427 West 12800 South
Draper, UT 84020

Test Report

Certification

FCC ID	SWX-LTULRR
Equipment Under Test	LTU-LR
Test Report Serial Number	TR3679_01
Date of Test(s)	October 30th, - November 5, 2019
Report Issue Date	November 13, 2019

Test Specification	Applicant
47 CFR FCC Part 15, Subpart E	Ubiquiti Inc. 685 Third Avenue New York, NY 10019 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-LR
FCC ID	SWX-LTULRR

On this 13 day of November 2019, 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 federal government.

Unified Compliance Laboratory

Written By: Clay Allred

Reviewed By: Alex Macon

Revision History		
Revision	**Description**	**Date**
01	Original Report Release	November 13, 2019

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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-LR
Serial Number	N/A
Dimensions (cm)	51.2 x 38.6 x 25.8

2.2 Description of EUT

The LTU-LR is a fixed point-to-point or point to multiple point transceiver, intended for outdoor use, operating in the UNII-1, UNII-2A/2C and UNII-3 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.

The UNII transceiver uses 5 modulation bandwidths with channels spaced 5 MHz apart. Modulation bandwidths of 10 MHz, 20 MHz, 30 MHz, 40 MHz, and 50 MHz are used. There are 2 transmit chains, one for vertically polarized and one for horizontally polarized transmission. The table below shows the channels used in each band with the different modulation bandwidths and maximum power 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.

Band	Modulation Bandwidth	Frequency (MHz)
UNII-1	10 MHz	5160, 5165, 5170. 5175, 5180, 5185, 5190, 5195, 5200, 5205, 5210, 5215, 5220, 5225, 5230, 5235, 5240, 5245
	20 MHz	5165, 5170, 5175, 5180, 5185, 5190, 5195, 5200, 5205, 5210, 5215, 5220, 5225, 5230, 5235, 5240
	30 MHz	5170, 5175, 5180, 5185, 5190, 5195, 5200, 5205, 5210, 5215, 5220, 5225, 5230, 5235
	40 MHz	5175, 5180, 5185, 5190, 5195, 5200, 5205, 5210, 5215, 5220, 5225, 5230
	50 MHz	5180, 5185, 5190, 5195, 5200, 5205, 5210, 5215, 5220, 5225

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: LTU MN: LTU-LR SN: N/A	Point-to-Point / Point-to-Multi-Point Transceiver	PoE – Shielded RJ-45 Input (4 meters) See Section 2.4 (Note 2)
BN: Ubiquiti In. MN: POE-24V-5X-HD SN: N/A	PoE Power supply	See Section 2.4
BN: Dell MN: XPS SN: N/A	Laptop Computer	Ethernet Non-Shielded Cat 5e to PoE PSU

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
LTU-LR PoE/Data in	1	Shielded Cat 5e cable (4 meters)
PoE PSU AC mains	1	3 Conductor power cord (40 cm)
PoE PSU PoE/Data out	1	Shielded Cat 5e cable (8 meters)
PoE PSU Data in	1	Non-shielded Cat 5e cable (1 meter)

2.5 Operating Environment

Power Supply	120 VAC
AC Mains Frequency	60 Hz
Temperature	22.9 C
Humidity	21.0%
Barometric Pressure	12.5 psi

2.6 Operating Modes

The LTU-LR was tested while the UNII transceiver was in a constant transmit mode at the upper, middle, and lower channels for each modulation bandwidth and frequency band. The Bluetooth LE transceiver was active while testing the UNII-1 transceiver to assess any transmitter interactions.

2.7 EUT Exercise Software

Ubiquiti test software and firmware were used to control the transceivers of the EUT. (ART)

