



427 West 12800 South
Draper, UT 84020

Test Report Certification

FCC ID	SWX-LTUINS
ISED ID	6545A-LTUINS
Equipment Under Test	LTU-Instant
Test Report Serial Number	TR6821_02
Date of Tests	8 June, 9 July, 10 and 12 Nov 2021; 5 Jan 2022
Report Issue Date	19 January 2022

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	LTU
Model Number	LTU-Instant
FCC ID	SWX-LTUINS
ISED ID	6545A-LTUINS

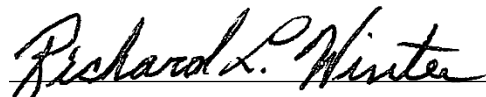
On this 18th day of January 2022, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete and correct to the best of my knowledge and are made in good faith.

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	19 January 2022
02	Amend Section 2.2	3 February 2022

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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	Mark Feil
Title	Compliance Manager

1.2 Manufacturer

Company	Ubiquiti Inc. 685 Third Avenue New York, NY 10017 U.S.A.
Contact Name	Mark Feil
Title	Compliance Manager

2 Equipment Under Test (EUT)

2.1 Identification of EUT

Brand Name	LTU
Model Number	LTU-Instant
Serial Number	68D79A1F3019
Dimensions (cm)	20.1 x 6.42 x 5.62

2.2 Description of EUT

The LTU-Instant is a fixed point-to-multi-point transceivers, meant for outdoor use, operating in the 5GHz frequency bands. A Bluetooth LE transceiver is included for device management. An Ethernet port is used for data transfer and to provide power using a POE-24V-5X-HD POE supply.

Band	Modulation Bandwidth	Frequency (MHz)
UNII-2A	10 MHz	5255, 5260, 5300, 5320
	20 MHz	5260, 5300, 5335
	30 MHz	5270, 5300, 5330
	40 MHz	5270, 5300, 5325
	50 MHz	5275, 5300, 5320
UNII-2C	10 MHz	5480, 5500, 5520, 5540, 5560, 5580, 5600*, 5620*, 5640*, 5660, 5680, 5700, 5710
	20 MHz	5485, 5500, 5520, 5540, 5560, 5580, 5600*, 5620*, 5640*, 5660, 5680, 5700, 5710
	30 MHz	5490, 5500, 5520, 5540, 5560, 5580, 5600*, 5620*, 5640*, 5660, 5680, 5705
	40 MHz	5495, 5500, 5520, 5540, 5560, 5580, 5600*, 5620*, 5640*, 5660, 5680, 5700
	50 MHz	5500, 5520, 5540, 5560, 5580, 5600*, 5620*, 5640*, 5660, 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
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PROPRIETARY

BN: LTU MN: LTU-Instant SN: 68D79A1F3019	Point-to-multi-point Transceiver	See Section 2.4
BN: Ubiquiti Inc. MN: POE-24V-5X-HD SN: N/A	PoE Power Supply	See Section 2.4
BN: Dell MN: XPS 13 SN: N/A	Laptop Personal Computer	Ethernet/Shielded or Unshielded Cat 5e Cable
BN: HP MN: Spectre SN: N/A	Laptop Personal Computer	Ethernet/Shielded or Unshielded Cat 5e Cable

Notes: (1) EUT

(2) Interface port connected to EUT (See Section 2.4)

The support equipment listed above was not modified 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 (PoE Injector)	1	3 conductor power cord/80 cm
PoE (PoE Injector)	1	Shielded Cat 5e cable/8 meters
Lan (PoE Injector)	1	Un-Shielded Cat 5e cable/1 meters

2.5 Operating Environment

Power Supply	120 Vac to 24 Volt PoE Power
AC Mains Frequency	60 Hz
Temperature	21.1-26.8 °C
Humidity	22.7-54.7 %
Barometric Pressure	1016.9 mBar

2.6 Operating Modes

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

2.7 EUT Exercise Software

EUT firmware version 3.2.2.0 was used to operate the transmitter using a constant transmit mode.

