UNIFIED COMPLIANCE LABORATORY

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	TR9387_02
Date of Test(s)	15, 18, 31 July; 1, 6, 13 August; 9 – 11, 16 September 2024
Report Issue Date	17 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 TESTING ilac-MRA

NVLAP LAB CODE 600241-0

Certification of Engineering Report

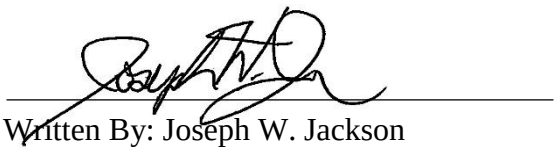
This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart E. This report may be reproduced in full. Partial reproduction of this report may only be made with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

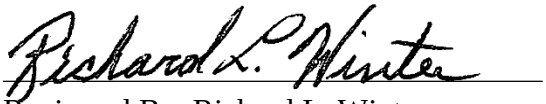
On this 17th day of September 2024, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete and correct to the best of my knowledge and are made in good faith.

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	17 September 2024
02	Amended Section 5.4	23 September 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	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.

Band	Modulation Bandwidth	Frequency (MHz)
UNII-2A	20 MHz	5260, 5265, 5270, 5275, 5280, 5285, 5290, 5295, 5300, 5305, 5310, 5315, 5320
	40 MHz	5270, 5275, 5280, 5285, 5290, 5295, 5300, 5305, 5310
	80 MHz	5290
UNII-2C	20 MHz	5500, 5505, 5510, 5515, 5520, 5525, 5530, 5535, 5540, 5545, 5550, 5555, 5560, 5565, 5570, 5575, 5580, 5585, 5590, 5595, 5600*, 5605*, 5610*, 5615*, 5620*, 5625*, 5630*, 5635*, 5640*, 5645*, 5650, 5655, 5660, 5665, 5670, 5675, 5680, 5685, 5690, 5695, 5700, 5705, 5710, 5715, 5720
	40 MHz	5510, 5515, 5520, 5525, 5530, 5535, 5540, 5545, 5550, 5555, 5560, 5565, 5570, 5575, 5580, 5585, 5590, 5595, 5600*, 5605*, 5610*, 5615*, 5620*, 5625*, 5630*, 5635*, 5640*, 5645*, 5650, 5655, 5660, 5665, 5670, 5675, 5680, 5685, 5690, 5695, 5700, 5705, 5710
	80 MHz	5530, 5535, 5540, 5545, 5550, 5555, 5560, 5565, 5570, 5575, 5580, 5585, 5590, 5595, 5600*, 5605*, 5610*, 5615*, 5620*, 5625*, 5630*, 5635*, 5640*, 5645*, 5650, 5655, 5660, 5665, 5670, 5675, 5680, 5685, 5690
* Frequency not applicable in Canada		

Table 1: UNII-2A and UNII-2C Channel Settings

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	25.4 – 26.5 °C
Humidity	29.5 – 46.1 %
Barometric Pressure	1010 mBar

2.6 Operating Modes

The UDB 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 802.11 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

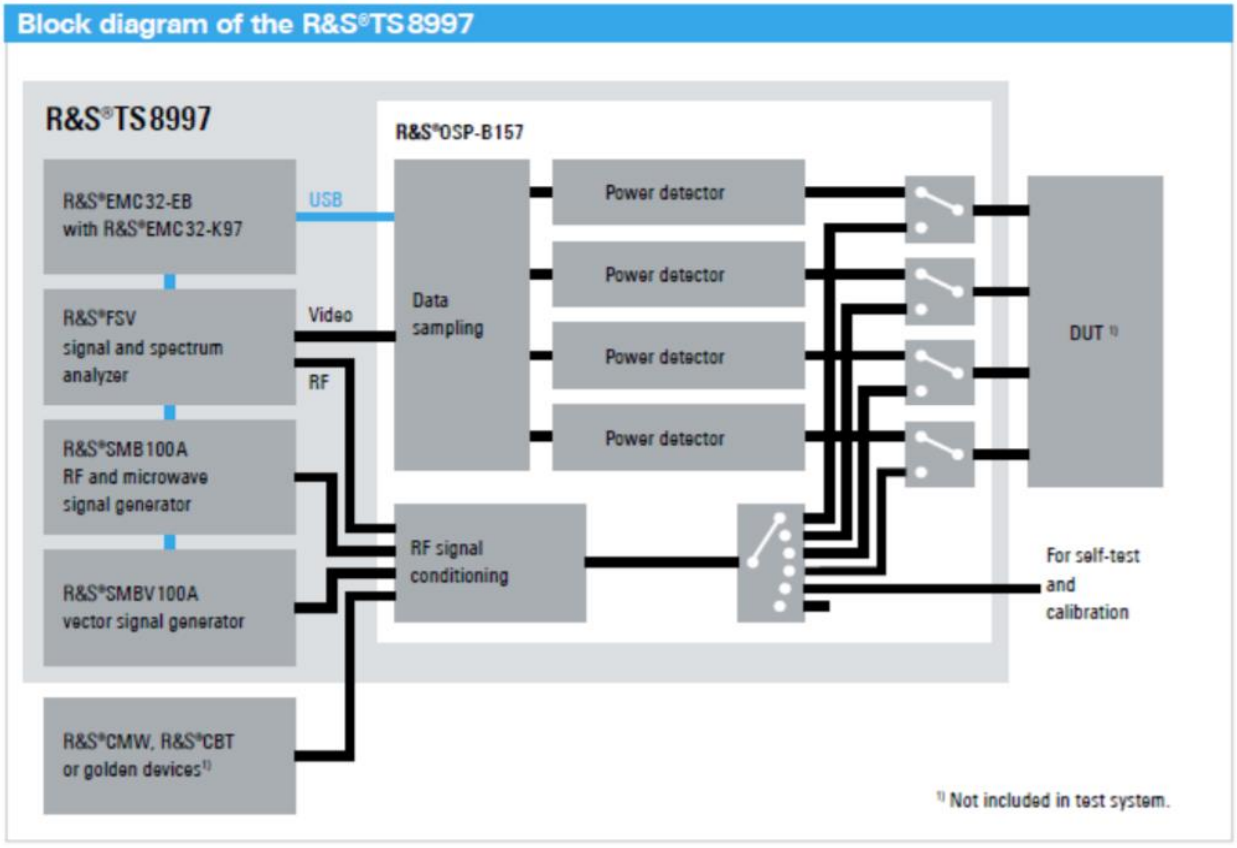


Diagram 1: Test Configuration Block Diagram

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(a)	RSS-247 §6.2.2, §6.2.3	Bandwidth Requirement	5260 to 5720	Compliant
15.407(a)	RSS-247 §6.2.2, §6.2.3	Peak Output Power	5260 to 5720	Compliant
15.407(b)	RSS-247 §6.2.2, §6.2.3	Antenna Conducted Spurious Emissions	0.009 to 40000	Compliant
15.407(b)	RSS-247 §6.2.2, §6.2.3	Radiated Spurious Emissions	0.009 to 40000	Compliant
15.407(a)	RSS-247 §6.2.2, §6.2.3	Peak Power Spectral Density	5260 to 5720	Compliant
15.407(h)	RSS-247 §6.3	DFS Requirements	5260 to 5720	Compliant
The testing was performed according to the procedures in ANSI C63.10-2013, KDB 558074 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 2: List of equipment used for Conducted Emissions Testing at Mains Port

