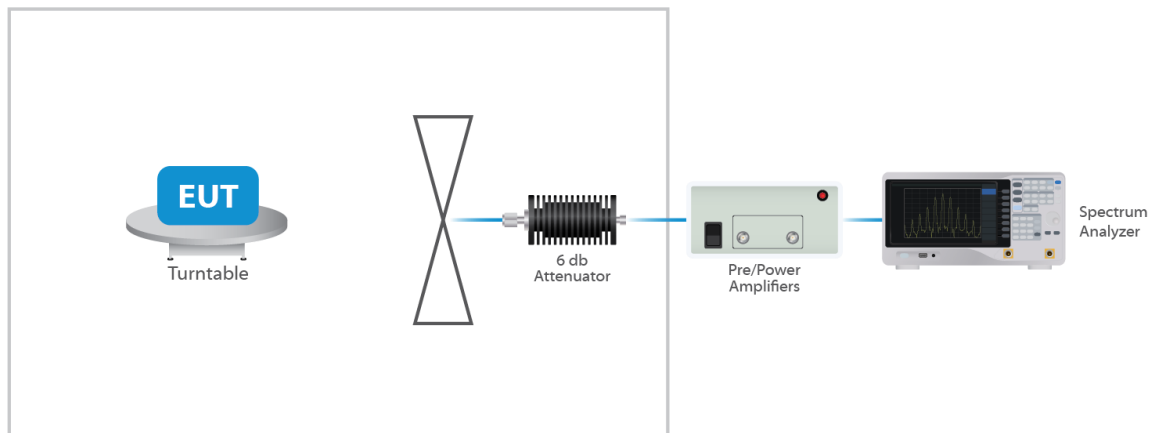


Figure 4: Radiated Emissions Test

4.4 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.

4.5 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 integral internal antenna and a Dipole external antenna. Per the manufacturer, the Maximum gain of the internal antenna per chain is 5 dBi and the external antenna is 4 dBi. This is an 802.11 device and utilizes CDD as described in KDB 662911 D01. The antenna internal antenna is not user replaceable while the external antenna is 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 $\text{NANT} \leq 4$;

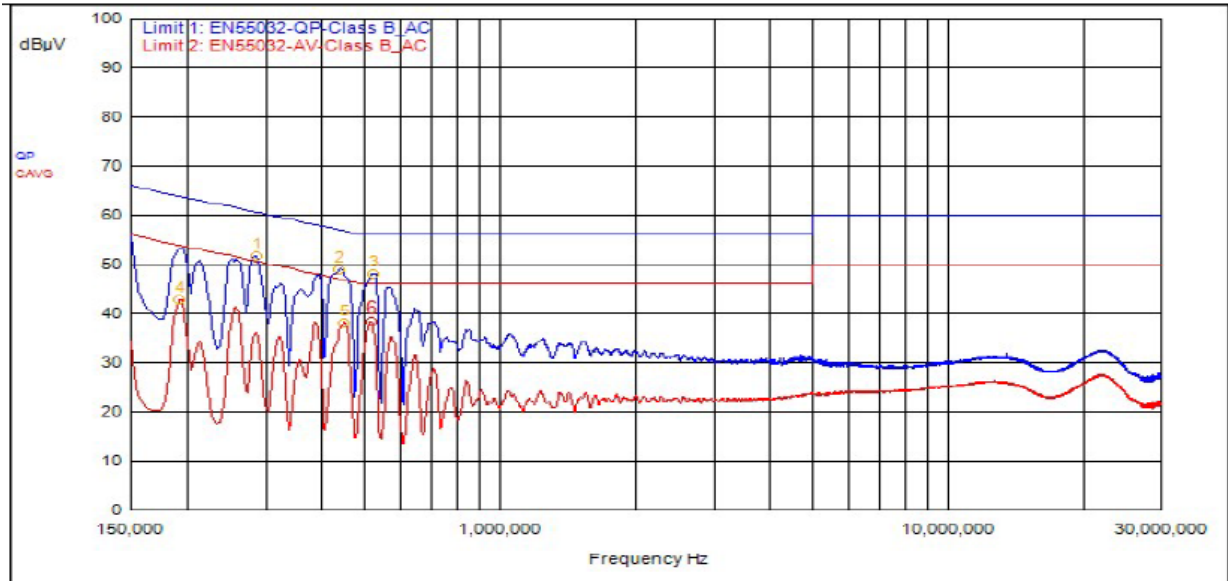
For PSD measurements when Nss=1: Array Gain = $10 \log(\text{NANT}/\text{NSS})$ dB + Antenna Gain (dBi). Or 3.01 dB + 5 dBi = 8.01 dBi for the internal antenna and 3.01 dB + 4 dBi = 7.01 dBi for the external antenna.