2.8 Block Diagram of Test Configuration

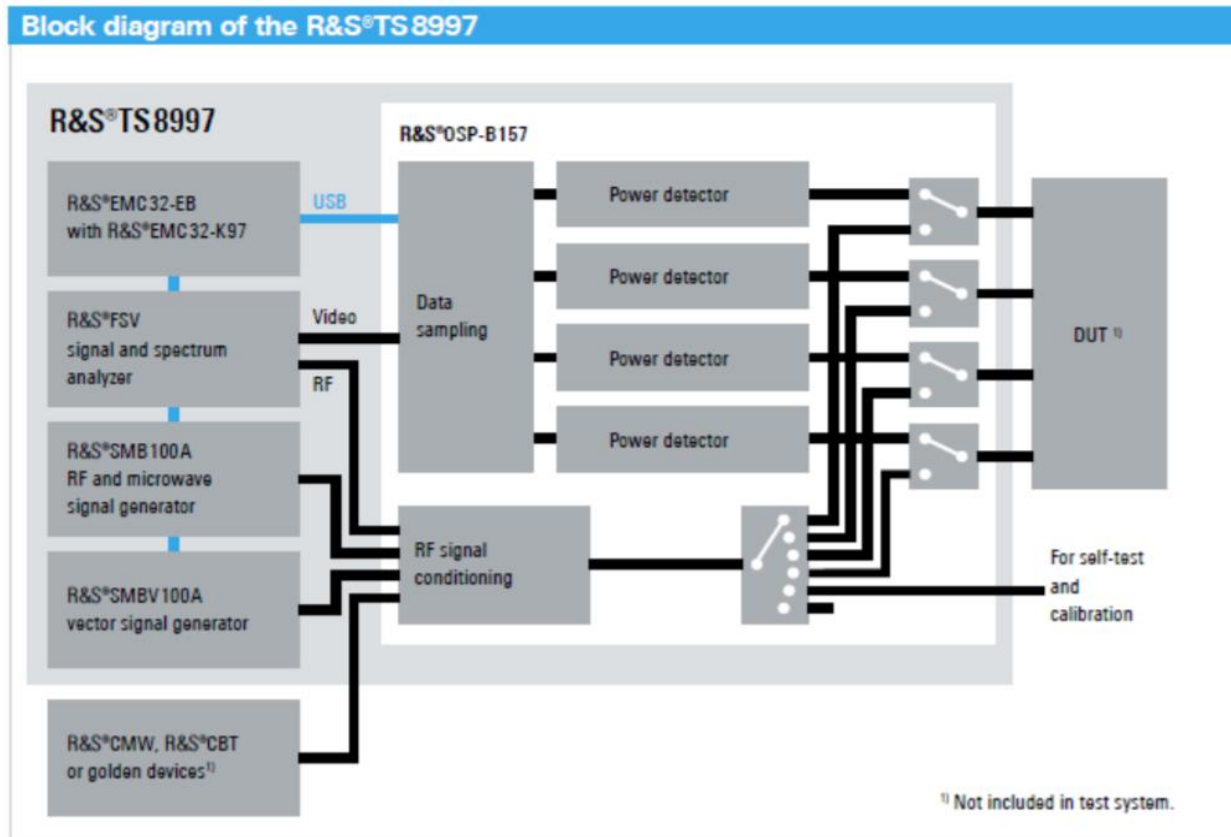


Diagram 1: Test Configuration Block Diagram

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 5570	Compliant
15.407(a)	RSS-247 §6.2.2, §6.2.3	Peak Output Power	5260 to 5570	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 5570	Compliant
15.407(h)	RSS-247 §6.3	DFS Requirements	5260 to 5570	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.				

3.3.2 Results

In the configuration tested, the EUT complied with the requirements of the specification.

3.4 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 2022. 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 2022. Unified Compliance Laboratory has been assigned 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	9/18/2020	3/17/2022
LISN	AFJ	LS16C/10	UCL-2512	5/26/2020	5/26/2022
Cat6 ISN	Teseq	ISN T8-Cat6	UCL-2971	5/18/2020	5/18/2022
ISN	Teseq	ISN T800	UCL-2974	6/4/2021	6/4/2022
LISN	Com-Power	LIN-120C	UCL-2612	5/19/2021	5/19/2022
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

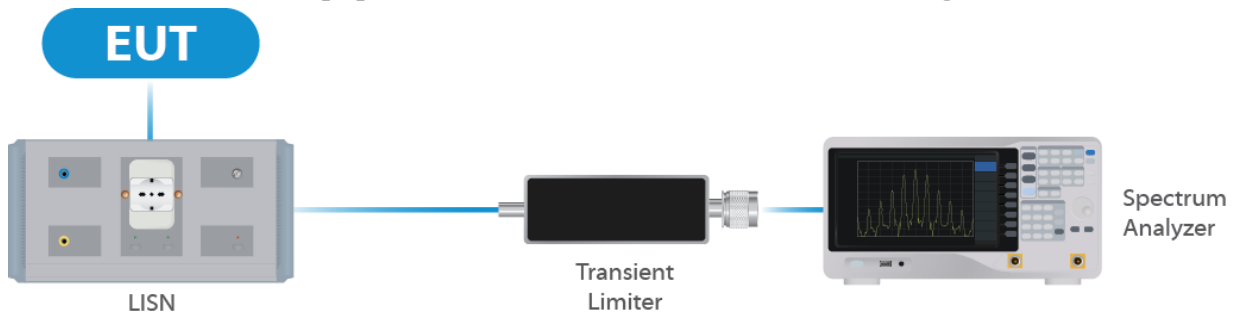


Figure 1: Conducted Emissions Test

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	1/03/2022	1/03/2023
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	1/03/2022	1/03/2023
Switch Extension	R&S	OSP-150W	UCL-2870	1/03/2022	1/03/2023

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

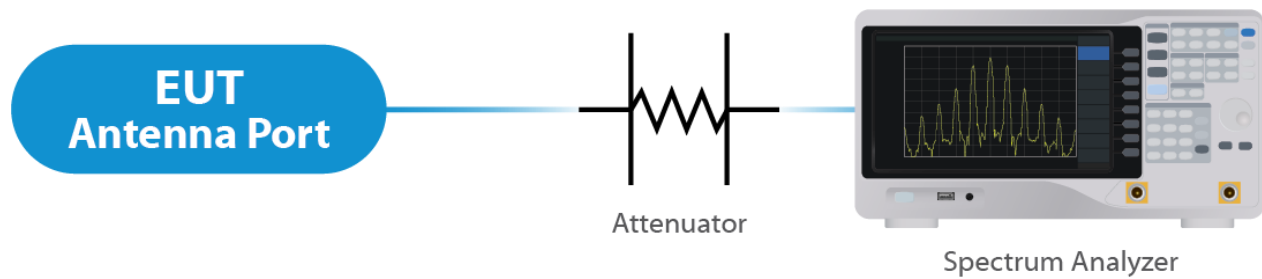


Figure 2: Direct Connect at the Antenna Port Test



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	6/21/2021	6/21/2022
Pre-Amplifier 9 kHz – 1 GHz	Sonoma Instruments	310N	UCL-2889	10/7/2021	10/7/2022
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3062	8/28/2020	8/27/2022
Broadband Antenna	Scwarzbeck	VULB 9163	UCL-3071	5/19/2020	5/19/2022
Double Ridge Horn Antenna	Scwarzbeck	BBHA 9120D	UCL-3065	7/8/2021	7/8/2022
Log Periodic	Scwarzbeck	STLP 9129	UCL-3068	11/16/2020	11/16/2022
15 - 40 GHz Horn Antenna	Scwarzbeck	BBHA 9170	UCL-2487	5/21/2020	5/21/2022
1 – 18 GHz Amplifier	Com-Power	PAM 118A	UCL-3833	10/7/2021	10/7/2022
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 4: List of equipment used for Radiated Emissions