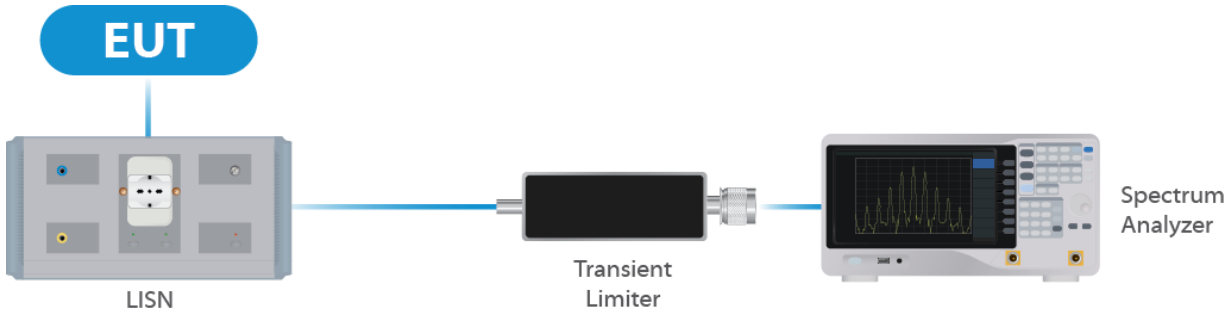


Figure 1: Conducted Emissions Test

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

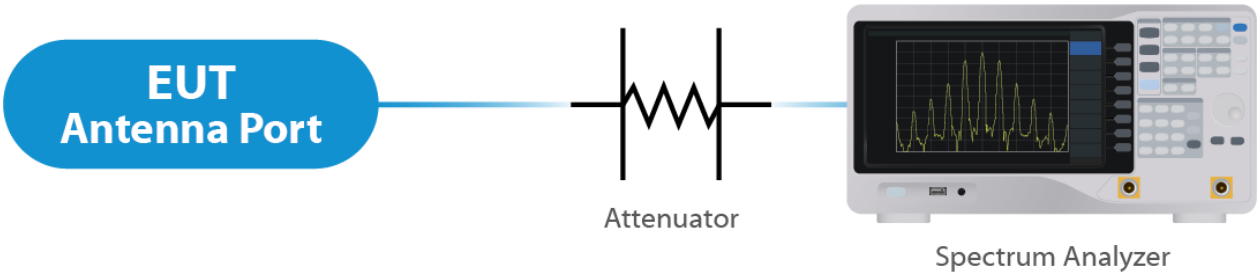


Figure 2: Direct Connect at the Antenna Port Test

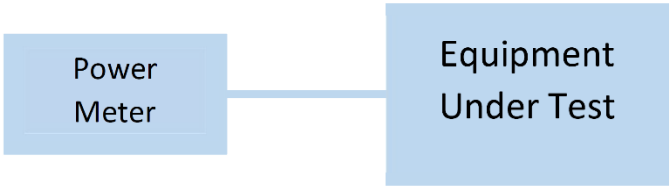


Figure 3: Output Power Measurement

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 4: List of equipment used for Radiated Emissions

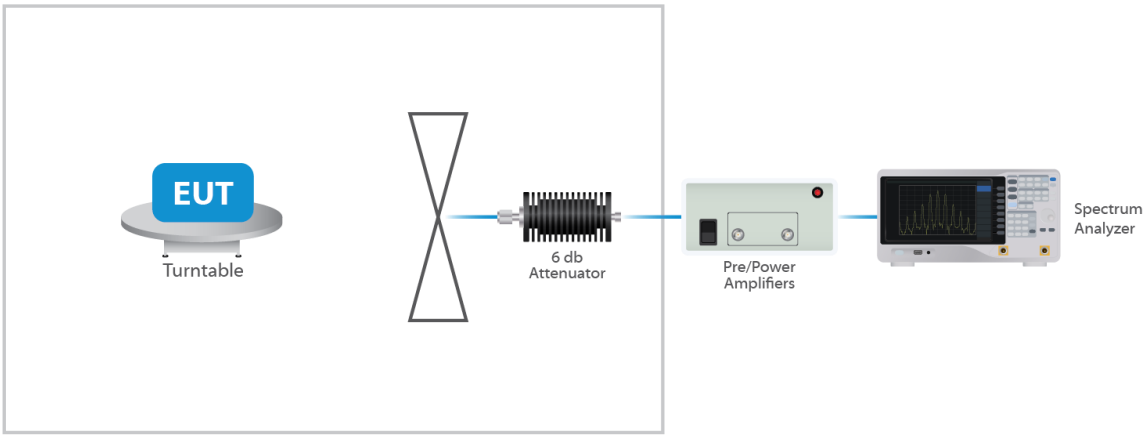


Figure 4: Radiated Emissions Test

4.4 DFS Testing

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
Vector Signal Generator	R&S	SMBV100A	UCL-2873	N/A	N/A
Spectrum Analyzer	Keysight	N9010B	UCL-7069	5/3/2024	5/3/2025

4.4.1 Client Test Set Up

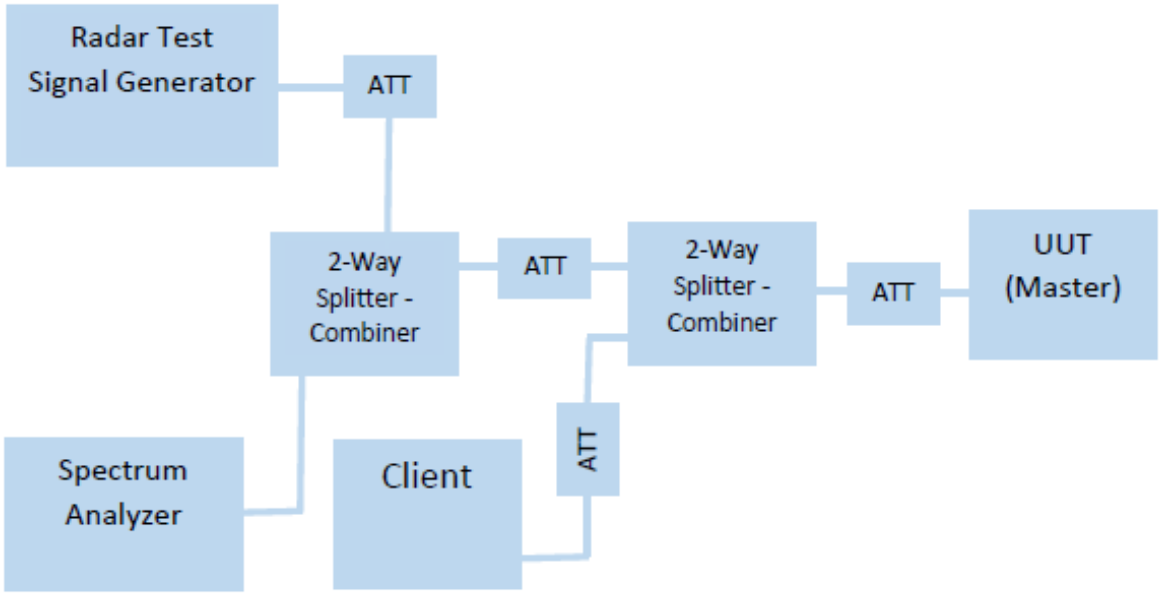


Figure 5: DFS Test Set Up – Client

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 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(NANT/NSS) dB
NANT = number of transmit antennas and
NSS = number of spatial streams. NSS = 1 considered worst case.

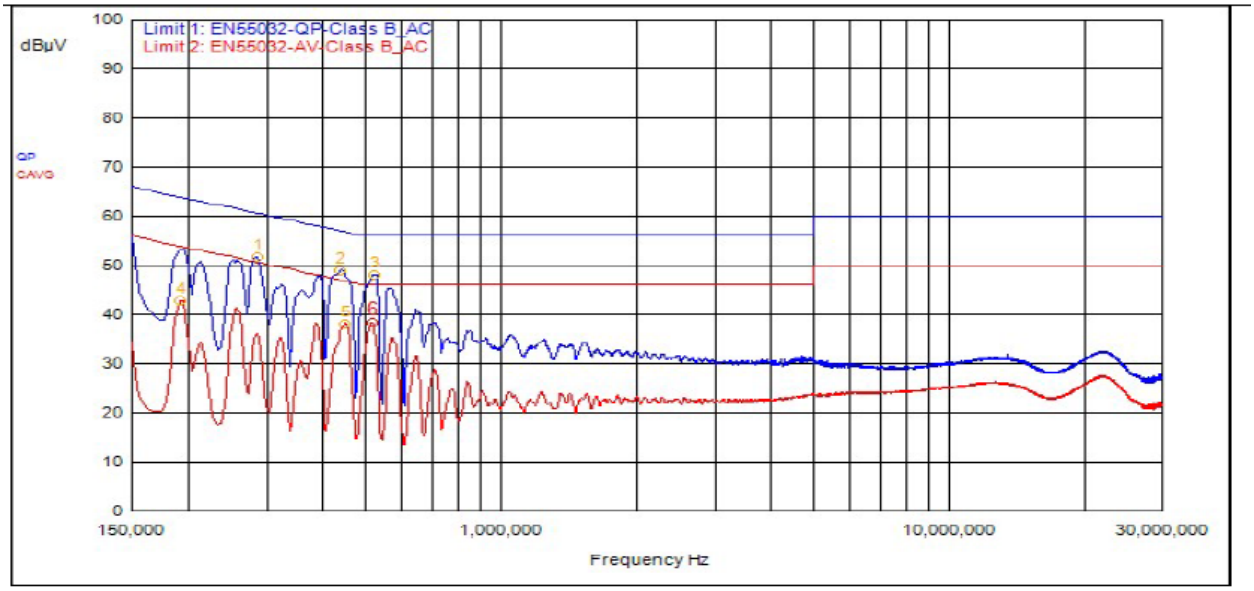
For power measurements on IEEE 802.11 devices, Array Gain = 0 dB for NANT ≤ 4;
For PSD measurements when Nss=1: Array Gain = 10 log(NANT/NSS) dB + Antenna Gain (dBi). Or 3.01 dB + 5 dBi = 8.01 dBi for the internal antenna and 3.01 dB + 4 dBi = 7.01 dBi for the external antenna.