Results

The EUT complied with the specification

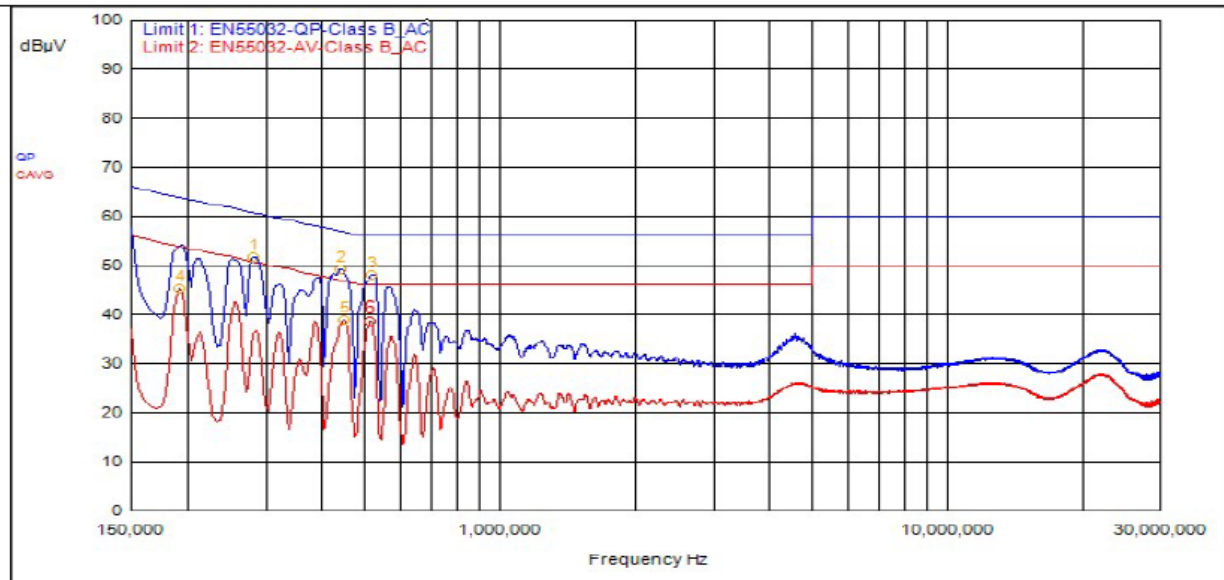
5.2 Conducted Emissions at Mains Ports Data

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	519,000kHz	9.49			QPeak	38.70	48.19	56.00	-7.81			
2	438,000kHz	9.49			QPeak	39.35	48.84	57.10	-8.26			
1	285,000kHz	9.48			QPeak	42.22	51.70	60.67	-8.97			
4	192,000kHz	9.49			C_AVG	33.34	42.83			53.95	-11.12	
5	447,000kHz	9.49			C_AVG	28.70	38.19			46.93	-8.74	
6	516,000kHz	9.49			C_AVG	28.96	38.45			46.00	-7.55	

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
2	441,000kHz	9.64			QPeak	39.63	49.27	57.04	-7.77			
3	516,000kHz	9.63			QPeak	38.55	48.18	56.00	-7.82			
1	282,000kHz	9.63			QPeak	42.09	51.72	60.76	-9.04			
4	192,000kHz	9.62			C_AVG	35.58	45.20			53.95	-8.75	
5	447,000kHz	9.64			C_AVG	29.24	38.88			46.93	-8.05	
6	513,000kHz	9.63			C_AVG	28.91	38.54			46.00	-7.46	

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.