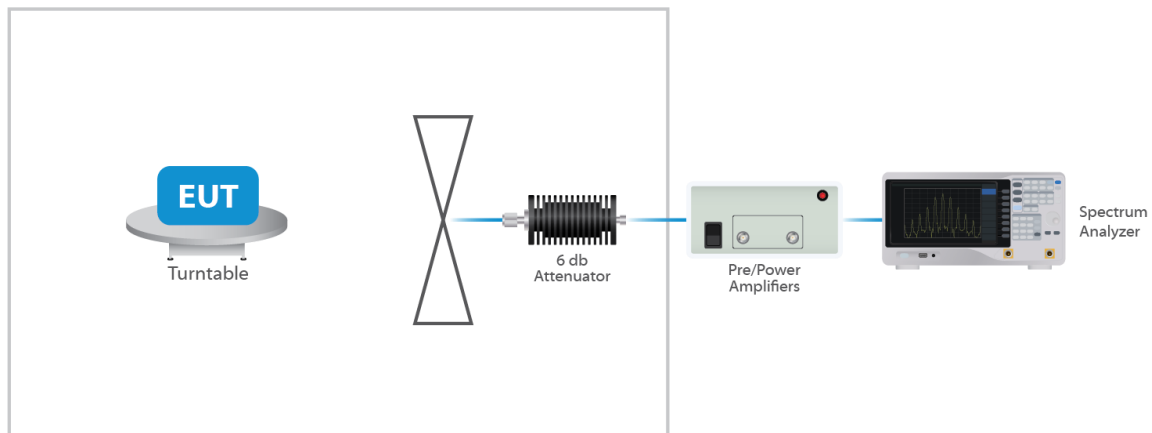


Figure 4: Radiated Emissions Test

4.4 DFS Testing

4.4.1 Client Test Set Up

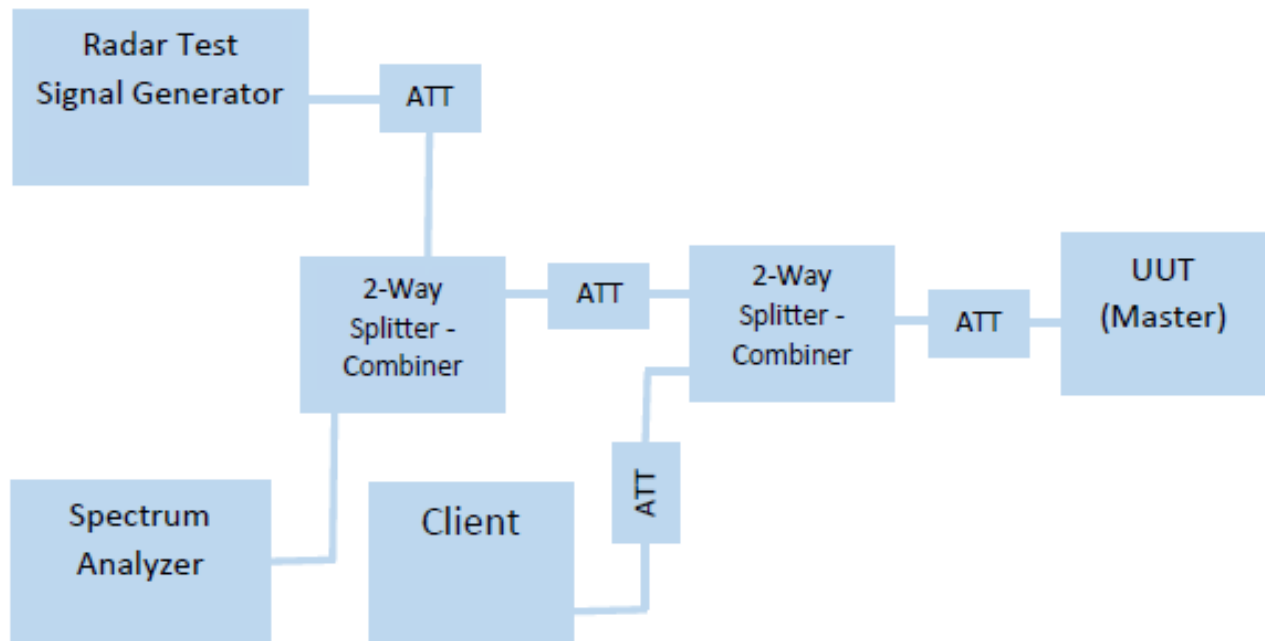


Figure 5: DFS Test Set Up – Client

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 ($\pm$ 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 antenna and an optional accessory dish antenna. The Maximum gain of the integral antenna is 3 dBi and the optional dish antenna is 22 dBi. The integral antenna is not user replaceable while the optional dish antenna is user replaceable.

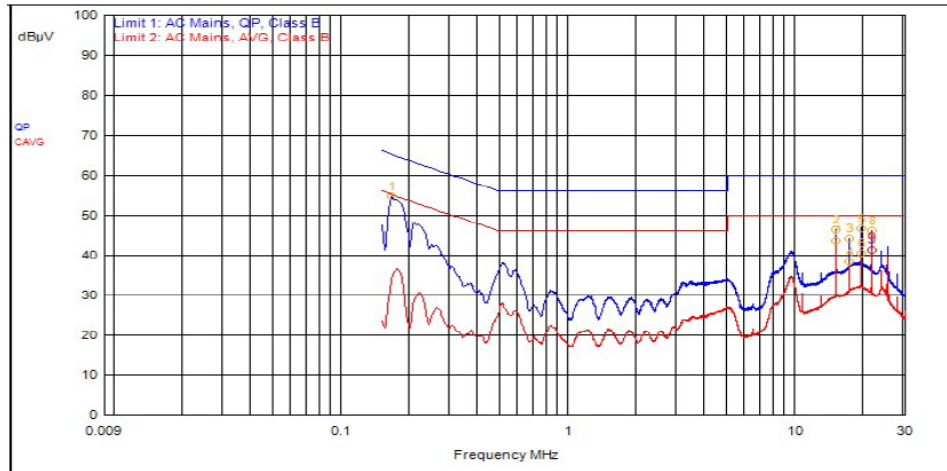
The 2 chains of the radio are cross-polarized.

