427 West 12800 South
Draper, UT 84020

Test Report

Certification

FCC ID	SWX-UAPACPRO
ISED ID	6545A-UAPACPRO
Equipment Under Test	UAP-AC-PRO
Test Report Serial Number	TR5395_01
Date of Test(s)	10 and 18 September 2020
Report Issue Date	22 September 2020

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

NVLAP LAB CODE 600241-0

Certification of Engineering Report

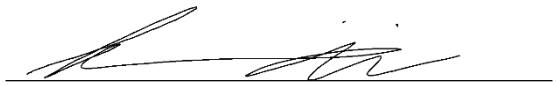
This report has been prepared by Unified Compliance Laboratory (UCL) to document compliance of the device described below with the requirement of Federal Communication Commissions (FCC) Part 15, Subpart C. This report may be reproduced in full. Partial reproduction of this report may only be made with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

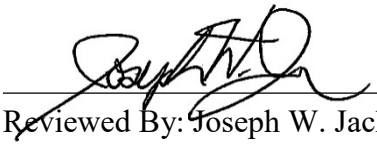
On this 22nd day of September 2020, I individually and for Unified Compliance Laboratory certify that the statements made in this engineering report are true, complete and correct to the best of my knowledge and are made in good faith.

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: Alex Macon



Reviewed By: Joseph W. Jackson

Revision History		
Revision	**Description**	**Date**
01	Original Report Release	22 September 2020

Table of Contents

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	UniFi
Model Number	UAP-AC-PRO
Serial Number	NA
Dimensions (cm)	19.67 x 19.67 x 3.5

2.2 Description of EUT

The UAP-AC-PRO is a wireless access points. The UAP-AC-PRO has 3, 2.4 GHz TX paths

This report covers the circuitry of the device subject to FCC Part 15, Subpart C. Firmware version 4.3 (latest public release according to the manufacturer) was tested against select requirements of 15.247, only.

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: UniFi(1) MN: UAP-AC-PRO SN: N/A	2 port wireless access point	Ethernet/POE

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
Ethernet/POE	1	Shielded Cat 5e/<3m Shielded

2.5 Operating Environment

Power Supply	120VAC
AC Mains Frequency	60 Hz
Temperature	23.3 °C
Humidity	18.1 %
Barometric Pressure	1017 mBar

2.6 Operating Modes

The EUT were tested in constant transmit mode utilizing the command prompt ART. All modes were investigated with the worst case being reported.

2.7 EUT Exercise Software

The software used for testing is ART

2.8 Modification Incorporated/Special Accessories on EUT

There were no modifications made to the EUT during testing to comply with the specification.

2.9 Deviation, Opinions Additional Information or Interpretations from Test Standard

This is an abridged test report in response to an FCC Enforcement Bureau investigation: File No. EB-SED-17-00024731

The following deviations, opinions, additional information or interpretations of the test specification were made during testing.

- Following guidance from the FCC, the worst case output power found in the original filling was retested.
- Following guidance from the FCC, Radiated Emissions was tested from 1 – 16 GHz only.

3 Test Specification, Method and Procedures

3.1 Test Specification

Title	47 CFR FCC Part 15, Subpart C 15.203, 15.207 and 15.247 Limits and methods of measurement of radio interference characteristics of radio frequency 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 15.247

See test standard for details.

3.3 FCC Part 15, Subpart C

3.3.1 Summary of Tests

FCC Section	Environmental Phenomena	Frequency Range (MHZ)	Result
15.203	Antenna requirements	Structural Requirement	N/A
15.207	Conducted Disturbance at Mains Port	0.15 to 30	N/A
15.247(a)	Bandwidth Requirement	2400 to 2483.5	N/A
15.247(b)	Peak Output Power	2400 to 2483.5	Compliant
15.247(d)	Antenna Conducted Spurious Emissions	0.009 to 25000	N/A
15.247(d)	Radiated Spurious Emissions	0.009 to 25000	Compliant
15.247(e)	Peak Power Spectral Density	2400 to 2483.5	N/A
The testing was performed according to the procedures in ANSI C63.10-2013, KDB 558074 and 47 CFR Part 15.			

