UNIFIED COMPLIANCE LABORATORY

427 West 12800 South
Draper, UT 84020

Test Report

Certification

FCC ID	SWX-LBE5ACXR
ISED ID	6545A-LBE5ACXR
Equipment Under Test	LBE-5AC-XR
Test Report Serial Number	TR6348_01
Date of Test(s)	23, 24, 28, 29 June and 9 July 2021
Report Issue Date	19 August 2021

Test Specification	Applicant
47 CFR FCC Part 15, Subpart E	Ubiquiti Inc. 685 Third Avenue New York, NY 10019 U.S.A.

NVLAP TESTING ilac-MRA

NVLAP LAB CODE 600241-0

Certification of Engineering Report

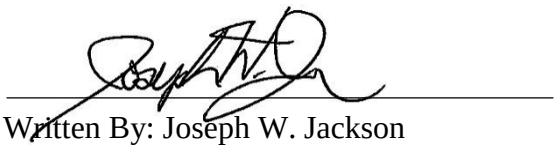
This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart E. This report may be reproduced in full. Partial reproduction of this report may only be made with 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	airMAX
Model Number	LBE-5AC-XR
FCC ID	SWX-LBE5ACXR
ISED ID	6545A-LBE5ACXR

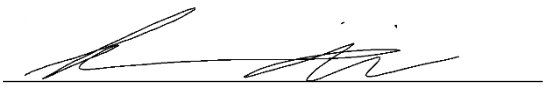
On this 19th day of August 2021, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete and correct to the best of my knowledge and are made in good faith.

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: Alex Macon

Revision History		
Revision	**Description**	**Date**
01	Original Report Release	19 August 2021

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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	airMAX
Model Number	LBE-5AC-XR
Serial Number	0418D6A2AFB9
Dimensions (cm)	74.7 x 52.5 x 34.7

2.2 Description of EUT

The LBE-5AC-XR is a point-to-point transceiver, intended for outdoor use, operating in the 5 GHz WiFi, UNII-1, UNII-2A/2C and UNII-3 frequency bands. The LBE-5AC-XR is designed to the lightweight and aimed to create extremely long-distance wireless links. The LBE-5AC-XR also has a Bluetooth LE transceiver for device management. An Ethernet port is used for data transfer and to provide power using a POE-24V-24W POE power supply. The antenna elements of the LBE-5AC-XR are cross-polarized

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

Band	WiFi Mode	Modulation Bandwidth	Modulation Type	Frequency (MHz)
UNII-3	N	10 MHz	HT	5735, 5790, 5840
	N	20 MHz	HT	5740, 5790, 5835
	N	30 MHz	HT	5745, 5790, 5830
	ac	40 MHz	VHT	5750, 5790, 5825
	ac	50 MHz	VHT	5755, 5790, 5820
	ac	60 MHz	VHT	5760, 5790, 5815
	ac	80 MHz	VHT	5770, 5790, 5805

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: airMAX MN: LBE5AC-XR (Note 1) SN: 0418D6A2AFB9	Wireless Transceiver	See Section 2.4

BN: Ubiquiti Inc. MN: POE-24-24W (Note 1) SN: None	POE Supply	POE Port See Section 2.4
BN: Dell MN: XPS 13 SN: None	Laptop PC	LAN Port / Shielded or Unshielded Cat 5e cable (Note 2)
BN: HP MN: Spectre SN: None	Laptop PC	LAN Port / Shielded or Unshielded Cat 5e cable (Note 2)

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 (PoE Injector)	1	3 conductor power cord/80cm
LAN (PoE Injector)	1	Shielded or Unshielded Cat 5e cable/1 meter
Data	1	Shielded or Unshielded Cat 5e cable/8meters

2.5 Operating Environment

Power Supply	120 Vac to 24 Volt PoE Power
AC Mains Frequency	60 Hz
Temperature	20.6 – 27.4 °C
Humidity	33.0 – 52.4 %
Barometric Pressure	1015 mBar

2.6 Operating Modes

The LBE-5AC-XR was tested using test software in order to enable to constant transmission of over 98%. All emission modes of 802.11 n/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