Results

The EUT complied with the specification

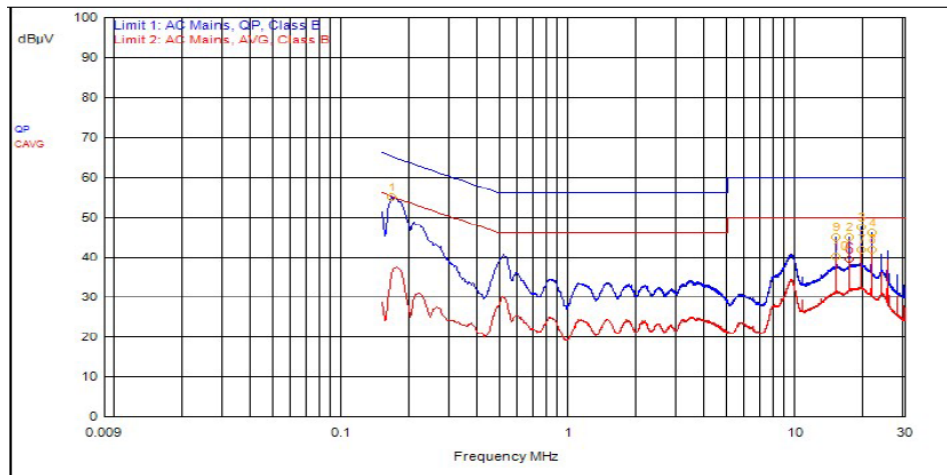
5.2 Conducted Emissions at Mains Ports Data

5.2.1 Line



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.
1	165,000kHz	12.4	0.0		QPeak	42.2	54.6	65.2	-10.6		
5	19.161MHz	12.3	0.2		QPeak	34.4	46.8	60.0	-13.2		
2	14.904MHz	12.5	0.2		QPeak	33.6	46.3	60.0	-13.7		
8	21.294MHz	12.3	0.2		QPeak	33.6	46.1	60.0	-13.9		
3	17.034MHz	12.4	0.2		QPeak	31.5	44.1	60.0	-15.9		
4	17.034MHz	12.4	0.2		C_AVG	25.6	38.2			50.0	-11.8
6	19.161MHz	12.3	0.2		C_AVG	28.2	40.6			50.0	-9.4
7	14.904MHz	12.5	0.2		C_AVG	30.8	43.5			50.0	-6.5
9	21.291MHz	12.3	0.2		C_AVG	28.9	41.4			50.0	-8.6

5.2.2 Neutral



ID	Frequency	Probe	Cable	Atten.	Detector	Meter Read	Meas Level	Limit 1	Limit 1 Dist.	Limit 2	Limit 2 Dist.
1	165,000kHz	12.4	0.0		QPeak	42.7	55.1	65.2	-10.1		
3	19.155MHz	12.3	0.2		QPeak	35.0	47.5	60.0	-12.5		
4	21.285MHz	12.3	0.2		QPeak	33.6	46.1	60.0	-13.9		
2	17.028MHz	12.4	0.2		QPeak	32.4	45.0	60.0	-15.0		
9	14.898MHz	12.5	0.2		QPeak	32.3	45.0	60.0	-15.0		
6	17.028MHz	12.4	0.2		C_AVG	26.8	39.4			50.0	-10.6
7	19.155MHz	12.3	0.2		C_AVG	29.5	41.9			50.0	-8.1
8	21.285MHz	12.3	0.2		C_AVG	29.4	41.9			50.0	-8.1
10	14.898MHz	12.5	0.2		C_AVG	27.5	40.2			50.0	-9.8

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

Nominal Bandwidth (MHz)	Frequency (MHz)	99% Bandwidth (MHz)	Emissions 26 dB Bandwidth (MHz)
10	5255	9.35	13.00
10	5300	9.35	10.40
10	5340	9.35	10.40
20	5260	18.80	20.80
20	5300	18.90	28.50
20	5335	18.90	23.50
30	5270	28.35	30.75
30	5300	28.50	32.25

30	5330	28.35	32.55
40	5270	37.75	43.65
40	5300	37.75	41.55
40	5325	37.75	41.40
50	5275	47.25	52.00
50	5300	47.25	55.75
50	5320	47.00	52.50

5.3.2 UNII-2C

Nominal Bandwidth (MHz)	Frequency (MHz)	99% Bandwidth (MHz)	Emissions 26 dB Bandwidth (MHz)
10	5480	9.40	10.45
10	5600	9.35	10.45
10	5715	9.40	10.40
20	5485	18.70	20.80
20	5600	18.80	20.80
20	5710	18.70	20.80
30	5490	28.20	31.20
30	5600	28.20	31.20
30	5705	28.20	30.75
40	5495	37.75	41.25
40	5600	37.75	41.10
40	5700	37.75	41.25
50	5500	46.75	52.00
50	5600	47.25	52.00
50	5690	47.25	52.00

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 were measured and summed under the guidance of KDB 789033 Section II. E.2. and KDB 66291 D01. Please see associated annex for details on instrument settings.

The maximum average RF conducted output power measured for this device was 22.99 dBm or 199.07 mW. The limit is 30 dBm, or 1 Watt when using an antenna with 23 dBi (Fixed point to point) or less gain. The integral antenna has a gain of 3 dBi with the dish antenna having a gain of 22 dBi. TP setting reflected are with the 3 dBi antenna. The maximum e.i.r.p. at any elevation angle above 30 degrees as measured from the horizon must not exceed 125 mW (21 dBm).