5.3.1 Internal Antenna

Nominal BW (MHz)	Frequency (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
a 20	5745	32.5	50.6
a 20	5775	31.3	50.3
a 20	5825	32.1	53.1
ac 20	5745	33.7	52.2
ac 20	5775	19.0	30.0
ac 20	5825	18.8	33.4
ac 40	5755	38.5	69.5
ac 40	5775	37.5	55.2
ac 40	5795	38.5	54.0
ac 80	5775	78.0	83.5

5.3.2 External Antenna

Nominal BW (MHz)	Frequency (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
a 20	5745	24.0	36.7
a 20	5775	31.8	46.4
a 20	5825	25.0	37.7
ac 20	5745	23.8	37.8
ac 20	5775	33.7	56.0
ac 20	5825	25.8	43.4
ac 40	5755	43.0	77.5
ac 40	5775	56.0	88.5
ac 40	5795	48.5	82.6
ac 80	5775	75.9	98.0

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/outputs 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 26.74 dBm or 472.06 mW. The limit is 30 dBm, or 1 Watt when using antennas with 6 dBi or less gain. The internal antenna has a gain of 5 dBi and the external antenna has a gain of 4 dBi.

5.4.1 Internal Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	Measured EIRP	Measured PSD
OFDM 20	5745	Mcs0	45	26.44	31.44	11.42
OFDM 20	5775	Mcs0	45	26.05	31.05	10.97
OFDM 20	5825	Mcs0	45	25.46	30.46	9.82
VHT 20	5745	Mcs0	45	26.74	31.74	11.26
VHT 20	5775	Mcs0	43	22.14	27.14	6.57
VHT 20	5825	Mcs0	43	21.96	26.96	5.72
VHT 40	5755	Mcs0	44	25.67	30.67	7.69
VHT 40	5775	Mcs0	41	22.82	27.82	5.24
VHT 40	5795	Mcs0	41	22.63	27.63	4.83
VHT 80	5775	Mcs0	38	20.07	25.07	-1.67

5.4.2 External Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	Measured EIRP	Measured PSD
OFDM 20	5745	Mcs0	46	23.69	28.69	8.69
OFDM 20	5775	Mcs0	47	24.91	29.91	9.90
OFDM 20	5825	Mcs0	45	22.96	27.96	7.55
VHT 20	5745	Mcs0	46	23.66	28.66	8.35
VHT 20	5775	Mcs0	47	24.91	29.91	9.50
VHT 20	5825	Mcs0	45	22.96	27.96	6.84
VHT 40	5755	Mcs0	45	23.64	28.64	6.18
VHT 40	5775	Mcs0	47	24.41	29.41	5.97
VHT 40	5795	Mcs0	45	23.36	28.36	4.89
VHT 80	5775	Mcs0	38	19.22	24.22	-2.15

Result

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

* Gated EIRP shown in the Annex is the conducted measurement

5.5 §15.407(b)(7) Spurious Emissions

5.5.1 Conducted Spurious Emissions

The frequency ranges 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 within the annex are plots with the EUT turned to the upper and lower channels with the antenna gain of 5 dBi accounted for. These demonstrate compliance with the provisions of this section at the band edges.

All emissions shall be limited to a level of -27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

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 TP45.

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.