2.8 Block Diagram of Test Configuration

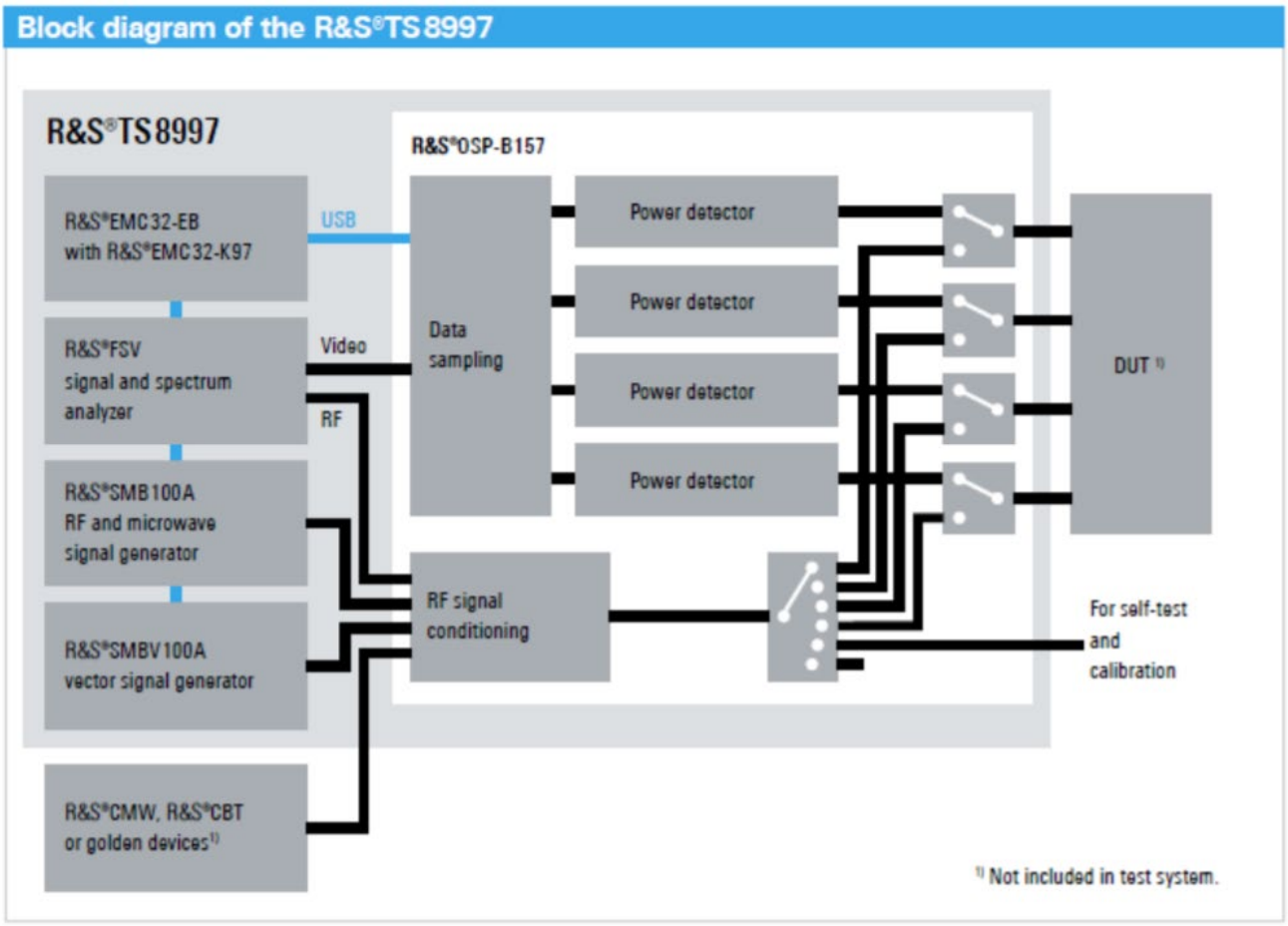


Diagram 1: Test Configuration Block Diagram

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	IC 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	2400 to 2483.5	Compliant
15.407(a)	RSS-247 §6.2.2, §6.2.3	Peak Output Power	2400 to 2483.5	Compliant
15.407(b)	RSS-247 §6.2.2, §6.2.3	Antenna Conducted Spurious Emissions	0.009 to 25000	Compliant
15.407(b)	RSS-247 §6.2.2, §6.2.3	Radiated Spurious Emissions	0.009 to 25000	Compliant
15.407(a)	RSS-247 §6.2.2, §6.2.3	Peak Power Spectral Density	2400 to 2483.5	Compliant
The testing was performed according to the procedures in ANSI C63.10-2013, KDB 789033 and 47 CFR Part 15.				

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 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 2020.

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	12/14/2018	4/17/2020
Transient Limiter	Com-Power	LIT-930A	UCL-2496	2/11/2019	2/11/2020
LISN	AFJ	LS16C/10	UCL-2512	12/14/2018	4/17/2020
Cat6 ISN	Teseq	ISN T8-Cat6	UCL-2971	2/11/2019	5/21/2020
ISN	Teseq	ISN T800	UCL-2974	2/19/2019	5/21/2020
LISN	Com-Power	LIN-120C	UCL-2612	2/11/2019	2/11/2020
AC Power Source	Laplace Instruments	AC1000A	UCL-2857	N/A	N/A
Monitoring Probe	Teseq	MD 4070A	UCL-2980	3/16/2019	5/21/2020
Test Software	UCL	Revision 1	UCL-3107	N/A	N/A

Table 1:List of equipment used for Conducted Emissions Testing at Mains Port

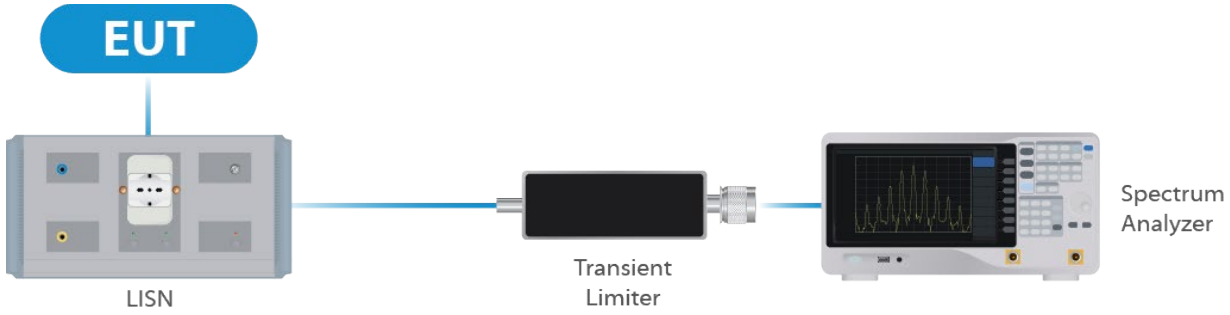


Figure 1: Conducted Emissions Test

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	06/12/2019	06/12/2020
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	06/13/2019	06/13/2020
Switch Extension	R&S	OSP-150W	UCL-2870	06/14/2019	06/14/2020

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

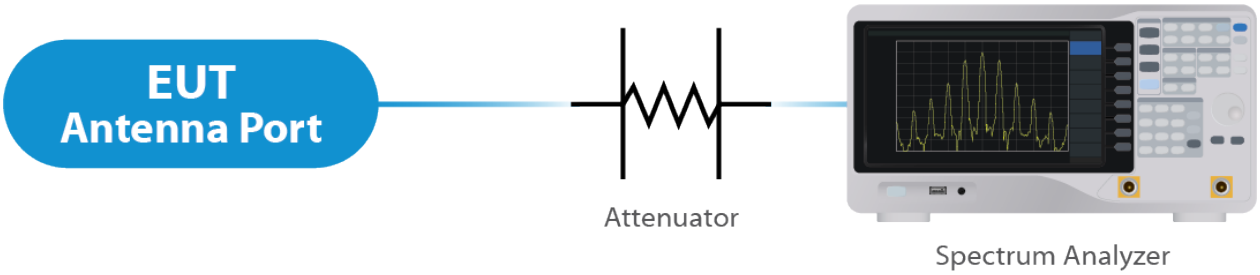


Figure 2: Direct Connect at the Antenna Port Test

4.3 Radiated Emissions

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
EMI Receiver	Keysight	N9038A	UCL-2778	11/26/2018	5/3/2020
Pre-Amplifier	Sonoma Instruments	310N	UCL-2889	9/13/2018	5/16/2020
Double Ridge Horn Antenna	Scwarzbeck	BBHA 9120D	UCL-3065	4/11/2019	6/3/2020
Log Periodic	Scwarzbeck	STLP 9129	UCL-3068	4/11/2019	6/3/2020
15 - 40 GHz Horn Antenna	Scwarzbeck	BBHA 9170	UCL-2487	2/15/2017	4/16/2020
18 – 40 GHz Amplifier	Scwarzbeck	BBV 9721	UCL-2490	4/1/2019	4/1/2020
0.5 – 18 GHz Amplifier	Scwarzbeck	BBV 9718C	UCL-2493	4/1/2019	4/1/2020
Loop Antenna	Com-Power	AL-130R	UCL-2596	10/26/2018	4/23/2020
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

Table 3:List of equipment used for Radiated Emissions

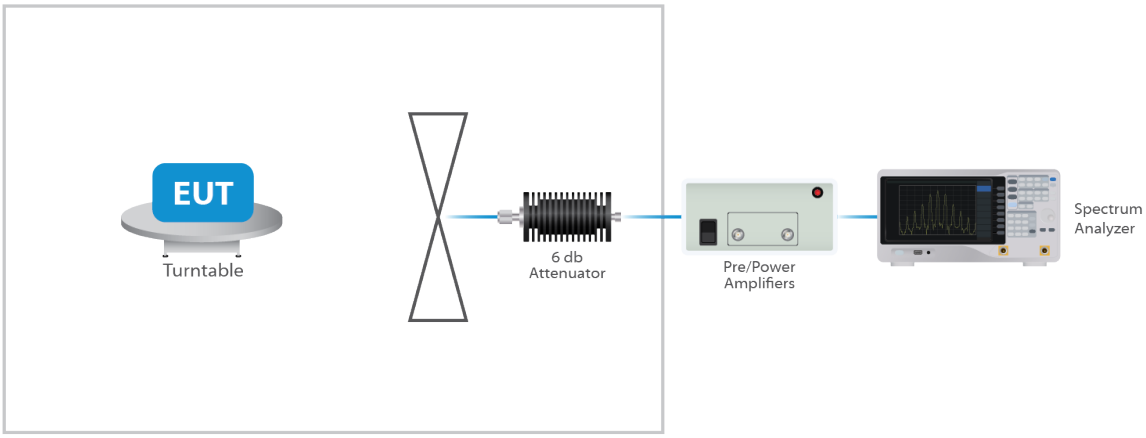


Figure 3: Radiated Emissions Test

4.4 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.