5.4.1 UNII-2A

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	Measured EIRP	Measured PSD
HT10	5255	Mcs0	21	21.90	24.90	9.80
HT10	5300	Mcs0	19	20.48	23.48	8.15
HT10	5340	Mcs0	19	20.45	23.45	8.20
HT20	5260	Mcs0	22	21.78	24.78	7.80
HT20	5300	Mcs0	22	22.99	25.99	7.92
HT20	5335	Mcs0	22	22.02	25.02	7.96
HT30	5270	Mcs0	22	22.00	25.00	6.36
HT30	5300	Mcs0	22	22.10	25.10	6.11
HT30	5330	Mcs0	22	22.00	25.00	6.28
VHT40	5270	Mcs0	22	21.90	24.90	4.51
VHT40	5300	Mcs0	22	22.04	25.04	4.30
VHT40	5325	Mcs0	22	21.98	24.98	5.22
VHT50	5275	Mcs0	22	21.77	24.77	3.87
VHT50	5300	Mcs0	22	21.88	24.88	3.77
VHT50	5320	Mcs0	22	21.79	24.79	4.09

5.4.2 UNII-2C

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	Measured EIRP	Measured PSD
HT10	5480	Mcs0	20	20.84	23.84	9.09
HT10	5600	Mcs0	21	20.73	23.73	10.15
HT10	5715	Mcs0	19	20.97	23.97	9.08
HT20	5485	Mcs0	22	21.78	24.78	8.08
HT20	5600	Mcs0	22	21.74	24.74	8.34
HT20	5710	Mcs0	22	22.50	25.50	8.24
HT30	5490	Mcs0	22	21.72	24.72	6.21
HT30	5600	Mcs0	22	21.63	24.63	6.31
HT30	5705	Mcs0	22	22.21	25.21	6.72
VHT40	5495	Mcs0	22	21.58	24.58	5.06

VHT40	5600	Mcs0	22	21.44	24.44	5.12
VHT40	5700	Mcs0	22	22.18	25.18	4.90
VHT50	5500	Mcs0	22	21.62	24.62	4.29
VHT50	5600	Mcs0	22	21.55	24.55	4.30
VHT50	5690	Mcs0	22	21.93	24.93	4.11

Result

In the configuration tested, the maximum average RF output power was less than 1 watt; therefore, the EUT complied with the requirements of the specification.

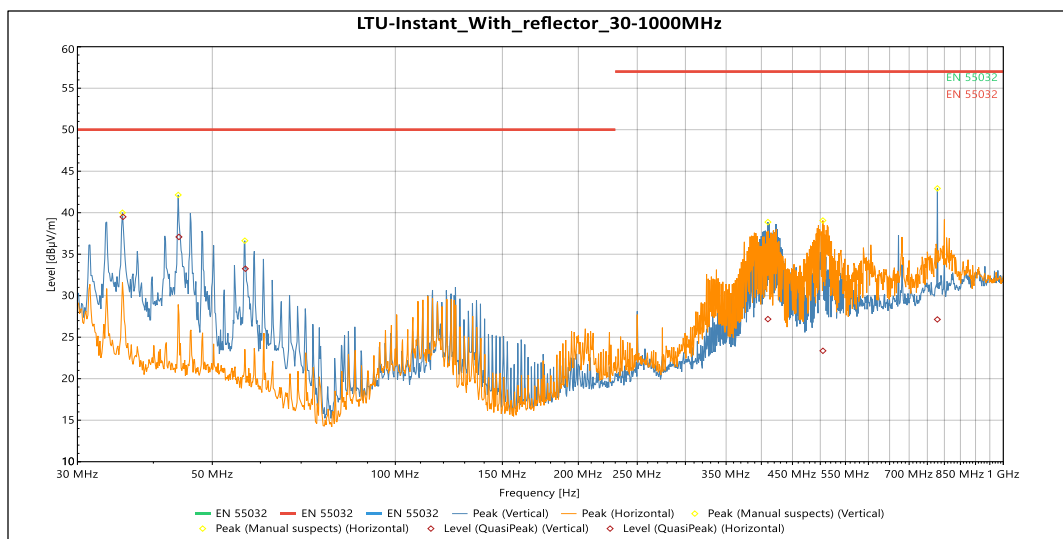
5.5 §15.407(b) Spurious Emissions

5.5.1 Radiated Spurious Emissions in the Restricted Bands of § 15.205

The frequency ranges within 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.

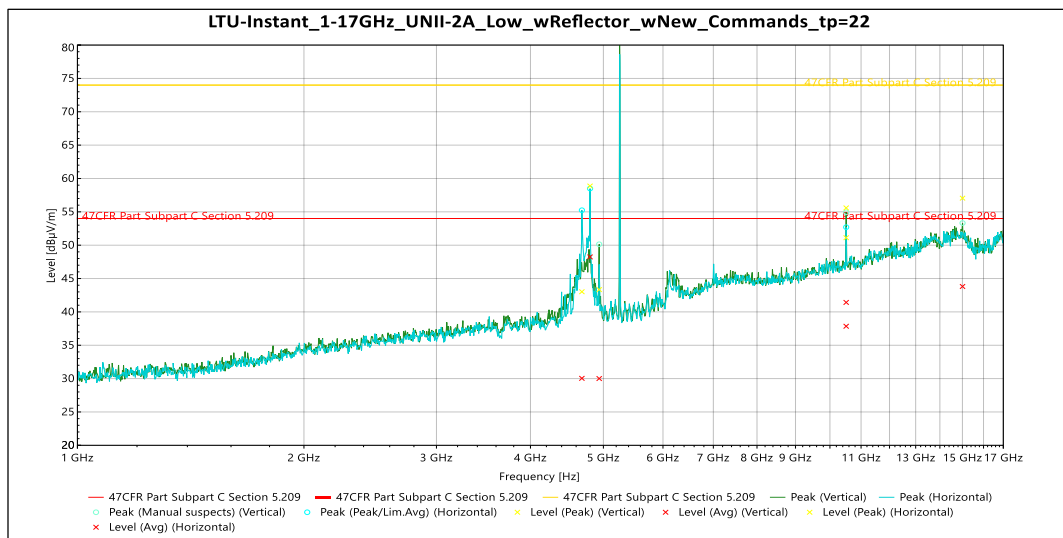
Correction Factor = Antenna Factor + Cable Loss - Pre-Amplifier Gain, and is added to the Receiver reading.