Internal Antenna

QuasiPeak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
55.914 MHz	36.10	40	-3.90	2	1	Vertical	-8.31
59.593 MHz	31.47	40	-8.53	52	1.131	Vertical	-8.836
156.38 MHz	27.18	40	-12.82	246	1.131	Vertical	-12.477
778.37 MHz	32.04	47	-14.96	128	2.567	Vertical	1.411
235.1 MHz	28.78	47	-18.22	131	1	Horizontal	-8.241

Table 4: Radiated Emissions 30 – 1000 MHz

Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.487 GHz	63.66	74	-10.34	47	2.919	Vertical	9.12
12.5 GHz	57.47	74	-16.53	89	1.5	Vertical	8.325
11.484 GHz	66.08	74	-7.92	39	1.538	Horizontal	9.093
12.5 GHz	58.07	74	-15.93	64	1.659	Horizontal	8.325
13.965 GHz	56.91	74	-17.09	262	2.495	Horizontal	11.769

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.487 GHz	50.89	54	-3.12	47	2.919	Vertical	9.12
12.5 GHz	51.24	54	-2.76	89	1.5	Vertical	8.325
11.484 GHz	53.28	54	-0.72	39	1.538	Horizontal	9.093
12.5 GHz	52.15	54	-1.86	64	1.659	Horizontal	8.325
13.965 GHz	43.28	54	-10.73	262	2.495	Horizontal	11.769

Table 5: 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)
11.549 GHz	63.39	74	-10.61	13	1.658	Vertical	9.283
12.5 GHz	58.21	74	-15.79	78	1.658	Vertical	8.325
14.648 GHz	57.27	74	-16.74	278	1.867	Vertical	12.848
11.55 GHz	64.86	74	-9.14	126	1.661	Horizontal	9.282

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.549 GHz	49.423	54	-4.58	13	1.658	Vertical	9.283
12.5 GHz	52.286	54	-1.71	78	1.658	Vertical	8.325
14.648 GHz	43.898	54	-10.10	278	1.867	Vertical	12.848
11.55 GHz	52.829	54	-1.17	126	1.661	Horizontal	9.282

Table 6: 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)
11.653 GHz	64.12	74	-9.88	16	2.08	Vertical	8.932
12.5 GHz	57.84	74	-16.16	78	1.658	Vertical	8.325
14.85 GHz	56.81	74	-17.19	67	2.078	Vertical	12.383
11.65 GHz	65.30	74	-8.70	37	1.87	Horizontal	8.951
12.5 GHz	57.53	74	-16.47	59	2.079	Horizontal	8.325
12.5 GHz	57.54	74	-16.46	62	1.658	Horizontal	8.325
13.839 GHz	55.78	74	-18.22	70	1.661	Horizontal	11.819
14.729 GHz	56.23	74	-17.78	237	1.658	Horizontal	12.841
16.944 GHz	55.75	74	-18.26	117	1.87	Horizontal	13.194

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.653 GHz	49.68	54	-4.32	16	2.08	Vertical	8.932
12.5 GHz	52.06	54	-1.94	78	1.658	Vertical	8.325
14.85 GHz	43.24	54	-10.76	67	2.078	Vertical	12.383
11.65 GHz	53.01	54	-0.90	37	1.87	Horizontal	8.951
12.5 GHz	51.90	54	-2.10	59	2.079	Horizontal	8.325
12.5 GHz	51.69	54	-2.31	62	1.658	Horizontal	8.325
13.839 GHz	42.76	54	-11.24	70	1.661	Horizontal	11.819
14.729 GHz	43.57	54	-10.43	237	1.658	Horizontal	12.841
16.944 GHz	42.68	54	-11.32	117	1.87	Horizontal	13.194

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

Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
32.487 GHz	52.612	74	-21.388	173	Vertical	2.248
34.939 GHz	53.326	74	-20.674	161	Vertical	3.44
25.166 GHz	49.986	74	-24.014	179	Horizontal	0.685

Frequency	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
27.026 GHz	52.328	74	-21.672	279	Horizontal	1.927

Avg

Frequency	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
32.487 GHz	37.417	54	-16.583	173	Vertical	2.248
34.939 GHz	36.831	54	-17.169	161	Vertical	3.44
25.166 GHz	35.468	54	-18.532	179	Horizontal	0.685
27.026 GHz	36.648	54	-17.352	279	Horizontal	1.927