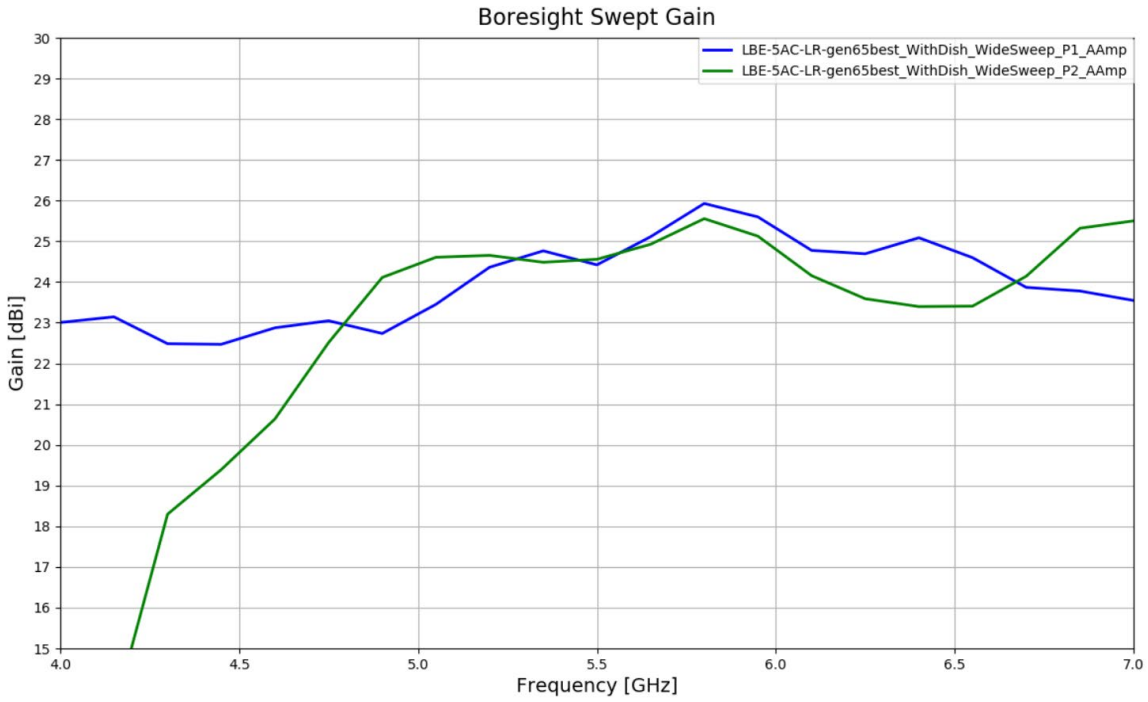
4.5 Measurement Uncertainty

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)	3.95	95
Radiated Emissions (1 GHz to 18 GHz)	5.56	95
Radiated Emissions (18 GHz to 40 GHz)	5.16	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 Omni and an optional accessory Dish antenna. The Maximum gain of the Omni antenna is 3 dBi and the optional Dish antenna gain curve is in the graph below. The antennas are not user replaceable.