Results

The EUT complied with the specification

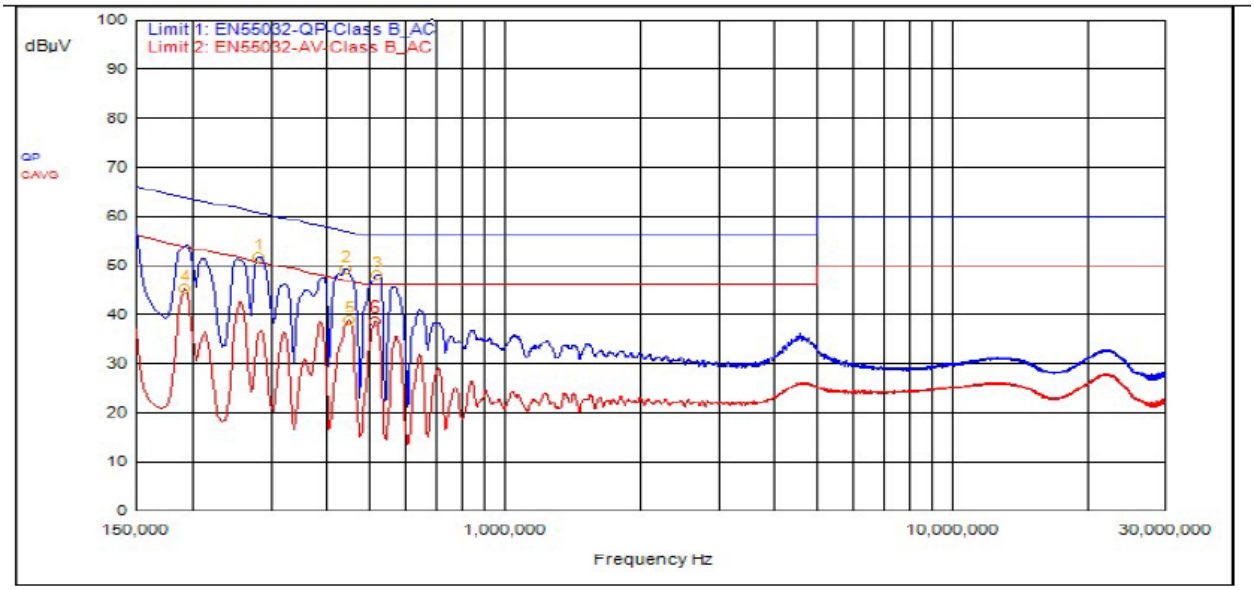
5.2 Conducted Emissions at Mains Ports Data

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 UNII-2A

Internal Antenna

Bandwidth	Frequency (MHz)	99% Bandwidth (MHz)	Emissions 26 dB Bandwidth (MHz)
a 20 MHz	5260	19.5	31.5
a 20 MHz	5280	19.5	36.5
a 20 MHz	5320	18.5	28.6
ac 20 MHz	5260	18.5	21.7
ac 20 MHz	5280	18.8	22.3
ac 20 MHz	5320	18.8	22.8
ac 40 MHz	5270	37.0	42.8
ac 40 MHz	5310	37.0	41.6
ac 80 MHz	5290	77.0	89.5

External/Internal Antenna

Bandwidth	Frequency (MHz)	99% Bandwidth (MHz)	Emissions 26 dB Bandwidth (MHz)
a 20 MHz	5260	24.8	38.4
a 20 MHz	5280	20.3	36.1
a 20 MHz	5320	19.8	31.8
ac 20 MHz	5260	18.5	22.8
ac 20 MHz	5280	18.3	21.7
ac 20 MHz	5320	18.3	21.5
ac 40 MHz	5270	38.0	42.2
ac 40 MHz	5310	37.0	42.2

ac 80 MHz	5290	78.0	88.5

5.3.2 UNII-2C

Internal Antenna

Bandwidth	Frequency (MHz)	99% Bandwidth (MHz)	Emissions 26 dB Bandwidth (MHz)
a 20 MHz	5500	18.0	28.2
a 20 MHz	5600	18.3	31.0
a 20 MHz	5720	18.0	25.4
ac 20 MHz	5500	18.5	22.1
ac 20 MHz	5600	18.5	22.3
ac 20 MHz	5720	18.5	22.7
ac 40 MHz	5510	37.5	41.9
ac 40 MHz	5590	37.0	42.2
ac 40 MHz	5710	37.5	43.5
ac 80 MHz	5530	77.0	90.5
ac 80 MHz	5610	77.0	91.5
ac 80 MHz	5690	77.0	93.0

External/Internal Antenna

Bandwidth	Frequency (MHz)	99% Bandwidth (MHz)	Emissions 26 dB Bandwidth (MHz)
a 20 MHz	5500	19.5	25.3
a 20 MHz	5600	21.5	35.6
a 20 MHz	5720	22.3	36.8
ac 20 MHz	5500	18.3	22.1
ac 20 MHz	5600	18.3	21.8
ac 20 MHz	5720	18.8	22.3

ac 40 MHz	5510	37.5	42.5
ac 40 MHz	5590	37.0	42.3
ac 40 MHz	5710	37.5	43.4
ac 80 MHz	5530	77.0	88.0
ac 80 MHz	5610	77.0	88.5
ac 80 MHz	5690	77.0	90.0

Result

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

5.4 §15.407(a)(2) 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 23.41 dBm or 219.28 mW. The limit is 24 dBm or 250 mW 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 UNII-2A

Internal Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	EIRP	Measured PSD
a 20 MHz	5260	Mcs0_Nss2	42	23.32	28.32	10.79
a 20 MHz	5280	Mcs0_Nss2	42	23.25	28.25	10.94
a 20 MHz	5320	Mcs0_Nss2	41	22.80	27.80	10.41
ac 20 MHz	5260	Mcs0_Nss2	45	16.30	21.30	3.12
ac 20 MHz	5280	Mcs0_Nss2	45	16.05	21.05	2.62
ac 20 MHz	5320	Mcs0_Nss2	45	15.80	20.80	2.35
ac 40 MHz	5270	Mcs0_Nss2	45	16.98	21.98	0.80
ac 40 MHz	5310	Mcs0_Nss2	45	16.85	21.85	0.35
ac 80 MHz	5290	Mcs0_Nss2	45	16.12	21.12	-3.38

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	EIRP	Measured PSD
a 20 MHz	5260	Mcs0_Nss1	40	21.32	26.32	8.79
a 20 MHz	5280	Mcs0_Nss1	40	21.25	26.25	8.94
a 20 MHz	5320	Mcs0_Nss1	39	20.80	25.80	8.41
ac 20 MHz	5260	Mcs0_Nss1	45	16.30	21.30	3.12
ac 20 MHz	5280	Mcs0_Nss1	45	16.05	21.05	2.62
ac 20 MHz	5320	Mcs0_Nss1	45	15.80	20.80	2.35
ac 40 MHz	5270	Mcs0_Nss1	45	16.98	21.98	0.80
ac 40 MHz	5310	Mcs0_Nss1	45	16.85	21.85	0.35

ac 80 MHz	5290	Mcs0_Nss1	45	16.12	21.12	-3.38

External/Internal Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	EIRP	Measured PSD
a 20 MHz	5260	Mcs0_Nss2	46	23.41	28.41	10.93
a 20 MHz	5280	Mcs0_Nss2	45	22.99	27.99	10.94
a 20 MHz	5320	Mcs0_Nss2	45	23.15	28.15	10.80
ac 20 MHz	5260	Mcs0_Nss2	47	17.94	19.94	2.20
ac 20 MHz	5280	Mcs0_Nss2	47	14.87	19.87	1.96
ac 20 MHz	5320	Mcs0_Nss2	47	14.44	19.44	1.35
ac 40 MHz	5270	Mcs0_Nss2	47	15.79	20.79	-0.03
ac 40 MHz	5310	Mcs0_Nss2	47	15.10	20.10	-0.62
ac 80 MHz	5290	Mcs0_Nss2	47	14.71	19.71	-4.63