3.4 Results

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

- Output Power
- Radiated Spurious Emissions from 1 – 16 GHz as per guidance from the FCC

3.5 Test Location

Testing was performed at the Unified Compliance Laboratory 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 2021.

4 Test Equipment

4.1 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	8/24/2020	9/8/2021
Switch Extension	R&S	OSP-150W	UCL-2870	8/21/2020	8/21/2021

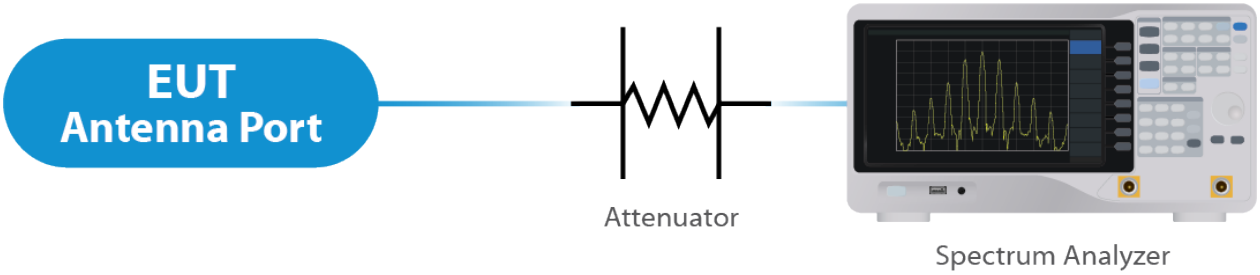


Figure 1: Direct Connect at the Antenna Port Test

4.2 Radiated Emissions

Type of Equipment	Manufacturer	Model Number	Asset Number	Date of Last Calibration	Due Date of Calibration
EMI Receiver	Keysight	N9038A	UCL-2778	6/1/2020	6/1/2021
Pre-Amplifier	Sonoma Instruments	310N	UCL-2889	9/10/2020	9/10/2021
Double Ridge Horn Antenna	Schwarzbeck	BBHA 9120D	UCL-3065	7/8/2020	7/8/2021
Log Periodic	Schwarzbeck	STLP 9129	UCL-3068	5/20/2020	5/20/2021
15 - 40 GHz Horn Antenna	Schwarzbeck	BBHA 9170	UCL-2487	5/21/2020	5/21/2021
18 – 40 GHz Amplifier	Com-Power	PAM 118A	UCL-3833	1/28/2020	1/28/2021
0.5 – 18 GHz Amplifier	Schwarzbeck	BBV 9718C	UCL-2493	1/24/2020	1/24/2021
Test Software	UCL	Revision 1	UCL-3108	N/A	N/A