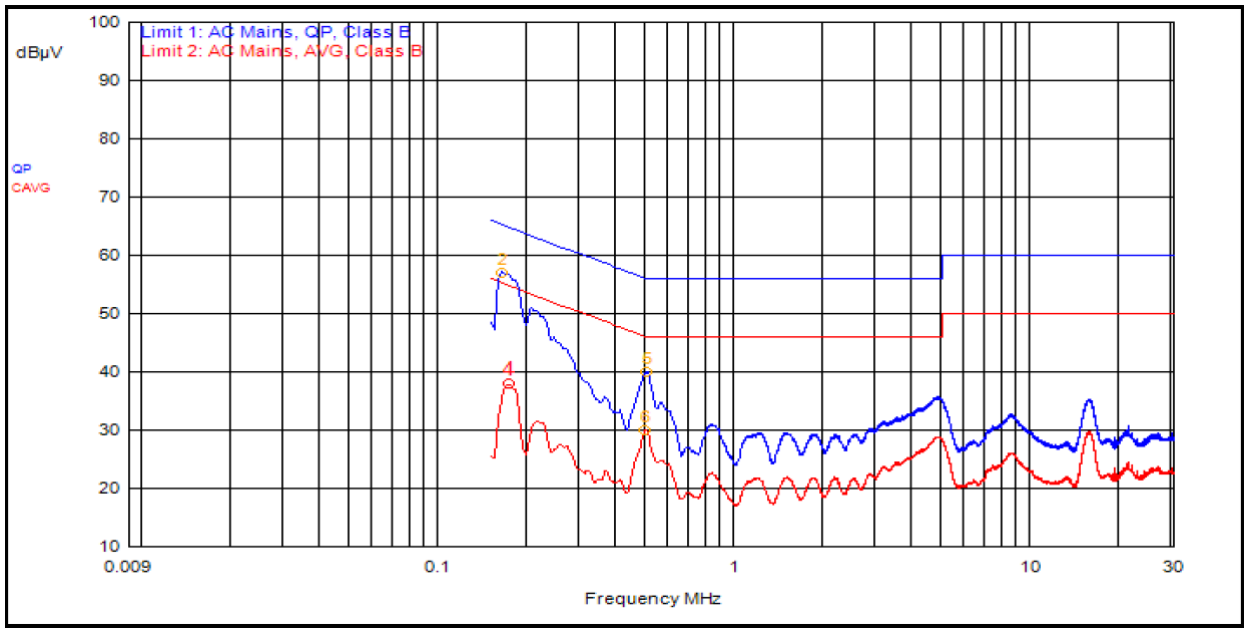


Graph 1: Dish Antenna Gain Curve

Results

The EUT complied with the specification

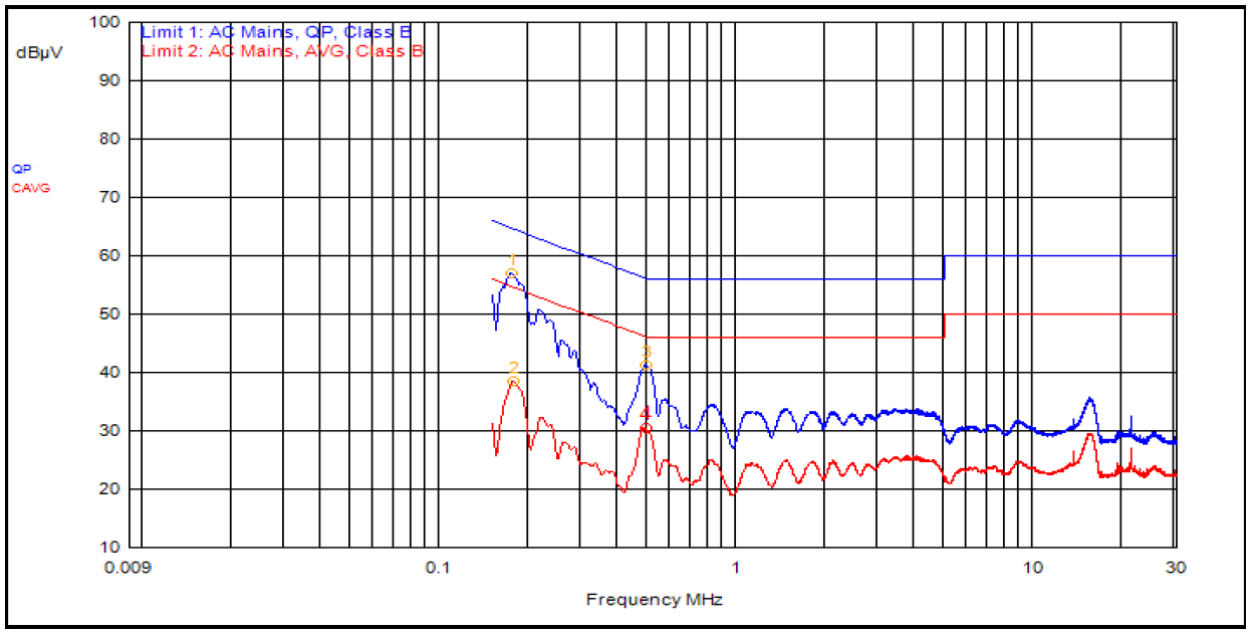
5.2 Conducted Emissions at Mains Ports Data



Graph 2: Line Conductor

Frequency (MHZ)	Line	Detector	Receiver Reading (dBµV)	Probe / LISN (dB)	Cable / Atten Factor (dB)	Meas. Level (dBµV)	Limit (dBµV/m)	Margin (dB)
0.162	Line 1	QP	44.9	12.2	0.0	57.1	65.4	-8.2
0.501	Line 1	QP	27.6	12.3	0.0	39.9	56.0	-16.1
0.495	Line 1	AVG	17.7	12.3	0.0	29.9	46.1	-16.1
0.171	Line 1	AVG	25.6	12.2	0.0	37.9	54.9	-17.1

Table 4: Line Conductor



Graph 3: Neutral Conductor

Frequency (MHZ)	Line	Detector	Receiver Reading (dBµV)	Probe / LISN (dB)	Cable / Atten Factor (dB)	Meas. Level (dBµV)	Limit (dBµV/m)	Margin (dB)
0.174	Neut	QP	44.7	12.2	0.0	57.0	64.8	-7.8
0.492	Neut	QP	29.0	12.3	0.0	41.2	56.1	-14.9
0.489	Neut	AVG	18.3	12.3	0.0	30.6	46.2	-15.6
0.177	Neut	AVG	26.3	12.2	0.0	38.6	54.6	-16.0

Table 5: Neutral Conductor

Result

The EUT complied with the specification limit.

5.3 §15.403(i) 26 dB Emissions Bandwidth

Nominal BW (MHz)	Frequency (MHz)	99% Bandwidth (MHz)	26 dB Bandwidth (MHz)
10	5160	9.45	10.50
10	5200	10.65	19.85
10	5245	11.75	21.05
20	5165	18.90	20.90
20	5200	18.90	20.70
20	5240	23.80	45.60
30	5170	28.20	31.05
30	5200	28.35	34.05
30	5235	30.30	56.10
40	5175	37.75	41.55
40	5200	38.00	41.40
40	5230	37.75	43.65
50	5180	47.00	51.75
50	5200	47.25	52.25
50	5225	47.00	52.25

Table 6: Bandwidth Emissions

Result

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

5.4 §15.407(a)(1) Maximum Average Output Power

The maximum average RF conducted output power measured for this device was 25.2* dBm or 331.13 mW. The limit is 30 dBm, or 1W. The antenna has a gain of 3 dBi.

Nominal BW (MHz)	Frequency (MHz)	Data Rate	TP Setting	Measured EIRP	Conducted Output Power
10	5160	vt0	18	20.5	17.5
10	5200	vt0	30	27.4	24.4
10	5245	vt0	30	28.2	25.2
20	5165	vt0	18	19.9	16.9
20	5200	vt0	23	23.2	20.2
20	5240	vt0	30	28.2	25.2
30	5170	vt0	18	20.8	17.8
30	5200	vt0	24	24.3	21.3
30	5235	vt0	29	27.3	24.3
40	5175	vf0	18	19.8	16.8
40	5200	vf0	20	19.6	16.6
40	5230	vf0	26	25.1	22.1
50	5180	vf0	18	18.6	15.6
50	5200	vf0	18	18.6	15.6
50	5225	vf0	18	18.6	15.6

Table 7: 3dBi Antenna

Nominal BW (MHz)	Frequency (MHz)	Data Rate	TP Setting	Conducted Output Power (dBm)
10	5160	vt0	-5	-5.5
10	5200	vt0	7	1.4
10	5245	vt0	7	2.2
20	5165	vt0	-5	-6.1
20	5200	vt0	0	-2.8
20	5240	vt0	7	2.2
30	5170	vt0	-5	-5.2
30	5200	vt0	1	-1.7
30	5235	vt0	6	1.3
40	5175	vf0	-5	-6.2
40	5200	vf0	-3	-6.4
40	5230	vf0	3	-0.9
50	5180	vf0	-5	-7.4
50	5200	vf0	-5	-7.4
50	5225	vf0	-5	-7.4

Table 8: 26dBi Antenna

Result

In the configuration tested, the maximum 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).

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 3 dBi accounted for. These demonstrate compliance with the provisions of this section at the band edges.

Result

Conducted spurious emissions were attenuated below the limit; therefore, the EUT complies with the specification. See annex for results.

5.5.2 Radiated Spurious Emissions in the Restricted Bands of § 15.205

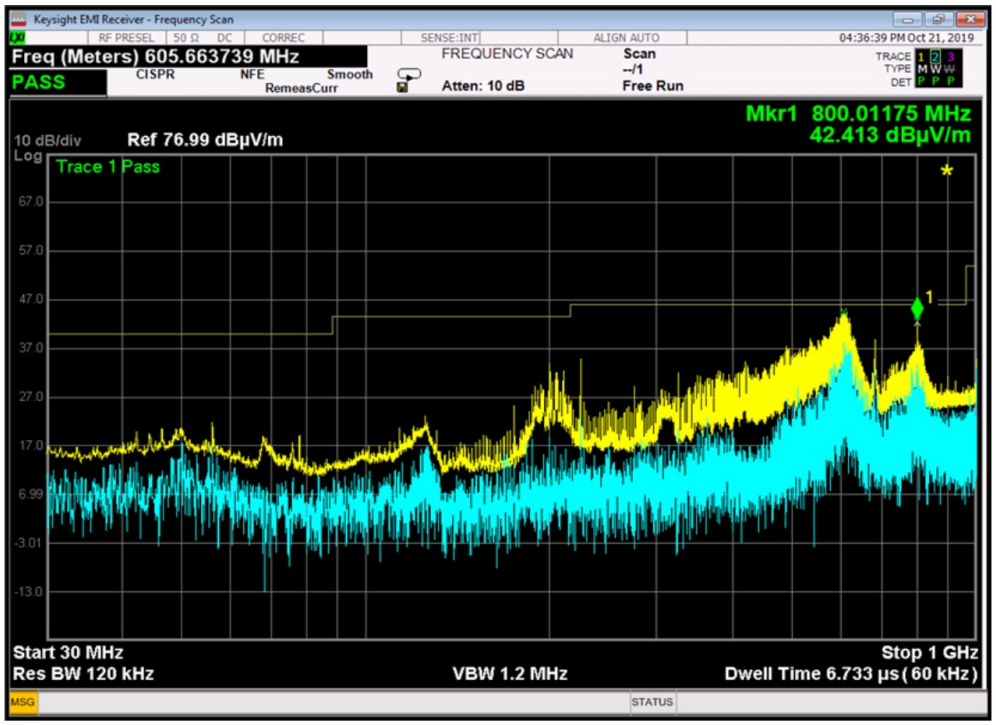
The EUT uses various power settings based on the channel in use. In order to reduce test time, the radiated spurious emissions at the lowest, middle, and highest channel were measured at the maximum power of TP30.