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	EIRP	Measured PSD
a 20 MHz	5260	Mcs0_Nss1	44	21.41	26.41	8.93
a 20 MHz	5280	Mcs0_Nss1	43	20.99	25.99	8.94
a 20 MHz	5320	Mcs0_Nss1	43	21.15	26.15	8.80
ac 20 MHz	5260	Mcs0_Nss1	47	17.94	19.94	2.20
ac 20 MHz	5280	Mcs0_Nss1	47	14.87	19.87	1.96
ac 20 MHz	5320	Mcs0_Nss1	47	14.44	19.44	1.35
ac 40 MHz	5270	Mcs0_Nss1	47	15.79	20.79	-0.03
ac 40 MHz	5310	Mcs0_Nss1	47	15.10	20.10	-0.62
ac 80 MHz	5290	Mcs0_Nss1	47	14.71	19.71	-4.63

5.4.2 UNII-2C

Internal Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	EIRP	Measured PSD
a 20 MHz	5500	Mcs0_Nss2	41	23.18	28.18	10.92
a 20 MHz	5600	Mcs0_Nss2	39	22.86	27.86	10.64
a 20 MHz	5720	Mcs0_Nss2	41	22.50	27.50	10.17
ac 20 MHz	5500	Mcs0_Nss2	45	16.58	21.58	3.60
ac 20 MHz	5600	Mcs0_Nss2	45	17.44	22.44	4.71
ac 20 MHz	5720	Mcs0_Nss2	45	15.24	20.24	2.40
ac 40 MHz	5510	Mcs0_Nss2	45	17.46	22.46	1.59
ac 40 MHz	5590	Mcs0_Nss2	45	18.21	23.21	2.42
ac 40 MHz	5710	Mcs0_Nss2	45	16.65	21.65	0.50
ac 80 MHz	5530	Mcs0_Nss2	45	16.86	21.86	-2.33
ac 80 MHz	5610	Mcs0_Nss2	45	17.44	22.44	-1.86
ac 80 MHz	5690	Mcs0_Nss2	45	16.17	21.77	-2.86

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	EIRP	Measured PSD
a 20 MHz	5500	Mcs0_Nss1	39	21.18	26.18	8.92
a 20 MHz	5600	Mcs0_Nss1	37	20.86	25.86	8.64
a 20 MHz	5720	Mcs0_Nss1	39	20.50	25.50	8.17
ac 20 MHz	5500	Mcs0_Nss1	45	16.58	21.58	3.60
ac 20 MHz	5600	Mcs0_Nss1	45	17.44	22.44	4.71
ac 20 MHz	5720	Mcs0_Nss1	45	15.24	20.24	2.40
ac 40 MHz	5510	Mcs0_Nss1	45	17.46	22.46	1.59
ac 40 MHz	5590	Mcs0_Nss1	45	18.21	23.21	2.42
ac 40 MHz	5710	Mcs0_Nss1	45	16.65	21.65	0.50
ac 80 MHz	5530	Mcs0_Nss1	45	16.86	21.86	-2.33
ac 80 MHz	5610	Mcs0_Nss1	45	17.44	22.44	-1.86

ac 80 MHz	5690	Mcs0_Nss2	45	16.17	21.77	-2.86

External/Internal Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	EIRP	Measured PSD
a 20 MHz	5500	Mcs0_Nss2	44	22.44	27.44	9.98
a 20 MHz	5600	Mcs0_Nss2	43	22.89	27.89	10.68
a 20 MHz	5720	Mcs0_Nss2	45	22.93	27.93	10.67
ac 20 MHz	5500	Mcs0_Nss2	47	14.36	19.36	1.41
ac 20 MHz	5600	Mcs0_Nss2	47	15.46	20.46	2.91
ac 20 MHz	5720	Mcs0_Nss2	47	14.30	19.30	1.80
ac 40 MHz	5510	Mcs0_Nss2	47	15.39	20.39	-0.09
ac 40 MHz	5590	Mcs0_Nss2	47	16.13	21.13	0.57
ac 40 MHz	5710	Mcs0_Nss2	47	15.37	20.37	-0.36
ac 80 MHz	5530	Mcs0_Nss2	47	14.91	19.91	-4.27
ac 80 MHz	5610	Mcs0_Nss2	47	15.33	20.33	-3.73
ac 80 MHz	5690	Mcs0_Nss2	47	14.66	19.66	-4.68

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	EIRP	Measured PSD
a 20 MHz	5500	Mcs0_Nss1	43	21.44	26.44	8.98
a 20 MHz	5600	Mcs0_Nss1	41	20.89	25.89	8.68
a 20 MHz	5720	Mcs0_Nss1	43	20.93	25.93	8.67
ac 20 MHz	5500	Mcs0_Nss1	47	14.36	19.36	1.41
ac 20 MHz	5600	Mcs0_Nss1	47	15.46	20.46	2.91
ac 20 MHz	5720	Mcs0_Nss1	47	14.30	19.30	1.80
ac 40 MHz	5510	Mcs0_Nss1	47	15.39	20.39	-0.09
ac 40 MHz	5590	Mcs0_Nss1	47	16.13	21.13	0.57
ac 40 MHz	5710	Mcs0_Nss1	47	15.37	20.37	-0.36
ac 80 MHz	5530	Mcs0_Nss1	47	14.91	19.91	-4.27

ac 80 MHz	5610	Mcs0_Nss1	47	15.33	20.33	-3.73
ac 80 MHz	5690	Mcs0_Nss1	47	14.66	19.66	-4.68

Result

In the configuration tested, the maximum average RF output power was less than 0.250 watt; therefore, the EUT complied with the requirements of the specification.

5.5 §15.407(b) 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 dBi accounted for. These demonstrate compliance with the provisions of this section at the band edges.

The emissions must be below -27 dBm EIRP.

Result

Conducted spurious emissions were below -27 dBm; therefore, the EUT complies with the specification. See Annex for results.

5.5.2 Radiated Spurious Emissions in the Restricted Bands of § 15.205

The frequency range from the lowest frequency generated or used in the device to the tenth harmonic of the highest fundamental emissions was investigated to measure any radiated emissions in the restricted bands. For frequencies above 18.0 GHz. The emissions in the restricted bans must meet the limits specified in § 15.209. Conducted measurement results are included in the Annex. Radiated data with the EUT transmitting into a load is included below. All emissions between the required frequencies were investigated, the following plots represent the worst case. The “fail” is the transmitted signal exceeding the spurious limit.

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

5.5.3 UNII-2A

Internal Antenna

QuasiPeak

Frequency	Level (dBµV/m)	Limit (dBµV/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 5: Radiated Emissions 30 – 1000 MHz

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.5 GHz	55.38	74	-18.62	272	1.5	Vertical	11.297
14.37 GHz	56.985	74	-17.015	38	3.974	Vertical	15.636
16.893 GHz	59.169	74	-14.831	39	1.5	Vertical	19.183
14.486 GHz	57.093	74	-16.907	288	3.789	Horizontal	15.588
16.951 GHz	59.811	74	-14.189	275	1.705	Horizontal	19.268

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.5 GHz	45.078	54	-8.922	272	1.5	Vertical	11.297
14.37 GHz	44.032	54	-9.968	38	3.974	Vertical	15.636
16.893 GHz	46.157	54	-7.843	39	1.5	Vertical	19.183
14.486 GHz	43.847	54	-10.153	288	3.789	Horizontal	15.588
16.951 GHz	46.141	54	-7.859	275	1.705	Horizontal	19.268

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)
14.515 GHz	57.122	74	-16.878	134	1.638	Vertical	15.569
16.9 GHz	59.708	74	-14.292	5	3.793	Vertical	19.256
12.5 GHz	54.481	74	-19.519	321	1.5	Horizontal	11.297