5.5.2 UNII-2A



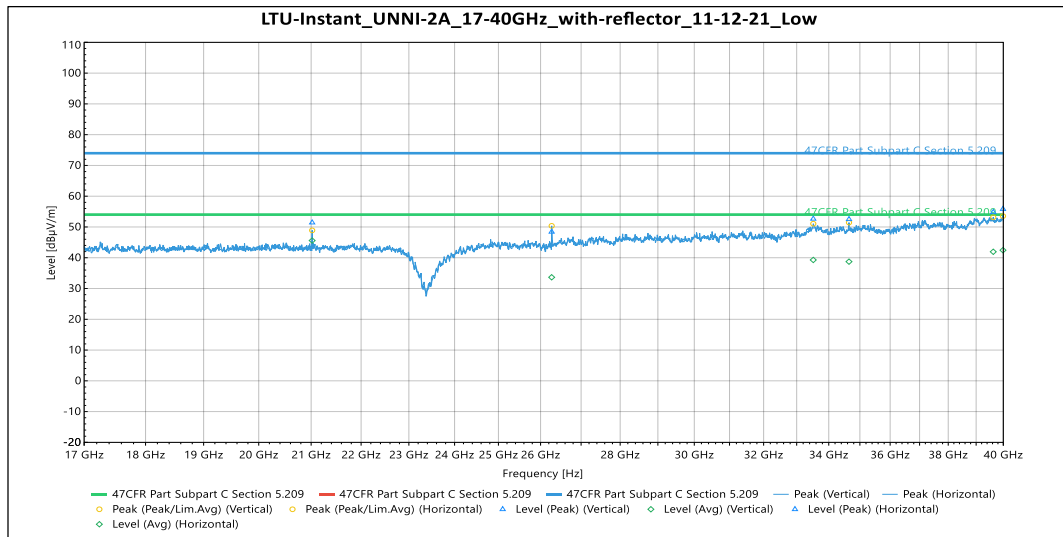
Frequency	SR #	Level (dBμV/m)	Limit (dBμV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
35.657 MHz	1	39.499	50	-10.501	59	1.142	Vertical	-6.659
44.062 MHz	1	37.075	50	-12.925	258	1.142	Vertical	-6.284
56.675 MHz	1	33.254	50	-16.746	95	1.142	Vertical	-8.012
410.05 MHz	1	27.178	57	-29.822	281	1.143	Vertical	-4.173
778.96 MHz	1	27.136	57	-29.864	248	3.483	Vertical	1.697
504.99 MHz	2	23.364	57	-33.636	23	1.335	Horizontal	-2.354

Graph 1: Radiated Spurious Emissions in 30MHz – 1GHz



Frequency	Peak/Avg	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
4.9362 GHz	Peak	43.338	74	-30.662	291	3.798	Vertical	0.466
10.51 GHz	Peak	51.118	74	-22.882	260	1.522	Vertical	10.091
15.005 GHz	Peak	57.046	74	-16.954	99	1.991	Vertical	14.706
4.9362 GHz	Avg	30.012	54	-23.988	291	3.798	Vertical	0.466
10.51 GHz	Avg	37.849	54	-16.151	260	1.522	Vertical	10.091
15.005 GHz	Avg	43.806	54	-10.194	99	1.991	Vertical	14.706
4.6814 GHz	Peak	43.02	74	-30.98	294	1.878	Horizontal	-0.637
4.7999 GHz	Peak	58.869	74	-15.131	8	1.815	Horizontal	0.034
10.51 GHz	Peak	55.587	74	-18.413	11	2.352	Horizontal	10.091
4.6814 GHz	Avg	30.042	54	-23.958	294	1.878	Horizontal	-0.637
4.7999 GHz	Avg	48.237	54	-5.763	8	1.815	Horizontal	0.034
10.51 GHz	Avg	41.424	54	-12.576	11	2.352	Horizontal	10.091

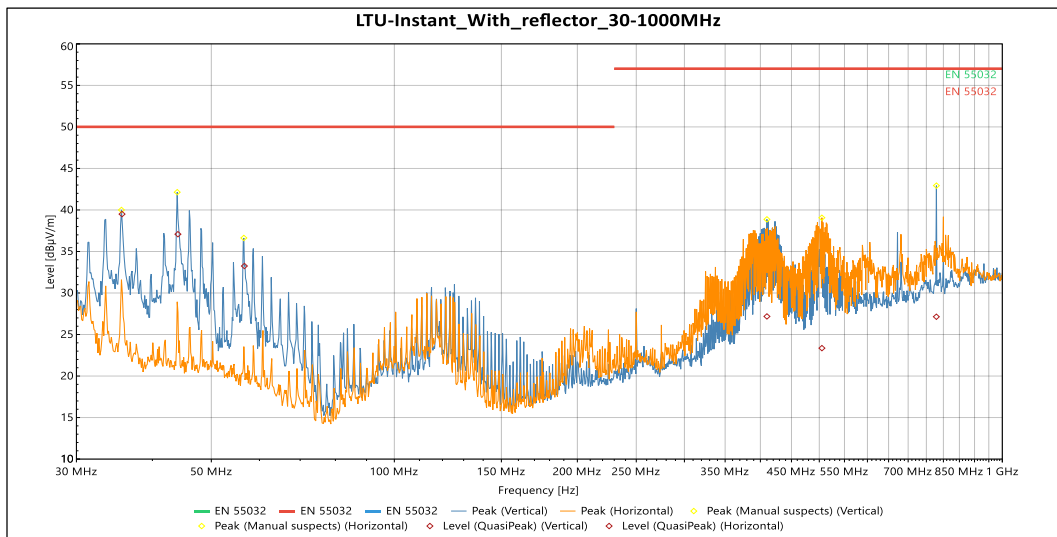
Graph 2: Radiated Spurious Emissions in 1-17GHz on Low Frequency (worst-case)