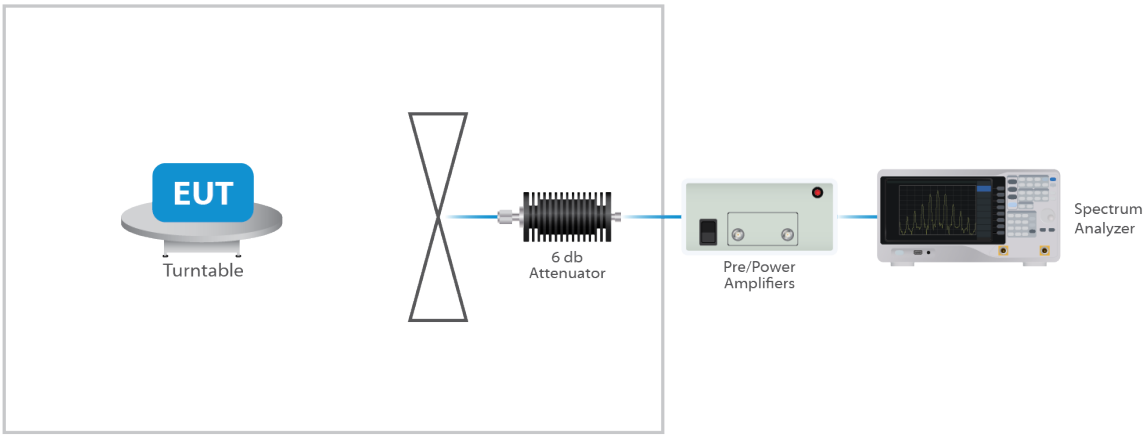


Figure 2: Radiated Emissions Test

4.3 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.

4.4 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 integral antenna. The Maximum gain of the antenna is 3.0 dBi. The antenna is not user replaceable.

Results

The EUT complied with the specification

5.2 §15.247(b)(3) Maximum Average Output Power

The maximum average RF conducted output power measured for this device was 11.48 dBm or 14.1 mW. The limit is 30 dBm or 1 Watt when using antennas with 6 dBi or less gain. The antenna has a gain of 3.0 dBi.

Mode	Frequency (MHz)	Measured Output Power (dBm)	Output Power (mW)
b	2412	11.17	13.1
	2417	10.94	12.4
	2462	11.48	14.1
g	2412	9.77	9.48
	2417	9.72	9.38
	2462	10.13	10.3
n 20	2412	10.1	10.2
	2417	9.91	9.79
	2462	10.23	10.5
n 40	2422	9.18	8.28
	2452	10.1	10.2

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.

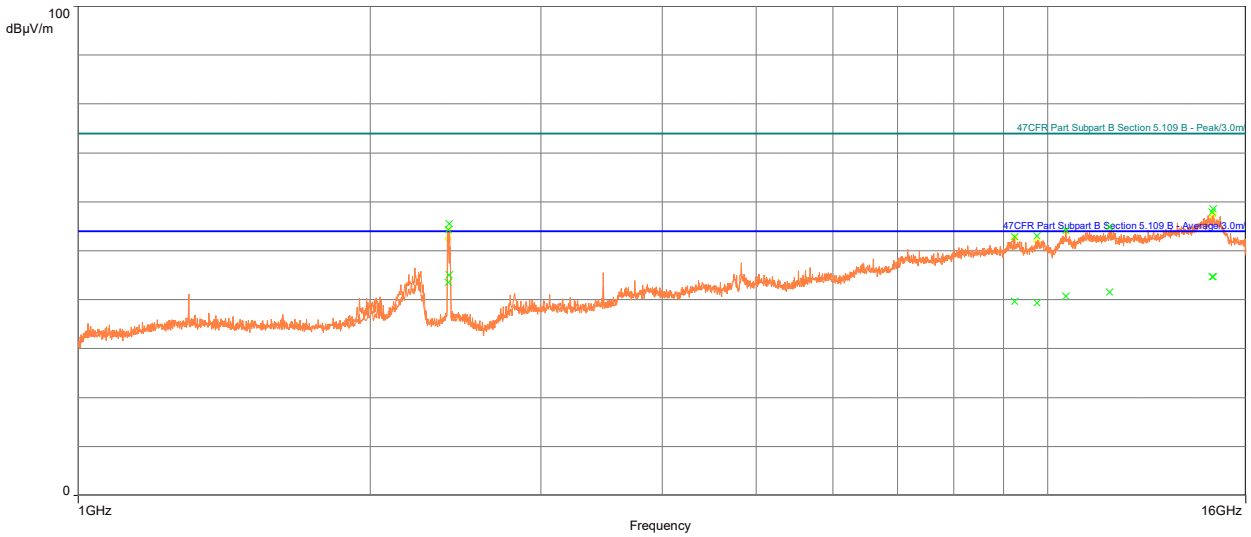
5.3 §15.247(d) Spurious Emissions

5.3.1 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. The following tables show measurements of any emissions that fell into the restricted bands of §15.205. The tables show the worst-case emissions measured from the EUT. For frequencies above 18.0 GHz, a measurement distance of 1 meter was used. The noise floor was a minimum of 6 dB below the limits. The emissions in the restricted bans must meet the limits specified in §15.209. Tabular data for each of the spurious emissions is shown below for each of the units. Plots of the band edges are also shown.