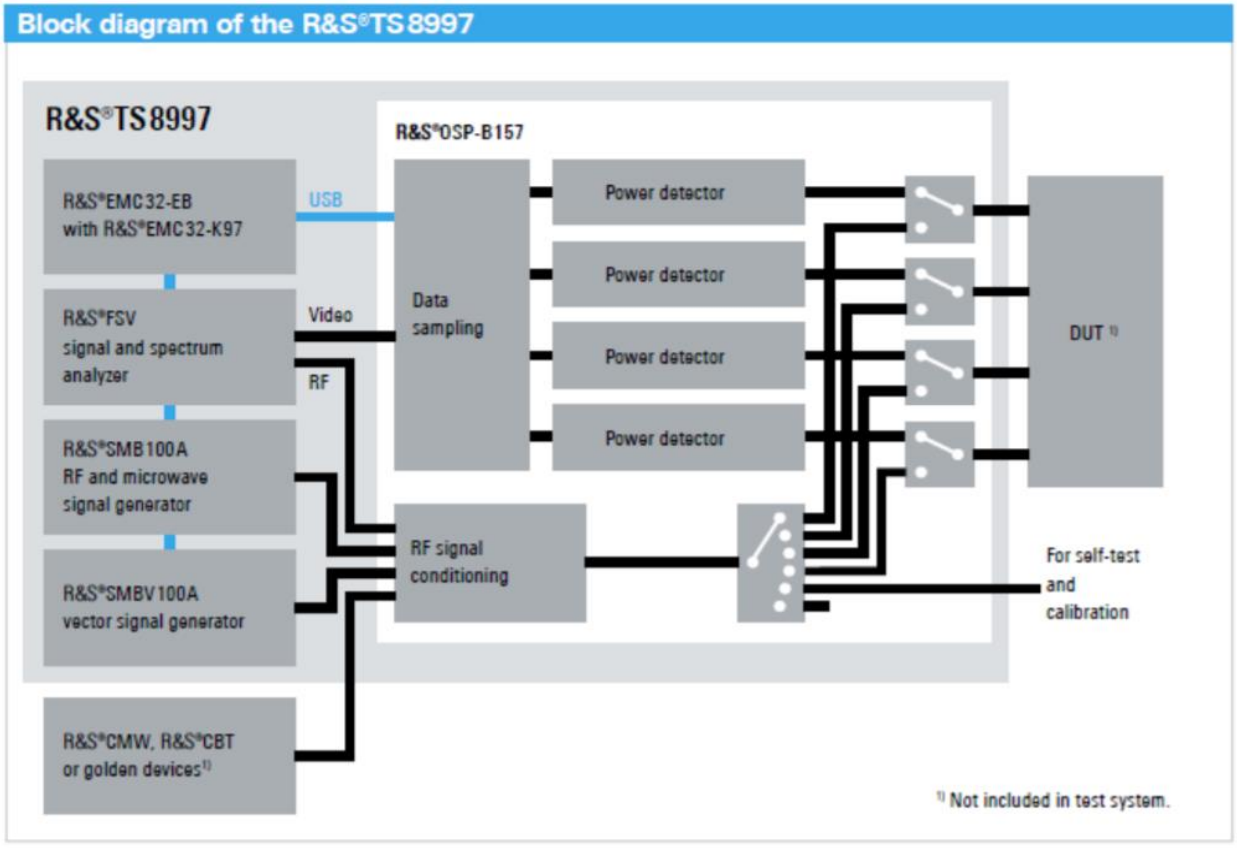


Diagram 1: Test Configuration Block Diagram

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 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	9/17/2021
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 1:List of equipment used for Conducted Emissions Testing at Mains Port

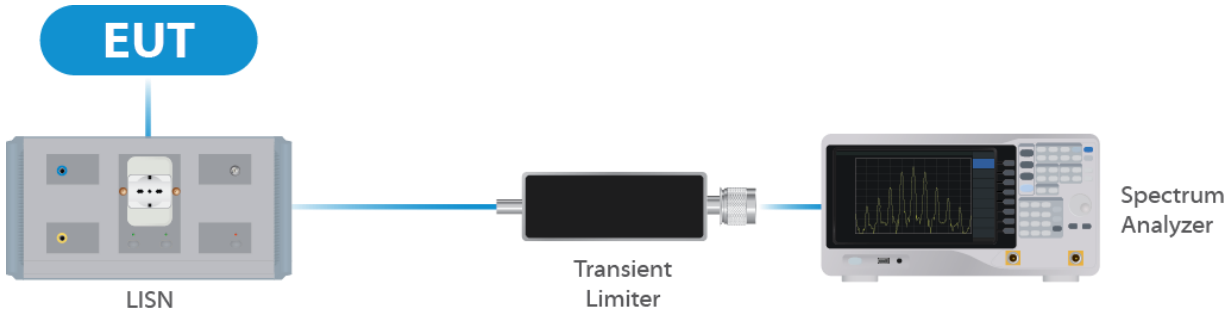


Figure 1: Conducted Emissions Test

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	8/24/2020	8/24/2021
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	9/8/2020	9/8/2021
Switch Extension	R&S	OSP-150W	UCL-2870	3/3/2021	3/3/2022

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

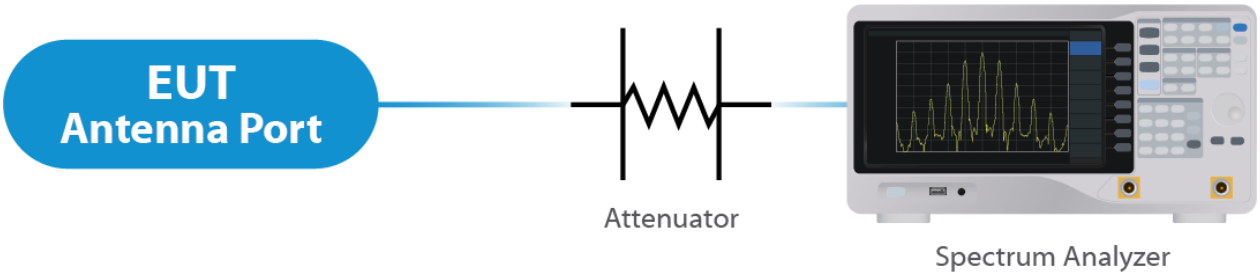


Figure 2: Direct Connect at the Antenna Port Test [1]

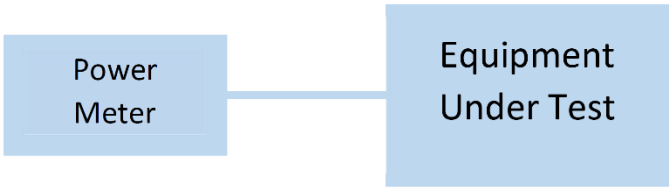


Figure 3: Output Power Measurement

(1) Figure 2 is for all antenna port testing except output power which is shown in Figure 3.