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.

Frequency (MHZ)	Antenna Polarity	Detector	Receiver Reading (dBµV)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
605.66	H	QP	43.5	-6.9	46.0	-2.5
800.01	H	QP	40.3	-2.0	46.0	-5.7
48.36	V	QP	24.0	-12.1	40.0	-16.0
199.99	V	QP	32.6	-15.2	43.5	-11.0
603.08	V	QP	25.1	-6.9	46.0	-10.9
605.30	V	QP	39.9	-6.9	46.0	-6.1
800.01	V	QP	31.0	-4.6	46.0	-15.0

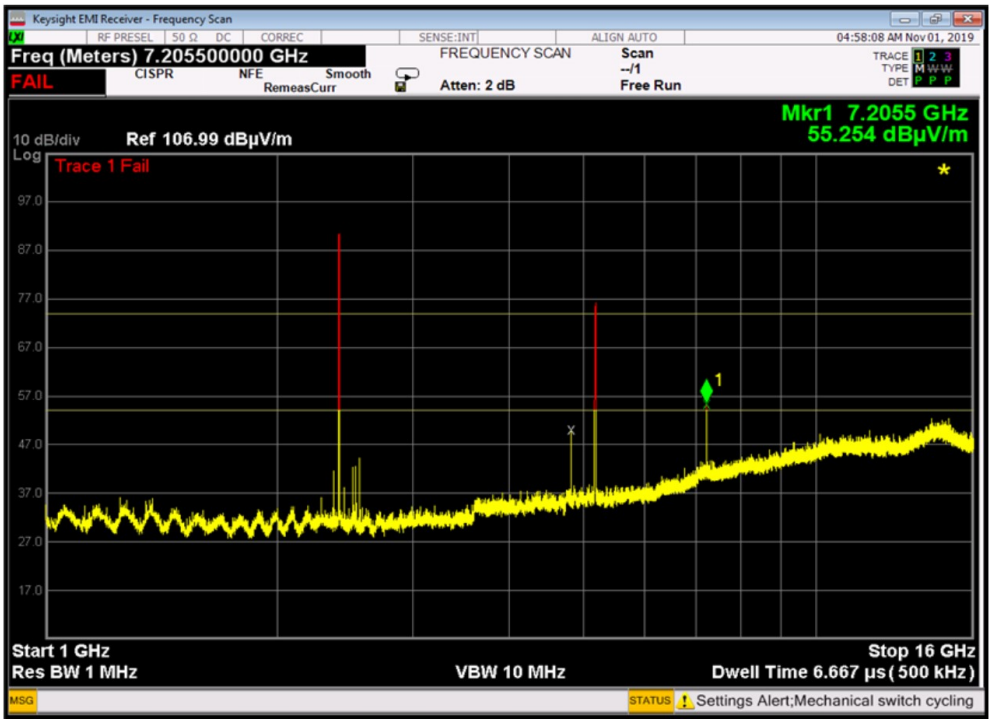
Table 9: 30-1000MHz Frequency Range



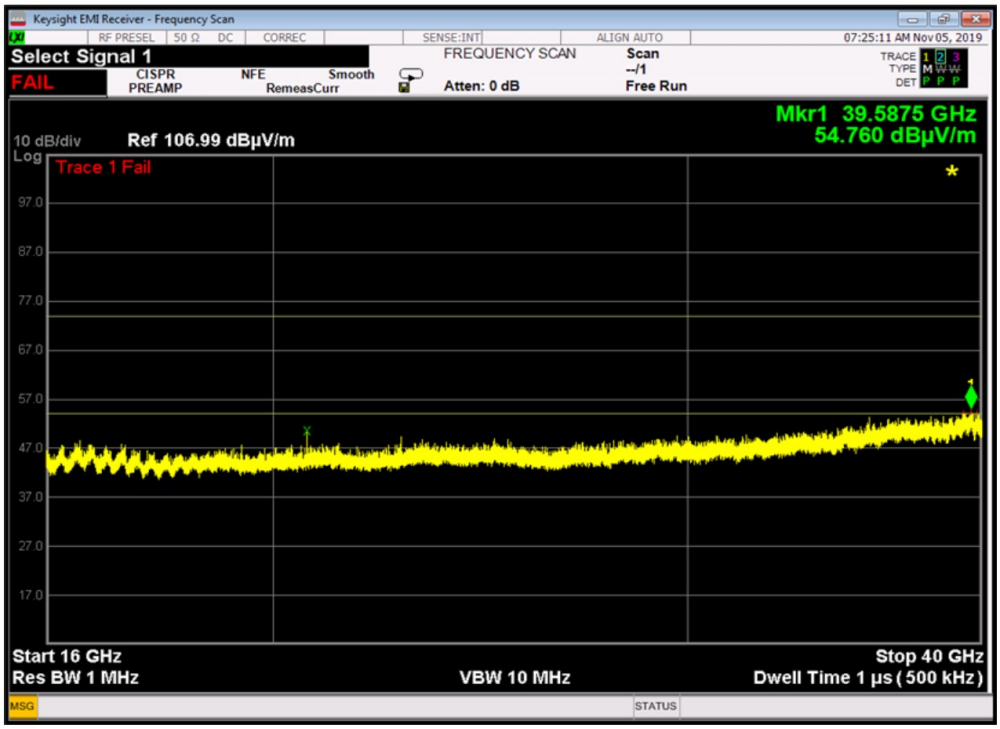
Graph 4: Worst Case Receiver Plot (Horizontal, at 5160MHz, 10MHz BW)