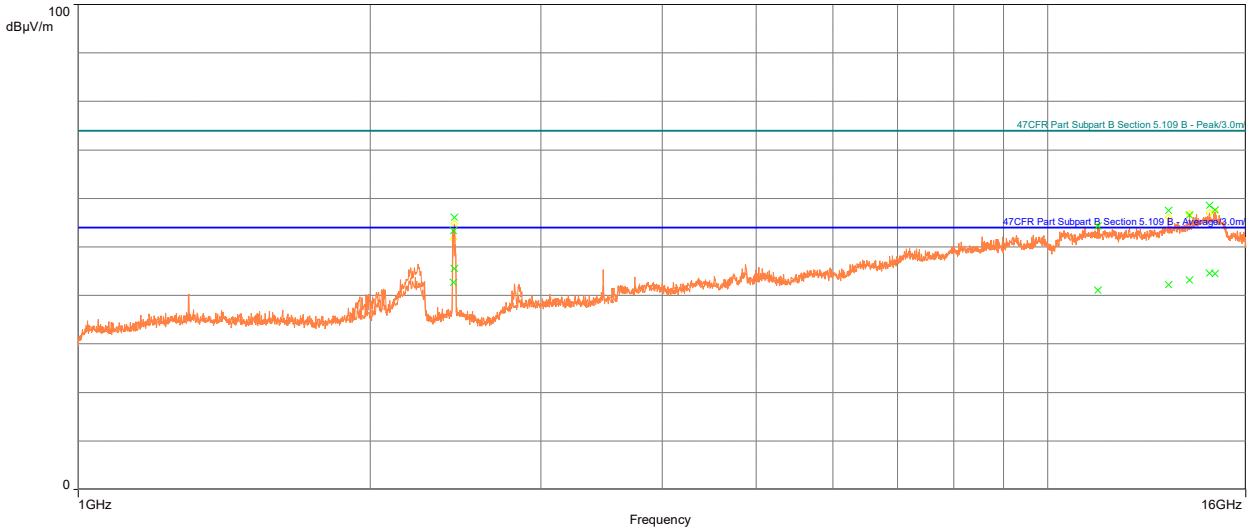
Result

All emissions in the restricted bands of §15.205 met the limits specified in §15.209; therefore, the EUT complies with the specification.