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	9/10/2020	9/10/2021
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	11/16/2021
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	9/29/2020	9/29/2021
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 3:List of equipment used for Radiated Emissions

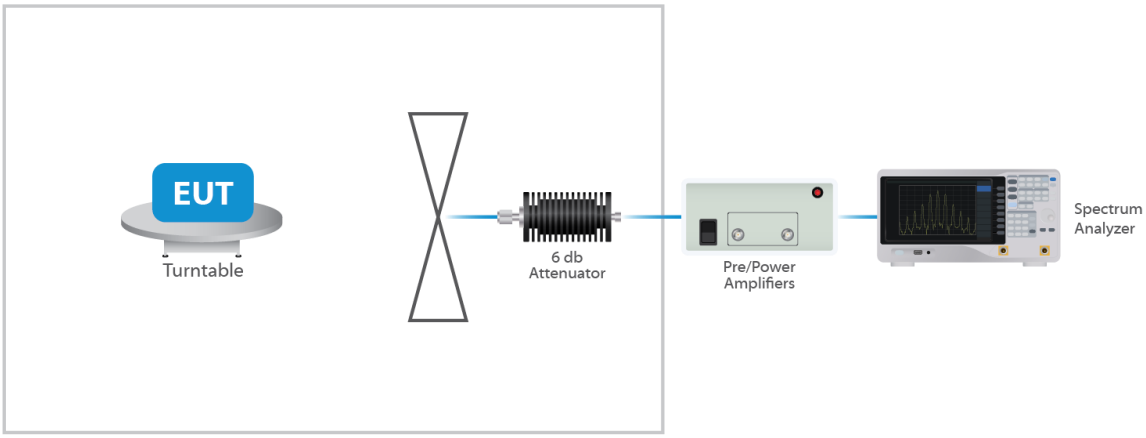


Figure 4: Radiated Emissions Test

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 (± 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

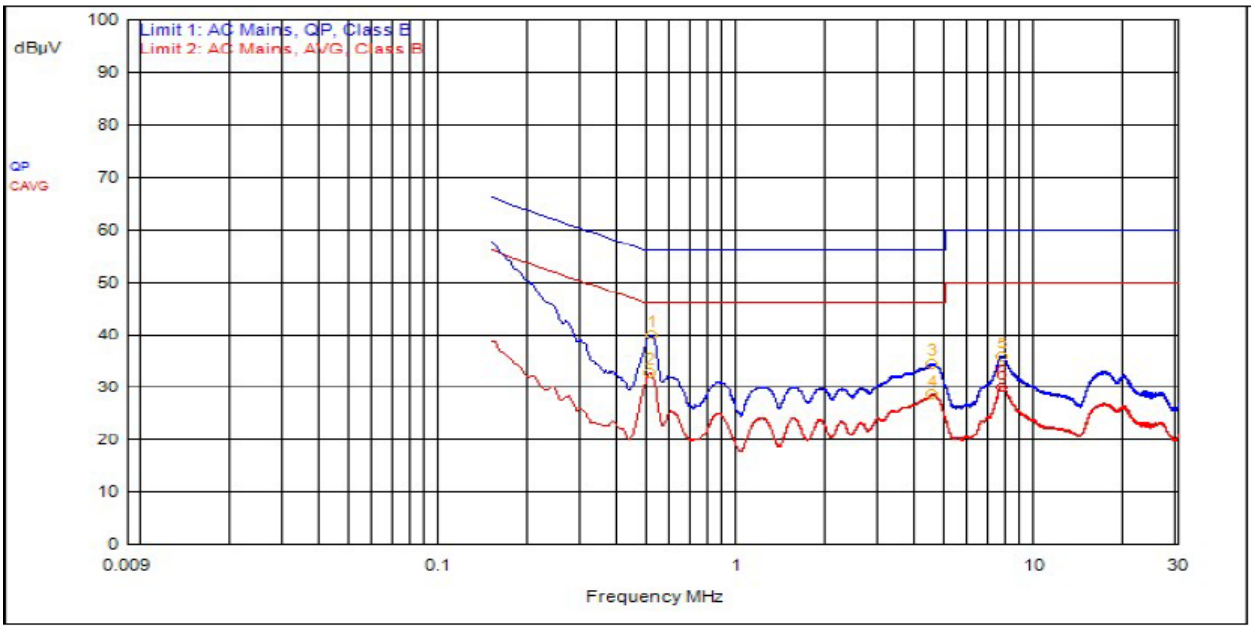
The EUT uses an integral omni antenna and an optional accessory dish antenna. The Maximum gain of the integral antenna is 3 dBi and the optional dish antenna is 29 dBi. The integral antenna is not user replaceable while the optional dish antenna is user replaceable.
The 2 chains of the radio are cross-polarized.