Frequency (GHZ)	Transceiver BW (MHz)	Antenna Polarity	Detector	Receiver Reading (dBµV)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
24.98	30	V	P	47.7	8.2	74.0	-26.3
24.98	30	V	A	36.4	8.2	54.0	-17.6
20.66	20	V	P	52.5	6.0	74.0	-21.5
20.66	20	V	A	44.6	6.0	54.0	-9.4
20.64	10	V	P	56.0	6.0	74.0	-18.0
20.64	10	V	A	39.2	6.0	54.0	-14.8
4.80	50	H	P	48.7	0.3	74.0	-25.3
7.21	50	H	P	54.0	8.2	74.0	-20.0
7.21	50	H	A	45.7	8.2	54.0	-8.3
4.80	50	H	P	49.0	0.3	74.0	-25.0
7.21	50	H	P	54.6	8.2	74.0	-19.4
7.21	50	H	A	45.2	8.2	54.0	-8.8
4.80	40	V	P	48.6	0.3	74.0	-25.4
7.21	40	V	P	54.2	8.2	74.0	-19.8
7.21	40	V	A	46.0	8.2	54.0	-8.0
4.80	40	H	P	49.5	0.3	74.0	-24.5
7.21	40	H	P	53.5	8.2	74.0	-20.5
7.21	40	H	A	45.9	8.2	54.0	-8.1
4.80	30	H	P	48.9	0.3	74.0	-25.1
7.21	30	H	P	55.3	8.2	74.0	-18.7
7.21	30	H	A	46.4	8.2	54.0	-7.6
4.80	30	V	P	49.8	0.3	74.0	-24.2
7.21	30	V	P	54.4	8.2	74.0	-19.6
7.21	30	V	A	45.3	8.2	54.0	-8.7
4.80	20	V	P	50.0	0.3	74.0	-24.0
7.21	20	V	P	55.0	8.2	74.0	-19.0
7.21	20	V	A	47.5	8.2	54.0	-6.5
4.80	20	H	P	50.2	0.3	74.0	-23.8
7.21	20	H	P	56.1	8.2	74.0	-17.9
7.21	20	H	A	46.9	8.2	54.0	-7.1
7.21	10	H	P	54.6	8.2	74.0	-19.4
7.21	10	H	A	45.4	8.2	54.0	-8.6
4.80	10	V	P	52.8	0.3	74.0	-21.2
7.21	10	V	P	54.0	8.2	74.0	-20.0
7.21	10	V	A	46.2	8.2	54.0	-7.8
4.80	10	V	A	46.0	0.3	54.0	-8.0
Note: If peak measurements are below the average limit, average measurements may not have been recorded. Note: No harmonics noted from the 5Ghz transceiver with the 50-ohm loads applied to the RF output. See below for worst case plots of the data noted above.							

Table 10: Transmitting on the Lowest Frequency for Each of the Bandwidths Noted



Graph 5: Worst Case Receiver Plot (1-16GHz; Vertical, at 5165MHz, 20MHz BW)

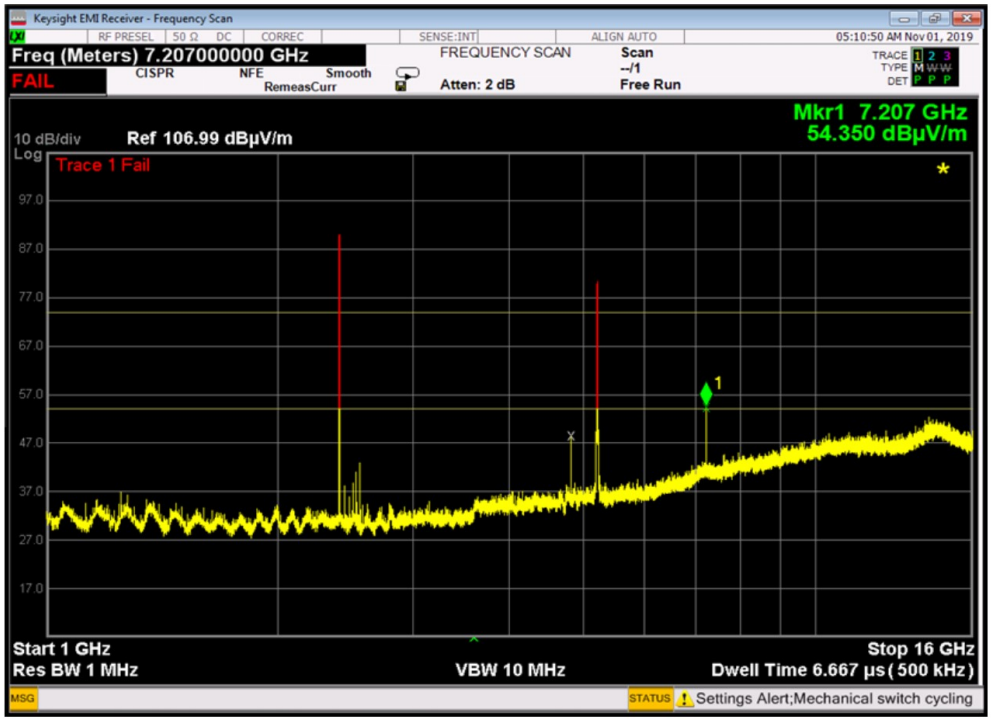


Graph 6: Worst Case Receiver Plot (16-40GHz; Vertical, at 5165MHz, 20MHz BW)