Table 8: Radiated Emissions 17 – 40 GHz at the Middle Frequency (worse case)

External Antenna

QuasiPeak

Frequency	Level (dB μ V/m)	Limit (dB μ V/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
55.914 MHz	36.099	40	-3.901	2	1	Vertical	-8.31
59.593 MHz	31.468	40	-8.532	52	1.131	Vertical	-8.836
156.38 MHz	27.183	40	-12.817	246	1.131	Vertical	-12.477
778.37 MHz	32.04	47	-14.96	128	2.567	Vertical	1.411
235.1 MHz	28.778	47	-18.222	131	1	Horizontal	-8.241

Table 9: Radiated Emissions 30 – 1000 MHz

Peak

Frequency	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.49 GHz	64.90	74	-9.10	168	1.638	Vertical	10.64
12.50 GHz	56.91	74	-17.09	25	1.638	Vertical	9.88
11.49 GHz	63.82	74	-10.18	207	1.643	Horizontal	10.64
12.50 GHz	56.08	74	-17.92	349	1.638	Horizontal	9.88

Avg

Frequency	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.49 GHz	51.39	54	-2.61	168	1.638	Vertical	10.64
12.50 GHz	48.20	54	-5.80	25	1.638	Vertical	9.89
11.49 GHz	50.37	54	-3.63	207	1.643	Horizontal	10.64
12.50 GHz	47.95	54	-6.05	349	1.638	Horizontal	9.88

Table 10: Radiated Emissions 1 – 17 GHz at the Lowest Frequency

Peak

Frequency	Level (dB μ V/m)	Limit (dB μ V/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.55 GHz	63.66	74	-10.34	315	1.638	Vertical	10.76
12.50 GHz	57.68	74	-16.33	27	1.638	Vertical	9.88
11.55 GHz	65.74	74	-8.26	202	1.638	Horizontal	10.77
12.50 GHz	57.21	74	-16.79	348	1.643	Horizontal	9.88

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.55 GHz	50.33	54	-3.67	315	1.638	Vertical	10.76
12.50 GHz	50.50	54	-3.50	27	1.638	Vertical	9.88
11.55 GHz	51.40	54	-2.60	202	1.638	Horizontal	10.77
12.50 GHz	49.30	54	-4.70	348	1.643	Horizontal	9.88

Table 11: 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)
5.82 GHz	59.78	74	-14.22	58	1.714	Vertical	-11.05
11.65 GHz	62.49	74	-11.51	319	2.871	Vertical	10.43
12.50 GHz	55.57	74	-18.43	328	2.040	Vertical	9.88
11.65 GHz	60.21	74	-13.79	210	2.871	Horizontal	10.45
12.50 GHz	54.71	74	-19.29	349	1.500	Horizontal	9.88

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
5.82 GHz	49.62	54	-4.38	58	1.714	Vertical	-11.05
11.65 GHz	49.08	54	-4.92	319	2.871	Vertical	10.43
12.50 GHz	45.31	54	-8.69	328	2.040	Vertical	9.88
11.65 GHz	47.19	54	-6.81	210	2.871	Horizontal	10.45
12.50 GHz	43.19	54	-10.81	349	1.500	Horizontal	9.88

Table 12: Radiated Emissions 1 – 17 GHz at the Highest Frequency

Peak

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
17.46 GHz	64.38	74	-9.62	78	Vertical	-0.16
17.47 GHz	67.76	74	-6.24	82	Vertical	-0.19
17.49 GHz	64.59	74	-9.41	78	Vertical	-0.23
23.30 GHz	66.54	74	-7.46	52	Vertical	1.68
29.11 GHz	56.59	74	-17.41	253	Vertical	2.48
34.95 GHz	61.69	74	-12.31	222	Vertical	6.34
39.33 GHz	56.54	74	-17.46	359	Vertical	4.35
17.48 GHz	64.12	74	-9.88	339	Horizontal	-0.21
17.49 GHz	61.71	74	-12.29	335	Horizontal	-0.22
23.21 GHz	62.92	74	-11.08	44	Horizontal	1.67