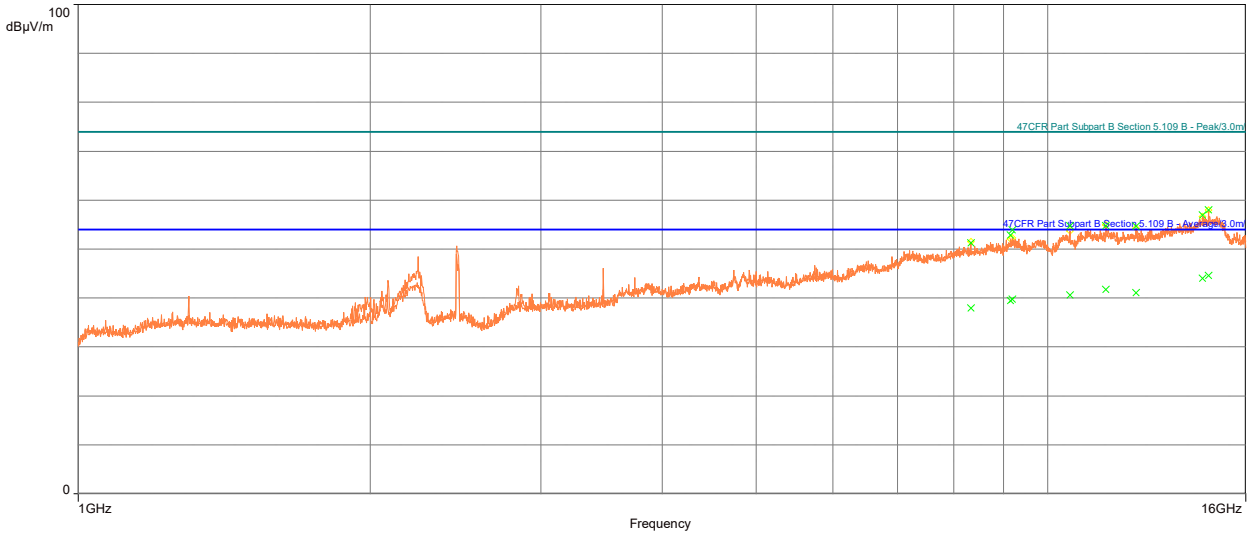
Frequency (MHz)	Det.	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
9245.2	A	39.67	54.00	-14.33	330.00	1.92	Vertical	9.81
11575	A	41.50	54.00	-12.50	346.00	2.36	Vertical	12.15
14819	A	44.67	54.00	-9.33	311.00	3.95	Vertical	15.04
9748.7	A	39.34	54.00	-14.66	359.00	3.41	Horizontal	8.84
10432	A	40.70	54.00	-13.30	29.00	2.94	Horizontal	10.62
14774	A	44.65	54.00	-9.35	248.00	2.80	Horizontal	15.03
9245.2	P	52.90	74.00	-21.10	330.00	1.92	Vertical	9.81
11575	P	54.82	74.00	-19.18	346.00	2.36	Vertical	12.15
14819	P	58.61	74.00	-15.39	311.00	3.95	Vertical	15.04
9748.7	P	53.03	74.00	-20.97	359.00	3.41	Horizontal	8.84
10432	P	54.18	74.00	-19.82	29.00	2.94	Horizontal	10.62
14774	P	57.89	74.00	-16.11	248.00	2.80	Horizontal	15.03

Table 1: Transmitting at the Lowest Frequency



Frequency (MHz)	Det.	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
13316	A	42.21	54.00	-11.79	86.00	2.62	Vertical	13.21
14001	A	43.20	54.00	-10.80	327.00	1.87	Vertical	13.64
14680	A	44.63	54.00	-9.37	237.00	1.89	Vertical	15.09
11262	A	41.09	54.00	-12.91	347.00	3.36	Horizontal	11.63
14873	A	44.51	54.00	-9.49	278.00	2.79	Horizontal	14.87
13316	P	57.48	74.00	-16.52	86.00	2.62	Vertical	13.21
14001	P	56.52	74.00	-17.48	327.00	1.87	Vertical	13.64
14680	P	58.53	74.00	-15.47	237.00	1.89	Vertical	15.09
11262	P	54.29	74.00	-19.71	347.00	3.36	Horizontal	11.63
14873	P	57.59	74.00	-16.41	278.00	2.79	Horizontal	14.87