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
14.694 GHz	56.785	74	-17.215	280	3.613	Horizontal	15.473
16.922 GHz	59.45	74	-14.55	130	2.751	Horizontal	19.315

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
14.515 GHz	43.896	54	-10.104	134	1.638	Vertical	15.569
16.9 GHz	46.198	54	-7.802	5	3.793	Vertical	19.256
12.5 GHz	45.546	54	-8.454	321	1.5	Horizontal	11.297
14.694 GHz	43.555	54	-10.445	280	3.613	Horizontal	15.473
16.922 GHz	46.137	54	-7.863	130	2.751	Horizontal	19.315

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)
10.637 GHz	59.934	74	-14.066	209	2.751	Vertical	11.939
14.379 GHz	56.776	74	-17.224	31	2.575	Vertical	15.638
15.961 GHz	56.692	74	-17.308	15	1.82	Vertical	12.105
10.641 GHz	59.318	74	-14.682	217	1.877	Horizontal	11.941
14.109 GHz	56.571	74	-17.429	120	3.793	Horizontal	15.288
16.99 GHz	60.53	74	-13.47	139	1.877	Horizontal	19.202

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.637 GHz	46.708	54	-7.292	209	2.751	Vertical	11.939
14.379 GHz	43.995	54	-10.005	31	2.575	Vertical	15.638
15.961 GHz	42.966	54	-11.034	15	1.82	Vertical	12.105
10.641 GHz	45.425	54	-8.575	217	1.877	Horizontal	11.941
14.109 GHz	43.329	54	-10.671	120	3.793	Horizontal	15.288
16.99 GHz	46.06	54	-7.94	139	1.877	Horizontal	19.202

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)
21.123 GHz	63.825	74	-10.175	197	Vertical	0.809
30.792 GHz	53.577	74	-20.423	140	Vertical	2.22
36.326 GHz	56.578	74	-17.422	37	Vertical	5.796
27.234 GHz	53.219	74	-20.781	277	Horizontal	3.015
33.52 GHz	55.995	74	-18.005	81	Horizontal	4.605
35.085 GHz	56.733	74	-17.267	232	Horizontal	5.919
39.575 GHz	56.81	74	-17.19	349	Horizontal	4.209

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
21.123 GHz	49.801	54	-4.199	197	Vertical	0.809
30.792 GHz	40.817	54	-13.183	140	Vertical	2.22
36.326 GHz	43.833	54	-10.167	37	Vertical	5.796
27.234 GHz	40.346	54	-13.654	277	Horizontal	3.015
33.52 GHz	42.314	54	-11.686	81	Horizontal	4.605
35.085 GHz	43.703	54	-10.297	232	Horizontal	5.919
39.575 GHz	43.361	54	-10.639	349	Horizontal	4.209

Table 9: Radiated Emissions 17 – 40 GHz at the Middle Frequency (worse case)

External/Internal Antenna

QuasiPeak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
36.06 MHz	34.65	40	-5.35	185	1.13	Vertical	-10.02
45.11 MHz	30.66	40	-9.34	329	1.13	Vertical	-8.02
51.82 MHz	36.73	40	-3.27	339	1.13	Vertical	-8.11
56.34 MHz	32.03	40	-7.98	73	1.64	Vertical	-8.36
218.70 MHz	31.04	40	-8.96	258	1.13	Horizontal	-9.44

Table 10: Radiated Emissions 30 – 1000 MHz

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.50 GHz	54.26	74	-19.74	351	3.798	Vertical	9.88
12.50 GHz	52.87	74	-21.13	59	1.83	Horizontal	9.88

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.50 GHz	43.56	54	-10.44	351	3.798	Vertical	9.88
12.50 GHz	39.81	54	-14.19	59	1.83	Horizontal	9.88

Table 11: 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)
12.50 GHz	57.44	74	-16.57	25	1.638	Vertical	9.88
12.50 GHz	56.51	74	-17.49	354	1.638	Horizontal	9.88
13.94 GHa	56.76	74	-17.25	4	2.645	Horizontal	13.34

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.50 GHz	50.53	54	-3.48	25	1.638	Vertical	9.88
12.50 GHz	48.89	54	-5.11	354	1.638	Horizontal	9.88
13.94 GHz	43.33	54	-10.67	4	2.645	Horizontal	13.34

Table 12: 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)
12.50 GHz	55.99	74	-18.01	337	1.643	Vertical	9.88
14.74 GHz	57.33	74	-16.67	350	1.638	Vertical	14.09
10.96 GHz	53.88	74	-20.12	359	1.643	Horizontal	11.32
12.50 GHz	57.05	74	-16.95	345	1.638	Horizontal	9.88

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.50 GHz	47.48	54	-6.52	337	1.643	Vertical	9.88
14.74 GHz	44.45	54	-9.55	350	1.638	Vertical	14.09
10.96 GHz	41.03	54	-12.97	359	1.643	Horizontal	11.32
12.50 GHz	49.30	54	-4.70	345	1.638	Horizontal	9.88

Table 13: Radiated Emissions 1 – 17 GHz at the Highest Frequency

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
26.75 GHz	52.76	74	-21.24	11	Vertical	3.10
33.74 GHz	55.71	74	-18.29	44	Vertical	4.77
34.94 GHz	57.52	74	-16.49	49	Vertical	6.30
25.55 GHz	53.61	74	-20.39	359	Horizontal	3.55
28.01 GHz	53.14	74	-20.86	8	Horizontal	2.65
33.80 GHz	56.19	74	-17.81	119	Horizontal	5.30

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
26.75 GHz	39.80	54	-14.20	11	Vertical	3.10
33.74 GHz	42.20	54	-11.80	44	Vertical	4.77
34.94 GHz	44.02	54	-9.98	49	Vertical	6.30
25.55 GHz	40.43	54	-13.57	359	Horizontal	3.55
28.01 GHz	40.13	54	-13.87	8	Horizontal	2.65

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
33.80 GHz	42.79	54	-11.21	119	Horizontal	5.30

Table 14: Radiated Emissions 17 – 40 GHz at the Lowest Frequency (worse case)

5.5.4 UNII-2C

Internal Antenna

QuasiPeak

Frequency	Level (dBµV/m)	Limit (dBµV/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 15: Radiated Emissions 30 – 1000 MHz

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.001 GHz	56.078	74	-17.922	22	2.575	Vertical	12.222
14.425 GHz	56.986	74	-17.014	311	2.716	Vertical	15.626
16.499 GHz	57.867	74	-16.133	268	2.358	Vertical	16.17
11.003 GHz	53.68	74	-20.32	24	3.617	Horizontal	12.221
12.5 GHz	53.795	74	-20.205	295	2.579	Horizontal	11.297
14.403 GHz	56.89	74	-17.11	26	1.638	Horizontal	15.64
16.55 GHz	57.161	74	-16.839	23	3.789	Horizontal	16.643

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.001 GHz	42.649	54	-11.351	22	2.575	Vertical	12.222
14.425 GHz	44.015	54	-9.985	311	2.716	Vertical	15.626
16.499 GHz	44.753	54	-9.247	268	2.358	Vertical	16.17
11.003 GHz	40.538	54	-13.462	24	3.617	Horizontal	12.221
12.5 GHz	43.465	54	-10.535	295	2.579	Horizontal	11.297
14.403 GHz	44.045	54	-9.955	26	1.638	Horizontal	15.64
16.55 GHz	44.369	54	-9.631	23	3.789	Horizontal	16.643

Table 16: 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)
11.2 GHz	57.448	74	-16.552	323	3.453	Vertical	12.137
16.795 GHz	59.622	74	-14.378	323	3.802	Vertical	18.346
11.204 GHz	56.366	74	-17.634	336	3.802	Horizontal	12.138
12.5 GHz	52.167	74	-21.833	211	3.272	Horizontal	11.297
14.771 GHz	56.59	74	-17.41	3	1.5	Horizontal	15.363
16.79 GHz	59.577	74	-14.423	3	3.436	Horizontal	18.33

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.2 GHz	44.342	54	-9.658	323	3.453	Vertical	12.137
16.795 GHz	46.404	54	-7.596	323	3.802	Vertical	18.346
11.204 GHz	43.005	54	-10.995	336	3.802	Horizontal	12.138
12.5 GHz	39.067	54	-14.933	211	3.272	Horizontal	11.297
14.771 GHz	43.667	54	-10.333	3	1.5	Horizontal	15.363
16.79 GHz	46.215	54	-7.785	3	3.436	Horizontal	18.33