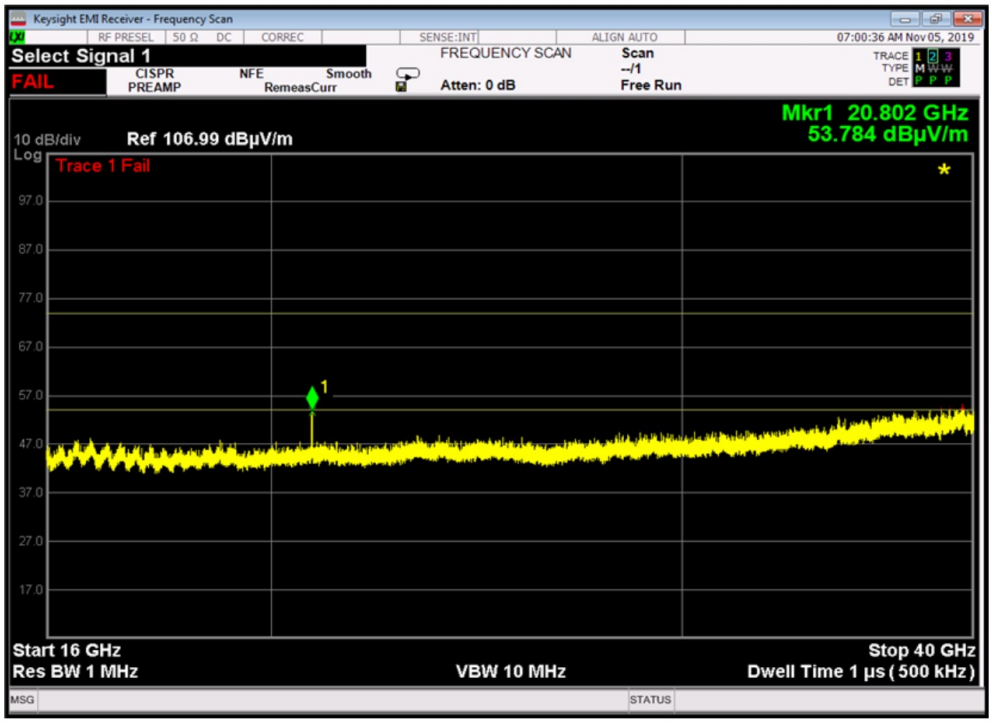
Frequency (GHZ)	Transceiver BW (MHz)	Antenna Polarity	Detector	Receiver Reading (dBµV)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
16.73	50	V	P	49.5	14.0	74.0	-24.5
16.75	40	H	P	48.6	13.8	74.0	-25.4
16.75	40	H	A	37.2	13.8	54.0	-16.8
20.80	20	H	P	50.8	6.2	74.0	-23.2
20.80	20	H	A	38.7	6.2	54.0	-15.3
20.80	20	V	P	51.8	6.2	74.0	-22.2
20.80	20	V	A	38.8	6.2	54.0	-15.2
20.80	10	V	P	55.2	6.2	74.0	-18.8
20.80	10	V	A	42.0	6.2	54.0	-12.0
20.80	10	H	P	53.1	6.2	74.0	-20.9
20.80	10	H	A	39.7	6.2	74.0	-34.3
4.80	50	V	P	49.1	0.3	74.0	-24.9
7.21	50	V	P	54.4	8.2	74.0	-19.6
7.21	50	V	A	45.2	8.2	54.0	-8.8
4.80	50	H	P	47.8	0.3	74.0	-26.2
7.21	50	H	P	54.0	8.2	74.0	-20.0
7.21	50	H	A	44.9	8.2	54.0	-9.1
4.80	40	H	P	48.0	0.3	74.0	-26.0
7.21	40	H	P	53.6	8.2	74.0	-20.4
7.21	40	H	A	45.9	8.2	54.0	-8.1
4.80	40	V	P	49.6	0.3	74.0	-24.4
7.21	40	V	P	54.1	8.2	74.0	-19.9
7.21	40	V	A	46.1	8.2	54.0	-7.9
4.80	30	V	P	49.6	0.3	74.0	-24.4
7.21	30	V	P	54.3	8.2	74.0	-19.7
7.21	30	V	A	45.3	8.2	54.0	-8.7
4.80	30	H	P	48.7	0.3	74.0	-25.3
7.21	30	H	P	54.9	8.2	74.0	-19.1
7.21	30	H	A	45.8	8.2	54.0	-8.2
4.80	20	H	P	48.6	0.3	74.0	-25.4
7.21	20	H	P	55.1	8.2	74.0	-18.9
7.21	20	H	A	46.1	8.2	54.0	-7.9
4.80	20	V	P	49.8	0.3	74.0	-24.2
7.21	20	V	P	55.2	8.2	74.0	-18.8
7.21	20	V	A	46.1	8.2	54.0	-7.9
4.70	10	V	P	51.4	0.3	74.0	-22.6
4.70	10	V	A	44.6	0.3	54.0	-9.4
7.21	10	V	P	54.1	8.2	74.0	-19.9
7.21	10	V	A	45.0	8.2	54.0	-9.0
7.60	10	V	P	51.0	8.5	74.0	-23.0
7.60	10	V	A	37.5	8.5	54.0	-16.5
15.61	10	V	P	52.3	15.5	74.0	-21.7
15.61	10	V	A	41.6	15.5	54.0	-12.4

Frequency (GHZ)	Transceiver BW (MHz)	Antenna Polarity	Detector	Receiver Reading (dBµV)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
7.21	10	H	P	54.8	8.2	74.0	-19.2
7.21	10	H	A	45.5	8.2	54.0	-8.5
10.40	10	H	P	53.7	13.6	74.0	-20.4
10.40	10	H	A	41.8	13.6	54.0	-12.2
13.94	10	H	P	47.4	16.9	74.0	-26.6
13.94	10	H	A	36.7	16.9	54.0	-17.3
Note: If peak measurements are below the average limit, average measurements may not have been recorded. Note: No harmonics noted from the 5Ghz transceiver with the 50-ohm loads applied to the RF output. See below for worst case plots of the data noted above.							

Table 11: Transmitting on the Middle Frequency (5200MHz)



Graph 7: Worst Case Receiver Plot (1-16GHz; Horizontal, at 5200MHz, 20MHz BW)

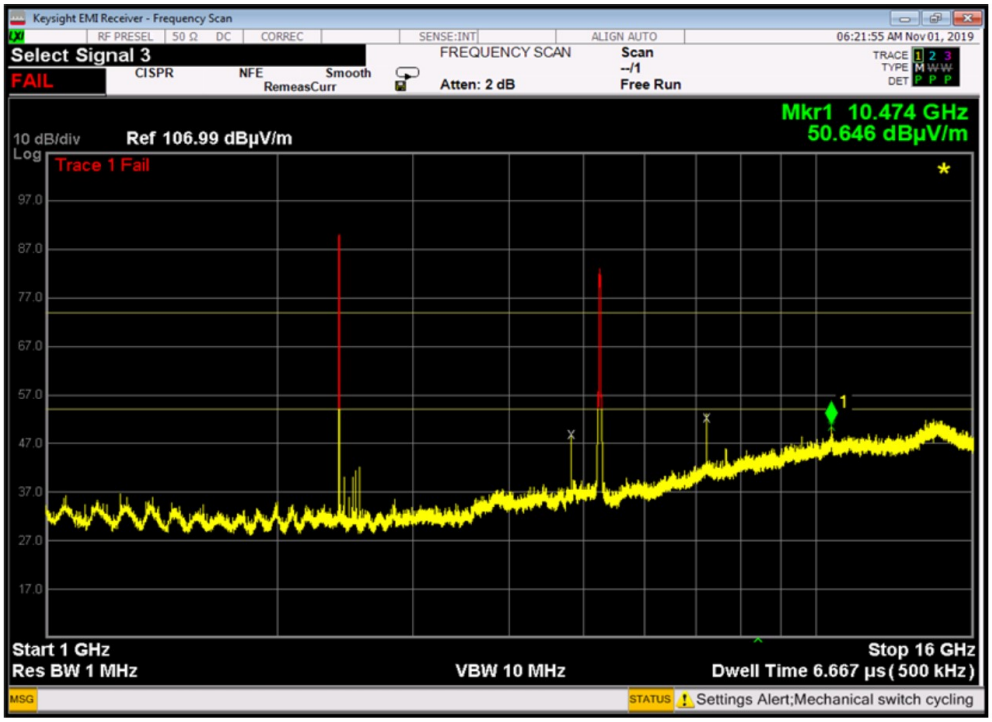


Graph 8: Worst Case Receiver Plot (16-40GHz; Vertical, at 5200MHz, 10MHz BW)