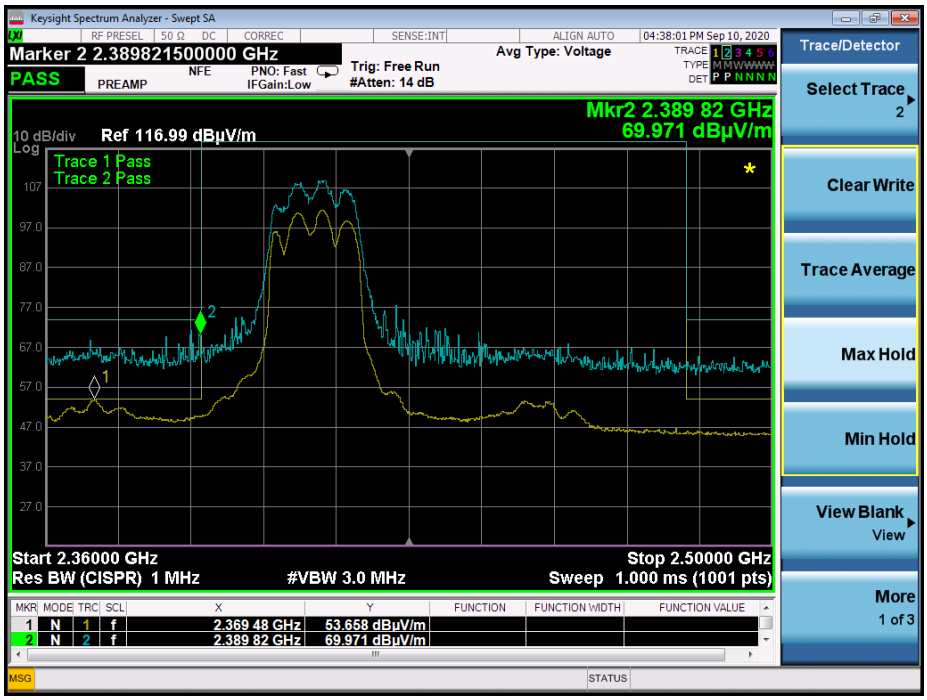
Table 2:Transmitting at the Middle Frequency



Frequency (MHz)	Det.	Level (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Azimuth (°)	Height (m)	Pol.	Correction (dB)
9194.3	A	39.77	54.00	-14.23	176.00	1.53	Vertical	9.85
10539	A	40.61	54.00	-13.39	223.00	2.72	Vertical	11.14
11471	A	41.76	54.00	-12.24	324.00	1.99	Vertical	12.44
14646	A	44.62	54.00	-9.38	231.00	2.87	Vertical	15.01
8327.3	A	37.91	54.00	-16.09	220.00	1.89	Horizontal	8.23
9153.2	A	39.43	54.00	-14.57	1.00	3.52	Horizontal	9.72
12332	A	41.06	54.00	-12.94	311.00	3.26	Horizontal	11.73
14439	A	44.04	54.00	-9.96	5.00	3.06	Horizontal	14.41
9194.3	P	53.86	74.00	-20.14	176.00	1.53	Vertical	9.85
10539	P	54.73	74.00	-19.27	223.00	2.72	Vertical	11.14
11471	P	54.71	74.00	-19.29	324.00	1.99	Vertical	12.44
14646	P	57.97	74.00	-16.03	231.00	2.87	Vertical	15.01
8327.3	P	51.20	74.00	-22.80	220.00	1.89	Horizontal	8.23
9153.2	P	52.86	74.00	-21.14	1.00	3.52	Horizontal	9.72
12332	P	54.70	74.00	-19.30	311.00	3.26	Horizontal	11.73
14439	P	56.96	74.00	-17.04	5.00	3.06	Horizontal	14.41

Table 3: Transmitting at the Highest Frequency

Graph 1: Radiated Lower Band Edge Plot b mode



Graph 2: Radiated Lower Band Edge Plot g mode

Graph 3: Radiated Lower Band Edge Plot n mode

Graph 4: Radiated Lower Band Edge Plot n mode (40)

Graph 5: Radiated Upper Band Edge Plot b mode

Graph 6: Radiated Upper Band Edge Plot g mode

Graph 7: Radiated Upper Band Edge Plot n mode

Graph 8: Radiated Upper Band Edge Plot n mode (40)

-- End of Test Report --