Table 17: 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)
11.429 GHz	59.783	74	-14.217	12	2.402	Vertical	12.862
14.411 GHz	57.24	74	-16.76	133	2.226	Vertical	15.635
16.973 GHz	59.068	74	-14.932	195	1.815	Vertical	19.231
11.439 GHz	58.417	74	-15.583	185	1.638	Horizontal	12.864
14.511 GHz	57.353	74	-16.647	126	3.793	Horizontal	15.572
16.941 GHz	59.167	74	-14.833	307	3.272	Horizontal	19.284

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.429 GHz	46.343	54	-7.657	12	2.402	Vertical	12.862
14.411 GHz	44.024	54	-9.976	133	2.226	Vertical	15.635
16.973 GHz	46.092	54	-7.908	195	1.815	Vertical	19.231
11.439 GHz	45.489	54	-8.511	185	1.638	Horizontal	12.864

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
14.511 GHz	43.966	54	-10.034	126	3.793	Horizontal	15.572
16.941 GHz	46.199	54	-7.801	307	3.272	Horizontal	19.284

Table 18: Radiated Emissions 1 – 17 GHz at the Highest Frequency

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
25.625 GHz	53.658	74	-20.342	182	Vertical	3.526
27.631 GHz	54.382	74	-19.618	4	Vertical	3.423
34.98 GHz	57.065	74	-16.935	238	Vertical	6.385
39.302 GHz	56.911	74	-17.089	270	Vertical	4.364
18.75 GHz	52.05	74	-21.95	244	Horizontal	0.205
25.564 GHz	53.729	74	-20.271	4	Horizontal	3.672
27.595 GHz	54.653	74	-19.347	293	Horizontal	3.362
34.996 GHz	57.798	74	-16.202	336	Horizontal	6.411

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
25.625 GHz	40.662	54	-13.338	182	Vertical	3.526
27.631 GHz	41.333	54	-12.667	4	Vertical	3.423
34.98 GHz	44.553	54	-9.447	238	Vertical	6.385
39.302 GHz	43.398	54	-10.602	270	Vertical	4.364
18.75 GHz	41.696	54	-12.304	244	Horizontal	0.205
25.564 GHz	40.807	54	-13.193	4	Horizontal	3.672
27.595 GHz	41.093	54	-12.907	293	Horizontal	3.362
34.996 GHz	44.505	54	-9.495	336	Horizontal	6.411

Table 19: Radiated Emissions 17 – 40 GHz at the Lowest Frequency (worse case)

External/Internal Antenna

QuasiPeak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
36.06 MHz	34.65	40	-5.35	185	1.13	Vertical	-10.02
45.11 MHz	30.66	40	-9.34	329	1.13	Vertical	-8.02
51.82 MHz	36.73	40	-3.27	339	1.13	Vertical	-8.11
56.34 MHz	32.03	40	-7.98	73	1.64	Vertical	-8.36
218.70 MHz	31.04	40	-8.96	258	1.13	Horizontal	-9.44

Table 20: Radiated Emissions 30 – 1000 MHz

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.50 GHz	57.36	74	-16.64	28	1.638	Vertical	9.88
13.86 GHz	57.15	74	-16.85	113	1.638	Vertical	13.35
12.50 GHz	55.92	74	-18.08	31	3.802	Horizontal	9.88

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.50 GHz	50.20	54	-3.80	28	1.638	Vertical	9.88
13.86 GHz	44.10	54	-9.90	113	1.638	Vertical	13.35
12.50 GHz	46.56	54	-7.44	31	3.802	Horizontal	9.88

Table 21: 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)
10.89 GHz	54.19	74	-19.81	297	2.142	Vertical	10.98
12.50 GHz	57.79	74	-16.21	27	1.638	Vertical	9.88
12.50 GHz	55.64	74	-18.40	353	1.643	Horizontal	9.88
16.75 GHz	56.33	74	-17.67	163	2.65	Horizontal	13.62

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
10.89 GHz	41.42	54	-12.58	297	2.142	Vertical	10.98
12.50 GHz	50.79	54	-3.30	27	1.638	Vertical	9.88
12.50 GHz	45.87	54	-8.13	353	1.643	Horizontal	9.88
16.75 GHz	42.81	54	-11.19	163	2.65	Horizontal	13.62

Table 22: 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)
12.50 GHz	57.62	74	-16.38	26	1.643	Vertical	9.88
14.63 GHz	57.88	74	-16.12	221	2.146	Vertical	14.19
12.50 GHz	56.12	74	-17.88	359	1.638	Horizontal	9.88

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
12.50 GHz	48.52	54	-5.48	26	1.643	Vertical	9.88
14.63 GHz	44.83	54	-9.17	221	2.146	Vertical	14.19
12.50 GHz	47.33	54	-6.67	359	1.638	Horizontal	9.88

Table 23: Radiated Emissions 1 – 17 GHz at the Highest Frequency

Peak

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
27.31 GHz	52.59	74	-21.42	70	Vertical	2.77
33.79 GHz	55.17	74	-18.83	150	Vertical	4.94
27.54 GHz	53.11	74	-20.89	67	Horizontal	2.82
33.80 GHz	56.13	74	-17.88	275	Horizontal	5.30

Avg

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
27.31 GHz	39.79	54	-14.21	70	Vertical	2.77
33.79 GHz	42.39	54	-11.60	150	Vertical	4.94
27.54 GHz	40.23	54	-13.77	67	Horizontal	2.82

Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
33.80 GHz	42.71	54	-11.29	275	Horizontal	5.30

Table 24: Radiated Emissions 17 – 40 GHz at 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 11 dBm in any 1 MHz band during any time interval of continuous transmission. Results of this testing are summarized. With a 6 dBi antenna, the conducted limit for power spectral density is 11 dBm.

The internal antenna and external/internal antennas have a gain of 5 dBi so the PSD Nss-1 adjusted limit is 8.99 dBm.

For PSD measurements when Nss=1: Array Gain = 10 log(NANT/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 of this testing are summarized.

5.6.1 UNII-2A

Internal Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured PSD
a 20 MHz	5260	Mcs0_Nss2	42	23.32	10.79
a 20 MHz	5280	Mcs0_Nss2	42	23.25	10.94
a 20 MHz	5320	Mcs0_Nss2	41	22.80	10.41
ac 20 MHz	5260	Mcs0_Nss2	45	16.30	3.12
ac 20 MHz	5280	Mcs0_Nss2	45	16.05	2.62
ac 20 MHz	5320	Mcs0_Nss2	45	15.80	2.35
ac 40 MHz	5270	Mcs0_Nss2	45	16.98	0.80
ac 40 MHz	5310	Mcs0_Nss2	45	16.52	0.35
a 80 MHz	5260	Mcs0_Nss2	45	16.12	-3.38

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured PSD
a 20 MHz	5260	Mcs0_Nss1	40	21.32	8.79
a 20 MHz	5280	Mcs0_Nss1	40	21.25	8.94

a 20 MHz	5320	Mcs0_Nss1	39	25.80	8.41
ac 20 MHz	5260	Mcs0_Nss1	45	16.30	3.12
ac 20 MHz	5280	Mcs0_Nss1	45	16.05	2.62
ac 20 MHz	5320	Mcs0_Nss1	45	15.80	2.35
ac 40 MHz	5270	Mcs0_Nss1	45	16.98	0.80
ac 40 MHz	5310	Mcs0_Nss1	45	16.52	0.35
a 80 MHz	5260	Mcs0_Nss1	45	16.12	-3.38

External/Internal Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured PSD
a 20 MHz	5260	Mcs0_Nss2	46	23.41	10.93
a 20 MHz	5280	Mcs0_Nss2	45	22.99	10.94
a 20 MHz	5320	Mcs0_Nss2	45	23.15	10.80
ac 20 MHz	5260	Mcs0_Nss2	47	14.94	2.20
ac 20 MHz	5280	Mcs0_Nss2	47	14.87	1.96
ac 20 MHz	5320	Mcs0_Nss2	47	14.44	1.35
ac 40 MHz	5270	Mcs0_Nss2	47	15.79	-0.03
ac 40 MHz	5310	Mcs0_Nss2	47	15.10	-0.62
a 80 MHz	5260	Mcs0_Nss2	47	14.71	-4.63