Results

The EUT complied with the specification

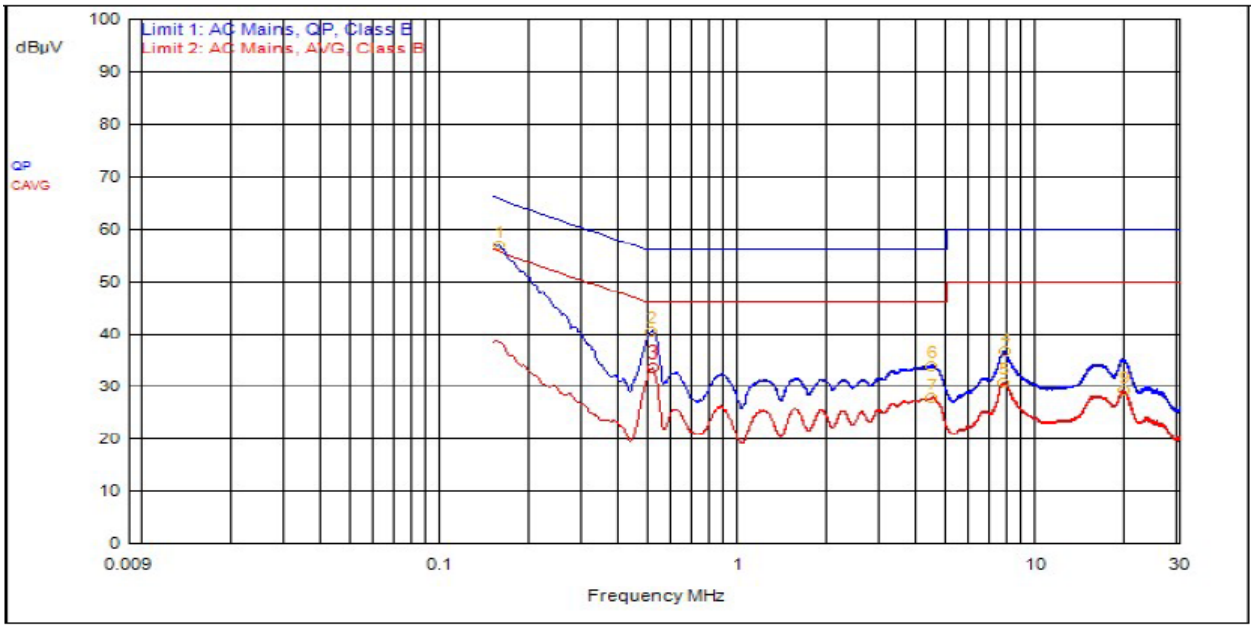
5.2 Conducted Emissions at Mains Ports Data

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	510,000kHz	12.4	0.0		QPeak	27.5	39.9	56.0	-16.1		
3	4.437MHz	12.3	0.1		QPeak	22.0	34.4	56.0	-21.6		
5	7.686MHz	12.3	0.2		QPeak	23.4	35.9	60.0	-24.1		
2	507,000kHz	12.4	0.0		C_AVG	20.4	32.8			46.0	-13.2
4	4.467MHz	12.3	0.1		C_AVG	16.1	28.5			46.0	-17.5
6	7.611MHz	12.3	0.2		C_AVG	17.6	30.1			50.0	-19.9

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	156,000kHz	12.4	0.0		QPeak	44.5	56.9	65.7	-8.8		
2	507,000kHz	12.4	0.0		QPeak	28.2	40.6	56.0	-15.4		
6	4.407MHz	12.3	0.1		QPeak	21.6	34.0	56.0	-22.0		
4	7.719MHz	12.3	0.2		QPeak	24.1	36.6	60.0	-23.4		
3	510,000kHz	12.4	0.0		C_AVG	21.0	33.5			46.0	-12.5
5	7.686MHz	12.3	0.2		C_AVG	18.3	30.8			50.0	-19.2
7	4.419MHz	12.3	0.1		C_AVG	15.5	27.9			46.0	-18.1
9	19.401MHz	12.2	0.2		C_AVG	16.8	29.2			50.0	-20.8

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.

Nominal BW (MHz)	Frequency (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
10	5735	9.1	13.2
10	5790	9.1	13.65
10	5840	9.15	13.9
20	5740	17.9	24.3
20	5790	17.9	24.6
20	5835	17.9	24.8
30	5745	27.0	37.8
30	5790	27.15	37.95
30	5830	27.15	37.2
40	5750	36.75	48.6
40	5790	36.75	48.45
40	5825	36.75	48.90
50	5755	45.0	59.75
50	5790	44.75	59.75
50	5820	44.75	59.5
60	5760	56.5	73.0
60	5790	56.0	72.5
60	5815	56.5	73.0
60	5770	76.5	102.0
80	5790	76.5	99.5
80	5805	76.5	102.5

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 §15.403(a)(3) Maximum Average Output Power

All chains were measured and summed under the guidance of KDB 789033 Section II. E.2. and KDB 66291 D01. Please see associated annex for details on instrument settings.
The maximum average RF conducted output power measured for this device was 20.43 dBm or 110.41 mW. The limit is 30 dBm, or 1 Watt when using antennas with 6 dBi or less gain. The integral antenna has a gain of 3 dBi with the dish antenna having a gain of 29 dBi. TP setting reflected are with the 3 dBi antenna.