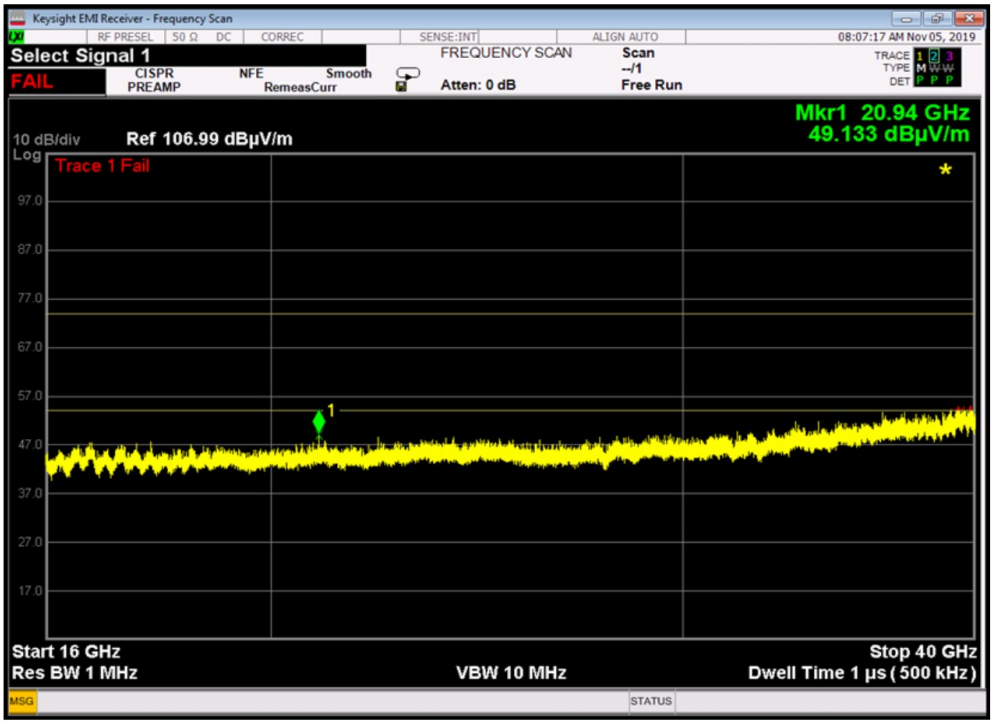
Frequency (GHZ)	Transceiver BW (MHz)	Antenna Polarity	Detector	Receiver Reading (dBµV)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
16.76	50	H	P	48.7	13.8	74.0	-25.3
20.94	30	V	P	51.6	6.4	74.0	-22.4
20.94	30	V	A	40.4	6.4	54.0	-13.6
20.99	10	H	P	51.9	6.5	74.0	-22.1
20.99	10	H	A	38.7	6.5	54.0	-15.3
20.99	10	V	P	53.5	6.5	74.0	-20.5
20.99	10	V	A	39.7	6.5	54.0	-14.3
4.80	50	H	P	49.1	0.3	74.0	-24.9
7.21	50	H	P	54.1	8.2	74.0	-19.9
7.21	50	H	A	44.8	8.2	54.0	-9.2
4.80	50	V	P	48.7	0.3	74.0	-25.3
7.21	50	V	P	54.3	8.2	74.0	-19.7
7.21	50	V	A	45.3	8.2	54.0	-8.7
4.80	40	V	P	49.3	0.3	74.0	-24.7
7.21	40	V	P	54.2	8.2	74.0	-19.8
7.21	40	V	A	46.2	8.2	54.0	-7.8
4.80	40	H	P	49.4	0.3	74.0	-24.6
7.21	40	H	P	53.5	8.2	74.0	-20.5
7.21	40	H	A	45.8	8.2	54.0	-8.2
4.80	30	V	P	48.8	0.3	74.0	-25.2
7.21	30	V	P	55.5	8.2	74.0	-18.5
7.21	30	V	A	47.7	8.2	54.0	-6.3
10.47	30	V	P	50.6	13.5	74.0	-23.4
4.80	30	H	P	48.2	0.3	74.0	-25.8
7.21	30	H	P	54.1	8.2	74.0	-19.9
7.21	30	H	A	46.1	8.2	54.0	-7.9
4.80	20	V	P	49.5	0.3	74.0	-24.5
7.21	20	V	P	54.3	8.2	74.0	-19.7
7.21	20	V	A	46.4	8.2	54.0	-7.6
7.64	20	V	P	46.4	8.7	74.0	-27.6
4.80	20	H	P	49.9	0.3	74.0	-24.1
7.21	20	H	P	54.3	8.2	74.0	-19.7
7.21	20	H	A	45.3	8.2	54.0	-8.7
10.48	20	H	P	52.9	13.6	74.0	-21.1
10.48	20	H	A	40.5	13.6	54.0	-13.5
7.21	10	H	P	53.5	8.2	74.0	-20.5
7.21	10	H	A	44.2	8.2	54.0	-9.8
7.64	10	H	P	52.5	8.5	74.0	-21.5
7.64	10	H	A	39.3	8.5	54.0	-14.7
10.49	10	H	P	55.8	15.5	74.0	-18.2
10.49	10	H	A	43.5	15.5	54.0	-10.5
4.81	10	V	P	51.5	0.3	74.0	-22.5

Frequency (GHZ)	Transceiver BW (MHz)	Antenna Polarity	Detector	Receiver Reading (dBµV)	Correction Factor (dB)	Limit (dBµV/m)	Margin (dB)
4.81	10	V	A	43.9	0.3	54.0	-10.1
7.21	10	V	P	54.4	8.2	74.0	-19.6
7.21	10	V	A	46.0	8.2	54.0	-8.0
7.65	10	V	P	52.4	8.6	74.0	-21.6
7.65	10	V	A	38.8	8.6	54.0	-15.2
Note: If peak measurements are below the average limit, average measurements may not have been recorded. Note: No harmonics noted from the 5Ghz transceiver with the 50-ohm loads applied to the RF output. See below for worst case plots of the data noted above.							

Table 12: Transmitting on the Highest Frequency for Each of the Bandwidths Noted



Graph 9: Worst Case Receiver Plot (1-16GHz; Horizontal, at 5235MHz, 30MHz BW)



Graph 10: Worst Case Receiver Plot (16-40GHz; Vertical, at 5235MHz, 30MHz BW)

5.6 §15.407(a) Maximum Power Spectral Density

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.

Nominal BW (MHz)	Frequency (MHz)	Data Rate	TP Setting	Measured PSD
10	5160	vt0	18	6.0
10	5200	vt0	30	13.1
10	5245	vt0	30	13.7
20	5165	vt0	18	3.1
20	5200	vt0	23	5.7
20	5240	vt0	30	10.9
30	5170	vt0	18	3.6
30	5200	vt0	24	7.4
30	5235	vt0	29	9.8
40	5175	vf0	18	1.3
40	5200	vf0	20	1.3
40	5230	vf0	26	6.6
50	5180	vf0	18	-0.9
50	5200	vf0	18	-0.7
50	5225	vf0	18	-0.9
*Note: Mathematically adjusted to subtract the 3dBi antenna which was accounted for by test program.				

Table 13:3dBi Antenna

Nominal BW (MHz)	Frequency (MHz)	Data Rate	TP Setting	Measured PSD
10	5160	vt0	-5	-17.0
10	5200	vt0	7	-9.9
10	5245	vt0	7	-9.3
20	5165	vt0	-5	-19.9
20	5200	vt0	0	-17.3
20	5240	vt0	7	-12.1
30	5170	vt0	-5	-19.4
30	5200	vt0	1	-15.6
30	5235	vt0	6	-13.2
40	5175	vf0	-5	-21.7
40	5200	vf0	-3	-21.7
40	5230	vf0	3	-16.4
50	5180	vf0	-5	-23.9
50	5200	vf0	-5	-23.7
50	5225	vf0	-5	-23.9
*Note: Mathematically adjusted to subtract the 3dBi antenna which was accounted for by test program.				

Table 14 26dBi Antenna

Result

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

-- End of Test Report --