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
29.13 GHz	57.95	74	-16.05	31	Horizontal	2.43
33.80 GHz	56.02	74	-17.98	334	Horizontal	5.31
34.84 GHz	56.24	74	-17.76	359	Horizontal	5.54
39.20 GHz	56.47	74	-17.53	46	Horizontal	4.1

Avg

Frequency	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
17.46 GHz	47.84	54	-6.16	78	Vertical	-0.16
17.47 GHz	53.84	54	-0.16	82	Vertical	-0.19
17.49 GHz	48.47	54	-5.53	78	Vertical	-0.23
23.30 GHz	51.99	54	-2.01	52	Vertical	1.68
29.11 GHz	42.73	54	-11.27	253	Vertical	2.48
34.95 GHz	47.07	54	-6.93	222	Vertical	6.34
39.33 GHz	43.09	54	-10.91	359	Vertical	4.35
17.48 GHz	50.75	54	-3.25	339	Horizontal	-0.21
17.49 GHz	45.32	54	-8.68	335	Horizontal	-0.22
23.21 GHz	48.87	54	-5.13	44	Horizontal	1.67
29.13 GHz	43.92	54	-10.08	31	Horizontal	2.43
33.80 GHz	42.66	54	-11.34	334	Horizontal	5.31
34.84 GHz	43.06	54	-10.94	359	Horizontal	5.54
39.20 GHz	42.62	54	-11.38	46	Horizontal	4.1

Table 13: Radiated Emissions 17 – 40 GHz at the Highest Frequency (worse case)

5.6 §15.407(a) Maximum Power Spectral Density

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

The maximum average power spectral density conducted from the intentional radiator of the antenna shall not be greater than 30 dBm in any 500 kHz band during any time interval of continuous transmission. Results of this testing are summarized.

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 internal antenna gain is 5 dBi + Array gain of 3.01 dB which is a total of 8.01 dBi, and the external antenna gain is 4 dBi + Array gain of 3.01 dB which is a total of 7.01 dBi.

5.6.1 Internal Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured EIRP	Measured PSD
OFDM 20	5745	Mcs0	45	26.44	31.44	11.42
OFDM 20	5775	Mcs0	45	26.05	31.05	10.97
OFDM 20	5825	Mcs0	45	25.46	30.46	9.82
VHT 20	5745	Mcs0	45	26.74	31.74	11.26
VHT 20	5775	Mcs0	43	22.14	27.14	6.57
VHT 20	5825	Mcs0	43	21.96	26.96	5.72
VHT 40	5755	Mcs0	44	25.67	30.67	7.69
VHT 40	5775	Mcs0	41	22.82	27.82	5.24
VHT 40	5795	Mcs0	41	22.63	27.63	4.83
VHT 80	5775	Mcs0	38	20.07	25.07	-1.67

5.6.2 External Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured EIRP	Measured PSD
OFDM 20	5745	Mcs0	46	23.69	28.69	8.69
OFDM 20	5775	Mcs0	47	24.91	29.91	9.90
OFDM 20	5825	Mcs0	45	22.96	27.96	7.55
VHT 20	5745	Mcs0	46	23.66	28.66	8.35
VHT 20	5775	Mcs0	47	24.91	29.91	9.50
VHT 20	5825	Mcs0	45	22.96	27.96	6.84

VHT 40	5755	Mcs0	45	23.64	28.64	6.18
VHT 40	5775	Mcs0	47	24.41	29.41	5.97
VHT 40	5795	Mcs0	45	23.36	28.36	4.89
VHT 80	5775	Mcs0	38	19.22	24.22	-2.15

Result

The maximum summed average power spectral density was less than the limit of 30 dBm; therefore, the EUT complies with the specification.

-- End of Test Report --