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	Measured EIRP	Measured PSD
HT 10	5735	Mcs0	20	20.09	23.09	4.97
HT 10	5790	Mcs0	18	18.84	21.84	3.59
HT 10	5840	Mcs0	19	19.51	22.51	3.91
HT 20	5740	Mcs0	20	20.41	23.41	2.12
HT 20	5790	Mcs0	18	18.79	21.79	0.55
HT 20	5835	Mcs0	19	19.67	22.67	1.23
HT 30	5745	Mcs0	20	20.33	23.33	0.57
HT 30	5790	Mcs0	18	18.89	21.89	- 0.96
HT 30	5830	Mcs0	19	19.82	22.82	-0.2
VHT 40	5750	Mcs0	20	20.18	23.16	- 0.93
VHT 40	5790	Mcs0	18	18.45	21.45	- 2.99
VHT 40	5825	Mcs0	19	20.05	23.05	- 1.39
VHT 50	5755	Mcs0	20	20.35	23.35	- 1.67
VHT 50	5790	Mcs0	18	18.46	21.46	- 4.21
VHT 50	5820	Mcs0	19	19.88	22.88	- 2.37
VHT 60	5760	Mcs0	20	20.43	23.43	- 2.79
VHT 60	5790	Mcs0	18	18.54	21.54	- 4.71
VHT 60	5815	Mcs0	19	19.87	22.87	- 3.42
VHT 80	5770	Mcs0	20	20.16	23.16	- 4.16
VHT 80	5790	Mcs0	18	18.30	21.30	- 6.36
VHT 80	5805	Mcs0	19	19.51	22.51	- 5.01

Table 4: 3 dBi Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	Conducted Output Power *
HT 10	5735	Mcs0	- 5.91
HT 10	5790	Mcs0	- 7.16
HT 10	5840	Mcs0	- 6.49
HT 20	5740	Mcs0	- 5.59
HT 20	5790	Mcs0	- 7.21
HT 20	5835	Mcs0	- 6.33
HT 30	5745	Mcs0	- 5.67
HT 30	5790	Mcs0	- 7.11
HT 30	5830	Mcs0	- 6.18
VHT 40	5750	Mcs0	- 5.82
VHT 40	5790	Mcs0	- 7.55
VHT 40	5825	Mcs0	- 5.95
VHT 50	5755	Mcs0	- 5.65
VHT 50	5790	Mcs0	- 7.54
VHT 50	5820	Mcs0	- 6.12
VHT 60	5760	Mcs0	- 5.57
VHT 60	5790	Mcs0	- 7.46
VHT 60	5815	Mcs0	- 6.13
VHT 80	5770	Mcs0	- 5.84
VHT 80	5790	Mcs0	- 7.70
VHT 80	5805	Mcs0	- 6.49

Table 5: 29 dBi Antenna

Result

In the configuration tested, the maximum summed average RF output power was less than 1 watt; therefore, the EUT compiled 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 3 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.

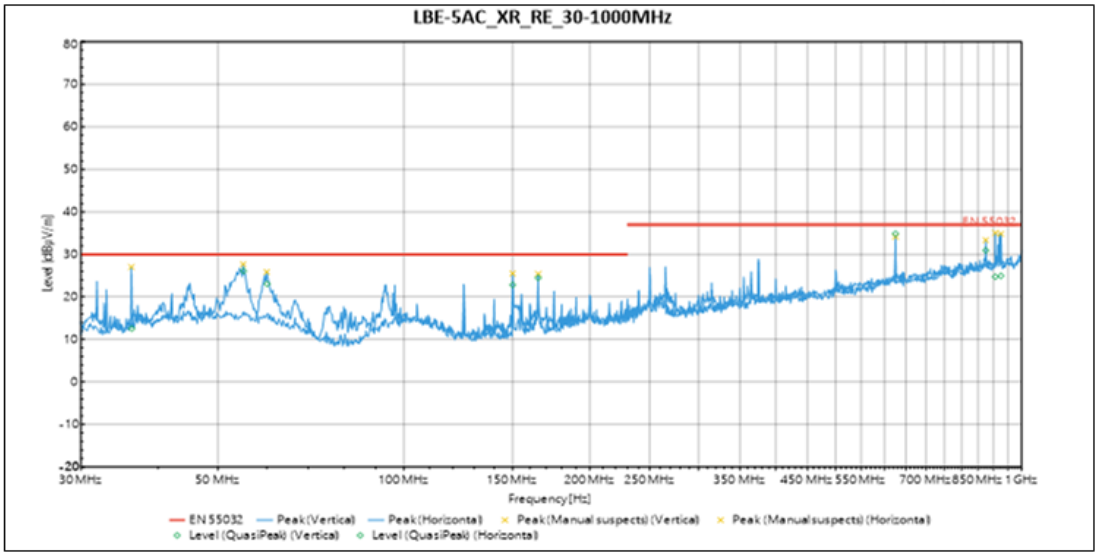
5.5.2 Radiated Spurious Emissions in the Restricted Bands of § 15.205

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 TP20.

Correction Factor = Antenna Factor + Cable Loss - Pre-amp 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.