Frequency	Peak/Avg	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
21.02 GHz	Peak	51.418	74	-22.582	306	Vertical	-5.718
34.647 GHz	Peak	52.511	74	-21.489	313	Vertical	0.399
39.627 GHz	Peak	54.825	74	-19.175	46	Vertical	3.391
21.02 GHz	Avg	45.594	54	-8.406	306	Vertical	-5.718
34.647 GHz	Avg	38.734	54	-15.266	313	Vertical	0.399
39.627 GHz	Avg	41.937	54	-12.063	46	Vertical	3.391
26.27 GHz	Peak	48.43	74	-25.57	322	Horizontal	-5.719
33.514 GHz	Peak	52.651	74	-21.349	156	Horizontal	1.622
39.987 GHz	Peak	55.839	74	-18.161	323	Horizontal	3.599
26.27 GHz	Avg	33.655	54	-20.345	322	Horizontal	-5.719
33.514 GHz	Avg	39.279	54	-14.721	156	Horizontal	1.622
39.987 GHz	Avg	42.452	54	-11.548	323	Horizontal	3.599

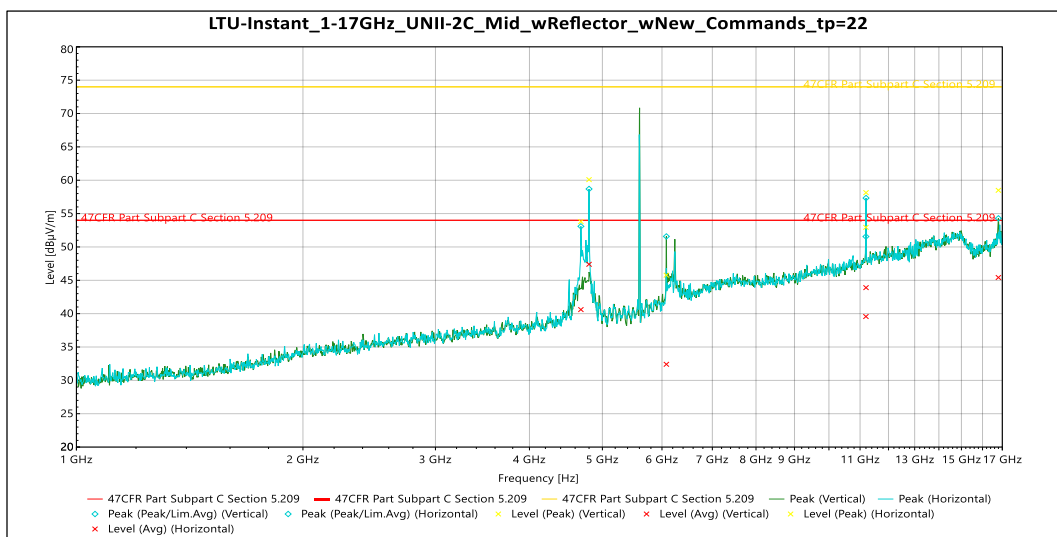
Graph 3: Radiated Emissions in 17-40GHz on Low Frequency (worst-case)

5.5.3 UNII-2C



Frequency	SR #	Level (dBμV/m)	Limit (dBμV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
35.657 MHz	1	39.499	50	-10.501	59	1.142	Vertical	-6.659
44.062 MHz	1	37.075	50	-12.925	258	1.142	Vertical	-6.284
56.675 MHz	1	33.254	50	-16.746	95	1.142	Vertical	-8.012
410.05 MHz	1	27.178	57	-29.822	281	1.143	Vertical	-4.173
778.96 MHz	1	27.136	57	-29.864	248	3.483	Vertical	1.697
504.99 MHz	2	23.364	57	-33.636	23	1.335	Horizontal	-2.354

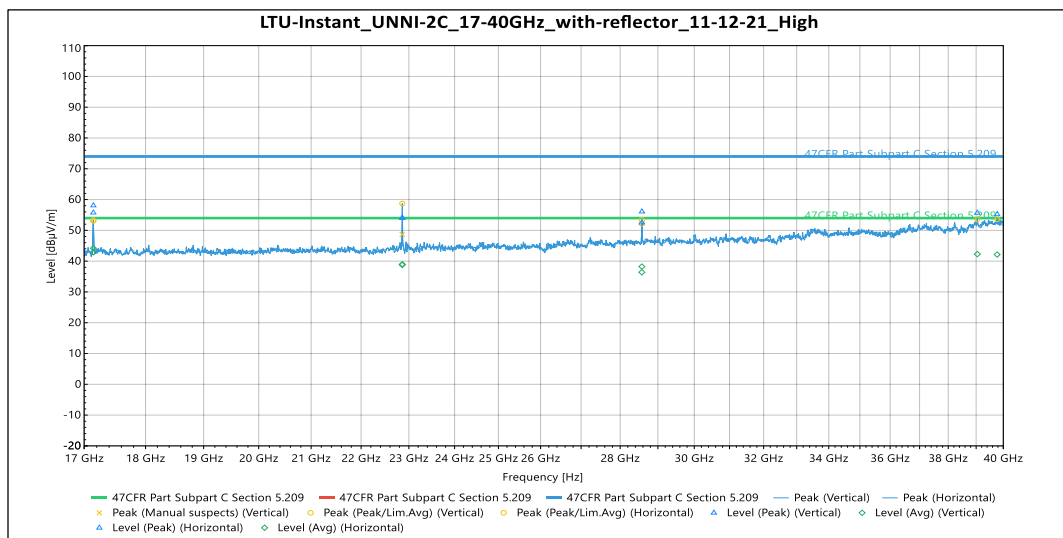
Graph 4: Radiated Spurious Emissions in 30MHz – 1GHz