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured PSD
a 20 MHz	5260	Mcs0_Nss1	44	21.41	8.93
a 20 MHz	5280	Mcs0_Nss1	43	20.99	8.94
a 20 MHz	5320	Mcs0_Nss1	43	21.15	8.80
ac 20 MHz	5260	Mcs0_Nss1	47	14.94	2.20
ac 20 MHz	5280	Mcs0_Nss1	47	14.87	1.96
ac 20 MHz	5320	Mcs0_Nss1	47	14.44	1.35
ac 40 MHz	5270	Mcs0_Nss1	47	15.79	-0.03
ac 40 MHz	5310	Mcs0_Nss1	47	15.10	-0.62

a 80 MHz	5260	Mcs0_Nss1	47	14.71	-4.63

5.6.2 UNII-2C

Internal Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured PSD
a 20 MHz	5500	Mcs0_Nss2	41	23.18	10.92
a 20 MHz	5600	Mcs0_Nss2	39	22.86	10.64
a 20 MHz	5720	Mcs0_Nss2	41	22.50	10.17
ac 20 MHz	5500	Mcs0_Nss2	45	16.58	3.60
ac 20 MHz	5600	Mcs0_Nss2	45	17.44	4.71
ac 20 MHz	5720	Mcs0_Nss2	45	15.24	2.40
ac 40 MHz	5510	Mcs0_Nss2	45	17.46	1.59
ac 40 MHz	5590	Mcs0_Nss2	45	18.21	2.42
ac 40 MHz	5710	Mcs0_Nss2	45	16.65	0.50
ac 80 MHz	5530	Mcs0_Nss2	45	16.86	-2.33
ac 80 MHz	5610	Mcs0_Nss2	45	17.44	-1.86
ac 80 MHz	5690	Mcs0_Nss2	45	16.17	-2.86

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured PSD
a 20 MHz	5500	Mcs0_Nss1	39	21.18	8.92
a 20 MHz	5600	Mcs0_Nss1	37	20.86	8.64
a 20 MHz	5720	Mcs0_Nss1	39	20.50	8.17
ac 20 MHz	5500	Mcs0_Nss1	45	16.58	3.60
ac 20 MHz	5600	Mcs0_Nss1	45	17.44	4.71
ac 20 MHz	5720	Mcs0_Nss1	45	15.24	2.40
ac 40 MHz	5510	Mcs0_Nss1	45	17.46	1.59
ac 40 MHz	5590	Mcs0_Nss1	45	18.21	2.42
ac 40 MHz	5710	Mcs0_Nss1	45	16.65	0.50

ac 80 MHz	5530	Mcs0_Nss1	45	16.86	-2.33
ac 80 MHz	5610	Mcs0_Nss1	45	17.44	-1.86
ac 80 MHz	5690	Mcs0_Nss1	45	16.17	-2.86

External/Internal Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured PSD
a 20 MHz	5500	Mcs0_Nss2	44	22.44	9.98
a 20 MHz	5600	Mcs0_Nss2	43	22.89	10.68
a 20 MHz	5720	Mcs0_Nss2	45	22.93	10.67
ac 20 MHz	5500	Mcs0_Nss2	47	14.36	1.41
ac 20 MHz	5600	Mcs0_Nss2	47	15.46	2.91
ac 20 MHz	5720	Mcs0_Nss2	47	14.30	1.80
ac 40 MHz	5510	Mcs0_Nss2	47	15.39	-0.09
ac 40 MHz	5590	Mcs0_Nss2	47	16.13	0.57
ac 40 MHz	5710	Mcs0_Nss2	47	15.37	-0.36
ac 80 MHz	5530	Mcs0_Nss2	47	14.91	-4.27
ac 80 MHz	5610	Mcs0_Nss2	47	15.33	-3.73
ac 80 MHz	5690	Mcs0_Nss2	47	14.66	-4.68

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power	Measured PSD
a 20 MHz	5500	Mcs0_Nss1	43	21.44	8.98
a 20 MHz	5600	Mcs0_Nss1	41	20.89	8.68
a 20 MHz	5720	Mcs0_Nss1	43	20.93	8.67
ac 20 MHz	5500	Mcs0_Nss1	47	14.36	1.41
ac 20 MHz	5600	Mcs0_Nss1	47	15.46	2.91
ac 20 MHz	5720	Mcs0_Nss1	47	14.30	1.80
ac 40 MHz	5510	Mcs0_Nss1	47	15.39	-0.09
ac 40 MHz	5590	Mcs0_Nss1	47	16.13	0.57
ac 40 MHz	5710	Mcs0_Nss1	47	15.37	-0.36

ac 80 MHz	5530	Mcs0_Nss1	47	14.91	-4.27
ac 80 MHz	5610	Mcs0_Nss1	47	15.33	-3.73
ac 80 MHz	5690	Mcs0_Nss1	47	14.66	-4.68

Result

The maximum average power spectral density was less than the limit of 11 dBm; therefore, the EUT complies with the specification.

5.7 DFS Requirement

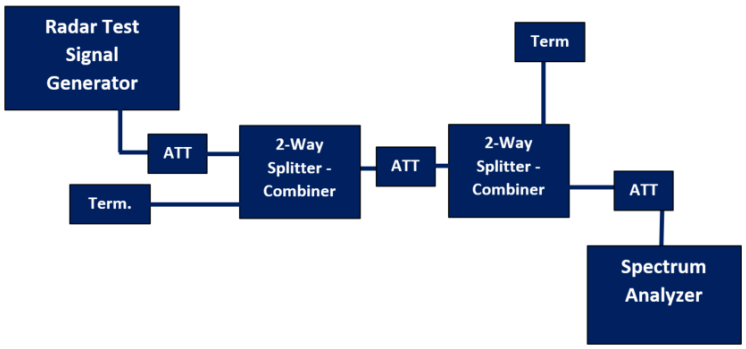
This product is a client without radar detection. The outcome of the required DFS tests is located in this section. DFS testing was performed following the test procedures as outlined in KDB 905462.

The product passes all required DFS tests for a client with radar detection.

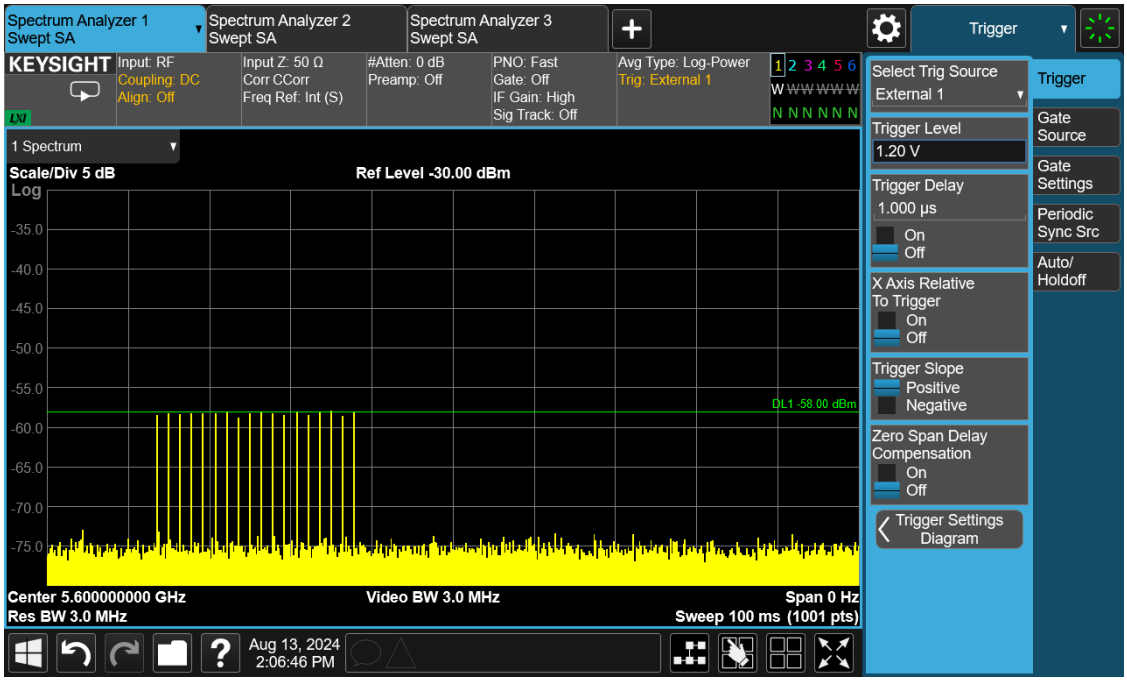
Information	Status	
Possible Antenna/s	Integral Internal 5 dBi and External Omni 4 dBi	
Antenna used for test	External Omni	
Operating mode	Client	
If Client	SWX-U7PRO	
Port used for testing	J0	
EIRP range	> 200 milliwatts	
Impedance of port	50 ohms	
Channel loading technique	Data transfer was enacted to achieve a minimum channel loading of approximately 17%	
Antenna measurement technique	See note 1	
Time of power-on cycle	25s	
Detection threshold level	-64 dBm	