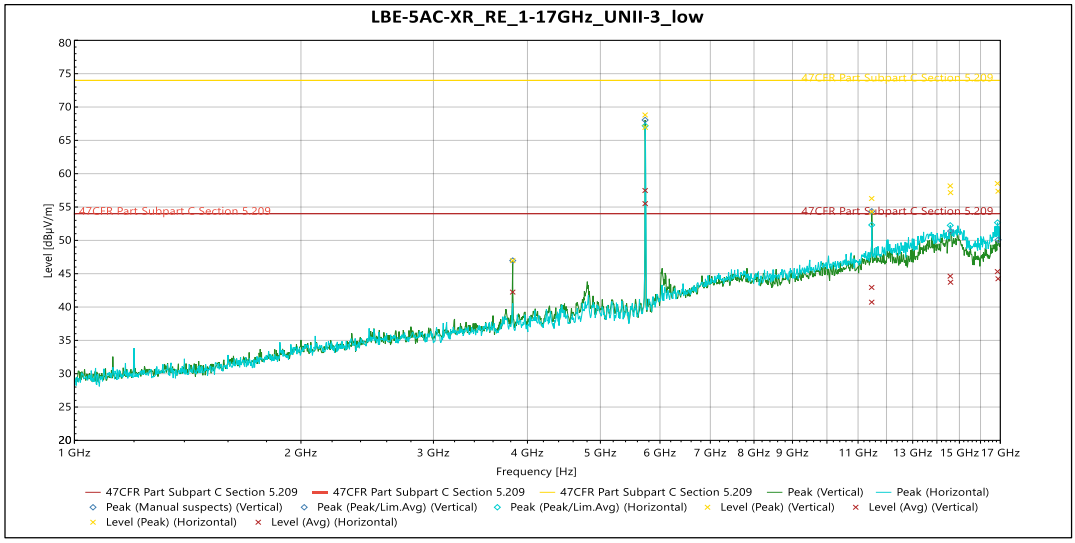
Vertical

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
QuasiPeak	36.268 MHz	12.547	30	-17.453	246	0.995	Vertical	-14.359
QuasiPeak	55.037 MHz	26.11	30	-3.89	31	3.661	Vertical	-12.734
QuasiPeak	60.067 MHz	23.037	30	-6.963	110	3.442	Vertical	-13.432
QuasiPeak	150.02 MHz	22.839	30	-7.161	59	1.167	Vertical	-17.799
QuasiPeak	164.98 MHz	24.483	30	-5.517	213	1.034	Vertical	-16.827
QuasiPeak	906.67 MHz	24.727	37	-12.273	328	3.059	Vertical	-0.573
QuasiPeak	925.77 MHz	24.963	37	-12.037	309	1.735	Vertical	0.037

Horizontal

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin	Azimuth (°)	Height	Pol.	Correction (dB)
QuasiPeak	625 MHz	34.856	37	-2.144	153	1.362	Horizontal	-4.944
QuasiPeak	875.04 MHz	30.931	37	-6.069	133	1.125	Horizontal	-1.207

Table 6: Radiated Emissions 30 – 1000 MHz



Vertical

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
Peak	3.8233 GHz	46.962	74	-27.038	125	1.5	Vertical	-3.529
Peak	11.469 GHz	54.264	74	-19.736	161	1.636	Vertical	12.328
Peak	14.598 GHz	57.164	74	-16.836	64	1.636	Vertical	15.084
Peak	16.888 GHz	57.369	74	-16.631	218	3.655	Vertical	16.965

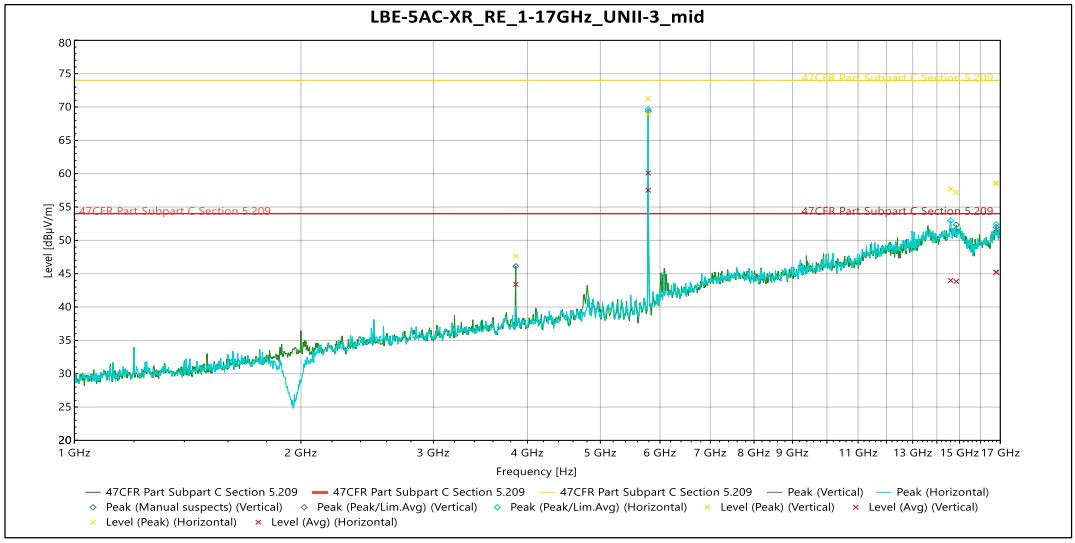
Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
Avg	3.8233 GHz	42.244	54	-11.756	125	1.5	Vertical	-3.529
Avg	11.469 GHz	40.728	54	-13.272	161	1.636	Vertical	12.328
Avg	14.598 GHz	43.718	54	-10.282	64	1.636	Vertical	15.084
Avg	16.888 GHz	44.245	54	-9.755	218	3.655	Vertical	16.965

Horizontal

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
Peak	11.468 GHz	56.276	74	-17.724	51	3.315	Horizontal	12.346
Peak	14.586 GHz	58.171	74	-15.829	348	2.332	Horizontal	15.336
Peak	16.855 GHz	58.532	74	-15.468	108	2.141	Horizontal	17.015