Frequency	Peak/Avg	Level (dBμV/m)	Limit (dBμV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
6.0815 GHz	Peak	45.773	74	-28.227	313	2.93	Vertical	3.825

Frequency	Peak/Avg	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
11.199 GHz	Peak	52.941	74	-21.059	56	2.577	Vertical	11.306
16.797 GHz	Peak	58.486	74	-15.514	346	1.634	Vertical	16.933
6.0815 GHz	Avg	32.408	54	-21.592	313	2.93	Vertical	3.825
11.199 GHz	Avg	39.571	54	-14.429	56	2.577	Vertical	11.306
16.797 GHz	Avg	45.425	54	-8.575	346	1.634	Vertical	16.933
4.6815 GHz	Peak	53.801	74	-20.199	20	1.522	Horizontal	-0.637
4.7999 GHz	Peak	60.091	74	-13.909	17	1.815	Horizontal	0.034
11.202 GHz	Peak	58.145	74	-15.855	22	1.634	Horizontal	11.324
4.6815 GHz	Avg	40.614	54	-13.386	20	1.522	Horizontal	-0.637
4.7999 GHz	Avg	47.4	54	-6.6	17	1.815	Horizontal	0.034
11.202 GHz	Avg	43.905	54	-10.095	22	1.634	Horizontal	11.324

Graph 5: Radiated Spurious Emissions in 1-17GHz on Mid Frequency (worst-case)



Frequency	Peak/Avg	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
17.147 GHz	Peak	58.068	74	-15.932	303	Vertical	-5.362
22.859 GHz	Peak	54.098	74	-19.902	327	Vertical	-5.302
28.57 GHz	Peak	52.495	74	-21.505	330	Vertical	-5.075
39.042 GHz	Peak	55.657	74	-18.343	4	Vertical	3.238
17.147 GHz	Avg	44.191	54	-9.809	303	Vertical	-5.362
22.859 GHz	Avg	38.783	54	-15.217	327	Vertical	-5.302
28.57 GHz	Avg	36.385	54	-17.615	330	Vertical	-5.075
39.042 GHz	Avg	42.275	54	-11.725	4	Vertical	3.238
17.146 GHz	Peak	55.747	74	-18.253	330	Horizontal	-5.377
22.86 GHz	Peak	53.97	74	-20.03	313	Horizontal	-5.274
28.572 GHz	Peak	56.093	74	-17.907	315	Horizontal	-5.074
39.771 GHz	Peak	55.216	74	-18.784	206	Horizontal	3.369
17.146 GHz	Avg	42.87	54	-11.13	330	Horizontal	-5.377
22.86 GHz	Avg	38.989	54	-15.011	313	Horizontal	-5.274
28.572 GHz	Avg	38.229	54	-15.771	315	Horizontal	-5.074
39.771 GHz	Avg	42.145	54	-11.855	206	Horizontal	3.369

Graph 6: Radiated Spurious Emissions in 17-40GHz on High Frequency (worst-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 3 dBi antenna, the conducted limit for power spectral density is 11 dBm. As per KDB 662911, When the EUT is using spatial-multiplexing in HT to HE modes, there is not additional array gain to accommodate. When the EUT uses Nss=1 data rates, the antenna gain is 3 dBi + Array gain of 6.02 dB which is a total of 9.02 dBi

Results of this testing are summarized.

5.6.1 UNII-2A

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	Measured EIRP	Measured PSD
HT10	5255	Mcs0	21	21.90	24.90	9.80
HT10	5300	Mcs0	19	20.48	23.48	8.15
HT10	5340	Mcs0	19	20.45	23.45	8.20
HT20	5260	Mcs0	22	21.78	24.78	7.80
HT20	5300	Mcs0	22	22.99	25.99	7.92
HT20	5335	Mcs0	22	22.02	25.02	7.96
HT30	5270	Mcs0	22	22.00	25.00	6.36
HT30	5300	Mcs0	22	22.10	25.10	6.11
HT30	5330	Mcs0	22	22.00	25.00	6.28
VHT40	5270	Mcs0	22	21.90	24.90	4.51
VHT40	5300	Mcs0	22	22.04	25.04	4.30
VHT40	5325	Mcs0	22	21.98	24.98	5.22
VHT50	5275	Mcs0	22	21.77	24.77	3.87
VHT50	5300	Mcs0	22	21.88	24.88	3.77
VHT50	5320	Mcs0	22	21.79	24.79	4.09

5.6.2 UNII-2C

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power*	Measured EIRP	Measured PSD
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HT10	5480	Mcs0	20	20.84	23.84	9.09
HT10	5600	Mcs0	21	20.73	23.73	10.15
HT10	5715	Mcs0	19	20.97	23.97	9.08
HT20	5485	Mcs0	22	21.78	24.78	8.08
HT20	5600	Mcs0	22	21.74	24.74	8.34
HT20	5710	Mcs0	22	22.50	25.50	8.24
HT30	5490	Mcs0	22	21.72	24.72	6.21
HT30	5600	Mcs0	22	21.63	24.63	6.31
HT30	5705	Mcs0	22	22.21	25.21	6.72
VHT40	5495	Mcs0	22	21.58	24.58	5.06
VHT40	5600	Mcs0	22	21.44	24.44	5.12
VHT40	5700	Mcs0	22	22.18	25.18	4.90
VHT50	5500	Mcs0	22	21.62	24.62	4.29
VHT50	5600	Mcs0	22	21.55	24.55	4.30
VHT50	5690	Mcs0	22	21.93	24.93	4.11

Result

The maximum average power spectral density was less than the limit of 8 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 in the DFS Annex. The product passes all required DFS tests for a client without radar detection.

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

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

-- End of Test Report --