Requirement	Operational Mode		
	Master	Client Without Radar Detection	Client With Radar Detection
Non-Occupancy Period	Yes	Not Required	Yes
DFS Detection Threshold	Yes	Not Required	Yes
Channel Availability Check Time	Yes	Not Required	Not Required
U-NII Detection Bandwidth	Yes	Not Required	Yes

Requirement	Operational Mode	
	Master or Client Client Without Radar Detection	Client Without Radar Detection
DFS Detection Threshold	Yes	Not Required
Channel Closing Transmission Time	Yes	Yes
Channel Move Time	Yes	Yes
U-NII Detection Bandwidth	Yes	Not Required



Maximum Transmit Power	**Value (See Notes 1, 2, and 3)**
EIRP ≥ 200 milliwatt	-64 dBm
EIRP < 200 milliwatt and power spectral density < 10 dBm/MHz	-62 dBm
EIRP < 200 milliwatt that do not meet the power spectral density requirement	-64 dBm
Note 1: This is the level at the input of the receiver assuming a 0 dBi receive antenna. **Note 2:** Throughout these test procedures an additional 1 dB has been added to the amplitude of the test transmission waveforms to account for variations in measurement equipment. This will ensure that the test signal is at or above the detection threshold level to trigger a DFS response. **Note3:** EIRP is based on the highest antenna gain. For MIMO devices refer to KDB Publication 662911 D01.	



Plot 1: Radar Level 0

5.7.1 In-service Monitoring

Channel Move Time	10 seconds
Channel Closing Transmission Time	200 ms + aggregate of 60 ms over remaining 10 second period
Non-occupancy period	Minimum 30 minutes

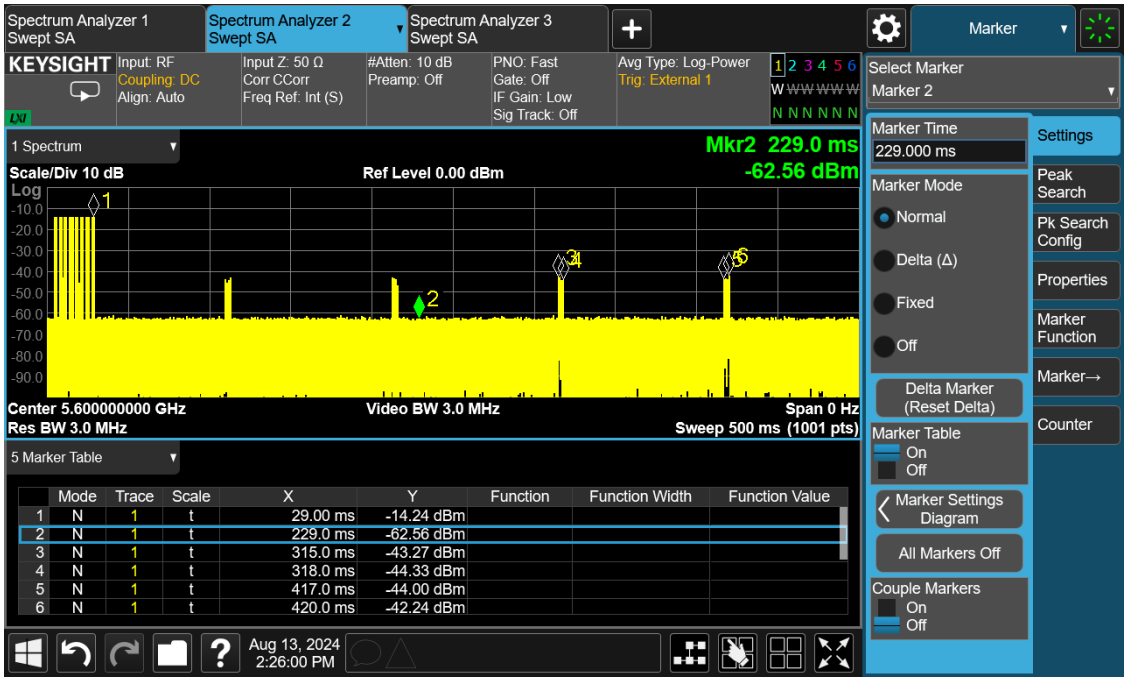
Verified during in-service monitoring: channel closing transmission time and channel move time. The transmissions were observed at the end of the radar burst on the operating channel for a duration of greater than 10 seconds. The transmissions were measured and recorded during the observation time. This was compared to the channel move time and channel closing time limits.

One 12 second plot is reported for the short pulse radar type 0. A 60 ms plot is also provided to verify closing time for the aggregate transmission time starting from 200 ms after the end of the radar signal to the completion of the channel move.

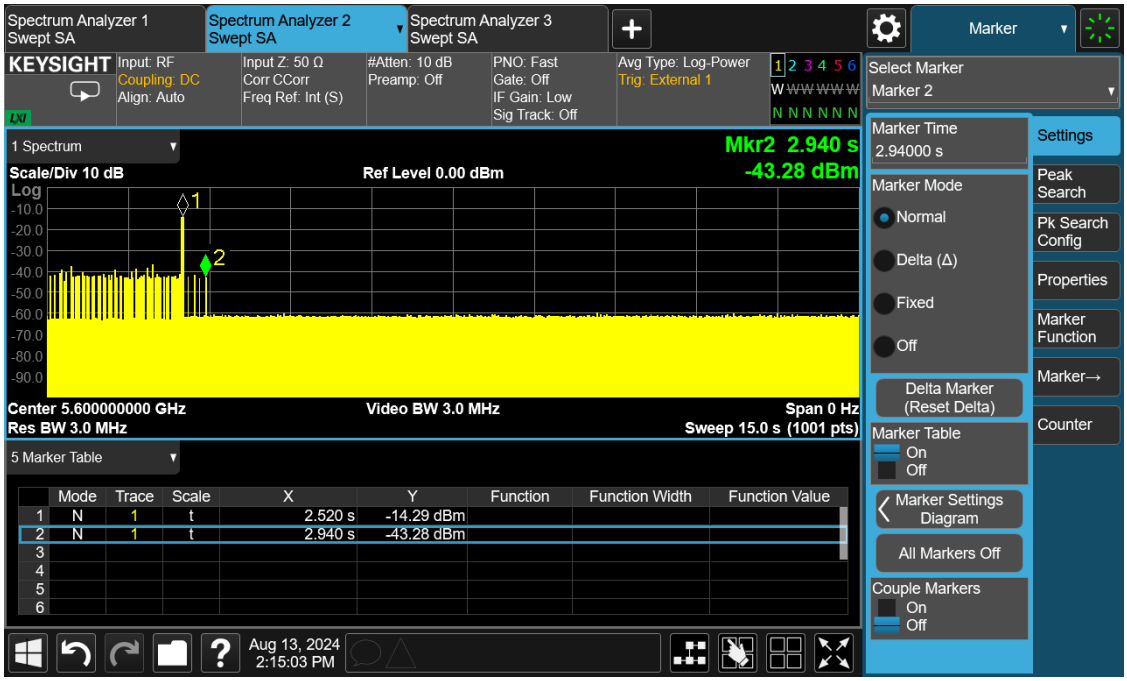
During the 30 minutes observation time, the EUT did not make any transmissions on a channel after a radar signal was detected.

Please see plots below.

A spectrum analyzer is used as a monitor to verify that the EUT has vacated the channel within the channel closing transmission time and channel move time, and does not transmit on a channel during the non-occupancy period after the detection and channel move.



Plot 2: Channel Close (400 ms)



Plot 3: Channel Move

-- End of Test Report --