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
Avg	11.468 GHz	42.935	54	-11.065	51	3.315	Horizontal	12.346
Avg	14.586 GHz	44.634	54	-9.366	348	2.332	Horizontal	15.336
Avg	16.855 GHz	45.32	54	-8.68	108	2.141	Horizontal	17.015

Table 7: Transmitting on the Lowest Frequency 5735 MHz 1 – 17 GHz



Vertical

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
Peak	3.8598 GHz	47.631	74	-26.369	106	1.5	Vertical	-3.406
Peak	14.859 GHz	57.205	74	-16.795	68	2.641	Vertical	14.871
Peak	16.786 GHz	58.588	74	-15.412	114	3.651	Vertical	16.825

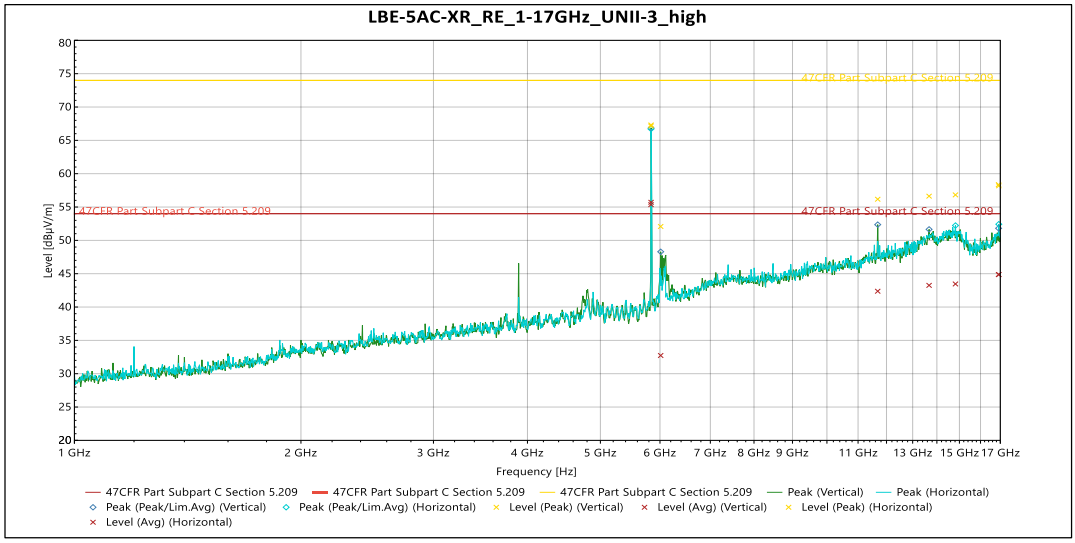
Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
Avg	3.8598 GHz	43.403	54	-10.597	106	1.5	Vertical	-3.406
Avg	14.859 GHz	43.844	54	-10.156	68	2.641	Vertical	14.871
Avg	16.786 GHz	45.227	54	-8.773	114	3.651	Vertical	16.825

Horizontal

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
Peak	14.605 GHz	57.719	74	-16.281	288	3.685	Horizontal	14.908
Peak	16.786 GHz	58.517	74	-15.483	341	3.808	Horizontal	16.825

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
Avg	14.605 GHz	43.997	54	-10.003	288	3.685	Horizontal	14.908
Avg	16.786 GHz	45.215	54	-8.785	341	3.808	Horizontal	16.825

Table 8: Transmitting on the Middle Frequency 5790 MHz 1 – 17 GHz



Vertical

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
Peak	6.0131 GHz	52.075	74	-21.925	154	1.669	Vertical	3.36
Peak	11.682 GHz	56.173	74	-17.827	150	1.659	Vertical	11.793
Peak	13.67 GHz	56.633	74	-17.367	267	1.696	Vertical	14.152
Peak	16.909 GHz	58.365	74	-15.635	253	4	Vertical	16.588

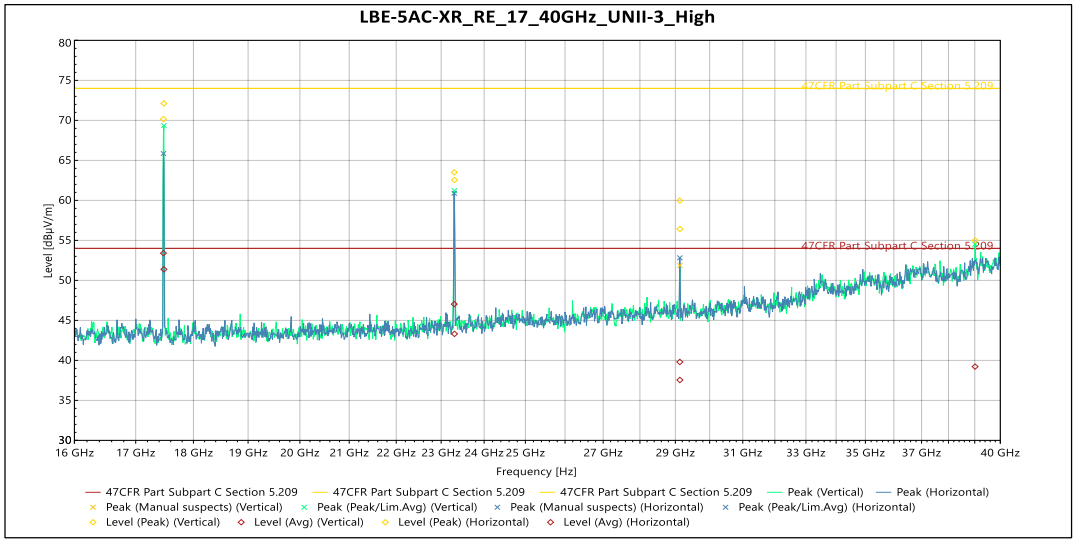
Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
Avg	6.0131 GHz	32.729	54	-21.271	154	1.669	Vertical	3.36
Avg	11.682 GHz	42.37	54	-11.63	150	1.659	Vertical	11.793
Avg	13.67 GHz	43.248	54	-10.752	267	1.696	Vertical	14.152
Avg	16.909 GHz	44.867	54	-9.133	253	4	Vertical	16.588

Horizontal

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
Peak	14.819 GHz	56.82	74	-17.18	335	2.294	Horizontal	14.491
Peak	16.922 GHz	58.177	74	-15.823	25	1.661	Horizontal	16.515

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
Avg	14.819 GHz	43.465	54	-10.535	335	2.294	Horizontal	14.491
Avg	16.922 GHz	44.867	54	-9.133	25	1.661	Horizontal	16.515

Table 9: Transmitting on the Highest Frequency 5835 MHz 1 – 17 GHz



Vertical

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
Peak	17.481 GHz	72.12	74	-1.88	86	Vertical	-6.006
Peak	23.306 GHz	62.545	74	-11.455	302	Vertical	-5.336
Peak	29.13 GHz	56.424	74	-17.576	129	Vertical	-4.385
Peak	39.013 GHz	54.996	74	-19.004	340	Vertical	3.097

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
Avg	17.481 GHz	51.376	54	-2.624	86	Vertical	-6.006
Avg	23.306 GHz	43.308	54	-10.692	302	Vertical	-5.336
Avg	29.13 GHz	37.548	54	-16.452	129	Vertical	-4.385
Avg	39.013 GHz	39.223	54	-14.777	340	Vertical	3.097

Horizontal

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m) (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
Peak	17.474 GHz	70.151	74	-3.849	66	Horizontal	-6.041
Peak	23.301 GHz	63.501	74	-10.499	98	Horizontal	-5.387
Peak	29.128 GHz	59.973	74	-14.027	91	Horizontal	-4.388

Source	Frequency	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Pol.	Correction (dB)
Avg	17.474 GHz	53.402	54	-0.598	66	Horizontal	-6.041
Avg	23.301 GHz	47.031	54	-6.969	98	Horizontal	-5.387
Avg	29.128 GHz	39.795	54	-14.205	91	Horizontal	-4.388

Table 10: Transmitting on the Highest Frequency 5835 MHz 17 – 40 GHz (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.

Modulation (BW)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power *	Measured EIRP	Measured PSD
HT 10	5735	Mcs0	20	20.09	23.09	4.97
HT 10	5790	Mcs0	18	18.84	21.84	3.59
HT 10	5840	Mcs0	19	19.51	22.51	3.91
HT 20	5740	Mcs0	20	20.41	23.41	2.12
HT 20	5790	Mcs0	18	18.79	21.79	0.55
HT 20	5835	Mcs0	19	19.67	22.67	1.23
HT 30	5745	Mcs0	20	20.33	23.33	0.57
HT 30	5790	Mcs0	18	18.89	21.89	- 0.96
HT 30	5830	Mcs0	19	19.82	22.82	-0.2
VHT 40	5750	Mcs0	20	20.18	23.16	- 0.93
VHT 40	5790	Mcs0	18	18.45	21.45	- 2.99
VHT 40	5825	Mcs0	19	20.05	23.05	- 1.39
VHT 50	5755	Mcs0	20	20.35	23.35	- 1.67
VHT 50	5790	Mcs0	18	18.46	21.46	- 4.21
VHT 50	5820	Mcs0	19	19.88	22.88	- 2.37
VHT 60	5760	Mcs0	20	20.43	23.43	- 2.79
VHT 60	5790	Mcs0	18	18.54	21.54	- 4.71
VHT 60	5815	Mcs0	19	19.87	22.87	- 3.42
VHT 80	5770	Mcs0	20	20.16	23.16	- 4.16
VHT 80	5790	Mcs0	18	18.30	21.30	- 6.36
VHT 80	5805	Mcs0	19	19.51	22.51	- 5.01

Table 11: 3 dBi Antenna

Modulation (BW)	Frequency (MHz)	Data Rate	Measured PSD
HT 10	5735	Mcs0	21.03
HT 10	5790	Mcs0	22.41
HT 10	5840	Mcs0	22.09
HT 20	5740	Mcs0	23.88
HT 20	5790	Mcs0	25.45
HT 20	5835	Mcs0	24.77
HT 30	5745	Mcs0	25.43
HT 30	5790	Mcs0	56.96
HT 30	5830	Mcs0	26.02
VHT 40	5750	Mcs0	26.93
VHT 40	5790	Mcs0	28.99
VHT 40	5825	Mcs0	27.39
VHT 50	5755	Mcs0	27.67
VHT 50	5790	Mcs0	30.21
VHT 50	5820	Mcs0	28.37
VHT 60	5760	Mcs0	28.79
VHT 60	5790	Mcs0	30.71
VHT 60	5815	Mcs0	29.42
VHT 80	5770	Mcs0	30.16
VHT 80	5790	Mcs0	32.36
VHT 80	5805	Mcs0	31.01

Table 12: 29 dBi Antenna

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 --